DeltaNode™
Wireless Technology

Maximum Permissible Exposure (MPE) Calculations

MPE limit in 47CFR §1.1310

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

The Plane-wave equivalent power density can be calculated with the equation:

$$S = \frac{EIRP}{4 * \pi * R^2}$$

Where

$$
\begin{aligned}
S &= \text{Power Density} & \text{mW/cm}^2 \\
EIRP &= \text{Effective isotropic radiated power} & \text{mW} \\
R &= \text{Distance} & \text{cm}
\end{aligned}
$$

From this equation we can calculate the safety distance needed to fulfil the MPE limits.

In these calculations we have assumed no feeder loss and a high directional antenna with 17dBi antenna gain at the installation.

Amplifier	Freq	P Output power to antenna	G Antenna gain (typical)	P+G TX Power EIRP	EIRP TX Power EIRP	S Power density limit*	R Calculated safety distance
	(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm2)	(cm)
700uC DL	746-758	41	17	58	631000	0,50	316
850 DL	869-894	41	17	58	631000	0,58	294
1900 DL	1930-1990	41	17	58	631000	1,00	224
AWS DL	2110-2155	41	17	58	631000	1,00	224

* Limit for General Population/Uncontrolled Exposure

No MPE calculations are needed for the Uplink paths in the EUT, because they are not radiated by an antenna. They are connected directly to the Base station.

Sincerely,

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