# RF TEST REPORT



Report No.: 17070259-FCC-R
Supersede Report No.: N/A

Applicant	Verykool USA Inc		
Product Name			
Product Name	Mini Bluetooth Speaker		
Model No.	VI1400		
Serial No.	N/A		
Test Standard	FCC Part 15.247: 2016, ANSI C63.10: 2013		
Test Date	April 18 to May 04, 2017		
Issue Date	May 05, 2017		
Test Result	Pass Fail		
Equipment complied with the specification			
Equipment did not comply with the specification			
LOVEN LUO David Huang			
Loren Lu Test Engir	5901A1593		

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

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park
South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn



Test Report	17070259-FCC-R3
Page	2 of 62

### **Laboratories Introduction**

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



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

### **Accreditations for Conformity Assessment**

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



Test Report	17070259-FCC-R3
Page	3 of 62

This page has been left blank intentionally.



Test Report	17070259-FCC-R3
Page	4 of 62

## **CONTENTS**

1.	REPORT REVISION HISTORY	5
2.	CUSTOMER INFORMATION	
3.	TEST SITE INFORMATION	5
4.	EQUIPMENT UNDER TEST (EUT) INFORMATION	6
5.	TEST SUMMARY	7
6.	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	8
6.1	ANTENNA REQUIREMENT	8
6.2	CHANNEL SEPARATION	9
6.3	20DB BANDWIDTH	13
6.4	PEAK OUTPUT POWER	17
6.5	NUMBER OF HOPPING CHANNEL	21
6.6	TIME OF OCCUPANCY (DWELL TIME)	23
6.7	BAND EDGE & RESTRICTED BAND	27
6.8	AC POWER LINE CONDUCTED EMISSIONS	35
6.9	RADIATED EMISSIONS & RESTRICTED BAND	41
ANN	NEX A. TEST INSTRUMENT	47
ANN	NEX B. EUT AND TEST SETUP PHOTOGRAPHS	48
ANN	NEX C. TEST SETUP AND SUPPORTING EQUIPMENT	57
ANN	NEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST	61
ANI	NEX E. DECLARATION OF SIMILARITY	62



Test Report	17070259-FCC-R3
Page	5 of 62

## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
17070259-FCC-R	NONE	Original	May 05, 2017

### 2. Customer information

Applicant Name	Verykool USA Inc	
Applicant Add	3636 Nobel Drive, Suite 325, San Diego, California 92122 United States	
Manufacturer	NAMO COMMUNIATION TECHNOLOGY (HK) LIMITED	
Manufacturer Add	Room 310-311; Building 2, Block A, GuangXingYuan Internet Industry base, 1009	
	BaoYuan Road, BaoAn distric, Shenzhen	

### 3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES	
	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park	
Lab Address	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 of	Dedicted Emission Drawson To Chamban v2.0	
Radiated Emission	Radiated Emission Program-To Shenzhen v2.0	
Test Software of	E7 EMO( 1 0044)	
Conducted Emission	EZ-EMC(ver.lcp-03A1)	



FCC ID:

Test Report	17070259-FCC-R3
Page	6 of 62

4. Equipment under	lest (EUI) Information
Description of EUT:	Mini Bluetooth Speaker
Main Model:	VI1400
Serial Model:	N/A
Date EUT received:	April 17, 2017
Test Date(s):	April 18 to May 04, 2017
Equipment Category :	DSS
Antenna Gain:	0dBi
Antenna Type:	PCB antenna
Type of Modulation:	Bluetooth: GFSK, π /4DQPSK, 8DPSK
Max. Output Power:	-3.967dBm
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz
Number of Channels:	Bluetooth: 79CH
Port:	USB Port
Input Power:	Battery: Model:672125 Spec: AC 3.7V, 280mAh USB:DC 5V
Trade Name :	veryKool

WA6VI1400



Test Report	17070259-FCC-R3
Page	7 of 62

### 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& Restricted  Band and Radiated  Emissions& Restricted  Band	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	
-	-	-	



Test Report	17070259-FCC-R3
Page	8 of 62

### 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 1 antenna:

A permanently attached PCB antenna for Bluetooth, the gain is 0dBi for Bluetooth.

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.



Test Report	17070259-FCC-R3
Page	9 of 62

### 6.2 Channel Separation

Temperature	22°C
Relative Humidity	54%
Atmospheric Pressure	1002mbar
Test date :	May 04, 2017
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		V
Test Setup		Spectrum Analyzer EUT	
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guideline  Use the following spectrum analyzer settings:  The EUT must have its hopping function enabled  Span = wide enough to capture the peaks of two adjacent channels  Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span  Video (or Average) Bandwidth (VBW) ≥ 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		ent on to
		channels. The limit is specified in one of the subparagr Section. Submit this plot.	aphs of this



Test Report	17070259-FCC-R3
Page	10 of 62

Rema	rk				
Resu	lt	Pass	Fail		
Test Data	Yes	i	N/A		
Test Plot	Ye	s (See below)	□ <sub>N/A</sub>		

### Channel Separation measurement result

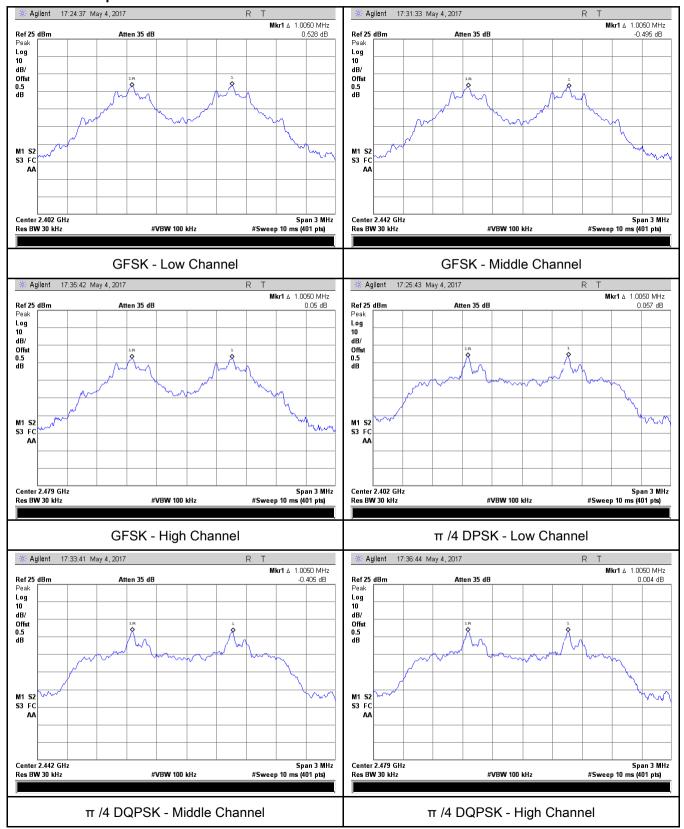
Type/ Modulation	СН	CH Frequency (MHz)	CH Separation (MHz)	Limit (MHz)	Result
	Low Channel	2402	1.005	0.688	Pass
	Adjacency Channel	2403	1.005	0.000	F a 3 3
CH Separation	Mid Channel	2440	1.005	0.690	Pass
GFSK	Adjacency Channel	2441	1.005	0.090	P d 5 5
	High Channel	2480	1 005	0 600	Doos
	Adjacency Channel	2479	1.005	0.689	Pass
	Low Channel	2402	1.005	0.749	Pass
	Adjacency Channel	2403	1.005	0.749	Pa55
CH Separation	Mid Channel	2440	1.005	0.753	Pass
π /4 DQPSK	Adjacency Channel	2441	1.005	0.755	Pass
	High Channel	2480	1 005	0.758	Dees
	Adjacency Channel	2479	1.005	0.758	Pass
	Low Channel	2402	1.005	0.690	Dess
	Adjacency Channel	2403	1.005	0.690	Pass
CH Separation	Mid Channel	2440	4 005	0.004	Desa
8DPSK	Adjacency Channel	2441	1.005	0.691	Pass
	High Channel	2480	1.005	0.607	Dess
	Adjacency Channel	2479	1.005	0.687	Pass



Test Report	17070259-FCC-R3
Page	11 of 62

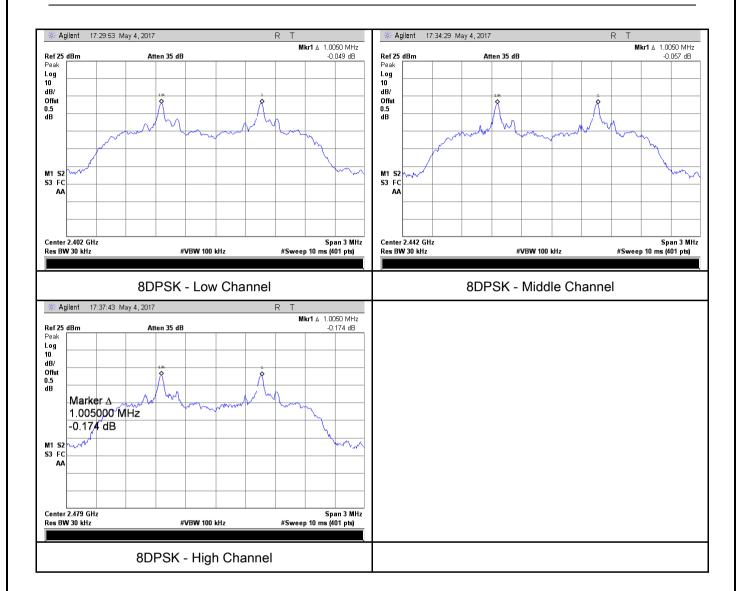
#### **Test Plots**

### Channel Separation measurement result





Test Report	17070259-FCC-R3
Page	12 of 62





Test Report	17070259-FCC-R3
Page	13 of 62

### 6.3 20dB Bandwidth

Temperature	22°C
Relative Humidity	54%
Atmospheric Pressure	1002mbar
Test date :	May 04, 2017
Tested By :	Loren Luo

Requirement(s):					
Spec	Item	Requirement	Applicable		
		Frequency hopping systems shall have hopping			
§15.247(a)	a)	channel carrier frequencies separated by a minimum	<b>V</b>		
(1)	a)	of 25 kHz or the 20 dB bandwidth of the hopping			
		channel, whichever is greater.			
Test Setup		Spectrum Analyzer EUT			
	The test follows FCC Public Notice DA 00-705 Measurement Guidelines.				
	Use the following spectrum analyzer settings:				
	-	Span = approximately 2 to 3 times the 20 dB bandwidth,	centered on		
		a hopping channel			
	-	RBW ≥ 1% of the 20 dB bandwidth			
	-	VBW ≥ RBW			
Test	-	Sweep = auto			
Procedure	-	Detector function = peak			
1 Tocedure	-	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	e marker-		
		delta function, and move the marker to the other side of the	he		
		emission, until it is (as close as possible to) even with the	reference		



Test Report	17070259-FCC-R3
Page	14 of 62

		marker	level. The marker-delta reading at this point is the 20 dB
		bandwi	dth of the emission. If this value varies with different modes of
		operation	on (e.g., data rate, modulation format, etc.), repeat this test for
		each va	riation. The limit is specified in one of the subparagraphs of
		this Sec	ction. Submit this plot(s).
Remark			
Result		Pass	Fail
Test Data	Y	es	□ <sub>N/A</sub>
Test Plot	Y	es (See below)	N/A

### Measurement result

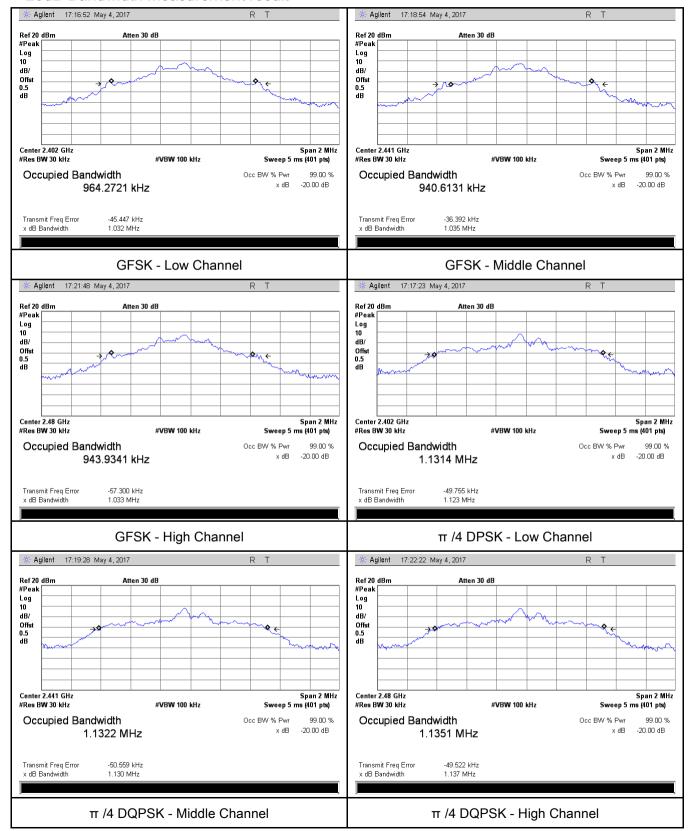
Modulation	СН	CH Frequency	20dB Bandwidth	99% Occupied
Modulation	Сп	(MHz)	(MHz)	Bandwidth (MHz)
	Low	2402	1.032	0.9643
GFSK	Mid	2441	1.035	0.9406
	High	2480	1.033	0.9439
	Low	2402	1.123	1.1314
π /4 DQPSK	Mid	2441	1.130	1.1322
	High	2480	1.137	1.1351
	Low	2402	1.035	1.1051
8-DPSK	Mid	2441	1.036	1.1061
	High	2480	1.030	1.1003



Test Report	17070259-FCC-R3
Page	15 of 62

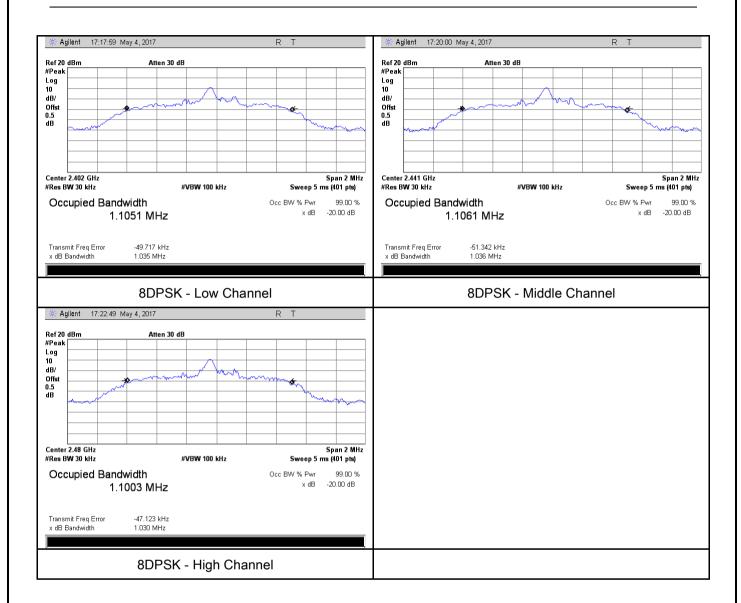
#### **Test Plots**

### 20dB Bandwidth measurement result





Test Report	17070259-FCC-R3
Page	16 of 62





Test Report	17070259-FCC-R3
Page	17 of 62

### 6.4 Peak Output Power

Temperature	22°C
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	April 25, 2017
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement Applicable		
	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1	<b>V</b>	
		Watt		
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt		
§15.247(b)	c)	For all other FHSS in the 2400-2483.5MHz band:	<b>V</b>	
(3)	<u> </u>	≤ 0.125 Watt.		
(3)	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt		
	0)	FHSS in 902-928MHz with ≥ 25 & <50 channels:		
	e)	≤ 0.25 Watt		
	f)	DTS in 902 <u>-</u> 928MHz, 2400 <u>-</u> 2483.5MHz: ≤ 1 Watt		
Test Setup				
		Spectrum Analyzer EUT		
	The te	The test follows FCC Public Notice DA 00-705 Measurement Guidelines.		
	Use the following spectrum analyzer settings:			
	-	Span = approximately 5 times the 20 dB bandwidth, center	ered on a	
		hopping channel		
Test	- RBW > the 20 dB bandwidth of the emission being measured			
Procedure	- VBW≥ RBW			
	-	Sweep = auto		
	-	Detector function = peak		
	-	Trace = max hold		
	- Allow the trace to stabilize.			



Test Report	17070259-FCC-R3
Page	18 of 62

_	
	- 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	Pass Fail
Test Data	Yes N/A

### Peak Output Power measurement result

Test Plot Yes (See below)

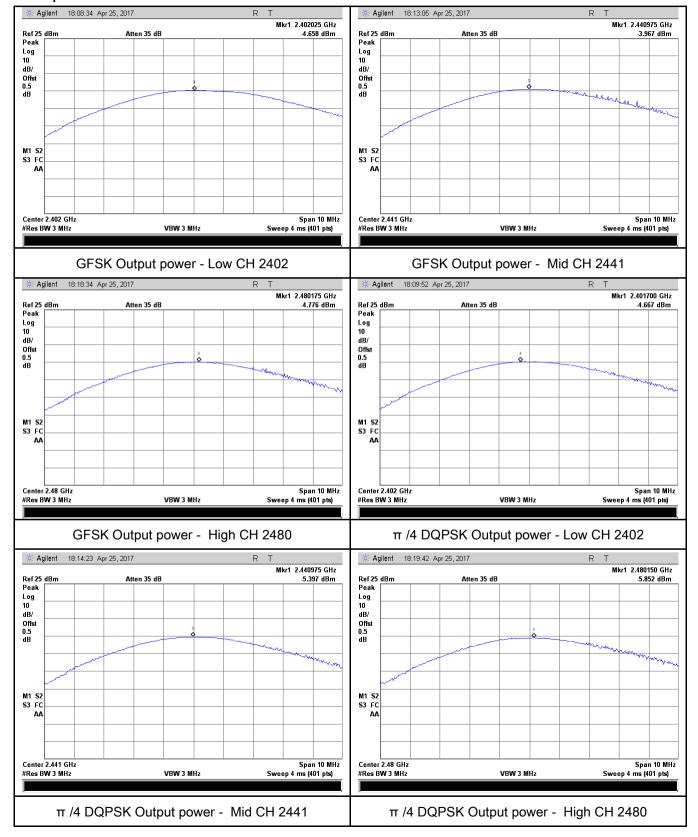
Туре	Modulation	СН	Frequenc y (MHz)	Conducted Power (dBm)	Limit (mW)	Result
		Low	2402	-4.658	125	Pass
	GFSK	Mid	2441	-3.967	125	Pass
		High	2480	-4.776	125	Pass
Out to ut	π /4 DQPSK 8-DPSK	Low	2402	-4.667	125	Pass
Output		Mid	2441	-5.397	125	Pass
power		High	2480	-5.852	125	Pass
		Low	2402	-4.265	125	Pass
		Mid	2441	-5.082	125	Pass
		High	2480	-5.870	125	Pass



Test Report	17070259-FCC-R3
Page	19 of 62

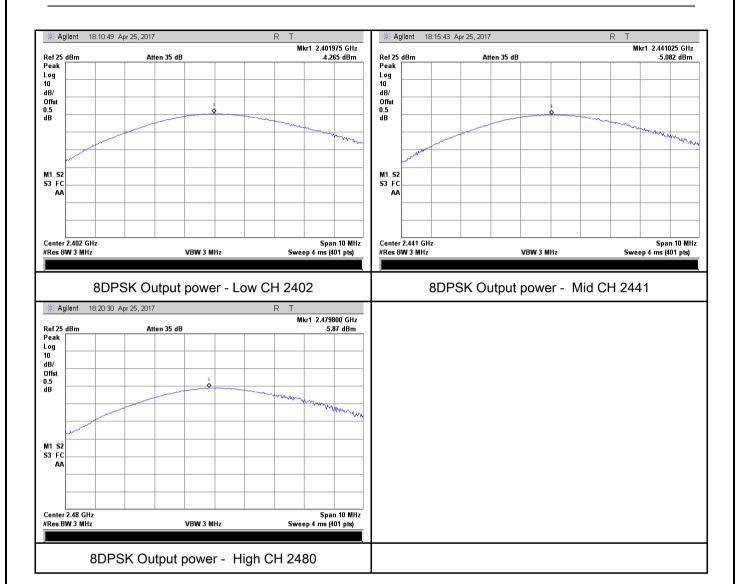
#### **Test Plots**

#### Output Power measurement result





Test Report	17070259-FCC-R3
Page	20 of 62





Test Report	17070259-FCC-R3
Page	21 of 62

### 6.5 Number of Hopping Channel

Temperature	23°C
Relative Humidity	57%
Atmospheric Pressure	1027mbar
Test date :	April 26, 2017
Tested By :	Loren Luo

Requirement(s):					
Spec	Item	Requirement	Applicable		
§15.247(a) (1)(iii)	a)	FHSS in 2400-2483.5MHz ≥ 15 channels	V		
Test Setup		Spectrum Analyzer EUT			
	The te	st follows FCC Public Notice DA 00-705 Measurement Gu	iidelines.		
	Use the	e following spectrum analyzer settings:			
	The El	JT must have its hopping function enabled.			
	-	Span = the frequency band of operation			
	-	RBW ≥ 1% of the span			
T 4	-	VBW ≥ RBW			
Test	-	Sweep = auto			
Procedure	-	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				
		one of the subparagraphs of this Section. Submit this plot	:(s).		
Remark					
Result	Pas	Fail			
Test Data	Yes	N/A	_		
Test Plot	Yes (See	e below)			



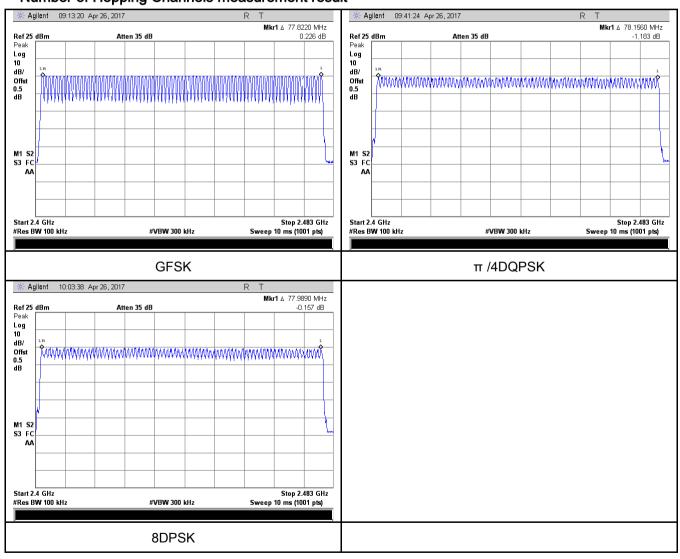
Test Report	17070259-FCC-R3
Page	22 of 62

### Number of Hopping Channel measurement result

Туре	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	π /4 DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

#### **Test Plots**

### Number of Hopping Channels measurement result





Test Report	17070259-FCC-R3
Page	23 of 62

## 6.6 Time of Occupancy (Dwell Time)

Temperature	22°C
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	April 25, 2017
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)(iii)	a)	Dwell Time < 0.4s	>
Test Setup		Spectrum Analyzer EUT	
Test Procedure	Use th	st follows FCC Public Notice DA 00-705 Measurement G e following spectrum analyzer  Span = zero span, centered on a hopping channel  RBW = 1 MHz  VBW ≥ RBW  Sweep = as necessary to capture the entire dwell time p channel  Detector function = peak  Trace = max hold  use the marker-delta function to determine the dwell time	er hopping
Remark			
Result	Pas	s Fail	

Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



Test Report	17070259-FCC-R3
Page	24 of 62

### Dwell Time measurement result

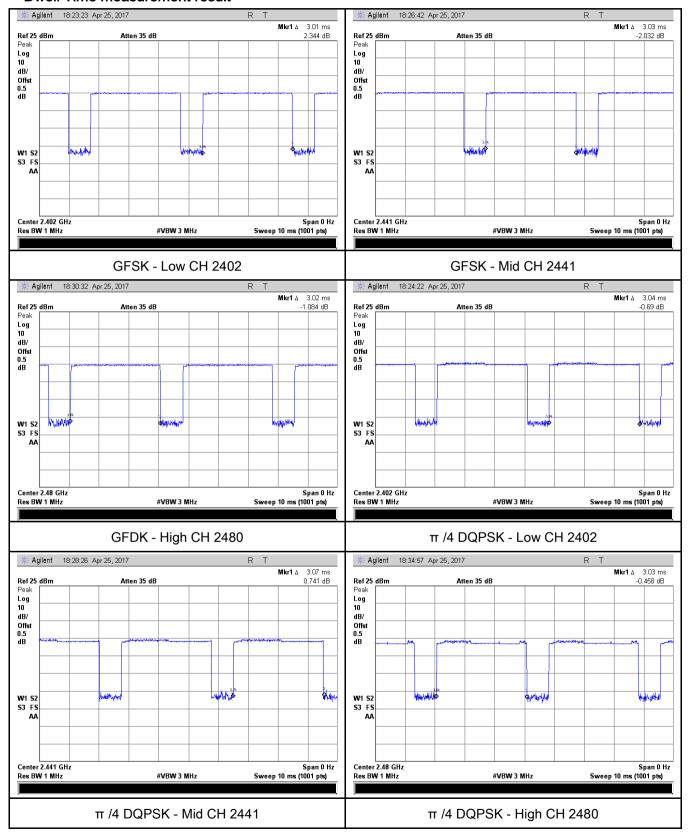
Type	Modulation	СП	Pulse Width	Dwell Time	Limit	Docult
Туре	Wodulation	СН	(ms)	(ms)	(ms)	Result
		Low	3.01	321.067	400	Pass
	GFSK	Mid	3.03	323.200	400	Pass
		High	3.02	322.133	400	Pass
		Low	3.04	324.267	400	Pass
Dwell Time	Time π /4 DQPSK	Mid	3.07	327.467	400	Pass
		High	3.03	323.200	400	Pass
		Low	3.04	324.267	400	Pass
	8-DPSK	Mid	3.02	322.133	400	Pass
		High	3.04	324.267	400	Pass
Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6						



Test Report	17070259-FCC-R3
Page	25 of 62

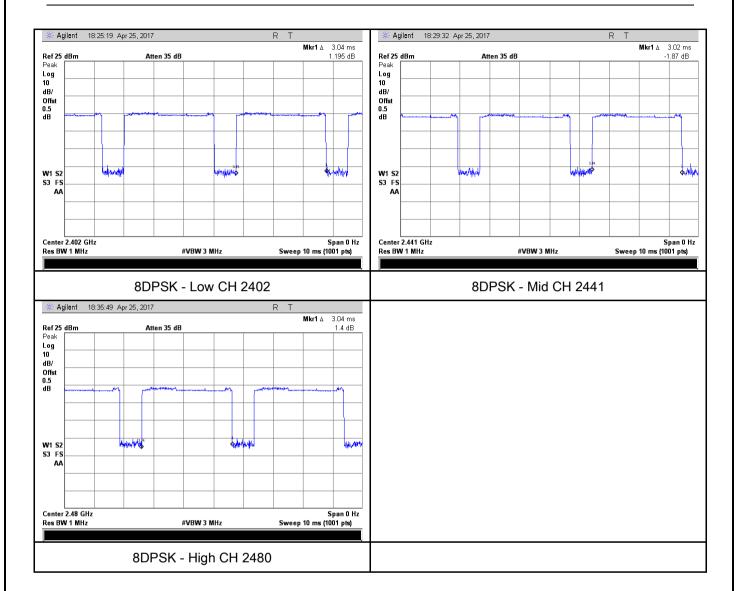
#### **Test Plots**

#### **Dwell Time measurement result**





Test Report	17070259-FCC-R3
Page	26 of 62





Test Report	17070259-FCC-R3
Page	27 of 62

### 6.7 Band Edge & Restricted Band

Temperature	24°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	April 26, 2017
Tested By :	Loren Luo

### Requirement(s):

Requirement(s):	l	In	
Spec	Item	Requirement	Applicable
		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	
§15.247(a)		produced by the intentional radiator shall be at least 20 dB	_
(1)(iii)	a)	below that in the 100 kHz bandwidth within the band that	<b>~</b>
(1)(111)		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.□	
Test Setup	Ant. Tower  Support Units  Turn Table  Ground Plane  Test Receiver		
		st follows FCC Public Notice DA 00-705 Measurement G	Guidelines.
Test Procedure		d Method Only	
	1. Check the calibration of the measuring instrument using either an internal		
		calibrator or a known signal from an external generator.	
		Position the EUT without connection to measurement instrum	
		the Rotated table and turn on the EUT and make it operate in tra	_
		mode. Then set it to Low Channel and High Channel within its o	perating range,



Test Report	17070259-FCC-R3
Page	28 of 62

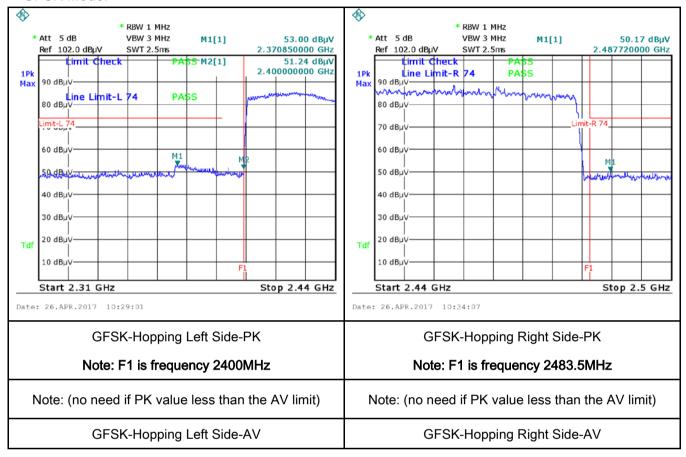
		and make sure the instrument is operated in its linear range.
		- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a
		convenient frequency span including 100kHz bandwidth from band edge, check
		the emission of EUT, if pass then set Spectrum Analyzer as below:
		a. The resolution 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		
Remark		
Result		Pass Fail
T4 D-4-		es N/A
Test Data	Y	es N/A
Test Plot	Y	es (See below)



Test Report	17070259-FCC-R3
Page	29 of 62

### **Test Plots**

#### **GFSK Mode:**





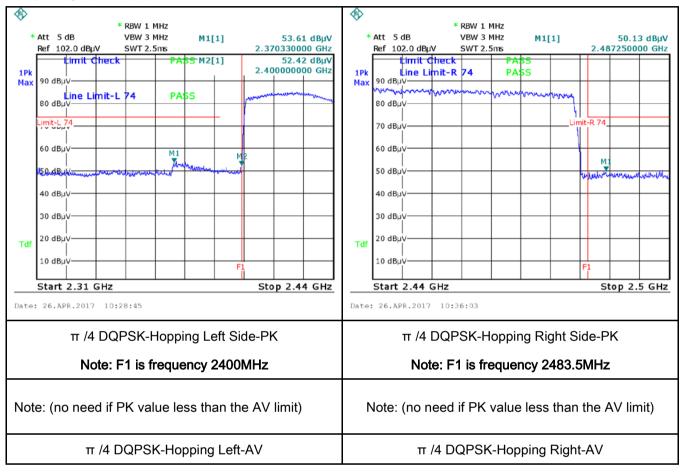
Test Report	17070259-FCC-R3
Page	30 of 62





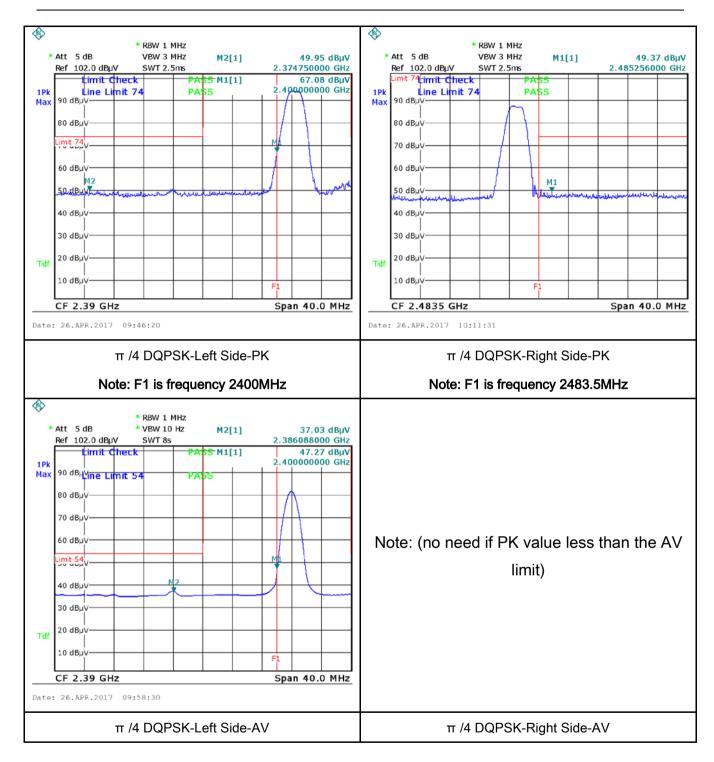
Test Report	17070259-FCC-R3
Page	31 of 62

### π /4 DQPSK Mode:





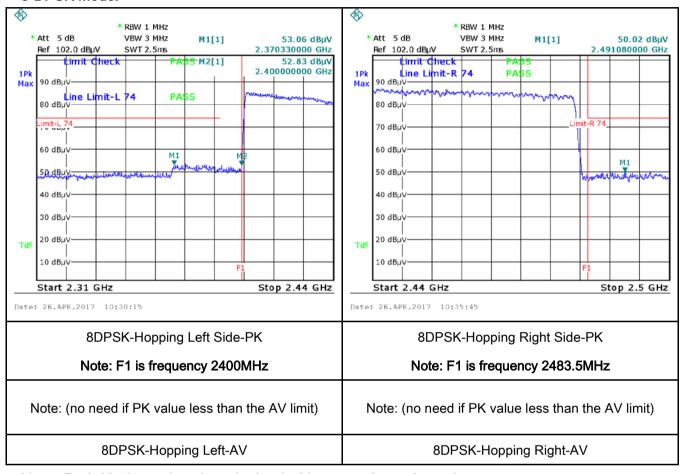
Test Report	17070259-FCC-R3
Page	32 of 62





Test Report	17070259-FCC-R3
Page	33 of 62

### 8-DPSK Mode:





Test Report	17070259-FCC-R3
Page	34 of 62





Test Report	17070259-FCC-R3
Page	35 of 62

### 6.8 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	April 19, 2017
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement			Applicable
47CFR§15. 207, RSS210 (A8.1)	a)	For Low-power radio-freconnected to the public voltage that is conducted frequency or frequencied not exceed the limits in [mu]H/50 ohms line implower limit applies at the Frequency ranges (MHz)	e utility (AC) power line ed back onto the AC po es, within the band 150 the following table, as pedance stabilization n	the radio frequency ower line on any kHz to 30 MHz, shall measured using a 50 etwork (LISN). The	<b>\</b>
		0.15 ~ 0.5 0.5 ~ 5	66 – 56 56	56 – 46 46	
		5 ~ 30	60	50	
Test Setup  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.					
Procedure	<ol> <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>				



Test Plot 
✓ Yes (See below) 
N/A

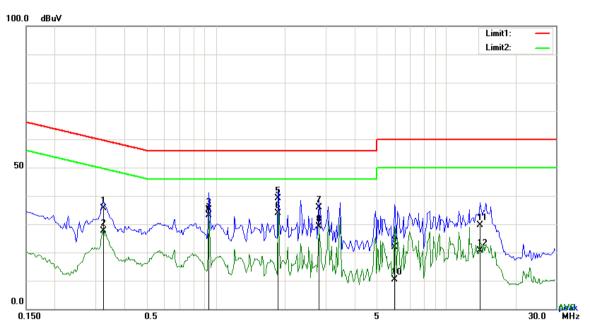
Test Report	17070259-FCC-R3
Page	36 of 62

	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	Pass Fail
Test Data	Yes N/A



Test Report	17070259-FCC-R3
Page	37 of 62

Test Mode: Bluetooth Mode



Test Data

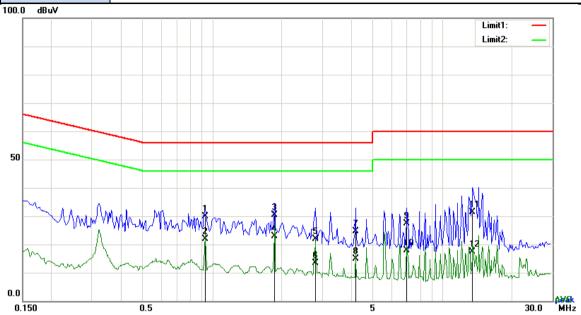
## Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.3255	25.58	QP	10.03	35.61	59.57	-23.96
2	L1	0.3255	17.66	AVG	10.03	27.69	49.57	-21.88
3	L1	0.9339	25.03	QP	10.03	35.06	56.00	-20.94
4	L1	0.9339	23.19	AVG	10.03	33.22	46.00	-12.78
5	L1	1.8660	29.19	QP	10.04	39.23	56.00	-16.77
6	L1	1.8660	23.82	AVG	10.04	33.86	46.00	-12.14
7	L1	2.8020	25.80	QP	10.05	35.85	56.00	-20.15
8	L1	2.8020	19.00	AVG	10.05	29.05	46.00	-16.95
9	L1	5.9835	11.70	QP	10.09	21.79	60.00	-38.21
10	L1	5.9835	0.23	AVG	10.09	10.32	50.00	-39.68
11	L1	14.0409	19.46	QP	10.21	29.67	60.00	-30.33
12	L1	14.0409	10.45	AVG	10.21	20.66	50.00	-29.34



Test Report	17070259-FCC-R3
Page	38 of 62





#### Test Data

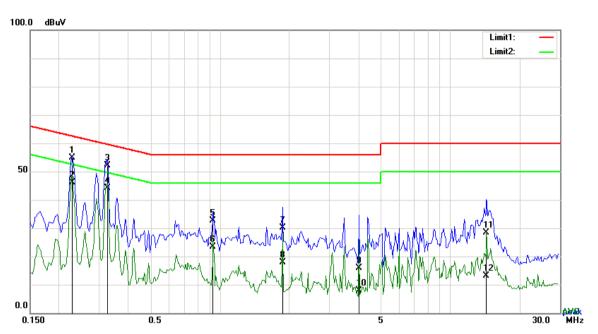
### Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.9300	19.79	QP	10.03	29.82	56.00	-26.18
2	N	0.9300	11.80	AVG	10.03	21.83	46.00	-24.17
3	N	1.8621	20.41	QP	10.04	30.45	56.00	-25.55
4	N	1.8621	12.78	AVG	10.04	22.82	46.00	-23.18
5	N	2.8020	11.93	QP	10.05	21.98	56.00	-34.02
6	N	2.8020	3.37	AVG	10.05	13.42	46.00	-32.58
7	N	4.1856	14.60	QP	10.06	24.66	56.00	-31.34
8	N	4.1856	4.76	AVG	10.06	14.82	46.00	-31.18
9	N	6.9897	17.27	QP	10.10	27.37	60.00	-32.63
10	N	6.9897	7.88	AVG	10.10	17.98	50.00	-32.02
11	N	13.5027	21.29	QP	10.18	31.47	60.00	-28.53
12	N	13.5027	7.20	AVG	10.18	17.38	50.00	-32.62



Test Report	17070259-FCC-R3
Page	39 of 62

Test Mode: Bluetooth Mode



Test Data

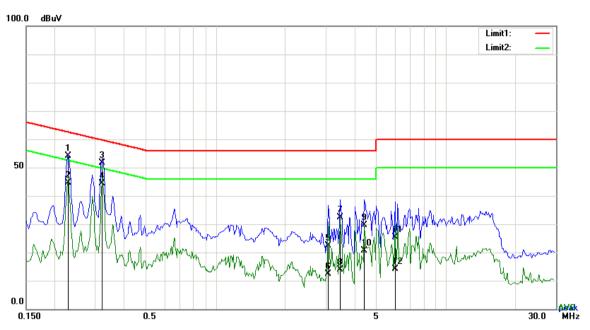
### Phase Line Plot at 240Vac, 60Hz

				o i lot at				
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.2280	44.90	QP	10.03	54.93	62.52	-7.59
2	L1	0.2280	36.16	AVG	10.03	46.19	52.52	-6.33
3	L1	0.3255	42.10	QP	10.03	52.13	59.57	-7.44
4	L1	0.3255	34.19	AVG	10.03	44.22	49.57	-5.35
5	L1	0.9339	22.52	QP	10.03	32.55	56.00	-23.45
6	L1	0.9339	13.45	AVG	10.03	23.48	46.00	-22.52
7	L1	1.8699	19.98	QP	10.04	30.02	56.00	-25.98
8	L1	1.8699	7.89	AVG	10.04	17.93	46.00	-28.07
9	L1	4.0140	5.89	QP	10.07	15.96	56.00	-40.04
10	L1	4.0140	-2.07	AVG	10.07	8.00	46.00	-38.00
11	L1	14.4231	18.08	QP	10.22	28.30	60.00	-31.70
12	L1	14.4231	2.80	AVG	10.22	13.02	50.00	-36.98



Test Report	17070259-FCC-R3
Page	40 of 62

Test Mode: Bluetooth Mode



Test Data

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

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.2280	44.02	QP	10.02	54.04	62.52	-8.48
2	N	0.2280	34.49	AVG	10.02	44.51	52.52	-8.01
3	N	0.3216	41.52	QP	10.02	51.54	59.67	-8.13
4	N	0.3216	34.33	AVG	10.02	44.35	49.67	-5.32
5	N	3.0780	12.34	QP	10.05	22.39	56.00	-33.61
6	N	3.0780	2.21	AVG	10.05	12.26	46.00	-33.74
7	N	3.4680	22.25	QP	10.05	32.30	56.00	-23.70
8	Ν	3.4680	3.90	AVG	10.05	13.95	46.00	-32.05
9	N	4.4079	19.63	QP	10.06	29.69	56.00	-26.31
10	N	4.4079	10.46	AVG	10.06	20.52	46.00	-25.48
11	N	6.0030	15.28	QP	10.08	25.36	60.00	-34.64
12	N	6.0030	4.06	AVG	10.08	14.14	50.00	-35.86



Test Report	17070259-FCC-R3
Page	41 of 62

# 6.9 Radiated Emissions & Restricted Band

Temperature	24°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	April 19, 2017
Tested By :	Loren Luo

# Requirement(s):

Spec	Item	Item Requirement Applical				
47CFR§15. 205, §15.209, §15.247(d)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges  Frequency range (MHz)  Field Strength (µV/m)  30 - 88  100  88 - 216  216 - 960  200				
		Above 960	500			
Test Setup			Ant. Tower 1-4m Variable e d Plane eceiver	-		
Procedure	1.	condition.				



Test Report	17070259-FCC-R3
Page	42 of 62

		a.	Vertical or horizontal polarization (whichever gave the higher emission
			level over a full rotation of the EUT) was chosen.
		b.	The EUT was then rotated to the direction that gave the maximum
			emission.
		C.	Finally, the antenna height was adjusted to the height that gave the
			maximum emission.
	3.	The re	solution bandwidth and video bandwidth of test receiver/spectrum analyzer is
		120 kH	Hz for Quasiy Peak detection at frequency below 1GHz.
	4.	The res	solution bandwidth of test receiver/spectrum analyzer is 1MHz and video
		bandw	idth is 3MHz with Peak detection for Peak measurement at frequency above
		1GHz.	
		The re	solution bandwidth of test receiver/spectrum analyzer is 1MHz and the video
		bandw	vidth is 10Hz with Peak detection for Average Measurement as below at
		freque	ncy above 1GHz.
	5.	Steps	2 and 3 were repeated for the next frequency point, until all selected
		freque	ency points were measured.
Remark			
Result	<b>☑</b> Pa	ass	Fail

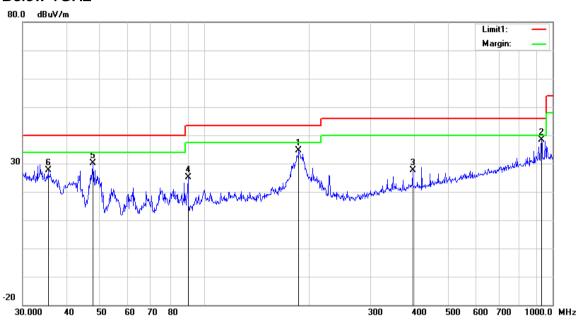
Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



Test Report	17070259-FCC-R3
Page	43 of 62

Test Mode: Bluetooth Mode

### Below 1GHz



### Test Data

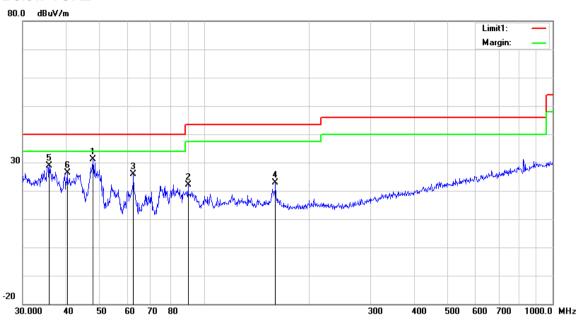
# Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detect	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degr
		(MHz)	(dBuV/m)	or	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	Н	186.4409	44.07	peak	11.35	22.29	1.48	34.61	43.50	-8.89	100	91
2	Н	929.0082	33.47	peak	22.65	20.82	3.13	38.43	46.00	-7.57	100	215
3	Н	396.2415	31.94	peak	15.62	22.02	2.01	27.55	46.00	-18.45	100	263
4	Τ	89.5900	38.46	peak	7.98	22.32	0.96	25.08	43.50	-18.42	100	17
5	Н	47.8260	42.45	peak	9.36	22.34	0.78	30.25	40.00	-9.75	100	307
6	I	35.4993	32.02	peak	17.19	22.25	0.76	27.72	40.00	-12.28	200	113



Test Report	17070259-FCC-R3
Page	44 of 62

### Below 1GHz



### Test Data

# Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detect	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degr
		(MHz)	(dBuV/m)	or	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	ee (°)
		(IVII IZ)	(dbdv/iii)		(dB/III)	(GD)	(GD)	(dbdv/iii)	(dbdv/iii)	(db)	(GIII)	()
1	V	47.8260	43.45	peak	9.36	22.34	0.78	31.25	40.00	-8.75	100	209
2	V	89.5900	35.57	peak	7.98	22.32	0.96	22.19	43.50	-21.31	100	199
3	٧	62.4314	40.01	peak	7.42	22.40	0.81	25.84	40.00	-14.16	100	193
4	V	159.7844	31.06	peak	12.60	22.27	1.39	22.78	43.50	-20.72	100	65
5	V	35.7491	33.35	peak	17.00	22.25	0.76	28.86	40.00	-11.14	100	163
6	V	40.2757	34.23	peak	13.72	22.28	0.79	26.46	40.00	-13.54	100	238



Test Report	17070259-FCC-R3
Page	45 of 62

## Above 1GHz

smitting Mode
---------------

#### Low Channel: 8-DPSK Mode (Worst Case) (2402 MHz)

Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
4804	39.32	AV	V	33.67	6.86	32.66	47.19	54	-6.81
4804	39.55	AV	Н	33.67	6.86	32.66	47.42	54	-6.58
4804	48.61	PK	V	33.67	6.86	32.66	56.48	74	-17.52
4804	46.23	PK	Н	33.67	6.86	32.66	54.1	74	-19.9
17805	24.19	AV	V	45.03	11.21	32.38	48.05	54	-5.95
17805	24.22	AV	Н	45.03	11.21	32.38	48.08	54	-5.92
17805	40.13	PK	V	45.03	11.21	32.38	63.99	74	-10.01
17805	41.45	PK	Н	45.03	11.21	32.38	65.31	74	-8.69

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

Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
4882	38.99	AV	V	33.71	6.95	32.74	46.91	54	-7.09
4882	38.49	AV	Н	33.71	6.95	32.74	46.41	54	-7.59
4882	49.11	PK	V	33.71	6.95	32.74	57.03	74	-16.97
4882	47.15	PK	Н	33.71	6.95	32.74	55.07	74	-18.93
17813	24.91	AV	V	45.15	11.18	32.41	48.83	54	-5.17
17813	23.76	AV	Н	45.15	11.18	32.41	47.68	54	-6.32
17813	40.25	PK	V	45.15	11.18	32.41	64.17	74	-9.83
17813	41.47	PK	Н	45.15	11.18	32.41	65.39	74	-8.61



Test Report	17070259-FCC-R3
Page	46 of 62

#### High Channel: GFSK Mode (Worst Case) (2480 MHz)

Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
4960	38.15	AV	V	33.9	6.76	32.74	46.07	54	-7.93
4960	38.01	AV	Н	33.9	6.76	32.74	45.93	54	-8.07
4960	47.23	PK	V	33.9	6.76	32.74	55.15	74	-18.85
4960	47.36	PK	Н	33.9	6.76	32.74	55.28	74	-18.72
17826	24.58	AV	V	45.22	11.35	32.38	48.77	54	-5.23
17826	24.75	AV	Н	45.22	11.35	32.38	48.94	54	-5.06
17826	42.33	PK	V	45.22	11.35	32.38	66.52	74	-7.48
17826	41.16	PK	Н	45.22	11.35	32.38	65.35	74	-8.65

#### Note:

- 1, The testing has been conformed to 10\*2480MHz=24,800MHz
- 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.



Test Report	17070259-FCC-R3
Page	47 of 62

# Annex A. TEST INSTRUMENT

Instrument	Model	Serial#	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/16/2016	09/15/2017	V
Line Impedance	LI-125A	191106	09/24/2016	09/23/2017	V
Line Impedance	LI-125A	191107	09/24/2016	09/23/2017	V
LISN	ISN T800	34373	09/24/2016	09/23/2017	V
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	<b>V</b>
Transient Limiter	LIT-153	531118	08/31/2016	08/30/2017	✓
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/16/2016	09/15/2017	<b>V</b>
Power Splitter	1#	1#	08/31/2016	08/30/2017	<b>V</b>
DC Power Supply	E3640A	MY40004013	09/16/2016	09/15/2017	<b>V</b>
Radiated Emissions					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	V
Positioning Controller	UC3000	MF780208282	11/18/2016	11/17/2017	V
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	✓
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	V
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	V
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	V
Universal Radio Communication Tester	CMU200	121393	09/24/2016	09/23/2017	V



Test Report	17070259-FCC-R3
Page	48 of 62

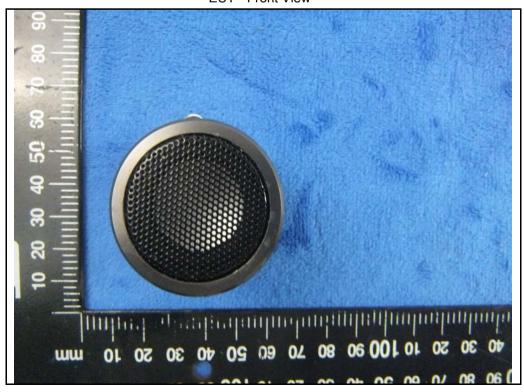
# Annex B. EUT And Test Setup Photographs

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

Whole Package View



**EUT - Front View** 



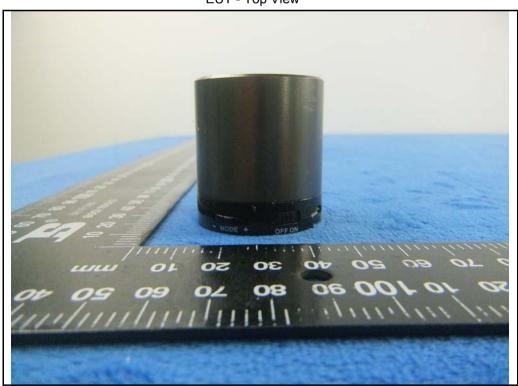


Test Report	17070259-FCC-R3
Page	49 of 62

**EUT - Rear View** 



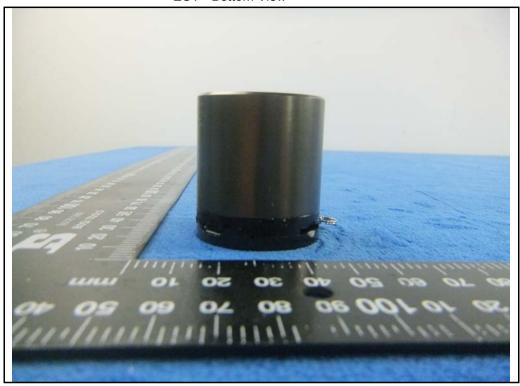
EUT - Top View



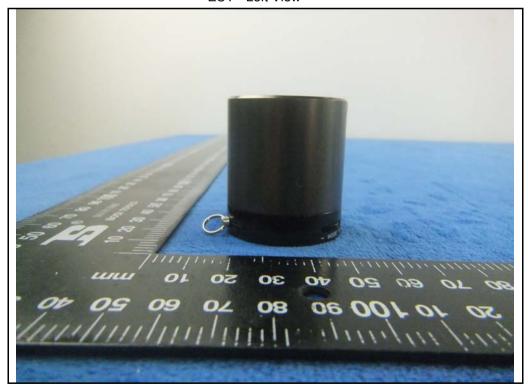


Test Report	17070259-FCC-R3
Page	50 of 62

EUT - Bottom View



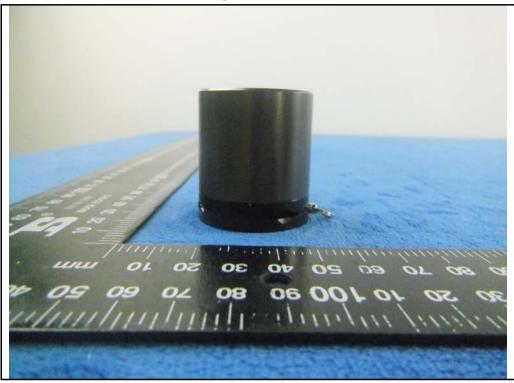
EUT - Left View





Test Report	17070259-FCC-R3
Page	51 of 62

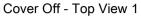
### EUT - Right View

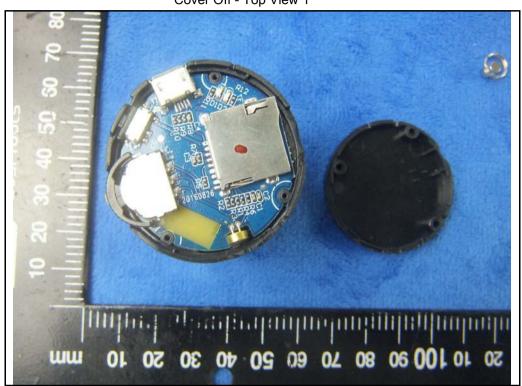




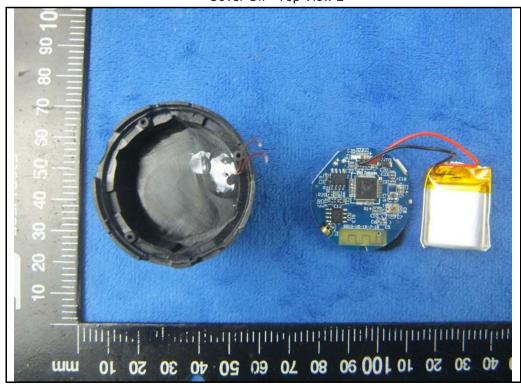
Test Report	17070259-FCC-R3
Page	52 of 62

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





Cover Off - Top View 2



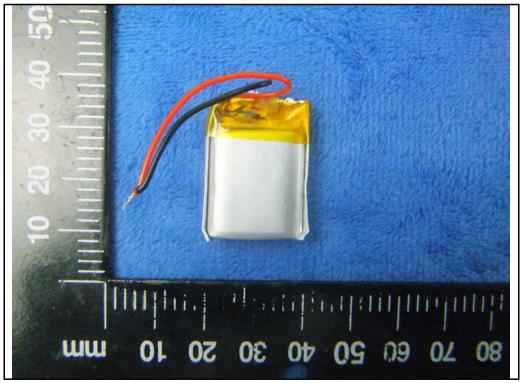


Test Report	17070259-FCC-R3
Page	53 of 62

Battery - Front View



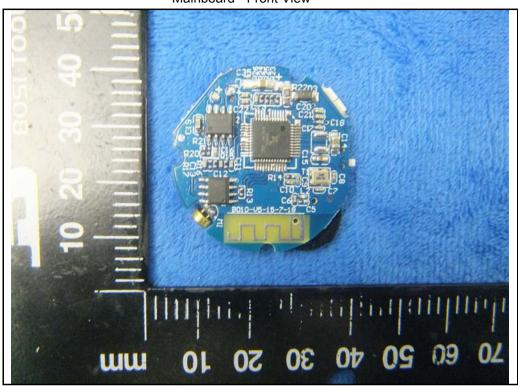
Battery - Rear View



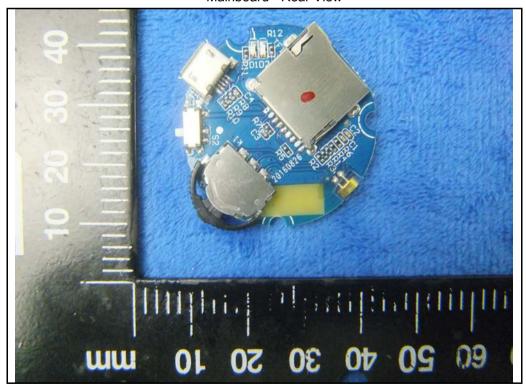


Test Report	17070259-FCC-R3
Page	54 of 62

Mainboard - Front View



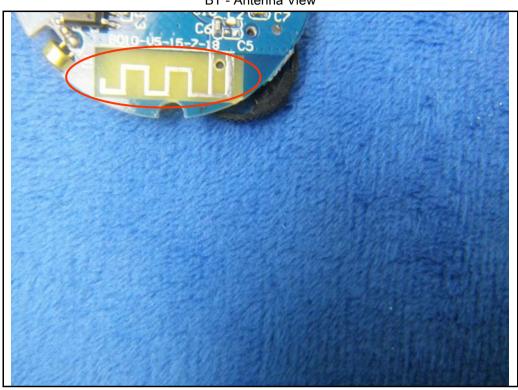
Mainboard - Rear View





Test Report	17070259-FCC-R3
Page	55 of 62

#### BT - Antenna View





Test Report	17070259-FCC-R3
Page	56 of 62

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



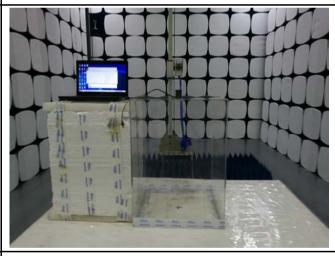
Conducted Emissions Test Setup Front View



Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

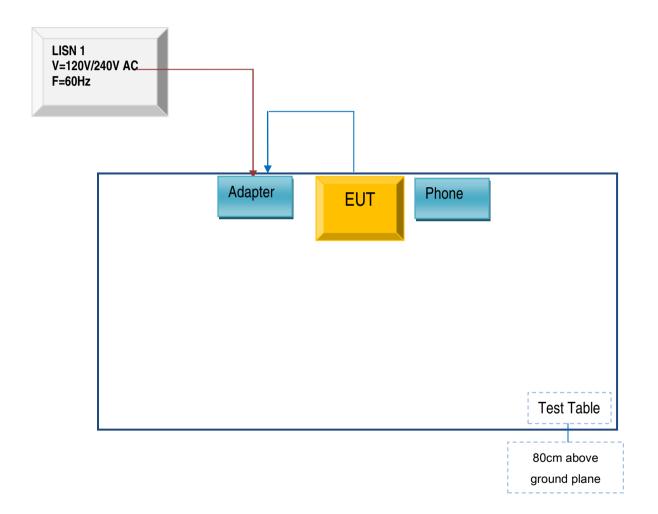


Test Report	17070259-FCC-R3
Page	57 of 62

# Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

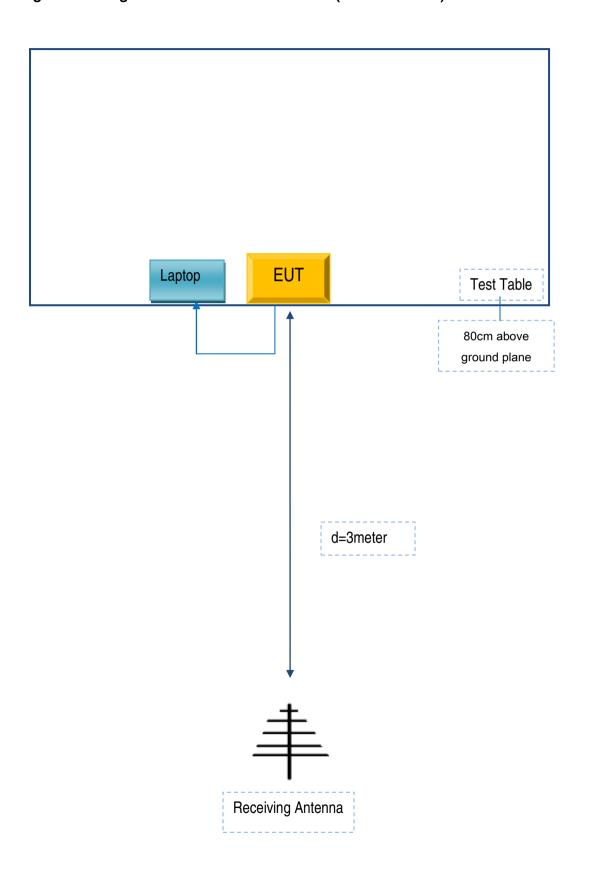
Block Configuration Diagram for AC Line Conducted Emissions





Test Report	17070259-FCC-R3
Page	58 of 62

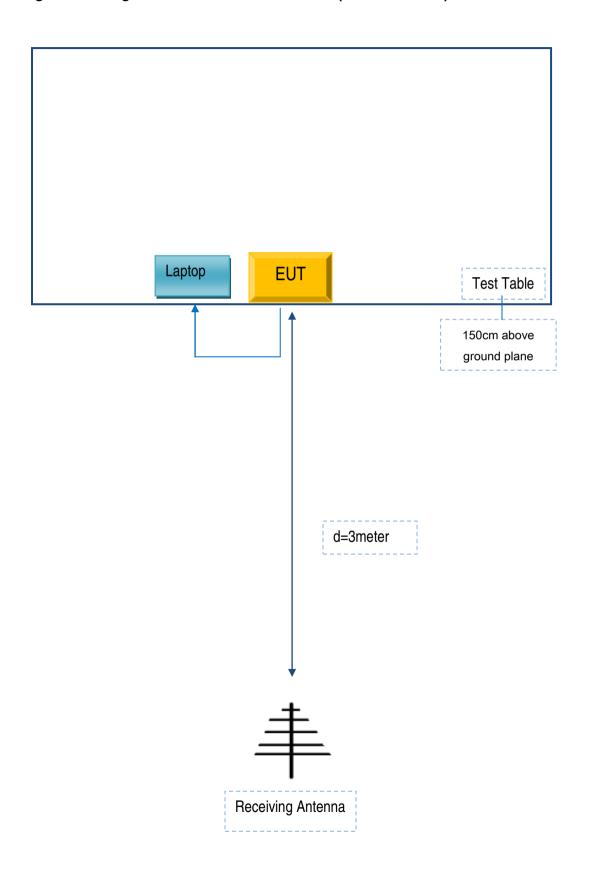
# Block Configuration Diagram for Radiated Emissions (Below 1GHz).





Test Report	17070259-FCC-R3
Page	59 of 62

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





Test Report	17070259-FCC-R3
Page	60 of 62

## Annex C. il. 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
Verykool USA Inc	Adapter	A8-50100	F1012
Lenovo	Laptop	E40	LR-1EHRX
NOKIA	Phone	S6T	TX210018

## Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	F1012
Power Cable	Un-shielding	No	0.5m	GT211032



Test Report	17070259-FCC-R3
Page	61 of 62

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

Please see the attachment



Test Report	17070259-FCC-R3
Page	62 of 62

# Annex E. DECLARATION OF SIMILARITY

N/A