

## 5 RSS-102 §4 – EXPOSURE LIMIT

### 5.1 Applicable Standard

According to RSS-102 §4:

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Reference Period (minutes)
0.003-10 <sup>21</sup>	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f <sup>0.25</sup>	0.1540/ f <sup>0.25</sup>	8.944/ f <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f <sup>1.2</sup>
150000-300000	0.158 f <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> f <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> f	616000/ f <sup>1.2</sup>
<b>Note:</b> f is frequency in MHz. * Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Calculated Formulary:

S = PG/4 π R<sup>2</sup> = power density (in appropriate units, e.g. W/m<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., W);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., m);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

## 5.2 RF Exposure Evaluation Result

### Beam-forming:

For the 2.4G Wi-Fi, as it can support the beam-forming function,

So Directional gain = GANT +  $10 \cdot \log(2)$  · 2.4+3.01 = 5.41 dBi

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Average Power		Distances (mm)	Power Density (W/m <sup>2</sup> )	RF Exp. Limit (W/m <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(W)			
WIFI 2.4GHz	2412-2462	5.41	3.475	22.9	0.195	200	1.348	5.366
WIFI 5GHz	5180-5240	9.05	8.035	18.1	0.065	200	1.032	9.047
WIFI 5GHz	5745-5825	9.49	8.892	26	0.447	200	7.042	9.710

### Non Beam-forming:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Average Power		Distances (mm)	Power Density (W/m <sup>2</sup> )	RF Exp. Limit (W/m <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(W)			
WIFI 2.4GHz	2412-2462	2.4	1.738	26.1	0.407	200	1.408	5.366
WIFI 5GHz	5180-5240	4.8	3.020	18.2	0.066	200	0.396	9.047
WIFI 5GHz	5745-5825	5.8	3.802	29.6	0.912	200	6.898	9.710

The WIFI 2.4GHz and WIFI 5GHz cannot transmit simultaneously

**Result: The device meets the exemption requirement.**