

1. 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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Maximum Permissible Exposure (MPE) Evaluation

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	16.70	0.047	0.25
5220	16.47	0.044	0.25
5240	15.75	0.038	0.25

MPE Prediction (802.11a 5180~5240)

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:	16.70	(dBm)
Maximum peak output power at antenna input terminal:	46.77351413	(mW)
Duty cycle:	100	(%)
Maximum Pav :	46.77351413	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(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)	0.0147554	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0147554 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	13.87	0.024	1
5785	14.16	0.026	1
5825	13.42	0.022	1

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:	14.16	(dBm)
Maximum peak output power at antenna input terminal:	26.0615355	(mW)
Duty cycle:	100	(%)
Maximum Pav :	26.0615355	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5785	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0082215	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0082215 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5785MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	17.56	0.057	0.25
5220	16.46	0.044	0.25
5240	16.57	0.045	0.25

MPE Prediction (802.11n_HT20 5180~5240)

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:	17.56	(dBm)
Maximum peak output power at antenna input terminal:	57.01642723	(mW)
Duty cycle:	100	(%)
Maximum Pav :	57.01642723	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(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)	0.0179867	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0179867 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	16.34	0.043	1
5785	16.09	0.041	1
5825	15.25	0.033	1

MPE Prediction (802.11 n_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:	16.34	(dBm)
Maximum peak output power at antenna input terminal:	43.05266105	(mW)
Duty cycle:	100	(%)
Maximum Pav :	43.05266105	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(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)	0.0135816	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0135816 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5745MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5190	12.05	0.016	0.25
5230	11.15	0.013	0.25

MPE Prediction (802.11n_HT40 5190~5230)

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:	12.05	(dBm)
Maximum peak output power at antenna input terminal:	16.03245391	(mW)
Duty cycle:	100	(%)
Maximum Pav :	16.03245391	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5190	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0050577	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0050577 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5190MHz.

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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5755	14.64	0.029	1
5795	16.92	0.049	1

MPE Prediction (802.11n_HT40 5745~5795)

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:	16.92	(dBm)
Maximum peak output power at antenna input terminal:	49.20395357	(mW)
Duty cycle:	100	(%)
Maximum Pav :	49.20395357	(mW)
Antenna gain (Maximum):	2	(dBi)
Antenna gain (linear):	1.584893192	(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)	0.0155221	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0155221 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5795MHz.

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