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narda Safety Test Solutions
an L3 Technologies Company

PERSONAL MONITOR

RadMan / RadMan XT / RadMan Mobile

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

Conforms to EMF Directive 2013/35/EU

Monitoring electric and magnetic fields

radiated by broadcast transmitters, mobile phone base stations and radar systems

- **Wide frequency monitoring from 1 MHz to 40 GHz** 5G ready
- **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 monitoring signals apart from the body (e.g. for 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 Personal Monitors are small and lightweight devices that 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 device models are available to cover the various 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 monitors 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 cap of the RadMan 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.

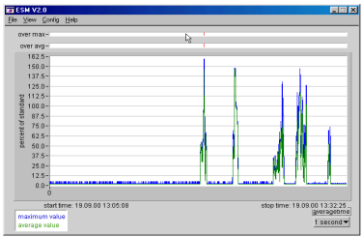
PC Interface Kit (Option)

For downloading and analyzing logged data from RadMan XT

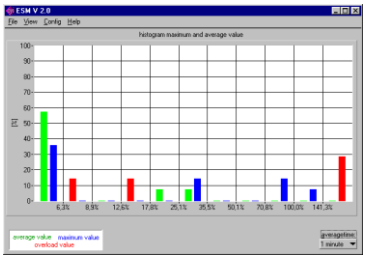
For monitoring E field and H field in real time via fiber optic cable, when the monitor is used off the body.

The Interface kit ESM-TS includes:

- Windows® compatible User's Software
- O/E converter that connects to the USB port of a PC
- Fiber optic cable to connect RadMan to O/E converter



Exposure versus time



Histogram analysis

APPLICATIONS

Monitoring RF signals (occupational limits)
Mobile, telecom, broadcast and industrial applications are covered by the models *RadMan, RadMan XT and RadMan Mobile*. 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.

Monitoring pulsed radar signals
The “*Fast Response*” 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 for E-fields down to 30 milliseconds for all “Fast” models.

Monitoring workplaces
Fixed on a non-conductive tripod (optional accessory) all RadMan versions can be used for workplace radiation monitoring. This application is ideal for areas to be monitored occasionally. For permanent surveillance Narda offers the wall mountable Smarts II™.

Searching for leaks
As a locating unit all RadMan 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

SPECIFICATIONS

RadMan / RadMan XT / RadMan Mobile		
Frequency range	See Model Selection Guide	
Type of frequency response	Shaped (see Model Selection Guide for available standards)	
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 but not more than 100 kV/m or 265 A/m	
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	
Input signal integration time	1 s (30 ms for the E-field of all fast response models)	
ELF Immunity @ 50/60 Hz	1 kV/m	
Data logger (RadMan XT only) Number of records [e] Logging intervals [f] Logging time @ rate of 1/min	 1638 1 s, 2 s, 5 s, 10 s, 1 min, 3 min (default: 1 min) 27.3 hours	
UNCERTAINTY		
Flatness of frequency response [g]	All other versions	Version 2251/11, 2252/11 (SC6 2015)
	E-FIELD (electric 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) RadMan Mobile is limited to 6 GHz	E-FIELD (electric field): +4/-3 dB (up to 3 GHz) +6/-3 dB (3 GHz to 10 GHz) +8/-3 dB (10 GHz to 18 GHz) +8/-10 dB (18 GHz to 40 GHz) RadMan Mobile is limited to 6 GHz
	H-FIELD (magnetic field): ±3 dB (up to 1 GHz)	H-FIELD (magnetic field): +4/-3 dB (up to 1 GHz)
Isotropic response [d]	+4/-2 dB (27 MHz to 500 MHz)	
GENERAL SPECIFICATIONS		
Calibration frequency	100 MHz	
Recommended calibration interval	36 months	
Battery type/ life (approx.)	2 x AAA Alkaline, 200 hrs. (with LEDs and alarm OFF, interface cover closed)	
Temperature range Operating Non-operating (Transport)	 -10 °C to +55 °C -40 °C to +70 °C	
Humidity	5 to 95%, non condensing ≤29 g/m³ 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	
Country of origin	Germany	

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)
g The specified frequency response can be exceeded in the range 6.2 GHz to 8.8 GHz due to resonances in the H field sensor.
No underestimation of the measured field will result from this in any case. This means that an alarm may occur at field strengths that are below the limit value.

MODEL SELECTION GUIDE

STANDARD / GUIDANCE	Part Number		Frequency Range	
	RadMan XT (with data logger)	**RadMan**	**E-FIELD**	**H-FIELD**
BGV B11, 2001 EXP. 1 Occupational	2251/01 2251/51, fast response	2250/51 2250/01, fast response	1 MHz to 40 GHz	1 MHz to 1 GHz
ICNIRP, 1998 [a] Occupational	2251/06 2251/56, fast response	2250/56 2250/06, fast response		27 MHz to 1 GHz
ICNIRP, 1998 [a] General Public – E-field only	2251/16			Not available
FCC 96-326 Occupational / Controlled	2251/02	2250/52 2250/02, fast response	3 MHz to 40 GHz	3 MHz to 1 GHz
Japan, RCR-38 Controlled	2251/03	2250/53 2250/03, fast response		
Canada, Safety Code 6 (2015) Controlled Env.	2251/11		10 MHz to 40 GHz	27 MHz to 1 GHz
		RadMan Mobile	**E-FIELD**	**H-FIELD**
FCC 96-326 Occupational / Controlled		2252/02	50 MHz to 6 GHz	50 MHz to 1 GHz
ICNIRP, 1998 [a] Occupational		2252/06		
Canada, Safety Code 6 (2015) Controlled Env.		2252/11		

[a] ICNIRP versions are also compliant with standards ÖVE/ÖNORM E 8850 and ARPANSA RPS3

ORDERING INFORMATION

RadMan / RadMan XT / RadMan Mobile	Part Number
RadMan / RadMan XT / RadMan Mobile Personal Monitor	**See Model Selection Guide**
ACCESSORIES	
ESM-TS, PC Interface Kit, USB for RadMan/XT includes: Microsoft Windows compatible Software (supports COM 1...99), O/E Converter USB , Cable Fiber Optic Duplex 2m	**2251/90.51**
Tripod, Benchtop, 0.16m, Non-Conductive	**2244/90.32**
Test-Generator 27MHz, Hand-Held	**2244/90.38**
Handle, Non-Conductive Extension, 0.42 m	**2250/92.02**
Hardcase for RadMan	**2250/92.03**
Accessory Kit RadMan (Handle, Hardcase)	**2250/92.05**
Cable, Adapter USB 2.0 - RS232, 0.8m	**2260/90.53**
NATO STOCK NUMBERS	
6625-12-355-2053	**2251/06**
6625-12-360-2005	**2251/56**

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