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

FCC ID: 2BGY7-HZ

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

	Modes& Channel Freq. (MHz)	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&M CH	7±1	8	6.3096	1.5346 (1.86dBi)	0.0019	1	Pass
EDR	8DPSK&M CH	10±1	11	12.5893	1.5346 (1.86dBi)	0.0038	1	Pass
2.4G WIFI ANT1	802.11n(HT20)&2412	14±1	15	31.6228	1.7022 (2.31dBi)	0.0107	1	Pass
2.4G WIFI ANT2	802.11n(HT20)&2412	14±1	15	31.6228	1.7022 (2.31dBi)	0.0107	1	Pass
5.2GWIFI ANT1	802.11ac20&5180	13±1	14	25.1189	1.4521 (1.62dBi)	0.007	1	Pass
5.2GWIFI ANT2	802.11a&5180	13±1	14	25.1189	1.4521 (1.62dBi)	0.007	1	Pass
5.3GWIFI ANT1	802.11ac20&5260	13±1	14	25.1189	2.2439 (3.51dBi)	0.0112	1	Pass
5.3GWIFI ANT2	802.11n(HT20)&5260	13±1	14	25.1189	2.2439 (3.51dBi)	0.0112	1	Pass
5.6GWIFI ANT1	802.11ac20&5500	14±1	15	31.6228	3.6058 (5.57dBi)	0.0227	1	Pass
5.6GWIFI ANT2	802.11n(HT40)&5510	14±1	15	31.6228	3.6058 (5.57dBi)	0.0227	1	Pass
5.8GWIFI ANT1	802.11ac20&5825	14±1	15	31.6228	2.2803 (3.58dBi)	0.0144	1	Pass
5.8GWIFI ANT2	802.11n(HT20)&5825	14±1	15	31.6228	2.2803 (3.58dBi)	0.0144	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)	∑ MPE Ratio	∑ 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	1.7022 (2.31dBi)	0.0107	0.0107	1	0.0214	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)	∑ MPE Ratio	∑ MPE Ratio Limit	Result
	ANT 1	ANT 2	ANT 1	ANT 2		ANT 1	ANT 2				
5G WIFI MIMO	14 ±1	14 ±1	15	15	3.6058 (5.57dBi)	0.0227	0.0227	1	0.0454	1	Pass

BT+WIFI supported simultaneous transmission:

BT+2.4GWIFI MIMO: ∑MPE Ratio =0.0038+0.0214=0.0252≤1,

BT+5GWIFI MIMO: ∑MPE Ratio =0.0038+0.0454=0.0492≤1,

BT+2.4GWIFI MIMO +5GWIF MIMO: ∑MPE Ratio =0.0038+0.0214+0.0454=0.0706≤1,

So passed.