

RF TEST REPORT



Report No.: FCC-IC_RF_SL15083101-HID-025-BLE_Rev1.0

Supersede Report No.: FCC-IC_RF_SL15083101-HID-025-BLE

Applicant	HID Global Corporation		
Product Name	Bluetooth Smart Module		
Model No.	Xtender		
Host Model No.	SE3200, SE3210		
Test Standard	47CFR15.247, RSS-247 Issue 1.0, May 2015		
Test Method	ANSI C63.10: 2013, RSS-Gen Issue 4, Nov 2014, 558074 D01 DTS Meas. Guidance V03r02		
FCC ID	JQ6-XTENDER		
IC ID	2236B-XTENDER		
Date of test	September 1 st – 4 th , and 8 th of 2015		
Issue Date	10/9/2015		
Test Result	☒ Pass ☐ Fail		
Equipment complied with the specification			[x]
Equipment did not comply with the specification			[]
This Test Report is Issued Under the Authority of:			
			
Osvaldo Casorla		Nima Molaei	
Test Engineer		Engineer Reviewer	
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:
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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/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	EMC, RF/Wireless, Telecom, Safety
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

CONTENTS

1	REPORT REVISION HISTORY.....	4
2	EXECUTIVE SUMMARY	5
3	CUSTOMER INFORMATION	5
4	TEST SITE INFORMATION.....	5
5	MODIFICATION.....	5
6	EUT INFORMATION.....	6
6.1	EUT Description	6
6.2	Radio Description	6
6.3	EUT test modes/configuration Description	6
6.4	EUT Photos.....	7
6.5	EUT Test Setup Photos.....	8
7	SUPPORTING EQUIPMENT/SOFTWARE AND CABLING DESCRIPTION	9
7.1	Supporting Equipment.....	9
7.2	Cabling Description.....	9
7.3	Test Software Description.....	9
8	TEST SUMMARY	10
9	MEASUREMENT UNCERTAINTY	11
10	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS.....	12
10.1	Antenna Requirement.....	12
10.2	Conducted Emission Test Result.....	13
10.3	RF Conducted Measurement	14
10.4	Radiated Measurement.....	24
ANNEX A. TEST INSTRUMENT		30
ANNEX B. SIEMIC ACCREDITATION		31

1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC-IC_RF_SL15083101-HID-025-BLE	-	Original	10/7/2015
FCC-IC_RF_SL15083101-HID-025-BLE_Rev1.0	Rev. 1.0	Updated EUT and applicant's information.	10/9/2015

2 Executive Summary

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

Company: HID Global Corporation
Product: Bluetooth Smart Module
Model: Xtender
Host Model: SE3200, SE3210

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

3 Customer information

Applicant Name	:	HID Global Corporation
Applicant Address	:	15730 Barranca Parkway, Irvine CA, 92618 USA
Manufacturer Name	:	HID Global Corporation
Manufacturer Address	:	15730 Barranca Parkway, Irvine CA, 92618 USA

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	Bluetooth Smart Module
Model No.	Xtender
Host Model No.	SE3200, SE3210
Trade Name	HID
Serial No.	N/A
Input Power	3.3V _{DC}
Host Input Power	6V _{DC}
Hardware version	N/A
Software version	N/A
Date of EUT received	08/31/2015
Equipment Class/ Category	DTS
Port/Connectors	USB Micro-B
Remark	The SE3200 and SE3210 hosts are identical except for the pin layout. Only the SE3210 is presented in the report as a representative of the worst case scenario.

6.2 Radio Description

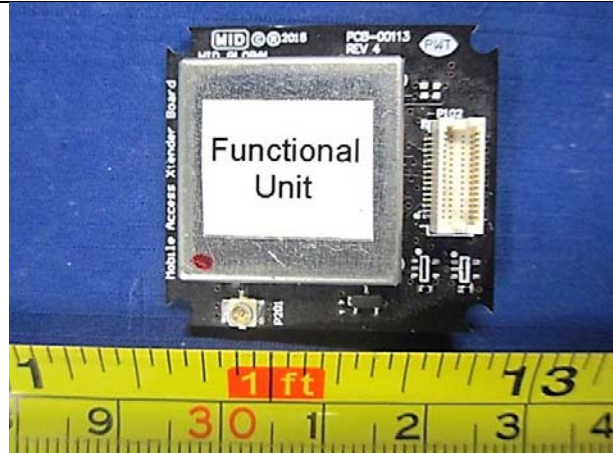
Specifications for Radio:

Radio Type	Bluetooth (LE)
Operating Frequency	2402MHz-2480MHz
Modulation	GFSK (LE)
Channel Spacing	2MHz (LE)
Number of Channels	40
Antenna Type	PCB
Antenna Gain	0.1 dBi (2.4GHz)
Antenna Connector Type	N/A

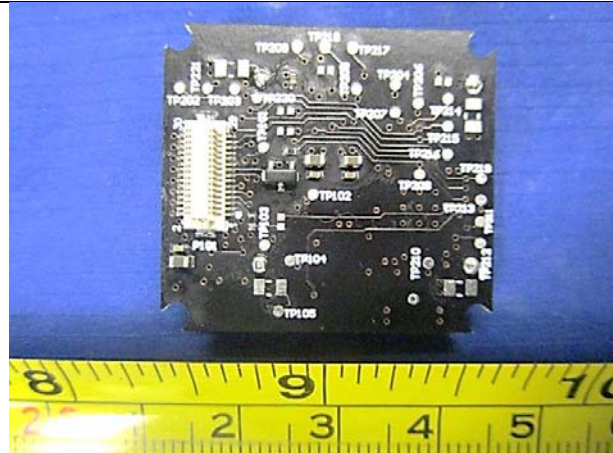
6.3 EUT test modes/configuration Description

Mode	Note
Bluetooth	LE (GFSK)

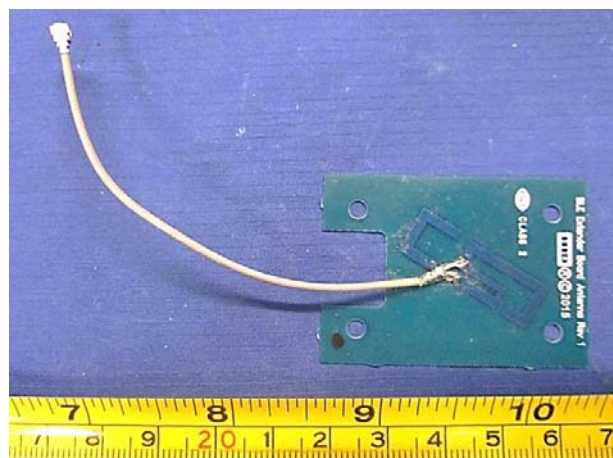
6.4 EUT Photos



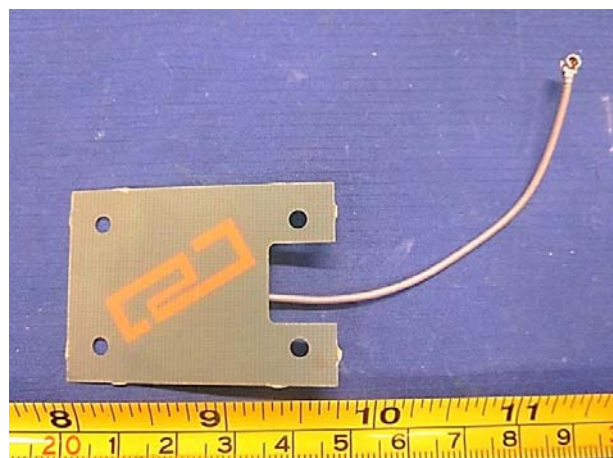
Module View 1



Module View 2



Antenna View 1



Antenna View 2



SE3210 Host View 1

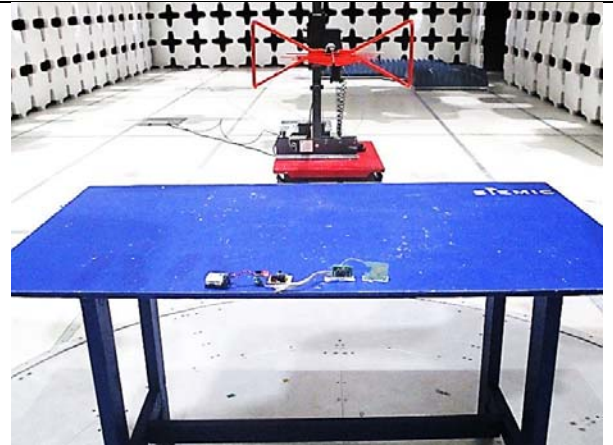


SE3210 Host View 2

6.5 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

Index	Supporting Equipment Description	Model	Serial Number	Manu	Note
1	Laptop	D6410	18209556397	DELL	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
1	EUT	USB	Laptop	USB	2.0	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Putty.exe	Terminal emulator allows setting the EUT to transmit at a test channel.

8 Test Summary

General Technical Requirement:

Test Item		Test standard		Test Method/Procedure	Pass / Fail
Restricted Band of Operation		FCC	15.205	ANSI C63.10 – 2013 558074 D01 DTS Meas. Guidance v03r02 RSS Gen Issue 4: 2014	☒ Pass
		IC	RSS Gen 8.10		☐ N/A
AC Conducted Emissions ⁽¹⁾		FCC	15.207(a)	ANSI C63.10 – 2013 RSS Gen Issue 4: 2014	☐ Pass
		IC	RSS Gen 8.8		☒ N/A
Remark	1. Test not applicable since the EUT is DC powered.				

DTS requirement:

Test Item	Test standard		Test Method/Procedure		Pass / Fail
6 dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas. Guidance v03r02	☒ Pass ☐ N/A
	IC	RSS247 (5.2.1)	IC	-	
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10 – 2013 558074 D01 DTS Meas. Guidance v03r02	☒ Pass ☐ N/A
	IC	RSS247 (5.5)	IC	-	
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas. Guidance v03r02	☒ Pass ☐ N/A
	IC	RSS247 (5.4.4)	IC	RSS-247 Issue 1.0, May 2015	
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 4: 2014	☐ Pass ☒ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass ☒ N/A
	IC	-	IC	-	
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas. Guidance v03r02	☒ Pass ☐ N/A
	IC	RSS247 (5.2.2)	IC	RSS-247 Issue 1.0, May 2015	
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass ☒ N/A
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 4: 2014	
Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 2. 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.				

9 Measurement Uncertainty

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

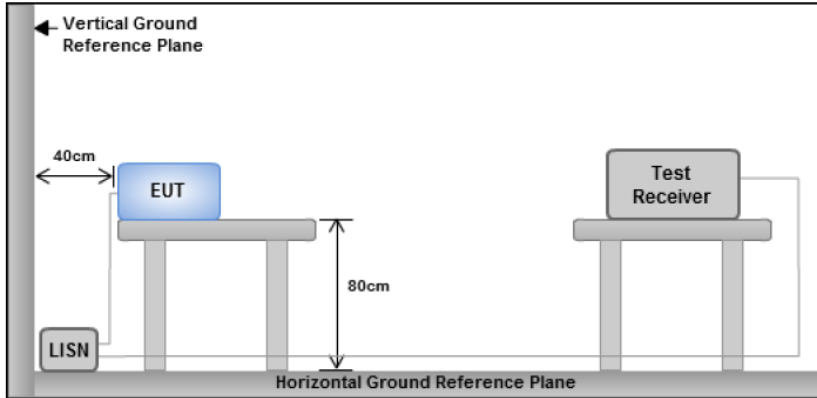
10.1 Antenna Requirement

Specification(s)	Requirement	Applicable
§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. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. b) Antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.	☒
Remark	The BT antenna is attached to the PCB board to the device using a unique type of connector which meets the requirement (See Internal Photographs submitted as another Exhibit).	
Result	☒ Pass ☐ Fail	

10.2 Conducted Emission Test Result

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

Specification(s)	Item	Requirement	Applicable
§ 15.207, RSS Gen 8.8	a)	For an intentional radiator 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 set in § 15.207, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). AC Line conducted emission within the band 150KHz to 30MHz	☐
Test Setup		 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	
Procedure		- 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. - The power supply for the EUT was fed through a 50Ω/50µH 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. - All other supporting equipment was powered separately from another main supply.	
Remark		Test not applicable since EUT is DC powered.	
Result		☐ Pass ☐ Fail	

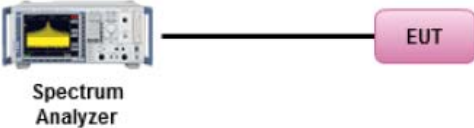
Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☐ Yes (See below) ☒ N/A

10.3 RF Conducted Measurement

10.3.1 6dB Bandwidth –DTS (Bluetooth LE)

Requirement(s):

Specification(s)	Item	Requirement	Applicable
47CFR§15.247, RSS247 (5.2.1)	a)	For digitally modulated systems, the minimum 6dB bandwidth shall be at least 500 kHz.	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas. Guidance v03r02, 8.1 DTS bandwidth <u>6dB Emission bandwidth measurement procedure</u> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) $\geq 3 \times$ RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - 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.		
Test Date	09/02/2015	Environmental condition	Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	None		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
6 dB DTS Bandwidth	1-5% of DTS BW ($\leq 100\text{kHz}$)	3 x RBW	>EBW	Peak	Auto	Max hold	-

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

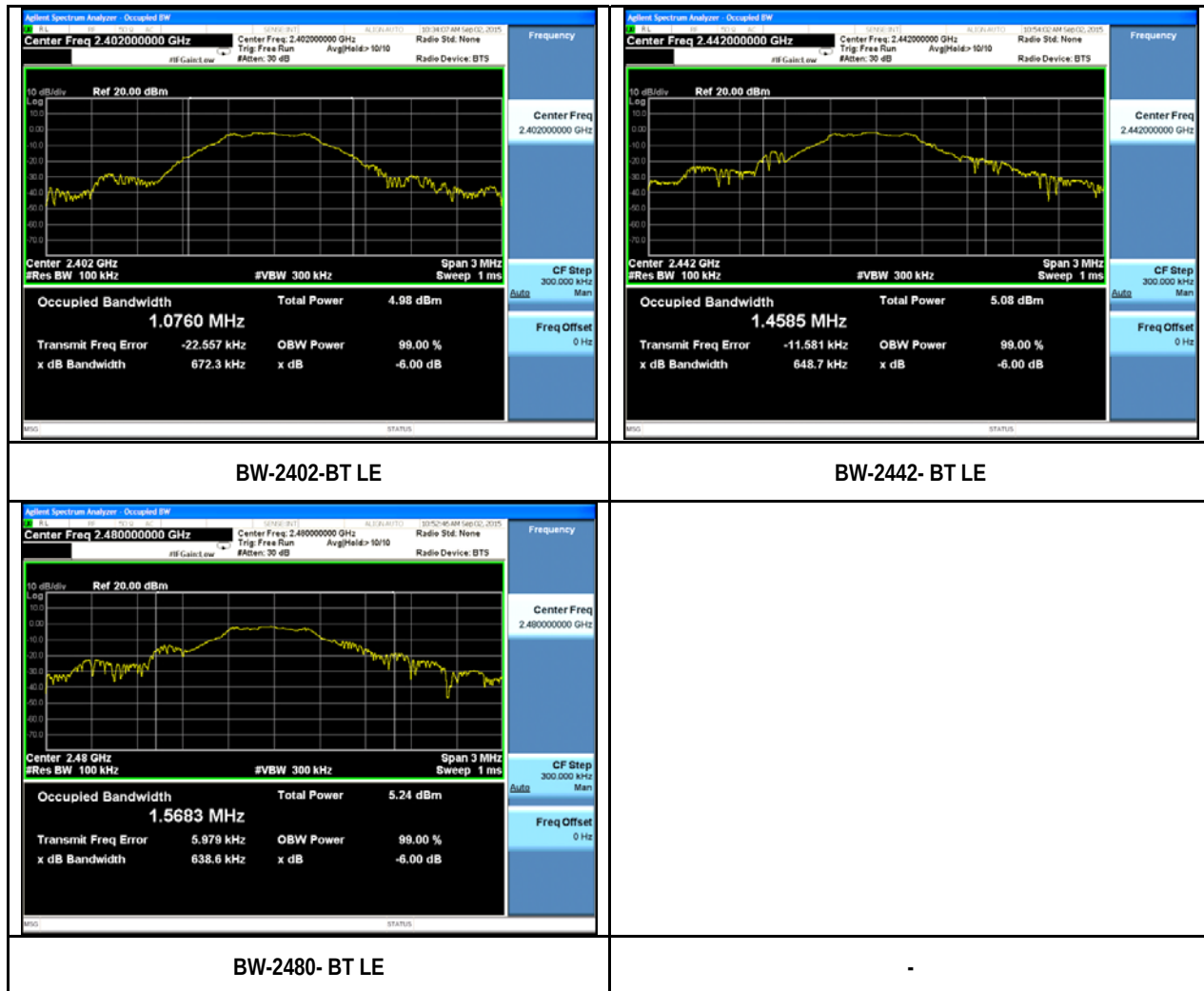
6dB Bandwidth Test Results:

Type	Freq. (MHz)	Test mode	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	2402	Bluetooth LE	Low	0.6723	≥0.5	Pass
6dB BW	2442	Bluetooth LE	Mid	0.6487	≥0.5	Pass
6dB BW	2480	Bluetooth LE	High	0.6386	≥0.5	Pass

99% Bandwidth Test Results:

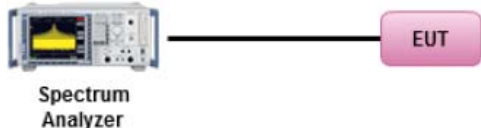
Type	Freq. (MHz)	Test mode	CH	99% Bandwidth (MHz)
99% OBW	2402	Bluetooth LE	Low	1.0760
99% OBW	2442	Bluetooth LE	Mid	1.4585
99% OBW	2480	Bluetooth LE	High	1.5683

Test Plots



10.3.2 Peak Spectral Density – DTS (Bluetooth LE)

Requirement(s):

Specification(s)	Item	Requirement	Applicable
§ 15.247(e), RSS247 (5.2.2)	a)	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas. Guidance v03r02, 10.2 Method PKPSD (peak PSD) <u>Peak spectral density measurement procedure</u> - Set analyzer center frequency to DTS channel center frequency. - Set the span to 1.5 times the DTS bandwidth. - Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$. - Set the VBW $\geq 3 \times \text{RBW}$. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the peak marker function to determine the maximum amplitude level within the RBW. - If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.		
Test Date	09/02/2015	Environmental condition	Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	None		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
PSD	100kHz	$\geq 3 \times \text{RBW}$	1.5x DTS BW	Peak	Auto	Max hold	-

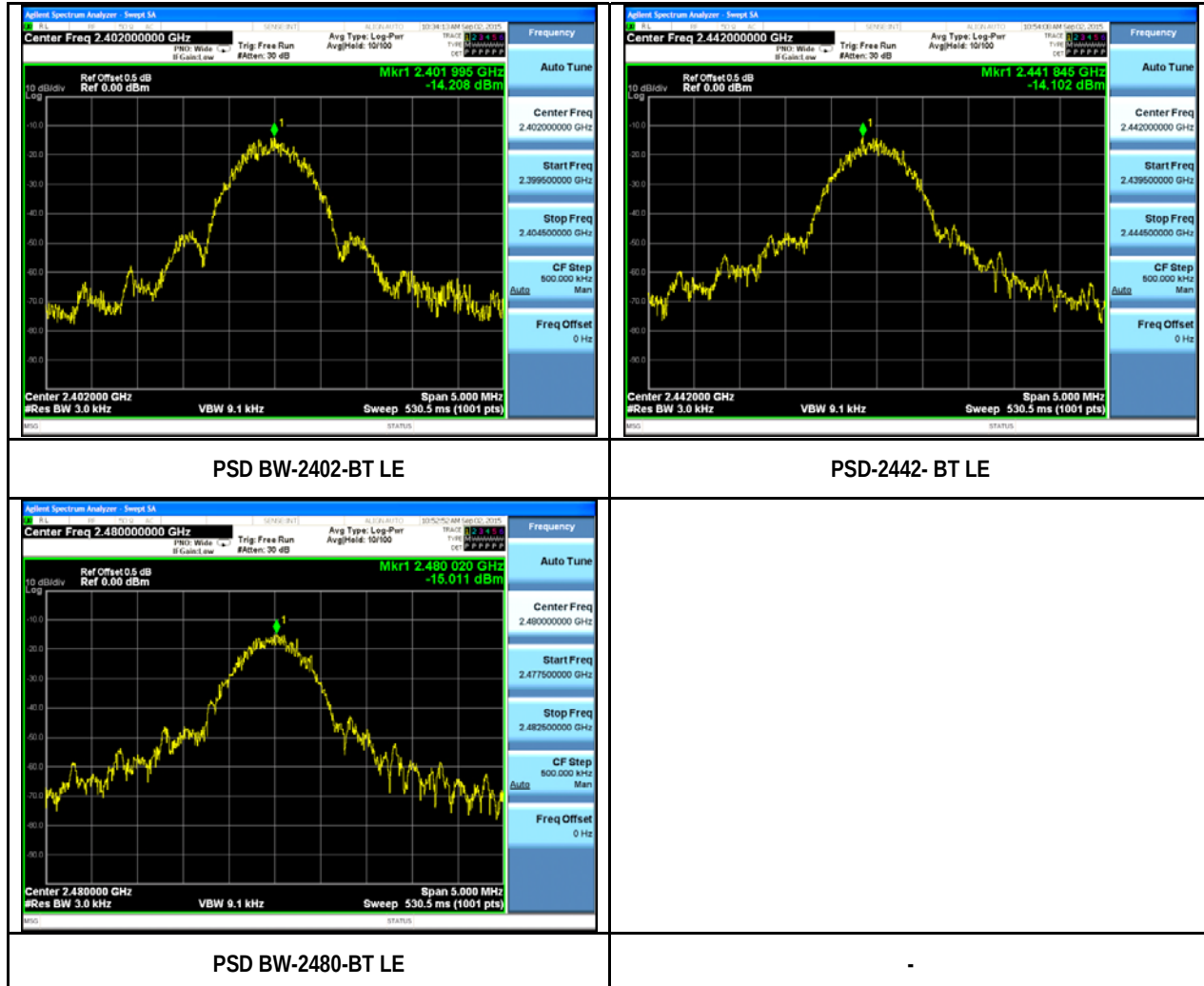
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

PSD Test Result

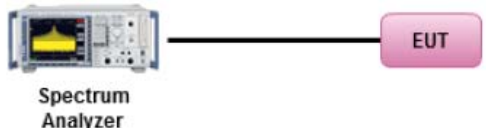
Type	Freq. (MHz)	Test mode	CH	PSD (dBm/100kHz)	Limit (dBm/3kHz)	Result
Maximum PSD	2402	Bluetooth LE	Low	-14.208	≤8	Pass
Maximum PSD	2442	Bluetooth LE	Mid	-14.102	≤8	Pass
Maximum PSD	2480	Bluetooth LE	High	-15.011	≤8	Pass

Test Plots



10.3.3 Peak Output Power – DTS (Bluetooth LE)

Requirement(s):

Specification(s)	Item	Requirement	Applicable
§ 15.247(b) (2) , RSS247 (5.4.4)	a)	For systems using digital modulation in the 2400-2483.5MHz, and 5725-5850MHz bands: below 1 Watt.	☒
	b)	Power reduction (antenna gain > 6dBi)	☐
Test Setup			
Test Procedure	558074 D01 DTS Meas. Guidance v03r02, 9.1.2 Integrated band power method <u>Maximum output power measurement procedure</u> - Set the RBW = 1 MHz. - Set the VBW ≥ 3x RBW - Set the span ≥ 1.5 x DTS bandwidth. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.		
Test Date	09/02/2015	Environmental condition	Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	None		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
Peak output power	1MHz	≥3MHz	≥1.5 x DTS BW	Peak	Auto	Max hold	-

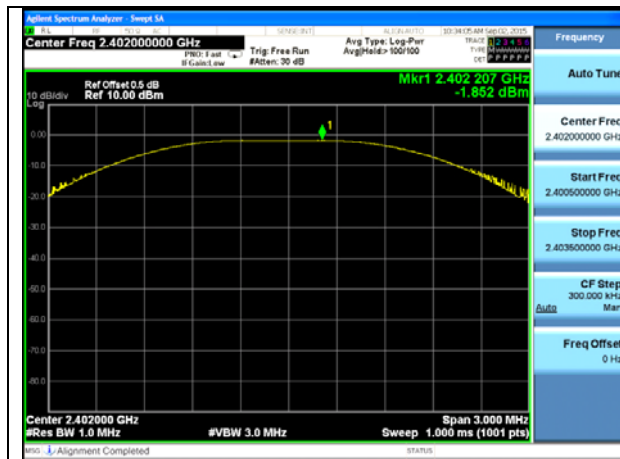
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

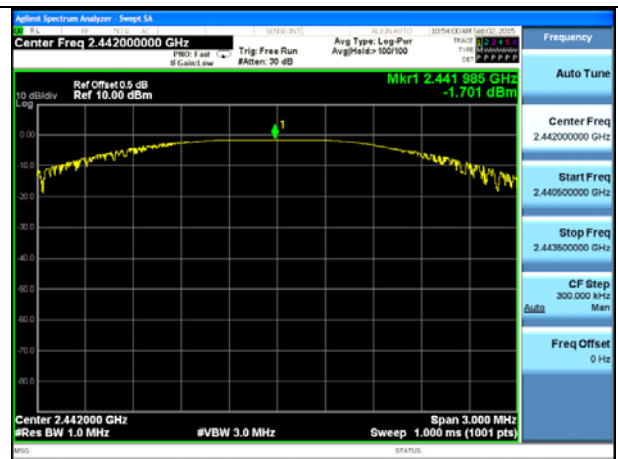
Peak Output Power Test Results

Type	Freq. (MHz)	Test mode	Channel	Power (dBm)	Limit (dBm)	Result
Output power	2402	Bluetooth LE	Low	-1.85	< 30	Pass
Output power	2442	Bluetooth LE	Mid	-1.70	< 30	Pass
Output power	2480	Bluetooth LE	High	-1.58	< 30	Pass

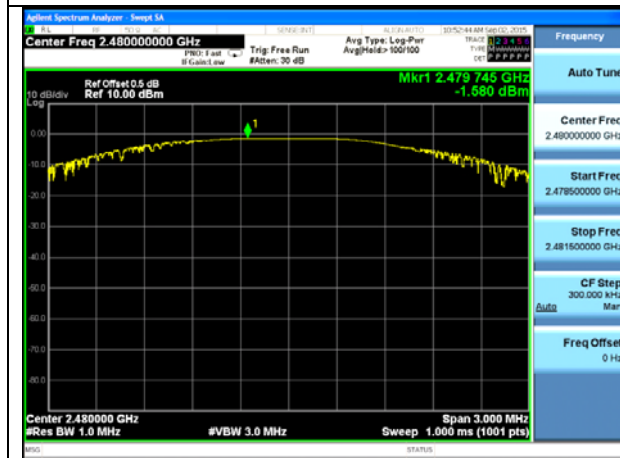
Output Power test plots (DTS):



Bluetooth BLE 2402MHz



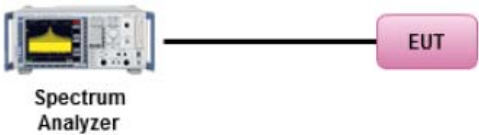
Bluetooth BLE 2442MHz



Bluetooth BLE 2480MHz

10.3.4 Band Edge -DTS (Bluetooth LE)

Requirement(s):

Specification(s)	Item	Requirement	Applicable
47CFR§15.247(d), RSS247 (5.5)	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 ☒ 20 dB down ☐ 30 dB down	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas. Guidance v03r02 <u>Band Edge measurement procedure</u> 1. Set the EUT to maximum power setting and enable the EUT transmit continuously. 2. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as a measured. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used. 3. Change modulation and channel bandwidth then repeat step 1 to 2. 4. Measured and record the results in the test report.		
Test Date	09/02/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	None		
Result	☒ Pass ☐ Fail		

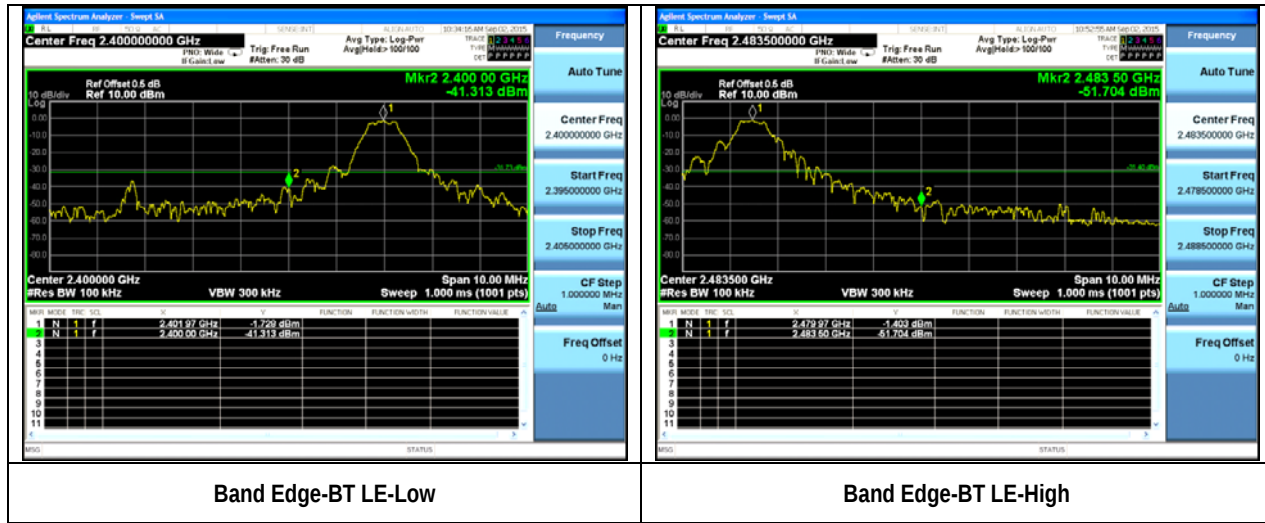
Equipment Setting

Test	RBW	VBW	Detector	Sweep	Trace	Notes
Band Edge	100kHz	≥3 x RBW	Peak	Auto	Max hold	-

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

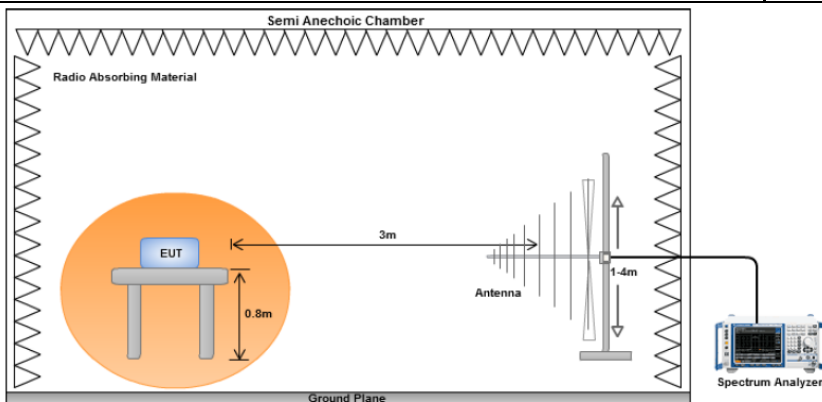
Test Plots



10.4 Radiated Measurement

10.4.1 Radiated Measurement below 1GHz

Requirement(s):

Specification(s)	Item	Requirement	Applicable							
47CFR§15.247(d), RSS247 (5.5)	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	☒							
		<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
Frequency range (MHz)	Field Strength (uV/m)									
30 – 88	100									
88 – 216	150									
216 960	200									
Above 960	500									
Test Setup										
Procedure	1. 2. 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 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: a. Vertical or horizontal polarisation (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. 4. A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.									
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.									
Result	☒ Pass ☐ Fail									

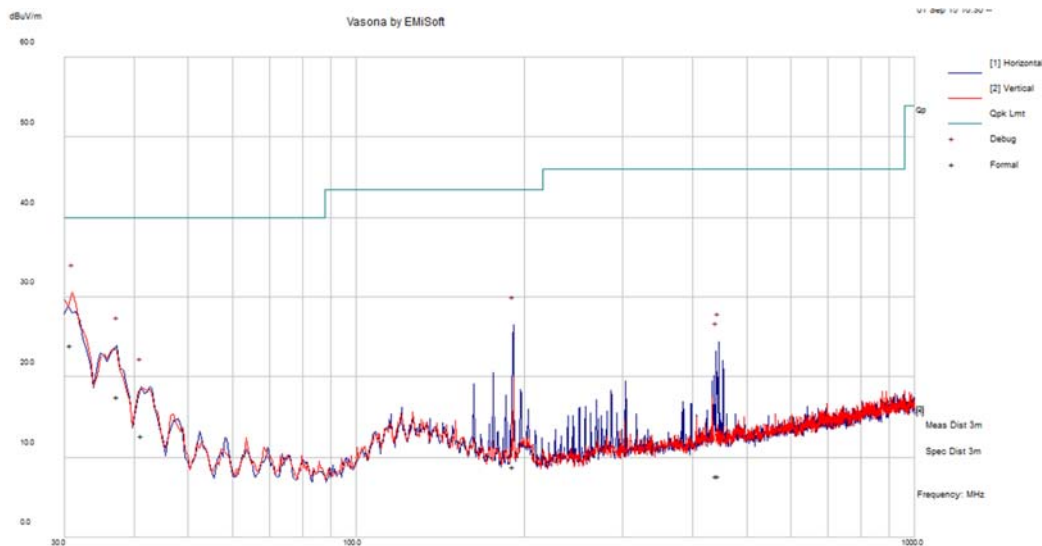
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emissions Test Results (below 1GHz)

Test specification:	Radiated Spurious Emissions			
Environmental Conditions:	Temp(°C):	25.5 °C	Result:	☒ Pass ☐ Fail
	Humidity (%):	44.4 %		
	Atmospheric(mbar):	1016 mbar		
Mains Power:	6V _{DC}			
Tested by:	Osvaldo Casorla			
Test Date:	09/01/2015			
Remarks:	BLE High Channel			

f=30MHz – 1000MHz plot at V= 6V_{DC} and 3 meter distance

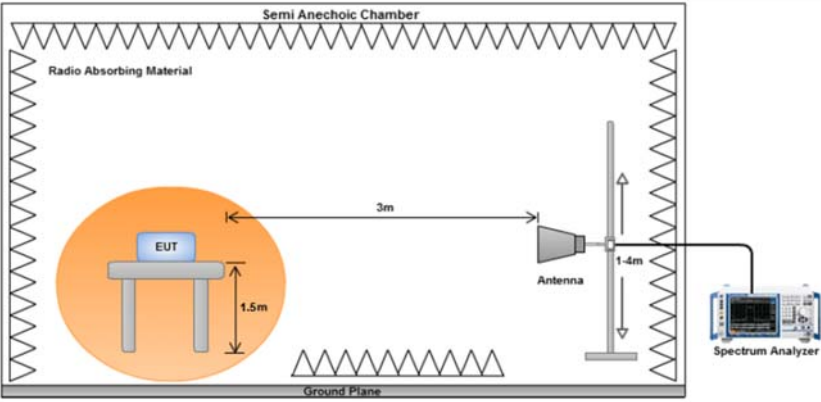


f=30MHz – 1000MHz Measurements

Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
30.83	39.98	0.84	15.16	25.66	Quasi Max	V	209.00	47.00	40.00	-14.34	Pass
37.31	39.03	0.91	20.61	19.33	Quasi Max	H	113.00	199.00	40.00	-20.67	Pass
41.31	37.17	0.95	23.55	14.57	Quasi Max	H	100.00	28.00	40.00	-25.43	Pass
190.95	38.07	2.02	27.19	12.90	Quasi Max	H	232.00	7.00	43.52	-30.62	Pass
441.27	32.97	3.25	22.12	14.10	Quasi Max	H	390.00	69.00	46.02	-31.92	Pass
445.15	33.01	3.24	22.13	14.12	Quasi Max	H	240.00	223.00	46.02	-31.90	Pass

10.4.2 Radiated Spurious Emissions > 1GHz

Requirement(s):

Specification(s)	Item	Requirement	Applicable
47CFR§15.247(d), RSS247 (5.5)	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 ☒ 20 dB down ☐ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	- 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 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: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 26GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

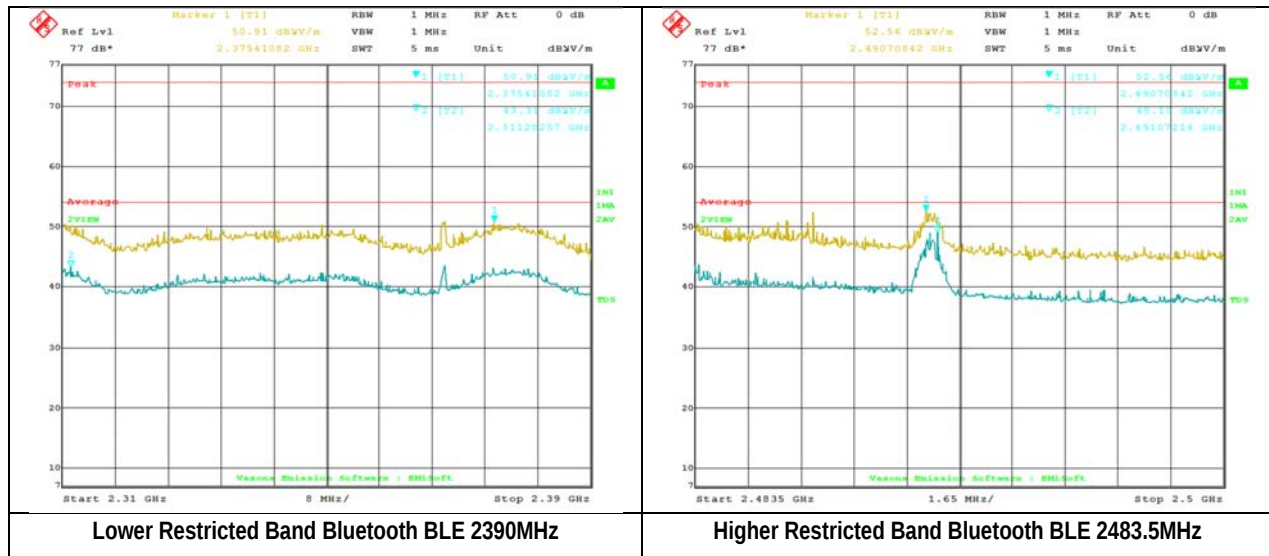
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission Test Results (above 1GHz)

Test specification:	Radiated Spurious Emissions (above 1GHz)			
Environmental Conditions:	Temp(°C):	24 °C	Result:	☒ Pass ☐ Fail
	Humidity (%):	41%		
	Atmospheric(mbar):	1017 mbar		
Mains Power:	6V _{DC}			
Tested by:	Oswaldo Casoria			
Test Date:	09/02/2015			
Remarks:	Bluetooth BLE			

Restricted Band Measurements



Bluetooth BLE 2402MHz

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
1018.92	38.93	2.45	9.65	51.03	Peak Max	V	161.00	6.00	74.00	-22.97	Pass
2038.58	40.83	3.48	11.35	55.66	Peak Max	H	258.00	280.00	74.00	-18.34	Pass
2432.24	39.30	4.88	10.20	54.39	Peak Max	V	253.00	320.00	74.00	-19.61	Pass
4235.48	39.38	6.03	11.21	56.61	Peak Max	H	202.00	16.00	74.00	-17.39	Pass
14761.87	42.53	13.56	7.72	63.82	Peak Max	H	217.00	336.00	74.00	-10.18	Pass
17964.55	39.98	13.00	10.87	63.85	Peak Max	H	289.00	179.00	74.00	-10.15	Pass
1018.92	25.03	2.45	9.65	37.13	Average Max	V	161.00	6.00	54.00	-16.87	Pass
2038.58	27.78	3.48	11.35	42.62	Average Max	H	258.00	280.00	54.00	-11.38	Pass
2432.24	26.15	4.88	10.20	41.24	Average Max	V	253.00	320.00	54.00	-12.76	Pass
4235.48	25.45	6.03	11.21	42.69	Average Max	H	202.00	16.00	54.00	-11.31	Pass
14761.87	29.12	13.56	7.72	50.41	Average Max	H	217.00	336.00	54.00	-3.59	Pass
17964.55	26.65	13.00	10.87	50.52	Average Max	H	289.00	179.00	54.00	-3.48	Pass

Bluetooth BLE 2442MHz

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
1083.25	39.06	2.49	9.55	51.10	Peak Max	H	119.00	245.00	74.00	-22.90	Pass
6211.74	44.06	7.53	10.56	62.15	Peak Max	H	174.00	121.00	74.00	-11.85	Pass
8207.54	41.57	9.04	7.60	58.21	Peak Max	V	119.00	317.00	74.00	-15.79	Pass
9723.01	41.44	11.96	7.71	61.11	Peak Max	V	99.00	72.00	74.00	-12.89	Pass
11935.04	42.77	12.20	8.49	63.46	Peak Max	V	127.00	13.00	74.00	-10.54	Pass
17727.63	40.42	13.00	10.63	64.05	Peak Max	H	100.00	240.00	74.00	-9.95	Pass
1083.25	25.32	2.49	9.55	37.35	Average Max	H	119.00	245.00	54.00	-16.65	Pass
6211.74	31.37	7.53	10.56	49.46	Average Max	H	174.00	121.00	54.00	-4.54	Pass
8207.54	28.28	9.04	7.60	44.92	Average Max	V	119.00	317.00	54.00	-9.08	Pass
9723.01	27.93	11.96	7.71	47.59	Average Max	V	99.00	72.00	54.00	-6.41	Pass
11935.04	28.34	12.20	8.49	49.04	Average Max	V	127.00	13.00	54.00	-4.96	Pass
17727.63	27.15	13.00	10.63	50.78	Average Max	H	100.00	240.00	54.00	-3.22	Pass

Bluetooth BLE 2480MHz

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
2006.01	41.20	3.35	11.46	56.01	Peak Max	V	166.00	325.00	74.00	-17.99	Pass
4048.57	38.74	5.87	12.01	56.63	Peak Max	V	200.00	200.00	74.00	-17.37	Pass
9836.71	40.60	11.61	8.17	60.38	Peak Max	V	203.00	189.00	74.00	-13.62	Pass
12479.80	42.00	13.01	8.37	63.38	Peak Max	V	278.00	129.00	74.00	-10.62	Pass
14679.74	42.27	13.42	7.94	63.63	Peak Max	V	233.00	184.00	74.00	-10.37	Pass
17728.04	40.42	13.00	10.63	64.05	Peak Max	H	121.00	159.00	74.00	-9.95	Pass
2006.01	28.32	3.35	11.46	43.13	Average Max	V	166.00	325.00	54.00	-10.87	Pass
4048.57	25.88	5.87	12.01	43.77	Average Max	V	200.00	200.00	54.00	-10.23	Pass
9836.71	27.84	11.61	8.17	47.63	Average Max	V	203.00	189.00	54.00	-6.37	Pass
12479.80	28.65	13.01	8.37	50.03	Average Max	V	278.00	129.00	54.00	-3.97	Pass
14679.74	29.18	13.42	7.94	50.54	Average Max	V	233.00	184.00	54.00	-3.46	Pass
17728.04	27.31	13.00	10.63	50.95	Average Max	H	121.00	159.00	54.00	-3.05	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Cycle	Cal Due	In use
Radiated Emissions					
EMI Test Receiver	ESL6	100178	1 Year	05/27/2016	☒
ETS-Lingren Loop Antenna	6512	00049120	1 Year	08/20/2016	☒
Antenna - Biconlog (30 MHz – 2 GHz)	JB1	A030702	1 Year	08/15/2016	☒
DoubleRidged Waveguide Horn Antenna (1-18 GHz)	3115	10SL0059	1 Year	08/25/2016	☒
Horn Antenna (18 GHz - 40 GHz)	AH-840	101013	1 Year	08/28/2016	☒
RF Pre-Amplifier	LPA-6-30	11140711	1 Year	02/19/2016	☒
Microwave Preamplifier (18 GHz - 40 GHz)	PA-840	181251	1 Year	02/19/2016	☐
3 Meters SAC	3M	N/A	1 Year	10/30/2016	☒
10 Meters SAC	10M	N/A	1 Year	05/06/2016	☒
RF Conducted Measurement					
Spectrum Analyzer	N9010A	MY50210206	1 Year	08/20/2016	☒

Test Software Version

Test Item	Vendor	Software	Version
Radiated Emission	EMISoft	EMISoft Vasona	V5.0
Conducted Emission	EMISoft	EMISoft Vasona	V5.0

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		A1 , A2 , A3 , A4 , B1 , B2 , B3 , B4 , 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		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I , Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
HongKong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		Radio : A1. Terminal equipment for purpose of calling Telecom : B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: 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 Radio: 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 Telecom: 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
Taiwan FCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 Radiocommunications: 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 Telecommunications: 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
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