

RF TEST REPORT



Report No.: RF_SL14031801-HID-007_FCC-IC Rev1.0
Supersede Report No.: RF_SL14031801-HID-007_FCC-IC

Applicant	HID Global Corporation
Product Name	Bluetooth Smart Module
Model No.	BTSmart Module
Test Standard	47 CRF 15.247: 2013 RSS-210 Issue 8: 2010
Test Method	ANSI C63.4: 2009 558074 D01 DTS Meas Guidance v03r01
FCC ID	JQ6-ICLASSBTM
IC ID	2236B-ICLASSBTM
Date of test	03/27/2014 - 04/01/2014
Issue Date	4/4/2014
Test Result	<u>Pass</u> Fail
Equipment complied with the specification	[x]
Equipment did not comply with the specification	[]
	
Angel Escamilla	David Zhang
Test Engineer	Engineer Reviewer
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Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

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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

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
RF_SL14031801-HID-007_FCC-IC	-	Original	4/02/2014
RF_SL14031801-HID-007_FCC-IC Rev1.0	Rev1.0	Update antenna gain	4/04/2014

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: BTSmart Module

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	15370 Barranca Parkway, Irvine, CA 92618 USA
Manufacturer Name	HID Global Corporation
Manufacturer Address	15370 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.	BTSmart Module
Trade Name	HID
Serial No.	-
Input Power	3.3 VDC
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Date of EUT received	3/26/2014
Equipment Class/ Category	DTS
Operating Frequencies	2402 MHz- 2480 MHz
Port/Connectors	N/A

6.2 Radio Description

Spec for Radio -

Radio Type	
Operating Frequency	2402 MHz- 2480 MHz
Modulation	GFSK
Channel Spacing	2 MHz
Number of Channels	40
Antenna Type	PCB Trace Antenna
Antenna Gain	3 dBi
Antenna Connector Type	N/A

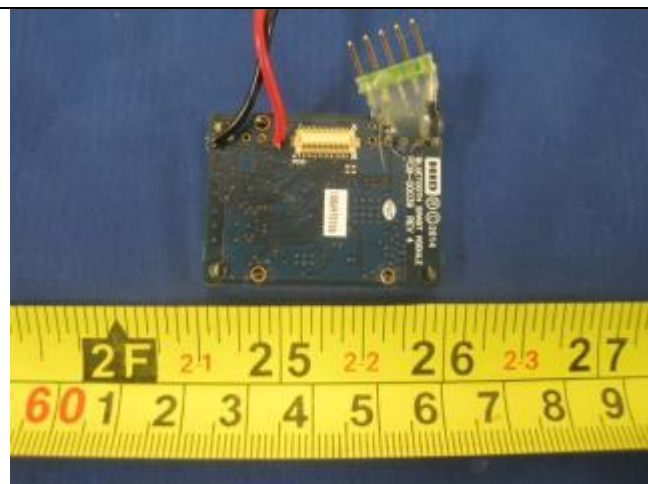
6.3 EUT test modes/configuration Description

	Test Mode	Note
Pre_test_mode_1	Continuous Transmit	-
Pre_test_mode_2	-	-
Pre_test_mode_3	-	-

6.4 EUT Photos - External

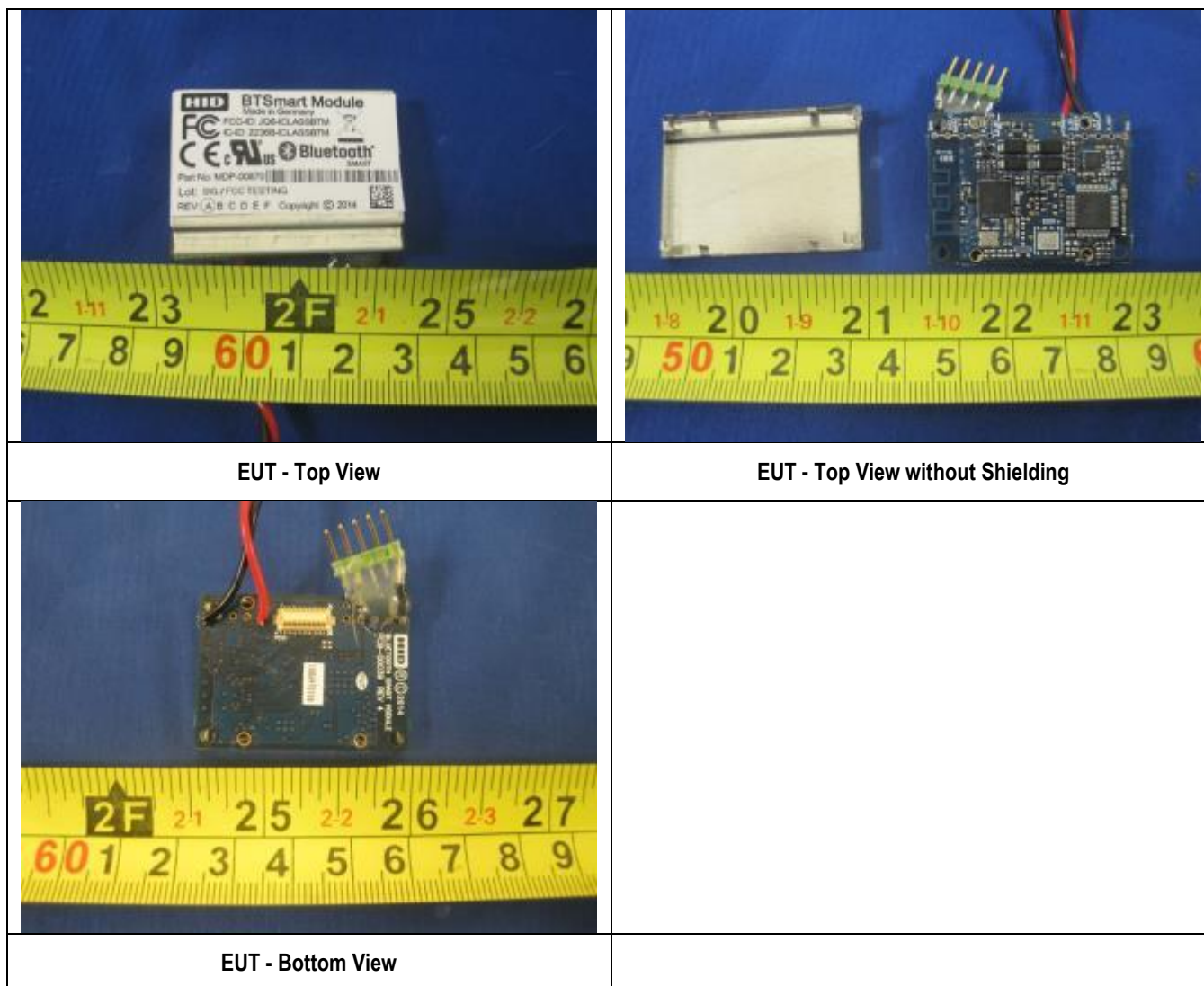


EUT – Top View



EUT – Bottom View

6.5 EUT Photos - Internal



6.6 EUT Test Setup Photos



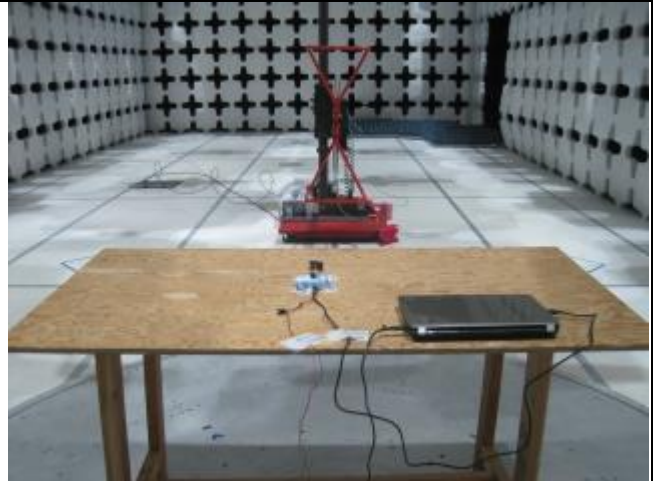
AC Line Conducted Emissions – Front View



AC Line Conducted Emissions – Rear View



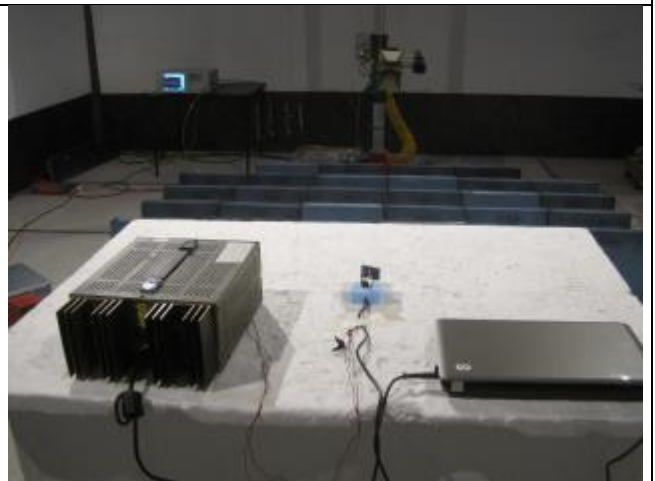
Radiated Emissions (<1GHz) – Front View



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	Pavilion g4	5CD2135VQM	HP	-
2	DC Power Supply	TPS-2000	920027	Topward Electric Instruments	-

7.2 Test Software Description

Test Item	Software	Description
RF Testing	PuTTY	Set the EUT to transmit continuously

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.4 – 2009 558074 D01 DTS Meas Guidance v03r01	☒ Pass ☐ N/A
	IC	RSS 210 (2.2)	IC	-	
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.4 – 2009	☒ Pass ☐ N/A
	IC	RSS Gen (7.2.2)	IC	-	

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210 (A8.1)	IC	-	
Occupied Bandwidth	FCC	15.247(a)(1)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.1)	IC	-	
Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r01	☒ Pass ☐ N/A
	IC	RSS210 (A8.2)	IC	-	
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.1)	IC	-	
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.4 – 2009, 558074 D01 DTS Meas Guidance v03r01	☒ Pass ☐ N/A
	IC	RSS210(A8.5)	IC	-	
Time of Occupancy	FCC	15.247(a)(1)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.1)	IC	-	
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r01	☒ Pass ☐ N/A
	IC	RSS210 (A8.4)	IC	-	
Receiver Spurious Emissions	FCC	15.247(d)	FCC	-	☒ Pass ☐ N/A
	IC	RSS Gen (4.8)	IC	-	
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.4)	IC	-	
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r01	☒ Pass ☐ N/A
	IC	RSS210(A8.3)	IC	-	
Hybrid System Requirement	FCC	15.247(f)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.3)	IC	-	
Hopping Capability	FCC	15.247(g)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.1)	IC	-	
Hopping Coordination Requirement	FCC	15.247(h)	FCC	-	☐ Pass ☒ N/A
	IC	RSS210(A8.1)	IC	-	
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass ☒ N/A
	IC	RSS Gen(5.5)	IC	-	
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - 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

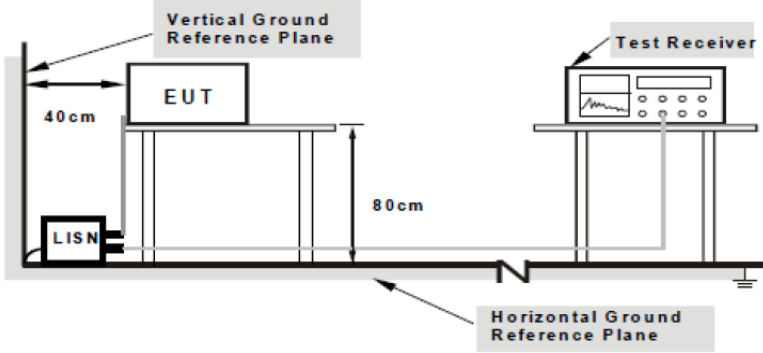
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious 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

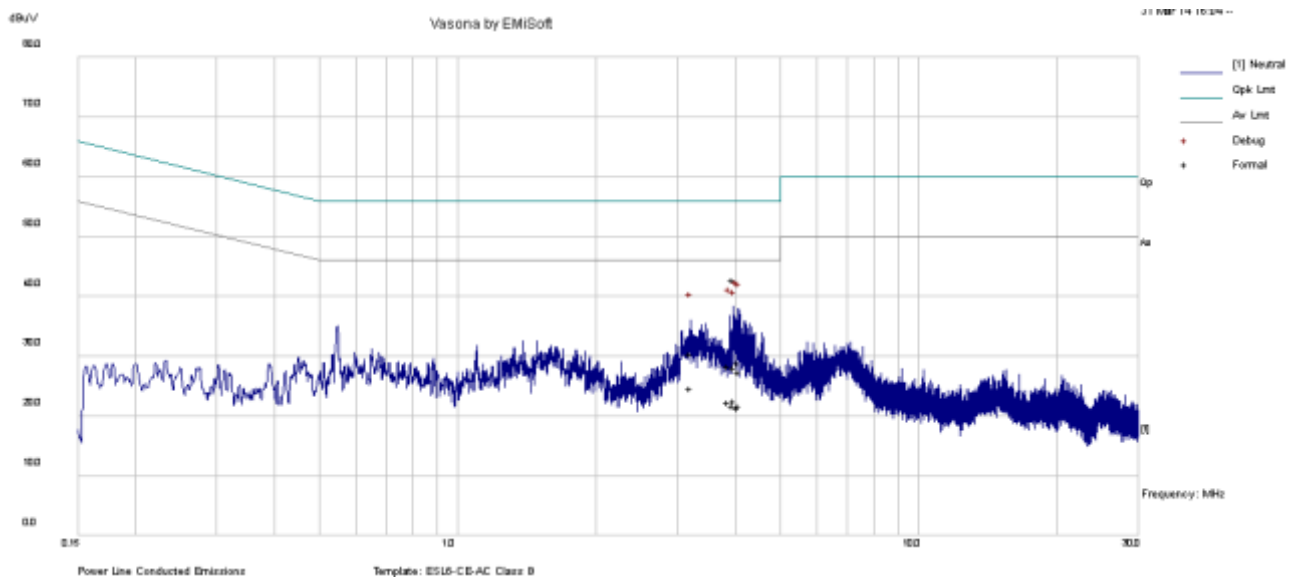
Spec	Item	Requirement	Applicable
47CFR§15.207, RSS210(A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	☒
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	- 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			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

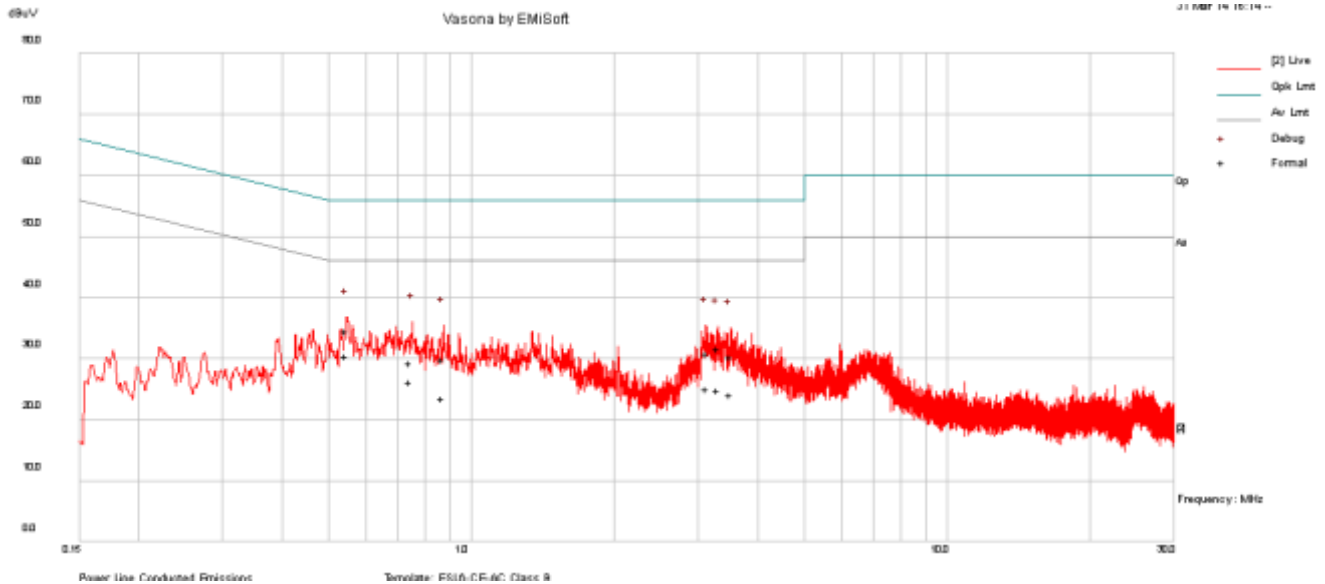
Conducted Emission Test Results (AC Line Test Result)

Environmental Conditions:	Temp (°C):	21	Result: Pass
	Humidity (%)	35	
	Atmospheric (mbar):	1022	
Mains Power:	120VAC / 60Hz		
Tested by:	Angel Escamilla		
Test Date:	3/30/2014		
Remarks:	Neutral Line		



Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail
3.20	19.37	10.03	1.00	30.40	Quasi Peak	Neutral	56.00	-25.60	Pass
3.87	17.35	10.03	1.07	28.45	Quasi Peak	Neutral	56.00	-27.55	Pass
3.96	31.80	10.03	1.08	42.91	Quasi Peak	Neutral	56.00	-13.09	Pass
4.00	17.08	10.03	1.08	28.20	Quasi Peak	Neutral	56.00	-27.80	Pass
4.06	17.80	10.03	1.08	28.92	Quasi Peak	Neutral	56.00	-27.08	Pass
4.09	16.20	10.03	1.08	27.32	Quasi Peak	Neutral	56.00	-28.68	Pass
3.20	13.59	10.03	1.00	24.62	Average	Neutral	46.00	-21.38	Pass
3.87	11.31	10.03	1.07	22.41	Average	Neutral	46.00	-23.59	Pass
3.96	10.77	10.03	1.08	21.88	Average	Neutral	46.00	-24.12	Pass
4.00	11.38	10.03	1.08	22.49	Average	Neutral	46.00	-23.51	Pass
4.06	10.34	10.03	1.08	21.46	Average	Neutral	46.00	-24.54	Pass
4.09	10.61	10.03	1.08	21.72	Average	Neutral	46.00	-24.28	Pass

Environmental Conditions:	Temp (°C):	21	Result: Pass
	Humidity (%)	35	
	Atmospheric (mbar):	1022	
Mains Power:	120VAC / 60Hz		
Tested by:	Angel Escamilla		
Test Date:	3/30/2014		
Remarks:	Phase Line		



Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail
0.55	23.78	10.01	0.74	34.53	Quasi Peak	Live	56.00	-21.47	Pass
0.74	18.50	10.01	0.76	29.27	Quasi Peak	Live	56.00	-26.73	Pass
0.87	19.08	10.01	0.73	29.82	Quasi Peak	Live	56.00	-26.18	Pass
3.12	19.84	10.03	0.99	30.86	Quasi Peak	Live	56.00	-25.14	Pass
3.30	20.54	10.03	1.01	31.58	Quasi Peak	Live	56.00	-24.42	Pass
3.51	19.33	10.03	1.03	30.39	Quasi Peak	Live	56.00	-25.61	Pass
0.55	19.80	10.01	0.74	30.55	Average	Live	46.00	-15.45	Pass
0.74	15.48	10.01	0.76	26.25	Average	Live	46.00	-19.75	Pass
0.87	12.82	10.01	0.73	23.57	Average	Live	46.00	-22.43	Pass
3.12	14.06	10.03	0.99	25.08	Average	Live	46.00	-20.92	Pass
3.30	13.93	10.03	1.01	24.96	Average	Live	46.00	-21.04	Pass
3.51	13.08	10.03	1.03	24.15	Average	Live	46.00	-21.85	Pass

10.2 6dB Bandwidth

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW≥500KHz;	☒
RSS Gen(4.6.1)	b)	99% BW: For FCC reference only; required by IC.	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r01, 8.1 DTS bandwidth <u>6dB Emission bandwidth measurement procedure</u> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) $\geq 3 * RBW$. - 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. <u>99% bandwidth measurement procedure</u> - Allow the trace to stabilize. - Use the spectrum analyzer built-in measurement function to determine the 99% BW. - Capture the plot. - Repeat above steps for different test channel and other modulation type.		
Remark			
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	PK	Auto	Max hold	-

Test Data ☒ Yes ☐ N/A
Test Plot ☒ Yes ☐ N/A

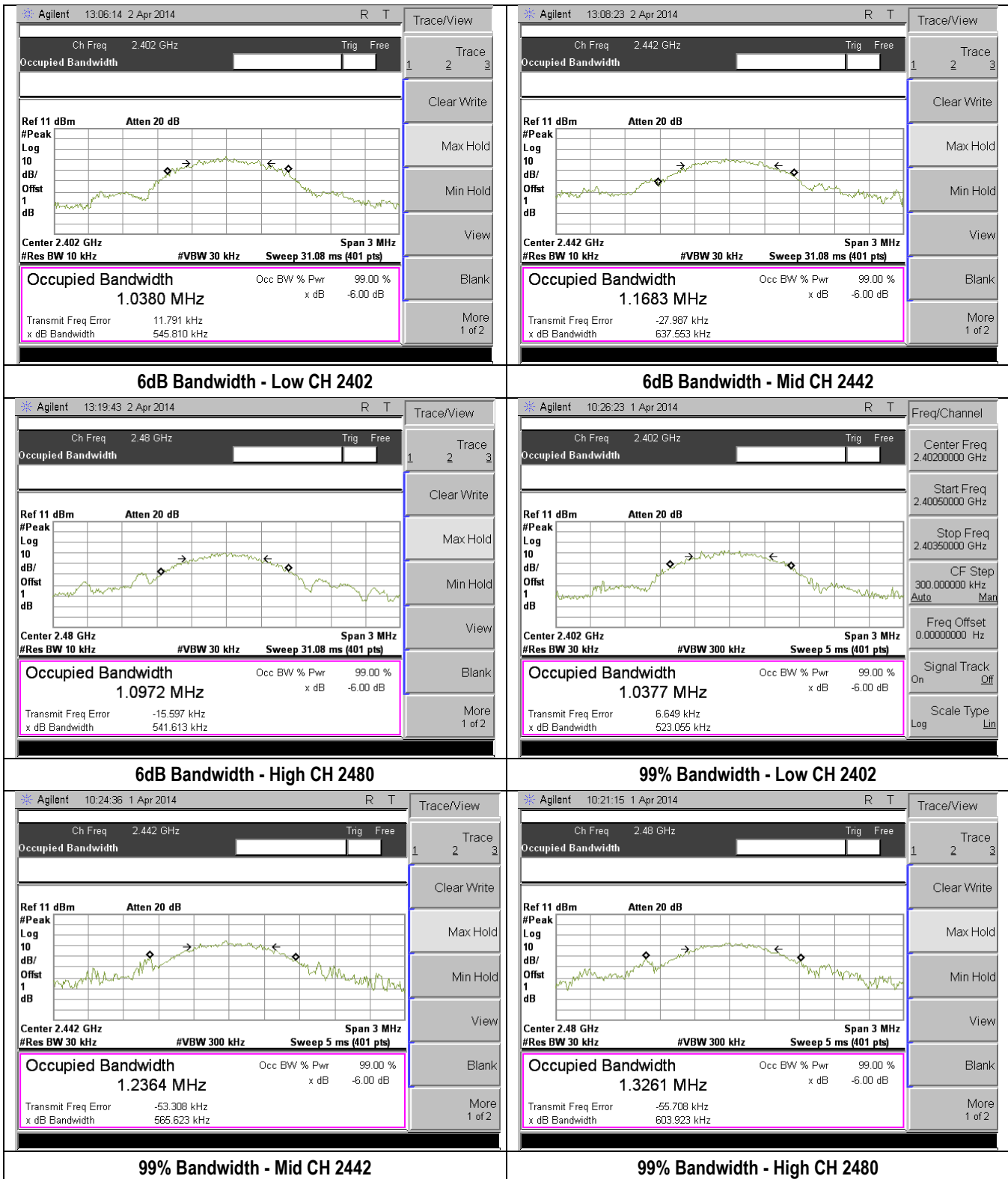
6dB Bandwidth measurement result

Type	Freq (MHz)	Test mode	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	2402	BT-LE	Low	0.54581	≥0.5	Pass
6dB BW	2442	BT-LE	Mid	0.63755	≥0.5	Pass
6dB BW	2480	BT-LE	High	0.54161	≥0.5	Pass

99% Bandwidth measurement result

Type	Freq (MHz)	Test mode	CH	Result (MHz)	Limit (MHz)	Result
99% OBW	2402	BT-LE	Low	1.0377	-	-
99% OBW	2442	BT-LE	Mid	1.2364	-	-
99% OBW	2480	BT-LE	High	1.3261	-	-

Test Plots



10.3 Peak Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(b) (2) ,RSS210 (A8.4)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & < 50 channels: ≤ 0.25 Watt	☐
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤ 1 Watt	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r01, 9.1.1 RBW $\geq$ DTS bandwidth <u>Maximum output power measurement procedure</u> - Set the RBW $\geq$ DTS bandwidth. - Set the VBW $\geq 3 \times$ RBW - Set span $\geq 3 \times$ RBW - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use peak marker function to determine the peak amplitude level.		
Remark	This device has integrated antenna which is not easy to be removed. Radiated measurement method was used to obtain the maximum field strength to calculate the EIRP level. Based on the antenna gain, the conducted power was calculated. EIRP (dBm) = Field Strength (dBuV/m) @ 3m – 95.23 Conducted Power (dBm) = EIRP (dBm) – Ant Gain (dBi)		
Result	☒ Pass ☐ Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
PK output power	1MHz	≥ 3 MHz	$\geq 1.5 \times$ DTS BW	Peak	Auto	Max hold	-

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Output Power measurement result

Type	Freq (MHz)	Test mode	CH	Max field strength (dBuV/m) @ 3m	Converted EIRP (dBm)	Antenna Gain (dBi)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	2402	BT-LE	Low	97.38	2.15	3	-0.85	30	Pass
Output power	2442	BT-LE	Mid	97.82	2.59	3	-0.41	30	Pass
Output power	2480	BT-LE	High	98.26	3.03	3	0.03	30	Pass

10.4 Peak Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(e), RSS210 (A8.3)	a)	DSSS: $\leq 8\text{dBm}/3\text{KHz}$	☒
	b)	DSSS in hybrid sys with FH turned off: $\leq 8\text{dBm}/3\text{KHz}$	☐
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r01, 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.		
Remark	This device has an integrated antenna which is not easy to be removed. Radiated measurement method was used but a reference offset was applied on the spectrum analyzer to match the amplitude to the conducted peak output power while maintaining the same settings as to be used for peak output power measurement. After the amplitudes matched, the correct settings for PSD were made to record the measurement. The obtained value is equivalent to the conducted PSD value.		
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 ☐ N/A

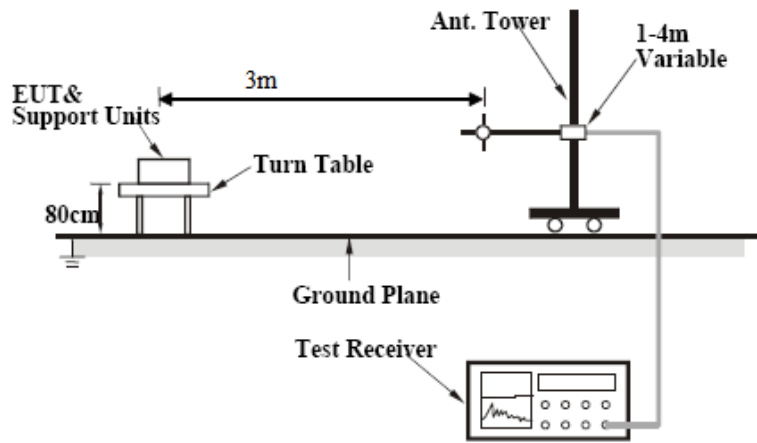
Test Plot ☒ Yes (See below) ☐ N/A

PSD measurement result

Type	Freq (MHz)	Test mode	CH	Conducted PSD (dBm/MHz)	Limit (dBm/MHz)	Result
Maximum PSD	2402	BT LE	Low	0.295	≤8	Pass
Maximum PSD	2442	BT LE	Mid	0.589	≤8	Pass
Maximum PSD	2480	BT LE	High	-1.326	≤8	Pass

10.5 Radiated Emissions below 1GHz

Requirement(s):

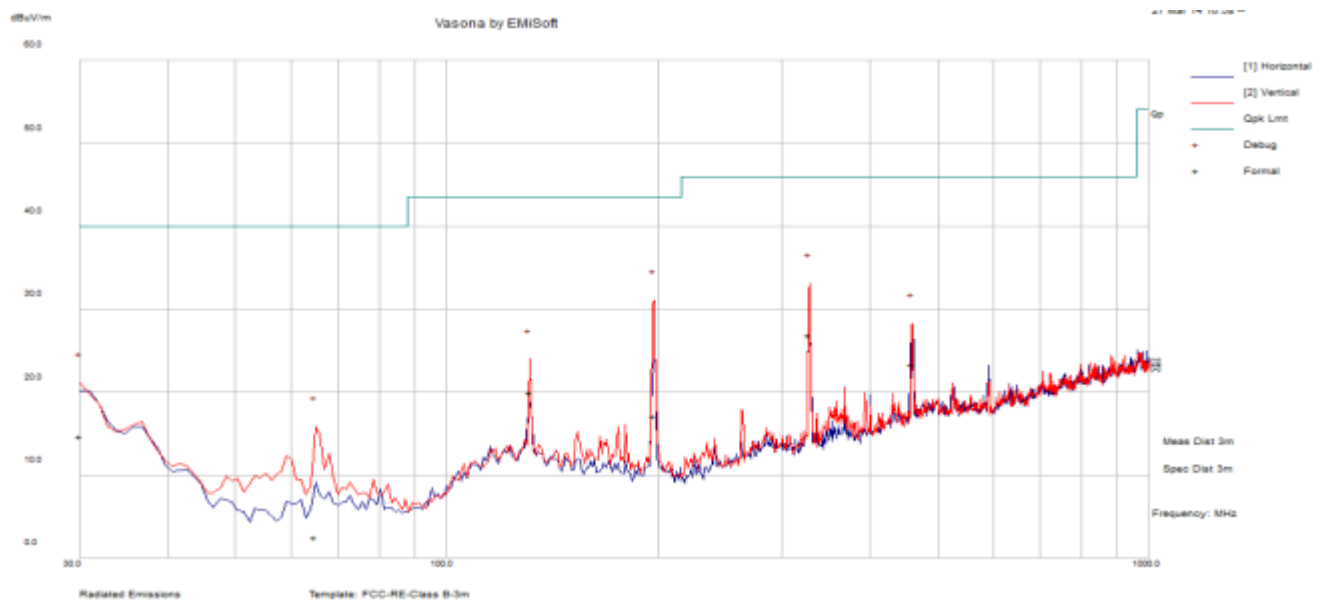
Spec	Item	Requirement	Applicable										
47CFR§15.247(d), RSS210(A8.5)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions 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	200	Above 960	500	☒
	Frequency range (MHz)	Field Strength (uV/m)											
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup													
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. 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. A Quasi-peak measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.												
Remark													
Result	☒ Pass ☐ Fail												

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission Test Results (Below 1GHz)

Test specification	below 1GHz			Result	PASS
Environmental Conditions:	Temp (°C):	22			
	Humidity (%)	38			
	Atmospheric (mbar):	1023			
Mains Power:	3.3VDC				
Tested by:	Angel Escamilla				
Test Date:	3/27/2014				
Remarks:	Mid channel (2442 MHz), Continuous Tx				

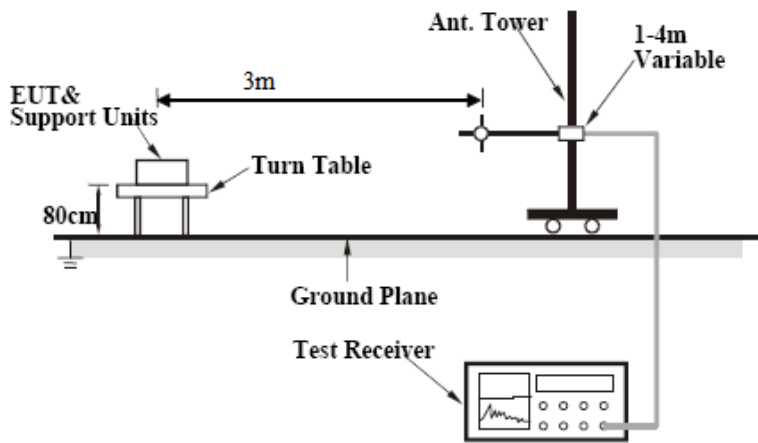


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
30.00	29.61	1.16	-16.07	14.70	Quasi Max	V	242.00	320.00	40.00	-25.30	Pass
64.93	32.47	1.35	-31.34	2.48	Quasi Max	V	103.00	141.00	40.00	-37.52	Pass
131.20	44.00	2.09	-26.15	19.94	Quasi Max	V	109.00	250.00	43.50	-23.56	Pass
197.40	43.03	2.49	-28.34	17.18	Quasi Max	V	167.00	165.00	43.50	-26.32	Pass
328.27	50.14	3.10	-26.40	26.84	Quasi Max	V	116.00	339.00	46.00	-19.16	Pass
459.37	42.77	3.84	-23.30	23.31	Quasi Max	V	126.00	215.00	46.00	-22.69	Pass

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

10.6 Radiated Spurious Emissions above 1GHz

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 ☒ 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 25GHz. 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)

Above 1GHz-25GHz- Mode1: BT-LE Low CH (2402 MHz)

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3894.07	39.20	2.83	-0.38	41.65	Peak Max	H	159.00	326.00	74.00	-32.35	Pass
9479.07	39.08	4.33	6.54	49.95	Peak Max	V	138.00	121.00	74.00	-24.05	Pass
3894.07	26.81	2.83	-0.38	29.26	Average Max	H	159.00	326.00	54.00	-24.74	Pass
9479.07	26.41	4.33	6.54	37.28	Average Max	V	138.00	121.00	54.00	-16.72	Pass

Band Edge Low CH

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
2390.00	-17.67	2.12	28.57	13.02	Peak Max	H	106.00	187.00	74.00	-60.98	Pass
2390.00	-20.29	2.12	28.57	10.39	Peak Max	V	100.00	321.00	74.00	-63.61	Pass
2390.00	-26.74	2.12	28.57	3.95	Average Max	H	106.00	187.00	54.00	-50.05	Pass
2390.00	-29.36	2.12	28.57	1.32	Average Max	V	100.00	321.00	54.00	-52.68	Pass

Above 1GHz-25GHz- Mode1: BT-LE Mid CH (2442 MHz)

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1218.39	39.84	1.17	-6.75	34.26	Peak Max	V	184.00	242.00	74.00	-39.74	Pass
1413.09	40.36	1.35	-6.41	35.30	Peak Max	V	154.00	150.00	74.00	-38.70	Pass
1438.25	39.45	1.37	-6.37	34.45	Peak Max	V	126.00	136.00	74.00	-39.55	Pass
12452.80	36.90	5.50	6.27	48.67	Peak Max	V	188.00	75.00	74.00	-25.33	Pass
1218.39	28.21	1.17	-6.75	22.63	Average Max	V	184.00	242.00	54.00	-31.37	Pass
1413.09	27.78	1.35	-6.41	22.72	Average Max	V	154.00	150.00	54.00	-31.28	Pass
1438.25	27.60	1.37	-6.37	22.60	Average Max	V	126.00	136.00	54.00	-31.40	Pass
12452.80	25.25	5.50	6.27	37.02	Average Max	V	188.00	75.00	54.00	-16.98	Pass

Above 1GHz-25GHz- Mode1: BT-LE Mid CH (2480 MHz)

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
12423.01	37.27	5.49	6.29	49.04	Peak Max	H	160.00	51.00	74.00	-24.96	Pass
1484.43	39.81	1.41	-6.30	34.92	Peak Max	H	176.00	206.00	74.00	-39.08	Pass
12423.01	25.43	5.49	6.29	37.21	Average Max	H	160.00	51.00	54.00	-16.79	Pass
1484.43	28.45	1.41	-6.30	23.56	Average Max	H	176.00	206.00	54.00	-30.44	Pass

Band Edge High CH

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
2483.50	-20.42	2.15	28.75	10.49	Peak Max	H	127.00	218.00	74.00	-63.51	Pass
2483.50	-20.09	2.15	28.75	10.81	Peak Max	V	129.00	217.00	74.00	-63.19	Pass
2483.50	-30.74	2.15	28.75	0.17	Average Max	H	127.00	218.00	54.00	-53.83	Pass
2483.50	-30.41	2.15	28.75	0.49	Average Max	V	129.00	217.00	54.00	-53.51	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒
R&S LISN	ESH2-Z5	861741/013	05/18/2013	1 Year	05/18/2014	☒
CHASE LISN	MN2050B	1018	07/24/2013	1 Year	07/24/2014	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
Radiated Emissions						
R & S Receiver	ESL6	100178	03/01/2014	1 Year	03/01/2015	☒
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒
ETS-Lingren Loop Antenna	6512	00049120	05/13/2013	1 Year	05/13/2014	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	07/03/2013	1 Year	07/03/2014	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2013	1 Year	04/26/2014	☒
Horn Antenna (18-40 GHz)	AH-840	101013	04/23/2013	1 Year	04/23/2014	☒
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/30/2013	1 Year	05/30/2014	☒
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2013	1 Year	05/30/2014	☒
3 Meters SAC	3M	N/A	10/13/2013	1 Year	10/13/2014	☒
10 Meters SAC	10M	N/A	06/05/2013	1 Year	06/05/2014	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
RF Conducted Measurement						
Spectrum Analyzer	N9010A	MY50210206	05/30/2013	1 Year	05/30/2014	☒
Spectrum Analyzer	E4407B	US88441016	05/31/2013	1 Year	05/31/2014	☒
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒

Annex B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

Annex C. 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
Hong Kong 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 NCC 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 Radio communications: 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