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

FCC ID: 2AAA9-RA340

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

TEST RESULTS

2.4G WIFI

Test Channe	Frequency	Total Power (PK) (dBm)		Total Power (PK)	LIMIT
	(MHz)	ANT A	ANT B	dBm	dBm
TX 802.11b Mode					
CH01	2412	13.23	13.03	16.14	29.25
CH06	2437	12.63	12.35	15.50	29.25
CH11	2462	12.78	12.43	15.62	29.25
TX 802.11g Mode					
CH01	2412	13.55	13.38	16.48	29.25
CH06	2437	13.33	13.27	16.31	29.25
CH11	2462	14.74	14.39	17.58	29.25
TX 802.11n/20M Mode					
CH01	2412	12.64	13.43	16.06	29.25
CH06	2437	13.31	13.13	16.23	29.25
CH11	2462	14.11	14.43	17.28	29.25
TX 802.11n/40M Mode					
CH03	2422	13.76	14.10	16.94	29.25
CH06	2437	14.34	14.25	17.31	29.25
CH09	2452	14.74	14.43	17.60	29.25

5G WIFI

Frequency	Power ANT A (dBm)	Power ANT B (dBm)	Total power (dBm)	Limit (dBm)	Result
TX 802.11a Mode					
CH 149	11.44	11.29	14.38	27.29	PASS
CH 157	11.91	11.76	14.85	27.29	PASS
CH 165	11.20	11.55	14.39	27.29	PASS
TX 802.11n20 Mode					
CH 149	11.13	11.09	14.12	27.29	PASS
CH 157	11.47	11.24	14.37	27.29	PASS
CH 165	10.61	10.36	13.50	27.29	PASS
TX 802.11n40 Mode					
CH151	10.88	10.66	13.78	27.29	PASS
CH159	10.64	10.45	13.56	27.29	PASS

Frequency	Power ANT A (dBm)	Power ANT B (dBm)	Total power (dBm)	Limit (dBm)	Result
TX 802.11 ac(VHT20) Mode					
CH 149	10.97	10.11	13.57	27.29	PASS
CH 157	10.65	10.61	13.64	27.29	PASS
CH 165	10.87	10.63	13.76	27.29	PASS
TX 802.11 ac(VHT40) Mode					
CH 151	10.64	10.35	13.51	27.29	PASS
CH 159	10.21	10.21	13.22	27.29	PASS
TX 802.11 ac(VHT80) Mode					
CH155	10.64	10.46	13.56	27.29	PASS

2.4G

Mode	Range	Maximum output power (dBm)	Output power (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Limit of Power Density (S) (mW/ cm2)	Result
802.11b	15~17	17	50.119	3.74(2.366)	0.02359	1	Pass
802.11g	16~18	18	63.096	3.74(2.366)	0.02970	1	Pass
802.11nHT20	16~18	18	63.096	3.74(2.366)	0.02970	1	Pass
802.11nHT40	16~18	18	50.119	3.74(2.366)	0.02359	1	Pass

5G

Mode	Range	Maximum output power (dBm)	Output power (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Limit of Power Density (S) (mW/ cm2)	Result
802.11a	14~16	16	39.811	5.7(3.715)	0.02943	1	Pass
802.11 nHT20	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass
802.11nHT40	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass
802.11nHT40	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass
802.11 acHT20	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass
802.11acHT40	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass
802.11acHT80	13~15	15	31.623	5.7(3.715)	0.02337	1	Pass

2.4G and 5GWiFi simultaneously transmission, maximum Power Density (S) is 0.05913 (mW/ cm2) does not exceed Limit of Power Density (S) 1 (mW/ cm2).

Conclusion: No RF exposure evaluation is required.