

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

**FCC ID: 2BEW9-OPSLFA**

### 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> 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/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
BLE 1M	GFSK & LCH	3±1	4	2.5119	2.6242 (4.19dBi)	0.0013	1	Pass
BLE 2M	GFSK & LCH	3±1	4	2.5119	2.6242 (4.19dBi)	0.0013	1	Pass
EDR	8DPSK & HCH	5±1	6	3.9811	2.6242 (4.19dBi)	0.002	1	Pass
2.4G WIFI ANT1	802.11n(H T20)&2412	14±1	15	31.6228	2.6242 (4.19dBi)	0.0165	1	Pass
2.4G WIFI ANT2	802.11n(H T20)&2462	13±1	14	25.1189	2.6242 (4.19dBi)	0.0131	1	Pass
5.2GWIFI ANT1	802.11a&5200	14±1	15	31.6228	2.5351 (4.04dBi)	0.016	1	Pass
5.2GWIFI ANT2	802.11a&5200	14±1	15	31.6228	2.5351 (4.04dBi)	0.016	1	Pass
5.3GWIFI ANT1	802.11a&5260	14±1	15	31.6228	2.6363 (4.21dBi)	0.0166	1	Pass
5.3GWIFI ANT2	802.11a&5320	14±1	15	31.6228	2.6363 (4.21dBi)	0.0166	1	Pass

Technology	Tune up Produce power(dBm)		Maximum Tune-up (dBm)		Antenna Gain(ANT 1/ANT 2) (numeric)	Power Density (S) (mW/cm <sup>2</sup> )		MPE Limit (mW/cm <sup>2</sup> )	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	13±1	15	14	2.6242 (4.19dBi)	0.0165	0.0131	1	0.0296	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)	$\Sigma$ MPE Ratio	$\Sigma$ 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	2.6363 (4.21dBi)	0.0166	0.0166	1	0.0332	1	Pass

BT+WIFI supported simultaneous transmission:

EDR+2.4GWIFI MIMO:  $\Sigma$  MPE Ratio =0.002+0.0296=0.0316,

EDR+5GWIFI MIMO:  $\Sigma$  MPE Ratio =0.002+0.0332=0.0352,

EDR+2.4GWIFI MIMO+5GWIFI MIMO:  $\Sigma$  MPE Ratio =0.002+0.0296+0.0332=0.0648 $\leq$ 1, so passed.