

## 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 <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

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SGS Taiwan Ltd.

台灣檢驗科技股份有限公司

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan/台北縣五股工業區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

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## 1.2. Maximum Permissible Exposure (MPE) Evaluation

### Bluetooth Power Table (BDR Mode)

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	14.51	0.00	14.51	0.02825	1
2441.00	14.41	0.00	14.41	0.02761	1
2480.00	14.28	0.00	14.28	0.02679	1

### MPE Prediction (Bluetooth)

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:	14.51	(dBm)
Maximum peak output power at antenna input terminal:	28.24879975	(mW)
Duty cycle:	100	(%)
Maximum Pav :	28.24879975	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2402	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0089115	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0089 mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2402MHz.

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### 802.11b Power Table

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	17.09	0.00	17.09	0.05117	1
2437.00	17.08	0.00	17.08	0.05105	1
2462.00	17.02	0.00	17.02	0.05035	1

### MPE Prediction (802.11b)

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:	17.09	(dBm)
Maximum peak output power at antenna input terminal:	51.16818355	(mW)
Duty cycle:	100	(%)
Maximum Pav :	51.16818355	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0161417	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0161 mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2412MHz.

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### 802.11g Power Table

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	15.15	0.00	15.15	0.03273	1
2437.00	15.07	0.00	15.07	0.03214	1
2462.00	14.92	0.00	14.92	0.03105	1

### MPE Prediction (802.11g)

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:	15.15	(dBm)
Maximum peak output power at antenna input terminal:	32.73406949	(mW)
Duty cycle:	100	(%)
Maximum Pav :	32.73406949	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0103264	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.0103 mW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2412.

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