

# 3M™ EM Eye Meter — ESD Event, Electromagnetic Field and RF Signal Measurements

## The Power of a Benchtop Meter in Your Pocket

Whether you are in charge of product development, EMC compliance or ESD prevention, equipment installation and maintenance, or if you are involved in research, your work depends on the test equipment you have available. What you can or cannot achieve depends on the ability to take various measurements, to collect and store data, to present the data in the most convenient way, and to process it on a computer, along with the portability of your instruments.

To make your job a little easier, 3M has developed the EM Eye Meter – one of the smallest and most versatile instruments for measuring EM fields, RF signals and ESD events determined by the sensor connected to the EM Eye Meter. This meter allows you to expand your instrumentation at a lower cost since adding a sensor is less expensive than purchasing a completely new instrument. Weighing just 9 3/4 ounces, the EM Eye Meter can literally fit in the palm of your hand or in your shirt pocket. The touch screen and color display make this instrument very easy to use.

**ESD Events Detection** – The EM Eye Meter is capable of detecting ESD events and characterize them in most HBM, CDM and MM models. It is capable of rejecting non-ESD related events, making analysis easier. The meter is easy to operate and can be used by almost anyone who is involved with ESD. It provides information on estimated discharge voltages at a specific location, what time it occurred, and how many discharges have occurred. The meter's small size allows it to be used in tight locations inside the tools or in a wider area of interest. For extended temperature environments, the EM Eye Meter uses an optional remote antenna which will work under most conditions. All information is recorded on an SD™ card for easy review and retrieval of data.

**Electromagnetic Field (EMF) Measurement** – By simply placing the EMF sensor head into the EM Eye Meter base, the EM Eye Meter transforms into a dedicated EMF meter, a power density meter and an EIRP meter. The EM Eye Meter detects and measures high frequency electric fields that may be present in equipment, tools, circuit boards or on any process in a manufacturing area. The EM Eye Meter also measures high frequency electric fields from mobile phones, over-the-air TV signals, wireless LANs and any other source generating fields within its specification. The EM Eye Meter comes with a miniature directional antenna that measures just one parameter. The meter then can calculate several parameters from that original one. The directional antenna reduces the influence of ambient electromagnetic fields when measuring emission coming from the specific source. So whether you're in the fields of product design, mobile phones, TV signals or wireless LAN, the portable EM Eye Meter is a helpful and important part of your toolbox.






**RF Signal Sensor** – The EM Eye Meter, with the replacement RF sensor head, is capable of measuring RF signals. Usually used by radio communications designers and engineers, the EM Eye Meter will be able to provide a readout of RF signal voltages. The EM Eye Meter offers exceptional sensitivity and linearity.



3M™ EM Eye Meter



# 3M™ EM Eye Meter User Features

<p><b>Modular Construction</b></p> <p>The 3M™ EM Eye Meter with the modular construction concept can expand to different applications. With the current design, it measures ESD events, electromagnetic fields (EMF), power density, effective isotropically radiated power and radio frequency (RF).</p>	
<p><b>Touch Screen to Power ON</b></p> <p>The EM Eye Meter is designed with a modern user interface. All buttons and controls are within the display itself. With its display and touch screen, it is easier for users to quickly navigate through the features that were built into the meter.</p>	
<p><b>Speaker and Headphone Alarm Outputs</b></p> <p>The EM Eye Meter, with a speaker and headphones, allows flexible means for audible indications, beeping or “warbling” like a radio. If one is in a noisy place, a headphone jack for optional headphones can be used for clearer audio.</p>	
<p><b>Remote or Local Antenna Selection</b></p> <p>3M recognizes that an engineer may be working in tight physical locations. The EM Eye Meter is small and portable with expansion accessories that can be fitted in hard-to-reach places, and in hot or cold temperatures.</p>	
<p><b>Easy Data Logging to Memory Card</b></p> <p>The EM Eye Meter supports data logging by using a miniSD™ card and exports to an Excel spreadsheet. Having data at hand enables quick analysis. Solutions can be decided quickly and can be measured on the spot.</p>	

## Specifications

General	
Overall Functions	ESD event detector Electromagnetic field (EMF) meter Power density meter Effective isotropically radiated power (EIRP) meter Radio frequency (RF) meter
Audio Indicators	Speaker: beep or analog audio with volume control
External Data Storage	MiniSD™ Card, FAT32 format, SanDisk 512Mb, 1GB, 2GB (For other card types, please contact 3M for verification.)
Recording Interval	Peaks: 1-360 seconds Average signals: 0.1-360 seconds
Battery Type	1) Lithium-Ion, internal 2) Lithium coin, internal Batteries are not user serviceable. Please contact 3M for service.
Battery Charge Life	New batteries: ~ 8 hours at 10% brightness; ~ 4 hours at 100% brightness Charging time: 2 hours
Operating Temperature	10 - 40°C
Relative Humidity	30% - 70% RH

## 3M™ EM Eye Meter Specifications, continued

### General

Display	TFT RGB LCD 240 x 320 pixels
Size	65 W x 32 D x 105 L mm (2.6 W x 1.3 D x 4.2 L in.)
Headphone Jack	3.5 mm (1/8 in.)
Antenna/Cable Connector	Reverse SMA
Power Supply/Charger	Input: 100-240 V ~ 50-60 Hz 0.2 A Output: 5.0 V 1000 mA Center: positive, ID 1.3 mm; OD 3.5 mm Plug converter: EU, US, China, Korea, Taiwan, Philippines

Power supply/charger regulatory marks:



### Applications

#### ESD Events

- ESD Audit and Survey
- ESD Environ Diagnostics
- Reduction of Yield Losses Caused by ESD
- Data Logging for ESD Reports and for Statistical Analysis

#### Electromagnetic Fields

- EMC Diagnostics
- Antenna Installation and Maintenance
- Telecommunications (CW, TDMA/GSM/DECT)
- RF Safety
- Diagnostics of Power Equipment
- Interference Analysis
- Site Survey

#### RF Signals

- Product Design
- R & D
- Service, Repair and Maintenance of RF Equipment

### Features

#### ESD Events

- Detects ESD events and locates their sources
- Measures the magnitude of individual ESD events
- Counts ESD events
- Logs ESD events with their magnitude and time/date stamp for generating ESD environment diagrams and records
- Lets you listen to ESD event "crackles" via internal speaker or optional headphones

#### Electromagnetic Fields

- Measures electromagnetic field strength over a wide dynamic range
- Measures both continuous and pulsed fields
- Measures field strength and power density
- Measures EIRP of a transmitter
- Locates sources of EMI

#### RF signals

- Broad frequency range (1 MHz to 2.5 GHz)
- Wide dynamic range

### ESD Event Sensor Specifications

ESD Event Detection Modes	Human body model (HBM), machine model (MM), charged device model (CDM), raw input (ESD), all signals (ESD and other noise signals)
Raw Input Resolution	1 mV (1 mV - 15 mV); 15 mV (1 mV - 1500 mV)
Threshold Resolution	1-10 Volts, 10-990 Volts. Raw input: 1 mV (1 - 15 mV) and 15 mV (15 - 1500 mV)
Distance Detection Range	1.3 cm (0.5 in.) – 38.1 cm (15.0 in.)
ESD Counter Range	0 – 32,767 counts
Hardware Setup	Brightness, auto off-time
Antenna Options	Local or remote (CTC113 for regular use, or CTC115 for high temp use)

## 3M™ EM Eye Meter

Electromagnetic Field Sensor			
Function Modes	Electromagnetic Field	Power Density Meter	EIRP Meter
Peak Range	0.001 – 20.00 V/m	Min: 0.027 nW/cm <sup>2</sup> Max: 106.1 uW/cm <sup>2</sup>	Min: 0.001W Max: 5333 W @ 20 m.
Average Range	0.01 – 20.00 V/m	Min: 0.027 nW/cm <sup>2</sup> Max: 106.1 uW/cm <sup>2</sup>	NA
Memory Reference Range	0.01 – 20.00 V/m	Min: 0.027 nW/cm <sup>2</sup> Max: 106.1 uW/cm <sup>2</sup>	NA
Current Reference Range	0.01 – 20.00 V/m	Min: 0.027 nW/cm <sup>2</sup> Max: 106.1 uW/cm <sup>2</sup>	NA
Units	V/m, dBuV/m	W/cm <sup>2</sup>	W-m
EIRP Distance			0.25 – 20.0 m 0.82 – 65.60 ft.
Antenna Factor Range	-40.0 to 40.0 dBm-1		
Hardware Setup	Brightness, off-time, antenna factor (AF)		
Frequency Response	10 MHz – 2.5 GHz		

RF Sensor Specifications	
Unit Modes	dBuV, dBm, mV
Dynamic Range	Min:52 dBuV Max 106.9 dBuV; Min: -55dBm-Max: 0 dBm; Min: 0.4mV Max: 223.6mV
Reference Range for Peak/Average	0.100 - 224.0 mV
Record Interval Range	1 – 360 seconds
Record Averaging Range	0.1 – 360 seconds
External ATT	00 dB / 20 dB
Frequency Bandwidth	1 MHz to 2.5 GHz

## Product Ordering Information

Model Number	Description
CTM048-2128	EM Eye Meter with ESD and EMI Sensors, 80-0012-2091-4
CTM048-21	EM Eye Meter with ESD Sensor, 80-0012-2092-2
CTM048-28	EM Eye Meter with EMI Sensor, 80-0012-2093-0
CTM048-29	EM Eye Meter with RF Sensor, 80-0012-2094-8
If you're already using the EM Eye Meter and would like to add another sensor, you can order:	
CTC021	ESD Sensor, 80-0012-2095-5
CTC028	EMI Sensor, 80-0012-2096-3
CTC029	RF Sensor, 80-0012-2097-1

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