

RF exposure

According to FCC part 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in § 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (Mb)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Average time				
(A) Limits for Occupational / Control Exposures								
300 – 1 500			f/300	6				
1 500 - 100000			5	6				
(B) Limits for General Population / Uncontrol Exposures								
300 – 1 500			<u>f/1500</u>	<u>6</u>				
1 500 – 100 000			1	30				

f= frequency in Mb

Friis transmission formula: $Pd = (Pout \times G)/(4 \times pi \times R^2)$

Where,

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd the limit of MPE, f/1500 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Results

Channel	Frequency (Mb)	Peak output power (dBm)	Antenna gain (dBi)	Power density at 20 cm(mW/cm²)	Limit (mW/cm²)
Low	450.0250	33.00	-3.00	0.19894	0.30
Middle	457.5750	33.00	-3.00	0.19894	0.31
High	469.9875	33.00	-3.00	0.19894	0.31

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According to RSS-Gen 3.2: the requirements in Radio Standards Specification RSS-102, Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands), shall be met.

INDUSTRY CANADA EXEMPTION

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;

Results -

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	Channel	Frequency (MHz)	Conducted Average Power (dBm)	Ant Gain (dBi)	EIRP		- · ·
					(dBm)	(W)	Limit
	Low	450.0250	32.14	-3.00	29.14	0.820	0.852
	Middle	457.5750	32.31	-3.00	29.31	0.853	0.862
	High	469.9875	32.25	-3.00	29.25	0.841	0.878

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