



## RadMan / RadMan XT RF Personal Monitors

- ◆ 1 MHz to 40 GHz
- ◆ Shaped Frequency Response Matched to Your Standard
- ◆ Multi-Function Tool – Personal Monitor, Leakage Detector, Simple Measurement Instrument
- ◆ Simultaneous E- and H-Field Measurement
- ◆ Data Logger Records Continuously (Radman XT)
- ◆ Four LED Level Indicators
- ◆ Isotropic Response when used Off the Body
- ◆ Optical Interface can be used “Real Time”
- ◆ Patented Design



### Description

All RadMan monitors share the same compact housing, dual electric (E) and magnetic (H) field detection, and wideband shaped frequency response. The “shaped” frequency response means that the monitor has frequency-selective sensitivity that matches your standard – all major standards are supported. The alarm criteria and the output information are incorporated in the “Percent of Standard.”

Narda Safety Test Solutions’ latest RF personal monitor is the Series ESM-30 RadMan XT. This “Extended Technology” monitor is very similar to the ESM-20 Series monitors that have been available since 1997 with one very important difference: the RadMan XT continuously records the field strength that it measures. Since the monitor has both electric and magnetic (E and H) field sensors, it records six different values for every data point: Maximum, Minimum, and Average values during the averaging period for both the E field and the H field. The time and date of each data point is also stored. This data may be retrieved at any time using the optional ESM-TS Interface Set which includes a fiber optic cable, adapter circuit, and software. The software permits the user to download the data that the monitor has collected, analyze the data, and set the monitor’s internal clock. The data logger is always on – it simply stores the newest data in place of the oldest data.

All RadMan monitors are multi-function tools. With the RF absorber cap off, the RadMan functions as a simple instrument with isotropic detection and four level indicator LEDs that provide an approximate indication of field strength. The RadMan can also be used as a simple area monitor. The fiber optic interface and available software can be used to continuously monitor the detected field strength levels from both the electric field and magnetic field sensors.



## RadMan Personal Monitors

### Applications

RadMan RF monitors are generally usable over their entire rated frequency range with two limitations:

- The RadMan XT ELF Immune Series is specifically designed for use in strong ELF fields, such as where wireless antennas are mounted on towers that carry high voltage 50/60 Hz utility power. RadMan and RadMan XT Series models are not designed for this environment and false alarms may occur.
- Standard RadMan monitors are not recommended for use with radar signals. "Fast" RadMan monitors are available for applications where peak detection of radar signals is desired. See Detecting Peak Radar Signals on the next page.

There are three series of RadMan RF monitors. Within each series, the specifications are essentially identical except for the sensor "shaping." Each specific standard or guidance requires some differences in the sensor design and calibration. The specified frequency range of each model can vary depending on the difficulty in shaping the frequency response of the monitor to match the standard. The three RadMan series are:

#### RADMAN XT:

This is the full-featured RadMan monitor. It operates over the maximum frequency range and contains both E and H field sensors. Monitors are generally shaped to match the higher level of two-tier standards, i.e., the "Controlled," "Occupational," or "RF Worker" limits. The data-logger can log more than 1,600 sets of data that can be used to analyze personnel exposures in order to improve operations. Or it can be used in the same way a Flight Data Recorder is used on board an aircraft – the logged data can be reviewed whenever there is a need to determine an individual's level of exposure.

#### RADMAN XT ELF IMMUNE:

These monitors are very similar to the RadMan XT series except that the inside of the housing has a special conductive coating. This coating blocks the ELF signals, reducing the frequency range of these monitors at the low end.

#### RADMAN:

This series is identical to the full-featured RadMan XT except they do not include the data-logging capability.

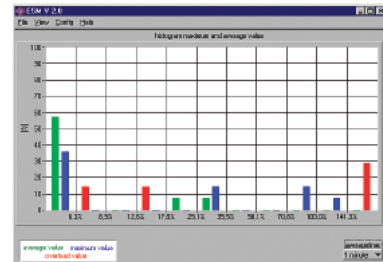
### RadMan PC Interface Set

Allows you to monitor both E and H fields in real time via fiber optic cable when monitor is used off the body. You can download and analyze logged data from RadMan XT monitors.

Interface Set ESM-TS includes:

- Windows® compatible User's Software
- Interface Module that connects directly to the COM port of your PC
- Fiber optic cable to connect module to RadMan

**ONE TRANSFER KIT PER LOCATION IS RECOMMENDED (P/N 2251/90.50)**





### Model Selection Guide

Select the model based on standard/guidance and the product series (RadMan XT, RadMan XT ELF Immune or RadMan). The frequency rating is for the E-field sensor. The H-field sensor is rated 1 MHz to 1 GHz for most models. Exceptions are noted.

STANDARD / GUIDANCE	RADMAN XT	RADMAN XT, ELF Immune	RADMAN
BGV B11, 2001, Exp. 1 Occupational	<b>2251/01 (2251/51 fast)</b> E-Field 1 MHz to 40 GHz H-Field 1 MHz to 1 GHz	<b>2251/71</b> E-Field 27 MHz to 40 GHz H-Field 1 MHz to 1 GHz	<b>2250/51 (2250/01 fast)</b> E-Field 1 MHz to 40 GHz H-Field 1 MHz to 1 GHz
Canada Safety Code 6 99-EHD-237 RF Workers	<b>2251/10</b> E-Field 1 MHz to 40 GHz H-Field 1 MHz to 1 GHz	<b>2251/80</b> E-Field 27 MHz to 40 GHz H-Field 1 MHz to 1 GHz	<b>2250/60 (2250/01 fast)</b> E-Field 1 MHz to 40 GHz H-Field 1 MHz to 1 GHz
ENV 50166-2 Occupational	<b>2251/04</b> E-Field 1 MHz to 40 GHz H-Field 27 MHz to 1 GHz	—	<b>2250/54 (2250/04 fast)</b> E-Field 1 MHz to 40 GHz H-Field 27 MHz to 1 GHz
FCC 96-326 Occupational / Controlled	<b>2251/02</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz	<b>2251/72</b> E-Field 27 MHz to 40 GHz H-Field 3 MHz to 1 GHz	<b>2250/52 (2250/02 fast)</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz
ICNIRP 1998 Occupational	<b>2251/06 (2251/56 fast)</b> E-Field 1 MHz to 40 GHz H-Field 27 MHz to 1 GHz	<b>2251/76</b> E-Field 27 MHz to 40 GHz H-Field 27 MHz to 1 GHz	<b>2250/56 (2250/06 fast)</b> E-Field 1 MHz to 40 GHz H-Field 27 MHz to 1 GHz
ICNIRP 1998 General Public (E-Field Only)	<b>2251/16</b> E-Field 1 MHz to 40 GHz no H-Field	<b>2251/86</b> E-Field 27 MHz to 40 GHz no H-Field	—
IEEE C95.1-2005 Controlled	<b>2251/05</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz	—	<b>2250/55 (2250/05 fast)</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz
Japan RCR-38 Controlled	<b>2251/03</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz	—	<b>2250/53 (2250/03 fast)</b> E-Field 3 MHz to 40 GHz H-Field 3 MHz to 1 GHz

### Detecting Peak Radar Signals

Most RadMan XT, RadMan XT ELF Immune and RadMan monitors use a one-second averaging time for their alarm criteria. "Fast" Radman models (see Model Selection Guide) have a 30-millisecond averaging period for the electric field sensor. These monitors detect the peaks of sharp, narrow radar pulses. The ICNIRP standard, for example, requires peak detection when the ratio of peak to average power is greater than 30 dB.



## RadMan Personal Monitors

### Specifications

SERIES	RADMAN XT	RADMAN XT, ELF IMMUNE	RADMAN
Frequency Range	See Model Selection Guide		
Type of Frequency Response	Shaped		
LED Indicators	12.5%, 25%, 50%, and 100% of Standard <sup>a</sup>		
Alarm Threshold	50% of Standard <sup>b</sup>		
CW Overload	20 dB above standard but not more than 10 kV/m or 26.5 A/m		
Peak Overload	40 dB above standard for pulse widths < 10 µsec		
Sensors	E and H Field (no H field for General Public versions) Diode based design		
Directivity	Isotropic (Tri-axial)		
Sensitivity <sup>c</sup>	6% of Standard		
Frequency Sensitivity (Typical)			
H-field	±3 dB		
E-Field	±3 dB (up to 3 GHz) +4/-3 dB (3 GHz to 10 GHz) +6/-3 dB (10 GHz to 18 GHz) +6/-10 dB (18 GHz to 40 GHz)		
Isotropic Response <sup>d</sup>	+4/-2 dB (27 MHz to 500 MHz)		
ELF Immunity	1 kV/m	100 kV/m	1 kV/m
Memory			
Number of Data Points (six values per data point) <sup>e</sup>	1638		—
Logging Intervals <sup>f</sup>	1 sec., 2 sec., 5 sec., 10 sec., 1 min., 3 min. (default: 1 min.)		
Logging Time @ rate of 1/min	27.3 hrs.		
Calibration Frequency	100 MHz (200 MHz for IEEE versions /05, /55)		
Recommended Calibration Interval	36 months		
Battery Type	2 x AAA Alkaline		
Life	200 hrs. with LEDs and Audio Alarm OFF		
Temperature Operating	-10°C to +55°C		
Non-operating	-40°C to +70°C		
Humidity	5 to 95%, non condensing ≤29 g/m <sup>3</sup> , absolute humidity (IEC 60721-3-2 class 7K2)		
Weight (including cap and batteries)	4.6 oz. (130 g.)		
Size without cap	1.0 x 1.4 x 6.2 inches (26 x 36.4 x 157 mm)		
with cap as absorber	1.5 x 1.6 x 6.4 inches (37 x 41 x 163 mm)		
with cap as handle	1.5 x 1.6 x 7.8 inches (37 x 41 x 197 mm)		
Accessories Supplied	Earphone, Operating Manual, Soft Case, Batteries		
Optional Accessories	PC Transfer Set <sup>f</sup> , Extension Rod for Hand-Held Use (BN 2250/92.02), Hard Case (BN 2250/92.03) and Tripod (BN 2244/90.31)		

#### Notes:

<sup>a</sup> The percent of standard ratings refer to equivalent power density.

<sup>b</sup> The alarm threshold is set to 50% of Standard ±1 dB at the calibration frequency.

<sup>c</sup> This value is only significant for data logging and online measurements.

<sup>d</sup> Uncertainty due to varying polarization (verified by type approval test). Ellipse ratio included.

<sup>e</sup> Each record includes the maximum, minimum and average values for both the E field and the H field (optional, P/N 2251/90.50).

<sup>f</sup> The logging interval can be selected via the ESM-TS software (optional)