

RF TEST REPORT



Report No.: **RF_SL13102301-HID-031_FCC-IC(RP15EL)**

Supersede Report No.: **NONE**

Applicant	:	HID Global Corporation
Product Name	:	multiCLASS SE Indala Reader
Model No.	:	RP15EL
Test Standard	:	FCC 15.225: 2013 FCC 15.207: 2013 RSS-210 Issue 8: 2010
Test Method	:	FCC 15.225: 2013 ANSI C63.4 2009 RSS Gen 4.6, RSS Gen 4.7 & RSS Gen 4.9
FCC ID	:	JQ6-MCLASSRP15EL
IC ID	:	2236B-MCLASRP15EL
Dates of test	:	November 6, 2013 - November 18, 2013
Issue Date	:	November 26, 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:	
	
Angel Escamilla	David Zhang
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

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TESTING CERT # 2742-01

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Laboratory Introduction

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Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/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

Accreditations for Product Certifications

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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
RF_SL13102301-HID-031_FCC-IC(RP15EL)	-	Original	11/26/2013

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2 Executive Summary

The purpose of this test program was to demonstrate compliance of the HID Global Corporation, multiCLASS SE Indala Reader, and model: RP15EL against the current Stipulated Standards. The RP15EL has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	HID Global Corporation
Applicant Address	:	15370 Barranca Parkway, Irvine, CA 92618 USA
Manufacturer Name	:	HID Global Corporation
Manufacturer Address	:	15370 Barranca Parkway, Irvine, CA 92618 USA

4 Test site information

Lab performing tests	:	SIEMIC Laboratories
Lab Address	:	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	:	881796
IC Test Site No.	:	4842D-2
VCCI Test Site No.	:	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

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6 EUT Information

6.1 EUT Description

Product Name	:	multiCLASS SE Indala Reader
Model No.	:	RP15EL
Trade Name	:	HID
Serial No.	:	-
Input Power	:	12VDC
Date of EUT received	:	November 4, 2013
Equipment Class/ Category	:	DXX, DCD
Clock Frequencies	:	27.12 MHz
Port/Connectors	:	-

EUT has either Pigtail or Terminal wiring connection. Both wiring connections were tested.

6.2 Radio Description

Spec for Radio -

Radio Type	RFID
Operating Frequency	125KHz, 13.56MHz
Modulation	ASK (125KHz), ASK (13.56MHz)
Channel Spacing	None
Antenna Type	PCB loop antenna
Antenna Gain	1 dBi
Antenna Connector Type	N/A

Channel List

Type	Mode	Channel No.	Frequency (MHz)	Available (Y/N)
RFID	125KHz	1	0.125	Y
RFID	13.56MHz	1	13.56	Y

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6.3 EUT test modes/configuration Description

Mode	Note
RF test	EUT continuous transmit when powered on
Note :None	

Test Item	Operating mode	Tested antenna port	Test frequencies
Antenna Requirement	N/A	-	125kHz 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	-	

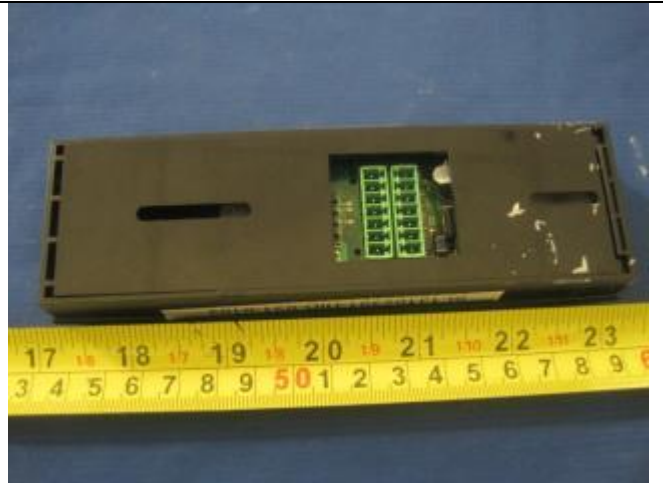
Note: EUT uses a PCB trace antenna attached to the PCB board. Only radiated measurements were performed during the test.

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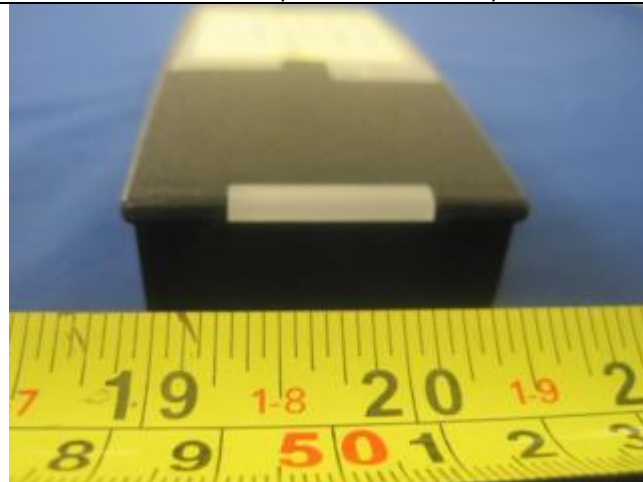
6.4 EUT Photos – External



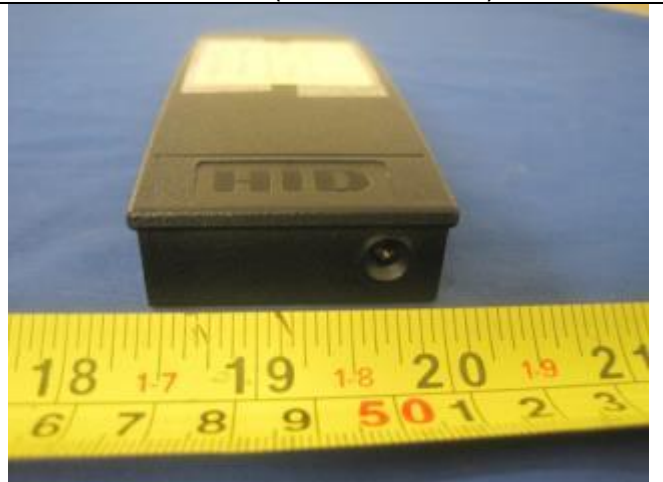
Front View (Terminal Connector)



Rear View (Terminal Connector)



Top View (Terminal Connector)



Bottom View (Terminal Connector)



Left Side View (Terminal Connector)

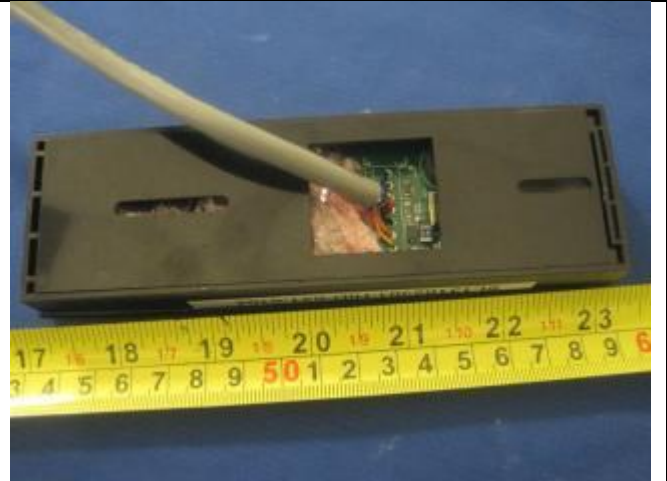


Right Side View (Terminal Connector)

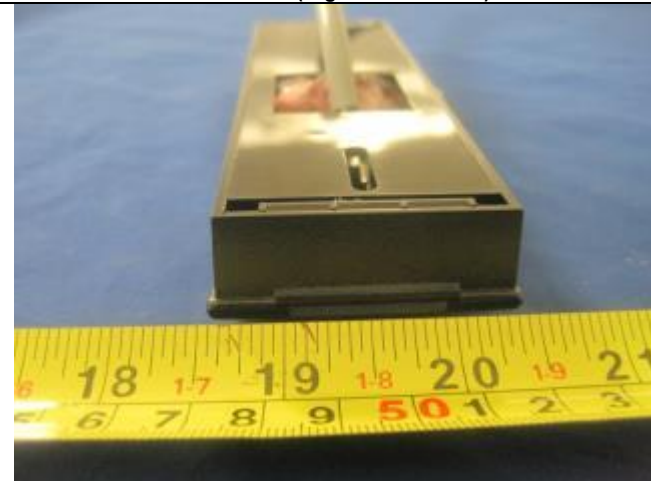
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Front View (Pigtail Connector)



Rear View (Pigtail Connector)



Top View (Pigtail Connector)



Bottom View (Pigtail Connector)



Left Side View (Pigtail Connector)



Right Side View (Pigtail Connector)

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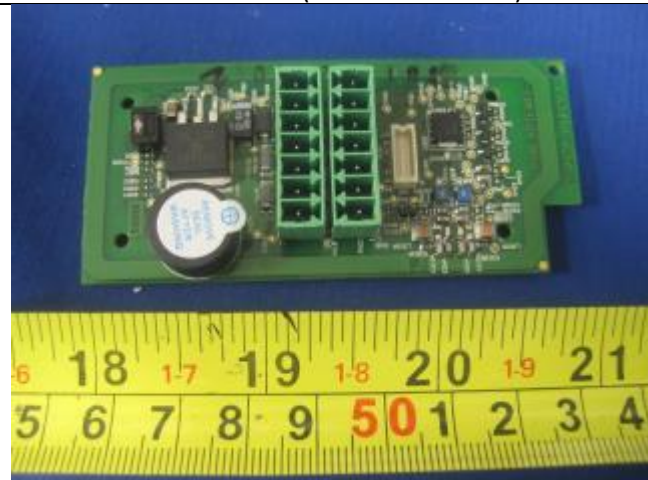
6.5 EUT Photos – Internal



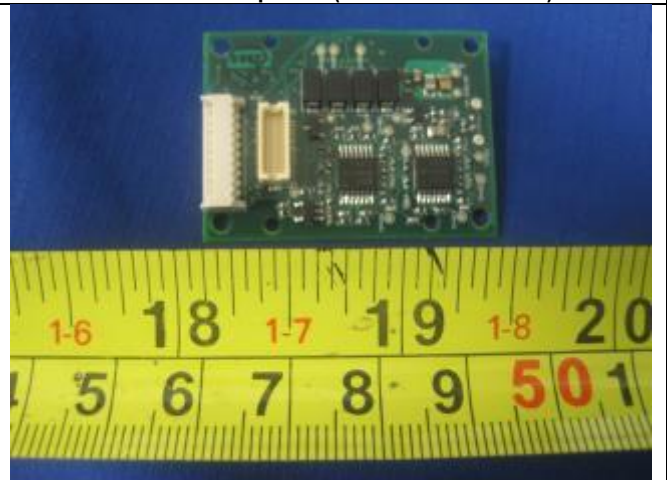
Cover Off View (Terminal Connector)



Main PCBA Top View (Terminal Connector)



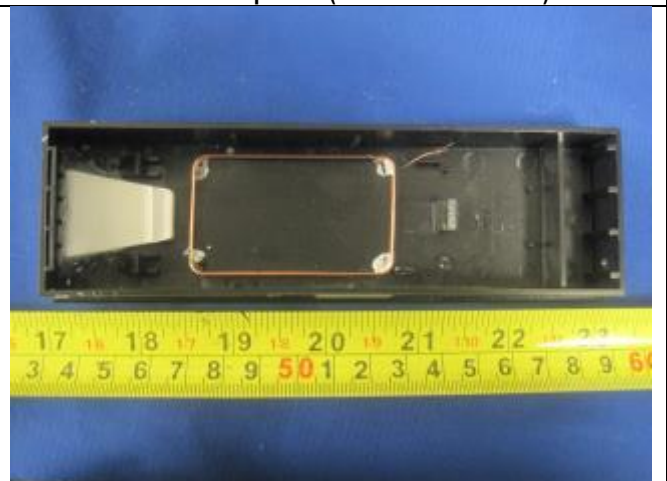
Main PCBA Bottom View (Terminal Connector)



Sub PCBA Top View (Terminal Connector)



Sub PCBA Bottom View (Terminal Connector)

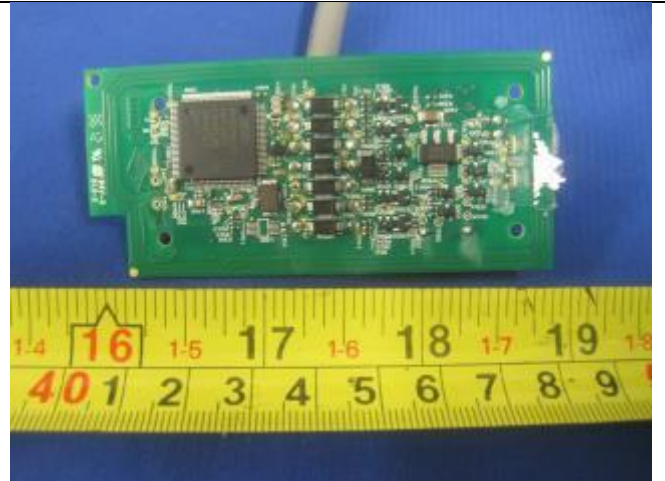


Loop Antenna (Terminal Connector)

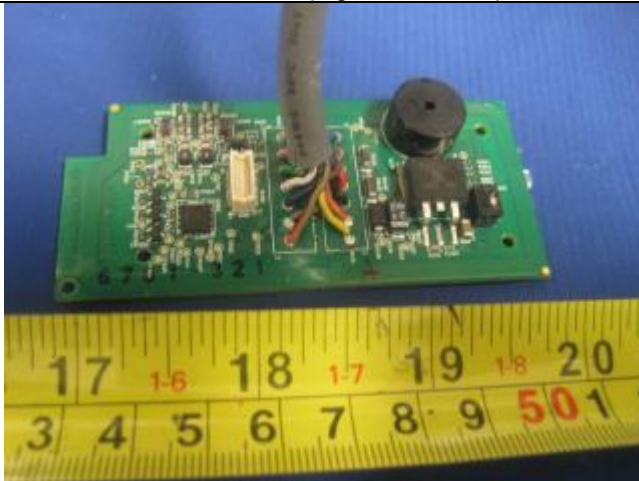
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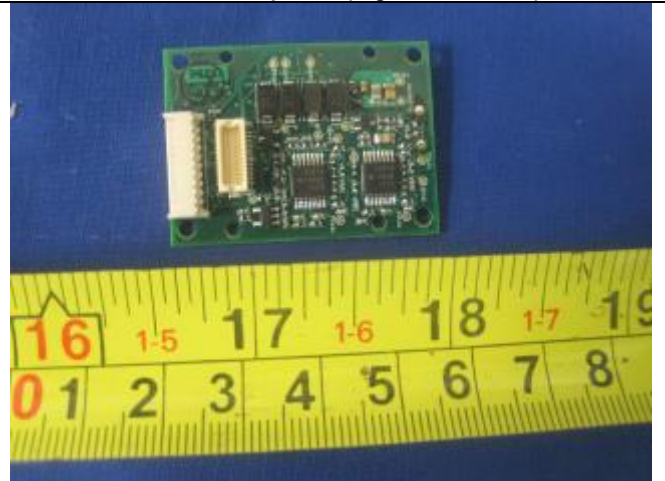
Cover Off View (Pigtail Connector)



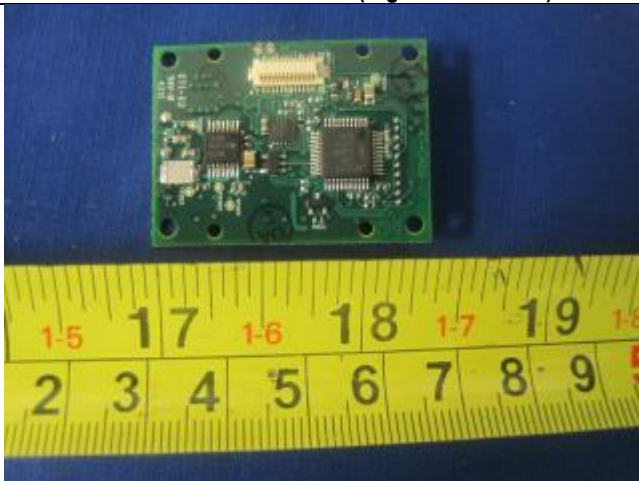
Main PCBA Top View (Pigtail Connector)



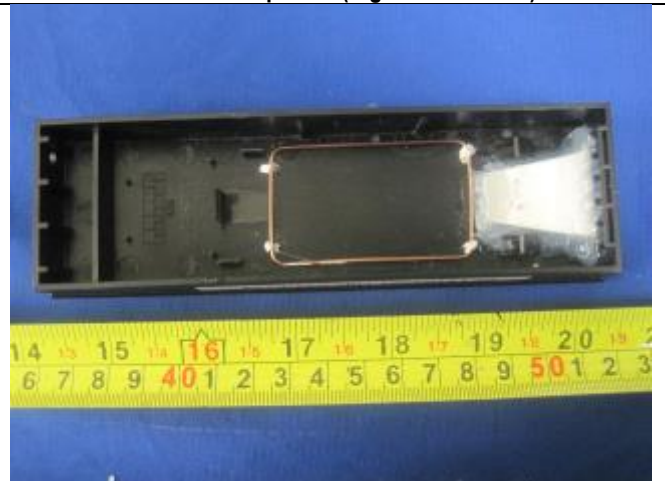
Main PCBA Bottom View (Pigtail Connector)



Sub PCBA Top View (Pigtail Connector)



Sub PCBA Bottom View (Pigtail Connector)



Loop Antenna (Pigtail Connector)

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6.6 EUT Test Setup Photos



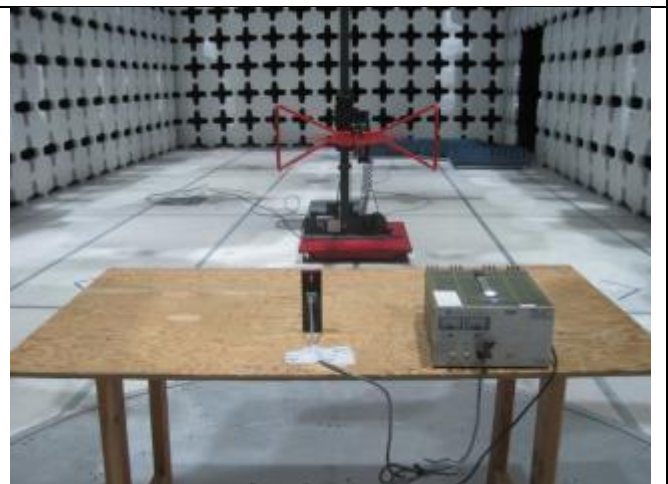
Conducted Emissions– Front View (Terminal Connector)



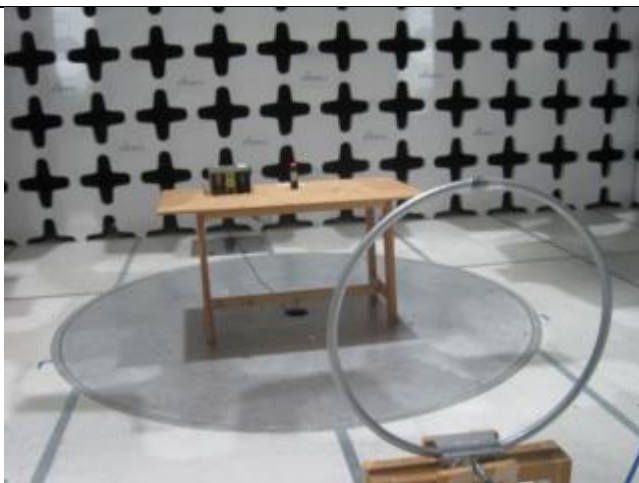
Conducted Emissions– Rear View (Terminal Connector)



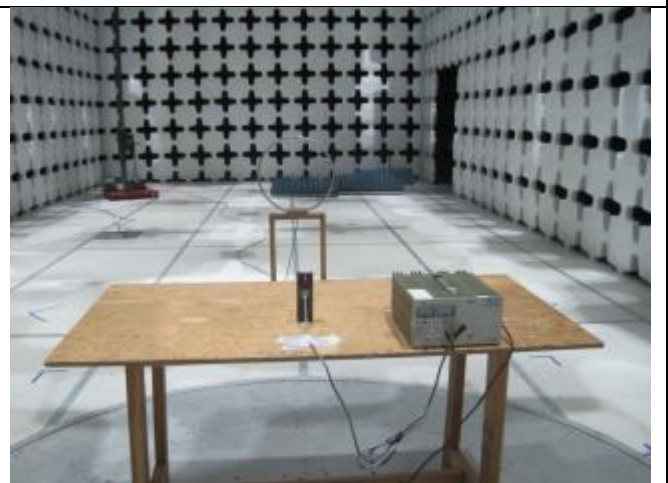
Radiated Emissions (<1GHz) – Front View (Terminal Connector)



Radiated Emissions (<1GHz) – Rear View (Terminal Connector)



Radiated Emissions (<30MHz) – Front View (Terminal Connector)



Radiated Emissions (<30MHz) – Rear View (Terminal Connector)

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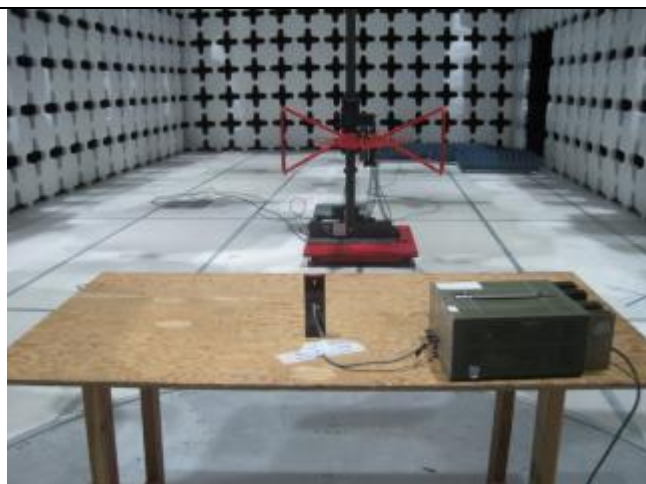
Conducted Emissions– Front View (Pigtail Connector)



Conducted Emissions– Rear View (Pigtail Connector)



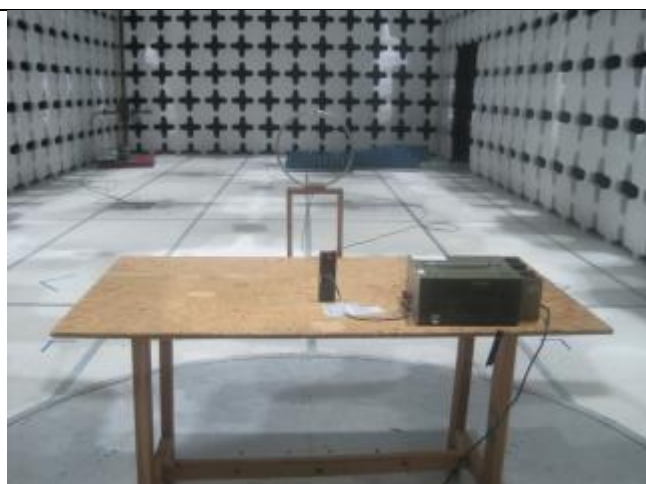
Radiated Emissions (<1GHz) – Front View (Pigtail Connector)



Radiated Emissions (<1GHz) – Rear View (Pigtail Connector)



Radiated Emissions (<30MHz) – Front View (Pigtail Connector)



Radiated Emissions (<30MHz) – Rear View (Pigtail Connector)

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7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No	Manu	Note
1	DC Power Supply	TPS-2000	920027	Topward Electric Instruments	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
Power Cable	EUT	Power Input	DC Power Supply	DC Power Output	2.0	Shielded	Terminal Connector
Power Cable	EUT	Power Input	DC Power Supply	DC Power Output	0.5	Shielded	Pigtail Connector

7.3 Test Software Description

Test Item	Software	Description
Conducted Emissions	N/A	EUT to transmit continuously when powered on
Radiated Spurious Emissions	N/A	EUT to transmit continuously when powered on
Frequency Stability	N/A	EUT to transmit continuously when powered on
Occupied Bandwidth	N/A	EUT to transmit continuously when powered on

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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				

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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

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10 Measurements, examination and derived results

10.1 Antenna Requirement

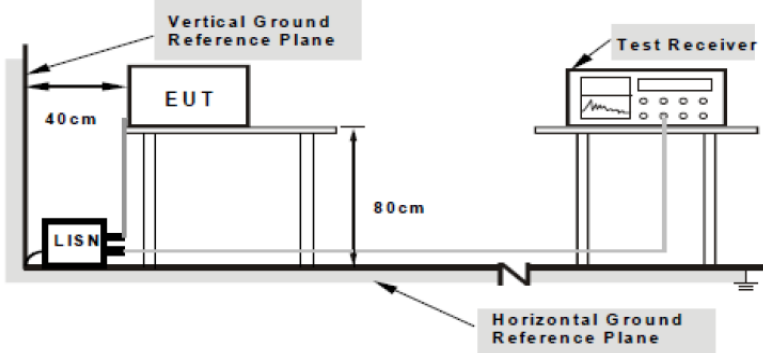
Spec	Requirement	Applicable
§15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. 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 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	

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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

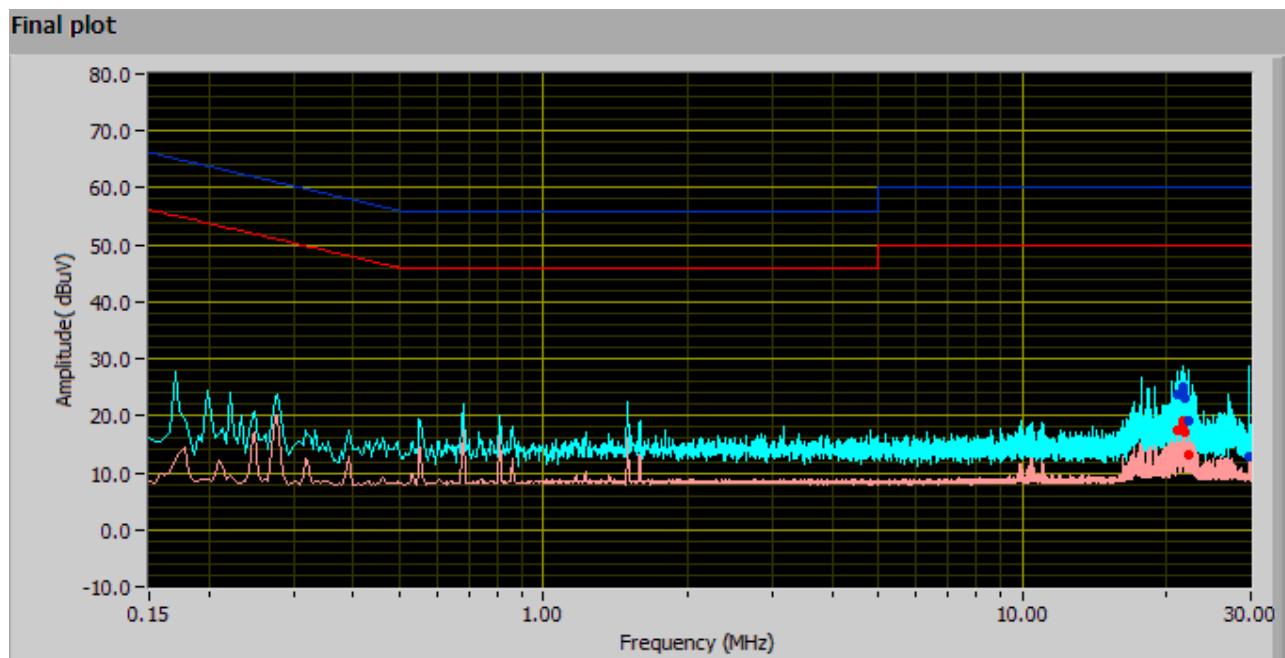
Spec	Item	Requirement	Applicable
§ 15.207, RSS210(A8.1)	a)	For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits set in § 15.207, as measured using a 50 μ H/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 LISNs (AMN) are 80cm from EUT and at least 80cm from other units and 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	11/15/2013	Environmental conditions	Temperature 21.5°C Relative Humidity 39 % Atmospheric Pressure 1025 mbar
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

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RP15EL with terminal connector test results



Quasi-Peak Limit

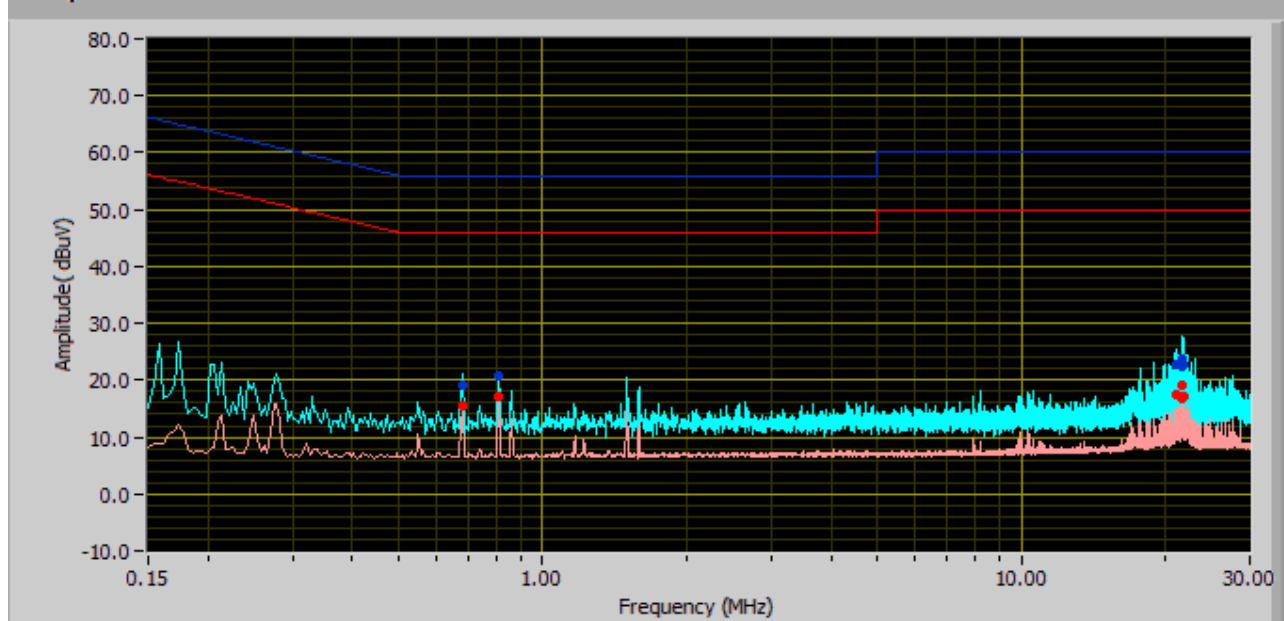
Average Limit

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dB μ V)	Class B Limit (dBuV)	Margin (dB)	Avg Value (dB μ V)	Class B Limit (dBuV)	Margin (dB)	Line
21.05	23.78	60.00	-36.22	17.50	50.00	-32.50	Phase
21.56	24.43	60.00	-35.57	18.51	50.00	-31.49	Phase
21.66	25.15	60.00	-34.85	18.97	50.00	-31.03	Phase
21.83	23.10	60.00	-36.90	16.97	50.00	-33.03	Phase
22.16	19.26	60.00	-40.74	13.02	50.00	-36.98	Phase
29.66	12.95	60.00	-47.05	12.95	50.00	-37.05	Phase

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Final plot



Quasi-Peak Limit

Average Limit

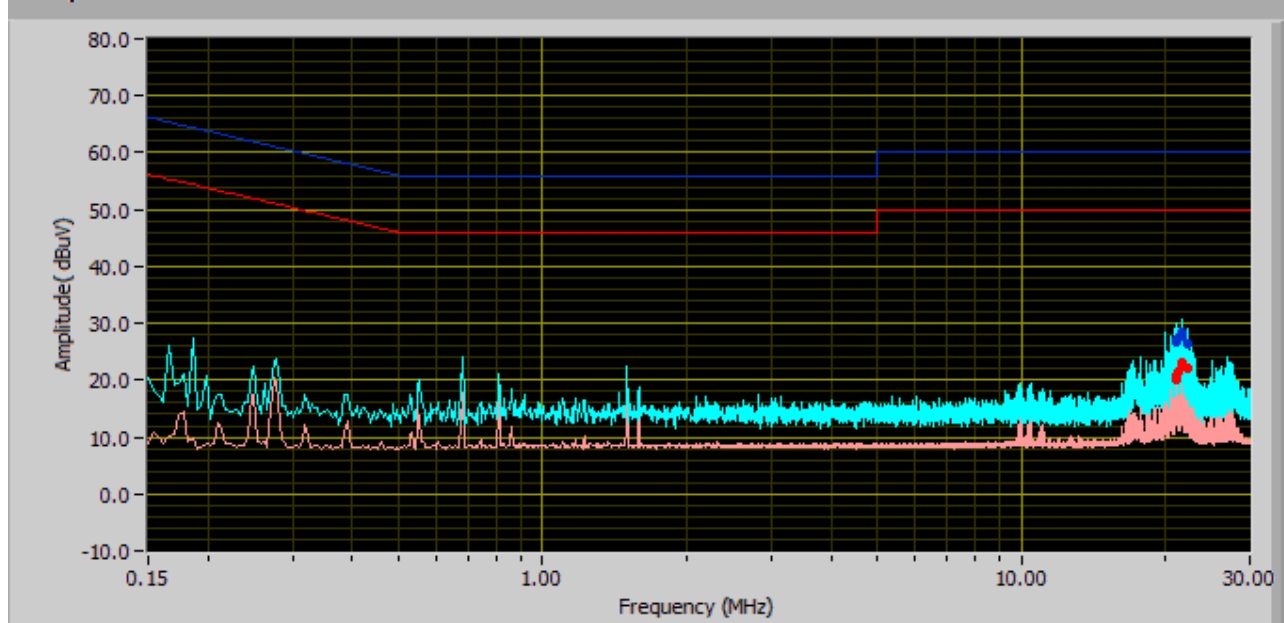
Neutral Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Avg Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Line
0.68	19.17	56.00	-36.83	15.40	46.00	-30.60	Neutral
0.81	20.86	56.00	-35.14	16.98	46.00	-29.02	Neutral
21.13	22.67	60.00	-37.33	17.33	50.00	-32.67	Neutral
21.65	23.87	60.00	-36.13	19.08	50.00	-30.92	Neutral
21.67	22.43	60.00	-37.57	16.66	50.00	-33.34	Neutral
21.91	22.77	60.00	-37.23	17.28	50.00	-32.72	Neutral

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

RP15EL with pigtail connector test results

Final plot



Quasi-Peak Limit

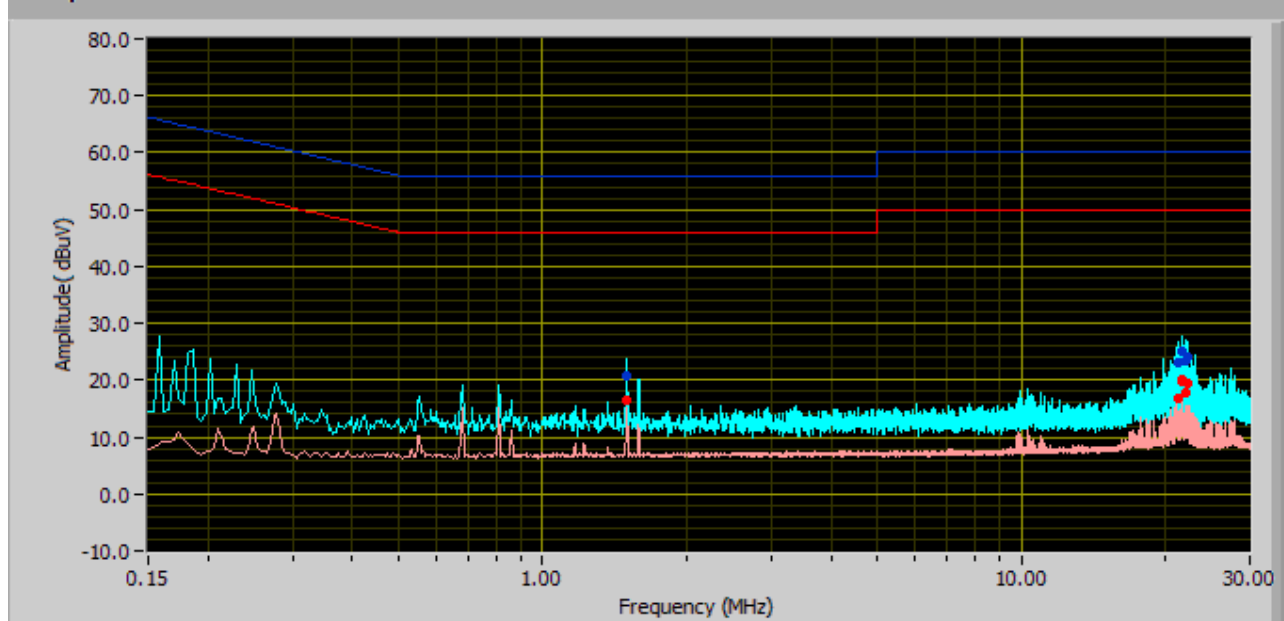
Average Limit

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Avg Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Line
21.05	26.82	60.00	-33.18	20.80	50.00	-29.20	Phase
21.14	27.02	60.00	-32.98	20.20	50.00	-29.80	Phase
21.22	27.30	60.00	-32.70	21.30	50.00	-28.70	Phase
21.56	27.71	60.00	-32.29	22.46	50.00	-27.54	Phase
21.65	28.37	60.00	-31.63	23.09	50.00	-26.91	Phase
22.17	26.36	60.00	-33.64	22.04	50.00	-27.96	Phase

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

Final plot



Quasi-Peak Limit

Average Limit

Neutral Line Plot at 120Vac, 60Hz

Frequency (MHz)	QP Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Avg Value (dBμV)	Class B Limit (dBuV)	Margin (dB)	Line
1.50	20.71	56.00	-35.29	16.60	46.00	-29.40	Neutral
21.22	22.97	60.00	-37.03	16.82	50.00	-33.18	Neutral
21.65	24.97	60.00	-35.03	20.22	50.00	-29.78	Neutral
21.65	25.05	60.00	-34.95	19.78	50.00	-30.22	Neutral
22.09	23.55	60.00	-36.45	17.72	50.00	-32.28	Neutral
22.26	23.93	60.00	-36.07	19.47	50.00	-30.53	Neutral

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

10.3 Radiated Measurements

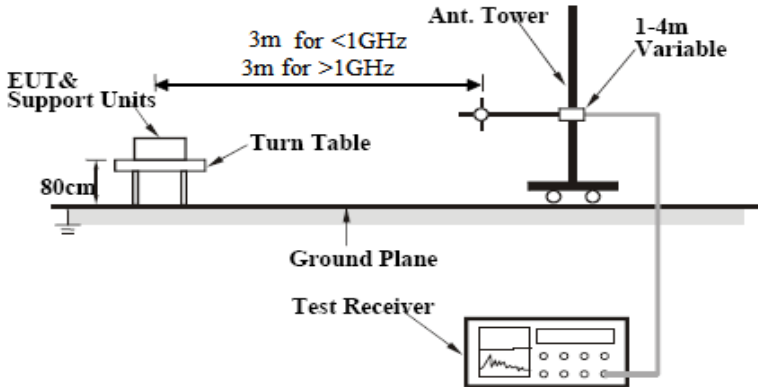
Receiver/Spectrum analyzer settings

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	-

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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

10.3.1 Radiated Measurements below 1GHz

Requirement(s):

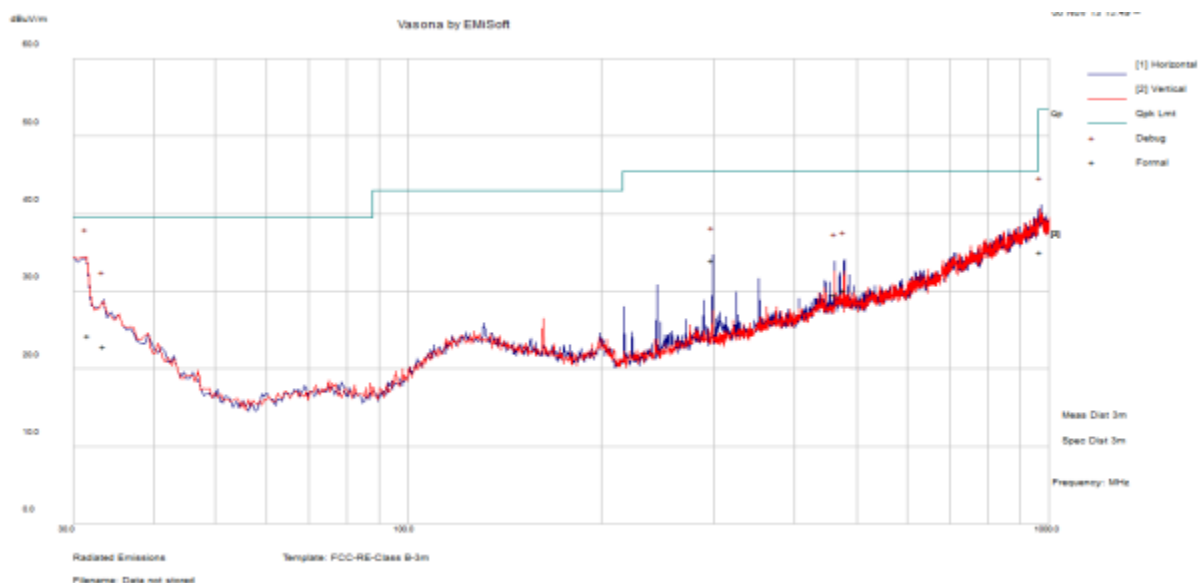
Spec	Requirement	Applicable																								
§ 15.209, RSS210 (A8.5)	Except higher limit as specified elsewhere in another section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted 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	11/6/2013	Environmental conditions Temperature 22.8°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 report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

RP15EL with terminal connector test results

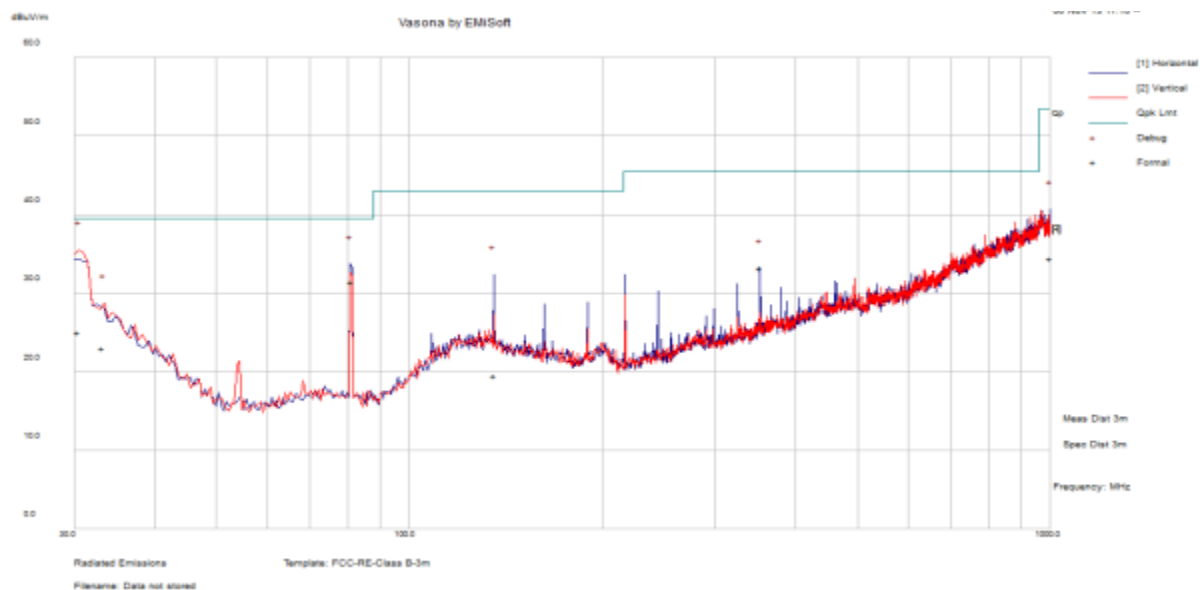


30MHz to 1000MHz at 3m

Frequency (MHz)	Corrected Amplitude (dBuV/m)	Turntable position (degree)	Polarity H/V	Antenna height (cm)	Class B Limit (dBuV/m)	Margin (dB)	Measure Detector
31.63	24.28	346.00	H	242.00	39.50	-15.22	QP
33.44	22.93	166.00	H	400.00	39.50	-16.57	QP
298.35	34.03	75.00	H	103.00	45.50	-11.47	QP
462.44	29.64	159.00	H	160.00	45.50	-15.86	QP
478.33	30.11	157.00	H	213.00	45.50	-15.39	QP
968.99	35.12	4.00	V	382.00	53.50	-18.38	QP

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

RP15EL with pigtail connector test results



30MHz to 1000MHz at 3m

Frequency (MHz)	Corrected Amplitude (dBuV/m)	Turntable position (degree)	Polarity H/V	Antenna height (cm)	Class B Limit (dBuV/m)	Margin (dB)	Measure Detector
30.38	25.02	326.00	V	128.00	39.50	-14.48	QP
33.27	23.01	53.00	V	330.00	39.50	-16.49	QP
81.37	31.48	78.00	V	220.00	39.50	-8.02	QP
135.52	19.55	321.00	H	309.00	43.00	-23.45	QP
352.59	33.21	96.00	H	100.00	45.50	-12.29	QP
997.95	34.34	276.00	V	291.00	53.50	-19.16	QP

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
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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	- 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. - The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable. - 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 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	11/12-13/2013	<table> <tr> <td>Environmental conditions</td> <td>Temperature</td> <td>21.5°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>39%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1026mbar</td> </tr> </table>	Environmental conditions	Temperature	21.5°C		Relative Humidity	39%		Atmospheric Pressure	1026mbar
Environmental conditions	Temperature	21.5°C									
	Relative Humidity	39%									
	Atmospheric Pressure	1026mbar									
Remark	-										
Result	☒ Pass ☐ Fail										

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

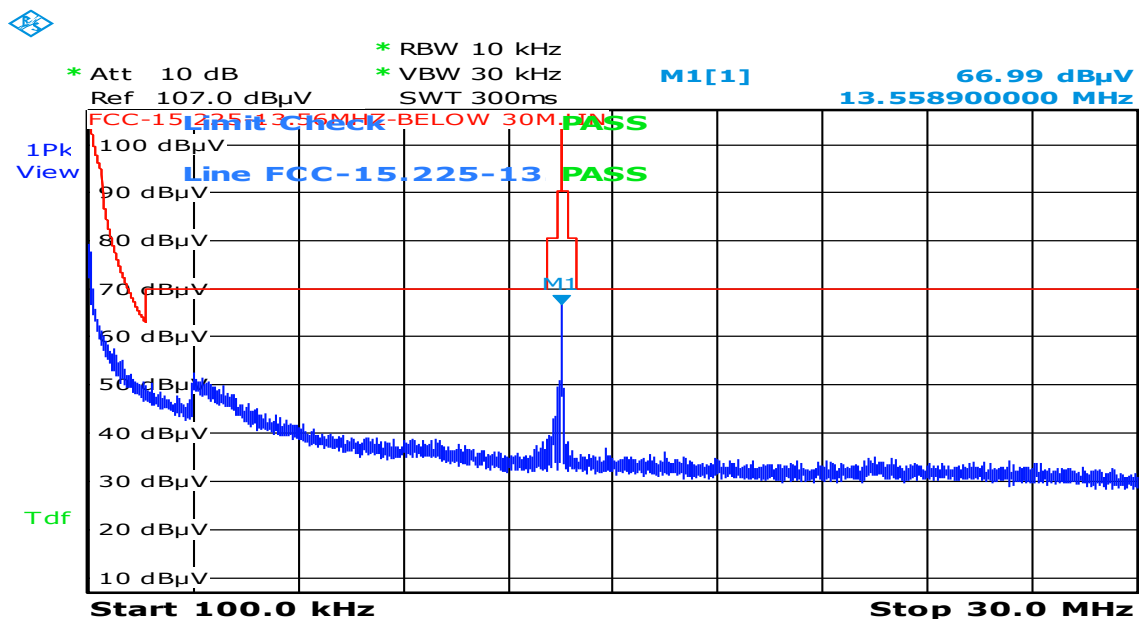
Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
Page	27 of 46
FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

RP15EL with terminal connector test results

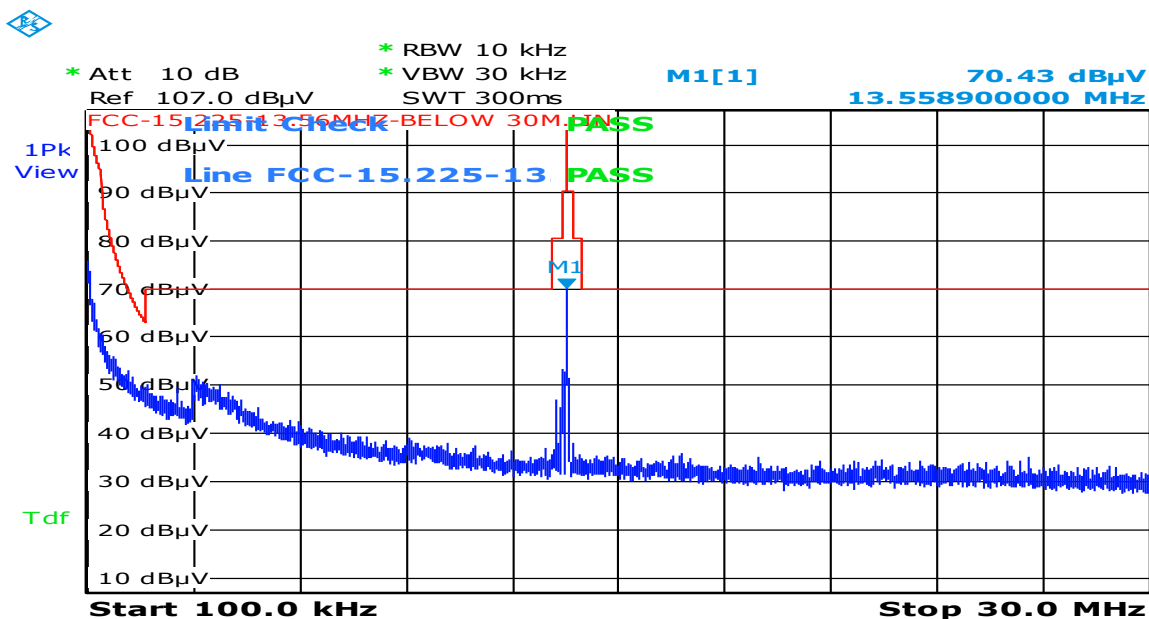
Plot: 100 kHz – 30 MHz

Loop Antenna at 0 degree

General Emission Limit @ 3 Meter



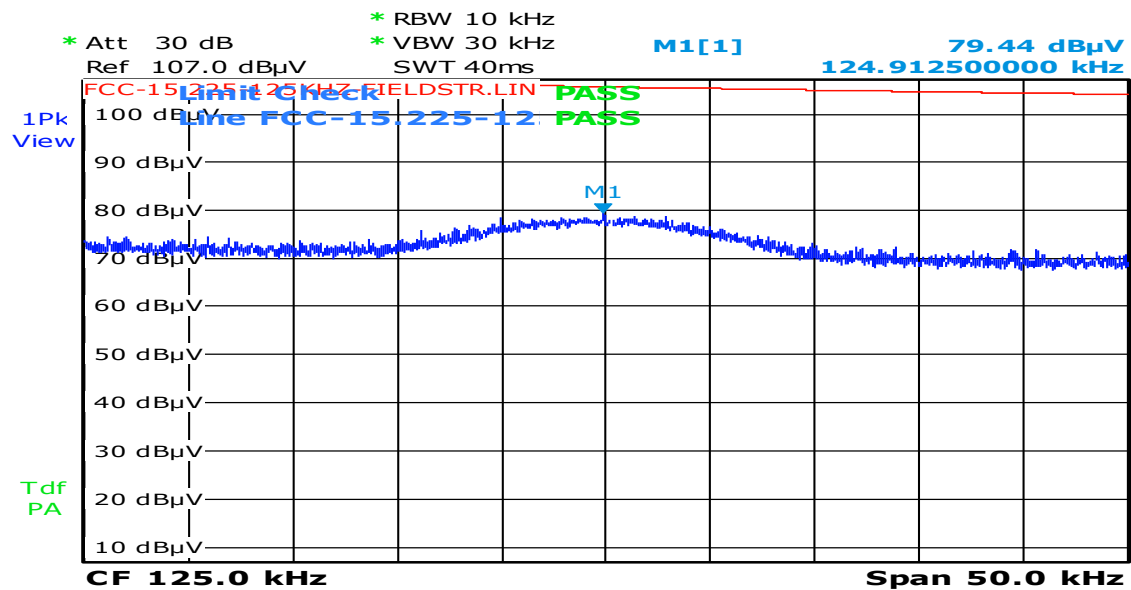
Loop Antenna at 90 degree



Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

Loop Antenna at 0 degree

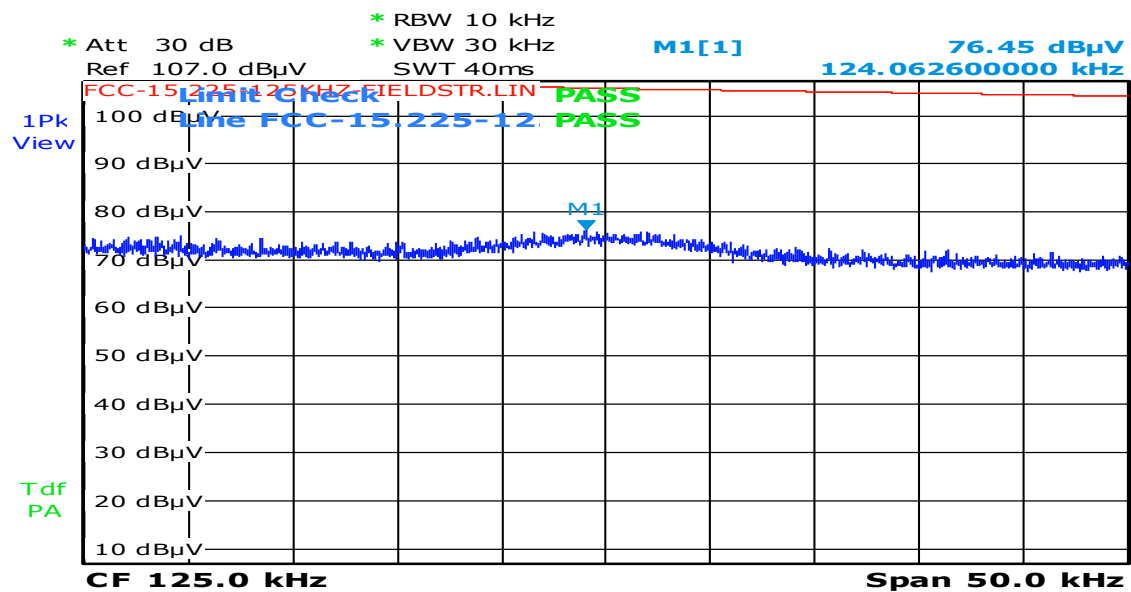
General Emission Limit @ 3 meter



Date: 12.NOV.2013 18:34:00

Frequency(kHz)	Amplitude(dBuV/m)
124.91	79.44

Loop Antenna at 90 degree



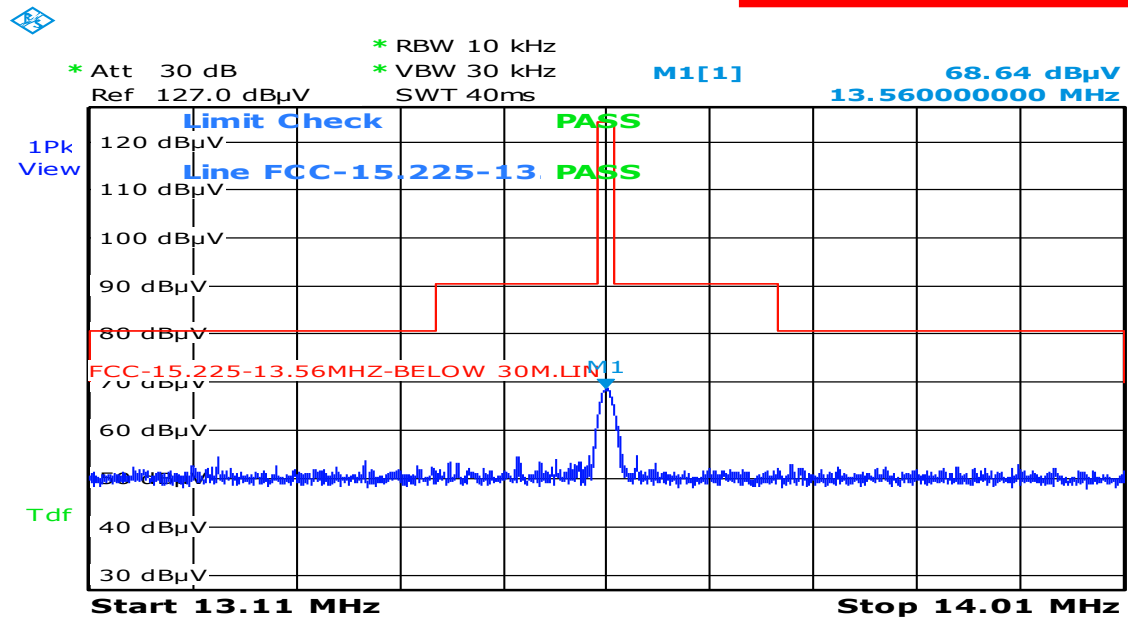
Date: 12.NOV.2013 18:51:27

Frequency(kHz)	Amplitude(dBuV/m)
124.02	76.45

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

Loop Antenna at 0 degree

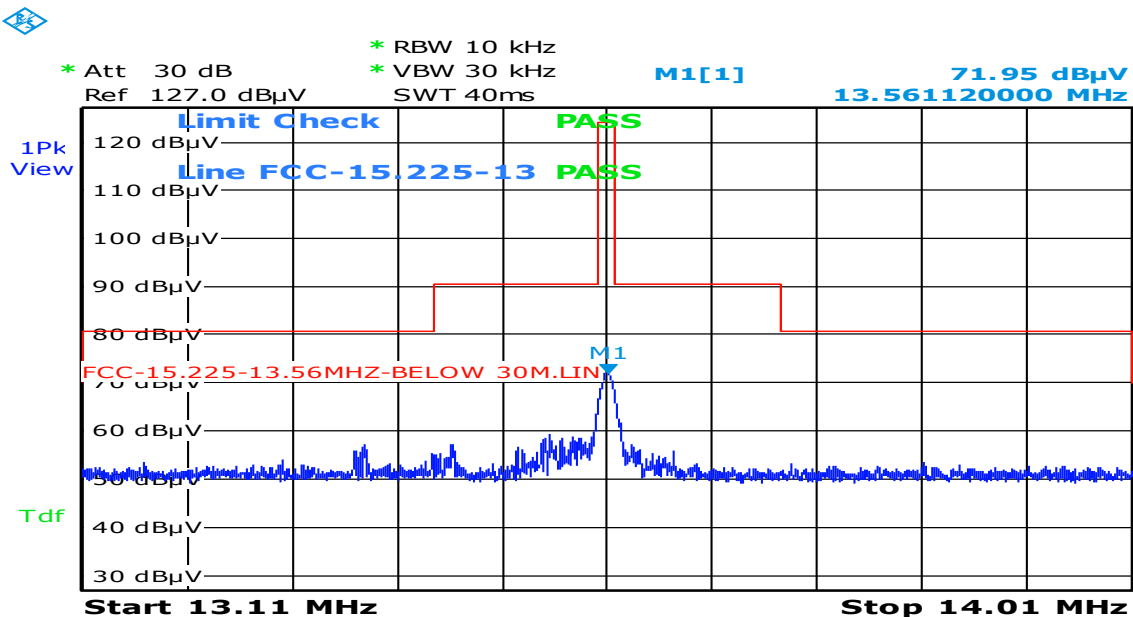
General Emission Limit @ 3 meter



Date: 12.NOV.2013 18:36:10

Frequency(MHz)	Amplitude(dBuV/m)
13.56	68.64

Loop Antenna at 90 degree



Date: 12.NOV.2013 18:54:17

Frequency(MHz)	Amplitude(dBuV/m)
13.56	71.95

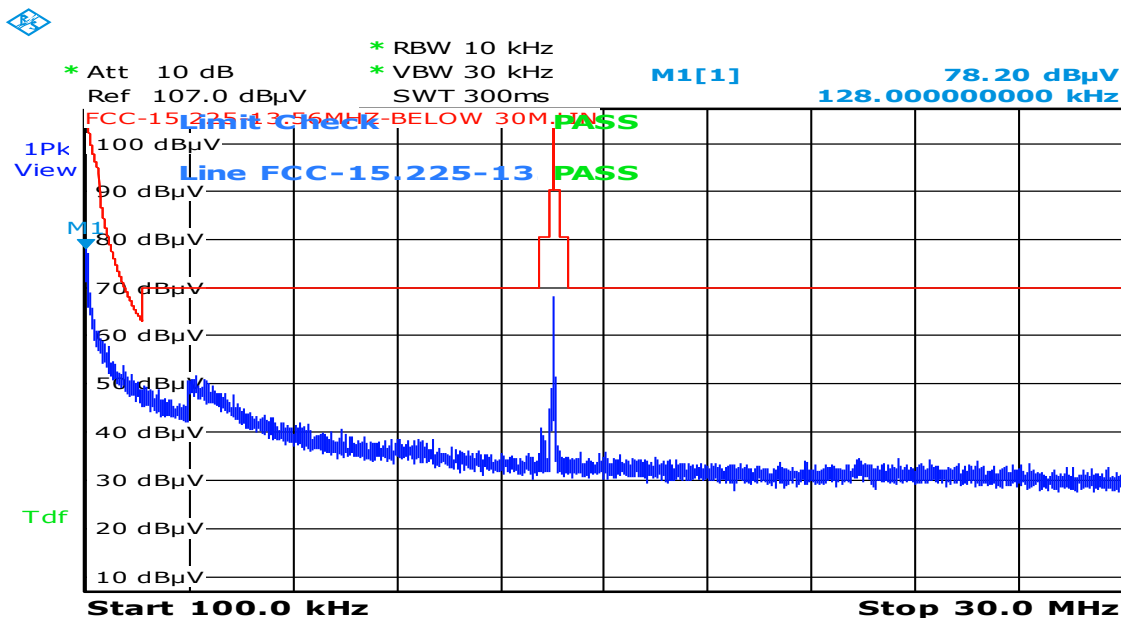
Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

RP15EL with pigtail connector test results

Plot: 100 kHz – 30 MHz

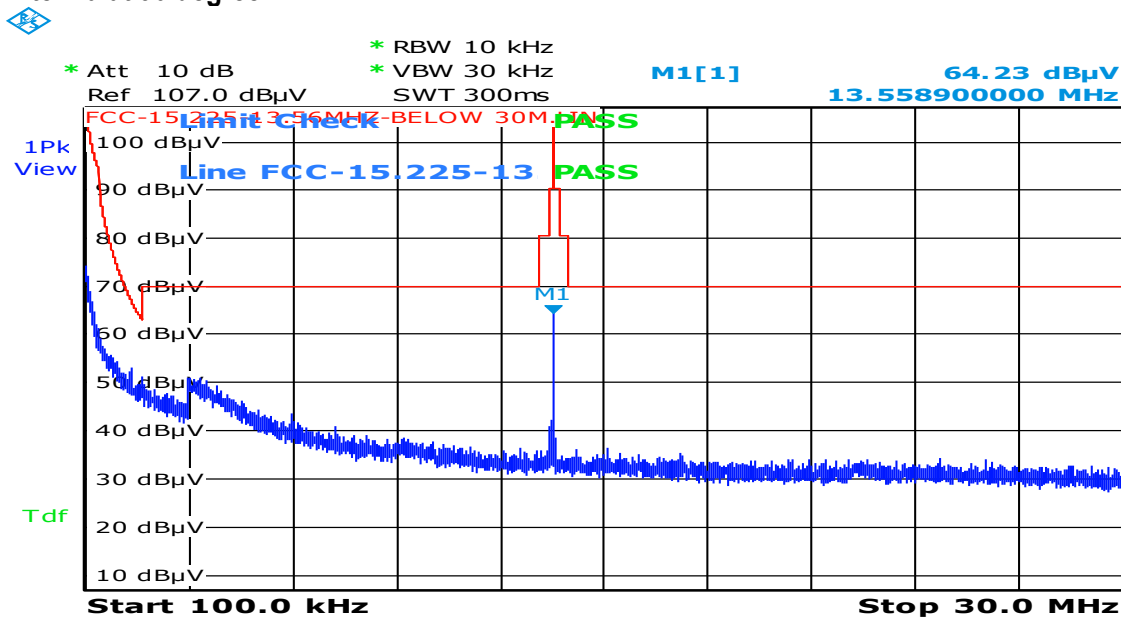
Loop Antenna at 0 degree

General Emission Limit @ 3 Meter



Date: 13.NOV.2013 02:30:29

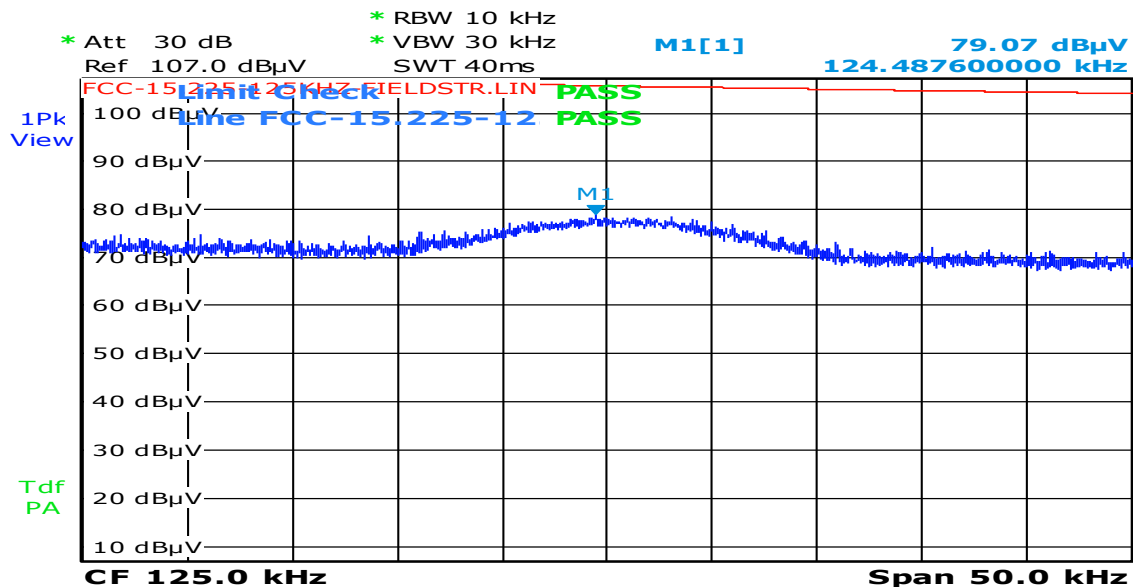
Loop Antenna at 90 degree



Date: 13.NOV.2013 02:40:34

Loop Antenna at 0 degree

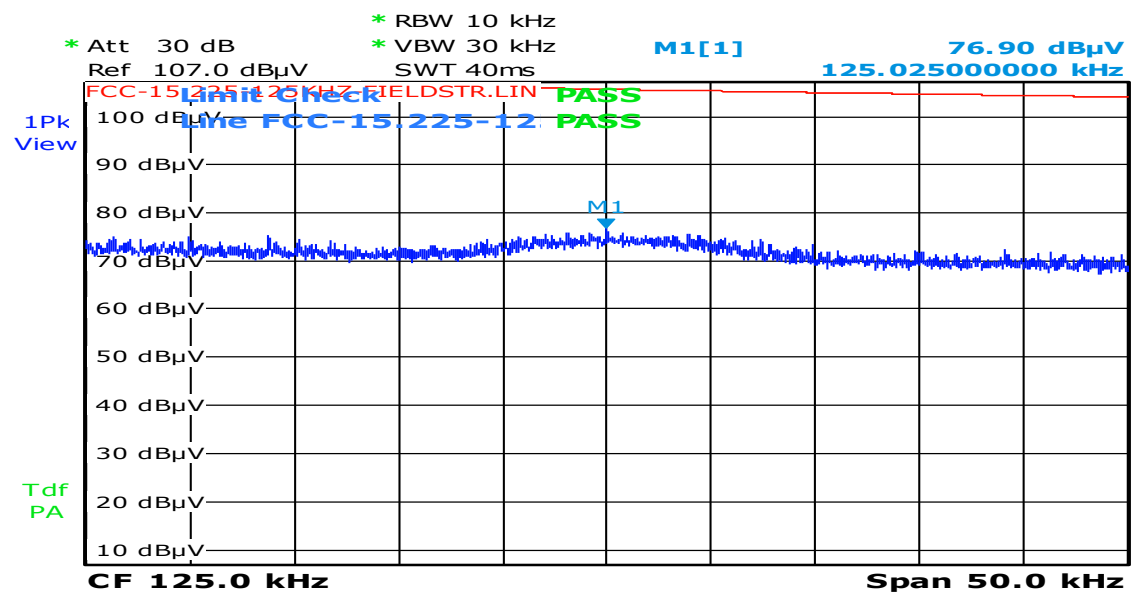
General Emission Limit @ 3 meter



Date: 13.NOV.2013 02:26:33

Frequency(kHz)	Amplitude(dBuV/m)
124.49	79.07

Loop Antenna at 90 degree



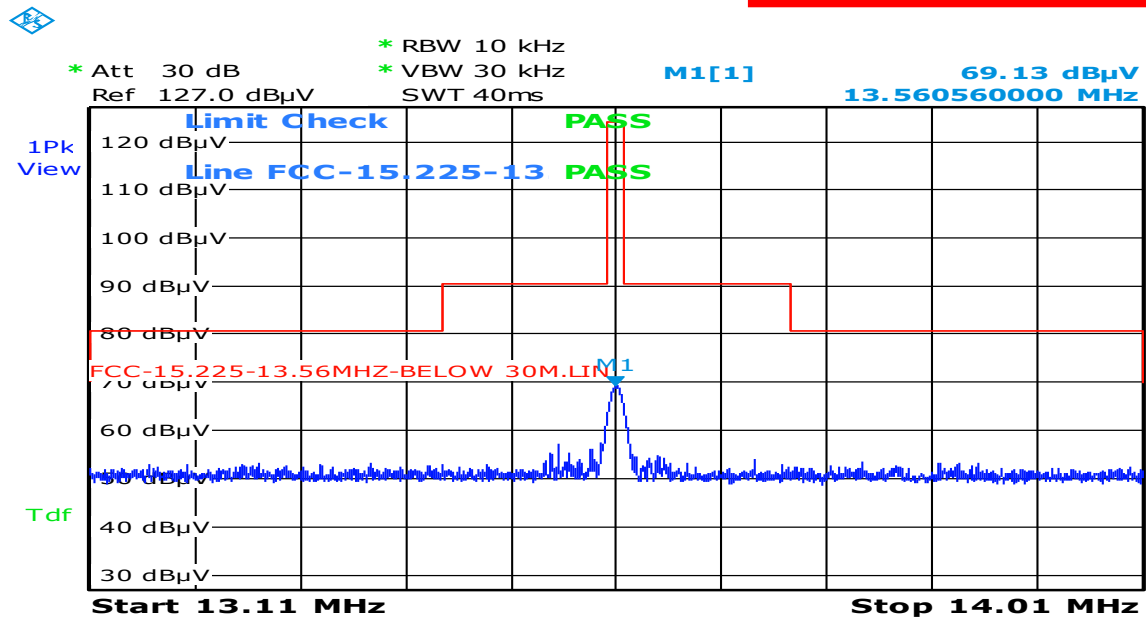
Date: 13.NOV.2013 02:36:35

Frequency(kHz)	Amplitude(dBuV/m)
125.03	76.90

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
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Loop Antenna at 0 degree

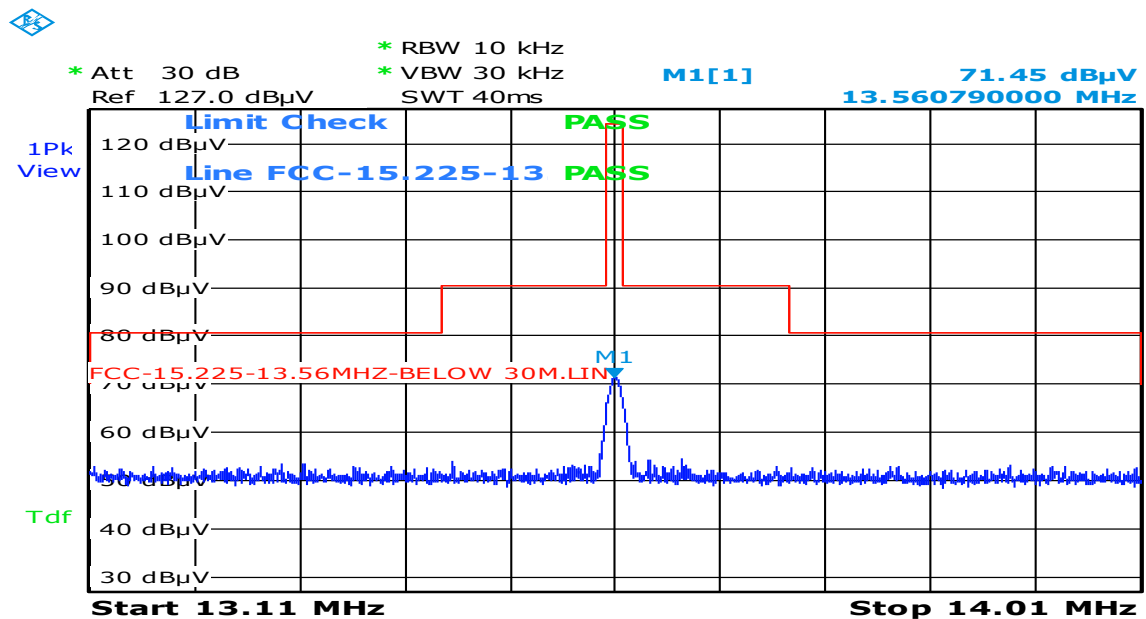
General Emission Limit @ 3 meter



Date: 13.NOV.2013 02:28:32

Frequency(MHz)	Amplitude(dBuV/m)
13.56	69.13

Loop Antenna at 90 degree



Date: 13.NOV.2013 02:38:26

Frequency(MHz)	Amplitude(dBuV/m)
13.56	71.45

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
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10.3.3 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 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	11/18/2013	Environmental conditions	Temperature 21°C Relative Humidity 38% Atmospheric Pressure 1028mbar
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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RP15EL with terminal connector 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: 13.560691MHz 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	13.560661	30	<0.01	Pass
40	13.560665	26	<0.01	Pass
30	13.560661	30	<0.01	Pass
20	Reference (13.560691MHz)			
10	13.560705	13	<0.01	Pass
0	13.560708	16	<0.01	Pass
-10	13.560704	12	<0.01	Pass
-20	13.560709	18	<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 a 20°C environmental temperature.

Carrier Frequency 13.560691MHz at 20°C at 12VDC

Measured Voltage $\pm 15\%$ of nominal (DC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
13.8	13.560682	9	<0.01	Pass
10.2	13.560681	10	<0.01	Pass

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
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RP15EL with pigtail connector 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: 13.560752 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	13.560730	21	<0.01	Pass
40	13.560725	27	<0.01	Pass
30	13.560765	13	<0.01	Pass
20	Reference (13.560752 MHz)			
10	13.560763	12	<0.01	Pass
0	13.560725	27	<0.01	Pass
-10	13.560725	27	<0.01	Pass
-20	13.560788	36	<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 a 20°C environmental temperature.

Carrier Frequency: 13.560752 at 20°C at 12VDC

Measured Voltage $\pm 15\%$ of nominal (DC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
13.8	13.560752	0	<0.01	Pass
10.2	13.560752	0	<0.01	Pass

Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

10.3.4 Occupied bandwidth

Requirement(s):

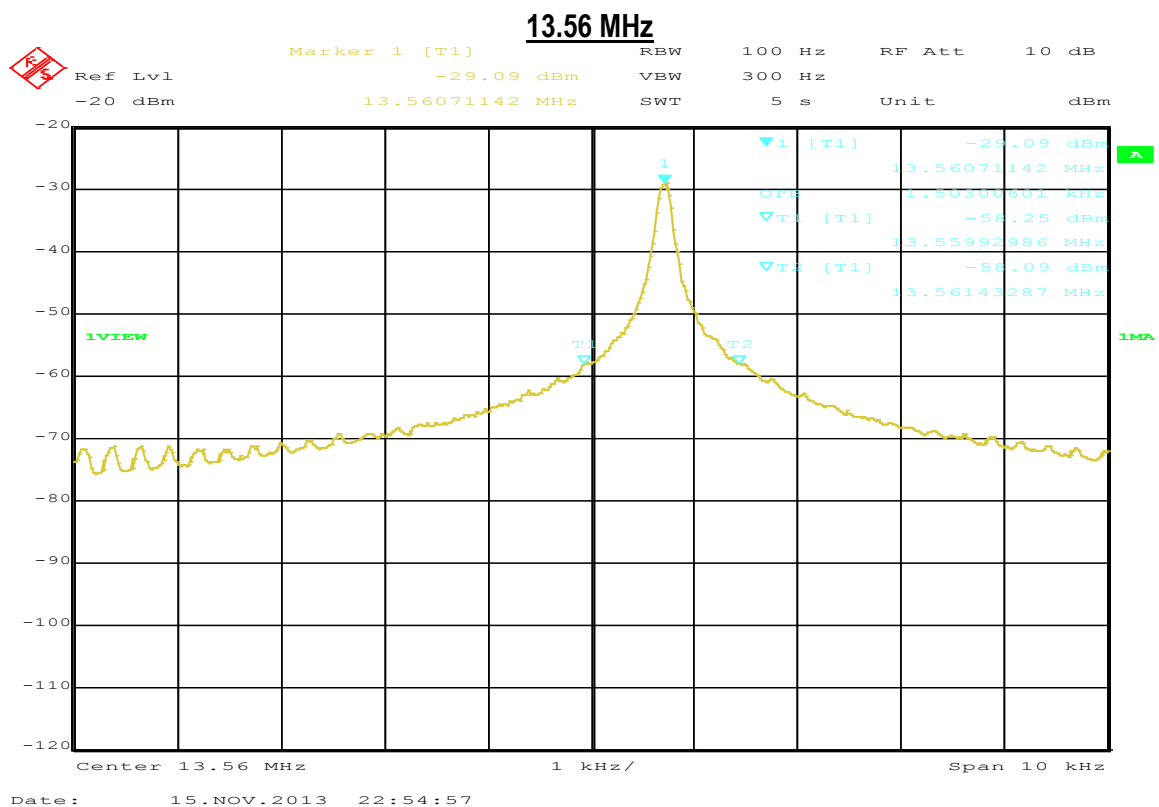
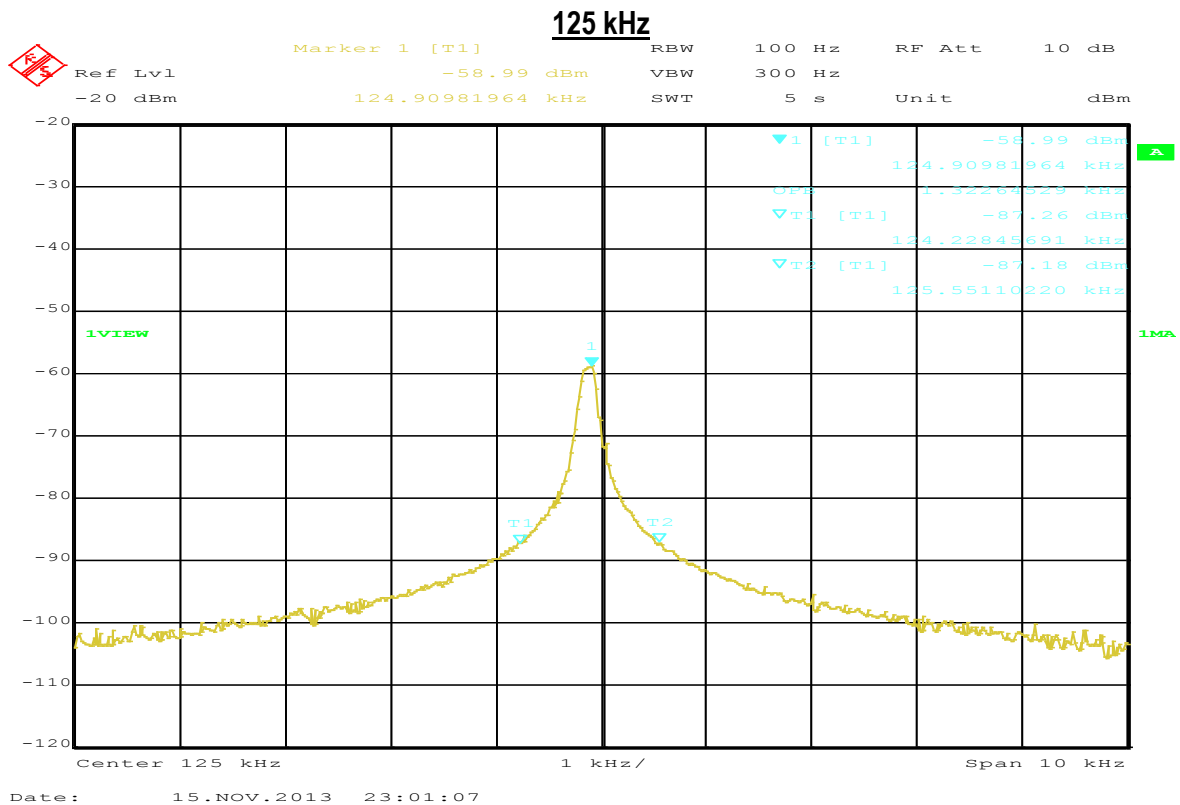
Spec	Requirement	Applicable
RSS-Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set 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	1. The EUT was set up inside a semi-anechoic chamber in accordance with the standard. 2. The EUT was placed on top of a 0.8m high, non-metallic table in a typical configuration.	
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	11/15/2013	Environmental conditions Temperature 22.5°C Relative Humidity 40% Atmospheric Pressure 1025mbar
Remark	-	
Result	☒ Pass ☐ Fail	

Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☒ Yes (See below) ☐ N/A

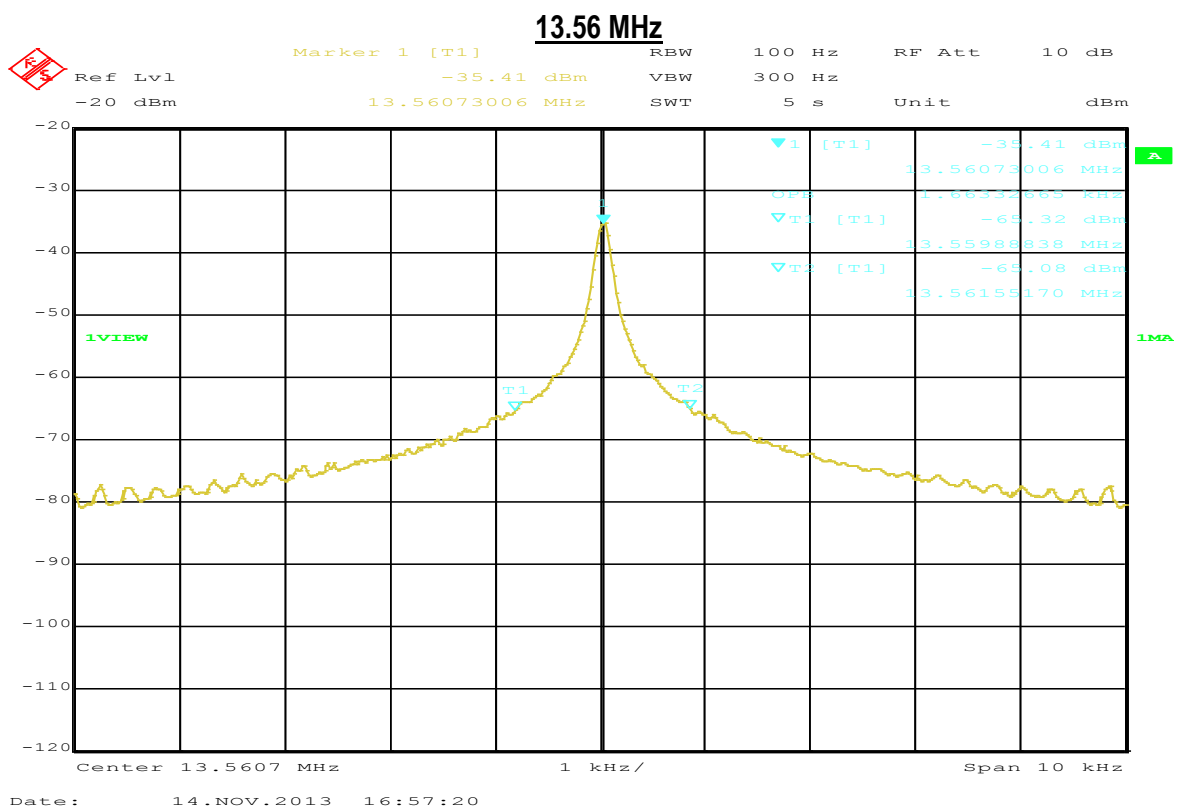
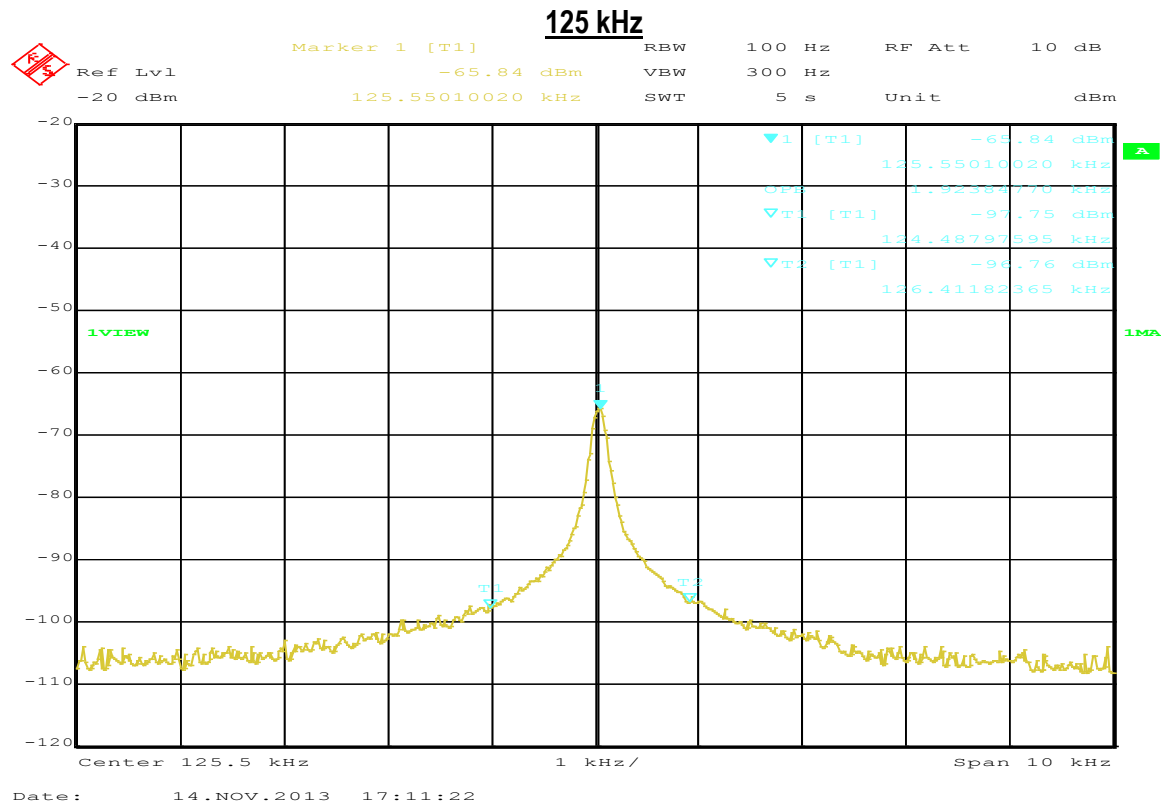
Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
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RP15EL with terminal connector test results:



Test report No.	RF_SL13102301-HID-031_FCC-IC(RP15EL)
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FCC ID	JQ6-MCLASSRP15EL
IC ID	2236B-MCLASRP15EL

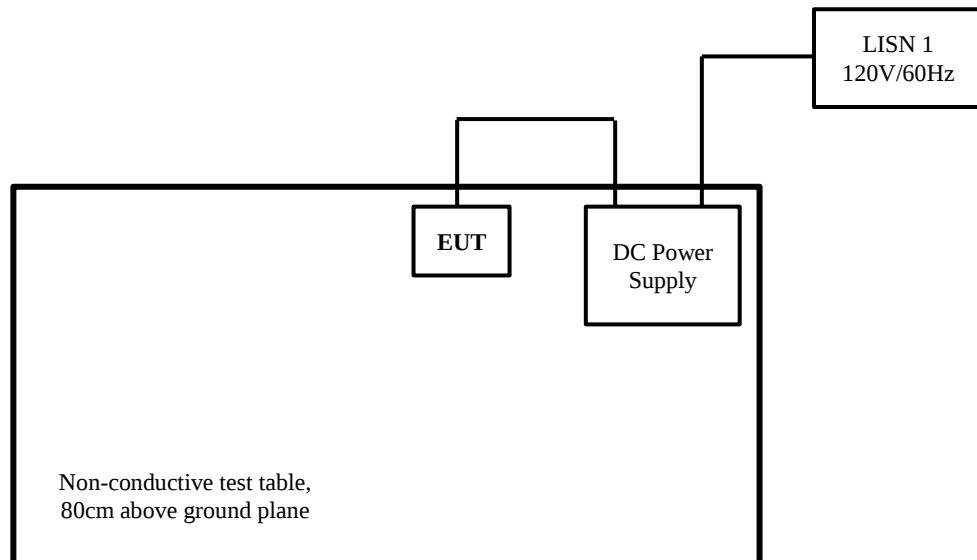
RP15EL with pigtail connector test results:



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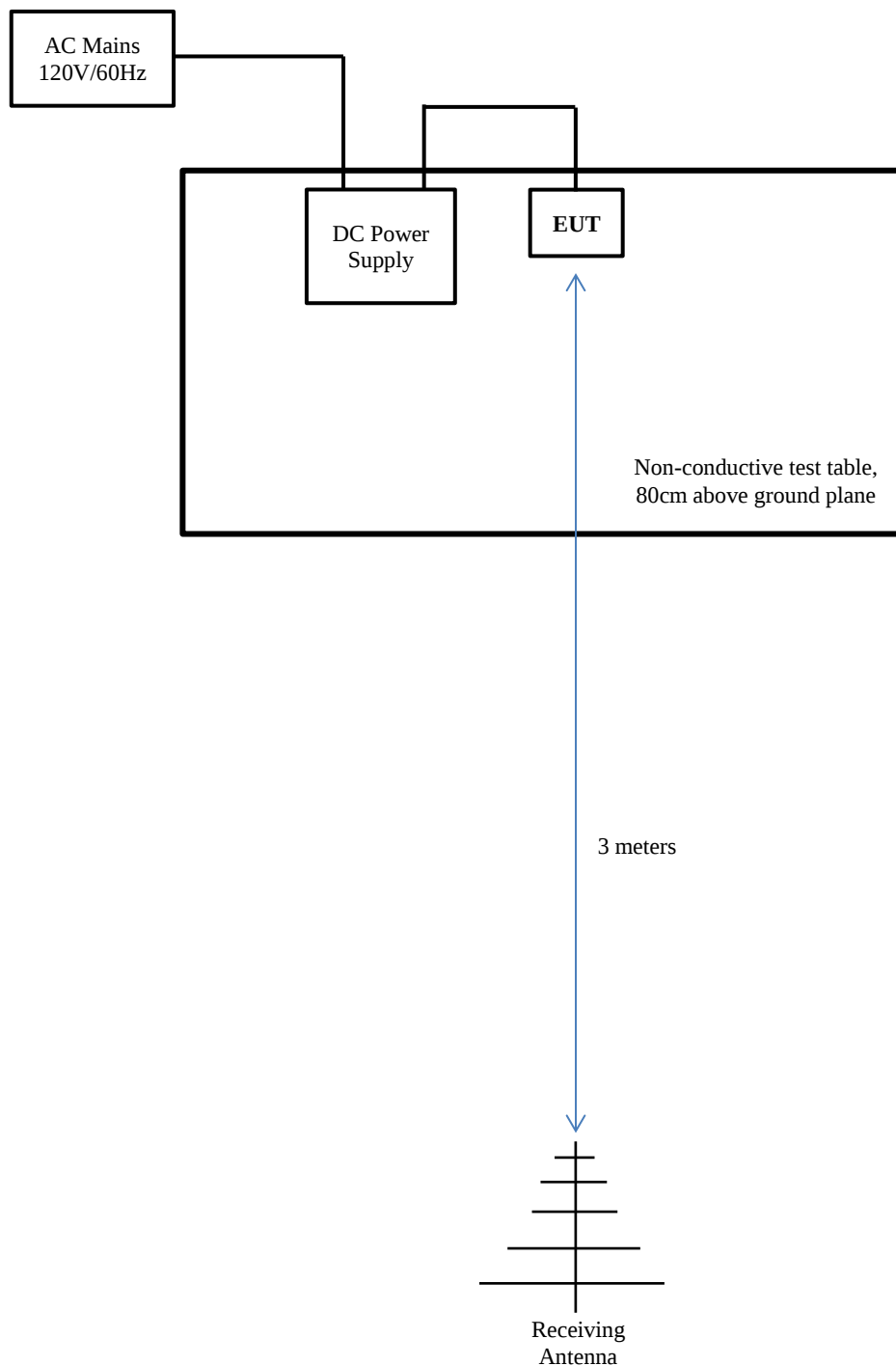
10.3.5 Test Setup Block Diagrams

Conducted Emissions Test Setup Block Diagram



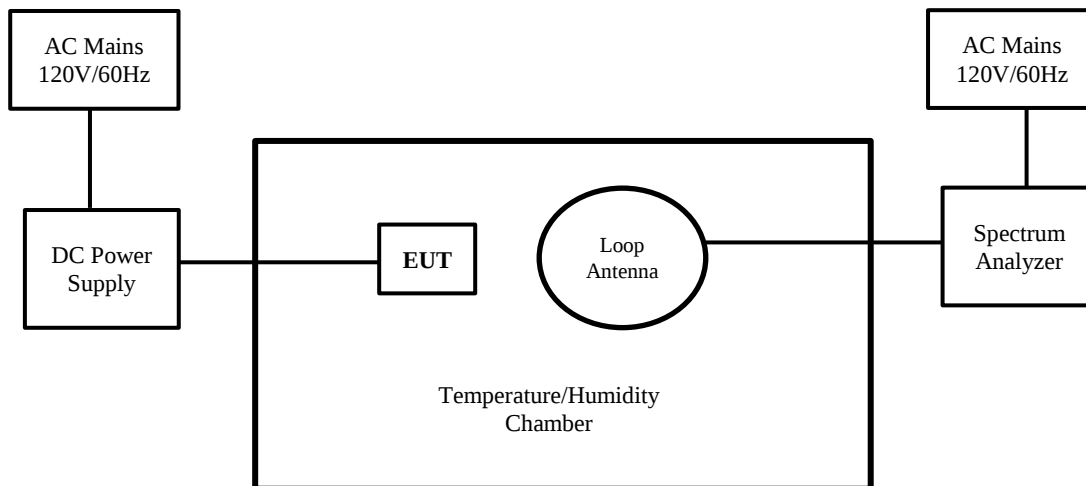
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Radiated Emissions Test Setup Block Diagram



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Frequency Tolerance Test Setup Block Diagram



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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	10/13/2013	1 Year	10/13/2014	☐
10 Meters SAC	10M	N/A	06/05/2013	1 Year	06/05/2014	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
Spectrum Analyzer	N9010A	MY50210206	05/30/2013	1 Year	05/30/2014	☒
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	☒

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Annex B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

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Annex C. SIEMIC Accreditation

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

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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 Measurements
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

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