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

12.1 Applicable Standard

According to §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 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)	Time Averaging (min)
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

12.2 MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

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 peak output power at antenna input terminal (dBm):	-5.7
Maximum peak output power at antenna input terminal (mW):	0.27
Prediction distance (cm):	20
Prediction frequency (MHz):	2402
Maximum Antenna Gain, typical (dBi):	2.0
Maximum Antenna Gain (numeric):	1.58
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.000084869
Power density of prediction frequency at 20.0 cm (W/m^2):	0.00084869
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

12.3   Test Result

FCC: The power density level at 20 cm distance is 0.000084869mW/cm^2, which is below the uncontrolled exposure limit of 1.0 mW/cm².

IC: The power density level at 20 cm distance is 0.00084869 W/m^2, which is below the uncontrolled exposure limit of 10W/m².