

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

FCC ID: 2A3PX-RCL1

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	Maximum peak output power (dBm)	Output power to antenna (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Limit (mW / cm2)	Result
BLE GFSK& LCH	3±1	4	2.5119	1.4093 (1.49dBi)	0.0007	1	Pass
EDR 8DPSK&LCH	2±1	3	1.9953	1.4093 (1.49dBi)	0.0006	1	Pass
ANT1 2.4G WIFI 802.11n(HT20)&2462	14±1	15	31.6228	1.4093 (1.49dBi)	0.0089	1	Pass
ANT2 2.4G WIFI 802.11b&2412	15±1	16	39.8107	1.4093 (1.49dBi)	0.0112	1	Pass
ANT1 5.2GWIFI 802.11a&5200	11±1	12	15.8489	1.762 (2.46dBi)	0.0056	1	Pass
ANT2 5.2GWIFI 802.11a&5240	11±1	12	15.8489	1.762 (2.46dBi)	0.0056	1	Pass
ANT1 5.8GWIFI 802.11n(HT20)& 5745	11±1	12	15.8489	1.1246 (1.51dBi)	0.0035	1	Pass
ANT2 5.8GWIFI 802.11n(HT40)& 5755	12±1	13	19.9526	1.1246 (1.51dBi)	0.0045	1	Pass

Tech nolo gy	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)	Σ MPE Ratio	Σ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
2.4G WIFI MIMO	14 ±1	15 ±1	15	16	1.4093 (1.49dBi)	0.0089	0.0112	1	0.0201	1	Pass

Technology	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)	Σ MPE Ratio	Σ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
5G WIFI MIMO	11±1	11±1	12	12	1.762 (2.46dBi)	0.0056	0.0056	1	0.0112	1	Pass

BT+2.4GWIFI MIMO+5GWIFI MIMO: Σ MPE Ratio =0.0007+0.0112+0.0056=0.0175 $\leq$ 1, so passed.