(2006)国认监认字(002)号

2006002171A

检 测
CNAS L0095

Test Report No.:
FCC2007-0003-1/2

TEST REPORT

EUT	:	**Sensor transmitter**
MODEL/TYPE	:	**I**
CLIENT	:	**FOSHAN SHUNDE ADVANTE ELECTRON LTD.**
FCC ID	:	**Q2I-IPIRTX**
Classification of Test	:	**COMMISSION TEST**

Guangzhou Testing & Inspection Institute for Household Electrical Appliances

广州日用电器检测所 GTIHEA

国家日用电器质量监督检验中心

Add.: 204 Xingang West Road Guangzhou 510302 P.R. China
Telephone: 86-20-84451692 Fax: 86-20-84183160
E-mail: EMC@ GTIHEA.COM

Client	**Name:** FOSHAN SHUNDE ADVANTE ELECTRON LTD. **Address:** Jiang Cun Industrial Area, Leliu, Shunde, Foshan, Guangdong, P. R. China
Manufacturer	**Name:** FOSHAN SHUNDE ADVANTE ELECTRON LTD. **Address:** Jiang Cun Industrial Area, Leliu, Shunde, Foshan, Guangdong, P. R. China
Equipment under Test	**Name** : Sensor transmitter **Model/ type** : I **FCC ID** : Q2I-IPIRTX **Trade mark** : Advante **Serial no.** : — **Sampling** : —

Date of Receipt.	**2007.01.15**	Date of Testing	**2007.01.15-2007.03.22**

Test Specification	**Test Result**
FCC PART 15 Subpart C, 2006	**PASS**

Evaluation of Test Result	This device complies with the requirements of Federal Communications Commission (FCC) Rules and Regulations Part 15. **Issue Date: March 22, 2007**

Tested by:	Reviewed by:	Approved by:
Zeng Bo	Wang Xiaoyan	
Name Signature	Name Signature	Name Signature

Other Aspects:

NONE

Abbreviations: OK, Pass = passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

Contents

1. General Product Information

1.1 Product Function

Refer to the operation instruction.

1.2 Ratings and System Details

Power supply	4.5VDC
Max Load	/
Frequency	315±0.15MHz
Modulation type	Pulse modulation
Power wire	NONE
Interconnecting wires	NONE
Antenna type	Internal permanently attached antenna
Classification	Intentional radiator

1.3 Independent Operation Modes

The basic operation modes are:

1. Transmission
2. Stand by

1.4 Submitted Documents

Operating Instructions and Installation Manual
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 Testing & Inspection Institute for Household Electric Appliances.

Add. : 204 Xingang West Road Guangzhou 510302 P.R. China
Telephone : 86-20-84451692
Fax : 86-20-84183160

The EMC testing laboratory has been recognized by China National Commission for Laboratory Assessment, and authorized by Nemko of Norway since 1997(Aut. No. ELA139), and authorized by TüV Rheinland of Germany since 1998(Aut. No. 9868976-1216), and registered by FCC since 2001(Registered No. 102430).

2.2 Description of Non-standard Method and Deviations

The testing and measurement method used in this report are all the standard method applied, no any non-standard method and deviations from the used standard were used.

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

Refer to **Test Setup.**

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to Achieve EMC Compliance

None.

4. Emission test results (intentional radiator)

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 Condition	Test Requirement	Test Method	Test Result		
			Pass	Failed	N/A
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	☐	☐	☒
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	☒	☐	☐
Ceasing transmission within 5 seconds after activation	FCC 47CFR 15.231(a)(2)	ANSI C63.4:2003	☒	☐	☐
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231(b)	ANSI C63.4:2003	☒	☐	☐
20dB Bandwidth	FCC 47CFR 15.231I	ANSI C63.4:2003	☒	☐	☐

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 within 5 seconds after activation.

4.1 Conducted emission (0.15MHz~30MHz)

RESULT : N/A

Remark:

The appliance is not connected to the supply main, so the test is not applicable.

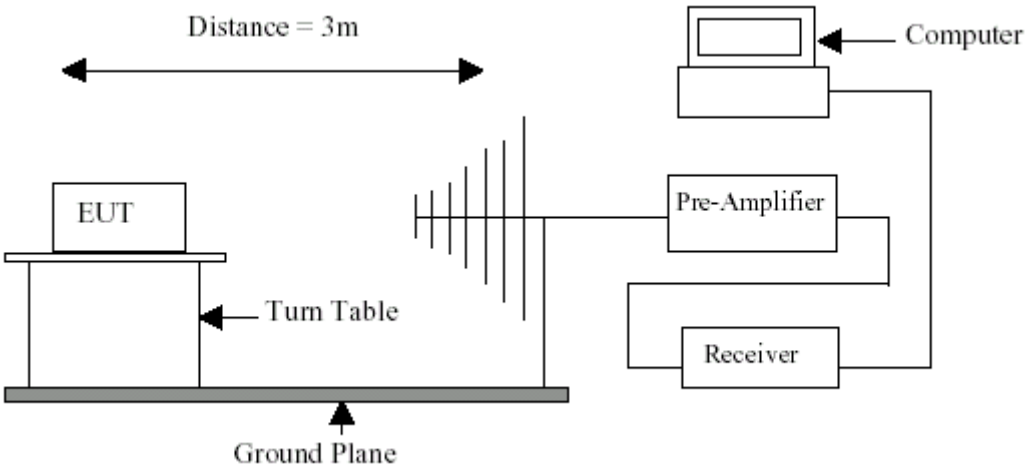
4.2 Radiated emission (Above30 MHz)

RESULT	:	Pass
Test procedure	:	ANSI C63.4 : 2003
Frequency range	:	30 MHz ~ 5GHz
Limits	:	FCC PART 15, Subpart C, Section 15.209 FCC PART 15, Subpart C, Section 15.231(a)(2) FCC PART 15, Subpart C, Section 15.231(b)
Test Site	:	3m Anechoic Chamber (Registration Number: 102430)

Test Method:

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. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results below.

Test Setup:



Transducer (partial)

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

3m, 1GHz-18GHz

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
6000	13.06	2.10	15.16
7000	14.58	2.20	16.78
8000	14.23	2.55	18.88
9000	17.98	2.70	20.68
10000	17.58	3.10	21.85
11000	18.75	3.30	22.05
12000	18.71	3.40	22.11
13000	19.81	3.50	23.31
14000	20.91	3.60	24.51
15000	19.71	3.70	23.41
16000	19.51	3.80	23.31
17000	23.81	3.90	27.71
18000	28.21	4.00	32.21

Note: Correction Factor included Antenna Factor and Cable Attenuation.

(1). Radiated Emissions limits, general requirement [FCC 47 CFR 15.209]

Frequency Range. (MHz)	Field Strength (μV/m) Average detector	Field Strength (μV/m) Peak detector	Distance (m)
30-88	100	1000	3
88-216	150	1500	3
216-960	200	2000	3
Above 960	500	5000	3

(2). Radiated Emissions limits, additional provisions [FCC 47 CFR 15.231(b)]:

Frequency Range. (MHz)	Field Strength of Fundamental (μV/m)	Field Strength of Spurious Emissions (μV/m)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

Note: ** linear interpolations

Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths is as follows: for315MHz, μV/m at 3 meters = 41.6667×(F) – 7083.3333 =6041.67(μV/m). The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits stricter field strength.

The field strength of emissions appearing within restricted bands of operation shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

Results:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 4.5V DC ;
Operating Mode of the EUT : Transmission.

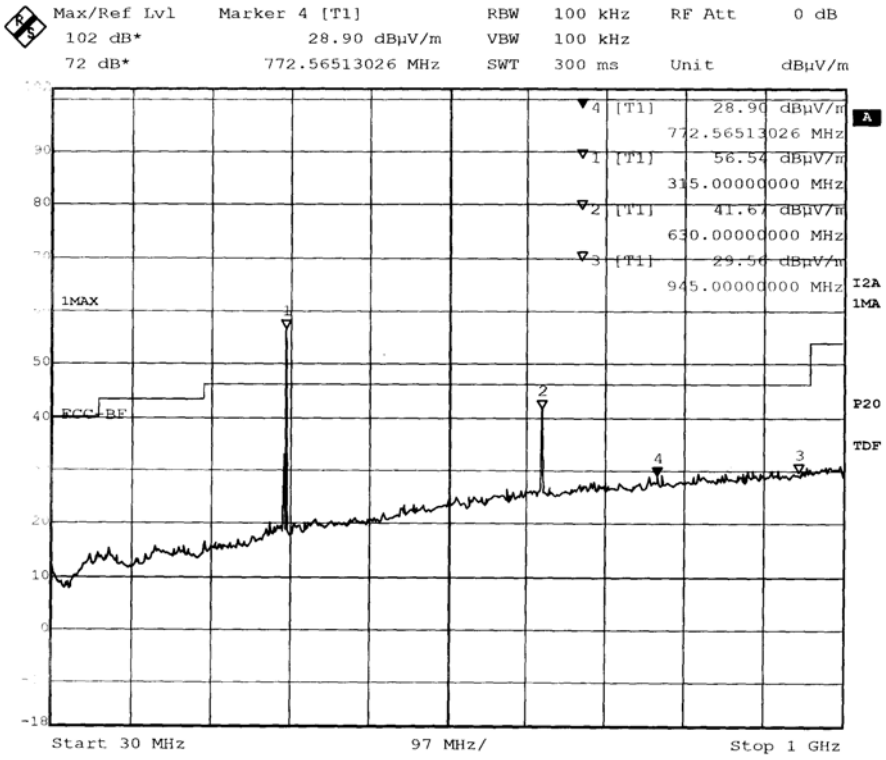
Field Strength of Fundamental Emissions (Peak Value)				
Freq. (MHz)	Antenna Polarity (V/H)	Result dB(μV/m)	Limits dB(μV/m) *	Limits (μV/m) *
315.0	H	58.1	75.6	6041.67
315.0	V	74.7	75.6	6041.67
*The average value limits are used for comparing with measured peak value.				

Field Strength of Spurious Emissions (Peak Value)				
Freq. (MHz)	Antenna Polarity (V/H)	Result dB(μV/m)	Limits dB(μV/m)*	Limits (μV/m)*
630.0	H	46.7	55.6	604.167
772.56	H	28.9	46.0	200.0
1260.0	H	39.8	55.6	604.167
1575.0	H	40.1	55.6	604.167
1890.0	H	48.0	55.6	604.167
2205.0	H	52.8	55.6	604.167
2520.0	H	44.8	55.6	604.167
630.0	V	43.1	55.6	604.167
932.0	V	31.3	46.0	200.0
1260.0	V	40.2	55.6	604.167
1575.0	V	38.2	55.6	604.167
1890.0	V	41.1	55.6	604.167
2520.0	V	38.1	55.6	604.167
*The average value limits are used for comparing with measured peak value.				

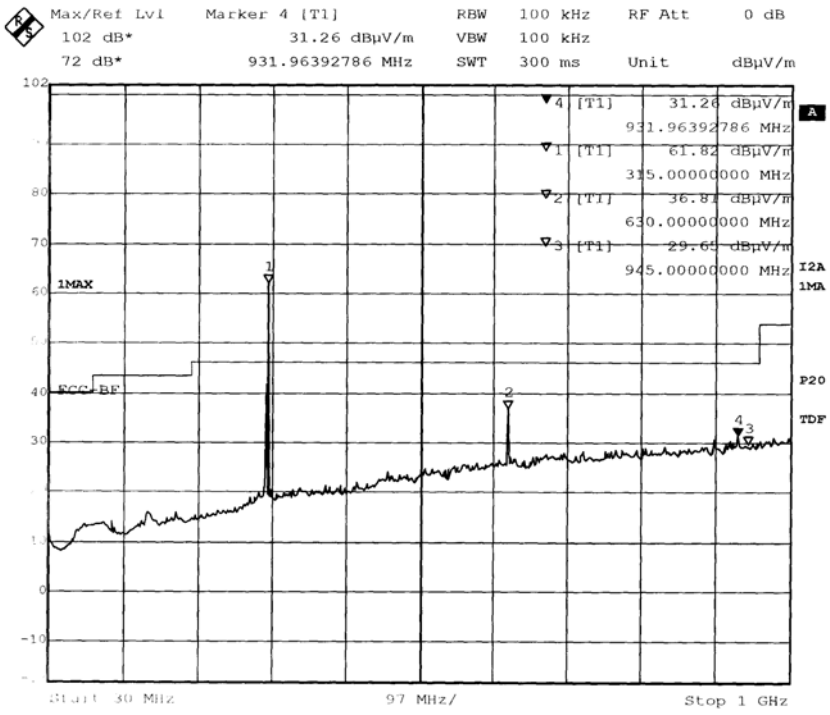
Remarks:

- Calculated measurement uncertainty is 5.9dB from 30MHz to 1GHz.
- Field strength of Fundamental for Average detector is 41.6667×315-7083.3333 =6041.67μV/m
- Because the peak value complies with average limit, the average value is not needed to be measured, and the duty cycle correction factor for determining the average value is not needed to be measured.
- Peak detector was used in the following graphs.

Scan Graph and Scan Settings

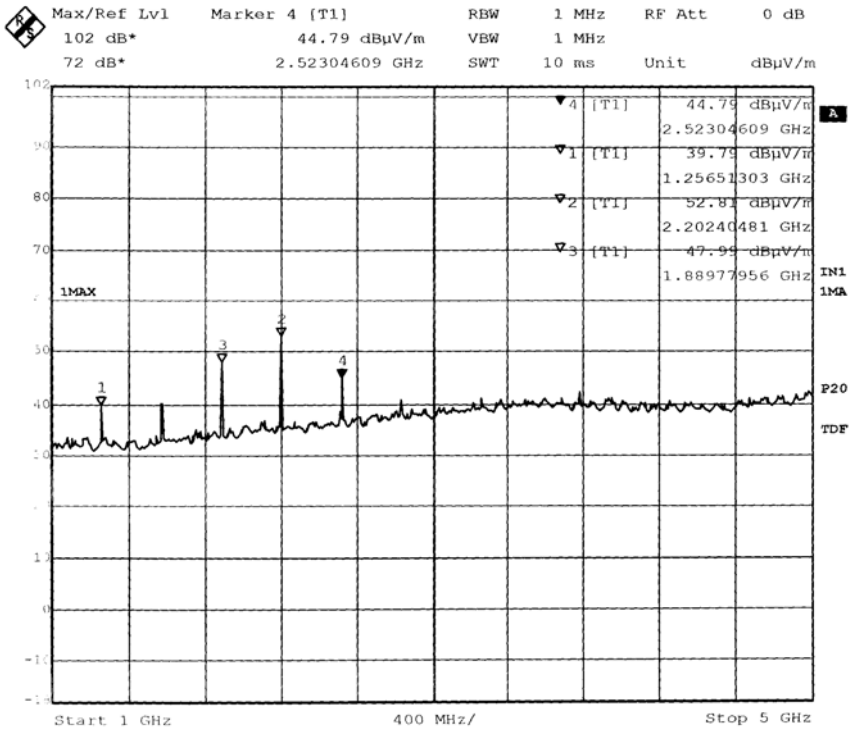


Transmission (Horizontal)

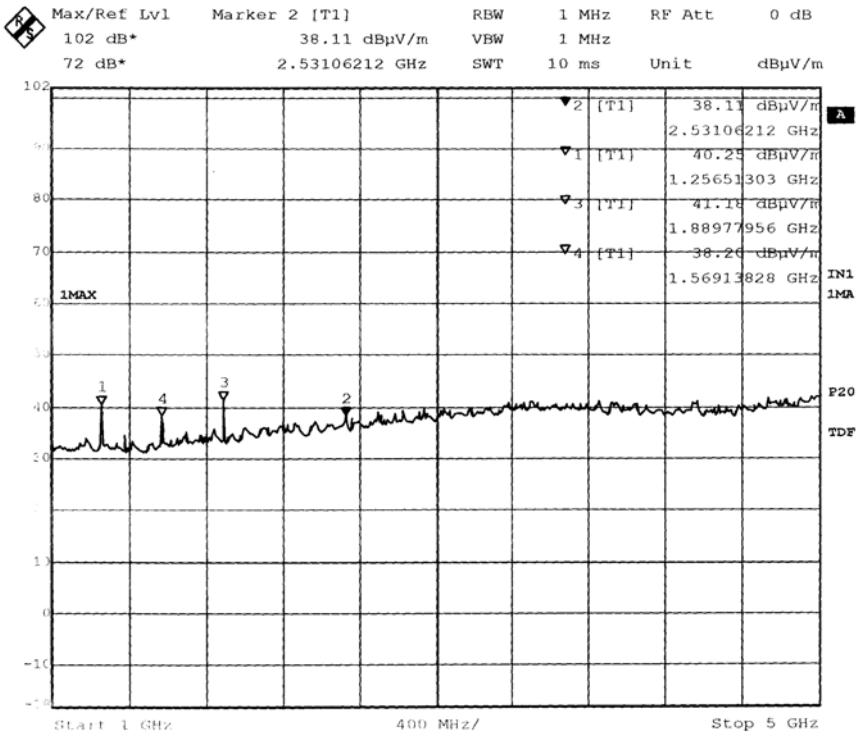


Transmission (Vertical)

Scan Graph and Scan Settings



Transmission (Horizontal)



Transmission (Vertical)

4.3 Ceasing transmission within 5 seconds after activation

RESULT : **Pass**

Test procedure : ANSI C63.4 : 2003
Limits : FCC PART 15, Subpart C, Section 15.231(a)(2)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Method:
The receiver is working at analyzer mode; the receiving frequency is set at the fundamental frequency of transmitter (315MHz).The transmission duration of transmitter is measured the time of transmission signal lasted after activation.

Test Setup:
As Test Setup of clause 4.2 in this test report.

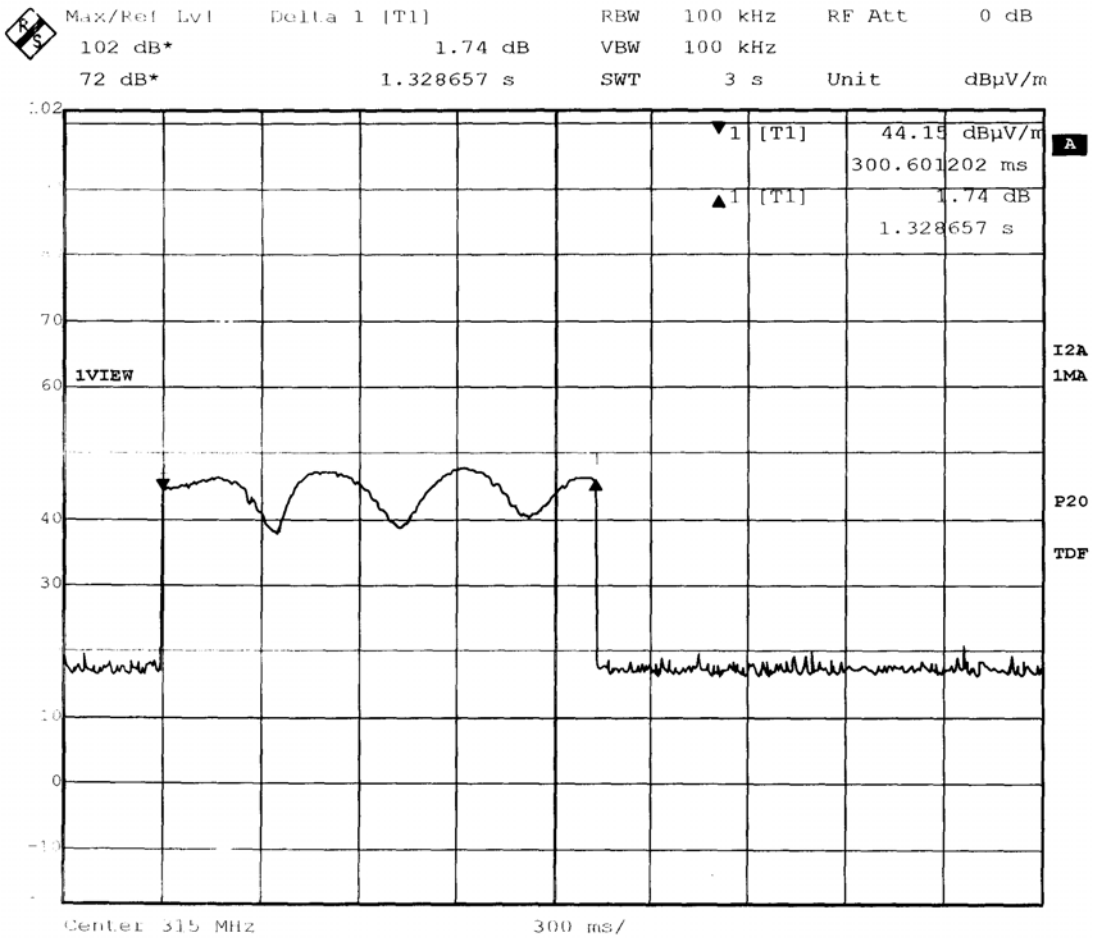
Results:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 4.5VDC ;
Operating Mode of the EUT : Transmission.

Frequency Range [MHz]	Ceasing transmission time [s]	FCC Limits [s]	Conclusion
315.0	1.329	5	Not longer than the FCC limits

Scan Graph and Scan Settings



4.4 20dB Bandwidth of Fundamental Emission

RESULT : Pass

Test procedure : ANSI C63.4 : 2003
Limits : FCC PART 15, Subpart C, Section 15.231I
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

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.

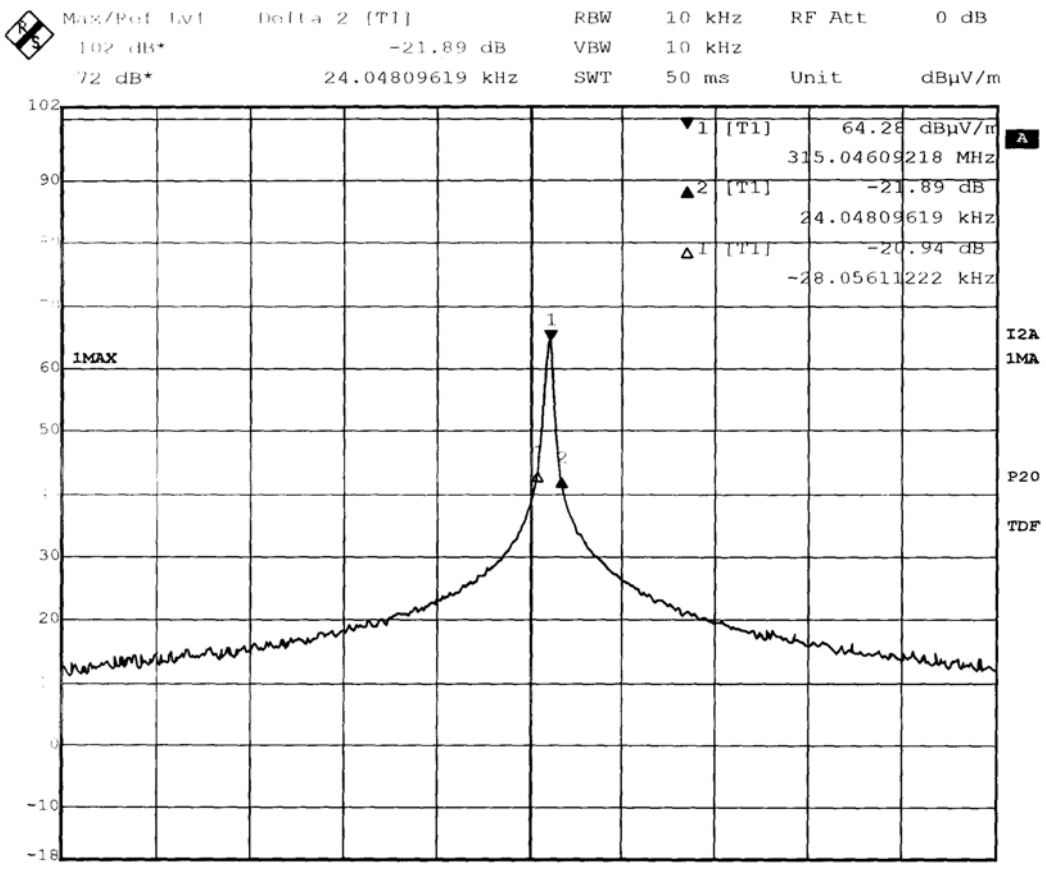
Results:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 4.5VDC ;
Operating Mode of the EUT : Transmission.

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [kHz]	Conclusion
315.0	24.0+28.0=52.0	0.25%×315.0×1000 = 787.5	Not wider than the FCC limits

Scan Graph and Scan Settings



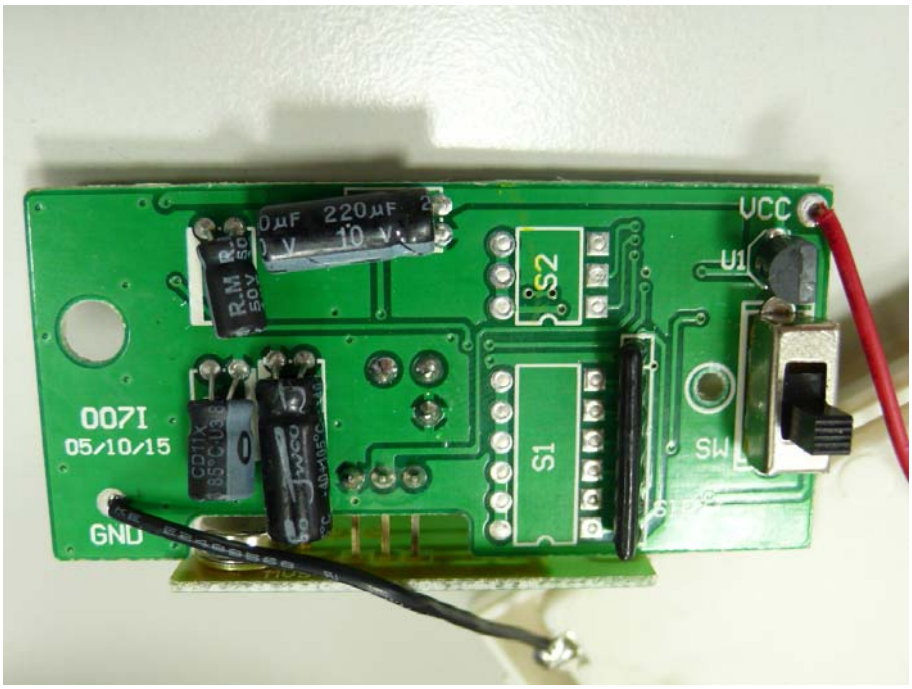
5. Photographs & Nameplates of the EUT

5.1 Outlook:

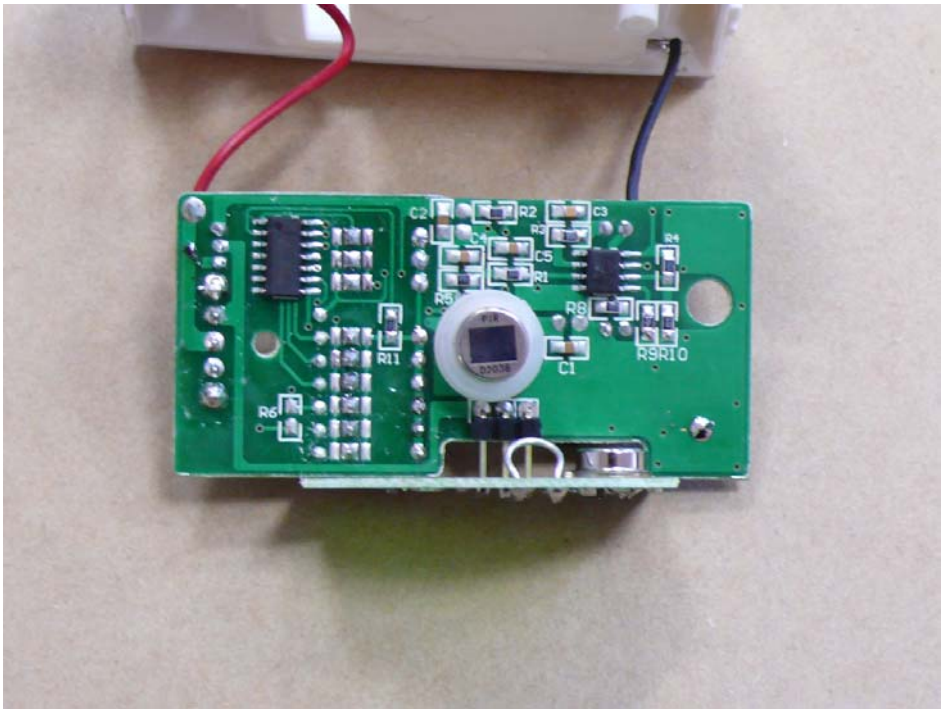
Front View of the EUT

Rear View of the EUT

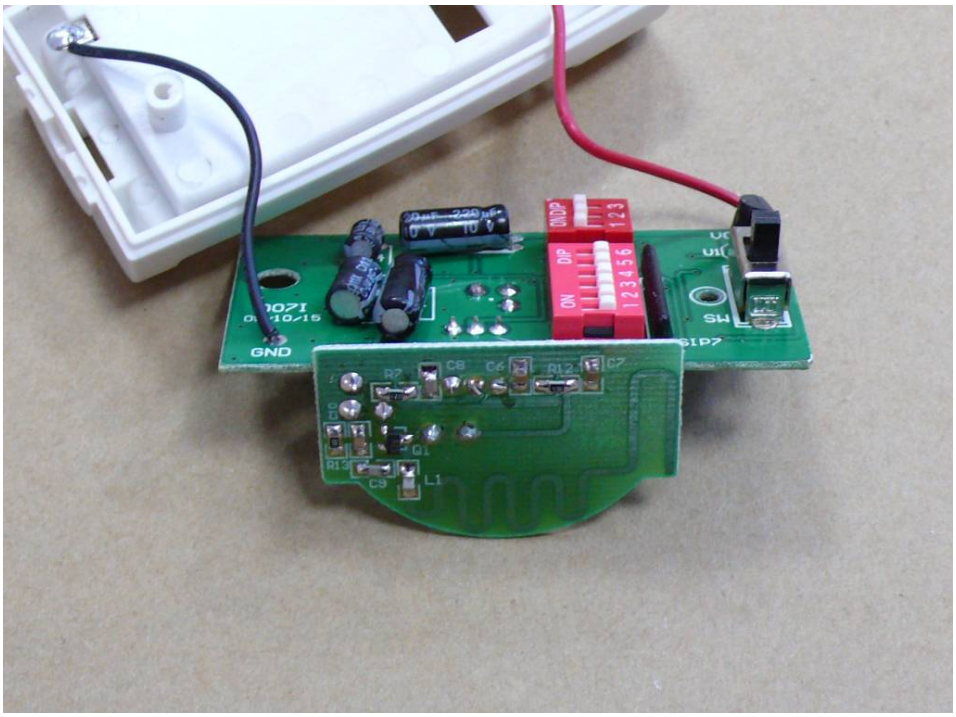
5.2 Structure of internal wires:



Front side of PCB1



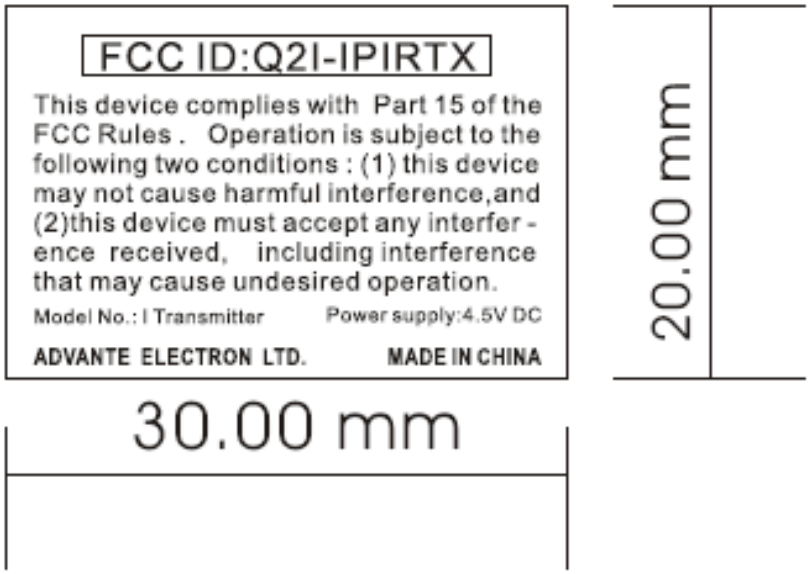
Back side of PCB1

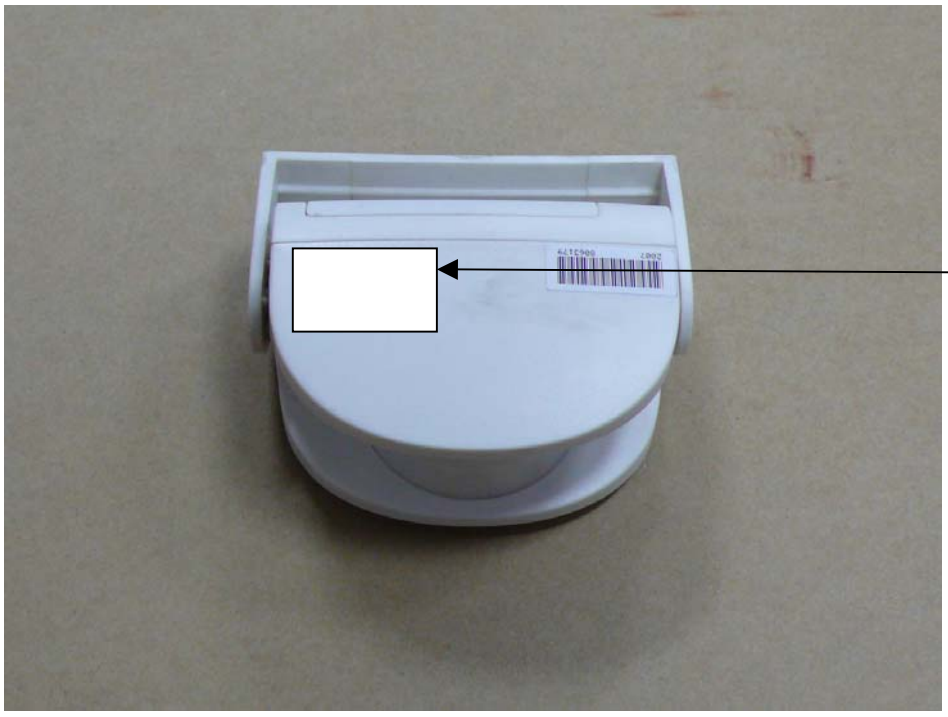


Front side of PCB2

Back side of PCB2

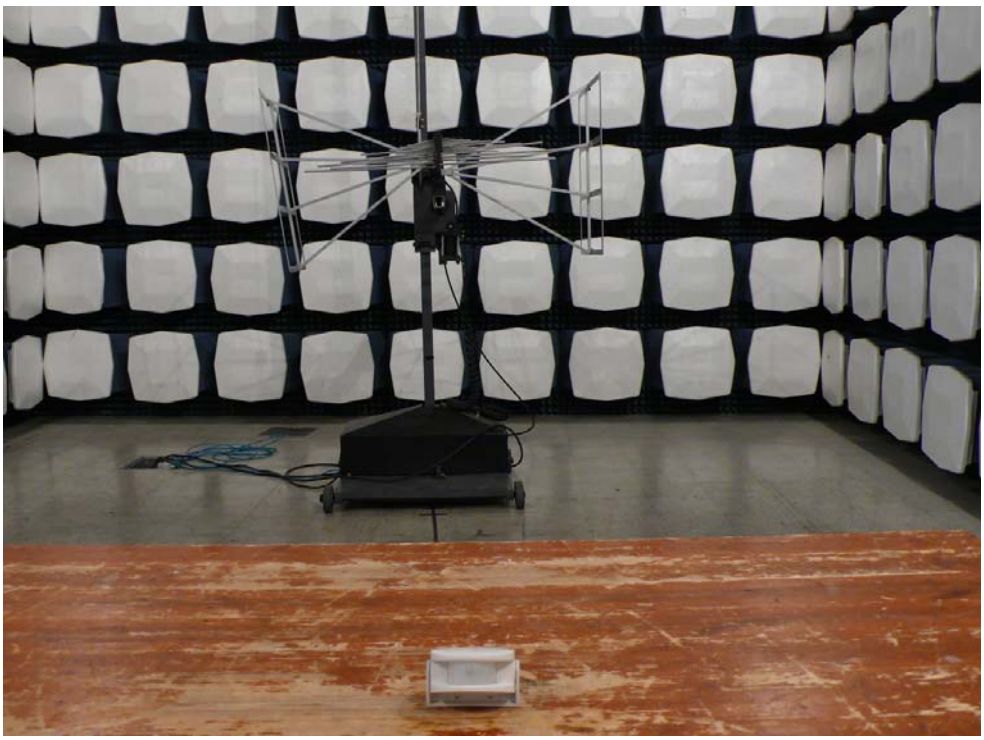
5.3 Nameplate:



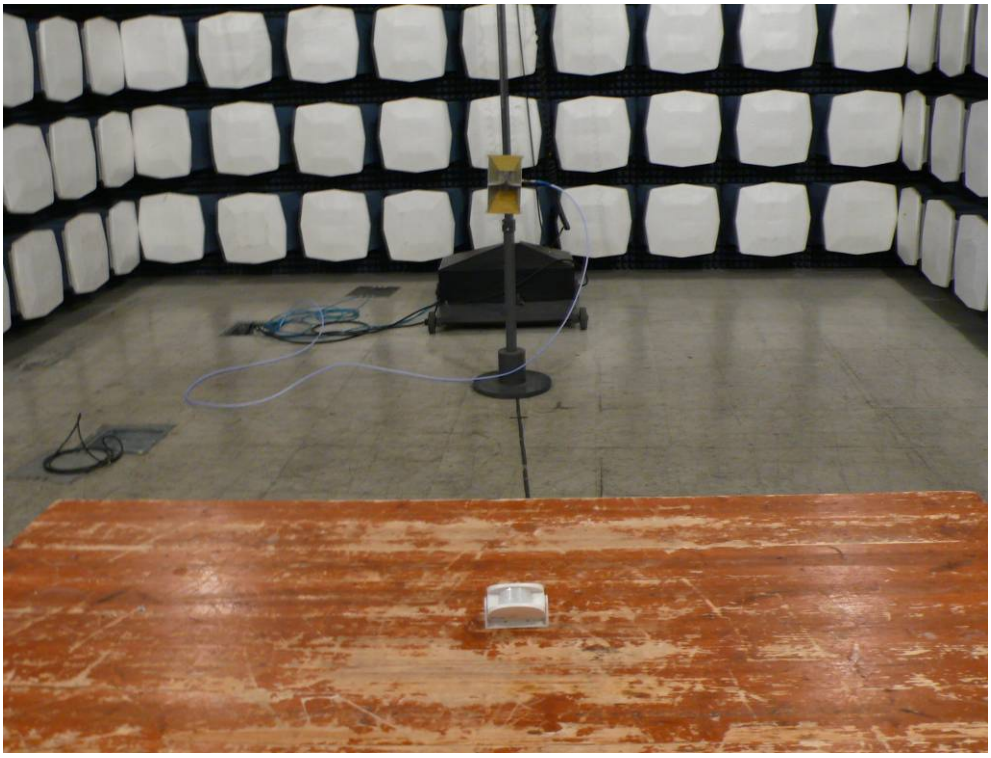


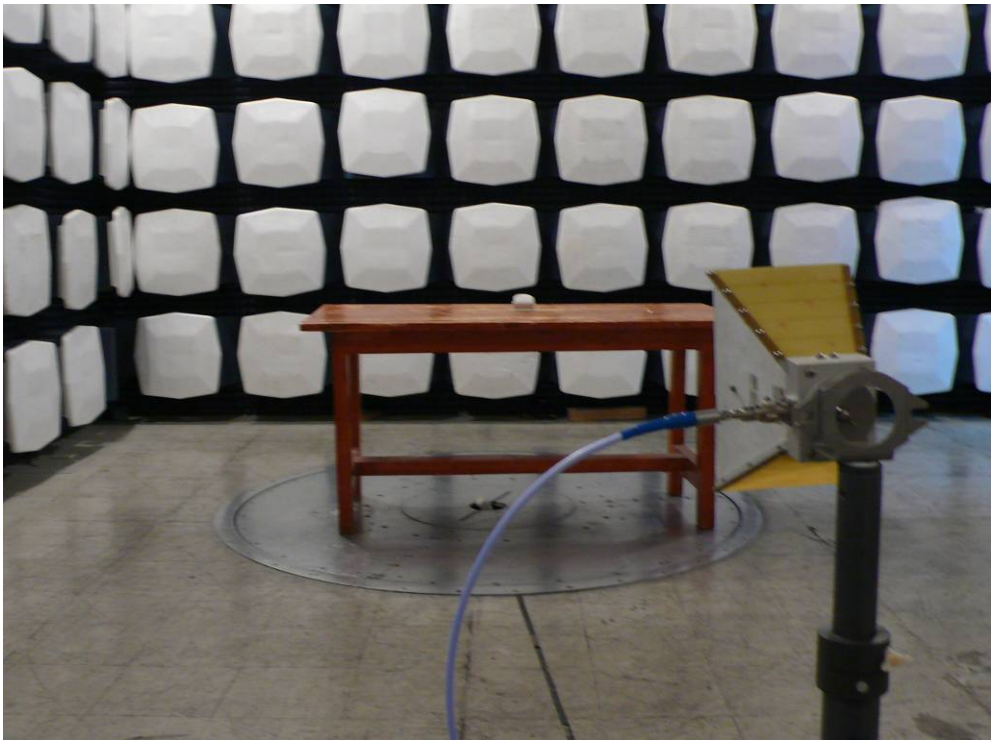
Position of the Nameplate

6. Photograph of the test setup



Measurement of Radiated Emission Test 30MHz-1GHz





Measurement of Radiated Emission Test 1GHz-5GHz

Appendix A

Test Equipment	Mature Date of Calibration	Type/Model	Serial No.	Manufacturer
EMI Test Receiver	2007.10.12	ESI26	834000/009	R & S
EMI Test Receiver	2007.10.12	ESCS30	100158	R & S
LISN	2007.10.12	ESH3-Z5	844982/020	R & S
LISN	2007.10.12	ESH3-Z5	833874/002	R & S
Biconilog Antenna	2007.06.04	3141	1178	EMCO
Waveguide Horn	2007.06.04	3115	0002-6038	EMCO
Pre-amplifier	2008.02.11	AFS42-00101 800-25-S-42	1119249	MITEQ

End of Document