

RF TEST REPORT



Report No.: 15070008-FCC-R2

Supersede Report No.: N/A

Applicant	Verykool USA Inc	
Product Name	Mobile Phone	
Model No.	s5014	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2014, ANSI C63.10: 2009	
Test Date	January 13 to January 19, 2015	
Issue Date	January 21, 2015	
Test Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
Equipment complied with the specification		<input checked="" type="checkbox"/>
Equipment did not comply with the specification		<input type="checkbox"/>
Winnie.Zhang	Alex.Liu	
Winnie Zhang Test Engineer	Alex Liu 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
15070008-FCC-R2	NONE	Original	January 21, 2015

2. Customer information

Applicant Name	Verykool USA Inc
Applicant Add	3636 Nobel Drive, Suite 325, San Diego, CA 92122, USA
Manufacturer	BIRD SUIZHOU ELECTRIC CO.,LTD.
Manufacturer Add	NO.1, BIRD ROAD, E.T.DEVELOPMENT ZONE, SUIZHOU CITY, HUBEI 441300, CHINA

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Labview of SIEMIC version 2.0

4. Equipment under Test (EUT) Information

Description of EUT: Mobile Phone

Main Model: s5014

Serial Model: N/A

Date EUT received: January 12, 2015

Test Date(s): January 13 to January 19, 2015

Equipment Category : DSS

GSM850: -1 dBi

PCS1900: -1 dBi

UMTS-FDD Band V: -1 dBi

Antenna Gain:	UMTS-FDD Band II: 0 dBi UMTS-FDD Band IV: 0 dBi Bluetooth/BLE: 1 dBi WIFI: 1 dBi
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GSM / GPRS: GMSK

EGPRS: GMSK, 8PSK

UMTS-FDD: QPSK, 16QAM

Type of Modulation:	UMTS-FDD: QPSK, 16QAM 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, π /4DQPSK, 8DPSK BLE: GFSK
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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 II TX:1852.4 ~ 1907.6 MHz;

RF Operating Frequency (ies): RX: 1932.4 ~ 1987.6 MHz
UMTS-FDD Band IV TX :1712.4 ~ 1752.6 MHz;
RX : 2112.4 ~ 2152.6 MHz
WIFI:802.11b/g/n(20M): 2412-2462 MHz
WIFI:802.11n(40M): 2422-2452 MHz
Bluetooth& BLE: 2402-2480 MHz

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Max. Output Power: GFSK: 6.434 dBm

GSM 850: 124CH

PCS1900: 299CH

UMTS-FDD Band V : 102CH

UMTS-FDD Band II : 277CH

Number of Channels: UMTS-FDD Band IV: 202CH

WIFI :802.11b/g/n(20M): 11CH

WIFI :802.11n(40M): 7CH

Bluetooth: 79CH

BLE: 40CH

Port: Power Port, Earphone Port, USB Port

Battery:

Model: BH-L4Pi

Spec: 3.7V 1900mAh

Input Power: Limited charger voltage: 4.2V

Adapter:

Model: SC050100-US

Input: AC 100-240V; 50/60Hz 0.4A

Output: DC 5.0V; 1000mA

Trade Name : verykool

GPRS/EGPRS Multi-slot class 8/10/12

FCC ID: WA6S5014

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247(a)(1)	Channel Separation	Compliance
§15.247(a)(1)	20 dB Bandwidth	Compliance
§15.247(b)(1)	Peak Output Power	Compliance
§15.247(a)(1)(iii)	Number of Hopping Channel	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(d)	Band Edge	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance

Measurement Uncertainty

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

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

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

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has 2 antennas:

A permanently attached PIFA antenna for Bluetooth/BLE/WIFI, the gain is 1 dBi for Bluetooth/BLE/WIFI.

A permanently attached PIFA antenna for GSM and UMTS, the gain is -1 dBi for GSM850/PCS1900/UMTS-FDD Band V, 0 dBi for UMTS-FDD Band II /UMTS-FDD Band IV.

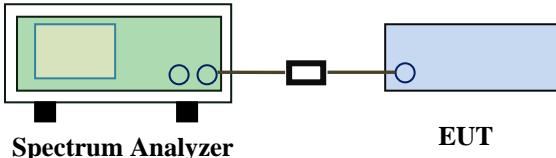
The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 Channel Separation

Temperature	19°C
Relative Humidity	60%
Atmospheric Pressure	1008mbar
Test date :	January 13, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(a)(1)	a)	Channel Separation < 20dB BW and 20dB BW < 25KHz ; Channel Separation Limit=25KHz Chanel Separation < 20dB BW and 20dB BW > 25kHz ; Channel Separation Limit=2/3 20dB BW	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<p>The test follows FCC Public Notice DA 00-705 Measurement Guidelines.</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

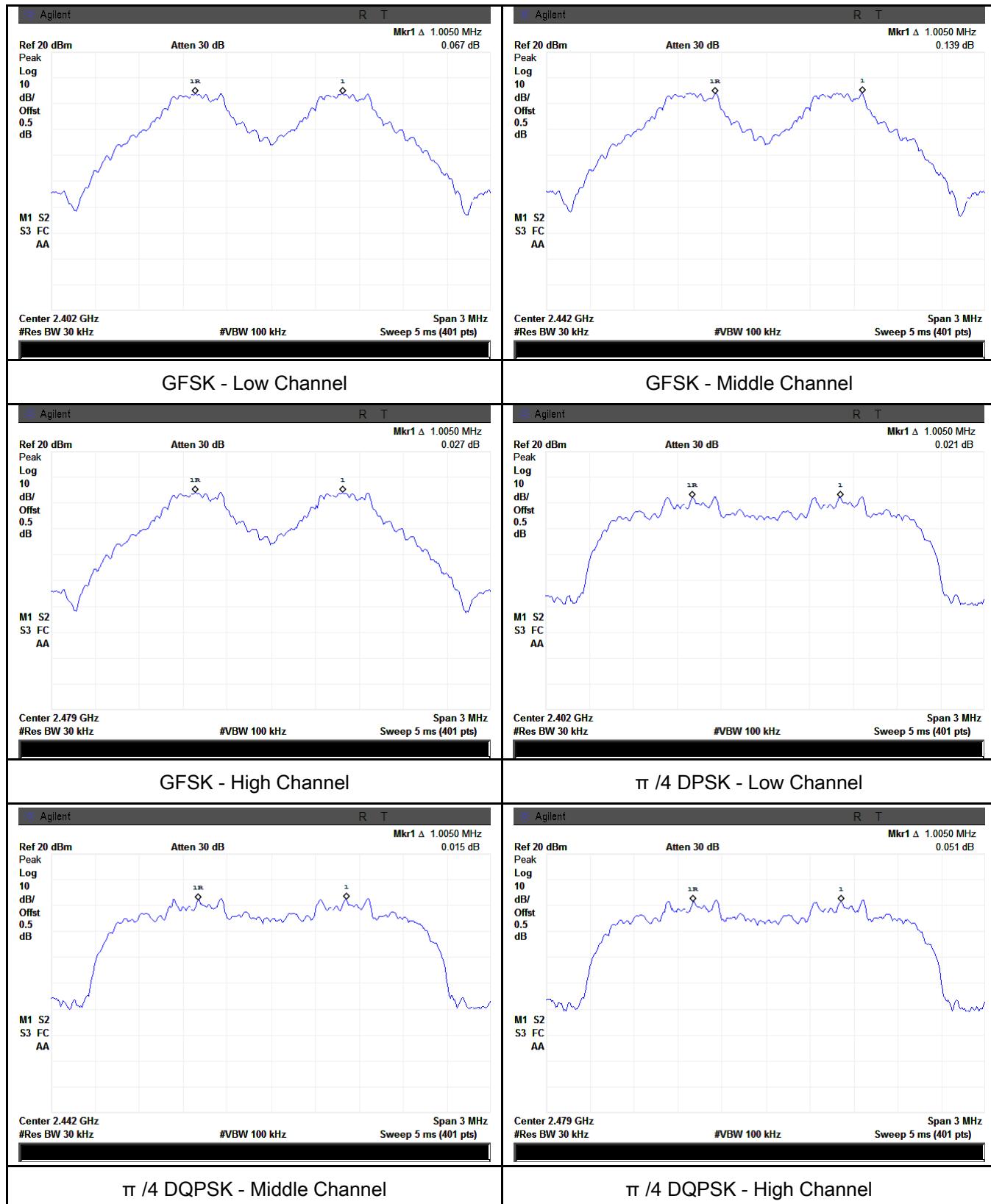
Test Data Yes N/A
 Test Plot Yes (See below) N/A

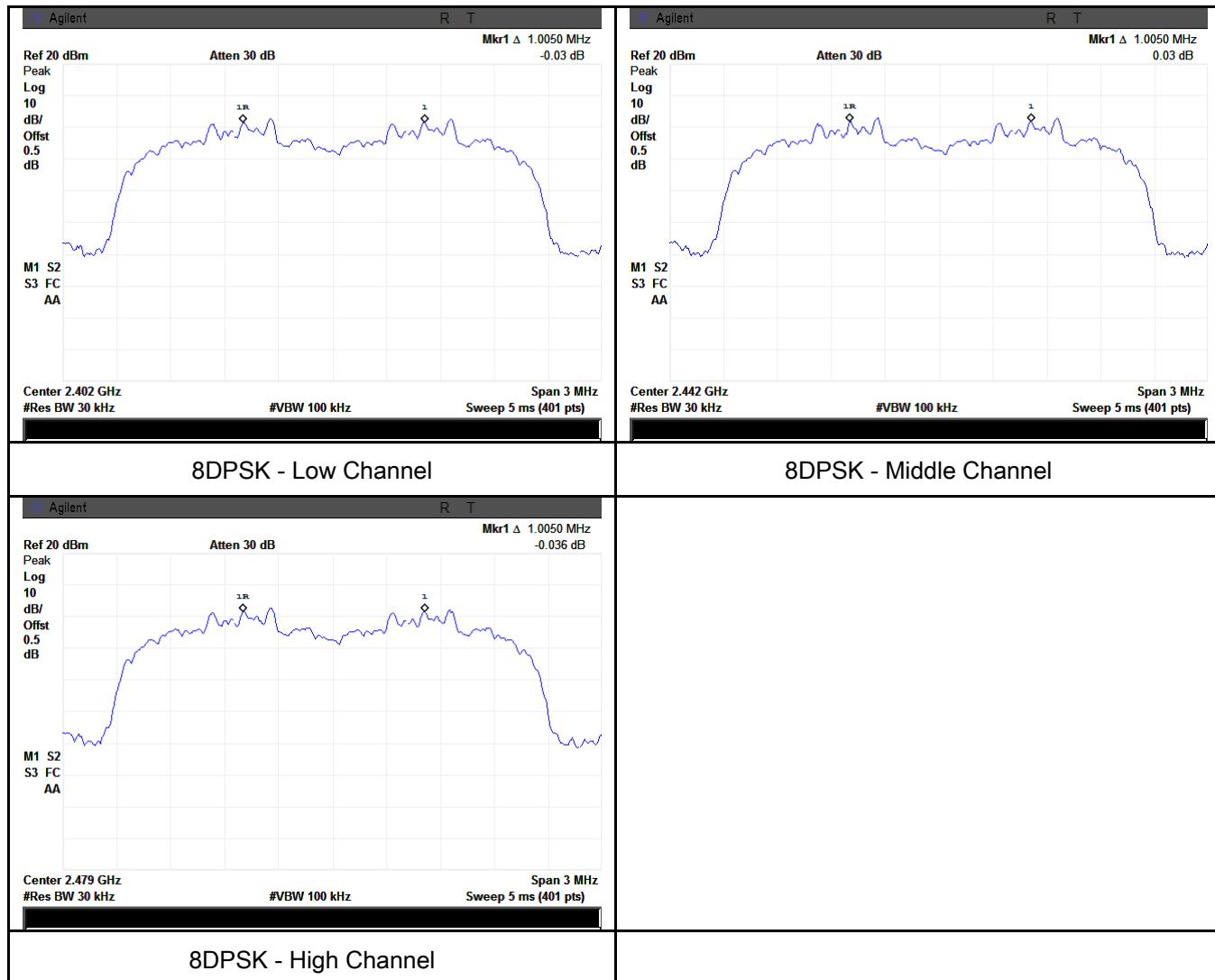
Channel Separation measurement result

Type/ Modulation	CH	CH Freq (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	1.005	0.692	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.005	0.687	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.005	0.687	Pass
	Adjacency Channel	2479			
CH Separation $\pi/4$ DQPSK	Low Channel	2402	1.005	0.869	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.005	0.869	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.005	0.869	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.005	0.869	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.005	0.869	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.005	0.869	Pass
	Adjacency Channel	2479			

Test Plots

Channel Separation measurement result

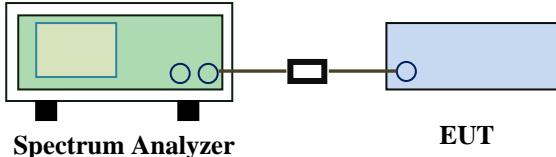




6.3 20dB Bandwidth

Temperature	19°C
Relative Humidity	60%
Atmospheric Pressure	1008mbar
Test date :	January 13, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)	a)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.	<input checked="" type="checkbox"/>
Test Setup			
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

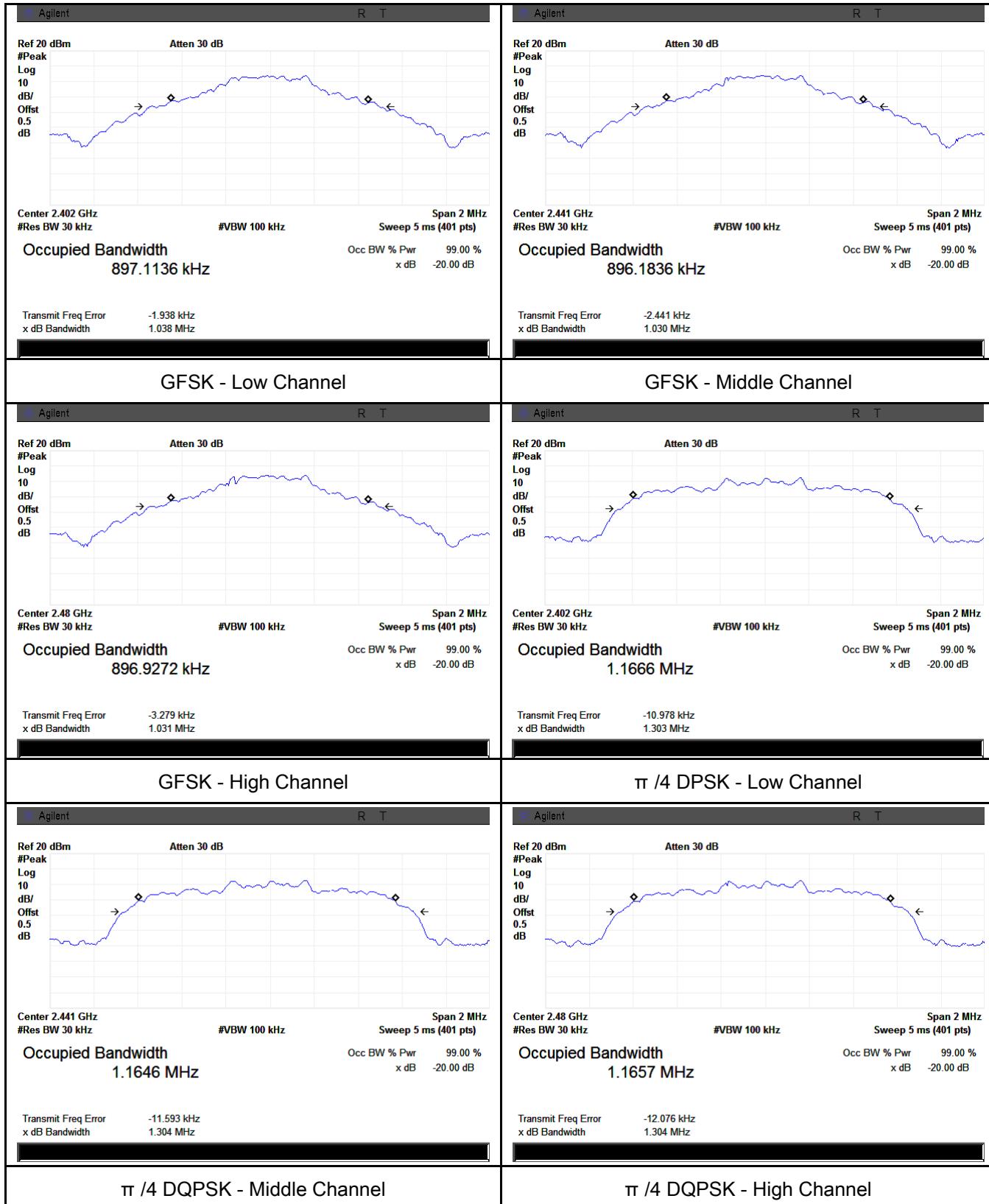
Test Plot Yes (See below) N/A

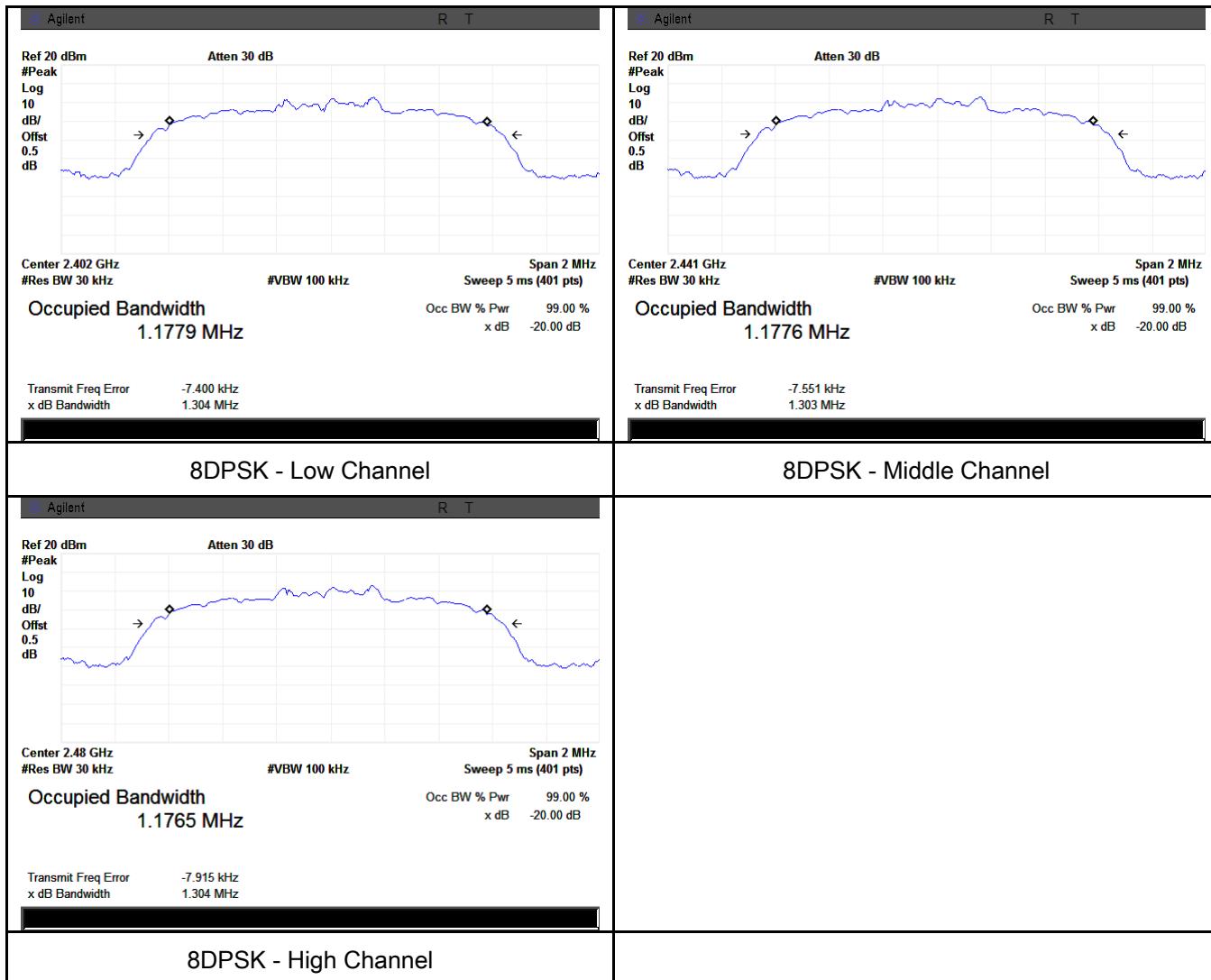
Measurement result

Modulation	CH	CH Freq (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GFSK	Low	2402	1.038	0.897
	Mid	2441	1.030	0.896
	High	2480	1.031	0.897
$\pi/4$ DQPSK	Low	2402	1.303	1.1666
	Mid	2441	1.304	1.1646
	High	2480	1.304	1.1657
8-DPSK	Low	2402	1.304	1.1779
	Mid	2441	1.303	1.1776
	High	2480	1.304	1.1765

Test Plots

20dB Bandwidth measurement result

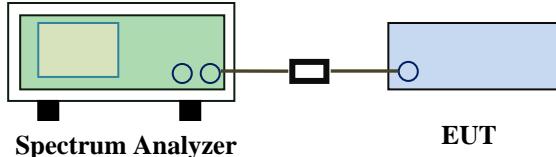




6.4 Peak Output Power

Temperature	19°C
Relative Humidity	60%
Atmospheric Pressure	1008mbar
Test date :	January 13, 2015
Tested By :	Winnie Zhang

Requirement(s):

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

	<ul style="list-style-type: none"> - Allow the trace to stabilize. - 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.
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data Yes N/A

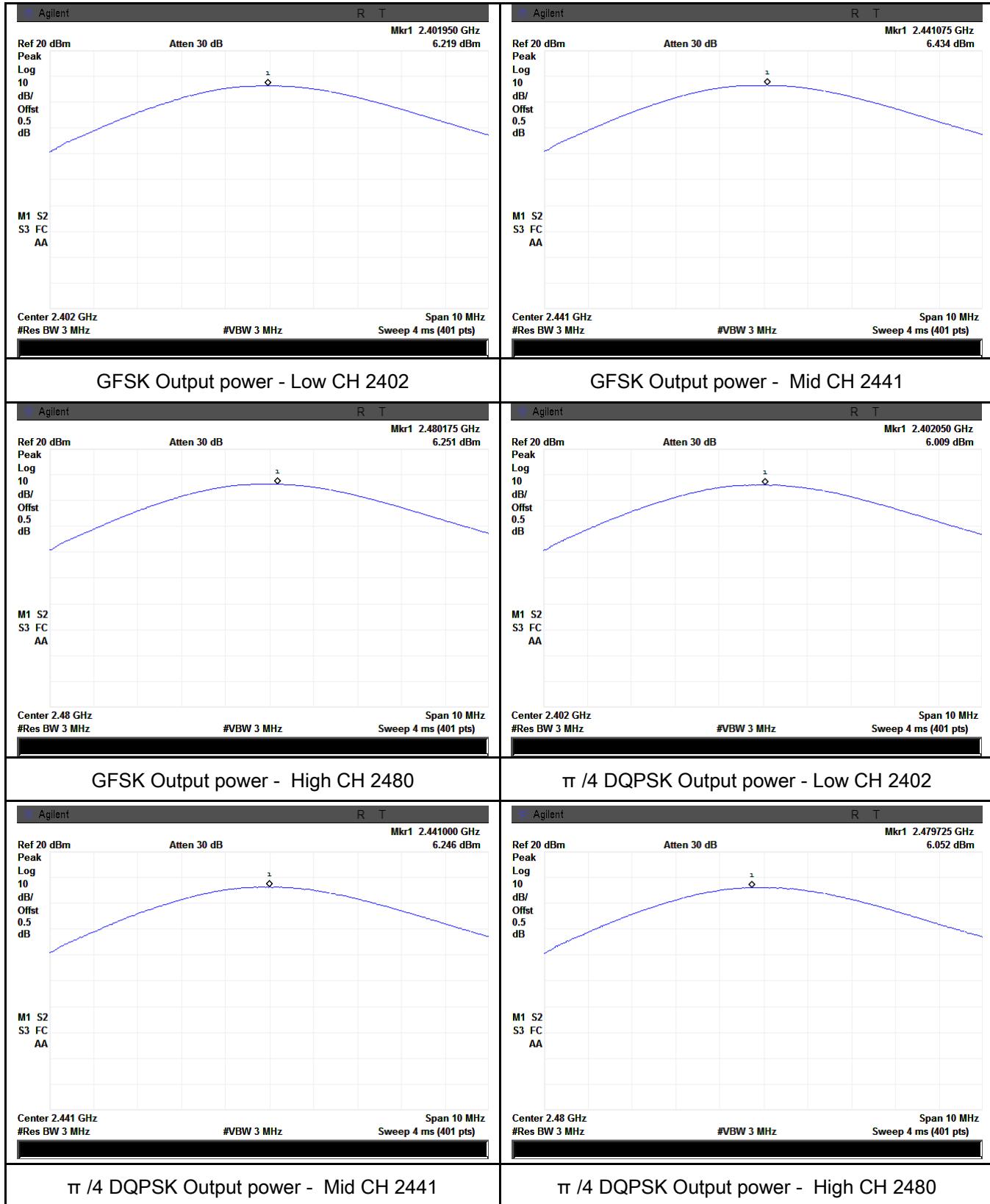
Test Plot Yes (See below) N/A

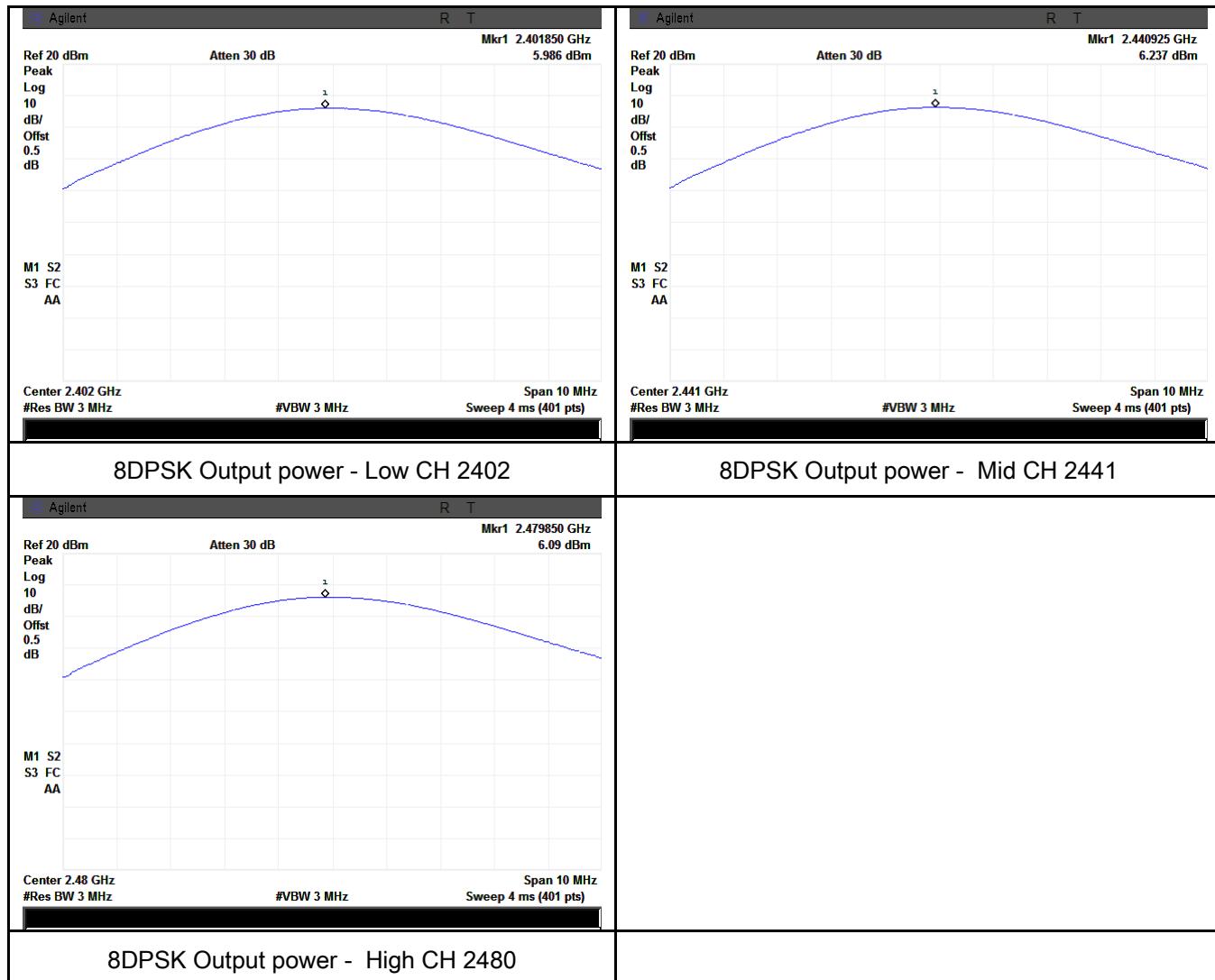
Peak Output Power measurement result

Type	Modulation	CH	Freq (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	GFSK	Low	2402	6.219	125	Pass
		Mid	2441	6.434	125	Pass
		High	2480	6.251	125	Pass
	$\pi/4$ DQPSK	Low	2402	6.009	125	Pass
		Mid	2441	6.246	125	Pass
		High	2480	6.052	125	Pass
	8-DPSK	Low	2402	5.986	125	Pass
		Mid	2441	6.237	125	Pass
		High	2480	6.090	125	Pass

Test Plots

Output Power measurement result





6.5 Number of Hopping Channel

Temperature	22°C
Relative Humidity	58%
Atmospheric Pressure	1009mbar
Test date :	January 15, 2015
Tested By :	Winnie Zhang

Requirement(s):

Test Data Yes

Yes (See below) N/A

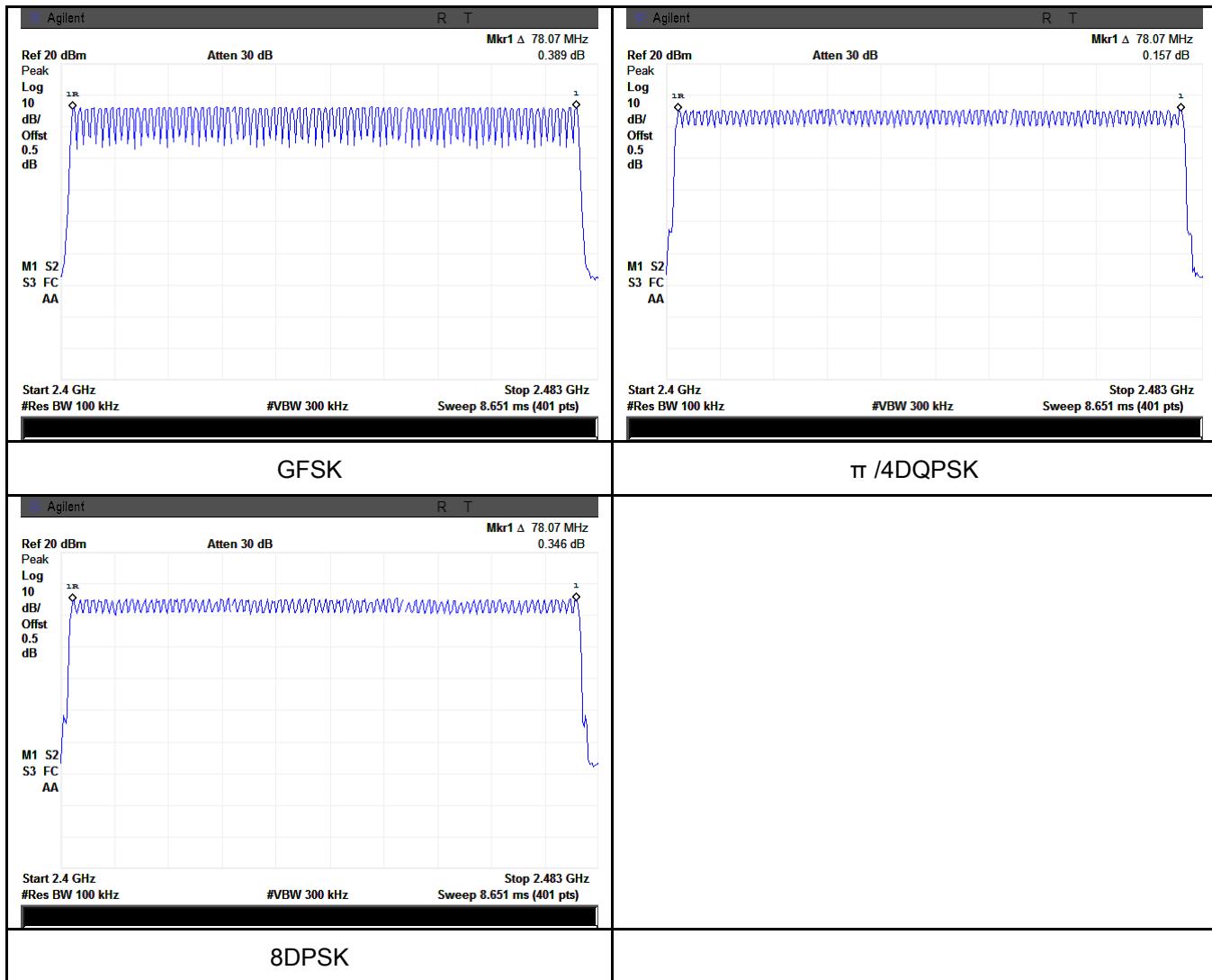
Test Plot Yes (See below) N/A

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

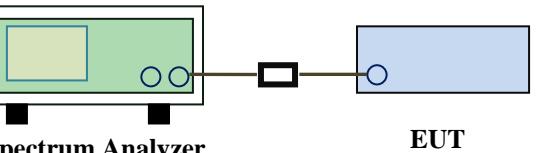
Number of Hopping Channels measurement result



6.6 Time of Occupancy (Dwell Time)

Temperature	22°C
Relative Humidity	58%
Atmospheric Pressure	1009mbar
Test date :	January 15, 2015
Tested By :	Winnie Zhang

Requirement(s):

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

Yes (See below) N/A

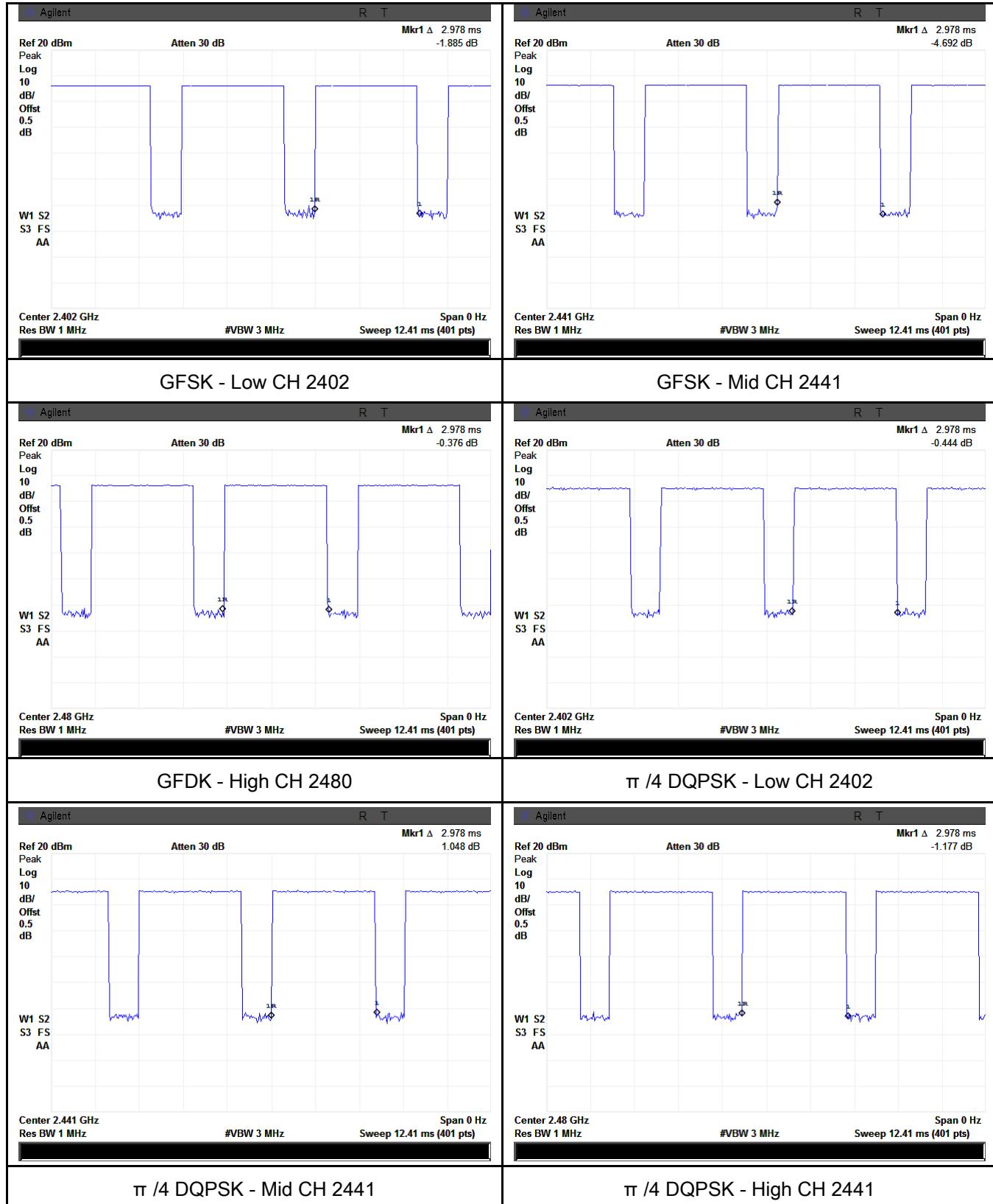
Dwell Time measurement result

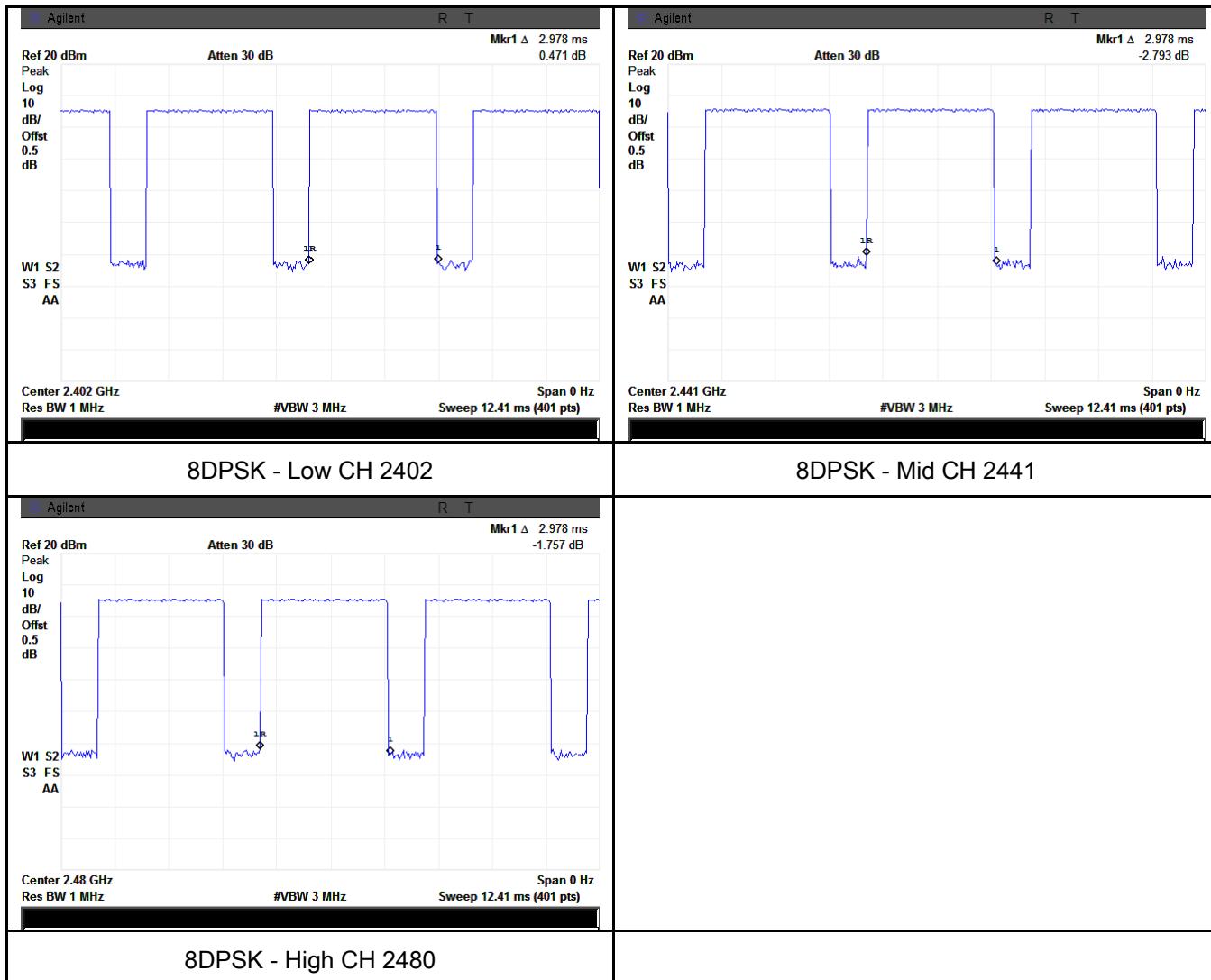
Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	GFSK	Low	2.978	317.653	400	Pass
		Mid	2.978	317.653	400	Pass
		High	2.978	317.653	400	Pass
	$\pi/4$ DQPSK	Low	2.978	317.653	400	Pass
		Mid	2.978	317.653	400	Pass
		High	2.978	317.653	400	Pass
	8-DPSK	Low	2.978	317.653	400	Pass
		Mid	2.978	317.653	400	Pass
		High	2.978	317.653	400	Pass

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

Test Plots

Dwell Time measurement result

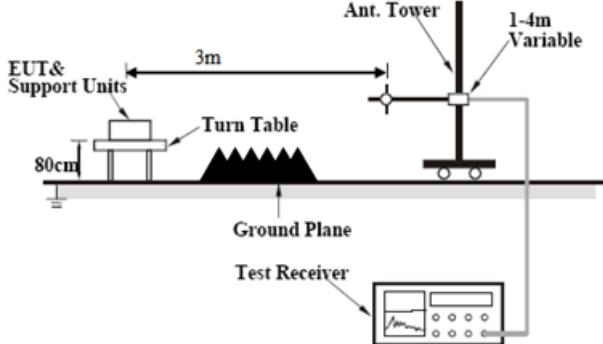




6.7 Band Edge

Temperature	22°C
Relative Humidity	58%
Atmospheric Pressure	1009mbar
Test date :	January 15, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.	<input checked="" type="checkbox"/>
Test Setup	 <p>The diagram illustrates the test setup. An 'EUT & Support Units' is positioned on a 'Turn Table' at a height of 80cm from the 'Ground Plane'. The turn table is 3m away from an 'Ant. Tower' mounted on a '1-4m Variable' height post. A 'Test Receiver' is connected to the turn table to monitor 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, and make sure the instrument is operated in its linear range. - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a 		

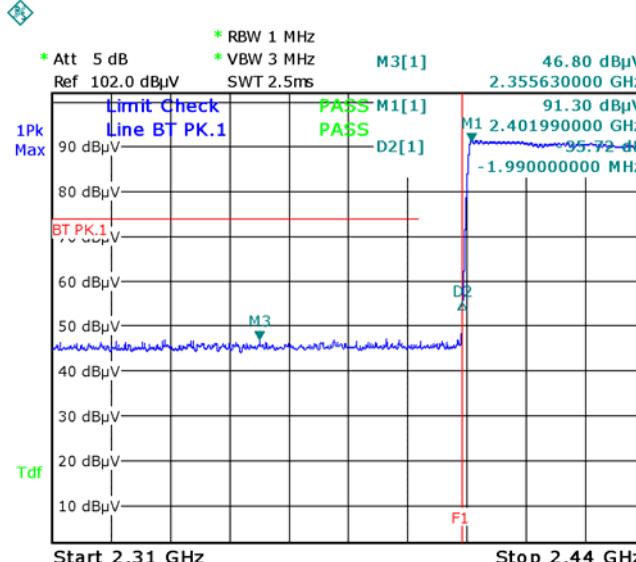
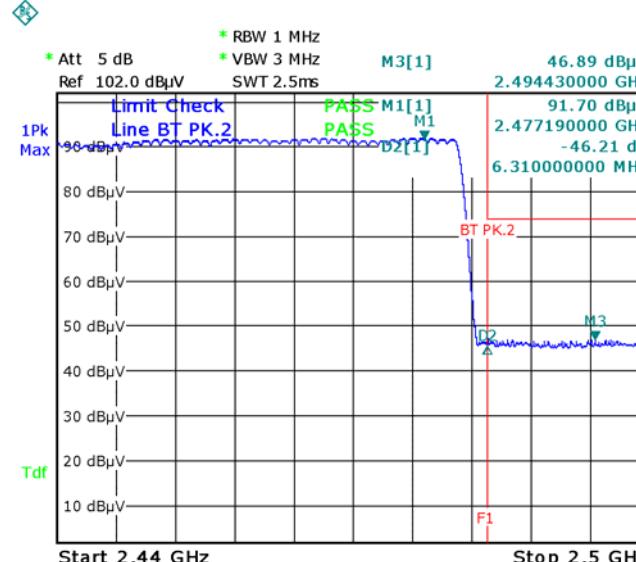
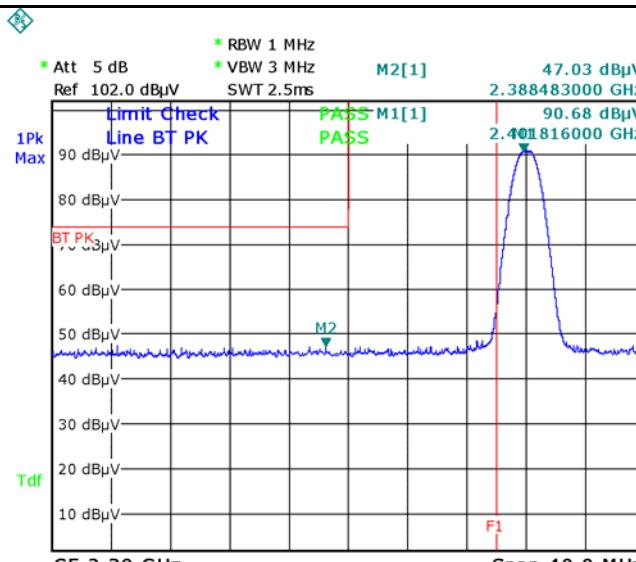
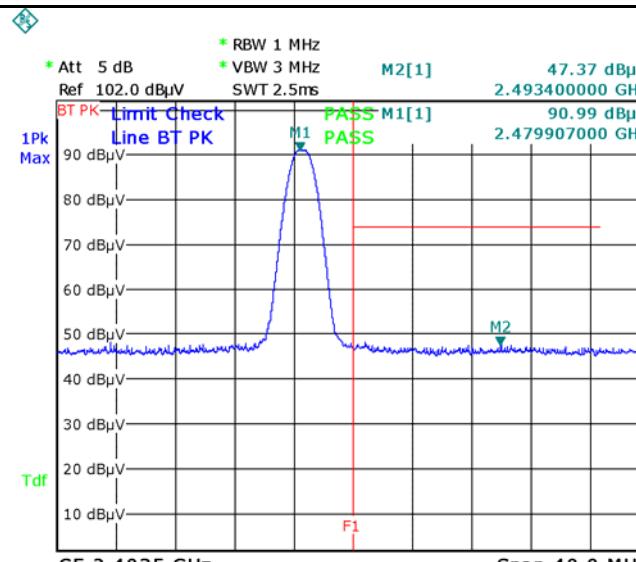
	<p>convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below:</p> <ul style="list-style-type: none"> a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection 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

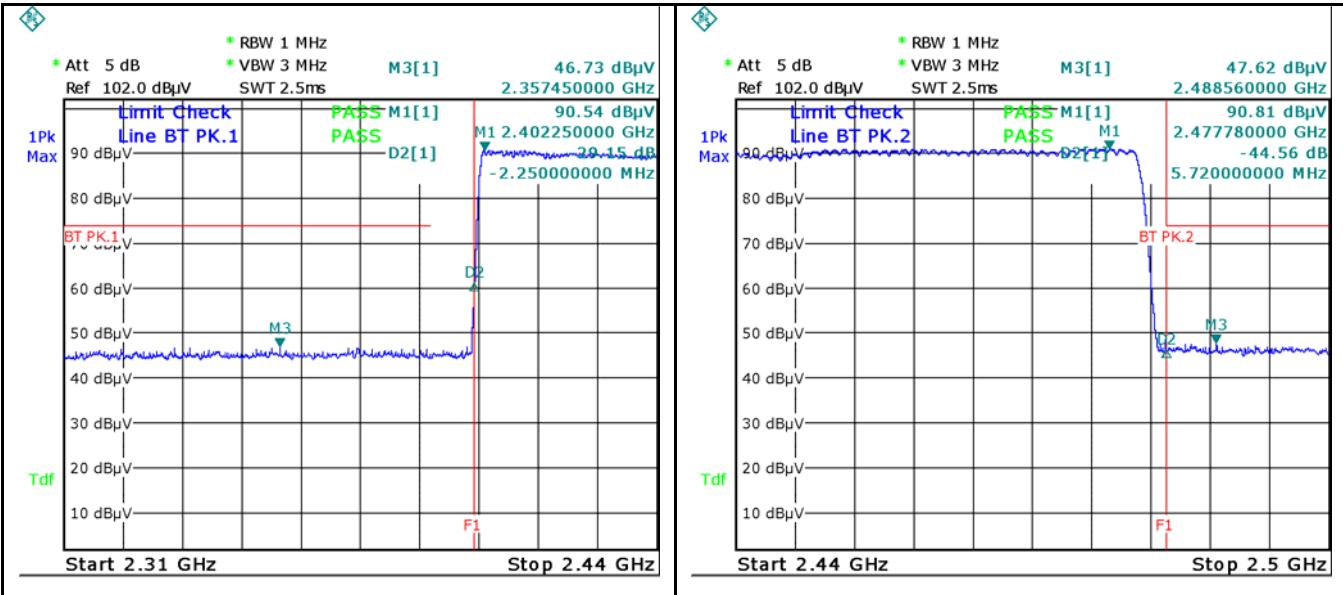
Test Data Yes N/A

Test Plot Yes (See below) N/A

Test Plots

GFSK Mode:

 <p>M3[1] 46.80 dBμV 2.355630000 GHz</p> <p>1PK Max 90 dBμV 10 dBμV Tdf</p> <p>Limit Check Line BT PK.1 PASS M1[1] PASS D2[1] M1 2.401990000 GHz 91.30 dBμV -1.990000000 MHz</p> <p>BT PK.1 70 dBμV M3 50 dBμV D2 A 40 dBμV F1</p> <p>Start 2.31 GHz Stop 2.44 GHz</p> <p>Date: 15.JAN.2015 12:36:59</p>	 <p>M3[1] 46.89 dBμV 2.494430000 GHz</p> <p>1PK Max 90 dBμV 10 dBμV Tdf</p> <p>Limit Check Line BT PK.2 PASS M1[1] M1 2.477190000 GHz 91.70 dBμV -46.21 dB 6.310000000 MHz</p> <p>BT PK.2 70 dBμV M3 50 dBμV D2 A 40 dBμV F1</p> <p>Start 2.44 GHz Stop 2.5 GHz</p> <p>Date: 15.JAN.2015 12:52:13</p>
GFSK-Hopping Left Side-PK	GFSK-Hopping Right Side-PK
Note: (no need if PK value less than the AV limit)	Note: (no need if PK value less than the AV limit)
GFSK-Hopping Left Side-AV	GFSK-Hopping Right Side-AV
 <p>M2[1] 47.03 dBμV 2.388483000 GHz</p> <p>1PK Max 90 dBμV 10 dBμV Tdf</p> <p>Limit Check Line BT PK PASS M1[1] PASS 2.401816000 GHz 90.68 dBμV</p> <p>BT PK 70 dBμV M2 50 dBμV F1</p> <p>CF 2.39 GHz Span 40.0 MHz</p> <p>Date: 15.JAN.2015 10:22:57</p>	 <p>M2[1] 47.37 dBμV 2.493400000 GHz</p> <p>1PK Max 90 dBμV 10 dBμV Tdf</p> <p>BT PK Limit Check Line BT PK PASS M1[1] PASS 2.479907000 GHz 90.99 dBμV</p> <p>M1 70 dBμV M2 50 dBμV F1</p> <p>CF 2.4835 GHz Span 40.0 MHz</p> <p>Date: 15.JAN.2015 10:46:13</p>
GFSK-Left Side-PK	GFSK-Right Side-PK
Note: (no need if PK value less than the AV limit)	Note: (no need if PK value less than the AV limit)
GFSK-Left Side-AV	GFSK-Right Side-AV

π/4 DQPSK Mode:


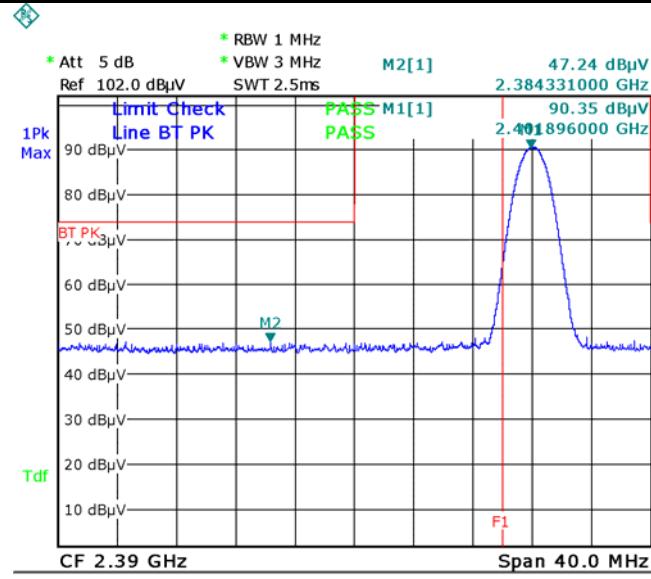
Date: 15.JAN.2015 12:39:46

Date: 15.JAN.2015 12:50:05

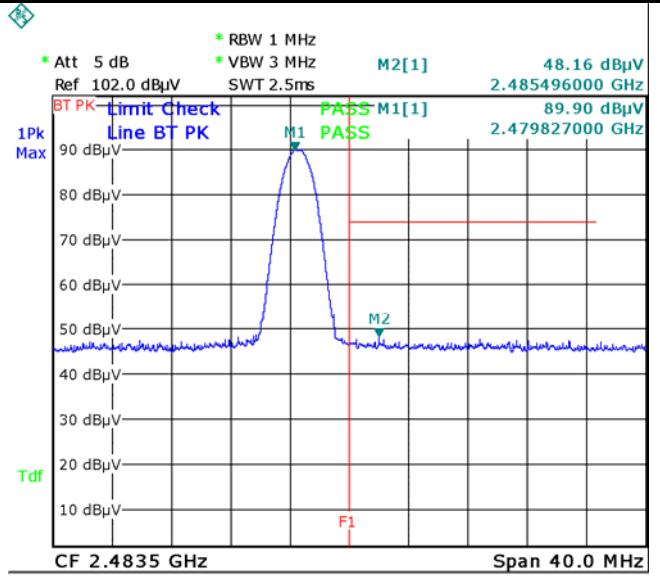
π/4 DQPSK-Hopping Left Side-PK
π/4 DQPSK-Hopping Right Side-PK

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

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

π/4 DQPSK-Hopping Left-AV
π/4 DQPSK-Hopping Right-AV


Date: 15.JAN.2015 10:27:29



Date: 15.JAN.2015 10:43:40

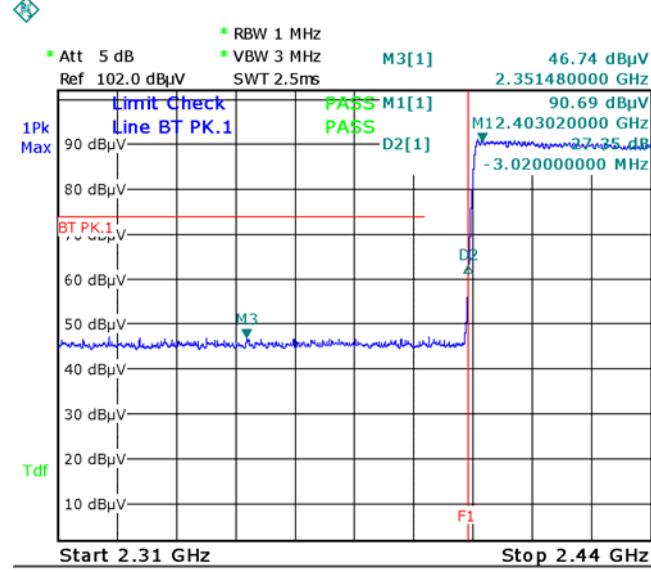
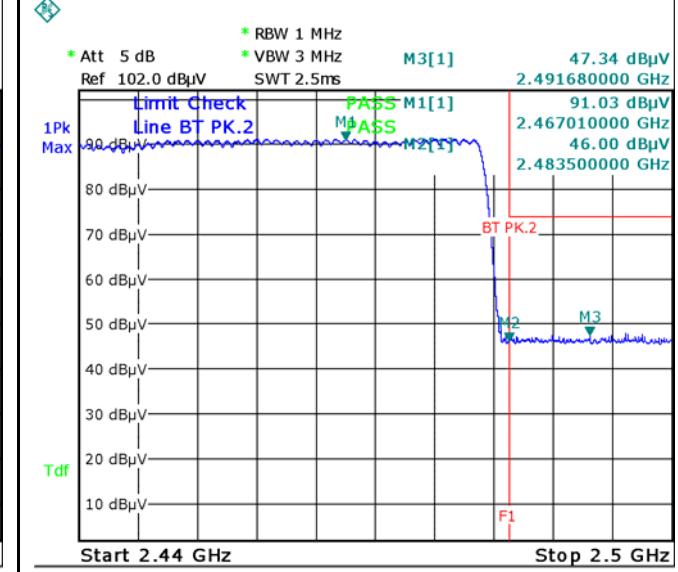
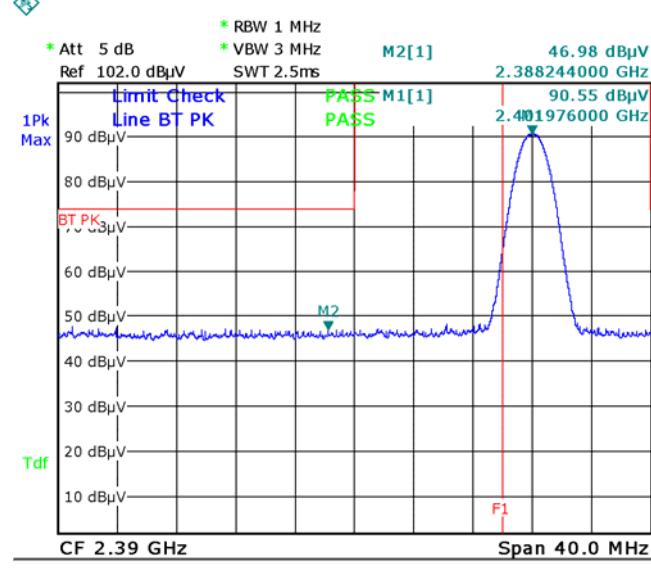
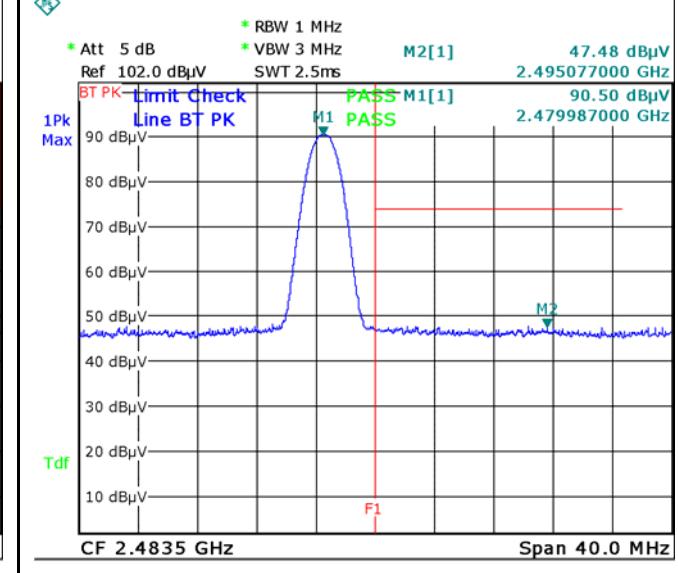
π/4 DQPSK-Left Side-PK
π/4 DQPSK-Right Side-PK

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

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

π/4 DQPSK-Left Side-AV
π/4 DQPSK-Right Side-AV

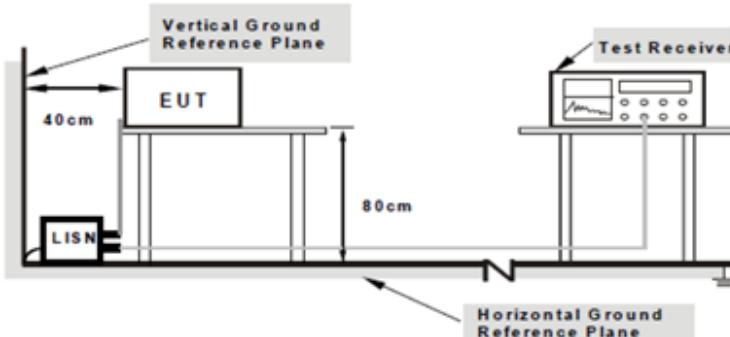
8-DPSK Mode:

 <p>RBW 1 MHz VBW 3 MHz SWT 2.5ms Att 5 dB Ref 102.0 dBμV 1Pk Max Tdf</p> <p>Limit Check Line BT PK.1 PASS M1[1] PASS D2[1]</p> <p>90 dBμV 80 dBμV 70 dBμV 60 dBμV 50 dBμV 40 dBμV 30 dBμV 20 dBμV 10 dBμV</p> <p>Start 2.31 GHz Stop 2.44 GHz</p>	 <p>RBW 1 MHz VBW 3 MHz SWT 2.5ms Att 5 dB Ref 102.0 dBμV 1Pk Max Tdf</p> <p>Limit Check Line BT PK.2 PASS M1[1] PASS M2[1]</p> <p>90 dBμV 80 dBμV 70 dBμV 60 dBμV 50 dBμV 40 dBμV 30 dBμV 20 dBμV 10 dBμV</p> <p>Start 2.44 GHz Stop 2.5 GHz</p>
Date: 15.JAN.2015 12:42:46 8DPSK-Hopping Left Side-PK	Date: 15.JAN.2015 12:46:42 8DPSK-Hopping Right Side-PK
Note: (no need if PK value less than the AV limit)	Note: (no need if PK value less than the AV limit)
8DPSK-Hopping Left-AV	8DPSK-Hopping Right-AV
 <p>RBW 1 MHz VBW 3 MHz SWT 2.5ms Att 5 dB Ref 102.0 dBμV 1Pk Max Tdf</p> <p>Limit Check Line BT PK PASS M1[1] PASS</p> <p>90 dBμV 80 dBμV 70 dBμV 60 dBμV 50 dBμV 40 dBμV 30 dBμV 20 dBμV 10 dBμV</p> <p>CF 2.39 GHz Span 40.0 MHz</p>	 <p>RBW 1 MHz VBW 3 MHz SWT 2.5ms Att 5 dB Ref 102.0 dBμV 1Pk Max Tdf</p> <p>Limit Check Line BT PK PASS M1[1] PASS M2[1]</p> <p>90 dBμV 80 dBμV 70 dBμV 60 dBμV 50 dBμV 40 dBμV 30 dBμV 20 dBμV 10 dBμV</p> <p>CF 2.4835 GHz Span 40.0 MHz</p>
Date: 15.JAN.2015 10:31:54	Date: 15.JAN.2015 10:41:22
8DPSK-Left Side-PK	8DPSK-Right Side-PK
Note: (no need if PK value less than the AV limit)	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	19°C
Relative Humidity	60%
Atmospheric Pressure	1011mbar
Test date :	January 19, 2015
Tested By :	Winnie Zhang

Requirement(s):

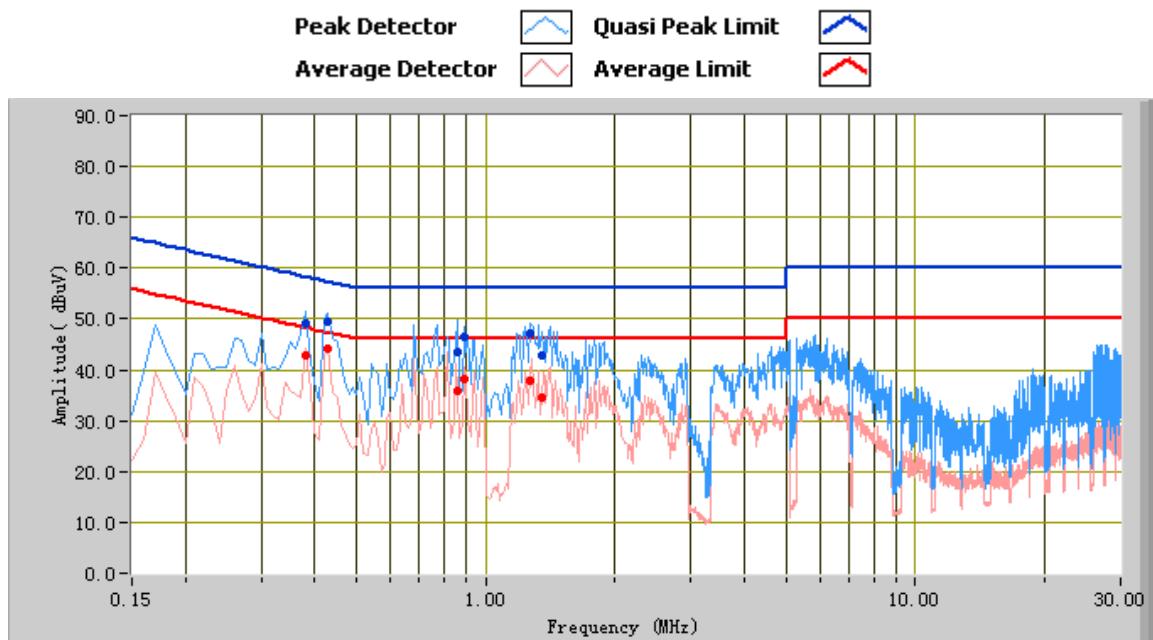
Spec	Item	Requirement	Applicable														
47CFR§15.207, RSS210 (A8.1)	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within 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: Transmitting Mode

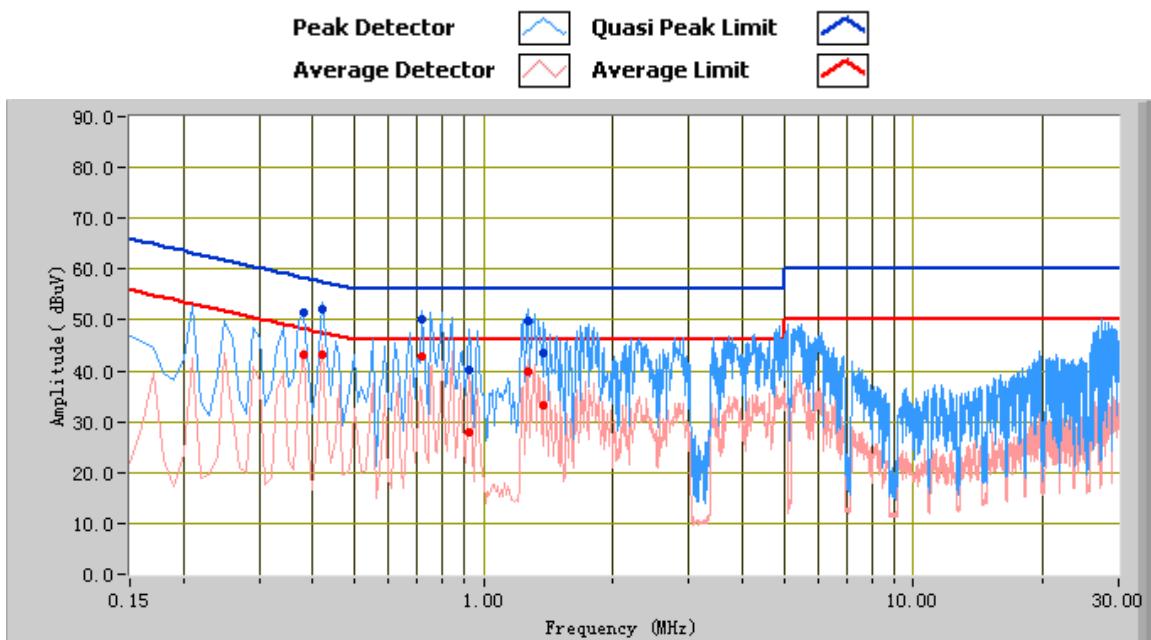


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dB μ V)	Limit (dB μ V)	Margin (dB)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Factors (dB)
0.43	49.40	57.25	-7.85	44.08	47.25	-3.17	10.86
0.86	43.51	56.00	-12.49	35.88	46.00	-10.12	10.37
0.38	49.07	58.28	-9.21	42.73	48.28	-5.55	11.08
1.27	47.08	56.00	-8.92	37.77	46.00	-8.23	10.31
0.89	46.60	56.00	-9.40	38.11	46.00	-7.89	10.35
1.35	42.86	56.00	-13.14	34.67	46.00	-11.33	10.32

Test Mode: Transmitting Mode



Test Data

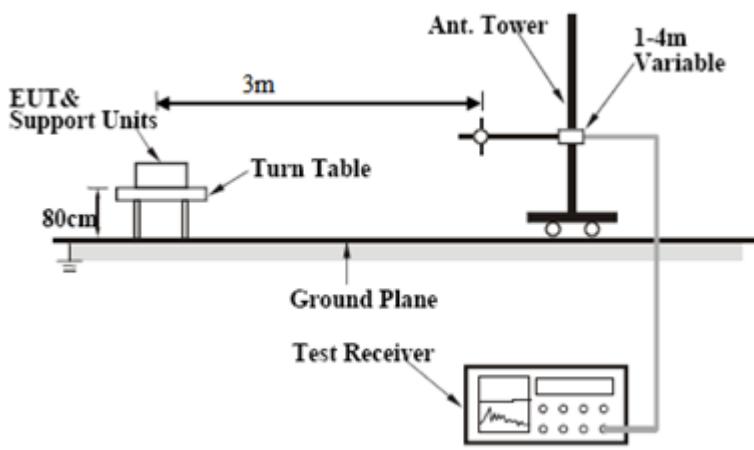
Phase Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dB μ V)	Limit (dB μ V)	Margin (dB)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Factors (dB)
1.27	49.92	56.00	-6.08	39.89	46.00	-6.11	10.31
0.42	51.99	57.45	-5.46	43.25	47.45	-4.20	10.91
0.72	50.07	56.00	-5.93	42.75	46.00	-3.25	10.44
1.38	43.41	56.00	-12.59	33.27	46.00	-12.73	10.33
0.38	51.35	58.28	-6.93	43.29	48.28	-4.99	11.08
0.92	40.25	56.00	-15.75	27.97	46.00	-18.03	10.34

6.9 Radiated Spurious Emissions

Temperature	19°C
Relative Humidity	60%
Atmospheric Pressure	1011mbar
Test date :	January 19, 2015
Tested By :	Winnie Zhang

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 for radiated spurious emissions. A 'Turn Table' is positioned on a 'Ground Plane'. An 'EUT & Support Units' assembly is mounted on the turn table, with a vertical distance of '80cm' indicated. A 'Test Receiver' is connected to the turn table. A vertical 'Ant. Tower' is located on the turn table, with a '1-4m Variable' height adjustment mechanism. A horizontal distance of '3m' is marked between the EUT and the Ant. Tower.</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: 											

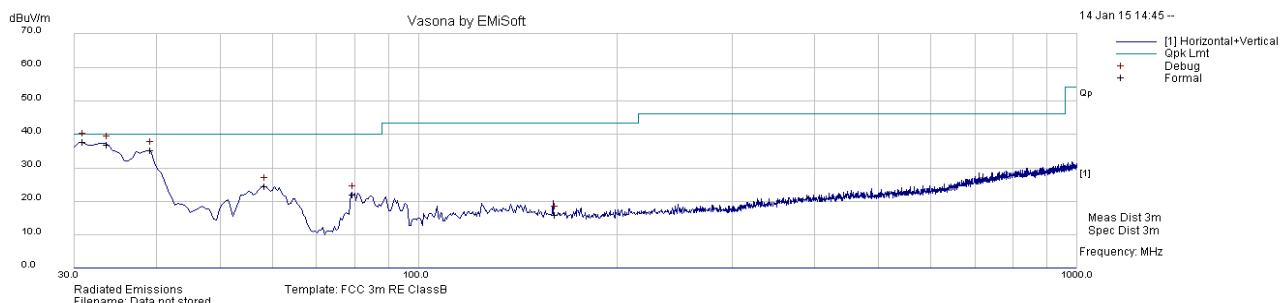
	<p>a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</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: **Transmitting Mode**

Below 1GHz



Vasona Data : Formally Assessed Peaks

No	Frequency MHz	Raw dB μ V	Cable Loss	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	Comments
1 (7)	30.5395	30.06	0.56	-2.57	28.05	Quasi Max	V	108	359	40	-11.95	Pass	
2 (8)	33.5306	31.65	0.59	-4.06	28.18	Quasi Max	V	206	14	40	-11.82	Pass	
3 (9)	38.9019	29.96	0.65	-7.54	23.06	Quasi Max	V	282	259	40	-16.94	Pass	
4 (10)	58.4312	32.74	0.78	-14.91	18.61	Quasi Max	V	130	279	40	-21.39	Pass	
5 (11)	79.7954	30.62	0.92	-14.82	16.73	Quasi Max	V	159	105	40	-23.27	Pass	
6 (12)	161.59	26.83	1.31	-9.54	18.6	Quasi Max	V	131	174	43.5	-24.9	Pass	

Test Mode:	Transmitting Mode
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Note: Other modes were verified, only the result of worst case basic rate mode was presented.

Above 1GHz

Mode: GFSK (Worst Case)

Low Channel (2402 MHz)

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	31.53	AV	V	33.83	4.87	27.32	42.91	54	-11.09
4804	31.46	AV	H	33.83	4.87	27.32	42.84	54	-11.16
4804	44.54	PK	V	33.83	4.87	27.32	55.92	74	-18.08
4804	44.61	PK	H	33.83	4.87	27.32	55.99	74	-18.01

Middle Channel (2441 MHz)

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	29.8	AV	V	33.86	4.87	26.32	42.21	54	-11.79
4882	29.48	AV	H	33.86	4.87	26.32	41.89	54	-12.11
4882	43.83	PK	V	33.86	4.87	26.32	56.24	74	-17.76
4882	43.83	PK	H	33.86	4.87	26.32	56.24	74	-17.76

High Channel (2480 MHz)

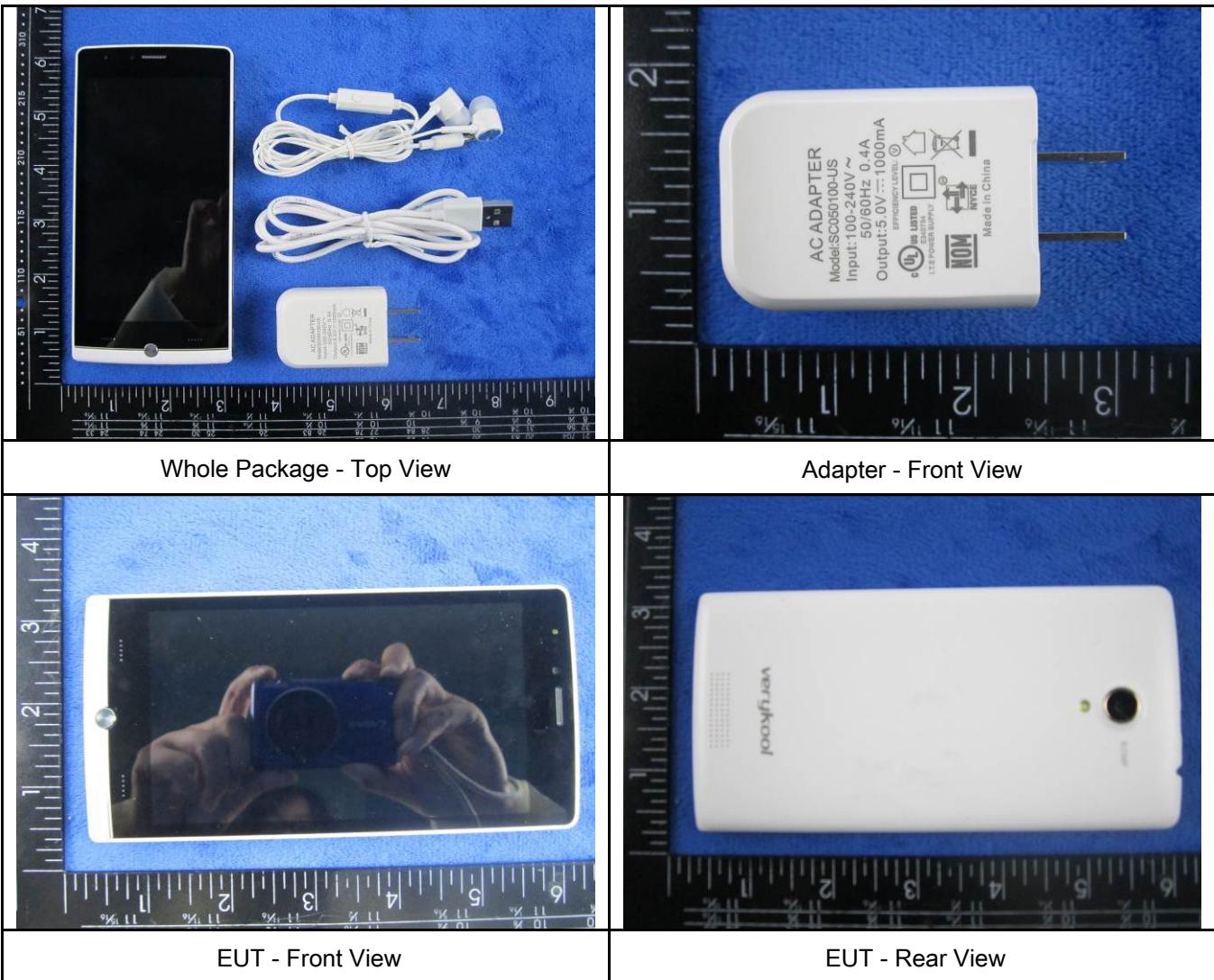
Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4960	30.48	AV	V	33.9	4.87	26.72	42.53	54	-11.47
4960	30.49	AV	H	33.9	4.87	26.72	42.54	54	-11.46
4960	44.15	PK	V	33.9	4.87	26.72	56.2	74	-17.8
4960	44.16	PK	H	33.9	4.87	26.72	56.21	74	-17.79

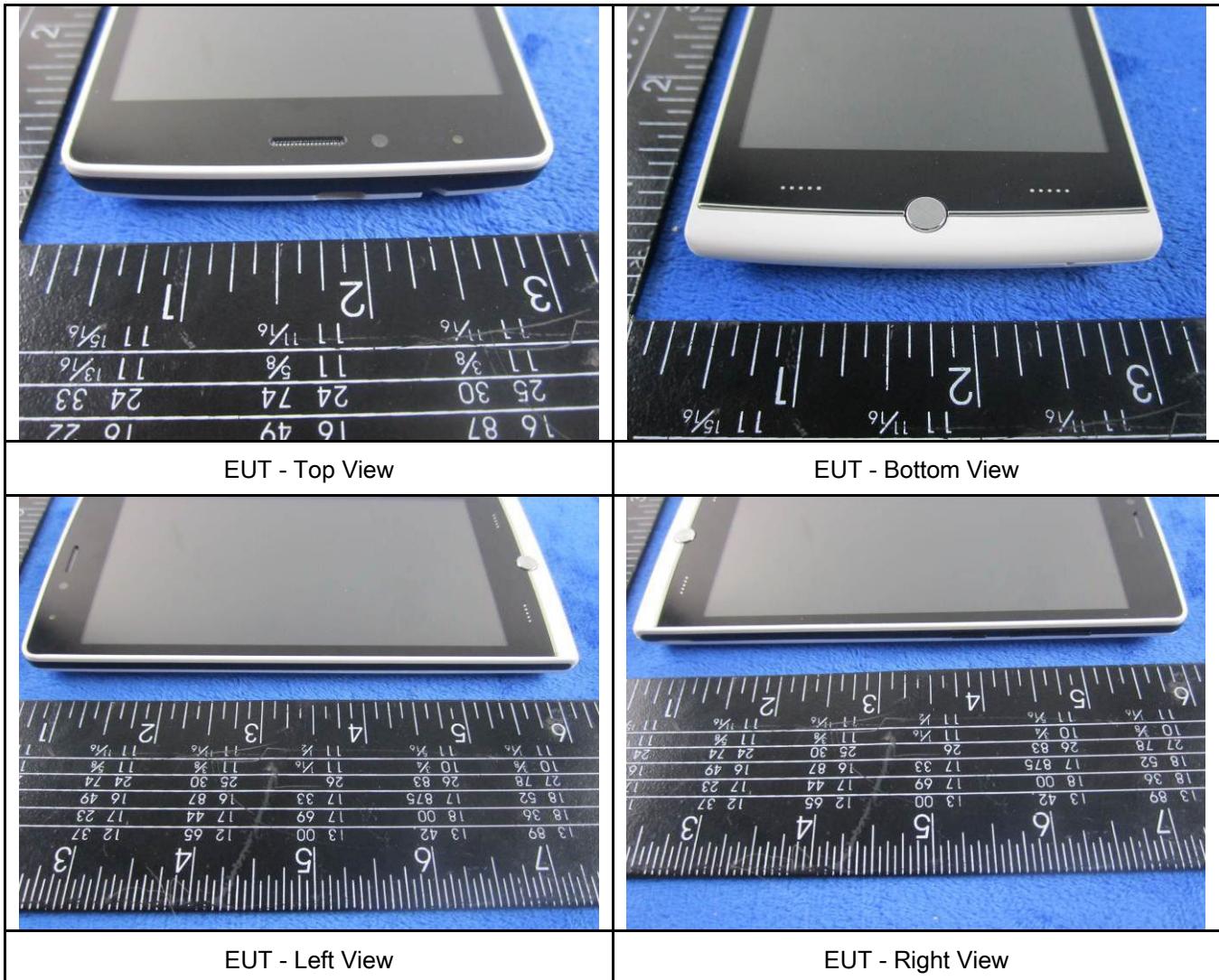
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191106	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191107	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Radiated Emissions					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Positioning Controller	UC3000	MF780208282	11/20/2014	11/19/2015	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/22/2014	09/21/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>

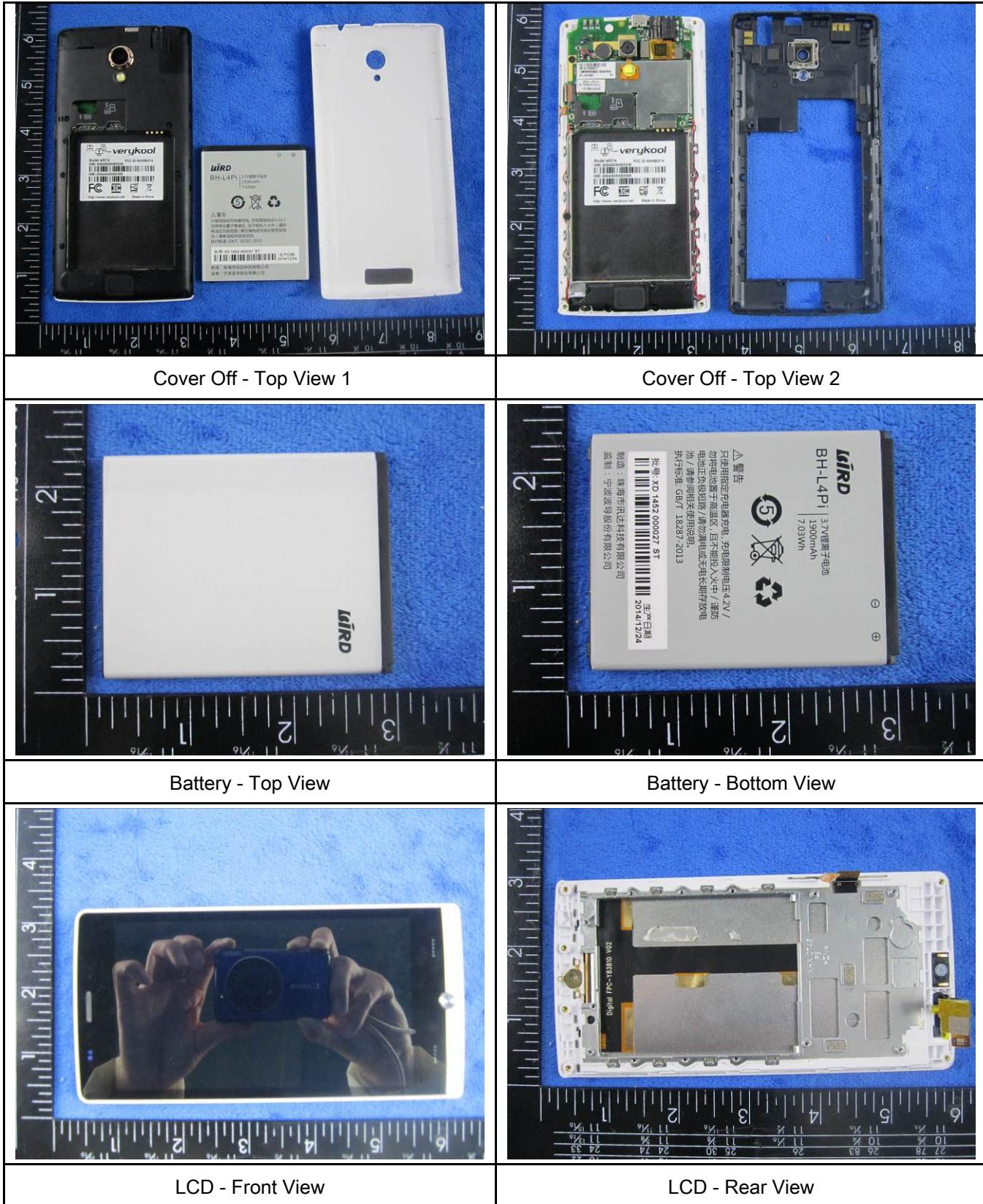
Annex B. EUT And Test Setup Photographs

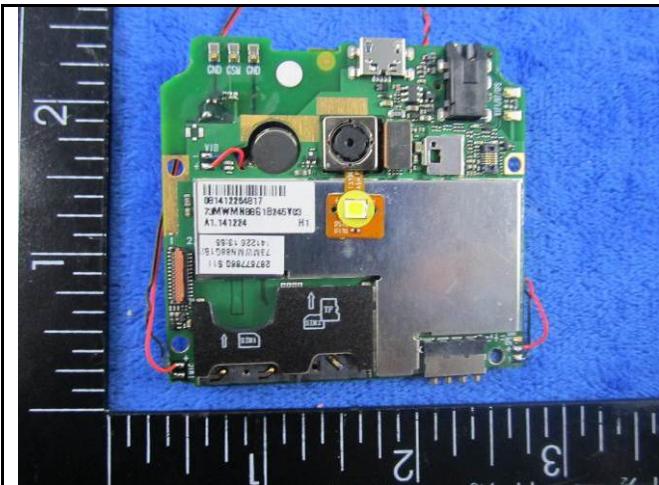
Annex B.i. Photograph: EUT External Photo



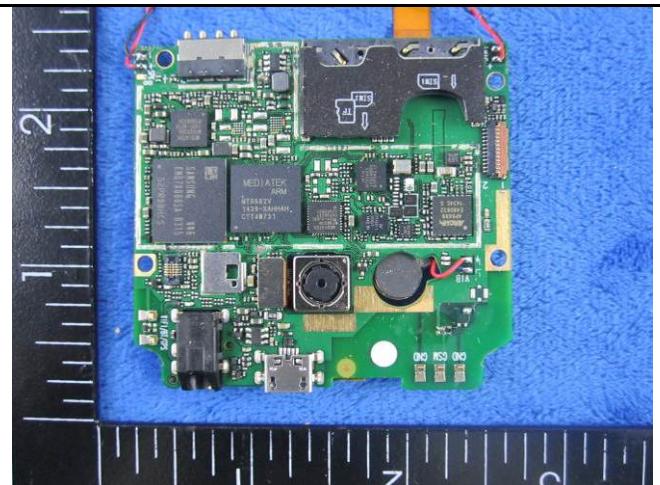


Annex B.ii. Photograph: EUT Internal Photo

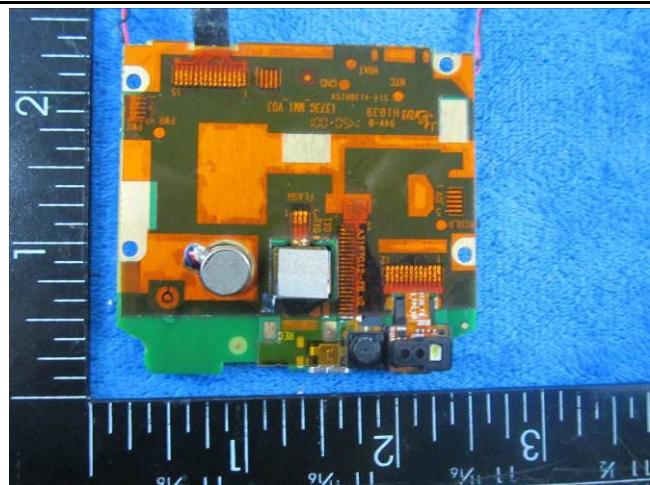




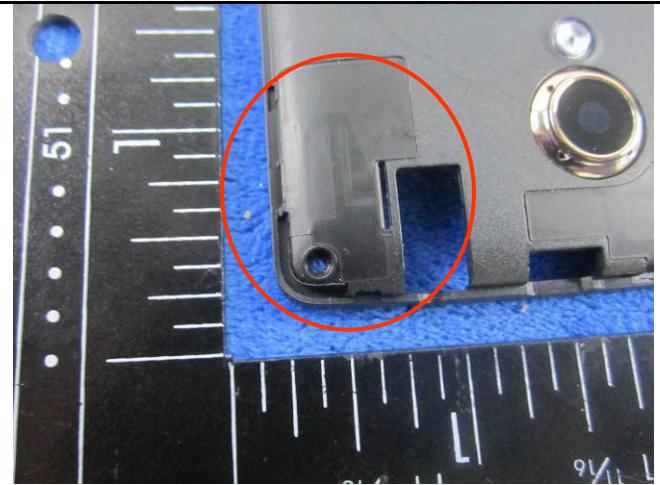
Mainborad With Shielding - Front View



Mainborad Without Shielding - Front View



Mainborad - Rear View

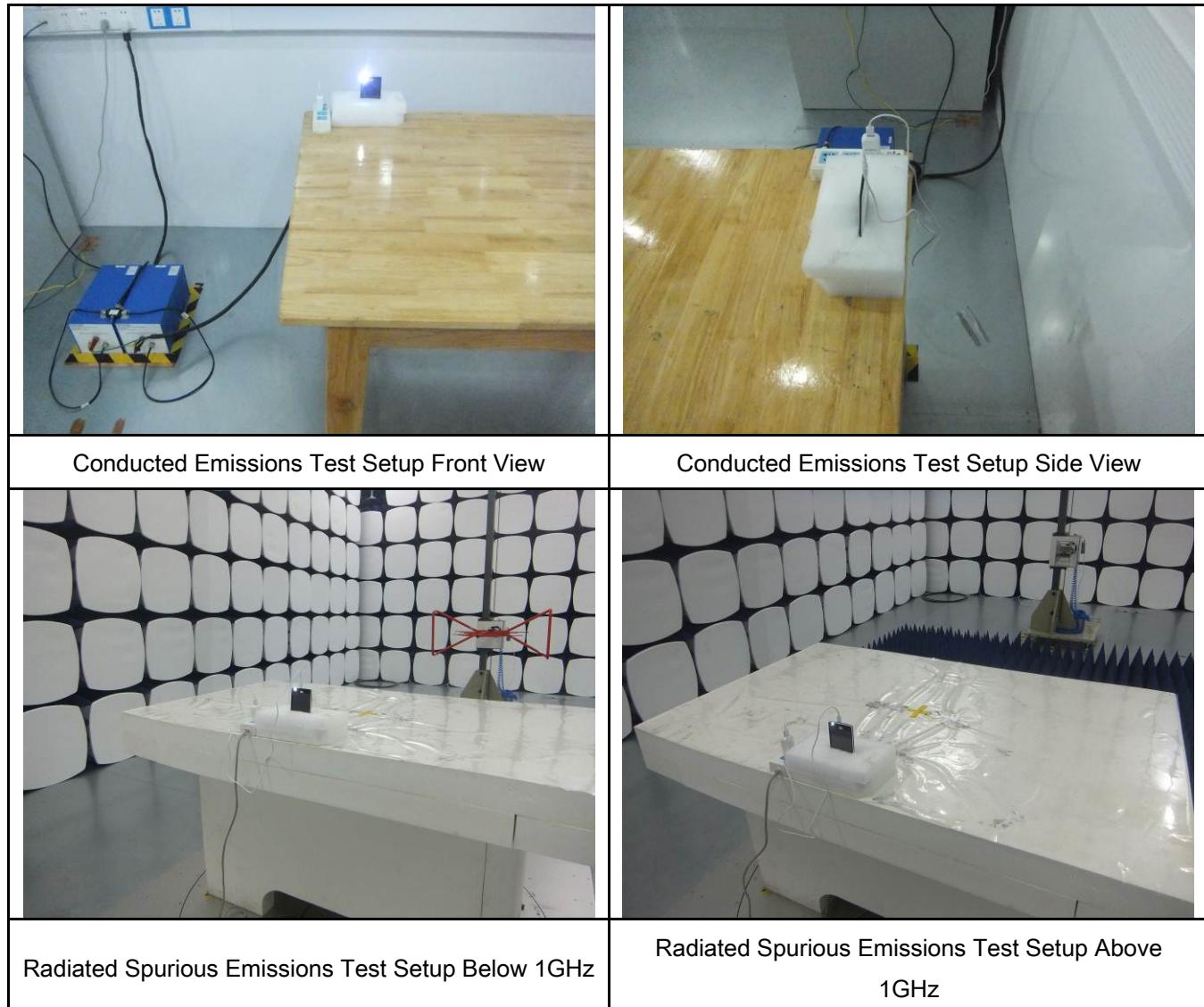


BT/BLE/WIFI Antenna View



GSM/PCS/UMTS-FDD Antenna View

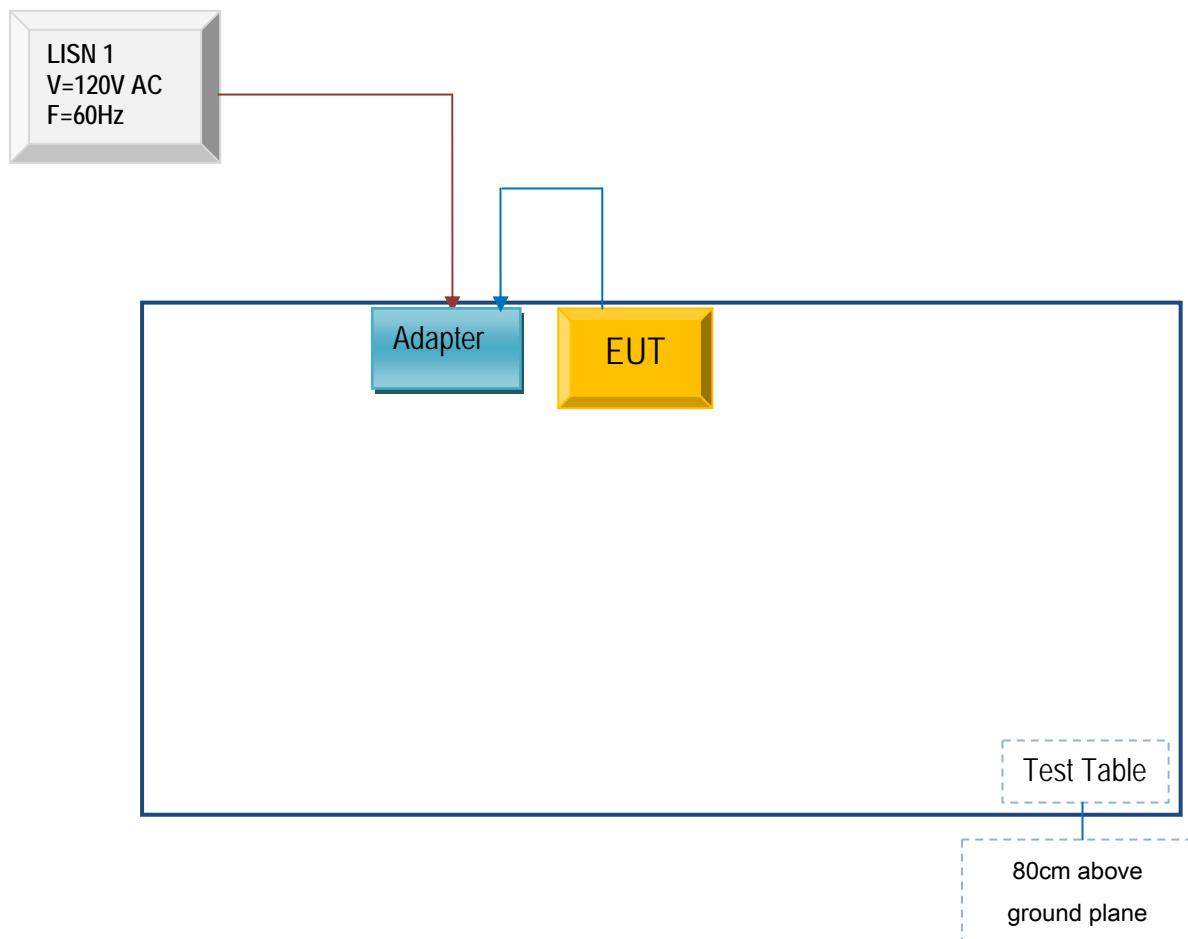
Annex B.iii. Photograph: Test Setup Photo



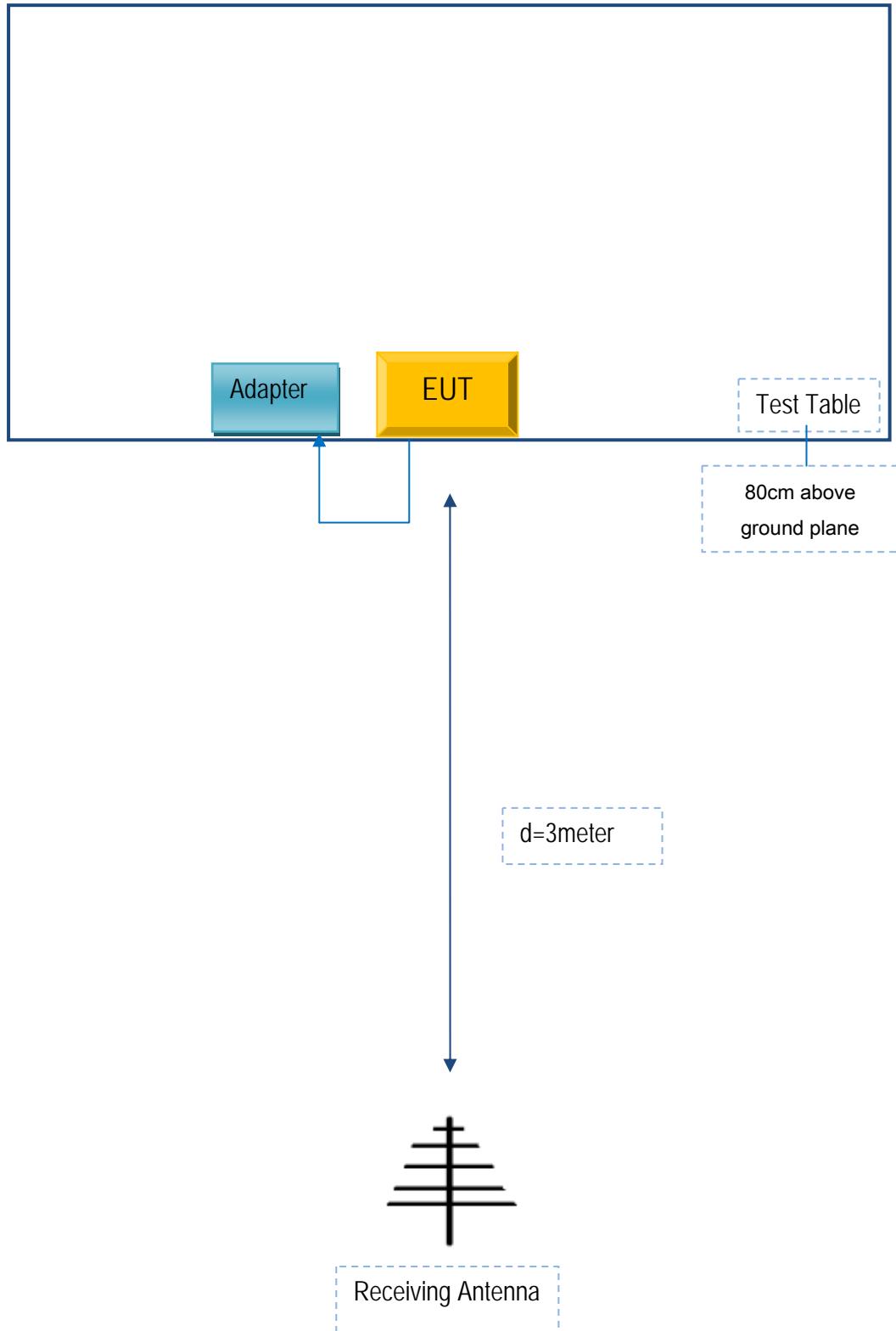
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

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

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

N/A