

## 15. Maximum Permissible Exposure (MPE)

### 15.1 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 <sup>2</sup> )	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 <sup>2</sup> )	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

## 15.2 Maximum Permissible Exposure (MPE) Evaluation

### MPE Prediction (802.11n HT40) (worst case)

Power measurement:

Mode	Freq(MHz)	channel	Output Chain (dBm)		Combine Peak Output Power (dBm)	Limit(dBm)	Result
			Chain A	chain B			
N HT40	5190	38	8.02	7.81	10.93	16.98	Pass
	5230	46	7.59	7.33	10.47	16.98	Pass

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

Maximum peak output power at antenna input terminal:	10.93	(dBm)
Maximum peak output power at antenna input terminal:	12.38796587	(mW)
Duty cycle:	100	(%)
Maximum Pav :	12.38796587	(mW)
Antenna gain (typical):	4	(dBi)
Maximum antenna gain:	2.511886432	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5190	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0061937	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.00619 mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 5190MHz.