

CORNET Microsystem Inc., ED-85EXPlus Electromog meter is a **Dual-mode device** for quick measurement of both High frequency (RF) Electromagnetic wave field strength/power density level, and Low frequency (LF) Magnetic field level(Gauss, Tesla) for living environments. It is an excellent device for individual or company with Electromagnetic wave safety concerns. It has RF bandwidth (SMA connector direct input) of 1MHz to 8GHz with high sensitivity -70dBm,(0.05uw/m² to 1.8w/m²), and LF bandwidth of 50Hz to 10KHz (or 50Hz to 1KHz) with sensitivity of 0.1uT to 60uT(1mG-600mG) or 0.01uT to 1uT(0.1mG to 10mG). Data Logging function is also included.

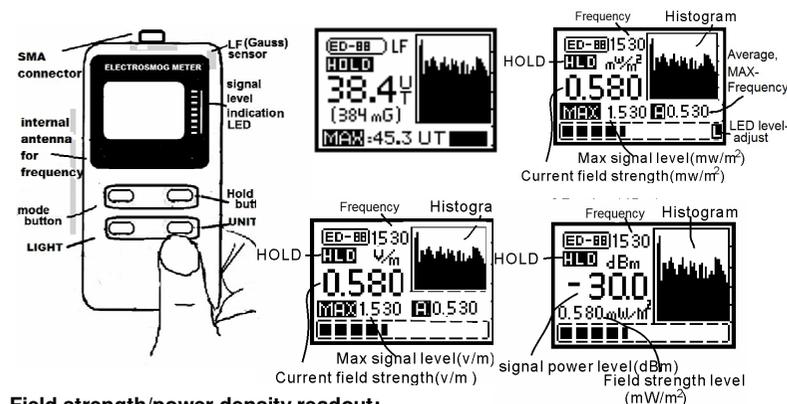
Applications:

- High frequency RF Electromagnetic wave field strength, power density and frequency measurement
- Low frequency LF Magnetic field measurement (Gauss meter function)
- Mobile phone base station antenna radiation power density measurement
- Wireless communications, Analog & Digital RF (AM/FM, TDMA, GSM, DECT, CDMA, 3G, 4G, 5G)
- RF power measurement for transmitters
- Wireless LAN (Wi-Fi), Bluetooth, Ultra-wide-band detection, installation, optimization
- Spy camera, wireless bug finder, IOT devices
- Cellular/Cordless phone radiation safety level, Electrical Utilities SMART METER radiation level
- AC power line, Power Transformer, motors and small appliance EMF
- Microwave oven leakage detection
- Personal living environment EMF safety evaluation

Usage guide:

- (1) Put the 9V battery in the ED85EXPlus, Handle the unit with right hand in vertical direction, and turn on the volume/power switch to turn on the power, it will come up with RF meter mode.
- (2) The RF external SMA connector for external antenna is located on the top of ED85EXPlus; the LF sensor is located in the right hand top side of the ED85EXPlus.
please do not cover the sensor area with hand or other objects.
- (3) There are 4 push button on the ED85EXPlus: “MODE”, “HOLD”, “LIGHT”, and “UNIT” button, “MODE” button is used to switch in between RF mode, and two LF modes.. The “HOLD” button is used to freeze the data reading of the ED85EXPlus.
- (4) **RF mode:** measured RF field strength/power density is shown on the digital LCD display (with dBm, v/m, or mw/m²). 8 LED lights with Red, Yellow, and Green color on the right hand side of LCD window are used for quick RF signal level indications. 3 Red LEDs are used to indicate the 3 safety standard of three country. The power level of each LED can be found in the table on the ED85EXPlus back cover. Frequency of input signal is displayed on LCD screen (for field strength measurement through build in internal antenna only, **NOT for external SMA input signals**)
- (5) **LF mode:** measured LF magnetic field strength is shown on the digital LCD display (with uT and mGauss). Two LF modes can be selected by “MODE” button: (a) **LF30mode** (0.1mG-10mG) and (b)**LF600 mode** (1mG-600mG). 8 color LED lights are also available to show the relative strength of the magnetic field.
- (6) **Histogram:** previous 30 signal level readings are recorded and shown as moving graph on the LCD display for RF, and LF modes. It can be used for finding direction of signal source and recording bursts from digital RF signals such as signals from AC smart meter.
- (7) **HOLD & UNIT:** HOLD button can be used to halt the data measurement of the ED85EXPlus, a “HOLD” Mark will show on the LCD screen to indicate the “Hold” condition. Push the “HOLD” button again the ED85EXPlus will exit from the “Hold” condition. “UNIT” button can select the mw/m², v/m, or dBm unit.
- (8) **MAX:** Maximum measured data value since the last power-on is shown on the LCD display.
- (9) **Average:** average or peak average value is displayed on the LCD with “A” or “P” mark. It can be used to estimate the duty cycle of the digital RF burst signals or the average of peak signal level.
- (10) **Sound function & LCD backlight:** Toggling the “LIGHT” button can turn-on/off the LCD back light and the Audio Sound function, (a “S” mark on the LCD indicates the sound mode is on). Wheel Volume control can be used to adjust the sound level. Audio Sound can be used to detect very low level RF signals (down to 0.05uw/m²) especially for the digital RF burst signals. In order to reduce the battery current consumption please remember to turn-off the LCD back light or the sound when it is not needed.
- (11) **Data Logging menu:** Push and hold the “UNIT” button then click the “MODE” button to go into LoggerSetup menu. Please see the “ED85EXPlus Data Logging user Guide” from www.cornetmicro.com for details of the Data Logging functions.

- (12) **SysSetup Menu:** Push and hold the “UNIT” button then push the “HOLD” button to get into the SysSetup menu. Use the “>” button to move the cursor in the Menu and use the “<” button to enable/disable the functions in the SysSetup menu:
 - (a) **EXIT:** exit the SysSetup menu, return to normal mode
 - (b) **RF level Unit select:** select default mw/m², v/m, or dBm mode when meter is powered on.
 - (c) **LED Level:** used to adjust the color LED segment display level for custom safety standards OFF,-5,-10,-15, or -20dB. (use -20dB for “SBM2008 Building Biology Testing Methods”)
 - (d) **Average/P:** select Peak average, or All average of MAX value display.
 - (e) **MAX_Clear bit:** If the MAX_Clear is “ON” the MAX value can be cleared by toggling the “HOLD” button. If it is “OFF” the MAX value can be cleared only by power-off the meter.
 - (f) **Alarm:** ON/OFF or one of the 8 trigger levels(0,-5,-10,-15,-20,-25,-30,-35dBm) can be selected to trigger the audio Alarm. *(Alarm function is used in RF mode only).
 - (e) **RESET:** reset to default (mw/m²,LED Level OFF, MAX_CLEAR ON, Alarm OFF,PeakAvg).
 - (g) **SAVE:** push the “<” button to save the changes of setup to EEPROM memory. **Do not power off meter, Wait until save is done!** (EXIT without SAVE to memory the changes will still functional, but it will lost if the meter is power-off).
- (13) The **LF30 mode:** has high sensitivity (0.1mG-10mG), but with lower frequency range (50Hz – 1KHz) to reduce the high frequency noise. (The Histogram and LED segment display can go up to 30mG)
- The **LF600 mode:** with sensitivity (1mG-600mG), has higher frequency coverage (50Hz -10KHz). When measuring the high frequency digital/pulse type of signals,(such as switching power supply), the LF30 mode might have lower reading than the LF600 mode, this is due to the lower frequency coverage range of the LF30 mode.
- (14) While in LF (magnetic/electric field measurement), please hold the ED85EXPlus steady to get the good stable reading, avoid fast moving of the ED85EXPlus to prevent the sudden change of the reading caused by the Earth magnetic field or the induced electric field of nearby objects.
- (15) AC Smart Meter radiates RF signal in short burst every few minutes, use MAX function and Histogram function of ED85EXPlus, and wait a few minutes to capture the RF signals from smart meter.



Field strength/power density readout:

ED85EXPlus use 8 high brightness LED to indicate the measured power density with 3 safety Indications of three countries. *Action is reference to ICNIRP (for reference only).

| LED color | RF Power level | RF Power density | LF600/LF30 level | E-field level | Indication | Action |
|-----------|----------------|------------------------|-------------------|---------------|--|----------|
| RED3 | -5 dBm up | 0.18 w/m ² | 30uT/3uT up | n/a | Italy RF safety standard (0.1w/m ²) | Caution! |
| RED2 | -10 dBm | 0.058 w/m ² | 20uT/2uT | n/a | Swiss RF safety standard (0.04w/m ²) | Caution! |
| RED1 | -15 dBm | 0.018 w/m ² | 10uT/1uT | n/a | Russian RF safety standard (0.02w/m ²) | Caution! |
| YELLOW3 | -20 dBm | 5.8 mw/m ² | 5uT/0.5uT | n/a | | Safe* |
| YELLOW2 | -25 dBm | 1.8 mw/m ² | 2uT/0.2uT | n/a | | Safe* |
| YELLOW1 | -30 dBm | 0.58 mw/m ² | 0.5uT/0.05uT | n/a | | Safe* |
| GREEN3 | -35 dBm | 0.18 mw/m ² | 0.2uT/0.02uT | n/a | WiFi Wireless LAN typically in this range | Safe* |
| GREEN2 | -40 dBm down | 0.06 mw/m ² | 0.2uT/0.02uT down | n/a | Some signal source around | Safe* |

NOTE:

- Most high frequency RF antenna such as Mobile phone base station is vertical polarized (in vertical direction), therefore while in RF mode, the ED85EXPlus is normally used in vertical direction. For LF mode, the LF sensor is located in the top right hand of the ED85EXPlus and the meter is normally used in Horizontal position in LF mode. Please rotate the meter to find the maximum reading direction in either case. The maximum reading will also increase as you approach the source. ED85EXPlus can be used to find the location of signal source. ED85EXPlus measures the peak power density of the signal with very fast sampling time. of readout which only shown the average value of signal power most of the time.
- 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 an effective and low cost shielding material for most of RF radiations.
- ED85EXPlus is designed for quick living environment RF radiation evaluation and is for reference use only. Official RF safety radiation measurement procedure is complicate and should be handled by trained technical person with lab instruments. Safety range standard listed below is for reference only. ED85EXPlus is not a medical instrument, Please do not use it in medical, legal, commercial rental purpose or other related applications. (for personal use only)
- Turn the volume control to minimum first before plug in the earphone to the ED85EXPlus to avoid damage to your ear by accident from high level sound produced by digital RF signals.
- The audio sound output of the sound function is the demodulated RF signal, it is good for AM and modern digital RF signals (pulse/burst) detection, it is not for FM or constant amplitude RF signals or LF/ELF modes. It is an excellent tool for RF signal type indication. (different RF signal such as Wifi, GSM, DECT, ...etc., all has different sound frequency signature of the demodulated RF signal) and for very low level signal detection.
- The Maximum input power to the RF input SMA connector is 10dBm (10mW), it might damage the RF sensor of the ED85EXPlus if the RF input power level is over the limit. Use the 20dB attenuator in front of the RF input SMA connector before connecting the ED85EXPlus to any RF transmitter output. (Typical Max. RF output level of WiFi router is 100mW, CB radio is 2W).

Specification

Sensor type: Electric field sensor and Magnetic field sensor
Frequency range & Sensitivity: RF: 1MHz to 8GHz (SMA connector direct input) (-65dBm to +5dBm), (0.18uW/m² to 1.8W/m²), (0.008V/m to 26.2V/m), -- (calibrated) -70dBm (0.05uW/m²) (0.004V/m) -- (uncalibrated)
 *RF frequency range for field strength measurement is depend on the external antenna used.
LF1: 50Hz to 10KHz (0.1uT to 60uT)/(1mG to 600mG)
LF2: 50Hz to 1KHz (0.01uT to 1uT)/(0.1mG to 10mG)
Frequency display: 100MHz~2.7GHz for field strength measurement, (from internal build-in antenna only, not from SMA connector direct input) -35dBm minimum signal level required.
Input Impedance: 50 Ohms
Connector type: SMA female
RF Peak power measurement: 0.05uW/m² to 1.8W/m² (with external antenna for RF field strength) 0.004V/m to 26.2V/m (with external antenna for RF field strength)
Display type: digital LCD graphic display
Unit of measurements: dBm, mW/m², V/m, uT, mG, MHz
LCD backlight: 15 seconds auto-off and manual on/off control
Display of data: LCD 4 and 5 digit, 8 LED color segment, Moving Histogram (level/time) of previous 30 recorded data, Analog segment bar
Data update rate: Sampling rate: 10000/sec. Display update rate: 2/sec.
Error rate: RF: +/- 1.5dBm, LF: 20%
Functions: Hold, Max, Average, Sound signature, Alarm, Frequency
Sound & Alarm: Sound on/off/volume control, programmable Alarm triggering level
Safety standard indication: 3 safety range indication by 3 Red LED, adjustable LED level
Data Logging: 1000 data storage point memory for logging/recording measured RF signal level
Battery used: 9V alkaline battery or external power supply through USB port (5V) >20 hours (battery & USB cable is not included in shipment)
Battery life: internal build-in antenna for Frequency display use only
Internal antenna: External whip antenna is included.
External antenna: Optional Log periodic antenna available (not included)

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 (for Reference only !)

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

