

# EMC Information – Guidance and Manufacture’s Declaration


## 1. Electromagnetic Emissions

Guidance and manufacture’s declaration – electromagnetic emission		
<p>The device is intended for use in the electromagnetic environment specified below. The user of the device should assure that it is used in such and environment.</p>		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The <i>device</i> 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 equipment.
RF emission CISPR 11	Class A	The <i>device</i> is suitable for use in all establishments, other than domestic 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	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

## 2 Electromagnetic Immunity – for all EQUIPMENT and SYSTEMS

<b>Guidance and manufacture's declaration – electromagnetic immunity</b>			
The <i>device</i> is intended for use in the electromagnetic environment specified below. The user of <i>device</i> should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical transient/burst fast IEC 61000-4-4	± 2 kV for power supply lines	± 2V for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50Hz, 60Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	$< 5\% U_T$ (> 95% dip in $U_T$ ) for 0.5 cycle  $40\% U_T$ (60% dip in $U_T$ ) for 5 cycles  $70\% U_T$ (30% dip in $U_T$ ) for 25 cycles  $< 5\% U_T$ (> 95% dip in $U_T$ ) for 5 sec	$< 5\% U_T$ (> 95% dip in $U_T$ ) for 0.5 cycle  $40\% U_T$ (60% dip in $U_T$ ) for 5 cycles  $70\% U_T$ (30% dip in $U_T$ ) for 25 cycles  $< 5\% U_T$ (> 95% dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the <i>device</i> requires continued operation during power mains interruptions, it is recommended that the <i>device</i> be powered from an uninterruptible power supply or a battery.
<b>NOTE:</b> $U_T$ is the a.c. mains voltage prior to application of the test level.			

### 3 Electromagnetic Immunity – for EQUIPMENT and SYSTEM that are not LIFE-SUPPORTING

<b>Guidance and manufacture’s declaration – electromagnetic immunity</b>			
The <i>device</i> is intended for use in the electromagnetic environment specified below. The user of <i>device</i> should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3</p>	<p>3 V<sub>rms</sub> 150 kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3V<sub>rms</sub></p> <p>3 V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the <i>device</i> including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> $d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}$ $d = \left[ \frac{3.5}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[ \frac{7}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where <i>P</i> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a)</sup> should be less than the compliance level in each frequency range.<sup>b)</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div style="text-align: center;">  </div>

**NOTE 1:** At 80 MHz and 800 MHz, the higher frequency range applies.

**NOTE 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

- a) Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the *device* is used exceeds the applicable RF compliance level above, the *device* be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the *device*.
- b) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

## 4 Recommended Separation Distance

Recommended separation distances between portable and mobile RF communications equipment and the device			
The <i>device</i> is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the <i>device</i> can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the <i>device</i> as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}$	80 MHz to 800 MHz $d = \left[ \frac{3.5}{E_1} \right] \sqrt{P}$	800 MHz to 2.5 GHz $d = \left[ \frac{7}{E_1} \right] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.73
1	1.2	1.2	2.3
10	3.7	3.7	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance <i>d</i> in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where <i>P</i> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
<b>NOTE 1:</b> At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
<b>NOTE 2:</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			