

## 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 §2.1091 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

**Power measurement result:**

802.11b

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	10.63	8.54	30
7	2442	10.55	8.31	
11	2462	11.56	9.53	

802.11g

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	14.08	5.09	30
7	2442	13.24	8.03	
11	2462	14.33	6.22	

802.11N 20MHz(2.4G)

Cable loss = 0		Output Power		Limit (dBm)
CH	Frequency (MHz)	Detector		
		PK (dBm)	AV (dBm)	
1	2412	13.35	2.01	30
7	2442	12.97	2.15	
11	2462	14.84	3.01	

### Maximum Permissible Exposure (MPE) Evaluation

The worst case of Average power: 802.11 b

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

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 Average output power at antenna input	9.53	(dBm)
Power Tolerance	2	dB
Maximum peak output power at antenna input terminal:	14.22328787	(mW)
Duty cycle:	99	(%)
Maximum Pav :	14.08105499	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0028028	(mW/cm <sup>2</sup> )

### Measurement Result

The predicted power density level at 20 cm is 0.002802cmW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2462MHz.

**BDR Mode**

Frequency (MHz)	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	3.47	0.00	3.47	0.00222	1
2441.00	4.92	0.00	4.92	0.00310	1
2480.00	5.77	0.00	5.77	0.00378	1

**EDR 2M Mode**

Frequency (MHz)	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.68	0.00	0.68	0.00117	0.125
2441.00	0.73	0.00	0.73	0.00118	0.125
2480.00	0.77	0.00	0.77	0.00119	0.125

**EDR 3M Mode**

Frequency (MHz)	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.83	0.00	0.83	0.00121	0.125
2441.00	0.75	0.00	0.75	0.00119	0.125
2480.00	0.82	0.00	0.82	0.00121	0.125

**Maximum Permissible Exposure (MPE) Evaluation**

The worst case of Average power: BT BDR, DH5, duty cycle: 2.92/3.76=0.77

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 Average output power at antenna input	5.77	(dBm)
Power Tolerance	2	dB
Maximum peak output power at antenna input terminal:	5.984115951	(mW)
Duty cycle:	77	(%)
Maximum Pav :	4.607769282	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2480	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm <sup>2</sup> )
Power density at predication frequency at 20 (cm)	0.0009172	(mW/cm <sup>2</sup> )

**Measurement Result**

The predicted power density level at 20 cm is 0.00091cmW/cm<sup>2</sup>. This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2488MHz.