SAT-242 Radiation Hazard Analysis

This analysis summarizes the power flux density levels for the SAT-242 MET. The calculations in this exhibit follow the methodology outlined in OET Bulletin No. 65 (Edition 97-01 August 1997) "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," and Supplement C (Edition 01-01 June 2001) entitled "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions."

The following table summarizes the relevant antenna and MET characteristics.

Manf.	MET Type	Antenna Type	Antenna Size	Antenna Peak Gain (dBi)
Satamatics	SAT-242	Patch	0.08m	4

The MET type has a peak EIRP of 9 dBW. The power flux density calculations in this exhibit are based on this peak value for a transmitting frequency at 1.6 GHz. At this frequency, the maximum permissible exposure ("MPE") levels in the FCC's guidelines are as follows:

Occupational/controlled	5 mW/cm^2 averaged over 6 minutes
General population/uncontrolled	1 mW/cm^2 averaged over 30 minutes

While most of applications for this MET will be located in areas that fall within the FCC's definition of "Occupational/controlled," there may be some applications where the MET operates in areas where the general public may be present. Those persons falling within the former category will be made fully aware of the potential for exposure through warning signs, labels, operating instructions and/or training. Those METs that are not fixed at any particular location fall under the Commission's definition of "mobile" (not "portable") transmitting devices because they are designed to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of a user or nearby persons.

The power flux density levels around the MET type can be calculated as follows:

$$S = EIRP/4\pi R^2 = 1.58\ mW/cm^2 \text{ (at 20 cm)}$$

However, as indicated in OET Bulletin 65, the FCC's exposure guidelines are averaged over certain periods of time. Because the transmissions from the MET is "burst" in nature, they are not always on and therefore the power flux density levels can be averaged over time. While typical MET will transmit bursts only a few times per day, a worst case scenario could result from the following:

Maximum length of each transmission burst = 8 seconds

Transmission time slot = 10 seconds

The MET references its timing from the received traffic channel to which it must tune and decode the frame header before a transmission is allowed in the following 30 second frame. The Inmarsat-D (IsatM2M mode) system limits the maximum number of transmissions to 4 in any 2 consecutive 30 second frames. As a result:

Maximum transmit/total time ratio = 4*8/60 = 0.533

Using this factor and the above calculated power flux density level yields an MPE as follows:

MPE = 1.58 * 0.533 = 0.842 mW/cm^2 (at 20 cm)

As indicated above, this level is within the most restrictive MPE requirements for general population/uncontrolled environments.