

1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 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

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

802.11b					
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	1	14.71	29.58	1 Watt = 30 dBm
6	2437	1	14.52	28.31	1 Watt = 30 dBm
11	2462	1	14.30	26.92	1 Watt = 30 dBm

802.11g					
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	6	12.01	15.89	1 Watt = 30 dBm
6	2437	6	12.06	16.07	1 Watt = 30 dBm
11	2462	6	12.04	16.00	1 Watt = 30 dBm

802.11n_20M					
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	MCS0	11.00	12.59	1 Watt = 30 dBm
6	2437	MCS0	10.88	12.25	1 Watt = 30 dBm
11	2462	MCS0	10.72	11.80	1 Watt = 30 dBm

MPE Prediction (802.11b)

Average output power at antenna input terminal:	14.71	(dBm)
Average output power at antenna input terminal:	29.580125	(mW)
Duty cycle:	100	(%)
Maximum Pav :	29.580125	(mW)
Peak Antenna gain (Maximum):	3.789	(dBi)
Peak Antenna gain (linear):	2.3927647	(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)	0.014	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.014 mW/cm².

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

MPE Prediction (802.11g)

Average output power at antenna input terminal:	12.06	(dBm)
Average output power at antenna input terminal:	16.069413	(mW)
Duty cycle:	100	(%)
Maximum Pav :	16.069413	(mW)
Peak Antenna gain (Maximum):	3.789	(dBi)
Peak Antenna gain (linear):	2.3927647	(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)	0.008	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.008 mW/cm².

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

MPE Prediction (802.11 n20M)

Average output power at antenna input terminal:	11.00	(dBm)
Average output power at antenna input terminal:	12.589254	(mW)
Duty cycle:	100	(%)
Maximum Pav :	12.589254	(mW)
Peak Antenna gain (Maximum):	3.789	(dBi)
Peak Antenna gain (linear):	2.3927647	(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)	0.006	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.006 mW/cm².

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