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.

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^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

Maximum Permissible Exposure (MPE) Evaluation

Wifi mode: 802.11 b has the worst case

Maximum Permissible Exposure (MPE) Evaluation: The worst case of Average power

Power measurement: refer to Part15.247 report for details.

Transmit Power:	802.11b: 8 dBm (AV) 802.11g: -2 dBm (AV) 802.11n HT20: -3 dBm (AV)
Antenna Designation:	Fixed PCB Antenna, 3.3dBi
Power Tolerance:	+/- 1.0 dBm

Tune-Up power Tolerance: 1dB

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 output power at antenna input terminal:	8.84	(dBm)
Maximum output power at antenna input terminal:	7.655966069	(mW)
Tune-Up power Tolerance:	1	dB
Duty cycle:	100	(%)
Maximum Pav :	9.638290236	(mW)
Antenna gain (typical):	3.3	(dBi)
Maximum antenna gain:	2.13796209	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)
Power density at predication frequency at 20 (cm)	0.0041016	(mW/cm^2)

Measurement Result:

The predicted power density level at 20 cm is 0.0041016 mW/cm2.. This is below the uncontrolled exposure limit of 1 mW/cm^2.

BT mode:

Maximum Permissible Exposure (MPE) Evaluation: The worst case of Average power

Power measurement: refer to Part15.247 report for details.

Tune-Up Power:

Frequency Range:	2402 – 2480MHz
Tune-Up Power:	3dBm +/- 1.0 dBm
Antenna Gain:	-2.58dBi

Tune-Up power Tolerance: 1dB

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 output power at antenna input terminal:	3	(dBm)
Maximum output power at antenna input terminal:	1.995262315	(mW)
Tune-Up power Tolerance:	1	dB
Duty cycle:	100	(%)
Maximum Pav :	2.511886432	(mW)
Antenna gain (typical):	-2.58	(dBi)
Maximum antenna gain:	0.552077439	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)
Power density at predication frequency at 20 (cm)	0.0002760	(mW/cm^2)

Measurement Result:

The worst power density is 0.000276 mW/cm^2 which is less than 1 mW/cm^2.

Simultaneous transmission mode

WiFi 2.4GHz mode + BT 2.4GHz Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0041016	(mW/cm^2)

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0002760	(mW/cm^2)
2.4GHz + 2.4GHz Power density at predication frequency at 20 (cm) distance	0.0043776	(mW/cm^2)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)

The predicted power density level at 20 cm is 0.0043776mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2.

~ end ~