

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

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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	4±1	5	3.1623	1.2618 (1.01dBi)	0.0008	1	Pass
EDR	GFSK & MCH	8±1	9	7.9433	1.2618 (1.01dBi)	0.002	1	Pass
2.4G WIFI ANT1	802.11g & 2462	15±1	16	39.8107	1.2618 (1.01dBi)	0.01	1	Pass
2.4G WIFI ANT2	802.11g &2437	14±1	15	31.6228	1.2618 (1.01dBi)	0.008	1	Pass
5.2GWIFI ANT1	802.11a c80& 5210	14±1	15	31.6228	1.2474 (0.96dBi)	0.008	1	Pass
5.2GWIFI ANT2	802.11a c40& 5230	14±1	15	31.6228	1.2474 (0.96dBi)	0.008	1	Pass
5.8GWIFI ANT1	802.11a & 5825	13±1	14	25.1189	1.2735 (1.05dBi)	0.0064	1	Pass
5.8GWIFI ANT2	802.11n(HT20)& 5825	14±1	15	31.6228	1.2735 (1.05dBi)	0.008	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)	Σ MPE Ratio	Σ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
2.4G WIFI MIMO	15 ±1	14 ±1	16	15	1.2618 (1.01dBi)	0.01	0.008	1	0.018	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	14 $\pm$ 1	14 $\pm$ 1	15	15	1.2474 (0.96dBi)	0.008	0.008	1	0.016	1	Pass