

Exposure limit according to §15.247(i) and RSS-102

The PMASTER 33 control panel transmitter operates according to FCC part 15 subpart C section 15.247 and RSS-210 Annex 8. The panel includes a single modular approved transmitter FCC ID:RI7GE864Q2, IC:5131A- GE864Q2. The control panel is classified as mobile device.

Limit for power density for general population/uncontrolled exposure is $f/1500$ mW/cm² for 300 – 1500 MHz frequency range:

$$P = 912.75/1500 = 0.61 \text{ mW/cm}^2$$

The power density P (mW/cm²) = $P_T / 4\pi r^2$

- 1) P_T is the transmitted power, which is equal to the peak transmitter output power 17.82 dBm plus maximum antenna gain -4 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_T = 17.82 \text{ dBm} - 4 \text{ dBi} = 13.82 \text{ dBm} = 24.1 \text{ mW}$$

The power density at 20 cm (minimum safe distance, required for mobile devices), calculated as follows:

$$24.1 \text{ mW} / 4\pi (20 \text{ cm})^2 = 0.005 \text{ mW/cm}^2 \ll 0.61 \text{ mW/cm}^2$$

- 2) Maximum conducted output power given in FCC ID:RI7GE864Q2 module grant is 1740 mW (32.4 dBm) in 824.2-848.8 MHz band and 930 mW (29.7 dBm) in 1850.2-1909.8 MHz band..

Limit for power density is $f/1500 = 0.56 \text{ mW/cm}^2$ for 824-849 MHz for general population/uncontrolled exposure.

The gain of antenna used with the module in the control panel in 824.2-848.8 band is (-2) dBi.

The maximum equivalent isotropically radiated power EIRP is

$$P_T = 32.4 \text{ dBm} - 2 \text{ dBi} = 30.4 \text{ dBm} = 1096 \text{ mW}$$

The power density at 20 cm is calculated as follows:

$$1096 \text{ mW} / 4\pi (20 \text{ cm})^2 = 0.22 \text{ mW/cm}^2 < 0.56 \text{ mW/cm}^2$$

The gain of antenna used with the module in the control panel in 1850.2-1909.8 band is 0 dBi.

The maximum equivalent isotropically radiated power EIRP is

$$P_T = 29.7 \text{ dBm} + 0 \text{ dBi} = 29.7 \text{ dBm} = 930 \text{ mW}$$

The power density at 20 cm is calculated as follows:

$$930 \text{ mW} / 4\pi (20 \text{ cm})^2 = 0.185 \text{ mW/cm}^2 < 1 \text{ mW/cm}^2 - \text{ is less than in 824-849 MHz}$$

Summation

When all the antennas are at least 20 cm away from the user but individual antennas cannot be separated by 20 cm from each other the following equation shall be fulfilled

$$\frac{S1}{\text{Limit}} + \frac{S2}{\text{Limit}} < 1, \text{ i.e.} \\ 0.005 \text{ mW/cm}^2 / 0.61 \text{ mW/cm}^2 + 0.22 \text{ mW/cm}^2 / 0.56 \text{ mW/cm}^2 = 0.008 + 0.36 = 0.368 < 1$$

Therefore, the control panel including approved module complies with FCC RF exposure limit for mobile device for general population.

General public cannot be exposed to dangerous RF level.