CE EMC TEST REPORT

REPORT NO.	:	EH5N2614
MODEL NO.	:	ML-60-35, ML-60-35-1
RECEIVED DATE	:	Nov. 30, 2015
FINAL TESTED DATE	:	Dec. 25, 2015
ISSUED DATE	:	Feb. 16, 2016
TEST STANDARD	:	EN 301 489-1 V1.9.2 (2011-09), Class B EN 301 489-17 V2.2.1 (2012-09)
APPLICANT	:	Accton Technology Corporation
ADDRESS	:	No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C
MANUFACTURER	:	Joy Technology (ShenZhen) Corporation
ADDRESS	:	HengKeng Ind., Shangpai, Shangwu,Aiqun Rd., Shiyan Town,Shenzhen 518108 China
ISSUED BY	:	SPORTON International Inc.
LAB ADDRESS	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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Testing Laboratory
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History of This Test Report

REPORT NO.	VERSION	ISSUED DATE	Description
EH5N2614	Rev. 01	Feb. 16, 2016	Initial issue of report

Project No: CB10502020

VERIFICATION OF COMPLIANCE

EQUIPMENT NAME	:	Metrolinq Outdoor 60GHz PTP + 5 GHz
BRAND NAME	:	IgniteNet
MODEL NO.	:	ML-60-35, ML-60-35-1
APPLICANT	:	Accton Technology Corporation
ADDRESS	:	No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C
FINAL TESTED DATE	:	Dec. 25, 2015
TEST STANDARD	:	EN 301 489-1 V1.9.2 (2011-09), Class B EN 301 489-17 V2.2.1 (2012-09)

I **HEREBY** DECLARE THAT:

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 1999/5/EC**.

The above equipment has been tested by **SPORTON International Inc.** LAB., and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Beck Wu

Beck Wu
SPORTON INTERNATIONAL INC.

1. Summary of Test Results

After estimating all the combination of every test mode, the result shown as below is the worst case.

The EUT has been tested according to the following specifications.

Applicable Standard: EN 301 489-1 V1.9.2 (2011-09)			
Test Standard	**Test Type**	**Result**	**Remarks**
EN 55022:2010/AC:2011	AC Power Port Conducted emission test 150 kHz – 30 MHz	PASS	Meet minimum passing margin is -16.67dB at 24.7904MHz.
	Telecom Port Conducted emission test 150 kHz – 30 MHz	PASS	Meet minimum passing margin is -7.34dB at 10.0009MHz.
	Radiated emission test 30 MHz – 1,000 MHz @ 10 m 1,000 MHz – 6,000 MHz @ 3 m	PASS	Meet minimum passing margin is -4.36dB at 63.95MHz.
EN 61000-3-2:2014	Harmonic Current emission test	-	Note1
EN 61000-3-3:2013	Voltage Fluctuations and Flicker tests	-	Note1

Note1:
The EUT was powered by PoE, and the PoE was for measurement only, would not be marketed. Thus, it's not necessary to apply to Harmonic Current emission, Voltage Fluctuations and Flicker tests.

Applicable Standard: EN 301 489-1 V1.9.2 (2011-09)		
Test Standard	**Test Type**	**Pass Criterion**
EN 61000-4-2:2009	**Electrostatic discharge immunity test** ± 2, 4 kV Contact Discharge ± 2, 4, 8 kV Air Discharge Standard Criterion B	**B**
EN 61000-4-3:2006/A1:2008/A2:2010	**Radiated immunity test** Frequency Range：80 MHz to 1,000 MHz and 1,400 MHz to 2,700 MHz Electromagnetic field：3 V/m (unmodulated, r.m.s) Amplitude modulated：80 % AM (1 kHz) Standard Criterion A	**A**
EN 61000-4-4:2012	**Electrical fast transient / burst immunity test** I/O ports 5/50 ns, ± 0.5 kV, 5 kHz Standard Criterion B	**A (Note)**
EN 61000-4-5:2014	**Surge immunity test** Telecommunication/Signal ports： outdoor (1.2/50 us)：± 0.5, 1 kV Standard Criterion B	**A (Note)**
EN 61000-4-6:2014	**Conducted immunity test** Frequency Range：150 kHz to 80 MHz Electromagnetic field：3 V (unmodulated, r.m.s) Amplitude modulated：80 % AM (1 kHz) Standard Criterion A	**A (Note)**
EN 61000-4-11:2004	**Voltage dips, short interruptions and voltage variations immunity tests** 1. Dip 0% residual 10 ms (0.5 cycles) – Standard Criterion B	**(Note)**
	2. Dip 0% residual 20 ms (1.0 cycles) – Standard Criterion B	**(Note)**
	3. Dip 70% residual 500 ms (25 cycles) – Standard Criterion B	**(Note)**
	4. Interruption 0% residual 5000 ms (250 cycles) – Standard Criterion C	**(Note)**

Note:

The EUT was powered by PoE, and the PoE was for measurement only, would not be marketed. Thus, It's not necessary to apply to EFT (AC power port), Surge (AC power port), CS (AC power port) and DIP tests.

2. General Description of Equipment under Test

Product Detail	
Equipment Name	Metrolinq Outdoor 60GHz PTP + 5 GHz
Model No.	ML-60-35, ML-60-35-1
Brand Name	IgniteNet
Power Supply	From PoE

2.1. Feature of Equipment under Test

1. The EUT supports 5GHz and 60GHz wireless function.
2. Accessories: N/A
3. The EUT has two model names which are identical to each other in all aspects except for the following table:

Model Name	5GHz	60GHz	Remark
ML-60-35	Internal / Dish Ant.	Internal / Dish Ant.	Outdoor use
ML-60-35-1	External / Sector Ant.	Internal / Dish Ant.	

Note: Both models were tested and recorded in the report. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3. Test Configuration of Equipment under Test

3.1. Test Mode

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Conducted Emissions	
Test Mode	Description
1	Place EUT in Y axis - 60GHz
2	Place EUT in Y axis - 5GHz - External Ant.
3	Place EUT in Y axis - 5GHz - Internal Ant.
Mode 1 generated the worst test result, so it was recorded in this report.	

Disturbances at Telecommunication Ports	
Test Mode	Description
1	Place EUT in Y axis - 60GHz - LAN Port / 10Mbps
2	Place EUT in Y axis - 60GHz - LAN Port / 100Mbps
3	Place EUT in Y axis - 60GHz - LAN Port / 1Gbps
4	Place EUT in Y axis - 60GHz - PoE LAN Port / 10Mbps
5	Place EUT in Y axis - 60GHz - PoE LAN Port / 100Mbps
6	Place EUT in Y axis - 60GHz - PoE LAN Port / 1Gbps
Mode 1 and Mode 4 have been evaluated to be the worst case among Mode 1~6, thus measurement for Mode 7 ~ 10 will follow this same test mode.	
7	Place EUT in Y axis - 5GHz - External Ant. - LAN Port / 10Mbps
8	Place EUT in Y axis - 5GHz - External Ant. - PoE LAN Port / 10Mbps
9	Place EUT in Y axis - 5GHz - Internal Ant. - LAN Port / 10Mbps
10	Place EUT in Y axis - 5GHz - Internal Ant. - PoE LAN Port / 10Mbps
Mode 1 and Mode 4 are worst test result among Mode 1 ~ Mode 10, and the test result of those two modes are selected to record in the test report.	

Radiated Emissions	
Test Mode	Description
1	Place EUT in Y axis - 60GHz
2	Place EUT in Y axis - 5GHz - External Ant.
3	Place EUT in Y axis - 5GHz - Internal Ant.
For Radiated Emission test below 1GHz: Mode 2 generated the worst test result, so it was recorded in this report. For Radiated Emission test above1GHz: Mode 2 generated the worst test result for Radiated emission below 1GHz test, thus the measurement for Radiated emission above 1GHz test will follow this same test configuration.	

ESD、RS、EFT、Surge、CS	
Test Mode	Description
1	Place EUT in Y axis - 60GHz
2	Place EUT in Y axis - 5GHz - External Ant.
3	Place EUT in Y axis - 5GHz - Internal Ant.

Note1: The EUT can used at Y-axis only.

Note2: The power of EUT is supplied by PoE. But the PoE is for measurement only, and it would not be marketed.

Equipment	Brand Name	Model Name
PoE	ITE	NU24-F240100-I2

3.2. 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.

For Conducted Emissions Test:

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
PoE*2	ITE	NU24-F240100-I2	N/A
Flash disk3.0	Transcend	639205 7755	DoC
Voltage and current device	HUA	85C1-50V	N/A
60G+5G WLAN AP (Device)	Accton	OAP920920	N/A

For Radiated Emissions Test:

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
PoE	ITE	NU24-F240100-I2	N/A
Flash disk3.0	Transcend	639205 7755	DoC
Voltage and current device	HUA	85C1-50V	N/A

For EMS test:

For Test Mode 2 ~ Mode 3

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
PoE	ITE	NU24-F240100-I2	N/A
Flash disk3.0	Transcend	639205 7755	DoC
Voltage and current device	HUA	85C1-50V	N/A

For Test Mode 1

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
PoE	ITE	NU24-F240100-I2	N/A
Flash disk3.0	Transcend	639205 7755	DoC
Voltage and current device	HUA	85C1-50V	N/A
60G+5G WLAN AP (Device)	Accton	OAP920920	N/A

3.3. EUT Operation Condition

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For Conducted Emissions and Radiated Emissions Test:

During the test, the following programs under WIN 7 were executed:

The remote notebook executed “ping.exe” to link with the EUT to maintain the connection by LAN and WLAN.

The Voltage and current device linked with the EUT to monitor data.

For Telecom Port Conducted emission test:

At the same time, the remote notebook executed “LAN TEST" to link with the EUT to traffic packet data generated software and keep 10% traffic load to link with the remote workstation by LAN.

<EMS>

During the test, the following programs under WIN 7 were executed:

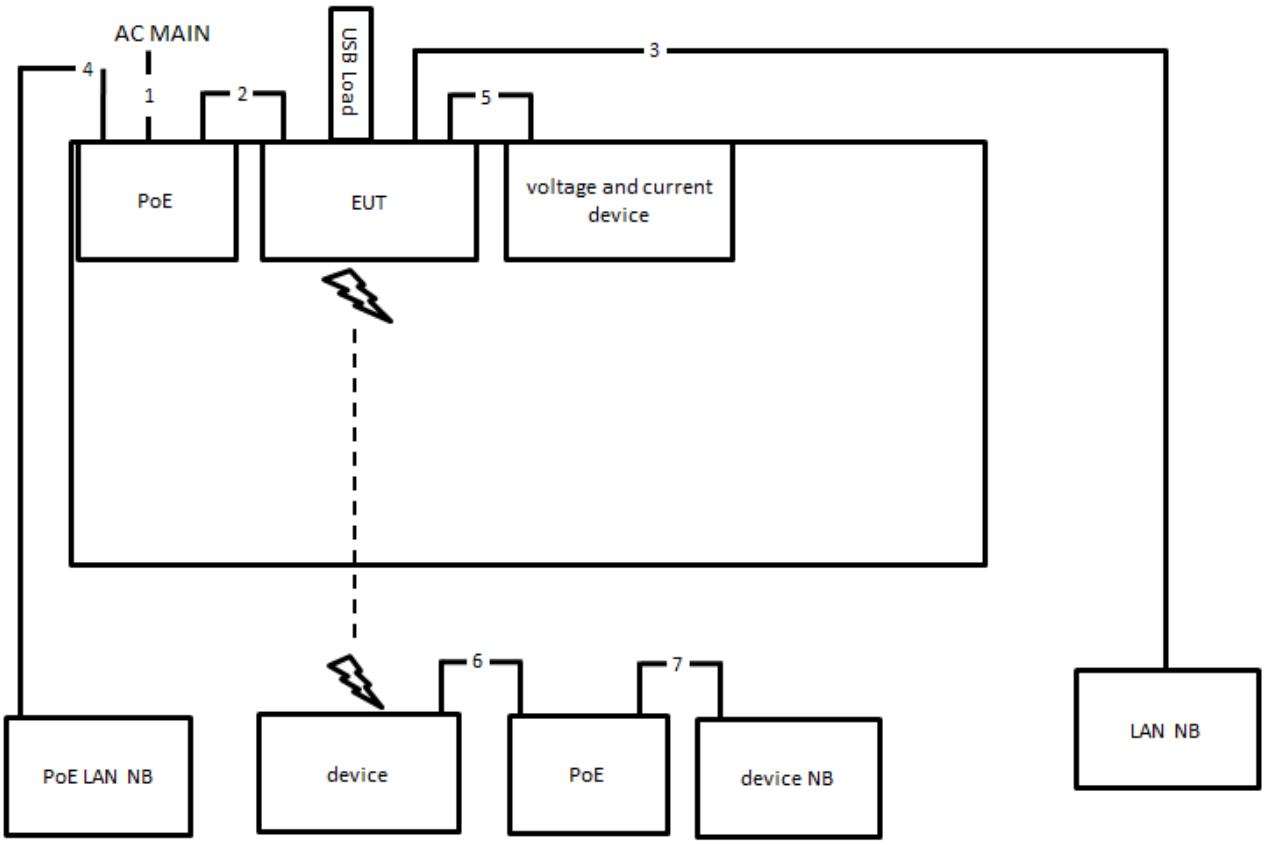
The remote notebook executed “ping.exe” to link with the EUT to maintain the connection by LAN and WLAN.

The Voltage and current device linked with the EUT to monitor data.

3.4. Connection Diagram of Test System

3.4.1. AC Power Line Conduction Emissions Test Configuration

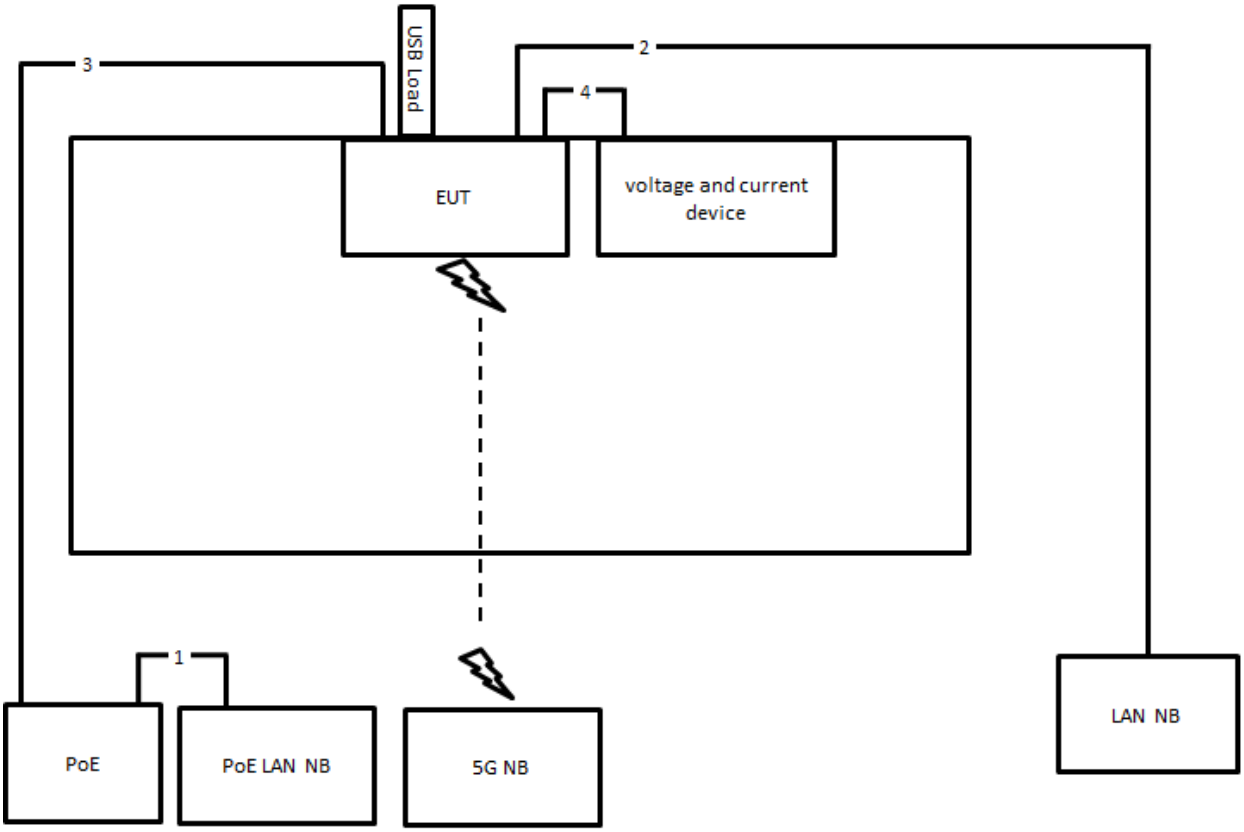
Test Mode: Mode 1



Item	Connection	Shielded	Length
1	Power cable	No	1m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	Console cable	No	0.4m
6	RJ-45 cable	No	1.5m
7	RJ-45 cable	No	1.5m

3.4.2. Radiation Emissions Test Configuration

Test Mode: Mode 2



Item	Connection	Shielded	Length
1	RJ-45 cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	Console cable	No	0.4m

4. General Information of Test

4.1. Test Facility

<EMI>

Test Site Location	:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
TEL	:	886-3-656-9065
FAX	:	886-3-656-9085
Test Site No.	:	Conduction: CO01-CB Radiation: 10CH01-CB

<EMS>

Test Site Location	:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
TEL	:	886-3-656-9065
FAX	:	886-3-656-9085

4.2. Test Voltage

Power Type	Test Voltage
AC Power Supply	230 V / 50 Hz

4.3. Frequency Range Investigated

EMI Test Items	Frequency Range
Conducted emission test	150 kHz to 30 MHz
Radiated emission test	30 MHz to 6,000 MHz
EMS Test Items	**Frequency Range**
Radio frequency electromagnetic field immunity test	80 MHz to 1,000 MHz, 1,400 MHz to 2,700 MHz
Conducted immunity test	150 kHz to 80 MHz

4.4. Test Distance

Test Items	Test Distance
Radiated emission test below 1 GHz (30 MHz to 1,000 MHz)	10 m
Radiated emission test above 1 GHz (1,000 MHz to 6,000 MHz)	3 m
Radio frequency electromagnetic field immunity test	3 m

5. Test of Conducted Emission

5.1. Limit

5.1.1. Limit for AC power ports：

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

5.1.2. Limit for Telecommunication ports：

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	QP	AV	QP	AV
0.15~0.5	84~74	74~64	40~30	30~20
0.5~30	74	64	30	20

5.2. Description of Major Test Instruments

Test Receiver	R&S ESCS 30
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

5.3. Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.

b. Connect EUT to the power mains through a line impedance stabilization network (LISN).

c. Connect Telecommunication port to ISN (Impedance Stabilization Network).

d. All the support units are connect to the other LISN.

e. The LISN provides 50 Ω coupling impedance for the measuring instrument.

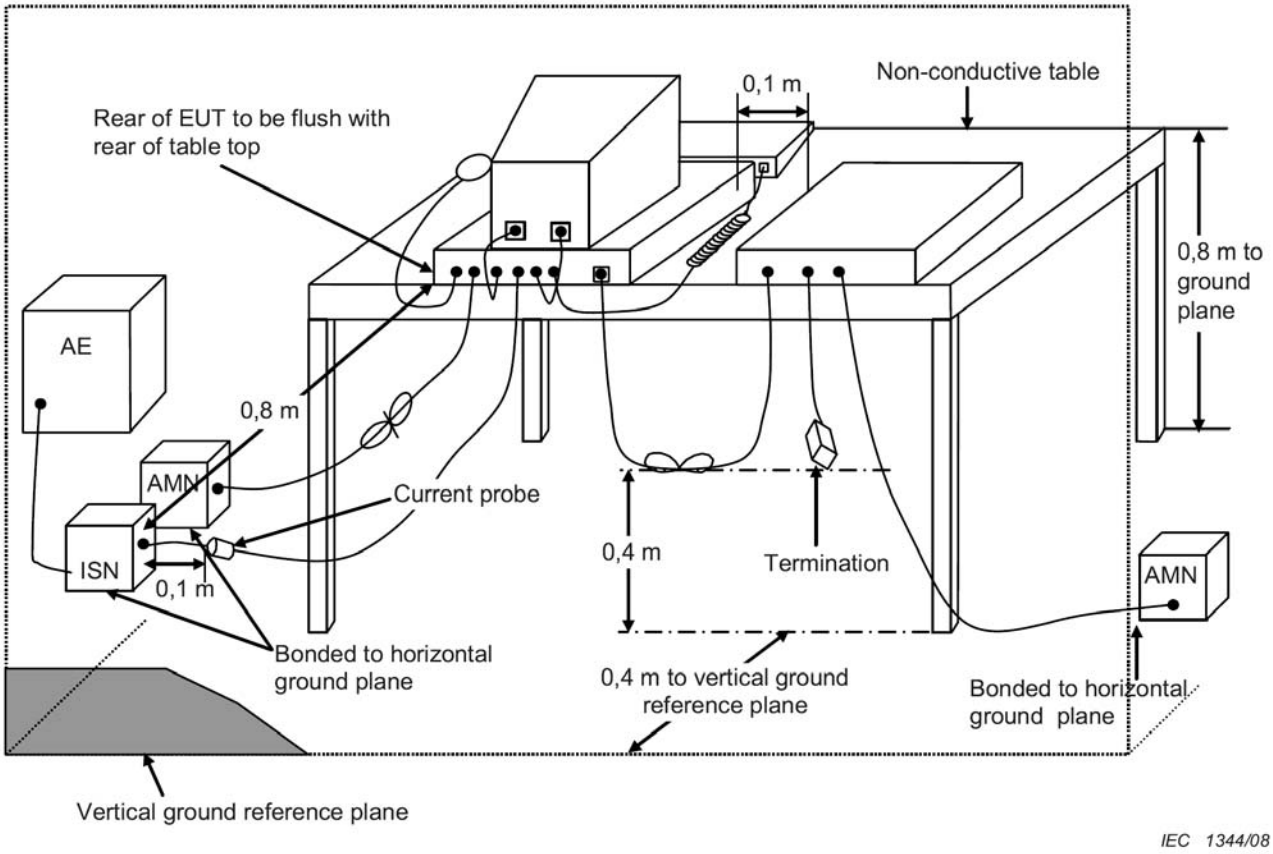
f. The CISPR states that a 50 Ω, 50 uH LISN should be used.

g. Both sides of AC line were checked for maximum conducted interference.

h. The frequency range from 150 kHz to 30 MHz was searched.

i. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.4. Typical Test Setup Layout of Conducted Emission and disturbances at telecommunication ports

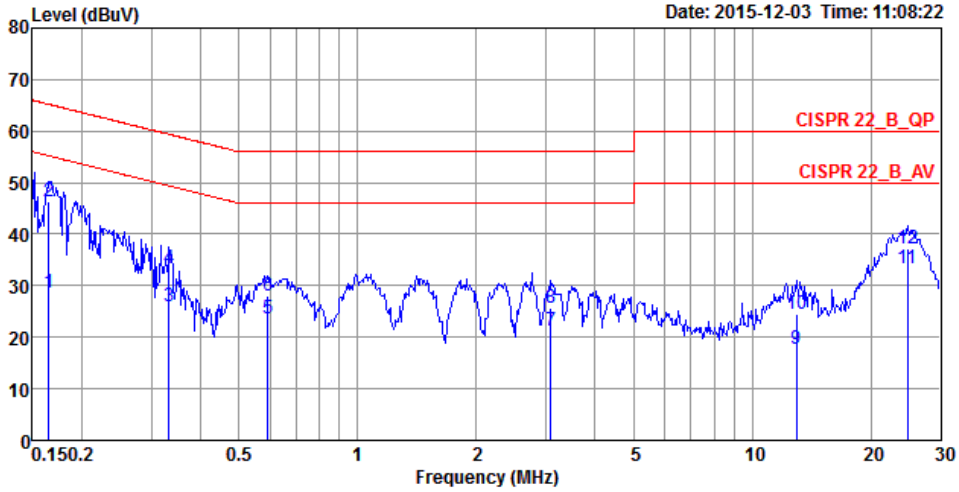


5.5. Test Result of AC Power Ports

Temperature	25℃	Humidity	58%
Test Engineer	Parody Lin	Frequency Range	0.15 MHz to 30 MHz
Test Mode	Mode 1		

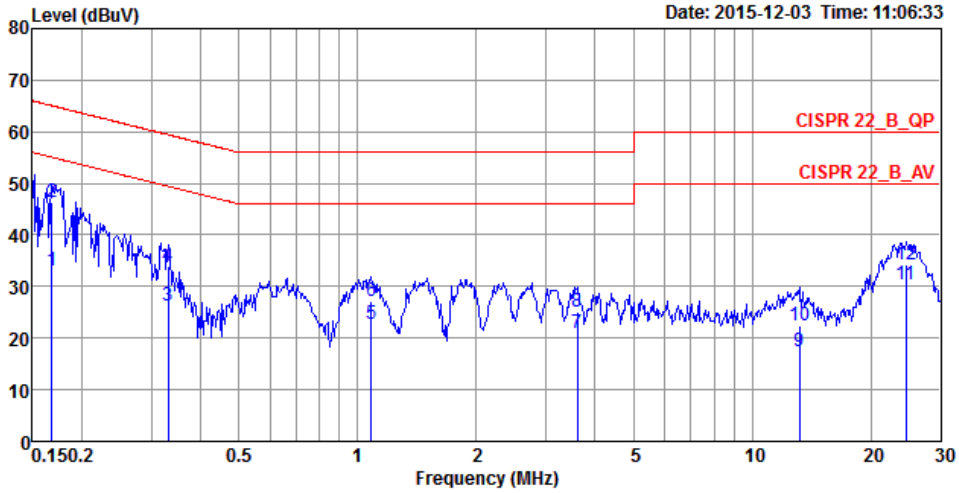
- Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
- Margin = - Limit + (Read Level + LISN Factor + Cable Loss)
- All emissions not reported here are more than 10 dB below the prescribed limit.
- The test was passed at the minimum margin that marked by a frame in the following table

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1650	28.78	-26.43	55.21	18.83	9.93	0.02	LINE	Average
2	0.1650	46.47	-18.74	65.21	36.52	9.93	0.02	LINE	QP
3	0.3321	25.99	-23.41	49.40	16.02	9.93	0.04	LINE	Average
4	0.3321	33.47	-25.93	59.40	23.50	9.93	0.04	LINE	QP
5	0.5916	23.61	-22.39	46.00	13.63	9.94	0.04	LINE	Average
6	0.5916	28.11	-27.89	56.00	18.13	9.94	0.04	LINE	QP
7	3.0901	21.18	-24.82	46.00	11.12	10.01	0.05	LINE	Average
8	3.0901	25.57	-30.43	56.00	15.51	10.01	0.05	LINE	QP
9	12.9199	17.81	-32.19	50.00	7.29	10.27	0.25	LINE	Average
10	12.9199	24.36	-35.64	60.00	13.84	10.27	0.25	LINE	QP
11	24.7904	33.33	-16.67	50.00	22.50	10.56	0.27	LINE	Average
12	24.7904	37.30	-22.70	60.00	26.47	10.56	0.27	LINE	QP

Neutral

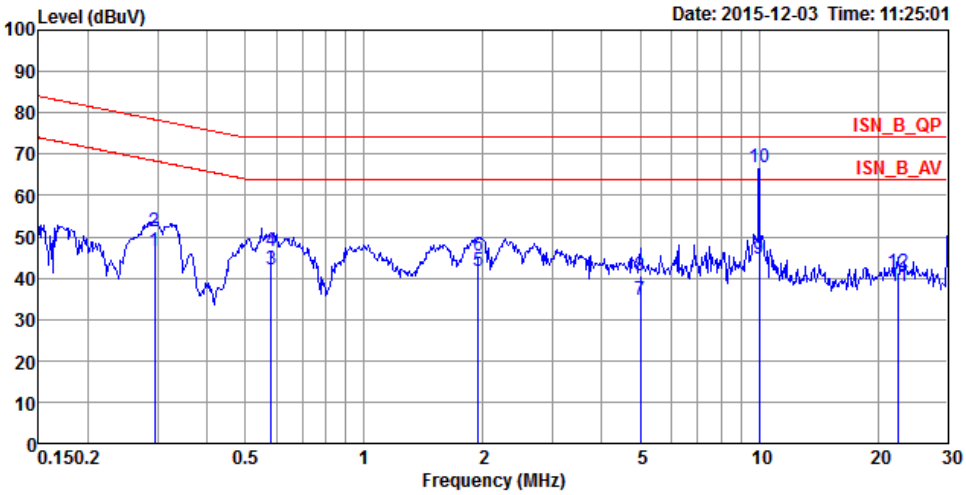


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1677	33.00	-22.08	55.08	23.20	9.78	0.02	NEUTRAL	Average
2	0.1677	46.40	-18.68	65.08	36.60	9.78	0.02	NEUTRAL	QP
3	0.3303	26.18	-23.26	49.44	16.35	9.79	0.04	NEUTRAL	Average
4	0.3303	33.96	-25.48	59.44	24.13	9.79	0.04	NEUTRAL	QP
5	1.0824	22.68	-23.32	46.00	12.82	9.81	0.05	NEUTRAL	Average
6	1.0824	27.03	-28.97	56.00	17.17	9.81	0.05	NEUTRAL	QP
7	3.6034	20.89	-25.11	46.00	10.96	9.87	0.06	NEUTRAL	Average
8	3.6034	25.15	-30.85	56.00	15.22	9.87	0.06	NEUTRAL	QP
9	13.1966	17.27	-32.73	50.00	6.94	10.08	0.25	NEUTRAL	Average
10	13.1966	22.58	-37.42	60.00	12.25	10.08	0.25	NEUTRAL	QP
11	24.5291	30.41	-19.59	50.00	19.87	10.27	0.27	NEUTRAL	Average
12	24.5291	34.33	-25.67	60.00	23.79	10.27	0.27	NEUTRAL	QP

5.6. Test Result of Telecommunication Ports

Temperature	25℃	**Humidity**	58%
Test Engineer	Parody Lin	**Frequency Range**	0.15 MHz to 30 MHz
Test Mode	Mode 1: EUT - 60GHz - LAN Port / 10Mbps		

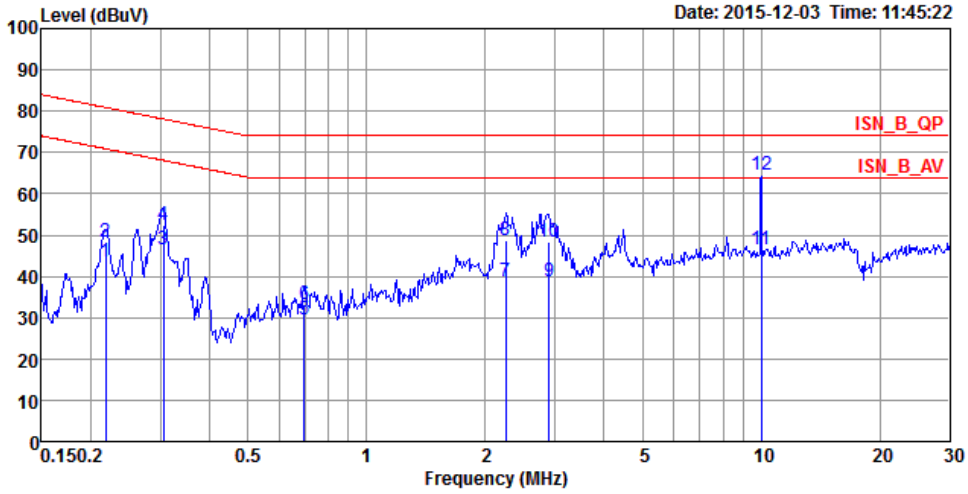
- Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
- Margin = - Limit + (Read Level + LISN Factor + Cable Loss)
- All emissions not reported here are more than 10 dB below the prescribed limit.
- The test was passed at the minimum margin that marked by a frame in the following table



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2955	46.33	-22.04	68.37	36.39	9.90	0.04		Average
2	0.2955	51.33	-27.04	78.37	41.39	9.90	0.04		QP
3	0.5823	42.04	-21.96	64.00	32.25	9.75	0.04		Average
4	0.5823	46.60	-27.40	74.00	36.81	9.75	0.04		QP
5	1.9489	41.80	-22.20	64.00	32.12	9.62	0.06		Average
6	1.9489	45.49	-28.51	74.00	35.81	9.62	0.06		QP
7	5.0046	34.60	-29.40	64.00	24.93	9.58	0.09		Average
8	5.0046	40.48	-33.52	74.00	30.81	9.58	0.09		QP
9	10.0009	44.68	-19.32	64.00	34.86	9.57	0.25		Average
10	10.0009	66.66	-7.34	74.00	56.84	9.57	0.25		QP
11	22.5354	38.08	-25.92	64.00	27.89	9.92	0.27		Average
12	22.5354	41.37	-32.63	74.00	31.18	9.92	0.27		QP

Temperature	25℃	Humidity	58%
Test Engineer	Parody Lin	Frequency Range	0.15 MHz to 30 MHz
Test Mode	Mode 4: EUT - 60GHz - PoE LAN Port / 10Mbps		

- Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
- Margin = - Limit + (Read Level + LISN Factor + Cable Loss)
- All emissions not reported here are more than 10 dB below the prescribed limit.
- The test was passed at the minimum margin that marked by a frame in the following table



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2185	43.65	-27.23	70.88	33.64	9.99	0.02		Average
2	0.2185	48.44	-32.44	80.88	38.43	9.99	0.02		QP
3	0.3051	46.48	-21.62	68.10	36.55	9.89	0.04		Average
4	0.3051	52.49	-25.61	78.10	42.56	9.89	0.04		QP
5	0.6936	29.55	-34.45	64.00	19.78	9.73	0.04		Average
6	0.6936	33.12	-40.88	74.00	23.35	9.73	0.04		QP
7	2.2486	38.76	-25.24	64.00	29.09	9.61	0.06		Average
8	2.2486	48.78	-25.22	74.00	39.11	9.61	0.06		QP
9	2.8998	38.84	-25.16	64.00	29.19	9.60	0.05		Average
10	2.8998	48.47	-25.53	74.00	38.82	9.60	0.05		QP
11	9.9999	46.43	-17.57	64.00	36.61	9.57	0.25		Average
12	9.9999	64.52	-9.48	74.00	54.70	9.57	0.25		QP

6. Test of Radiated Emission

6.1. Limit

Radiated Emission below 1 GHz test at 10 m:

Frequency (MHz)	QP (dBuV/m)
30~230	30
230~1,000	37

Radiated Emission above 1 GHz test at 3 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
1,000~3,000	70	50
3,000~6,000	74	54

6.2. Description of Major Test Instruments

6.2.1. 30 MHz ~ 1,000 MHz

Amplifier	Agilent 8447D
RF Gain	25 dB
Signal Input	9 kHz to 1.3 GHz

Spectrum Analyzer	Agilent N9038A
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Resolution Bandwidth	120 kHz
Signal Input	9 kHz to 8.4 GHz

Test Receiver	R&S ESCI
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Resolution Bandwidth	120 kHz
Signal Input	9 kHz to 3 GHz

6.2.2. Above 1 GHz

Amplifier	Agilent 8449B
RF Gain	35 dB
Signal Input	1 GHz to 26.5 GHz

Spectrum Analyzer	Agilent N9038A
Start Frequency	1 GHz
Stop Frequency	6 GHz
Resolution Bandwidth	1 MHz
Signal Input	9 kHz to 8.4 GHz

6.3. Test Procedures

<Below 1 GHz>:

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

<Above 1 GHz>:

a. Same test set up as below 1 GHz radiated testing.

b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.

c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.

d. The table was rotated 360 degrees to determine the position of the highest radiation.

e. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

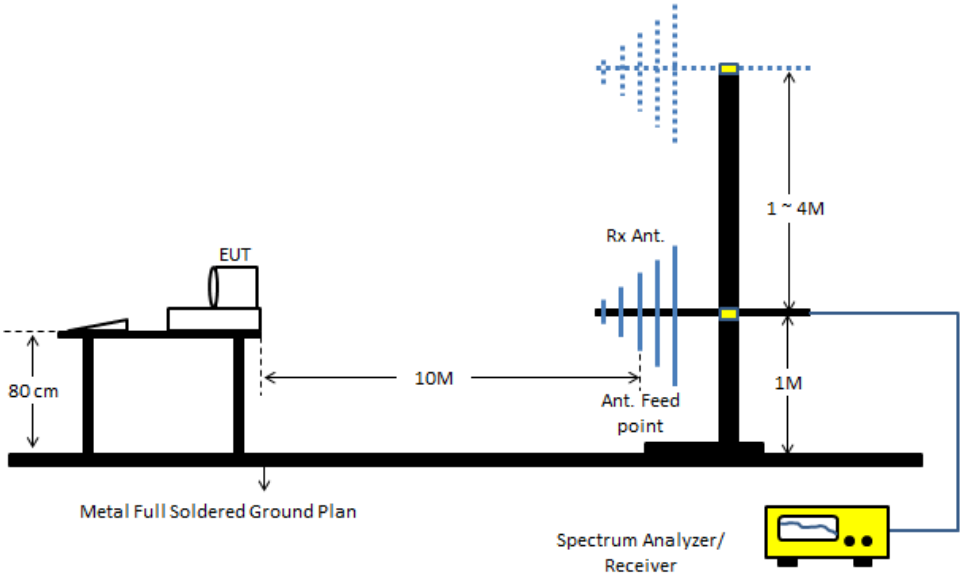
f. Set the DRG Horn Antenna at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.

g. When EUT locating on the turn-table, and its height is over 172 cm (Antenna's 3dB beam width of 6 GHz is 27°), the DRG Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.

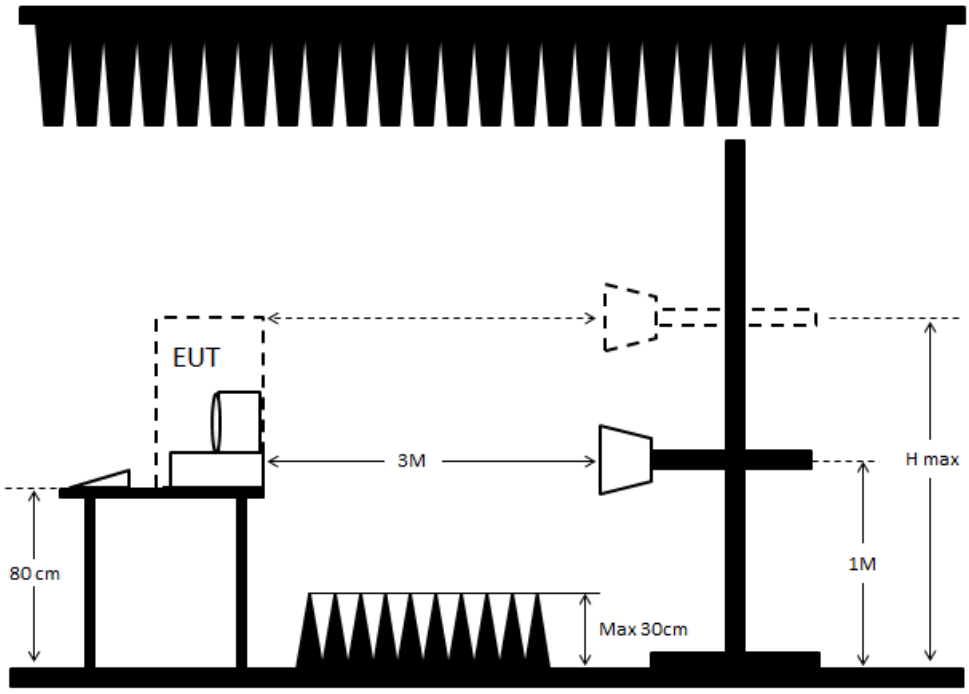
h. If emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

6.4. Typical Test Setup Layout of Radiated Emission

<Below 1 GHz>:



<Above 1 GHz>:



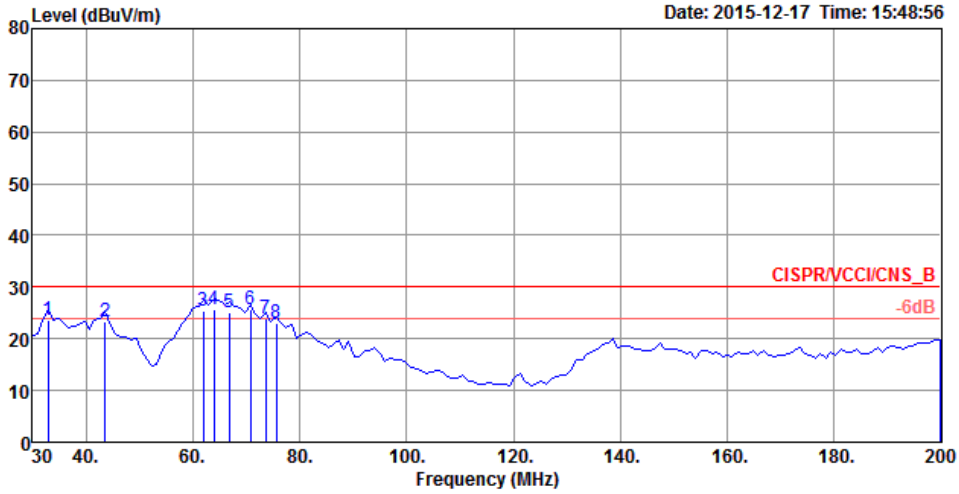
Remark : When EUT height is over 172cm , H max = Top of EUT

6.5. Test Result of Radiated Emission below 1 GHz

Temperature	25℃	Humidity	58%
Test Engineer	Kane Liu	Frequency Range	30 MHz to 1,000 MHz
Test Mode	Mode 2		

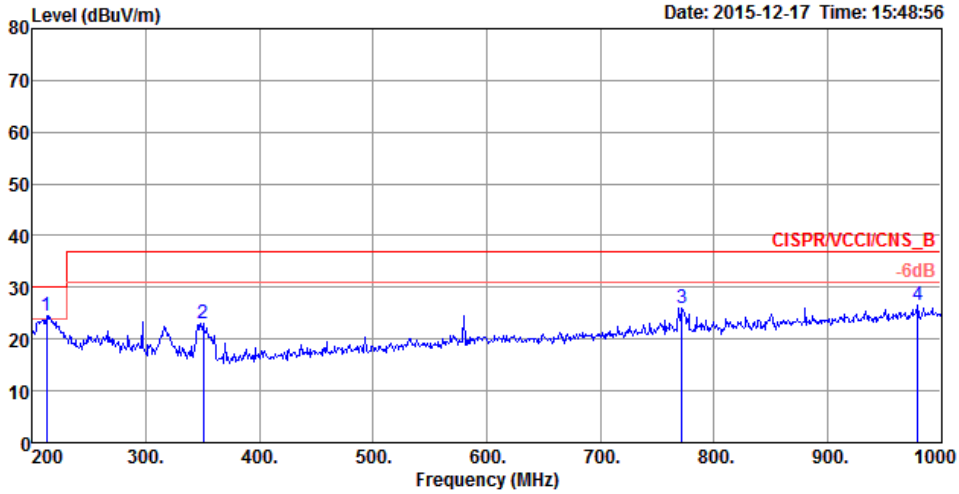
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- Margin = - Limit + (Read Level + Antenna Factor + Cable Loss - Preamp Factor)
- The test was passed at the minimum margin that marked by the frame in the following test record

Vertical 30 MHz to 200 MHz



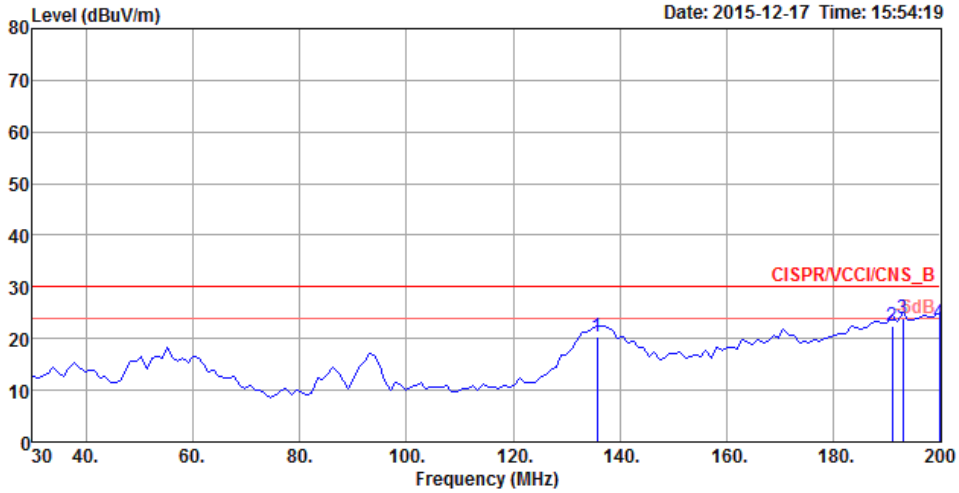
	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	32.91	23.76	30.00	-6.24	38.09	28.62	12.66	1.63	QP	300	353	VERTICAL
2	43.58	23.28	30.00	-6.72	39.17	28.60	10.84	1.87	QP	200	60	VERTICAL
3	62.01	25.50	30.00	-4.50	42.29	28.55	9.52	2.24	QP	300	195	VERTICAL
4	63.95	25.64	30.00	-4.36	42.48	28.55	9.44	2.27	QP	200	135	VERTICAL
5	66.86	25.04	30.00	-4.96	41.94	28.54	9.32	2.32	QP	100	212	VERTICAL
6	70.74	25.60	30.00	-4.40	42.57	28.53	9.17	2.39	QP	300	45	VERTICAL
7	73.65	23.98	30.00	-6.02	40.98	28.53	9.09	2.44	QP	300	264	VERTICAL
8	75.59	23.11	30.00	-6.89	40.13	28.52	9.03	2.47	QP	100	6	VERTICAL

Vertical 200 MHz to 1,000 MHz



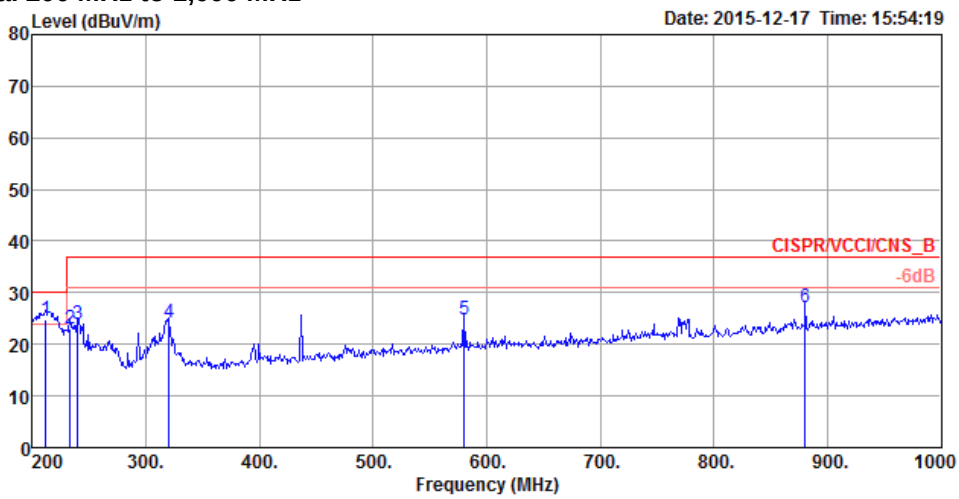
	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	212.36	24.43	30.00	-5.57	32.65	27.33	15.10	4.01	QP	100	105	VERTICAL
2	350.10	23.02	37.00	-13.98	29.85	27.51	15.50	5.18	QP	400	353	VERTICAL
3	772.05	26.00	37.00	-11.00	25.37	27.94	20.69	7.88	QP	100	150	VERTICAL
4	979.63	26.57	37.00	-10.43	22.36	27.21	22.50	8.92	QP	100	187	VERTICAL

Horizontal 30 MHz to 200 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	135.73	20.48	30.00	-9.52	34.00	28.29	11.47	3.30	QP	400	1	HORIZONTAL
2	191.02	22.47	30.00	-7.53	32.61	28.02	13.96	3.92	QP	400	126	HORIZONTAL
3	192.96	24.01	30.00	-5.99	34.00	28.01	14.08	3.94	QP	400	126	HORIZONTAL
4	199.75	22.96	30.00	-7.04	32.44	27.98	14.49	4.01	QP	400	134	HORIZONTAL

Horizontal 200 MHz to 1,000 MHz



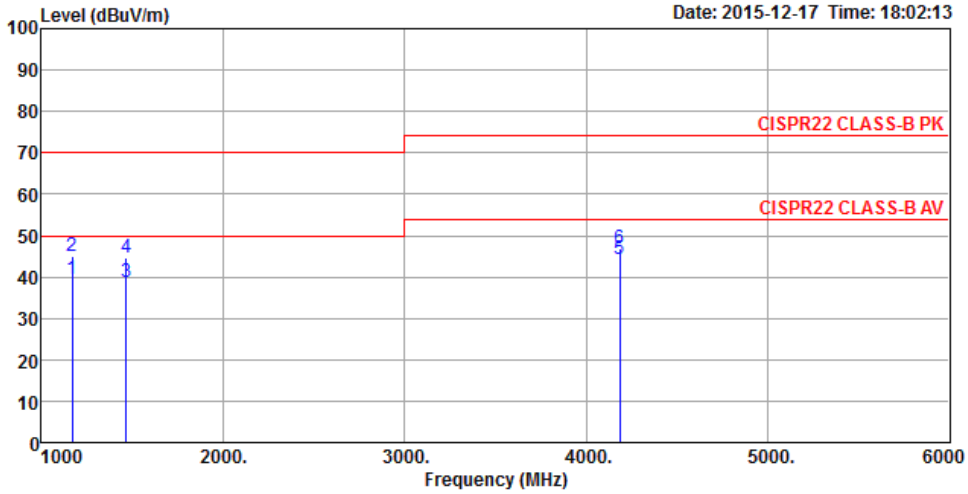
	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	211.39	24.67	30.00	-5.33	32.83	27.33	15.17	4.00	QP	300	160	HORIZONTAL
2	232.73	22.91	37.00	-14.09	32.60	27.27	13.39	4.19	QP	400	39	HORIZONTAL
3	239.52	23.92	37.00	-13.08	34.05	27.25	12.87	4.25	QP	300	43	HORIZONTAL
4	320.03	24.10	37.00	-12.90	32.23	27.26	14.17	4.96	QP	200	202	HORIZONTAL
5	579.99	24.92	37.00	-12.08	27.79	28.50	18.90	6.73	QP	200	46	HORIZONTAL
6	880.69	27.08	37.00	-9.92	24.58	27.59	21.69	8.40	QP	100	263	HORIZONTAL

6.6. Test Result of Radiated Emission above 1 GHz

Temperature	25℃	Humidity	58%
Test Engineer	Kane Liu	Frequency Range	1,000 MHz to 6,000 MHz
Test Mode	Mode 2		

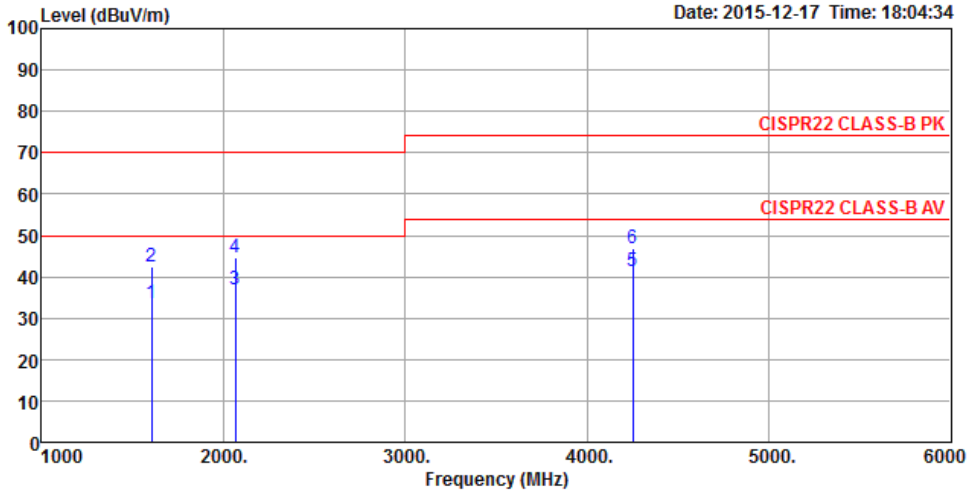
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- Margin = - Limit + (Read Level + Antenna Factor + Cable Loss - Preamp Factor)
- The test was passed at the minimum margin that marked by the frame in the following test record

Vertical 1,000 MHz to 6,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	1170.00	39.43	50.00	-10.57	43.22	36.25	27.70	4.76	Average	100	210	VERTICAL
2	1170.00	44.90	70.00	-25.10	48.69	36.25	27.70	4.76	Peak	100	210	VERTICAL
3	1465.00	38.67	50.00	-11.33	41.55	36.05	27.70	5.47	Average	100	0	VERTICAL
4	1465.00	44.82	70.00	-25.18	47.70	36.05	27.70	5.47	Peak	100	0	VERTICAL
5	4185.00	44.15	54.00	-9.85	37.36	36.32	33.72	9.39	Average	100	241	VERTICAL
6	4185.00	46.85	74.00	-27.15	40.06	36.32	33.72	9.39	Peak	100	241	VERTICAL

Horizontal 1,000 MHz to 6,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	1605.00	33.74	50.00	-16.26	35.32	35.98	28.63	5.77	Average	100	48	HORIZONTAL
2	1605.00	42.45	70.00	-27.55	44.03	35.98	28.63	5.77	Peak	100	48	HORIZONTAL
3	2065.00	36.76	50.00	-13.24	34.32	35.92	31.82	6.54	Average	100	3	HORIZONTAL
4	2065.00	44.57	70.00	-25.43	42.13	35.92	31.82	6.54	Peak	100	3	HORIZONTAL
5	4250.00	41.22	54.00	-12.78	34.33	36.34	33.80	9.43	Average	100	234	HORIZONTAL
6	4250.00	46.71	74.00	-27.29	39.82	36.34	33.80	9.43	Peak	100	234	HORIZONTAL

7. General Performance Criteria Description of Immunity Test

The following describes the general performance criteria.

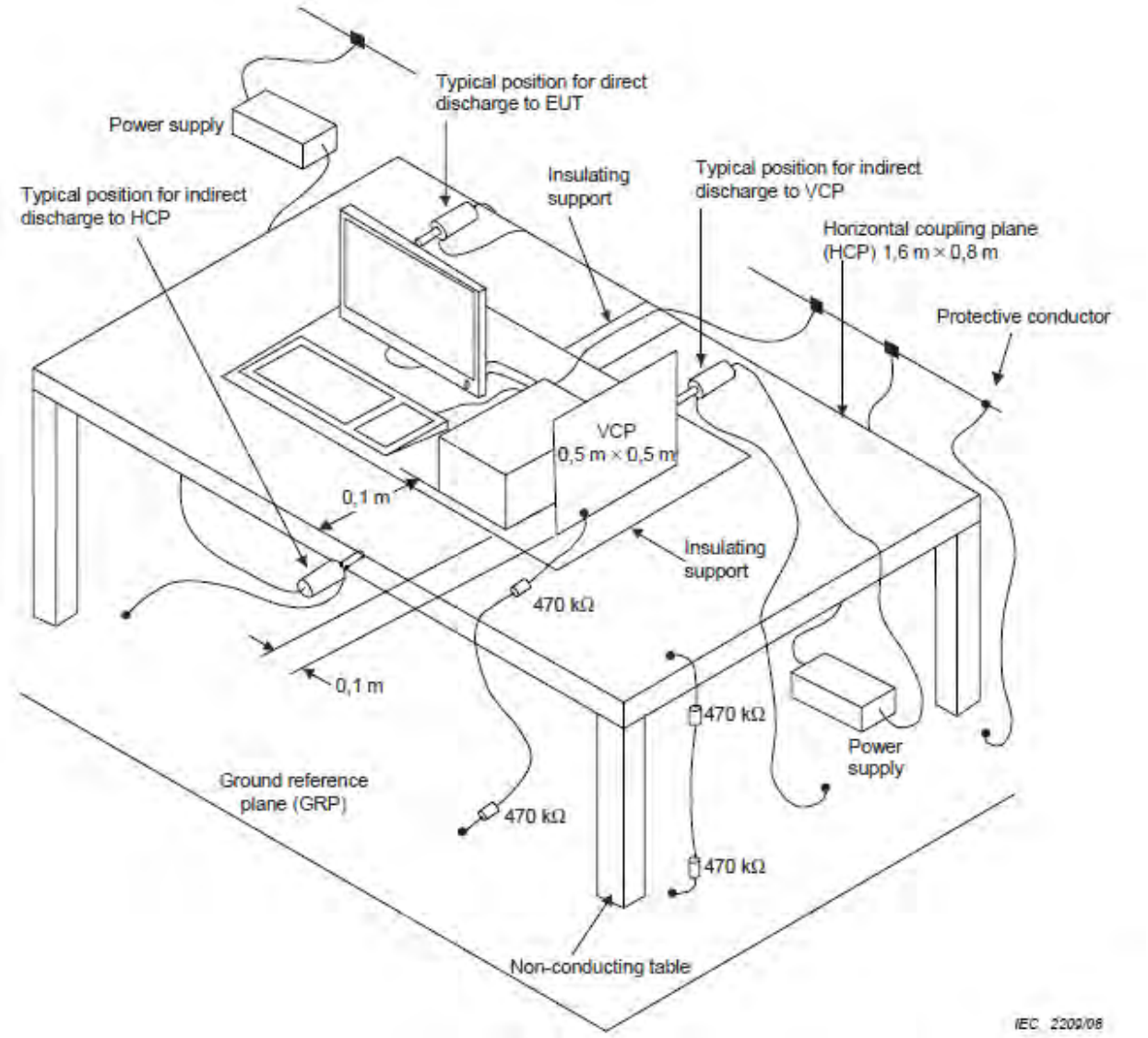
CT / CR (Criterion A)	**Performance criteria for continuous phenomena applied to transmitters and receivers** During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.
TT / TR (Criterion B)	**Performance criteria for transient phenomena applied to transmitters and receivers** After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.
TT / TR (Criterion C)	**Only for voltage interruption** **Performance criteria for transient phenomena applied to transmitters and receivers** In the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator

8. Electrostatic Discharge Immunity Test (ESD)

8.1. Test Specification

Reference Standard	EN 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Contact Discharge	±2, 4 kV
Air Discharge	±2, 4, 8 kV
Rise Time	0.8 ns +/-25 %
Current at 30 ns	+/- 30 %
Current at 60 ns	+/- 30 %
Polarity	Positive / Negative
Number of Discharge	Air Discharge 20 times at each test point
	Contact Discharge 20 times at each test point
Single Discharge Mode	1 discharge per 1s

8.2. Test Setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner:

a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;

b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

8.3. Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resister located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

8.4. ESD Test Procedure

a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
   - ambient temperature: 15°C to 35°C;
   - relative humidity : 30% to 60%;
   - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT.

   The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.

d. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

e. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

f. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:
   - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
   - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
   - The contact discharge test shall not be applied to such surfaces.

g. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

8.5. Test Result

Temperature	22℃	**Humidity**	51%
Pressure	100 kPa	**Test Engineer**	Ryo Fan
Test Mode	Mode 2	**Test Date**	Dec. 25, 2015
Standard	Required Criteria B		
Test Recorded	The EUT had "request time out" message during the test, but it will automatically return to normal conditions after the test.		

Direct Application：

Test Point	Tested Voltage (kV)	Contact Discharge (Performance Criteria)	Air Discharge (Performance Criteria)
1~4	±2, 4, 8	-	A
5~8	±2, 4	B	-
9~14	±2, 4, 8	-	A
15~17	±2, 4	B	-
18	±2, 4, 8	-	A
19, 20	±2, 4	A	-

Indirect Application：

Coupling Plan	Coupling Side	Test Voltage (kV)	Performance Criteria
HCP	Front / Rear / Right / Left	± 2, 4	A
VCP	Front / Rear / Right / Left	± 2, 4	A

Temperature	22℃	**Humidity**	51%
Pressure	100 kPa	**Test Engineer**	Ryo Fan
Test Mode	Mode 1 and Mode 3	**Test Date**	Dec. 25, 2015
Standard	Required Criteria B		
Test Recorded	The EUT had "request time out" message during the test, but it will automatically return to normal conditions after the test.		

Direct Application：

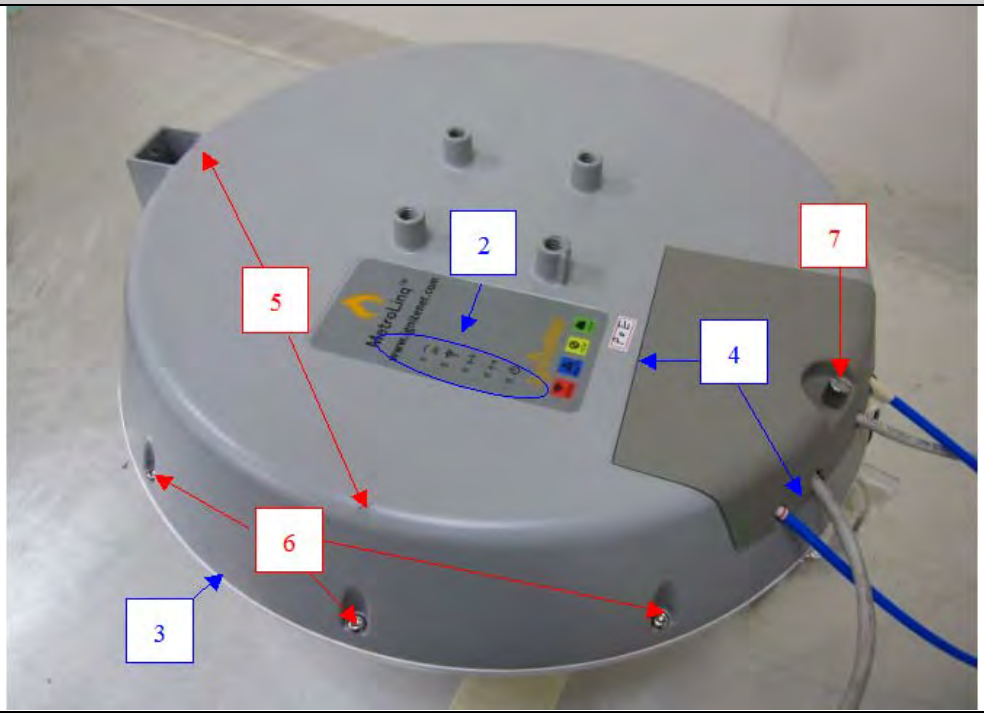
Test Point	Tested Voltage (kV)	Contact Discharge (Performance Criteria)	Air Discharge (Performance Criteria)
1~4	±2, 4, 8	-	A
5~8	±2, 4	B	-
9~15	±2, 4, 8	-	A
16	±2, 4	B	-

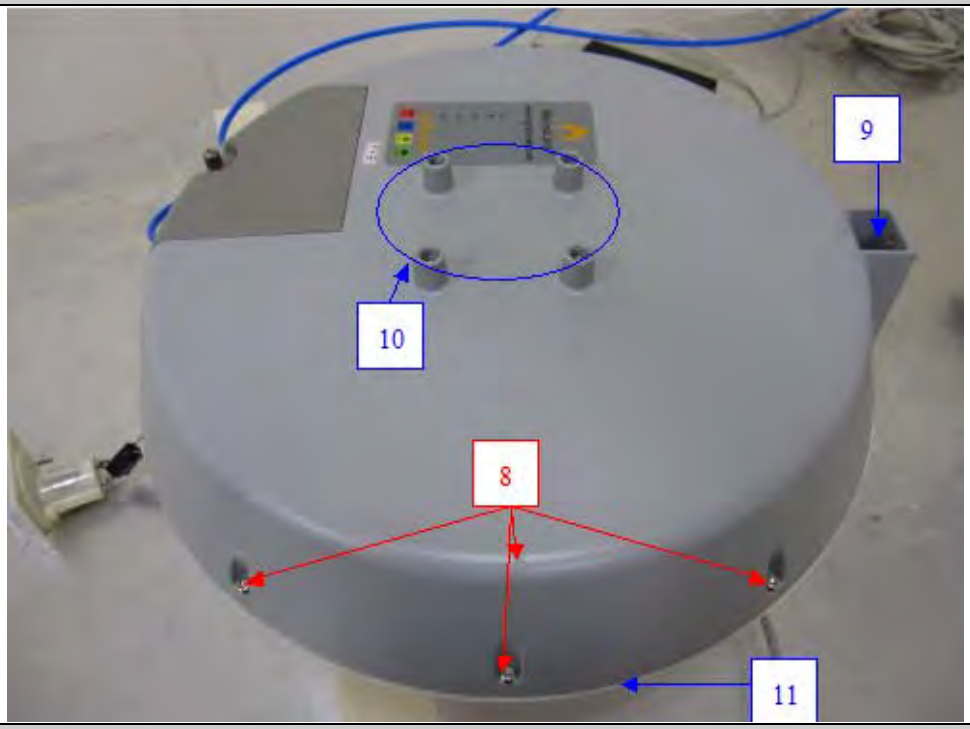
Indirect Application：

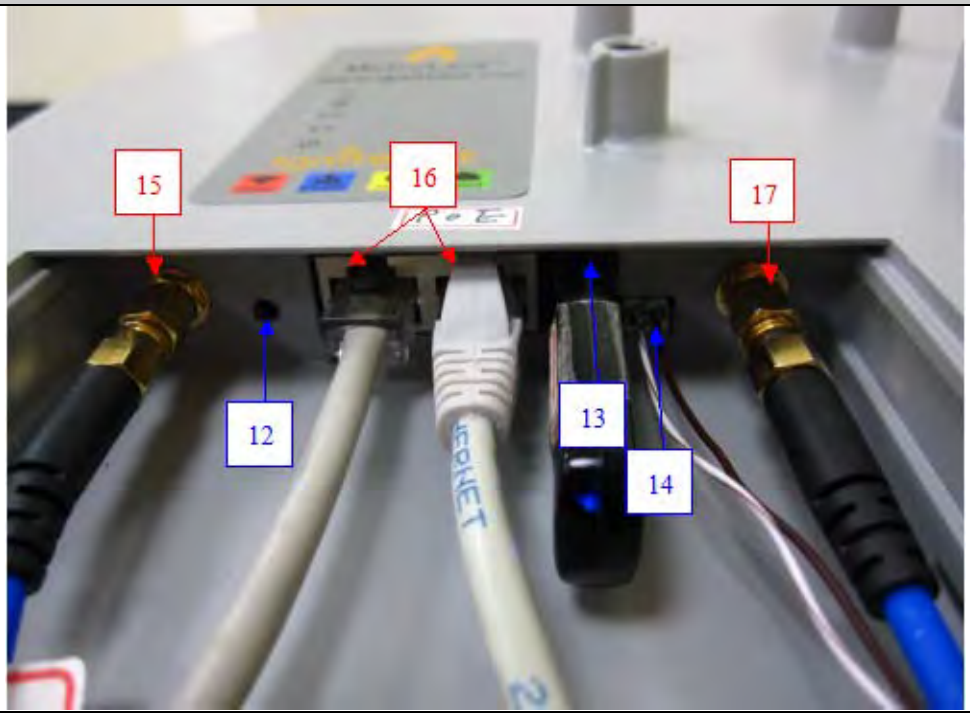
Coupling Plan	Coupling Side	Test Voltage (kV)	Performance Criteria
HCP	Front / Rear / Right / Left	± 2, 4	A
VCP	Front / Rear / Right / Left	± 2, 4	A

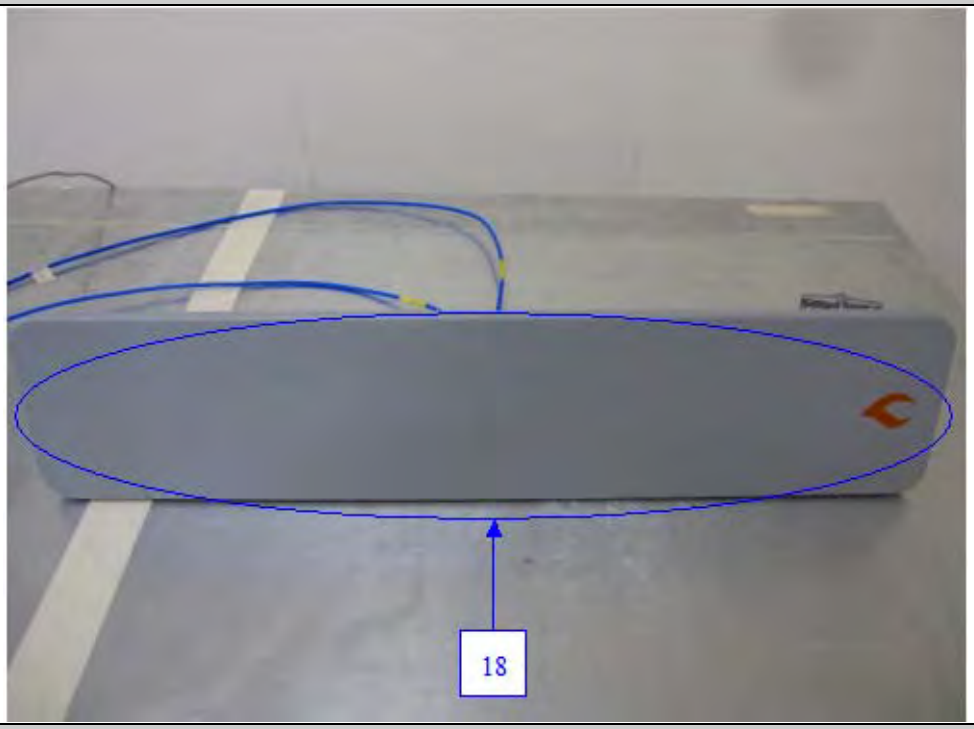
8.6. Photographs of Electrostatic Discharge Immunity Test

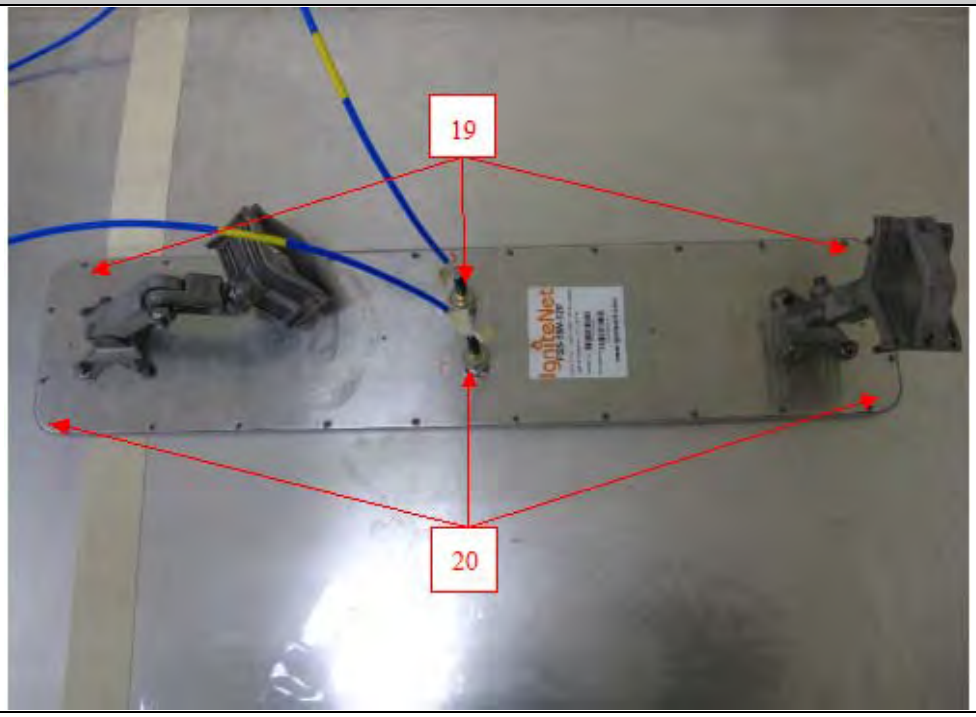
Test Mode: Mode 2

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

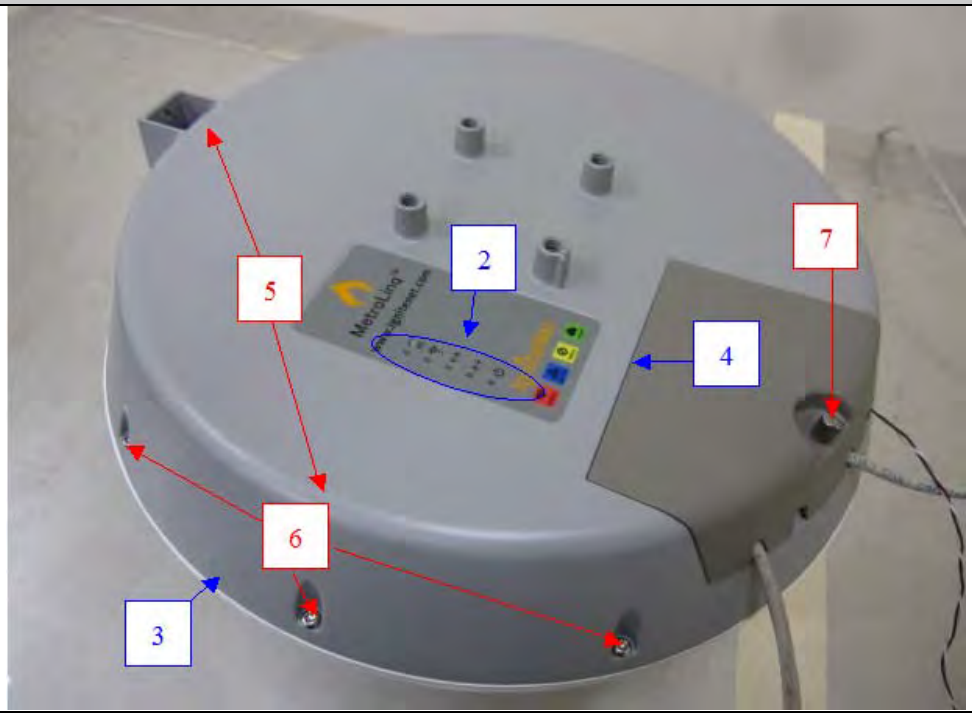
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

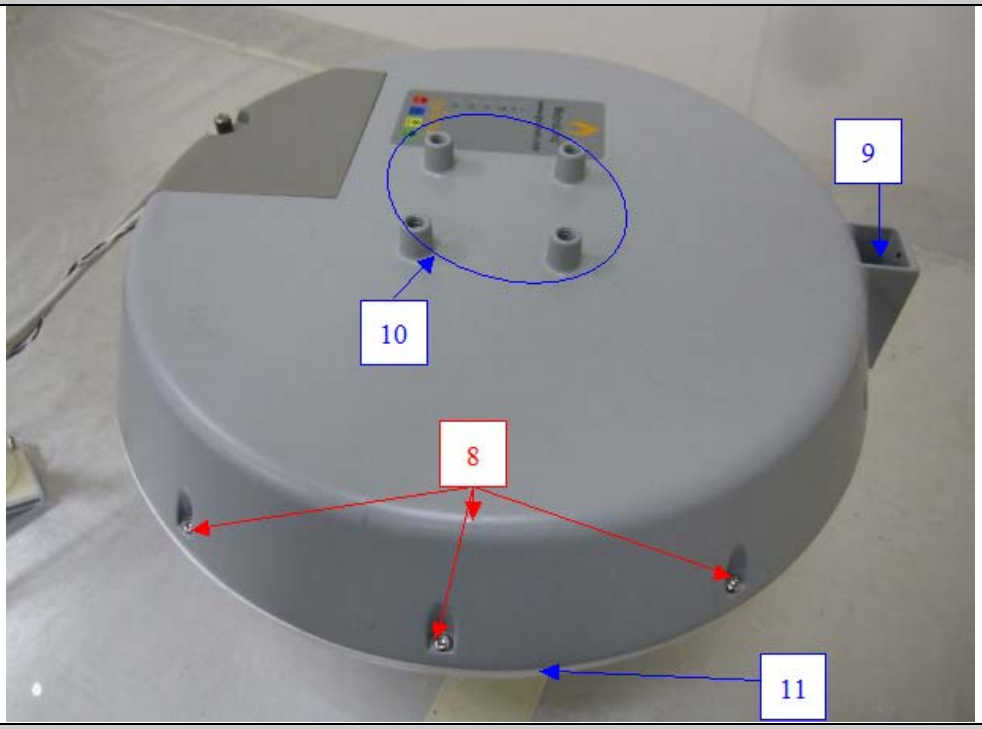
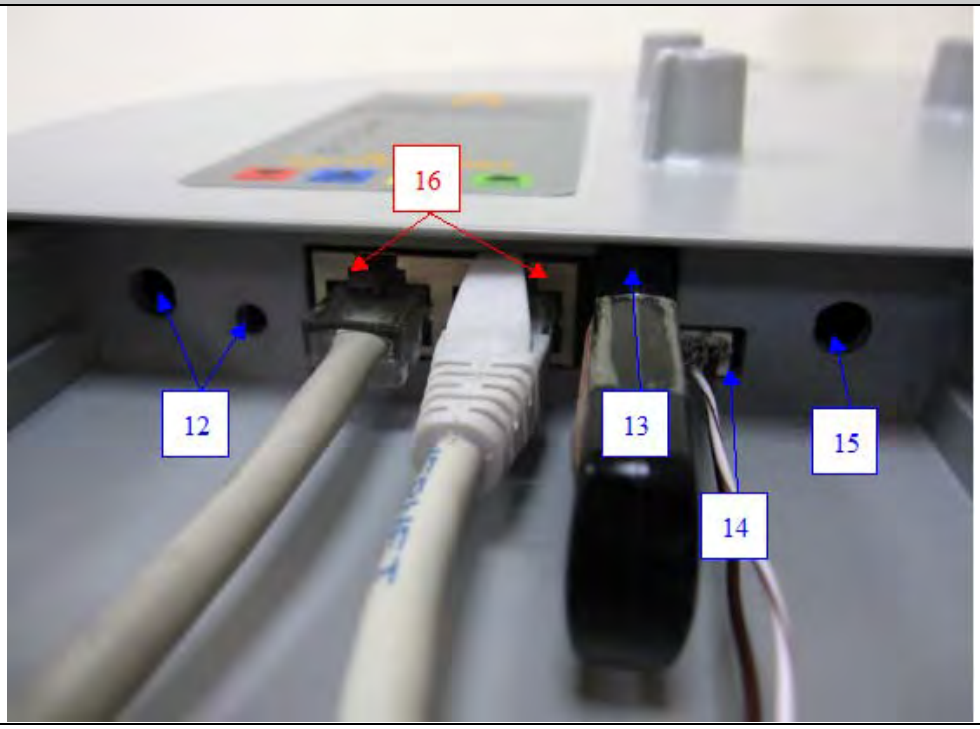
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Mode: Mode 1 and Mode 3

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

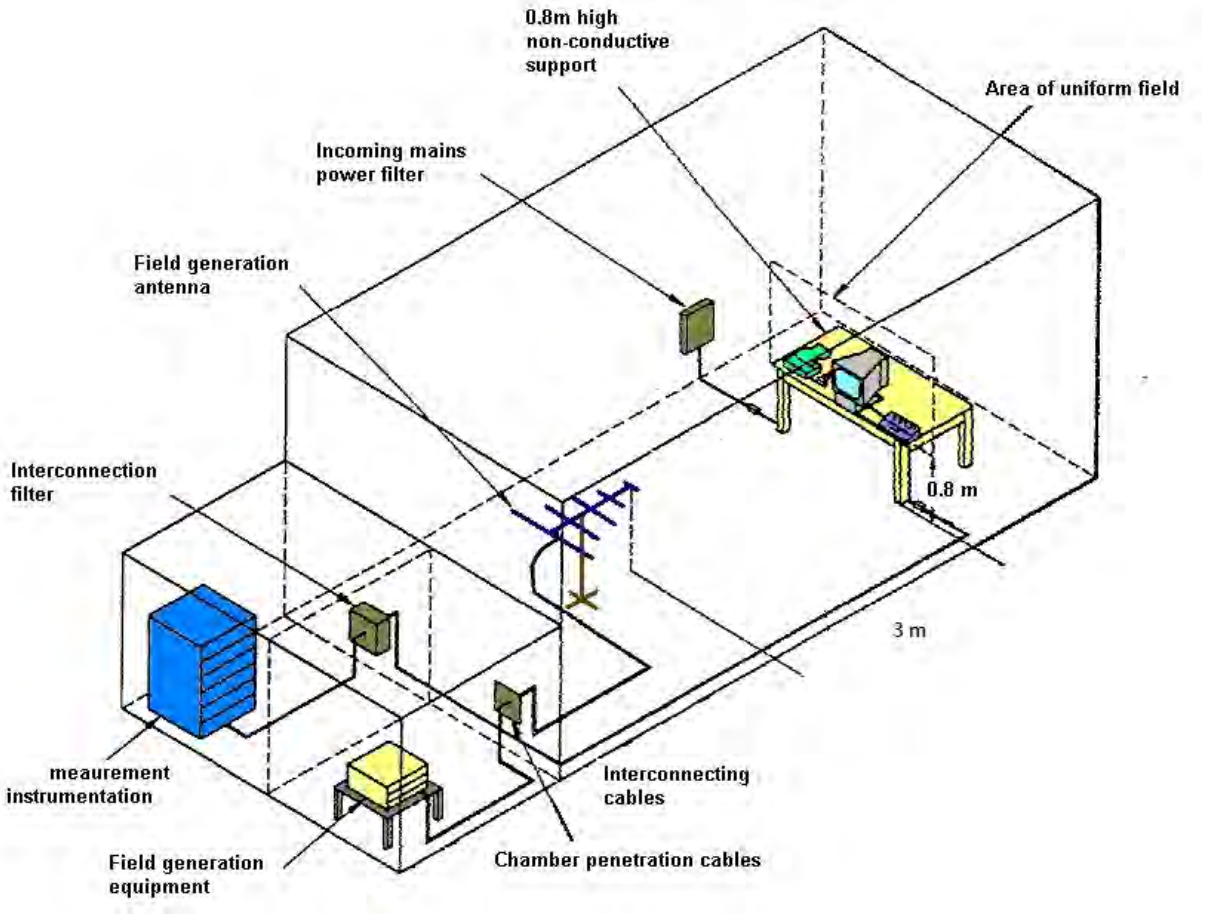
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

9. Radio Frequency Electromagnetic Field Immunity Test (RS)

9.1. Test Specification

Reference Standard	EN 61000-4-3
Frequency Range	80 MHz to 1,000 MHz and 1,400 MHz to 2,700MHz
Field Strength	3 V/m (un-modulated, r.m.s) 80% AM (1 kHz)
Frequency Step	1 %
Dwell Time	2.9 sec
Antenna Polarity	Vertical / Horizontal

9.2. Test Setup



The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels.

9.3. Test Procedure

a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.

b. The bilog antenna which is enabling the complete frequency range of 80 MHz - 1,000 MHz and 1,400 MHz - 2,700MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.

c. The test is normally performed with the generating antenna facing each of four sides of the EUT. The polarization of the field generated by the broadband (bilog) antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.

d. At each of the above conditions, the frequency range is swept 80 MHz - 1,000 MHz and 1,400 MHz - 2,700MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of $1.5*10^{-3}$ decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

e. If need to use the exclusion band, for deferent equipment should be reference as below:

The exclusion band for 2.450 GHz equipment was from 2280 MHz to 2607.675 MHz.

9.4. Test Result

Temperature	25℃	**Humidity**	62%
Pressure	100 kPa	**Test Engineer**	Deven Huang
Test Mode	Mode 1 ~ Mode 3	**Test Date**	Dec. 21, 2015
Standard	Required Criteria A		
Test Recorded	There was no abnormal situation during the test compared with initial operation.		

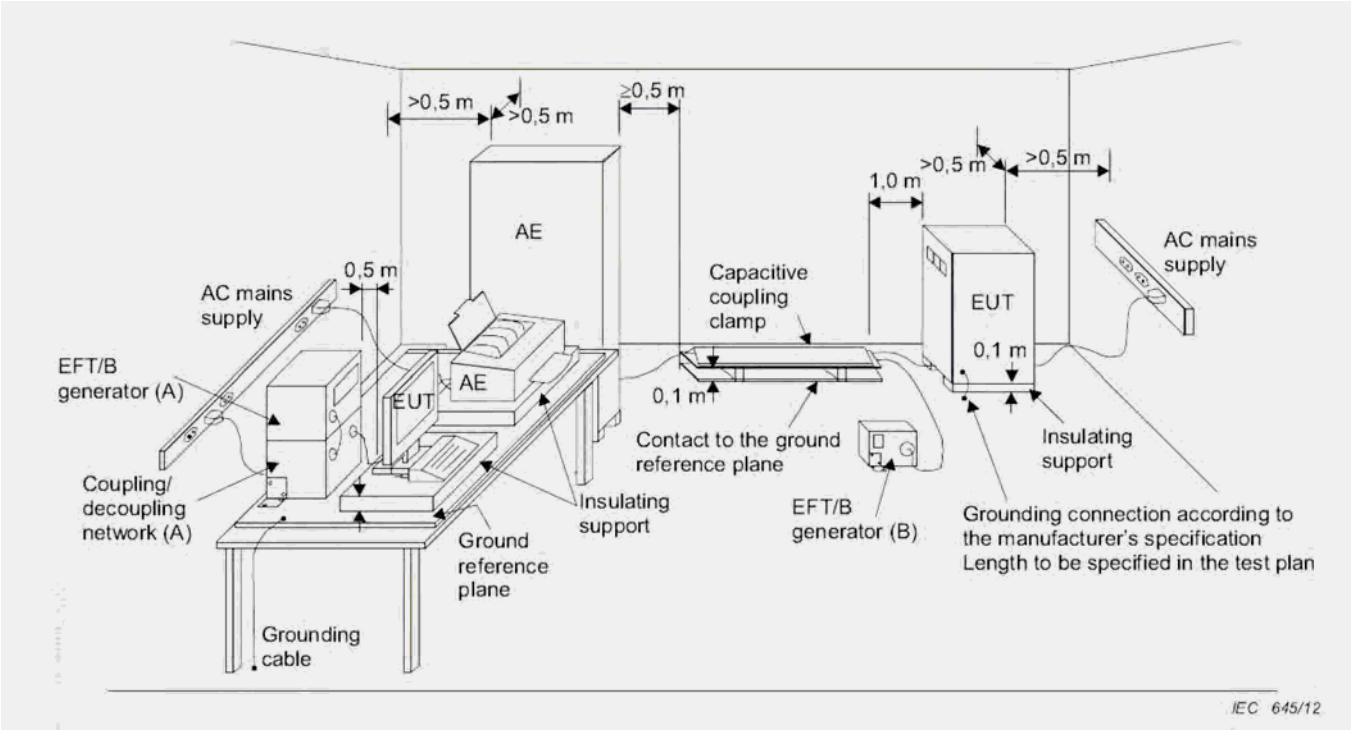
Frequency Range MHz	Field V/m	Antenna Polarization	EUT Face Exposed	Performance Criteria
80~1,000	3	Vertical	Front/Back/Right/Left	A
80~1,000	3	Horizontal	Front/Back/Right/Left	A
1,400~2,700	3	Vertical	Front/Back/Right/Left	A
1,400~2,700	3	Horizontal	Front/Back/Right/Left	A

10. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

10.1. Test Specification

Reference Standard	EN 61000-4-4
Test Voltage	Telecommunication/Signal Line: ± 0.5 kV
Polarity	Positive / Negative
Rise time of the pulses	5 ns
Impulse duration	50 ns
Burst duration	15 ms
Burst period	300 ms
Impulse Frequency	5 kHz
Duration	1 min

10.2. Test Setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8 m above the GRP.. The GRP. Was a metallic sheet (copper or aluminum) of 0.25 mm ,minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1 m on all sides and connected to the protective earth. In the SPORTON EMC LAB. We provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 0.5m or less.

10.3. Test Procedure

a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
   - ambient temperature: 15°C to 35°C;
   - relative humidity : 45% to 75%;
   - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.

c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.

d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
   - Normal performance within the specification limits.
   - Temporary degradation or loss of function or performance which is self-recoverable.
   - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
   - Degradation or loss of function which is not recoverable due to damage of equipment (components).

10.4. Test Result

Temperature	25℃	**Humidity**	62%
Pressure	100 kPa	**Test Engineer**	Deven Huang
Test Mode	Mode 1 ~ Mode 3	**Test Date**	Dec. 21, 2015
Standard	Required Criteria B		
Test Recorded	There was no abnormal situation during the test compared with initial operation.		

Telecommunication Port：

Telecommunication Port	**Test Voltage (kV)**
	±0.5 kV
LAN	A
PoE LAN	A

11. Surge Immunity Test

11.1. Test Specification

Reference Standard	EN 61000-4-5
Test Voltage	Outdoor Telecommunication/Signal Port: ± 0.5, 1 kV
Polarity	Positive / Negative
Wave Shape	1.2/50 us Open-circuit voltage 8/20 us Short-circuit current
Phase Angle	0°, 90°, 180°, 270°
Time between successive pulses	60 sec.
Number of test	5 positive and 5 negative

11.2. Test Setup

11.3. Test Procedure

a. Climatic conditions

The climatic conditions shall comply with the following requirements :

-- ambient temperature : 15 ˚C to 35 ˚C

-- relative humidity : 10 % to 75 %

-- atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

b. Electromagnetic conditions

The electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according the test plan that shall specify the test set-up with

-- generator and other equipment utilized;

-- test level (voltage/current);

-- generator source impedance;

-- internal or external generator trigger;

-- number of tests: at least five positive and five negative at the selected points;

-- repetition rate: maximum 1/min.

-- inputs and outputs to be tested;

-- representative operating conditions of the EUT;

-- sequence of application of the surge to the circuit;

-- phase angle in the case of a.c. power supply;

-- actual installation conditions, for example :

AC : neutral earthed,

DC : (+) or (-) earthed to simulated the actual earthing conditions.

d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.

f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.

g. If the actual operating signal sources are not available, the may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according the a test plan.

h. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

11.4. Test Result

Temperature	25℃	**Humidity**	62%
Pressure	100 kPa	**Test Engineer**	Ryo Fan
Test Mode	Mode 1 ~ Mode 3	**Test Date**	Dec. 21, 2015
Standard	Required Criteria B		
Test Recorded	There was no abnormal situation during the test compared with initial operation.		

Telecommunication Port:

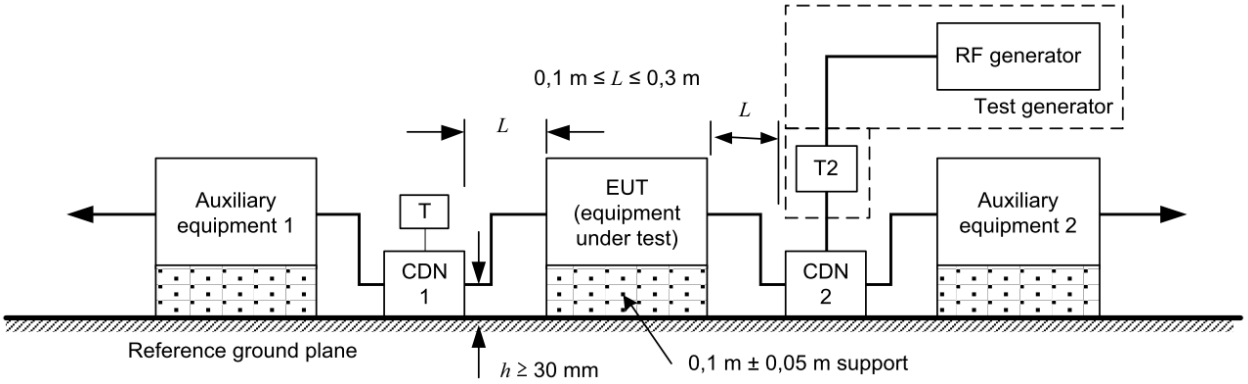
Voltage (kV)	Test Location	Polarity	Performance Criteria
0.5, 1 kV	LAN (Outdoor)	+	A
		−	A
0.5, 1 kV	PoE LAN (Outdoor)	+	A
		−	A

12. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

12.1. Test Specification

Reference Standard	EN 61000-4-6
Frequency Range	150 kHz~80 MHz
Field Strength	3 $V_{r.m.s}$ (un-modulated, r.m.s) 80% AM (1 kHz)
Frequency Step	1 %
Dwell Time	2.9 sec
Coupling mode	CDN T8-10, CDN T800

12.2. Test Setup



12.3. Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.

b. This test method test can be performed without using a self-shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.

c. 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.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sinewave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.

e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.

f. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.

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

h. The use of special exercising programs is recommended.

i. Testing shall be performed according to a Test Plan, which shall be included in the test report.

j. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

12.4. Test Result

Temperature	25℃	**Humidity**	62%
Pressure	100 kPa	**Test Engineer**	Deven Huang
Test Mode	Mode 1 ~ Mode 3	**Test Date**	Dec. 21, 2015
Standard	Required Criteria A		
Test Recorded	There was no abnormal situation during the test compared with initial operation.		

Frequency Range MHz	V (r.m.s)	CDN	Coupling port	Performance Criteria
0.15 ~ 80	3	T8-10	LAN (1000Mbps)	A
0.15 ~ 80	3	T8-10	PoE LAN (1000Mbps)	A

13. List of Measuring Equipment Used

<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 16, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 13, 2015	Conduction (CO01-CB)
Impedance Stabilization Network	Teseq	ISN T800	24557	150kHz ~ 230MHz	Oct. 27, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 25, 2015	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
10m Semi Anechoic Chamber	TDK	NSA	10CH01-CB	30MHz~1GHz 10m	Mar. 31, 2015	Radiation (10CH01-CB)
10m Semi Anechoic Chamber	TDK	VSWR	10CH01-CB	1GHz ~40GHz 3m	Nov. 24, 2015	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10783	9kHz ~ 1.3GHz	Mar. 23, 2015	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 04, 2015	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	-	25MHz ~ 1GHz	Nov. 30, 2015	Radiation (10CH01-CB)
High Cable	Woken	SUCOFLEX 104	-	25MHz ~ 1GHz	Nov. 30, 2015	Radiation (10CH01-CB)
EMI Test Receiver	Rohde&Schwarz	ESCI	100186	9kHz ~ 3GHz	Jul. 14, 2015	Radiation (10CH01-CB)
Spectrum Analyzer	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 13, 2015	Radiation (10CH01-CB)
Horn Antenna	ESCO	3117	00081283	1GHz ~ 18GHz	Nov. 25, 2015	Radiation (10CH01-CB)
Amplifier	Agilent	8449B	3008A02660	1GHz ~ 26.5GHz	May 25, 2015	Radiation (10CH01-CB)
CABLE(1~40G)	Woken	SUCOFLEX 104	-	1GHz ~ 40GHz	Nov. 30, 2015	Radiation (10CH01-CB)
Software	Audix	E3	6.120210m	-	N.C.R.	Radiation (10CH01-CB)

※ Calibration Interval of instruments listed above is one year.

※ N.C.R. means Non-Calibration required.

<EMS>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
ESD Simulator	KEYTEK	MINIZAP	0408333	Air: 0 kV ~ 15 kV, Contact: 0 kV ~ 8kV	Nov. 21, 2015	ESD
Integrated Measurement System	R&S	IMS	100002	9kHz ~ 3GHz	Apr. 24, 2015	RS
Average Power Sensor	R&S	NRP-Z91	101117	9kHz ~ 6GHz	Mar. 24, 2015	RS
RF Power Amplifier	AR	30S1G3	0323046	1GHz ~ 3GHz, 30W	Mar. 20, 2015	RS
RF Power Amplifier	AR	250W1000A	0323202	80MHz ~1GHz, 250W	May 06, 2015	RS
Log-Periodic Antenna	AR	AT1080	0323130	80MHz ~ 1GHz	N.C.R.	RS
Horn Antenna	AR	AT4002A	0323305	0.8GHz ~ 5GHz	N.C.R.	RS
Software	R&S	EMC32	5.20.1	-	N.C.R.	RS
Surge/EFT/Dip Generator	Teseq AG	NSG 3060	1534	Surge 0 ~ 6kV EFT 0 kV ~ 4.4 kV Dip 100~240V/ 50Hz /60Hz	Feb. 10, 2015	Surge/ EFT
Burst/EFT Dataline Coupling Clamp	Teseq AG	CDN 3425	1776	0.25kV~4kV	Jan. 27, 2015	EFT
Surge Coupling Decoupling Network	Teseq AG	CDN HSS-2	34283	0.25kV~4kV	Jun. 08, 2015	Surge
Software	Teseq AG	NSG3000	-	-	N.C.R.	Surge/ EFT
Conducted Immunity Test System	SCHAFFNER	NSG2070	1091	100kHz ~ 250MHz, AM 1kHz 80%	Mar. 06, 2015	CS
Coupling decoupling network	Teseq GmbH	CDN T8-10	38993	150kHz~230MHz	Jan. 26, 2015	CS
Coupling decoupling network	Teseq GmbH	CDN T800	34369	150kHz~230MHz	Apr. 07, 2015	CS
Software	Tesq	NSG4070	030593.V1.28	-	N.C.R.	CS

※ Calibration Interval of instruments listed above is one year.

※ N.C.R. means Non-Calibration required.

14. Uncertainty of Test Site

Test Items	Uncertainty	Remark
Conducted Emissions	3.2 dB	Confidence levels of 95%
Radiated Emissions below 1GHz	4.0 dB	Confidence levels of 95%
Radiated Emissions above 1GHz	4.7 dB	Confidence levels of 95%

Immunity Test Measurement Uncertainty

Electrostatic Discharge Immunity (ESD)

Negative Discharge Current

From Standard					From calibration certificate					
2kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **+5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	7.5	4.0	2.0	Positive	6.9	7.2	3.6	3.8	1.9	2.0
Min.	6.4	2.8	1.4	Negative	7.3	7.7	3.7	3.9	1.9	2.0
Max.	8.6	5.2	2.6	Min.		6.4		2.8		1.4
Tolerance in %	0.2	0.3	0.3	Max.		8.6		5.2		2.6

4kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **+5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	15.0	8.0	4.0	Positive	14.4	15.1	7.6	7.9	3.8	4.0
Min.	12.8	5.6	2.8	Negative	14.1	14.8	7.4	7.8	4.0	4.2
Max.	17.3	10.4	5.2	Min.		12.8		5.6		2.8
Tolerance in %	0.2	0.3	0.3	Max.		17.3		10.4		5.2

6kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **-5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	22.5	12.0	6.0	Positive	21.2	22.2	11.2	11.7	5.8	6.1
Min.	19.1	8.4	4.2	Negative	20.7	21.7	11.1	11.7	6.0	6.2
Max.	25.9	15.6	7.8	Min.		19.1		8.4		4.2
Tolerance in %	0.2	0.3	0.3	Max.		25.9		15.6		7.8

8kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **-5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	30.0	16.0	8.0	Positive	27.8	29.1	14.7	15.4	7.6	8.0
Min.	25.5	11.2	5.6	Negative	28.4	29.8	15.0	15.7	7.8	8.1
Max.	34.5	20.8	10.4	Min.		25.5		11.2		5.6
Tolerance in %	0.2	0.3	0.3	Max.		34.5		20.8		10.4

Negative Discharge Voltage

Standard Parameters					Calculated Range		
Indicated Voltage (kV)	Polarity	Tolerance (%)	Max. (kV)	Min. (kV)	Calibration (kV)	Max. (kV)	Min. (kV)
2	Positive	15.0	2.3	1.7	2.0	2.0	2.0
	Negative	15.0	2.3	1.7	2.1	2.6	2.6
4	Positive	15.0	4.6	3.4	4.0	4.0	4.0
	Negative	15.0	4.6	3.4	4.1	4.1	4.1
6	Positive	15.0	6.9	5.1	6.0	6.0	6.0
	Negative	15.0	6.9	5.1	6.1	6.1	6.1
8	Positive	15.0	9.2	6.8	8.0	8.0	7.9
	Negative	15.0	9.2	6.8	8.1	8.1	8.1
15	Positive	15.0	17.3	12.8	15.2	15.2	15.2
	Negative	15.0	17.3	12.8	14.9	14.9	14.9

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence.

Radio Frequency Electromagnetic Field Immunity (RS)
IMS

Frequency 10MHz Output Check	
Standard	Reading
10 MHz	9,999,985.8 Hz

Frequency Accuracy/offset：1.4E-07
Frequency Stability：5E-09/1.0S
Uncertainty: 4.0E-06

Gain Flatness Measurement (For 80 MHz to 1 GHz Amp.)		
Freq. (MHz)	Reading (dB)	Expected (dB)
80.0	62.6	> 54
100.0	62.4	> 54
200.0	61.6	> 54
300.0	62.0	> 54
400.0	58.8	> 54
500.0	60.4	> 54
600.0	58.4	> 54
700.0	58.8	> 54
800.0	59.3	> 54
900.0	58.3	> 54
1000.0	55.8	> 54

Gain Flatness Measurement (For 1 GHz to 3 GHz Amp.)		
Freq. (GHz)	Reading (dB)	Expected (dB)
0.8	47.6	> 40
1.0	48.0	> 40
1.5	47.9	> 40
2.0	47.8	> 40
2.5	46.4	> 40
3.0	46.3	> 40

VSWR Measurement (input port)		
Freq. (MHz)	Actual (dB)	Hige Range (dB)
80.0	1.7	< 2.00
100.0	1.5	< 2.00
200.0	1.6	< 2.00
300.0	1.5	< 2.00
400.0	1.5	< 2.00
500.0	1.4	< 2.00
600.0	1.4	< 2.00
700.0	1.4	< 2.00
800.0	1.4	< 2.00
900.0	1.5	< 2.00
1000.0	1.4	< 2.00

Power Linearly Measurement								
Freq. (MHz)	Reading (Watts)	Standard (Watts)	Freq. (MHz)	Reading (Watts)	Standard (Watts)	Freq. (MHz)	Reading (Watts)	Standard (Watts)
80.0	20.0	23.2	200.0	200.0	226.9	800.0	100.0	97.7
80.0	50.0	63.9	200.0	250.0	279.7	800.0	150.0	147.2
80.0	100.0	122.4	500.0	20.0	21.3	800.0	200.0	196.1
80.0	150.0	173.4	500.0	50.0	52.6	800.0	250.0	244.9
80.0	200.0	234.7	500.0	100.0	103.8	1000.0	20.0	16.5
80.0	250.0	302.2	500.0	150.0	155.4	1000.0	50.0	45.2
200.0	20.0	22.4	500.0	200.0	206.8	1000.0	100.0	87.3
200.0	50.0	58.3	500.0	250.0	258.1	1000.0	150.0	131.9
200.0	100.0	107.6	800.0	20.0	19.1	1000.0	200.0	175.9
200.0	150.0	166.7	800.0	50.0	48.6	1000.0	250.0	220.0

Standard Power Measurement					
For 80 MHz to 1 GHz			For 80 MHz to 1 GHz		
Freq.	Expected (WATTS)	Standard (WATTS)	Freq.	Expected (WATTS)	Standard (WATTS)
80.0	> 250	348.0	0.8	> 30	30.3
100.0	> 250	335.0	1.0	> 30	34.2
200.0	> 250	340.0	1.5	> 30	39.9
300.0	> 250	329.0	2.0	> 30	36.7
400.0	> 250	324.0	2.5	> 30	34.0
500.0	> 250	282.0	3.0	> 30	34.3
600.0	> 250	318.0			
700.0	> 250	329.0			
800.0	> 250	306.0			
900.0	> 250	294.0			
1000.0	> 250	271.0			

Uncertainty: 3%

It has been demonstrated that the RS generator meets the specified requirements in the standard with at least a 95% confidence.

Electrical Fast Transient/Burst Immunity (EFT/BURST)
Voltage

Impedance	Voltage Setting(V)	Expected (kV)	Actual (kV)	Uncertainty (%)	T1	Uncertainty (%)	T2	Uncertainty (%)
50Ω	500	250	253	8.2	5.39	4.4	46.49	4.4
50Ω	1000	500	504	8.2	5.7	4.4	45.98	4.4
50Ω	2000	1000	971	8.2	5.57	4.4	44.89	4.4
50Ω	4000	2000	1972	8.2	5.38	4.4	46.07	4.4
50Ω	-500	-250	-248	8.2	4.66	4.4	88.31	4.4
50Ω	-1000	-500	-496	8.2	5.23	4.4	86.25	4.4
50Ω	-2000	-1000	-962	8.1	5.11	4.4	85.48	4.4
50Ω	-4000	-2000	-1960	8.2	5.04	4.4	87.83	4.4
1kΩ	500	500	476	8.2	5.81	4.4	87.87	4.4
1kΩ	1000	1000	933	8.2	5.42	4.4	88.38	4.4
1kΩ	2000	2000	1814	8.2	5.35	4.4	89.78	4.4
1kΩ	4000	4000	3674	8.2	5.98	4.4	85.91	4.4
1kΩ	-500	-500	-460	8.2	6.03	4.4	37.78	4.4
1kΩ	-1000	-1000	-918	8.2	6.24	4.4	36.86	4.4
1kΩ	-2000	-2000	-1777	8.2	6.16	4.4	37.23	4.4
1kΩ	-4000	-4000	-3599	8.2	6.42	4.4	37.53	4.4

EFT Repetition Frequency (Voltage @ 1 kV)

Setting (kHz)	Actual (kHz)	Uncertainty (%)	Tolerance (%)
5	5	4.4	20%
100	100.01	4.4	20%

Burst Duration (Voltage @ 1 kV)

Setting (ms)	Repetition Freq. (kHz)	Actual (ms)	Uncertainty (%)	Tolerance (%)
15	5	14.82	4.4	20%
0.75	100	0.74	4.5	20%

Burst Period (Voltage @ 1 kV)

Setting (ms)	Repetition Freq. (kHz)	Actual (ms)	Uncertainty (%)	Tolerance (%)
300	5	300	4.4	20%
300	100	300	4.4	20%

It has been demonstrated that the EFT/BURST generator meets the specified requirements in the standard with at least a 95% confidence.

Surge Immunity

Open Circuit Output Voltage Waveform check:

Impedance	Voltage Setting(V)	Actual (kV)	Uncertainty (%)	T3	Uncertainty (%)	T4	Uncertainty (%)
L-N 2Ω	500.0	503.0	3.9	1.3	3.7	54.0	3.7
L-N 2Ω	4000.0	4020.0	3.9	1.2	3.7	51.2	3.7
L-N 2Ω	-500.0	-503.0	3.9	1.3	3.7	50.8	3.7
L-N 2Ω	-4000.0	-4068.0	3.9	1.1	3.7	50.3	3.7
L-G 2Ω	500.0	485.0	3.9	1.3	3.7	29.7	3.7
L-G 2Ω	4000.0	3948.0	3.9	1.0	3.7	28.2	3.7
L-G 2Ω	-500.0	-480.0	3.9	1.3	3.7	28.3	3.7
L-G 2Ω	-4000.0	-3900.0	3.9	1.1	3.7	28.0	3.7
N-G 2Ω	500.0	490.0	3.9	1.3	3.7	29.5	3.7
N-G 2Ω	4000.0	3900.0	3.9	1.2	3.7	27.9	3.7
N-G 2Ω	-500.0	-478.0	3.9	1.3	3.7	28.4	3.7
N-G 2Ω	-4000.0	-3900.0	3.8	1.2	3.7	28.2	3.7
Impulse	500.0	511.0	3.9	1.5	3.7	53.4	3.7
Impulse	1000.0	1041.0	3.9	1.3	3.7	51.9	3.7
Impulse	2000.0	2022.0	3.9	1.2	3.8	53.3	3.7
Impulse	4000.0	4044.0	3.9	1.3	3.6	53.3	3.7
Impulse	-500.0	-503.0	3.9	1.5	3.7	52.6	3.7
Impulse	-1000.0	-1023.0	3.9	1.3	3.7	51.9	3.7
Impulse	-2000.0	-2022.0	3.9	1.2	3.7	51.4	3.7
Impulse	-4000.0	-4044.0	3.9	1.3	3.7	51.4	3.7

Short Circuit Output Voltage Waveform check:

Impedance	Voltage Setting(V)	Actual (kV)	Uncertainty (%)	T5	Uncertainty (%)	T6	Uncertainty (%)
L-N 2Ω	500.0	231.0	2.5	7.7	2.1	19.6	2.1
L-N 2Ω	4000.0	1854.0	2.5	7.4	2.1	19.9	2.1
L-N 2Ω	-500.0	-228.0	2.5	7.7	2.1	19.8	2.1
L-N 2Ω	-4000.0	-1818.0	2.5	7.6	2.1	19.9	2.1
L-G 2Ω	500.0	42.0	3.0	2.6	2.1	25.3	2.1
L-G 2Ω	4000.0	326.0	2.5	2.5	2.1	25.1	2.1
L-G 2Ω	-500.0	-42.0	2.8	2.6	2.1	25.0	2.1
L-G 2Ω	-4000.0	-337.0	2.5	2.4	2.1	25.0	2.1
N-G 2Ω	500.0	41.0	3.0	2.8	2.1	26.4	2.1
N-G 2Ω	4000.0	325.0	2.5	2.7	2.1	25.9	2.1
N-G 2Ω	-500.0	-41.0	2.7	2.9	2.1	26.1	2.1
N-G 2Ω	-4000.0	-323.0	2.5	2.6	2.1	25.8	2.1
Impulse	500.0	243.0	2.5	6.8	2.1	22.2	2.1
Impulse	1000.0	494.0	2.5	6.9	2.1	22.3	2.1
Impulse	2000.0	999.0	2.5	6.8	2.1	22.3	2.1
Impulse	4000.0	2022.0	2.5	7.1	2.1	22.3	2.1
Impulse	-500.0	-251.0	2.5	7.2	2.1	22.6	2.1
Impulse	-1000.0	-497.0	2.5	7.0	2.1	22.3	2.1
Impulse	-2000.0	-987.0	2.5	6.9	2.1	22.3	2.1
Impulse	-4000.0	-1986.0	2.5	7.0	2.1	22.4	2.1

It has been demonstrated that the Surge generator meets the specified requirements in the standard with at least a 95% confidence.

Conducted Disturbances Induced by Radio-Frequency Field Immunity (CS)

RF Frequency Measurement Check		RF Generator Second Harmonic Check
Reading	Standard	Harmonic (dBc)
9.000 kHz	8.99997282 kHz	-45.6
50.000 kHz	49.998570 kHz	-42.3
100.000 kHz	99.9997118 kHz	-43.5
1.000000 MHz	0.999997073 MHz	-45.6
5.000000 MHz	4.99998552 MHz	-47.8
10.000000 MHz	9.99997043 MHz	-48.4
50.000000 MHz	49.9998556 MHz	-47.1
100.000000 MHz	99.9997100 MHz	-46.2
500.000000 MHz	499.998548 MHz	-49.9
1000.000000 MHz	999.997093 MHz	-52.6

RF Generator AM Modulation Measurement Check (1 kHz ; 80 %)			
Frequency	Mod. Freq.	Reading	Standard
100.000 kHz	1 kHz	80.0%	81.4%
1.000000 MHz	1 kHz	80.0%	81.3%
5.000000 MHz	1 kHz	80.0%	81.2%
10.000000 MHz	1 kHz	80.0%	81.1%
50.000000 MHz	1 kHz	80.0%	81.3%
100.000000 MHz	1 kHz	80.0%	81.1%
500.000000 MHz	1 kHz	80.0%	81.5%
1000.000000 MHz	1 kHz	80.0%	80.8%

RF Generator Response and Accuracy Measurement Check		
Frequency	Reading (dBm)	Standard (dBm)
9.000 kHz	0	-43.0
50.000 kHz	0	0.0
100.000 kHz	0	-0.1
1.000000 MHz	0	0.1
5.000000 MHz	0	0.1
10.000000 MHz	0	0.1
50.000000 MHz	0	-0.2
50.000000 MHz	-10	-10.2
50.000000 MHz	-20	-20.3
50.000000 MHz	-30	-30.3
50.000000 MHz	-40	-40.3
50.000000 MHz	-50	-50.3
100.000000 MHz	0	0.1
500.000000 MHz	0	0.0
1000.000000 MHz	0	-0.3

RF Power Meter Measurement Check			
Frequency (MHz)		Standard (dBm)	Reading (dBm)
CH 1	50	10	9.7
CH 1	50	0	-0.3
CH 1	50	-10	-10.3
CH 1	50	-15	-15.3
CH 2	50	10	9.7
CH 2	50	0	-0.3
CH 2	50	-10	-10.3
CH 2	50	-15	-15.3
CH 3	50	10	9.7
CH 3	50	0	-0.4
CH 3	50	-10	-10.3
CH 3	50	-15	-15.3

Power Amplifier Gain Flatness Measurement		Power Amplifier Standard Measurement (Input: 10 dBm)		Power Amplifier Second Harmonic Measurement Check
Frequency	Reading (dB)	Result (dBm)	Spec. (dBm)	Reading (dBc)
150.000 kHz	50.1	48.1	> 44.77	-48.6
1.000000 MHz	51.2	48.3	> 44.77	-47.8
5.000000 MHz	51.2	48.4	> 44.77	-53.6
10.000000 MHz	51.1	48.4	> 44.77	-48.7
50.000000 MHz	50.4	48.4	> 44.77	-49.2
100.000000 MHz	49.6	48.2	> 44.77	-44.7
200.000000 MHz	49.4	47.0	> 44.77	-54.3
2300.000000 MHz	49.6	46.4	> 44.77	-57.5

Uncertainty: Frequency: 1.9×10^{-9}
Linear: 0.9 dB
RF Power Level: 1.2 dB
Harmonic: 2.0 dB

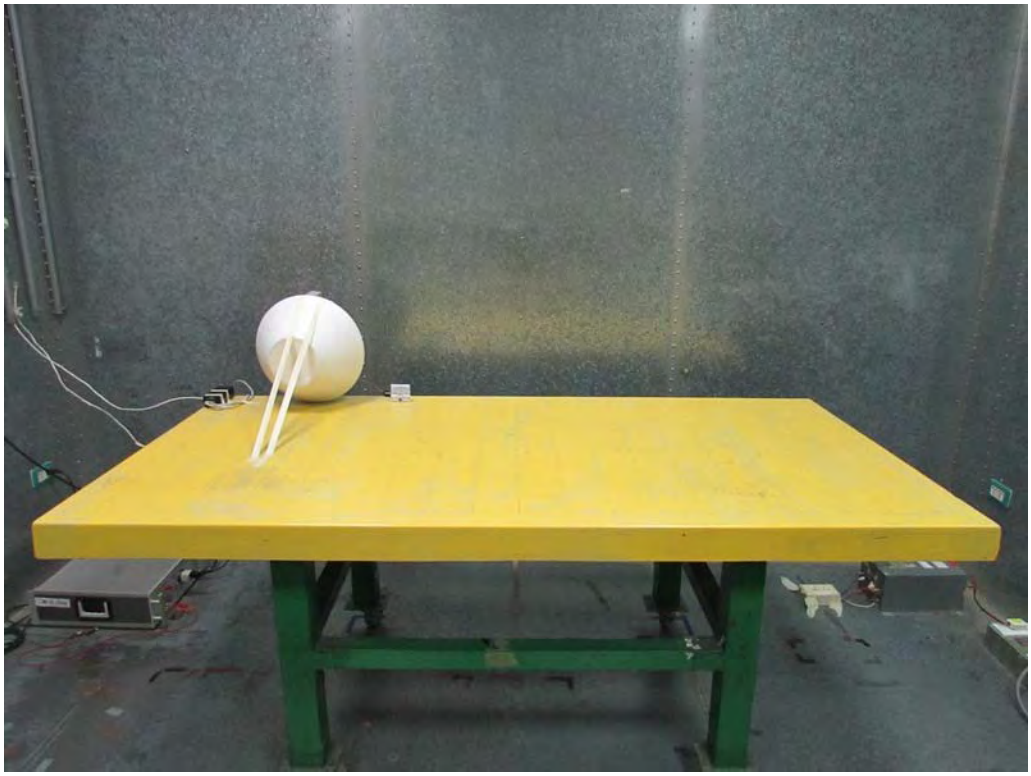
It has been demonstrated that the CS generator meets the specified requirements in the standard with at least a 95% confidence.

Appendix A. Test Photos

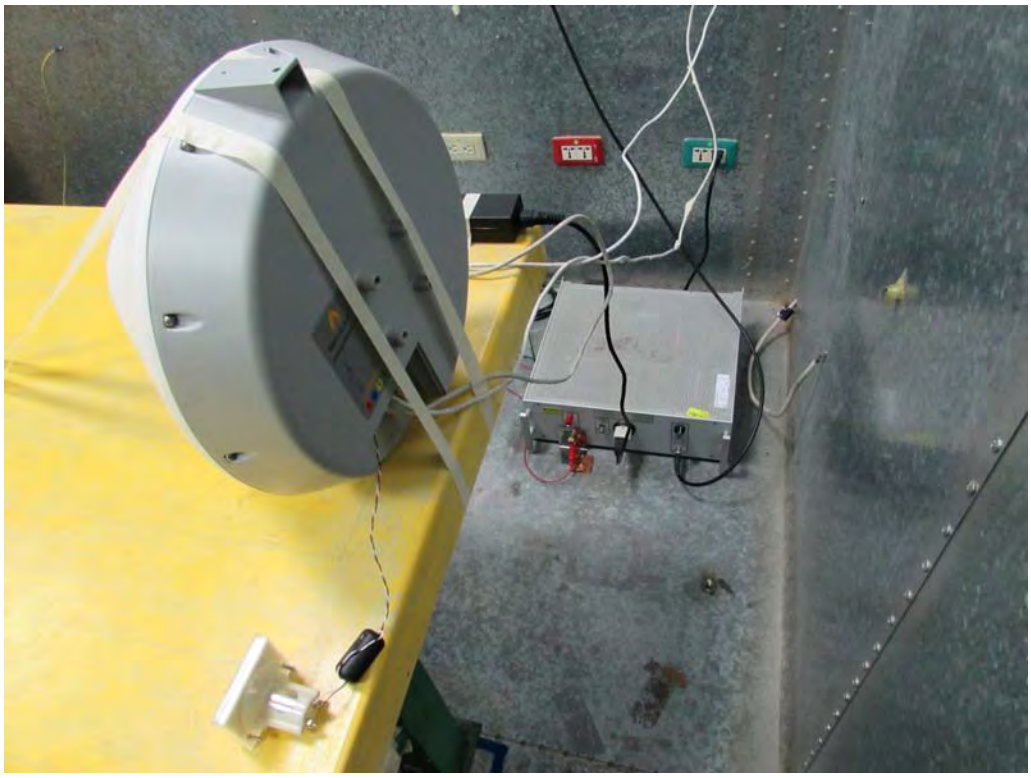
1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 1

FRONT VIEW



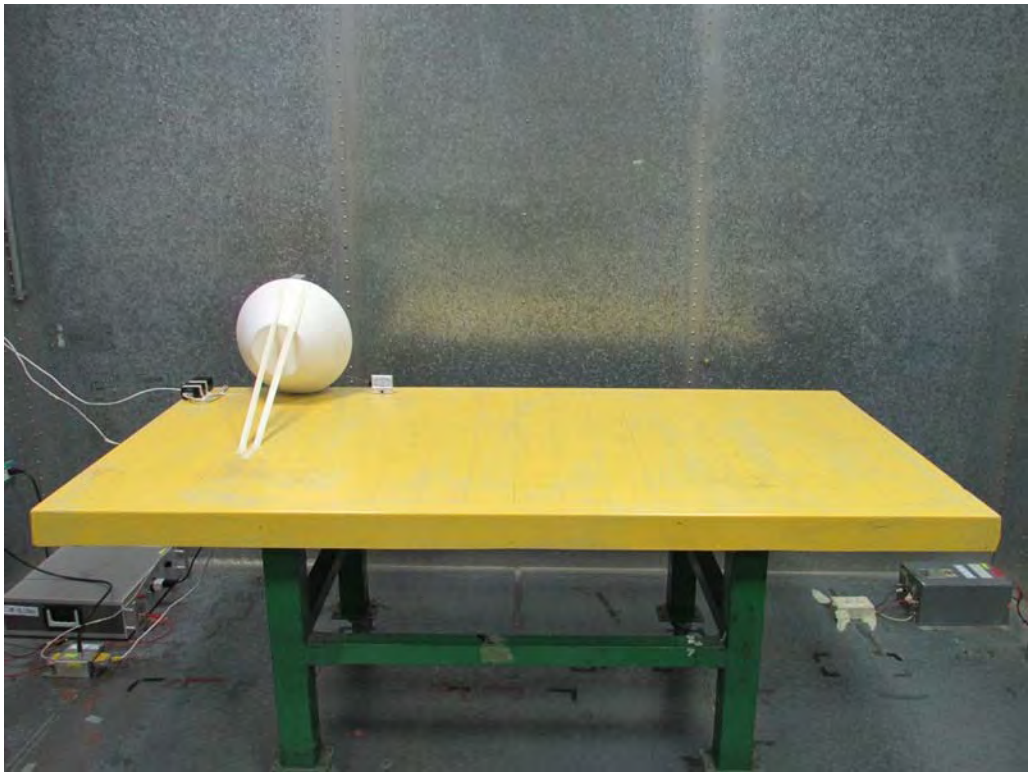
REAR VIEW



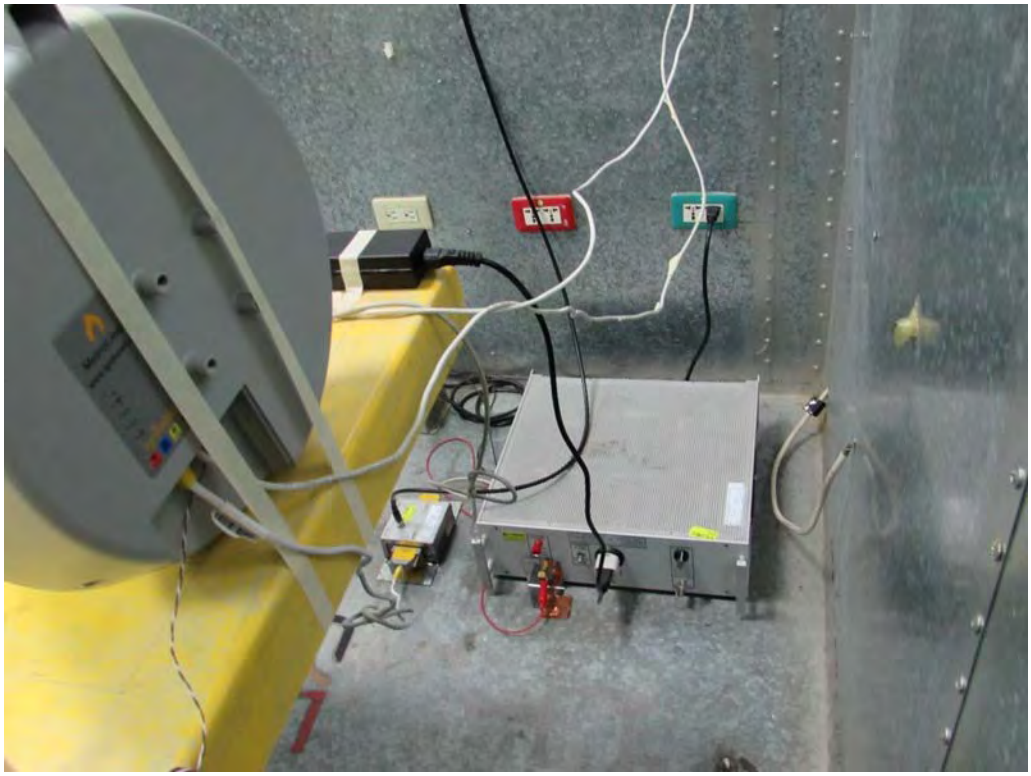
2. Photographs of Telecommunication Line Conducted Emissions Test Configuration

Test Mode: Mode 1 and Mode 4

FRONT VIEW



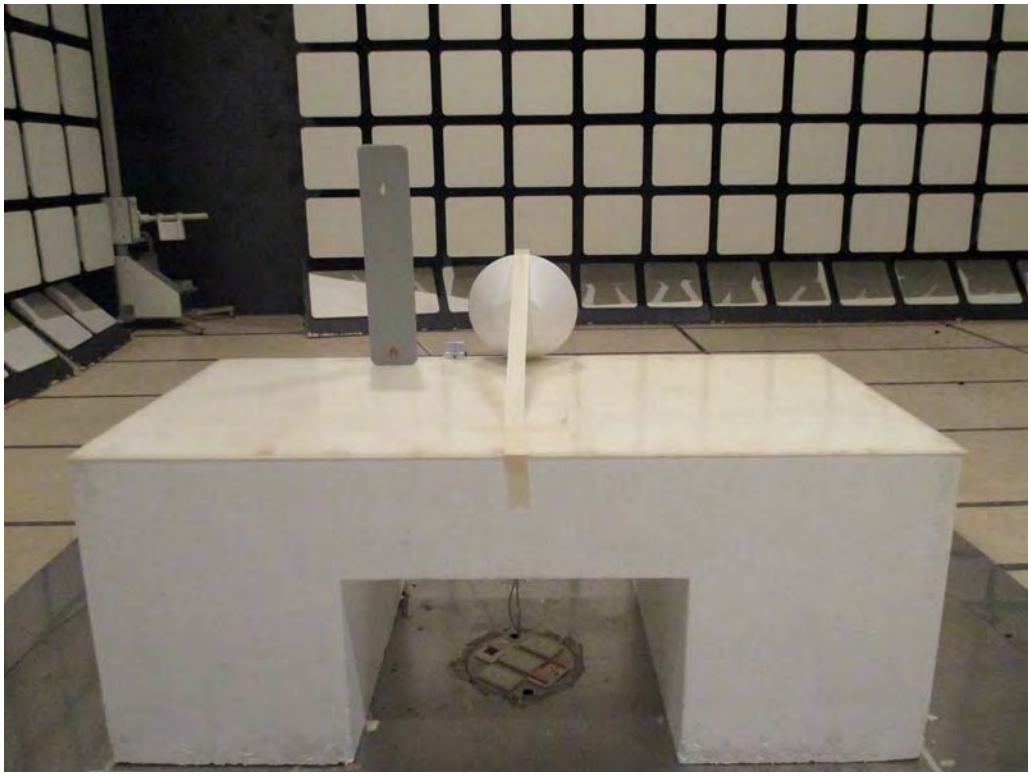
REAR VIEW



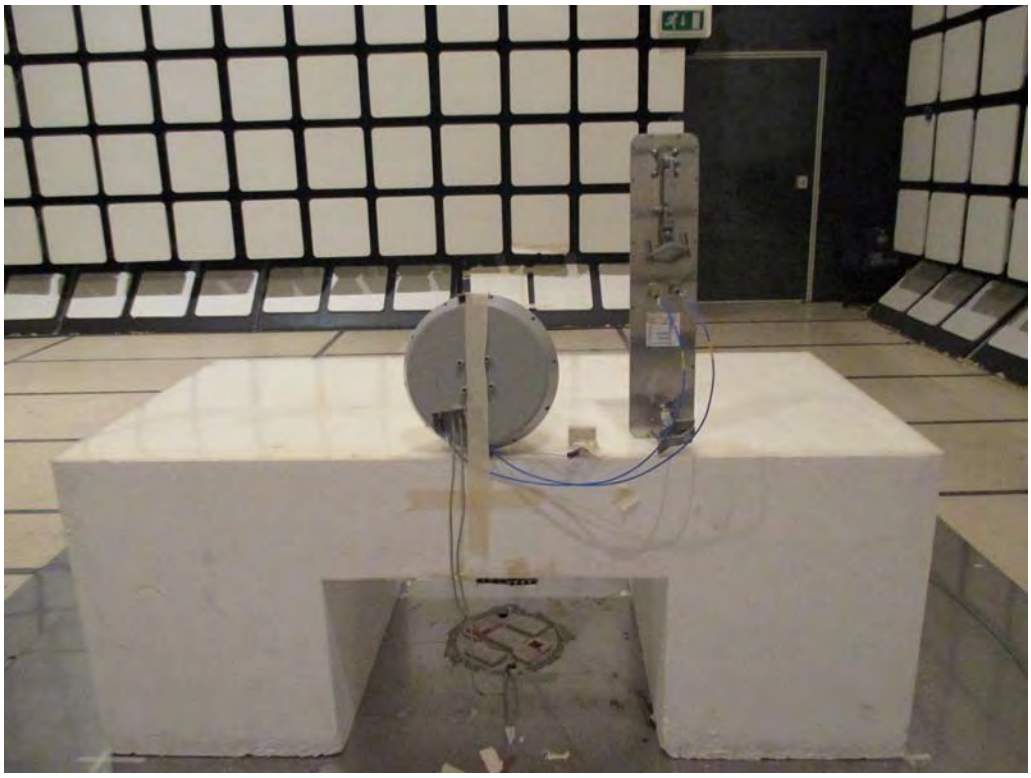
3. Photographs of Radiated Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 2

FRONT VIEW

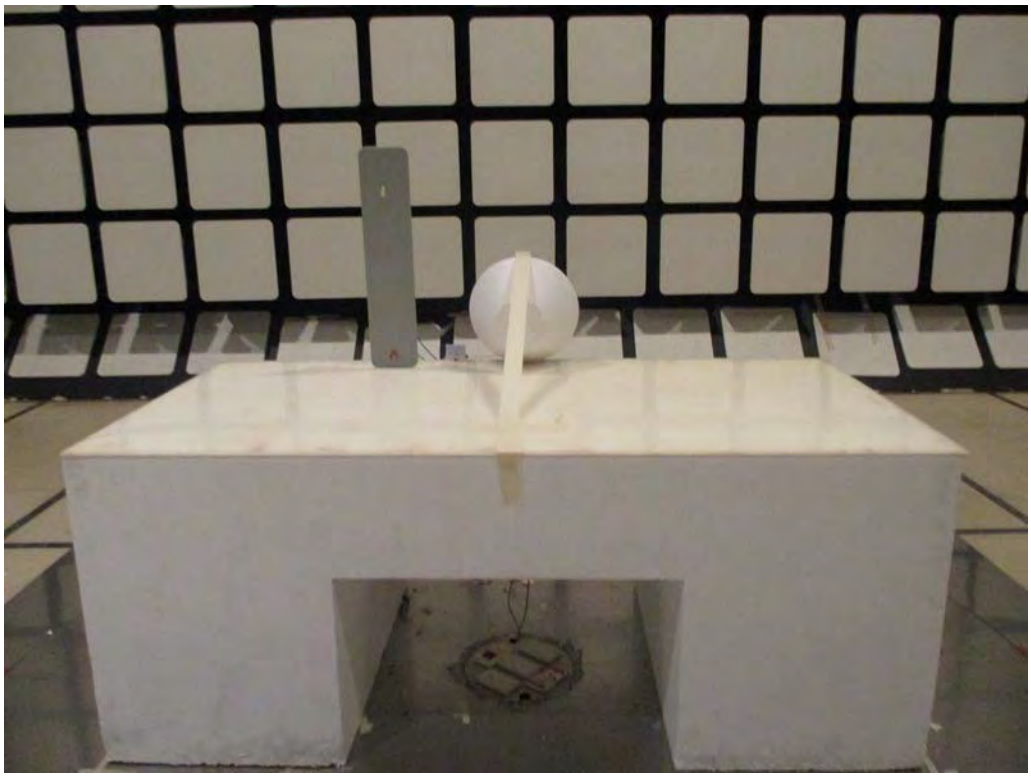


REAR VIEW

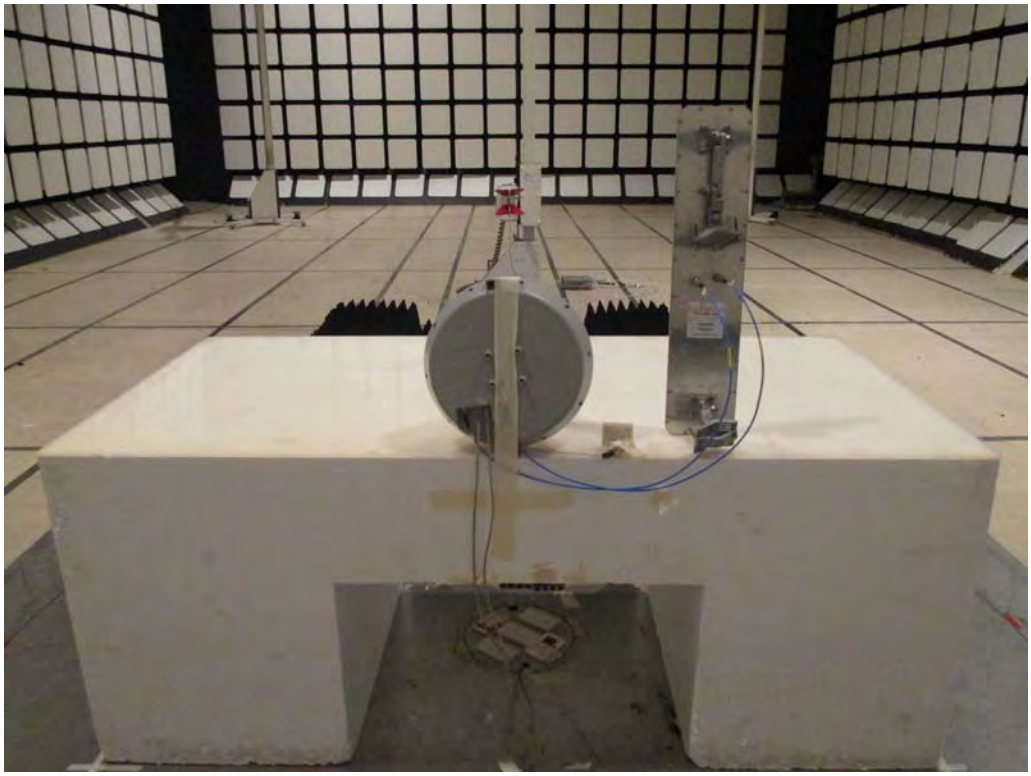


Test Configuration: Above 1GHz / Test Mode: Mode 2

FRONT VIEW



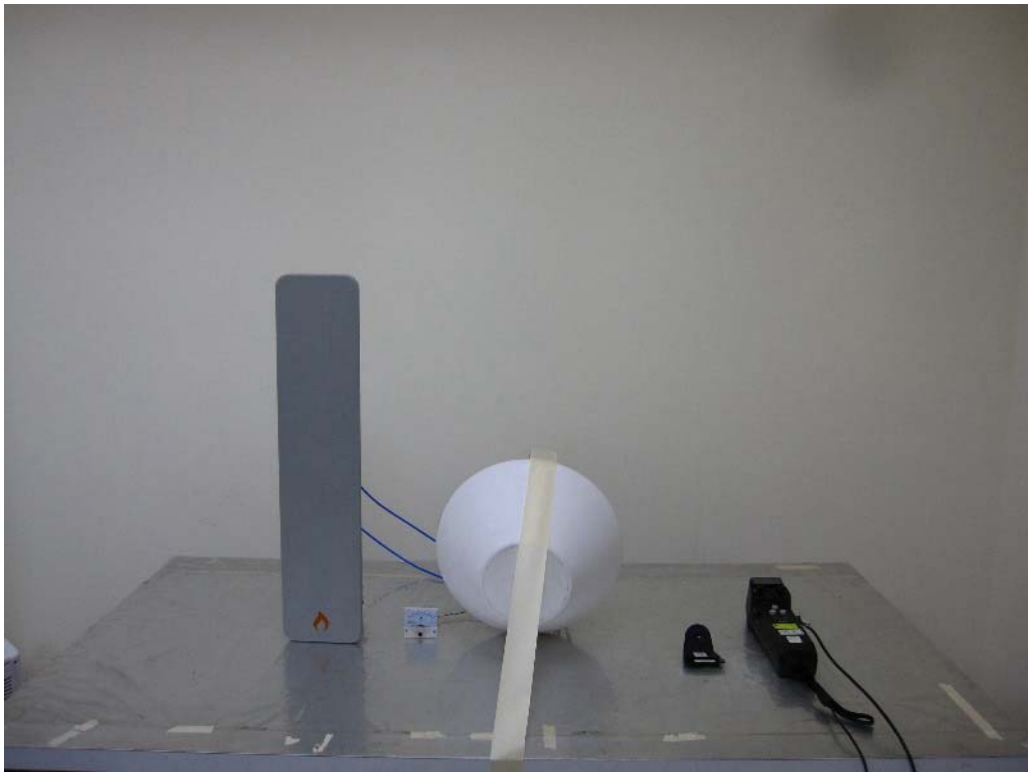
REAR VIEW



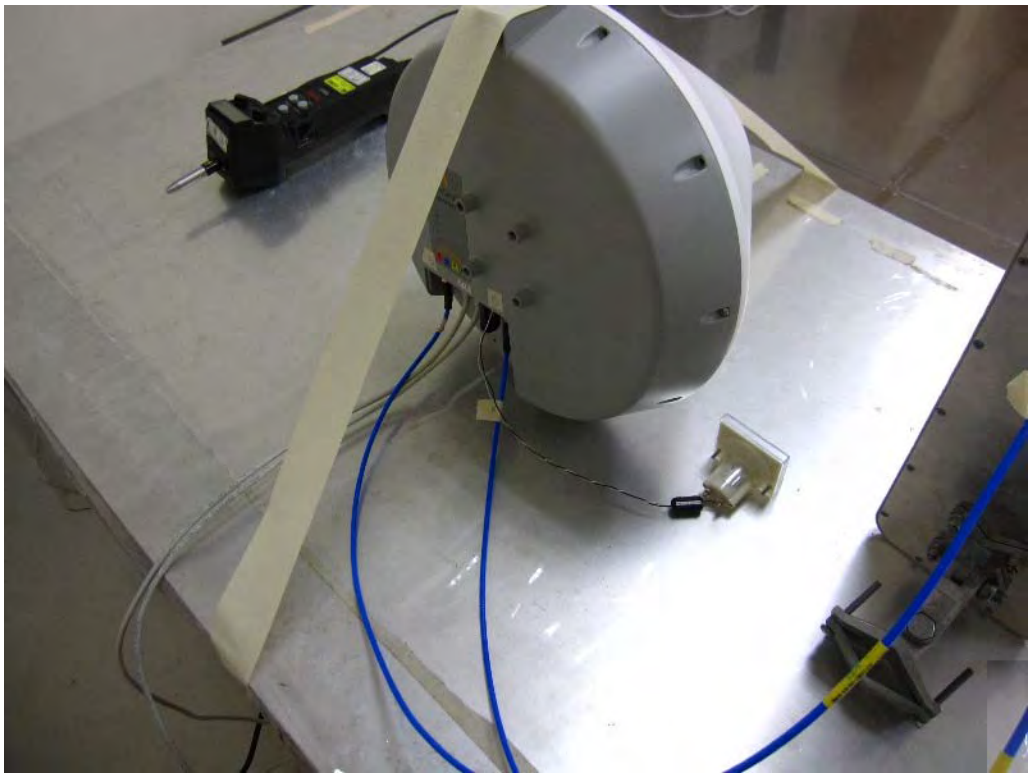
4. Photographs of ESD Immunity Test Configuration

Test Mode: Mode 2

FRONT VIEW

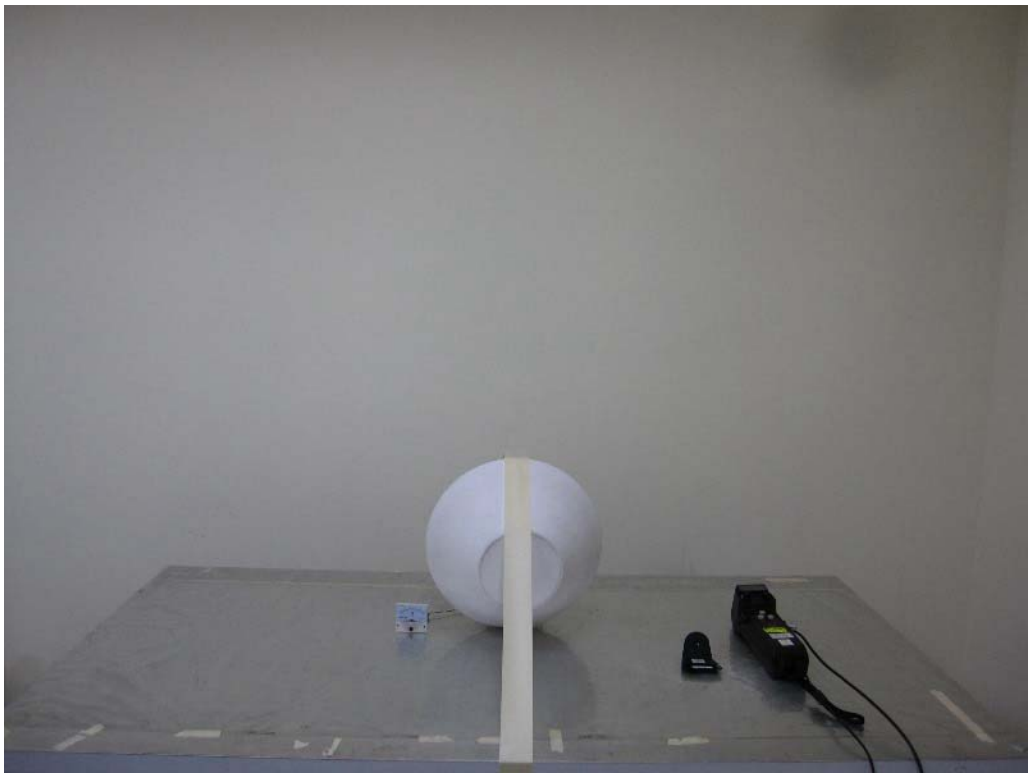


REAR VIEW

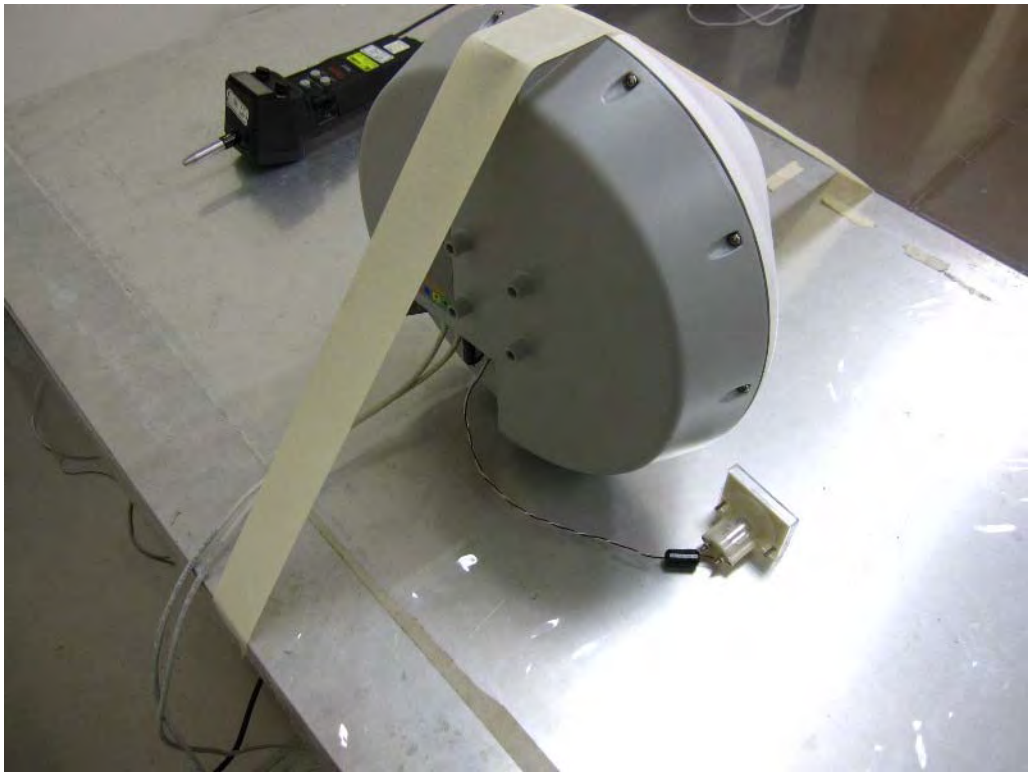


Test Mode: Mode 1 and Mode 3

FRONT VIEW



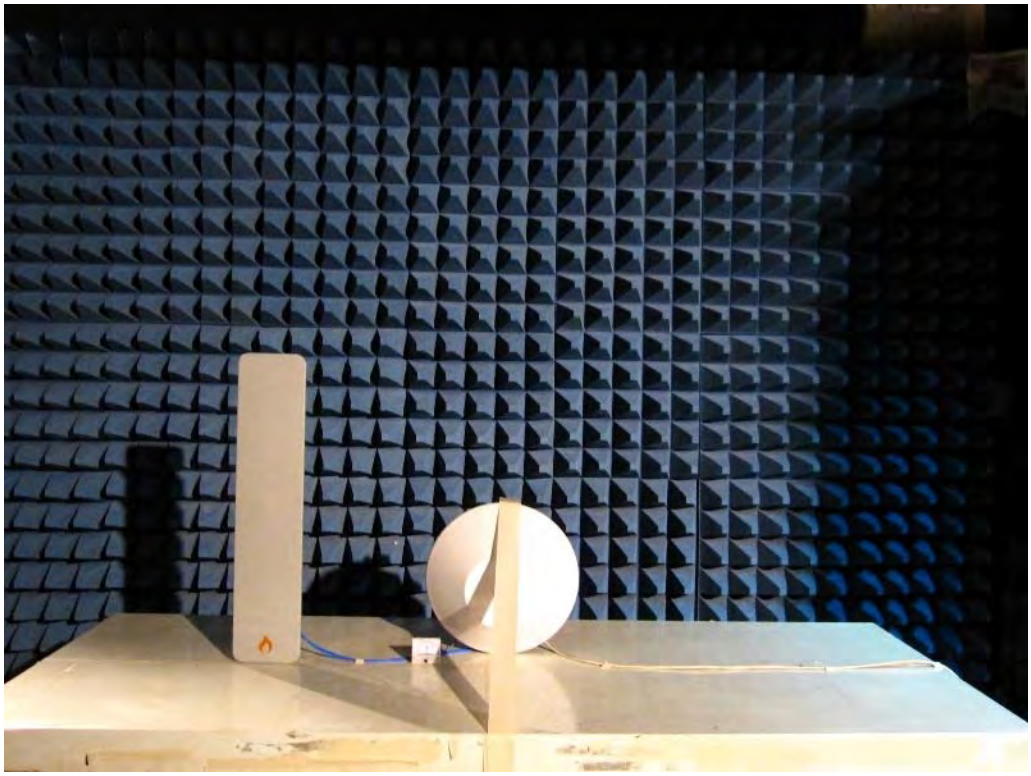
REAR VIEW



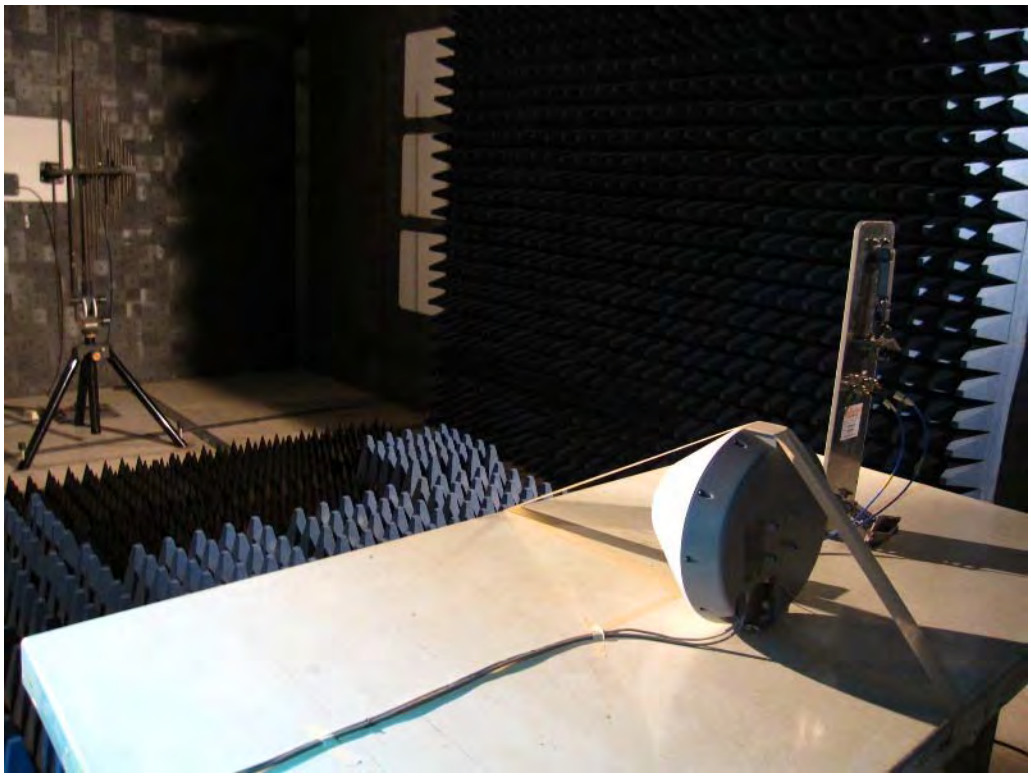
5. Photographs of RS Immunity Test Configuration

Test Mode: Mode 2

FRONT VIEW

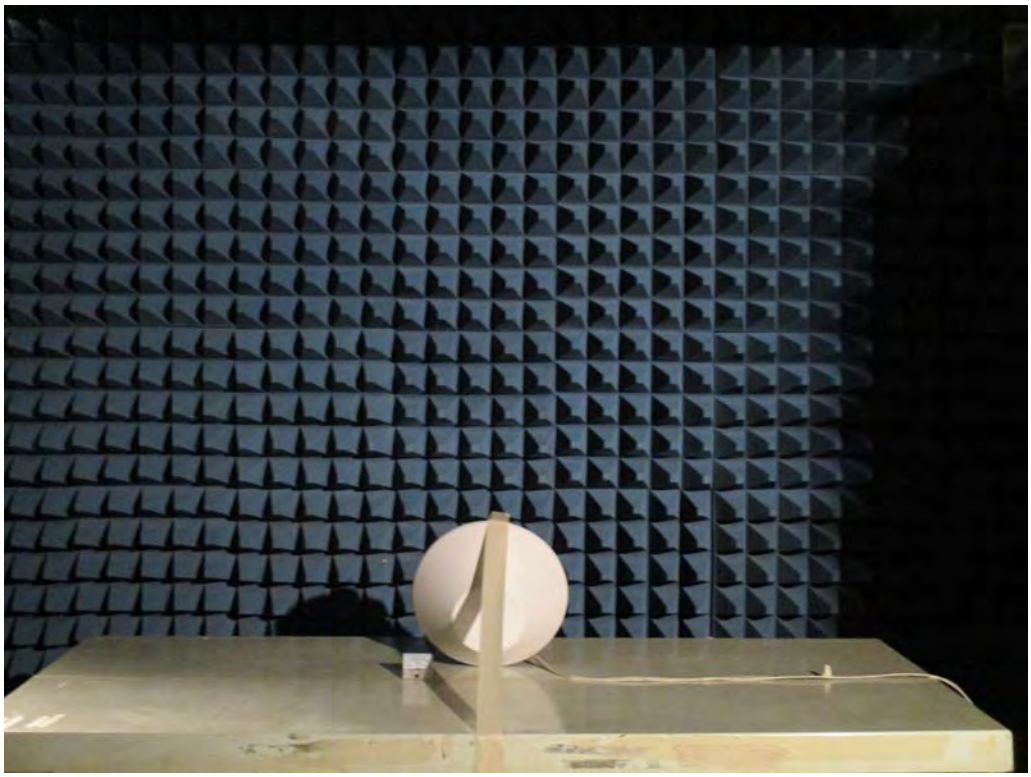


REAR VIEW

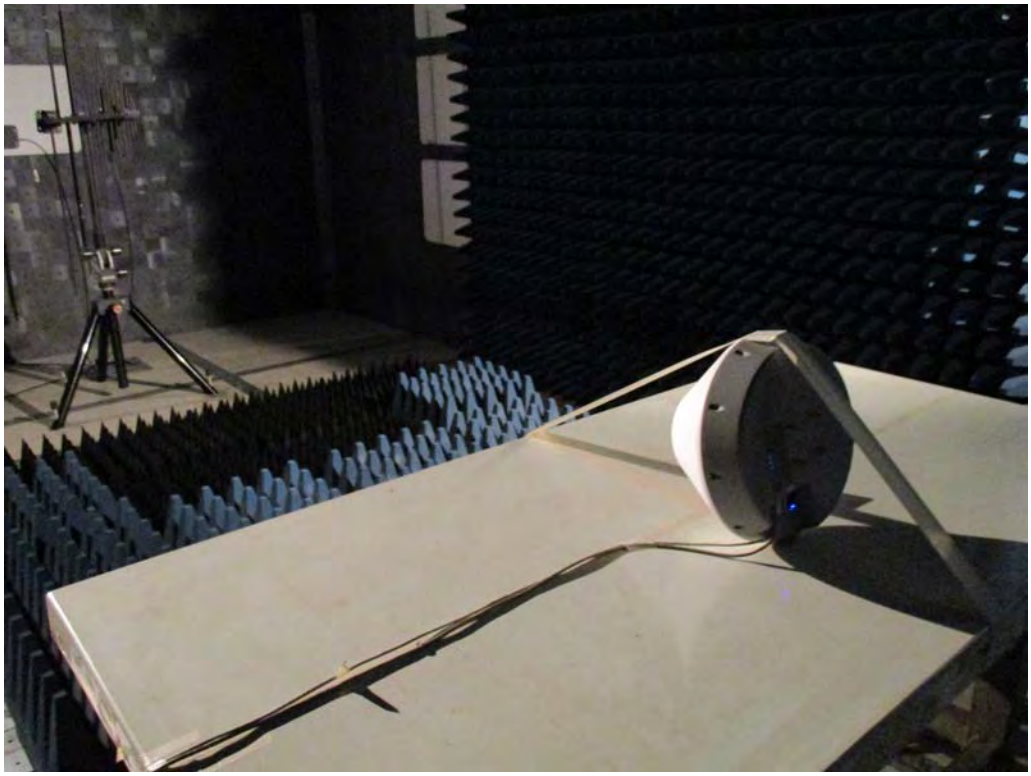


Test Mode: Mode 1 and Mode 3

FRONT VIEW



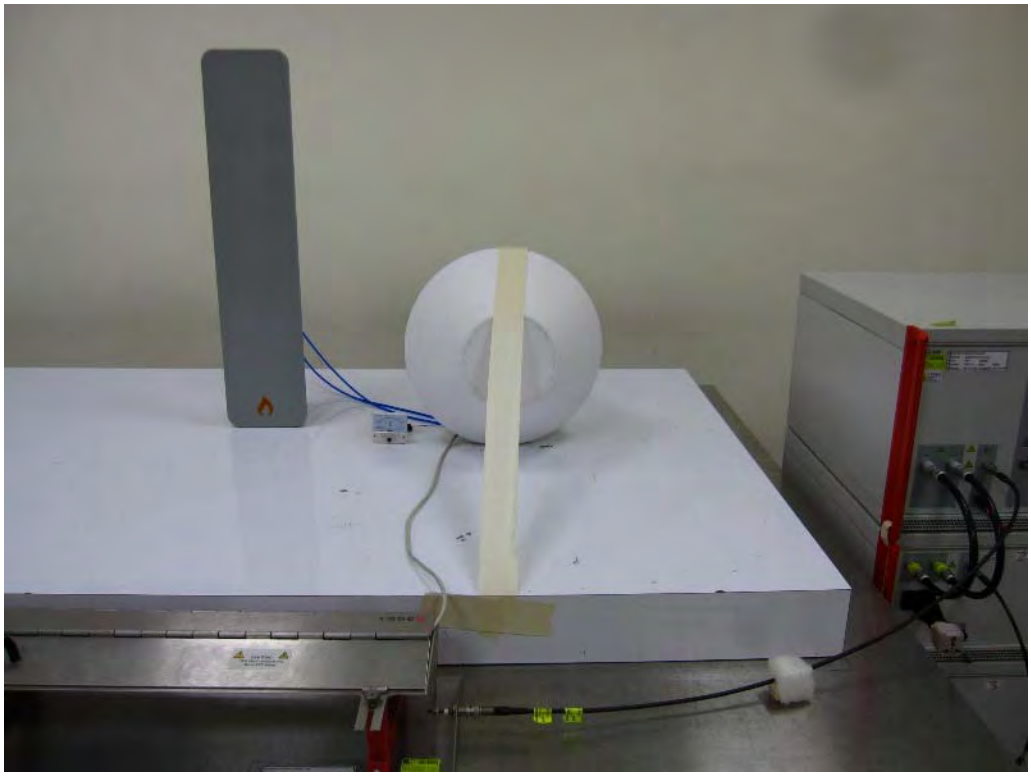
REAR VIEW



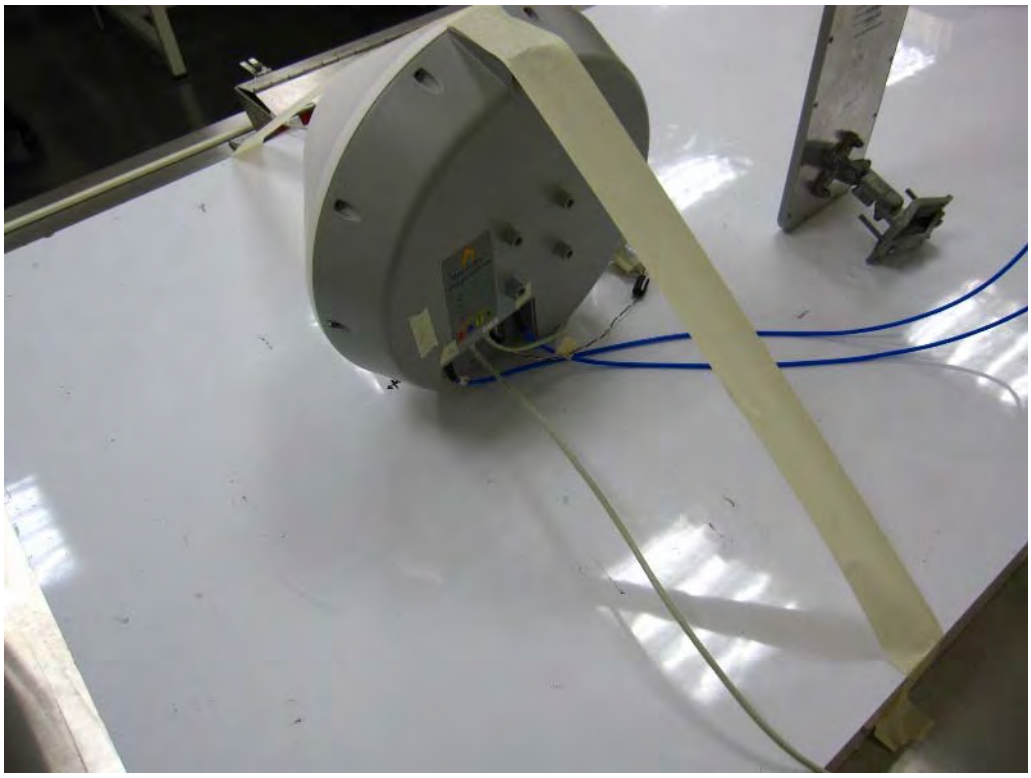
6. Photographs of EFT Test Configuration

Test Mode: Mode 2

FRONT VIEW

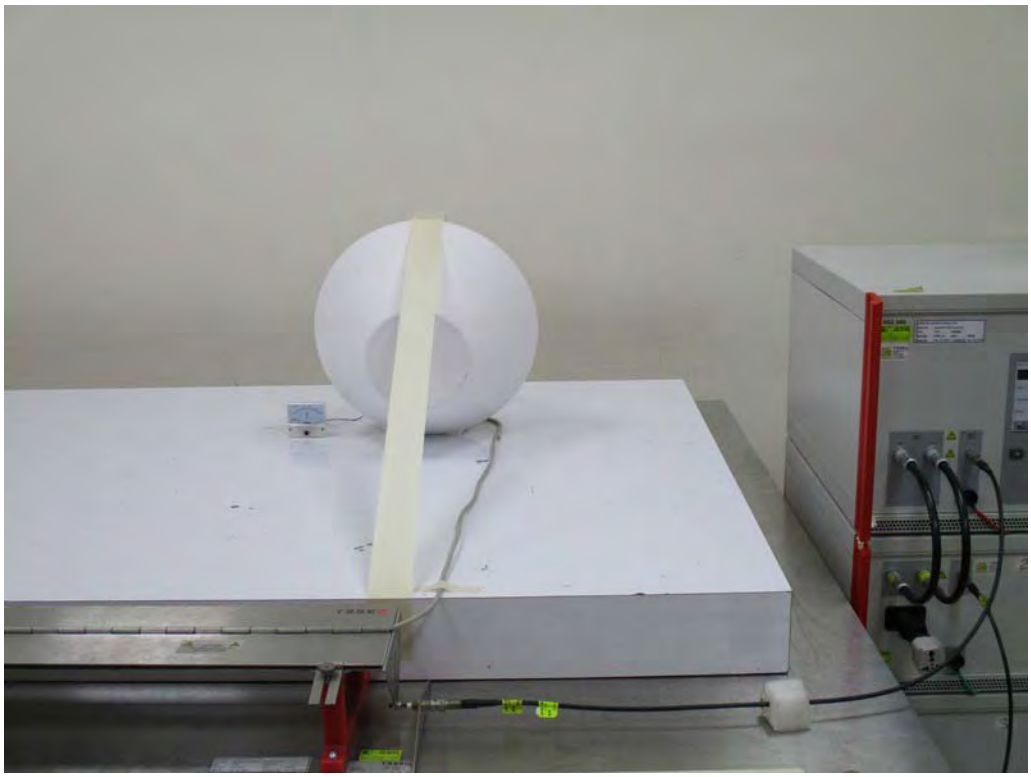


REAR VIEW

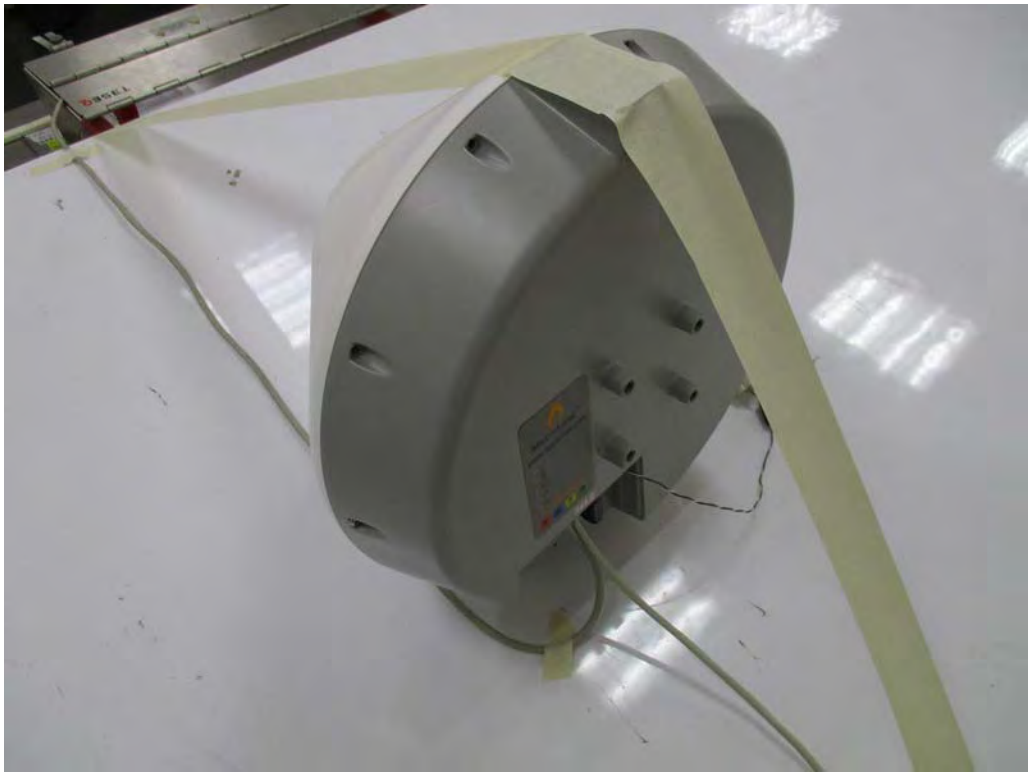


Test Mode: Mode 1 and Mode 3

FRONT VIEW



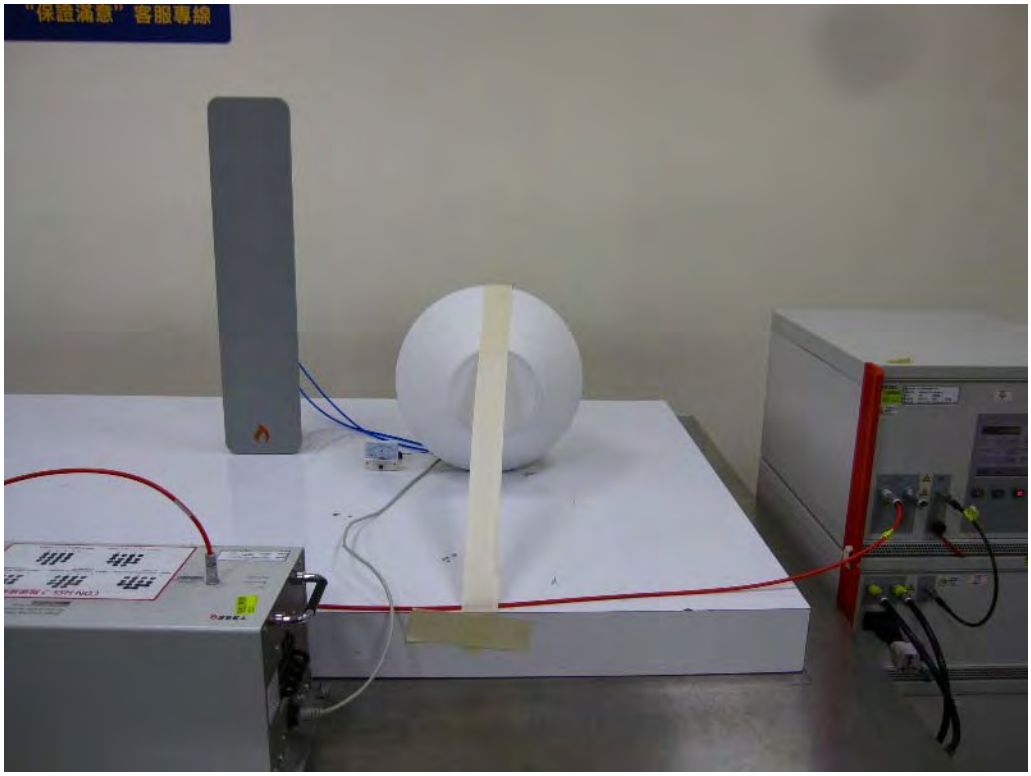
REAR VIEW



7. Photographs of Surge Test Configuration

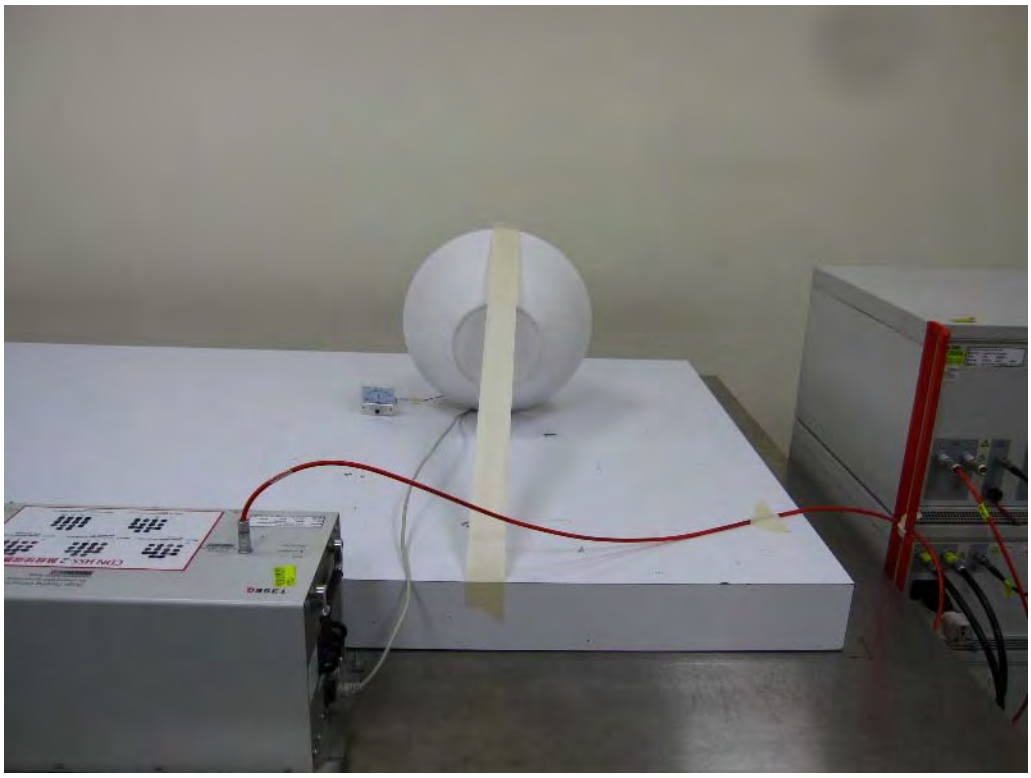
Test Mode: Mode 2

FRONT VIEW



Test Mode: Mode 1 and Mode 3

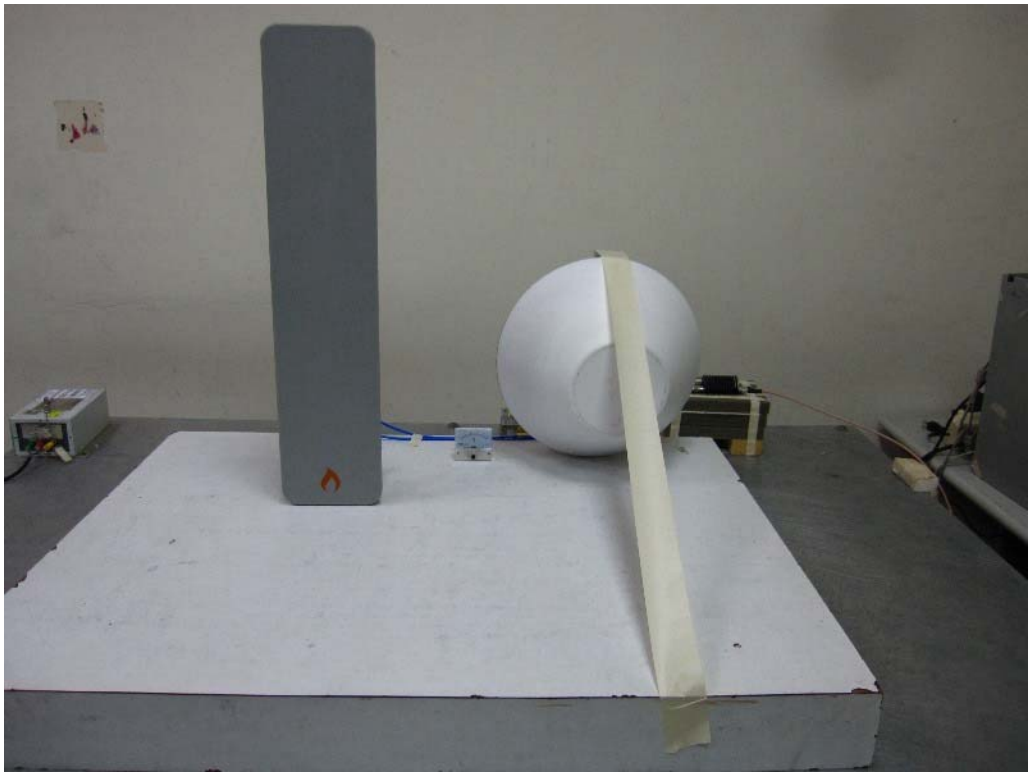
FRONT VIEW



8. Photographs of CS Immunity Test Configuration

Test Mode: Mode 2

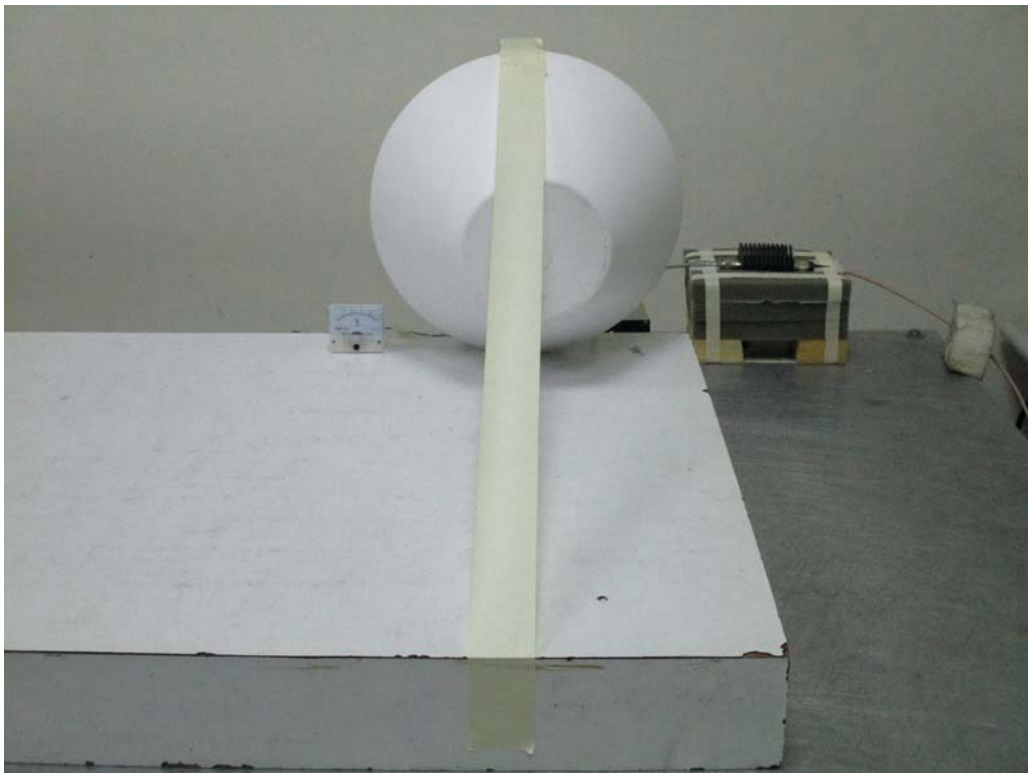
FRONT VIEW



REAR VIEW

Test Mode: Mode 1 and Mode 3

FRONT VIEW



REAR VIEW