

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

1.2 Maximum Permissible Exposure (MPE) Evaluation

802.11b

Cable loss = 0		Output Power		limit
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	(dBm)
1	2412	15.27	12.57	25
6	2437	15.14	12.87	25
11	2462	15.54	12.18	25

MPE Prediction (802.11b)

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:	15.54	(dBm)
Maximum peak output power at antenna input terminal:	35.80964371	(mW)
Duty cycle:	100	(%)
Maximum Pav :	35.80964371	(mW)
Antenna gain (typical):	10.76	(dBi)
Maximum antenna gain:	11.91242008	(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)	0.0849083	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.084908 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2462MHz.

802.11g

Cable loss = 0		Output Power		limit
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	(dBm)
1	2412	17.48	7.54	25
6	2437	17.85	8.01	25
11	2462	18.41	8.66	25

MPE Prediction (802.11g)

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:	18.41	(dBm)
Maximum peak output power at antenna input terminal:	69.3425806	(mW)
Duty cycle:	100	(%)
Maximum Pav :	69.3425806	(mW)
Antenna gain (typical):	10.76	(dBi)
Maximum antenna gain:	11.91242008	(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)	0.1644184	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.164418 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2462.

802.11N 20MHz

Cable loss = 0		Output Power		limit
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	(dBm)
1	2412	17.06	7.70	25
6	2437	17.40	8.16	25
11	2462	17.97	8.82	25

MPE Prediction (802.11n(2.4GHz)_20M)

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:	17.97	(dBm)
Maximum peak output power at antenna input terminal:	62.66138647	(mW)
Duty cycle:	100	(%)
Maximum Pav :	62.66138647	(mW)
Antenna gain (typical):	10.76	(dBi)
Maximum antenna gain:	11.91242008	(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)	0.1485766	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.148577 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2462.

802.11N 40MHz

Cable loss = 0		Output Power		limit
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	(dBm)
3	2422	17.40	7.50	25
6	2437	17.53	7.79	25
9	2452	17.84	8.12	25

MPE Prediction (802.11n(2.4GHz)_40M)

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:	17.84	(dBm)
Maximum peak output power at antenna input terminal:	60.81350013	(mW)
Duty cycle:	100	(%)
Maximum Pav :	60.81350013	(mW)
Antenna gain (typical):	10.76	(dBi)
Maximum antenna gain:	11.91242008	(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)	0.1441951	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0144195 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2452.