

# RF TEST REPORT



Report No.: 17071438-FCC-R

Supersede Report No.: N/A

Applicant	RC4WD	
Product Name	CTX-01	
Main Model	CTX-01	
Serial Model	N/A	
Test Standard	FCC Part 15.249: 2016; ANSI C63.10: 2013	
Test Date	December 21, 2017 to January 05, 2018	
Issue Date	January 06, 2018	
Test Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
Equipment complied with the specification <input checked="" type="checkbox"/>		
Equipment did not comply with the specification <input type="checkbox"/>		
Aarron Liang Test Engineer	David Huang Checked By	
<p>This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only</p>		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: [China@siemic.com.cn](mailto:China@siemic.com.cn)

## Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

Test Report No.	17071438-FCC-R
Page	3 of 38

---

This page has been left blank intentionally.

## CONTENTS

1. REPORT REVISION HISTORY .....	5
2. CUSTOMER INFORMATION .....	5
3. TEST SITE INFORMATION.....	5
4. EQUIPMENT UNDER TEST (EUT) INFORMATION .....	6
5. TEST SUMMARY .....	7
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS .....	8
6.1 ANTENNA REQUIREMENT.....	8
6.2 AC LINE CONDUCTED EMISSIONS.....	9
6.3 RADIATED SPURIOUS EMISSIONS.....	11
6.4 FIELD STRENGTH MEASUREMENT.....	19
6.5 20DB BANDWIDTH TESTING.....	21
6.6 BAND EDGE.....	23
ANNEX A. TEST INSTRUMENT.....	27
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS.....	28
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....	35
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST .....	37
ANNEX E. DECLARATION OF SIMILARITY .....	38

## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
17071438-FCC-R	NONE	Original	January 06, 2018

## 2. Customer information

Applicant Name	RC4WD
Applicant Add	618 Blossom Hill Road, Suite 201, San Jose, CA 95123
Manufacturer	Mun Ah Plastic Electronic Toys CO., LTD.
Manufacturer Add	Flat G, 21/ Floor, Kingsway Industrial Building, Phase 2, 173- 175 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong

## 3. Test site information

Test Lab A:

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

Test Lab B:

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMC(ver.lcp-03A1)

Note: We just perform Radiated Spurious Emission above 18GHz in the test Lab. B.

#### **4. Equipment under Test (EUT) Information**

Description of EUT: CTX-01

Main Model: CTX-01

Serial Model: N/A

Date EUT received: December 20, 2017

Test Date(s): December 21, 2017 to January 05, 2018

Antenna Gain: 2dBi

Antenna Type: Internal Antenna

Power: 98.85dBuV/m

Type of Modulation: FHSS, GFSK, 250kbps data rate

RF Operating Frequency (ies): 2406-2420MHz

Number of Channels: 15CH

Input Power: Battery:  
Spec: 6V DC(4\*AA battery)

Trade Name : RC4WD

FCC ID: 2AOMDCTX01

## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	N/A
§15.205, §15.209, §15.249(a), §15.249(d)	Radiated Fundamental / Radiated Spurious Emissions	Compliance
§15.249(a)	Field Strength Measurement	Compliance
§15.249©	20 dB Bandwidth	Compliance
§15.249(d)	Band Edge	Compliance

### Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

## **6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS**

### **6.1 Antenna Requirement**

#### **Standard Requirement:**

According to § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

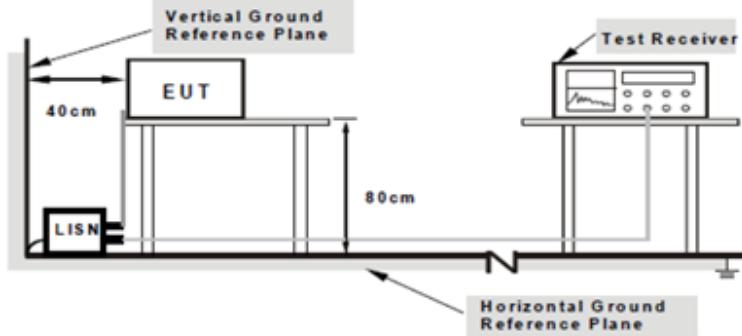
#### **Antenna Connector Construction**

A permanently attached Internal Antenna, the gain is 2dBi.

#### **Test Result: Pass**

## 6.2 AC Line Conducted Emissions

Temperature	-----
Relative Humidity	-----
Atmospheric Pressure	-----
Test date :	-----
Tested By :	-----

Spec	Item	Requirement	Applicable														
§15.207	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dB<math>\mu</math>V)</th> </tr> <tr> <th>QP</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 ~ 0.5</td> <td>66 – 56</td> <td>56 – 46</td> </tr> <tr> <td>0.5 ~ 5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5 ~ 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency ranges (MHz)	Limit (dB $\mu$ V)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50	<input checked="" type="checkbox"/>
Frequency ranges (MHz)	Limit (dB $\mu$ V)																
	QP	Average															
0.15 ~ 0.5	66 – 56	56 – 46															
0.5 ~ 5	56	46															
5 ~ 30	60	50															
Test Setup			 <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Support units were connected to second LISN.</li> <li>2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</li> </ol>														
Procedure			<ol style="list-style-type: none"> <li>1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.</li> <li>2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> </ol>														

	<ol style="list-style-type: none"> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.</li> <li>7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.</li> <li>8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol>
Remark	<b>The EUT is powered by battery.</b>
Result	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A

Test Data     Yes       N/A

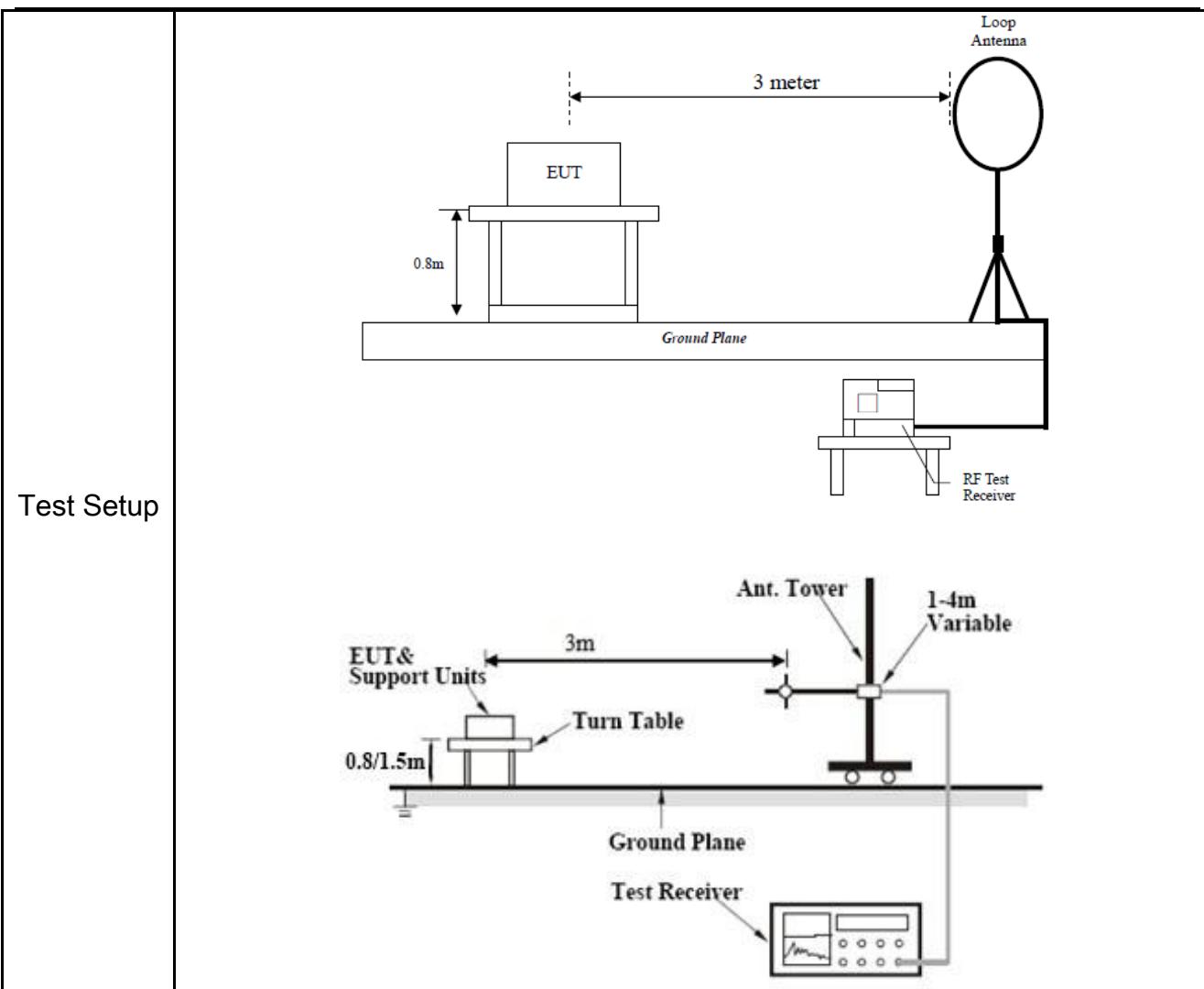
Test Plot     Yes (See below)       N/A

## 6.3 Radiated Spurious Emissions

Temperature	23°C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	December 28, 2017
Tested By :	Aarron Liang

### Requirement(s):

Spec	Requirement	Applicable																															
§15.209, §15.205, §15.249(a) & §15.249(d)	<p>The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.</p> <p>The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:</p> <table border="1"> <thead> <tr> <th>Fundamental frequency</th> <th>Field strength of fundamental (millivolts/meter)</th> <th>Field strength of harmonics (microvolts/meter)</th> </tr> </thead> <tbody> <tr> <td>902– 928 MHz</td> <td>50</td> <td>500</td> </tr> <tr> <td>2400– 2483.5 MHz</td> <td>50</td> <td>500</td> </tr> <tr> <td>5725– 5875 MHz</td> <td>50</td> <td>500</td> </tr> <tr> <td>24.0– 24.25 GHz</td> <td>250</td> <td>2500</td> </tr> </tbody> </table> <p>(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (<math>\mu</math>V/m)</th> </tr> </thead> <tbody> <tr> <td>0.009~0.490</td> <td>2400/F(KHz)</td> </tr> <tr> <td>0.490~1.705</td> <td>24000/F(KHz)</td> </tr> <tr> <td>1.705~30.0</td> <td>30</td> </tr> <tr> <td>30 – 88</td> <td>100</td> </tr> <tr> <td>88 – 216</td> <td>150</td> </tr> <tr> <td>216 960</td> <td>200</td> </tr> <tr> <td>Above 960</td> <td>500</td> </tr> </tbody> </table>	Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	902– 928 MHz	50	500	2400– 2483.5 MHz	50	500	5725– 5875 MHz	50	500	24.0– 24.25 GHz	250	2500	Frequency range (MHz)	Field Strength ( $\mu$ V/m)	0.009~0.490	2400/F(KHz)	0.490~1.705	24000/F(KHz)	1.705~30.0	30	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<input checked="" type="checkbox"/>
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)																															
902– 928 MHz	50	500																															
2400– 2483.5 MHz	50	500																															
5725– 5875 MHz	50	500																															
24.0– 24.25 GHz	250	2500																															
Frequency range (MHz)	Field Strength ( $\mu$ V/m)																																
0.009~0.490	2400/F(KHz)																																
0.490~1.705	24000/F(KHz)																																
1.705~30.0	30																																
30 – 88	100																																
88 – 216	150																																
216 960	200																																
Above 960	500																																



<p><b>Procedure</b></p> <ul style="list-style-type: none"> <li>- Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function</li> <li>- For emission frequencies measured below 1GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1GHZ, a pre-scan also be performed with a meter measuring distance before final test.</li> <li>- For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and 1MHz resolution bandwidth respectively for each frequency measured in step 2.</li> <li>- The search antenna is to be raised and lowered over a range from 1 to 4m in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, the change the orientation of EUT on the test table over a range from 0 to 360°. With a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer.</li> </ul>
--

	Vary the antenna position again and record the highest value as a final reading. - Repeat step 4 until all frequencies need to be measured was complete. - Repeat step5 with search antenna in vertical polarized orientations.
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

## Test Result:

Test Mode:	Transmitting Mode
------------	-------------------

Frequency range: 9KHz - 30MHz

Freq. (MHz)	Detection value	Factor (dB/m)	Reading (dBuV/m)	Result (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

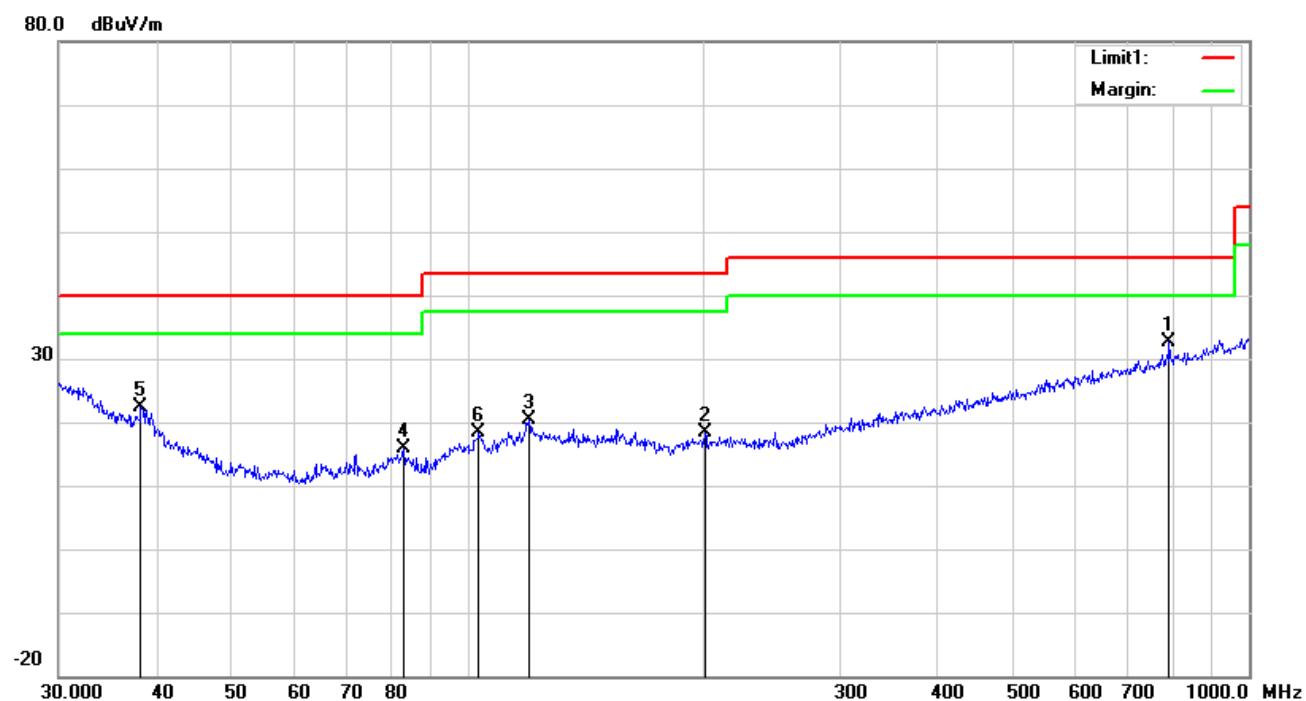
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

**Test Mode:** 2.4G Mode

### 30MHz -1GHz

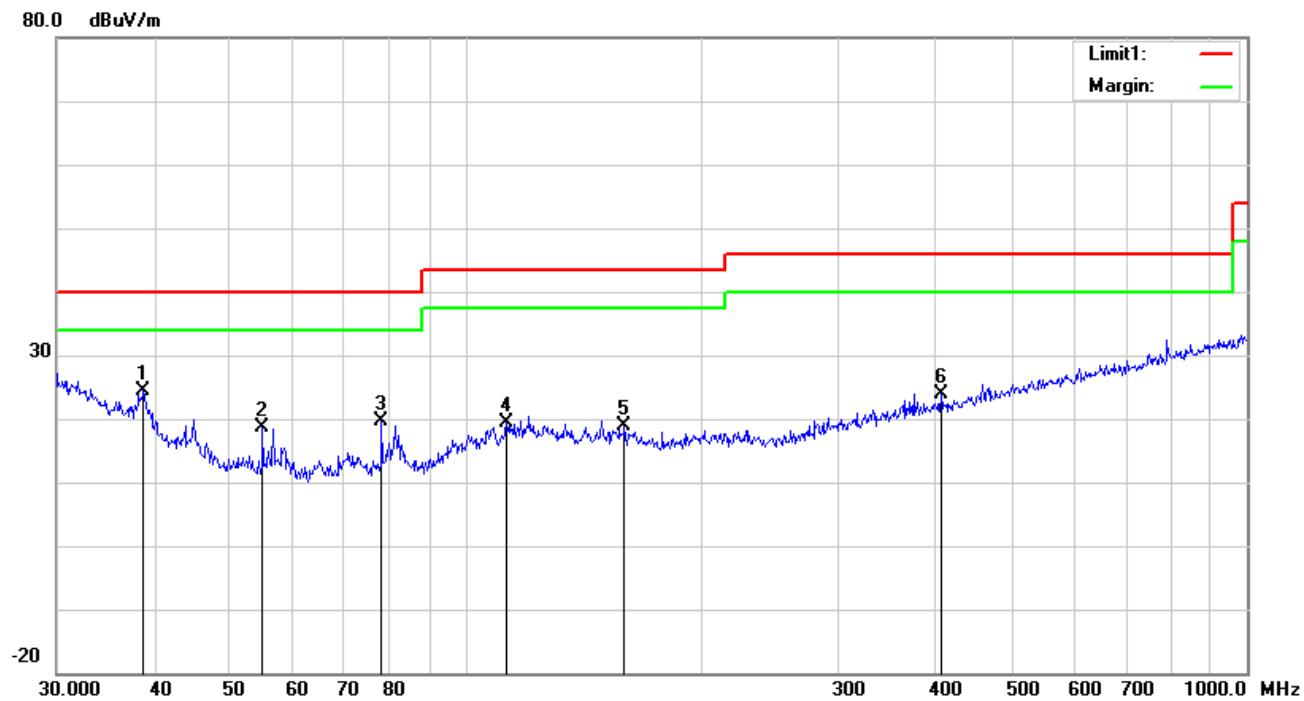


### Test Data

#### Horizontal Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detect or	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degr ee
1	H	790.6188	29.48	peak	21.29	21.17	2.94	32.54	46.00	-13.46	100	116
2	H	201.3930	27.24	peak	12.08	22.38	1.54	18.48	43.50	-25.02	100	98
3	H	119.8556	27.59	peak	13.87	22.36	1.16	20.26	43.50	-23.24	100	116
4	H	82.9385	29.46	peak	7.72	22.39	1.06	15.85	40.00	-24.15	100	88
5	H	38.2120	28.59	peak	15.21	22.27	0.78	22.31	40.00	-17.69	100	51
6	H	103.4421	28.49	peak	11.00	22.33	1.14	18.30	43.50	-25.20	100	261

### 30MHz -1GHz



### Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detect or	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degr ee
1	V	38.7518	31.12	peak	14.81	22.27	0.78	24.44	40.00	-15.56	100	347
2	V	55.0274	32.51	peak	7.85	22.40	0.78	18.74	40.00	-21.26	200	109
3	V	78.1389	33.45	peak	7.64	22.41	1.02	19.70	40.00	-20.30	100	33
4	V	112.9196	28.00	peak	12.66	22.35	1.17	19.48	43.50	-24.02	100	178
5	V	159.7844	27.07	peak	12.60	22.27	1.39	18.79	43.50	-24.71	100	159
6	V	406.0880	28.14	peak	15.82	22.00	2.02	23.98	46.00	-22.02	100	80

## Above 1GHz

Test Mode:	2.4G Mode
------------	-----------

### Low Channel: 2406 MHz

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4812	48.29	AV	V	33.36	7.21	48.46	40.4	54	-13.6
4812	42.44	AV	H	33.36	7.21	48.46	34.55	54	-19.45
4812	66.5	PK	V	33.36	7.21	48.46	58.61	74	-15.39
4812	67.62	PK	H	33.36	7.21	48.46	59.73	74	-14.27
10787	35.17	AV	V	39.57	10.95	47.08	38.61	54	-15.39
10787	34.39	AV	H	39.57	10.95	47.08	37.83	54	-16.17
10787	53.68	PK	V	39.57	10.95	47.08	57.12	74	-16.88
10787	49.99	PK	H	39.57	10.95	47.08	53.43	74	-20.57

### Middle Channel: 2413 MHz

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4826	46.95	AV	V	33.64	7.56	48.34	39.81	54	-14.19
4826	42.89	AV	H	33.64	7.56	48.34	35.75	54	-18.25
4826	66.62	PK	V	33.64	7.56	48.34	59.48	74	-14.52
4826	64.48	PK	H	33.64	7.56	48.34	57.34	74	-16.66
7365	30.6	AV	V	36.7	7.33	49.05	25.58	54	-28.42
7365	28.46	AV	H	36.7	7.33	49.05	23.44	54	-30.56
7365	49.61	PK	V	36.7	7.33	49.05	44.59	74	-29.41
7365	43.51	PK	H	36.7	7.33	49.05	38.49	74	-35.51

High Channel: 2420 MHz

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4840	49.93	AV	V	33.61	7.98	49.01	42.51	54	-11.49
4840	48.86	AV	H	33.61	7.98	49.01	41.44	54	-12.56
4840	68.7	PK	V	33.61	7.98	49.01	61.28	74	-12.72
4840	69.66	PK	H	33.61	7.98	49.01	62.24	74	-11.76
17791	20.26	AV	V	44.03	19.51	44.61	39.19	54	-14.81
17791	19.78	AV	H	44.03	19.51	44.61	38.71	54	-15.29
17791	39.89	PK	V	44.03	19.51	44.61	58.82	74	-15.18
17791	40.63	PK	H	44.03	19.51	44.61	59.56	74	-14.44

**Note:**

1, The testing has been conformed to  $10*2420\text{MHz}=24,200\text{MHz}$

2, All other emissions more than 30 dB below the limit

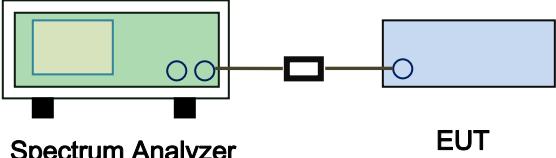
3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

4, The radiated spurious test above 18GHz is subcontracted to SIEMIC (Nanjing-China) Laboratories. and found 30dB below the limit at least.

## 6.4 Field Strength Measurement

Temperature	23°C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	December 28, 2017
Tested By :	Aarron Liang

### Requirement(s):

Spec	Requirement	Applicable																
§15.249(a)	<table border="1"> <tr> <td>Fundamental frequency</td> <td>Field strength of fundamental (millivolts/meter)</td> <td>Field strength of harmonics (microvolts/meter)</td> </tr> <tr> <td>902–928 MHz .....</td> <td>50</td> <td>500</td> </tr> <tr> <td>2400–2483.5 MHz .....</td> <td>50</td> <td>500</td> </tr> <tr> <td>5725–5875 MHz .....</td> <td>50</td> <td>500</td> </tr> <tr> <td>24.0–24.25 GHz .....</td> <td>250</td> <td>2500</td> </tr> </table>	Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	902–928 MHz .....	50	500	2400–2483.5 MHz .....	50	500	5725–5875 MHz .....	50	500	24.0–24.25 GHz .....	250	2500	<input checked="" type="checkbox"/>	
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)																
902–928 MHz .....	50	500																
2400–2483.5 MHz .....	50	500																
5725–5875 MHz .....	50	500																
24.0–24.25 GHz .....	250	2500																
Test Setup	 <b>Spectrum Analyzer</b> <b>EUT</b>																	
Test Procedure	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.																	
Remark																		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail																	

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

Test Mode:	2.4G Mode
------------	-----------

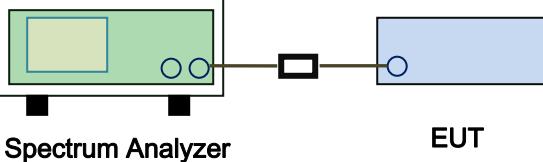
### Field Strength Measurement

P/L	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limit (dB/m)	Over (dB)	Detector
H	2405.99	111.16	-13.9	97.26	114	-16.74	peak
H	2405.99	97.41	-13.9	83.51	94	-10.49	AVG
V	2405.99	104.92	-13.9	91.02	114	-22.98	peak
V	2405.99	94.52	-13.9	80.62	94	-13.38	AVG
H	2414.63	110.86	-13.87	96.99	114	-17.01	peak
H	2414.63	94.02	-13.87	80.15	94	-13.85	AVG
V	2414.63	100.29	-13.87	86.42	114	-27.58	peak
V	2414.63	93.12	-13.87	79.25	94	-14.75	AVG
H	2418.96	112.72	-13.87	98.85	114	-15.15	peak
H	2418.96	95.12	-13.87	81.25	94	-12.75	AVG
V	2418.96	101.95	-13.87	88.08	114	-25.92	peak
V	2418.96	95.48	-13.87	81.61	94	-12.39	AVG

## 6.5 20dB Bandwidth Testing

Temperature	23°C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	December 28, 2017
Tested By :	Aarron Liang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.215(c)	a)	<p>Radiated Emissions Measurement Uncertainty</p> <p>All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz ( 3m &amp; 10m ) &amp; 1GHz above ( 3m ) is +5.6/-4.5dB.</p>	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure		<ul style="list-style-type: none"> <li>-Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</li> <li>-Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.</li> <li>-Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.</li> <li>-Repeat above procedures until all frequencies measured were complete.</li> </ul>	
Remark			

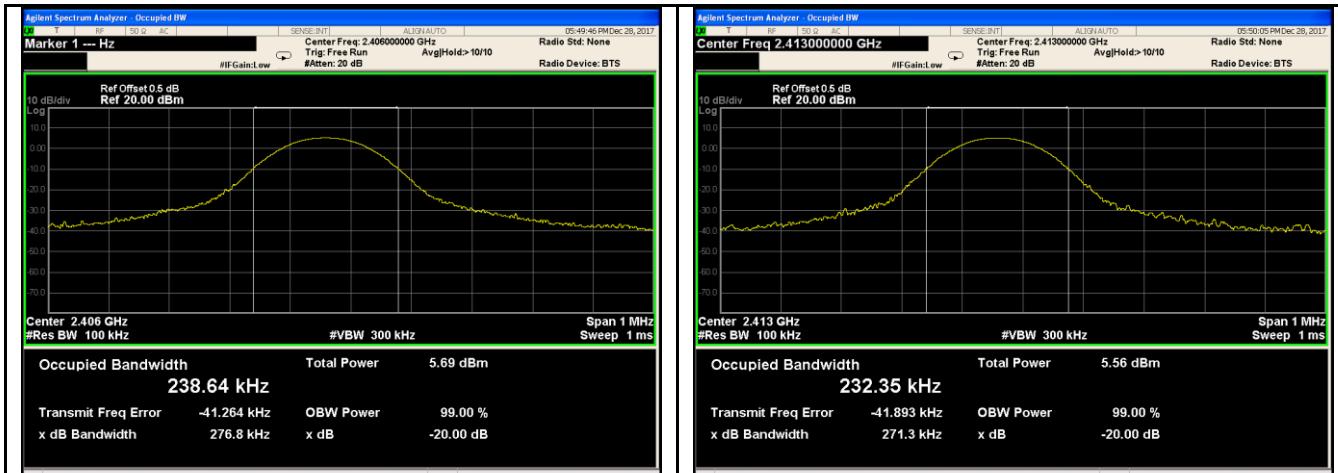
Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
Test Data	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> N/A
Test Plot	<input checked="" type="checkbox"/> Yes (See below)	<input type="checkbox"/> N/A

## 20dB Bandwidth measurement result

CH	Fundamental Frequency (MHz)	20dB Bandwidth ( MHz )	Result
Low	2406	0.277	Pass
Middle	2413	0.271	Pass
High	2420	0.270	Pass

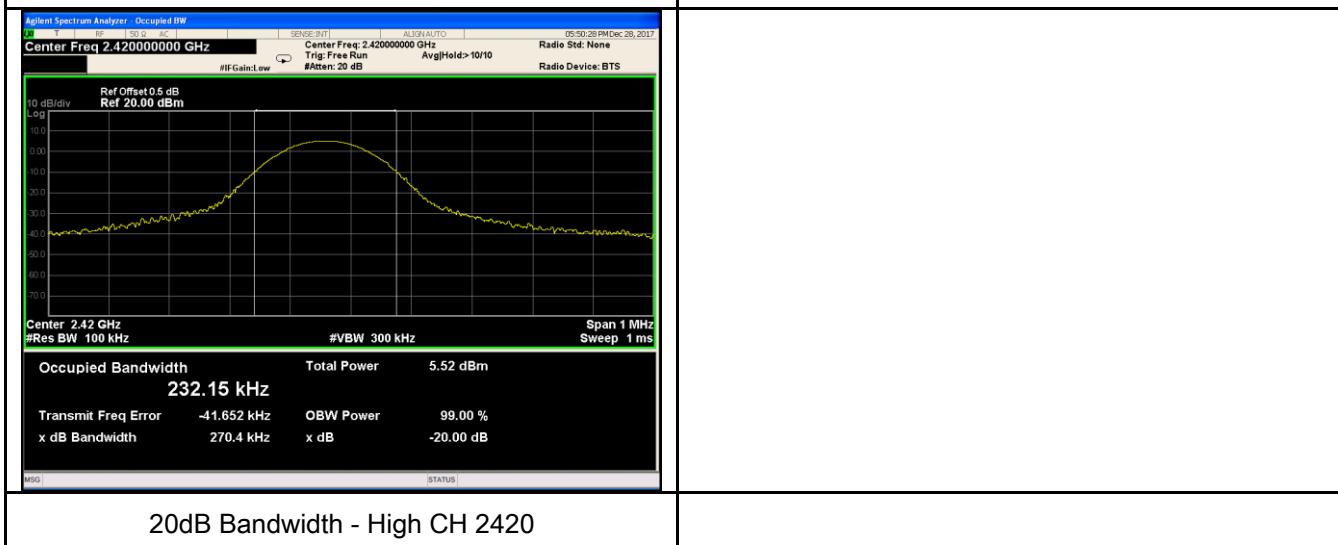
## Test Plots

### 20dB Bandwidth measurement result



20dB Bandwidth - Low CH 2406

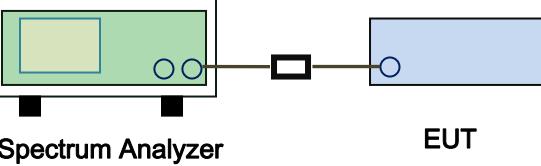
2dB Bandwidth - Mid CH 2413



20dB Bandwidth - High CH 2420

## 6.6 Band Edge

Temperature	24°C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	December 29, 2017&January 03, 2018
Tested By :	Aarron Liang

Spec	Item	Requirement	Applicable
§15.249(d)	a)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure		<ul style="list-style-type: none"> <li>- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</li> <li>- Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.</li> <li>- Set both RBW and VBW of spectrum analyzer to 1MHz.</li> <li>- Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.</li> <li>- Repeat above procedures until all measured frequencies were complete.</li> </ul>	
Remark			
Result		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

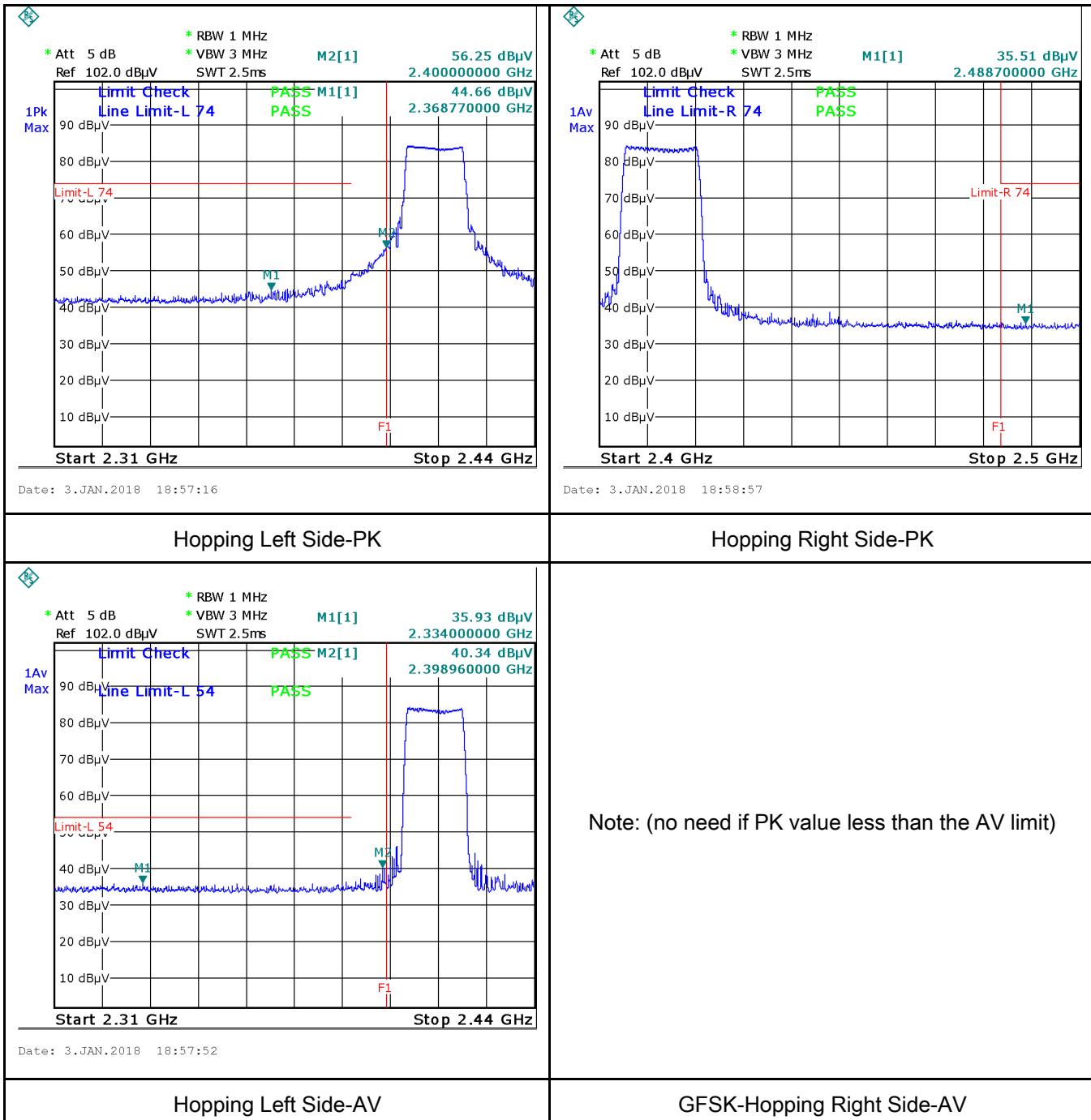
Test Report No.	17071438-FCC-R
Page	24 of 38

**Test Data**  Yes  N/A

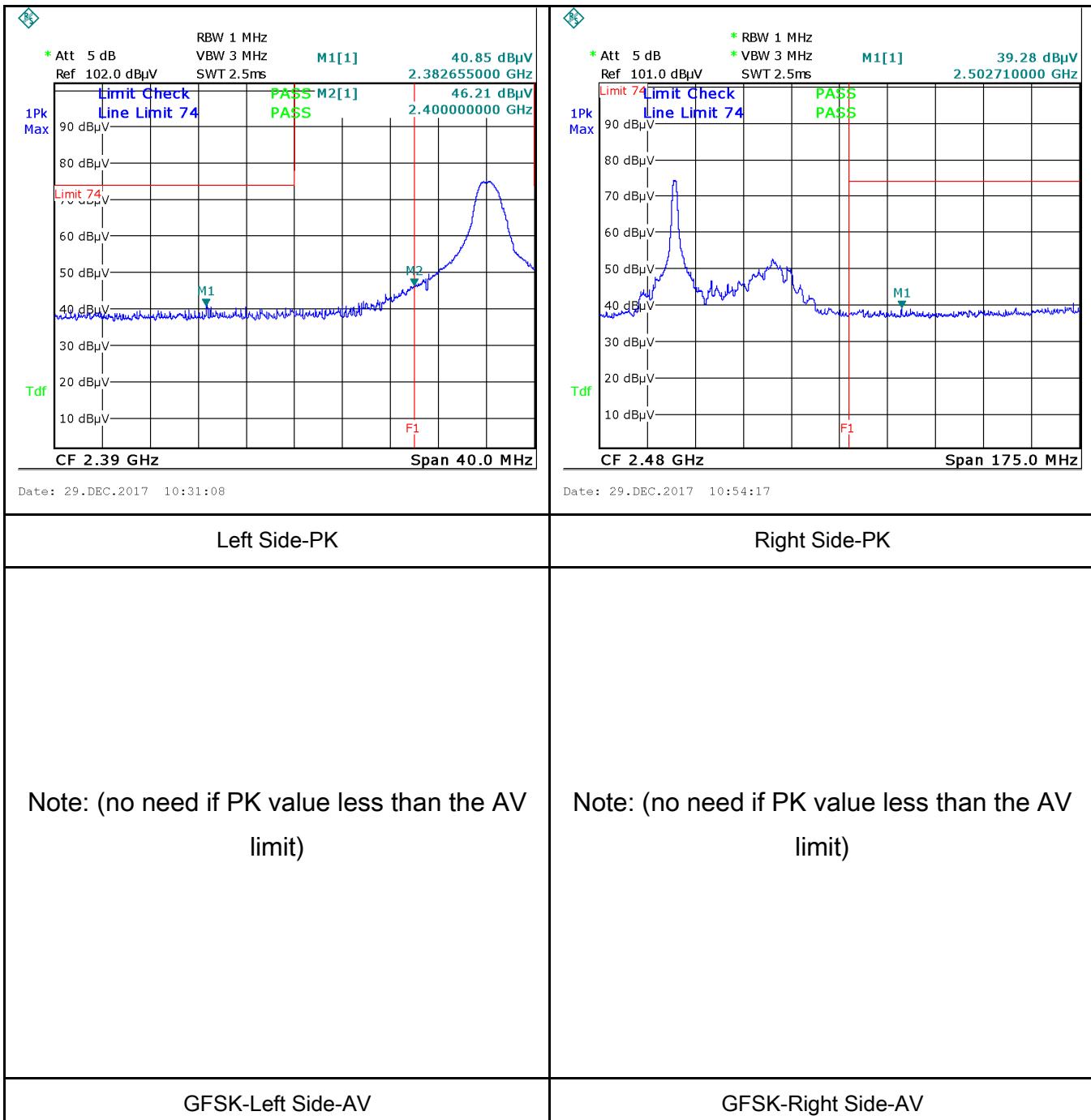
**Test Plot**  Yes (See below)  N/A

## Test Plots

### Band Edge measurement result



Note: Both Horizontal and vertical polarities were investigated.



Note: Both Horizontal and vertical polarities were investigated.

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted</b>					
EMI test receiver	ESCS30	8471241027	09/15/2017	09/14/2018	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191106	09/23/2017	09/22/2018	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191107	09/23/2017	09/22/2018	<input checked="" type="checkbox"/>
ISN	ISN T800	34373	09/23/2017	09/22/2018	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	08/30/2017	08/29/2018	<input checked="" type="checkbox"/>
<b>RF conducted test</b>					
Agilent ESA-E SERIES	E4407B	MY45108319	09/15/2017	09/14/2018	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	08/30/2017	08/29/2018	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/15/2017	09/14/2018	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	<input checked="" type="checkbox"/>
Positioning Controller	UC3000	MF780208282	11/17/2017	11/16/2018	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	<input checked="" type="checkbox"/>
Active Antenna (9kHz-30MHz)	AL-130	121031	10/12/2017	10/11/2018	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	<input checked="" type="checkbox"/>
Active Antenna (9kHz-30MHz)	AL-130	121031	10/12/2017	10/11/2018	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	<input checked="" type="checkbox"/>

## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo

EUT - Front View



EUT - Rear View



EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View



### Annex B.ii. Photograph: EUT Internal Photo

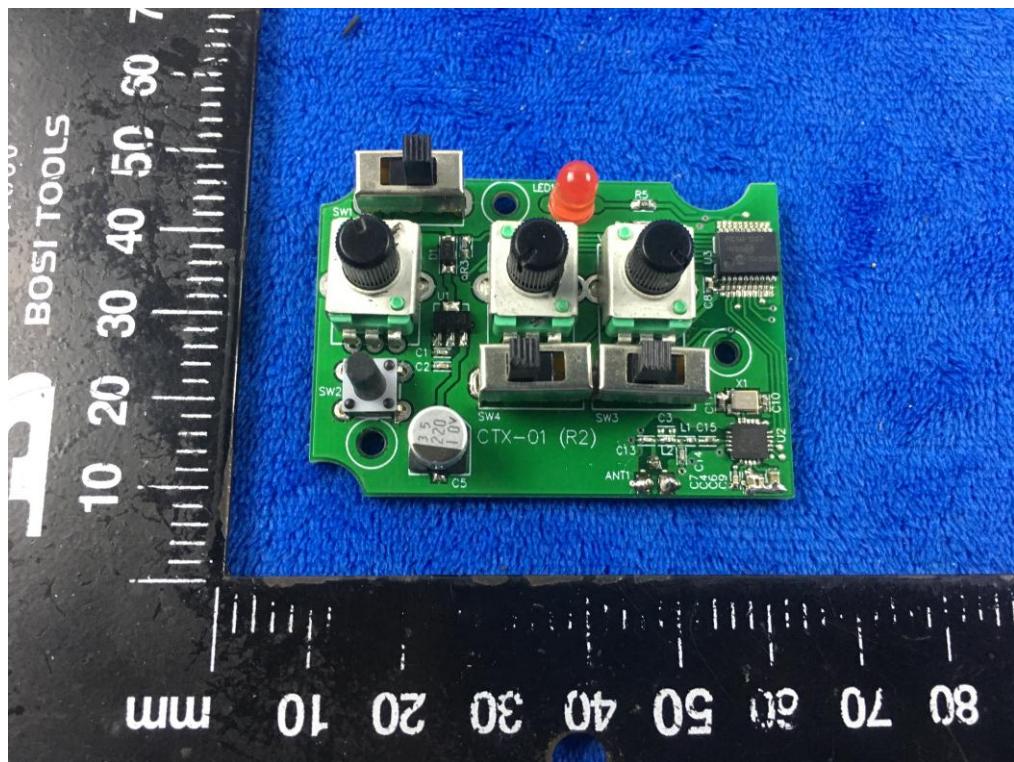
Cover Off - Top View 1



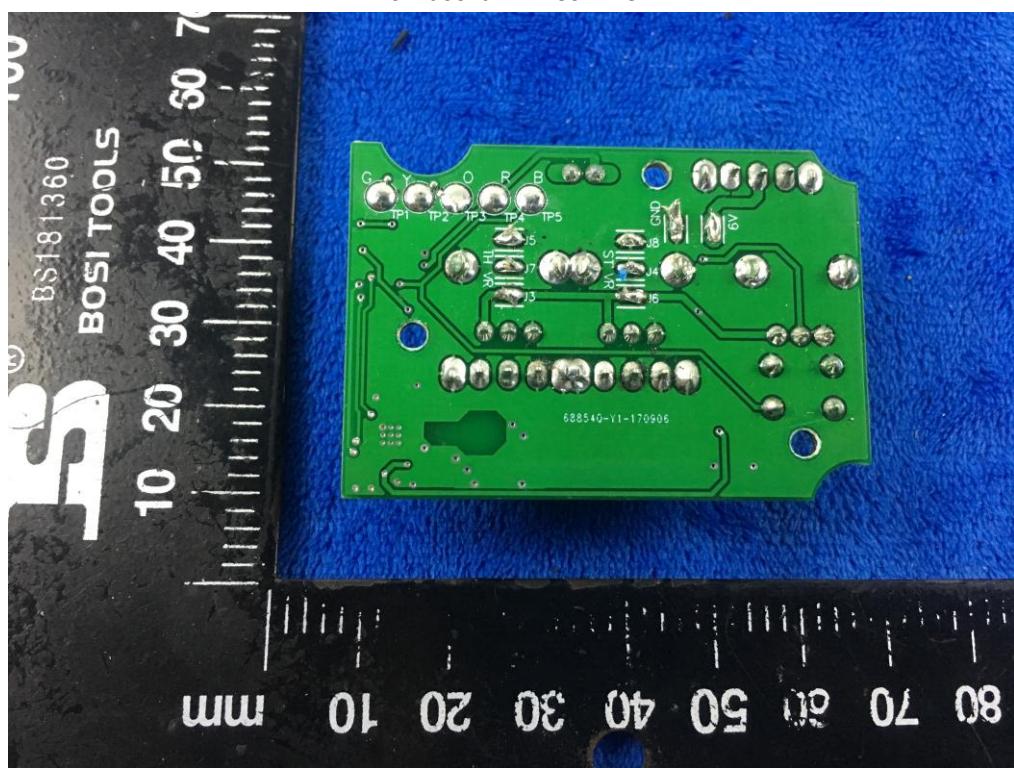
Cover Off - Top View 2



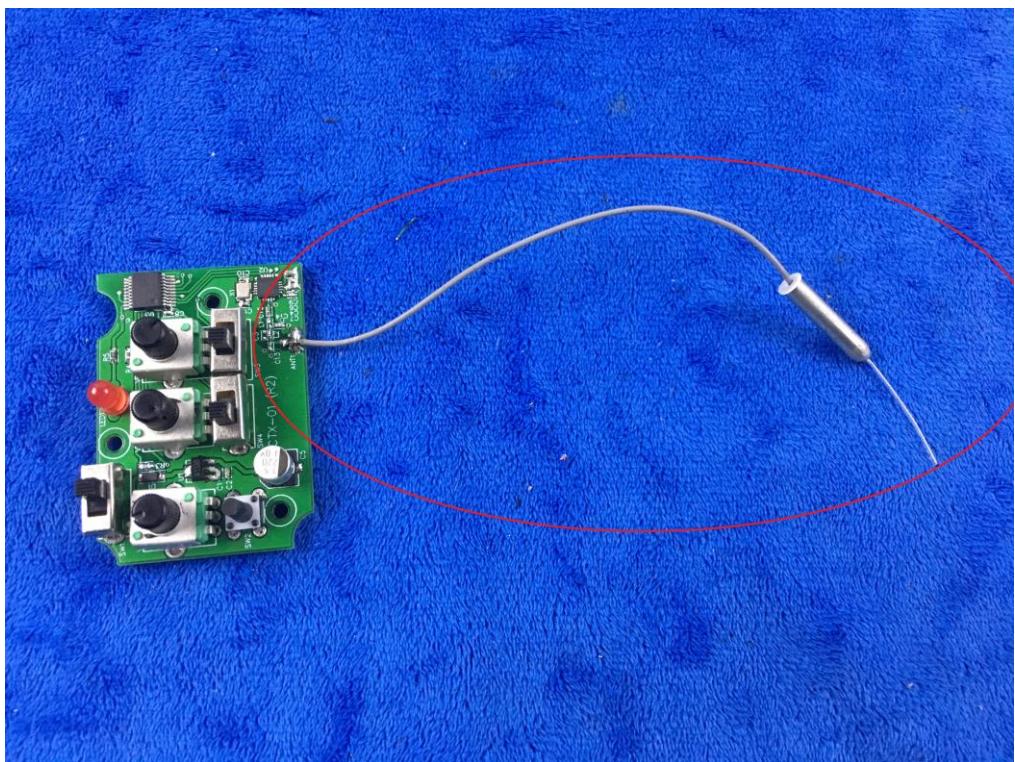
Mainboard - Front View



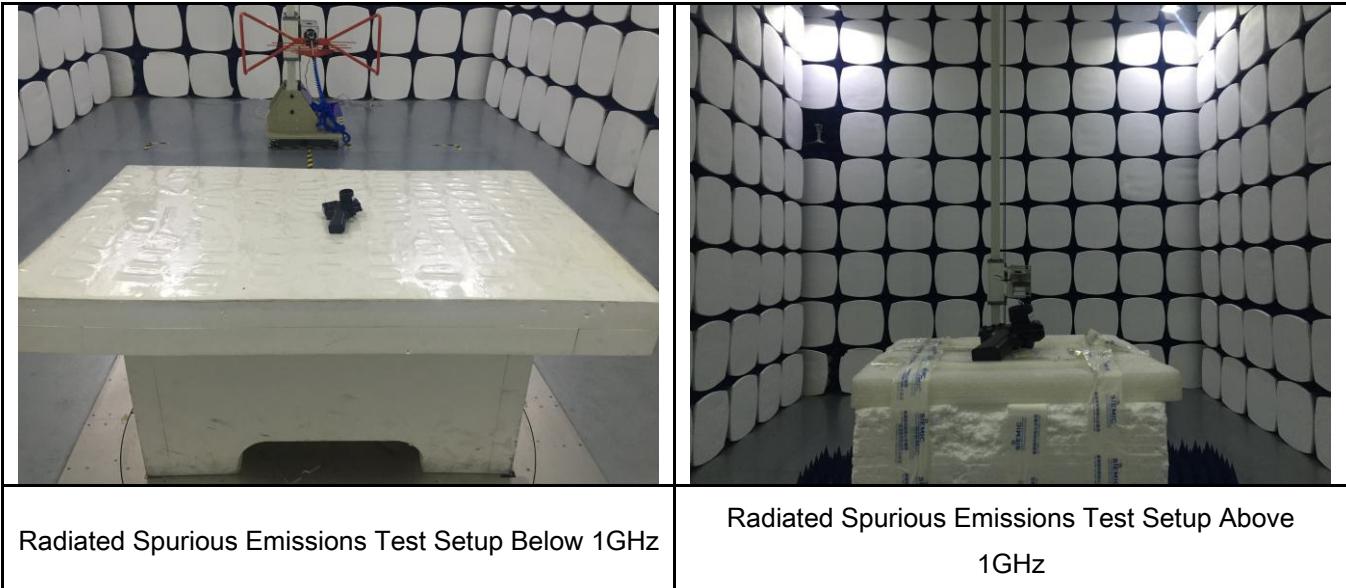
Mainboard – Rear View



Antenna View



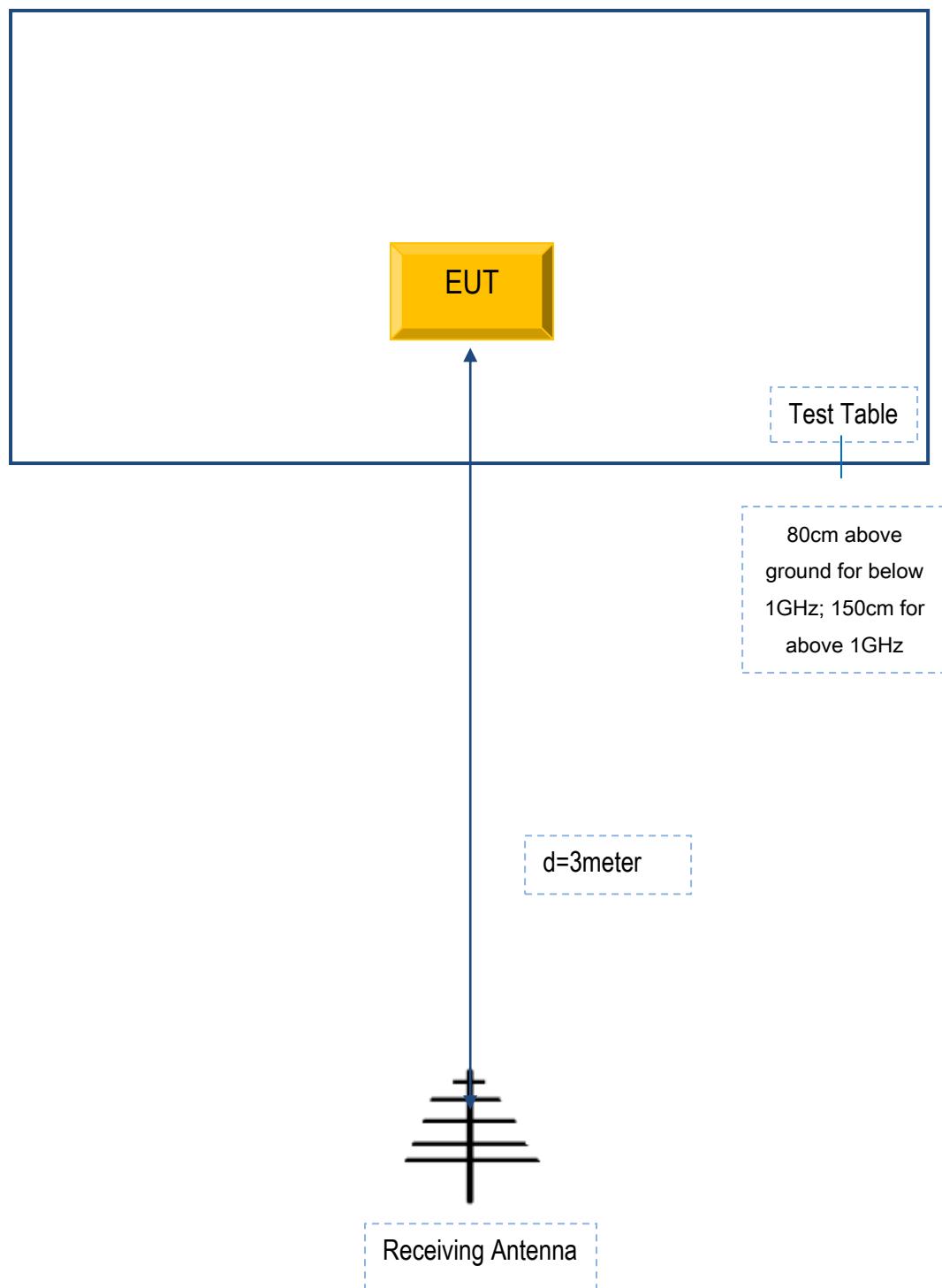
**Annex B.iii. Photograph: Test Setup Photo**



## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK

#### Block Configuration Diagram for Radiated Emissions



### Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Serial No.
N/A	N/A	N/A	N/A

## Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

## Annex E. DECLARATION OF SIMILARITY

N/A