

## Maximum Permissible Exposure (MPE)

### 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.

According to §1.1310 and §2.1091 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

## Maximum Permissible Exposure (MPE) Evaluation

**Wifi mode: 802.11 b has the worst case**

Maximum Permissible Exposure (MPE) Evaluation: The worst case of Average power

**Power measurement:** refer to Part15.247 report for details.

Transmit Power:	802.11b: 14.28dBm (AV) 802.11g: -6.92dBm (AV) 802.11n HT20: 11.13 dBm (AV)
Antenna Designation:	Fixed Chip Antenna, 1.72dBi
Power Tolerance:	+/- 1.0 dBm

Tune-Up power Tolerance: 1dB

Prediction of MPE limit at a given distance

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

$$S = \frac{PG}{4\pi R^2}$$

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 output power at antenna input terminal:	14.28	(dBm)
Maximum output power at antenna input terminal:	26.79168325	(mW)
Tune-Up power Tolerance:	1	dB
Duty cycle:	100	(%)
Maximum Pav :	33.72873087	(mW)
Antenna gain (typical):	1.72	(dBi)
Maximum antenna gain:	1.485935642	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0099759	(mW/cm <sup>2</sup> )

## Measurement Result:

The predicted power density level at 20 cm is 0.0099759 mW/cm<sup>2</sup>.. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup>.

**BT mode:**

Maximum Permissible Exposure (MPE) Evaluation: The worst case of Average power

**Power measurement:** refer to Part15.247 report for details.

**Tune-Up Power:**

Frequency Range:	2402 – 2480MHz
Tune-Up Power:	5.40dBm +/- 1.0 dBm
Antenna Gain:	1.72dBi

Tune-Up power Tolerance: 1dB

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 output power at antenna input terminal:	5	(dBm)
Maximum output power at antenna input terminal:	3.16227766	(mW)
Tune-Up power Tolerance:	1	dB
Duty cycle:	100	(%)
Maximum Pav :	3.981071706	(mW)
Antenna gain (typical):	1.72	(dBi)
Maximum antenna gain:	1.485935642	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)
Power density at predication frequency at 20 (cm)	0.0011775	(mW/cm^2)

**Measurement Result:**

The worst power density is 0.0011775 mW/cm^2 which is less than 1 mW/cm^2.

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