RF TEST REPORT

SIEMIC
GLOBAL TESTING & CERTIFICATIONS
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Report No.: FCC_IC_RF_ SL15041401-LHS-001_Co-location (HA7040)_Rev1.0
Supersede Report No.: FCC_IC_RF_ SL15041401-LHS-001_Co-location (HA7040)

Applicant	:	Pass & Seymour, Inc. d/b/a Legrand
Product Name	:	802.11 b/g/n Wi-Fi Module & Z-Wave Transceiver Device (host)
Model No.	:	CU-282 & HA7040(host)
Test Standard	:	47 CRF 15.247: 2013 RSS-210 Issue 8: 2010
Test Method	:	ANSI C63.10: 2013 RSS GEN Issue 4: 2014 558074 D01 DTS Meas Guidance v03r02
FCC ID	:	WIFI Module: YV8-CU282 ZWAVE Module: YV8-HA7040
IC ID		WIFI Module: 9922A-CU282 ZWAVE Module: 9922A-HA7040
Dates of test	:	June 16, 2015
Issue Date	:	July 22, 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:	
Teody Manansala	**Chen Ge**
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA

ilac-MRA
ACCREDITED
TESTING CERT # 2742-01

Laboratory Introduction

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

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

Accreditations for Conformity Assessment

Country/Region	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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_IC_RF_ SL15041401-LHS-001_Co-location (HA7040)	None	Original	06/26/2015
FCC_IC_RF_ SL15041401-LHS-001_Co-location (HA7040)_Rev1.0	1.0	Update product name	07/22/2015

2 Executive Summary

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

Company: Pass & Seymour, Inc. d/b/a Legrand
Product: 802.11 b/g/n Wi-Fi Module & Z-Wave Transceiver Device (host)
Model: CU-282 & HA7040(host)

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	:	Pass & Seymour, Inc. d/b/a Legrand
Applicant Address	:	301 Fulling Mill Rd, Suite G, Middletown, PA 17057 USA
Manufacturer Name	:	Pass & Seymour, Inc. d/b/a Legrand
Manufacturer Address	:	301 Fulling Mill Rd, Suite G, Middletown, PA 17057 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	:	802.11 b/g/n Wi-Fi Module & Z-Wave Transceiver Device (host)
Model No.	:	CU-282 & HA7040(host)
Trade Name	:	Pass & Seymour, Inc. d/b/a Legrand
Serial No.	:	N/A
Input Power	:	3.3VDC
Power Adapter Manu/Model	:	EPSA050250U-P5P-EJ
Power Adapter SN	:	N/A
Hardware version	:	N/A
Software version	:	N/A
Date of EUT received	:	06/15/2015
Equipment Class/ Category	:	Class B, DTS
Clock Frequencies	:	N/A
Port/Connectors	:	Ethernet

6.2 Radio Description

Spec for Z-Wave

Radio Type	Description
Operating Frequency	908.40MHz/916.00MHz
Modulation	2FSK/2GFSK
Number of Channels	2
Antenna Type	Embedded antenna
Antenna Gain	3.48 dBi
Antenna Connector Type	On Board

Specs for WLAN

Radio Type	802.11b	802.11g	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz	2422-2452MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM,64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz	5MHz
Number of Channels	11	11	11	7
Antenna Type	Chip			
Antenna Gain (Peak)	0.53dBi (for 2.4GHz)			
Antenna Connector Type	On Board, U.FL			

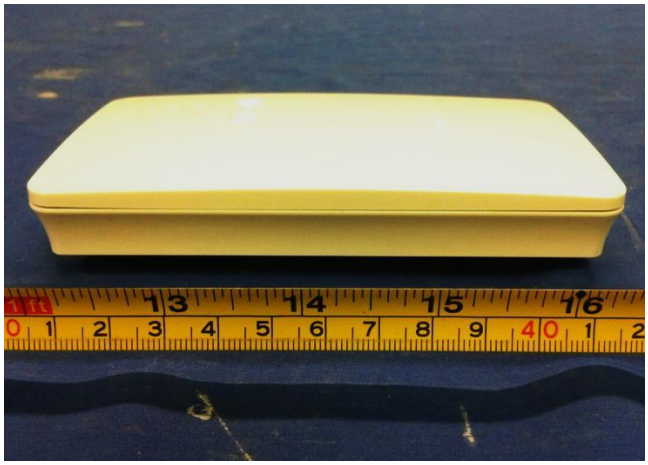
6.3 EUT test modes/configuration Description

Final Test Mode		Note
Final_test_mode _1	EUT set to continuous transmit Z-wave and Wifi simultaneously	Radiated spurious emissions below 1GHz
Final_test_mode _2	EUT set to continuous transmit Z-wave and Wifi simultaneously	Radiated spurious emissions above 1GHz
Remarks:		

6.4 EUT Photos – External

EUT – Top View

EUT – Bottom View



EUT – Left Side View

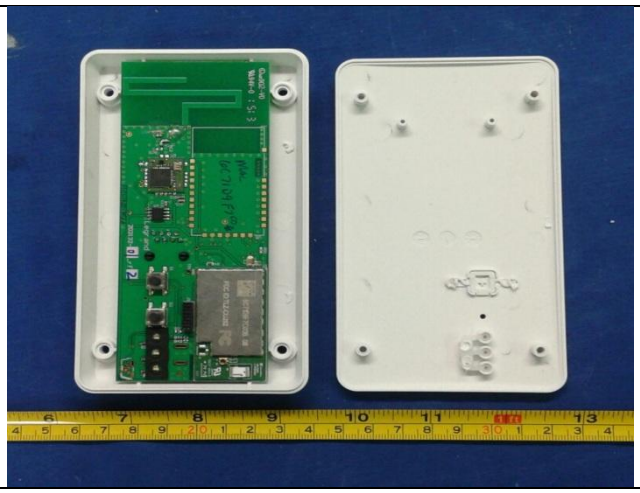
EUT – Right Side View

EUT – Top View

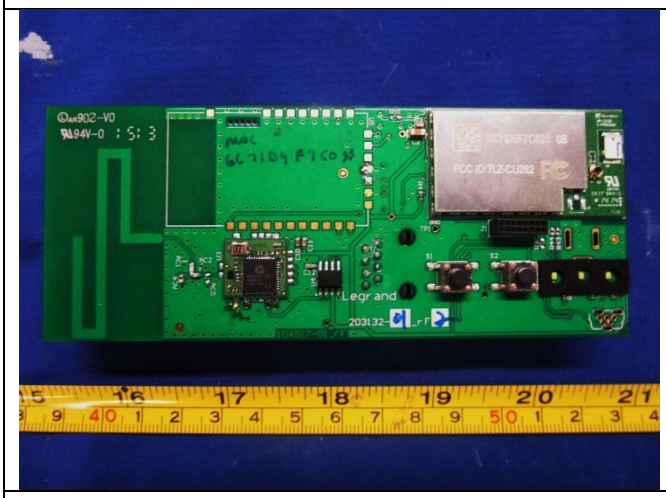
EUT – Bottom View

6.5 EUT Photos – Internal

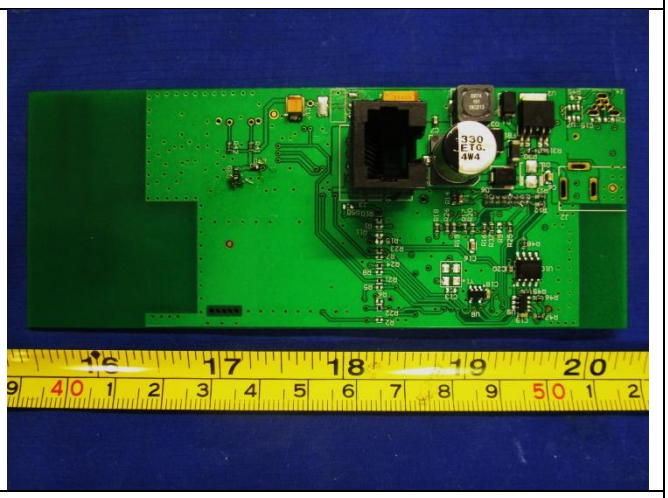
EUT-with cov



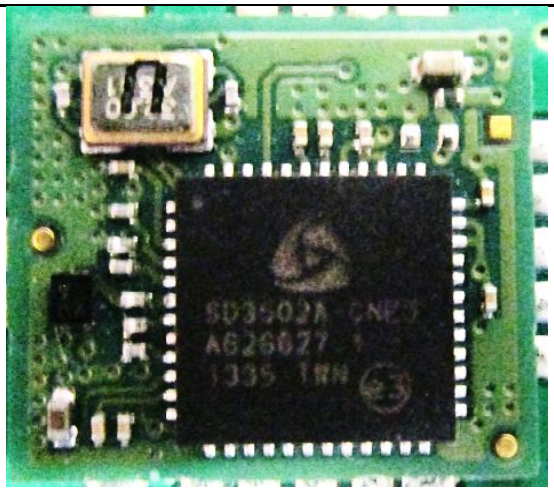
EUT-without cover



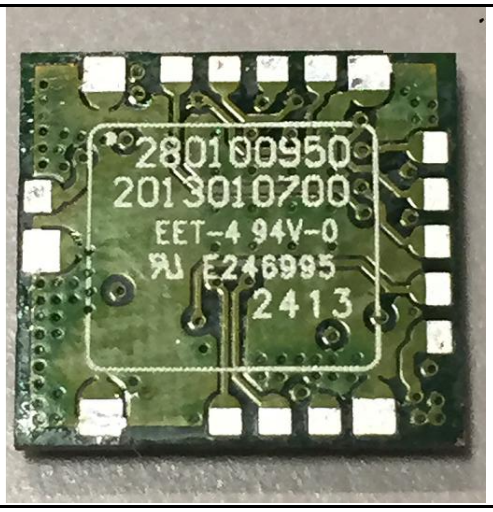
EUT – Top View



EUT – Bottom View

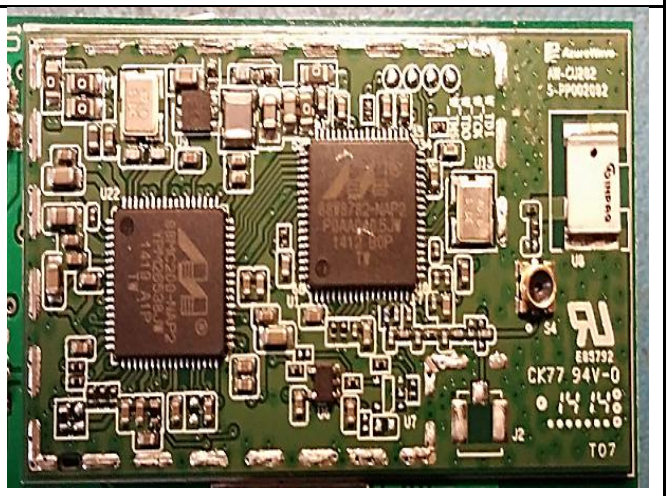


Z-Wave Module Top View

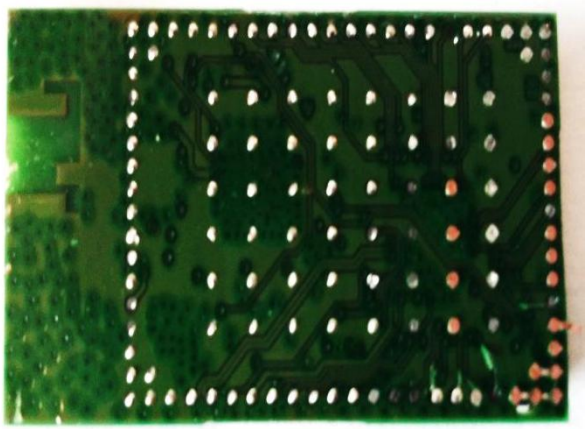


ZWave Module Bottom View

WLAN Module With Shielding

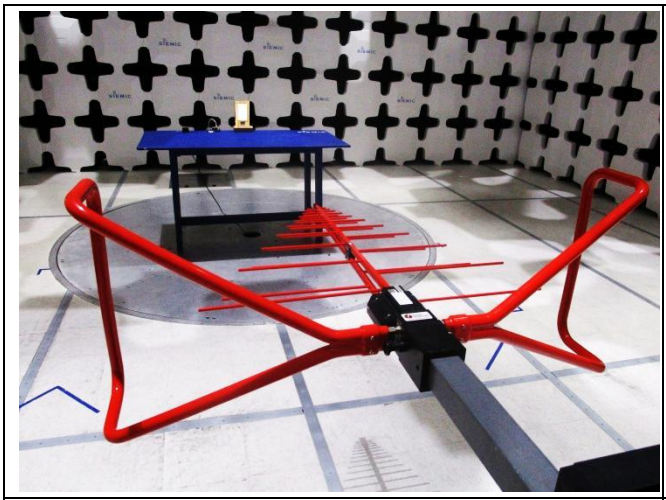


WLAN Module Without Shielding

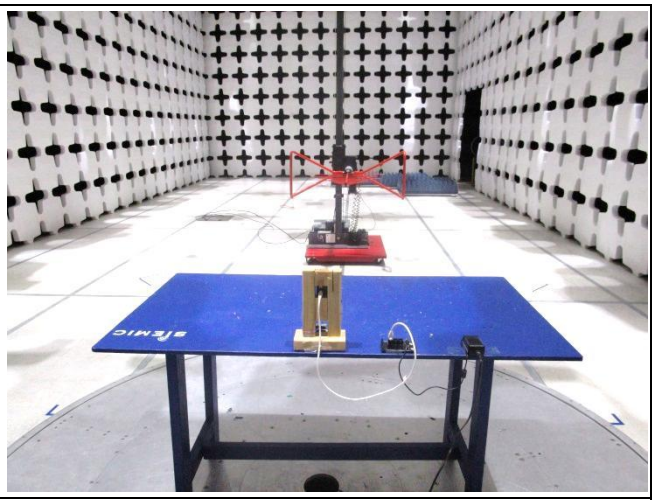


WLAN Bottom View

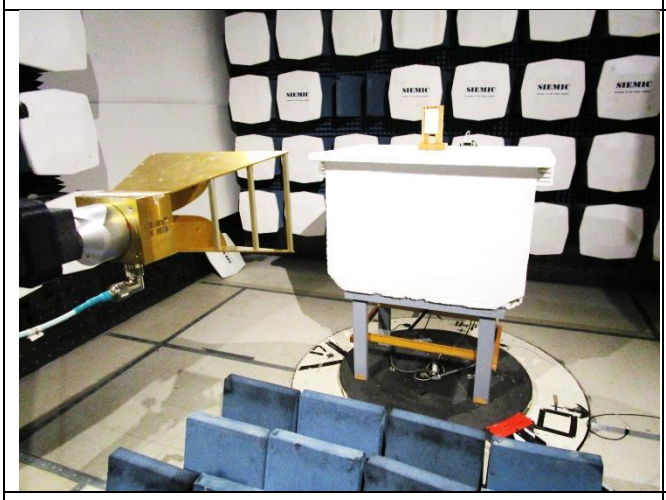
6.6 EUT Test Setup Photos



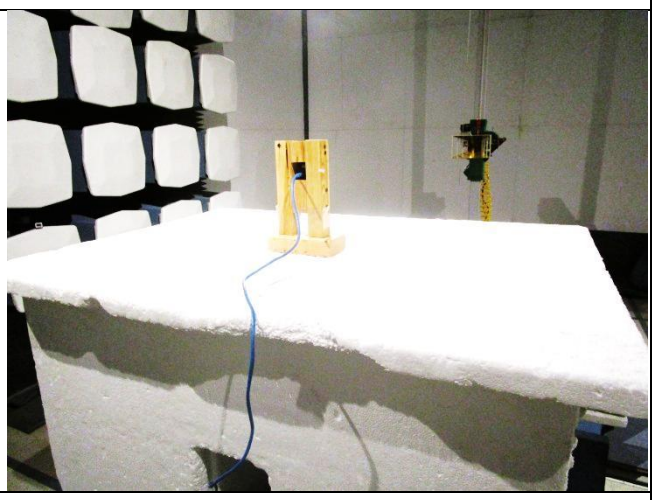
Spurious Emissions (30MHz-1GHz) – Front View



Spurious Emissions (30MHz-1GHz) – Rear View



Spurious Emissions (>1GHz) – Front View



Spurious 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	ES420	30437961985	Dell	-
2	Debug Adapter	203133	-	Legrand	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
RJ45	Power mdule	J1	EUT	J3	1	No	-
-	-	-	-	-	-	-	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Marvel W8782 Labtool	Set the EUT to transmit continuously in WIFI mode
RF Testing	Sigma RF-Link	Set the EUT to transmit continuously in Z-Wave mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Band Edge and Radiated Spurious Emissions	FCC/IC	15.247(d) RSS210(A8.5)	FCC/IC	ANSI C63.10 – 2013 558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
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.				

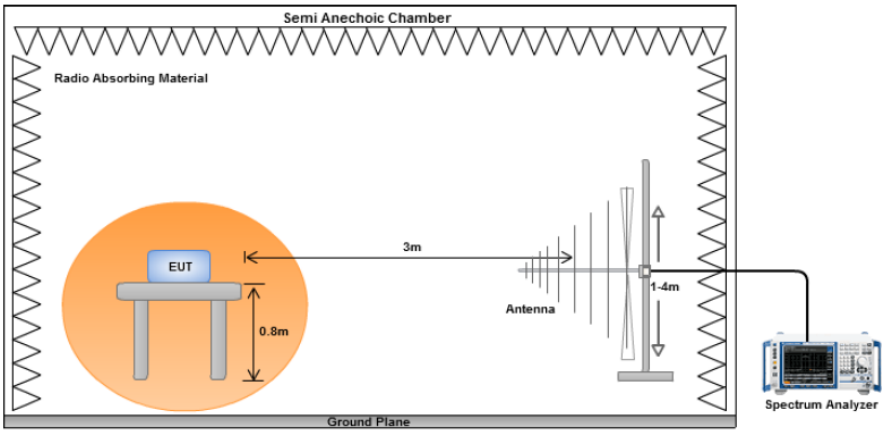
9 Measurement Uncertainty

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 Radiated Emissions below 1GHz

Requirement(s):

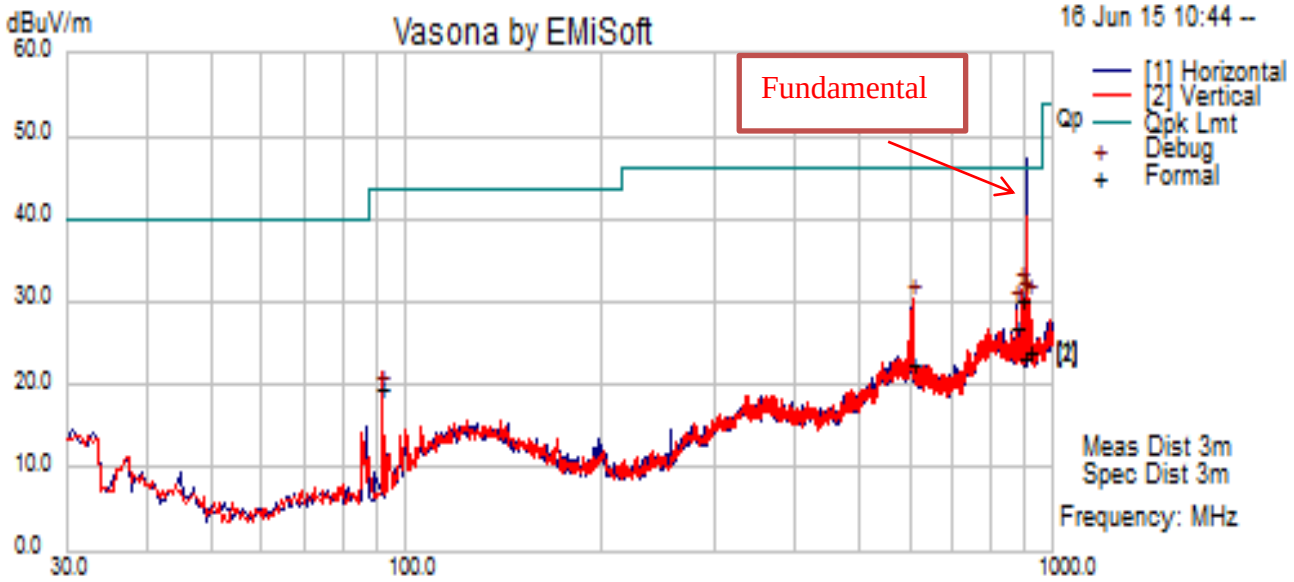
<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.247(d), RSS210(A8.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels 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></td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">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.</td></tr>
<tr><td>Remark</td><td colspan="3">The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission Test Results (Below 1GHz)

Test specification	Below 1GHz			
Environmental Conditions:	Temp (°C):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	110VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	June 16, 2015			
Remarks:	Z-Wave and WLAN transmitting simultaneously			



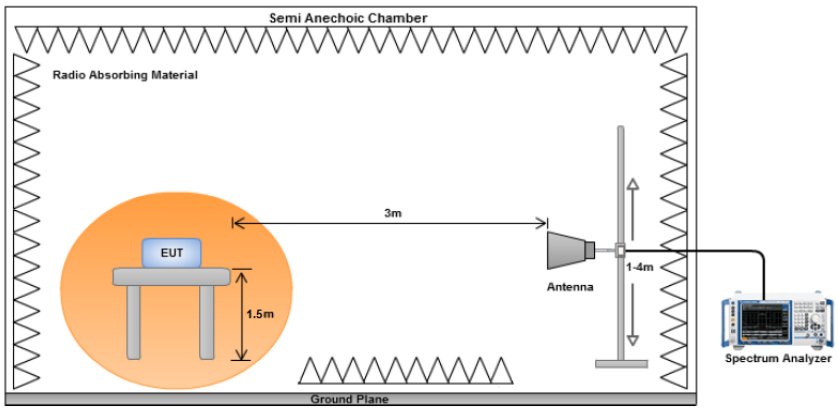
Quasi Max Measurement

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
45.28	47.54	1.10	-26.78	21.86	Quasi Max	V	138.00	339.00	40.00	-18.14	Pass
82.25	48.75	1.60	-30.74	19.61	Quasi Max	V	124.00	306.00	40.00	-20.39	Pass
52.56	45.47	1.18	-30.14	16.50	Quasi Max	V	100.00	151.00	40.00	-23.50	Pass
65.85	43.19	1.39	-30.05	14.53	Quasi Max	H	356.00	204.00	40.00	-25.47	Pass
33.15	33.41	1.01	-20.84	13.58	Quasi Max	V	187.00	255.00	40.00	-26.42	Pass
100.34	41.28	1.79	-28.26	14.82	Quasi Max	V	207.00	104.00	43.52	-28.70	Pass

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

10.2 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	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. An average 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	The EUT was scanned up to 25GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 18 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 18 GHz	Peak	Auto	Max hold	Ave Measurement

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test specification	Above 1GHz			
Environmental Conditions:	Temp (°C):	26.7	Result	Pass
	Humidity (%)	46.8		
	Atmospheric (mbar):	1020		
Mains Power:	110VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	June 16, 2015			
Remarks:	Z-Wave and WLAN transmitting simultaneously			

Above 1GHz-18GHz- Z-Wave and WIFI transmitting simultaneously

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
1034.51	44.75	2.46	9.62	56.83	Peak Max	H	258.00	29.00	74.00	-17.17	Pass
4117.09	40.79	5.93	11.71	58.43	Peak Max	H	151.00	92.00	74.00	-15.57	Pass
2057.03	42.66	3.55	11.30	57.51	Peak Max	H	168.00	48.00	74.00	-16.49	Pass
17846.18	39.74	13.00	10.75	63.49	Peak Max	V	141.00	324.00	74.00	-10.51	Pass
13145.00	42.13	12.10	8.16	62.39	Peak Max	V	168.00	40.00	74.00	-11.61	Pass
1034.51	31.83	2.46	9.62	43.92	Average Max	H	258.00	29.00	54.00	-10.08	Pass
4117.09	26.91	5.93	11.71	44.55	Average Max	H	151.00	92.00	54.00	-9.45	Pass
2057.03	29.87	3.55	11.30	44.71	Average Max	H	168.00	48.00	54.00	-9.29	Pass
17846.18	26.76	13.00	10.75	50.51	Average Max	V	141.00	324.00	54.00	-3.49	Pass
13145.00	28.76	12.10	8.16	49.02	Average Max	V	168.00	40.00	54.00	-4.98	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
Spectrum Analyzer	N9010A	MY50210206	08/13/2014	1 Year	08/13/2015	
V-LISN (150 kHz – 30 MHz)	NNLK 8129	8129-190	08/11/2014	1 Year	08/11/2015	☐
LISN (9 kHz – 30 MHz)	MN2050B	1018	07/31/2014	1 Year	07/31/2015	☐
Radiated Emissions						
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2014	1 Year	08/12/2015	☑
Horn Antenna (1-18GHz)	3115	10SL0059	08/11/2014	1 Year	08/11/2015	☑
Horn Antenna (18-40 GHz)	AH-840	101013	08/11/2014	1 Year	08/11/2015	☐
Pre-Amplifier	LPA-6-30	11140711	02/19/2015	1 Year	02/19/2016	☑
Microwave Preamplifier (18-40 GHz)	PA-840	181251	02/19/2015	1 Year	02/19/2016	☐
3 Meters SAC	3M	N/A	08/29/2014	1 Year	08/29/2015	☑
10 Meters SAC	10M	N/A	09/05/2014	1 Year	09/05/2015	☑
EMI Test Receiver	ESIB 40	100179	06/03/2015	1 Year	06/03/2016	☑

Test Software Version

Test Item	Vendor	Software	Version	In Use
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
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