

RF Exposure Evaluation

LIMIT

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/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500	-	-	f/300	6
1500–100,000	-	-	5	6
(B) 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

Note: f = frequency in MHz

EVALUATION METHOD

Transmission formula: $Pd = (Pout * G) / (4 * \pi * r^2)$

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

TEST RESULT

☒ **Passed**

☐ **Not Applicable**

Frequency range (MHz)	Type	Conducted Average Power (dBm)	Maximum Tune-up (dBm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
2405-2480	2.4G	2.75	3.00	0.0006	1.000	Pass
824.20-848.80	GSM850	32.25	33.00	0.5055	0.5495	Pass
1850.20-1909.80	PCS1900	29.05	30.00	0.3835	1.0000	Pass
1850.7 – 1909.3	LTE Band 2	22.81	23.00	0.09522	1.0000	Pass
1710.7 – 1754.3	LTE Band 4	22.86	23.00	0.09744	1.0000	Pass
824.7– 848.3	LTE Band 5	22.67	23.00	0.06008	0.5498	Pass
699.7 – 715.3	LTE Band12	22.79	23.00	0.05114	0.4665	Pass
779.5 – 784.5	LTE Band 13	22.86	23.00	0.05871	0.5200	Pass
1850.7 - 1914.3	LTE Band 25	22.99	23.00	0.09522	1.0000	Pass
824.7 – 848.3	LTE Band26	22.83	23.00	0.06008	0.5498	Pass
1710.7 – 1779.3	LTE Band 66	22.74	23.00	0.09744	1.0000	Pass
814.7-823.3	LTE Band26	22.83	23.00	0.06008	0.5431	Pass

Consider the 2.4G and cellular can transmitting simultaneously, the total transmitting MPE rate as below formula:

$$\text{MPE rate} = \text{Power density of 2.4G/limit} + \text{Power density of cellular/limit} < 1$$

The worst case is 2.4G and cellular transmitting simultaneously, the result as below:

Evaluation mode	Power density/limit	Sum of the MPE rate	limit
2.4G	0.0006	0.5061	1
cellular	0.5055		

Note:

- 1) The maximum antenna gain is 3.8dBi
- 2) The exposure evaluation safety distance is 20cm.