DataSend900-PSTN Safe Distance Calculation - OET Bulletin 65

As the DataSend900-PSTN is to be used as part of a fixed installation at a fixed location i.e. physically secured at one location and not able to be easily moved to another location it is necessary to calculate the safe distance at which the exposure limits as defined in FCC Rule Part 1.1310 are met.

The MPE calculation as given in FCC OET Bulletin 65, page 19 is used to calculate the safe operating distance for the user.

The transmitter operation for the DataSend900-PSTN covers the 902 MHz to 928 MHz ISM band.

CALCULATION

From OET Bulletin 65 the following far field power density equation is applicable:

$$S = EIRP/4 \pi R^2$$

Where S = Power density

EIRP = Effective Isotropically Radiated Power (EIRP = P x G)

P = Conducted Transmitter Power

G = Antenna Gain (relative to an isotropic radiator)

R = distance to the centre of radiation of the antenna

Transmitter frequency range = 902 MHz to 928 MHz

Conducted Maximum Transmitter Power = 0.135 W

Antenna gain = 2.15 dBi (x1.64)

Peak EIRP = 0.221 W

The device transmits a total of 2.325 mS every 20.04 seconds

Therefore source based time based average transmitter power

P_{ave} =(0.221 W*[0.002325/20.04])

= 25.6 μW_{ave}

Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310

S = f/1500 mW/cm^2 (f = operating frequency)

S = 902/1500 = 0.60 mW/cm^2 (worst case)

Calculation for safe distance

Values: P_{peak} = 221 mW; S=0.6 mW/cm^2

P_{ave} = 25.6 µW; S=0.6 mW/cm^2

For peak power P_{peak} (absolute worst case):

Safe distance R = √(EIRP/4 π S)

R=√(221/[12.56 x 0.6])

=√28.66

R= 5.42 cm

For source based time based average power P_{ave}:

Safe distance R = √(EIRP/4 π S)

R=√(0.0256/[12.56 x 0.6])

=√0.013

R= 0.06 cm

Conclusion

Installers must ensure that all installations of the DataSend900-PSTN provide at least 5.42 cm of separation from the antenna to anyone from the 'general population'.