

**CORNET ED-85EX Electromog meter** is designed for quick measurement of high frequency (RF) Electromagnetic wave field strength and power level for living environment, excellent for individual or company with Electromagnetic wave safety concerns. It has broad bandwidth (1MHz to 8GHz), high sensitivity (-55dBm to 0dBm) and fast response time. The ED85EX has the External SMA connector to connect to the external RF signal source to be measured, or with coaxial cable or to the External Antenna, filters, and attenuators.

**Applications:**

- High frequency (RF) Electromagnetic wave field strength and RF power measurement
- Mobile phone base station antenna radiation power density measurement
- Wireless communication applications (AM/FM, TDMA, GSM, DECT, CDMA)
- RF power level measurement for transmitters
- Wireless LAN (Wi-Fi, 2.4GHz/ 5.8GHz), Bluetooth, Ultra-wide-band detection, installation
- Spy camera, wireless bug finder, Electrical Smart meters
- Cellular/Cordless phone radiation safety level
- Microwave oven leakage detection
- Personal living environment EMF safety

**Features:**

- Broad Frequency range: 1MHz to 8GHz (SMA connector RF input)
- High Dynamic range: 60 dB
- High sensitivity: -55dBm to 0dBm (0.025V/m to 14.8V/m)
- Peak power density measurement: 1.5uw/m<sup>2</sup> to 0.58w/m<sup>2</sup> (\*with external antenna)
- External 50 ohms SMA connector for external antenna, attenuator, and filter connection
- LCD digital power level and power density level display with auto scale
- Moving graphic Histogram, and Bar signal level display (5dBm/segment)
- 8 high brightness color LED to display power density level with 3 safety range indications
- Continues wave (AM/FM) and high speed digital burst RF (GSM, TDMA, PCS, CDMA, Wi-Fi)
- Super fast response time with easy reading color LED segment display (5dBm/segment)
- LCD back light (15 seconds auto-off) LCD back light on/off control, Sound Signature function
- Hold mode, Correction Factor for calibration, Maximum level, and Low battery indication
- Small, compact handheld design 13cmx6.5cmx3cm
- Battery operated (9V DC ) \*9V alkaline battery recommended, not included in the package

**Usage guide:**

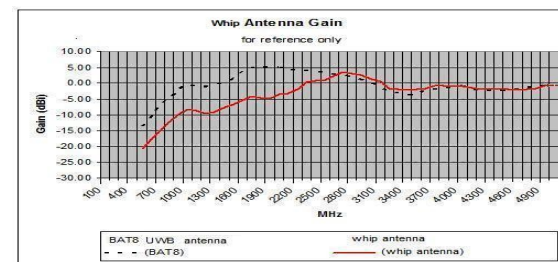
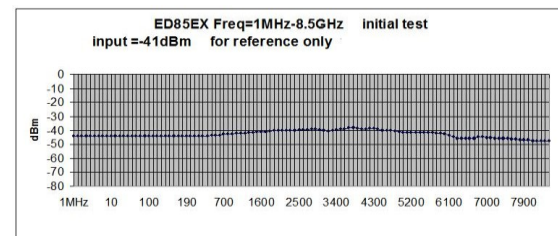
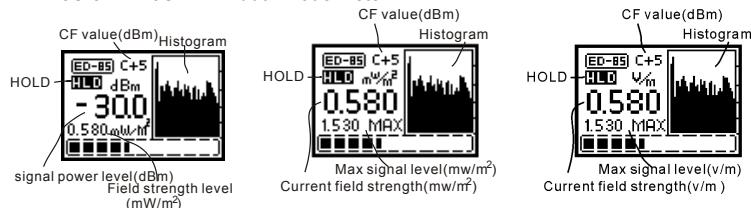
- (1) Put the 9V battery in the ED85EX, push the power switch button to turn on the ED85EX.
- (2) The RF connector (SMA) is located on the top of ED85EX, connect the ED85EX to the RF source to be measured with 50ohms RF cable or External sensing Antenna. The Input impedance of ED85EX is 50 ohms.
- (3) Measured RF signal level /power density is shown on the digital LCD display (with dBm, mw/m<sup>2</sup> and V/m). There are two LCD display modes: Power meter mode and Field strength mode. The 1<sup>st</sup> push button is used to change the LCD display modes:
  - (a) **Power meter display mode**---see Fig.1, the signal level is displayed in dBm with big characters and the mw/m<sup>2</sup> in small characters.
  - (b) **Field strength meter display mode**---see Figure, the signal level is displayed in mW/m<sup>2</sup> or V/m with big characters and the Max signal level is displayed in small characters
- (4) The 2<sup>nd</sup> push button is used to get into and exit the HOLD-mode of the ED85EX LCD display
- (5) 8 color LED lights. With 3Red, 3Yellow, and 2Green color on the right hand side of LCD window is used for quick RF signal level indications. 3 Red LEDs are used to indicate the 3 safety range. The power level of each LED can be found in the table label on the ED85 front panel. (5 dBm/ LED segment)
- (6) **Histogram** of previous 30 signal level readings are recorded and shown as moving graph
- (7) **LCD Bar** (5dBm/segment) display can be used for relative signal strength indications.
- (8) **LCD backlight/Sound control**---- to turn on/off the LCD backlight and Sound function manually, use 2<sup>nd</sup> push button to get into the HOLD-mode first, then use the 1<sup>st</sup> push button to toggle the LCD backlight and the sound function on/off (in sequence of: LCD-on, LCD-off, Sound-on, Sound-off) Get out of the HOLD-mode by pushing the 2<sup>nd</sup> button after the LCD backlight/Sound setup is done.
- (9) **Max signal level display** ----- in Field strength display mode, the Maximum signal level (since the meter power- on) is displayed below the mw/m<sup>2</sup> display line, the Max signal level is excellent for recording the Max. Signal level while measuring the field strength around with the meter. Getting in/out of the HOLD-mode will not clear the Max value, the Max level recording is continued after getting out of the HOLD-mode. **Power off the meter and power on again to clear the Max signal level value.**

- (9) **Correction factor (CF)** for signal level displayed ---- the signal level displayed on the LCD display can be adjusted by using the Correction factor(CF), ( from +1 ~+20 dB, to -1~- 20dB). To setup the Correction factor, hold the 2<sup>nd</sup>. push button down, turn on the power switch to get into Calibr-menu. use the 1<sup>st</sup> push button to move the cursor in the menu. Push the 2<sup>nd</sup> push button to increase or decrease the CF value. Use the **CF-CLR** to clear the CF value. The CF value is useful for correcting the offset of the signal level received by the ED85EX such as: external antenna gain correction, external attenuator used, or meter calibration adjustments. If the CF value is not zero, the CF value will be displayed on the top of LCD display with C+xx, or C-xx ( xx is the CF value) when in the Hold mode, to remind you the CF is on. 11 different CF value can be setup and stored, use **FB=xx** to select/store/use the CF value, the **RFxx** mark displayed on the LCD display indicates the current **FB** location (CF value) is used. Use **FB\_RST** to reset the FB to location 0. Do not forget to reset the CF value to 0 if it is not used (or just select the FB where the CF is 0). The FBs can be used to store different CF values for different frequency band for fine adjustment of the signal level displayed if the signal frequency is known. (**move cursor with 1<sup>st</sup> button to SAVE in the menu and use 2<sup>nd</sup> button to save the new value of the CF or FB.**)

**\*NOTE:** the Correction factor will not increase the dynamic range of the ED85EX. It only increase or decrease the offset of the signal level displayed by fixed amount. Please do not touch the factory setup if you get into the Factory-Setup menu by accident. Just turn-off the power of the meter to exit the "Factory Setup" mode. (use the RESET to reset it to the factory default value if you mess up the calibration accidentally).

- (10) Most high frequency RF antenna such as Mobile phone base station is vertical polarized (in vertical direction), therefore if ED85EX is connected to External sensing Antenna, the Antenna normally is in vertical direction. Please also rotate the Antenna to find the maximum power reading directions to take care of the high frequency RF wave reflections in real world environments.
- (11) Modern communication devices (Mobile phone, Wireless LAN, Wi-Fi, etc..) use digital communication technology with burst digital RF signals. When measuring the digital RF signals, several LED lights may blinking at the same time. This is normal and can be used as an indication of burst type of digital RF signals. For continues waves (AM/FM) signals, the LED light will stable. ED85EX measures peak power level of signal with very quick response time. It measures the input signal several thousand times for each update of the LCD readout. It is more accurate than the needle style of readout which only shown the average value of signal power most of the time.
- (12) ED85EX is a broadband High frequency RF signal power level measuring device. It is used for applications such as Mobile phone base station antenna radiation, Microwave oven, Cellular/cordless phone, Radio transmitters, and WiFi wireless LAN installation aid.

**It is not for low frequency magnetic field measurement (AC power transformer, high voltage power transmission line, motor ...etc.), which should be measured with Gauss-meters such as CORNET ED25G or ED75G RF/LF dual mode meter.**



## LED table and Field strength/power density readout:

-- ED85EX use 8 high brightness LED to indicate the measured power and power density. With 3 safety range indications.  
 -- The power level and power density level conversion in the table is calculated based on the standard dipole antenna.  
 Different external antenna may have different antenna gain comparing to the standard dipole antenna. The power level is the received RF power level at the SMA RF input connector of ED85EX

LED color	Power level	Power density	Indication	Action
RED3	-5 dBm up	0.18 w/m <sup>2</sup>	Safety range#3 Italy standard (0.1w/m-sq)	Caution!
RED2	-10 dBm	0.058 w/m <sup>2</sup>	Safety range#2 Swiss standard (0.04w/m-sq)	Caution!
RED1	-15 dBm	0.018 w/m <sup>2</sup>	Safety range#1 Russian standard (0.02w/m-sq)	Caution!
YELLOW3	-20 dBm	0.0058 w/m <sup>2</sup>		safe
YELLOW2	-25 dBm	1.8 mw/m <sup>2</sup>		safe
YELLOW1	-30 dBm	0.58 mw/m <sup>2</sup>		safe
GREEN3	-35 dBm	0.18 mw/m <sup>2</sup>	Wireless LAN, WiFi typically in this range	safe
GREEN2	-40 dBm down	0.06 mw/m <sup>2</sup>	Some signal source around	safe

### NOTE:

\* Electromagnetic wave field strength/power density reduces very fast with distance (distance square), keep a good distance from the high frequency RF signal source can reduce the high frequency radiation effect. Alumina foil or window sun reflector film (silver color) can be used as a effective and cheap shielding material for most of RF radiations.

\* ED85EX does not have build-in internal Antenna, Please use external Antenna with SMA connector or adaptors to connect to ED85EX for measuring the RF field strength, Use external antenna with right frequency coverage for the RF signal to be measured. The included whip antenna is centered at 2.4GHz, it can be used for general use (700MHz- 6GHz) Broadband antenna such as LPDA1810 Log Periodic Antenna (1.8GHz-10GHz) or UWB Antenna can be used for more broad frequency coverage. (see the whip antenna and ED85EX frequency response chart in front page for reference)

\* ED85EX is designed for quick living environment RF radiation evaluation and reference only. Official RF safety radiation measurement procedure is complicate and should be handled by trained technical person with lab instruments. Safety range standard are listed here as a reference only. ED85EX is not a medical instrument, Please do not use it in medical, legal certification or other related applications. This product is not for commercial rental purpose/use.

\* The Maximum input power to the ED85EX SMA RF input connector is 10dBm (10mW), it might damage the RF sensor inside the ED85EX if the RF input power level is over the limit. To protect the RF sensor, Use the 20dB attenuator in front of the ED85EX SMA RF input connector before connecting the ED85EX to any RF transmitter output. (Typical Max. RF output of WiFi LAN is 100mW, CB radio is 2W). The actual sensitivity of ED85EX is much higher than -55dBm, it can measure down to -65dBm, (uncalibrated). a marking (x) on the display indicates the signal level displayed is lower than the -55dBm level or higher than +5dBm

The European Community provided general guidelines in its Council Recommendation of July 1999.<sup>1</sup> ICNIRP published similar guidelines in April 1998.<sup>2</sup> Table I gives a sampling of the international and national field-strength limit values for the general public and continuous exposure (reference only).

950Mhz 1850Mhz

		950Mhz	1850Mhz
International	Council Recommendation 1999/519/EC	42 V/m (4.75W/m <sup>2</sup> )	59 V/m (9.25W/m <sup>2</sup> )
International	ICNIRP Guidelines, April 1998	42 V/m (4.75W/m <sup>2</sup> )	59 V/m (9.25W/m <sup>2</sup> )
Austria	ÖNORM S1120	49 V/m (6.33W/m <sup>2</sup> )	61 V/m (10W/m <sup>2</sup> )
Belgium	Belgisch Staatsblad F.2001-1365	21 V/m (1.18W/m <sup>2</sup> )	30 V/m (2.31W/m <sup>2</sup> )
Germany	26. Deutsche Verordnung	42 V/m (4.75W/m <sup>2</sup> )	59 V/m (9.25W/m <sup>2</sup> )
Italy	Decreto n. 381, 1998	6 V/m (0.1W/m <sup>2</sup> ) 20 V/m (1W/m <sup>2</sup> )	6 V/m (0.1W/m <sup>2</sup> ) 20 V/m (1W/m <sup>2</sup> )
The Netherlands	Health Council	51 V/m (6.92W/m <sup>2</sup> )	83 V/m (18W/m <sup>2</sup> )
Switzerland	Verordnung 1999	4 V/m (0.04W/m <sup>2</sup> )	6 V/m (0.1W/m <sup>2</sup> )
United States	IEEE C95.1	49 V/m (6.33W/m <sup>2</sup> )	68 V/m (12W/m <sup>2</sup> )
China	Draft: National Quality Technology Monitoring Bureau	49 V/m (6.33W/m <sup>2</sup> )	61 V/m (10W/m <sup>2</sup> )
Japan	Radio-Radiation Protection Guidelines, 1990	49 V/m (6.33W/m <sup>2</sup> )	61 V/m (10W/m <sup>2</sup> )



## SPECIFICATON:

Sensor type: Electric field sensor with SMA connector  
 Frequency range: 1MHz to 8GHz (meter itself, SMA connector RF input), usable up to 10GHz  
 \* In field strength mode: depend on external antenna used  
 Sensitivity: -55dBm to 0dBm (calibrated), down to -65dBm (uncalibrated)  
 Dynamic range: 60 dB  
 Input Impedance: 50 Ohms  
 Connector type: SMA female  
 Peak power measurement: 1.5uW/m<sup>2</sup> to 0.58 W/m<sup>2</sup> (\*with external antenna for RF field strength)  
 0.025V/m to 14.8V/m (\*with external antenna for RF field strength)  
 Display type: Digital LCD display, LED color segment display  
 Unit of measurements: dBm, uW/m<sup>2</sup>, mW/m<sup>2</sup>, V/m (auto scale)  
 Display error rate: ±1.5dBm (SMA connector input)  
 LCD back light: 12- 15 seconds auto-off or manual on/off control  
 Display of data: LCD 3 and 5 digit, 8 LED color segment, Histogram of 30 reading, LCD Bar segment (5 dBm/segment) Maximum level display HOLD function Power level mode and Field Strength mode display  
 Safety standard indication: 3 safety range indication by 3 Red LED  
 Sound: Audio Sound Signature function for signal indication  
 Battery used: 9V alkaline battery, (not included)  
 Battery life: >20 hours  
 Internal Antenna: None  
 External Antenna: External whip antenna included. or optional Log periodic antenna