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

4.1 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.

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		

Limits for General Population/Uncontrolled Exposure	ıre
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f = frequency in MHz

* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC 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)	Time Averaging (min)
0.003 - 1	280	2.19	-	б
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 - 300	28	0.073	2*	б
300 - 1 500	$1.585 f^{0.5}$	$0.0042 \text{ f}^{0.5}$	f / 150	б
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

MPE Prediction 4.2

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

 $\mathbf{R} = \mathbf{distance}$ to the center of radiation of the antenna

MPE Results 4.3

Antenna gain 5 dBi

- Maximum peak output power at antenna input terminal (dBm): 23.81 Maximum peak output power at antenna input terminal (mW): 240.44 Prediction distance (cm):
 - 20
 - Prediction frequency (MHz): 5745
 - Maximum Antenna Gain, typical (dBi): 5
 - Maximum Antenna Gain (numeric): 3.16
 - Power density of prediction frequency at 20.0 cm (mW/cm²): 0.15
 - Power density of prediction frequency at $20.0 \text{ cm} (\text{W/m}^2)$: 1.5
- <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u> 1.0
 - MPE limit for uncontrolled exposure at prediction frequency (W/m^2) : 10

Antenna gain 12 dBi

- Maximum peak output power at antenna input terminal (dBm): 23.74
- Maximum peak output power at antenna input terminal (mW): 236.59
 - Prediction distance (cm): 20
 - Prediction frequency (MHz): 5745
 - Maximum Antenna Gain, typical (dBi): 12
 - Maximum Antenna Gain (numeric): 15.85
 - Power density of prediction frequency at 20.0 cm (mW/cm²): 0.75
 - Power density of prediction frequency at $20.0 \text{ cm} (\text{W/m}^2)$: 7.5
- <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u> 1.0
 - MPE limit for uncontrolled exposure at prediction frequency (W/m^2) : 10

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Antenna gain 15 dBi

Maximum peak output power at antenna input terminal (dBm):			
Maximum peak output power at antenna input terminal (mW):			
Prediction distance (cm):	<u>20</u>		
Prediction frequency (MHz):	<u>5795</u>		
Maximum Antenna Gain, typical (dBi):	<u>15</u>		
Maximum Antenna Gain (numeric):	31.62		
Power density of prediction frequency at 20.0 cm (mW/cm ²):	<u>0.78</u>		
Power density of prediction frequency at $20.0 \text{ cm} (W/m^2)$:	7.8		
MPE limit for uncontrolled exposure at prediction frequency (mW/cm ²):			
MPE limit for uncontrolled exposure at prediction frequency (W/m ²):			

The device is compliance with the FCC/IC MPE limit for the uncontrolled exposure environment at 20 cm distance.