
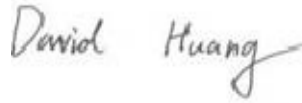



# RF TEST REPORT



Report No.: 16071065-FCC-R2

Supersede Report No.: N/A

Applicant	MOBIWIRE MOBILES (NINGBO) CO.,LTD.	
Product Name	Mobile phone	
Model No.	A500	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2015, ANSI C63.10: 2013	
Test Date	August 31 to September 20, 2016	
Issue Date	September 21, 2016	
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"/>	
		
Loren Luo 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

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## 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

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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
16071065-FCC-R2	NONE	Original	September 21, 2016
16071065-FCC-R2	V1	Changing Test Setup Photo Above 1GHz	November 02, 2016

## 2. Customer information

Applicant Name	MOBIWIRE MOBILES (NINGBO) CO.,LTD.
Applicant Add	No.999,Dacheng East Road,Fenghua City,Zhejiang
Manufacturer	MOBIWIRE MOBILES (NINGBO) CO.,LTD
Manufacturer Add	No.999,Dacheng East Road,Fenghua City,Zhejiang

## 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:	Mobile phone
Main Model:	A500
Serial Model:	N/A
Date EUT received:	August 29, 2016
Test Date(s):	August 31 to September 20, 2016
Equipment Category :	DSS
Antenna Gain:	GSM850: -1dBi PCS1900: -2dBi UMTS-FDD Band V: -1dBi UMTS-FDD Band IV: -1dBi UMTS-FDD Band II: -2dBi Bluetooth/BLE/WIFI: -2dBi GPS: -2dBi
Type of Modulation:	GSM / GPRS: GMSK EGPRS: GMSK, UMTS-FDD: QPSK 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, $\pi$ /4DQPSK, 8DPSK BLE: GFSK GPS: BPSK
Input Power:	Adapter: Model: A8+-500550 Input: AC 100-240V~50/60Hz;0.2A Max Output: DC 5.0V,550mA Battery: Model: H5012 Nominal Voltage: 3.8V;2150mAh;8.17Wh Charging Voltage: DC 4.35V

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	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz
	PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz
	UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz
	UMTS-FDD Band IV TX:1712.4 ~ 1752.6 MHz; RX : 2112.4 ~ 2152.6 MHz
RF Operating Frequency (ies):	UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz; RX: 1932.4 ~ 1987.6 MHz
	WIFI: 802.11b/g/n(20M): 2412-2462 MHz
	WIFI: 802.11n(40M): 2422-2452 MHz
	Bluetooth& BLE: 2402-2480 MHz
	GPS: 1575.42 MHz
Max. Output Power:	6.302dBm
	GSM 850: 124CH
	PCS1900: 299CH
	UMTS-FDD Band V : 102CH
	UMTS-FDD Band IV: 202CH
Number of Channels:	UMTS-FDD Band II : 277CH
	WIFI :802.11b/g/n(20M): 11CH
	WIFI :802.11n(40M): 7CH
	Bluetooth: 79CH
	BLE: 40CH
	GPS:1CH
Port:	Earphone Port, USB Port
Trade Name :	N/A
GPRS/EGPRS Multi-slot class	8/10/12
FCC ID:	2ADA4A500
Antenna Type:	PIFA antenna

## 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& Restricted Band	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions& Restricted Band	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 PIFA antenna for Bluetooth/BLE/WIFI/GPS, the gain is -2dBi for Bluetooth/BLE /WIFI and GPS.

A permanently attached PIFA antenna for GSM/PCS/UMTS, the gain is -1dBi for GSM850, -2dBi for PCS1900, -1dBi for UMTS-FDD Band V and Band IV, -2dBi for UMTS-FDD Band II.

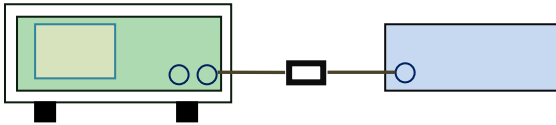
**The antenna meets up with the ANTENNA REQUIREMENT.**

**Result:** Compliance.

## 6.2 Channel Separation

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	September 06, 2016
Tested By :	Loren Luo

### 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	<input checked="" type="checkbox"/>
Test Setup			
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>		

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

Test Data  Yes  N/A

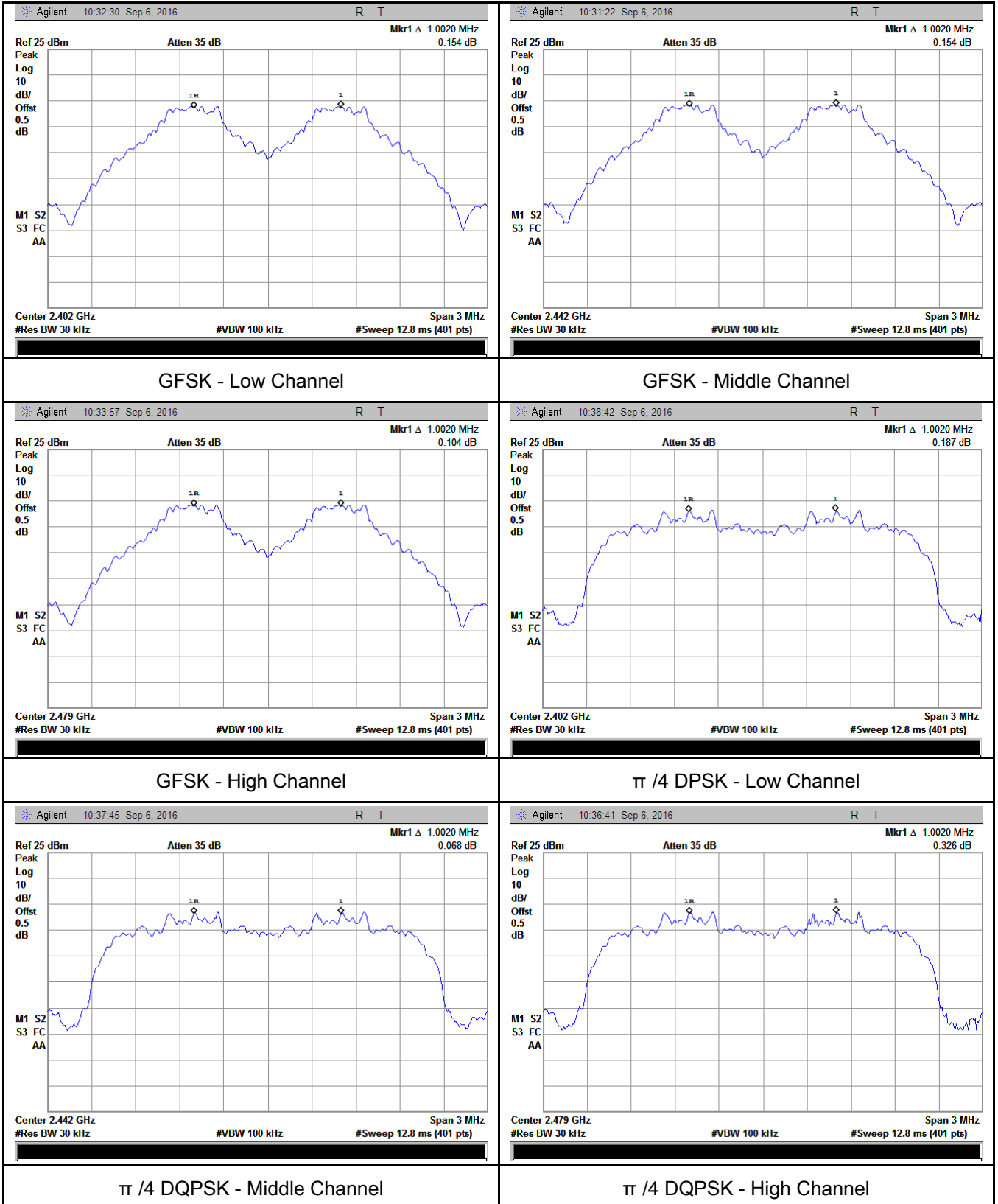
Test Plot  Yes (See below)  N/A

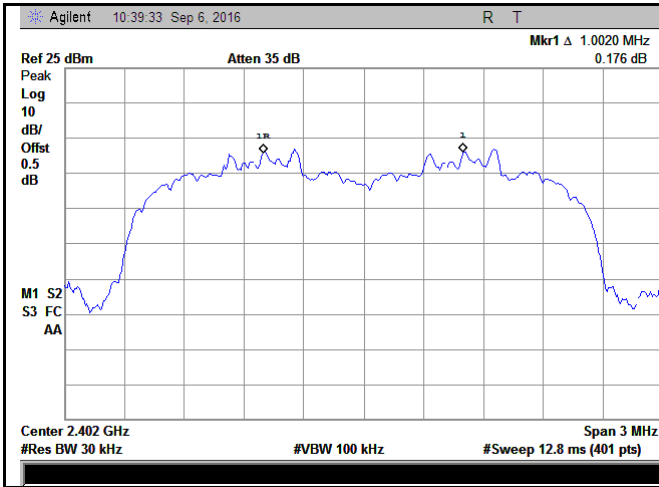
### Channel Separation measurement result

Type/ Modulation	CH	CH Frequency (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	1.002	0.684	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.685	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.685	Pass
	Adjacency Channel	2479			
CH Separation $\pi/4$ DQPSK	Low Channel	2402	1.002	0.860	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.865	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.862	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.002	0.863	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.863	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.865	Pass
	Adjacency Channel	2479			

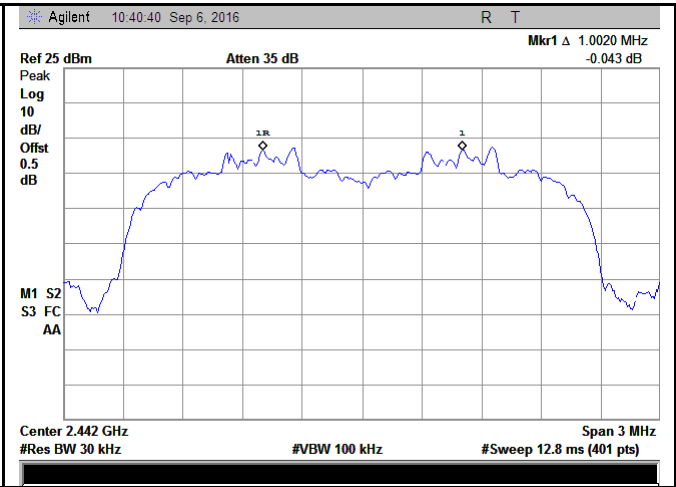
## Test Plots

### Channel Separation measurement result

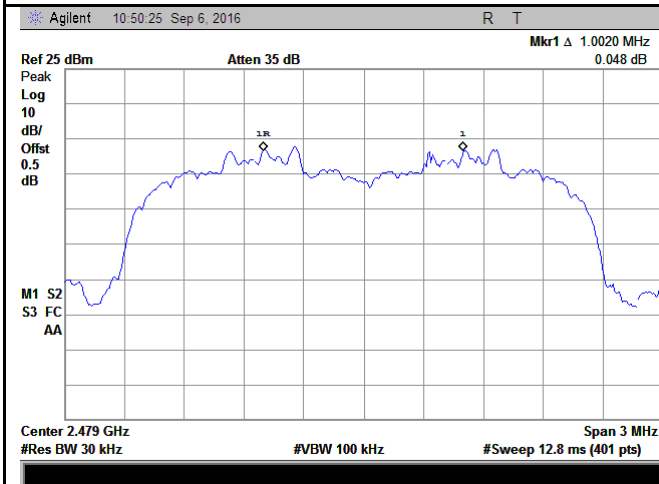




8DPSK - Low Channel



8DPSK - Middle Channel



8DPSK - High Channel

### 6.3 20dB Bandwidth

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	September 06, 2016
Tested By :	Loren Luo

**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	
------------	--

Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines.  <u>Use the following spectrum analyzer settings:</u></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>
----------------	--

	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

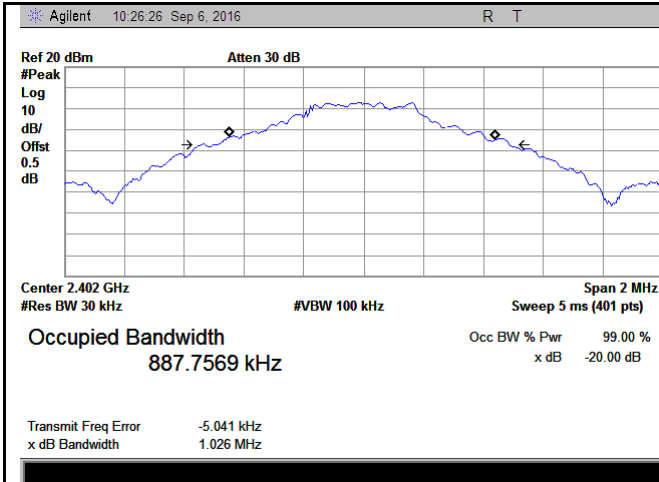
Test Plot  Yes (See below)  N/A

#### Measurement result

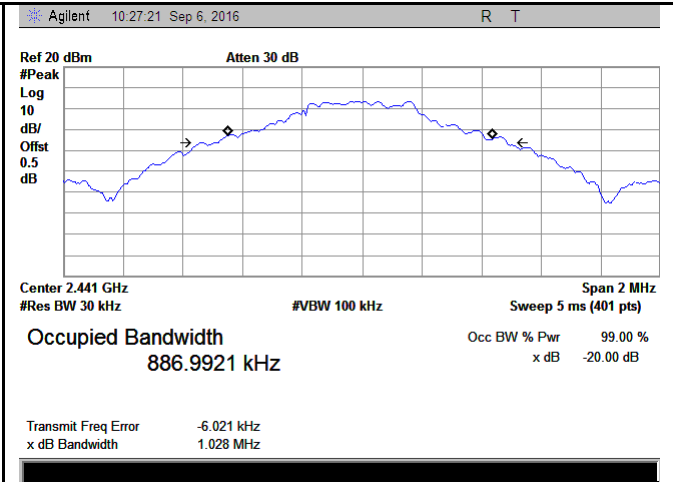
Modulation	CH	CH Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GFSK	Low	2402	1.026	0.8878
	Mid	2441	1.028	0.8870
	High	2480	1.028	0.8898
$\pi/4$ DQPSK	Low	2402	1.290	1.1674
	Mid	2441	1.298	1.1681
	High	2480	1.293	1.1657
8-DPSK	Low	2402	1.295	1.1690
	Mid	2441	1.294	1.1692
	High	2480	1.297	1.1698

## Test Plots

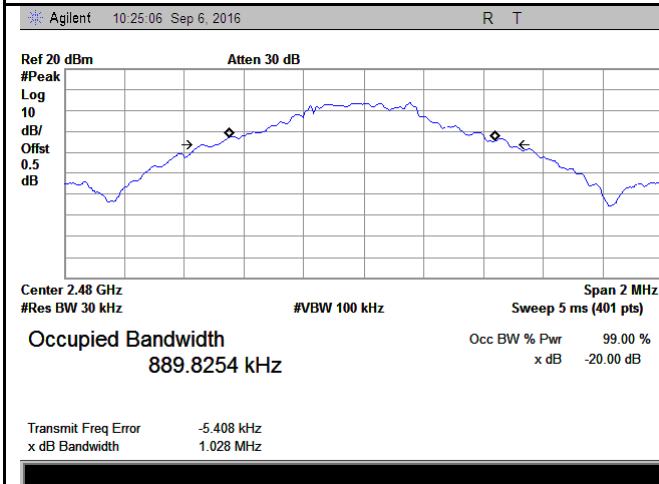
### 20dB Bandwidth measurement result



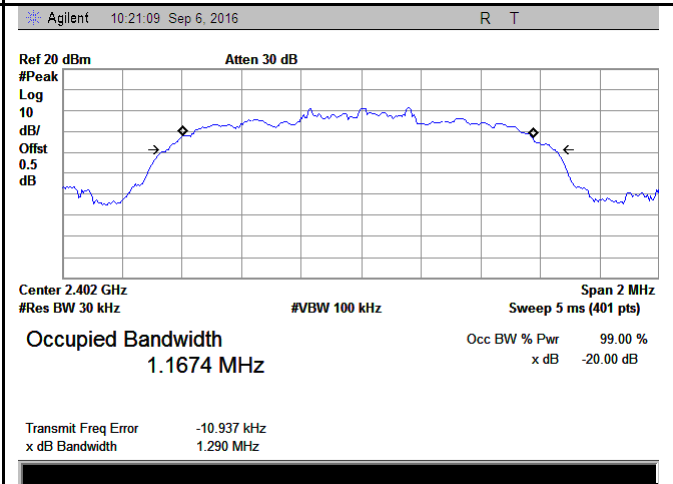
GFSK - Low Channel



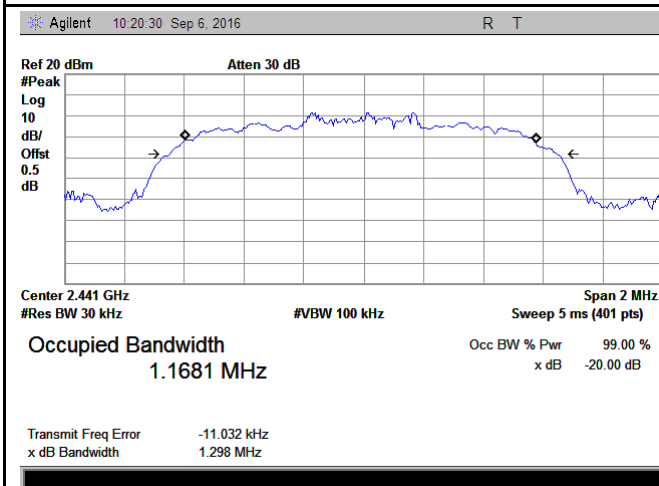
GFSK - Middle Channel



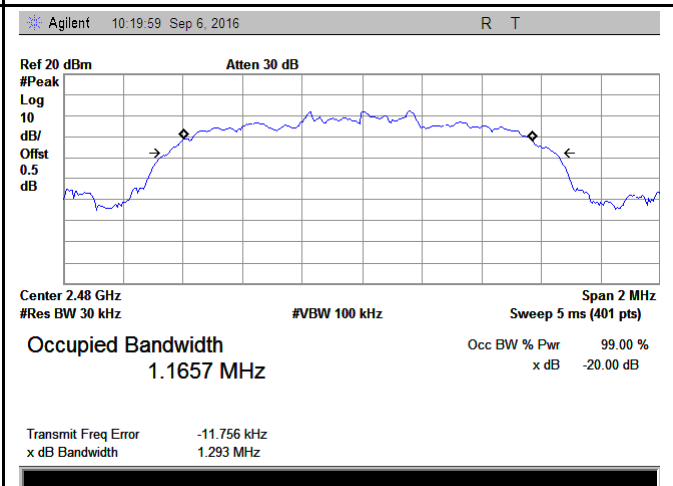
GFSK - High Channel



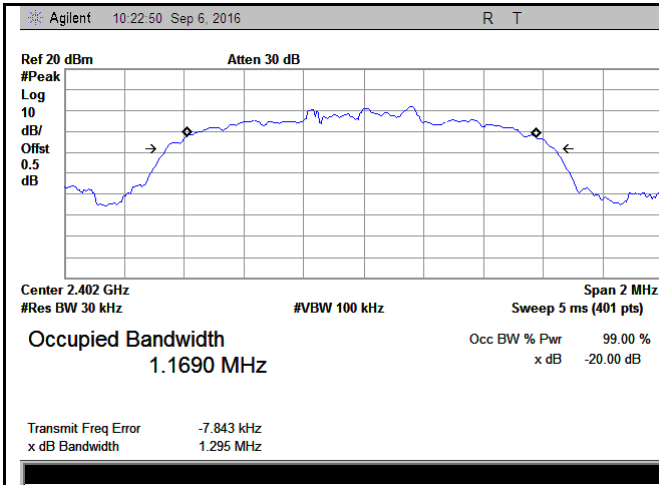
$\pi/4$  DPSK - Low Channel



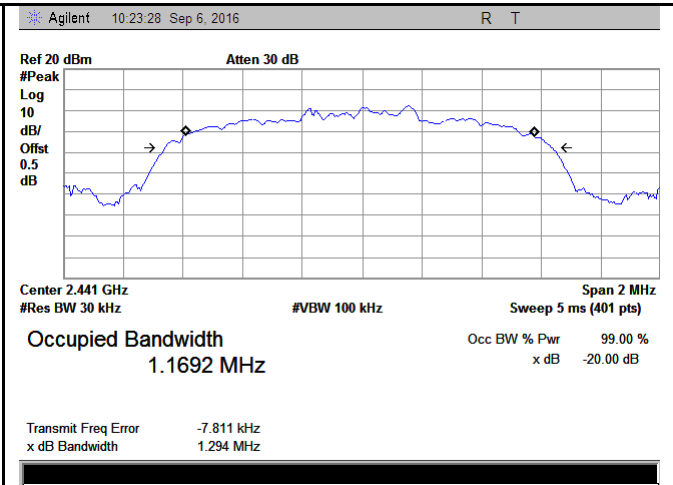
$\pi/4$  DQPSK - Middle Channel



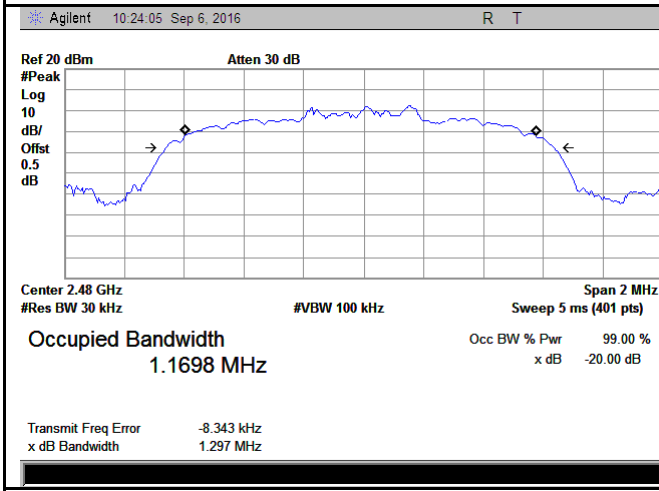
$\pi/4$  DQPSK - High Channel



8DPSK - Low Channel



8DPSK - Middle Channel



8DPSK - High Channel

## 6.4 Peak Output Power

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	September 06, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (3)	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)	DTS in 902-928MHz, 2400-2483.5MHz: $\leq 1$ Watt	<input type="checkbox"/>

Test Setup	
------------	--

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 &gt; 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> <li>- Allow the trace to stabilize.</li> </ul>
----------------	--

	<ul style="list-style-type: none"> <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

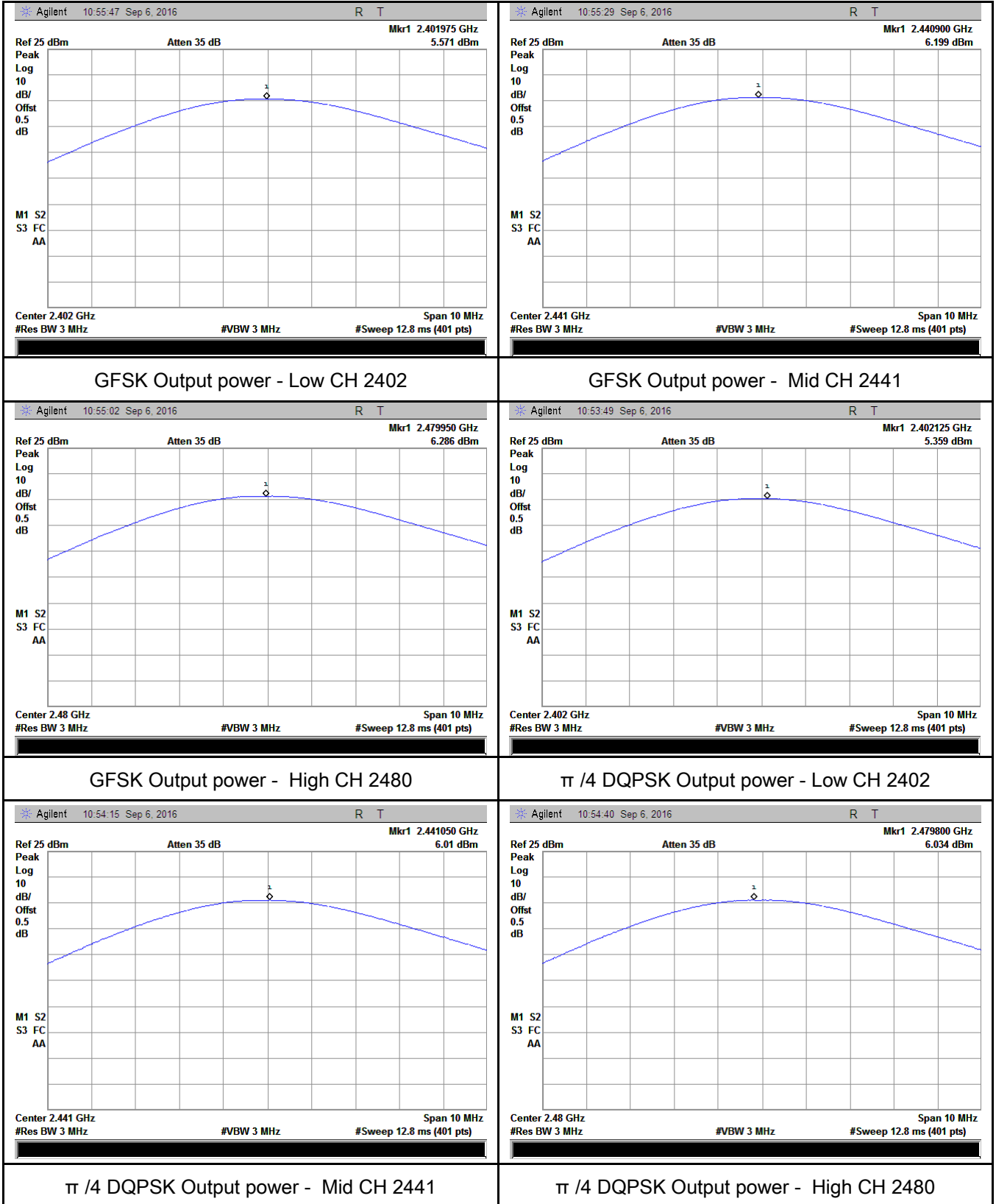
Test Plot     Yes (See below)             N/A

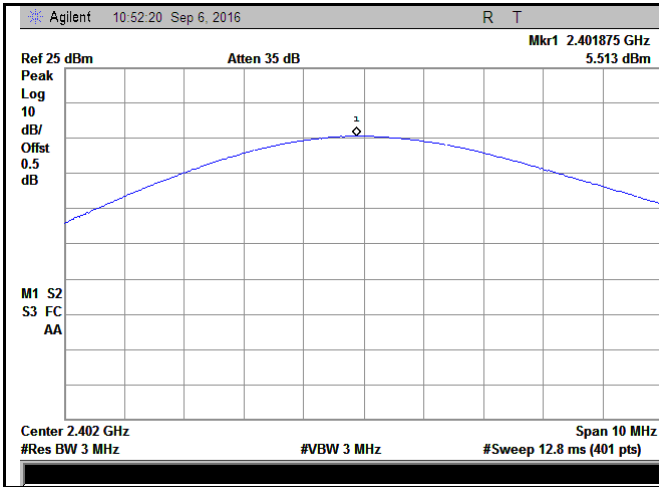
**Peak Output Power measurement result**

Type	Modulation	CH	Frequency (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	GFSK	Low	2402	5.571	125	Pass
		Mid	2441	6.199	125	Pass
		High	2480	6.286	125	Pass
	$\pi/4$ DQPSK	Low	2402	5.359	125	Pass
		Mid	2441	6.01	125	Pass
		High	2480	6.034	125	Pass
	8-DPSK	Low	2402	5.513	125	Pass
		Mid	2441	6.121	125	Pass
		High	2480	<b>6.302</b>	125	Pass

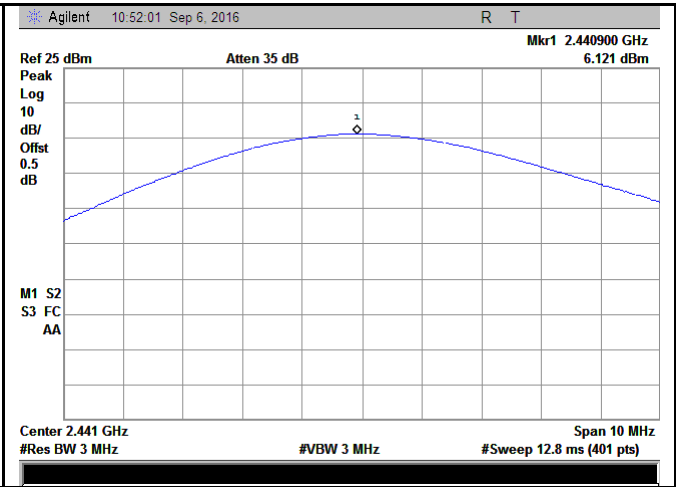
**Test Plots**

**Output Power measurement result**

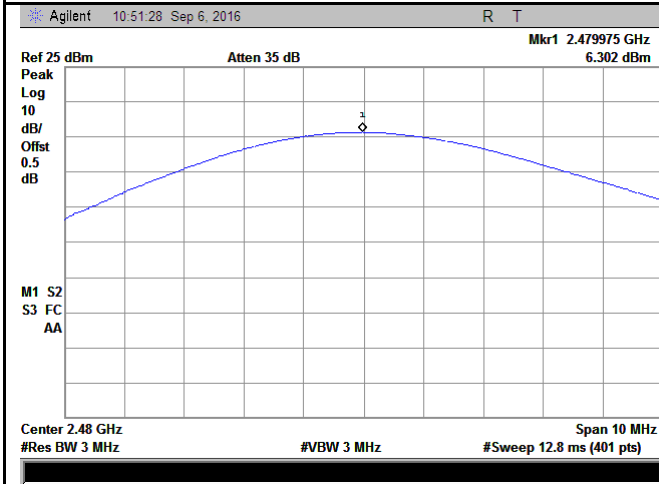




8DPSK Output power - Low CH 2402



8DPSK Output power - Mid CH 2441

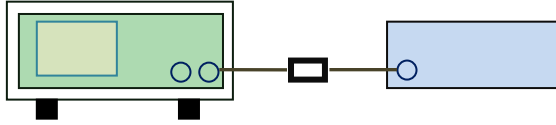


8DPSK Output power - High CH 2480

## 6.5 Number of Hopping Channel

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	September 06, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	FHSS in 2400-2483.5MHz ≥ 15 channels	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings:</p> <p>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 ≥ 1% of the span</li> <li>- VBW ≥ 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		

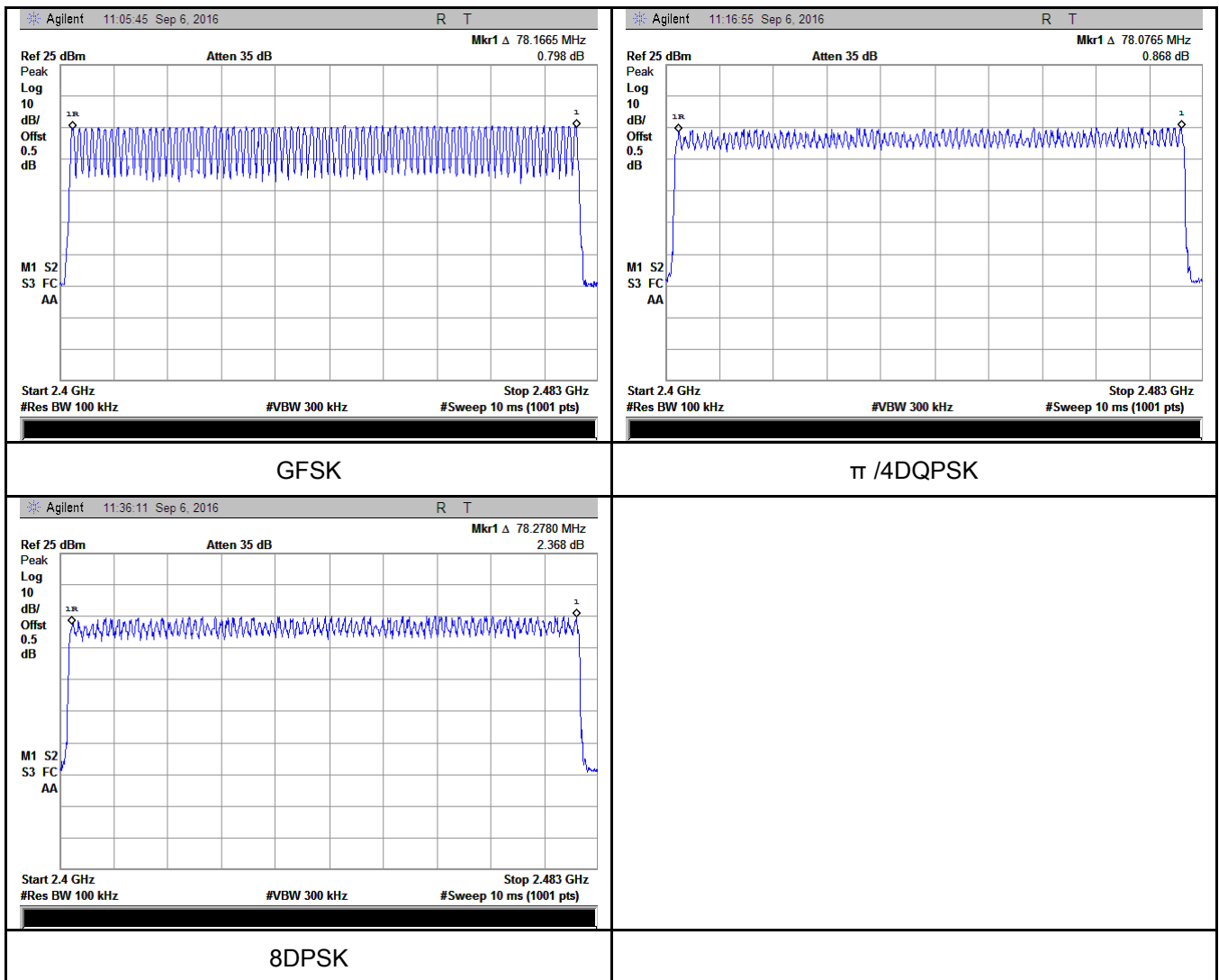
Test Data     Yes       N/A  
 Test Plot     Yes (See below)       N/A

### Number of Hopping Channel measurement result

Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	$\pi/4$ DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

### Test Plots

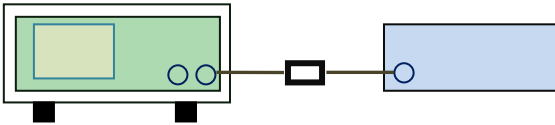
#### Number of Hopping Channels measurement result



## 6.6 Time of Occupancy (Dwell Time)

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	September 06, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	Dwell Time < 0.4s	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines.</p> <p><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

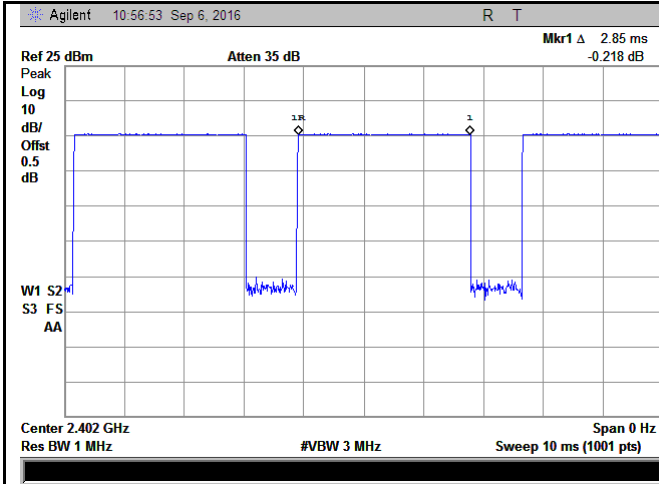
Test Plot     Yes (See below)             N/A

**Dwell Time measurement result**

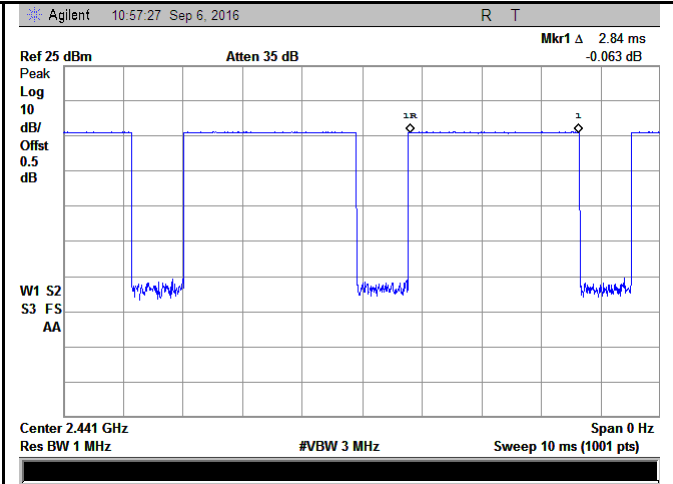
Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	GFSK	Low	2.85	304.000	400	Pass
		Mid	2.84	302.933	400	Pass
		High	2.86	305.067	400	Pass
	π /4 DQPSK	Low	2.86	305.067	400	Pass
		Mid	2.87	306.133	400	Pass
		High	2.86	305.067	400	Pass
	8-DPSK	Low	2.86	305.067	400	Pass
		Mid	2.85	304.000	400	Pass
		High	2.85	304.000	400	Pass
Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6						

**Test Plots**

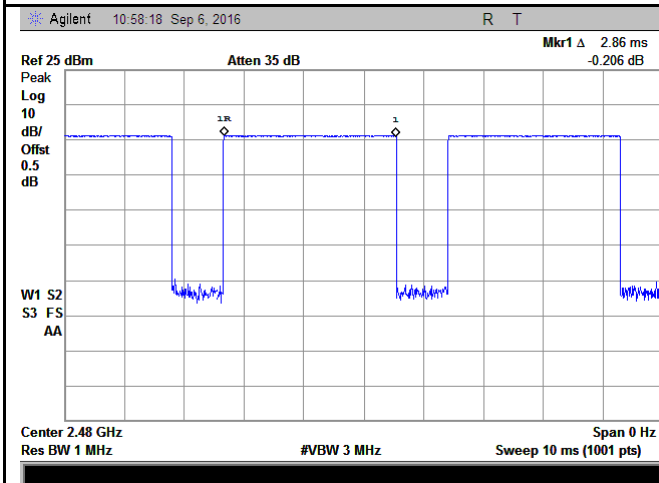
**Dwell Time measurement result**



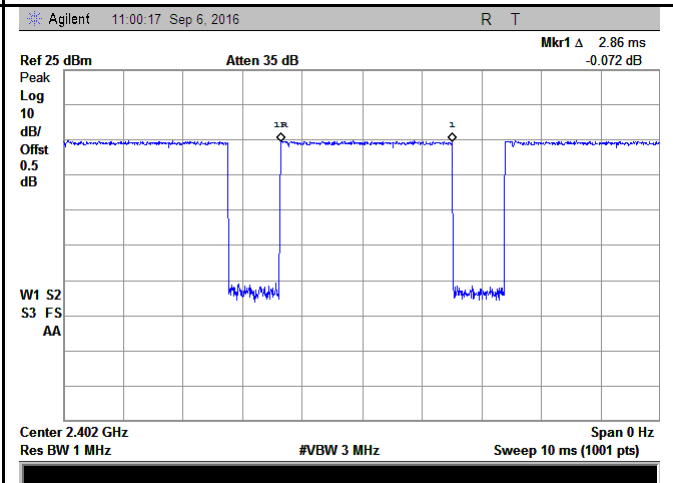
GFSK - Low CH 2402



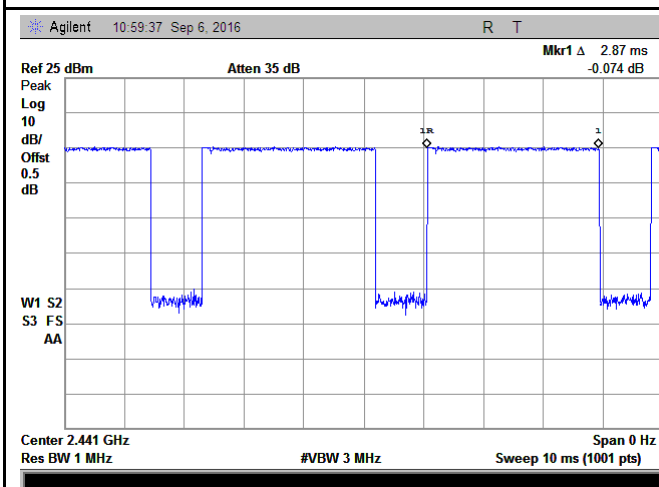
GFSK - Mid CH 2441



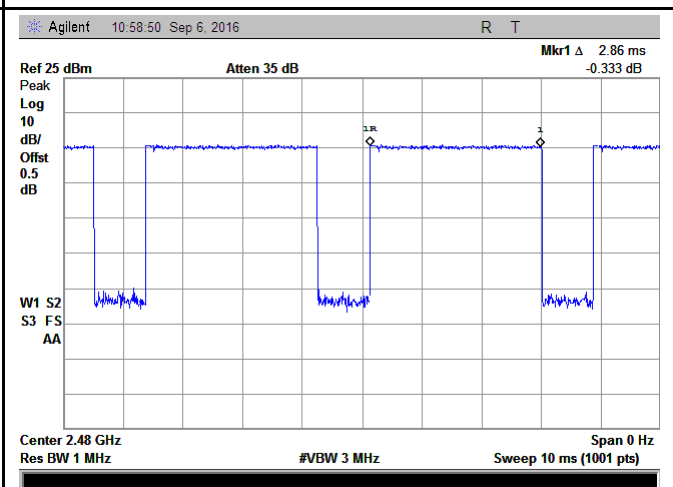
GFDK - High CH 2480



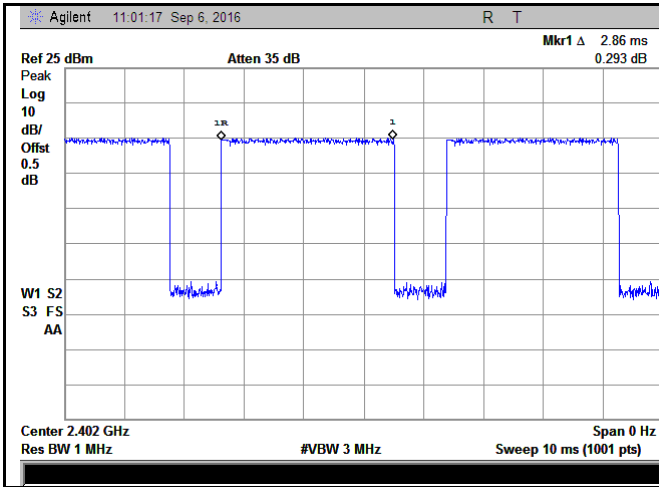
$\pi/4$  DQPSK - Low CH 2402



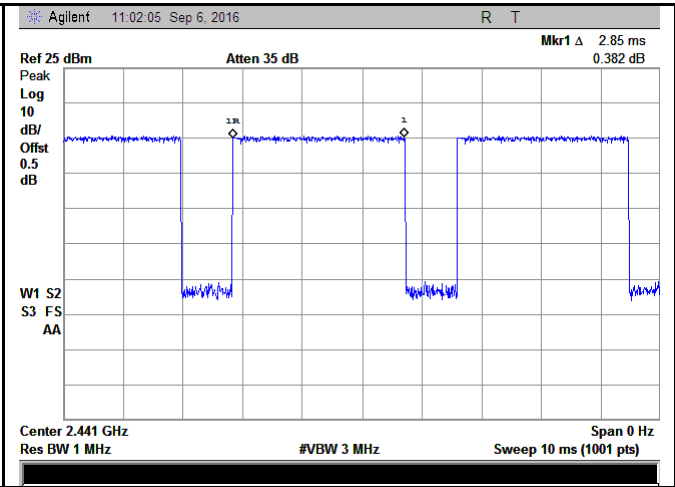
$\pi/4$  DQPSK - Mid CH 2441



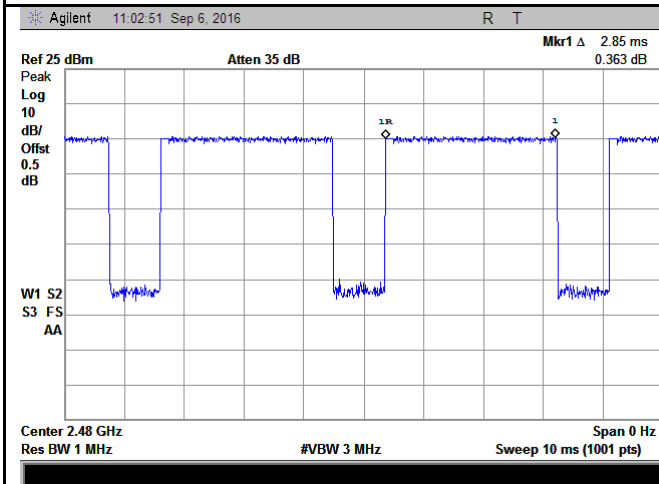
$\pi/4$  DQPSK - High CH 2480



8DPSK - Low CH 2402



8DPSK - Mid CH 2441



8DPSK - High CH 2480

## 6.7 Band Edge & Restricted Band

Temperature	22°C
Relative Humidity	51%
Atmospheric Pressure	1009mbar
Test date :	September 09, 2016
Tested By :	Loren Luo

### 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>
----------------	--

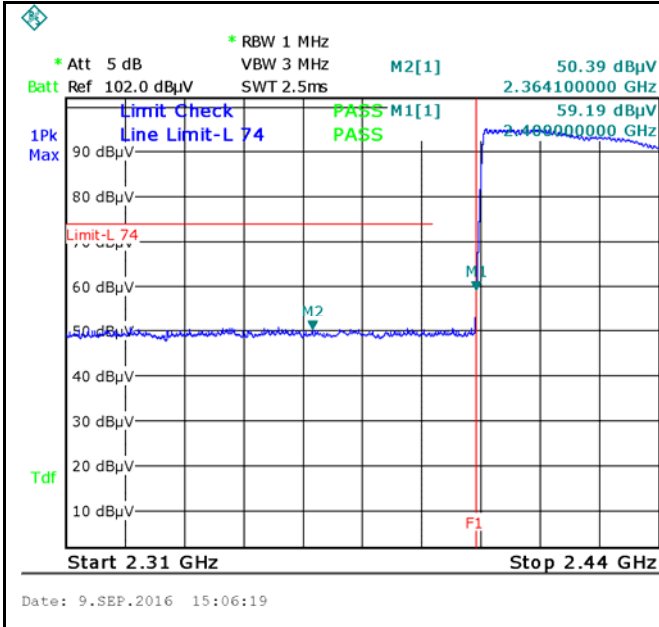
Test Report	16071065-FCC-R2
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	<p>and make sure the instrument is operated in its linear range.</p> <ul style="list-style-type: none"> <li>- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz 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

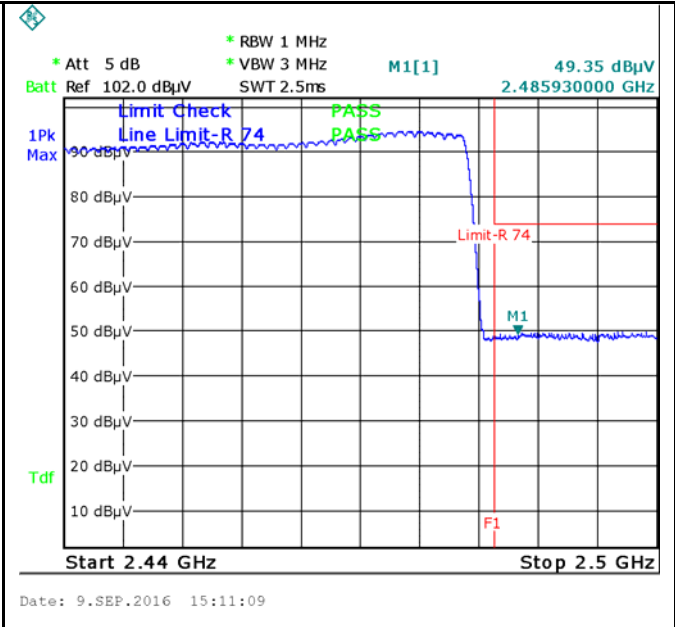
**Test Plots**

**GFSK Mode:**



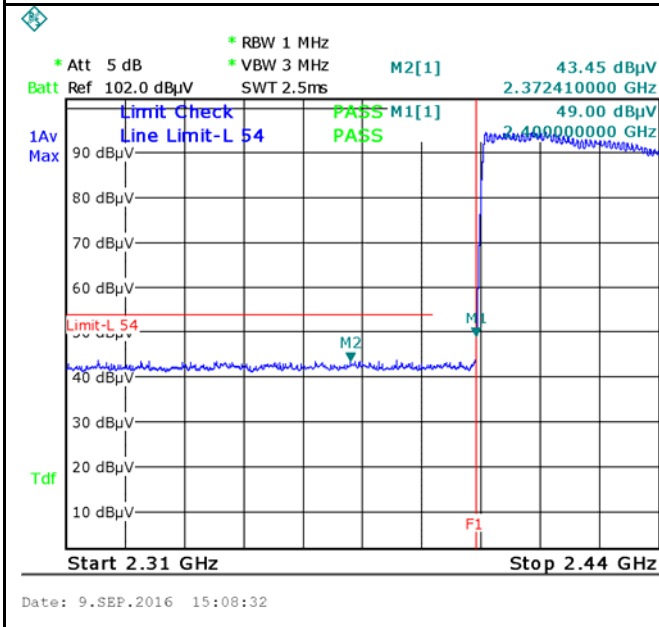
GFSK-Hopping Left Side-PK

Note: F1 is frequency 2400MHz



GFSK-Hopping Right Side-PK

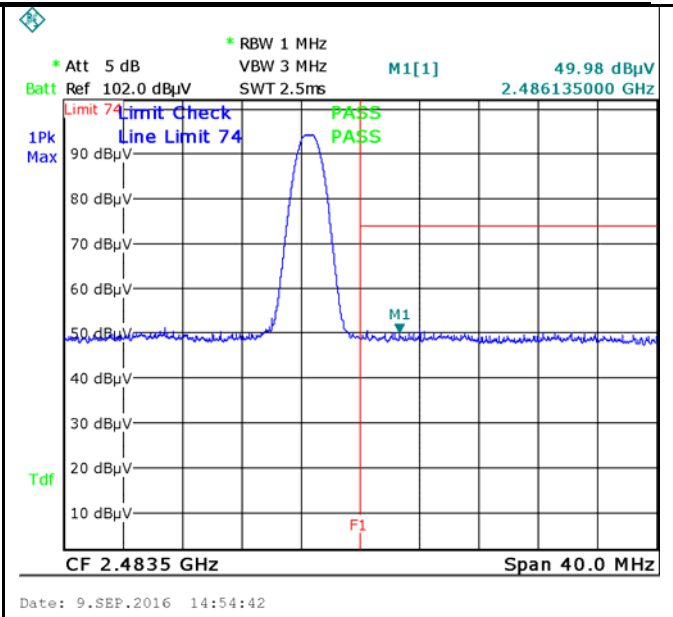
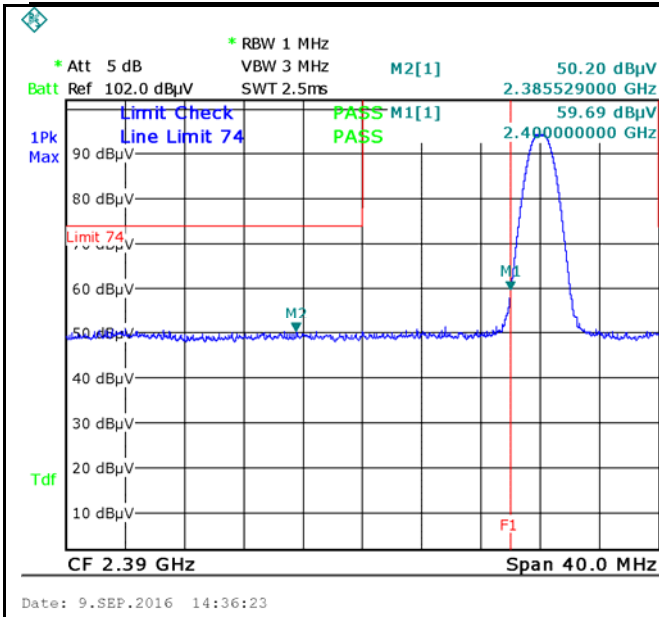
Note: F1 is frequency 2483.5MHz



GFSK-Hopping Left Side-AV

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

GFSK-Hopping Right Side-AV

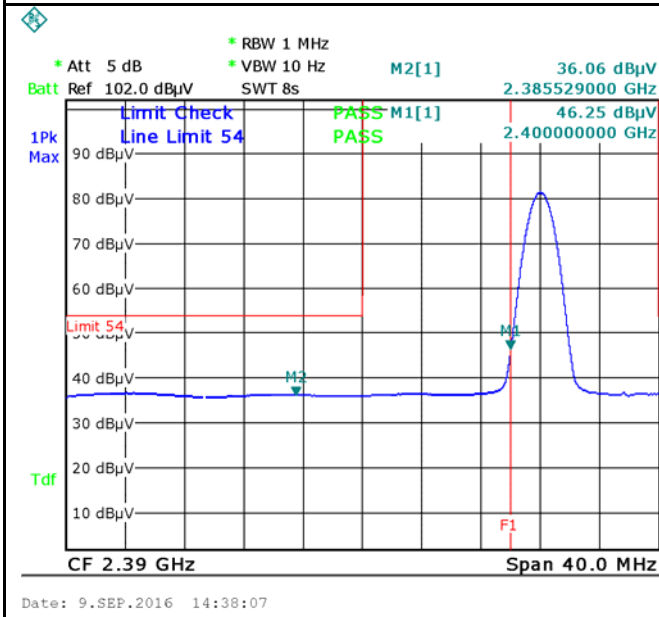


GFSK-Left Side-PK

Note: F1 is frequency 2400MHz

GFSK-Right Side-PK

Note: F1 is frequency 2483.5MHz

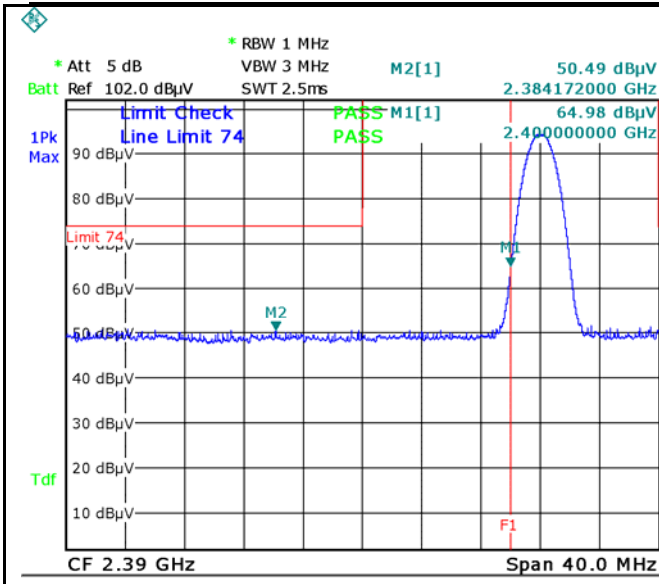


Note: (no need if PK value less than the AV limit)

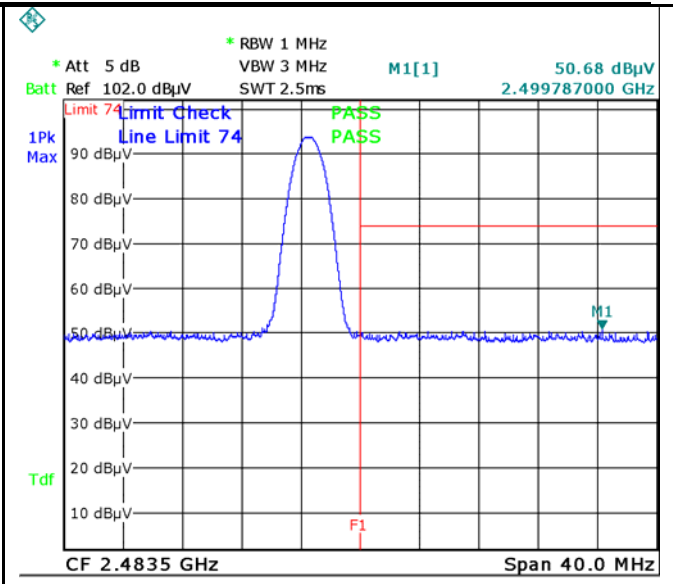
GFSK-Left Side-AV

GFSK-Right Side-AV





Date: 9.SEP.2016 14:42:31



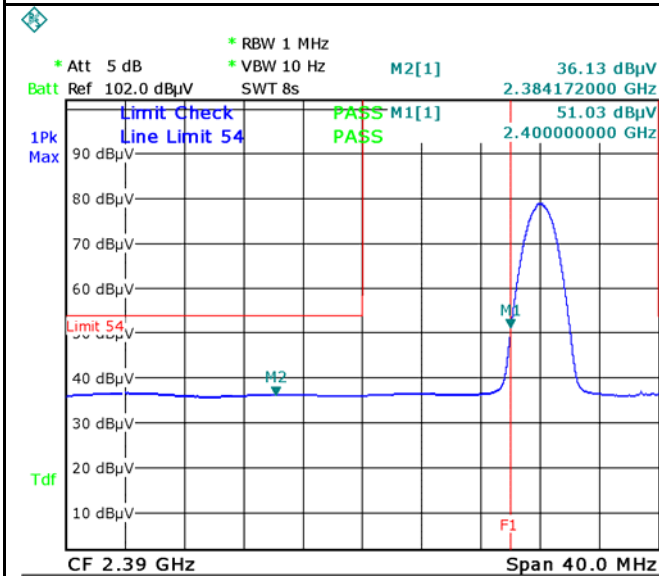
Date: 9.SEP.2016 14:57:29

$\pi$  / 4 DQPSK-Left Side-PK

Note: F1 is frequency 2400MHz

$\pi$  / 4 DQPSK-Right Side-PK

Note: F1 is frequency 2483.5MHz



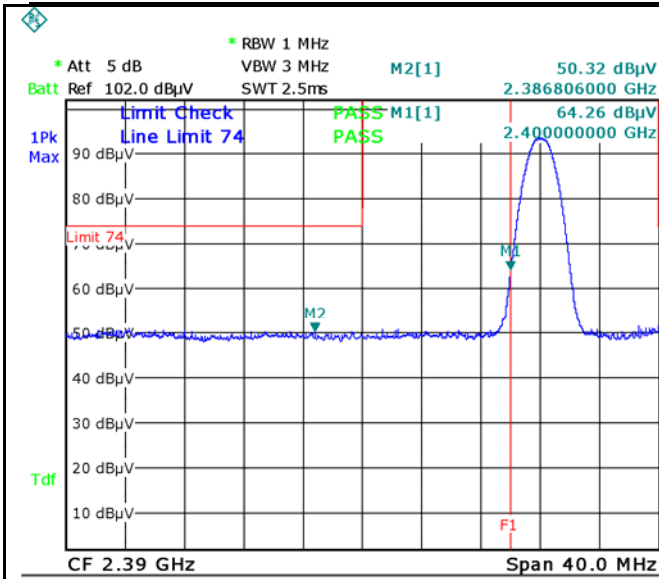
Date: 9.SEP.2016 14:43:54

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

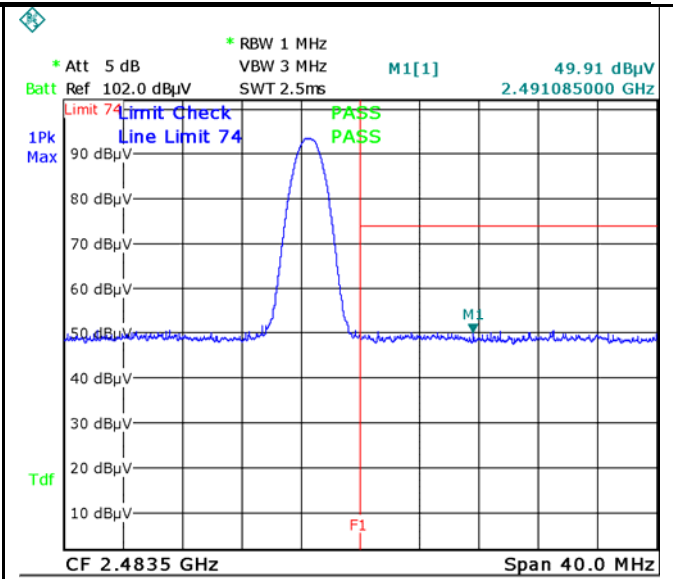
$\pi$  / 4 DQPSK-Left Side-AV

$\pi$  / 4 DQPSK-Right Side-AV





Date: 9.SEP.2016 14:48:44



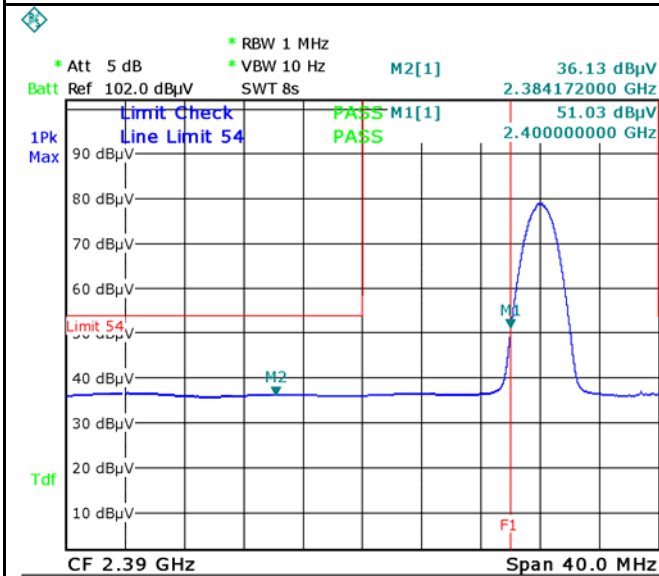
Date: 9.SEP.2016 15:01:03

8DPSK-Left Side-PK

Note: F1 is frequency 2400MHz

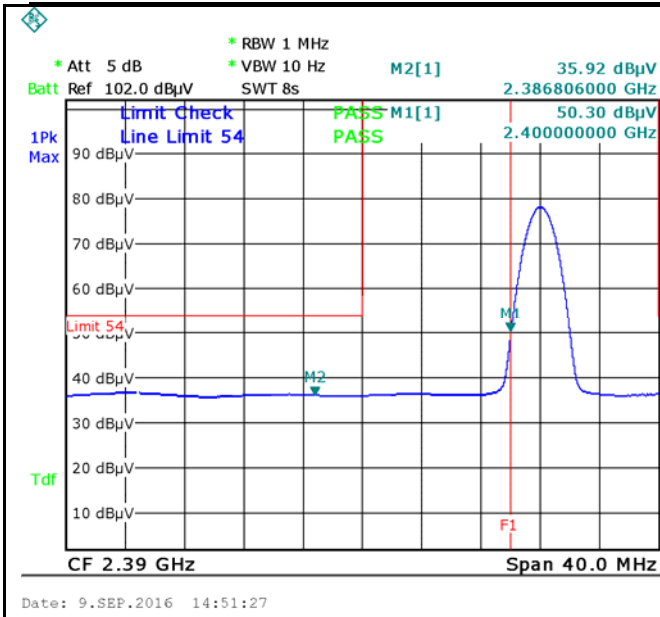
8DPSK-Right Side-PK

Note: F1 is frequency 2483.5MHz



Date: 9.SEP.2016 14:43:54

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



8DPSK-Left Side-AV

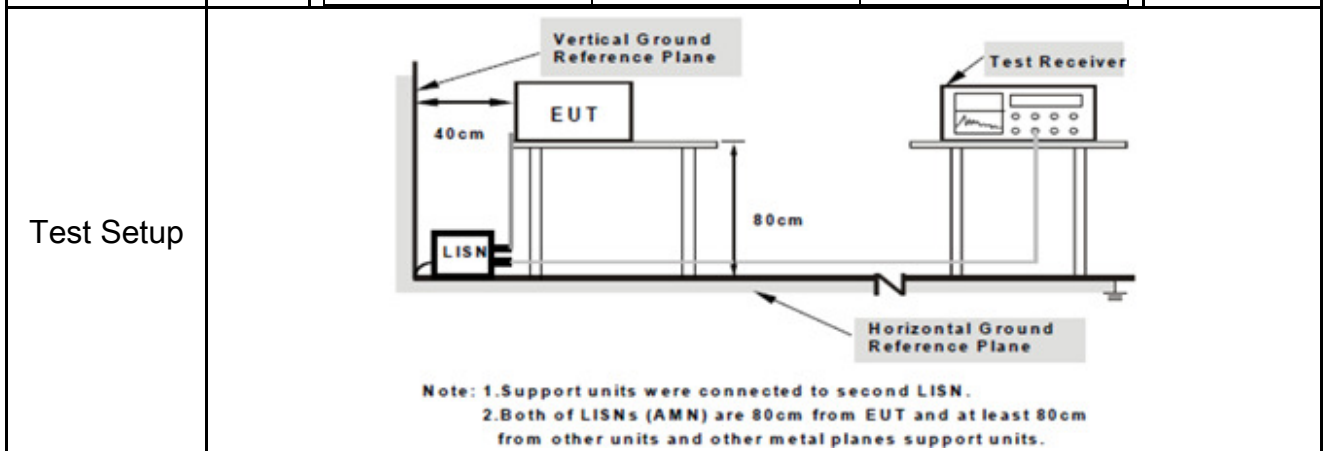
8DPSK-Right Side-AV

## 6.8 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	53%
Atmospheric Pressure	1001mbar
Test date :	September 02, 2016
Tested By :	Loren Luo

### 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 [μ]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.	<input checked="" type="checkbox"/>														
		<table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dBμV)</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 (dBμV)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50
		Frequency ranges (MHz)			Limit (dBμV)												
				QP	Average												
0.15 ~ 0.5	66 – 56	56 – 46															
0.5 ~ 5	56	46															
5 ~ 30	60	50															



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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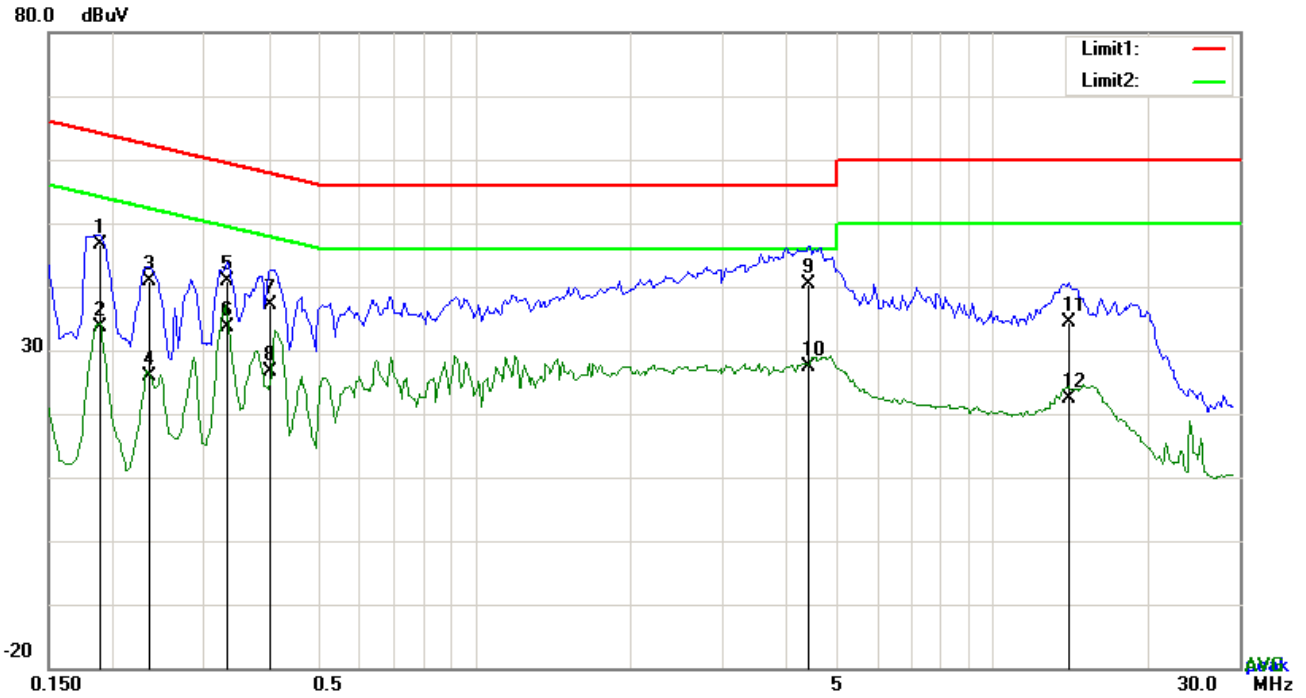
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	<p>coaxial cable.</p> <ol style="list-style-type: none"> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>6. 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: Bluetooth Mode**

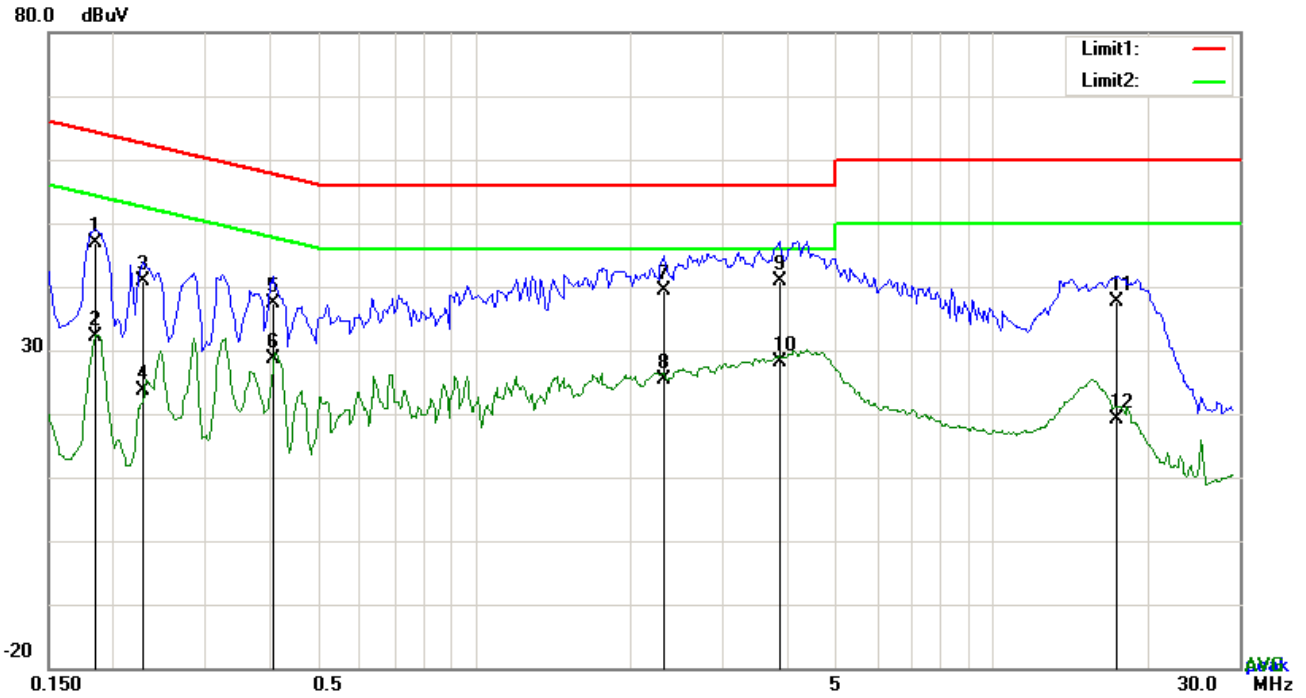


**Test Data**

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

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.1890	36.69	QP	10.03	46.72	64.08	-17.36
2	L1	0.1890	23.70	AVG	10.03	33.73	54.08	-20.35
3	L1	0.2358	30.82	QP	10.03	40.85	62.24	-21.39
4	L1	0.2358	15.92	AVG	10.03	25.95	52.24	-26.29
5	L1	0.3333	30.88	QP	10.03	40.91	59.37	-18.46
6	L1	0.3333	23.63	AVG	10.03	33.66	49.37	-15.71
7	L1	0.4035	26.99	QP	10.03	37.02	57.78	-20.76
8	L1	0.4035	16.58	AVG	10.03	26.61	47.78	-21.17
9	L1	4.4235	30.43	QP	10.07	40.50	56.00	-15.50
10	L1	4.4235	17.35	AVG	10.07	27.42	46.00	-18.58
11	L1	14.0019	24.22	QP	10.21	34.43	60.00	-25.57
12	L1	14.0019	12.18	AVG	10.21	22.39	50.00	-27.61

**Test Mode: Bluetooth Mode**

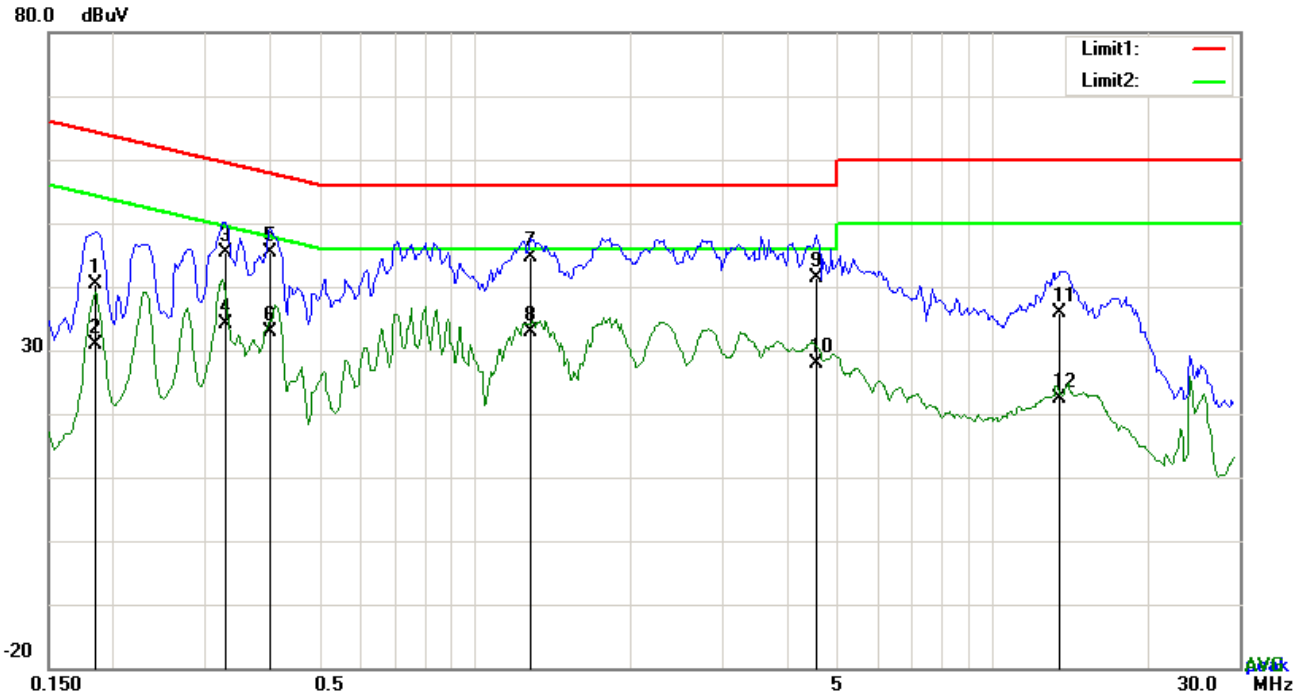


**Test Data**

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

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.1851	36.76	QP	10.02	46.78	64.25	-17.47
2	N	0.1851	22.18	AVG	10.02	32.20	54.25	-22.05
3	N	0.2280	30.81	QP	10.02	40.83	62.52	-21.69
4	N	0.2280	13.73	AVG	10.02	23.75	52.52	-28.77
5	N	0.4074	27.35	QP	10.02	37.37	57.70	-20.33
6	N	0.4074	18.72	AVG	10.02	28.74	47.70	-18.96
7	N	2.3184	29.36	QP	10.04	39.40	56.00	-16.60
8	N	2.3184	15.30	AVG	10.04	25.34	46.00	-20.66
9	N	3.8970	30.89	QP	10.06	40.95	56.00	-15.05
10	N	3.8970	18.18	AVG	10.06	28.24	46.00	-17.76
11	N	17.4495	27.41	QP	10.23	37.64	60.00	-22.36
12	N	17.4495	9.02	AVG	10.23	19.25	50.00	-30.75

<b>Test Mode:</b>	<b>Bluetooth Mode</b>
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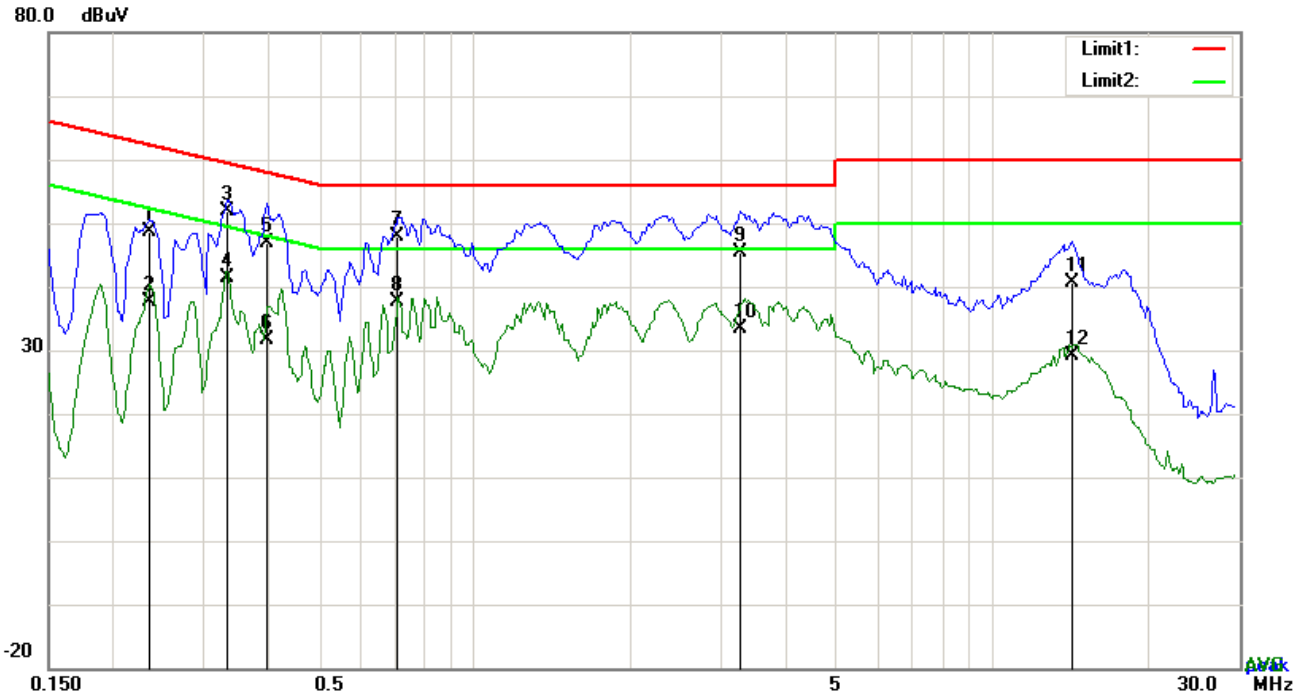


**Test Data**

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

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.1851	30.36	QP	10.03	40.39	64.25	-23.86
2	L1	0.1851	20.87	AVG	10.03	30.90	54.25	-23.35
3	L1	0.3294	35.26	QP	10.03	45.29	59.47	-14.18
4	L1	0.3294	23.98	AVG	10.03	34.01	49.47	-15.46
5	L1	0.4035	35.39	QP	10.03	45.42	57.78	-12.36
6	L1	0.4035	22.83	AVG	10.03	32.86	47.78	-14.92
7	L1	1.2810	34.49	QP	10.03	44.52	56.00	-11.48
8	L1	1.2810	22.94	AVG	10.03	32.97	46.00	-13.03
9	L1	4.5678	31.25	QP	10.07	41.32	56.00	-14.68
10	L1	4.5678	17.75	AVG	10.07	27.82	46.00	-18.18
11	L1	13.5495	25.64	QP	10.20	35.84	60.00	-24.16
12	L1	13.5495	12.23	AVG	10.20	22.43	50.00	-27.57

<b>Test Mode:</b>	<b>Bluetooth Mode</b>
-------------------	-----------------------



**Test Data**

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

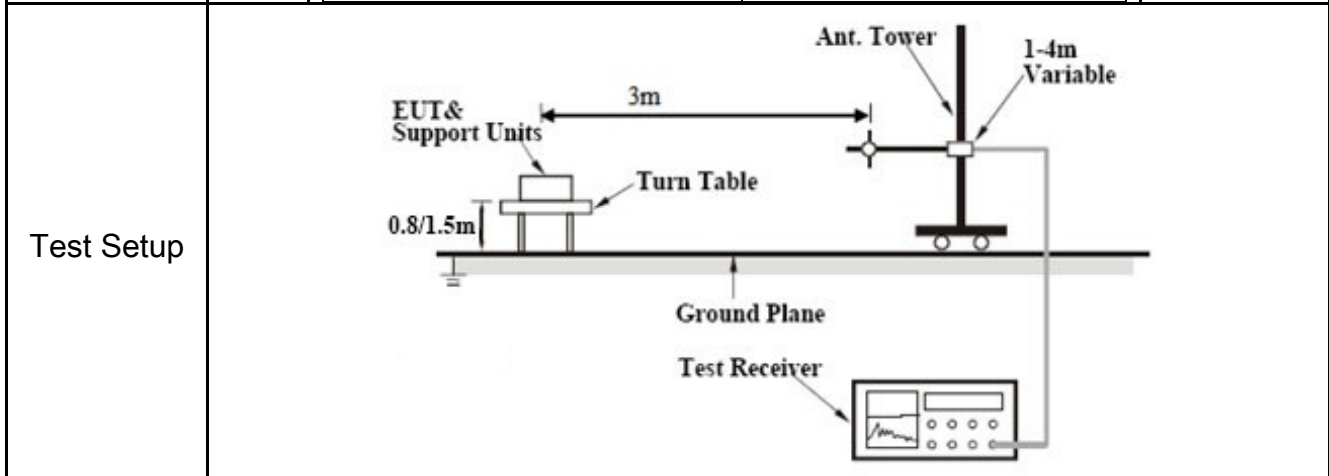
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.2358	38.56	QP	10.02	48.58	62.24	-13.66
2	N	0.2358	27.54	AVG	10.02	37.56	52.24	-14.68
3	N	0.3333	41.82	QP	10.02	51.84	59.37	-7.53
4	N	0.3333	31.36	AVG	10.02	41.38	49.37	-7.99
5	N	0.3957	36.85	QP	10.02	46.87	57.94	-11.07
6	N	0.3957	21.51	AVG	10.02	31.53	47.94	-16.41
7	N	0.7116	37.81	QP	10.02	47.83	56.00	-8.17
8	N	0.7116	27.65	AVG	10.02	37.67	46.00	-8.33
9	N	3.2418	35.39	QP	10.05	45.44	56.00	-10.56
10	N	3.2418	23.43	AVG	10.05	33.48	46.00	-12.52
11	N	14.2515	30.39	QP	10.19	40.58	60.00	-19.42
12	N	14.2515	18.89	AVG	10.19	29.08	50.00	-20.92

## 6.9 Radiated Spurious Emissions & Restricted Band

Temperature	25°C
Relative Humidity	54%
Atmospheric Pressure	1002mbar
Test date :	September 07, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.205, §15.209, §15.247(d)	a)	<p>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</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (<math>\mu\text{V/m}</math>)</th> </tr> </thead> <tbody> <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>	Frequency range (MHz)	Field Strength ( $\mu\text{V/m}$ )	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength ( $\mu\text{V/m}$ )												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												



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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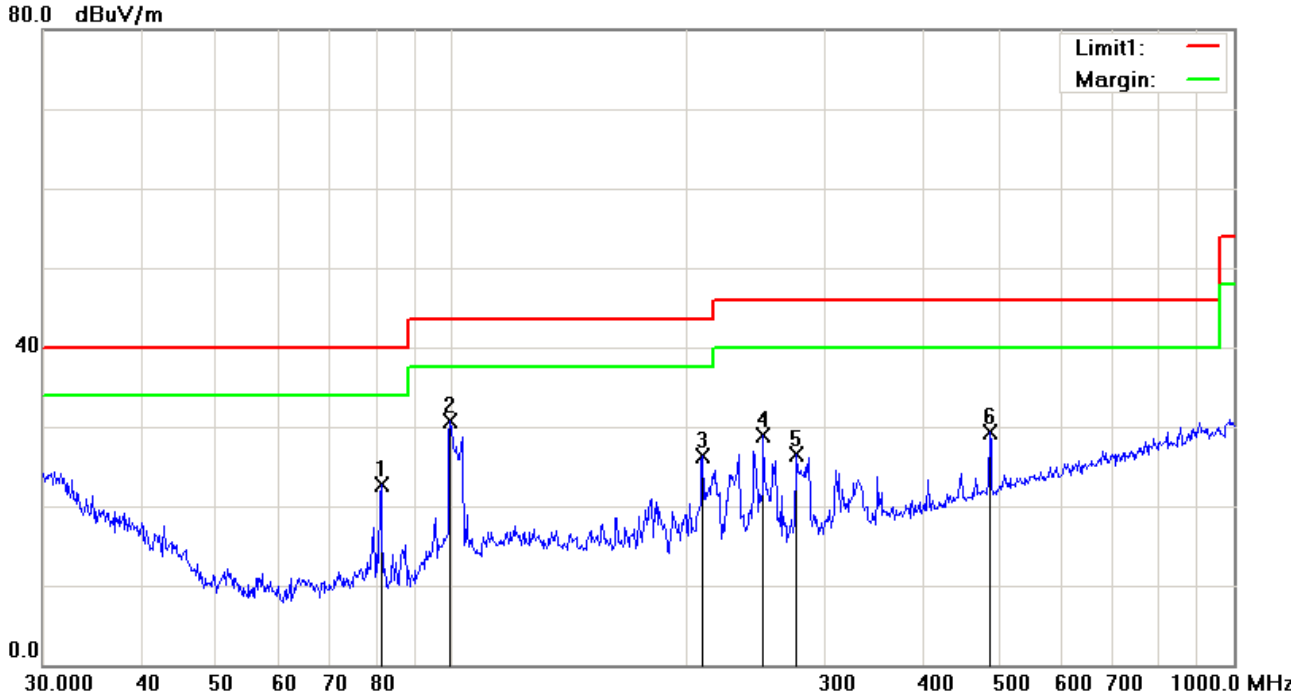
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	<ol style="list-style-type: none"> <li>a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>b. The EUT was then rotated to the direction that gave the maximum emission.</li> <li>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> <ol style="list-style-type: none"> <li>3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</li> <li>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.</li> <li>5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</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:** Bluetooth Mode

**Below 1GHz**

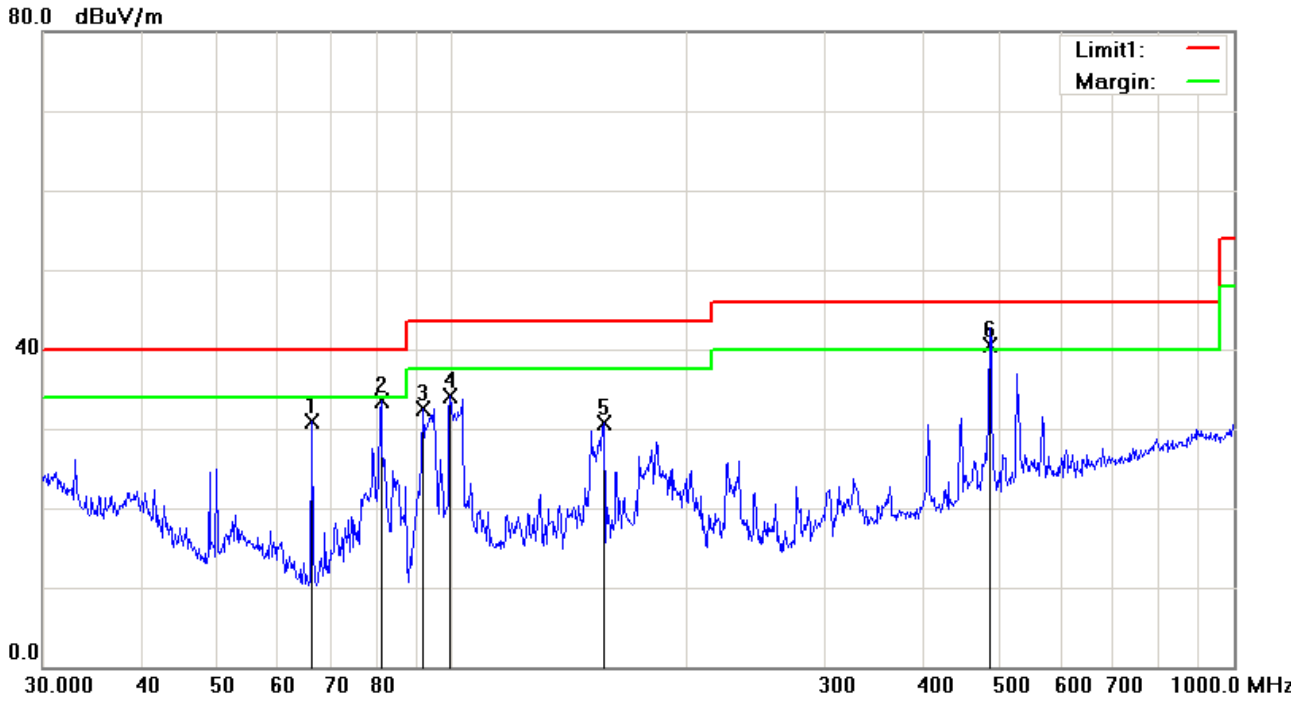


**Test Data**

**Horizontal Polarity Plot @3m**

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( ° )
1	H	81.2117	36.49	peak	-13.71	22.78	40.00	-17.22	100	96
2	H	99.5281	41.64	peak	-10.92	30.72	43.50	-12.78	100	150
3	H	209.3129	35.16	peak	-8.82	26.34	43.50	-17.16	100	316
4	H	250.3012	38.04	peak	-9.18	28.86	46.00	-17.14	100	271
5	H	276.1236	34.42	peak	-7.99	26.43	46.00	-19.57	100	108
6	H	487.3151	31.31	peak	-2.04	29.27	46.00	-16.73	100	64

**Below 1GHz**



**Test Data**

**Vertical Polarity Plot @3m**

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( ° )
1	V	66.2662	44.79	peak	-13.87	30.92	40.00	-9.08	100	156
2	V	81.2117	47.13	peak	-13.71	33.42	40.00	-6.58	100	93
3	V	91.8163	45.47	peak	-12.92	32.55	43.50	-10.95	100	360
4	V	99.5281	45.09	peak	-10.92	34.17	43.50	-9.33	100	157
5	V	156.4578	39.09	peak	-8.32	30.77	43.50	-12.73	100	38
6	V	487.3151	42.56	QP	-2.04	40.52	46.00	-5.48	100	211

### Above 1GHz

<b>Test Mode:</b>	<b>Transmitting Mode</b>
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Mode: GFSK (Worst Case)

#### Low Channel (2402 MHz) ( GFSK Worst Case )

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)
4804	38.76	AV	V	33.67	6.86	32.66	46.63	54	-7.37
4804	38.12	AV	H	33.67	6.86	32.66	45.99	54	-8.01
4804	48.02	PK	V	33.67	6.86	32.66	55.89	74	-18.11
4804	47.26	PK	H	33.67	6.86	32.66	55.13	74	-18.87
17784	25.11	AV	V	45.03	11.21	32.38	48.97	54	-5.03
17784	24.36	AV	H	45.03	11.21	32.38	48.22	54	-5.78
17784	41.18	PK	V	45.03	11.21	32.38	65.04	74	-8.96
17784	40.67	PK	H	45.03	11.21	32.38	64.53	74	-9.47

#### Middle Channel (2441 MHz) ( GFSK Worst Case )

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)
4882	38.94	AV	V	33.71	6.95	32.74	46.86	54	-7.14
4882	38.25	AV	H	33.71	6.95	32.74	46.17	54	-7.83
4882	48.12	PK	V	33.71	6.95	32.74	56.04	74	-17.96
4882	47.35	PK	H	33.71	6.95	32.74	55.27	74	-18.73
17811	25.27	AV	V	45.15	11.18	32.41	49.19	54	-4.81
17811	24.51	AV	H	45.15	11.18	32.41	48.43	54	-5.57
17811	41.29	PK	V	45.15	11.18	32.41	65.21	74	-8.79
17811	40.78	PK	H	45.15	11.18	32.41	64.7	74	-9.3

**High Channel (2480 MHz) ( 8-DPSK Worst Case )**

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)
4960	38.82	AV	V	33.9	6.76	32.74	46.74	54	-7.26
4960	37.98	AV	H	33.9	6.76	32.74	45.9	54	-8.1
4960	48.34	PK	V	33.9	6.76	32.74	56.26	74	-17.74
4960	47.56	PK	H	33.9	6.76	32.74	55.48	74	-18.52
17793	25.18	AV	V	45.22	11.35	32.38	49.37	54	-4.63
17793	24.39	AV	H	45.22	11.35	32.38	48.58	54	-5.42
17793	41.22	PK	V	45.22	11.35	32.38	65.41	74	-8.59
17793	40.78	PK	H	45.22	11.35	32.38	64.97	74	-9.03

**Note:**

- 1, The testing has been conformed to  $10 \times 2480 \text{MHz} = 24,800 \text{MHz}$
- 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.

## 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	08/31/2016	08/30/2017	<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#	08/31/2016	08/30/2017	<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	11/19/2015	11/18/2016	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	<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	09/24/2016	<input checked="" type="checkbox"/>

**Annex B. EUT And Test Setup Photographs**

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



Whole Package View



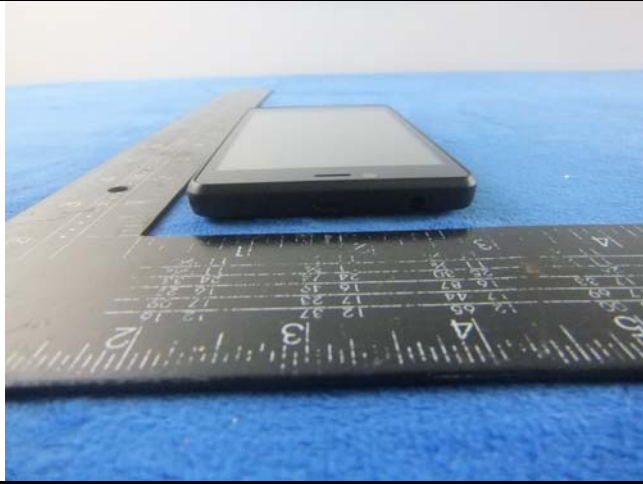
Adapter - Front View



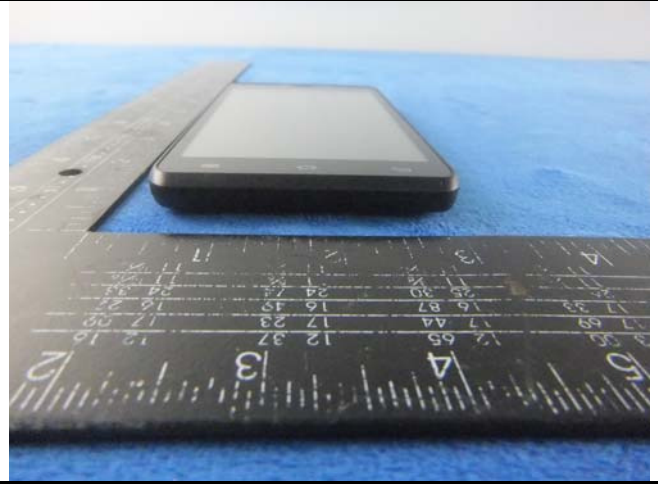
EUT - Front View



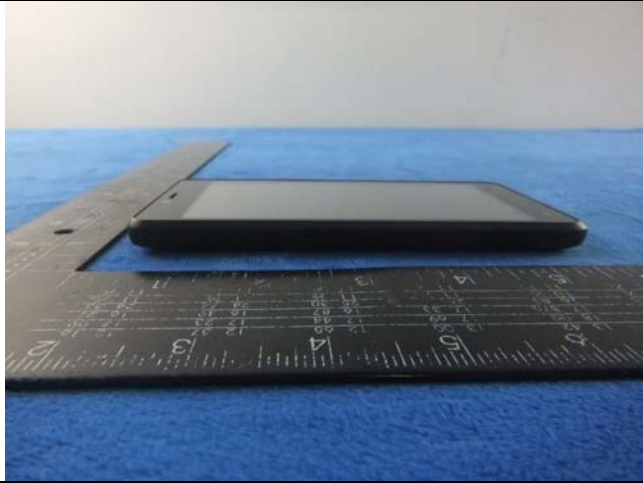
EUT - Rear View



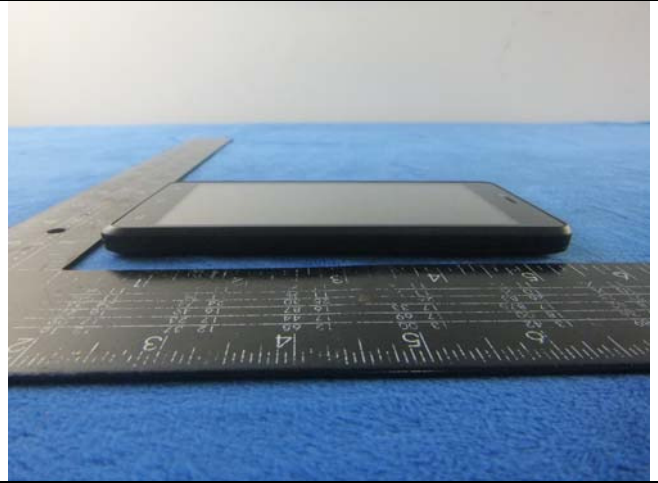
EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

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



Cover Off - Top View 1



Cover Off - Top View 2



Battery - Front View



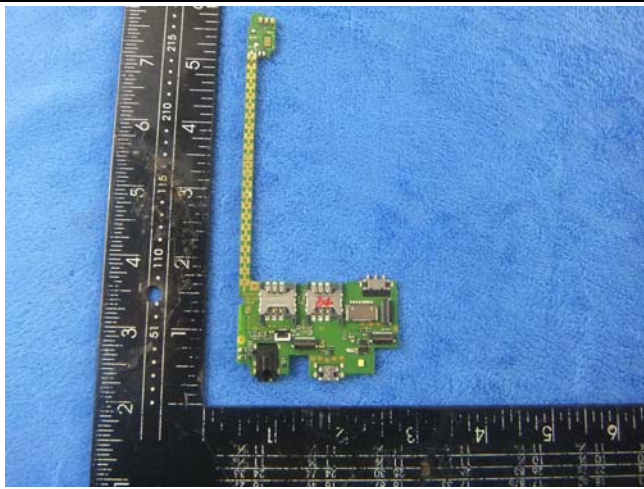
Battery - Rear View



Mainboard with Shielding - Front View



Mainboard without Shielding - Front View



Mainboard - Rear View



LCD - Front View



LCD - Rear View



GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE/GPS - Antenna View

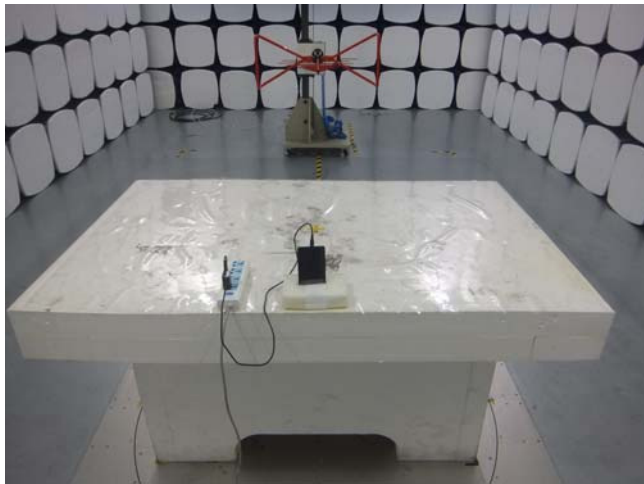
**Annex B.iii. Photograph: Test Setup Photo**



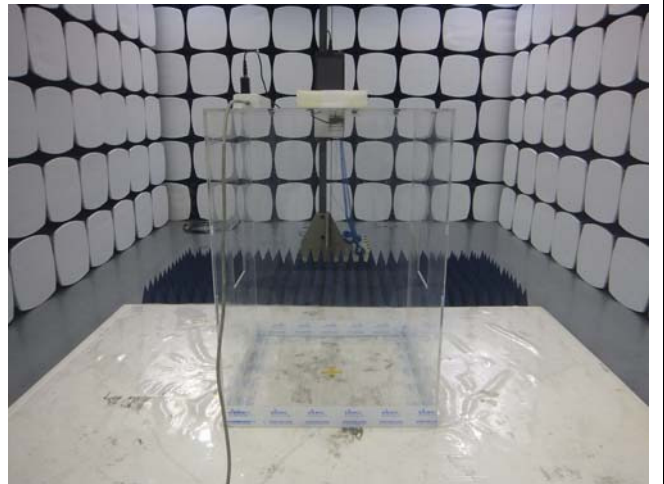
Conducted Emissions Test Setup Front View



Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz

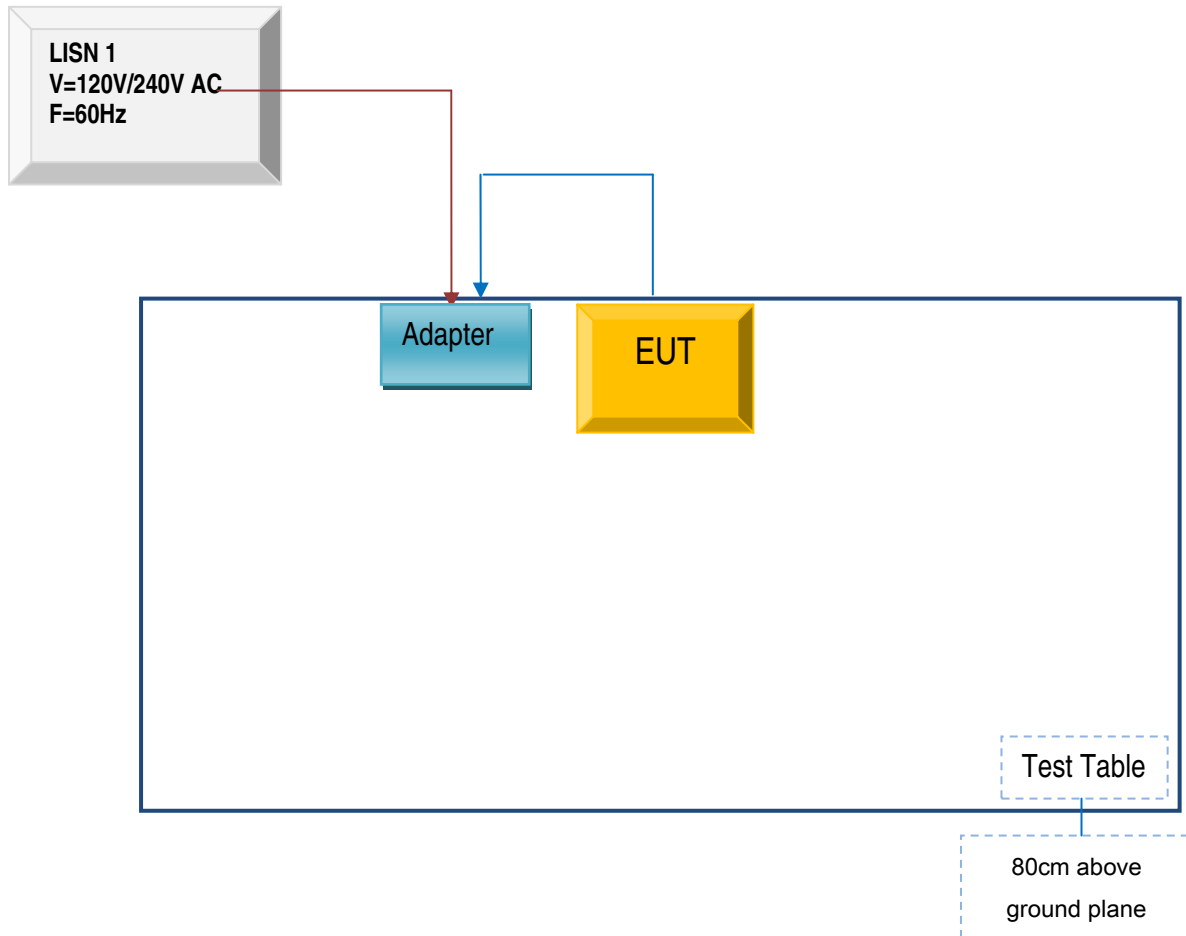


Radiated Spurious Emissions Test Setup Above 1GHz

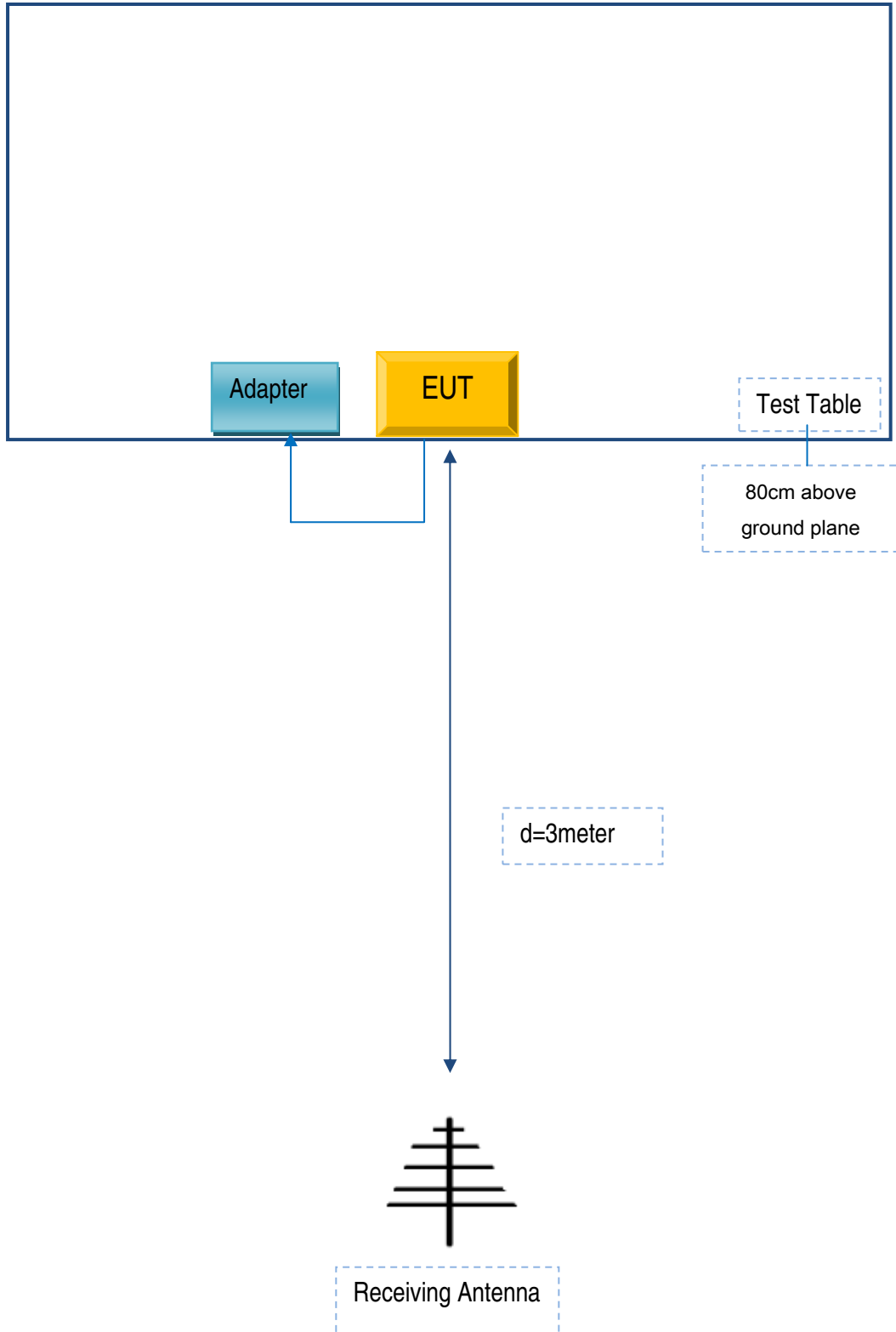
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

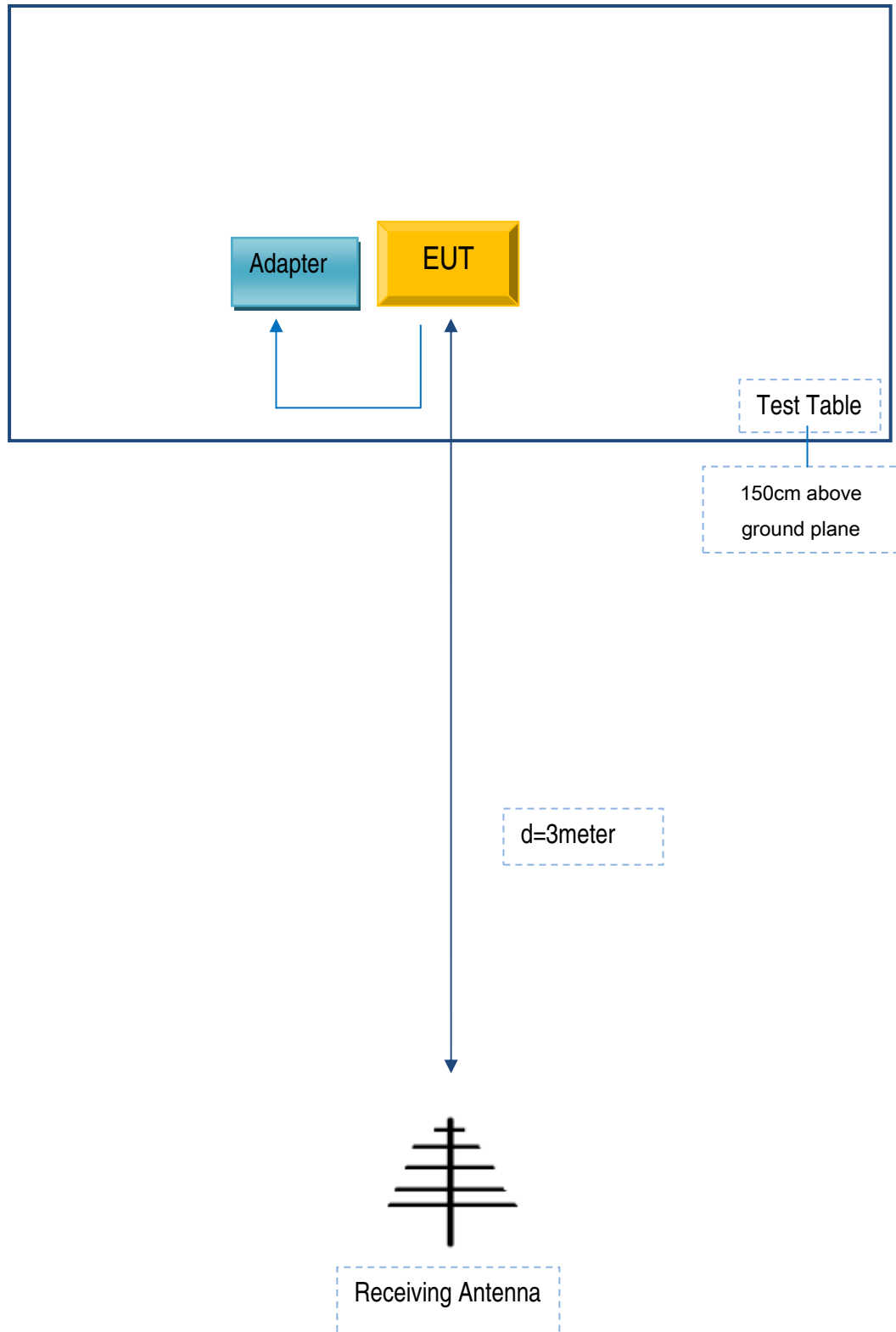
#### Block Configuration Diagram for AC Line Conducted Emissions



**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.

### Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
MOBIWIRE MOBILES (NINGBO) CO.,LTD.	Adapter	A8+-500550	CL0002

### Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	CL0002

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

**See attachment**

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## Annex E. DECLARATION OF SIMILARITY

N/A