

Electromagnetic immunity

The MsD reltec is intended for use in the electromagnetic environment specified below. The customer or the user of the MsD reltec should assure that it is used in such an environment.

Immunity test	Test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	contact: ±8kV air: ±2, 4, 8, 15kV	contact: ±8kV air: ±2, 4, 8, 15kV	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC61000-4-4	power supply lines: ±2kV Repeated frequency 100kHz	power supply lines: ±2kV Repeated frequency 100kHz	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	Between line and line ±0.5kV and ±1kV Between line and ground ±0.5kV, ±1kV and ±2kV	Between line and line ±0.5kV and ±1kV Between line and ground ±0.5kV, ±1kV and ±2kV	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency magnetic field IEC61000-4-8	30A/m (50 or 60Hz)	30A/m (50Hz)	If image distortion occurs, it may be necessary to position MsD reltec further from sources of power frequency magnetic fields or to install magnetic shielding. The power frequency magnetic field should be measured in the intended installation location to assure that it is sufficiently low.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	0%UT: for 0.5 cycle 0°, 45°, 90°, 135°, 180°, 225°, 270° or 315° 0%UT: 1 cycle or 70%UT: 25/30 cycle single phase 0°	0%UT: for 0.5 cycle 0°, 45°, 90°, 135°, 180°, 225°, 270° or 315° 0%UT: 1 cycle or 70%UT: 25/30 cycle single phase 0°	Mains power quality should be that of a typical commercial or hospital environment. If the user of the MsD reltec requires continued operation during power mains interruptions, it is recommended that the MsD reltec be powered from an uninterruptible power supply or a battery.

Electromagnetic immunity- for device and system that are not life-supporting

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Conducted RF IEC 61000-4-6	3V/m 150kHz~80MHz 6V/m ISM Band during 150kHz~80MHz	3V/m 150kHz~80MHz 6V/m ISM Band during 150kHz~80MHz	Portable and mobile RF communications device should be used no closer to any part of the MsD reltec, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Immunity test level $E = \left(\frac{6}{d} \right) \sqrt{P}$
Radiated RF IEC 61000-4-3	3V/m 80MHz z ~ 2.7GHz z	3V/m 80MHz z ~ 2.7GHz z	Where P is the maximum output rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of device marked with the following symbol.

RF Test specification of exterior port immunity to radio communication device

Frequency (MHz)	Band ^{a)} (MHz)	Communication service ^{a)}	Modulation ^{b)}	Maximum power (w)	Separation distance (m)	Immunity test level (V/m)
385	380~390	TETRA 400	Pulse modulation ^{b)} 18Hz	1.8	0.3	27
450	430~470	GMRS460 FRS460	Pulse modulation ^{c)} 18Hz	2	0.3	28
710	704~787	LTE Band 13,17	Pulse modulation ^{b)} 217Hz	0.2	0.3	9
745						
780						
810	800~960	GSM800/900 TETRA800 iDEN820 CDMA850 LTE Band 5	Pulse modulation ^{b)} 18Hz	2	0.3	28
870						
930						
1500	1475.9~1510.9	LTE Band 11,22	Pulse modulation ^{b)} 217Hz	0.25	0.3	10
1720	1700~1990	GSM1800 CDMA1900 GSM1900 DECT LTE Band 1,3,4,25 UMTS	Pulse modulation ^{b)} 217Hz	2	0.3	28
1845						
1970						
2450	2400~2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation ^{b)} 217Hz	2	0.3	28
3500	3400~3560	LTE Band 42	Pulse modulation ^{b)} 217Hz	0.2	0.3	9
5240	5100~5800	WLAN 802.11 a/n	Pulse modulation ^{b)} 217Hz	0.2	0.3	9
5500						
5785						

a) Include only uplink line frequency in some services

b) Carrier is modulated by duty ratio 50%

c) 50% pulse modulation in 18Hz may be used instead of frequency modulation.

This does not show the actual modulation, but can be considered as a worst situation.

Electromagnetic emissions

The MsD reltec is intended for use in the electromagnetic environment specified below.

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Emissions test	Compliance	Electromagnetic environment-guidance
RF missions CISPR11	Group1	The MsD reltec uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic device.
RF emissions CISPR11	Class A	The MsD reltec is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	N/A	NOTE: The EMISSIONS characteristics of this device make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this device might not offer adequate protection to radio -frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the device.
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	