# **FCC §15.247(i) & ISED RSS-102 – RF Exposure**

#### 5.1 **Applicable Standards**

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/cm²)	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 <sup>2</sup> )	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

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

## According to ISEDC RSS-102 §2.5.2:

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RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- •below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- •at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- •at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- •at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where f is in MHz;
- •at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

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f = frequency in MHz

<sup>\* =</sup> Plane-wave equivalent power density

#### 5.2 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

#### 5.3 MPE Results

Maximum peak output power at antenna input terminal (dBm): 19.44

Maximum peak output power at antenna input terminal (mW): 87.902

Prediction distance (cm): 20

Prediction frequency (MHz): 2462

Maximum Antenna Gain, typical (dBi): -5.2

Maximum Antenna Gain (numeric): 0.301995

Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>): 0.005281

FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>): 1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.005281 mW/cm<sup>2</sup>. Limit is 1.0 mW/cm<sup>2</sup>.

Note: The highest power of the two chains was used for MPE-802.11n20, Antenna Chain 0, High Channel.

### 5.4 RF exposure evaluation exemption for IC

 $19.44 + (-5.2) \text{ dBi} = 14.24 \text{ dBm} < 1.31 \times 10^{-2} f^{0.6834} = 2.722 \text{ W} = 34.349 \text{ dBm}$ 

Therefore the RF exposure is not required.

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