

# CE EMC TEST REPORT

for

**Combo Antenna**

**MODEL:**

**AW-9, SG-9S, SG2-9S, SG-9, SG2-9, AU-9S, AU-9GS, AU-9S-DL,  
AU-9GS-DL, AU-9, AU-9G, AU-9-DL, AU-9G-DL, AW-9S, AW-9GS, AW-9G, DL-9S, SL-9S,  
DL-9, SL-9, LW-9S, LW-9, DW-9S, SW-9S, DW-9, SW-9**

Test Report Number:

T151214W11-RE

Issued for

**SAN JOSE TECHNOLOGY, INC.**

11F., No.2, Sec. 4, Jhongyang Rd., Tucheng Dist., New Taipei City 236, Taiwan (R.O.C.)

Issued By:

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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
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# 1 TEST CERTIFICATION

<b>Product:</b>	Combo Antenna
<b>Model:</b>	AW-9, SG-9S, SG2-9S, SG-9, SG2-9, AU-9S, AU-9GS, AU-9S-DL, AU-9GS-DL, AU-9, AU-9G, AU-9-DL, AU-9G-DL, AW-9S, AW-9GS, AW-9G, DL-9S, SL-9S, DL-9, SL-9, LW-9S, LW-9, DW-9S, SW-9S, DW-9, SW-9
<b>Brand:</b>	SANAV
<b>Applicant:</b>	<b>SAN JOSE TECHNOLOGY, INC.</b> 11F., No.2, Sec. 4, Jhongyang Rd., Tucheng Dist., New Taipei City 236, Taiwan (R.O.C.)
<b>Manufacturer:</b>	<b>SAN JOSE TECHNOLOGY, INC.</b> 11F., No.2, Sec. 4, Jhongyang Rd., Tucheng Dist., New Taipei City 236, Taiwan (R.O.C.)
<b>Tested:</b>	December 28 ~ 29, 2015
<b>Applicable Standards:</b>	<b>ETSI EN 301 489-3 V1.6.1 2013-08;</b> <b>ETSI EN 301 489-1 V1.9.2 2011-09;</b> EN 55022:2010/AC: 2011 EN 61000-3-2:2014 EN 61000-3-3:2013 EN 61000-4-2:2009 EN 61000-4-3:2006+A1:2008+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2006 EN 61000-4-6:2009 EN 61000-4-11:2004

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

**Approved by:**

*Kevin Liu*

Kevin Liu  
Section Manager

**Reviewed by:**

*Angel Cheng*

Angel Cheng  
Section Manager

## 2 TEST RESULT SUMMARY

EMISSION			
Standard	Item	Result	Remarks
EN 55022: 2010/AC: 2011	Conducted (Main Port)	N/A	Not applicable, because EUT not connect to AC Main Source direct.
	Conducted (Telecom port)	N/A	Not applicable, the EUT doesn't have LAN Port or Modem port.
	Radiated	PASS	Meet limit Class B
EN 61000-3-2:2014	Harmonic current emissions	N/A	Not applicable, because EUT not connect to AC Main Source direct.
EN 61000-3-3:2013	Voltage fluctuations & flicker	N/A	Not applicable, because EUT not connect to AC Main Source direct.

IMMUNITY 【 EN 301 489-1 V1.9.2:2011 】			
Standard	Item	Result	Remarks
EN 61000-4-2:2009	ESD	PASS	Meets the requirements of Performance Criterion TT&TR
EN 61000-4-3:2006+A1:2008+A2:2010	RS	PASS	Meets the requirements of Performance Criterion CT&CR
EN 61000-4-4:2012	EFT	N/A	Not applicable, because EUT not connect to AC Main Source direct.
EN 61000-4-5:2006	Surge	N/A	Not applicable, because EUT not connect to AC Main Source direct.
EN 61000-4-6:2009	CS	N/A	Not applicable, because EUT not connect to AC Main Source direct.
EN 61000-4-11:2004	Voltage dips & voltage variations	N/A	Not applicable, because EUT not connect to AC Main Source direct.

**Note:** (1). The test result judgment is decided by the limit of test standard  
 (2). The information of measurement uncertainty is available upon the customer's request.

Equipment Type	Technical nature of the primary function
<input type="checkbox"/> I	Transfer of messages (digital or analogue signals)
<input type="checkbox"/> II	Transfer of audio (speech or music)
<input checked="" type="checkbox"/> III	Others

## Classification of SRD equipment

The product family of Short Range Devices is divided into three classes of equipment, each having its own set of minimum performance criteria. This classification is based upon the impact on persons and/or goods in case the equipment does not operate above the specified minimum performance level under EMC stress.

**Table 3**

<b>Class of SRD equipment</b>	<b>Risk assessment of receiver performance</b>
<input type="checkbox"/> 1	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person)
<input type="checkbox"/> 2	Medium reliable SRD communication media; e.g. causing inconvenience to persons, which cannot simply be overcome by other means
<input checked="" type="checkbox"/> 3	Standard reliable SRD communication media; e.g. inconvenience to persons, which can simply be overcome by other means (e.g. manual)

### 3 EUT DESCRIPTION

<b>Product</b>	Combo Antenna
<b>Brand Name</b>	SANAV
<b>Model</b>	AW-9, SG-9S, SG2-9S, SG-9, SG2-9, AU-9S, AU-9GS, AU-9S-DL, AU-9GS-DL, AU-9, AU-9G, AU-9-DL, AU-9G-DL, AW-9S, AW-9GS, AW-9G, DL-9S, SL-9S, DL-9, SL-9, LW-9S, LW-9, DW-9S, SW-9S, DW-9, SW-9
<b>Applicant</b>	SAN JOSE TECHNOLOGY,INC.
<b>Housing material</b>	Plastic w/ metal plate
<b>Identify Number</b>	T151214W11
<b>Received Date</b>	December 14, 2015
<b>EUT Power Rating</b>	Power from GS Signal Device
<b>AC Power Cord Type</b>	N/A
<b>DC Power Cord Type</b>	N/A

**Note:**

1. Client consigns only one sample to test (model number: AW-9). Therefore, the testing Lab. just guarantees the unit, which has been tested.
2. Difference of the forty-two samples (list on this report) please see as below:

<b>Model Number</b>	<b>Difference(External)</b>	<b>Difference(Function)</b>
AW-9	cable central entry	WiFi, GPS and LTE function
SG-9S	cable side entry	GPS function only
SG2-9S	cable side entry	GPS function only
SG-9	cable central entry	GPS function only
SG2-9	cable central entry	GPS function only
AU-9S	cable side entry	GPS and LTE function
AU-9GS	cable side entry	GPS and LTE function
AU-9S-DL	cable side entry	GPS and LTE function
AU-9GS-DL	cable side entry	GPS and LTE function
AU-9	cable central entry	GPS and LTE function
AU-9G	cable central entry	GPS and LTE function
AU-9-DL	cable central entry	GPS and LTE function
AU-9G-DL	cable central entry	GPS and LTE function
AW-9S	cable side entry	WiFi, GPS and LTE function
AW-9GS	cable side entry	WiFi, GPS and LTE function
AW-9G	cable central entry	WiFi, GPS and LTE function
DL-9S	cable side entry	LTE function only
SL-9S	cable side entry	LTE function only
DL-9	cable central entry	LTE function only
SL-9	cable central entry	LTE function only
LW-9S	cable side entry	WiFi and LTE function
LW-9	cable central entry	WiFi and LTE function
DW-9S	cable side entry	WiFi function only
SW-9S	cable side entry	WiFi function only
DW-9	cable central entry	WiFi function only
SW-9	cable side entry	WiFi function only

**I/O PORT**

<b>I/O PORT TYPES</b>	<b>Q'TY</b>	<b>TESTED WITH</b>
1. GPS Signal Port	1	1
2. Signal Port	2	2



## 4 TEST METHODOLOGY

### 4.1. DECISION OF FINAL TEST MODE

- The following test mode was scanned during the preliminary test:

Pre-Test Mode
<b>Mode 1:</b> Normal Operation(AW9)

- After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	N/A
	Radiated Emission	Mode 1
	PH & PF	N/A
Immunity(ESD, RS)		Mode 1
Immunity(EFT, Surge ,CS ,DIP)		N/A

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

### 4.2. EUT SYSTEM OPERATION

1	Setup the EUT and simulators as shown on 5.2.
2	Turn on the power of all equipment.
3	EUT connect the GPS signal device.
4	EUT through the GPS signal device with the GPS base station connection.
5	NB set software confirm GPS connection is normal.
6	Adjust to the test mode, and begin testing.

**Note:** Test program is self-repeating throughout the test.

## 5 SETUP OF EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

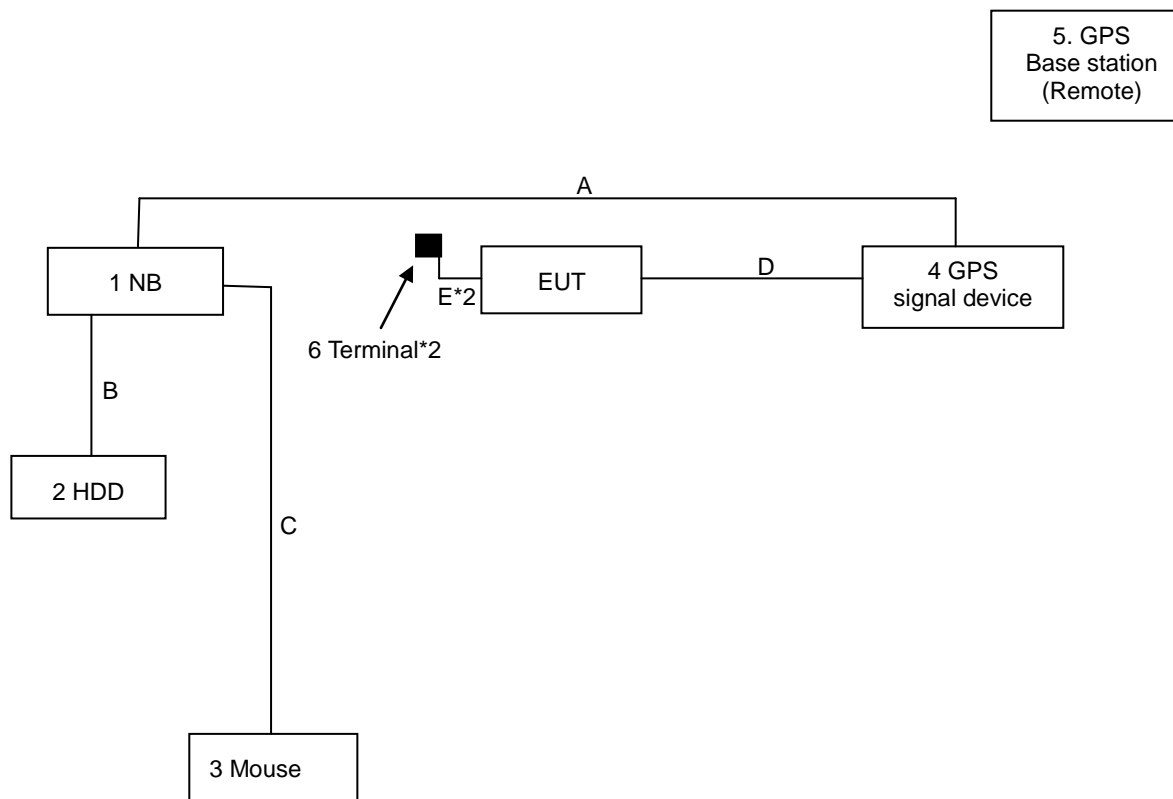
#### Peripherals Devices

No.	Equipment	Trade Name	Model No.	Serial No.	FCC ID	Power Cord
1.	NB	HP	Pavilion dv6	CNF9491GLJ	R33022	Non-Shielded, 2.0 m
2.	HDD	Sony	HD-E1	RCV0A1K3524177B	D33021	N/A
3.	Mouse	DELL	OXN867	J0206CRS	R41108	N/A
4.	GPS signal device	N/A	N/A	N/A	N/A	Non-Shielded, 1.8 m
5	GPS base station (Remote)	SPECTRACOM	GSG-5 Series	N/A	N/A	Non-Shielded, 1.8 m
6	Terminal	N/A	N/A	N/A	N/A	N/A
	Terminal	N/A	N/A	N/A	N/A	N/A

No.	Cable Name	Unit	Shielded	Length	With Core
(A)	RS232 to USB Cable	1	<input checked="" type="checkbox"/> Shielded, <input type="checkbox"/> Non	0.8 m	<input type="checkbox"/> With Corex____, <input checked="" type="checkbox"/> Non
(B)	USB Cable(HDD)	1	<input checked="" type="checkbox"/> Shielded, <input type="checkbox"/> Non	0.5 m	<input type="checkbox"/> With Corex____, <input checked="" type="checkbox"/> Non
(C)	USB Mouse Cable	1	<input checked="" type="checkbox"/> Shielded, <input type="checkbox"/> Non	1.8 m	<input type="checkbox"/> With Corex____, <input checked="" type="checkbox"/> Non
(D)	GPS Signal Cable	1	<input type="checkbox"/> Shielded, <input checked="" type="checkbox"/> Non	1 m	<input type="checkbox"/> With Corex____, <input checked="" type="checkbox"/> Non
(E)	Signal Cable	2	<input type="checkbox"/> Shielded, <input checked="" type="checkbox"/> Non	1 m	<input type="checkbox"/> With Corex____, <input checked="" type="checkbox"/> Non

**Note:** Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 5.2. CONFIGURATION OF SYSTEM UNDER TEST



## 6 FACILITIES AND ACCREDITATIONS

### 6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at:

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

☒ No.139, Wugong Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

### 6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>Taiwan</b>	TAF (TAF 1309)
<b>USA</b>	A2LA (0824.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>Canada</b>	Industry Canada (3M Semi Anechoic Chamber: IC 2324G-1 / IC 2324G-2 / 2324J-1 / 2324J-2 to perform)
<b>Norway</b>	Nemko
<b>Japan</b>	VCCI 966 Chamber C: Radiated emissions: 30 MHz -1000 MHz: R-3282 / Above 1GHz: G-146 10M Chamber: Radiated emissions: 30 MHz -1000 MHz: R-3283 / Above 1GHz: G-147 Conducted Emission A: C-3612 / T-1745 Conducted Emission B: C-3700 / T-1839
<b>USA</b>	FCC (3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

### 6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions #B	9kHz~30MHz	N/A
Radiated emissions (#10M Chamber)	30~200MHz	±3.9163 dB
	200~1000MHz	±3.9030 dB
	Above 1GHz	±2.5208 dB

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

Consistent with industry standard (e.g. CISPR 22:2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than UCISPR which is 3.6dB and 5.2dB respectively. CCS values (called ULab in CISPR 16-4-2) is less than UCISPR as shown in the table above. Therefore, MU need not be considered for compliance.

## 7 EMISSION TEST

### 7.1. CONDUCTED EMISSION MEASUREMENT

#### 7.1.1. LIMITS

**Table 5: Limits for conducted emissions**

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

**Note:** (1). The lower limit shall apply at the transition frequencies.

(2). The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

(3). All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Alternatively, for equipment intended to be used in telecommunication centres only, the limits given in table 6 may be used.

**Table 6: Limits for conducted emissions of equipment intended to be used in telecommunication centres only**

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	79	66
0.50 – 30.0	73	60

#### 7.1.2. TEST INSTRUMENTS

Conducted Emission Room #B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

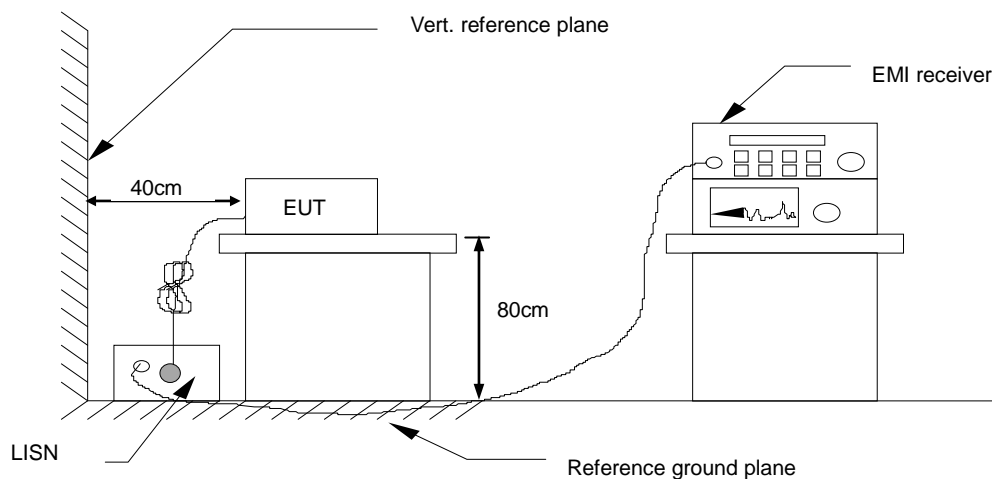
**7.1.3. TEST PROCEDURES** (please refer to measurement standard or CCS SOP PA-031)**Procedure of Preliminary Test**

- The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When 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 EN 55022 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- The EUT installed by AC main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
- All support equipment power by a second LISN.
- The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

### 7.1.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.1.5. DATA SAMPLE:

Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correctrion factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak. limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
x.xx	43.95	33.00	10.00	53.95	43.00	56.00	46.00	-2.05	-3.00	Pass

Frequency (MHz) = Emission frequency in MHz  
 Reading (dBuV) = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB  
 Correction Factor (dB) = LISN Factor + Cable loss  
 Result (dBuV) = Raw reading converted to dBuV and CF added  
 Limit (dBuV) = Limit stated in standard  
 Margin (dB) = Result (dBuV) – Limit (dBuV)

### 7.1.6. TEST RESULTS

***Not applicable, because EUT not connect to AC Main Source direct.***



## 7.2. CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

### 7.2.1. LIMITS

The telecommunication ports shall meet the class B limits given in EN 55022 [1].

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 - 30.0	74	64	30	20

**Note:** The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in EN 55022 [1] may be used.

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 ~ 87	84 ~ 74	53 ~ 43	40 ~ 30
0.5 ~ 30.0	87	74	43	30

**NOTE:** The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

### 7.2.2. TEST INSTRUMENTS

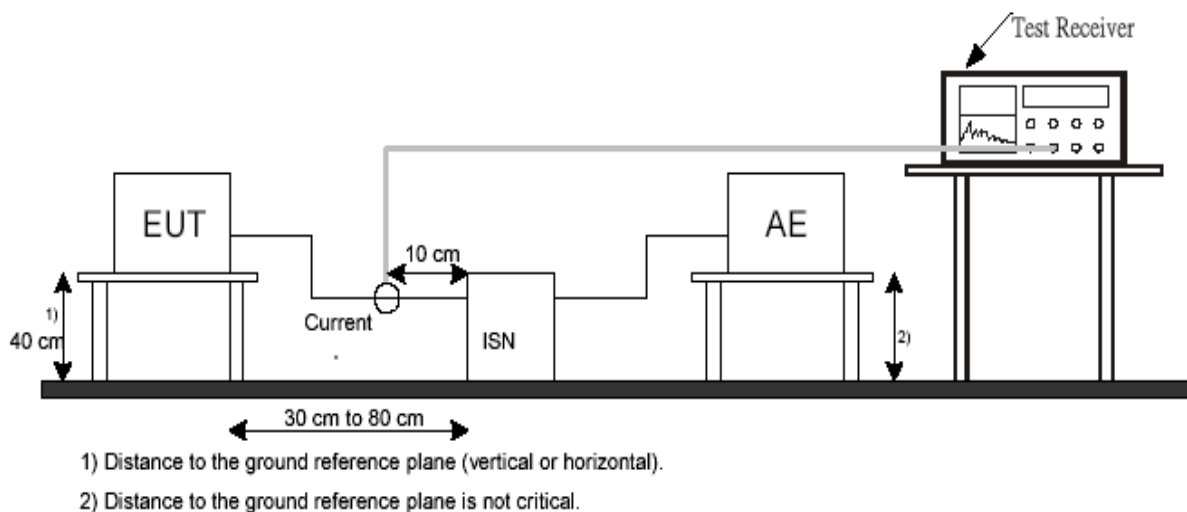
Conducted Emission Room #B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

**7.2.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-031)

- Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
- The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
- Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
- Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- In case of measuring on the screened cable, the current limit shall be applied; otherwise the voltage limit should be applied.

***Not applicable, the EUT doesn't have LAN Port or Modem port.***

### 7.2.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.2.5. DATA SAMPLE:

Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
x.xx	43.95	33.00	10.00	53.95	43.00	74.00	64.00	-20.05	-21.00	Pass

Frequency (MHz) = Emission frequency in MHz  
 Reading (dBuV) = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB  
 Correction Factor (dB) = ISN Factor + Cable loss  
 Result (dBuV) = Raw reading converted to dBuV and CF added  
 Limit (dBuV) = Limit stated in standard  
 Margin (dB) = Result (dBuV) – Limit (dBuV)

### 7.2.6. TEST RESULTS

***Not applicable, the EUT doesn't have LAN Port or Modem port.***

## 7.3. RADIATED EMISSION MEASUREMENT

### 7.3.1. LIMITS

Frequency (MHz)	Limit (quasi-peak) dBuV/m (At 10m)
30 ~ 230	30
230 ~ 1000	37

**Note:** (1). The lower limit shall apply at the transition frequencies.  
 (2). Emission level (dBuV/m) = 20 log Emission level (uV/m).

**Table 3: Limits for radiated disturbance above 1 GHz at a measurement distance of 3 m**

Frequency (GHz)	Average Limit dB(uV/m)	Peak Limit dB(uV/m)
1 ~ 3	50	70
3 ~ 6	54	74

**Note:** The lower limit applies at the transition frequency.

Alternatively, for ancillary equipment intended to be used in telecommunication centres only, the class A limits given in EN 55022 [1] and the limits above 1 GHz shown in table 4 apply.

**Table 4: Limits above 1 GHz for radiated emissions from ancillary equipment intended for use in telecommunication centres only, and measured on a stand alone basis at a measurement distance of 3 m**

Frequency (GHz)	Average Limit dB(uV/m)	Peak Limit dB(uV/m)
1 ~ 3	56	76
3 ~ 6	60	80

**Note:** The lower limit applies at the transition frequency.

## 7.3.2. TEST INSTRUMENTS

Wugu 10M Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250297	09/19/2016
EMI Test Receiver	R&S	ESCI	100961	08/20/2016
EMI Test Receiver	R&S	ESCI	100962	08/23/2016
Pre-Amplifier	HP	8447D	2944A07754	05/02/2016
Pre-Amplifier	HP	8447D	2944A08150	05/02/2016
Bilog Antenna	TESEQ	CBL 6112D	31674	08/04/2016
Bilog Antenna	TESEQ	CBL6112D	31675	08/04/2016
Horn Antenna	EMCO	3117	55167	01/12/2016
Horn Antenna	EMCO	3116	26370	12/24/2016
Coaxial Cable	Huber+Suhner	104PEA	33948/4PEA	05/02/2016
Coaxial Cable	Huber+Suhner	104PEA	33949/4PEA	05/02/2016
Coaxial Cable	Huber+Suhner	104	330026/4	05/02/2016
Coaxial Cable	Huber+Suhner	104	330029/4	05/02/2016
Coaxial Cable	Huber+Suhner	104	329382/4	05/02/2016
Coaxial Cable	Huber+Suhner	104	330028/4	05/02/2016
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Antenna Tower	Sunol Sciences	TLT2	031010-5	N.C.R.
Controller	Sunol Sciences	SC104V	031010-1	N.C.R.
Test S/W	EZ-EMC (CCS-3A1RE)			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

(2). N.C.R = No Calibration Request.

**7.3.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-031)**Frequency range 30MHz ~ 1GHz**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position.
2. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The height of antenna is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was turned to heights for 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

**Frequency range above 1GHz**

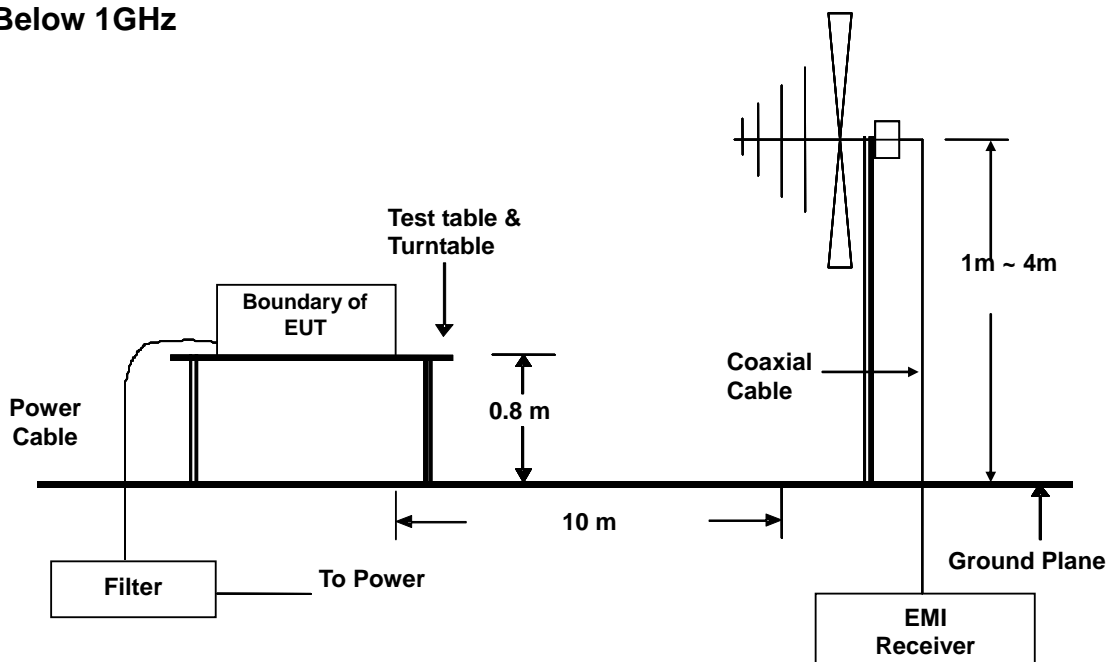
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position.
2. The EUT was set 3 meters away from the directional antenna, which was pointed towards the source of the emission within the EUT. This could be done by either pointing the antenna at an angle towards the source of the emission, or by rotating the EUT, in both height and polarization, to maximize the measured emission.
3. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3 dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was turned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

**NOTE:**

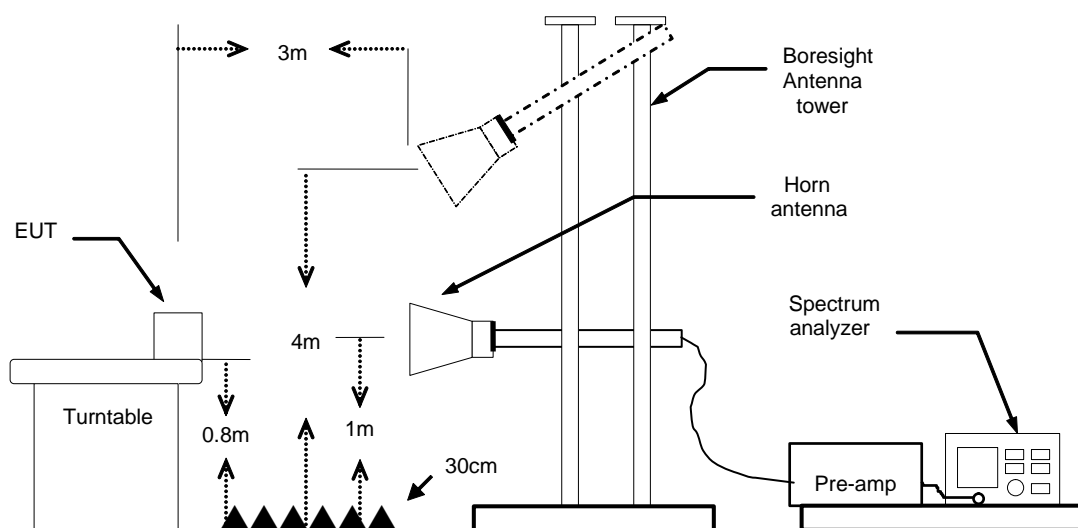
1. The resolution bandwidth is 1MHz and video bandwidth of test spectrum analyzer is 1 MHz for peak detection at above 1GHz. The resolution bandwidth is 1MHz and video bandwidth of test spectrum analyzer is 100Hz for average detection at frequency above 1 GHz.
2. For measurement of frequency above 1GHz, the EUT was set 3 meters away from the directional antenna.

### 7.3.4. TEST SETUP

#### Below 1GHz



#### Above 1GHz



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.3.5. DATA SAMPLE:

#### Below 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
xx.xx	16.49	9.86	26.35	30.00	-3.65	116.00	101.00	QP

#### Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
xx.xx	66.04	-20.61	45.43	70.00	-24.57	400	158	Peak
xx.xx	56.89	-14.91	41.98	50.00	-8.02	400	351	AVG

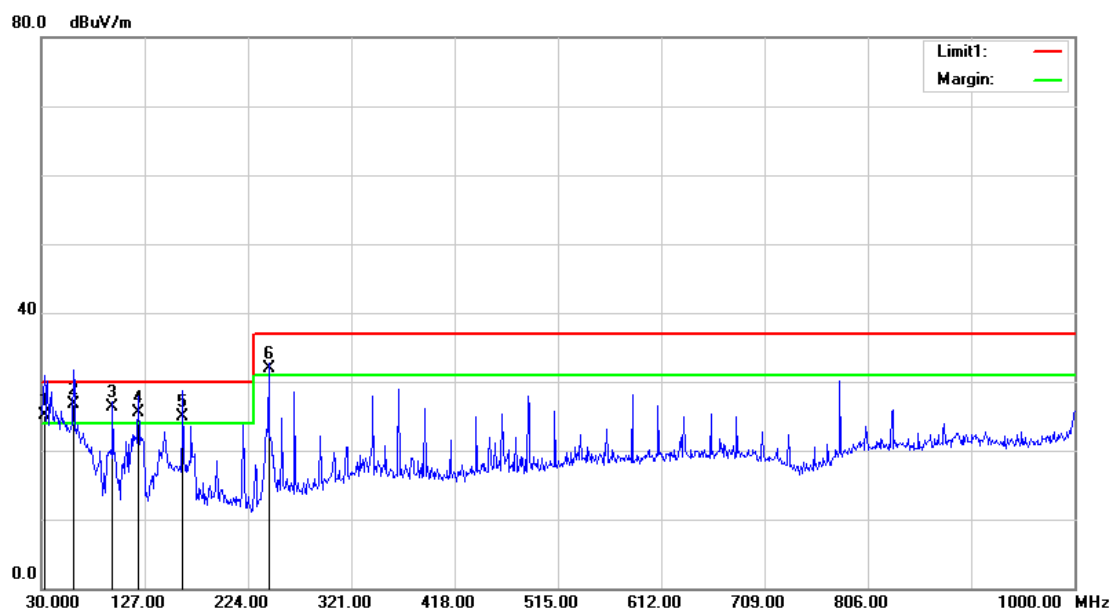
Frequency (MHz) = Emission frequency in MHz  
Reading (dBuV) = Uncorrected Analyzer / Receiver reading  
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain  
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)  
Limit (dBuV/m) = Limit stated in standard  
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)  
Q.P. = Quasi-Peak



## 7.3.6. TEST RESULTS

## Below 1GHz

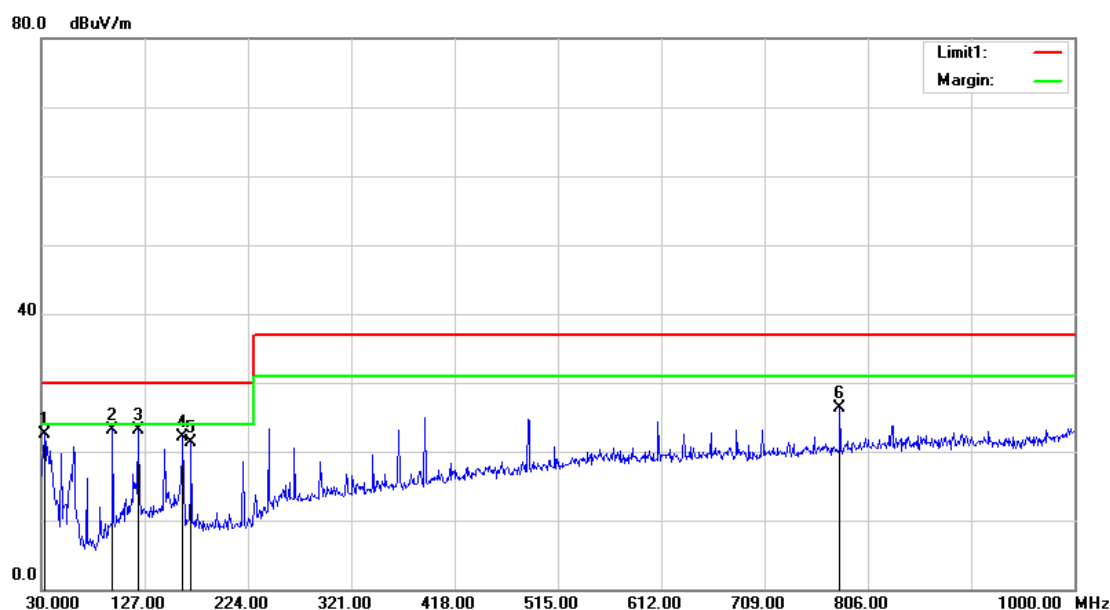
Model No.	AW-9	Test Mode	Mode 1
Environmental Conditions	26°C, 60% RH	Test Date	2015/12/28
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Eason Liu



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	33.5100	36.09	-10.91	25.18	30.00	-4.82	100	69	QP
2	60.0700	46.66	-20.00	26.66	30.00	-3.34	400	0	QP
3	96.9300	41.60	-15.37	26.23	30.00	-3.77	100	42	QP
4	121.1800	38.92	-13.45	25.47	30.00	-4.53	100	111	QP
5	162.8900	39.55	-14.74	24.81	30.00	-5.19	100	57	QP
6	243.4000	43.92	-12.06	31.86	37.00	-5.14	100	359	QP

**Note:** The other emission levels were very low against the limit.

<b>Model No.</b>	AW-9	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>Test Date</b>	2015/12/28
<b>Antenna Pole</b>	Horizontal	<b>Antenna Distance</b>	10m
<b>Detector Function</b>	Quasi-peak.	<b>Tested by</b>	Eason Liu

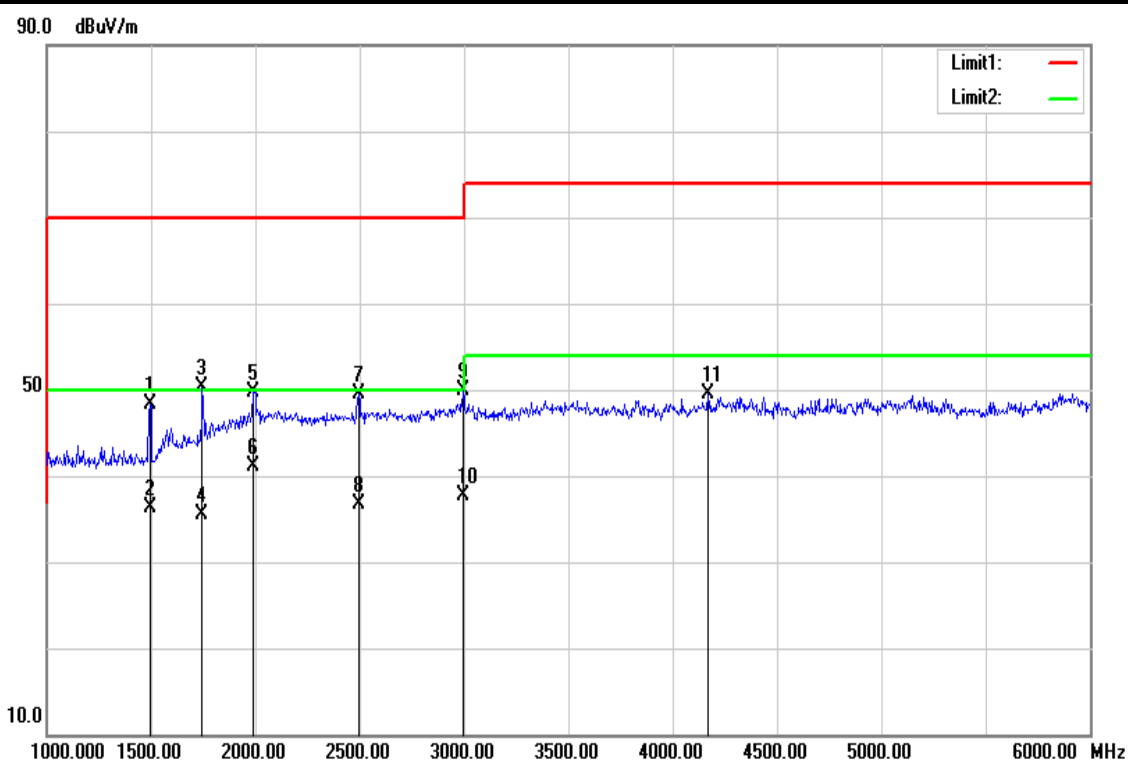


No.	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	32.9100	33.71	-11.13	22.58	30.00	-7.42	200	0	peak
2	96.9300	39.17	-15.97	23.20	30.00	-6.80	333	271	peak
3	121.1800	37.14	-13.98	23.16	30.00	-6.84	300	342	peak
4	162.8900	37.64	-15.49	22.15	30.00	-7.85	333	66	peak
5	170.6500	37.05	-15.73	21.32	30.00	-8.68	333	268	peak
6	779.8100	29.90	-3.59	26.31	37.00	-10.69	333	0	peak

**Note:** The other emission levels were very low against the limit.

**Above 1GHz**

<b>Model No.</b>	AW-9	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>Test Date</b>	2015/12/29
<b>Antenna Pole</b>	Vertical	<b>Antenna Distance</b>	3m
<b>Highest frequency generated or used</b>	2.4GHz	<b>Upper frequency</b>	6GHz
<b>Detector Function</b>	Peak & Average	<b>Tested by</b>	Eason Liu

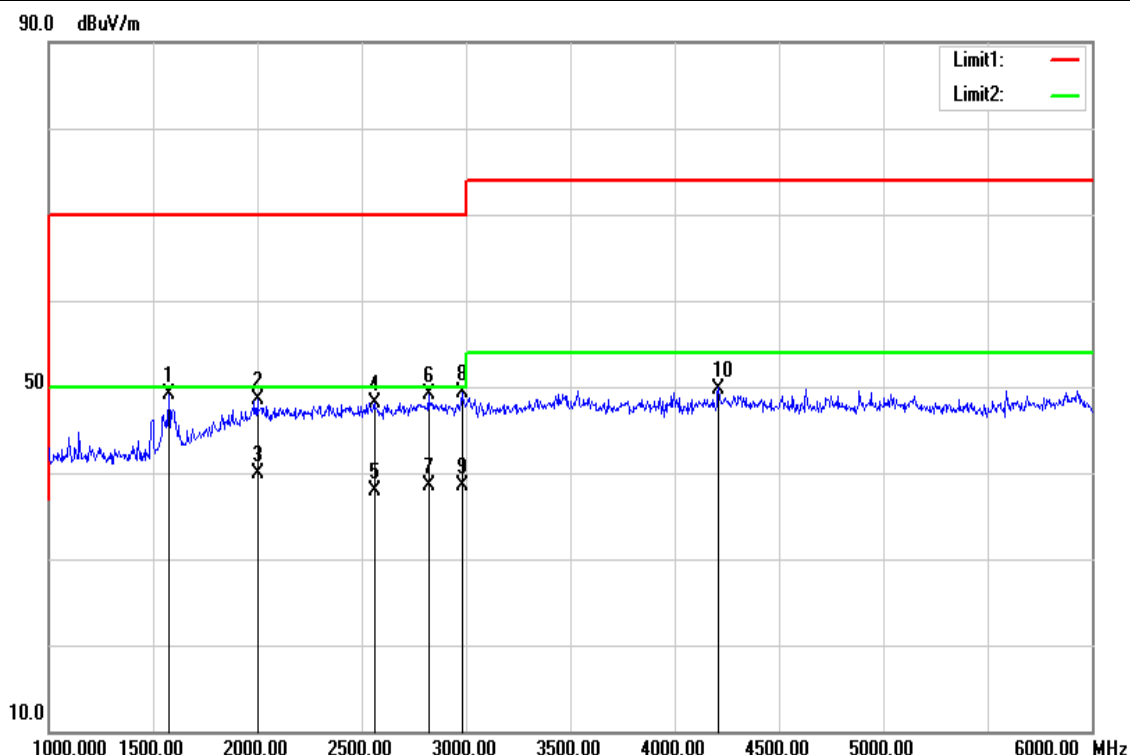


No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	1495.000	63.36	-15.12	48.24	70.00	-21.76	100	311	peak
2	1495.000	51.45	-15.12	36.33	50.00	-13.67	100	307	AVG
3	1747.500	63.01	-12.68	50.33	70.00	-19.67	100	333	peak
4	1747.500	48.17	-12.68	35.49	50.00	-14.51	100	339	AVG
5	1992.500	60.03	-10.29	49.74	70.00	-20.26	100	144	peak
6	1992.500	51.37	-10.29	41.08	50.00	-8.92	100	141	AVG
7	2497.500	59.75	-10.24	49.51	70.00	-20.49	200	26	peak
8	2497.500	47.02	-10.24	36.78	50.00	-13.22	200	31	AVG
9	2995.000	59.21	-9.31	49.90	70.00	-20.10	300	0	peak
10	2995.000	47.10	-9.31	37.79	50.00	-12.21	300	12	AVG
11	4170.000	57.43	-8.01	49.42	74.00	-24.58	200	89	peak

**REMARKS:**

1. The other emission levels were very low against the limit.
2.  $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limit (dBuV/m)}$

<b>Model No.</b>	AW-9	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>Test Date</b>	2015/12/29
<b>Antenna Pole</b>	Horizontal	<b>Antenna Distance</b>	3m
<b>Highest frequency generated or used</b>	2.4GHz	<b>Upper frequency</b>	6GHz
<b>Detector Function</b>	Peak & Average	<b>Tested by</b>	Eason Liu



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	1575.000	63.50	-14.37	49.13	70.00	-20.87	100	41	peak
2	2000.000	58.79	-10.21	48.58	70.00	-21.42	100	339	peak
3	2000.000	50.09	-10.21	39.88	50.00	-10.12	100	334	AVG
4	2562.500	58.21	-10.12	48.09	70.00	-21.91	400	57	peak
5	2562.500	47.94	-10.12	37.82	50.00	-12.18	400	61	AVG
6	2820.000	58.73	-9.64	49.09	70.00	-20.91	200	23	peak
7	2820.000	48.07	-9.64	38.43	50.00	-11.57	200	27	AVG
8	2982.500	58.57	-9.33	49.24	70.00	-20.76	100	360	peak
9	2982.500	47.80	-9.33	38.47	50.00	-11.53	100	355	AVG
10	4212.500	57.74	-7.94	49.80	74.00	-24.20	300	354	peak

**REMARKS:**

- The other emission levels were very low against the limit.
- Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

## 7.4. HARMONICS CURRENT MEASUREMENT

### 7.4.1. LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

**Note:** (1). Class A and Class D are classified according to item 7.4.3.

- (2). According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

### 7.4.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

**7.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-029)

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The classification of EUT is according to section 5 of EN 61000-3-2.
- The EUT is classified as follows:

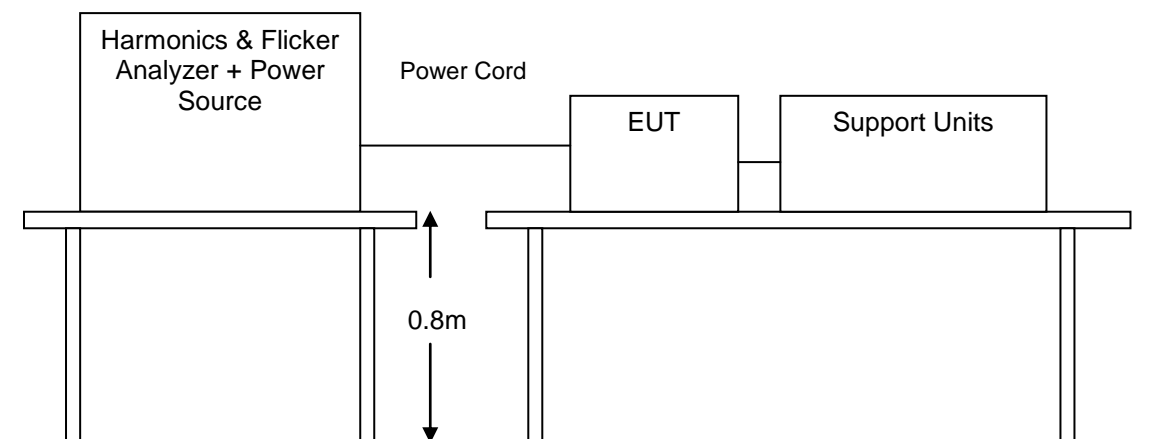
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

**7.4.4. TEST SETUP**

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**7.4.5. TEST RESULTS**

***Not applicable, because EUT not connect to AC Main Source direct.***

## 7.5. VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

### 7.5.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

Test Item	Limit	Remark
$P_{st}$	1.0	$P_{st}$ means short-term flicker indicator.
$P_{lt}$	0.65	$P_{lt}$ means long-term flicker indicator.
$T_{dt}$ (ms)	500	$T_{dt}$ means maximum time that dt exceeds 3.3 %.
$d_{max}$ (%)	4%	$d_{max}$ means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

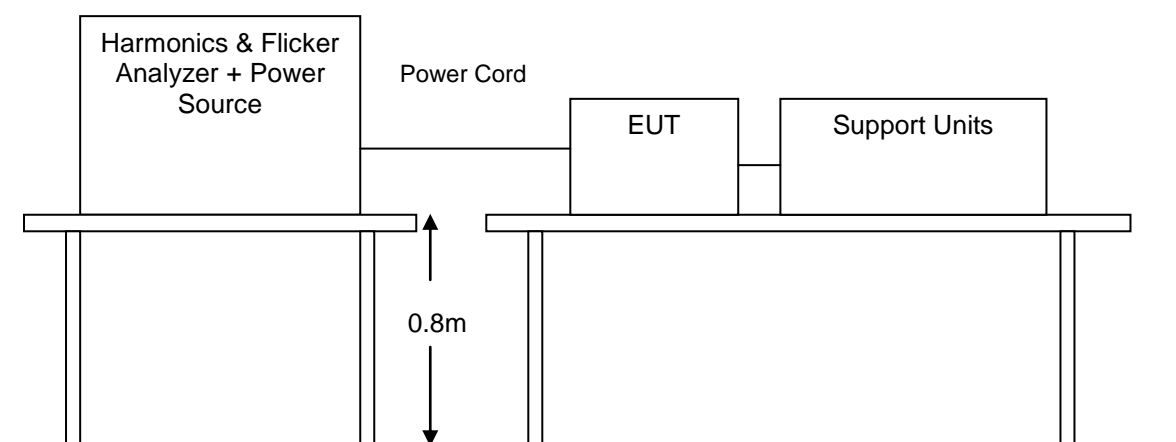
### 7.5.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				



**7.5.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-030)

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

**7.5.4. TEST SETUP**

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**7.5.5. TEST RESULTS**

***Not applicable, because EUT not connect to AC Main Source direct.***

## 8 IMMUNITY TEST

### 8.1. GENERAL DESCRIPTION

Product Standard	ETSI EN 301 489-1 V1.9.2 2011-09; ETSI EN 301 489-3 V1.6.1 2013-08	
	Test Type	Minimum Requirement
<b>Basic Standard, Specification, and Performance Criterion required</b>	EN 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion TT&TR
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~1000 MHz and 1400 ~ 2700MHz, 3V/m, 80% AM(1kHz), Performance Criterion CT&CR
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Power Port: 1kV DC Power Port: 0.5kV Signal Ports and Telecommunication Ports: 0.5kV Performance Criterion TT&TR
	EN 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV DC Power Port ~ line to earth: 0.5kV Signal Ports and Telecommunication Ports ~ line to ground: 1kV Performance Criterion TT&TR
	ISO 7637-2	Meets the requirement as below: Pulse 1, 2a,2b,4: Criteria TT & TR Pulse 3a, 3b: Criteria CT & CR
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test –CS: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion CT&CR
	EN 61000-4-11	Voltage Dips: 1) 0% reduction 0.5 periods Performance TT or TR 2) 0% reduction 1 periods Performance TT or TR 3) 70% reduction 25 periods Performance TT or TR 4) 0% reduction 250 periods Performance TT or TR 5) 30% reduction 0.5 periods Performance CT or CR 6) 60% reduction 5 periods Performance TT or TR 7) >95% reduction 250 periods Performance TT or TR

## 8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

### General performance criteria

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

### Performance table

**Table 1: Performance criteria**

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

## Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement.

(NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance table for EN 301 489-3		
Class 1 SRD equipment		
Criteria	During test	After test
A	Operate as intended No loss of function For equipment type II the minimum performance shall be 12 dB SINAD No unintentional responses	Operate as intended For equipment type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Class 2 SRD equipment		
Criteria	During test	After test
A	Operate as intended No loss of function For equipment type II the minimum performance shall be 6 dB SINAD No unintentional responses	Operate as intended For equipment type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Class 3 SRD equipment		
Criteria	During test	After test
A and B	May be loss of function (one or more) No unintentional responses	Operate as intended, for equipment type II the communication link may be lost, but shall be recoverable by user No degradation of performance Lost functions shall be self-recoverable

## Performance criteria for Continuous phenomena applied to Transmitters (CT)

For equipment of type I or II including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

## Performance criteria for Transient phenomena applied to Transmitters (TT)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

## Performance criteria for Continuous phenomena applied to Receivers (CR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

## Performance criteria for Transient phenomena applied to Receivers (TR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

### 8.3. ELECTROSTATIC DISCHARGE (ESD)

#### 8.3.1. TEST SPECIFICATION

<b>Basic Standard:</b>	EN 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Discharge Voltage:</b>	Air Discharge: 2; 4; 8 kV (Direct) Contact Discharge: 2; 4 kV (Direct/Indirect)
<b>Polarity:</b>	Positive & Negative
<b>Number of Discharge:</b>	Air Discharge: min. 10 times at single test point for each negative and positive polarity Contact Discharge: min. 200 times in total
<b>Discharge Mode:</b>	Single Discharge 1 second minimum

#### 8.3.2. TEST INSTRUMENT

IMMUNITY SHIELDED ROOM				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESD Simulator	SCHAFFNER	NSG 438	170	10/08/2016

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

**8.3.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-022)

The discharges shall be applied in two ways:

a) Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the **Horizontal Coupling Plane (HCP)**. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b) Air discharges at slots and apertures and insulating surfaces:

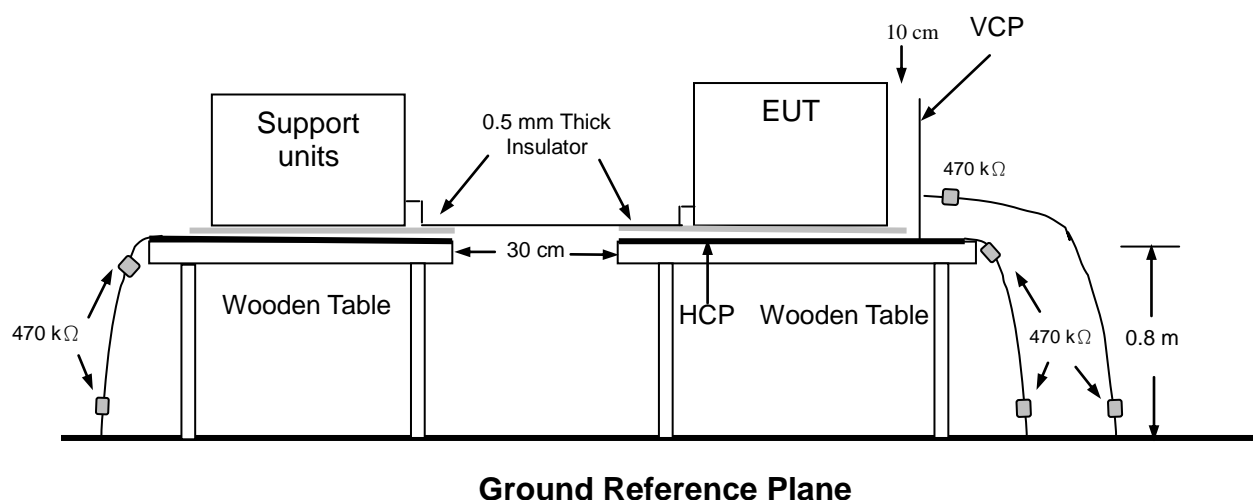
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with EN 61000-4-2:

- a) The EUT was located 0.1 m minimum from all side of the **HCP** (dimensions 1.6m x 0.8m).
- b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
- c) The time interval between two successive single discharges was at least 1 second.
- d) Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- e) Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each **HCP** opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the **HCP** and perpendicular to its front edge during the discharge.
- g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane (VCP)** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



### 8.3.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### NOTE:

##### TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

##### FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

## 8.3.5. TEST RESULTS

Temperature:	26°C	Humidity	46% RH
Pressure	999mbar	Tested By	Sam Lin
Test Mode	Mode 1	Required Passing Performance	Criterion TT&TR

Air Discharge									
Test Points	Test Levels						Results		
	± 2 kV	Performance Criterion	± 4 kV	Performance Criterion	± 8 kV	Performance Criterion	Pass	Fail	Observation
Front	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Back	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Left	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Right	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Top	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Bottom	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2

Contact Discharge									
Test Points	Test Levels						Results		
	± 2 kV	Performance Criterion	± 4 kV	Performance Criterion	± 8 kV	Performance Criterion	Pass	Fail	Observation
Front	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note 1
Left	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Right	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Top	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2
Bottom	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/> CT / <input type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	<input type="checkbox"/>	<input type="checkbox"/>	Note 2

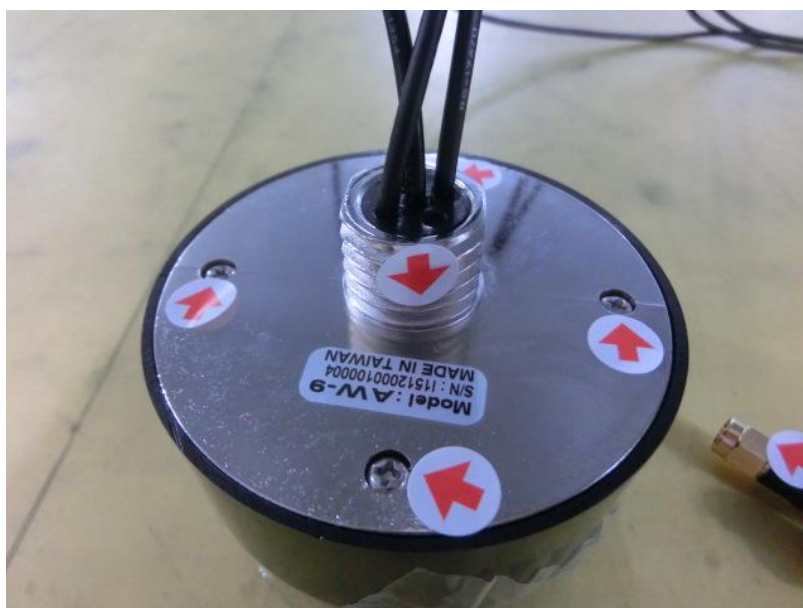
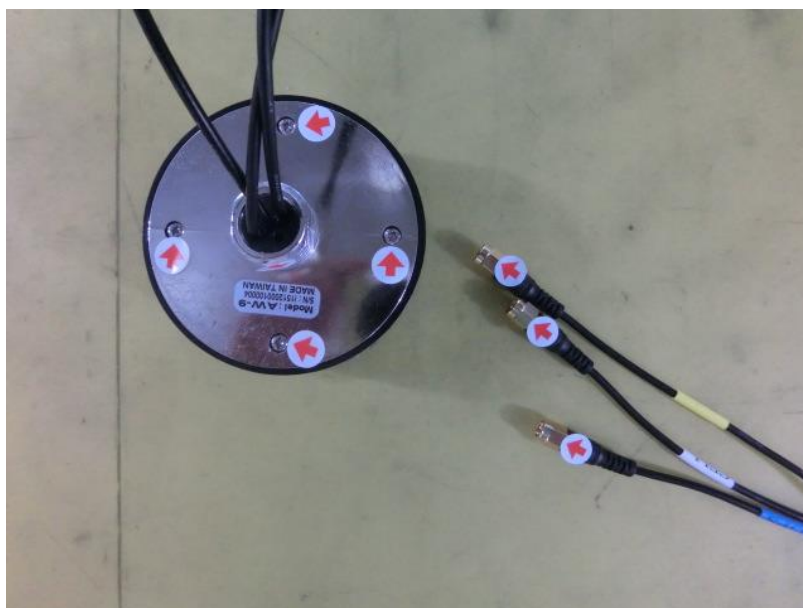
For the tested points to EUT, please refer to attached page. (Red arrow mark for Contact Discharge and Blue arrow mark for Air Discharge)

Discharge To Horizontal Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1

Discharge To Vertical Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> CT / <input checked="" type="checkbox"/> CR <input type="checkbox"/> TT / <input type="checkbox"/> TR	Note 1

**Note:** (1). There was no change compared with initial operation during the test.  
(2). Means that no discharge point had been occurred during that particular coupling method.

### The Photo for Discharge Points of EUT



## 8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)

### 8.4.1. TEST SPECIFICATION

<b>Basic Standard:</b>	EN 61000-4-3
<b>Frequency Range:</b>	80 MHz ~1000 MHz, 1400 MHz ~ 2700 MHz
<b>Field Strength:</b>	3 V/m
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Test Distance:</b>	3 m
<b>Antenna Height:</b>	1.5m

### 8.4.2. TEST INSTRUMENT

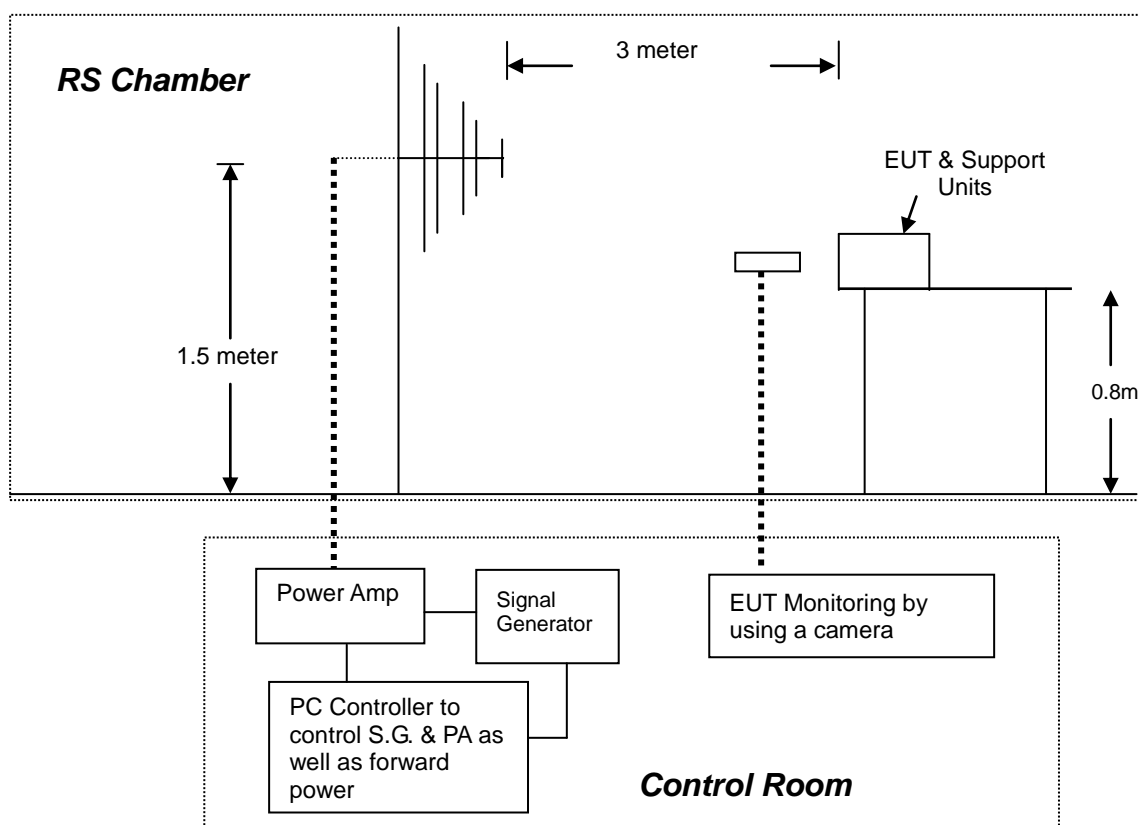
RS Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G	R&S	SMY 02	100094	09/14/2016
RF Test System Controller	AR	SC1000M3	0433953	N.C.R
Power Amplifier	AR	50S1G6M1	0433952	N.C.R
Power Amplifier	AR	250W1000BM1	0579919	N.C.R
SMART SENSOR	R&S	NRP-Z21	101860	08/09/2016
SMART SENSOR	R&S	NRP-Z21	101861	08/09/2016
Bilog Antenna	AR	ATL80M1G	044851	N.C.R
Horn Antenna	SCHWARZBECK	STLP 9149	9149-261	N.C.R
Dual Directional Coupler	AR	DC6180A	433803	N.C.R
Dual Directional Coupler	RD Microswaves	C1-A47NFNF	31	N.C.R
Field Probe	Narda	NBM-520	D-0924	11/19/2016
Test S/W	SW1006 (V1.13)			

**Note:** (1). The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 (2). N.C.R.= No Calibration required.

**8.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-023)

The test procedure was in accordance with EN 61000-4-3

- a) The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b) The frequency range is swept from 80 MHz to 1000 MHz / 1400 MHz to 2700 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.
- c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d) The field strength level was 3V/m.
- e) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

**8.4.4. TEST SETUP**

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**NOTE:****TABLETOP EQUIPMENT**

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

**FLOOR STANDING EQUIPMENT**

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

#### 8.4.5. TEST RESULTS

Temperature	26°C	Humidity	46% RH
Pressure	999mbar	Dwell Time	3 sec.
Tested by	Sam Lin	Test Mode	Mode 1
Required Passing Performance	Criterion CT&CR		

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Performance Criterion	Observation	Result
80 ~ 1000	V&H	0	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
80 ~ 1000	V&H	90	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
80 ~ 1000	V&H	180	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
80 ~ 1000	V&H	270	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
1400 ~ 2700	V&H	0	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
1400 ~ 2700	V&H	90	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
1400 ~ 2700	V&H	180	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS
1400 ~ 2700	V&H	270	3	<input checked="" type="checkbox"/> CT <input checked="" type="checkbox"/> CR	Note 1	PASS

**Note:** (1). There was no change compared with the initial operation during the test.

## 8.5. ELECTRICAL FAST TRANSIENT (EFT)

### 8.5.1. TEST SPECIFICATION

<b>Basic Standard:</b>	EN 61000-4-4
<b>Test Voltage:</b>	AC Power Port: 1kV DC Power Port: 0.5kV Signal Ports and Telecommunication Ports: 0.5kV
<b>Polarity:</b>	Positive & Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Wave-shape:</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	300ms
<b>Test Duration:</b>	Not less than 1 min.

### 8.5.2. TEST INSTRUMENT

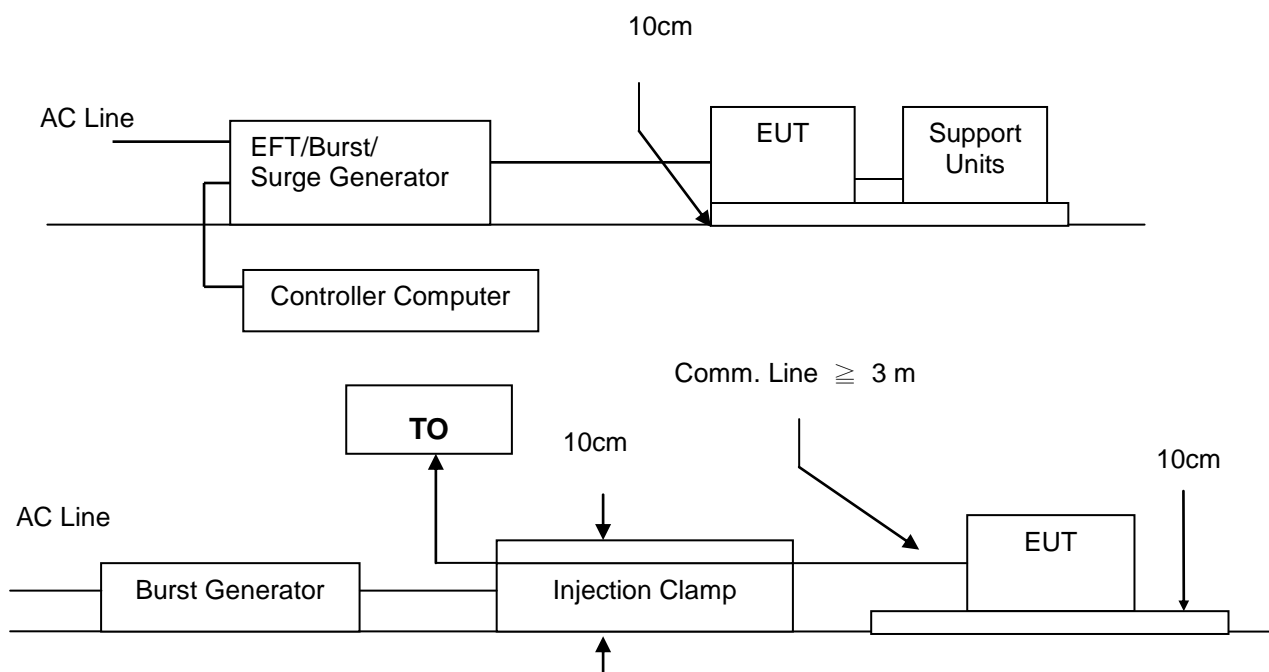
Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

### 8.5.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-024)

- Both positive and negative polarity discharges were applied.
- The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.



#### 8.5.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### NOTE:

##### TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

##### FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

#### 8.5.5. TEST RESULTS

***Not applicable, because EUT not connect to AC Main Source direct.***

## 8.6. SURGE IMMUNITY TEST

### 8.6.1. TEST SPECIFICATION

<b>Basic Standard:</b>	EN 61000-4-5
<b>Wave-Shape:</b>	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV
<b>Test Voltage:</b>	DC Power Port ~ line to earth: 0.5kV Signal Ports and Telecommunication Ports ~ line to ground: 1kV AC Power Port: L-N / L-PE / N-PE DC Power Port: L-PE
<b>Surge Input/Output:</b>	Signal Ports and Telecommunication Ports: T to Ground/ R to Ground
<b>Generator Source Impedance:</b>	2 ohm between networks 12 ohm between network and ground
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	0 / 90 / 180 / 270
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	5 positive and 5 negative at selected points

### 8.6.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

**8.6.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-025)

## a) For EUT power supply:

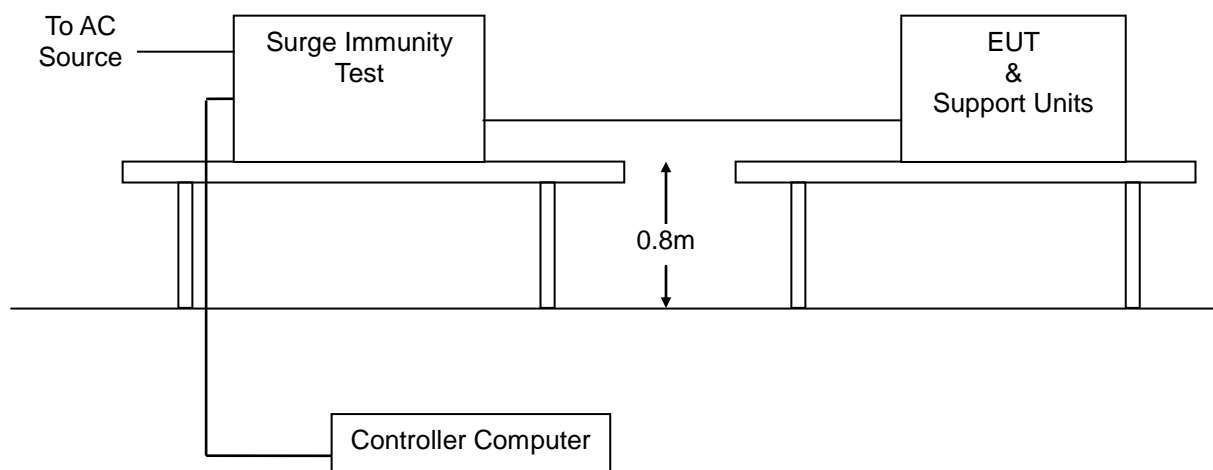
The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

## b) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

## c) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

**8.6.4. TEST SETUP**

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**8.6.5. TEST RESULTS**

***Not applicable, because EUT not connect to AC Main Source direct.***

## 8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

### 8.7.1. TEST SPECIFICATION

**Basic Standard:** EN 61000-4-6

**Frequency Range:** 0.15 MHz ~ 80 MHz

**Field Strength:** 3 Vrms

**Modulation:** 1kHz Sine Wave, 80%, AM Modulation

**Frequency Step:** 1 % of preceding frequency value

**Coupled cable:** Power Mains, Unshielded

**Coupling device:**

- ☐ CDN-M2 (2 wires)
- ☐ CDN-M3 (3 wires)
- ☐ CDN-T2 for Line
- ☐ CDN-T4 for LAN

### 8.7.2. TEST INSTRUMENT

CS Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

### 8.7.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-026)

The EUT shall be tested within its intended operating and climatic conditions.

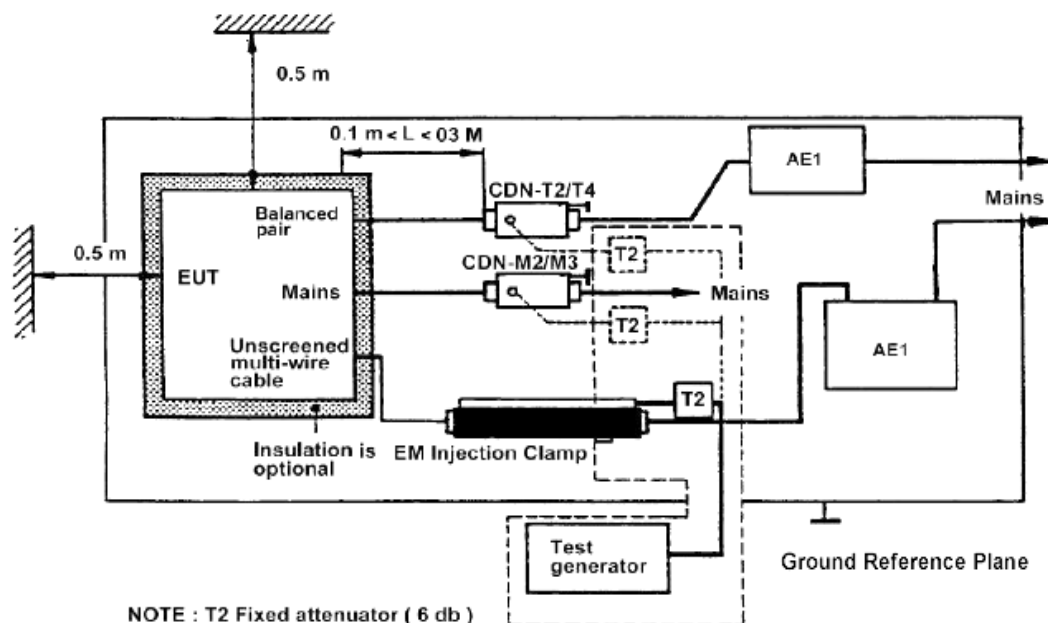
The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was  $1.5 \times 10^{-3}$  decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.

Attempts were made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

#### 8.7.4. TEST SETUP



**Note:** (1). The EUT is setup 0.1m above Ground Reference Plane  
 (2). The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**NOTE:**

**TABLE-TOP AND FLOOR-STANDING EQUIPMENT**

The equipment to be tested was placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

#### 8.7.5. TEST RESULTS

***Not applicable, because EUT not connect to AC Main Source direct.***

## 8.8. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

### 8.8.1. TEST SPECIFICATION

<b>Basic Standard:</b>	EN 61000-4-11
<b>Test duration time:</b>	Minimum three test events in sequence
<b>Interval between event:</b>	Minimum 10 seconds
<b>Angle:</b>	0~360 degree
<b>Step:</b>	45 degree

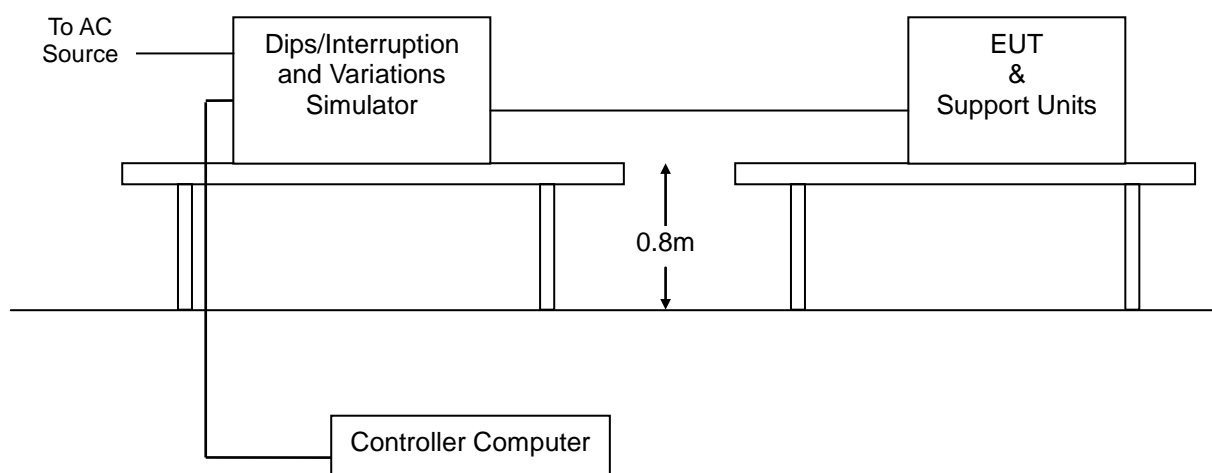
### 8.8.2. TEST INSTRUMENT

Immunity shielded room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

### 8.8.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-028)

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. Setting the parameter of tests and then perform the test software of test simulator.
3. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
4. Recording the test result in test record form.

### 8.8.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**8.8.5. TEST RESULTS**

*Not applicable, because EUT not connect to AC Main Source direct.*

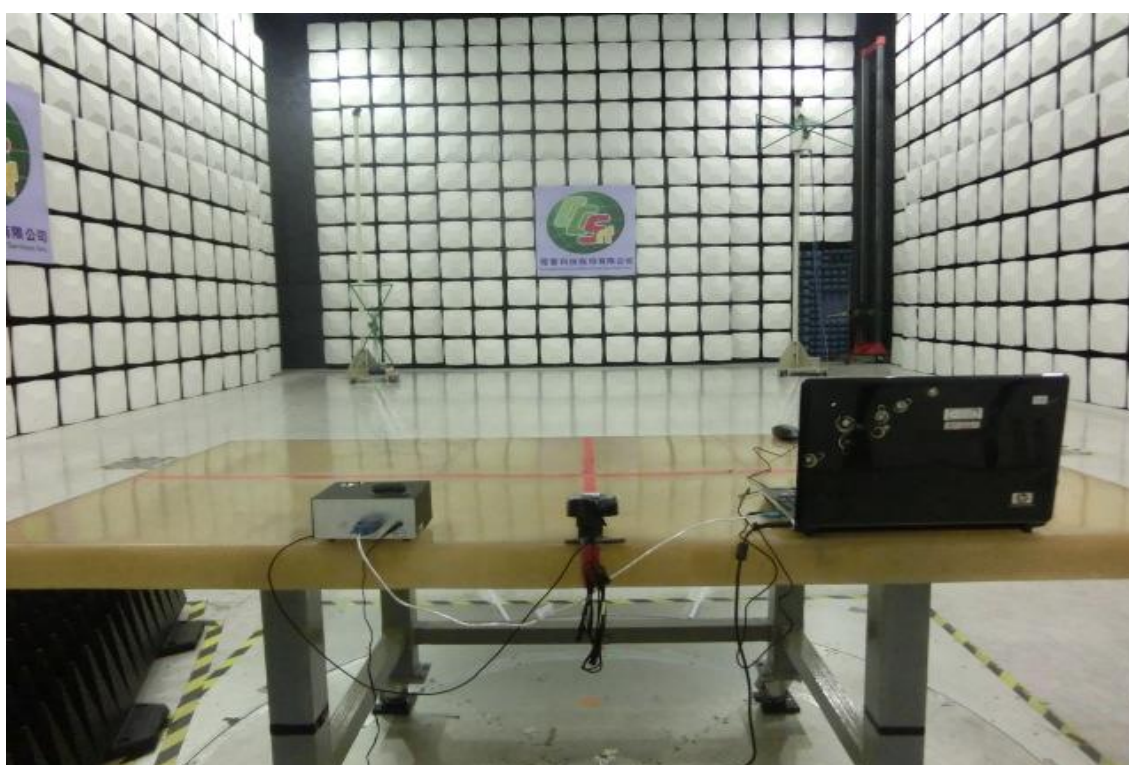


## 9 PHOTOGRAPHS OF THE TEST CONFIGURATION

### RADIATED EMISSION TEST

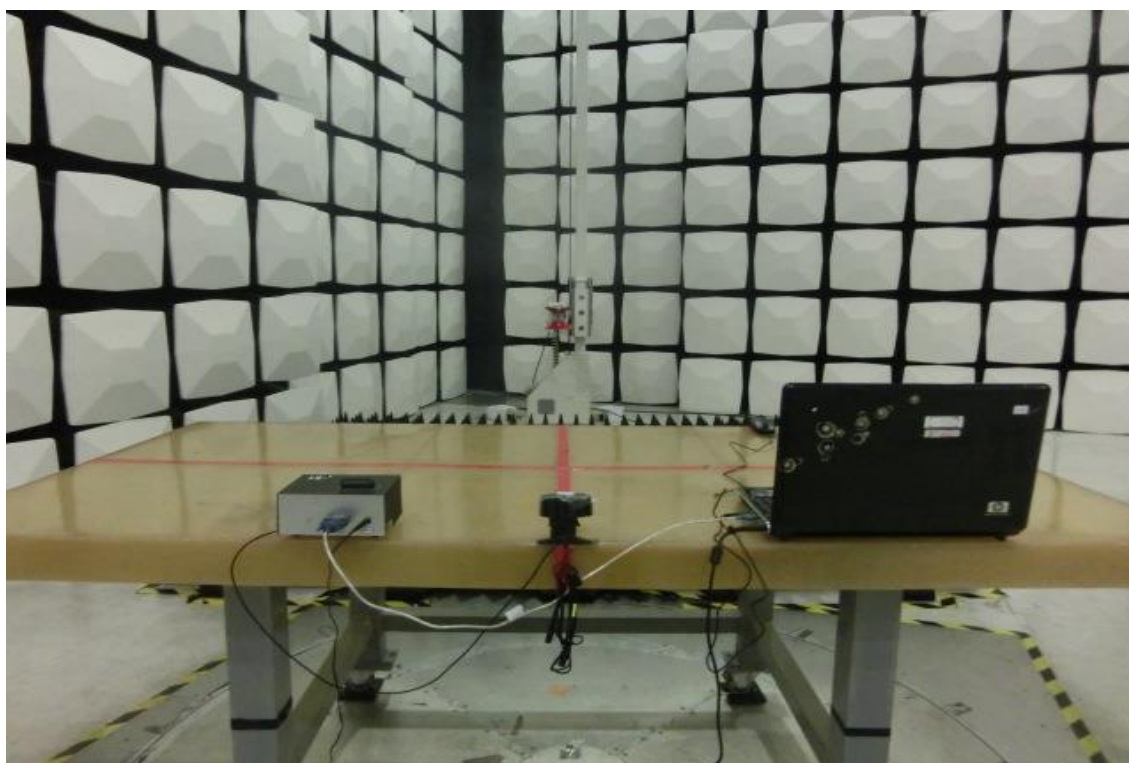
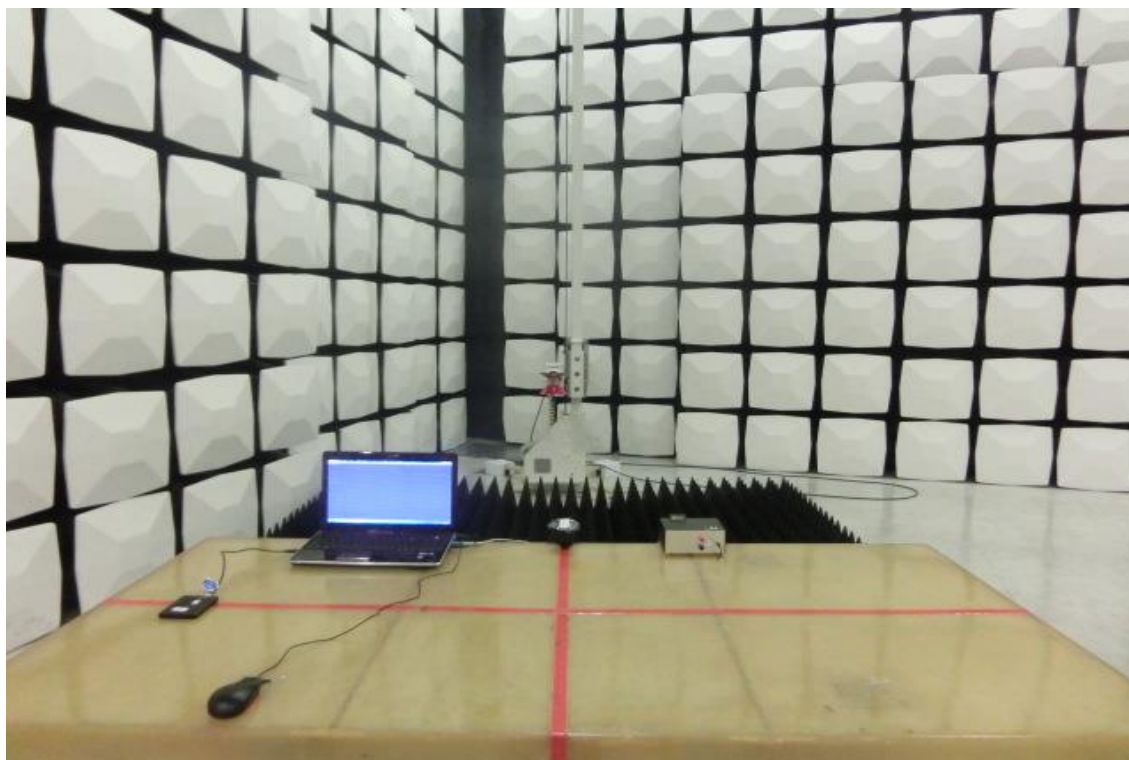
Below 1GHz

Mode 1





**Above 1GHz  
Mode 1**



## ESD Test



## RS Test

