

FCC TEST REPORT

FCC ID: XNZ91900G

On Behalf of

KATUMFEL INDUSTRY LIMITED(HK)

2.4G remote control

Model No.: 91900G-3F, 91900G-3

Prepared for : KATUMFEL INDUSTRY LIMITED(HK)

FuCheng Industrial Town, Hong Tian, ShaJing, ShenZhen,

Hong Kong

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.

Building B, East Area of Nanchang Second Industrial Zone,

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Report Number : T1871428 01 Date of Receipt : July 03, 2017

Date of Test : July 03, 2017- July 11, 2017

Date of Report : July 11, 2017

Version Number : REV0

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TEST REPORT DECLARATION

Applicant KATUMFEL INDUSTRY LIMITED(HK) Manufacturer KATUMFEL INDUSTRY LIMITED(HK)

EUT Description 2.4G remote control

> (A) Model No. : 91900G-3F, 91900G-3

: N/A Trademark

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2016, ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Reak Yang Tested by (name + signature)....: **Test Engineer**

Reak Yang Simple Guan Approved by (name + signature).....: Project Manager

Date of issue....: July 11, 2017

Report No.: T1871428 01

1. General Information

1.1. Description of Device (EUT)

Trade Name : N/A

EUT : 2.4G remote control

Model No. : 91900G-3F, 91900G-3

DIFF : All the models are the same, except the model name, this report

performs the model 91900G-3F.

: Integrated Antenna, Maximum Gain is 2.0dBi Antenna Type

Operation

Frequency

: 2405-2478MHz

Channel

number

: 74 Channels(Channel Spacing 1MHz)

Modulation

: FSK

type

Power Supply : DC 6V from battery

Applicant : KATUMFEL INDUSTRY LIMITED(HK)

Address : FuCheng Industrial Town, Hong Tian, ShaJing, ShenZhen, Hong

Kong

Manufacturer : KATUMFEL INDUSTRY LIMITED(HK)

Address : FuCheng Industrial Town, Hong Tian, ShaJing, ShenZhen, Hong

Kong

1.2. Accessories of device (EUT)

N/A

1.3. Test Facility

Shenzhen Alpha Product Testing Co., Ltd Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road, Bao'an, Shenzhen, China

August 11, 2014 File on Federal Communication Commission

Registration Number: 203110

July 18, 2014 Certificated by IC Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10:2013	PASS
Bandwidth	FCC Part 15: 15.215 ANSI C63.10 :2013	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10:2013	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10:2013	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10:2013	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	N/A
Antenna requirement	FCC Part 15: 15.203	PASS

Note: 1. P is an abbreviation for Pass.

- 2. F is an abbreviation for Fail.
- 3. N/A is an abbreviation for Not Applicable.

2.2. Assistant equipment used for test

N/A

2.3. Block Diagram

EUT

2.4. Test mode

Tested mode, channel, and data rate information					
Mode	Frequency (MHz)				
	Low :CH1	2405			
FSK	Middle: CH37	2441			
	High: CH74	2478			

2.5. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	27℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	980kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.71dB	
Uncertainty for Radiation Emission test in 3m chamber	2.13 dB	Polarize: V
(below 30MHz)	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber	3.90dB	Polarize: V
(30MHz to 1GHz)	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber	4.28dB	Polarize: H
(1GHz to 25GHz)	4.26dB	Polarize: V
Uncertainty for radio frequency	1×10-9	
Uncertainty for conducted RF Power	0.16dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Due cal.	Cal Interval
3m Semi-Anechoic	CHENYU	N/A	N/A	2020.07.20	4Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2017.09.28	1Year
Receiver	R&S	ESPI	101873	2017.09.28	1Year
Receiver	R&S	ESCI	101165	2017.09.28	1Year
Bilog Antenna	SCHWARZBECK	VULB 9168	VULB9168-438	2018.09.29	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.09.29	2Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2017.09.28	1 Year
L.I.S.N.#2	ROHDE&SCHWA RZ	ENV216	101043	2017.09.28	1 Year
Cable	Resenberger	N/A	No.1	2017.09.28	1Year
Cable	SCHWARZBECK	N/A	No.2	2017.09.28	1Year
Cable	SCHWARZBECK	N/A	No.3	2017.09.28	1Year
Pre-amplifier	НР	HP8347A	2834A00455	2017.09.28	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2017.09.28	1Year
vector Signal Generator	Agilent	N5182A	MY49060042	2017.09.28	1 Year
vector Signal Generator	Agilent	E4438C	US44271917	2017.09.28	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080020	2017.09.28	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54110001	2017.09.28	1 Year
Signal Analyzer	Agilent	N9020A	MY48030494	2017.09.28	1 Year
]			

3. Maximum Peak Output power

3.1. Limit

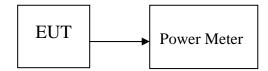
Please refer section 15.247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	
CH1	2405	7.133	5.168	<30	
CH37	2441	5.506	3.553	<30	
CH74	2478	6.034	4.012	<30	

Conclusion: PASS

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3. Test Result

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	Limit (kHz)	Conclusion
CH1	2405	522.6	/	PASS
CH37	2441	523.5	/	PASS
CH74	2478	538.9	/	PASS

Orginal Test data For 20dB bandwidth

FSK:

CH Low:



CH Mid:



CH High:



5. Carrier Frequency Separation

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

5.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

5.3. Test Result

Mode/Channel Channel separation (MHz)		20dB Bandwidth (KHz)	Conclusion
FSK	1011	538.9	PASS

FSK



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6. Number Of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

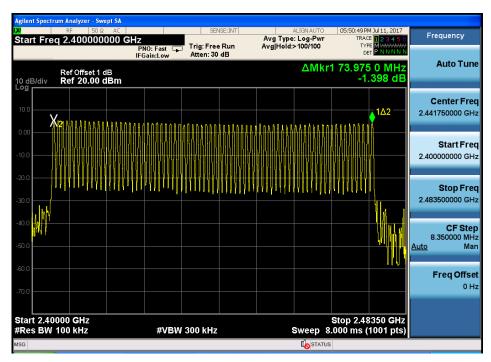
6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

6.3. Test Result

Mode Number of hopping channel		Limit	Conclusion
FSK	74	>15	PASS

Original test data for hopping channel number FSK



7. Dwell Time

7.1. Test limit

Please refer section 15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 sec- onds multiplied by the number of hopping channel employed.

7.2. Test Procedure

- 7.2.1. Place the EUT on the table and set it in transmitting mode.
- 7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 7.2.3. Set center frequency of spectrum analyzer = operating frequency.
- 7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span=0Hz, Sweep=auto.
- 7.2.5. Repeat above procedures until all frequency measured were complete.

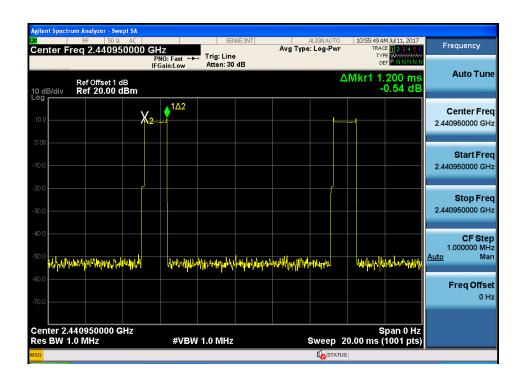
7.3. Test Result

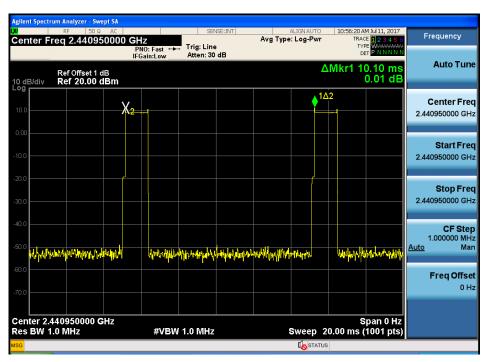
PASS.

Detailed information please see the following page.

Mode	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
FSK	2441	1.200	0.119	< 0.4	PASS

Note: Dwell Time= $T_{on}/T_{on+off}=1.200/10.10$





8. Radiated emissions

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

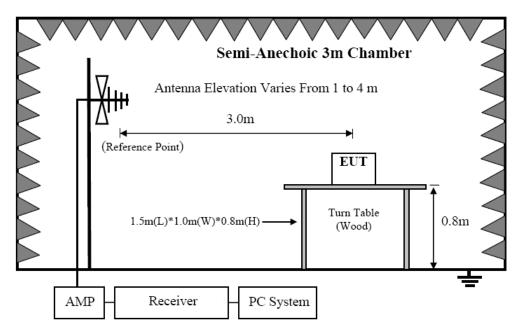
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

15.209 Limit

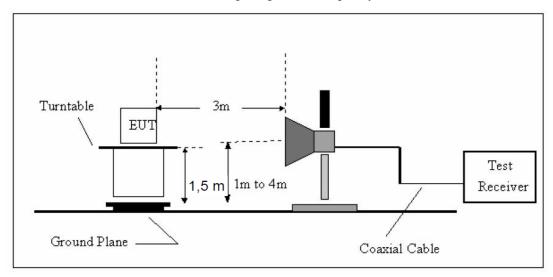
FREQUENCY	DISTANCE	FIELD STRENGTHS LIMIT			
MHz	Meters	μV/m	$dB(\mu V)/m$		
0.009-0.490	300	2400/F(KHz)	/		
0.490-1.705	30	24000/F(KHz)	/		
1.705-30	30	30	29.5		
30 ~ 88	3	100	40.0		
88 ~ 216	3	150	43.5		
216 ~ 960	3	200	46.0		
960 ~ 1000	3	500	54.0		
Above 1000	3	$74.0 \text{ dB}(\mu\text{V})/\text{m} \text{ (Peak)}$			
Above 1000	3	54.0 dB(μV)/m (Average)			

8.2. Block Diagram of Test setup

8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
- (a) Change work frequency or channel of device if practicable.
- (b) Change modulation type of device if practicable.
- (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

8.4. Test Result

We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency.. Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS

Site LAB 966-2 Chamber Polarization: Vertical Temperature: 23.8 Limit: FCC Part 15 Class B Radiation Power: DC 6V Humidity: 56 %

Distance:

EUT: 2.4G remote control

M/N: 91900G-3F Mode: TX mode

Note:

4

483.9094

Engineer Signature:

Radiated Emission Measurement Date: 2017/7/5 File:2017 Data:#1 Time: 14:23:23 80.0 dBuV/m 70 60 FCC Part 15 Class B Radiation 50 40 30 20 10 0.0 30.000 60 70 80 (MHz) 300 400 500 600 700 1000.000 Reading Correct Measure-Antenna Table No. Mk. Limit Margin Freq. Level Factor ment Height Degree MHz dBuV dB dBuV/m dBuV/m dB Detector degree Comment 15.57 13.95 29.52 1 38.3462 40.00 -10.48 peak 2 53.1313 14.42 13.44 27.86 40.00 -12.14 peak 3 147.9214 13.83 14.40 28.23 43.50 -15.27 peak

14.04

17.19

31.23

46.00

-14.77

peak

Site LAB 966-2 Chamber

Limit: FCC Part 15 Class B Radiation

EUT: 2.4G remote control

M/N: 91900G-3F Mode: TX mode

Note:

Engineer Signature:

Polarization: Horizontal

DC 6V Power:

23.8 Temperature: Humidity:

56 %

Distance:

				Radiated	∟missio	n Measu	rement					
File	:2017		[Data :#2		Date	e: 2017/7/5		Time:	14:25:	:03	
80.0 dE	BuV/m											7
70												
60												-
							FCC I	Part 15 Class	s B Radiati	on	ı	-
50												1
40												
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20						Margin			00 600	700		
20 10 0.0 30.000	40	50 60 Reading	70 Correct	Measure-	(MHz)			400 50 Antenna	00 600 Table	700 e		
20 10 0.0 30.000	40 Freq.	50 60 Reading Level	Correct Factor	Measure- ment	(MHz)	Margin	300	400 50 Antenna Height	00 600 Table Degree	700 e	1000	
20 10 0.0 30.000 No. Mk.	40 Freq. MHz	Seading Level	Correct Factor	Measure- ment dBuV/m	(MHz) Limit	Margin	300 Detector	400 50 Antenna Height	00 600 Table Degree	700 e	1000	

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

From 1G-25GHz

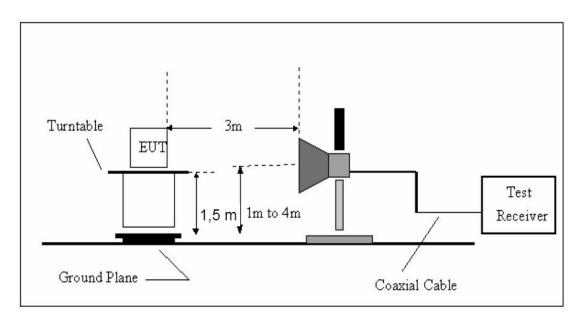
	FIGHT 1G-23GHZ								
Test Mo	ode: TX Lov	W							
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4810	43.63	V	33.95	10.18	34.26	53.50	74	20.50	PK
4810	34.83	V	33.95	10.18	34.26	44.70	54	9.30	AV
7215	/		/						
9620	/		/						
4810	42.94	Н	33.95	10.18	34.26	52.81	74	21.19	PK
4810	33.65	Н	33.95	10.18	34.26	43.52	54	10.48	AV
7215									
9620									
Test Mo	ode: TX Mi	d							
4882	41.81	V	33.93	10.2	34.29	51.65	74	22.35	PK
4882	32.46	V	33.93	10.2	34.29	42.30	54	11.70	AV
7323	/								
9764	/								
4882	41.54	Н	33.93	10.2	34.29	51.38	74	22.62	PK
4882	32.83	Н	33.93	10.2	34.29	42.67	54	11.33	AV
7323									
9764									
Test Mo	ode: TX Hig	gh							
4956	42.30	V	33.98	10.22	34.25	52.25	74	21.75	PK
4956	32.76	V	33.98	10.22	34.25	42.71	54	11.29	AV
7434	/								
9912	/								
4956	42.43	Н	33.98	10.22	34.25	52.38	74	21.62	PK
4956	31.50	Н	33.98	10.22	34.25	41.45	54	12.55	AV
7434	/								
9912	/								

^{1,} Result = Read level + Antenna factor + cable loss-Amp factor

^{2,} All the other emissions not reported were too low to read and deemed to comply with FCC limit.

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested, only worse case is reported.

9.4. Test Result

PASS. (See below detailed test data)

Radiated Method

FSK (CH Low)

Band Edge Test result								
Test mode: Tx CH Low 2405MHz								
Antenna polarity: Vertical								
Read Level (dBuV/m)	Factor		Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	
44.40	27.62	3.92	34.97	40.99	74	33.01	PK	
aitan III air a	201							
1		2.02	24.07	40.05	7.4	22.05	DV	
44.36	21.02	3.92	34.97	40.93	/4	33.03	PK	
	Read Level (dBuV/m) 44.40	rity: Vertical Read Antenna Level Factor (dBuV/m) (dB/m) 44.40 27.62 rity: Horizontal	rity: Vertical Read Antenna Cable Level Factor loss(d (dBuV/m) (dB/m) B) 44.40 27.62 3.92 rity: Horizontal	rity: Vertical Read Antenna Cable Amp Level Factor loss(d Factor (dBuV/m) (dB/m) B) (dB) 44.40 27.62 3.92 34.97 rity: Horizontal	Read	Read	Read	

- 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
- 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
- 3, Result = Read level + Antenna factor + cable loss-Amp factor
- 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

FSK (CH High)

Band Edge Test result									
Test mode: T	Fest mode: Tx CH High 2478MHz								
Antenna pola	Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)		Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	
2483.5	44.35	27.89	4	34.97	41.27	74	32.73	PK	
Antenna Pola	rity: Horizo	ontal							
2483.5	43.93	27.89	4	34.97	40.85	74	33.15	PK	

- 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
- 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
- 3, Result = Read level + Antenna factor + cable loss-Amp factor
- 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

FSK (Hopping Low)

	Band Edge Test result								
Test mode: T	X								
Antenna pola	Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)		Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	
2390	43.71	27.62	3.92	34.97	40.28	74	33.72	PK	
Antenna Pola	rity: Horizo	ontal							
2390	44.49	27.62	3.92	34.97	41.08	74	32.92	PK	
						-			

- 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
- 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
- 3, Result = Read level + Antenna factor + cable loss-Amp factor
- 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

FSK (Hopping High)

	Band Edge Test result								
Test mode: T	X								
Antenna pola	Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)		Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	
2483.5	40.02	27.89	4	34.97	40.94	74	33.06	PK	
Antenna Pola	rity: Horizo	ontal							
2483.5	44.58	27.89	4	34.97	41.50	74	32.50	PK	

- 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
- 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
- 3, Result = Read level + Antenna factor + cable loss-Amp factor
- 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Conducted Method

FSK

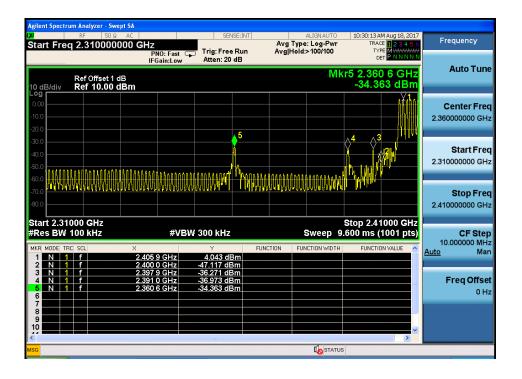
CH LOW:



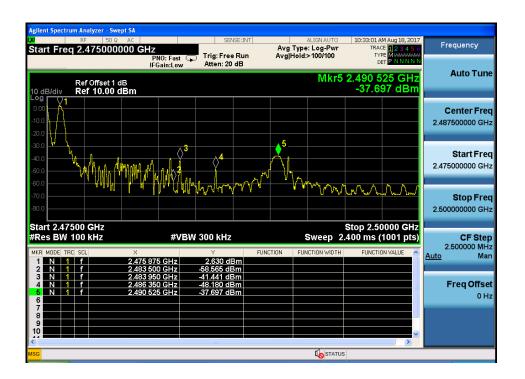
CH High:



Hopping Low

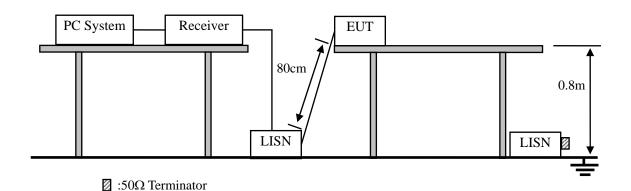


High



10. Power Line Conducted Emissions

10.1.Block Diagram of Test Setup



10.2.Limit

	Maximum R	F Line Voltage
Frequency	Quasi-Peak Level	Average Level
	$dB(\mu V)$	$dB(\mu V)$
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

10.3.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

10.4. Test Result

The EUT is powered by DC 6V battery, so there is no need to conduct this test.

11. Antenna Requirements

11.1.Limit

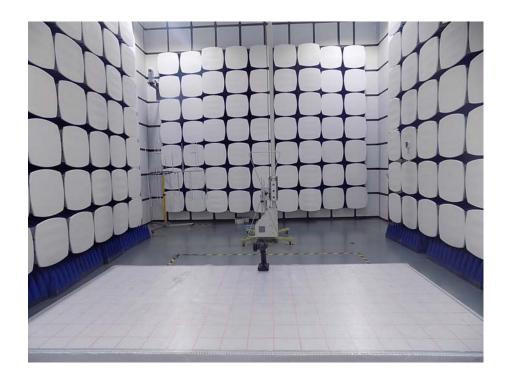
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2.Result

The antennas used for this product is integrated antenna, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 2.0dBi.

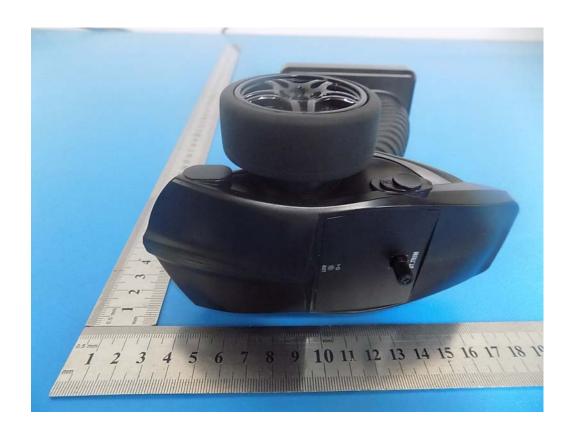
12. Test setup photo

12.1.Photos of Radiated emission





13.Photos of EUT











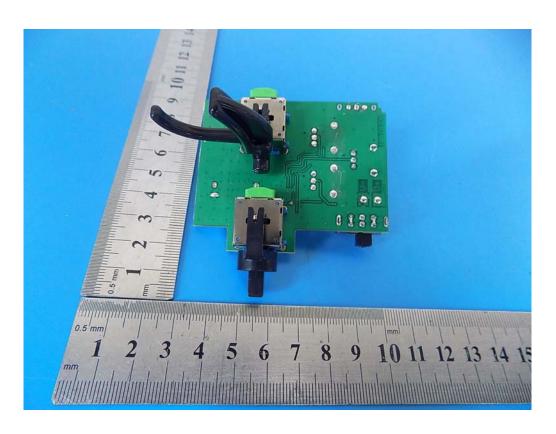


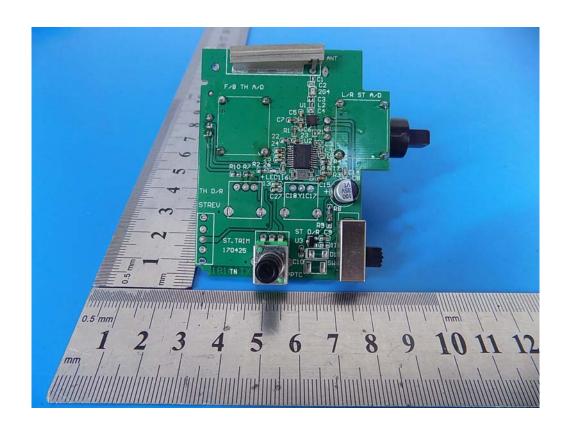












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