



# RF TEST REPORT



Report No.: FCC-IC\_RF\_SL15010901-SFE-001-BT  
Supersede Report No.: NONE

Applicant	:	Active Mind Technology, Inc.
Product Name	:	GAME Golf Live
Model No.	:	AMTGGL1R
Test Standard	:	47 CFR 15.247 RSS 210 Issue8: 2010
Test Method	:	ANSI C63.10:2013 FCC Public Notice DA 00-705 RSS Gen issue4
FCC ID	:	2AAP4-AMTGGL1R
IC ID	:	11296A-AMTGGL1R
Dates of test	:	06/29/2015 to 07/03/2015
Issue Date	:	07/21/2015
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:

	
<b>Cipher chu</b>	<b>Nima Molaei</b>
Test Engineer	Engineer Reviewer

Issued By:  
SIEMIC Laboratories  
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## Laboratory Introduction

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### Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRR, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

### Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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## 1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC-IC_RF_SL15010901-SFE-001-BT	None	Original	07/21/2015

## 2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Active Mind Technology, Inc.  
Product: GAME Golf Live  
Model: AMTGGL1R

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

Applicant Name	:	Active Mind Technology, Inc.
Applicant Address	:	77 Geary Street, 5th Floor, San Francisco, CA 94108
Manufacturer Name	:	Active Mind Technology, Inc.
Manufacturer Address	:	77 Geary Street, 5th Floor, San Francisco, CA 94108

## 4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

## 5 Modification

Index	Item	Description	Note
-	-	-	-

## 6 EUT Information

### 6.1 EUT Description

Product Name	GAME Golf Live
Model No.	AMTGGL1R
Trade Name	Game
Serial No.	N/a
Input Power	5Vdc Battery
Power Adapter Manu/Model	N/a
Power Adapter SN	N/a
Hardware version	N/a
Software version	N/a
Date of EUT received	2/20/2015
Equipment Class/ Category	DSS
Port/Connectors	USB Micro-B
Remark	The EUT was tested as a portable standalone device.

### 6.2 Radio Description

Radio Type	Bluetooth (EDR)
Operating Frequency	2402MHz-2480MHz
Modulation	FHSS (EDR),
Channel Spacing	1MHz (EDR),
Antenna Type	PCB
Antenna Gain	5.3dBi (2.4 GHz)
Antenna Connector Type	N/A

#### Channel List

Type		Channel No.	Frequency (MHz)	Available (Y/N)
Bluetooth	(EDR) 2402-2480MHz	0	2402	Y
		...	...	Y
		39	2441	Y
		...	...	Y
		78	2480	Y
NFC	13.56MHz	-	13.56MHz	Y

### 6.3 EUT test modes/configuration Description

Mode	Note
Bluetooth	EDR (8-DPSK)
NFC	13.56MHz



#### 6.4 EUT Photos - External



EUT – Front View



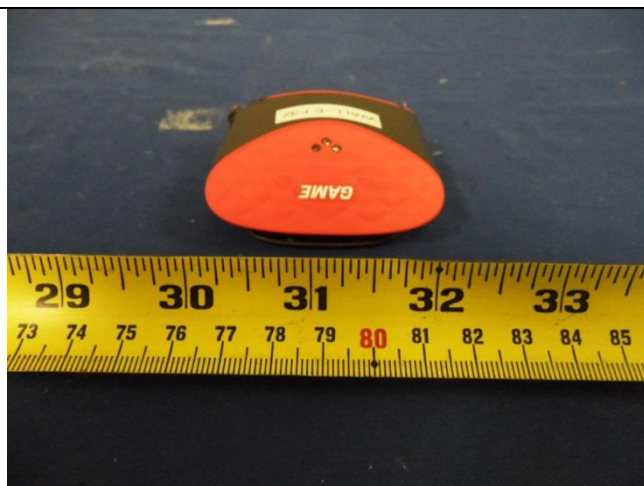
EUT – Rear View



EUT – Left View



EUT – Right View



EUT – Top View



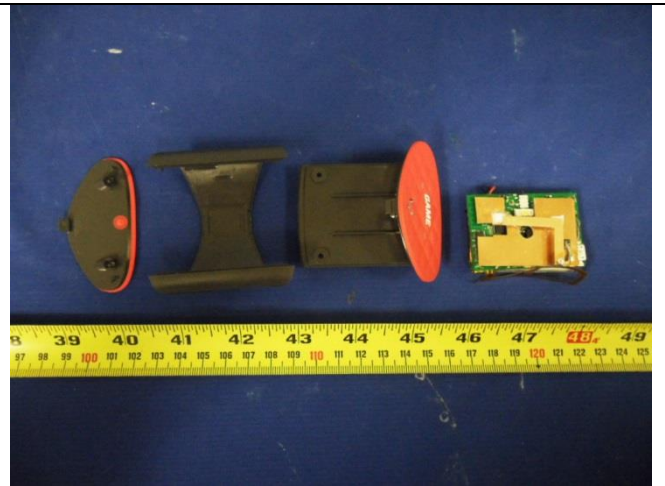
EUT – Bottom View



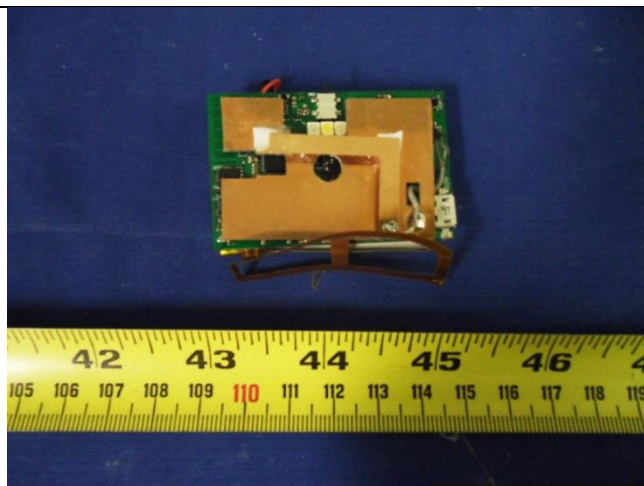
## 6.5 EUT Photos - Internal



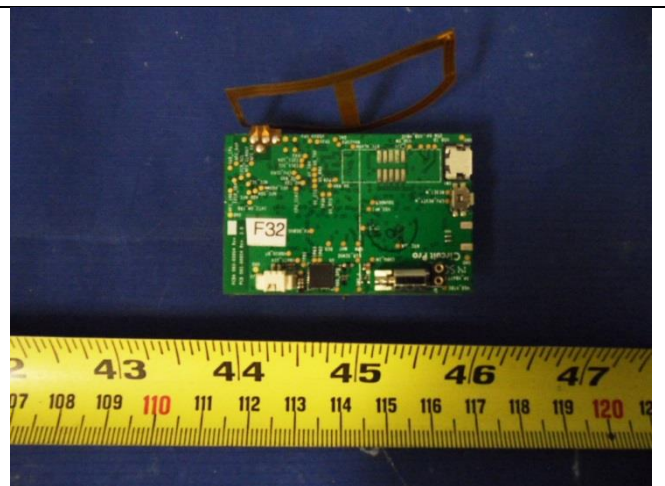
EUT with Cover



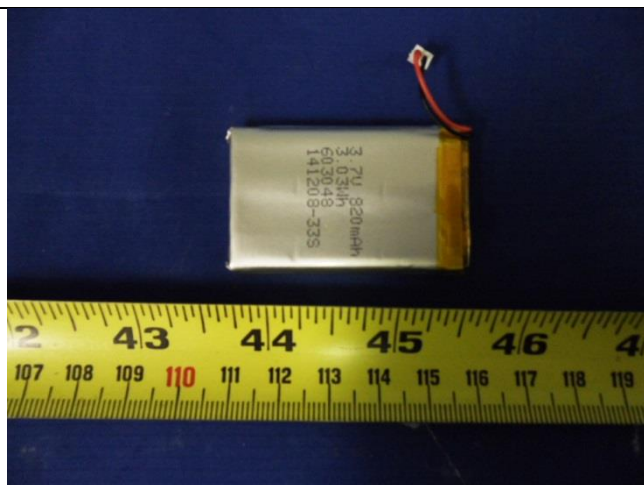
EUT without Cover



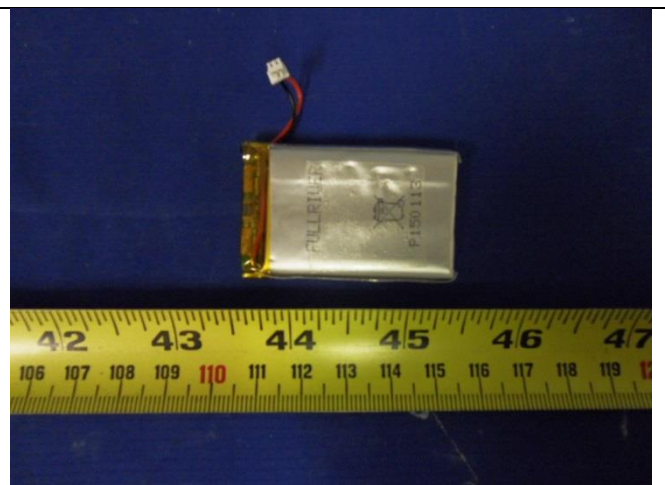
Main PCB - Top View



Main PCB - Rear View



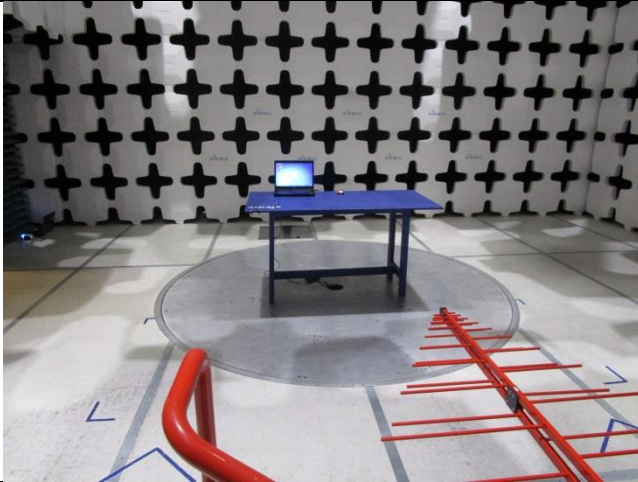
Battery - Top View



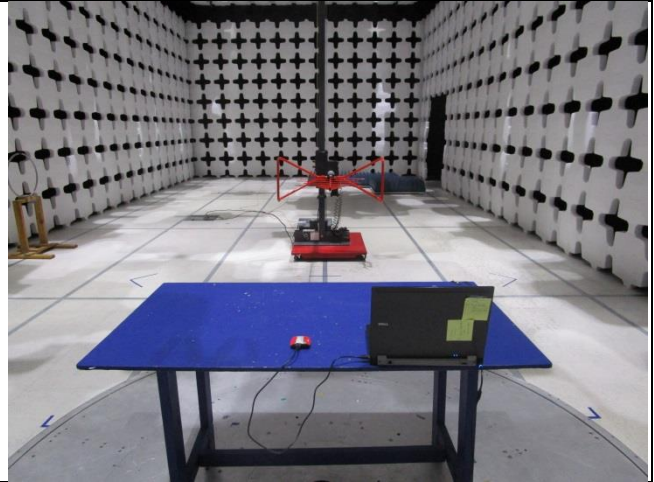
Battery - Bottom View



## 6.6 EUT Test Setup Photos



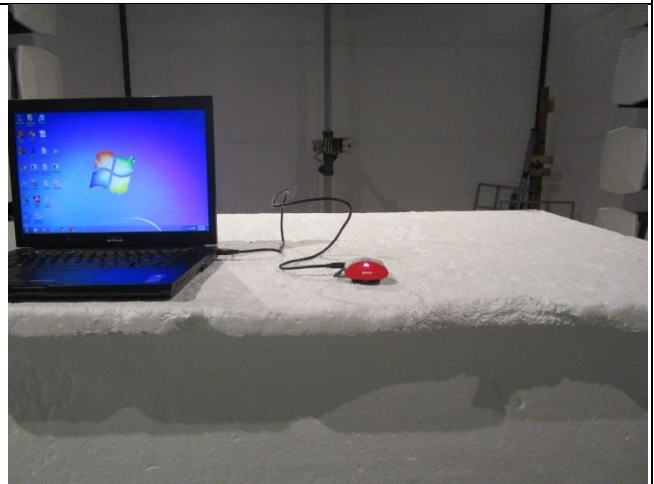
**Radiated Emissions (<1GHz) – Front View**



**Radiated Emissions (<1GHz) – Rear View**



**Radiated Emissions (>1GHz) – Front View**



**Radiated Emissions (>1GHz) – Rear View**

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	E6500	N/A	DELL	-

### 7.2 Test Software Description

Test Item	Software	Description
RF Testing	BtUSBTool/ART	Set the EUT to different modulation and channels

## 8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10 – 2013	<input checked="" type="checkbox"/> Pass
	IC	RSS 210 (2.2)	IC	Public Notice DA 00-705	<input type="checkbox"/> N/A
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	<input type="checkbox"/> Pass
	IC	RSS 210 (2.2)	IC	RSS Gen Issue 4: 2014	<input checked="" type="checkbox"/> N/A

### FHSS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210 (A8.1)	IC	-	<input type="checkbox"/> N/A
20dB Occupied Bandwidth	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen(4.6.1)	IC	-	<input type="checkbox"/> N/A
Bandwidth	FCC	15.247(a)(2)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass
	IC	RSS210 (A8.2)	IC	-	<input checked="" type="checkbox"/> N/A
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A8.1)	IC	-	<input type="checkbox"/> N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A8.5)	IC	-	<input type="checkbox"/> N/A
Time of Occupancy	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A8.1)	IC	-	<input type="checkbox"/> N/A
Output Power	FCC	15.247(b)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210 (A8.4)	IC	-	<input type="checkbox"/> N/A
Receiver Spurious Emissions	FCC	15.247(d)	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen (7.1)	IC	RSS Gen (7.1)	<input type="checkbox"/> N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass
	IC	RSS210(A8.4)	IC	-	<input checked="" type="checkbox"/> N/A
Power Spectral Density	FCC	15.247(e)	FCC	-	<input type="checkbox"/> Pass
	IC	RSS210(A8.3)	IC	-	<input checked="" type="checkbox"/> N/A
Hybrid System Requirement	FCC	15.247(f)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass
	IC	RSS210(A8.3)	IC	-	<input checked="" type="checkbox"/> N/A
Hopping Capability	FCC	15.247(g)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A8.1)	IC	-	<input type="checkbox"/> N/A
Hopping Coordination Requirement	FCC	15.247(h)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass
	IC	RSS210(A8.1)	IC	-	<input checked="" type="checkbox"/> N/A
RF Exposure requirement	FCC	15.247(i)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass
	IC	RSS Gen(5.5)	IC	-	<input checked="" type="checkbox"/> N/A
Remark	<ol style="list-style-type: none"> <li>All measurement uncertainties are not taken into consideration for all presented test result.</li> <li>The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.</li> </ol>				

## 9 Measurement Uncertainty

Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	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
Band Edge and Radiated Spurious Emissions	1GHz – 40GHz	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)	+4.3dB/-4.1dB

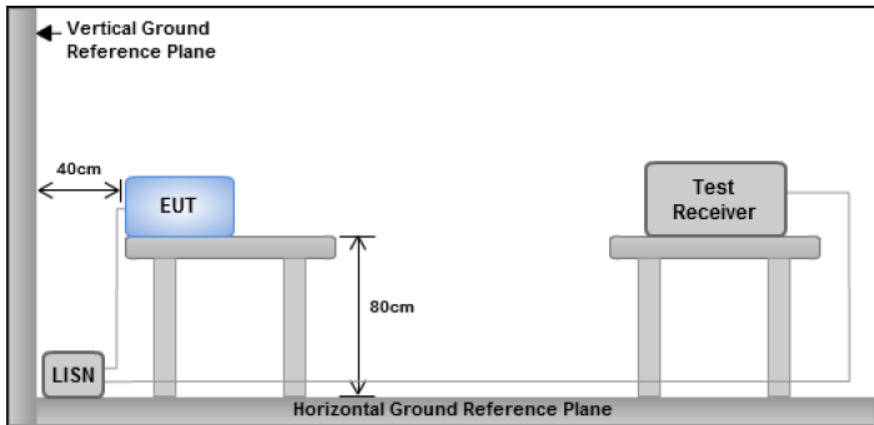


## 10 Measurements, Examination and Derived Results

### 10.1 Conducted Emissions

#### Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBuV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

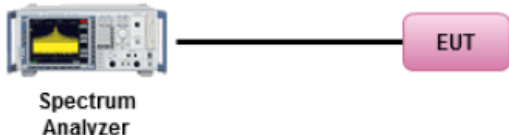
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	<input type="checkbox"/>
Test Setup	 <p>Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>		
Procedure	<ul style="list-style-type: none"> <li>- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.</li> <li>- The power supply for the EUT was fed through a 50<math>\Omega</math>/50<math>\mu</math>H 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 coaxial cable.</li> <li>- All other supporting equipment was powered separately from another main supply.</li> </ul>		
Remark	EUT is battery powered.		
Result	<input type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data    ☐ Yes                      ☒ N/A

Test Plot    ☐ Yes                      ☒ N/A

## 10.2 Channel Separation (EDR)

### Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.247 (e) RSS-210 (A2.6)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or 2/3 of 20 dB bandwidth of the hopping channel, whichever is greater.	<input checked="" type="checkbox"/>									
Test Setup	<div></div>										
Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems <u>Channel Separation procedure</u> <ol style="list-style-type: none"><li>1. The EUT must have its hopping function enabled.</li><li>2. Span = wide enough to capture the peaks of two adjacent channels</li><li>3. Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span</li><li>4. Video (or Average) Bandwidth (VBW) ≥ RBW.</li><li>5. Detector = Peak.</li><li>6. Trace mode = max hold.</li><li>7. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.</li></ol>										
Test Date	07/01/2015	<table><tr><td>Environmental condition</td><td>Temperature</td><td>23oC</td></tr><tr><td></td><td>Relative Humidity</td><td>47%</td></tr><tr><td></td><td>Atmospheric Pressure</td><td>1019mbar</td></tr></table>	Environmental condition	Temperature	23oC		Relative Humidity	47%		Atmospheric Pressure	1019mbar
Environmental condition	Temperature	23oC									
	Relative Humidity	47%									
	Atmospheric Pressure	1019mbar									
Remark	-										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

**Test Data** ☒ Yes (See below) ☐ N/A

**Test Plot** ☒ Yes (See below) ☐ N/A

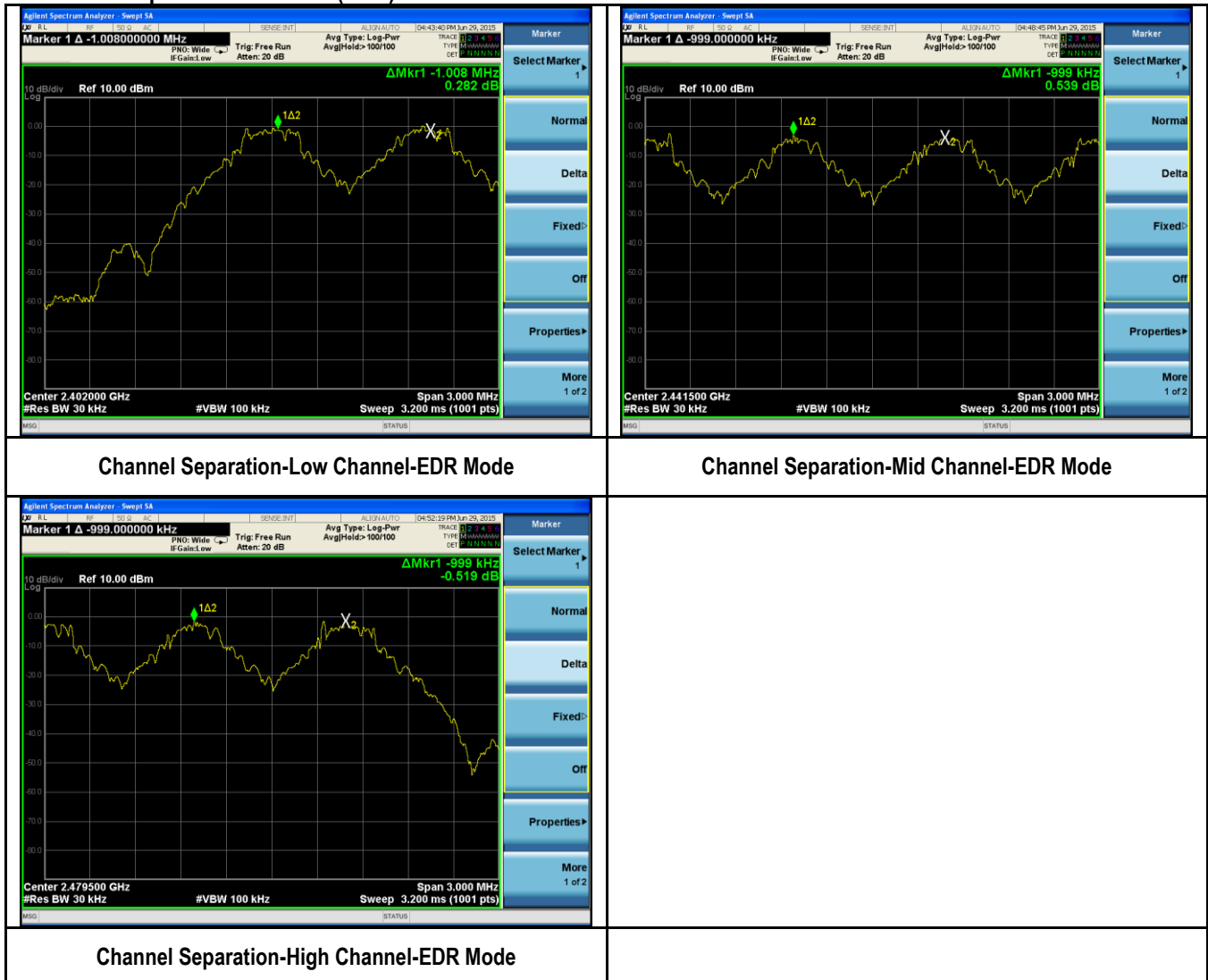
### Equipment Setting

Test	RBW	VBW	SPAN	Detector	Sweep	Trace	Notes
Channel Separation	$\geq 1\%$ Span	$\geq$ RBW	-	PK	Auto	Maxhold	-

### Configuration : Bluetooth Mode , EDR 3Mbps

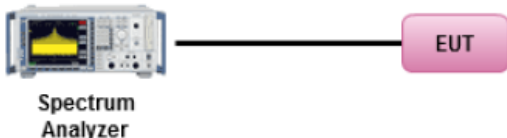
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	2/3 20dB Bandwidth (MHz)	Pass/Fail
Low	2402	1.008	0.9146	Pass
Mid	2441	0.999	0.9053	Pass
High	2480	0.999	0.9053	Pass

### Channel Separation Test Plot (EDR)



### 10.3 20dB Occupied Bandwidth (EDR)

#### Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS-210 (A2.6)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 2/3 of 20 dB bandwidth of the hopping channel, whichever is greater.	<input checked="" type="checkbox"/>
Test Setup		
Procedure	<u>20dB Emission bandwidth measurement procedure</u> <ol style="list-style-type: none"> <li>1. Set RBW <math>\geq 1\%</math> of 20dB Bandwidth</li> <li>2. Set the video bandwidth (VBW) <math>\geq</math> RBW.</li> <li>3. Detector = Peak.</li> <li>4. Trace mode = max hold.</li> <li>5. Sweep = auto couple.</li> <li>6. Allow the trace to stabilize.</li> <li>7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.</li> </ol>	
Test Date	07/01/2015	Environmental condition Temperature 23oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	The 20 dB test result and the 2/3 of 20 dB data calculation are for channel separation measurement reference only. There isn't limit for 20 dB bandwidth for this product.	
Result	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	

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

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

#### Equipment Setting

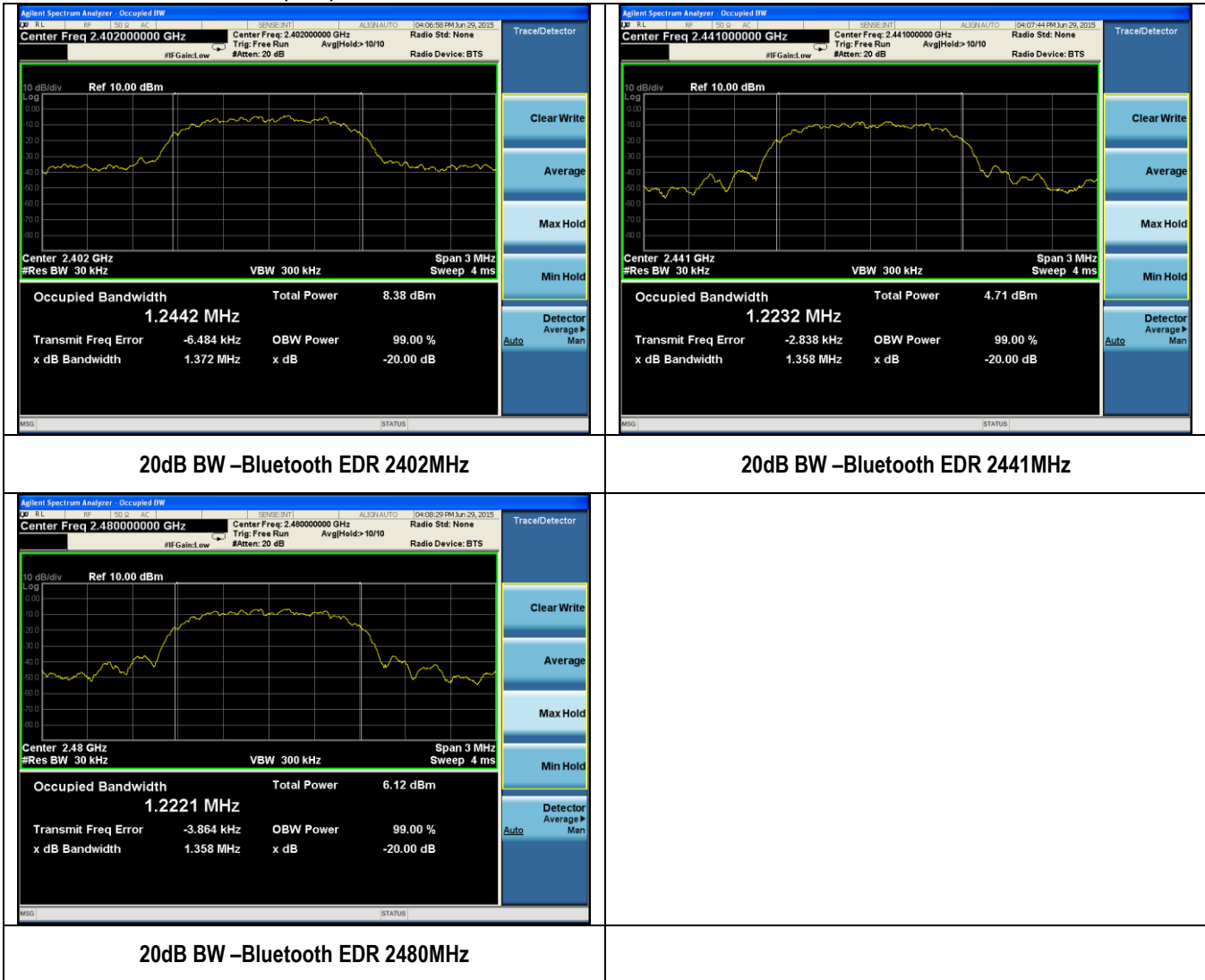
Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
20dB Bandwidth	$\geq 1\%$ of 20dB bandwidth	$\geq$ RBW	$\sim 2 - 3$ times 20dB bandwidth	PK	Auto	Maxhold	-

#### Configuration : Bluetooth mode , EDR mode

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)	2/3 20dB Bandwidth (MHz)	Limit
Low	2402	1.372	0.9146	N/A
Mid	2441	1.358	0.9053	N/A
High	2480	1.358	0.9053	N/A

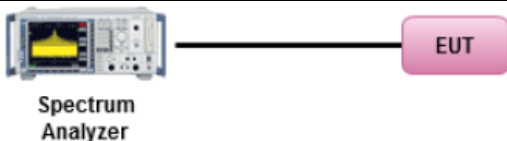


## 20dB Bandwidth Test Plots(EDR)



#### 10.4 Peak Output Power(Bluetooth EDR)

##### Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	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 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			
Test Procedure	<u>Maximum output power measurement procedure</u> <ul style="list-style-type: none"> <li>- Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel.</li> <li>- RBW &gt; 20 dB bandwidth of the emission being measured;</li> <li>- VBW <math>\geq</math> RBW.</li> <li>- Detector = peak.</li> <li>- Sweep time = auto couple.</li> <li>- Trace mode = max hold.</li> <li>- Allow trace to fully stabilize.</li> <li>- Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.</li> </ul>		
Test Date	07/01/2015	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

##### Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
PK output power	>20dB bandwidth	$\geq$ RBW	~ 5 times 20dB bandwidth	Peak	Auto	Maxhold	Including Cable loss and Attenuation

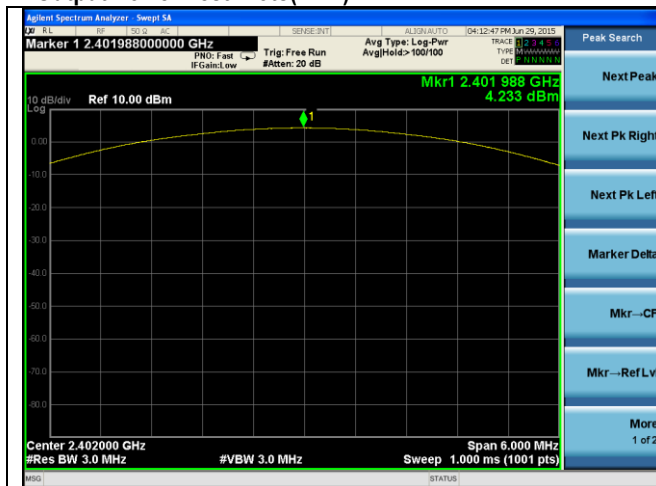
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

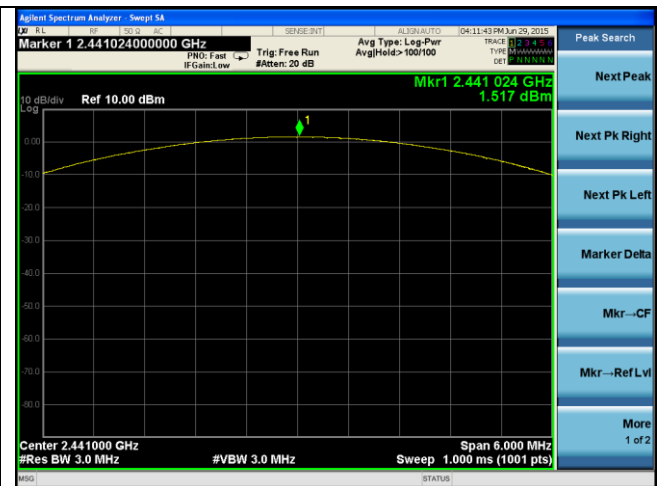
### Output Power measurement result (Bluetooth)

Type	Test mode	Freq (MHz)	CH	Cable Loss (dB)	Conducted Power (dBm)	Limit (dBm)	Result
Output	Bluetooth	2402	Low	0.5	4.733	30	Pass
Output	Bluetooth	2441	Mid	0.5	2.017	30	Pass
Output	Bluetooth	2480	High	0.5	3.365	30	Pass

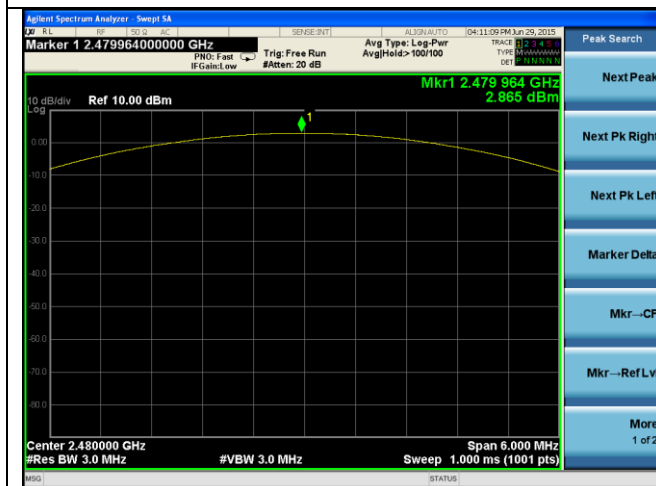
### Output Power Test Plots(EDR)



Bluetooth EDR 2402MHz



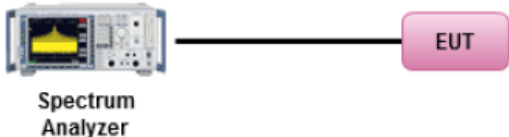
Bluetooth EDR 2441MHz



Bluetooth EDR 2480MHz

## 10.5 Band Edge (Bluetooth EDR)

### Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	d)	For non-restricted band, 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 or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209 (a) is not required  <input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems  <u>Channel Separation procedure</u> <ol style="list-style-type: none"> <li>Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation</li> <li>RBW = 1% of the span; VBW ≥ RBW</li> <li>Sweep = auto.</li> <li>Detector = Peak.</li> <li>Trace mode = max hold.</li> <li>Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge.</li> <li>Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.</li> </ol>		
Test Date	07/01/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	-		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

### Equipment Setting

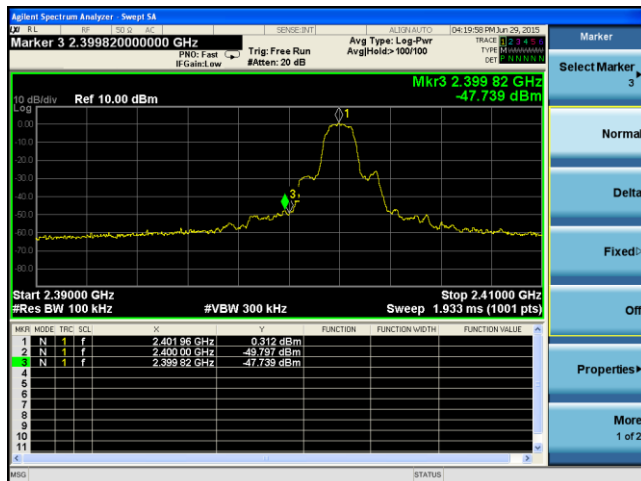
Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
PK output power	1% Span	≥RBW	Wide enough	Peak	Auto	Max hold	-

Test Data    ☐ Yes                      ☒ N/A

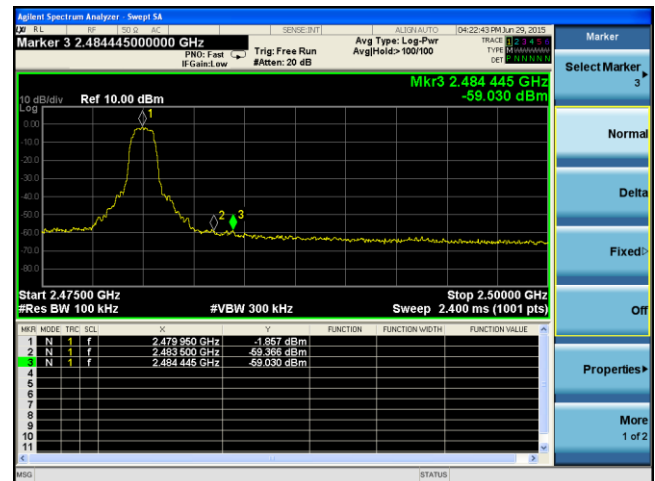
Test Plot    ☒ Yes (See below)              ☐ N/A



## Band Edge Test Plots (Bluetooth)



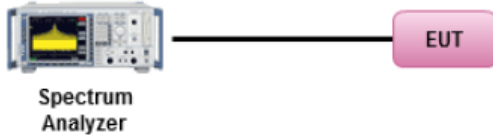
Band Edge-EDR Low



Band Edge-EDR High

## 10.6 Number of Hopping Channel (EDR)

### Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS-210 (A2.6)	Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.	<input checked="" type="checkbox"/>
Test Setup		
Procedure	<b>Number of hopping frequencies procedure</b> <ol style="list-style-type: none"> <li>1. The EUT must have its hopping function enabled</li> <li>2. Span = the frequency band of operation.</li> <li>3. Resolution (or IF) Bandwidth (RBW) <math>\geq</math> 1% of the span.</li> <li>4. Video (or Average) Bandwidth (VBW) <math>\geq</math> RBW.</li> <li>5. Detector = peak.</li> <li>6. Sweep time = auto couple.</li> <li>7. Trace mode = max hold.</li> <li>8. Allow trace to fully stabilize.</li> <li>9. Save the plot</li> </ol>	
Test Date	07/01/2015	Environmental condition Temperature 23oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

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

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

### Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
Hopping Channel Number	$\geq$ 1% Span	$\geq$ RBW	-	PK	Auto	Maxhold	-

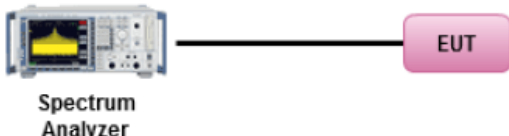
Channel Number	Limit	Pass/Fail
79	15	Pass



EDR – 79 Channels

## 10.7 Time of Occupancy (Bluetooth EDR)

### Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS-210 (A2.6)	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.	<input checked="" type="checkbox"/>
Test Setup		
Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems  <b>Channel Separation procedure</b> <ol style="list-style-type: none"> <li>1. The EUT must have its hopping function enabled.</li> <li>2. Span = zero span</li> <li>3. centered on a hopping channel</li> <li>4. RBW = 1 MHz; VBW ≥ RBW</li> <li>5. Sweep = as necessary to capture the entire dwell time per hopping channel.</li> <li>6. Detector = Peak.</li> <li>7. Trace mode = max hold.</li> <li>8. If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.</li> </ol>	
Test Date	07/01/2015	Environmental condition Temperature 24oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	Dwell Time=Pulse time*(1600/6/79)*31.6s	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

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

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

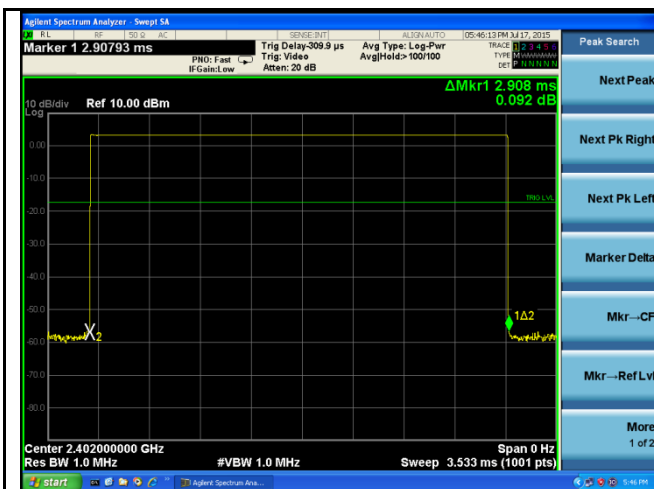
### Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
Occupied Time	100kHz	≥ RBW	0Hz	PK	-	Maxhold	-

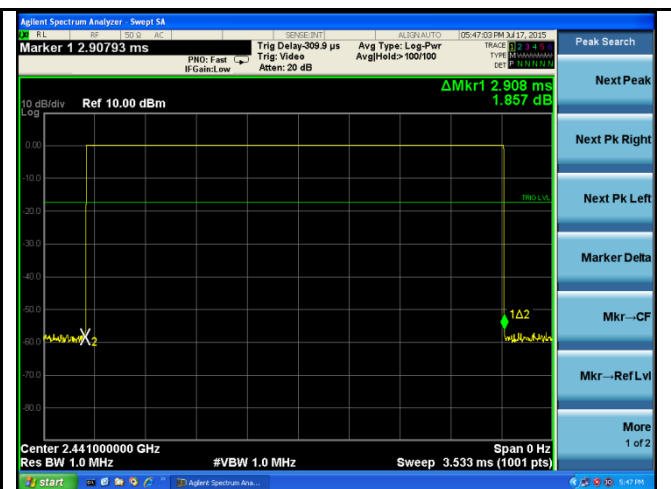


### Bluetooth EDR Test Mode

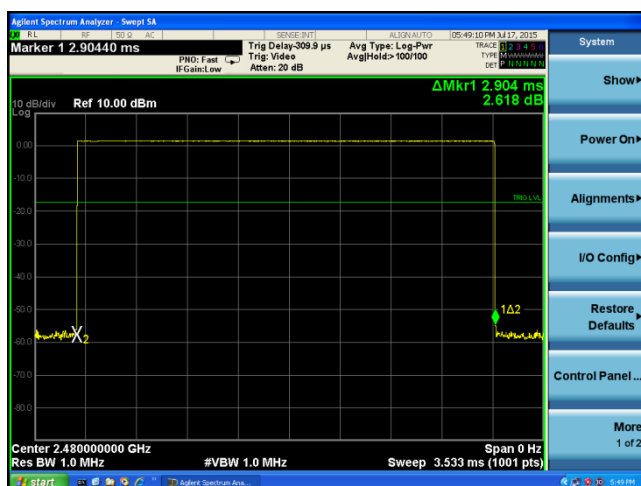
Type	Freq (MHz)	Test mode	One Burst (msec)	Dwell Time (sec)	Limit (Sec)	Result
Dwell time	2402	EDR Mode	2.908	0.31	0.4	Pass
Dwell time	2441	EDR Mode	2.908	0.31	0.4	Pass
Dwell time	2480	EDR Mode	2.904	0.31	0.4	Pass
Dwell Time=Pulse time*(1600/6/79)*31.6s						



EDR Low Channel (Sweep in 3.533sec)



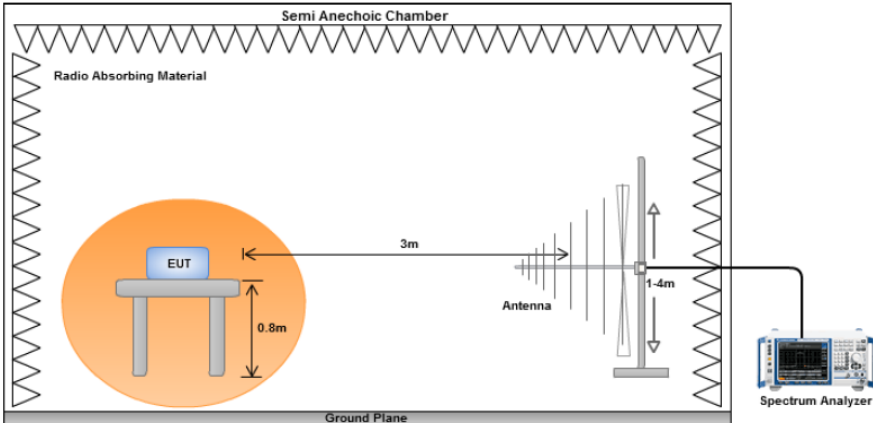
EDR Mid Channel (Sweep in 3.533sec)



EDR High Channel (Sweep in 3.533sec)

## 10.9 Radiated Emissions below 1GHz

### Requirement(s):

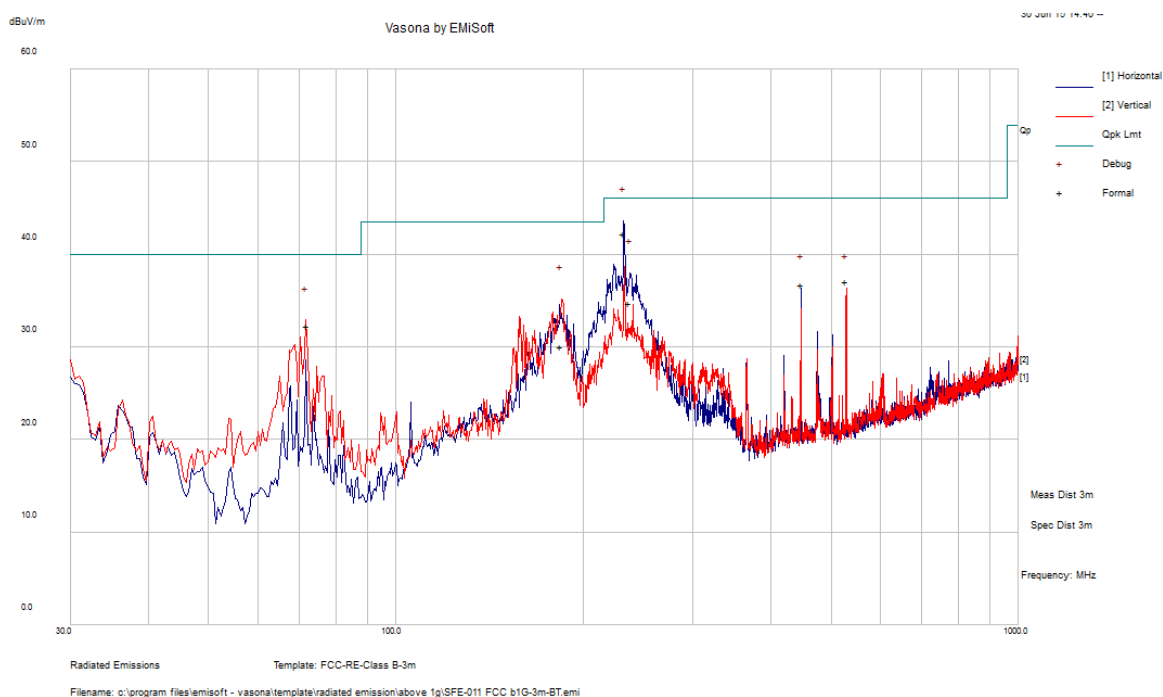
Spec	Item	Requirement	Applicable										
47CFR§15.247(d), RSS210(A8.5)	a)	<p>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</p> <table><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<div><input checked="" type="checkbox"/></div>
Frequency range (MHz)	Field Strength (uV/m)												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup	<div></div>												
Procedure	<div><div><div>1.</div><div>2.</div><div>3.</div><div>4.</div></div><div><p>The EUT was switched on and allowed to warm up to its normal operating condition.</p><p>The test was carried out at the selected frequency points obtained from the EUT characterisation. 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><div><div>a.</div><div>b.</div><div>c.</div></div><p>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</p><p>The EUT was then rotated to the direction that gave the maximum emission.</p><p>Finally, the antenna height was adjusted to the height that gave the maximum emission.</p><p>A Quasi-peak measurement was then made for that frequency point.</p><p>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p></div></div>												
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.												
Result	<div><div><input checked="" type="checkbox"/> Pass</div><div><input type="checkbox"/> Fail</div></div>												

**Test Data** ☒ Yes (See below) ☐ N/A

**Test Plot** ☒ Yes (See below) ☐ N/A

## Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	<div><input checked="" type="checkbox"/> Pass</div> <div><input type="checkbox"/> Fail</div>
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	5Vdc Battery			
Tested by:	Cipher Chu			
Test Date:	07/02/2015			
Remarks:	- Bluetooth EDR 2402			



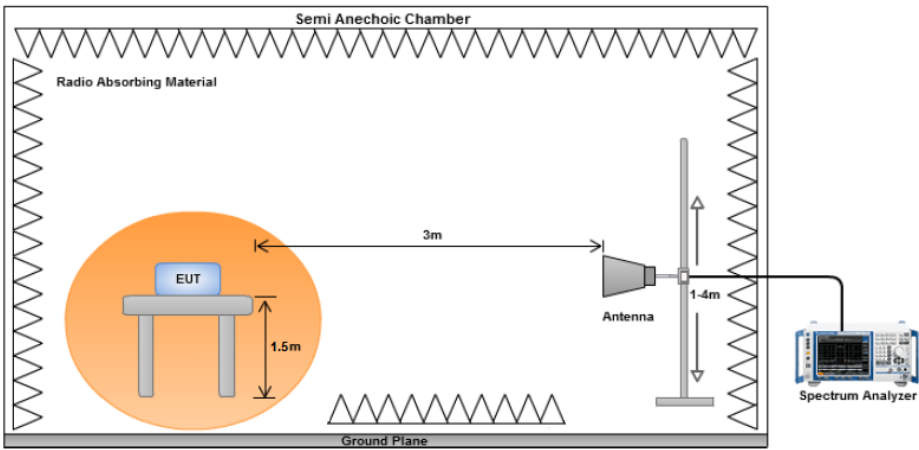
## Quasi Max Measurement

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
232.3752	66.79	2.69	-27.27	42.21	Quasi Max	H	114	77	46.02	-3.81	Pass
71.99961	60.79	1.48	-30.04	32.23	Quasi Max	V	101	346	40	-7.77	Pass
237.3301	59.06	2.71	-27.08	34.69	Quasi Max	H	130	66	46.02	-11.33	Pass
183.9656	55.3	2.44	-27.71	30.03	Quasi Max	H	119	101	43.52	-13.49	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

## 10.10 Radiated Spurious Emissions above 1GHz & Restricted band

### Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS210(A8.5)	a)	For non-restricted band, 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 or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required  <input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>An average measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>		
Remark	The EUT was scanned up to 26GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

### Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 25 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 25 GHz	Peak	Auto	Max hold	Ave Measurement

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

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

## Radiated Emission Test Results (Above 1GHz)

Test specification:	Radiated Spurious Emissions (above 1GHz)			
Environmental Conditions:	Temp(°C):	20	Result:	<input checked="" type="checkbox"/> Pass  <input type="checkbox"/> Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	5Vdc Battery			
Tested by:	Cipher Chu			
Test Date:	07/02/2015			
Remarks:	Bluetooth EDR			

### Bluetooth EDR 2402

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17945.12	40.21	6.61	14.29	61.11	Peak Max	H	128	227	74	-12.89	Pass
4154.33	42.2	3.36	-0.21	45.35	Peak Max	V	274	303	74	-28.65	Pass
1021.84	46.71	1.77	-7.13	41.35	Peak Max	V	224	281	74	-32.65	Pass
17945.12	27.16	6.61	14.29	48.06	Average Max	H	128	227	54	-5.94	Pass
4154.33	29.41	3.36	-0.21	32.56	Average Max	V	274	303	54	-21.44	Pass
1021.84	34.17	1.77	-7.13	28.81	Average Max	V	224	281	54	-25.19	Pass

### Restricted Band Bluetooth EDR 2402

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
2390	41.99	2.69	-3.53	41.15	Peak Max	V	189	254	74	-32.85	Pass
2390	42.25	2.69	-3.54	41.4	Peak Max	H	173	165	74	-32.6	Pass
2390	29.23	2.69	-3.53	28.39	Average Max	V	189	254	54	-25.61	Pass
2390	29.23	2.69	-3.54	28.38	Average Max	H	173	165	54	-25.62	Pass

### Bluetooth EDR 2441

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17889.38	40.22	6.6	14.1	60.92	Peak Max	V	204	272	74	-13.08	Pass
8346.21	41.75	4.22	5.09	51.06	Peak Max	V	174	227	74	-22.94	Pass
1012.73	47.44	1.76	-7.16	42.04	Peak Max	V	182	57	74	-31.96	Pass
17889.38	27.17	6.6	14.1	47.87	Average Max	V	204	272	54	-6.13	Pass
8346.21	29.01	4.22	5.09	38.32	Average Max	V	174	227	54	-15.68	Pass
1012.73	34.32	1.76	-7.16	28.92	Average Max	V	182	57	54	-25.08	Pass

### Bluetooth EDR 2480

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17910.02	40.47	6.6	14.15	61.22	Peak Max	H	210	224	74	-12.78	Pass
5145.81	43.84	3.64	0.53	48.01	Peak Max	V	229	332	74	-25.99	Pass
1014.76	48.37	1.75	-7.17	42.95	Peak Max	V	152	214	74	-31.05	Pass
17910.02	27.14	6.6	14.15	47.89	Average Max	H	210	224	54	-6.11	Pass
5145.81	30.41	3.64	0.53	34.58	Average Max	V	229	332	54	-19.42	Pass
1014.76	34.52	1.75	-7.17	29.1	Average Max	V	152	214	54	-24.9	Pass

### Restricted Band Bluetooth EDR 2480

















Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
2483.5	51.89	2.72	-3.32	51.29	Peak Max	V	101	165	74	-22.71	Pass
2483.5	40.64	2.72	-3.32	40.04	Peak Max	H	230	313	74	-33.96	Pass
2483.5	43.13	2.72	-3.32	42.53	Average Max	V	101	165	54	-11.47	Pass
2483.5	27.98	2.72	-3.32	27.38	Average Max	H	230	313	54	-26.62	Pass










## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
<b>Radiated Emissions</b>						
R & S Receiver	ESL6	100178	03/01/2015	1 Year	03/01/2016	<input checked="" type="checkbox"/>
R & S Receiver	ESIB 40	100179	06/03/2015	1 Year	06/03/2016	<input checked="" type="checkbox"/>
ETS-Lingren Loop Antenna	6512	00049120	05/13/2014	1 Year	05/13/2015	<input type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	07/03/2015	1 Year	07/03/2016	<input checked="" type="checkbox"/>
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2015	1 Year	04/26/2016	<input checked="" type="checkbox"/>
Horn Antenna (18-40 GHz)	AH-840	101013	04/23/2014	1 Year	04/23/2015	<input type="checkbox"/>
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/30/2015	1 Year	05/30/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2014	1 Year	05/30/2015	<input type="checkbox"/>
3 Meters SAC	3M	N/A	10/13/2015	1 Year	10/13/2016	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	06/05/2015	1 Year	06/05/2016	<input checked="" type="checkbox"/>
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2015	1 Year	05/25/2016	<input checked="" type="checkbox"/>
<b>RF Conducted Measurement</b>						
Spectrum Analyzer	N9010A	MY50210206	08/13/2014	1 Year	08/13/2015	<input checked="" type="checkbox"/>

## Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		<a href="#">A1</a> , <a href="#">A2</a> , <a href="#">A3</a> , <a href="#">A4</a> , <a href="#">B1</a> , <a href="#">B2</a> , <a href="#">B3</a> , <a href="#">B4</a> , C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		<b>Radio &amp; Telecommunications Terminal Equipment:</b> EN45001 – EN ISO/IEC 17025
		<b>Electromagnetic Compatibility:</b> EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	<a href="#">Phase I</a> , <a href="#">Phase II</a>
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		<b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom
		<b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		<b>Radio:</b> Scope A – All Radio Standard Specification in Category I
		<b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p><b>EMS:</b> KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p> <p><b>Radio:</b> RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p><b>Telecom:</b> President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		<p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>
Australia CAB Recognition		<p><b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p> <p><b>Radio communications:</b> AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p> <p><b>Telecommunications:</b> AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2