

FCC §15.247 (i), §2.1091 – RF Exposure

FCC ID: 2BBMFRG-IDC151

Applied procedures / limit

According to FCC §15.247(i) and §1.1307(b)(1), 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 of the Commission's guidelines.

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 Time 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
1500-100,000			5	6

Note: f is frequency in MHz

* = Power density limit is applicable at frequencies greater than 100 MHz

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

MPE PREDICTION

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna, R=20cm

Test Result of RF Exposure Evaluation

	Tune up Produce power	Maximu m peak output power (dBm)	Output power to antenna (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Limit (mW / cm2)	Result
EDR 8DPSK&HCH	1±1	2	1.5849	2.958 (4.71dBi)	0.0009	1	Pass
2.4G WIFI ANT1 802.11b&2412	14±1	15	31.6228	2.8642 (4.57dBi)	0.01803	1	Pass
2.4G WIFI ANT2 802.11b&2437	14±1	15	31.6228	2.8642 (4.57dBi)	0.01803	1	Pass
5.2GWIFI ANT1 802.11a & 5240	12±1	13	19.9526	2.7733 (4.43dBi)	0.011	1	Pass
5.2GWIFI ANT2 802.11ac20 & 5240	12±1	13	19.9526	2.7733 (4.43dBi)	0.011	1	Pass
5.8GWIFI ANT1 802.11a & 5785	11±1	12	15.8489	2.8642 (4.57dBi)	0.009	1	Pass
5.8GWIFI ANT2 802.11a & 5785	11±1	12	15.8489	2.8642 (4.57dBi)	0.009	1	Pass
LTE BAND 2	21±1	22	158.489 3	1.2589 (1dBi)	0.0397	1	Pass
LTE BAND 4	21±1	22	158.489 3	1.8408 (2.65dBi)	0.0581	1	Pass
LTE BAND 5	22±1	23	199.526 2	1.6255 (2.11dBi)	0.0646	0.6	Pass
LTE BAND 7	22±1	23	199.526 2	1.6406 (2.15dBi)	0.06516	1	Pass
LTE BAND 12	22±1	23	199.526 2	1.4689 (1.67dBi)	0.058	0.5	Pass

LTE BAND 13	22±1	23	199.526 2	1.4689 (1.67dBi)	0.058	0.5	Pass
LTE BAND 25	22±1	23	199.526 2	1.2589 (1dBi)	0.05	1	Pass
LTE BAND 26	22±1	23	199.526 2	1.6255 (2.11dBi)	0.0646	0.5	Pass
LTE BAND 66	22±1	23	199.526 2	2.0512 (3.12dBi)	0.0815	1	Pass
LTE BAND 71	23±1	24	251.188 6	1.4689 (1.67dBi)	0.073	0.4	Pass

Tech nology	Tune up Produce power(dBm)		Maximum Tune-up (dBm)		Antenna Gain(ANT 1/ANT 2) (numeric)	Power Density (S) (mW/ cm2)		MPE Limit (mW/ cm2)	ΣMPE Ratio	Σ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
2.4G WIFI MIMO	14 ±1	14 ±1	15	15	2.8642 (4.57dBi)	0.0180 3	0.0180 3	1	0.0360 6	1	Pass

Tech nology	Tune up Produce power(dBm)		Maximum Tune-up (dBm)		Antenna Gain(ANT 1/ANT 2) (numeric)	Power Density (S) (mW/ cm2)		MPE Limit (mW/ cm2)	ΣMPE Ratio	Σ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
5.2G WIFI MIMO	12 ±1	12 ±1	13	13	2.7733 (4.43dBi)	0.011	0.011	1	0.022	1	Pass

$S=0.03606/1+0.0009/1+0.0815/1=0.11846 \leq 1$, So passed