TEST REPORT

Reference No.	:	WTS15S0122518E
FCC ID	:	GCDAYH6XX0
Applicant	:	Rosslare Enterprises Limited
Address	:	Flat 12,9/F., Wing Fat Ind. Bldg.,12 Wang Tai Road , Kowloon Bay, Kowloon, Hong Kong
Manufacturer	:	Rosslare Electronics (Shenzhen) Ltd
Address	:	Block 2, No. A-1 Baiwangxin Indurstrial Park, XiLi Town, Shenzhen, China
Product Name	:	O2S Smart Card Reader
Model No.	:	AY-H6270X+XXX, AY-H6280X+XXX, AY-H6370X+XXX, AY-H6380X+XXX (where, the first X can be B or W; the second X can be P or T; the third X can be R or 0; the forth X can be S or 0)
Trademark:		ROSSLARE
Standards.....	:	FCC CFR47 Part 15 Section 15.225: 2013
Date of Receipt sample	:	Jan. 30, 2015
Date of Test	:	Jan. 31- Mar.05, 2015
Date of Issue.....	:	Mar. 06, 2015
Test Result.....	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
Waltek Services (Shenzhen) Co., Ltd.
Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China
Tel :+86-755-83551033
Fax:+86-755-83552400

Compiled by:

Zero Zhou / Project Engineer

Approved by:

Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.225	PASS
Frequency Tolerance	15.225	PASS
20dB Bandwidth	15.215(c)	PASS
Antenna Requirement	15.203	PASS

3 Contents

4 General Information

4.1 General Description of E.U.T.

Product Name: O2S Smart Card Reader

Model No.: AY-H6270X+XXX, AY-H6280X+XXX, AY-H6370X+XXX, AY-H6380X+XXX (where, the first X can be B or W; the second X can be P or T; the third X can be R or 0; the forth X can be S or 0)

Model Difference: AY-H6370B+P is the test model.

Digit	Description	Code	Options
1-2	Reader	AY	Fixed model
3	Spacer	-	
4	Mounting Options	H	US/UK/Asia Gang Box
		G	Mullion
5-6	Keypad Options	62	Prox Only
		63	Prox & Keypad
7-8	Credential Technology	70	MIFARE Plu / Classic
		80	MIFARE DESFire EV1 / Classic
9	Reader Color	B	Blac
		W	White
10	Spacer	+	
11	Termination Type	P	Pigtail
		T	Terminal Blocks
12	RSDP/OSDP Support	0	No
		R	Yes
13	Special Instructions	0	No
		S	Yes

Type of Modulation: FSK

Frequency Range: 13.56 MHz

The Lowest Oscillator: 8 MHz

Antenna installation: Loop Antenna

4.2 Details of E.U.T.

Technical Data: DC input: 12 V⎓, 110 mA; Class Ⅲ

4.3 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.15,2014	Sep.14,2015
2.	LISN	R&S	ENV216	101215	Sep.15,2014	Sep.14,2015
3.	Cable	Top	TYPE16(3.5M)	-	Sep.15,2014	Sep.14,2015
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.15,2014	Sep.14,2015
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.15,2014	Sep.14,2015
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.15,2014	Sep.14,2015
4.	Cable	LARGE	RF300	-	Sep.15,2014	Sep.14,2015
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.15,2014	Sep.14,2015
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.15,2014	Sep.14,2015
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2014	Apr.18,2015
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.15,2014	Sep.14,2015
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2014	Apr.18,2015
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.19,2014	Apr.18,2015
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2014	Mar.16,2015
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.10,2014	Apr.09,2015
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	Sep.15,2014	Sep.14,2015
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.15,2014	Sep.14,2015
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.15,2014	Sep.14,2015
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.15,2014	Sep.14,2015

RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.15,2014	Sep.14,2015
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2014	Sep.14,2015
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.15,2014	Sep.14,2015
4.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	Sep.15,2014	Sep.14,2015

5.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	±3.64dB	(1)
Radiated Spurious Emissions	30MHz~1000MHz	±5.03dB	(1)
	1000M~5000MHz	± 5.47 dB	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

5.4 Description of Accessory Device

Equipment	Manufacturer	Model No.	Series No.
Mainboard	Rosslare Electronics (Shenzhen) Ltd	AYG/H6XX0	/
AC Adapter	KINGS	KSS12_150_0800G	/
Remark: The above accessory devices are unmodified and commercially available. AC adapter is used for power supply to mainboard. Mainboard is used for communication with EUT and power supply to it.			

6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment **:**

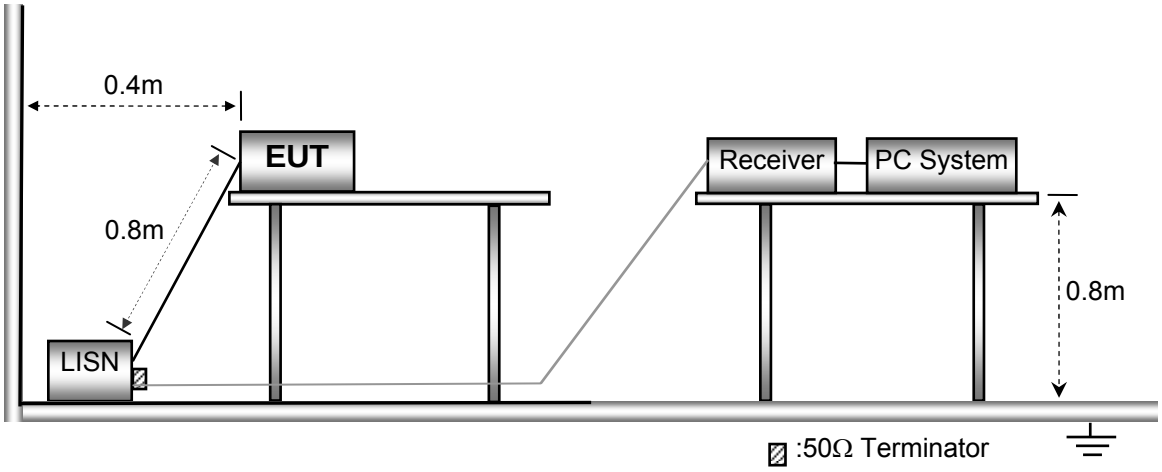
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

6.2 EUT Setup

The EUT was placed on the test table in shielding room.

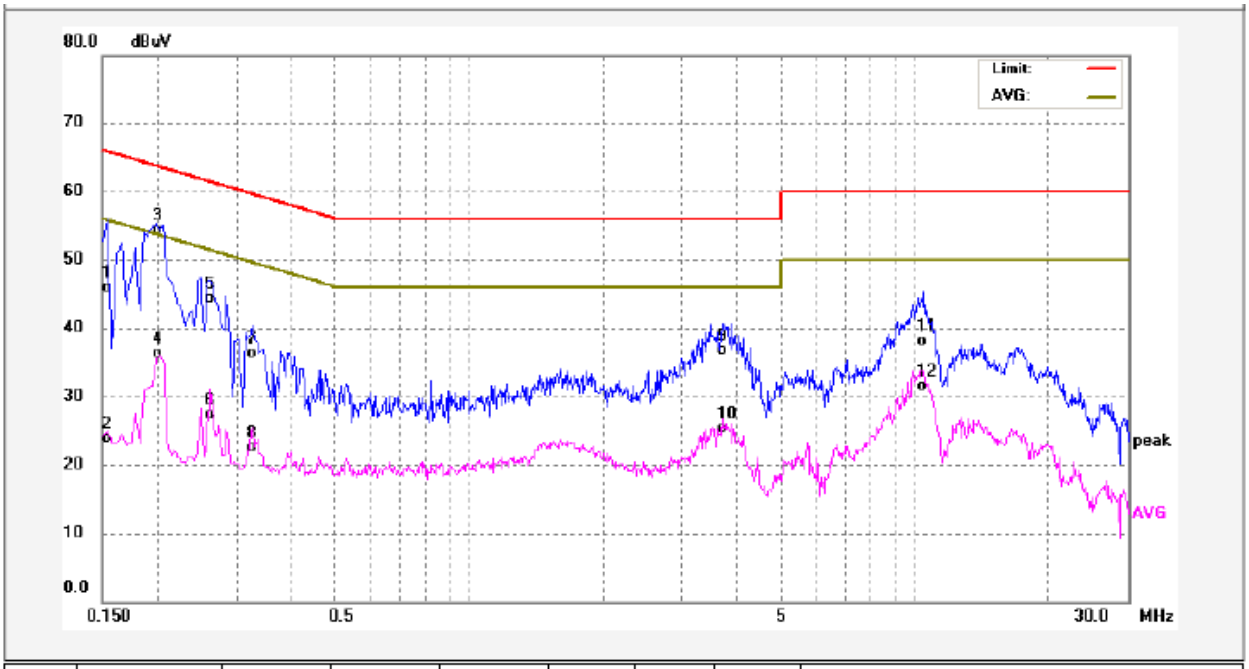


6.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

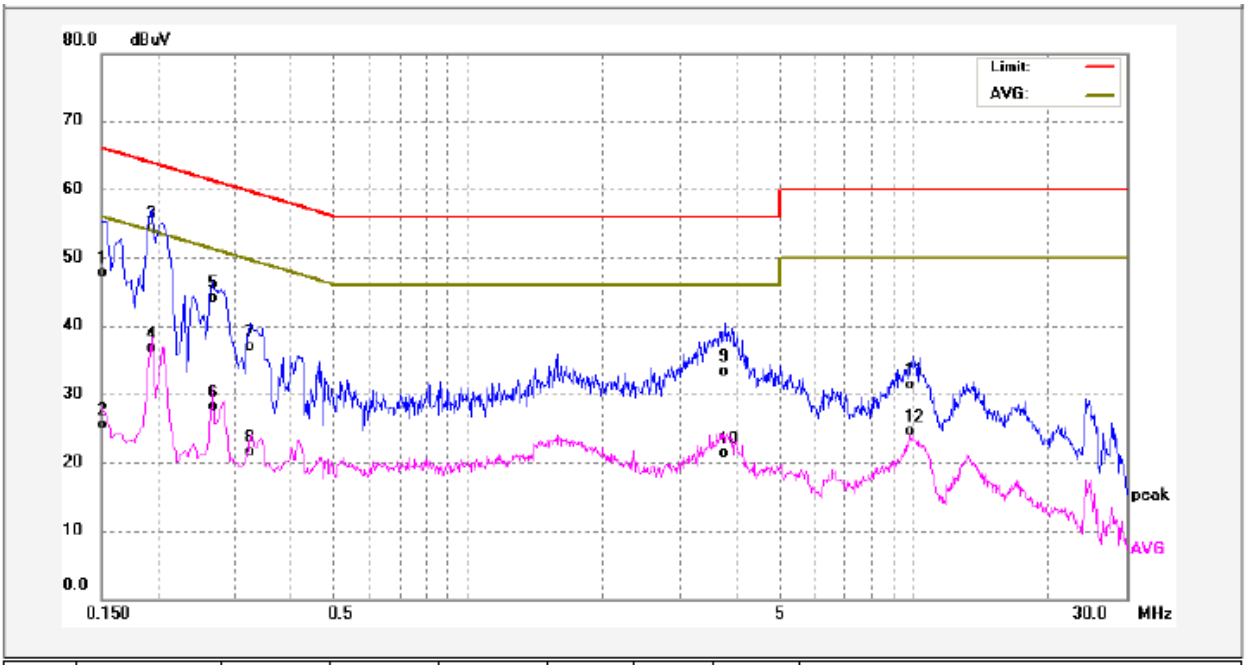
6.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	34.73	11.18	45.91	65.78	-19.87	QP	
2	0.1539	12.66	11.18	23.84	55.78	-31.94	AVG	
3	0.1980	43.08	11.29	54.37	63.69	-9.32	QP	
4	0.1980	25.10	11.29	36.39	53.69	-17.30	AVG	
5	0.2620	32.97	11.30	44.27	61.36	-17.09	QP	
6	0.2620	15.97	11.30	27.27	51.36	-24.09	AVG	
7	0.3260	25.07	11.30	36.37	59.55	-23.18	QP	
8	0.3260	11.15	11.30	22.45	49.55	-27.10	AVG	
9	3.7100	25.50	11.22	36.72	56.00	-19.28	QP	
10	3.7100	14.07	11.22	25.29	46.00	-20.71	AVG	
11	10.4780	26.72	11.32	38.04	60.00	-21.96	QP	
12	10.4780	20.18	11.32	31.50	50.00	-18.50	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	36.49	11.17	47.66	65.99	-18.33	QP	
2	0.1500	14.38	11.17	25.55	55.99	-30.44	AVG	
3	0.1940	43.01	11.28	54.29	63.86	-9.57	QP	
4	0.1940	25.33	11.28	36.61	53.86	-17.25	AVG	
5	0.2660	32.86	11.30	44.16	61.24	-17.08	QP	
6	0.2660	16.74	11.30	28.04	51.24	-23.20	AVG	
7	0.3220	25.64	11.30	36.94	59.65	-22.71	QP	
8	0.3220	10.14	11.30	21.44	49.65	-28.21	AVG	
9	3.7900	22.02	11.22	33.24	56.00	-22.76	QP	
10	3.7900	10.13	11.22	21.35	46.00	-24.65	AVG	
11	9.9379	19.96	11.31	31.27	60.00	-28.73	QP	
12	9.9379	13.26	11.31	24.57	50.00	-25.43	AVG	

7 Radiated Spurious Emissions

Test Requirement: FCC Part15 Paragraph 15.225

Test Method: ANSI C63.4:2003

Test Result: PASS

Measurement Distance: 3m

Limit:

FCC Part15 Paragraph 15.209

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

FCC Part15 Paragraph 15.225

(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, equal to 124dBuV/m at 3 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, equal to 90.5dBuV/m at 3 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, equal to 80.5dBuV/m at 3 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.

7.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

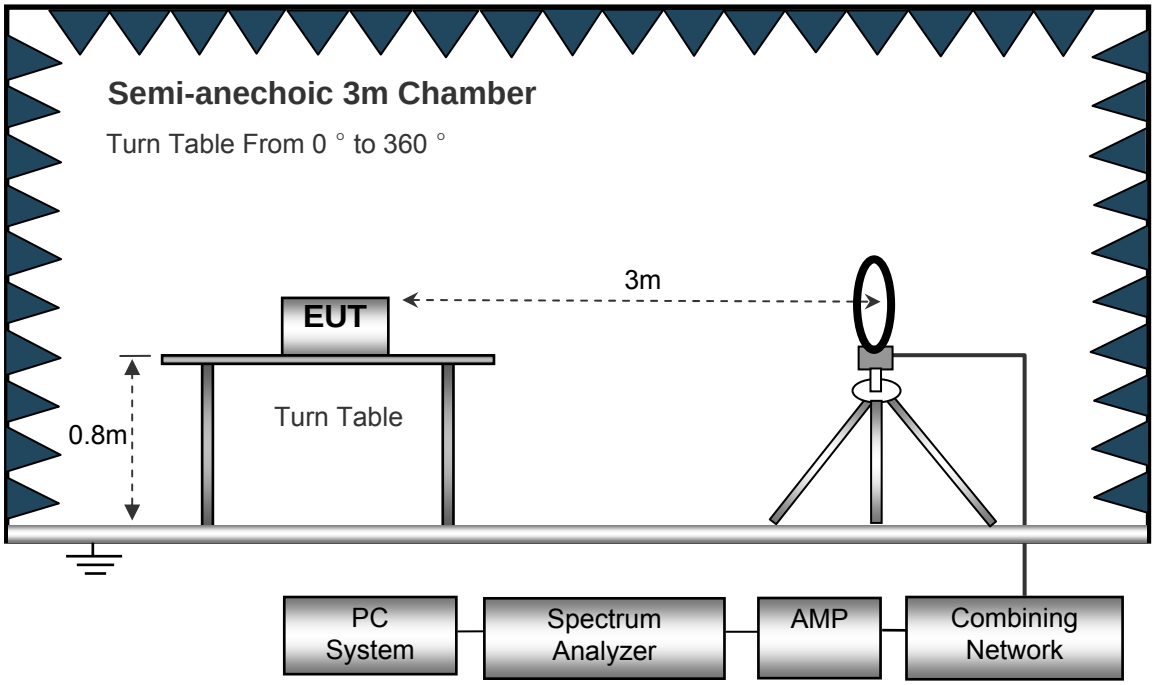
EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

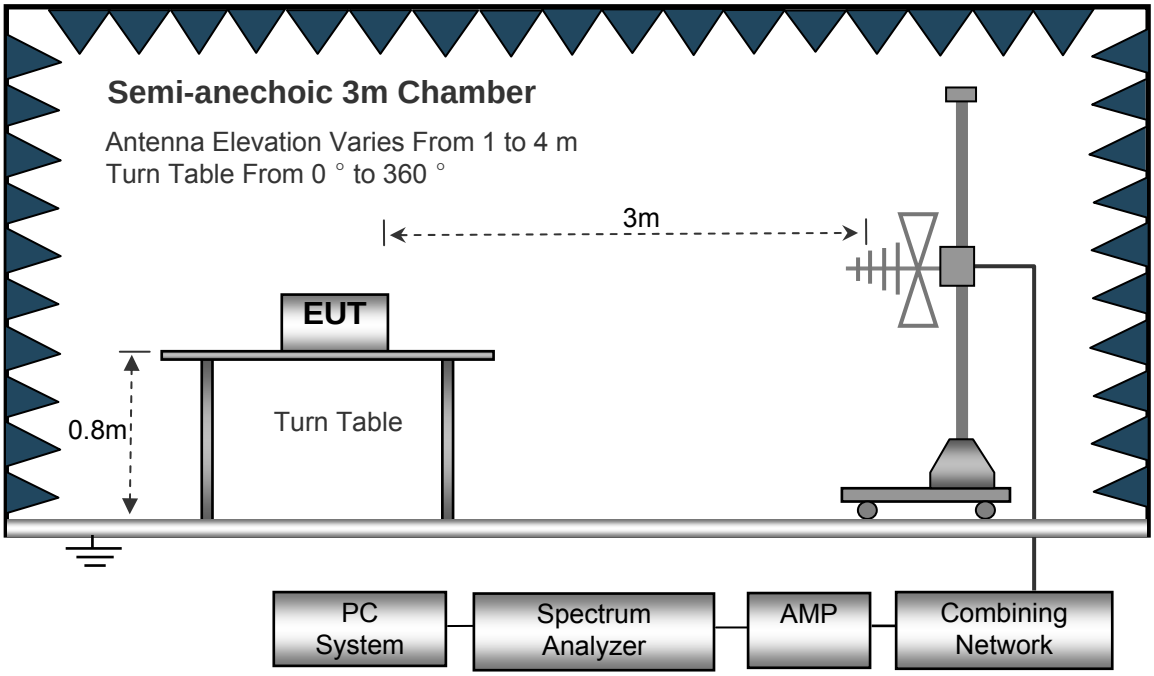
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

7.5 Summary of Test Results

Test Frequency :8MHz ~ 30MHz Note: Correct factor = Cable loss + Antenna factor

Frequency	Receiver Reading (PK)	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude (PK)	FCC Part 15.231/15.209/205	
			Height	Polar			Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
13.56	89.66	114	2	H	19.68	109.34	124	-14.66
13.56	71.35	341	1.6	V	29.71	101.06	124	-22.94

Frequency (MHz)	Receiver Reading	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	dBμV@3m	PK/QP	dB/m	dB	dBμV/m @300m&30m	dBμV/m @300m	dB
27.685	10.89	Qp	19.90	40.00	-9.21	29.54	-38.75

Frequency Range (MHz)	Frequency (MHz)	Receiver Reading	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	dBμV @3m	dBμV/m	PK/ QP	dB	dB	dBμV/m @30m	dBμV/m @30m	dBμV/m
13.110~13.41	13.362	28.47	QP	21.55	40	10.02	40.5	-30.48
13.410~13.553	13.542	38.52	QP	21.55	40	20.07	50.5	-30.43
13.553~13.567	13.536	66.33	QP	21.55	40	47.88	84.0	-36.12
13.567~13.71	13.552	39.61	QP	21.55	40	21.16	50.5	-29.34
13.710~14.01	13.818	29.95	QP	21.55	40	11.5	40.5	-29.00

Test Frequency : 30MHz ~ 1GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.225/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP /Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV /m)	(dB)
54.79	20.38	QP	110	1.5	H	14.14	34.52	40	-5.48
54.79	15.25	QP	108	1.7	V	14.14	29.39	40	-10.61
266.58	28.85	QP	74	1.5	H	12.50	41.35	43.5	-2.15
266.58	27.29	QP	245	1.7	V	12.50	39.79	43.5	-3.71
493.32	11.33	QP	302	1.5	H	21.65	32.98	46	-13.02
493.32	7.67	QP	358	1.7	V	21.65	29.32	46	-16.68

8 Frequency Tolerance

Test Requirement: FCC Part15.225

Test Method: ANSI C63.4:2003

Limit The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

8.1 Test Procedure

1.The EUT was placed on a turn table which is 0.8m above ground plane.

2.Set EUT as normal operation

3.Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.

4.Set SPA Max hold. Mark peak.

8.2 Test Result

Power Supply	Temperature (℃)	Measured Frequency (MHz)	Frequency Error	Part 15.225 Limit
DC 12.0V	-20	13.56075	0.0055%	13.56075
	20	13.56079	0.0058%	13.56079
	50	13.56073	0.0053%	13.56073
DC 10.2V	-20	13.56077	0.0056%	13.56077
	20	13.56071	0.0052%	13.56071
	50	13.56073	0.0054%	13.56073
DC 13.8V	-20	13.56071	0.0052%	13.56071
	20	13.56072	0.0053%	13.56072
	50	13.56066	0.0049%	13.56066

9 20dB Bandwidth

Test Requirement: FCC Part15.215

Test Method: ANSI C63.4:2003

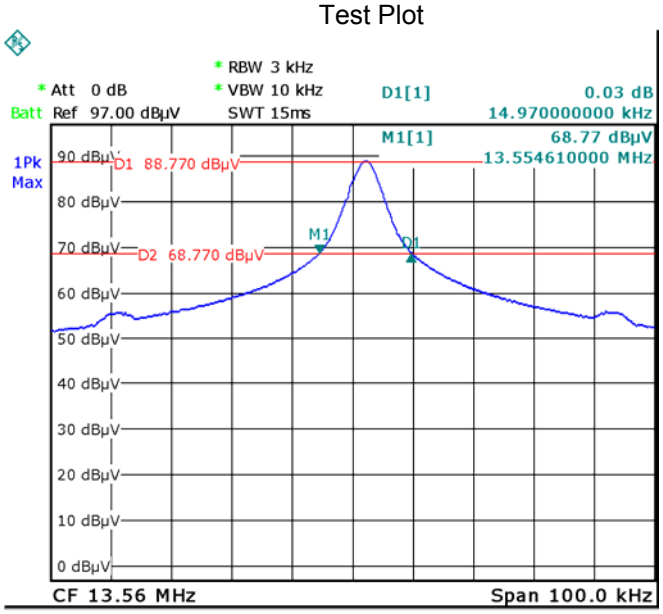
9.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
2. 20dB Bandwidth the resolution bandwidth of 1 kHz and the video bandwidth of 1 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

9.2 Test Result

Frequency(MHz)	Bandwidth Emission(kHz)
13.56	14.97

Test Plot



10 Antenna Requirement

According to the FCC Part 15 Paragraph 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. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product use a permanent Loop antenna, fulfill the requirement of this section

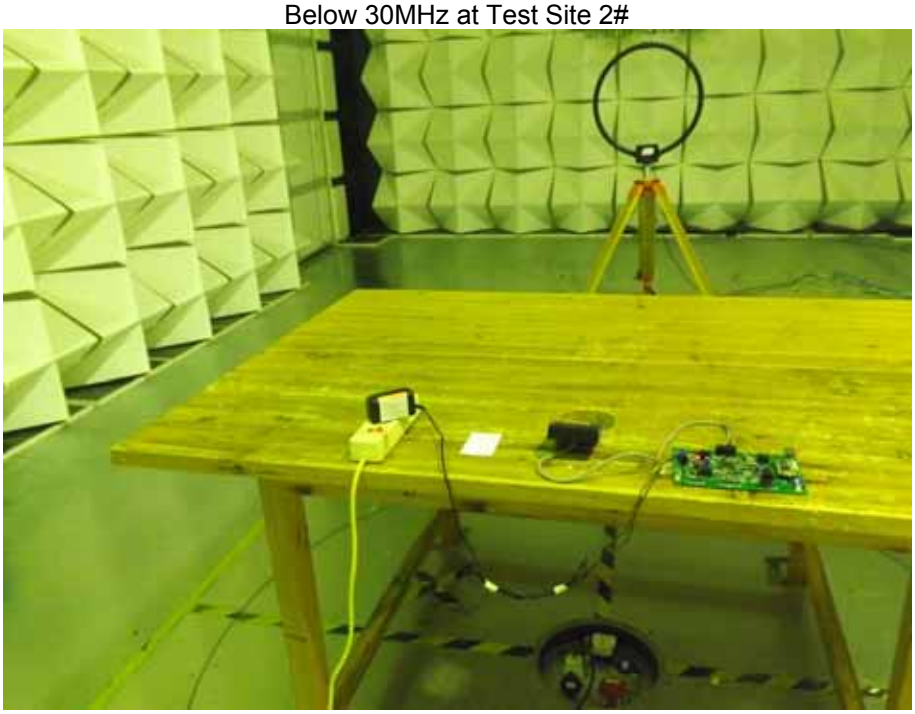
11 Model AY-G6370B+P Photographs of Testing

11.1 Conduction Emission Test Setup

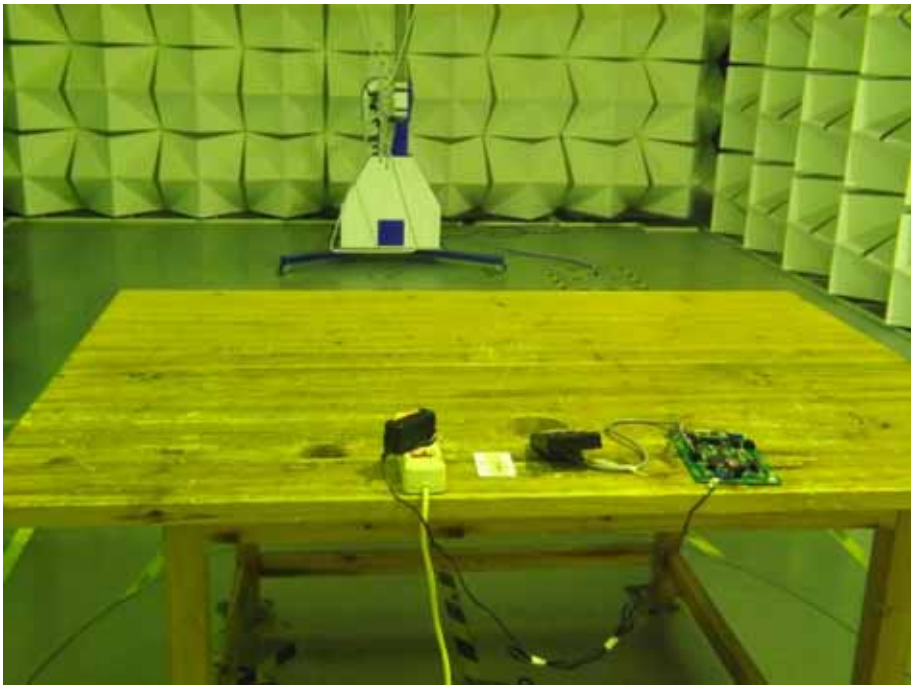
Test Site 2#

11.2 Radiation Emission Test Setup

Below 30MHz at Test Site 2#



From 30MHz to 1GHz at Test Site 2#



12 Photographs - Constructional Details

12.1 EUT - Appearance View

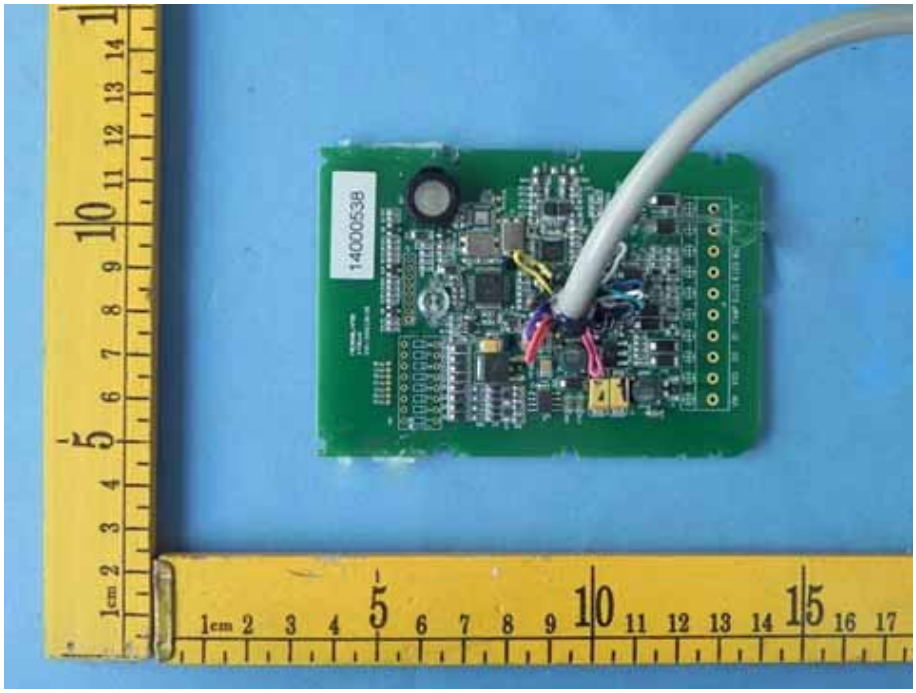
Model: AY-H6370B+P00

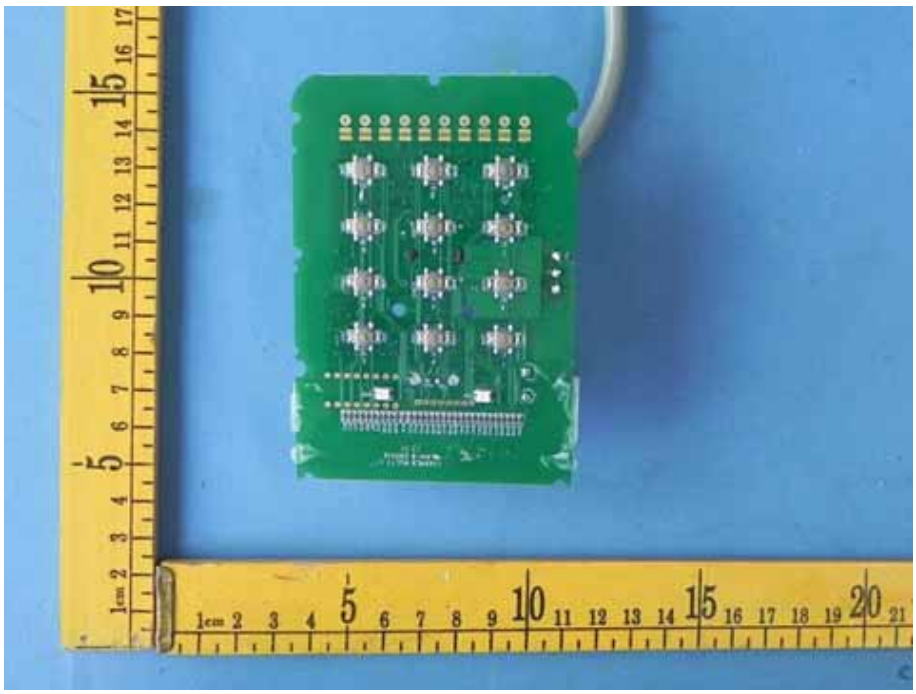
Model: AY-H6380B+TR0

12.2 EUT- Internal View

Model: AY-H6370B+P00


ANT

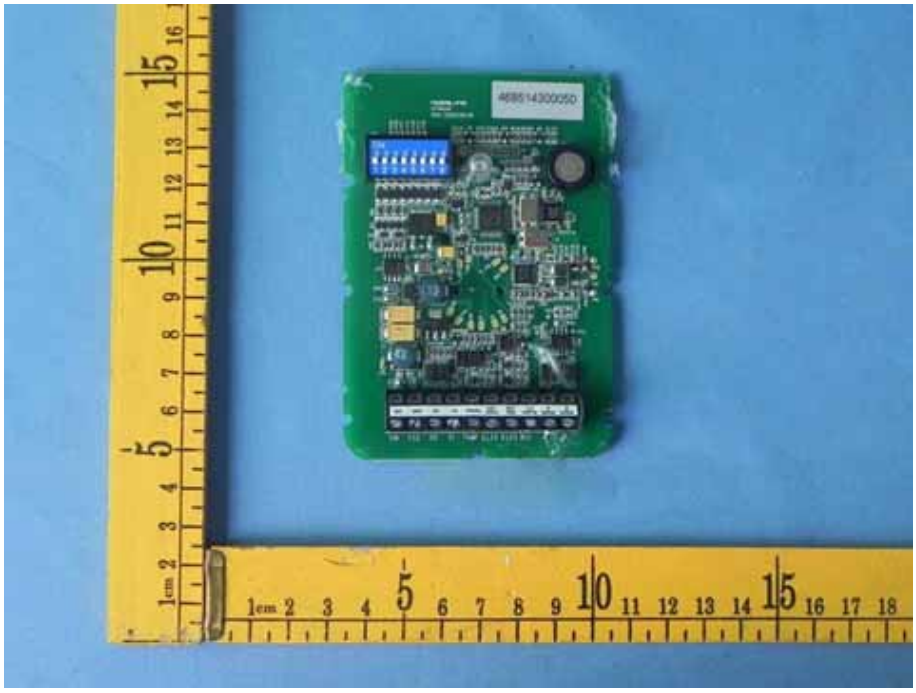

14000538

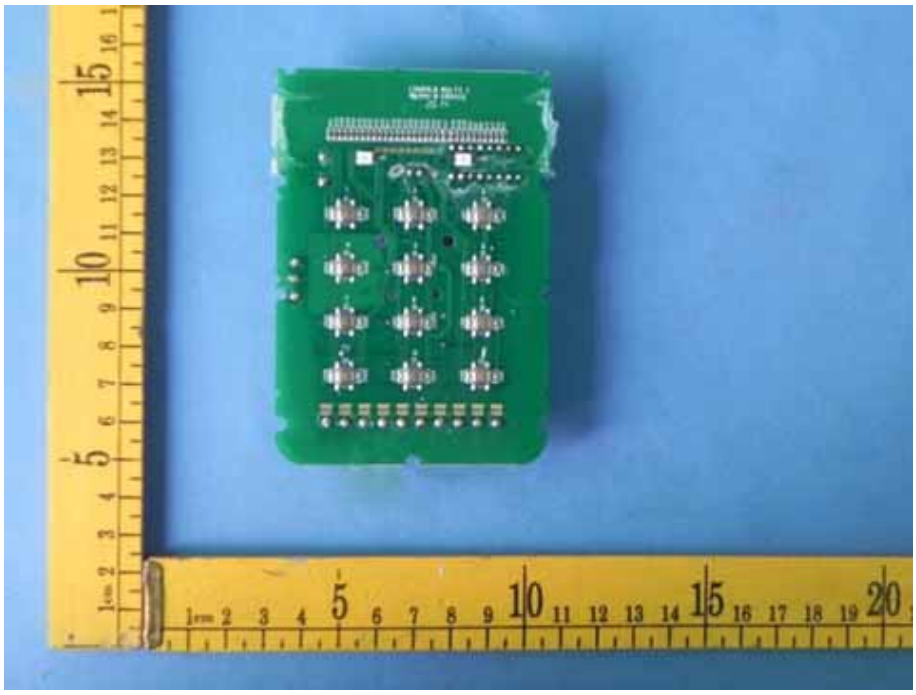


Loop ANT.

Model: AY-H6380B+TR0


ANT





Loop ANT.

======End of Report======