

## 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 <sup>2</sup> )	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 <sup>2</sup> )	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	<b>10.08</b>	<b>10.186</b>	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	<b>10.09</b>	<b>10.209</b>	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	<b>10.07</b>	<b>10.162</b>	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	<b>10.09</b>	<b>10.209</b>	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 <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.003	(mW/cm <sup>2</sup> )

**Measurement Result**

The predicted power density level at 20 cm is 0.003 mW/cm<sup>2</sup>.  
This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> 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 <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.003	(mW/cm <sup>2</sup> )

**Measurement Result**

The predicted power density level at 20 cm is 0.003 mW/cm<sup>2</sup>.  
This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> 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 <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.003	(mW/cm <sup>2</sup> )

**Measurement Result**

The predicted power density level at 20 cm is 0.003 mW/cm<sup>2</sup>.  
This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> 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 <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.003	(mW/cm <sup>2</sup> )

**Measurement Result**

The predicted power density level at 20 cm is 0.003 mW/cm<sup>2</sup>.  
This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 5785MHz.

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