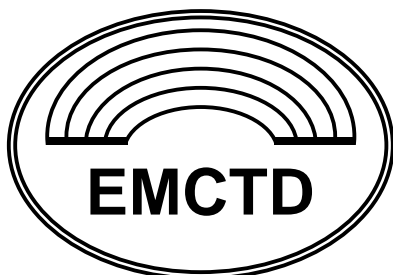


EMC Test Design<sup>®</sup>

## Field Meters



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## About EMC Test Design®

EMC Test Design® is created and driven by a group of professionals with background in RF, Analog and Digital Electronics with particular expertise in Electromagnetic Compatibility (EMC). We have been designing EMC test equipment and custom solutions for in-house EMC testing and qualification since 1992. Our company is located in Newton, MA, USA.

Our latest product addition is the most wanted EMC instrument **Smart Fieldmeter™**. It has been designed, as a response to our customer needs for versatile and portable EM field strength meter for multiple applications.

**Smart Fieldmeter™** - has innovative design and combines the major features of professional quality field monitoring equipment with convenience and simplicity for users on a budget.

## Applications

### In the EMC lab



**Smart Fieldmeter™** can be used for RF Radiated Immunity testing for practically any EMC standard, including MIL STD 461/462, RTCA DO-160, EN50082, EN61000-4-3, etc.).

The probe has the frequency range of 0.2 MHz-3 GHz, and field dynamic range from 0.2 to 600 V/m (single probe). We have the probe variants, including the one with upper field limit of 800 V/m.

Smart Fieldmeter™ has isotropic probe with good RF decoupling and relatively small size. Probe can be placed inside the TEM cell, EMC chamber or near the unit under test on the included non-metal tripod.

Meter is connected to probe through decoupled cable and provides the remote monitor output to external equipment. Our approach works better than the one where probe is permanently mounted on the meter. By placing meter away from the RF field test area we can get more predictable field measurements.

Smart Fieldmeter™ has fast (<100 ms) response time that matches well the modern automated test procedures. If more averaging is required - our slow (2 s) time constant mode makes an ideal choice.

With optional DAQ having the AC/RF isolated amplifier(s), data are streamed to RS232 port of the PC, giving the capability for fast (240 readings/sec.) data acquisition during the test, storage, display and/or integration with any RF Immunity software packages.

### In the field



Smart Fieldmeter™ can be used for evaluation and measurements of EM fields from various field sources: AM/FM/TV and cellular stations; transmitters and CB radios, etc. Its multimode (Average, Peak and Pulse) operation allows monitoring of the steady state and pulsed fields by displaying the average or peak values.

For these application we offer the optional data logging solutions with external battery operated DMM having the optically decoupled RS 232 interface and allowing to make 30 -100 field measurements with memory, time and date stamps for the subsequent data analysis, PC storage and evaluation.

Lightweight design (meter and probe together weight 335 g, or 0.7 lb) and small size with possibility of detached probe operation, create the benefits in the field, while 100 hours life time of the standard 9 V battery ensures the device operation on the longest trips.

Auto-zero function works even in the strongest fields guaranteeing the low errors due to the temperature variations and parts aging.

### In industry



**Smart Fieldmeter™** can be used for the evaluation and measurements of EM fields from various industrial sources, like microwave ovens, technological, scientific and medical equipment, - anywhere where there are intentional and non-intentional RF fields.

The remote output with fast response allows data logging into portable battery operated loggers and can also be used for signal monitoring and remote data analysis. This approach allows storing thousands data measurements spaced by time intervals from seconds to days.

## **Specification: Meter RFP-04, Probe- PI-01**

- Portable EM field meter (E-Field) with detachable isotropic probe.
- Wide dynamic range: 0.2 - 600 V/m.
- Resolution (at range): 0.01 V/m (2 V/m and 20 V/m),  
0.1 V/m (200 V/m), 1 V/m (600 V/m).
- Broad frequency range: 0.2 MHz-3 GHz.
- Probe directivity: Omni directional (Isotropic probe).
- Ranges (V/m, full scale): 2, 20, 200, 600.
- Calibration accuracy: +/- 0.5 dB (at reference levels).
- Linearity deviation: +/- 1.5 dB (any range 10-100% of full scale).
- Probe frequency response: +/- 1 dB (0.5 MHz–1 GHz),  
+/- 2.5 dB (1 GHz–3 GHz),  
Roll off -3 dB @ 0.2 MHz.
- Probe isotropy: +/- 1.5 dB (100, 500, and 2500 MHz).  
Typically +/- 0.6 dB @ 100 MHz.
- Operating modes: Average, Pulse and Peak.
- Reading:  
Average: RMS (root mean square) in all modes:  
RMS (Averaged over  $T_{av}$ ).  
Pulse: 0.707 x Instant Value (Averaged over  $T_p$ ).  
Peak: 0.707 x Peak Value (Averaged over  $T_s$ ).
- Response times for different operating modes:  
Average (Slow Response):  $T_{av}$  (averaging slow time)=2 s.  
Pulse (Fast Response):  $T_p$  (averaging fast time)=100 ms.  
Peak (Peak Response):  $T_s$  (sample time) =50 ms,  $T_h$  (hold time)=14 s.
- Auto zeroing (automatic and/or user activated) operates even at strong EM fields, and eliminates temperature induced offset errors.
- Display: LCD 3.5 Digits, with over-range feature.
- Remote monitor: Special 1.8 m (6 ft.) cable (supplied with unit) allows remote output monitoring by data logger, scope or voltmeter.
- PC data streaming allows fast data transfer (240 samples/sec.) through AC/RF decoupled DAQ box to serial RS232 port.
- Data logging allows the use of portable battery operated data loggers for data storage and PC transfer at a later time.
- Design: rugged metal hand held enclosure. Probe is mounted on nonmetal handle and can be removed for cable operation at a distance.
- Standard tripod mount (1/4"-20) for meter, probe clip and nonmetal portable tripod are provided.

- Operating temperature: 5 C° to 40° C, RH 10%-90%, non-condensing.
- Temperature error: <0.08 dB/°C (range 2 V/m), <0.05 dB/°C (other ranges).
- Dimensions: Meter (hxwxh) 130x80x30 mm., 5x3.125x1.25 inch, Probe (LxD) 230x58 mm, 9.0x2.25 inch.
- Weight: Meter 225 g., 0.5 lb; Probe 100 g., 0.2 lb.
- Battery life: 100 hr. with user replaceable 9V battery (included). Low battery indicator.
  
- Calibration: Every unit is individually calibrated for absolute test levels and linearity at specified frequencies. NIST traceable Calibration certificate is supplied with each unit.
- Accessories: Smart Fieldmeter™ comes in a hard carrying case and includes the RFP-04 Meter with installed battery, PI-01 Isotropic Probe together with probe cable, remote monitor cable, tripod, probe clip and product documentation.
- Warranty: Unit is guaranteed for parts and labor for 1 (*one*) year from the date of purchase.



## Meter/Probe Selection Table

Meter, Probe Code	Frequency Range	Field Strength Range	Time Constant s Ts, Tav, Th	Notes
<b>RFP-04 PI-01</b>	<b>0.2MHz - 3 GHz</b>	<b>0.2 – 500* V/m</b>	<b>50 ms, 2 s, 14 s</b>	<b>Stocked model.</b> *Exact upper limit is specified for every unit.
<b>RFP-04CE</b>	<b>0.2MHz - 3 GHz</b>	<b>0.2 – 500* V/m</b>	<b>50 ms, 2 s, 14 s</b>	<b>CE marked model.</b>

<b>PI-01CE</b>			<b>14 s</b>	
<b>RFP-04LF PI-01LF</b>	<b>50 KHz – 3 GHz</b>	<b>0.4 – 500* V/m</b>	<b>50 ms, 2 s, 14 s</b>	<b>Extended lower frequency limit.</b>
<b>RFP-04UL PI-01UL</b>	<b>0.2 MHz - 3 GHz</b>	<b>1.0 – 800* V/m</b>	<b>50 ms, 2 s, 14 s</b>	<b>Extended upper field limit.</b>
<b>RFP-04F PI-01F</b>	<b>0.2 MHz –3 GHz</b>	<b>0.2 – 500* V/m</b>	<b>5 ms, 2 s, 14 s</b>	<b>Faster response time in Pulse, Peak modes.</b>
<b>RFP-04E PI-01E</b>	<b>0.2 MHz - 3 GHz</b>	<b>0.2 - 500 V/m</b>	<b>50 ms, 2 s, 14 s</b>	<b>Environmental model. Contact EMCTD for specification details.</b>

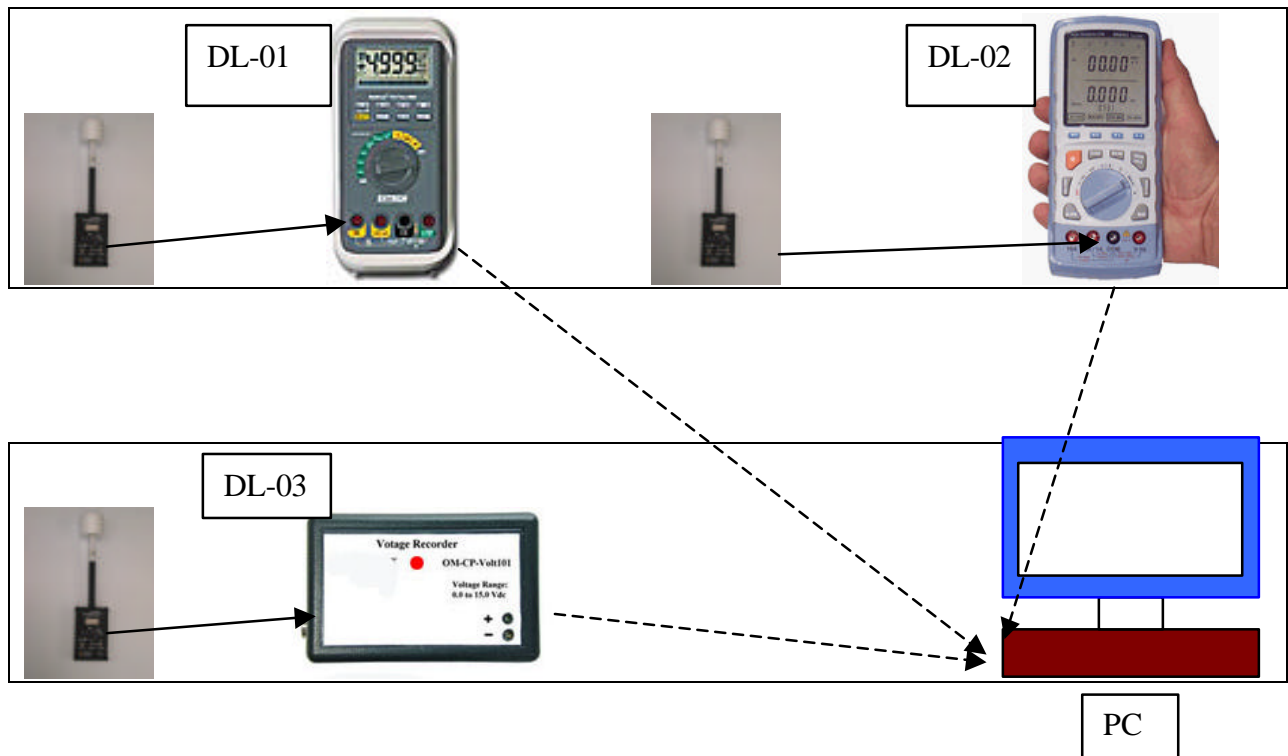
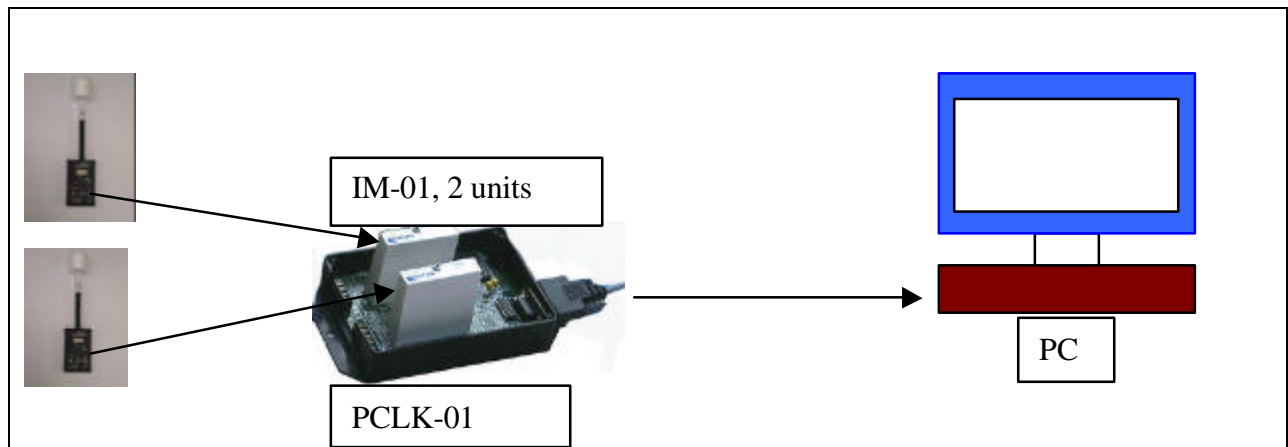




## Accessories Selection Table

Name	Description	Notes
Probe PI-01	<b>Standard probe</b>	Must be calibrated with RFP-04 meter
Probe PI-01LF	Extended <b>lower frequency limit</b> probe.	Must be calibrated with RFP-04LF meter
Probe PI-01UL	Extended <b>upper field limit</b> probe.	Must be calibrated with RFP-04UL meter
Probe PI-01F	<b>Faster response time</b> probe	Must be calibrated with RFP-04F meter
Cable: Probe	SMA/SMA 4-6 ft.	Stocked, standard
Cable: Remote Monitor.	3.5 mm one end -dual banana another end, 6 ft long.	Stocked, special
Tripod	6" Nonmetal tripod	Stocked, standard.
PCLK-01 with IM-01	PC Link Kit (240 samples/sec). RS232 isolated serial data link for two channels with one isolating input module and display software.	<b>Data streaming and display on PC for one RFP-04 unit. Can support two RFP-04 units with extra IM-01.</b>
SF-01	Software driver for seamless integration of Smart Fieldmeter with industry popular RF immunity software.	Coming soon!
IM-01	Isolating input module (second channel).	Add to PCLK-01 to connect <b>two meters with probes</b> to PC simultaneously.
DL-01	Portable data logging DMM with PC link (20 samples/sec).	DMM with optically decoupled RS232 link
DL-02	Portable data logging DMM with PC link (1 sample/sec).	DMM with optically decoupled RS232 link
DL-03	Portable data logger with 8,000 memory samples and RS 232 output.	Variable sampling rate from sec. to days.

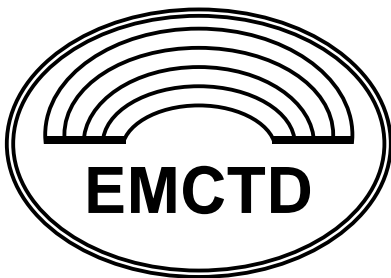
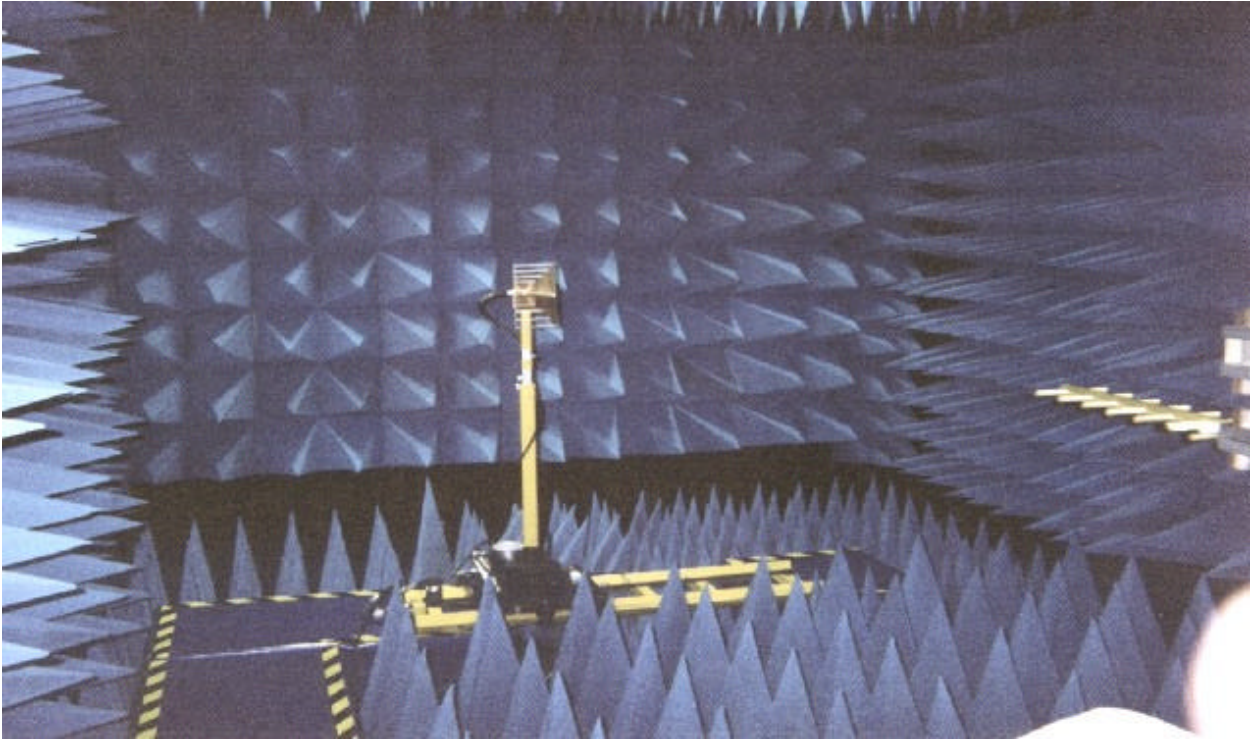
# Data Streaming and Data Logging Option



## Services Selection Table

Name	Description	Notes
<b>Calibration</b>	<b>Calibration of meter with probe. NIST traceable.</b>	<b>Recommended once per year.</b>
<b>Repair</b>	<b>Repair and <u>calibration</u> of meter with probe. NIST traceable</b>	<b>Free during the warranty period of 1 year.</b>





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