

## **FCC §1.1307(b) & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

### **Applicable Standard**

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
<b>Frequency Range (MHz)</b>	<b>Electric Field Strength (V/m)</b>	<b>Magnetic Field Strength (A/m)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>Averaging Time (minutes)</b>
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### **Calculated Formulary:**

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data:**

Mode	Frequency Band(MHz)	Antenna Gain		Cable Loss	Maximum Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)		(dBm)	(mW)			
Uplink	698-716	9	7.94	1.9	23	200	20.00	0.204	0.465
	776-787	9	7.94	1.9	23	200	20.00	0.204	0.517
	824-849	9	7.94	1.95	23	200	20.00	0.201	0.549
	1710-1755	10	10.00	2.55	23	200	20.00	0.221	1
	1850-1915	10	10.00	2.9	23	200	20.00	0.204	1
Downlink	728-746	9	7.94	1.3	0	1	20.00	0.001	0.485
	746-757	9	7.94	1.3	0	1	20.00	0.001	0.497
	869-894	9	7.94	1.35	0	1	20.00	0.001	0.579
	2110-2155	10	10.00	1.9	0	1	20.00	0.001	1
	1930-1995	10	10.00	1.8	0	1	20.00	0.001	1

Note: the power was used for evaluation is rated power including tolerance.  
The worst antenna kitting, please refer the user manual.

**Result:** The device meet FCC MPE at 20 cm distance.