Co-location MPE Calculation

The EIRP value is used to calculate the MPE limits. FCC part 1.1310, Table 1 limits the power density for uncontrolled exposure to F / 1500 . The distance, d(cm) from the antenna at which the power density, Pd (mW/cm^2) is below this limit is calculated from the maximum EIRP, E(mW) using the equation: $Pd = E/(4 * \prod * d^2)$

Re-arranging to calculate distance gives:

$$d = \sqrt{EIRP/4 * \prod * Pd}$$

While it is anticipated that the OEM installation would typically consist of a single system. But, there are site-planning considerations that must be accounted for when installing multiple systems at a single site. The following MPE calculation has been modified to reflect the number of antennas that can be installed in a given site before exceeding the 20 cm requirement.

$$d = \sqrt{EIRP * N / 4 * \prod * Pd}$$

N= Number of antennas at a given location.

The following formula shows what is the maximum number of antennas that can be installed in the same location before exceeding the 20-cm requirement. The worst-case power density of .549 mW/cm^2 was used in the formula (824 / 1500 = .549 mW/cm^2). The modules maximum conducted output power is 631 mW and the maximum antenna sold with the modules is 2.5 dBi. The EIRP will calculate 1.123 Watts.

For One antenna:

$$d = \sqrt{1123 * 1 / 4 * \prod * .549 \text{ mW/cm}^2} = 12.74 \text{ cm}$$

For Two antennas:

$d = \sqrt{1123 * 2 / 4 * \prod * .549 \text{ mW/cm}^2} = 18.02$ cm

For Three antennas:

$$d = \sqrt{1123 * 3 / 4 * \prod * .549 \text{ mW/cm}^2} = 22.07 \text{ cm}$$

The calculation shows that two antennas, of the same type and gain, is the maximum that can be installed in a single location.