



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 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

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13.3 Maximum Permissible Exposure (MPE) Evaluation

CH	Frequency (MHz)	Max. output power including tune-up tolerance (dBm)	Required Limit
1	2402	15.93	1 Watt = 30 dBm
6	2442	15.96	1 Watt = 30 dBm
11	2480	15.96	1 Watt = 30 dBm

MPE Prediction (802.11b 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

Max. output power including tune-up tolerance:	15.96	(dBm)
Max. output power including tune-up tolerance:	39.44573	(mW)
Duty cycle:	100	(%)
Maximum Pav :	39.44573	(mW)
Peak Antenna gain (Maximum):	6.27	(dBi)
Peak Antenna gain (linear):	4.2364297	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.033	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.033 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 2437MHz.

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CH	Frequency (MHz)	Max. output power including tune-up tolerance (dBm)	Required Limit
1	2402	13.96	1 Watt = 30 dBm
6	2442	13.97	1 Watt = 30 dBm
11	2480	13.98	1 Watt = 30 dBm

MPE Prediction (802.11g 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

Max. output power including tune-up tolerance:	13.98	(dBm)
Max. output power including tune-up tolerance:	25.003454	(mW)
Duty cycle:	100	(%)
Maximum Pav :	25.003454	(mW)
Peak Antenna gain (Maximum):	6.27	(dBi)
Peak Antenna gain (linear):	4.2364297	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.021	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.021 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 2462MHz.

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CH	Frequency (MHz)	Max. output power including tune-up tolerance (dBm)	Required Limit
1	2402	12.98	1 Watt = 30 dBm
6	2442	12.92	1 Watt = 30 dBm
11	2480	12.97	1 Watt = 30 dBm

MPE Prediction (802.11n_20M 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

Max. output power including tune-up tolerance:	12.98	(dBm)
Max. output power including tune-up tolerance:	19.860949	(mW)
Duty cycle:	100	(%)
Maximum Pav :	19.860949	(mW)
Peak Antenna gain (Maximum):	6.27	(dBi)
Peak Antenna gain (linear):	4.2364297	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.017	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.017 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 2412MHz.

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CH	Frequency (MHz)	Max. output power including tune-up tolerance (dBm)	Required Limit
3	2422	12.95	1 Watt = 30 dBm
6	2437	12.91	1 Watt = 30 dBm
9	2452	12.96	1 Watt = 30 dBm

MPE Prediction (802.11n_40M 2422~2452 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

Max. output power including tune-up tolerance:	12.96	(dBm)
Max. output power including tune-up tolerance:	19.769696	(mW)
Duty cycle:	100	(%)
Maximum Pav :	19.769696	(mW)
Peak Antenna gain (Maximum):	6.27	(dBi)
Peak Antenna gain (linear):	4.2364297	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2452	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.017	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.017 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 2452MHz.

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