



DN200 - MPE Calculation

This calculation is based on maximum allowable transmitter power and a selection of the antennas used in the operating bands, included the maximum gain.

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

The following FCC Rule Parts are applicable:

Part 1.1310 – Radiofrequency radiation exposure limits

CALCULATION

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

$$S = \text{EIRP} / 4 \pi R^2$$

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 (safe operating distance)

Calculation for DN200 @ 2412 – 2462 MHz

Maximum EIRP:

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15.247(b)(4) – For the high gain antennas specified, power will always be reduced to accommodate meeting the 1.0W (30dBm) conducted power limit with +6dBi antenna gain as absolute maximum EIRP.

ie: $EIRP_{max} = 30 + 6 = 36dBm$ (4.0W) will not be exceeded as the maximum power to be transmitted

Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of
FCC Rule Part 1.1310 for >1.5GHz

$$S_{req} = 1.0 \text{ mW/cm}^2 \text{ (worst case)}$$

Calculation:

$$S = EIRP/4 \pi R^2$$
$$1.0 = 4000/(12.56 \times R^2)$$
$$R^2 = 4000/12.56$$

$$R = 17.85 \text{ cm}$$

Calculation for DN200 @ 5745 – 5825MHz (Point to Point Antenna)

Note: 15.247(b)(4)(ii) permits antennas greater than 6dBi to be used without transmitter power reduction for fixed, point to point operation in this band

Maximum conducted power = 1.0W (30dBm)

Maximum Antenna Gain (Point to Point) = 34dBi

$$EIRP_{max} = (30 + 34) \text{ dBm} = 2.51 \times 10^3 \text{ W}$$

Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of
FCC Rule Part 1.1310 for >1.5GHz

$$S_{req} = 1.0 \text{ mW/cm}^2 \text{ (worst case)}$$

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Calculation:

$$S = \text{EIRP}/4 \pi R^2$$
$$1.0 = 2.51 \times 10^6 / (12.56 \times R^2)$$
$$R^2 = 2.51 \times 10^6 / 12.56$$

$$R = 447 \text{ cm (4.47m)}$$

Calculation for DN200 @ 5150 – 5240MHz (Omni Antenna)

Maximum EIRP:

15.407(1) – For the high gain antennas specified, power will always be reduced to accommodate meeting the 50mW (17dBm) conducted power limit with +6dBi antenna gain as absolute maximum EIRP.

ie: $\text{EIRP}_{\text{max}} = 17 + 6 = 23\text{dBm}$ (0.2W) will not be exceeded as the maximum power to be transmitted

Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310 for >1.5GHz

$$S_{\text{req}} = 1.0 \text{ mW/cm}^2 \text{ (worst case)}$$

Calculation:

$$S = \text{EIRP}/4 \pi R^2$$
$$1.0 = 200 / (12.56 \times R^2)$$
$$R^2 = 200 / 12.56$$

$$R = 4.0 \text{ cm}$$

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