

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 §2.1091 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 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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1.2 Maximum Permissible Exposure (MPE) Evaluation

802.11b Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	1	21.54	1 Watt = 30.00 dBm	PASS
6	2437	1	21.49	1 Watt = 30.00 dBm	PASS
11	2462	1	20.93	1 Watt = 30.00 dBm	PASS
802.11b Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	1	18.74	1 Watt = 30.00 dBm	PASS
6	2437	1	18.67	1 Watt = 30.00 dBm	PASS
11	2462	1	18.08	1 Watt = 30.00 dBm	PASS

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

Max. output power including tune-up tolerancel:	18.74	(dBm)
Max. output power including tune-up tolerancel:	74.81695	(mW)
Duty cycle:	98.8	(%)
Maximum Pav :	73.919147	(mW)
Peak Antenna gain (Maximum):	1.11	(dBi)
Peak Antenna gain (linear):	1.2912193	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.019	(mW/cm2)
Measurement Result		
The predicted power density level at 20 cm is 0.019 mW/cm2.		
This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412MHz.		

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1.3 Maximum Permissible Exposure (MPE) Evaluation

802.11g Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	6	25.57	1 Watt = 30.00 dBm	PASS
6	2437	6	25.68	1 Watt = 30.00 dBm	PASS
11	2462	6	25.71	1 Watt = 30.00 dBm	PASS
802.11g Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	6	16.58	1 Watt = 30.00 dBm	PASS
6	2437	6	16.90	1 Watt = 30.00 dBm	PASS
11	2462	6	17.01	1 Watt = 30.00 dBm	PASS

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

Max. output power including tune-up tolerancel:	17.01	(dBm)
Max. output power including tune-up tolerancel:	50.234259	(mW)
Duty cycle:	93.19	(%)
Maximum Pav :	46.813306	(mW)
Peak Antenna gain (Maximum):	1.11	(dBi)
Peak Antenna gain (linear):	1.2912193	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.012	(mW/cm2)

Measurement Result

The predicted power density level at 20 cm is 0.012 mW/cm2.

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

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1.4 Maximum Permissible Exposure (MPE) Evaluation

802.11n_HT20M Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	MCS0	25.03	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	24.95	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	24.87	1 Watt = 30.00 dBm	PASS
802.11n_HT20M Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	MCS0	15.29	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	15.09	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	14.80	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11n20 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

Max. output power including tune-up tolerance:	15.29	(dBm)
Max. output power including tune-up tolerance:	33.806484	(mW)
Duty cycle:	92.63	(%)
Maximum Pav :	31.314946	(mW)
Peak Antenna gain (Maximum):	1.11	(dBi)
Peak Antenna gain (linear):	1.2912193	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm ²)
Power density at predication frequency at 20 (cm) distance	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 2412MHz.

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1.5 Maximum Permissible Exposure (MPE) Evaluation

802.11n_HT40M Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
3	2422	MCS0	24.84	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	24.73	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	24.81	1 Watt = 30.00 dBm	PASS
802.11n_HT40M Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
3	2422	MCS0	15.07	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	14.88	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	14.91	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11n40 2422~2452)

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 tolerancel:	15.07	(dBm)
Max. output power including tune-up tolerancel:	32.136605	(mW)
Duty cycle:	86.31	(%)
Maximum Pav :	27.737104	(mW)
Peak Antenna gain (Maximum):	1.11	(dBi)
Peak Antenna gain (linear):	1.2912193	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2422	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.007	(mW/cm2)

Measurement Result

The predicted power density level at 20 cm is 0.007 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 2422MHz.

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