

13 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

13.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

13.2 Maximum Permissible Exposure (MPE) Evaluation

ZigBee mode:			
CH	Frequency (MHz)	Max. Avg. Output include tune up tolerance Power (dBm)	Required Limit
1	2405	-8.48	1 Watt = 30 dBm
8	2440	-8.66	1 Watt = 30 dBm
14	2470	-9.04	1 Watt = 30 dBm

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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MPE Prediction (Zigbee 2405~2470)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	-8.48	(dBm)
Max. output power including tune-up tolerancel:	0.1419058	(mW)
Duty cycle:	100	(%)
Maximum Pav :	0.1419058	(mW)
Peak Antenna gain (Maximum):	-0.48	(dBi)
Peak Antenna gain (linear):	0.8953648	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2405	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm ²)
Power density at predication frequency at 20 (cm) distance	0.000	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 2405MHz.

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