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

FCC ID: 2AYZ8WP05001132

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&LCH	0±1	1	1.2589	1.3397 (1.27dBi)	0.0003	1	Pass
2.4G WIFI ANT1	802.11b&2412	14±1	15	31.6228	1.9634 (2.93dBi)	0.0124	1	Pass
2.4G WIFI ANT2	802.11b&2437	14±1	15	31.6228	2.2909 (3.6dBi)	0.0144	1	Pass
5.2G WIFI ANT1	802.11a&5240	12±1	13	19.9526	1.9815 (2.97dBi)	0.0079	1	Pass
5.2G WIFI ANT2	802.11a&5240	12±1	13	19.9526	1.8664 (2.71dBi)	0.0074	1	Pass
5.3G WIFI ANT1	802.11a&5320	12±1	13	19.9526	2.138 (3.3dBi)	0.0085	1	Pass
5.3G WIFI ANT2	802.11a&5280	12±1	13	19.9526	2.0277 (3.07dBi)	0.0081	1	Pass
5.6G WIFI ANT1	802.11ac20&5700	13±1	14	25.1189	2.2233 (3.47dBi)	0.0111	1	Pass
5.6G WIFI ANT2	802.11a&5580	13±1	14	25.1189	2.0654 (3.15dBi)	0.0103	1	Pass
5.8G WIFI ANT1	802.11a&5745	11±1	12	15.8489	1.7022 (2.31dBi)	0.0054	1	Pass
5.8G WIFI ANT2	802.11a&5745	11±1	12	15.8489	2.0797 (3.18dBi)	0.0066	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	ANT1:1.9634 (2.93dBi) ANT2:2.2909 (3.6dBi)	0.0124	0.0144	1	0.0268	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	13 ±1	13 ±1	14	14	ANT1:2.2233 (3.47dBi) ANT2:2.0654 (3.15dBi)	0.0111	0.0103	1	0.0214	1	Pass

BT+WIFI supported simultaneous transmission:
BLE + 2.4GWIFI MIMO+5GWIFI MIMO: ∑MPE Ratio
=0.0003/1+0.0144/1+0.0111/1=0.0258≤1, So passed.