

## - RF Exposure

### 1. Regulation

According to §15.247(i), 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: RF exposure is calculated.

Frequency Range	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 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

f=frequency in MHz, \*= plane-wave equivalent power density

#### MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S = power density [mW/cm<sup>2</sup>]

P = Power input to antenna [mW]

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 [cm]

### 2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

### 3. Calculation Result of RF Exposure

Mode	Target power [dBm]	Tune up tolerance [dB]	Max tune up power [dBm]	Max tune up power [mW]	Ant Gain [dBi]	Ant Gain [mW]	Power Density at 20 cm [mW/cm <sup>2</sup> ]	Limit [mW/cm <sup>2</sup> ]
WCDMA Band 5	26.00	±1.0	27.00	501.19	1.519	1.42	0.141 46	0.55
802.11g_Highest	18.00	±1.0	19.00	79.43	2.882	1.94	0.030 69	1.00

### 4. Target power and tolerance, Max tuneup power

#### - WCDMA

Mode	Target power [dBm]	Tolerance [dB]	Max tune up power [dBm]	Conducted Power [dBm]
WCDMA Band 5	26.00	±1.0	27.00	26.60

#### - WiFi

Mode	Target power [dBm]	Tolerance [dB]	Max tune up power [dBm]	12 V	24 V
				Average Power [dBm]	Average Power [dBm]
802.11b_Lowest	17.00	±1.0	18.00	17.35	17.95
802.11b_Middle	17.00	±1.0	18.00	17.55	17.50
802.11b_Highest	17.00	±1.0	18.00	17.57	17.50
802.11g_Lowest	18.00	±1.0	19.00	18.66	18.92
802.11g_Middle	18.00	±1.0	19.00	18.79	18.83
802.11g_Highest	18.00	±1.0	19.00	18.93	18.97
802.11n HT20_Lowest	18.00	±1.0	19.00	18.81	18.82
802.11n HT20_Middle	18.00	±1.0	19.00	18.88	18.71
802.11n HT20_Highest	18.00	±1.0	19.00	18.84	18.84