

RF TEST REPORT



Report No.: **SL13070201-EQU-001-RFID_Rev1.0**

Supersede Report No.: **SL13070201-EQU-001-RFID**

Applicant	:	Equinox Payments LLC
Product Name	:	Electronic POS Terminal
Model No.	:	CFD, AIO
Test Standard	:	FCC 15.225 (2012) FCC 15.207 (2012) RSS 210 (2010)
Test Method	:	FCC 15.225 (2012)(2012) ANSI C63.4 2009 RSS Gen 4.6, RSS Gen 4.7 & RSS Gen 4.9
FCC ID	:	NVA00008
IC ID	:	N/A
Dates of test	:	August 6th-10th, 2013
Issue Date	:	9/11/2013
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:

	
Nima Molaei	David Zhang
Test Engineer	Engineer Reviewer

Issued By:

SIEMIC Laboratories

775 Montague Expressway, Milpitas, 95035 CA



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

Visit us at: www.siemic.com; Follow us at:



Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	1 of 40
FCC ID	NVA00008
IC ID	N/A

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/RRR, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	IDA, NIST	EMC , RF , Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF , Telecom
HongKong	OFTA (US002)	RF , Telecom

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	2 of 40
FCC ID	NVA00008
IC ID	N/A

CONTENTS

1	REPORT REVISION HISTORY	3
2	EXECUTIVE SUMMARY	4
3	CUSTOMER INFORMATION	4
4	TEST SITE INFORMATION	4
5	MODIFICATION	4
6	EUT INFORMATION	5
6.1	EUT Description	5
6.2	Radio Description	5
6.3	EUT test modes/configuration Description.....	6
6.4	EUT Photos – External for CFD Model	7
6.5	EUT Photos – External for AIO Model	8
6.6	EUT Photos – Internal for CFD Model	9
6.7	EUT Photos – Internal for AIO Model.....	11
6.8	EUT Test Setup Photos for CFD Model	13
6.9	EUT Test Setup Photos for AIO Model	14
7	SUPPORTING EQUIPMENT/SOFTWARE AND CABLING DESCRIPTION.....	15
7.1	Supporting Equipment	15
7.2	Cabling Description	15
7.3	Test Software Description	15
8	TEST SUMMARY.....	16
9	MEASUREMENT UNCERTAINTY	17
10	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	18
10.1	Antenna Requirement.....	18
10.2	Conducted Emission Test Result	19
10.2	Radiated Measurement	22
10.2.1	Radiated Measurement below 1GHz	23
10.2.2	Radiated Measurement below 30MHz	26
10.2.3	Frequency Stability	32
10.2.4	Occupied bandwidth	34
	ANNEX A. TEST INSTRUMENT.....	36
	ANNEX B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM	37
	ANNEX C. SIEMIC ACCREDITATION	38

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	3 of 40
FCC ID	NVA00008
IC ID	N/A

1 Report Revision History

Report No.	Report Version	Description	Issue Date
SL13070201-EQU-001-RFID_Rev1.0	Original	-	09/04/2013
SL13070201-EQU-001-RFID_Rev1.0	1.0	Correct model number	09/11/2013

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	4 of 40
FCC ID	NVA00008
IC ID	N/A

2 Executive Summary

The purpose of this test program was to demonstrate compliance of the Equinox Payments LLC, Electronic POS Terminal, and model: CFD, AIO against the current Stipulated Standards. The CFD, AIO has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	Equinox Payments LLC
Applicant Address	:	8901 E Raintree Dr., Suit 400, Scottsdale, AZ 85260
Manufacturer Name	:	Equinox Payments LLC
Manufacturer Address	:	8901 E Raintree Dr., Suit 400, Scottsdale, AZ 85260

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
-	-	-	-

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	5 of 40
FCC ID	NVA00008
IC ID	N/A

6 EUT Information

6.1 EUT Description

Product Name	:	Electronic POS Terminal
Model No.	:	CFD, AIO
Trade Name	:	Equinox
Serial No.	:	B02132700061, B02133100003
Input Power	:	9VDC
Date of EUT received	:	August 4th, 2013
Equipment Class/ Category	:	DXX, DSS
Clock Frequencies	:	27.12 MHz
Port/Connectors	:	-
Difference Between two models	:	- Slightly different dimensions for AIO to accommodate integral printer - AIO has printing capability and CFD does not have printing capability

6.2 Radio Description

Spec for Radio -

Radio Type	RFID
Operating Frequency	13.56MHz
Modulation	AM
Antenna Type	This antenna is simply 2 tight loops of wire looped around the display chassis with an RC tuning circuit.
Antenna Gain	N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	6 of 40
FCC ID	NVA00008
IC ID	N/A

6.3 EUT test modes/configuration Description

Mode	Note
RF test	EUT continuous transmit itself when power on
Note :None	

Test Item	Operating mode	Tested antenna port	Test frequencies
Antenna Requirement	N/A	-	13.56MHz
Conducted Emissions Voltage	Continues Transmit	-	
Limit in the band of 13.553 – 13.567 MHz	Continues Transmit	-	
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	Continues Transmit	-	
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	Continues Transmit	-	
Limit outside the band of 13.110 – 14.010 MHz	Continues Transmit	-	
Frequency Stability	Continues Transmit	-	
Occupied Bandwidth	Continues Transmit	-	

Note: EUT using a PCB trace Antenna and attached to the PCB board. Only using radiated measurement during the test.

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	7 of 40
FCC ID	NVA00008
IC ID	N/A

6.4 EUT Photos – External for CFD Model



Top



Bottom



Front



Rear



Left Side



Right Side

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	8 of 40
FCC ID	NVA00008
IC ID	N/A

6.5 EUT Photos – External for AIO Model

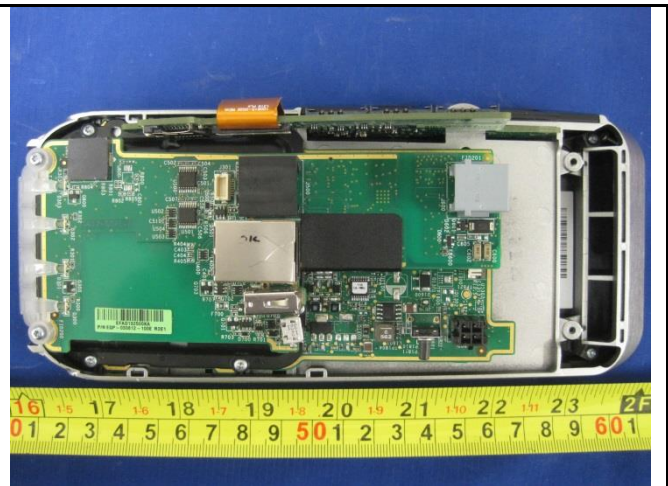


Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	9 of 40
FCC ID	NVA00008
IC ID	N/A

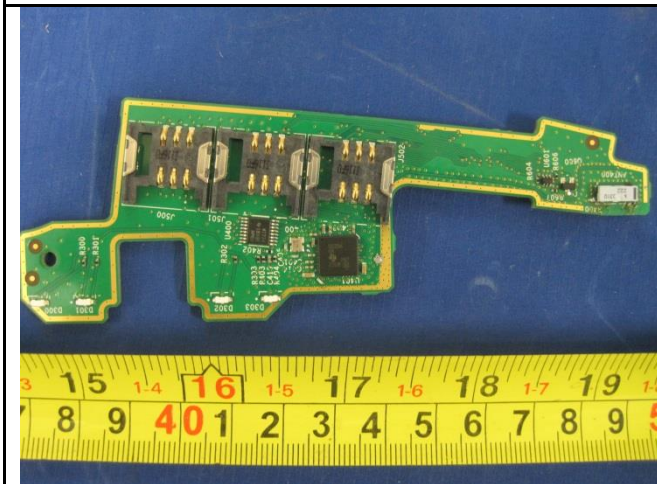
6.6 EUT Photos – Internal for CFD Model



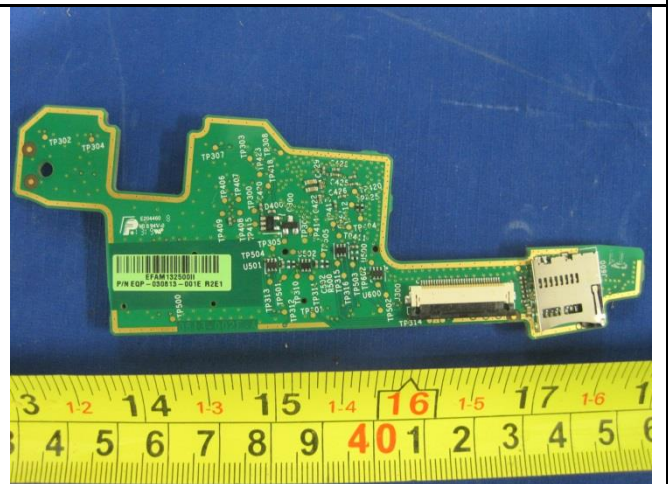
EUT - Cover off



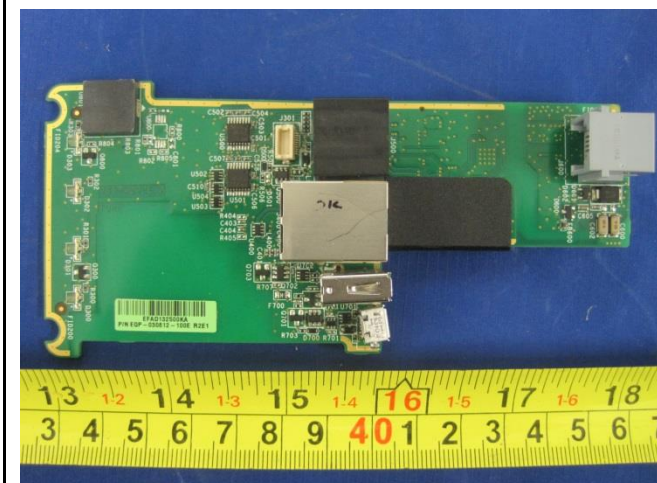
EUT- Mainboard without Cover



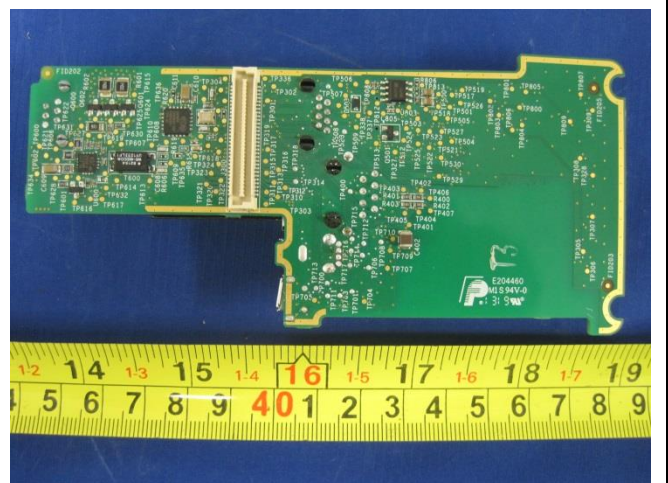
Radio Module – top view



Radio Module – bottom view

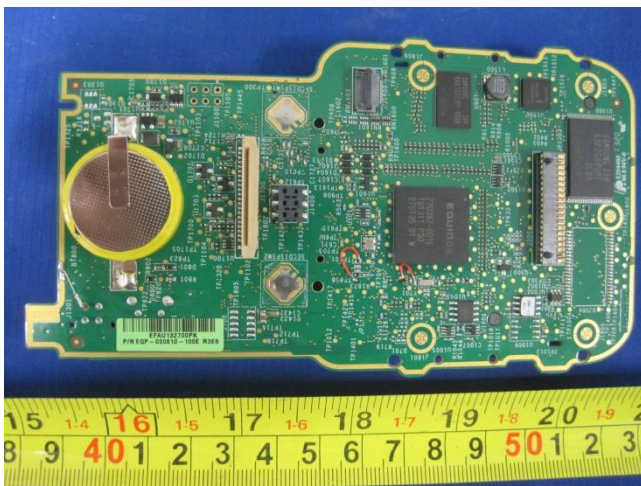


PCB 1 – Top view

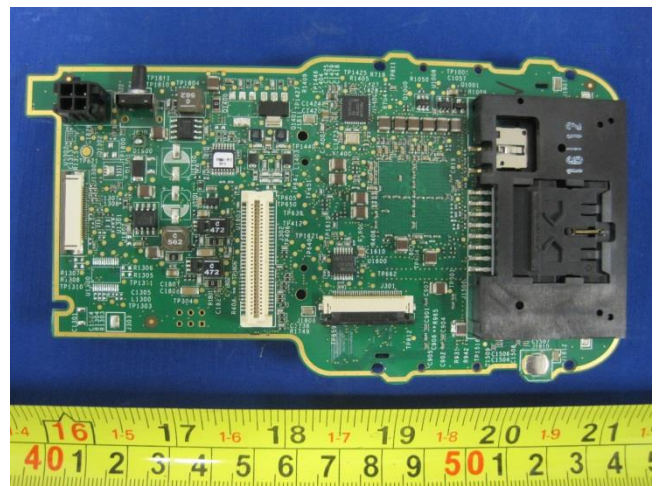


PCB 1 – Bottom view

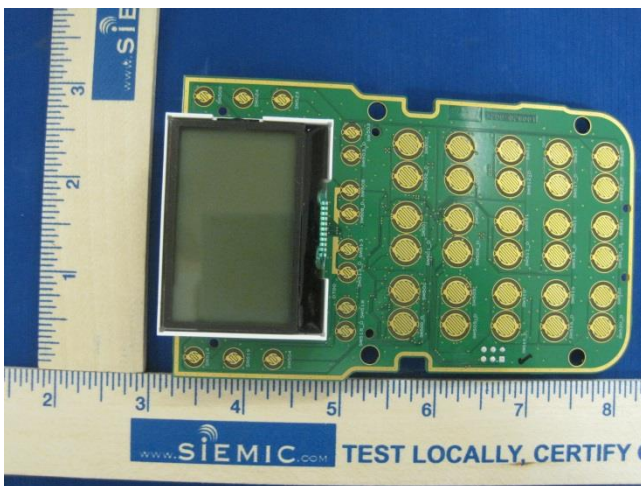
Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	10 of 40
FCC ID	NVA00008
IC ID	N/A



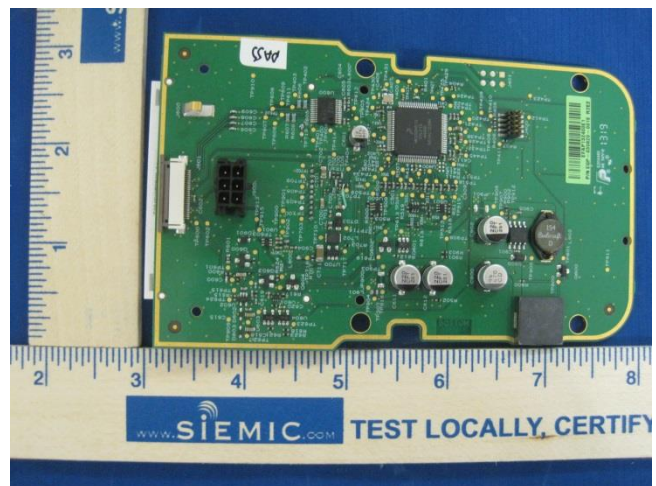
PCB 2 – Top view



PCB 2 – Bottom view



Keypad Mainboard Top View



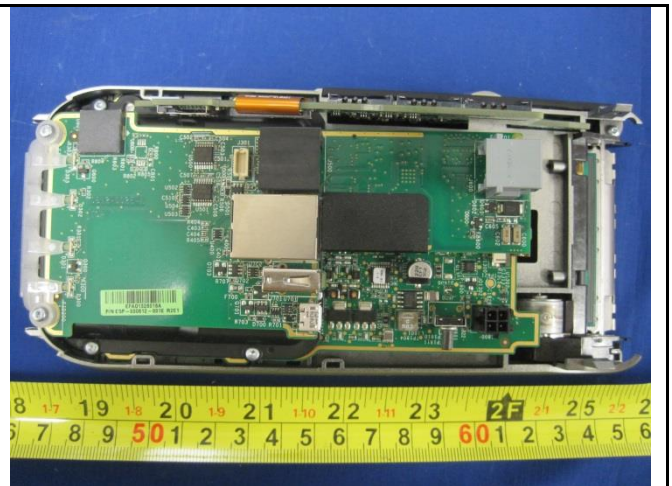
Keypad Mainboard Bottom View

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	11 of 40
FCC ID	NVA00008
IC ID	N/A

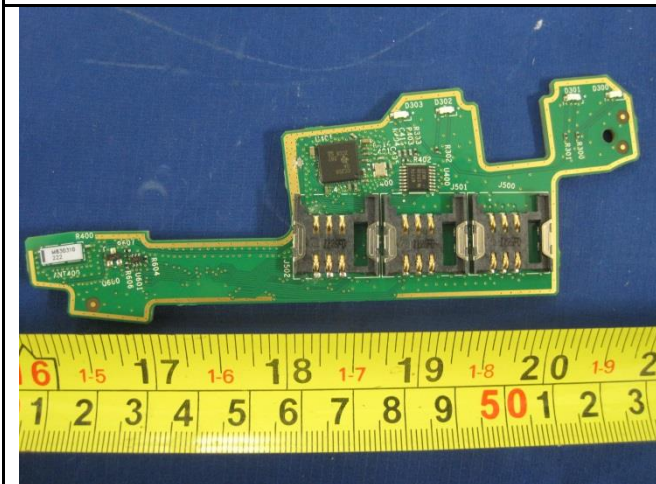
6.7 EUT Photos – Internal for AIO Model



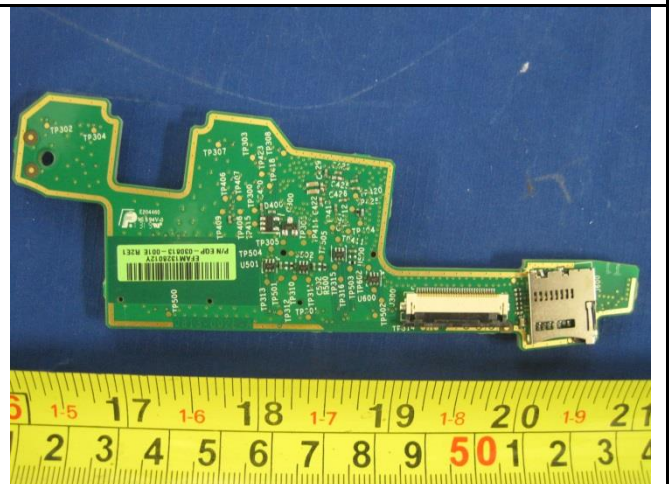
EUT - Cover off



EUT- Mainboard without Cover



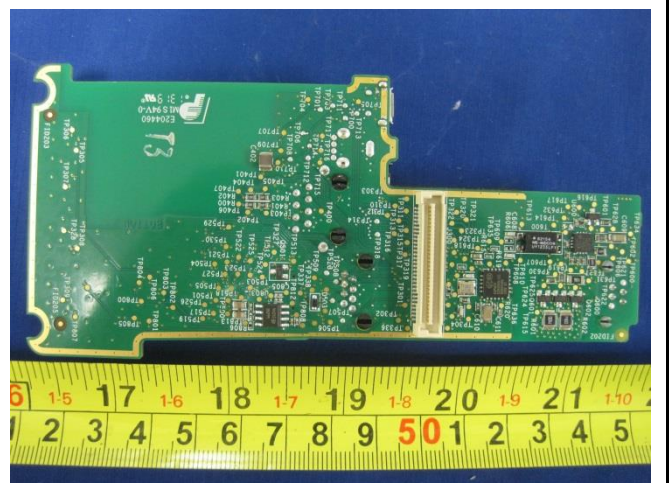
Radio Module – top view



Radio Module – bottom view

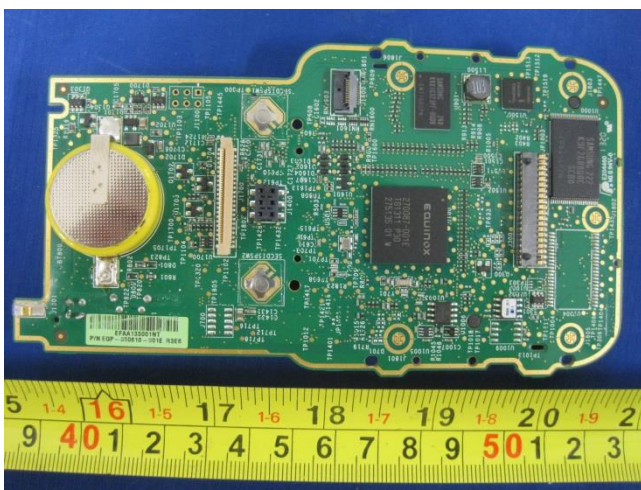


PCB 1 – Top view

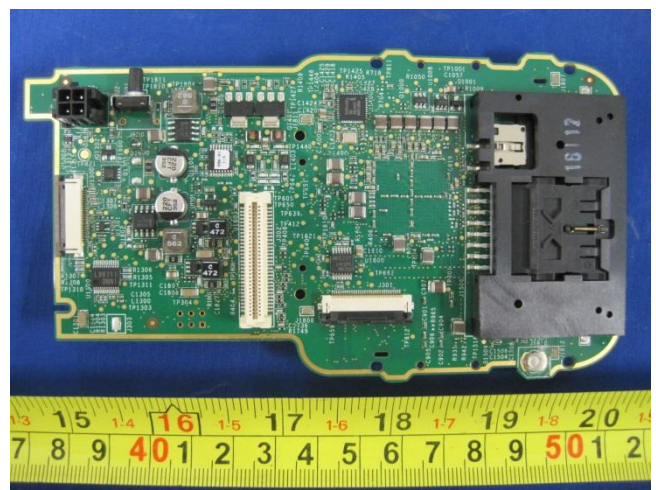


PCB 1 – Bottom view

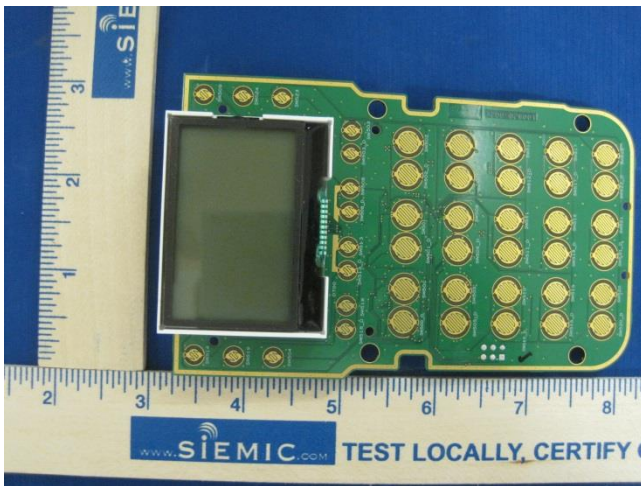
Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	12 of 40
FCC ID	NVA00008
IC ID	N/A



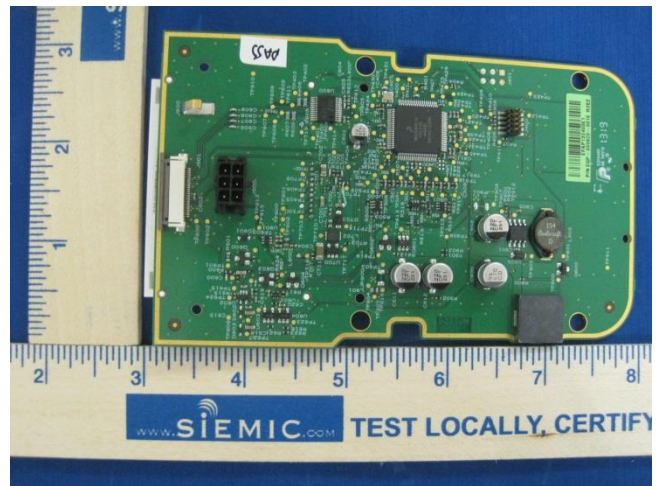
PCB 2 – Top view



PCB 2 – Bottom view



Keypad Mainboard Top View



Keypad Mainboard Bottom View

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	13 of 40
FCC ID	NVA00008
IC ID	N/A

6.8 EUT Test Setup Photos for CFD Model



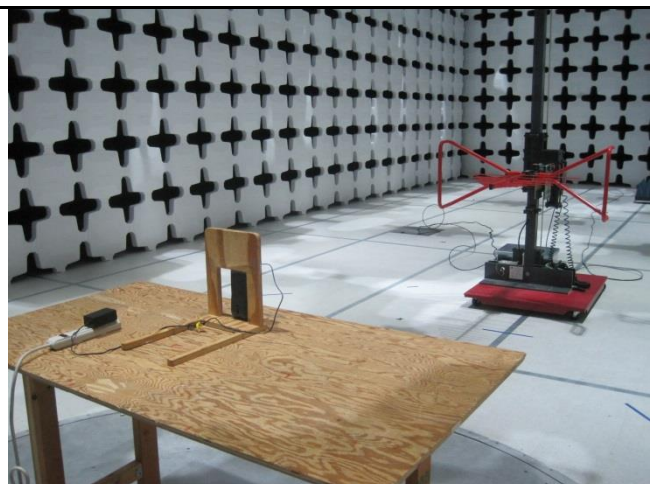
Conducted Emission - Front



Conducted Emission - Rear



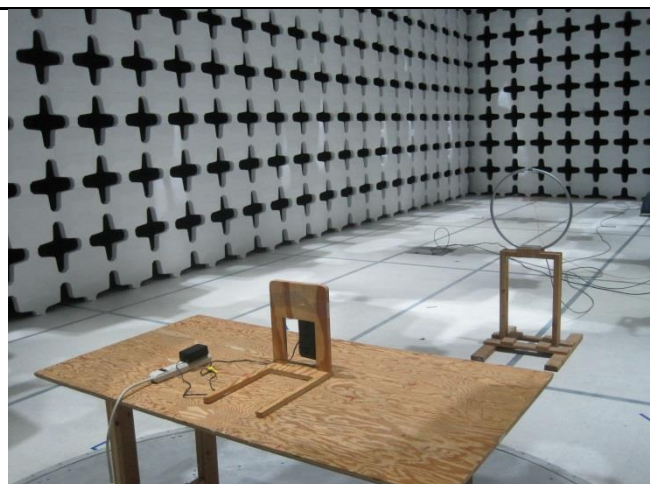
Radiated Emission Test setup (<1GHz) - Front



Radiated Emission Test setup (<1GHz) - Rear



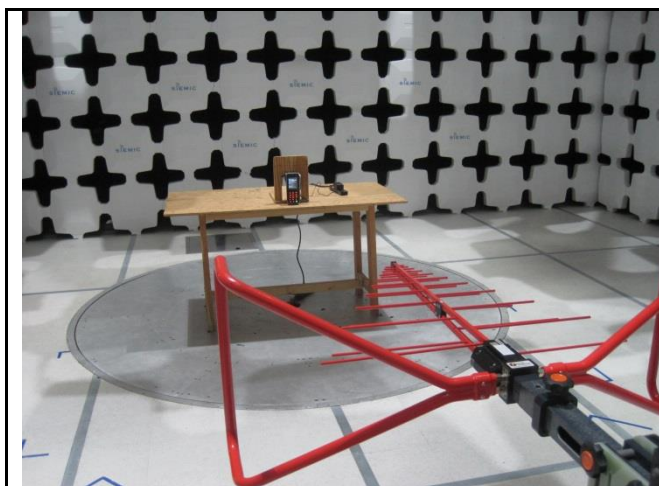
Radiated Emission Test setup (<30MHz) - Front



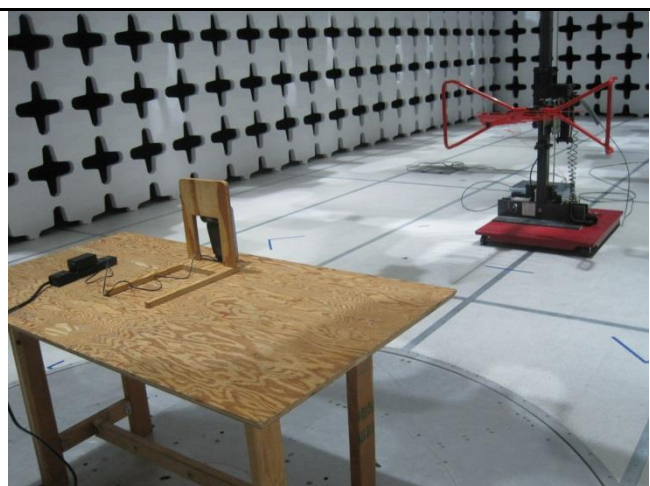
Radiated Emission Test setup (<30MHz) - Rear

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	14 of 40
FCC ID	NVA00008
IC ID	N/A

6.9 EUT Test Setup Photos for AIO Model



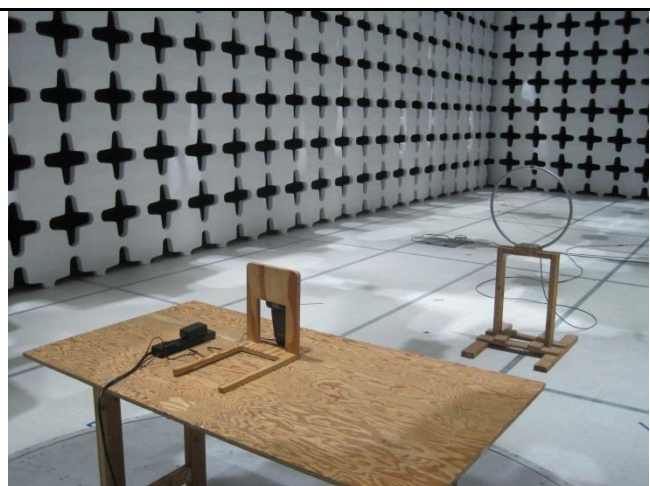
Radiated Emission Test setup (<1GHz) - Front



Radiated Emission Test setup (<1GHz) - Rear



Radiated Emission Test setup (<30MHz) - Front



Radiated Emission Test setup (<30MHz) - Rear

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	15 of 40
FCC ID	NVA00008
IC ID	N/A

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No.	Manu	Note
1	AC/DC Adapter	MC28	870082-001E	EQUINOX	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
Cable	EUT	AC/DC	Supply	AC/DC	1.2	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
-	-	-

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	16 of 40
FCC ID	NVA00008
IC ID	N/A

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Antenna Requirement	FCC	15.203	FCC	-	☒ Pass
	IC		IC	-	☐ N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.4 2009	☒ Pass
	IC	RSS Gen (7.2.2)	IC	-	☐ N/A

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 C63.4 2009	☒ Pass
	IC	RSS210(A2.6)	IC	RSS Gen 4.9	☐ N/A
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	FCC	15.225(b)	FCC	ANSI C63.4 2009	☒ Pass
	IC	RSS210(A2.6)	IC	RSS Gen 4.9	☐ N/A
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	FCC	15.225(c)	FCC	ANSI C63.4 2009	☒ Pass
	IC	RSS210(A2.6)	IC	RSS Gen 4.9	☐ N/A
Limit outside the band of 13.110 – 14.010 MHz	FCC	15.225(d), 15.209	FCC	ANSI C63.4 2009	☒ Pass
	IC	RSS210(A2.6)	IC	RSS Gen 4.9	☐ N/A
Frequency Stability	FCC	15.225(e)	FCC	-	☒ Pass
	IC	RSS210(A2.6)	IC	RSS Gen 4.7	☐ N/A
Occupied Bandwidth	FCC	-	FCC	-	☒ Pass
	IC	RSS-210(5.9.1)	IC	RSS Gen 4.6	☐ N/A
Remark	- All measurement uncertainties are not taken into consideration for all presented test result. - 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. - Test Method: ANSI C63.4: 2009 / RSS – Gen Issue 3: 2010				

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	17 of 40
FCC ID	NVA00008
IC ID	N/A

9 Measurement Uncertainty

Test Item	Frequency Range	Description	Uncertainty
AC Conducted Emissions Voltage	150KHz – 30MHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	±3.5dB
Limit in the band of 13.553 – 13.567 MHz	13.553 – 13.567 MHz	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
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	13.410 – 13.553 MHz and 13.567 – 13.710 MHz		+5.6dB/-4.5dB
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	13.110 – 13.410 MHz and 13.710 – 14.010 MHz		+5.6dB/-4.5dB
Limit outside the band of 13.110 – 14.010 MHz	9KHz – 30MHz		+5.6dB/-4.5dB
Radiated Spurious Emissions	30MHz – 1GHz		+5.6dB/-4.5dB

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	18 of 40
FCC ID	NVA00008
IC ID	N/A

10 Measurements, examination and derived results

10.1 Antenna Requirement

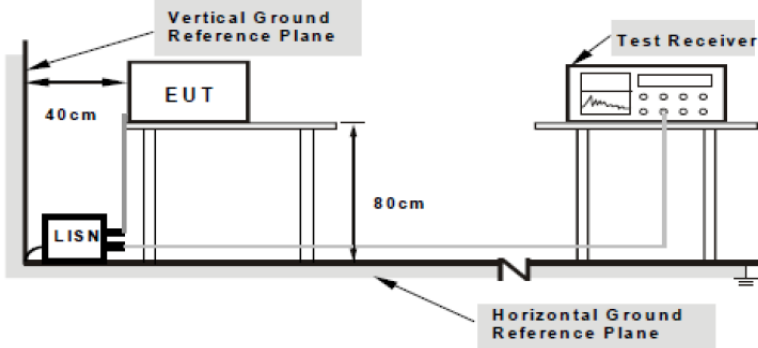
Spec	Item	Requirement	Applicable
§15.203	-	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. b) Antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.	☒
Remark	The RFID 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		

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	19 of 40
FCC ID	NVA00008
IC ID	N/A

10.2 Conducted Emission 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

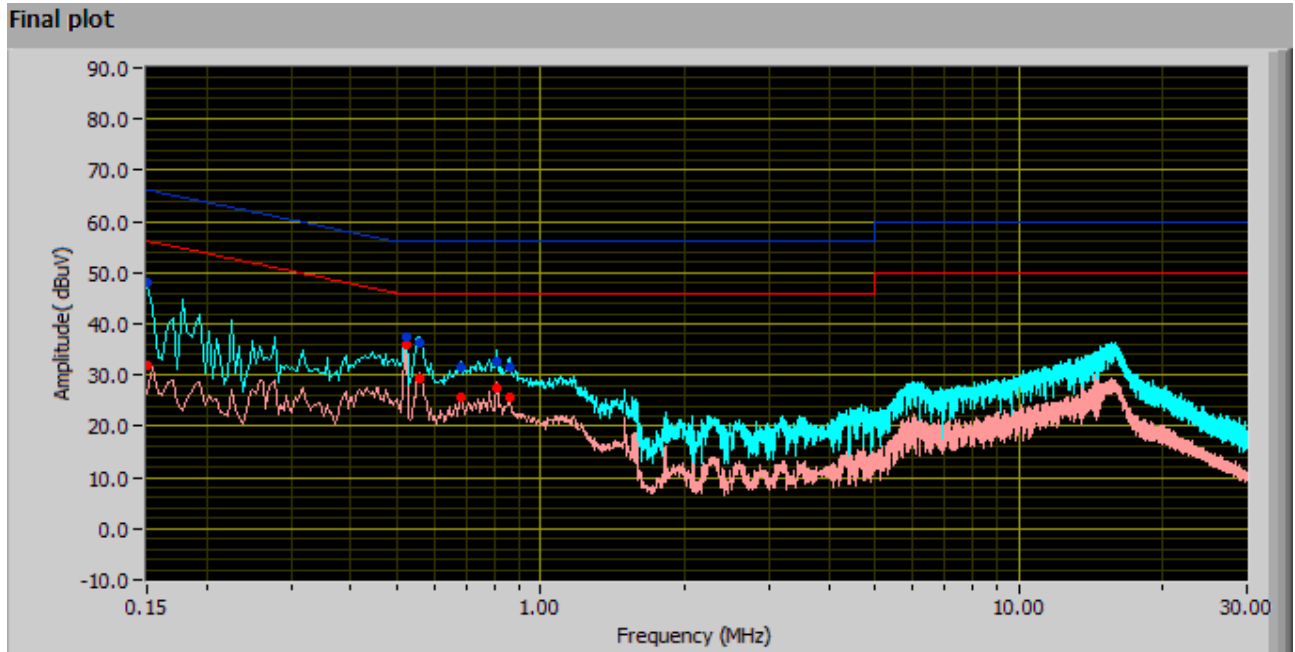
Spec	Item	Requirement	Applicable
§ 15.207, RSS210(A8.1)	a)	For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, 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 80cm from EUT and at least 80cm from other units and other metal planes support units.		
Procedure	- The EUT and supporting equipment was 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 equipments were powered separately from another main supply.		
Test Date	08/06/2013	Environmental condition	Temperature 24°C Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	20 of 40
FCC ID	NVA00008
IC ID	N/A

Graph



Quasi-Peak Limit

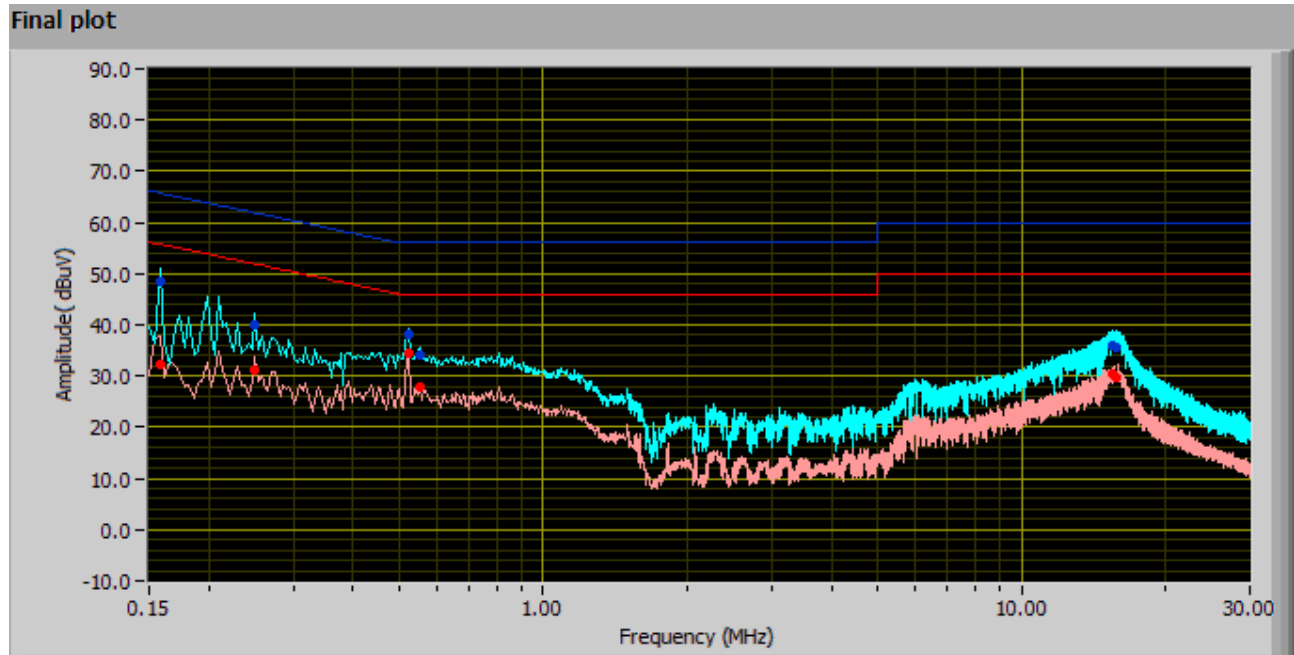
Average Limit

Neutral Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dB μ V)	Class B Limit (dB)	Margin (dB)	Avg Value (dB μ V)	Class B Limit (dB)	Margin (dB)	Line
0.150	48.137	66.189	-18.052	31.887	56.189	-24.302	Neutral
0.522	37.558	56	-18.442	35.898	46	-10.102	Neutral
0.558	36.162	56	-19.838	29.502	46	-16.498	Neutral
0.682	31.591	56	-24.409	25.721	46	-20.279	Neutral
0.806	32.782	56	-23.218	27.452	46	-18.548	Neutral
0.858	31.404	56	-24.596	25.504	46	-20.496	Neutral

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	21 of 40
FCC ID	NVA00008
IC ID	N/A

Graph



Quasi-Peak Limit

Average Limit

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dBμV)	Class B Limit (dB)	Margin (dB)	Avg Value (dBμV)	Class B Limit (dB)	Margin (dB)	Line
0.158	48.511	65.749	-17.238	32.111	55.749	-23.638	Phase
0.25	40.025	61.864	-21.839	31.255	51.864	-20.609	Phase
0.522	38.21	56	-17.79	34.65	46	-11.35	Phase
0.554	34.261	56	-21.739	27.941	46	-18.059	Phase
15.549	36.058	60	-23.942	30.298	50	-19.702	Phase
15.797	35.769	60	-24.231	29.829	50	-20.171	Phase

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	22 of 40
FCC ID	NVA00008
IC ID	N/A

10.2 Radiated Measurement

Receiver/Spectrum analyser setting

TEST	Detector	RBW	VBW	Test Distance		NOTES
Radiated Emission < 1GHz (30MHz – 1GHz)	PK/QP	100KHz	300KHz	3m	-	-
Radiated Emission < 30MHz	PK/QP	10KHz	30KHz	3m	-	-
Radiated Emission > 1GHz (1GHz – 18GHz)	PK/AV	1MHz	3MHz	3m	-	-

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	23 of 40
FCC ID	NVA00008
IC ID	N/A

10.2.1 Radiated Measurement below 1GHz

Requirement(s):

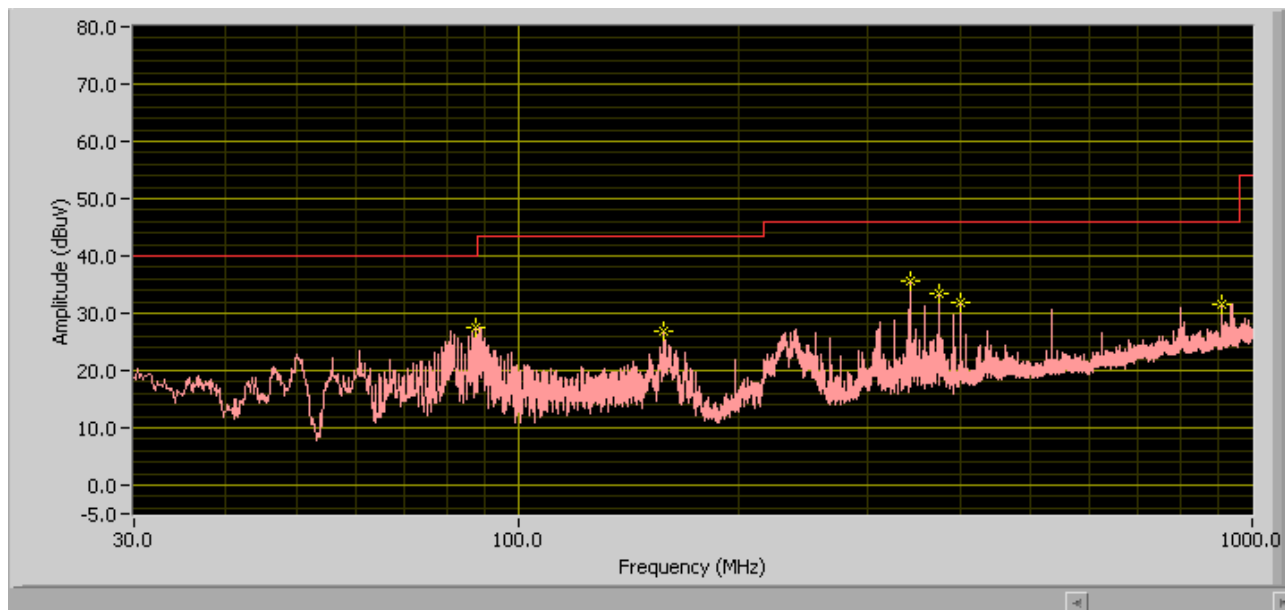
Spec	Requirement	Applicable																								
§ 15.209 ,RSS210 (A8.5)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th><th>Measurements Distance (meters)</th></tr> </thead> <tbody> <tr> <td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr> <tr> <td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr> <tr> <td>1.705-30.0</td><td>30</td><td>30</td></tr> <tr> <td>30 – 88</td><td>100</td><td>3</td></tr> <tr> <td>88 – 216</td><td>150</td><td>3</td></tr> <tr> <td>216 960</td><td>200</td><td>3</td></tr> <tr> <td>Above 960</td><td>500</td><td>3</td></tr> </tbody> </table>	Frequency range (MHz)	Field Strength (uV/m)	Measurements Distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30 – 88	100	3	88 – 216	150	3	216 960	200	3	Above 960	500	3	☒
Frequency range (MHz)	Field Strength (uV/m)	Measurements Distance (meters)																								
0.009-0.490	2400/F(kHz)	300																								
0.490-1.705	24000/F(kHz)	30																								
1.705-30.0	30	30																								
30 – 88	100	3																								
88 – 216	150	3																								
216 960	200	3																								
Above 960	500	3																								
Test Setup																										
Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - A Quasi-peak measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.																									
Test Date	08/06/2013	<table> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>24oC</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>47%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1019mbar</td> </tr> </table>	Environmental condition	Temperature	24oC		Relative Humidity	47%		Atmospheric Pressure	1019mbar															
Environmental condition	Temperature	24oC																								
	Relative Humidity	47%																								
	Atmospheric Pressure	1019mbar																								
Remark	-																									
Result	☒ Pass ☐ Fail																									

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	24 of 40
FCC ID	NVA00008
IC ID	N/A

Results & Graph for CFD Model:

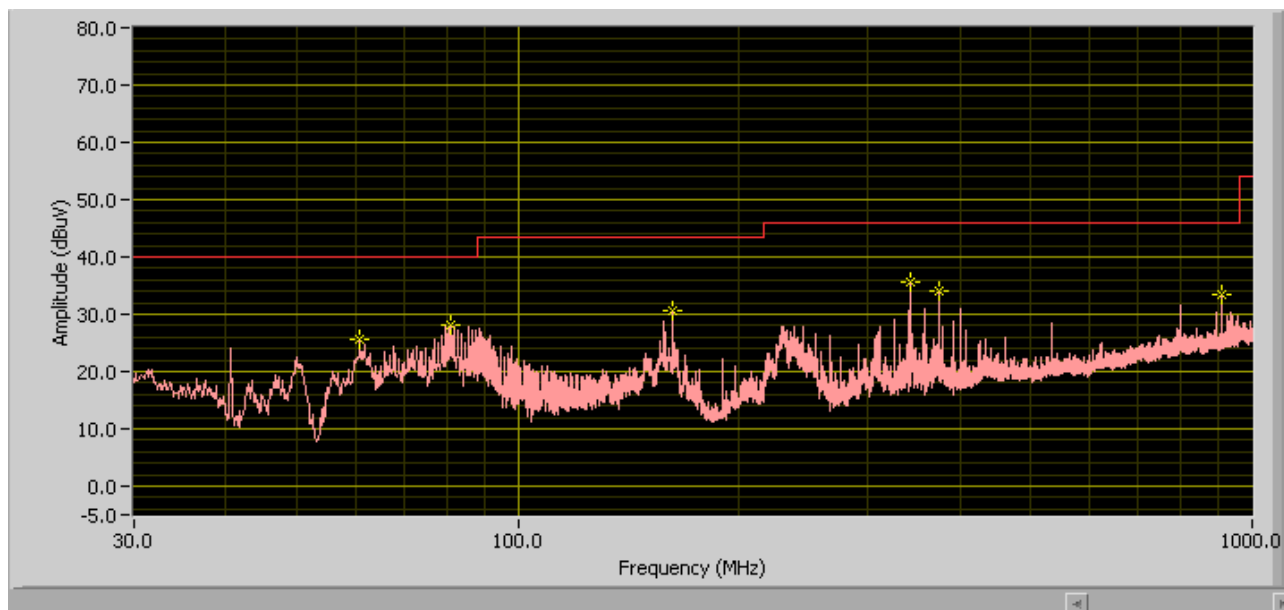


Test Data

Frequency (MHz)	Reading (dBuV)	Azimuth (degree)	Polarity	Height (cm)	Antenna Factor (dB)	Cable Loss (dB)	Amplifier (dB)	Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.65	49.23	248	H	111	14	3	31.7	34.53	46	-11.47
374.99	45.97	281	H	100	15.1	3.1	31.7	32.47	46	-13.52
87.90	48.57	62	V	100	7.4	1.3	32	25.27	40	-14.73
400.01	42.72	263	H	111	15.3	3.2	31.7	229.52	46	-16.48
911.34	31.85	343	H	328	21.7	5.5	31.3	27.75	46	-18.24
158.33	40.61	313	H	326	12	2	31.9	22.71	43.52	-20.81

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	25 of 40
FCC ID	NVA00008
IC ID	N/A

Results & Graph for AIO Model:



Test Data

Frequency (MHz)	Reading (dBuV)	Azimuth (degree)	Polarity	Height (cm)	Antenna Factor (dB)	Cable Loss (dB)	Amplifier (dB)	Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)
341.68	48.26	263	H	100	14	3	31.7	33.56	46	-12.43
80.91	49.04	209	H	205	7.7	1.2	32	25.94	40	-14.06
375.01	45.18	290	H	100	15.1	3.1	31.7	31.68	46	-14.32
910.98	31.80	176	H	400	21.7	5.5	31.3	27.70	46	-18.30
162.73	47.36	107	H	157	11.9	2	31.9	29.36	43.52	-14.15
60.96	43.80	352	V	229	7.4	1	32	20.20	40	-19.80

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	26 of 40
FCC ID	NVA00008
IC ID	N/A

10.2.2 Radiated Measurement 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	1. The EUT and supporting equipment was 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 C63.4. The EUT was set to transmit at the highest output power. The EUT was set 3 meters 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	08/06/2013	Environmental condition Temperature 24oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-	
Result	☒ Pass ☐ Fail	

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	27 of 40
FCC ID	NVA00008
IC ID	N/A

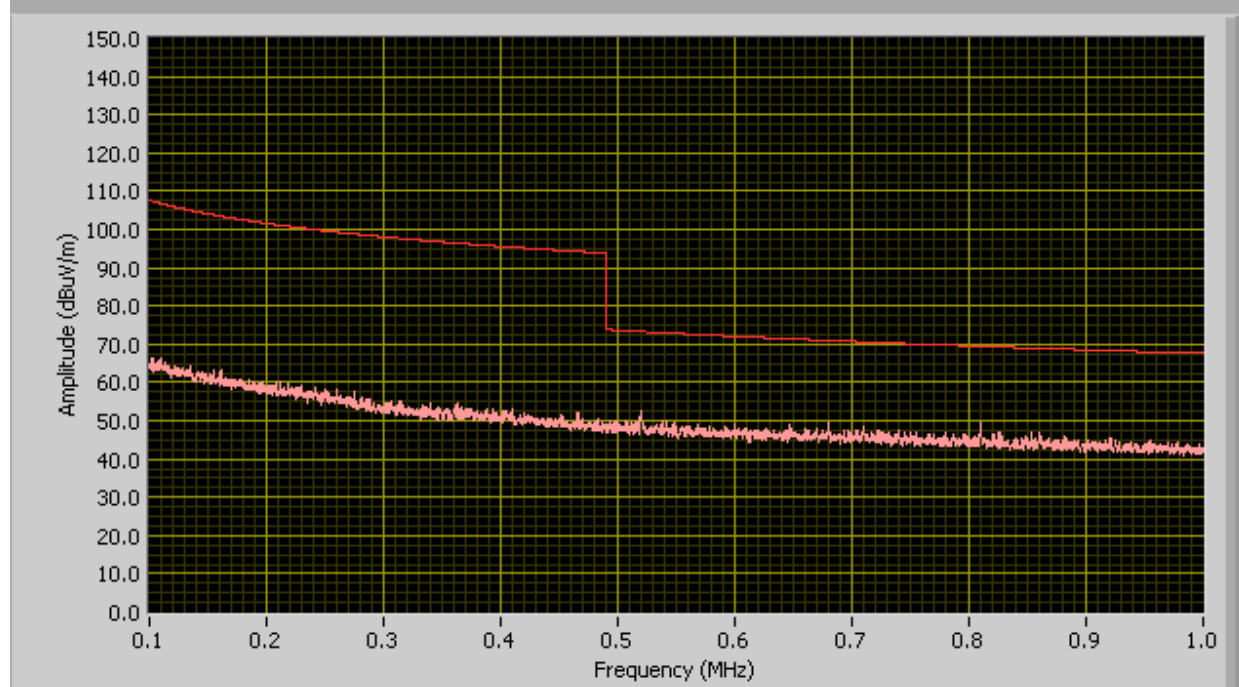
Results & Graph for CFD Model:

100 kHz ~ 1 MHz

Loop Antenna at 0 degree

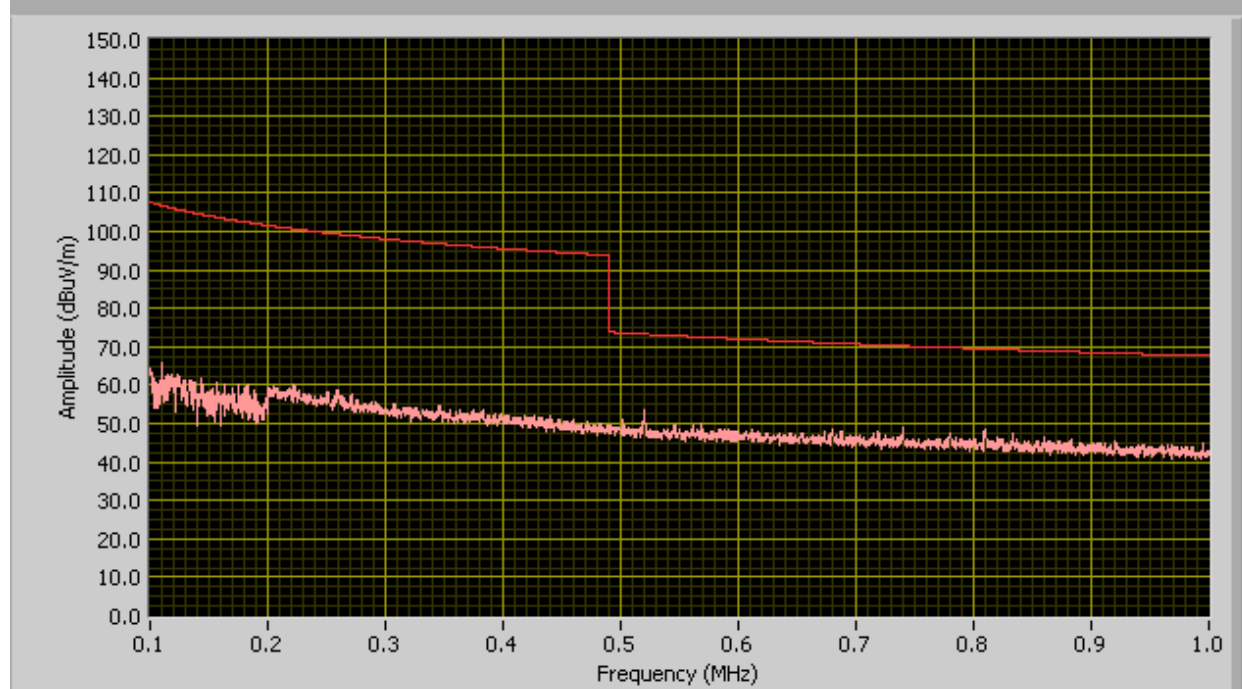
General Emission Limit @ 3 Meter

FCC- 100KHz to 1000KHz Radiated Emission at 3meter Distance



Loop Antenna at 90 degree

FCC- 100KHz to 1000KHz Radiated Emission at 3meter Distance



Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	28 of 40
FCC ID	NVA00008
IC ID	N/A

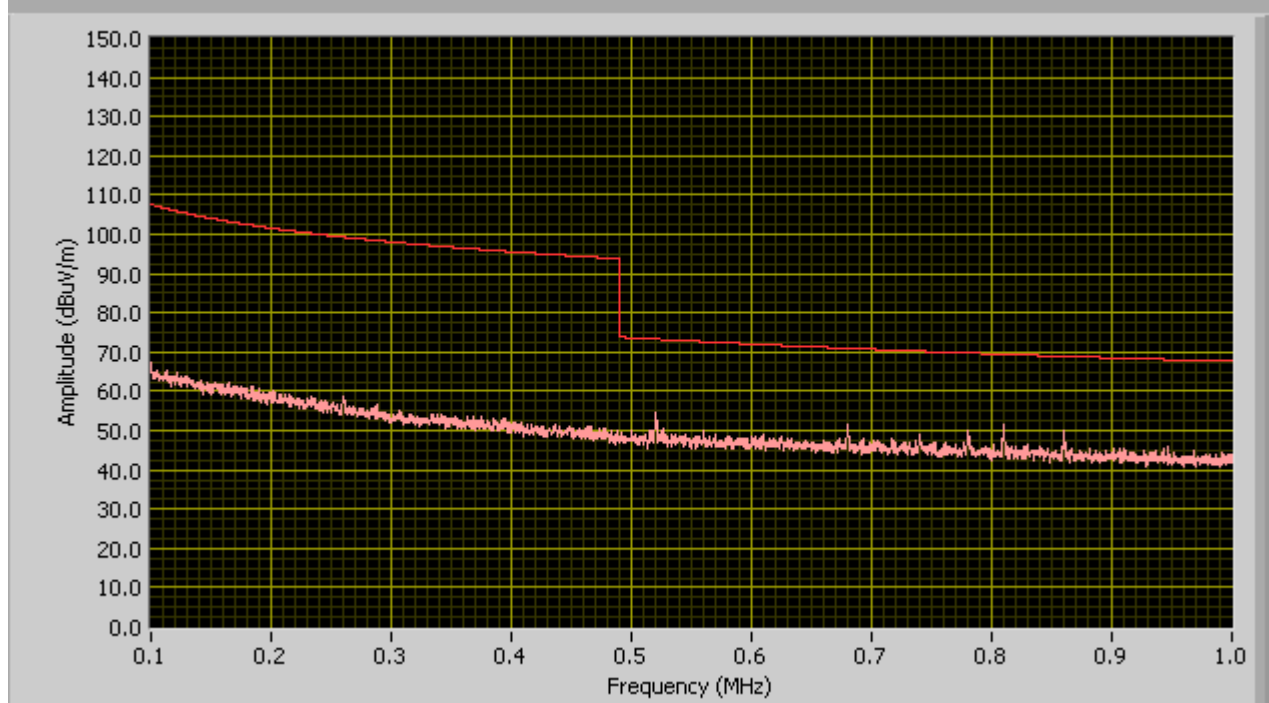
Results & Graph for AIO Model:

100 kHz ~ 1 MHz

Loop Antenna at 0 degree

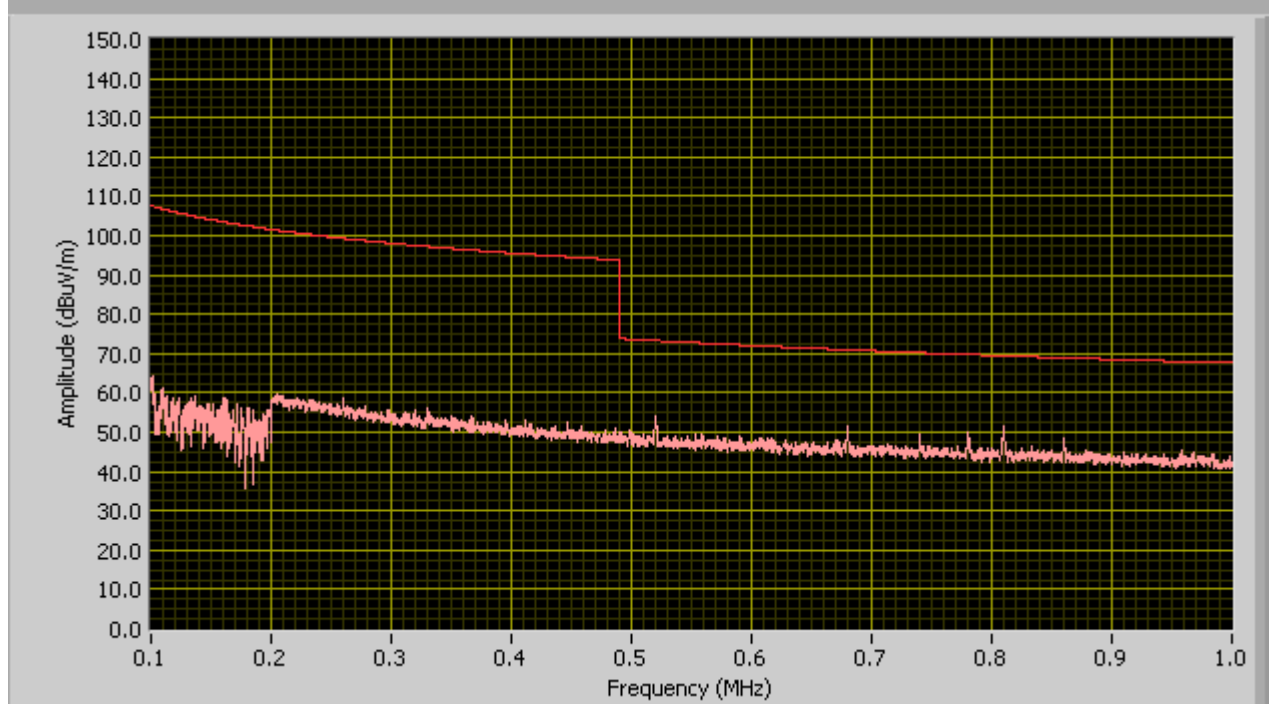
General Emission Limit @ 3 Meter

FCC- 100KHz to 1000KHz Radiated Emission at 3meter Distance



Loop Antenna at 90 degree

FCC- 100KHz to 1000KHz Radiated Emission at 3meter Distance



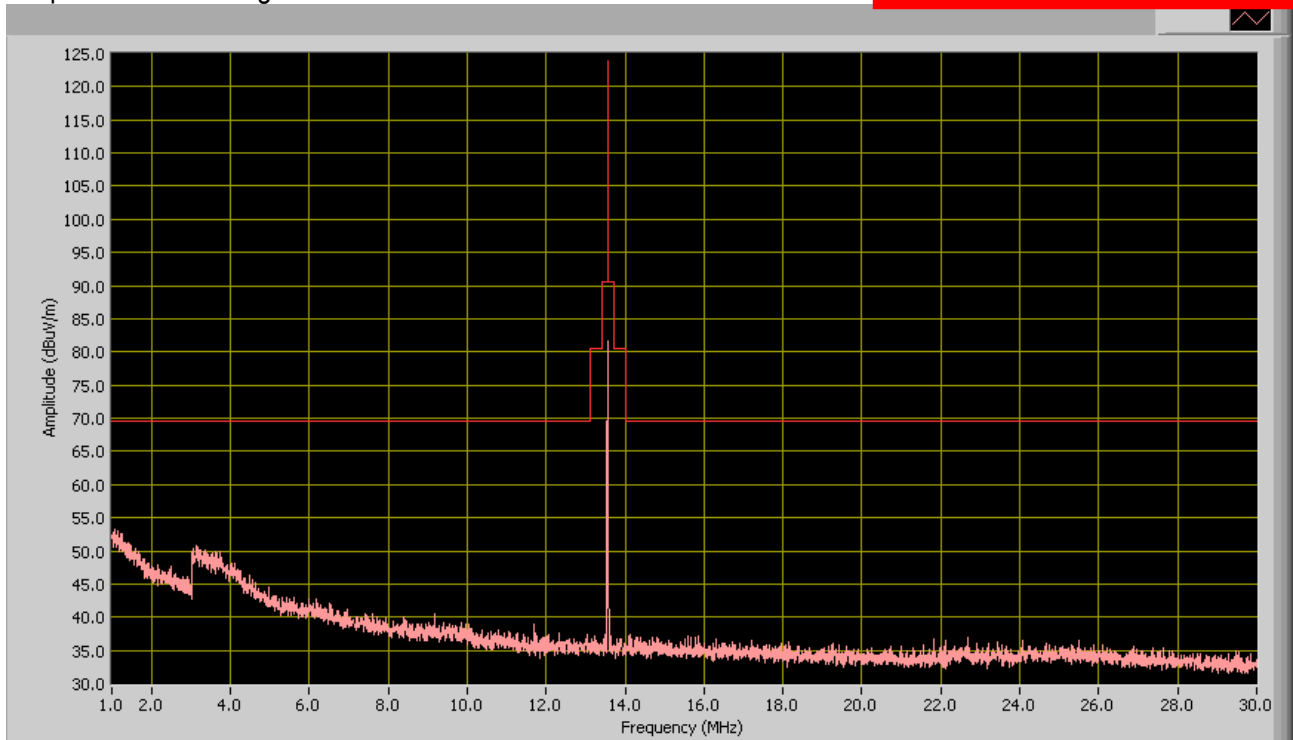
Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	29 of 40
FCC ID	NVA00008
IC ID	N/A

Results & Graph for CFD Model:

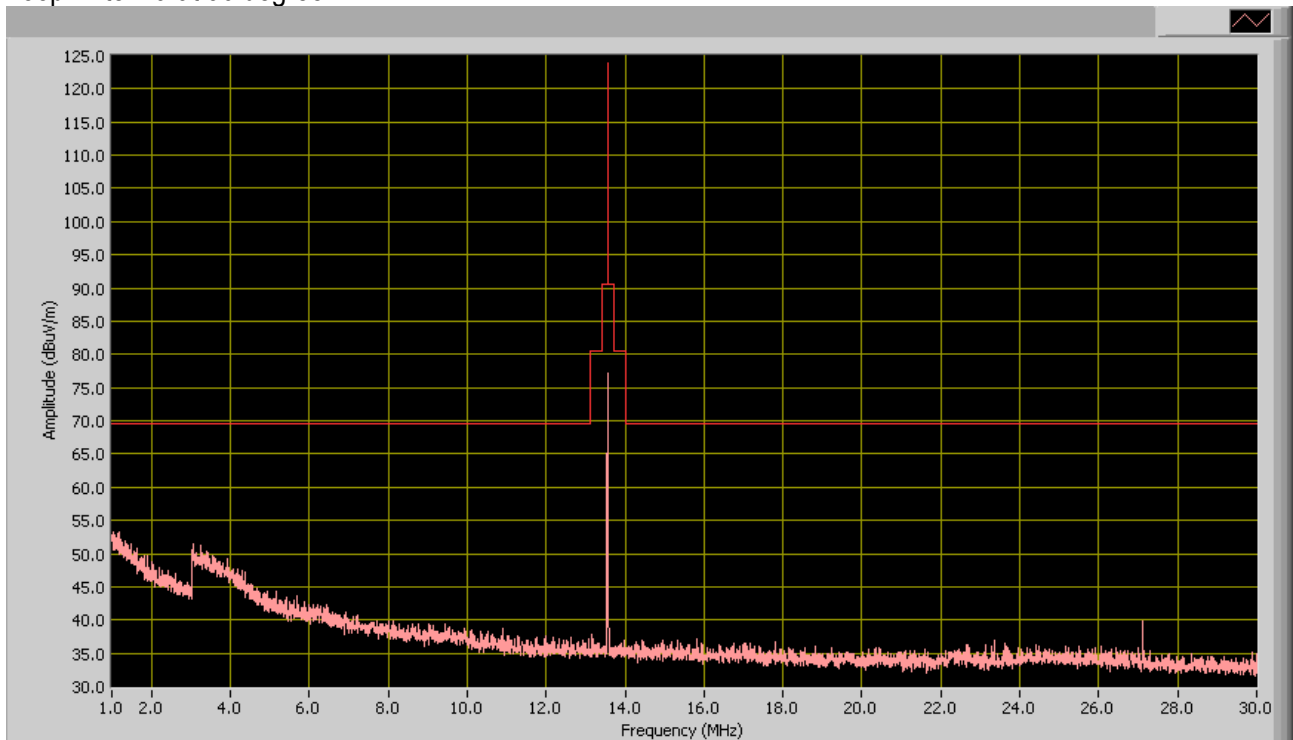
1MHz ~ 30MHz

Loop Antenna at 0 degree

General Emission Limit @ 3 meter



Loop Antenna at 90 degree



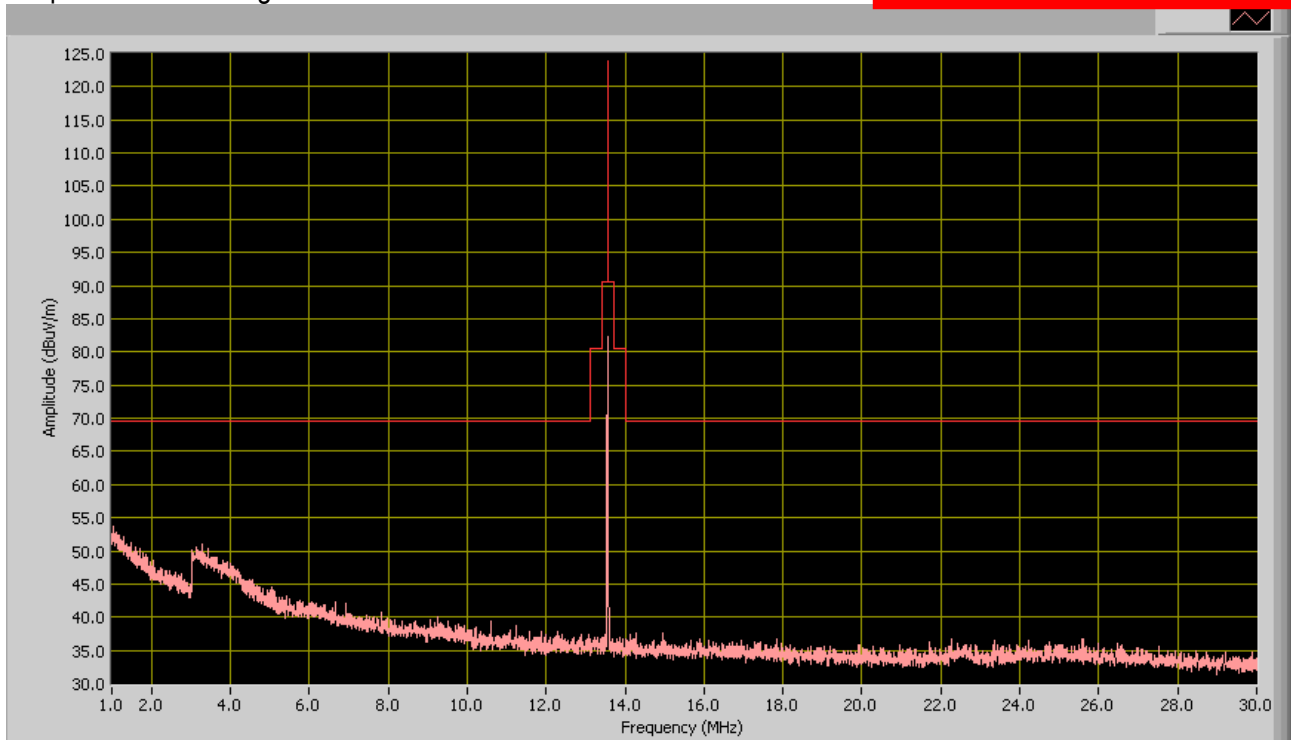
Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	30 of 40
FCC ID	NVA00008
IC ID	N/A

Results & Graph for AIO Model:

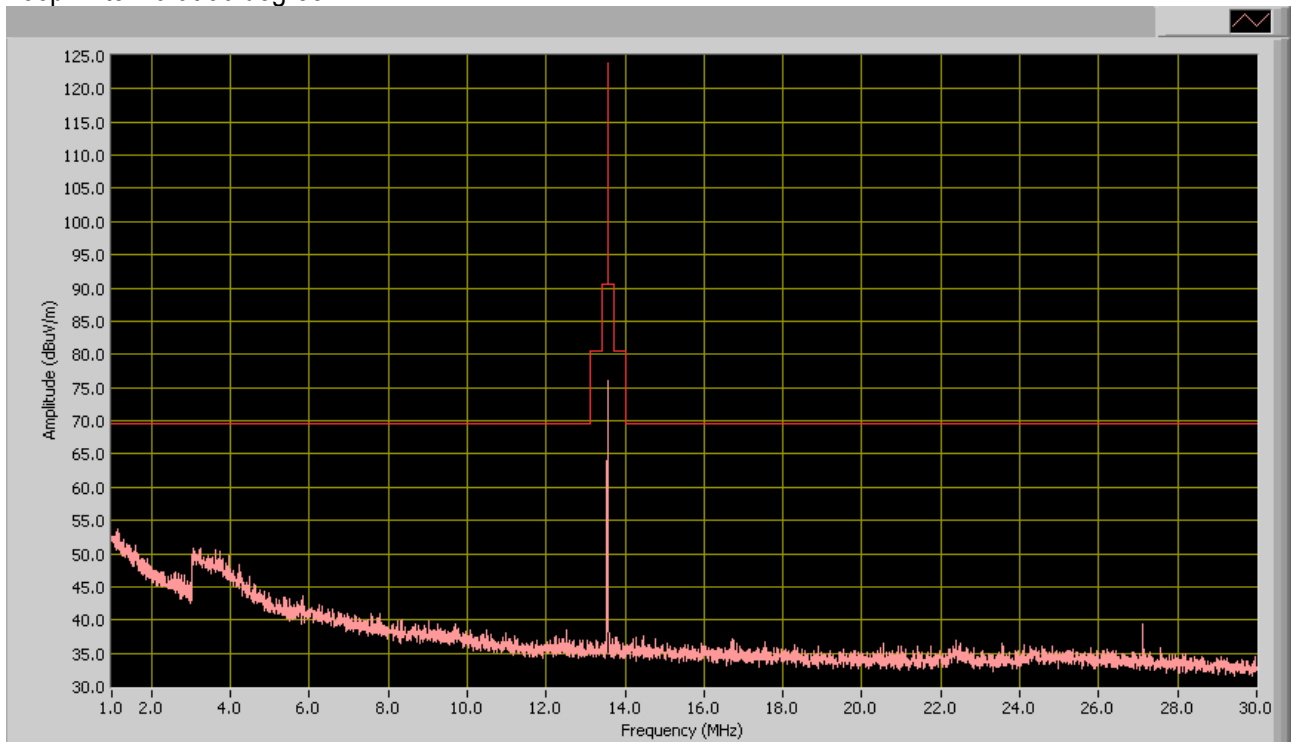
1MHz ~ 30MHz

Loop Antenna at 0 degree

General Emission Limit @ 3 meter



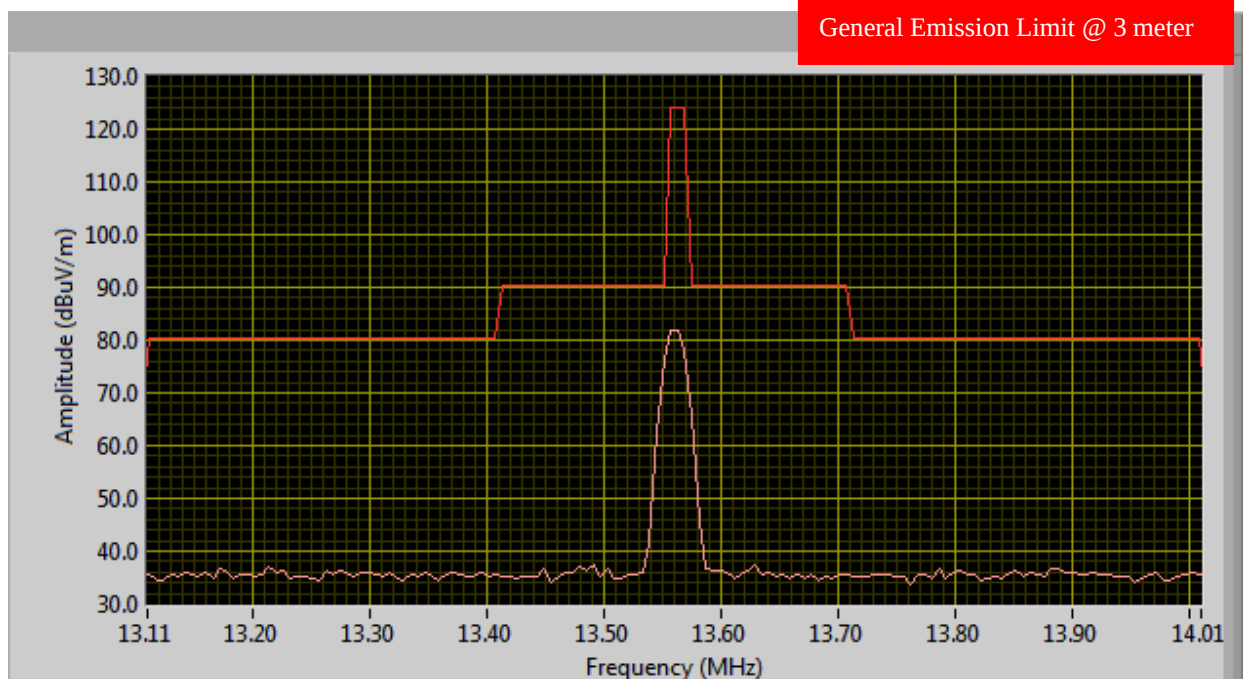
Loop Antenna at 90 degree



Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	31 of 40
FCC ID	NVA00008
IC ID	N/A

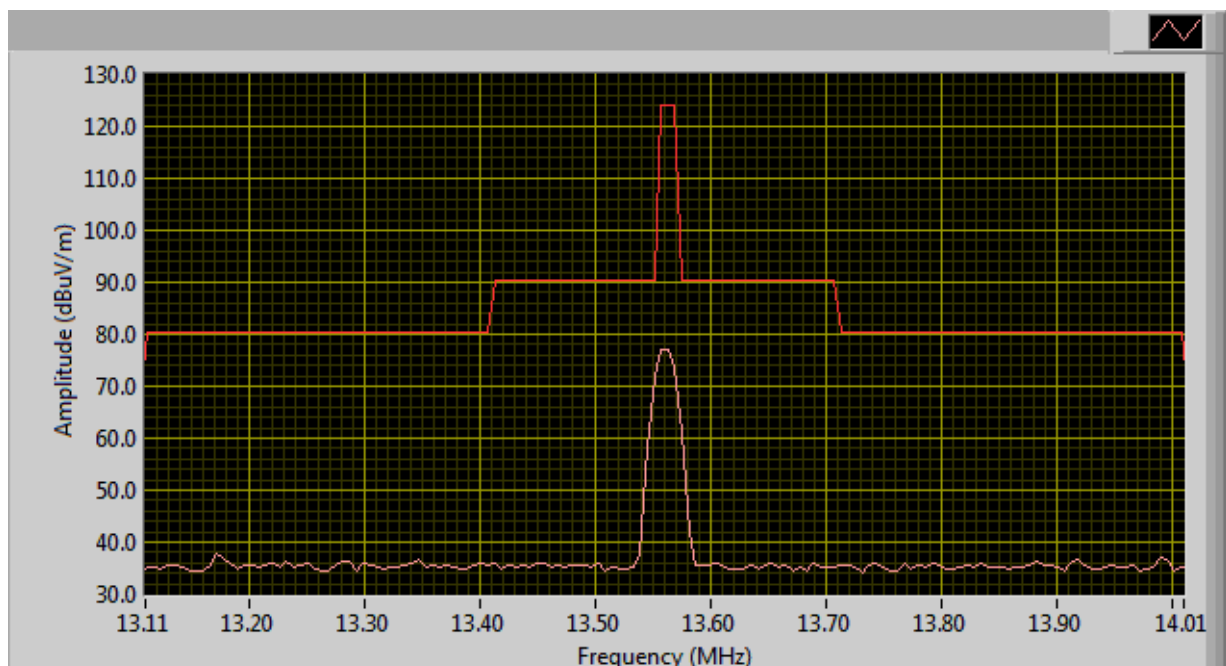
Results & Graph for CFD & AIO Model:

Loop Antenna at 0 degree



Frequency(MHz)	Amplitude(dBuV/m)
13.563	81.7136

Loop Antenna at 90 degree



Frequency(MHz)	Amplitude(dBuV/m)
13.563	77.2053

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	32 of 40
FCC ID	NVA00008
IC ID	N/A

10.2.3 Frequency Stability

Requirement(s):

Spec	Requirement		Applicable
47 CFR §15.225 (e) RSS-210 (A2.6)	Limit: $\pm 0.01\%$ 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 center of the environmental.		
Procedure	Frequency Stability was measured according to 47 CFR §2.1055. A measurement was taken with a 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	08/06/2013	Environmental condition	Temperature 24oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	33 of 40
FCC ID	NVA00008
IC ID	N/A

Test Result

Frequency Stability versus Temperature: The Frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage.

Reference Frequency: 13.560495 MHz at -20°C and $+50^{\circ}\text{C}$

Temperature ($^{\circ}\text{C}$)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	13.560516	21	<0.01	Pass
40	13.560510	15	<0.01	Pass
30	13.560504	9	<0.01	Pass
20	Reference (13.50495 MHz)			
10	13.560487	8	<0.01	Pass
0	13.560482	13	<0.01	Pass
-10	13.560475	20	<0.01	Pass
-20	13.560470	25	<0.01	Pass

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

Carrier Frequency: 13.560495 MHz at 20°C at 9VDC

Measured Voltage $\pm 15\%$ of nominal (DC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
7.65	13.560490	5	<0.01	Pass
10.35	13.560500	5	<0.01	Pass

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	34 of 40
FCC ID	NVA00008
IC ID	N/A

10.2.4 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 analyzer 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, an 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 records.	
Test Date	07/29/2013	Environmental condition Temperature 21oC Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	-	
Result	☒ Pass ☐ Fail	

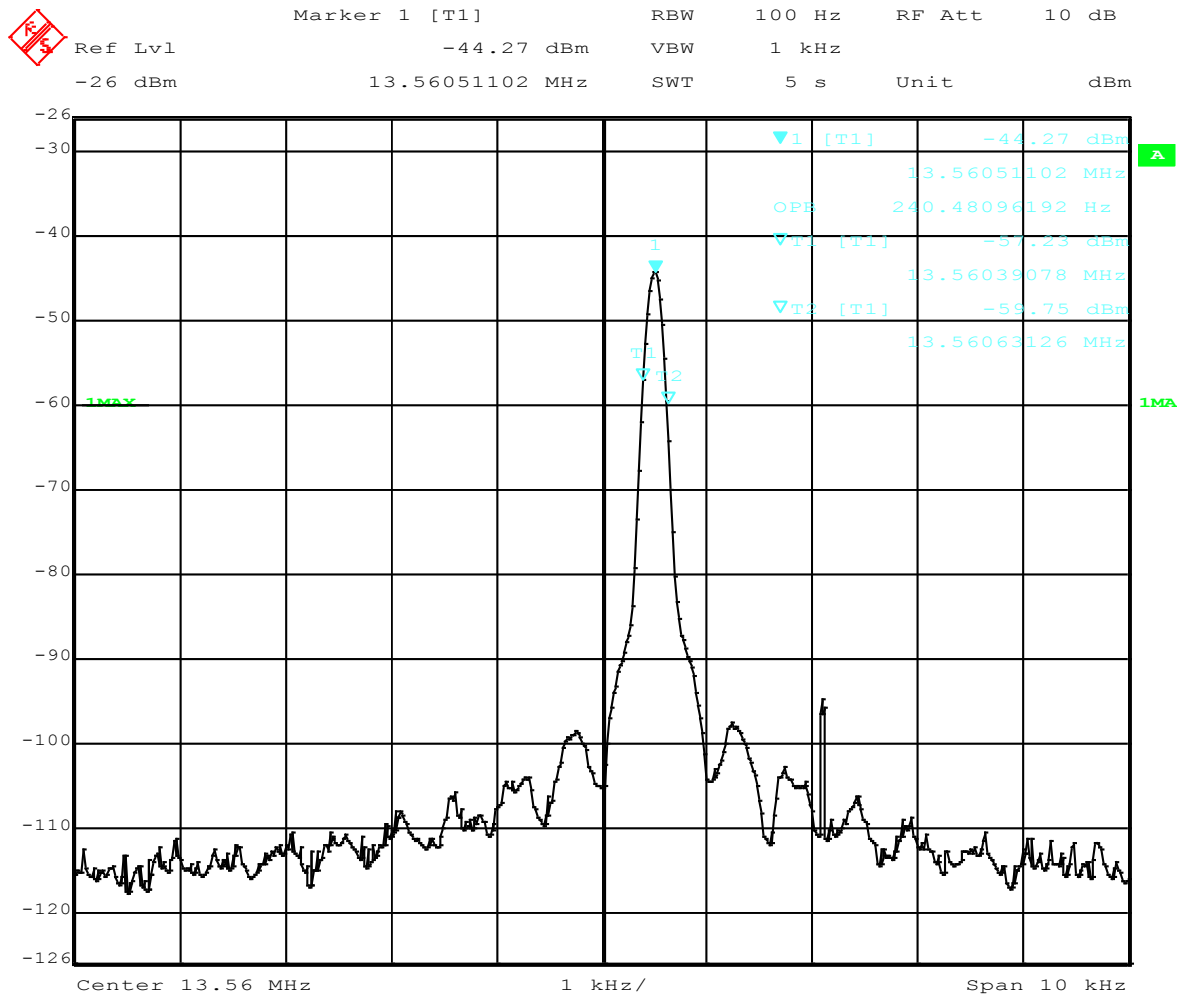
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Results:

Radio	Channel Frequency (MHz)	99% Occupied BW (KHz)	Limit
13.56MHz Radio	13.56	0.24048	N/A

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	35 of 40
FCC ID	NVA00008
IC ID	N/A



Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	36 of 40
FCC ID	NVA00008
IC ID	N/A

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒
R&S LISN	ESH2-Z5	861741/013	05/18/2013	1 Year	05/18/2014	☒
CHASE LISN	MN2050B	1018	07/24/2013	1 Year	07/24/2014	☐
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
Radiated Emissions						
R & S Receiver	ESL6	100178	03/01/2013	1 Year	03/01/2014	☒
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☐
Passive Loop Antenna (10k-30MHz)	6512	49120	5/22/2013	1 Year	5/22/2014	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	02/09/2013	1 Year	02/09/2014	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2013	1 Year	04/26/2014	☐
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2013	1 Year	05/30/2014	☐
3 Meters SAC	3M	N/A	10/13/2012	1 Year	10/13/2013	☐
10 Meters OATS	10M	N/A	06/05/2013	1 Year	06/05/2014	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
Frequency tolerance						
Spectrum Analyzer	8564E	3738A00962	5/20/2013	1 Year	05/20/2014	☒
Test Equity Environment Chamber	1007H	61201	07/05/2013	1 Year	07/05/2014	☒

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	37 of 40
FCC ID	NVA00008
IC ID	N/A

Annex B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	38 of 40
FCC ID	NVA00008
IC ID	N/A

Annex C. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1 , A2 , A3 , A4 , B1 , B2 , B3 , B4 , C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I , Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
HongKong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	39 of 40
FCC ID	NVA00008
IC ID	N/A

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 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

Test report No.	SL13070201-EQU-001-RFID_Rev1.0
Page	40 of 40
FCC ID	NVA00008
IC ID	N/A

This page has been left blank intentionally.