CE EMC Test Report

Issued date: Oct. 12, 2015

Project No.: 15Q083101

Product : Network Camera

Model : FD9171-HT, FD9371-HTV, FD9371-EHTV

Applicant : VIVOTEK INC.

Address : 6F, No.192, Lien-Cheng Rd., Chung-Ho, New Taipei City, 235, Taiwan, R.O.C.

Report No: WD-EE-R-150121-00

According to

EN55022: 2010 +AC:2011, Class B
AS/NZS CISPR 22:2009 +A1:2010, Class B
CISPR 22: 2008 (Ed 6.0)
EN 61000-3-2: 2006 +A1: 2009 +A2: 2009
EN 61000-3-3: 2008

EN55024: 2010 (Ed 2.0)
IEC 61000-4-2: 2008 (Ed 2.0)
IEC 61000-4-3: 2010 (Ed 3.2)
IEC 61000-4-4: 2012 (Ed 3.0)
IEC 61000-4-5: 2014 (Ed 3.0)
IEC 61000-4-6: 2013 (Ed 4.0)
IEC 61000-4-8: 2009 (Ed 2.0)
IEC 61000-4-11: 2004 (Ed 2.0)

Technical Engineer : Toby Chung / Toby Chung

Authorized Signatory : Robert Wang / Robert Wang

Wendell Industrial Co., Ltd
Wendell Electronic Test Laboratory
Add: 6F/6F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan R.O.C.

Table of Contents

History of this test report

Report No.	Issue date	Description
WD-EE-R-150121-00	Oct. 12, 2015	Initial Issue

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

History of supplementary report

Report No.	Issue date	Description
WD-EE-R-150121-00	Oct. 12, 2015	Original report

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

1 Certification

Product:	Network Camera
Brand Name:	VIVOTEK
Model No:	FD9171-HT, FD9371-HTV, FD9371-EHTV
Applicant:	VIVOTEK INC.
Tested:	Sep. 01 ~ Sep. 18, 2015
Standard:	**EN 55022: 2010 +AC: 2011, Class B** **AS/NZS CISPR 22:2009 +A1:2010, Class B** **CISPR 22: 2008 (Ed 6.0)** **EN 61000-3-2: 2006 +A1: 2009 +A2: 2009** **EN 61000-3-3: 2008** **EN 55024: 2010** IEC 61000-4-2: 2008 IEC 61000-4-3: 2010 IEC 61000-4-4: 2012 IEC 61000-4-5: 2014 IEC 61000-4-6: 2013 IEC 61000-4-8: 2009 IEC 61000-4-11: 2004

The above equipment (Model: FD9171-HT, FD9371-HTV) has been tested by **Wendell Electrical Test Laboratory**, and found compliance with the requirement of the above standards. The test record, data evaluation and 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.

1.1 Summary of Test Result

The EUT has been tested according to the following specifications:

Emission				
Standard	**Test Item**	**Limit**	**Result**	**Remark**
EN 55022 CISPR 22	Conducted disturbance at mains terminals	Class B	Pass	Meets the requirements
	Conducted disturbance at telecommunication ports test	Class B	Pass	Meets the requirements
	Radiated disturbance	Class B	Pass	Meets the requirements
EN 61000-3-2	Harmonic current emissions	Class A	Pass	The power consumption of EUT is less than 75W and no limits apply
EN 61000-3-3	Voltage fluctuations and flicker	-	Pass	Meets the requirements

Immunity			
Standard	**Test Item**	**Result**	**Remark**
IEC 61000-4-2	Electrostatic discharges (ESD)	Pass	Meets the requirements of Performance Criterion B
IEC 61000-4-3	Continuous radiated disturbances (RS)	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-4	Electrical fast transients (EFT)	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-5	Surges	Pass	Meets the requirements of Performance Criterion B
IEC 61000-4-6	Continuous conducted disturbances(CS)	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-8	Power-frequency magnetic fields (PFMF)	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-11	Voltage dips and interruptions	Pass	Meets the requirements of Voltage Dips: ✧ >95% reduction – Performance Criterion A ✧ 30% reduction - Performance Criterion A Voltage Interruptions: ✧ >95% reduction - Performance Criterion B

Note: Test record contained in the referenced test report relate only to the EUT sample and test item.

2 Test Configuration of Equipment Under Test

2.1 Test Facility

Conducted disturbance at mains terminals, Conducted disturbance at telecommunication ports, Harmonics, Flicker and Immunity Tests

W01: Add: 6F/6F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan R.O.C.

Radiated emission Test (OATS)

W03: Land No. 0295-0006, Dakeng Small Section, Small Keelung Section, Sanzhi Dist., New Taipei City 252, Taiwan (R.O.C.)

ACCREDITATIONS

The laboratories are accredited and approved by the TAF according to ISO/IEC 17025.

2.2 Measurement Uncertainty

The measurement instrumentation uncertainly consideration contained in CISPR 16-4-2.

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

2.2.1 Conducted Emission test

Test Site	Measurement Freq. Range	dB (U_{cispr})	Note
W01	150 kHz ~ 30 MHz	3.19	N/A

2.2.2 Conducted emission at telecom port test

Test Site	Measurement Freq. Range	dB (Ucispr)	Note
W01	150 kHz ~ 30 MHz	3.16	N/A

2.2.3 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB (Ucispr)	Note
W03	30 MHz ~ 200 MHz	V	4.29	N/A
	30 MHz ~ 200 MHz	H	3.35	N/A
	200 MHz ~ 1000 MHz	V	3.87	N/A
	200 MHz ~ 1000 MHz	H	3.48	N/A
	1 GHz ~ 3 GHz	V	4.47	N/A
	1 GHz ~ 3 GHz	H	4.44	N/A
	3 GHz ~ 6 GHz	V	4.86	N/A
	3 GHz ~ 6 GHz	H	4.47	N/A

2.2.4 Harmonics Current Measurement

Test Site	Expanded Uncertainty	
W01	Voltage	3.96 V
	Current	1.18 mA
	Power	0.15 Hz

2.2.5 Voltage Fluctuation and Flicker Measurement

Test Site	Expanded Uncertainty	
W01	d_c, d_{max}	11.56 %
	P_{st}, P_{lt}	5.77 %

2.2.6 Immunity Test

Test Site	Item	Expanded Uncertainty		Note
W01	Electrostatic Discharge (ESD)	Voltage	0.05%	N/A
		Timing	5.6%	
	Continuous radiated disturbances (RS)	80MHz – 2.5GHz	3.0dB	80MHz - 1GHz, k=2
	Electrical fast transients (EFT)	Voltage	8.5%	N/A
		Timing	4.4%	
	Surges	Voltage	3.9%	N/A
		Current	2.9%	
		Time	3.7%	
	Continuous conducted disturbances (CS)	CDN	1.80dB	150KHz – 80MHz, k=2
		EM Clamp	3.75dB	
	Power-frequency magnetic fields (PFMF)	Magnetic Field Strength	1.0%	N/A
	Voltage dips and interruptions	Voltage	3.8%	N/A
		Current	2.4%	
		Time	2.0%	

3 Generation Information

3.1 Description of EUT

Product	Network Camera
Brand	VIVOTEK
Model No.	FD9171-HT, FD9371-HTV, FD9371-EHTV
Applicant	VIVOTEK INC.
EUT Power Rating	12 Vdc (from adapter) or 48 Vdc (from POE)
Model Differences	Refer to Note for more details
Operating System	N/A
Data Cable Supplied	N/A
Accessory Device	N/A
I/O Port	Please refer to the User's Manual

Note:

1. The following models are provided to this EUT. The model: FD9171-HT and FD9371-HTV were chosen for final test.

Brand Name	Model No.	Difference		
		Enclosure	Heater	Operating temperature
VIVOTEK	FD9171-HT	Plastic shell	No	-20℃~50℃
	FD9371-HTV	Iron shell	No	-20℃~50℃
	FD9371-EHTV	Iron shell	Yes	-50℃~50℃

2. The EUT's highest operating frequency is 1600MHz. Therefore the radiated emission is tested up to 6GHz.

3.2 Description of Test Modes

For radiated emission, the EUT has been pre-tested under the following test modes, and **FD9171-HT and FD9371-HTV Mode** were the worst case for final test.

Test Mode	Test Condition
1	FD9171-HT, Adapter Mode
2	FD9171-HT, POE Mode
3	FD9371-HTV, Adapter Mode
4	FD9371-HTV, POE Mode
5	FD9371-EHTV, Adapter Mode
6	FD9371-EHTV, POE Mode

Test results are presented in the report as below.

Test Result	Test Condition
Conducted emission test	
1	FD9171-HT, Adapter Mode
2	FD9371-HTV, Adapter Mode
Conducted emission test at telecom port test	
1	FD9171-HT, Adapter Mode, LAN (10Mbps/100Mbps)
2	FD9171-HT, POE Mode, LAN (10Mbps/100Mbps)
3	FD9371-HTV, Adapter Mode, LAN (10Mbps/100Mbps)
4	FD9371-HTV, POE Mode, LAN (10Mbps/100Mbps)
Radiated emission 30MHz ~ 1GHz test	
1	FD9171-HT, Adapter Mode
2	FD9171-HT, POE Mode
3	FD9371-HTV, Adapter Mode
4	FD9371-HTV, POE Mode
Radiated emission above 1GHZ test	
1	FD9171-HT, Adapter Mode
2	FD9171-HT, POE Mode
3	FD9371-HTV, Adapter Mode
4	FD9371-HTV, POE Mode
Harmonics, Flicker and Immunity test	
1	FD9171-HT, Adapter Mode
2	FD9171-HT, POE Mode
3	FD9371-HTV, Adapter Mode
4	FD9371-HTV, POE Mode

3.3 EUT Operating Condition

a. Placed the EUT on the test table.
b. Prepared server PC to act as a communication partner and placed it outside of testing area.
c. The EUT was connected to the server PC with LAN cables.
d. The communication partner sent data to EUT by command "PING" via LAN.
e. The EUT write data with micro SD card.

3.4 Description of Support Unit

The EUT has been conducted testing with other necessary accessories or support units.

Item	Equipment	Brand	Model No.	Serial No.	FCC ID	Data Cable	Power Cord	Remark
1	Server PC	DELL	OPTIPLEX 380	2C6742S	FCC DoC Approved	Adapter Mode: 20m non-shielded RJ 45 cable POE Mode: 1.5m non-shielded RJ 45 cable	1.8m non-shielded cable	-
2	Micro SD Card	ADATA	32GB	N/A	N/A	N/A	N/A	-
3	POE Injector	GeoVision	GV-481	N/A	N/A	20m non-shielded RJ45 cable	N/A	-
4	Adapter	ENG	3A-303WP12	N/A	N/A	1.5m no-shielded cable with one core	N/A	Supplied by client

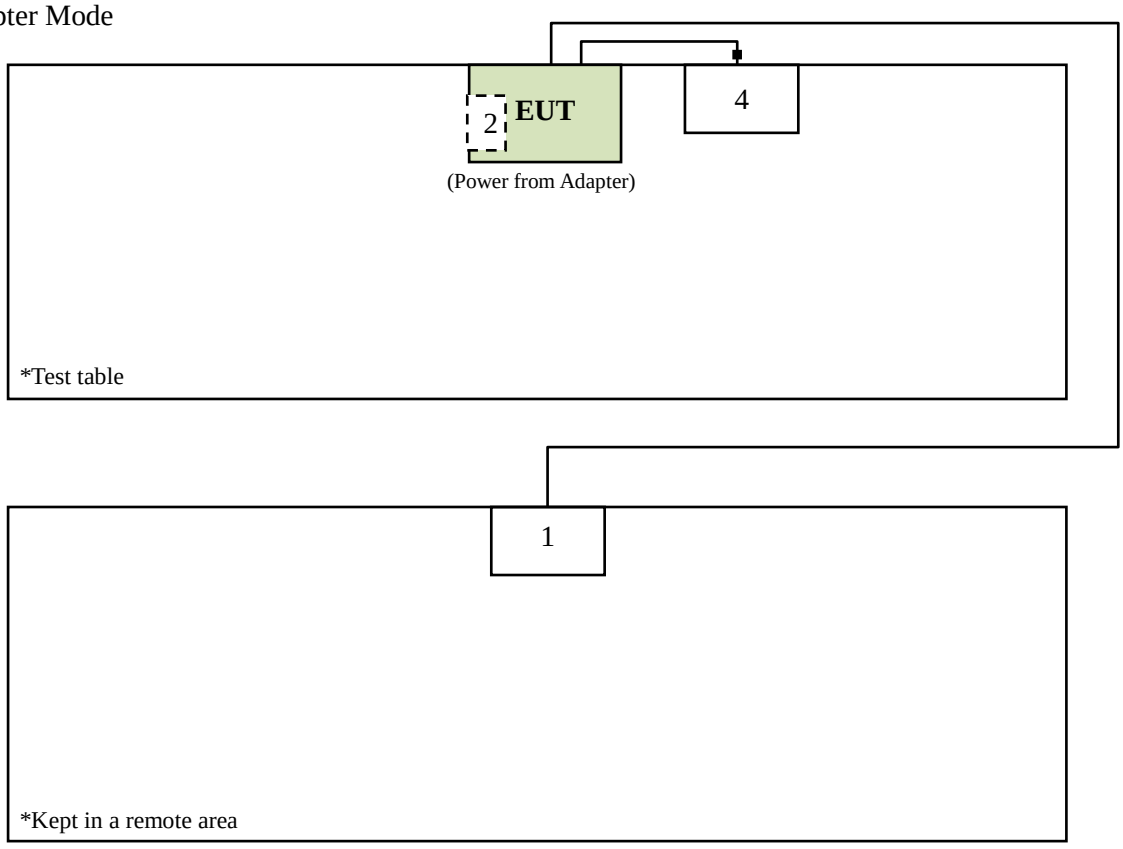
Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 1 acted as communication partners to transfer data.
3. The EUT uses the follow adapter and POE:

Adapter (Support unit)	
Brand	ENG
Model	3A-303WP12
Input Power	100-240Vac, 1A, 50-60Hz
Output Power	12Vdc, 2.5A
Power line	1.5m no-shielded cable with one core

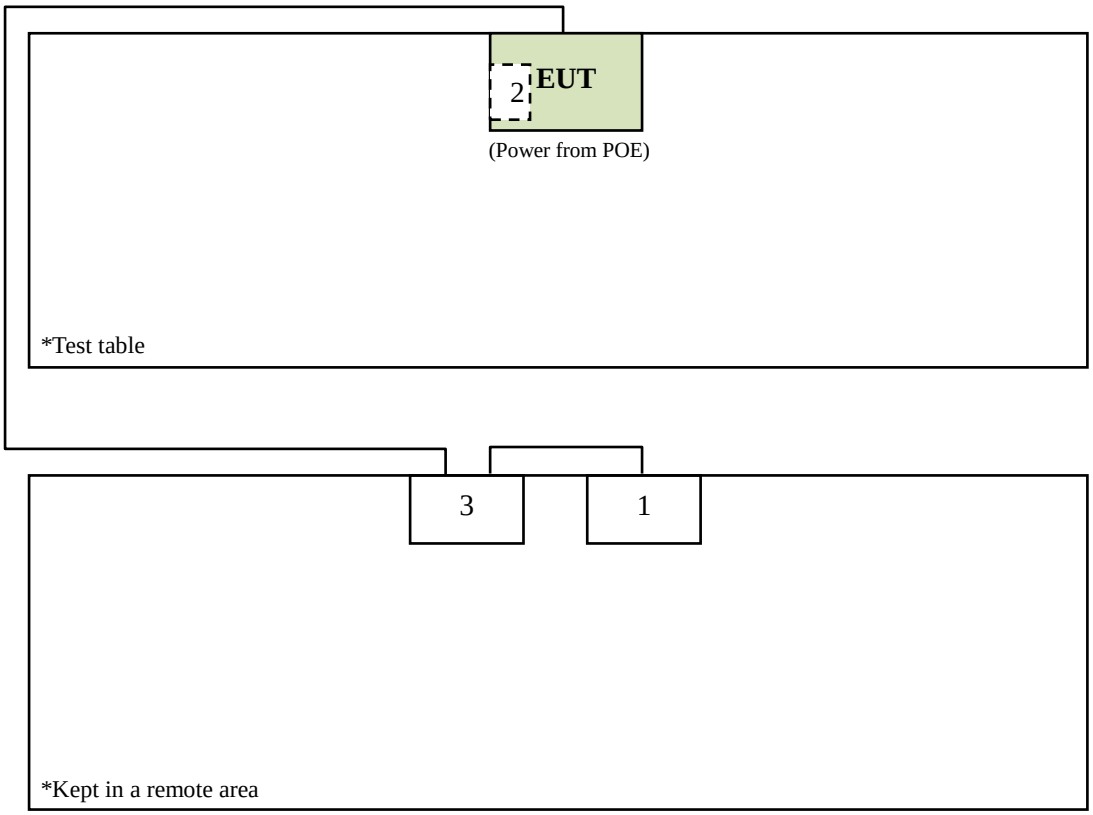
POE Injector (Support unit)	
Brand	GeoVision
Model	GV-481
Input Power	100-240Vac, 2A
Output Power	48Vdc, 1A

3.5 Configuration of System Under Test

Adapter Mode



POE Mode



4 Emission Test

4.1 Conducted Emission Measurement (Frequency Range 150 KHz-30MHz)

4.1.1 Limit of Conducted Emission Measurement

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 30.0	73	60	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 of 0.15 to 0.50 MHz.
3. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
4. The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correction Factor = Insertion loss of LISN + Cable loss
Margin Level = Measurement Value –Limit Value

4.1.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Mar. 27, 2015
2	EMI Test Receiver	R&S	ESCI	CT-01-024	Apr. 01, 2015
3	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Mar. 27, 2015
4	Test Cable	HANRUIN	5D-FB	CT-1-069-2	Aug. 05, 2015
5	50ohm Termination	N/A	N/A	CT-1-065-1	Mar. 30, 2015
6	Measurement Software	EZ-EMC	Ver: FA-03A	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

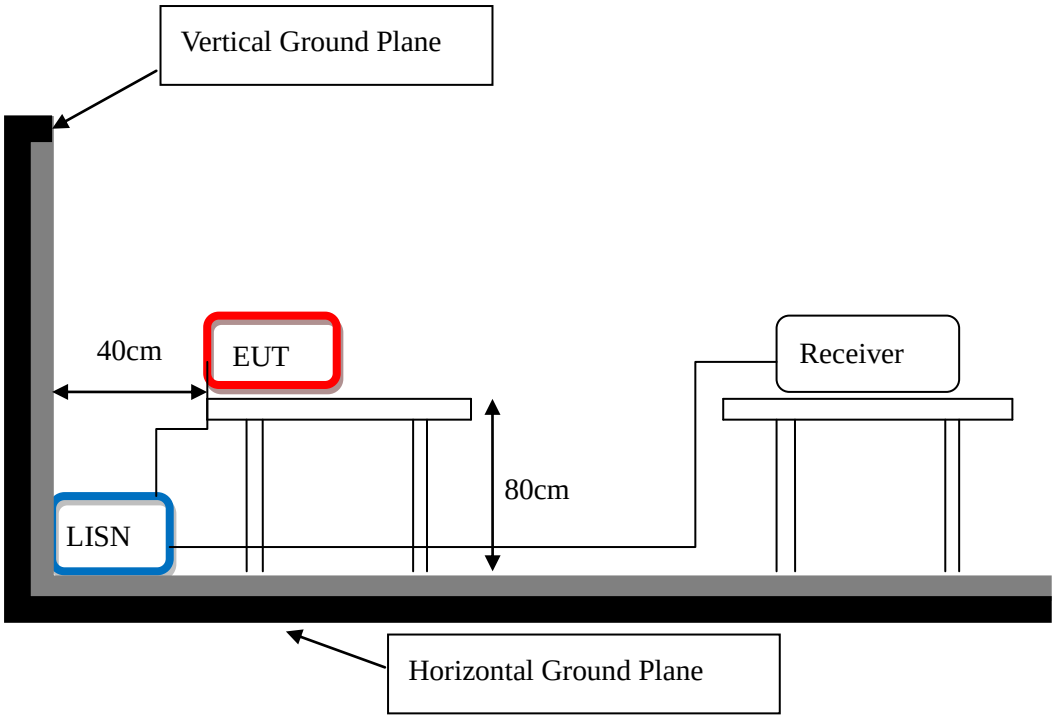
4.1.3 Test Procedure

a. The EUT was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The LISN at least be 80 cm from nearest chassis of EUT.
b. The line impedance stabilization network (LISN) provides 50 ohm/50uH of coupling impedance for the measuring instrument. All other support equipments powered from additional LISN(s).
c. Interrelating cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle. All I/O cables were positioned to simulate typical usage.
d. All I/O cables that are not connected to a peripheral shall be bundle in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
e. The EMI test receiver connected to LISN powering the EUT. The actual test configuration, please refer to EUT test photos.
f. The receiver scanned from 150kHz to 30MHz for emissions in each of test modes. A scan was taken on both power lines, Line and Neutral, recording at least six highest emissions.
g. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.1.4 Deviation from Test Standard

No deviation

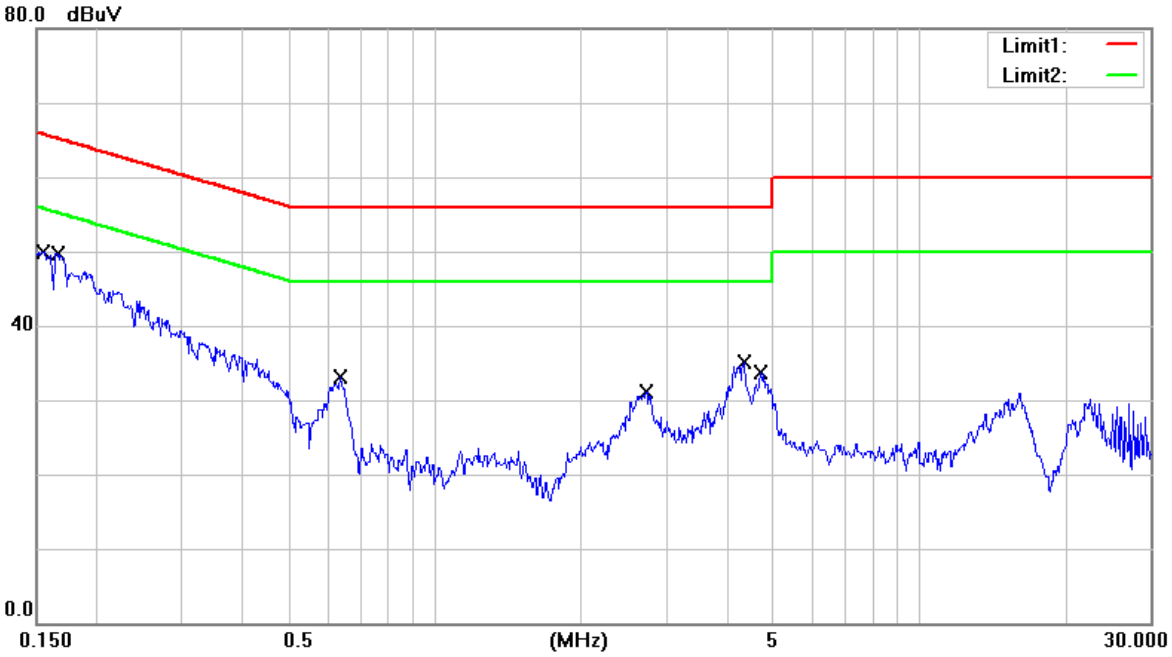
4.1.5 Test Setup



Note: Please refer to 4.1.7 for the actual test configuration.

4.1.6 Test Result

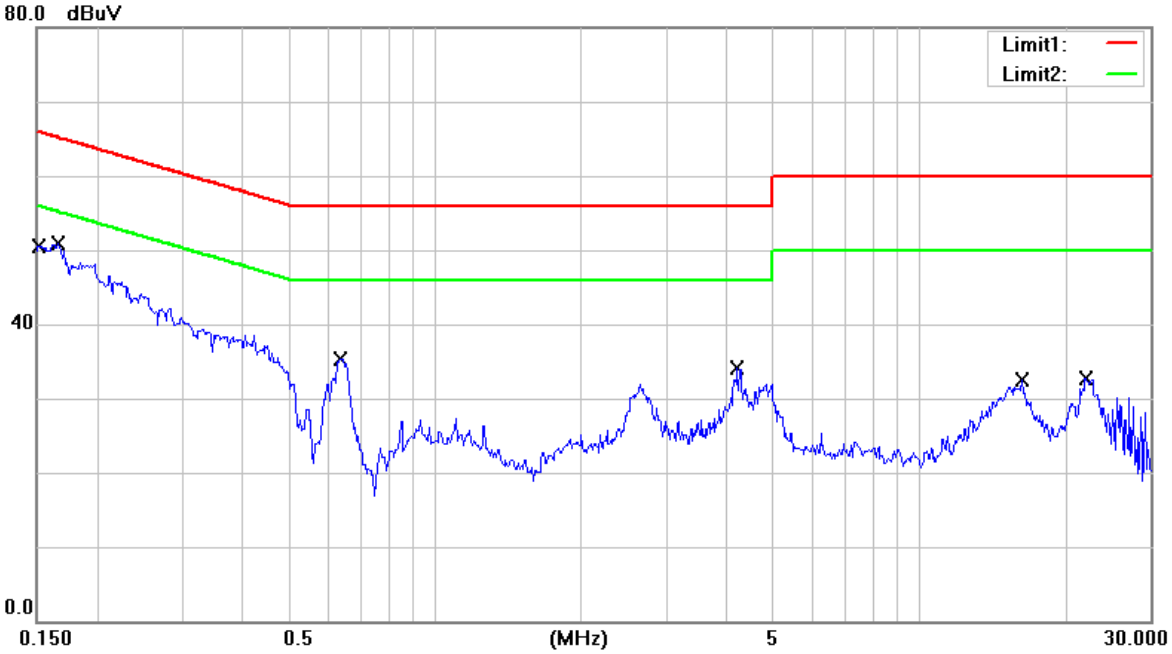
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Phase**	L
Tested by	Toby Chung	**Test Mode**	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1552	36.97	9.67	46.64	65.71	-19.07	QP
2	0.1552	18.45	9.67	28.12	55.71	-27.59	AVG
3	0.1650	36.43	9.67	46.10	65.20	-19.10	QP
4	0.1650	16.30	9.67	25.97	55.20	-29.23	AVG
5	0.6350	20.24	9.67	29.91	56.00	-26.09	QP
6	0.6350	10.92	9.67	20.59	46.00	-25.41	AVG
7	2.7230	15.46	9.71	25.17	56.00	-30.83	QP
8	2.7230	8.04	9.71	17.75	46.00	-28.25	AVG
9	4.3205	17.40	9.74	27.14	56.00	-28.86	QP
10	4.3205	7.56	9.74	17.30	46.00	-28.70	AVG
11	4.6940	16.85	9.75	26.60	56.00	-29.40	QP
12	4.6940	9.49	9.75	19.24	46.00	-26.76	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

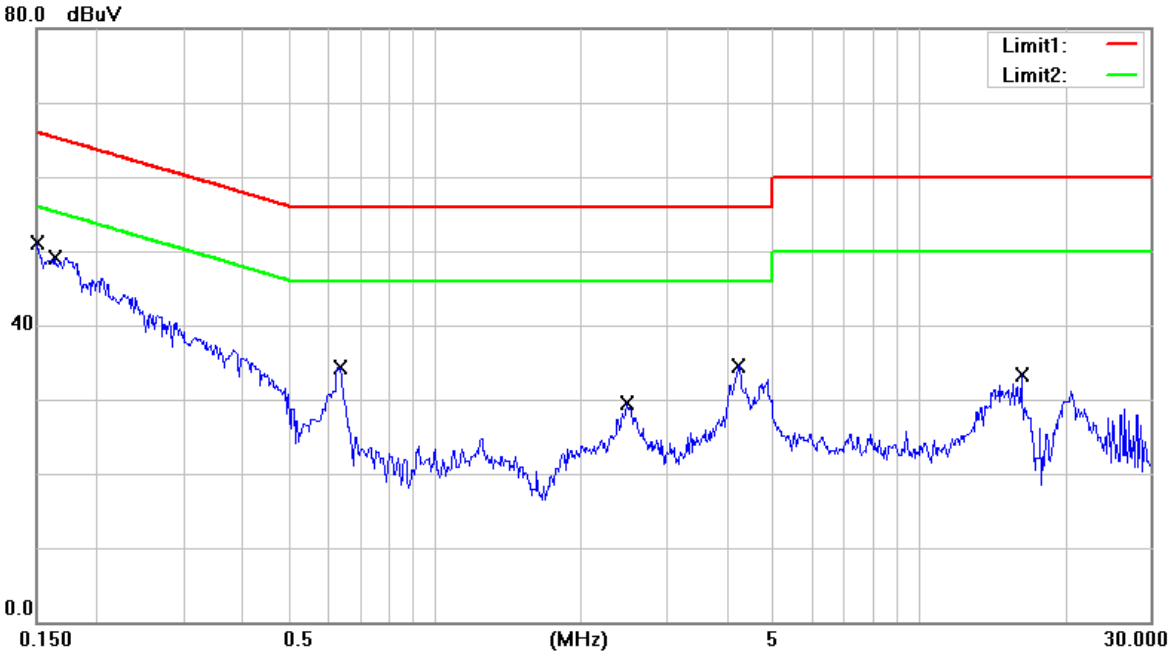
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Phase**	N
Tested by	Toby Chung	**Test Mode**	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1510	36.29	9.65	45.94	65.94	-20.00	QP
2	0.1510	17.07	9.65	26.72	55.94	-29.22	AVG
3	0.1654	36.38	9.65	46.03	65.18	-19.15	QP
4	0.1654	16.83	9.65	26.48	55.18	-28.70	AVG
5	0.6350	22.32	9.65	31.97	56.00	-24.03	QP
6	0.6350	13.42	9.65	23.07	46.00	-22.93	AVG
7	4.1855	17.16	9.71	26.87	56.00	-29.13	QP
8	4.1855	6.77	9.71	16.48	46.00	-29.52	AVG
9	16.2500	16.51	9.90	26.41	60.00	-33.59	QP
10	16.2500	11.07	9.90	20.97	50.00	-29.03	AVG
11	21.9500	18.23	9.93	28.16	60.00	-31.84	QP
12	21.9500	13.00	9.93	22.93	50.00	-27.07	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

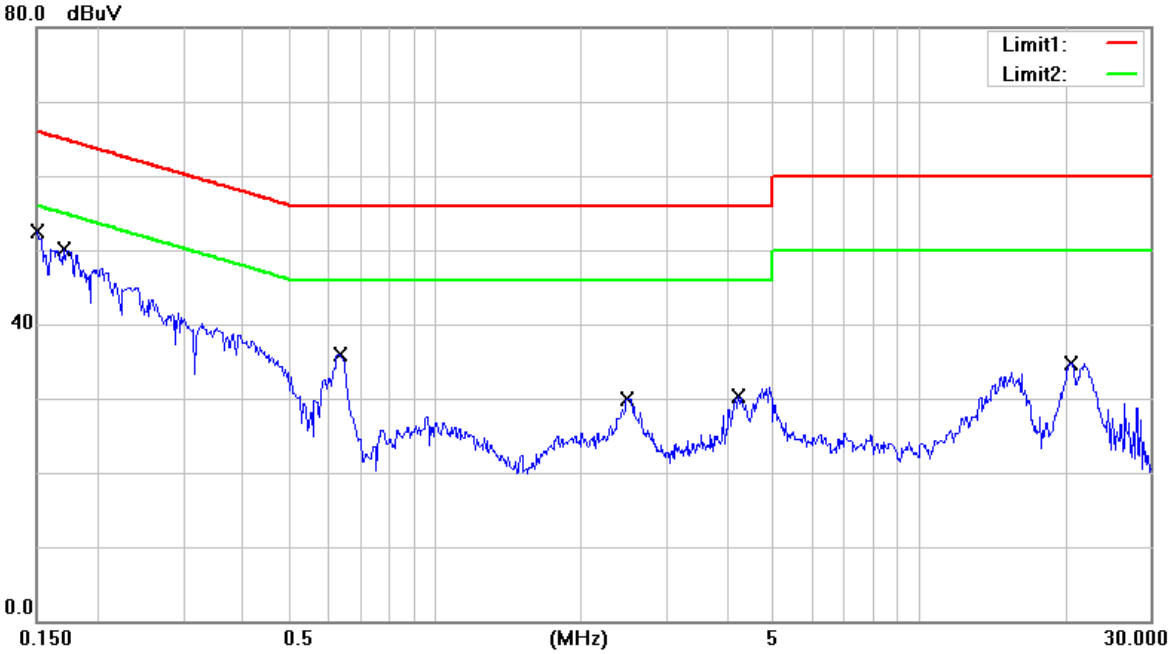
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Phase**	L
Tested by	Toby Chung	**Test Mode**	2



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	38.20	9.67	47.87	65.99	-18.12	QP
2	0.1500	18.44	9.67	28.11	55.99	-27.88	AVG
3	0.1629	35.50	9.67	45.17	65.31	-20.14	QP
4	0.1629	16.75	9.67	26.42	55.31	-28.89	AVG
5	0.6305	20.45	9.67	30.12	56.00	-25.88	QP
6	0.6305	10.95	9.67	20.62	46.00	-25.38	AVG
7	2.4844	14.03	9.71	23.74	56.00	-32.26	QP
8	2.4844	7.01	9.71	16.72	46.00	-29.28	AVG
9	4.2260	18.06	9.73	27.79	56.00	-28.21	QP
10	4.2260	7.77	9.73	17.50	46.00	-28.50	AVG
11	16.2250	20.12	9.88	30.00	60.00	-30.00	QP
12	16.2250	17.97	9.88	27.85	50.00	-22.15	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Phase**	N
Tested by	Toby Chung	**Test Mode**	2

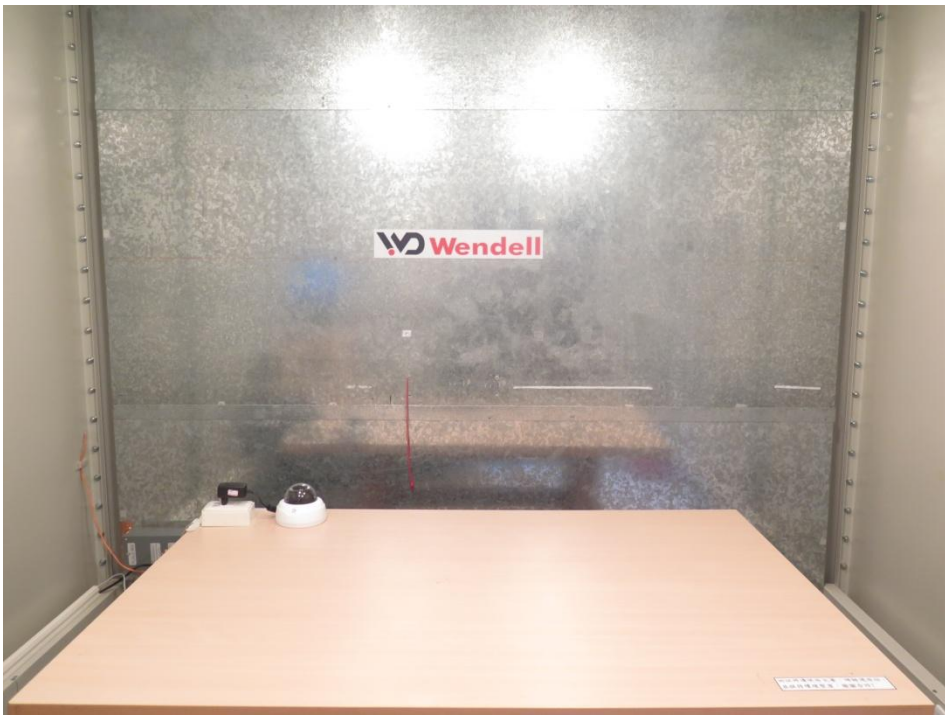


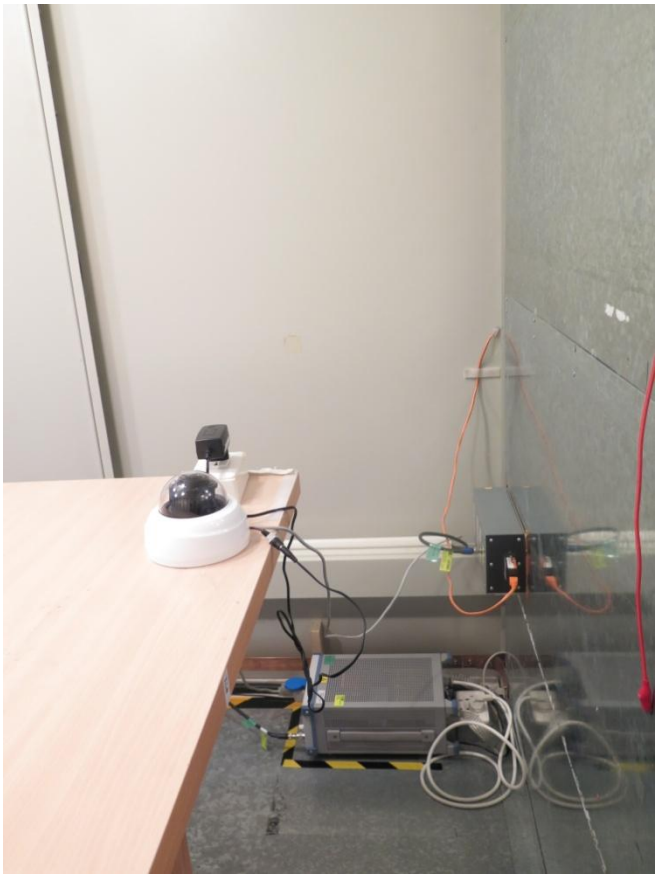
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1503	38.56	9.65	48.21	65.98	-17.77	QP
2	0.1503	18.75	9.65	28.40	55.98	-27.58	AVG
3	0.1699	34.61	9.65	44.26	64.96	-20.70	QP
4	0.1699	17.24	9.65	26.89	54.96	-28.07	AVG
5	0.6305	22.79	9.65	32.44	56.00	-23.56	QP
6	0.6305	14.31	9.65	23.96	46.00	-22.04	AVG
7	2.4800	14.70	9.69	24.39	56.00	-31.61	QP
8	2.4800	8.36	9.69	18.05	46.00	-27.95	AVG
9	4.2125	13.77	9.71	23.48	56.00	-32.52	QP
10	4.2125	5.62	9.71	15.33	46.00	-30.67	AVG
11	20.5000	20.41	9.94	30.35	60.00	-29.65	QP
12	20.5000	14.89	9.94	24.83	50.00	-25.17	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

4.1.7 Photographs of Test Configuration

Test mode 1





Test mode 2

4.2 Conducted Emission at Telecommunication Ports Test

4.2.1 Limit of Conducted Emission at Telecommunication Ports Test

Class A equipment

Frequency (MHz)	Voltage limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.5	97 to 87	84 to 74
0.5 to 30	87	74

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

Class B equipment

Frequency (MHz)	Voltage limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.5	84 to 74	74 to 64
0.5 to 30	74	64

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 of 0.15 to 0.50 MHz.
3. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
4. The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correction Factor = Insertion loss of ISN + Cable loss
Margin Level = Measurement Value –Limit Value

4.2.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Mar. 27, 2015
2	EMI Test Receiver	R&S	ESCI	CT-01-024	Apr. 01, 2015
3	Impedance Stabilization Network	FCC	F-071115-10 57-1-09	CT-01-027	Mar. 30, 2015
4	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Mar. 27, 2015
5	Test Cable	HANRUIN	5D-FB	CT-1-069-1	Aug. 05, 2015
6	50ohm Termination	N/A	N/A	CT-1-065-2	Mar. 30, 2015
7	Measurement Software	EZ-EMC	Ver: FA-03A	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.2.3 Test Procedure

a. The EUT was placed 0.4 meter from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The LISN at least be 80 cm from nearest chassis of EUT.

b. The line impedance stabilization network (LISN) provides 50 ohm/50uH of coupling impedance for the measuring instrument. All other support equipments powered from additional LISN(s).

c. Interrelating cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle. All I/O cables were positioned to simulate typical usage.

d. All I/O cables that are not connected to a peripheral shall be bundle in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

e. ISN at least 80 cm from nearest chassis of EUT. The communication function of EUT was executed in normal condition. ISN was connected between EUT and associated equipment and ISN was connected directly to reference ground plane. The actual test configuration, please refer to EUT test photos.

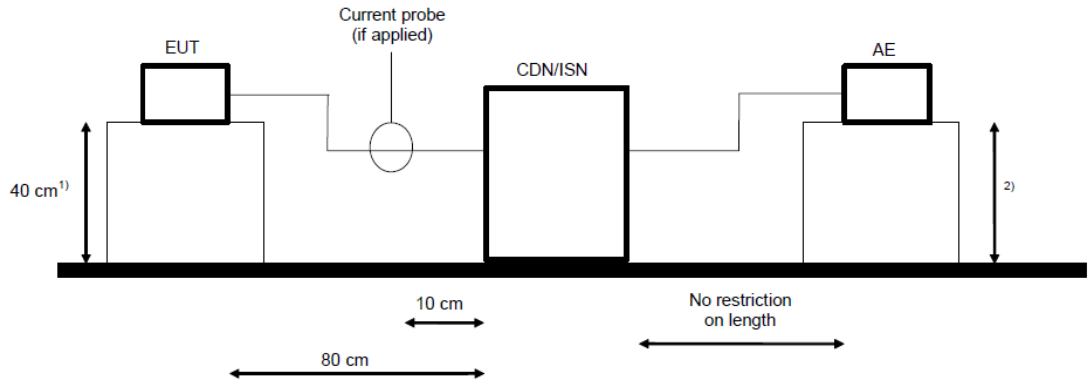
f. The receiver scanned from 150kHz to 30MHz for emissions in each of test modes. The test mode included 10Mbps, 100Mbps, 1Gbps and POE mode. Emission frequency and amplitude were recorded, recording at least six highest emissions.

g. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.2.4 Deviation from Test Standard

No deviation

4.2.5 Test Setup



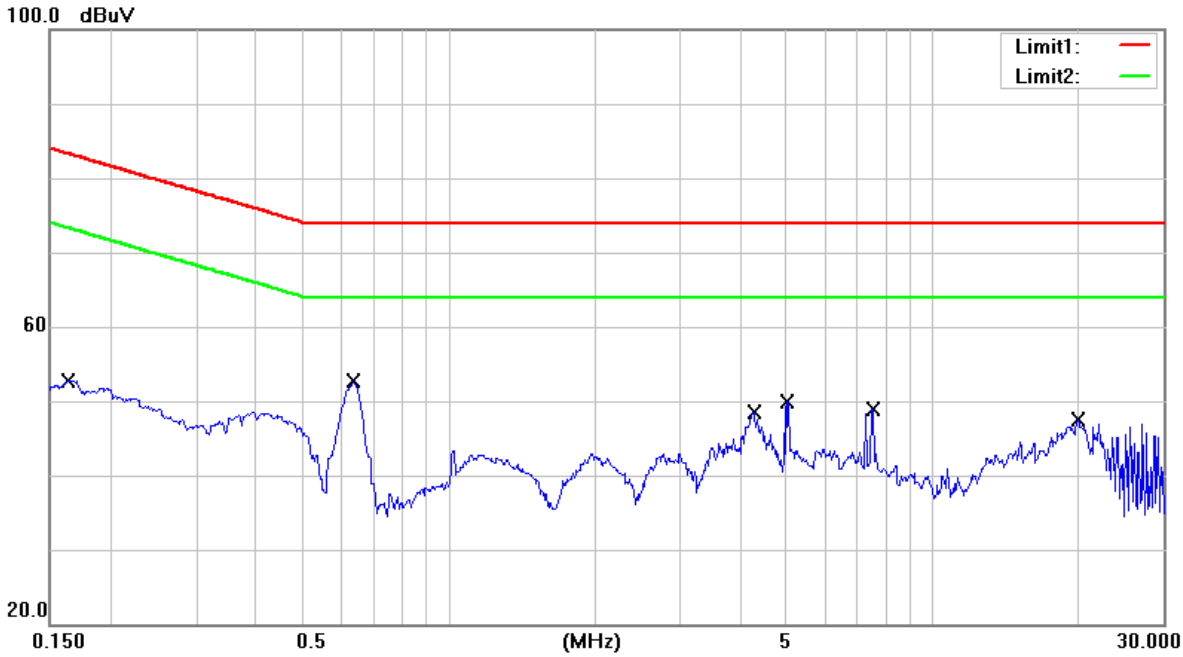
AE = Associated equipment
EUT = Equipment under test

1) Distance to the reference groundplane (vertical or horizontal).
2) Distance to the reference groundplane is not critical.

Note: Please refer to the 4.2.7 for the actual test configuration.

4.2.6 Test Result

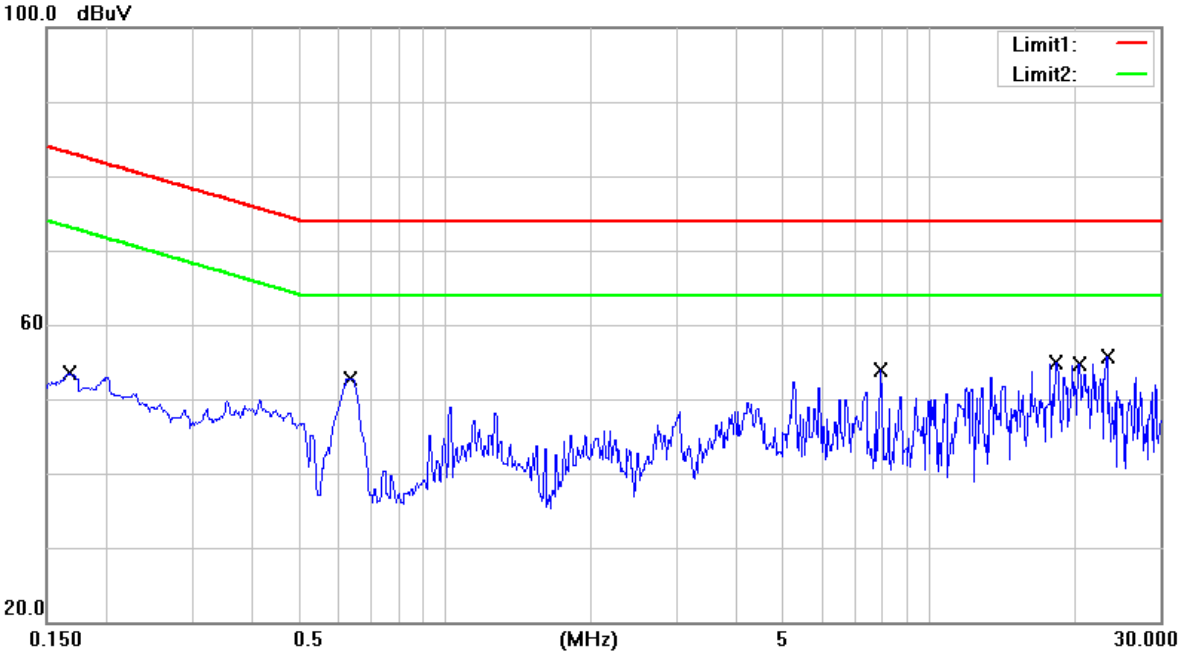
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Tested by**	Toby Chung
Test Condition	LAN port with ISN (10Mbps)	**Test Mode**	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1621	40.49	9.75	50.24	83.35	-33.11	QP
2	0.1621	28.85	9.75	38.60	73.35	-34.75	AVG
3	0.6350	41.25	9.44	50.69	74.00	-23.31	QP
4	0.6350	33.55	9.44	42.99	64.00	-21.01	AVG
5	4.2665	32.93	9.27	42.20	74.00	-31.80	QP
6	4.2665	24.53	9.27	33.80	64.00	-30.20	AVG
7	5.0250	28.79	9.26	38.05	74.00	-35.95	QP
8	5.0250	22.00	9.26	31.26	64.00	-32.74	AVG
9	7.5000	28.68	9.28	37.96	74.00	-36.04	QP
10	7.5000	22.33	9.28	31.61	64.00	-32.39	AVG
11	19.8750	33.00	9.48	42.48	74.00	-31.52	QP
12	19.8750	27.40	9.48	36.88	64.00	-27.12	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

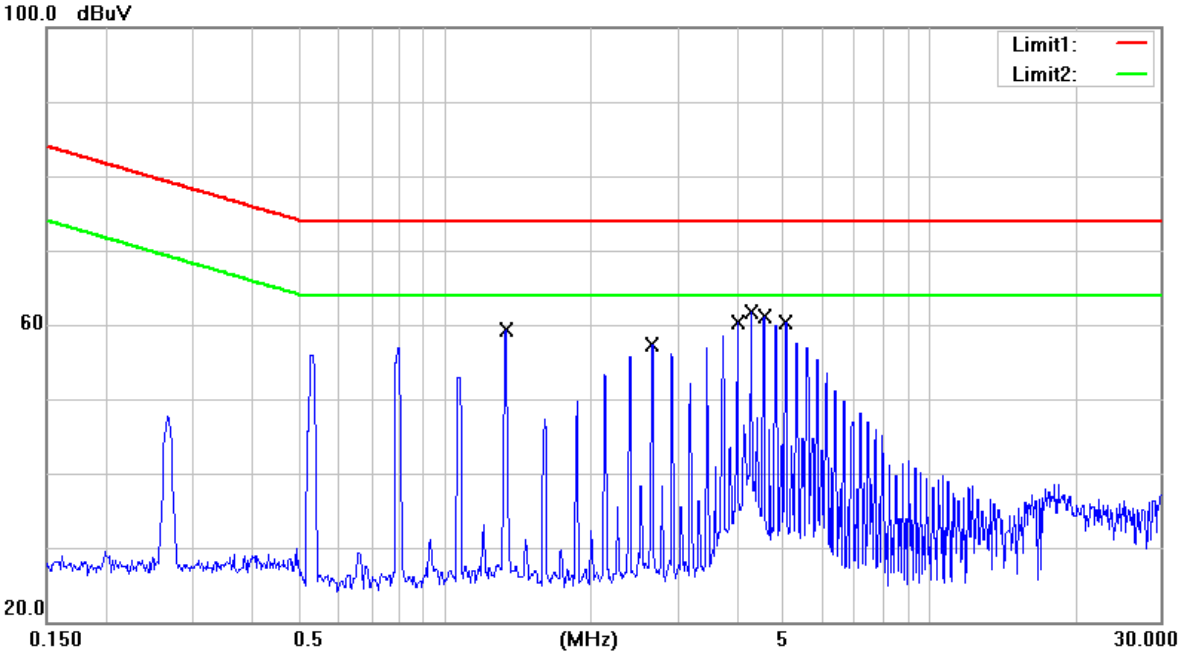
Test Voltage	230Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (100Mbps)	Test Mode	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1675	41.03	9.74	50.77	83.08	-32.31	QP
2	0.1675	29.75	9.74	39.49	73.08	-33.59	AVG
3	0.6350	41.47	9.44	50.91	74.00	-23.09	QP
4	0.6350	33.64	9.44	43.08	64.00	-20.92	AVG
5	7.9250	41.58	9.29	50.87	74.00	-23.13	QP
6	7.9250	39.02	9.29	48.31	64.00	-15.69	AVG
7	18.2500	34.03	9.45	43.48	74.00	-30.52	QP
8	18.2500	31.19	9.45	40.64	64.00	-23.36	AVG
9	20.2750	32.97	9.49	42.46	74.00	-31.54	QP
10	20.2750	27.24	9.49	36.73	64.00	-27.27	AVG
11	23.1500	26.19	9.57	35.76	74.00	-38.24	QP
12	23.1500	20.38	9.57	29.95	64.00	-34.05	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

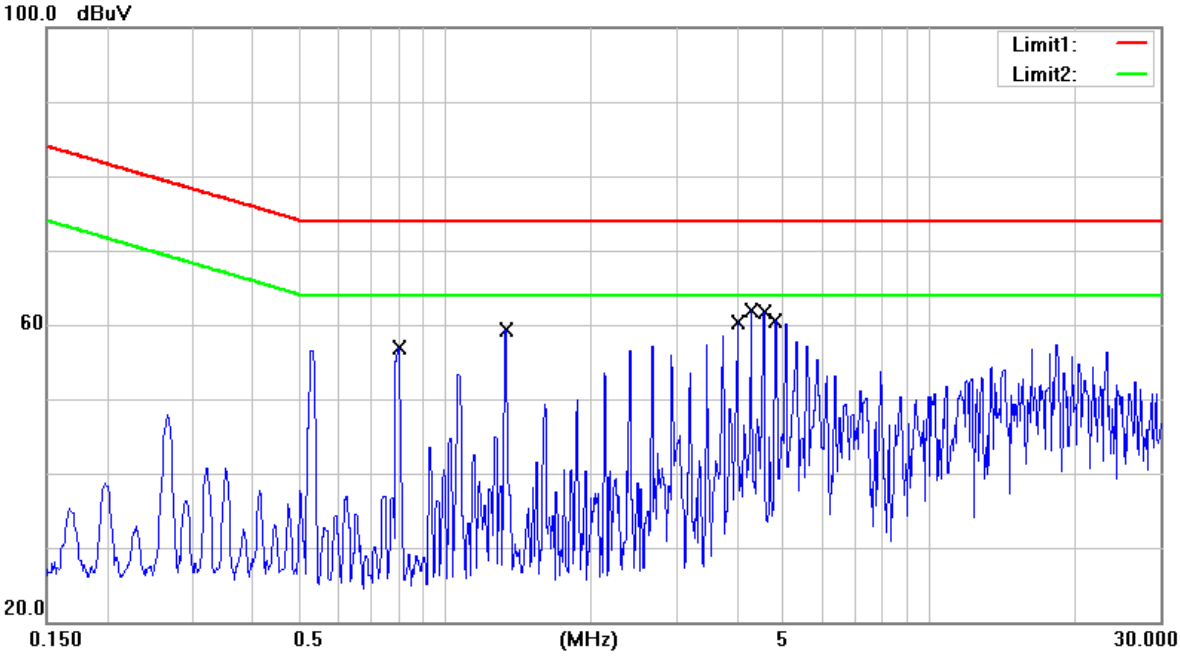
Test Voltage	48Vdc (from POE)	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (10Mbps)	Test Mode	2



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.3325	49.15	9.34	58.49	74.00	-15.51	QP
2	1.3325	49.15	9.34	58.49	64.00	-5.51	AVG
3	2.6645	46.89	9.29	56.18	74.00	-17.82	QP
4	2.6645	45.48	9.29	54.77	64.00	-9.23	AVG
5	3.9965	50.14	9.27	59.41	74.00	-14.59	QP
6	3.9965	49.55	9.27	58.82	64.00	-5.18	AVG
7	4.2665	45.83	9.27	55.10	74.00	-18.90	QP
8	4.2665	43.51	9.27	52.78	64.00	-11.22	AVG
9	4.5319	46.11	9.27	55.38	74.00	-18.62	QP
10	4.5319	44.30	9.27	53.57	64.00	-10.43	AVG
11	5.0500	23.21	9.26	32.47	74.00	-41.53	QP
12	5.0500	16.88	9.26	26.14	64.00	-37.86	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

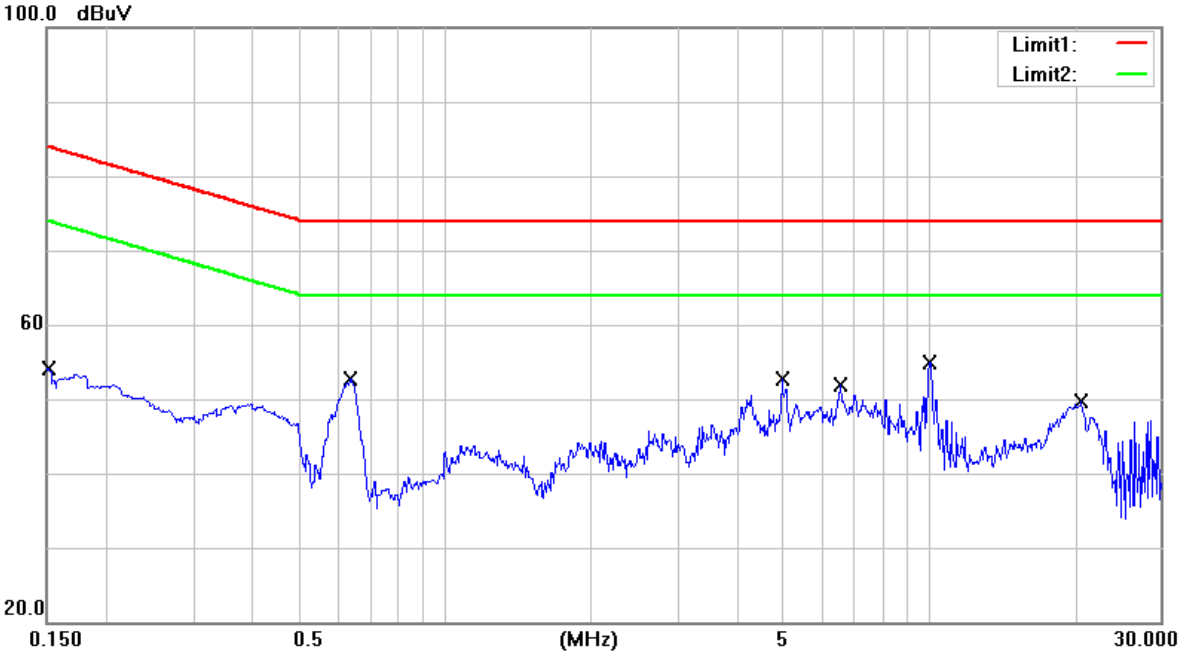
Test Voltage	48Vdc (from POE)	**Frequency Range**	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/09/07	**Tested by**	Toby Chung
Test Condition	LAN port with ISN (100Mbps)	**Test Mode**	2



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.7970	45.75	9.41	55.16	74.00	-18.84	QP
2	0.7970	45.78	9.41	55.19	64.00	-8.81	AVG
3	1.3280	45.64	9.34	54.98	74.00	-19.02	QP
4	1.3280	45.29	9.34	54.63	64.00	-9.37	AVG
5	3.9965	49.84	9.27	59.11	74.00	-14.89	QP
6	3.9965	48.96	9.27	58.23	64.00	-5.77	AVG
7	4.2619	51.25	9.27	60.52	74.00	-13.48	QP
8	4.2619	49.13	9.27	58.40	64.00	-5.60	AVG
9	4.5319	44.64	9.27	53.91	74.00	-20.09	QP
10	4.5319	43.17	9.27	52.44	64.00	-11.56	AVG
11	4.7975	47.93	9.26	57.19	74.00	-16.81	QP
12	4.7975	43.70	9.26	52.96	64.00	-11.04	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

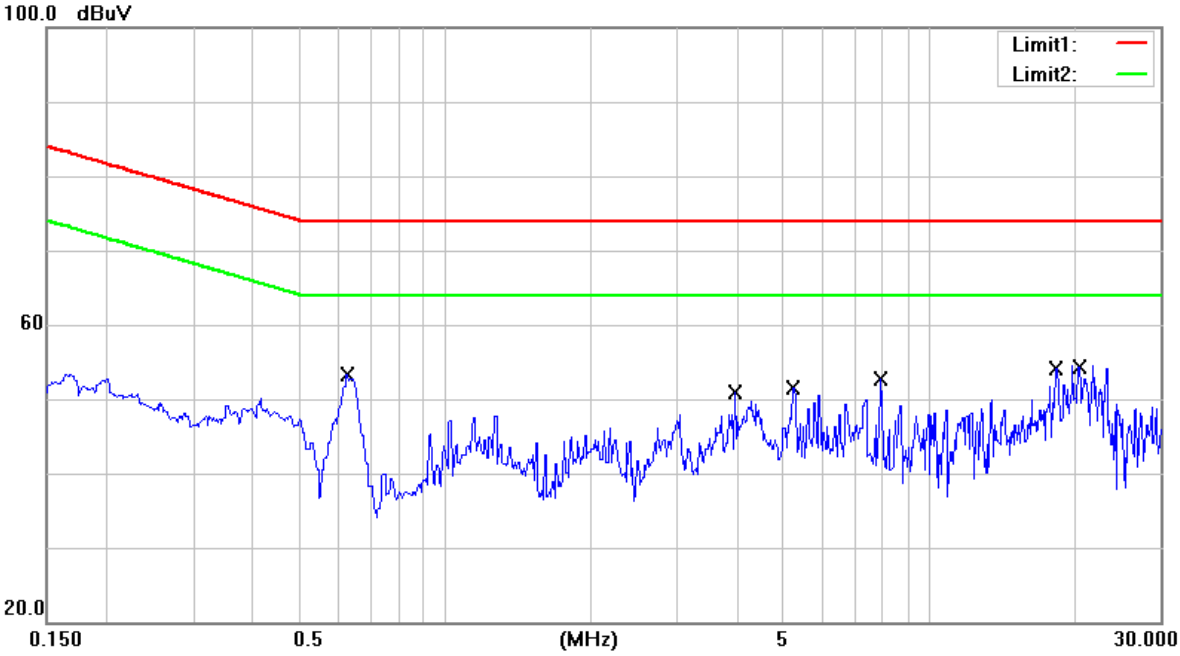
Test Voltage	230Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (10Mbps)	Test Mode	3



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1510	42.04	9.77	51.81	83.94	-32.13	QP
2	0.1510	29.14	9.77	38.91	73.94	-35.03	AVG
3	0.6394	41.21	9.44	50.65	74.00	-23.35	QP
4	0.6394	32.88	9.44	42.32	64.00	-21.68	AVG
5	4.9550	36.35	9.26	45.61	74.00	-28.39	QP
6	4.9550	27.41	9.26	36.67	64.00	-27.33	AVG
7	6.5250	31.76	9.28	41.04	74.00	-32.96	QP
8	6.5250	24.58	9.28	33.86	64.00	-30.14	AVG
9	10.0250	39.45	9.31	48.76	74.00	-25.24	QP
10	10.0250	25.12	9.31	34.43	64.00	-29.57	AVG
11	20.5250	35.60	9.49	45.09	74.00	-28.91	QP
12	20.5250	29.62	9.49	39.11	64.00	-24.89	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

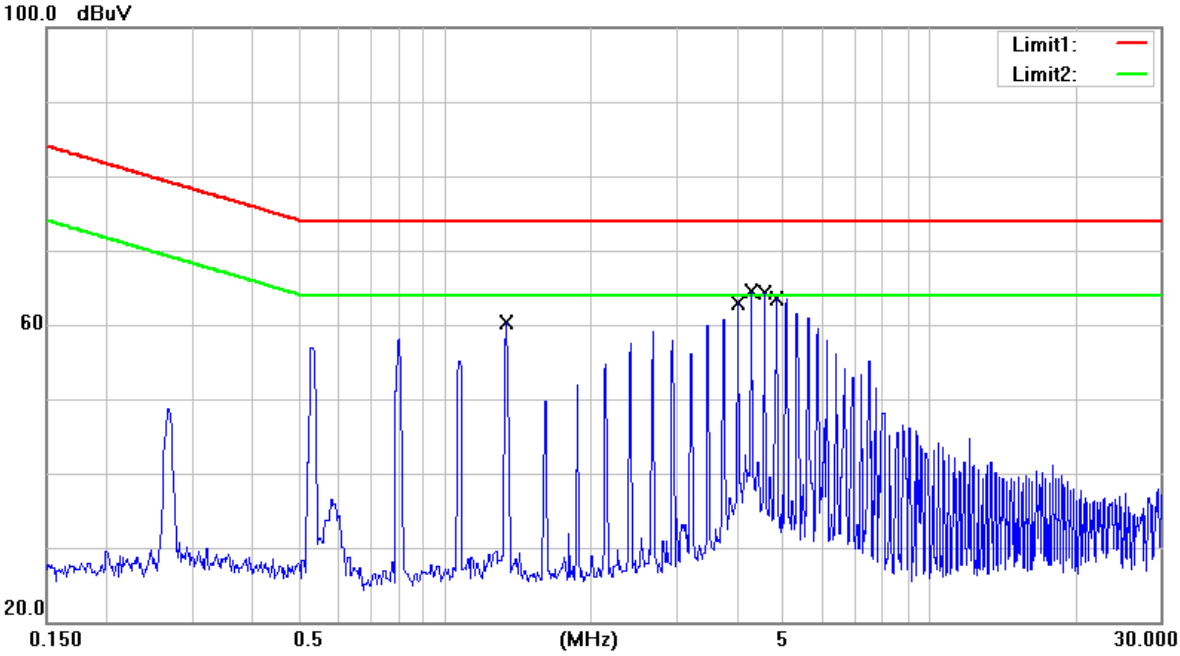
Test Voltage	230Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (100Mbps)	Test Mode	3



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.6260	40.81	9.44	50.25	74.00	-23.75	QP
2	0.6260	32.93	9.44	42.37	64.00	-21.63	AVG
3	3.9560	35.95	9.27	45.22	74.00	-28.78	QP
4	3.9560	31.64	9.27	40.91	64.00	-23.09	AVG
5	5.2250	29.04	9.26	38.30	74.00	-35.70	QP
6	5.2250	23.74	9.26	33.00	64.00	-31.00	AVG
7	7.9250	40.23	9.29	49.52	74.00	-24.48	QP
8	7.9250	37.38	9.29	46.67	64.00	-17.33	AVG
9	18.2500	34.04	9.45	43.49	74.00	-30.51	QP
10	18.2500	30.59	9.45	40.04	64.00	-23.96	AVG
11	20.2750	34.82	9.49	44.31	74.00	-29.69	QP
12	20.2750	29.08	9.49	38.57	64.00	-25.43	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

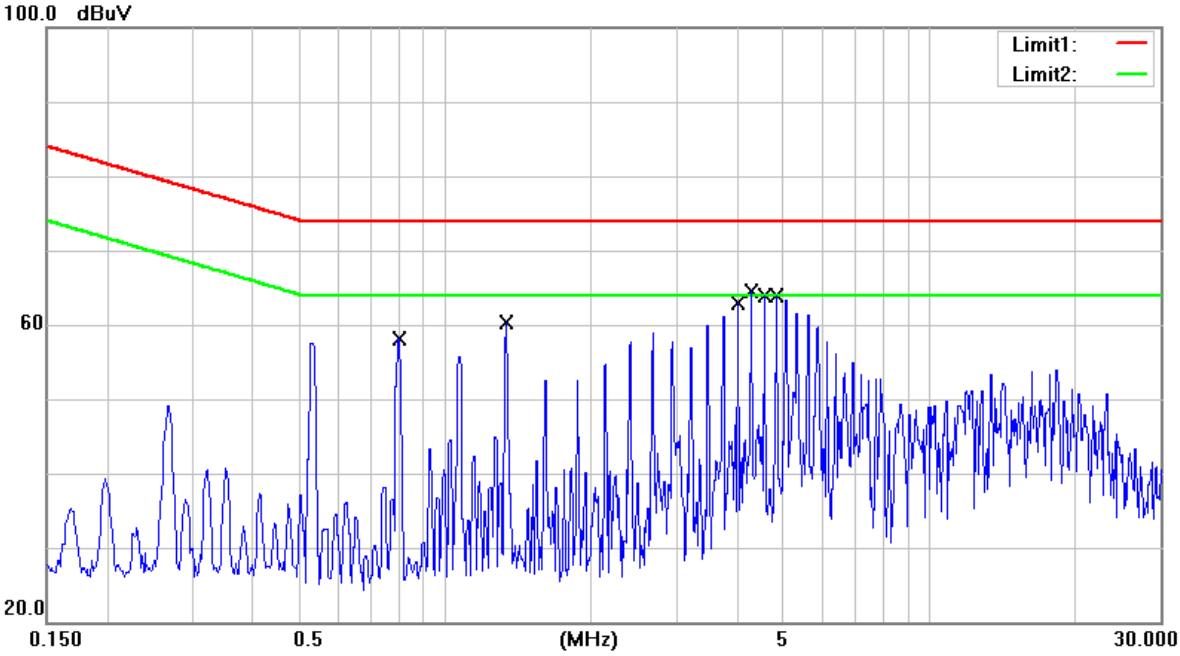
Test Voltage	48Vdc (from POE)	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (10Mbps)	Test Mode	4



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.3370	49.61	9.34	58.95	74.00	-15.05	QP
2	1.3370	49.54	9.34	58.88	64.00	-5.12	AVG
3	4.0100	49.68	9.27	58.95	74.00	-15.05	QP
4	4.0100	48.74	9.27	58.01	64.00	-5.99	AVG
5	4.2755	53.33	9.27	62.60	74.00	-11.40	QP
6	4.2755	51.28	9.27	60.55	64.00	-3.45	AVG
7	4.5455	47.40	9.27	56.67	74.00	-17.33	QP
8	4.5455	46.05	9.27	55.32	64.00	-8.68	AVG
9	4.8110	51.90	9.26	61.16	74.00	-12.84	QP
10	4.8110	51.88	9.26	61.14	74.00	-12.86	QP
11	4.8110	48.54	9.26	57.80	64.00	-6.20	AVG
12	4.8110	48.54	9.26	57.80	64.00	-6.20	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

Test Voltage	48Vdc (from POE)	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Tested by	Toby Chung
Test Condition	LAN port with ISN (100Mbps)	Test Mode	4

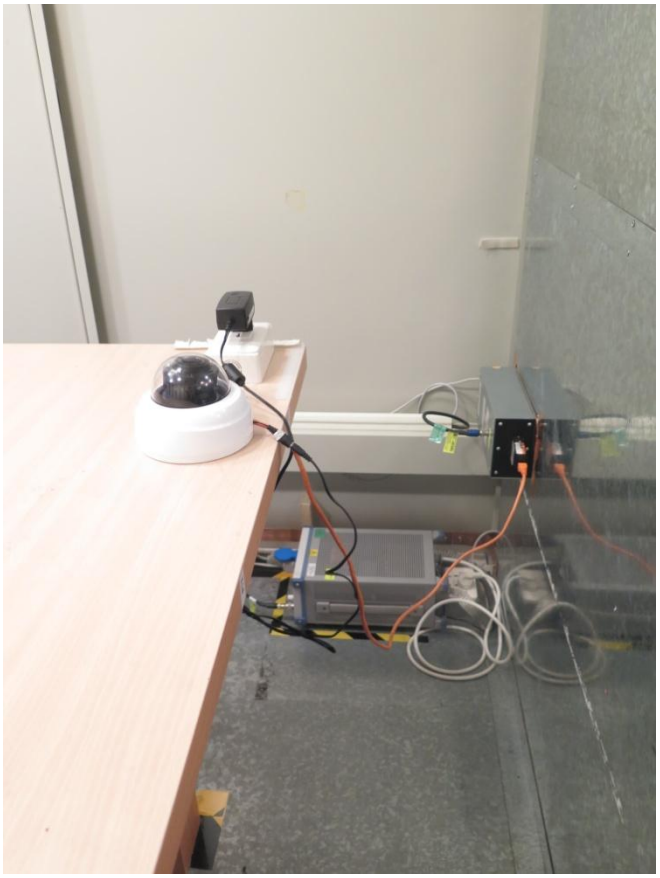


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.8015	48.02	9.41	57.43	74.00	-16.57	QP
2	0.8015	48.09	9.41	57.50	64.00	-6.50	AVG
3	1.3325	48.07	9.34	57.41	74.00	-16.59	QP
4	1.3325	47.71	9.34	57.05	64.00	-6.95	AVG
5	4.0100	48.06	9.27	57.33	74.00	-16.67	QP
6	4.0100	46.87	9.27	56.14	64.00	-7.86	AVG
7	4.2755	51.98	9.27	61.25	74.00	-12.75	QP
8	4.2755	50.05	9.27	59.32	64.00	-4.68	AVG
9	4.5455	46.27	9.27	55.54	74.00	-18.46	QP
10	4.5455	43.63	9.27	52.90	64.00	-11.10	AVG
11	4.8110	50.71	9.26	59.97	74.00	-14.03	QP
12	4.8110	46.26	9.26	55.52	64.00	-8.48	AVG

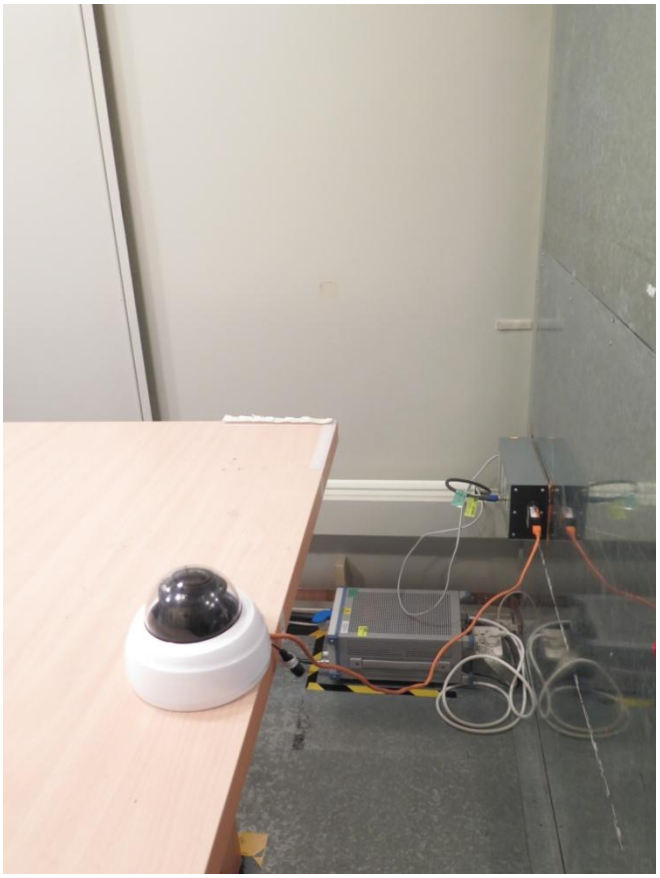
Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

4.2.7 Photographs of Test Configuration

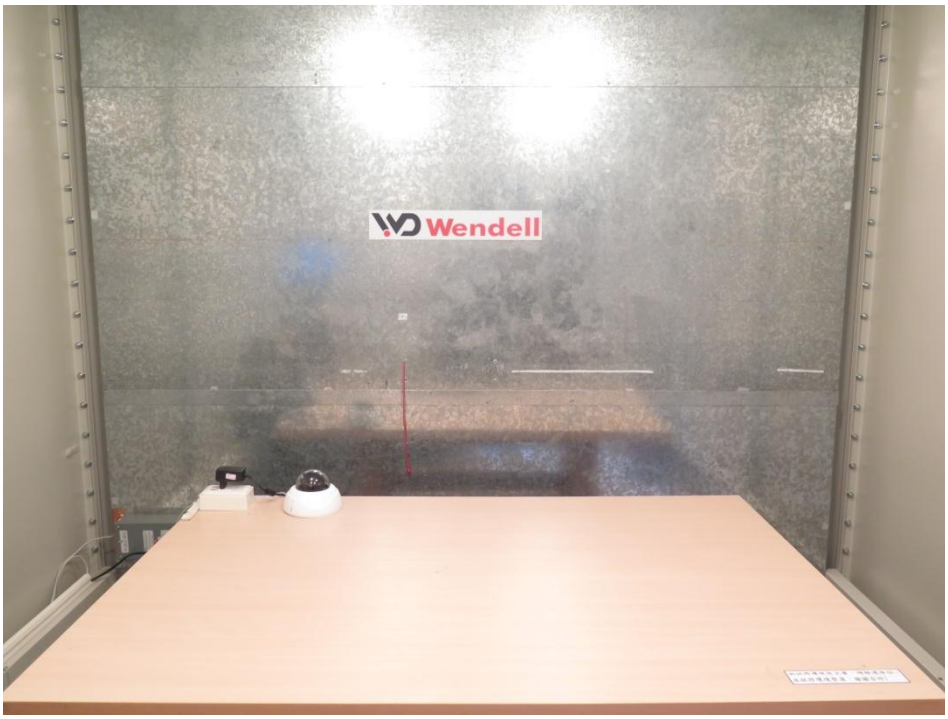
Test mode 1

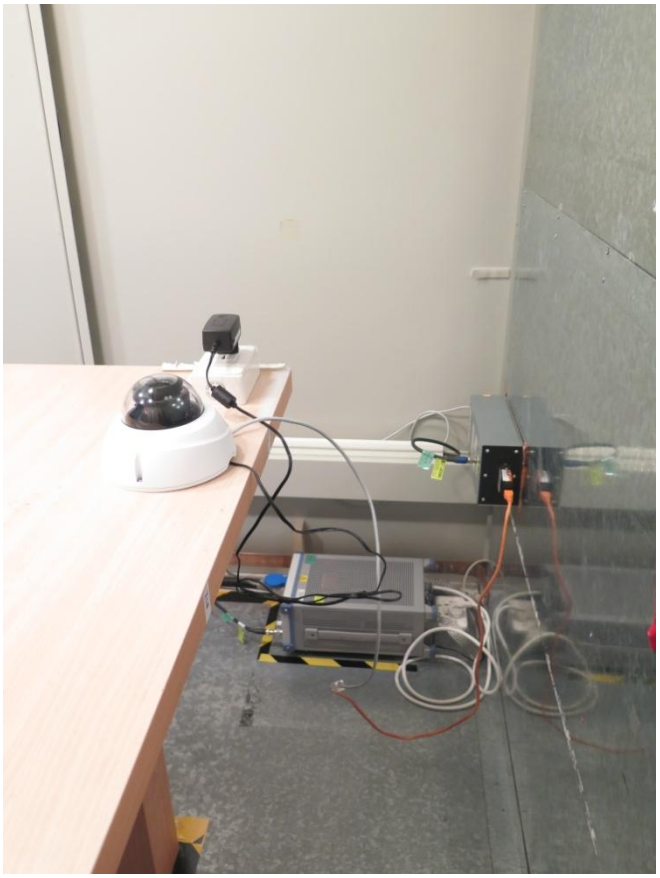


Test mode 2



Test mode 3





Test mode 4

4.3 Radiated Emission Measurement

4.3.1 Limits of Radiated Emission Measurement

Radiated Frequency range 30 MHz to 1000 MHz

Frequency (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 to 230	40	30
230 to 1000	47	37

Note: 1. The lower limit shall apply at the transition frequency.

Radiated Frequency range above 1 GHz

Frequency (GHz)	Class A (at 3m)		Class B (at 3m)	
	Average (dBuV/m)	Peak (dBuV/m)	Average (dBuV/m)	Peak (dBuV/m)
1 to 3	56	76	50	70
3 to 6	60	80	54	74

Note: 1. The lower limit shall apply at the transition frequency.
2. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
3. The test result calculated as following:
   Measurement Value = Reading Level + Correct Factor
   Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
   Margin Level = Measurement Value - Limit Value
4. Maximum internal signal source is defined as the maximum frequency of the device under test, or EUT highest frequency tuning of the operation or in the production or use of the device under test.
5. If the maximum frequency of the device under test is less than the internal source of 108MHz, the only measure to 1GHz.
6. If the maximum frequency of the device between 108MHz and 500MHz maximum frequency of the device under test ranged from internal sources, you must measure to 2GHz.
7. If the maximum frequency of the device under test between internal source of 500MHz and 1GHz, you must measure to 5GHz.
8. If the maximum frequency of the device under test is higher than the internal source of 1GHz, it must measure up to the maximum frequency of 5 times or 6GHz, choosing the less.

4.3.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Horn Antenna	Schwarzbeck	BBHA 9120 D	CT-1-001	Apr. 01, 2015
2	Bilog Antenna	Schwarzbeck	VULB 9168	CT-1-002-1	Mar. 30, 2015
3	Test Cable	HARUIN	CFD400NL-LW	CT-1-070	Aug. 05, 2015
4	Preamplifier	EM Electronics Corporation	EM30265	CT-1-013	Aug. 05, 2015
5	Test Cable	HARBOUR	27478 LL142	CT-1-073	Aug. 03, 2015
6	EMI Test Receiver	Agilent	N9038A	CT-1-068	Aug. 06, 2015
7	Measurement Software	Ez-EMC	Ver : FA-03A2 RE	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.3.3 Test Procedure

a. The EUT was placed on the top of a turntable 0.8 meters above the ground at a 3 m or 10 m open area test site. The table was rotated 360 degrees to determine the position of the high radiation emissions.

b. The height of the test antenna shall vary between 1 m to 4 m. Both vertical and horizontal polarizations of the antenna were set to make the measurement.

c. The EUT was set up as per the test configuration to simulate typical usage per the user's manual. All I/O cables were positioned to simulate typical usage. The actual test configuration, please refer to EUT test photos.

d. The initial step in collecting radiated emission data is a Spectrum Mode scanning the measurement frequency range.

Blow 1GHz:

Reading in which marked as QP or Peak means measurements by using Spectrum Mode with detector RBW=120kHz.

If the Spectrum Mode measured peak value compliance with and lower than Quasi Peak Limit, the EUT shall be deemed to meet QP Limits.

Above 1GHz:

Reading in which marked as Peak & AVG means measurements by using Spectrum Mode with setting in RBW=1MHz.

If the Spectrum Mode measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak and AVG Limits.

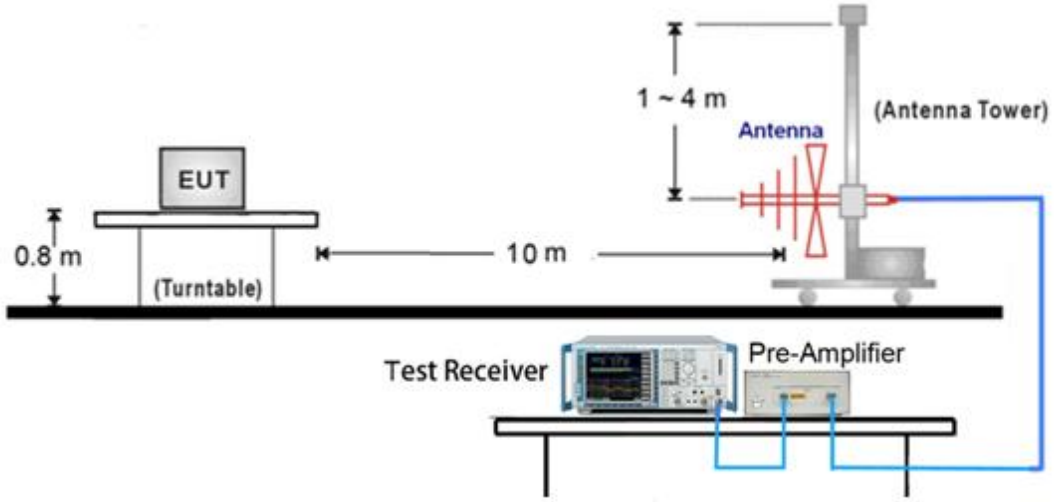
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.3.4 Deviation from Test Standard

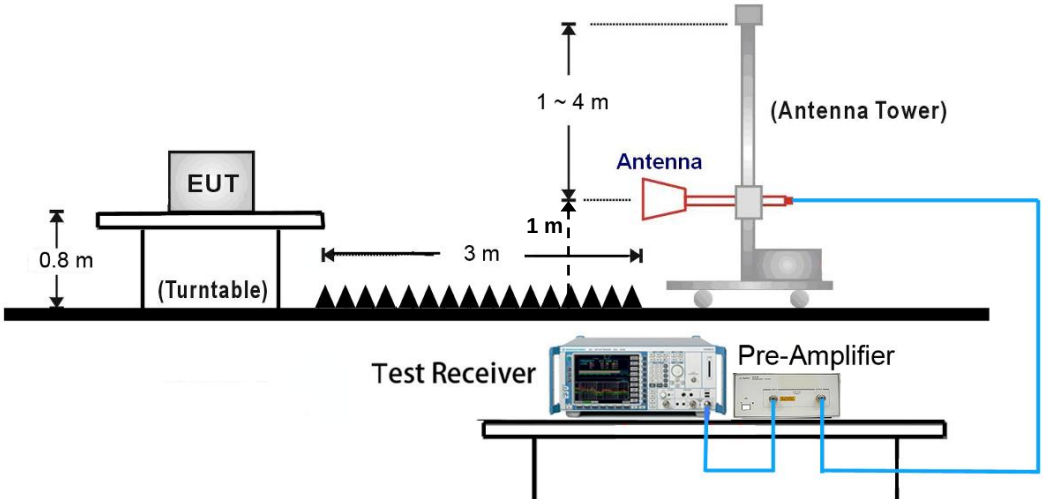
No deviation

4.3.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

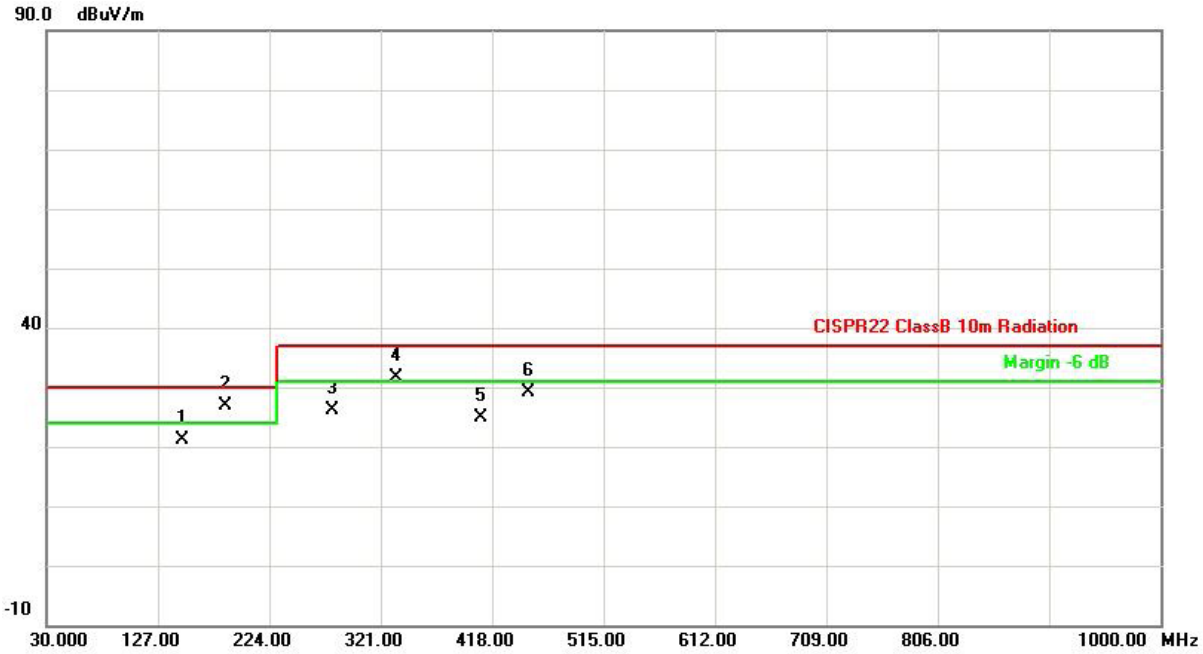


Note:

(1) Please refer to the 4.3.7 for the actual test configuration.
(2) The formula of measured value as: Test Result = Reading + Correction Factor
(3) Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)
Margin Level = Measurement Value - Limit Value

4.3.6 Test Result

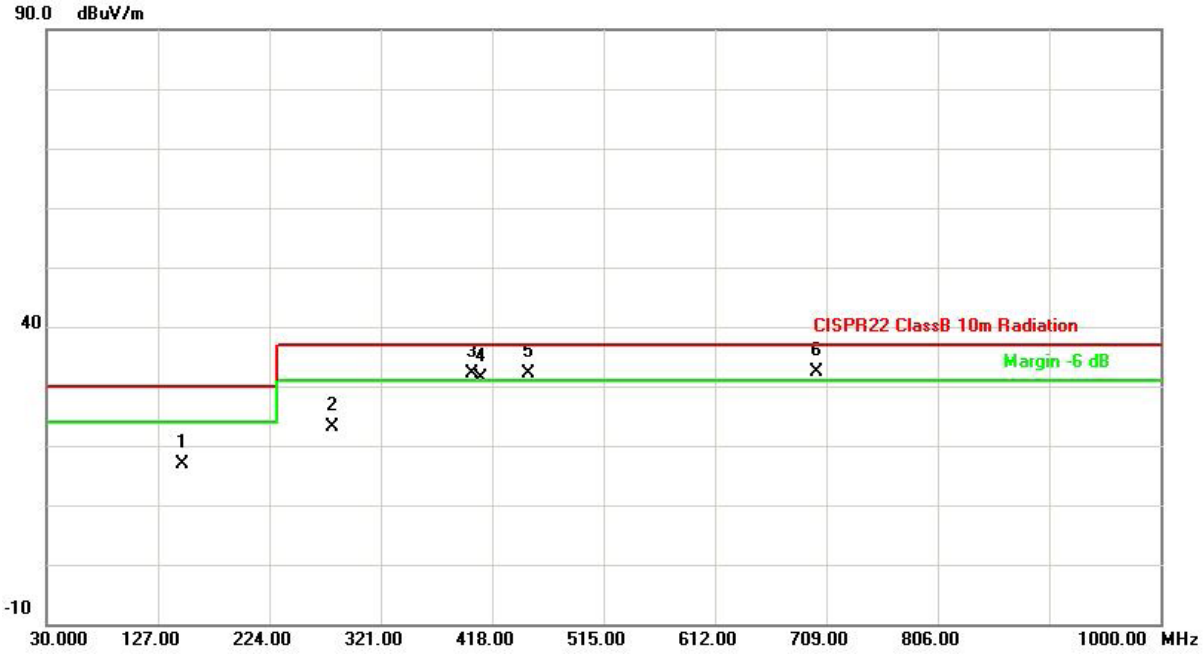
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/10	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	1		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	148.5100	47.52	-26.43	21.09	30.00	-8.91	QP	100	119
2	185.6200	56.19	-29.38	26.81	30.00	-3.19	QP	100	220
3	278.4500	53.61	-27.46	26.15	37.00	-10.85	QP	100	240
4	334.1300	57.71	-26.07	31.64	37.00	-5.36	QP	100	79
5	408.3800	48.89	-23.90	24.99	37.00	-12.01	QP	100	264
6	450.0000	51.77	-22.53	29.24	37.00	-7.76	QP	100	140

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

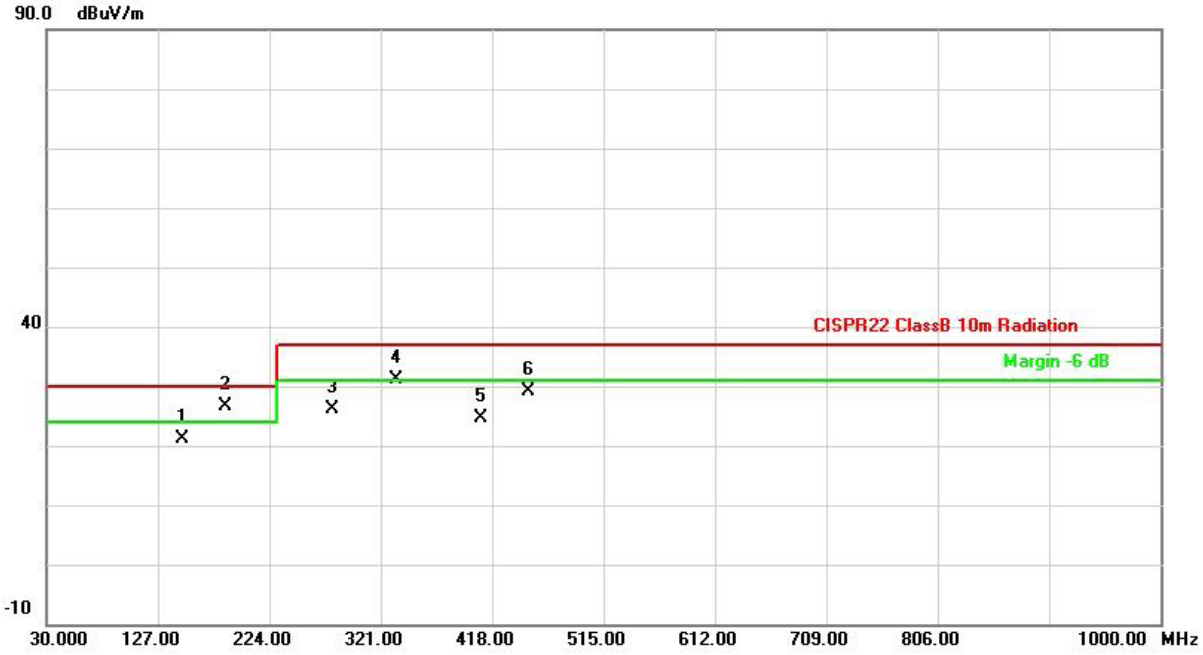
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/10	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	1		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	148.5100	43.19	-26.43	16.76	30.00	-13.24	QP	200	63
2	278.4200	50.51	-27.46	23.05	37.00	-13.95	QP	210	279
3	400.0000	56.33	-24.18	32.15	37.00	-4.85	QP	200	96
4	408.3800	55.29	-23.90	31.39	37.00	-5.61	QP	200	277
5	450.0000	54.73	-22.53	32.20	37.00	-4.80	QP	203	250
6	700.0000	50.21	-17.87	32.34	37.00	-4.66	QP	240	70

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

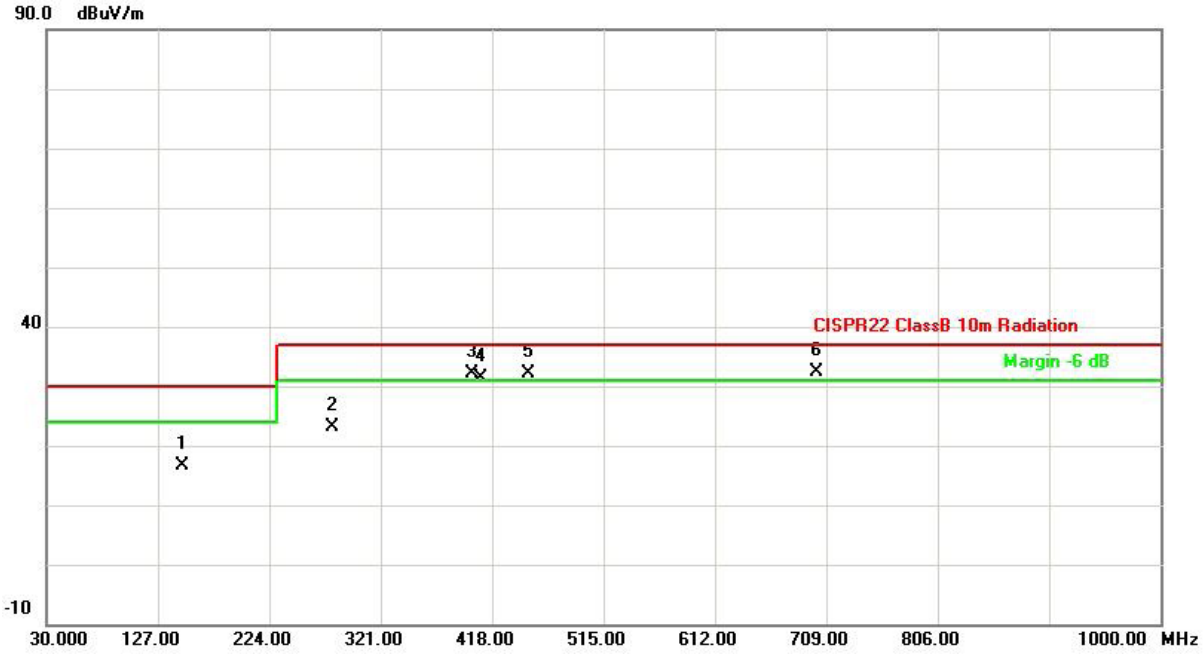
Test Voltage	48Vdc (from POE)	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/10	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	2		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	148.5100	47.58	-26.43	21.15	30.00	-8.85	QP	100	120
2	185.6200	56.12	-29.38	26.74	30.00	-3.26	QP	100	223
3	278.4500	53.64	-27.46	26.18	37.00	-10.82	QP	100	246
4	334.1300	57.13	-26.07	31.06	37.00	-5.94	QP	100	83
5	408.3800	48.57	-23.90	24.67	37.00	-12.33	QP	100	267
6	450.0000	51.71	-22.53	29.18	37.00	-7.82	QP	100	145

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

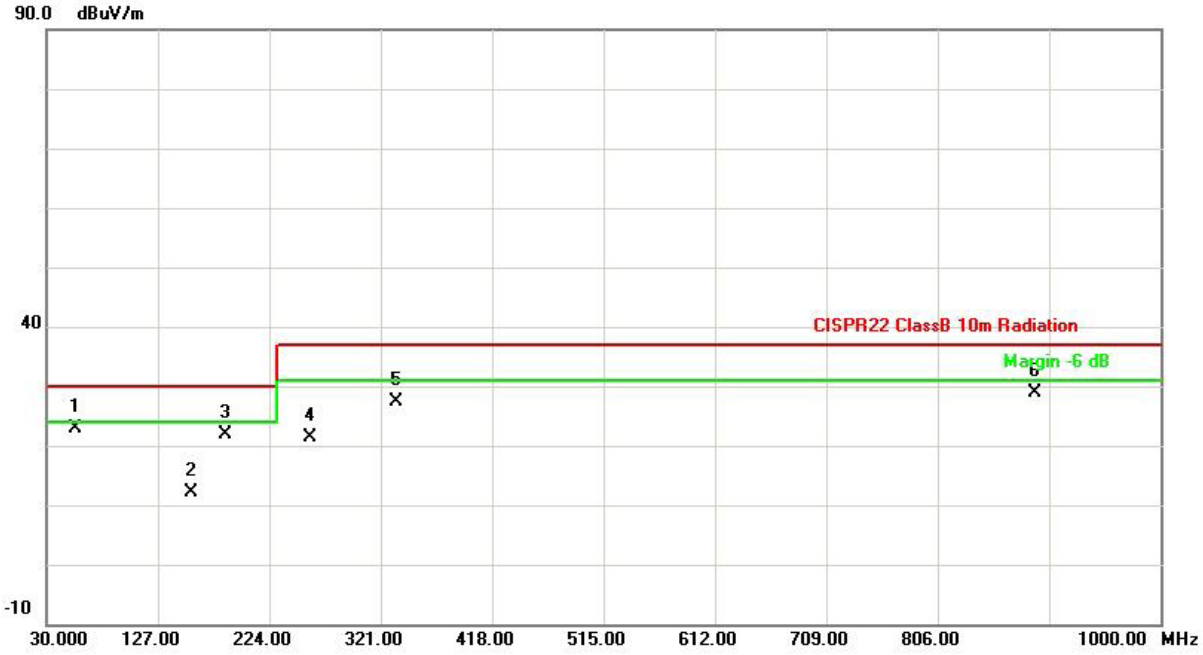
Test Voltage	48Vdc (from POE)	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/10	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	2		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	148.5100	43.10	-26.43	16.67	30.00	-13.33	QP	200	79
2	278.4200	50.56	-27.46	23.10	37.00	-13.90	QP	200	283
3	400.0000	56.31	-24.18	32.13	37.00	-4.87	QP	200	100
4	408.3800	55.24	-23.90	31.34	37.00	-5.66	QP	200	275
5	450.0000	54.71	-22.53	32.18	37.00	-4.82	QP	200	245
6	700.0000	50.26	-17.87	32.39	37.00	-4.61	QP	245	78

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

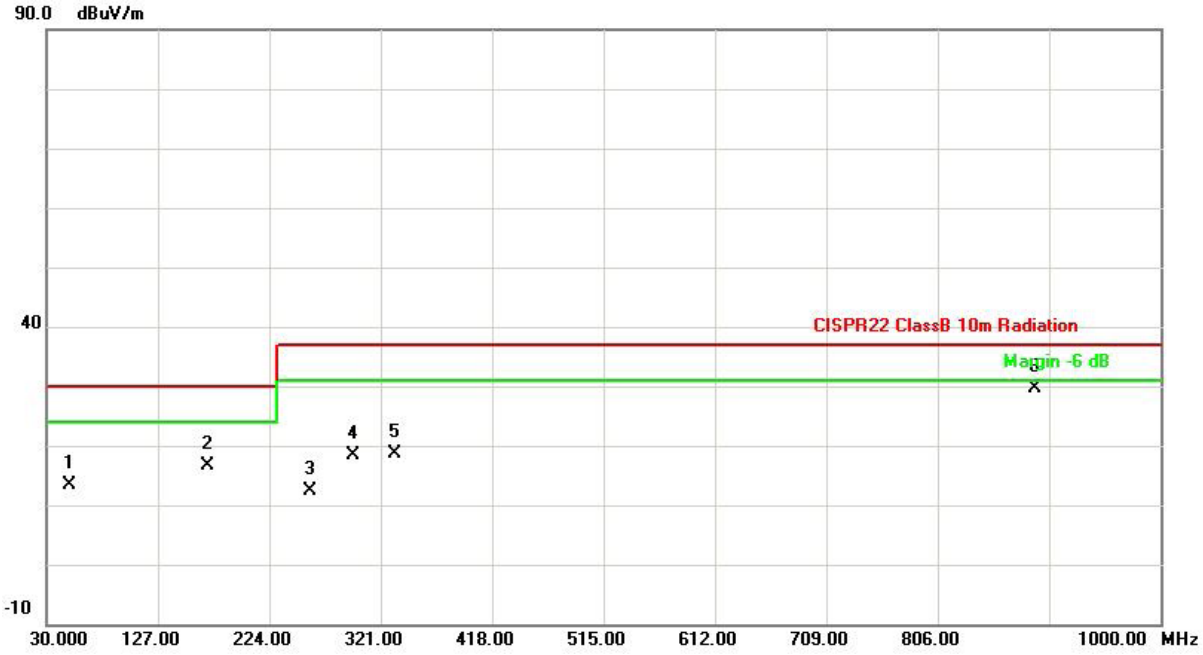
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/01	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	3		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	55.0000	48.08	-25.21	22.87	30.00	-7.13	QP	100	315
2	155.6000	39.23	-27.11	12.12	30.00	-17.88	QP	100	359
3	185.6000	51.85	-30.03	21.82	30.00	-8.18	QP	100	145
4	260.0000	50.59	-29.09	21.50	37.00	-15.50	QP	100	12
5	334.0000	53.97	-26.68	27.29	37.00	-9.71	QP	100	227
6	891.0000	44.59	-15.66	28.93	37.00	-8.07	QP	100	217

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

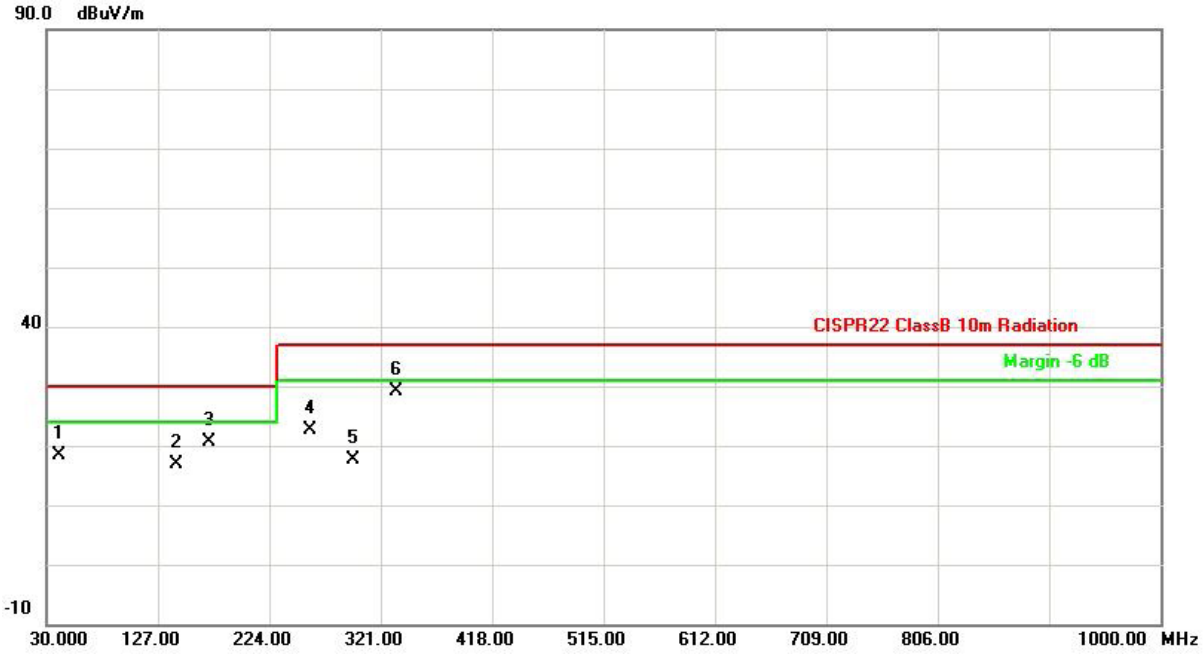
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/01	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	3		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	50.5200	38.24	-24.80	13.44	30.00	-16.56	QP	172	26
2	170.0000	44.66	-27.91	16.75	30.00	-13.25	QP	400	354
3	260.0000	41.45	-29.09	12.36	37.00	-24.64	QP	200	195
4	297.5000	45.87	-27.54	18.33	37.00	-18.67	QP	200	102
5	332.9000	45.24	-26.71	18.53	37.00	-18.47	QP	200	350
6	891.0000	45.29	-15.66	29.63	37.00	-7.37	QP	131	228

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

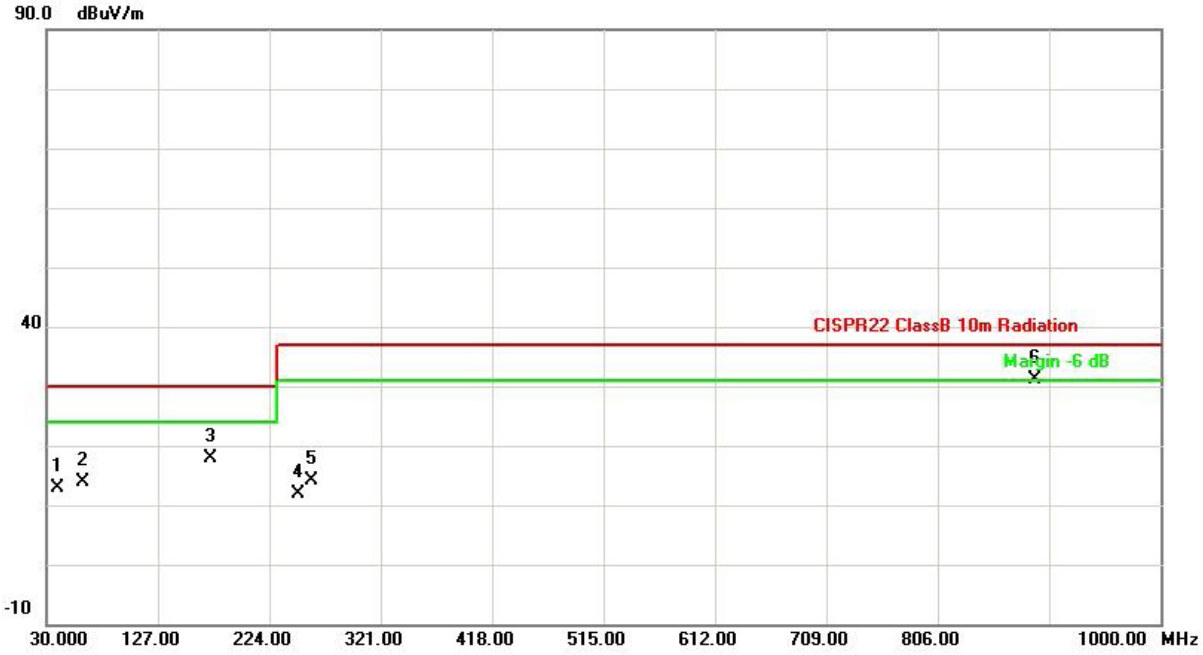
Test Voltage	48Vdc (from POE)	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/01	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	4		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	40.5000	43.54	-25.18	18.36	30.00	-11.64	QP	100	50
2	143.4000	43.85	-27.06	16.79	30.00	-13.21	QP	100	25
3	171.0000	48.66	-28.04	20.62	30.00	-9.38	QP	100	288
4	260.0000	51.75	-29.09	22.66	37.00	-14.34	QP	100	20
5	297.0000	45.08	-27.56	17.52	37.00	-19.48	QP	100	99
6	334.1000	55.77	-26.68	29.09	37.00	-7.91	QP	100	253

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

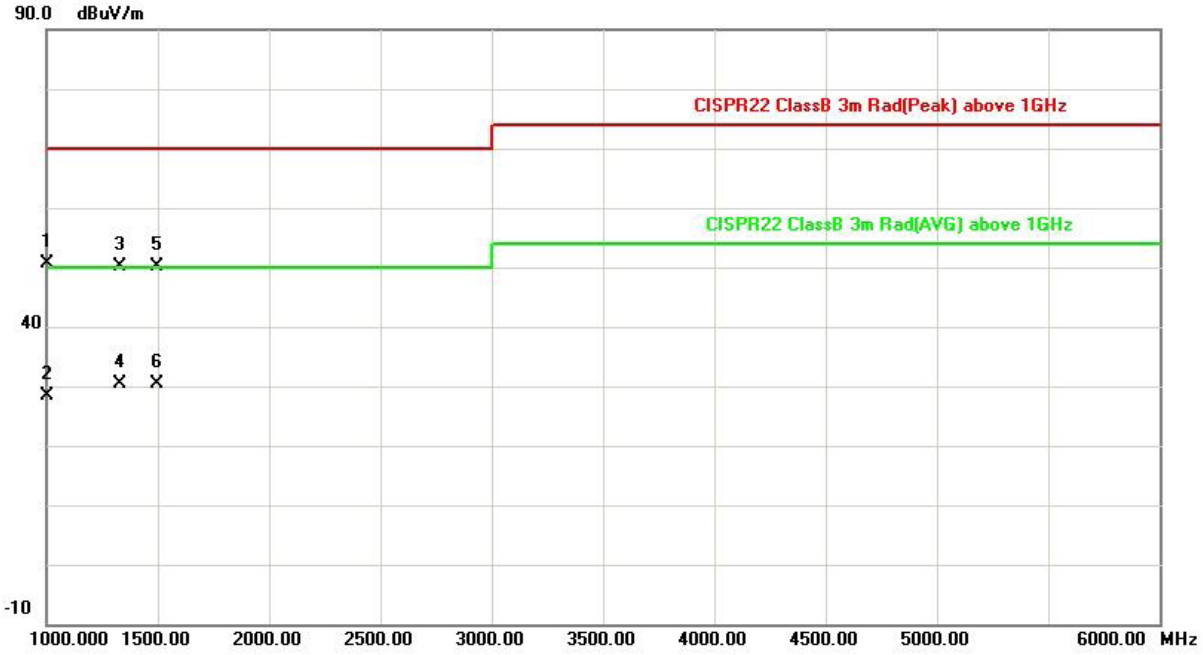
Test Voltage	48Vdc (from POE)	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/01	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	4		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	40.3200	38.16	-25.19	12.97	30.00	-17.03	QP	100	75
2	61.8400	40.03	-26.05	13.98	30.00	-16.02	QP	100	357
3	172.3000	46.09	-28.20	17.89	30.00	-12.11	QP	311	65
4	249.1000	41.28	-29.49	11.79	37.00	-25.21	QP	200	340
5	260.5000	43.31	-29.06	14.25	37.00	-22.75	QP	186	10
6	891.0000	46.70	-15.66	31.04	37.00	-5.96	QP	100	131

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

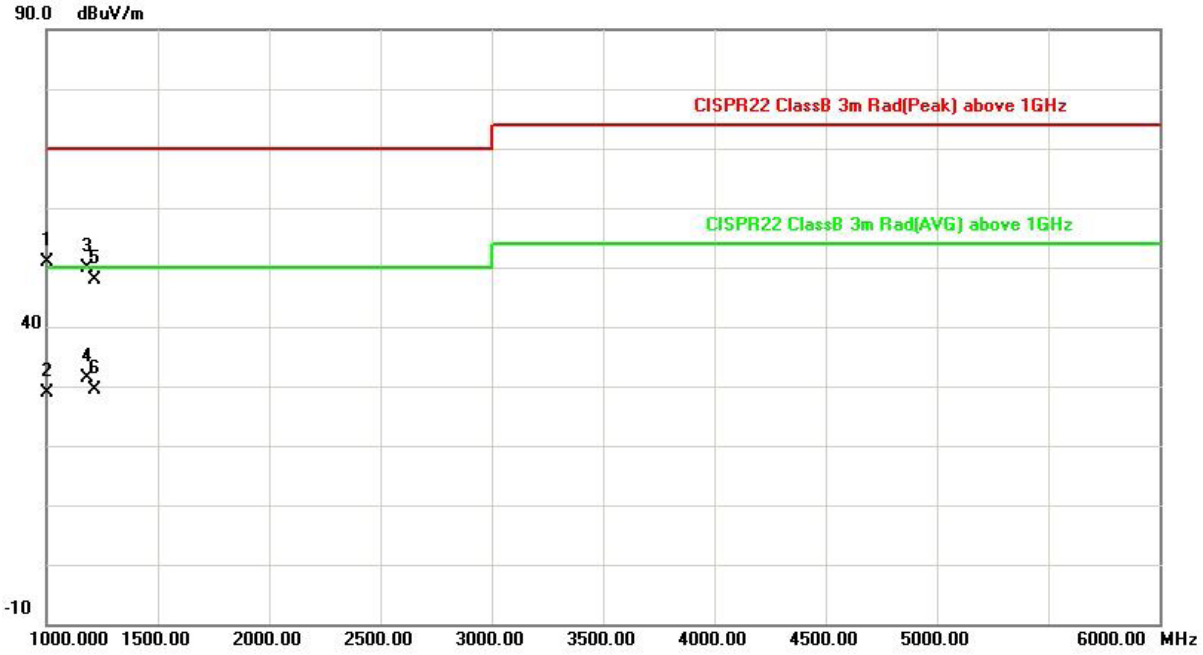
Test Voltage	230Vac, 50Hz	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	1		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	65.02	-14.51	50.51	70.00	-19.49	peak	100	114
2	1000.0000	42.90	-14.51	28.39	50.00	-21.61	AVG	100	114
3	1330.000	62.27	-12.11	50.16	70.00	-19.84	peak	100	221
4	1330.000	42.51	-12.11	30.40	50.00	-19.60	AVG	100	221
5	1499.900	60.99	-10.87	50.12	70.00	-19.88	peak	100	199
6	1499.900	41.37	-10.87	30.50	50.00	-19.50	AVG	100	199

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

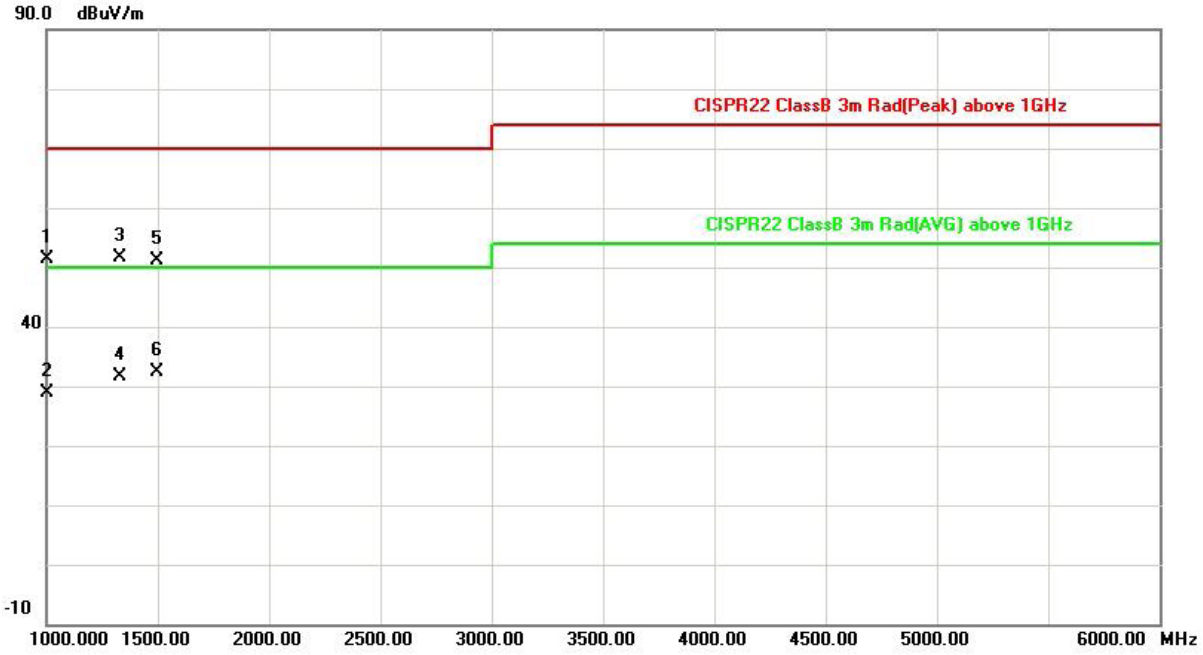
Test Voltage	230Vac, 50Hz	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	1		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	65.46	-14.51	50.95	70.00	-19.05	peak	100	66
2	1000.0000	43.43	-14.51	28.92	50.00	-21.08	AVG	100	66
3	1185.000	63.01	-13.16	49.85	70.00	-20.15	peak	100	179
4	1185.000	44.53	-13.16	31.37	50.00	-18.63	AVG	100	179
5	1215.000	60.79	-12.94	47.85	70.00	-22.15	peak	100	211
6	1215.000	42.43	-12.94	29.49	50.00	-20.51	AVG	100	211

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

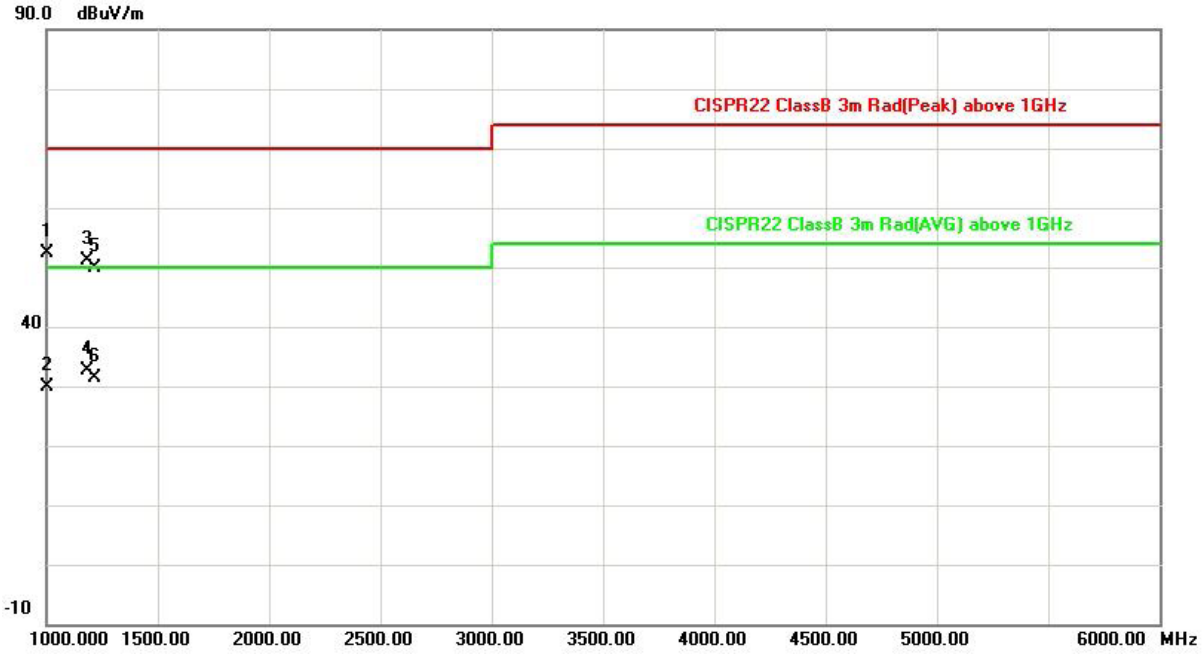
Test Voltage	48Vdc (from POE)	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	2		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	65.97	-14.51	51.46	70.00	-18.54	peak	100	152
2	1000.0000	43.39	-14.51	28.88	50.00	-21.12	AVG	100	152
3	1330.000	63.67	-12.11	51.56	70.00	-18.44	peak	100	191
4	1330.000	43.79	-12.11	31.68	50.00	-18.32	AVG	100	191
5	1499.900	61.97	-10.87	51.10	70.00	-18.90	peak	100	164
6	1499.900	43.26	-10.87	32.39	50.00	-17.61	AVG	100	164

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

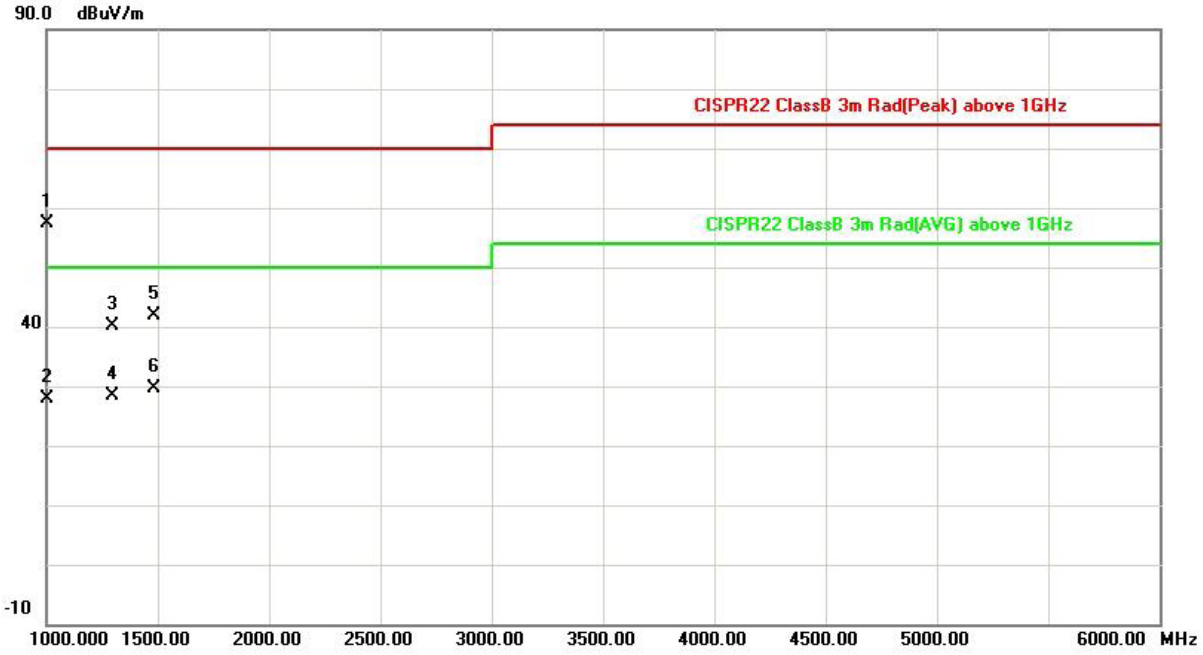
Test Voltage	48Vdc (from POE)	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	2		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	66.79	-14.51	52.28	70.00	-17.72	peak	100	90
2	1000.0000	44.36	-14.51	29.85	50.00	-20.15	AVG	100	90
3	1185.000	64.26	-13.16	51.10	70.00	-18.90	peak	100	164
4	1185.000	45.79	-13.16	32.63	50.00	-17.37	AVG	100	164
5	1215.000	62.75	-12.94	49.81	70.00	-20.19	peak	100	201
6	1215.000	44.32	-12.94	31.38	50.00	-18.62	AVG	100	201

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

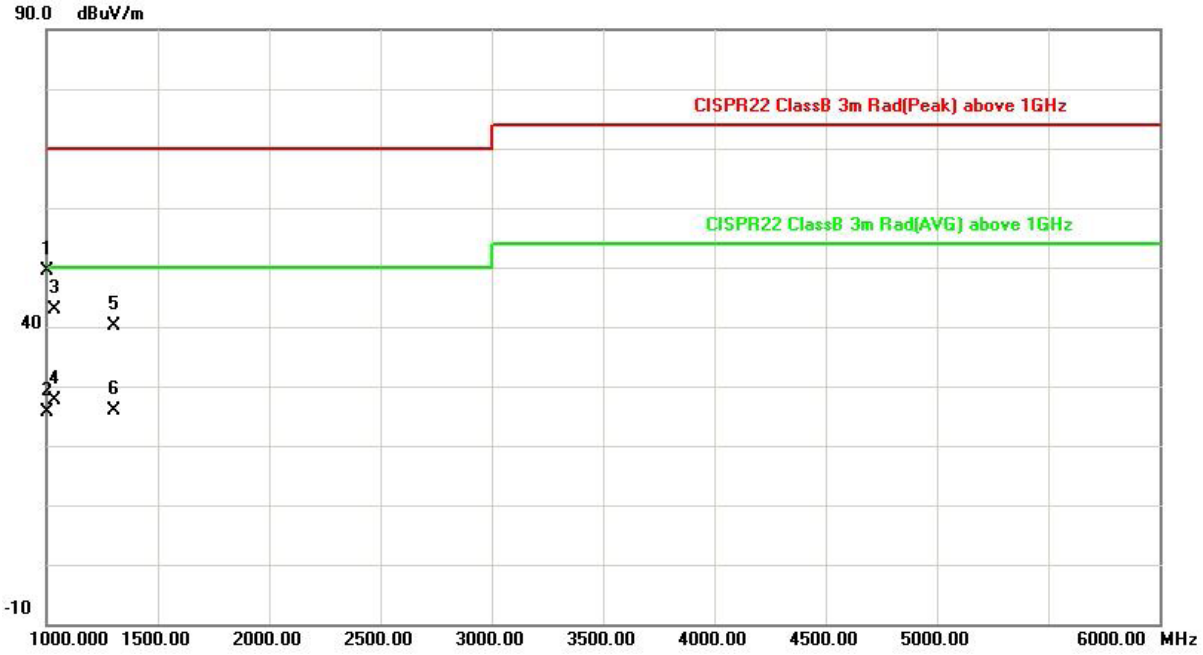
Test Voltage	230Vac, 50Hz	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	3		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	71.99	-14.51	57.48	70.00	-12.52	peak	100	73
2	1000.0000	42.37	-14.51	27.86	50.00	-22.14	AVG	100	73
3	1299.300	52.41	-12.33	40.08	70.00	-29.92	peak	100	199
4	1299.300	40.62	-12.33	28.29	50.00	-21.71	AVG	100	199
5	1485.000	52.77	-10.98	41.79	70.00	-28.21	peak	100	224
6	1485.000	40.55	-10.98	29.57	50.00	-20.43	AVG	100	224

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

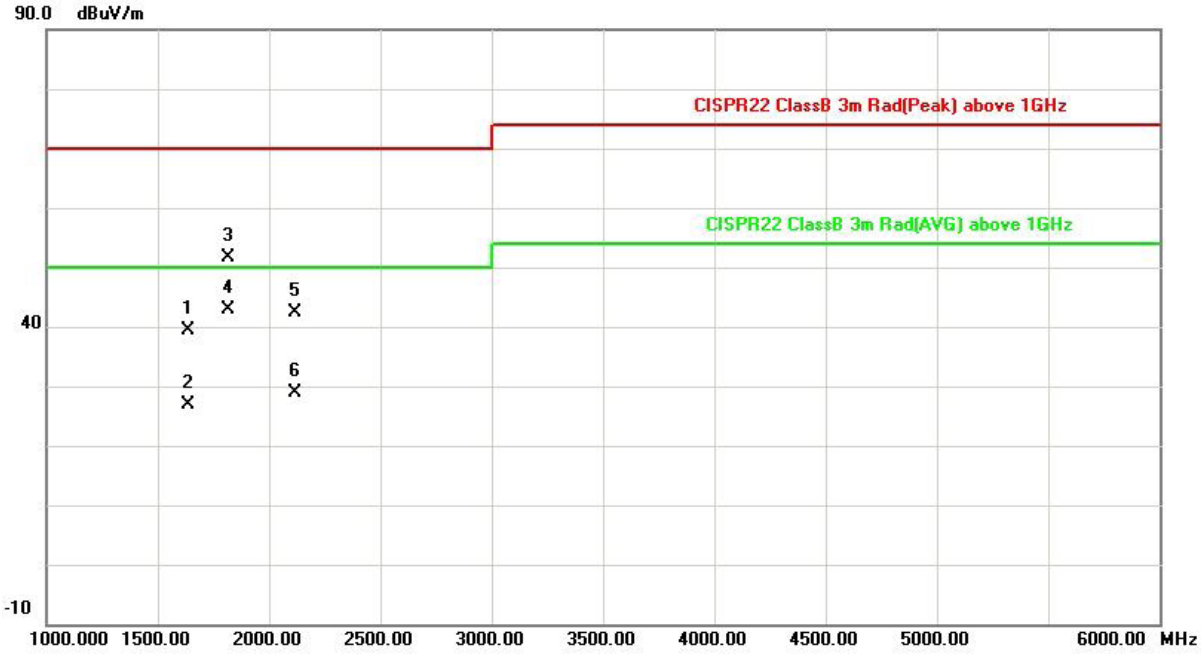
Test Voltage	230Vac, 50Hz	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	3		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1000.0000	63.79	-14.51	49.28	70.00	-20.72	peak	100	37
2	1000.0000	40.14	-14.51	25.63	50.00	-24.37	AVG	100	37
3	1039.500	57.17	-14.22	42.95	70.00	-27.05	peak	100	141
4	1039.500	41.92	-14.22	27.70	50.00	-22.30	AVG	100	141
5	1300.000	52.43	-12.33	40.10	70.00	-29.90	peak	100	172
6	1300.000	38.29	-12.33	25.96	50.00	-24.04	AVG	100	172

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

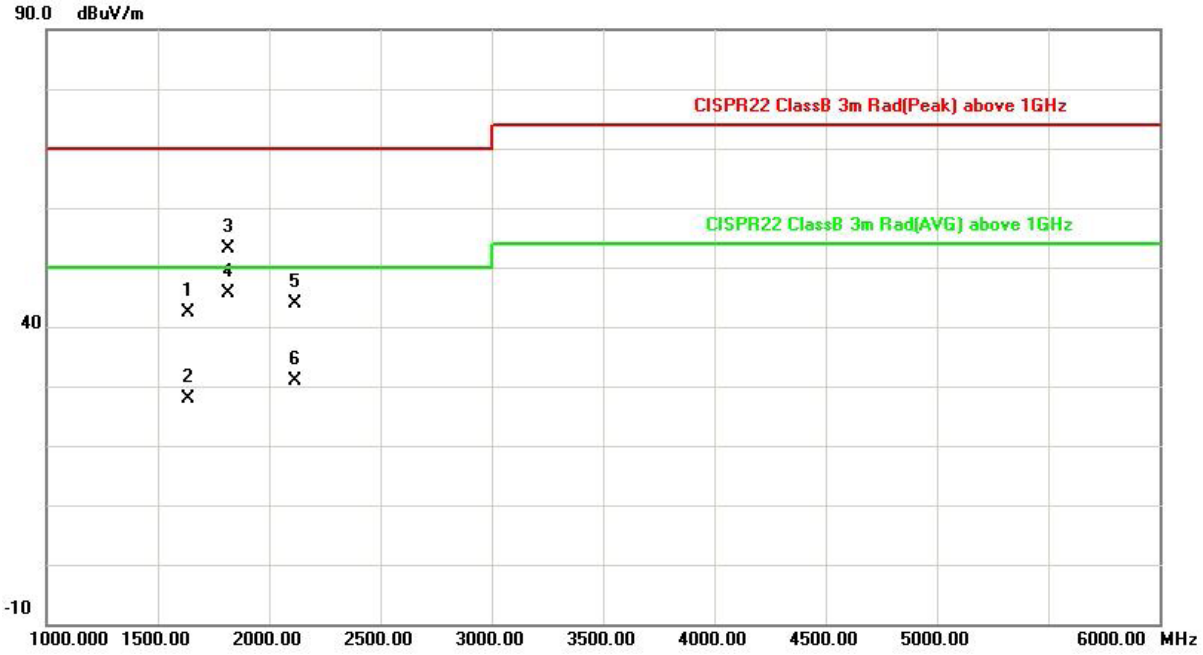
Test Voltage	48Vdc (from POE)	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	4		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1634.050	49.62	-10.19	39.43	70.00	-30.57	peak	151	176
2	1634.050	37.12	-10.19	26.93	50.00	-23.07	AVG	151	176
3	1818.256	60.96	-9.25	51.71	70.00	-18.29	peak	136	162
4	1818.256	52.12	-9.25	42.87	50.00	-7.13	AVG	136	162
5	2118.007	50.03	-7.76	42.27	70.00	-27.73	peak	146	150
6	2118.007	36.56	-7.76	28.80	50.00	-21.20	AVG	146	150

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

Test Voltage	48Vdc (from POE)	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Horizontal
Test Mode	4		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1634.050	52.58	-10.19	42.39	70.00	-27.61	peak	162	179
2	1634.050	38.05	-10.19	27.86	50.00	-22.14	AVG	162	179
3	1818.256	62.28	-9.25	53.03	70.00	-16.97	peak	152	164
4	1818.256	54.78	-9.25	45.53	50.00	-4.47	AVG	152	164
5	2118.007	51.73	-7.76	43.97	70.00	-26.03	peak	161	152
6	2118.007	38.75	-7.76	30.99	50.00	-19.01	AVG	161	152

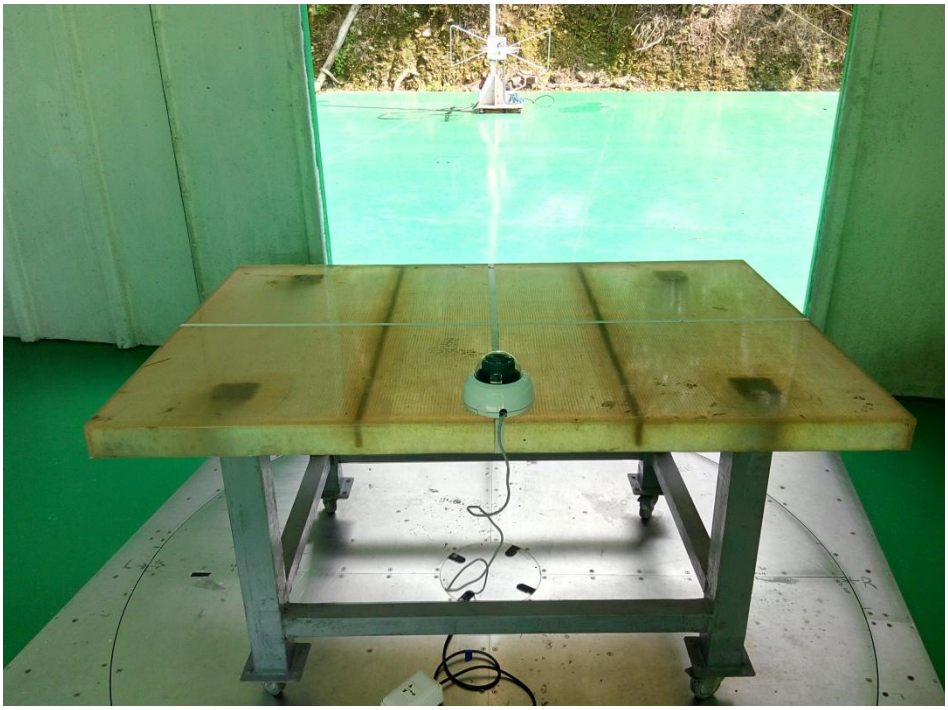
Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

4.3.7 Photographs of Test Configuration

Radiated Emission Test (30MHz~1GHz)

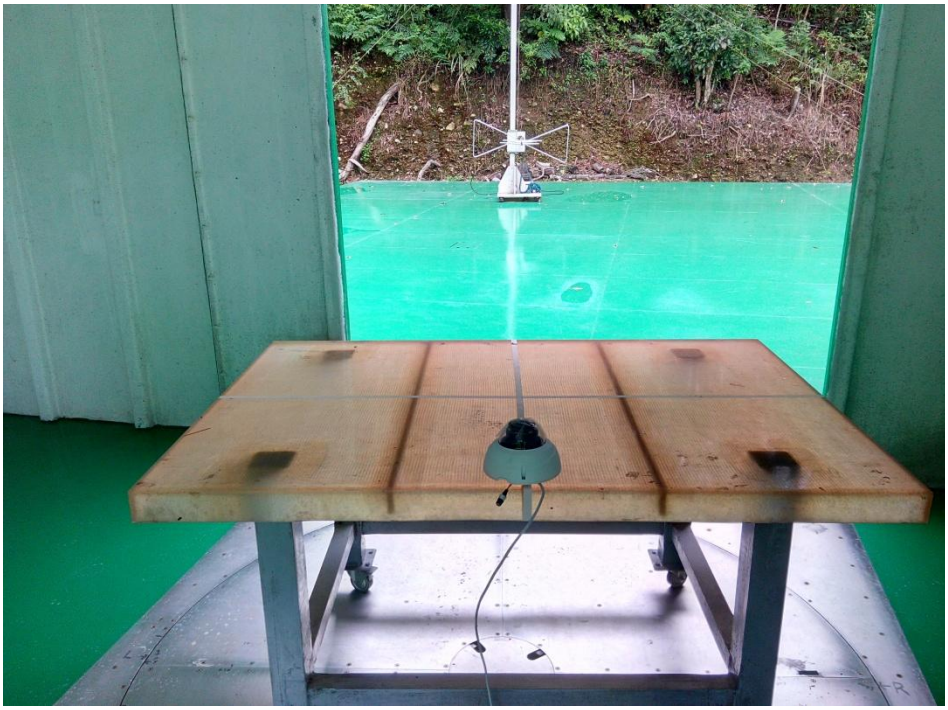
Test mode 1

Test mode 2



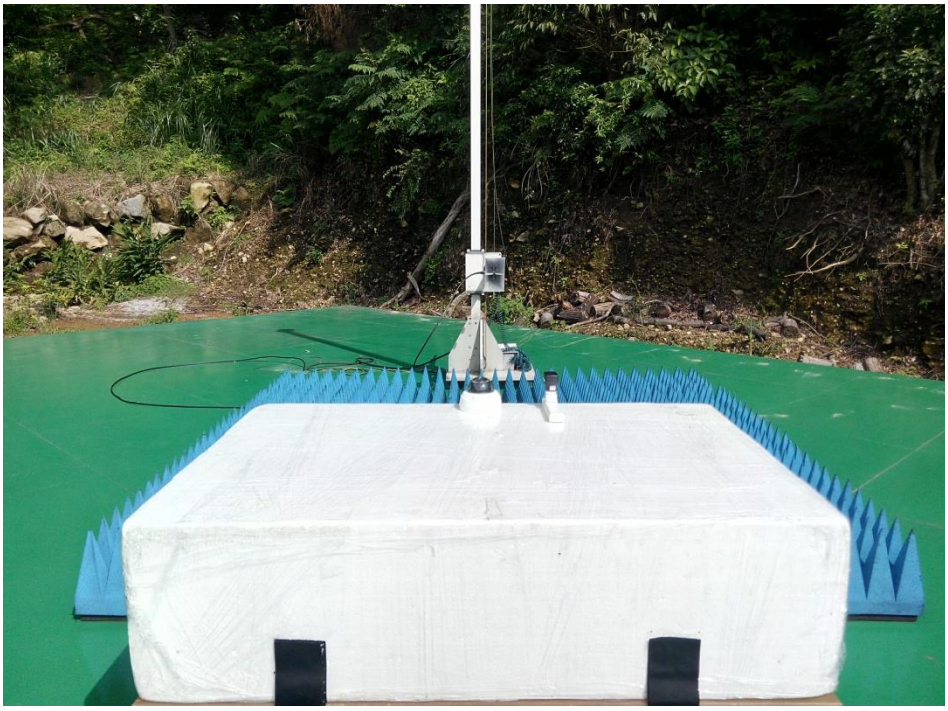
Test mode 3

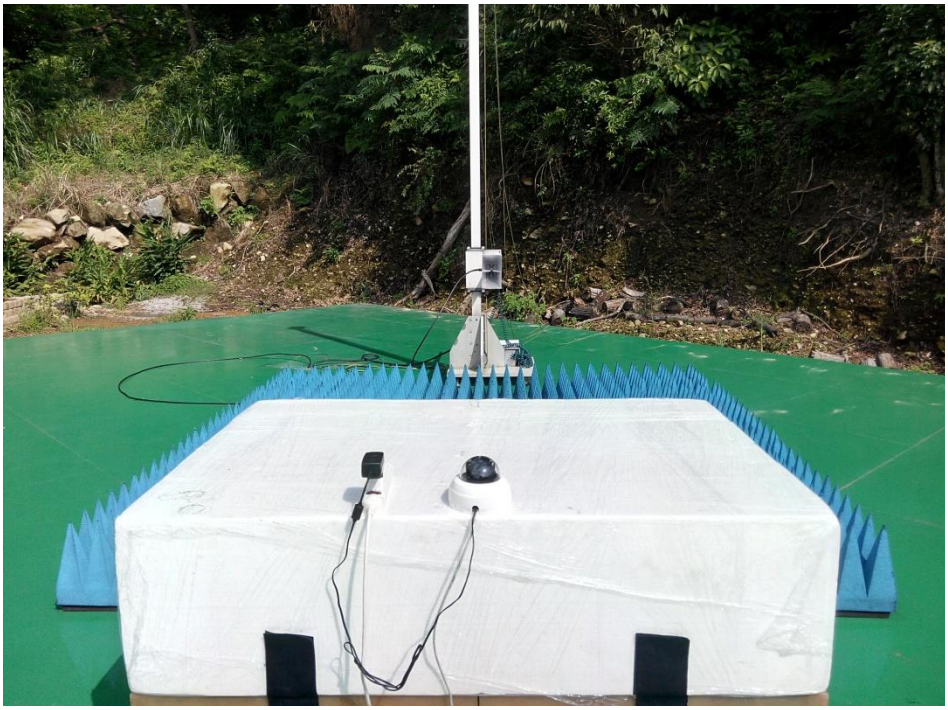
Test mode 4



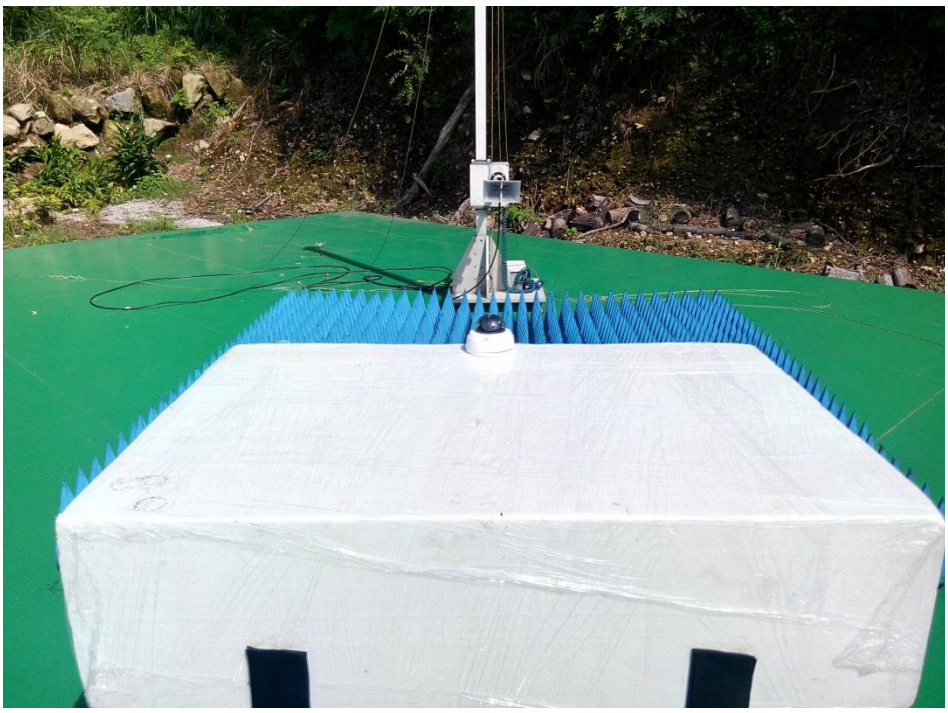
Radiated Emission Test (Above 1GHz)

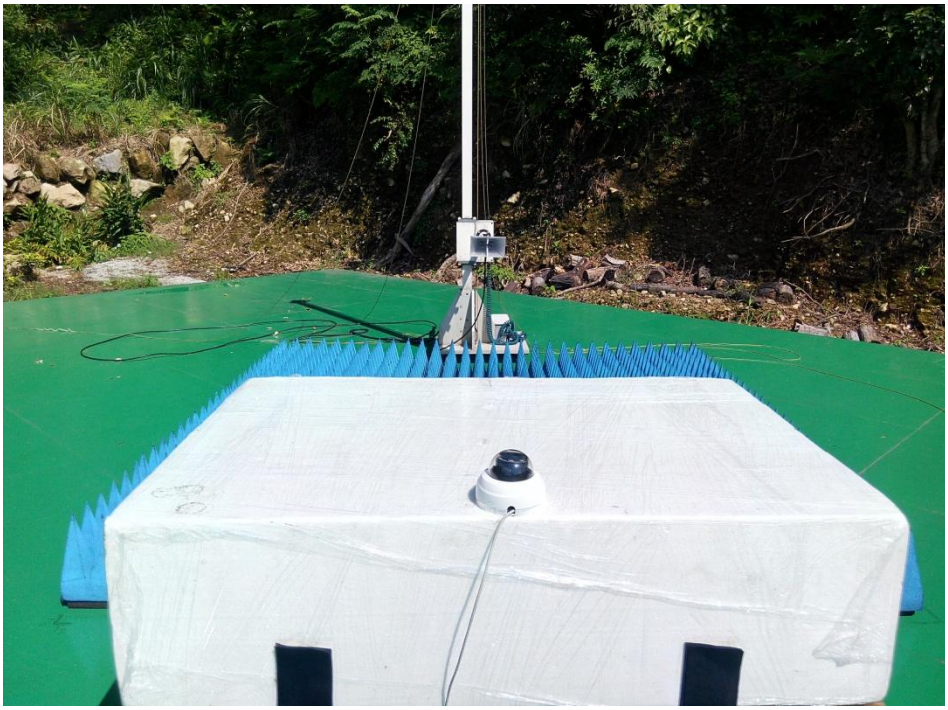
Test mode 1



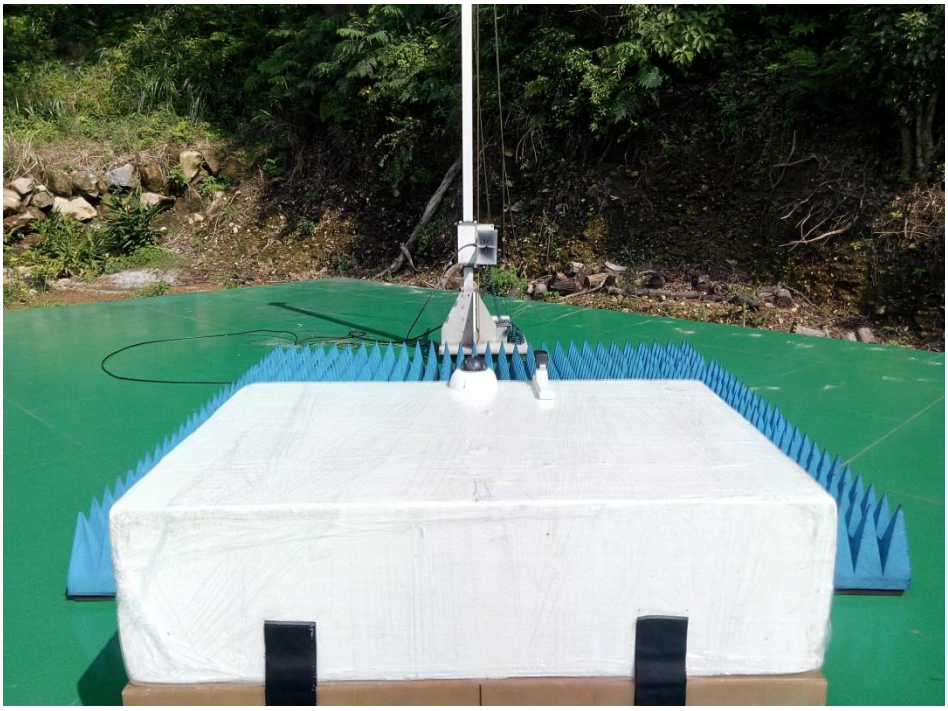


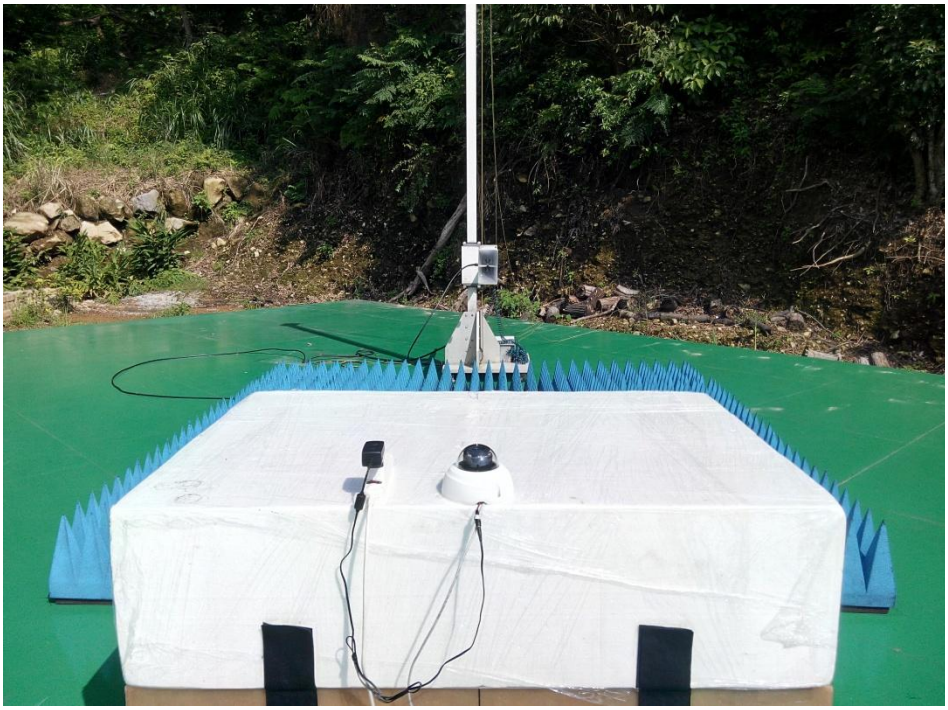
Test mode 2



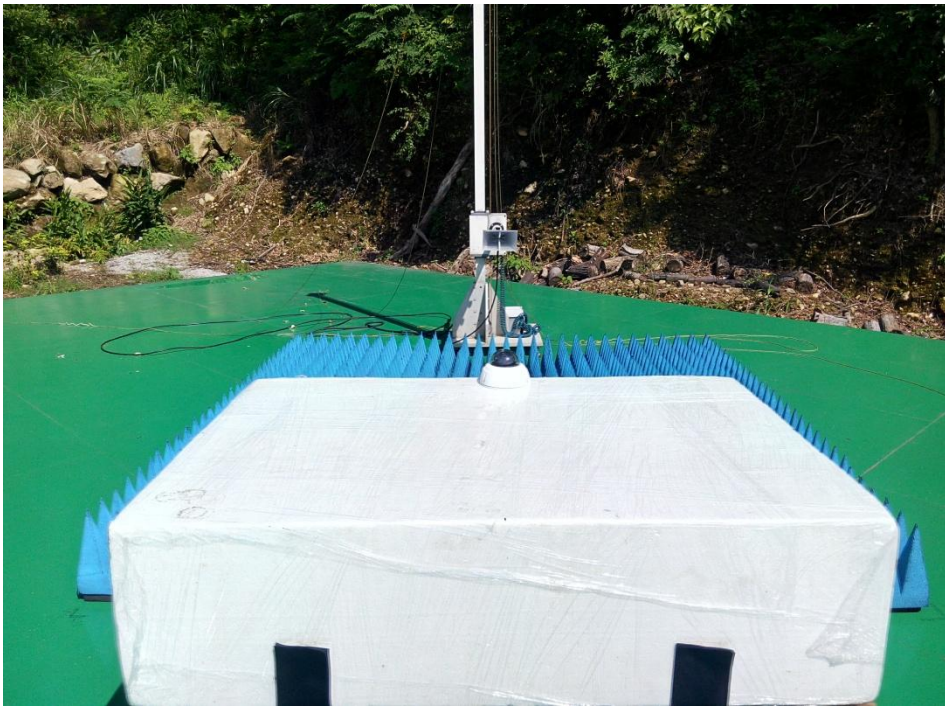


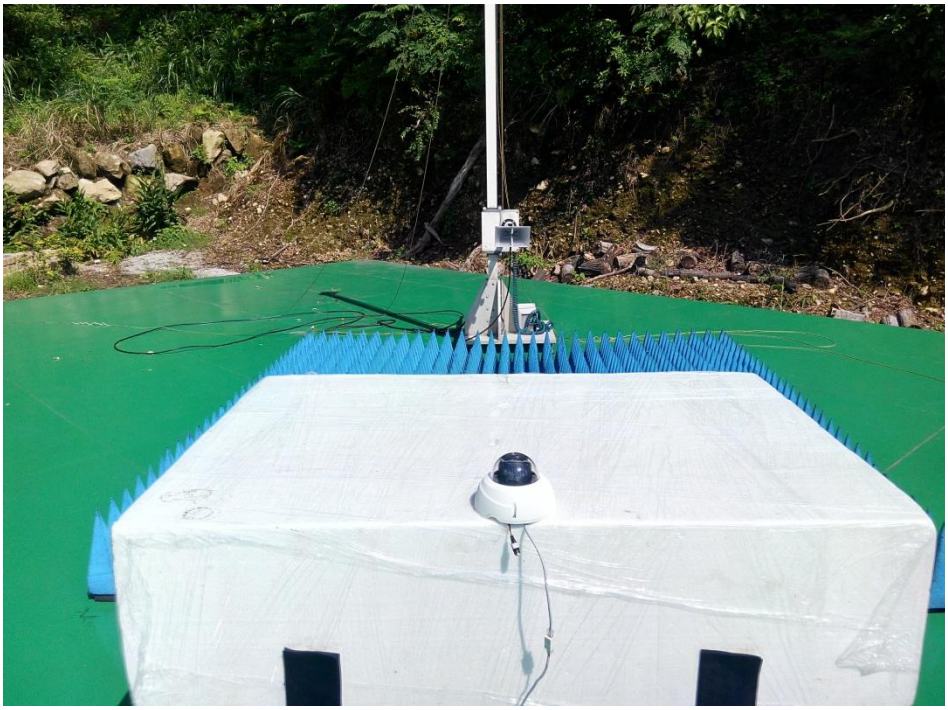
Test mode 3





Test mode 4





4.4 Harmonics Current Measurement

4.4.1 Limits of Harmonics Current Measurement

The limits ensure that harmonic disturbance levels do not exceed the compatibility levels defined in IEC 61000-3-2.

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

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

Note: 1. Class A and Class D are classified according to item section 5 of EN 61000-3-2.
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.

4.4.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Harmonics & Flicker Analyser	Laplace Instruments	AC2000A	CT-1-067	Aug. 06, 2015
2	Power Source	Laplace Instruments	AC1000A	CT-1-067	Aug. 06, 2015

Note: 1. The calibration interval of the above test instruments is 12 months.

4.4.3 Test Procedure

The EUT was placed on the top of a wooden table 0.8 meter above the ground and operated to produce the maximum harmonic 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 classified as follows:
Class A:

- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Equipment not specified in one of the three other classes should be considered as Class A equipment.

Note 1: Equipment that can be shown to have a significant effect on the supply system may be reclassified in a future edition of the standard. Factors to be taken into account include:

- Number in use;
- Duration of use;
- Simultaneity of use;
- Power consumption;
- Harmonic spectrum, including phase.

Class B:

- Portable tools;
- Arc welding equipment, which is not professional equipment.

Class C:

- Lighting equipment;

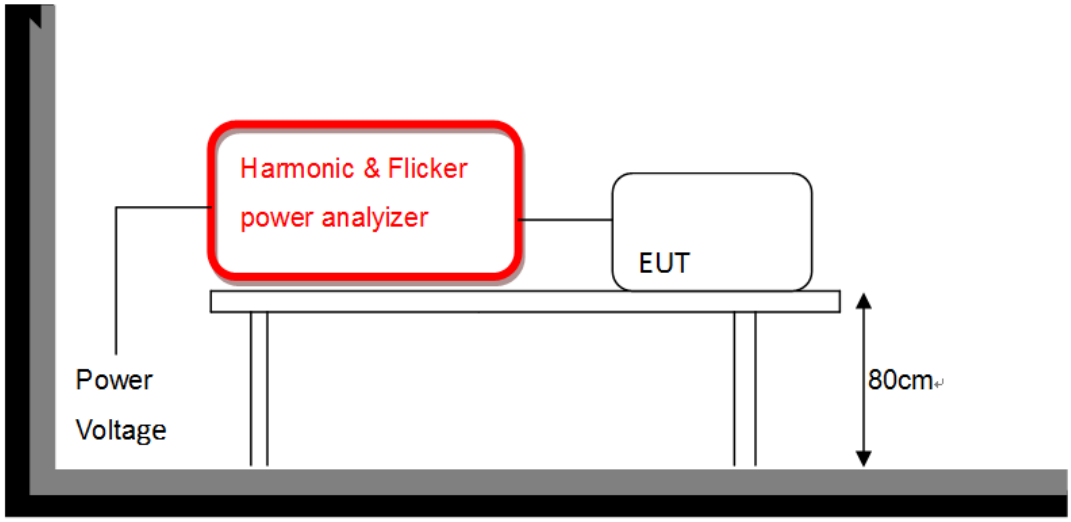
Class D:
Equipment having a specified power according to 6.2.2 less than or equal to 600W, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.

4.4.4 Deviation from Test Standard

No deviation

4.4.5 Test Setup



4.4.6 Test Result

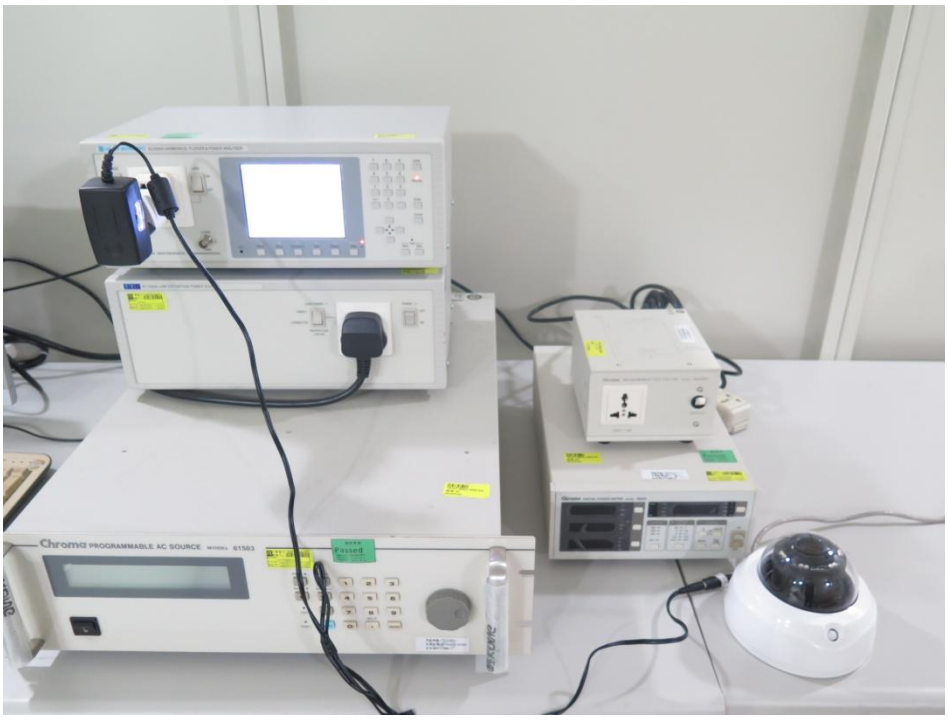
Supply Voltage / Ampere	230.3 Vrms / 47.2 to 48.6 mArms	**Test Date**	2015/09/09
Test Duration	150 secs	**Power Consumption**	3.57 to 3.73W
Power Frequency	49.98 to 50.04Hz	**Power Factor**	0.332
Environmental Conditions	25℃, 51% RH	**Tested by**	Guanwei Liao
Test Mode	1		

Supply Voltage / Ampere	230.2 Vrms / 47.7 to 49.1 mArms	**Test Date**	2015/09/09
Test Duration	150 secs	**Power Consumption**	3.63 to 3.79W
Power Frequency	49.98 to 50.05Hz	**Power Factor**	0.334
Environmental Conditions	25℃, 51% RH	**Tested by**	Guanwei Liao
Test Mode	3		

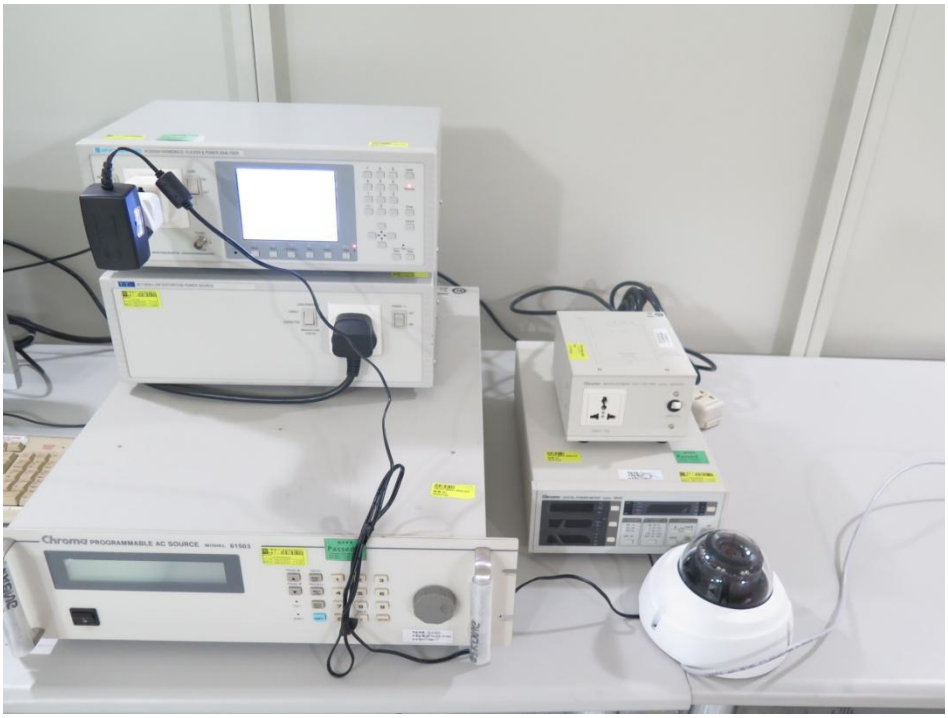
Note:
1. Limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment).
2. According to EN 61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits. The specified power shall be within +/-10% of the measured power.

4.4.7 Photographs of Test Configuration

Test mode 1



Test mode 3



4.5 Voltage Fluctuation and Flicker Measurement

4.5.1 Limit for Voltage Function and Flicker Measurement

Tests Item	Limits	Remark
	IEC/EN 61000-3-3	
P st	1.0, Tp= 10 min.	Pst means short-term flicker
P lt	0.65, Tp=2 hr.	Plt means long-term flicker
Dc(%)	3.3%	dc means relative steady-state voltage change
Dmax(%)	4%	dmax means maximum relative voltage change.
Td (t)	3.3% / 500 ms	Tdt means maximum time that dt exceeds 3 %.

4.5.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Harmonics & Flicker Analyser	Laplace Instruments	AC2000A	CT-1-067	Aug. 06, 2015
2	Power Source	TTi	AC1000A	CT-1-067	Aug. 06, 2015

Note: 1. The calibration interval of the above test instruments is 12 months.

4.5.3 Test Procedure

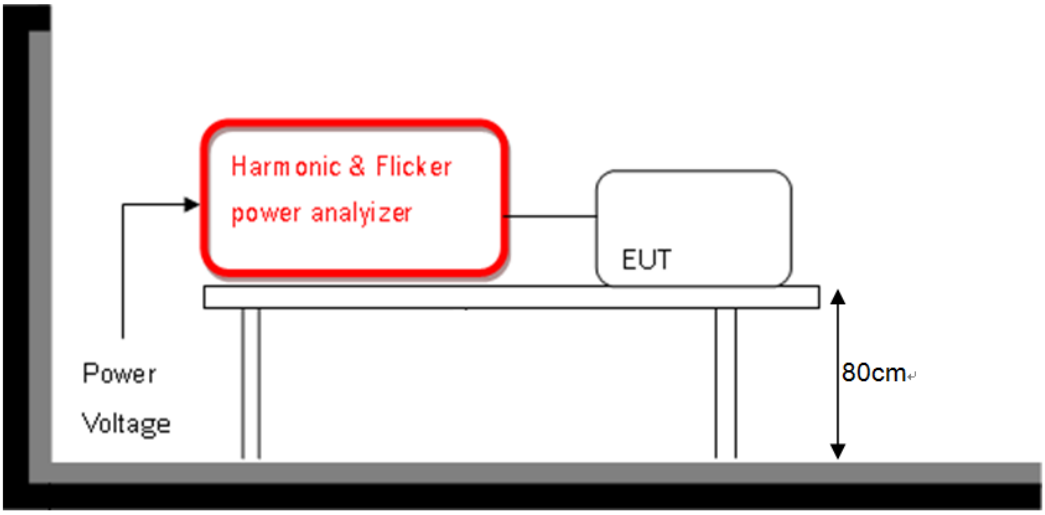
The EUT was placed on the top of a wooden table 0.8 meter above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating condition.

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 min and the observation period for long-term flicker indicator is 2 hours.

4.5.4 Deviation from Test Standard

No deviation

4.5.5 Test Setup



4.5.6 Test Result

Supply Voltage / Ampere	230.3 Vrms / 0.1 Arms	Test Date	2015/09/09
Observation (Tp)	600 secs	Environmental Conditions	25℃, 51% RH
Power Frequency	49.99Hz	Tested by	Guanwei Liao
Test Mode	1		

Test Parameter	Measurement Value	Test Limit	Remarks
P_{st}	0.15	1.00	Pass
P_{lt}	0.00	0.65	Pass
T_{dt} (ms)	0.00	500	Pass
d_{max} (%)	0.89	4%	Pass
dc (%)	0.02	3.3%	Pass

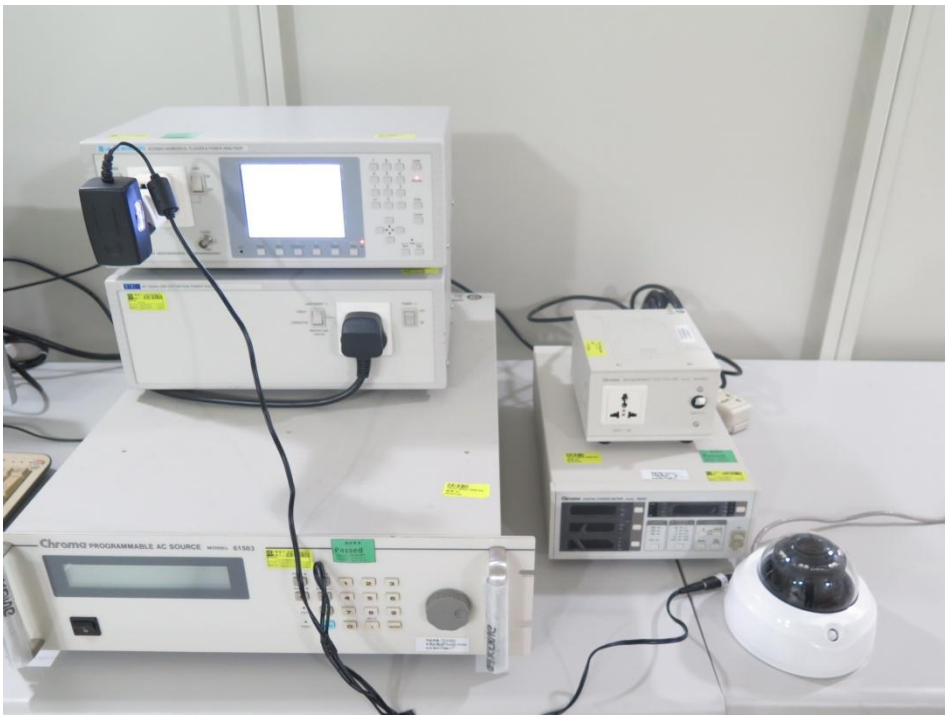
Supply Voltage / Ampere	230.3 Vrms / 0.1 Arms	Test Date	2015/09/09
Observation (Tp)	600 secs	Environmental Conditions	25℃, 51% RH
Power Frequency	49.99 to 50.04Hz	Tested by	Guanwei Liao
Test Mode	3		

Test Parameter	Measurement Value	Test Limit	Remarks
P_{st}	0.16	1.00	Pass
P_{lt}	0.00	0.65	Pass
T_{dt} (ms)	0.00	500	Pass
d_{max} (%)	0.91	4%	Pass
dc (%)	0.01	3.3%	Pass

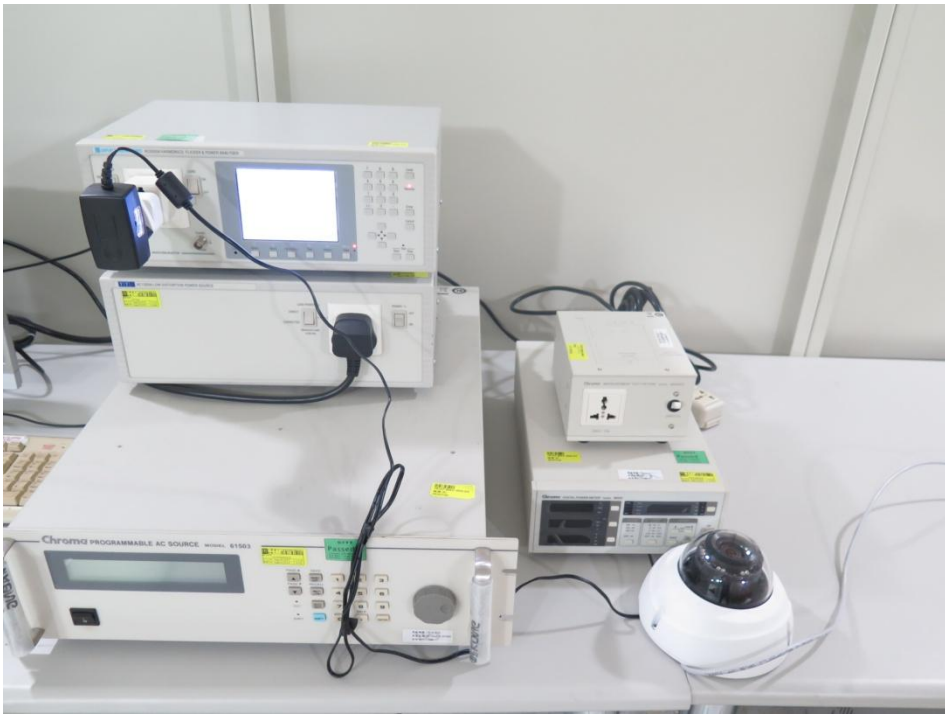
Note: 1. P_{st} means short-term flicker indicator.
2. P_{lt} means long-term flicker indicator.
3. T_{dt} means maximum time that dt exceeds 3.3 %.
4. d_{max} means maximum relative voltage change.
5. dc means relative steady-state voltage change.

4.5.7 Photographs of Test Configuration

Test mode 1



Test mode 3



5 Immunity Test

5.1 Standard Description

Product standard	EN55024	
Basic Standard and Performance Criterion required	IEC 61000-4-2 (ESD)	±8kV Air discharge ±4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3 (RS)	80 M~ 1000 MHz, 3V/m(rms) , 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4 (EFT)	Electrical Fast Transient/Burst – EFT: AC Power Port: ±1kV DC Power Port: ±0.5kV Signal Ports and Telecommunication Ports(cable length > 3m): 0.5kV Performance Criterion B
	IEC 61000-4-5 (Surge)	AC power line: line to line ±1 kV, line to earth ±2 kV, DC power line: line to earth ±0.5 kV, Performance Criteria B Outdoor signal line: 1) ±1 kV without primary protectors, Performance Criteria C 2) ±4 kV with primary protectors, Performance Criterion C
	IEC 61000-4-6 (CS)	Signal and Telecommunication Ports(cable length > 3m), AC Power Port; DC Power Port: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8 (PFMF)	50Hz or 60Hz, 1A/m Performance Criterion A
	IEC 61000-4-11 (Dips)	Voltage Dips: >95% reduction, 0.5 period, Performance Criterion B 30% reduction, 25 period, Performance Criterion C Voltage Interruptions: >95% reduction, 250 period, Performance Criterion C

5.2 Performance Criteria

According to Clause 7 of EN 55024 standard, the general performance criteria as following:

Criteria A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.3 Electrostatic Discharge (ESD)

5.3.1 Test Specification

Standard	IEC/EN 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Discharge Voltage	Air Discharge: ±2, ±4, ±8 kV (Direct) Contact Discharge: ±2, ±4 kV (Direct/Indirect)
Number of Discharge	Air: Minimum 10 times at each point. Contact: Minimum 25 times at each point and minimum 200 times in total
Discharge Mode	Single Discharge
Discharge Period	1 second minimum

5.3.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	ESD Simulator/ Discharge Gun	NoiseKen	ESS-2002	CT-1-010	Apr. 13, 2015
2	Digital Thermo-Hygro Meter	N/A	HTC-8	CT-2-047	Apr. 09, 2015
3	Atmosphere pressure meter	N/A	Kat.Nr.45.10 00.01	CT-2-052-1	Aug. 04, 2015

Note: 1. The calibration interval of the above test instruments is 12 months.

5.3.3 Test Procedure

The test generator necessary to perform direct and indirect application of discharge to the EUT in following methods:

a. Contact discharges to the conductive surface and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at positive and negative 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 be each receives at least 50 direct contact discharges. If no direct contact test points are available, shall be at least 200 indirect discharges applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5 m × 0.5 m, is placed parallel to, and positioned at a distance 0.1 m from, the EUT, with the discharge electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane, of dimensions 1.6 m × 0.8 m, is placed under the EUT. The generator shall be positioned vertically a distance of 0.1 m from the EUT, with the discharge electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

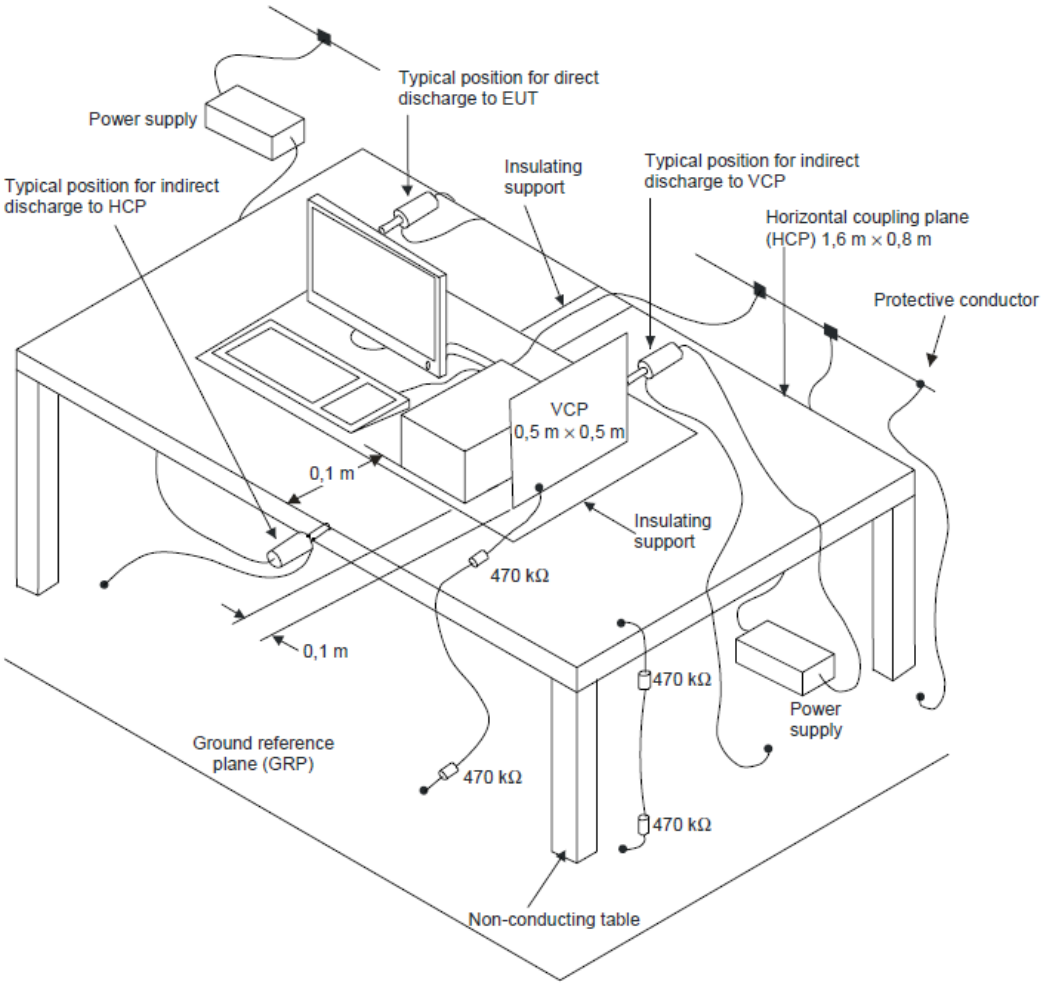
b. Air discharge at apertures and slots and insulating surface:

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 10 single air discharges shall be applied to the selected test point for each such area.

5.3.4 Deviation from Test Standard

No deviation

5.3.5 Test Setup



5.3.6 Test Result

Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	**Test Date**	2015/09/14
Environmental Conditions	25.6℃, 58% RH	**Pressure**	1010 mbar
Tested by	Guanwei Liao	**Test Mode**	1, 2, 3, 4

Test Results of Direct Application

Air Discharge				
Test Point	**Discharge Level (kV)**			**Result**
	±2	**±4**	**±8**	
Front	A	A	A	A
Back	A	A	A	A
Left	A	A	A	A
Right	A	A	A	A
Top	A	A	A	A

* Test location(s) in which discharge to be applied illustrated by photos shown in next page(s).

Contact Discharge			
Test Point	**Discharge Level (kV)**		**Result**
	±2	**±4**	
Front	A	B(#1)	B
Back	A	B(#1)	B
Left	A	B(#1)	B
Right	A	B(#1)	B

* Test location(s) in which discharge to be applied illustrated by photos shown in next page(s).

Test Results of Indirect Application

HCP Discharge			
Test Point	**Discharge Level (kV)**		**Result**
	±2	**±4**	
Front	A	A	A
Back	A	A	A
Left	A	A	A
Right	A	A	A

VCP Discharge			
Test Point	**Discharge Level (kV)**		**Result**
	±2	**±4**	
Front	A	A	A
Back	A	A	A
Left	A	A	A
Right	A	A	A

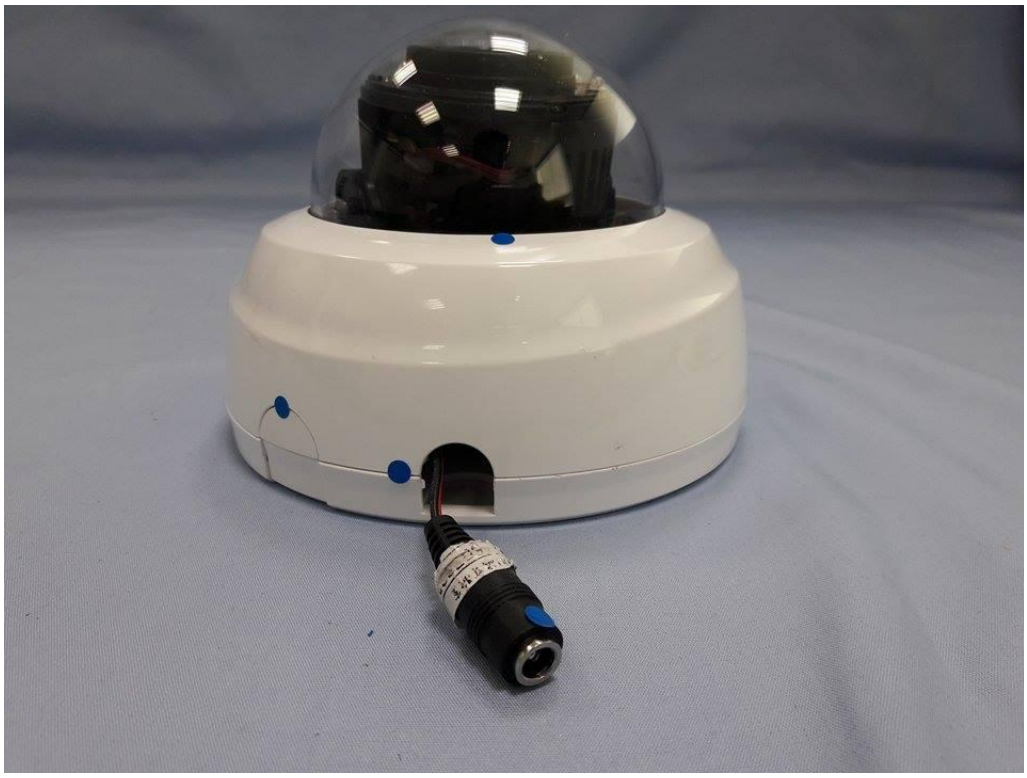
Note:
Criteria A: The EUT function was correct during the test.
Criteria B: (#1) The LAN was interrupted during the test, but could self-recover to the initial operation after the test.

Description of Test Points

Model: FD9171-HT

Front

Back



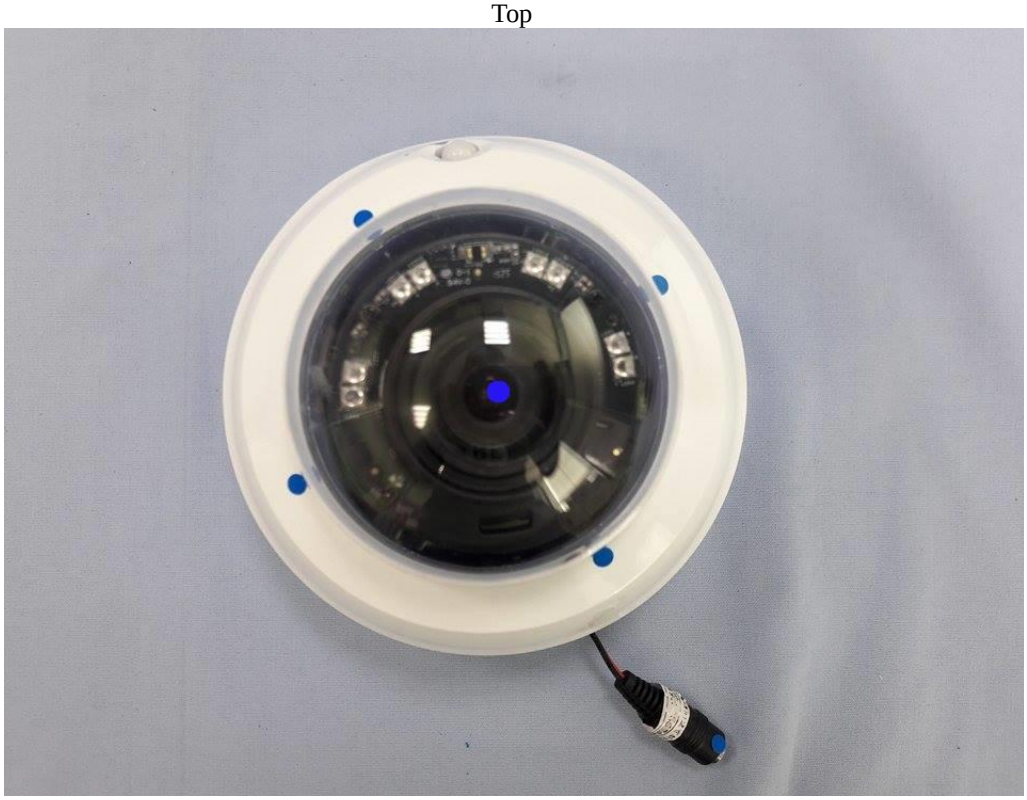
*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Left

Right

*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Top



Model: FD9371-HTV

Front

*Red Dot - Contact Discharged
Blue Dot - Air Discharged

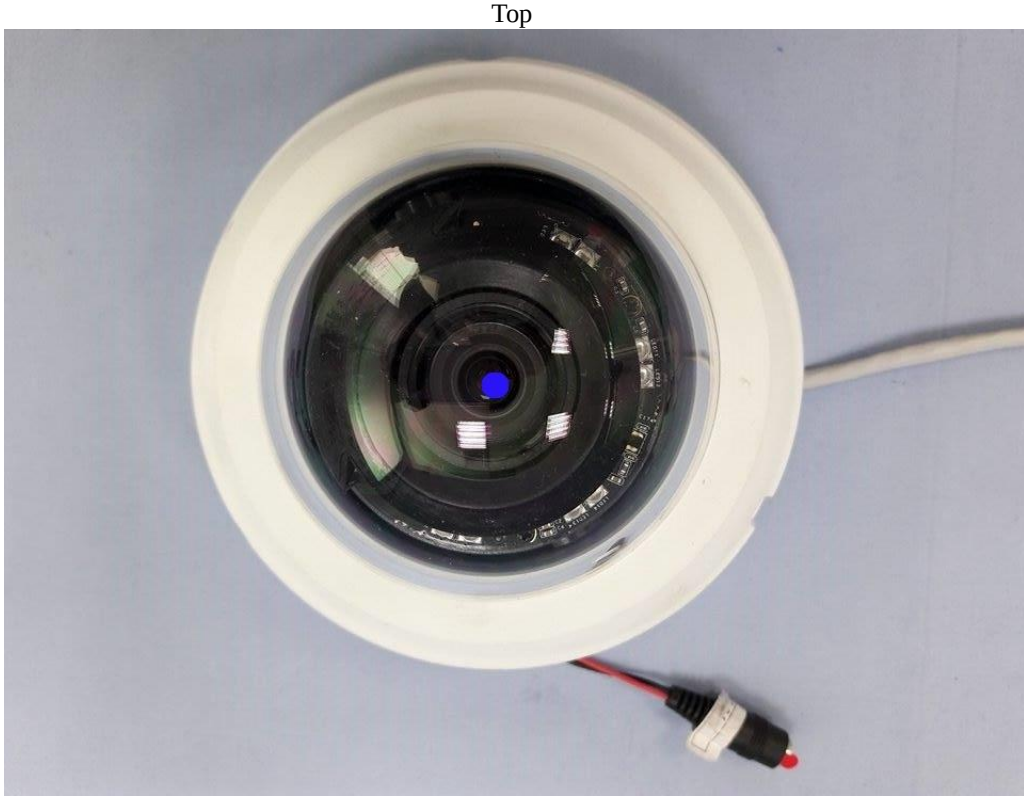
Back

Left

*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Right

Top



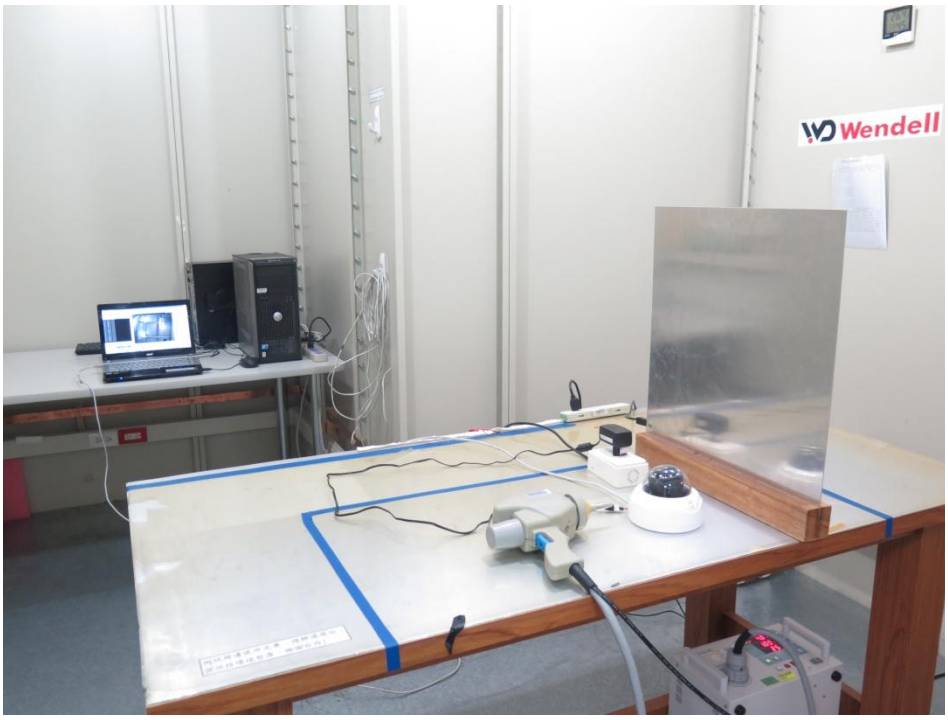
*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Other

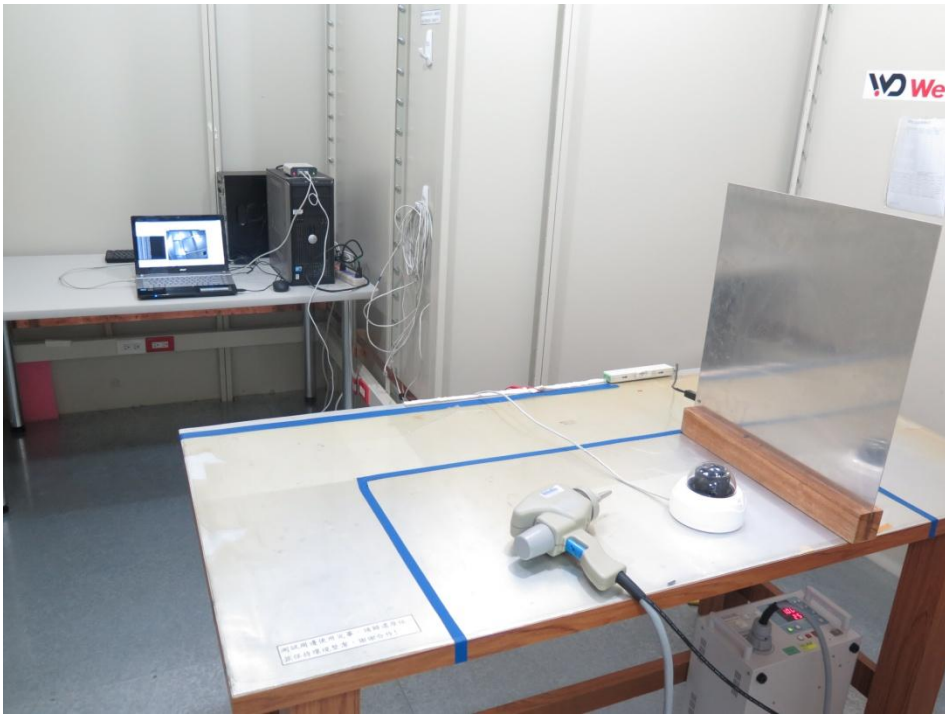
*Red Dot - Contact Discharged
Blue Dot - Air Discharged

5.3.7 Photographs of Test Configuration

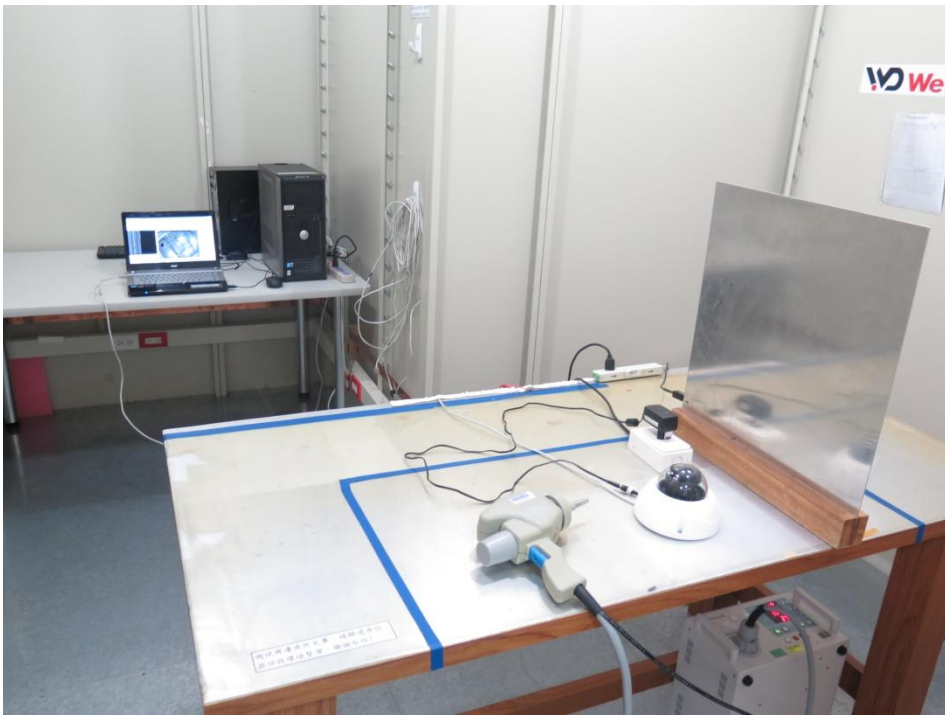
Test mode 1



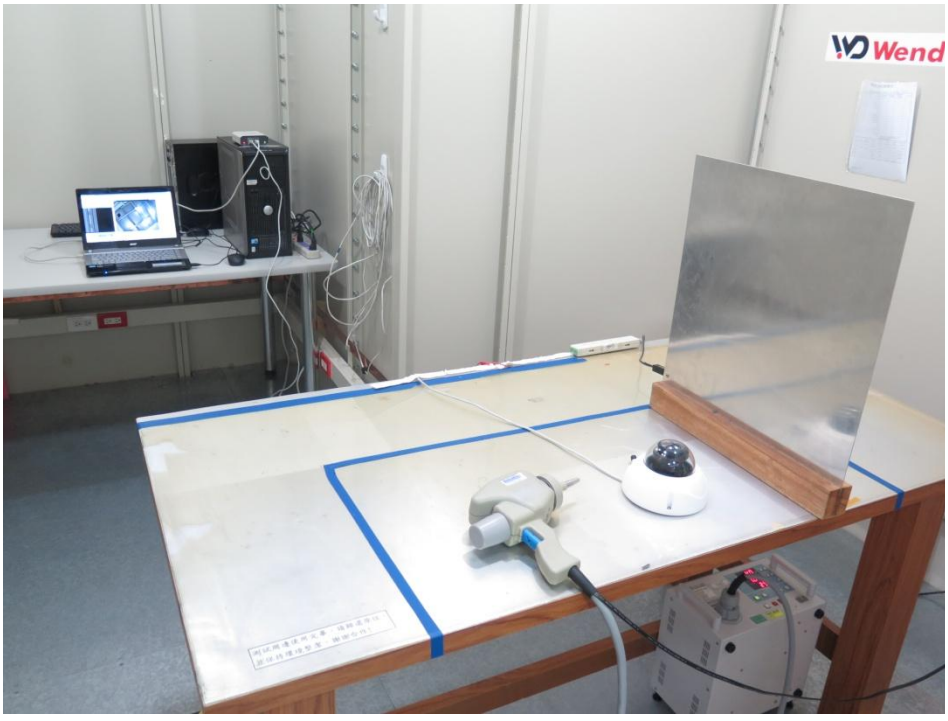
Test mode 2



Test mode 3



Test mode 4



5.4 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

5.4.1 Test Specification

Standard	IEC/EN 61000-4-3
Frequency Range	80 MHz - 1000 MHz
Field Strength	3 V/m
Modulation	80%, AM Modulation, 1 kHz Sine Wave
Frequency Step	1%
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5 m
Dwell Time	3.0 seconds

5.4.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	RadiCentre ® Modular EMC Test Systems	DARE	CTR1004B	CT-1-080	No calibration request
2	RF Signal Generator	DARE	RPR2006C	CT-1-081-1	No calibration request
3	LINEAR POWER RF AMPLIFIER	OPHIR	5225	CT-1-082	No calibration request
4	LINEAR POWER RF AMPLIFIER	OPHIR	5193	CT-1-083	No calibration request
5	LINEAR POWER RF AMPLIFIER	OPHIR	5022A	CT-1-084	No calibration request
6	Periodic Test-Antenna	Schwarzbeck Mess - Elektronik	STLP 9128 E	CT-1-085	No calibration request
7	Microwave Log.-Per. Antenna	Schwarzbeck Mess - Elektronik	ALX-4000E	CT-1-064	No calibration request
8	Electric Field Probe	FRANKONIA	EFS-10	CT-1-060a1	Aug. 29, 2014
9	Measurement Software	EMC-RS	Ver: 2.02	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.4.3 Test Procedure

The test procedure was in accordance with IEC 61000-4-3.

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT was 2 meters.

Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

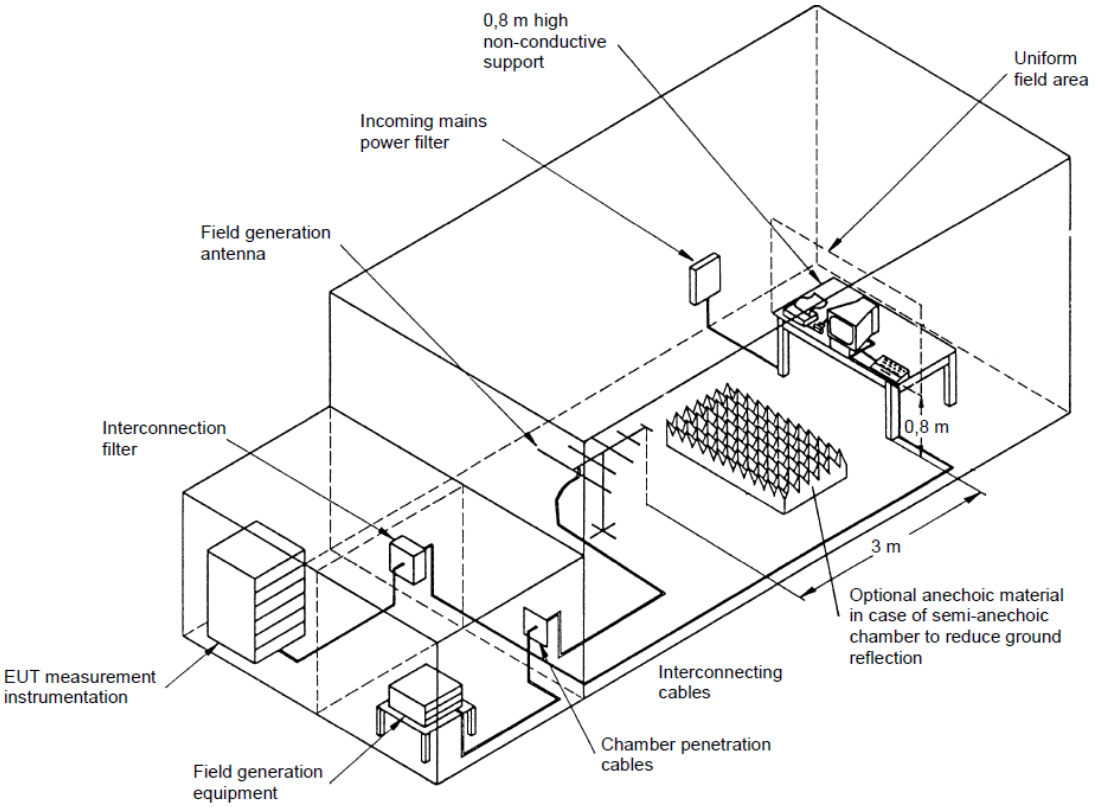
In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.
All the scanning conditions are as follows:

	Condition of Test	Remarks
1	Field Strength	3V/m
2	Radiated Signal	AM 80% Modulated with 1kHz
3	Scanning Frequency	80 M- 1000MHz
4	Dwell Time	3.0 Seconds
5	Frequency Step Size Δf	1%

5.4.4 Deviation from Test Standard

No deviation

5.4.5 Test Setup



NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height.

5.4.6 Test Result

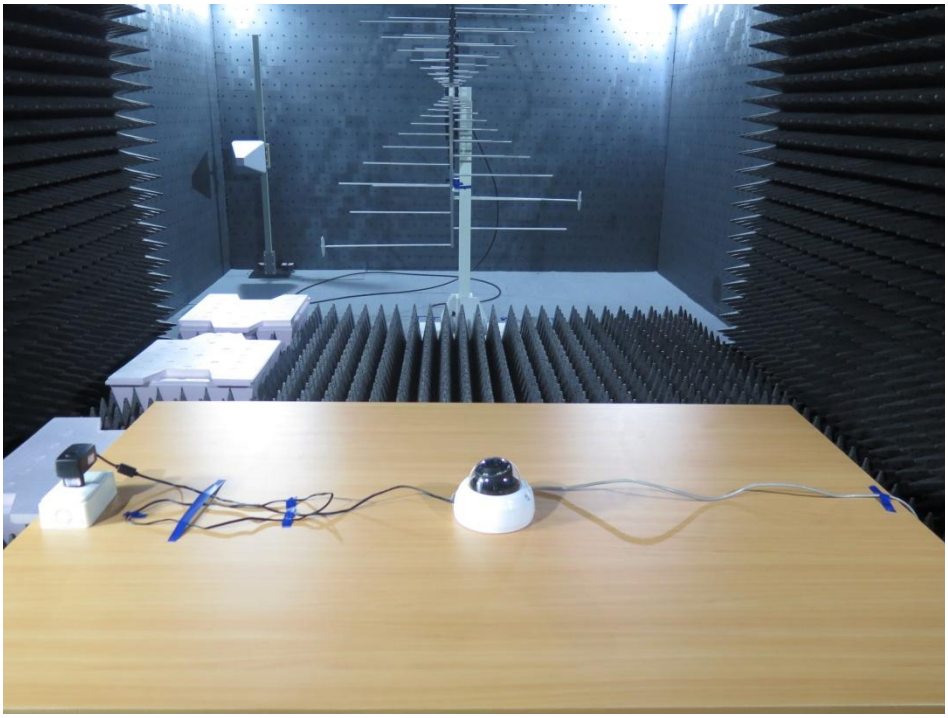
Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	Environmental Conditions	25℃, 51% RH
Tested by	Guanwei Liao	Test Date	2015/09/09
Test Mode	1, 2, 3, 4		

Frequency Range (MHz)	Azimuth	Polarity	Field Strength (V/m)	Modulation	Result
80-1000	0	H/V	3	80% AM (1kHz)	A
80-1000	90	H/V	3	80% AM (1kHz)	A
80-1000	180	H/V	3	80% AM (1kHz)	A
80-1000	270	H/V	3	80% AM (1kHz)	A

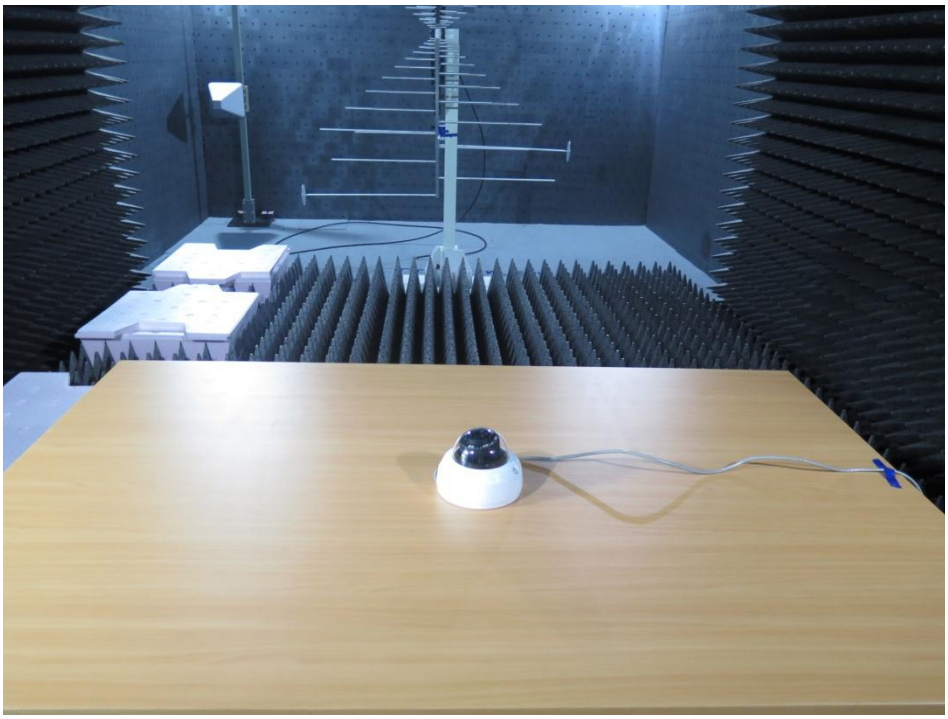
Note:
Criteria A: The EUT function was correct during the test.

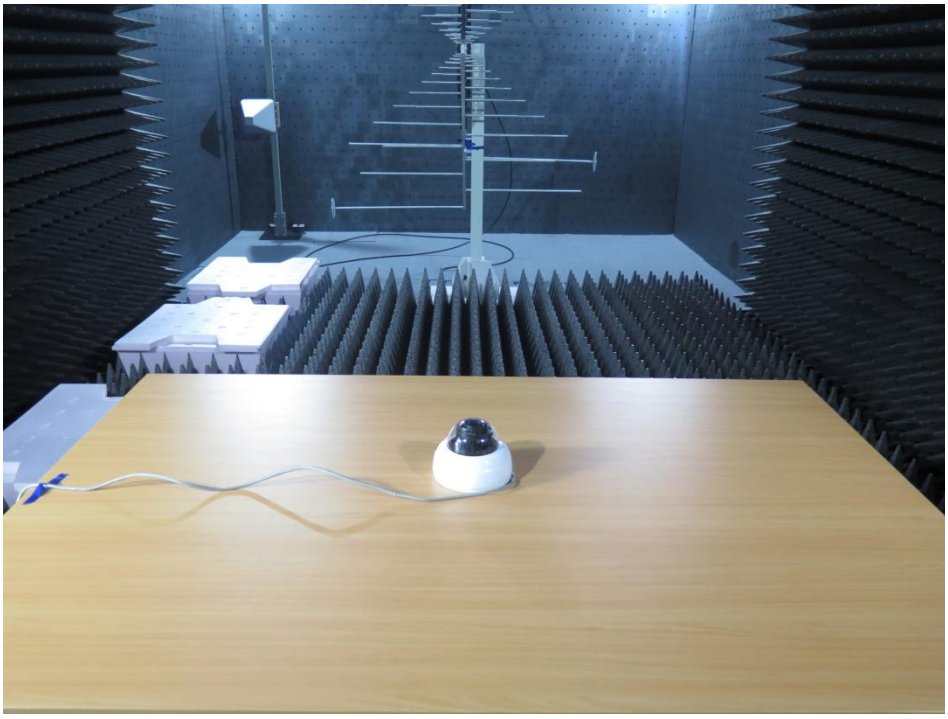
5.4.7 Photographs of Test Configuration

Test mode 1

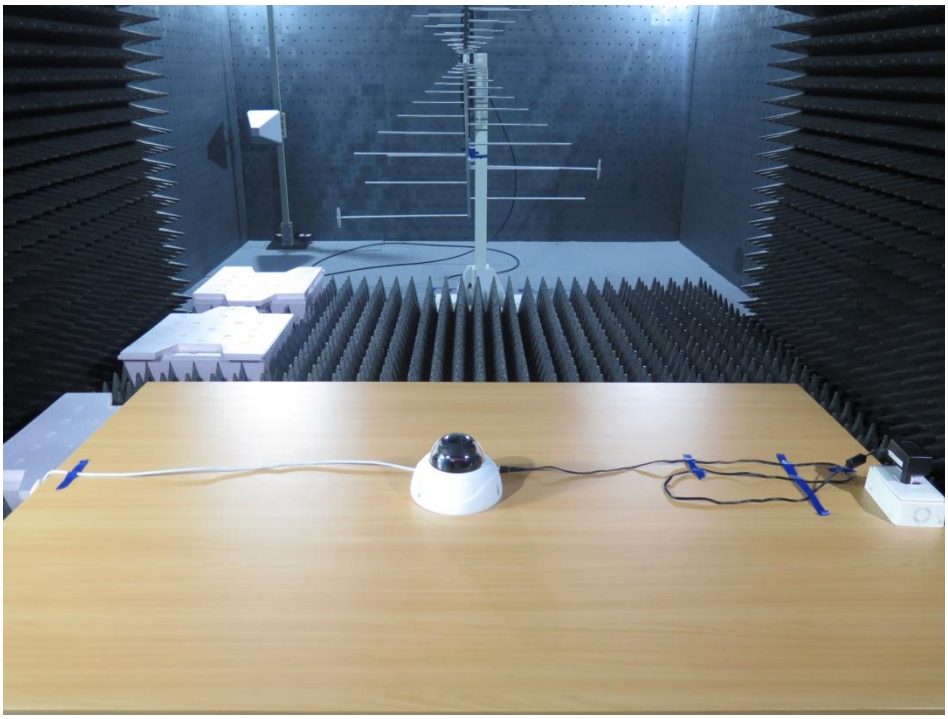


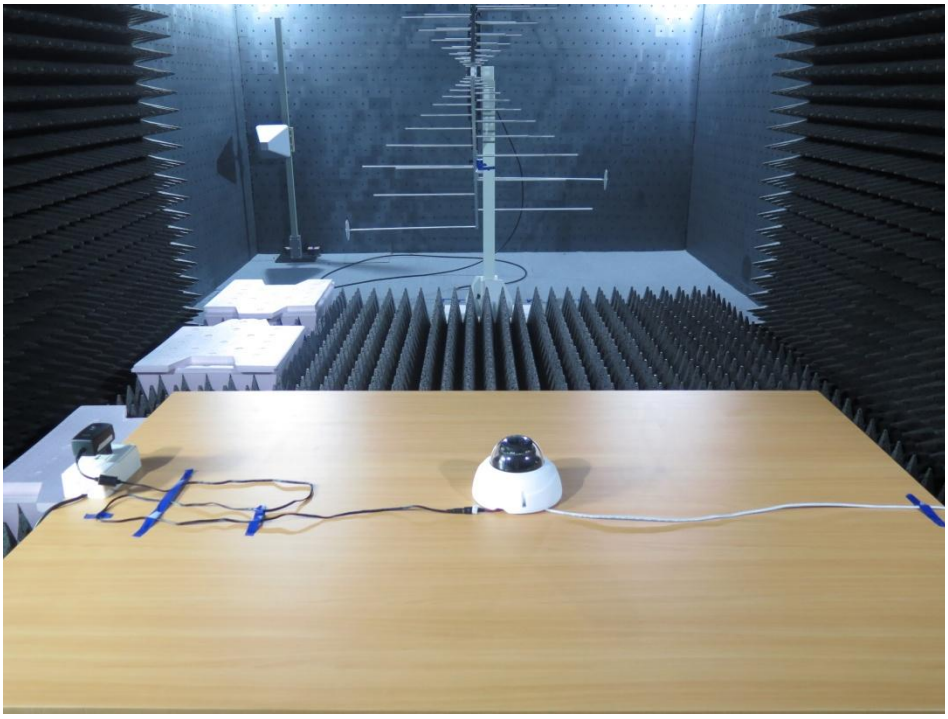
Test mode 2



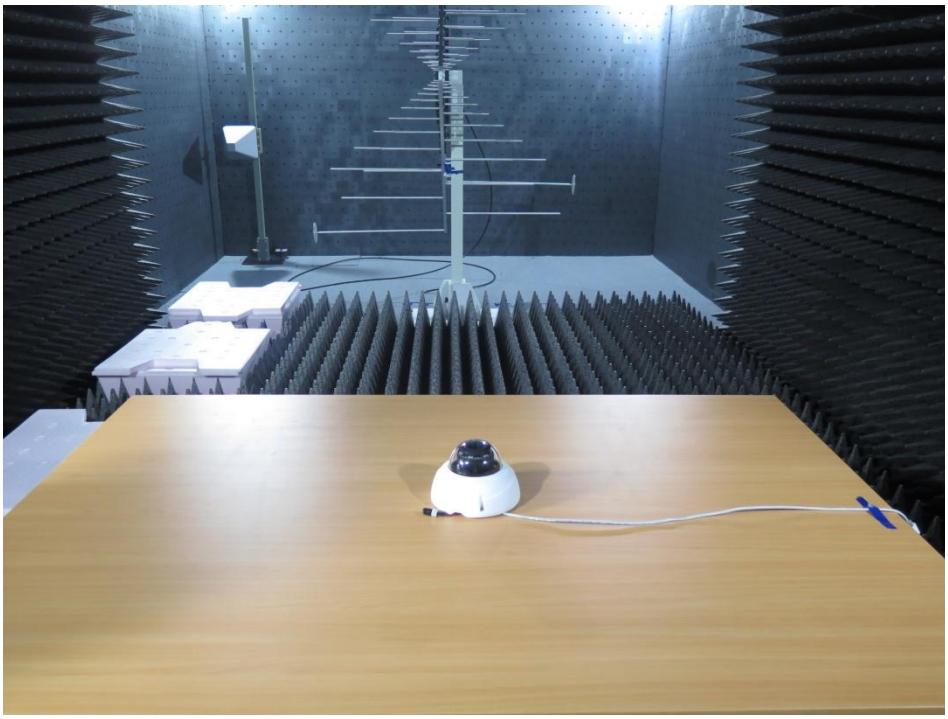


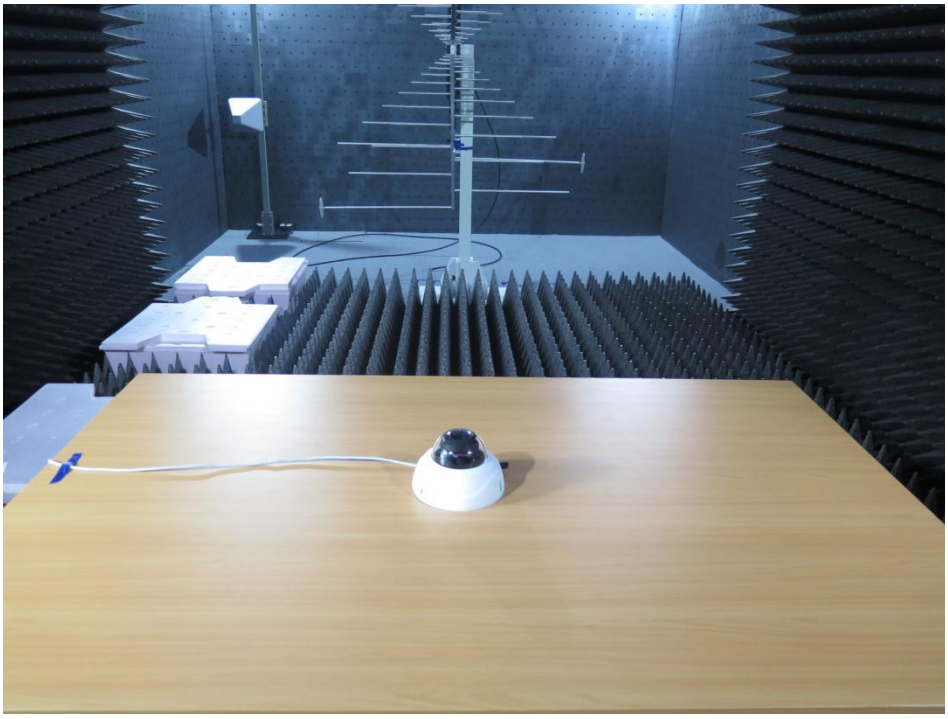
Test mode 3





Test mode 4





5.5 Electrical Fast Transient /Burst Immunity Test (EFT)

5.5.1 Test Specification

Standard	IEC/EN 61000-4-4
Test Voltage	AC supply lines: ±1 kV DC Power Port: N/A Signal ports and telecommunication ports: ±0.5kV
Polarity	Positive & Negative
Impulse Frequency	xDSL telecommunication port: 100 kHz other: 5kHz
Impulse Wave	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	Not less than 1 min.

5.5.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	EMS Generator	Thermo	EMC Pro	CT-1-030	Apr. 10, 2015
2	Clamp	KeyTek	CCL	CT-1-032	Apr. 10, 2015
3	Measurement Software	CEWare32	Ver: 4.1	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.5.3 Test Procedure

The EUT is placed on a table that is 0.8 meter height. A ground reference plane is placed on the table, and uses a 0.1m insulation between the EUT and ground reference plane.

The minimum area of the ground reference plane is 1m*1m, and 0.65mm thick min, and projected beyond the EUT by at least 0.1m on all sides.

For input AC power ports:

The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal.

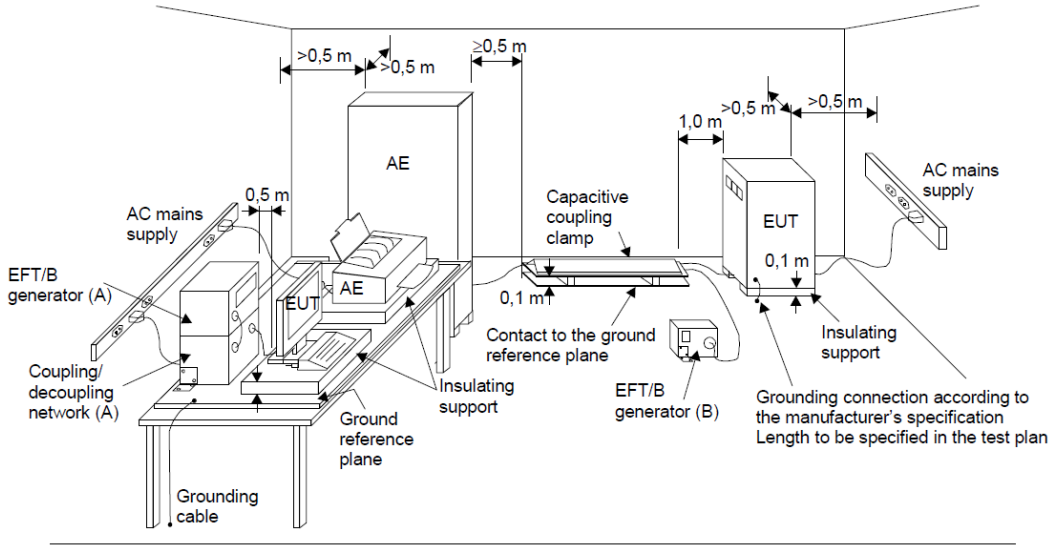
Each of the line conductors is impressed with burst noise for 1 minute.

The length of the power lines between the coupling device and the EUT is 0.5m.

5.5.4 Deviation from Test Standard

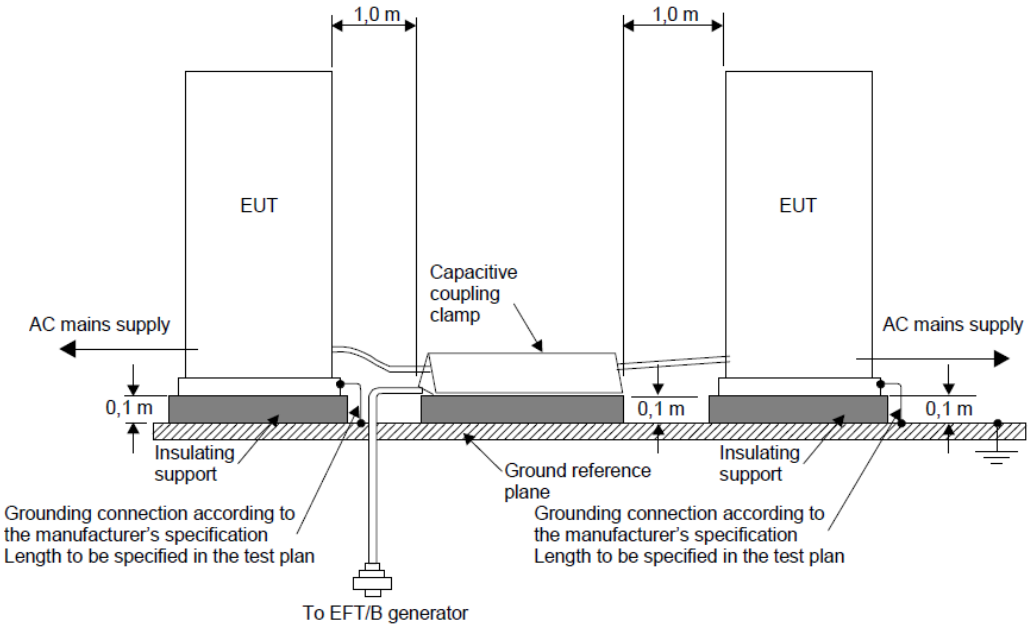
No deviation

5.5.5 Test Setup



(A) location for supply line coupling

(B) location for signal lines coupling



5.5.6 Test Result

Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	**Environmental Conditions**	25℃, 51% RH
Tested by	Toby Chung	**Test Date**	2015/09/18

Test Point		**Test Level (kV)**	**Polarity (+/-)**	**Result**	**Test Mode**
AC Power Port	L	1	+/-	A	1, 3
	N	1	+/-	A	
	L + N	1	+/-	A	
Signal Ports Telecommunication Ports	RJ45	0.5	+/-	A	1, 2, 3, 4

Note:
Criteria A: The EUT function was correct during the test.

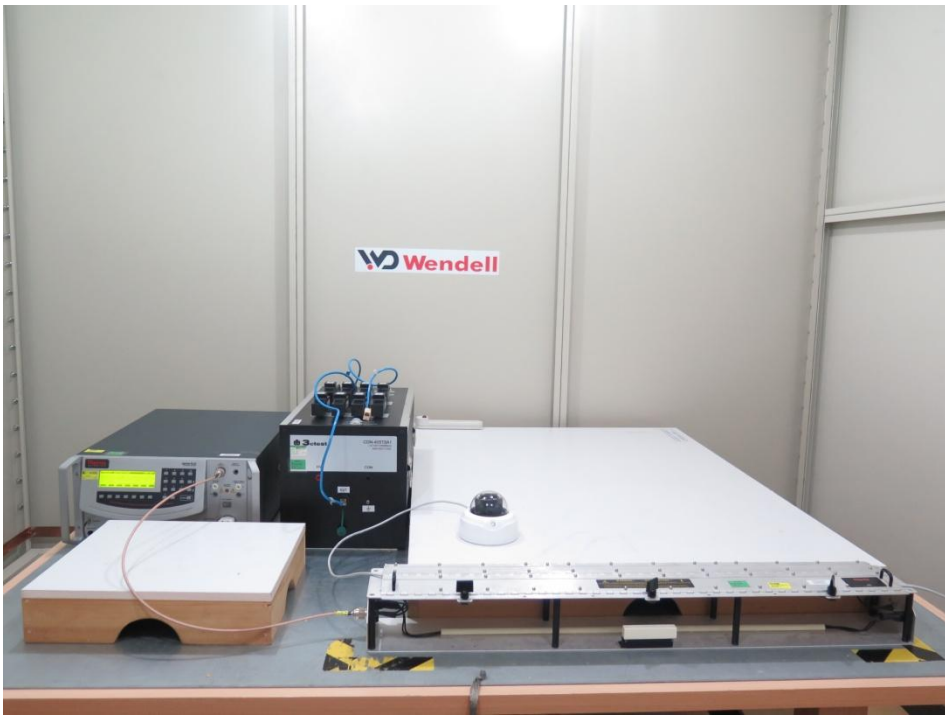
5.5.7 Photographs of Test Configuration

Model: FD9171-HT

Power

RJ45

POE



Model: FD9371-HTV

Power

RJ45

POE

5.6 Surge Immunity Test

5.6.1 Test Specification

Standard	IEC/EN 61000-4-5
Wave- Shape	Signal and telecommunication ports(direct to outdoor cables(Note 1)): 10/700 μs Open Circuit Voltage 5/320 μs Short Circuit Current Input DC power port(direct to outdoor cables(Note 1)): 1.2/50 μs Open Circuit Voltage 8/20 μs Short Circuit Current Input AC Power ports: 1.2/50 μs Open Circuit Voltage 8 /20 μs Short Circuit Current
Test Voltage	Signal and telecommunication ports(Note 2) (direct to outdoor cables(Note 1)): w/o primary protectors: ±1kV, with primary protectors fitted: N/A Input DC power port(direct to outdoor cables(Note 1)): N/A, Input AC Power ports: Line to line: ±1kV, Line to earth or ground: N/A
Surge Input / Output	L1-L2
Polarity	Positive/Negative
Phase Angle	0˚/90˚/180˚/270˚
Pulse Repetition Rate	1 time / min. (maximum)
Times	5 positive and 5 negative at selected points

Note: 1. This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables
2. For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.

5.6.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	EMS Generator	Thermo	EMC Pro	CT-1-030	Apr. 10, 2015
2	Surge CDN	3cTest	CDN-405T8A1	CT-1-074(5)	Mar. 03, 2015
3	Measurement Software	CEWare32	Ver: 4.1	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.6.3 Test Procedure

The EUT is placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m minimum and 0.65mm thick minimum and projected beyond the EUT by at least 0.1m on all sides. The length of power cord between the coupling device and the EUT shall be 2m or less.

For input AC power ports:

The EUT is connected to the power mains through a coupling device that directly couples the surge interference signal.

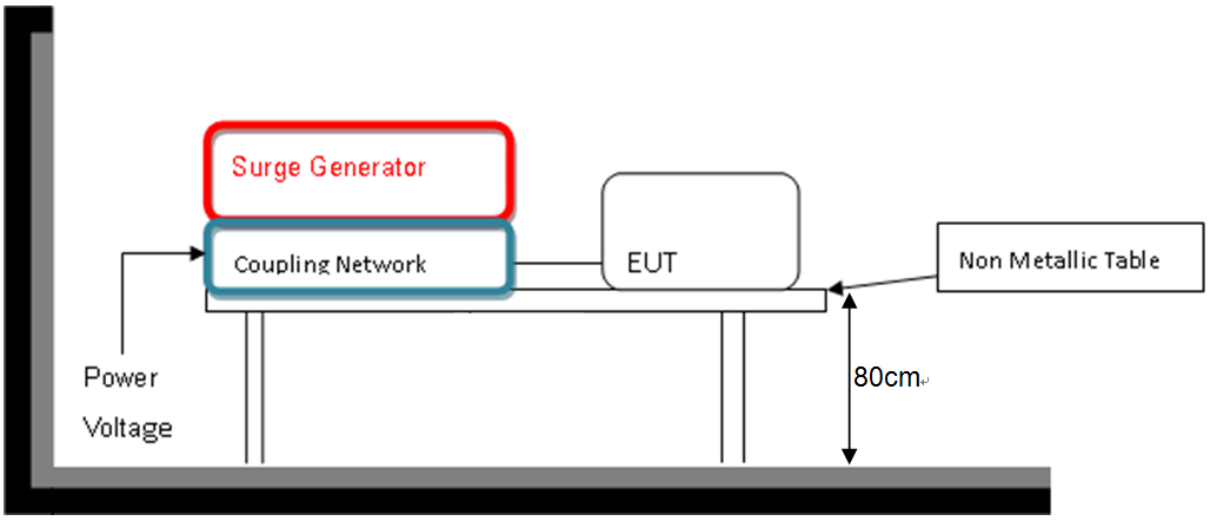
The surge noise shall be applied synchronized to the voltage phase at 0°, 90°, 180°, 270° and the peak value of the AC voltage wave. (Positive and negative)

Each of Line to Earth and Line to Line is impressed with a sequence of five surge voltages with interval of 1 minute.

5.6.4 Deviation from Test Standard

No deviation

5.6.5 Test Setup



5.6.6 Test Result

Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	**Environmental Conditions**	25℃, 49% RH
Tested by	Guanwei Liao	**Test Date**	2015/09/18

AC Power Port						
Test Point	**Phase**	**Polarity (+/-)**	**Test Voltage (kV)**		**Result**	**Test Mode**
			0.5	**1**		
L to N	0°	+/-	A	A	A	1, 3
	90°	+/-	A	**A**		
	180°	+/-	A	**A**		
	270°	+/-	A	**A**		

Signal Ports Telecommunication Ports (10/700 μs Wave)					
Test Point	**Polarity (+/-)**	**Test Level (kV)**		**Result**	**Test Mode**
		0.5	**1**		
RJ45	+/-	B(#1)	B(#1)	B	3, 4

Note:
Criteria A: The EUT function was correct during the test.
Criteria B: (#1) The LAN and video were interrupted during the test, but could self-recover to the initial operation after the test.

5.6.7 Photographs of Test Configuration

Model: FD9171-HT

Power

Model: FD9371-HTV

Power

RJ45

5.7 Continuous Conducted Disturbances (CS)

5.7.1 Test Specification

Standard	IEC/EN 61000-4-6
Frequency Range	0.15 MHz - 80 MHz
Voltage Level	3 V(rms)
Modulation	AM Modulation, 80%, 1 kHz Sine Wave
Frequency Step	1% of fundamental
Dwell Time	3 seconds

5.7.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Coupling clamp according to IEC 6100-4-6	FRANKONIA	EMCL-2	CT-1-049	Mar. 30, 2015
2	CDN for screened cables	FRANKONIA	CDN S1/75Ω	CT-1-050	Mar. 30, 2015
3	CDN for power supply lines	FRANKONIA	CDN M2+M3	CT-1-054	Mar. 30, 2015
4	6 dB Attenuator	BIRD	75-A-FFN-06	CT-1-056	Mar. 31, 2015
5	Compact Immunity Test System acc	FRANKONIA	CIT-10/75	CT-1-057	Mar. 27, 2015
6	Measurement Software	HUBERT	Ver: 1.1.2	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.7.3 Test Procedure

The EUT is placed on 0.1m insulation table between the EUT and ground reference plane.

For input AC power ports:

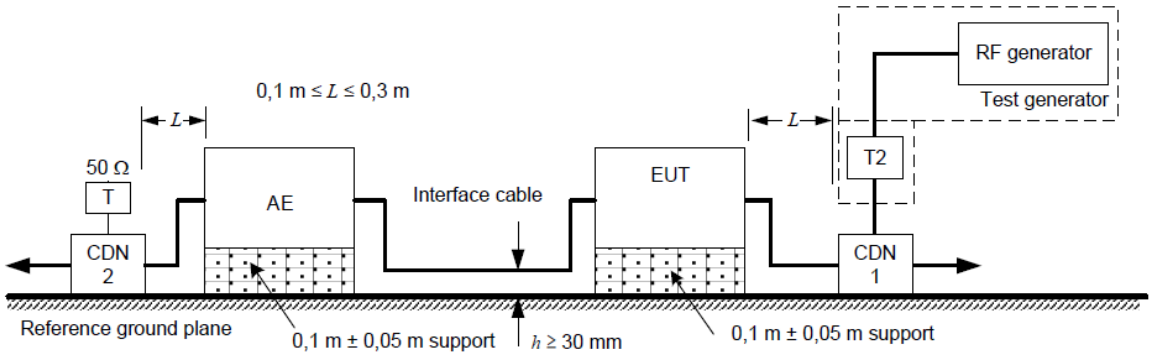
The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. And directly couples the disturbances signal into EUT.

Auxiliary equipment (AE) required for the defined operation of the EUT according to the specifications of the product committee.

5.7.4 Deviation from Test Standard

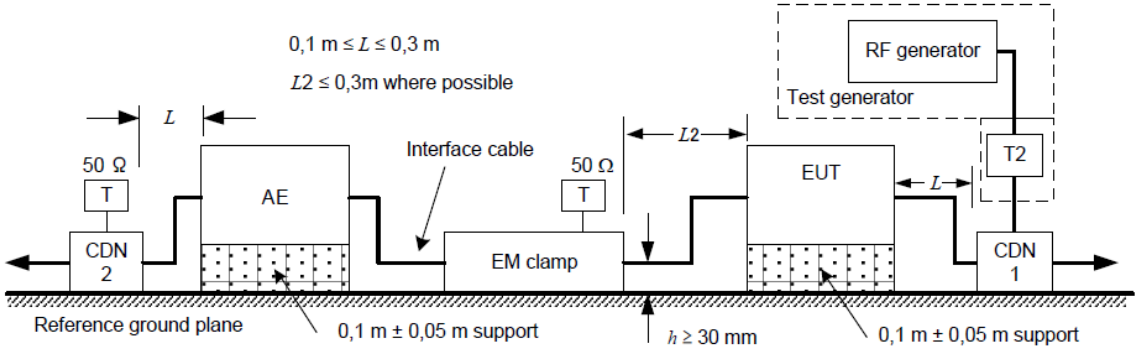
No deviation

5.7.5 Test Setup



The interface cable is set at 1 m if possible.

a) Schematic setup for a 2-port EUT connected to only 1 CDN



Note:

T: Termination 50 Ω

T2: Power attenuator (6 dB)

CDN: Coupling and decoupling network

Injection clamp: current clamp or EM clamp

5.7.6 Test Result

Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	**Environmental Conditions**	25℃, 51% RH
Tested by	Guanwei Liao	**Test Date**	2015/09/14

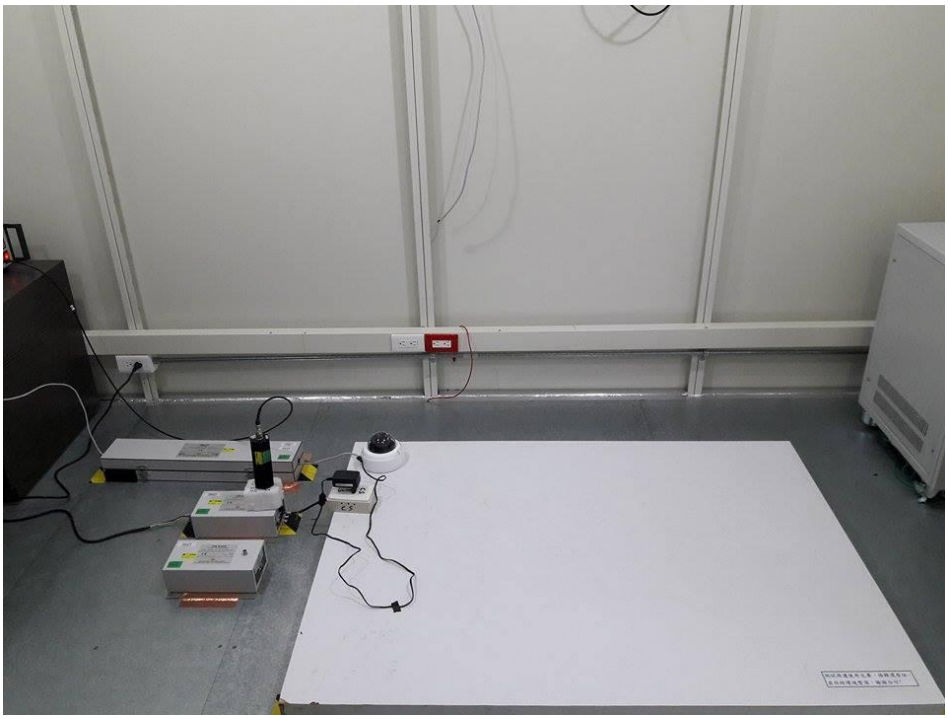
Frequency Range (MHz)	Tested Port	Injection Method	Test Level ($V_{r.m.s.}$)	Modulation	Result	Test Mode
0.15 - 80	AC Power	CDN-M2+ M3	3	80% AM, 1kHz	A	1, 3
0.15 - 80	RJ45	CLAMP	3	80% AM, 1kHz	A	1, 2, 3, 4

Note:
Criteria A: The EUT function was correct during the test.

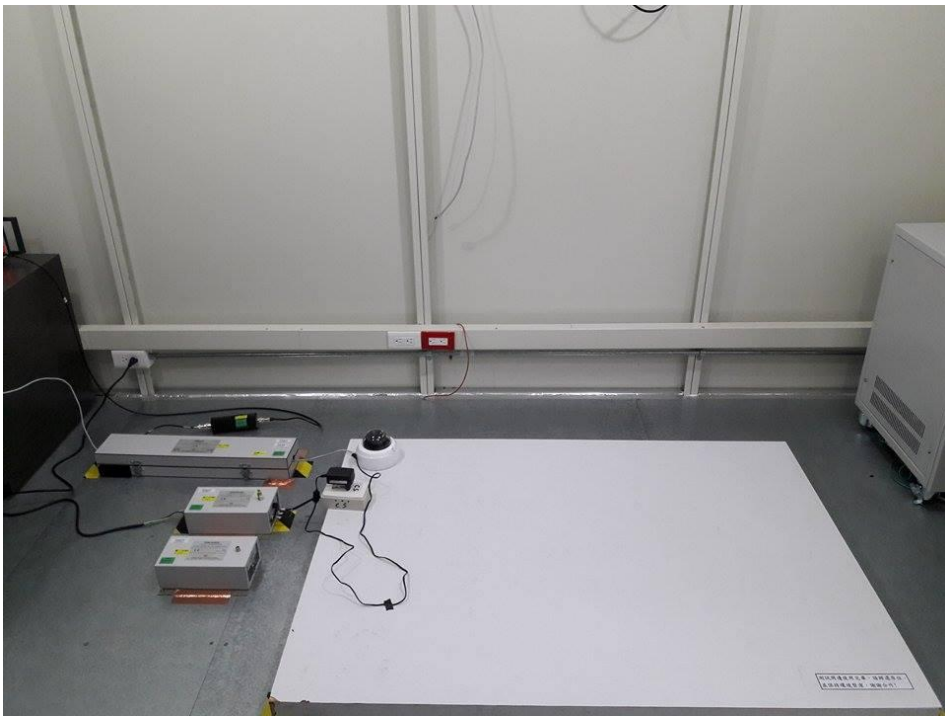
5.7.7 Photographs of Test Configuration

Model: FD9171-HT

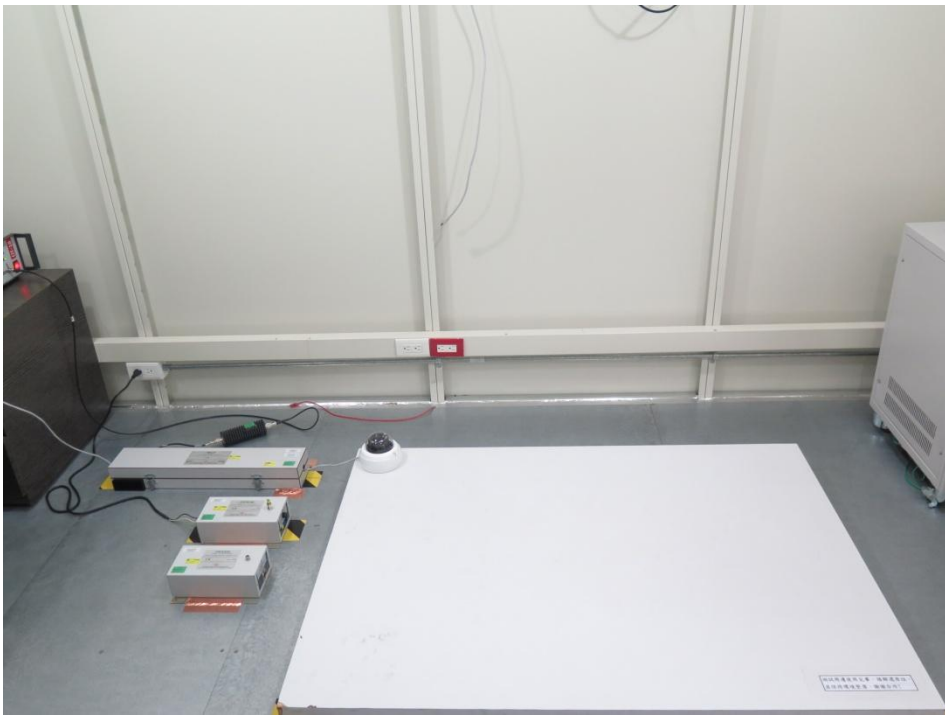
Power



RJ45

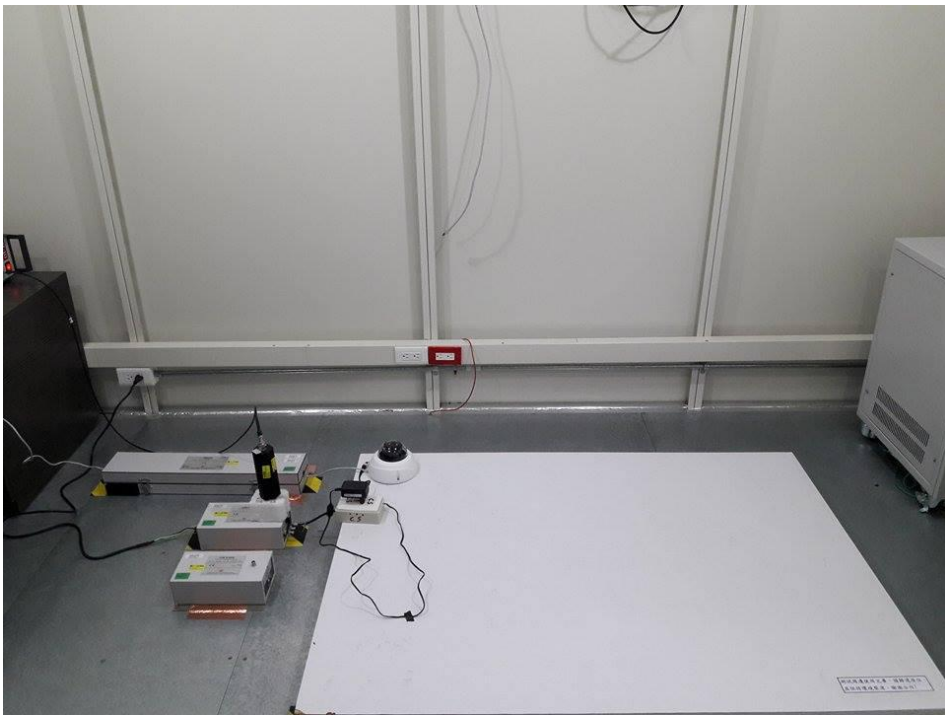


POE

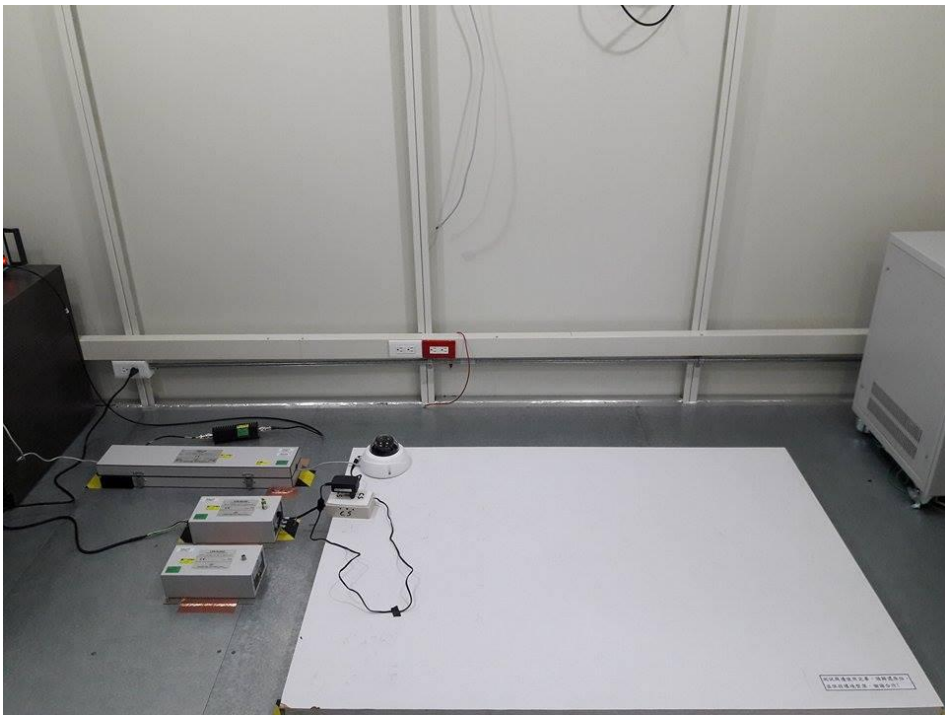


Model: FD9371-HTV

Power



RJ45



POE

5.8 Power Frequency Magnetic Field Immunity Test

5.8.1 Test Specification

Standard	IEC/EN 61000-4-8
Frequency Range	50/60Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

5.8.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	PFMF	HAEFELY	MFS-100	CT-1-066	Aug. 03, 2015

Note: 1. The calibration interval of the above test instruments is 12 months.

5.8.3 Test Procedure

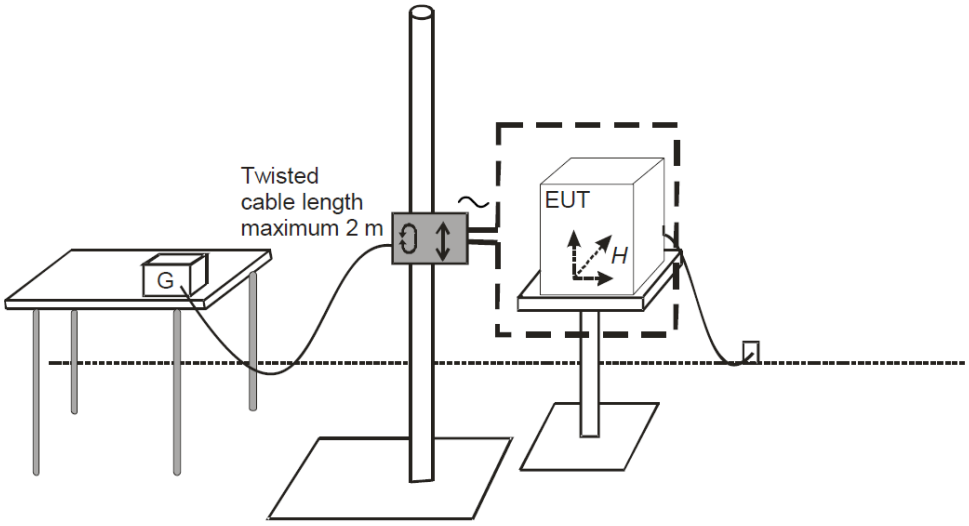
The EUT is placed on a table which is 0.8 meter above a metal ground plane measured at least 1m*1m minimum. The test magnetic field shall be placed at central of the induction coil.

The test magnetic Field shall be applied 10 minutes by the immersion method to the EUT, and the induction coil shall be rotated by 90° in order to expose the EUT to the test field with different orientation (X, Y, Z Orientations).

5.8.4 Deviation from Test Standard

No deviation

5.8.5 Test Setup



For the actual test configuration, please refer to 5.8.7.

NOTE:

TABLETOP EQUIPMENT
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT
The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

5.8.6 Test Result

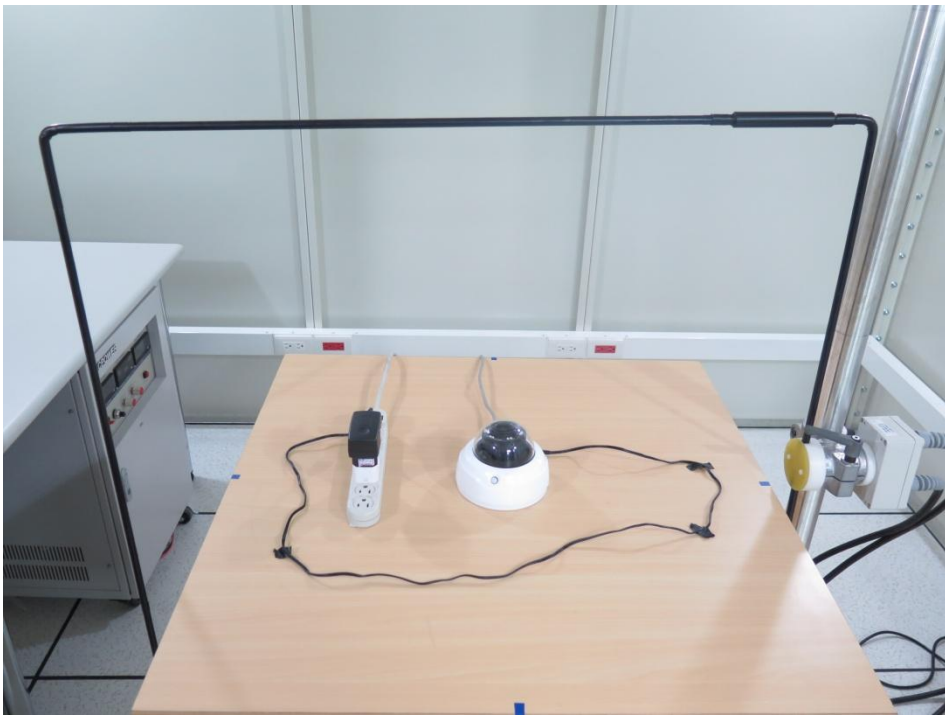
Test Voltage	230Vac, 50Hz or 48Vdc (from POE)	**Environmental Conditions**	25℃, 54% RH
Tested by	Guanwei Liao	**Test Date**	2015/09/09
Test Mode	1, 2, 3, 4		

Test Coil Position	Frequency (Hz)	Magnetic Strength (A/m)	Result
X - Axis	50/60	1	A
Y - Axis	50/60	1	A
Z - Axis	50/60	1	A

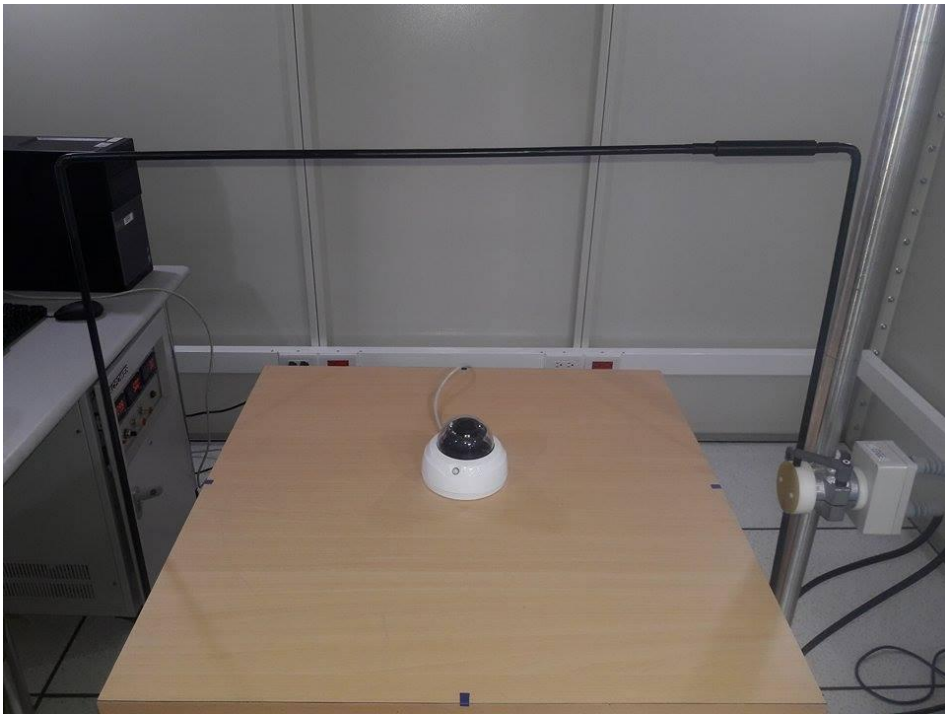
Note:
Criteria A: The EUT function was correct during the test.

5.8.7 Photographs of Test Configuration

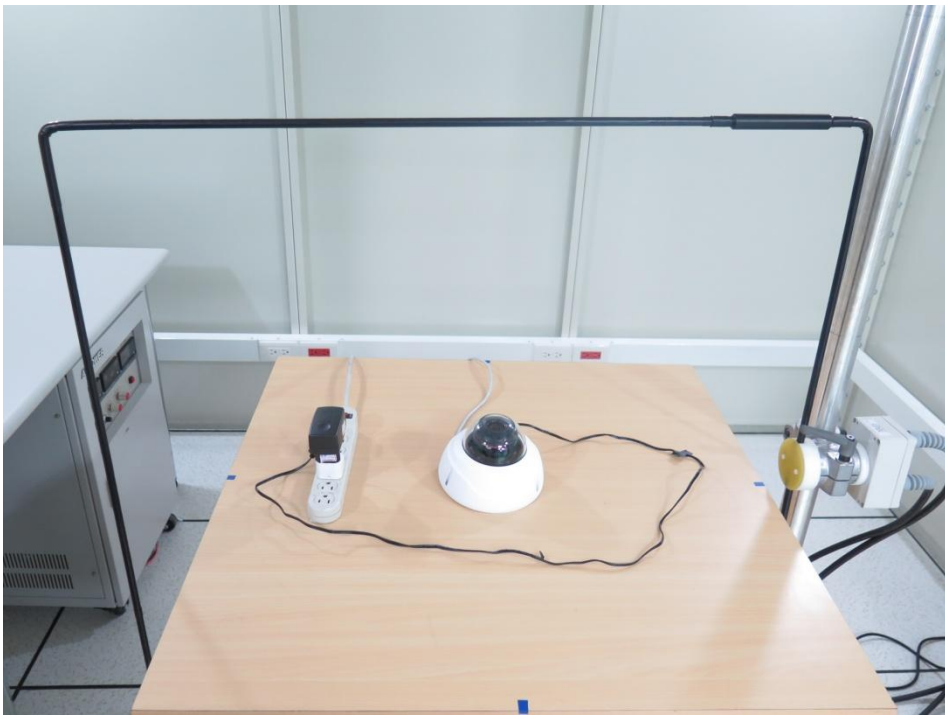
Test mode 1



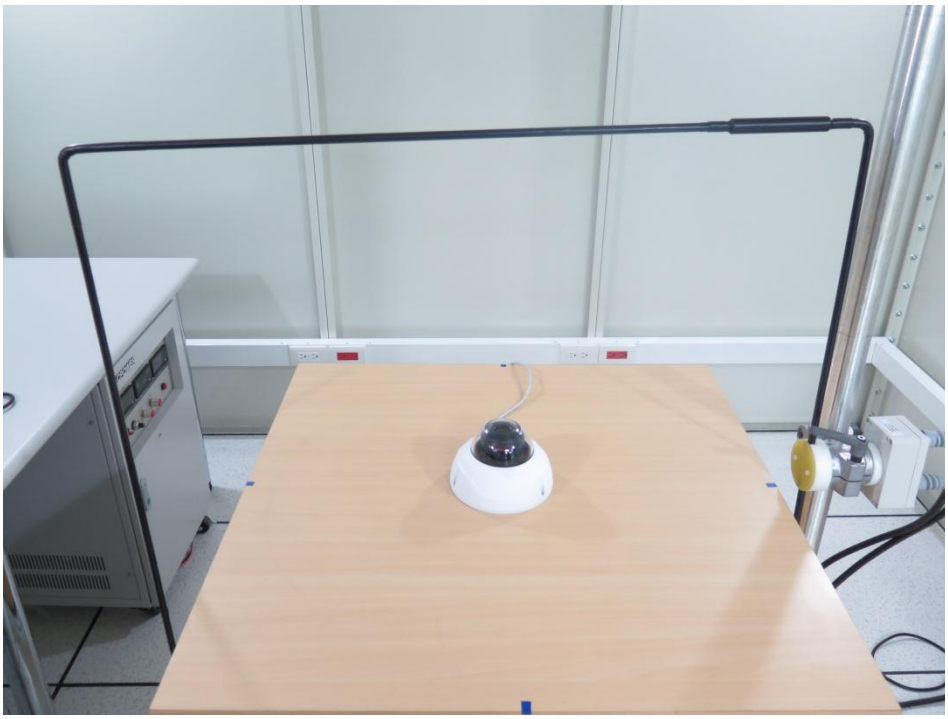
Test mode 2



Test mode 3



Test mode 4



5.9 Voltage Dips & Short Interruptions

5.9.1 Test Specification

Basic Standard	IEC/EN 61000-4-11
Test Level	Voltage Dips: >95% reduction - 0.5 period 30% reduction - 25 period Voltage Interruptions: >95% reduction - 250 period
Test Duration Time	Minimum 3 test events in sequence
Interval between Event	Minimum 10 seconds
Phase Angle	0° / 180°
Test Cycle	3 times

5.9.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	EMS Generator	Thermo	EMC Pro	CT-1-030	Apr. 10, 2015
2	Measurement Software	CEWare32	Ver: 4.1	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.9.3 Test Procedure

Before starting the test of a given EUT, a test plan shall be prepared.

The test plan should be representative of the way the system is actually used.

Systems may require a precise pre-analysis to define which system configurations must be tested to reproduce field situations.

Test cases must be explained and indicated in the Test report.

It is recommended that the test plan include the following items:

- the type designation of the EUT;
- information on possible connections (plugs, terminals, etc.) and corresponding cables, and peripherals;
- input power port of equipment to be tested;
- representative operational modes of the EUT for the test;
- performance criteria used and defined in the technical specifications;
- operational mode(s) of equipment;
- description of the test set-up.

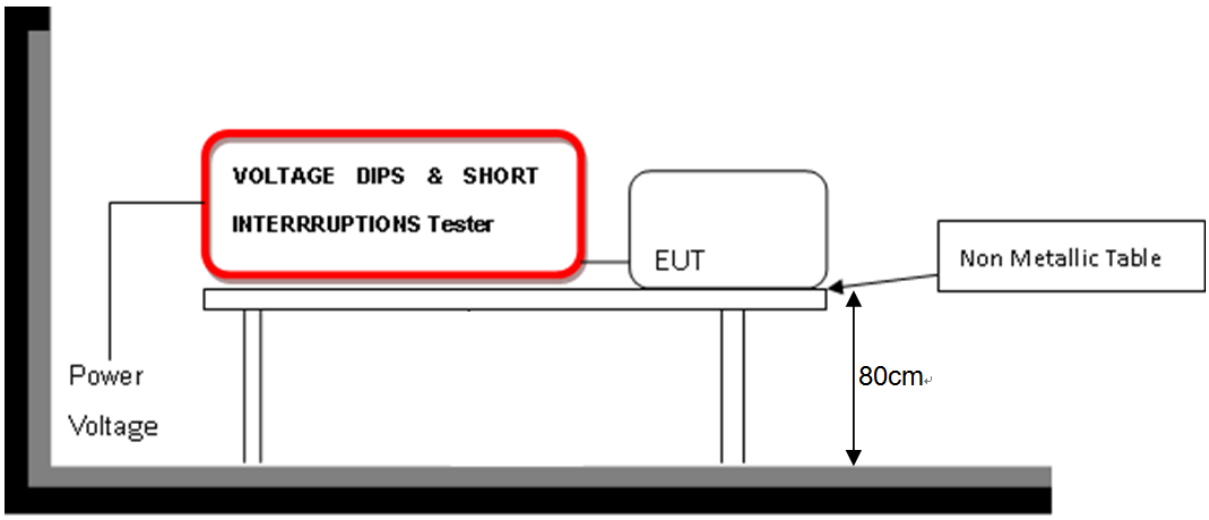
If the actual operating signal sources are not available to the EUT, they may be simulated.

For each test, any degradation of performance shall be recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the EUT during and after the tests. After each group of tests, a full functional check shall be performed.

5.9.4 Deviation from Test Standard

No deviation

5.9.5 Test Setup



5.9.6 Test Result

Test Voltage	100-240Vac, 50Hz	**Environmental Conditions**	25℃, 49% RH
Tested by	Guanwei Liao	**Test Date**	2015/09/18
Test Mode	1, 3		

230Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	B(#1)

240Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	B(#1)

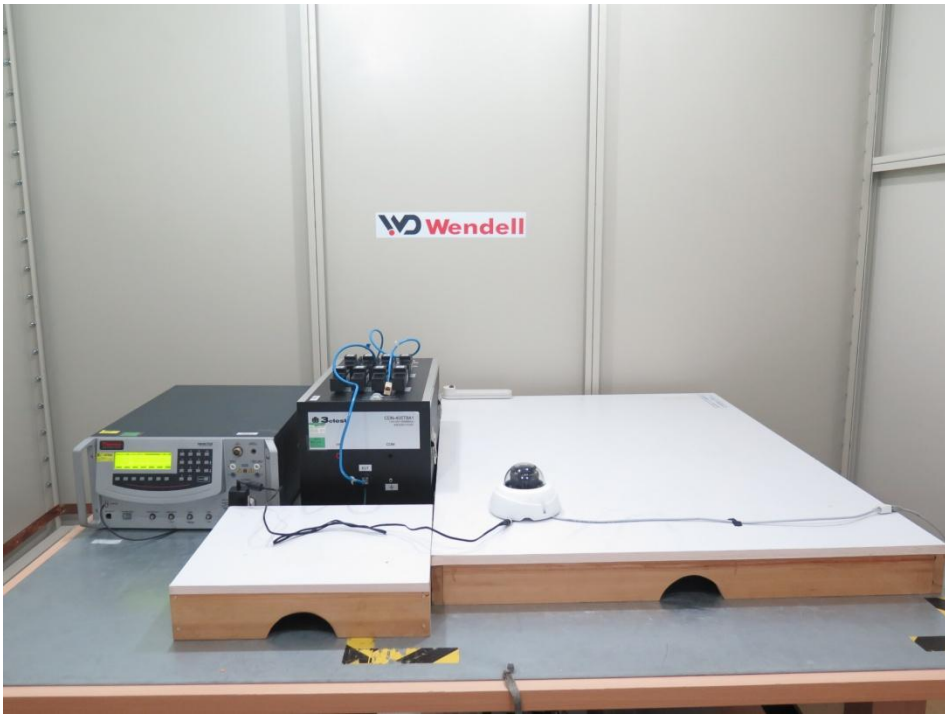
100Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	B(#1)

Note:
Criteria A: The EUT function was correct during the test.
Criteria B: (#1) The LAN and video were interrupted during the test, but could self-recover to the initial operation after the test.

5.9.7 Photographs of Test Configuration

Test mode 1

Test mode 3



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