

RF TEST REPORT



Report No.: 16071000-FCC-R2

Supersede Report No.: N/A

Applicant	MOBIWIRE MOBILES (NINGBO) CO.,LTD.	
Product Name	Mobile phone	
Model No.	A400	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2015, ANSI C63.10: 2013	
Test Date	August 18 to September 10, 2016	
Issue Date	September 13, 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	David Huang	
Loren Luo Test Engineer	David Huang Checked By	
This test report may be reproduced in full only		
Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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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
16071000-FCC-R2	NONE	Original	September 13, 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:	A400
Serial Model:	N/A
Date EUT received:	August 17, 2016
Test Date(s):	August 18 to September 10, 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, π /4DQPSK, 8DPSK BLE: GFSK GPS:BPSK
Input Power:	Adapter: Model: A8+-500550 Input: AC 100-240V~50/60Hz;0.2A Output: DC 5.0V,550mA
	Battery: Model: ELITE Capacity: 1400mAh;5.18Wh Voltage: DC 3.7V, Charging Limited Voltage:4.2V

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
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Max. Output Power: 4.454dBm

GSM 850: 124CH
PCS1900: 299CH
UMTS-FDD Band V : 102CH
UMTS-FDD Band IV: 202CH
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

ECC ID: 2ADA4A400

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.

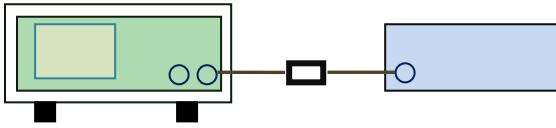
The antenna meets up with the ANTENNA REQUIREMENT.

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.</p> <p><u>Use the following spectrum analyzer settings:</u></p> <ul style="list-style-type: none"> - The EUT must have its hopping function enabled - Span = wide enough to capture the peaks of two adjacent channels - Resolution (or IF) Bandwidth (RBW) \geq 1% of the span - Video (or Average) Bandwidth (VBW) \geq RBW - Sweep = auto - Detector function = peak - Trace = max hold - 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. 		

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

 Test Data Yes N/A

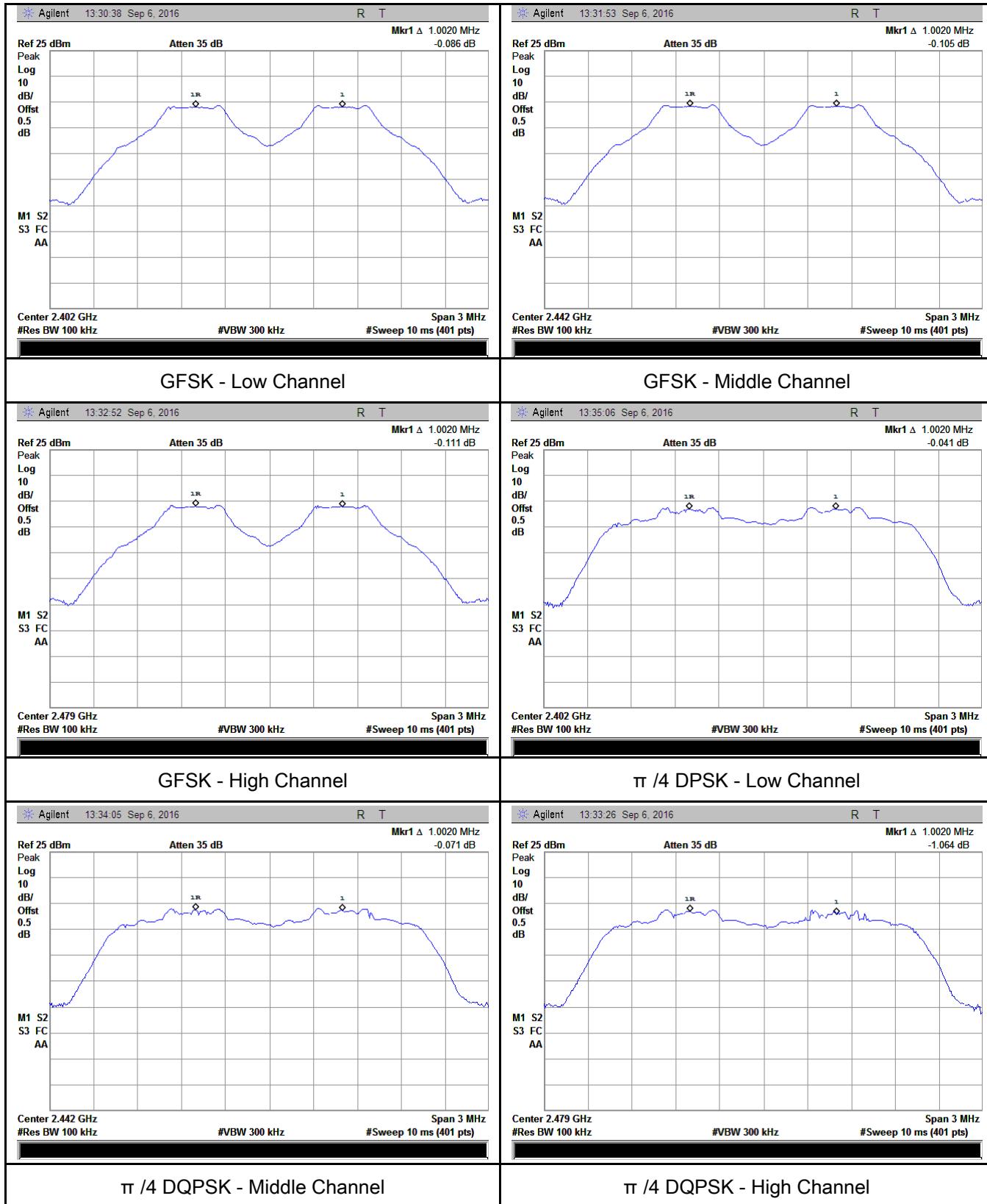
 Test Plot Yes (See below) N/A

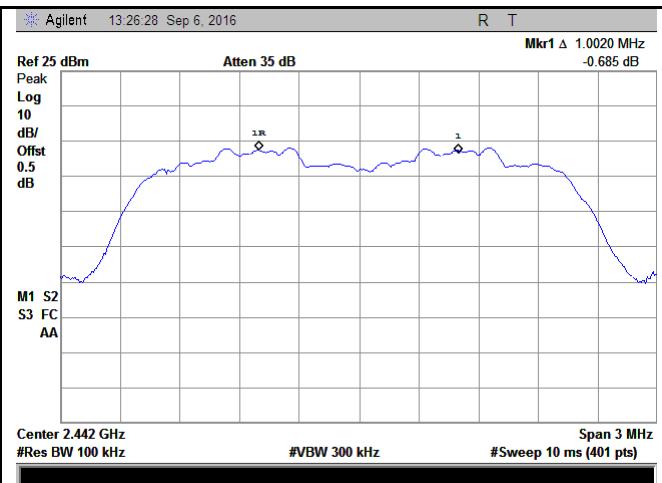
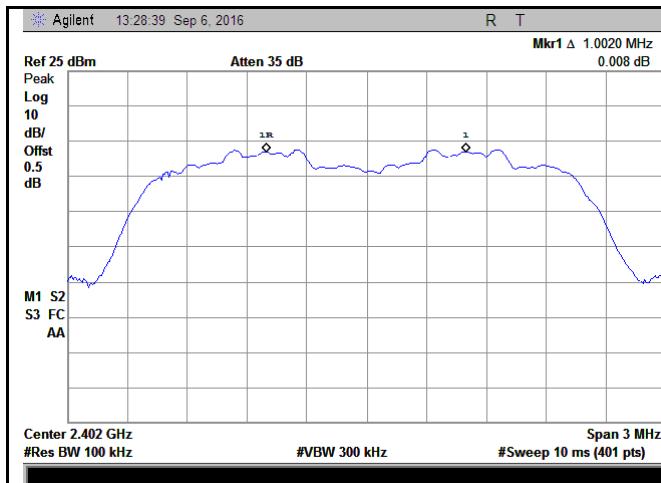
Channel Separation measurement result

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			
	Adjacency Channel	2441	1.002	0.679	Pass
	High Channel	2480			
	Adjacency Channel	2479			
CH Separation $\pi/4$ DQPSK	Low Channel	2402	1.002	0.863	Pass
	Adjacency Channel	2403			
	Mid Channel	2440			
	Adjacency Channel	2441	1.002	0.864	Pass
	High Channel	2480			
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.002	0.871	Pass
	Adjacency Channel	2403			
	Mid Channel	2440			
	Adjacency Channel	2441	1.002	0.865	Pass
	High Channel	2480			
	Adjacency Channel	2479			

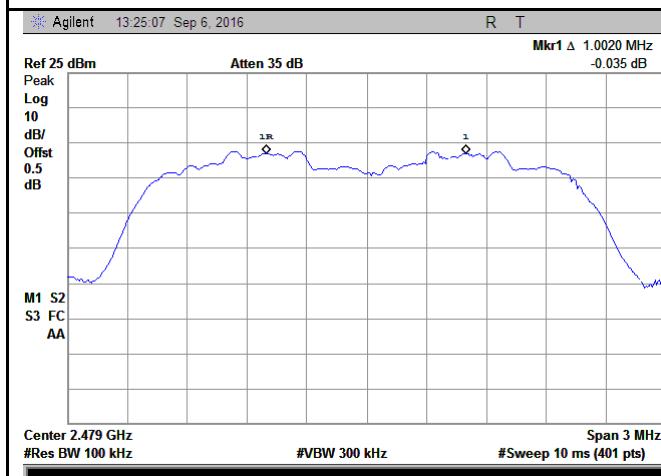
Test Plots

Channel Separation measurement result

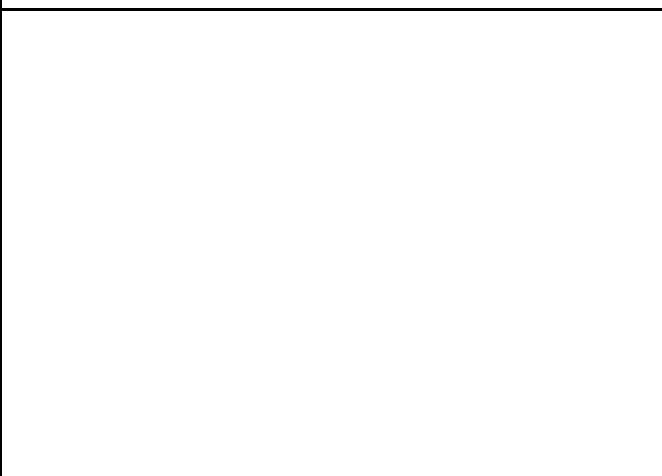




8DPSK - Low Channel



8DPSK - Middle Channel

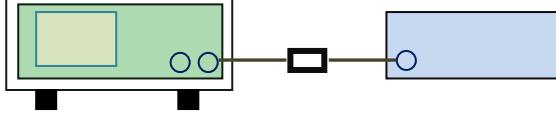


8DPSK - High Channel

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.</p> <p><u>Use the following spectrum analyzer settings:</u></p> <ul style="list-style-type: none"> - Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel - RBW \geq 1% of the 20 dB bandwidth - VBW \geq RBW - Sweep = auto - Detector function = peak - Trace = max hold. - 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 		

	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

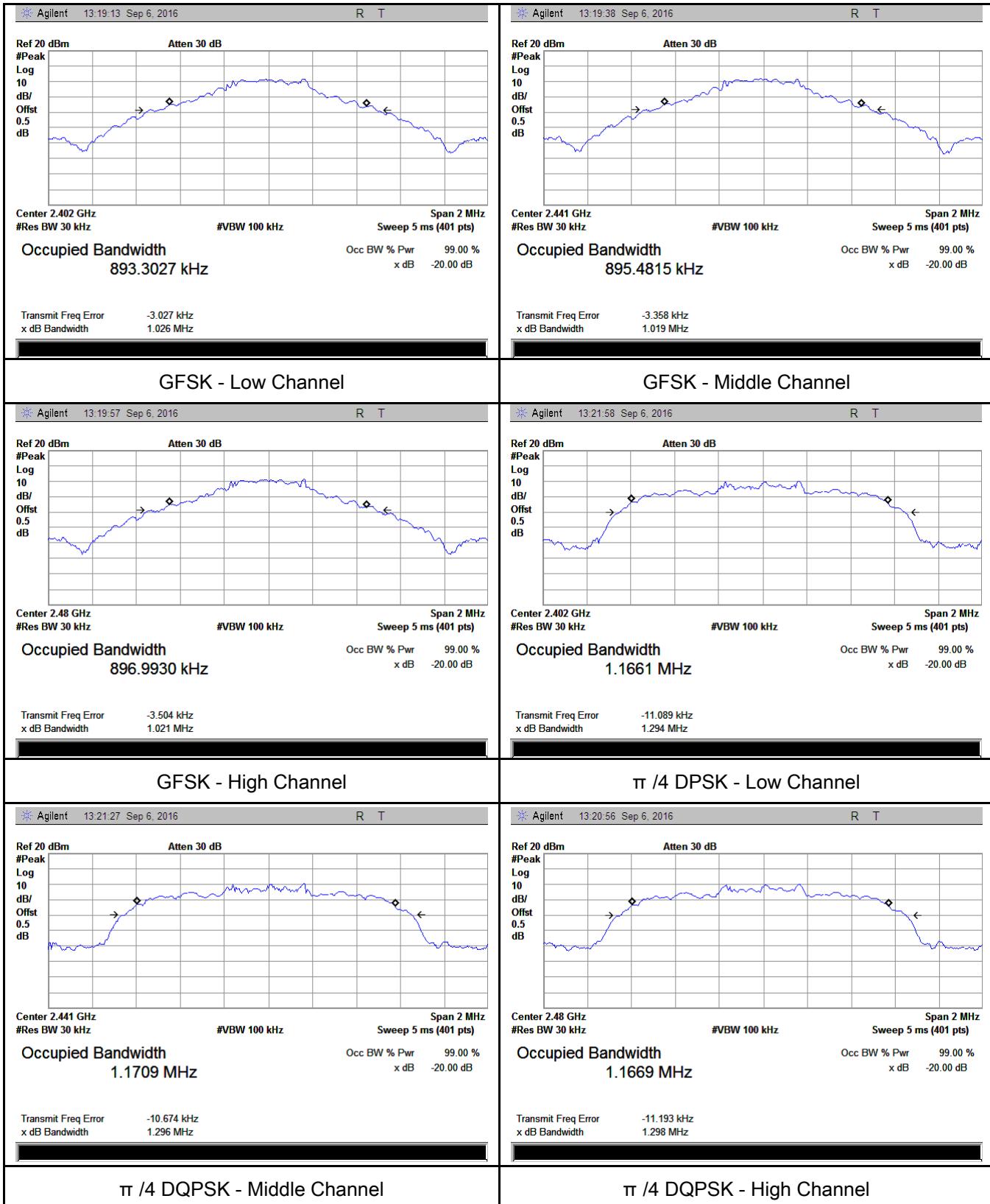
Test Plot Yes (See below) N/A

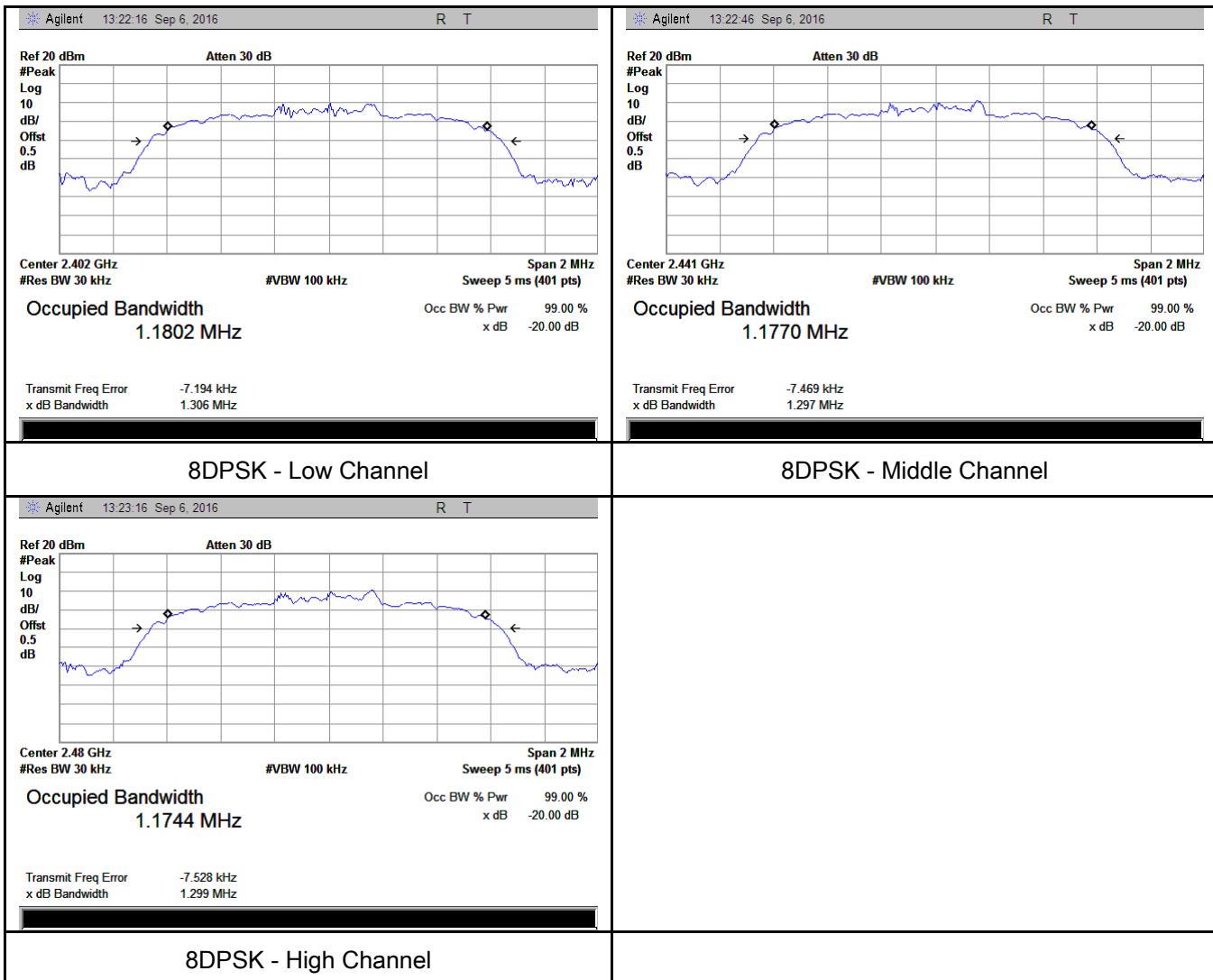
Measurement result

Modulation	CH	CH Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GFSK	Low	2402	1.026	0.8933
	Mid	2441	1.019	0.8955
	High	2480	1.021	0.8970
$\pi/4$ DQPSK	Low	2402	1.294	1.1661
	Mid	2441	1.296	1.1709
	High	2480	1.298	1.1669
8-DPSK	Low	2402	1.306	1.1802
	Mid	2441	1.297	1.1770
	High	2480	1.299	1.1744

Test Plots

20dB Bandwidth measurement result

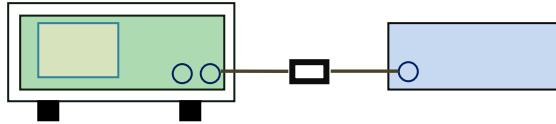




6.4 Peak Output Power

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.</p> <p><u>Use the following spectrum analyzer settings:</u></p> <ul style="list-style-type: none"> - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel - RBW > the 20 dB bandwidth of the emission being measured - VBW \geq RBW - Sweep = auto - Detector function = peak - Trace = max hold - Allow the trace to stabilize. 	

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

Test Data Yes N/A

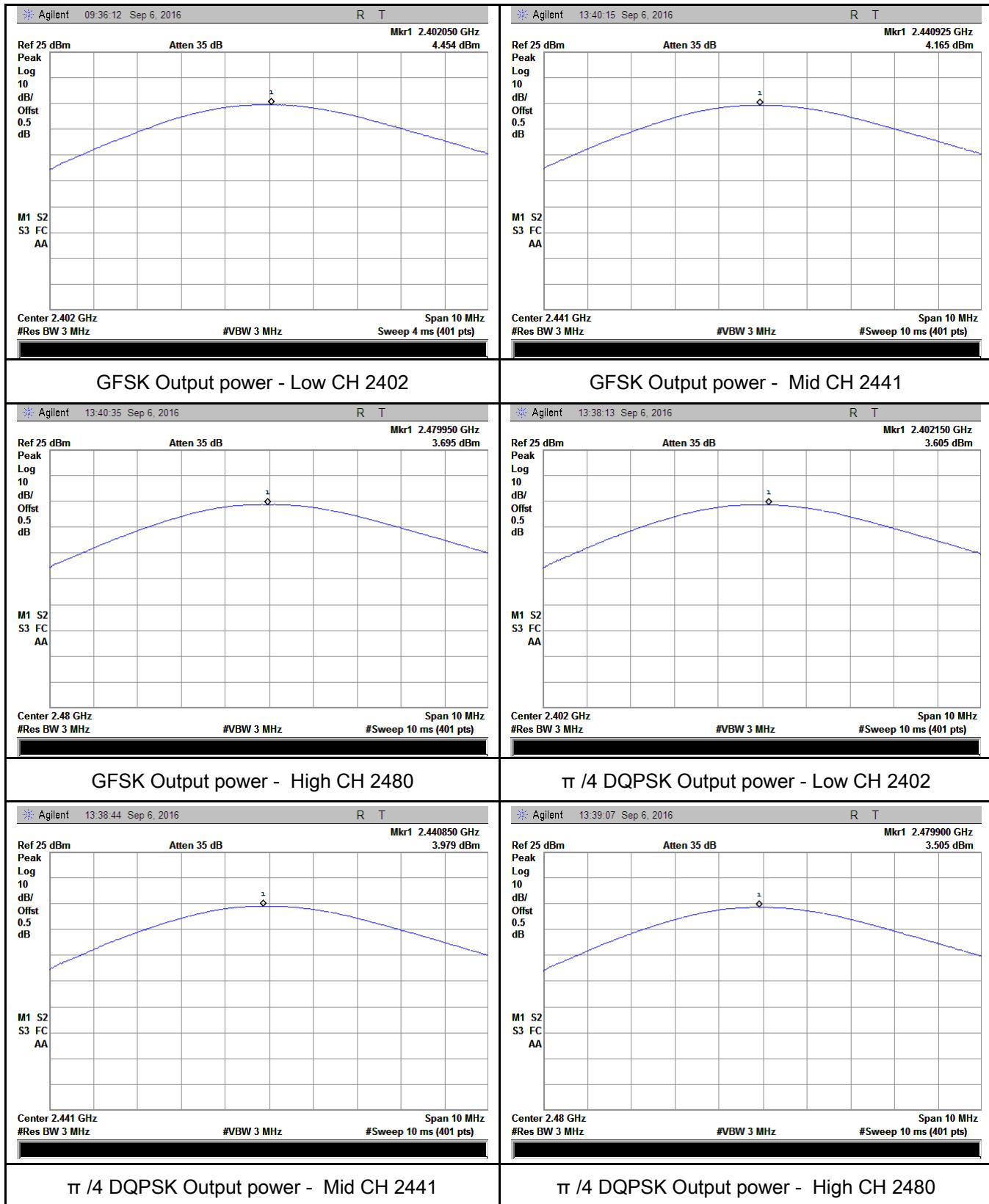
Test Plot Yes (See below) N/A

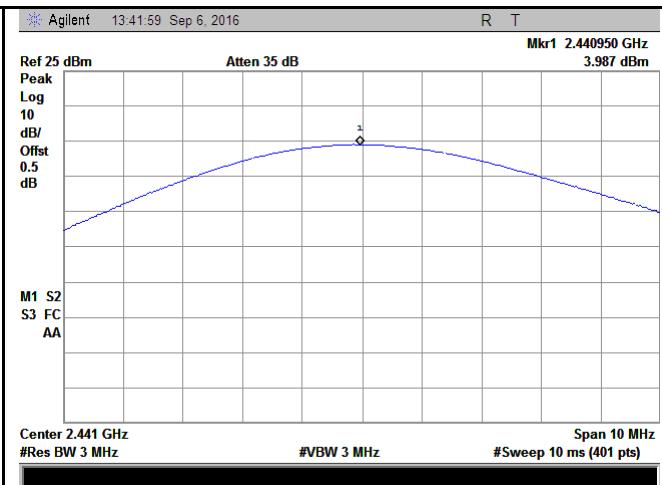
Peak Output Power measurement result

Type	Modulation	CH	Frequency (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	GFSK	Low	2402	4.454	125	Pass
		Mid	2441	4.165	125	Pass
		High	2480	3.695	125	Pass
	$\pi/4$ DQPSK	Low	2402	3.605	125	Pass
		Mid	2441	3.979	125	Pass
		High	2480	3.505	125	Pass
	8-DPSK	Low	2402	3.65	125	Pass
		Mid	2441	3.987	125	Pass
		High	2480	3.563	125	Pass

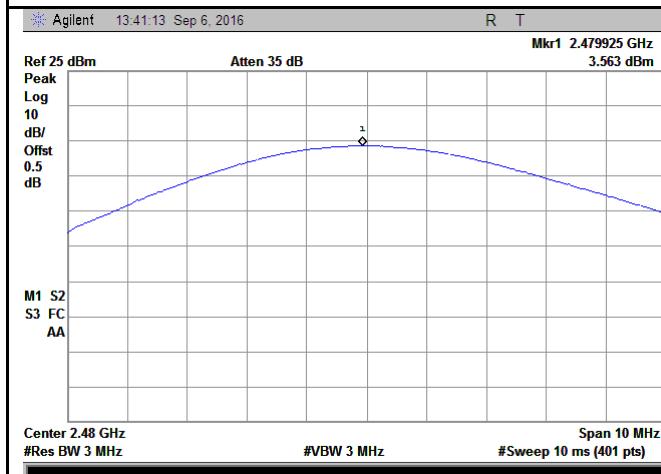
Test Plots

Output Power measurement result





8DPSK Output power - Low CH 2402



8DPSK Output power - Mid CH 2441



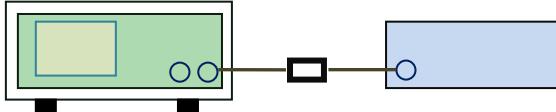
8DPSK Output power - High CH 2480



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):

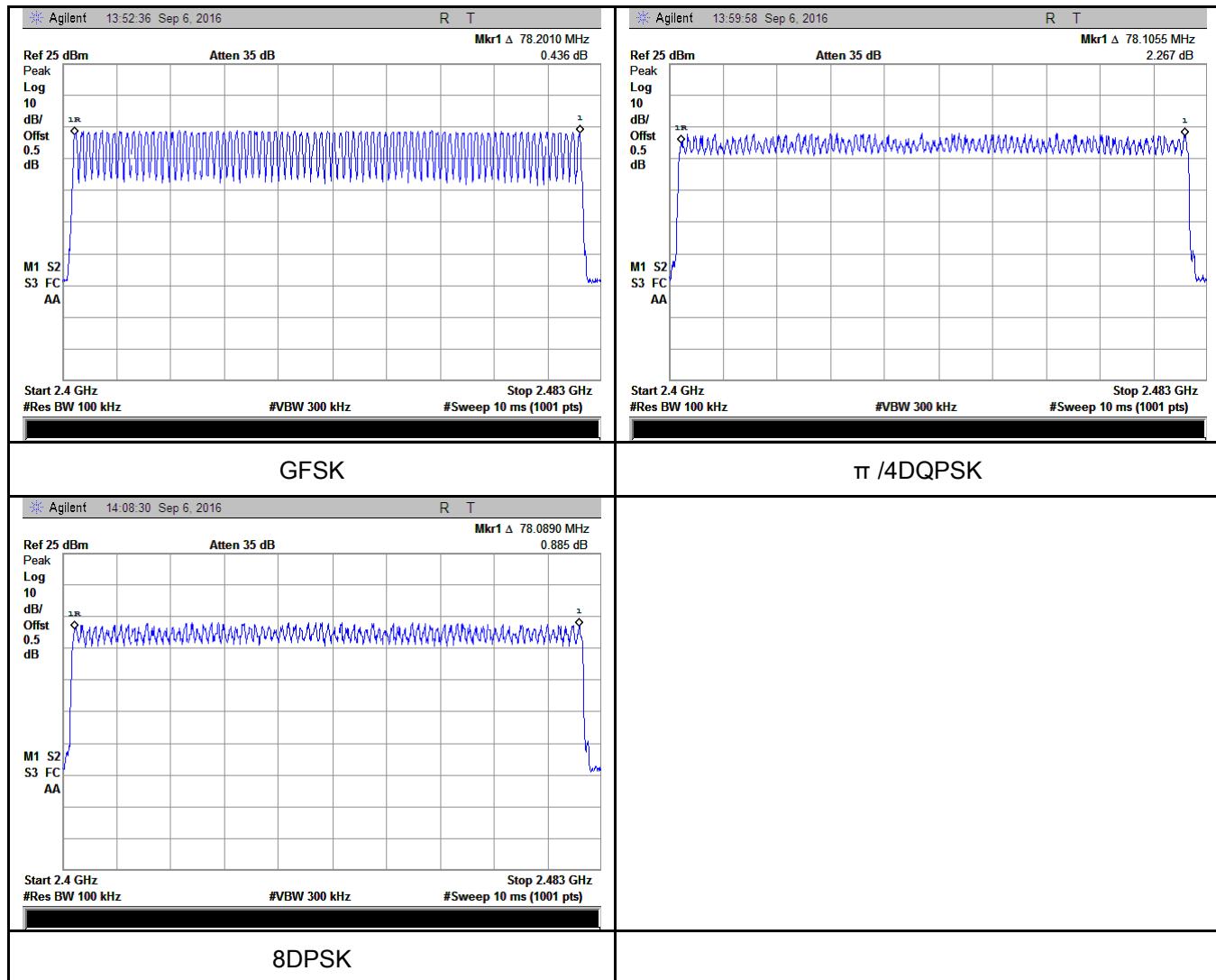
Spec	Item	Requirement	Applicable	
§15.247(a) (1)(iii)	a)	FHSS in 2400-2483.5MHz \geq 15 channels	<input checked="" type="checkbox"/>	
Test Setup				
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines.</p> <p><u>Use the following spectrum analyzer settings:</u></p> <p>The EUT must have its hopping function enabled.</p> <ul style="list-style-type: none"> - Span = the frequency band of operation - RBW \geq 1% of the span - VBW \geq RBW - Sweep = auto - Detector function = peak - Trace = max hold - Allow trace to fully stabilize. - 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). 			
Remark				
Result	<input checked="" type="checkbox"/>	Pass	<input type="checkbox"/>	Fail
Test Data	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	N/A
Test Plot	<input checked="" type="checkbox"/>	Yes (See below)	<input type="checkbox"/>	N/A

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

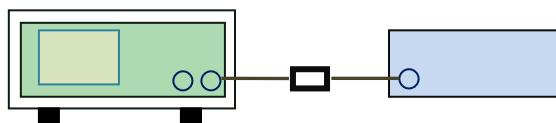
Number of Hopping Channels measurement result



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"> - Span = zero span, centered on a hopping channel - RBW = 1 MHz - VBW \geq RBW - Sweep = as necessary to capture the entire dwell time per hopping channel - Detector function = peak - Trace = max hold - use the marker-delta function to determine the dwell time 			
Remark				
Result	<input checked="" type="checkbox"/>	Pass	<input type="checkbox"/>	Fail

Test Data Yes N/A

Test Plot Yes (See below) N/A

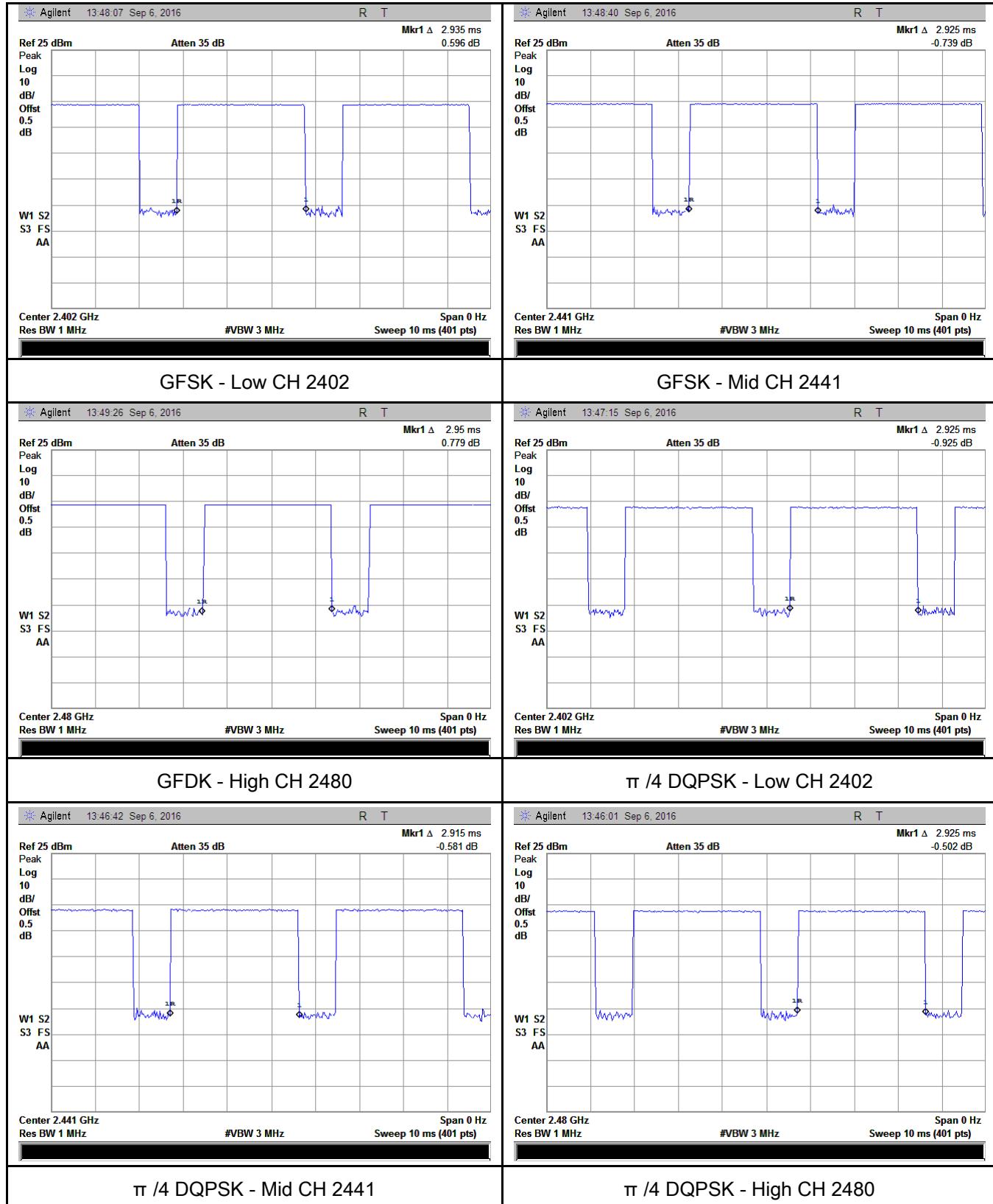
Dwell Time measurement result

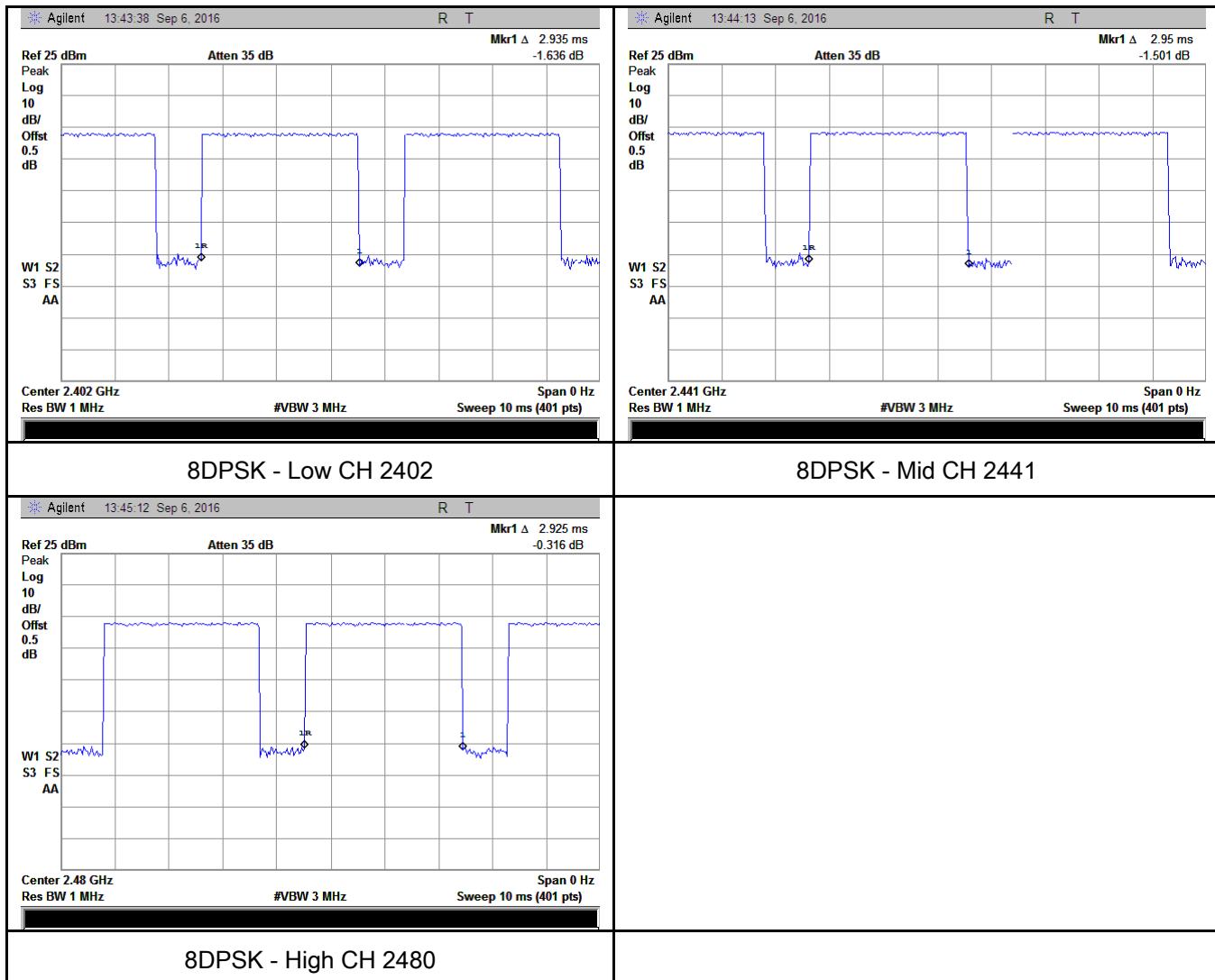
Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	GFSK	Low	2.935	313.067	400	Pass
		Mid	2.925	312.000	400	Pass
		High	2.95	314.667	400	Pass
	$\pi/4$ DQPSK	Low	2.925	312.000	400	Pass
		Mid	2.915	310.933	400	Pass
		High	2.925	312.000	400	Pass
	8-DPSK	Low	2.935	313.067	400	Pass
		Mid	2.95	314.667	400	Pass
		High	2.925	312.000	400	Pass

Note: Dwell time=Pulse Time (ms) $\times (1600 \div 6 \div 79) \times 31.6$

Test Plots

Dwell Time measurement result

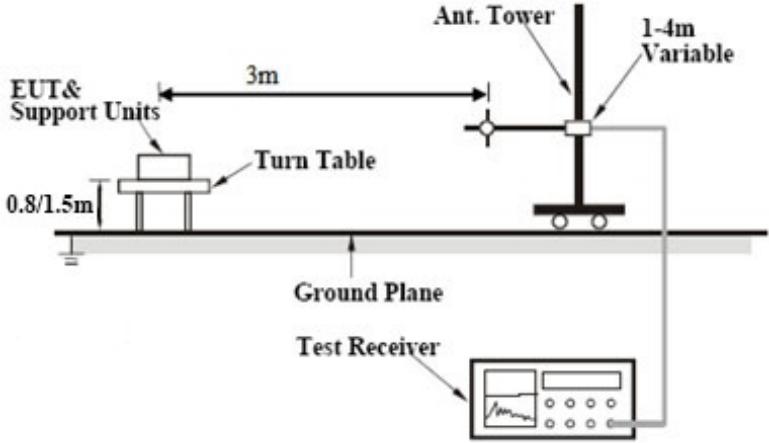




6.7 Band Edge & Restricted Band

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	August 24, 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	 <p>The diagram illustrates the test setup. A Turn Table is positioned on a Ground Plane. An EUT & Support Units is placed on the turn table. A vertical Ant. Tower is mounted on the turn table, with a 3m horizontal distance to the EUT. The Ant. Tower has a 1-4m Variable height adjustment. A Test Receiver is connected to the Ant. Tower to measure the signal. </p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Radiated Method Only</p> <ul style="list-style-type: none"> - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 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, 		

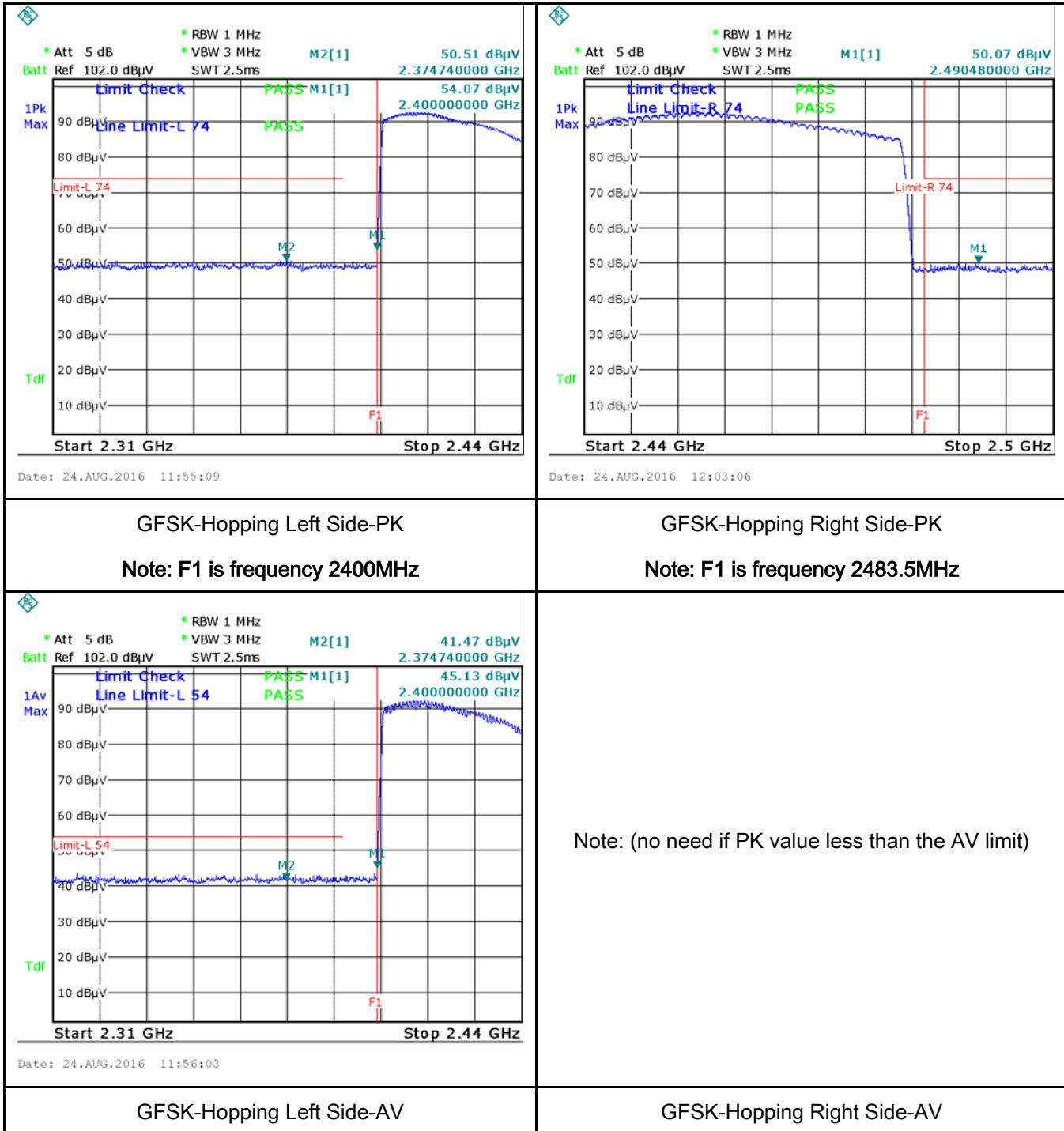
	<p>and make sure the instrument is operated in its linear range.</p> <ul style="list-style-type: none"> - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer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

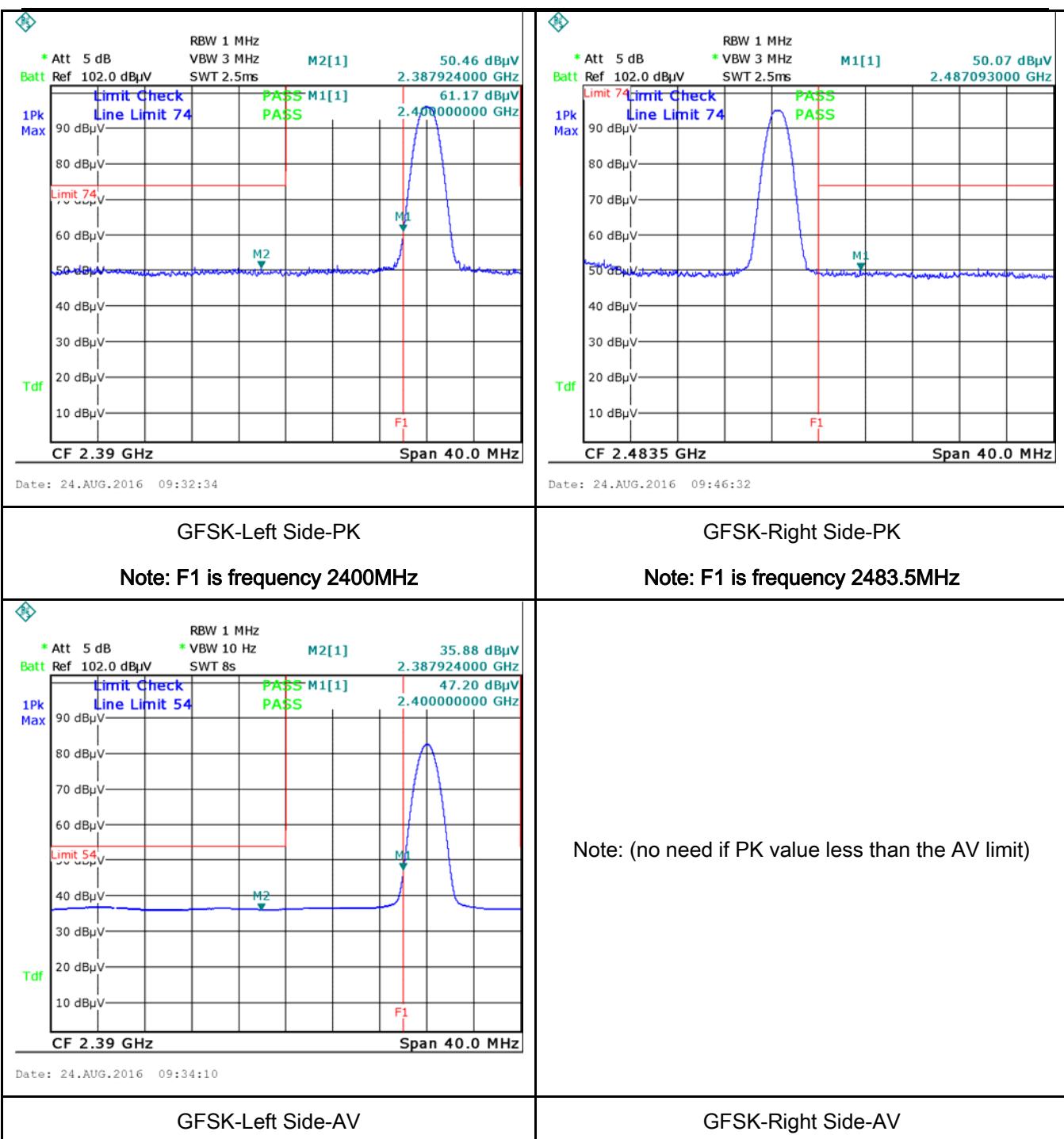
Test Data Yes N/A

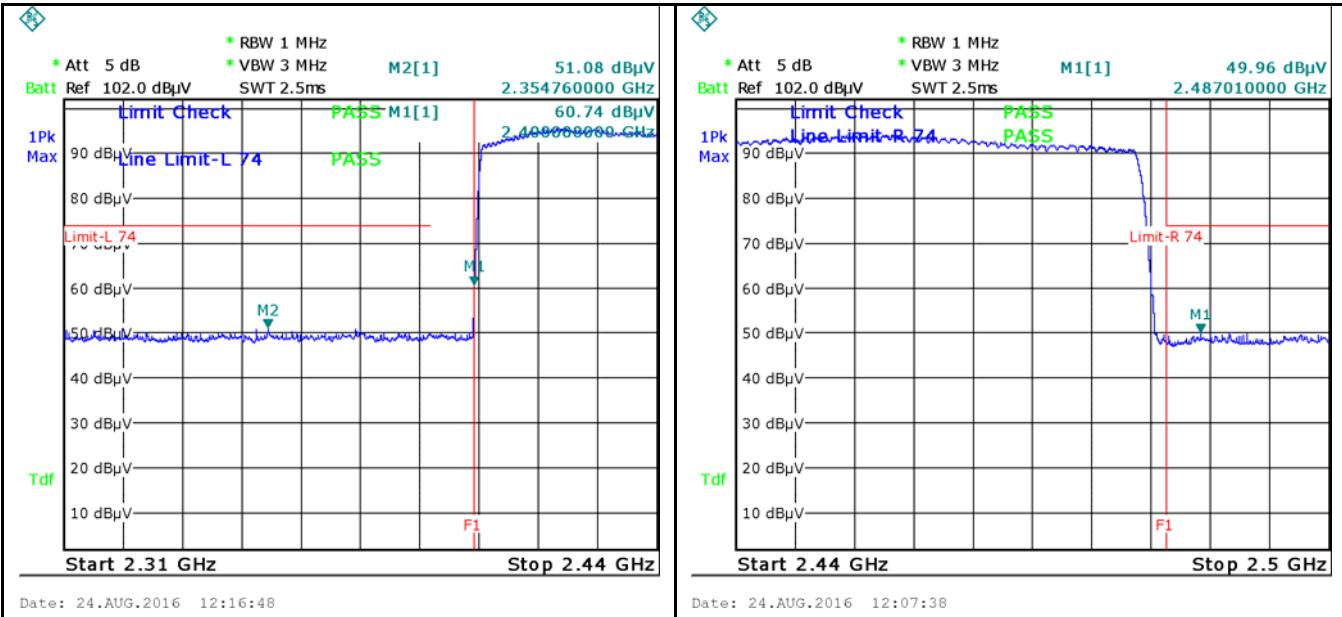
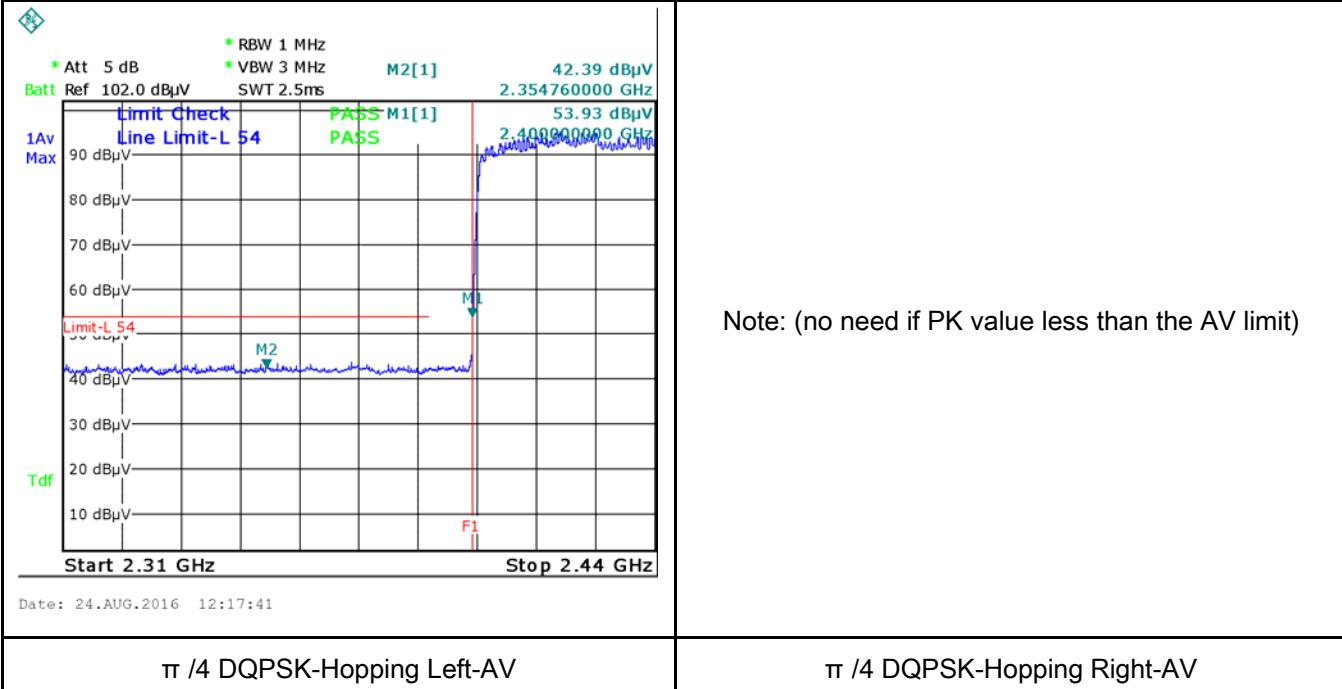
Test Plot Yes (See below) N/A

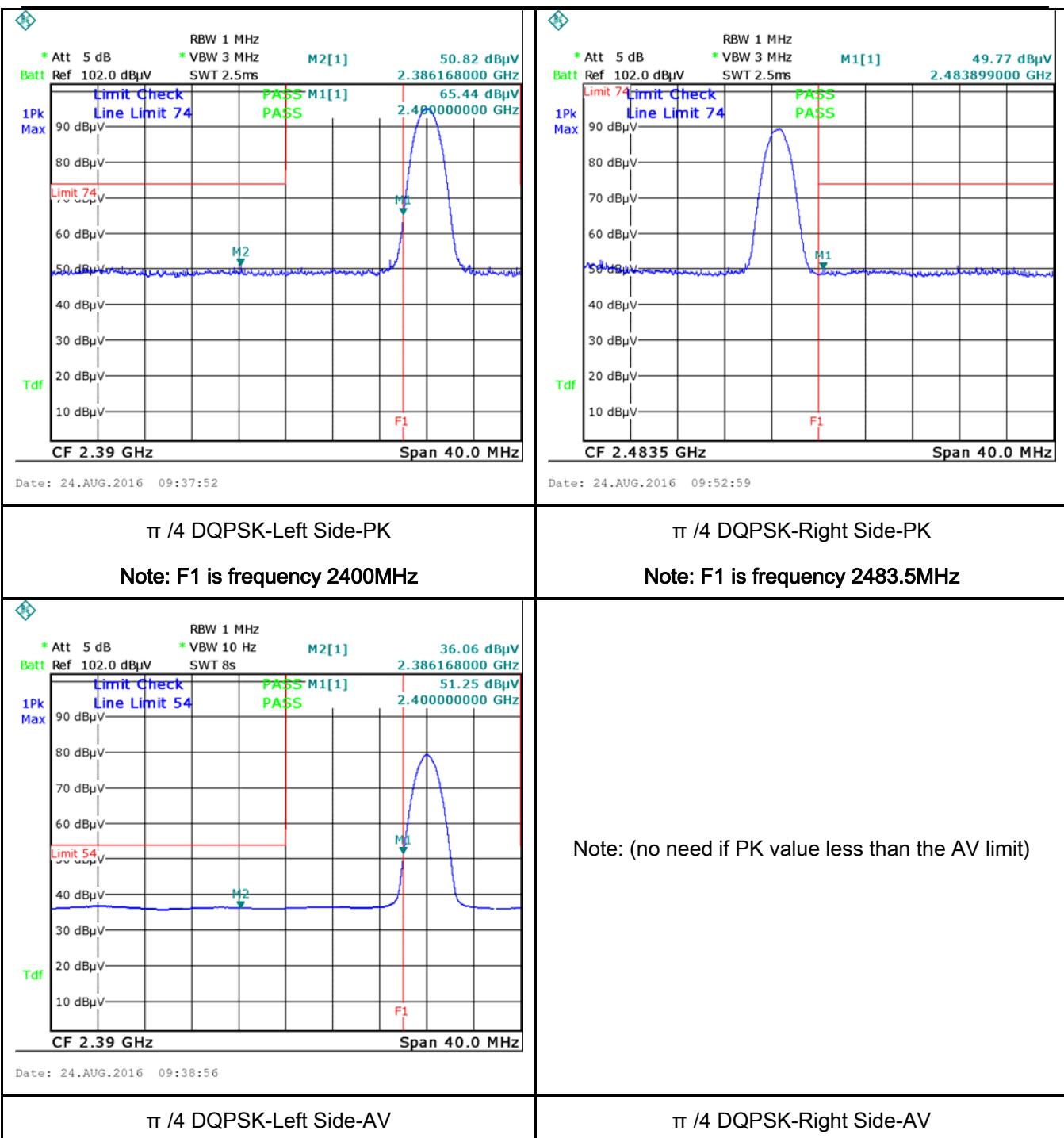
Test Plots

GFSK Mode:

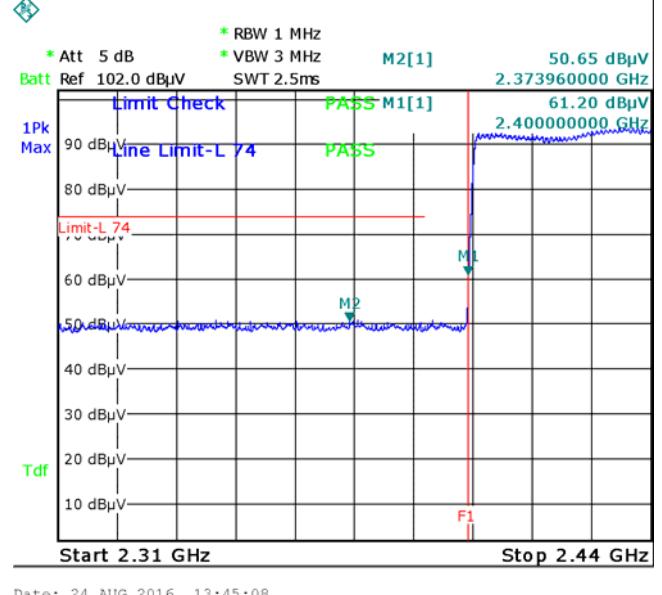
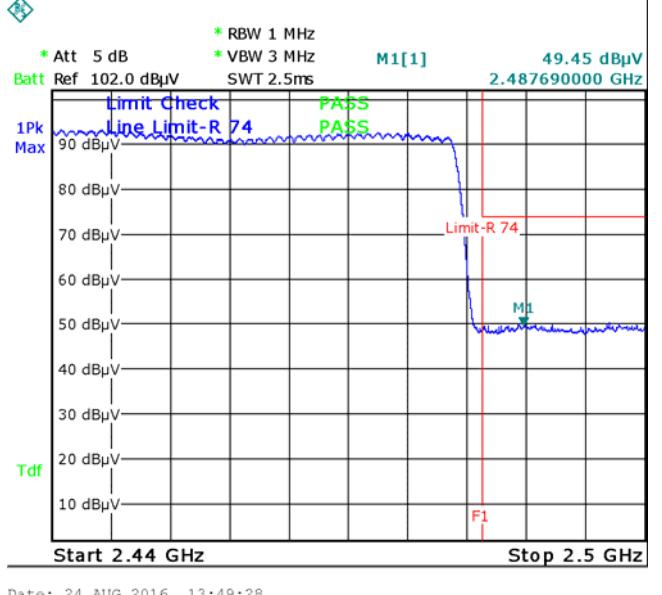
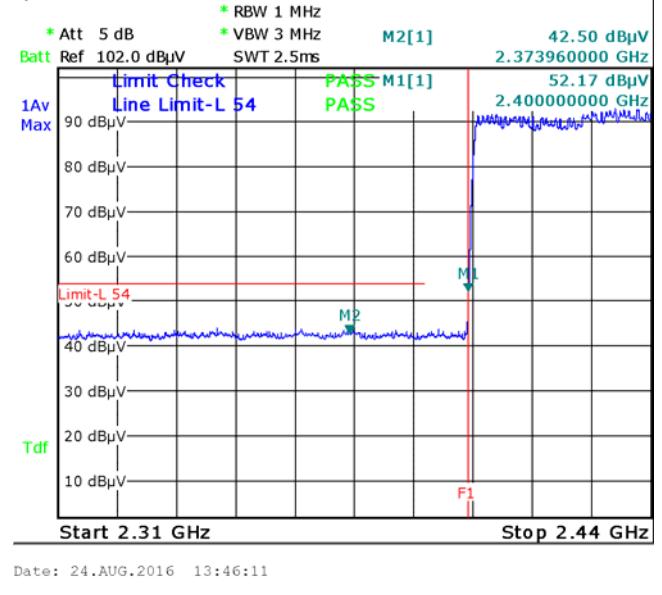


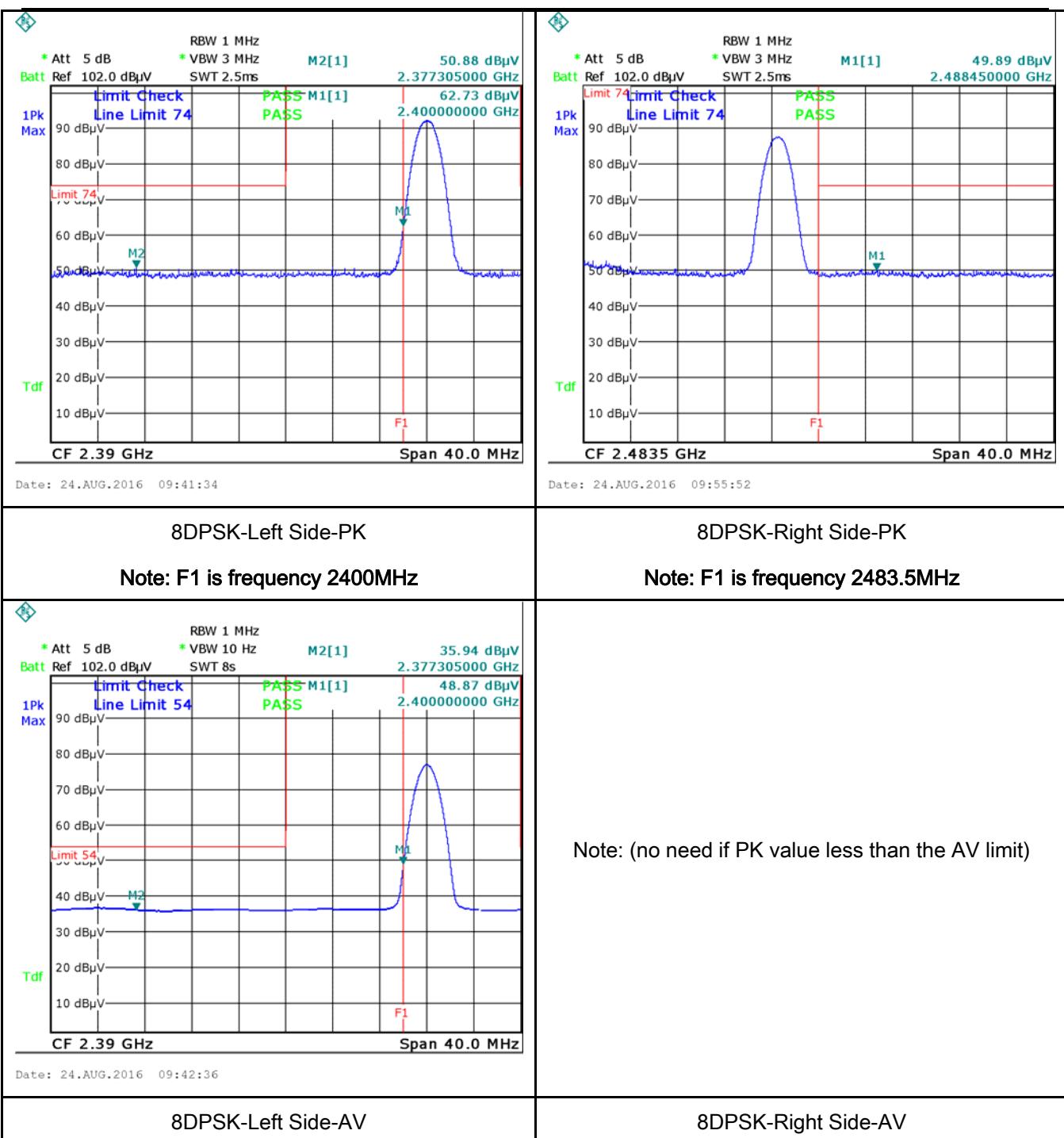


π /4 DQPSK Mode:

π /4 DQPSK-Hopping Left Side-PK
Note: F1 is frequency 2400MHz
π /4 DQPSK-Hopping Right Side-PK
Note: F1 is frequency 2483.5MHz




8-DPSK Mode:

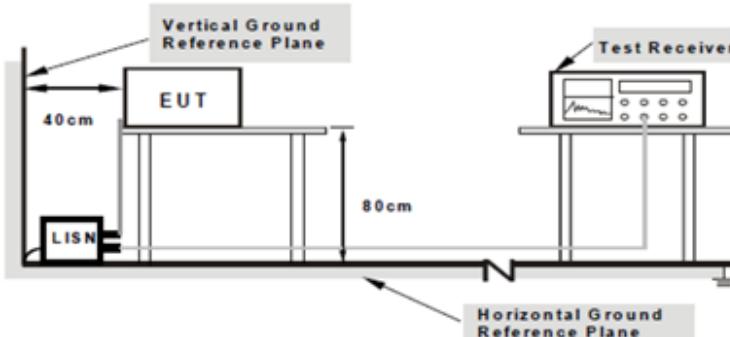
 <p>RBW 1 MHz Att 5 dB VBW 3 MHz Ref 102.0 dBμV SWT 2.5ms</p> <p>M2[1] 50.65 dBμV 2.373960000 GHz</p> <p>1Pk Max 90 dBμV Line Limit-L 74 Tdf</p> <p>Limit Check PASS M1[1] 61.20 dBμV 2.400000000 GHz PASS</p> <p>Start 2.31 GHz Stop 2.44 GHz</p> <p>Date: 24.AUG.2016 13:45:08</p>	 <p>RBW 1 MHz Att 5 dB VBW 3 MHz Ref 102.0 dBμV SWT 2.5ms</p> <p>M1[1] 49.45 dBμV 2.487690000 GHz</p> <p>1Pk Max 90 dBμV Line Limit-R 74 Tdf</p> <p>Limit Check PASS M1[1] 61.20 dBμV 2.400000000 GHz PASS</p> <p>Start 2.44 GHz Stop 2.5 GHz</p> <p>Date: 24.AUG.2016 13:49:28</p>
<p>8DPSK-Hopping Left Side-PK</p> <p>Note: F1 is frequency 2400MHz</p>	<p>8DPSK-Hopping Right Side-PK</p> <p>Note: F1 is frequency 2483.5MHz</p>
 <p>RBW 1 MHz Att 5 dB VBW 3 MHz Ref 102.0 dBμV SWT 2.5ms</p> <p>M2[1] 42.50 dBμV 2.373960000 GHz</p> <p>1Av Max 90 dBμV Line Limit-L 54 Tdf</p> <p>Limit Check PASS M1[1] 52.17 dBμV 2.400000000 GHz PASS</p> <p>Start 2.31 GHz Stop 2.44 GHz</p> <p>Date: 24.AUG.2016 13:46:11</p>	<p>Note: (no need if PK value less than the AV limit)</p>
<p>8DPSK-Hopping Left-AV</p>	<p>8DPSK-Hopping Right-AV</p>



6.8 AC Power Line Conducted Emissions

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1031mbar
Test date :	August 31, 2016
Tested By :	Loren Luo

Requirement(s):

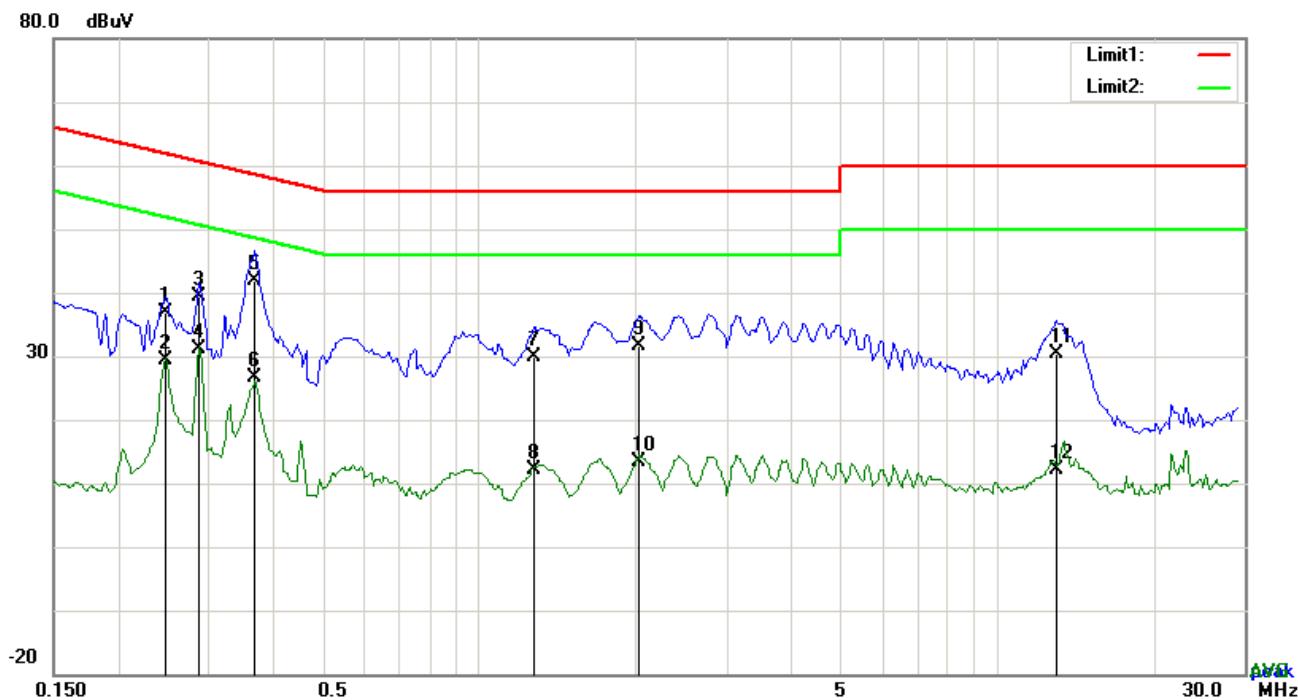
Spec	Item	Requirement	Applicable														
47CFR§15.207, RSS210 (A8.1)	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (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 (dB μ V)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50	<input checked="" type="checkbox"/>
Frequency ranges (MHz)	Limit (dB μ V)																
	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>																
Procedure	<ol style="list-style-type: none"> 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. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss 																

	coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 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. 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. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
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

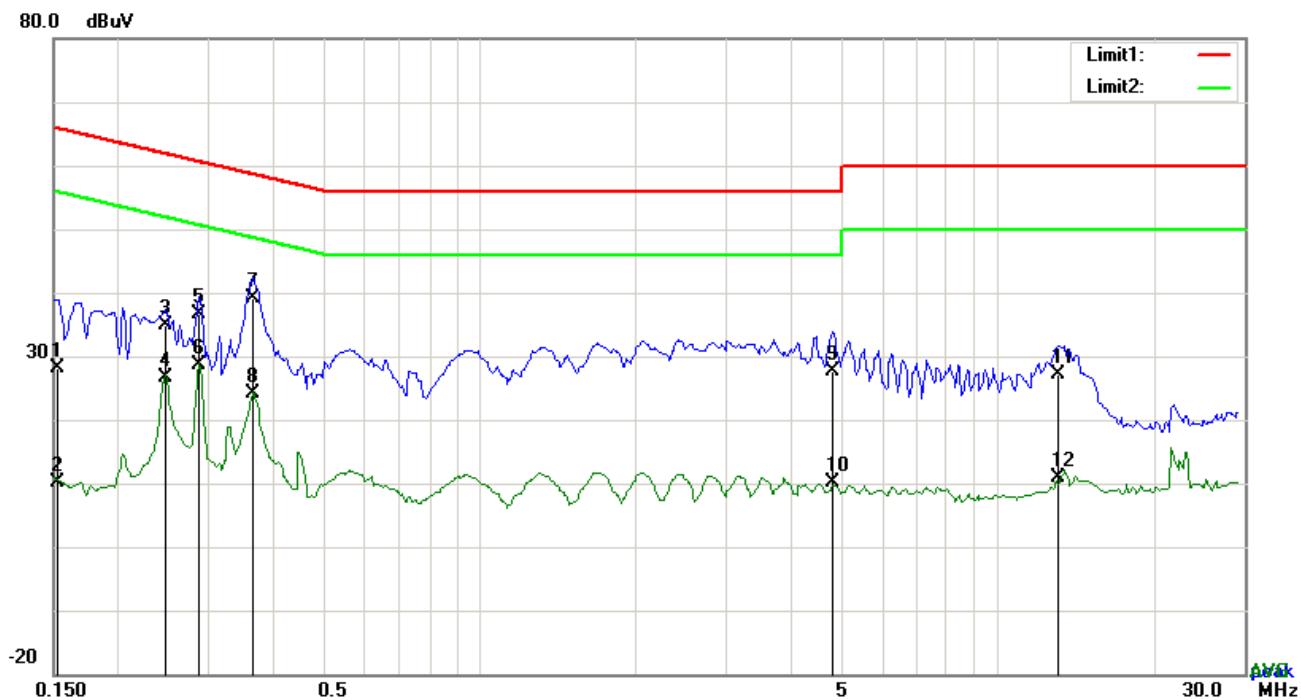


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	L1	0.2475	26.93	QP	10.03	36.96	61.84	-24.88
2	L1	0.2475	19.31	AVG	10.03	29.34	51.84	-22.50
3	L1	0.2865	29.26	QP	10.03	39.29	60.63	-21.34
4	L1	0.2865	21.00	AVG	10.03	31.03	50.63	-19.60
5	L1	0.3684	31.83	QP	10.03	41.86	58.54	-16.68
6	L1	0.3684	16.49	AVG	10.03	26.52	48.54	-22.02
7	L1	1.2732	19.89	QP	10.03	29.92	56.00	-26.08
8	L1	1.2732	2.11	AVG	10.03	12.14	46.00	-33.86
9	L1	2.0298	21.57	QP	10.04	31.61	56.00	-24.39
10	L1	2.0298	3.44	AVG	10.04	13.48	46.00	-32.52
11	L1	13.0152	20.21	QP	10.20	30.41	60.00	-29.59
12	L1	13.0152	2.04	AVG	10.20	12.24	50.00	-37.76

Test Mode: Bluetooth Mode

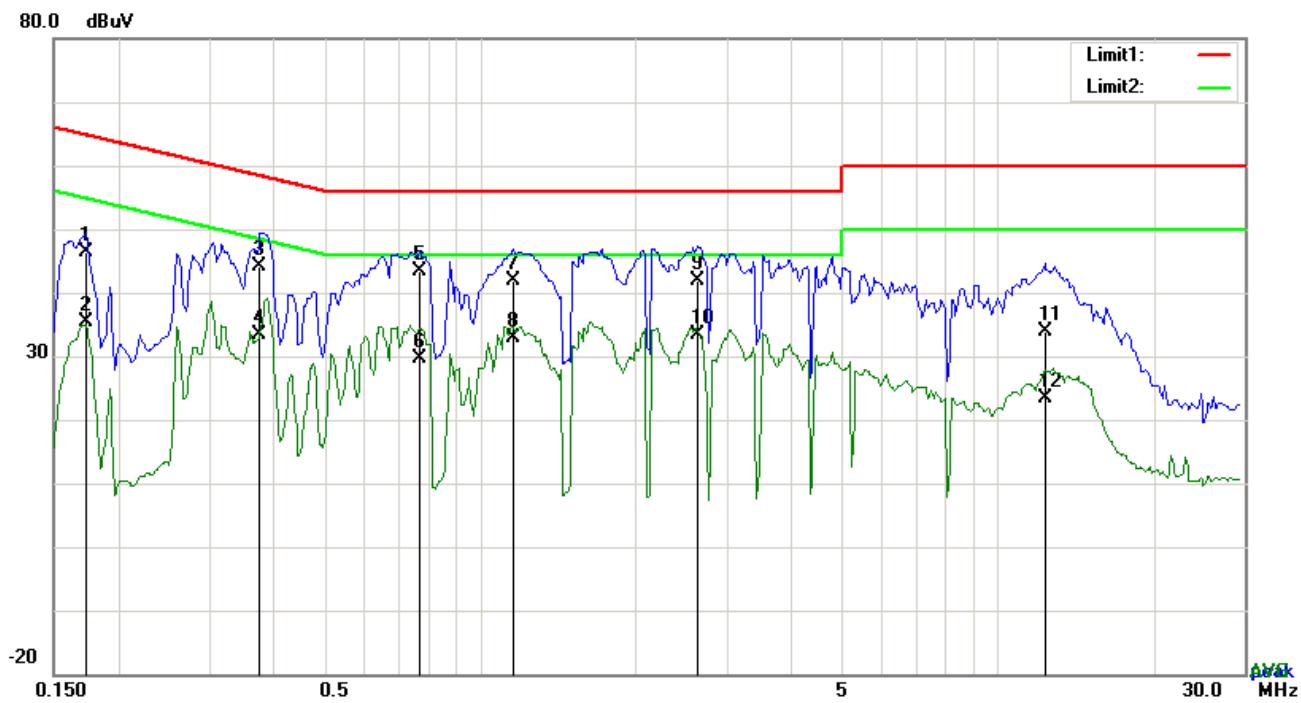


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	N	0.1524	18.08	QP	10.02	28.10	65.87	-37.77
2	N	0.1524	0.02	AVG	10.02	10.04	55.87	-45.83
3	N	0.2475	24.86	QP	10.02	34.88	61.84	-26.96
4	N	0.2475	16.72	AVG	10.02	26.74	51.84	-25.10
5	N	0.2865	26.56	QP	10.02	36.58	60.63	-24.05
6	N	0.2865	18.63	AVG	10.02	28.65	50.63	-21.98
7	N	0.3645	29.21	QP	10.02	39.23	58.63	-19.40
8	N	0.3645	14.03	AVG	10.02	24.05	48.63	-24.58
9	N	4.8174	17.48	QP	10.07	27.55	56.00	-28.45
10	N	4.8174	0.01	AVG	10.07	10.08	46.00	-35.92
11	N	13.1010	16.98	QP	10.18	27.16	60.00	-32.84
12	N	13.1010	0.68	AVG	10.18	10.86	50.00	-39.14

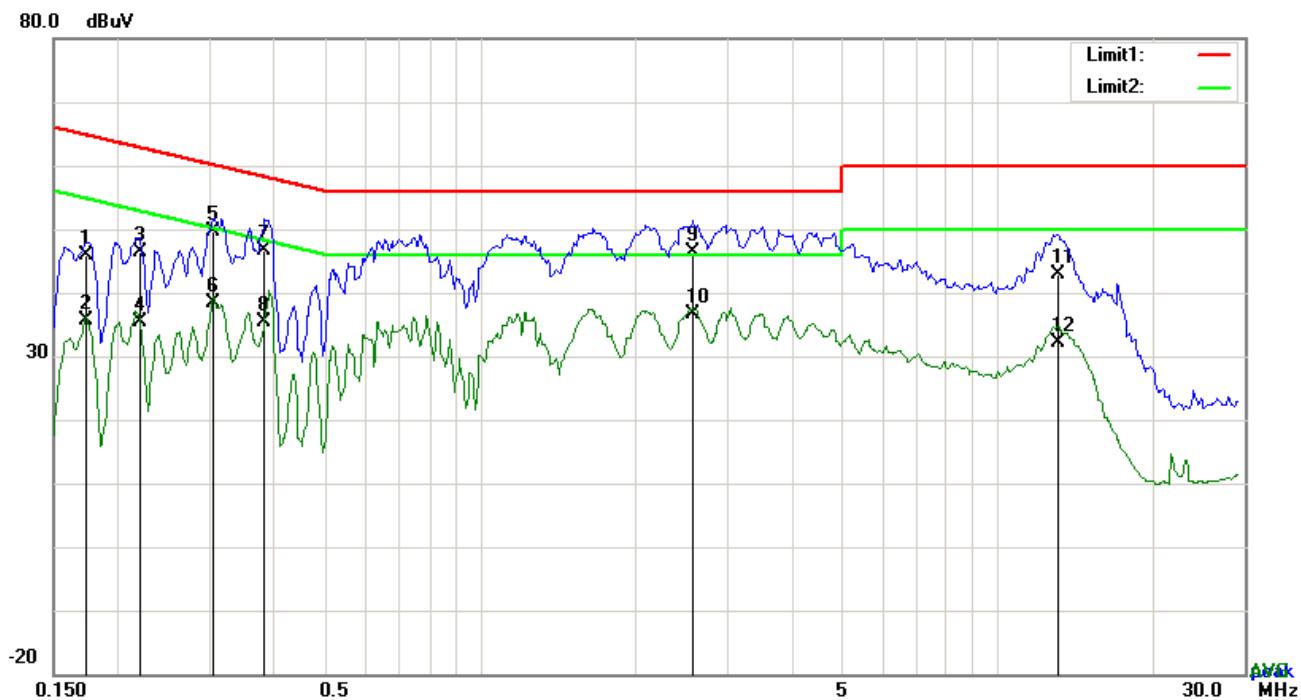
Test Mode: Bluetooth Mode



Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	L1	0.1734	36.28	QP	10.03	46.31	64.80	-18.49
2	L1	0.1734	25.26	AVG	10.03	35.29	54.80	-19.51
3	L1	0.3762	34.16	QP	10.03	44.19	58.36	-14.17
4	L1	0.3762	23.45	AVG	10.03	33.48	48.36	-14.88
5	L1	0.7662	33.33	QP	10.03	43.36	56.00	-12.64
6	L1	0.7662	19.48	AVG	10.03	29.51	46.00	-16.49
7	L1	1.1601	31.93	QP	10.03	41.96	56.00	-14.04
8	L1	1.1601	22.75	AVG	10.03	32.78	46.00	-13.22
9	L1	2.6226	31.92	QP	10.05	41.97	56.00	-14.03
10	L1	2.6226	23.25	AVG	10.05	33.30	46.00	-12.70
11	L1	12.3249	23.72	QP	10.18	33.90	60.00	-26.10
12	L1	12.3249	13.19	AVG	10.18	23.37	50.00	-26.63

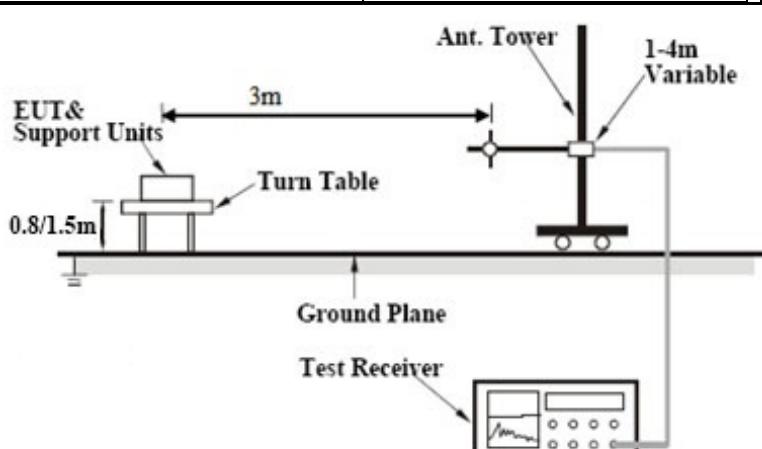
Test Mode: Bluetooth Mode

Test Data
Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	N	0.1734	35.97	QP	10.02	45.99	64.80	-18.81
2	N	0.1734	25.69	AVG	10.02	35.71	54.80	-19.09
3	N	0.2202	36.34	QP	10.02	46.36	62.81	-16.45
4	N	0.2202	25.42	AVG	10.02	35.44	52.81	-17.37
5	N	0.3060	39.61	QP	10.02	49.63	60.08	-10.45
6	N	0.3060	28.47	AVG	10.02	38.49	50.08	-11.59
7	N	0.3840	36.65	QP	10.02	46.67	58.19	-11.52
8	N	0.3840	25.45	AVG	10.02	35.47	48.19	-12.72
9	N	2.5836	36.29	QP	10.05	46.34	56.00	-9.66
10	N	2.5836	26.58	AVG	10.05	36.63	46.00	-9.37
11	N	13.0659	32.82	QP	10.18	43.00	60.00	-17.00
12	N	13.0659	22.03	AVG	10.18	32.21	50.00	-17.79

6.9 Radiated Spurious Emissions & Restricted Band

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1031mbar
Test date :	August 31, 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 (μV/m)</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 (μ V/m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength (μ V/m)												
30 – 88	100												
88 – 216	150												
216 – 960	200												
Above 960	500												
Test Setup		 <p>The diagram illustrates the test setup. A 'Turn Table' is positioned on a 'Ground Plane'. A 'EUT & Support Units' is mounted on the turn table. A 'Ant. Tower' is connected to the EUT and is height-adjustable, with a '1-4m Variable' height indicator. A 'Test Receiver' is connected to the tower and the ground plane. A distance of '3m' is indicated between the EUT and the tower. The height of the EUT is marked as '0.8/1.5m'.</p>											
Procedure		<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. 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: 											

	<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.</p> <p>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: Bluetooth Mode

Below 1GHz

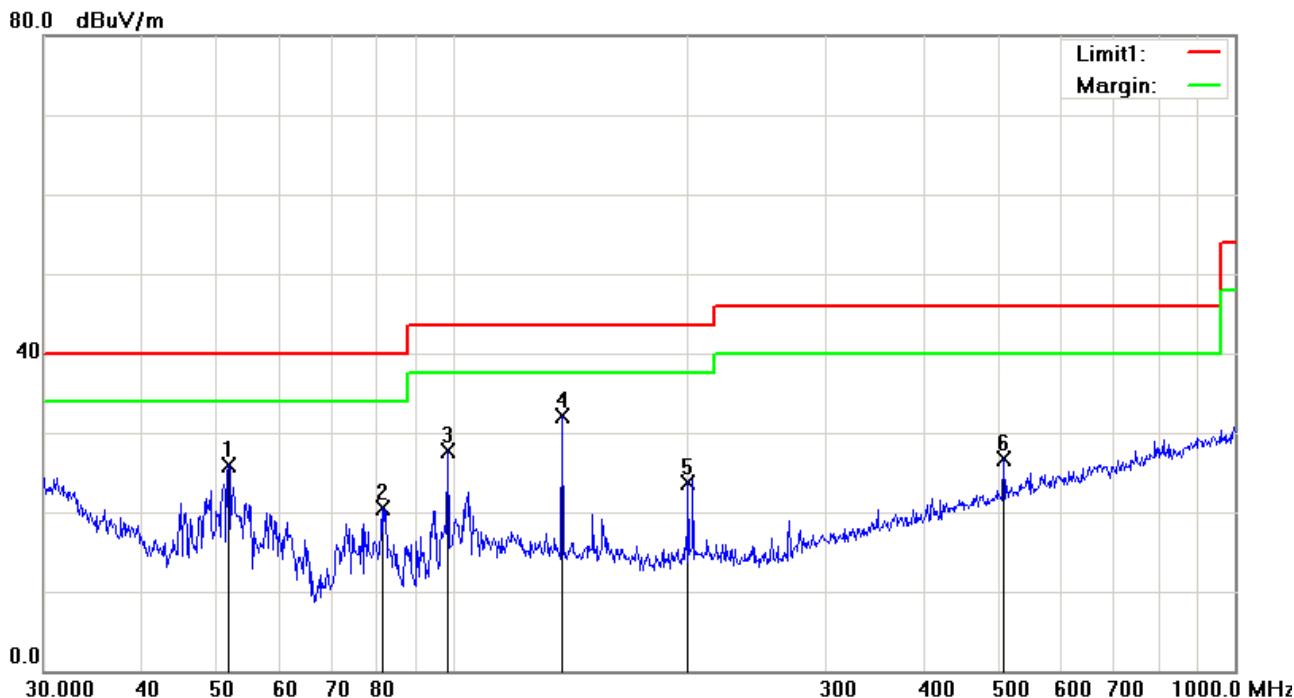


Test Data

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	32.0668	25.99	peak	-1.78	24.21	40.00	-15.79	100	85
2	H	77.0505	27.39	peak	-13.75	13.64	40.00	-26.36	100	254
3	H	104.5361	30.92	peak	-10.00	20.92	43.50	-22.58	100	186
4	H	133.1511	29.89	peak	-8.12	21.77	43.50	-21.73	100	160
5	H	294.1137	28.02	peak	-7.17	20.85	46.00	-25.15	100	164
6	H	906.4824	25.60	peak	4.74	30.34	46.00	-15.66	100	81

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency (MHz)	Readin g (dBuV/ m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	V	51.6616	39.19	peak	-13.37	25.82	40.00	-14.18	100	292
2	V	81.2117	34.29	peak	-13.71	20.58	40.00	-19.42	100	26
3	V	98.4866	38.82	peak	-11.20	27.62	43.50	-15.88	100	120
4	V	137.9029	40.42	peak	-8.40	32.02	43.50	-11.48	100	154
5	V	199.9856	32.44	peak	-8.74	23.70	43.50	-19.80	100	199
6	V	506.4791	28.26	peak	-1.58	26.68	46.00	-19.32	100	341

Above 1GHz

Test Mode:	Transmitting Mode
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Mode: GFSK (Worst Case)
Low Channel (2402 MHz) (GFSK Worst Case)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4804	38.94	AV	V	33.67	6.86	32.66	46.81	54	-7.19
4804	38.16	AV	H	33.67	6.86	32.66	46.03	54	-7.97
4804	47.85	PK	V	33.67	6.86	32.66	55.72	74	-18.28
4804	47.21	PK	H	33.67	6.86	32.66	55.08	74	-18.92
17794	24.45	AV	V	45.03	11.21	32.38	48.31	54	-5.69
17794	24.13	AV	H	45.03	11.21	32.38	47.99	54	-6.01
17794	41.02	PK	V	45.03	11.21	32.38	64.88	74	-9.12
17794	40.37	PK	H	45.03	11.21	32.38	64.23	74	-9.77

Middle Channel (2441 MHz) (GFSK Worst Case)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4882	39.01	AV	V	33.71	6.95	32.74	46.93	54	-7.07
4882	38.76	AV	H	33.71	6.95	32.74	46.68	54	-7.32
4882	48.12	PK	V	33.71	6.95	32.74	56.04	74	-17.96
4882	47.67	PK	H	33.71	6.95	32.74	55.59	74	-18.41
17812	24.58	AV	V	45.15	11.18	32.41	48.5	54	-5.5
17812	24.33	AV	H	45.15	11.18	32.41	48.25	54	-5.75
17812	41.19	PK	V	45.15	11.18	32.41	65.11	74	-8.89
17812	40.92	PK	H	45.15	11.18	32.41	64.84	74	-9.16

High Channel (2480 MHz) (GFSK Worst Case)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4960	38.72	AV	V	33.9	6.76	32.74	46.64	54	-7.36
4960	38.23	AV	H	33.9	6.76	32.74	46.15	54	-7.85
4960	48.01	PK	V	33.9	6.76	32.74	55.93	74	-18.07
4960	47.39	PK	H	33.9	6.76	32.74	55.31	74	-18.69
17789	24.89	AV	V	45.22	11.35	32.38	49.08	54	-4.92
17789	24.15	AV	H	45.22	11.35	32.38	48.34	54	-5.66
17789	40.94	PK	V	45.22	11.35	32.38	65.13	74	-8.87
17789	40.27	PK	H	45.22	11.35	32.38	64.46	74	-9.54

Note:

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

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

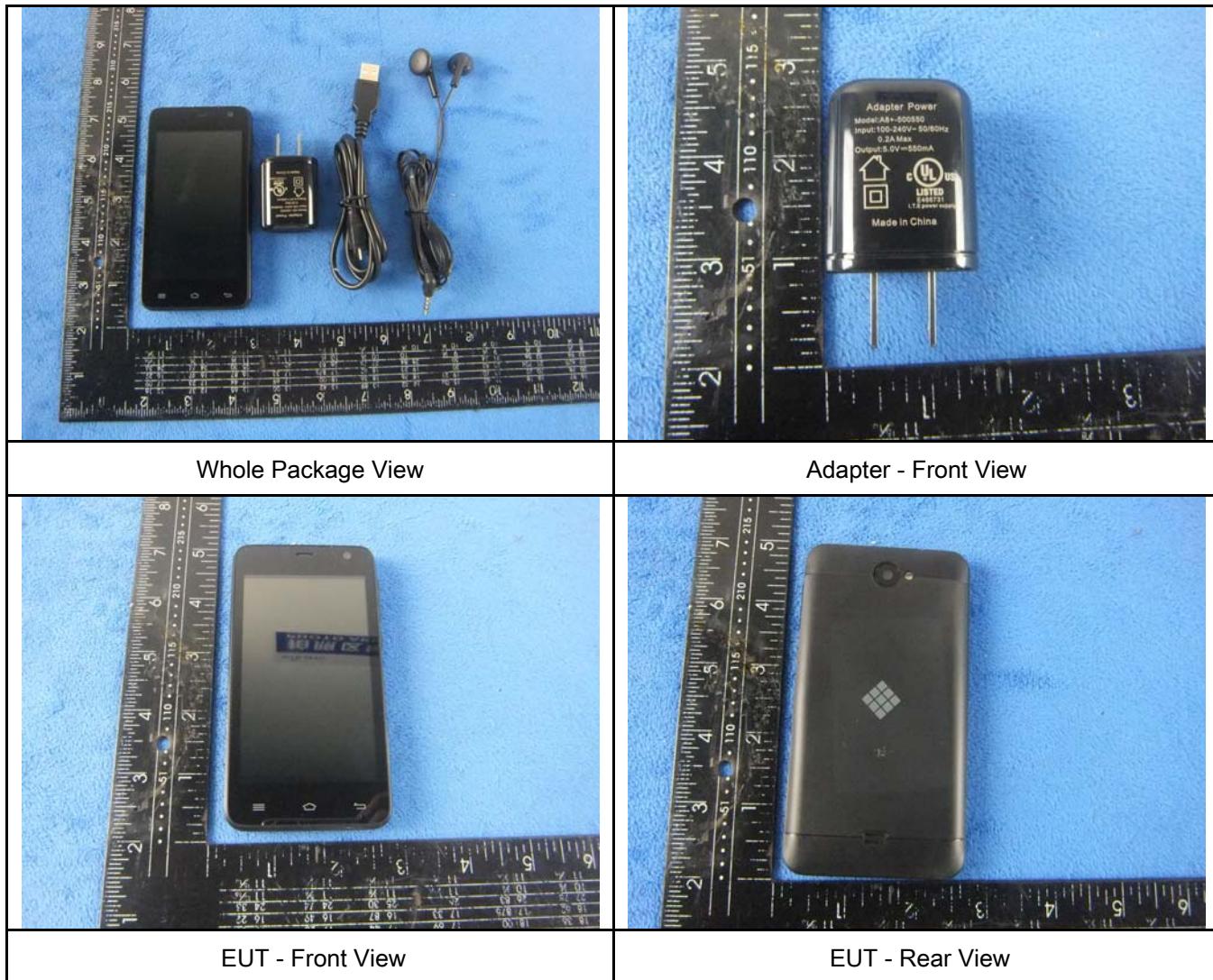
3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

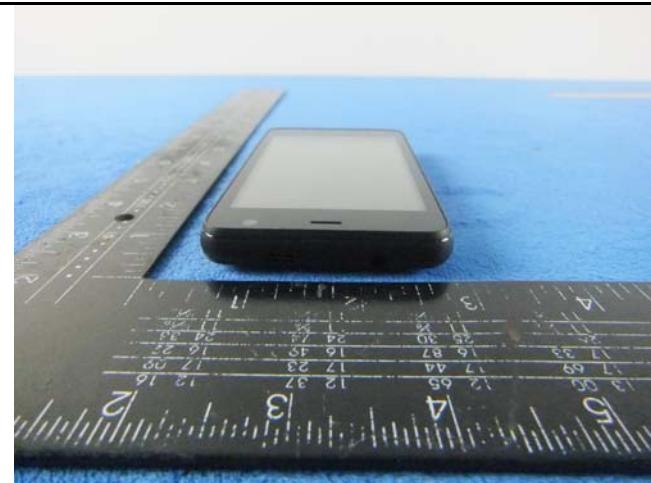
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
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"/>
RF conducted test					
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"/>
Radiated Emissions					
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

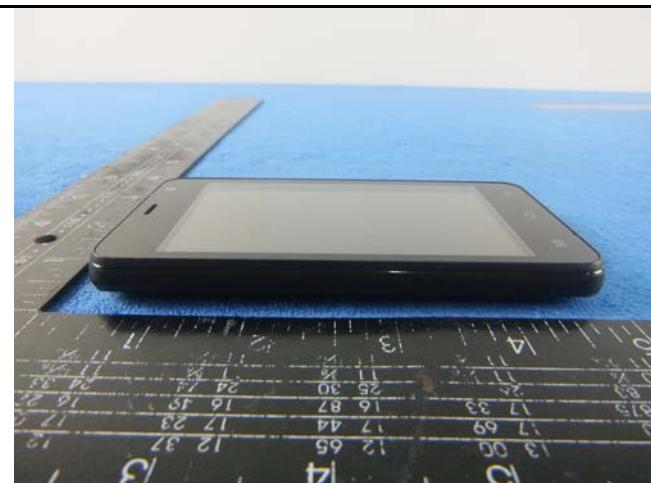




EUT - Top View



EUT - Bottom View

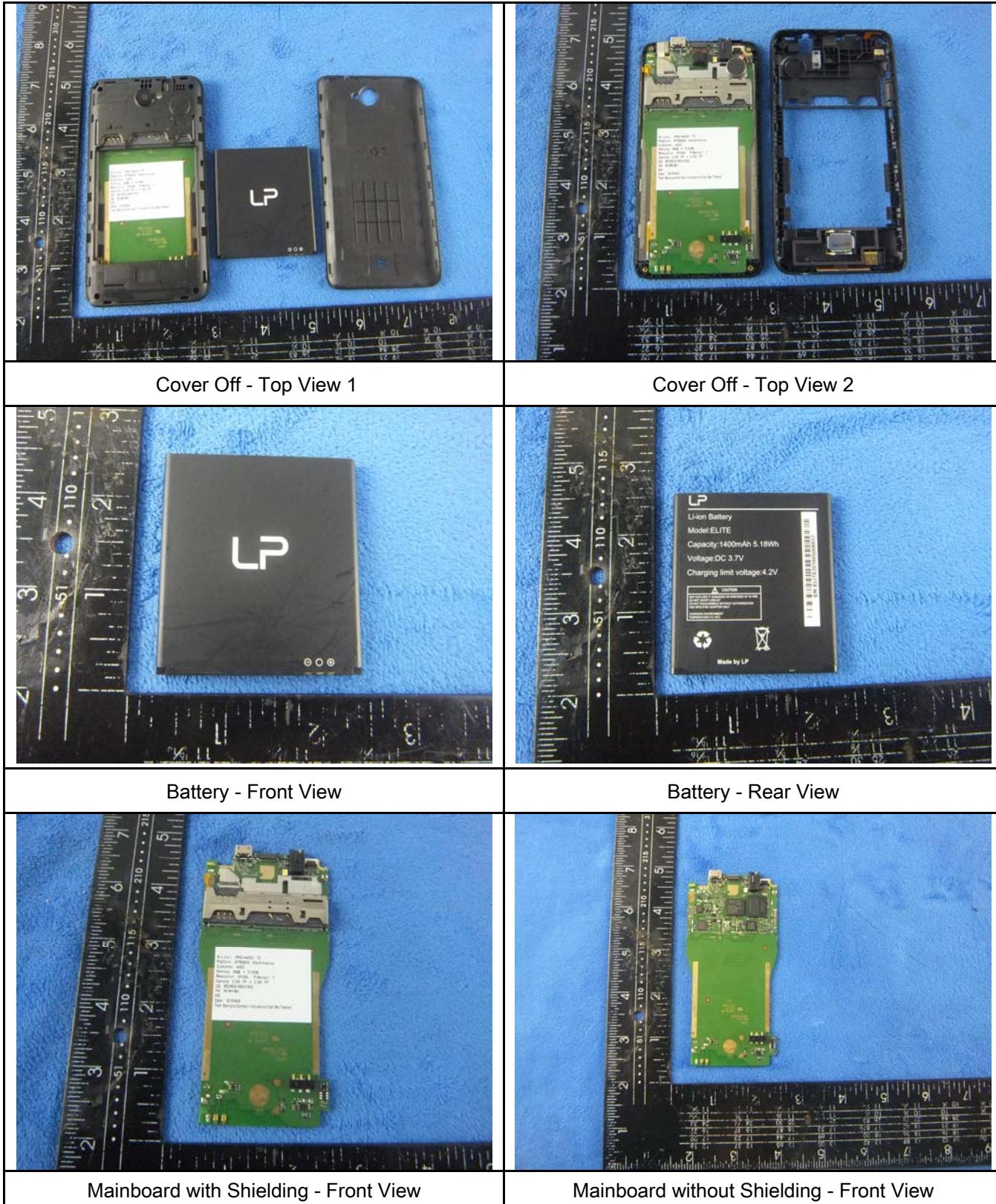


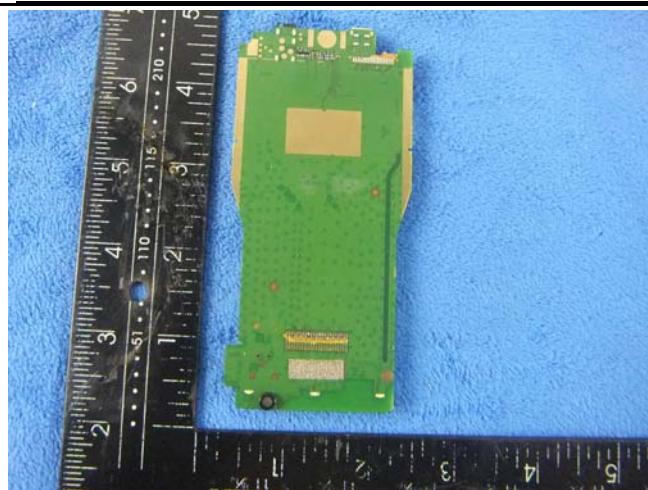
EUT - Left View



EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo

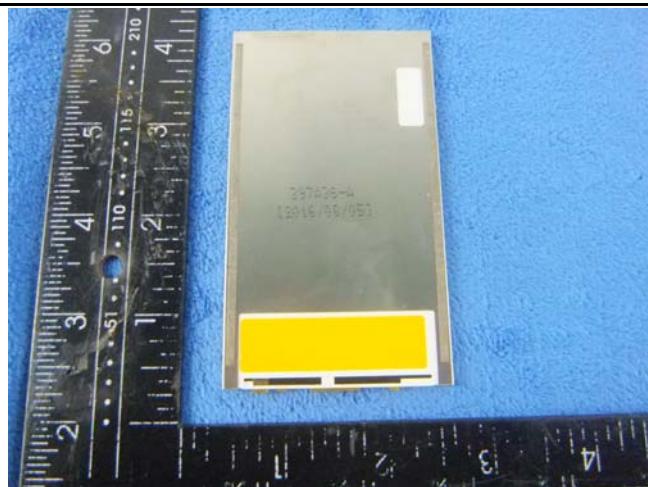




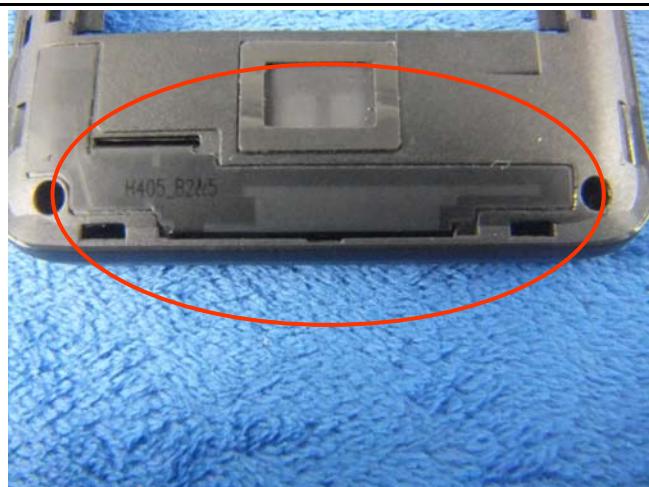
Mainboard - Rear View



LCD – Front View



LCD – Rear View

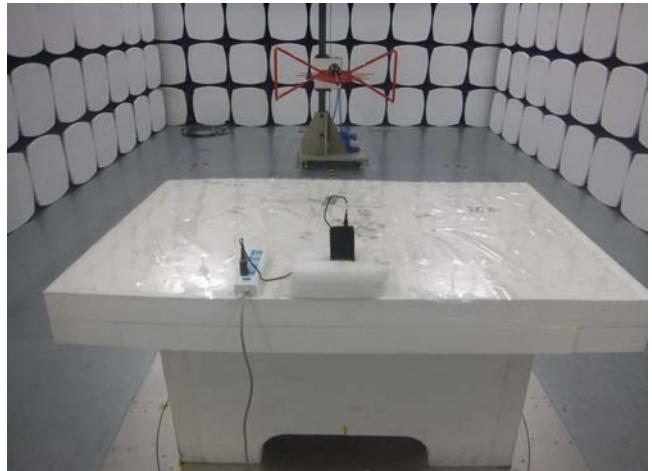
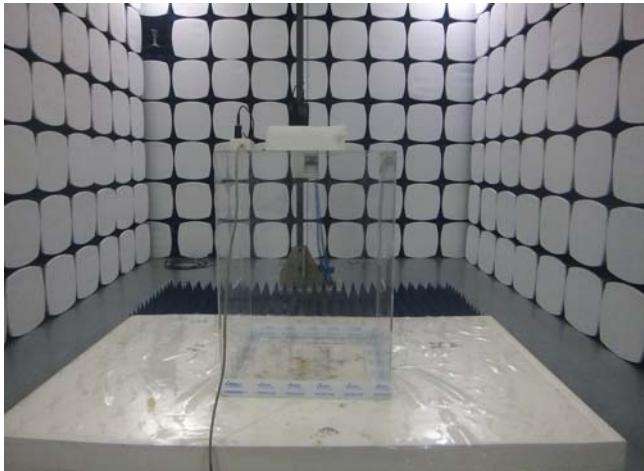


GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE/GPS - Antenna View

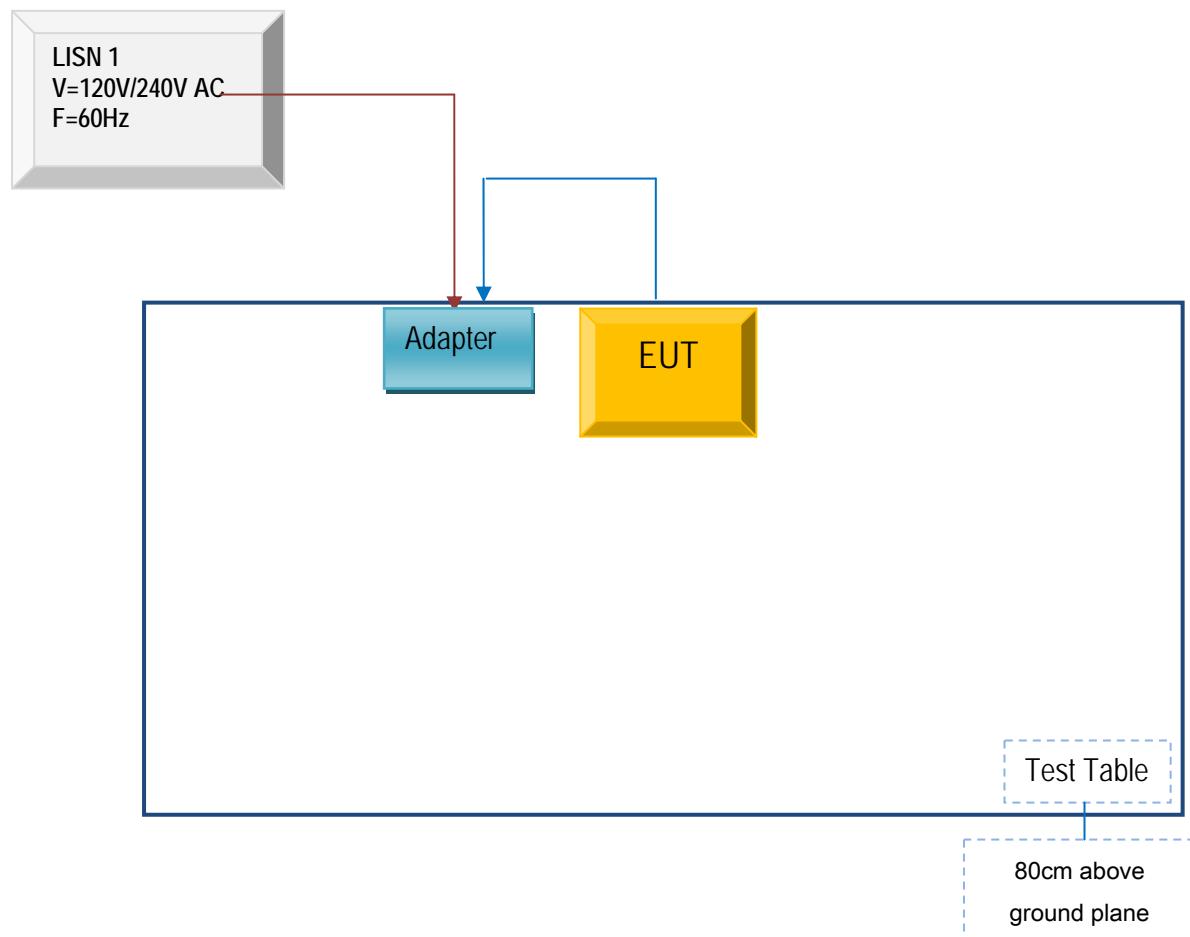
Annex B.iii. Photograph: Test Setup Photo

 A photograph showing a wooden table in a test chamber. Various cables and equipment are connected to the table. A power strip is visible on the table, and a power outlet is on the wall to the left.	 A photograph showing a side view of the same test setup. The wooden table is visible, along with the power strip and cables. The test chamber's interior walls are made of reflective material.
Conducted Emissions Test Setup Front View	Conducted Emissions Test Setup Side View
 A photograph of a test setup in a chamber. A device is mounted on a stand on a white table. The chamber walls are covered in a grid of reflective panels. A power strip and cables are visible on the table.	 A photograph of a test setup in a chamber. A device is mounted on a stand on a white table. The chamber walls are covered in a grid of reflective panels. A power strip and cables are visible on the table.
Radiated Spurious Emissions Test Setup Below 1GHz	Radiated Spurious Emissions Test Setup Above 1GHz

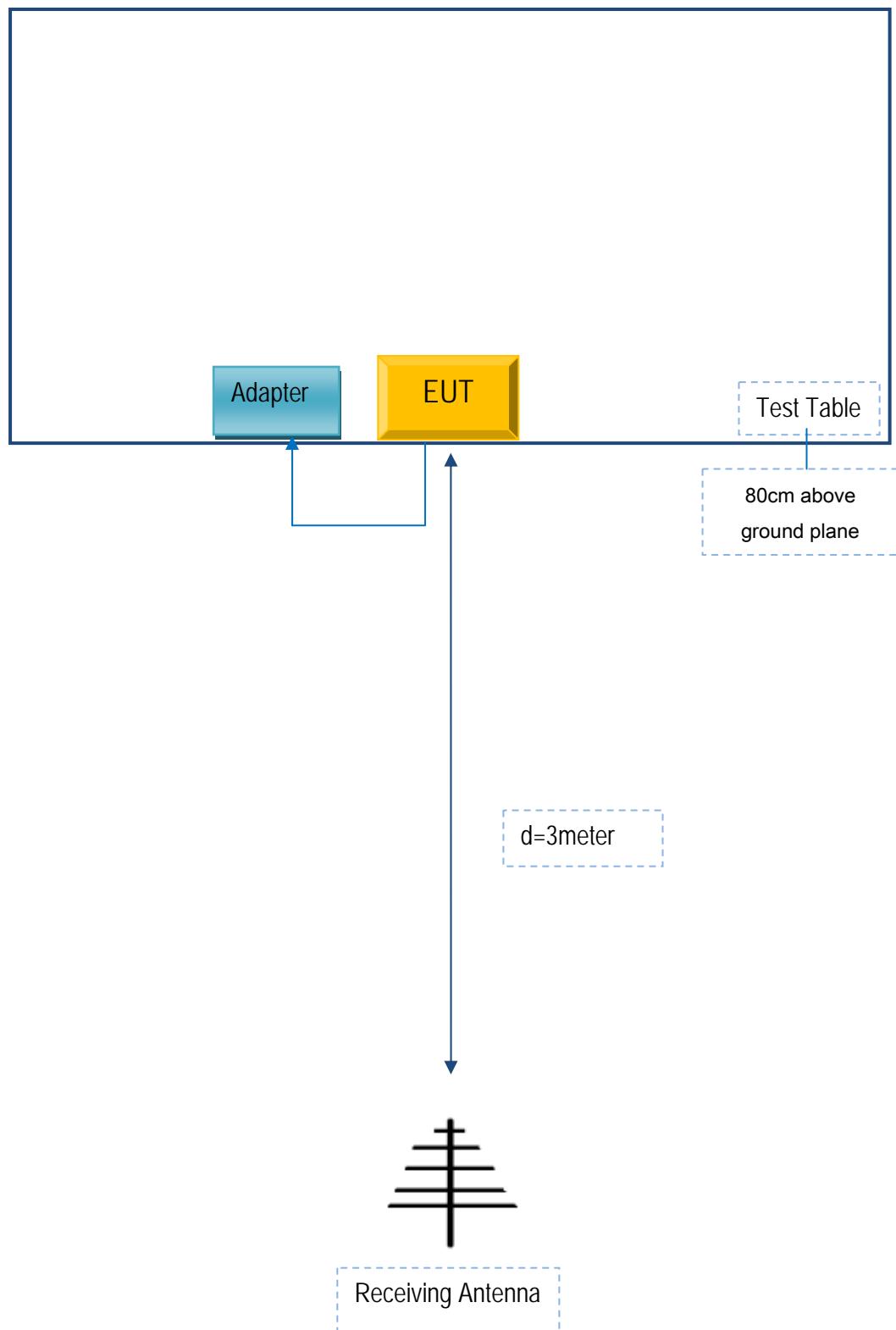
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

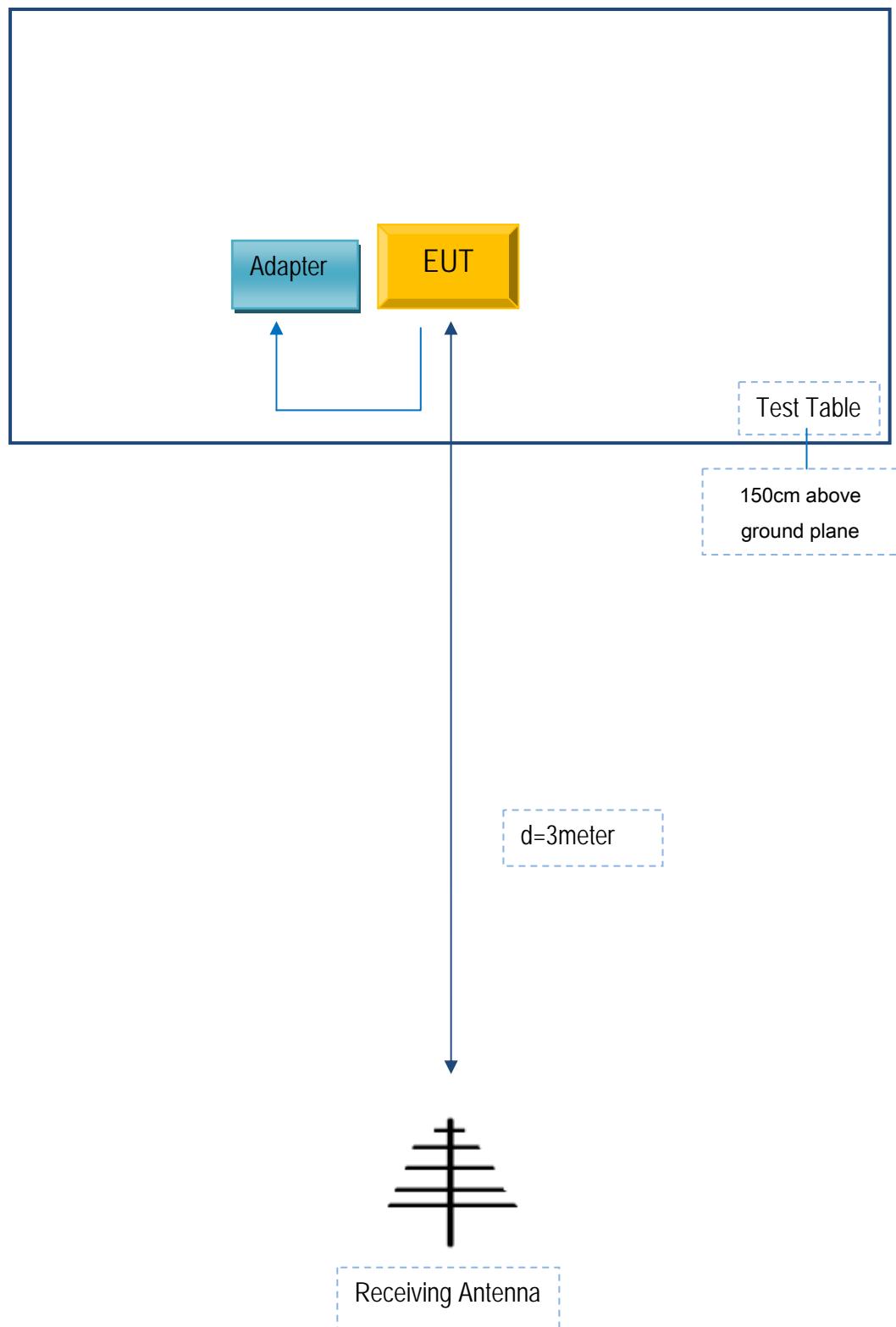
Block Configuration Diagram for AC Line Conducted Emissions



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	CL0004

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	CL0004

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

See attachment

Annex E. DECLARATION OF SIMILARITY

N/A