TEST REPORT

Reference No.	:	WTS15S1137686E
FCC ID	:	GCD-DR12C
Applicant	:	Rosslare Enterprises Ltd
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 Industrial Park, XiLi Town, Shenzhen, China
Product Name	:	EM Card Desktop Reader
Model No.	:	DR-12C
Standards	:	FCC CFR47 Part 15.209: 2015
Date of Receipt sample	:	Nov. 18, 2015
Date of Test	:	Nov. 19, 2015 – Dec. 04, 2015
Date of Issue	:	Dec. 07, 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:
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Compiled by:

Lake Xie / Test 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
Antenna Requirement	15.203	PASS

3 Contents

4 General Information

4.1 General Description of E.U.T.

Product Name:	EM Card Desktop Reader
Model No.:	DR-12C
Model Difference:	N/A
Type of Modulation:	FSK
Frequency Range:	125KHz
The Lowest Oscillator:	20MHz
Antenna installation:	Loop Antenna

4.2 Details of E.U.T.

Technical Data:	DC 5V by USB Port

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, 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.

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.14,2015	Sep.13,2016
2.	LISN	R&S	ENV216	101215	Sep.14,2015	Sep.13,2016
3.	Cable	Top	TYPE16(3.5M)	-	Sep.14,2015	Sep.13,2016
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.14,2015	Sep.13,2016
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.14,2015	Sep.13,2016
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.14,2015	Sep.13,2016
4.	Cable	LARGE	RF300	-	Sep.14,2015	Sep.13,2016
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.14,2015	Sep.13,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.14,2015	Sep.13,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.18,2015	Apr.17,2016
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.14,2015	Sep.13,2016
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.18,2015	Apr.17,2016
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.18,2015	Apr.17,2016
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.16,2015	Mar.15,2016
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.09,2015	Apr.08,2016
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.14,2015	Sep.13,2016
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.14,2015	Sep.13,2016
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.14,2015	Sep.13,2016
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.14,2015	Sep.13,2016

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.14,2015	Sep.13,2016
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.14,2015	Sep.13,2016
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.14,2015	Sep.13,2016
4.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	Sep.14,2015	Sep.13,2016
RF Exposure						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	Probe(0.01-10MHz)	Shangfang	9502-103	SF0629	Sep.14,2015	Sep.13,2016
3m Semi-anechoic Chamber for Radiation Emissions(9KHz-30MHz)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1.	Test Receiver	R&S	ESCI	101296	Sep.14,2015	Sep.13,2016
2.	Loop antenna	DZ	ZN30900A	0703	Sep.14,2015	Sep.13,2016

5.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	±3.64dB	(1)
Radiated Spurious Emissions	9KHz~30MHz	±3.03dB	(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.

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 **:**

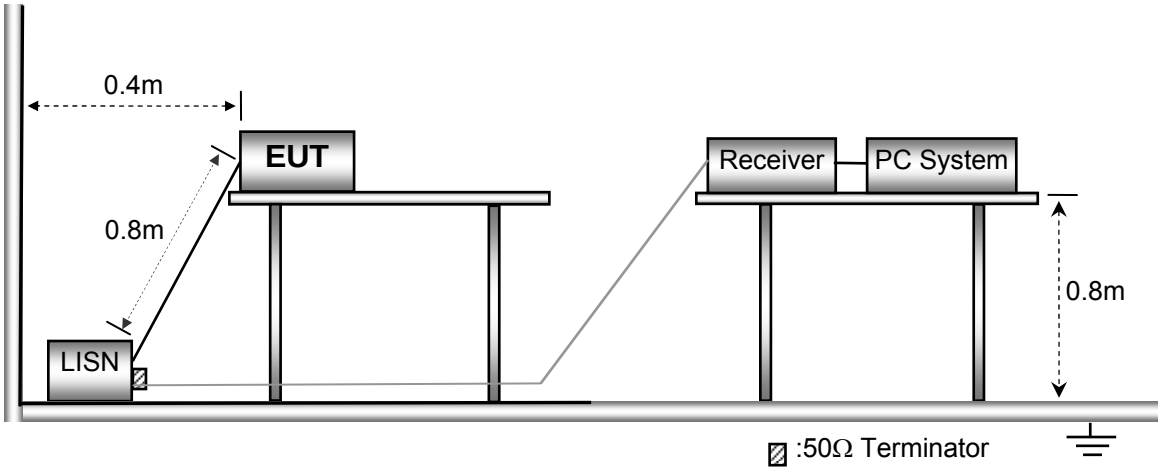
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

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

6.2 EUT Setup

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

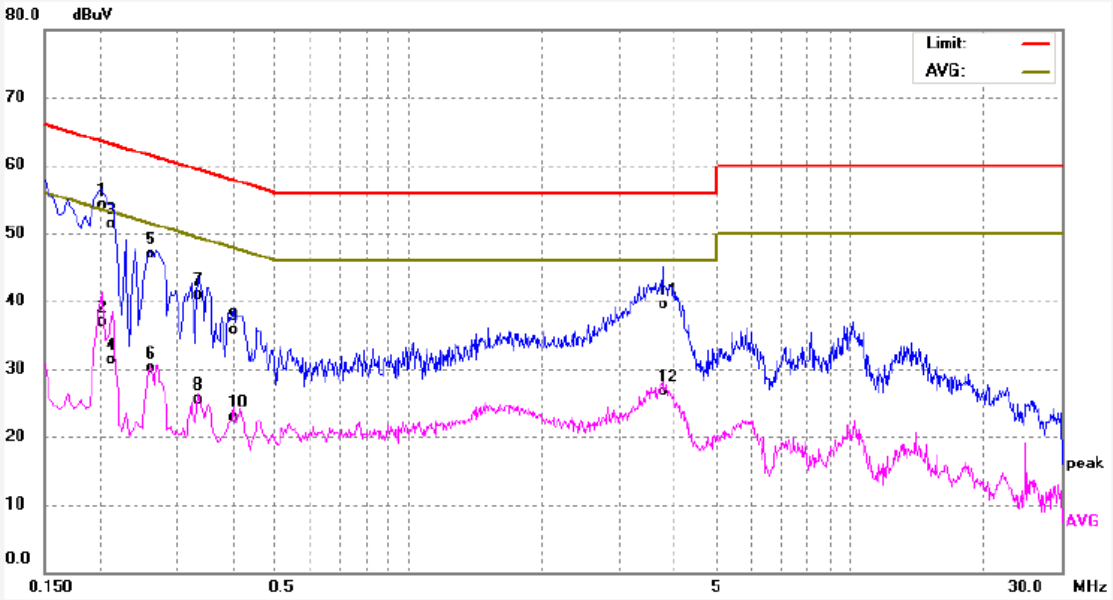


6.3 Measurement Description

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.

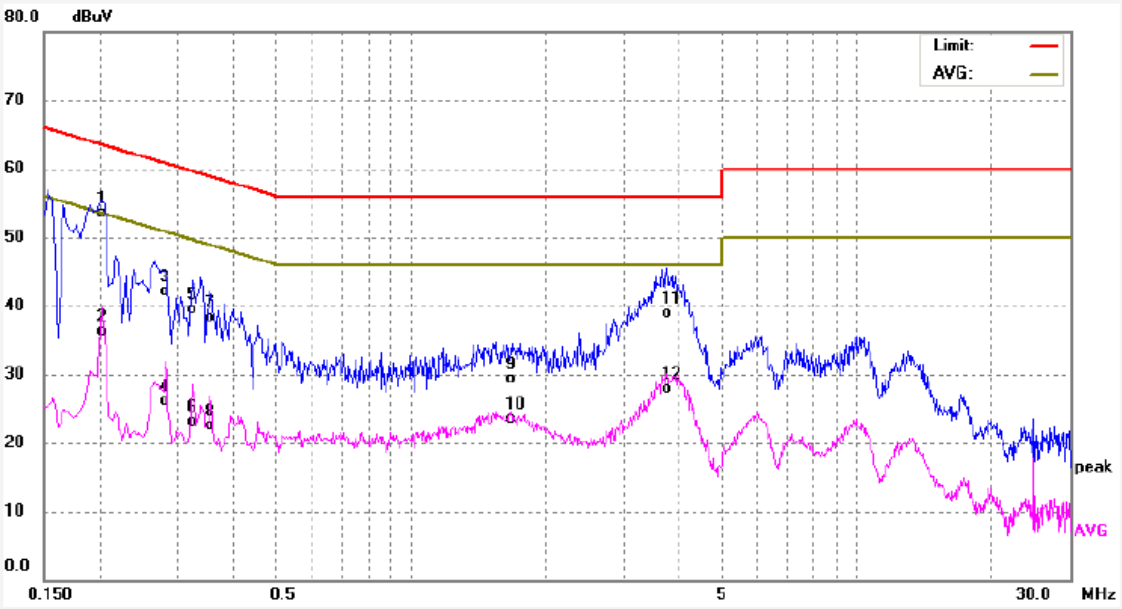
6.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2020	43.91	10.10	54.01	63.52	-9.51	QP	
2	0.2020	26.82	10.10	36.92	53.52	-16.60	AVG	
3	0.2140	41.30	10.10	51.40	63.04	-11.64	QP	
4	0.2140	21.21	10.10	31.31	53.04	-21.73	AVG	
5	0.2620	36.87	10.10	46.97	61.36	-14.39	QP	
6	0.2620	19.95	10.10	30.05	51.36	-21.31	AVG	
7	0.3339	30.70	10.11	40.81	59.35	-18.54	QP	
8	0.3339	15.41	10.11	25.52	49.35	-23.83	AVG	
9	0.4020	25.61	10.11	35.72	57.81	-22.09	QP	
10	0.4020	12.78	10.11	22.89	47.81	-24.92	AVG	
11	3.7620	29.26	10.23	39.49	56.00	-16.51	QP	
12	3.7620	16.53	10.23	26.76	46.00	-19.24	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2020	43.47	10.10	53.57	63.52	-9.95	QP	
2	0.2020	26.19	10.10	36.29	53.52	-17.23	AVG	
3	0.2819	32.03	10.11	42.14	60.76	-18.62	QP	
4	0.2819	15.96	10.11	26.07	50.76	-24.69	AVG	
5	0.3220	29.41	10.11	39.52	59.65	-20.13	QP	
6	0.3220	13.07	10.11	23.18	49.65	-26.47	AVG	
7	0.3540	28.27	10.11	38.38	58.87	-20.49	QP	
8	0.3540	12.45	10.11	22.56	48.87	-26.31	AVG	
9	1.6740	19.09	10.20	29.29	56.00	-26.71	QP	
10	1.6740	13.32	10.20	23.52	46.00	-22.48	AVG	
11	3.7500	28.65	10.22	38.87	56.00	-17.13	QP	
12	3.7500	17.65	10.22	27.87	46.00	-18.13	AVG	

7 Radiated Spurious Emissions

Test Requirement: FCC Part15 Paragraph 15.209

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	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

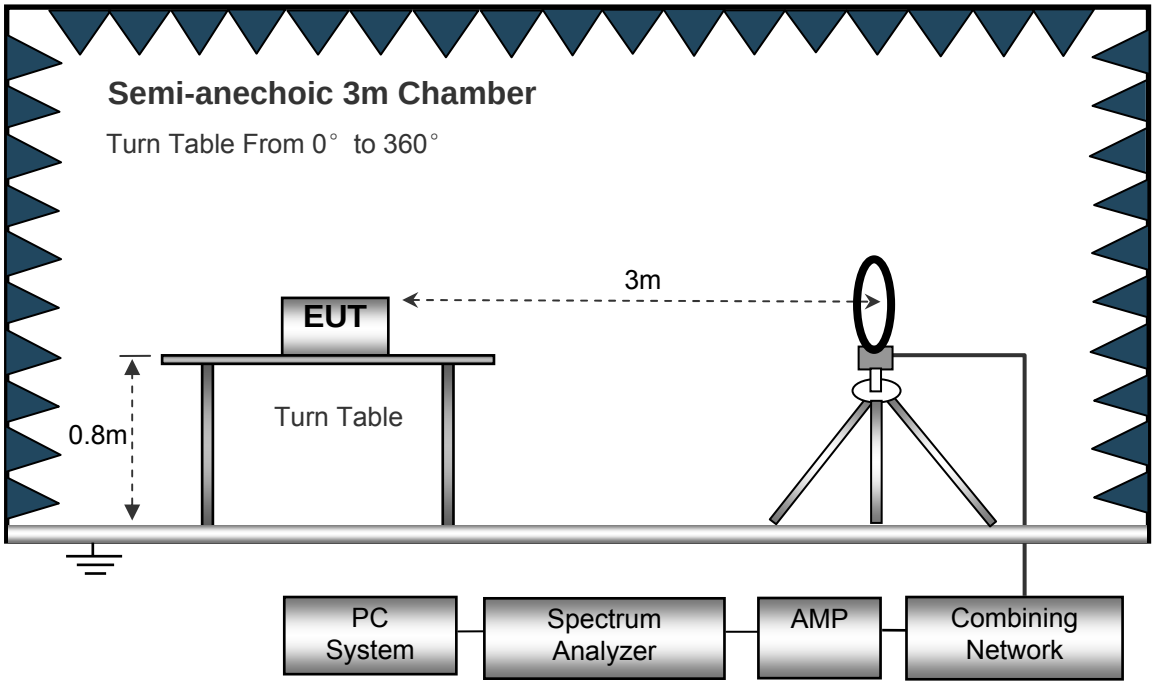
EUT Operation **:**

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

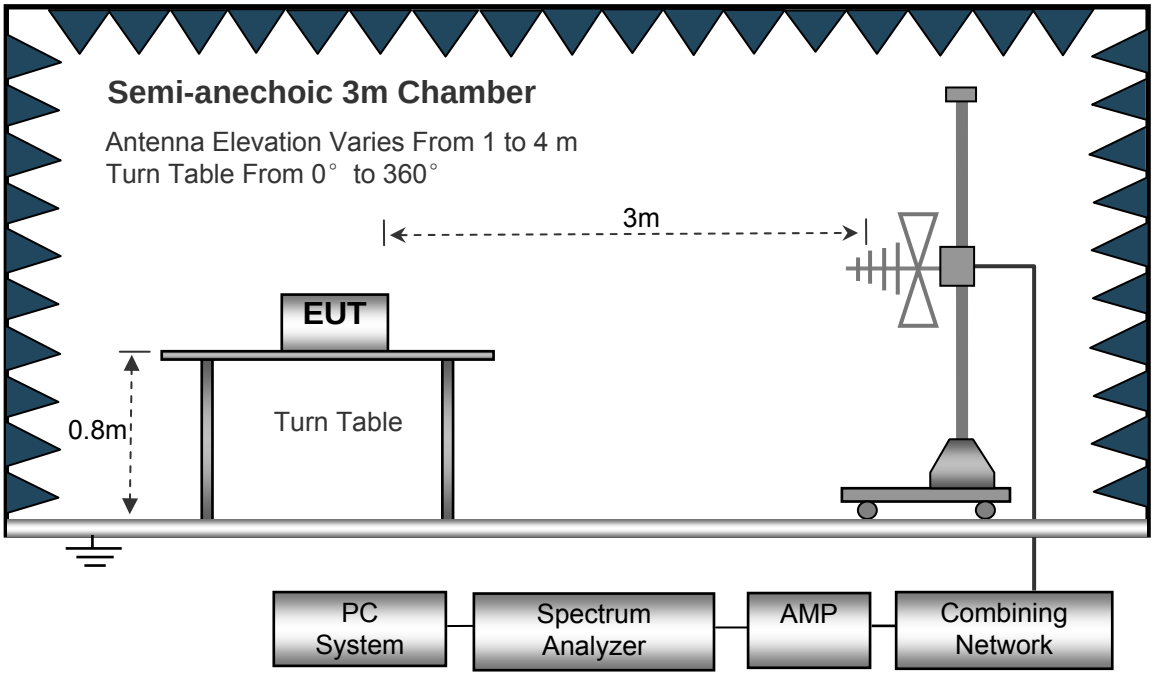
7.2 Test Setup

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.
8. New battery was used during test.

7.5 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)	FCC Part 15.209	
			Height	Polar			Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
0.125	55.47	114	2.0	H	19.58	75.05	105.67	-30.62
0.125	28.65	341	1.6	V	29.73	58.38	105.67	-47.29

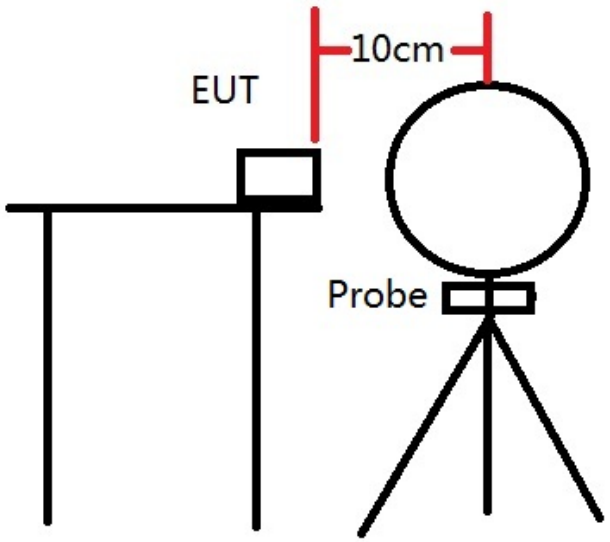
Frequency (MHz)	Receiver Reading	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	dBμV@3m	PK/QP	dB/m	dB	dBμV/m @3m	dBμV/m @3m	dB
0.152	20.52	QP	20.60	80.00	41.12	103.97	-62.85
2.690	18.25	QP	20.20	40.00	38.45	69.54	-31.09
16.593	20.17	QP	19.90	40.00	40.07	69.54	-29.47

Test Frequency : 30MHz ~ 1GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.209	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP /Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV /m)	(dB)
33.33	34.19	QP	232	1.5	H	-16.33	17.86	40	-22.14
33.33	38.09	QP	178	1.7	V	-15.18	22.91	40	-17.09
98.49	37.30	QP	116	1.5	H	-17.87	19.43	43.50	-24.07
98.49	36.10	QP	355	1.7	V	-17.87	18.23	43.50	-25.27
218.31	36.18	QP	51	1.5	H	-17.13	19.50	46.00	-26.95
218.31	36.50	QP	351	1.7	V	-17.05	19.45	46.00	--26.55

8 RF Exposure

8.1 Test Setup



These testing were performed at test configuration as above diagram.

EUT was placed on a table, and the measure probe was placed at a measurement distance of 10cm from the EUT to the center of the probe. The EUT was put in different directions (Left, Right, Front, Rear, Top and Bottom) to obtain the maximum reading.

8.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

8.3 Test Data

E-Field

Test Side	Separation Distance(cm)	E-Field Measured(V/m)	E-Field Limit(V/m)
Left	10	5.26	614
Right	10	5.39	614
Front	10	5.43	614
Rear	10	5.39	614
Top	10	6.23	614
Bottom	10	6.41	614

H-Field

Test Side	Separation Distance(cm)	H-Field Measured(A/m)	H-Field Limit(A/m)
Left	10	0.15	1.63
Right	10	0.08	1.63
Front	10	0.16	1.63
Rear	10	0.17	1.63
Top	10	0.32	1.63
Bottom	10	0.29	1.63

9 Antenna Requirement

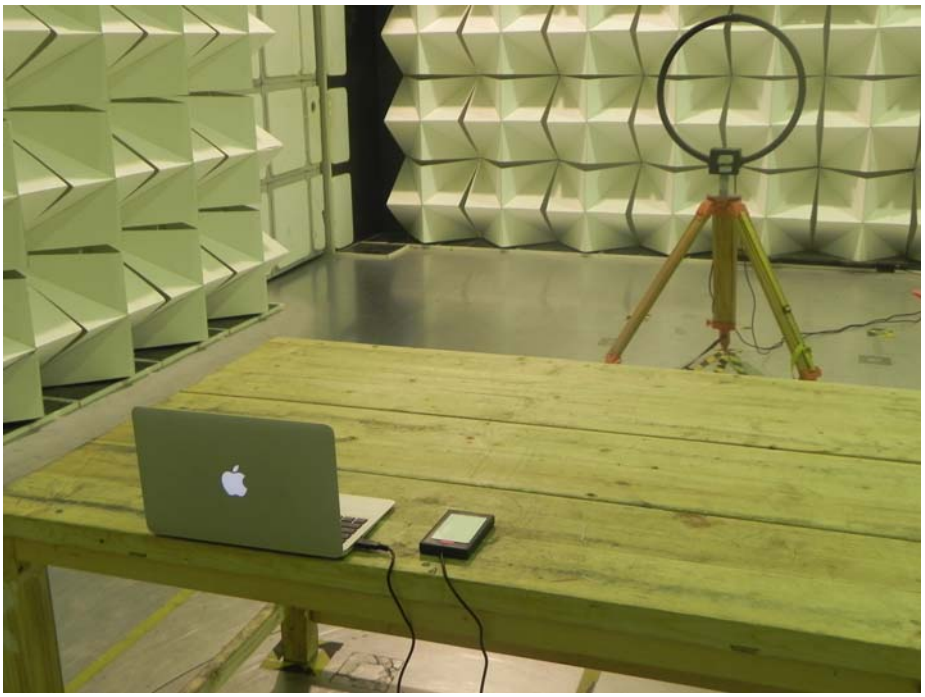
According to the FCC Part 15 Paragraph 15.209, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product use a permanent Loop antenna, fulfill the requirement of this section

10 Model DR-12C Photographs of Testing

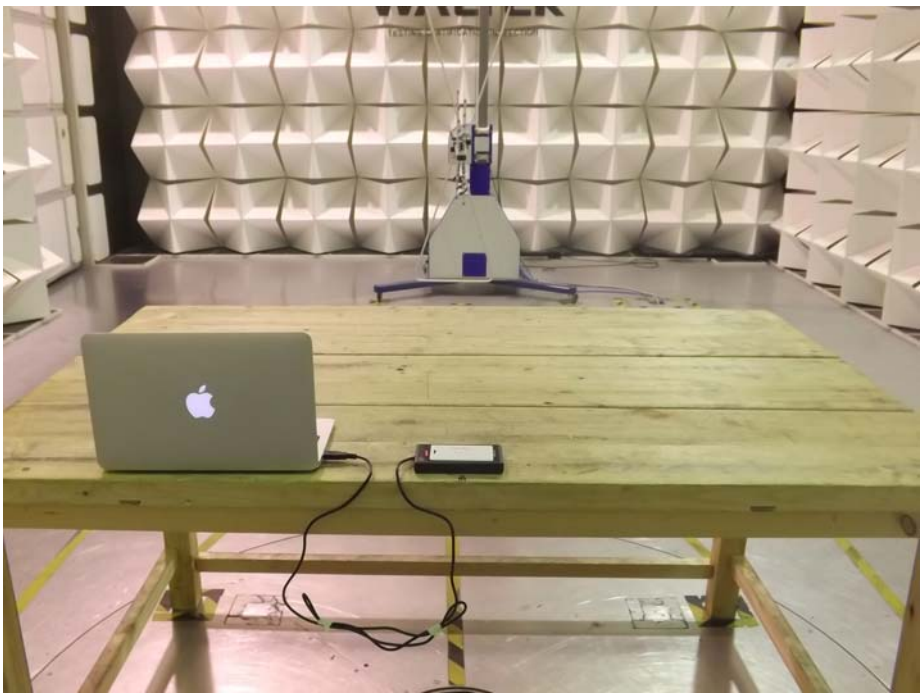
10.1 Photograph –Conducted Disturbance at Mains Terminal Test Setup

10.2 Radiation Emission Test Setup

Below 30MHz



30MHz to 1GHz



11 Photographs - Constructional Details

11.1 Model DR-12C - Appearance View

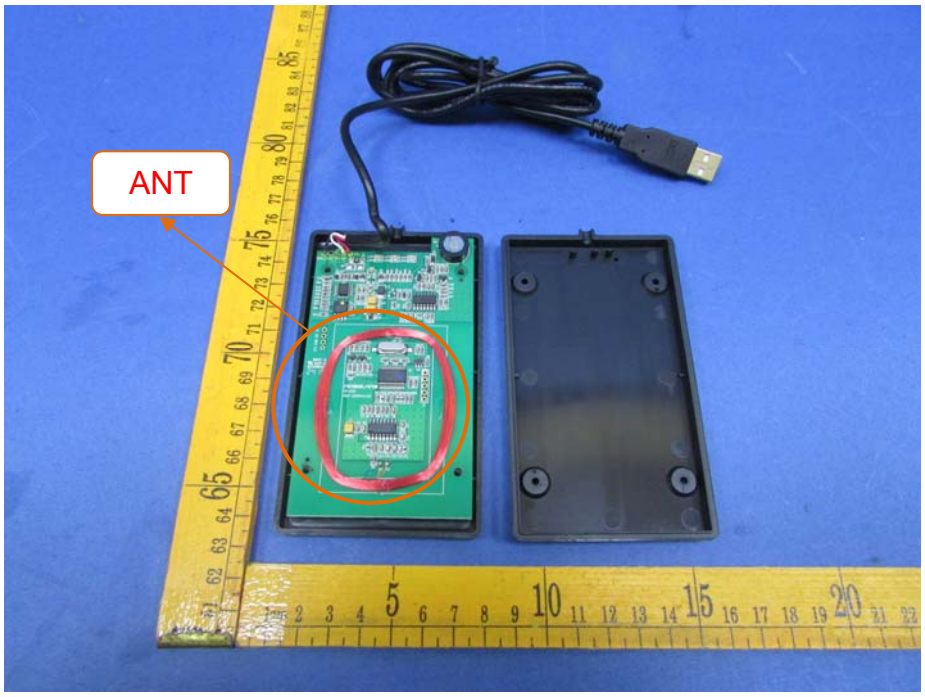

CARD

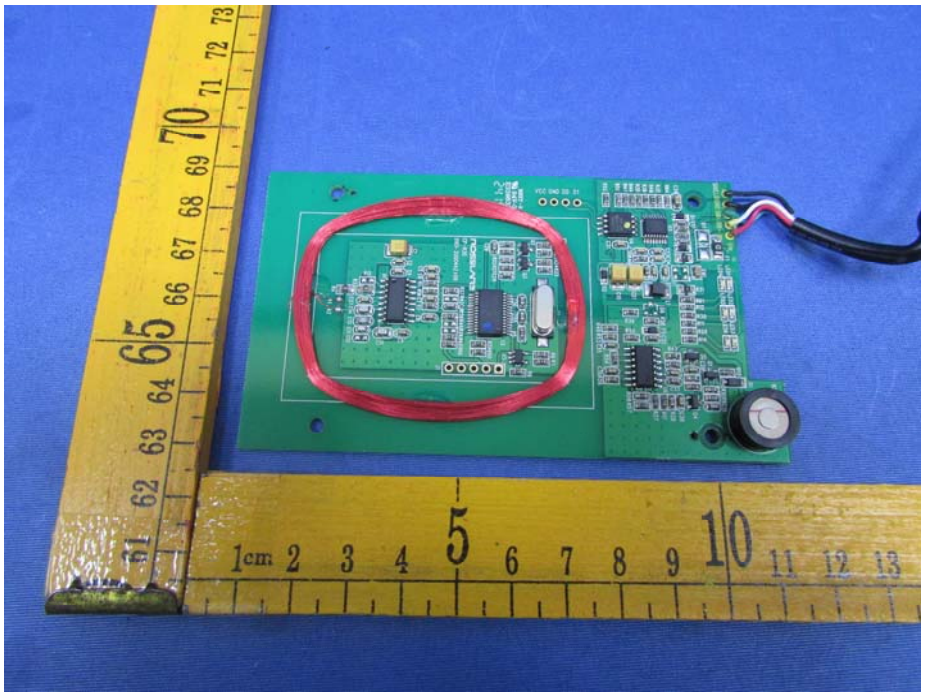

CARD

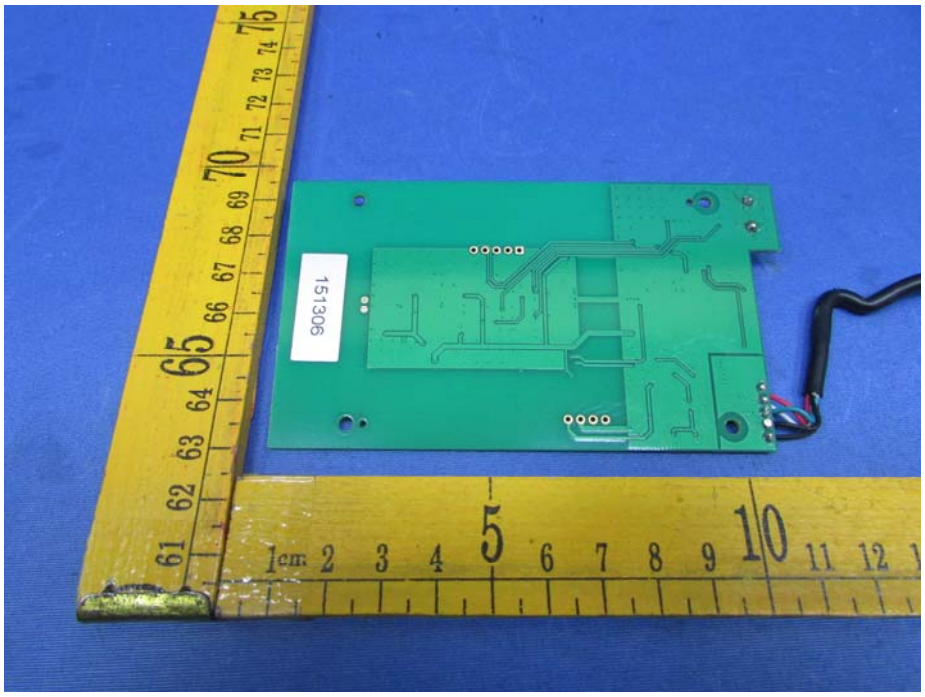

CARD


ROSSLARE

11.2 Model DR-12C - Internal View







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