

RF Exposure Evaluation Result

1. Requirement

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

Limits for General Population/Uncontrolled Exposure

(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 Time 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
1500-100,000			1.0	30

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

2. Calculation Method

$$E(\text{V/m}) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } S(\text{mW/cm}^2) = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (mW)

G = EUT Antenna numeric gain (numeric)=

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

The formula can be changed to

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

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

3. Estimation Result

Mode	Frequency (MHz)	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE ratios (mW/cm^2)
11b	2412	19.73	93.97	4.5	2.82	0.053
	2442	19.68	92.90	4.5	2.82	0.052
	2462	19.43	87.70	4.5	2.82	0.049
11g	2412	20.55	113.50	4.5	2.82	0.064
	2442	20.07	101.62	4.5	2.82	0.057
	2462	20.89	122.74	4.5	2.82	0.069
11n HT 20	2412	20.78	119.67	4.5	2.82	0.067
	2442	20.71	117.76	4.5	2.82	0.066
	2462	20.79	119.95	4.5	2.82	0.067
11n HT40	2422	19.63	91.83	4.5	2.82	0.051
	2442	19.59	90.99	4.5	2.82	0.051
	2452	19.58	90.78	4.5	2.82	0.051
11a	5745	21.88	154.17	5	3.16	0.097
	5785	22.42	174.58	5	3.16	0.110
	5825	22.35	171.79	5	3.16	0.108
11n HT20	5745	21.57	143.55	5	3.16	0.090
	5785	21.84	152.76	5	3.16	0.096
	5825	21.62	145.21	5	3.16	0.091
11n HT40	5755	23.48	222.84	5	3.16	0.140
	5795	23.13	205.59	5	3.16	0.129
11ac HT20	5745	21.64	145.88	5	3.16	0.091
	5785	21.88	154.17	5	3.16	0.097
	5825	21.62	145.21	5	3.16	0.091
11ac HT40	5755	23.49	223.36	5	3.16	0.140
	5795	23.12	205.17	5	3.16	0.129
11ac HT80	5775	21.36	136.77	5	3.16	0.086

11a	5180	13.42	21.98	5	3.16	0.014
	5200	13.31	21.43	5	3.16	0.013
	5240	13.49	22.34	5	3.16	0.014
11n HT20	5180	12.56	18.03	5	3.16	0.011
	5200	12.51	17.82	5	3.16	0.011
	5240	12.59	18.16	5	3.16	0.011
11n HT40	5190	12.40	17.38	5	3.16	0.011
	5230	12.66	18.45	5	3.16	0.011
11ac HT20	5180	12.52	17.86	5	3.16	0.011
	5200	12.66	18.45	5	3.16	0.012
	5240	12.56	18.03	5	3.16	0.011
11ac HT40	5190	12.51	17.82	5	3.16	0.011
	5230	12.54	17.95	5	3.16	0.011
11ac HT80	5220	12.78	18.97	5	3.16	0.012

Note: The estimation distance is 20cm

Conclusion: PASS

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