

RF Exposure Report

FCC ID: 2ATTHMGV2002

Applicant: Migu Video Co.,Ltd.

Exposure category: General population/uncontrolled environment

EUT Type: Stand alone

Device Type: MIGU BOX

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

2.4GHz/5GHz)Antenna Gain0: 2.0dBi

2.4GHz/5GHz)Antenna Gain1: 2.0dBi

2.4GHz/5GHz)Antenna Gain0+1: 5.01dBi

BT Antenna Gain: 2dBi

Note 1: For WIFI , according to KDB 662911, all transmit signals are completely correlated with each other. 2. Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi

Conducted Output Power (dBm)

802.11b mode

Channel	Frequency (MHz)	Output Power(dBm)		Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	
1	2412	16.25	17.77	17 ± 1
6	2437	16.77	17.88	17 ± 1
11	2462	17.05	17.89	17 ± 1

802.11g Test mode

Channel	Frequency (MHz)	Output Power(dBm)		Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	
1	2412	14.66	16.14	16 ± 1
6	2437	15.03	16.11	16 ± 1
11	2462	15.39	16.26	16 ± 1

802.11n-20MHz Test mode

Channel	Frequency (MHz)	Output Power(dBm)			Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	Ant. 0+1	
1	2412	10.89	12.06	14.52	14 ± 1
6	2437	11.20	12.18	14.73	14 ± 1
11	2462	11.49	12.18	14.86	14 ± 1

802.11n-40MHz Test mode

Channel	Frequency (MHz)	Output Power(dBm)			Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	Ant. 0+1	
3	2422	11.22	12.10	14.69	14 ± 1
6	2437	11.36	12.17	14.79	14 ± 1
9	2452	11.59	12.19	14.91	14 ± 1

Conducted Power Test results of band U-NII-1 (5150 ~ 5250 MHz)

802.11a mode				
Frequency (MHz)	Conducted Output Power (dBm)		Tune Up tolerance(dBm)	
	Antenna 0	Antenna 1		
5180	13.48	13.29	13 ± 1	
5220	14.24	13.06	13 ± 1	
5240	14.76	12.98	13 ± 1	
802.11n-HT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5180	11.10	9.37	13.33	13 ± 1
5220	11.06	9.65	13.42	13 ± 1
5240	10.51	9.55	13.07	13 ± 1
802.11n-HT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5190	11.67	10.25	14.03	14 ± 1
5230	11.18	10.05	13.66	14 ± 1
802.11ac-VHT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5180	11.24	9.62	13.52	13 ± 1
5220	11.36	9.60	13.58	13 ± 1
5240	10.97	10.16	13.59	13 ± 1
802.11ac-VHT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5190	10.57	9.16	12.93	12 ± 1
5230	10.55	8.90	12.81	12 ± 1
802.11ac-VHT80 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5210	10.12	8.92	12.57	12 ± 1

Conducted Power Test results of band U-NII-3 (5725 ~ 5850 MHz)

802.11a mode				
Frequency (MHz)	Conducted Output Power (dBm)		Tune Up tolerance(dBm)	
	Antenna 0	Antenna 1		
5745	12.30	14.82	14 ± 1	
5785	12.22	14.74	14 ± 1	
5825	12.90	14.42	14 ± 1	
802.11n-HT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5745	11.25	12.12	14.72	14 ± 1
5785	11.14	12.12	14.67	14 ± 1
5825	11.69	11.95	14.83	14 ± 1
802.11n-HT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5755	11.95	12.78	15.40	15 ± 1
5795	12.28	12.57	15.44	15 ± 1
802.11ac-VHT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5745	11.46	12.34	14.93	15 ± 1
5785	11.81	12.35	15.10	15 ± 1
5825	12.34	11.99	15.18	15 ± 1
802.11ac-VHT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5755	10.87	11.41	14.16	14 ± 1
5795	11.49	11.61	14.56	14 ± 1
802.11ac-VHT80 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5775	10.40	10.76	13.59	13 ± 1

Calculation results (for 2.4G WIFI): Worst-case mode

Antenna	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	2412	18	20	0.0397	1.0
	2437	18	20	0.0397	
	2462	18	20	0.0397	
	2422	17	20	0.0316	
	2452	17	20	0.0316	

Calculation results (for 5.2G WIFI band U-NII-1): Worst-Case mode

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	N20	5180	14	20	0.0158	1.0
		5220	14	20	0.0158	
		5240	14	20	0.0158	
	N40	5190	15	20	0.0199	
		5230	15	20	0.0199	
	AC20	5180	14	20	0.0158	
		5220	14	20	0.0158	
		5240	14	20	0.0158	
	AC40	5190	13	20	0.0126	
		5230	13	20	0.0126	
	AC80	5210	13	20	0.0126	

Calculation results (for 5.8G WIFI band U-NII-3): Worst-Case mode

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	N20	5745	15	20	0.0199	1.0
		5785	15	20	0.0199	
		5825	15	20	0.0199	
	N40	5755	16	20	0.0251	
		5795	16	20	0.0251	
	AC20	5745	16	20	0.0251	
		5785	16	20	0.0251	
		5825	16	20	0.0251	
	AC40	5755	15	20	0.0199	
		5795	15	20	0.0199	
	AC80	5775	14	20	0.0158	

Max BT conducted power

Bluetooth GFSK			
Channel	Channel 0	Channel 39	Channel 78
Output Power (dBm)	6.71	6.97	7.05
Bluetooth $\pi/4$ -DQPSK			
Channel	Channel 0	Channel 39	Channel 78
Output Power (dBm)	8.68	8.98	8.98
Bluetooth 8- DPSK			
Channel	Channel 0	Channel 39	Channel 78
Output Power (dBm)	9.02	9.26	9.24

Manufacturing tolerance

Bluetooth GFSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	7	7	7
Tolerance $\pm$ (dB)	1	1	1
Bluetooth $\pi/4$ -DQPSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	8	8	8
Tolerance $\pm$ (dB)	1	1	1
Bluetooth 8- DPSK			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	9	9	9
Tolerance $\pm$ (dB)	1	1	1

Evaluation Results

Bluetooth					
Mode	Antenna Distance (cm)	RF output power (including tune-up tolerance)		Result (mW/cm ²)	Limit (mW/cm ²)
		dBm	mW		
GFSK	20	8	6.3	0.00199	1
$\pi/4$ -DQPSK	20	9	7.9	0.00251	1
8- DPSK	20	10	10	0.00315	1

Simultaneous transmission

No.	Transmitter Combinations	Scenario Supported or not
1	WIFI+BT	Yes

Evaluation Results

No.	Mode	Simultaneous	Results
1	2.4G WLAN+BT	0.0397+0.00315	0.04285<1.0(pass)