

## 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.

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

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## Maximum Permissible Exposure (MPE) Evaluation

Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (mW)
2412	16.00	39.81	1000
2437	16.50	44.67	1000
2462	16.50	44.67	1000

### MPE Prediction (802.11b 2412~2462)

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 average output power at antenna input	14.10	(dBm)
Maximum average output power at antenna input	25.703958	(mW)
Duty cycle:	99	(%)
Maximum Pav :	25.446918	(mW)
Antenna gain (Maximum):	2.88	(dBi)
Antenna gain (linear):	1.9408859	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0098307	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0098mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1mW/cm<sup>2</sup> at 2437MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (mW)
2412	12.50	17.78	1000
2437	12.50	17.78	1000
2462	12.75	18.84	1000

### MPE Prediction (802.11g 2412~2462)

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 average output power at antenna input	12.75	(dBm)
Maximum average output power at antenna input	18.836491	(mW)
Duty cycle:	97.12	(%)
Maximum Pav :	18.294	(mW)
Antenna gain (Maximum):	2.8	(dBi)
Antenna gain (linear):	1.9054607	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0069384	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0069mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1mW/cm<sup>2</sup> at 2462MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (mW)
2412	11.65	14.61	1000
2437	12.15	16.40	1000
2462	12.61	18.25	1000

### MPE Prediction (802.11n\_HT20 2412~2462) (MIMO)

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 average output power at antenna input	12.61	(dBm)
Maximum average output power at antenna input	18.238957	(mW)
Duty cycle:	94.5	(%)
Maximum Pav :	17.235814	(mW)
Antenna gain (Maximum):	5.81	(dBi)
Antenna gain (linear):	3.8106582	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0130732	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0131mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1mW/cm<sup>2</sup> at 2462MHz.

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