	MPB S.r.l. Via Giacomo Peroni 400/402 00131 Rome - Italy	Tel +39 0641200744 Fax +39 0641200653 info@gruppompb.com
		www.gruppompb.uk.com

User manual

SEMS & SEMS LIGHT

Shielding Effectiveness Measurement System

SAFETY NOTES

Read before using the product

MPB works to provide the best safety conditions available and complies with the latest safety standards.

The instrumentation described in this manual was produced, tested and left the factory in conditions that fully comply with European standards.

To ensure the correct use of the product, these general instructions must be read and applied before and for any use of the instrumentation.

The SEMS is made for industrial environments and laboratories and should be used by authorized staff only.

MPB disclaims any responsibility for a use of the device different from explained in the manual.

In order to keep the 24 months warranty, please <u>do not remove</u> the seals of the instrument.

Declaration of conformity

C E

(according to EMC 89/336/EEC directive and low voltage 73/23/EEC)

This is to certify that the product: SEMS / SEMS LIGHT
(Shielding Effectiveness Measurement System)
complies with the following European standards:

Safety: CEI EN 61010-1 (undated reference, applies to all editions)
EMC: EN 61326-1 (undated reference, applies to all editions)

This product complies also with the 2006/95/CE Low voltage directive
requirements and with EMC 2004/108/CE directive

MPB S.r.l.

Index

1. General information

1.1. Introduction

The SEMS was developed to meet the raising need for shielding effectiveness testing of shielded environments in hospitals and industries.
This system allows measuring, automatically, rapidly and with extreme accuracy, the attenuation value of the magnetic and the electric field in shielded environments.

1.2. System description

The shielding effectiveness measurement system consists of a transmitter (TX), a receiver (RX), and related antennas to measure the attenuation of the magnetic and the electric field.
Unlike other systems available in the market, that measure the shielding effectiveness only on a few frequency points, the SEMS allows performing a complete test continuously and overall frequency range. Another strength, compared to a standard system, is the synchronization between the TX and RX, connected by a wireless system or via fiber optic, that enables automatic measures that minimize errors from the operator.
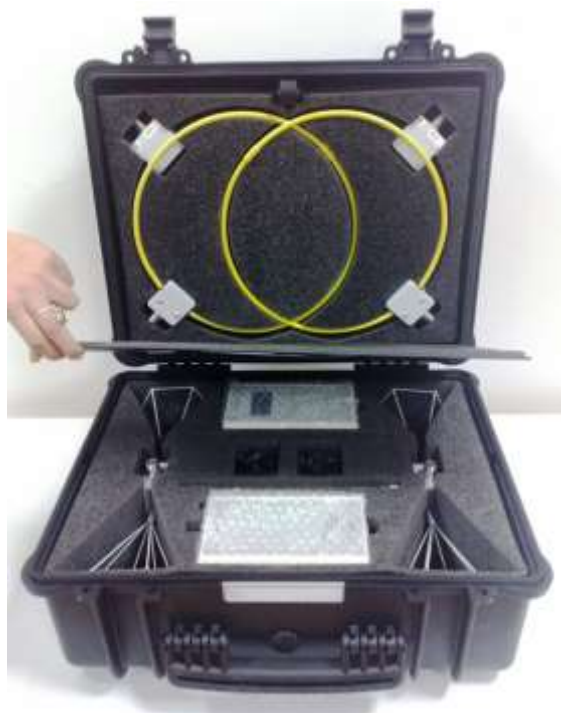
Picture 1

1.3. System composition and optional accessories

Model	SEMS KIT 1	SEMS LIGHT
RX Unit (10kHz…300MHz)	✓	Up to 128MHz
TX Unit (10kHz…300MHz)	✓	✓
Biconical antennas Mod. B1 (60…300MHz)	✓	○
Rod antennas Mod. R2 and R2W (1…128MHz)	○	○
Loop antennas Mod. L1 (2…128MHz)	✓	✓
Loop antennas Mod. L2 (10kHz…4MHz)	○	○
Loop antennas Mod. L3 for RF leak	○	○
Dipole antennas Mod. D1 and D2(40…300MHz)	○	○
Tuned loop antennas Mod. L4 (2…128MHz)	○	○
RS/232 Wireless Key - Bluetooth technology	✓	✓
RS232/USB cable for downloading the memory of the SEMS and for programming	✓	✓
Battery Charger	✓	✓
Hard case Mod. SEMS-CC	✓	✓
Antenna adapters N(m)-N(m)	✓	✓
Cal-Kit 4 attenuators 30 dB/each	○	○
Cal-Kit Accredited Certificate	○	○
Non-magnetic tripod Mod. NMR-01 Adjustable height	○	○
Optical link Mod. LO with 10m/20m fiber optic	○	○
Software Mod. SEMS-SW	✓	✓
User manual on USB key	✓	✓
Standard Calibration Certificate SEMS-STD	✓	✓

○=Option

Loop Mod. L-2 — Rod Mod.R2W — Tripod Mod.NMR-01 Non-magnetic — Dipole Mod. D-1 Dipole Mod. D-2 — Loop Leak Mod. L-3 — Tuned Loop Mod L-4

Picture 2

DIPOLO D1
Element 4
Element 3
Element 2
Element 1
Element 0

Frequency range [MHz]	Extended element
200-300	0
140-240	0+1
90-180	0+1+2
70-140	0+1+2+3
40-120	0+1+2+3+4

Note:
if mod. D2 dipole is composed by 5 elements (0-4), user must refer to mod. D1 during the measurement.

DIPOLO D2
Element 5
Element 4
Element 3
Element 2
Element 1
Element 0

Frequency range [MHz]	Extended element
260-300	0
170-290	0+1
140-180	0+1+2
115-155	0+1+2+3
80-120	0+1+2+3+4
40-115	0+1+2+3+4+5

Picture 3

TIPS TO HAVE THE BEST DYNAMIC WITH DIPOLE ANTENNA MODEL D1 AND D2

1.4. SEMS Receiver (RX) front panel

The picture below (n°4) shows the front panel of the SEMS Receiver. It comes with a display and a keyboard.

RF in 50 Ohm
N female connector

Alphanumeric display

Keyboard
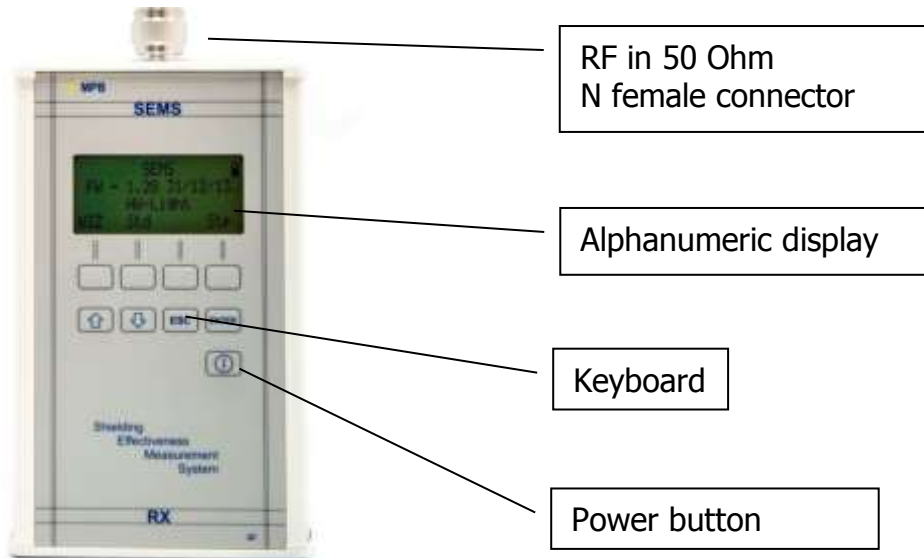
Power button

Picture 4

1.5. SEMS Transmitter (TX) front panel

The SEMS Transmitter (picture n° 5) comes with no keyboard but only with a power button and a led to indicate whether the transmission is active, since the inputs are sent by the Receiver through a wireless connection.

RF out 50 Ohm
N female connector

Power button

LED on when
transmission is active
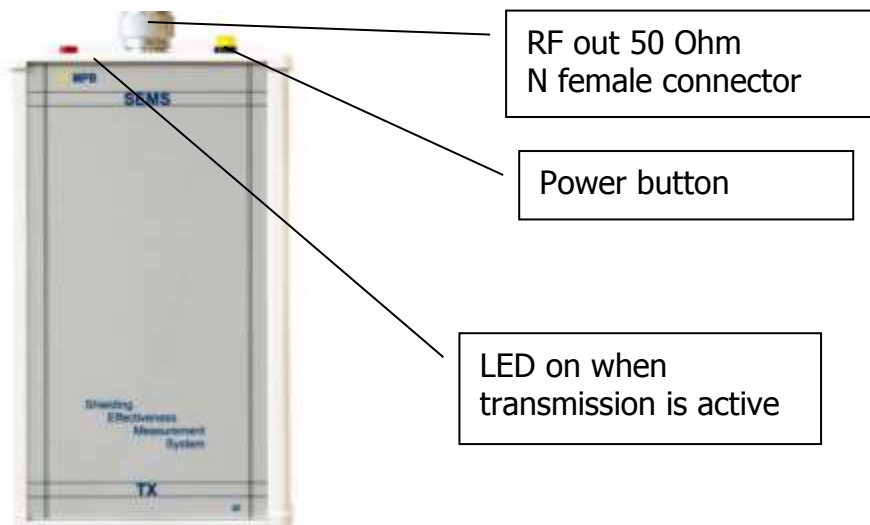
Picture 5

1.6. Receiver / Transmitter rear panel

The rear panels are the same for both units and come with the serial number, the threaded insert for the tripod, the battery charger connection and the RS232 interface for the wireless link.

Picture 6

RS232

Serial
number

Thread insert ¼"

Battery charger
connection
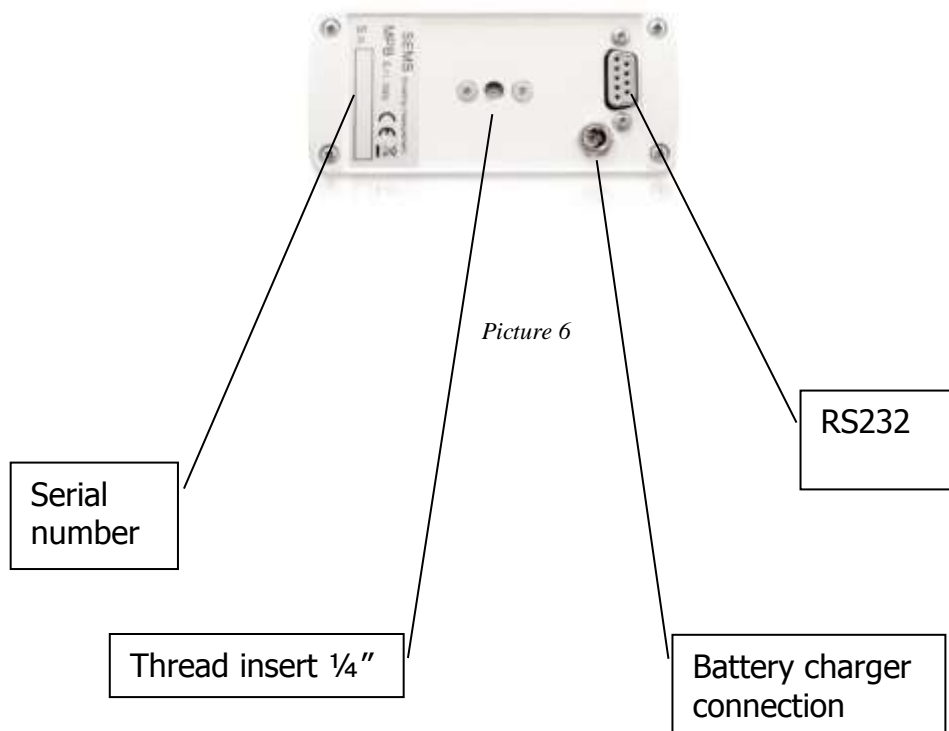
Warning: use only the original battery charger provided with the instrument to avoid serious damages to the device and risks for the operator.

Warning: the battery charger must be connected to both devices (TX and RX) turned off.

1.7. Technical specifications

Frequency range for TX/RX	10 kHz…300 MHz (SEMS Light up to 128MHz)
Resolution	10 Hz
RF out (TX module)	Z_{out} 50 Ω, N fem.
Max output power (typical)	+30 dBm
RF in (RX module)	Z_{in} 50 Ω, N fem.
VSWR	< 1.2
Attenuator	0…20dB
Max input power	110 dBuV
Dynamic Range	120 dB
IF bandwidth (RX module)3 dB bandwidth	5/150Hz
Attenuation measurement accuracy	10 kHz…30 MHz ± 1.0 dB
(typical)	30 MHz…300 MHz ± 1,5 dB
I/O interface	RS232 / Wireless
Buzzer	To set on attenuation level
International standards compliance	MIL-Std-285 IEEE Std 299 EN 50147-1 NSA65-6
Operating temperature	0°….40°C
Battery	Irreplaceable and rechargeable Li-Ion (6 h)
Antennas	
Loop Mod.L-1	Frequency range 2…128 MHz Diameter 30 cm
Loop Mod.L-2	Frequency range 10 kHz…4 MHz Diameter 30 cm
Rod Mod. R-2W and R-2	Frequency range 1…128 MHz Adjustable on length
Dipole Mod. D-1 and D-2	Frequency range 40…300 MHz Adjustable on extension
Loop Mod. L-3	Used for RF Leak
Biconical Mod. B-1	Frequency range 60…300 MHz Width 35 cm
Tuned Mod. L-4	Frequency range 2 MHz- 128 MHz
Accessories	
Non-magnetic tripod Mod. NMR-01	Adjustable in height, non-reflective
Optical Link Mod. LO	With 10m or 20 m. fiber optic
Calibration Set-Up and Measurement	Programmable with software
Weight and dimensions	
Overall weight	9,4 kg
Case dimensions	52x43x23cm

Technical specifications may change without notice

1.8. Battery charging

To charge the equipment, please disconnect the RS232 wireless and the RS232 cable.

In sequence, please connect:

a) The battery charger to the main power supply until the green LED appears on the charger
b) The charger plug in to the SEMS

When the red light is on, the charging is in progress.
At the end of the charging, the LED turns green.
With batteries 100% low, the charging time is approx. 4 hours.
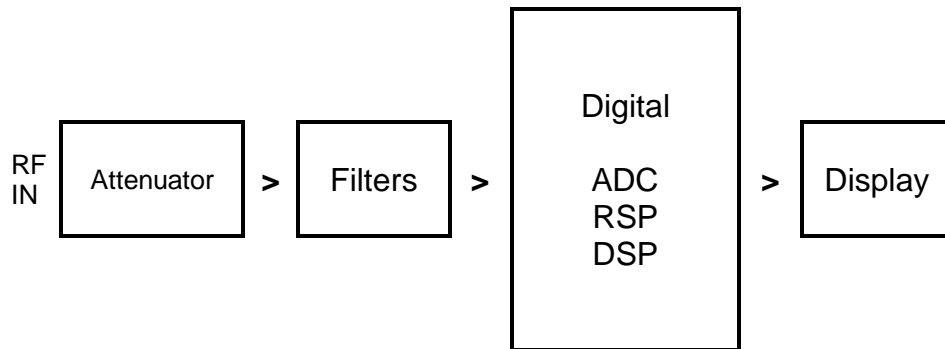
Note: the charging time of each power supply may vary because the electronic control of the tolerance about the total charge might be different.

This means that the status time of the LED (from red to green) might vary.

2. Operating principle

2.1. SEMS Receiver (RX)

The block diagram below represents the SEMS Receiver:

Picture 7

Following the RF signal that comes from the receiving antenna there is the attenuator module, that fits the RF signal level to the following modules, then there is the filters module, that selects the bandwidth, according to the reception frequency. The adapted RF signal enters the digital part through an ADC converter followed by a RSP and a DSP that, through complex algorithms, process the digital signal, and then show it on the display.

2.2. SEMS Transmitter (TX)

The block diagram below represents the SEMS Transmitter.
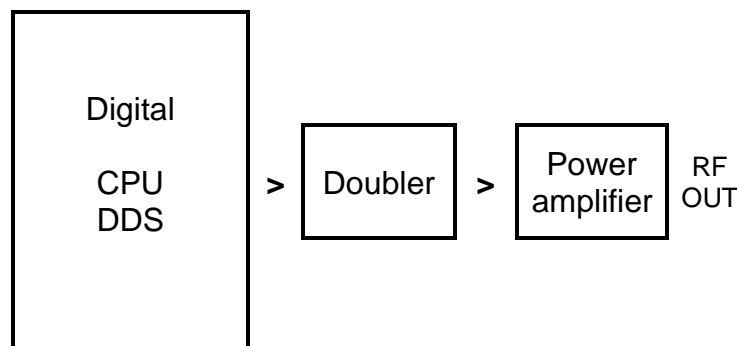
Picture 8

The signal to transmit is generated from the DDS, following the inputs from the CPU that receives the instructions from the receiver's wireless interface. This signal is duplicated and amplified in order to achieve the required level to be transmitted by the transmitting antenna.

2.3. SEMS System

The main functionality of the SEMS is measuring the shielding effectiveness in a shielded environment that means to measure the attenuation of the electric or the magnetic field.
The SEMS performs a relative measure and not an absolute one.
We can briefly describe the operating principle as follows: the transmitter generates a RF signal and irradiates it through the antenna. At a predetermined distance, the receiver catches the signal with a correspondent antenna and measures the signal level. By moving the receiver inside the shielded environment, maintaining the same distance from the transmitter, we will obtain a lower signal, so we can consider the shielding attenuation as the difference between the two signals.
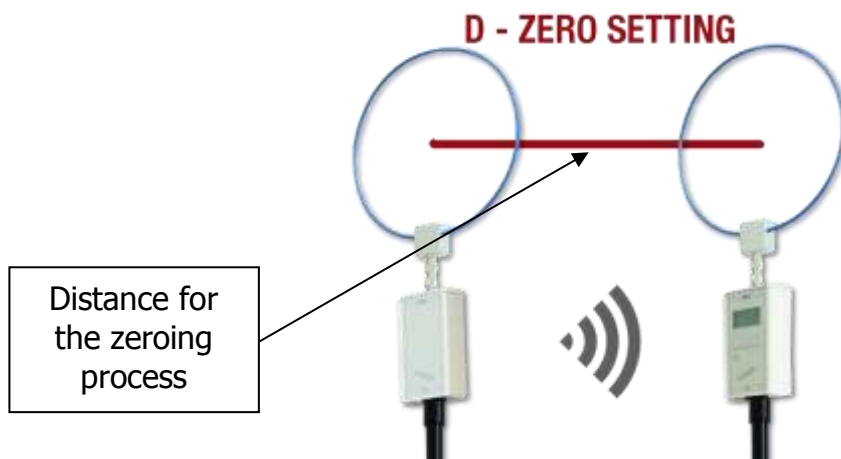
Picture 9

2.4. Power saving and recalibration

The SEMS has an inner timer in both RX and TX units for two reasons: the TX automatically turns off after 17 min of idle to save the battery; the RX unit, after 15 min from the last zeroing, requires recalibrating the SEMS by repeating the procedure.
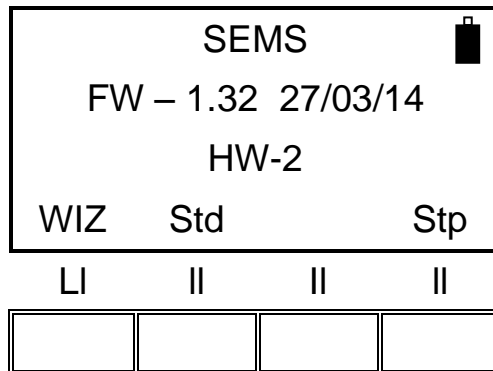
3. Use and operations

3.1. Turn on menu

By pressing the power button of the RX module, the device will turn on: to turn it off, press the power button for at least four seconds. Follow the same procedure for the TX module.

Note: <u>To turn on the unit, press for at least one second and no more than two seconds the power button. Holding the button for more than two second, will cause a system reboot. This is valid for both Receiver and Transmitter</u>

As the device is on, the display will show the following screenshot.
Top right of the screen, a battery icon to show the charging status of the RX unit will appear. After a few seconds, after the TX connection, top left, the TX unit battery icon will appear.
If the battery icon do not appear on the display, it means that there is no communication between the units. Please check the configuration of the wireless Bluetooth.

```
┌─────────────────────────────┐
│      SEMS              ▮     │
│   FW – 1.32  27/03/14       │
│        HW-2                 │
│                             │
│  WIZ    Std         Stp     │
├────────┬──────┬──────┬──────┤
│   Ll   │  ll  │  ll  │  ll  │
├────────┼──────┼──────┼──────┤
│        │      │      │      │
└────────┴──────┴──────┴──────┘
```
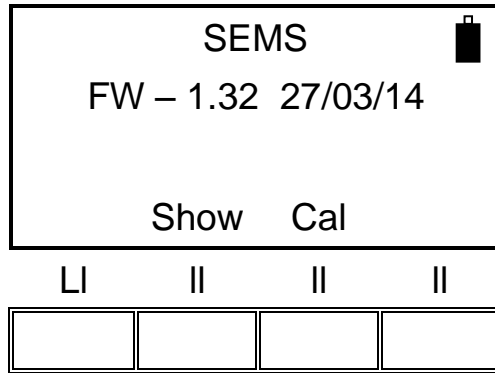
Picture 10

Note: <u>If the connection is established, the red LED of the wireless devices flashes together with the yellow ones. Please wait until the complete switching off of the first ones in order to let the devices synchronize. It is required up to one minute from the moment when both units are powered, to establish the connection.</u>

3.2. Std Menu

By pressing the **Std** menu button, a screen as below will appear:

```
        SEMS              🔋
   FW – 1.32  27/03/14


        Show    Cal
  LI      II      II      II
 [    ][    ][    ][    ]
```

Picture 11

By pressing the related buttons, the system will enable the access to the **Show** and **Cal** menus.

3.2.1. Cal menu

The **Cal** mode was developed to perform the system's zeroing process (**Scan** or **List**) or the system's calibration process (**CalK**).

```
 🔋      SEMS            🔋
   Ready for Measuring


 Scan    List   CalK
   II      II      II      II
 [    ][    ][    ][    ]
```
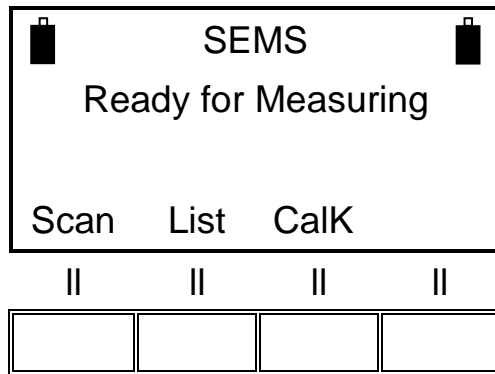
Picture 12

The **Scan** performs the system zeroing process through default or programmable scansions. In fact, by pressing the **Scan** button, the system will enable to choose default scans (**L_Lo**, **L_Hi** e **Bic**) or customized programmable bands (**Sc1**,**Sc2**,**Sc3** and **Sc4**) by pressing the **User** button (customized bands are pre-programmable through the SEMS-SW software).

```
┌─────────────────────────────────┐
│  🔋            SEMS          🔋  │
│                                 │
│        Ready for Measuring      │
│                                 │
│                                 │
│   L_Lo   L_Hi   Bic     User    │
└─────────────────────────────────┘
     ‖       ‖      ‖       ‖
   ┌─────┬─────┬──────┬──────┐
   │     │     │      │      │
   └─────┴─────┴──────┴──────┘
```
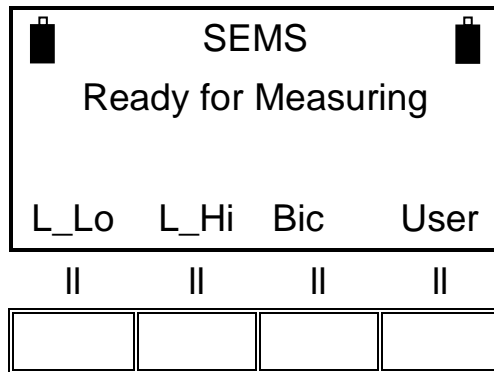
Picture 13

Choosing which scan to press depends on the type of antenna used:
L_Lo (Loop antennas Mod. L2)
L_Hi (Loop antennas Mod. L1)
Bic   (Biconical antennas Mod. B1)

User mode:

```
┌─────────────────────────────────┐
│  🔋            SEMS          🔋  │
│                                 │
│        Ready for Measuring      │
│                                 │
│                                 │
│   Sc1     Sc2    Sc3     Sc4    │
└─────────────────────────────────┘
     ‖       ‖      ‖       ‖
   ┌─────┬─────┬──────┬──────┐
   │     │     │      │      │
   └─────┴─────┴──────┴──────┘
```
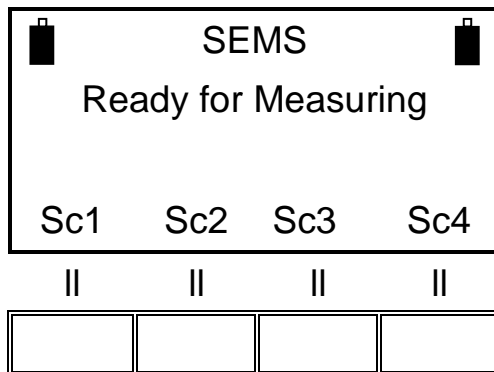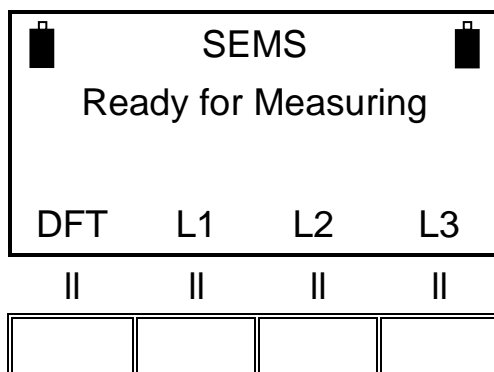
Picture 14

The **List** performs the system's zeroing process through default or programmable frequency lists. By pressing the **List** button, a menu where to select the **DFT** default frequency list or three programmable lists (**L1, L2** e **L3**) will appear.

```
┌─────────────────────────────────┐
│  🔋            SEMS          🔋  │
│                                 │
│        Ready for Measuring      │
│                                 │
│                                 │
│   DFT     L1     L2      L3     │
└─────────────────────────────────┘
     ‖       ‖      ‖       ‖
   ┌─────┬─────┬──────┬──────┐
   │     │     │      │      │
   └─────┴─────┴──────┴──────┘
```

Picture 15

The **CalK** performs the system's calibration process through the four-30dB attenuators (CAL-KIT optional accessories).

Note: this procedure implies a wireless connection between the TX and the RX unit: the connection will be confirmed through the battery status on the top left of the screen of the RX (it will appear only in case of successful connection).

Warning: never use the Cal-Kit procedure with the charger connected.

3.2.2. HiDyn menu

HiDyn is a feature available for a max number of 30 frequencies (12 for SEMS-light). Through this mode, the operator, during the zeroing process, can check if there is some noise (radio frequency disturbance) at the same frequencies of the test, that could compromise the dynamic of the measure, and consequently the results.

Note: this procedure implies a wireless connection between the TX and the RX unit: the connection will be confirmed through the battery status on the top left of the screen of the RX (it will appear only in case of successful connection).
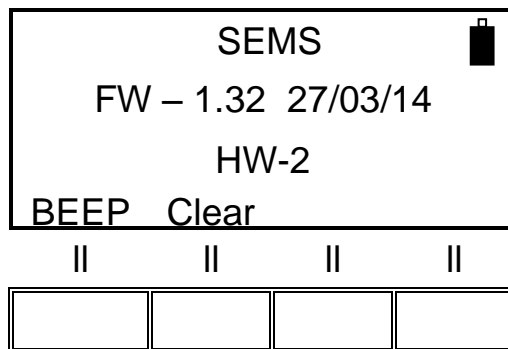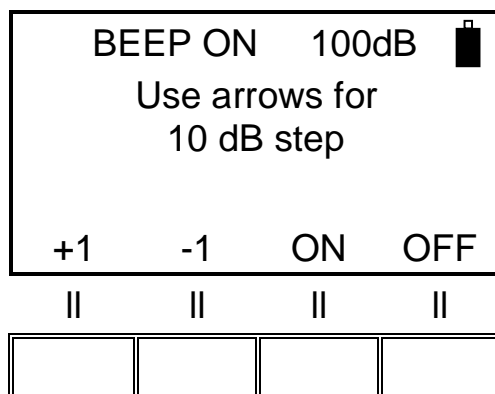
The scanning can be executed in automatic or manual mode, by pressing the **Stp** menu:
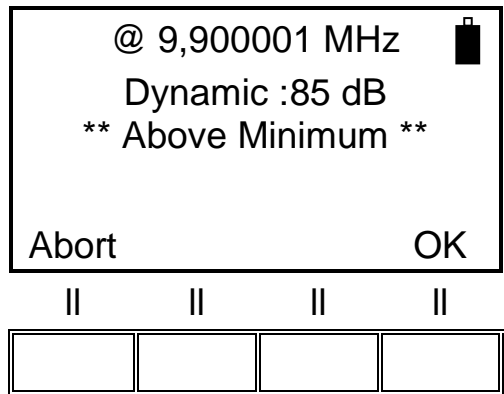
Picture 16

Picture 17

Pressing **BEEP ON/OFF** enables/disables the manual or automatic execution of the **HiDyn**.
The arrows on the keypad enables to also set the threshold of the dynamic during the test.

For example, before the zero procedure, by setting this value at 100dB (through the **BEEP ON**) the operator will know immediately if that specific dynamic is available for the measure, even before starting the measurement.
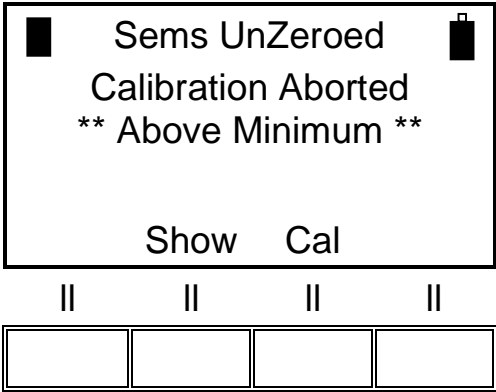
```
┌─────────────────────────────────┐
│   @ 9,900001 MHz        ▐        │
│   Dynamic :85 dB                 │
│  ** Above Minimum **             │
│                                  │
│                                  │
│  Abort                     OK    │
└─────────────────────────────────┘
       ‖      ‖      ‖      ‖
     ┌────┬────┬──────┬──────┐
     │    │    │      │      │
     └────┴────┴──────┴──────┘
```

Picture 18

In this example, the operator will be immediately aware of how much dynamic is available during the measure at the frequency of 9,900001MHz.
Confirming through the **OK** key, the SEMS RX Receiver will proceed at the next frequency by activating the **HiDyn** function as follows:

For every test frequency, two additional side frequencies are added: the lowest is f*0.99 (-1%) and the highest is f*1.01 (+1%).
All the frequencies are tuned on the RX unit, while the TX unit is kept OFF, and for each frequency, the noise floor is recorded.
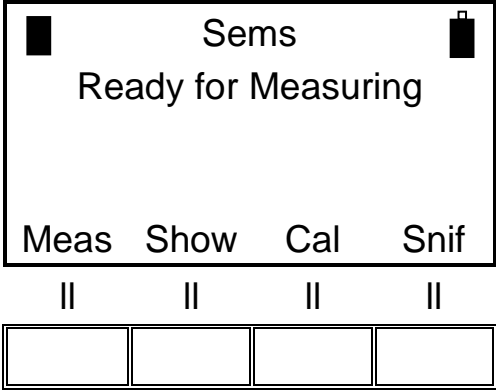
At the end of this step, for each frequency triplet, the frequency point, which shows the lowest noise floor, is taken, while the remaining two are discarded.
In this way is created a new frequency list inside the RX unit, same in number of points as the default ones.

The **HiDyn** function can be interrupted at any time.
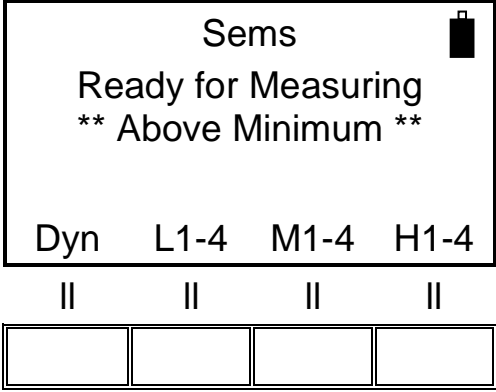By pressing the **Abort** button, the menu below will appear:

```
┌─────────────────────────────────┐
│ ■        Sems UnZeroed        ▯  │
│       Calibration Aborted        │
│       ** Above Minimum **        │
│                                  │
│                                  │
│          Show    Cal             │
└─────────────────────────────────┘
      ‖       ‖       ‖       ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```

Picture 19

It is also possible to display all the dynamic values available for each frequency point, before starting the measurement, through the **Show** key:
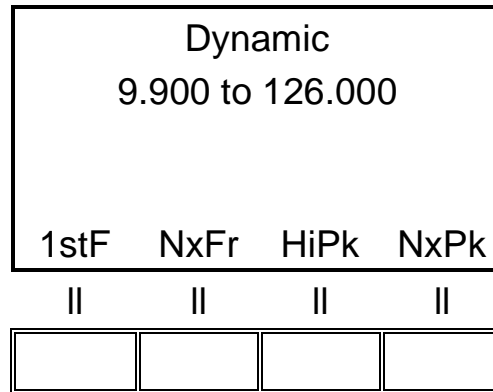
```
┌─────────────────────────────────┐
│ ■          Sems               ▯  │
│       Ready for Measuring        │
│                                  │
│                                  │
│  Meas  Show    Cal    Snif       │
└─────────────────────────────────┘
      ‖       ‖       ‖       ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```

Picture 20

And through the **Dyn** key after that:

```
┌─────────────────────────────────┐
│            Sems               ▯  │
│       Ready for Measuring        │
│       ** Above Minimum **        │
│                                  │
│  Dyn    L1-4   M1-4   H1-4       │
└─────────────────────────────────┘
      ‖       ‖       ‖       ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```
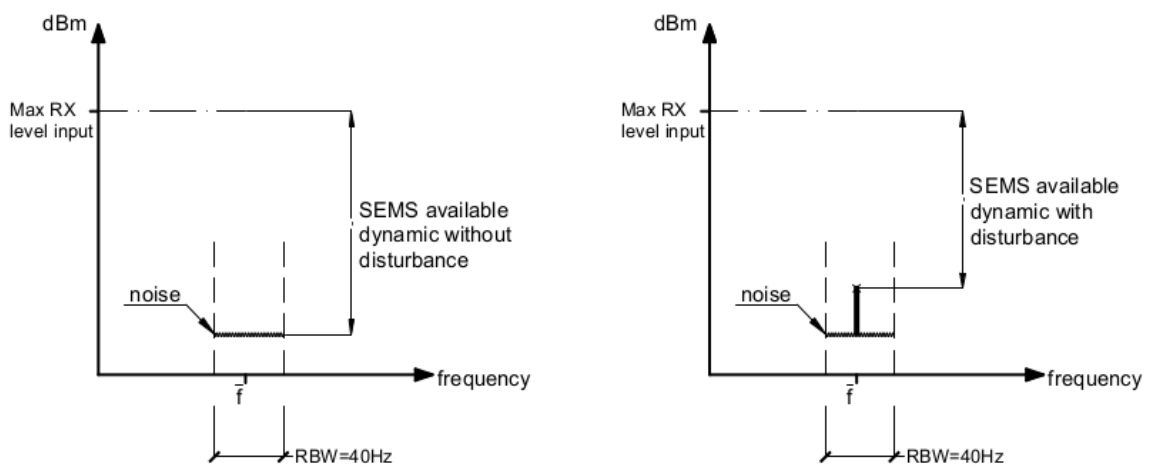
Picture 21

To display them one by one, press the button **NxFr** (next frequency) or **HiPk** (highest peak) and **NxPk** (following peak to the one displayed):

```
┌─────────────────────────────────────┐
│              Dynamic                 │
│          9.900 to 126.000            │
│                                      │
│                                      │
│                                      │
│   1stF    NxFr    HiPk    NxPk       │
│    ‖       ‖       ‖       ‖         │
│  ┌─────┐┌─────┐┌─────┐┌─────┐        │
│  │     ││     ││     ││     │        │
│  └─────┘└─────┘└─────┘└─────┘        │
└─────────────────────────────────────┘
```

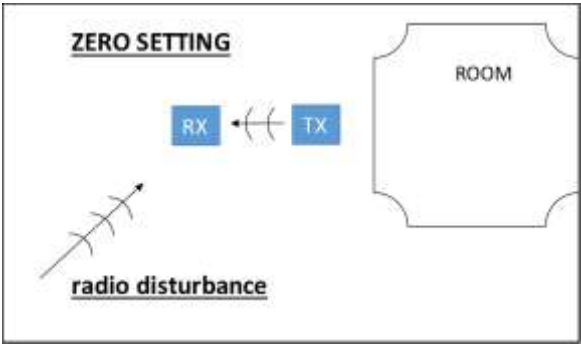*Picture 22*

3.2.3. HiDyn menu: an example

As explained in previous chapter, **HiDyn** function verifies the available dynamic and checks if a disturbance could compromise the dynamic of measurement.
In Picture 23 an example of available dynamics is shown with and without presence of disturbance.
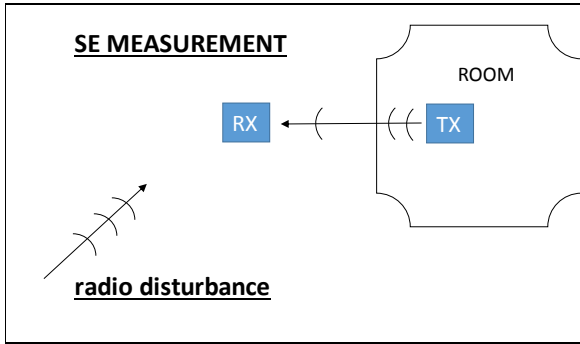

Picture 23: Dynamic range with and without presence of disturbance

Suppose that a shielding of a room has to be checked and following hypothesis are taken:
- Frequency to be tested f=10 MHz
- perform zero-setting outside of the room using **HiDyn** function
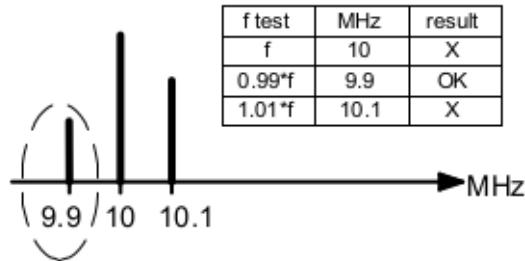- leave the RX outside the room during the measurement (*Picture* 24 and *Picture* 25)

Picture 24: zero setting phase

Picture 25: measurement phase

Running **Hidyn** function, RX performs frequency test (<u>while TX unit is turned **OFF**</u>!) and takes the frequency point with a lower noise (see chapter 3.2.2).
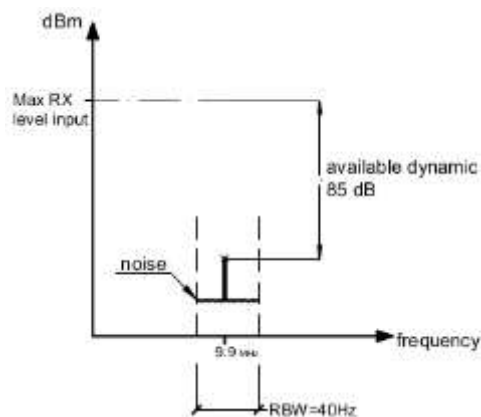Suppose that f=9.9 is taken (Picture 26).

f test	MHz	result
f	10	X
0.99*f	9.9	OK
1.01*f	10.1	X

Picture 26: f-test during Hidyn function

Further, suppose that SEMS shows an *available dynamic value* of 85 dB at f= 9,9MHz (*Picture 27* and *Picture 28*).
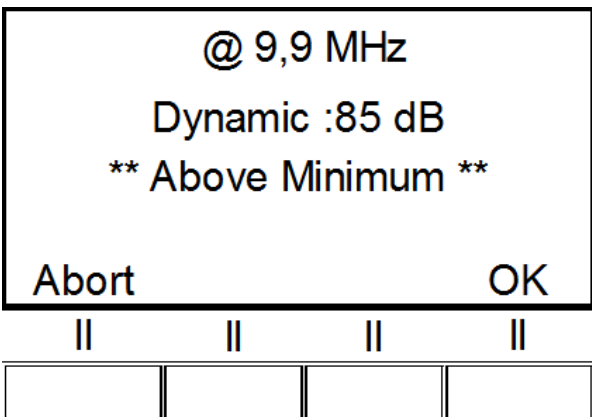
*Picture 27: displayed dynamic value*

Picture 28: available dynamic

Now, suppose the user wants to investigate the attenuation of the room in two different cases:

- CASE A: required SE = 95 dB
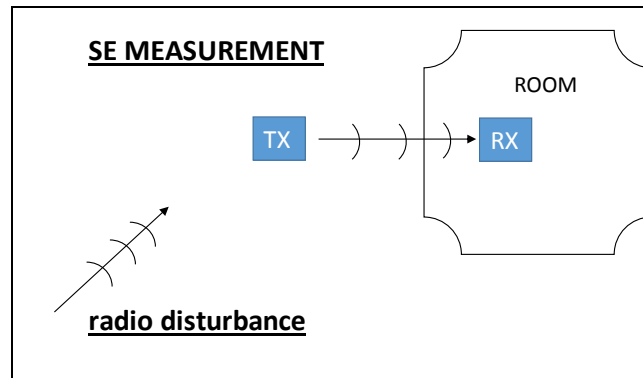
- CASE B: required SE = 75 dB

CASE A: required SE is 95 dB

Available dynamic of device is 85dB (as per **HiDyn** result).
Max value measurable by device is *lower than* value of SE to be verified.
We are **not able** to do the measurement.
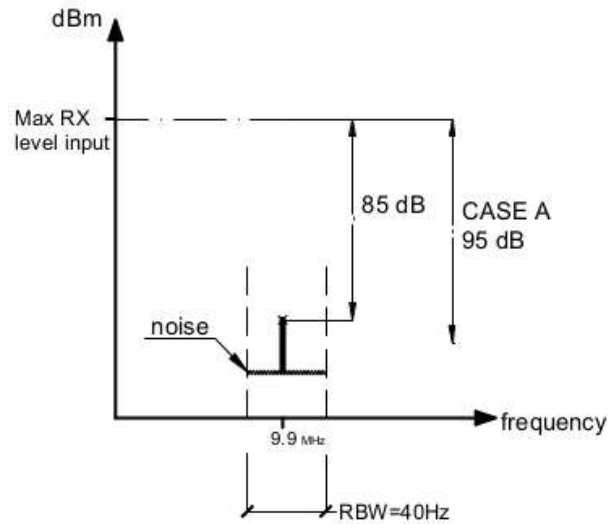
Picture 29: case A- measurement of SE

Technical note: in order to solve the problem, the measurements could be performed putting RX inside the room (in this way the dynamic range would be higher).

Picture 30: measurement with RX inside the room

CASE B: required SE is 75 dB

Available dynamic of device is 85dB (as per **HiDyn** result).
Max value measurable by device is *higher than* value of SE to be verified.
We are able to do the measurement and compare this measurement with required SE.
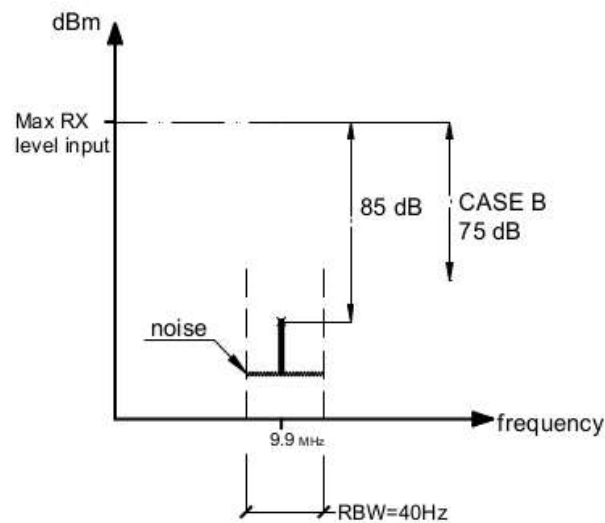
Picture 31: case B-measurement of SE

Technical note: SEMS could display 85dB as value of room's SE but, in this case, the "real" SE value could be also higher (the presence of disturbance limits the dynamic which can be displayed!)

3.2.4. Meas menu

The **Meas** key is part of the **Std** menu, but it is displayed only after having performed the zeroing through the **Cal** key (already described in **3.2.1**).
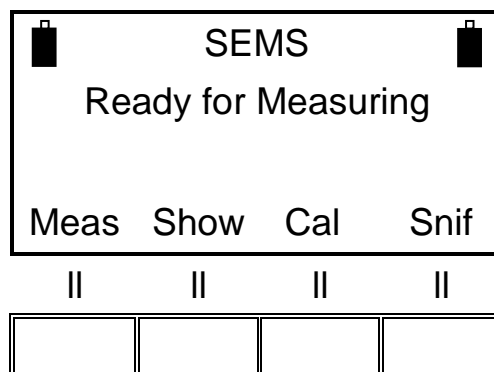
Picture 32

The command performs a measure of the attenuation, either automatically (**Auto**), or manually (**Man**).

Note: this menu is available only with the LO option.

Note: this procedure implies a wireless connection between the TX and the RX unit: the connection will be confirmed through the battery status on the top left of the screen of the RX (it will appear only in case of successful connection).

Fully Zeroed
Ready for Measuring

Auto   Man   PreQ   Unc
  || || || ||
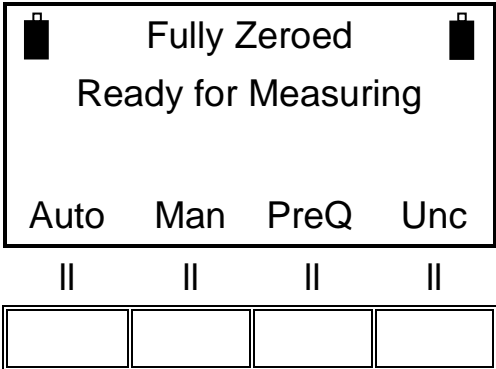
Picture 33

The automatic mode enables to choose whether to start the measurement procedure immediately (**Now**), or with a set time delay (**10s, 30s, e 60s**).

SEMS
Ready for Measuring

Now   10s   30s   60s
 || || || ||
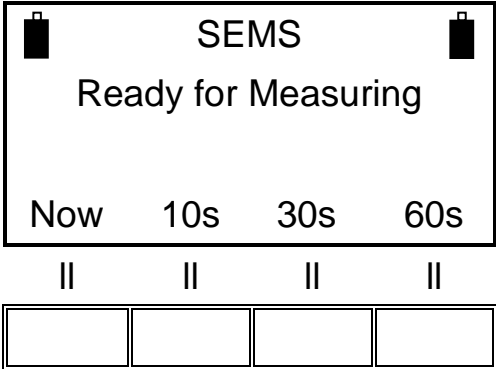
Picture 34

When instead performing a manual measurement, the following commands are required: (**Prev**) measure of the previous frequency, (**Next**) measure of the following frequency, (**Redo**) in order to re-measure the current frequency and (**Abort**) to end the measurement. To measure the electrical component, we recommend using Rod Antennas, Mod. R-2, completely open, the Biconical antennas Mod. B-1, the D-2 dipoles, on both RX and TX unit. For the magnetic field, the Loop Antennas L-1, L-2 and L-4 are available.

60.000000 MHz
Rbw:40 Hz.
Att: 56 dB
Prev   Next   Redo   Abort
 || || || ||
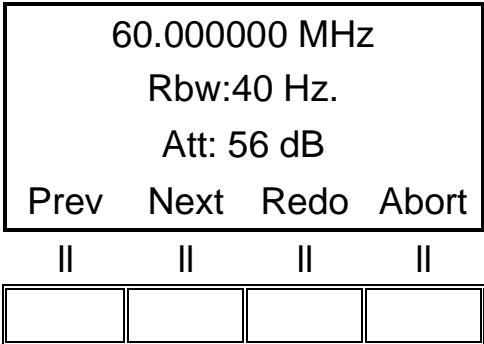
Picture 35

As the measurement is performed, the display will require choosing one of the four memory slots, for each frequency range, where to store the acquired data.

Frequency Range from 0.01 to 2MHz = memory (**L-1**, **L-2**, **L-3** e **L-4**)
Frequency Range from 2 to 60MHz = memory (**M-1**, **M-2**, **M-3** e **M-4**)
Frequency Range from 60 to 300MHz = memory (**H-1**, **H-2**, **H-3** e **H-4**)

In case the last frequency from the list is on overlap with another, the system will propose the first other memory available.

E.g. at 60MHz it could happen to have a M or H slot.

Example: storing request in the range 60-300MHz:

```
Scan Terminated
Press 1-4 to save
or Escape


H-1    H-2   H-3     H-4
 ||     ||    ||      ||
```
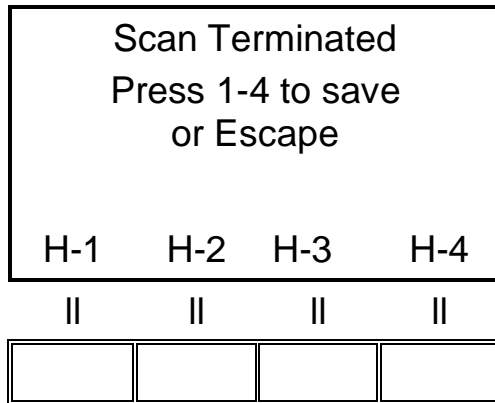
Picture 36

By pressing the **H-1** button, the data will be stored and the system will go back to the starting screen.

3.2.5. Snif Menu

This menu enables measuring the shielding effectiveness on a single frequency for leak sniffing purposes.

```
137.520975 MHz
RBW: 40Hz
to 137.520975


Next   Prev
 ||     ||    ||      ||
```

Picture 37

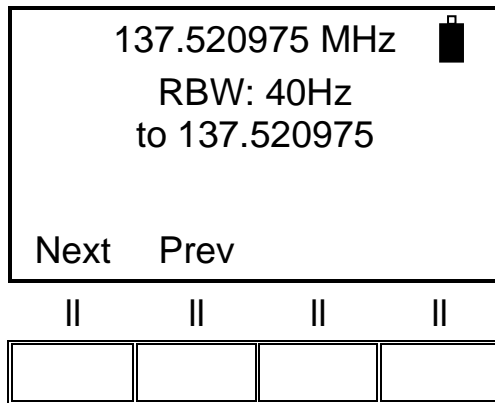Press **Next** or **Prev** to select the required working frequency for the sniffer.

```
  144.210005 MHz  ▮
  TX Tuned and Ready
     to 144.210005


  Next   Prev   Meas
   ‖      ‖      ‖      ‖
 ┌─────┬─────┬─────┬─────┐
 │     │     │     │     │
 └─────┴─────┴─────┴─────┘
```
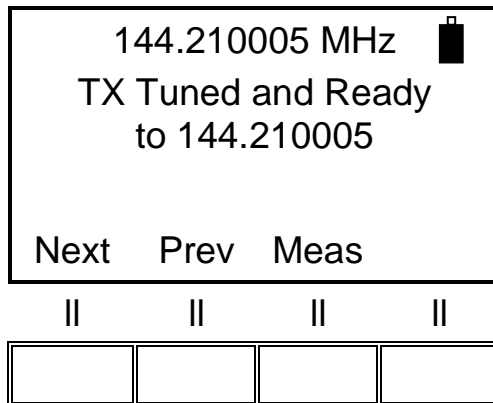
Picture 38

By pressing **Meas**, the SEMS will start measuring the shielding effectiveness on the selected frequency, displaying the current attenuation, along with the maximum and minimum value, in brackets.

```
  144.210005 MHz  ▯
   (112.4 : 134.4)
    Att:120.1 dB


  Stop        Clear
   ‖      ‖      ‖      ‖
 ┌─────┬─────┬─────┬─────┐
 │     │     │     │     │
 └─────┴─────┴─────┴─────┘
```
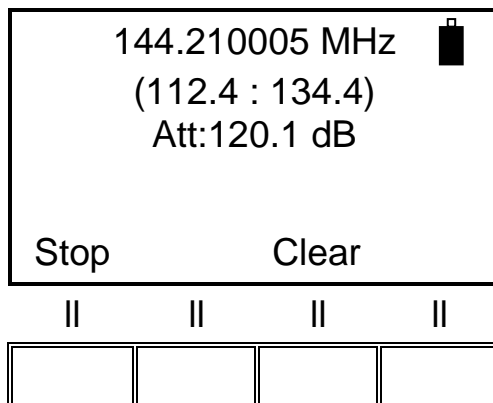
Picture 39

By pressing **Clear**, the maximum and minimum values are reset, and, by pressing **Stop,** the measure will be interrupted.

```
 ▮  144.210005 MHz  ▮

   Sniffing terminated

    (112.4 : 134.4)
  Meas  Show  Cal   Snif
   ‖      ‖      ‖      ‖
 ┌─────┬─────┬─────┬─────┐
 │     │     │     │     │
 └─────┴─────┴─────┴─────┘
```
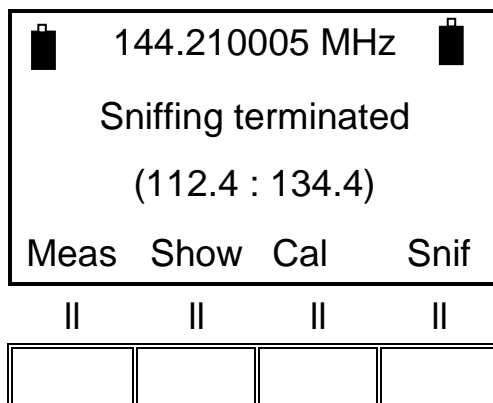
Picture 40

Pressing **Snif** again will enable to restart the sniffing or to select a different frequency.

Note: this operating mode can work in environments where the RS232\Wireless Bluetooth cannot be used, so to allow, along with the "Unconnected Mode" (see the **3.4** section in this manual) a full environmental investigation.

The units require communication with each other only during the selection of the frequency. As soon as the frequency is selected, the message "TX tuned and ready" appears. The latter enables removing all the connections and start the measurement.
Restoring the communication between TX and RX units is required only in case the user is willing to edit the working frequency.

The sniffing mode with Loop Mod. L-3 antenna works like in picture below:

Picture 41

3.3. WIZ mode

To improve the management of the measurement saving procedures, the SEMS provides a wizard mode (**WIZ**).

Press the **WIZ** button in the starting menu. The wizard will lead the user throughout the procedure, asking for:

- The selection of the chamber to be measured (A, B, C, D). Each A, B, C and D, identifies a shielded chamber. The user will have to remember the letter assigned to the chamber where the measurements were performed.

```
┌─────────────────────────────────┐
│  █       Choose the        █    │
│      Chamber you want            │
│         To measure               │
│   A      B      C      D         │
└─────────────────────────────────┘
    ‖      ‖      ‖      ‖
  ┌─────┬─────┬─────┬─────┐
  │     │     │     │     │
  └─────┴─────┴─────┴─────┘
```
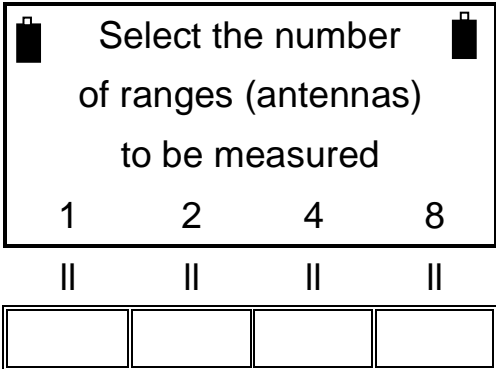
Picture 42

- Choice of the maximum number of spots to measure (1, 2, 4, 8). It represents the number of measuring spots assigned for each chamber. The user will have to order in chronological execution order the measured spots, so to find the same order in the instrument's memory.

```
┌─────────────────────────────────┐
│  █       Select the max    █    │
│        number of spot            │
│        to be measured            │
│   1      2      4      8         │
└─────────────────────────────────┘
    ‖      ‖      ‖      ‖
  ┌─────┬─────┬─────┬─────┐
  │     │     │     │     │
  └─────┴─────┴─────┴─────┘
```
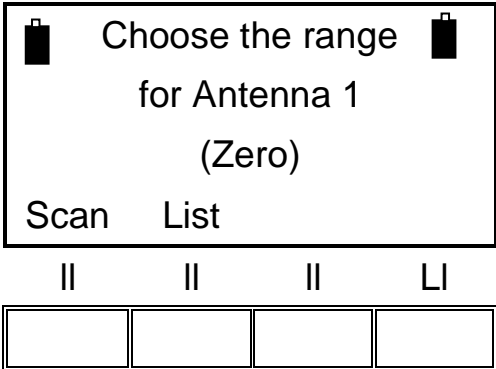
Picture 43

- The selection of ranges (antennas) to measure (1, 2, 3, 4). It represents the number of antennas' systems available during the measurements. After having performed the measurements for all spots with an antenna type, the system will require to replace the antennas and re-perform the zeroing procedure.

```
┌─────────────────────────────┐
│ ▊  Select the number     ▊  │
│      of ranges (antennas)   │
│        to be measured       │
│    1      2      4      8    │
└─────────────────────────────┘
     ‖      ‖      ‖      ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```
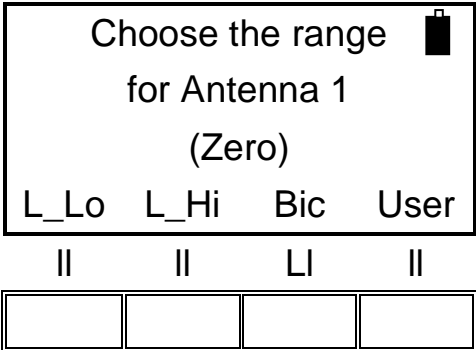
Picture 44

3.3.1. Wizard mode measurements

After the selection of the chamber, spots and ranges, the instrument will require performing the zero of the first set of antennas that the user is willing to use. The procedure is the same as the zero calibration, already described in chapter **3.2.1**

```
┌─────────────────────────────┐
│ ▊  Choose the range     ▊   │
│       for Antenna 1         │
│          (Zero)             │
│  Scan    List               │
└─────────────────────────────┘
     ‖      ‖      ‖      ⌴
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```
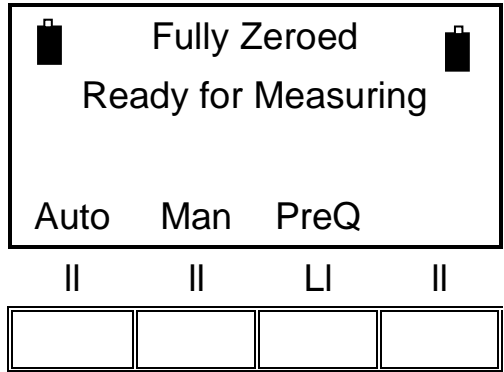
Picture 45

By selecting **Scan**, the system will require performing the zero through the default scansions (**L_Lo - L_Hi - BIC**) or the ones programmable from the SEMS SW software.

```
┌─────────────────────────────┐
│   Choose the range     ▊    │
│      for Antenna 1          │
│         (Zero)              │
│  L_Lo   L_Hi   Bic   User   │
└─────────────────────────────┘
     ‖      ‖      ⌴      ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```
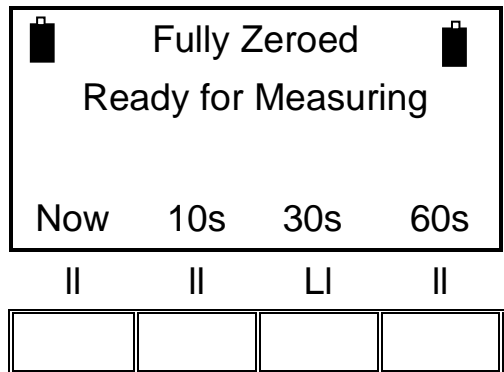
Picture 46

As the zeroing procedure is completed, the measurement screen as below will appear on the display.

The user can choose how to perform the measurements: automatically (**Auto**), or manually (**Man**). The **Prequiet mode** will be explained later in the manual.
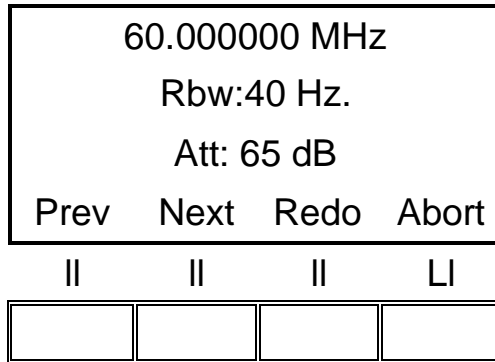
```
┌─────────────────────────────┐
│ ▌        Fully Zeroed      ▐ │
│        Ready for Measuring   │
│                              │
│   Auto    Man    PreQ        │
│   II      II     LI     II   │
│  ┌───┐  ┌───┐  ┌───┐  ┌───┐  │
│  └───┘  └───┘  └───┘  └───┘  │
└─────────────────────────────┘
```

Picture 47

Through the automatic mode, the measurement can start immediately (**Now**), or after a pre-fixed countdown (**10s, 30s, e 60s**).

```
┌─────────────────────────────┐
│ ▌        Fully Zeroed      ▐ │
│        Ready for Measuring   │
│                              │
│   Now    10s    30s    60s   │
│   II      II     LI     II   │
│  ┌───┐  ┌───┐  ┌───┐  ┌───┐  │
│  └───┘  └───┘  └───┘  └───┘  │
└─────────────────────────────┘
```
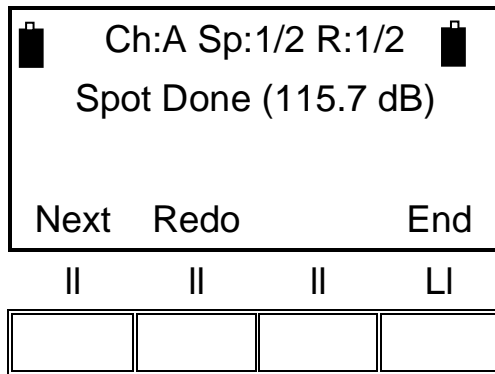
Picture 48

Through the manual mode, the user will have to press **Prev** for the previous frequency, **Next** for the following frequency, **Redo** to repeat the current frequency or **Abort** to quit.

```
┌─────────────────────────────────┐
│        60.000000 MHz            │
│          Rbw:40 Hz.             │
│          Att: 65 dB             │
│   Prev   Next   Redo   Abort    │
└─────────────────────────────────┘
      ll     ll     ll     Ll
┌──────┬──────┬──────┬──────┐
│      │      │      │      │
└──────┴──────┴──────┴──────┘
```

Picture 49

After choosing the frequency and performing the measurement, the wizard management screen will appear in order to check the status of the procedure, as in the screenshot below.

```
┌─────────────────────────────────┐
│ ▮   Ch:A Sp:1/2 R:1/2   ▮       │
│      Spot Done (115.7 dB)       │
│                                 │
│   Next   Redo          End      │
└─────────────────────────────────┘
      ll     ll     ll     Ll
┌──────┬──────┬──────┬──────┐
│      │      │      │      │
└──────┴──────┴──────┴──────┘
```

Picture 50

"Ch:A" indicates that the chosen chamber is the "A", "Sp:1/2" is the ongoing measurement spot index (in this case the spot is one of two), "R:1/2" is the antennas' system (range) that is on (in this example it is the first of two).
"Spot Done" means that the measurement is completed for the ongoing spot and with the indicated range. The value shown in brackets is the maximum attenuation value from all the frequencies required for the measurement.

Press the **Next** button to get to the next spot. If all the required spots have been measured, the system will automatically switch to the zeroing screen of the following pair of antennas. In case all the antennas systems have been used, the system will return to the main screen, with a message informing about the successful data storing.

The **Redo** button repeats the measurement for the ongoing spot on the screen. As soon as this operation is completed, the display will show the same screen, with the updated value of the maximum attenuation.

The **End** button interrupts the measurements with the ongoing set of antennas. By pressing **End**, the instrument will ask to change the antennas and start the zero procedure. In case also all the antennas systems have been used, the procedure

will end and the system will return to the main screen, with a message informing about the successful data storing.

Warning: by pressing the **End** button, all the spots where no measure was performed, are deleted. (E.g. by selecting eight spots and measuring only three of them, pressing **End** will reduce to three the number of spots taken into consideration).
Instead, by performing a measurement on all eight spots, when at the antennas' changing and after three spots measured, the system will keep all the five spots.

3.4. Unconnected Mode

Some measurement applications are not suited for the usage of the RS232\Wireless Bluetooth key nor the Optical Link Mod. LO.

An example could be a measurement in a shielded environment, with no waveguides for fiber optics on technical panels.
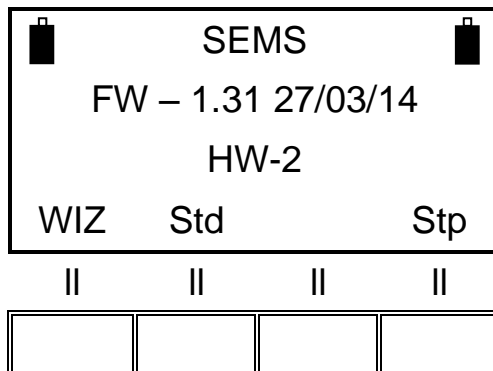
For such applications, the SEMS provides a specific operating mode called "Unconnected mode". Through this mode, there is no need to connect the RX to the TX unit to perform the measurement.

Note: for using the "Unconnected mode", the SEMS RX must be programmed (through the SEMS Software) with a list of no more than 20 frequencies.

The list can be saved in any of the three **L1-3** slots.

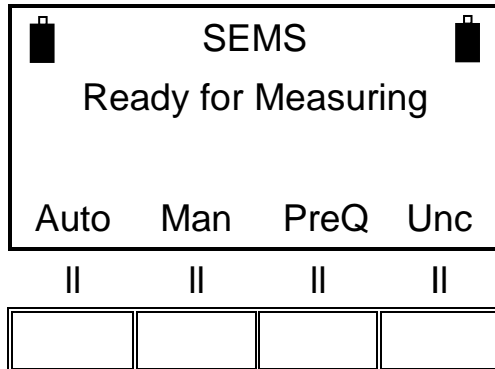The "Unconnected mode" works in both "Wizard" and "Standard" mode.

For the "Standard" mode, select **Std** from the main menu:

```
┌─────────────────────────────┐
│ ▮            SEMS          ▮ │
│      FW – 1.31 27/03/14      │
│           HW-2              │
│ WIZ    Std           Stp   │
└─────────────────────────────┘
    ‖      ‖      ‖      ‖
  ┌────┬────┬────┬────┐
  │    │    │    │    │
  └────┴────┴────┴────┘
```

Picture 51

Press **Cal**, then **List** and then select the list where the frequencies for the unconnected mode were stored. Proceed with the zeroing procedure, same as for standard measurements.
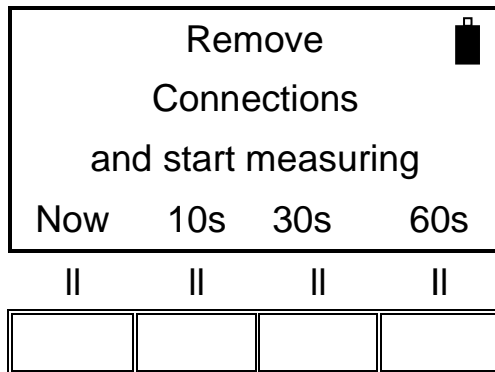
As the zeroing ends, press **Meas**:

```
┌─────────────────────────────┐
│ ▐                           ▐│
│ ▐      SEMS                 ▐│
│    Ready for Measuring       │
│                              │
│                              │
│   Auto   Man   PreQ   Unc    │
└─────────────────────────────┘
     ‖      ‖      ‖      ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```

Picture 52

Place the TX and RX units in the preferred measurement spot and press the **Unc** button to enable the synchronization of the internal clock of the units.
Note: for allowing this step, both the batteries' icons have to be appear on the display.

```
┌─────────────────────────────┐
│        Remove            ▐   │
│      Connections             │
│   and start measuring        │
│   Now    10s   30s    60s    │
└─────────────────────────────┘
     ‖      ‖      ‖      ‖
   ┌─────┬─────┬─────┬─────┐
   │     │     │     │     │
   └─────┴─────┴─────┴─────┘
```
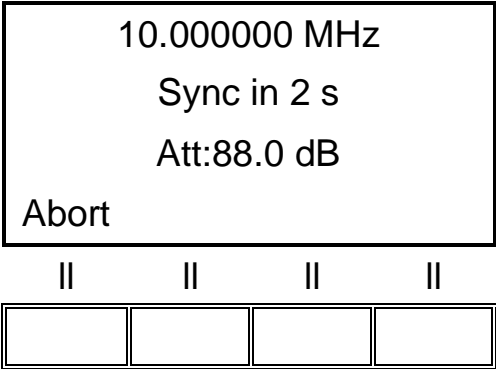
Picture 53

Remove the RS232\Wireless adapter from the RX unit (the battery icon of the TX unit will disappear), close the door of the shielded environment and start the measurement.

A countdown will appear on the screen starting from a value that can vary according to the instant when the measurement started and to the number of frequencies entered in the list.
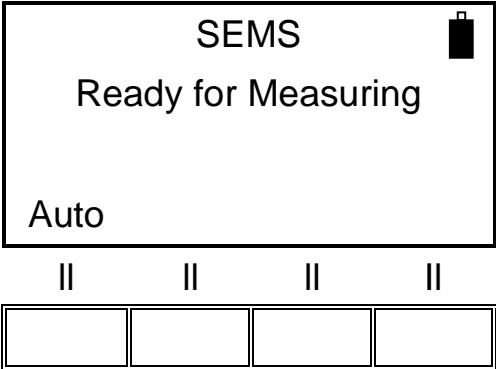
```
┌─────────────────────────────┐
│        5.000000 MHz         │
│        Sync in 12 s         │
│                             │
│                             │
│  Abort                      │
└─────────────────────────────┘
      ‖      ‖      ‖      ‖
   ┌─────┐┌─────┐┌─────┐┌─────┐
   │     ││     ││     ││     │
   └─────┘└─────┘└─────┘└─────┘
```
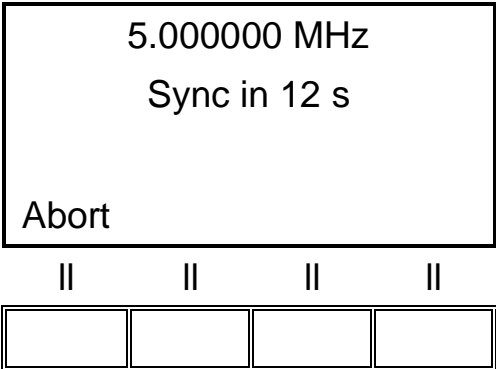
Picture 54

After the first measurement, there will be a synchronization delay before each frequency.

```
┌─────────────────────────────┐
│       10.000000 MHz         │
│         Sync in 2 s         │
│         Att:88.0 dB         │
│  Abort                      │
└─────────────────────────────┘
      ‖      ‖      ‖      ‖
   ┌─────┐┌─────┐┌─────┐┌─────┐
   │     ││     ││     ││     │
   └─────┘└─────┘└─────┘└─────┘
```

Picture 55

Once the measurement ends, save the data in a memory slot as for any standard measurement.

Pressing **Meas** again, enables another measurement:

```
┌─────────────────────────────┐
│        SEMS            ▮     │
│     Ready for Measuring      │
│                             │
│  Auto                       │
└─────────────────────────────┘
      ‖      ‖      ‖      ‖
   ┌─────┐┌─────┐┌─────┐┌─────┐
   │     ││     ││     ││     │
   └─────┘└─────┘└─────┘└─────┘
```

Picture 56

By pressing **Auto**, a new measurement can be started without having to reconnect the two units, although it is limited to a fixed timing (see below).

Using the "Unconnected mode" with the Wizard measurement works similarly.

A Wizard zeroing can be started by selecting the list programmed for the "Unconnected mode" as the only measurement range.

```
┌─────────────────────────────────────┐
│  ▮         Fully Zeroed          ▯   │
│        Ready for Measuring            │
│                                       │
│                                       │
│   Auto    Man    PreQ    Unc          │
└─────────────────────────────────────┘
     ‖       ‖       ‖       ‖
   ┌─────┬───────┬───────┬───────┐
   │     │       │       │       │
   └─────┴───────┴───────┴───────┘
```
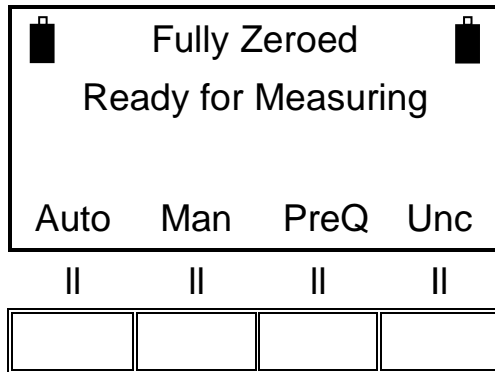
Picture 57

Place the TX and RX units in the preferred measurement spot and press the **Unc** button to enable the synchronization of the internal clock of the units.

Note: for allowing this step, both the batteries' icons have to appear on the display.

```
┌─────────────────────────────────────┐
│        Remove              ▮          │
│        Connections                    │
│        and start measuring            │
│   Now     10s    30s    60s           │
└─────────────────────────────────────┘
     ‖       ‖       ‖       ‖
   ┌─────┬───────┬───────┬───────┐
   │     │       │       │       │
   └─────┴───────┴───────┴───────┘
```
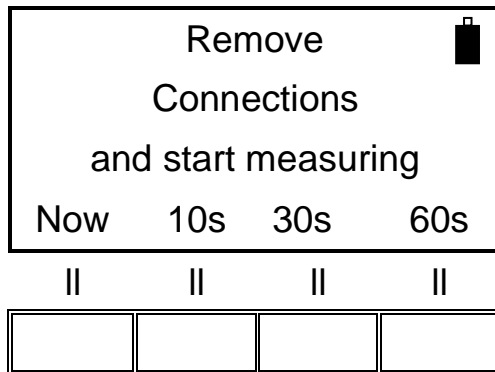
Picture 58

Remove the RS232\Wireless adapter from the RX unit (the battery icon of the TX unit will disappear), close the door of the shielded environment and start the measurement.

A countdown will appear on the screen starting from a value that can vary according to the instant when the measurement started and to the number of frequencies entered in the list

```
        5.000000 MHz

        Sync in 12 s



Abort
```

   ‖   ‖   ‖   ‖
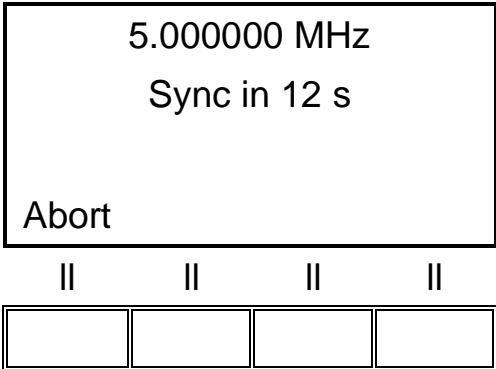
Picture 59

After the first measurement, there will be a synchronization delay before each frequency.

```
       10.000000 MHz

        Sync in 2 s

        Att:88.0 dB

Abort
```
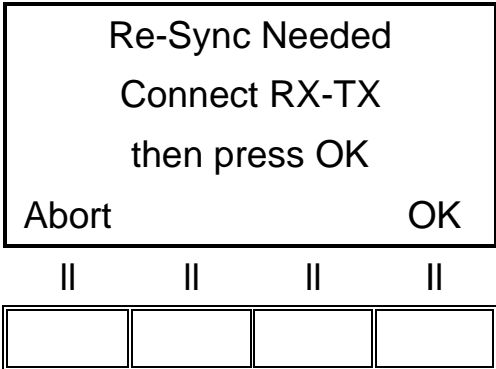
   ‖   ‖   ‖   ‖
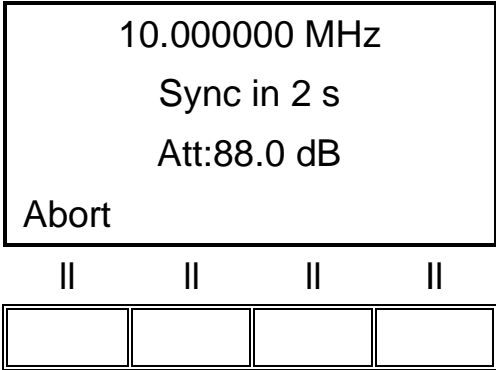
Picture 60

As the measurement ends, the "Spot Done" screen from the Wizard mode will appear. The user can repeat the measurement (**ReDo**) or start measuring the next (in case there is any) spot (**Next**).

In both Standard and Wizard modes, there is a limited timing to perform the measurements, before having to reconnect the RX and TX unit.

The timer was developed in order to avoid measurement errors imputable to long-term clock delays.

The timer starts as the **Unc** button is pressed.

After 14 minutes from the starting of a measurement, the system will require to reconnect the TX and RX units and wait for the fixed green light, in order to recalibrate the internal clocks

```
┌─────────────────────────────────┐
│        Re-Sync Needed           │
│                                 │
│        Connect RX-TX            │
│                                 │
│        then press OK            │
│                                 │
│  Abort                     OK   │
└─────────────────────────────────┘
     II      II      II      II
   ┌──────┬──────┬──────┬──────┐
   │      │      │      │      │
   └──────┴──────┴──────┴──────┘
```

Picture 61

At that point, press **OK**.

In case of successful connection the following screen will appear:

```
┌─────────────────────────────────┐
│           Sync OK               │
│                                 │
│           Remove                │
│                                 │
│         Connections             │
│  Abort                     OK   │
└─────────────────────────────────┘
     II      II      LI      II
   ┌──────┬──────┬──────┬──────┐
   │      │      │      │      │
   └──────┴──────┴──────┴──────┘
```
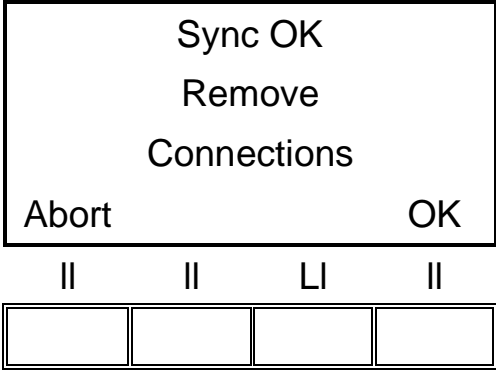
Picture 62

The measured is then enabled and the 14 minutes timer restarts.

```
┌─────────────────────────────────┐
│        Synchronizing            │
│                                 │
│         Transmitter             │
│                                 │
│                                 │
│  Abort                     OK   │
└─────────────────────────────────┘
     II      II      II      II
   ┌──────┬──────┬──────┬──────┐
   │      │      │      │      │
   └──────┴──────┴──────┴──────┘
```
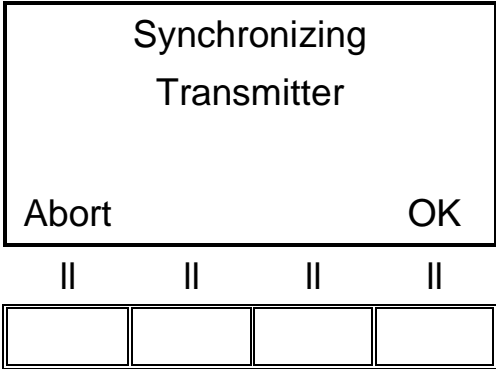
Picture 63

In case instead, the connection fails (please consider that after 17 minutes the TX Unit turns off automatically) the following screen will appear:

Could not Sync

Failed

Is TX connected?

Abort   OK

|| || || ||
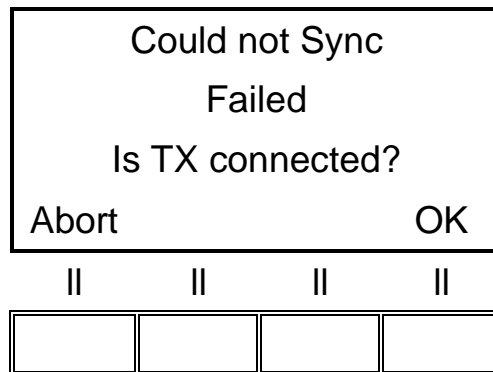
Picture 64

In this case, check the TX connection and, if required, turn on the unit again. Then try again by pressing **OK**.

3.5. Prequiet mode

Some shielded environments are naturally noisy. The background noise of the environment can affect the artifact of the measurement itself.

In order to avoid this, the SEMS has a cleaning feature called "Prequiet Mode".

In the "Prequiet Mode", the SEMS RX slightly edits the working frequencies so that the environmental noise is kept out of the measurement spots.

The "Prequiet mode" is available in both "Wizard" and "Standard" modes (but it cannot work along with the "Unconnected mode").

In both "Wizard" and "Standard" modes, the zeroing of the system is required. Once the zeroing is completed, the **PreQ** button will be available in the **Meas** menu.

In "Standard" mode:

SEMS

Ready for Measuring

Auto   Man   PreQ   Unc

|| || || ||
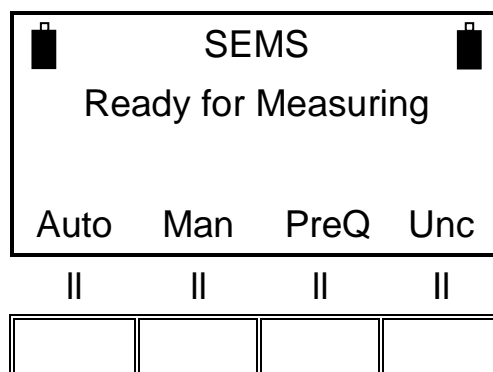
Picture 65

In "Wizard" mode:

```
┌─────────────────────────────┐
│ █              █            │
│      Fully Zeroed           │
│    Ready for Measuring      │
│                             │
│                             │
│  Auto   Man   PreQ   Unc    │
└─────────────────────────────┘
     ‖      ‖     ‖      ‖
  ┌─────┬─────┬─────┬─────┐
  │     │     │     │     │
  └─────┴─────┴─────┴─────┘
```
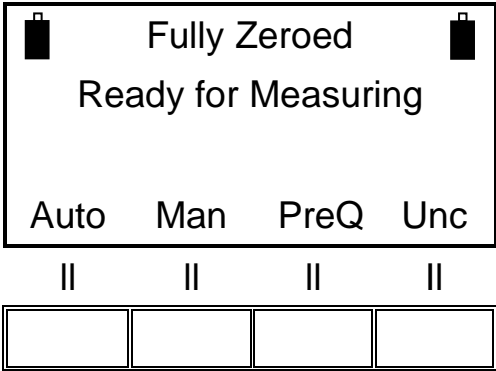
Picture 66

As the quieting procedure ends, a new measurement is allowed:

```
┌─────────────────────────────┐
│ █                █          │
│       Quieting              │
│      Terminated             │
│                             │
│  Meas  Show  Cal    Snif    │
└─────────────────────────────┘
     ‖      ‖     ‖      ‖
  ┌─────┬─────┬─────┬─────┐
  │     │     │     │     │
  └─────┴─────┴─────┴─────┘
```
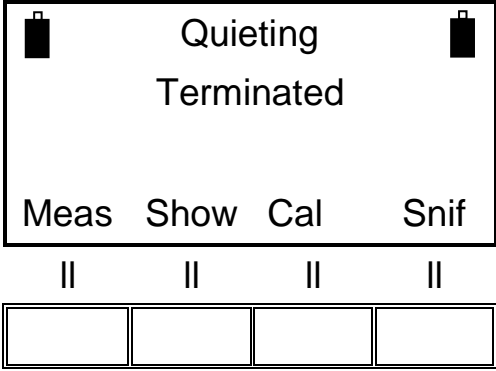
Picture 67

By pressing **Meas** so to start a new measure, the SEMS will automatically use the optimized frequency list.

3.6. STP menu

The SEMS provides the possibility of activating an internal buzzer that beeps as an alarm threshold, programmable by the user, is exceeded.

To activate this function, press the **Stp** button in the main starting screen.

```
┌─────────────────────────────┐
│        SEMS                 │
│   FW – 1.32 27/03/14  █     │
│        HW-2                 │
│  BEEP  Clear                │
└─────────────────────────────┘
     ‖      ‖     ‖      ‖
  ┌─────┬─────┬─────┬─────┐
  │     │     │     │     │
  └─────┴─────┴─────┴─────┘
```
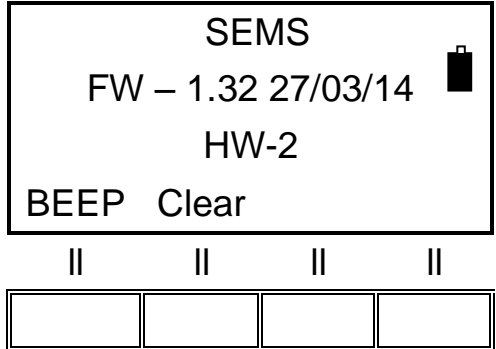
Picture 68

Then press the **BEEP** button:

```
┌─────────────────────────────────┐
│     BEEP OFF 100dB        ▪      │
│     Use arrows for              │
│     10 dB step                  │
│  +1      -1      ON     OFF     │
└─────────────────────────────────┘
     II      II      II      LI
  ┌──────┬──────┬──────┬──────┐
  │      │      │      │      │
  └──────┴──────┴──────┴──────┘
```
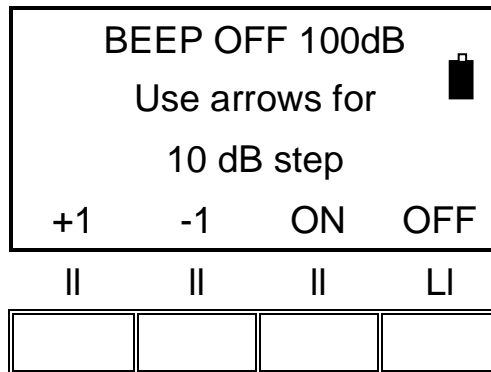
Picture 69

Move the threshold in 10dB steps by making use of the up and down arrows on the SEMS keyboard. Press the **+1** and **-1** buttons, to increase or decrease the threshold of 1dB.

Pressing the **ON** button will activate the buzzer mode: during the measurements, if the measured attenuation goes above the threshold, the buzzer will produce an acoustic signal.

Note: that this is a multifunction button that works also for the HiDyn mode

If the measured value remains under the threshold, the buzzer will produce a fast series of beeps, followed by a slower series of beeps.
The **OFF** button will disable the buzzer.

The buzzer status is reported on the top of the menu on the display through **BEEP ON** and **BEEP OFF**.

The ongoing threshold is reported on the top right of the screen (in the example is 100dB)

The Clear function enables to delete all the measures stored inside the RX unit, by pressing **OK.**

```
        WARNING
       ALL Measures
      Will be ERASED
   Abort            OK
```

```
■   Memory cleared   ■
      No measure Left

   WIZ   Std        Stp
```

Picture 70

3.7. Show menu

The **Show** menu displays the results of the measurements previously performed and stored.

To display the stored measurements, press the **Show** button:

```
     SEMS
  Ready for Measuring

Meas  Show  Cal   Snif
```

Picture 71

E.g. we choose a measure stored in the memory bank named **H1-4**:

```
 ▪         SEMS         ▪
       Ready for Measuring


   Last    L1-4   M1-4   H1-4
    ||      ||     ||     ||
   [   ]  [   ]  [   ]  [   ]
```

Picture 72

Then we recall the **H-1** memory:

```
 ▪         SEMS         ▪
       Ready for Measuring


   H-1    H-2    H-3    H-4
    ||     ||     ||     ||
   [   ]  [   ]  [   ]  [   ]
```
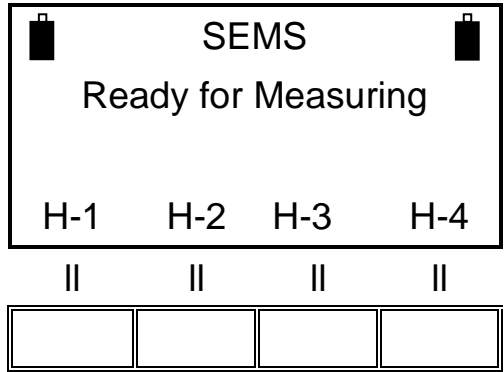
Picture 73

1stF Shows the attenuation at the lowest frequency from the selected scan or list
NxFr Shows the attenuation at the following frequency
HiPk Shows the minimum attenuation value overall scan or list
NxPk Shows the minimum following attenuation value

```
 ▪         Scan          ▪
       60.000 to 300.000


   1stF   NxFr   HiPk   NxPk
    ||     ||     ||     ||
   [   ]  [   ]  [   ]  [   ]
```
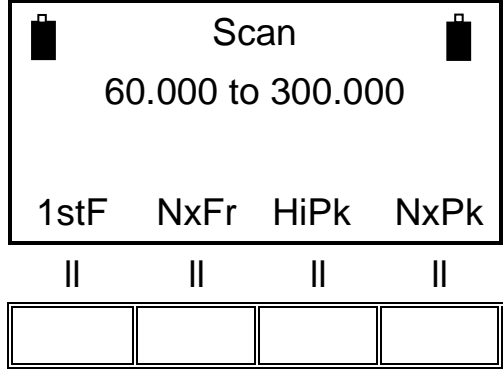
Picture 74

By pressing the **Last** button, the results of the last measurement performed are displayed, while, through the other three buttons, the other stored data (up to four for each button) are shown.

As the measure to display is chosen, it is possible to analyze the measured attenuation frequency by frequency (the frequencies are always expressed in MHz).

By pressing the **ESC** button, the system will go back to the previous menu.

3.8.   Measuring the shielding attenuation

1) Place the receiver and the transmitter on the tripods (approx. height 120 cm), and place them at a distance of minimum 60 cm if using the loop, biconical and the rod antennas and minimum 150 cm for dipole antennas.

   Warning: when performing the zero with the D-2 dipoles and the R-2W/R-2 rod antennas please make sure to respect the minimum distance above and use the 10dB attenuator provided with the instrument in order not to damage the RX (see also **3.10**).

2) Connect the antennas on the transmitter and the receiver, making sure to align them in parallel.

3) Connect the wireless transducers to the RS232 ports on the transmitter and the receiver, turn on both devices and wait until the green blinking light stops and remains fixed. Make sure that the two icons of the batteries appear on the RX display. It is recommended to wait a few minutes before proceeding (warm-up).

4) Perform the zeroing procedure by using the **Cal** button, then select **Scan** or **List** for the preferred band (another zeroing mode is available, see the **3.2.2** chapter).

5) As the zeroing procedure is finished, move the receiver inside or outside the shielded environment near the first measurement spot and the transmitter in the opposite side, keeping the same distance of the zeroing, but adding the shield thickness.

6) Measure the attenuation by pressing the **Meas**, **Auto** and **10s** buttons, to enable the user to leave the measuring spot.

   Note: this procedure implies a wireless connection between the TX and the RX unit: the connection will be confirmed through the battery status on the top left of the screen of the RX (it will appear only in case of successful connection).

7) As the measure ends, store the result in one of memories available.

8) Repeat the steps n. 5, 6 and 7 for each measurement spot.

9) After all the spots are measured, download the results on a PC through the SEMS SW provided with the product.

Configuration of the Key wireless Bluetooth

```
        MASTER<<---- ON    OFF ---->>
ON              4 - OFF=115K ON=9600
ON              3 - AUTO MASTER
ON              2 - AUTO DISCOVER
OFF             1 - FACTORY DEFAULTS

        SLAVE    <<---- ON    OFF ---->>
ON              4 - OFF=115K ON=9600
OFF             3 - AUTO MASTER
ON              2 - AUTO DISCOVER
OFF             1 - FACTORY DEFAULTS
```

3.9. Calibration through Cal-Kit

The SEMS requires a periodic linear calibration; the optional Cal-Kit helps accomplishing this purpose, together with a proper maintenance and a calibration in the MPB laboratories every 24 months. If required, the Cal-Kit can be provided also with an Accredited calibration.

To start the calibration procedure, press the **Std/Cal** button from the main menu then press the **CalK** button: by following the instructions on the display, the calibration will start.

The screenshot below shows the request for the 30dB attenuator.

```
┌─────────────────────────────┐
│           Insert            │
│     30 dB Attenuator        │
│           HW-2              │
│  Abort               OK     │
└─────────────────────────────┘
      II     II     II     II
   ┌──────┬──────┬──────┬──────┐
   │      │      │      │      │
   └──────┴──────┴──────┴──────┘
```
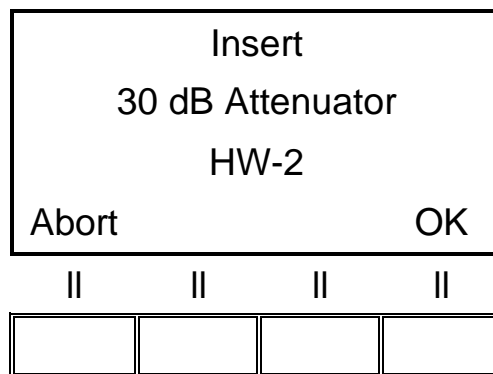
Picture 75

Connect the TX and RX using the 30dB attenuator and press the **OK** button.

The following screenshot shows the request for the second attenuator:

```
Insert (2 X 30 dB)

60 dB Attenuator


Abort                    OK
```
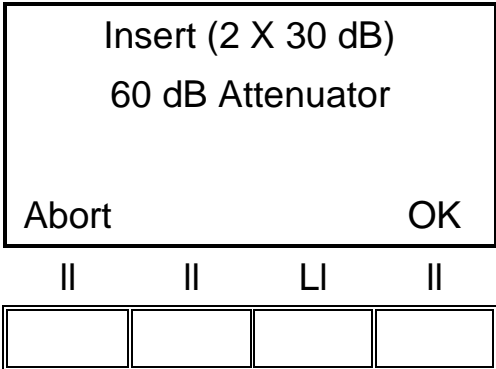
Picture 76

Connect the second attenuator and then press the **OK** button.

Repeat the same operation for all four 30dB attenuators (4x30 dB= 120 dB).

When the calibration is finished, a screen as below appears:


```
Calibration done

Worst: 0.70 dB

20.000 kHz (120 dB)

Show   Cal
```
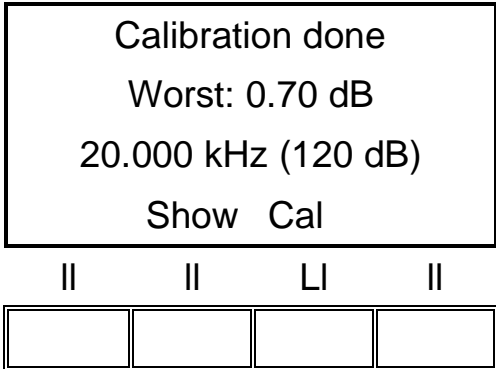
Picture 77

The "Worst" parameter indicates the worst attenuation measurement accuracy over frequencies (in this case is 0.7 dB at 20.000 kHz, that typically falls within the specifications of the SEMS).

10 kHz... 30MHz ± 1.0dB
30 MHz...300MHz ± 1.5dB

The following picture shows the procedure's set-up:

Picture 78

3.10. Measurement with Rod antennas mod. R-2W and R-2 and dipole antennas mod. D-1 and D-2

When using Rod antennas and the dipole antennas (both for the zero and for the measurement) it is <u>necessary</u> to connect the SEMS TX 10dB attenuator, supplied with the instrument, before connecting the Rod antenna.

Warning: <u>not using the attenuator might seriously damage the system.</u>

Picture 79

3.11. SEMS LIGHT

By turning on the RX unit, the display will show the following screen:
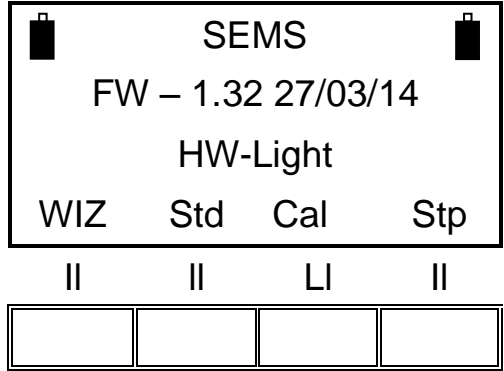
Picture 80

The SEMS LIGHT comes with the same features of a standard SEMS.
The only difference is the frequency range that is up to 128MHz for the SEMS light and the number of programmable frequencies of the lists (max 12 frequencies).

Through the **Stp** menu, it is however possible to upgrade the RX Unit (through an activating code provided by MPB) from SEMS LIGHT to SEMS, in order to cover frequencies up to 300MHz. Press **Code0** to unlock the system.
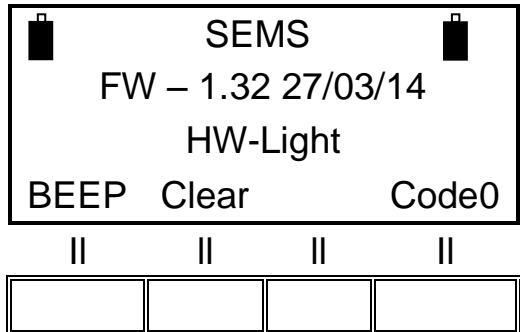
Picture 81

Enter the code and confirm. Please note that the activating Code is an option (Mod. Key-300):
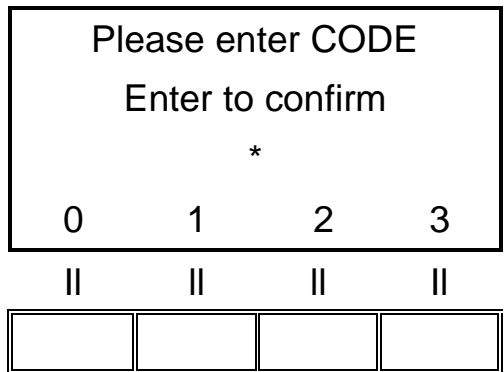
Picture 82

After the unlocking, the SEMS LIGHT display will show a screen as below:

```
┌─────────────────────────────┐
│         Code saved          │
│        Turn the SEMS        │
│       OFF then on again     │
│  Abort                  OK  │
└─────────────────────────────┘
     ‖      ‖      ‖      ‖
   ┌────┐ ┌────┐ ┌────┐ ┌────┐
   │    │ │    │ │    │ │    │
   └────┘ └────┘ └────┘ └────┘
```
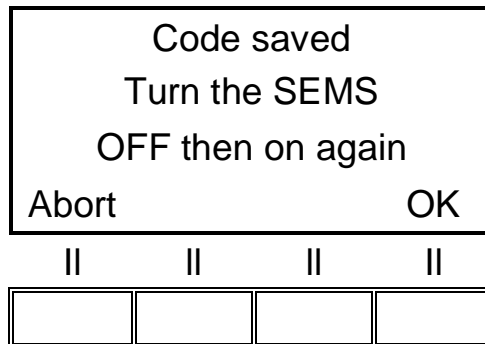
Picture 83

Press **OK** and start measuring with your upgraded system.

4. *SEMS SW* (software), controls and functions

4.1. Installation

Insert the USB Drive provided with the SEMS system in the PC you are installing the software in.

Picture 84

Launch the setup file (SEMS SW.exe) and eventually click **YES/Execute** in the pop up window. Please note that the SEMS SW can require to be "executed as administrator".

The SEMS SW installer comes with instructions in English language only.
Click **Next** on all four steps to proceed with the installation.
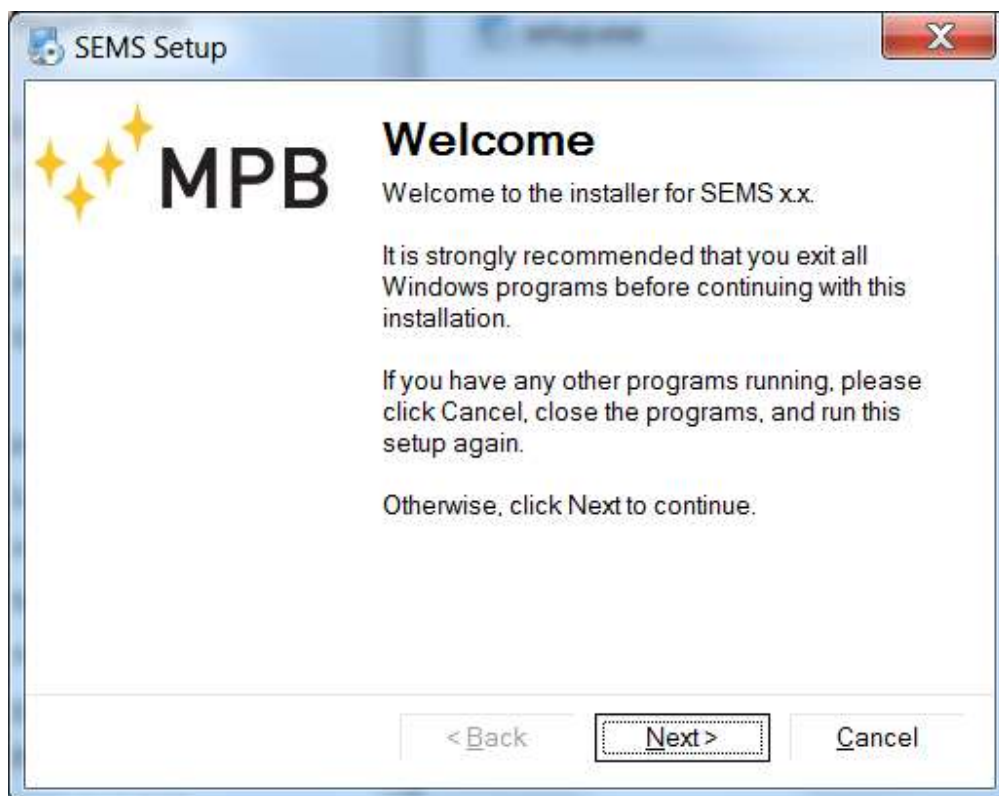
Picture 85
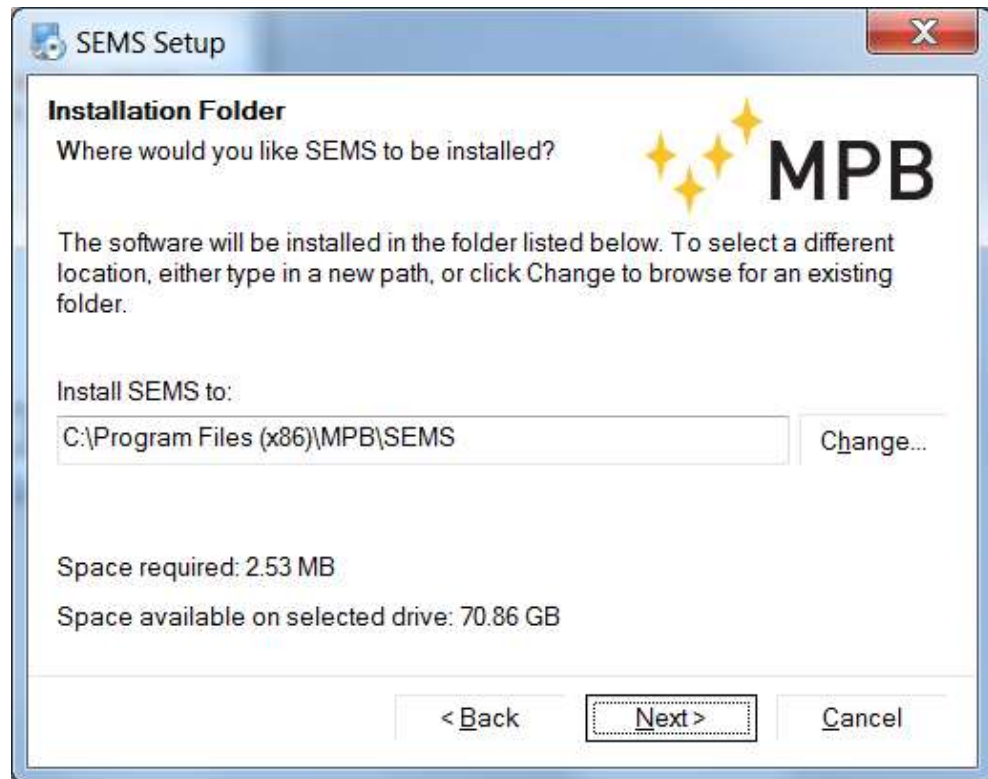
Picture 86
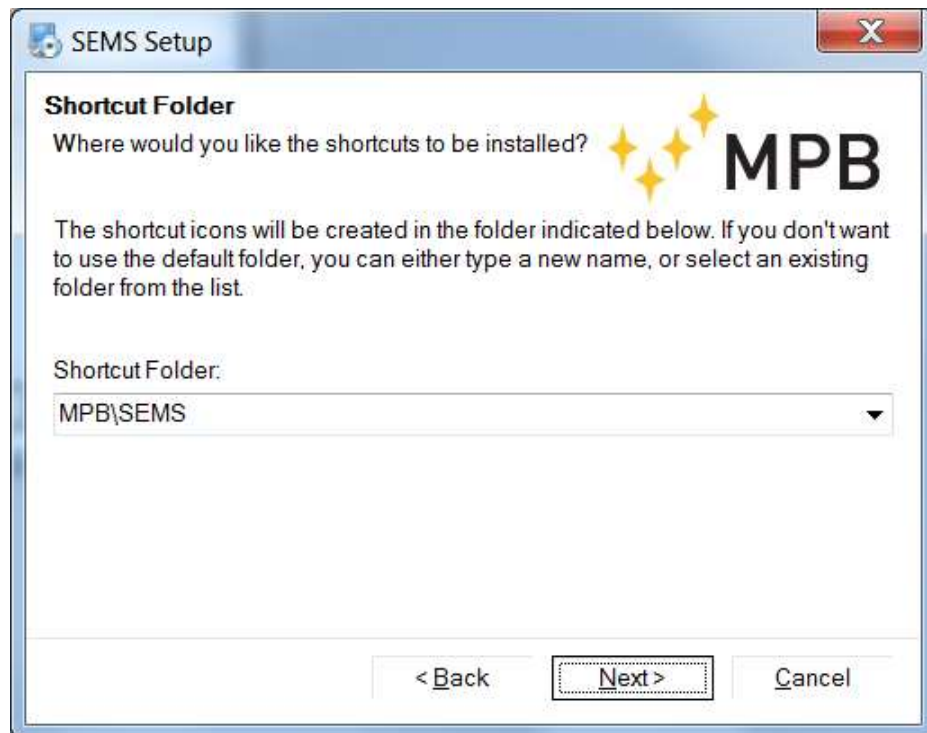
Picture 87
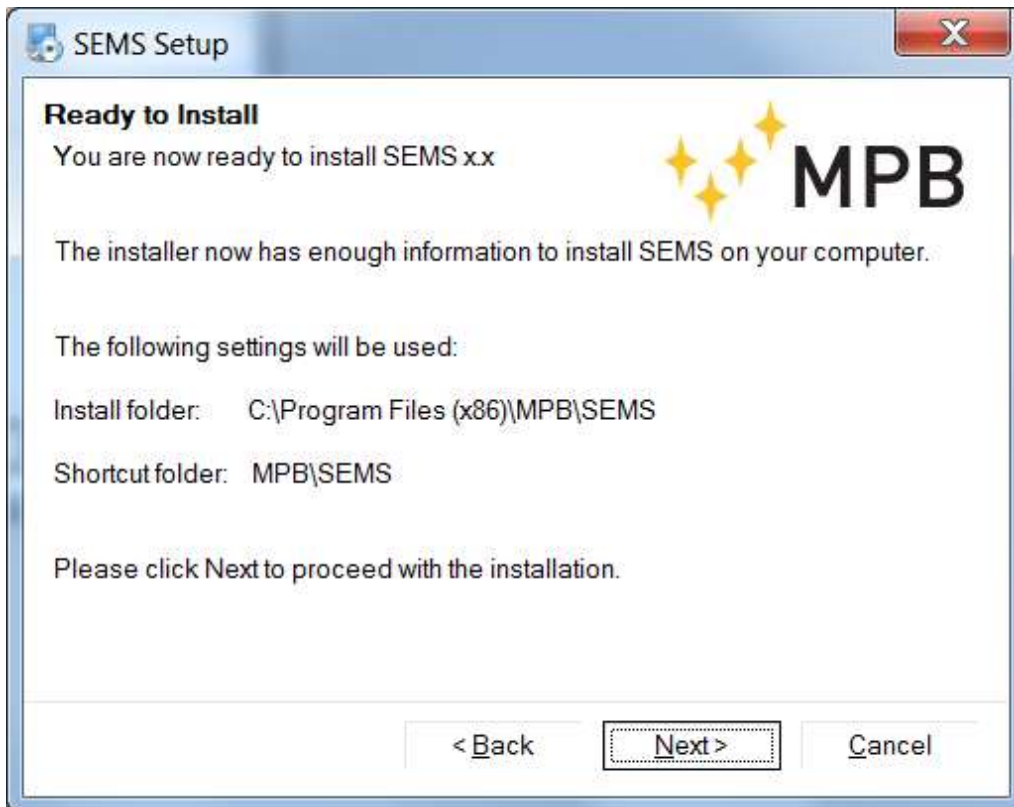
Picture 88
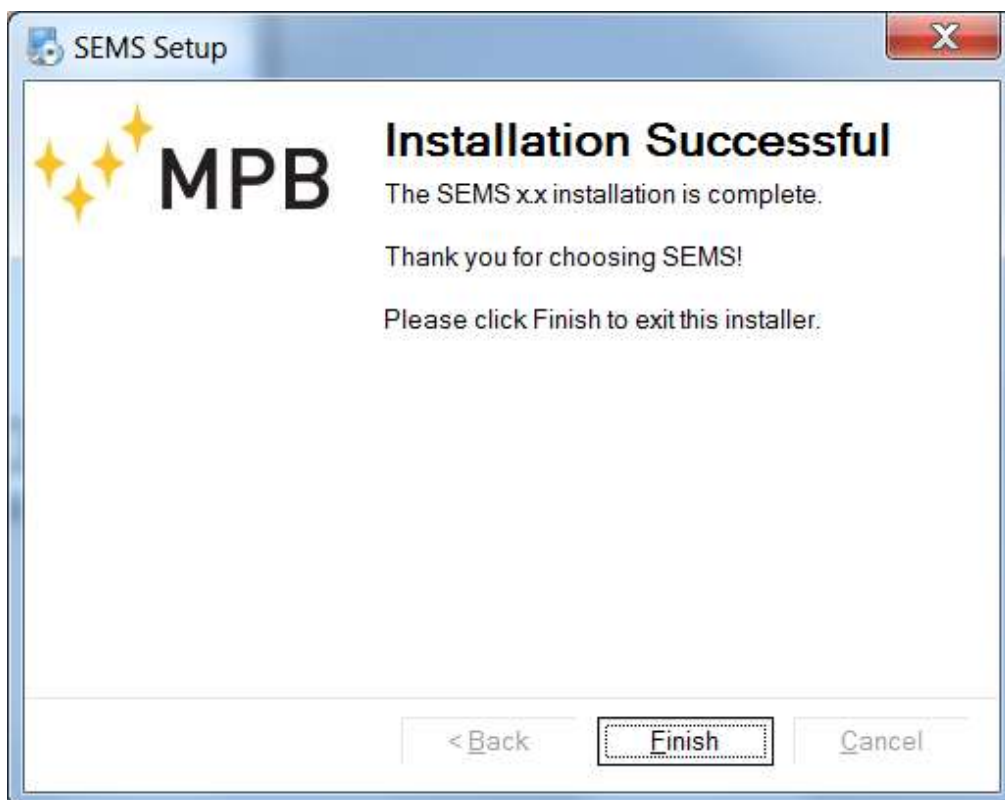
Picture 89

At installation completed, a screen as above will appear: click **Finish** to end the installation.

4.2. Connecting the instrument

1) Start the SEMS SW, plug the USB Serial adapter to your computer, connect the SEMS RX to the RS232 connector and turn on the SEMS RX unit.

Note: before turning on the SEMS RX is necessary to install the RS232 driver connector. For the latest operating system the installation starts automatically as soon as the cable is connected. For the others install the driver through the CD provided with the cable.

2) Click the **Connect** button: in case of successful attempt, the **Connect** button will be eventually disabled and a bottom left bar on the screen with the "SEMS connected" wording will appear.
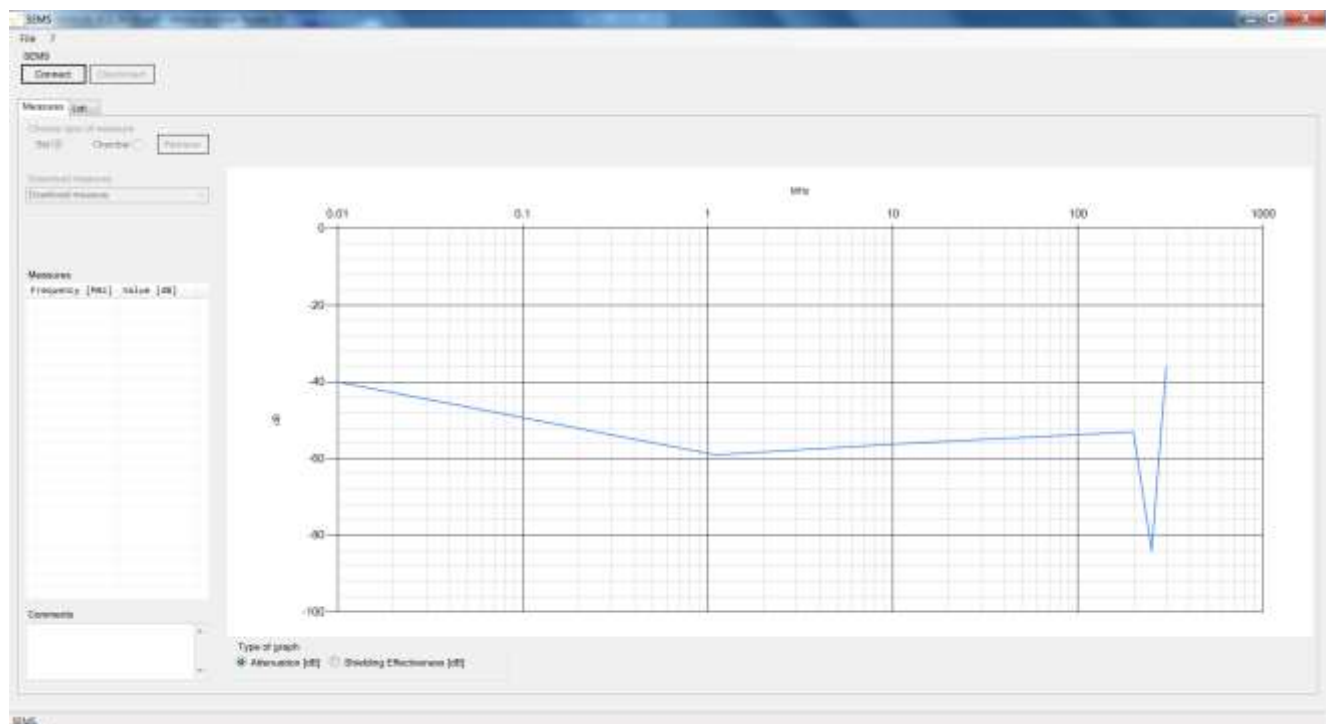
Picture 90

4.3. Retrieving a measurement

In order to retrieve the list of the stored performed measures, choose "Std" or "Chamber", according to the room where measures were saved while performing them with the instrument, then click "Retrieve":
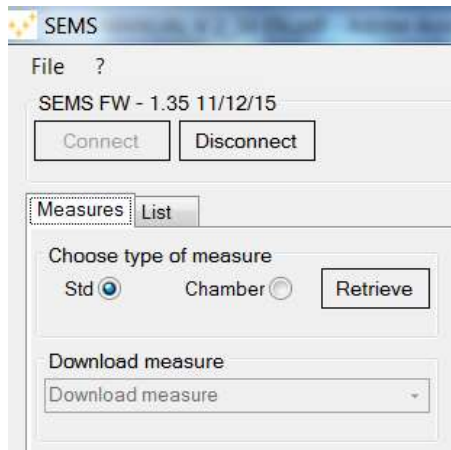
Picture 91
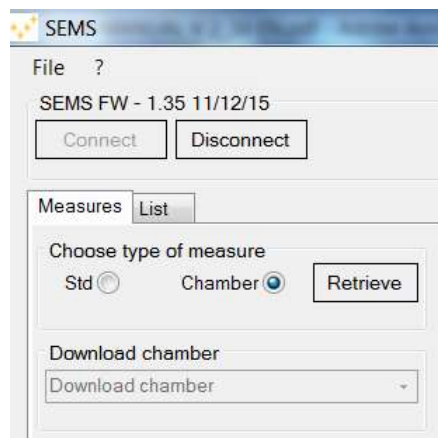
Picture 92

Once the meaures have been retrieved, the "Retrieve" button is disabled, and the "Download measure" room right below is enabled: from "Download measure", it is possible to open the performed measures, according to the correspondence with the ones displayed on the RX unit, only by clicking on any of them. The downloaded measures can be ordered by frequency (ascending/descending) and value (ascending/descending)

4.3.1. Std
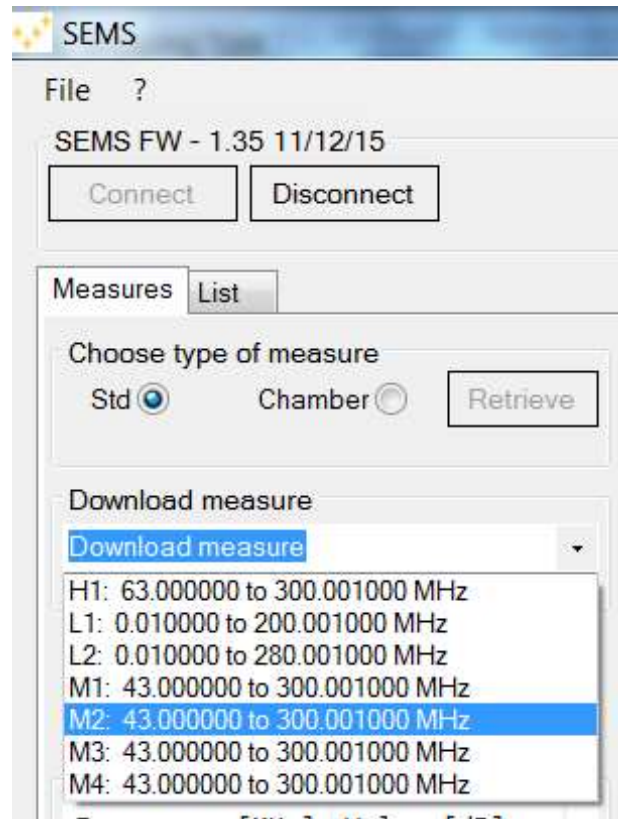
Picture 93

For example, after having chosen "Std", by clicking on M2 as shown in the screen above, the screen as follows will appear:
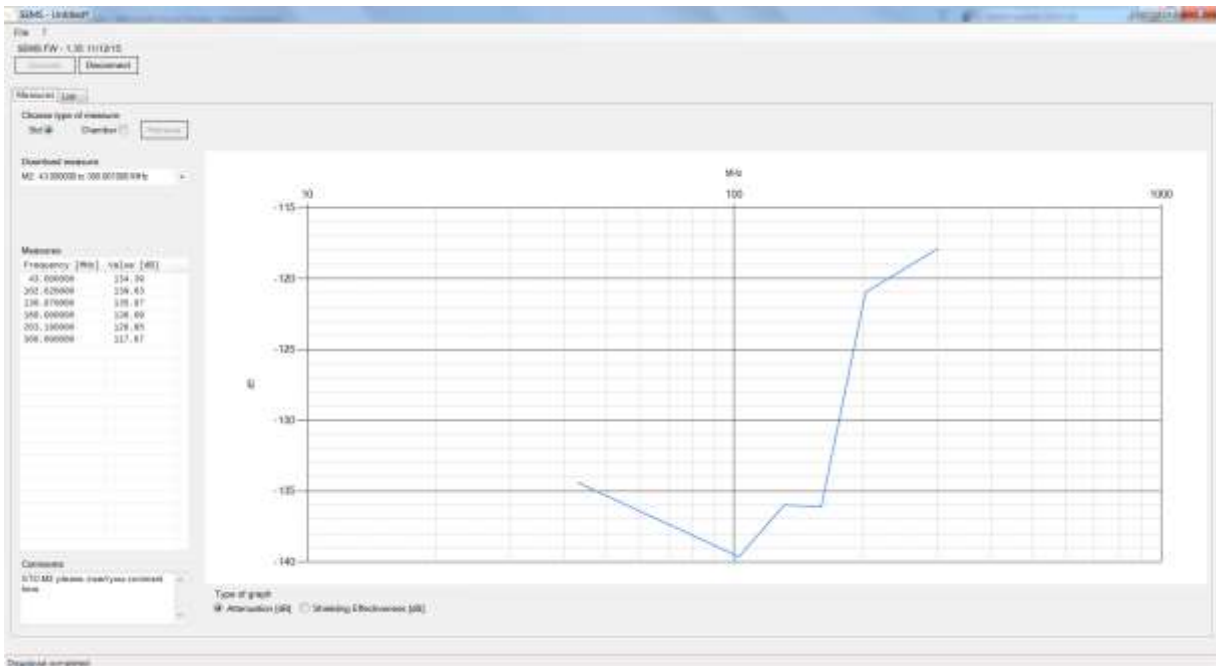
Picture 94

On the left of the screen, the frequencies with their related values are shown: below there is the possibility of adding a comment to the list that can be saved with the measures afterwards, when downloading the measures on the computer.

4.3.2. Chamber

The process for the "Chamber" type of measure is similar to the one for the "Std"
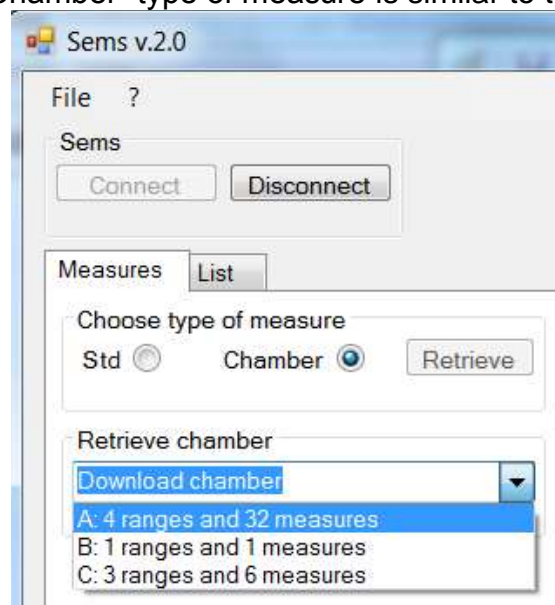
Picture 95
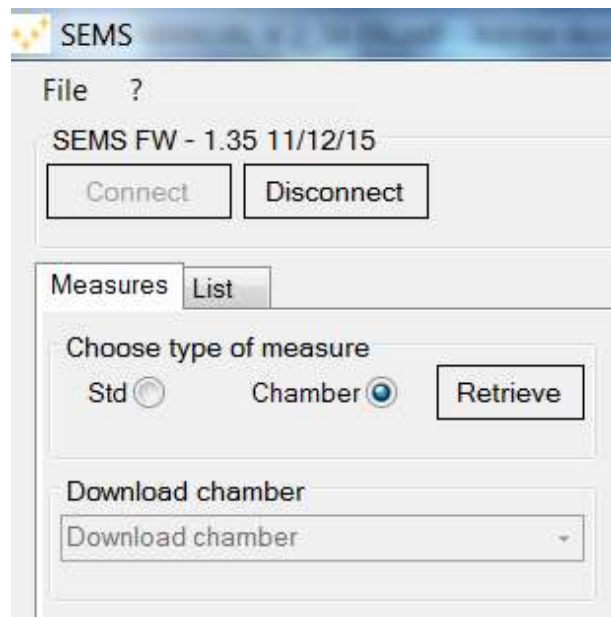
Picture 96
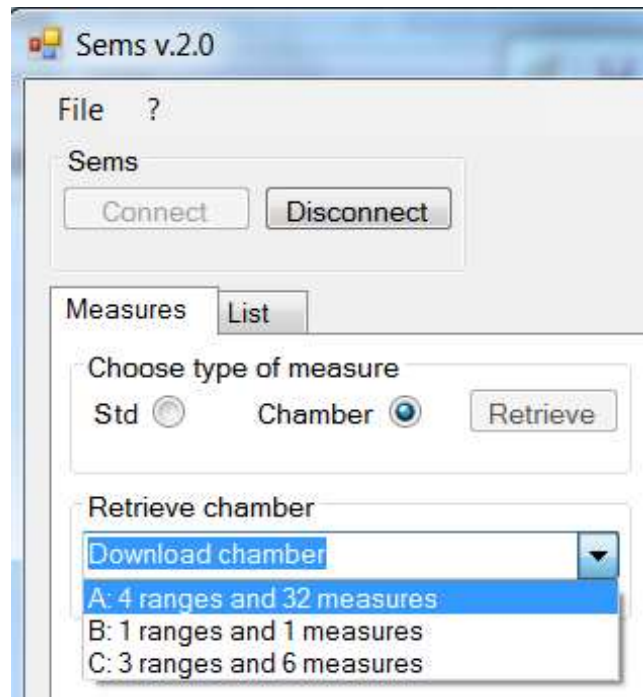
Picture 97

Once the chamber have been selected, the download starts automatically: in order to display the downloaded measures, select respectively the chamber, the range and the measure.
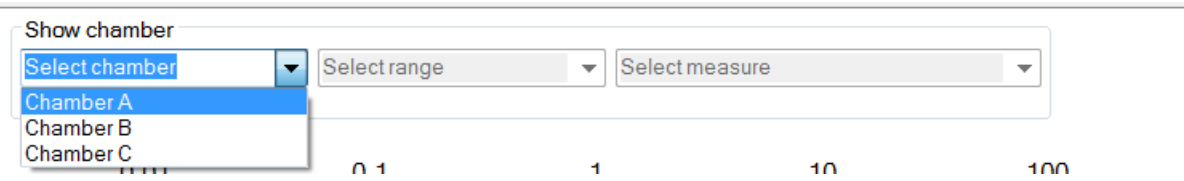
Picture 98
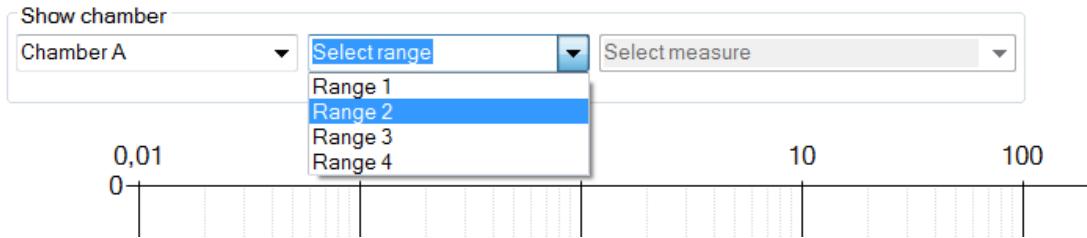
Picture 99
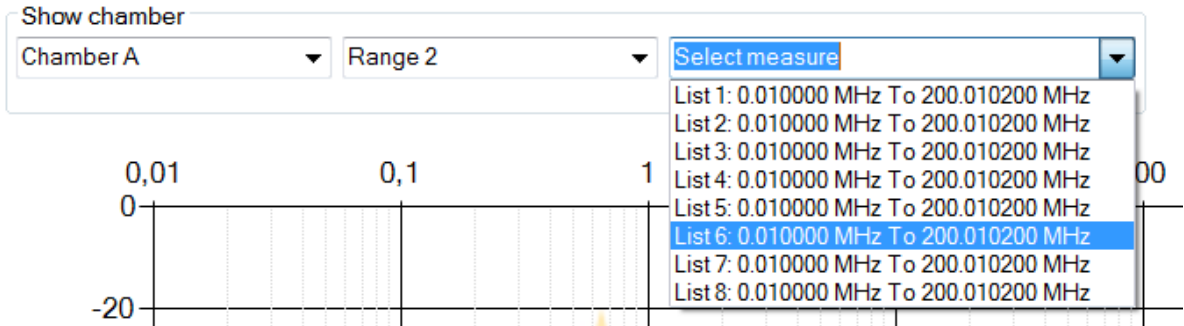
Picture 100

In order to download the lists directly on a file on the PC, click on the menu "File" and then "Save…".
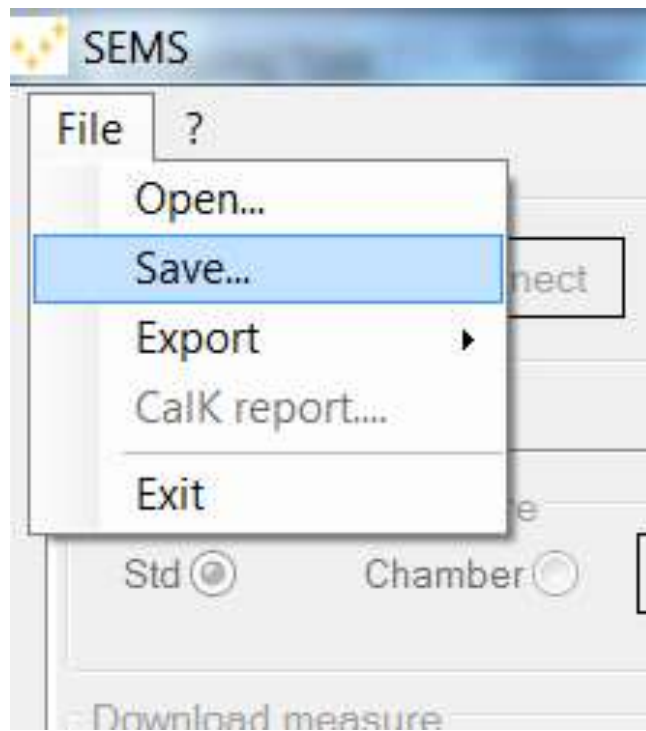
Picture 101

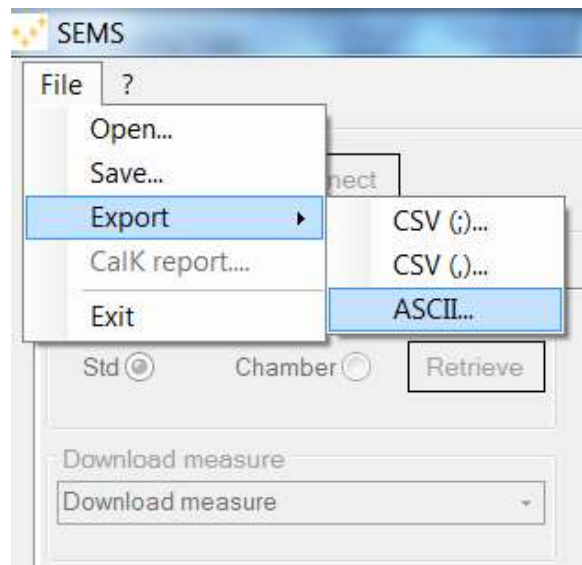The downloaded files can be exported on three different formats:
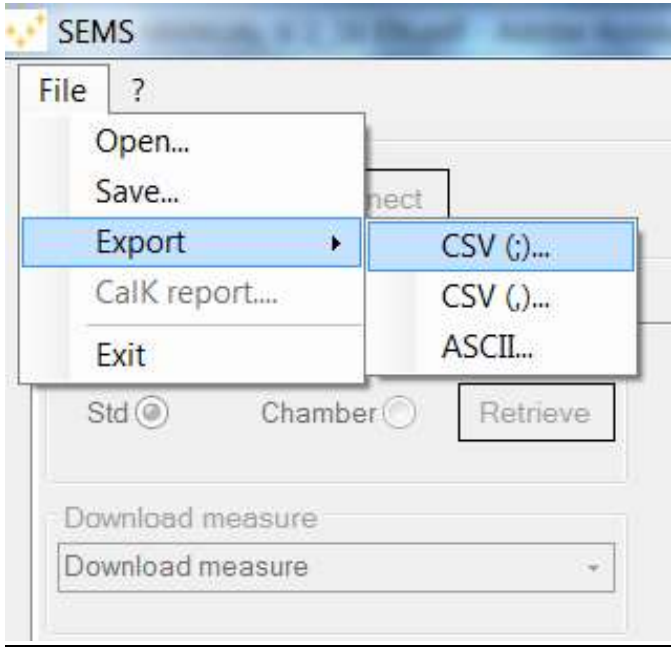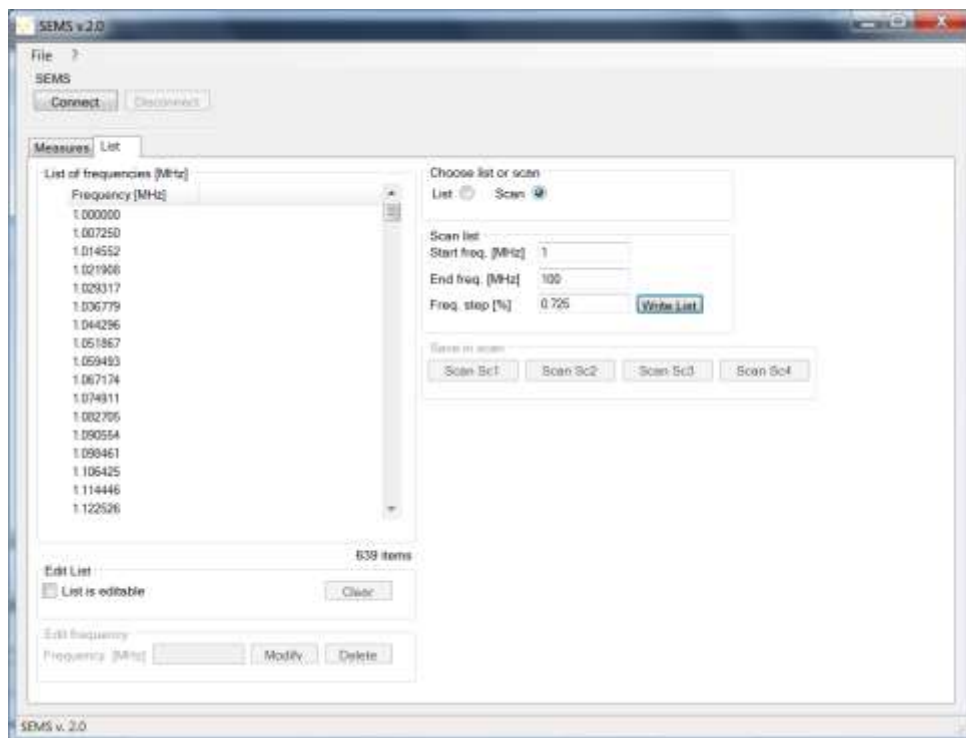

Picture 102
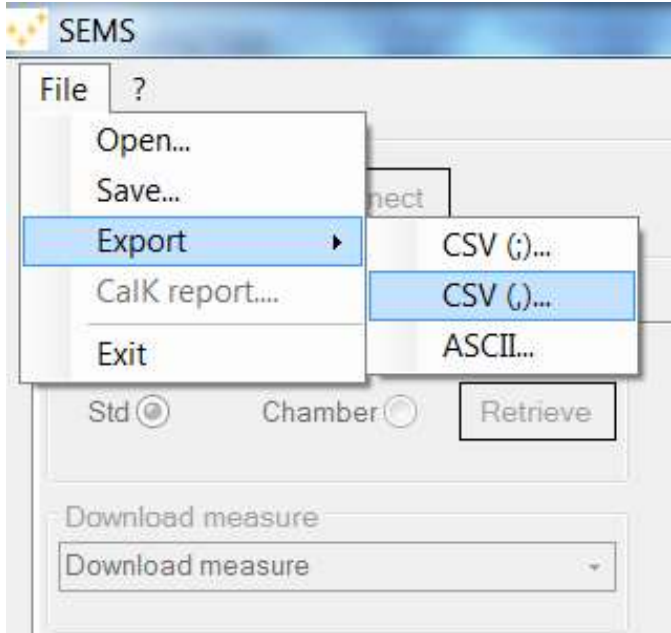
Picture 103

Picture 104

4.4. Programming a frequency list with List or Scan

The List menu from the software allows programming a list of frequencies or a scanning and storing them inside the RX unit:

The picture below is the menu for programming:

Picture 105

To use the Scanning, select the start/stop frequency and choose the step in percentage.

To make a table list, click on the "Write List" button

Picture 106

Finally, by clicking on one of the four available memories, store them inside the RX Unit.

Picture 107

In case of entering a list of frequencies, click in the "List" room and insert the frequency:

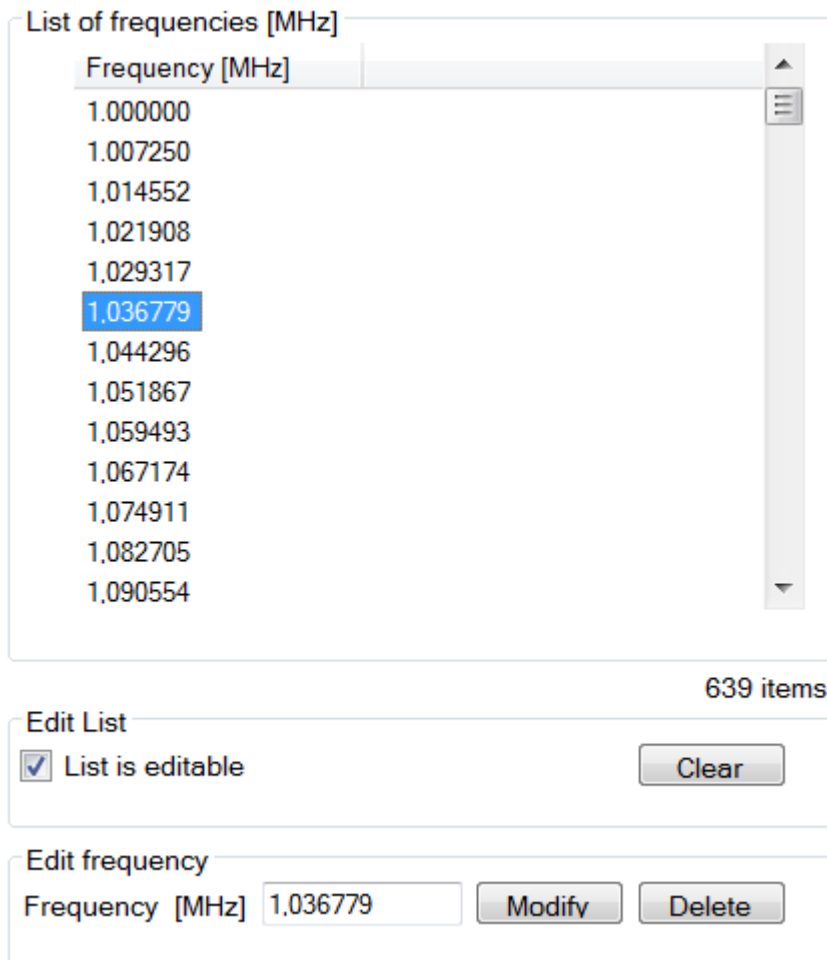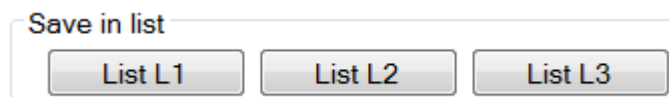*Picture 108*

Select the "Insert" button, write the frequency value in the dedicated room and push again the "Insert" button.

In order to edit or remove a frequency value, select the frequency, flag the "List is editable" room, and click " Modify" or "Delete".

Picture 109

Insert minimum three frequencies to enable the box below:

Picture 110

Save the data inside the RX unit by clicking on one of the three buttons.

Please make sure, when programming, in order to enable the following functions, to:

"Unconnected Mode"   Make max 20 Frequencies (12 for SEMS-light)

"HiDyn-Mode   Make max 30 Frequencies (12 for SEMS-light)

4.5. Cal-kit report

The Cal-kit report can be retrieved only if the SEMS is connected. In order to retrieve the report, connect the SEMS and click File → Calk report. Choose the file name and save in the preferred folder.

Further information: www.gruppompb.uk.com

Technical information: assistenza@gruppompb.com

Phone +39 06 41200744