

## FCC TEST REPORT

### 47 CFR FCC Part 15 Subpart B

<b>FCC ID</b> .....	: <b>OWOMW-RF-L</b>	
<b>Report Reference No.</b> .....	: <b>TRE12070080 R/C:87571</b>	
Compiled by ( position+printed name+signature)...	: File administrators Tim Zhang	<i>Tim Zhang</i>
Supervised by ( position+printed name+signature)...	: Test Engineer Eric Zhang	<i>Eric Zhang</i>
Approved by ( position+printed name+signature)...	: Manager Wenliang Li	<i>Wenliang Li</i>
Date of issue.....	: Sep 28, 2012	
<b>Testing Laboratory Name</b> .....	: <b>Shenzhen Huatongwei International Inspection Co., Ltd</b>	
Address .....	: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China	
<b>Applicant's name</b> .....	: <b>Shenzhen Mingwah Aohan Electronics Technology Co.Ltd</b>	
Address .....	: Room569,Build 202,SHANGBU INDUSTRIAL,HUAQIANG NORTH ROAD,FUTIAN DISTRICT,SHENZHEN,China	
<b>Test specification:</b>		
Standard .....	: <b>47 CFR FCC Part 15 Subpart B - Unintentional Radiators</b> <b>ANSI C63.4: 2009</b>	
TRF Originator.....	: Shenzhen Huatongwei International Inspection CO., Ltd	
Master TRF.....	: Dated 2006-06	
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<b>Test item description</b> .....	: Card Reader	
Trade Mark .....	: /	
Model/Type reference.....	: MW-RF-L	
Listed Models .....	: /	
Operation Frequency.....	: 125KHz	
Result.....	: <b>Positive</b>	

# TEST REPORT

<b>Test Report No. :</b> TRE12070080	Sep 28, 2012 Date of issue
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Equipment under Test : Card Reader

Model /Type : MW-RF-L

Listed Models : /

**Applicant** : **Shenzhen Mingwah Aohan Electronics Technology Co.Ltd**

Address : Room569,Build 202,SHANGBU INDUSTRIAL,HUAQIANG NORTH ROAD,FUTIAN DISTRICT,SHENZHEN,China

**Manufacturer** : **Shenzhen Mingwah Aohan Electronics Technology Co.Ltd**

Address : Room569,Build 202,SHANGBU INDUSTRIAL,HUAQIANG NORTH ROAD,FUTIAN DISTRICT,SHENZHEN,China

<b>Test Result</b> according to the standards on page 4:	<b>Positive</b>
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The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2009](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Aug 20, 2012
Testing commenced on	:	Aug 20, 2012
Testing concluded on	:	Sep 28, 2012

### 2.2. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input type="radio"/> Other (specified in blank below)	

DC 5V

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### 2.3. Short description of the Equipment under Test (EUT)

125kHz (Card Reader (MW-RF-L))

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

### 2.4. EUT operation mode

The EUT has been tested under typical operating condition.

### 2.5. Related Submittal(s) / Grant (s)

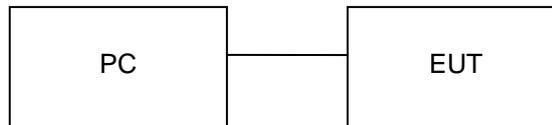
This submittal(s) (test report) is intended for FCC ID: **OWOMW-RF-L** filing to comply with the FCC Part 15, Subpart B Rules.

### 2.6. Modifications

No modifications were implemented to meet testing criteria.

## 2.7. Configuration of Tested System

### Configuration of Tested System



### Equipment Used in Tested System

No.	Equipment	Manufacturer	Model No.	Serial No.	Notes
1	PC	DELL	D610	CN-0D4571-48643-51S-0236	DOC

## 2.8. NOTE

The EUT is a Card Reader, The functions of the EUT listed as below:

	Test Standards	Reference Report
EMC REPORT	FCC PART 15 Subpart C	TRE12070081
EMC REPORT	FCC PART 15 Subpart B	TRE12070080

### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Shenzhen Huatongwei International Inspection Co., Ltd  
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China  
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

#### **3.2. Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

##### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

##### **A2LA-Lab Cert. No. 2243.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

##### **FCC-Registration No.: 662850**

Shenzhen Huatongwei International Inspection 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 662850, Renewal date June. 01, 2012, valid time is until June. 01, 2015.

##### **IC-Registration No.: 5377A**

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

##### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

##### **NEMKO-Aut. No.: ELA125**

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the authorization is valid through July 07, 2013

##### **VCCI**

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2009. Valid time is until Dec. 19, 2012.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2010. Valid time is until May 06, 2013.

## DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2013.

### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

### 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9K-30MHz	3.22 dB	(1)
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.39 dB	(1)

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

**3.5. Equipments Used during the Test**

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde & Schwarz	ESCI	100106	2012/10/27
2	ARTIFICIAL MAINS	Rohde & Schwarz	ESH2-Z5	100028	2012/10/27
3	PULSE LIMITER	Rohde & Schwarz	ESHSZ2	100044	2012/10/27
4	EMI TEST SOFTWARE	Rohde & Schwarz	ES-K1	N/A	2012/10/27

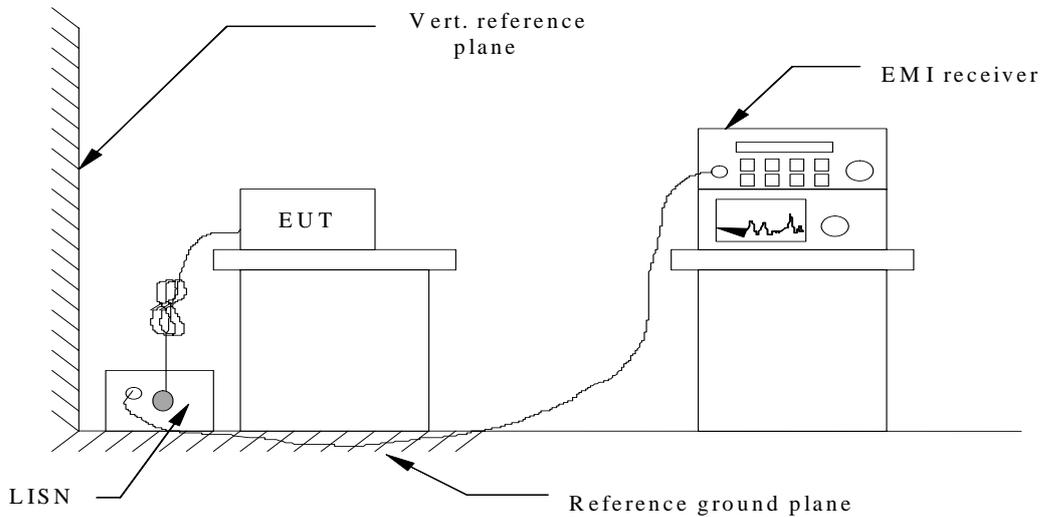
Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde & Schwarz	HL562	100015	2012/10/27
2	EMI TEST RECEIVER	Rohde & Schwarz	ESI 26	100009	2012/10/27
3	RF TEST PANEL	Rohde & Schwarz	TS / RSP	335015/ 0017	2012/10/27
4	TURNTABLE	ETS	2088	2149	2012/10/27
5	ANTENNA MAST	ETS	2075	2346	2012/10/27
6	EMI TEST SOFTWARE	Rohde & Schwarz	ESK1	N/A	2012/10/27
7	HORN ANTENNA	Rohde & Schwarz	HF906	100039	2012/10/27
8	Amplifier	Sonoma	310N	E009-13	2012/10/27
9	JS amplifier	Rohde & Schwarz	JS4-00101800-28-5A	F201504	2012/10/27
10	High pass filter	Compliance Direction systems	BSU-6	34202	2012/10/27
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2012/10/27

The calibration interval was one year.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. Conducted Emissions

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
- 2 Support equipment, if needed, was placed as per ANSI C63.4-2009.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009.
- 4 The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### CONDUCTED POWER LINE EMISSION LIMIT

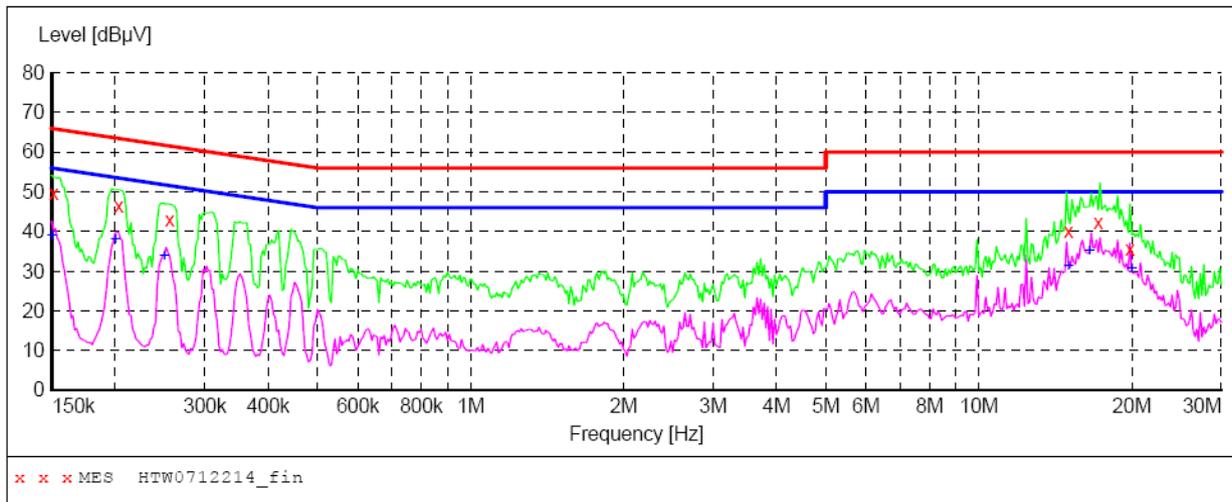
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dBµV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

#### TEST RESULTS

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "HTW0712214\_fin"**

7/13/2012 10:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.151200	49.70	9.8	66	16.2	QP	L1	GND
0.203041	46.40	9.7	64	17.1	QP	L1	GND
0.255820	42.80	9.7	62	18.8	QP	L1	GND
15.006470	40.00	9.7	60	20.0	QP	L1	GND
17.183350	42.30	9.7	60	17.7	QP	L1	GND
19.833408	35.70	9.6	60	24.3	QP	L1	GND

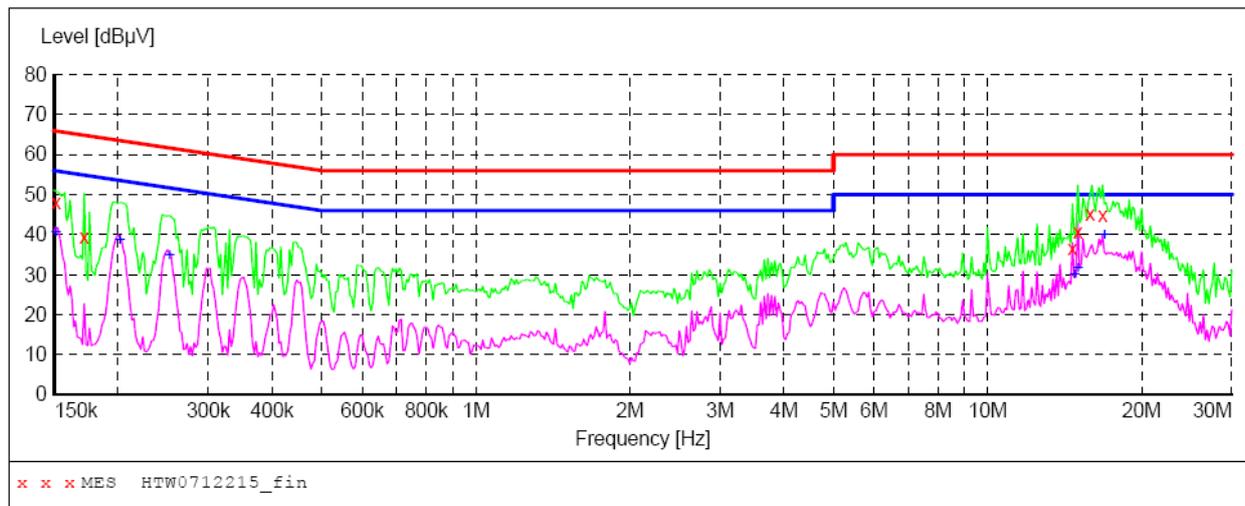
**MEASUREMENT RESULT: "HTW0712214\_fin2"**

7/13/2012 10:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	39.00	9.8	56	17.0	AV	L1	GND
0.199830	38.00	9.7	54	15.6	AV	L1	GND
0.249780	33.90	9.7	52	17.9	AV	L1	GND
15.006470	31.50	9.7	50	18.5	AV	L1	GND
16.512210	35.10	9.7	50	14.9	AV	L1	GND
19.992070	30.80	9.6	50	19.2	AV	L1	GND

**SCAN TABLE: "Voltage (9K-30M) FIN"**

Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "HTW0712215\_fin"**

7/13/2012 10:16AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.151200	48.00	9.8	66	17.9	QP	N	GND
0.171753	39.30	9.8	65	25.6	QP	N	GND
14.652006	36.50	9.7	60	23.5	QP	N	GND
15.006479	40.60	9.7	60	19.4	QP	N	GND
15.867280	45.20	9.7	60	14.8	QP	N	GND
16.777454	44.70	9.7	60	15.3	QP	N	GND

**MEASUREMENT RESULT: "HTW0712215\_fin2"**

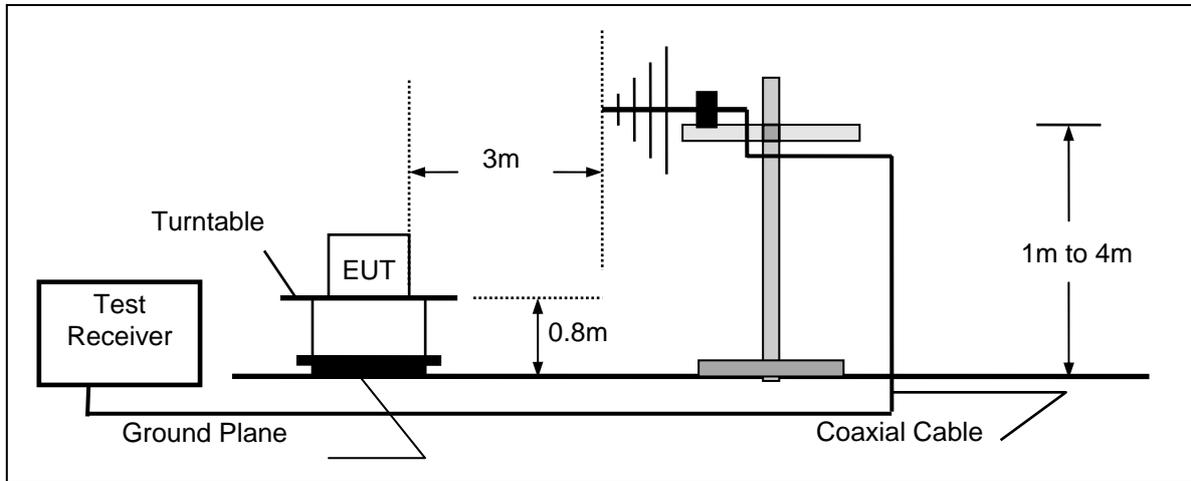
7/13/2012 10:16AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.151200	40.60	9.8	56	15.3	AV	N	GND
0.201430	38.80	9.7	54	14.8	AV	N	GND
0.251780	34.80	9.7	52	16.9	AV	N	GND
14.769220	30.30	9.7	50	19.7	AV	N	GND
15.006479	31.90	9.7	50	18.1	AV	N	GND
16.911674	40.10	9.7	50	9.9	AV	N	GND

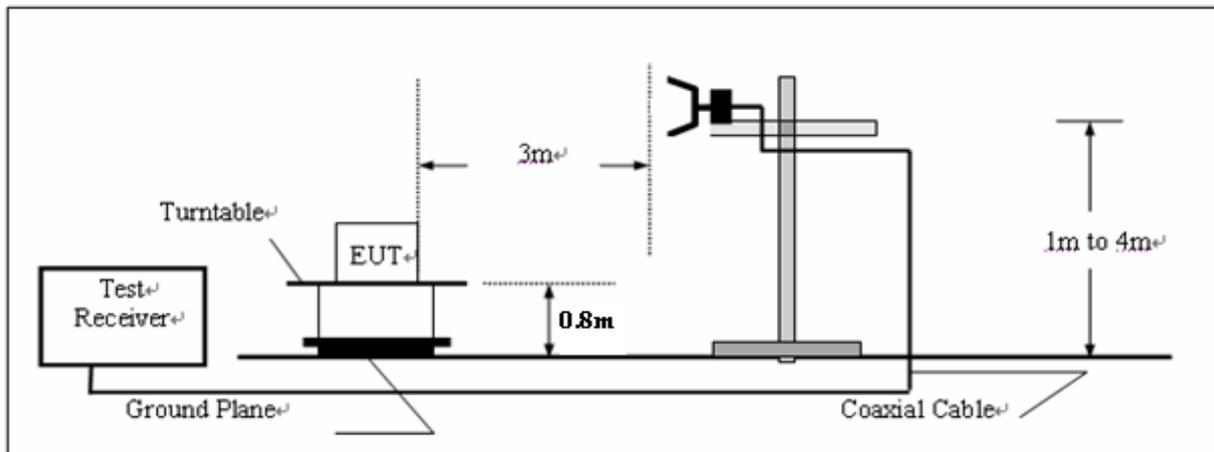
## 4.2. Radiated Emission

### TEST CONFIGURATION

- a) Radiated Emission Test Set-Up, Frequency below 1000MHz



- b) Radiated Emission Test Set-Up, Frequency above 1000MHz



### 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 varied from 1m to 4m to find out the highest emissions.
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.

**FIELD STRENGTH CALCULATION**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dBµV/m)	RA (dBµV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

$$Transd=AF +CL-AG$$

**RADIATION LIMIT**

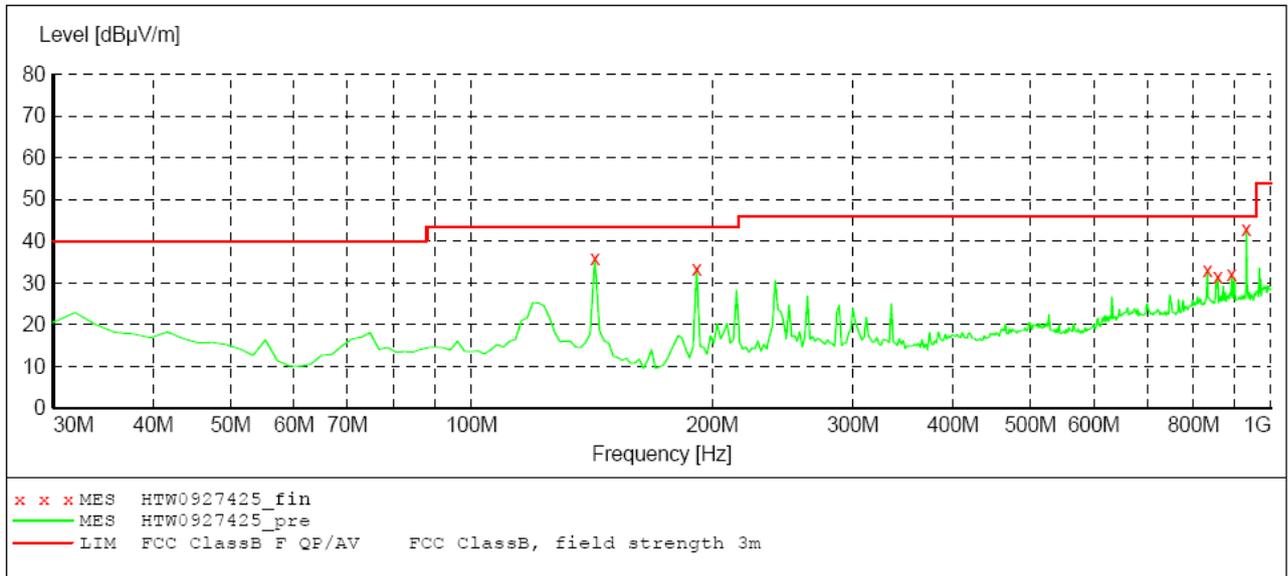
According to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

**TEST RESULTS**

**SCAN TABLE: "test Field (30M-1G) QP"**

Short Description:			Field Strength (30M-1G)			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



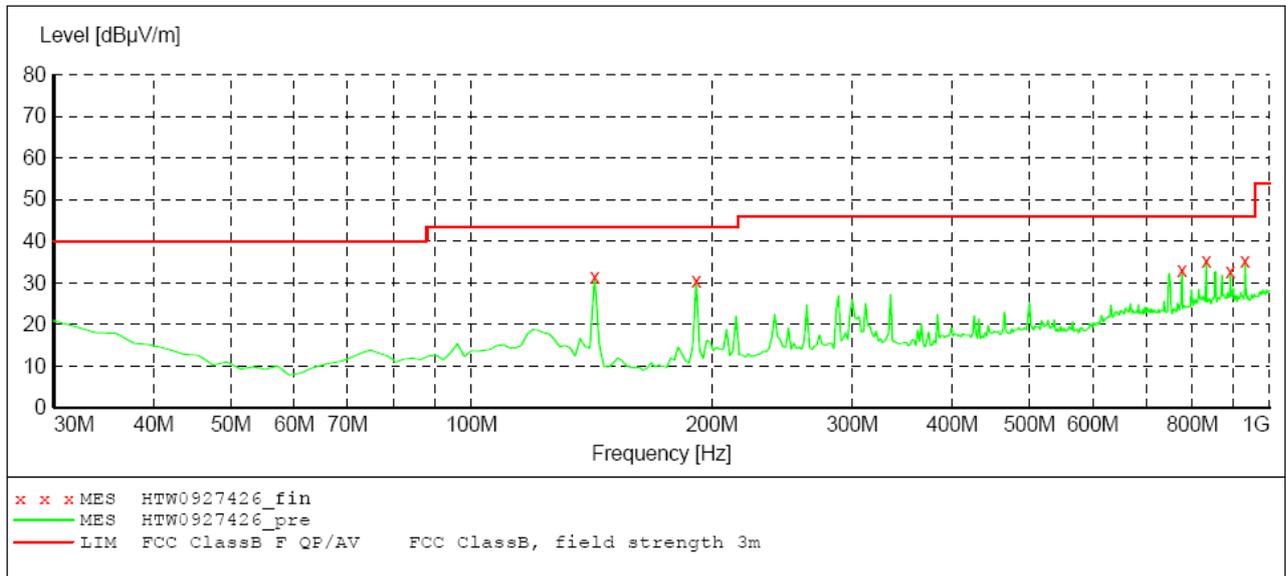
**MEASUREMENT RESULT: "HTW0927425\_fin"**

9/27/2012 10:24PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
142.745491	36.00	-22.0	43.5	7.5	QP	100.0	27.00	VERTICAL
191.342685	33.50	-22.3	43.5	10.0	QP	100.0	264.00	VERTICAL
832.825651	33.10	-7.7	46.0	12.9	QP	100.0	277.00	VERTICAL
858.096192	31.60	-7.5	46.0	14.4	QP	100.0	0.00	VERTICAL
893.086172	32.00	-6.8	46.0	14.0	QP	100.0	31.00	VERTICAL
931.963928	42.90	-7.3	46.0	3.1	QP	100.0	0.00	VERTICAL

**SCAN TABLE: "test Field (30M-1G) QP"**

Short Description:		Field Strength (30M-1G)				
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



**MEASUREMENT RESULT: "HTW0927426\_fin"**

9/27/2012 10:27PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
142.745491	31.50	-22.0	43.5	12.0	QP	300.0	29.00	HORIZONTAL
191.342685	30.50	-22.3	43.5	13.0	QP	300.0	222.00	HORIZONTAL
776.452906	33.10	-9.5	46.0	12.9	QP	100.0	197.00	HORIZONTAL
832.825651	35.10	-7.7	46.0	10.9	QP	100.0	207.00	HORIZONTAL
893.086172	32.80	-6.8	46.0	13.2	QP	100.0	207.00	HORIZONTAL
931.963928	35.10	-7.3	46.0	10.9	QP	100.0	222.00	HORIZONTAL

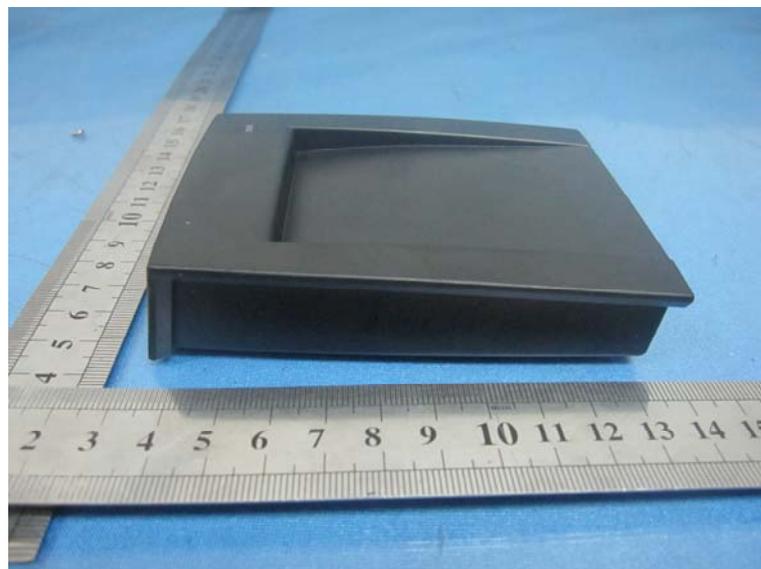
## 5. Test Setup Photos of the EUT



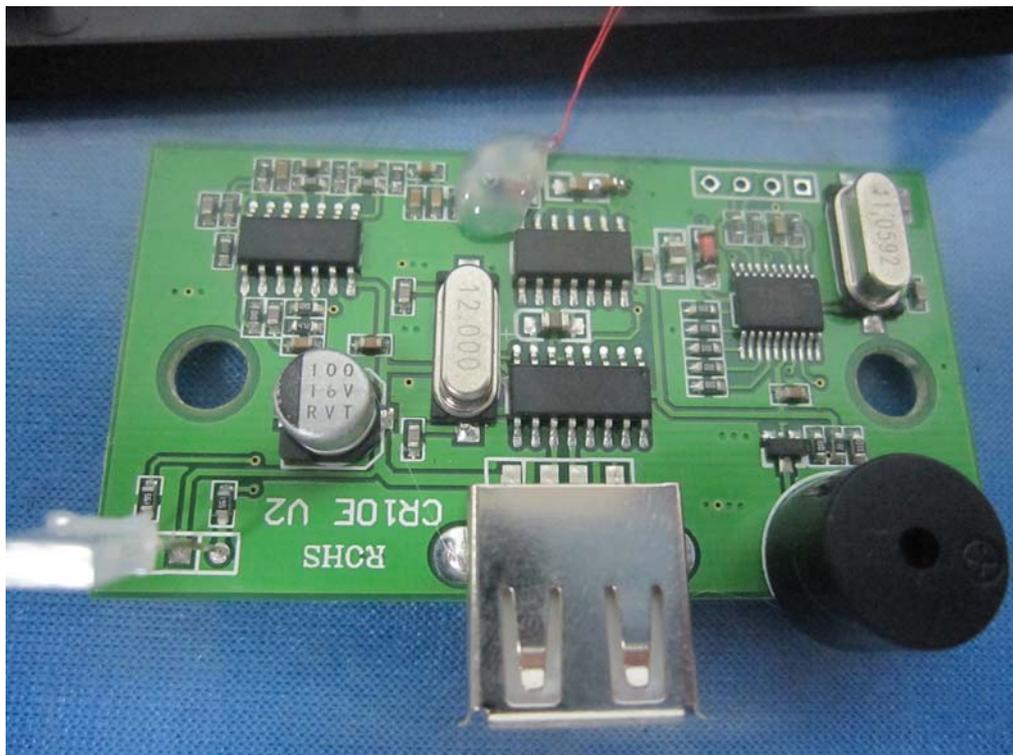
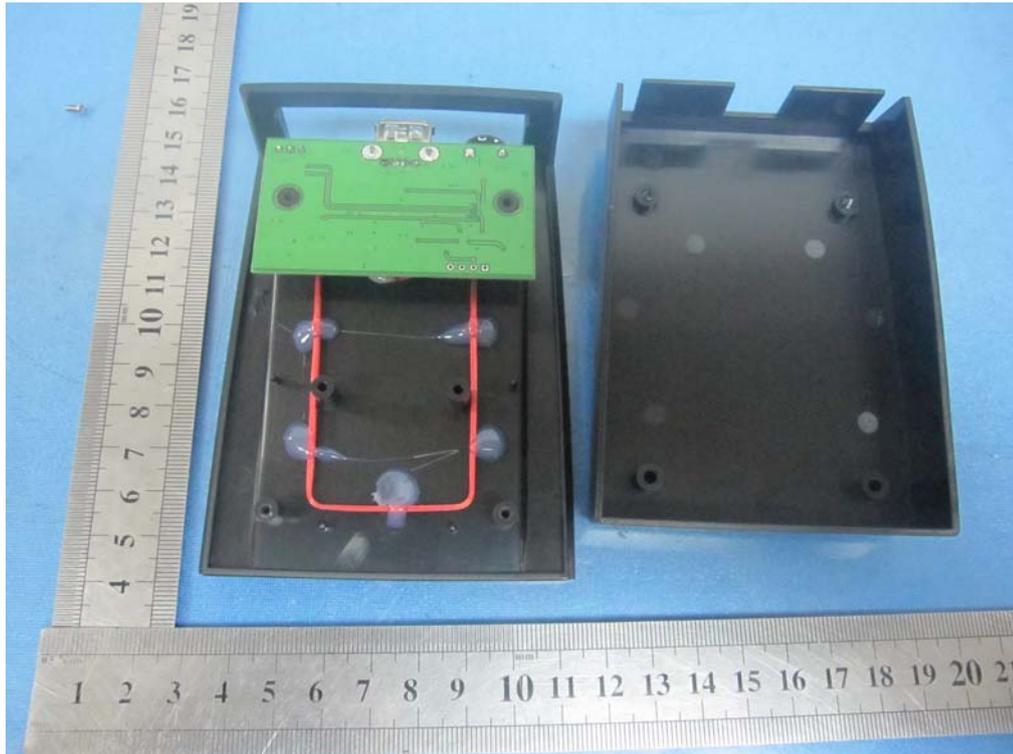
## 6. External and internal Photos of the EUT

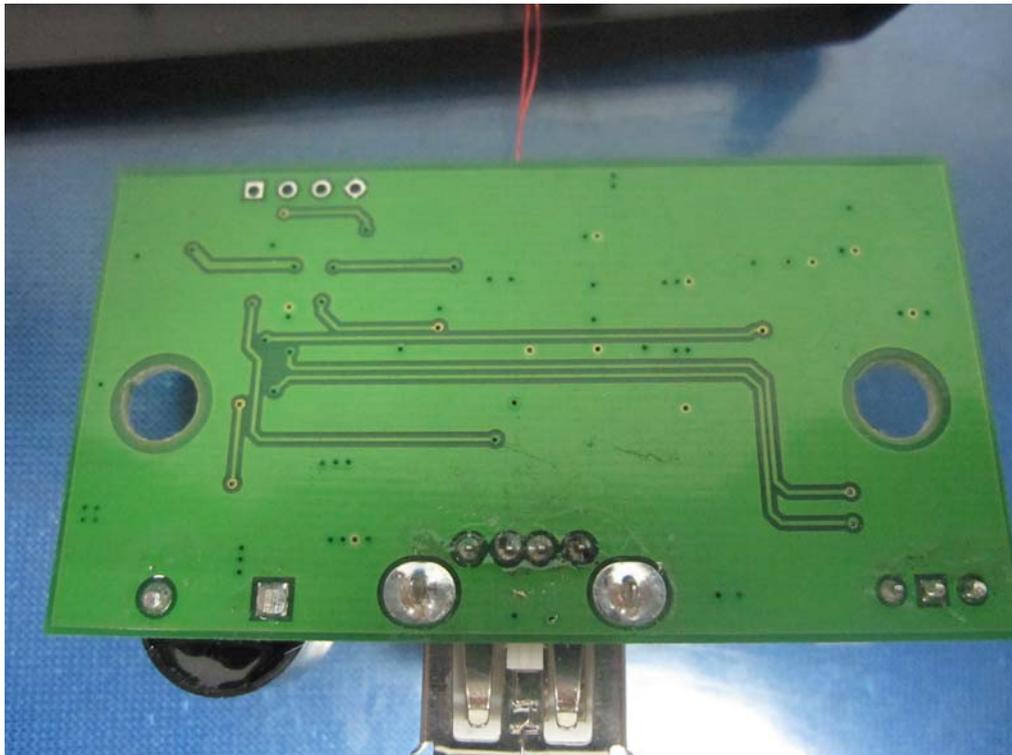
### External Photos





The internal photos of EUT





.....End of Report.....