

MPE

FCC ID: 2AGHCHBMT04

Applicant: Guangdong Hisense Broadband Technology Co.,Ltd

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Refer Standard: FCC Part 2.1091: Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

FCC MPE Limited:

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Antenna Gain information

Antenna Gain1: 3.12dBi=2.05

Antenna Gain2: 3.12dBi=2.05

Antenna Gain1+2: 3.12dBi=2.05_{note1}

Note 1: According to KDB 662911, all transmit signals are completely uncorrelated with each other. Directional gain = G_{ANT}

Antenna Gain3: 3.14dBi=2.06

Antenna Gain4: 4.58dBi=2.87

Antenna Gain5: 5.0dBi=3.16

Antenna Gain3+4+5: 4.31dBi=2.70_{note2}

Note 2: Note: According to KDB 662911, all transmit signals are completely uncorrelated with each other. Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10})/N_{ANT}]$ dBi

Conducted Output Power Results for 2.4G WIFI

Antenna	Mode	Frequency (MHz)	Max.RF Power(dBm)
1	802.11b	2412	25.04
	802.11b	2437	24.73
	802.11b	2462	24.17
2	802.11g	2412	23.28
	802.11g	2437	22.78
	802.11g	2462	22.62
1+2	802.11n20	2412	26.03
	802.11n20	2437	25.69
	802.11n20	2462	25.43

Manufacturing tolerance

Antenna	Mode/Channel	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance $\pm$ (dB)
1	802.11b/1	2412	25.04	25	1
	802.11b/6	2437	24.73	25	1
	802.11b/11	2462	24.17	25	1
2	802.11g/1	2412	23.28	23	1
	802.11g/6	2437	22.78	23	1
	802.11g/11	2462	22.62	23	1
1+2	802.11n20/1	2412	26.03	26	1
	802.11n20/6	2437	25.69	26	1
	802.11n20/11	2462	25.43	26	1

Conducted Output Power Results for 5.8G WIFI band U-NII-1 (5150 ~ 5250 MHz)

Antenna	Mode	Frequency (MHz)	Max.RF Power(dBm)
3	802.11ac-VHT20	5180	18.38
	802.11ac-VHT20	5220	18.70
	802.11ac-VHT20	5240	18.68
	802.11ac-VHT40	5190	18.78
	802.11ac-VHT40	5230	18.86
	802.11ac-VHT80	5210	18.84
4	802.11n-HT20	5180	18.81
	802.11ac-VHT20	5220	18.86
	802.11n-HT20	5240	18.90
	802.11ac-VHT40	5190	18.91
	802.11ac-VHT40	5230	18.97

Antenna	Mode	Frequency (MHz)	Max.RF Power(dBm)
	802.11ac-VHT80	5210	18.93
5	802.11n-HT20	5180	18.32
	802.11ac-VHT20	5220	18.72
	802.11ac-VHT20	5240	18.36
	802.11ac-VHT40	5190	18.33
	802.11ac-VHT40	5230	18.48
	802.11ac-VHT80	5210	18.50
3+4+5	802.11n-HT20	5180	23.23
	802.11ac-VHT20	5220	23.53
	802.11ac-VHT20	5240	23.40
	802.11ac-VHT40	5190	23.45
	802.11ac-VHT40	5230	23.54
	802.11ac-VHT80	5210	23.53

Manufacturing tolerance

Antenna	Mode	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance $\pm$ (dB)
3	802.11ac-VHT20	5180	18.38	18	1
	802.11ac-VHT20	5220	18.70	18	1
	802.11ac-VHT20	5240	18.68	18	1
	802.11ac-VHT40	5190	18.78	18	1
	802.11ac-VHT40	5230	18.86	18	1
	802.11ac-VHT80	5210	18.84	18	1
4	802.11n-HT20	5180	18.81	18	1
	802.11ac-VHT20	5220	18.86	18	1
	802.11n-HT20	5240	18.90	18	1
	802.11ac-VHT40	5190	18.91	18	1
	802.11ac-VHT40	5230	18.97	18	1
	802.11ac-VHT80	5210	18.93	18	1
5	802.11n-HT20	5180	18.32	18	1
	802.11ac-VHT20	5220	18.72	18	1
	802.11ac-VHT20	5240	18.36	18	1
	802.11ac-VHT40	5190	18.33	18	1
	802.11ac-VHT40	5230	18.48	18	1
	802.11ac-VHT80	5210	18.50	18	1
3+4+5	802.11n-HT20	5180	23.23	23	1
	802.11ac-VHT20	5220	23.53	23	1
	802.11ac-VHT20	5240	23.40	23	1
	802.11ac-VHT40	5190	23.45	23	1
	802.11ac-VHT40	5230	23.54	23	1
	802.11ac-VHT80	5210	23.53	23	1

Conducted Output Power Results for 5.8G WIFI band U-NII-3 (5725 ~ 5850 MHz)

Antenna	Mode	Frequency (MHz)	Max.RF Power(dBm)
3	802.11a	5745	18.63
	802.11ac-VHT20	5785	18.77
	802.11ac-VHT20	5825	18.64
	802.11ac-VHT40	5755	18.60
	802.11ac-VHT40	5795	18.69
	802.11ac-VHT80	5775	18.80
4	802.11ac-VHT20	5745	18.42
	802.11ac-VHT20	5785	18.46
	802.11ac-VHT20	5825	18.62
	802.11ac-VHT40	5755	18.28
	802.11ac-VHT40	5795	18.60
	802.11ac-VHT80	5775	18.71
5	802.11ac-VHT20	5745	18.35
	802.11n-HT20	5785	18.30
	802.11ac-VHT20	5825	18.19
	802.11ac-VHT40	5755	18.06
	802.11n-HT40	5795	18.11
	802.11ac-VHT80	5775	18.43
3+4+5	802.11ac-VHT20	5745	23.22
	802.11ac-VHT20	5785	23.20
	802.11ac-VHT20	5825	23.26
	802.11ac-VHT40	5755	23.09
	802.11ac-VHT40	5795	23.23
	802.11ac-VHT80	5775	23.42

Manufacturing tolerance

Antenna	Mode	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance $\pm$ (dB)
3	802.11a	5745	18.63	18	1
	802.11ac-VHT20	5785	18.77	18	1
	802.11ac-VHT20	5825	18.64	18	1
	802.11ac-VHT40	5755	18.60	18	1
	802.11ac-VHT40	5795	18.69	18	1
	802.11ac-VHT80	5775	18.80	18	1
4	802.11ac-VHT20	5745	18.42	18	1
	802.11ac-VHT20	5785	18.46	18	1
	802.11ac-VHT20	5825	18.62	18	1

Antenna	Mode	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance ±(dB)
	802.11ac-VHT40	5755	18.28	18	1
	802.11ac-VHT40	5795	18.60	18	1
	802.11ac-VHT80	5775	18.71	18	1
5	802.11ac-VHT20	5745	18.35	18	1
	802.11n-HT20	5785	18.30	18	1
	802.11ac-VHT20	5825	18.19	18	1
	802.11ac-VHT40	5755	18.06	18	1
	802.11n-HT40	5795	18.11	18	1
	802.11ac-VHT80	5775	18.43	18	1
3+4+5	802.11ac-VHT20	5745	23.22	23	1
	802.11ac-VHT20	5785	23.20	23	1
	802.11ac-VHT20	5825	23.26	23	1
	802.11ac-VHT40	5755	23.09	23	1
	802.11ac-VHT40	5795	23.23	23	1
	802.11ac-VHT80	5775	23.42	23	1

Calculation results (for 2.4G WIFI): pass

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
1	802.11b	2412	26	20	0.16	1.0
	802.11b	2437	26	20	0.16	
	802.11b	2462	26	20	0.16	
2	802.11g	2412	24	20	0.10	
	802.11g	2437	24	20	0.10	
	802.11g	2462	24	20	0.10	
1+2	802.11n20	2412	27	20	0.20	
	802.11n20	2437	27	20	0.20	
	802.11n20	2462	27	20	0.20	

Calculation results (for 5.8G WIFI band U-NII-1): pass

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
3	802.11ac-VHT20	5180	19	20	0.03	1.0
	802.11ac-VHT20	5220	19	20	0.03	
	802.11ac-VHT20	5240	19	20	0.03	
	802.11ac-VHT40	5190	19	20	0.03	
	802.11ac-VHT40	5230	19	20	0.03	
	802.11ac-VHT80	5210	19	20	0.03	

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
4	802.11n-HT20	5180	19	20	0.05	
	802.11ac-VHT20	5220	19	20	0.05	
	802.11n-HT20	5240	19	20	0.05	
	802.11ac-VHT40	5190	19	20	0.05	
	802.11ac-VHT40	5230	19	20	0.05	
	802.11ac-VHT80	5210	19	20	0.05	
5	802.11n-HT20	5180	19	20	0.05	
	802.11ac-VHT20	5220	19	20	0.05	
	802.11ac-VHT20	5240	19	20	0.05	
	802.11ac-VHT40	5190	19	20	0.05	
	802.11ac-VHT40	5230	19	20	0.05	
	802.11ac-VHT80	5210	19	20	0.05	
3+4+5	802.11n-HT20	5180	24	20	0.13	
	802.11ac-VHT20	5220	24	20	0.13	
	802.11ac-VHT20	5240	24	20	0.13	
	802.11ac-VHT40	5190	24	20	0.13	
	802.11ac-VHT40	5230	24	20	0.13	
	802.11ac-VHT80	5210	24	20	0.13	

Calculation results (for 5.8G WIFI band U-NII-3)

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
3	802.11a	5745	19	20	0.03	1.0
	802.11ac-VHT20	5785	19	20	0.03	
	802.11ac-VHT20	5825	19	20	0.03	
	802.11ac-VHT40	5755	19	20	0.03	
	802.11ac-VHT40	5795	19	20	0.03	
	802.11ac-VHT80	5775	19	20	0.03	
4	802.11ac-VHT20	5745	19	20	0.05	
	802.11ac-VHT20	5785	19	20	0.05	
	802.11ac-VHT20	5825	19	20	0.05	
	802.11ac-VHT40	5755	19	20	0.05	
	802.11ac-VHT40	5795	19	20	0.05	
	802.11ac-VHT80	5775	19	20	0.05	
5	802.11ac-VHT20	5745	19	20	0.05	
	802.11n-HT20	5785	19	20	0.05	
	802.11ac-VHT20	5825	19	20	0.05	

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
	802.11ac-VHT40	5755	19	20	0.05	
	802.11n-HT40	5795	19	20	0.05	
	802.11ac-VHT80	5775	19	20	0.05	
3+4+5	802.11ac-VHT20	5745	24	20	0.13	
	802.11ac-VHT20	5785	24	20	0.13	
	802.11ac-VHT20	5825	24	20	0.13	
	802.11ac-VHT40	5755	24	20	0.13	
	802.11ac-VHT40	5795	24	20	0.13	
	802.11ac-VHT80	5775	24	20	0.13	