

15. FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE)

15.1 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

Note:

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

*Note: BT / WLAN 2.4G / WLAN 5G will transmit together.

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15.2 Maximum Permissible Exposure (MPE) Evaluation (Worst Case)

802.11n_HT20_Main

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	10.08	10.186	23.98	PASS
44	5220	10.06	10.139	23.98	PASS
48	5240	10.04	10.093	23.98	PASS
52	5260	10.06	10.139	23.98 or $11+10\log(B) = 25.31$	PASS
60	5300	10.09	10.209	23.98 or $11+10\log(B) = 25.31$	PASS
64	5320	9.95	9.886	23.98 or $11+10\log(B) = 25.49$	PASS
100	5500	9.87	9.705	23.98 or $11+10\log(B) = 25.62$	PASS
116	5580	10.07	10.162	23.98 or $11+10\log(B) = 25.48$	PASS
140	5700	9.81	9.572	23.98 or $11+10\log(B) = 25.33$	PASS
149	5745	10.01	10.023	30	PASS
157	5785	10.09	10.209	30	PASS
165	5825	10.02	10.046	30	PASS

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MPE Prediction (802.11n_HT20 5150~5250)

Max. output power including tune-up tolerancel:	10.08	(dBm)
Max. output power including tune-up tolerancel:	10.185914	(mW)
Duty cycle:	86.19	(%)
Maximum Pav :	8.7792392	(mW)
Peak Antenna gain (Maximum):	2	(dBi)
Peak Antenna gain (linear):	1.5848932	(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)	0.003	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.003 mW/cm².
This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

MPE Prediction (802.11n_HT20 5250~5350)

Max. output power including tune-up tolerancel:	10.09	(dBm)
Max. output power including tune-up tolerancel:	10.209395	(mW)
Duty cycle:	86.19	(%)
Maximum Pav :	8.7994774	(mW)
Peak Antenna gain (Maximum):	2	(dBi)
Peak Antenna gain (linear):	1.5848932	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5300	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.003	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.003 mW/cm².
This is below the uncontrolled exposure limit of 1 mW/cm² at 5300MHz.

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MPE Prediction (802.11n_HT20 5470~5725)

Max. output power including tune-up tolerancel:	10.07	(dBm)
Max. output power including tune-up tolerancel:	10.162487	(mW)
Duty cycle:	86.19	(%)
Maximum Pav :	8.7590475	(mW)
Peak Antenna gain (Maximum):	2	(dBi)
Peak Antenna gain (linear):	1.5848932	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5580	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.003	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.003 mW/cm².
This is below the uncontrolled exposure limit of 1 mW/cm² at 5580MHz.

MPE Prediction (802.11n_HT20 5725~5850)

Max. output power including tune-up tolerancel:	10.09	(dBm)
Max. output power including tune-up tolerancel:	10.209395	(mW)
Duty cycle:	86.19	(%)
Maximum Pav :	8.7994774	(mW)
Peak Antenna gain (Maximum):	2	(dBi)
Peak Antenna gain (linear):	1.5848932	(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)	0.003	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.003 mW/cm².
This is below the uncontrolled exposure limit of 1 mW/cm² at 5785MHz.

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