

5 FCC §2.1091 & ISED RSS-102 - RF Exposure

5.1 Applicable Standard

According to FCC §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.

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

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

Band 5:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>25.6</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>363.08</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>824.2</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.259</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.091</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.5495</u>

Band 12 & Band 17

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>26.3</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>426.58</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>699.2</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.259</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.107</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.466</u>

Band 13:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>25.9</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>389.045</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>746.2</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.259</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.097</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.4975</u>

Band 2 & Band 25

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>26.0</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>398.107</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1852.4</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.259</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.0997</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

Band 4:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>27.4</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>549.5409</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1712.4</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.259</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.1377</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure at the distance of 20 cm.

5.4 ISED Exemption of RF Exposure Evaluation

According to ISED RSS-102, Issue 5 section 2.5.2 exemption limits for routine evaluation.

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:

- 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;

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.

The maximum e.i.r.p. of device is less than the exemption limits. Routine RF exposure evaluation is not required.

Refer to 3585A-BMC653 IC Test Report V1.2 Section 3.6