

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

FCC ID: 2A9L7TV40-FS3B

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/cm ²)	Limit (mW/cm ²)	Result
BLE	GFSK & LCH	1±1	2	1.5849	1.6181 (2.09dBi)	0.0005	1	Pass
EDR	8DPSK & HCH	4±1	5	3.1623	1.6181 (2.09dBi)	0.001	1	Pass
2.4GWIFI ANT1	802.11b & 2462	14±1	15	31.6228	2.9309 (4.67dBi)	0.01845	1	Pass
2.4GWIFI ANT2	802.11b & 2412	14±1	15	31.6228	2.9309 (4.67dBi)	0.01845	1	Pass
5.2GWIFI ANT1	802.11ac20 & 5180	14±1	15	31.6228	1.9409 (2.88dBi)	0.01222	1	Pass
5.2GWIFI ANT2	802.11a & 5240	14±1	15	31.6228	1.9409 (2.88dBi)	0.01222	1	Pass
5.3GWIFI ANT1	802.11ac20 & 5280	14±1	15	31.6228	2.0559 (3.13dBi)	0.01294	1	Pass
5.3GWIFI ANT2	802.11n(H T20) & 5280	14±1	15	31.6228	2.0559 (3.13dBi)	0.01294	1	Pass
5.6GWIFI ANT1	802.11ac20 & 5580	14±1	15	31.6228	2.1677 (3.36dBi)	0.01364	1	Pass
5.6GWIFI ANT2	802.11n(H T20) & 5500	14±1	15	31.6228	2.1677 (3.36dBi)	0.01364	1	Pass
5.8GWIFI ANT1	802.11a & 5700	14±1	15	31.6228	2.0606 (3.14dBi)	0.01297	1	Pass
5.8GWIFI ANT2	802.11ac20 & 5700	14±1	15	31.6228	2.0606 (3.14dBi)	0.01297	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				
2.4G WIFI MIMO	14 \pm 1	14 \pm 1	15	15	2.9309 (4.67dBi)	0.01845	0.01845	1	0.0369	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	2.1677 (3.36dBi)	0.01364	0.01364	1	0.02728	1	Pass

BT+WIFI supported simultaneous transmission:

EDR+2.4GWIFI MIMO : Σ MPE Ratio =0.001+0.0369=0.0379 \leq 1, So passed.

EDR+5GWIFI MIMO: Σ MPE Ratio =0.001+0.02728=0.02828 \leq 1, So passed.