

AMB-8059

MULTI-BAND EMF AREA MONITOR

User's Manual

AMB-8059/00

AMB-8059/01

AMB-8059/02

AMB-8059/03

NEED HELP?



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TO CONTACT US**



Air-Met Scientific
www.airmet.com.au

This version of the User's Manual is valid for all the devices which serial number starts with 14x or higher.

SERIAL NUMBER OF THE INSTRUMENT

You can find the Serial Number near the probe connector.
Serial Number is in the form: 000XY00000.

The first three digits and the letters are the Serial Number prefix, the last four digits are the Serial Number suffix. The prefix is the same for identical instruments, it changes only when a configuration change is made to the instrument.
The suffix is different for each instrument.

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If the instrument is used in any other way than as described in this User's Manual, it may become unsafe.

Before using this product, the related documentation must be read with great care and fully understood to familiarize with all the safety prescriptions.

To ensure the correct use and the maximum safety level, the User shall know all the instructions and recommendations contained in this document.



This product is a **Safety Class III** instrument according to IEC classification and has been designed to meet the requirements of EN61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use).

In accordance with the IEC classification, the power supply of this product meets requirements **Safety Class II** and **Installation Category II** (having double insulation and able to carry out mono-phase power supply operations).

It complies with the requirements of **Pollution Class II** (usually only non-conductive pollution). However, occasionally it may become temporarily conductive due to condense on it.

The information contained in this document is subject to change without notice.

EXPLANATION OF ELECTRICAL AND SAFETY SYMBOLS :



You now own a high-quality instrument that will give you many years of reliable service. Nevertheless, even this product will eventually become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local Narda Sales Partner or by visiting our website at www.narda-sts.it.



Warning, danger of electric shock



Earth



Read carefully the Operating Manual and its instructions, pay attention to the safety symbols



Unit Earth Connection



Earth Protection



Equipotential

KEY TO THE SYMBOLS USED IN THIS DOCUMENT:



The **DANGER** sign draws attention to a serious risk to a person's safety, which, if not avoided, will result in death or serious injury. All the precautions must be fully understood and applied before proceeding.



The **WARNING** sign indicates a hazardous situation, which, if not avoided, could result in death or serious injury. All the precautions must be fully understood and applied before proceeding.



The **CAUTION** sign indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.



The **NOTICE** sign draws attention to a potential risk of damage to the apparatus or loss of data.



The **NOTE** sign draws attention to important information.

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⚠ WARNING ***SAFETY RECOMMENDATIONS AND INSTRUCTIONS***

This product has been designed, produced and tested in Italy, and it left the factory in conditions fully complying with the current safety standards. To maintain it in safe conditions and ensure correct use, these general instructions must be fully understood and applied before the product is used.

- When the device must be connected permanently, first provide effective grounding;
- If the device must be connected to other equipment or accessories, make sure they are all safely grounded;
- In case of devices permanently connected to the power supply, and lacking any fuses or other devices of mains protection, the power line must be equipped with adequate protection commensurate to the consumption of all the devices connected to it;
- In case of connection of the device to the power mains, make sure before connection that the voltage selected on the voltage switch and the fuses are adequate for the voltage of the actual mains;
- Devices in Safety Class I, equipped with connection to the power mains by means of cord and plug, can only be plugged into a socket equipped with a ground wire;
- Any interruption or loosening of the ground wire or of a connecting power cable, inside or outside the device, will cause a potential risk for the safety of the personnel;
- Ground connections must not be interrupted intentionally;
- To prevent the possible danger of electrocution, do not remove any covers, panels or guards installed on the device, and refer only to NARDA Service Centers if maintenance should be necessary;
- To maintain adequate protection from fire hazards, replace fuses only with others of the same type and rating;
- Follow the safety regulations and any additional instructions in this manual to prevent accidents and damages.

Dichiarazione di Conformità *EC Declaration of Conformity*



In accordo alla Decisione 768/2008/EC, conforme alle direttive EMC 2014/30/UE, Bassa Tensione 2014/35/UE e RoHS 2011/65/UE, ed anche alle norme ISO/IEC 17050-1 e 17050-2.

In accordance with the Decision 768/2008/EC, compliant to the Directives EMC 2014/30/UE, Low Voltage 2014/35/UE and RoHS 2011/65/EU, also compliant to the ISO/IEC standard 17050-1 and 17050-2

Il costruttore
The manufacturer

narda Safety Test Solutions S.r.l. Socio Unico

Indirizzo
Address

Via Benessea, 29 / B

I-17035 Cisano sul Neva (SV) - Italy

sulla base delle seguenti norme europee armonizzate, applicate con esito positivo:
based on the following harmonized European Standards, successfully applied:

EMC - Emissioni:
EMC - Emission: **IEC EN 61326-1 (2021)**

EMC - Immunità:
EMC - Immunity: **IEC EN 61326-1 (2021)**

Sicurezza:
Safety: **EN 61010-1 (2010)**

dichiara, sotto la propria responsabilità, che il prodotto:
declares, under its sole responsibility, that the product:

Descrizione
Description **SISTEMA DI MONITORAGGIO MULTI-BANDA
*MULTI-BAND EMF AREA MONITOR***

Modello
Model **AMB-8059/00, AMB-8059/01, AMB-8059/02, AMB-8059/03**

è conforme ai requisiti essenziali delle seguenti Direttive:
conforms with the essential requirements of the following Directives:

Bassa Tensione
Low Voltage **2014/35/EU**

Compatibilità Elettromagnetica
EMC **2014/30/EU**

RoHS
RoHS **2011/65/EU**

Cisano sul Neva, 6 March 2024

Egon Stocca
General Manager

EC Conformity

XI

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1 – General Information

1.1 Documentation

This Users Manual contains the following annexes:

- A form to be returned to NARDA with the device when requesting service.
- A checklist of the accessories included in the shipment.

1.2 Introduction

The AMB-8059 family products are revolutionary, accurate and reliable solutions for remote and continuous monitoring of electromagnetic fields.

AMB-8059/01 and AMB-8059/03 are powered by high capacity internal batteries and solar panels that ensure practically unlimited autonomy under conditions of normal sunlight.

For indoor applications, the autonomy of the unit is at least 80 days after full battery charge.

AMB-8059/00 and AMB-8059/02 do not have any solar cells, as they are powered by replaceable high capacity primary battery for several months autonomy.

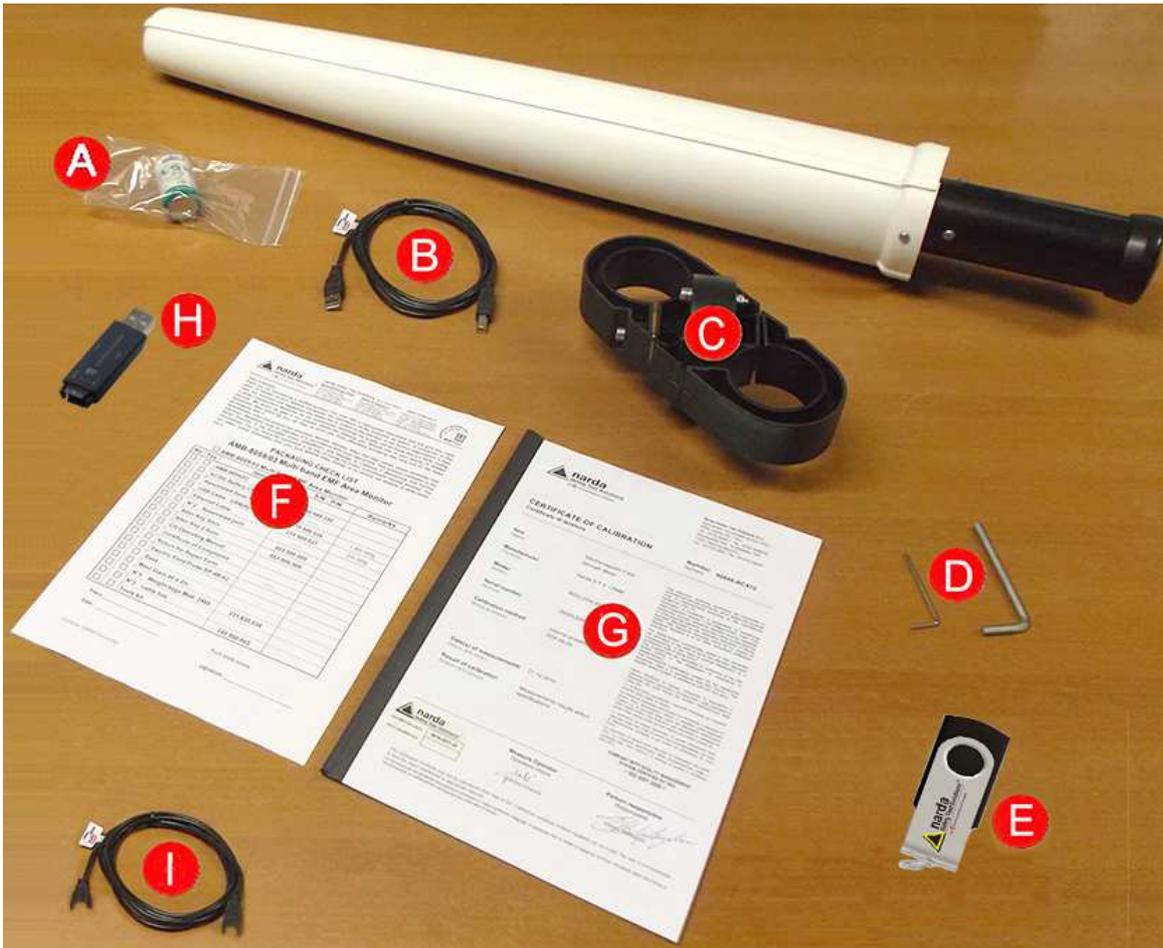
The system of acquisition makes it possible to program each parameter and transfer to a PC the data saved into the unit. The recorded data can be viewed either as a graph or as a table.

All AMB-8059 models are equipped with internal WiFi and GPS modules.

In the event of any alarm, such as a threshold setting being exceeded or any attempt to tamper with the remote unit or a breakdown of the unit, AMB-8059/02 and AMB-8059/03 which are equipped with 4G GSM/GPRS modem, can be programmed to send a SMS or EMAIL describing the alarm to the user's, and/or generate a point-to-point data call to the controller PC. Station set for Modem/FTP communication mode can be programmed to access the user's FTP server and download measurement results as soon as any alarm condition occurs.

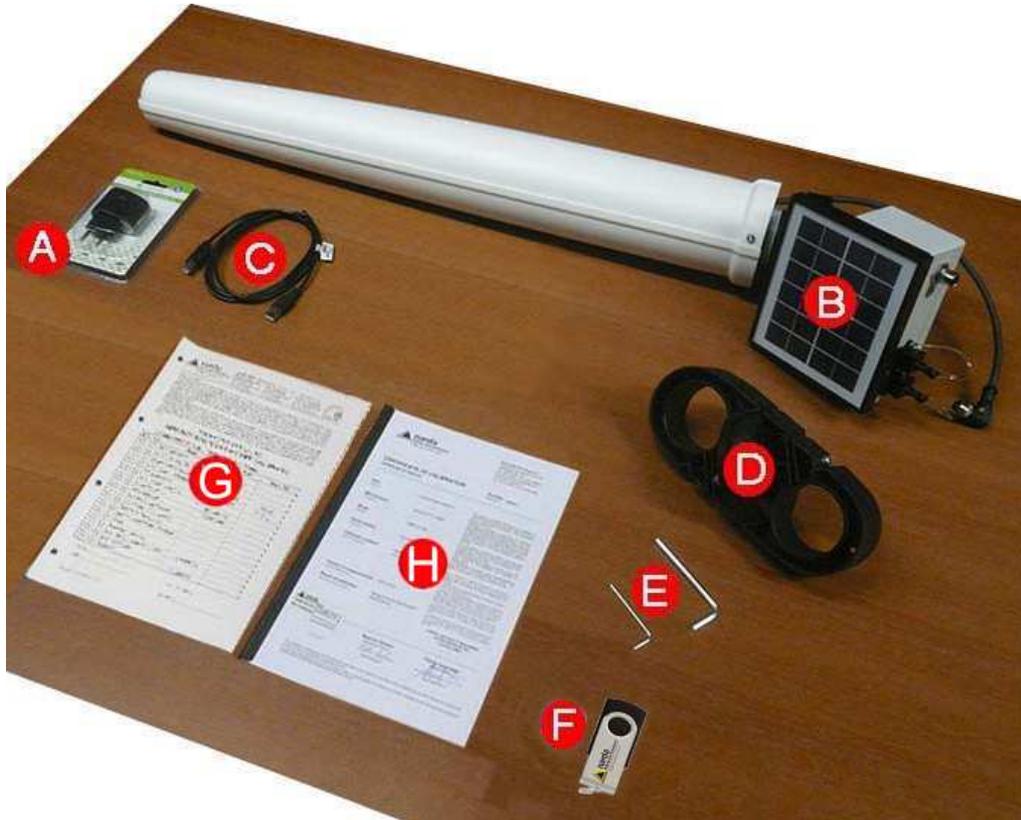
1.3 Standard accessories Standard accessories included with AMB-8059/00 and AMB-8059/02 units:
AMB-8059/00 and AMB-8059/02

- A – Lithium-Ion Battery;
- B – USB Cable – USB(A)/USB(B) 1.8m (AMB-8059/02 model only).
- C – Swivel joint for installation on the supporting pole;
- D – 2.5 mm and 5 mm Allen keys for socket –head screws;
- E – Software Media including user’s manual
- F – Checklist of the accessories;
- G – Calibration Certificate;
- H – USB-OC Optical Converter (AMB-8059/00 model only);
- I- Cable, FO Duplex, RP-02, 10m (AMB-8059/00 model only);



1.4 Standard accessories Standard accessories included with AMB-8059/01 and AMB-8059/03 units:
AMB-8059/01 and AMB-8059/03

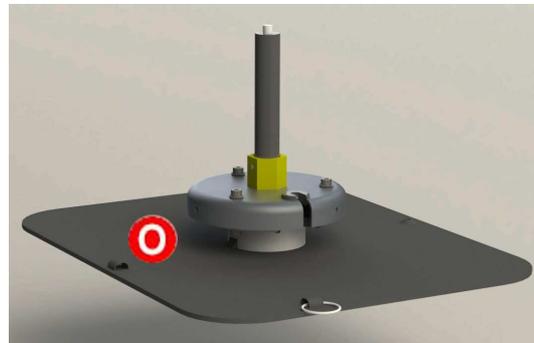
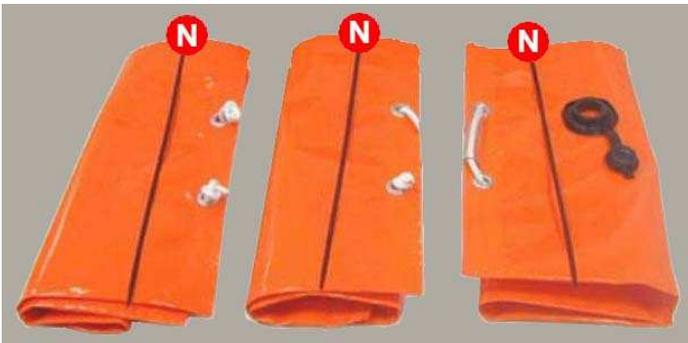
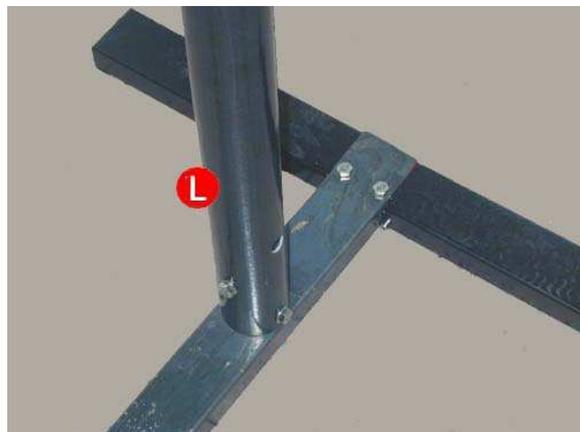
- A – AC/DC Converter with plug adapters;
- B – Assembled Solar Panel;
- C – USB Cable 2.5m - USB(A)/USB(B);
- D – Swivel joint for installation on the supporting pole;
- E – 2.5 mm and 5 mm Allen keys for socket – head screws;
- F – Software Media including user's manual
- G – Checklist of the accessories;
- H – Calibration Certificate.



1.5 Optional accessories Accessories supplied separately (on charge) for all models:

- 8059-MAST including;
 - I - Metal supporting T-shaped base measuring 60 x 60 cm
 - L - Fiberglass 60mm pole, 2 m long;
 - M - Tool Kit of screws and clamps.
 - N - n°3 bags for ballast and n°3 Cable ties;
- Field probe EP-1B-01;
- Field probe EP-1B-03;
- Field probe EP-1B-04;
- Field probe EP-1B-05;
- Field probe EP-1B-06;
- Field probe EP-1B-08;
- Field probe EP-3B-01;
- Field probe EP-4B-01;
- Field probe EP-4B-02;
- Field probe HP-1B-01;
- Field probe EHP-2B-01;
- Field probe EHP-2B-02;
- Field probe EHP-2B-03;
- Field probe EHP-2B-04;

- Ethernet Cable;
- Cable, FO Duplex, RP-02 , 20m (for AMB-8059/00 only);
- Cable, FO Duplex, RP-02, 40m (for AMB-8059/00 only);
- FO-8059/10 fiber optic 10m (for AMB-8059/01 and AMB-8059/03 only);
- FO-8059/20 fiber optic 20m (for AMB-8059/01 and AMB-8059/03 only);
- FO-8059/40 fiber optic 40m (for AMB-8059/01 and AMB-8059/03 only);
- 8059/CMK Car Mounting Kit (for AMB-8059/00 model only) including (see §6.10 for Installation):
 - - 8059/CMK Car Mounting Kit
 - Allen Key 1.5 mm
 - n°3 Clamping Knobs
 - Narda EMFGPSLogger Software on Software Media
 - Soft carrying case for Magnetic plate
 - Soft carrying case for Area monitor
- Li-Ion Rechargeable Battery Kit (for 8059/CMK only) including (see §6.11 for Installation):
 - n°3 Lithium-Ion Rechargeable Batteries AA size
 - Battery charger and accessories
 - 3AA to D Size Battery Converter Adapter Holder
- 8059-Optical link (for AMB-8059/01 and AMB-8059/03 only); see §6.9 for Installation.
- Two-wire USB Cable 2.5m - USB (A) to IP67 USB (B) (for AMB-8059/01 and AMB-8059/03 only); see §6.12 for Installation.
- Radome Dual Probe (see §2.7 for Installation)
- 8059/IP66K Kit IP66 adapter (for AMB-8059/01 and AMB-8059/03 only) including (see §6.13 for Installation):
 - 8059/IP66K Kit IP66 Adapter
 - Protective cover for IP66 protection



1.6 Main Specifications Tables 1-1 – 1-2 list the specifications of all models.

TABLE 1-1 Technical Specifications	
Frequency range	Depending on the probe
Dynamic range	Depending on the probe
Resolution	Depending on the probe
Sensitivity	Depending on the probe
Accuracy	Depending on the probe
Measurement Units	V/m , kV/m , nT , μ T , mT , % . Depending on the probe
Measured field	Total field, average and Peak (MAX)
Sampling	Minimum 1 S/s ⁽¹⁰⁾ or 5 S/s in High Sampling mode (depending on the probe)

TABLE 1-2 Measurement/acquisition functions	
Rate interval	from 30 sec to 15 min
Averaging period	from 1 to 30 min
Internal Memory	over 512 Mb
Max Data Storage Capacity (before data are overwritten)	over 364 days with 1 acquisition every minute. (See table)
External memory	Micro SD card (not included); max capacity up to 16 GB
Data download	Manual Automatic managed by the unit at predefined timings ⁽¹⁾ Automatic by PC ⁽²⁾ Automatic creation of a TXT and .BMP file after download
Functions	AVG, RMS, maximum peak; daily report via SMS ⁽³⁾ Display and marking of acquired data ⁽¹¹⁾
Field strength alarm	two programmable field strength thresholds (warning and alarm) with automatic notice both of exceeding the limits and returning within the limits
Clock	real time internal clock
Messages/Email	SMS which can be sent to up to 10 mobile phones simultaneously (see table) or EMAIL delivered to the recipient address ⁽³⁾
Sensor	display of model and calibration date
Battery management	Every record includes Battery Voltage and Charge Current value
Temperature management	Every record includes Internal Temperature value
Humidity management	Every record includes Internal Humidity value
GPS coordinates	Programmable record

TABLE 1-3 General Specifications

GSM module	Worldwide LTE, UMTS/HSPA+/GSM/GPRS/EDGE coverage ⁽³⁾
SIM card type (not included)	Enabled for CSD: Circuit Switched Data service or GPRS or both communication modes Enabled for SMS & FTP: required
Wi-Fi	WiFi (802.11 b/g)
Field Probes	Interchangeable, several models available, single and multi probe operation
Interfaces	RS232 ⁽¹³⁾ , Ethernet ⁽¹³⁾ , USB ⁽¹²⁾ , Micro SD Card, Wi-Fi, Optical ⁽⁶⁾ , 4G modem ⁽³⁾
Protection	sensor to notify case opening
Other Alarms	protective case opening, internal overheat, internal humidity, battery low, battery overload (model AMB-8059/01 and AMB-8059/03 only), probe malfunction, field over limit.
Internal battery AMB-8059/00 and AMB-8059/02 AMB-8059/01 and AMB-8059/03	Non rechargeable primary battery, lithium LSH20, 3,6V, 13A/h; Lead 4 V, 2,5 A/h, rechargeable
Power Consumption	1 mA with 4G and Wi-Fi module off and optic link off (only with RF field probes) 6 mA with optical link data query every 1 second and WiFi and 4G off 20 mA with 4G and WiFi module in stand-by state ⁽³⁾ 120 mA max with WiFi transmitting 500 mA max with 4G transmitting ⁽³⁾
External power	DC, 5 V - 1 A max ⁽⁸⁾
Operating time <u>AMB-8059/00 and /02</u>	about 8 months @ 1min GSM ⁽³⁾ module transmission per day and single probe operating mode (autonomy depends on probe and setting) ^{(4) (5)}
<u>AMB-8059/01 and /03</u>	> 80 days in total darkness @ a 1 min GSM ⁽³⁾ module transmission per day and single probe operating mode (autonomy depends on the setting) ^{(4) (5)}
Recharge time	24 hours with external power unit (AMB-8059/01 and AMB-8059/03 only)
Autotest	automatic
Compliance	2014/30, 2014/35, CEI 211-6, CEI 211-7, ITU-T K.83 and ITU-T K.113 ⁽⁷⁾
Environment temperature	-20 / +55°C
Dimensions (WxDxH)	112 x 112 x 730 mm 112 x 112 x 800 mm (in dual probe configuration)
Weight <u>AMB-8059/00</u> <u>AMB-8059/01</u> <u>AMB-8059/02</u> <u>AMB-8059/03</u>	1,2 kg only the unit; 6,5 kg total weight inclusive of supports and base 2,4 kg only the unit; 7,7 kg total weight inclusive of supports and base 1,2 kg only the unit; 6,5 kg total weight inclusive of supports and base 2,4 kg only the unit; 7,7 kg total weight inclusive of supports and base
Environmental protection	IP55 IP66 with IP66K optional accessory ⁽⁹⁾

Note (1): to the controller PC or to the user's FTP server depending on the preferred communication mode.

Note (2): directly from the station or from the user FTP server depending on the preferred communication mode.

Note (3): AMB-8059/02 and AMB-8059/03 only are equipped with 4G modem (for station which serial number starts with 290ZY.....); the previous serial number are equipped with 3G modem.

Note (4): Being not equipped with 4G modem AMB-8059/00 and AMB-8059/01 power autonomy is longer.

Autonomy of AMB-8059/00 with Car Mounting Kit option is 18 hours

Note (5): Specification depending on battery age, environmental temperature and GSM field coverage.

Alarm and GPS status must be set OFF.

Note (6): Optical link available only on: AMB-8059/00, AMB-8059/01 and AMB-8059/03

Note (7): ITU-T K.113 only for AMB-8059/00 with Car Mounting Kit option.

Note (8): AMB-8059/01 and AMB-8059/03 only; as service, maintenance or backup of solar panel in field from S/N prefix 170WY

Note (9): Not suitable with Radome Dual Probe and Car Mounting Kit option.

Note (10) on page 1-5: Up to 3 S/s on AMB-8059/00 with CMK option.

Note (11) on page 1-5: Data potentially affected by on board transmitting modems or wired connections are marked for further plausibility evaluation

Note (12): USB only for the model: AMB-8059/01, AMB-8059/02 and AMB-8059/03

Note (13): RS232 and Ethernet only for the model AMB-8059/01 and AMB-8059/03

Table 1-4 Technical specifications for AMB-8059/00 with Car Mounting Kit

The Table 1-4 shows the AMB-8059/00 specifications in mobile version (CMK). For AMB-8059/00 in standard configuration refer to Table 1-3.

Field probes	Interchangeable
Interface	USB (through Fiber Optic), Wi-Fi (*)
Internal battery	Non rechargeable primary battery, lithium LSH20, 3,6V, 13A/h
Vehicle speed	0 to 60 km/h
Sample rate	300 ms (GPS coordinates synchronized with EMF)
Operating time	Over 200h (max current consumption 40mA with Wi-Fi OFF)
Max data storage in drive test application	18 h
Installation	Magnetic mounting kit for the vehicle
Compliance	European directives 2014/30, 2014/35, CEI 211-6, CEI 211-7, ITU-T K.113
Ambient temperature	-20 to +55 °C
Dimensions	301 x 241 x 750 mm (complete of AMB-8059/00)
Weight	Less than 3 kg
Environmental protection	IP55

Specification are subject to change without notice

(*) Future implementation on the Narda EMF GPS Logger software.



It is possible to replace the non-rechargeable primary battery with a rechargeable one using the optional Li-Ion Battery Kit. See §2.8.1 and §6.11 for further information.

TABLE 1-5 Max acquisition time

All models can measure and store data for an extremely long period of time: one of the 128 Mb Flash memories is used exclusively for recording measurements and can contain up to 524.288 records of 32 bytes each. The following formula and table indicate the internal memory capacity depending on the Rate Setting.

$$N_{\text{records}} * [\text{Rate (min)}] / [\text{minutes/day}] = \text{Memory capacity (days)}$$

For example, with a Storing Rate of 6 min, considering that a day consists of 1440 minutes, the memory capacity formula is: $524288 * 6 / 1.440 = 2184.5$ days

Storing Rate	Memory capacity
30 sec	>182 days
1 min	>364 days
6 min	> 2184 days (~6 years)

The internal memory can be read at every new data transfer to the central unit, at set times or by remote control. Moreover, when the memory is full, the new data are overwritten on the oldest so as to ensure availability of the data for the most recent measurement period.

All models also use an additional memory bank of 128 Mb which serves various functions. 32kB of this memory serve for the registration of events, each of them occupies a space of 128 bytes. In the memory there is therefore space to record at least the latest 224 events.

TABLE 1-6 Settings/Queries

All of the AMB-8059 models are equipped with a WiFi modem module which can be used to download data from the station via a direct IP (over the internet) connection or via an AP (Access Point) direct connection or also via a FTP (overt the internet) scheduled connection.

AMB-8059/02 and AMB-8059/03 can also be set and queried remotely via mobile phone or a central unit consisting of a PC, with 8059SW-02 software installed, connected via GSM or Line Modem (station set for Point-to-point communication) or, through the Internet, by FTP (station set for FTP communication). All models can be set and queried locally by means of the RS232, USB, Ethernet (/01 and /03 models) connection to the controller PC. The following table describes the different possibilities:

Possible functions	SMS	via Modem (P-to-P)	via FTP (non real time)	PC via RS232	PC via USB	PC via ETHERNET
Setting	YES	YES	YES	YES	YES	YES
Reading status and alarms	YES	YES	YES	YES	YES	YES
Reading max value	YES	NO	NO	NO	NO	NO
Reading average value	YES	YES	YES	YES	YES	YES
Download data	NO	YES	YES	YES	YES	YES
Reading of battery	YES	YES	YES	YES	YES	YES
Reading of internal temperature	YES	YES	YES	YES	YES	YES
Reading of internal humidity	YES	YES	YES	YES	YES	YES
Spontaneous call	NO	YES	YES	NO	NO	YES
Reporting alarms	YES	YES	YES	NO	NO	NO
Reporting via SMS of daily maximum	YES	NO	NO	NO	NO	NO

TABLE 1-7 Field Probes

AMB-8059/00, AMB-8059/01, AMB-8059/02 and AMB-8059/03 model can be equipped with electric and magnetic field probes as follows:

Field Probe	Frequency range	Reading range
ELECTRIC FIELD PROBE EP-1B-01 (*)	100 kHz – 3 GHz	0.2 – 200 V/m
TRI-BAND ELECTRIC FIELD PROBE EP-3B-01	100 kHz – 3 GHz	0.2 – 200 V/m
MAGNETIC FIELD PROBE HP-1B-01 (*)	10 Hz – 5 kHz	50 nT – 200 μ T
QUAD-BAND ELECTRIC FIELD PROBE EP-4B-01 (*)	100 kHz – 3 GHz	0.03 – 200 V/m
ELECTRIC FIELD PROBE EP-1B-03 (*)	100 kHz – 7 GHz	0.2 – 200 V/m
QUAD-BAND ELECTRIC FIELD PROBE EP-4B-02 (*)	100 kHz – 7 GHz	(0.03) 0.2 – 200 V/m
ELECTRIC FIELD PROBE EP-1B-04	10 Hz – 5 KHz	5 V/m – 20 kV/m
ELECTRIC FIELD PROBE EP-1B-05 (*)	300 kHz – 18 GHz	0.5 – 800 V/m
ELECTRIC FIELD PROBE EP-1B-06 (*)	300 kHz – 40 GHz	0.5 – 800 V/m
ELECTRIC FIELD PROBE EP-1B-08 (*)	100 kHz – 8 GHz	0.2 – 200 V/m
ELECTRIC AND MAGNETIC FIELD SHAPED PROBE EHP-2B-01	E: 500 kHz – 9.25 GHz H: 20 MHz – 1 GHz	E: 0.1 (0.5) – 1000 % H: 0.3 (1.5) – 1000 %
ELECTRIC AND MAGNETIC FIELD SHAPED PROBE EHP-2B-02	E: 500 kHz – 60 GHz H: 20 MHz – 1 GHz	E: 0.1 (0.5) – 1000 % H: 0.3 (1.5) – 1000 %
ELECTRIC AND MAGNETIC FIELD SHAPED PROBE EHP-2B-03	E: 1.34 MHz – 9.25 GHz H: 1 MHz – 1 GHz	E: 0.1 (0.5) – 1000 % H: 0.3 (1.5) – 1000 %
ELECTRIC AND MAGNETIC FIELD SHAPED PROBE EHP-2B-04	E: 1.34 MHz – 60 GHz H: 1 MHz – 1 GHz	E: 0.1 (0.5) – 1000 % H: 0.3 (1.5) – 1000 %

(*) Includes AMB-8059/00 CMK model



The EHP-2B-01, EHP-2B-02, EHP-2B-03 and EHP-2B-04 do not operate in Dual-probe configuration.



AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration.



AMB-8059/00 with Car Mounting kit can not be equipped with EP-3B-01, EP-1B-04, EHP-2B-01, EHP-2B-02, EHP-2B-03 and EHP-2B-04



AMB-8059/00 mobile version (CMK) works with fiber optic and Wi-Fi connection. The Wi-Fi function is not implemented on the software yet.



To use the EP-1B-05 and EP-1B-06 with AMB-8059/00 mobile version (CMK) it's necessary the Firmware release 1.85 or higher.



For the drive test measurement use EP-1B-03 and EP-4B-02 probe with serial number having the first three digit equal or greater than 100.



To use the EHP-2B-01, EHP-2B-02, EHP-2B-03 and EHP-2B-04 with AMB-8059 models it's necessary the Firmware release 2.24 or higher.



To support the EHP-2B-01, EHP-2B-02, EHP-2B-03 and EHP-2B-04, the 8059SW-02 Software must be release 1.38 or higher

TABLE 1-8 Probe combinations on Dual-probe configuration

ELF		
HP-1B-01 + EP-1B-04	complete solution for low frequency monitoring providing both E and H field in the 10Hz – 5kHz frequency range	best answer to the concern of population exposed to power plants or lines.
ELF + RF		
HP-1B-01 + EP-1B-01	H field: 10 Hz – 5 kHz + E field: 100 kHz – 3 GHz	whenever population can be exposed to both low and high frequency fields
HP-1B-01 + EP-1B-03	H field: 10 Hz – 5 kHz + E field: 100 kHz – 7 GHz	
HP-1B-01 + EP-1B-05	H field: 10Hz – 5kHz + E field: 300 kHz – 18 GHz	
HP-1B-01 + EP-1B-06	H field: 10Hz – 5kHz + E field: 300 kHz – 40 GHz	
HP-1B-01 + EP-1B-08	H field: 10Hz – 5kHz + E field: 100 kHz – 8 GHz	
HP-1B-01 + EP-3B-01	H field: 10Hz – 5kHz + E field: 100 kHz – 3 GHz	
HP-1B-01 + EP-4B-01	H field: 10Hz – 5kHz + E field: 100 kHz – 3 GHz	
HP-1B-01 + EP-4B-02	H field: 10Hz – 5kHz + E field: 100 kHz – 7 GHz	



NOTE

When a tri-band or quad-band probe is used in Dual-probe configuration the additional result, provided besides the low frequency magnetic field, will be limited to the electric field measurement of the wideband only, without providing any information related to the Low and High frequency bands.



NOTE

The EHP-2B-01, EHP-2B-02, EHP-2B-03 and EHP-2B-04 do not operate in Dual-probe configuration



NOTE

AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration

TABLE 1-9 Technical Specifications of Field Probe

ELECTRIC FIELD PROBE EP-1B-01

Frequency range	0.1 – 3000 MHz
Reading range	0.2 – 200 V/m
Overload	600 V/m
Dynamic range	> 60 dB
Linearity	± 0.5 dB (0.5 to 100 V/m) @ 50 MHz
Resolution	0.01 V/m
Sensitivity	0.2 V/m
Flatness @ 20V/m	1 – 200 MHz ±0.8 dB 150 kHz - 3 GHz ±1.5 dB
Anisotropy @ 6V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)
Rejection of magnetic field	> 20 dB
Temperature error	0.1 dB/°C
A/D conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g



Fig. 1-1 EP-1B-01 probe

TRI-BAND ELECTRIC FIELD PROBE EP-3B-01

	Wide band	Low pass	High pass
Frequency range	0.1 – 3000 MHz	0.1 – 862 MHz	933 – 3000 MHz
Reading range	0.2 – 200 V/m		
Overload	600 V/m		
Dynamic range	> 60 dB		
Linearity	± 0.5 dB (0.5 to 100 V/m) @ 50 MHz	± 0.5 dB (0.5 to 100 V/m)	± 0.5 dB (0.5 to 100 V/m)
Resolution	0.01 V/m		
Sensitivity	0.2 V/m		
Flatness @ 20V/m	1 – 200 MHz ±0.8 dB 150 kHz - 3 GHz ±1.5 dB	1 – 200 MHz ±0.8 dB 150 kHz - 862 MHz ±1.5 dB	933 – 3000 MHz ±1.5 dB
Anisotropy @ 6V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)		+/- 0.8 dB @ 1 GHz (typical 0.6 dB)
Attenuation out of band	Not applicable	933 MHz – 3 GHz > 23 dB (respect to 50 MHz)	0.1 – 862 MHz > 23 dB (respect to 1 GHz)
Rejection of magnetic field	> 20 dB		
Temperature error	0.1 dB/°C		
A/D conversion	On board		
Calibration factors	On board E ² prom		
Temperature sensor	On board		
Dimensions	Length 450mm, diameter 55mm		
Weight	180g		



Fig. 1-2 EP-3B-01 Probe

MAGNETIC FIELD PROBE HP-1B-01

Frequency range	10 Hz – 5 kHz
Reading range	50 nT – 200 μ T
Overload	> 1 mT
Dynamic range	> 72 dB
Linearity	\pm 0.5 dB (200 nT to 100 μ T) @ 50 Hz
Resolution	1 nT
Sensitivity	50 nT
Flatness @ 40 Hz - 1 kHz	1 dB (typical 0.6)
Anisotropy @ 50 Hz 3 μ T	0.3 dB
Rejection of electric field	> 20 dB
A/D Conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 83 mm, diameter 53 mm
Weight	110g



Fig. 1-3 HP-1B-01 Probe

QUAD-BAND ELECTRIC FIELD PROBE EP-4B-01

	Wide band	EGSM 900 Band pass	EGSM 1800 Band pass	UMTS Band pass
Frequency range	0.1 – 3000 MHz	925 – 960 MHz	1805 – 1880 MHz	2110 – 2170 MHz
Level range	0.2 – 200 V/m	0.03 – 30 V/m		
Dynamic range	> 60 dB	> 60 dB		
Linearity	± 0.5 dB (0.5 to 100 V/m)	± 0.5 dB (0.06 to 20 V/m)		
Resolution	0.01 V/m			
Sensitivity	0.2 V/m	0.03 V/m		
Flatness @ 6 V/m	1 – 200 MHz +/-0.8 dB 0.15 MHz - 3 GHz +/-1.5 dB	925 – 960 MHz +0.5 / -2.5 dB	1805 MHz – 1880 MHz +0.5 / -2.5 dB	2110 – 2170 MHz +0.5 / -2.5 dB
Anisotropy @ 3 V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)	± 0.8 dB (typical 0.6 dB) @ 942.5 MHz	± 0.8 dB (typical 0.6 dB) @ 1842.5 MHz	± 0.8 dB (typical 0.6 dB) @ 2140 MHz
Out band attenuation	not applicable	Rejection to 1842 GSM = 25 dB to 2140 UMTS = 25 dB	Rejection to 942 GSM = 15 dB to 2140 UMTS = 13 dB	Rejection to 942 GSM = 17 dB to 1842 GSM = 10 dB
H filed rejection	> 20 dB			
Temperature error	0°C±50°C = ± 0.3 dB		-20°C±0°C = - 0.1 dB / °C	
Center frequency drift	not applicable	40°C±60°C = ± 100 kHz	-20°C±40°C = -100 kHz / °C	
A/D conversion	On board			
Calibration factors	On board E ² prom			
Temperature sensor	On board			
Size	Length 450 mm, diameter 55 mm			
Weight	210g			



Fig. 1-4 EP-4B-01 probe

ELECTRIC FIELD PROBE EP-1B-03

Frequency range	0.1 – 7000 MHz
Reading range	0.2 – 200 V/m
Overload	600 V/m
Dynamic range	> 60 dB
Linearity	± 0.5 dB (0.5 to 100 V/m) @ 50 MHz
Resolution	0.01 V/m
Sensitivity	0.2 V/m
Flatness @ 20V/m	3 MHz - 200 MHz +/-0.8 dB 0.15 MHz - 3 GHz +/-1.5 dB 0.1 MHz - 6 GHz +/-2 dB
Anisotropy @ 6V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)
Rejection of magnetic field	> 20 dB
Temperature error	0.1 dB/°C
A/D conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g



Fig. 1-5 EP-1B-03 probe

QUAD-BAND ELECTRIC FIELD PROBE EP-4B-02

	Wide band	EGSM 900 Band pass	EGSM 1800 Band pass	UMTS Band pass
Frequency range	0.1 – 7000 MHz	925 – 960 MHz	1805 – 1880 MHz	2110 – 2170 MHz
Level range	0.2 – 200 V/m			
Dynamic range	> 60 dB			
Linearity	± 0.5 dB (0.5 to 100 V/m) @ 50 MHz			
Resolution	0.01 V/m			
Sensitivity	0.2 V/m	0.03 V/m		
Flatness @ 6 V/m	3 – 200 MHz +/-1.5 dB 0.15 MHz - 3 GHz +/-2 dB 0.1 MHz – 7 GHz +/- 3 dB	925 – 960 MHz +0.5 / -2.5 dB	1805 MHz – 1880 MHz +0.5 / -2.5 dB	2110 – 2170 MHz +0.5 / -2.5 dB
Anisotropy @ 3 V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)	± 0.8 dB @ 942.5 MHz (typical 0.6 dB)	± 0.8 dB @ 1842.5 MHz (typical 0.6 dB)	± 0.8 dB @ 2140 MHz (typical 0.6 dB)
Out of band attenuation	not applicable	Rejection to 1842 GSM = 25 dB to 2140 UMTS = 25 dB	Rejection to 942 GSM = 15 dB to 2140 UMTS = 13 dB	Rejection to 942 GSM = 17 dB to 1842 GSM = 10 dB
H filed rejection	> 20 dB			
Temperature error	0°C+50°C = ± 0.3 dB		-20°C+0°C = - 0.1 dB / °C	
Center frequency drift	not applicable	40°C+60°C = ± 100 kHz	-20°C+40°C = -100 kHz / °C	
A/D conversion	On board			
Calibration factors	On board E ² prom			
Temperature sensor	On board			
Size	Length 450 mm, diameter 55 mm			
Weight	210g			



Fig. 1-6 EP-4B-02 probe

ELECTRIC FIELD PROBE EP-1B-04

Frequency range	10 Hz – 5 kHz
Level range	5 V/m – 20 kV/m
Overload	> 30 kV/m
Dynamic range	> 72 dB
Resolution	0.1 V/m
Sensitivity	5 V/m
Flatness @ 100 V/m (40 Hz - 1 kHz)	1 dB (typical 0,5)
Anisotropy @ 100 V/m	0.5 dB @ 50 Hz
Rejection of magnetic field	> 20 dB
A/D Conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 77 mm, diameter 53 mm
Weight	110g



Fig. 1-7 EP-1B-04 probe

ELECTRIC FIELD PROBE EP-1B-05

Frequency range	0.3 MHz – 18 GHz
Reading range	0.5 – 800 V/m
Overload	1200 V/m
Dynamic range	> 64 dB
Linearity	±0.5 dB (±0.3 typical) (1.2 V/m to 200 V/m) @ 200 MHz
Resolution	0.01 V/m
Sensitivity	0.5 V/m
Flatness @ 6 V/m	1 MHz to 1 GHz ±1.5 dB 1 GHz to 12 GHz ±3 dB 12 GHz to 18 GHz ±4 dB
Anisotropy @ 200 MHz	±0.8 dB (typical 0.5 dB @ 930 and 1800 MHz)
Rejection of magnetic field	> 20 dB
Temperature error	0.02 dB/°C
A/D conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g



Fig. 1-8 EP-1B-05 probe

ELECTRIC FIELD PROBE EP-1B-06

Frequency range	0.3 MHz – 40 GHz
Reading range	0.5 – 800 V/m
Overload	1200 V/m
Dynamic range	> 64 dB
Linearity	±0.5 dB (±0.3 typical) (1.2 V/m to 200 V/m) @ 200 MHz
Resolution	0.01 V/m
Sensitivity	0.5 V/m
Flatness @ 6 V/m	1 MHz to 1 GHz ±1.5 dB 1 GHz to 12 GHz ±3 dB 12 GHz to 23 GHz ±4 dB 23 GHz to 40 GHz ±5 dB
Anisotropy @ 200 MHz	±0.8 dB (typical 0.5 dB @ 930 and 1800 MHz)
Rejection of magnetic field	> 20 dB
Temperature error	0.02 dB/°C
A/D conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g



Fig. 1-9 EP-1B-06 probe

ELECTRIC FIELD PROBE EP-1B-08

Frequency range	0.1 MHz – 8 GHz
Reading range	0.2 – 200 V/m
Overload	600 V/m
Dynamic range	> 60 dB
Linearity	±0.5 dB (0.5 V/m to 100 V/m) @ 50 MHz
Resolution	0.01 V/m
Sensitivity	0.2 V/m
Flatness @ 20 V/m	3 MHz - 200 MHz ±0.8 dB 0.15 kHz - 6 GHz ±2 dB 0.1 kHz - 8 GHz ±3 dB
Anisotropy @ 6 V/m	±0.8 dB (typical 0.6 dB @ 50 MHz)
Rejection of magnetic field	> 20 dB
Temperature error	0.1 dB/°C
A/D conversion	On board
Calibration factors	On board E ² prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g



Fig. 1-10 EP-1B-08 probe

DUAL-BAND ELECTRIC AND MAGNETIC SHAPED FIELD PROBE EHP-2B-01
For ICNIRP 1998 and SC6 2015 *

		Electric Field	Magnetic Field
Frequency range	ICNIRP 1998	Occupational	20 – 1000 MHz
		General Public	
	SC6 2015	Controlled	
		Uncontrolled	
Level range ⁽¹⁾	Occupational / Controlled		0.3 – 1000 %
	General Public / Uncontrolled		1.5 – 1000 %
Overload		2000 %	
Linearity ⁽²⁾		+/- 0.5 dB	
Power (Amplitude) dynamic range	Occupational / Controlled		35 (70) dB
	General Public / Uncontrolled		28 (56) dB
Resolution		0.01 %	
Sensitivity	Occupational / Controlled		0.3 %
	General Public / Uncontrolled		1.5 %
Frequency flatness ⁽³⁾ (typ)	ICNIRP 1998	Occupational	20 – 1000 MHz +/-3 dB
		General Public	
	SC6 2015	Controlled	
		Uncontrolled	
Anisotropy ⁽⁴⁾		+/- 0.5 dB	
Temperature error ⁽⁴⁾		0.03 dB/°C	0.01 dB/°C
Temperature sensor		On board	
Field sensor		Triaxial orthogonal dipoles	Triaxial orthogonal loops
A/D conversion		On board	
Calibration ⁽⁵⁾		internal E ² PROM	
Operating temperature		-20 to +55 °C	
Operating relative humidity ⁽⁶⁾		5 to 95 %	
Storage temperature		-30 to +75°C	
Dimensions		450 mm length, 55mm diameter	
Weight		200 g	

Specification are subject to change without notice

When not differently specified the following specifications are referred to operating ambient temperature 23°C and relative humidity 50%.

Note (1): Power density referred.

Note (2): At 50 MHz on related level range 6dB above the noise floor

Note (3): Relative to 10% of the standard limit

Note (4): At 50 MHz / 10% of the standard limit

Note (5): Recommended re-calibration interval 24 month

Note (6): Without condensation

(*) All probes include on board A/D conversion, calibration factors on E₂PROM, and temperature sensor



Fig. 1-11 EHP-2B-01 probe

DUAL-BAND ELECTRIC AND MAGNETIC SHAPED FIELD PROBE EHP-2B-02
For ICNIRP 1998 and SC6 2015 *

			Electric Field	Magnetic Field
Frequency range	ICNIRP 1998	Occupational	0.5 MHz – 60 GHz	20 – 1000 MHz
		General Public	3 MHz – 60 GHz	
	SC6 2015	Controlled		
		Uncontrolled		
Level range ⁽¹⁾	Occupational / Controlled		0.1 – 1000 %	0.3 – 1000 %
	General Public / Uncontrolled		0.5 – 1000 %	1.5 – 1000 %
Overload			2000 %	
Linearity ⁽²⁾			+/- 0.5 dB	
Power (Amplitude) dynamic range	Occupational / Controlled		40 (80) dB	35 (70) dB
	General Public / Uncontrolled		33 (66) dB	28 (56) dB
Resolution			0.01 %	
Sensitivity	Occupational / Controlled		0.1 %	0.3 %
	General Public / Uncontrolled		0.5 %	1.5 %
Frequency flatness ⁽³⁾ (typ)	ICNIRP 1998	Occupational	0.5 – 3 MHz +4/-2 dB 3 – 18000 MHz +/-3 dB 18 – 60 GHz +8/-1 dB	20 – 1000 MHz +/- 3 dB
		General Public	3 – 10 MHz +2/-3 dB 10 – 18000 MHz +/-3 dB 18 – 60 GHz +8/-1 dB	
	SC6 2015	Controlled	3 – 9250 MHz +/-3.5 dB 9250 – 18000 MHz +6/0 dB	
		Uncontrolled	18 – 60 GHz +8/-1 dB	
Anisotropy ⁽⁴⁾			+/- 0.5 dB	
Temperature error ⁽⁴⁾			0.03 dB/°C	0.01 dB/°C
Temperature sensor			On board	
Field sensor			Triaxial orthogonal dipoles	Triaxial orthogonal loops
A/D conversion			On board	
Calibration ⁽⁵⁾			internal E ² PROM	
Operating temperature			-20 to +55 °C	
Operating relative humidity ⁽⁶⁾			5 to 95 %	
Storage temperature			-30 to +75°C	
Dimensions			450 mm length, 55mm diameter	
Weight			200 g	

Specifications are subject to change without notice

When not differently specified the following specifications are referred to operating ambient temperature 23°C and relative humidity 50%.

Note (1): Power density referred.

Note (2): At 50 MHz on related level range 6dB above the noise floor

Note (3): Relative to 10% of the standard limit

Note (4): At 50 MHz / 10% of the standard limit

Note (5): Recommended re-calibration interval 24 month

Note (6): Without condensation

(*) All probes include on board A/D conversion, calibration factors on E²PROM, and temperature sensor



Fig. 1-12 EHP-2B-02 probe

DUAL-BAND ELECTRIC AND MAGNETIC SHAPED FIELD PROBE EHP-2B-03
For ICNIRP 2020 and FCC 96-326 *

			Electric Field	Magnetic Field
Frequency range	ICNIRP 2020	Occupational	5 – 9250 MHz	1 – 1000 MHz
		General Public		
	FCC 96-326	Occupational	2 – 9250 MHz	2 – 1000 MHz
		General Pop.	1.34 – 9250 MHz	1 – 1000 MHz
Level range ⁽¹⁾	Occupational		0.1 – 1000 %	0.3 – 1000 %
	General P.		0.5 – 1000 %	1.5 – 1000 %
Overload			2000 %	
Linearity ⁽²⁾			+/- 0.5 dB	
Power (Amplitude) dynamic range	Occupational		40 (80) dB	35 (70) dB
	General P.		33 (66) dB	28 (56) dB
Resolution			0.01 %	
Sensitivity	Occupational		0.1 %	0.3 %
	General P.		0.5 %	1.5 %
Frequency flatness ⁽³⁾ (typ)	ICNIRP 2020	Occupational	5 – 9250 MHz +/-2 dB	1 – 200 MHz +3.5/-1 dB
		General Public		200 - 1000 MHz +3.5/-4 dB
	FCC 96-326	Occupational	2 – 9250 MHz +/-3 dB	2 – 1000 MHz +/-3 dB
		General Pop.	1.34 – 9250 MHz +/-3 dB	1 – 1000 MHz +/-3 dB
Anisotropy ⁽⁴⁾			+/- 0.5 dB	
Temperature error ⁽⁴⁾			0.03 dB/°C	0.01 dB/°C
Temperature sensor			On board	
Field sensor			Triaxial orthogonal dipoles	Triaxial orthogonal loops
A/D conversion			On board	
Calibration ⁽⁵⁾			internal E ² PROM	
Operating temperature			-20 to +55 °C	
Operating relative humidity ⁽⁶⁾			5 to 95 %	
Storage temperature			-30 to +75°C	
Dimensions			450 mm length, 55mm diameter	
Weight			200 g	

Specification are subject to change without notice

When not differently specified the following specifications are referred to operating ambient temperature 23°C and relative humidity 50%.

FCC 96-326 considers the terms general population/uncontrolled and occupational/controlled.

Note (1): Power density referred.

Note (2): At 50 MHz on related level range 6dB above the noise floor

Note (3): Relative to 10% of the standard limit

Note (4): At 50 MHz / 10% of the standard limit

Note (5): Recommended re-calibration interval 24 month

Note (6): Without condensation

(*) All probes include on board A/D conversion, calibration factors on E₂PROM, and temperature sensor



Fig. 1-13 EHP-2B-03 probe

DUAL-BAND ELECTRIC AND MAGNETIC SHAPED FIELD PROBE EHP-2B-04
For ICNIRP 2020 and FCC 96-326 *

			Electric Field	Magnetic Field
Frequency range	ICNIRP 2020	Occupational	5 MHz – 60 GHz	1 – 1000 MHz
		General Public		
	FCC 96-326	Occupational	2 MHz – 60 GHz	2 – 1000 MHz
		General Pop.	1.34 MHz – 60 GHz	1 – 1000 MHz
Level range ⁽¹⁾	Occupational		0.1 – 1000 %	0.3 – 1000 %
	General P.		0.5 – 1000 %	1.5 – 1000 %
Overload			2000 %	
Linearity ⁽²⁾			+/- 0.5 dB	
Power (Amplitude) dynamic range	Occupational		40 (80) dB	35 (70) dB
	General P.		33 (66) dB	28 (56) dB
Resolution			0.01 %	
Sensitivity	Occupational		0.1 %	0.3 %
	General P.		0.5 %	1.5 %
Frequency flatness ⁽³⁾ (typ)	ICNIRP 2020	Occupational	5 – 9250 MHz +/-2 dB	1 – 200 MHz +3.5/-1 dB 200 – 1000 MHz +3.5/-4 dB
		General Public	9250 – 18000 MHz +3/-2 dB 18 – 60 GHz +8/-1 dB	
	FCC 96-326	Occupational	2 – 18000 MHz +/-3 dB 18 – 60 GHz +8/-1 dB	2 – 1000 MHz +/- 3 dB
		General Pop.	1.34 – 18000 MHz +/-3 dB 18 – 60 GHz +8/-1 dB	1 – 1000 MHz +/- 3 dB
Anisotropy ⁽⁴⁾			+/- 0.5 dB	
Temperature error ⁽⁴⁾			0.03 dB/°C	0.01 dB/°C
Temperature sensor			On board	
Field sensor			Triaxial orthogonal dipoles	Triaxial orthogonal loops
A/D conversion			On board	
Calibration ⁽⁵⁾			internal E ² PROM	
Operating temperature			-20 to +55 °C	
Operating relative humidity ⁽⁶⁾			5 to 95 %	
Storage temperature			-30 to +75°C	
Dimensions			450 mm length, 55mm diameter	
Weight			200 g	

Specification are subject to change without notice

When not differently specified the following specifications are referred to operating ambient temperature 23°C and relative humidity 50%.

FCC 96-326 considers the terms general population/uncontrolled and occupational/controlled.

Note (1): Power density referred.

Note (2): At 50 MHz on related level range 6dB above the noise floor

Note (3): Relative to 10% of the standard limit

Note (4): At 50 MHz / 10% of the standard limit

Note (5): Recommended re-calibration interval 24 month

Note (6): Without condensation

(*) All probes include on board A/D conversion, calibration factors on E₂PROM, and temperature sensor



Fig. 1-14 EHP-2B-04 probe

1.7 AMB-8059/00 and AMB-8059/02

1.7.1 Top panel (inside protective cover)



Fig. 1-15 Top panel

Legend:

1. **GPS:** antenna GPS
2. **SIM slot:** point of insertion of the SIM card for 4G GSM/GPRS communication
3. **Micro SD slot:** point of insertion of the Micro SD card and its led status
4. **S/N:** serial number of the unit
5. **Probe Connector:** connector for measurement probe



NOTE

The station is able to accept a Micro SD card with 16 GB maximum capacity

1.7.2 Bottom panel (inside protective cover)

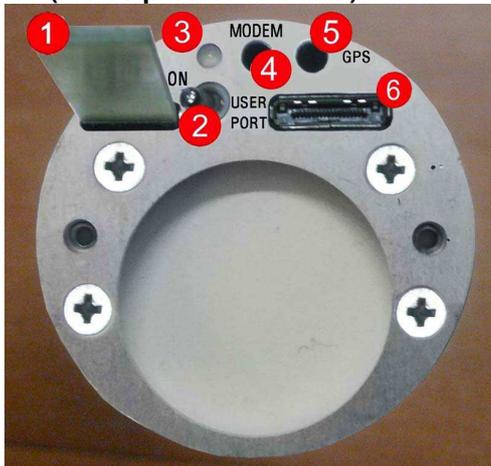


Fig. 1-16 Bottom panel

Legend:

1. **Antenna:** multi-band antenna for internal 4G GSM (/02 model only) and WiFi modems
2. **Power switch:** switches AMB-8059 on/off
3. **Led ON:** lit when power is on
4. **External Modem:** future implementation
5. **External GPS:** future implementation
6. **User Port:** connector for data and power
Fiber optic connector (AMB-8059/00 only)

1.7.3 Battery compartment cover (inside protective cover)

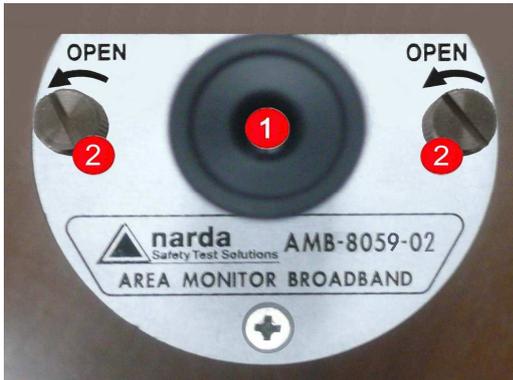


Fig. 1-17 Battery compartment cover

Legend:

1. **Main Unit support:** to support the metering unit.
2. **Thumb screw:** to open and close the battery compartment.

1.7.4 Battery for AMB-8059/00 and AMB-8059/02

The monitoring station AMB-8059/00 and AMB-8059/02 are powered by an internal replaceable primary (non-rechargeable) battery.

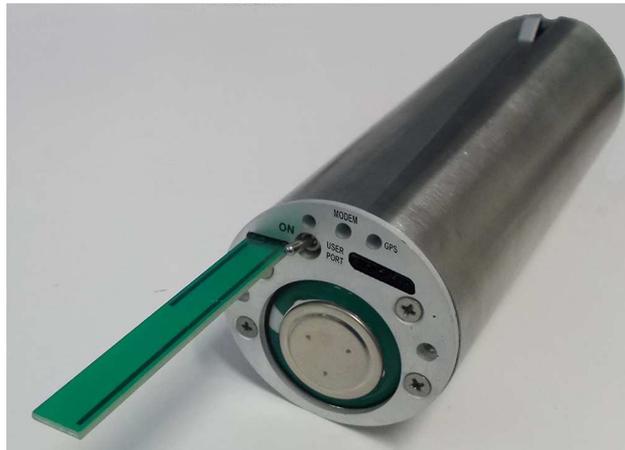


The optional Li-Ion Rechargeable Battery Kit is not available for AMB-8059/00 and AMB-8059/02 model. It can be used for AMB-8059/00 mobile version (CMK) only.

Remove the monitoring unit by unscrewing the thumbscrews of the battery compartment from the bottom panel.



Respect polarity when replacing the battery!



Close the cover screwing the thumbscrews of the battery compartment to the bottom panel.



NOTE

**1.7.5 Tamperproof
Interlock
(inside protective
cover)**

When the SD CARD led blinking orange (see table 2-1 on pag. 2-22) the battery must be replaced.

A micro switch on the side of the unit is tripped when the unit is opened. It is possible to activate an alarm, sent by AMB-8059/02 to any GSM mobile phone, warning of any attempts to tamper with the device.



Fig. 1-18 Tamperproof interlock

1.7.6 Base plate

A rubber cover on the lower side of the base plate protects unused USB port from dirt and dust; when open it allows the user to access the USB connection.
To open the USB cover by holding the cover self and pulling out.

NOTICE

Do not open/close the cover by holding the lanyard.

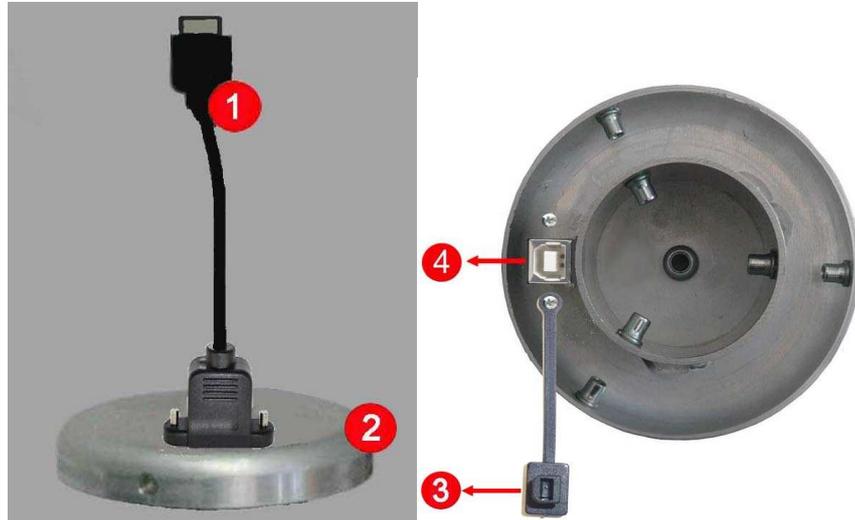


Fig. 1-19 Base plate

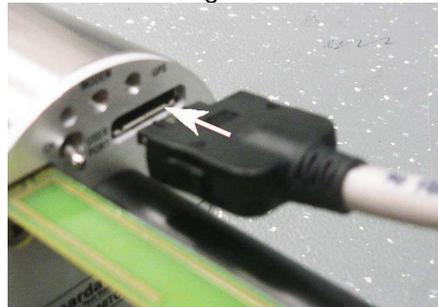
Legend:

- 1. Plug (User Port)
- 2. Base plate
- 3. USB protective cover
- 4. USB-B connector

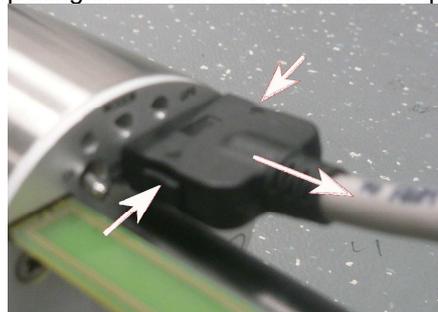
1.7.7 Plug (User Port)



The connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.



Disconnected the User Port pushing the two buttons on the both sides and pulling in the direction shown in the picture.



1.8 AMB-8059/01 and AMB-8059/03

1.8.1 Top panel (inside protective cover)



Fig. 1-20 Top panel

Legend:

1. **GPS:** antenna GPS
2. **SIM slot:** point of insertion of the SIM card for GSM/GPRS communication
3. **Micro SD slot:** point of insertion of the Micro SD card and its led status
4. **S/N:** serial number of the unit
5. **Probe Connector:** connector for measurement probe



NOTE

The station is able to accept a Micro SD card with 16 GB maximum capacity

1.8.2 Bottom panel (inside protective cover)

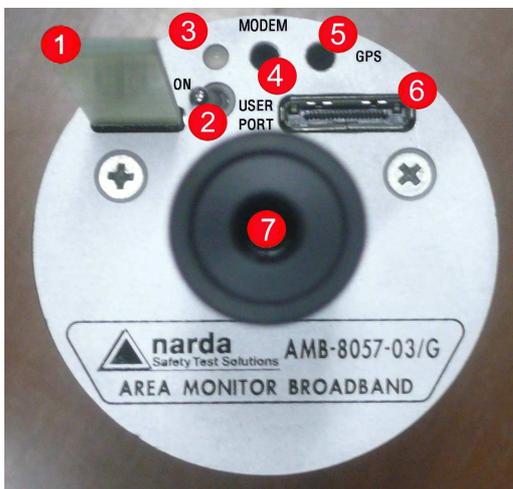


Fig. 1-21 Bottom panel

Legend:

1. **Antenna:** multi-band antenna for internal five-band GSM and WiFi modems.
2. **Power switch:** switches AMB-8059 on/off
3. **Led ON:** lit when power is on
4. **External Modem:** future implementation
5. **External GPS:** future implementation
6. **User Port:** connector for data and power
7. **Main Unit support:** mechanical support

1.8.3 Tamperproof Interlock (inside protective cover)

A micro switch on the side of the unit is tripped when the unit is opened. It is possible to activate an alarm, sent by AMB-8059/03 to any GSM mobile phone, warning of any attempts to tamper with the device.



Fig. 1-22 Tamperproof interlock

1.8.4 Base plate



Fig. 1-23 AMB-8059/01 and AMB-8059/03 base plate

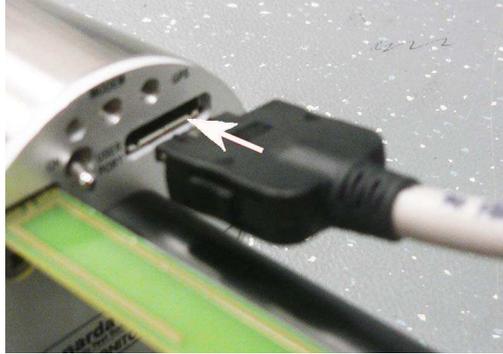
Legend:

- 1. Plug (User Port)
- 2. Base plate
- 3. Data-Supply connector

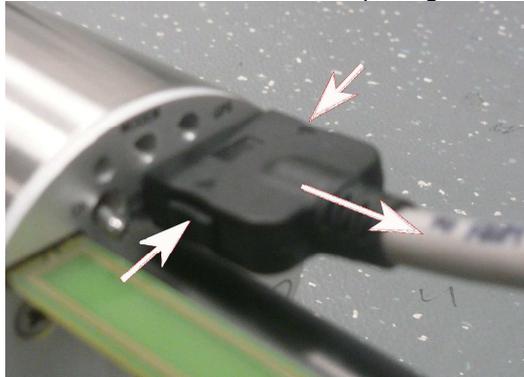
1.8.5 Plug (User Port)



The connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.

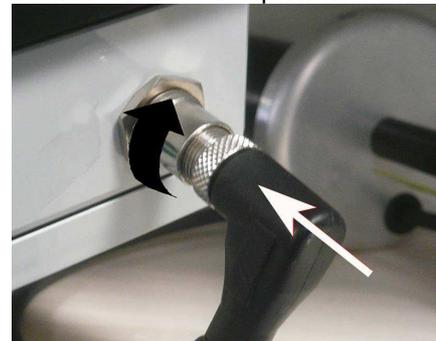


The connector can be disconnected from the User Port pushing the two buttons on the both sides and pulling in the direction shown in the picture.



1.8.6 Data-Supply Connector

Connect the Data-Supply connector to the Solar module taking care about proper orientation and screw in the direction show in the picture



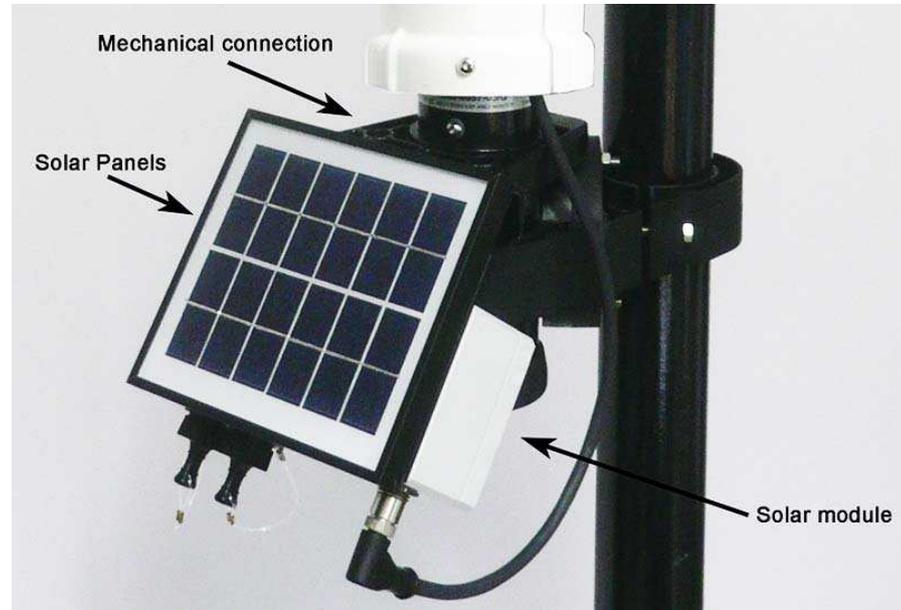
Disconnect the connector from the Solar module unscrewing in the direction show in the picture



1.8.7 Solar module

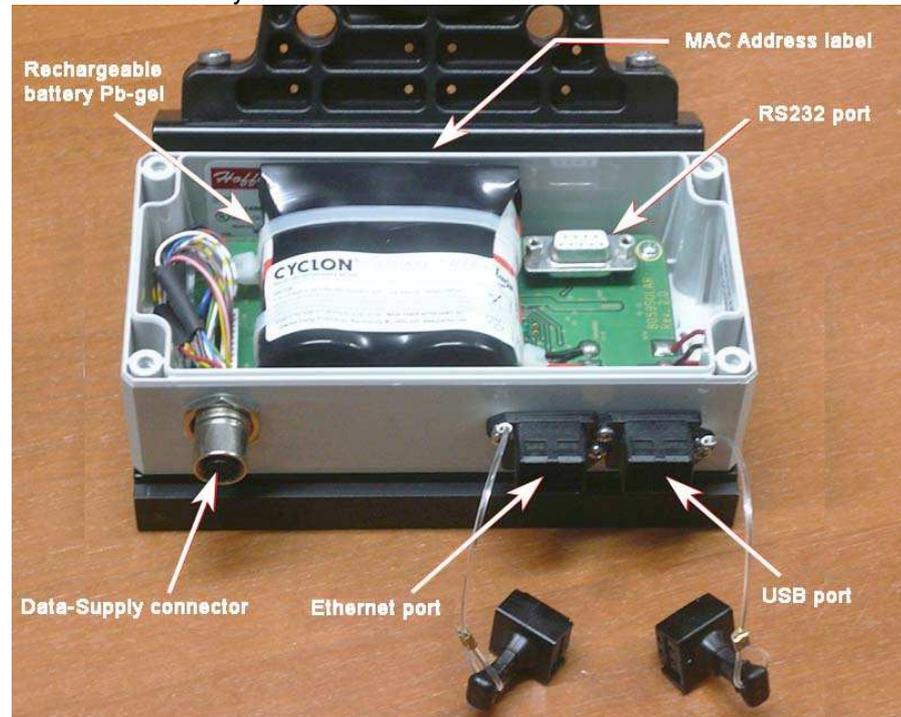
AMB-8059/01 and AMB-8059/03 are equipped with an independent power supply system and powered jointly by a rechargeable battery Pb-gel 4V, 2,5A, placed in a sealed compartment (so called "Solar Module"), and by solar panels.

This Solar Module has a suitable mechanical connection to the AMB-8059/01 and AMB-8059/03 main unit.



The Solar Module has an external Data-Supply connector to the monitoring station and Ethernet and USB port; it also has an internal RS232 connection.

The Solar module has a MAC address assigned by the manufacturer and it is located externally on one side of the box.



Detail of Solar Panel module:

- **Data-Supply connector** for connection to the monitoring station.
- **USB connector and its dust cap** for direct connection to Personal Computer and for battery charger.
- **Ethernet connector and its dust cap** for direct connection to Personal Computer.
- **RS232 connector** for direct connection to Personal Computer.

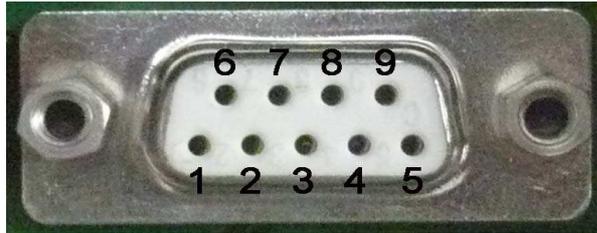


Fig. 1-24 DB9 Female front side view

DB9 Female Connector pin configuration:

Pin 2 RX [Received Data]

Pin 3 TX [Transmit Data]

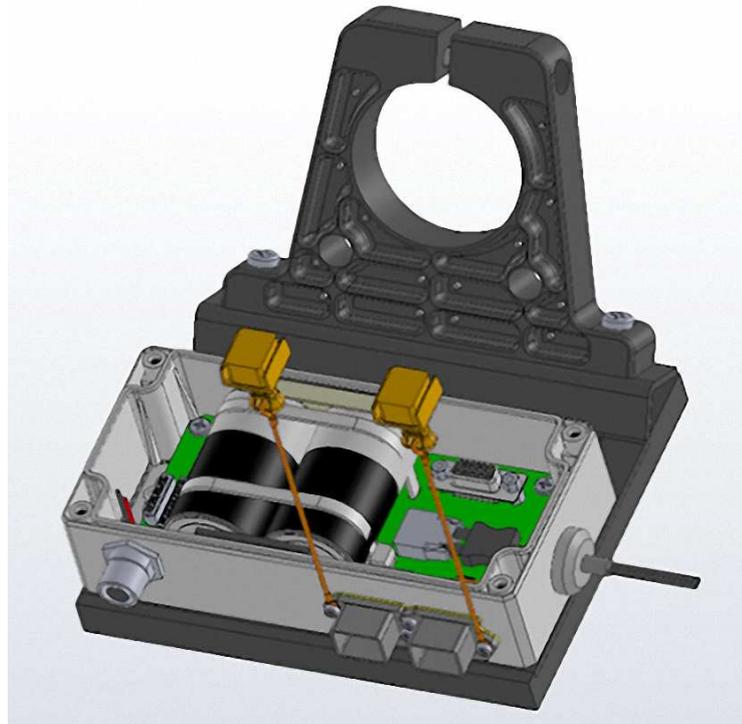
Pin 5 GND [Signal Ground]

Pin 9 +3VD [Current limited]

- **MAC Address label** reports the physical address assigned to the module for Ethernet/LAN connection.

1.8.7.1 8059-Optical link

AMB-8059/01 and AMB-8059/03 can be controlled via an optional fiber optic cable, as depicted below. Inside the Solar Panel waterproof box, an optical port is already prepared for this purpose.



To install the fiber optic link, remove the rubber cap (on the right side of the picture) and insert the fiber optic cable in the hole; the cable is equipped with its special waterproof cap.

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2 – AMB-8059 Installation and first use

2.1 Introduction

This section provides the information necessary to install and use the AMB-8059 Multi-band EMF Area Monitor in different configuration:

- Standard configuration (see §2.6)
- Dual-probe configuration (see §2.7)
- Mobile configuration (see §2.8)

It also includes information regarding initial inspection, power requirements, interconnections, working environment, assembly, cleaning, storage and shipment.

2.2 Initial inspection

Inspect the package for any possible damage.

NOTICE

If the packaging or protective material are damaged, check that the contents is complete and that the instrument has not been damaged in any of its electrical or mechanical parts. Check the accessories, referring to the checklist enclosed with the manual. Report any noticed damages to the forwarder and to NARDA.

2.3 Working environment

The working conditions for the instrument are as follows:

- Temperature From -20°C to +55°C
- Relative humidity (without condensation) ≤ 95%

The instrument should be stored in a clean, dry place free of acids, dust and moisture.

The storage environment must have the following specifications:

- Temperature From -25°C to + 70°C
- Relative humidity (without condensation) < 99%
- Altitude Up to 4000 m (a.s.l.)

2.4 Return for repairs

Any part of the instrument – with the sole exception of the protective case and AMB-8059/00 and AMB-8059/02 battery - can only be replaced by NARDA, therefore, in case of damage to parts and/or malfunctions, contact the NARDA service center.

When the instrument has to be returned to NARDA for repairs, please complete the form enclosed with this Users Manual, filling in all the information necessary for the service requested.

To reduce the time necessary for the repair, be as specific as possible in describing the malfunction. If the problem only occurs under specific conditions, detail in the best possible way how to reproduce these conditions.

Whenever possible, it is preferable to use the original packing for return, making sure to wrap the device in heavy paper or plastic. In alternative, pack the equipment in a sturdy card box with plenty of impact absorbing material all around the equipment, to ensure a tight fit and prevent it from moving inside the box. Take special precautions to protect the solar cells. Seal the package securely and write FRAGILE on the outside to encourage careful handling.



Nowadays there are restrictions on the shipment of hazardous materials, eg. some types of lithium batteries.

Please, check the proper, safe, shipping mode, with the help of your courier, in the case the product is equipped with batteries.

2.5 Cleaning

Use a clean, soft, dry cloth to clean the instrument and the solar cells.

NOTICE

To clean the instrument do not use solvents, acids, cleaning fluid, turpentine, acetone or similar products which could damage it



In the northern (boreal) hemisphere, the AMB-8059/01 and AMB-8059/03 should be installed with the solar cells facing south, in order to take the best advantage of the solar radiation for continuous recharging of the internal batteries. An angle of 35° with respect to vertical is the ideal position for the solar cells to optimize solar radiation in the European latitudes, specially in winter when the light levels are generally lower than in summer.



To ensure maximum efficiency in recharging the battery and to take advantage of the maximum operating autonomy, make sure the position in which the unit is installed receives sunlight all the day long and is not shaded by buildings or other screening objects.

NOTICE

Correct readings may be conditioned by the nature of the places in which the field monitoring system is installed.

The field sensor is affected by huge metallic masses or other objects that may reflect the signal, if located in the vicinity of the unit.

Whenever possible, it is a good rule to install the unit at some distance from walls, high voltage pylons, buildings and other obstacles that could affect the signals reaching the sensor.

NOTICE

Prior to installing stations where the WiFi connection is planned to be used, make sure that the point at which the field monitor will be placed is adequately covered by the Access Point WiFi network, thus allowing remote data communication.

The signal strength can be checked using any smartphone capable of indicating the intensity of the WiFi signal coming from the AP desired. It is also advisable to look for the point at which the signal shows its maximum and, eventually, rotate the remote station along its vertical axis to face the Antenna toward the AP direction.

NOTICE

Prior to installing stations equipped with the 4G GSM/GPRS module, make sure that the point at which the field monitor will be installed is adequately covered by the mobile phone service allowing remote data communication.

This can be done using any GSM mobile phone capable of indicating the intensity of the signal coming from the local base radio station of the company chosen for the SIM card.

**2.6 Installation –
Standard configuration**

The NARDA Multi-band EMF Area Monitor is designed to operate outdoors, in the vicinity of the electromagnetic fields sources that shall be controlled, and under the most severe environmental conditions.

The AMB-8059 Multi-band EMF Area Monitor consist of a protective case made of material that is transparent to electromagnetic fields and designed to house the field probe, the electronic measuring instruments and the data transmission devices.



Models AMB-8059/01 and AMB-8059/03 have power unit, consisting of solar panels and a battery; the low consumption of the system ensure a practically unlimited autonomy under normal sunlight conditions.



Use only AC/DC Converter provided with the AMB-8059/01 and AMB-8059/03. In general, the user must operate only with the accessories supplied by the manufacturer.



Any part of the instrument, with the sole exception of the protective case and AMB-8059/00 and AMB-8059/02 battery - can only be replaced by NARDA, therefore, in case of damage to parts and/or malfunctions, contact the NARDA Service Center.



The Station is usually installed outdoors where the strong winds can endanger its stability that depends on the weight and eventual ballast bags or nylon wind strays.



The safety of any system incorporating the AMB-8059 is the responsibility of the assembler.



Pay attention not to cause electrical short circuits when plug the RS232 cable on the AMB-8059/01 and AMB-8059/03 Solar module.



Fig. 2-1 AMB-8059/01



Fig. 2-2 AMB-8059/03



Models AMB-8059/00 and AMB-8059/02 do not have the solar panel module.



Fig. 2-3 AMB-8059/00



Fig. 2-4 AMB-8059/02

2.6.1 Installation of AMB-8059/00 and AMB-8059/02

1. Remove the three screws and take off along its axis the protective case from the monitoring unit.
2. Unplug the User Port connector (see § 1.7.7) (AMB-8059/02 only).
3. Remove the monitoring unit by unscrewing the thumbscrews of the battery compartment from the bottom panel (see § 1.7.4).
4. Be sure that the tray for the SIM card is well locking inside its slot **even if the GSM is not being used (AMB-8059/02 only)**.
5. Insert the SIM card enabled for data communication in its tray in the GSM modem of the unit (see § 2.9.1) (AMB-8059/02 only).



Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations (AMB-8059/02 only).

6. Be sure that the probe connector is well locking.
7. Insert the Li-ion battery respecting the polarity (positive toward the inner side) (see § 1.7.4).
8. Install the monitoring unit by screwing the thumbscrews of the battery compartment to the bottom panel.
9. Plug the user port connector removed at step 2 (AMB-8059/02 only).
10. Connect the PC (USB port) to the USB port of the station, for AMB-8059/02 only, or to the Optic Fibre connector using the USB-OC adapter and the supplied Optic Fibre, for AMB-8059/00 only (see § 1.7.6).
11. Switch the unit ON.
12. Be sure the AMB-8059 Area Monitor has been installed successfully on the virtual COM port (see § 4.2).
13. Switch the unit OFF.
14. Disconnected the Optic Fibre connector.
15. Install again the protective cover that was removed at step 1 and tight the screws. Install the monitoring unit on the site to be monitored.

Follow instructions below to install the monitoring unit on the site:



The 8059-MAST Supporting pole is an accessory supplied separately (on charge); it is available for all AMB-8059 models.

16. Install the fibreglass pole (see § 6.7) on the site.
17. Slide on the fibreglass pole the mechanical joint:
 - a) Unscrew the socket-head screw under the bottom cap of the protective case housing the unit without losing it completely.
 - b) Press on the screw (the movement should be about 1cm) to unlock the blocking wedge inside the cap.
 - c) Remove the bottom cap.
 - d) Slide on the fibreglass pole the mechanical joint (see § 6.7).
 - e) Insert and close carefully the bottom cap (be sure it is fully inserted), then screw the socket-head screw.
18. Slide the group monitoring station - connection joint onto the fibreglass pole and tight the screws at the desired position.



To use the mechanical joint see § 6.7.

19. Put on top of the fibreglass pole the supplied cap, and install the strays and the ballast bags (see § 6.7);
20. Remove the protective case, switch the unit ON and slide the protective case
21. Configure the AMB-8059 station with NardaAMConfigurator software (see § 2.16).
22. Local data download through USB (Optic) will be regularly required if no WiFi connection is available and in case no GSM signal is present in the installation place when using an AMB-8059/02.

**2.6.2 Installation of
AMB-8059/01 and
AMB-8059/03**

1. Remove the three screws and take off along its axis the protective case from the monitoring unit.
2. Be sure that the tray for the SIM card is well locking inside its slot **even if the GSM is not being used (AMB-8059/03 only)**.
3. Insert the SIM card enabled for data communication in its tray in the GSM modem of the unit (see § 2.9.1) (AMB-8059/03 only).



Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations (AMB-8059/03 only).

4. Be sure that the probe connector is well locking.
5. Be sure that the “user port” cable is well connected (see § 1.7.7).
6. Switch the unit ON.
7. Install again the protective cover that was removed at step 1 and tight the screws.
8. Slide on the fibreglass pole the mechanical joint:
9. Unscrew the socket-head screw under the bottom cap of the protective case housing the unit without losing it completely.
10. Press on the screw (the movement should be about 1cm) to unlock the blocking wedge inside the cap.
11. Remove the bottom cap.
12. Slide on the fibreglass pole the mechanical joint (see § 6.7).
13. Insert and close carefully the bottom cap (be sure it is fully inserted), then screw the socket-head screw.
14. Take off the cover of the Solar Module by unscrewing the 4 screws.
15. Charge the batteries for at least 24 hours (see § 6.6).
16. Connect the PC to the Solar Module (see § 1.8.7).
17. Connect the Data-Supply cable to the external connector on the Solar Module (see § 1.8.6).
18. Be sure the AMB-8059 Area Monitor has been installed successfully on the PC port (see § 4.2)
19. Disconnect the Solar module from the PC.
20. Disconnect the Data-Supply cable (the unit is OFF).
21. Close the Solar Module. Install the monitoring unit on the site to be monitored.

Follow instructions below to install the monitoring unit on the site:



The 8059-MAST Supporting pole is an accessory supplied separately (on charge); it is available for all AMB-8059 models.

22. Install the fibreglass pole (see § 6.7) on the site to be monitored;
23. Slide the group monitoring station - connection joint – Solar Module onto the fibreglass pole and tight the screws at the desired position, paying attention to orienting toward south the solar cells of the Solar Module;



To use the mechanical joint see § 6.7.

24. Put on top of the fibreglass pole the supplied cap, and install the strays and the ballast bags (see § 6.7);
25. Connect the Data-Supply cable to the external connector on the Solar Module;
26. Configure the AMB-8059 station with NardaAMConfigurator software (see § 2.16);
27. Local data download through RS232, USB, Ethernet and Optical (optional) will be regularly required if no WiFi connection is available and in case no GSM signal is present in the installation place when using an AMB-8059/03. The Solar Module cover must be temporary removed to access the internal RS232 connector.



When the Ethernet cable is connected to the Solar module and is switched on, the RS232 (and Optical) port is not available.



Every time the Ethernet cable is plugged to the Solar module, the connection will last 15 minutes regardless the scheduled time which continues to work in separate way.



To ensure maximum efficiency of recharging and optimum autonomy of the internal batteries, it is a good rule to keep the solar cells of the AMB-8059 clean, inspecting them periodically.
If necessary, clean them with a soft cloth and a normal glass cleanser.

NOTICE

The SIM card adopted shall be enabled to data transmission.
Dial up calls require that both the station SIM card as well as the PC modem one (if GSM) are enabled for CSD data communication.
GPRS/FTP communication mode require that the station SIM card is enabled for GPRS data communication allowing the station to access the user FTP server to download measurement results, automatically, according to the user setting. No modem but Internet access is required for the controller PC to access the user FTP server

NOTICE

All operations of connection and disconnection of cables and probes must be done under the condition that the main unit is switched off.



When switching off the station, it takes a certain amount of time to completely empty the residual circuit charge. Please wait for at least 30 seconds before switching on the unit again.

2.7 Radome Dual Probe (optional) – Dual probe configuration

Besides safety applications informing about critical situations by means of alarm messages and providing historical results, long term EM field monitoring is the best solution to show, especially in case of population concern and protests against antennas and power lines, that the field intensity is usually low and well below the regulation limits.

Even if in some applications, like measurement in proximity of power lines, low frequency electric field can be easily determined through mathematical calculations and usually does not change with time, its monitoring, along with magnetic field, can be beneficial to show population measurement result of both quantities instead of explaining theory.

Regulations provide limits for Electric and Magnetic fields. Continuous monitoring of both quantities provides complete results to be easily compared to the limits without the need of any calculation.

Additionally, some industrial application may take advantage of the Dual-probe monitoring.

AMB-8059 Multi-band EMF Area Monitor can operate in Dual-probe configuration that enhances its field monitoring capacity.

Different probe combinations are possible by selecting the secondary one depending on specific monitoring needs as shown in the table 1-8 on page 1-10. Please note that the primary probe, directly connected to the area monitor main unit, must always be the HP-1B-01 model.

Dual-probe operation is based on the HP-1B-01 probe, for low frequency magnetic field measurement, that is equipped with a “pass-through” connector to allow the installation of a secondary probe.

Any single or tri-band probe can be installed as the secondary one of Dual-probe configuration allowing thus to acquire, besides the ELF magnetic field, the ELF or RF electric one, depending on the secondary probe model.

NOTICE

For Probe combinations on Dual-probe configuration see Table 1-8 (page 1-10).

NOTICE

8059/IP66K kit IP66 Adapter optional accessory not suitable with Radome Dual Probe.

NOTICE

AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration.



When a tri-band or quad-band probe is used in Dual-probe configuration the additional result, provided besides the low frequency magnetic field, will be limited to the electric field measurement of the wideband only, without providing any information related to the Low and High frequency bands.

Remove the external protective case unscrewing the 3 screws that fix it to the base disk. Then, take the cap off being careful not to rotate it (the interlock switch could be damaged if rotating the cover while taking it off).



Install the primary probe HP-1B-01 to the main section of the unit by probe connector. The HP-1B-01 top panel provides an additional connector for the secondary probe.



Fig. 2-5 HP-1B-01 top panel

Connect the secondary probe to the primary one as shown below:



Fig. 2-6 Dual-probe configuration (internal view):
EP-1B-01 mounted as secondary probe



Fig. 2-7 Dual-probe configuration (internal view):
EP-1B-04 mounted as secondary probe

Fasten the Radome Dual Probe to the base plate with the provided 3 pcs. hexagon socket button head screws, plastic washers and hexagonal nut. Install the monitoring unit on the site (see chapter 1 and chapter 2 for installation instructions).



Fig. 2-8 AMB-8059 in Dual-probe configuration



The Dual-probe configuration is automatically detected by the station firmware that provides the requested functions.

2.8 Installation – Car Mounting Kit configuration

AMB-8059/00 Car Mounting Kit is an easy to install kit to transform the well-known Multi-band EMF Area Monitor, usually adopted for fixed installation, in a mobile version (CMK) designed to be mounted onto a car.

These model units are powered by an internal battery and equipped with a fiber optic port to be connected to a PC for station setting, measurements collection during the measurement campaign, and data download.

The support is made of a magnetic plate that is designed to hold the instrument firmly on the car.

Three clamping screws are provided for an easy and quick protective case installation during “mobile” operation.

This paragraph provides the necessary information for installation of the Car Mounting Kit optional accessory.



Car Mounting Kit, optional accessory, is available for AMB-8059/00 model only.

It is possible to replace the non-rechargeable primary battery with a rechargeable one using the optional Li-Ion Battery Kit. See §2.8.1 and §6.11 for further information

AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration

AMB-8059/00 with Car Mounting kit can not be equipped with EP-3B-01 and EP-1B-04.

During “mobile” operation, all programmed schedules are suspended. Schedules restart normally after exiting the logger function.

AMB-8059/00 mobile version (CMK) works with fiber optic and Wi-Fi connection. The Wi-Fi function is not implemented on the software yet.

To use the EP-1B-05 and EP-1B-06 with AMB-8059/00 mobile version (CMK) it's necessary the Firmware release 1.85 or higher.

For the drive test measurement use EP-1B-03 and EP-4B-02 probe with serial number having the first three digit equal or greater than 100.

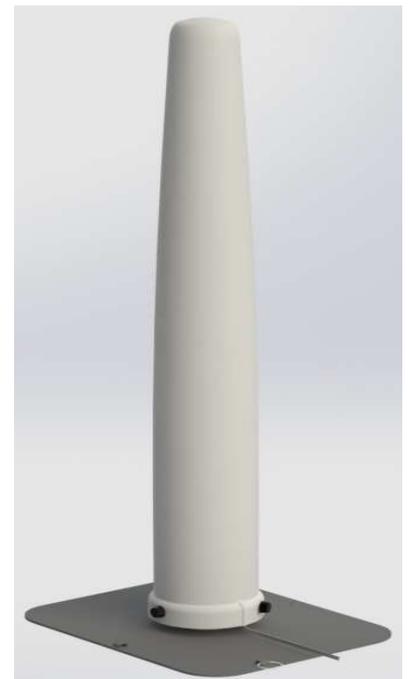
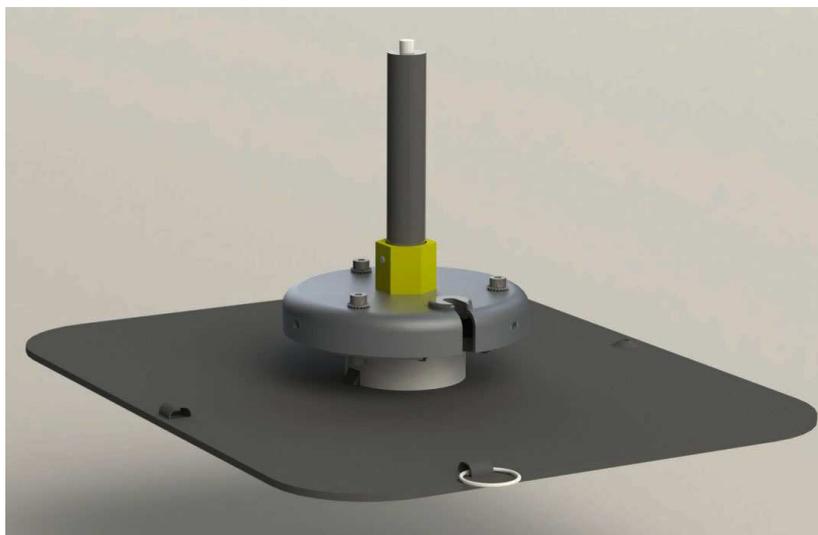


Fig. 2-9 Car Mount Kit

To transform the AMB-8059/00 Multi-band EMF Area Monitor, usually adopted for fixed installation, in a AMB-8059/CMK mobile version designed to be mounted onto a car, follow the procedure below:

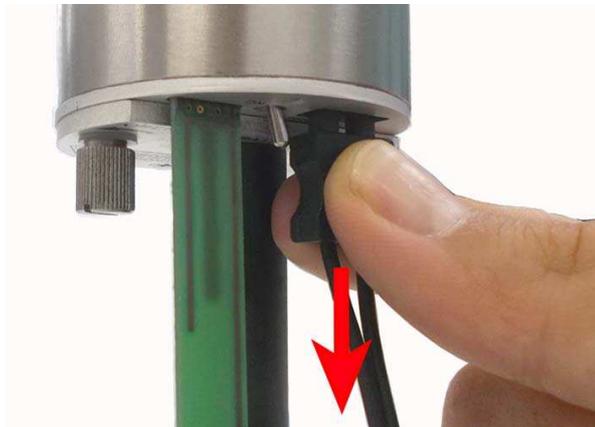
- Unscrew the three screws that fix the cap to the base disk and take off along its axis the protective case from the monitoring unit being careful not to rotate it (the interlock switch could be damaged if rotating the cover while taking it off).



- Switch off the unit by level switch.



- Disconnect the fiber optic cable from the main unit pulling in the direction shown in the picture and remove it from the base disk.



- Rotate and remove the unit by metallic threaded insert while holding the plastic support.



Now the unit is ready to be installed onto the car mounting support using the Car Mounting Kit optional accessory.

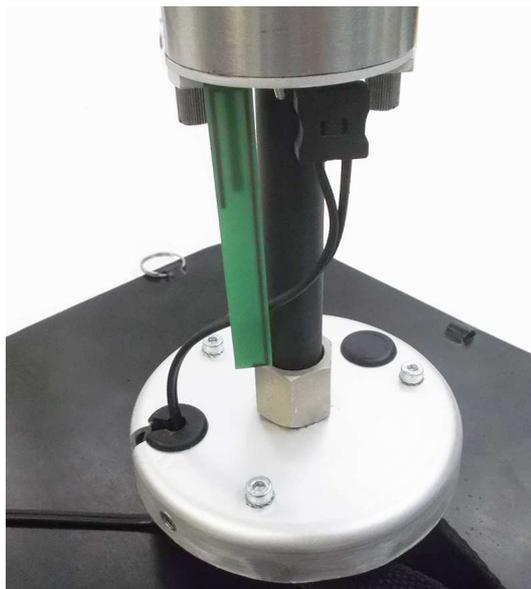
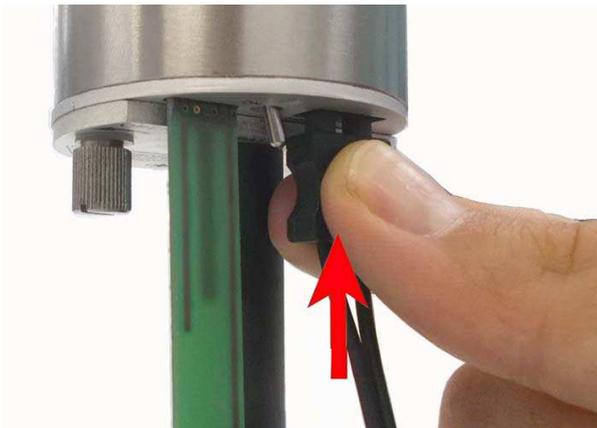
- Screw the unit to the Car Mounting Kit plastic support by its metallic threaded insert and tighten firmly.



- Facilitate the optical fiber to pass through the hole located into the car mounting metal disk.



- The fiber connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.



- Switch on the unit by level switch.

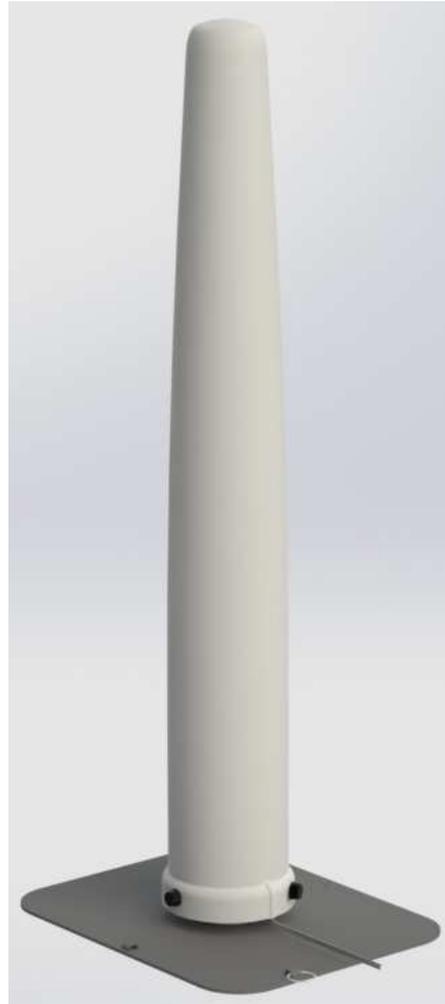


Remember the station must be turned on before placing the protective cover.

- Put the protective cover back without rotating it and tighten the three clamping screws at its bottom.



On the left before the protective cover is put back in place, and on the right ready to work.



- When the assembly is ready, the station can be placed onto the roof of the car and tied to the vehicle by using the appropriate security strap.



Pay attention to the magnetic base of the stand.

It produces a strong attractive force when related to the whole surface.

Unsafe handling could cause jamming of fingers or skin in between the magnet and other magnets or sheet metal. This may lead to contusions and bruises.

Wear heavy protective gloves when handling large magnets.

Even if it is not able to generate a very strong magnetic field, it is advisable to keep sufficient distance for people wearing pacemakers and heart defibrillators.

The magnetic field could also affect the functionality of TVs and laptops, computer hard drives, credit and ATM cards, data storage media, mechanical watches, hearing aids and speakers.

Keep magnets away from devices and objects that could be damaged by strong magnetic fields.



8059/IP66K kit IP66 Adapter optional accessory not suitable with Car Mounting Kit



- Make sure that the unit is firmly attached before departing, with the security strap hooked inside a door.

Bring the optical fiber inside the car, through a door, looking for a spot where the gasket is softer. Pay attention not to cut the cable.

- The connection between the fiber optic (EMF station) and the User's PC is done via the supplied USB-Optical Converter.



Once set the station with NardaEMFGPSLogger software, the fiber optic cable can be disconnected during the measurement campaign. In this case, the Log file can not be generated and any alarm will not be notify if occurs.



Please check the battery level before starting a measurement campaign.

2.8.1 Li-Ion Rechargeable Battery Kit installation and battery replacement (optional)

The monitoring station AMB-8059/00 CMK is powered by an internal replaceable primary (non-rechargeable) battery. It is available the optional Li-Ion Rechargeable Battery Kit that allows to replace the standard battery with a rechargeable one.

Follow the instructions step-by-step:

- Charge the three AA battery with the battery charger and the USB(A) – USB(C) cable supplied with the kit.



For proper use of the Battery charger, refer to the instructions of its manufacturer.

- After charging complete, insert the three AA battery on the D Size Battery Converter Adapter Holder.



- Unplug the fiber connector from the User Port and remove the monitoring unit by unscrewing the thumbscrews of the battery compartment from the bottom panel. Respect polarity when replacing the battery!



- Close the cover screwing the thumbscrews of the battery compartment to the bottom panel and put the protective cover back



- **Every time the battery was removed from it, the internal clock has to be set.**

All additional information and explanations of using NardaEMFGPSLogger can be found on §3.28, §3.29, §3.30, §3.31 and §3.32 .

2.9 GSM Modem ⁽¹⁾

AMB-8059/02 and AMB-8059/03 are equipped with a 4G GSM modem that allows remote communication for programming and for the remote collection of the data recorded.

The GSM modem requires a regular SIM Card enabled for data communication (CSD, GPRS or both, depending on the preferred communication mode).

2.9.1 SIM CARD

The SIM Card to be used must be enabled for the preferred data communication mode.

The user can choose the most suitable SIM Card to install, depending on the services and costs offered by the different mobile phone Service Providers; it should also be chosen so as to guarantee optimum coverage for the specific zone of installation of the field monitor.



Fig. 2-10 SIM Card

The modem for data transfer is housed inside the main unit and the SIM Card has to be inserted in the special slot, as shown in the figure. To extract it press the button just beside the SIM tray.

NOTICE

To download the measurement data from the monitoring station through the RS232, USB and Ethernet port, the tray holding the SIM Card must be correctly fitted inside its slot even if no SIM Card is installed.

NOTICE

Before removing or inserting the SIM Card, switch off the monitoring station.

NOTICE

If you use a rechargeable SIM Card, make sure it is charged. Before using the SIM Card with the monitoring station, disable the PIN code using the proper function available on any mobile phone.

⁽¹⁾ AMB-8059/02 and AMB-8059/03 only

2.9.2 Status of the LED in relation to the status of the monitoring station

When the monitoring station is switched on, the LED on the bottom panel, after a fast flash, is first lit with a steady red light for about 10 seconds, then starts to blink at the rate of one blink per second, indicating that the monitoring station is active in normal Stand-By conditions and **not** in the low consumption mode.

The condition in which the LED blinks at a rate of one (brief) flash per second indicating that the monitoring station is in Stand-By mode and not in low consumption mode, are the following:

- All the time the Modem is on Stand-By
Both for GSM and WiFi modems, the LED behaves in the same way. Even if the user will disable most of the modem functions through the software, the minimum periods at which the internal modem would be ON (first hour after switch ON without Low Battery alarm and from 11:00 to 11:45 when the “Schedule for modem” and “Schedule for SMS/WiFi/EMAIL” are set to zero) the LED will be red blinking every second
- The time between acknowledgment of a command (via RS232, USB, Ethernet) to about 60 seconds from the last command received.
- All the time between the attempts by the monitoring station to establish a communication with the probe to about 60 seconds after correct acknowledgement of the connection.



After exiting this mode, the LED changes the manner of blinking to a (brief) green flash every second, thus indicating the low consumption status. The monitoring station remains in this status until an event rouses it and causes the return to Stand-by status again.

Possible events are:

- Modem switched on in Programmed or Spontaneous mode
- Sending of a programmed or spontaneous SMS
- Activity on the RS232, USB, Ethernet, Optic Fibre.
- Absence or malfunction of the probe

As indicated above, about 60 seconds after the termination of the event, the LED resumes blinking at the frequency of 1 Hz.

The LED also has five additional statuses:

- It blinks at a higher frequency than once per second during a communication (from the beginning to the end) to indicate the modem is in use.
- It remains on with fixed red light during connections establishments and data downloads.
- It blinks red when the modem is on (stand-by)
- It blinks green when the modem is off
- It blinks orange when the Ethernet is connected

2.10 Micro SD

AMB-8059 is a self-contained instrument which does not require any external device such as mass-storage memory. Indeed, its built-in memory is large enough to store almost a full year data, with a rate of 1 minute. However, the AMB-8059 supports Micro SD Card. It is solely intended for backing up data when no other way is accessible among the many present (RS232, USB, FTP, Ethernet and Modem Point-to-point). Therefore, for no reason should a Micro SD Card be left in the slot permanently, or for a long time, as its power consumption is 5 to 10 times higher than the whole monitoring station and the autonomy would be drastically reduced with no advantage at all.



The station is able to accept a Micro SD card with 16 GB maximum capacity

In order to be used, a Micro SD Card should be first formatted, either FAT or FAT32, and then have a file named "SDCOPY.SD9" in the root.

The size of this file, "SDCOPY.SD9", determines the number of record will be backed-up on the Micro SD Card.

According to the §5.7 "Download Description Multi-band EMF Area Monitor AMB-8059 for Single and three bands probes", §5.8 "Download Description Multi-band EMF Area Monitor AMB-8059 for 2-bands probes", §5.9 "Download Description Multi-band EMF Area Monitor AMB-8059 for 4-Bands Probes" and §5.10 "Download Description Multi-band EMF Area Monitor AMB-8059 for Dual probe operation", each record takes 32 bytes. Thus to store N records the required size is 32x N Bytes. For example, to back up 1000 records it is necessary to make the file "SDCOPY.SD9" whose size is 32000 bytes. The data stored in SD CARD are in binary format; the download description is explained on §5.7, §5.8, §5.9 and §5.10".

The AMB-8059, as soon as it detects the presence of an Micro SD Card, tries to open the file "SDCOPY.SD9" and, if successful, tries writing the last <size_of_file> divided by 32 records having thus the most recent ones. In the above example it would write the most recent 1000 records.

It is important to keep in mind that records will be aligned to last record-most recent record.

The Led let the user know about the state of process as shown in the following table.

LEDs	Status	Action
Blinking RED	DATA is being storing	*** DO NOT REMOVE the SD Card ***
Steady RED	SD Card ERROR	This can be caused by: SD-card not formatted FAT or FAT32 Damaged SD-Card
Steady ORANGE	SD Card ERROR	This can be caused by: File "SDCOPY.SD9" not present. Non-Writable SD-Card
Blinking ORANGE (for AMB-8059/00 and AMB-8059/02 only)	Battery run out	Replace the battery (See §1.7.4)

The speed of storing is roughly 128kB (4096 records which are nearly 3 days with 1 min storing rate) in 5 seconds

Keep in mind that when storing all tasks are suspended thus it is better to limit the size to the minimum required to avoid missing data.

Once more, do not leave the SD-Card in the slot as it would not store anything more, the storing process is triggered only by SD-Card insertion, but would draw energy reducing thus the autonomy.

2.11 Field probe

The technical features of the field probes are listed in table 1-7 (page 1-9).

NOTICE

Should it be necessary to change the probe, this must be inserted and removed holding it by the metal part of the connector. Inserting or removing the probe holding it by its support or head could heavily damage it.

NOTICE

When opening the protective case of the monitoring station, to avoid damages, remove along its axis the protective case from probe.

NOTICE

Before removing the probe, switch off the monitoring station. To avoid damages to the probe connector, the insertion key must be placed with care in correspondence of the connector.

2.12 RF signals of dangerous intensity

The probes used in the NARDA Multi-band EMF Area Monitor contain highly sensitive elements. Never place the probe in an electrical field higher than the maximum allowed for that probe.

NOTICE

If radiated by strong electromagnetic fields, the probe can be damaged even if disconnected from the monitoring station, or connected to a monitoring station that is switched off.

2.13 Signals with AM modulation



When measuring fields coming from antennas transmitting at frequencies lower than few tens of MHz (e.g. medium wave AM stations), it is advisable to place the probe with the supporting handle perpendicular to the polarization of the antenna, so as to prevent it from affecting the measurement. In this case, if the monitoring station is installed indoor it should be placed in horizontal position. For outdoor installation the maximum allowed rotation (see §6.7) should not be exceeded.

The type of field sensor installed is automatically detected by the control system integrated in the NARDA Multi-band EMF Area Monitor, so it is not necessary to perform any operation after installing or replacing it.

2.14 Controlling the internal batteries

The voltage level (AMB-8059/00 and AMB-8059/02) or the level of the charge (AMB-8059/01 and AMB-8059/03) can be checked locally or by remote using the 8059SW-02 program: there is a specific window which displays battery voltage and where a battery charge alarm can be set, if necessary.

The battery status of stations equipped with GSM modem can be read from any mobile phone by sending an SMS with the code **#BM?BAT***.

The lead batteries used in the AMB-8059/01 and AMB-8059/03 can be damaged if the charge drops to less than 3,2V.

Below this value chemical processes that could damage them begin. Therefore, if the unit is not used it should be switched off. For indoor applications or in the shade, do not use the station for longer than 80 days.

If it should be necessary to store the unit for a period of few months, it is advisable to disconnect the cable between the main unit and the Solar Module (AMB-8059/01 and AMB-8059/03 only).

NOTICE

NOTICE

Any part of the instrument, with the sole exception of the protective case and AMB-8059/00 and AMB-8059/02 battery, can only be replaced by NARDA, therefore in case of any damages to parts and/or malfunctions, please contact the NARDA Service Center.

! WARNING

Risk of explosion if the battery of AMB-8059/00 and AMB-8059/02 is replaced by an incorrect type. To replace the battery follow the instructions.

2.15 Power consumption and operating mode

The monitoring station is a device with very low current absorption. To achieve that, a number of different solutions have been applied, but the main one is to reduce the activity of the microcontroller to the very minimum.

Depending on the operating status of the monitoring station, it will absorb different current values for each status.



The minimum consumption is obtained with the modem completely off. In this mode, even the microcontroller shuts down about 20 seconds after having received the last command, with regular interruptions 20 times a minute to perform the check and function routines. This is the status in which the monitoring station operates most of the time.

Any command sent via RS232, USB (Optic), Ethernet immediately rouses the microcontroller. However, because of the peculiarity of the stop status, in this case the command is lost and must be sent again in order to be carried out. This is done automatically by the management software and should be taken into consideration by the User in developing any custom software.



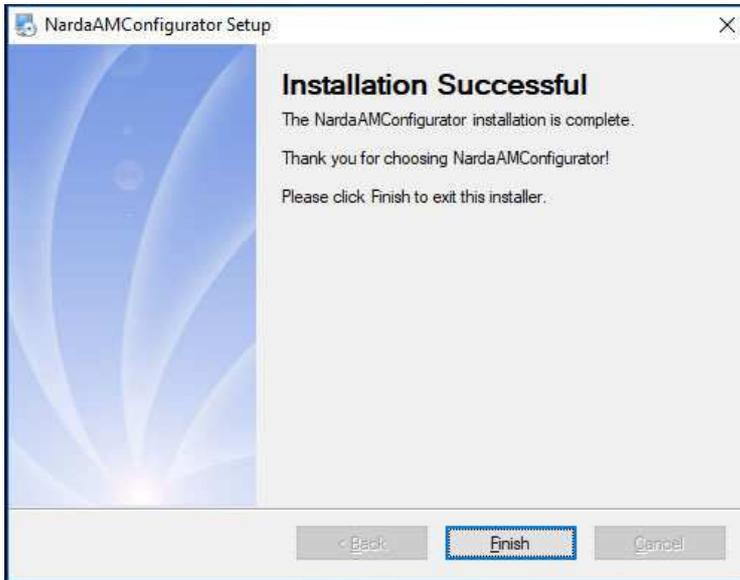
Obviously, this does not occur in case of commands issued via SMS or in case of connection via modem, as the microcontroller is always on when the GSM modem is on stand-by.

It should be noted, also, that the current absorption may be higher than normal, even with the modem off, when:

- Data is required (the microcontroller is working);
- Any commands are sent (the microcontroller is working);
- There is no probe (the microcontroller is constantly in search mode);
- The RS232, USB, Ethernet cable is connected to a port (even if not in use).

2.16 Use of NardaAMConfigurator

The NardaAMConfigurator installation must be performed and the software icon is shown on desktop.



Double click on NardaAMConfigurator icon to run the configurator.



Follow the instructions step-by-step.

The configuration wizard help you to configure all AMB-8059 field monitoring stations:

- Auto-detect the connection of the station to the PC by RS232, fibre optic or USB
- Check the status of battery and the version of the firmware
- Choice of the connection mode and configuration (modem or Wifi)
- Make sure that internet connection (PC side) is established
- Send the demo credentials for FTP connection
- Configure the clock
- Configure the security settings
- Allows to check log files or identify errors during the configuration



Each instructions is explained on the chapter 4 of this manual.

3 – 8059SW-02 and NardaEMFGPSLogger User's guide and Data Display

8059SW-02 – User's guide

3.1 Introduction

The 8059SW-02 software is a control program fully integrated into the AMB-8059 Multi-band EMF Area Monitor. It allows accessing all the remote Field Monitor stations to download data and modify station settings.

Downloaded data are filed within the controller PC and a calendar style search tool allows data displaying, printing and saving in graph and tabled form. The data transfer can be controlled by:

- Fiber optic connection (AMB-8059/00, AMB-8059/01 and AMB-8059/03 model)
- USB cable connection (AMB-8059/01, AMB-8059/02 and AMB-8059/03 model)
- RS232 and Ethernet cable connection (AMB-8059/01 and AMB-8059/03 only)
- WiFi connection (every AMB-8059 model, through the Access Point mode or through the Over IP mode)
- Line or GSM PC modem (AMB-8059/02 and AMB-8059/03 set for Point-to-Point data communication)
- Internet by means of the user's FTP server (AMB-8059 set for FTP data communication)

The software is based on the Windows™ operating system.

The 8059SW-02 software features the following basic functions:

- Querying and monitoring all the AMB-8059 installed;
- Programming different monitoring stations individually with different acquisition modes;
- Querying the Field Monitors at user programmable times;
- Communicating via line modem, GSM modem, Internet FTP, WiFi, RS232, USB or Ethernet;
- Protecting accesses with different keys at different querying levels;
- Controlling and verifying the reliability of the data recorded;
- Protecting the data recorded;
- Acquisition and display of fields detected on different frequency bands (depending on the probe in use), providing for each the average and peak values;
- Saving and manipulating all the downloaded readings;
- Saving graphs and tables representing all the measured data;
- Downloading data with automatic generation of Bitmap (.BMP) and text file (.TXT) to be used for easy data exchange with any "Office" applications;
- Keeping traces of all the commands launched (LOGFILE).

3.2 Hardware Requirements

To ensure the proper operations of the 8059SW-02 software, the minimum hardware requirements of the Personal Computer are:

- Pentium processor or equivalent;
- at least 256 Mb RAM;
- at least 100 Mb of free space on your hard disk;
- minimum display resolution 1024x768 (the Windows™ default screen appearance setting is recommended. Depending on the operating system in use, some customized screen appearance could cause abnormal displaying of the control software);
- WiFi (for AP direct or Over IP Point-to-point, or for FTP communication)
- GSM or line modem (for Point-to-point data communication);
- Full Internet access allowed for FTP (for FTP communication);
- Free USB or RS232 or Ethernet port;
- Operating System: Windows™ Win7, Win8.1, Win10 and Win11.



8059SW-02 control software has been developed to operate properly with different Date /Time formats that can be selected through the Regional Settings of the Windows Control Panel.

Not all the possible combinations has been tested.

A functional test by setting European format (dd/MM/yyyy , HH:mm:ss) is suggested in case a malfunction is noticed.

WiFi must be compatible with the requirements of the IEEE 802.11 b/g.

PC modem can be either internal or external, line modem or GSM. It must support the data transmission protocol.



If a GSM or PCMCIA GSM model with SIM Card is used, it must allow to receive and transmit data, not only on fixed phone numbers but also to and from cellular phones; check with the Telephone Service Provider to make sure this additional service is available.

For proper installation of the modem, refer to the instructions of its manufacturer.

3.3 Software Installation

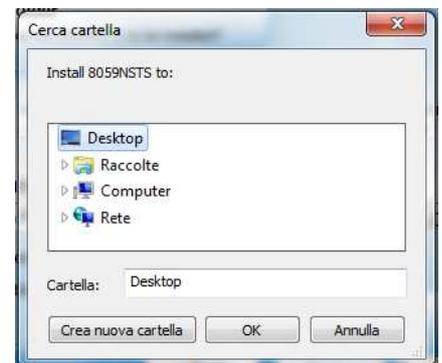
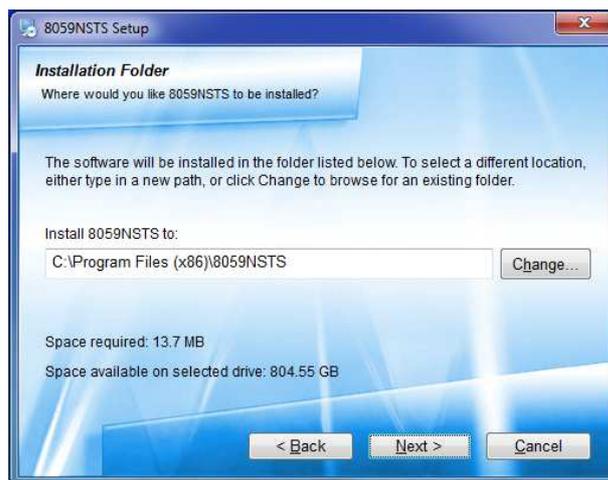
To install the 8059SW-02 on PC, browse the supplied Software Media and double click on the **8059NSTS Setup** icon.

The following Welcome window will appear, click **Next** to start installing or **Cancel** to exit.

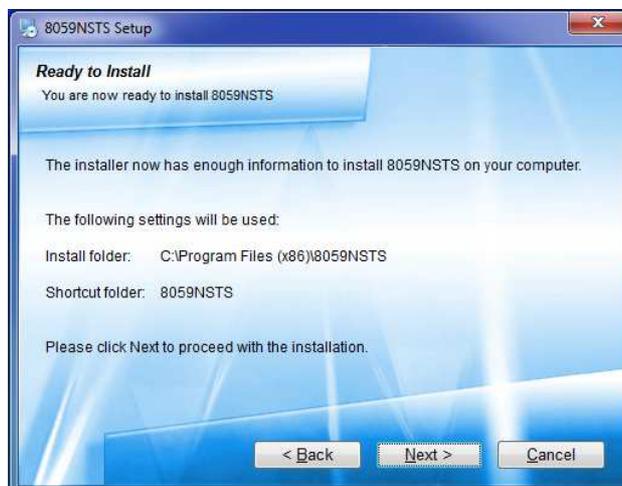


The installation folder must be specified.

Click **Next** to confirm the default folder (recommended) or **Change** to modify.



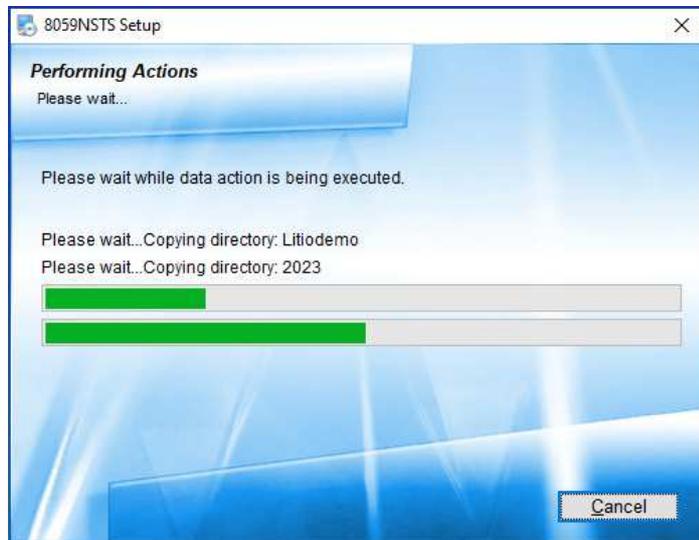
Click **Next** to proceed installing.



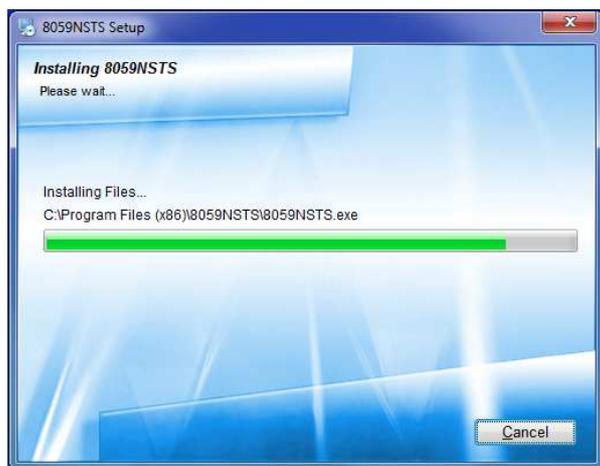
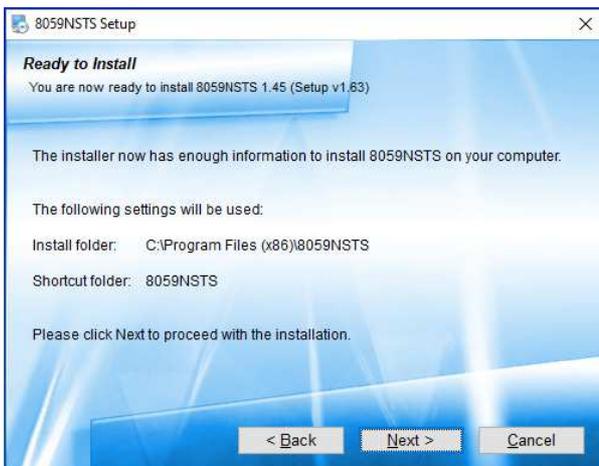
When the presence of the data stored is detected in a folder different from **C:\Users\XXX.XXX\Documents\NardaSafety\8059NSTS**, the following message will appear:



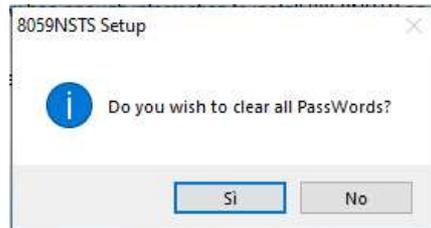
Confirming with **OK** the software will copy the data in the new location.



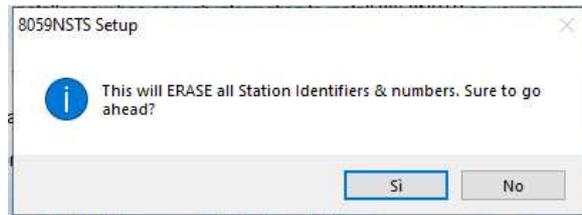
After copying the data, click **Next** to continue. The installing status is displayed:



In case of existing installation, the software will ask to cancel all the Passwords.



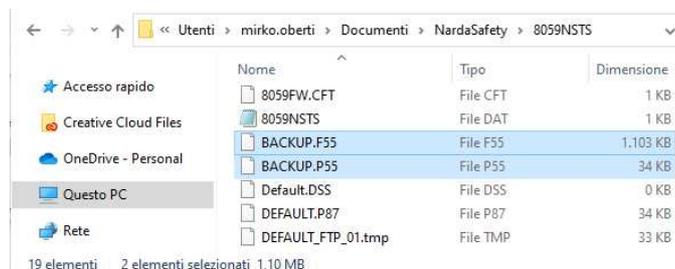
If the answer is **YES**, the software will show another message asking whether to continue, as follows:



Answering **NO**, all the stations, telephone numbers and the respective Device Passwords will be immediately visible to the User.

Answering **YES** again, all the stations and measurements already saved will be hidden and backed up on the folder **C:\Users\XXX.XXX\Documents\NardaSafety\8059NSTS**, but still accessible by adding all the stations used and maintaining the original name (respecting upper and lower case letters) and phone number.

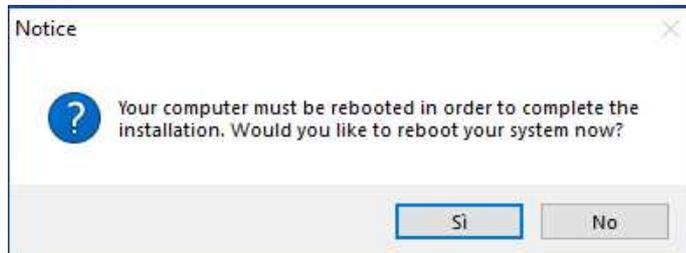
The following confirmation message will appear when the installation is complete:



Click **Finish** to complete and exit the installer.

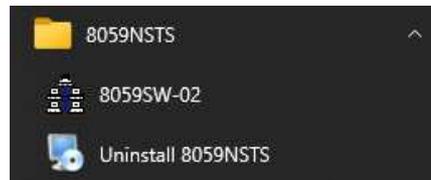


Reboot your system to complete installation.



The folder **8059NSTS** is created under **Programs** with **8059SW-02** executable.

Another item is created in the Programs list at Start Menu, which is “**8059NSTS**”, where the “**8059SW-02**” program must be run from.



The **8059SW-02** icon will be available on desktop



You can remove 8059SW-02, if needed, simply running the **Uninstall 8059NSTS** application (see §3.19).

3.4 Password management

3.4.1 Entering the TERMINAL password

8059SW-02 allows the user to create a list of all stations that are going to be used. The list include parameters, like telephone number, station name, ecc. needed by the software to access every single station. To avoid any improper modification of parameters included in the station list by non admitted personnel a **Terminal password** is needed.

#	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	New8059	0123456789	26/02/15 16.18	0/0	● General
2	020wX50142	0123456789	27/02/15 11.16	0/0	● Battery
3	Narda Safety Test	#####	27/02/15 11.17	0/0	● General

Edit Station # 3

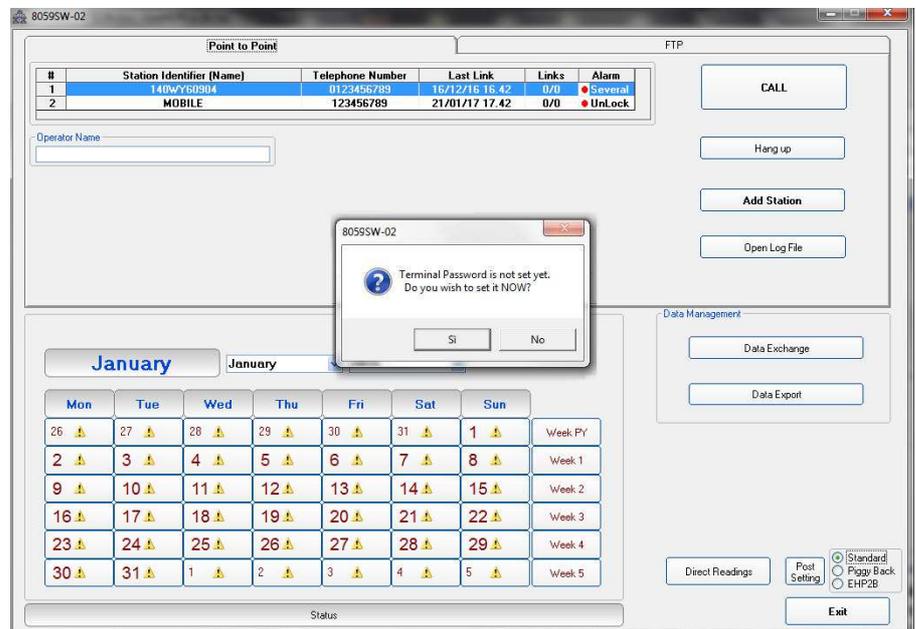
Station Identifier (Name): Automatic Download
 PC Answering

Telephone number: PC Calling

Scheduled Call Device Password:

 Generate Call Hide digits
 Auto ASCII File
 Autoload Events

Running the software for the first time after installation the user is allowed to define the password. The screen looks like this:



If the answer is **YES**, a window will be opened where it is possible to enter the **Terminal Password** for the management of the Station list parameters. If the answer is **NO**, the program will allow to enter the password later.

Every time you have to modify a field, the Terminal Password will be requested by the software. At the beginning, for the first setting operations, it would be helpful to leave these password blank, simply pressing enter on the keyboard.

Set a password only after all your area monitors will be correctly set, and just in case you need to have an higher security level.



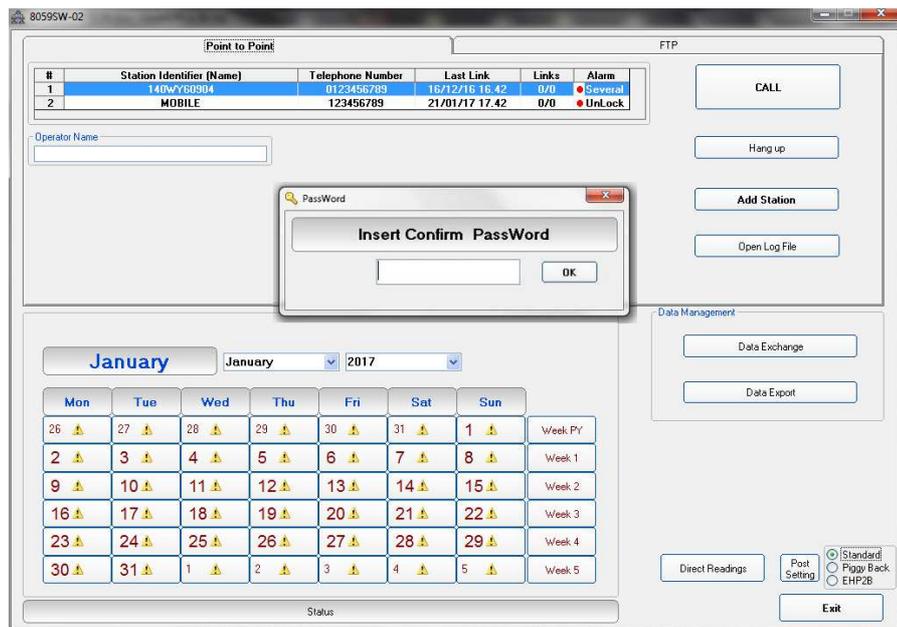
If the answer is **YES**, the screen looks like this:



The User can enter any sequence of alphanumerical characters; any special characters are not allowed. We recommend to take note of the Terminal Password entered.

After entering the **Password** with **OK**, the software will request confirmation of the password before registering it into the system.

The next screen will therefore look like this:



At this point, type the same **Password** again. In case of any mistake, the software will display the following message:



After the answer **YES** it is possible to re-enter the correct password; answering **NO** the procedure for the assignment of a new password starts over again.

3.4.1.1 Changing the TERMINAL password

If it is necessary to change the Terminal Password, just press function key F10 while the software is displaying the main window that includes the station list. The software displays the message:



If the answer is **YES**, first enter the old **Terminal Password**, then enter the new one.

If a wrong **Terminal Password** is entered, the following message pops up::

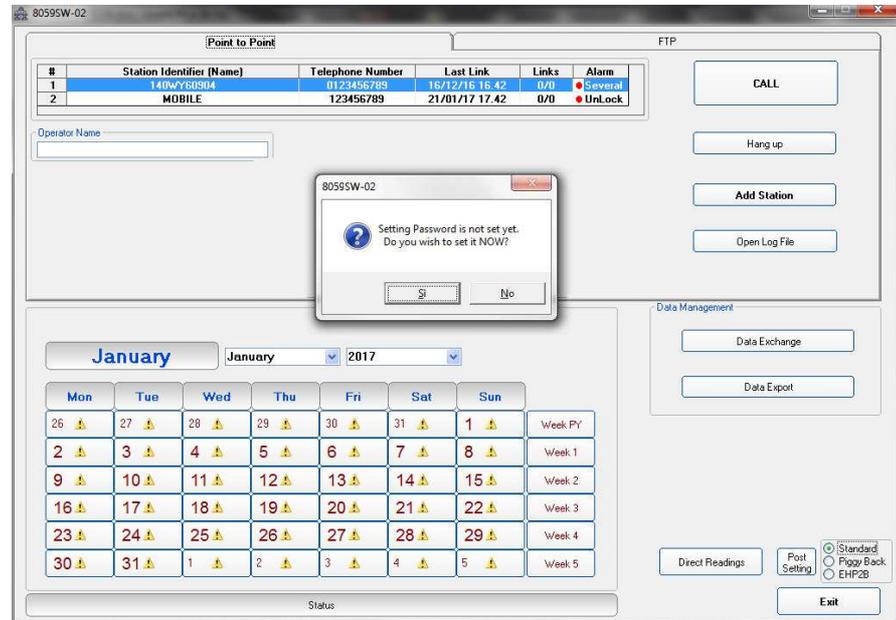


Press **OK** and try again.

3.4.2 Entering the SETTING password

After entering the **Terminal Password** needed to ensure the secure management of the Field Monitors, the software asks to define a **Setting Password** which is needed to edit the station settings (Rate settings, Station Date&Time, Alarm and Warning field Thresholds, Device Password, etc..) on the 8059SW-02 control window (see §3.11).

The **Setting Password** screen looks like this:



If the answer is **YES**, the User will be asked to enter and confirm a new **Password** (which may be different from the Terminal Password). If the answer is **NO**, it is also possible to enter this Setting Password later on, at the time of the first call to the Field Monitor.

Every time you have to modify a field, the **Setting Password** will be requested by the software. At the beginning, for the first setting operations, it would be helpful to leave these password blank, simply pressing enter on the keyboard. Set a password only after all your area monitors will be correctly set, and just in case you need to have an higher security level.



The User can enter any sequence of alphanumerical characters; any special characters are not allowed. Always take note of the Setting Password entered.



3.4.2.1 Changing the SETTING password

If it is necessary to change the Setting Password, just press function key F10 while the software is displaying the station settings window. The software shows the following message:



If the answer is **YES**, first enter the old **Setting Password**, then enter the new one.

If a wrong **Setting Password** is entered, the following message pops up::



Press **OK** and try again.

3.4.3 Entering the DEVICE password

Remote communication in Point-to-point mode is protected by a **Device Password** that is stored in every AMB-8059 Area Monitor; all the monitoring stations are initialized in the factory with the password "PASSPMM" that is advisable to replace during the first connection following these steps:

In Point-to-point communication mode, enter "PASSPMM" in the **Device Password** field in the station list provided by the control software.

#	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	New8059	0123456789	26/02/15 16.18	0/0	Several
2	020WX50142	0123456789	27/02/15 11.16	0/0	Battery
3	Narda Safety Test	#####	27/02/15 11.17	0/0	Several

Edit Station # 3

Station Identifier (Name): Automatic Download
 PC Answering
 PC Calling

Telephone number:

Scheduled Call Generate Call Hide digits
 Auto ASCII File
 Autoload Events

Device PassWord:

Press the **CALL** button to establish the communication. The match between the Device Password memorized in the PC and the one memorized in the station is checked. If they do not match, the communication is not allowed.



Device passwords are not checked during local RS232 or USB or Ethernet communication.

3.4.3.1 Changing the DEVICE password

Once a link has been successfully established, the control window is opened and it is possible to change the Device Password memorized in the station with **Enable Change** button.

The screenshot shows a control window with several buttons and options. In the center, there is a 'Device PassWord' field with an 'Enable Change' button below it. Other buttons include 'Enable Setting', 'Clear Station', 'Update FirmWare', 'Execute', 'GSM Off on Exit', and 'Hang & Exit'. There are also 'OFF' and 'ON' buttons at the top.

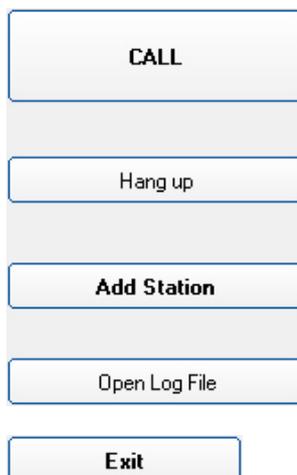
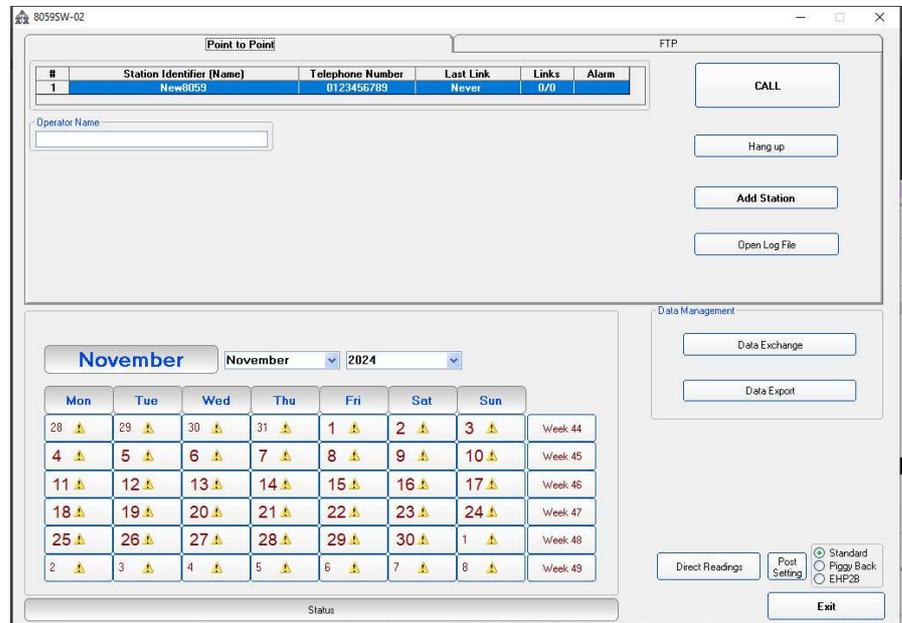
Once the device password has been successfully changed, the same password must be also entered in the station list provided by the control software to allow future communication.

3.5 Point to Point Main window

Once set the station, run the 8059SW-02.

After entering the Passwords, the program displays the main window. Select the **Point to Point** tab.

The first part of the main window is used to select from the list the Field Monitor to be queried. The 8059SW-02 software automatically installs, as an example, a dormant station called "New8059".

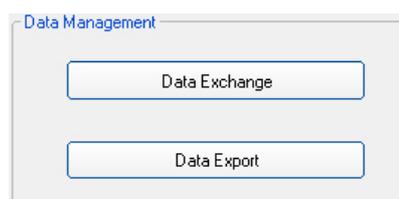


The following commands are also available:

- **CALL** to make a wireless Point-to-point call or start RS232, USB, Ethernet local connection to the station selected;
- **Hang up** to end the call/connection in progress;
- **Add Station** to add a new AMB-8059 Area Monitor to the list;
- **Open Log File** displays all settings and main activities automatically and manually downloaded from the station
- **Exit** to exit the program.

A "Data Management" window contains the following commands:

- **Data Exchange** to exchange data with other control centers (i.e. other PC's);
- **Data Export** to generate .txt and .bmp files of measurement results related to user selectable time periods.



The list of remote stations contains the following information:

#	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	New8059	0123456789	Never	0/0	

- **Station Identifier (Name):** the name of the monitoring station;
- **Telephone Number:** the phone number of the station SIM card;
- **Last Link:** date of the latest connection made;
- **Links:** number of completed connections/number of trials;
- **Alarm:** alarm status relative to latest link.

The status of alarms relative to latest link, in the last column, is normally empty if there are no alarms. A red dot is displayed, followed by a description of the type of event causing the alarm in case of just one alarm. If more alarms occurred, to avoid overcrowding the column the word "**Several**" is displayed: simply move the mouse cursor above the description to display the list of all the alarms.

Telephone Number	Last Link	Links	Alarm
23456789	26/02/15 16.18	0/0	• Several
23456789	27/02/15 11.17	0/0	• Battery
23456789	27/02/15 11.17	0/0	• Several

Operator Name

The name of the operator can be entered in the **Operator Name** field, so as to maintain a log of the operations performed by who requested them.

3.6 Station management

3.6.1 Entering a new station

To make a call or download data from an existing Field Monitor, it is necessary to use the **Add Station** command and add the station to the list. The screen looks like this:




The 'New Station' dialog box contains the following fields and options:

- Station Identifier (Name):** Text input field.
- Telephone number:** Text input field.
- Scheduled Call:** Includes a 'Time' input field and a 'Generate Call' checkbox.
- Device Password:** Text input field.
- Automatic Download:** Includes checkboxes for 'PC Answering' and 'PC Calling'.
- Remove Station:** Button.
- Options:** Checkboxes for 'Hide digits', 'Auto ASCII File', and 'Autoload Events'.

The procedure to add a station is as follows:

- Enter the station name (alphanumeric ASCII characters only) on the **Station Identifier (Name)** line. This name will be recorded in the station memory the first time it is queried. It will also appear on the display of your mobile phone every time the station is queried via SMS or shown in the SMS/EMAIL delivered for alarm notification or when that station sends its daily Reports.
- Enter the **Telephone number** of the SIM card installed in the station (SIM cards allowed for CSD data communication are generally provided with three different numbers: Voice call, Fax, Data. Be sure to type the number assigned for CSD data communication); **the field Telephone Number must be filled even if the CSD communication mode is not desired or provided. Type a number string like "0123456789" to add the new station to the station list.**
- Enter the **Device Password** identifying the station to allow CSD remote communication.
- If necessary, select one of the **Automatic Download** functions to start downloading data automatically every time a remote station calls the controller PC (**PC answering**) and /or every time the controller PC calls a remote station (**PC calling**).
- Select **Auto ASCII File** function if you want a data txt file to be automatically generated after any data download has been completed.
- In the **Scheduled Call** field, enter a **Time** when the PC, if enabled with the **Generate Call** function, automatically calls the station in CSD mode.



The Terminal password will be requested for every operation.



The 'Insert Terminal Password' dialog box features a title bar with a key icon and the text 'PassWord'. The main area contains the text 'Insert Terminal Password' above a text input field. An 'OK' button is located to the right of the input field.

If a wrong **Device Password** is entered, the following message appears when trying to access the remote station in CSD mode:



Entering the Device Password prevents the station from being queried by any unauthorized person who might in some way to know the User telephone number.

This Device Password is unnecessary only when connection is made via cable (RS232 or USB).

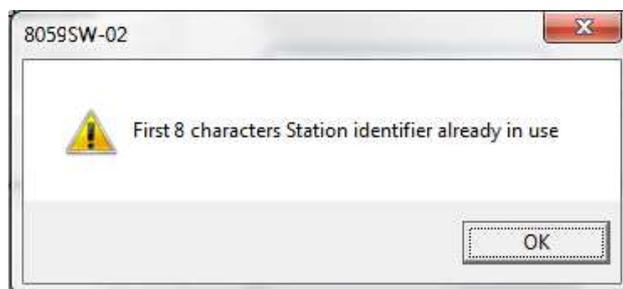
Device Password is requested for every access through Modem or SMS, while it is not necessary when a direct connection via RS232 or USB is performed. However, in particular conditions listed below, the Monitoring Station becomes inaccessible with direct RS232 or USB connection even if the Password is entered, while it remains normally accessible, of course, with Password authentication via Modem.

These conditions are:

- Spontaneous call from the monitoring station (upon appointment or alarm) not successfully completed. In this case the station is not accessible via RS232 or USB for all the period in which the station tries to make a connection. This period may last at most 30 minutes.
- Spontaneous transmission of SMS from the station (upon appointment or alarm). In this case the station is not accessible via RS232 or USB for additional 2 or 3 minutes after a successful sending of the SMS.



The first 8 characters of the Station Identifier (Name) must differ from those of any other stations already entered. If they do not, the following error message will be displayed:



3.6.2 Removing a station

To remove a station from the list, click **Remove Station**. The message is:



If the answer is **YES**, the software will require to enter the Terminal Password, and the station will be deleted; if the answer is **NO**, the operation will be aborted.



Removing stations from the station list does not erase measurement results that will be still available if the same Station Identifier (Name) is added again to the station list.

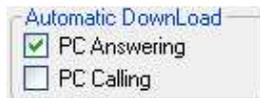
3.6.3 Editing a station

To change the name or telephone number of a station, click twice on the line relative to the station to open the following window:



It is now possible to edit the necessary data, enable or disable automatic download functions or automatic creation of .TXT files, or change the status of the function relative to data display (name and telephone number). For each of the above operations the program will require to enter the security Terminal Password.

3.6.5 Answering



By enabling the command PC Answering, at the scheduled time, the station enabled for Point-to-point communication calls the modem connected to the PC and automatically downloads all its data.

To program the station to do that, proceed as follows:

- Access the station by pressing **Call**;
- Wait for the connection to be established;
- When the software displays the configuration of the station, use the command **Enable Setting** and enter the Setting Password;
- Eventually, in the window **Schedule for MODEM**, write the telephone number the station has to call (PC modem). 2 different telephone numbers can be entered, that will be called in sequence. The first of these number that will answer and secure a communication will receive the data. This means that the data will be downloaded only on a PC that is switched on, with the modem enabled, and that is running the software;
- In the **Time (HH:mm)** window, enter the time when the call has to be made (of course the PC and modem must be on at that time);
- In the **Stand BY (H)** window write for how long the GSM modem must stay on. To save battery power, select the shortest possible time. Writing 00, the station switches the modem on, sends the data and switches it off immediately;
- In the window **Every (H)** enter a submultiple of 24 hours defining the daily rate at which the operation has to be repeated;
- The function **Originate CALL** should be **ON**. If **OFF** is selected, the modem will be switched on but no call will be made.

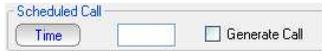
On receiving a call via modem from a station, the 8059SW-02 software requests that the calling station identifies itself and on the basis of the response string, it proceeds as follows:

1. If the ID (Name assigned to the station) of the calling station is on the list of known stations, the 8059SW-02 prepares to receive the data in the corresponding directories;
2. If the ID is not in the list of known stations, the 8059SW-02 adds the new station to the list (leaving the telephone number field empty) and creates the directories to receive the corresponding data;
3. If the ID is not provided or does not respect the protocol (e.g. a call by a telephone), the 8059SW-02 put itself in stand-by.

After having identified the calling station, all the parameters are requested in order to trace the call in the proper log, and after that all the field data since the latest successful link are requested, so as to ensure continuity of the downloaded data.

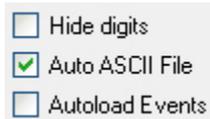
After the download of the data, the software sends the hang-up command to the station to minimize link time and make itself available for another call.

3.6.6 Calling



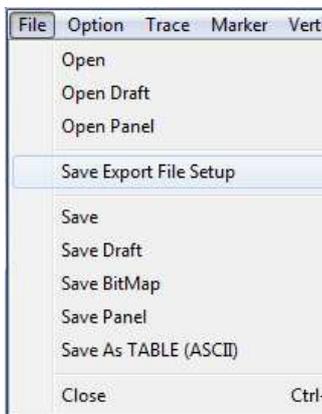
When the **PC Calling** function is enabled, every time the station is called using the CALL or “Scheduled CALL” commands, the data present on the station - and recorded since the latest download - will be automatically downloaded to the PC. This can be very useful because it makes unnecessary to remember the time of the latest download. After having completed the automatic download, the station does not hang up immediately but remains linked until the call is ended either manually or for 2 minutes after the last operation.

3.6.7 Auto ASCII File

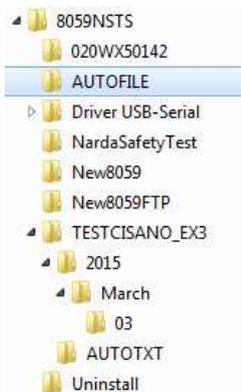
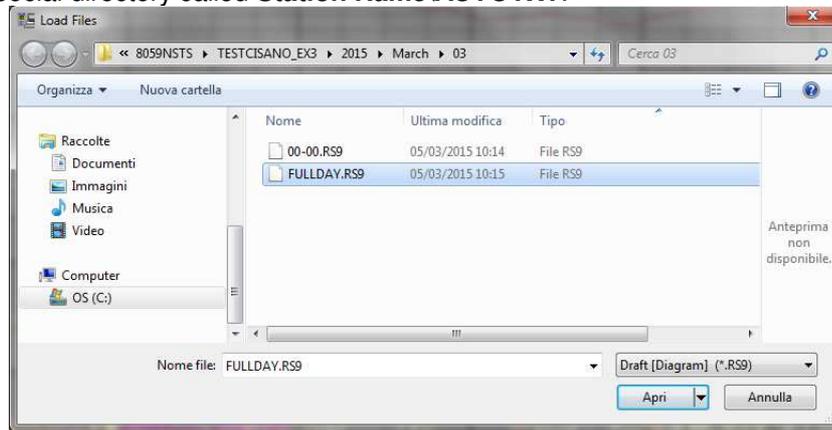


Select **Auto ASCII File** to automatically generate an ASCII file and, if enabled, a .bmp file too, containing all the information relative to the data downloaded; the format will be the same adopted with the “**Save Export File Setup**” function, when displaying monitoring results starting from the calendar.

When displaying results, the function “**Save Export File Setup**” is available on the main menu, under the File menu command.



When a call, either incoming or outgoing, is reported by the station and the data are downloaded manually or automatically, all the files normally placed in the directory **Station Name\Year\Months\Day** are also copied in the special directory called **Station Name\AUTOTXT**.



When all the data have been downloaded, the files in the directory **Station Name\AUTOTXT** are grouped in a single file **.RS9** which displays a graph having as its starting and ending the date and time of the download. This will be used to create the file **.TXT** that identified with a specific name containing the time and date of the download and the serial number of the station generating it, will be saved in a special directory called **AUTOFILE**, common for all the stations and placed at the same level as their specific directories.

The file name appears in the following format:

POSTAZIONEserialnumber_FROM_YYYY-MM-DD_HH-mm_TO_YYYY_MM_DD_HH-mm.TXT

Every time the data are downloaded with the **AUTO ASCII FILE** function enabled, a new **.TXT** file will be created with a specific name, saved in the **AUTOFILE** directory and containing the data acquired by the station from the **Start** to the **Stop** time of the download.

If you enter the command **/AUTOBMP** in the destination field of the properties with the **AUTO ASCII FILE** function enabled, the software provide a **.txt** and **.bmp** file at the same time. The bitmap is created with the settings used to create the same file for the manual mode.

It will be saved in the **AUTOFILE** directory and placed at the same level of the txt file.

3.6.8 Autoload Events

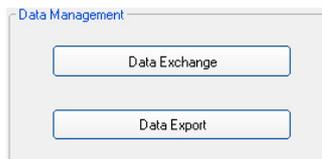
- Hide digits
- Auto ASCII File
- Autoload Events

The AMB-8059 Area Monitor Broadband can save a certain number of events in its internal memory, so as to ensure traceability (independent from the operations of the control center) with regard to the settings and main activities of the station. These events can be downloaded from the station, displayed in text format and copied into the mass memory of the control center to keep updated the station history.

The option **Autoload Events** facilitates this task as, every time the station is contacted, it is automatically asked for all events not already downloaded. It is important to know that to increase the reliability in case of sudden interruption of the call, at each connection the events request is made at two separate times. The first request is made at the end of reception of the setting parameters and the second is made immediately before receiving the hang-up command. This ensure that all events are downloaded even in case of problems during the connection (which may be interrupted before all operations have been completed) and at the same time ensures that all events recorded after the connection in progress will also be received.

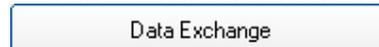
3.7 Data management

3.7.1 Filing data



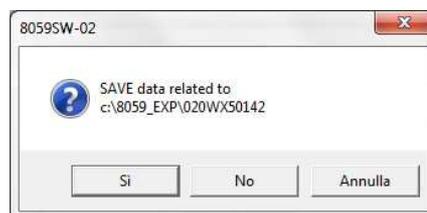
The **Data Exchange** key is used to file the data saved and import them later on to other control centers.

Selecting this key the following options are displayed:



When exporting data, after the selection of the type of support, the data are automatically saved in a directory called 8059_EXP.

Select **Selective storing** to enable the program to select which data to export, as shown in the figure below, otherwise all the data found will be exported.



Exported data can be easily imported by the 8059SW-02 control software installed in a different PC by selecting device containing exported data and clicking the "Import" button.

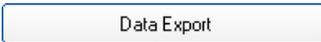
Importing data creates a directory which name correspond to the Station Identifier (Name) selected from the station list before exporting data.

If not already present, a new station, with the same Station Identifier (Name) should be added to the station list in order to be able, through the calendar, to display measurement results.



3.7.2 Exporting data

The **Data Export** function creates text files and, if enabled, .bmp files related to the time range specified by the user:



After selecting the desired time range (From date – To date) click the **Export** button to create, in the **AUTOFILE** directory, the following text files:

- A text file reporting the events relative to the control center in the selected period. This file is saved as AUTOFILE\PC_LOG.TXT;
- A text file reporting the events relative to the station in the selected period. This file is saved as AUTOFILE\8059_LOG.TXT;
- A text file and, if enabled, a .bmp file, reporting the data records (field strength, battery voltage, temperature, alarms, etc.) formatted as in the menu for the selected range. Indeed, the file is the same one produced automatically with the option Auto ASCII file except that, instead of referring to the period downloaded, the period can be specified manually. The file name appears in the following format:

POSTAZIONEserialnumber_FROM_YYYY-MM-DD_HH-mm_TO_YYYY_MM_DD_HH-mm.TXT

On opening the Data Export window, the initial date and time shown by default are the date and time of the latest export of the station: it is therefore possible to export in a very easy way all the data collected in the correct chronological sequence without having to remember the latest operation.



The maximum time interval that can be processed by the Data Export function is one month.

3.8 Direct readings

Direct Readings

When the station is connected to the controller PC through the RS232 or USB cable, the **Direct Readings** button is used to open a window where it is possible to immediately read the basic station data. With this function the User can read the field values acquired by the station without post-processing them; that is, without any RMS or arithmetic average, or maximum. The data, which can be requested at any time, are updated by the station 20 times per minute (every 3 seconds) so a higher reading frequency will produce only redundant data.

SingleBand Probe is shown below as example.



In case of using DualBand Electric and Magnetic probe, both field value will be shown and the **Standard** drop-down menu is enable (see §3.12.1.4).



Instead, in case of Dual-probe configuration both results will be displayed.



Get

The "Get" button is used to request the field value of different frequency bands (depending on the probe), battery voltage and temperature.
The **Auto Repeat** option with a value **nn** indicated in **Get every** is used to request the values automatically every **nn** seconds.



Log Data

The "Log Data" command allows to record the set of values read in a text file, in order to save the data to process them, if necessary, at a later time.
To start the save, press the Log Data button. Press again to stop saving.
The actual status is shown in the window at the bottom (Getting Data)

3.9 Send settings



Select the AMB-8059 configuration (Standard or Dual-Probe or DualBand) and click on **Post Settings** key to open a window where settings can be defined for the selected station.

This presetting operation allows to change the settings even if the station cannot be contacted at the specific moment, for any reason. All the settings are saved temporarily and sent to the station during the first link.



The presetting window shows the status of the station as it was during the last link or just after the latest modification of the parameters. Every change is saved in the order made, regardless of whether it may be redundant or contrary to the previous one. The command "**Remove All Postponed Settings**" cancels every setting saved and ready to be sent at the first available link. To prevent the data already stored in the memory of the station become meaningless because a change of settings, the presetting commands are sent to the station only immediately before the hang-up command.

3.10 Calendar of measurements

The calendar, created automatically by the 8059SW-02 software, always shows the current month and year and is used to select and display in graphical form the data downloaded from the Field Monitoring station, simply by clicking the button of the desired day or week.



Only the buttons with blue characters contain data, which has been previously downloaded from the station.



Days or weeks with red characters are empty; in this case the symbol  will be displayed close to the days.

By selecting a day with right click mouse, the User can delete the measurements downloaded on that day, week, month, year or all station data (the corresponding directory will be removed from the installation folder).



The last part of the main screen contains a status bar showing additional information relative to the operations in progress, and the program **Exit** button.

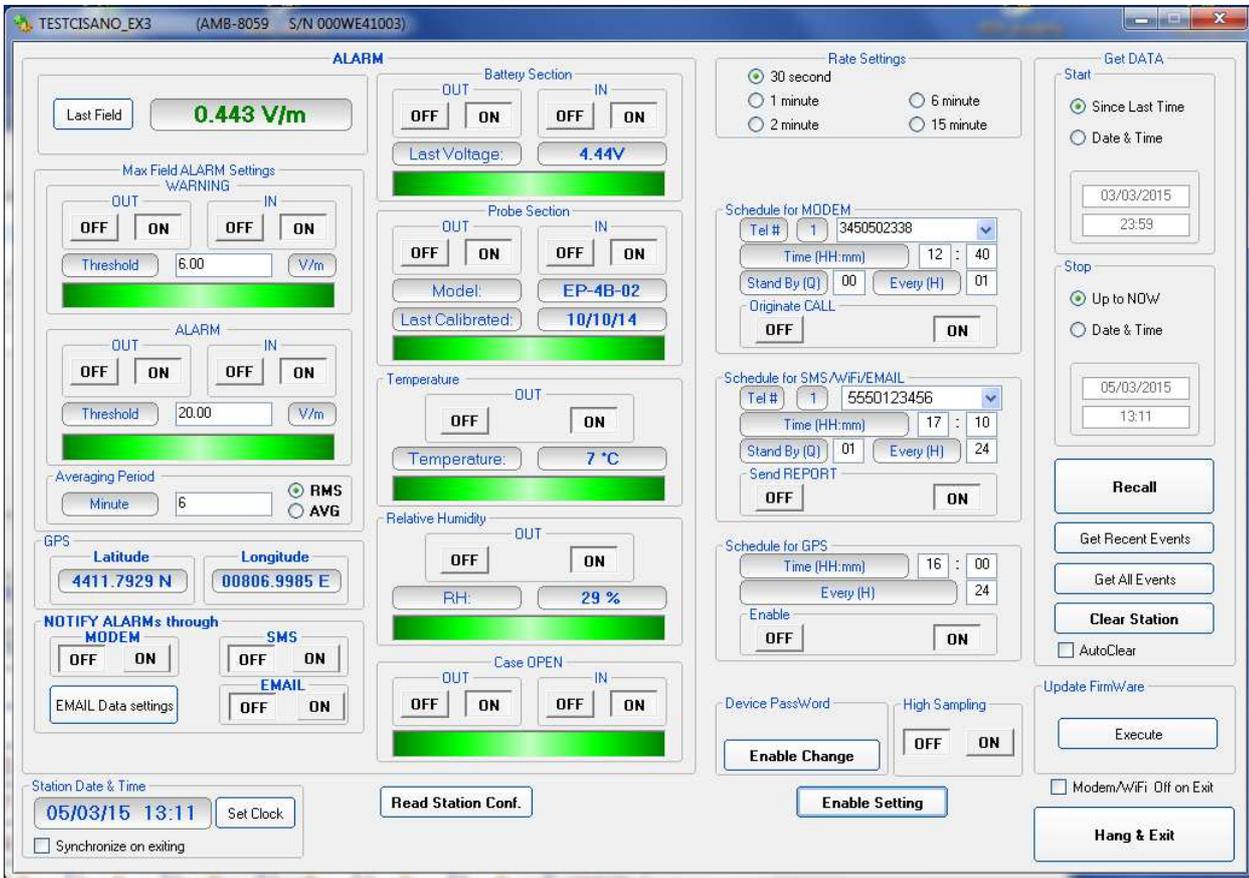


3.11 Control window

Once a link has been successfully established, in Point-to-point mode, the control window is opened for the selected station and it is possible to:

- Check the settings and parameters of the station;
- Edit the settings (function protected by the Setting Password);
- Download measurement results to the PC;
- Change the Device Password (needed for calls in CSD mode only).

The control window looks like this:



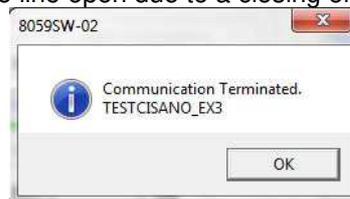
The above labels refer to QuadBand probe. The “Last field” (see §3.12.1.2), “Max Field ALARM Setting” (see §3.12.1.5) and “Probe section” (see §3.12.1.7) may change in case of using different probes or configuration.



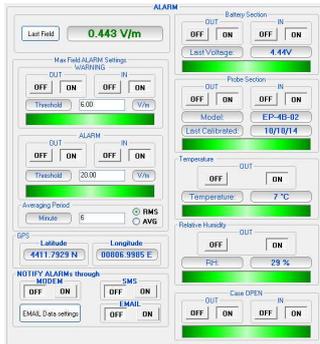
The “Standard” drop-down menu is enabled (see 3.12.1.4) on the Alarm section when the DualBand Electric and Magnetic probe is connected.



After two minutes of inactivity, the GSM link will be ended automatically. This will prevent keeping the line open due to a closing error or simple omission.



3.12 Description of controls

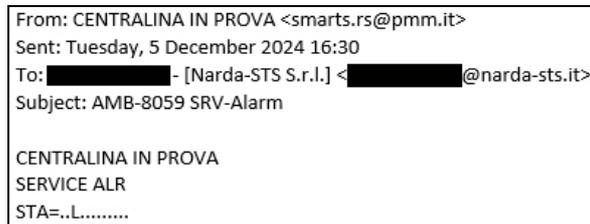
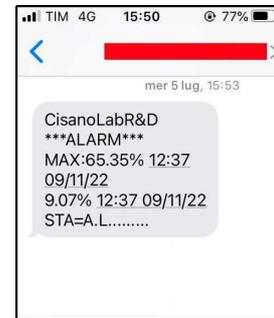


The control window is divided in different zones grouping the available commands by type and function:

ALARMS divided in:

- Last Field
- WARNING
- ALARM
- Averaging Period
- Battery Section
- Probe Section
- Temperature Limit
- Relative Humidity Limit
- Case OPEN
- NOTIFY ALARMS through
- Standard (enable for EHP-2B model probe only)

The software is also enable to notify alarm via **EMAIL** or **SMS** (see §3.12.1.1 and §3.12.3); for each alarm a string is sent and for full list see ?STA command on pag. 5-13 .



Rate Settings consisting of the options:

- 30 seconds
- 1 minute
- 2 minutes
- 6 minutes
- 15 minutes

The Rate Setting affects use of the memory and battery duration.



Schedule for MODEM divided in:

- Telephone number (ignored for WiFi connections)
- Time (HH:mm)
- Stand by (Q) indicated in number of quarters of an hour; this value affects battery duration
- Every (H)
- Originate CALL

Up to 2 fixed phone numbers can be programmed. The first phone number which is free and allows the data download will interrupt the search for the other number.

This schedule works also for the WiFi modem; in this case the telephone number is ignored.



Please refer to paragraph 3.12.2 of this manual for further information of using Schedule for MODEM function.



Schedule for SMS/Wifi/EMAIL divided into:

- Telephone number (ignored for WiFi sessions)
- Time (HH:mm)
- Stand by (Q) indicated in number of quarters of an hour; this value affects battery duration
- Every (H)
- Send REPORT

At the scheduled time the report is sent by SMS to two programmed mobile phones or delivered by EMAIL to the recipient address entered on **EMAIL Data settings** section.

In case of WiFi interfacing, this is the schedule for AP mode (direct Access Point connections to the station).

Please refer to §3.12.1.1 **EMAIL Data settings** and §3.12.3 **Schedule for SMS/Wifi/EMAIL** for further information

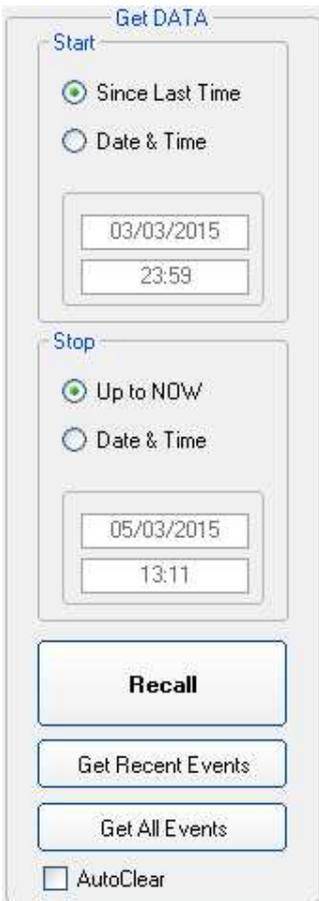


For each alarm a string is sent to mobile phones programmed; for full list see ?STA command on the pag. 5-13.



Schedule for GPS divided into:

- Time (HH:mm)
- Every (H)
- Enable



Get DATA divided in:

- **Start** with the subcommands
 - Since Last Time
 - Date & Time
- **Stop** with the subcommands:
 - Up to NOW
 - Date & Time

The starting date must be coherent with the Rate selected and not later than the Stop date.

If measurement results related to a period longer than the capacity of the memory, or data no longer contained in the memory (because overwritten) are requested, the software will show a warning message.

The **Stop** date must be later than the Start date otherwise an error message will appear.

Recall
It is used to start downloading results acquired in the period from Start to Stop settings.

Get Recent Events
This command manually recalls all the events that have not yet been downloaded, and appends them at the end of the relative file. This command shall be considered the manual alternative to the option **Autoload Events**.

Get All Events
The command manually recalls all the events available on the station and appends them at the end of the relative file. Though this does not create any problems, no control of redundancy is made, so repeatedly selection of the command may lead to repetitive information.

Auto Clear
Enables total cancellation of the data in the station memory after complete downloads. When this option is enabled, after every complete download up to the time and date indicated in **Get Data**→ **Stop**, the software sends a request of complete cancellation (SCAM) of the data in the memory and, if there are no errors, the request is accepted by the station, which clears its memory. Obviously, once the data have been cancelled they cannot be recalled anymore.



The AMB-8059 has a built-in GPS which allows tracking its position. Data is reported in a NMEA RMC sentence according to NMEA 0183 ver 3.01. As for example, the Latitude in the picture corresponds to 44° 04' 29" when indicated in degrees, minutes and seconds

Although the GPS circuitry is at the state-of-the-art to keep power consumption extremely low, in comparison to AMB-8059 average battery drawing, the required power is higher than the whole consumption, similar to the modem situation.

Therefore, the GPS should not be kept permanently on but instead it should be turned on only when necessary.

The AMB-8059 has an efficient way to use the GPS by turning it on when required and switching it off as soon as the position has been fixed (or when it has timed out).

Whenever the station is switched on, the GPS is turned on as well allowing thus tracking the position at first installation. Once the fix is made, or the tracking has timed out, the GPS is turned off. After that, the information is available at any time via all ways (SMS, RS232, USB, FTP, Ethernet and MODEM Point-to-point).

Under normal conditions, this is sufficient to have the coordinates related to the station and covers the majority of installations.

In addition to that, there is a specific command, GOI, which forces the GPS ON. Again, the GPS will stay on until a fix is made or a time out occurs.

Optionally, by adding an 'F' to the command, becoming GOIF, when the GPS is off, it will also send an SMS to the numbers stored in the sms-directory having thus an immediate feedback.

This feature can be used for example when a station is prepared and closed in a lab and is only afterwards moved to its final location.



Chapter 5 of this Manual describes in detail all the commands, the messages available via SMS .

Moreover, there is the possibility to schedule GPS activity by means of specific settings (see **Schedule for GPS** at pag. 3-48)



Station Date & Time with subcommand

- **Set Clock**, to transfer the current date of the PC to the station
- **Synchronize on exiting**, to make the above function (updating time and date at the end of every link) automatic.

3.12.1 ALARM



Stations equipped with GSM modem are able to notify alarm condition by sending SMS or EMAIL or starting a CSD call to the controller PC. Stations not equipped with GSM modem are not able to notify alarm conditions that are anyway recorded along with measurement results. Measurement results downloaded from any station include therefore information of any alarm occurred during the monitoring activity.

Depending on the local laws, the place of installation, the climatic conditions, the availability of sunlight and the duration of measurement, certain alarms should be enabled for the control and proper operation of the field monitor. In addition, if the station is installed in what is defined as a “sensitive” locations as regards electromagnetic fields, the alarm for exceeding the threshold defined by law should be enabled to ensure control almost in real time.

Any alarm notification can be set on a dual threshold, with reference to the occurrence of an event (**OUT**): i.e. exceeding a threshold; and upon regaining normal conditions (**IN**).

OUT: enabled (**ON** pressed) or disabled (**OFF** pressed) notifies you of an alarm in the following cases:

1. On exceeding a threshold setting for attention (Warning)
2. On exceeding an alarm threshold (Alarm);
3. When battery voltage is too low (e.g. <2,9 V for AMB-8059/02) or too high (e.g. >5,0 V for AMB-8059/03);
4. When one or more field probe parameters is faulty;
5. On exceeding the temperature limit inside the field monitor;
6. When the data memory is almost full
7. When the external container is opened.



Whenever an alarm occurs, the GSM modem will remain on for 30 minutes to enable the operator to send an SMS message, query the station and download the data.



IN: enabled (**ON** pressed) or disabled (**OFF** pressed) notifies you that normal conditions have been restored.



Both “OUT” and “IN” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01)



When the monitoring station is off, the alarms are shown as off when the station is switched on again.

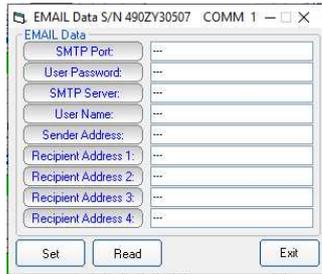
3.12.1.1 NOTIFY ALARMS through and EMAIL Data settings

Stations equipped with the GSM modem are able to notify alarm via SMS or EMAIL or CSD calls. This occurs only if the **ON** function is pressed in the **NOTIFY ALARMS through** window.



Notification of alarms via **MODEM** will be sent to the first number listed on Schedule for MODEM that answers the call (see §3.12.2).

Notification of alarms via **SMS** will be sent up to two mobile phones listed on Schedule for SMS/Wifi/EMAIL (see §3.12.3)



Notification of alarms via **EMAIL** is delivered to the recipient address entered on the **EMAIL Data settings** window; in addition, the user can set which SMTP Server manage the email to notify alarm condition:

- SMTP Server IP address.
- SMTP Server Port.
- User Name and User Password of the email account.
- Sender Address: It is the “From” address used to send emails.
- Recipient(s) Address: the mailing address of the intended recipient.

The **Read** button shows the actual Email data configuration on the station.

When both Modem and SMS/EMAIL notifications are enabled, priority is given to the Modem.

For each alarm a string is sent; for full list see ?STA command (pag. 5-13).



“MODEM”, “SMS” and EMAIL must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01)



For each one of the 7 alarms there is a bar in the control window that shows by its color the current status of the respective alarm, regardless of whether notice via modem or SMS or EMAIL is enabled or disabled:

- RED:** alarm condition activated;
- GREEN:** alarm not active.

3.12.1.2 Last Field

Displays in green the field averaged in the latest minutes as set in the **Averaging Period** field (see §3.12.1.3); the value turn red when the field strength is above the ALARM thresholds (see §3.12.1.5).



AMB-8059/02 and AMB-8059/03 can be remotely queried by mobile phone sending the following SMS message to the station: #BM?LFA*

In case of using DualBand Electric and Magnetic probe, the Last Field value will show both field value.

Instead, in Dual-probe configuration the Last Field value will display the field measurement of both probes; in the example below the HP-1B-01 is set as **primary** probe and an EP-1B-03 can be installed as **secondary** one.



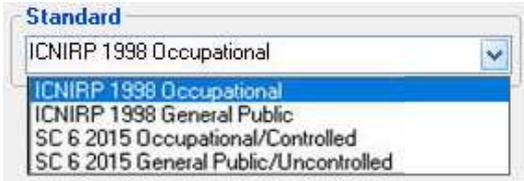
3.12.1.3 Averaging Period

Defines the time period on which the average of the field levels will be calculated. The average can be arithmetic (AVG) or quadratic (RMS).

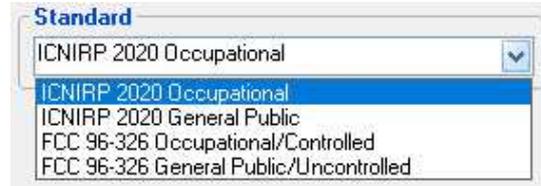


**3.12.1.4 Standard
(for EHP-2B probe only)**

The **Standard** drop-down menu is used to load a default standard limit saved into the memory at the factory. Default limit list shows limits that are compatible to the EHP-2B model probe connected.



EHP-2B-01 and EHP-2B-02
Standard limit



EHP-2B-03 and EHP-2B-04
Standard limit

**3.12.1.5 Max Field
ALARM Settings**

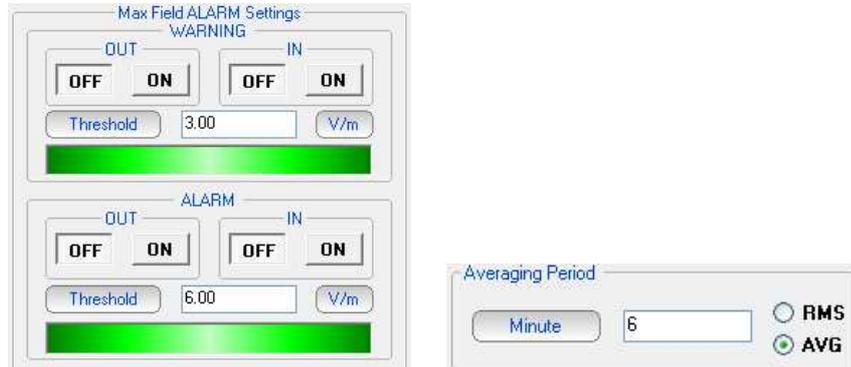
The field monitor features two warnings: field strength thresholds that can be set to define “WARNING” and “ALARM” conditions.

On exceeding one of these thresholds, the station is able to notify alarm condition by SMS or EMAIL or starting a CSD call to the controller PC. This occurs only if the **ON** function is enabled in the **NOTIFY ALARMS through** window.

Select **ON** to enable the station to notify alarms and select **OFF** when no action shall be taken.

The **OUT** function is used to control the exceeding of the alarm threshold setting; select **IN** to control the return of the electrical field values below the set value.

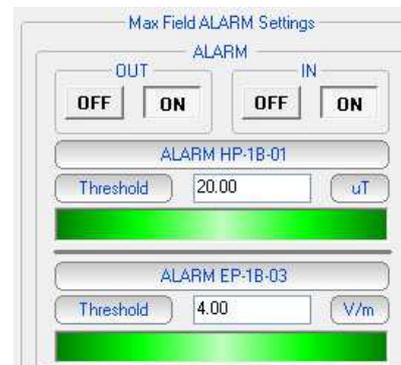
In this example an alarm will occur when the field exceeds 3 or 6 V/m averaged on the time period defined with the option Averaging Period. Thus, brief but intense field variations will not necessarily cause any alarms if the averaged value (in this example on 6 minutes) does not exceed 3 or 6 V/m.



In case of using DualBand Electric and Magnetic probe or Dual-probe configuration, both Last Field value are continuously compared with the Alarm thresholds, set by the user, to determine whether any field alarm condition is occurring.



Max Field ALARM Settings
with DualBand E/H probe



Max Field ALARM Settings
in Dual-probe configuration

3.12.1.6 Battery ALARM section

The internal control system of the Field Monitor features a voltmeter for continuous measurement of the battery voltage. This function ensures constant control of the power situation for correct operation of the system. Settings are made as for all the other alarms.



For the model AMB-8059/00 and AMB-8059/02, the default values of the battery alarm are 3.00V (Threshold minimum) and 3.9V (Threshold maximum).

When the SD CARD led blinking orange (see table 2-1 on pag. 2-22) the battery must be replaced as described on the § 1.7.4.



For the model AMB-8059/01 and AMB-8059/03, the default values of the battery alarm are 3.9V (Threshold minimum) e 5.02V (Threshold maximum).



The bar turns red when the value is below the minimum or above the maximum and if the alarm notification is enabled an appropriate message will be sent via SMS or EMAIL.



Stations equipped with the GSM modem can be remotely queried for this value using a mobile phone and sending to the station the SMS message: #BM?BAT*



Both “OUT” and “IN” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

3.12.1.7 Probe ALARM section

The following section displays the field probe in use and its calibration data.



The bar turns red when any probe parameter does not function properly and if the alarm notification is enabled an appropriate message will be sent via SMS or EMAIL.

The characteristics of sensor used by a specific station equipped with GSM modem can be read by any mobile phone by sending the SMS message: #BM?PRB*.

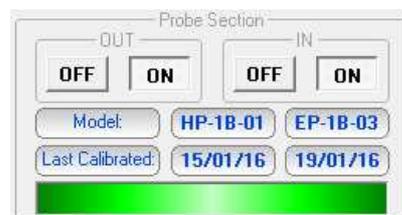


Both “OUT” and “IN” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

In Dual-probe configuration the “Probe section” shows model and calibration date of both probes.



The Probe alarm is always referred to the secondary probe only.



3.12.1.8 Temperature limit

The monitoring station features a thermometer for the measurement of the internal temperature, in order to have constant control upon the environmental conditions affecting the correct operation of the system. The setting is made as for the other alarms.



Minimum temperature alarm threshold = 0 °C
Maximum temperature alarm threshold = 50 °C

The Temperature thresholds can not be changed.



The internal temperature of stations equipped with the GSM modem can be remotely queried using a mobile phone and sending to the station the SMS message: #BM?TMP*

It returns the response in the following format: #BM TMP=tt,rh*

The first value read on the phone is the temperature expressed in degrees Centigrade.



“OUT” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

3.12.1.9 Relative Humidity limit

The monitoring station also features a hygrometer for the measurement of the internal Relative Humidity, in order to have constant control upon the environmental conditions affecting the correct operation of the system. The setting is made as for the other alarms.



Relative Humidity alarm threshold > 95%.

The Relative Humidity threshold can not be changed.



The internal Relative Humidity of stations equipped with the GSM modem can be remotely queried using a mobile phone and sending to the station the SMS message: #BM?TMP*

It returns the response in the following format: #BM TMP=tt,rh*

The second value read on the phone is the relative humidity expressed in Percentage.



“OUT” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

3.12.1.10 Case OPEN

Whenever the external protective case of the field monitor is opened, an alarm condition occurs. Like it happens in case of other alarm conditions, the status bar shown below the “Case OPEN” frame, when connected to the station, will be displayed in red colour. Similarly to any other alarm frames the “OUT” and “IN” buttons must be set to OFF in case of stations not equipped with the GSM modem.



3.12.2 Schedule for MODEM

Programming the station for modem links.

To query the station by a remote PC linked to a telephone or to a GSM modem, or using its WiFi interface, the proper Station modem must be on. In addition, when an alarm occurs, the station can automatically call in CSD mode the telephone number of the modem used by the controller PC. Programming consists of setting a scheduled time for switching on the internal modem, defining how much time the modem will stay ON (stand-by), repetition interval and whether or not a call to the controller PC must be generated.



The parameter **Time (HH:mm)** specifies what time of day the Station modem has to be switched on and placed in Stand-By condition, while the parameter **Stand BY (Q)** determines how long the modem stays on, expressed in quarters of hour (max 24). The parameter **Every (H)** indicates the frequency of repetition or after how many hours from the latest start the Station modem has to be switched on again.

To prevent the schedule from changing every day, this parameter has to be programmed in submultiples of 24, so that only the following values are accepted: 1, 2, 3, 4, 6, 8, 12, 24.



In case of using this function, the Time must be different from the hour set on Schedule for SMS/Wifi/EMAIL frame (see the next paragraph).



To prevent excessive battery consumption a limit of 24 quarters of hour for continuous modem ON condition was established.

If the command **Originate CALL** is **ON**, the station will automatically call the remote PC at the first phone number listed in the field "Tel #" at the time indicated in the **Time (HH:mm)** field, if this number does not answer or the line is busy, the station will try to communicate with the second phone number on the list.

The minimum Stand By time is 0; that means that the station makes the call at the time indicated and automatically switches the internal modem off.



See chapter 4, page 4-21 and 4-22, for the different ways of switching on the modem.

Recommended settings for stations where the internal modem is not to be used should be as follows:

- Tel # : VOID
- Time (HH:mm) : 00:00
- Stand By (Q): 00
- Every (H) : 24
- Originate CALL : OFF



The "Schedule for MODEM" frame is disabled, and therefore cannot be set, if the station is set for FTP communication mode (factory default configuration). See 4.2.4. for instructions to set the station to "Modem, Point-to-point" mode.



At the time the station modem is switched on, the GPS module takes the position

3.12.3 Schedule for SMS/Wifi/EMAIL

The “Schedule for SMS/Wifi/EMAIL” offers the opportunity to define an additional time period during which the station modem will be ON (stand-by mode) and therefore able to receive calls and SMS query and setting commands. In addition, at the Scheduled time an alarm notification or daily reports is sent via SMS to the two numbers phone or via EMAIL to the recipient address list set on EMAIL Data setting section (see §3.12.1.1). In case of WiFi interfacing, this schedule is used to set the uptime for the Access Point direct WiFi connections.

The frame **Schedule for SMS/Wifi/EMAIL** functions in the following way:

- in the blank part near the written **Tel#**, you have to add the telephone number of the modem connected to the PC, this just in case you want the area monitor originates an automatic call to the computer
- in the **Time**, you have to decide when the modem has to be switched ON
- in the **Stand By**, you have to decide for how many quarters of hours, starting from the hours of switching ON, the modem has to stay in stand by
- in the **Every**, you have to decide the interval, expressed in hours, from every switching ON

In case of using this function, the Time must be different from the hour set on Schedule for MODEM frame (see the previous paragraph).



With the **Send REPORT** command **ON**, at the time indicated in the window **Time (HH:mm)** the monitoring station automatically sends its daily report to all the mobile phones listed (it has no effect for WiFi stations) or email address.

The minimum Stand By time (expressed in quarters of an hour) is 0; in this condition the station sends the Report via SMS or EMAIL at the time indicated and automatically switches off the internal GSM.

Recommended settings, for stations where the internal modem is not to be used, are the following:

- Tel # : VOID
- Time (HH:mm) : 00:00
- Stand By (Q): 00
- Every (H) : 24
- Send REPORT: OFF



It is possible to receive and read the daily report on any mobile phone (max field value, time and date, minimum battery voltage) by sending the SMS message: #BM?RPT*.



The Report shown on the phone display or on the email will indicate the highest field value and the time at which it was read, and the lowest battery voltage and the relative time since the last time the report was sent or requested.

Therefore if at 9.00 a report is sent and at 10.00 the station is queried with the request of a new report, the display will show the highest field value and lowest battery voltage between 9.00 and 10.00.



Chapter 5 of this Manual describes in detail all the commands and the messages available via SMS.

3.12.4 Rate Settings and High Sampling mode

Configuration of data memorization.

Data are saved in the station at a frequency (**Rate**) ranging from 30 seconds to 15 minutes.



As default the station performs 1 reading every 1 second and saves the average value and maximum (Peak) at the selected Rate. By enabling the **High Sampling** function the reading interval could be minimum 200ms (depending on the probe connected).

Example: if the rate of 1 minute and an averaging period of 1min are selected, the station will take 60 readings and save the average value calculated minute by minute (with **High Sampling** function ON the station will perform minimum 300 readings every 1 minute).



If an Averaging Period of 6min and a rate of 1min are selected the indication will represent, minute by minute, the field average calculated on the previous 6 minutes.

The selection of a different Averaging Period as well as a different Rate will invalidate all the data stored with the previous settings that will be no more available for downloading, therefore the software will indicate this risk.

The following message appears:



If the answer is **YES**, the software will show another message asking whether to continue with the new setting, as follows:



Answering **YES** again, the software will allow you to change the setting but all the data previously acquired will no longer be available for new downloads. It is therefore suggested to download any measurement result before changing settings.

NOTICE

The previously acquired data are lost changing one of the following settings:

- Storing rate
- Average type (AVG or RMS) and/or Averaging period
- Date and time of the monitoring station

It is therefore suggested to download all the data before changing any of the listed settings.

In general, great care shall be adopted in changing the timing or type of average or the saving rate.

Indeed, data recorded with the same station, relative to the same day but acquired with different settings will not be compatible. Only results acquired before changing setting will be displayed in the graph or table of the same day.

By selecting the same day on the calendar (marked with blue), the following warning message will appear (see Pag.8-5):



Results acquired with the new setting will be displayed starting from the next day.

If it is really necessary to change the settings, NARDA recommends one of the following procedure:

- Change the station name before making the settings change.
In this case the station with the new name is considered a new station with all data and results stored in a new station directory. The old station name will be still available in the station list allowing selection and display of all data acquired previously.
- Change the name of the directory in which the previous data were saved before the settings change (or in any case before downloading the new data).
In this case the station maintains the same name but, even if not lost, no old data will be displayed.
To display data acquired with the old setting it will be necessary to add a station in the list which Station ID (name) correspond to the changed name of the old directory.
- Do not download the data acquired in the period of time between the settings change and the midnight of the same day if neither of the above suggestions is adopted and results of the same day are not needed.



3.12.5 Get DATA



Downloading data from the monitoring station to the PC.

The data in the internal memory of the station can be downloaded after defining a Start and Stop event as follows:

The Start and Stop of the data download is done between the following commands, in any combination.

- **Since Last Time:** Automatically enters the time and date of the latest download;
- **Date & Time:** any date and time indicated;
- **Up to NOW:** actual date and time with reference to the station;

The “**Recall**” command starts downloading results to the controller PC.

The data downloaded will be assigned automatically to the relevant days of the calendar and those days will be marked with blue characters.




The Start event must be earlier than the Stop event otherwise an error message will be displayed, as follows:



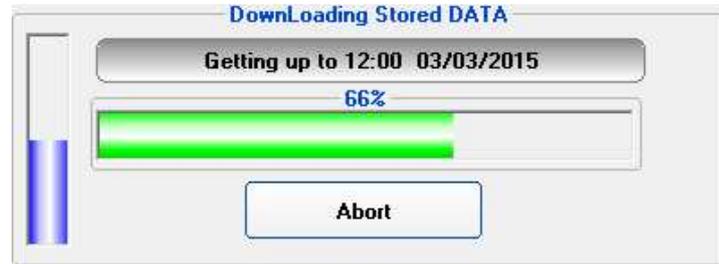
If the download period is longer than that allowed by the memory available at the rate defined, the following message will appear:



After downloading the data, click Hang & Exit to view the data downloaded



During the download of the data from the station a window is displayed with two bars indicating the progress of the download.



The vertical bar gives the percentage of the total amount of data to be downloaded while the horizontal shows the progress of the download for each subsequent six hours interval.

During data download through wireless channels, mainly due to poor reception or to poor quality of the radio signal, some error messages may be received.

In these cases, repeat the **RECALL** command.

3.12.6 Station Date & Time

Used to update or change the internal clock in the monitoring station and synchronize it with the time set on the PC. The operation will be carried out automatically after every connection if the **Synchronize on exiting** option is enabled.



The internal clock of the station is extremely accurate and in many cases much more accurate than the clock on the PC. The internal clock is not automatically updated to summer time and/or to standard winter time.

When the internal clock of the station is changed, some readings may no longer appear contiguous and gaps may be found.

For this reason NARDA recommend to use of this function sparingly

3.12.7 Firmware update

Update of internal Firmware

It is important to update the station firmware in order to use all the new functions added and eliminate any bugs in the software.

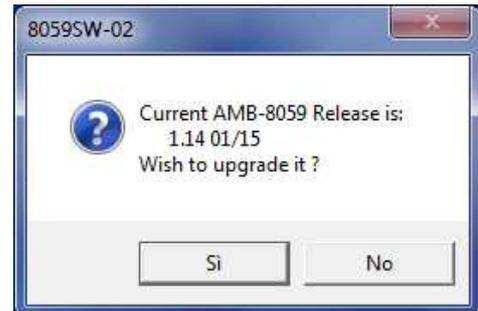
To update the firmware, use the **Execute** command.

The monitoring station will place the old firmware in its memory and will try to load a new one. A window with a coloured progress bar appears on the screen to indicate the firmware loading in progress.

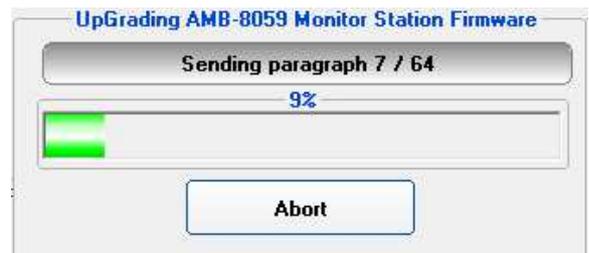
The following steps will be carried out:



1. Request to confirm transfer;



2. Firmware transfer in progress indicated by the progress bar;



3. Back-up writing (Internal copy of FW);

4. Reset and automatic startup of the monitoring station with new version of Firmware.



If any errors occur or if, in wireless mode, there is a poor signal connection, or if for any reasons the new firmware is not completely and successfully transferred to the monitoring station, the station will automatically restore the old firmware in order to prevent malfunctions or stops.

It is also possible to update the firmware by connecting the PC to the station.

3.12.8 Modem/WiFi off on Exit

Modem/WiFi Off on Exit

- The option **Modem/WiFi Off on Exit** sends to the field monitor the request to switch off the station modem in advance, in addition to the request to end the connection. When this option is enabled, at the end of the link (not made after a line break and not after the maximum time without dialogue) the station switches its internal modem off after a time ranging from 1 to 2 minutes, regardless of the residual time set, in order not to waste energy.

3.12.9 Device Password

Device PassWord

- Device Password** to edit the identification password saved on the station.
The device password shall be composed by a number alphanumeric characters from 1 to 32.
Uppercase and lowercase are considered different characters.

3.13 General Commands Three general commands are located at the bottom of the main window:

Read Station Conf
Enable Setting
Hang & Exit

3.13.1 Read Station Conf. To read the status of the monitoring station, select **Read Station Conf.** Click on the button to start a new query of the station.



This command is similar to RECALL but does not download any data

3.13.2 Enable Setting

To enable settings on the monitoring station, click on the **Enable Setting** button.

The software will ask to enter the Setting password:

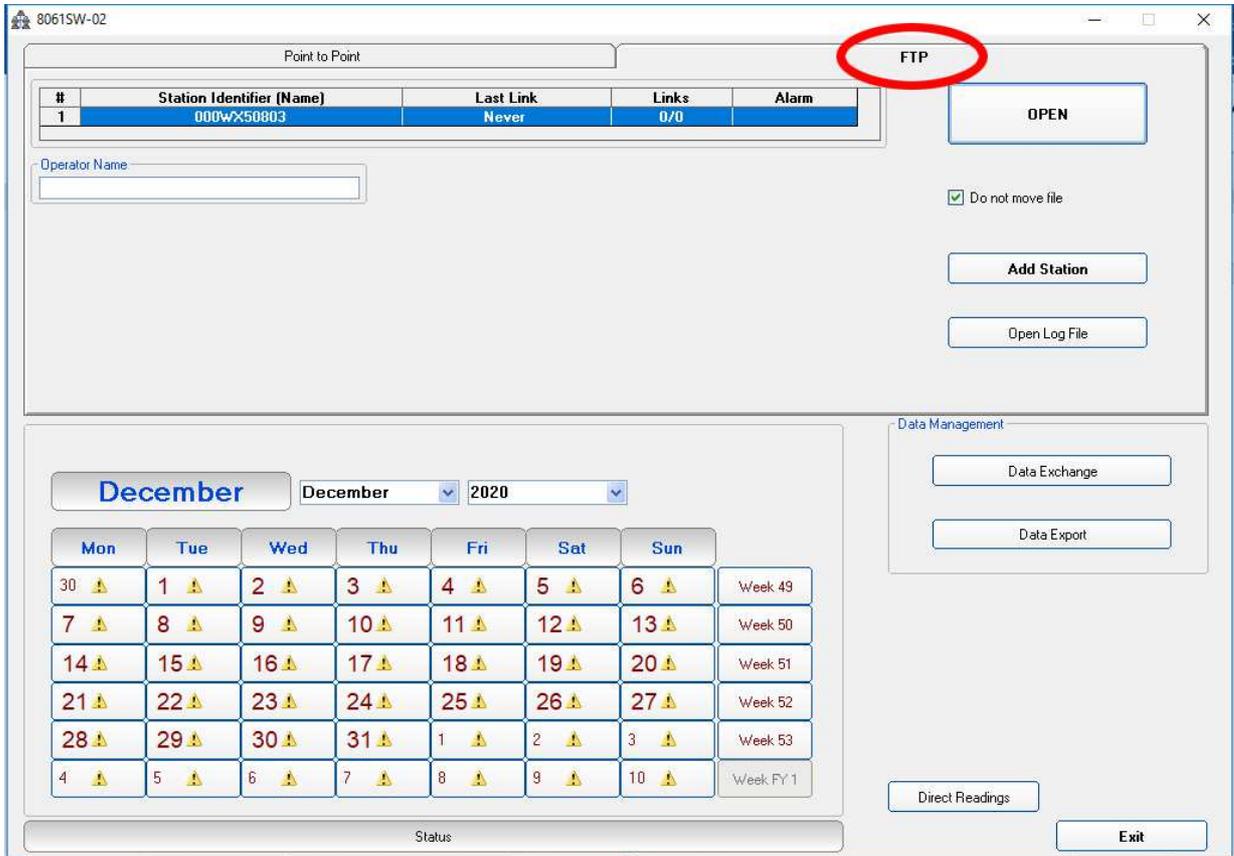


3.13.3 Hang & Exit

The **Hang & Exit** button ends the ongoing communication with the monitoring station and returns to the main window.

3.14 FTP Main window

Once set the station, run the 8059SW-02.
After entering the Passwords, the program displays the main window.
Select the **FTP** tab:



Do not move file

If the function “Do not move file” is enabled the data stored by the station in the ftp server will be still available for a future download, even from a different PC. If it is not ticked, the data are deleted from the FTP server after each download.

Select your station and hit **Open** to access the ftp server.



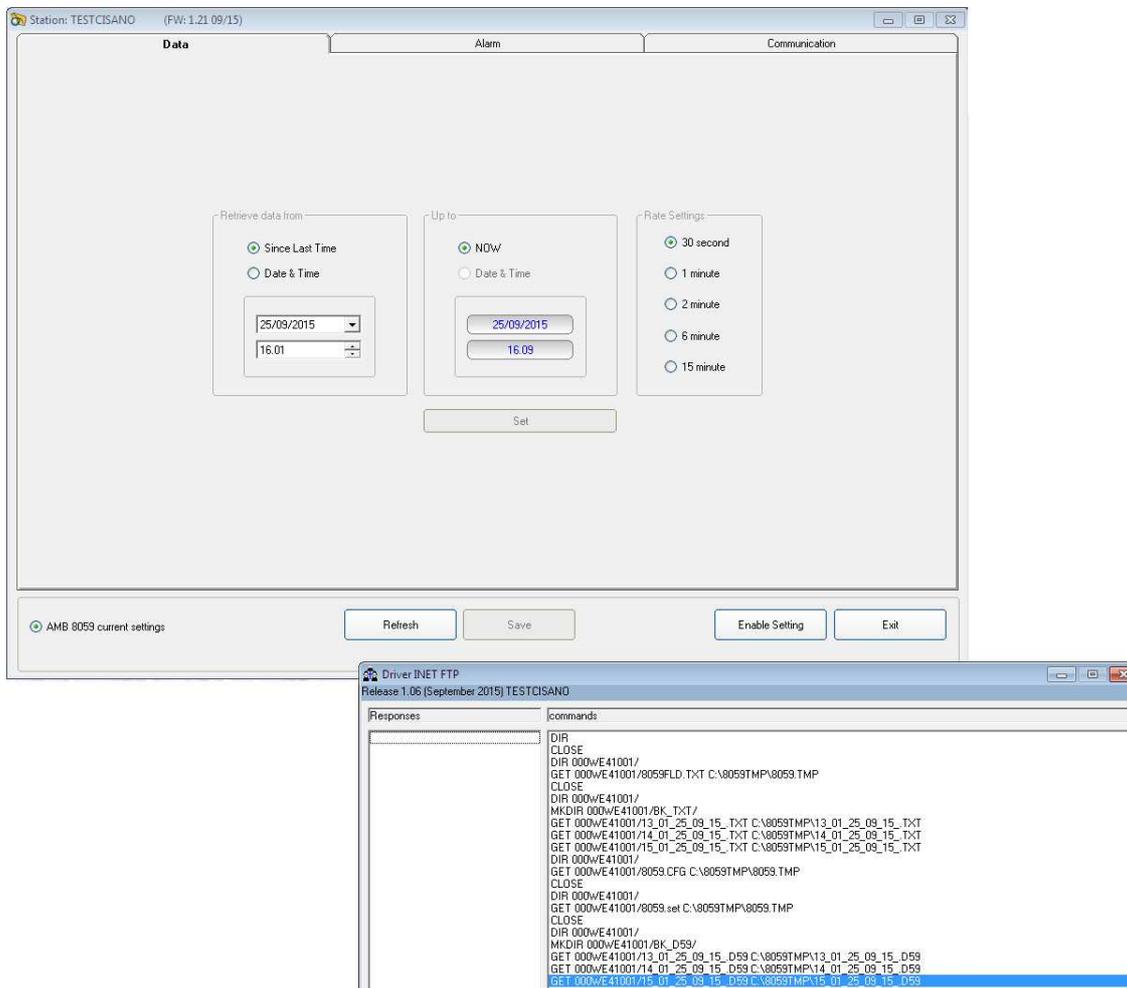
The station folder, into the ftp server, has not been created yet, answer **Yes** to create it.

The name of this folder will be the same as the station serial number that you already set, it will be used for any data exchange between Controller PC – FTP server and Remote Station – FTP server.

Hit **Yes**, the folder will be created.

3.15 Data section

The first section **Data** will show which data will be downloaded by the station at the next connection. The default setting is “Since” date-time (your PC clock) – “Up to” now (when the station will access the server).



Meanwhile it will be shown the **DRIVER INET FTP** window; this driver manages the download and upload data in the ftp server.

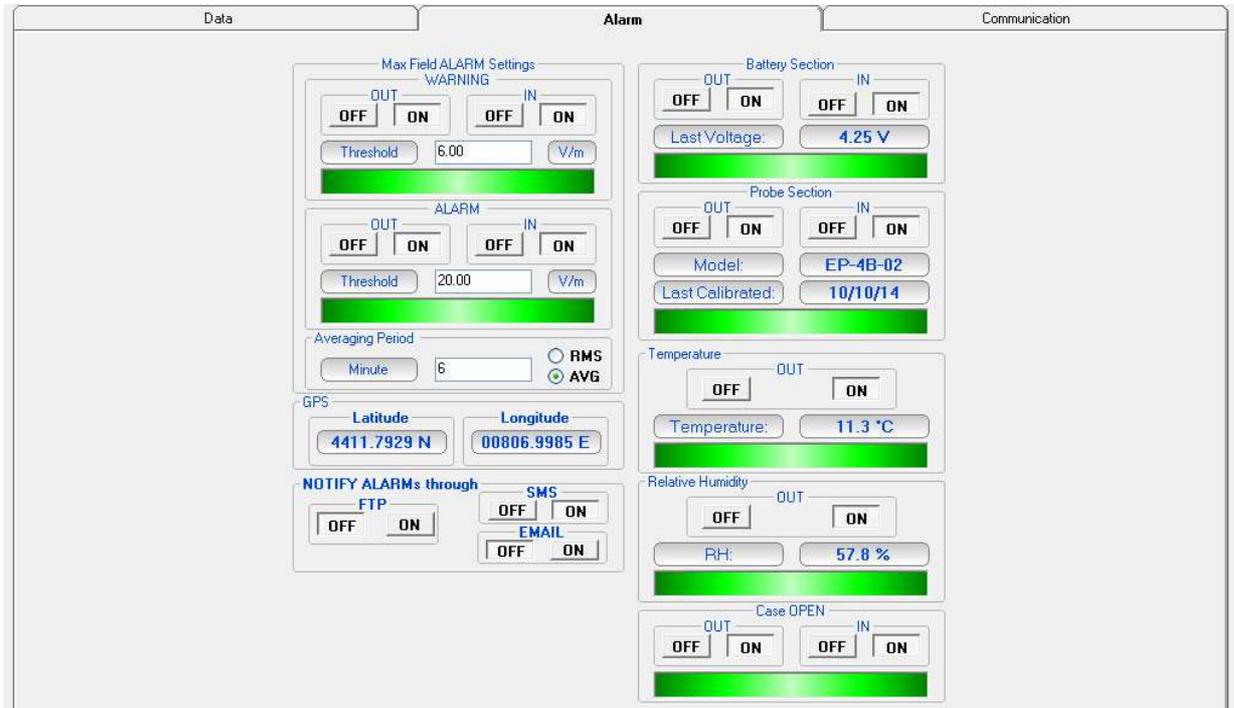
Hit **Enable setting** and type the Setting Password to be allowed to hit the **Set** button to create the first .FLD file that will be read by the station, at its first connection to the server, to know which data have to be downloaded.

The **Rate Setting** frame, on the right, allows you to set the rate setting. It is the storing rate of the station. In the above example, the station will store the field measurement, in its internal memory, every 30 seconds.

Please refer to §3.12.4 Rate Settings and High Sampling mode of this manual for further information of using Rate settings frame.

3.16 Alarm section

The second section, named **Alarm**, allows the user to set which alarm should be notified, if through **FTP** connection or **SMS** to the user mobile phone (available only for GSM modem equipped units) or **EMAIL** to the recipient address.



The above labels refer to QuadBand probe. The “Max Field ALARM Setting” (see §3.12.1.5) and “Probe section” (see §3.12.1.7) may change in case of using different probes or configuration.



The “Standard” drop-down menu is enabled (see 3.12.1.4) when the DualBand Electric and Magnetic probe is connected.



The same windows allows the user to set which average type should be performed on the acquired data, **AVG** or **RMS**, and the averaging period over which the average calculation is performed. In the above example, average type is AVG over 6 minutes time period.

Both **Warning** and **Alarm** thresholds are set to be notified by an **SMS** to the user’s mobile phone or by an **EMAIL** to the recipient address; telephone number and email address list should be set during RS232 or USB connection through the **Point-to-point** section (the telephone numbers list can also be managed by SMS to the station).



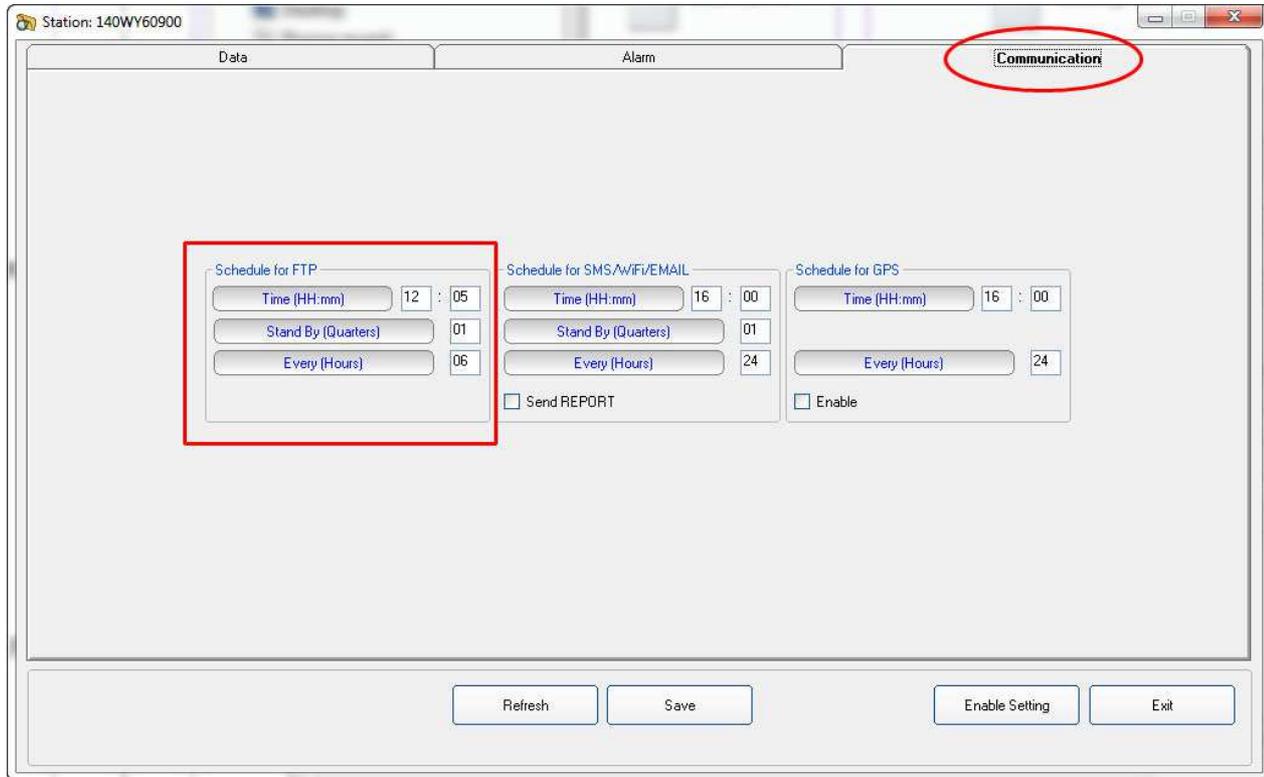
Please refer to §3.12.3 of this manual for further information of using Telephone numbers list.



Please refer to §3.12.1.1 of this manual for further information of using EMAIL Recipient Address settings and list.

3.17 Communication section

The third section, named **Communication**, allows changing the **Schedule for FTP**, **Schedule for SMS/WiFi/EMAIL** and **Schedule for GPS** settings accordingly to your work



The frame **Schedule for FTP** is in the following way:

- in the part **Time**, you have to decide when the modem has to be switched ON and send data to the FTP server
- in the part **Stand By**, you have to decide for how many quarters of hours, starting from the hours of switching ON, the modem has to stay in stand by and try to send all data
- in the part **Every**, you have to decide the interval, expressed in hours, from every switching ON

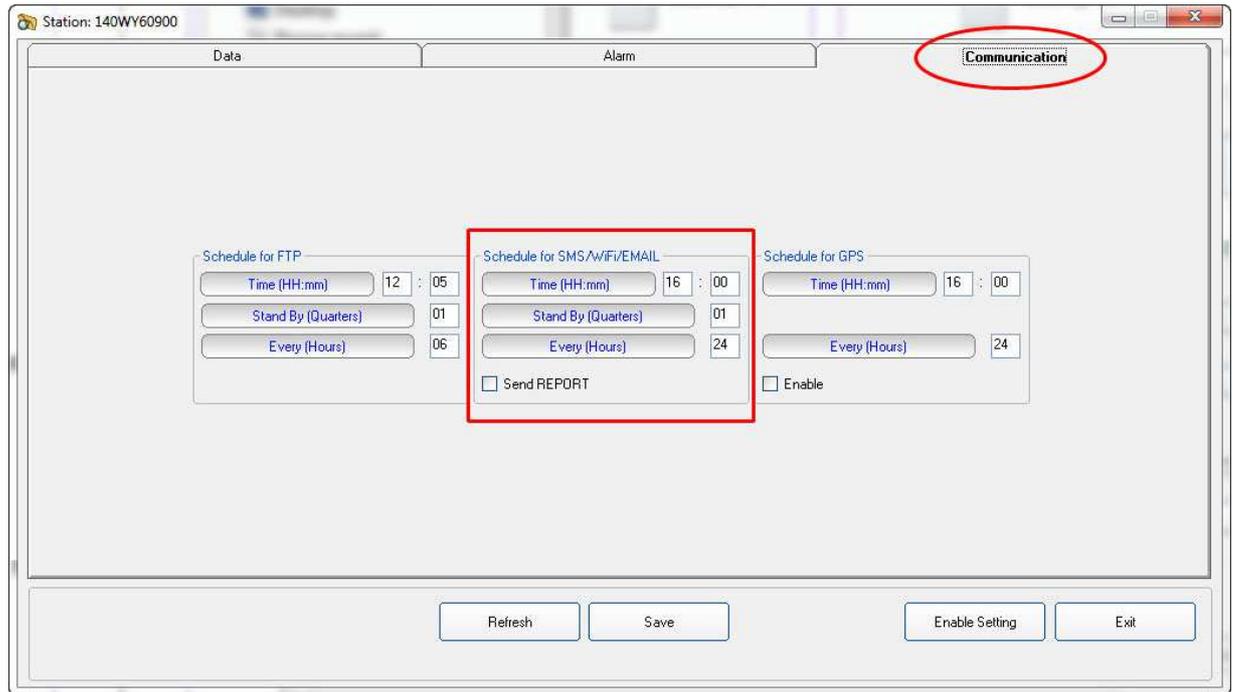


In case of using this function, the Time must be different from the hour set on Schedule for SMS/WiFi/EMAIL frame (see the next page).

The above example shows that the station modem will switch ON for an FTP connection to the server at 12:05, it will stay ON for 15 minutes (1 quarter). Every 6 hours the loop will be repeated so that the modem will switch ON, and the station will download its data at 12:05, 18:05, 00:05, 06:05 every day. So frequent connections are set for test purpose only, if the parameter **Every (Hours)** was set to 01 the station downloaded its data every hour.



To avoid affecting the energy balance between solar panel, back up battery and station consumption we recommend to set the modem to switch on only once a day, better during day time, for 1 quarter (15 minutes). This configuration assures station power autonomy even during long bad weather periods when the solar radiation could be not enough to supply the station modem for longer time.



The second frame **Schedule for SMS/WiFi/EMAIL** allows the user to set in the same way a second time period for the modem to be ON. This is not for FTP connections but it is provided to manage a stand-by period for SMS information exchange (available only for GSM modem equipped units) or for EMAIL notification alarm or for WiFi direct connection (Point-to-point) which can be made in Access Point mode or in Over IP mode.

The frame **Schedule for SMS/WiFi/EMAIL** works in the following way:

- in the part **Time**, you have to decide when the modem has to be switched ON and send data to the FTP server using the Wi-Fi connection
- in the part **Stand By**, you have to decide for how many quarters of hours, starting from the hours of switching ON, the WiFi has to try to send all data
- in the part **Every**, you have to decide the interval, expressed in hours, from every switching ON



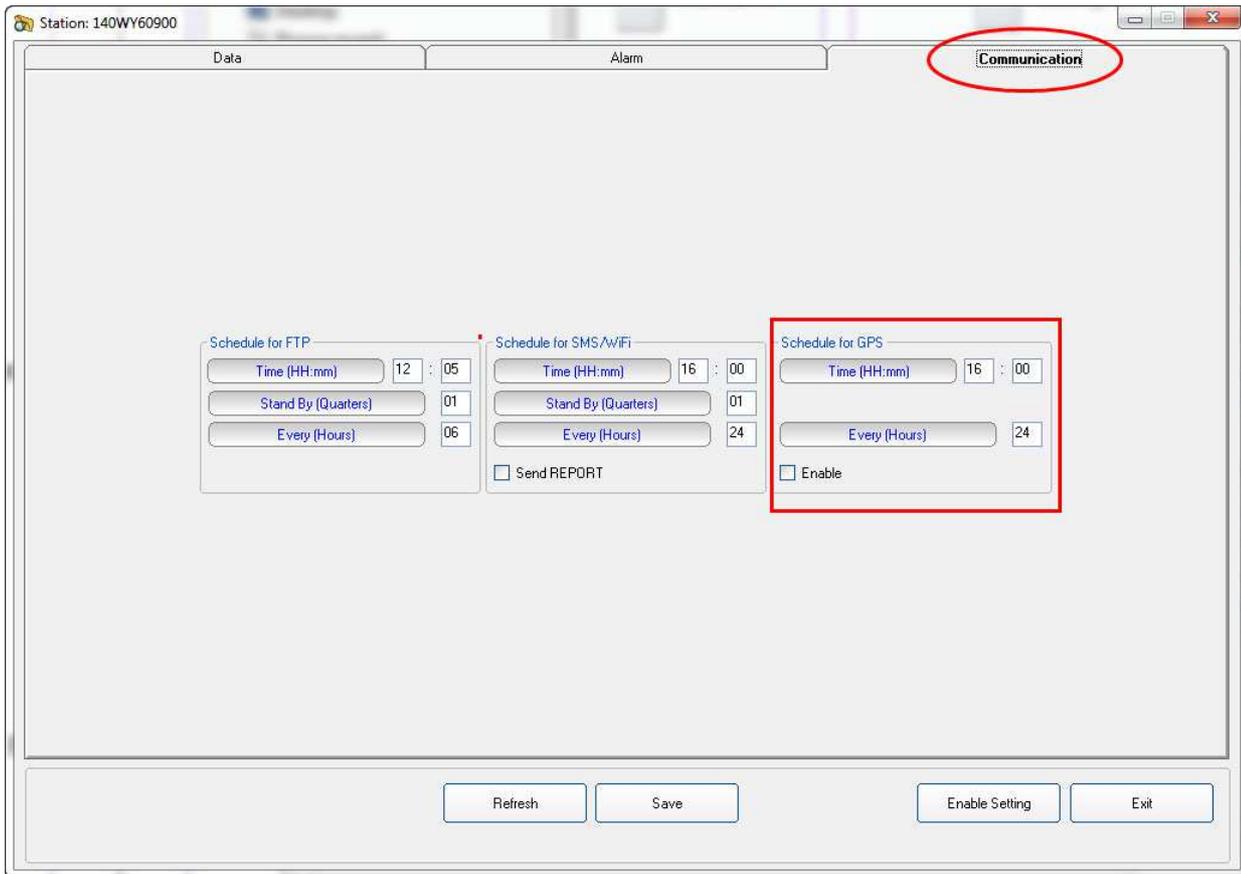
In case of using this function, the Time must be different from the hour set on Schedule for FTP frame (see the previous page).

Example:

In the picture the Wi-Fi will be switched ON at 16:00 and it will try to send all data to your FTP server for 1 quarters of hours.

This operation is repeated every 24 hours for a total of 1 connections every day at 16:00 o'clock

If the command **Send Report** is checked, an SMS is sent to the user mobile phone or an EMAIL is delivered to the recipient address informing about maximum field strength measured and lowest battery voltage of the day; telephone number and recipient address list should be set via direct local connection during preliminary installation and test (the telephone number list can also be managed by SMS to the station).



The third frame **Schedule for GPS** is independent of all other schedules, such as SMS-schedule and Modem schedule, allowing consequently turning the GPS on at certain times every day regardless the modem activity. Indeed, the ON hour can be specified in the whole 24 hour span and the interval between activities can be set in the range of 1 up to 24 hours.

3.18 Software update



The new releases can be downloaded directly from the Narda website <http://www.narda-sts.it>

To update the software double click on the **8059NSTS Setup**.

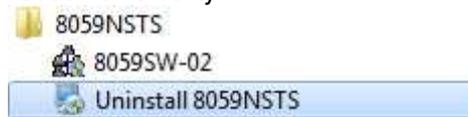


All additional information and explanations can be found on **Pag.3-3, § 3.3 .**

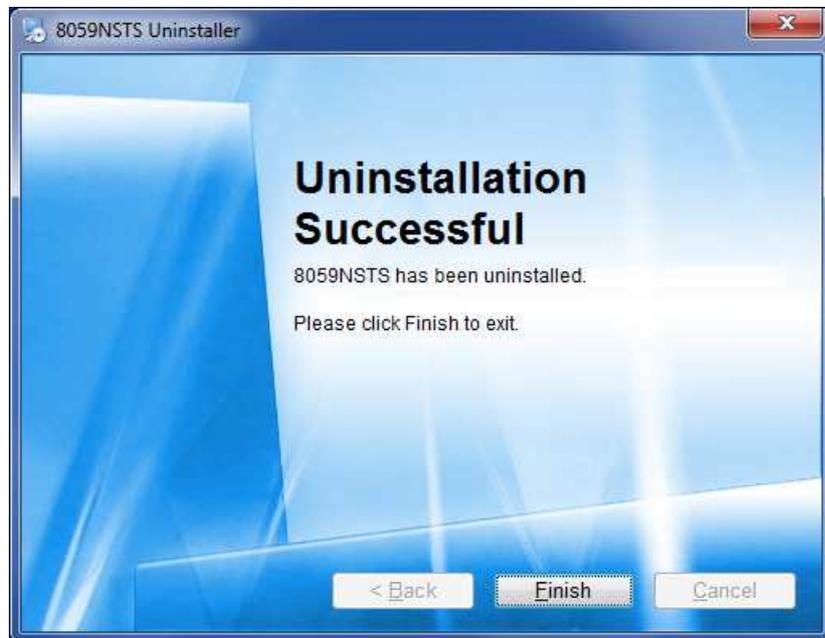
3.19 Uninstalling Software

It is possible to remove the 8059SW-02 software from the PC according to the following procedure:

Run the **Uninstall 8059NSTS** utility.



Follow the uninstaller instructions.



The software is now removed from the system; click **Finish** to close uninstaller utility

8059SW-02 – Data Display

3.20 Introduction

This section provides information for correct display and interpretation of the data downloaded from the AMB-8059 using the 8059SW-02 software.

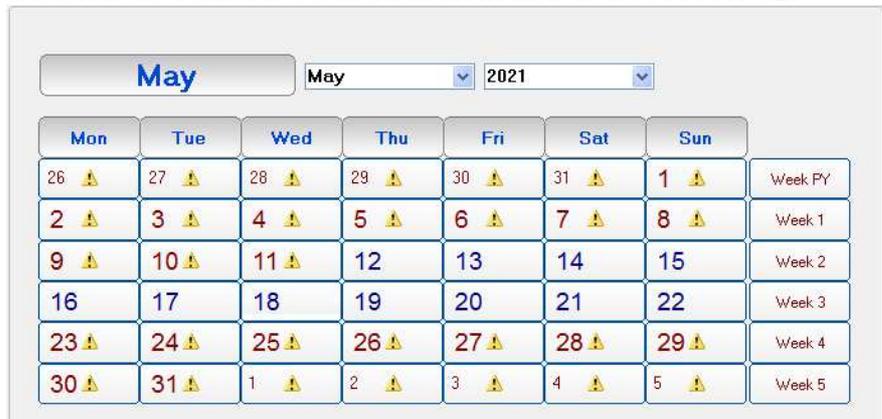
When a new monitoring station is installed, a new folder is created in the main program directory, among those listed in the main window of the program 8059SW-02, which will receive the data downloaded from that specific station.

The new folder is automatically named assigning the first 8 characters of the full name entered for the station (excluding spaces and special characters which should not be used).

Example: for a station called TESTCISANO_EX3 the corresponding folder will be named TESTCISANO_EX3.

3.21 Calendar tool

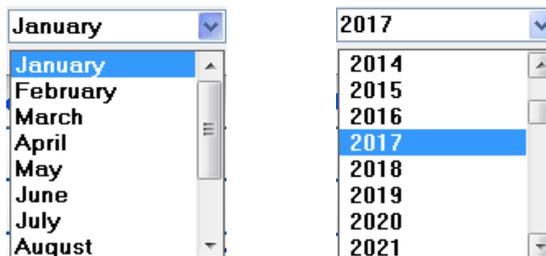
The new folder is created to collect the data every time the AMB-8059 station is queried, dividing them by day, month and year. The data are then automatically called up by the program on the basis of the day or week chosen in the Calendar tool in the main window of the 8059SW-02:



NOTICE

To ensure the program runs correctly it is important not to rename or move the saved files.

Using the Calendar it is possible to select the day or the week to be presented in graph form, simply by pressing the corresponding key. The month and the year are selected using the pulldown menu.

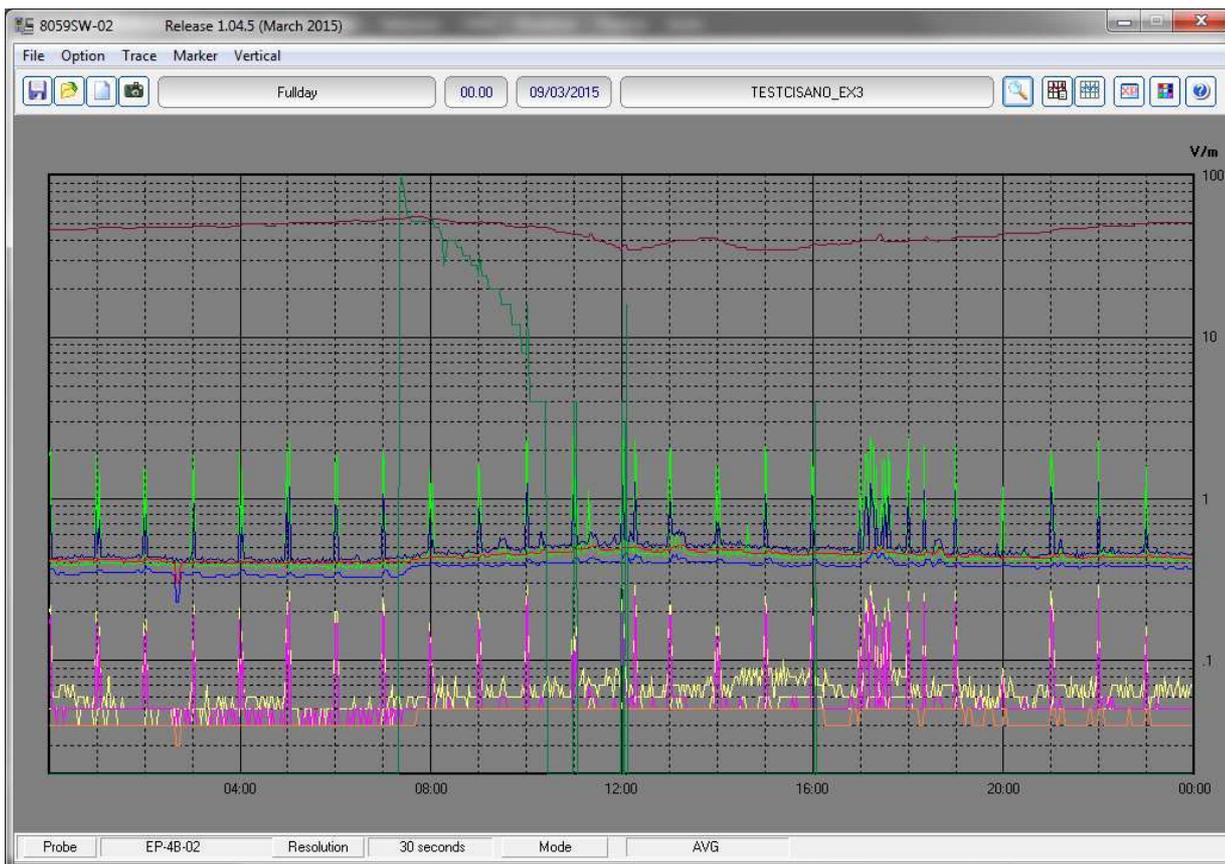


Days and weeks containing data have the characters displayed in blue color, while those for which data have not been downloaded are shown in red color (the symbol  is displayed close to the days).

3.22 Data window

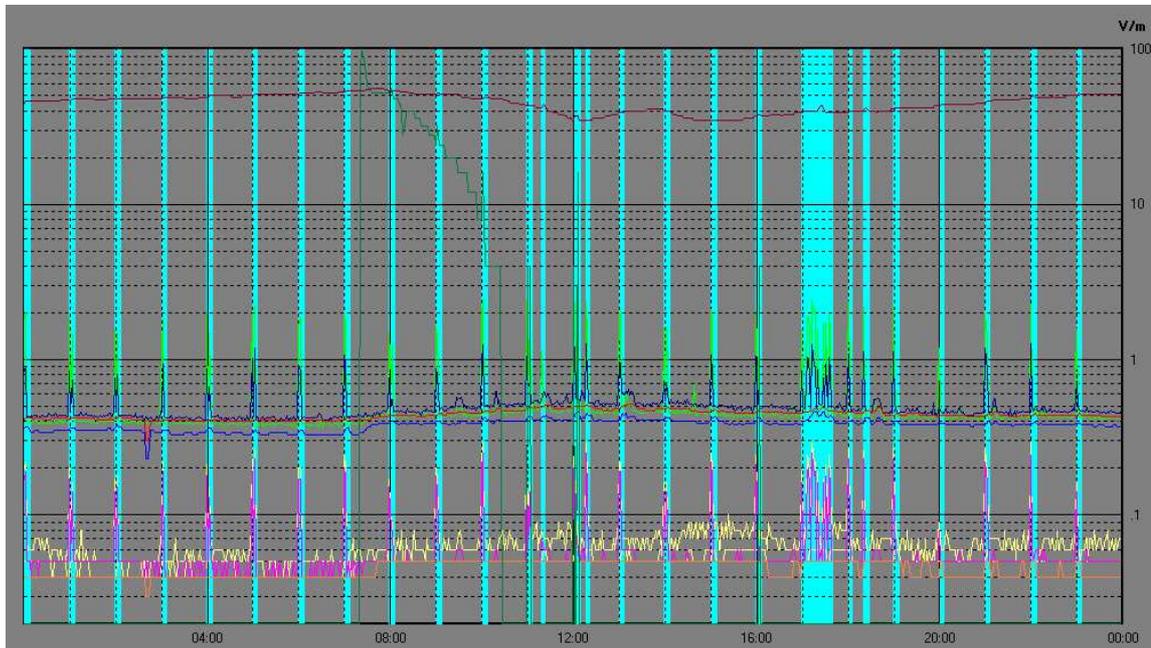
By selecting a day or a week shown in blue, the User can access the main menu for graphic representation. Using this menu it is also possible:

- Display any graphs belonging to any stations (using **Open Files**);
- Select the colors and the order of display for the different traces (using **Option**);
- Save the graphs (using **Save Files**);
- Save the graphs displayed as a BITMAP image on the clipboard for insertion in other applications such as a Word Processor or Image Editor (using **Clipboard**);
- Add or amend a comment (using **Comment**);
- Modify the appearance of the status window and the icons (using **Appearance**);
- Select the limits and the colors (using **Setup**);
- Highlight or remove the highlight for the time the GSM and/or others disturbance band is on, or when any of the alarms is active, or select traces to be displayed (using **Trace**);
- Position the marker (using **Marker**);
- Expand graphs horizontally (using **ZOOM**);
- Expand graphs vertically (using **Vertical**);
- Display a table containing the data shown in the graphs (using **Show Table File**);
- Display the software release (using **?**);

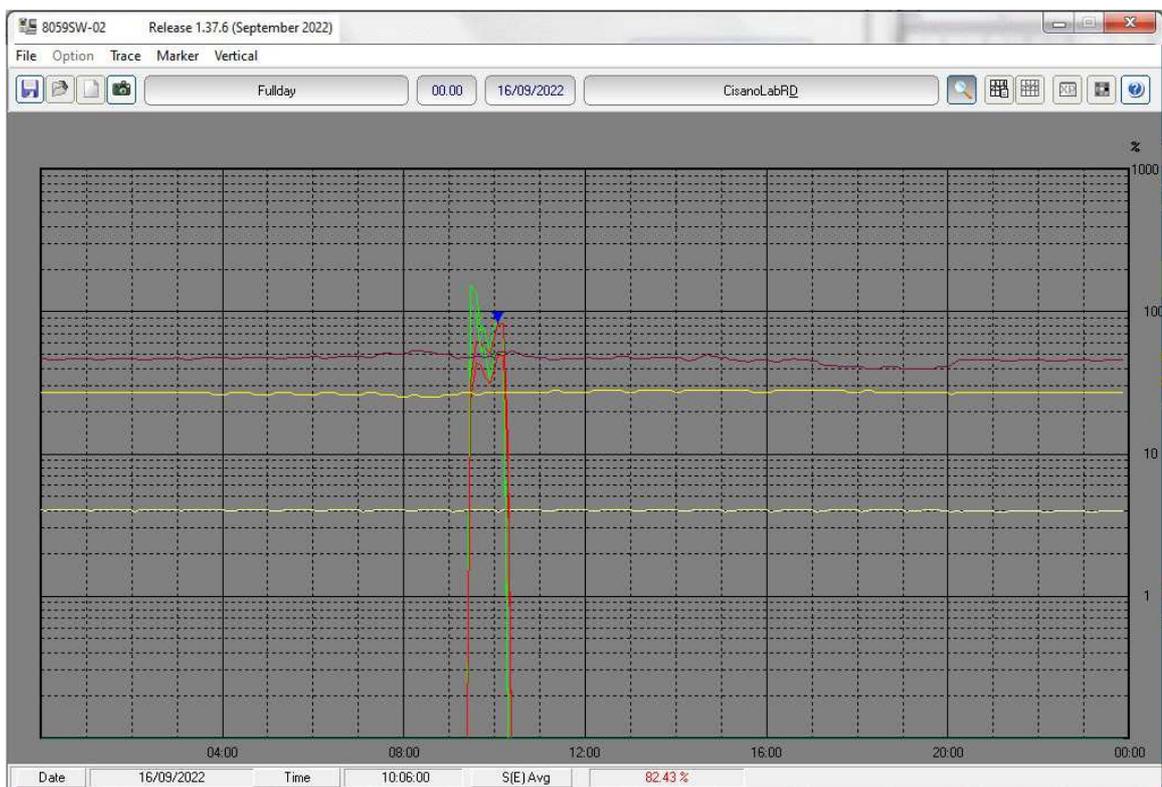


The data window presents the data for the selected day or week in a graphical form.

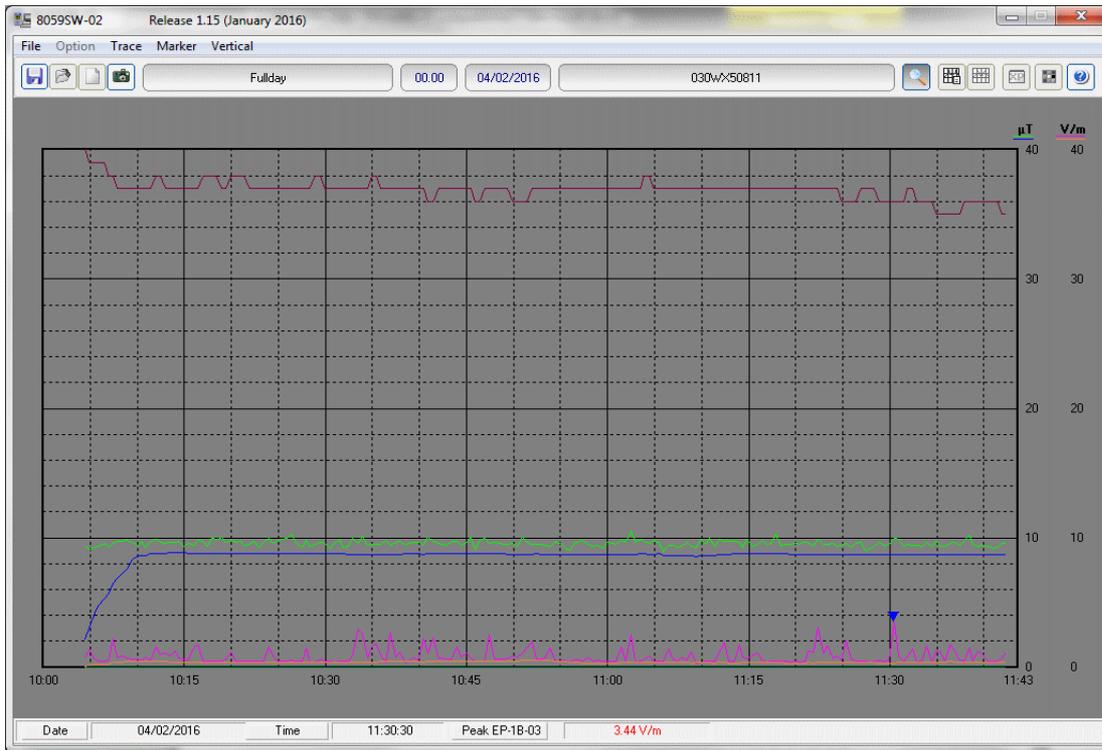
In the example below, it is possible to notice the narrow cyan vertical bands (the color can be set by the User), indicating that the internal GSM modem was transmitting either on the provider request (periodical querying of the phone number), or by the User request, calling the station to make any queries. This indication is used to discriminate fields generated by the internal GSM modem from any environmental field.



In case of using DualBand Electric and Magnetic probe, both field can be included in the same graph.



In Dual-probe configuration, results from both probes can be included in the same graph.



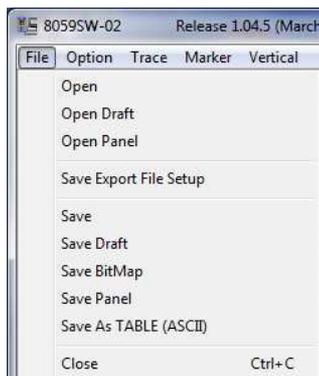
3.23 Main commands

The main commands of the 8059SW-02 are:



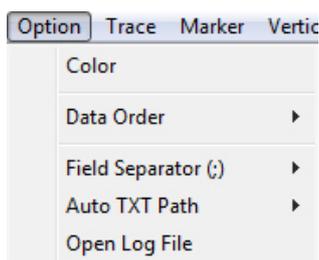
3.23.1 File

This command is used to open any files of any stations or to save the files downloaded.



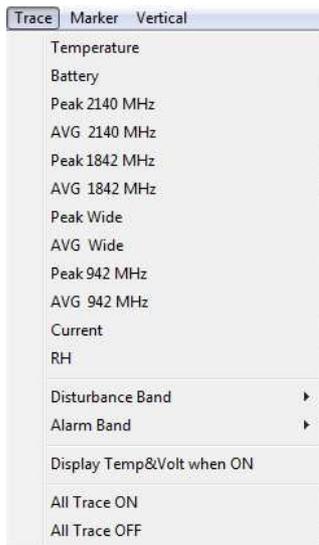
For a detailed description of its use see the paragraphs relative to the specific icons **Save** and **Open** here below.

3.23.2 Option



This command is used to define the colors of the traces (**Color**, as well as **Setup** described below); the order of priority for display of traces (**Data Order**); the character used as data separator when required by the form of table (**Field Separator (:)**); the path and the name that are used for the **AUTO ASCII FILE (Auto TXT Path)**; to display all settings and main activities automatically and manually downloaded from the station (**Open Log File**).

3.23.3 Trace

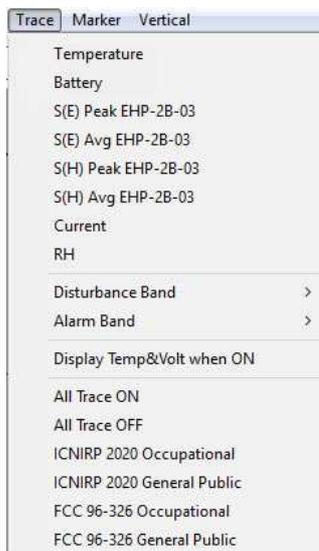


The **Trace** command allows to select which traces will be displayed in the graph. The possible choices are:

- **Temperature**; indicates the temperature of the environment for each data reading;
- **Battery**; provides the voltage of the batteries whenever the field data are stored;
- **Peak 2140 MHz**; shows the peak value measured in the UMTS Band pass.
- **AVG 2140 MHz**; shows the average calculated in the UMTS Band pass;
- **Peak 1842 MHz**; shows the peak value measured in the EGSM 1800 Band pass.
- **AVG 1842 MHz**; shows the average calculated in the EGSM 1800 Band pass;
- **Peak Wide**; shows the peak value measured in the wide band;
- **AVG Wide**; shows the average calculated, in this example of the AVG type, in the Averaging Period (set in this example as 6 minutes) of the signal read by the wide band sensor
- **Peak 942 MHz**; shows the peak value measured in the EGSM 900 Band pass.
- **AVG 942 MHz**; shows the average calculated in the EGSM 900 Band pass;
- **Current**; provides the consumption current of the station whenever the field data are stored;
- **RH**; indicates the Relative Humidity of the environment for each data reading;
- **Disturbance Band**; used to hide or display any disturbance activity using vertical bars (which can be selected individually); Any data affected by disturbance activity will be marked in the txt table with the asterisk (*) if **Global** is enable at the time of activating the Save Export File Setup function. The asterisk (*) is hide if **Global** is disable.



- **Alarm Band**; used to hide or display any activity of alarms with vertical bars (which can be selected individually);
- **Display Temp&Volt when ON**; shows traces of the temperature and voltage on the graph when enabled;
- **All Traces ON**; shows all traces;
- **All Trace OFF**; hides all traces.

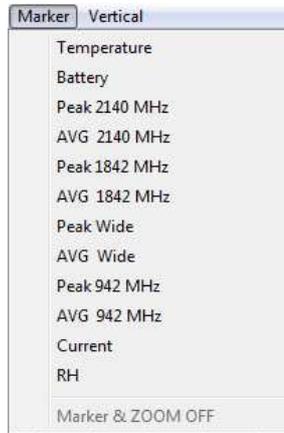


The above labels refer to EP-4B-02 probe; different models will show different traces according to the probe frequency bands. For example, in case of using DualBand Electric and Magnetic probe, the differences are the following (EHP-2B-03 as example):

- **S(E) Peak EHP-2B-03**; shows the peak value measured in the Electric field.
- **S(E) Avg EHP-2B-03**; shows the average calculated in the electric field;
- **S(H) Peak EHP-2B-03**; shows the peak value measured in the Magnetic field.
- **S(H) Avg EHP-2B-03**; shows the average calculated in the Magnetic field;
- **ICNIRP 2020 Occupational**; select the ICNIRP 2020 Occupational limit
- **ICNIRP 2020 General Public**; select the ICNIRP 2020 General Public limit
- **FCC-96 326 Occupational**; select the FCC-69 329 Occupational limit
- **FCC-96 326 General Public**; select the FCC-69 329 General Public limit

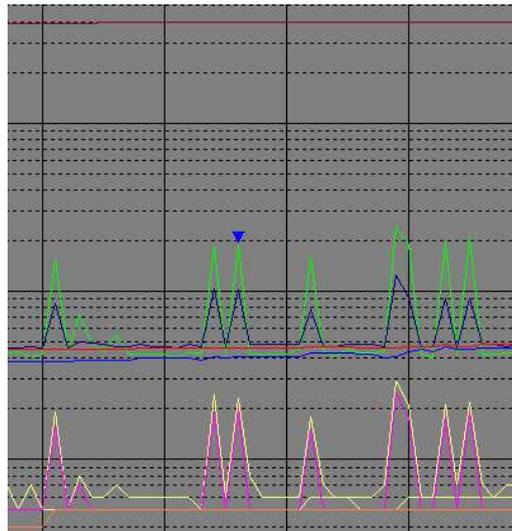
3.23.4 Marker

When the field monitor has been set up to display all data, the graph contains many traces. To ensure accurate measurement of each trace it is possible to enable a marker that will show the value of the electrical field, temperature, batteries, etc depending on the trace for which it is selected. The screen will look like this (the below marker refer to EP-4B-02):

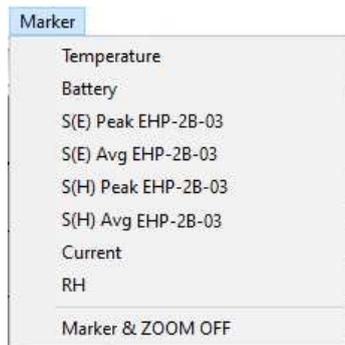


The marker is made visible also by activating the ZOOM function.

Using the mouse it is possible to scroll the entire time axis and stop on the trace and in the point for which the exact value is desired.



Different probes will show different marker according to the probe frequency bands. For example, in case of using DualBand Electric and Magnetic probe, the differences are the following (EHP-2B-03 is shown below as example):

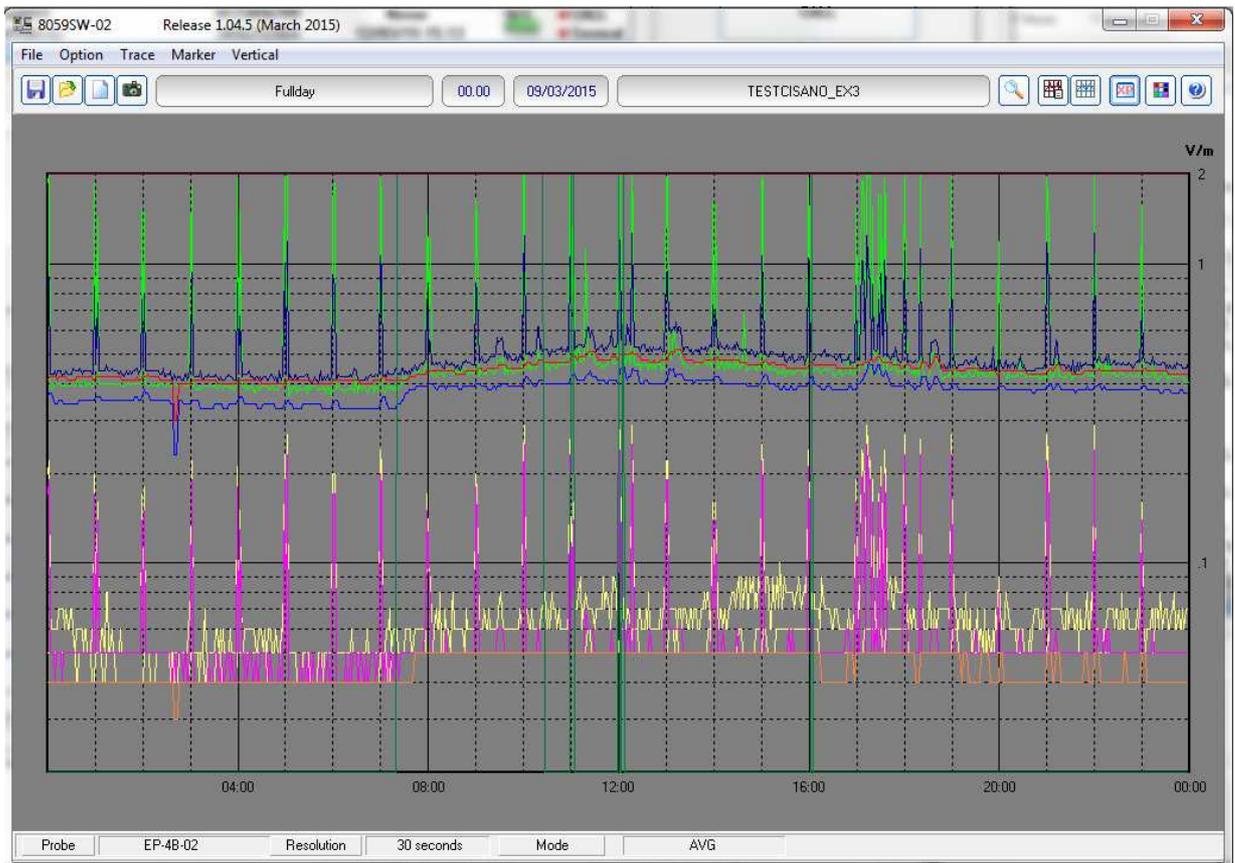


3.23.5 Vertical

This function is used to select the vertical scale with a linear or logarithmic view and also serves to define the scale range. The screen looks like this:



Selecting **x 100 Range** the maximum sensitivity is displayed (scale range equal to 2 V/m).



3.24 Secondary commands

Description of command bar:



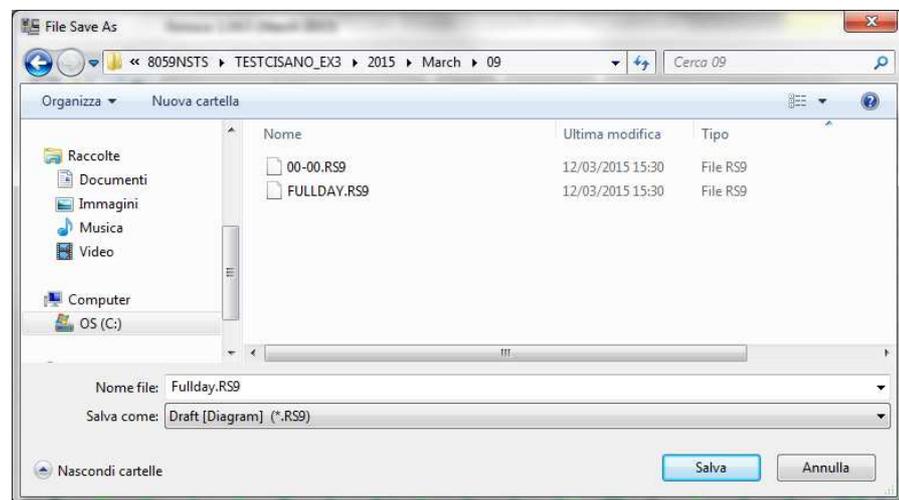
3.24.1 Save Files



Used to save files of measurements in the following formats:

1. **Draft (Diagram) (*.RS2)** (Default) Archive for future processing of readings;
2. **Panel (*.P87)** A file with the extension ***.P87** is saved, containing the current settings selected with the **Setup** key, so that the operator can readily restore the preferred settings at a later date. (Normally the program starts with the setting in the file **default.P87**)
3. **BitMap (*.BMP)** A graphic bitmap file is saved which is identical to the diagram displayed on the screen at the time of the request.
4. **ASCII (*.TXT)** A text file is saved containing the data of the configuration, saved with the function **Save Export File Setup**.

The screen looks like this:



Measurements can be saved in any directories. During this procedure the software shows a list of the previously saved files.

3.24.1.1 Saving File in ASCII format

Files in ASCII format with the .TXT extension contain an * (asterisk) marking any data, and averaged value, affected by the internal modem and others disturbance activity.

The structure of data tables saved in the default .TXT format is as follows:

- All traces enabled;
- All alarms or disturbance enabled;
- All marker enabled;
- Separation character: “;” (semicolon);
- Data sorted according to “**Wide, Low Pass, High**” mode, first average and then peak.



Like every other item listed in the table, the asterisk (*) of the GSM, Charging, USB and Ethernet Band on will not be shown if the Trace Menu has “Global” disabled at the time of activating the Save Export File Setup function.



This structure can be changed with the Save Export File Setup function. This also applies to alarms and disturbances marking.

The actual settings can be viewed by pressing **Show Table File**. This function automatically creates the table of data relative to the graph on view, and reflects the default settings listed above or those saved with the **Save Export File Setup** function.

Lastly, columns are shown indicating all the active alarms.

8059SW-02
Firmware: 1.14 01/15

Station: TESTCISANO_EX3 (Nsts,AMB-8059 S/N 000WE41003)

Date: 09/03/2015 Time: 00:00 (AVG 6 minute)

Probe EP-4B-02 (Last Calibrated:10.10.14)

Limit = 0,7 V/m AVG

Date;Time;TxOn;AVG W.;AVG 2140;AVG 1842;AVG 942;Peak W.;Peak 2140;Peak 1842;Peak 942;Battery;Temp;Current;RH;Alarms;
;;V/m;V/m;V/m;V/m;V/m;V/m;V/m;V/m;V;C°;mA;%;AWPLCTV;

09/03/2015;00:00:00;;0.35;0.05;0.04;0.41;0.38;0.06;0.05;0.41;4.22;0;0;45;.....T;
09/03/2015;00:00:30;*;0.36;0.05;0.04;0.41;1.88;0.20;0.17;0.84;4.18;0;0;45;.....T;
09/03/2015;00:01:00;*;0.36;0.05;0.04;0.41;0.42;0.05;0.05;0.44;4.18;0;0;44;.....T;
09/03/2015;00:01:30;*;0.36;0.05;0.04;0.41;0.39;0.05;0.04;0.42;4.14;1;0;44;.....T;
09/03/2015;00:02:00;*;0.36;0.05;0.04;0.41;0.39;0.06;0.04;0.43;4.14;1;0;45;.....T;
09/03/2015;00:02:30;*;0.36;0.05;0.04;0.41;0.40;0.07;0.05;0.44;4.14;1;0;45;.....T;
09/03/2015;00:03:00;*;0.36;0.05;0.04;0.41;2.00;0.22;0.19;0.91;4.14;0;0;45;.....T;
09/03/2015;00:03:30;*;0.37;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:04:00;*;0.37;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:04:30;*;0.37;0.05;0.04;0.42;0.38;0.05;0.04;0.43;4.14;0;0;46;.....T;
09/03/2015;00:05:00;*;0.37;0.05;0.04;0.42;0.38;0.06;0.05;0.42;4.14;0;0;46;.....T;
09/03/2015;00:05:30;*;0.37;0.05;0.04;0.42;0.38;0.05;0.04;0.43;4.14;0;0;46;.....T;
09/03/2015;00:06:00;*;0.37;0.05;0.04;0.42;0.36;0.05;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:06:30;*;0.36;0.05;0.04;0.42;0.37;0.06;0.05;0.42;4.14;0;0;46;.....T;
09/03/2015;00:07:00;*;0.36;0.05;0.04;0.42;0.38;0.05;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:07:30;*;0.35;0.05;0.04;0.42;0.40;0.05;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:08:00;*;0.35;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:08:30;*;0.35;0.05;0.04;0.42;0.37;0.05;0.05;0.42;4.14;0;0;46;.....T;
09/03/2015;00:09:00;*;0.35;0.05;0.04;0.42;0.39;0.05;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:09:30;;0.34;0.05;0.04;0.42;0.39;0.06;0.04;0.44;4.14;0;0;46;.....T;
09/03/2015;00:10:00;;0.34;0.05;0.04;0.42;0.37;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:10:30;;0.34;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:11:00;;0.34;0.05;0.04;0.42;0.38;0.05;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:11:30;;0.34;0.05;0.04;0.41;0.40;0.06;0.05;0.42;4.14;0;0;46;.....T;
09/03/2015;00:12:00;;0.34;0.05;0.04;0.41;0.39;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:12:30;;0.34;0.05;0.04;0.41;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:13:00;;0.34;0.05;0.04;0.41;0.40;0.05;0.04;0.43;4.14;0;0;46;.....T;
09/03/2015;00:13:30;;0.34;0.05;0.04;0.41;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:14:00;;0.34;0.05;0.04;0.41;0.40;0.05;0.05;0.44;4.14;0;0;46;.....T;
09/03/2015;00:14:30;;0.34;0.05;0.04;0.42;0.39;0.05;0.05;0.44;4.14;0;0;46;.....T;
09/03/2015;00:15:00;;0.34;0.05;0.04;0.42;0.39;0.07;0.05;0.44;4.14;0;0;46;.....T;
09/03/2015;00:15:30;;0.34;0.05;0.04;0.41;0.40;0.06;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:16:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:16:30;;0.34;0.05;0.04;0.42;0.39;0.05;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:17:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:17:30;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.44;4.14;0;0;46;.....T;
09/03/2015;00:18:00;;0.35;0.05;0.04;0.42;0.40;0.05;0.04;0.43;4.14;0;0;46;.....T;
09/03/2015;00:18:30;;0.35;0.05;0.04;0.42;0.39;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:19:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:19:30;;0.35;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:20:00;;0.34;0.05;0.04;0.42;0.39;0.06;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:20:30;;0.34;0.05;0.04;0.42;0.38;0.05;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:21:00;;0.34;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:21:30;;0.34;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:22:00;;0.34;0.05;0.04;0.42;0.40;0.05;0.04;0.42;4.14;0;0;46;.....T;
09/03/2015;00:22:30;;0.34;0.05;0.04;0.41;0.37;0.06;0.05;0.42;4.14;0;0;46;.....T;
09/03/2015;00:23:00;;0.34;0.05;0.04;0.42;0.39;0.06;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:23:30;;0.34;0.05;0.04;0.42;0.38;0.07;0.05;0.43;4.14;0;0;46;.....T;
09/03/2015;00:24:00;;0.34;0.05;0.04;0.41;0.37;0.05;0.04;0.42;4.14;0;0;46;.....T;



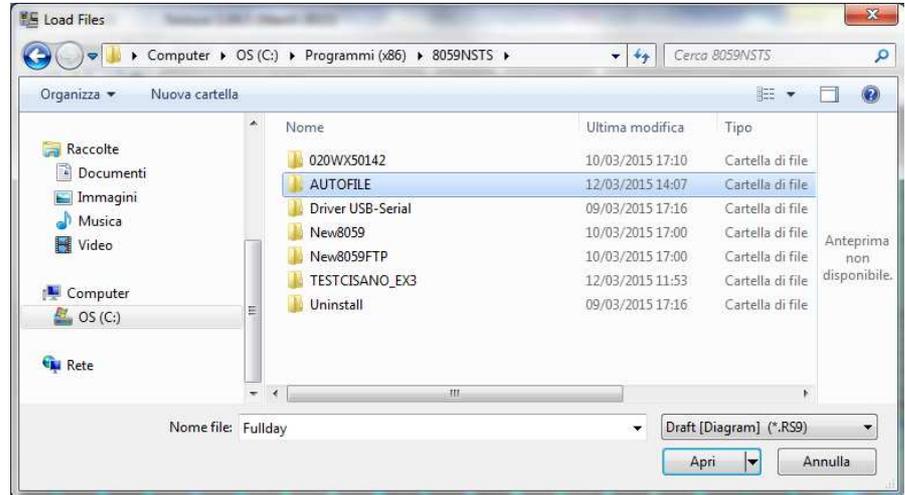
Like every other item listed in the table, the asterisks (*) of the Modem, Charging, USB, Ethernet Band on will not be shown if the Trace Menu has this item disabled at the time of activating the Save Export File Setup function.

3.24.2 Open Files

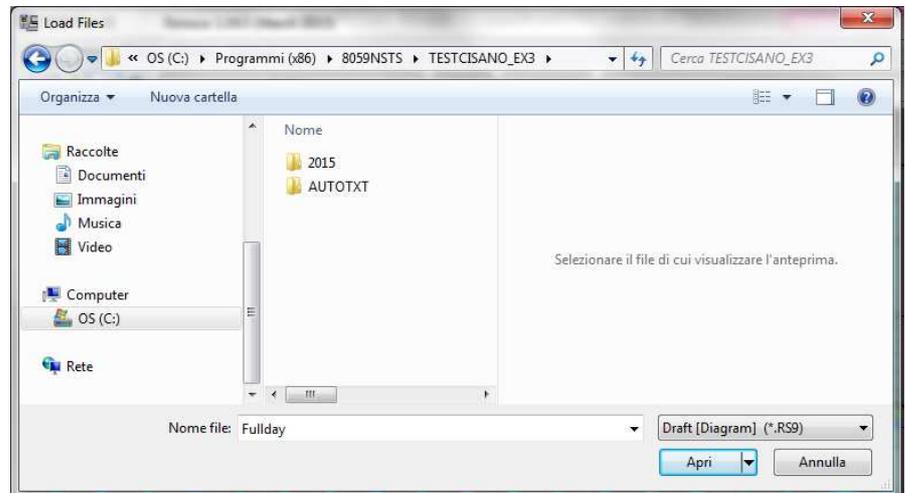


Used to download and view measurement files previously saved (*.RS9). Also serves to load files of settings (*.P87).

If the software is already in graph mode, clicking on **Open Files** will display all the stations available and also the directory **AUTOFILE**, containing only the **.TXT** files created automatically with the **AUTO ASCII FILE** function.

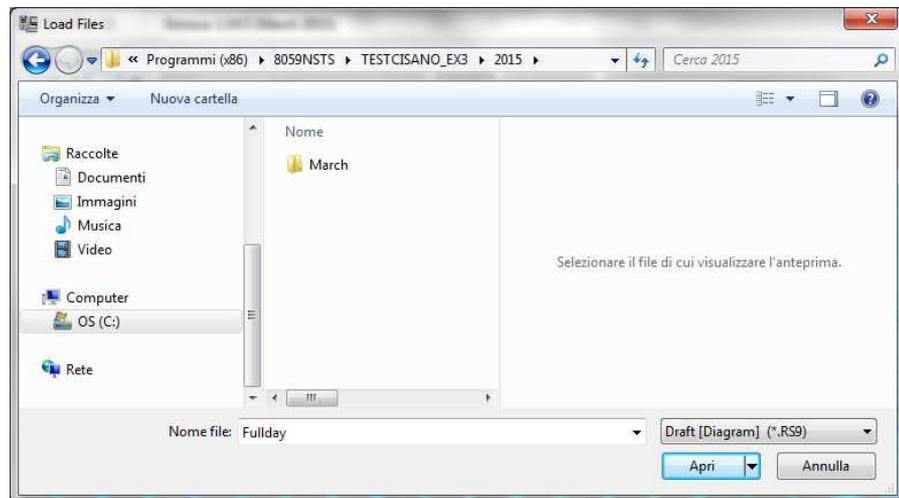


Selecting, for example, station **TESTCISANO_EX3**, it will display all the years relative to downloads and the directory **"AUTOTXT"**:



Associated with the name of each station, the software creates the directory of years (in this example 2015) and the directory **"AUTOTXT"** which contains all the data relative to the **Auto ASCII File** function.

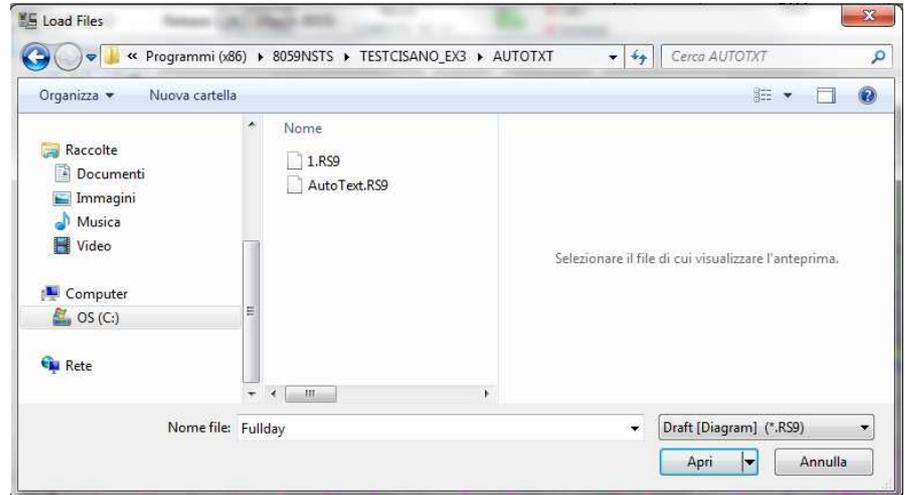
Selecting the desired year, the menu will display all the months and weeks available:



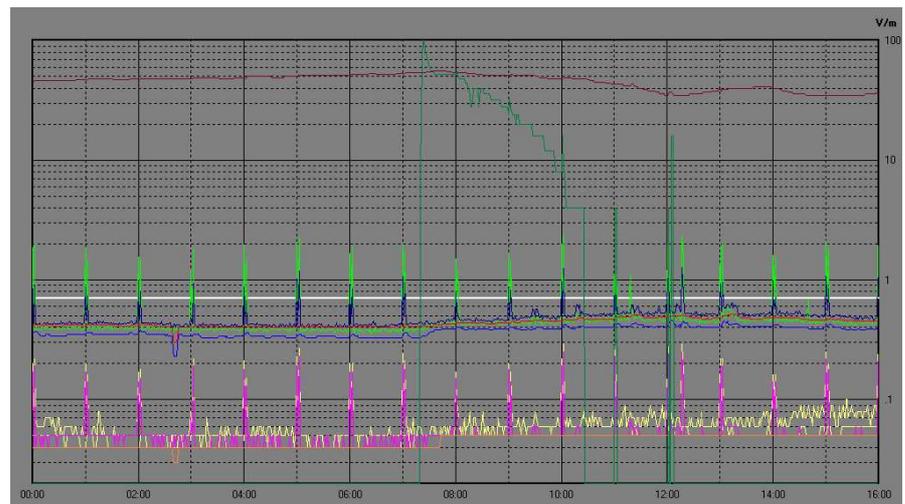
Selecting the month, the software will display the list of all the days containing data.
Selecting the desired day and clicking **OK** the data will be displayed; pressing **Cancel** to interrupt the operation.

3.24.2.1 Open Autotext file

The files in the **AUTOFILE** directory are saved in .TXT format, while the files in the **AUTOTXT** directory are saved in **.RS9** format. The former are created so as to be readily exported into Windows Office programs, and cannot be opened using 8059SW-02 software. The latter can be viewed because they are saved in the proprietary graph form of AMB-8059 (.RS9).

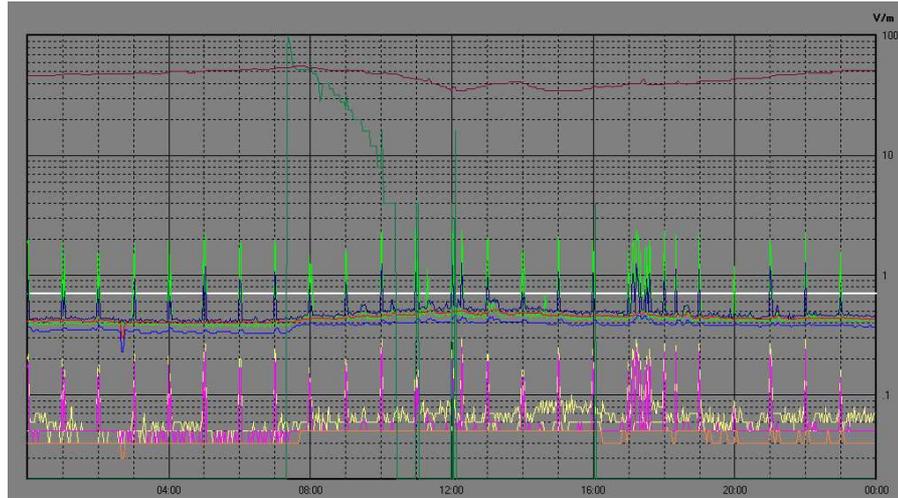


The time window between Start and Stop is defined by the conditions used during download.



In this example, the software shows the graph from 00.00 to 16:00 of autotxt file .RS9.

If, however, you open the file Fullday.RS9 (created automatically in the Month/Day directory), the same graph displays the data for the 24 hour period, from 00.00 to 24.00.



Therefore, with the function Auto ASCII File it is possible to create any graphs with a start and end period of measurement defined in any desired way. For example, from Friday to Monday, or between two months, etc.

Of course, this time period must be selected in the download data procedure.

3.24.3 Show Table File



This is used to automatically display a table report containing the data relative to the set of traces saved with the **Save Export File Setup** function.

Like every other item listed in the table, the asterisk (*) of the **GSM, Charging, USB and Ethernet Band on** will not be shown if the **Trace Menu** has “Global” disabled at the time of activating the **Save Export File Setup** function.

When the **Show Table File** function is enabled, every other function is disabled. The screen looks like this.

8059SW-02 Release 1.045 (March 2015)

Station: TESTCISANO_EX3 (Nets:AMB-8059 S/N 000VE41003)

Date: 11/03/2015 Time: 00.00 (AVG 6 minute)

Probe EP-4B-02 (Last Calibrated:10.10.14)

Date	Time TxOn	AVG V _{V/n}	AVG 2140 V _n	AVG 1842 V _n	AVG 942 V _n	Peak V _{V/n}	Peak 2140 V _n	Peak 1842 V _n	Peak 942 V _n	Battery V	Temp C	Current mA	RH %	Alarms AWPLCTV
11/03/2015	00:01:00	*G	0.35	0.05	0.04	0.42	0.41	0.05	0.05	4.18	0	0	50	.....T
00:01:30	*G	0.35	0.05	0.04	0.42	0.42	0.06	0.05	0.44	4.14	0	0	50	.....T
00:02:00	*G	0.35	0.05	0.04	0.42	0.44	0.05	0.05	0.44	4.10	1	0	50	.....T
00:02:30	*G	0.35	0.05	0.04	0.42	0.44	0.07	0.06	0.46	4.10	0	0	51	.....T
00:03:00	*G	0.36	0.05	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	52	.....T
00:03:30	*G	0.36	0.05	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	52	.....T
00:04:00	*G	0.36	0.05	0.04	0.42	0.39	0.06	0.04	0.42	4.14	0	0	51	.....T
00:04:30	*G	0.36	0.05	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:05:00	*G	0.36	0.05	0.04	0.42	0.39	0.05	0.04	0.42	4.14	0	0	51	.....T
00:05:30	*G	0.36	0.05	0.04	0.42	0.40	0.05	0.04	0.43	4.14	0	0	51	.....T
00:06:00	*G	0.36	0.05	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:06:30	*G	0.35	0.05	0.04	0.42	0.36	0.05	0.05	0.42	4.14	0	0	51	.....T
00:07:00	*G	0.35	0.05	0.04	0.42	0.38	0.05	0.04	0.42	4.14	0	0	51	.....T
00:07:30	*G	0.35	0.05	0.04	0.42	0.39	0.05	0.04	0.42	4.14	0	0	51	.....T
00:08:00	*G	0.34	0.05	0.04	0.42	0.36	0.05	0.04	0.42	4.14	0	0	51	.....T
00:08:30	*G	0.34	0.05	0.04	0.42	0.40	0.05	0.04	0.42	4.14	0	0	51	.....T
00:09:00	*G	0.34	0.05	0.04	0.42	0.36	0.05	0.04	0.42	4.14	0	0	51	.....T
00:09:30	*G	0.34	0.05	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:10:00	*G	0.34	0.05	0.04	0.42	0.40	0.05	0.04	0.42	4.14	0	0	51	.....T
00:10:30	*G	0.34	0.05	0.04	0.42	0.39	0.05	0.04	0.43	4.14	0	0	51	.....T
00:11:00	*G	0.34	0.05	0.04	0.42	0.36	0.04	0.04	0.42	4.14	0	0	51	.....T
00:11:30	*G	0.34	0.05	0.04	0.42	0.36	0.05	0.04	0.42	4.14	0	0	51	.....T
00:12:00	*G	0.34	0.04	0.04	0.42	0.38	0.05	0.04	0.42	4.14	0	0	51	.....T
00:12:30	*G	0.34	0.04	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:13:00	*G	0.34	0.04	0.04	0.42	0.35	0.05	0.04	0.42	4.14	0	0	51	.....T
00:13:30	*G	0.34	0.04	0.04	0.42	0.39	0.04	0.04	0.42	4.14	0	0	51	.....T
00:14:00	*G	0.34	0.04	0.04	0.42	0.37	0.04	0.04	0.42	4.14	0	0	51	.....T
00:14:30	*G	0.34	0.04	0.04	0.42	0.38	0.05	0.04	0.42	4.14	0	0	51	.....T
00:15:00	*G	0.34	0.04	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:15:30	*G	0.33	0.04	0.04	0.42	0.37	0.05	0.04	0.42	4.14	0	0	51	.....T
00:16:00	*G	0.34	0.04	0.04	0.42	0.37	0.04	0.04	0.42	4.14	0	0	51	.....T
00:16:30	*G	0.33	0.04	0.04	0.42	0.38	0.05	0.04	0.42	4.14	0	0	51	.....T
00:17:00	*G	0.33	0.04	0.04	0.42	0.39	0.05	0.04	0.42	4.14	0	0	51	.....T

Probe EP-4B-02 Resolution 30 seconds Mode AVG

In case of using DualBand Electric and Magnetic probe, the screen looks like this (EHP-2B-03 is shown below as example):

8059SW-02 Release 1.37.6 (September 2022)

Station: CisanoLabR&D (Nets:AMB-8059 S/N 160WY80514)

Date: 16/09/2022 Time: 00.00 (RMS 6 minute)

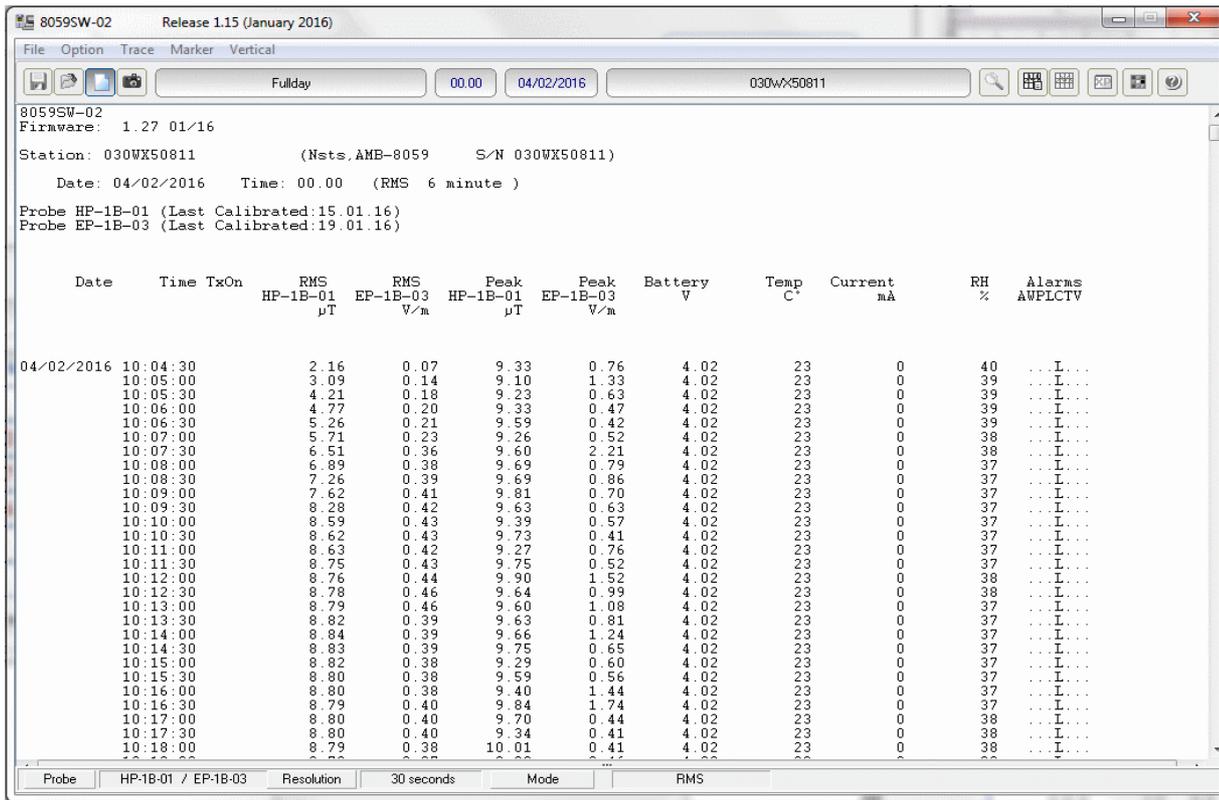
Latitude: 4404.4784 N
Longitude: 809.5875 E

Probe EHP-2B-03 (Last Calibrated:12.09.22)
Standard ICNIRP 2020 Occupational

Date	Time TxOn	RMS S(H) %	RMS S(E) %	Peak S(H) %	Peak S(E) %	Battery V	Temp C	Current mA	RH %	Alarms AWPLCTV
16/09/2022	00:00:00	2.16	0.07	9.33	0.76	4.06	27	0	47	.....L
00:06	*G	3.09	0.14	9.10	1.33	3.98	27	0	47	.....L
00:12	*G	4.21	0.18	9.23	0.63	4.02	27	0	46	.....L
00:18	*G	4.77	0.20	9.33	0.47	4.02	27	0	46	.....L
00:24	*G	5.26	0.21	9.59	0.42	4.06	27	0	46	.....L
00:30	*G	5.71	0.23	9.26	0.52	4.06	27	0	46	.....L
00:36	*G	6.51	0.36	9.60	2.21	4.06	27	0	47	.....L
00:42	*G	6.89	0.38	9.69	0.79	4.06	27	0	47	.....L
00:48	*G	7.26	0.39	9.69	0.86	4.06	27	0	47	.....L
00:54	*G	7.62	0.41	9.81	0.70	4.06	27	0	47	.....L
01:00	*G	8.28	0.42	9.63	0.63	4.06	27	0	47	.....L
01:06	*G	8.59	0.43	9.39	0.57	3.98	27	0	47	.....L
01:12	*G	8.62	0.43	9.73	0.41	4.02	27	0	46	.....L
01:18	*G	8.63	0.42	9.27	0.76	4.02	27	0	46	.....L
01:24	*G	8.75	0.43	9.75	0.52	4.02	27	0	46	.....L
01:30	*G	8.76	0.44	9.90	1.52	4.06	27	0	47	.....L
01:36	*G	8.78	0.46	9.64	0.99	4.06	27	0	47	.....L
01:42	*G	8.79	0.46	9.60	1.08	4.06	27	0	47	.....L
01:48	*G	8.82	0.39	9.63	0.81	4.06	27	0	47	.....L
01:54	*G	8.84	0.39	9.66	1.24	4.06	27	0	47	.....L
02:00	*G	8.83	0.39	9.75	0.65	4.02	27	0	47	.....L
02:06	*G	8.92	0.38	9.29	0.60	3.94	27	0	47	.....L
02:12	*G	8.80	0.38	9.59	0.56	4.02	27	0	46	.....L
02:18	*G	8.80	0.38	9.40	1.44	4.02	27	0	46	.....L
02:24	*G	8.79	0.40	9.84	1.74	4.02	27	0	46	.....L
02:30	*G	8.80	0.40	9.70	0.44	4.02	27	0	47	.....L
02:36	*G	8.80	0.40	9.34	0.41	4.02	27	0	47	.....L

Probe EHP-2B-03 Resolution 6 min Mode RMS

Instead in Dual-probe configuration the screen looks like this:



3.24.4 Clipboard



Used to make the bitmap corresponding to the actual measurement displayed on the Windows Clipboard. That makes it possible to perform operations of cutting and pasting images directly on other programs without constructing exchange files. This operation can be useful to integrate test reports or other documents written with a Word Processor, such as Word for Windows™, inserting the graphic image of the taken readings. Each single trace is converted into bitmap format and copied with the colors taken from the palette selected in **Setup**.

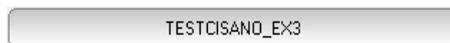


The **File Name** field contains the name of the file displayed. This is normally updated automatically with the **LOAD** command.



Fields **Status 1** and **Status 2** show the time and date of start of the display.

The next field contains the name of the Field Monitor unit.



3.24.5 Zoom Mode



This is used for horizontal expansion of the actual measurement displayed (ZOOM) to observe the measurement with better definition. When the ZOOM function is on, the **Marker** function is enabled as well. A small blue triangle appears on the display and can be moved with the mouse to any point on the graph. The window at the bottom will show the amplitude marked and the time of occurrence.

To enable the **Zoom** function proceed as follows:

- select the **Zoom Mode** key;
- position the mouse on the **Marker** triangle at the starting point;
- holding the left mouse key down, drag the **Marker** to the point at the end of the trace you wish to expand. Release the mouse key and the selected trace will be expanded immediately.

During this operation an orange cross and two vertical bars are displayed to aid in selection of the area to expand. To return to normal display unselect **Zoom Mode**.



The smallest selectable trace is 120 seconds (2 minutes). A greater enlargement would only put more space between the two measurement points without adding any significant information.

If you try to zoom on a trace of less than 2 minutes an error message will be displayed.



As already mentioned, the **Zoom Mode** key is used to enable the **Marker**, represented by a colored arrow which, using the mouse, can be positioned anywhere along the displayed trace. In this case, the time values will be reported on the status bar at the bottom of the screen (time from start of measurement) and the amplitude will be displayed with respect to the actual position of the **Marker**. This function is used for a detailed analysis of the graph and of the relative values saved.



When the Zoom Mode key is enabled, the other commands are automatically disabled except Save, ClipBoard and Help.

3.24.6 Comment



When this icon is selected, it is possible to enter or display the field containing the comment, which can be written or edited up to a **maximum of 1024 characters**. The screen looks like this:



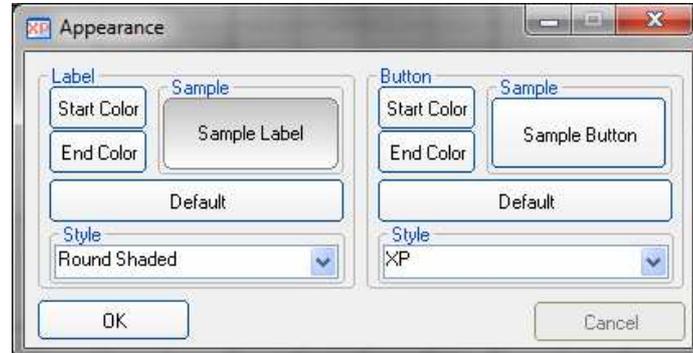
In the bitmap, the comment is shown only when the Comment key is enabled.

3.24.7 Redraw



Used to refresh the screen and redraw the diagram.
This operation is necessary in particular when the PC does not have much memory and/or many applications are running at the same time.

3.24.8 Appearance



Button and label style can be selected from a **Style** list

Start and **End Color** button allow selection from a color palette

Sample Button and **Sample Label** show the appearance preview

Default button to set appearance to the default parameters

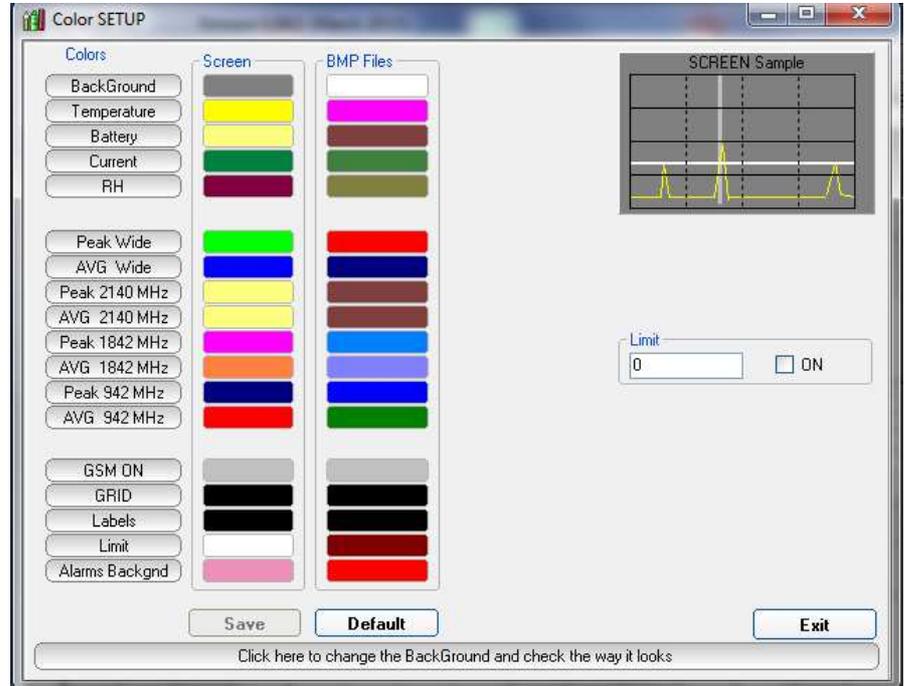
3.24.9 Setup



The use of the **Setup** key allows to access the window for setting the colors of the graph.

It is possible to change the current settings at any time, and the new settings can be saved in a file and restored later.

The **Setup** window looks like this:



For each trace of the graph listed under **Colors**, the desired color can be selected, and these colors can be different for the **Screen** and for the **BMP Files** to better adapt to the viewing and printing needs of the User.

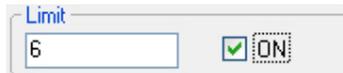
3.24.9.1 Color Palette

The choice is made by moving the mouse to the color to be changed and then using the Color Palette window.



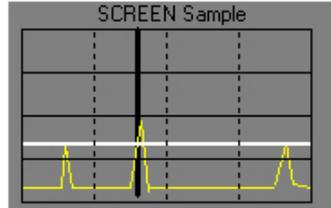
3.24.10 Limit

The **Limit** field is used to set and enable a reference trace on the current screen.



3.24.10.1 SCREEN Sample

The small graph on the upper right of the display gives a preview of the results in save or print obtained with the colors selected.

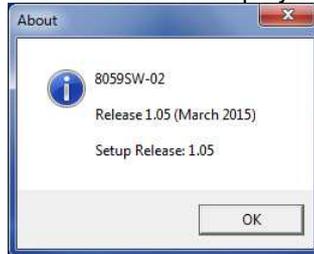


Click **Exit** to close the **Setup** window without saving the new setting, to maintain the current settings for the graphs displayed after opening the program again. The new configuration can be saved in a relevant file by clicking **Save**.

3.24.11 Software release

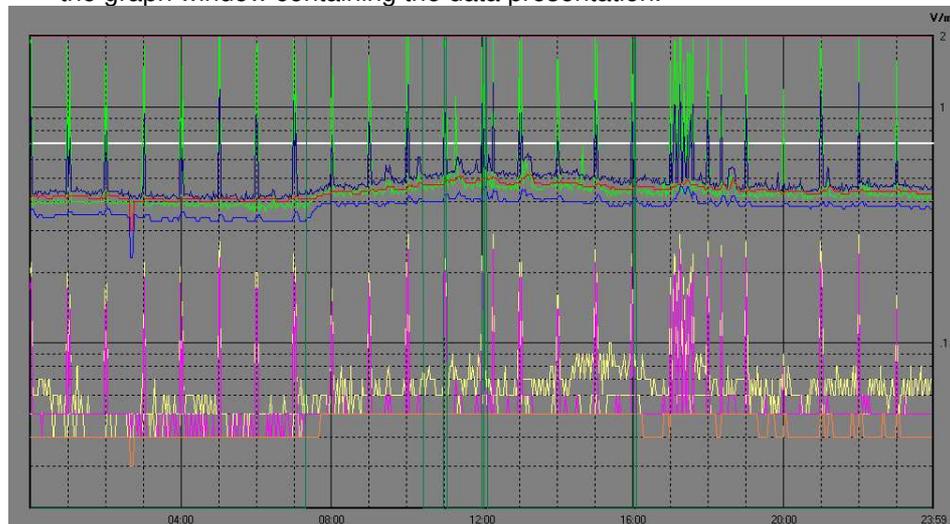


Click this icon to display the software release currently installed on the PC.



3.25 Graph window

The central part of the data window for the 8059SW-02 program displays the graph window containing the data presentation.



The graph window displays the traces saved on the basis of the settings made in the main window of the **Storing Settings** section.

When **Zoom Mode** is enabled, a triangle with its apex pointing downward highlights the position of the **Marker**.

A horizontal line, of the color chosen with **Setup**, highlights the limit set, permitting easy comparison with the values shown on the graph.

3.26 Status window

The bottom section of the data window in the 8059SW-02 program displays the status window.

This window provides useful information about the program functions and also gives extended and immediate help with the meaning of the commands and options on which the mouse is positioned.

A few examples are shown below:

Probe	EP-4B-02	Resolution	30 seconds	Mode	AVG
-------	----------	------------	------------	------	-----

Actual operating mode

Date	04/03/2015	Time	22:27:30	Battery	4.14 V
------	------------	------	----------	---------	--------

Values relative to **Marker** position

Makes a BITMAP and put it in the clipboard so that it can be pasted to other applications such as word processor and image editors
--

Display of description of the **Clip Board** key

3.27 Importing data to Word or Excel

All the graphs saved in .TXT format can be displayed by other programs. If Word or Excel are used, the saved file can be searched with the Open file command and selected using **File type: All files (*.*)**. Search for the file in the 8059SW-02 directory and follow the path (Station Name, year, month and day) to select the desired file to open.

NardaEMFGPSLogger – User’s guide

3.28 Hardware requirements

Install the NardaEMFGPSLogger on PC; to ensure the proper operations of the NardaEMFGPSLogger software, the minimum hardware requirements of the Personal Computer are:

- Pentium processor or equivalent;
- at least 256 Mb RAM;
- at least 100 Mb of free space on your hard disk;
- minimum display resolution 1024x768 (the Windows™ default screen appearance setting is recommended. Depending on the operating system in use, some customized screen appearance could cause abnormal displaying of the control software);
- One Free USB port;
- Operating System: Windows™ Win7, Win8.1, Win10, and Win11.



The new releases can be downloaded directly from the Narda website <http://www.narda-sts.it>

NOTICE

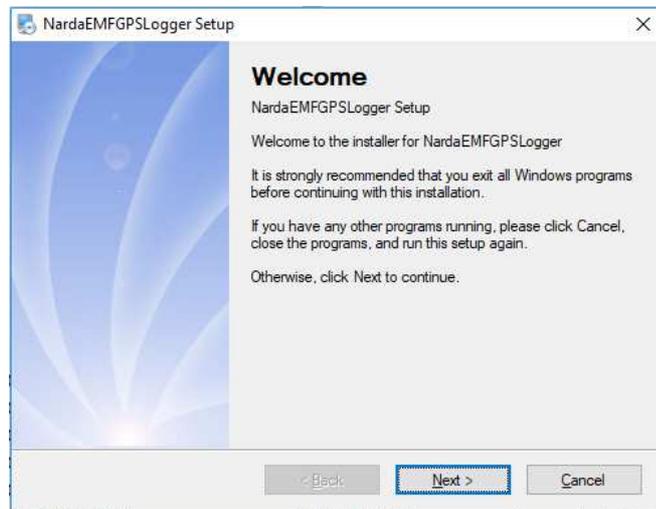
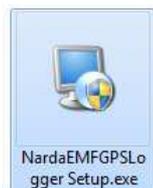
On Device Manager the user must verify that his device is still supplying power when the computer is in Sleep mode.

3.29 Installation

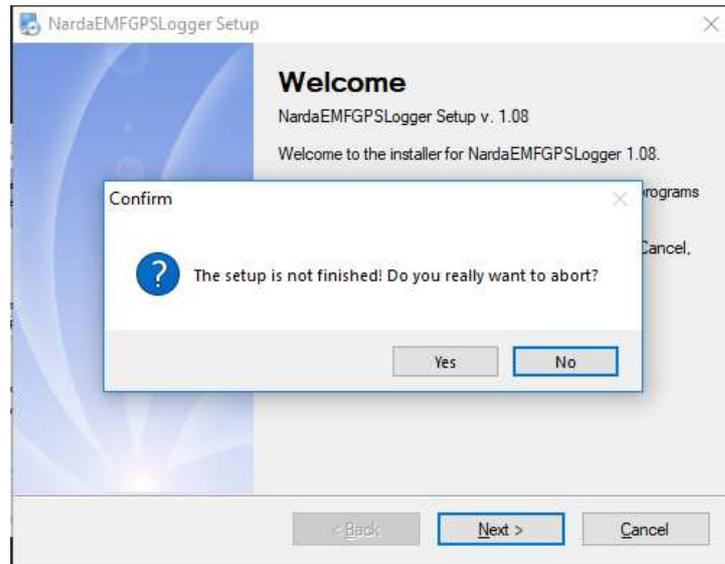
To install the **NardaEMFGPSLogger** on PC from the supplied Software Media proceed as follows:

In Computer Resources, browse the Software Media.

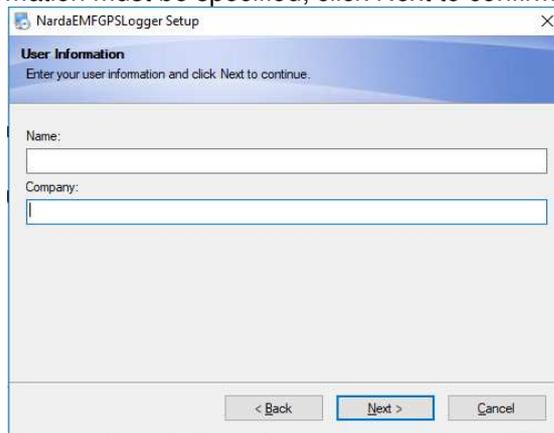
To start the installation double click on the **NardaEMFGPSLogger Setup.exe**.



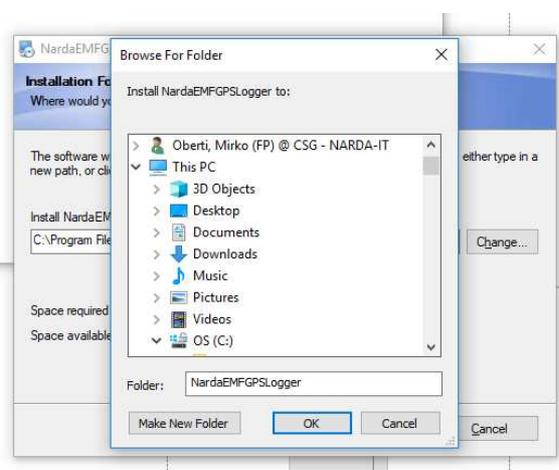
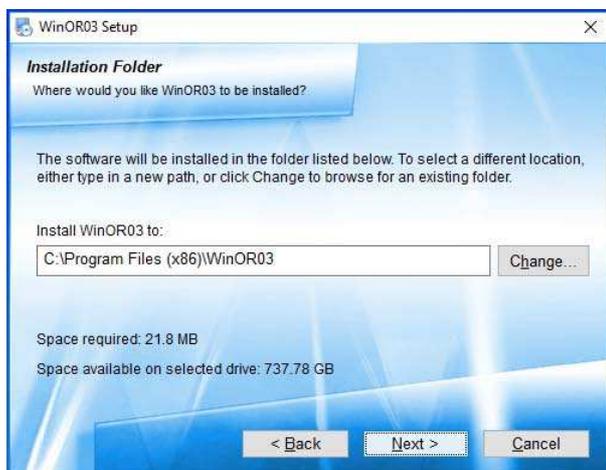
The installation can be aborted by clicking on **Cancel**:



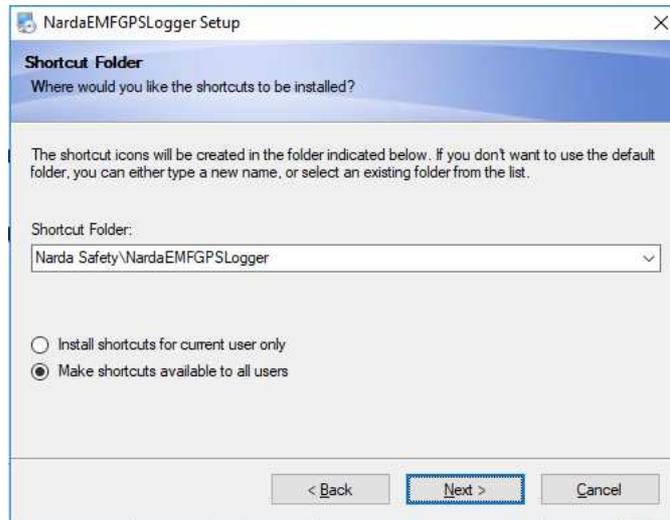
The user information must be specified; click Next to confirm.



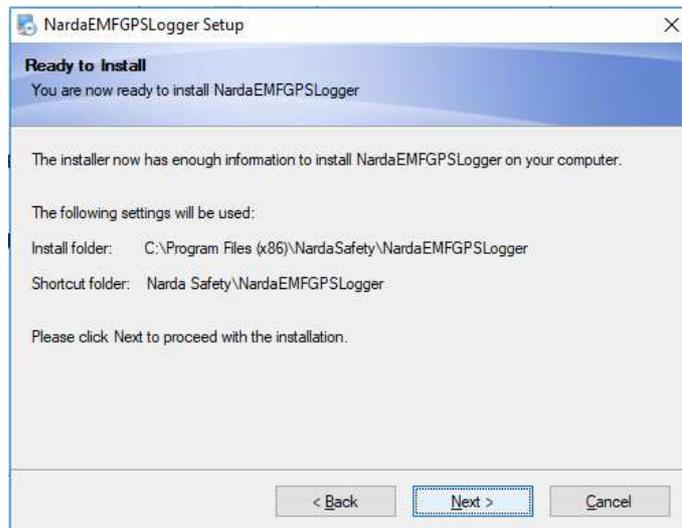
The installation folder must be specified. Click **Next** to confirm the default folder or **Change** to modify.



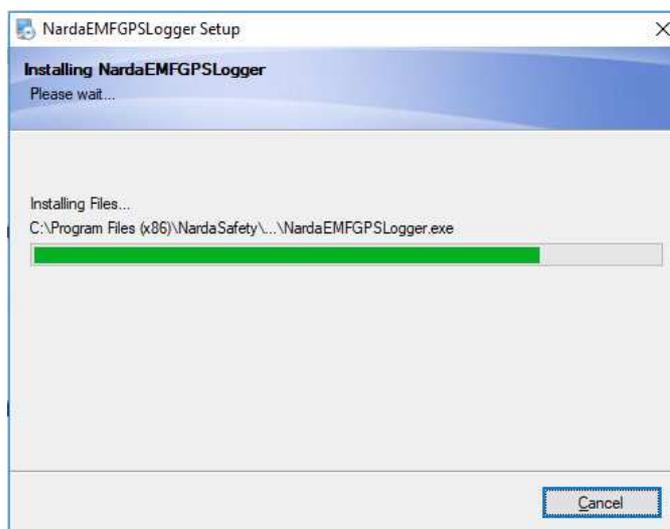
The shortcut folder must be specified. Click **Next** to confirm.



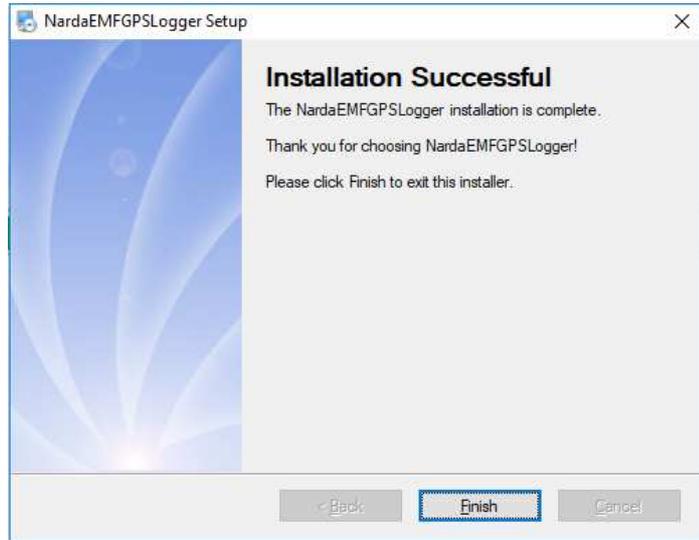
Click **Next** to proceed installing.



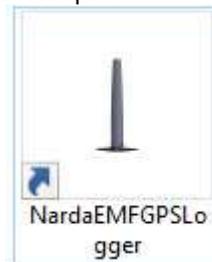
The installing status is displayed then:



Click **Finish** to complete and exit the installer.



The folder **NardaEMFGPSLogger** is created under **Programs** with the icon **NardaEMFGPSLogger** on desktop.



Disable Sleep mode

NOTICE

When you are not using your Laptop for measurement campaign, Windows turn it in "Sleep" mode. Some device and the NardaEMFGPSLogger software are suspended to save power and the data may get lost until the PC is not woke up.

NOTICE

On Device Manager you must verify that your device is still supplying power when the computer is asleep. In this way Windows will no longer power off the hardware connected to your PC.

3.30 Mobile operation Instructions

Follow the instructions step-by-step for “mobile” operation:

- Running the software (see §3.30.1)
- Setting the language (see §3.30.2)
- Setting the internal clock (see §3.30.3)
- Setting the field limits (see §3.30.4)
- Active acoustic level warnings (see §3.30.5)
- Setting the Sample distance (see §3.30.6)
- Download previous data and start measurements campaign (see §3.30.7)
- Measurements campaign events (see §3.30.8)
- Stop measurement and export data (see §3.30.9)
- Resume connection or Exit program (see §3.30.10)

3.30.1 Run the software Run the application; a welcome screenshot will appear for a few seconds.

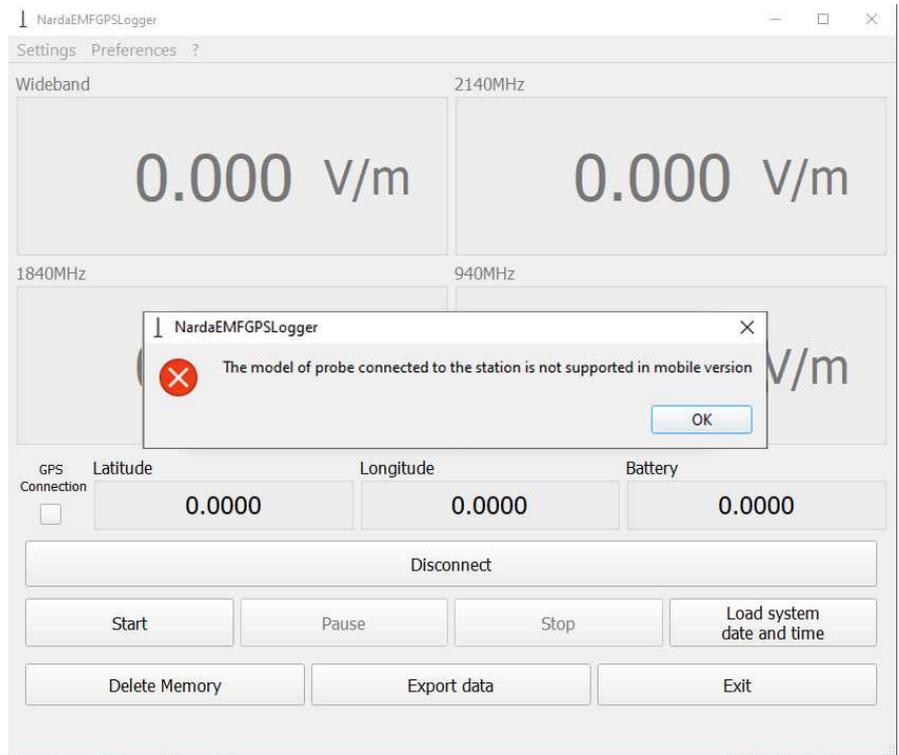


In case a problem in the communication port occurs, the message “Cannot open USB 8059” or “AMB-8059-00 is not connected to the PC” appears instead:



In this case, please check the USB-OC Optical converter is properly connected to EMF station

In case of using a probe model not supported by the station, the following message will be shown:



 **NOTE**

Table 1-7 on Pag.1-9, includes the list of the field probes available for AMB-8059/00 mobile version (CMK) and their technical specifications.

 **NOTE**

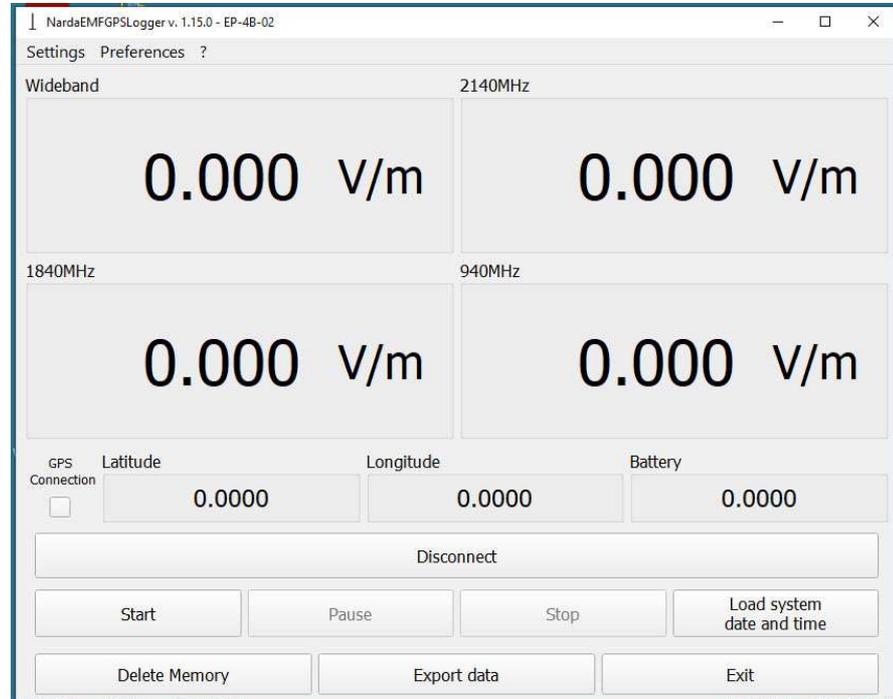
For the drive test measurement use probe with serial number having the first three digit equal or greater than 100.

 **NOTE**

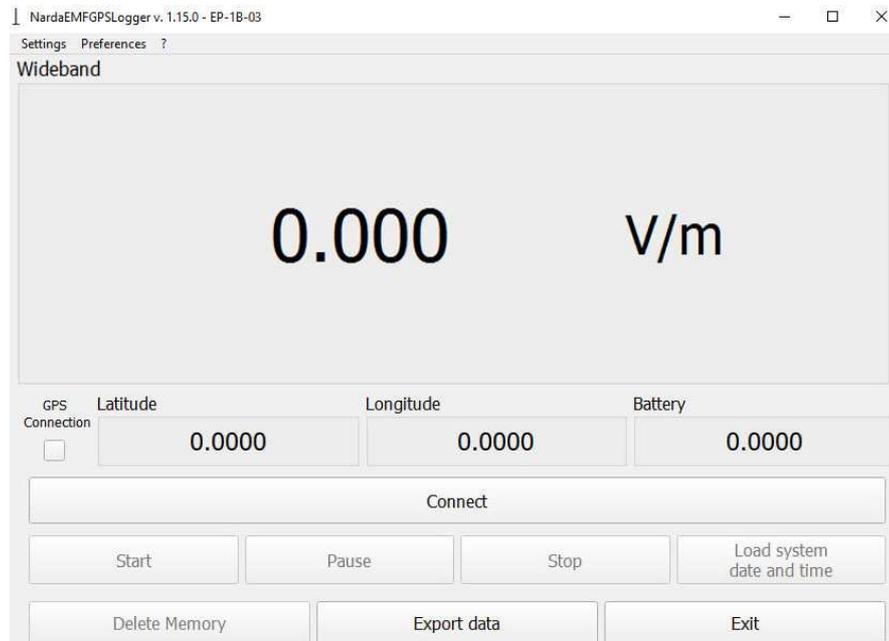
AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration.

The program main window will be shown and the probe name is displayed on the top left and ? tab. There are the instantaneous values of the measured level (up to four fields, each with its unit).

In the following screen, a quad-band probe (EP-4B-02) is in use.



In the following screen, a single-band probe (EP-1B-03) is in use.



3.30.2 Setting the Language

Under **Preferences** tab, it is possible to choose the desired language.



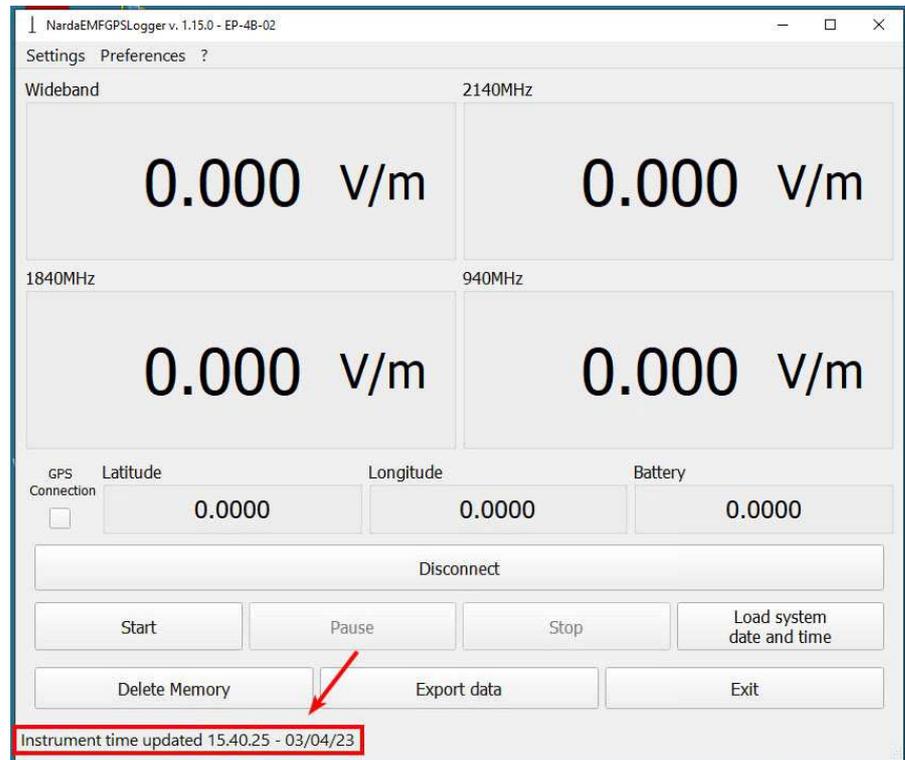
3.30.3 Setting the internal clock

The station clock is very important as every field data stored by the station is related to time taking, as a reference, the station RTC.

NOTICE

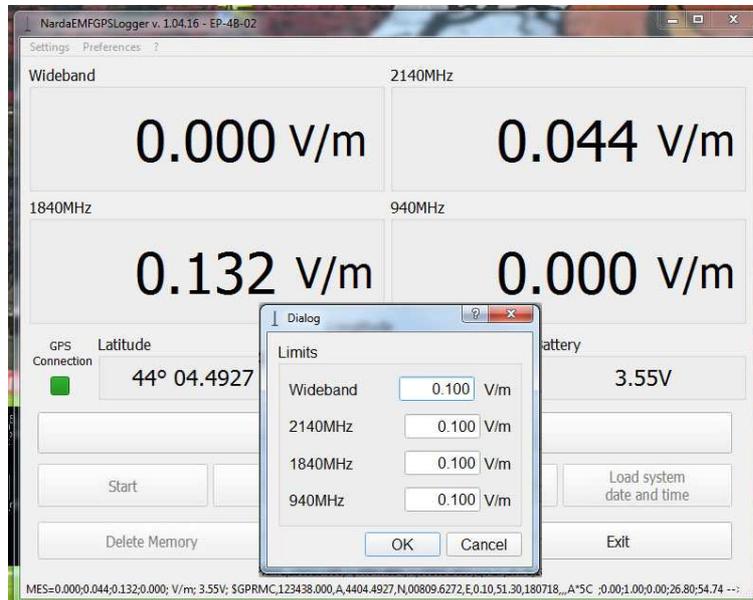
Every time the battery was removed from it, the internal clock has to be set.

Before pressing **Start**, click on **Load system date and time** to change the internal clock in the monitoring station and synchronize it with the PC. A confirmation message will appear on the left bottom.

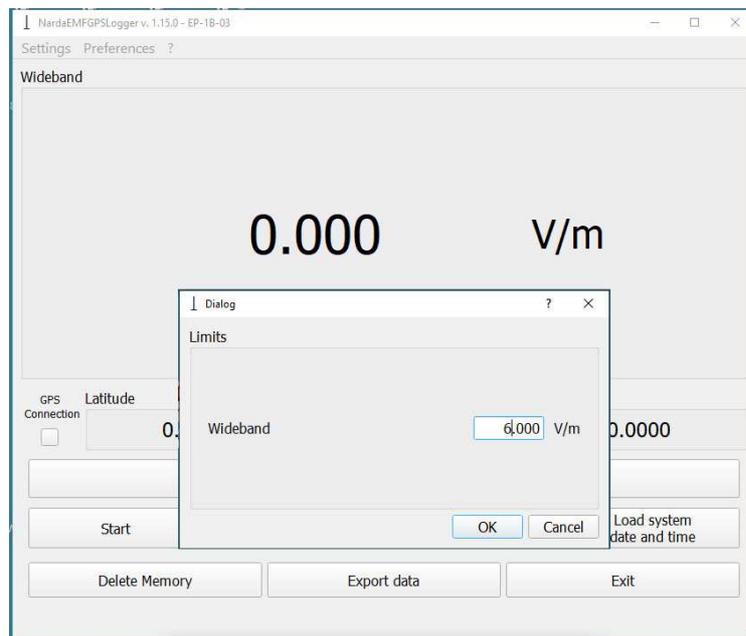


3.30.4 Setting the Field limits

Open the **Limits** dialog box under **Settings** tab.
For Quad-band probe the software allows setting the limit for each band. In case of using a single-band model, the Wideband value will be available only.
In the following screen, a quad-band probe (EP-4B-02) limits setting.



In the following screen, a single-band probe (EP-1B-03) limits setting.



If the station is not connected to the PC and a quad-band probe is replaced by a single-band one, the measured field is compared to the Wideband limit set only.



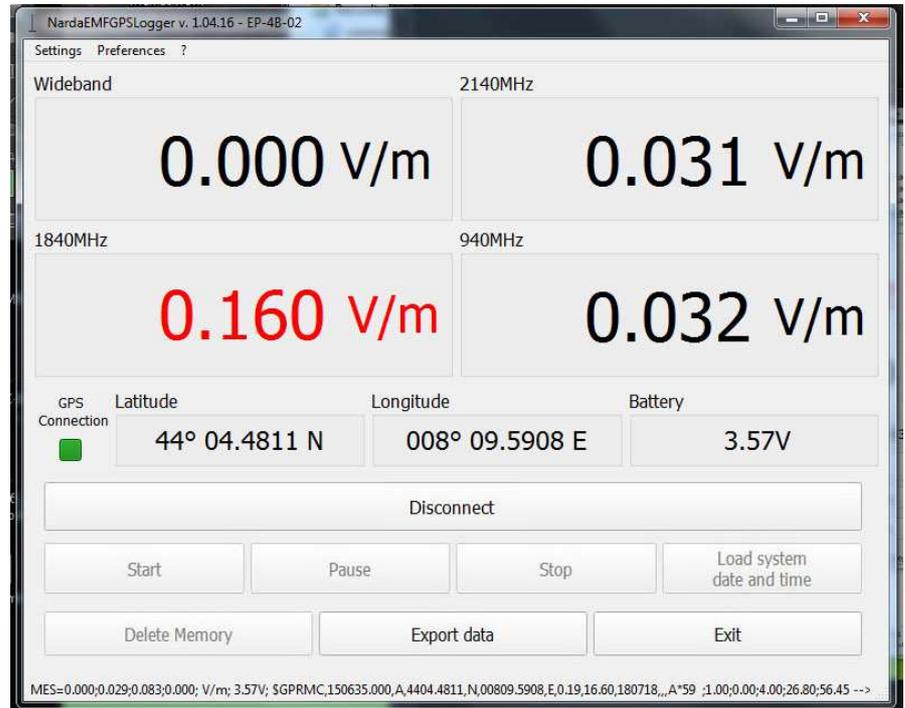
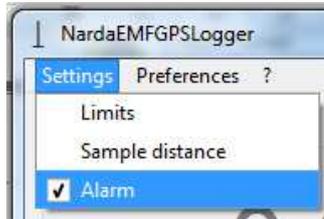
If any value is not entered, the software set each value to 6 V/m.



In case of needs, the limits can also be changed before exporting the stored data.

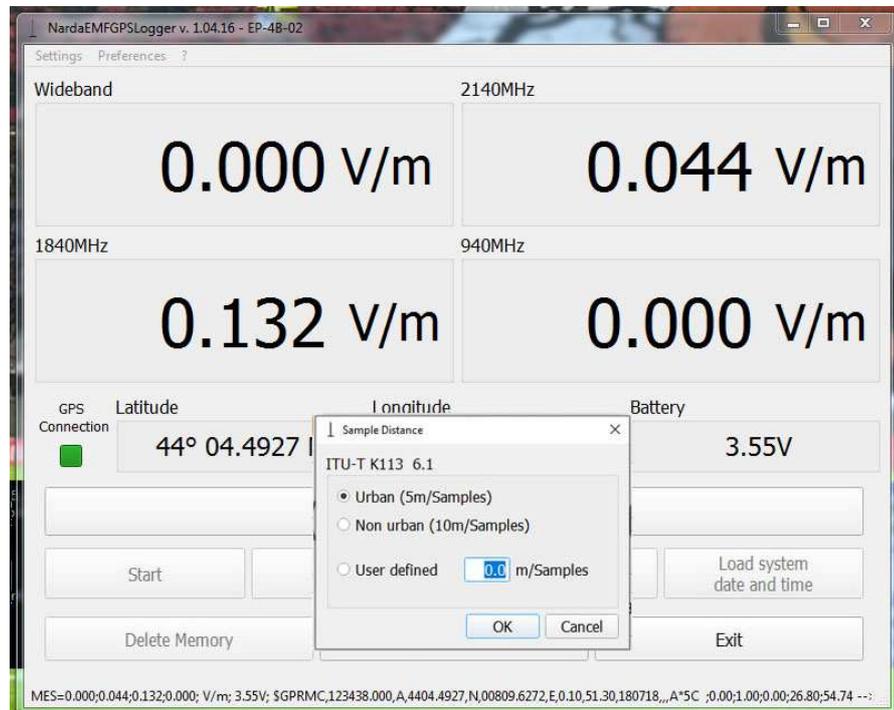
3.30.5 Setting acoustic Warning

If **Alarm** is activated (✓) under **Settings** tab, an acoustic warning comes from PC when the field measured is above the limit.



3.30.6 Setting the Samples distance

Each measurement must be taken according to the recommendation ITU-T K.113 or the user's needs. Open the **Sample distance** dialog box under **Settings** tab.

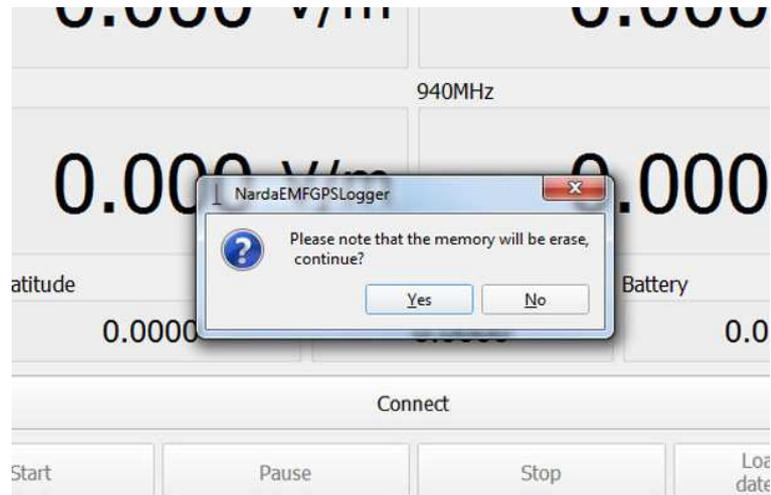


Since the measurements are taken on the move, the measurement time of the equipment used should be taken into account (see the definition for measurement time in clause 3.2.2 of the Recommendation ITU-T K.113). Samples (measurements) must be completed within a distance of 5 m for urban areas and within 10 m for non-urban areas. Therefore, the maximum allowed speed of the vehicle must be calculated according to the measurement time of the equipment being used.

Example 1: measurement time of 300ms as AMB-8059/00 CMK feature – if moving at 50 km/h, it will require 4.2 m for each sample to be taken; – the maximum speed would be 60 km/h in order to stay within the 5 m distance between samples (urban area).

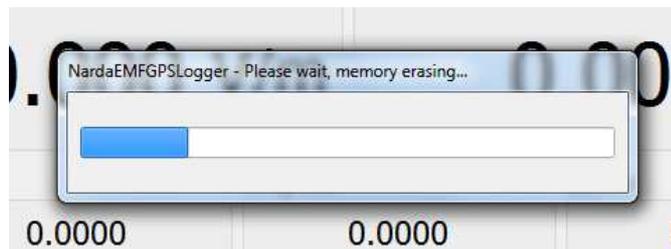
3.30.7 Download previous data and Start measurement campaign

Click **Start** button to start storing measurements on the internal station memory; the following message will appear:

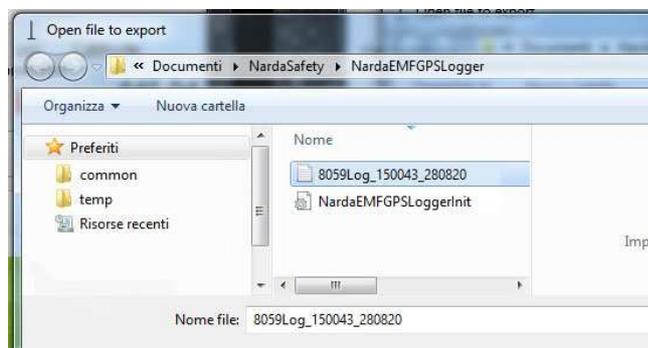


On the station the previous measurements field are overwrite by the last one and will be no more available for downloading. It is suggested to select **No** and download the previous data through the **Export** data (see §3.30.9).

Answering **Yes**, the software delete the previous data and starts a new logger measurements; a window is displayed with the bar indicating the progress of the memory erasing.



At any time the software is started and the AMB-8059/00 CMK is connected to PC, a text Log file will be automatically created in the directory **Users\.....\Documents\NardaSafety\NardaEMFGPSLogger**. The file name appears in the following format:
8059Log_hhmmss_ddmmyy.txt



Once set the station with NardaEMFGPSLogger software, the fiber optic cable can be disconnected during the measurement campaign. In this case, the Log file is not generated and any alarm will not be notify if occurs.

The Log file includes all settings and main activities automatically downloaded from the station.

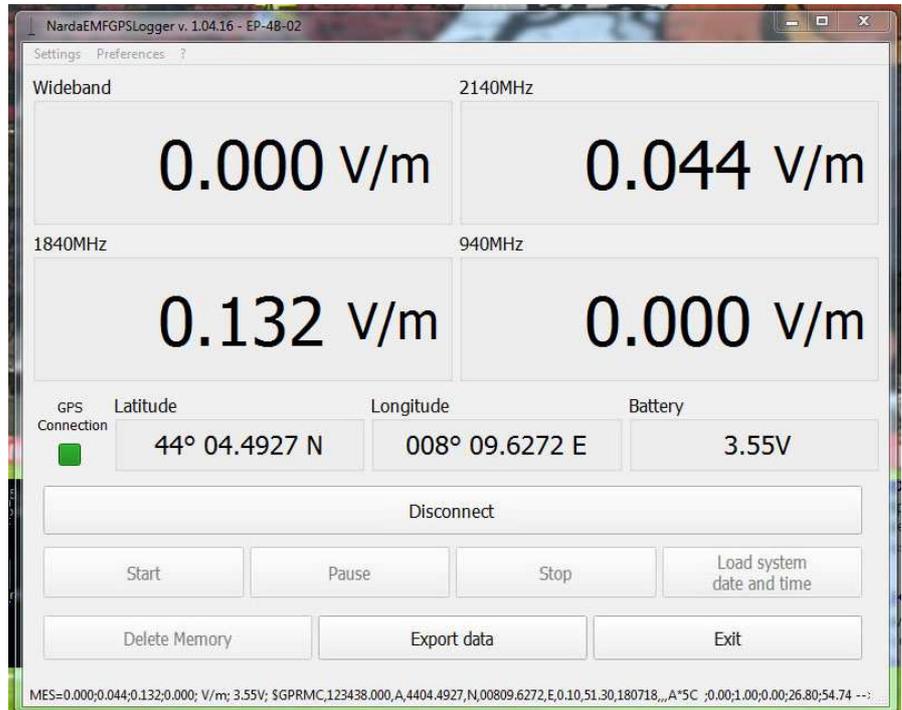
The following is an example where an EP-4B-02 probe is connected to the 8059/CMK (1). Then, the software deletes the previous data on internal memory station (2). Since the beginning of the measurement campaign the instant value of the field for each band are stored (3); the data are continuously stored and the GPS acquisition is still in progress (4). After few seconds the GPS coordinates are acquired (5).

```

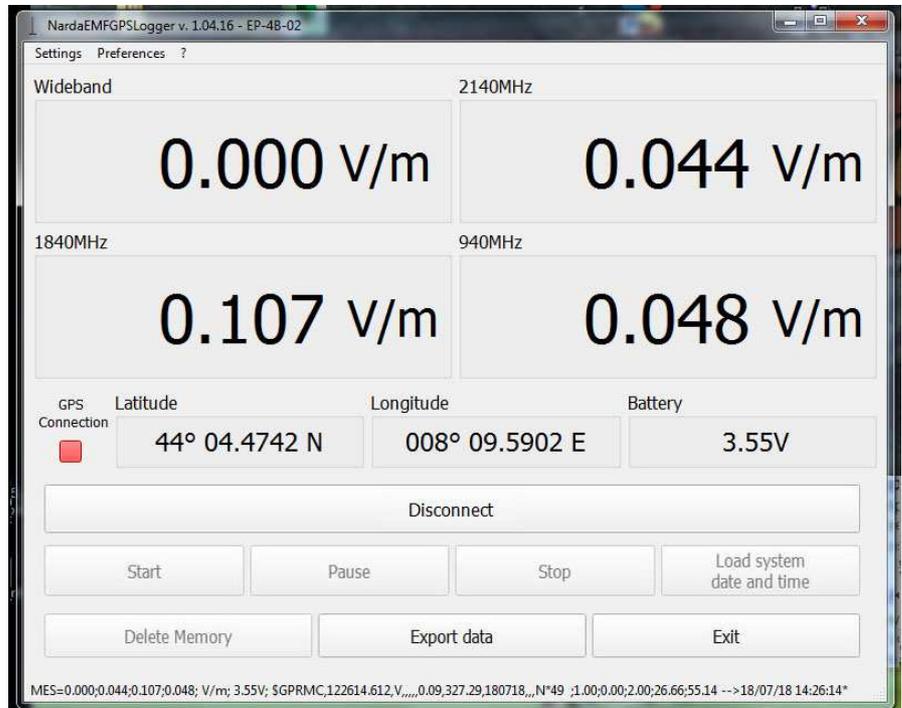
8059Log_150043_280820 - Blocco note di Windows
File Modifica Formato Visualizza ?
#BM PRB=EP-4B-02:15.07.19; V/m:1000.00:200.00:0.25:4:0.02*
#BM EEM=OK*
Erasing Mobile Flash
#BM ERM=OK 32*
#BM *;
MES=0.484;0.038;0.043;0.037; V/m; 3.59V; ;555.00;48.00;27.00;20.15;14.07 -->04/02/20 14:59:40*;
MES=0.484;0.036;0.041;0.037; V/m; 3.59V; ;-26.00;-9.00;-8.00;20.15;14.07 -->04/02/20 14:59:40*;
MES=0.494;0.036;0.041;0.038; V/m; 3.59V; ;6.00;4.00;9.00;20.15;14.07 -->04/02/20 14:59:41*;
MES=0.480;0.037;0.041;0.038; V/m; 3.59V; ;-5.00;-5.00;0.00;20.15;14.07 -->04/02/20 14:59:41*;
MES=0.475;0.036;0.041;0.038; V/m; 3.59V; ;3.00;7.00;1.00;20.15;14.07 -->04/02/20 14:59:41*;
MES=0.465;0.036;0.041;0.038; V/m; 3.59V; ;16.00;2.00;-7.00;20.15;14.07 -->04/02/20 14:59:41*;
MES=0.456;0.036;0.042;0.036; V/m; 3.59V; ;-14.00;-2.00;4.00;20.15;14.07 -->04/02/20 14:59:42*;
MES=0.456;0.036;0.041;0.036; V/m; 3.59V; $GPRMC,145942.851,V,,,,,0.00,0.00,040220,,,N*4A;;9.00;5.00;0.00;20.15;14.07 -->04/02/20 14:59:42*;
MES=0.456;0.037;0.041;0.036; V/m; 3.59V; $GPRMC,145942.851,V,,,,,0.00,0.00,040220,,,N*4A;;-15.00;-10.00;16.00;20.15;14.07 -->04/02/20 14:59:42*;
MES=0.456;0.035;0.042;0.037; V/m; 3.59V; $GPRMC,145942.851,V,,,,,0.00,0.00,040220,,,N*4A;;-8.00;19.00;-31.00;20.15;14.07 -->04/02/20 14:59:42*;
MES=0.456;0.035;0.042;0.038; V/m; 3.59V; $GPRMC,145942.851,V,,,,,0.00,0.00,040220,,,N*4A;;10.00;-17.00;29.00;20.15;14.07 -->04/02/20 14:59:43*;
MES=0.456;0.035;0.042;0.038; V/m; 3.59V; $GPRMC,145943.851,V,,,,,0.00,0.00,040220,,,N*4B;;7.00;8.00;-5.00;20.15;14.07 -->04/02/20 14:59:43*;
MES=0.446;0.037;0.042;0.038; V/m; 3.59V; $GPRMC,145943.851,V,,,,,0.00,0.00,040220,,,N*4B;;14.00;-9.00;-20.00;20.15;14.07 -->04/02/20 14:59:43*;
MES=0.456;0.033;0.042;0.038; V/m; 3.59V; $GPRMC,145945.840,A,4404.4964,N,00809.5903,E,0.30,104.89,040220,,,A*6C;;-15.00;0.00;-4.00;20.15;14.07 -->04/02/20 14:59:45*;
MES=0.451;0.033;0.042;0.037; V/m; 3.59V; $GPRMC,145945.840,A,4404.4964,N,00809.5903,E,0.30,104.89,040220,,,A*6C;;13.00;3.00;9.00;20.15;14.07 -->04/02/20 14:59:46*;
MES=0.451;0.033;0.041;0.037; V/m; 3.59V; $GPRMC,145945.840,A,4404.4964,N,00809.5903,E,0.30,104.89,040220,,,A*6C;;-17.00;-4.00;-1.00;20.15;14.07 -->04/02/20 14:59:46*;
MES=0.451;0.033;0.041;0.037; V/m; 3.59V; $GPRMC,145946.841,A,4404.4964,N,00809.5904,E,0.09,6.65,040220,,,A*62;;-8.00;7.00;6.00;20.15;14.07 -->04/02/20 14:59:46*;
MES=0.456;0.033;0.041;0.039; V/m; 3.59V; $GPRMC,145946.841,A,4404.4964,N,00809.5904,E,0.09,6.65,040220,,,A*62;;-1.00;-4.00;2.00;20.15;14.07 -->04/02/20 14:59:47*;
MES=0.446;0.034;0.042;0.039; V/m; 3.59V; $GPRMC,145946.841,A,4404.4964,N,00809.5904,E,0.09,6.65,040220,,,A*62;;-1.00;-8.00;-9.00;20.15;14.07 -->04/02/20 14:59:47*;

```

Before starting a measurement campaign, make sure the GPS acquisition is correctly acquired (the **GPS connection** led indicator blinking green).

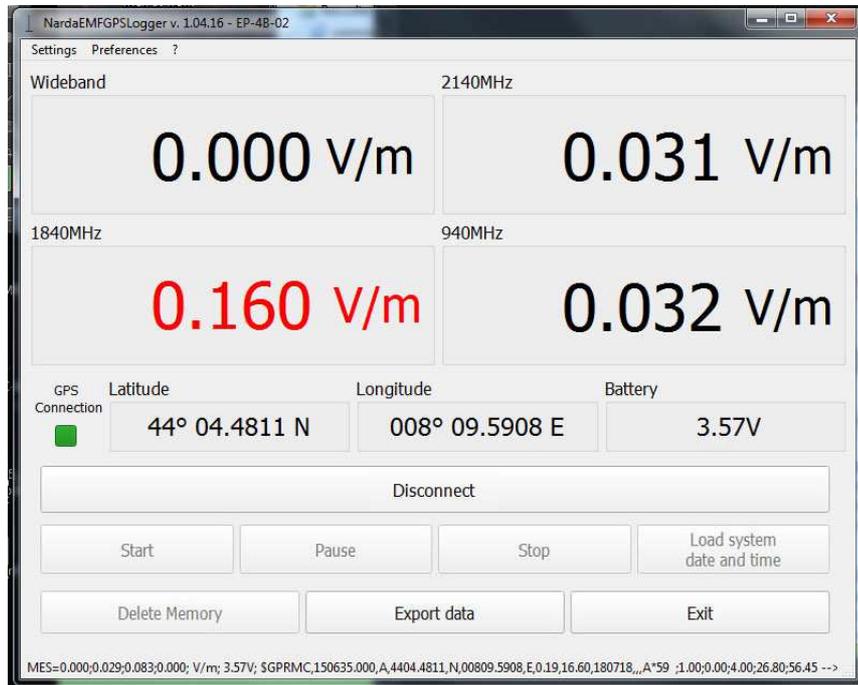


The GPS acquisition is still in progress (red flashing led indicator)

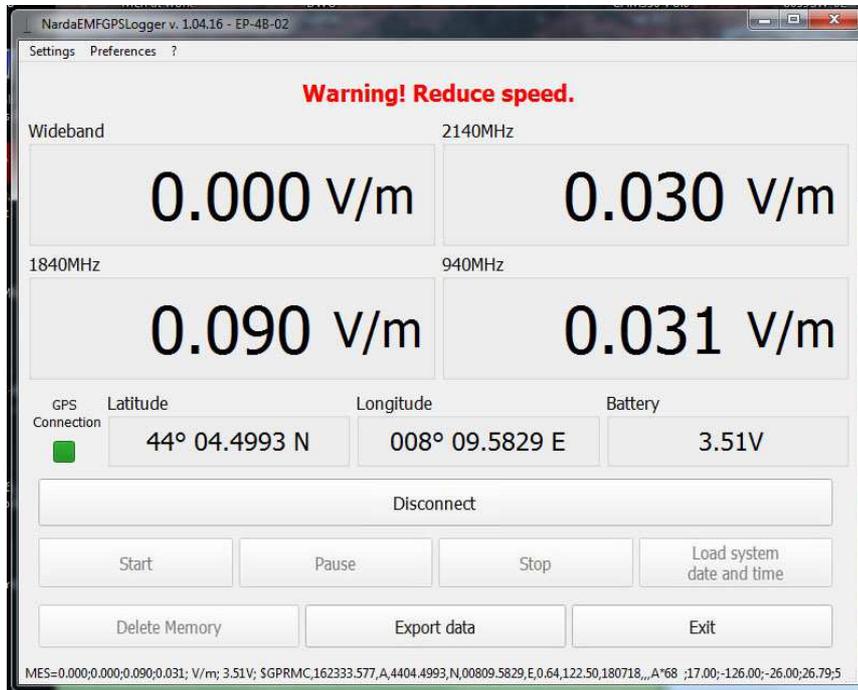


3.30.8 Measurement campaign events

While measurements collection is running, some alarms may occur:
 - If the field measured exceeds the limit set, the value will be displayed in red. In addition, if **Alarm** (Settings menu) has been activated, an acoustic warning also comes from PC.



- A red **“Warning! Reduce speed”** message will be display on the top if the sample time is exceeded.

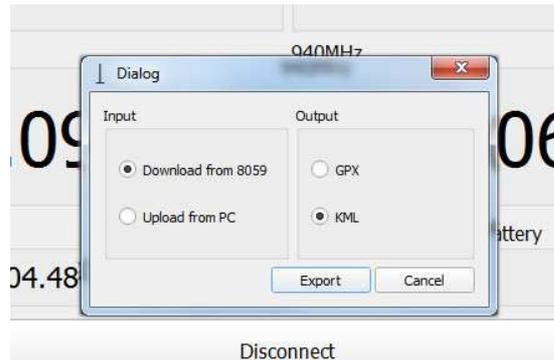


The logger can be paused (**Pause**) by clicking the corresponding software buttons at any time.

When the measurement is completed, click **Stop** button to end storing data.

3.30.9 Export data

Click **Export data** button. The following dialog box will be display:



Download from 8059

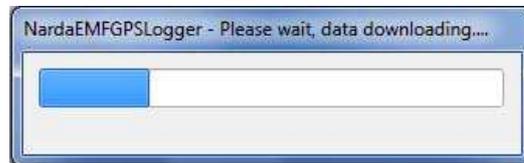
The function **Download from 8059** allows exporting the measurement stored in the memory station and saving it on PC in .GPX or .KML extension.

The **KML** extension is the Google Earth format and the User must have Google Earth installed.

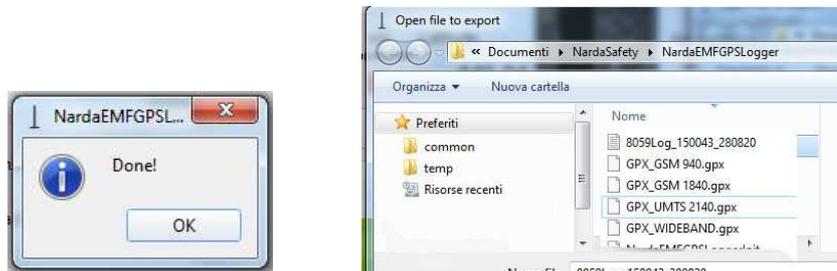
In the KML file the color and the placemarks is already assigned to each limits according to the recommendation ITU-T K.113 (see 3.32 KML data display).

The **.GPX** extension is a standard GPS exchange format and can be displayed by a variety applications. In case of using Quad band probe, a file will be saved for each band.

Click **Export** button to download the data; a window is displayed with the bar indicating the transfer in progress.



The file .GPX or .KML can be saved in any directories; enter a new name and click **Save**. A confirmation message will be display:

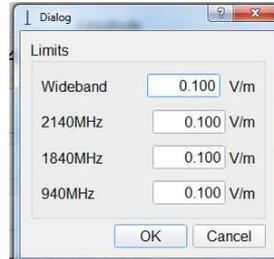


The file .GPX or .KML can also be created without having the station connected to PC (see **Upload from PC** function on the next page)

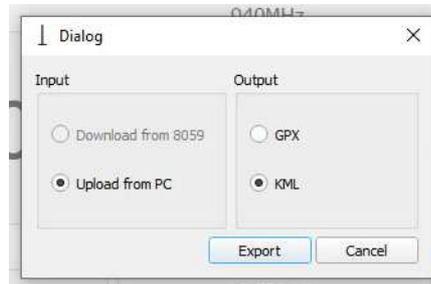
Upload from PC

The function **Upload from PC** allows to create the **.GPX** or **.KML** file using the Log file generated by the software during the measurements campaign (see 3.30.7). Proceed as follow:

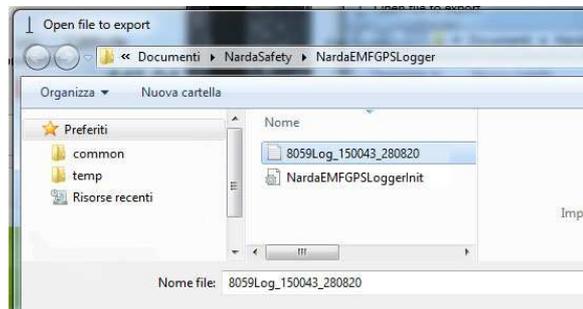
- Open the **Limits** dialog box under **Settings** tab and select the limit as reported on §3.30.4.



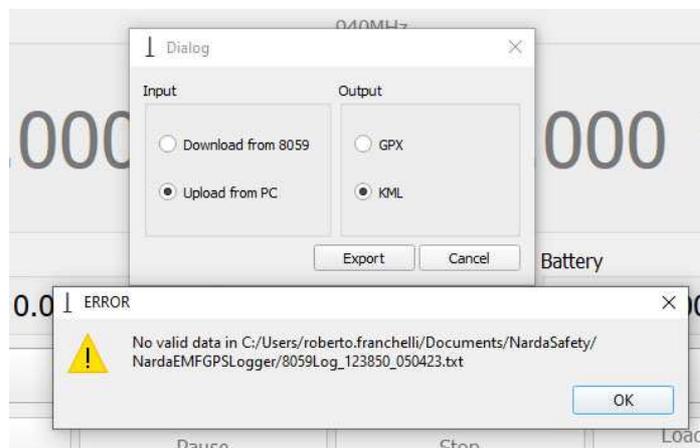
- Click **Export data** button. The following dialog box will be display:



- Click **Export** button and browse the NardaEMFGPSLogger directory on **Users\.....\Documents\NardaSafety\NardaEMFGPSLogger**. Select the file and confirm with **Open**.



If the text file does not contain data or the GPS acquisition has not been valid or any errors occur during the measurements, the following error message will be display:



- Click **Open** button to upload the data; a window is displayed with the bar indicating the transfer in progress.

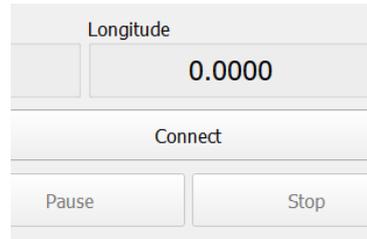


- The file .GPX or .KML can be saved in any directories; enter a new name and click **Save**. A confirmation message will be display:



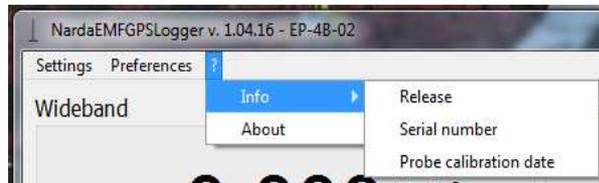
3.30.10 Resume connection

After exporting data, the connection between PC and Station can be reestablish for a new measurement pressing **Connect** button



3.30.11 ? Info and Exit program

The ? tab provides hardware and software informations.



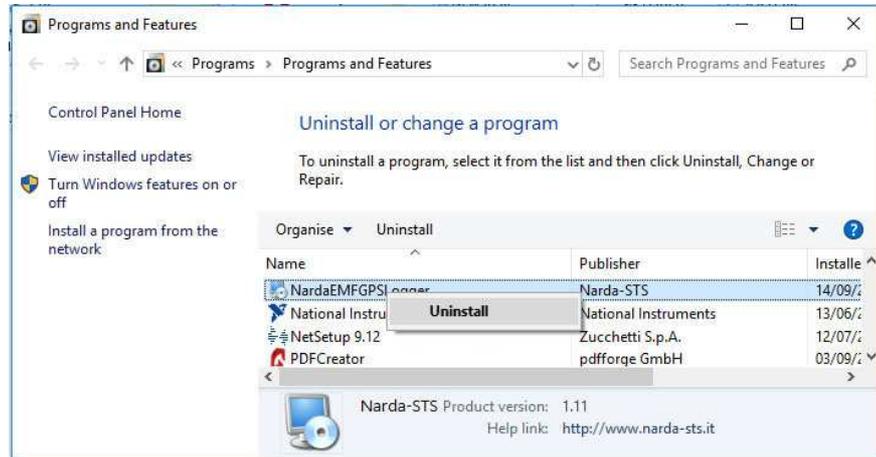
press **Exit** and confirm with **Yes** to close the program



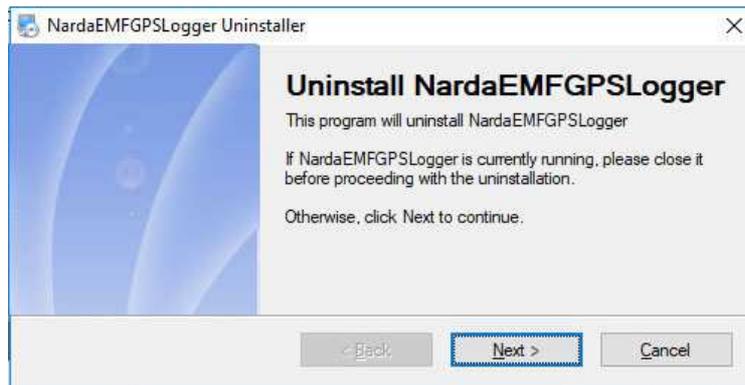
3.31 Uninstall the software

It is possible to remove the **NardaEMFGPSLogger** software from the PC according to the following procedure:

Select **NardaEMFGPSLogger** software with right mouse click on Uninstall program panel and select Uninstall.

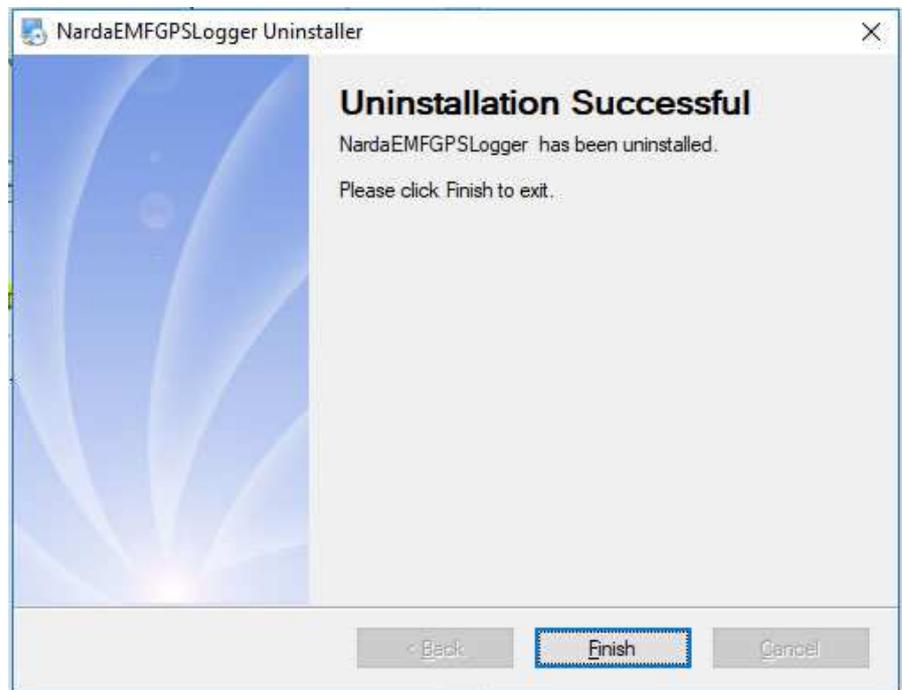


Follow the uninstaller instructions.



Before removing any shared system file, the uninstaller will ask for a confirmation.

Answer “NO” in case you are not sure whether the showed system file is required for other applications.



NardaEMFGPSLogger software is now removed from the system, click “Finish” to close uninstaller utility.

NardaEMFGPSLogger – Data Display

3.32 KML data display

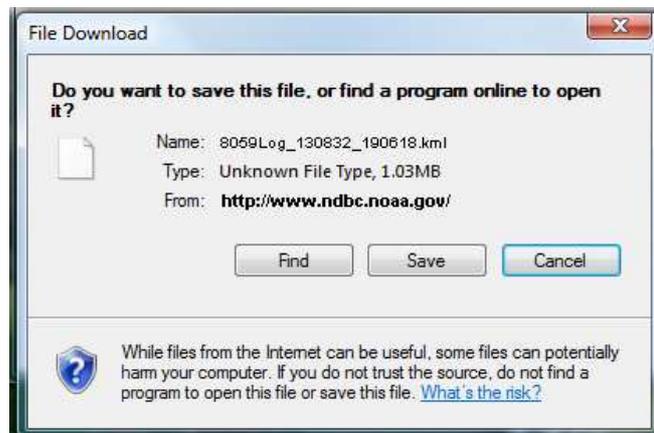
This section provides information for correct display and interpretation of the KML data using Google Earth software. Google Earth is a free program available on Google; the installer will run to download and install the software on your PC.



If your machine is connected to a network, you must have administrative rights to your computer to install. Check with your administrator if the program will not install.



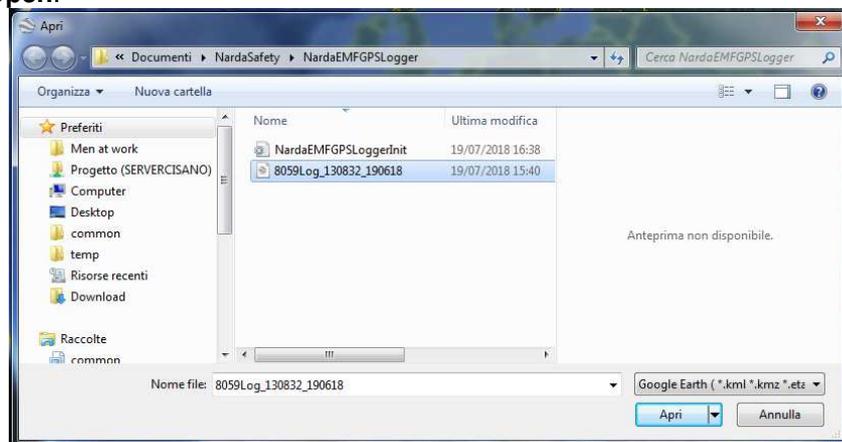
If Google Earth is not installed on your PC, a popup message box will appear when the user double clicks on the KML file.



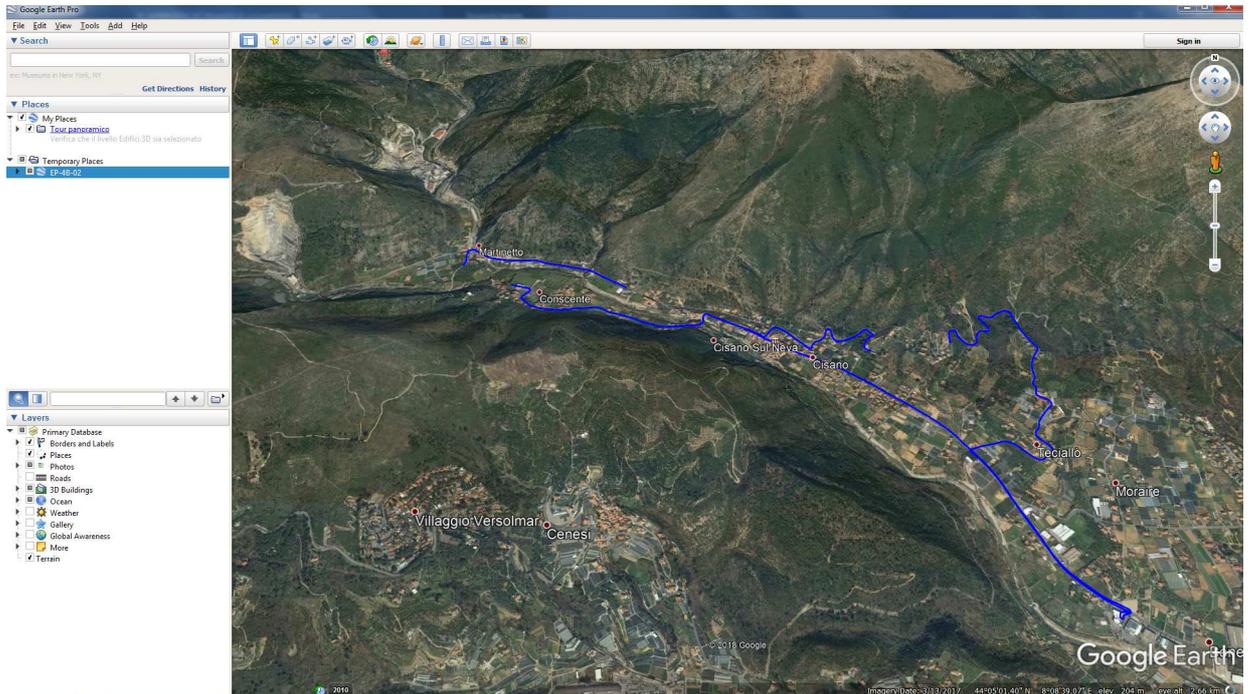
To start the application double click on the **Google Earth Pro.exe** .



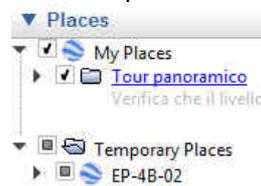
Click on **File → Open** on the right top of the main windows and browse the directory containing the KML file created. Select the file and confirm with **Open**.



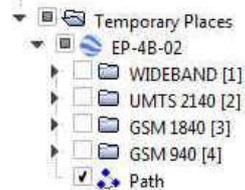
Once open the KML file, Google Earth zoom into the area and displays the path.



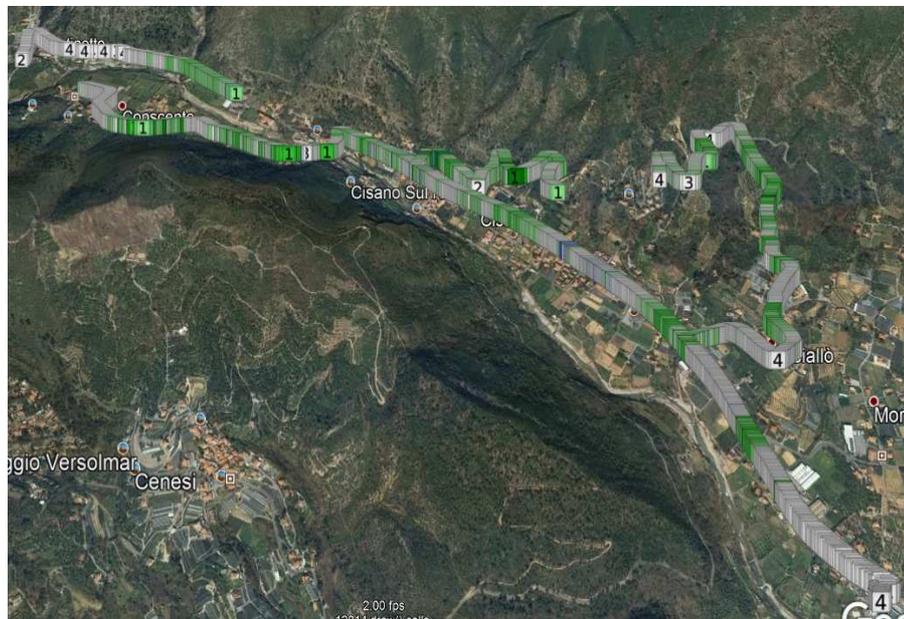
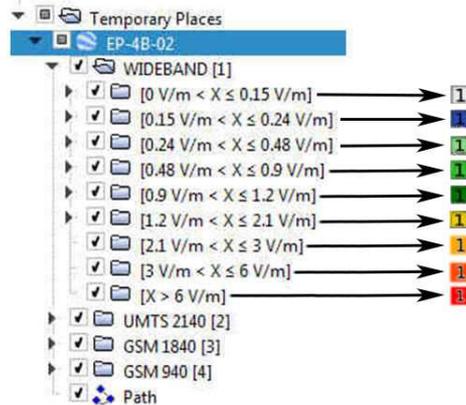
The **Places** Tab in the left Panel displays the **Temporary places** folder where all probe measurements has been loaded from KML file



The user can expand (▶) or collapse (▼) the list of the bands available under probe name. For each band is assigned a placemark with progressive number **[N]**



Using the check box on the left of the label (✓) the user can show the desired band on the map with colored placemarks; the colour depends on the colour code reported on the recommendation ITU-T K.113. Expand (▶) the band for showing the available interval limit.

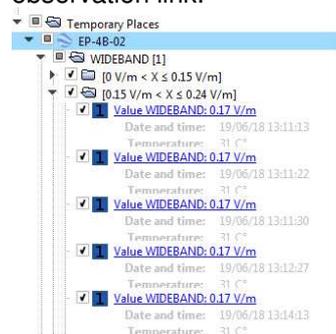


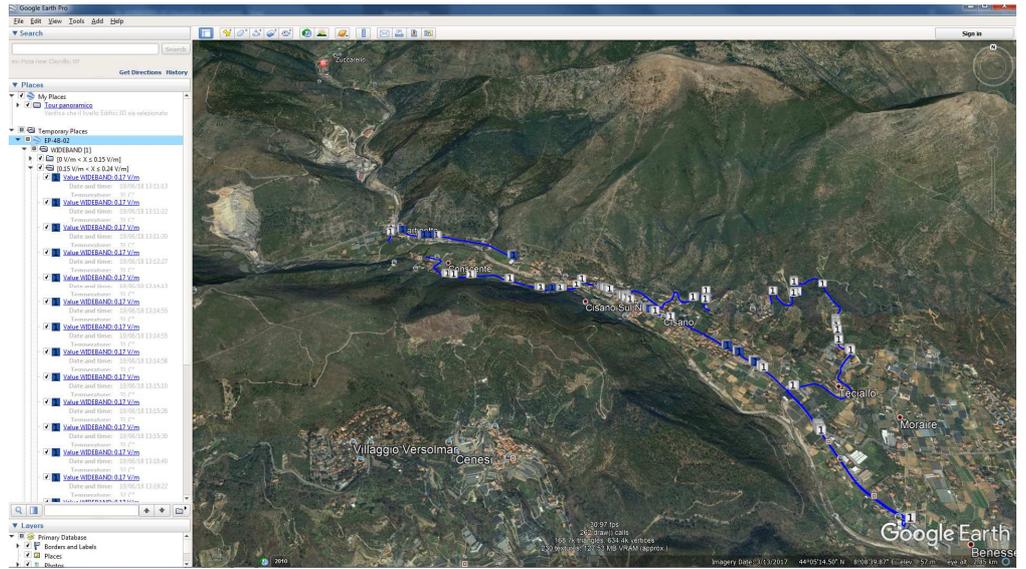
The group without ▶ does not contain data.



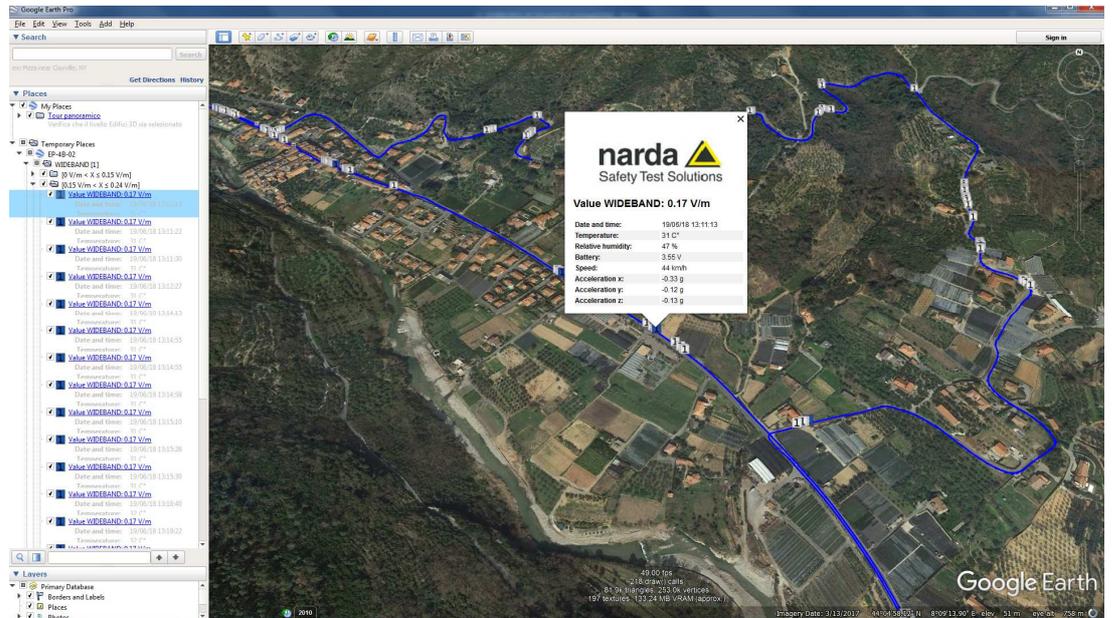
Depends on the PC hardware performance, it is suggested to reduce as much as possible the number of the data shown on the map.

Expand (▶) the interval limit for showing all value measured and related observation link.

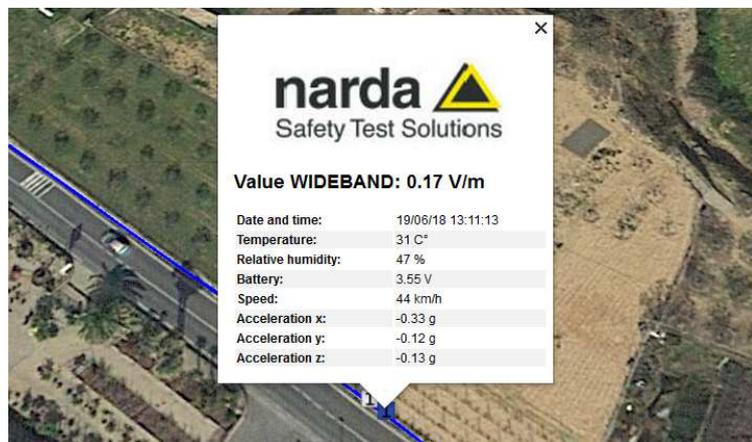




When the user double clicks an observation link, the user will see the earth globe zoom into that particular point and open a field data window.



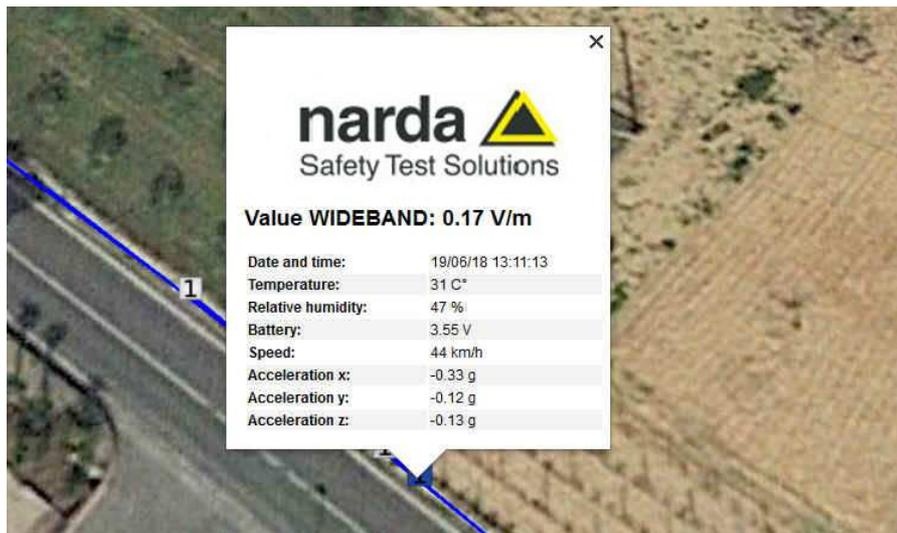
Scroll up the mouse wheel for deeper zoom operation.



To query manually a certain point, move the cursor to the desired area and scroll up/down the mouse wheel for zoom operation.



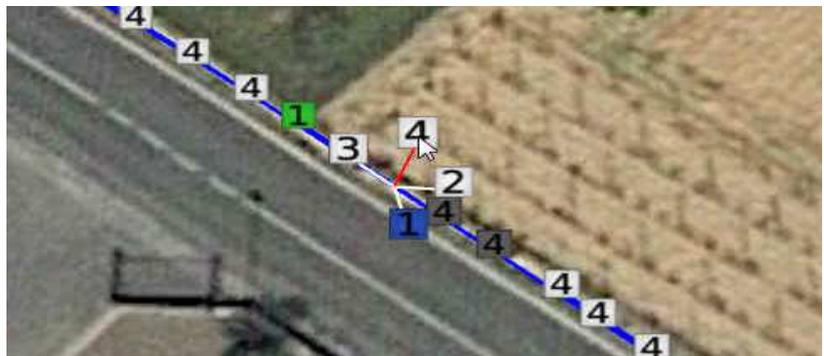
Clicking on the placemaker, a field data window is opened.



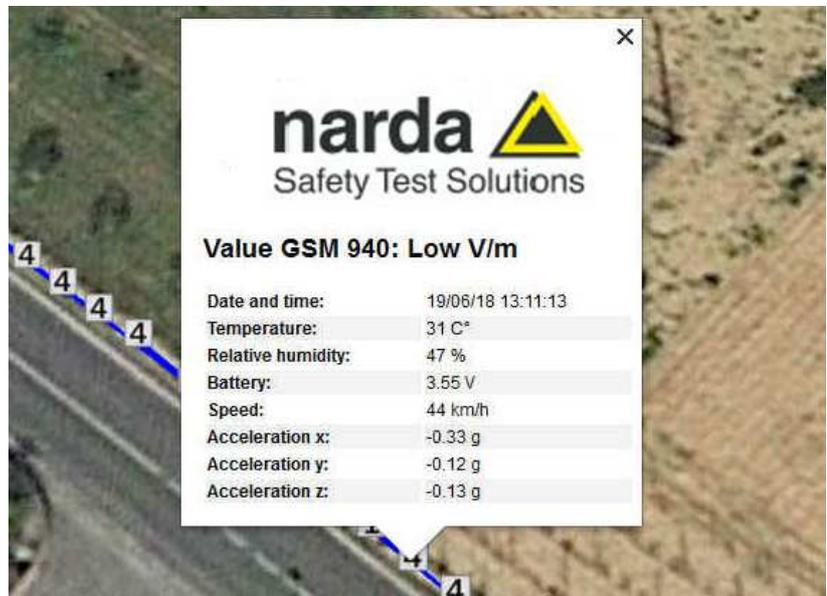
If the placemaker contains more bands, once selected it will be splitted into bands available



Move the cursor above the desired band (the white line connected turns in red) and click on it.



When the user clicks on the placemaker, a field data window is opened



Notice the marker will assume the status of the last selection after closing the field data window with **×**.

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4 – First connection - Point to Point and FTP communication

4.1 General Information

This chapter describes the manual procedure for the Point to Point or FTP configuration of the AMB-8059 Area Monitor. Both can be automatically set by using the NardaAMConfigurator (see §2.16).

The AMB-8059 Area Monitor has been developed to be mainly used in FTP mode with the use of a SIM card.

It is possible to use it also in other modalities like CSD or Wi-Fi but with some limitations.

The use of the 4G modem automatically disable the Wi-Fi module and viceversa.

With this area monitor the user can work in **Point-to Point** mode or **FTP** mode, using the 4G modem or the Wi-Fi connection or also via USB/optical fiber cable.

FTP means File Transfer Protocol, in this mode there is no direct connection between the area monitor and the computer. The area monitor will send all data on a FTP server where they lies up to the user will use the software to download them.

To work in this mode the user need a FTP server and then choose between a Modem connection or Wi-Fi connection:

- In case of **Modem** connection the user need a SIM card in the area monitor modem with an internet data subscription. Make sure the PIN code of the SIM card in use has been removed.
- In case of **Wi-Fi** connection, especially with free networks, be sure that the access has always the same password. The area monitor is able to support up WPA2-PSK protocol



Please refer to chapter 3 of this manual for further information of using 8059SW-02 software

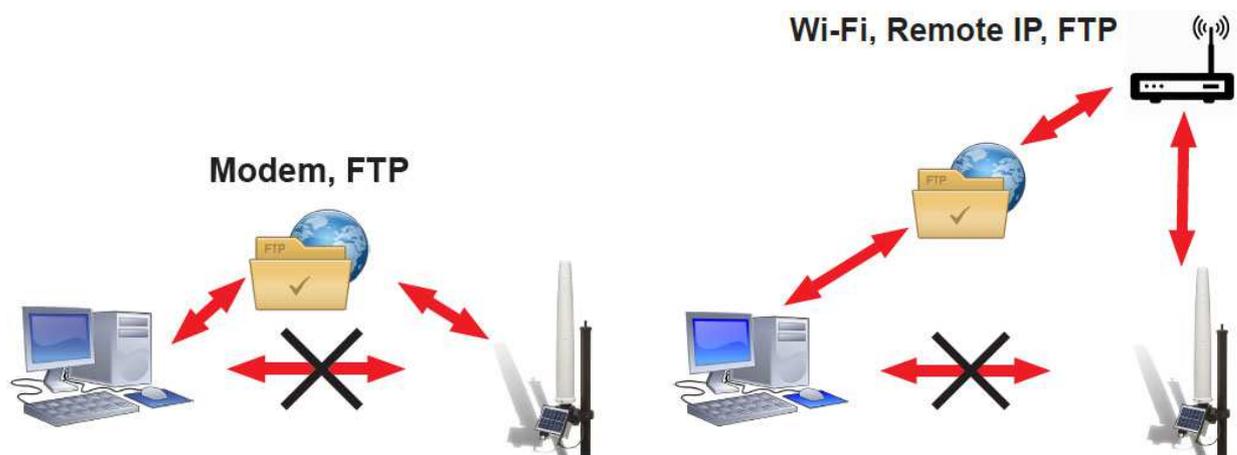


Fig. 4-1 FTP communication mode

Point to Point is a direct connection between the area monitor and the computer using the **Optical fiber/USB** cable or the **Modem** or the **Wi-Fi**. The Point to Point with the Wi-Fi can be done directly, only in case the area monitor and the computer are under the same Wi-Fi network, or through a router.

In case of Modem connection, you need a PC modem, a SIM card in the area monitor modem and another SIM card for the PC modem but only if it is GSM. Beware, the SIM card for this way of communication need to be specifically enabled for CSD communication mode. This kind of specific SIM card is normally called M2M Machine to Machine. Make sure the PIN code of the SIM card in use has been removed.

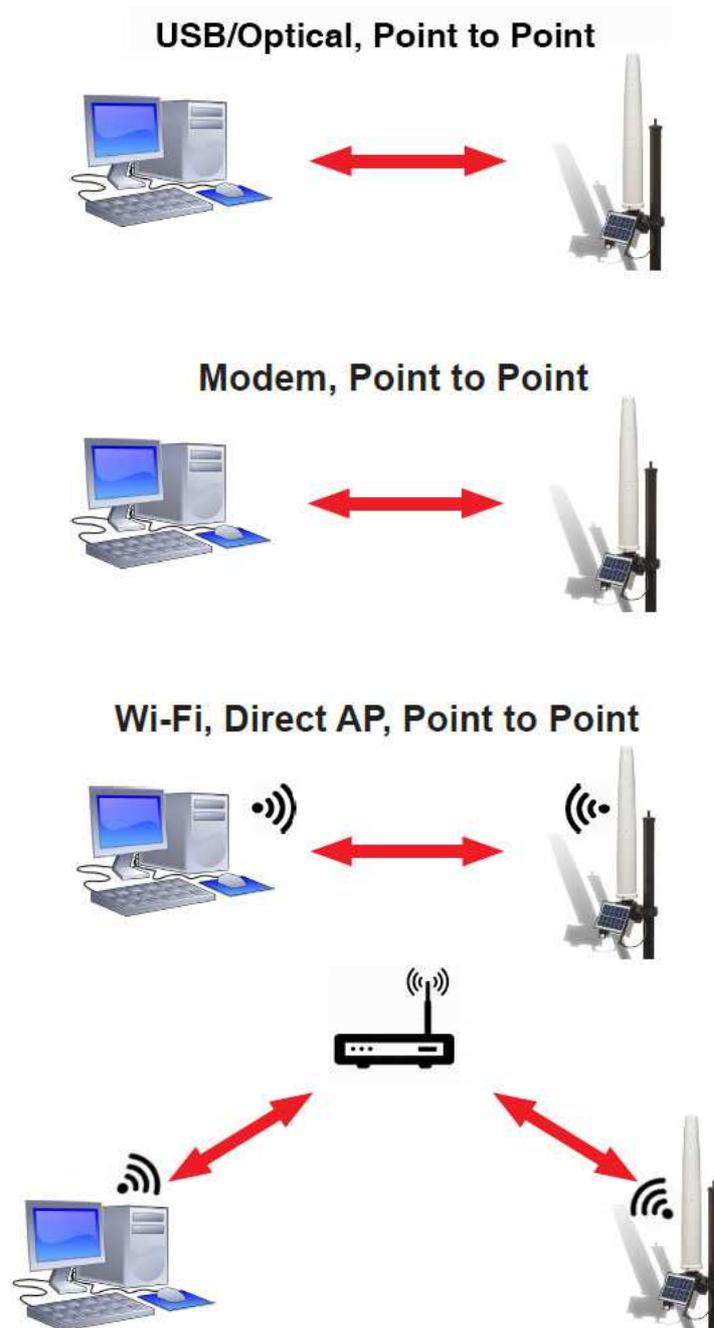


Fig. 4-2 Point to Point communication modes

First connection – Point to Point communication

4.2 First connection – Setting stations to Point-to-point mode

All stations are equipped with a WiFi modem (some also with a GSM/GPRS modem) and are initially set, at the factory, for FTP communication mode.

Stations set for FTP communication are intended to be configured by means of the user's FTP server through the Internet connection but can be accessed, locally, by connecting the RS232, USB, Fiber optical or Ethernet cable and, even if not recommended, by means of wireless calls too.

Some commands specially related to the modem activity are not enabled for the real time setting that can be done in wired serial and wireless direct connections if the station is set for FTP communication.

The first connection may take place either **via modem** (WiFi is available for all models) or **via direct RS232 or USB or Fiber or Ethernet** connection. The direct connection is much faster and the first connection must be made in this way even if the subsequent operations will be done via WiFi or 4G modem.

AMB-8059/00 is equipped with an optic fiber port and connected to the PC through the supplied optic fiber cable and USB-OC Optical adapter.

AMB-8059/02 is equipped with an USB port and linked to the PC through the USB cable.

AMB-8059/01 and AMB-8059/03 are equipped with an USB port and connected to the PC through the supplied waterproof cable.

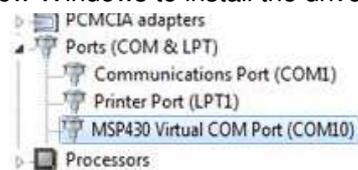
In **Windows 10**: When connecting an AMB-8059 to the PC USB port for the first time, a message informing that new hardware “**Dispositivo seriale USB (COMn)**“ has been found appears and It should be automatically installed on your computer.



In **Windows 7**: When connecting an AMB-8059 to the PC USB port for the first time, a message informing that new hardware has been found appears. To install the new hardware enter in **Peripheral management (Start > Control Panel > Device Manager)**. In **Other Devices**, the device will be shown with a yellow exclamation point next to it



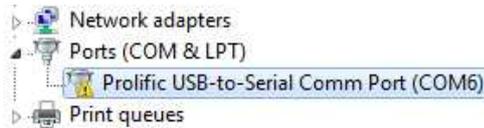
The 8059SW-02 installation folder includes the file requested for the driver installation. Select the device with the right mouse button, click **Upgrade driver software** and **Browse my computer for driver software**. Select **Browse**, locate the file **MSP430_CDC.inf** on C:\Program Files (x86)\(folder installation)\, select **Next** and allow Windows to install the driver program.



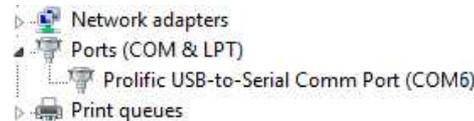
In case of use of USB-OC Optical Adapter, the converter appears among the devices as a “**Prolific USB-to-Serial Comm Port (COMn)**”.

In Windows 10: it should be automatically installed on your computer.

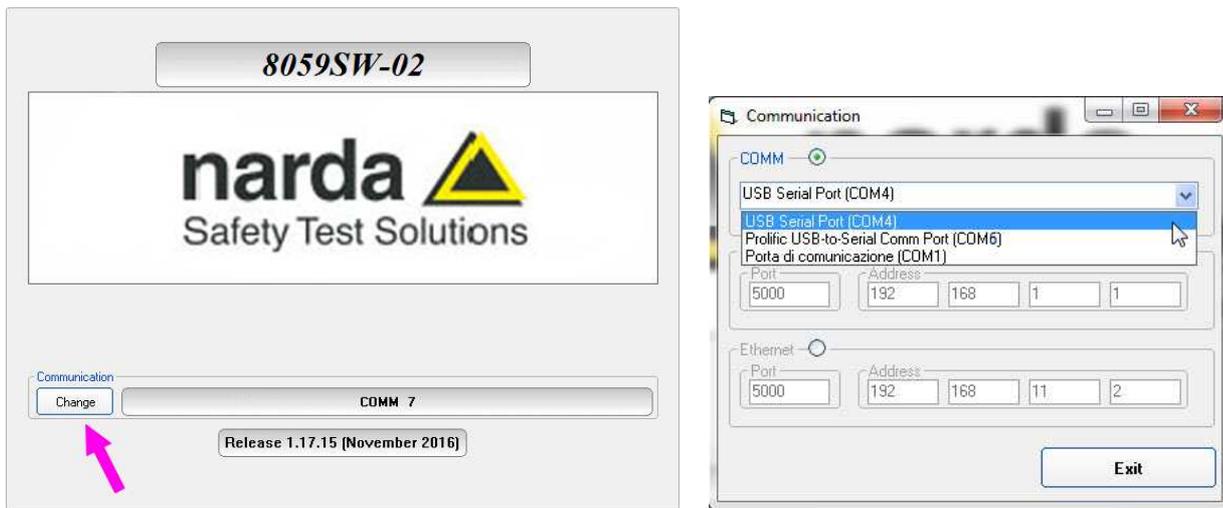
In Windows 7: a message informing that new hardware has been found appears. To install the new hardware enter in **Peripheral management (Start > Control Panel > Device Manager)**. In **Other Devices**, the device will be shown with a yellow exclamation point next to it.



The 8059SW-02 installation folder includes the file requested for the driver installation on path C:\Program Files (x86)\(folder installation)\Driver USB-Serial



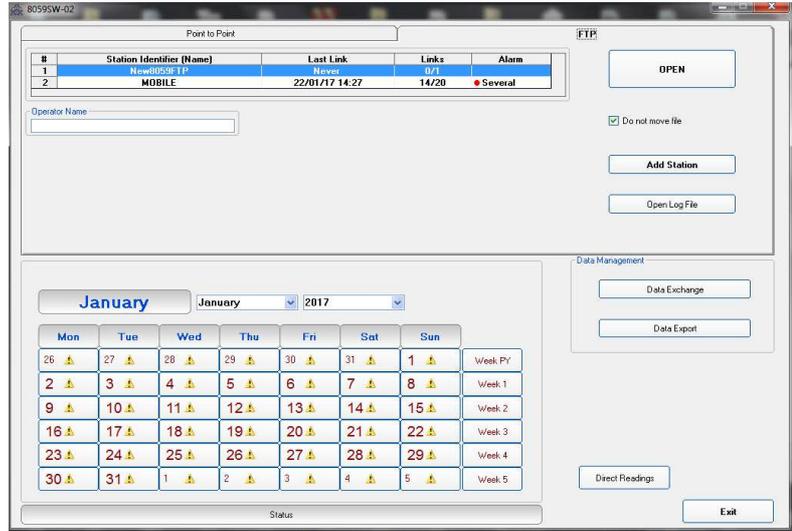
Click twice on the 8059SW-02 icon to start the software. First a window appears displaying the software release and the port COM assigned.



The User can quickly change the desired communication port by clicking onto the **Change** button located in the Communication frame of the first displayed window. The starting screen lasts for about 4 seconds, then it is automatically closed and the program enters its main view.

When the **Change** button is clicked, the communication port selector appears. A specific USB Serial Port must be selected to drive the control software to the AMB-8059 Area Monitor.

- Run 8059SW-02 and the main window appears as follows. The software ask you to enter a Terminal and Setting password (see §3.4.1, §3.4.1.1, §3.4.2, §3.4.2.1).



- Double click the first station listed in the FTP station list (new software installations show the “New8059FTP” station, on the list, as an example). A new area monitor must be added to the list as follow (all field are necessary).



- Insert the Station Identifier: it is the name you decide to give to your monitor station.
- Insert the Serial Number of the station.
- Insert the Address, User Name and Password: these parameters are of our FTP server for preliminary test. Beware that our FTP server is periodically cleaned, do not use it in a definitive way.

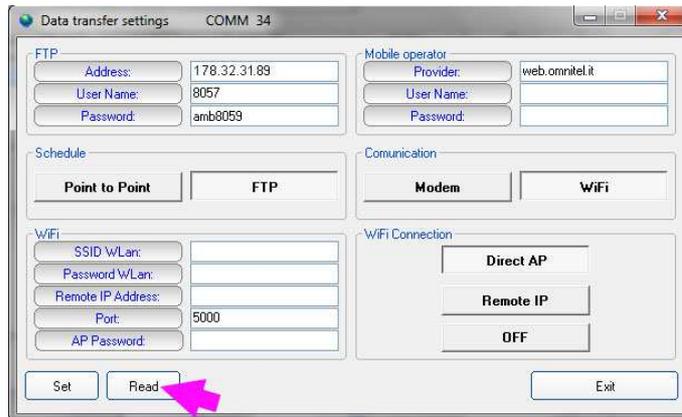


For every field the computer will request the Terminal Password (see §3.4.1 and §3.4.1.1).

- Click the button “Data transfer settings”. The software will verify if the serial number matches or not. In case you can have the following window:



- The Data transfer settings window allows to set stations for FTP or Point-to-point



Schedule: Here you have to set if the area monitor has to work in Point to Point or FTP mode.

Communication: Decide to use the internal 4G Modem or the internal WiFi

FTP: These parameters depending on the FTP server you are using. As default, every Narda area monitor is set to work in FTP mode and the parameters you can find in this section area of our FTP server that can be used for preliminary test. Do not use it in a definitive way because the Narda FTP server is periodically cleaned.

Mobile operator: These parameters depending on the service provider of the used SIM.

Provider is the APN (Access Point Name)
User name used for GPRS connection
Password used for GPRS connection

Some examples:

Italy: APN for a Vodafone SIM card is: web.omnitel.it

User name and password are not required.

Greece: APN for a Cosmote SIM card is: internet

User name and password are not required.

Wi-Fi: Here you have to set the Wi-Fi parameters.

SSID WLAN: the name of the wireless network you intend to use

Password WLAN: the password of that specific wireless network

Remote IP address: this is the IP address of the area monitor, default 192.168.1.1

Port: the number of the port used by the area monitor (default 5000)

AP Password: this is the access point password, the password used by the area monitor, it is not mandatory

In this section, last 3 parameters (Remote IP address, Port and AP Password) are used only for the over ip connection. In case the Wi-Fi communication is just used in FTP mode you can leave these windows blank.

Wi-Fi Connection:

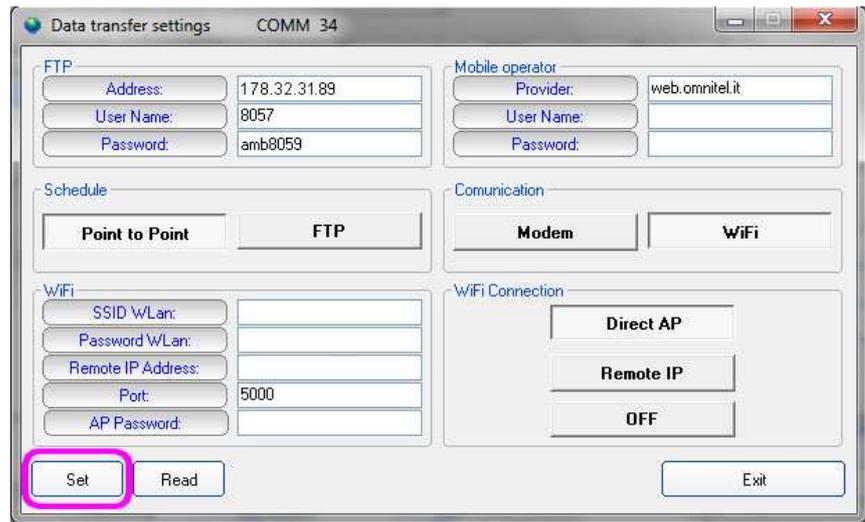
Direct AP: direct to the Access Point. In this case there is a direct communication between the area monitor and the computer.

Remote IP: remote Internet Protocol. With these option you can choose to work in a point to point connection or also in FTP.

Once all fields are filled, push the button Set.

The button Read is used to verify what parameters are recorded in AMB-8059.

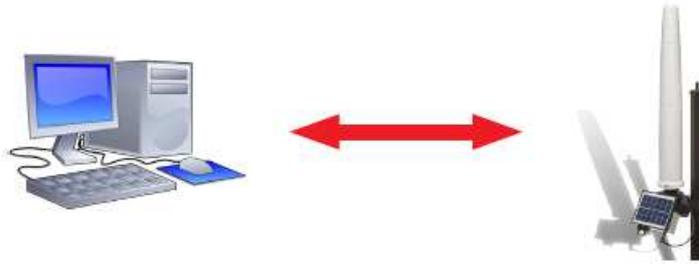
- Click the “Read” button and type the Terminal password when requested.
The “Read” buttons queries the station connected by RS232 or USB and displays in the “Schedule” frame which communication mode is enabled.
The above picture shows a station set for FTP WiFi communication mode.
- To set the station to the Point-to-point mode select “Point to Point” in the “Schedule” frame, click the “Set” button and type the Terminal password when requested.



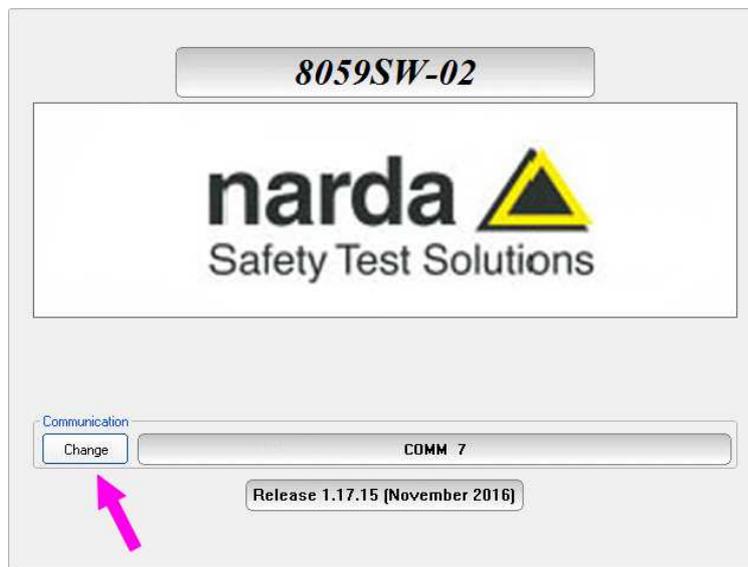
- The “Read” button can be used to check that the CSD (Point to Point) mode has been correctly enabled in the station connected to the controller PC.
- Now choose in which way to use the station:
“**Optical, Point to Point**” (see §4.2.1, Pag.4-8)
“**WiFi, Direct AP Point to Point**” (see §4.2.2, Pag.4-10)
“**WiFi Over IP, Point to Point**” (see §4.2.3, Pag.4-15)
“**Modem, Point to Point**” (see §4.2.4, Pag.4-17)

**4.2.1 Optical,
Point to Point**

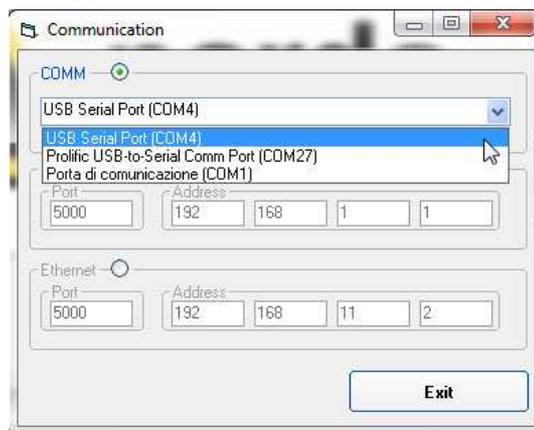
Via direct Fiber connection is the easiest way to communicate with the area monitor.



Click twice on the 8059SW-02 icon to start the software. A window appears displaying the software release and the port COM assigned.



When the **Change** button is clicked, the communication port selector appears. A specific USB Serial Port must be selected to drive the control software to the AMB-8059 Area Monitor.



- Click the “Exit” button to go back to the main window and select the Point to Point section and use the function **Direct Readings** to immediately receive data from the area monitor. For further explanation consult §3.8

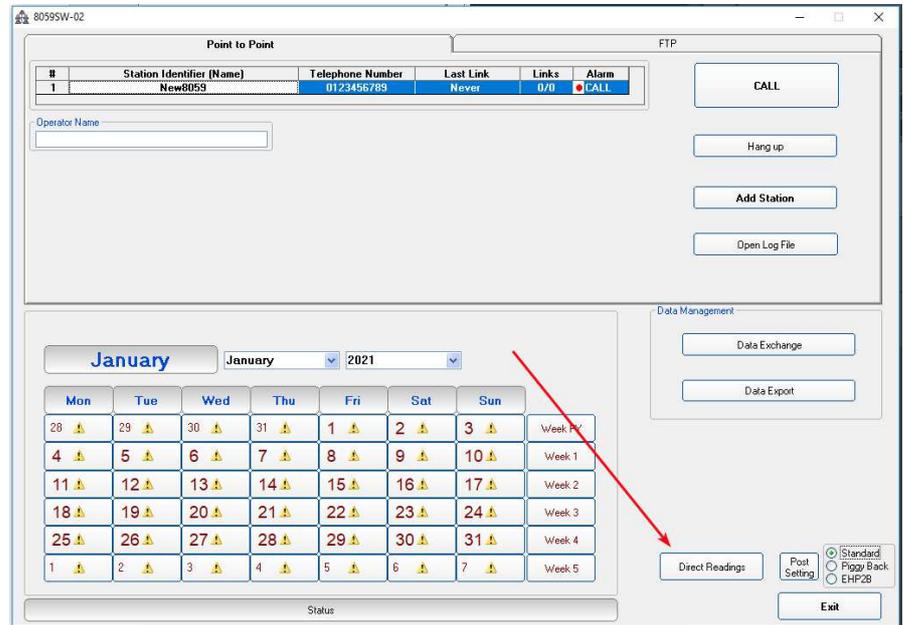


Fig. 4-3 “Direct Readings” button



These are the basic operations to follow to work with the AMB-8059. All additional information and explanations can be found on chapter 3

All AMB-8059 models can make use of the direct communication also for downloading of measurement results.

In the AMB-8059/01 and AMB-8059/03 the USB connector is immediately available on the lower side of the station base plate, thus avoiding the need to remove any cover to connect the serial cable. Those models have a Solar module with USB and Ethernet port and an internal RS232 connection.

Direct communication mode is also provided by AMB-8059/00 and AMB-8059/02 by using the Optic fibre connector available on the lower side of the base plate.

In some situations where, for example, the GSM signal is very weak or there is no coverage of the WiFi and GSM network, it is possible to make an acquisition of long term (over 364 days with 1 acquisition every minute) data without downloading them daily via any connection port. At the end of the desired acquisition period, the data can be downloaded to the PC entering in the 8059SW-02 control window with the **CALL** button. For further explanation consult §3.11, §3.12 and §3.13

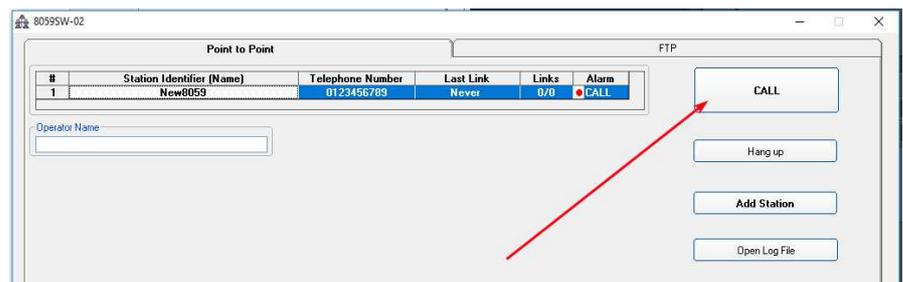


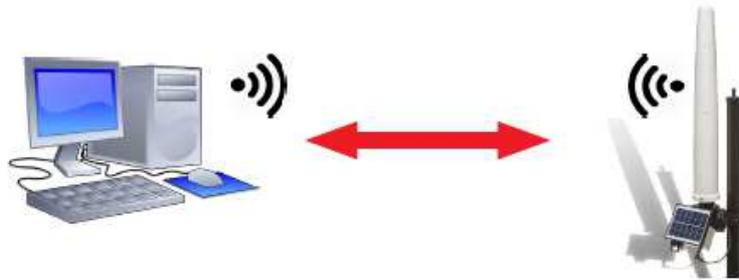
Fig. 4-4 “CALL” button

4.2.2 WiFi , Direct AP, Point to Point

New AMB-8059 series support Point-to-point connections also via wireless standard WiFi.

Two different ways are allowed: **Access Point direct** mode and **Over IP**.

In **direct Access Point** feature, the connection is established locally between the controller PC and the AMB-8059 station, as depicted below. No network infrastructure is needed (nor routers etc.); the only requirement for the wireless direct communication is that the user has a WiFi capable tool (e.g., laptop, tablet, smart-phone, etc.) and is located within the WiFi coverage area.



Practically, the User sees the AMB-8059 station as a WiFi AP (i.e., the Narda_8059_<serNum> appears in the SSID list of available Wireless services, where *serNum* is the serial number of the AMB-8059 monitoring station).

Once connected to Narda_8059 AP, which works as a Router and manages TCP/IP based communications, the User can directly and wirelessly communicate with the station by using the IP address (192.168.1.1) and port (configurable, default 5000) of the AMB-8059 station.

8059SW-02 software and also any other application that allows TCP/IP connection can be used.

The scheduling to automatically and periodically enable the WiFi direct communication with AMB-8059 station *replaces the scheduling for SMS activity*.

Narda_8059_<serNum> access point can be opened or encrypted via WPA2 security protocol. Communications are anyway always secured via AMB-8059 monitoring station too which denies any access via remote command until authentication with *IDNF Password* command.

To work in this way the area monitor has to be set in this way:

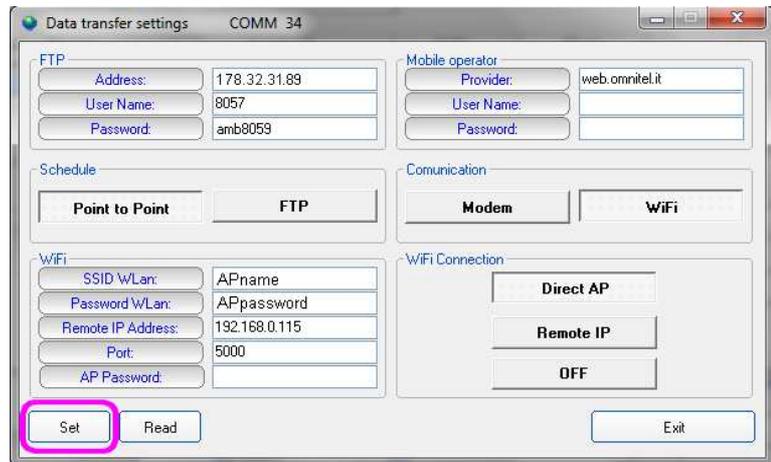


Fig. 4-5 “WiFi, Direct AP Point to Point” settings

Schedule: Point to Point

Communication: Wi-Fi

Wi-Fi: Remote Address, it must be 192.168.1.1

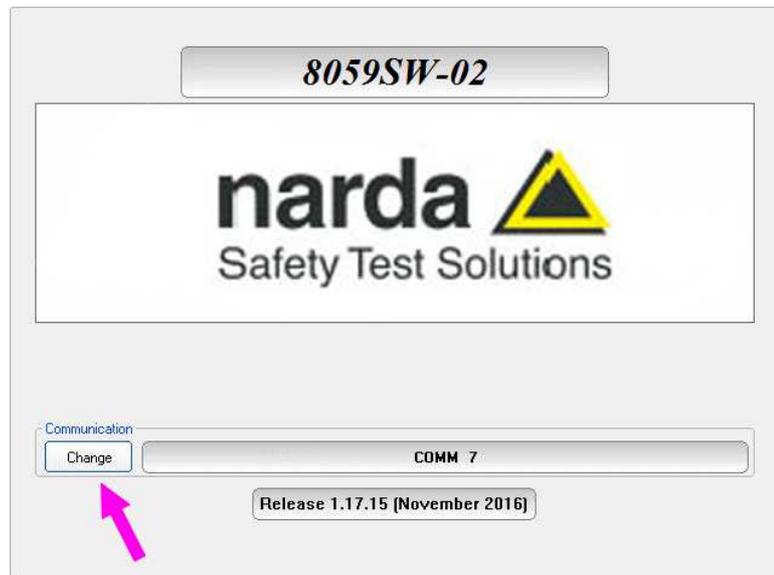
Port, the port used by the area monitor for the Wi-Fi communication, default 5000

AP Password, it is not mandatory, it is a protection password to assign to the station (If it is left empty, Wifi access will be open).

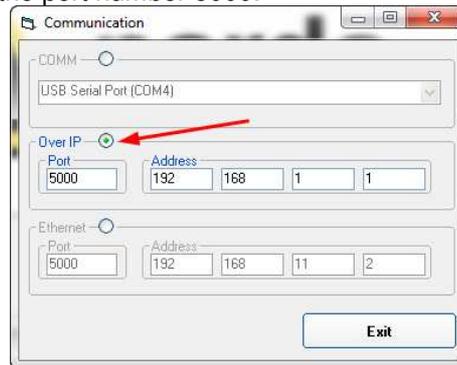
All other field can be left blank.

Press SET and then Exit

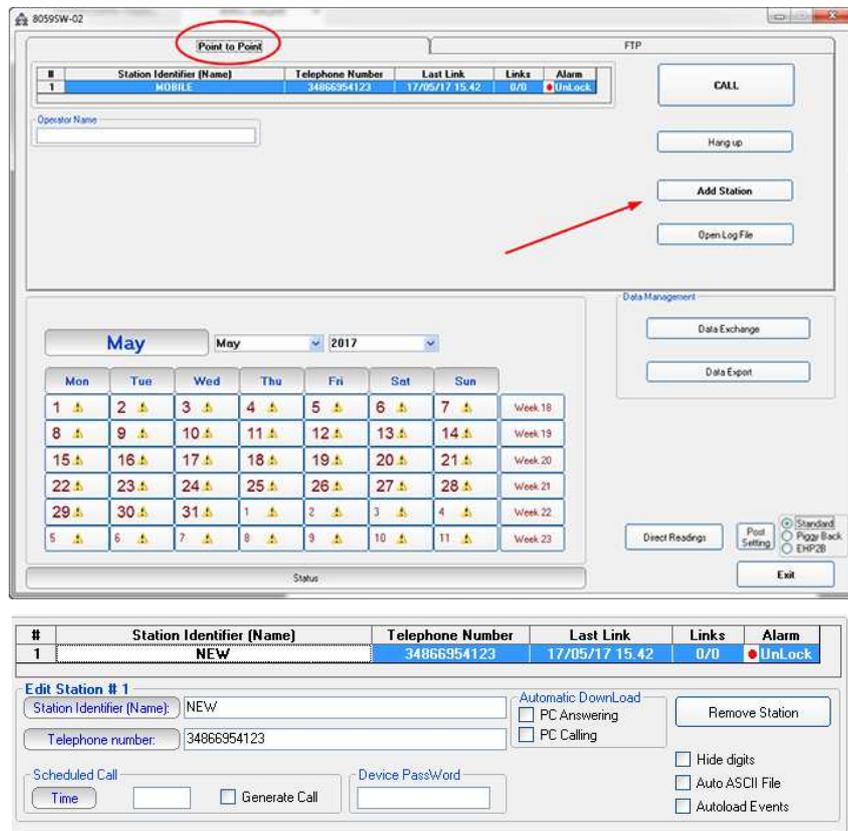
Close the program 8059-SW02. Using the Wi-Fi connection of your computer, look for the Wi-Fi network of your Area monitor and connect to it and launch it again. In the first window press the button change:



Now check over IP and then complete the fields with the IP address 192.168.1.1 and the port number 5000.



Now switch the main panel of the software into Point to Point mode and add a new station. It always better add and remove stations instead of change an existing one.



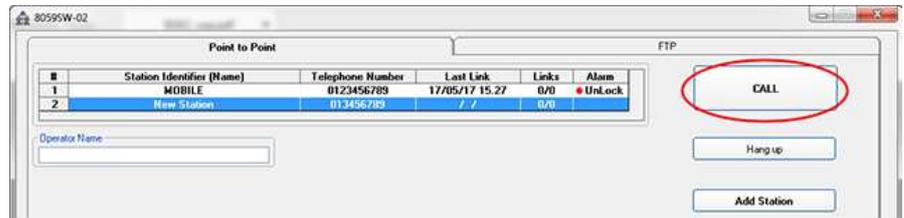
- Insert the Station Identifier: it is the name you decide to give to your monitor station. As default it is the serial number of the station.
- Insert the Telephone Number: even if the connection is Wi-Fi, the telephone number is necessary to add the station in the grid. In this case it can also be invented.
- Insert the Device Password: this is the AP password you assigned at the monitor station, as default it is blank.



For every field the computer will request the Terminal Password (see §3.4.1 and §3.4.1.1).

Now your area monitor should be added to the list.

Click once on its row and then press the button **Call**.



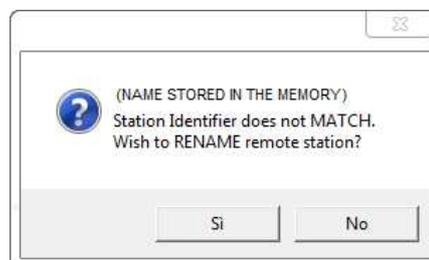
The software will try to have a connection with the modem. Because of the area monitor is directly connected to the PC you will see the following window:



Press YES (SI)

Now the software will verify if the name you gave to the station is the same registered in the station's memory.

In case they are not matching the software will ask you if you want to change the name of the area monitor stored in the internal memory with that one you wrote in the grid as following message:



If you press YES the name inside the station will be changed; it is just a label and the serial number of the area monitor will be always the same and cannot be changed.

If you press No, the software will ask you if you want to replace the name in the grid with that one stored in the area monitor.



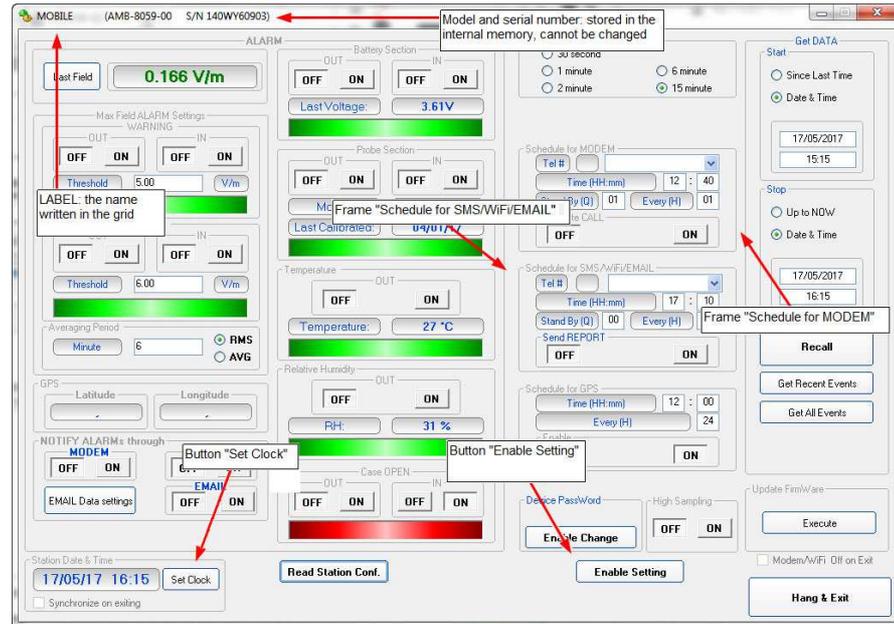
The main window of the software show you all possible information about the area monitor and the probe.

Now passages to do are:

- push **Enable Settings** button
- push **Set Clock** button
- decide how many time and for how long the Wi-Fi has to be switched on in the **Schedule SMS/WiFi/EMAIL** frame



For every field the computer will request the Setting Password (see §3.4.2 and §3.4.2.1).



Please refer to §3.12.3 Schedule for SMS/WiFi/EMAIL for further information.



In the picture the modem will be switched ON at 13:45 and it will stay in stand by mode for 2 quarters of hours.

This means that for 30 minutes starting from the 13:45, the area monitor is ready to be called with the Wi-Fi.

The area monitor will available to be contacted every 24 hours, for 30 minutes and always from the 13:45.

Every time the Area monitor is switched OFF and the battery pack disconnected from it, the internal clock has to be set. It is always better prepare the first installation on site with the help of a laptop or a tablet to verify that internal clock has the right hour and date

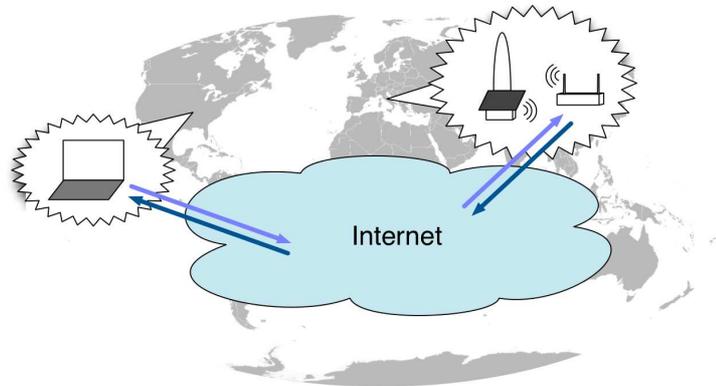


These are the basic operations to follow to work with the AMB-8059. All additional information and explanations can be found on chapter 3

4.2.3 WiFi Over IP, Point to Point

Over IP is another feature to allow remote, real-time, Point-to-point communication. It works as a standard over the Internet connection. The network can be both a LAN or a WAN.

So the system needs at least an Access Point and a router (they are often combined) to make possible the communication between AMB-8059 and PC.

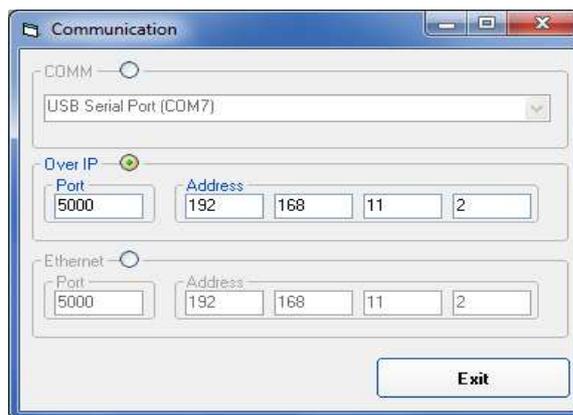


Wherever located in the World the User can communicate real time with AMB-8059.

The remote station needs Internet access which, as for the FTP mode, can be provided by means of WiFi APs of existing infrastructures or via a dedicated 3G/4G Router.

To remotely reach an AMB-8059 station, the User needs the public IP address of the Router (x.y.z.k) which is providing the Internet access to the station itself. This parameter can be static or dynamic; it can be simply read by any online IP finder service.

The Router must be also set such that any TCP/IP traffic toward the AMB-8059 station is (wirelessly) forwarded to it. Practically, a forwarding rule to AMB-8059 station IP port (configurable, default 5000) and private IP address (configurable, default 192.168.1.115) must be added in the NAT/Virtual-server setting of the Router.



8059SW-02 and also any other application that allows TCP/IP connection can be used.

The scheduling to automatically and periodically enable the Internet-based communication with AMB-8059 station *replaces the scheduling for SMS activity*.

Communication are secured via AMB-8059 which denies any access via remote command until authentication via IDNF command

To work in this way the area monitor has to be set in this way:

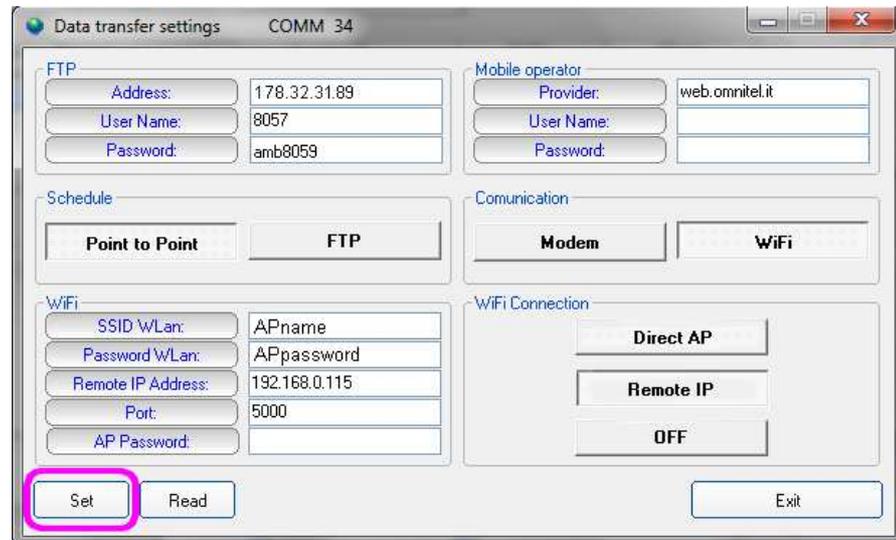


Fig. 4-6 “WiFi Over IP, Point to Point” settings



On start-up, the monitoring station enters in direct wireless communication mode for 15 minutes to allow the User to connect to and configure it.

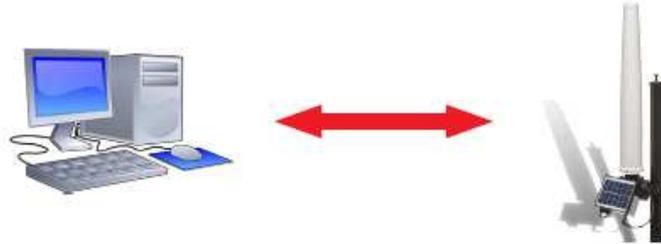


These are the basic operations to follow to work with the AMB-8059. All additional information and explanations can be found on chapter 3

4.2.4 Modem, point to point

This modality allows to communicate directly with area monitor. All you need is a PC modem, a SIM card in the area monitor modem and another SIM card for the PC modem but only if it is GSM. Beware, the SIM card for this way of communication need to be specifically enabled for CSD communication mode. This kind of specific SIM card is normally called M2M Machine to Machine.

Make sure the PIN code of the SIM card in use has been removed.



To work in this way the area monitor has to be set in this way:

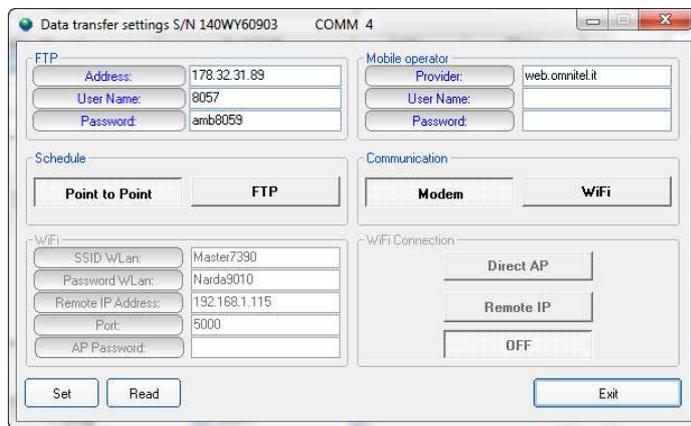
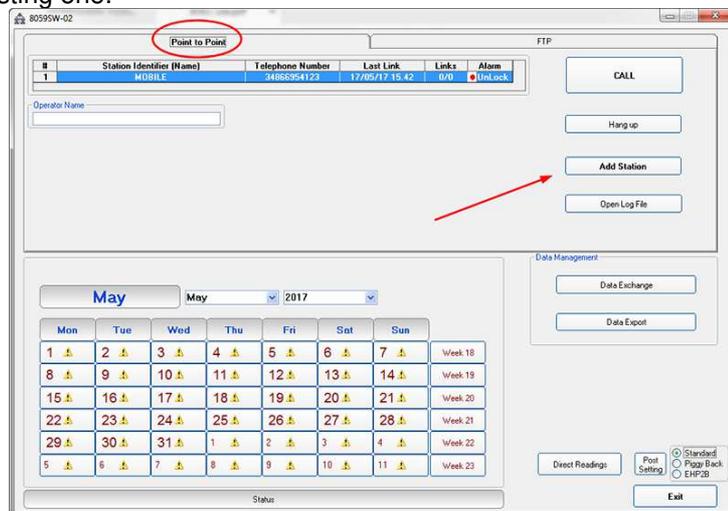


Fig. 4-7 “Modem, Point to Point” settings

Schedule: Point to Point,
Communication: Modem
All other field can be left blank
Press SET

Now switch the main panel of the software into Point to Point mode and add a new station. It always better add and remove stations instead of change an existing one.



#	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	NEW	34866954123	17/05/17 15.42	0/0	UnLock

Edit Station # 1

Station Identifier (Name): NEW Automatic DownLoad
 PC Answering
 PC Calling

Telephone number: 34866954123 Remove Station

Scheduled Call: Generate Call Device PassWord: PASSPMM
 Hide digits
 Auto ASCII File
 Autoload Events

- Insert the Station Identifier: it is the name you decide to give to your monitor station. As default it is the serial number of the station.
- Insert the Telephone Number: it is the phone number associated to the SIM card in the area monitor
- Insert the Device Password: as default it is PASSPMM



For every field the computer will request the Terminal Password (see §3.4.1 and §3.4.1.1).

Now your area monitor should be added to the list.
Click once on its row and then press the button **Call**.

#	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	MOBILE	0123456789	17/05/17 15.27	0/0	UnLock
2	New Station	013456789	/ /	0/0	

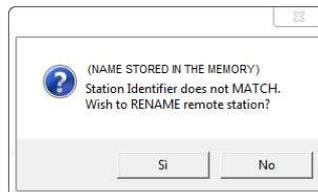
Operator Name:

The software will try to have a connection with the modem. Because of the area monitor is directly connected to the PC, a message will display:



Press YES (SI)

Now the software will verify if the name you gave to the station is the same registered in the station's memory. In case they are not matching the software will ask you if you want to change the name of the area monitor stored in the internal memory with that one you wrote in the grid, as follows message:



If you press YES the name inside the station will be changed. It is just a label and the serial number of the area monitor will be always the same and cannot be changed.

If you press no, the software will ask you if you want to replace the name in the grid with that one stored in the area monitor.





The main window of the software show you all possible information about the area monitor and the probe. Now passages to do are:

- Push **Enable Settings** button
- Push **Set Clock** button
- Decide how many time and for how long the modem has to be switched on in the **Schedule for MODEM** frame

For every field the computer will request the Setting Password (see §3.4.2 and §3.4.2.1).

The screenshot shows the MOBILE software interface with the following components and annotations:

- Top Bar:** MOBILE (AMB-8059-00 S/N 140WY60903). A red arrow points to the model and serial number with the annotation: "Model and serial number: stored in the internal memory, cannot be changed".
- ALARM Section:**
 - Current reading: 0.166 V/m.
 - Max Field ALARM Settings: WARNING (OFF/ON), Threshold: 5.00 V/m.
 - Max Field ALARM Settings: (OFF/ON), Threshold: 6.00 V/m.
 - Averaging Period: Minute: 6, RMS/AVG selection.
 - GPS: Latitude and Longitude fields.
 - NOTIFY ALARMS through: MODEM (OFF/ON), EMAIL (OFF/ON).
 - Station Date & Time: 17/05/17 16:15, with a "Set Clock" button.
 - Synchronize on exiting checkbox.
- Battery Section:** (OFF/ON), Last Voltage: 3.61V.
- Probe Section:** (OFF/ON), Last Calibrated: 04/01/17.
- Temperature:** (OFF/ON), Temperature: 27 °C.
- Relative Humidity:** (OFF/ON), RH: 31%.
- Case OPEN:** (OFF/ON).
- Schedule for MODEM:** Frame "Schedule for MODEM" (annotated), Tel #, Time (12:40), Stand By (01), Every (01), Send REPORT (OFF/ON).
- Schedule for SMS/WIFI/EMAIL:** Frame "Schedule for SMS/WIFI/EMAIL" (annotated), Tel #, Time (17:10), Stand By (00), Every (24), Send REPORT (OFF/ON).
- Schedule for GPS:** Time (12:00), Every (24), Enable checkbox.
- Device PassWord:** Enable Change button (annotated with "Button 'Enable Setting'").
- High Sampling:** (OFF/ON).
- Update FirmWare:** Execute button.
- Modem/WiFi Off on Exit:** checkbox.
- Buttons:** Read Station Conf., Enable Setting, Hang & Exit.
- Right Panel:** Get DATA (Start: Since Last Time, Date & Time: 17/05/2017 15:15), Stop (Up to NOW, Date & Time: 17/05/2017 16:15), Recall, Get Recent Events, Get All Events.

**Setting station RTC
(Real Time Clock)**

The station clock is very important as every field data stored by the station is related to time taking, as a reference, the station RTC.

Being connected through the cable, the station clock can be set with a good accuracy (the PC clock is used).

After on site installation, having no direct connection between controller PC and remote station, RTC will be set, if required, by means of a cell phone, sending an SMS to the station.

As the SMS delivery time is not known, the SMS command sent by the user generate a message, sent by the station, to itself. If, as usual, the station receives its message within 30 seconds it takes the time information coming within the message as the time reference to be used to set its clock. A confirmation message is then sent to the user mobile phone.

The internal clock can also be set automatically by GPS sending the **#BMSGCSAX*** command; in this case the internal clock updating depends on the GPS strength. For further information see pag. 5-19 .

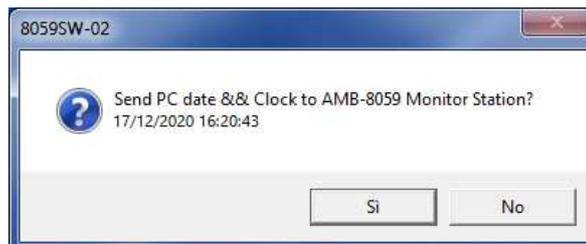
The picture on the previous page shows the “140WY60903” station. Please note that the station clock (RTC) has not been set as it shows the date 17th May 2017 in the “Station Date & Time” frame on the left bottom side.

Hit the button **Enable Setting**, on the bottom right side, to modify the settings of your station.

You should remember the setting password that have been set the first time this software has been run. You will be asked to type it to be allowed to modify the station settings.



Type the setting password to be allowed to change RTC and press the **Set Clock** button; the following message will be displayed:



Click **Yes** to synchronize the station clock with your PC.



The station clock is now set.

How to switch the WiFi or the GSM modem on

All AMB-8059 models incorporate a WiFi modem module.

AMB-8059/02 and AMB-8059/03 are equipped also with a 4G GSM/GPRS modem, which power consumption, especially while transmitting, is very high, if compared with the station overall consumption.

Additionally, modem transmissions, including communications between terminal (modem) and network that are not under the user control, generate E.M. fields that affect the measurement results.

For the reasons above, the modem activity of an E.M field monitoring device should be reduced to the minimum by switching the modem OFF whenever convenient.

The WiFi/GSM modem of AMB-8059 is therefore switched ON/OFF depending on the user settings and other conditions.

When the modem is OFF it neither consumes power nor generates any E.M. field. On the other hand, it is not able to receive calls or messages.

It is suggested to program the modem to be OFF for the major part of the day except times, usually one hour per day or less, to download results and be able to receive calls and messages. Abnormal situations, like alarm conditions, will be able, anyway, to switch the modem ON to allow automatic activities like alarm notifications.

A modem ON, but not communicating, is defined here as to be in "Stand-by" mode. It consumes some power but it is able to receive calls and messages.

Short transmissions due to communications between the modem and the GSM/WiFi network occur usually every few hours when the modem is in Stan-by mode.

During transmission the modem power consumption is high and, in the case of the GSM module, it depends on the quality of the network signal.

On the monitoring station the GSM/WiFi modem can be switched on in three different ways:

1. **Programmed** (the User decides when the modem has to be switched on and for how long).
2. **Spontaneous** (the monitoring station switches the modem on whenever there is an alarm)
3. **Automatic** (the monitoring station switches the modem on and off automatically when certain conditions occur)

Programmed mode

The internal modem (WiFi available for all models and GSM for AMB-8059/02 and /03 only) will remain on and in Stand-by for 60 minutes after the monitor station was switched on. Afterwards, the modem will be switched on and off depending on the **Schedule for MODEM** settings:



Please refer to paragraph 3.12.2 of this manual for further information of using Schedule for MODEM function.

The above picture shows the **Schedule for MODEM** setting to place the modem in stand-by mode at 12:05 for 1 hour (4 quarters) every 24 hours. It means that every day the monitor station is able to receive or to originate calls from 12:05 to 13:05.

If the monitor station is switched on at 11:30 the modem will be switched in stand-by mode until 12:30.

At 12:30 it will be switched off until 12:05 of the next day. No communications will be possible in this window time.

Instead, in case the monitor station is switched on at 10:50 the modem will be switched in stand-by mode until 11:50. Then OFF for 15 minutes until, at 12:05 of the same day, switched again in stand-by mode for 4 quarters by the “schedule for MODEM” settings.

Spontaneous mode

In Spontaneous mode, whenever an alarm condition occurs or when the normal conditions are restored (e.g. exceeding the threshold value set for the field intensity or returning below the threshold), the GSM modem is switched on directly by the monitoring station either to make a call or to send an SMS to the modem number(s) or deliver EMAIL to the recipient address (depending on the settings).

Afterwards, the GSM remains on stand-by for 10 minutes.

Automatic mode

Certain particular conditions - apart alarms - can cause the modem to be switched on and off regardless of the programming time.

All models

If both Stand-By parameters (“Schedule for Modem” and “Schedule for SMS/Wifi/EMAIL”) are set to zero, the modem would never be switched on and therefore the monitoring station would be unreachable. To avoid this condition, at 11 a.m. of the internal clock, every day the modem is placed on Stand-By for 30 minutes (the GSM modem where available).

Once set the GSM/Wifi modem you can disconnect the station from the computer and put it in the place choose for monitoring.

Connect the modem to the computer to start working in “Modem, Point to Point” mode with the area monitor.

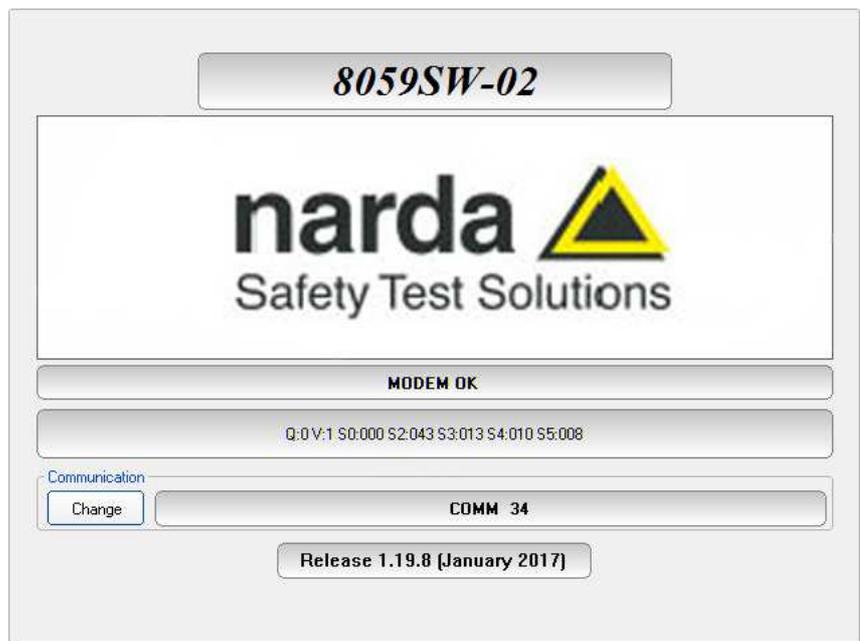


Remember that the modem works with a baud-rate of 115200.

Clicking twice on the 8059SW-02 icon a window appears displaying the software release and COM port assigned; the software check the presence and status of the modem.



In case the modem is detected, the message **MODEM OK** will appear.



In case the modem is not detect the message **MODEM NOT FELT** will be displayed.



If the software 8059SW-02 does not detect any modem or connection with the PC, proceed as follows:



When using a GSM Modem, make sure the PIN code of the SIM card in use has been removed.



Preferably, a GSM PC modem should be used for calling remote stations in “Modem, Point to Point” mode. A line modem can be used but it should be connected to a direct phone line (the same connection used for a fax machine). Sometimes, if there is a switchboard system, it may only be possible to place outgoing calls but not to receive incoming calls (where an extension may be needed, etc.).

- Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations.
- Be sure that the tray for the SIM card is locked inside its slot
- Make sure all cables are well connected to the Modem.
- Make sure the serial port corresponds to the one selected.
- Send some commands by means of any Terminal program or similar applications, to make sure the modem is working properly.



Every time the Area monitor is switched OFF, and the battery pack disconnected from it, the internal clock has to be set. It is always better prepare the first installation on site with the help of a laptop or a tablet to verify that internal clock has the right hour and date



These are the basic operations to follow to work with the AMB-8059. All additional information and explanations can be found on chapter 3

First connection – FTP communication

4.3 General Information

This section refers to all AMB-8059 area monitor models used in conjunction with 8059SW-02 control software, since all of them are equipped with an internal WiFi modem.

AMB-8059/01 and AMB-8059/03 are also equipped with a 4G GSM/GPRS modem.

4.3.1 Introduction

AMB-8059 area monitors can be set to operate using two different remote communication modes, both using one of the internal modem network: Point-to-point and FTP (File Transfer Protocol).



NOTE

The user should decide in advance the communication mode for each station as Point-to-point communication mode is not allowed while a station is set for FTP and viceversa.

This section provides operating instructions and suggestions to use the AMB-8059 area monitors set for FTP communication mode.



NOTE

For FTP communication mode, first connection must be done via RS232 or USB cable to allow proper FTP settings and MODEM parameters.

4.3.2 Brief description of FTP communication

When a wireless modem switches on it links up with the proper network.

Assuming that parameters such as Access Point Name, User Name and Password are correctly set by the user, the modem accesses the Internet to establish packet data communication towards other devices identified by their IP address.

Unlike the Point-to-point data communication, there is no need to establish a direct connection between two devices by means of a call to a telephone number. Each data packet put in the network includes the receiver IP address so that any packet can be delivered efficiently.

In GSM/GPRS mode the telephone channel is not engaged continuously but only when some data have to be transmitted. In this way a single telephone channel can be shared between users or more channels can be used at the same time to improve the communication speed.

Usually there is no need to ask the provider for specific data service as SIM cards are often already enabled for 4G GPRS.

An evident advantage using internet for data exchange is that it allows accessing data from anywhere, at low cost, regardless the distance.

4.3.3 Monitoring networks

The monitoring network is a system composed by one to several AMB-8059 remote stations and a controller PC running the 8059SW-02 control software.

Remote stations continuously perform field measurements and store results in their internal memory.

At programmed time, each station downloads the stored results to the controller PC in a different way depending on the communication mode set previously.

4.3.4 System operation in FTP mode

After initial installation, there is no direct communication between remote stations set for FTP mode and controller PC.

A User's FTP server with a static IP address (or, at least, with a numeric alias if dynamic) is always necessary, presuming availability of the WiFi or 4G GSM (for AMB-8059/01 and /03 models only) signal at the remote station installation site, for AMB-8059 to download data to the server itself.

When connecting to the server, the remote station will check for the existence of any request to modify its settings or to download results related to some specific time interval.

In case, the station will proceed accordingly, by changing its settings or by downloading the requested data. If no special requests are found, the station downloads all measurement results, which have been acquired since the previous access to the server.

To avoid energy wasting, and generating undesired electromagnetic fields, that would be measured by the station itself, the station modem, which allows communication with the FTP server, should be set to be off for the major part of the day.

At the programmed time, set by the User, the modem switches on and the station access the ftp server to download its results.

Depending on the setting decided by the User, various abnormal conditions regarding field strength and station operation, generate alarm events able to immediately switch on the modem to access the server or send SMS to the user's mobile phone (where available) or deliver EMAIL to the recipient address.

Being the modem a power consuming component, it is advisable to avoid programming the station to access the server more than once a day to avoid, especially during bad weather periods, affecting the energy balance between solar panel (where installed) and battery backup.

The main interface to the system, from the operator side, is the controller PC. When desired, through the control software 8059SW-02, the User can select one of the remote stations from the list and access its folder opening a ftp connection to the server.

All data not already downloaded from the server to the controller PC are then downloaded, and eventually a new setting file, if requested by the User, is transferred to the server to be read by the station when it will access the server.

The controller PC needs a full internet connection allowed for FTP (File Transfer Protocol).



Due to the network signal quality, it may happen, sometimes, that the station is not able to access the ftp server at the scheduled time. No data will be anyway loss: it will be downloaded at the next connection.

4.3.5 Some advantages

Any remote unit (AMB-8059 area monitor) downloads its data to the FTP server at scheduled time and according to the User settings.

The controller PC is able to retrieve them whenever desired without any need to establish a direct connection to the remote station.

Integrity check of transmitted data is automatically performed by the remote station.

In case of wireless network bad signal quality, remote stations automatically try several times to access the network and download measurement results.

The small dimensions of data files normally transferred by our systems make it convenient to choose telephone charges based on data volume usually available for GSM/GPRS service.

4.4 General Requirements

4.4.1 Remote station

Remote station:

- A SIM card enabled for 4G GSM/GPRS communication must be provided by the user and inserted in the SIM card slot according to instruction provided by this manual.
- The SIM card PIN code must be disabled using a mobile phone

Information required for FTP communication:

- **APN** (Access Point Name)
- **UN** (User Name)
- **PW** (Password)

The above parameters are specific of the SIM card provider, it often happens that User Name and Password are not required.

Some examples:

Italy: APN for a Vodafone SIM card is: web.omnitel.it
User name and password are not required.

Greece: APN for a Cosmote SIM card is: internet
User name and password are not required.

China: APN for a China Mobile (Shanghai) SIM card is: cmnet
User name and password are not required.

Configuration of the above, as well as ftp server parameters must be done in advance, before on site installation, using the controller PC running the provided 8059SW-02 control software or, as an alternative, by means of specific messages (SMS) to be sent to the station telephone number.

A Narda STS ftp server is available to our Customers, for preliminary tests only:

IP address: 178.32.31.89

User Name: 8057

Password: amb8059

NOTICE

Be aware that data in this server are periodically removed.

4.4.2 FTP server requirements

FTP server requirements:

A STATIC IP address is required for the FTP server.

The following information regarding the ftp server must be available to set-up correctly remote units and controller PC:

IP address (it is the static IP address assigned to the ftp server)

User name and Password (to be allowed to exchange data with the ftp server)



Username and Password must only contain alphanumeric characters; any special characters are not allowed.

4.4.3 Brief operating description and file structure

Basically, at scheduled times the AMB-8059 regularly establishes via the selected channel a connection to the server through FTP:

- First it loads, if any, all the (new) settings which have been written by the (client) application.
- Then it writes all data that have been requested by the application.
- Finally it erases all previous required settings in order to avoid reloading them at the next connection. Note that data related to field measurements are never deleted by the station.

After that the connection is terminated.

4.4.4 Structure

To avoid having multiple stations that store data in the same directory every data exchange is done on a directory named as the serial number of the monitoring station itself. Here, an example of directory structure:

```
FTP_Root
  000WE41003
    8059.CFG
    8059.set
    8059FLD.TXT
    17_08_01_07_09_.D59
```



Directories are created by the control software, at the first connection to the server, after the station parameter set-up has been completed. Remote station will not create any directory. **The user must ensure that the directory have been created before operating the remote station.**

4.4.4.1 CFG File (configuration)

Whenever the AMB-8059 connects to the wireless network and accesses to FTP server, it looks for a file named 8059.CFG in its directory (its serial number). If the file is present, the AMB-8059 retrieves it and calculates the checksum in order to use it and thus get the new configuration. If the checksum is wrong, the file is discarded otherwise the new configuration is taken.

Is important to note that the new setting will not take effect immediately but only after the connection is closed.

4.4.4.2 FLD File (Read)

After having dealt with the configuration file 8059.CFG, the AMB-8059 check for the presence of a file named 8059FLD.TXT.

This, is an ASCII file which contains the date of the first requested record and the number of them. The syntax is: **FLD HH:mm;GG/MM/YY; n** where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year
- n is the number of records required (if n="---" then all records starting from the date/hour up the last recorded record will be uploaded).

For example the string FLD **18:13;23/07/09;100**

Asks for 100 records from the 23th of July 2009 at 18:13 .

If, instead, the string would have been FLD **18:13;23/07/09;---**

It would ask for all records from the 23th of July 2009 at 18:13 up to now.



Note that, in case of “---“ (up to now option), in order to avoid huge files and long transfer time, the number of records will be limited to about 5000.

Once the AMB-8059 has read the file 8059FLD.TXT, it deletes it. It will be replaced later with the newer self created 8059FLD.TXT which reflects the last uploaded record.

This solves the continuity of records even without any external intervention. Indeed, for every connection the AMB-8059 uploads the records and writes a new FLD file which reports the date/hour of last record so that next connection will continue from this having thus an uninterrupted series of records.

4.4.4.3 Record File (Write)

After having read the FLD file, which informs the AMB-8059 about which records have to be uploaded, it writes a file named HH_mm_GG_MM_YY.D59 where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

This file, in binary format, contains the downloaded measurement results.

4.4.4.4 FLD File (Write)

After having written the record file HH_mm_GG_MM_YY.D59, the AMB-8059 writes the file named 8059FLD.TXT which replaces the old one.

This, is an ASCII file which contains the date of the last uploaded record and terminates with the string “---“.

The content will be therefore: FLD HH:mm;GG/MM/YY;--- where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

For example the string FLD **20:30;23/07/09;---**

Says that the last updated record is related to the date of 23th of July 2009 at 20:30 .

If the user does not need a specific period but, as usual, a simple continuous data logger , there is no need to write any FLD File as the system is self-sufficient.

4.4.4.5 Event File (Write)

After having written the FLD file, the AMB-8059 writes a file named HH_mm_GG_MM_YY.TXT where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

Which represents the events file.

This is an ASCII file which contains all the new events since last connection.

Alternatively, soliciting a connection, by the SMS command, different event history can be retrieved as follows:

- SCGNA : all the stored events are written in EVENT.TXT file
- SCGNL : The last 20 events are written in EVENT.TXT file

The content of EVENT file is the chronological history of all events up to the time of connection (RTC setting assumed to be correct).

4.5 First connection – Setting stations to FTP mode

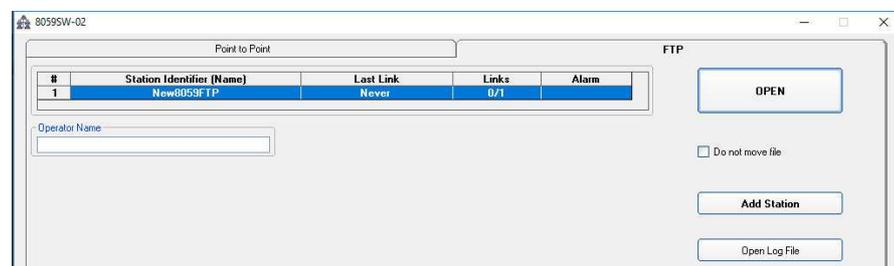
First configuration of each station and its functional test should be performed before installing the station on site.

User must ensure that the desired wireless network signal is available in the installation site.

First connection must be done via **RS232** or **USB** or **Fiber** or **Ethernet** connection to allow proper FTP settings and modem parameters.

Follow the step from to n°1 to n°18:

- 1) Setup the remote unit and recharge batteries (if necessary) as explained in the chapter 2.
- 2) Install the 8059SW-02 software (see §3.3)
- 3) When connecting an AMB-8059/01 or an AMB-8059/03 to the PC USB port for the first time, a message informing that new hardware “**MSP430 Virtual COM Port (COMn)**“ has been found appears (see §4.2).
- 4) If the USB-OC (Optic Fibre adapter) is used, it appears among the devices as a “**Prolific USB-to-Serial Comm Port**” (see §4.2).
- 5) Run the 8059SW-02 software (Pag.3-6) and select the correct COM port (see §4.2).
- 6) Select the **FTP** section on the 8059SW-02 main window.



7) Click **Add Station** button on the right side to add a new station to your list and fill the new form with requested parameters:

#	Station Identifier (Name)	Last Link	Links	Alarm
1	New8059FTP	Never	0/1	
2	MOBILE	22/01/17 14:27	14/20	● Several

Edit Station # 1

Station Identifier (Name):	New8059FTP	Address:	178.32.31.89	Remove Station
S/N:	140WY60901	User Name:	8057		☐ Hide digits
Scheduled Call		Password:	amb8059	<input type="checkbox"/> Auto ASCII File
Time	<input type="text"/>	<input type="checkbox"/> Generate Call	Start 00:00 19/07/2019	Stop 23:59 19/07/2019 <input type="checkbox"/>
Data transfer settings				

Station Identifier (Name):

“New8059FTP” in this example, you can decide for any alphanumeric name.

The station list cannot contain two or more stations with the same name. The folder containing all information and data of a specific station is created automatically by the control software. The folder name is the same assigned to the station in the station list.

S/N:

“140WY60901” in this example, is the serial number, different for any station.

By means of the control software a new directory with the same name will be created in the FTP server. It will be used for any data exchange between PC-server FTP and station-server FTP related to this specific station.

Address:

“178.32.31.89” in this example Narda STS ftp server IP address that can be used by User for preliminary tests. **Be aware that data in this server are periodically removed.**

User must set here the **static IP address** of his FTP server.

User Name and Password:

Respectively “8057” and “amb8059” in this example to access the Narda STS ftp server for test.

User must set access parameters for his own ftp server.

Downloading data from FTP server to PC.

Start 00:00 19/07/2019 Stop 23:59 19/07/2019

If disable the data in FTP server will be downloaded on PC since the latest download up to actual date and time

Start 00:00 19/07/2019 Stop 23:59 19/07/2019

If enabled (✓) the data in FTP server can be downloaded on PC in the data interval set on “Start” to “Stop” at the time indicated.



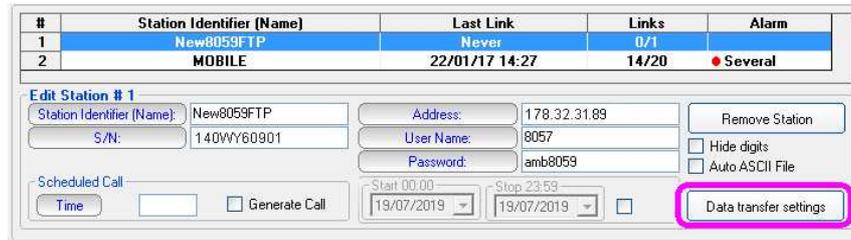
The above information S/N, Address, User name and password are necessary for the controller PC to access the ftp server for downloading station measurement results and change setting to the remote station.



After typing, press “Return” key to set each single parameter. Every time a single parameter is set in this form the user will be asked to type the terminal password.

**4.5.1 Modem, FTP mode
or
Wi-Fi, Remote IP,
FTP mode**

8) Click the button **Data transfer settings**:



#	Station Identifier (Name)	Last Link	Links	Alarm
1	New0059FTP	Never	0/1	
2	MOBILE	22/01/17 14:27	14/20	● Several

Edit Station # 1

Station Identifier (Name): New0059FTP Address: 178.32.31.89 Remove Station

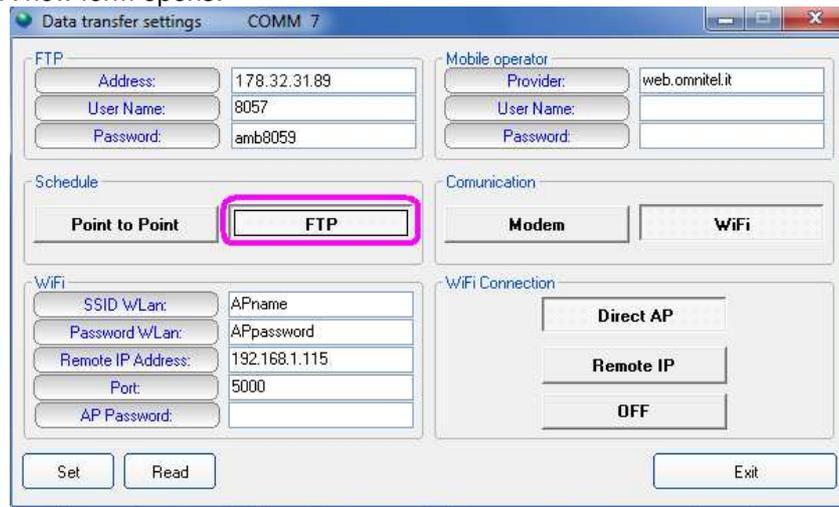
S/N: 140WY60901 User Name: 8057 Hide digits

 Password: amb8059 Auto ASCII File

Scheduled Call Start 00:00 Stop 23:59

Time Generate Call 19/07/2019 19/07/2019 **Data transfer settings**

A new form opens:



Data transfer settings COMM 7

FTP

Address: 178.32.31.89 Mobile operator: Provider: web.omnitel.it

User Name: 8057 User Name:

Password: amb8059 Password:

Schedule **Communication**

Point to Point **FTP** Modem WiFi

WiFi **WiFi Connection**

SSID WLAN: APname Direct AP

Password WLAN: APpassword Remote IP

Remote IP Address: 192.168.1.115 OFF

Port: 5000

AP Password:

Set Read Exit

Use the **Read** button to display the parameters of a station connected via RS232, USB, Optic Fibre or Ethernet cable.

Select the button **FTP** in the frame **Schedule** if not already selected. Fill the same parameters, Address, User Name and Password for the FTP server. These parameters will be transferred to the station and will be used by the station itself to access the ftp server for downloading measurement results and upload any new configuration file. In this example, parameters for the Narda STS ftp server are set for preliminary testing. User should then set access parameters for his own ftp server.

GSM

In case the **GSM/GPRS** network is to be used, select the **Modem** button in the **Communication** frame and fill the **Mobile operator** section with parameters needed by the station to link the GSM/GPRS network. In this example are set parameters for an Italian Vodafone SIM card (provider); see default parameters in the §4.4.1 Remote station.

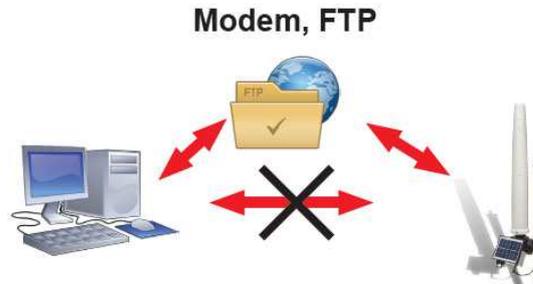
WiFi

In case the **WiFi** network is to be used, select the **WiFi** button in the **Communication** frame, fill the **WiFi** section with parameters needed by the station to link the WiFi local area network.

Now choose in which way to use the station:

- **“Modem, FTP mode”** (page 4-34)
- **“Wi-Fi, Remote IP, FTP mode”** (page 4-35)

In **Modem, FTP mode**, the area monitor will send all data to an FTP server where they lie up. All you need is a PC modem, a SIM card in the area monitor modem and another SIM card for the PC modem but only if it is GSM. Beware, the SIM card for this way of communication is a standard SIM card with an internet subscription activated. Make sure the PIN code of the SIM card in use has been removed



To work in this way the area monitor has to be set in this way:

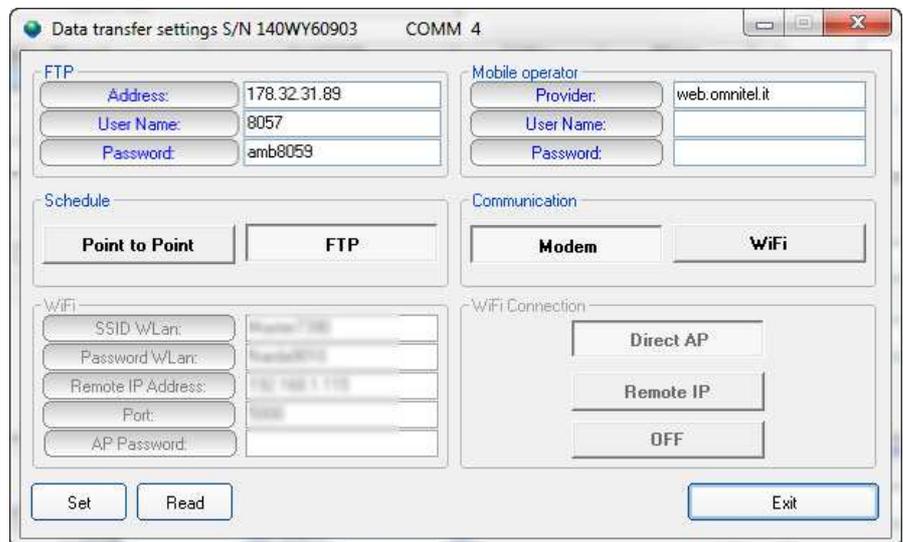


Fig. 4-8 “Modem, FTP mode” settings

Schedule: FTP

Communication: Modem

FTP:

- Address: the static IP of the FTP server you intend to use
- User Name: the user name to enter in the FTP server
- Password: the password to enter in the FTP server

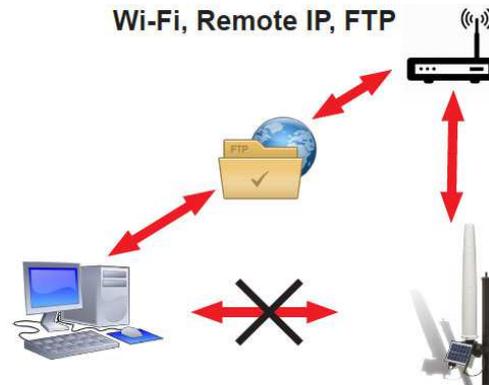
Mobile operator: these parameters depending on the service provider of the used SIM.

- Provider: the APN (Access Point Name)
- User name: user name used for GPRS connection
- Password: password used for GPRS connection

Press **SET** and then **Exit**

In **Wi-Fi, Remote IP, FTP mode**, the area monitor will send all data to an FTP server where they lie up. The area monitor communicates to a router through the Wi-Fi network.

To work in this way the area monitor hast to be set in this way:



To work in this way the area monitor hast to be set in this way:

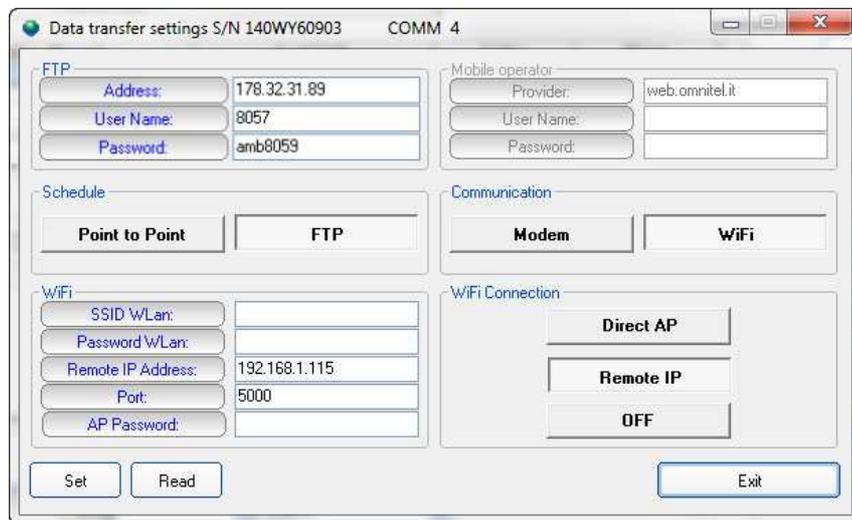


Fig. 4-9 "Wi-Fi, Remote IP, FTP mode" settings

Schedule: FTP

Communication: Wi-Fi

Wi-Fi:

SSID Wlan is the name of the Wi-Fi network you intend to use

Password, the password of the Wi-Fi network

Remote Address: the IP address you assign to the area monitor, default 192.168.1.115

Port: the port used by the area monitor for the Wi-Fi communication, default 5000

AP Password, it is not mandatory, it is a protection password to assign to the station

All other field can be left blank.

Press **SET** and then **Exit**

Every time you switch an AMB-8059 ON, it starts to work in Direct AP mode. After some minutes the area monitor will switch on the correct modality set in Data Transfer Settings. Due to it has unique IP address we have to add its MAC address in the router 's IP list.

The MAC address is written in the area monitor certification.

You have to enter in the router control panel you intend to use. Look for DHCP settings and the option "Add Manually".

This section is different for every router, every brand, every access point. We recommend to read instructions of the device you intend to use to have the Wi-Fi connection.

Once the area monitor we be recognized by the router, in the group of possible devices, you have to select it and specify the IP to use. The IP to use must match with the Remote Address you set in Data Transfer Settings window.

Normally, every area monitor, in addition to its MAC address, is normally recognized as WiFly Ezx

Also consider that a lot of free Wi-Fi networks, request to change the user name and password after a specific time. We suggest to use only networks where this option is not acivated.



9) Setting station RTC (Real Time Clock)

The station clock is very important as every field data stored by the station is related to time taking, as a reference, the station RTC.

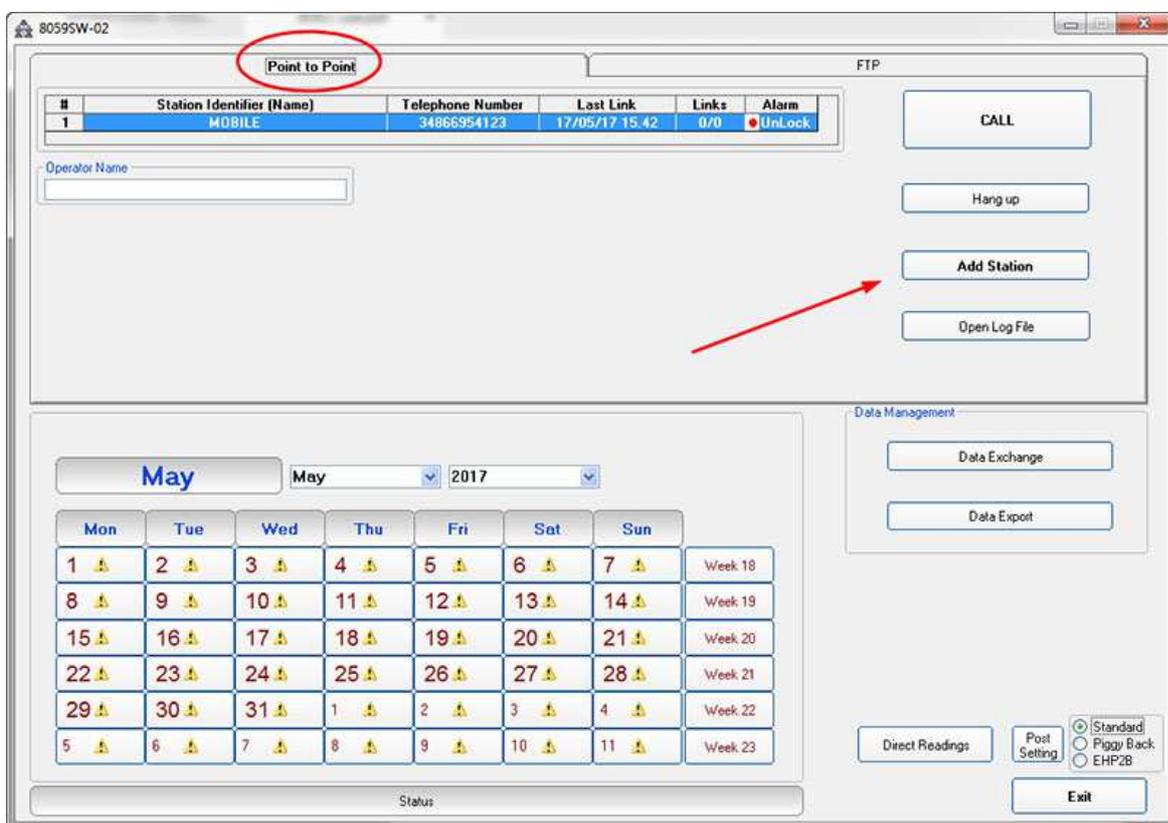
Being connected through the cable, the station clock can be set with a good accuracy (the PC clock is used).

After on site installation, having no direct connection between controller PC and remote station, RTC will be set, if required, by means of a cell phone, sending an SMS to the station.

As the SMS delivery time is not known, the SMS command sent by the user generate a message, sent by the station, to itself. If, as usual, the station receives its message within 30 seconds it takes the time information coming within the message as the time reference to be used to set its clock.

A confirmation message is then sent to the user mobile phone.

Select the **Point-to-point** section of the 8059SW-02 control software and select one station from the stations list (the first installation will show only one station set by the software as an example):



Insert the Station Identifier: it is the name you decide to give to your monitor station. As default it is the serial number of the station.

Insert the Telephone Number: it is the phone number associated to the SIM card in the area monitor

Insert the Device Password: as default it is PASSPMM

For every field the computer will request the Terminal Password

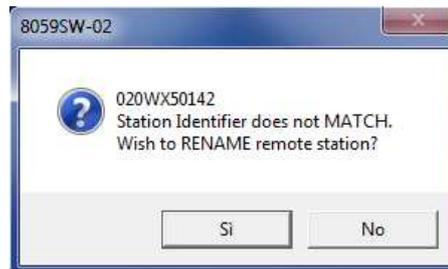
Hit the button **Call**, on the right, to access the station connected by cable. As the Point-to-point mode normally operates through a modem, a message will inform that no modem has been detected on your COM port. It will ask whether you wish to access a station connected by cable. Being this the case, you will answer **Yes** to access your station through the Serial RS232, USB or Ethernet cable:



The station name is always stored within the station and it is expected that it matches the name, in your station list, that have been selected before calling.

The user station have not been added to the Point-to-point stations list as the FTP communication mode has been decided, in advance, for this station.

Answer **No** to the next messages as you neither wish to change the station name, nor add in the Point-to-point station list the station you are using:

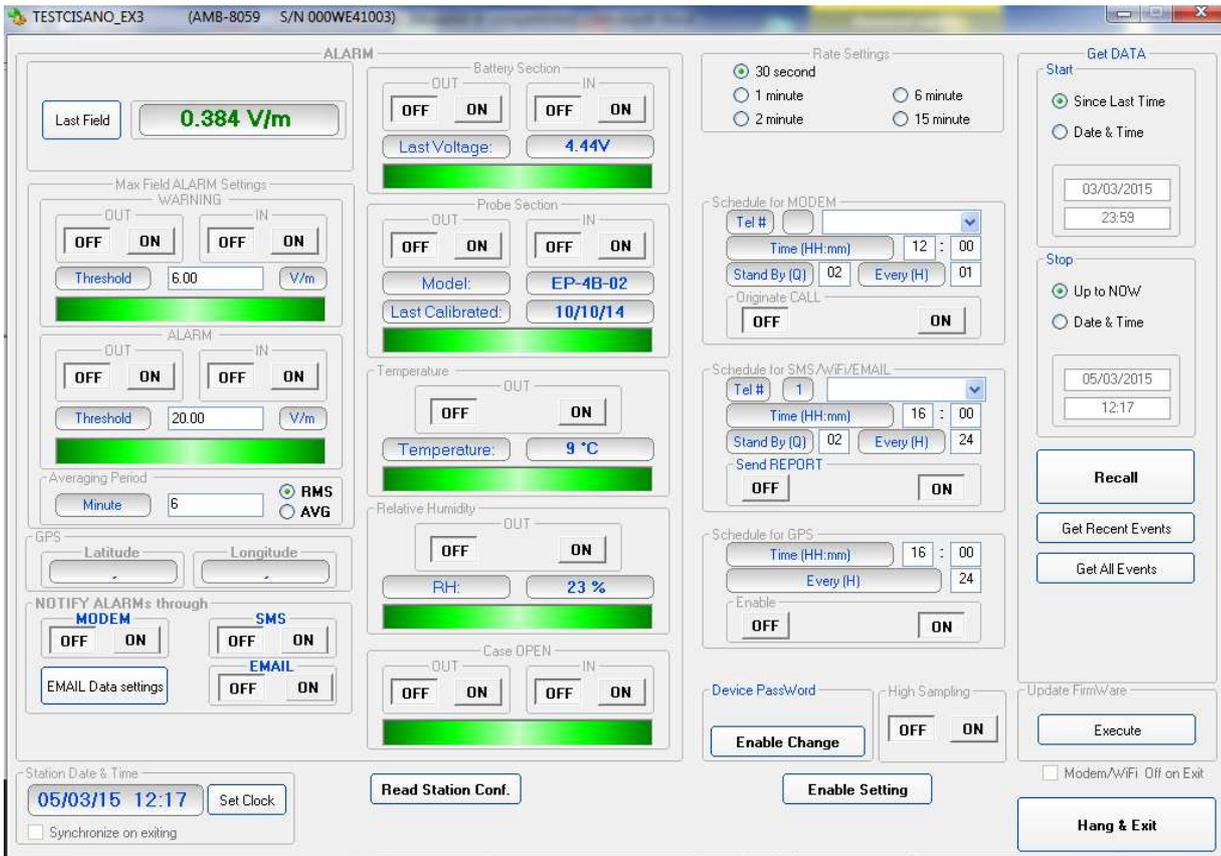


Answer **No** as you do not wish to change the name stored within your station.



Answer **No** as you do not need to add this station to the Point-to-point stations list, you are going to use it in FTP mode. This station is in your FTP stations list.

The station Setting window will be shown:



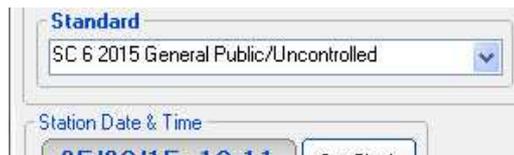
The above picture shows the “TESTCISANO_EX3” station. Please note that the station clock (RTC) has not been set as it shows the date, in the “Station Date & Time” frame on the left bottom side, 5th Mar 2015.

Hit the button **Enable Setting**, on the bottom right side, to modify the settings of your station.
You should remember the setting password that have been set the first time this software has been run. You will be asked to type it to be allowed to modify the station settings.

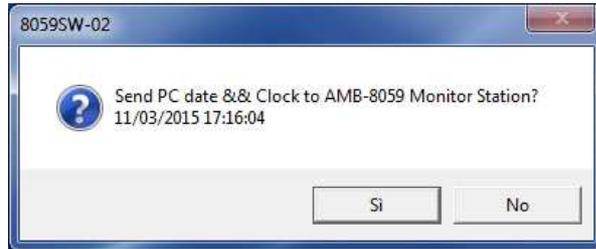
The above labels refer to QuadBand probe. The “Last field” (see §3.12.1.2), “Max Field ALARM Setting” (see §3.12.1.5) and “Probe section” (see §3.12.1.7) may change in case of using different probes or configuration.



The “Standard” drop-down menu is enabled (see 3.12.1.4) on the Alarm section when the DualBand Electric and Magnetic probe is connected.

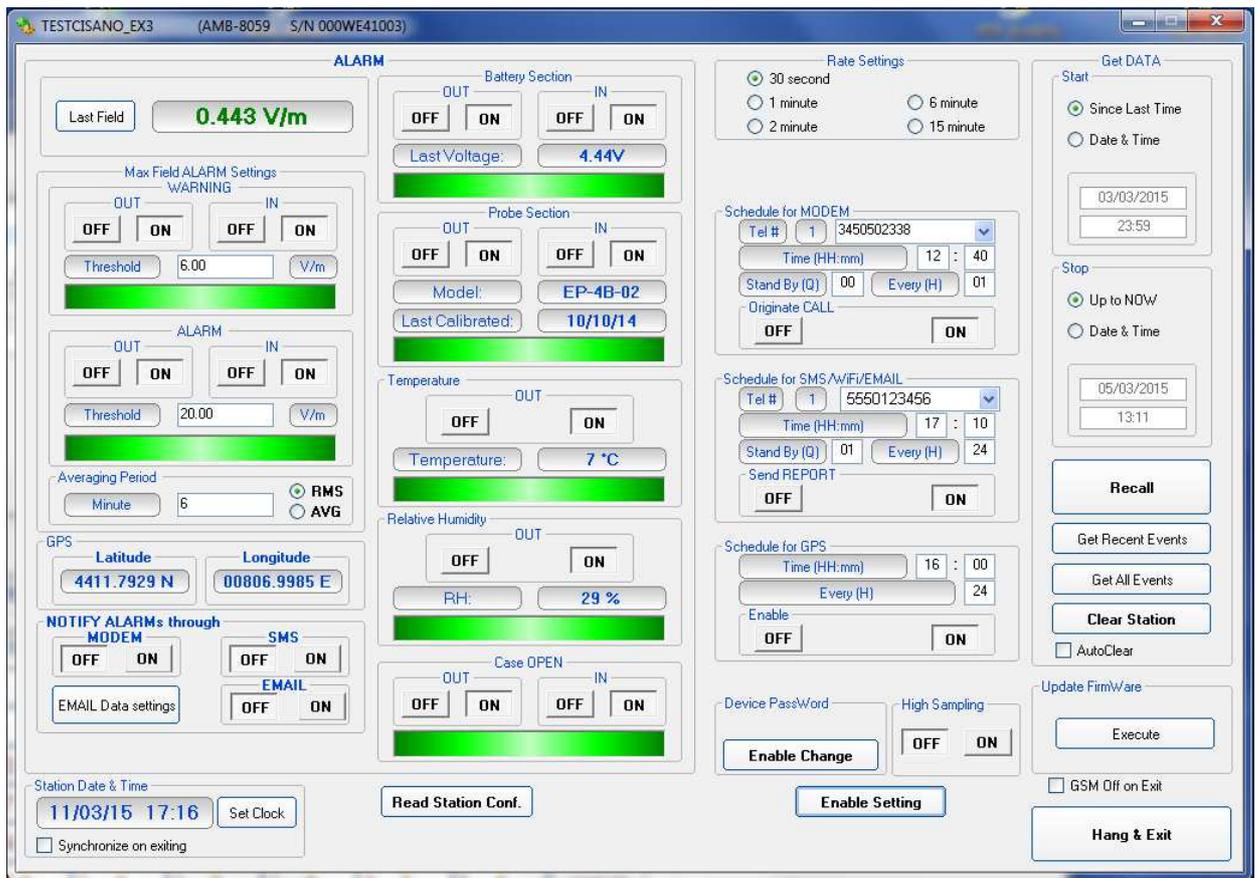


Hit the **Set Clock** button, the following message will be displayed:



Click **Yes** to synchronize the station clock with your PC.

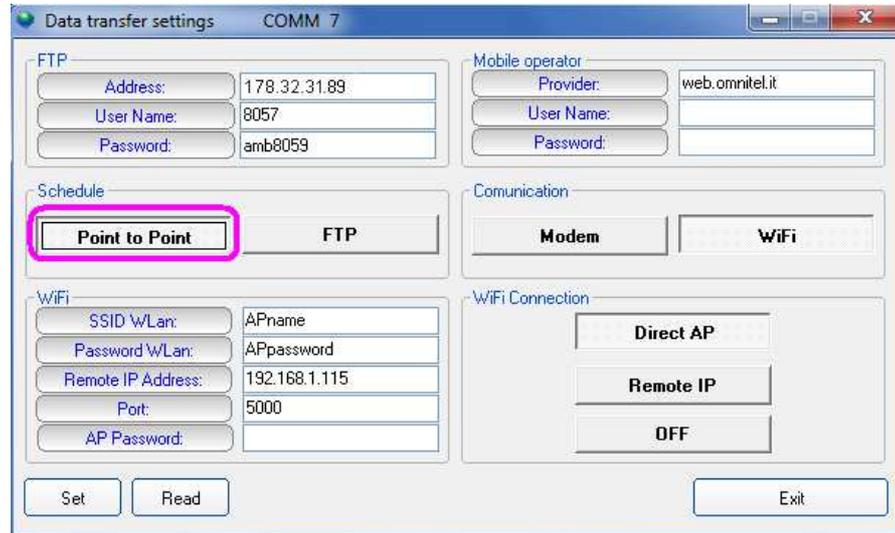
The station clock is now set.



Hit the **Hang & Exit** button on the right bottom side of the setting window.

Since the station is set to FTP communication mode, some parameters could be not available for modification, if their prevalent meaning is designed for Point-to-point mode.

If, for example, the User wishes to preset the Schedule for MODEM, that is to say the time plan for ftp wireless data download, it is possible to temporary set the station to Point-to-point communication mode (in the Data transfer settings window)

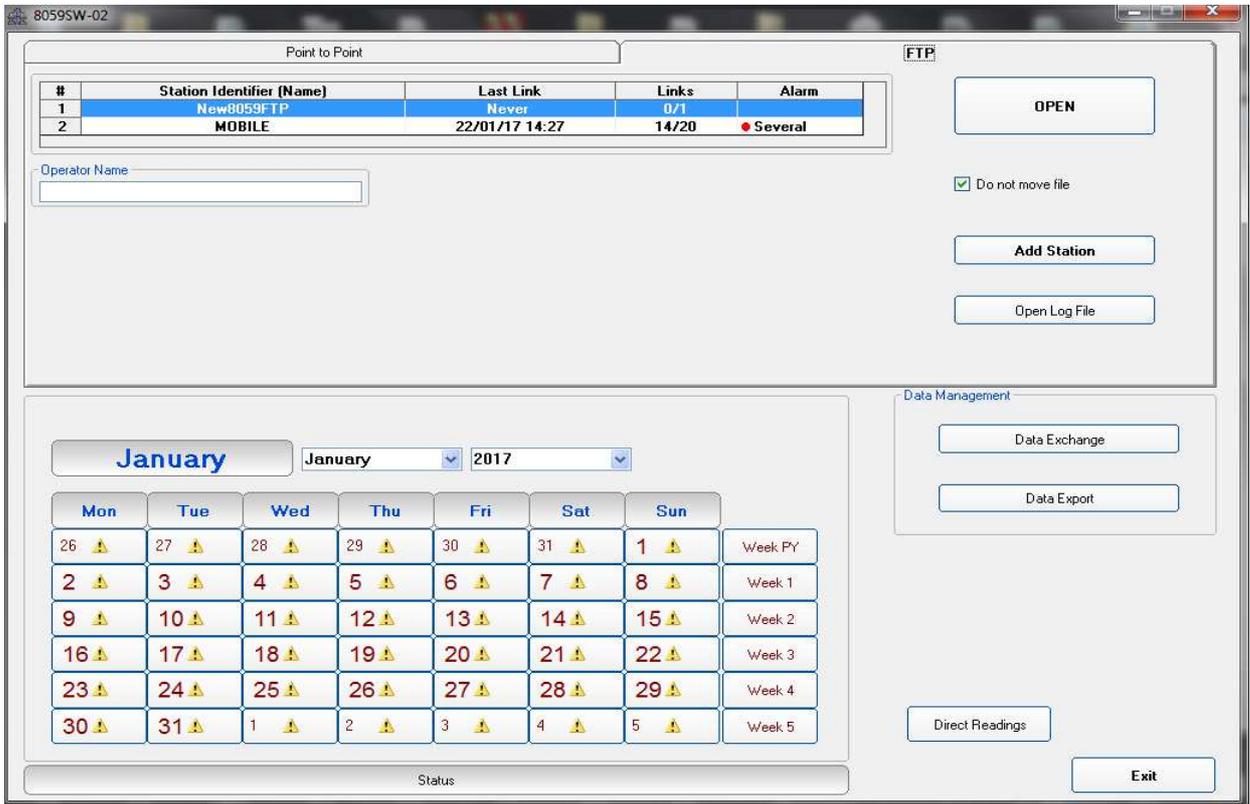


Then, connect the station in the Point-to-point section, as already explained, and set all the desired parameters. After that, go back to the Data transfer settings window, and restore the final FTP mode in the Schedule frame. From now on the station is ready to work as desired, with all the parameters set before of its first FTP connection.

10) Accessing the FTP server

Be sure a full internet connection is available for the controller PC. The firewall, if active, should not close ports 20 and 21 usually used for ftp communication (the executable is called DRIVERIN.exe)

From the 8059SW-02 main window, select the **FTP** label, your FTP stations list will be shown.



Do not move file

Enable or disable the “Do not move file” function



Please refer to paragraph 3.14 of this manual for further information of using “Do not move file” function

Select your station and hit **Open** to access the ftp server.

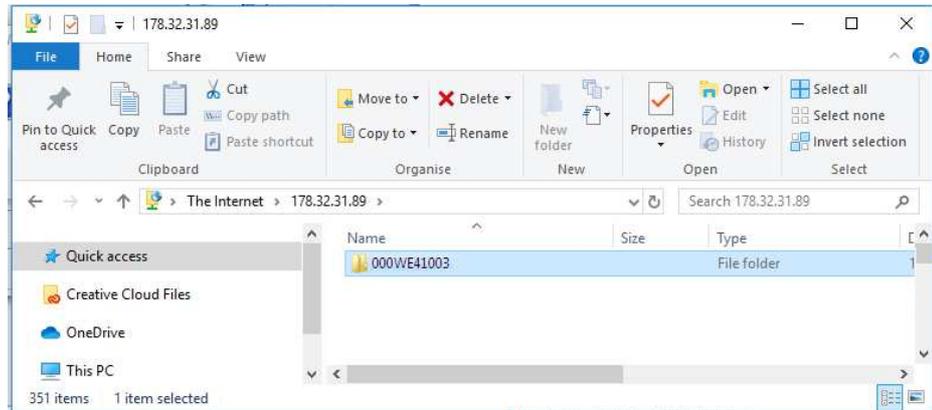
At the first connection, the software will advise you that there is no folder on FTP server with that serial number. The following message will appear:



The station folder, into the ftp server, has not been created yet, answer **Yes** to create it.

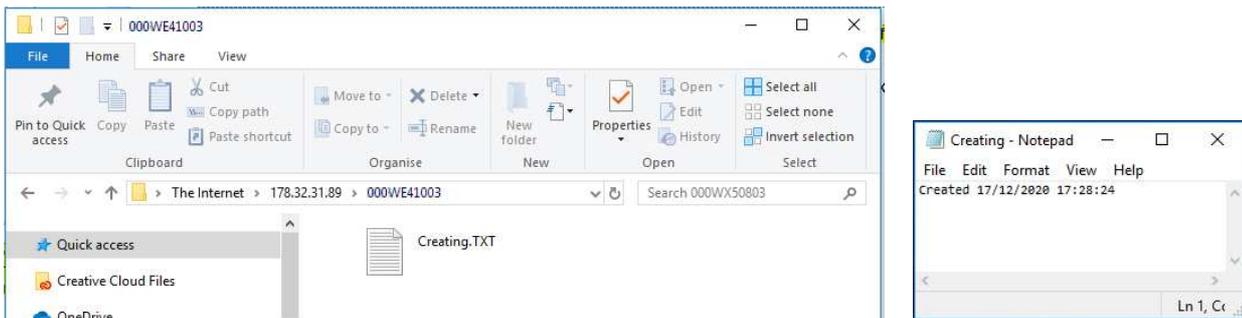


You can easily check it, just accessing your ftp server using Windows Explorer.



IP address, User Name and Password are to be set to access the ftp server through the Windows Explorer.

The only file you should find within the new folder is the “Creating.TXT” which contains information about creation date and time:

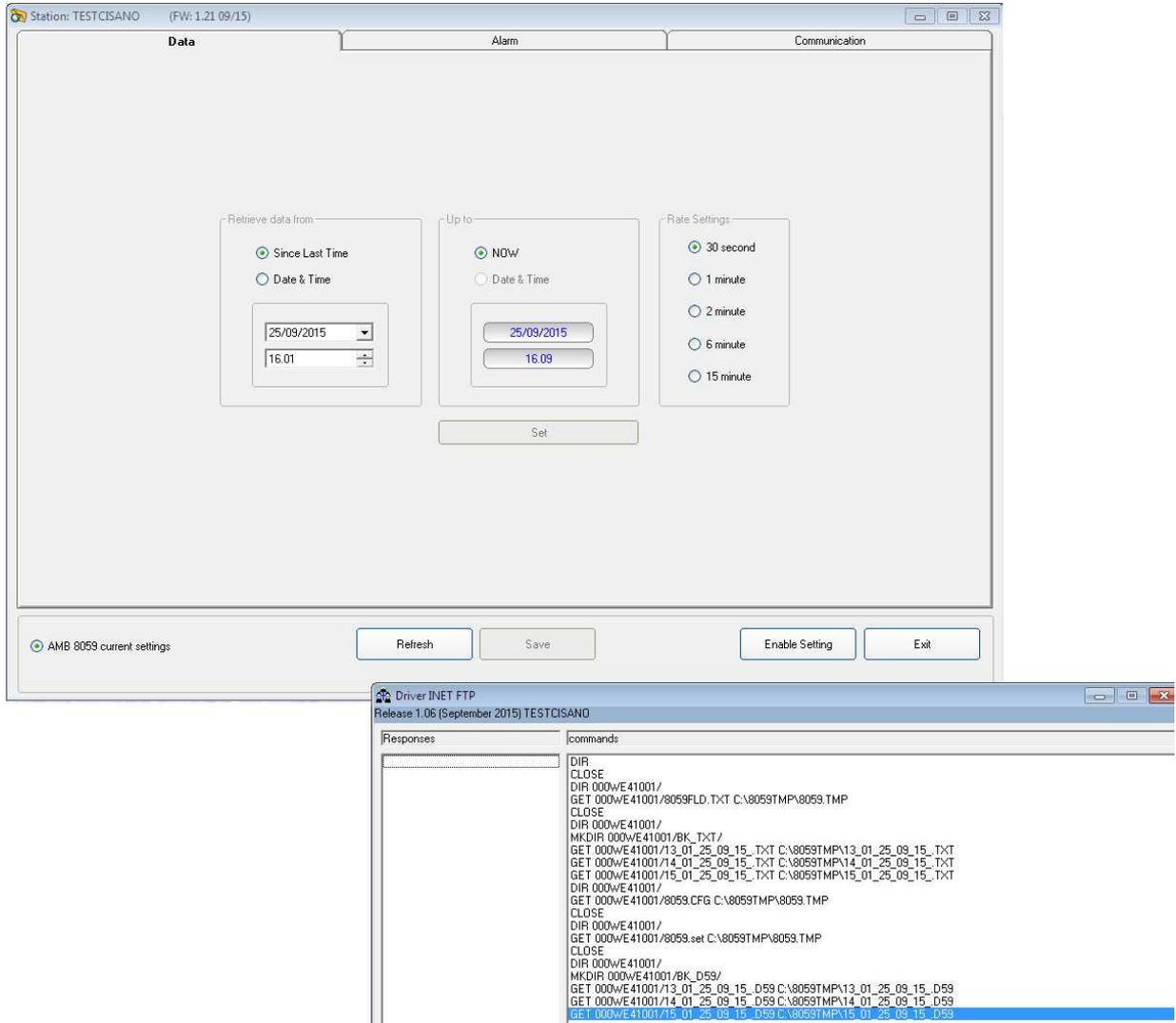


Next message shown by the software just ask you whether you wish to display a default setting which should be saved or modified by the user to save the first setting file “.cfg” which will be read and used by the station at its first connection to the server:



Answer **Yes** to display default setting.

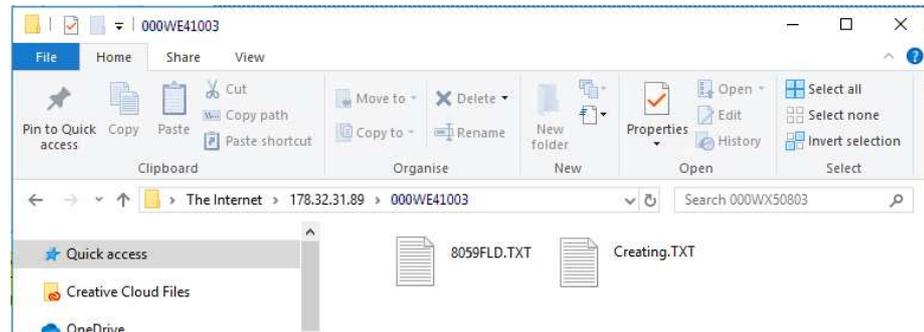
11) The first section **Data** will show which data will be downloaded by the station at the next connection. The default setting is “Since” date-time (your PC clock) – “Up to” now (when the station will access the server).



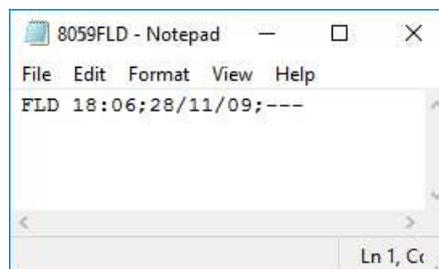
Please refer to paragraph 3.15 of this manual for further information of using Data function



You can check that the 8059FLD file has been created by accessing the ftp server using Windows Explorer. Open the station folder (the name is its serial number).



8059FLD.txt file contains information related to the next data the station should download when accessing the ftp server:



The above picture shows the content of 8059FLD file. After reading this file the station will download data starting from November 28th at 18:06. Last information, “---“in this case, shows how many records have to be downloaded.

“---“ means “up to now” so: all data that have been acquired since November 28th at 18:06.

A different information, let’s say “80” instead of “---“ means 80 records. In which case the time period depends on the **storing rate** that have been set for this station.

If the storing rate was 6min, 80 records means 6 x 80 minutes = 480 minutes that means 8 hours:

Downloaded data will be: “Since” November 28th at 18:06 “Up to” November 29th at 02:06.



It is usual to set any monitoring station to download data “Since last time” – “Up to now” so that everytime the station accesses the server, it downloads all data that have been acquired since the last access to the ftp server.

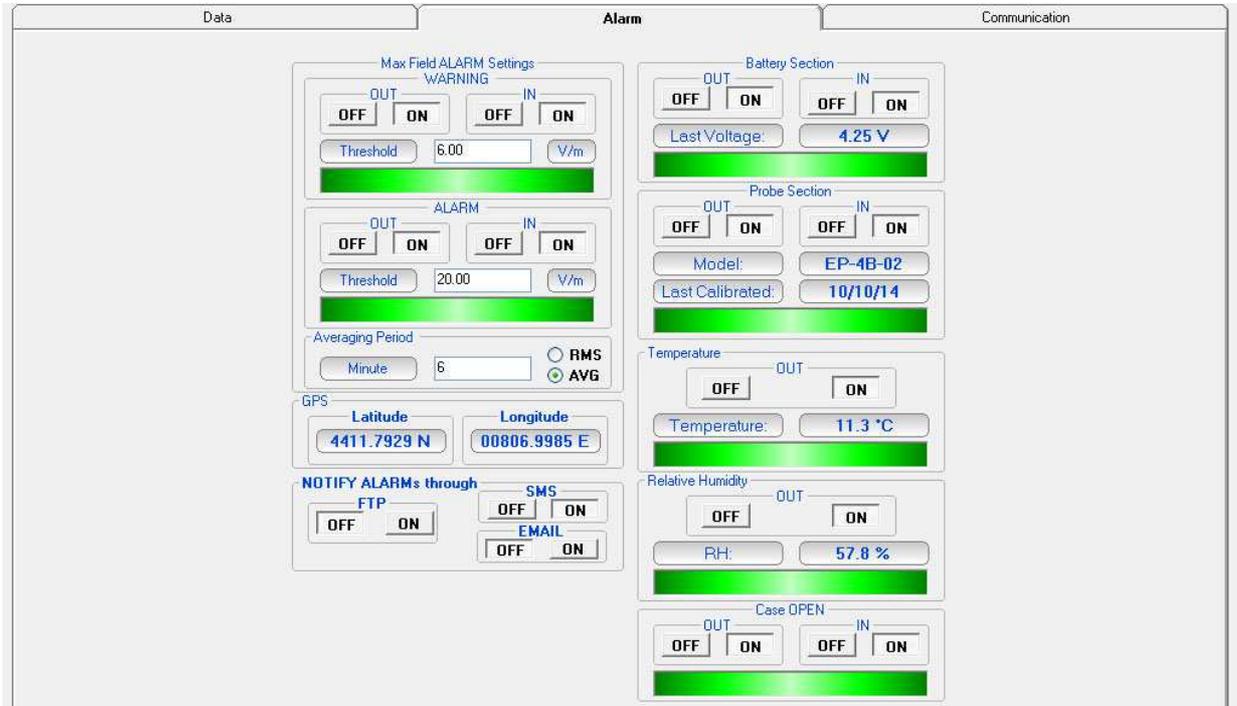
In case, due to some special need, a specific time period should be downloaded by setting the parameters “Retrieve Data From – Date&Time / Up to – Date&Time”, continuity of data to be downloaded later cannot be resolved automatically and a gap will be shown since last data already downloaded up to the time of next connection.



After downloading the requested specific time period the parameter “Up to” will be automatically set to “Now”.

The parameter “Retrieve Data From – Date&Time” should be then set manually to recover data not downloaded automatically.

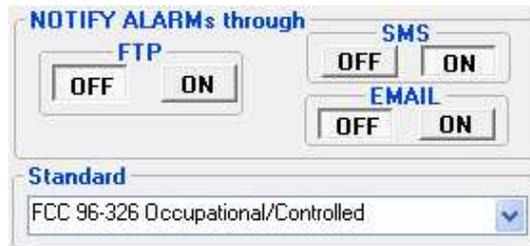
12) The second section, named **Alarm**, allows the user to set which alarm should be notified, if through FTP connection or SMS to the user mobile phone (available only for GSM modem equipped units) or EMAIL to the recipient address.



The above labels refer to QuadBand probe. The “Max Field ALARM Setting” (see §3.12.1.5) and “Probe section” (see §3.12.1.7) may change in case of using different probes or configuration.



The “Standard” drop-down menu is enabled (see 3.12.1.4) when the DualBand Electric and Magnetic probe is connected.



Please refer to §3.16 of this manual for further information of using Alarm function



Please refer to §3.12.1.1 EMAIL Data settings of this manual for further information of using EMAIL Recipient Address settings and list.

13) The third section, named **Communication**, allows:

For Modem, FTP mode.

In the software choose the section **Communication** and change the **Schedule for FTP** settings accordingly to your work

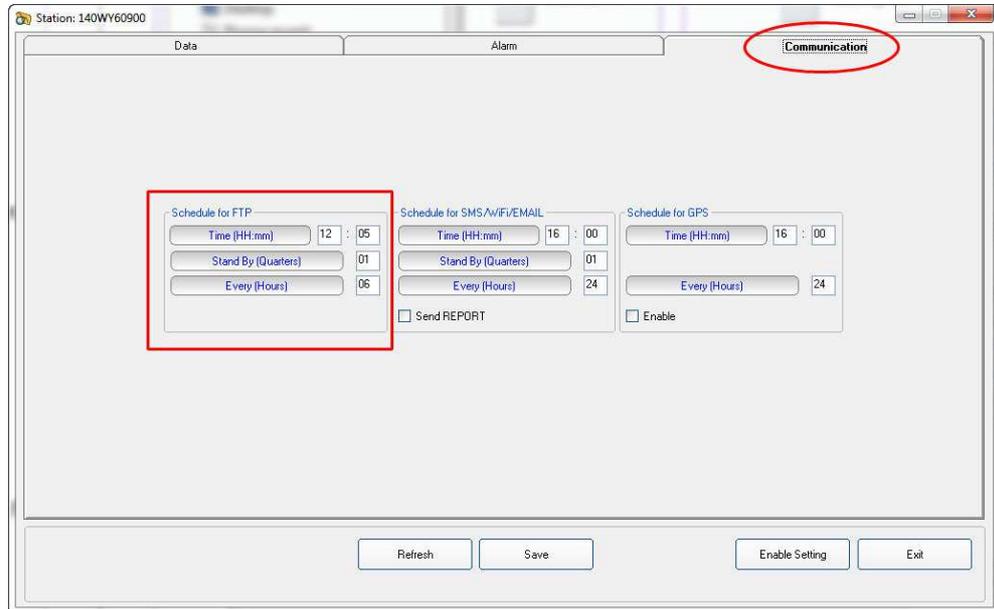


Fig. 4-10 Schedule for FTP frame

For Remote IP, FTP.

In the software choose the section **Communication** and change the **Schedule for SMS/WiFi/EMAIL** settings accordingly to your work.

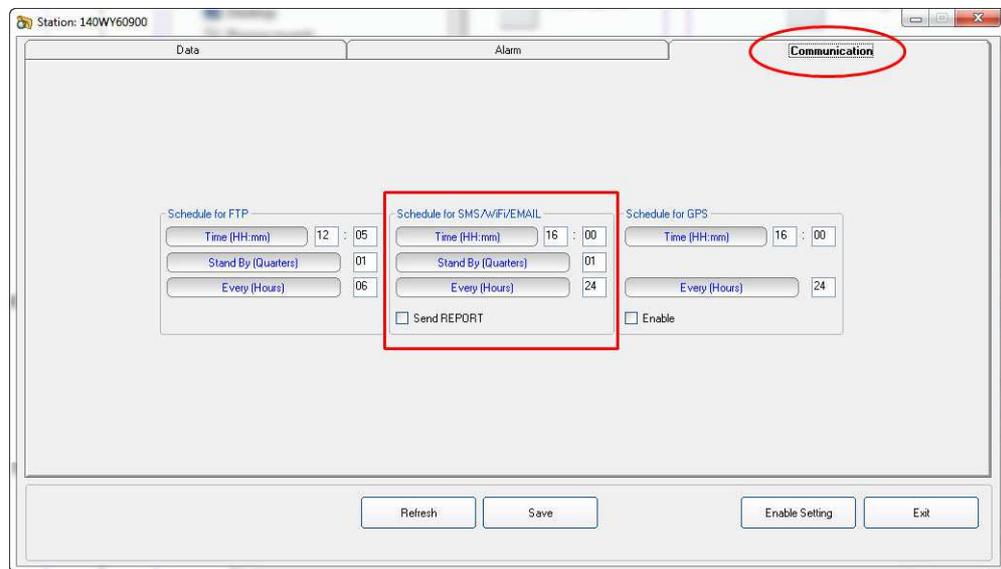


Fig. 4-11 Schedule for SMS/Wifi frame



In case of using these functions, the Time set on Schedule for FTP frame must be different from the hour on Schedule for SMS/WiFi/EMAIL section and viceversa.



Please refer to §3.17 of this manual for further information of using Schedule for FTP and Schedule for SMS/WiFi/EMAIL function.

In the software choose the section **Communication** and change the **Schedule for GPS** settings accordingly to your work

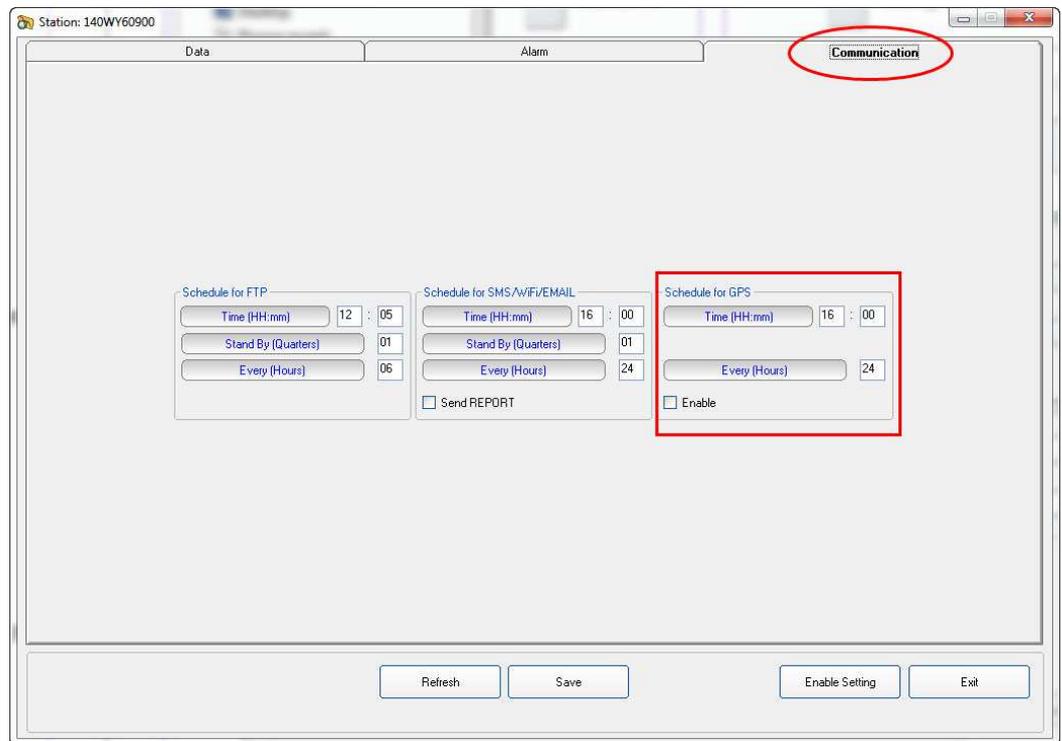


Fig. 4-12 Schedule for GPS frame



Please refer to §3.17 of this manual for further information of using Schedule for GPS function

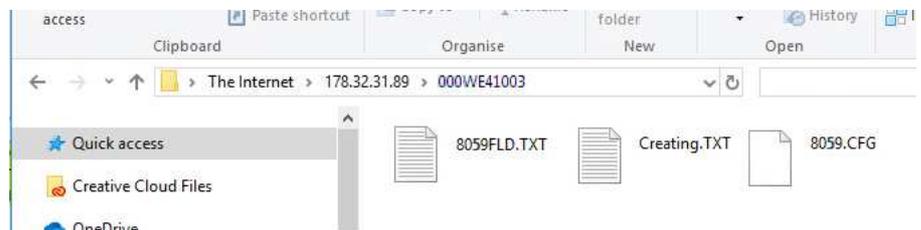
After all three sections, Data, Alarm and Communication are set as desired, hit the **Save** button, on the bottom side to store your settings.

A **.CFG** file will be created in the station folder within the ftp server. It will be read by the station, when accessing the server, to set itself as requested.

Hit **Exit** to come back to the 8059SW-02 main window.



The existence of 8059.CFG file can be checked by accessing the station folder, in the ftp server, through the Windows Explorer:



14) If the station is equipped with GSM modem, switch it OFF and insert the SIM card as follows:



Fig. 4-13 SIM card installation

15) Switch the station ON

Now you have to force the first connection between the AMB-8059 and the FTP server sending a SMS with a mobile phone as follows:

#BM?IDN(space)password*(space)#BMSCGN*

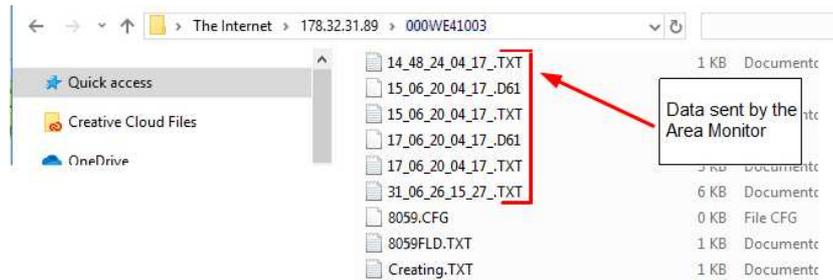
Where:

- **(space)** means you have to leave a space
- **password** is the Device Password (see §3.4.3 and §3.4.3.1). As default is PASSPMM.

In this case, with factory settings, the message will be:

#BM?IDN PASSPMM* #BMSCGN*

Here an example about what you should have on your FTP server:



As you can see the CFG file is 0 kB; this means that the area monitor has correctly taken the settings and is ready to work in total autonomy.

We strongly suggest to avoid free FTP storing services in general because of the many limitations and poor stability they exhibit. Overall features are not sufficient to guarantee a completely automatic system as Narda monitoring station.

Free web-hosting services are used to offer only passive FTP communication, whereas Narda monitoring station is designed for active FTP communications. Free web-hosting services have normally a limited number of connections (per time). This limitation, more often than not, stops FTP communication in the middle of data up- and down-load even on the same TCP session between the server and the same client. Free web-hosting services, often, exhibit very long reply times which trigger Narda monitoring station TO procedures.

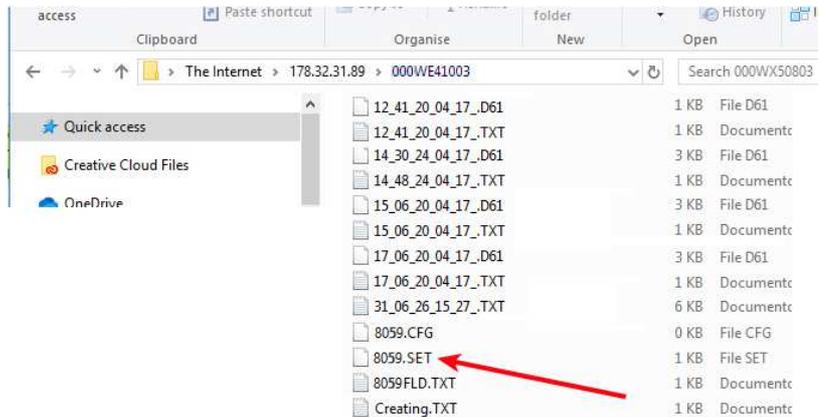
To try Narda monitoring stations and setup a first working setup, we can provide you FTP space on our private server. However, for a future actual installation, you will need to arrange your own FTP server without the above mentioned limitations.

NOTICE

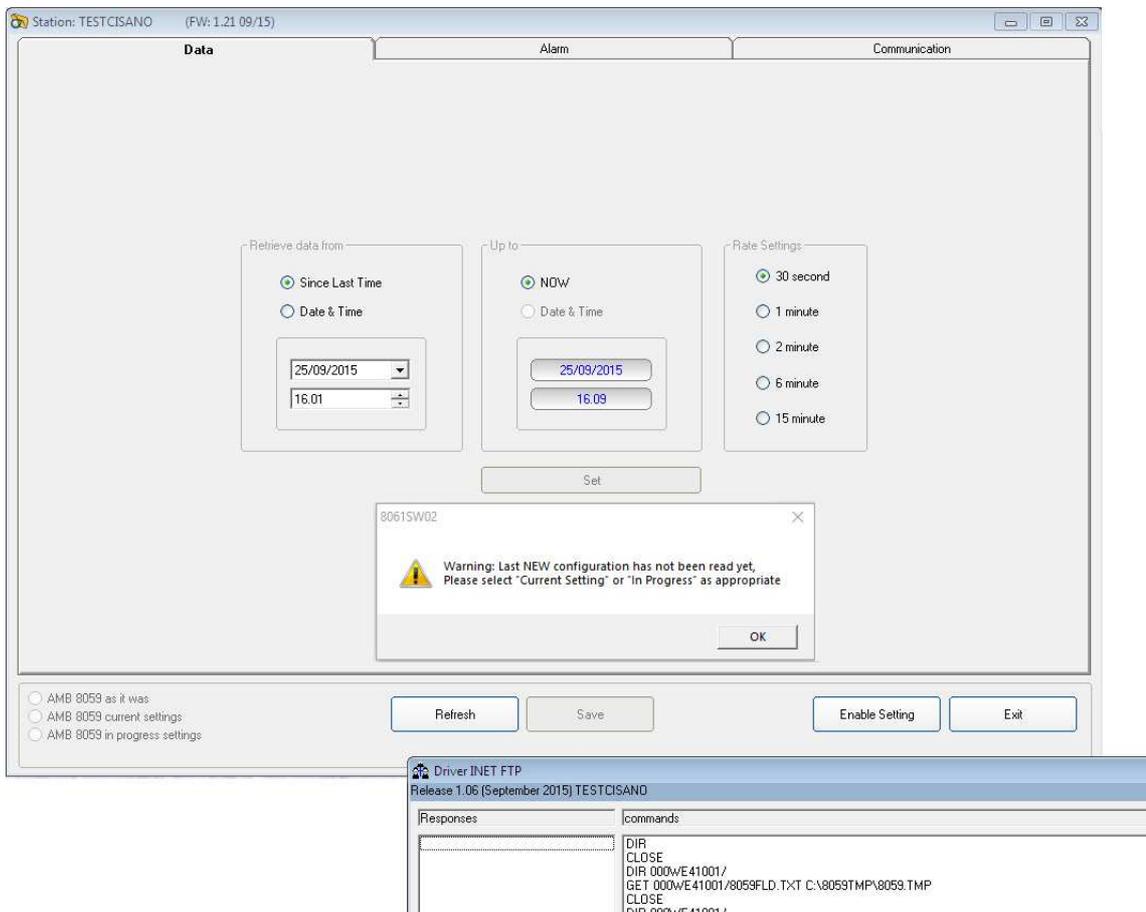
Everytime a new setting is changed, the .CFG file will be modified and it will be read by the station, when accessing the server, to set itself as requested. The area monitor change its internal settings and at the end it will leave a new file called 8059.SET. This new file is used by the software to show the last area monitor settings.



The existence of 8059.SET file can be checked by accessing the station folder, in the ftp server, through the Windows Explorer.



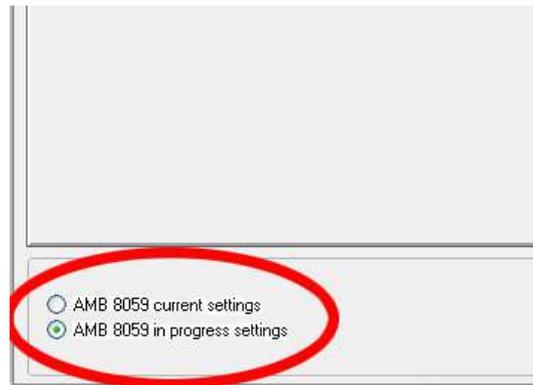
In case the .CFG file has been modified and the station is called before accessing to the server as modem schedule, it will be displayed the following warning message.



The message informs that the new configuration has not been stored in the station yet. Confirm with **OK**.

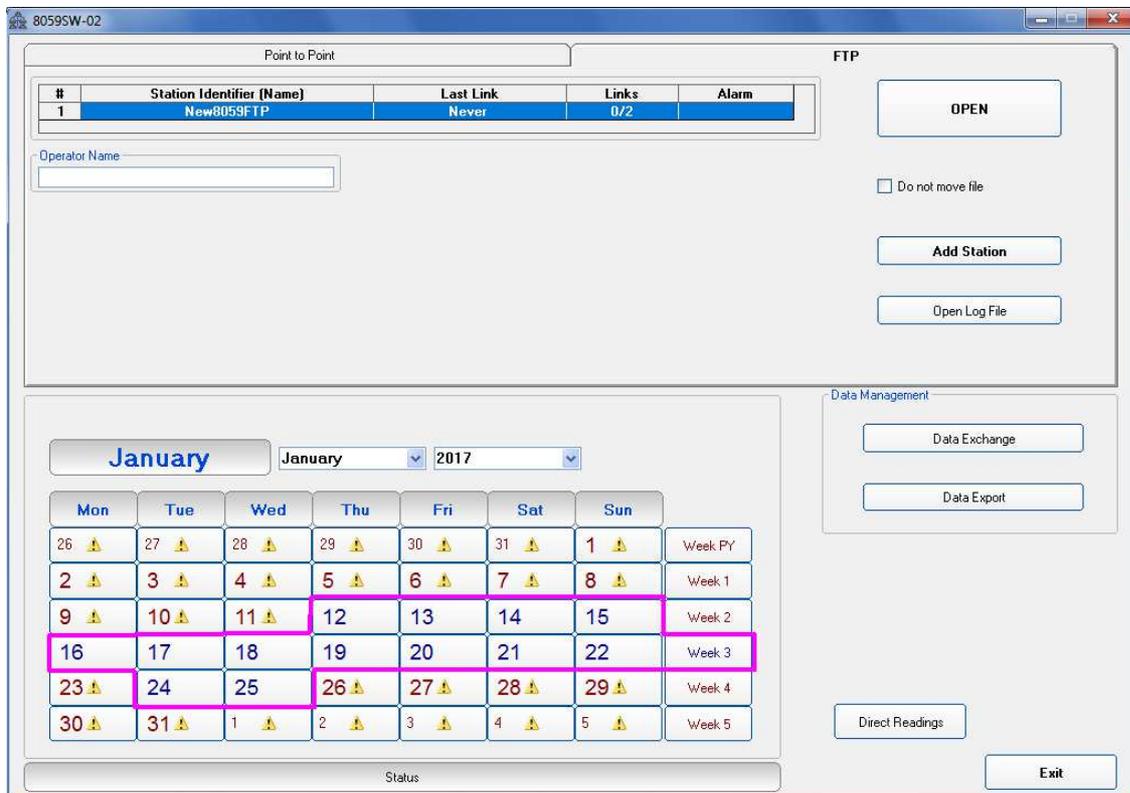
AMB-8059 currents settings and **AMB-8059 in progress settings** function are enable on the left bottom of each section.

The software allow reading the current settings (**AMB-8059 currents settings**) or the settings that are going to be store at the next modem connection (**AMB-8059 in progress settings**).

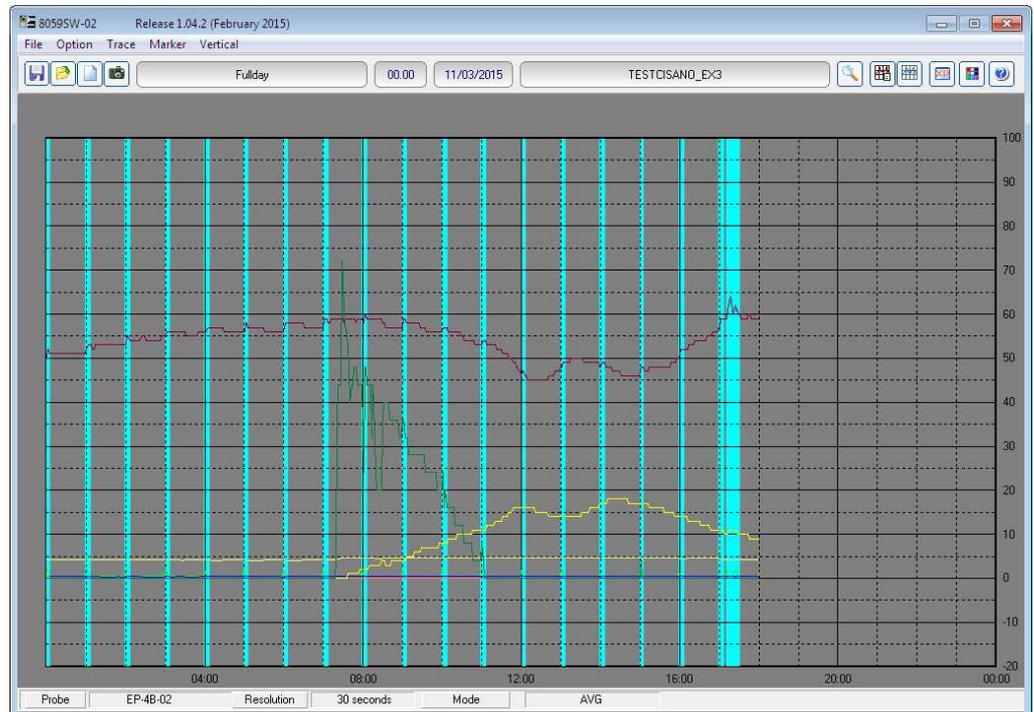


18) Displaying measurement results

After all automatic tasks have been completed and the bottom bar shows no operation, hit **Exit** to go back to the main window. If some data have been downloaded, the calendar will show the related day number coloured in blue, showing that some data is available.



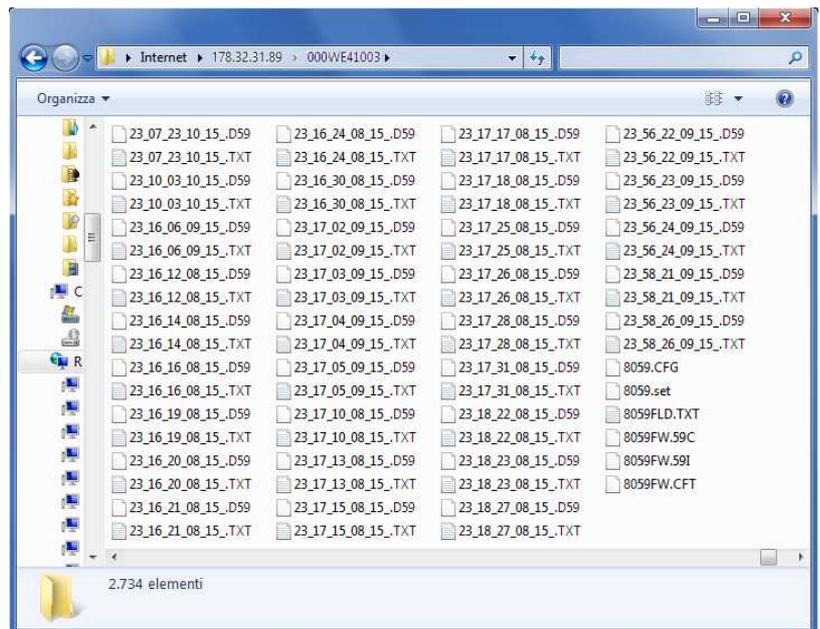
Hit the blue day in the calendar to open a graph showing downloaded data.



Please refer to the chapter 3 of this manual for details regarding data presentation, saving and related commands (see §3.22, §3.23, §3.24, §3.25, §3.26, and §3.27).

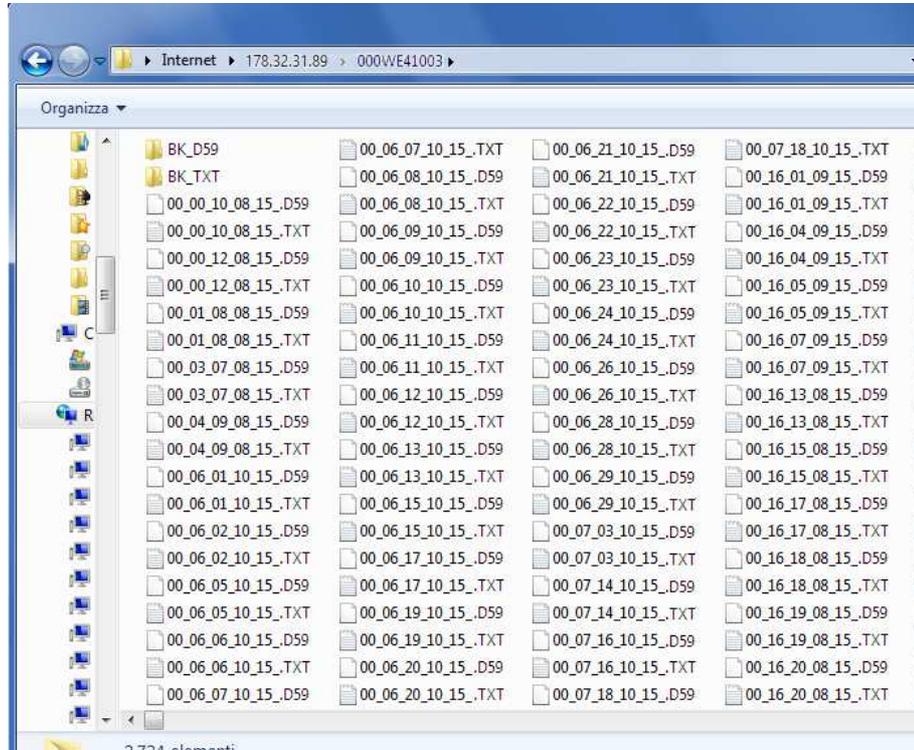


It is possible to check whether some new data is present in the station folder by accessing it using Windows Explorer. Two different kind of data file are downloaded at each connection: files with .txt extensions contains all Events related to the station, file with extension .D59 contains measurement result in binary format.



Do not move file

If the function “Do not move file” is disabled, all data already downloaded to the controller PC are transferred to back-up folders (one for the .txt files, one for the .D59 ones) and will not be available for a future download even from different station.



4.6 AMB-8059 Firmware updates in FTP mode

Whenever a new software / firmware version is released it is available in our Web site for free downloading.

The new software includes the remote station firmware and commands to update it.

The station firmware can be updated by connecting the station to the controller PC via serial port. Once the communication has been successfully established with the program 8059SW-02, press the **Execute** button (see §3.12.7).

The firmware update can be performed also for remotely situated stations both via Point-to-point wireless connection, or via FTP (depending on service availability and station setting).

To update a station working in FTP mode, please copy the firmware files, called **8059FW.59I**, **8059FW.59C** and **8059FW.CFT**, in the station's folder present on the FTP server.

Firmware files are normally located in the installation folder (for example **C:\Program Files (x86)\8059NSTS** default directory)

Now, it is possible sending the command **CGNFW** or **CGNFWI** via SMS, in agreement with the modem programming, to have the station updated.

In order to achieve the remote update for the stations working in FTP mode via WiFi, it is necessary to have previously configured the network for WiFi Over IP Point-to-point connections.

5 – Command protocol

5.1 Introduction

This chapter provides information about the communications protocol of the AMB-8059 Multi-band EMF Area Monitor via mobile phone using SMS (Short Message System) or through RS232, USB, Ethernet by means of Windows Hyper Terminal or similar applications.

Every monitoring station equipped with GSM modem can be reached by any GSM mobile phone and the commands sent via SMS will enable the User to change the settings or query various functions of the station.

The commands have the following general format:

#BMQcommand(parameters)* where:

= opens the command string;

BM = string always included;

Q = ? for query commands;

S for setting commands ;

Command = command string;

(parameters) = value of setting parameters (if any);

* = closes the command string.

The commands available via SMS message are divided into three main categories:

- **Query COMMANDs;**
- **Setting COMMANDs;**
- **Modem COMMANDs.**



Expect of “EVN”, “EVNL” and “EVNR” (not present on SMS) all the commands are available on SMS, Modem, RS232, USB, Ethernet.



Every SMS sent to the AMB-8059 must contain as a first command the invitation to authenticate the device password. This is to protect the station for undesired access.

Therefore every SMS, to be processed correctly, must start with the string:

#BM?IDN psw*

Where psw is the device password set for the station (the default password is PASSPMM).

Example: to request the last reading (average value) the SMS message to be sent to the AMB-8059 with the password set by the factory is as follows:

#BM?IDN PASSPMM*#BM?LFA*



Any command sent via RS232, USB, Ethernet immediately rouses the microcontroller. However, because of the peculiarity of the stop status, in this case the command is lost and must be sent again in order to be carried out. This is done automatically by the 8059SW-02 software and should be taken into consideration by the User in developing any custom software.

Obviously, this does not occur in case of commands issued via SMS or in case of connection via modem, as the microcontroller is always on when the GSM is on stand-by.

5.2 List of commands

Query COMMANDS

Syntax	Function
#BM?2BS*	Request the reference standard (for EHP-2B model probe only).
#BM?ALR*	Request alarm threshold.
#BM?AQ_*	Request actual acquisition mode setting.
#BM?BAT*	Request battery voltage status.
#BM?CIMI*	Request the International Mobile Subscriber Identity (IMSI)
#BM?CLK*	Request complete internal clock.
#BM?COM*	Request AMB-8059 communication mode
#BM?CPIN*	Request the SIM card PIN's status.
#BM?CSQ*	Request the modem signal strength (RSSI) and the bit error rate (BER) value.
#BM?DML*	Request current EMAIL setting(s).
#BM?EVN*	Request record of all events.
#BM?EVNL*	Request record of latest 20 events.
#BM?EVNR*	Request record of events since last reading.
#BM?FTP*	Request FTP status
#BM?GCS*	Request internal clock updating mode
#BM?GPS*	Request latest NMEA RMC sentence revealed.
#BM?GPX*	Request GPX file (for AMB-8059/00 only)
#BM?HSM*	Request the High Sampling mode status
#BM?HFTP*	Request User, Password and IP address hidden status on the RS232 port sniffer
#BM?MBR*	Request all records stored in the mobile mass storage (for AMB-8059/00 only)
#BM?MDM*	Request Modem status
#BM?IDN psw*	Request ID.
#BM?IDNF psw*	Request extended ID.
#BM?LFA*	Request latest average value.
#BM?LFAS*	Request latest average value of the primary and secondary probe.
#BM?MES*	Request instantaneous (not averaged) field value.
#BM?MESRv*	Request instantaneous field value (continued) (for AMB-8059/00 only)
#BM?MSK*	Request alarm screen.
#BM?PRB*	Request field probe data.
#BM?RPT*	Request report.
#BM?RPT0*	Request report with reset.
#BM?STA*	Request alarm status.
#BM?SWI*	Request Wifi scheduling setting
#BM?TDM*	Request complete modem phone list.
#BM?TDMn*	Request single modem phone number.
#BM?TDS*	Request complete SMS phone list.
#BM?TDSn*	Request single SMS phone number.
#BM?TMP*	Request temperature.
#BM?TSE*	Request schedule programmed settings for Ethernet
#BM?TSG*	Request schedule programmed settings for GPS.
#BM?TSM*	Request schedule programmed settings for modem.
#BM?TSS*	Request schedule programmed settings for SMS.
#BM?WMEf*	Request the Electric and Magnetic field value in % (for EHP-2B model probe only).
#BM?WRN	Request warning threshold.

Setting COMMANDs

Syntax	Function
#BMS2BS (parameters)*	Set the reference standard (for EHP-2B model probe only)
#BMSAA (parameters)*	Set the primary or secondary probe (for Dual-probe configuration only)
#BMSALR (parameters)*	Set alarm threshold.
#BMSAQ (parameters)*	Set acquisition mode.
#BMSATH*	End communication in progress.
#BMSATH0*	End communication in progress + modem.
#BMSAVG (parameters)*	Set averaging time.
#BMSCLD (parameters)*	Set clock date.
#BMSCLT (parameters)*	Set clock time.
#BMSCNL (parameters)*	Enable deferred call.
#BMSCOM (parameters)*	Set AMB-8059 communication
#BMSDIC*	Disable to calls.
#BMSDIE*	Disable the Ethernet
#BMSDIG*	Disable the GPS.
#BMSDIR*	Disable to send reports.
#BMSDMO*	Set MODEM disable function
#BMSEEM*	Enable the command to delete the GPS records
#BMSENC*	Enable to calls.
#BMSENE*	Enable the Ethernet
#BMSENG*	Enable the GPS.
#BMSENR*	Enable to send reports.
#BMSERM*	Permanently delete the GPS records (for AMB-8059/00 only)
#BMSETH*	End and switch the Ethernet off.
#BMSGCS (parameters)*	Set internal clock updating mode
#BMSGOI*	Switch the GPS on.
#BMSGOIF*	Switch the GPS on + SMS.
#BMSHFT (parameters)*	Show or hide User, Password and IP address on the RS232 port sniffer
#BMSHSM (parameters)*	Enable or disable the High Sampling mode
#BMSIDN (parameters)*	Set station ID
SMBE	End the mobile acquisition in progress (for AMB-8059/00 only)
SMBSv	Start mobile data acquisition and storage (for AMB-8059/00 only)
SMPA	End storing data (for AMB-8059/00 only)
#BMSMSK (parameters)*	Set alarm screen.
#BMSPSW (parameters)*	Save new Password.
#BMSRST*	Restore Default configuration.
#BMSRSTR*	Restore default configuration and storing rate.
#BMSSWI (parameters)*	Set remote access mode or enable/disable Wifi connection
#BMSTDMn (parameters)*	Set modem phone number.
#BMSTDSn (parameters)*	Set SMS phone number.
#BMSTSE*	Set programmed schedule for Ethernet
#BMSTSG*	Set programmed schedule for GPS.
#BMSTSM (parameters)*	Set programmed schedule for modem.
#BMSTSS (parameters)*	Set programmed schedule for SMS.
#BMSWRN (parameters)*	Set attention threshold.

FTP-GPRS Setting COMMANDS



NOTE

Username and Password must only contain alphanumeric characters; any special characters are not allowed.

Syntax	Function
#BMSGPR0 (parameter)*	Set Access Point Name for GPRS.
#BMSGPR1 (parameter)*	Set User Name for GPRS access network.
#BMSGPR2 (parameter)*	Set Password for GPRS access.
#BMSGPR3 (parameter)*	Set User Name for FTP access server.
#BMSGPR4 (parameter)*	Set Password for FTP access.
#BMSGPR5 (parameter)*	Set IP Address of the FTP server.
#BMSGPR6 (parameter)*	Set Access Point Name
#BMSGPR7 (parameter)*	Set Password for Wifi access to the Internet
#BMSGPR8 (parameter)*	Set Private IP address
#BMSGPR9 (parameter)*	Set IP port of AMB-8059 Station
#BMSGPRA (parameter)*	Set PSA2-PSK password of the AMB-8059 station Wifi access point
#BMSCGN*	Start a GPRS connection and access the FTP server.
#BMSCGNA*	Start a GPRS connection, access the FTP server and upload txt file including all events available.
#BMSCGNFW*	Start a GPRS connection with update firmware and reboot.
#BMSCGNFWI*	Start a GPRS connection with update firmware and reboot without uploading any records.
#BMSCGNL*	Start a GPRS connection, access the FTP server and upload txt file including last 20 events.
#BMSNETD*	Set the station to the Point-to-point communication mode.
#BMSNETE*	Set the station to the FTP communication mode.
#BMSSTS (parameter)*	Set the internal Real Time Clock by using the SMS provider's information.

FTP-GPRS Query COMMANDS



NOTE

Username and Password must only contain alphanumeric characters; any special characters are not allowed.

Syntax	Function
#BM?GPR0*	Request Access Point Name for GPRS
#BM?GPR1*	Request User Name for GPRS access network
#BM?GPR2*	Request Password for GPRS access
#BM?GPR3*	Request User Name for FTP access server.
#BM?GPR4*	Request Password for FTP access
#BM?GPR5*	Request IP Address of the FTP server

EMAIL Setting COMMANDS



NOTE

Password must only contain alphanumeric characters; any special characters are not allowed.

Syntax	Function
#BMSDML1 (parameter)*	Set SMTP Server Port number.
#BMSDML2 (parameter)*	Set EMAIL account Password.
#BMSDML3 (parameter)*	Set SMTP Server IP Address.
#BMSDML4 (parameter)*	Set EMAIL account User name.
#BMSDML5 (parameter)*	Set Sender address.
#BMSDML6 (parameter)*	Set Recipient address.

5.3 Query COMMANDS

Using these commands the monitoring station can be queried with a series of requests to which the unit will respond with an SMS message containing the required information.

Query commands are characterized by the character ? in the string.

Command	Meaning	
?2BS (for EHP-2B model probe only)	Request the reference standard. The response returns the standard set to the EHP-2B model probe. Example #BM ?2BS* returns the response: #BM 2BS=1* which means that the EHP-2B model probe is set to Standard 2.	
?ALR Alarm	Request ALARM threshold. The response returns the threshold in the current unit followed by the average time (in minutes) on which it is calculated. In case of using DualBand Electric and Magnetic probe, the answer returns the alarm threshold of the Electric field referred to the reference standard ICNIRP 2020 OCC (for EHP-2B-03 and 04) or ICNIRP98 OCC (for EHP-2B-01 and 02). In case of Dual-probe configuration, the answer is related to the threshold of the primary probe.	#BM ALR= 6.0; 6*
?AQ_	Request current acquisition mode setting. The response is given in the following format: #AQ_LTR* where: L is an index that goes from 0 to 4 and represents the rate of storing as follows" "0" = 30 seconds "1" = 1 minute "2" = 2 minutes "3" = 6 minutes "4" = 15 minutes T indicates an internal status and is not significant for any purpose R expresses the type of average used A= AVG; R=RMS Example #BM ?AQ_* returns the response: #BM AQ_=40A* which means that the station is storing data every 15 minutes and the average is AVG.	
?BAT (battery)	Request Battery Voltage Status. The response indicates the voltage in VOLT and hundredths of VOLT in the format: #BM BAT=V.vv*	#BM BAT=4.10*
?CIMI (IMSI)	Request the value of the International Mobile Subscriber Identity (IMSI) stored in the SIM Card. The response in the format " #BM CIMI xxxxxxxxxxxx* ". If the SIM is not inserted, the command returns ERROR.	Query: " #BM?CIMI " Reply: #BM CIMI=450050209516643*

<p>?CLK (clock)</p>	<p>Request complete clock. The response returns the time in the format: #BM CLK:HH.mm.ss;DD.MM.YY* H = hour m = minutes s = seconds D = days M = Month Y = Year</p> <p>#BM CLK:20.02.09;19.10.00*</p>	
<p>?COM</p>	<p>Request the type of 8059's communication The response in the format "#BM COM=<s>" Where <s> can be either - M: Modem communication. - W: Wifi Communication</p>	<p>Query: "#BM?COM" Reply: "#BM COM=M"</p>
<p>?CPIN</p>	<p>Request the SIM card PIN's status. The response in the format #BM +CPIN: SIM <s>* Where <s> can be either - READY: contains the last string obtained by the "AT+CPIN?" command sent to the modem - PIN: PIN is present - PUK: wrong PIN entered three times</p>	<p>Query: "#BM?CPIN"</p> <p>Reply: #BM +CPIN: SIM READY</p> <p>Reply: #BM +CPIN: SIM PIN</p> <p>Reply: #BM +CPIN: SIM PUK</p>
<p>?CSQ</p>	<p>Request the modem signal strength (RSSI) and the bit error rate (BER) value. The value is related to the last modem connection (for AMB-8059/02 and AMB-8059/03 only).</p> <p>The format is: #BM CSQ= x,y (dd/mm/yy hh:mm:ss)*</p> <p>The first value x indicates the modem signal strength (RSSI): 0: -113 dBm or less 1: -111 dBm 2...30: -109... -53 dBm 31: -51 dBm or greater 99: Not known or not detectable (or RSSI [dBm] = -113 + RSSI [id] *2)</p> <p>The second value y indicates the bit error rate (BER): 0: Less than 0,1 % 1: 0,26 % to 0,30 % 2: 0,51 % to 0,64 % 3: 1,0 % to 1,3 % 4: 1,9 % to 2,7 % 5: 3,8 % to 5,4 % 6: 7,6 % to 11,0 % 7: Greater than 15,0 % 99: Not known or not detectable</p> <p>The (dd/mm/yy hh:mm:ss) indicates Date and Time of the measured RSSI and BER value.</p> <p>Example #BM ?CSQ * returns the response: #BM CSQ= 4,99 (24/04/18 14:11:45)*</p>	

?DMLx	<p>Request current EMAIL setting(s); the value x indicates:</p> <p>1: SMTP server Port number. 2: EMAIL account password. 3: SMTP server address. 4: EMAIL account user name. 5: Sender address. 6: Index (from 1 to 4) and recipient address separated by the semicolon ';' character; the dot "--" means the field is empty A: All settings are shown.</p> <p>Example #BM?DMLA* returns the response: DML1=587 DML2=MyPsw123 DML3=smtp.servername.it DML4=uname@servername .it DML5=uname@servername .it DML6=1;dst1@yahoo.it DML6=2;dst2@gmail.com DML6=3;--- DML6=4;---</p> <p>Example #BM?DML6* returns the response: DML6=1;dst1@yahoo.it DML6=2;dst2@gmail.com DML6=3;dst3@yahoo.com DML6=4;dst4@virgilio.it</p> <p>In case the SHFTP is set to 1 (Hide), the DML2 field is replaced by "@@@". Example #BM?DML2* with SHFTP hidden returns the response: DML2=@@@</p>
?EVN	<p>Request record of events. The response returns the complete list of all events recorded by the unit. The terminator is #BM END_EVENTS* This command does not return any data in SMS mode but only the terminator feedback EVN N/A on SMS.</p>
?EVNL	<p>Request record of latest 20 events. The response returns the list of the latest 20 events recorded by the unit. The terminator is #BM END_EVENTS* This command does not return any data in SMS mode but only the terminator feedback EVN N/A on SMS.</p>
?EVNR	<p>Request record of events not yet read. The response returns the complete list of all events recorded by the station since the last reading. The terminator is #BM END_EVENTS* This command does not return any data in SMS mode but only the terminator feedback EVN N/A on SMS.</p>
?FTP	<p>Request of internal code related to the last FTP status. The response in the format #BM FTP=x*, where <x> is the internal code Example #BM ?FTP* returns the response: #BM FTP=2 (start sequence)</p>

?GCS	<p>Request the internal clock updating mode. The response in the format: #BM GCS=M* the internal clock updating is set in <u>manual</u> mode by commands (see SCLT e SCLD). or #BM GCS=A:x* the internal clock updating is set by GPS; x represents the time zone (the value is from -12 to +12)</p>
?GPS	<p>This query command #BM?GPS* requests the latest RMC NMEA phrases (NMEA 0183 ver 3.01) detected by the internal GPS module. RMC NMEA strings are reported in full, starting with \$GPRMC and/or \$GNRMC, and ending with the checksum followed by CR LF. When a position has not yet been acquired, the reply is:-----VOID Example of reply: \$GPRMC,154452.000,A,4404.4843,N,01047.9412,E,0.28,152.18,270122,,A*6E The format for NMEA coordinates is ddmm.mmmm (d=degrees and m=minutes); The NMEA degrees minutes can be convert to decimal degree as follows: 4404.4843 → Take the NMEA Latitude position. 0.4843 * 60 = 29.058 → Multiply by 60 the NMEA Latitude second part. 440429.058 → The product is added to the NMEA Latitude first part for making 6 digits long first part. 04 * 60 = 240 → Take the second two digits of the first part and multiply by 60. (240+29.058)/3600 = 0.074738 → The product is added to the last first part and the total divided by 3600. 44+0.074738 → Add the result to the first two digits. The total is Latitude expressed in decimal degree.</p>
?GPX (for AMB- 8059/00 only)	<p>The response returns a file in GPX format. It starts with </gpx> string and includes an header with station name and serial number, probe name and date of calibration, full date of acquisition and others fixed information as brand, website address and acquisition mode. Example of header:</p> <pre> <?xml version="1.0" encoding="UTF-8" standalone="no"?> <gpx xmlns="" xmlns:xsi="" xsi:schemaLocation="" version="1.1" creator="Narda Italy ,mobileProva"> <metadata> <name>Electromagnetic Measurements</name> <desc> Station Name:mobileProva Station S/N:030WX50807 Probe:EP-3B-01 Calibrated:14.09.15 </desc> <author> <name>Narda Italy ; mobileProva ;030WX50807</name> <link href="http://www.narda-sts.it/narda/default_it.asp"> <text>Narda Italy</text> </link> </author> <link href="http://www.narda-sts.it/view?t=GEIF"> <text>Narda Italy</text> </link> <time>2016-10-12T00:18:45Z</time> <keywords>8059 Narda mobileProva 030WX50807</keywords> </metadata> </pre> <p>The file also includes the latitude and longitude expressed in decimal degrees (dd.ddddd°), date and time of acquisition (Zulu), field information, speed (m/s), the acceleration from 3 axes (g), temperature (°C), relative humidity (%) and battery voltage (V). Each waypoints is marked by a circle whose radius and colour are directly proportional to the field value measured.</p> <pre> <wpt lat="43.685432" lon="10.799096"> <ele></ele> <time>2018-03-16T08:29:47Z</time> <name>WB: 3.02 V/m</name> <desc> Speed: --- g: 0.07;0.06;0.03 Temp: 22 C Rh: 48 % Batt: 3.49 V </desc> <symbol>circle</symbol> <color>#00007F</color> <radius>2</radius> </wpt> </pre> <p>The file ends with </gpx> string.</p>

?HFTP	<p>Request User, Password e IP address (FTP mode) and Passwords (Wifi mode) hidden status on the RS232 port sniffer.</p> <p>0: User, Password e IP address are shown on RS232 sniffer.</p> <p>1: User, Password e IP address are hidden on RS232 sniffer. In FTP communication mode the command and feedback response are replaced by “@@@”. This status also affects ?GPR3, ?GPR4, ?GPR5, ?GPR7, e ?GPRA commands.</p>
?HSM	<p>Request High Sampling mode status. When enable, The response in the format #BM HSM=x*, Where <x> can be either:</p> <p>0: High Sampling mode OFF</p> <p>1: High Sampling mode ON</p> <p>Example #BM ?HSM* returns the response: #BM HSM=1*</p>
?IDN psw (Identity)	<p>Request of ID with authentication of the password to enable commands. The subject “psw” must be the Device Password saved in the monitoring station using the command SPSW to enable the communication when the unit is not directly connected via RS232, USB, Ethernet. Any spaces entered between the IDN string and the password string are ignored: at least one space must be entered.</p> <p>The response of the unit contains the ID followed by the serial number as follows: #BM IDN=NAME;Serial No*</p> <p>Where Name is the ID string saved with the command #BMSIDN and Serial No. is an alphanumeric string that distinguishes the field monitor (serial number).</p> <p>When receiving a command like the following #BM?IDN PASSPMM* first the unit verifies that the Password PASSPMM in the command is the same previously memorized in the unit (see the command SPSW), then it returns the expected string if:</p> <ul style="list-style-type: none"> • It is connected directly via RS232, USB, Ethernet regardless of the correctness of the password • It is connected via modem and the password has been successfully verified • It is receiving a command via SMS and the password has been successfully verified (in this case all succeeding commands in the same SMS will be accepted as well). <p>The expected response string of the example is #BM IDN= Via_Marconi; 0987654321* and it provides the serial number “09876564321” and the ID “Via_Marconi”.</p> <p>If the Password is incorrect (although required) the response string is: #BM DENIED*.</p> <p>Since the SMS commands are recognize after the control of the Password, this command should be used instead of ?IDNF because using less characters. Indeed, the IDNF answer will use almost all the 160 characters allowed for a single SMS and would therefore be impossible to read and recognize the following commands.</p>

<p>?IDNF psw (Identity)</p>	<p>Request of ID with authentication of the password to enable commands. The subject "psw" must be the Device Password saved in the monitoring station using the command SPSW to enable the communication when the unit is not directly connected via RS232, USB, Ethernet. Any spaces entered between the IDN string and the password string are ignored. At least one space must be entered.</p> <p>The response of the unit contains the ID followed by:</p> <ul style="list-style-type: none"> • brand (Nsts), model and release of firmware • Serial number of the unit • Date of latest calibration • Originate call: ON or OFF (Point-to-point mode) or NET (FTP mode) • Time and frequency of MODEM start 1 (for non-SMS calls) • Transmission of the report via SMS or EMAIL ON or OFF • Time and frequency of MODEM start 2 (for non-SMS calls) • Alarms currently on (not masked) <p>The format is: #BM IDN= NAME ;Nsts,Model; R.rr MM/YY;Serial No.;dataprobe;ON OFF HH:mm (Xq) each Yh; ON OFF HH:mm (Xq) each Yh;ALARM;*</p> <p>Where: Name is the ID string saved with the command #BMSIDN Model is the Station model R.rr is the release version and MM/YY the date of the firmware. Serial No. is an alphanumerical string that distinguishes the unit (serial number) Dataprobe is the date of the latest calibration in the format dd.MM.YY (day.month.year)</p> <ul style="list-style-type: none"> • First interval <p>ON OFF only one of the two strings is present to indicate whether the incoming call is enabled or not HH:mm (Xq) each Yh displays the MODEM start schedule, exactly as in the command #BM?TSM*</p> <ul style="list-style-type: none"> • Second interval <p>ON OFF only one of the two strings is present to indicate whether the transmission of the report via SMS or EMAIL is enabled or not HH:mm (Xq) each Yh displays the MODEM start schedule, exactly as in the command #BM?TSS*</p> <p>ALARM displays the status of the alarms in progress (not masked) in symbolic mode as in the command #BM?ALR*</p> <p>When receiving a command like the following #BM?IDNF PASSPMM* first the unit verifies that the Password PASSPMM in the command is the same previously memorized in the unit using the command SPSW, then it returns the expected string if:</p> <ul style="list-style-type: none"> • It is connected directly via RS232, USB, Ethernet regardless of the correctness of the password • It is connected via modem and the password has been successfully verified • It is receiving a command via SMS and the password has been successfully verified (in this case all succeeding commands in the same SMS will be accepted as well). <p>The expected response string of the example is #BM IDN= TESTCISANO_EX3;Nsts,AMB-8059; 1.00 11/14; 000WE41003; 10.10.14;ON 02:00 (1q) each 24h;-----;* It identifies the field monitor Nsts model AMB-8059 (for AMB-8059/03) or AMB-8059/00/01/02 for others models; serial number 000WE41003; Firmware released in November 2014, Version 1.00; Date of latest calibration October 10, 2014; Programmed time to switch on the modem set at 02:00 for fifteen minutes only once a day; Call by unit enabled. No alarms active. If the Password is incorrect (although required) the response string is: #BM DENIED*</p> <p> NOTE If the #BM?IDNF psw* is sent with the command ?TDS, the expected response string is more than 160 characters allowed and the command returns the following message error: "CMS ERROR 305 Invalid text mode parameter."</p>
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<p>?LFA[S]</p>	<p>Request latest average value. The response returns the average value with the current unit followed by the time (in minutes) on which it has been calculated (the same indicated in the command ALR).</p> <p>In case of using DualBand Electric and Magnetic probe, the response shows the value of the both field expressed in %.</p> <p>In Dual-probe configuration the command ‘?LFAS’ shows the value of the primary and secondary probe.</p> <p>Example #BM ?LFA* returns the response: #BM LFA=1.23 V/m; 6* which means that the average of the last 6 minutes is 1,23 V/m</p> <p>Example #BM ?LFA* returns the response (DualBand Electric and Magnetic probe) #BM LFA=3.97; 2.78;%;6* which means that the average of the last 6 minutes are 3.97% and 2.78% of the reference standard.</p> <p>Example #BM ?LFAS* returns the response (Dual-probe configuration): #BM LFA=1.23 V/m; 6; 0.868 uT* which means that the average of the last 6 minutes are 1.23 V/m and 0.868 uT.</p>
<p>?MBR (for AMB- 8059/00 only)</p>	<p>Request all records stored in the Mobile mass storage.</p> <p>The answer is a block of binary data. This file is much lighter than GPX one and can be downloaded in roughly a sixth of the time required for downloading the GPX counterpart. The maximum time (related to the maximum length of recording) is roughly 30 minutes.</p>
<p>?MDM</p>	<p>Request Modem status</p> <p>The response in the format #BM MDM=x*, Where <x> can be either:</p> <ul style="list-style-type: none"> - 0: modem or Wifi OFF - 1: modem or Wi-Fi in activation process - 5: modem 2G is activated (may not be connected to the network but it works and ready to receive commands) - 6: modem 3G/4G is activated (may not be connected to the network but it works and ready to receive commands) - 7: WiFi is activated (may not be connected to the network but it works and ready to receive commands) <p>Example #BM ?MDM* returns the response: #BM MDM=0*</p> <p>Example #BM ?MDM * returns the response: #BM MDM=6*</p>

<p>?MES</p>	<p>Request instant value (not averaged) of field. This command requests the elementary value for each band in the format:</p> <p>SingleBand Probe:</p> <ul style="list-style-type: none"> • #BM MES=W.WW; V/m* where: • W.WW field probe value • V/m Label Unit of measurement <p>DualBand Electric and Magnetic probe:</p> <ul style="list-style-type: none"> • MES=E.EE;H.HH;%; where: • E.EE electric field probe value • H.HH magnetic field probe value • % Label Unit of measurement <p>Triband Probe:</p> <ul style="list-style-type: none"> • #BM MES=W.WW;L.LL;H.HH V/m* where: • W.WW is the wide band field probe value • L.LL is the low pass band field probe value (<862 MHz) • H.HH is the high pass band field probe value (>933MHz) • V/m Label Unit of measurement <p>Quadriband Probe:</p> <ul style="list-style-type: none"> • #BM MES=W.WW;A.AA;B.BB;C.CC V/m* where: • W.WW is the wide band field probe value • A.AA is the band1 field probe value (2140 MHz) • B.BB is the low pass band field probe value (1800 MHz) • C.CC is the low pass band field probe value (900 MHz) • V/m Label Unit of measurement <p>Dual-probe configuration:</p> <ul style="list-style-type: none"> • #BM MES=S.SS;W.WW; Unit_S, Unit_P* where: • S.SS field value of Secondary probe • W.WW field value of Primary probe • Unit_S* unit of Secondary probe • Unit_P unit of Primary probe <p>It should be noted that, due to the delay for data transfer from probe->unit->RS232, USB, Ethernet, the reading refers to the acquisition value of the previous sampling (minimum ≥ 3 seconds, maximum < 6 seconds).</p>
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<p>?MESRv</p> <p>(for AMB-8059/00 only)</p>	<p>Request instant value (not averaged) of field continuously. It requests the elementary value for every band as for the previous command “?MES” but enables continuous transfer of the elementary data as soon as they are available (1 second). It can be useful, for example, to record separately all the elementary data processed by the station; in this case the prefix “#BM” and the suffix “*” are omitted.</p> <p><u>SingleBand Probe:</u></p> <ul style="list-style-type: none"> • MES=W.WW;; V/m where: • W.WW field probe value • V/m Label Unit of measurement <p><u>DualBand Electric and Magnetic probe:</u></p> <ul style="list-style-type: none"> • MES=E.EE1;H.HH1;E.EE2;H.HH2;E.EE3;H.HH3;E.EE4;H.HH4;%; where: • E.EE1 electric field probe value • H.HH1 magnetic field probe value • E.EE2 electric field probe value • H.HH2 magnetic field probe value • E.EE3 electric field probe value • H.HH3 magnetic field probe value • E.EE4 electric field probe value • H.HH4 magnetic field probe value • % Label Unit of measurement <p>For EHP-2B-01 and EHP-2B-02 the value are listed as follows: ICNIRP98OCC, ICNIRP98GP, SC6CONTR, SC6UNCONTR. For EHP-2B-03 and EHP-2B-04 the value are listed as follows: ICNIRP2020OCC, ICNIRP2020GP, FCCCONTR, FCCUNCONTR.</p> <p><u>Triband Probe:</u></p> <ul style="list-style-type: none"> • MES=W.WW;L.LL;H.HH V/m where: • W.WW is the wide band field probe value • L.LL is the low pass band field probe value (<862 MHz) • H.HH is the high pass band field probe value (>933MHz) • V/m Label Unit of measurement <p><u>Quadriband Probe:</u></p> <ul style="list-style-type: none"> • MES=W.WW;A.AA;B.BB;C.CC V/m where: • W.WW is the wide band field probe value • A.AA is the band1 field probe value (2140 MHz) • B.BB is the low pass band field probe value (1800 MHz) • C.CC is the low pass band field probe value (900 MHz) • V/m Label Unit of measurement <p><u>Dual-probe configuration:</u></p> <ul style="list-style-type: none"> • MES=S.SS;W.WW; Unit_S, Unit_P* where: • S.SS field value of Secondary probe • W.WW field value of Primary probe • Unit_S* unit of Secondary probe • Unit_P unit of Primary probe <p>Following is the standard NMEA GPRMC and/or GNRMC string that reports the information:</p> <ul style="list-style-type: none"> • Time (Zulu) • Navigation receiver warning A = OK, V = warning • Latitude (deg. min North/South) • Longitude (deg. min East/West) • Speed over ground (Knots) • Course Made Good • Date (Zulu) • Magnetic variation (deg) • Mandatory checksum • Acceleration (g*590) • Temperature (°C) • Humidity (%) • Date and time of the station in the format: → DD/MM/YY HH:MM:SS* <p>The answer is: MES=0.27; ; ; V/m; 3.52V; \$GPRMC,083002.000,A,4341.1288,N,01047.9563,E,1.21,47.42,160318,,A*57; 467.00;198.00;105.00;21.98;49.42 →16/03/18 09:30:03*</p> <p>The NMEA degrees minutes can be convert to decimal degree (see ?GPS command). Note: To disable continuous transmission just send the command “?MES” . Note that when this command is enabled the absorption of the station, due to the full activity of the UART, is much greater than normal (~ 10 time greater). The temperature and humidity value are measured at one-minute interval and may change.</p>
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<p>?MSK (mask)</p>	<p>Request Status of Alarm SCREEN. The response returns a string with the relative alarms active in the format: #BM MSK=WwAaPpVvLIT MODEM SMS EML* The same symbols are used as for ?STA The string MODEM means the alarm is active on the MODEM function. The string SMS or EML means the alarm is in progress on the SMS or EMAIL function</p> <p>#BM?MSK* Risposta #BM MSK---A----L--* #BM?MSK* Risposta #BM MSK---A----L—MODEM* #BM?MSK* Risposta #BM MSK---A----L—SMS* #BM?MSK* Risposta #BM MSK---A----L—EML* #BM?MSK* Risposta #BM MSK---A----L—MODEM SMS * #BM?MSK* Risposta #BM MSK---A----L—MODEM EML *</p>	
<p>?PRB (probe)</p>	<p>Request PROBE data. The response returns the probe model, latest calibration date, unit of measurement and divider in the format: SingleBand Probe:</p> <ul style="list-style-type: none"> #BM PRB=NAME:dd.MM.YY;unit:divider:range:minlevel:S * <p>DualBand Magnetic and Electric Probe:</p> <ul style="list-style-type: none"> #BM PRB=NAME:dd.MM.YY; unit:divider:range:minlevelE:minfreqE:maxfreqE:RangeH:minlevelH:minfreqH:maxfreqH:S <p>Triband Probe:</p> <ul style="list-style-type: none"> #BM PRB=NAME:dd.MM.YY;unit:divider:range:minlevel* <p>Quadriband Probe:</p> <ul style="list-style-type: none"> #BM PRB=NAME:dd.MM.YY; unit:divider:range:minlevelWide:4:minlevelSubBand* <p>Dual-probe configuration: answers related to the two probes connected are provided, in the same format as above, separated by the semicolon ‘;’ character.</p> <ul style="list-style-type: none"> #BM PRB=NAME:dd.MM.YY;unit:divider:range:minlevel:S;PRB=NAME:dd.MM.YY;unit:divider:range:minlevel:S * 	<p>In case of SingleBand Probe config.: #BM PRB=EP 330:13.09.00;V/m: 100.:300.:.3.*</p> <p>In case of DualBand Magnetic and Electric Probe configuration: #BM PRB=EHP-2B-03:12.09.22;%:10.00:1000.00:0.10:4.99:9250.00:1000.00:0.50:1.00:1000.00:S*</p> <p>In case of Triband Probe config.: #BM PRB=EP-3B-01:14.07.06;V/m: 100.00:200.00:0.20*</p> <p>In case of Quadriband Probe config.: #BM PRB=EP-4B-02:10.10.14;V/m: 100.00:200.00:0.25:4:0.02*</p> <p>In case of Dual-probe configuration: #BM PRB=HP-1B-01:24.12.10; uT : 100.: 180.: .04:S;PRB=EP 3TB: 24.12.10; V/m: 100.: 300.: .45:S*</p>
<p>?RPT (Report)</p>	<p>Request of data relative to max field recorded by latest reading and battery voltage at the time. The time and date of the event are supplied. For example, the command #BM ?RPT* returns the response MAX:0.70 V/m 18:08 28/10/00 Battery=4.10V*</p> <p>In case of Dual-probe configuration, the answer is related to the Secondary and primary probe: MAX:0.332 V/m 12:49 05/02/16 3.093 uT 12:48 05/02/16 Battery=4.10V*</p>	

<p>?RPT0 (Report & reset)</p>	<p>Request of data relative to max field recorded by latest reading and battery voltage at the time. The time and date of the event are supplied, but in addition, the stored value of the field is reset so as to start over for a new period. For example, the command #BM ?RPT0* returns the response MAX:0.70 V/m 18:08 28/10/00 Battery=4.10V*</p> <p>In case of Dual-probe configuration, the answer is related to the Secondary and primary probe: MAX:0.332 V/m 12:49 05/02/16 3.093 uT 12:48 05/02/16 Battery=4.10V*</p>	
<p>?STA (status)</p>	<p>Request Alarm Status. The response returns a string with the relative alarms in the format: #BM STA=AWLVPTCawlvp* A = threshold of ALARM exceeded W = threshold of Attention exceeded L = ALARM for tampering V = ALARM for low battery P = ALARM for PROBE malfunction (for HP-1B-01 only in dual probe configuration) T = ALARM for temperature C = ALARM for relative humidity a = threshold of ALARM regained w = threshold of Attention regained l = Tampering ALARM ended v = Battery ALARM ended p = PROBE ALARM ended the dot (.) means the specific alarm is not active #BM STA=A.V.....*</p> <p>In case of Dual-probe configuration, there is only the threshold of ALARM related to primary probe or secondary probe or both probes. The threshold of attention is not notified.</p>	
<p>?SWI</p>	<p>Request the WiFi scheduling setting The reply in the following format "#BM SWI=<s>" Where <s> can be either - I: Internet access scheduling On - A: wireless direct access scheduling On - O: off, no WiFi connection scheduling</p>	<p>Query: "#BM?SWI" Reply: "#BM SWI=I" The current WiFi scheduling is set on Internet Access Mode.</p>

<p>?TDM Telephone Directory Modem</p>	<p>Request MODEM phone list. The response returns the numbers, if any, or VOID in the following format (every number is separated by<LF>: #BM TDM= xxxxxxxxxxxx VOID *</p>	<p>#BM TDM= 1234568565 VOID ... VOID</p>
<p>?TDMn Telephone Directory Modem</p>	<p>Request MODEM phone no. (n may vary from 0 to 9). The response returns the number requested, if any, or VOID in the following format: #BM TDMn=xxxxxxxxxxxx* For example, the command #BM?TDM1* returns the response #BM TDM1=VOID*</p>	
<p>?TDS Telephone Directory SMS</p>	<p>Request SMS phone list. The response returns the numbers, if any, or VOID in the following format (every number is separated by <LF>: #BM TDS= xxxxxxxxxxxx void *</p>	<p>#BM TDS= 1234568565 VOID VOID*</p>
<p> NOTE</p>	<p>If the ?TDS is sent with the command #BM?IDNF psw*, the expected response string is more than 160 characters allowed and the command returns the following message error: "CMS ERROR 305 Invalid text mode parameter"</p>	
<p>?TDSn Telephone Directory Sms</p>	<p>Request SMS phone no. (n may vary from 0 to 9). The response returns the number requested, if any, or VOID in the following format: #BM TDSn=xxxxxxxxxxxx* For example, the command #BM ?TDS1* returns the response #BM TDS1=1234568565*</p>	
<p>?TMP (temp. and relative. humid.)</p>	<p>Request Temperature and Relative Humidity. The response returns the temperature in degrees Centigrade and the relative humidity in percentage. The format is: #BM TMP=tt,rh*</p>	<p>#BM TMP=22.75,20.5*</p>
<p>?TSE Time Schedule Ethernet</p>	<p>Ethernet set timing query. The format is the following: :#BM TSG= ON|OFF HH:mm each ee* where: HH.mm is the set time at which the Ethernet is switched on ee sets the number of hours on which the operation is repeated. Example #BM ?TSE* The answer is: #BM TSE=ON 12:00 each 24h* informing that Ethernet will be on at 12:00 and repeated every day.</p>	
<p>?TSG Time Schedule GPS</p>	<p>Request Time Schedule Settings for GPS. The format is as follows: #BM TSG= ON|OFF HH:mm each ee* where: ON|OFF indicates if the GPS is enabled or not; HH.mm expresses the starting time of the GPS. ee is the number of hours between every turn on For example, the command #BM ?TSG* returns the response: #BM TSG=ON 12:00 each 24h* which confirms that the GPS is started at 12:00 and will be repeated every 24 hours</p>	

<p>?TSM Time Schedule Modem</p>	<p>Request Time Schedule Settings for MODEM. The format is: #BM TSM=ON|OFF HH:mm (Xq) each Yh (DIS)* where: ON|OFF indicates if the call from the station to the controlling PC is enabled or not; HH.mm expresses the starting time of the modem (on and Stand-By). Xq expresses the time in Quarters of an HOUR that the MODEM is on (maximum 24 quarters of an hour). Yh expresses how often the operation must be repeated. (DIS) informs whether the disable command (see SDMO) is on. The lack of the string (DIS) indicates that the function is disabled and that the modem will therefore function correctly at the required time. For example, the command #BM ?TSM* returns the response: #BM TSM=OFF 14:53 (1q) each 24h* which confirms that the modem is started at 14:53 and will remain on for 15 minutes and this will be repeated every day.</p>	
<p>?TSS Time Schedule SMS</p>	<p>Request Time Schedule Settings for SMS. The format is as follows: #BM TSS=ON|OFF HH:mm (Xq) each Yh (DIS)* where: ON|OFF indicates if the call from the station to the controlling PC is enabled or not; HH.mm expresses the starting time of the modem/GSM (on and Stand-By). Xq expresses the time in Quarters of an HOUR that it is on (maximum 24 quarters of an hour). Yh expresses how often the operation must be repeated. (DIS) informs whether the disable command (see SDMO) is on. The lack of the string (DIS) indicates that the function is disabled and that the modem will therefore function correctly at the required time. For example, the command #BM ?TSS* returns the response: #BM TSS=OFF 12:00 (4q) each 24h* which confirms that the modem is started at 12:00 and will remain on for 1 hour and this will be repeated every day.</p>	
<p>?WME/ (for EHP-2B model probe only)</p>	<p>Request the Electric and Magnetic field value in percentage in order to the standard set. l=1: Reference standard (the response is the same as response to command ?MES) l=2: Standard 2 l=3: Standard 3 l=4: Standard 4 The format is: WME=E.EE;H.HH;%;*;* * where: <ul style="list-style-type: none"> • E.EE electric field probe value • H.HH magnetic field probe value • % Label Unit of measurement For example, the command #BM ?WME1* returns the response: #BM WME=17.01;10.36;%;*;* * If the EHP-2B model probe is not connected, the response string is: #BM WME=NA</p>	
<p>?WRN Alarm</p>	<p>Request WARNING threshold. The response returns the threshold in the current unit followed by the average time (in minutes) on which it is calculated. In case of using DualBand Electric and Magnetic probe, the answer returns the alarm threshold of the Magnetic field referred to the reference standard ICNIRP 2020 OCC (for EHP-2B-03 and 04) or ICNIRP98 OCC (for EHP-2B-01 and 02). In case of Dual-probe configuration, the answer is related to the threshold of the secondary probe.</p>	<p>#BM WRN= 6.0; 6*</p>

5.4 Setting COMMANDS These commands are used to make settings on the monitoring station so that the unit can respond with an SMS message containing the corresponding information or confirmation.
The setting commands are characterized by the presence of the character **S** in the string.

Command	Meaning	Example of Response
S2BSx (for EHP-2B model probe only)	<p>Set the reference standard for EHP-2B probe. The format is as follows: #BM S2BS x* where X is an index that goes from 0 to 3: "0" = Standard 1 (ICNIRP98OCC for EHP-2B-01/02 and ICNIRP2020OCC for 03/04) "1" = Standard 2 (ICNIRP98GP for EHP-2B-01/02 and ICNIRP2020GP for 03/04) "2" = Standard 3 (SC6CONTR for EHP-2B-01/02 and FCCCONTR for 03/04) "3" = Standard 4 (SC6UNCONTR for EHP-2B-01/02 and FCCUNCONTR for 03/04)</p> <p>example #BM S2BS 1* returns the response: #BM 2BS=1* confirming that the EHP-2B probe is set to Standard 2.</p> <p>This index represents the reference standard for alarms, warnings, report and ?MES command response.</p> <p>The index is permanent and stored in the Flash.</p> <p>If the index entered is not correct, the response string is: #BM 2BS=ERROR*</p>	
SAAx (for Dual-probe configuration only)	<p>Set the probe on which is assigned the alarm threshold, warning threshold and field acquisition.</p> <p>The command #BMSSAAS* set the secondary probe (EP-1B-01 or EP-1B-03 or EP-1B-05 or EP-1B-06)</p> <p>The command #BMSSAAP* set the primary probe (HP-1B-01 only)</p> <p>The response is the same as response to command ?ALR</p>	#BM ALR= 6.0; 6*
SALR x.x	<p>Set Alarm Threshold. The setting xx.x establishes the threshold value: #BMSALR 6.0*</p> <p>In case of using DualBand Electric and Magnetic probe, this command set the alarm threshold of the Electric field referred to the reference standard ICNIRP 2020 OCC (for EHP-2B-03 and 04) or ICNIRP98 OCC (for EHP-2B-01 and 02). Instead, in case of Dual-probe configuration, the answer is related to the threshold of the Primary probe.</p> <p>The response is the same as response to command ?ALR</p>	#BM ALR=6.0 uT; 6*
SAQ_	<p>Set acquisition mode: the response is identical to that of command ?AQ_ The format is as follows: #SAQ_LTR* where: L is the rate of storing and goes from</p> <ul style="list-style-type: none"> • 0 (30 seconds) • 1 (1 minute) • 2 (2 minutes) • 3 (6 minutes) • 4 (15 minutes) <p>T must be "0" R expresses the type of average used A= AVG; R=RMS example #BM SAQ_10R* returns the response: #BM AQ_=10R* confirming that the station is set to save data every minute using RMS average.</p>	

SATH HANG	This command ends the communication in progress and is equivalent to having the station hanging up. It should always be used to end the communication as it confirms that the data exchange has ended. The response is always #BM ATH=OK* Example: #BM SATH*	
SATH0 HANG	Like the previous command, this one disables the communication in progress and is equivalent to having the station hanging up, then it switches the MODEM off. To allow it to complete any functions in progress correctly, the Modem is switched off after a time ranging from 1 to a maximum of 2 minutes. During this time the GSM can be called again. The response is always #BM ATH=OK* Example: #BM SATH0*	
SAVG x	Set average time for alarm and attention threshold. The setting x is expressed in minutes: #BMSAVG 4.0* The response is the same as response to command ?ALR In case of Dual-probe configuration, the answer is related to the threshold of the primary probe.	#BM ALR= 20.0 V/m; 4* #BM ALR=20.000 uT ; 4*
SCLD	Set clock date. The response returned is the same as the response to the command ?CLK #BMSCLD DD.MM.YY * D = days M = Month Y = Year	#BM CLK:20.02.09;19.10.00*
SCLT	Set clock time. The response returned is the same as the response to the command ?CLK #BMSCLT HH.mm.ss * H = hour m = minutes s = seconds	#BM CLK:20.02.09;19.10.00*
SCNL Call Number Later	Format: #BM SCNL d nnnnnnnn * where d is in minutes and ranges from 1 to 9 and nnnnnnnn is the number to be called. This command enables a deferred call to the number nnnnnnnn indicated. The call will be made d minutes later than the scheduled time. For example, #BM SCNL 5 018220346* returns the response: #BM SCNL=018220346* confirming that the station will call back the number indicated.	
SCOM	Set the type of 8059's communication. The command must be in the format: "#BMSCOM<s>" Where <s> can be either - M : Modem communication. - W : Wifi Communication. When the communication mean is changed, the new communication module (modem or Wifi module) are switched off immediately.	Query: "#BMSCOMM" Reply: "#BM COM=OK"
SDIC Disable Call	This command disables the call by the unit to the control center. If disabled, at the scheduled time (TSM) the MODEM switches on and remains in reception mode ready to receive any calls or SMS messages. The response has the same format as the command ?TSM. For example, #BM SDIC* returns the response: #BM TSM= 14:53 (1q) each 24h* confirming that the station is disabled for the call, at given schedule and modes.	

<p>SDIE DIsable Ethernet</p>	<p>Disable activity on Ethernet. When disable Ethernet will be permanently off independently from the scheduled (STSE). The answer has the same format of ?TSE command. Example #BM SDIE* gives the answer: #BM TSE= OFF 12:00 each 24h* confirming that Ethernet is disabled.</p>
<p>SDIG DIsable GPS</p>	<p>This command disables the GPS activity. If disabled the GPS unit is permanently off saving energy. The answer has the same format of the command ?TSG. Example #BM SDIG* gives the answer: #BM TSG= OFF 12:00 each 24h* confirming that the GPS is disabled</p>
<p>SDIR DIsable Report</p>	<p>This command disables sending the report via SMS. When disabled, at the scheduled time (STSS) the GSM switches on and remains in reception mode ready to receive calls or SMS messages. The response has the same format as the command ?TSM. For example, #BM SDIR* returns the response: #BM TSS= 12:00 (2q) each 24h* confirming that the station is disabled for the call, at given schedule and modes.</p>
<p>SDMO</p>	<p>Set the command to disable MODEM function. This command is accepted only if there is a battery alarm active. When the battery alarm ends, the status of disable function will be automatically cancelled. The response to this command is identical to ?TSM. For example, the command #BM SDMO* returns the response: #BM TSM=14:53 (1q) each 24h* which, in the absence of the string (DIS), informs that the disable command has been ignored.</p>
<p>SEEM (for AMB- 8059/00 only)</p>	<p>It enables the command to delete the GPS records stored in the mobile mass storage. This command will take effect after 3 seconds and it will remain on for 15 seconds.</p>
<p>SENC ENable Call</p>	<p>This command enables calls from the AMB-8059 to the control center. When enabled, at the scheduled time (STSM) the MODEM switches on and makes a call to the first number saved in the MODEM phone directory, following the call procedure. After the call, it remains in Stand-by condition for the rest of the time. Note that this command only enables the call and not MODEM startup at the scheduled time, which remains effective in any case. The response has the same format as the command ?TSM. For example, #BM SENC* returns the response: #BM TSM=ON 14:53 (1q) each 24h* confirming that the station is enabled for the call (ON) at given schedule and modes.</p>
<p>SENE ENable Ethernet</p>	<p>This command enables the activity of the scheduled Ethernet connection. Once enabled, on the scheduled time (STSE) Ethernet is available for 10 minutes. The answer has the same format of ?TSE command. Example #BM SENE* gives the answer: #BM TSE=ON 12:00 each 24h* confirming that Ethernet will be available (ON) at the scheduled time.</p>
<p>SENG ENable GPS</p>	<p>This command enables the GPS activity. Once enabled, at the settled time (STSG) the GPS is turned on and starts the satellites research. When FIX is obtained, the NMEA GLL phrase is stored and then the GPS is turned off. Answer has the same format of the command ?TSS. Example #BM SENG* gives the answer: #BM TSG=ON 12:00 each 24h* confirming that GPS is active and will be turned on (ON) at the settled time.</p>

<p>SENR ENable Report</p>	<p>This command enables sending the report via SMS or EMAIL depending on the MSK settings. When enabled, at the scheduled time (STSS) the GSM is switched on and sends the report via SMS to all the numbers saved in the SMS phone directory or via EMAIL all recipient address listed in EMAIL Data settings: after sending all the messages it remains in Stand-by condition for the rest of the time. Note that this command only enables message transmission and not GSM activation at the scheduled time, which remains enabled in any case. The response has the same format as the command ?TSS. For example, #BM SENR* returns the response: #BM TSS=ON 12:00 (2q) each 24h* confirming that the station is sending SMS messages or EMAIL (ON) at given schedule and modes.</p>	
<p>SERM (for AMB- 8059/00 only)</p>	<p>Delete the GPS records stored in the mobile mass storage permanently and prevent recovery. Use the SERM command before starting a new acquisition. Send the SEEM command to enable the SERM command.</p>	
<p>SETH</p>	<p>Interrupt and switch off Ethernet connection. To save energy it must be sent as soon as the communication is finished. For example, #BM SETH* returns the response #BM ETH=OK*</p>	
<p>SGCS</p>	<p>Set internal clock updating mode: Set the internal clock in <u>manual</u> mode sending #BMSGCSM* command; change time and date by SCLT and SCLD command. Set the internal clock by GPS sending the #BMSGCSAx* command (x represents the time zone and the value must be between -12 and 12 hours); the command responds with the string #BM OK if successful, otherwise with #BM GCS ERROR* and turns the internal clock in manual mode. The automatic internal clock updating depends on the GPS strength; in case of success all events available are updated with the string "Auto Set:hh:mm:ss; dd/mm/hh".</p>	
<p>SGOI GPS ON Immediately</p>	<p>This command switches on the GPS immediately; it will remain on until the first FIX or for a maximum time-out of 4 minutes. Answer is #BM SGOI=OK*</p>	
<p>SGOIF GPS ON Immediately Feedback</p>	<p>This command switches on the GPS immediately; it will remain on until the first FIX or for a maximum time-out of 4 minutes. Moreover, at the first FIX or timeout, a feedback by SMS will be sent, with the format NMEA RMC (NMEA 0183 ver 3.01), to every telephone number present in the list. Answer is #BM SGOI Feedback=OK*</p>	
<p>SHFTP</p>	<p>Hide (1) or shows (0) the User, Password and IP Address (FTP mode) and Passwords (Wifi mode) on the RS232 port sniffer. In FTP communication mode the command and feedback are replaced by "@@@" . This status also affects ?GPR3, ?GPR4, ?GPR5, ?GPR7, e ?GPRA commands.</p>	
<p>SHSM</p>	<p>Enable (1) or disable (0) the High Sampling mode. As default the AMB-8059 performs 1 reading every 1 second; by enabling this function the reading interval could be minimum 200ms (depending on the probe connected). 0: High Sampling mode OFF 1: High Sampling mode ON For example, the command #BM SHSM 1* returns the response #BM HSM=OK*</p>	
<p>SIDN</p>	<p>Set station ID. The maximum length is 20 characters. The response returned is the same as the response to the command ?IDN #BMSIDN Istituto Marconi, 23*</p>	<p>#BM IDN=Istituto Marconi 23; AMB-8059; A.00 10/00;*</p>

<p>SMBE (for AMB- 8059/00 only)</p>	<p>This command ends the mobile acquisition in progress permanently and stop storing data in Flash memory.</p>
<p>SMBSv (for AMB-8059/00 only)</p>	<p>This command starts mobile data acquisition and store the records in the Flash memory every 0,25 ms. The answer of this command is the same for the command “?MESRv”. In this case the prefix “#BM” and the suffix “*” are omitted.</p> <p>SingleBand Probe:</p> <ul style="list-style-type: none"> • MES=W.WW;; V/m where: • W.WW field probe value • V/m Label Unit of measurement <p>Triband Probe:</p> <ul style="list-style-type: none"> • MES=W.WW;L.LL;H.HH V/m where: • W.WW is the wide band field probe value • L.LL is the low pass band field probe value (<862 MHz) • H.HH is the high pass band field probe value (>933MHz) • V/m Label Unit of measurement <p>Quadriband Probe:</p> <ul style="list-style-type: none"> • MES=W.WW;A.AA;B.BB;C.CC V/m where: • W.WW is the wide band field probe value • A.AA is the band1 field probe value (2140 MHz) • B.BB is the low pass band field probe value (1800 MHz) • C.CC is the low pass band field probe value (900 MHz) • V/m Label Unit of measurement <p>Dual-probe configuration:</p> <ul style="list-style-type: none"> • MES=S.SS;W.WW; Unit_S, Unit_P* where: • S.SS field value of Secondary probe • W.WW field value of Primary probe • Unit_S* unit of Secondary probe • Unit_P unit of Primary probe <p>Follows the string NMEA standard GPRMC and/or GNRMC which has the following information:</p> <ul style="list-style-type: none"> • Time (Zulu) • Navigation receiver warning A = OK, V = warning • Latitude (deg. min North/South) • Longitude (deg. min East/West) • Speed over ground (Knots) • Course Made Good • Date (Zulu) • Magnetic variation (deg) • Mandatory checksum • Acceleration (g*590) • Temperature (°C) • Humidity (%) • Date and time of the station in the format: → DD/MM/YY HH:MM:SS* <p>The answer is: MES=0.27; ; ; V/m; 3.52V; \$GPRMC,083002.000,A,4341.1288,N,01047.9563,E,1.21,47.42,160318,,A*57; - 467.00;198.00;105.00;21.98;49.42 →16/03/18 09:30:03* The NMEA degrees minutes can be convert to decimal degree (see ?GPS command) The max data storage is 18 hours.</p>

<p>SMPA</p> <p>(for AMB-8059/00 only)</p>	<p>This command ends storing mobile data in Flash memory. The answer is: PAUSED; 3.52V; ; -527.00;51.00;31.00;22.95;47.97 -->20/01/18 14:28:31* Resume it by sending the SMBSv command.</p>	
<p>SMSK</p>	<p>Set alarm window. The window must contain the mnemonic symbols representing the individual alarms as shown in the table. The order of the symbols is not important.</p> <p>A = threshold of ALARM exceeded W = threshold of Attention exceeded L = ALARM for tampering V = ALARM for low battery P = ALARM for PROBE malfunction T = ALARM for temperature C = ALARM for relative humidity a = threshold of ALARM regained w = threshold of Attention regained l = Tampering ALARM ended v = Battery ALARM ended p = PROBE ALARM ended S= Enabled set to SMS E= Enabled set to EMAIL M= Enabled set to MODEM</p> <p>The response is the same as the response to the command “?MSK”</p> <p>For example: #BMSMSK AL* enables threshold alarms and protective case opening.</p> <p>Note that to have a call on alarm the relevant device (either MODEM or SMS or EMAIL) must also be enabled</p>	
<p>SPSW</p>	<p>Save new Password. The command responds with the string #BM PSW0=psw* if successful, otherwise with #BM ERROR* Syntax: #BM SPSW psw* psw is the Password that will be saved and must be alphanumerical. At least one space is required for separation between SPSW and the string. Every additional initial space is removed. This command is always accepted when connection is in direct mode (without MODEM or SMS) or via MODEM or SMS if the current Password has been verified (with the command “?IDN psw”)</p>	<p>#BM PSW0=PASSPMM*</p>

<p>SRST</p>	<p>Restore Default configuration. The command restores the main parameters as follows:</p> <ul style="list-style-type: none"> • Alarms all masked • Calls from station by appointment disabled • SMS from station by appointment disabled • Average period = 6 minutes • Average in progress reset • Type of average = RMS • Interval 1 Modem switched on at 12:05 every 24 hours for 1 hour • Interval 2 Modem switched on at 16:00 every 24 hours for 1/2 hour • (AMB-8059/00 and AMB-8059/02) Minimum battery charge alarm threshold = 3,00V • (AMB-8059/00 and AMB-8059/02) Maximum battery charge alarm threshold = 3,9V • (AMB-8059/01 and AMB-8059/03) Minimum battery charge alarm threshold = 3,9V • (AMB-8059/01 and AMB-8059/03) Maximum battery charge alarm threshold = 5,02V <p>The response indicates everything is OK with the string: #BM RST=OK*</p>	
<p>SRSTR</p>	<p>Restore Default configuration and rate of storing. The command, in addition to restoring the main parameters like SRST, also sets the rate of saves and executes the RESET (ReBoot) as follows:</p> <ul style="list-style-type: none"> • Save every 6 Minutes • Alarms all masked • Calls from station by appointment disabled • SMS from station by appointment disabled • Average period = 6 minutes • Average in progress reset • Type of average = RMS • Interval 1 Modem switched on at 12:05 every 24 hours for 1 hour • Interval 2 Modem switched on at 16:00 every 24 hours for 1/2 hour • (AMB-8059/00 and AMB-8059/02) Minimum battery charge alarm threshold = 3,00V • (AMB-8059/00 and AMB-8059/02) Maximum battery charge alarm threshold = 3,9V • (AMB-8059/01 and AMB-8059/03) Minimum battery charge alarm threshold = 3,9V • (AMB-8059/01 and AMB-8059/03) Maximum battery charge alarm threshold = 5,02V <p>The answer indicates the result of operation with the string #BM RST RATE=OK*</p> <p>To permit the accomplishment of the residual running functions (for example, to send the return SMS at the same command), the reboot complete comes postponed of 30 seconds from the identification of the command. Consequently, each activity or command will be interrupted to expiring of the 30th second for which, in modem connection eventual command "SATH" (neither necessary neither indispensable) it would have to be send within this time.</p> <p>Extreme care should be taken in using this command as it invalidates all the data already saved considering them as not significant.</p>	
<p>SSWI</p>	<p>Switch on, set the remote access type, and switch off the WiFi connection scheduling. The command must be in the format: "#BMSSWI=<v>" Where <v> can be either - I: Internet access scheduling On - A: wireless direct access scheduling On - O: off, no WiFi connection scheduling The reply is "#BM SWI=OK".</p>	<p>Query: "#BMSSWI" Reply: "#BM SWI=OK" The WiFi scheduling is now set on Internet Access Mode.</p>

<p>STDMn Telephone Directory Modem</p>	<p>Set MODEM telephone number in the directory. The format is as follows: #BM STDMn xxxxxxxxxx* where: n represent the position in the list and must be between 0 and 9 xxxxxxxxxx expresses the telephone number. To change a number just overwrite the previous number and to delete a number just enter a new number that starts with 00000. The response has the same format as the command ?TDMn.</p> <p>For example the command #BM STDM1 987654321* returns the response: #BM TDM1=987654321*</p>
<p>STDSn Telephone Directory Sms</p>	<p>Set SMS telephone number in the directory. The format is as follows: #BM STDSn xxxxxxxxxx* where: n represent the position in the list and must be between 0 and 9 xxxxxxxxxx expresses the telephone number. To change a number just overwrite the previous number and to delete a number just enter a new number that starts with 00000. The response has the same format as the command ?TDSn.</p> <p>For example the command #BM STDS1 0000000* returns the response: #BM TDS1=VOID*</p>
<p>STSE Time Schedule Ethernet</p>	<p>Ethernet setting time command. The format is the following: #BM STSE HH.mm.xx.ee* where: HH.mm is the set time at which the Ethernet is switched on xx must be 01. The on time of Ethernet is 10 minutes. To save Energy it is recommended to switch it off by SETH as soon as the communication is completed. ee sets the number of hours on which the on is repeated. This can be 12 or 24 and every different number will be automatically converted in 24.</p> <p>Notes. Numbers must be two digits. Blank are not allowed in the timing definition.</p> <p>The answer has the same format of ?TSG command. Example #BM STSE 12.10.01.24* Answer is: #BM TSE= ON 12:10 each 24h* confirming that Ethernet will be available at 12:10 for ten minutes every day.</p>

<p>STSG Time Schedule GPS</p>	<p>Set GPS time schedule. The format is as follows: #BM STSG HH.mm.xx.ee* where: HH.mm is the GPS turn on time. xx must be 01. ee expresses how often the operation has to be repeated. NOTE: The numbers must always be two digits without spaces, and must be a submultiple of the 24 hours Answer has the same format of the command ?TSG. For example, the command #BM STSG 12.00.01.24* gives the answer: #BM TSG= ON 12:00 each 24h* confirming that the GPS will be turn on at 12:00 and will be repeated every 24 hours.</p>	
<p>STSM Time Schedule Modem</p>	<p>Set MODEM time schedule. The format is as follows: #BM STSM HH.mm.xx.ee* where: HH.mm expresses the MODEM switch on time (on and Stand-By). xx expresses the time in Quarters of an HOUR of time the modem is on (maximum 24 quarters of an hour). ee expresses how often the operation has to be repeated. NOTE: The numbers must always consist of two digits and no spaces can be used in the time, duration and repetition, which must be sub-multiples of 24 hours. The response has the same format as the command ?TSM. For example, the command #BM STSM 14.53.01.24* returns the response: #BM TSM=14:53 (1q) each 24h* confirming that the modem will go on at 14:53 and stay on for 15 minutes and this will be repeated every day at the same time.</p>	
<p>STSS Time Schedule SMS</p>	<p>Set SMS time schedule. The format is as follows: #BM STSS HH.mm.xx.ee* where: HH.mm expresses the MODEM/GSM start time (on and Stand-By). xx expresses the time in Quarters of an Hour of time the modem is on (maximum 24 quarters of an hour). ee expresses how often the operation has to be repeated. NOTE: The numbers must always consist of two digits and no spaces can be used in the time, duration and repetition, which must be sub-multiples of 24 hours. The response has the same format as the command ?TSS. For example, the command #BM STSS 12.00.04.24* returns the response: #BM TSS=12:00 (4q) each 24h* confirming that the modem/gsm will go on at 12:00 and stay on for 1 hour and this will be repeated every day at the same time.</p>	
<p>SWRNx.x</p>	<p>Set Attention Threshold. The setting xx.x establishes the threshold value: #BMSWRN 4.0*</p> <p>In case of using DualBand Electric and Magnetic probe, this command set the alarm threshold of the Magnetic field referred to the reference standard ICNIRP 2020 OCC (for EHP-2B-03 and 04) or ICNIRP98 OCC (for EHP-2B-01 and 02).</p> <p>In case of Dual-probe configuration, the answer is related to the threshold of the Secondary probe.</p> <p>The response is the same as response to command ?WRN</p>	<p>#BM WRN=4.0 uT; 6*</p>

**5.5 FPT-GPRS
COMMANDS**

These commands are used by the user to establish a connection with an Access Point or FTP server, to enable the Modem or Point-to-point connection and to set time/date using the SMS provider's information. Each field cannot be more than 63 characters.

These commands cannot be executed via FTP/GPRS (because they would need to be already correctly set).

The GPRS commands are characterized by the presence of the character **GPR** in the string.



NOTE

Username and Password must only contain alphanumeric characters; any special characters are not allowed.

GPRS Connection Data		
Field	Description	Setting command Command to be issued by either SMS or RS232,USB,Ethernet
GPR0 APN Access Point Name	The provider name of the GPRS bearer.	#BMSGPR0 <apn>* where <apn> is Access Point Name Example: #BMSGPR0 web.omnitel.it*
GPR1 GUN User Name for Gprs access	The User Name required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR1 <gun>* where <gun> is the User Name of GPRS access. Example: #BMSGPR1 MyGPRS*
GPR2 GPSW Password for Gprs access	The Password required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR2 <gpsw>* where <gpsw> is the Password of GPRS access. Example: #BMSGPR2 1234*

FTP Connection Data		
Field	Description	Setting command Command to be issued by either SMS or RS232,USB,Ethernet
GPR3 FUN User Name for FTP access	The User Name required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR3 <fun>* where <fun> is the User Name for FTP. Example: #BMSGPR3 MyFTP*
GPR4 FPSW Password for FTP access	The Password required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR4 <fpsw>* where <fpsw> is the Password for FTP. Example: #BMSGPR4 abcd*
GPR5 FIP FTP IP Address	This parameter is the server address for FTP (IP Address of FTP). Normally this is the static IP Address that routes the file transferring process to the wanted server	#BMSGPR5 <fip>* where <fip> is the IP Address for FTP. Example: #BMSGPR5 194.183.2.17*



NOTE

Refer to pag. 5-26 for GPR6 to GPRA commands.

WiFi Connection Data		
Field	Description	Setting command Command to be issued by either SMS or RS232,USB,Ethernet
SSID Access Point Name	Set the name of the WiFi Access Point to the Internet. <i>(Required for FTP activity)</i>	#BMSGPR6 <ssid>* where <ssid> is Wifi Access Point Name Example: #BMSGPR6 EleMontiAp*
PSW Password for Wifi access to the Internet	Set the password required for logging-in to the Wifi Access Point Internet Access. <i>(Required for FTP activity)</i>	#BMSGPR7 <psw>* where <psw> is the Password for Wifi access. Example: #BMSGPR7 MyPSW123*
IPA Private IP address	Set the private IP address that localizes 8059 Station. This value should be used to set up the data forwarding rule in the Router for Internet-based communication.	#BMSGPR8 <ipa>* where <ipa> is the Private IP address of 8059 station. Example: #BMSGPR8 192.168.1.115*
IPP IP port	Set the IP port of 8059 Station. This value should be used to set up the data forwarding rule in the Router for Internet-based communication. This value represents also the port to use for wirelessly direct communication with 8059 station.	#BMSGPR9 <ipp>* where <ipp> is the IP port of 8059 station. Example: #BMSGPR9 5000*
APPSW IP port	Set the PSA2-PSK password of the Narda_AMB_<s/n> wifi access point (Direct Wireless Access mode). This password must be at least 8 characters long. If it is left empty, Narda_AMB_<s/n> wifi access will be open.	#BMSGPRA <appsw>* where <appsw> is the PSA2-PSK password to access 8059 station in Direct Wireless Access mode. Example: #BMSGPRA MyPass1234* or #BMSGPRA*

EMAIL Data		
Field	Description	Setting command Command to be issued by RS232
SMTTP SMTP Port	SMTP Server output port	#BMSDML1 <x>* Where <x> is the SMTP Server port number Example: #BMSDML1 687*
PSW SMTP Password	User Password of the email account	#BMSDML2 <x>* Where <x> is the SMTP account user password Maximum 16 characters. Example: #BMSDML2 MyPSW123*
ASMTTP SMTP address	SMTP Server IP address	#BMSDML3 <x>* Where <x> is the SMTP Server IP Address Maximum 32 characters. Example: #BMSDML3 outadd@smtpserver.it*
UNAME SMTP User Name	User Name of the email account	#BMSDML4 <x>* Where <x> is the SMTP account user name Maximum 32 characters. Example: #BMSDML4 Uname@smtpserver.it*
SNDR Sender Address	It is the "From" address used to send emails	#BMSDML5 <x>* Where <x> is the Sender address. Maximum 32 characters. Example: #BMSDML4 Uname@smtpserver.it*
RCPT Recipient Address	Mailing address of the intended recipient	#BMSDML6 <x>;<y>* Where <x> is the index of the given recipient address and <y> is the address. Maximum 32 characters and 4 addresses. String with less than 7 characters will delete the address for the given id. Example: #BMSDML6 1;dst1@gmail.com* #BMSDML6 2;dst2@gmail.it* In this case, two recipient addresses will be used. Example: #BMSDML6 1;dst1@gmail.com* #BMSDML6 2;dst2@gmail.it* #BMSDML6 3;dst3@gmail.com* #BMSDML6 4;dst4@gmail.it* In this case, four recipient addresses will be used. Example: #BMSDML6 1;dst1@gmail.com* #BMSDML6 2;dst2* #BMSDML6 3;dst3@gmail.com* #BMSDML6 4;dst4@gmail.it* In this case, three recipient addresses will be used (id2 will be deleted).

MISC		
Field	Description	Setting command Command to be issued by either SMS or RS232,USB, Ethernet
CGN Connect GPRS Now	This command starts a WiFi or GPRS connection immediately. All the procedures are then the same as it would for a scheduled connection.	#BMSCGN*
CGNA Connect GPRS Now (All Events)	This command starts a WiFi or GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing all the events available instead of the most, and not yet loaded, ones.	#BMSCGNA*
CGNFW Connect GPRS Now and update Firmware	This command starts a WiFi or GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots.	#BMSCGNFW*
CGNFWI Connect GPRS Now and Immediately update Firmware	This command starts a WiFi or GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots without uploading any records. The difference from CGNFW is that it does not upload the data before updating the FW thus all unloaded records are lost.	#BMSCGNFWI*
CGNL Connect GPRS Now (Last Events)	This command starts a WiFi or GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing the last 20 events instead of the most recent, and not yet loaded, ones.	#BMSCGNL*
NETD Disable GPRS protocol	This command disables the AMB-8059 GPRS and enables point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETD*
NETE Enable GPRS protocol	This command enables the AMB-8059 to connect via GPRS instead of point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETE*
STS id Set Timedate SMS	This command sets the internal real clock time by using the SMS provider's information. To use it id (the AMB-8059 telephone number) must be sent. This command works assumes that the SMS provider gives the correct Clock/Date and its feedback is within 30 seconds. The reply is sent only if the real time clock has been updated and is the same as for the command "?CLK"	#BMSSTS nnnnnnnn* where nnnnnnnn is the telephone number of AMB-8059

5.6 FTP on Multi-band EMF Area Monitor AMB-8059

These commands are used to make settings on the monitoring station so that the unit can respond with an SMS message containing the corresponding information or confirmation.

The setting commands are characterized by the presence of the character **S** in the string.

5.6.1 Fundamentals

As opposed to point-to-point Modem connection, which needs that both uploader and downloader are connected at the same time, GPRS via FTP mode works instead on a server way. Indeed, the monitoring station regularly stores all data on a server while a client application can retrieve them later on. This means there is no necessity to be on-line at the same time.

Moreover, more clients can share the same data as all data are stored in a server and stays there until they are deleted (by a client).

The method used is FTP.

Similarly to MODEM GSM schedule, which dials a remote Modem number stored in AMB-8059 telephone directory, GPRS establishes a connection using Provider Name, Username etc stored in its memory.

Basically, at schedules, the AMB-8059 regularly establishes, via GPRS, a connection to the server and through FTP:

- First it loads, if any, all the (new) settings which have been written by the (client) application.
- Then it writes all data that have been requested by the application.
- Finally it erases all previous required settings in order to avoid reloading them at the next connection. Note that data related to field measurements are never deleted by the station.

After that the connection is terminated.

Although the AMB-8059 can operate in both modes, MODEM and GPRS, it cannot do it at the same time. This means that a setting command is used to configure the AMB-8059 to work either via MODEM way or via GPRS.

5.6.2 Structure

All data exchange is done on the directory named as the serial number of the monitoring station itself. That is in order to avoid having multiple stations that store on same directory and, at the same time, having a unique location. Here, an example of directory structure:

```
FTP_Root
  000WE80201
    8059.CFG
    8059.set
    8059FLD.TXT
    17_08_01_07_09_.D59
  000WE80202
    8059.CFG
    8059.set
    8059FLD.TXT
  \ 20_00_01_07_09_.D59
```

Note that the user must ensure that the directory is already present on the FTP root as the AMB-8059 will not create it.

5.6.3 Configuration
(Read)

Whenever the AMB-8059 connects to GPRS and accesses to FTP, it looks for a file named **8059.CFG** in its directory (its serial number). If the file is present, the AMB-8059 retrieves it and calculates the checksum in order to use it and thus get the new configuration. If the checksum is wrong, the file is discarded otherwise the new configuration is taken.
Is important to note that the new setting will not take effect immediately but only after the connection is closed.



All figures are Little Endian notation unless differently specified.

The structure of the configuration file is as follows.

Pos	Name	Size Byte	Type	Description
0	ChkSum	2	Unsigned int	Check sum (see the related paragraph)
2	idStation	34	char	The name of Station. This is a null terminated string.
36	Mask alarm	2	Unsigned int Being Bits this is BIG endian	The mask of Alarm is a bit mask where '1' means Alarm Enabled while '0' is Alarm disabled. Here is a list of alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 Relative Humidity 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
38	Reserved	1	Unsigned char	None
39	AvgRms	1	Unsigned char	The way of averaging. If 'AvgRms' is 0 then is arithmetic average otherwise is Root Mean Square
40	MaxThr	4	Float	A little endian floating point figure that represents Max threshold used for Alarm.
44	WarnThr	4	Float	A little endian floating point figure that represents Warning threshold used for Alarm.
48	Logger	1	Unsigned char	This parameter sets the rate of the logger as follows "0" 30 seconds "1" 1 minute "2" 2 minutes "3" 6 minutes "4" 15 minutes
49	reserved	1	Unsigned char	None
50	Naver	2	Unsigned int	This parameter represents the averaging time for Warning and Alarm threshold. It is expressed as 4 times the averaging time. For example a 6 min time is reported as 24
52	GPRS Appoint	2	Unsigned int	This parameter represents the scheduled time for connecting to GPRS of the day. It is expressed in minutes elapsed since midnight. Figures equal or higher than 1440 are ignored. For example the schedule 12:30 would be $(12*60)+30=750$

54	GPRS Ton	1	Unsigned char	This parameter represents the time the GSM remains ON after a GPRS connections. It is expressed in quarter of hour.
55	GPRS Interval	1	Unsigned char	This parameter represents the interval between GPRS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
56	prxon	1	Unsigned char	This is the flag for connecting to GPRS upon alarms. If bit 0x01 is '1' and one or more unmasked alarm is set, a GPRS connection is done as it was for schedule. Note that bit 0x08, the GPRS Flag, Must always be ON.
57	reserved	1	Unsigned char	None
58	SMS Sched	2	Unsigned int	This parameter represents the scheduled time for SMS schedule of the day. It is expressed in minutes elapsed since midnight. Figures equal or higher than 1440 are ignored. For example the schedule 12:30 would be $(12*60)+30=750$
60	SMS Ton	1	Unsigned char	This parameter represents the time the GSM remains ON after a SMS connections. It is expressed in quarter of hour.
61	SMS Interval	1	Unsigned char	This parameter represents the interval between SMS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
62	SMS Xon	1	Unsigned char	This is a double flag for sending a report and alarm on SMS. If bit 0x01 is '1' and one or more unmasked alarm is set, an "ALR" like SMS is sent to the number stored in the SMS telephone directory. If bit 0x02 is '1' a "RPT" like SMS is sent to the number stored in the SMS telephone directory.
63	EHP2B STD	1	Unsigned char	This is the index of the reference standard in case of EHP2B probe. Accepted values are 0,1,2,3.
64	GPS Sched	2	Unsigned int	This parameter represents the scheduled time for GPS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be $(12*60)+30=750$
66	Reserved	1	Unsigned char	Reserved
67	GPS Interval	1	Unsigned char	This parameter represents the interval between GPS searches (starting from the first connection which is done at GSP Sched). It is expressed in hours.
68	GPS Active	1	Unsigned char	This parameter enables/disables GPS searches. When GPS Active = 0x02 the GPS activity is regulated by GPS sched. Instead, When GPS Active is 0 the GPS is OFF

69	Reserved	1	Unsigned char	Reserved
70	Ethernet Sched	2	Unsigned int	This parameter represents the scheduled time for Ethernet schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 11:08 would be $(11 * 60) + 8 = 668$
72	Reserved	1	Unsigned char	Reserved
73	Ethernet Interval	1	Unsigned char	This parameter represents the interval between Ethernet connection (starting from the first connection which is done at "Ethernet Sched"). It is expressed in hours and it can be either 12 or 24. Any other interval will be automatically converted to 24.
74	Ethernet Sched Active	1	Unsigned char	This parameter enables/disables Ethernet Scheduling. When "Ethernet Schedule Active" = 0x02 the Ethernet activity is regulated by "Ethernet Sched". Instead, when "Ethernet Schedule Active" is 0 the GPS is OFF.
75 277	Reserved	1	Unsigned char	Reserved



The checksum must be calculated starting from **idStation** (position 2) up to (included) position 77 for a total of 76 bytes.

5.6.4 FLD File (Read)

After having dealt with the configuration file **8059.CFG**, the AMB-8059 check for the presence of a file named 8059FLD.TXT. This is an ASCII file which contains the date of the first requested record and the number of them.

The syntax is: **FLD HH:mm;GG/MM/YY;n** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year
- n is the number of records required (if n="---" then all records starting from the date/hour up the last recorded record will be uploaded).

For example the string FLD **18:13;23/04/14;100**

Asks for 100 records from the 23th of April 2014 at 18:13.

If, instead, the string would have been FLD **18:13;23/04/14;---**

It would ask for all records from the 23th of April 2014 at 18:13 up to now.

Note that, in case of "---" (up to now option), in order to avoid huge files and long transfer time, the number of records will be limited to 5000.

Once the AMB-8059 has read the file 8059FLD.TXT, it deletes it. It will be replaced later with the newer self-created 8059FLD.TXT which reflects the last record.

This solves the continuity of records even without any external intervention. Indeed, for every connection the AMB-8059 uploads the records and writes a new FLD file which reports the date/hour of last record so that next connection will continue from this having thus an uninterrupted series of records.

5.6.5 Record File (Write)

After having read the FLD file, which informs the AMB-8059 about which records have to be uploaded, it writes a file named **HH_mm_GG_MM_YY.D59** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

The content of this file is binary and reflects what is described, according to the setting in the §5.7 (Download Description AMB-8059 for Single and three bands probes), in the §5.8 (Download Description AMB-8059 for 2-bands probes), in the §5.9 (Download Description AMB-8059 for 4-Bands Probes), in the §5.10 (Download Description AMB-8059 for Dual-probe operation). Please refer to them for the correct interpretation of data.

5.6.6 FLD File (Write)

After having written the record file **HH_mm_GG_MM_YY.D59**, the AMB-8059 writes the file named 8059FLD.TXT which replaces the old one. This is an ASCII file which contains the date of the last uploaded record and terminates with the string "---".

The content will be therefore: **FLD HH:mm;GG/MM/YY;---** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

For example the string **FLD 20:30;23/04/14;---**

Says that the last updated record is related to the date of 23th of April 2014 at 20:30.

If a client does not necessitate a specific period, and needs a simple continuous data logger, there is no need to write any FLD File as the system is self-sufficient.

5.6.7 Event File (Write)

After having written the FLD file, the AMB-8059 writes a file named **HH_mm_GG_MM_YY.TXT** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

Which represents the events file.

This is an ASCII file which contains all the new events since last connection. Alternatively, soliciting a connection, by the SMS command, different event history can be retrieved as follows:

- **SCGNA** : all the stored events are written in EVENT.TXT file
- **SCGNL** : The last 20 events are written in EVENT.TXT file

The content of EVENT file is the chronological history of all events up to the time of connection (RTC setting assumed to be correct).

5.6.8 Setting status (Write)

After having written the EVENT.TXT file, the AMB-8059 writes a file named **8059.set** which reflects the configuration of the monitoring station. Similarly to the Configuration 8059.CFG the file is binary. This file is solely intended for reading as it is ignored by AMB-8059 and therefore any change of it will be discarded. Use 8059.CGF if you want to change any setting.



All figures are in Little Endian notation.

The structure of the configuration file is as follows.

Pos	Name	Size Byte	Type	Description
0	ChkSum	2	Unsigned int	Check sum (see the related paragraph)
2	idstation	34	Char	The name of Station. This is a null terminated string.
36	Mask alarm	2	Unsigned int Being Bits this is BIG endian	The mask of Alarm is a bit mask where '1' means Alarm Enabled while '0' is Alarm disabled. Here is a list alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 Relative Humidity 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
38	Reserved	1	Unsigned char	None
39	AvgRms	1	Unsigned char	The way of averaging. If 'AvgRms' is 0 then is arithmetic average otherwise is Root Mean Square
40	MaxThr	4	Float	A little endian floating point figure that represents Max threshold used for Alarm.
44	WarnThr	4	Float	A little endian floating point figure that represents Warning threshold used for Alarm.
48	Logger	1	Unsigned char	This parameter sets the rate of the logger as follows "0" 30 seconds "1" 1 minute "2" 2 minutes "3" 6 minutes "4" 15 minutes
49	reserved	1	Unsigned char	None
50	Naver	2	Unsigned int	This parameter represents the averaging time for Warning and Alarm threshold. It is expressed as 4 times the averaging time. For example a 6 min time is reported as 24
52	GPRS Appoint	2	Unsigned int	This parameter represents the scheduled time for connecting to GPRS of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be $(12*60)+30=750$
54	GPRS Ton	1	Unsigned char	This parameter represents the time the time the GSM remains ON after a GPRS connections. It is expressed in quarter of hour.

55	GPRS Interval	1	Unsigned char	This parameter represents the interval between GPRS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
56	Prxon	1	Unsigned char	This is the flag for connecting to GPRS upon alarms. If bit 0x01 is '1' and one or more unmasked alarm is set, a GPRS connection is done as it was for schedule. Note that bit 0x08, the GPRS Flag, Must always be ON.
57	Reserved	1	Unsigned char	None
58	SMS Sched	2	Unsigned int	This parameter represents the scheduled time for SMS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be $(12*60)+30=750$
60	SMS Ton	1	Unsigned char	This parameter represents the time the time the GSM remains ON after a SMS connections . It is expressed in quarter of hour.
61	SMS Interval	1	Unsigned char	This parameter represents the interval between SMS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
62	SMS Xon	1	Unsigned char	This is a double flag for sending a report and alarm on SMS. If bit 0x01 is '1' and one or more unmasked alarm is set, a "ALR" like SMS is sent to the number stored in the SMS telephone directory. If bit 0x02 is '1' a "RPT" like SMS is sent to the number stored in the SMS telephone directory.
63	EHP2B STD	1	Unsigned char	This is the index of the reference standard in case of EHP2B probe. Accepted values are 0,1,2,3.
64	GPS Sched	2	Unsigned int	This parameter represents the scheduled time for GPS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be $(12*60)+30=750$
66	Reserved	1	Unsigned char	Reserved
67	GPS Interval	1	Unsigned char	This parameter represents the interval between GPS searches (starting from the first connection which is done at GPS Sched). It is expressed in hours.
68	GPS Active	1	Unsigned char	This parameter enables/disables GPS searches. When GPS Active = 0x02 the GPS activity is regulated by GPS sched. Instead, when GPS Active is 0 the GPS is OFF.
69	Reserved	1	Unsigned char	Reserved
70	Ethernet Sched	2	Unsigned int	This parameter represents the scheduled time for Ethernet schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 11:08 would be $(11*60)+8=668$
72	Reserved	1	Unsigned char	Reserved
73	Ethernet Interval	1	Unsigned char	This parameter represents the interval between Ethernet connections (starting from the first connection which is done at Ethernet Sched). It is expressed in hours and it can be either 12 or 24.
74	Ethernet Sched Active	1	Unsigned char	This parameter enables/disables Ethernet Scheduling. When "Ethernet Schedule Active" = 0x02 the Ethernet activity is regulated by "Ethernet Sched". Instead, when "Ethernet Schedule Active" is 0 the GPS is OFF

75	Reserved	17	Unsigned char	Reserved
86	Status alarm	2	Unsigned int Being Bits this is BIG endian	The status of Alarm contains the alarm bit by bit where '1' means Alarm ON while '0' is Alarm OFF. Here is a list alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 RH 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
88	Temp	2	Int	This parameter shows the AMB-8059 Temperature. It is ten times the last measured temperature. Thus, in order to get actual temperature Temp should be divided by 10.
90	RH	2	Int	This parameter shows the AMB-8059 Relative Humidity. It is ten times the last measured Relative Humidity. Thus, in order to get actual Relative Humidity, RH should be divided by 10.
92	Battery	2	Int	This parameter shows the AMB-8059 current voltage. It is hundred times the last measured Battery Voltage. Thus, in order to get actual Battery Voltage, Battery should be divided by 100.
94	Reserved	98		None
192	NMEA GPS	64	Char	Last received NMEA RMC sentence (NMEA 0183 Rel. 3.01). This filed is the copy of NMEA RMC sentence without the "\$GPRMC" and/or "\$GNRMC" preamble and without ending characters of checksum. For example the string: 053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,A Should be considered as it was: \$GPRMC,053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,A^53
256	Firmware	32	Char	Fw name and version. This is a null terminated string
288	Probe	64	Char	A null terminated string which gives all probe relevant data. The Single-band format is: Name:dd.MM.YY; unit: divider:range:minlevel:S For Dual-band probes (EHP-2B-XX) format is: Name:gg.MM.YY;unit:divider:rangeE:minlevelE: RangeH:minlevelH:S The Triple-band format is: Name:dd.MM.YY; unit: divider:range:minlevel The Quad-band format is: Name:dd.MM.YY; unit: divider:range:minlevelWide:4:MinLevSubBand For Probes other than EHP-2B-XX the string is the same it would get by the command #BM?PRB* See the ?PRB for further information.
352	Reserved	160		None

5.6.9 Checksum algorithm

As previously mentioned, there a little endian 16 bit unsigned int which is called checksum. The checksum is intended for verifying the reliability of the array read mainly from the AMB-8059's side as a corrupt configuration could potentially make the AMB-8059 ineffectual.

Therefore the application must ensure that the checksum in the 8059.CFG file reflects the actual state of the configuration setting. Otherwise, if the checksum does not match the exact value, the new configuration will be ignored.

The Checksum is calculated as the sum of all the byte involved starting from a seed of 0xAAAA.

Then, from the result the modulo 0x10000 is then taken (which also means truncating the result to 4 bytes).

5.7 Download Description This document describes the structure of a single or three bands probe Area Monitor Broadband record.
AMB-8059 for Single and three bands probes These records are created by either FTP enabled (files D59) or “?FLD” command

5.7.1 Command mode

Sintax	Description
?FLD HH:mm,dd/MM;n	Request for n samples starting from Hour HH and minute mm of the day dd of the month MM of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command #BM ?FLD 13:00,01/08;60* asks for 60 measures starting from 13:00 of the 1 st of August This answer is a block of binary data

The block of bytes in replying to **?FLD HH:mm,GG/MM;n** command is as follows:
 The block of bytes in replying to **#BM ?FLD HH:mm,GG/MM;n** command is as follows:
 A Header: made of **#BM FLD=***<CR><LF> (11 bytes)
 A series of **32** bytes per sample as shown in the following table.
 A final Checksum as described at the end of this document.

5.7.2 FTP Mode

At Modem schedule a file named HH_mm_dd_MM_yy_D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).
 This file contains 32 * **n** bytes (where n is the number of requested records).



All figures in this document are BIG ENDIANNESS

5.7.3 Single and Three Bands Probes Structure description

(Bands in red are present only for three band Probes)

Wide avg		Wide Peak		Reserved			
Hi Byte 1	Lo Byte 2	Hi Byte 3	Lo Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Battery	Temperature	Alarm	PERTS	MISC	DateTime		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
L B Avg		L B Peak		H B Avg		H B Peak	
Hi Byte 17	Lo Byte 18	Hi Byte 19	Lo Byte 20	Hi Byte 21	Lo Byte 22	Hi Byte 23	Lo Byte 24
Reserved		Reserved		Reserved		Charge	RH
Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **Wide_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Avg Byte 1/2	INFL flag	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval of field strength measured by the broadband channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Wide_Avg** is equal to **0xFFFF** then **Wide_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Wide Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) **INFL** flag gives the information whether in the period the measurement was influenced (Bit High) or not (Bit Low) by external cable or MODEM activity. Therefore it is not part of field strength and has to be masked. Indeed, this is just a flag which informs that the measure could have been influenced by the system itself.

Bit 15 is INFL flag which informs the user that the measurement could have been **influenced** by a sum of external issues such as GSM transmission, charging cable, USB cable & activity end Ethernet connection.

INFL flag is the OR of all single flags which refer to its own disturbing part (see **PERTs** byte).

Note that the presence of this flag informs the measurement can be heavily disturbed and thus could not be reliable at all.

The 16 bit figure named **Wide_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Peak Byte 3/4	RMS flag	15 bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the broadband channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) gives the information whether the average was quadratic RMS (Bit High) or arithmetic (Bit Low) and therefore it is not part of field strength and it should be masked.

In the particular case in which the figure **Wide_Peak** is equal to **0xFFFF** then **Wide_Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Wide Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 5 / 6 / 7 / 8	Reserved
-----------------------------	----------

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (Voltage)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: Volt = **Voltage** * **0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (Temperature)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40**.
SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).

If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
 - ARH When High it flags that the relative humidity is out of working range.
 - ATMP When High it flags that the temperature was out of working range.
 - ALCK When High it flags that the case was unlock.
 - APRB When High it flags that a Probe failure was detected.
 - AWRN When High it flags that the broadband field value overcame Warning threshold.
 - AALR When High it flags that the broadband field value overcame Alarm threshold.
-

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the flags in table indicates that the measurement result could have been affected by the related occurrence. In cases where the station communicates through Ethernet connection on permanent basis, the ETH flag indicates that the plausibility of the result should be verified.

A method to verify the plausibility, when necessary, is to compare the result with a measurement obtained by the same station with temporarily removed wire. For results lower than 1/10 of the standard no further investigations are suggested.

The 16 bit figure named **MISC** is shown as follows:

				BND1	BND0	AVP3	AVP2	AVP1	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14	Reserved			NOB		AVGPeriod 4 bit unsigned integer				MONTHS 7 bit unsigned integer						

This figure (**MISC**) should be considered as four different data as follows:

- Reserved. Three Most significant bits are reserved
- **NOB** is a 2 bit unsigned integer which informs how many bands are present in the record.
- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG).
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 months the overlapping period is more than 10 years and the User in developing any custom software must be taken into consideration this cyclicity: January 2014, September 2024, May 2035, January 2046, and so on. This means that every time the calculation is earlier of 10 years and 8 months, the User can add 128 months to the result or consider the reference data later to 128 months.

From	Until	Add	Start Date
01/01/2014	31/08/2024	0	01/01/2014
01/09/2024	30/04/2035	128	01/09/2024
01/05/2035	31/12/2045	256	01/05/2035
01/01/2046	31/08/2056	384	01/01/2046
01/09/2056	30/04/2067	512	01/09/2056

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7**) & **0xF** = **0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F** = **0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
DateTime Byte 15/16	DateTime															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current month (previous MONTHS data).
If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.
Indeed :

$$\begin{aligned} \text{Day} &= 1 + \text{Int}(\text{DateTime} / 1440) = 1 + \text{Int}(38318 / 1440) = 27 \\ \text{Hour} &= \text{Int}((\text{DateTime} \text{ Mod } (1440)) / 60) = \text{Int}((38318 \text{ Mod } (1440)) / 60) = 14 \\ \text{Minute} &= (\text{DateTime} \text{ Mod } (1440)) \text{ Mod } 60 = (38318 \text{ Mod } (1440)) \text{ Mod } 60 = 38 \end{aligned}$$

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

The 16 bit figure named **L_B_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
L_B_Avg Byte 17 / 18	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.
L_B_Avg is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by Low Band. The number should be considered a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **L_B_Avg** is equal to **0xFFFF** then **L_B_Avg** value must be considered invalid.
If, for example, 16 bit figure named **L_B_Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to channel tuned at **L_B** MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **L_B_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
L_B_Peak Byte 19 / 20	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.

L_B_Peak is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at **L_B** MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **L_B_Peak** is equal to **0xFFFF** then **L_B_Peak** value must be considered invalid.

If, for example, 16 bit figure named **L_B_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at **L_B** MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **B_H_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
B_H_Avg Byte 21 / 22	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.

B_H_Avg is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at **B_H** MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **B_H_Avg** is equal to **0xFFFF** then **B_H_Avg** value must be considered invalid.

If, for example, 16 bit figure named **B_H_Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to channel tuned at **B_H** MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **B_H_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
B_H_Peak Byte 22 / 23	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.

B_H_Peak is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at **B_H** MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **B_H_Peak** is equal to **0xFFFF** then **B_H_Peak** value must be considered invalid.

If, for example, 16 bit figure named **B_H_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at **B_H** MHz will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 25 / 30	Reserved
-----------------------	----------

The figure named **Charging** is shown as follows:

Charging	D07	D06	D05	D04	D03	D02	D01	D00
Byte 31	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.

To get the value in mA the following formula should be used:

$$\text{Current (mA)} = \text{Charging} * 4$$

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (RH)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command: **?FLD HH:mm,dd/MM;n** or, when FTP enabled, through the file 8059FLD.TXT (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).

Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.

Hence, expected size of reply can be easily calculated as follows:

Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header (“#BM FLD=*
r\n”), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

FTP mode (8059FLD.TXT file).

At GPRS schedule a file named HH_mm_dd_MM_yy_D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059)..

This file contains 32 * **n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;n)

5.8 Download Description This section describes the structure of a 2-bands probe record.
Multi-band EMF Area
Monitor AMB-8059 for 2-Bands Probes These records are created by either FTP enabled (files D59) or “?FLD” command.

5.8.1 Command mode

Sintax	Description
?FLD HH:mm,dd/MM;n	Request for n samples starting from Hour HH and minute mm of the day dd of the month MM of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command #BM ?FLD 13:00,01/08;60* asks for 60 measures starting from 13:00 of the 1 st of August This answer is a block of binary data

The block of bytes in replying to **?FLD HH:mm,GG/MM;n** command is as follows:
The block of bytes in replying to **#BM ?FLD HH:mm,GG/MM;n** command is as follows:
A Header: made of **#BM FLD=*<CR><LF>** (11 bytes)
A series of **32** bytes per sample as shown in the following table.
A final Checksum as described at the end of this document.

5.8.2 FTP Mode At Modem schedule a file named HH_mm_dd_MM_yy_.D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).
This file contains 32 * **n** bytes (where n is the number of requested records).



All figures in this document are BIG ENDIANNESS

5.8.3 2-Bands Probes
Structure description

k_shft E_std_2		k_shft E_std_3		k_shft E_std_4		Reserved	
Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8

Battery	Temperature	Alarm	PERTS	MISC	DateTime		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16

Electric_Avg		Electric_Peak		Magnetic_Avg		Magnetic_Peak	
Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24

k_shft H_std_2		k_shft H_std_3		k_shft H_std_4		Charge	RH
Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **k_shft_E_std_2** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_E_std_2 Byte 1 / 2	16 Bit unsigned integer															

k_shft_E_std_2 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific Electric **standard 2** given the value (i.e., **Electric_Avg** and **Electric_Peak**) for the per thousand of the **standard 1**.

If, for example, 16 bit figure named **Electric_Peak** is 0x0245 then the maximum Electric field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_E_std_2** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Electric_Peak** value, namely $0.977 \cdot 58.1 = 56.76\%$ of **standard 2**.

The 16 bit figure named **k_shft_E_std_3** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_E_std_3 Byte 3 / 4	16 Bit unsigned integer															

k_shft_E_std_3 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific Electric **standard 3** given the value (i.e., **Electric_Avg** and **Electric_Peak**) for the per thousand of the **standard 1**.

If, for example, 16 bit figure named **Electric_Peak** is 0x0245 then the maximum Electric field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_E_std_3** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Electric_Peak** value, namely $0.977 \cdot 58.1 = 56.76\%$ of **standard 3**.

The 16 bit figure named **k_shft_E_std_4** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_E_std_4 Byte 5 / 6	16 Bit unsigned integer															

k_shft_E_std_4 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific Electric **standard 4** given the value (i.e., **Electric_Avg** and **Electric_Peak**) for the per thousand of the **standard 1**.

If, for example, 16 bit figure named **Electric_Peak** is 0x0245 then the maximum Electric field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_E_std_4** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Electric_Peak** value, namely $0.977 \cdot 58.1 = 56.76\%$ of **standard 4**.

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (Voltage)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: Volt = **Voltage** * **0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (Temperature)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40**.

SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).

If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
 - ARH When High it flags that the relative humidity is out of working range.
 - ATMP When High it flags that the temperature was out of working range.
 - ALCK When High it flags that the case was unlock.
 - APRB When High it flags that a Probe failure was detected.
 - AWRN When High it flags that the broadband field value overcame Warning threshold.
 - AALR When High it flags that the broadband field value overcame Alarm threshold.
-

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the flags in table indicates that the measurement result could have been affected by the related occurrence. In cases where the station communicates through Ethernet connection on permanent basis, the ETH flag indicates that the plausibility of the result should be verified.

A method to verify the plausibility, when necessary, is to compare the result with a measurement obtained by the same station with temporarily removed wire. For results lower than 1/10 of the standard no further investigations are suggested.

The 16 bit figure named **MISC** is shown as follows:

	PB	TEHP2B	EHP2B	BND1	BND0	AVP3	AVP2	AVP1	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14	Res	Flag	Flag	Reserved		AVGPeriod 4 bit unsigned integer				MONTHS 7 bit unsigned integer						

This figure (**MISC**) should be considered as four different data as follows:

- Reserved. The Most significant bit is reserved
- **TEHP2B Flag** is a flag which indicates that EHP2B-03 or EHP2B-04 probe was present. Flag is '0' in case EHP2B-01 or EHP2B-02 probe was present.
- **EHP2B Flag** is a flag which indicates that a **weighted EHP2B Probe** is in the record. If **EHP2B Flag** is '0' a standards probe was present.
- Reserved. 2 bits are reserved.
- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG). An exception is **AVGPeriod** = 0 in which case the averaging time is 30 minute.
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 months the overlapping period is more than 10 years and the User in developing any custom software must be taken into consideration this cyclicity: January 2014, September 2024, May 2035, January 2046, and so on. This means that every time the calculation is earlier of 10 years and 8 months, the User can add 128 months to the result or consider the reference data later to 128 months.

From	Until	Add	Start Date
01/01/2014	31/08/2024	0	01/01/2014
01/09/2024	30/04/2035	128	01/09/2024
01/05/2035	31/12/2045	256	01/05/2035
01/01/2046	31/08/2056	384	01/01/2046
01/09/2056	30/04/2067	512	01/09/2056

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7**) & **0xF** = **0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F** = **0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
DateTime Byte 15/16	DateTime															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current s (previous MONTHS data).

If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.

Indeed :

$$\text{Day} = 1 + \text{Int}(\text{DateTime} / 1440) = 1 + \text{Int}(38318 / 1440) = 27$$

$$\text{Hour} = \text{Int}((\text{DateTime} \text{ Mod } (1440)) / 60) = \text{Int}((38318 \text{ Mod } (1440)) / 60) = 14$$

$$\text{Minute} = (\text{DateTime} \text{ Mod } (1440)) \text{ Mod } 60 = (38318 \text{ Mod } (1440)) \text{ Mod } 60 = 38$$

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

The 16 bit figure named **Electric_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Electric_Avg Byte 17 / 18	Reserved	15 Bit unsigned integer														

Electric_Avg is the per thousand value, **RMS** or **AVG**, averaged in the stored interval, of Electric field strength measured by the probe . The number should be considered a big-endian unsigned 15 bit integer. Most significant bit (D15) is not part of the data and should be masked. The figure represents the per thousand of the **standard 1**. In the particular case in which the figure **Electric_Avg** is equal to **0xFFFF** then **Electric_Avg** value must be considered invalid.

If, for example, 16 bit figure named **Electric_Avg** is 0x0245 then the **RMS** (or **AVG**) Electric field strength value will be 581 per thousand of standard 1 which is 58.1%

The 16 bit figure named **Electric_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Electric_Peak Byte 19 / 20	Reserved	15 Bit unsigned integer														

Electric_Peak is the **Peak** value, **Max value**, detected in the stored interval, of Electric field strength measured by the probe. The number should be considered as a big-endian unsigned 15 bit integer. Most significant bit (D15) is not part of the data and should be masked The figure represents the per thousand of the **standard 1**. In the particular case in which the figure **Electric_Peak** is equal to **0xFFFF** then **Electric_Peak** value must be considered invalid.

If, for example, 16 bit figure named **Electric_Peak** is 0x0245 then the **maximum** Electric field strength value will be 581 per thousand of the standard 1 which is 58.1%

The 16 bit figure named **Magnetic_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Magnetic_Avg Byte 21 / 22	Reserved	15 Bit unsigned integer														

Magnetic_Avg is the per thousand value, **RMS** or **AVG**, averaged in the stored interval, of **Magnetic** field strength measured by the probe. The number should be considered a big-endian unsigned 15 bit integer. Most significant bit (D15) is not part of the data and should be masked. The figure represents the per thousand of the **standard 1**. In the particular case in which the figure **Magnetic_Avg** is equal to **0xFFFF** then **Magnetic_Avg** value must be considered invalid.

If, for example, 16 bit figure named **Magnetic_Avg** is 0x0245 then the **RMS** (or **AVG**) **Magnetic** field strength value will be 581 per thousand of standard 1 which is 58.1%

The 16 bit figure named **Magnetic_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Magnetic_Peak Byte 22 / 23	Reserved	15 Bit unsigned integer														

Magnetic_Peak is the **Peak** value, **Max value**, detected in the stored interval, of **Magnetic** field strength measured by the probe. The number should be considered as a big-endian unsigned 15 bit integer. Most significant bit (D15) is not part of the data and should be masked. The figure represents the per thousand of the **standard 1**. In the particular case in which the figure **Magnetic_Peak** is equal to **0xFFFF** then **Magnetic_Peak** value must be considered invalid.

If, for example, 16 bit figure named **Magnetic_Peak** is 0x0245 then the **maximum Magnetic** field strength value will be 581 per thousand of the standard 1 which is 58.1%

The 16 bit figure named **k_shft_H_std_2** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_H_std_2 Byte 25 / 26	16 Bit unsigned integer															

k_shft_H_std_2 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific **Magnetic standard 2** given the value (i.e., **Magnetic_Avg** and **Magnetic_Peak**) for the per thousand of the **standard 1**.

If, for example, 16 bit figure named **Magnetic_Peak** is 0x0245 then the maximum **Magnetic** field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_H_std_2** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Magnetic_Peak** value, namely $0.977 * 58.1 = 56.76\%$ of **standard 2**.

The 16 bit figure named **k_shft_H_std_3** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_H_std_3 Byte 27/ 28	16 Bit unsigned integer															

k_shft_H_std_3 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific **Magnetic standard 3** given the value (i.e., **Magnetic_Avg** and **Magnetic_Peak**) for the per thousand of the **standard 1**.
If, for example, 16 bit figure named **Magnetic_Peak** is 0x0245 then the maximum **Magnetic** field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_H_std_3** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Magnetic_Peak** value, namely $0.977 * 58.1 = 56.76\%$ of **standard 3**.

The 16 bit figure named **k_shft_H_std_4** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
k_shft_H_std_4 Byte 29 / 30	16 Bit unsigned integer															

k_shft_H_std_4 is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific **Magnetic standard 4** given the value (i.e., **Magnetic_Avg** and **Magnetic_Peak**) for the per thousand of the **standard 1**.
If, for example, 16 bit figure named **Magnetic_Peak** is 0x0245 then the maximum **Magnetic** field strength value will be 581 per thousand of the standard 1 which is 58.1% of standard 1. Then, if for example, 16 bit figure named **k_shft_H_std_4** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Magnetic_Peak** value, namely $0.977 * 58.1 = 56.76\%$ of **standard 4**.

The figure named **Charging** is shown as follows:

Charging	D07	D06	D05	D04	D03	D02	D01	D00
Byte 31	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.

To get the value in mA the following formula should be used:

$$\text{Current (mA)} = \text{Charging} * 4$$

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (RH)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command: **?FLD HH:mm,dd/MM;n** or, when FTP enabled, through the file 8059FLD.TXT (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).

Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.

Hence, expected size of reply can be easily calculated as follows:

Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header (“#BM FLD=*
r\n”), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

FTP mode (8059FLD.TXT file).

At GPRS schedule a file named HH_mm_dd_MM_yy_D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).

This file contains 32 * **n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;n)

**5.9 Download Description
Multi-band EMF Area
Monitor AMB-8059 for
4-Bands Probes**

This section describes the structure of a 4-bands probe record. These records are created by either FTP enabled (files D59) or “?FLD” command.

5.9.1 Command mode

Syntax	Description
?FLD HH:mm,dd/MM;n	Request for n samples starting from Hour HH and minute mm of the day dd of the month MM of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command #BM ?FLD 13:00,01/08;60* asks for 60 measures starting from 13:00 of the 1st of August This answer is a block of binary data

The block of bytes in replying to ?FLD HH:mm,GG/MM;n command is as follows:

The block of bytes in replying to #BM ?FLD HH:mm,GG/MM;n command is as follows:

A Header: made of #BM FLD=<CR><LF> (11 bytes)
A series of 32 bytes per sample as shown in the following table.
A final Checksum as described at the end of this document.

5.9.2 FTP Mode

At FTP schedule a file named HH_mm_dd_MM_yy_.D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059). This file contains 32 * n bytes (where n is the number of requested records).



All figures in this document are BIG ENDIANNESS

**5.9.3 4-Bands Probes
Structure description**

Wide avg		Wide Peak		Reserved			
Hi Byte 1	Lo Byte 2	Hi Byte 3	Lo Byte 4	Byte 5	Byte 6	Byte 7	Byte 8

Battery	Temperature	Alarm	PERTS	MISC	DateTime		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16

2140 Avg		2140 Peak		1842 Avg		1842 Peak	
Hi Byte 17	Lo Byte 18	Hi Byte 19	Lo Byte 20	Hi Byte 21	Lo Byte 22	Hi Byte 23	Lo Byte 24

942 avg		942 Peak		Reserved		Charge	RH
Hi Byte 25	Lo Byte 26	Hi Byte 27	Lo Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **Wide_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Avg Byte 1/2	INFL flag	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval of field strength measured by the broadband channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Wide_Avg** is equal to **0xFFFF** then **Wide_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Wide Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) **INFL** flag gives the information whether in the period the measurement was influenced (Bit High) or not (Bit Low) by external cable or MODEM activity. Therefore it is not part of field strength and has to be masked.

Indeed, this is just a flag which informs that the measure could have been influenced by the system itself.

Bit 15 is **INFL** flag which informs the user that the measurement could have been **influenced** by a sum of external issues such as GSM transmission, charging cable, USB cable & activity end Ethernet connection.

INFL flag is the OR of all single flags which refer to its own disturbing part (see **PERTs** byte).

Note that the presence of this flag informs the measurement can be heavily disturbed and thus could not be reliable at all.

The 16 bit figure named **Wide_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Peak Byte 3/4	RMS flag	15 bit unsigned integer														

It is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the broadband channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) gives the information whether the average was quadratic RMS (Bit High) or arithmetic (Bit Low) and therefore it is not part of field strength and it should be masked.

In the particular case in which the figure **Wide_Peak** is equal to **0xFFFF** then **Wide_Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Wide Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 5 / 6 / 7 / 8	Reserved
-----------------------------	----------

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (Voltage)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: **Volt = Voltage * 0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (Temperature)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40**.

SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).
If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
 - ARH When High it flags that the relative humidity is out of working range.
 - ATMP When High it flags that the temperature was out of working range.
 - ALCK When High it flags that the case was unlock.
 - APRB When High it flags that a Probe failure was detected.
 - AWRN When High it flags that the broadband field value overcame Warning threshold.
 - AALR When High it flags that the broadband field value overcame Alarm threshold.
-

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the flags in table indicates that the measurement result could have been affected by the related occurrence. In cases where the station communicates through Ethernet connection on permanent basis, the ETH flag indicates that the plausibility of the result should be verified.

A method to verify the plausibility, when necessary, is to compare the result with a measurement obtained by the same station with temporarily removed wire. For results lower than 1/10 of the standard no further investigations are suggested.

The 16 bit figure named **MISC** is shown as follows:

						AVP3	AVP2	AVP	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14	Reserved					AVGPeriod 4 bit unsigned integer				MONTHS 7 bit unsigned integer						

This figure (**MISC**) should be considered as three different data as follows:

- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG).
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 months the overlapping period is more than 10 years and the User in developing any custom software must be taken into consideration this cyclicity: January 2014, September 2024, May 2035, January 2046, and so on. This means that every time the calculation is earlier of 10 years and 8 months, the User can add 128 months to the result or consider the reference data later to 128 months.

From	Until	Add	Start Date
01/01/2014	31/08/2024	0	01/01/2014
01/09/2024	30/04/2035	128	01/09/2024
01/05/2035	31/12/2045	256	01/05/2035
01/01/2046	31/08/2056	384	01/01/2046
01/09/2056	30/04/2067	512	01/09/2056

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7**) & **0xF** = **0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F** = **0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
Date Time Byte 15/16	DateTime															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current month (previous MONTHS data).

If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.

Indeed :

$$\text{Day} = 1 + \text{Int}(\text{DateTime} / 1440) = 1 + \text{Int} (38318 / 1440) = 27$$

$$\text{Hour} = \text{Int}((\text{DateTime Mod } (1440)) / 60) = \text{Int} ((38318 \text{ Mod } (1440)) / 60) = 14$$

$$\text{Minute} = (\text{DateTime Mod } (1440)) \text{ Mod } 60 = (38318 \text{ Mod } (1440)) \text{ Mod } 60 = 38$$

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

The 16 bit figure named **2140_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
2140_Avg Byte 17 / 18	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at 2140 MHz. The number should be considered a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **2140_Avg** is equal to **0xFFFF** then **2140_Avg** value must be considered invalid.

If, for example, 16 bit figure named **2140_Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **2140_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
2140_Peak Byte 19 / 20	Reserved	15 Bit unsigned integer														

It is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at 2140 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **2140_Peak** is equal to **0xFFFF** then **2140_Peak** value must be considered invalid.

If, for example, 16 bit figure named **2140_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

If, for example, 16 bit figure named **2140_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **1842_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
1842_Avg Byte 21 / 22	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at 1842 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **1842_Avg** is equal to **0xFFFF** then **1842_Avg** value must be considered invalid.

If, for example, 16 bit figure named **1842_Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to channel tuned at 1842 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **1842_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
1842_Peak Byte 22 / 23	Reserved	15 Bit unsigned integer														

It is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at 1842 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **1842_Peak** is equal to **0xFFFF** then **1842_Peak** value must be considered invalid.

If, for example, 16 bit figure named **1842_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 1842 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **942_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
942_Avg Byte 24 / 25	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval , of field strength measured by the channel tuned at 942 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **942_Avg** is equal to **0xFFFF** then **942_Avg** value must be considered invalid.

If, for example, 16 bit figure named **942_Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to channel tuned at 2140 942 will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **942_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
942_Peak Byte 26 / 27	Reserved	15 Bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the channel tuned at 942 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.

In the particular case in which the figure **942_Peak** is equal to **0xFFFF** then **942_Peak** value must be considered invalid.

If, for example, 16 bit figure named **942_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 942 MHz will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 28 / 29	Reserved															
-----------------------	----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

The figure named **Charging** is shown as follows:

Charging Byte 31	D07	D06	D05	D04	D03	D02	D01	D00
	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.

To get the value in mA the following formula should be used:

$$\text{Current (mA)} = \text{Charging} * 4$$

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (RH)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command:**?FLD HH:mm,dd/MM;n** or, when FTP enabled, through the file 8059FLD.TXT (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059)..

Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.

Hence, expected size of reply can be easily calculated as follows:

Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header (“#BM FLD=*
r\n”), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

FTP mode (8059FLD.TXT file).

At GPRS schedule a file named HH_mm_dd_MM_yy_.D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).

This file contains 32 * **n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;n)

**5.10 Download
Description AMB-8059 for
Dual-probe operation**

This document describes the structure of a Piggy Back probe record.

These records are created by either FTP enabled (files D59) or “?FLD” command.

5.10.1 Command mode

Syntax	Description
?FLD HH:mm,dd/MM;n	Request for n samples starting from Hour HH and minute mm of the day dd of the month MM of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command #BM ?FLD 13:00,01/08;60* asks for 60 measures starting from 13:00 of the 1 st of August This answer is a block of binary data

The block of bytes in replying to **?FLD HH:mm,GG/MM;n** command is as follows:

The block of bytes in replying to **#BM ?FLD HH:mm,GG/MM;n** command is as follows:

A Header: made of **#BM FLD=*<CR><LF>** (11 bytes)
A series of **32** bytes per sample as shown in the following table.
A final Checksum as described at the end of this document.

**5.10.2 FTP Mode
(WiFi or GPRS)**

At FTP schedule a file named **HH_mm_dd_MM_yy_D59** is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059).
This file contains **32 * n** bytes (where n is the number of requested records).



All figures in this document are BIG ENDIANNESS



**This document is valid for those records where the piggy back probe is present.
This can be checked by PB Flag described later at MISC section.**

**5.10.3 Piggy Back Probes
Structure description**

Secondary Wide_avg		Secondary Wide_Peak		Main Wide_avg		Main Wide_Peak	
Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Battery	Temperature	Alarm	PERTS	MISC	DateTime		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
Reserved		Reserved		Reserved		Reserved	
Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24
Reserved		Reserved		Reserved		Charge	RH
Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **Secondary_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Secondary Avg Byte 5 / 6	Reserved	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the **Secondary** channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Secondary_Avg** is equal to **0xFFFF** then **Wide_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Secondary Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to **Secondary** channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) is reserved. Therefore it is not part of field strength and has to be masked.

The 16 bit figure named **Secondary_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Secondary Peak Byte 7 / 8	Reserved	15 bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the **Secondary** channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is reserved. Therefore it is not part of field strength and it should be masked.

In the particular case in which the figure **Secondary_Peak** is equal to **0xFFFF** then **Secondary_Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Secondary Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to **Secondary** channel will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **Main_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Main Avg Byte 1/2	INFL flag	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the **Main** channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Main_Avg** is equal to **0xFFFF** then **Main_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Main Avg** is 0x0244 and the divider 100 then the **RMS** (or **AVG**) field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) **INFL** flag gives the information whether in the period the measurement was influenced (Bit High) or not (Bit Low) by external cable or MODEM activity. Therefore it is not part of field strength and has to be masked.

Indeed, this is just a flag which informs that the measure could have been influenced by the system itself.

Bit 15 is INFL flag which informs the user that the measurement could have been **influenced** by a sum of external issues such as GSM transmission, charging cable, USB cable & activity end Ethernet connection. **INFL** flag is the OR of all single flags which refer to its own disturbing part (see **PERTs** byte). Note that the presence of this flag informs the measurement can be heavily disturbed and thus could not be reliable at all.

The 16 bit figure named **Main_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Main Peak Byte 3/4	RMS flag	15 bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the **Main** channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) gives the information whether the average was quadratic RMS (Bit High) or arithmetic (Bit Low) and therefore it is not part of field strength and it should be masked.

In the particular case in which the figure **Main_Peak** is equal to **0xFFFF** then **Main_Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Main Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to **Main** channel will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 5 / 6 / 7 / 8	Reserved
-----------------------------	----------

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (Voltage)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: **Volt = Voltage * 0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (Temperature)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40**.

SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).

If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
- ARH When High it flags that the relative humidity is out of working range.
- ATMP When High it flags that the temperature was out of working range.
- ALCK When High it flags that the case was unlock.
- APRB When High it flags that a Probe failure was detected.
- AWRN When High it flags that the broadband field value overcame Warning threshold.
- AALR When High it flags that the broadband field value overcame Alarm threshold.

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the flags in table indicates that the measurement result could have been affected by the related occurrence. In cases where the station communicates through Ethernet connection on permanent basis, the ETH flag indicates that the plausibility of the result should be verified.

A method to verify the plausibility, when necessary, is to compare the result with a measurement obtained by the same station with temporarily removed wire. For results lower than 1/10 of the standard no further investigations are suggested.

The 16 bit figure named **MISC** is shown as follows:

	PB Flag			BND1	BND0	AVP3	AVP2	AVP1	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14		Reserved		NOB		AVGPeriod 4 bit unsigned integer				MONTHS 7 bit unsigned integer						

This figure (**MISC**) should be considered as four different data as follows:

- **PB Flag** is a flag which indicates that a **Piggy Back Probe** is in the record. If PB Flag is '0' no Piggy Back probe was present.
- Reserved. Three Most significant bits are reserved
- **NOB** is a 2 bit unsigned integer which informs how many bands are present in the record.
- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG).
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 months the overlapping period is more than 10 years and the User in developing any custom software must be taken into consideration this cyclicity: January 2014, September 2024, May 2035, January 2046, and so on. This means that every time the calculation is earlier of 10 years and 8 months, the User can add 128 months to the result or consider the reference data later to 128 months.

From	Until	Add	Start Date
01/01/2014	31/08/2024	0	01/01/2014
01/09/2024	30/04/2035	128	01/09/2024
01/05/2035	31/12/2045	256	01/05/2035
01/01/2046	31/08/2056	384	01/01/2046
01/09/2056	30/04/2067	512	01/09/2056

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7**) & **0xF** = **0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F** = **0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
Date Time Byte 15/16	DateTime															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current month (previous MONTHS data).

If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.

Indeed :

$$\text{Day} = 1 + \text{Int}(\text{DateTime} / 1440) = 1 + \text{Int} (38318 / 1440) = 27$$

$$\text{Hour} = \text{Int}((\text{DateTime} \text{ Mod } (1440)) / 60) = \text{Int} ((38318 \text{ Mod } (1440)) / 60) = 14$$

$$\text{Minute} = (\text{DateTime} \text{ Mod } (1440)) \text{ Mod } 60 = (38318 \text{ Mod } (1440)) \text{ Mod } 60 = 38$$

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

Reserved Byte 25 / 30	Reserved

The figure named **Charging** is shown as follows:

Charging	D07	D06	D05	D04	D03	D02	D01	D00
Byte 31	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.

To get the value in mA the following formula should be used:

$$\text{Current (mA)} = \text{Charging} * 4$$

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (RH)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command: **?FLD HH:mm,dd/MM;n** or, when FTP enabled, through the file 8059FLD.TXT (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059). Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.

Hence, expected size of reply can be easily calculated as follows:
Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header (“#BM FLD=*r\n”), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

FTP mode (8059FLD.TXT file)

At Modem schedule a file named HH_mm_dd_MM_yy_D59 is created (see §5.6 FTP on Multi-band EMF Area Monitor AMB-8059). This file contains **32 * n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;n).

5.11 Download Description This section describes the structure of a 4-bands probe record.
MOBILE Multi-band EMF
Area Monitor AMB-8059 These records are created by “?MBR” command.

5.11.1 Command mode

Syntax	Description
?MBR	Request All records stored in the Mobile mass storage This answer is a block of binary data

The block of bytes in replying to **?MBR** command is as follows:.

The header is made of 1024 Bytes.



All figures in this document are LITTLE ENDIANNESS

First 256 Bytes give information related to the main probe.

Byte 0: Type (Must be 0x64, otherwise the probe is not valid)

Byte 2: Unit Id (0=V/m, 1=A/m, 2=mT, 3=kV/m, 4=uT)

Byte 6,7,8,9: Divisor (IEEE Single Precision coefficient to get final Field strength value)

Byte 10,11,12,13: Range (IEEE Single Precision value representing the probe range)

Byte 62,63,64,65: Minimum Field Strength (IEEE Single Precision value below which the field strength is undetectable). In case of EHP2B this figure is related to E field.

Byte 66,67,68,69: Minimum Field Strength (IEEE Single Precision value below which the field strength is undetectable). In case of EHP2B this figure is related to H field.

Byte 87: Dual Head (>=10 = two bands; <10 = single band)

In case of EHP2B:

Byte 104,105: Figure (**k_shft_1**) related to Shift Standard 1 (Unsigned Little Endian Int).

Byte 106,107: Figure (**k_shft_2**) related to Shift Standard 2 (Unsigned Little Endian Int).

Byte 108,109: Figure (**k_shft_3**) related to Shift Standard 3 (Unsigned Little Endian Int).

Byte 110,111: Figure (**k_shft_4**) related to Shift Standard 4 (Unsigned Little Endian Int).

Bytes 206-214: Calibration date (String in the format dd.mm.yy)

Bytes 215-255: Probe Name (Null-terminated String)

Second 256 Bytes give information related to the piggy-back probe.

Byte 256: Type (Must be 0x64, otherwise the piggyback probe is not present or invalid)

Byte 258: Unit Id (0=V/m, 1=A/m, 2=mT, 3=kV/m, 4=uT)

Byte 262,263,264,265: Divisor (IEEE Single Precision coefficient to get final Field strength value)

Byte 266,267,268,269: Range (IEEE Single Precision value representing the probe range)

Byte 316,317,318,319: Minimum Field Strength (IEEE Single Precision value below which the field strength is undetectable)

Byte 341: Dual Head (>=10 = two bands; <10 = single band)

Bytes 460-468: Calibration date (String in the format dd.mm.yy)

Bytes 469-511: Probe Name (Null-terminated String)

All other Bytes are reserved.

Figures k_shft_i related to Standard Shifts with EHP-2B probes:

The unsigned int figure **k_shft_i** is the multiplicative per -thousand coefficient to extrapolate the per thousand value of the specific **standard i** given the pure value **Field_i**.

If, for example, 16 bit figure named **Field_1** is 0x0245 then the unadjusted field percentage value will be 581 per thousand. Then, if for example, 16 bit figure named **k_shft_1** is 0x03d1 then the multiplicative per -thousand coefficient will be 977 per thousand of **Field_1** value, namely $0.977 * 58.1 = 56.76\%$ of **standard 1**.

The EHP-2B standard are listed as follows:

Standard 1 (ICNIRP98OCC for EHP-2B-01/02 and ICNIRP2020OCC for 03/04)

Standard 2 (ICNIRP98GP for EHP-2B-01/02 and ICNIRP2020GP for 03/04)

Standard 3 (SC6CONTR for EHP-2B-01/02 and FCCCONTR for 03/04)

Standard 4 (SC6UNCONTR for EHP-2B-01/02 and FCCUNCONTR for 03/04)

5.11.2 Mobile Structure description

Field_1		Field_2		Field_3		Field_4	
Hi Byte 1	Lo Byte 2	Hi Byte 3	Lo Byte 4	Hi Byte 5	Lo Byte 6	Hi Byte 7	Lo Byte 8
Battery	RES	RES	RES	Status	RES	Temperature	RH
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
Acceleration X		Acceleration Y		Acceleration Z		Reserved	
Hi Byte 17	Lo Byte 18	Hi Byte 19	Lo Byte 20	Hi Byte 21	Lo Byte 22	Hi Byte 23	Lo Byte 24
Local Time						Reserved	
Hh Byte 25	Hh Byte 26	Mm Byte 27	Mm Byte 28	Ss Byte 29	Ss Byte 30	Res Byte 31	Res Byte 32
Speed				Reserved		Reserved	
Byte 33	Byte 34	Byte 35	Byte 36	Byte 37	Byte 38	Byte 39	Byte 40
GPS DATE							
Dd Byte 41 Byte 42		Mm Byte 43 Byte 44		Yy Byte 45 Byte 46		Res Byte 47 Byte 48	
GPS UTC							
hh Byte 49 Byte 50		mm Byte 51 Byte 52		ss Byte 53 Byte 54		Res Byte 55 Byte 56	
Latitude int		Latitude Fract		Longitude int		Longitude Fract	
degree Byte 57	minute Byte 58	Byte 59	Byte 60	degree Byte 61	minute Byte 62	Byte 63	Byte 64

Figures expressed in the above described structure must be interpreted as follows.

Field strength (integer) values must be divided by the coefficient “divisor” found in the header. The unit can be found in the header. These figures are available depending on the probe(s) used.

Field 1: Band Field Strength value (needs main probe divisor)

Field 2: Band Field Strength value (needs auxiliary divisor if auxiliary probe is present otherwise main probe divisor)

Field 3: Band Field Strength value (needs main probe divisor)

Field 4: Band Field Strength value (needs main probe divisor)

Battery short (value) must be multiplied by 0.0406 and is expressed in Volt [V].

Status (short) is 0 when 8059 is saving mobile data (normal condition), 1 when in pause (once, after entering in pause), 2 when resuming from pause status (once, after exit pause status).

Temperature (short) value must be reduced by 40 and is expressed in Celsius Degree [C].

RH (short) is the relative humidity and is expressed in [%].

Acceleration (integer) values must be divided by 590.0 and expressed in [g].

Speed (IEEE single precision) value is expressed in knots [kn]

GPS DATE (short) values represent the digits of the UT date in the format dd mm yy

GPS UTC (short) values represent the digits of the UTC (Zulu) time expressed in the format hh mm ss

The 16 bit figure named **Latitude int** is shown as follows:

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Byte 57/58	Degree								N/S	V	Minute					

The figure named **Latitude int** is made of 4 fields and represents the integer part of the GPS Latitude.

- **Degree** is a 8 bit unsigned integer which indicates the degree of latitude.
- **N/S** (D7) is a flag which indicates whether the latitude is North or South. When referred to North N/S=0 while if N/S=1 the latitude is South.
- **V** (D6) is a flag which indicates whether data is valid or not. When coordinates are valid V=0. When V=1 the GPS was not able to correctly get the position.
- **Minute** is a 6 bit unsigned integer which indicates the minute integer part of latitude.

The 16 bit figure named **Latitude Fract** is shown as follows:

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Byte 59/60	Ten thousandths of a minute															

The figure named **Latitude Fract** is a little-endian unsigned 16 bit integer and indicates the fractionary part of the GPS Latitude and it is expressed in Ten-thousandths of a minute.

Merging the previous data **Latitude int** and this figure the full latitude can be obtained.

If, for example, **Latitude int=0x2c04** and **Latitude Fract=0x12a9** then the GPS latitude would be: 44 degree, 04.4777 minute North.

Indeed, 0x2c=44, 0x04=04 and 0x12a9=4777. N/S is 0 then the latitude is North.

The 16 bit figure named **Longitude int** is shown as follows:

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Byte 61/62	Degree								E/W	res	Minute					

The figure named **Longitude int** is made of 4 fields and represents the integer part of the GPS Longitude.

- **Degree** is a 8 bit unsigned integer which indicates the degree of latitude.
- **E/W** (D7) is a flag which indicates whether the Longitude is East or West. When referred to East E/W=0 while if E/W=1 the Longitude is West.
- **D6** is reserved and have to be masked out.
- **Minute** is a 6 bit unsigned integer which indicates the minute integer part of Longitude.

The 16 bit figure named Longitude **Fract** is shown as follows:

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Byte 63/64	Ten thousandths of a minute															

The figure named **Longitude Fract** is a little-endian unsigned 16 bit integer and indicates the fractionary part of the GPS Longitude and it is expressed in Ten-thousandths of a minute.

Merging the previous data **Longitude int** and this figure the full Longitude can be obtained.

If, for example, **Longitude int=0x0809** and **Longitude Fract=0x16b3** then the GPS Longitude would be: 8 degree, 09.4777 minute East.

Note that position is valid only when **Flag V** of **Latitude int** is zero.

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6 - Accessories

6.1 Introduction

This chapter provides the necessary information for installation and use of the Accessories of the AMB-8059 Multi-band EMF Area Monitor. It also includes information regarding the initial inspection, power requirements, connections, working environment, assembly, cleaning, storage and shipment.

6.2 Initial inspection

Check the package for any damages.

NOTICE

If the packing materials or protective materials are damaged, check the equipment and make sure it is complete with all parts and intact, without any mechanical or electrical damage.

Check the accessories with reference to the packing list enclosed with the device.

Report any damages at once to the shipping company and to NARDA.

6.3 Working environment

The working environment for the accessories, unless specified otherwise, must be in the following ranges:

- Temperature from -10°C to +55°C
- Relative humidity (without condensation) ≤ 93%

The accessories should be stored in a clean, dry place free of acids, dusts and humidity.

The storage environment must be in the following ranges:

- Temperature from -25°C to + 70°C
- Relative humidity (without condensation) < 99% relative

6.4 Returning for repair

Any part of the instrument – with the sole exception of the protective case and AMB-8059/00 and AMB-8059/02 battery – can only be replaced by NARDA, therefore, in case of damage to parts and/or malfunctions, contact the NARDA service center.

When the instrument has to be returned to NARDA for repair, the User is kindly requested to fill out the questionnaire enclosed with this User's Manual and write all the required service information and a full description of the malfunction, to enable NARDA to repair the device in the shortest possible time.

To reduce the time necessary for the repair, be as specific as possible in describing the malfunction. If the problem only occurs under specific conditions, detail in the best possible way how to reproduce these conditions.

Whenever possible, use the original packing when returning items, and make sure to wrap the device in heavy paper or plastic.

If the original package material is no longer available, use a sturdy card box and a sufficient quantity of impact absorbing material all around the equipment to provide a tight fit and prevent its moving inside the packing.

In particular, take every precaution to protect the solar panels.

Seal the packing securely and write FRAGILE on the container to encourage better care in handling.

6.5 Cleaning

Use a clean, dry, soft cloth to clean the instruments.

NOTICE

Do not use solvents, acids, turpentine, acetone or similar products to clean the instruments to prevent damages.

6.6

Battery charger (AMB-8059/01 and AMB-8059/03 only)

6.6.1 Recharging the batteries of stations equipped with solar panel

AMB-8059/01 and AMB-8059/03 Multi-band EMF Area Monitor are equipped with an autonomous power unit and are powered jointly by a rechargeable internal battery and directly by solar panels. The unit can also be connected to an additional battery charger.

If, for example, the Field Monitor is used indoor for a prolonged period and there is no direct sunlight illumination, the internal battery could run down and undergo damage. In this case it is advisable to recharge the battery using the battery charger before switching on again the unit.

To charge the battery connect the USB Cable - USB(A)/USB(B) between the USB port of the Solar module and the USB port of the battery charger; plug the battery charger to the mains supply.



Use of the battery charger is not recommended during measurement, as it may introduce noises that could noticeably affect the readings.

The battery charger must be used with a mains frequency of 50/60 Hz and voltage of 100-240V.



Use only the battery charger supplied, which provides 5V DC, 1A max.

It takes about 24 hours to perform a complete battery recharge.

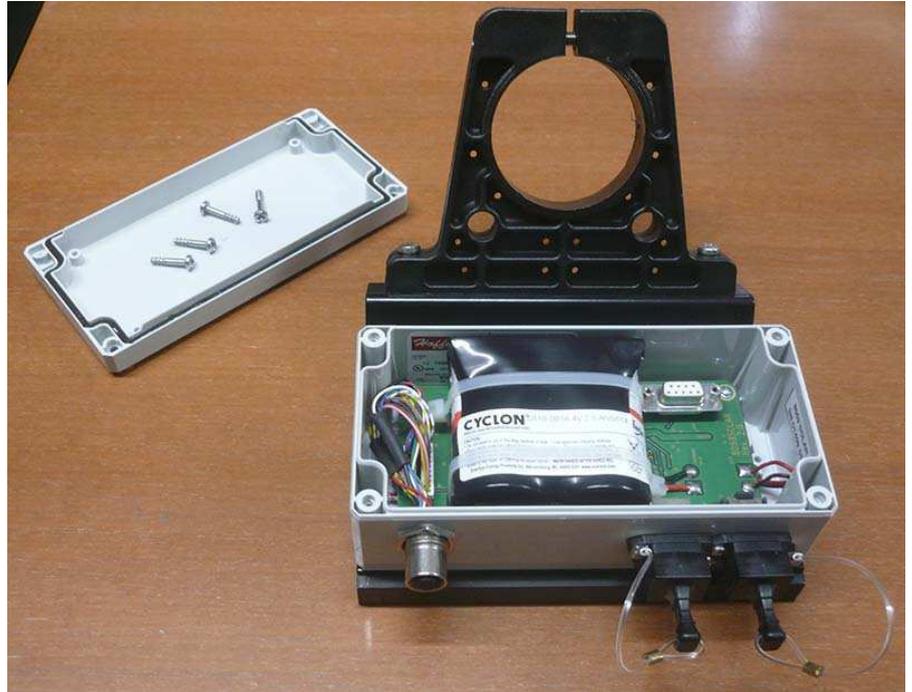


When recharging, the Data-Supply connector shall be connected.





Before installing the field monitor outdoors, make sure the cover on the Solar Module is securely closed, in order to prevent any moisture from penetrating the unit.



6.7

8059-MAST Supporting pole

6.7.1 Installation of the AMB-8059 on the mast

NARDA recommends to install all NARDA Field Monitoring Stations on the special mast that rests on a sturdy metal base.



Fig. 6-1
AMB-8059/00
AMB-8059/02
on its mast
without joint



Fig. 6-2
AMB-8059/00
AMB-8059/02
on its mast
with swivel joint



Fig. 6-3
AMB-8059/01
AMB-8059/03
on its mast
without joint



Fig. 6-4
AMB-8059/01
AMB-8059/03
on its mast
with swivel joint

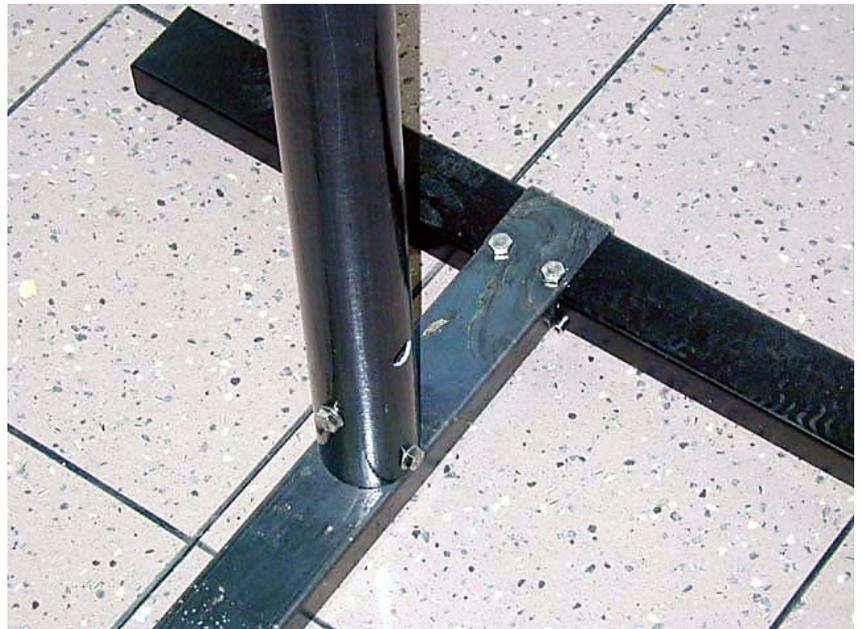
TABLE 6-1 8059-MAST Supporting pole Technical Specifications

Base material	Varnished iron	
Mast material	Fiberglass	
Dimensions	(WxDxH) 600 x 600 x 2000 mm	
Exterior mast diameter	60mm	
Total weight		
<u>AMB-8059/00 and AMB-8059/02</u>		approx. 5,5 kg (with field monitoring station)
<u>AMB-8059/00 and AMB-8059/02 with swivel joint</u>		approx. 6,5 kg (with field monitoring station)
<u>AMB-8059/01 and AMB-8059/03</u>		approx. 6,6 kg (with field monitoring station)
<u>AMB-8059/01 and AMB-8059/03 with swivel joint</u>		approx. 7,7 kg (with field monitoring station)

First, assemble the “T” base with the two screws supplied, then position the base where it will be installed, making sure it is leveled to ensure stability.



The mast fits inside the pipe stub at the center of the base. Match the holes on the pole with those on the stub and fasten with the four 8Mx20mm bolts as shown in the figure below.



The 8059-MAST kit is complete with the tools necessary for installation (13 mm hexagonal wrench and bolts).

Indoor and outdoor use For indoor use you can turn the field to the desired position as following procedure:

- Loose the central screw.
- Unscrew and remove the two fastening screws from the swivel joint.

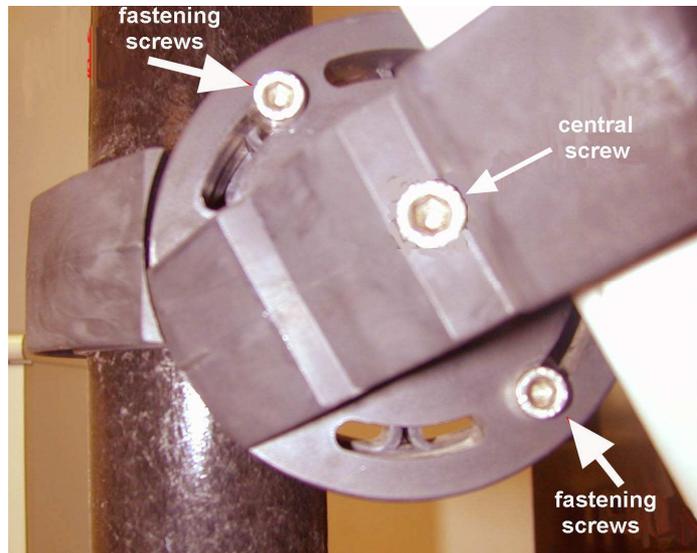


Fig. 6-5 Swivel joint

- Turn the field monitor in any angle when using the Area Monitor indoor.



Fig. 6-6 Horizontal position of AMB-8059/00 and AMB-8059/02

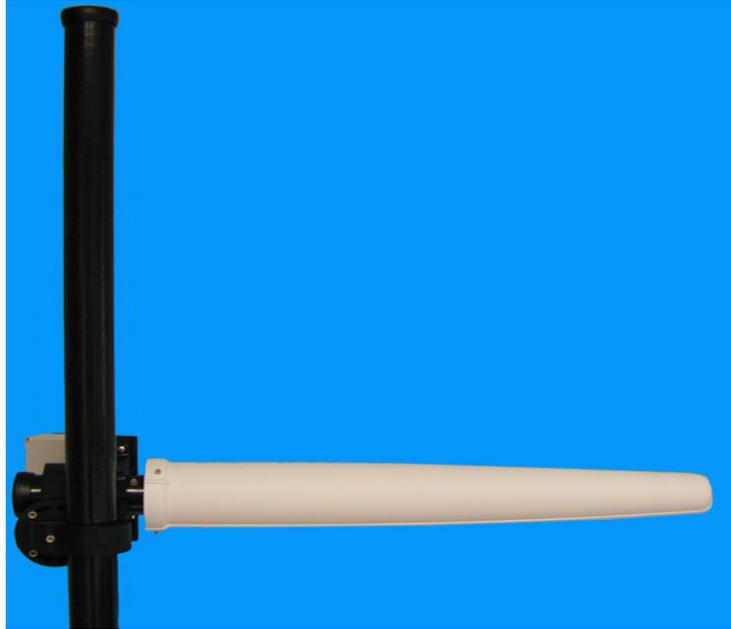


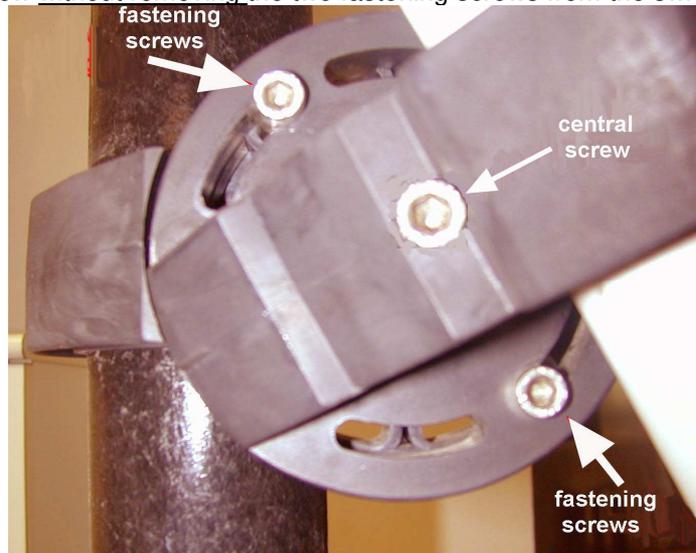
Fig. 6-7 Horizontal position of AMB-8059/01 and AMB-8059/03

- Replace and fasten the two screws in the joint slots
- Fasten the central screw.
- Fasten the two screws in the plate slots.

Instead during the outdoor use, the two swivel joint fastening screws limit the range of rotation (about 30 degree from the mast).



- Loose the central screw.
- Unscrew without removing the two fastening screws from the swivel joint.



- Turn the field monitor (maximum 30 degree from the mast allowed)
- Fasten the central screw.
- Fasten the two screws in the plate slots.

Bags

The Field Monitor is usually installed outdoors where atmospheric agents, especially strong winds, can endanger its stability.

To ensure the necessary stability under the worst possible conditions, the unit is supplied with three ballast bags that can be filled with water or sand and fastened to the base of the mast as shown in the following examples.



Fasten the ballast bags to the mast using the plastic straps.

The hook at the top of the mast serves for fastening the nylon wind strays supplied with the kit.

6.8

USB-OC Optical USB Converter

6.8.1 Introduction



USB-OC is a standard accessory for AMB-8059/00 and an optional one for AMB-8059/01 and /03 stations.

It converts the signals of some of the system's accessories, which are only connected via fiber optic, into USB-compatible signals.

It, therefore, makes it possible to link the remote station to the USB port of any Personal Computer, to operate it in conjunction with specific application software and for firmware updating.

Either USB-OC or a RS232 is indispensable for updating the internal firmware via a Personal Computer; the update utility is available free-of-charge at NARDA's Web site <http://www.narda-sts.it>

6.8.2 Installation

Insert USB-OC in the connector of a free USB port of the PC, connect the fiber optic coming from the probe or other Accessories treating the locating key with care.

Considering the very low consumption of the device, the power required by USB-OC is taken directly from the USB port of the PC. This means no maintenance is needed.

Table 6-2 Technical specifications of the USB-OC Optical USB Converter

Max. length of the fiber optic	40 m
USB Connector	Type A Male



The link between USB-OC and a HUB USB device or USB cable extension could not work properly. Connect the USB-OC to the PC directly.

Front view



Key:

Fiber optic connector

Rear view



Key:

USB Type A Male

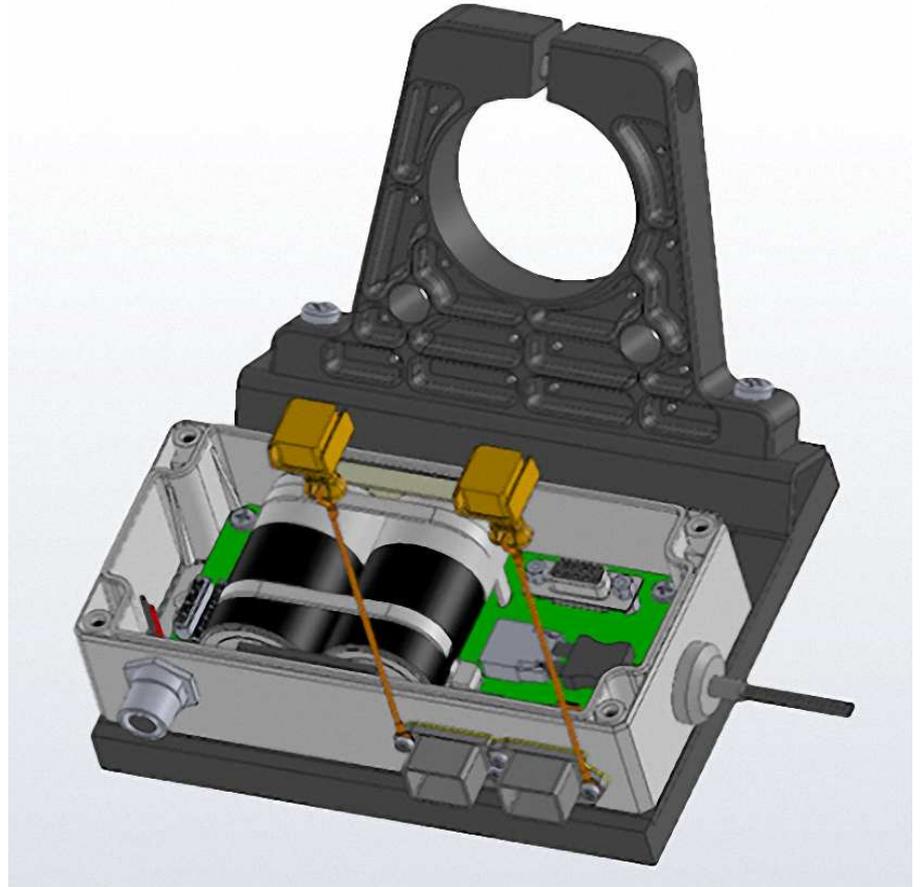
Fig. 6-8 USB-OC adapters

Power supply

USB-OC is powered directly from the USB port of the PC.

8059-Optical link (optional)

AMB-8059/01 and AMB-8059/03 can be controlled via an optional fiber optic cable, as depicted below. Inside the Solar Panel waterproof box, an optical port is already prepared for this purpose.



To install the fiber optic link: remove the rubber cap (on the right side of the picture) and insert the fiber optic cable in the hole.

The supplied optic cable is equipped with a special new waterproof cap, suitable for outdoor use.

The 8059-Optical link is supplied with an USB-OC Optical Converter (please see paragraph 6.8).

The fiber optic length can be chosen among 10, 20 and 40m (other lengths to be evaluated upon request).



When using the optical link, in Direct Readings mode, the current consumption of the station is 6 mA maximum (1 sec reading rate, modems off).

6.10

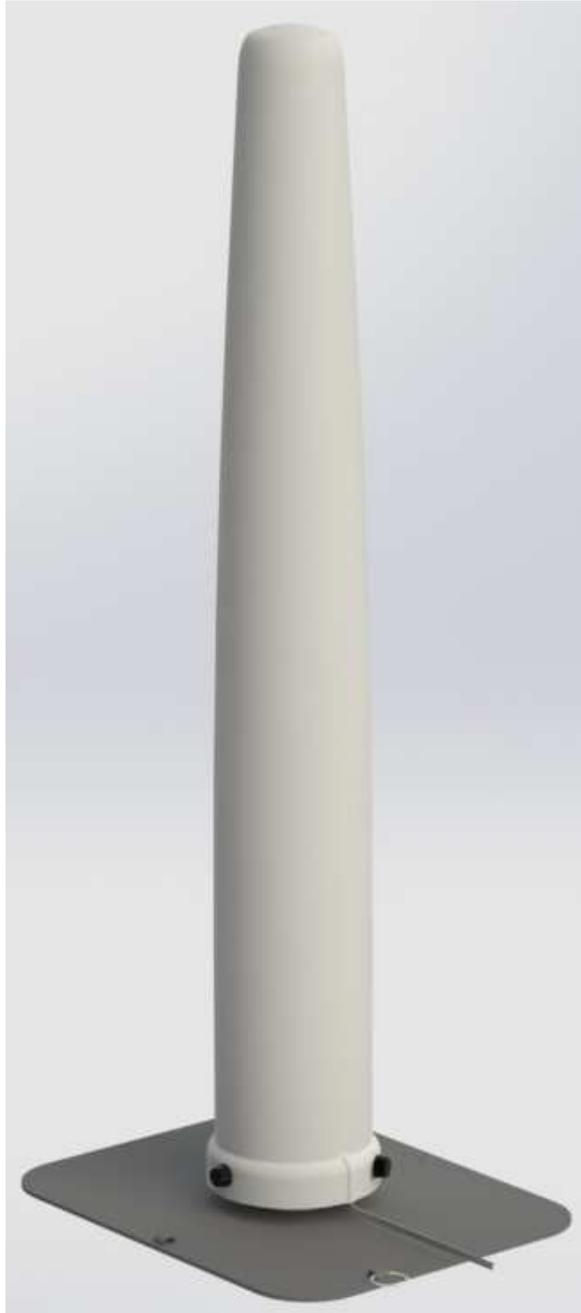
8059/CMK Car Mounting Kit (optional)

6.10.1 Introduction

The Car Mount Kit optional accessory (available for AMB-8059/00 model only) is an easy to install kit to transform the multi-band EMF Area Monitor, usually adopted for fixed installation, in a mobile version designed to be mounted onto a car.

With this kit, the station can be placed onto the roof of the car and used to collect measurements and map the electromagnetic fields of a desired area.

Each logged measurement is time- and geo-referenced by means of the integrated precise RTC and GPS module.



Please refer to 8059/CMK chapter of this manual for further details.

Li-Ion Rechargeable Battery Kit (optional)

The optional accessory Li-Ion Rechargeable Battery Kit (available for AMB-8059/00 CMK model only) allows to replace the standard non-rechargeable battery with a rechargeable one.

The Li-Ion Battery Kit is an easy install kit to transform rechargeable AA battery in the D format used on the station.

The Li-Ion Rechargeable Battery Kit including:

- 3 pcs. Lithium-Ion Rechargeable Battery AA size
- USB Battery charger and accessories
- 3AA to D Size Battery Converter Adapter Holder



 **NOTE**

Li-Ion Rechargeable Battery Kit optional accessory is available for AMB-8059/00 mobile version (CMK) only. See §2.8.1 Installation and battery replacement.

 **NOTE**

See §2.8 Car Mounting Kit configuration for further information.

 **NOTE**

For proper use of the Battery charger, refer to the instructions of its manufacturer.

6.12

Two-wire USB cable (optional)
(AMB-8059/01 and AMB-8059/03 only)

6.12.1 Introduction

The Two-wire USB cable optional accessory allows to connect the battery box permanently to the AC/DC 5V USB adapter (provided with the station) on the 220Vac grid and performs the measurements at the same time. In order to control the measurement uncertainty potentially introduced by the power cable connection to the station the unit will operate as follows:

- When battery is above a safe threshold the power cable is galvanically disconnected.
- When battery is under threshold the power cable is connected and the measurement is anyway performed; for example, in case of not correct orientation of the solar panel, the station will automatically provide power from the USB connector of the battery box. In the logged data the measures are marked as well as it happens when other potential disturbs are present.
- Data communication by USB connector will be not possible if the same will be used for power management.



Two-wire USB cable, optional accessory, is available for AMB-8059/01 and AMB-8059/03 model only; as service in maintenance or backup of solar panel in field from S/N prefix 170WY



Use only the adapter supplied, which provides 5V DC, 1A max. The adapter must be used with a mains frequency of 50/60 Hz and voltage of 100-240V.



Table 6-3 Technical specifications of the Two-wire USB cable

Length	2.5 m
USB Connectors	Type A Male / Type B Male (IP67) station side



Front view

Key:
USB Type A Male



Rear view

Key:
USB Type B Male (IP67)

Fig. 6-9 Two-wire USB cable connectors

6.12.2 Installation

Remove the USB dust cap from battery box



Connect the Two-wire USB cable between the USB port of the Battery box (IP67 side) and the USB port of the AC/DC 5V Adapter.



Plug the AC/DC 5V Adapter to the mains supply



6.13

8059/IP66K Kit IP66 Adapter (optional)
(AMB-8059/01 and AMB-8059/03 only)

6.13.1 Introduction

NOTICE



The 8059/IP66 Kit IPP66 Adapter optional accessory is an easy to install kit to transform the multi-band EMF Area Monitor in a rated product IP66.

8059/IP66K kit IP66 Adapter not suitable with Radome Dual Probe for Dual probe configuration and 8059/CMK Car Mount kit optional accessory.

8059/IP66K Kit IP66 Adapter, optional accessory, is available for AMB-8059/01 and AMB-8059/03 model only.

6.13.2 Installation

Remove the external protective cover unscrewing the 3 screws that fix it to the base disk. Then, take the cap off being careful not to rotate it (the interlock switch could be damaged if rotating the cover while taking it off).

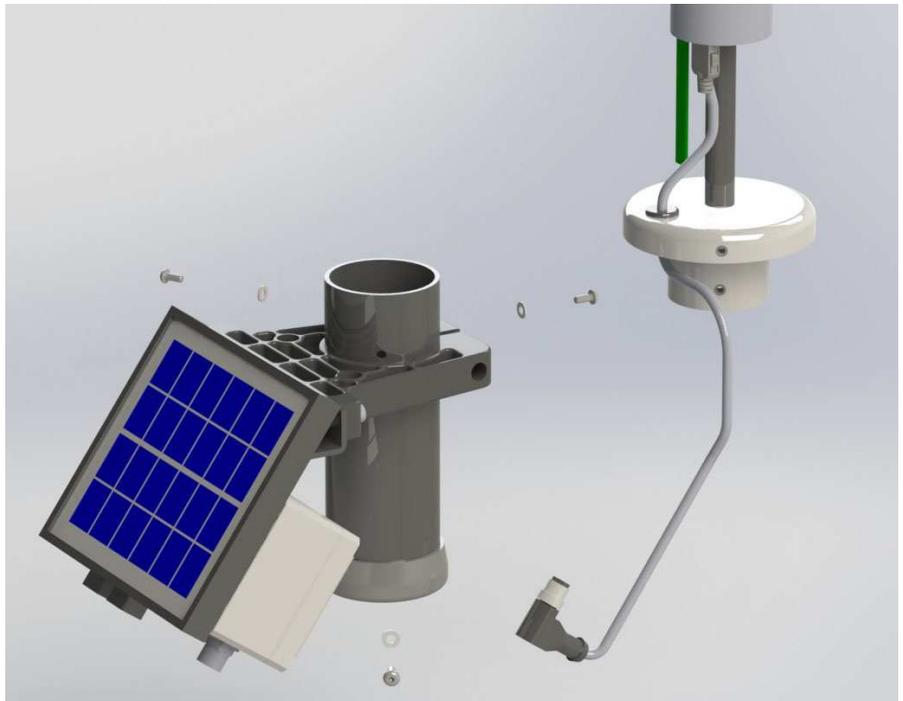


Make sure the unit is switched OFF.

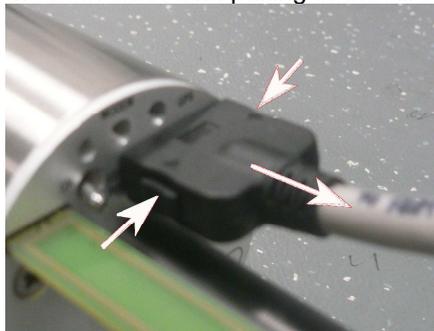
Disconnect the connector from the Solar module unscrewing in the direction show in the picture



Remove the base plate (and the unit) unscrewing the 3 screws that fix it to the solar mechanical connection.



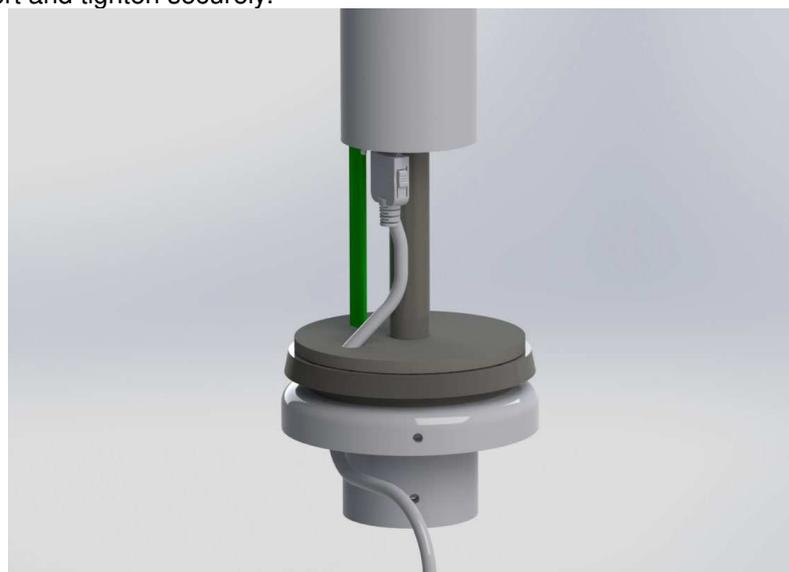
Disconnect the connector from the User Port pushing the two buttons on the both sides and pulling in the direction shown in the picture.



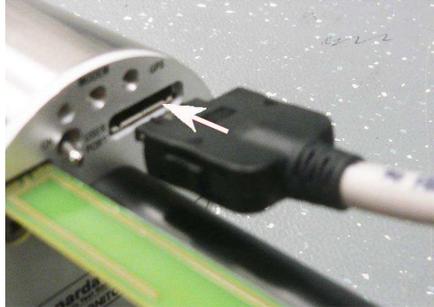
Unscrewing the screw located below the base disk for removing the unit from the metal plate.



Screw the unit to the 8059/IP66K Kit IP66 Adapter by metallic threaded insert and tighten securely.



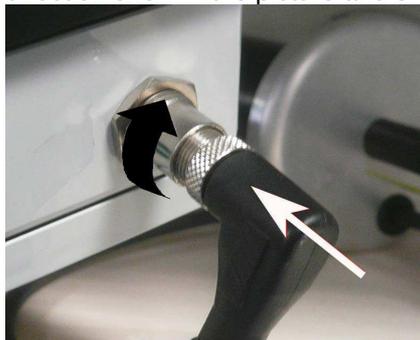
The connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.



Install the 8059/IP66K Kit IP66 Adapter (and the unit) to the solar mechanical connection screwing the 3 screws previously removed.



Connect the Data-Supply connector to the Solar module screwing in the direction show in the picture and switch on the unit.



Remember the station must be turned on before placing the protective cover.

Put the protective cover for IP66 protection provided with the kit (please insert without rotating it) and tighten the 3 screws at its bottom.

NOTICE

The Protective case included in standard delivery with station not suitable with 8059/IP66K Kit IP66 Adapter

6.14

Radome Dual Probe (optional)

6.14.1 Introduction

The optional Radome Dual Probe is a protective case made of material that is transparent to electromagnetic fields and designed to house different probe combinations on AMB-8059 Dual-probe configuration.



For Probe combinations on Dual-probe configuration see Table 1-8 (page 1-10).



For Radome Dual Probe additional information and installation see §2.7 (page 2-8).

NOTICE

8059/IP66K kit IP66 Adapter optional accessory not suitable with Radome Dual Probe.

NOTICE

AMB-8059/00 with Car Mounting kit does not operate in Dual-probe configuration.



7 – Action of the wind on the AMB-8059

7.1 Introduction

This section provides the information necessary to install and use the Multi-band EMF Area Monitor AMB-8059 in the presence of wind.

The Field Monitor is usually installed outdoors where the strong winds can endanger its stability that depends on the weight and eventual ballast bags or nylon wind strays.

Depending on the AMB-8059 models and wind speed, it is possible to calculate the weight of the ballast bags through the tables below to guarantee the stability of the apparatus.



The Station is usually installed outdoors where the strong winds can endanger its stability that depends on the weight and eventual ballast bags or nylon wind strays.



The safety of any system incorporating the AMB-8059 is the responsibility of the assembler.



It is necessary to calculate the speed and pressure of the wind in the place of installation; through the table it is possible to determine if it is necessary to use the ballast bags with their full weight or to fasten the nylon wind strays

The models of the AMB-8059 are:



AMB-8059/00
AMB-8059/02
(without swivel joint)



AMB-8059/00
AMB-8059/02
(with swivel joint)



AMB-8059/01
AMB-8059/03
(without swivel joint)



AMB-8059/01
AMB-8059/03
(with swivel joint)

**7.2 AMB-8059/00
AMB-8059/02
without joint**

Table 7-1 Wind resistance of the AMB-8059/00 and AMB-8059/02 without swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m ²]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,13	0,19	-54,06	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,50	0,75	-51,23	
10,80	3,00	1,20	1,25	6,75	1,13	1,70	-46,51	
14,40	4,00	1,20	1,25	12,00	2,01	3,02	-39,90	
18,00	5,00	1,20	1,25	18,75	3,15	4,72	-31,41	
21,60	6,00	1,20	1,25	27,00	4,53	6,79	-21,03	
25,20	7,00	1,20	1,25	36,75	6,16	9,25	-8,77	
28,80	8,00	1,20	1,25	48,00	8,05	12,08	5,39	
32,40	9,00	1,20	1,25	60,75	10,19	15,29	21,43	Ballast bags filled with water
36,00	10,00	1,20	1,25	75,00	12,58	18,87	39,35	
39,60	11,00	1,20	1,25	90,75	15,22	22,83	59,17	
43,20	12,00	1,20	1,25	108,00	18,12	27,17	80,87	
46,80	13,00	1,20	1,25	126,75	21,26	31,89	104,46	
50,40	14,00	1,20	1,25	147,00	24,66	36,99	129,94	
54,00	15,00	1,20	1,25	168,75	28,31	42,46	157,30	
57,60	16,00	1,20	1,25	192,00	32,21	48,31	186,55	
61,20	17,00	1,20	1,25	216,75	36,36	54,54	217,69	
64,80	18,00	1,20	1,25	243,00	40,76	61,14	250,71	
68,40	19,00	1,20	1,25	270,75	45,42	68,12	285,62	
72,00	20,00	1,20	1,25	300,00	50,32	75,48	322,42	
75,60	21,00	1,20	1,25	330,75	55,48	83,22	361,10	Ballast bags filled with sand
79,20	22,00	1,20	1,25	363,00	60,89	91,34	401,68	
82,80	23,00	1,20	1,25	396,75	66,55	99,83	444,14	
86,40	24,00	1,20	1,25	432,00	72,46	108,70	488,48	
90,00	25,00	1,20	1,25	468,75	78,63	117,94	534,72	
93,60	26,00	1,20	1,25	507,00	85,05	127,57	582,84	
97,20	27,00	1,20	1,25	546,75	91,71	137,57	632,85	
100,80	28,00	1,20	1,25	588,00	98,63	147,95	684,74	
104,40	29,00	1,20	1,25	630,75	105,80	158,70	738,52	Fastening the nylon wind strays
108,00	30,00	1,20	1,25	675,00	113,23	169,84	794,19	
111,60	31,00	1,20	1,25	720,75	120,90	181,35	851,75	
115,20	32,00	1,20	1,25	768,00	128,83	193,24	911,19	
118,80	33,00	1,20	1,25	816,75	137,00	205,50	972,52	
126,00	35,00	1,20	1,25	918,75	154,11	231,17	1100,85	
129,60	36,00	1,20	1,25	972,00	163,05	244,57	1167,84	
133,20	37,00	1,20	1,25	1026,75	172,23	258,34	1236,72	
136,80	38,00	1,20	1,25	1083,00	181,66	272,50	1307,48	
140,40	39,00	1,20	1,25	1140,75	191,35	287,03	1380,14	
144,00	40,00	1,20	1,25	1200,00	201,29	301,94	1454,68	

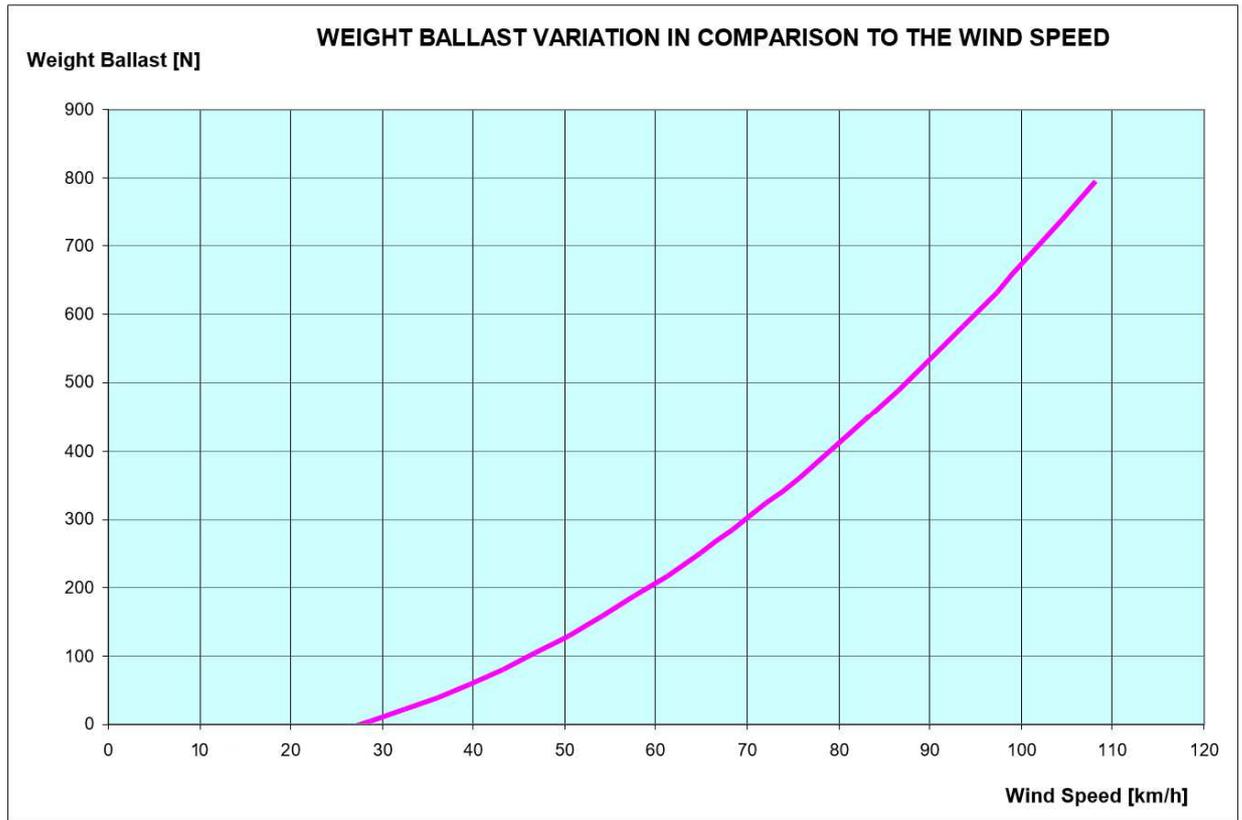


Fig. 7-1 Weight Ballast variation in comparison to the wind speed for AMB-8059/00 and AMB-8059/02 without joint

**7.3 AMB-8059/00
AMB-8059/02
with joint**

Table 7-2 Wind resistance of the AMB-8059/00 and AMB-8059/02 with swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m ²]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,18	0,27	-63,65	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,72	1,08	-59,61	
10,80	3,00	1,20	1,25	6,75	1,62	2,42	-52,88	
14,40	4,00	1,20	1,25	12,00	2,87	4,31	-43,46	
18,00	5,00	1,20	1,25	18,75	4,49	6,73	-31,34	
21,60	6,00	1,20	1,25	27,00	6,46	9,69	-16,53	
25,20	7,00	1,20	1,25	36,75	8,80	13,19	0,97	Ballast bags filled with water
28,80	8,00	1,20	1,25	48,00	11,49	17,23	21,17	
32,40	9,00	1,20	1,25	60,75	14,54	21,81	44,06	
36,00	10,00	1,20	1,25	75,00	17,95	26,93	69,64	
39,60	11,00	1,20	1,25	90,75	21,72	32,58	97,91	
43,20	12,00	1,20	1,25	108,00	25,85	38,78	128,88	
46,80	13,00	1,20	1,25	126,75	30,34	45,51	162,54	
50,40	14,00	1,20	1,25	147,00	35,19	52,78	198,89	
54,00	15,00	1,20	1,25	168,75	40,39	60,59	237,93	
57,60	16,00	1,20	1,25	192,00	45,96	68,93	279,67	
61,20	17,00	1,20	1,25	216,75	51,88	77,82	324,10	
64,80	18,00	1,20	1,25	243,00	58,16	87,24	371,22	
68,40	19,00	1,20	1,25	270,75	64,81	97,21	421,04	Ballast bags filled with sand
72,00	20,00	1,20	1,25	300,00	71,81	107,71	473,55	
75,60	21,00	1,20	1,25	330,75	79,17	118,75	528,75	
79,20	22,00	1,20	1,25	363,00	86,89	130,33	586,64	
82,80	23,00	1,20	1,25	396,75	94,96	142,45	647,23	
86,40	24,00	1,20	1,25	432,00	103,40	155,10	710,51	
90,00	25,00	1,20	1,25	468,75	112,20	168,30	776,48	Fastening the nylon wind strays
93,60	26,00	1,20	1,25	507,00	121,35	182,03	845,15	
97,20	27,00	1,20	1,25	546,75	130,87	196,30	916,51	
100,80	28,00	1,20	1,25	588,00	140,74	211,11	990,56	
104,40	29,00	1,20	1,25	630,75	150,97	226,46	1067,30	
108,00	30,00	1,20	1,25	675,00	161,56	242,35	1146,73	
111,60	31,00	1,20	1,25	720,75	172,52	258,77	1228,86	
115,20	32,00	1,20	1,25	768,00	183,82	275,74	1313,68	
118,80	33,00	1,20	1,25	816,75	195,49	293,24	1401,20	
122,40	34,00	1,20	1,25	867,00	207,52	311,28	1491,41	
126,00	35,00	1,20	1,25	918,75	219,91	329,86	1584,31	
129,60	36,00	1,20	1,25	972,00	232,65	348,98	1679,90	
133,20	37,00	1,20	1,25	1026,75	245,76	368,64	1778,18	
136,80	38,00	1,20	1,25	1083,00	259,22	388,83	1879,16	
140,40	39,00	1,20	1,25	1140,75	273,04	409,57	1982,83	
144,00	40,00	1,20	1,25	1200,00	287,23	430,84	2089,20	

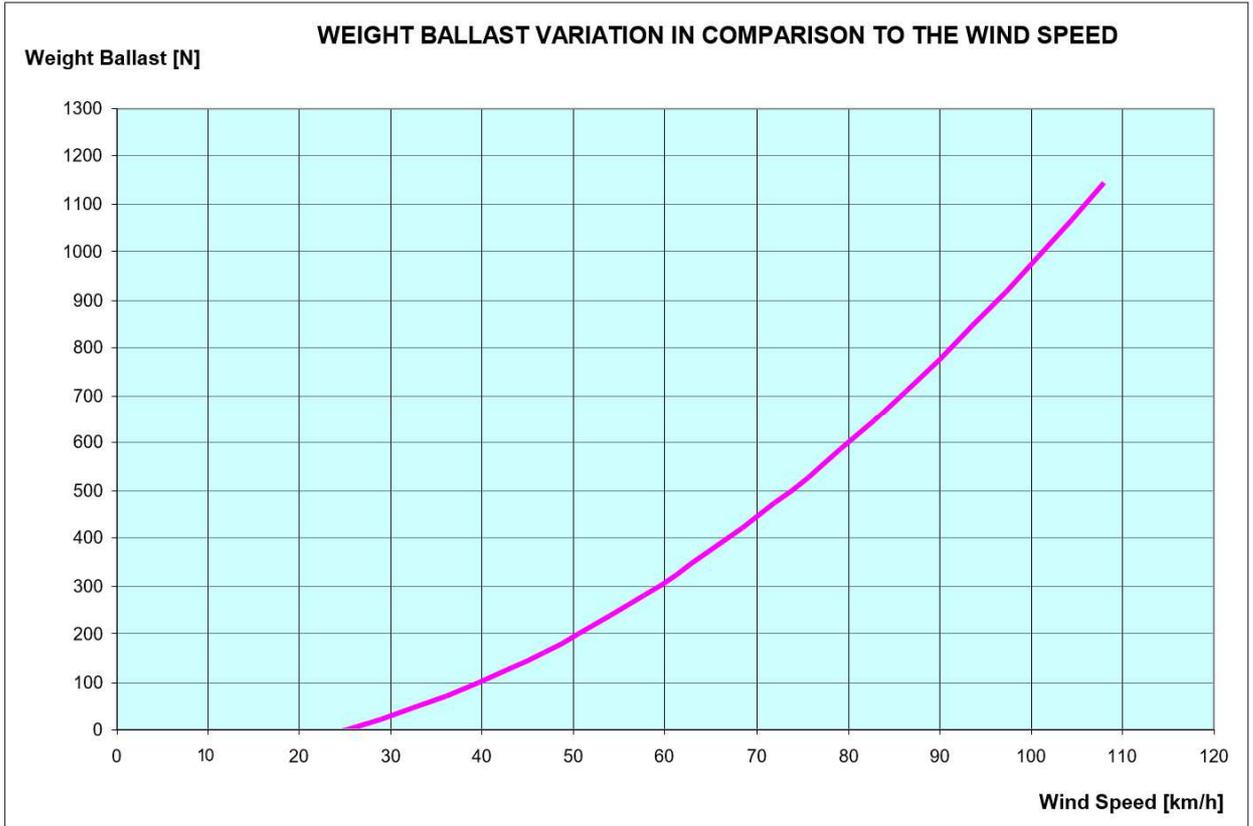


Fig. 7-2 Weight Ballast variations in comparison to the wind speed for AMB-8059/00 and AMB-8059/02 with joint

**7.4 AMB-8059/01
AMB-8059/03
without joint**

Table 7-3 Wind resistance of the AMB-8059/01 and AMB-8059/03 without swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m ²]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,14	0,21	-64,95	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,56	0,84	-61,79	
10,80	3,00	1,20	1,25	6,75	1,26	1,90	-56,52	
14,40	4,00	1,20	1,25	12,00	2,25	3,37	-49,15	
18,00	5,00	1,20	1,25	18,75	3,51	5,27	-39,67	
21,60	6,00	1,20	1,25	27,00	5,06	7,58	-28,08	
25,20	7,00	1,20	1,25	36,75	6,88	10,32	-14,39	
28,80	8,00	1,20	1,25	48,00	8,99	13,48	1,41	
32,40	9,00	1,20	1,25	60,75	11,38	17,06	19,32	Ballast bags filled with water
36,00	10,00	1,20	1,25	75,00	14,04	21,07	39,33	
39,60	11,00	1,20	1,25	90,75	16,99	25,49	61,46	
43,20	12,00	1,20	1,25	108,00	20,22	30,34	85,68	
46,80	13,00	1,20	1,25	126,75	23,74	35,60	112,02	
50,40	14,00	1,20	1,25	147,00	27,53	41,29	140,46	
54,00	15,00	1,20	1,25	168,75	31,60	47,40	171,00	
57,60	16,00	1,20	1,25	192,00	35,95	53,93	203,66	
61,20	17,00	1,20	1,25	216,75	40,59	60,88	238,42	
64,80	18,00	1,20	1,25	243,00	45,50	68,26	275,28	
68,40	19,00	1,20	1,25	270,75	50,70	76,05	314,26	
72,00	20,00	1,20	1,25	300,00	56,18	84,27	355,34	
75,60	21,00	1,20	1,25	330,75	61,94	92,91	398,53	Ballast bags filled with sand
79,20	22,00	1,20	1,25	363,00	67,98	101,96	443,82	
82,80	23,00	1,20	1,25	396,75	74,30	111,44	491,22	
86,40	24,00	1,20	1,25	432,00	80,90	121,35	540,73	
90,00	25,00	1,20	1,25	468,75	87,78	131,67	592,34	
93,60	26,00	1,20	1,25	507,00	94,94	142,41	646,06	
97,20	27,00	1,20	1,25	546,75	102,39	153,58	701,89	
100,80	28,00	1,20	1,25	588,00	110,11	165,17	759,83	
104,40	29,00	1,20	1,25	630,75	118,12	177,17	819,87	Fastening the nylon wind strays
108,00	30,00	1,20	1,25	675,00	126,40	189,60	882,01	
111,60	31,00	1,20	1,25	720,75	134,97	202,45	946,27	
115,20	32,00	1,20	1,25	768,00	143,82	215,73	1012,63	
118,80	33,00	1,20	1,25	816,75	152,95	229,42	1081,10	
122,40	34,00	1,20	1,25	867,00	162,36	243,53	1151,67	
126,00	35,00	1,20	1,25	918,75	172,05	258,07	1224,35	
129,60	36,00	1,20	1,25	972,00	182,02	273,03	1299,14	
133,20	37,00	1,20	1,25	1026,75	192,27	288,41	1376,03	
136,80	38,00	1,20	1,25	1083,00	202,80	304,21	1455,04	
140,40	39,00	1,20	1,25	1140,75	213,62	320,43	1536,14	
144,00	40,00	1,20	1,25	1200,00	224,71	337,07	1619,36	

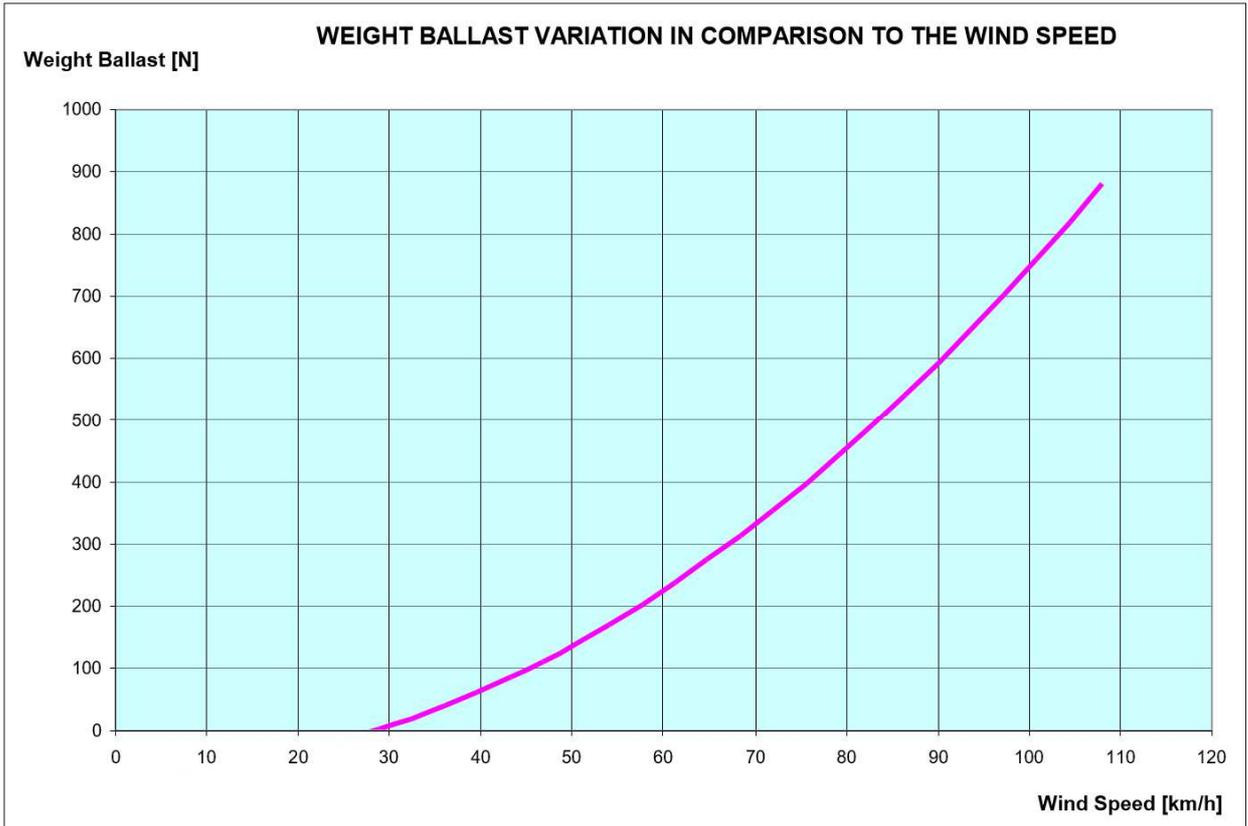


Fig. 7-3 Weight Ballast variations in comparison to the wind speed for AMB-8059/01 and AMB-8059/03 without joint

**7.5 AMB-8059/01
AMB-8059/03
with joint**

Table 7-4 Wind resistance of the AMB-8059/01 and AMB-8059/03 with swivel joint								
Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m ²]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,19	0,29	-75,54	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,78	1,16	-71,18	
10,80	3,00	1,20	1,25	6,75	1,75	2,62	-63,89	
14,40	4,00	1,20	1,25	12,00	3,11	4,66	-53,70	
18,00	5,00	1,20	1,25	18,75	4,85	7,28	-40,60	
21,60	6,00	1,20	1,25	27,00	6,99	10,48	-24,58	
25,20	7,00	1,20	1,25	36,75	9,51	14,27	-5,65	
28,80	8,00	1,20	1,25	48,00	12,43	18,64	16,20	
32,40	9,00	1,20	1,25	60,75	15,73	23,59	40,95	Ballast bags filled with water
36,00	10,00	1,20	1,25	75,00	19,42	29,12	68,62	
39,60	11,00	1,20	1,25	90,75	23,49	35,24	99,20	
43,20	12,00	1,20	1,25	108,00	27,96	41,94	132,69	
46,80	13,00	1,20	1,25	126,75	32,81	49,22	169,09	
50,40	14,00	1,20	1,25	147,00	38,05	57,08	208,41	
54,00	15,00	1,20	1,25	168,75	43,69	65,53	250,64	
57,60	16,00	1,20	1,25	192,00	49,70	74,56	295,78	
61,20	17,00	1,20	1,25	216,75	56,11	84,17	343,83	Ballast bags filled with sand
64,80	18,00	1,20	1,25	243,00	62,91	94,36	394,80	
68,40	19,00	1,20	1,25	270,75	70,09	105,14	448,68	
72,00	20,00	1,20	1,25	300,00	77,66	116,49	505,47	
75,60	21,00	1,20	1,25	330,75	85,62	128,43	565,17	
79,20	22,00	1,20	1,25	363,00	93,97	140,96	627,79	
82,80	23,00	1,20	1,25	396,75	102,71	154,06	693,31	
86,40	24,00	1,20	1,25	432,00	111,83	167,75	761,76	
90,00	25,00	1,20	1,25	468,75	121,35	182,02	833,11	Fastening the nylon wind strays
93,60	26,00	1,20	1,25	507,00	131,25	196,87	907,37	
97,20	27,00	1,20	1,25	546,75	141,54	212,31	984,55	
100,80	28,00	1,20	1,25	588,00	152,22	228,33	1064,64	
104,40	29,00	1,20	1,25	630,75	163,29	244,93	1147,64	
108,00	30,00	1,20	1,25	675,00	174,74	262,11	1233,55	
111,60	31,00	1,20	1,25	720,75	186,58	279,88	1322,38	
115,20	32,00	1,20	1,25	768,00	198,82	298,22	1414,12	
118,80	33,00	1,20	1,25	816,75	211,44	317,15	1508,77	
122,40	34,00	1,20	1,25	867,00	224,44	336,67	1606,33	
126,00	35,00	1,20	1,25	918,75	237,84	356,76	1706,81	
129,60	36,00	1,20	1,25	972,00	251,63	377,44	1810,20	
133,20	37,00	1,20	1,25	1026,75	265,80	398,70	1916,50	
136,80	38,00	1,20	1,25	1083,00	280,36	420,54	2025,71	
140,40	39,00	1,20	1,25	1140,75	295,31	442,97	2137,84	
144,00	40,00	1,20	1,25	1200,00	310,65	465,98	2252,88	

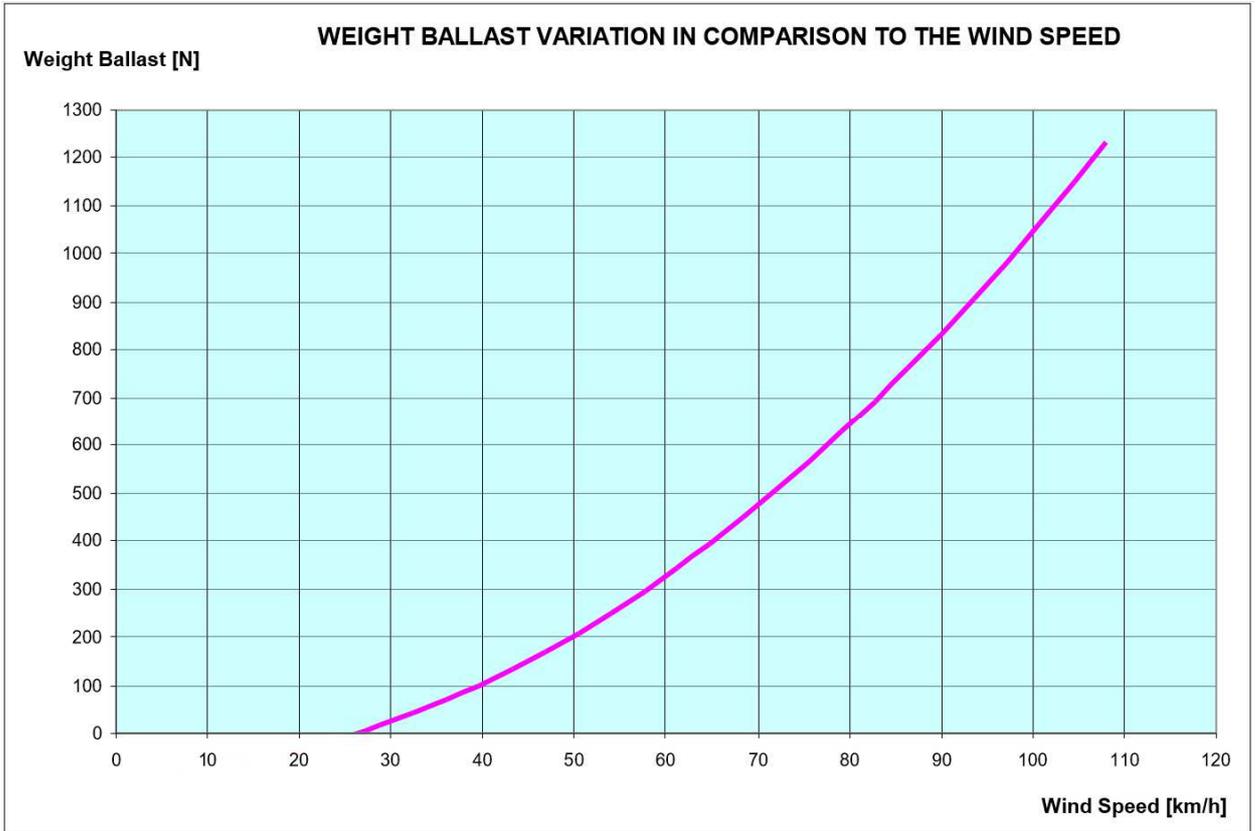


Fig. 7-4 Weight Ballast variations in comparison to the wind speed for AMB-8059/01 and AMB-8059/03 with joint

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8 – Troubleshooting & F.A.Q.

Troubleshooting

8.1 Troubleshooting

CSD communication problem.

- Verify that the SIM card is enabled for M2M communication (Machine to Machine)

- Verify that the SIM card has the PIN code disabled

- In case there is a modem connected to the PC, verify that it is set with a baud rate of 115200, to do this , use a software like hyper terminal, connect it to the modem and send the command:

AT+IPR?

The answer must be 115200, in case of a different answer, set the software hyper terminal on another baud rate, probably 9600, send the command
AT+IPR=115200

Then set again Hyper Terminal on a baud rate of 115200 and send the command

AT&W to save new settings

- In case there is a modem 3G/4G GSM connected to the computer, verify that the communication is set on 2G, to do this, use a software like hyper terminal, connect it to the modem and send the command:

AT+WS46?

The answer must be 12, in case of a different answer, send the command
AT+WS46=12 to set the modem only on the 2G network
and the digit

AT&W to save new settings

- Remember that when the area monitor is switched on, regardless of the model, the modem will remain ON for 60 minutes.

After this period there is a forced shutdown.

From this moment the area monitor will switch ON and OFF the modem according to its programming settings.

However, this situation may exist:

The area monitor is switched ON and its programming starts within 60 minutes before the forced shutdown. In this case, the modem will be switch OFF in any case and will switch back ON at the next programming cycle.

Take this example:

In this case the control unit remains ON for 1 hour (4 quarters of an hour) every 24 hours starting at 12:05 every day



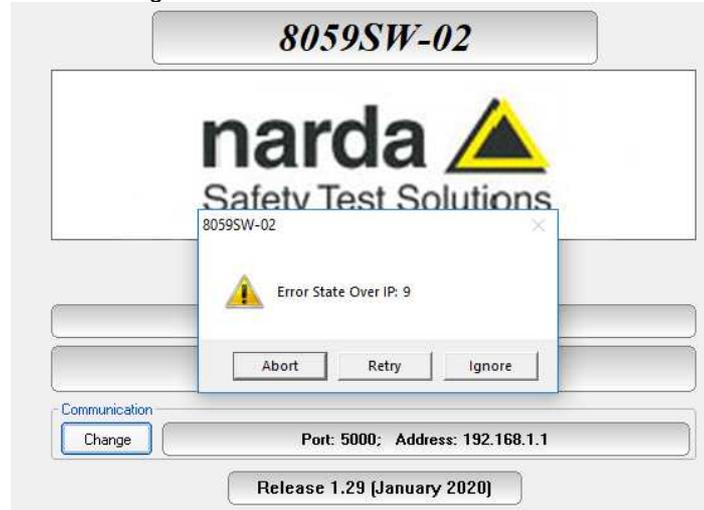
Screenshot of the "Schedule for MODEM" configuration window. The window contains the following fields and controls:

- Tel #: [Empty field]
- Time [HH:mm]: 12 : 05
- Stand By [Q]: 04
- Every [H]: 24
- Originate CALL: OFF (selected) and ON (button)

The area monitor is switched ON at 11:30.
In this case, at exactly 12:30, the control unit modem will be forced to shut down.
If you try to contact her at 13:00 you would not be able to, because the area monitor has turned OFF the modem (60 minutes have passed since it was switched on) and will turn it back ON only the following day at 12:05, and then perform the same operation every day.
Instead, if the same unit had been turned ON at 10:50 there would be no problems. Because the forced shutdown would occur at 11:50 and the next programming cycle requires that it be turned back on at 12:05. Then contacting her from 12:05 to 13:05, even the same day, you would find the modem ON and ready for communication.
All this is correct if the control unit is not faulty, there is a good GSM coverage, the SIM you are using is enabled to send and receive DATA and you do not have any PIN enabled.

Error State Over IP: 9

This message is shown when the PC WiFi is switched OFF



Error State Over IP: 6

This message is shown when a point to point Wi-Fi connection is attempted but no AMB-8059 station has been selected as AP.



Check the station operation.

Windows HyperTerminal (or similar programs like Putty or TeraTerm) and a serial port monitor could be useful tools to check the station operation when connected to the controller PC through any wired connection (RS232, USB Optic Fibre).

You can also check attempts of the station to connect to the wireless network and its operation.

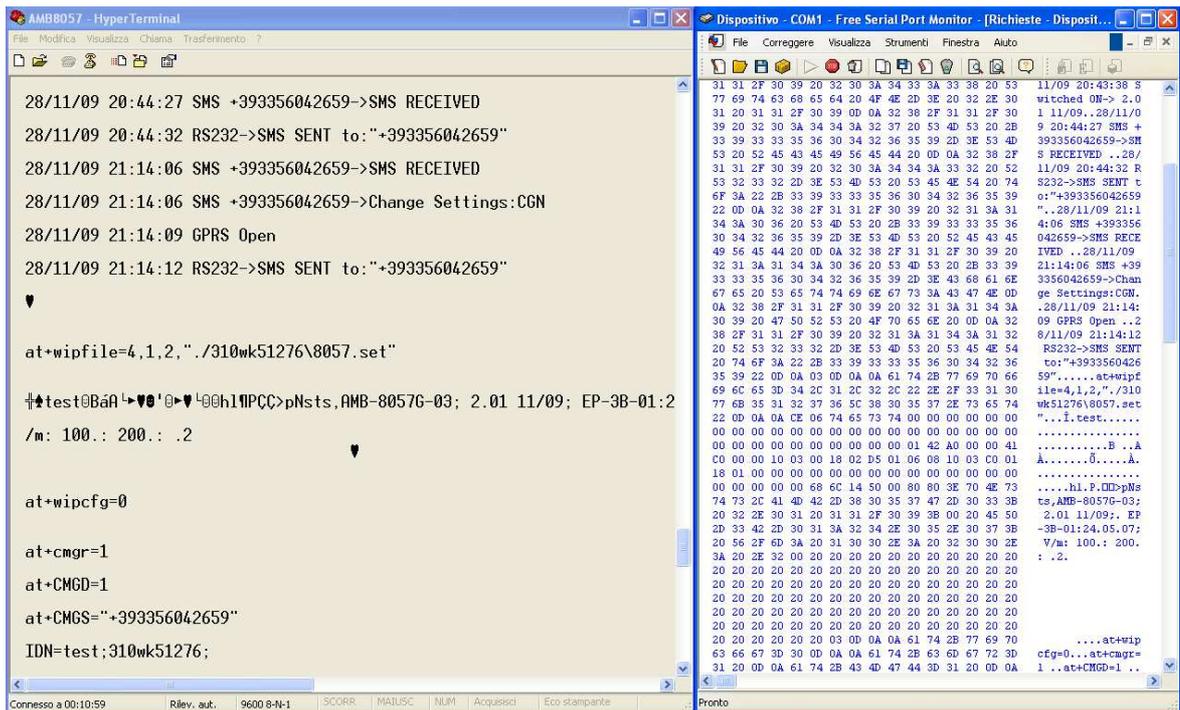
Any terminal and Serial Port Monitor show activity of the station being it connected to the PC RS232 or USB port.

To allow communication between the Hyper Terminal software and the area monitor, its has to be set with following configuration:

- Baud-rate: 115200
- Data: 8 bit
- Parity: None
- Stop: 1 bit
- Flow control: None

In this way it is possible to send all commands described in the user's manual chapter 5 and also verify the answer from the monitor station.

The example below shows that the station received an SMS from the user's mobile phone and, executes the received CGN command by connecting immediately to the ftp server.



Please be aware that GPRS service, as well as, generally, all mobile services, may be sometimes not available depending on the station installation site and on the GSM service condition.

Everytime a station is not able, for any reason, to access the ftp server, no measurement result will be lost, as soon as the station will be able to establish a connection to the server it will download all data that have not been downloaded till then.

Same concept is valid also for WiFi networks.

When I open the software, some sections are not active.

- Verify to have pushed the button Enable setting.
- Verify the area monitor is correctly set to work in Point to Point mode or in FTP mode. The choice of one mode can exclude some parts of the software when used in the other mode.

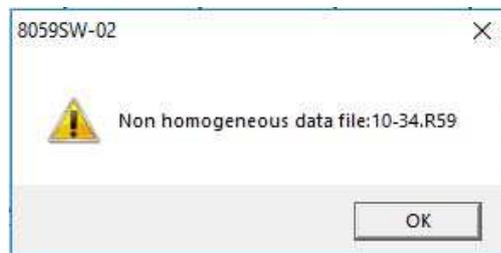
Example:

All sections concerning the Wi-Fi are not activated when the AMB-8059 is set to work with the modem

The software is not able to have a connection with the FTP server.

- Verify to have put correct IP address, user name and password for the FTP connection
- Try to enter in the FTP server with a browser (Mozilla, Safari, Internet Explorer, etc.)
- Verify that a firewall, or an anti-virus, is not blocking the connection, try to temporarily disable them just to try once

Sometimes, when I download data, I receive the window message: "Non homogeneous data file".



This happens because one of the following settings have been changed:

- Storing rate
- Average type (AVG or RMS) and/or Averaging period
- Date and time of the monitoring station

The software 8059SW-02 is not able to manage, in the same day different settings. When, in the same day one of these parameters change we have a not homogeneous data in that specific day.

The software will show you only data before the settings change.

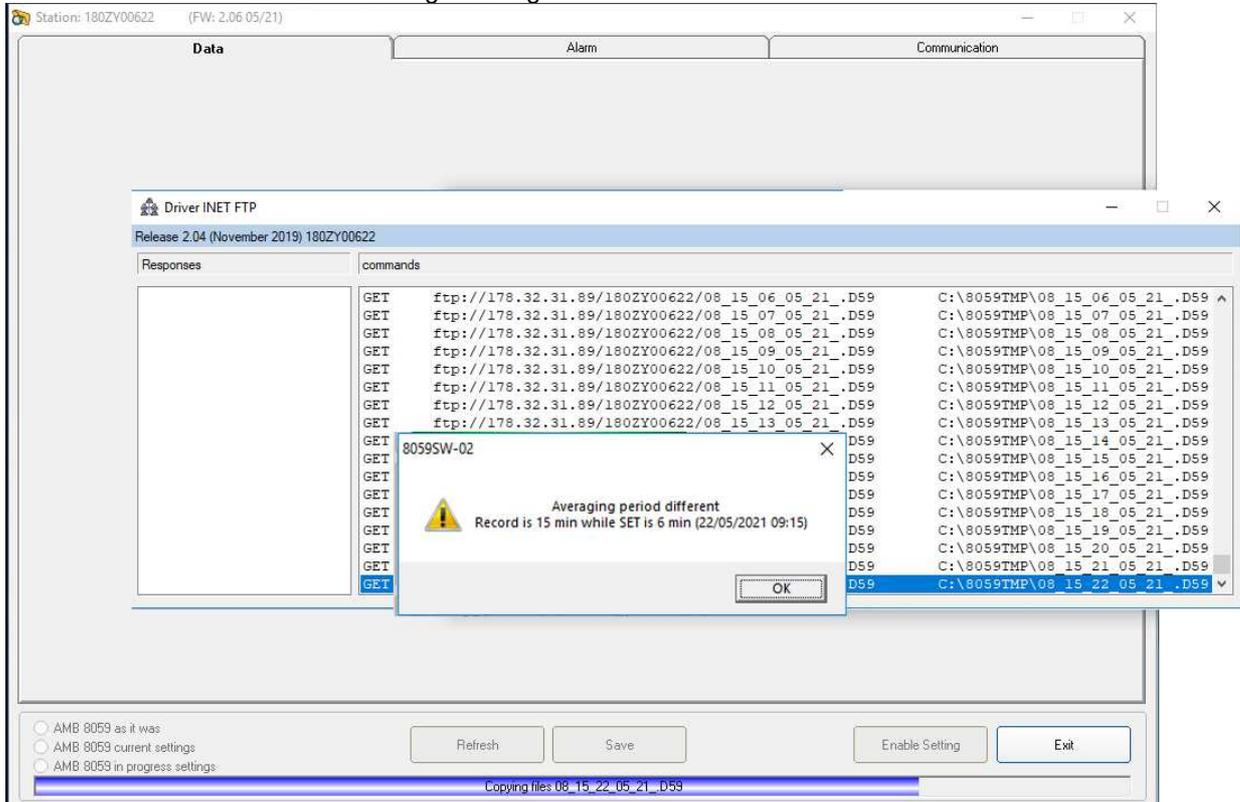
Data will be correctly available only from the next day.

To avoid this it would be better download all possible data before any change.

To download the data acquired in the period of time between the settings change and the midnight of the same day, you must delete all data acquired on that day using the **Calendar tool** (see §3.10) and set the desired interval data on **Data section** (see §3.15).

Sometimes, when I download data, I receive the window message: “Averaging period different”.

When the station download the data from the server and a change of averaging period was performed on the acquired data, it will be shown the following message.



In the above example, a new 6 minutes averaging period was set on the 22nd may 2021 at 9:15am.

The software is not able to manage, in the same day different averaging period. When, in the same day this parameter change we have a not homogeneous data in that specific day; the software will show you only data before the settings change.

Data will be correctly available only from the next day.

To download the data acquired in the period of time between the settings change and the midnight of the same day, you must delete all data acquired on that day using the **Calendar tool** (see §3.10) and set the desired interval data on **Data section** (see §3.15).

8059SW-02 Examples of error and information messages

Many phenomena can affect good communications between the modem of the monitoring station and the PC.

The selection of the port on which the modem is connected can generate a series of error messages.

The message in the status window is:

MODEM Failure

If the PC modem is off or the software is searching for the modem on a different serial port than the one to which the modem is physically connected, the message is:



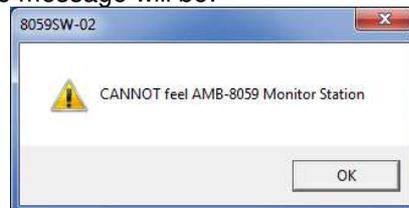
Connection Ok..Waiting for notification

The same message also appears when the User wish to make a local wired connection to the monitoring station.

Answering **YES**, the software tries to connect the station via RS232, USB, Ethernet or WiFi port, and if there is no connection, the next message is:



If the station does not answer because it is off or the batteries are completely down the message will be:

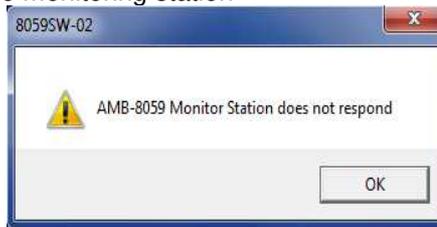


In case of error in data transmission this message will appear:



The control of the checksum guarantees the quality of the data received. When this error occurs, sometimes the 8059SW-02 software closes the application and exits.

No answer from the monitoring station



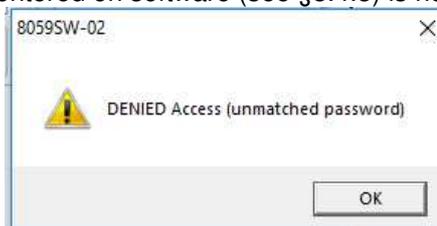
Message informing that data cannot be downloaded.



Click on **Read Station Conf.** to try and connect to the station and show its configuration. If the station does not answer, the configuration relative to the latest successful link is shown



Device Password entered on software (see §3.4.3) is not correct:



Last Call did not manage to negotiate

If there are communications problems in CSD mode between the servers of different GSM Service Providers, the message **LAST CALL DID NOT NEGOTIATE** appears in the Status frame of the main window. The same message can appear when there is heavy traffic or when the server is unable to perform roaming or when the Telephone number or Device Password entered are not correct or GSM signal is low.

#BM DENIED*

If the Device Password entered on software (see §3.4.3) does not match with the one memorized in the station, the message **#BM DENIED** appears in the Status frame of the main window

NO ANSWER

If the Telephone number of the SIM card entered on software is not correct, the message **NO ANSWER** appears in Status frame of the main window

NO CARRIER

The message **NO CARRIER** appears in the Status frame of the main window:

- If the monitoring station is switched off
- if the signal is insufficient for a Point to Point call

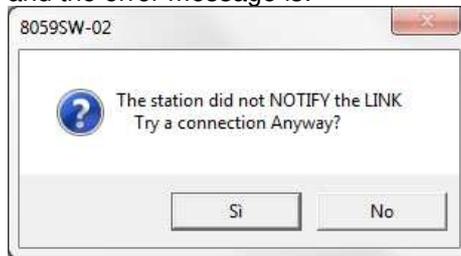
If the 8059SW-02 software does not see any available port on the PC where it is installed, the following message appears:



See paragraph 4.2 First connection - Setting stations to Point to-point mode

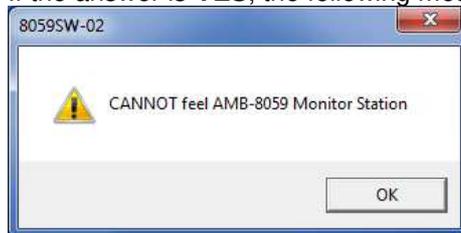
If a COM port is configured in a way that makes it not available on the computer or if there are no free ports, you can run the software in DEMO MODE to read the data already downloaded.

If the station is switched off, the serial communication cannot take place and the error message is:

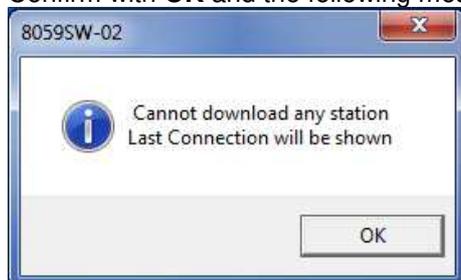


Answer **NO** and try to solve the problem checking the conditions of the cable and if it has been connected to the port used by the 8059SW-02 software.

If the answer is **YES**, the following message appears:



Confirm with **OK** and the following message appears:



Confirm with **OK**. The software will show the existing communication at the time of the latest data download.

F.A.Q.

8.2 F.A.Q

Some further questions and doubts may be raised during the Area Monitor operation.

Where to place an area monitor?

The placement of an area monitor is a compromise between a non-easy access site, to avoid possible vandalism, and a place that requires continuous monitoring.

Normally a roof, a very large terrace, an open place and on a straight surface, is the place that is most advisable.

For example, in case of a hospital or a kindergarten, why not put the instrumentation where people are?

As already explained, the instrumentation must be in a place not easy to access.

This is to avoid accidental damages from children's games such a balls or something else, possible signal influences caused by the passage of people with special equipment or who simply speak on the cell phone. Possibly avoid placing the control unit where it can be easily subjected to vandalism.

We also have to consider that signals we are going to monitor come from antennas, high voltage trellis, a technology that radiate even for miles. If the signal, we are detecting, on a roof is already low, it will be even more inside the building or at a distance greater than the emission point.

Instead, if the detected signal is near or exceeds the limits that is the area where we will have to investigate with more specific, selective equipment.

Exactly, once on a roof or a terrace, where and how does the control unit be installed?

First of all we must remember that the area monitor is powered by batteries that are recharged during the day thanks to its solar panel. Then the first thing to do is to choose a sunny place and point the solar panel in the SUD direction, if possible, or at least avoid positioning it completely toward NORTH.

Verify the presence of any objects or constructions around them does not create a shadow that will undermine the work of the solar panel.

Avoid places too close to large metal objects, or any objects that may interfere with the electromagnetic field, invalidating the measurement.

Where possible, it is good to install the area monitor at a certain distance from walls, palaces, pillars, high voltage trellis or other similar objects.

What is the minimum distance I should keep from a wall or any other object?

Much depends on the type of material it is made, its density, how the environmental factors affect it.

If we take the example of an area monitor mounted on a wall bracket, we must also consider how the latter will act on the signal that it is going to measure. If the wall was made of polystyrene, the control unit could also be attached to it, but in reality the density of the materials with which the wall is made, affects the signal.

It is also necessary to consider the atmospheric phenomena which, in conjunction with the structures around the control unit, can affect the signal.

During a rain, with the slightly wet wall, will the reflected signal be the same? And if instead of just being slightly wet it was completely covered with water? How does the refraction of the signal change?

It should be remembered that the area monitor measures a true value. If in a point the probe marks 10 V/m, it is because in that precise point there are actually 10 V/m, which is the result of the sum of all vectorial components, so both the direct and the reflected signals.

How do I know what is the most suitable point?

Good sense says that at least 3 to 4 meters away help minimize possible perturbations of the signal that you go to measure.

The best approach would be to use a wide bandwidth meter and make pads in some parts of the area chosen for installation, trying to locate an area where the signal is more homogeneous.

You do not just have to consider radio frequency though. Area monitors are programmed to send data using a SIM card. So also the presence of the 3G/4G GSM signal is important. We recommend using a cell phone to evaluate the presence and quality of cell signal.

When set the internal clock?

Every time the Area monitor is switched OFF, and the battery pack disconnected from it, the internal clock has to be set.

It is always better prepare the first installation on site with the help of a laptop or a tablet to verify that internal clock has the right hour and date

How can verify GSM signal quality in the place where the monitor is?

CSQ command (Check Signal Quality) allows verifying the GSM signal quality in the place where the area monitor is (for AMB-8059/02 and AMB-8059/03 only).

In addition to the possibility to send this command, with the syntax **#BM?CSQ***, in the log file, every time the area monitor switch the modem ON, before than its switching OFF, a verification of the GSM covering, is done.

For very connection there will be a string like this:

17/05/18 15:06:36 +CSQ: 19,99

There is the date, hour, the command and a result expressed with 2 numeric values.

The first value, 19 in this example, corresponds to the signal quality value (RSSI) expressed in dBm.

Values	dBm	Quality
from 2 to 9	from -109 to -101	Poor
from 10 to 14	from -93 to -85	Enough
from 15 to 19	from -83 to -75	Good
from 20 to 30	from -73 to -53	Excellent
31	-51 or higher	Excellent

The second value, 99 in this example, is the bit rate error

Values	Meaning
0	less than 0.1%
1	from 0.26% to 0.30%
2	from 0.51% to 0.64%
3	from 1.0% to 1.3%
4	from 1.9% to 2.7%
5	from 3.8% to 5.4%
6	from 7.6% to 11.0%
7	more than 15%
99	non detectable

How calculate the size of the data downloaded and the space occupied in the FTP server?

The quantity of the data downloaded per day from the station depends mainly on the model of the probe used (the dimension of the Quad-band probe records is approximately double than Mono and Tri-band probes), on the storing rate and, marginally, on the number of downloads. Even the number of the events (alarms, etc.) slightly effects the size of the data downloaded.

Supposing just a daily download and using a Quad-band probe EP-4B-01 model the quantity of the data downloaded is the following:

Rate 30 s → 100kB
Rate 1 min → 50kB
Rate 2 min → 25kB
Rate 6 min → 12kB
Rate 15 min → 6kB

In this case, the space occupied on the hard disk does not differ a lot from the amount of the data downloaded.

Differently, if the station was set for accessing to the server each hour (24 downloads per day), because of the minimum memory occupied by every single file (hard disk clusters dimension used), the space daily occupied on the server FTP disk, with cluster of 4kB, would be about 200kB independently of the Rate.

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Nevertheless, even this product will become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local NARDA Sales Partner or by visiting our website at www.narda-sts.it.

Servizio richiesto: *Service needed:*

Solo taratura Riparazione Riparazione & Taratura Taratura SIT Altro:
 Calibration only Repair Repair & Calibration Certified Calibration Other:

Ditta:

Company:

Indirizzo:

Address:

Persona da contattare:

Technical contact person:

Telefono:

Phone n.

Modello:

Equipment model:

Numero di serie:

Serial n.

Accessori ritornati con l'apparecchiatura: Nessuno Cavo(i) Cavo di alimentazione **Altro:**
 Accessories returned with unit: None Cable(s) Power cable **Other:**

Sintomi o problemi osservati: *Observed symptoms / problems:*

Guasto: Fisso Intermittente **Sensibile a :** Freddo Caldo Vibrazioni Altro
 Failure: Continuous Intermittent *Sensitive to:* Cold Heat Vibration Other

Descrizione del guasto/condizioni di funzionamento:

Failure symptoms/special control settings description:

Se l'unità è parte di un sistema descriverne la configurazione:

If unit is part of system please list other interconnected equipment and system set up:
