BCTC

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

FCC ID:2AFIV-RTG2

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=0.2m

TEST RESULTS

	max possible output power	Maximum peak output power (dBm)	Output power to antenna (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Limit (mW / cm2)	Result
8DPSK (BDR+EDR)	6±1	7	5.01	1.614(2.08dBi)	0.00161	1	Pass
GFSK 1Mbps (BLE)	5±1	6	3.98	1.614(2.08dBi)	0.00128	1	Pass
802.11b (2.4G Hz WIFI) ANT A	14±1	15	31.62	1.737(2.39dBi)	0.01093	1	Pass
802.11b (2.4G Hz WIFI) ANT B	15±1	16	39.81	1.545(1.97dBi)	0.01224	1	Pass
802.11n20 (2.4G Hz WIFI) MIMO	15±1	16	39.81	3.467(5.40dBi)	0.02746	1	Pass
802.11a20 (U-NII-1) ANT A	14±1	15	31.62	1.737(2.39dBi)	0.01093	1	Pass
802.11a20 (U-NII-1) ANT B	11±1	12	15.85	1.545(1.97dBi)	0.00487	1	Pass
802.11n20 (U-NII-1) MIMO	16±1	17	50.12	1.737(5.40dBi)	0.01732	1	Pass

802.11a20 (U-NII-3) ANT A	15±1	16	39.81	1.737(2.39dBi)	0.01376	1	Pass
802.11a20 (U-NII-3) ANT B	15±1	16	39.81	1.545(1.97dBi)	0.01224	1	Pass
802.11n20 (U-NII-3) MIMO	18±1	19	79.43	1.737(5.40dBi)	0.02745	1	Pass

For the Max simultaneous transmission:

Conclusion of simultaneous transmitter：

Both of the WIFI2.4G MIMO, WIFI5G MIMO, Cannot transmit simultaneously,

	Power Density (S) (mW/ cm2)	Total Power Density (S)	Limit	Result
BDR+EDR	0.00161	0.02761	1	Pass
802.11b (2.4G Hz WIFI) ANT B	0.01224			
802.11a20 (U-NII-3) ANT A	0.01376			
BDR+EDR	0.00161	0.02907	1	Pass
802.11n20 (2.4G Hz WIFI) MIMO	0.02746			

For the max result : 0.02907≤ 1.0, compliance with FCC's RF Exposure.