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Safety Test Solutions

Datasheet | RadMan 2LT/ 2XT

Warning device for electric and magnetic fields

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

The RadMan 2LT and RadMan 2XT Radiation Monitors are warning devices for the protection of people who work in areas where increased levels of electromagnetic radiation are present. Broadcasting, telecommunications and radar antennas are sources of strong electromagnetic fields, for example. It is often not possible to completely disable the transmitting equipment, and even if it is possible a check must be made to ensure that the switch off has indeed occurred. A personal monitor provides safety in such situations. The device is worn on the body and warns its user in good time before the permitted limit values are exceeded. RadMan 2LT and RadMan 2XT comply with the recommendations of ITU-T K.145 with regard to the use and properties of RF personal monitors.

- Wide frequency monitoring up to 8 GHz (LT) or 60 GHz (XT)
- In accordance with ITU-T Rec. K.145
- Compliant with ICNIRP 2020
- Simultaneous E-field and H-field monitoring with shaped frequency response
- Automatic sensor test when switched on
- Highly visible alarm LEDs, loud buzzer plus vibration alarm
- Versions with adjustable alarm thresholds available (XT)
- 800 hours of operation on a single charge
- HF absorber minimizes the body effect
- Isotropic monitoring away from the body by simply releasing it from the holder
- Detection of short pulsed signals (XT)
- Perfect for outdoor use (IP65)
- Data logger for permanent recording
- USB-C interface for faster data transfer and battery charging

Description

Display and warning signals

The actual field exposure level is indicated in six steps from 5% to 200% by LEDs. The percentages refer to the proportion of the power density limit value specified in a safety standard. If the field exposure level exceeds 50% of the limit value, the device vibrates and emits a loud alarm tone. There is also a bright light in the top part of the RadMan 2 that can be easily seen from various angles. The light flashes red in time with the alarm signal. A second, more persistent alarm sounds when the 100% threshold is exceeded, warning the user to leave the danger area. Device versions with alarm thresholds that can be set using PC software are also available.

Fig. 1. Front view with controls and indicators

Standard compliance by means of shaped frequency response

The permitted limit values specified in the standards vary according to the frequency. Weighting filters in the sensors of the RadMan 2 simulate the frequency response of the standard. They ensure that the alarm thresholds are correct over the entire frequency range. Settings are not necessary.

Usable in near field and far field conditions

The otherwise fixed relationship between the electric and magnetic fields does not apply in the near field region. Both types of field therefore need to be checked. RadMan 2 is equipped with both E-field and H-field sensors, so it provides reliable warning regardless of the distance from the radiation source.

Minimal body effect

Personal monitors are generally worn on the person. RadMan 2 is supplied fitted with a suitable attachment and RF absorber that allows it to be fixed easily to a harness or belt. The RF absorber reduces the signal reflections caused by the body which would otherwise affect the result displayed by the monitor. If needed, the RadMan 2 can be released from the attachment with one hand in order to determine the field exposure away from the body with an isotropic directional characteristic. An elastic security cord between the device and the attachment prevents the device from being dropped.

Automatic sensor test

The newly developed sensor test provides additional assurance. The correct function of each sensor is checked every time the RadMan 2 is switched on. The device does not need to be checked anymore with a test generator before starting work.

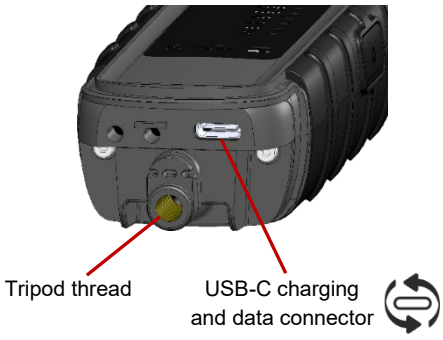

Fig. 2. View with cover open

Data logger for permanent recording

The RadMan 2 saves the exposure values for the E-field and H-field continuously and adds a timestamp to each data set. The ring memory concept allows unlimited storage by overwriting the oldest data. The user does not have to worry about anything. If necessary, the exposure data can be analyzed easily.

PC software

The RadMan 2-TS software allows the contents of the data recorder to be transferred to a PC via the USB interface. The maximum exposure values that have occurred as well as the averaged values can be displayed as a table or as a graph versus time using this software. It can also display live exposure level values and it can be used to configure the RadMan 2XT. The latest version is available for free download.

RadMan 2XT functions

The RadMan 2XT has more functionality than the RadMan 2LT. The E field sensors of the RadMan 2XT are suitable for a wider frequency range that extends from about 1 MHz up to 60 GHz. The device is therefore able to warn of excessive levels of directional radio, radar signals and 5G millimeter waves in this frequency range. To ensure that pulsed signals (e.g. radar) are reliably detected, the integration time can be changed from 1 s (Normal Mode) to 30 ms (Pulse Mode) on the device itself. The setting is displayed on the device. The data recorder of the RadMan 2XT is equipped with a larger memory, and the save intervals can be user configured.

The additional RF Detection Mode with its tone search function enables precise localization of leaks in waveguides and coaxial screw connectors. As the pitch of the tone changes when the field source is approached, this feature can also be used to quickly and simply check that an antenna has been switched off.

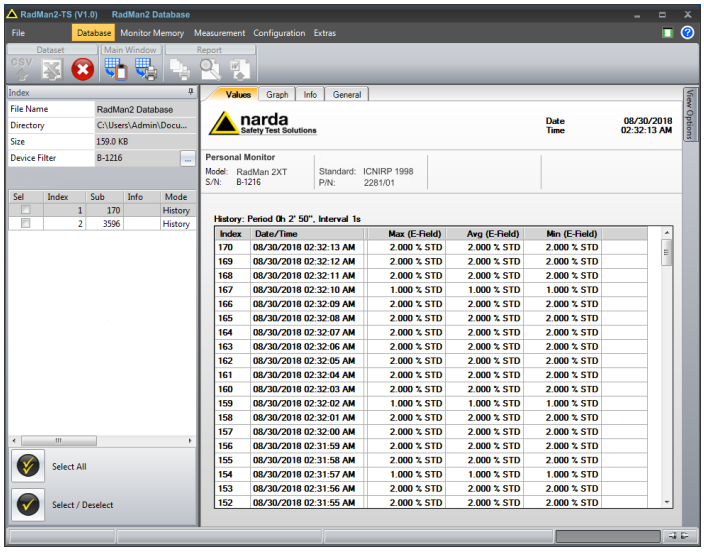

Fig. 3. The contents of the data recorder can be read out and displayed very conveniently using the RadMan 2-TS PC software

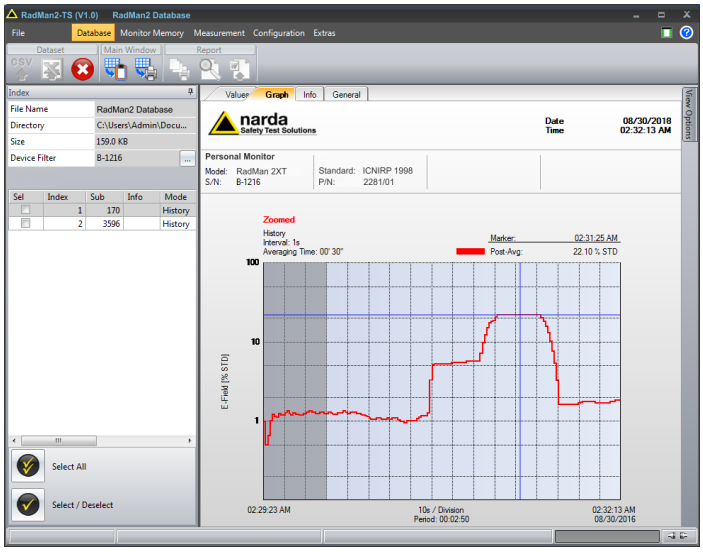

Fig. 4. Graphical representation of exposure over time

Specifications

Product Features		RadMan 2LT	RadMan 2XT
Sensors		Diode based isotropic E-field and H-field sensors (E-field sensor only for General Public models)	
Signal detection / integration time		RMS / 1 s	RMS / switchable 1 s or 30 ms (Pulse Mode)
Type of frequency response		Shaped response (weighted) according to a safety standard (see ordering information)	
Frequency range E-field		50 MHz to 8 GHz	900 kHz to 60 GHz (ICNIRP 98 Occ models) 10 MHz to 60 GHz (ICNIRP 98 GP models) 3 MHz to 60 GHz (FCC models) 10 MHz to 60 GHz (SC6 models)
Frequency range H-field		50 MHz to 1 GHz	27 MHz to 1 GHz (ICNIRP 98, SC6 models) 3 MHz to 1 GHz (FCC models)
Sensitivity		< 1% of standard	
RF exposure indication		6 LEDs, 5/ 10/ 25/ 50/ 100/ 200% of Standard (refers to the equivalent power density)	
Alarm indication		Alarm LED (270 ° viewing angle), audible alarm and vibration	
Alarm threshold		2 thresholds 50% and 100%	2 thresholds 50% and 100% (always preset) Thresholds adjustable via PC from 10% to 310% only for optioned models
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 < 10 µs but not more than 100 kV/m or 265 A/m	
ELF immunity @ 50/60 Hz		10 kV/m	
Data logger (Ring memory)	Number of records	2,880 events (48 hours)	100,000 events
	Logging intervals	1 min	1 s to 6 min or off (via PC), default:1 min
	Recorded data	Max/ Avg/ Min Exposure	
Data interface		USB type C	
Additional functions		Functional sensor test	Functional sensor test, RF detection mode

Frequency / Isotropic Response		RadMan 2LT	RadMan 2XT
ICNIRP 1998, General Public	E-Field only	±3.5 dB (50 MHz to 8 GHz)	±3 dB (10 MHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +10/-3 dB (> 20 GHz to 60 GHz)
ICNIRP 1998, Occupational	E-Field	±3.5 dB (50 MHz to 8 GHz)	±3 dB (900 kHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +10/-3 dB (> 20 GHz to 60 GHz)
	H-Field	±3 dB (50 MHz to 1 GHz)	±3 dB (27 MHz to 1 GHz)
ICNIRP 2020, General Public	E-Field only	±3.5 dB (50 MHz to 8 GHz)	±3 dB (27 MHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +10/-3 dB (> 20 GHz to 60 GHz)
ICNIRP 2020, Occupational	E-Field	±3.5 dB (50 MHz to 8 GHz)	±3 dB (27 MHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +10/-3 dB (> 20 GHz to 60 GHz)
	H-Field	±3 dB (50 MHz to 1 GHz)	±3 dB (1 MHz to 1 GHz)
FCC 96-326, Occupational	E-Field	±3.5 dB (50 MHz to 8 GHz)	±3 dB (3 MHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +10/-3 dB (> 20 GHz to 60 GHz)
	H-Field	±3 dB (50 MHz to 1 GHz)	±3 dB (3 MHz to 1 GHz)
Safety Code 6 (2015), Controlled	E-Field	+4/-3 dB (50 MHz to 3 GHz) +6/-3 dB (3 GHz to 8 GHz)	+4/-3 dB (10 MHz to 10 GHz) +6/-3 dB (> 10 GHz to 20 GHz) +11/-3 dB (> 20 GHz to 60 GHz)
	H-Field	+4/-3 dB (50 MHz to 1 GHz)	+4/-3 dB (27 MHz to 1 GHz)
Isotropic Response	E-Field	±1 dB (< 2.7 GHz)	
	H-Field	±1.5 dB (< 500 MHz)	

Note: Frequency and isotropic response are verified by type approval test. Positive values of the frequency response mean early warning.

General Specifications		
Recommended calibration interval		3 years, for the first time 3 years after initial startup
Power supply		2 replaceable NiMH batteries type AA, rechargeable via USB port
Operating time / charging time (approx.)		800 hrs. (without alarm) / charging time < 8 hrs.
Temperature range	Operating	-10 °C to +55 °C (14 °F to 131 °F)
	Non-operating	-40 °C to +70 °C (-40 °F to 158 °F)
Humidity		5% to 95%, non-condensing (≤ 29 g/m³, IEC 60721-3-2 class 7K2)
Ingress Protection		IP65 (dust-tight and protected against water jets)
Dimensions (H x W x D)		165 mm x 47 mm x 31 mm (6.5 in x 1.85 in x 1.22 in) without mounting adapter
Weight		185 g (0.4 lb) without mounting adapter
Country of origin		Germany

Ordering Information

RadMan 2LT - Personal Monitor Sets 8 GHz		Part number
RadMan 2LT, ICNIRP 1998/ Occupational [a]	compliant with ICNIRP 2020	**2280/101**
RadMan 2LT, FCC 96-326/ Occupational		**2280/102**
RadMan 2LT, SC 6 (2015)/ Controlled		**2280/103**
RadMan 2LT, ICNIRP 1998/ General Public, E-Field	compliant with ICNIRP 2020	**2280/111**
Each set includes: RadMan 2LT Basic Unit, Mounting Adapter, Fastening Strap, Lanyard, USB Cable, Allen Wrench 1.5 mm, Operating Manual, Carrying Case, Calibration Certificate		

RadMan 2XT - Personal Monitor Sets 60 GHz		Part number
RadMan 2XT, ICNIRP 1998/ Occupational [a]	compliant with ICNIRP 2020 for frequencies above 27 MHz	**2281/101**
RadMan 2XT, FCC 96-326/ Occupational		**2281/102**
RadMan 2XT, SC 6 (2015)/ Controlled		**2281/103**
RadMan 2XT, ICNIRP 1998/ General Public, E-Field	compliant with ICNIRP 2020 for frequencies above 27 MHz	**2281/111**
Each set includes: RadMan 2XT Basic Unit, Mounting Adapter, Fastening Strap, Lanyard, USB Cable, Allen Wrench 1.5 mm, Operating Manual, Carrying Case, Calibration Certificate		

RadMan 2XT - Personal Monitor Sets 60 GHz with adjustable Alarm Thresholds		Part number
RadMan 2XT Optioned, ICNIRP 1998/ Occupational [a]	compliant with ICNIRP 2020 for frequencies above 27 MHz	**2281/101-1**
RadMan 2XT Optioned, FCC 96-326/ Occupational		**2281/102-1**
RadMan 2XT Optioned, SC 6 (2015)/ Controlled		**2281/103-1**
Each set includes: RadMan 2XT Basic Unit, Mounting Adapter, Fastening Strap, Lanyard, USB Cable, Allen Wrench 1.5 mm, Operating Manual, Carrying Case, Calibration Certificate		

a) ICNIRP Occupational versions are also compliant with many national and international standards and regulations such as Directive 2013/35/EU, EMFV 2016 (Germany) and VEMF 2016 (Austria).

Optional Accessories	Part number
Tripod, Benchtop, 0.16m, Non-Conductive	**2244/90.32**
Handle, Non-Conductive Extension, 0.42 m	**2250/92.02**
Belt Bag for RadMan	**2250/92.06**
Car Charger Adapter, USB 5V	**2259/92.20**
Power Supply (Europe), USB 5V	**2259/92.21**
Power Supply (USA), USB 5V	**2259/92.22**
Power Supply (UK), USB 5V	**2259/92.23**

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