RF Exposure Compliance Requirement

1. Standard requirement

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	F/300	6
1500-100000	--	--	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	F/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

2. MPE Calculation Method

E (V/m)=$(30*P*G)^{0.5}/d$ Power Density: Pd(W/m^2)=$E^2/377$

E=Electric Field (V/m)

P=Peak RF output Power (W)

G=EUT Antenna numeric gain (numeric)

d= Separation distance between radiator and human body (m)

The formula can be changed to

Pd= $(30*P*G)/(377*d^2)$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

3. Calculated Result and Limit

For RF1 Module emission only:

Frequency (MHz)	Antenna Gain	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
2406	3dBi	1.995	15.88	38.726	0.01537	1
2441	3dBi	1.995	14.74	29.785	0.01182	1
2469	3dBi	1.995	13.41	21.928	0.00870	1

For RF2 Module emission only:

Frequency (MHz)	Antenna Gain	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
2406	3dBi	1.995	15.76	37.670	0.01495	1
2441	3dBi	1.995	14.87	30.690	0.01218	1
2469	3dBi	1.995	13.28	21.281	0.00845	1

The device RF1 module and RF2 module is synchronous transmitter and emission signal at same time.

Below worst case was evaluated.

The max peak output conducted power from the device should be RF1 conducted+RF2 conducted.

38.726+37.670=76.396mW

i.e.= 18.83dBm

For RF2 and RF1 total conducted emission power :

Frequency (MHz)	Antenna Gain	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
2406	3dBi	1.995	18.83	76.384	0.03032	1

Power density is 0.03032 (mW/cm2) < Limit 1 (mW/cm2).

Conclusion:

The device meets the maximum permissible exposure requirement.