



(2007)国认监认字(002)号



TESTING
CNAS L0095



DAT-P-240/06-00

Test Report No.:
FCC2008-0003

TEST REPORT

EUT : **Wireless Remote Control**
MODEL/TYPE : **HW-2011, HW-1011**
CLIENT : **MOJO OUTDOORS**
Classification of Test : **COMMISSION TEST**

**Guangzhou Testing & Inspection Institute
for Household Electrical Appliances**
广州日用电器检测所 GTIHEA

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GTIHEA

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.

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1. General Product Information

This report covers the models: HW-1011 and HW-2011. These models have the same construction and electrical circuit. The difference between them is only the number of button. The model HW2011 has two buttons, but the model HW-1011 has only one, which has no influence on the EUT's EMI performance. All tests were performed on the model HW-2011.

1.1 Product Function

Refer to the operation instruction.

1.2 Ratings and System Details

Power supply	12V
Frequency	315 ± 0.15 MHz
Modulation type	Pulse modulation
Power wire	None
Interconnecting wires	None
Antenna type	Telescopic antenna
Classification	Intentional Radiator

1.3 Independent Operation Modes

- ◆ transmission
- ◆ stand by

1.4 Submitted Documents

Operating Instructions and Installation Manual
Structural Parts
Rating Label
Wiring Diagram
Construction Drawing
Photographs of EUT
Material Bill (Parts List)

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by EMC testing Lab. of Guangzhou Vkan Certification and Testing Institute (CVC-former GTIHEA) .

Add : 204, Xingang West Road, Guangzhou, 510300, P. R. China
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The CVC EMC testing laboratory has been accredited, recognized or certified by the following organizations:

✧ CNAS (Lab. No: L0095)

The CVC EMC testing laboratory has been accredited by CNAS (China National Accreditation Service for Conformity Assessment) to ISO/IEC 17025:2005 for the competence in the field of EMC testing.

✧ DAR (Registration No: DAT-P-240/06-00)

The CVC EMC testing laboratory has been accredited by the by the DAR (German Accreditation Council) in the field of EMC testing since 2006.

✧ FCC (Registration No: 0004361416)

The CVC EMC testing laboratory has been registered by FCC since 2001.

✧ PSE

The CVC EMC testing laboratory has been Authorized by Japanese Government and CQC as PSE testing laboratory since 2007.

✧ VDE

The CVC EMC testing laboratory has been authorized by VDE as a TDAP Lab since 2004.

✧ TUV

The CVC EMC testing laboratory has been authorized by TÜV Rheinland of Germany since 1998.

✧ NEMKO

The CVC EMC testing laboratory has been authorized by Nemko of Norway since 1997.

2.2 Description of Non-standard Method and Deviations

None.

2.3 List of Test and Measurement Instruments

Refer to **Appendix A**.

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2 Physical Configuration For Testing

Refer to relative descriptions in this test report.

3.3 Test Operation Mode and Test Software

None.

3.4 Peripheral and Auxiliary Equipment

None.

3.5 Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

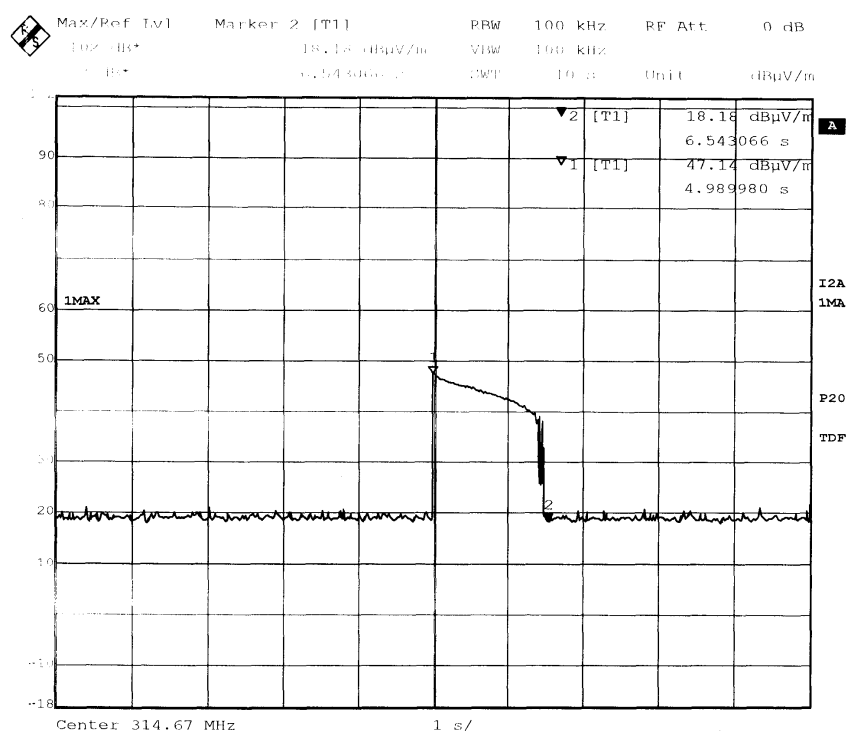
Perform Electromagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4:2003 for FCC Certification.

Test Standards and Results Summary					
Test	Test Requirement	Test Method	Test Result		
			Pass	Failed	N/A
Conducted Emissions on AC, (150 KHz to 30MHz)	FCC 47 CFR 15.207	ANSI C63.4:2003	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Radiated Emissions, (30MHz to 4GHz)	FCC 47 CFR 15.209	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47 CFR 15.231(b)	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth	FCC 47 CFR 15.231(c)	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

According to FCC 47CFR 15.231(a), the following conditions shall be met to comply with the provisions for this periodic operation:

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission with 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition
- (5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.



Remark: the transmitting time is $6.543066 - 4.989980 = 1.553086s$

The EUT is a manually operated, but not periodic transmitter. It employs a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. So, the EUT is complied with FCC Part 15,231(a) (1).

4.1 Conducted emission (150MHz ~ 30MHz)

RESULT : N/A

Remark:

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.

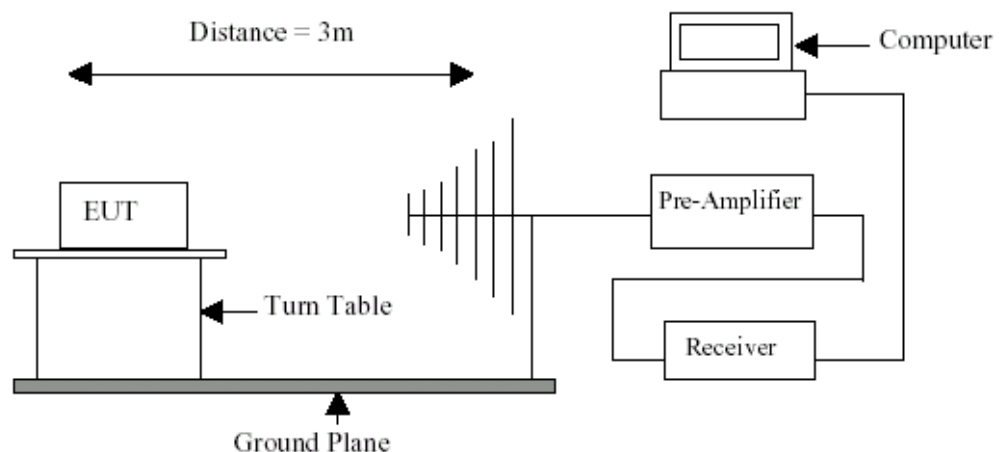
4.2 Radiated Emission (30MHz~4GHz)

RESULT : Pass

Test Method

Test Requirement: FCC Part 15
Test Procedure: ANSI C63.4:2003
Frequency Range: 30MHz to 4GHz
Limits: FCC PART 15, Subpart C, Section 15.209
FCC PART 15, Subpart C, Section 15.231(b)
Test Site : 3m Anechoic Chamber (Registration Number: 0004361416)
Detector : Peak Detector for pre-scan, AV for final result (30MHz to 4GHz).

The EUT was placed on a wooden turntable which could rotate from 0 °to 360 °, 0.8m high above the ground, at a distance of 3m in anechoic chamber, from the receiving broadband antenna which was mounted on the antenna tower. The scan graphs were measured with the antenna at 1m high, and the turn table at 0°, but the final measurement results were measured with antenna moved up and down between 1m to 4m, and the turn table rotated from 0° to 360°, the maximum reading was recorded as final QP reading.



Test Data

An initial pre-scan was performed in the 3m semi-anechoic chamber using the spectrum analyzer in peak detection mode. AV measurements were conducted based on the Peak sweep grasp.

Transducer

Broadband antenna, 3141, 3m, 26MHz~2GHz

Freq. (MHz)	3141 (3m) Value (dB)	Cable Value (dB)	Total Value (dB)
26	12.0	0.30	12.30
30	8.7	0.35	9.05
60	6.7	0.70	7.40
100	9.8	1.14	10.94
150	9.4	1.38	10.78
200	10.1	1.62	11.72
250	12.1	1.96	14.06
300	14.5	1.96	16.46
350	15.7	2.36	18.06
400	16.1	2.68	18.78
450	16.9	2.79	19.69
500	17.7	2.87	20.57
550	18.8	3.21	22.01
600	19.9	3.55	23.45
650	20.5	3.58	24.08
700	21.8	3.54	25.34
750	21.5	3.89	25.39
800	22.1	4.11	26.21
850	22.4	4.06	26.46
900	22.9	4.20	27.10
950	23.0	4.50	27.50
1000	24.1	4.56	28.66
1300	26.2	5.00	31.20
1700	27.2	6.00	33.20
2000	30.3	7.00	37.30

Horn antenna, 3115, 3m, 1GHz~5GHz

Freq. (MHz)	3115 (3m) Value (dB)	Cable Value (dB)	Total Value (dB)
1000	4.36	1.00	5.36
1500	5.71	1.15	6.86
2000	9.33	1.30	10.63
3000	10.62	1.50	12.12
4000	12.32	1.80	14.12
5000	11.86	1.90	13.76

Note for Transducer Factor:

Correction Factor included Antenna Factor and Cable Attenuation. All factors were inputted into the ESI 26 testing receiver, for frequencies between the known sampling points the transducer factor is approximated using modified spline interpolation by software of ESI 26. So, the readings displayed in the graphs are the final testing results we needed without any calculation.

Test Conditions

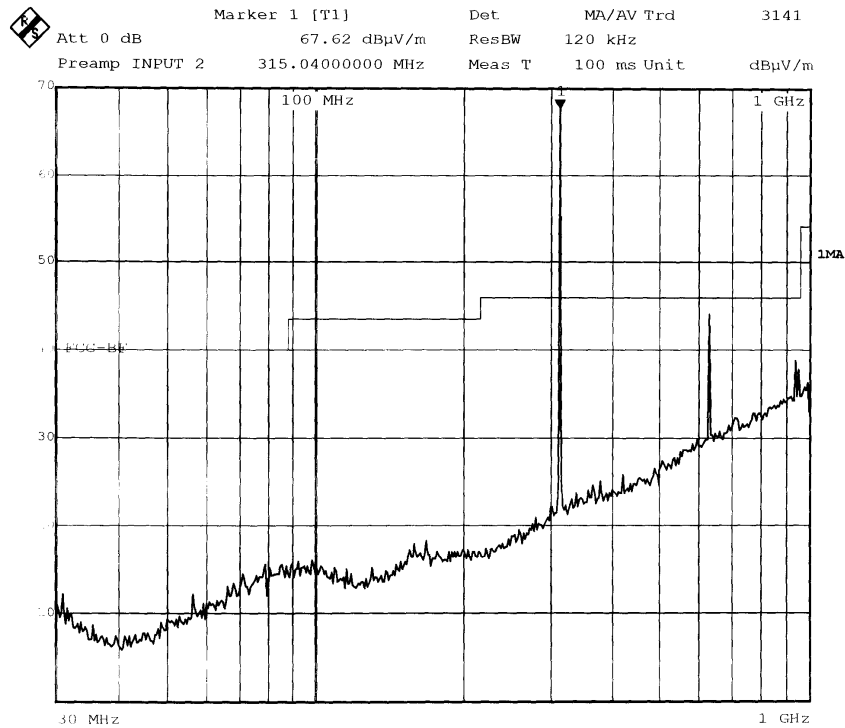
Ambient Temperature : 25 °C/ 25 °C (Before Test /After Test);
 Relative Humidity : 50 %/ 50 % (Before Test /After Test) ;
 Power Supply : 12V DC ;
 Operating Mode of the EUT : Transmission .

Radiated Emissions				
Freq. (MHz)	Antenna Polarity (V/H)	PK level (dBμV/m)	AV level (dBμV/m)	Limits (dBμV/m)
314.960	V	68.0	56.4	75.6
630.120	V	52.0	42.6	55.6
945.160	V	38.6	27.1	55.6
315.040	H	67.6	58.6	75.6
630.120	H	44.1	34.3	55.6
945.160	H	41.1	30.3	55.6
/	/	/		/
/	/	/		/

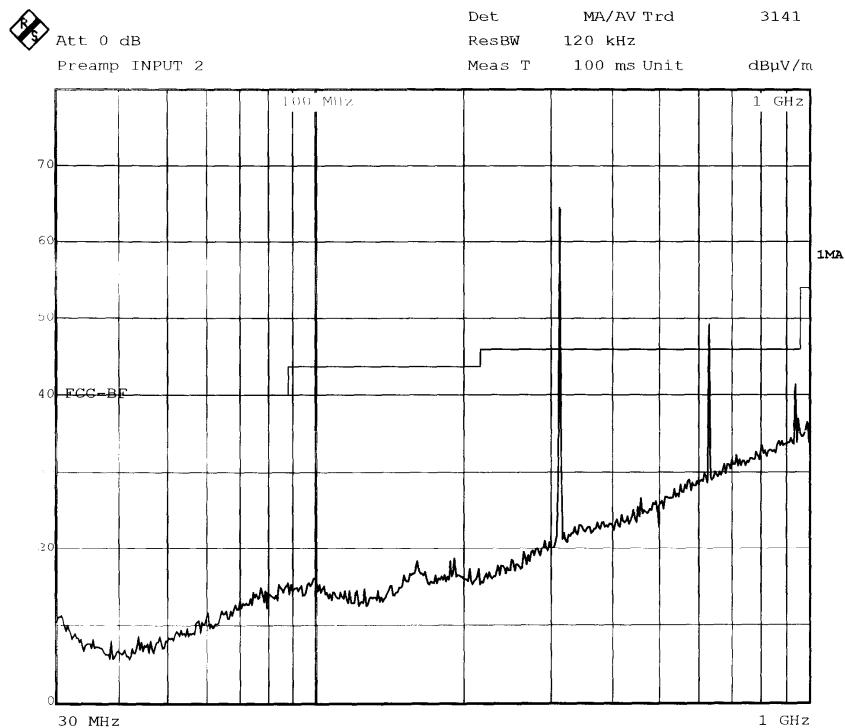
Remark:

- Calculated measurement uncertainty is 4.9 from 30MHz to 1GHz.
- Field strength of Fundamental is $41.667 \times 315-7083.3333=6041.67 \mu \text{ V/m}$.
- For handheld devices, the EUT was tested on three orthogonal axis. The worst-case emission level is recorded in the table and following Graph.
- For battery powered equipment, the device was test with a fresh battery per FCC part 15.31(e) requirement.

Scan Graph and Scan Setting

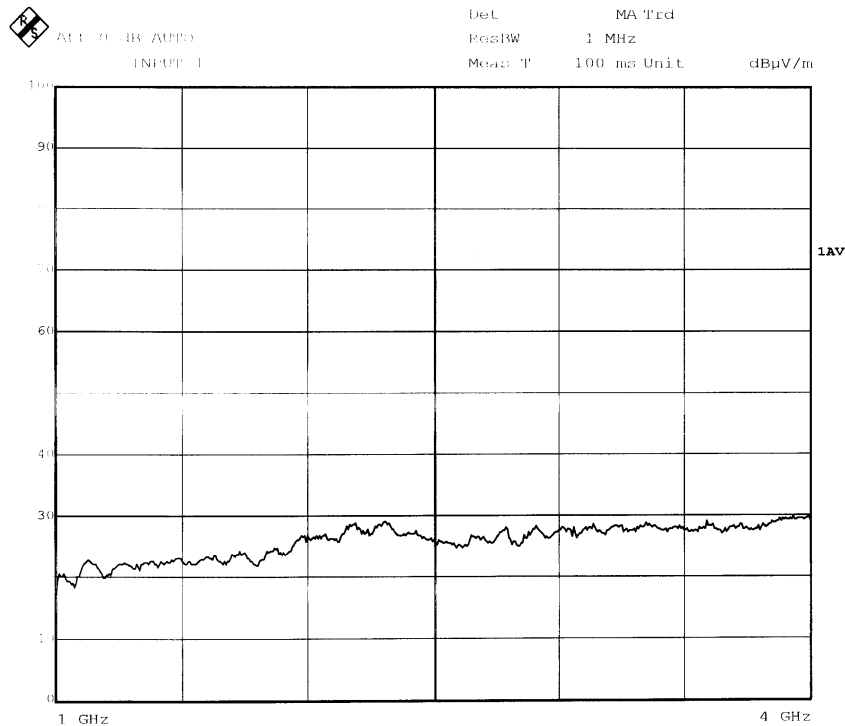


Transmission (Vertical)

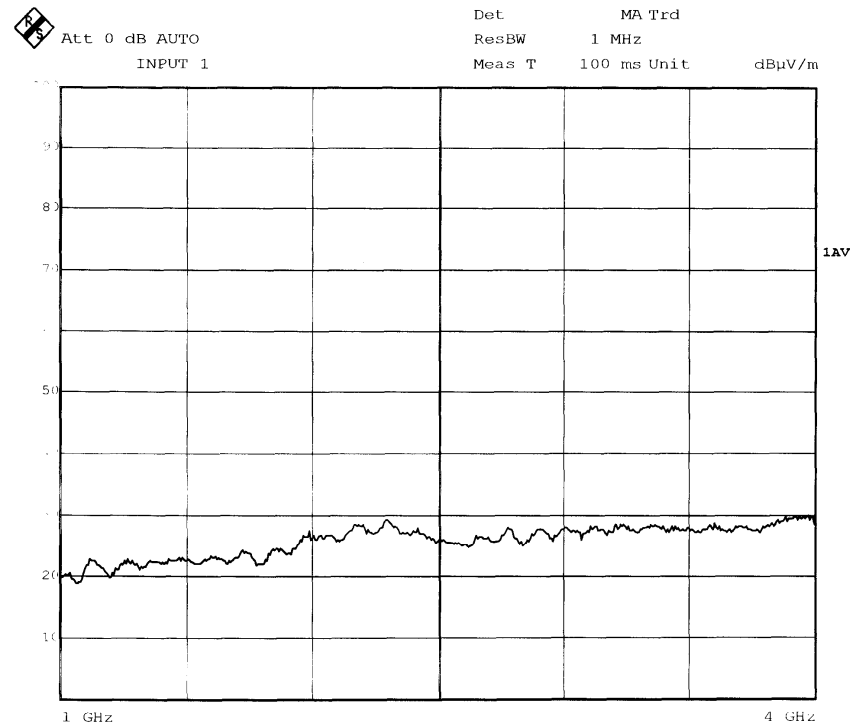


Transmission (Horizontal)

Scan Graph and Scan Setting



Transmission (Horizontal)



Transmission (Vertical)

4.3 20dB Bandwidth

RESULT : **Pass**

Test Method

Test Requirement : FCC Part 15
Test Procedure : ANSI C63.4:2003
Limits : FCC PART 15, Subpart C, Section 15.231(c)
Test Site : 3m Anechoic Chamber (Registration Number: 0004361416)

Test Method

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test setup:

As test setup of clause 4.2 in this test report.

Results:

Test Conditions:

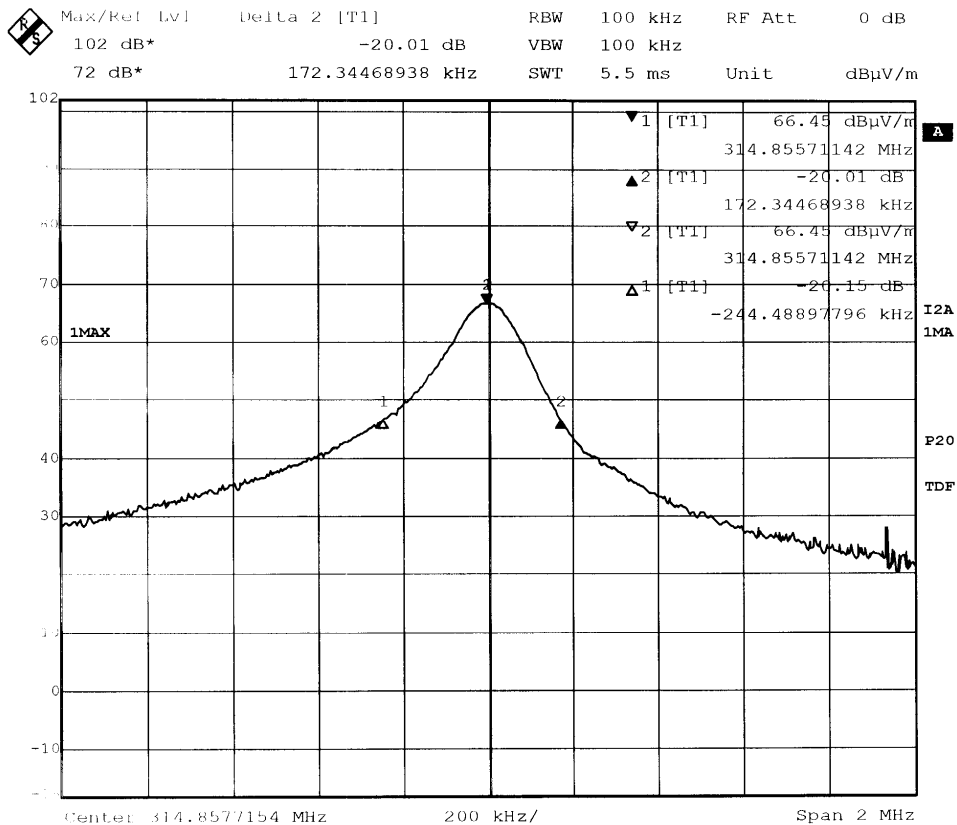
Ambient Temperature : 25 °C / 25 °C (Before Test /After Test);
Relative Humidity : 50 %/ 50 % (Before Test /After Test) ;
Power Supply : 12V DC ;
Operating Mode of the EUT : Transmission .

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [kHz]	Conclusion
315.0	416.8	787.5	Pass

Remark:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 800MHz. $315000.0 \text{ kHz} \times 0.25\% = 787.5 \text{ kHz}$

Scan Graph and Scan Settings



Remark:

The 20dB Bandwidth of the Transmitter is $172.345 + 244.489 = 416.82$ kHz.

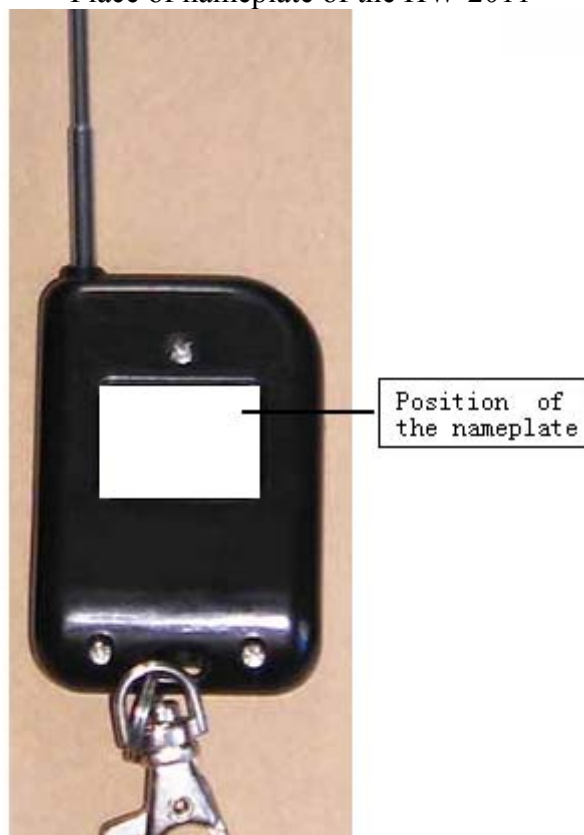
5. Photographs & Nameplates of the EUT

5.1 Nameplate:

Nameplate of the HW-2011



Place of nameplate of the HW-2011



5.2 Outlook of the EUT:

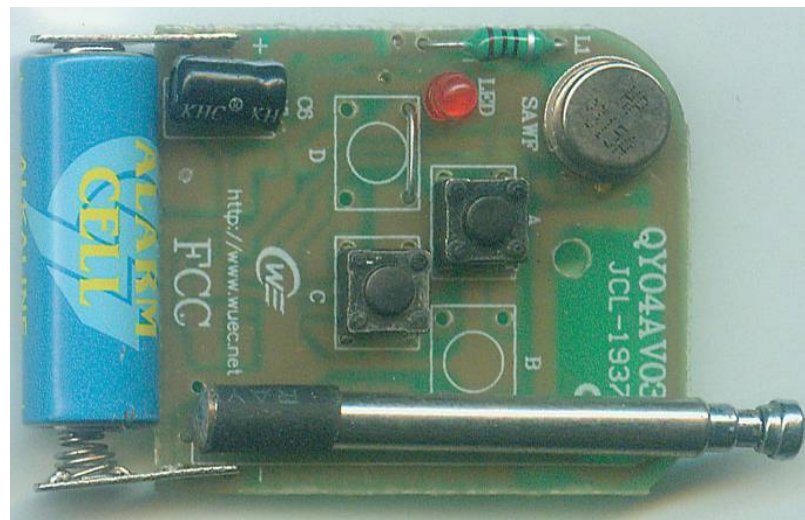


Front View of the Transmitters

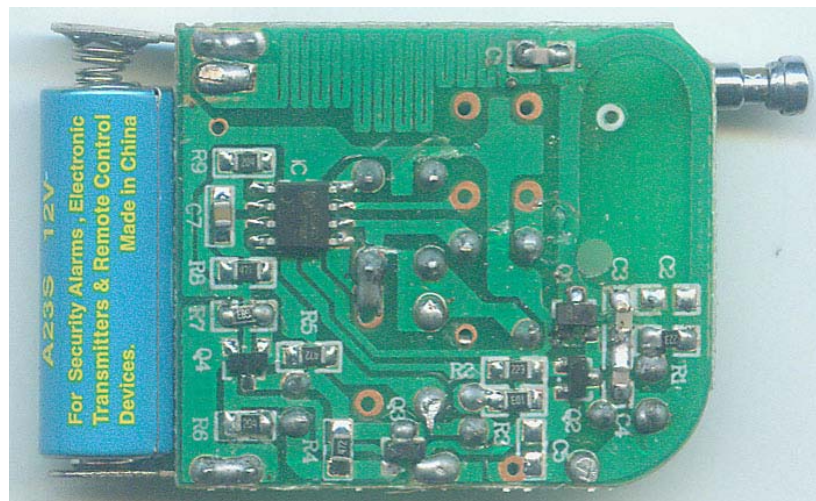


Rear View of the Transmitters

5.3 Structure of internal wires:

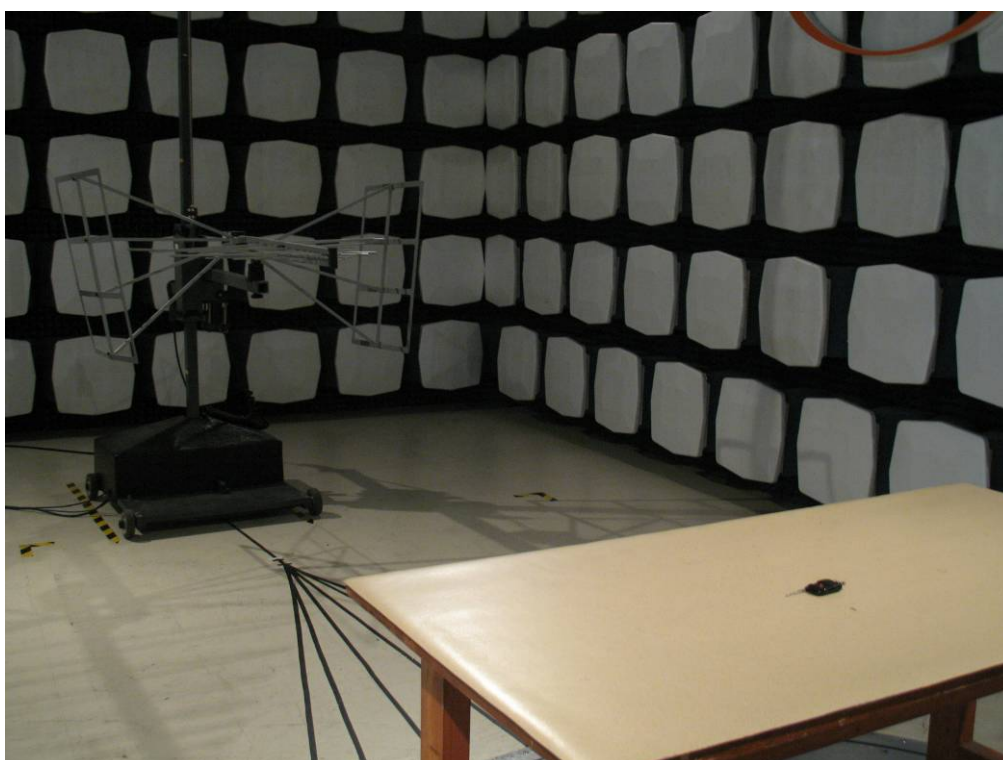
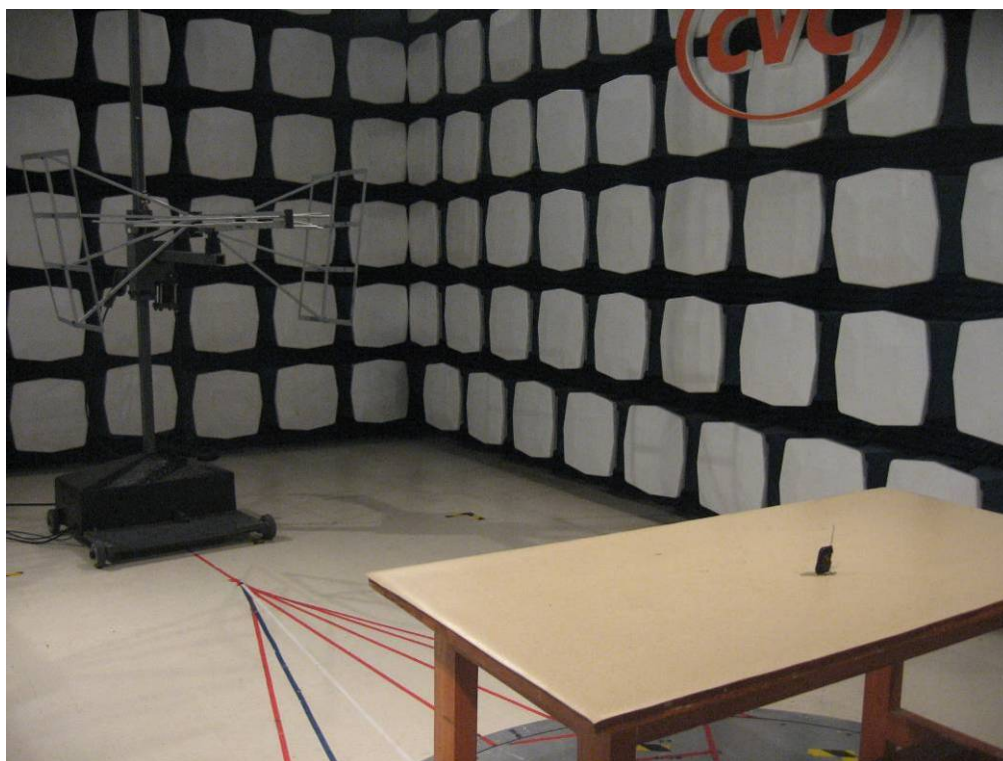


Front View of the internal wires

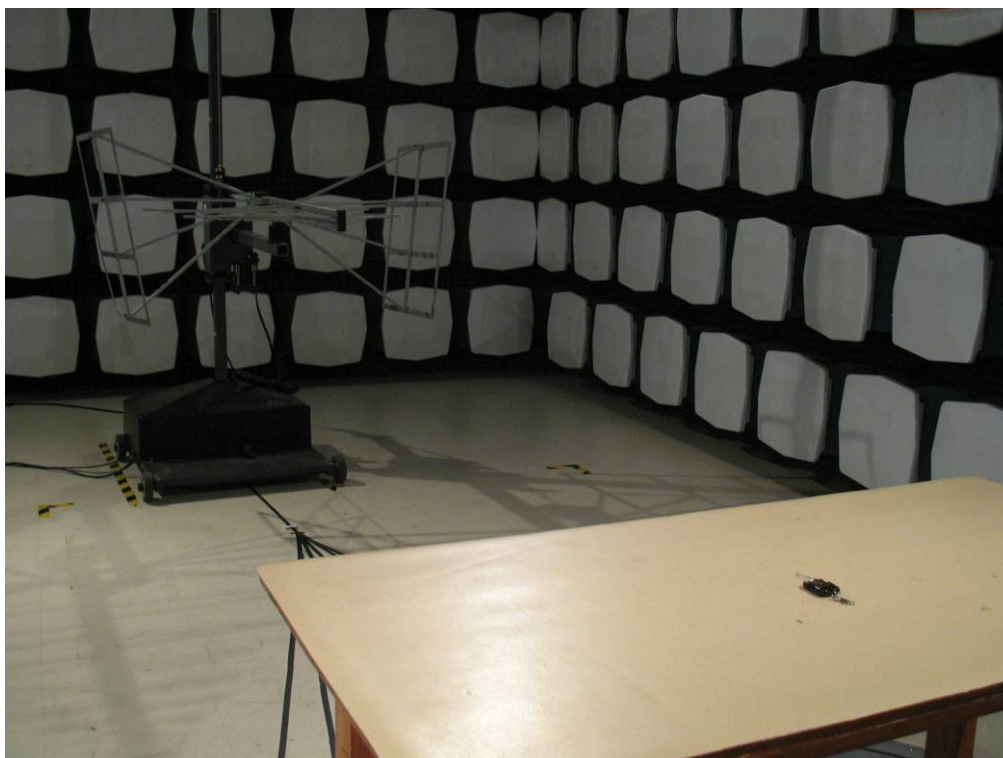


Rear View of the internal wires

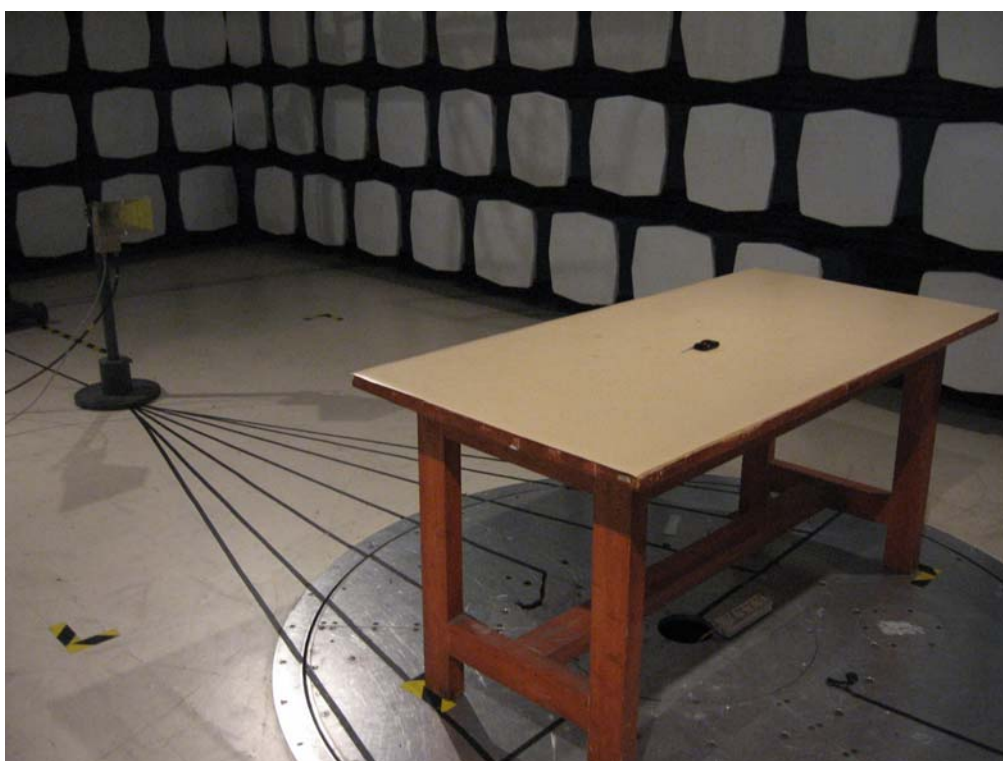
6. Photograph of the test setup



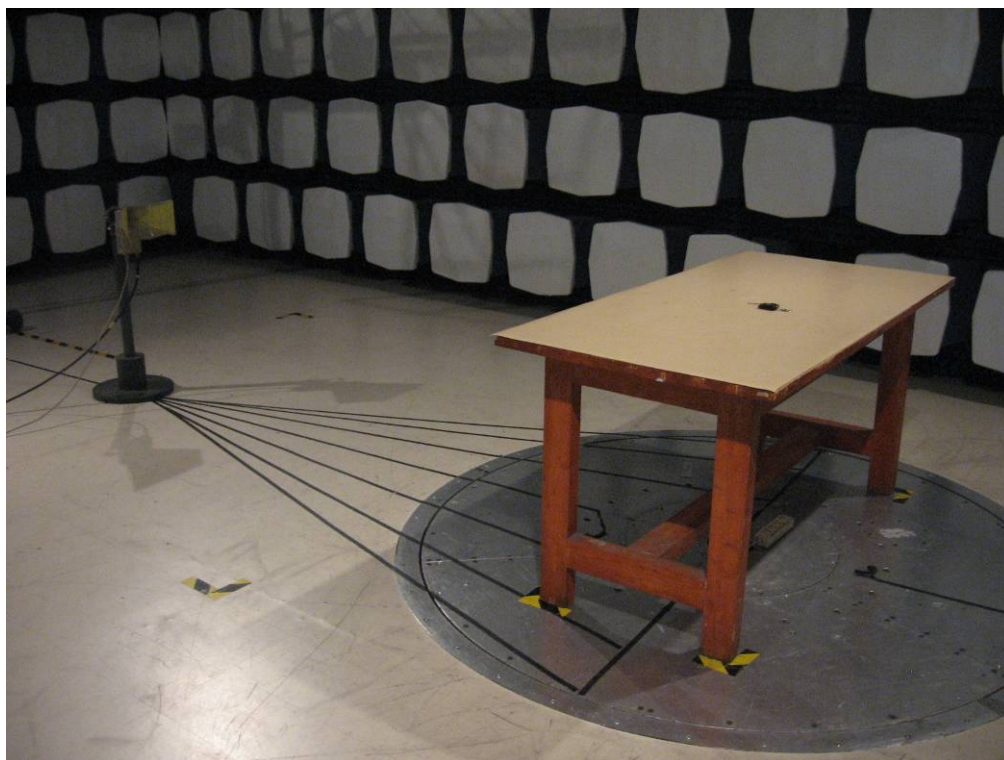
Radiated Emission (30MHz~1GHz)&
20dB Bandwidth



Radiated Emission (30MHz~1GHz)&
20dB Bandwidth



Radiated Emission(1GHz~4GHz)



Radiated Emission(1GHz~4GHz)

Appendix A

No.	Test Equipment	Type/Model	Serial No.	Manufacturer	Cal. Validity	used
1	EMI Test Receiver	ESI26	EMI Test Receiver	R&S	2010.02.12	√
2	EMI Test Receiver	ESS	EMI Test Receiver	R&S	2009.09.11	--
3	EMI Test Receiver	ESCS30	EMI Test Receiver	R&S	2010.03.12	--
4	LISN	ESH3-Z5	LISN	R&S	2009.09.11	--
5	LISN	ESH2-Z5	LISN	R&S	2009.09.11	--
6	LISN	ESH3-Z5	LISN	R&S	2009.09.11	--
7	Biconilog Antenna	CBL6140A	3141	EMCO	2009.07.23	√
8	Waveguide Horn	3115	0002-6038	EMCO	2009.07.23	√