CORNET Microsystem ED-85EX2 V.3.1L Quick user's manual

CORNET ED-85EX Electrosmog 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
- 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 (25mv/m to 14.8V/m)
- Peak power density measurement: $1.5uw/m^2$ to $0.58w/m^2$ (*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, LCD reading Hold key
- 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 and mw/m²). There are two LCD display modes: Power meter mode and Field strength mode. The 1st 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/m² in small characters.
>   (b) **Field strength meter display mode**----see Fig.2, the signal level is displayed in mW/m² with big characters and the Max.signal level is displayed in the small characters
>   The 2nd push button is used to get into and exit the "HOLD" mode of the ED85EX LCD display
(4) 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)
(5) **Histogram** of previous 30 signal level readings are recorded and shown as moving graph on the LCD display
(6) LCD Bar (5dBm/segment) display can be used for relative signal strength indications.
(7) **LCD backlight control**----- to turn on/off the LCD backlight , manually, use 2nd push button to get into the **"HOLD" mode** first, then use the 1st push button to toggle the LCD backlight on or off.   Get out of the "HOLD" mode by pushing the 2nd button after the LCD backlight setup is done.
(8) **Max signal level display** ------ in Field strength display mode, the Maximum signal level (since the meter power- on) is displayed below the mW/m² display line, the Max signal level is excellent for recording the Max. Signal level while measuring the field strength around with the meter. To clear the Max. Signal level; get into the "HOLD" mode first by 2nd push button, the Max signal level will be cleared when you exit the "HOLD" mode.
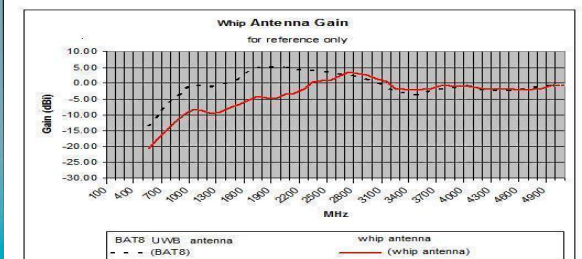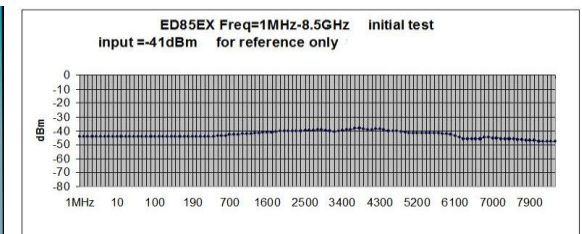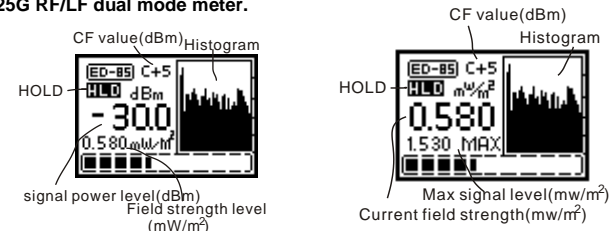
(9) **Correction factor (CF)** for signal level displayed ----- the signal level displayed on the LCD display can be adjusted by using the Correction factor(**CF**), (from +1 ~+20 dB, to -1~- 20dB). To setup the Correction factor, hold the two push button down together, turn on the power switch to get into "Calibr menu". use the 1st push button to move the cursor in the menu. Push the 2nd push button to increase or decrease the CF value.   Use the **CF-CLR** to clear the CF value. (do not touch the -25dBm item in the menu). 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. **Move the cursor to "SAVE" and push the 2nd push button to save the new (CF) value to the EEPROM of the meter.**

*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. 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)

Please do not touch the factory setup if you get into the "Factory Setup" menu by accident. Unless you have laboratory RF signal generator, it is highly possible to mess-up the factory calibration value and make the meter un-useful.   Do not push any button if you get into the Factory Setup menu. Just turn-off the power of the meter to exit the "Factory Setup" mode. (If you do mess-up the factory calibration value, use the "RESET" to reset it to the factory default value.)

(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 RF/LF dual mode meter.

CF value(dBm) Histogram — HOLD — signal power level(dBm) — Field strength level (mW/m²)

CF value(dBm) — Histogram — HOLD — Max signal level(mw/m²) — Current field strength(mw/m²)

ED85EX Freq=1MHz-8.5GHz   initial test input =-41dBm   for reference only

Whip Antenna Gain for reference only

BAT8 UWB antenna   - - - (BAT8)   whip antenna   (whip antenna)

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 ↑	0.18 w/m²	Safety range#3 Italy standard (0.1w/m-sq)	Caution!
RED2	-10 dBm	0.058 w/m²	Safety range#2 Swiss standard (0.04w/m-sq)	Caution!
RED1	-15 dBm	0.018 w/m²	Safety range#1 Russian standard (0.02w/m-sq)	Caution!
YELLOW3	-20 dBm	0.0058 w/m²		safe
YELLOW2	-25 dBm	1.8 mw/m²		safe
YELLOW1	-30 dBm	0.58 mw/m²		safe
GREEN3	-35 dBm	0.18 mw/m²	Wireless LAN, WiFi typically in this range	safe
GREEN2	-40 dBm ↓	0.06 mw/m²	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 for 2.4GHz, it can be used for general use up to 6GHz. Broadband antenna such as LPDA1810 Log Periodic Antenna (1.8Ghz-10GHz) or UWB Antenna can be used for more broad frequency coverage.
* 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 (100mW), 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 is100mW, CB radio is 2W). The sensitivity of ED85EX is higher than the -55dBm displayed on LCD (down to -65dBm), hold the 1st button and power on the meter to get into the TEST mode, the displayed raw RF level (ADC output) can be used for low level RF signal detection. (not calibrated).

The European Community provided general guidelines in its Council Recommendation of July 1999.[1] ICNIRP published similar guidelines in April 1998.[2] 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
International	Council Recommendation 1999/519/EC	42 V/m (4.75W/m²)	59 V/m (9.25W/m²)
International	ICNIRP Guidelines, April 1998	42 V/m (4.75W/m²)	59 V/m (9.25W/m²)
Austria	ÖNORM S1120	49 V/m (6.33W/m²)	61 V/m (10W/m²)
Belgium	Belgisch Staatsblad F.2001-1365	21 V/m (1.18W/m²)	30 V/m (2.31W/m²)
Germany	26. Deutsche Verordnung	42 V/m (4.75W/m²)	59 V/m (9.25W/m²)
Italy	Decreto n. 381, 1998	6 V/m (0.1W/m²) 20 V/m (1W/m²)	6 V/m (0.1W/m²) 20 V/m (1W/m²)
The Netherlands	Health Council	51 V/m (6.92W/m²)	83 V/m (18W/m²)
Switzerland	Verordnung 1999	4 V/m (0.04W/m²)	6 V/m (0.1W/m²)
United States	IEEE C95.1	49 V/m (6.33W/m²)	68 V/m (12W/m²)
China	Draft: National Quality Technology Monitoring Bureau	49 V/m (6.33W/m²)	61 V/m (10W/m²)
Japan	Radio-Radiation Protection Guidelines, 1990	49 V/m (6.33W/m²)	61 V/m (10W/m²)

RF Input, (50 ohms) SMA connector
Signal power Level in dBm
Signal power density level in uw/m², mw/m², or w/m²
Bar graph display 5dB each segment
CORNET
LED segment display signal level table
Electrosmog Meter
CORNET 0.05 -8GHz
-43.8 dBm
1.3531uW/m2
Moving histogram for 32 previous signal level readings
LED 8 segment signal power level display3Red, 3Yellow,2Green
Power switch
LCD backlight on/off
Hold

SPECIFICATON:

Sensor type:	Electric field sensor with SMA connector
Frequency range:	1MHz to 8GHz (SMA connector RF input)
Sensitivity:	-55dBm to 0dBm (calibrated), minimum to -65dBm(uncalibrated)
Dynamic range:	60 dB
Input Impedance:	50 Ohms
Connector type:	SMA female
Peak power measurement:	1.5uw/m² to 0.58w/m² (*with external antenna for RF field strength)
Display type:	Digital LCD display, LED color segment display
Unit of measurements:	dBm, uw/m², mw/m² (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
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