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NX594 MPE Calculation - OET Bulletin 65

The FCC requires that the calculated MPE be equal to or less than a given limit dependent on frequency at a distance of 20 cm from a device to the body of a user.

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

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

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

For the NX594 @ GSM850

Transmitter frequency range = 824MHz to 849MHz

Maximum Transmitter Power P = 2.0W

The GSM module supports a maximum of 2 active time slots

Therefore source based time based average Transmitter Power P_{ave} =(2.0W*2/8)

= $0.50W_{ave}$

Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310 for GSM850

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

S = 824/1500 = 0.55 mW/cm^2 (worst case)

Calculation for GSM850 20cm safe distance with stated antenna gain 3dBi

Values: P_{ave} = 500mW; R = 20cm; G = 3dBi (x2.0)

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

$S = 500x2/(12.56 \times 20^2)$

$= 1000/ 5024$

$S = 0.20$ mW/cm^2

For the NX594 @ PCS1900

Transmitter frequency range = 1850MHz to 1910MHz

Maximum Transmitter Power P = 1.0 W

The GSM module supports a maximum of 2 active time slots

Therefore source based time based average Transmitter Power P_{ave} =(1.0W*2/8)

$= 0.25 W_{ave}$

Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310 for PCS1900

$S = 1.0$ mW/cm^2 (worst case)

Calculation for PCS1900 20cm safe distance with stated antenna gain 3dBi

Values: $P_{ave} = 250$mW; R = 20cm; G = 3dBi (x2.0)

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

$S = 250x2/(12.56 \times 20^2)$

$= 500/ 5024$

$S = 0.10$ mW/cm^2

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Conclusion

The MPE values of the NX594 at 20 cm meet the RF exposure limits.

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