TEST REPORT

Reference No......	:	WTS16S0140818R1E
FCC ID	:	GCD-AYCX6X55
Applicant.....	:	Rosslare Enterprises Ltd
Address.....	:	Flat 5, 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 Industrial Park, XiLi Town, Shenzhen, China
Product Name.....	:	Smart Card CSN Reader
Model No.....	:	AYC-M6355, AY-M6255, AYC-H6355, AY-H6255
Standards.....	:	FCC CFR47 Part 15 Section 15.225: 2016
Date of Receipt sample	:	Sep. 24, 2016
Date of Test	:	Sep. 24 - 26, 2016
Date of Issue.....	:	Nov.10, 2016
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.

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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

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4 Report Revision History

Report No.	Report Version	Description	Issue Date
WTS16S0140818E	NONE	Original	Jan. 27, 2016
WTS16S0140818R1E	V1	Updated Transmitter carrier output level	Nov.10, 2016

5 General Information

5.1 General Description of E.U.T.

Product Name:	Smart Card CSN Reader
Model No.:	AYC-M6355, AY-M6255, AYC-H6355, AY-H6255
Model Difference:	The models have similar function only the shape of the product is not the same. For AYC M/H6355 and AYM/H6255, AYCx6355 have keypad and AYx6255 don't have keypad.
Remark:	The model AYC-M6355 is the tested sample.
Type of Modulation:	FSK
Frequency Range:	13.56 MHz
The Lowest Oscillator:	8MHz
Antenna installation:	Integrated Antenna

5.2 Details of E.U.T.

Technical Data:	: For models AYC-M6355 and AYC-H6355: 6-16V, MAX. 110mA For models AY-M6255 and AY-H6255: 8-16V, MAX. 120mA

5.3 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, October 15, 2015

- **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.

6 Equipment Used during Test

6.1 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.14,2016	Sep.13,2017
2.	LISN	R&S	ENV216	101215	Sep.14,2016	Sep.13,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.14,2016	Sep.13,2017
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.14,2016	Sep.13,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.14,2016	Sep.13,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.14,2016	Sep.13,2017
4.	Cable	LARGE	RF300	-	Sep.14,2016	Sep.13,2017
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.14,2016	Sep.13,2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.14,2016	Sep.13,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.18,2016	Apr.17,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.14,2016	Sep.13,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.18,2016	Apr.17,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.18,2016	Apr.17,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.16,2016	Mar.15,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.09,2016	Apr.08,2017
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.14,2016	Sep.13,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.14,2016	Sep.13,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.14,2016	Sep.13,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.14,2016	Sep.13,2017

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.14,2016	Sep.13,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.14,2016	Sep.13,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.14,2016	Sep.13,2017
4.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	Sep.14,2016	Sep.13,2017

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
AC/DC Adaptor	KINGS	KSS12_150_0800G	/
ACCESS CONTROL	Rosslare Electronics (Shenzhen) Ltd	AC-425IP	/
MacBook Air	APPLE	A1465（EW03039-1）	C17KTQDNF5N7

6.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	±3.64dB	(1)
Radiated Spurious Emissions	9kHz~30MHz	±3.00dB	(1)
	30MHz~1000MHz	±5.03dB	(1)

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

6.4 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.

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
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)

7.1 E.U.T. Operation

Operating Environment **:**

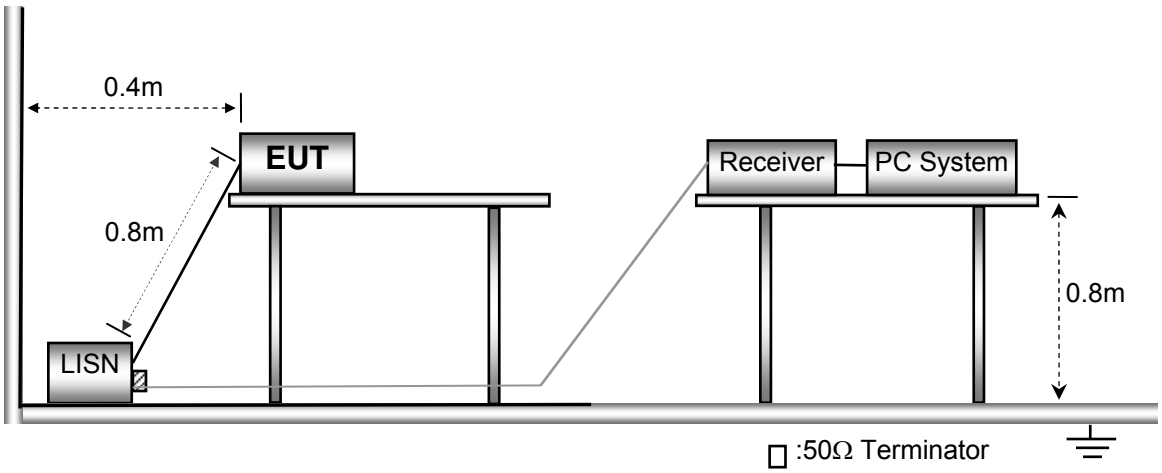
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

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

7.2 EUT Setup

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

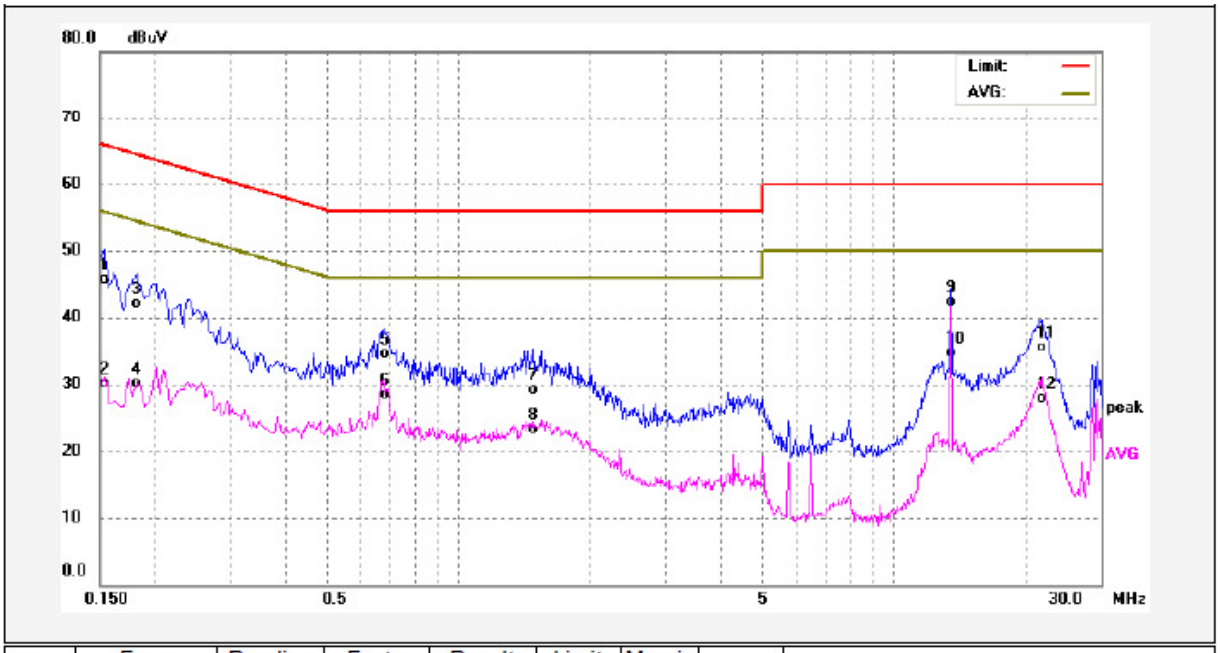


7.3 Measurement Description

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.

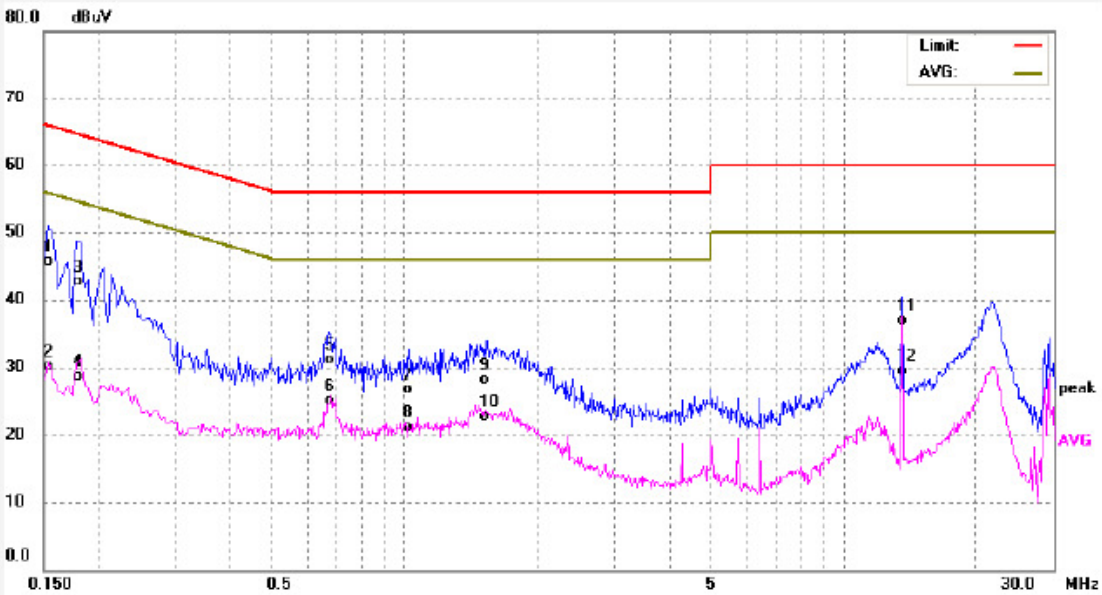
7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	35.53	10.10	45.63	65.78	-20.15	QP	
2	0.1539	20.00	10.10	30.10	55.78	-25.68	AVG	
3	0.1819	32.00	10.10	42.10	64.39	-22.29	QP	
4	0.1819	19.98	10.10	30.08	54.39	-24.31	AVG	
5	0.6820	24.28	10.17	34.45	56.00	-21.55	QP	
6	0.6820	18.32	10.17	28.49	46.00	-17.51	AVG	
7	1.4900	18.83	10.20	29.03	56.00	-26.97	QP	
8	1.4900	13.18	10.20	23.38	46.00	-22.62	AVG	
9	13.5620	31.84	10.51	42.35	60.00	-17.65	QP	
10	13.5620	24.16	10.51	34.67	50.00	-15.33	AVG	
11	21.8700	24.80	10.62	35.42	60.00	-24.58	QP	
12	21.8700	17.27	10.62	27.89	50.00	-22.11	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	35.57	10.10	45.67	65.78	-20.11	QP	
2	0.1539	19.93	10.10	30.03	55.78	-25.75	AVG	
3	0.1780	32.57	10.10	42.67	64.57	-21.90	QP	
4	0.1780	18.55	10.10	28.65	54.57	-25.92	AVG	
5	0.6700	21.00	10.16	31.16	56.00	-24.84	QP	
6	0.6700	14.87	10.16	25.03	46.00	-20.97	AVG	
7	1.0260	16.51	10.21	26.72	56.00	-29.28	QP	
8	1.0260	10.86	10.21	21.07	46.00	-24.93	AVG	
9	1.5380	17.94	10.20	28.14	56.00	-27.86	QP	
10	1.5380	12.47	10.20	22.67	46.00	-23.33	AVG	
11	13.5660	26.32	10.51	36.83	60.00	-23.17	QP	
12	13.5660	18.98	10.51	29.49	50.00	-20.51	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC Part15 Paragraph 15.205,15.209,15.225

Test Method: ANSI C63.10:2013

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.

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

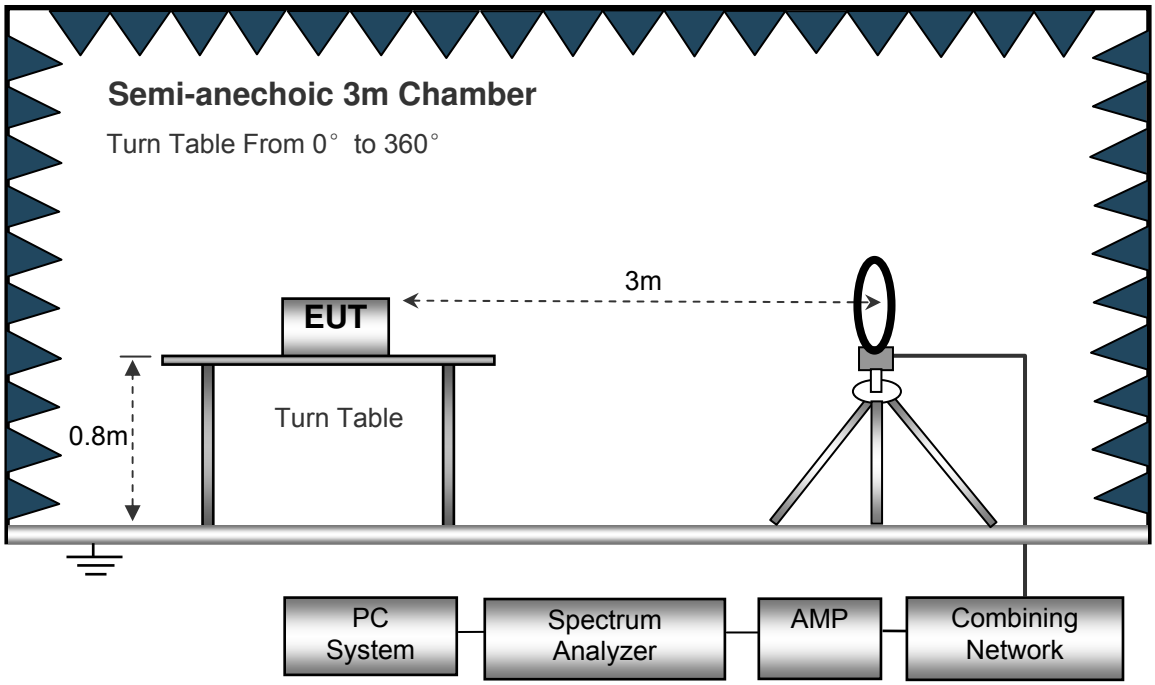
EUT Operation **:**

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

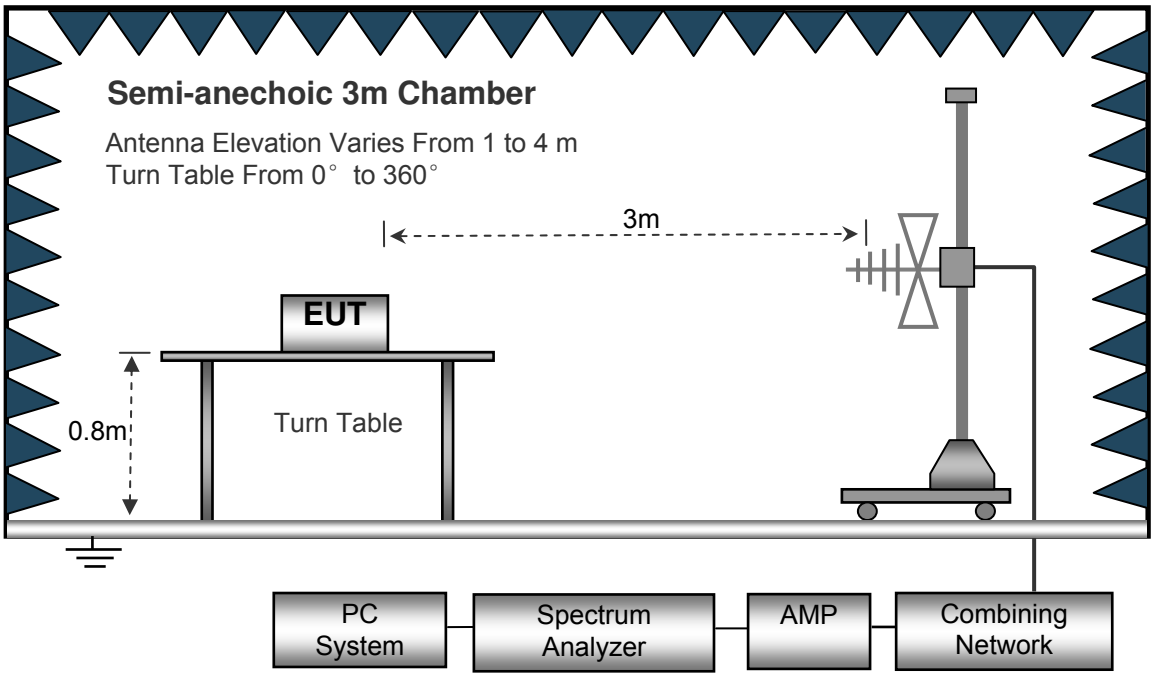
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

The test setup for emission measurement below 30MHz.



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



8.3 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

8.4 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.

8.5 Summary of Test Results

Test Frequency :9kHz ~ 30MHz Note: Correct factor = Cable loss + Antenna factor

Frequency	Receiver Reading (PK)	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude (PK)	Limit	Margin
			Height	Polar				
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
13.56	42.33	114	1.0	H	22.46	64.79	124	-59.21
13.56	42.16	341	1.0	V	22.46	64.62	124	-59.38

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
0.125	39.22	QP	20.74	80.00	-20.04	25.33	-45.37
3.628	21.51	QP	20.20	40.00	1.71	29.54	-27.83
10.349	21.95	QP	19.90	40.00	1.85	29.54	-27.69

Frequency Range	Frequency	Maximum Reading	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	(MHz)							
(MHz)	dBμV @3m	dBμV	PK/ QP	dB/m	dB	dBμV/m @30m	dBμV/m @30m	dB
13.110~ 13.41	13.391	22.18	QP	22.46	40	4.64	40.50	-35.86
13.410~ 13.553	13.551	27.33	QP	22.46	40	9.79	50.50	-40.71
13.553~ 13.567	13.559	40.26	QP	22.46	40	22.72	84.00	-61.28
13.567~ 13.71	13.569	27.54	QP	22.46	40	10	50.50	-40.50
13.710~ 14.01	13.841	22.37	QP	22.46	40	4.83	40.50	-35.67

Test Frequency : 30MHz ~ 1GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
34.58	32.66	QP	107	1.2	H	-14.30	18.36	40.00	-21.64
34.58	34.98	QP	69	1.5	V	-14.30	20.68	40.00	-19.32
220.17	37.81	QP	348	1.9	H	-13.58	24.23	46.50	-22.27
220.17	41.79	QP	220	2.2	V	-13.58	28.21	46.50	-18.29
519.33	38.44	QP	33	1.1	H	-5.63	32.81	46.50	-13.69
519.33	41.21	QP	73	1.5	V	-5.63	35.58	46.50	-10.92

9 Frequency Tolerance

Test Requirement: FCC Part15.225

Test Method: ANSI C63.10:2013

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.

9.1 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.

9.2 Test Result

Power Supply	Temperature (℃)	Measured Frequency (MHz)	Frequency Error	Part 15.225 Limit
DC 5.0V	-20	13.560078	0.0006%	±0.01%
	20	13.560211	0.0016%	±0.01%
	50	13.559366	-0.0047%	±0.01%
DC 4.25V	-20	13.560318	0.0023%	±0.01%
	20	13.559906	-0.0007%	±0.01%
	50	13.560403	0.0030%	±0.01%
DC 5.75V	-20	13.559824	-0.0013%	±0.01%
	20	13.559689	-0.0023%	±0.01%
	50	13.559527	-0.0035%	±0.01%

10 20dB Bandwidth

Test Requirement: FCC Part15.215

Test Method: ANSI C63.10:2013

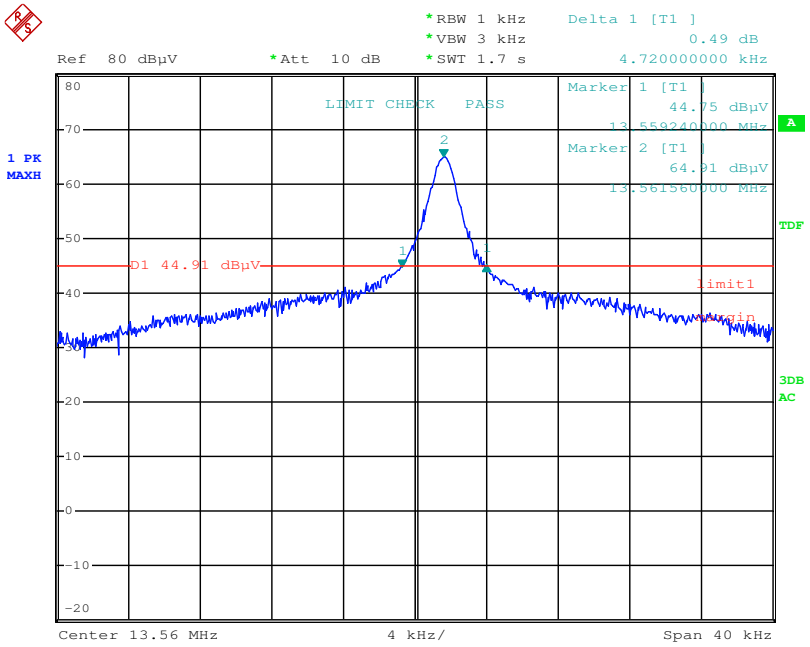
10.1 Test Procedure

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 3 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

10.2 Test Result

Frequency(MHz)	Bandwidth Emission(kHz)
13.56	4.72

Test Plot



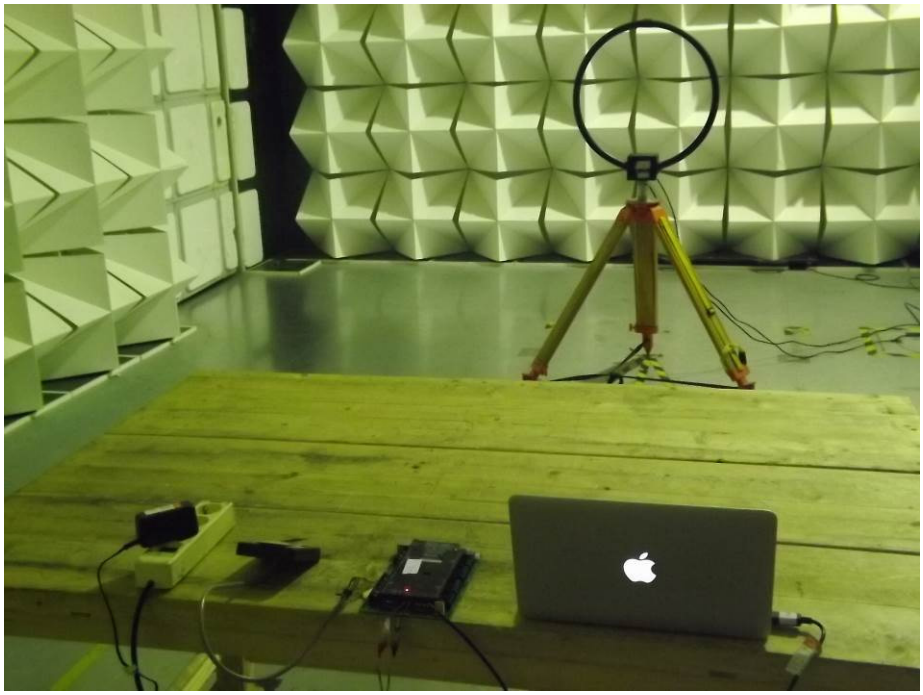
11 Antenna Requirement

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 integrated antenna, fulfill the requirement of this section

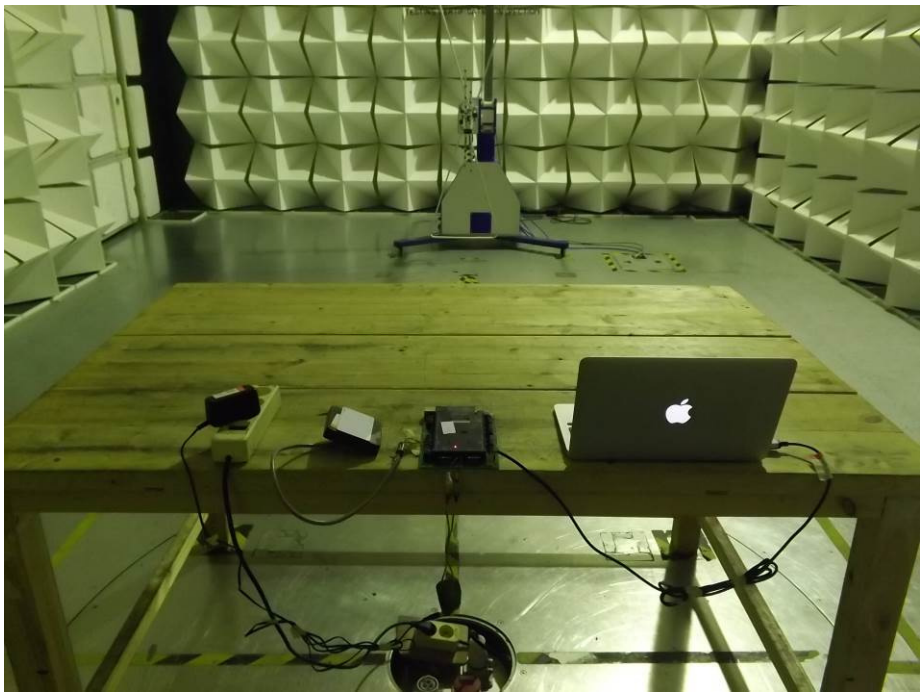
12 Model AYC-M6355 Photographs of Testing

12.1 Radiation Emission Test Setup

Below 30MHz at Test Site 2#



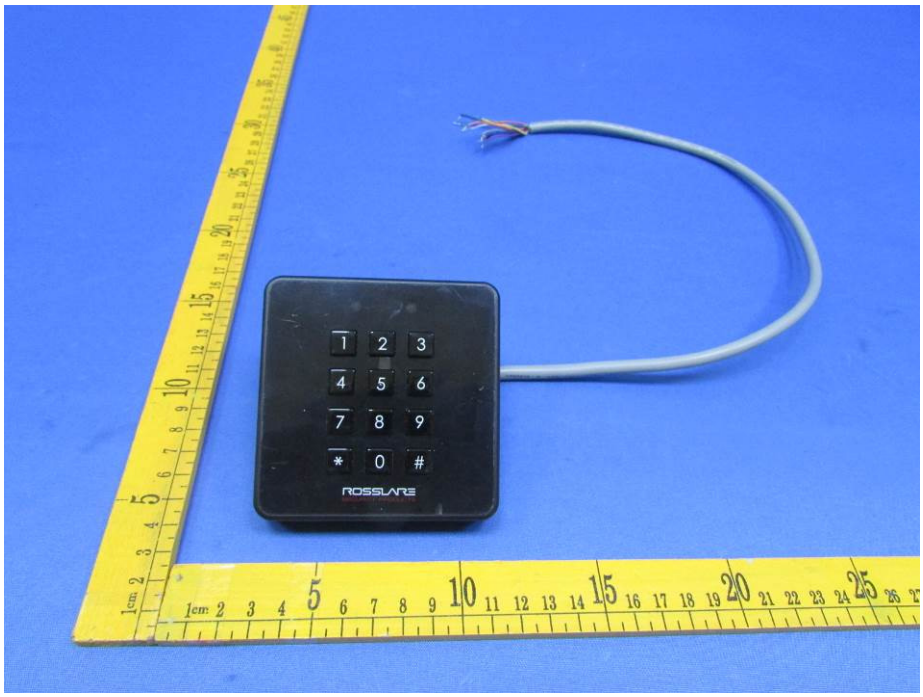
From 30MHz to 1GHz at Test Site 2#

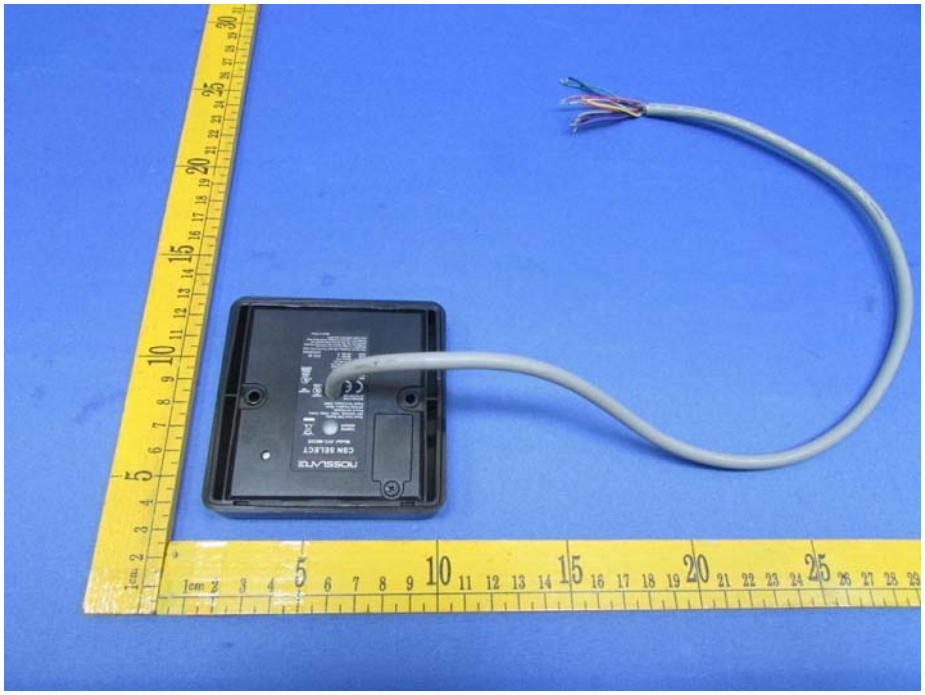


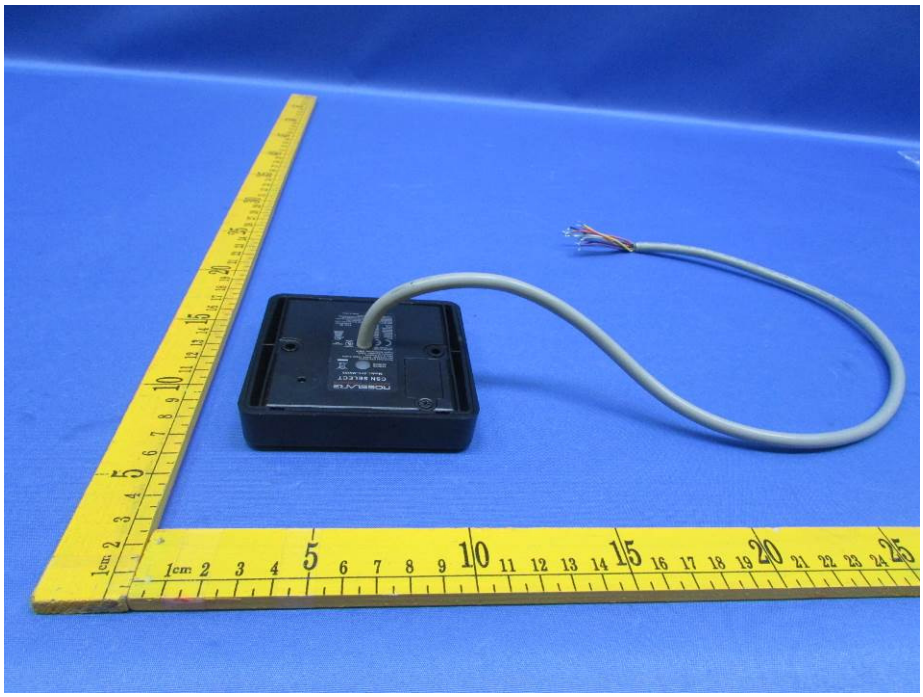
12.2 Photograph –Conducted Disturbance at Mains Terminal Test Setup

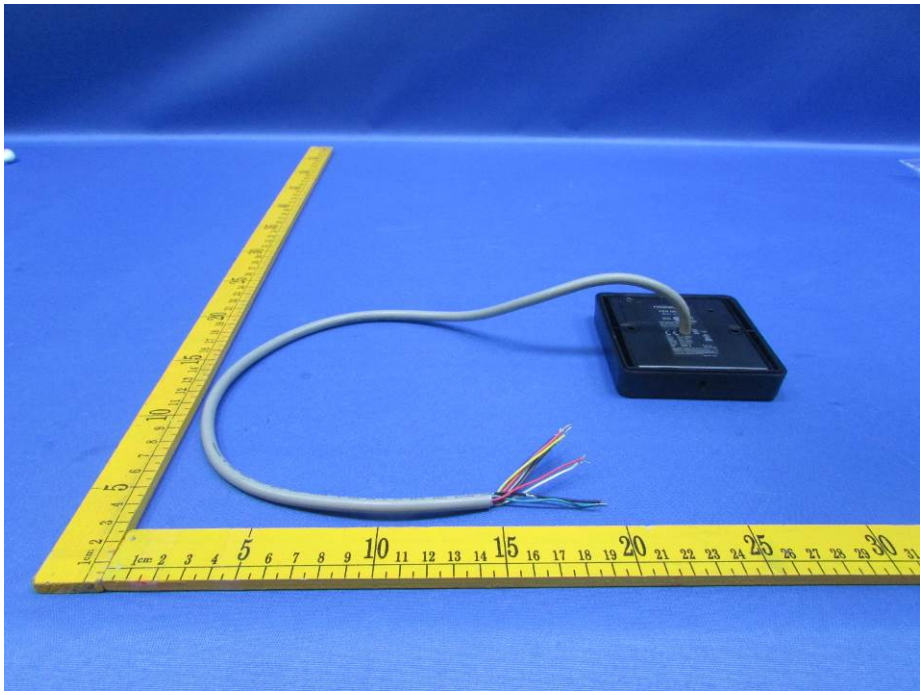
13 Photographs - Constructional Details

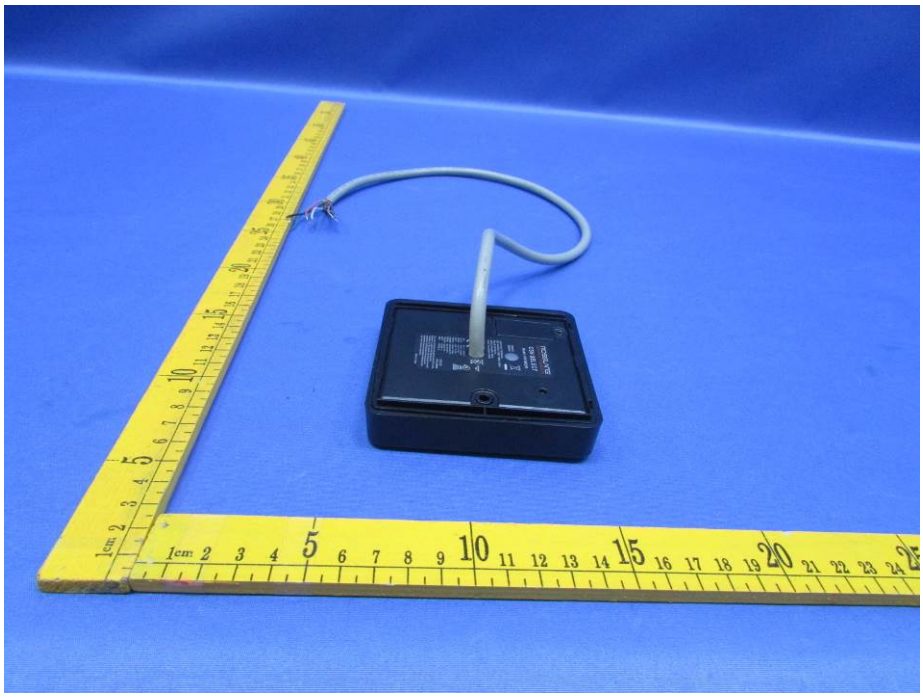
13.1 Model AYC-M6355- Appearance View

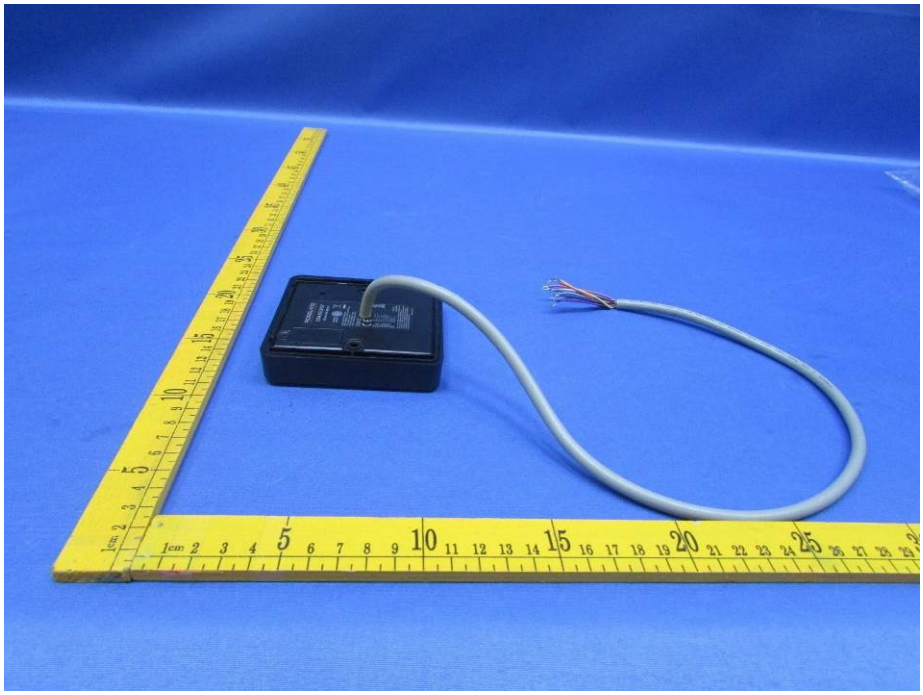




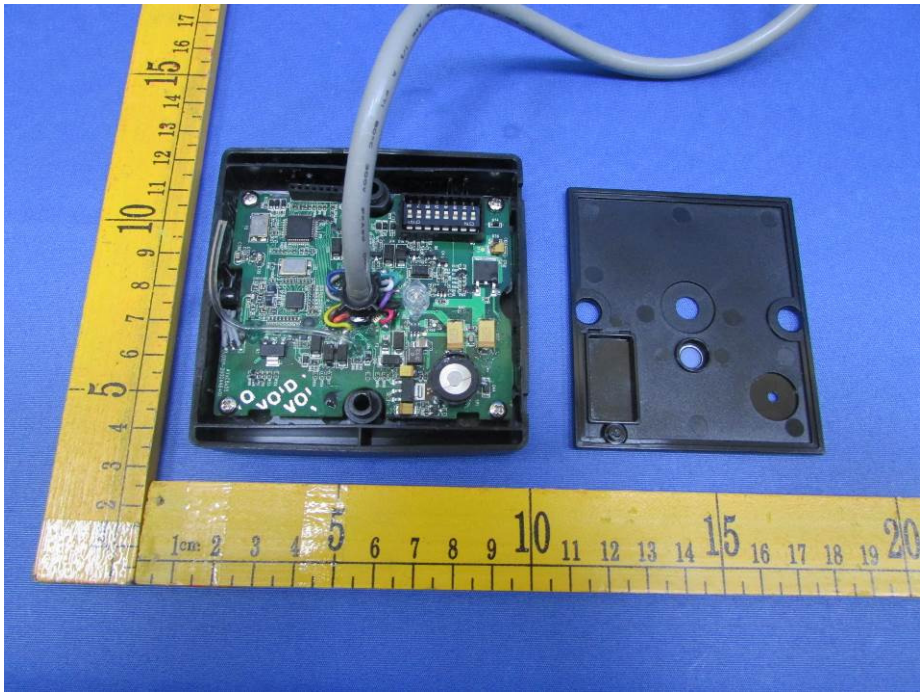


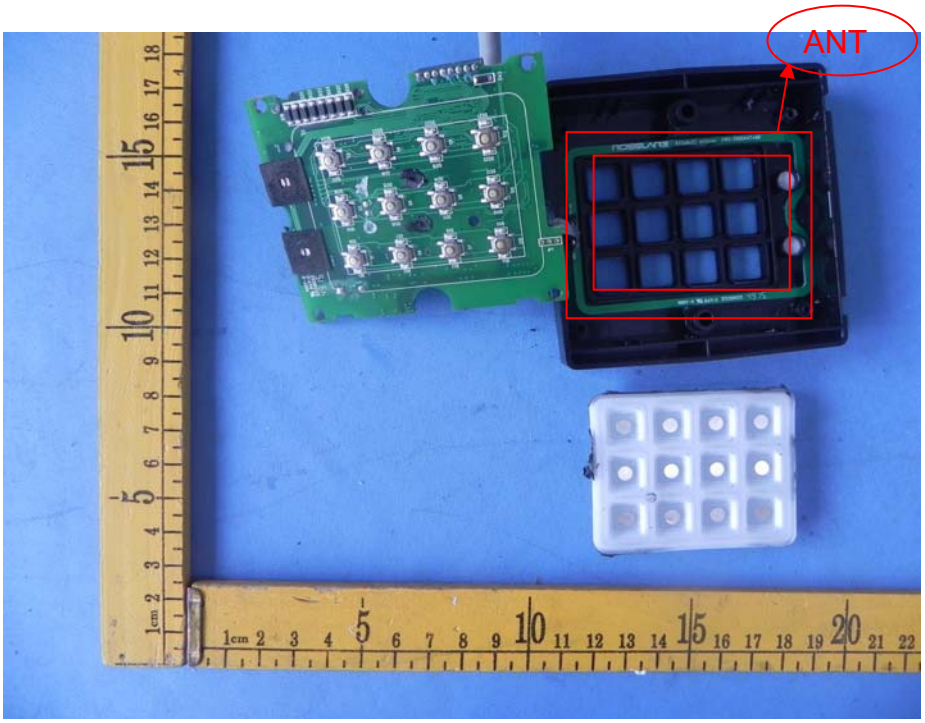


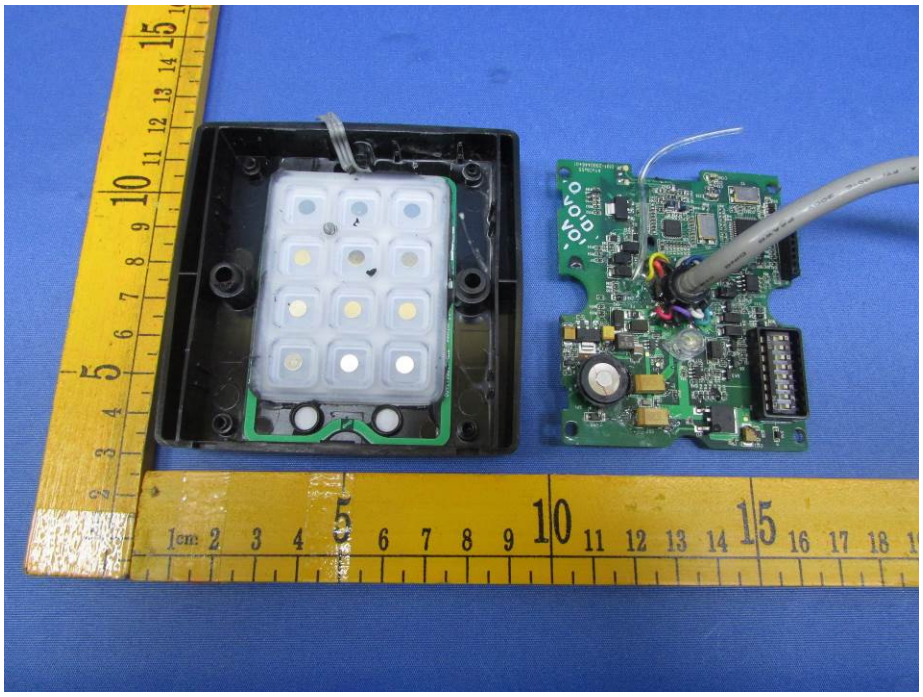


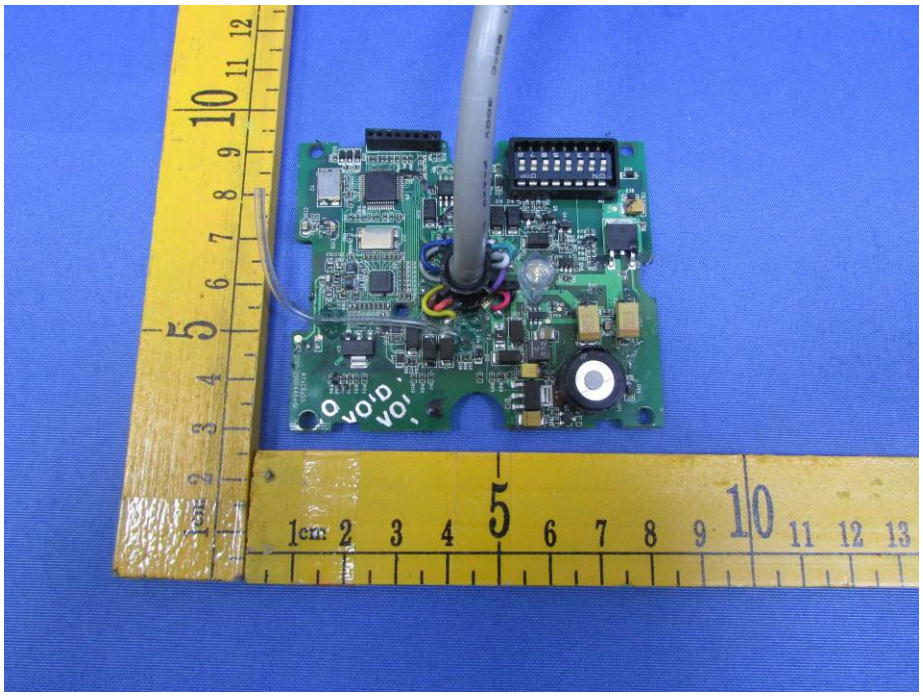


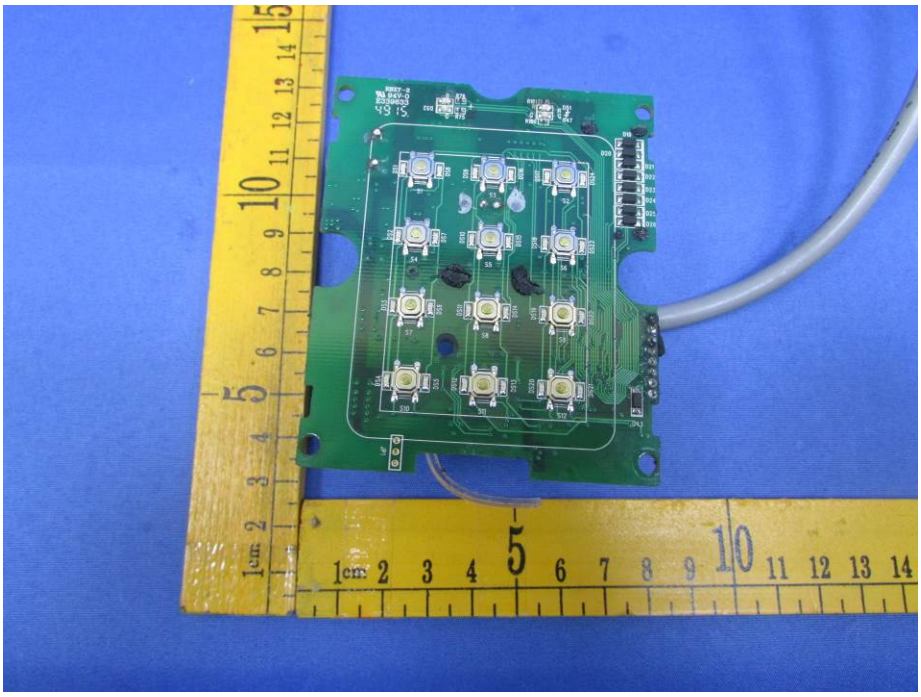
13.2 Model AYC-M6355- Internal View











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