MMT9000 RF Exposure Calculations

As per OET Bulliten 65 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields – Edition 97-01, the maximum power density allowed for general population/uncontrolled exposure is f/1500 where f is the frequency of operation in MHz. Calculating for the lowest frequency of operation (905MHz), the maximum power density allowed is 0.603 mW/cm^2. The power density is calculated as follows:

$S = (P*G)/(4*pi*R^2)$

where:
S = power density in mW/cm^2
P = power at the antenna connector in mW
G = linear system gain of the antenna
R = separation from antenna (cm)

By convention, a minimum separation distance of 20 cm has been used for indoor antennas. Applying this distance to the radiation exposure limits, the EIRP to 34.8 dBm.

The Mobile whip antennas can meet power density requirements of 1.1310 for a 20 cm separation between people and the antenna. In the worst case, the EIRP is 26 dBm at the antenna port (peak power) plus 7 dBi antenna gain for a total possible EIRP of 33 dBm, not taking into account any cable or connector losses, time averaging (duty cycle) or peak to average factors.

The Panel antenna is an outdoor antenna intended to be mounted in a permanent location or semi-permanent location, such as a command vehicle roof. With a gain of 9.3 dBi, this antenna requires 0.5 dB in installation losses to keep peak power at 34.8 dBm, so we are requiring a minimum of 6 feet of LMR200 cable to be used when installing this antenna. However, since it is an outdoor antenna, we are also requiring installers to provide at least 30 cm separation between people and the antenna. It is impractical to require 2 m as is conventional, since this antenna may be mounted on the roof of a van or trailer.

As per the MMT9000 Installation Guide, the whip antennas for the MMT9000 must be mounted such that there is at least 20cm of separation between the antenna and a person. For the MaxRad Panel Antenna Z183 antenna, the installation guide requires a separation of 30 cm and at least 6 feet of LMR200 cable for locating this antenna. Therefore the FCC requirements for human exposure to RF radiation are met.

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