



Novatel Wireless Expedite EU730 module MPE Calculations

Calculated at 20cm distance



GSM 850 (GPRS) – Bottom Channel – 824MHz, Top Channel – 849MHz

Calculation of Far Field Distance

The far field is calculated as $> \lambda / 2 \pi$, where λ is the wavelength at the transmission frequency.

at	824MHz the far field is beyond a distance from the antenna	5.80cm.
	849MHz the far field is beyond a distance from the antenna	5.63cm

Calculation of power density at 20cm:

The RF power density at an operational distance R from the antenna is calculated by the following expression

$$S = (P.G)/4\pi.R^2$$

where S = power density in mW/cm²
P = power output in mW = 2000mW (33dBm)
G = antenna gain (numeric gain value) = 2 (3dB)
R = operating distance from antenna in cm. (20)

$$S = \frac{2000 \times 2}{4\pi \times 400}$$

$$S = 0.796 \text{ mW/cm}^2$$

The Power Density Limit is 1.0mW/cm²



PCS 1900 (GPRS) – Bottom Channel – 1850MHz, Top Channel – 1910MHz

Calculation of Far Field Distance

The far field is calculated as $> \lambda / 2 \pi$, where λ is the wavelength at the transmission frequency.

at	1850MHz the far field is beyond a distance from the antenna	2.50cm.
	1910MHz the far field is beyond a distance from the antenna	2.58cm

Calculation of power density at 20cm:

The RF power density at an operational distance R from the antenna is calculated by the following expression

$$S = (P.G)/4\pi.R^2$$

where S = power density in mW/cm²
P = power output in mW = 1000mW (30dBm)
G = antenna gain (numeric gain value) = 2 (3dB)
R = operating distance from antenna in cm. (20)

$$S = \frac{1000 \times 2}{4\pi \times 400}$$

$$S = 0.398 \text{ mW/cm}^2$$

The Power Density Limit is 1.0mW/cm²



UMTS Band II – Bottom Channel – 1850MHz, Top Channel – 1910MHz

Calculation of Far Field Distance

The far field is calculated as $> \lambda / 2 \pi$, where λ is the wavelength at the transmission frequency.

at	1850MHz the far field is beyond a distance from the antenna	2.50cm.
	1910MHz the far field is beyond a distance from the antenna	2.58cm

Calculation of power density at 20cm:

The RF power density at an operational distance R from the antenna is calculated by the following expression

$$S = (P.G)/4\pi.R^2$$

where S = power density in mW/cm²
P = power output in mW = 126mW (21dBm)
G = antenna gain (numeric gain value) = 2 (3dB)
R = operating distance from antenna in cm. (20)

$$S = \frac{125 \times 2}{4\pi \times 400}$$

$$S = 0.05 \text{ mW/cm}^2$$

The Power Density Limit is 1.0mW/cm²



UMTS Band V – Bottom Channel – 824MHz, Top Channel – 849MHz

Calculation of Far Field Distance

The far field is calculated as $> \lambda / 2 \pi$, where λ is the wavelength at the transmission frequency.

at	824MHz the far field is beyond a distance from the antenna	5.80cm.
	849MHz the far field is beyond a distance from the antenna	5.63cm

Calculation of power density at 20cm:

The RF power density at an operational distance R from the antenna is calculated by the following expression

$$S = (P.G)/4\pi.R^2$$

where S = power density in mW/cm²
P = power output in mW = 126mW (21dBm)
G = antenna gain (numeric gain value) = 2 (3dB)
R = operating distance from antenna in cm. (20)

$$S = \frac{125 \times 2}{4\pi \times 400}$$

$$S = 0.05 \text{ mW/cm}^2$$

The Power Density Limit is 1.0mW/cm²