

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 ²)	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

1.2 MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Power density at the specific separation:

$S = PG/(4R^2 \pi)$ $S = (0.78 * 0.23) / (4 * 20^2 * \pi)$ $S = 0.02\text{mW/cm}^2$	Where, S = Maximum power density (mW/cm²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
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1.3 MAXIMUM PERMISSIBLE EXPOSURE Prediction**(Measured power 1 dBm ± 0.5dB)****3-1. Zigbee**

Max Peak output Power at antenna input terminal	-1.09	dBm
Max Peak output Power at antenna input terminal	0.78	mW
Prediction distance	5	cm
Prediction frequency	2480	MHz
Antenna Gain(typical)	-6.33	dBi
Antenna Gain(numeric)	0.23	-
Power density at prediction frequency(S)	0.02	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	0.007	mW/cm ²

Simultaneous transmission operations

SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance ≤ 50 mm = **Used**
$$[(\text{max.power of channel, including tune-up torelance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{f}(\text{GHz})]$$
$$= [0.78 / 50] * [\sqrt{2.480}] = 0.02 \leq 3, \text{ for 1g SAR}$$
Thus, SAR for this device is not required.