Measured - RF Exposure Information

The maximum radiation level from the unit was determined by using the W-band Standard Gain horn feeding directly into a spectrum analyzer. The analyzer was set to RBW=1 MHz, VBW=3 MHz for peak power detection. We also measured power received with a (average) power meter. In case the 1 mW/cm2 limit is exceeded, the maximum distance from the DUT would be determined by measurement where the field density is 1 mW/cm2. The physical aperture of this antenna is 1.869 x 2.461cm (A = 4.60 cm2). Its effective aperture at 76.5 GHz is 2.23 cm2, based on the Gain of 22.6 dB.

For the subject DUT, we probed throughout the near-field region, rotating the probe on all axis and polarizations. The maximum power was detected at the center of the radome, co-pol with the transmit signal. The reading was 0.10 mW on the spectrum analyzer and 0.023 mW on the power meter. For other axis and polarizations, the power was negligible. Power from spurious and harmonic emissions is also negligible.

Hence the maximum emitted power density of the device is

p(mW/cm2) = P/Aeff = 0.10 mW/ 2.23 cm2 = 0.04 mW/cm2

and, hence, meets the 1.1307, 1.1310, 2.1091, and 2.0193 requirements. Note, this is a peak value; the average is lower.

TCB - RF Exposure Information

The following summarizes the minimum separation distance as calculated following FCC OET Bulletin 65.

$S_{meas.(3m)}$ = -25.1 dBm/cm^2 (pk)

$S_{meas.(3m)}$ = ($10^{(-25.1/10)}$ mW/cm^2) (10000 cm^2/m^2) = 30.9 mW/m^2

EIRP = (30.9 mW/m^2) (4p) (9 m^2) = 3.495 W/m^2 or 35.43 dBm

ERP = EIRP (dB) – 2.15 dB = 35.43 dBm – 2.15 dB = 33.28 dBm or 2.130 W

Please note that under no circumstance is the ERP of this device as required by 2.1091 and the FCC mm wave accepted test procedure greater than 3 watts.

R = 16.7 cm

The following equations were used in calculating the operating distance (R).

$$S_{iso} = \frac{EIRP}{4pR^2}$$

$$EIRP = S_{meas.(3m)} \cdot 4p(3m)^2$$

$$EIRP(mW) = 10^{\frac{Gain(dBi)+AmpPower(dBm)}{10}}$$

and

$$R = \sqrt{\frac{EIRP(mW)}{4 \cdot \Pi \cdot S(mW/cm^2)}}\ \text{(cm)},\ \ S = 1\ (\text{mW/cm}^2)$$

Note: The DUT is only operating while the automobile is in motion.