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 (MHz)	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	--	--	f/1500	6
1 500 – 100 000	--	--	1	30

f= frequency in MHz

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 (MHz)	Peak output power (dBm)	Antenna gain (dBi)	Power density at 20 cm(mW/cm²)	Limit (mW/cm²)
Low	450.3250	31.00	-2.61	0.13739	0.30
Middle	457.5750	31.00	-2.61	0.13739	0.31
High	469.9875	31.00	-2.61	0.13739	0.31

RF exposure

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 ㎝, except when the device operates as follows:

At or above 300 ㎒ and below 6 ㎓ 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 ㎒;

Results -

Channel	Frequency (㎒)	Conducted Average Power (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit
Low	450.3250	29.44	-2.61	26.83	0.482	0.852
Middle	457.5750	29.52	-2.61	26.91	0.491	0.862
High	469.9875	29.21	-2.61	26.60	0.457	0.878