

5.10 RF Exposure

5.10.1 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 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 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/cm²]

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]

5.10.2 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.

Band [MHz]	Mode	Antenna Selection	Channel Frequency [MHz]	Ant Gain [dBi]	Conducted power [dBm]	E.I.R.P power [dBm]	Power Density at 20 cm [mW/Cm ²]
2 400 ~ 2 483.5	RF4CE	ANT0+1	2 425	5.59	2.28	7.87	0.001 22
5 725 ~ 5 850	11n 40	ANT1+2+3+4	5 755	3.00	25.90	28.90	0.154 43
							0.155 65

5.10.3 Calculation Result of RF Exposure

- 2 400 ~ 2 483.5 MHz (RF4CE)

Channel	Antenna Selection	Channel Frequency [MHz]	Ant Gain [dBi]	Conducted power [dBm]	E.I.R.P power [dBm]	Power Density at 20 cm [mW/Cm2]
Lowest	ANT0+1	2 425	5.59	2.28	7.87	0.001 22
Middle		2 450	5.59	2.10	7.69	0.001 17
Highest		2 475	5.59	2.23	7.82	0.001 20

- 5 150 ~ 5 250 MHz (Wi-Fi)

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11n 40MHz	ANT1+2+3+4	Lowest	5 190	1.55	15.44	34.99	0.010 78
		Highest	5 230	1.55	15.62	36.48	0.011 24

- 5 250 ~ 5 350 MHz (Wi-Fi)

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11n 40MHz	ANT1+2+3+4	Lowest	5 270	1.78	22.77	189.23	0.066 95
		Highest	5 310	1.78	22.70	186.21	0.065 88

- 5 470 ~ 5 725 MHz (Wi-Fi)

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11n 40MHz	ANT1+2+3+4	Lowest	5 510	1.95	22.88	194.09	0.075 29
		Middle	5 550	1.95	23.07	202.77	0.078 66
		Highest	5 670	1.95	22.92	195.88	0.075 99

- 5 750 ~ 5 850 MHz (Wi-Fi)

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11n 40MHz	ANT1+2+3+4	Lowest	5 755	2.00	25.90	389.05	0.154 43
		Highest	5 795	2.00	25.89	388.15	0.154 07