

PERSONAL MONITOR

RadMan / RadMan XT

DE Patent 19,726,138
US Patents 5,955,954 4,634,968

Monitoring electric and magnetic fields

ranging from high frequency
to microwaves

- ▲ **Wide frequency monitoring from 1 MHz to 40 GHz**
- ▲ **Loud warning buzzer with earphone for noisy environments**
- ▲ **Shaped frequency response matched to national and international standards**
- ▲ **Simultaneous E field and H field monitoring for near field use**
- ▲ **Detachable absorber cap to provide isotropic response for simple measurement tasks and leak detection**
- ▲ **Data logger for permanent recording (RadMan XT)**



RadMan XT

DESCRIPTION

Early warning is required wherever humans are likely to be directly threatened by the presence of strong electromagnetic fields. Antenna and radar equipment and machines which use strong electromagnetic fields to heat, weld or bond materials are typical sources of dangerous fields. RadMan and RadMan XT provide safe and timely warning of electromagnetic fields in these areas of application.

Warning and indication

A warning buzzer will produce a loud sound as soon as 50% of the maximum permissible exposure limit is exceeded. The included earphone is ideal for noisy environments. Four level indicator LEDs provide an approximate indication of the measured field strength in steps of 12.5%, 25%, 50% and 100% of the radiated power density.

Matching the standard

The *shaped frequency response* of the field sensors mirrors a particular standard. There's no more need to adjust the alarm limit to the frequency of the field source or service. Thanks to the shaping the alarm limit is always matched – over the entire frequency range. Different versions of RadMan and RadMan XT are available to cover the different national and international standards.

Distance-independent operation

The fixed relationship between electric and magnetic field does not apply in the near field of radiation. RadMan and RadMan XT have both electric (E) and magnetic (H) field sensors – for reliable warning independent from distance to the source.

Minimized influence of the body

Personal monitors are mainly used “on the body”, best worn on the outside of clothing. To minimize reflections caused by the human body, the yellow cab of the RadMan and RadMan XT includes a specially designed RF absorber. The absorber cap can be repositioned on the opposite side of the housing to obtain isotropic (non-directional) response for use “off the body”.

Data logger included in RadMan XT

RadMan XT continuously records the measured values for both the E field and the H field and adds a time stamp to each record. The data logger is always on and is able to store more than 1600 records. When the circular memory is full, it simply stores the newest data in place of the oldest data.

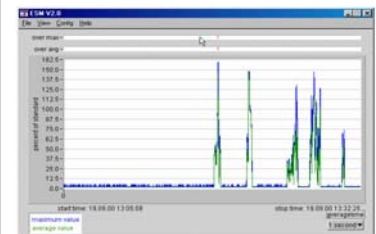
PC Interface Set (Option)

For downloading and analyzing logged data from RadMan XT

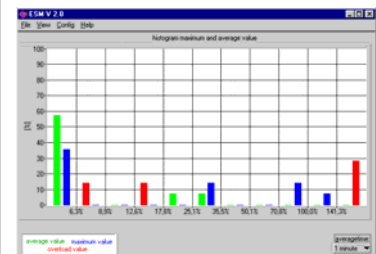
For monitoring E field and H field in real time via fiber optic cable, when the monitor is used off the body.

The Interface Set ESM-TS includes:

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



Exposure versus time



Histogram analysis

APPLICATIONS

Monitoring RF signals (occupational limits)

Mobile, telecom, broadcast and industrial applications are covered by the standard version of *RadMan* and *RadMan XT* (with data logger). The E field and H field sensors are shaped to match the higher level of two-tier standards, i.e. the “Controlled”, “Occupational” or “RF Worker” limits.

Monitoring RF signals (public limits)

For visitors and non-RF Workers lower exposure limits apply. The *RadMan XT ICNIRP GP* version has a higher sensitivity suitable for monitoring signals to meet the ICNIRP general public limits. It offers the same features as the standard version for occupational limits but detects the E field only.

RF signals in the presence of strong ELF fields

The *RadMan XT ELF Immune* versions are specifically designed for use in strong extremely low frequency (ELF) fields, such as where wireless antennas are mounted on towers that carry high voltage 50/60 Hz utility power. The conductive coating inside the housing blocks the ELF signals. The frequency range of these monitors is reduced at the low end due to the coating.

Monitoring pulsed radar signals

The “Fast” versions of *RadMan* and *RadMan XT* are designed to detect the peaks of sharp and narrow radar pulses. The ICNIRP standard, for example, requires peak detection when the ratio of peak to average power is greater than 30 dB. Peak detection is obtained by reducing the 1 second integration time down to 30 milliseconds for all “Fast” models.

Searching for leaks

As a locating unit all *RadMan* and *RadMan XT* versions can be used to locate leaks on waveguides and coaxial screw connectors (picture on the right). A non-conductive extension with handle is available as an optional accessory.



RadMan XT used as a personal monitor for radio frequency fields



RadMan XT used as an instrument for leak detection

MODEL SELECTION GUIDE

STANDARD / GUIDANCE	RadMan XT *)	RadMan XT ELF Immune *)	RadMan *)
BGV B11, 2001 EXP. 1 Occupational	2251/01 2251/51, fast	2251/71	2250/51 2250/01, fast
Canada, Safety Code 6 99 EHD-237 RF Workers	2251/10	2251/80	2250/60 2250/10, fast
ENV 50166-2 Occupational	2251/04		2250/54 2250/04, fast
FCC 96-326 Occupational / Controlled	2251/02	2251/72	2250/52 2250/02, fast
ICNIRP, 1998 Occupational	2251/06 2251/56, fast	2251/76	2250/56 2250/06, fast
ICNIRP, 1998 General Public – E-field only	2251/16	2251/86	
IEEE C95.1-2005 Controlled	2251/05		2250/55 2250/05, fast
Japan, RCR-38 Controlled	2251/03		2250/53 2250/03, fast

*) FREQUENCY RANGE	H-FIELD	E-FIELD
(A)	1 MHz to 1 GHz	1 MHz to 40 GHz
(B)	27 MHz to 1 GHz	
(C)	no H field	
(D)	3 MHz to 1 GHz	3 MHz to 40 GHz
(E)	1 MHz to 1 GHz	27 MHz to 40 GHz
(F)	3 MHz to 1 GHz	
(G)	27 MHz to 1 GHz	
(H)	no H field	

NATO STOCK NUMBERS	
2250/05	6625-12-349-3027
2251/06	6625-12-355-2053
2251/56	6625-12-360-2005

SPECIFICATIONS

RadMan / RadMan XT / RadMan XT ELF Immune			
Frequency range	See Model Selection Guide		
Type of frequency response	Shaped		
LED indicators	12.5%, 25%, 50%, and 100% of Standard ^a		
Alarm threshold	50 % of Standard ^b		
CW damage level	20 dB above standard but not more than 10 kV/m or 26.5 A/m		
Peak damage level	40 dB above standard for pulse widths < 10µs		
Sensors	E field and H field (no H field for General Public versions) Diode based design		
Directivity	Isotropic (Tri-axial)		
Sensitivity ^c	6 % of standard		
UNCERTAINTY			
Flatness of frequency response	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 ^d	+4/-2 dB (27 MHz to 500 MHz)		
SERIES	RadMan XT	RadMan XT ELF Imm	RadMan
ELF Immunity @ 50/60 Hz	1 kV/m	100 kV/m	1 kV/m
Data logger			Not available
Number of records ^e	1638		
Logging intervals ^f	1s, 2s, 5s, 10s, 1min, 3min (default: 1 min)		
Logging time @ rate of 1/min	27.3 hrs.		
GENERAL SPECIFICATIONS			
Calibration frequency	100 MHz (200 MHz for IEEE versions /05, /55)		
Recommended calibration interval	36 months		
Battery type/ life (approx.)	2 x AAA Alkaline, 200 hrs. with LEDs and alarm OFF		
Temperature range			
Operating	-10 °C to +55 °C		
Non-operating (Transport)	-40 °C to +70°C		
Humidity	5 to 95%, non condensing ≤29 g/m ³ absolute humidity (IEC 60721-3-2 class 7K2)		
Size (with cap as absorber)	37 x 41 x 163 mm		
Weight	130 g		
Accessories (included)	Earphone, operating manual, belt bag, batteries		

- a The percent of standard ratings refer to equivalent power density
 b The alarm threshold is set to 50% of Standard ±1 dB at the calibration frequency
 c This value is only significant for data logging and online measurements
 d Uncertainty due to varying polarization (verified by type approval test). Ellipse ratio included
 e Each record includes the maximum, minimum and average values for both the E field and the H field
 f The logging interval can be selected via the ESM-TS software (optional)

ORDERING INFORMATION

RadMan / RadMan XT	
	Part number
RadMan / RadMan XT	See Model Selection Guide
ACCESSORIES	
	Part number
ESM-TS, PC Interface Kit for RadMan/XT	2251/90.50
Handle, Non-Conductive Extension, 0.42 m	2250/92.02
Hardcase for RadMan	2250/92.03
Tripod, Non-Conductive, 1.65m with Carrying Bag	2244/90.31

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