Enabler® LPP FCC MPE Calculation

Revision 2.0

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MPE Calculation for Enfora Enabler[®] LPP - 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 transmitter operation for the **Enabler LPP** (**LPP0208-40**) radio module covers GSM850 and PCS1900 operating bands.

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

Summary Conclusion

The required 20cm RF exposure limits for General Population / Uncontrolled Exposure FCC Rule Part 1.1310 will not be exceeded for the **Enabler LPP** using antennas having a maximum gain of 1.4dBi (850MHz) and 3.0dBi (1900MHz) respectively.

For the Enabler LPP @ GSM850

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

$$S = f/1500 \text{ mW/cm}^2 \text{ (f = operating frequency)}$$

Transmitter frequency range = 824MHz to 849MHz

Max. Transmitter Power = 33dBm (2.0W) @ antenna socket

$$\textbf{S = 824/1500 = 0.55 mW/cm}^2 \textbf{ (worst case)}$$

Calculation to Determine Maximum Antenna Gain (G)

$S = 0.55 \text{ mW/cm}^2$
$P = 2000\text{mW}$
$R = 20\text{cm}$

$S = PxG/4\,\pi\,R^2$
$G = S \times (4\,\pi\,R^2) / P$
$G = 0.55 \times (12.56 \times 20^2) / 2000$
G = 1.38 (1.40dBi)

For the Enabler LPP @ GSM1900

Transmitter frequency range = 1850MHz to 1910MHz

Max. Conducted Transmitter Power P = 30dBm (1.0W) @ antenna socket

Calculation for Maximum radiated power output

Part 2.1091(c)
Part 24 PCS1900 devices operating at frequencies above 1.5GHz with effective radiated power (ERP) of 3 watts or more are subject to routine RF exposure evaluation, otherwise they are categorically excluded.

Part 24.232 (b)
Mobile/ Portable stations are limited to 2 Watts EIRP peak power

Maximum antenna gain G that can be used to comply with the maximum transmitter power limit of 2W EIRP of Part 24.232(b) is calculated as:

P x G = 2

ie: **G = 2/1 = 2 (3dBi)**

For 3dBi antenna gain maximum ERP is < 3.0W, so from Part 2.1091(c), routine RF exposure evaluation is categorically excluded. The 3dBi maximum gain antenna will therefore comply with the required FCC rule parts.