RF TEST REPORT

SIEMIC
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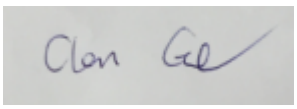
Report No.: FCC-IC_RF_SL15081101-CPC-009_UNII_5G_Rev1.2
Supersede Report No.: FCC-IC_RF_SL15081101-CPC-009_UNII_5G_Rev1.1

Applicant	:	ChargePoint, Inc
Product Name	:	Network Communication / RFID Reader
Model No.	:	28010077/ 28010087
Host Model no.	:	CPF12 & CPF25
Test Standard	:	47 CFR 15.407 RSS-247 Issue 1, May 2015
Test Method	:	ANSI C63.10: 2013 RSS-Gen Issue 4, Nov 2014 789033 D02 General UNII Test Procedures New Rules v01
FCC ID	:	W38-28010077/ W38-28010087
IC ID	:	8854A-28010077/ 8854A-28010087
Dates of test	:	September 17th, 21st – 23rd of 3015
Issue Date	:	11/4/2015
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	**Chen Ge**
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:
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	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_SL15081101-CPC-009_UNII_5G	None	Original	09/31/2015
FCC-IC_RF_SL15081101-CPC-009_UNII_5G_Rev1.0	Rev 1.0	Updated EUT information	10/01/2015
FCC-IC_RF_SL15081101-CPC-009_UNII_5G_Rev1.1	Rev 1.1	Included enclosure photos	10/27/2015
FCC-IC_RF_SL15081101-CPC-009_UNII_5G_Rev1.2	Rev 1.2	Updated page 31	11/4/2015

2 Executive Summary

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

Company:	ChargePoint, Inc.
Product:	Network Communication / RFID Reader
Model:	28010077/ 28010087
Host Model No.	CPF12 & CPF25

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	ChargePoint, Inc.
Applicant Address	254 E. Hacienda Ave Campbell, CA 95148
Manufacturer Name	ChargePoint, Inc.
Manufacturer Address	254 E. Hacienda Ave Campbell, CA 95148

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	:	Network Communication / RFID Reader
Model No.	:	28010077/ 28010087
Serial No.	:	Prototype 1
Trade Name	:	ChargePoint
Host Model No.	:	CPF12 & CPF25
Input Power	:	100-240VDC, 50/60Hz
Product Hardware version	:	28-010087
Product Software version	:	4.0.1.100
Radio Hardware version	:	28-010087
Radio Software version	:	4.0.1.100
Date of EUT received	:	08/21/2015
Equipment Class/ Category	:	UNII, DTS
Clock Frequencies	:	N/A
Port/Connectors	:	N/A

6.2 Radio Description

Specifications for Radio:

Radio Type	802.11a
Operating Frequency	5180-5240MHz 5745-5825MHz
Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	20MHz
Number of Channels	9
Antenna Type	Prestta WLAN Embedded Antenna
Antenna Gain (Peak)	3.5dBi (for 5GHz)
Antenna Connector Type	On Board
Note	-

Radio Type	RFID
Operating Frequency	13.56MHz
Modulation	ASK
Channel Spacing	None
Antenna Type	PCB loop antenna
Antenna Gain	0.5dBi
Antenna Connector Type	N/A

EUT Power Settings

Band	Mode	Frequency	Power setting
5150-5250MHz	802.11a	5180	20
		5200	20
		5240	20
5725-5850MHz	802.11a	5745	20
		5785	20
		5825	20

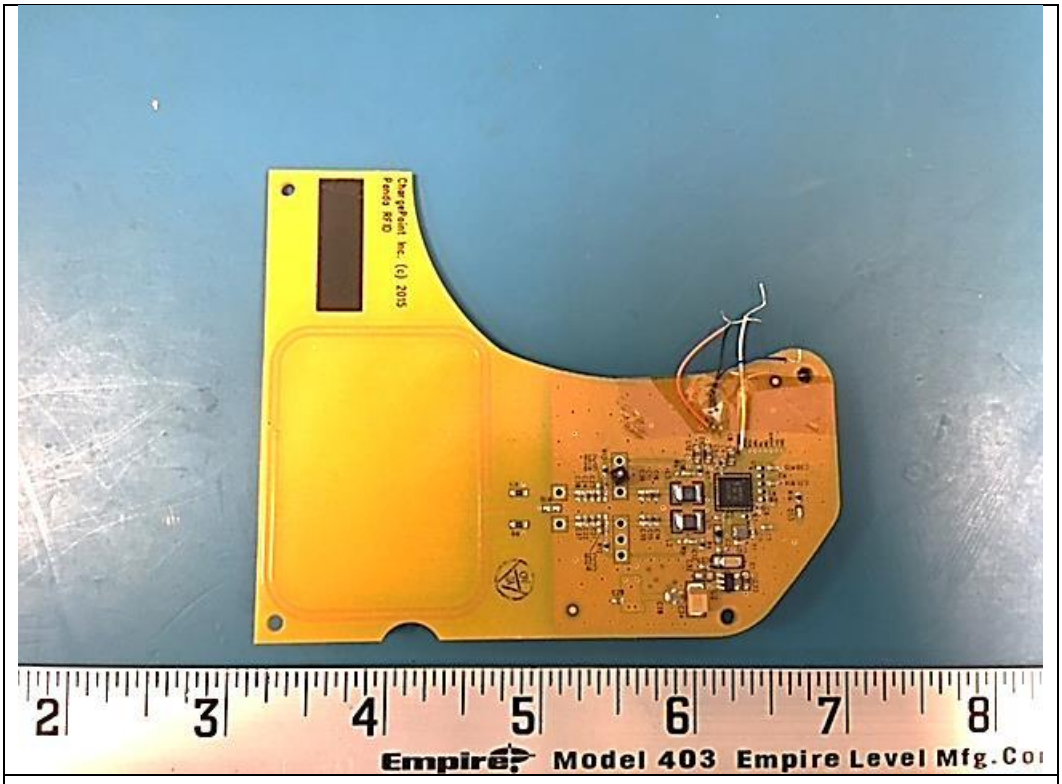
Channel List:

Type	Mode	Channel No.	Frequency (MHz)	Available (Y/N)
RFID	13.56MHz	1	13.56	Y

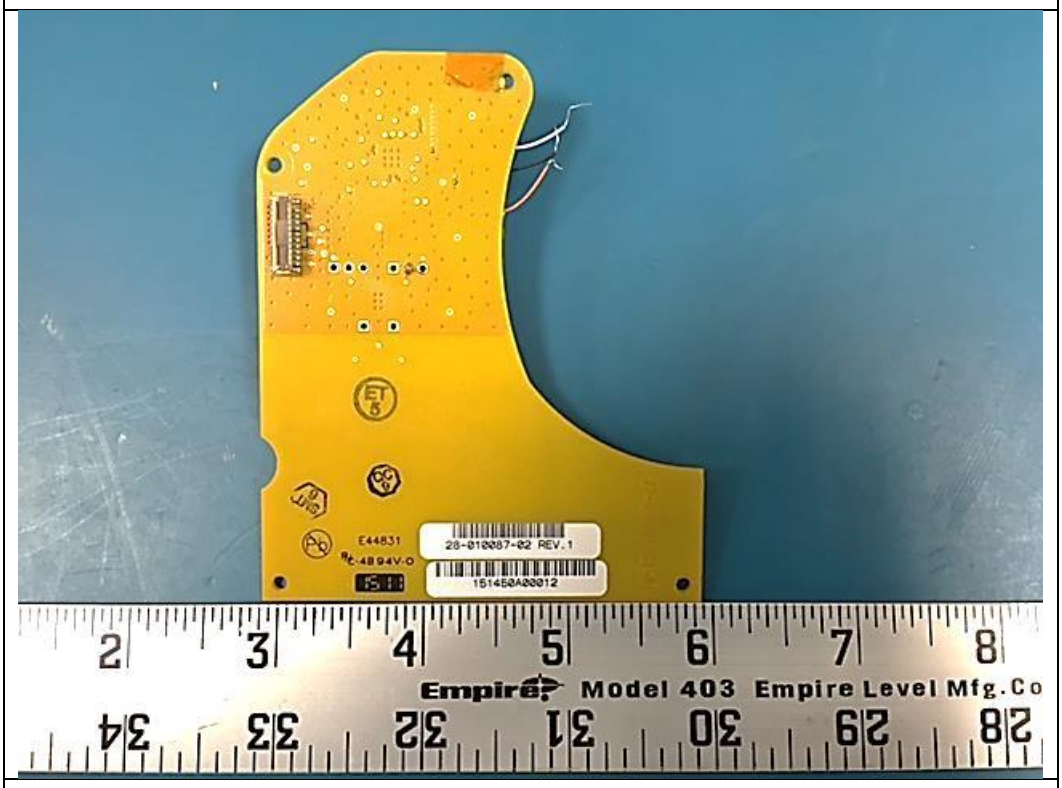
6.1 EUT test modes/configuration Description

Mode	Note
802.11a	OFDM
RF test	EUT is set to continuously transmit at 13.56MHz when powered on.

6.2 EUT Photos



PCBA1 RFID - View 1



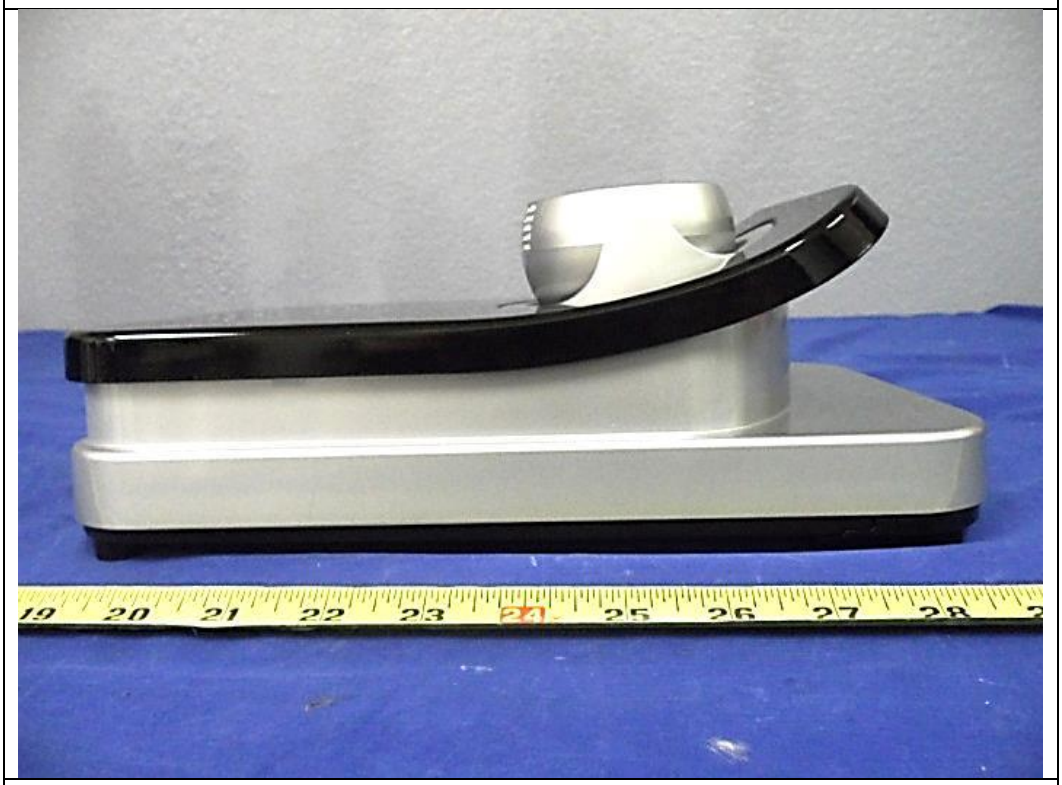
PCBA1 RFID - View 2

6.3 Host External Photos

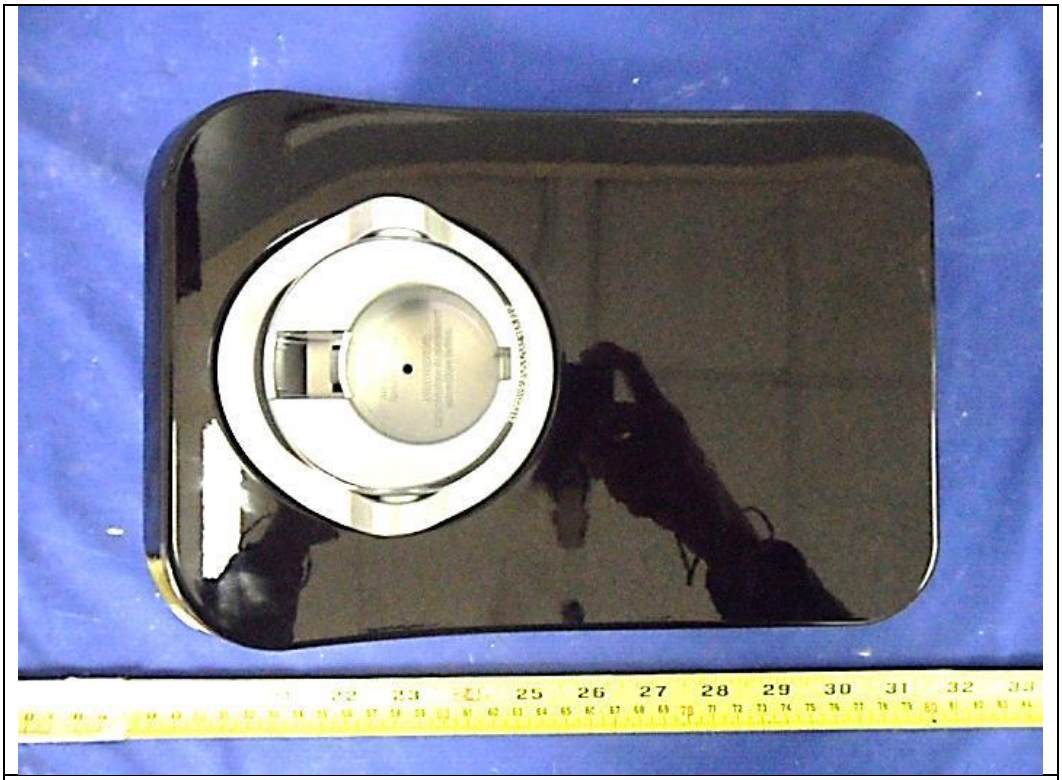
EUT – Front View

EUT – Rear View

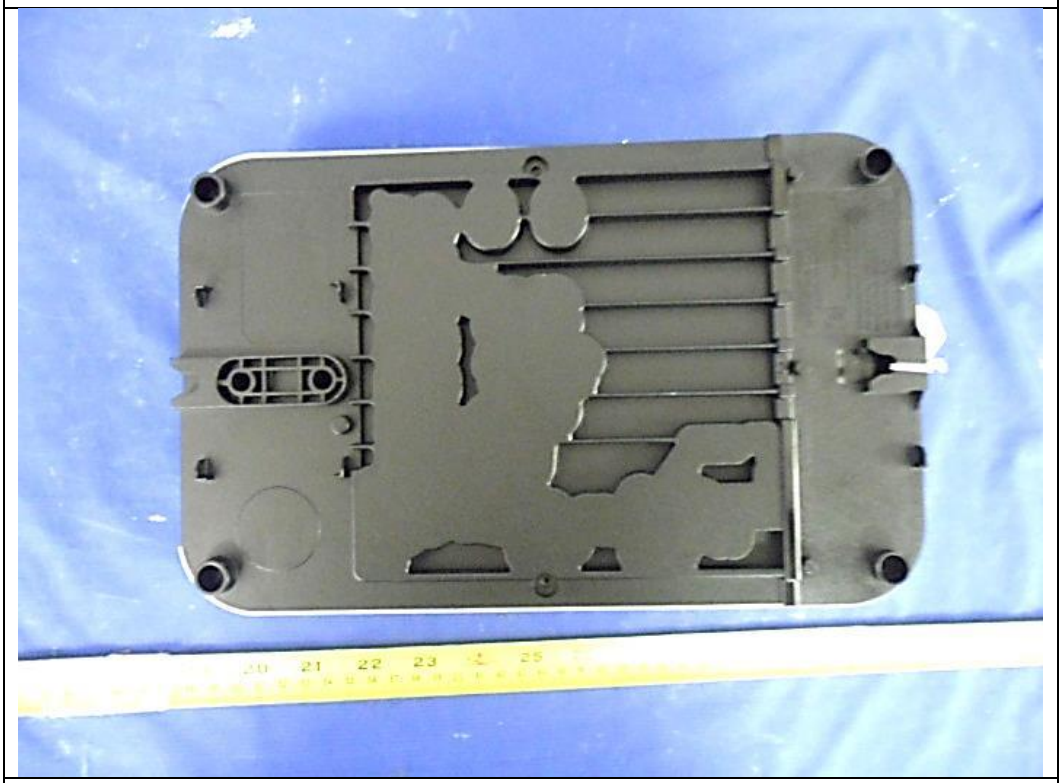
EUT – Left View



EUT – Right View

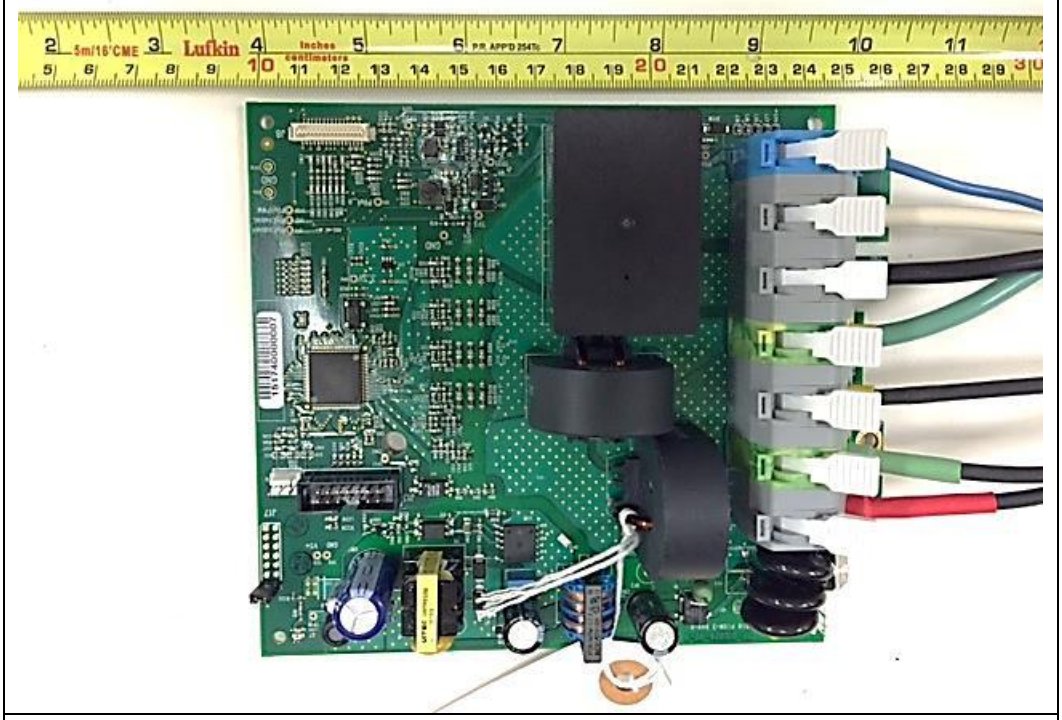


EUT – Top View

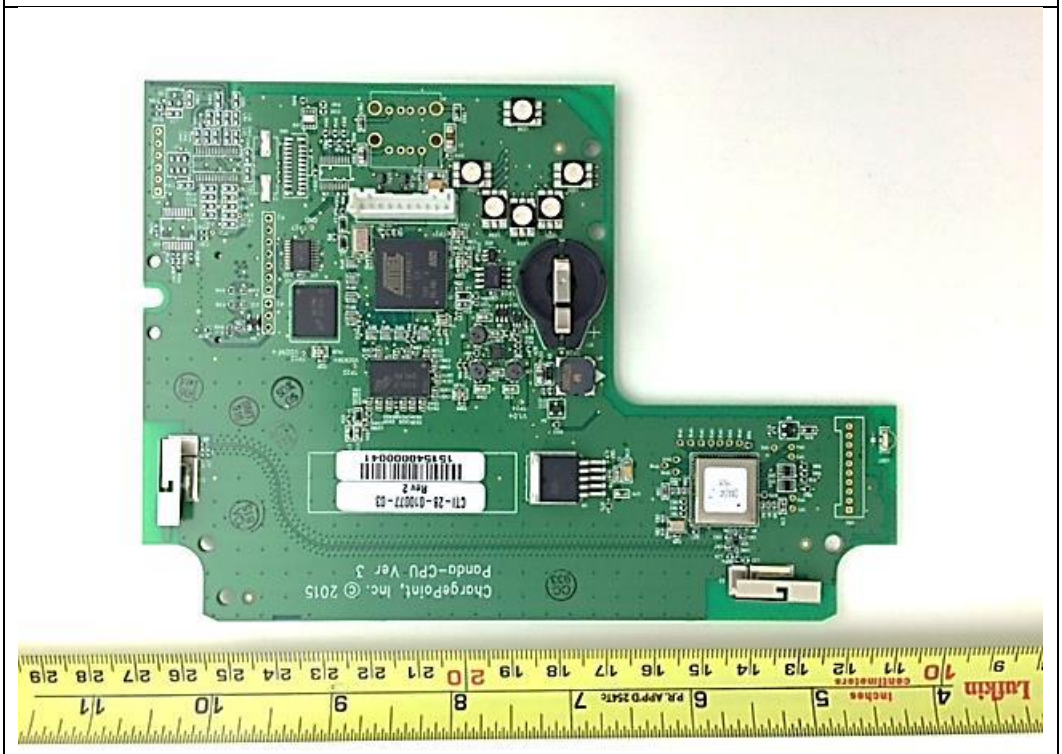


EUT – Bottom View

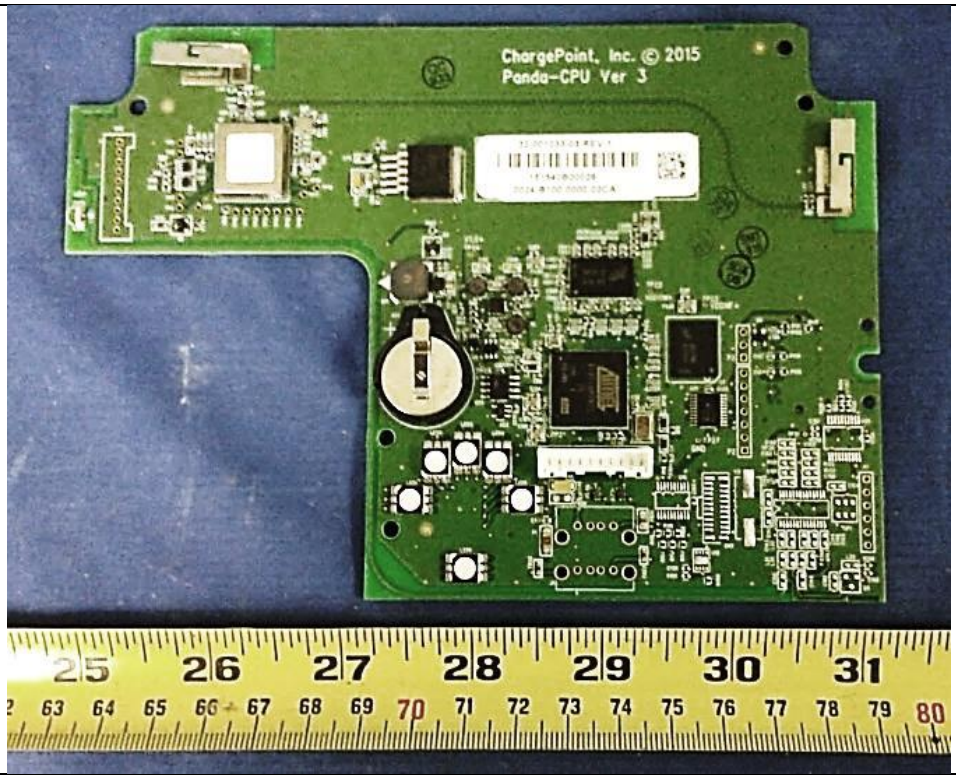
6.4 Host Internal Photos



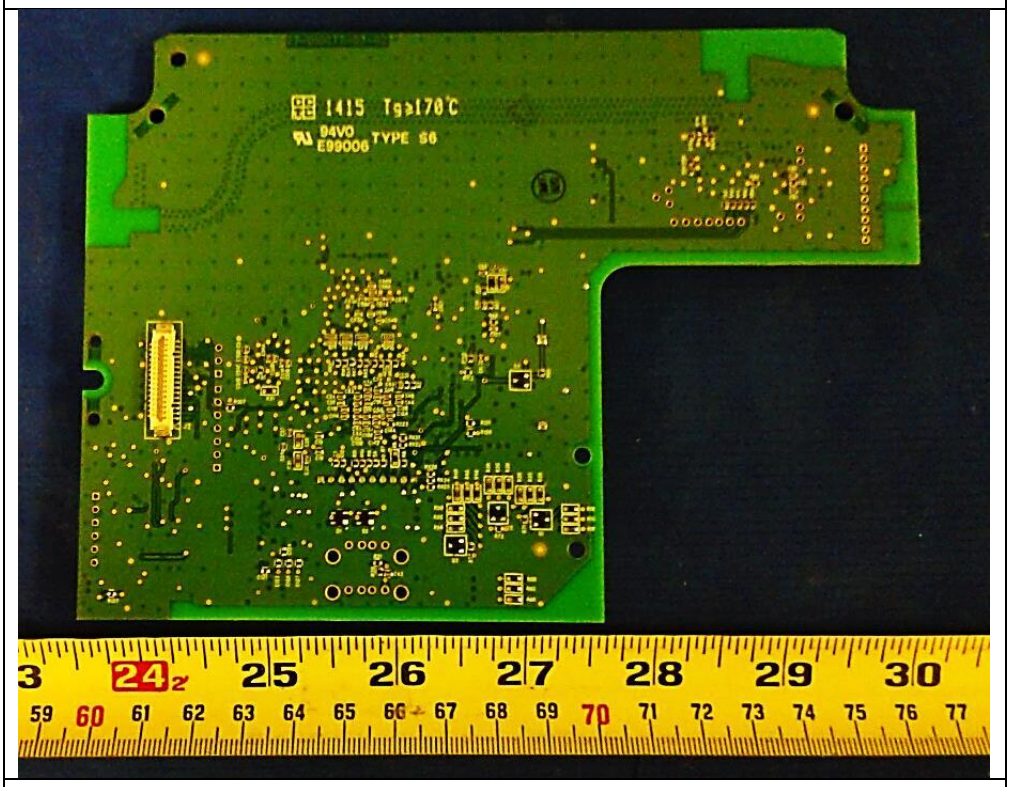
PCB Main Board- Top View



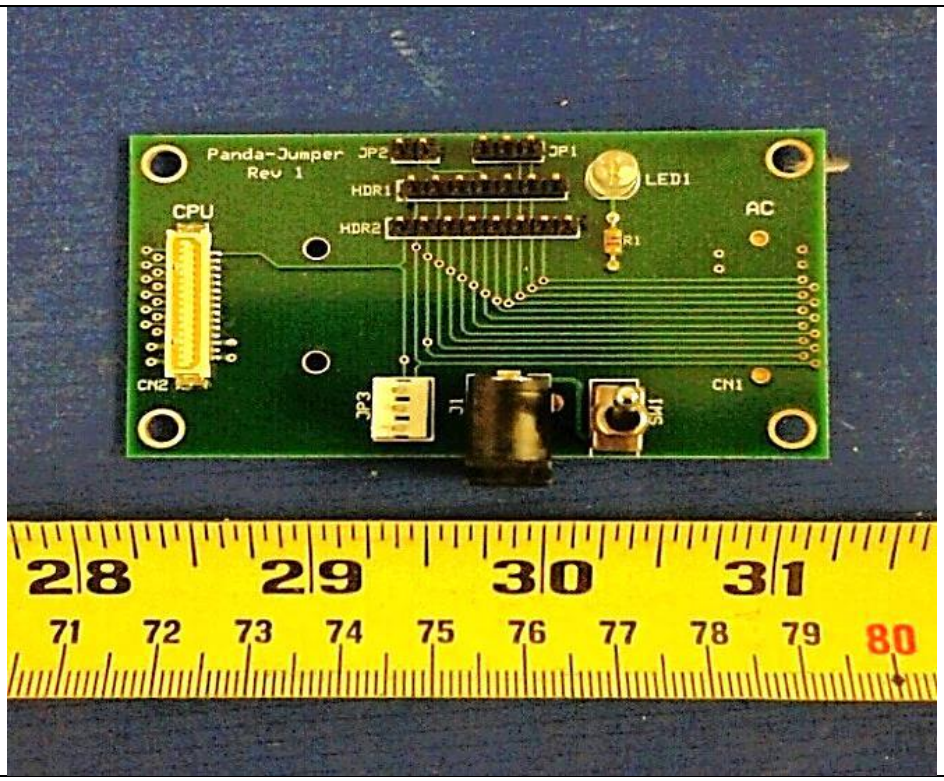
PCB Main Board- Bottom View



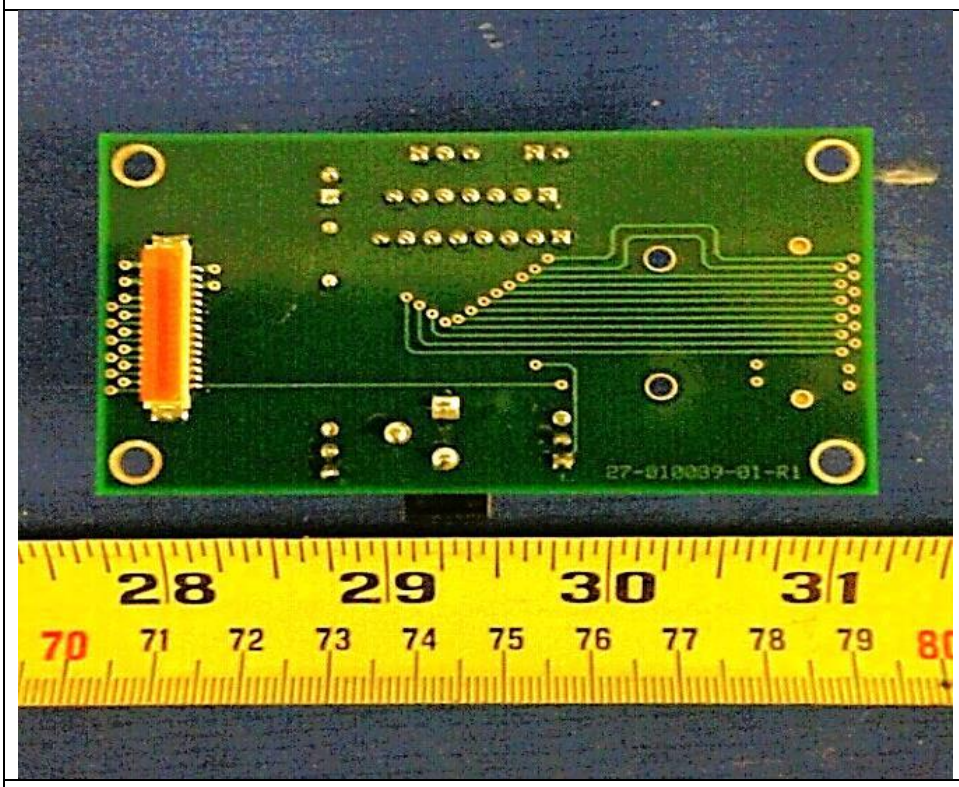
PCBA1 –Top View



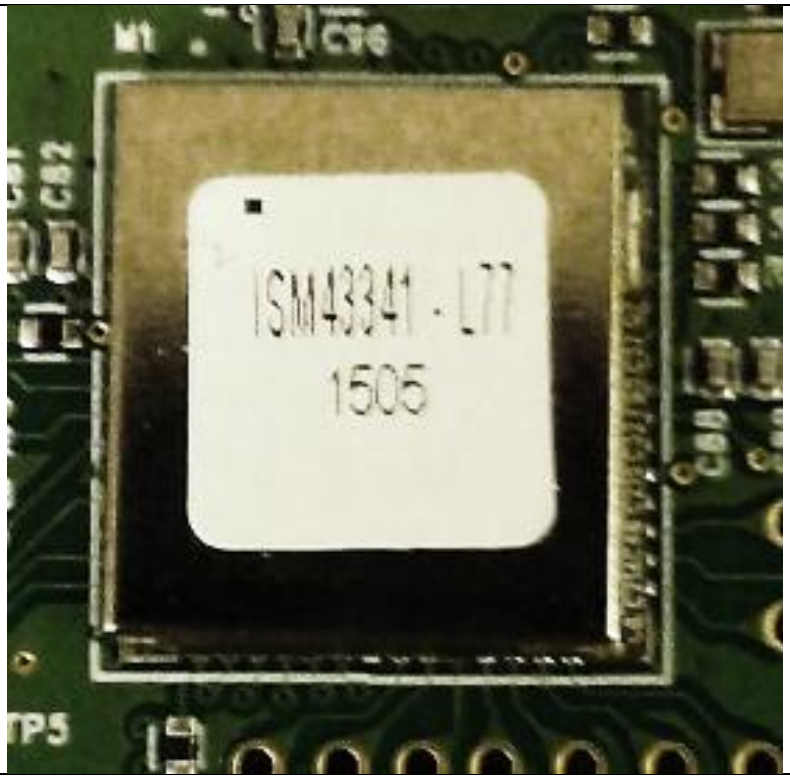
PCBA1 –Bottom View



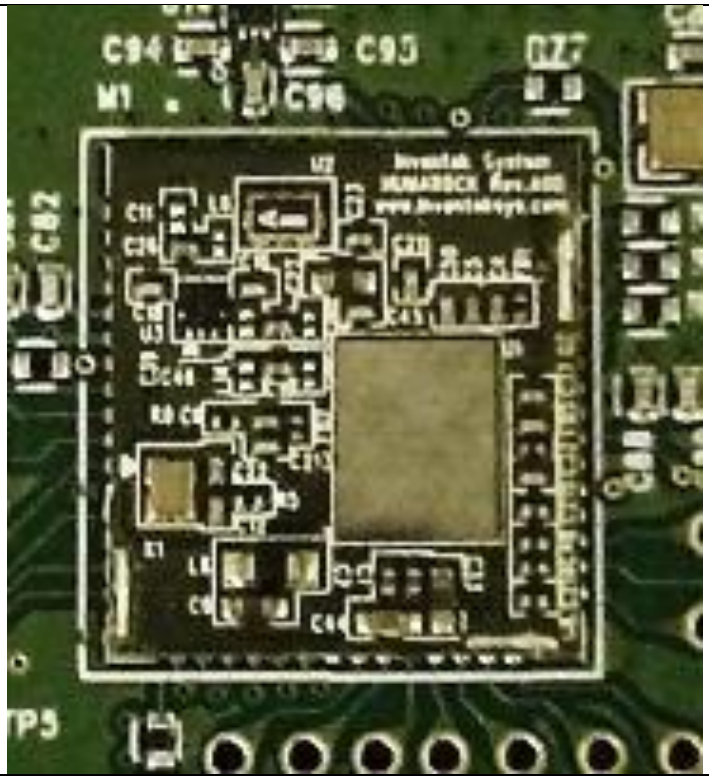
PCBA2 –Top View



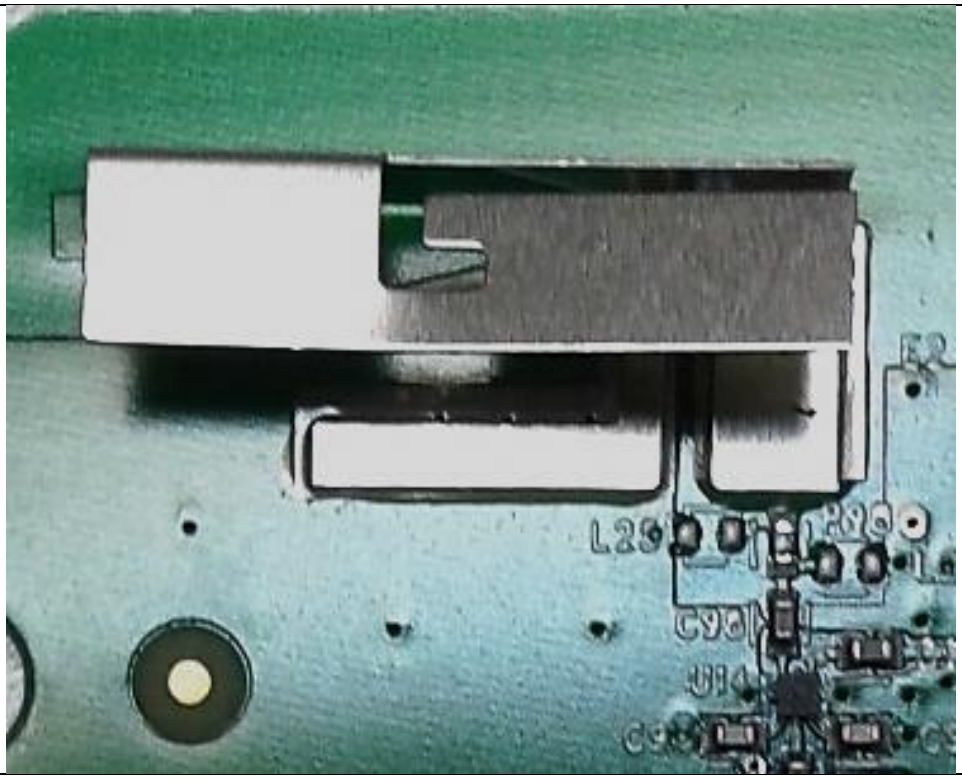
PCBA2 –Bottom View



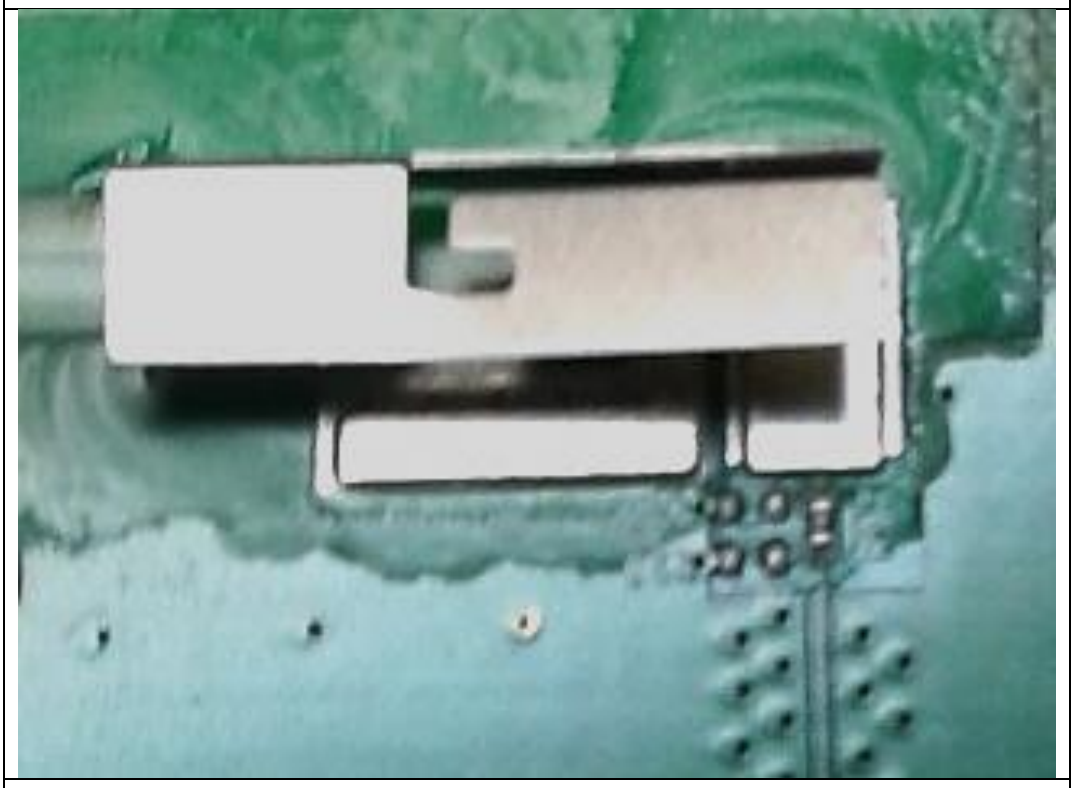
EUT Radio with shielding



EUT Radio without shielding

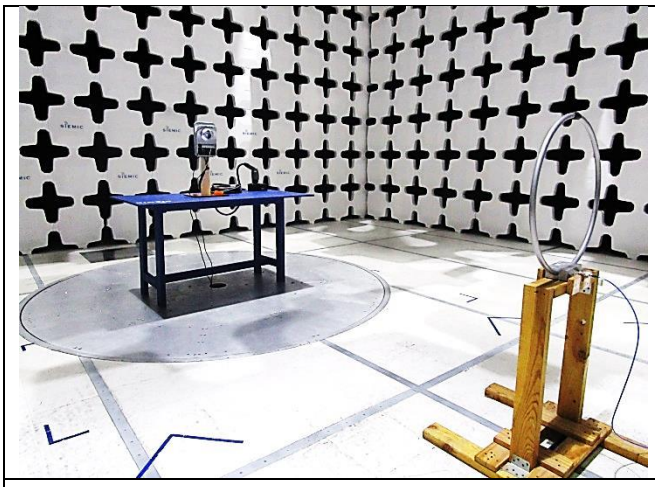


Antenna 1

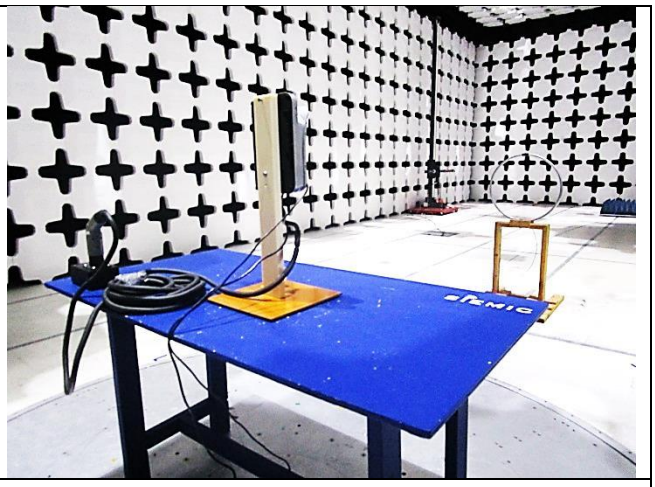


Antenna 2

6.5 EUT Test Setup Photos

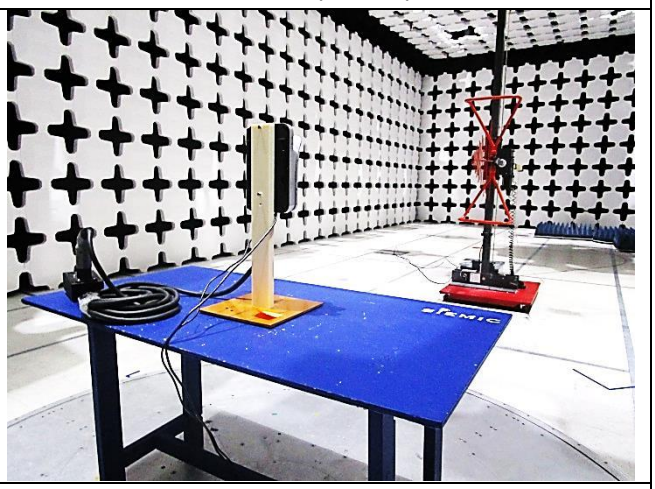


Radiated Emissions (<30MHz) – Front View

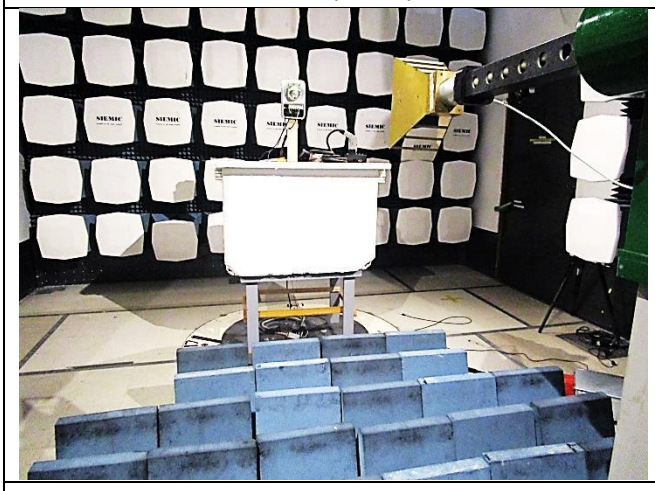


Radiated Emissions (<30MHz) – Rear View

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	P05F Latitude E5510	N/A	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	
USB	EUT	I/O Port	Laptop	USB	2	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Tera Term	Set the EUT to transmit continuously in diferent test mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Restricted Band of Operation	FCC	15.205	ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v01	☐ Pass ☒ N/A
	IC	RSS Gen 8.10		
AC Conducted Emissions Voltage	FCC	15.207(a)	ANSI C63.10: 2013	☐ Pass ☒ N/A
	IC	RSS Gen 8.8	RSS Gen Issue 4: 2014	

Test Item	Test standard		Test Method/Procedure	Pass / Fail
26 & 6 dB Emission Bandwidth	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☐ Pass ☒ N/A
	IC	RSS247 (6.2)	RSS Gen Issue 4: 2014	
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
	IC	RSS Gen (6.12)	RSS Gen Issue 4: 2014	
Power reduction (Antenna Gain > 6 dBi)	FCC	15.407 (a) (2)	-	☐ Pass ☒ N/A
	IC	-	-	
Band Edge and Radiated Spurious Emissions	FCC	15.407(b)(2), 15.407(b)(6)	ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
	IC	RSS Gen (6.13)	RSS Gen Issue 4: 2014	
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☐ Pass ☒ N/A
	IC	RSS247 (5.2.2)	RSS Gen Issue 4: 2014	
Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 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. 3. Reference the report FCC_RF_SL15060501-CPC-006_UNII_5G Rev 1.0 for more information.			

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 Measurements

10.1.1 Radiated Measurements below 30MHz

Requirement(s):

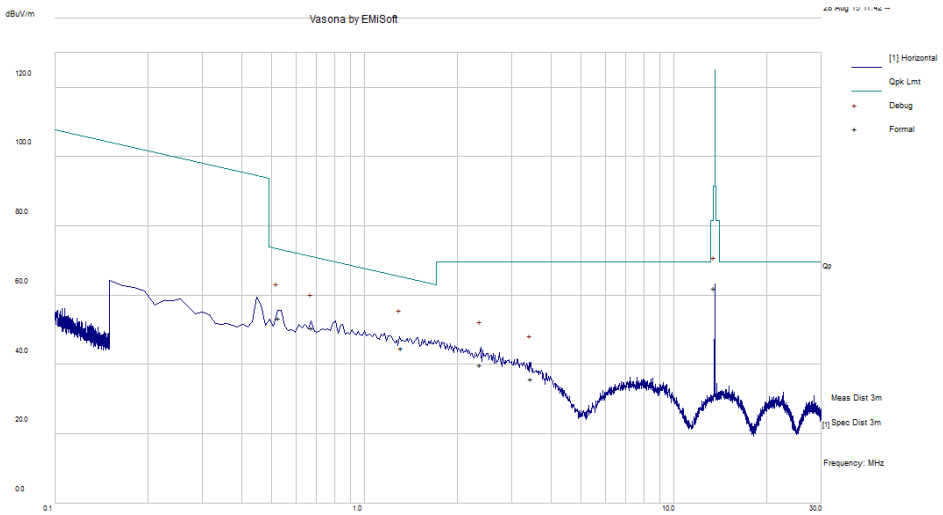
Specification(s)	Requirement			Applicable
47 CFR §15.225 RSS Gen 6.4	Operation within the band 13.110–14.010 MHz (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters. (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.			☒
Test Setup	1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table. 2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable. 3. The relevant loop antenna was set at the required test distance away from the EUT and supporting equipment boundary.			
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the centre of the loop. The measuring bandwidth was set to 10 kHz. The limit is converted from microvolt/meter to decibel microvolt/meter.			
Test Date	08/28/2015	Environmental conditions	Temperature Relative Humidity Atmospheric Pressure	22°C 40% 1026mbar
Remark	WLAN 2.4GHz worst case.			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Plots for LMA Module/s and CPF12 & CPF25 below 30MHz

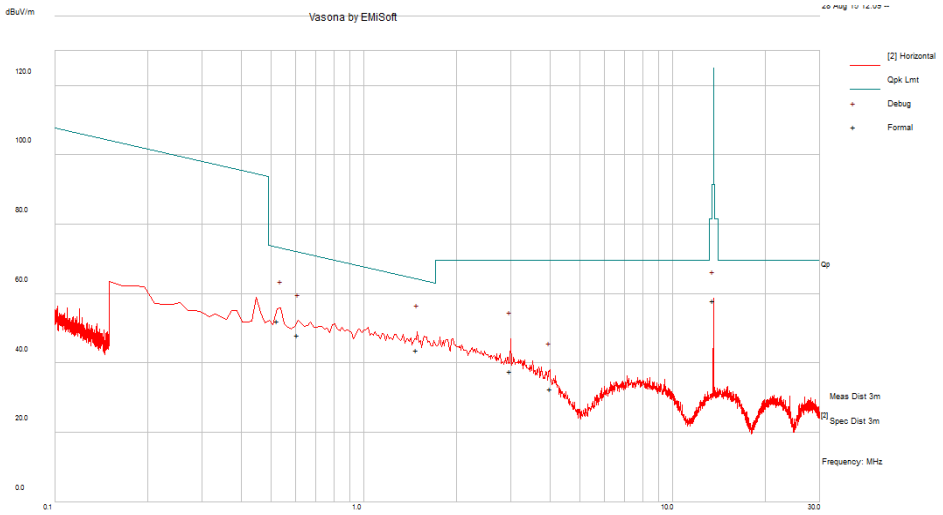
***f*= 100kHz – 30MHz plot, and loop antenna at 0 degree at 3m distance**



***f*= 100kHz – 30MHz Measurements**

Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Degree	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
0.53	35.78	-0.18	17.71	53.32	Quasi Max	0.00	100.00	262.00	73.12	-19.80	Pass
0.68	35.19	-0.19	15.72	50.72	Quasi Max	0.00	100.00	123.00	70.95	-20.23	Pass
1.32	34.57	-0.23	10.52	44.86	Quasi Max	0.00	100.00	123.00	65.19	-20.33	Pass
2.37	34.20	-0.30	6.16	40.06	Quasi Max	0.00	100.00	66.00	69.54	-29.48	Pass
3.46	32.47	-0.31	3.69	35.85	Quasi Max	0.00	100.00	167.00	69.54	-33.70	Pass
13.56	62.84	-0.62	-0.16	62.07	Quasi Max	0.00	100.00	184.00	123.99	--61.92	Pass

f= 100kHz – 30MHz plot, and loop antenna at 90 degree at 3m distance



f= 100kHz – 30MHz Measurements

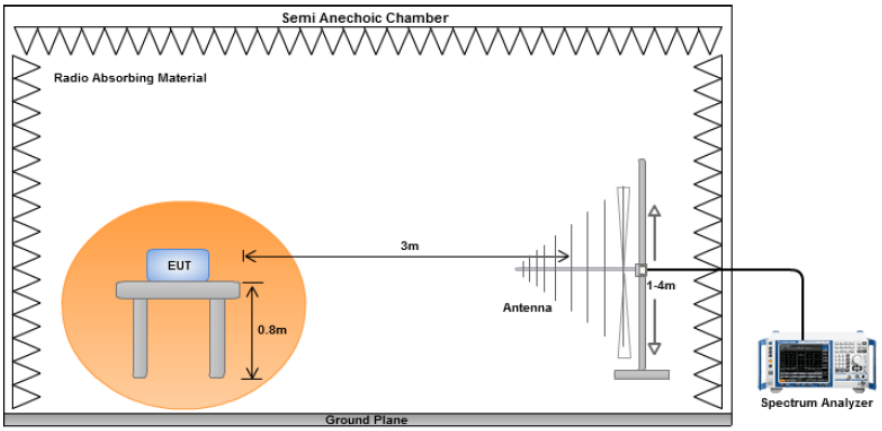
Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Degree	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
0.53	34.57	-0.18	17.77	52.17	Quasi Max	90.00	100.00	283.00	73.12	--20.95	Pass
0.61	31.67	-0.19	16.52	48.00	Quasi Max	90.00	100.00	171.00	71.90	-23.90	Pass
1.48	34.34	-0.24	9.62	43.73	Quasi Max	90.00	100.00	117.00	64.20	-20.47	Pass
2.99	33.33	-0.31	4.54	37.56	Quasi Max	90.00	100.00	176.00	69.54	-31.99	Pass
4.01	30.08	-0.30	2.83	32.61	Quasi Max	90.00	100.00	354.00	69.54	-36.93	Pass
13.56	58.67	-0.62	-0.16	57.89	Quasi Max	90.00	100.00	93.00	123.99	-66.10	Pass

10.1.2 Radiated Emissions below 1GHz

Requirement(s):

Specification(s)	Requirement	Applicable
47CFR§ 15.407(b) 15.209 (a) RSS Gen (6.13)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒

Frequency range (MHz)	Field Strength (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	Both horizontal and vertical polarities were investigated. The results show only the worst case.
Result	☒ Pass ☐ Fail

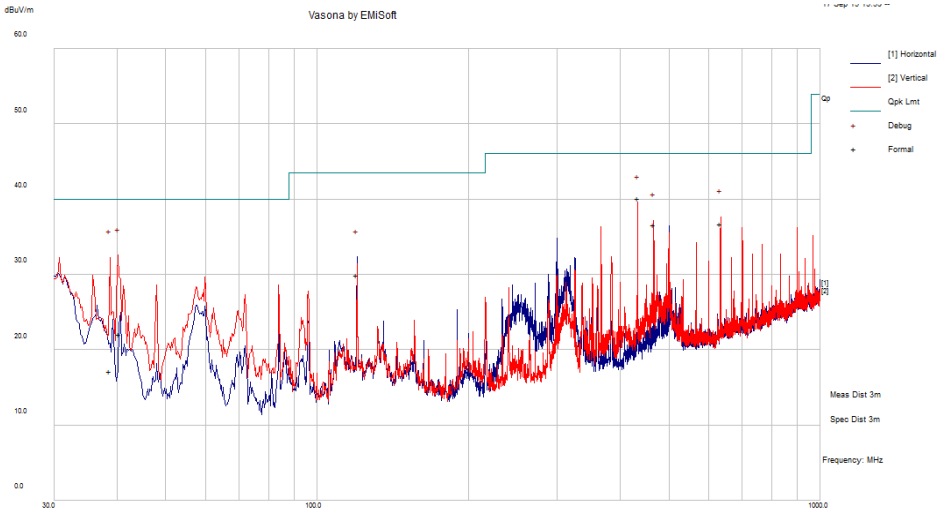
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Spurious Emissions			
Environmental Conditions:	Temp(°C):	25.5 ºC	Result:	☒ Pass ☐ Fail
	Humidity (%):	44.4 %		
	Atmospheric(mbar):	1016 mbar		
Mains Power:	208V_{AC}, 60Hz			
Tested by:	Osvaldo Casorla			
Test Date:	09/17/2015			
Remarks:	802.11a-5240MHz			

***f*=30MHz – 1000MHz plot at V= 208V_{AC}, 60Hz and 3 meter distance**



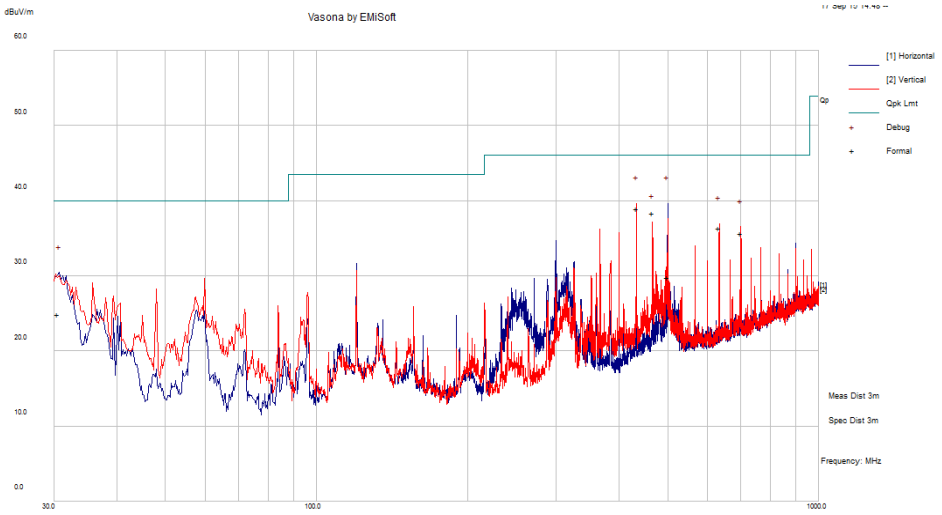
***f*=30MHz – 1000MHz Measurements**

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
38.64	37.90	0.90	-21.61	17.18	Quasi Max	V	198.00	270.00	40.00	-22.82	Pass
40.40	43.98	0.95	-22.90	22.03	Quasi Max	V	106.00	96.00	40.00	-17.97	Pass
120.02	52.76	1.80	-24.65	29.91	Quasi Max	H	257.00	283.00	43.52	-13.61	Pass
433.33	58.62	3.67	-22.09	40.19	Quasi Max	V	163.00	297.00	46.02	-5.83	Pass
466.69	54.59	3.75	-21.69	36.65	Quasi Max	V	150.00	254.00	46.02	-9.37	Pass
633.32	51.35	4.54	-19.21	36.68	Quasi Max	V	121.00	350.00	46.02	-9.34	Pass

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

Test specification:	Radiated Spurious Emissions			
Environmental Conditions:	Temp(°C):	25.5 ºC	Result:	☒ Pass ☐ Fail
	Humidity (%):	44.4 %		
	Atmospheric(mbar):	1016 mbar		
Mains Power:	208V_{AC}, 60Hz			
Tested by:	Osvaldo Casorla			
Test Date:	09/17/2015			
Remarks:	802.11a-5785MHz			

f=30MHz – 1000MHz plot at V= 208V_{AC}, 60Hz and 3 meter distance



f=30MHz – 1000MHz Measurements

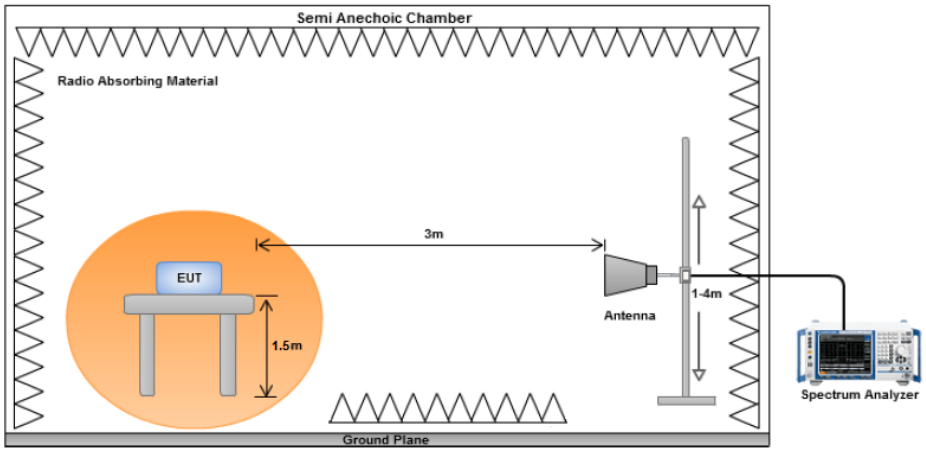
Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
30.49	38.99	0.81	-14.85	24.95	Quasi Max	H	203.00	73.00	40.00	-15.05	Pass
433.33	57.41	3.67	-22.09	38.99	Quasi Max	V	160.00	325.00	46.02	-7.03	Pass
466.65	56.29	3.75	-21.69	38.35	Quasi Max	V	167.00	248.00	46.02	-7.67	Pass
499.97	46.85	4.01	-21.08	29.78	Quasi Max	H	376.00	14.00	46.02	-16.24	Pass
633.33	51.02	4.54	-19.21	36.35	Quasi Max	V	100.00	356.00	46.02	-9.67	Pass
699.99	49.45	4.68	-18.42	35.71	Quasi Max	V	101.00	329.00	46.02	-10.31	Pass

10.1.3 Radiated Spurious Emissions above 1GHz

Requirement(s):

Specification(s)	Item	Requirement	Applicable
47CFR§ 15.407(b)(2), 15.407(b)(6) RSS Gen (6.13) RSS Gen 8.10	(1)	For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.	☒
	(2)	For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.	☐
	(3)	For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.	☐
	(4)	For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.	☒
	(5)	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.

Test Date	09/21/2015 - 09/23/2015	Environmental conditions	Temperature 24°C Relative Humidity 46% Atmospheric Pressure 1027mbar
Remark	The EUT was scanned up to 40GHz. 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)

802.11a – 5180MHz

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
2005.36	37.56	3.35	11.46	52.37	Peak Max	H	233.00	110.00	74.00	-21.63	Pass
3997.52	35.12	5.83	12.22	53.17	Peak Max	V	191.00	136.00	74.00	-20.83	Pass
15017.28	39.44	13.95	7.04	60.43	Peak Max	V	233.00	105.00	74.00	-13.57	Pass
2005.36	24.92	3.35	11.46	39.73	Average Max	H	233.00	110.00	54.00	-14.27	Pass
3997.52	22.60	5.83	12.22	40.65	Average Max	V	191.00	136.00	54.00	-13.35	Pass
15017.28	26.32	13.95	7.04	47.32	Average Max	V	233.00	105.00	54.00	-6.68	Pass

802.11a – 5200MHz

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
1018.72	35.83	2.45	9.65	47.93	Peak Max	H	229.00	308.00	74.00	-26.07	Pass
4050.49	35.87	5.87	12.00	53.74	Peak Max	V	301.00	98.00	74.00	-20.26	Pass
14780.89	39.66	13.60	7.67	60.93	Peak Max	H	229.00	239.00	74.00	-13.07	Pass
1018.72	22.62	2.45	9.65	34.72	Average Max	H	229.00	308.00	54.00	-19.28	Pass
4050.49	22.41	5.87	12.00	40.29	Average Max	V	301.00	98.00	54.00	-13.71	Pass
14780.89	26.62	13.60	7.67	47.88	Average Max	H	229.00	239.00	54.00	-6.12	Pass

802.11a – 5240MHz

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
2021.29	36.15	3.41	11.41	50.97	Peak Max	H	262.00	326.00	74.00	-23.03	Pass
4015.72	34.51	5.84	12.16	52.51	Peak Max	V	222.00	224.00	74.00	-21.49	Pass
11882.89	38.74	12.20	8.43	59.38	Peak Max	V	151.00	255.00	74.00	-14.62	Pass
2021.29	23.09	3.41	11.41	37.91	Average Max	H	262.00	326.00	54.00	-16.09	Pass
4015.72	22.14	5.84	12.16	40.15	Average Max	V	222.00	224.00	54.00	-13.85	Pass
11882.89	25.35	12.20	8.43	45.98	Average Max	V	151.00	255.00	54.00	-8.02	Pass

802.11a – 5745MHz

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
4221.30	35.65	6.02	11.27	52.93	Peak Max	H	178.00	164.00	74.00	-21.07	Pass
11697.06	38.23	12.18	8.22	58.63	Peak Max	V	255.00	345.00	74.00	-15.37	Pass
17780.26	37.06	13.00	10.69	60.74	Peak Max	H	215.00	285.00	74.00	-13.26	Pass
4221.30	22.43	6.02	11.27	39.71	Average Max	H	178.00	164.00	54.00	-14.29	Pass
11697.06	25.35	12.18	8.22	45.75	Average Max	V	255.00	345.00	54.00	-8.25	Pass
17780.26	24.21	13.00	10.69	47.90	Average Max	H	215.00	285.00	54.00	-6.10	Pass

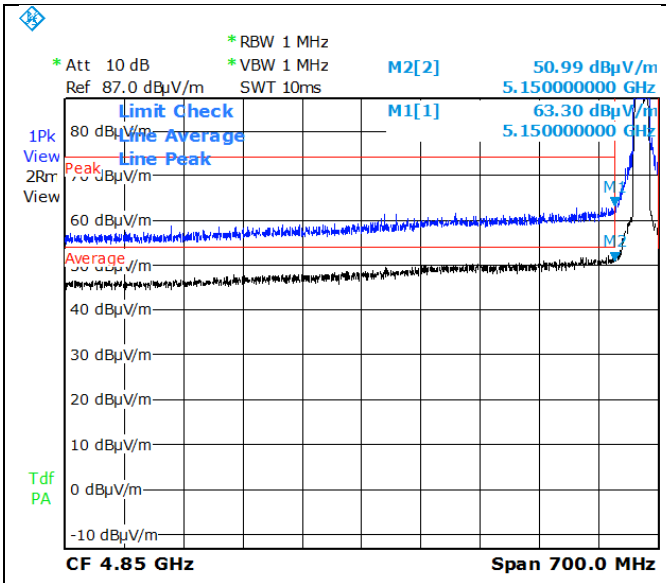
802.11a – 5785MHz

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
2023.99	36.28	3.42	11.40	51.11	Peak Max	H	208.00	41.00	74.00	-22.89	Pass
4118.52	35.47	5.93	11.71	53.11	Peak Max	V	287.00	183.00	74.00	-20.89	Pass
14730.21	39.14	13.51	7.81	60.45	Peak Max	V	151.00	82.00	74.00	-13.55	Pass
2023.99	23.48	3.42	11.40	38.30	Average Max	H	208.00	41.00	54.00	-15.70	Pass
4118.52	22.24	5.93	11.71	39.87	Average Max	V	287.00	183.00	54.00	-14.13	Pass
14730.21	26.34	13.51	7.81	47.66	Average Max	V	151.00	82.00	54.00	-6.34	Pass

802.11a – 5825MHz

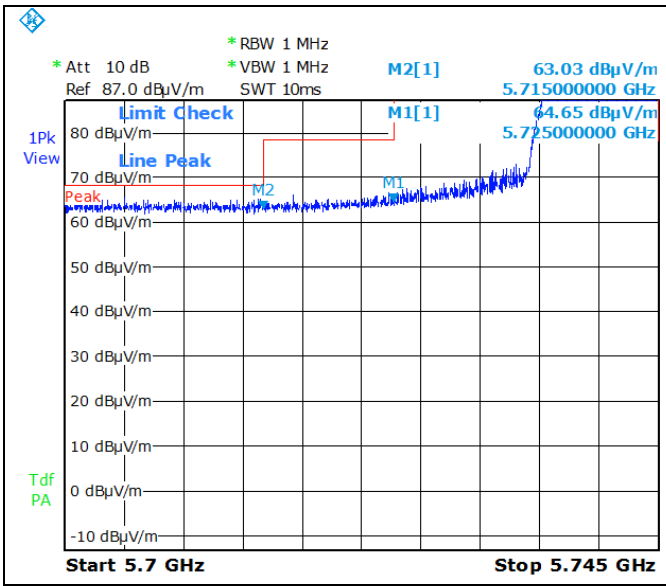
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
2007.51	37.30	3.36	11.45	52.12	Peak Max	V	234.00	37.00	74.00	-21.88	Pass
4150.16	35.32	5.96	11.57	52.85	Peak Max	H	292.00	271.00	74.00	-21.15	Pass
14590.29	39.72	13.26	8.18	61.16	Peak Max	H	289.00	3.00	74.00	-12.84	Pass
2007.51	24.59	3.36	11.45	39.40	Average Max	H	279.00	44.00	54.00	-14.60	Pass
4150.16	22.52	5.96	11.57	40.05	Average Max	H	292.00	271.00	54.00	-13.95	Pass
14590.29	26.63	13.26	8.18	48.06	Average Max	H	289.00	3.00	54.00	-5.94	Pass

Restricted Band Measurement Plots:

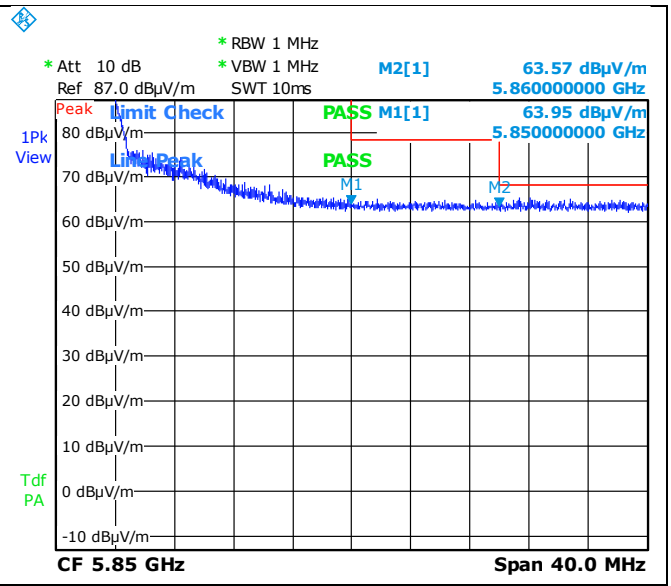


Restriced Band-802.11a 5180M– Edge Freq 5150MHz

Radiated Band Edge Measurement Plots:



Radiated Band Edge-802.11a 5745M– Edge Freq 5725MHz

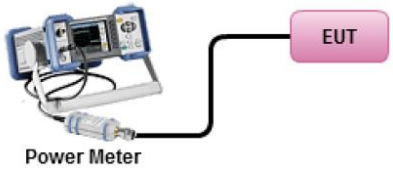


Radiated Band Edge-802.11a 5825M– Edge Freq 5850MHz

10.2 Peak Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).	☐
	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.	☒
	a)(1)(iii)	For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.	☐
	a)(1)(iv)	For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.	☐
	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.	☐
	a)(3)	For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.	☒

Test Setup				
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01 Measurement using a Power Meter (PM) Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required. - Connect EUT's RF output power to power meter - Set EUT to be continuous transmission mode - Measurement the average output power using power meter and record the result - Repeat above steps for different test channel and other modulation type.			
Test Date	09/21/2015 - 09/23/2015	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	24°C 46% 1027mbar
Remark	-			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Output Power measurement result for 5.2GHz

Test mode	Freq (MHz)	CH	Conducted Power (dBm)	Limit (dBm)	Result
802.11a	5180	Low	11.45	30	Pass
	5200	Mid	12.27	30	Pass
	5240	High	12.33	30	Pass

Output Power Measurement Results for 5.8GHz

Test mode	Freq(MHz)	CH	Conducted Power (dBm)	Limit (dBm)	Result
802.11a	5745	Low	11.73	30	Pass
	5785	Mid	11.89	30	Pass
	5825	High	11.55	30	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Cycle	Cal Due	In use
Conducted Emissions					
R & S Receiver	ESHS10	830223/0009	1 Year	06/24/2016	☐
Spectrum Analyzer	FSIQ7	825555/013	1 Year	08/04/2016	☐
Schwarzbeck LISN	NNLK 8129	8129-190	1 Year	08/21/2016	☐
CHASE LISN	MN2050B	1018	1 Year	08/07/2016	☐
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	☒
Power Sensor	EMPower7002-006	159814	1 Year	09/03/2016	☒

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