

**RF EXPOSURE EVULATION**

**1.1 Limit**

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

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength	Magnetic field Strength	Power density	Averaging time
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.....	.....	.....	<b>1.0</b>	30

F = frequency in MHz

\* = Plane-wave equivalent power density

**1.2 MAXIMUM PERMISSIBLE EXPOSURE Prediction**

Prediction of MPE limit at a given distance

**Power density at the specific separation:**

$S = PG/(4R^2 \pi)$ $S = (0.73 * 0.30) / (4 * 20^2 * \pi)$ $S = 0.02 \text{ mW/cm}^2$	<p>Where,</p> <p>S = Maximum power density (mW/cm<sup>2</sup>)</p> <p>P = Power input to the antenna (mW)</p> <p>G = Numeric power gain of the antenna</p> <p>R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)</p>
---------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**1.3 MAXIMUM PERMISSIBLE EXPOSURE Prediction**

**(Measured power 1 dBm ± 0.5dB)**

3-1. Zigbee

Max Peak output Power at antenna input terminal	-1.37	dBm
Max Peak output Power at antenna input terminal	0.73	mW
Prediction distance	5	cm
Prediction frequency	2480	MHz
Antenna Gain(typical)	-5.18	dBi
Antenna Gain(numeric)	0.30	-
Power density at prediction frequency( S)	0.02	mW/cm <sup>2</sup>
MPE limit for uncontrolled exposure at prediction frequency	0.007	mW/cm <sup>2</sup>

Simultaneous transmission operations

SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance ≤ 50 mm = **Used**

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}]$

$= [0.73 / 50] * [\sqrt{2.480}] = 0.02 \leq 3$ , for 1g SAR

**Thus, SAR for this device is not required.**