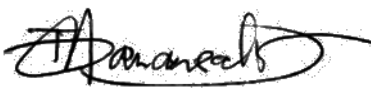
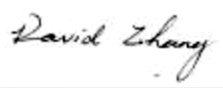


RF TEST REPORT



Report No.: RF_SL14092201-HID-028_FCC-IC_OK5121 Rev. 1.1
Supersede Report No.: RF_SL14092201-HID-028_FCC-IC_OK5121 Rev. 1.0

Applicant	OMNIKEY GmbH
Product Name	USB Tag Reader
Model No.	OMNIKEY OK5121 V2
Test Standard	47 CRF 15.225: 2014 RSS-210 Issue 8: 2010
Test Method	ANSI C63.10: 2009 RSS Gen 4.9
FCC ID	SIYOK5121
IC ID	5345A-OK5121
Date of test	10/27/2014-10/29/2014
Issue Date	11/03/2014
Test Result	<u>Pass</u> Fail
Equipment complied with the specification	[x]
Equipment did not comply with the specification	[]
	
Teody Manansala	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
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:



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	EMC, RF/Wireless, Telecom, Safety
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

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

CONTENTS

1	REPORT REVISION HISTORY	4
2	EXECUTIVE SUMMARY	5
3	CUSTOMER INFORMATION	5
4	TEST SITE INFORMATION	5
5	MODIFICATION	5
6	EUT INFORMATION	6
6.1	EUT Description	6
6.2	Radio Description	6
6.3	EUT test modes/configuration Description.....	6
6.4	EUT Internal Photos	7
6.5	EUT Test Setup Photos	8
7	SUPPORTING EQUIPMENT/SOFTWARE AND CABLING DESCRIPTION.....	9
7.1	Supporting Equipment	9
7.2	Test Software Description	9
8	TEST SUMMARY.....	10
9	MEASUREMENT UNCERTAINTY	11
10	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	12
10.1	Radiated Spurious Emissions below 30 MHz	12
10.2	Radiated Spurious Emissions 30 MHz – 1000MHz	14
ANNEX A. TEST INSTRUMENT		16
ANNEX B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM		17
ANNEX C. SIEMIC ACCREDITATION		18

1 Report Revision History

Report No.	Report Version	Description	Issue Date
RF_SL14092201-HID-028_FCC-IC_OK5121	None	Original	11/03/2014
RF_SL14092201-HID-028_FCC-IC_OK5121 Rev 1.0	1.0	Chang model name	11/11/2014
RF_SL14092201-HID-028_FCC-IC_OK5121 Rev 1.0	1.1	Change test standard	11/12/2014
		Change equipment class	
		Change test distance	
		Add table and remarks for below 30MHz test procedure	

2 Executive Summary

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

Company: OMNIKEY GmbH
Product: USB Tag Reader
Model: OMNIKEY OK5121 V2

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	OMNIKEY GmbH
Applicant Address	Am Klingenweg 6a, Walluf, D-65396 Germany
Manufacturer Name	OMNIKEY GmbH
Manufacturer Address	Am Klingenweg 6a, Walluf, D-65396 Germany

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	USB Tag Reader
Model No.	OMNIKEY OK5121 V2
Trade Name	HID
Serial No.	N/A
Input Power	N/A
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Date of EUT received	10/27/2014
Equipment Class/ Category	DXX
Operating Frequencies	13.56 MHz
Port/Connectors	N/A

6.2 Radio Description

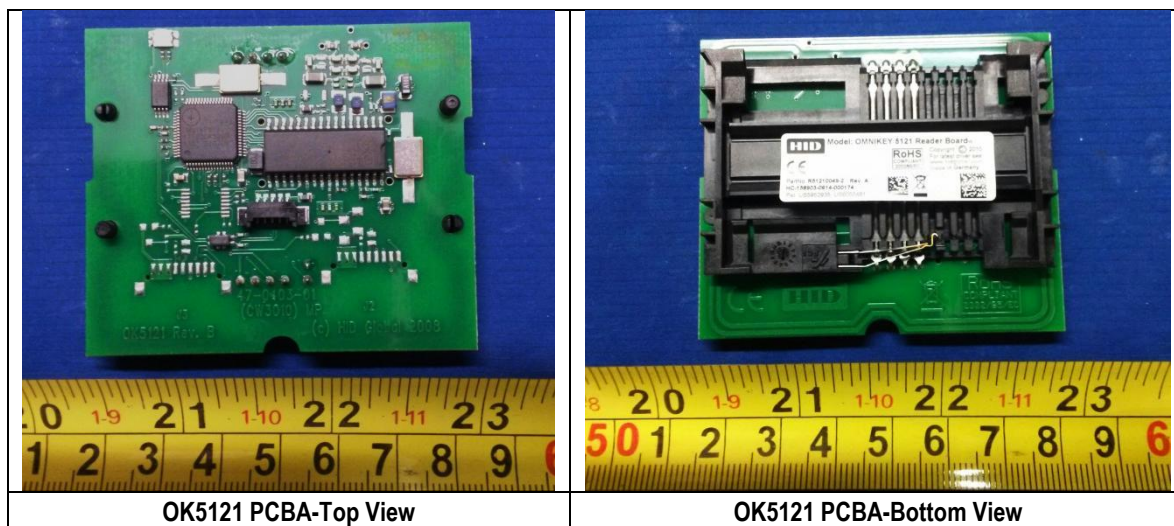
Spec for Radio -

Radio Type	
Operating Frequency	13.56 MHz(RFID)
Modulation	ASK (13.56MHz)
Channel Spacing	N/A
Number of Channels	1(RFID)
Antenna Type	Inductive Loop Antenna (RFID)
Antenna Gain	1dBi
Antenna Connector Type	N/A

6.3 EUT test modes/configuration Description

Test Mode		Note
Pre_test_mode_1	RFID Continuous Transmit	-
Pre_test_mode_2	-	-
Pre_test_mode_3	-	-

6.4 EUT Internal Photos



OK5121 PCBA-Top View

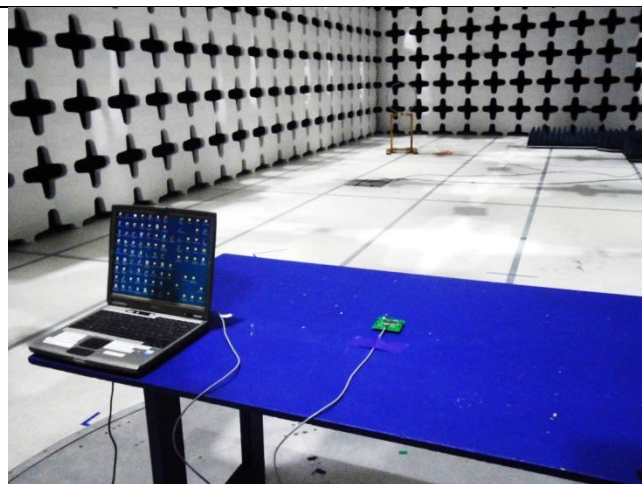
OK5121 PCBA-Bottom View

6.5 EUT Test Setup Photos

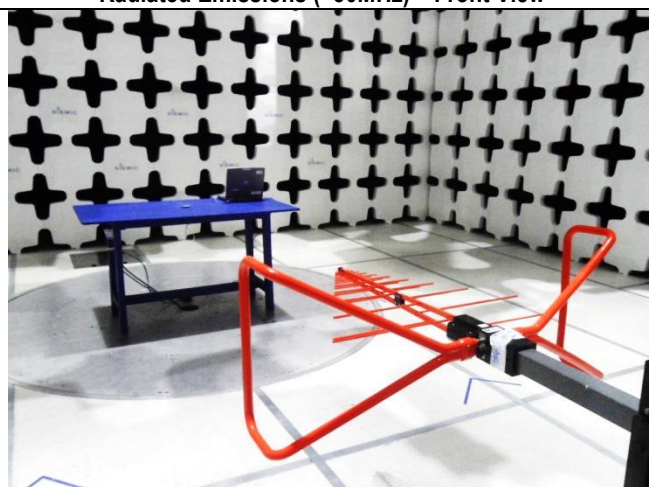
OK5121



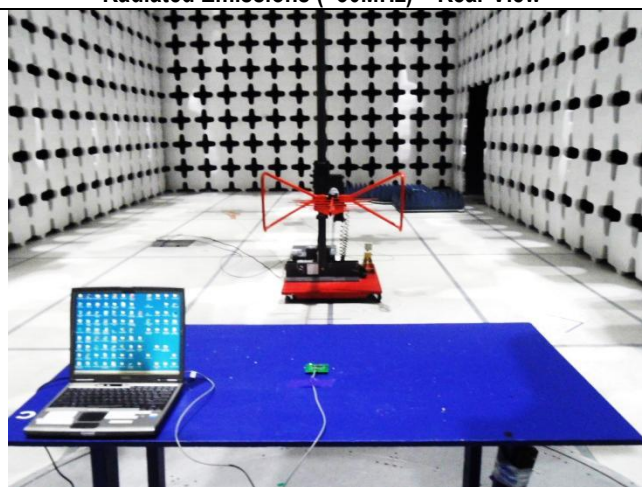
Radiated Emissions (<30MHz) – Front View



Radiated Emissions (<30MHz) – Rear View



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



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

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	Latitude D600	920027	Dell	-

7.2 Test Software Description

Test Item	Software	Description
-	-	-

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Radiated Spurious Emissions	FCC	15.209	FCC	ANSI C63.10 – 2009	☒ Pass
	IC	RSS 210(A8.5)	IC	RSS Gen 4.9	☐ N/A
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.				

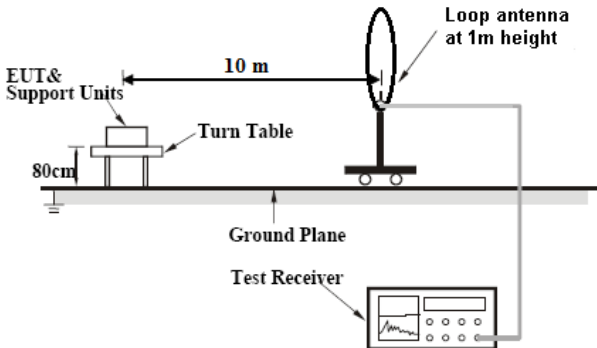
9 Measurement Uncertainty

Emissions			
Test Item	Frequency Range	Description	Uncertainty
Radiated Spurious Emissions	150 kHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Radiated Spurious Emissions	1GHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+4.3dB/-4.1dB

10 Measurements, Examination and Derived Results

10.1 Radiated Spurious Emissions below 30 MHz

Requirement(s):

Spec	Requirement	Applicable																								
47 CFR §15.225 RSS-210 (A2.6)	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 §15.225. <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th><th>Measurement Distance</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>2400/F(KHz)</td><td>30</td></tr> <tr> <td>1.705-30.00</td><td>30</td><td>30</td></tr> <tr> <td>30.00-88.00</td><td>100</td><td>3</td></tr> <tr> <td>88.00-216.00</td><td>150</td><td>3</td></tr> <tr> <td>216.00-960.00</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)	Measurement Distance	0.009-0.490	2400/F(KHz)	300	0.490-1.705	2400/F(KHz)	30	1.705-30.00	30	30	30.00-88.00	100	3	88.00-216.00	150	3	216.00-960.00	200	3	Above 960	500	3	☒
Frequency range (MHz)	Field Strength (uV/m)	Measurement Distance																								
0.009-0.490	2400/F(KHz)	300																								
0.490-1.705	2400/F(KHz)	30																								
1.705-30.00	30	30																								
30.00-88.00	100	3																								
88.00-216.00	150	3																								
216.00-960.00	200	3																								
Above 960	500	3																								
Test Setup																										
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 10 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.																									
Remark	Limit calculation example: Frequency = 0.8 MHz, limit @ 30m = $24000/800=30\mu\text{V/m}=29.5424 \text{ dBuV/m}$ To convert the limit from 30m to 10m, use following formula Limit @ 10m = Limit @ 30m + $40 \log (30/10)$ Frequency = 0.8 MHz, limit @ 10m = $29.5424 + 19.0848 = 48.6272 \text{ dBuV/m}$																									
Result	☒ Pass ☐ Fail																									

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test specification:	Radiated Spurious Emissions (below 30MHz)			
Environmental Conditions:	Temp(°C):	26	Result:	☒ Pass ☐ Fail
	Humidity (%):	45.6		
	Atmospheric(mbar):	1021		
Mains Power:	120VA, 60Hz			
Tested by:	Teody Manansala			
Test Date:	10/27/2014			
Remarks:	OK5121 at 0 degrees and 90 degrees			

Loop Antenna

Loop antenna at 0 Degree

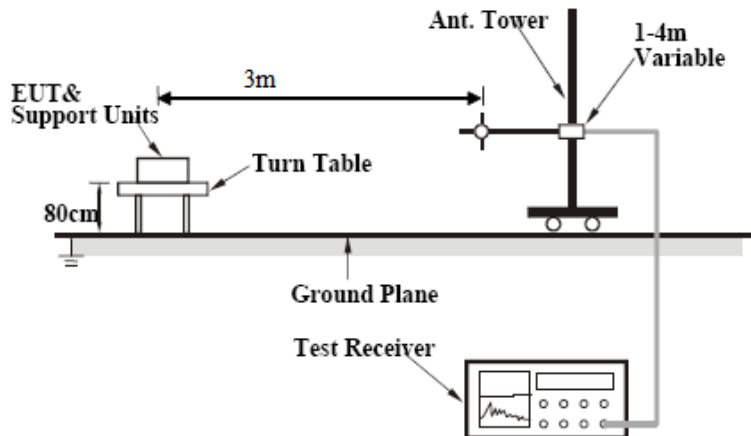
Frequency (MHz)	Raw (dBuV)	Total Loss (dB)	Level (dBuV/m)	Measurement Type	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
0.81	30.26	11.71	41.97	Quasi Max	100.00	127.00	48.52	-6.55	Pass
0.86	30.60	11.25	41.85	Quasi Max	100.00	77.00	48.01	-6.16	Pass
0.55	28.98	14.98	43.96	Quasi Max	100.00	17.00	51.86	-7.90	Pass

Loop antenna at 90 Degree

Frequency (MHz)	Raw (dBuV)	Total Loss (dB)	Level (dBuV/m)	Measurement Type	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
27.12	49.30	-3.40	45.91	Quasi Max	100.00	248.00	48.63	-2.72	Pass
0.86	30.63	11.25	41.88	Quasi Max	100.00	180.00	48.01	-6.13	Pass
0.81	30.31	11.70	42.01	Quasi Max	100.00	43.00	48.51	-6.50	Pass

10.2 Radiated Spurious Emissions 30 MHz – 1000MHz

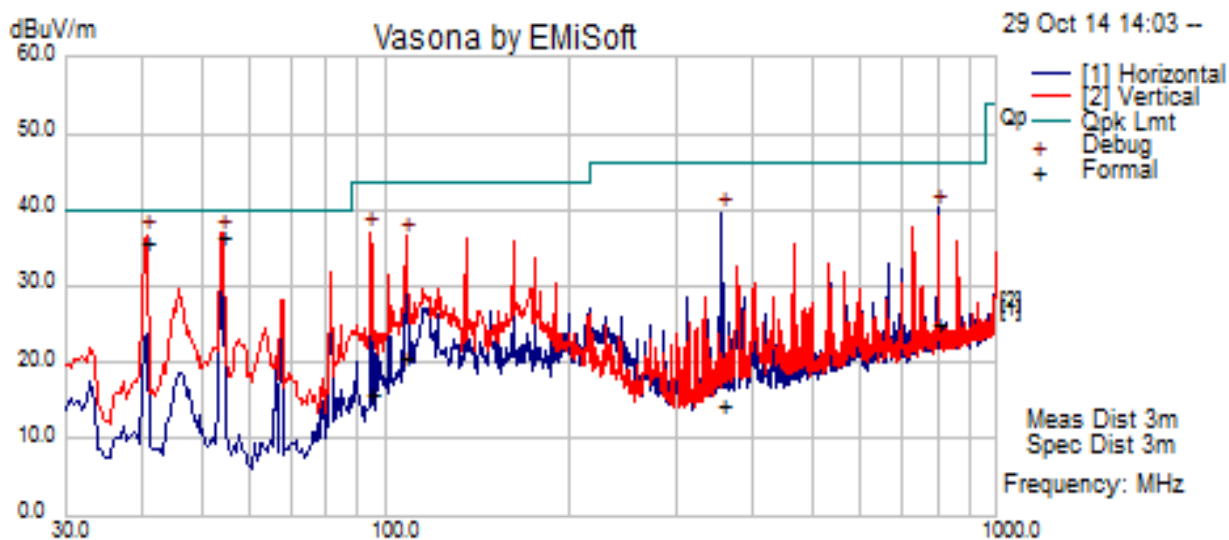
Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.209, RSS210(A8.5)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒										
		<table><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	
Frequency range (MHz)	Field Strength (uV/m)												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup													
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. A Quasi-peak measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.												
Remark													
Result	☒ Pass ☐ Fail												

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	23.7	Result:	☒ Pass ☐ Fail
	Humidity (%):	44.9		
	Atmospheric(mbar):	1021		
Mains Power:	120VA, 60Hz			
Tested by:	Teody Manansala			
Test Date:	10/29/2014			
Remarks:	OK5121			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
54.24	67.50	1.22	-31.37	37.36	Quasi Max	V	100.00	90.00	40.00	-2.64	Pass
40.69	62.68	1.16	-26.32	37.52	Quasi Max	V	100.00	112.00	40.00	-2.48	Pass
800.90	37.78	4.84	-17.74	24.88	Quasi Max	H	101.00	67.00	46.00	-21.12	Pass
355.43	35.94	3.19	-24.76	14.38	Quasi Max	H	209.00	129.00	46.00	-31.62	Pass
94.73	45.29	1.75	-31.27	15.77	Quasi Max	V	108.00	84.00	43.50	-27.73	Pass
107.88	46.45	1.90	-27.60	20.76	Quasi Max	V	140.00	55.00	43.50	-22.74	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
R & S Receiver	ESL6	100178	03/04/2014	1 Year	03/04/2015	☒
R & S Receiver	ESIB 40	100179	05/24/2014	1 Year	05/24/2015	☐
ETS-Lingren Loop Antenna	6512	00049120	08/22/2014	1 Year	08/22/2015	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2014	1 Year	08/12/2015	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2014	1 Year	04/26/2015	☐
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/30/2014	1 Year	05/30/2015	☒
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2014	1 Year	05/30/2015	☐
3 Meters SAC	3M	N/A	10/13/2014	1 Year	10/13/2015	☐
10 Meters SAC	10M	N/A	06/05/2014	1 Year	06/05/2015	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2014	1 Year	05/25/2015	☐

Annex B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

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

Japan Recognized Certification Body Designation		Radio: A1. Terminal equipment for purpose of calling Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68 Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771 Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06, AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2