

# RF TEST REPORT



Report No.: 15070819-FCC-R

Supersede Report No.: N/A

Applicant	Shenzhen Creative Industry Co., Ltd.	
Product Name	Video Baby Monitor	
Model No.	OT240M	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2014, ANSI C63.10: 2013	
Test Date	September 10 to November 05, 2015	
Issue Date	November 09, 2015	
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"/>		
<i>Winnie Zhang</i>	<i>David Huang</i>	
Winnie Zhang Test Engineer	David Huang Checked By	
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Issued by:

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## Laboratories Introduction

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### 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

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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070819-FCC-R	NONE	Original	November 09, 2015

## 2. Customer information

Applicant Name	Shenzhen Creative Industry Co., Ltd.
Applicant Add	2/F, Block 3, Nanyou Tian'an Industry Town, Guangd, Shenzhen, China, 518054
Manufacturer	MC Devices Co., Ltd.
Manufacturer Add	Suite 516 BLD 4, National Software Base, Keji zhong 2 Road, Shenzhen Hi-Tech Park, Shenzhen, 518.57, China

## 3. Test site information

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.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

## 4. Equipment under Test (EUT) Information

Description of EUT:	Video Baby Monitor
Main Model:	OT240M
Serial Model:	N/A
Date EUT received:	September 09, 2015
Test Date(s):	September 10 to November 05, 2015
Equipment Category :	DSS
Antenna Gain:	FHSS: 3dBi 433MHz Receiver: 0dBi
Type of Modulation:	FHSS
RF Operating Frequency (ies):	FHSS: 2409.75-2475 MHz Receiver: 433MHz
Max. Output Power:	14.49dBm
Number of Channels:	FHSS: 19CH Receiver: 1CH
Port:	USB Port
Input Power:	Adapter: Model :PS10E050K2000UU Input :100-240Vac, 50/60Hz, 0.35A Output :5.0Vdc, 2000mA
Trade Name :	N/A
FCC ID:	A49IPC240

#### Hopping Sequence Table:

```

0x0C, 0x01, 0x02, 0x0A, 0x04, 0x0D, 0x0B, 0x03, 0x06, 0x0E, 0x08, 0x05, 0x0F, 0x07, 0x09, 0x00,
0x0D, 0x00, 0x03, 0x0B, 0x05, 0x0C, 0x0A, 0x02, 0x07, 0x0F, 0x09, 0x04, 0x0E, 0x06, 0x08, 0x01,
0x0E, 0x03, 0x00, 0x08, 0x06, 0x0F, 0x09, 0x01, 0x04, 0x0C, 0x0A, 0x07, 0x0D, 0x05, 0x0B, 0x02,
0x0F, 0x02, 0x01, 0x09, 0x07, 0x0E, 0x08, 0x00, 0x05, 0x0D, 0x0B, 0x06, 0x0C, 0x04, 0x0A, 0x03,
0x05, 0x06, 0x00, 0x0A, 0x07, 0x0B, 0x02, 0x0D, 0x01, 0x08, 0x03, 0x0F, 0x09, 0x0E, 0x0C, 0x04,
0x04, 0x07, 0x01, 0x0B, 0x06, 0x0A, 0x03, 0x0C, 0x00, 0x09, 0x02, 0x0E, 0x08, 0x0F, 0x0D, 0x05,
0x07, 0x04, 0x02, 0x08, 0x05, 0x09, 0x00, 0x0F, 0x03, 0x0A, 0x01, 0x0D, 0x0B, 0x0C, 0x0E, 0x06,
0x06, 0x05, 0x03, 0x09, 0x04, 0x08, 0x01, 0x0E, 0x02, 0x0B, 0x00, 0x0C, 0x0A, 0x0D, 0x0F, 0x07,
0x0E, 0x08, 0x06, 0x05, 0x03, 0x0F, 0x0B, 0x07, 0x0D, 0x04, 0x0A, 0x09, 0x02, 0x01, 0x00, 0x0C,
0x0F, 0x09, 0x07, 0x04, 0x02, 0x0E, 0x0A, 0x06, 0x0C, 0x05, 0x0B, 0x08, 0x03, 0x00, 0x01, 0x0D,
0x0C, 0x0A, 0x04, 0x07, 0x01, 0x0D, 0x09, 0x05, 0x0F, 0x06, 0x08, 0x0B, 0x00, 0x03, 0x02, 0x0E,
0x0D, 0x0B, 0x05, 0x06, 0x00, 0x0C, 0x08, 0x04, 0x0E, 0x07, 0x09, 0x0A, 0x01, 0x02, 0x03, 0x0F,
0x0D, 0x01, 0x02, 0x08, 0x0B, 0x07, 0x03, 0x0F, 0x0A, 0x09, 0x00, 0x0E, 0x06, 0x0C, 0x05, 0x04,
0x0C, 0x00, 0x03, 0x09, 0x0A, 0x06, 0x02, 0x0E, 0x0B, 0x08, 0x01, 0x0F, 0x07, 0x0D, 0x04, 0x05,
0x0F, 0x03, 0x00, 0x0A, 0x09, 0x05, 0x01, 0x0D, 0x08, 0x0B, 0x02, 0x0C, 0x04, 0x0E, 0x07, 0x06,
0x0E, 0x02, 0x01, 0x0B, 0x08, 0x04, 0x00, 0x0C, 0x09, 0x0A, 0x03, 0x0D, 0x05, 0x0F, 0x06, 0x07,
0x02, 0x0F, 0x07, 0x0B, 0x00, 0x0E, 0x01, 0x09, 0x06, 0x0D, 0x04, 0x0A, 0x08, 0x0C, 0x05, 0x03,
0x0A, 0x01, 0x06, 0x0D, 0x05, 0x0C, 0x00, 0x04, 0x0F, 0x07, 0x08, 0x02, 0x0E, 0x09, 0x03, 0x0B,
0x03, 0x0A, 0x05, 0x04, 0x0E, 0x09, 0x00, 0x0B, 0x0F, 0x02, 0x0C, 0x0D, 0x06, 0x08, 0x01, 0x07,

```

#### Channel Mapping Table:

```

0x06, 0x18, 0x0C, 0x2F, 0x0F, 0x32, 0x1B, 0x0F, 0x26, 0x12, 0x23, 0x35, 0x15, 0x2C, 0x40, 0x23,
0x06, 0x18, 0x3B, 0x2F, 0x1B, 0x1B, 0x1B, 0x38, 0x38, 0x38, 0x29, 0x29, 0x2C, 0x1E, 0x1E, 0x2C,
0x0C, 0x0C, 0x09, 0x09, 0x26, 0x26, 0x26, 0x26, 0x38, 0x23, 0x38, 0x38, 0x2C, 0x3B, 0x3B, 0x3B,
0x2F, 0x2F, 0x2F, 0x2F, 0x32, 0x32, 0x32, 0x32, 0x35, 0x35, 0x1E, 0x1E, 0x2C, 0x40, 0x23, 0x2C,

```

## **Table for frequency list**

**For 2409.75-2475 MHz band**

Channel	Frequency (MHz)
0	2409.75
1	2413.125
2	2416.5
3	2419.875
4	2423.25
5	2426.625
6	2430
7	2433.375
8	2436.75
9	2442.375
10	2445.75
11	2449.125
12	2452.5
13	2455.875
14	2459.25
15	2462.625
16	2466
17	2469.375
18	2475



## 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
§15.247(a)(1)	Channel Separation	Compliance
§15.247(a)(1)	20 dB Bandwidth	Compliance
§15.247(b)(1)	Peak Output Power	Compliance
§15.247(a)(1)(iii)	Number of Hopping Channel	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(d)	Band Edge	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	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

#### **Applicable Standard**

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.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the 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 6 dBi.

#### **Antenna Connector Construction**

The EUT has 2 antennas:

A permanently attached antenna for FHSS, the gain is 3dBi for FHSS.

A permanently attached antenna for 433MHz Receiver, the gain is 0dBi for 433MHz Receiver.


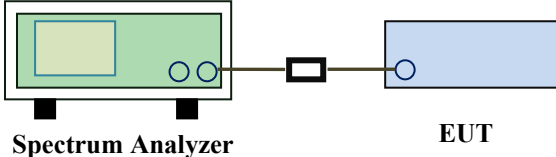
**The antenna meets up with the ANTENNA REQUIREMENT.**

**Result:** Compliance.

## 6.2 Channel Separation

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	October 13, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(a)(1)	a)	Channel Separation < 20dB BW and 20dB BW < 25KHz ; Channel Separation Limit=25KHz Chanel Separation < 20dB BW and 20dB BW > 25kHz ; Channel Separation Limit=2/3 20dB BW	
Test Setup	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>- The EUT must have its hopping function enabled</li> <li>- Span = wide enough to capture the peaks of two adjacent channels</li> <li>- Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span</li> <li>- Video (or Average) Bandwidth (VBW) ≥ RBW</li> <li>- Sweep = auto</li> <li>- Detector function = peak</li> <li>- Trace = max hold</li> <li>- Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.</li> </ul>		

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Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☒ Yes ☐ N/A

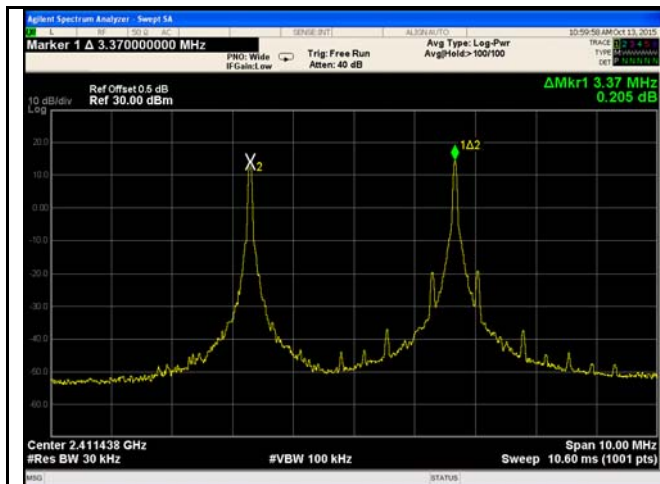
Test Plot ☒ Yes (See below) ☐ N/A

#### Channel Separation measurement result

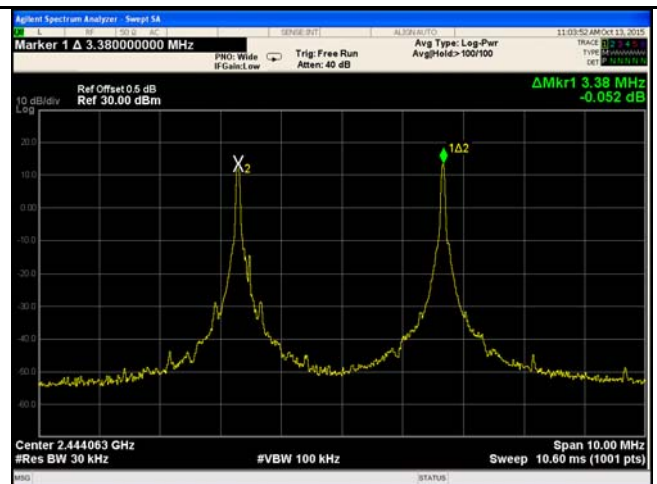
Type/ Modulation	CH	CH Freq (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation	Low Channel	2409.750	3.37	2.392	Pass
	Adjacency Channel	2413.125			
	Mid Channel	2442.375	3.38	2.485	Pass
	Adjacency Channel	2445.750			
	High Channel	2469.375	5.62	2.441	Pass
	Adjacency Channel	2475.000			

## Test Plots

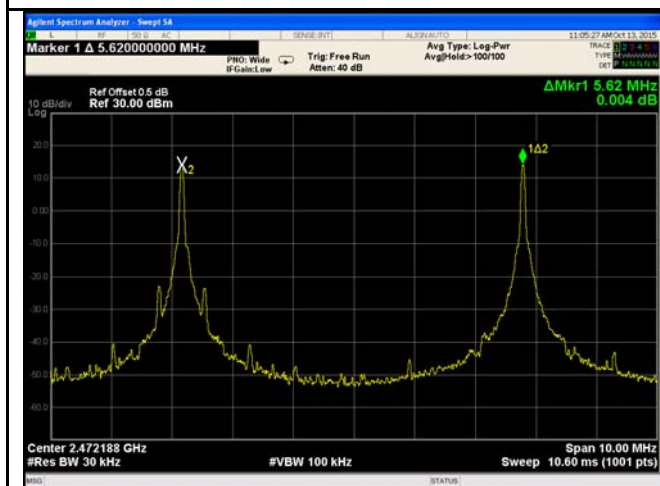
### Channel Separation measurement result



Low Channel



Middle Channel

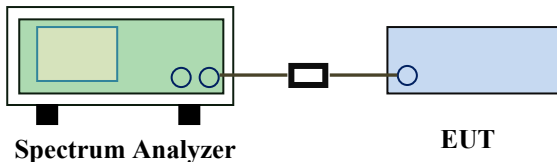


High Channel

### 6.3 20dB Bandwidth

Temperature	25°C
Relative Humidity	54%
Atmospheric Pressure	1012mbar
Test date :	October 12, 2015
Tested By :	Winnie Zhang

#### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)	a)	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.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>- Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel</li> <li>- RBW <math>\geq</math> 1% of the 20 dB bandwidth</li> <li>- VBW <math>\geq</math> RBW</li> <li>- Sweep = auto</li> <li>- Detector function = peak</li> <li>- Trace = max hold.</li> <li>- The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference</li> </ul>		

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	marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☒ Yes ☐ N/A

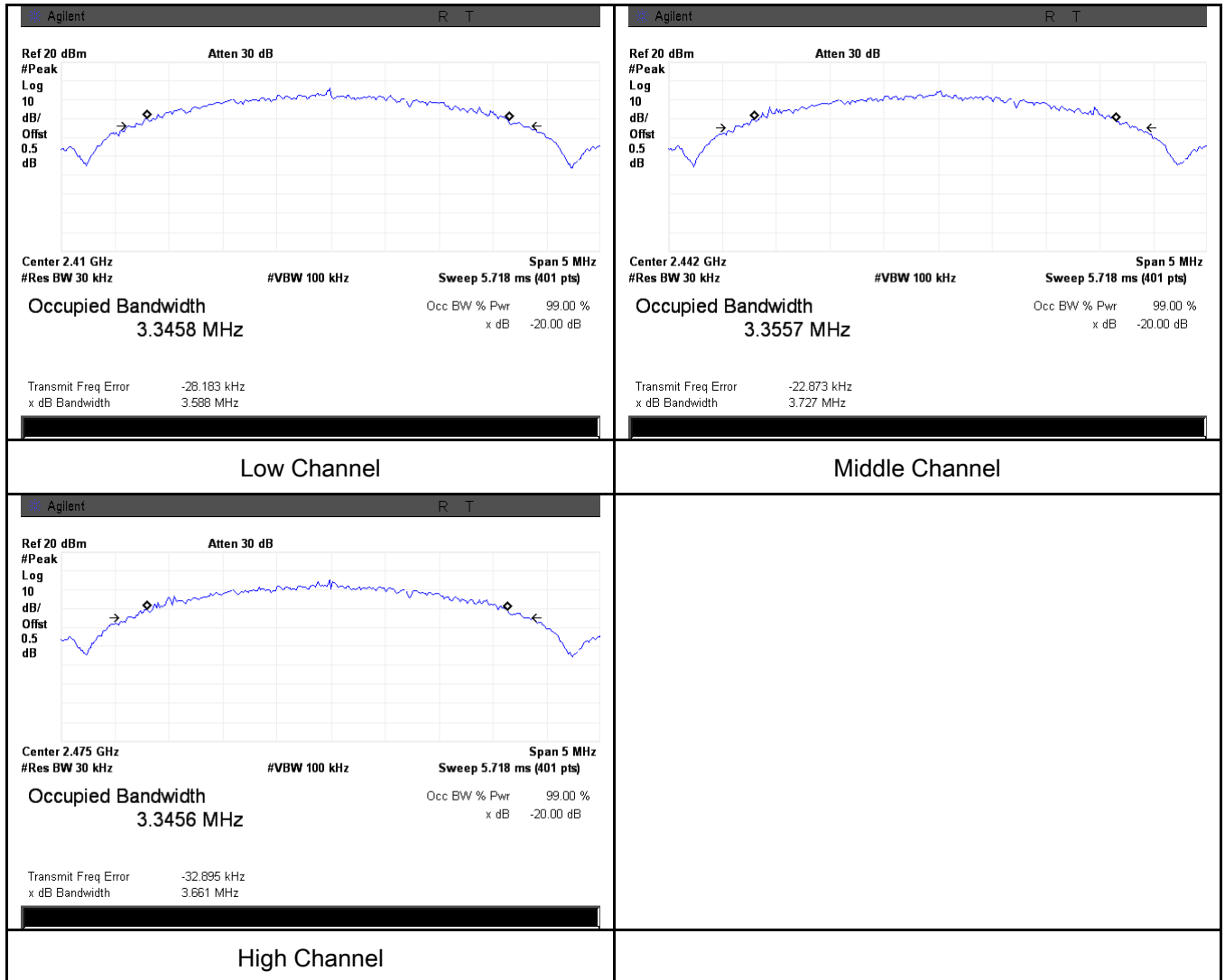
Test Plot ☒ Yes (See below) ☐ N/A

#### Measurement result

Modulation	CH	CH Freq (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
FHSS	Low	2409.750	3.588	3.3458
	Mid	2442.375	3.727	3.3557
	High	2475.000	3.661	3.3456

## Test Plots

### 20dB Bandwidth measurement result



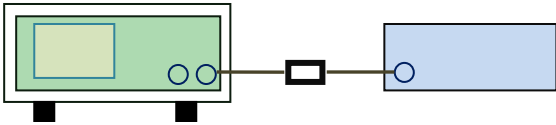


## 6.4 Peak Output Power

Temperature	25°C
Relative Humidity	54%
Atmospheric Pressure	1012mbar
Test date :	October 12, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (2)	a)	FHSS in 2400-2483.5MHz with $\geq 75$ channels: $\leq 1$ Watt	<input checked="" type="checkbox"/>
	b)	FHSS in 5725-5850MHz: $\leq 1$ Watt	<input type="checkbox"/>
	c)	For all other FHSS in the 2400-2483.5MHz band: $\leq 0.125$ Watt.	<input checked="" type="checkbox"/>
	d)	FHSS in 902-928MHz with $\geq 50$ channels: $\leq 1$ Watt	<input type="checkbox"/>
	e)	FHSS in 902-928MHz with $\geq 25$ & $< 50$ channels: $\leq 0.25$ Watt	<input type="checkbox"/>
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: $\leq 1$ Watt	<input type="checkbox"/>

Test Setup	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>
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Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>- Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel</li> <li>- RBW <math>&gt;</math> the 20 dB bandwidth of the emission being measured</li> <li>- VBW <math>\geq</math> RBW</li> <li>- Sweep = auto</li> <li>- Detector function = peak</li> <li>- Trace = max hold</li> </ul>
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	<ul style="list-style-type: none"> <li>- Allow the trace to stabilize.</li> <li>- Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (see the note above regarding external attenuation and cable loss). The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer.</li> </ul>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☒ Yes ☐ N/A  
 Test Plot ☒ Yes (See below) ☐ N/A

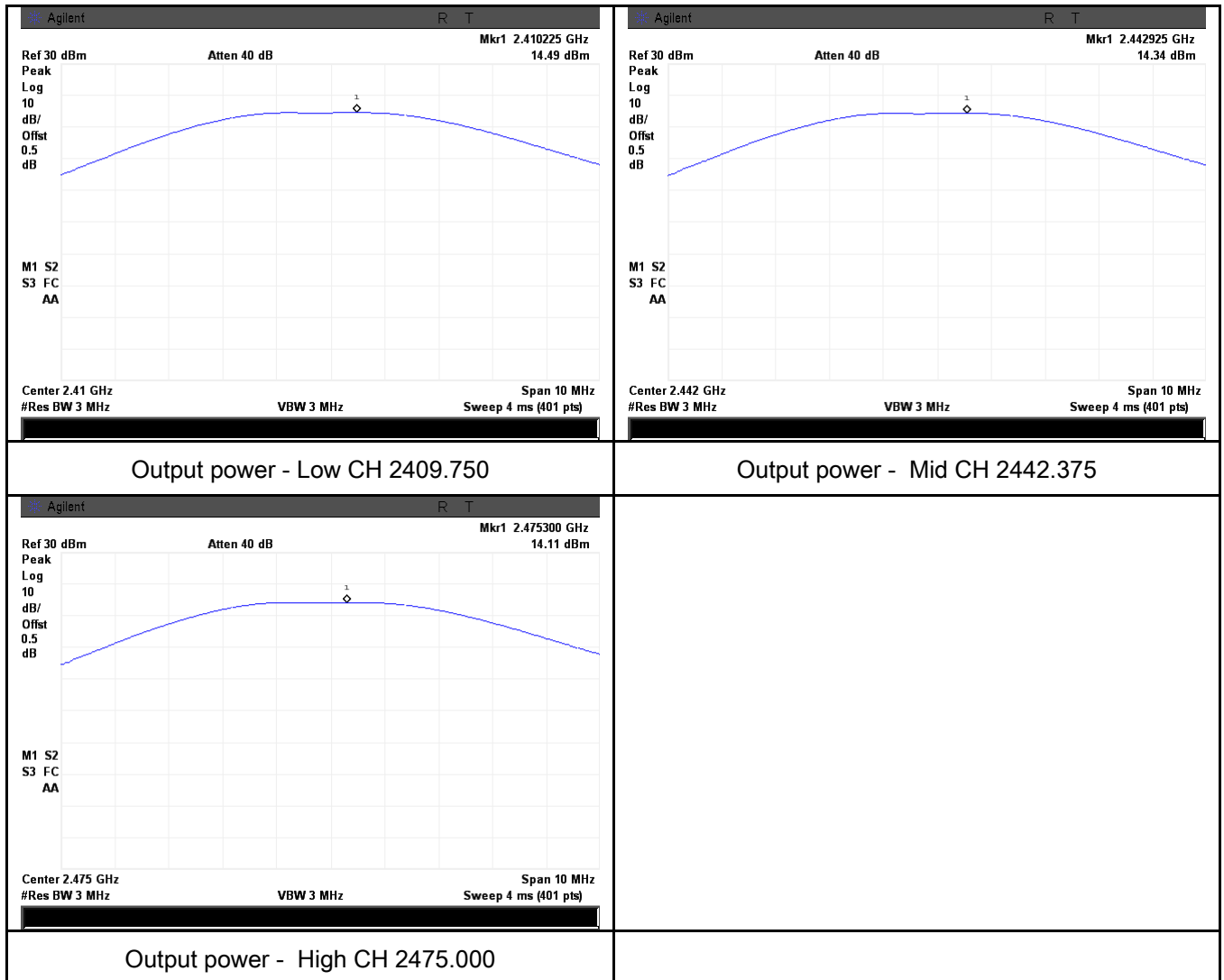
**Peak Output Power measurement result**

Type	Modulation	CH	Freq (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	FHSS	Low	2409.750	14.49	125	Pass
		Mid	2442.375	14.34	125	Pass
		High	2475.000	14.11	125	Pass

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## Test Plots

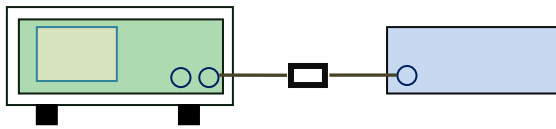
### Output Power measurement result



## 6.5 Number of Hopping Channel

Temperature	22°C
Relative Humidity	57%
Atmospheric Pressure	1005mbar
Test date :	November 05, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	FHSS in 2400-2483.5MHz $\geq$ 15 channels	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines.  <u>Use the following spectrum analyzer settings:</u>  The EUT must have its hopping function enabled.</p> <ul style="list-style-type: none"> <li>- Span = the frequency band of operation</li> <li>- RBW <math>\geq</math> 1% of the span</li> <li>- VBW <math>\geq</math> RBW</li> <li>- Sweep = auto</li> <li>- Detector function = peak</li> <li>- Trace = max hold</li> <li>- Allow trace to fully stabilize.</li> <li>- It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).</li> </ul>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data

☒ Yes

☐ N/A

Test Plot

☒ Yes (See below)

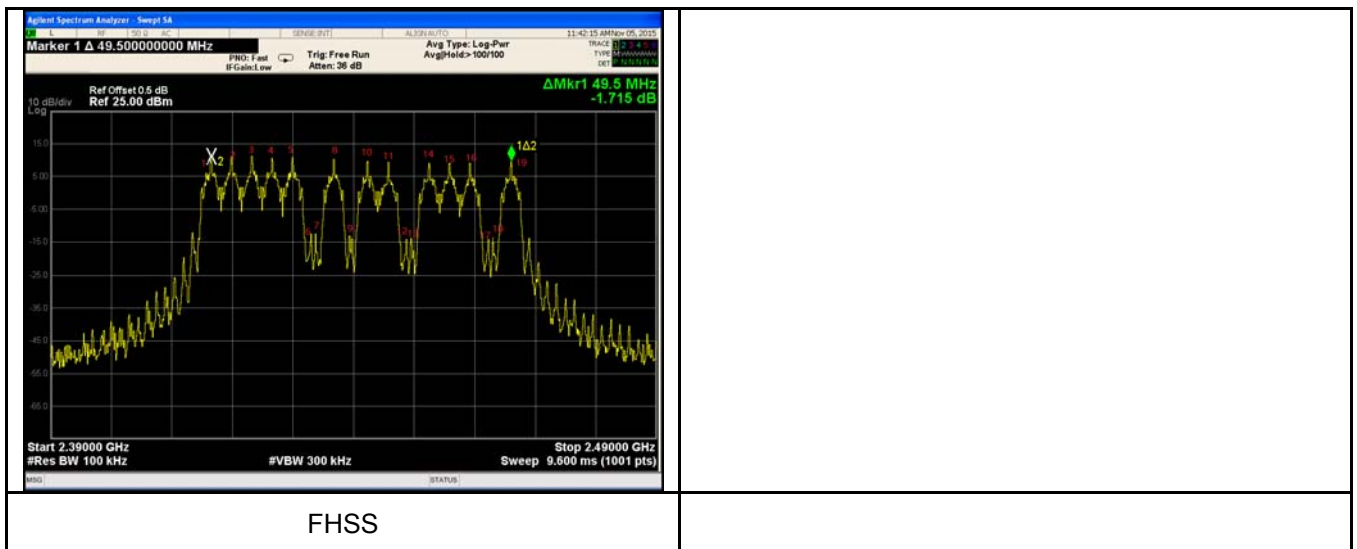
☐ N/A

### Number of Hopping Channel measurement result

Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	FHSS	2409.75-2475.00	19	15

### Test Plots

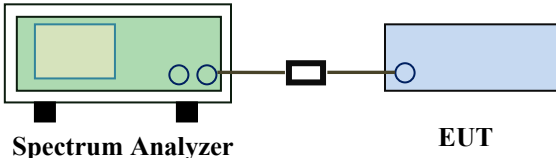
#### Number of Hopping Channels measurement result



## 6.6 Time of Occupancy (Dwell Time)

Temperature	22°C
Relative Humidity	57%
Atmospheric Pressure	1005mbar
Test date :	November 05, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	Dwell Time < 0.4s	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. <u>Use the following spectrum analyzer</u></p> <ul style="list-style-type: none"> <li>- Span = zero span, centered on a hopping channel</li> <li>- RBW = 1 MHz</li> <li>- VBW ≥ RBW</li> <li>- Sweep = as necessary to capture the entire dwell time per hopping channel</li> <li>- Detector function = peak</li> <li>- Trace = max hold</li> <li>- use the marker-delta function to determine the dwell time</li> </ul>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data    ☒ Yes                      ☐ N/A

Test Plot    ☒ Yes (See below)                      ☐ N/A

Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	FHSS	Low	0.28	29.867	400	Pass
		Mid	0.28	29.867	400	Pass
		High	0.28	29.867	400	Pass
Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6						

## Test Plots

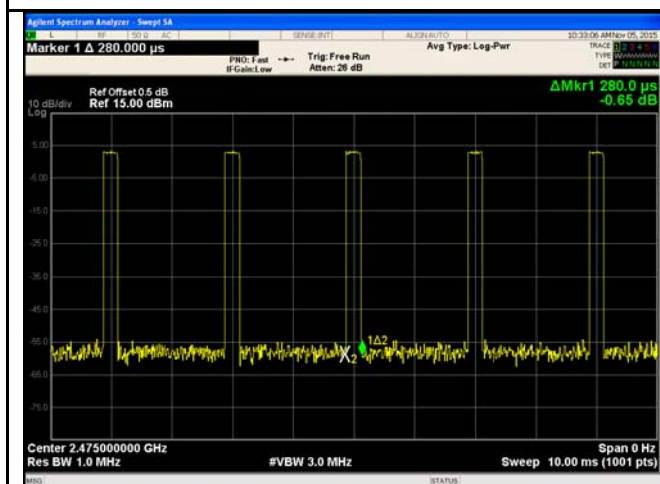
### Dwell Time measurement result



Low CH 2409.75



Mid CH 2442.375



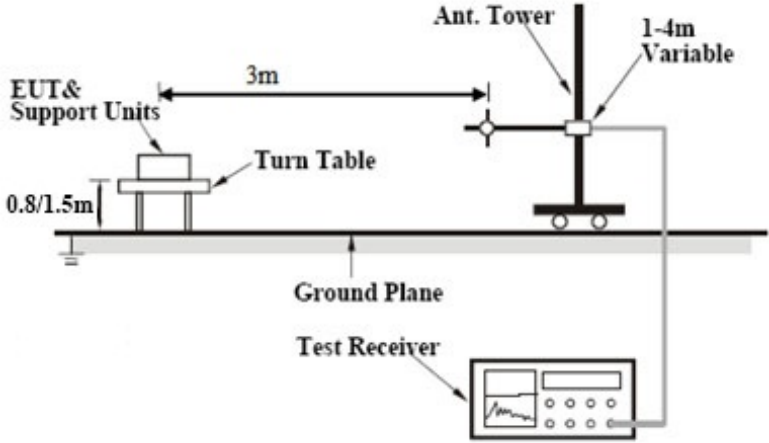
High CH 2475.00



## 6.7 Band Edge

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	November 03, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Radiated Method Only</p> <ul style="list-style-type: none"> <li>1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</li> <li>2. 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,</li> </ul>		

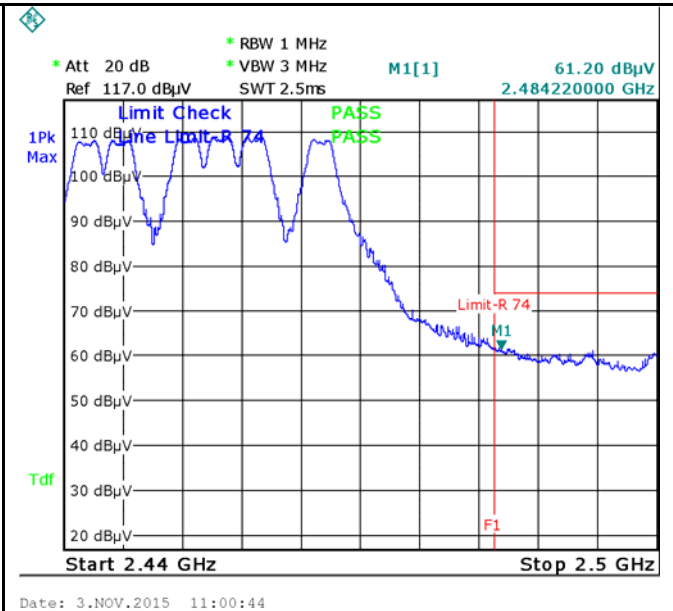
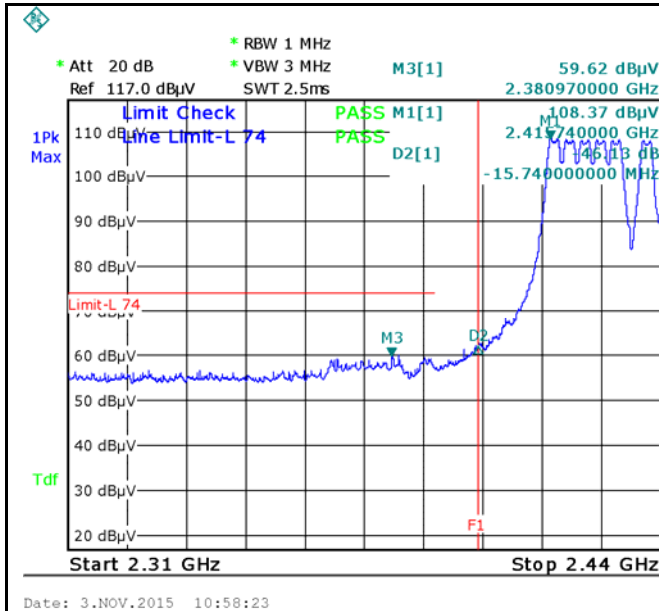
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	<p>and make sure the instrument is operated in its linear range.</p> <ul style="list-style-type: none"> <li>- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: <ul style="list-style-type: none"> <li>a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</li> <li>b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.</li> <li>c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz.</li> </ul> </li> <li>- 4. 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>- 5. Repeat above procedures until all measured frequencies were complete.</li> </ul>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☐ Yes ☒ N/A

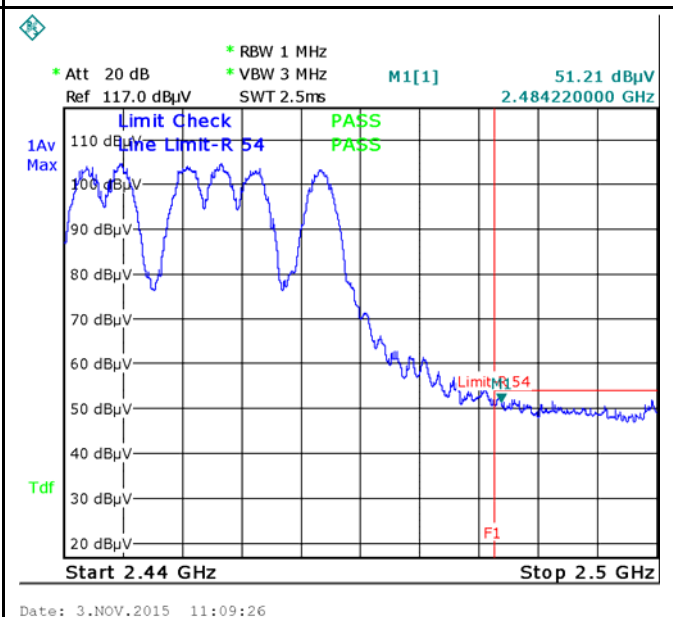
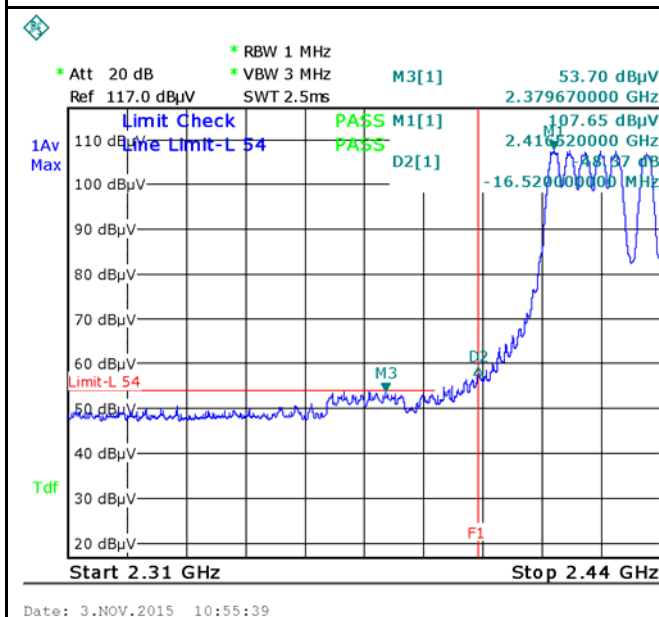
Test Plot ☒ Yes (See below) ☐ N/A

## Test Plots



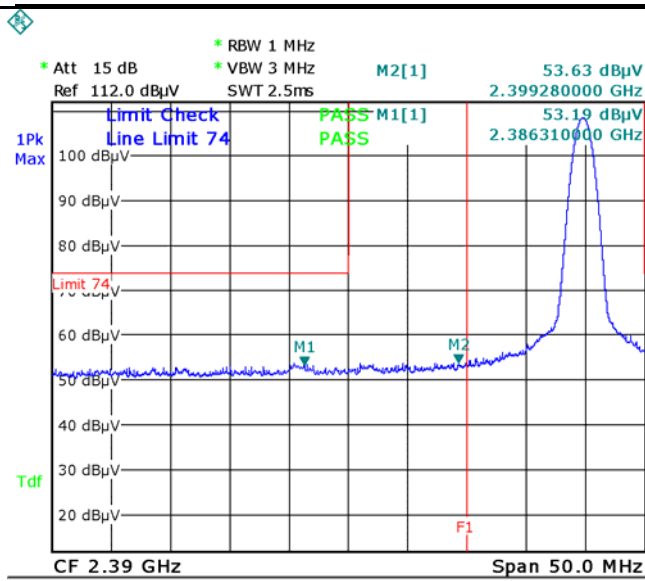
Hopping Left Side-PK

Hopping Right Side-PK

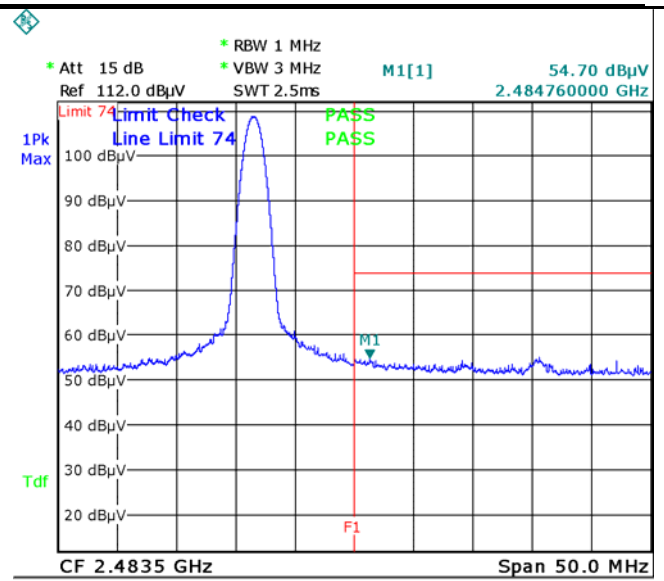


Hopping Left Side-AV

Hopping Right Side-AV

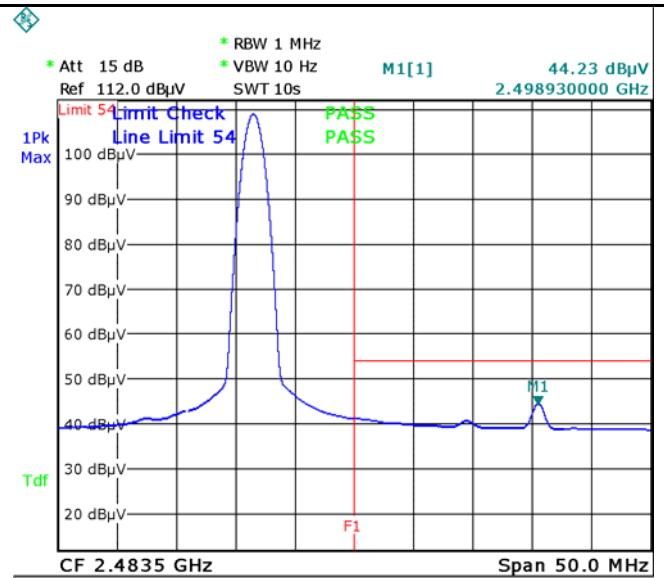


Left Side-PK



Right Side-PK

Note: (no need if PK value less than the AV limit)



Right Side-AV

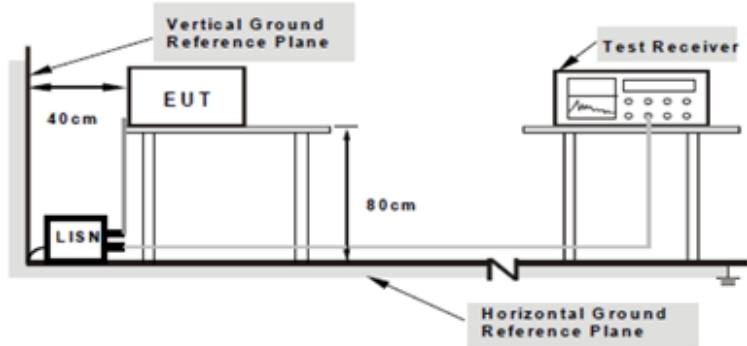
Left Side-AV

## 6.8 AC Power Line Conducted Emissions

Temperature	25°C
Relative Humidity	58%
Atmospheric Pressure	1016mbar
Test date :	October 16, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable		
47CFR§15.207, RSS210 (A8.1)	a)	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.	<div><input checked="" type="checkbox"/></div>		
		Frequency ranges (MHz)		Limit (dBµV)	
				QP	Average
		0.15 ~ 0.5		66 – 56	56 – 46
		0.5 ~ 5		56	46
5 ~ 30	60	50			

Test Setup	 <p>Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</p>
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Procedure	<ol style="list-style-type: none"> <li>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>The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss</li> </ol>
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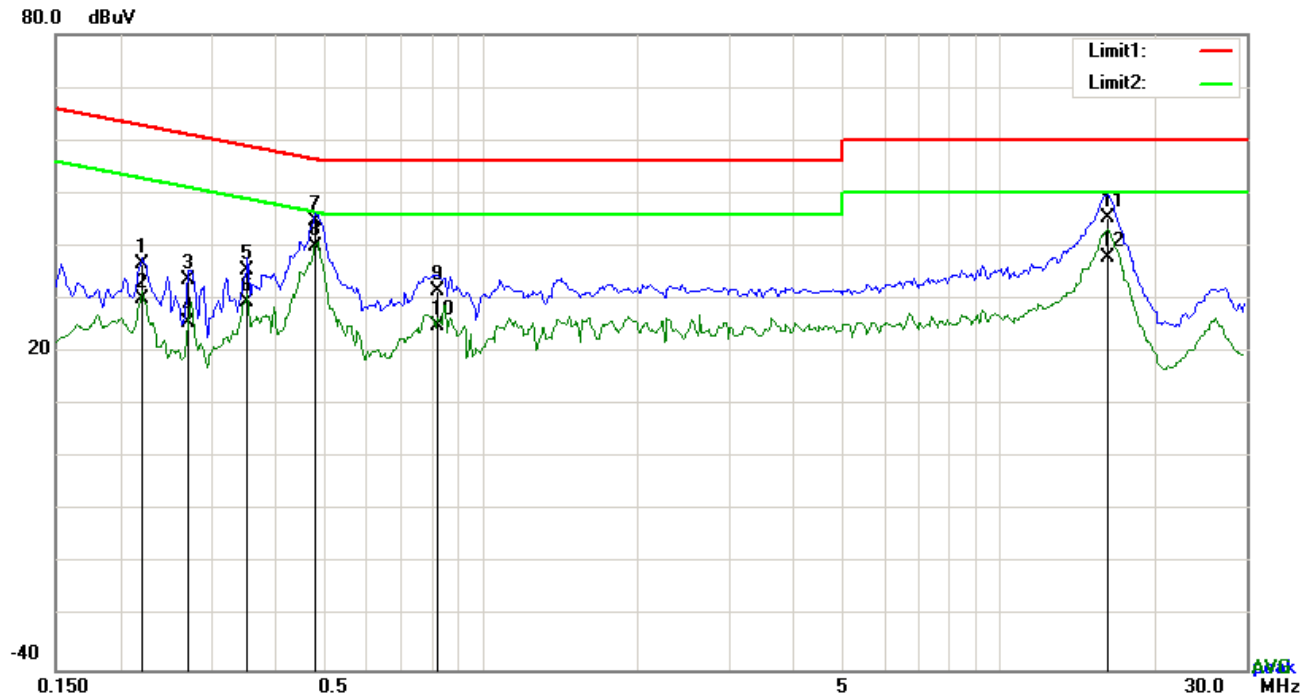
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	<p>coaxial cable.</p> <ol style="list-style-type: none"> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>6. 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	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

**Test Mode:** FHSS Mode

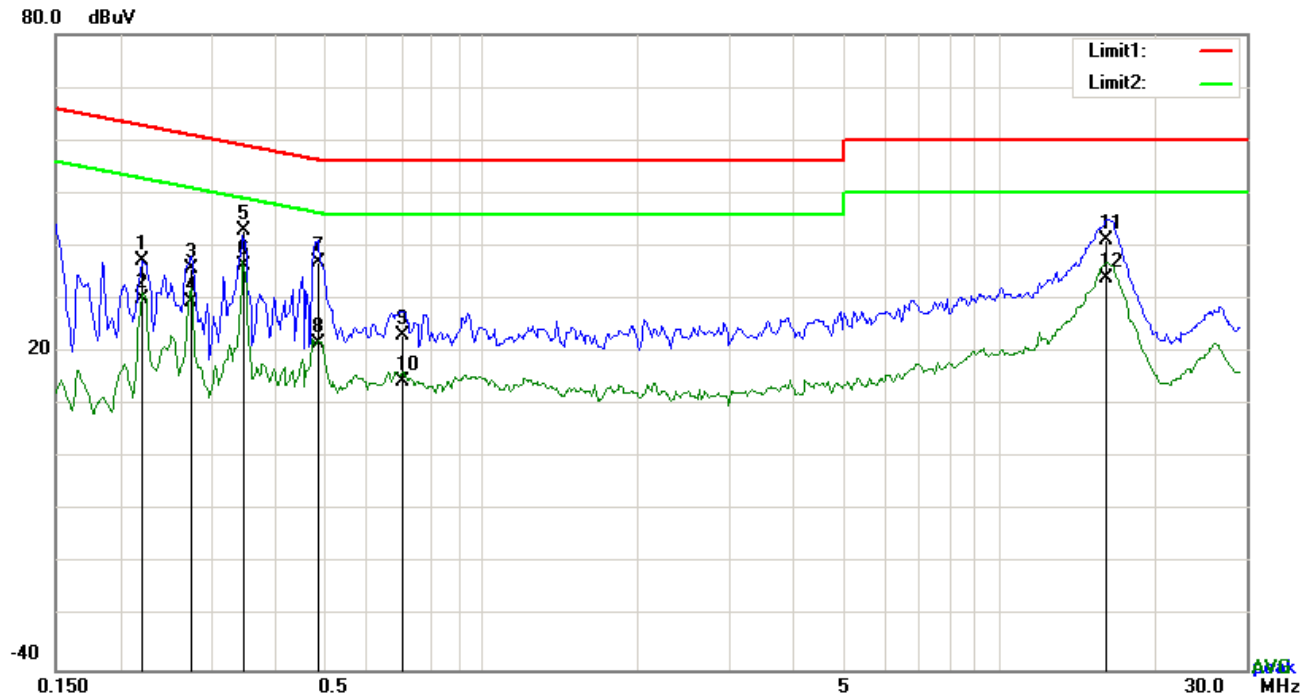


**Test Data**

**Phase Line Plot at 120Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.2202	26.53	QP	10.03	36.56	62.81	-26.25
2	L1	0.2202	20.01	AVG	10.03	30.04	52.81	-22.77
3	L1	0.2709	23.50	QP	10.03	33.53	61.09	-27.56
4	L1	0.2709	15.62	AVG	10.03	25.65	51.09	-25.44
5	L1	0.3528	25.38	QP	10.03	35.41	58.90	-23.49
6	L1	0.3528	19.47	AVG	10.03	29.50	48.90	-19.40
7	L1	0.4776	34.67	QP	10.03	44.70	56.38	-11.68
8	L1	0.4776	30.02	AVG	10.03	40.05	46.38	-6.33
9	L1	0.8208	21.66	QP	10.03	31.69	56.00	-24.31
10	L1	0.8208	14.85	AVG	10.03	24.88	46.00	-21.12
11	L1	16.1469	35.10	QP	10.24	45.34	60.00	-14.66
12	L1	16.1469	27.48	AVG	10.24	37.72	50.00	-12.28

**Test Mode:** FHSS Mode



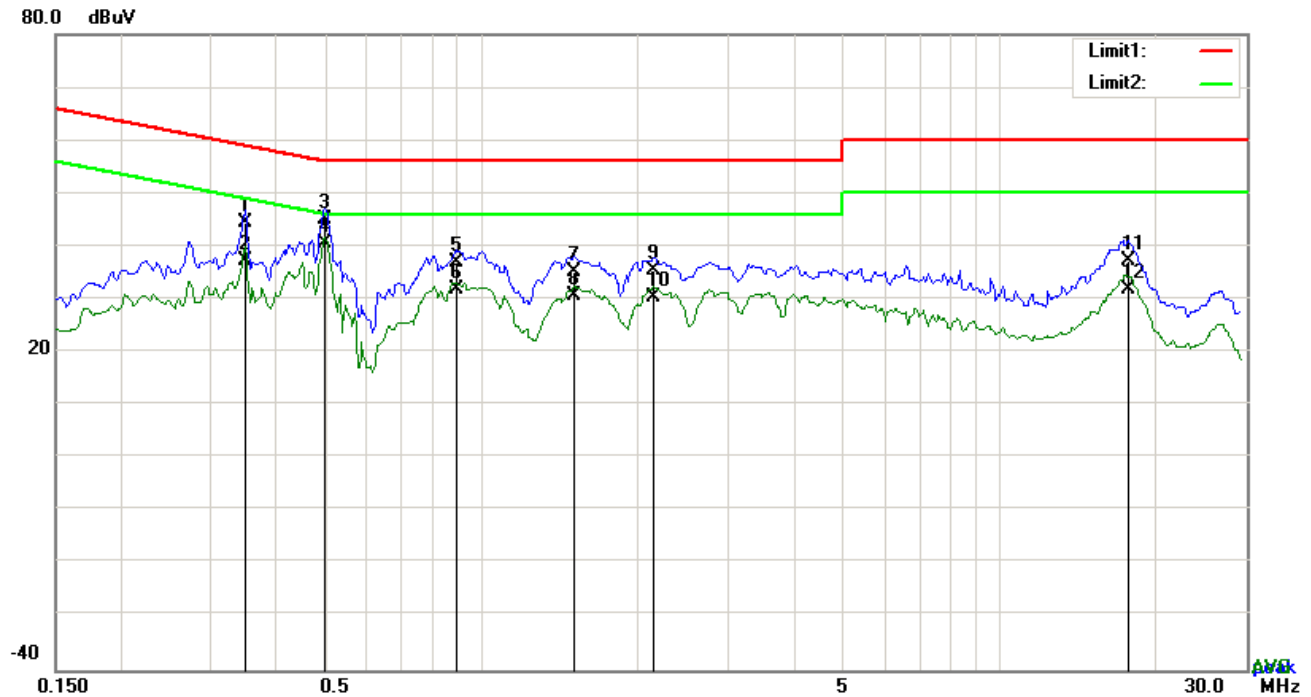
### Test Data

### Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.2202	27.15	QP	10.02	37.17	62.81	-25.64
2	N	0.2202	20.10	AVG	10.02	30.12	52.81	-22.69
3	N	0.2748	25.60	QP	10.02	35.62	60.97	-25.35
4	N	0.2748	19.39	AVG	10.02	29.41	50.97	-21.56
5	N	0.3465	33.06	QP	10.02	43.08	59.05	-15.97
6	N	0.3465	26.48	AVG	10.02	36.50	49.05	-12.55
7	N	0.4815	26.92	QP	10.02	36.94	56.31	-19.37
8	N	0.4815	11.50	AVG	10.02	21.52	46.31	-24.79
9	N	0.7038	13.23	QP	10.02	23.25	56.00	-32.75
10	N	0.7038	4.50	AVG	10.02	14.52	46.00	-31.48
11	N	16.1235	30.84	QP	10.21	41.05	60.00	-18.95
12	N	16.1235	23.78	AVG	10.21	33.99	50.00	-16.01



**Test Mode:** FHSS Mode

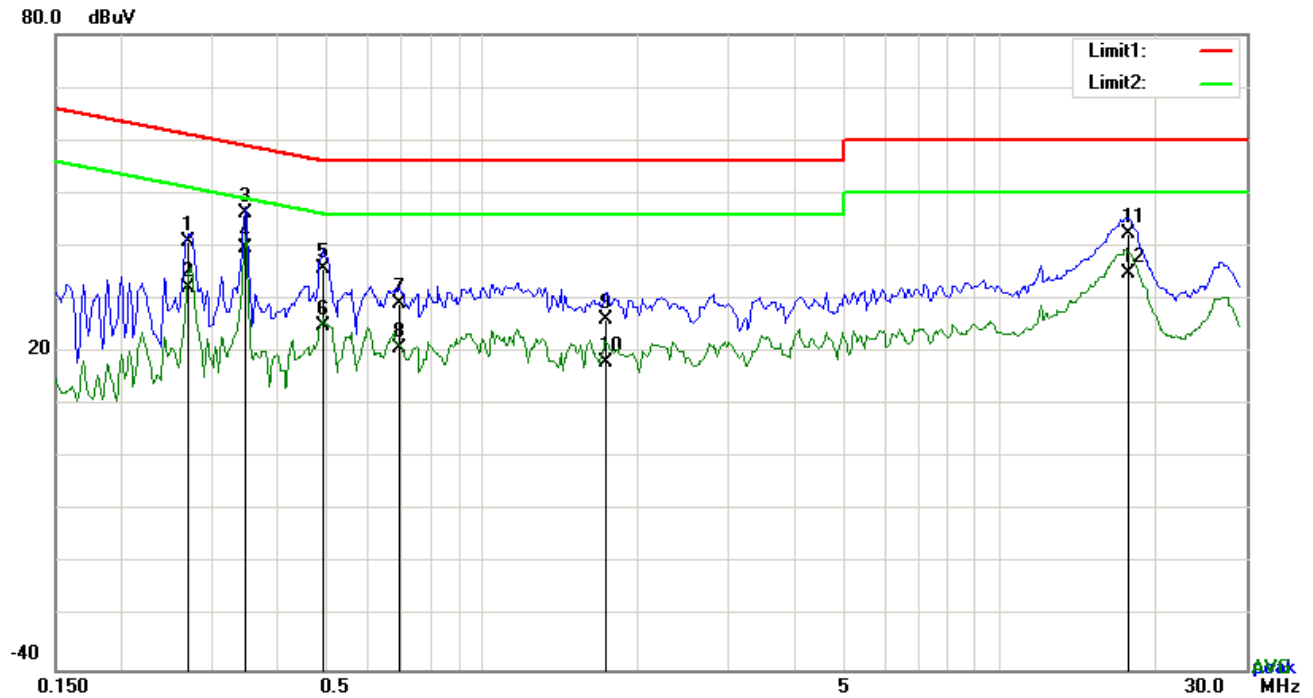


**Test Data**

**Phase Line Plot at 240Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.3489	34.37	QP	10.03	44.40	58.99	-14.59
2	L1	0.3489	27.26	AVG	10.03	37.29	48.99	-11.70
3	L1	0.4971	35.11	QP	10.03	45.14	56.05	-10.91
4	L1	0.4971	30.39	AVG	10.03	40.42	46.05	-5.63
5	L1	0.8910	26.96	QP	10.03	36.99	56.00	-19.01
6	L1	0.8910	21.84	AVG	10.03	31.87	46.00	-14.13
7	L1	1.5033	25.23	QP	10.04	35.27	56.00	-20.73
8	L1	1.5033	20.53	AVG	10.04	30.57	46.00	-15.43
9	L1	2.1507	25.30	QP	10.04	35.34	56.00	-20.66
10	L1	2.1507	20.29	AVG	10.04	30.33	46.00	-15.67
11	L1	17.7549	26.91	QP	10.27	37.18	60.00	-22.82
12	L1	17.7549	21.66	AVG	10.27	31.93	50.00	-18.07

**Test Mode:** FHSS Mode



### Test Data


#### Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.2709	30.96	QP	10.02	40.98	61.09	-20.11
2	N	0.2709	22.17	AVG	10.02	32.19	51.09	-18.90
3	N	0.3489	36.34	QP	10.02	46.36	58.99	-12.63
4	N	0.3489	29.54	AVG	10.02	39.56	48.99	-9.43
5	N	0.4932	25.61	QP	10.02	35.63	56.11	-20.48
6	N	0.4932	15.00	AVG	10.02	25.02	46.11	-21.09
7	N	0.6921	19.12	QP	10.02	29.14	56.00	-26.86
8	N	0.6921	10.84	AVG	10.02	20.86	46.00	-25.14
9	N	1.7412	16.26	QP	10.04	26.30	56.00	-29.70
10	N	1.7412	7.92	AVG	10.04	17.96	46.00	-28.04
11	N	17.7030	32.04	QP	10.23	42.27	60.00	-17.73
12	N	17.7030	24.52	AVG	10.23	34.75	50.00	-15.25

## 6.9 Radiated Emissions

Temperature	24°C
Relative Humidity	51%
Atmospheric Pressure	1027mbar
Test date :	October 27, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable											
47CFR§15.205, §15.209, §15.247(d)	a)	Except higher limit as specified elsewhere in other section, 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												
		<table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></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></table>		Frequency range (MHz)	Field Strength (µV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	
		Frequency range (MHz)		Field Strength (µV/m)										
		30 – 88		100										
		88 – 216		150										
		216 960		200										
Above 960	500													

Test Setup	
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Procedure	<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:</li> </ol>
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	<p>a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</p> <p>3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</p> <p>4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz.</p> <p>5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

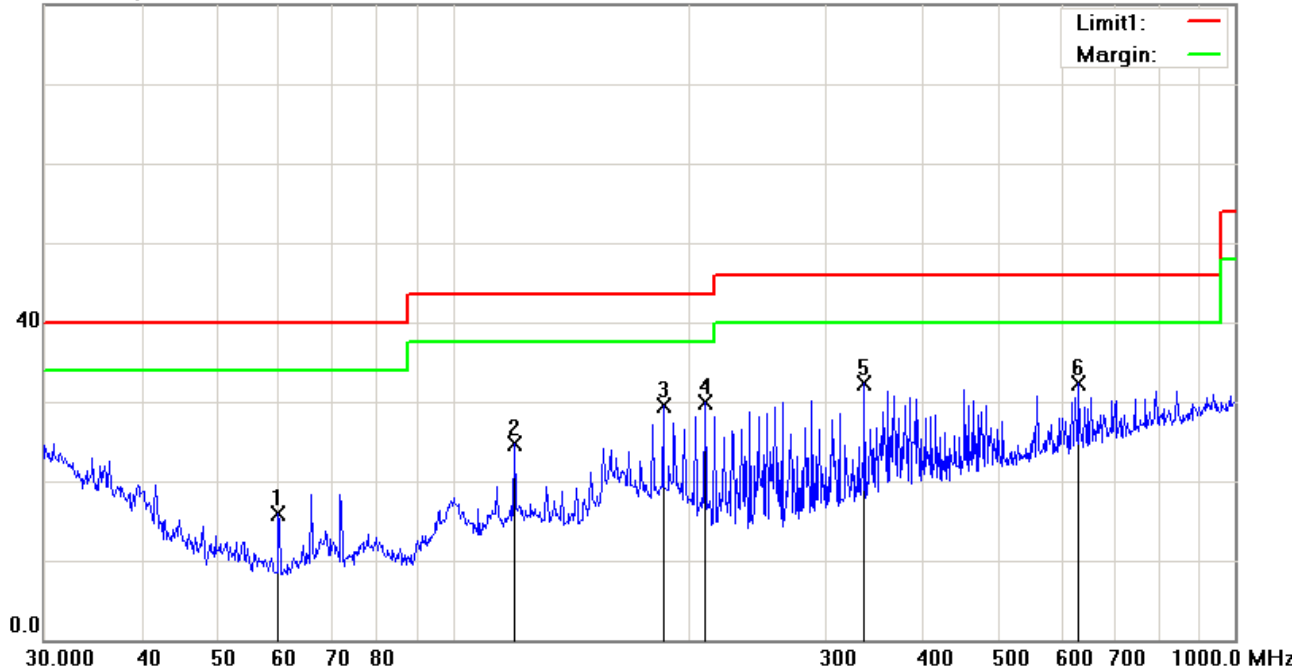
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

**Test Mode:** FHSS Mode

**Below 1GHz**

80.0 dBuV/m

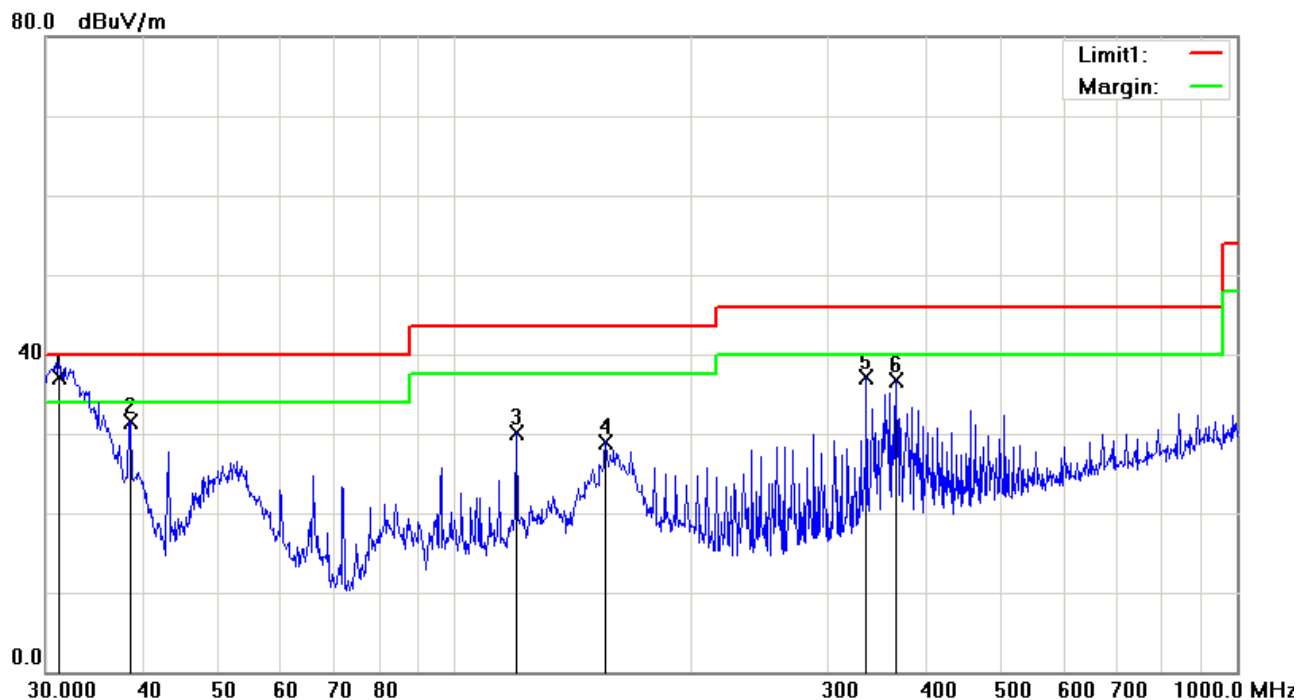


**Test Data**

**Horizontal Polarity Plot @3m**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )
1	H	59.8588	30.27	peak	-14.34	15.93	40.00	-24.07	100	329
2	H	119.8556	32.09	peak	-7.33	24.76	43.50	-18.74	100	182
3	H	185.7882	39.05	peak	-9.51	29.54	43.50	-13.96	100	35
4	H	210.0482	38.81	peak	-8.83	29.98	43.50	-13.52	100	284
5	H	336.0352	38.18	peak	-5.86	32.32	46.00	-13.68	100	151
6	H	631.6884	31.78	peak	0.52	32.30	46.00	-13.70	100	0

## Below 1GHz



## Test Data

### Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )
1	V	31.1798	38.16	QP	-1.13	37.03	40.00	-2.97	100	56
2	V	38.4809	37.91	peak	-6.48	31.43	40.00	-8.57	100	183
3	V	119.8556	37.37	peak	-7.33	30.04	43.50	-13.46	100	145
4	V	155.9101	37.33	peak	-8.33	29.00	43.50	-14.50	100	98
5	V	336.0352	42.92	peak	-5.86	37.06	46.00	-8.94	100	0
6	V	366.8231	41.73	peak	-5.07	36.66	46.00	-9.34	100	252

### Above 1GHz

<b>Test Mode:</b>	<b>Transmitting Mode</b>
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#### Low Channel (2409.75 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4819.5	44.28	AV	V	33.83	6.86	31.72	53.25	54	-0.75
4819.5	43.91	AV	H	33.83	6.86	31.72	52.88	54	-1.12
4819.5	50.25	PK	V	33.83	6.86	31.72	59.22	74	-14.78
4819.5	48.79	PK	H	33.83	6.86	31.72	57.76	74	-16.24

#### Middle Channel (2442.375 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4884.75	44.53	AV	V	33.86	6.82	31.82	53.39	54	-0.61
4884.75	43.89	AV	H	33.86	6.82	31.82	52.75	54	-1.25
4884.75	50.16	PK	V	33.86	6.82	31.82	59.02	74	-14.98
4884.75	48.71	PK	H	33.86	6.82	31.82	57.57	74	-16.43

#### High Channel (2475.00 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4950	44.49	AV	V	33.9	6.76	31.92	53.23	54	-0.77
4950	43.92	AV	H	33.9	6.76	31.92	52.66	54	-1.34
4950	49.97	PK	V	33.9	6.76	31.92	58.71	74	-15.29
4950	48.83	PK	H	33.9	6.76	31.92	57.57	74	-16.43

#### Note:

- 1, The testing has been conformed to 10\*2475MHz=24,750MHz
- 2, All other emissions more than 30 dB below the limit

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted</b>					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191106	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191107	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
<b>RF conducted test</b>					
Agilent ESA-E SERIES	E4407B	MY45108319	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Positioning Controller	UC3000	MF780208282	11/20/2014	11/19/2015	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/23/2016	<input checked="" type="checkbox"/>

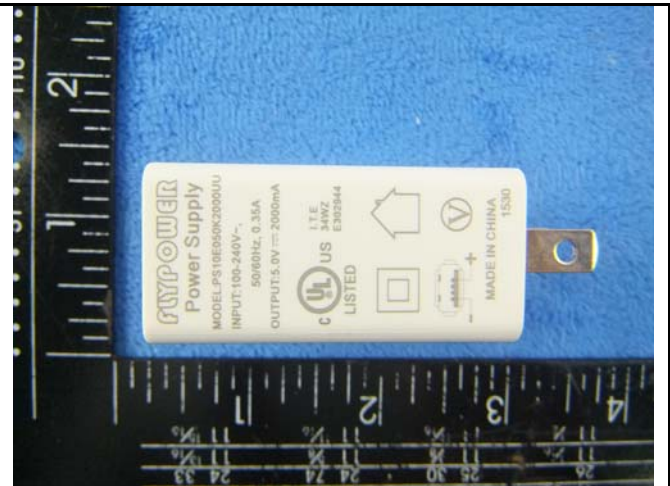


## Annex B. EUT And Test Setup Photographs

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



Whole Package - Top View



Adapter - Front View



EUT – Front View



EUT – Rear View



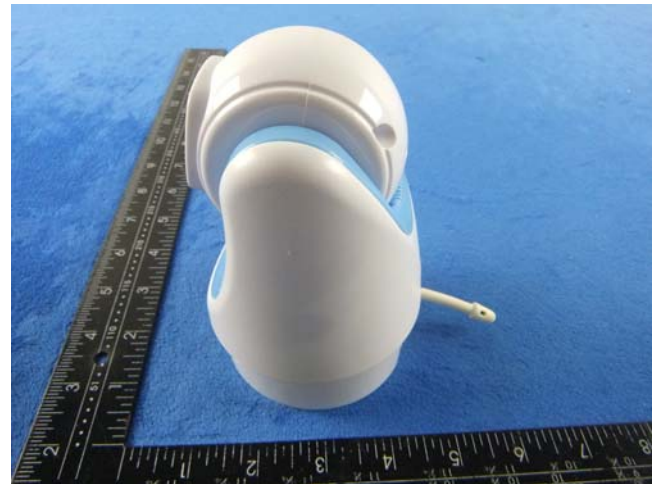
EUT - Top View



EUT - Bottom View



EUT - Left View



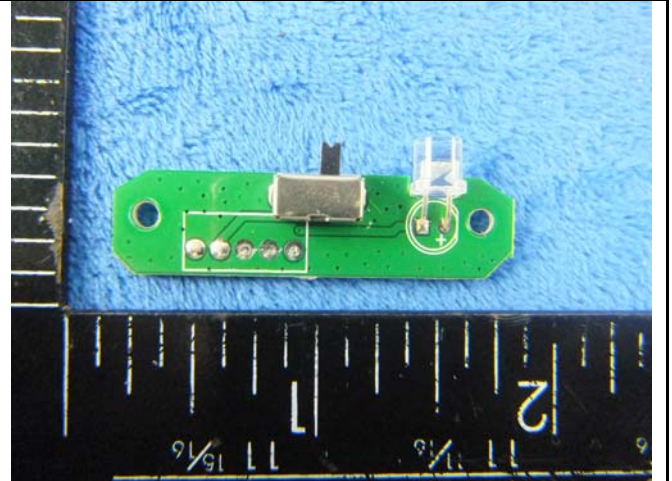
EUT - Right View



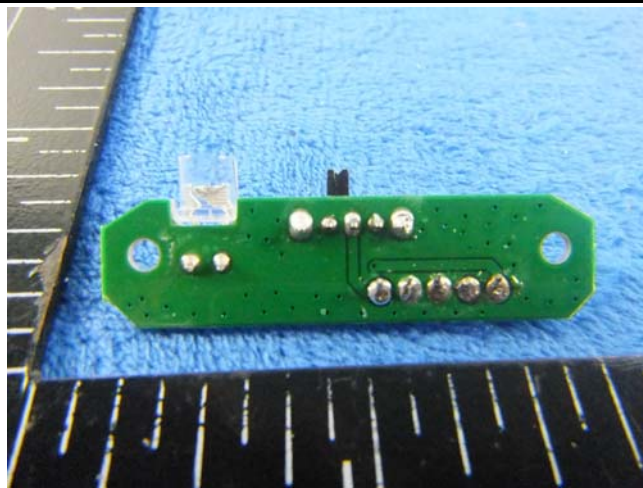
**Annex B.ii. Photograph: EUT Internal Photo**



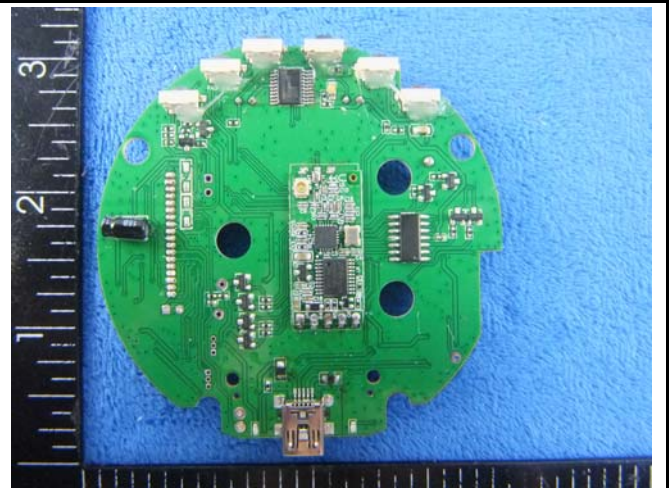
EUT - Uncover Front View 1



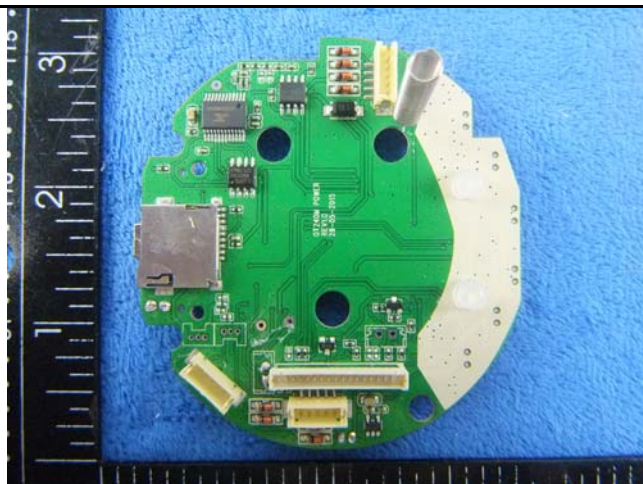
Small Mainboard - Front View



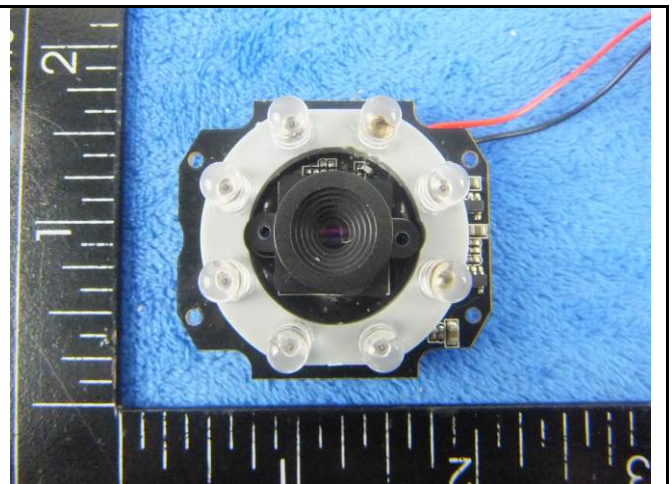
Small Mainboard - Rear View



Mainboard - Front View

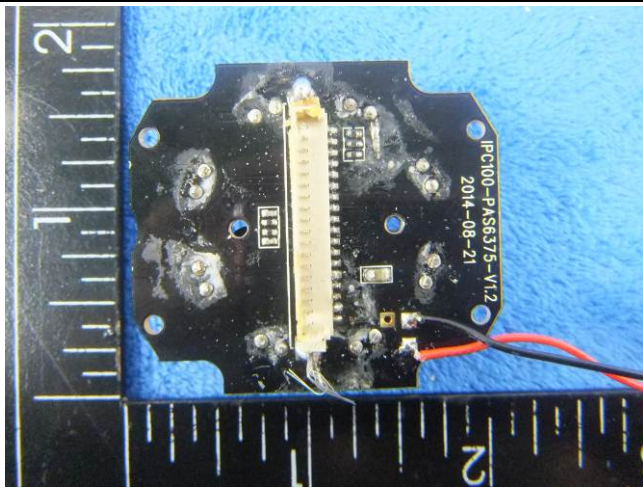


Mainboard - Rear View

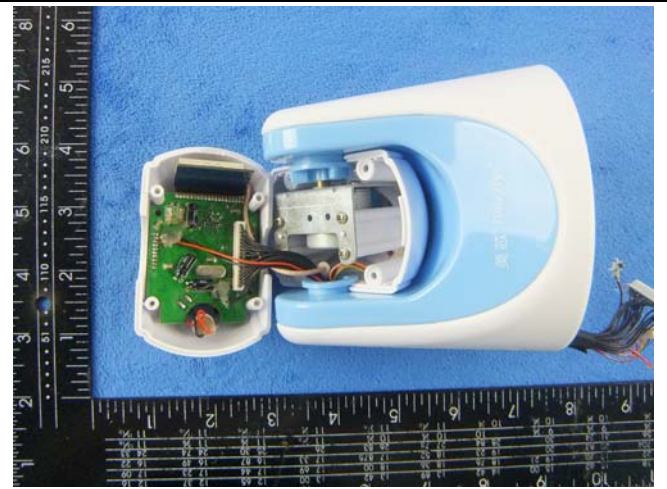


Camera - Front View

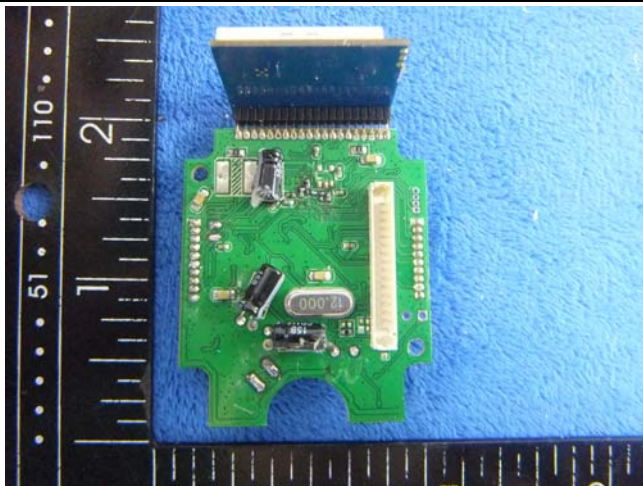




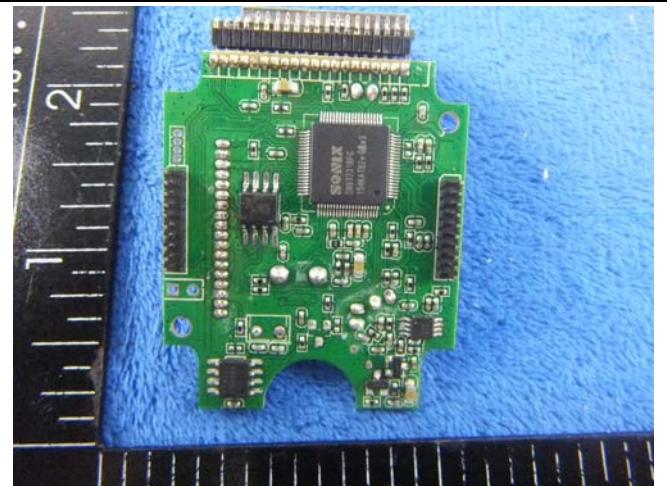
Camera - Rear View



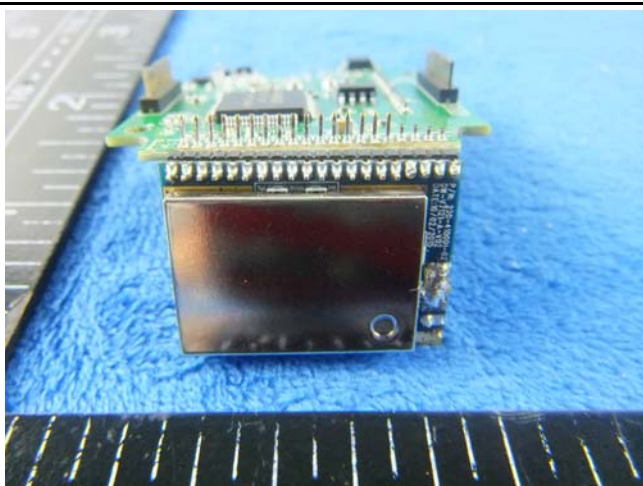
EUT - Uncover Front View 2



Connecting Board- Front View



Connecting Board - Rear View



FHSS Board with Shielding - Front View



FHSS Board - Rear View

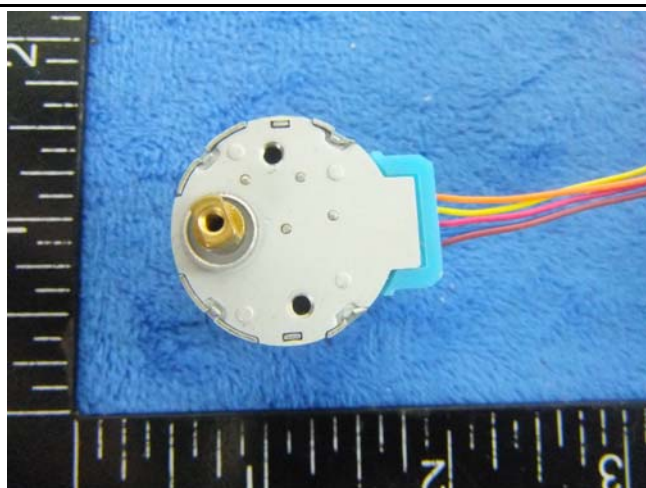




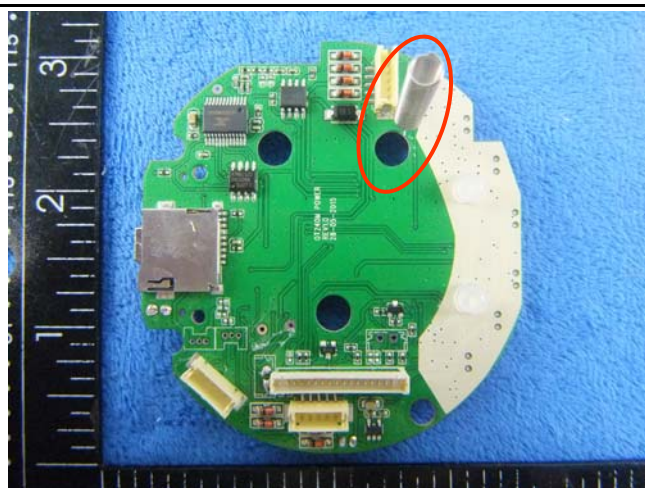
FHSS Board without shielding - Front View



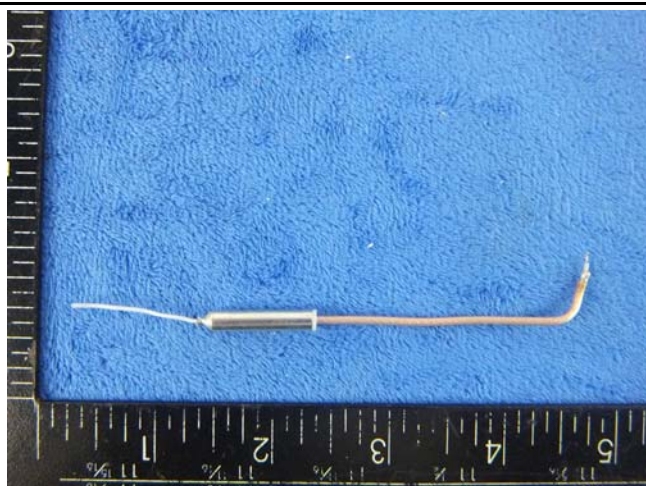
Motor – Front View



Motor – Rear View



433MHz Receiver - Antenna View



FHSS- Antenna View

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



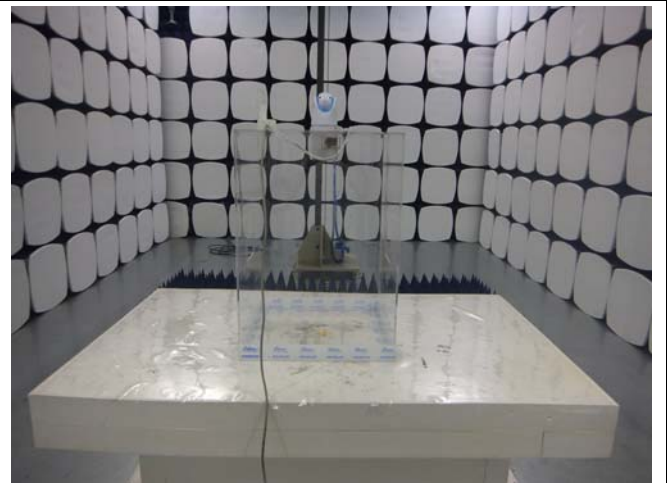
Conducted Emissions Test Setup Front View



Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz

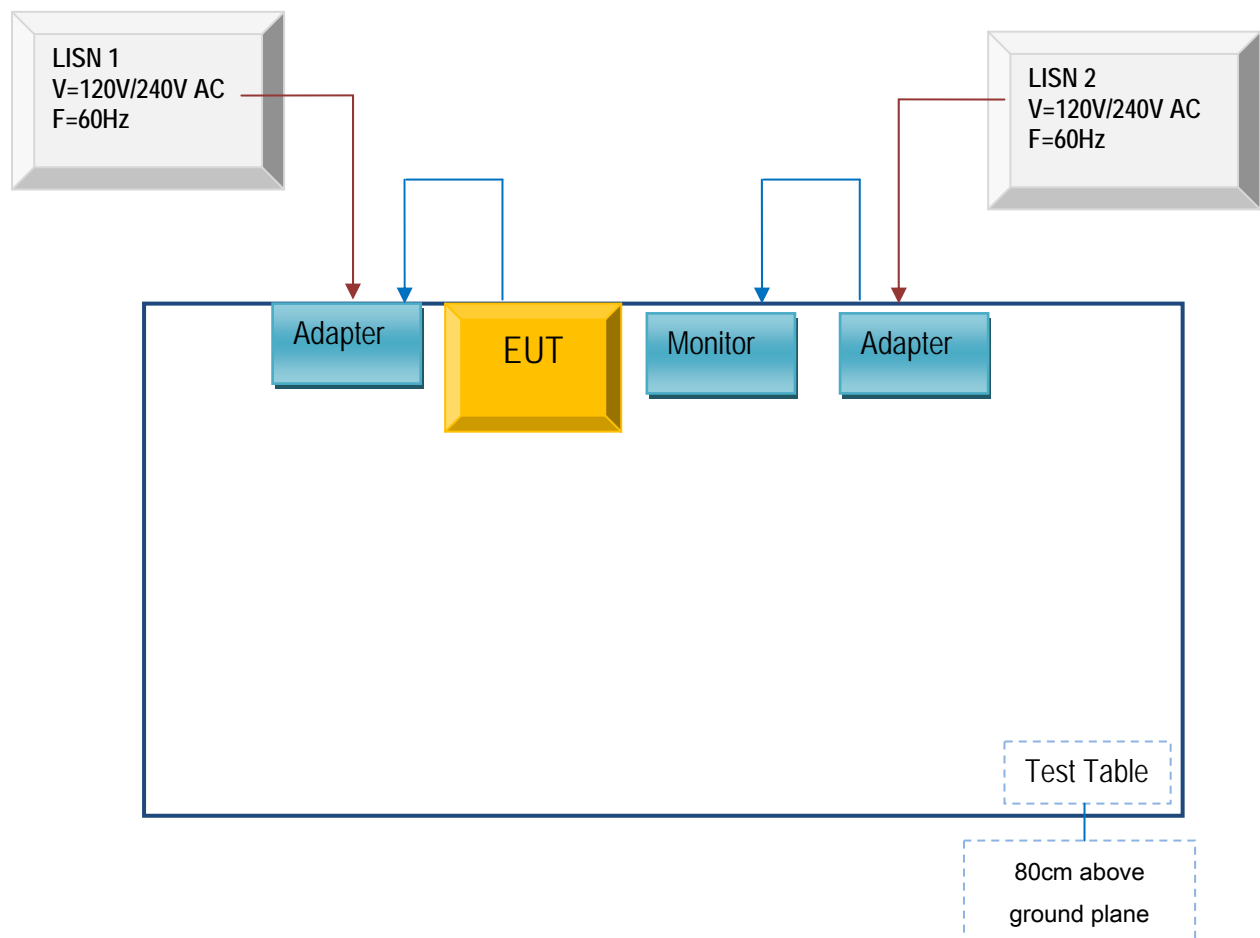


Radiated Spurious Emissions Test Setup Above  
1GHz

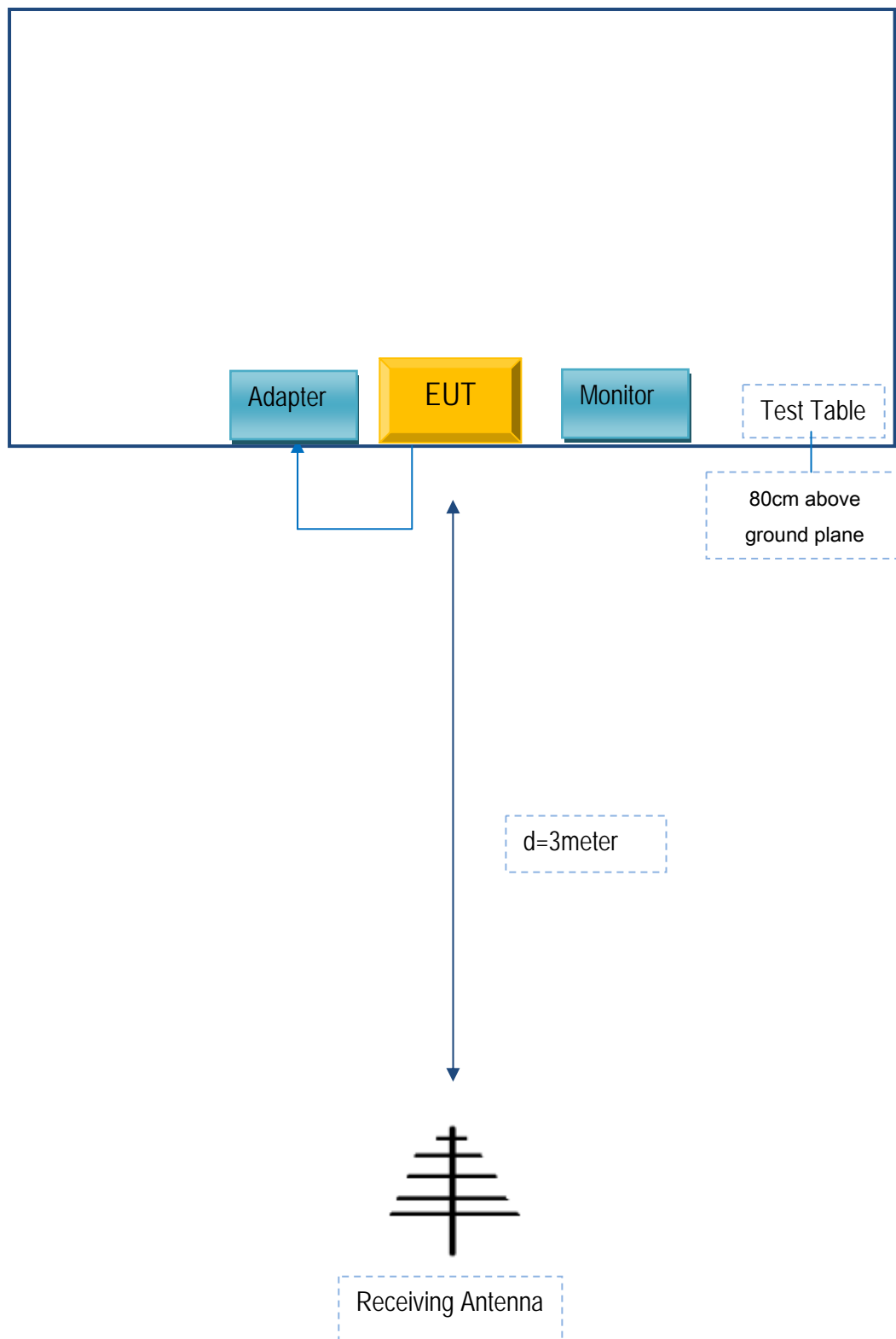
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

#### Block Configuration Diagram for AC Line Conducted Emissions

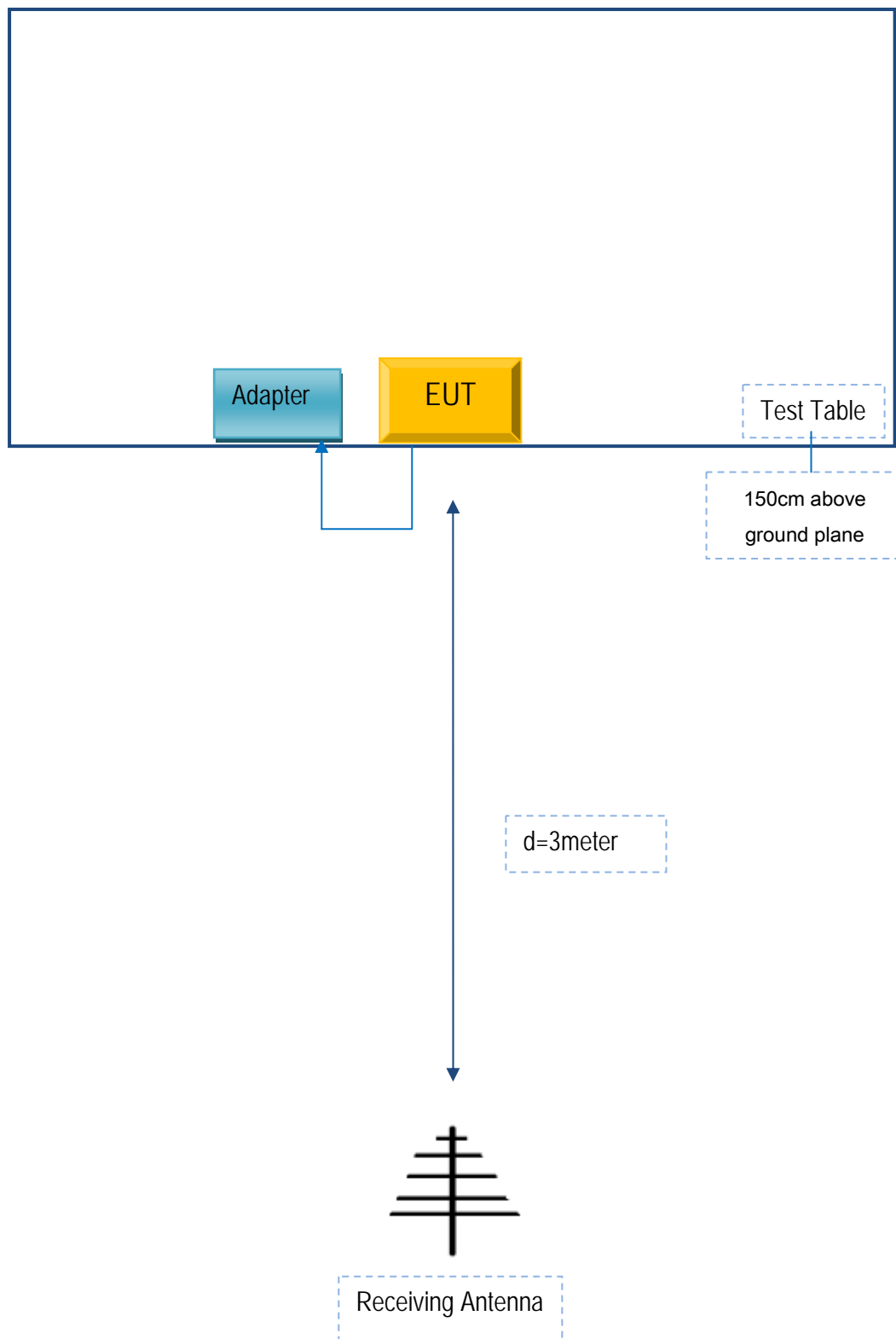


**Block Configuration Diagram for Radiated Emissions ( Below 1GHz ) .**





**Block Configuration Diagram for Radiated Emissions ( Above 1GHz ) .**



## **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
Shenzhen Creative Industry Co., Ltd.	Monitor	N/A	N/A
Shenzhen Creative Industry Co., Ltd.	Oximerer	PC-68A	N/A
Shenzhen Creative Industry Co., Ltd.	Adapter	PS10E050K2000UU	KL15032015

### **Supporting Cable:**

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	XM18702253

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

Please see attachment

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## Annex E. DECLARATION OF SIMILARITY

N/A