

# MPE Prediction

FCC Rule: 15.247(b)(5)

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines. See §1.1307(b)(1) of this Chapter.

## LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
30-300	61.4	0.613	1.0	6
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
30-300	27.5	0.073	0.2	30
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

## 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 the 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



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**3.2 Equivalent isotropic radiated power**

FCC Rule: 15.247(b)(3)

EIRP = max. conducted output power + antenna gain(Directional gain)

802.11b/g

EIRP = 14.50 dBm + 6.51 dBi  
= 21.01 dBm

802.11n(20MHz), 802.11n(40MHz)

EIRP = 13.33 dBm + 6.51 dBi  
= 19.84 dBm

Limit: EIRP = +36 dBm for Antenna gain <6dBi

Test equipment used: ETSTW-RE 055

**3.3 RF Exposure Compliance Requirements**

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

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

- S – Power Density
- P – Output power ERP
- R – Distance
- D – Cable Loss
- AG – Antenna Gain

802.11b/g

Item	Unit	Value	Remarks
P	mW	28.1838	Peak value
D	dB		
AG	dBi	6.51	
G		4.4771	Calculated Value
R	cm	20	Assumed value
S	mW/cm <sup>2</sup>	0.0251	Calculated value

802.11n(20MHz), 802.11n(40MHz)

Item	Unit	Value	Remarks
P	mW	21.5278	Peak value
D	dB		
AG	dBi	6.51	
G		4.4771	Calculated Value
R	cm	20	Assumed value
S	mW/cm <sup>2</sup>	0.0192	Calculated value

Limits:

Limit for General Population / Uncontrolled Exposure	
Frequency (MHz)	Power Density (mW/cm <sup>2</sup> )
1500 – 100.000	1.0