

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

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	15.71	0.0372	0.4246
5220	15.14	0.0327	0.4246
5240	12.41	0.0174	0.4246

MPE Prediction (802.11a 5150~5350)

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:	15.71	(dBm)
Maximum peak output power at antenna input terminal:	37.23917063	(mW)
Duty cycle:	96.8	(%)
Maximum Pav :	36.04751717	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0672707	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.067 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	18.45	0.0700	0.2123
5220	17.28	0.0535	0.2123
5240	16.30	0.0427	0.2123

MPE Prediction (802.11n_HT20 5150~5350)

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:	18.45	(dBm)
Maximum peak output power at antenna input terminal:	69.9841996	(mW)
Duty cycle:	93.68	(%)
Maximum Pav :	65.56119819	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.1223481	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.122 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5190	13.29	0.0213	0.2123
5230	16.87	0.0486	0.2123

MPE Prediction (802.11n_HT40 5150~5350)

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:	16.87	(dBm)
Maximum peak output power at antenna input terminal:	48.64072057	(mW)
Duty cycle:	91.18	(%)
Maximum Pav :	44.35060901	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5230	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0827656	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.083 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5230MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	11.39	0.0138	0.4064
5785	10.44	0.0111	0.4064
5825	10.10	0.0102	0.4064

MPE Prediction (802.11a 5745~5825)

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:	11.39	(dBm)
Maximum peak output power at antenna input terminal:	13.77209469	(mW)
Duty cycle:	96.8	(%)
Maximum Pav :	13.33138766	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5745	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0259912	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.026 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5745MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	15.18	0.0330	0.2032
5785	14.20	0.0263	0.2032
5825	13.46	0.0222	0.2032

MPE Prediction (802.11n_HT20 5745~5825)

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:	15.18	(dBm)
Maximum peak output power at antenna input terminal:	32.96097122	(mW)
Duty cycle:	93.68	(%)
Maximum Pav :	30.87783784	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5745	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0602001	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.060 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5745MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5755	13.26	0.0212	0.2032
5795	15.00	0.0316	0.2032

MPE Prediction (802.11n_HT40 5755~5795)

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:	15.00	(dBm)
Maximum peak output power at antenna input terminal:	31.6227766	(mW)
Duty cycle:	91.18	(%)
Maximum Pav :	28.83364771	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5795	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0562147	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.056 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5795MHz.