

6 FCC §15.247(i), §2.1091 & IC RSS-102 - RF Exposure Information

6.1 Applicable Standard

According to FCC §15.247(i) and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
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
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time (Minutes)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 - 300	28	0.073	2*	6
300 - 1 500	1.585 f ^{0.5}	0.0042 f ^{0.5}	f / 150	6
1 500 - 15 000	61.4	0.163	10	6
15 000 - 150 000	61.4	0.163	10	616000 / f ^{1.2}
150 000- 300 000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000 / f ^{1.2}

Note: f is frequency in MHz

* Power density limit is applicable at frequencies greater than 100 MHz

6.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from 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

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>29.52</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>895</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>902.7</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.178</u>
<u>Power density of prediction frequency at 20.0 cm (W/m²):</u>	<u>1.78</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.602</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (W/m²):</u>	<u>6.02</u>

Radio Type	Operating Frequency (MHz)	MPE Limit (mw/cm ²)	Conducted Power (mW)	Duty Cycle	Antenna Gain (dBi)	Gain (numeric)	Power Density at 20 cm	% of MPE	Co-located % of MPE
900 MHz Radio ON									
900 MHz Radio	902.7	0.602	895	100%	0.00	1.00	0.1781	29.6%	-
900 MHz Radio with 2.4 GHz FHSS Radio ON									
2.4 GHz FHSS Radio FCC ID: HSW-2410G	2469.81	1.000	69.02	70%	2.00	1.58	0.02	1.5%	31.1%
900 MHz Radio with 2.4 GHz Wi-Fi Radio ON									
2.4 GHz Wi-Fi Radio FCC ID: F4AWLNG1	2412	1.000	142.89	100%	3.00	2.00	0.06	5.7%	35.3%
900 MHz Radio with 2.4 GHz Wi-Fi Radio and 2.4 GHz FHSS Radio ON									
								-	36.8%

6.3 Test Result

The device complies with the MPE limit at 20 cm for uncontrolled exposure.