RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC_IC_RF_SL17080301-SHU-008_MXC620
Supersede Report No.: NONE

Applicant	:	Shure Incorporated
Product Name	:	6000 Wired Discussion System
Model No.	:	MXC620
Module Model No.	:	134-30393
Test Standard	:	FCC 15.225 RSS-210 Issue 9: 2016
Test Method	:	FCC 15.225 ANSI C63.10 2013 RSS Gen Issue 4 2014
FCC ID	:	DD4MXCNFC1
IC ID	:	616A-MXCNFC1
Dates of test	:	12/12/2017 – 12/15/2017
Issue Date	:	02/12/2018
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:

Rachana Khanduri	**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, CA 95035

ilac-MRA
A2LA 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 & Radio Equipment Directive (RED)
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

CONTENTS

1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_IC_RF_SL17080301-SHU-008_MXC620	None	Original	02/12/2018

2 Executive Summary

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

Company:	Shure Incorporated
Product:	6000 Wired Discussion System
Model:	MXC620
Module Model No.	134-30393

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	:	Shure Incorporated
Applicant Address	:	5800 Touhy Ave, Niles, IL 60714 USA
Manufacturer Name	:	Shure Incorporated
Manufacturer Address	:	5800 Touhy Ave, Niles, IL 60714 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	:	6000 Wired Discussion System
Model No.	:	MXC620
Module Model No.	:	134-30393
Trade Name	:	SHURE
Serial No.	:	N/A
Input Power	:	3.6VDC
Hardware version	:	N/A
Software version		N/A
Date of EUT received	:	11/12/2017
Equipment Class/ Category	:	DCD
Working Frequencies	:	13.56MHz
Port/Connectors	:	Microphone Connector, RJ45 (input and output)3.5mm audio jack

6.2 Radio Description

Specifications for Radio:

Radio Type	RFID
Operating Frequency	13.56MHz
Modulation	ASK (13.56MHz)
Channel Spacing	None
Antenna Type	PCB
Antenna Gain	-39.9 dBi (NFC Coupler)
Antenna Connector Type	N/A

Channel List:

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

6.3 EUT test modes/configuration Description

Mode	Note
RF test	EUT is set to continuously transmit at 13.56MHz.
Note: None	

Test Item	Operating mode	Tested antenna port	Test frequencies
Antenna Requirement	N/A	-	13.56MHz
Conducted Emissions Voltage	Continuous Transmit	-	
Limit in the band of 13.553 – 13.567 MHz	Continuous Transmit	-	
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	Continuous Transmit	-	
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	Continuous Transmit	-	
Limit outside the band of 13.110 – 14.010 MHz	Continuous Transmit	-	
Frequency Stability	Continuous Transmit	-	
Occupied Bandwidth	Continuous Transmit	-	
Note: EUT uses a PCB trace antenna attached to the PCB board. Only radiated measurements were performed during the test.			

6.4 EUT Photos – External

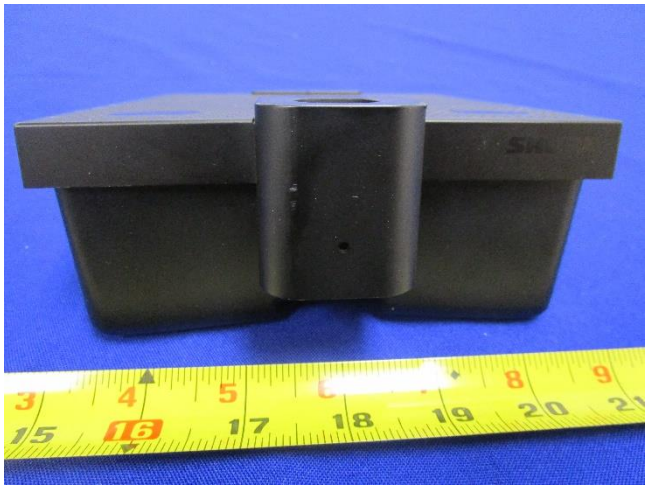
EUT with Microphone

EUT – Microphone Detached View

EUT – Top View

EUT – Bottom View

EUT – Front View



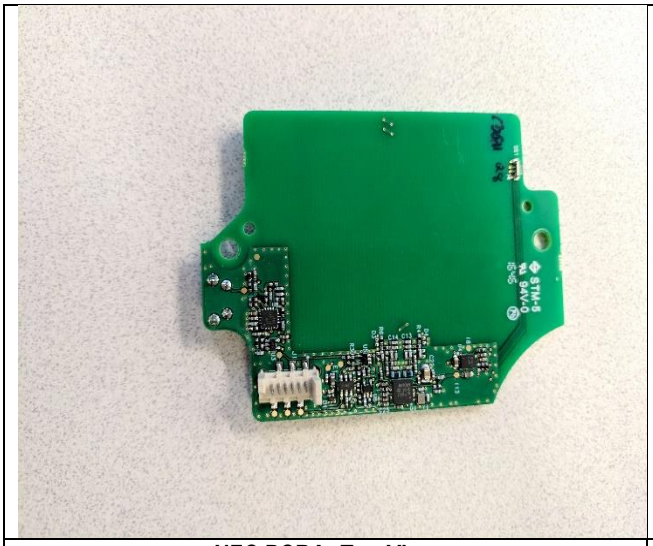
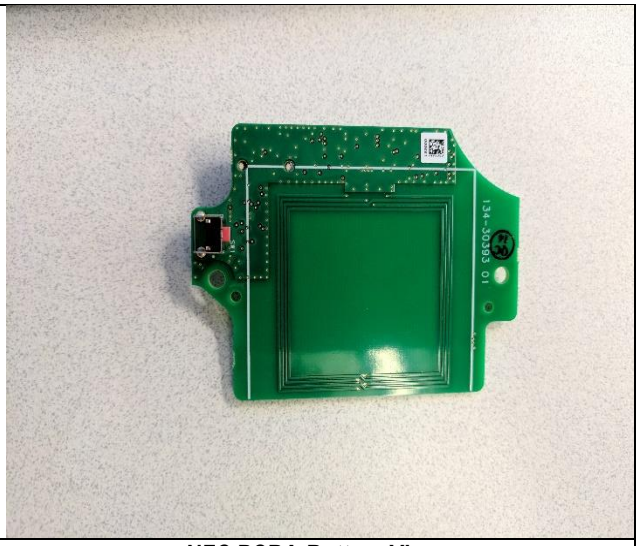
EUT – Rear View

EUT – Left side View

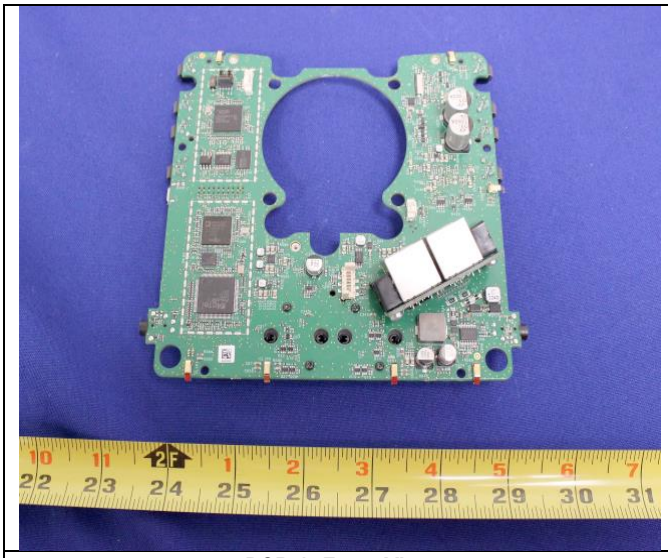
EUT – Right side View

6.5 EUT Photos – Internal

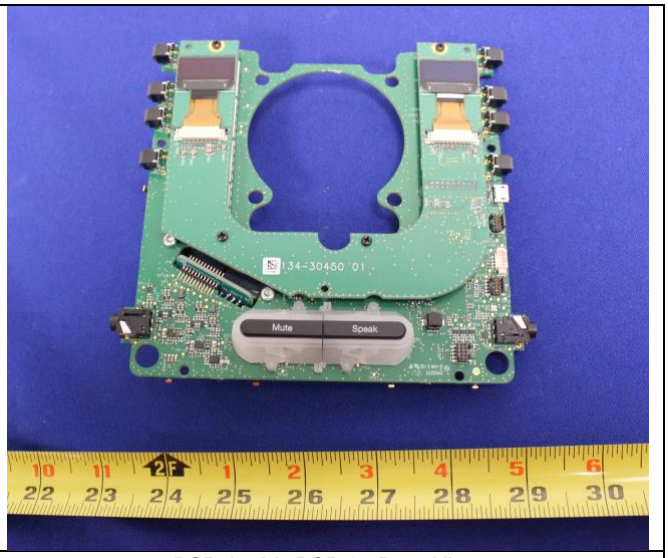
Module:

	
NFC PCBA -Top View	**NFC PCBA-Bottom View**

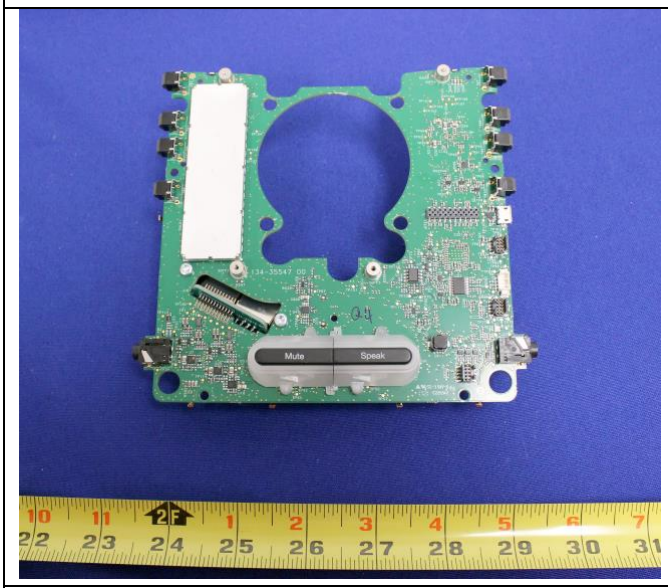
Host:



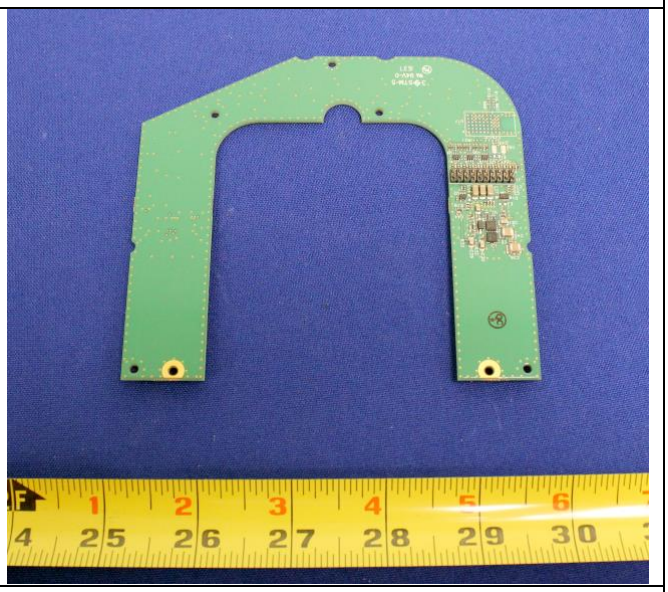
PCB 1- Front View



PCB 1 with PCB 2– Rear View

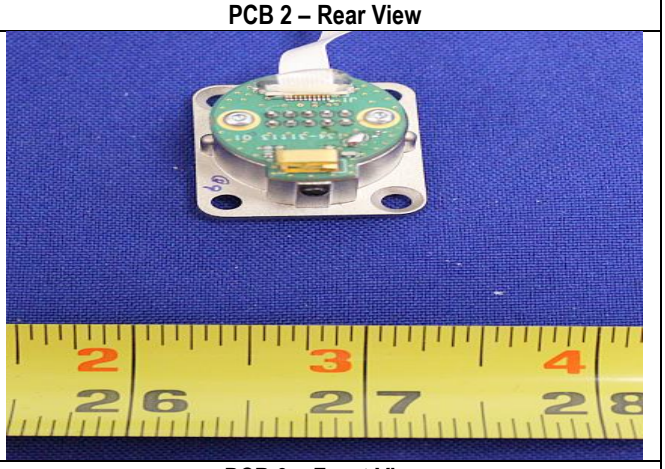


PCB 1 without PCB 2– Rear View

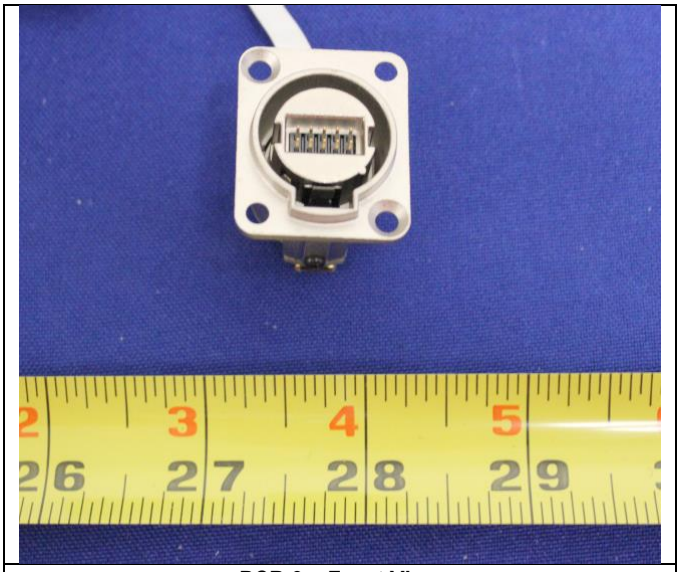


PCB 2 – Rear View

PCB 2 – Front View



PCB 3 – Front View

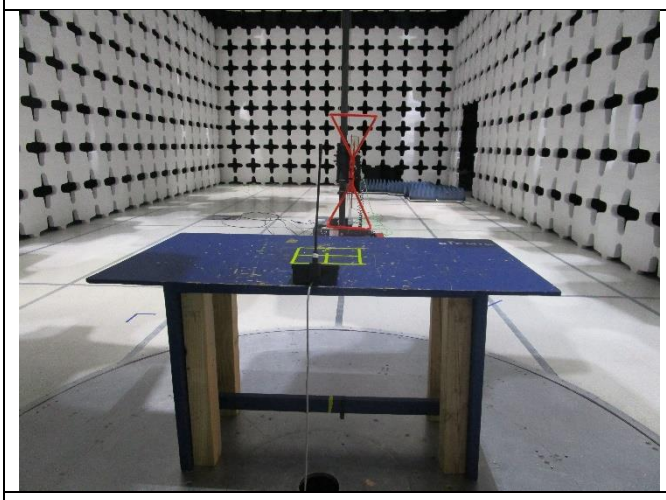


PCB 3 – Front View

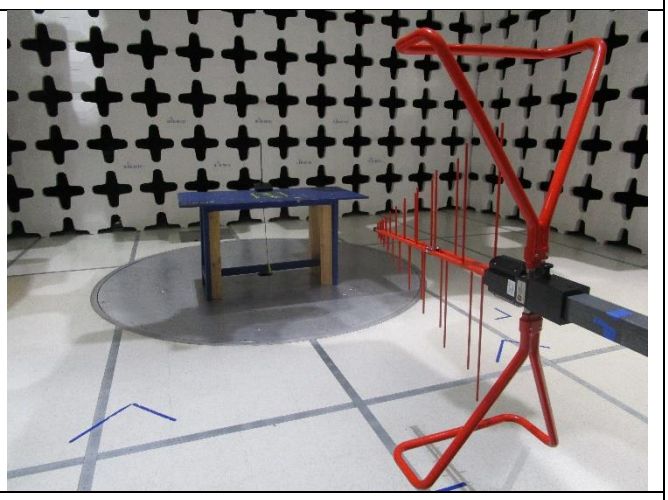
6.6 EUT Test Setup Photos

AC Line Conducted Emissions– Front View

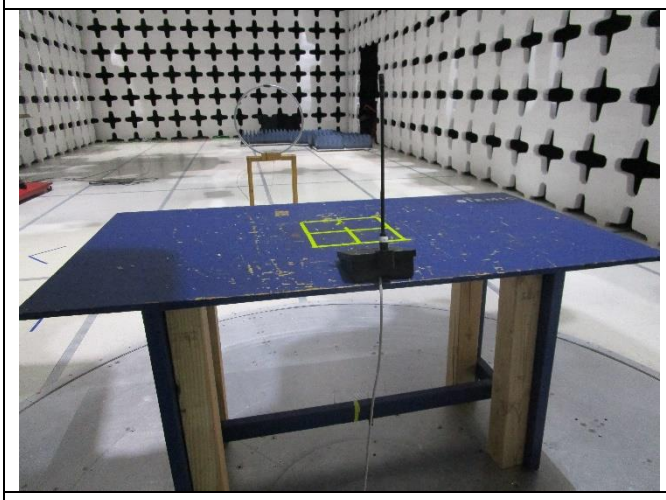
AC Line Conducted Emissions– Rear View



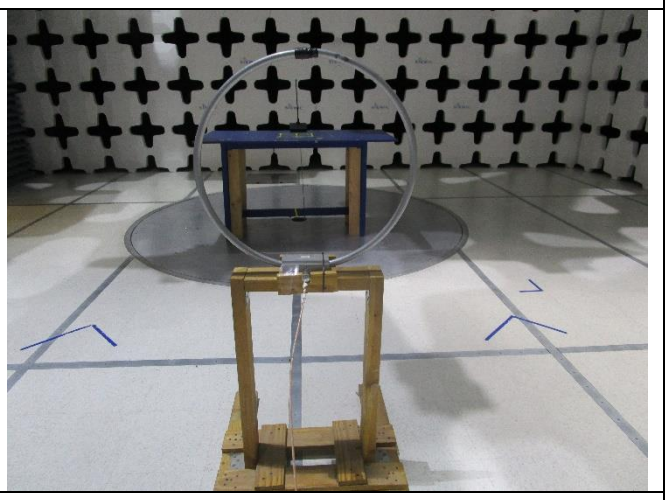
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (<30MHz) – Front View



Radiated Emissions (<30MHz) – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No	Manu	Note
1	Laptop	PP01L Latitude E5440	F1WPF12	Dell	-
2	Central Control Unit	DIS-CCU	1723-02D	SHURE	-

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	Central Control Unit	RJ45	EUT	RJ45	2	Unshielded	-

7.3 Test Software Description

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

8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Antenna Requirement	FCC	15.203	ANSI C63.10 – 2013 558074 D01 DTS Meas. Guidance v03r02	☒ Pass ☐ N/A
	IC			
AC Conducted Emissions Voltage	FCC	15.225(a)	ANSI C63.10 2013 RSS Gen. 8.8	☒ Pass ☐ N/A
	IC	RSS Gen (7.2.2)		
Remark	1. AC Line tests were performed on the support equipment's power adapter, laptop.			

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Limit in the band of 13.553 – 13.567 MHz	FCC	15.225(a)	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	FCC	15.225(b)	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	FCC	15.225(c)	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	
Limit outside the band of 13.110 – 14.010 MHz	FCC	15.225(d), 15.209	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	
Receiver Spurious Emission	IC	-	IC	RSS Gen 7.1	☐ Pass ☒ N/A
Frequency Stability	FCC	15.225(e)	FCC	-	☒ Pass ☐ N/A
	IC	RSS210(A2.6)	IC	RSS Gen 6.11	
Occupied Bandwidth	FCC	-	FCC	-	☒ Pass ☐ N/A
	IC	RSS-210(5.9.1)	IC	RSS Gen 6.6	
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.				

9 Measurement Uncertainty

9.1 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					**6.0118262**

The total derived measurement uncertainty is +/- 6.00 dB.

9.2 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					**8.4726**

The total derived measurement uncertainty is +/- 8.47 dB.

9.3 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					**0.952174**

The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, examination and derived results

10.1 Antenna Requirement

Spec	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) The antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.	☒
Remark	The NFC antenna is integral to the PCB board permanently to the device which meets the requirement (See Internal Photographs submitted as another Exhibit).	
Result	☒ PASS ☐ FAIL	

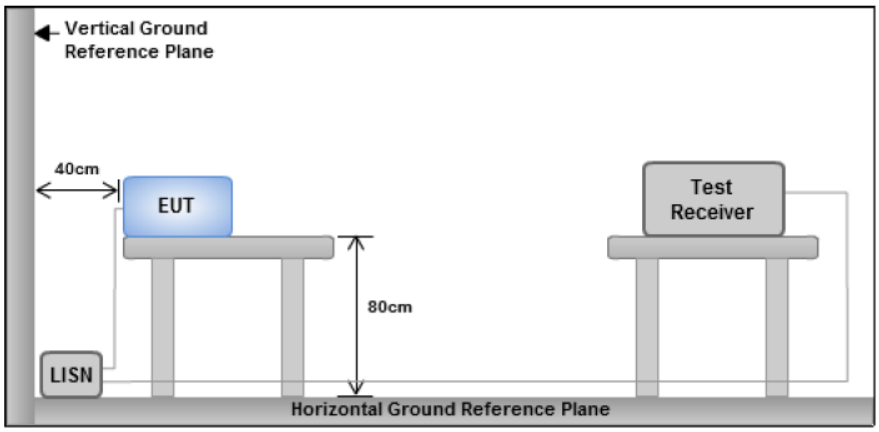
10.2 Conducted Emissions Test Result

Conducted Emission Limit

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

Spec	Item	Requirement	Applicable
§ 15.207, RSS210(A8.1)	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.

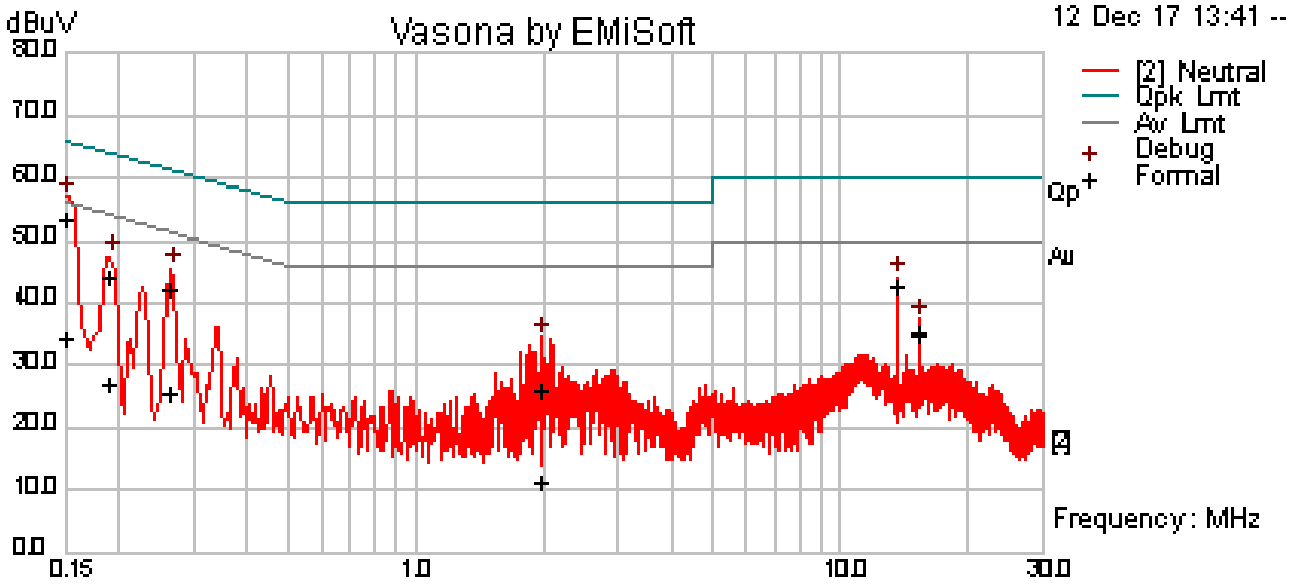
Test Date	12/12/2017	Environmental conditions	Temperature 21°C Relative Humidity 38 % Atmospheric Pressure 1025 mbar
Remark	The EUT was tested at 120VAC, 60Hz.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by Rachana Khanduri at Conducted Emission test site.

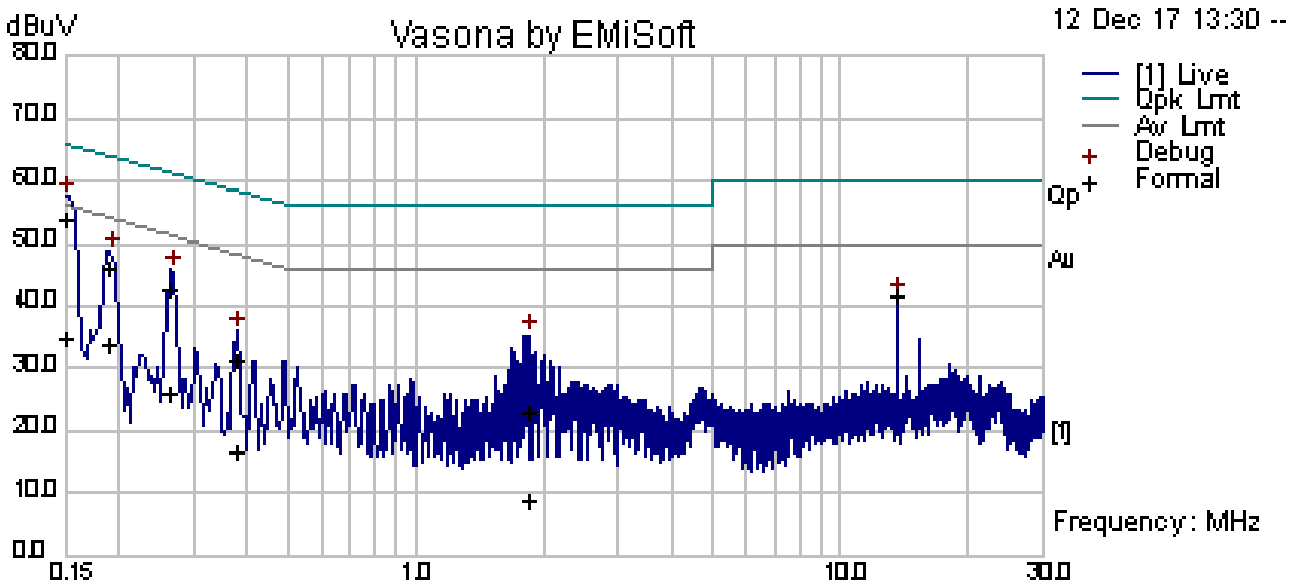
Test specification:	Conducted Emissions		
Mains Power:	120VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri		
Test Date:	12/12/2017		
Remarks:	AC Line @ Neutral		



Neutral Measurements

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
0.15	44.16	9.33	0.05	53.54	Quasi Peak	Neutral	66.00	-12.46	Pass
0.26	32.64	9.32	0.04	42.00	Quasi Peak	Neutral	61.28	-19.28	Pass
13.56	32.83	9.37	0.33	42.52	Quasi Peak	Neutral	60.00	-17.48	Pass
0.19	34.94	9.32	0.04	44.31	Quasi Peak	Neutral	64.07	-19.76	Pass
1.95	16.77	9.34	0.07	26.18	Quasi Peak	Neutral	56.00	-29.82	Pass
15.26	25.46	9.37	0.37	35.20	Quasi Peak	Neutral	60.00	-24.80	Pass
0.15	25.01	9.33	0.05	34.39	Average	Neutral	56.00	-21.61	Pass
0.26	15.98	9.32	0.04	25.35	Average	Neutral	51.28	-25.94	Pass
13.56	32.75	9.37	0.33	42.45	Average	Neutral	50.00	-7.55	Pass
0.19	17.45	9.32	0.04	26.82	Average	Neutral	54.07	-27.25	Pass
1.95	2.03	9.34	0.07	11.44	Average	Neutral	46.00	-34.56	Pass
15.26	24.96	9.37	0.37	34.70	Average	Neutral	50.00	-15.30	Pass

Test specification:	Conducted Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri			
Test Date:	12/12/2017			
Remarks:	AC Line @ Live			



Live Measurements

Frequency MHz	Raw dBµV	Cable Loss	Factors dB	Level dBµV	Measurement Type	Line/ Neutral	Limit dBµV	Margin dB	Pass /Fail
0.15	44.57	9.33	0.05	53.95	Quasi Peak	Live	65.99	-12.04	Pass
0.19	36.58	9.32	0.04	45.95	Quasi Peak	Live	64.08	-18.13	Pass
0.26	33.20	9.32	0.04	42.56	Quasi Peak	Live	61.29	-18.72	Pass
13.56	32.17	9.37	0.33	41.86	Quasi Peak	Live	60.00	-18.14	Pass
1.86	13.80	9.34	0.07	23.20	Quasi Peak	Live	56.00	-32.80	Pass
0.38	22.00	9.33	0.04	31.37	Quasi Peak	Live	58.36	-26.99	Pass
0.15	25.34	9.33	0.05	34.72	Average	Live	55.99	-21.27	Pass
0.19	24.35	9.32	0.04	33.72	Average	Live	54.08	-20.37	Pass
0.26	16.75	9.32	0.04	26.11	Average	Live	51.29	-25.17	Pass
13.56	32.13	9.37	0.33	41.83	Average	Live	50.00	-8.17	Pass
1.86	-0.47	9.34	0.07	8.94	Average	Live	46.00	-37.06	Pass
0.38	7.14	9.33	0.04	16.50	Average	Live	48.36	-31.85	Pass

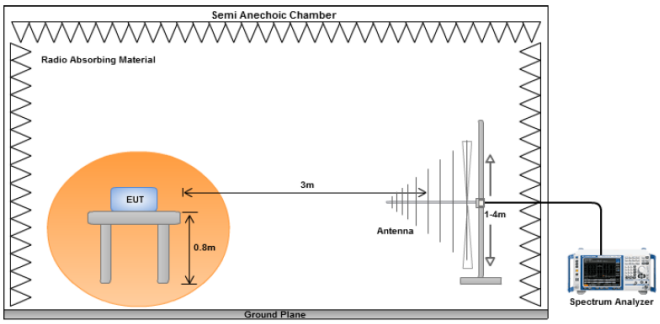
10.3 Radiated Measurements

10.3.1 Radiated Measurements 30MHz to 1GHz

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.225 RSS-210 (A2.6)	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.	☒

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.		
Test Date	12/13/2017	Environmental conditions	Temperature 20.1°C Relative Humidity 36% Atmospheric Pressure 1026mbar
Remark	-		
Result	☒ Pass ☐ Fail		

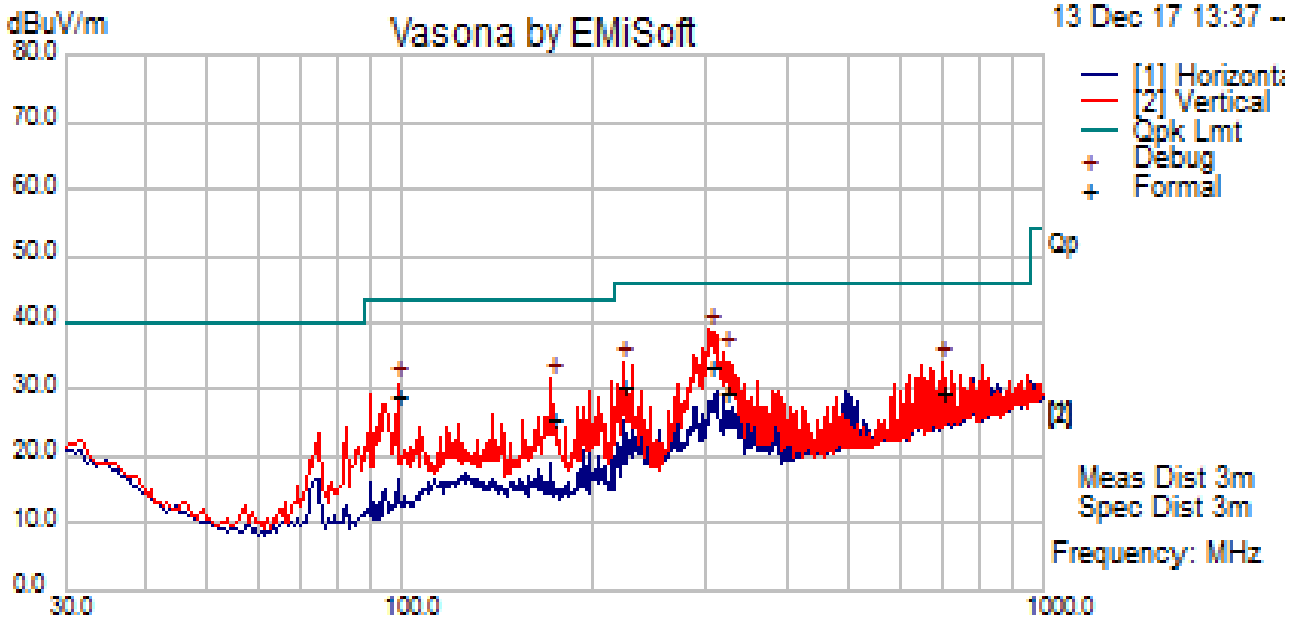
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at 10 meter chamber.

Test specification:	Radiated Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri			
Test Date:	12/13/2017			
Remarks:	***f*=30MHz – 1000MHz Measurements at 3m distance**			

***f*=30MHz – 1000MHz plot and 3-meter distance**



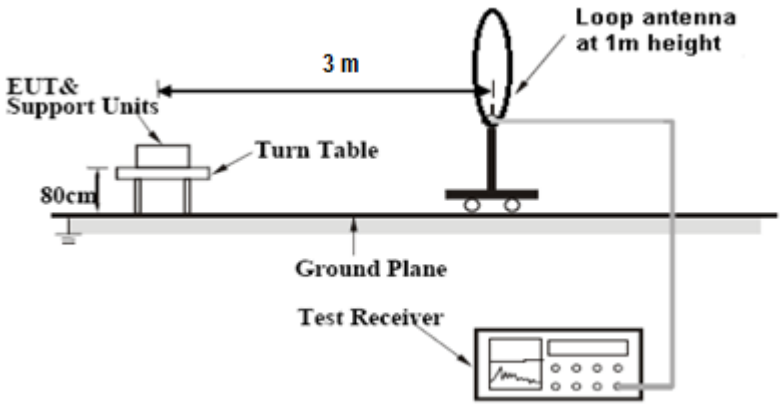
***f*=30MHz – 1000MHz Measurements**

Frequency MHz	Raw dBµV/m	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
303.06	43.12	13.46	-23.22	33.35	Quasi Max	V	299	222	46	-12.65	Pass
319.54	38.90	13.56	-22.82	29.64	Quasi Max	V	222	155	46	-16.36	Pass
696.36	29.93	15.61	-16.17	29.36	Quasi Max	V	128	322	46	-16.64	Pass
172.05	38.02	12.57	-24.91	25.68	Quasi Max	V	102	330	43.5	-17.82	Pass
221.19	43.26	13.00	-25.70	30.57	Quasi Max	V	139	92	46	-15.43	Pass
98.31	43.46	12.02	-26.53	28.96	Quasi Max	V	102	6	43.5	-14.55	Pass

10.3.2 Radiated Measurements below 30MHz

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.225 RSS-210 (A2.6)	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.	☒

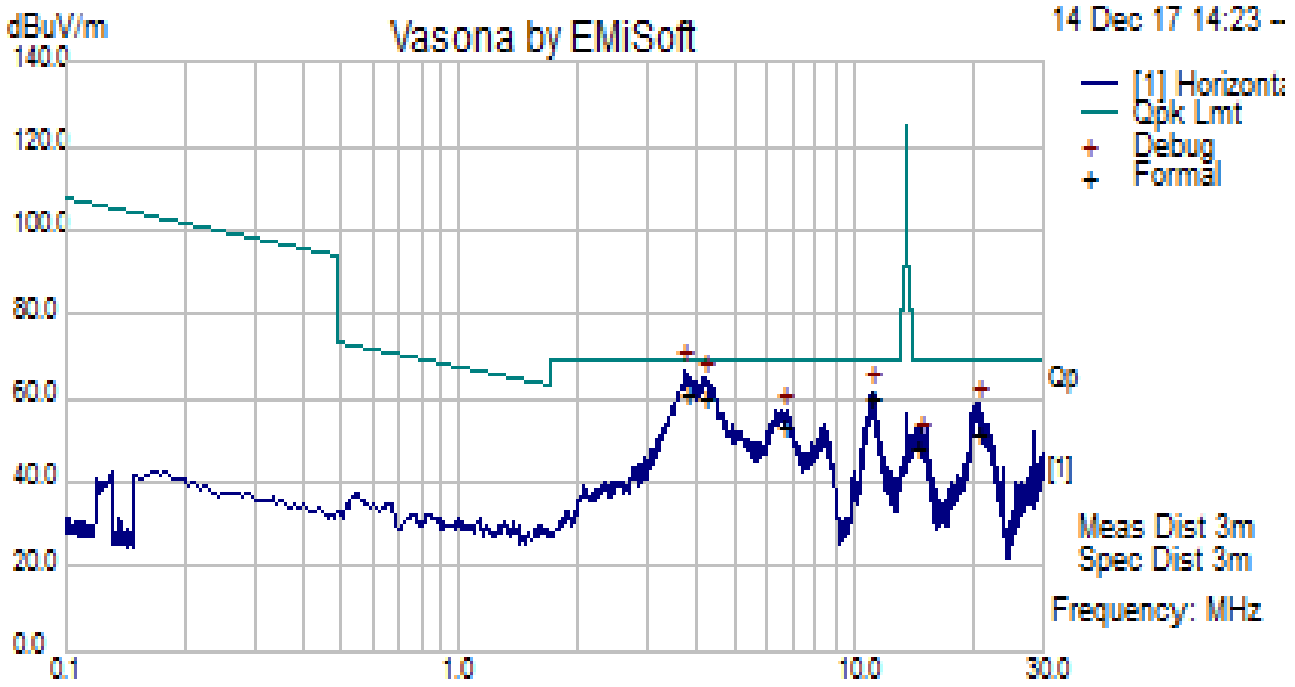
Test Setup				
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz. The limit is converted from microvolt/meter to decibel microvolt/meter.			
Test Date	12/14/2017	Environmental conditions	Temperature Relative Humidity Atmospheric Pressure	22°C 40% 1026mbar
Remark	-			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at 10 meter chamber.

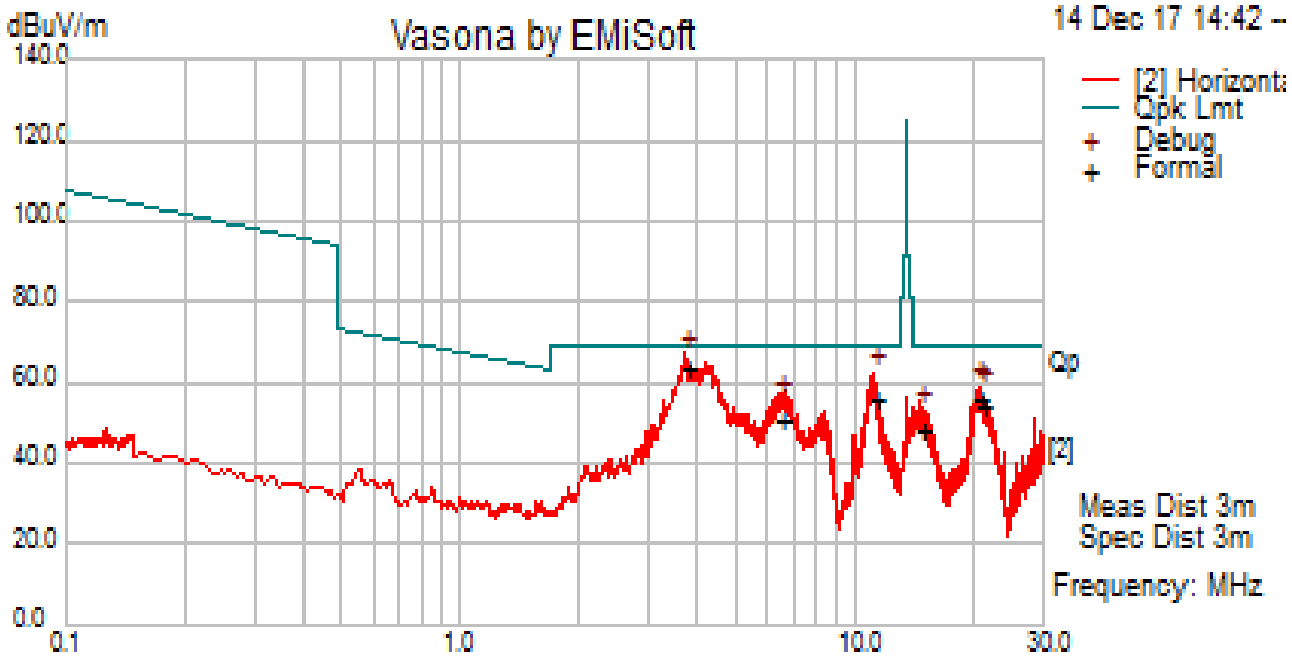
Test specification:	Radiated Spurious Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri			
Test Date:	12/14/2017			
Remarks:	**f= 100kHz – 30MHz plot, and loop antenna at 0 degree**			



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3.71	47.55	10.35	3.25	61.15	Quasi Max	0	100	38	69.54	-8.39	Pass
4.17	47.47	10.38	2.59	60.44	Quasi Max	0	100	58	69.54	-9.11	Pass
11.14	47.83	10.63	1.58	60.04	Quasi Max	0	100	282	69.54	-9.50	Pass
20.55	39.5	10.84	1.04	51.38	Quasi Max	0	100	121	69.54	-18.16	Pass
6.58	40.82	10.49	2.25	53.56	Quasi Max	0	100	147	69.54	-15.98	Pass
14.57	35.34	10.71	1.68	47.73	Quasi Max	0	100	357	69.54	-21.81	Pass

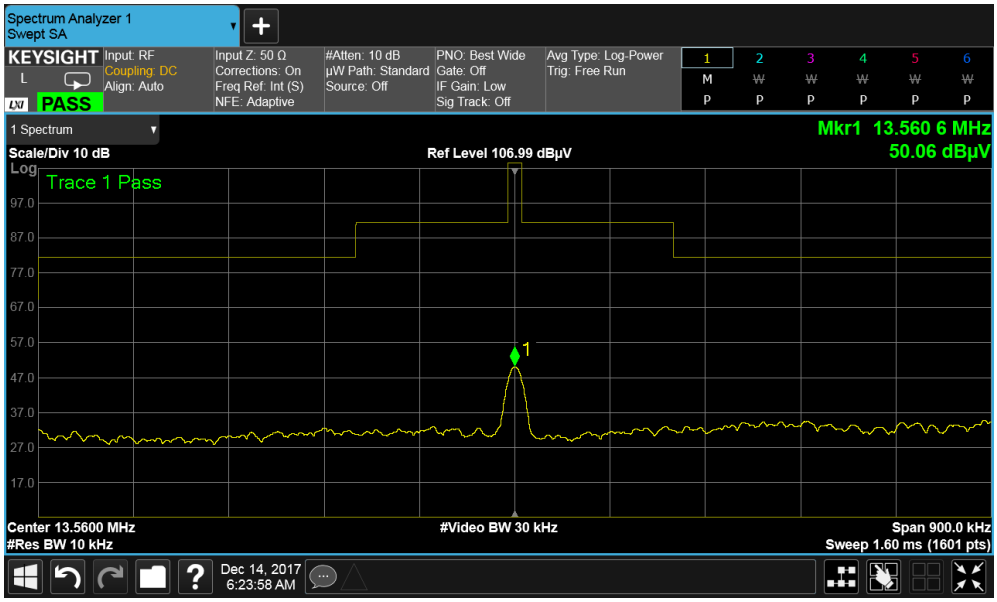
Test specification:	Radiated Spurious Emissions		
Mains Power:	120VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri		
Test Date:	12/14/2017		
Remarks:	**f= 100kHz – 30MHz plot, and loop antenna at 90 degree**		



Quasi Max Measurement

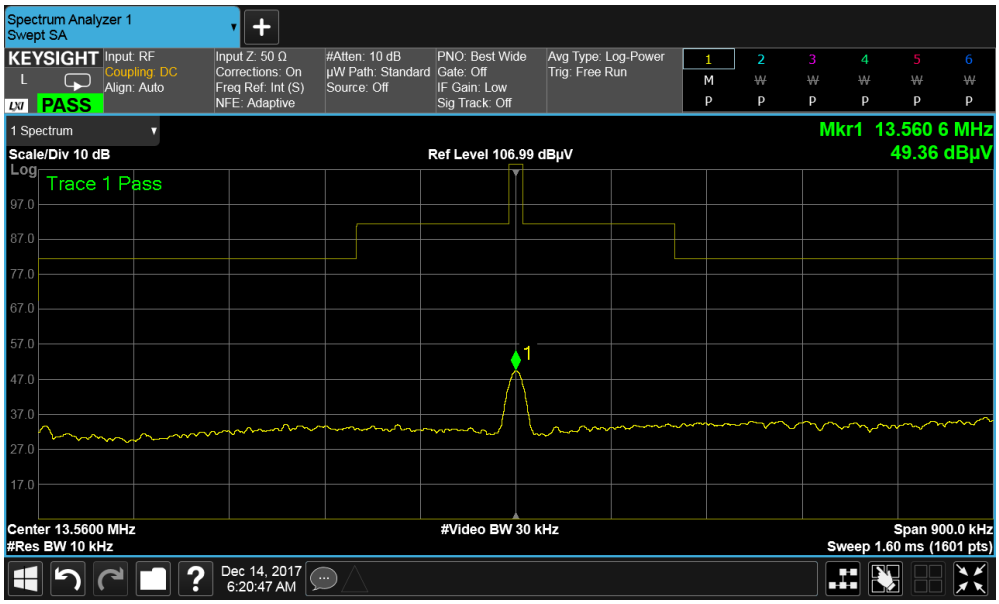
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3.71	49.55	10.35	3.25	63.15	Quasi Max	90	100	3.00	69.54	-6.39	Pass
11.20	43.72	10.63	1.58	55.94	Quasi Max	90	100	103.00	69.54	-13.60	Pass
20.73	43.83	10.84	1.08	55.76	Quasi Max	90	100	99.00	69.54	-13.79	Pass
20.86	41.97	10.85	1.12	53.94	Quasi Max	90	100	288.00	69.54	-15.60	Pass
6.51	37.95	10.49	2.28	50.71	Quasi Max	90	100	307.00	69.54	-18.83	Pass
14.59	35.84	10.71	1.68	48.24	Quasi Max	90	100	238.00	69.54	-21.31	Pass

Loop Antenna at 0 degree



Frequency (MHz)	Amplitude (dBµV/m)
13.5606	50.06

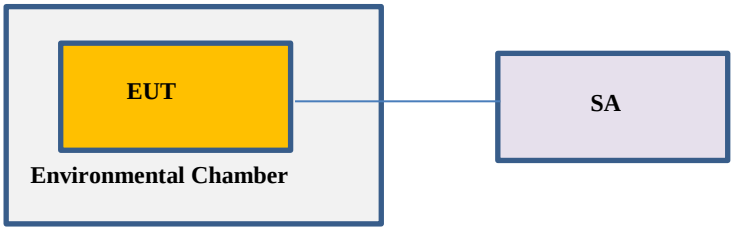
Loop Antenna at 90 degree



Frequency (MHz)	Amplitude (dBµV/m)
13.5606	49.36

10.3.3 Frequency Stability

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.225 e) RSS-210 (A2.6)	Limit: ±0.01% of 13.56 MHz = 1356 Hz	☒
Test Setup	 1. The EUT was set up inside an environmental chamber. 2. The EUT was placed in the centre of the environmental.	
Procedure	Frequency Stability was measured according to 47 CFR §2.1055. Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz. A voltmeter was used to monitor when varying the voltage.	

Test Date	12/12/2017	Environmental conditions	Temperature 20°C Relative Humidity 41% Atmospheric Pressure 1026mbar
Remark	None		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Rachana Khanduri at RF test site.

Test Result for 13.56MHz Radio

Frequency Stability versus Temperature: The Frequency tolerance of the carrier signal shall be maintained within ± 0.01% of the operating frequency over a temperature variation of -20ºC to +50ºC at normal supply voltage.

Reference Frequency: 13.56 MHz

Temperature (ºC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	13.56	0	<0.01	Pass
40	13.56	0	<0.01	Pass
30	13.56	0	<0.01	Pass
20	13.56	0	<0.01	Pass
10	13.56	0	<0.01	Pass
0	13.56	0	<0.01	Pass
-10	13.56	0	<0.01	Pass
-20	13.56	0	<0.01	Pass

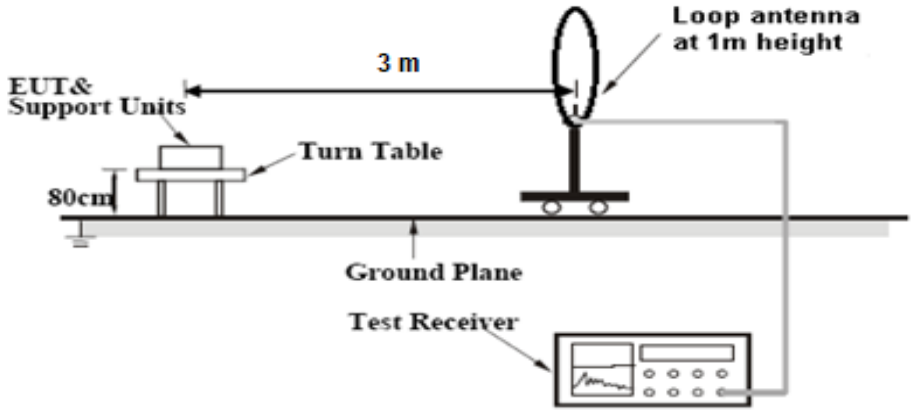
Frequency Stability versus Input Voltage: The Frequency tolerance of the carrier signal shall be maintained within ± 0.01%, the frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at a 20ºC environmental temperature.

Carrier Frequency: 13.56 MHz

Measured Voltage ±15% of nominal (AC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
4.14	13.56	0	<0.01	Pass
3.06	13.56	0	<0.01	Pass

10.3.4 Occupied bandwidth

Requirement(s):

Spec	Requirement	Applicable
RSS-Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyser shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.	☒
Test Setup		
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. To measure conducted, a SMA cable was used to replace the EUT antenna. To measure radiated, an external antenna was used to detect EUT transmission signal. 3. Measurement of the 99% Occupied Bandwidth of EUT transmission signal and make record.	

Test Date	12/12/2017	Environmental conditions	Temperature 22°C Relative Humidity 39% Atmospheric Pressure 1025mbar
Remark	-		
Result	☒ Pass ☐ Fail		

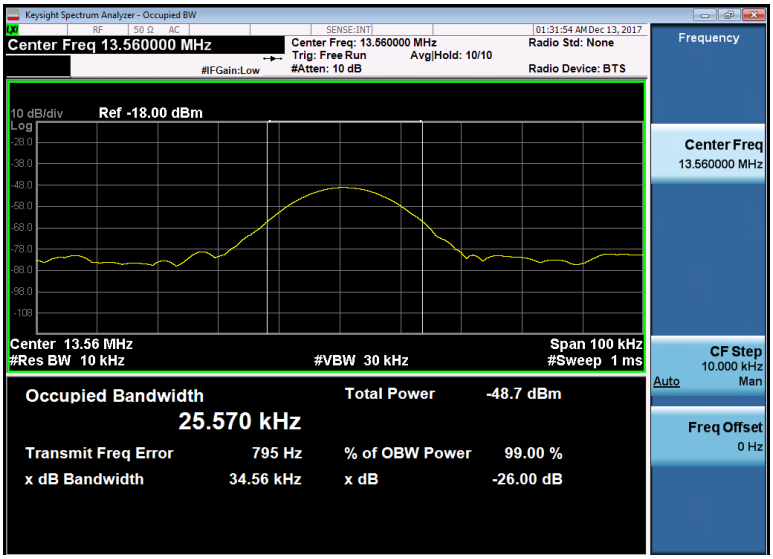
Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at 10 meter chamber.

Test results:

13.56 MHz



Frequency (MHz)	Occupied Bandwidth (KHz)
13.56	25.57

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/21/2017	1 Year	04/21/2018	☑
LISN (9 kHz – 30 MHz)	3816/2NM	214372	09/27/2017	1 Year	09/27/2018	☑
Radiated Emissions						
Keysight EXA 44GHz Spectrum Analyzer	N9010A	MY51440112	11/08/2017	1 Year	11/08/2018	☑
Loop Antenna	6512	49120	10/14/2017	1 Year	10/14/2018	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	01/13/2017	1 Year	01/13/2018	☑
Pre-Amplifier (1-40GHz)	SAS-474	579	04/04/2017	1 Year	04/04/2018	☑
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/09/2017	1 Year	02/09/2018	☑
RF Conducted Measurement						
Spectrum Analyzer	N9010A	MY51440112	11/08/2017	1 Year	11/08/2018	☑
Temperature / humidity Chamber	1007H	61201	11/08/2017	1 Year	11/08/2018	☑

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 Equipment: EN45011:** EN ISO/IEC 17065
		Electromagnetic Compatibility: EN45011 – EN ISO/IEC 17065
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 Measuremet
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