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

FCC ID: ZLJTOP-AR1021

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

5150-5250MHz					
Operating mode	Test Channel MHz	Output Power			Limit (dBm)
		Chain A(dBm)	Chain B(dBm)	Total(dBm)	
802.11a	5180	15.42	15.38	/	23.98
	5200	15.09	15.08	/	23.98
	5240	16.02	15.91	/	23.98
802.11n-HT20	5180	15.65	15.54	18.61	23.97
	5200	15.39	15.31	18.36	23.97
	5240	14.69	14.64	17.68	23.97
802.11n-HT40	5190	14.70	14.51	17.62	23.97
	5230	14.09	14.34	17.23	23.97

5725-5850MHz					
Operating mode	Test Channel MHz	Output Power			Limit (dBm)
		Chain A(dBm)	Chain B(dBm)	Total(dBm)	
802.11a	5745	16.41	16.39	/	30
	5785	15.25	15.94	/	30
	5825	15.86	15.77	/	30
802.11n-HT20	5745	16.37	16.37	19.38	29.99
	5785	16.06	16.05	19.07	29.99
	5825	15.64	16.04	18.85	29.99
802.11n-HT40	5755	15.73	15.39	18.57	29.99
	5795	15.09	14.97	18.04	29.99

Antenna A Gain =3dBi, Antenna B Gain =3dBi
MIMO mode: Directional gain=[10log(GA+ G B)] dbi =6.01dBi

RF Exposure Evaluation

	Tune up Produce power	Maximum peak output power (dBm)	Output power to antenna (mW)	Antenna Gain (numeric)	Power Density (S) (mW/ cm2)	Power Density (S) (mW/ cm2)	Limit (mW/ cm2)	Result
5180 Ant A	15±1	16	39.81	3.99 (6.01dBi)	0.03160	0.06320	1	Pass
5180 Ant B	15±1	16	39.81	3.99 (6.01dBi)	0.03160			
5745 Ant A	16±1	17	50.12	3.99 (6.01dBi)	0.03979	0.07958	1	Pass
5745 Ant B	16±1	17	50.12	3.99 (6.01dBi)	0.03979			