FCC Verification 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-EF-R-150121-00

According to

47 CFR FCC Part 15, Subpart B, Class B ANSI C63.4:2009

ICES-003:2012 Issue 5, Class B

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.

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History of this test report

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

History of supplementary report

Report No.	Issue date	Description
WD-EF-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. 11, 2015
Standard:	47 CFR FCC Part 15, Subpart B, Class B
	ICES-003:2012 Issue 5, Class B
	ANSI C63.4:2009

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**
47 CFR FCC Part 15, Subpart B	Conducted disturbance at mains terminals	Class B	Pass	Meets the requirements
ICES-003	Radiated disturbance	Class B	Pass	Meets the requirements

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 Test

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 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

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
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

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

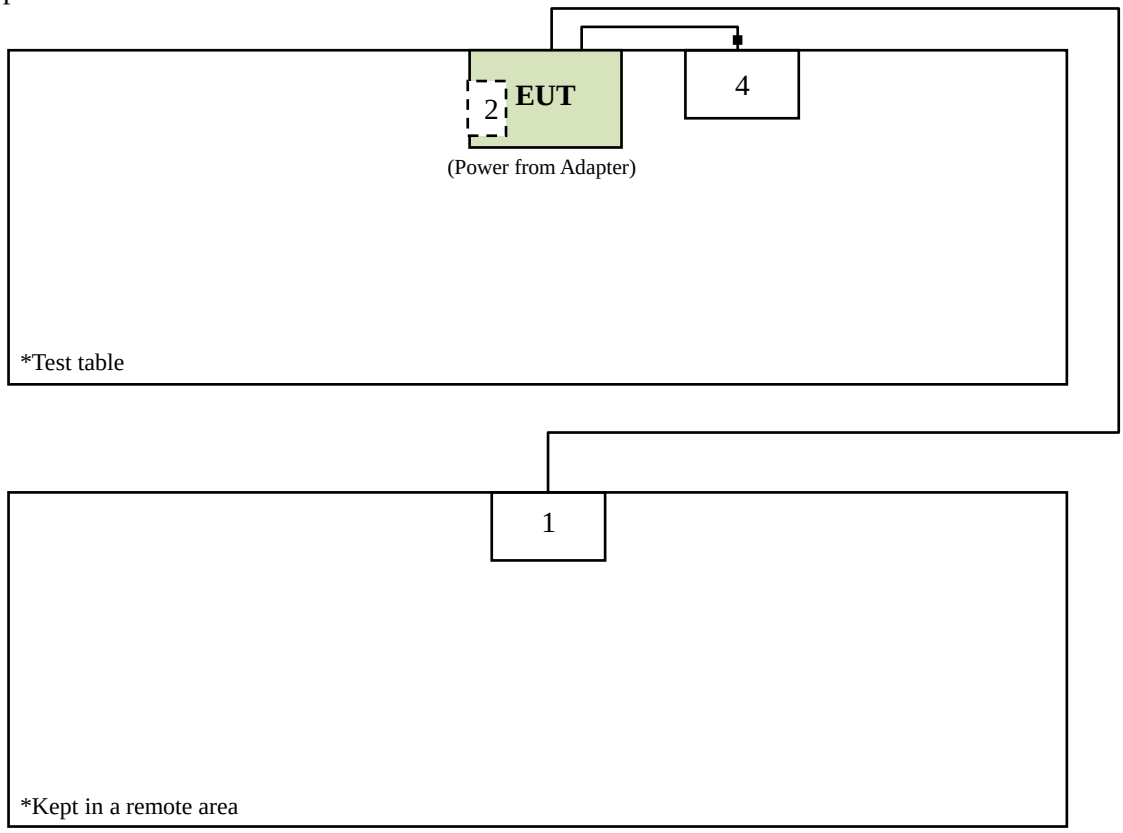
Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 1 acted as communication partners to transfer data.
3. The EUT uses the follow adapter and POE:

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

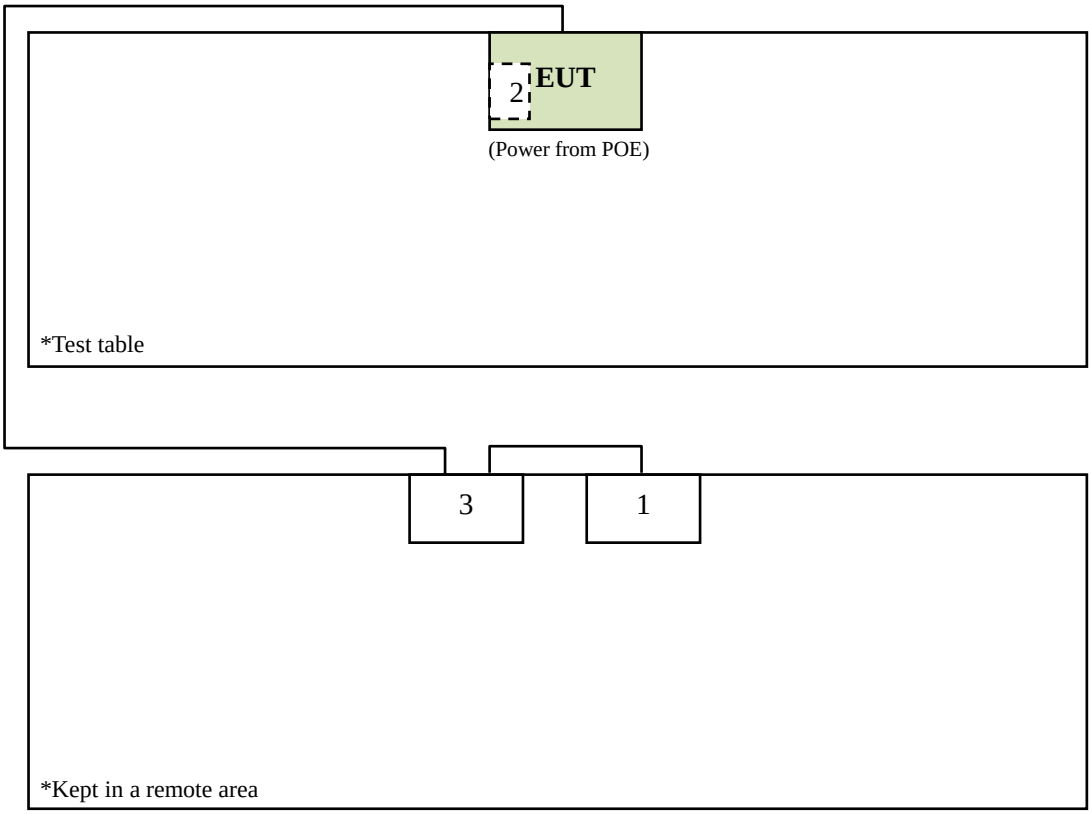
POE Injector (Support unit)	
Brand	GeoVision
Model	GV-481
Input Power	100-240Vac, 2A
Output Power	48Vdc, 1A

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.

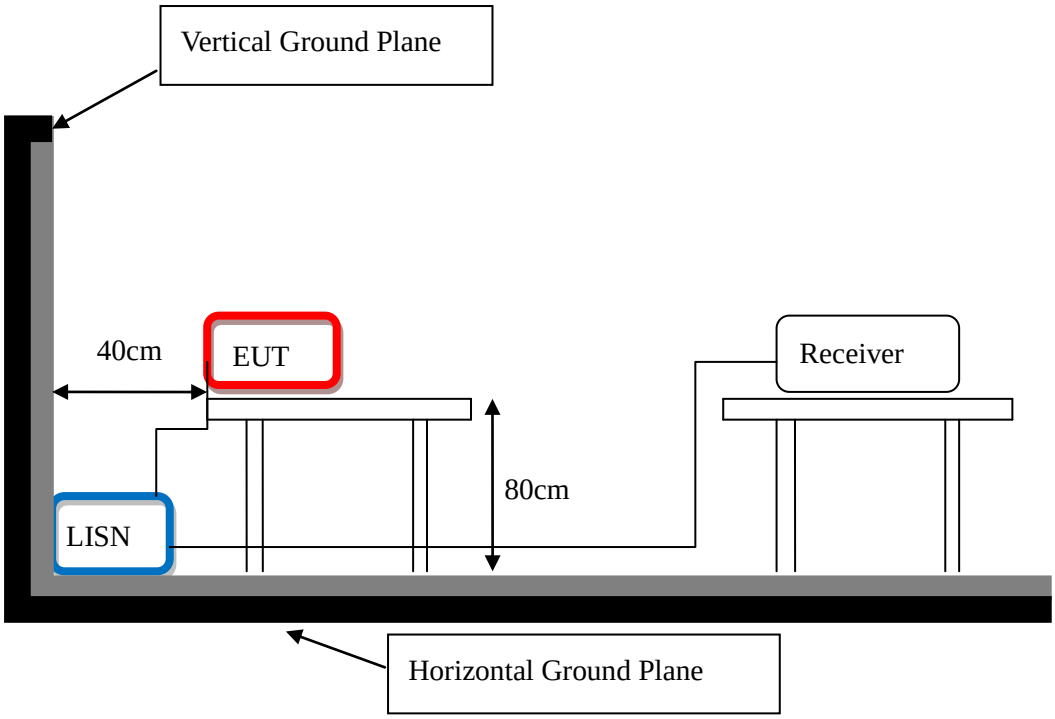
4.1.3 Test Procedure

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

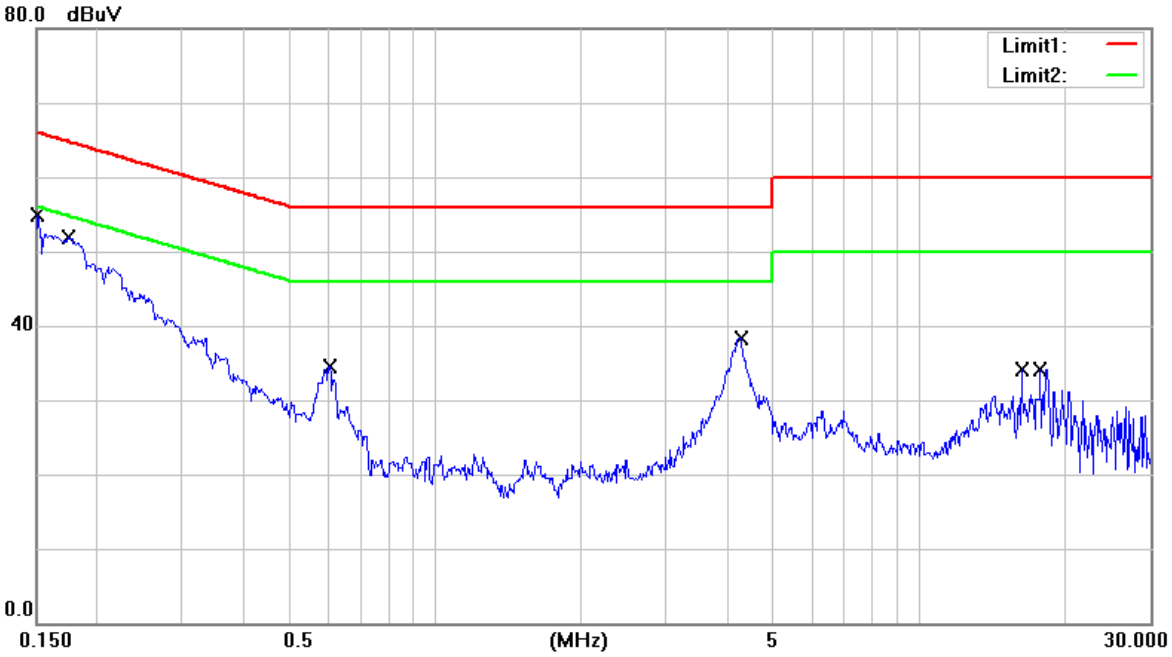
4.1.5 Test Setup



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

4.1.6 Test Result

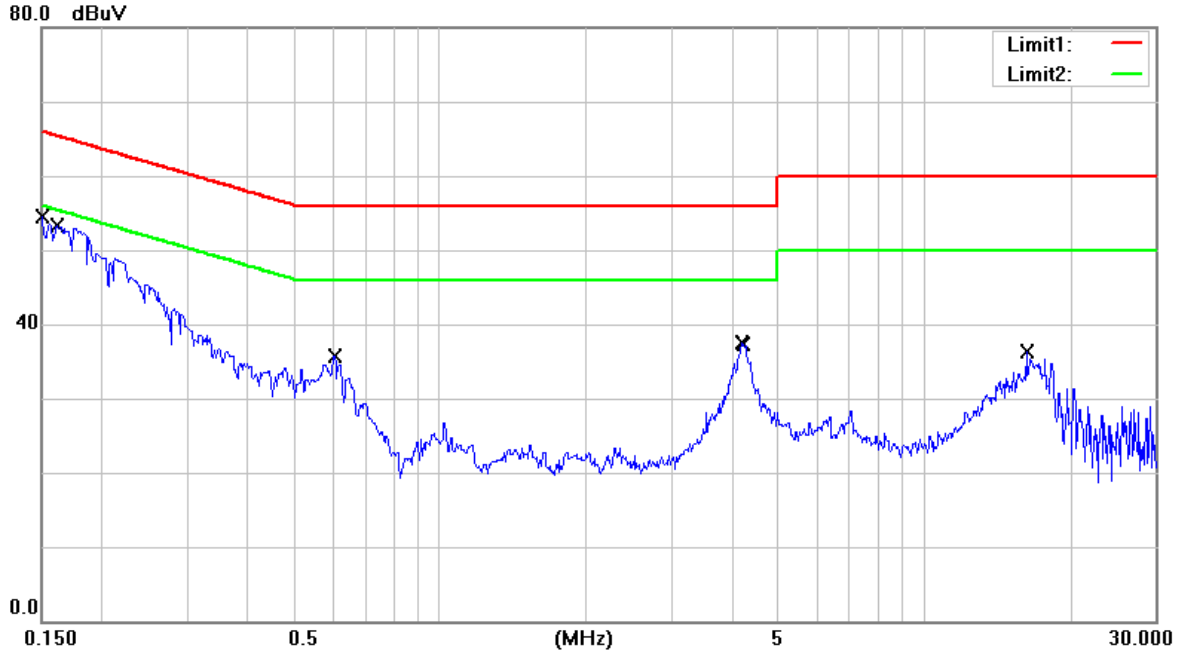
Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Phase	L
Tested by	Toby Chung	Test Mode	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1507	39.45	9.67	49.12	65.96	-16.84	QP
2	0.1507	17.86	9.67	27.53	55.96	-28.43	AVG
3	0.1741	37.44	9.67	47.11	64.76	-17.65	QP
4	0.1741	15.85	9.67	25.52	54.76	-29.24	AVG
5	0.6035	20.60	9.67	30.27	56.00	-25.73	QP
6	0.6035	9.71	9.67	19.38	46.00	-26.62	AVG
7	4.2485	25.74	9.73	35.47	56.00	-20.53	QP
8	4.2485	12.38	9.73	22.11	46.00	-23.89	AVG
9	16.2250	21.11	9.88	30.99	60.00	-29.01	QP
10	16.2250	19.56	9.88	29.44	50.00	-20.56	AVG
11	17.7000	13.23	9.90	23.13	60.00	-36.87	QP
12	17.7000	10.93	9.90	20.83	50.00	-29.17	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

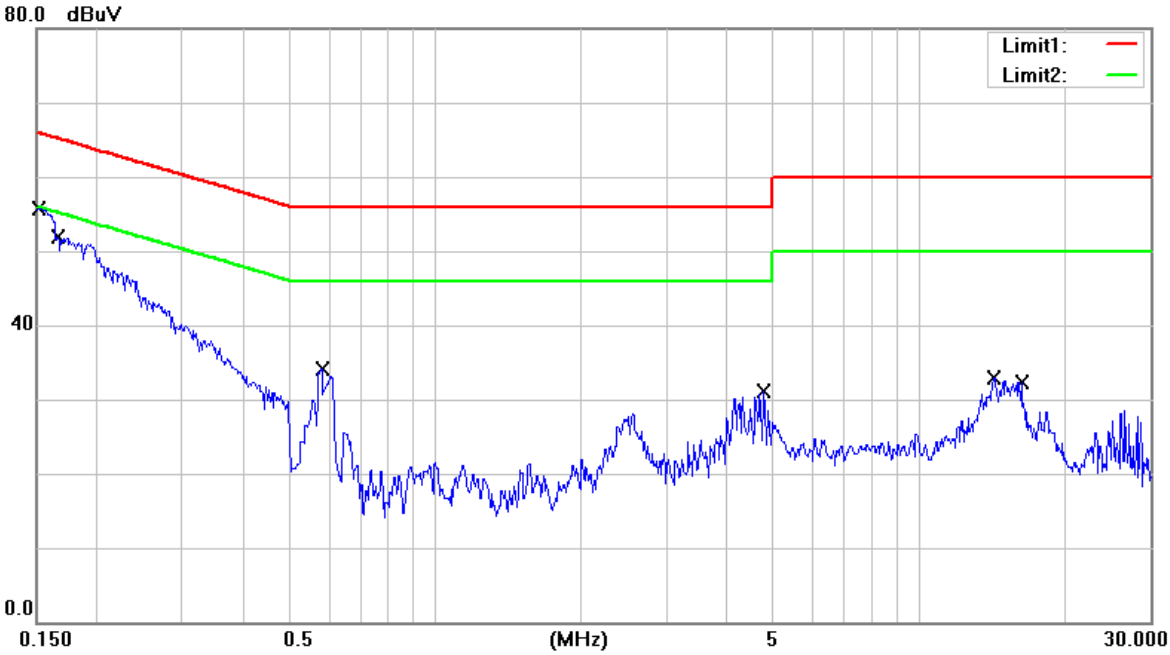
Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Phase	N
Tested by	Toby Chung	Test Mode	1



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	41.72	9.65	51.37	65.99	-14.62	QP
2	0.1500	19.48	9.65	29.13	55.99	-26.86	AVG
3	0.1615	39.95	9.65	49.60	65.38	-15.78	QP
4	0.1615	20.15	9.65	29.80	55.38	-25.58	AVG
5	0.6035	20.87	9.65	30.52	56.00	-25.48	QP
6	0.6035	9.50	9.65	19.15	46.00	-26.85	AVG
7	4.1765	22.32	9.71	32.03	56.00	-23.97	QP
8	4.1765	10.89	9.71	20.60	46.00	-25.40	AVG
9	4.2619	23.27	9.72	32.99	56.00	-23.01	QP
10	4.2619	10.40	9.72	20.12	46.00	-25.88	AVG
11	16.2250	23.60	9.90	33.50	60.00	-26.50	QP
12	16.2250	20.22	9.90	30.12	50.00	-19.88	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

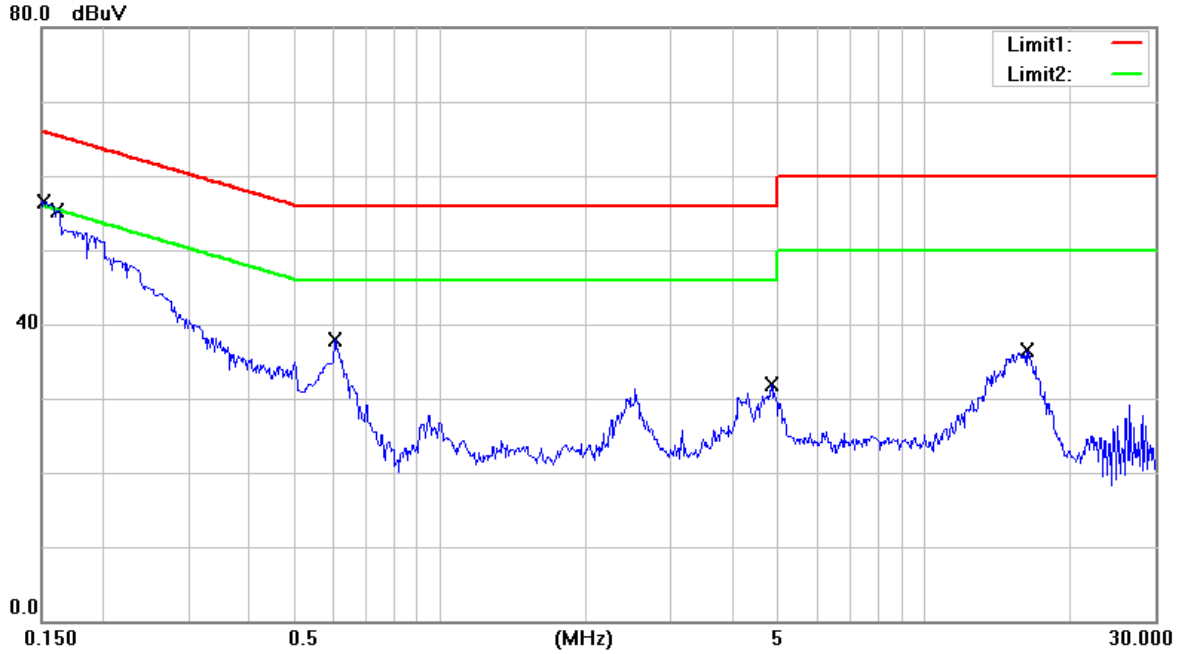
Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	25.3℃, 55% RH	6dB Bandwidth	9 kHz
Test Date	2015/09/07	Phase	L
Tested by	Toby Chung	Test Mode	2



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1517	43.23	9.67	52.90	65.90	-13.00	QP
2	0.1517	23.53	9.67	33.20	55.90	-22.70	AVG
3	0.1654	38.55	9.67	48.22	65.18	-16.96	QP
4	0.1654	18.05	9.67	27.72	55.18	-27.46	AVG
5	0.5810	20.89	9.67	30.56	56.00	-25.44	QP
6	0.5810	11.47	9.67	21.14	46.00	-24.86	AVG
7	4.7660	15.32	9.75	25.07	56.00	-30.93	QP
8	4.7660	7.19	9.75	16.94	46.00	-29.06	AVG
9	14.2250	16.70	9.88	26.58	60.00	-33.42	QP
10	14.2250	11.37	9.88	21.25	50.00	-28.75	AVG
11	16.2250	20.25	9.88	30.13	60.00	-29.87	QP
12	16.2250	17.88	9.88	27.76	50.00	-22.24	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	120Vac, 60Hz	**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

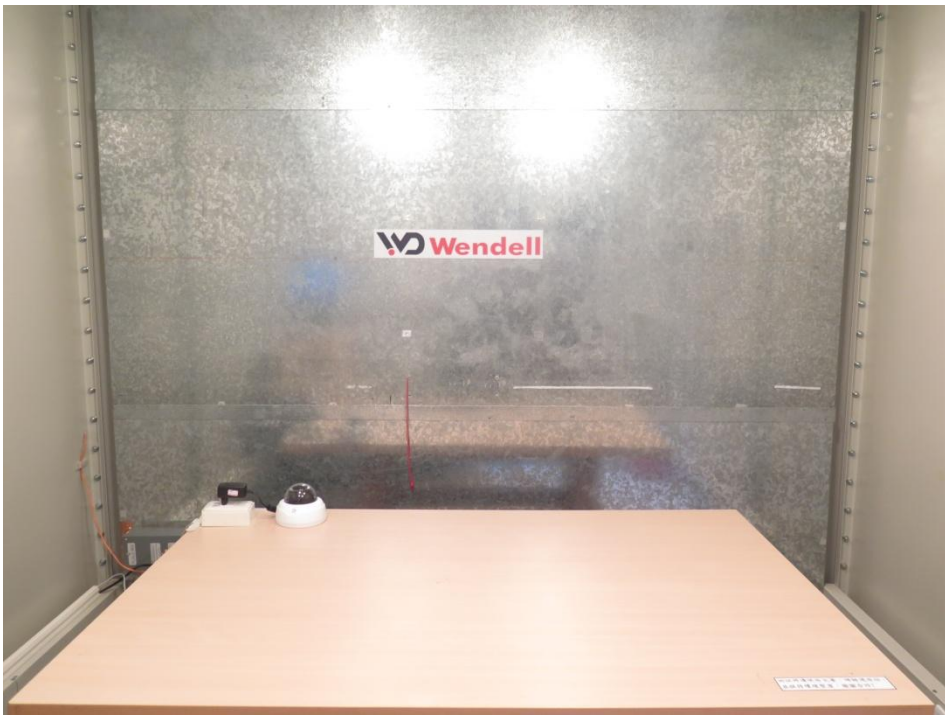


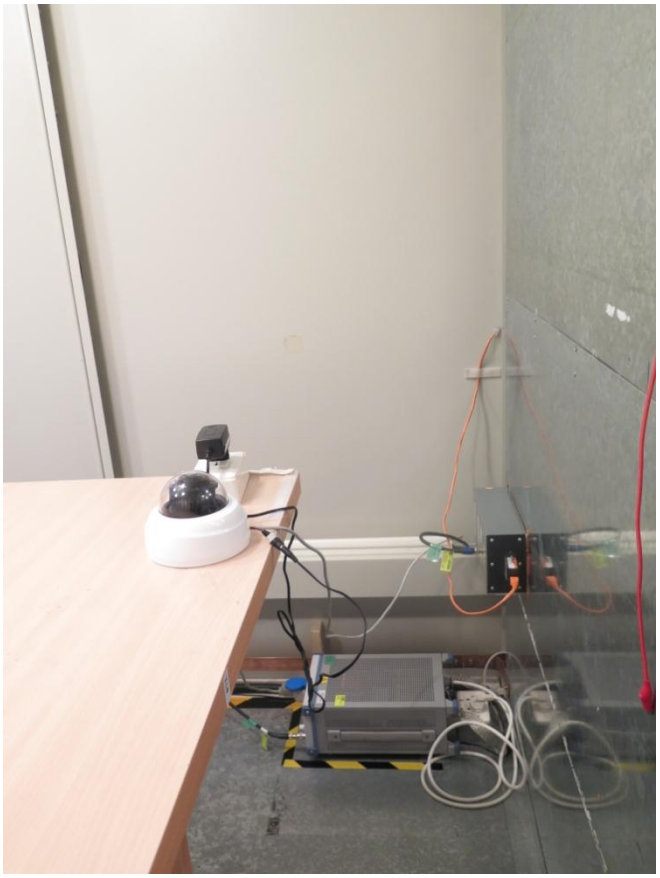
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1510	43.43	9.65	53.08	65.94	-12.86	QP
2	0.1510	23.18	9.65	32.83	55.94	-23.11	AVG
3	0.1621	40.27	9.65	49.92	65.35	-15.43	QP
4	0.1621	39.04	9.65	48.69	65.35	-16.66	QP
5	0.1621	20.23	9.65	29.88	55.35	-25.47	AVG
6	0.1621	18.84	9.65	28.49	55.35	-26.86	AVG
7	0.6080	23.02	9.65	32.67	56.00	-23.33	QP
8	0.6080	11.40	9.65	21.05	46.00	-24.95	AVG
9	4.8200	14.46	9.73	24.19	56.00	-31.81	QP
10	4.8200	7.63	9.73	17.36	46.00	-28.64	AVG
11	16.1750	20.76	9.90	30.66	60.00	-29.34	QP
12	16.1750	15.37	9.90	25.27	50.00	-24.73	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 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

Radiated Frequency range 30 MHz to 1000 MHz

Radiated Emissions Limits at 10 meters				
Frequencies (MHz)	**FCC 15B/ ICES-003**		**CISPR 22**	
	Class A (dBµV/m)	**Class B (dBµV/m)**	**Class A (dBµV/m)**	**Class B (dBµV/m)**
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters				
Frequencies (MHz)	**FCC 15B/ ICES-003**		**CISPR 22**	
	Class A (dBµV/m)	**Class B (dBµV/m)**	**Class A (dBµV/m)**	**Class B (dBµV/m)**
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960			57.5	47.5
960-1000	60	54		

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

Radiated Frequency range above 1 GHz

Radiated Emissions Limits at 10 meters						
Frequencies (MHz)	FCC 15B/ ICES-003				CISPR 22	
	Class A (dBµV/m)		Class B (dBµV/m)		Class A (dBµV/m)	Class B (dBµV/m)
	Peak	Average	Peak	Average		
1000-3000	69.5	49.5	63.5	43.5	Not defined	Not defined
Above 3000						

Radiated Emissions Limits at 3meters								
Frequencies (MHz)	FCC 15B/ ICES-003				CISPR 22			
	Class A (dBµV/m)		Class B (dBµV/m)		Class A (dBµV/m)		Class B (dBµV/m)	
	Peak	Average	Peak	Average	Peak	Average	Peak	Average
1000-3000	80	60	74	54	76	56	70	50
Above 3000					80	60	74	54

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

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

4.2.2 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.

4.2.3 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.

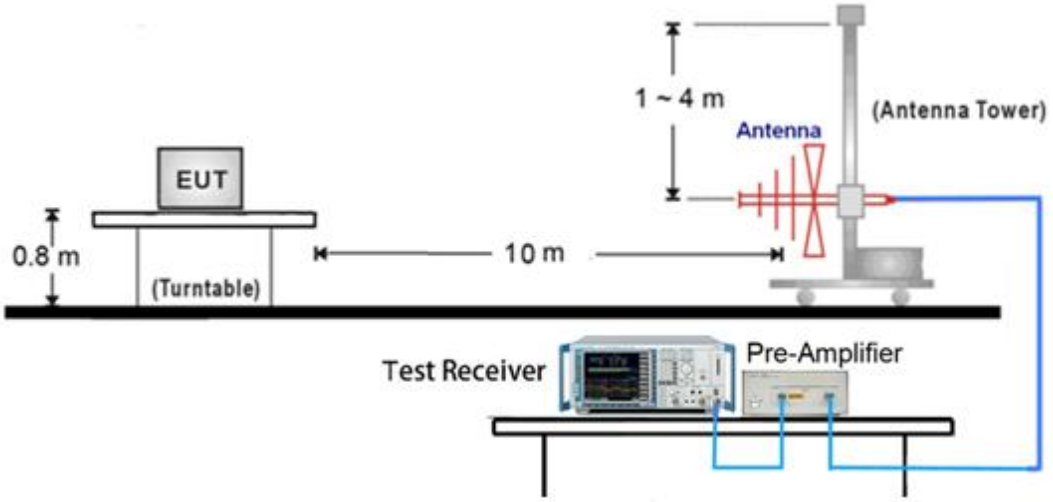
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.2.4 Deviation from Test Standard

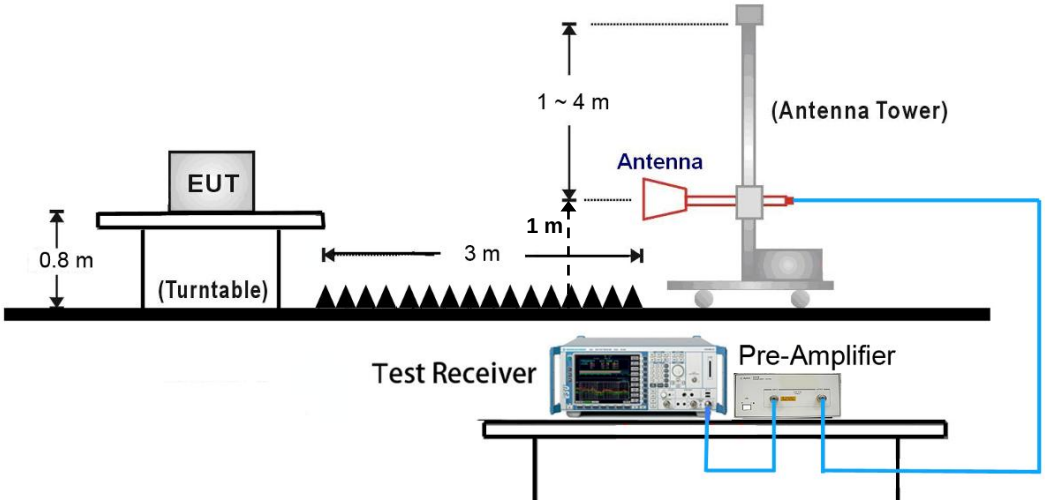
No deviation

4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

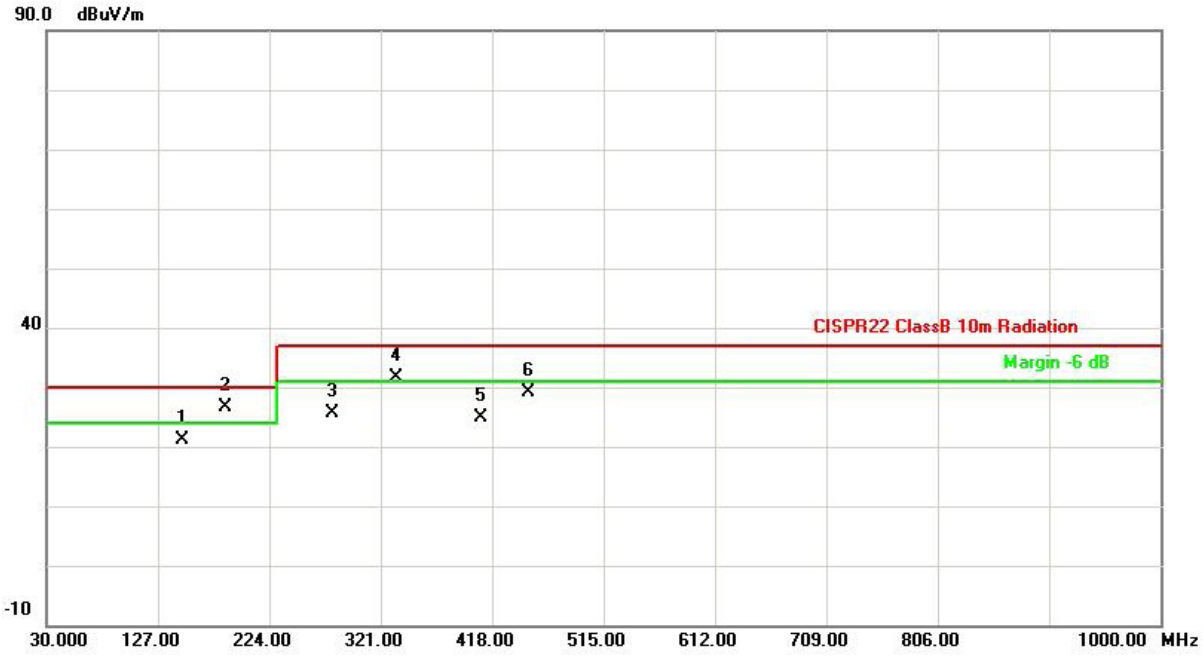


Note:

(1) Please refer to the 4.2.7 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

4.2.6 Test Result

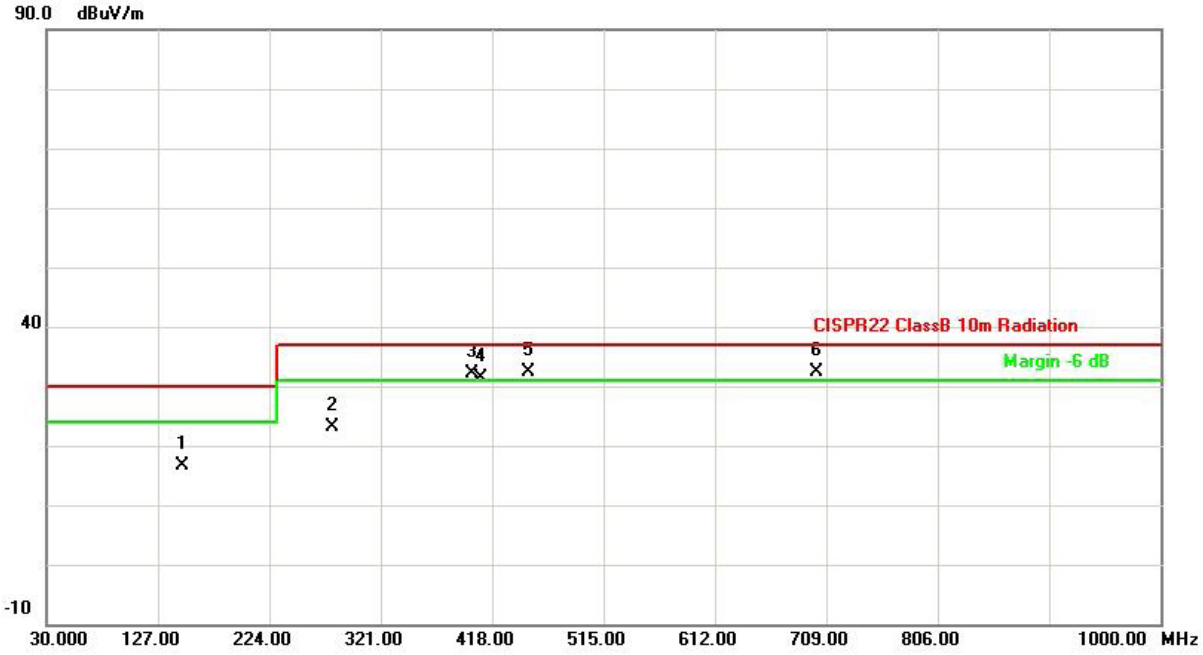
Test Voltage	120Vac, 60Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/10	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	1		



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	47.65	-26.43	21.22	30.00	-8.78	QP	100	114
2	185.6200	56.12	-29.38	26.74	30.00	-3.26	QP	100	214
3	278.4500	53.12	-27.46	25.66	37.00	-11.34	QP	100	238
4	334.1300	57.76	-26.07	31.69	37.00	-5.31	QP	100	72
5	408.3800	48.85	-23.90	24.95	37.00	-12.05	QP	100	264
6	450.0000	51.72	-22.53	29.19	37.00	-7.81	QP	100	138

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

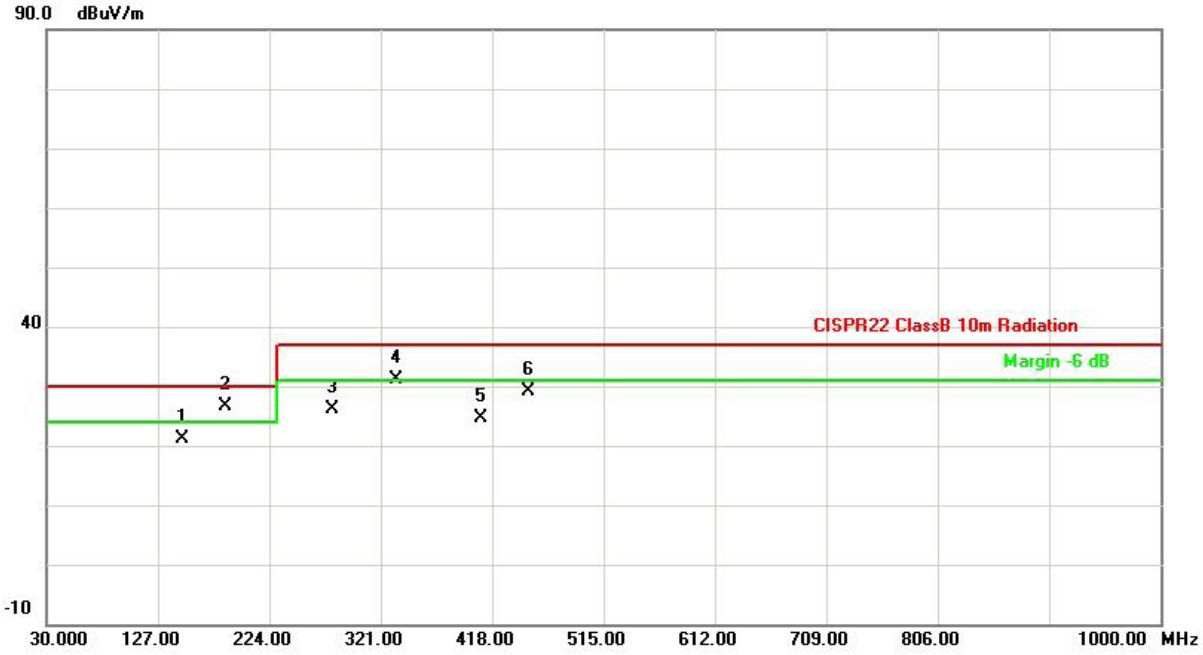
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/10	Test Distance	10m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	1		



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	43.15	-26.43	16.72	30.00	-13.28	QP	201	51
2	278.4200	50.57	-27.46	23.11	37.00	-13.89	QP	211	295
3	400.0000	56.37	-24.18	32.19	37.00	-4.81	QP	201	79
4	408.3800	55.27	-23.90	31.37	37.00	-5.63	QP	195	276
5	450.0000	54.88	-22.53	32.35	37.00	-4.65	QP	213	257
6	700.0000	50.28	-17.87	32.41	37.00	-4.59	QP	223	69

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

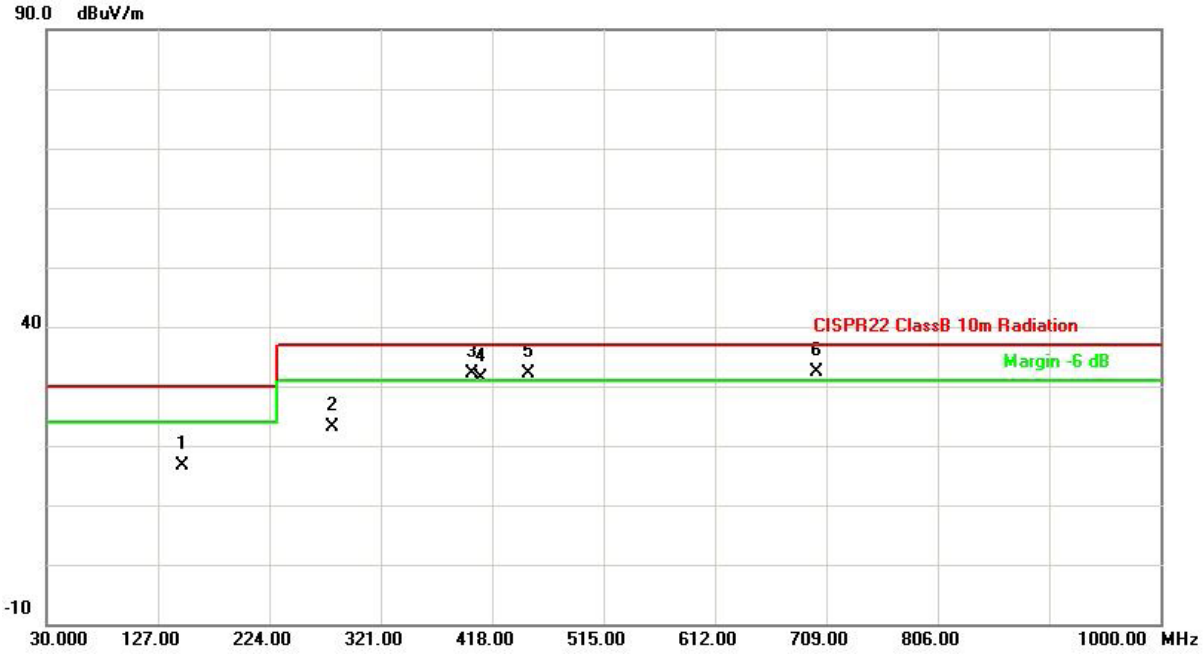
Test Voltage	48Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/11	Test Distance	10m
Tested by	Toby Chung	Polarization	Vertical
Test Mode	2		



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

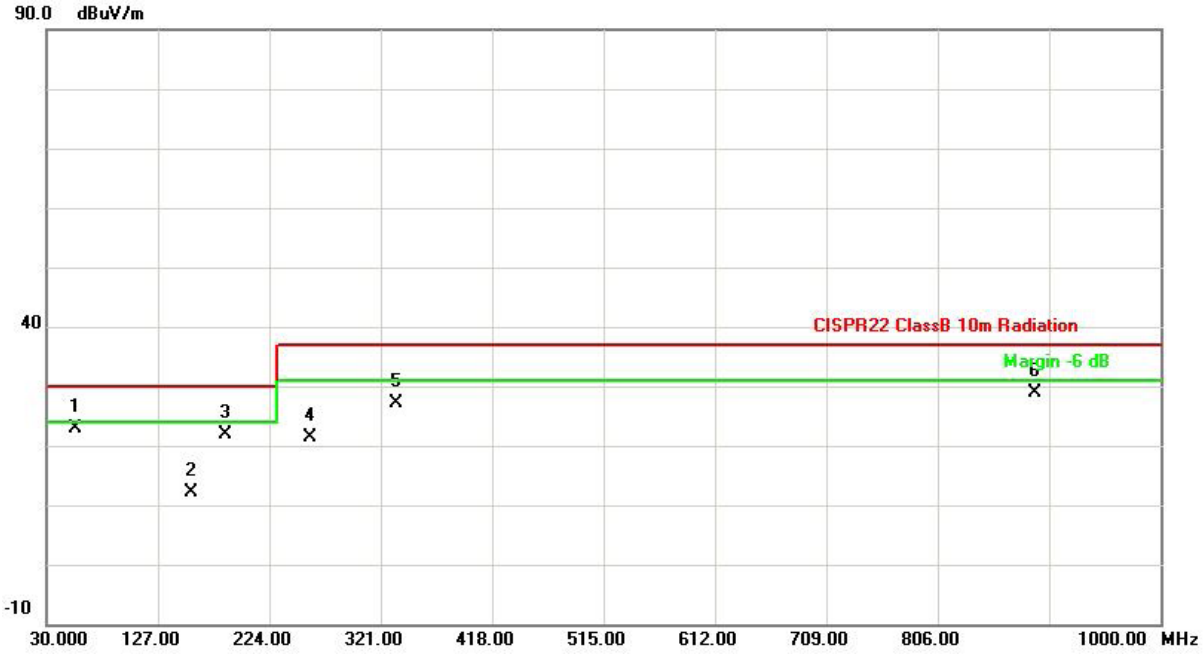
Test Voltage	48Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/10	Test Distance	10m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	2		



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

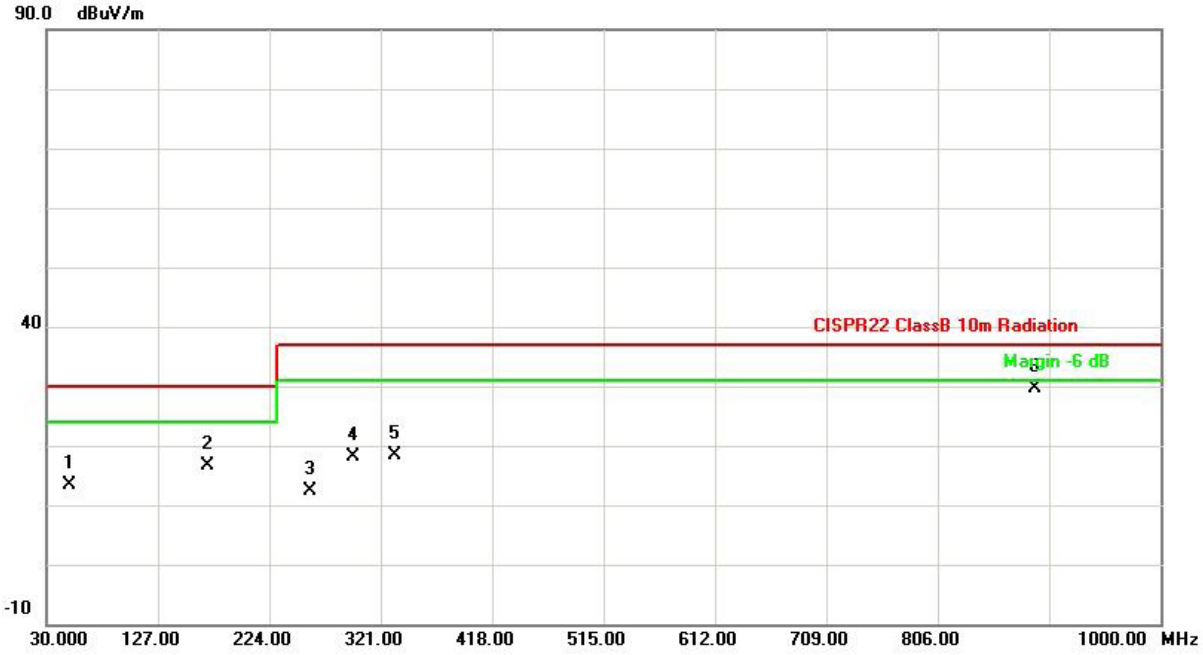
Test Voltage	120Vac, 60Hz	**Frequency Range**	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	**6dB Bandwidth**	120 kHz
Test Date	2015/09/01	**Test Distance**	10m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	3		



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	48.02	-25.21	22.81	30.00	-7.19	QP	100	310
2	155.6000	39.21	-27.11	12.10	30.00	-17.90	QP	100	350
3	185.6000	51.96	-30.03	21.93	30.00	-8.07	QP	100	150
4	260.0000	50.52	-29.09	21.43	37.00	-15.57	QP	100	10
5	334.0000	53.91	-26.68	27.23	37.00	-9.77	QP	100	220
6	891.0000	44.51	-15.66	28.85	37.00	-8.15	QP	100	207

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

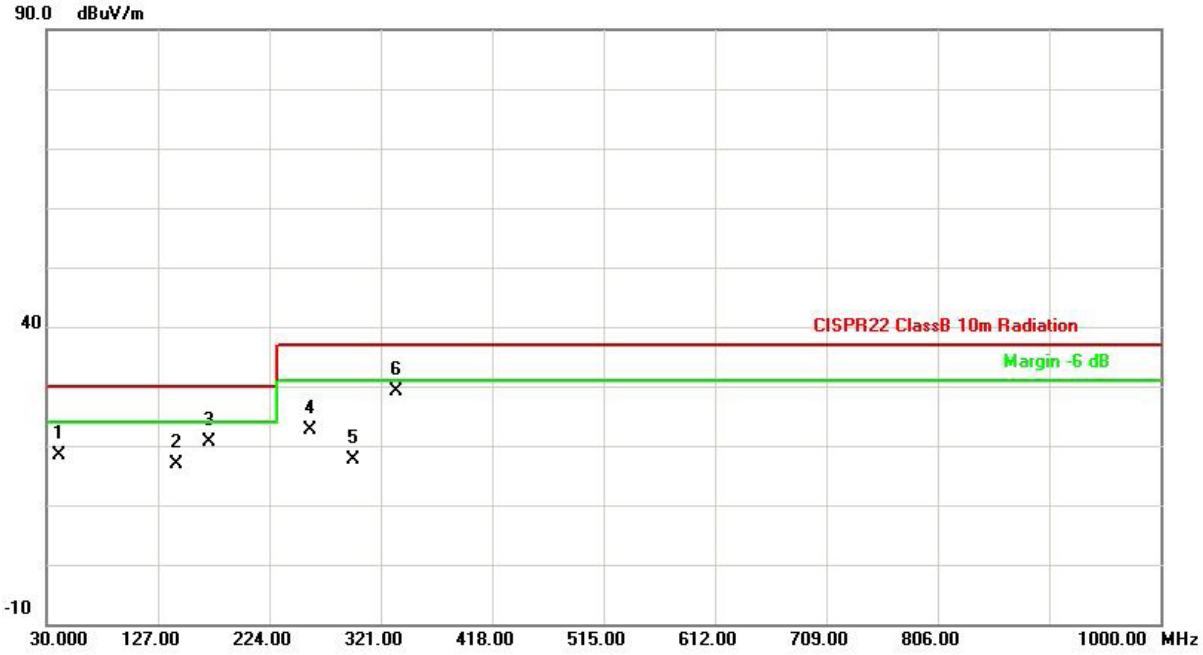
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/01	Test Distance	10m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	3		



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	38.21	-24.80	13.41	30.00	-16.59	QP	150	30
2	170.0000	44.56	-27.91	16.65	30.00	-13.35	QP	400	350
3	260.0000	41.46	-29.09	12.37	37.00	-24.63	QP	200	200
4	297.5000	45.63	-27.54	18.09	37.00	-18.91	QP	200	100
5	332.9000	45.21	-26.71	18.50	37.00	-18.50	QP	200	356
6	891.0000	45.26	-15.66	29.60	37.00	-7.40	QP	135	220

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

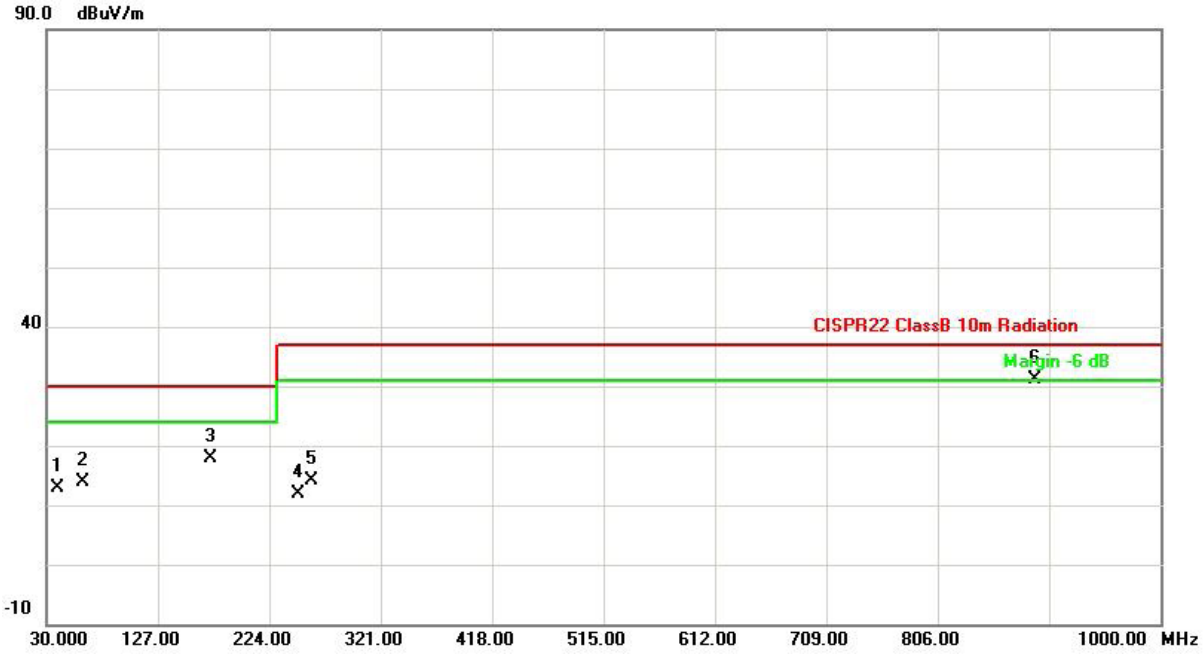
Test Voltage	48Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/01	Test Distance	10m
Tested by	Toby Chung	Polarization	Vertical
Test Mode	4		



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

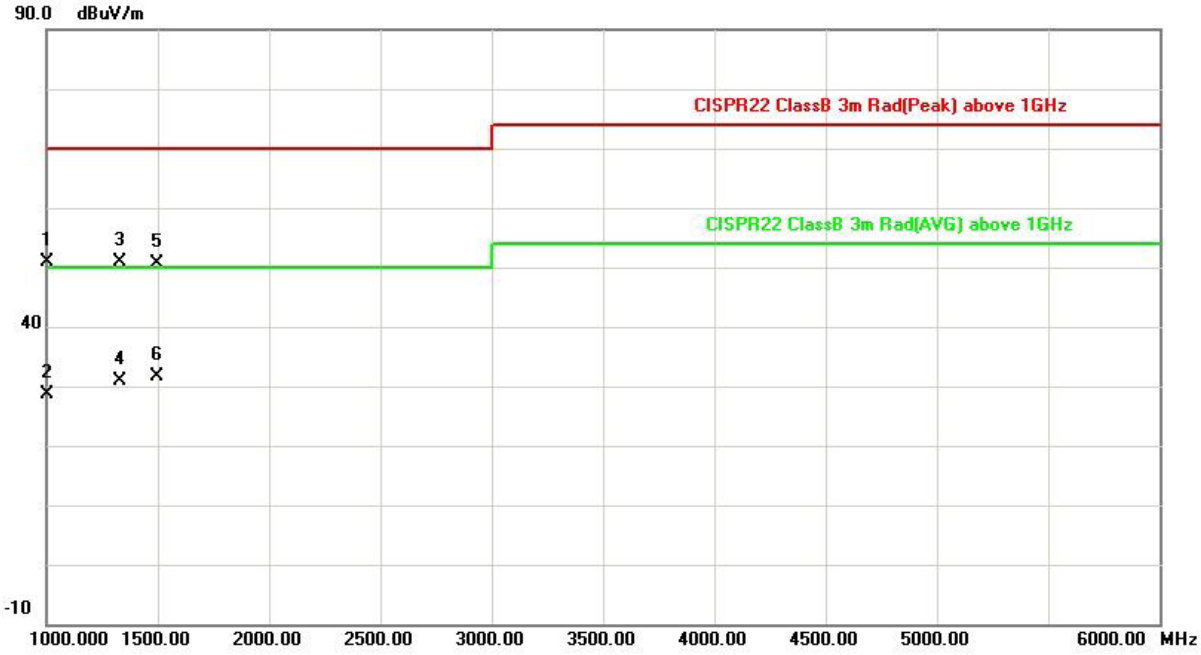
Test Voltage	48Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	29℃, 51% RH	6dB Bandwidth	120 kHz
Test Date	2015/09/01	Test Distance	10m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	4		



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

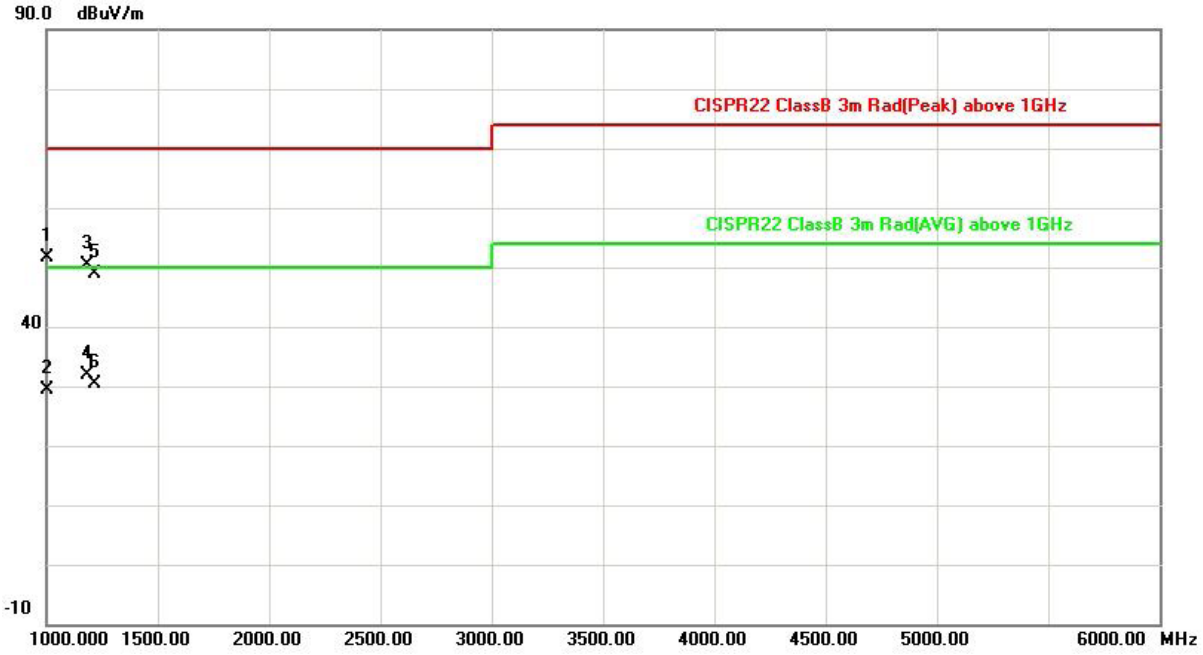
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Vertical
Test Mode	1		



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	65.37	-14.51	50.86	70.00	-19.14	peak	100	114
2	1000.0000	43.24	-14.51	28.73	50.00	-21.27	AVG	100	114
3	1330.000	63.07	-12.11	50.96	70.00	-19.04	peak	100	221
4	1330.000	43.09	-12.11	30.98	50.00	-19.02	AVG	100	221
5	1499.900	61.45	-10.87	50.58	70.00	-19.42	peak	100	199
6	1499.900	42.57	-10.87	31.70	50.00	-18.30	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

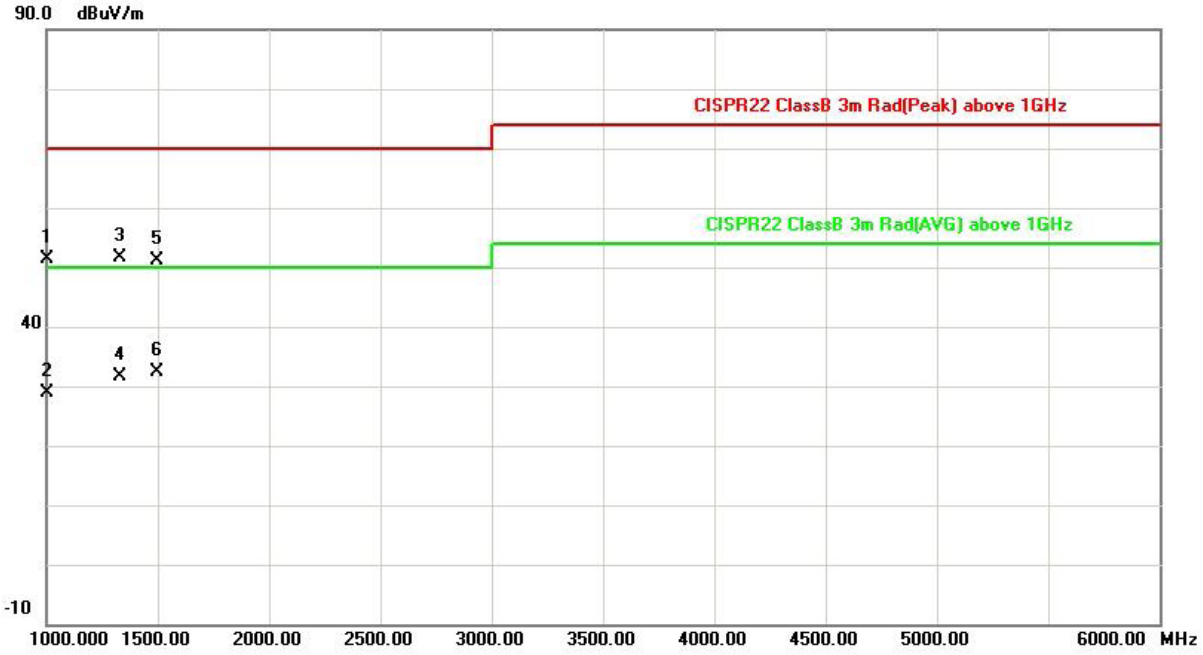
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	1		



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	66.21	-14.51	51.70	70.00	-18.30	peak	100	66
2	1000.0000	43.79	-14.51	29.28	50.00	-20.72	AVG	100	66
3	1185.000	63.49	-13.16	50.33	70.00	-19.67	peak	100	179
4	1185.000	44.99	-13.16	31.83	50.00	-18.17	AVG	100	179
5	1215.000	61.74	-12.94	48.80	70.00	-21.20	peak	100	211
6	1215.000	43.44	-12.94	30.50	50.00	-19.50	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

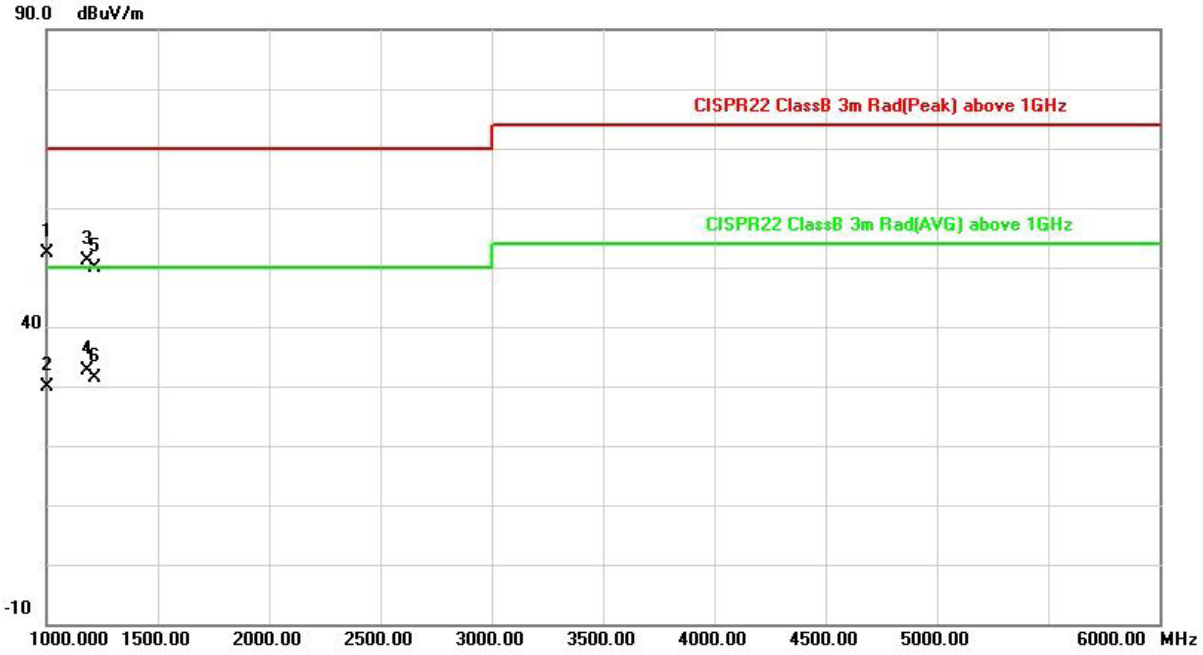
Test Voltage	48Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Vertical
Test Mode	2		



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

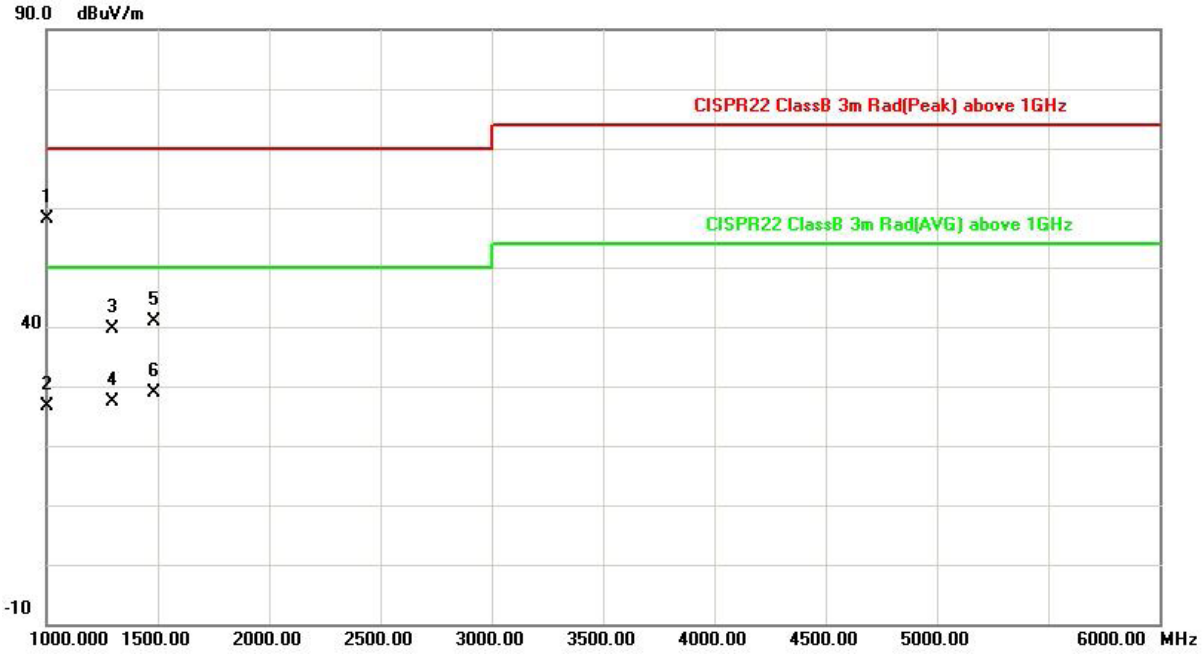
Test Voltage	48Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	2		



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

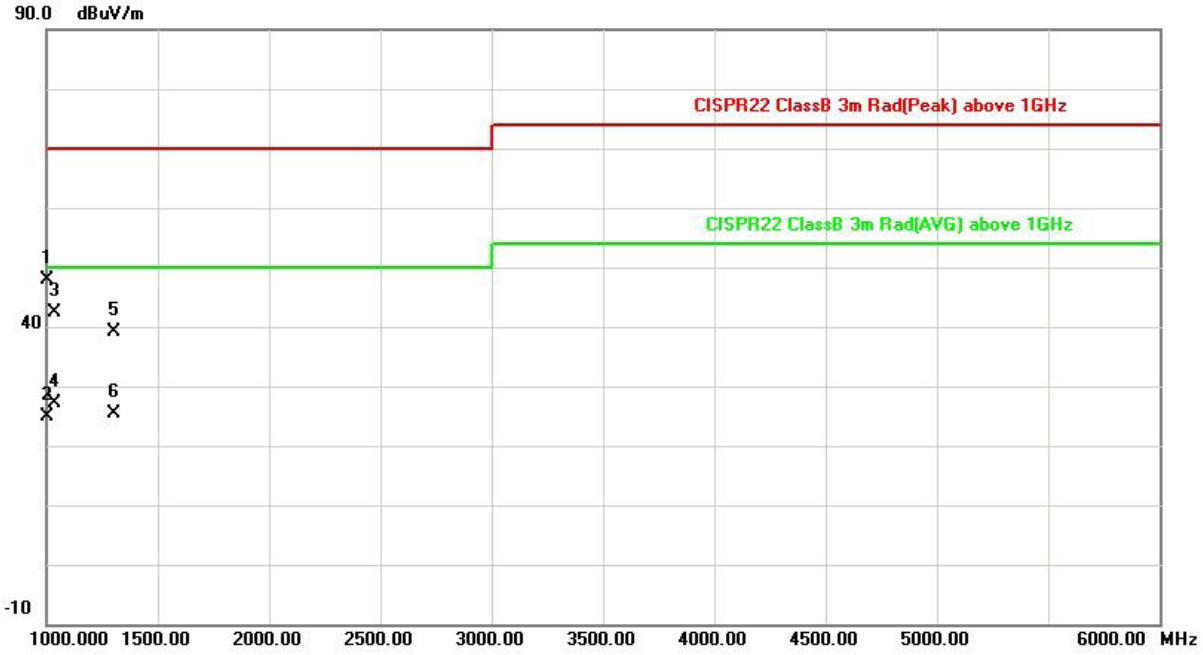
Test Voltage	120Vac, 60Hz	**Frequency Range**	1 – 6GHz
Environmental Conditions	31℃, 49% RH	**6dB Bandwidth**	1MHz
Test Date	2015/09/11	**Test Distance**	3m
Tested by	Toby Chung	**Polarization**	Vertical
Test Mode	3		



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	72.60	-14.51	58.09	70.00	-11.91	peak	100	169
2	1000.0000	41.26	-14.51	26.75	50.00	-23.25	AVG	100	169
3	1299.300	51.99	-12.33	39.66	70.00	-30.34	peak	100	234
4	1299.300	39.75	-12.33	27.42	50.00	-22.58	AVG	100	234
5	1485.000	51.94	-10.98	40.96	70.00	-29.04	peak	100	192
6	1485.000	39.85	-10.98	28.87	50.00	-21.13	AVG	100	192

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

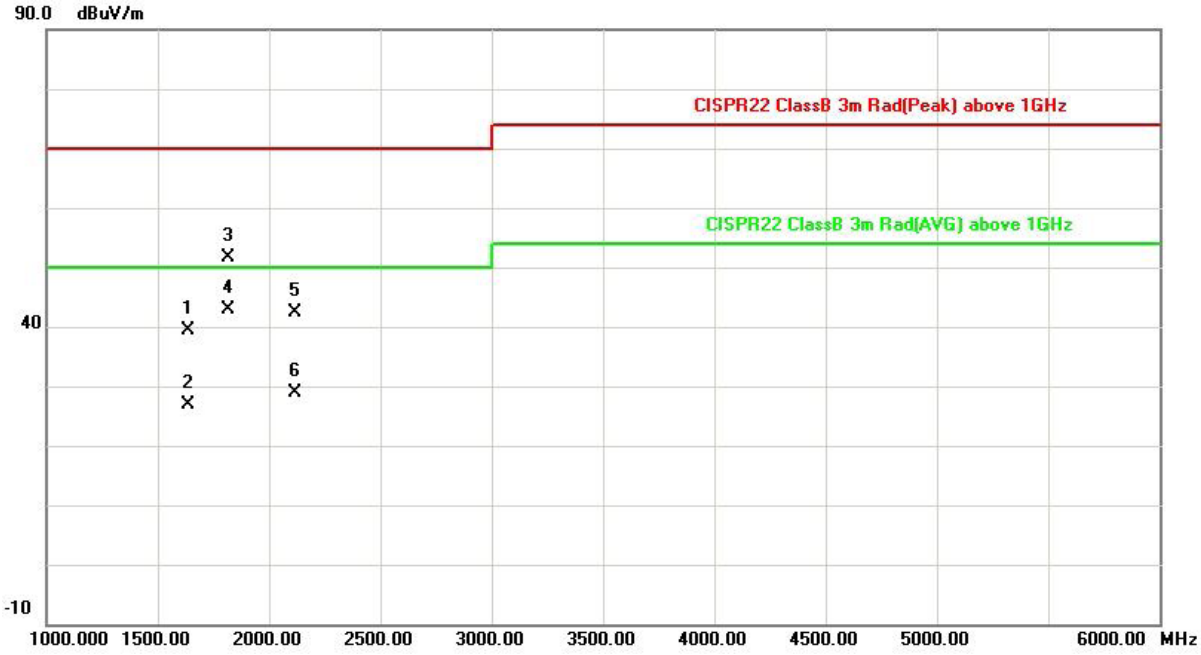
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Horizontal
Test Mode	3		



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	62.32	-14.51	47.81	70.00	-22.19	peak	100	154
2	1000.0000	39.33	-14.51	24.82	50.00	-25.18	AVG	100	154
3	1039.500	56.57	-14.22	42.35	70.00	-27.65	peak	100	211
4	1039.500	41.36	-14.22	27.14	50.00	-22.86	AVG	100	211
5	1300.000	51.55	-12.33	39.22	70.00	-30.78	peak	100	299
6	1300.000	37.77	-12.33	25.44	50.00	-24.56	AVG	100	299

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

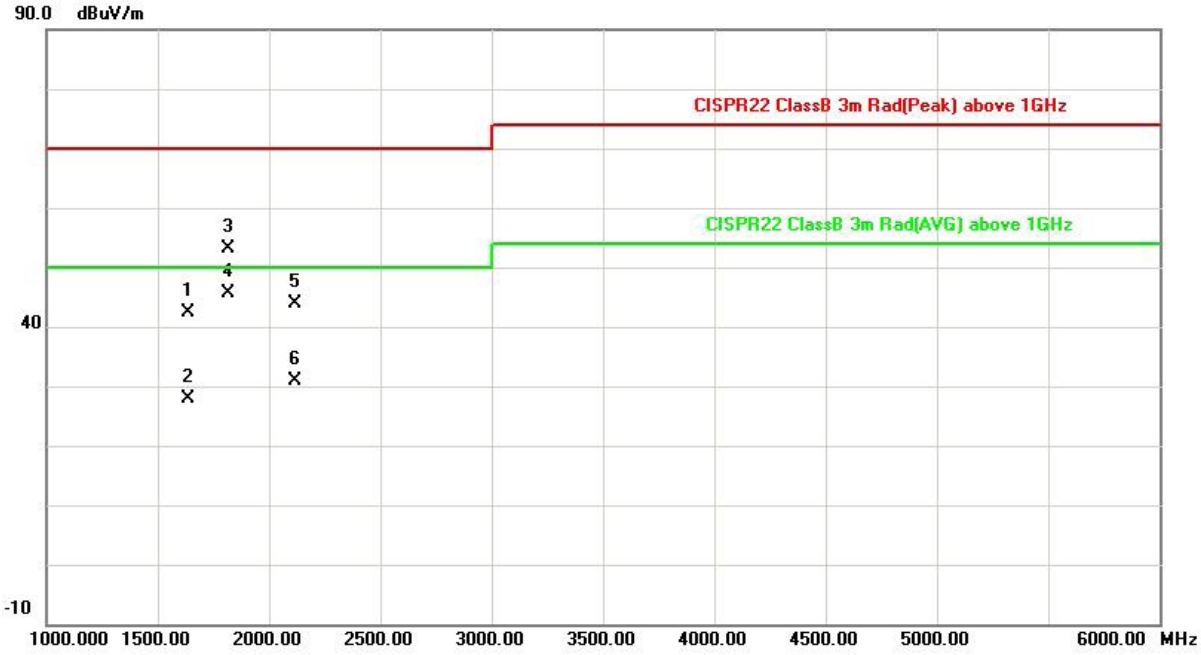
Test Voltage	48Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	31℃, 49% RH	6dB Bandwidth	1MHz
Test Date	2015/09/11	Test Distance	3m
Tested by	Toby Chung	Polarization	Vertical
Test Mode	4		



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		



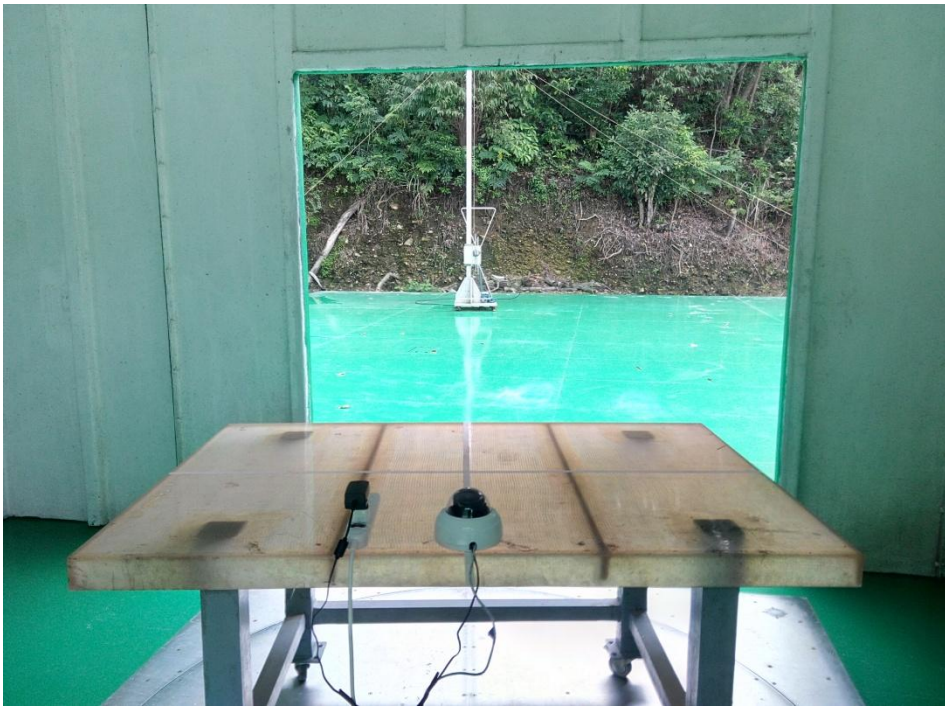
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1634.050	52.58	-10.19	42.39	70.00	-27.61	peak	162	179
2	1634.050	38.05	-10.19	27.86	50.00	-22.14	AVG	162	179
3	1818.256	62.28	-9.25	53.03	70.00	-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

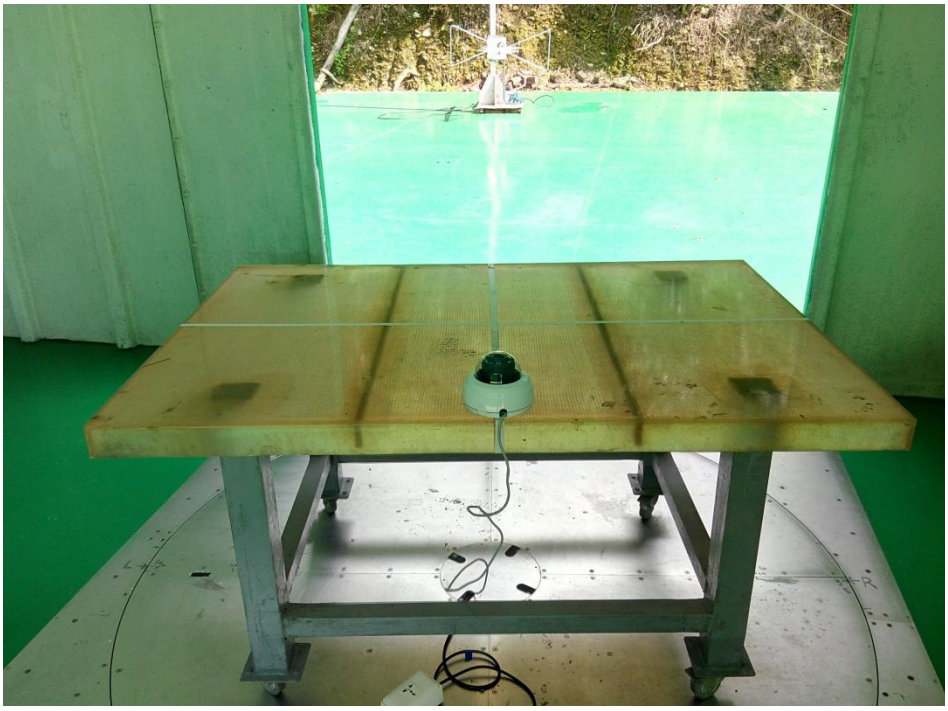
4.2.7 Photographs of Test Configuration

Radiated Emission Test (30MHz~1GHz)

Test mode 1



Test mode 2

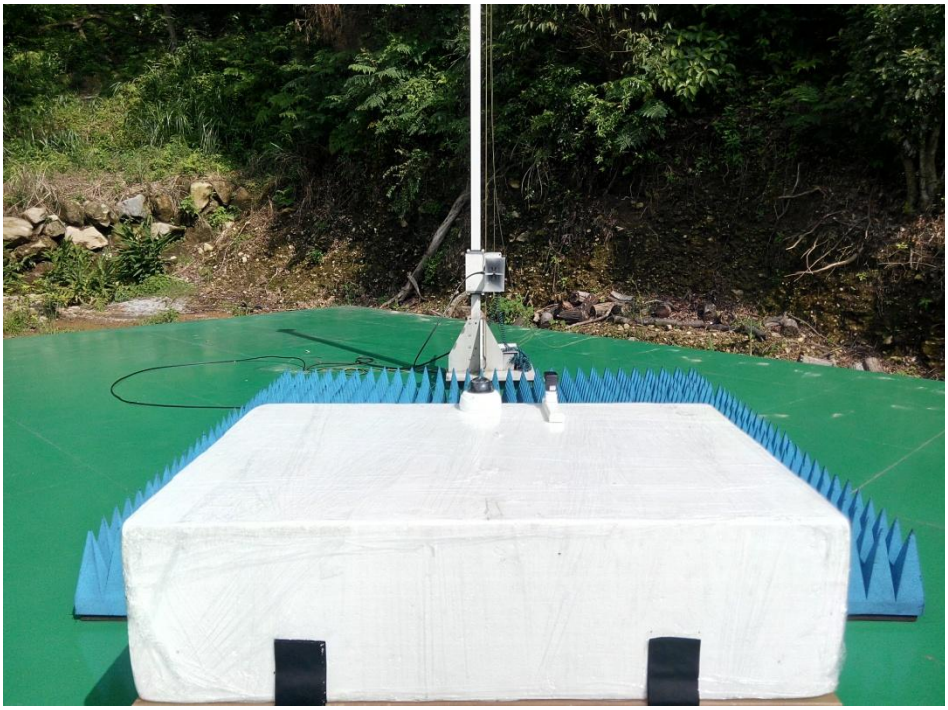


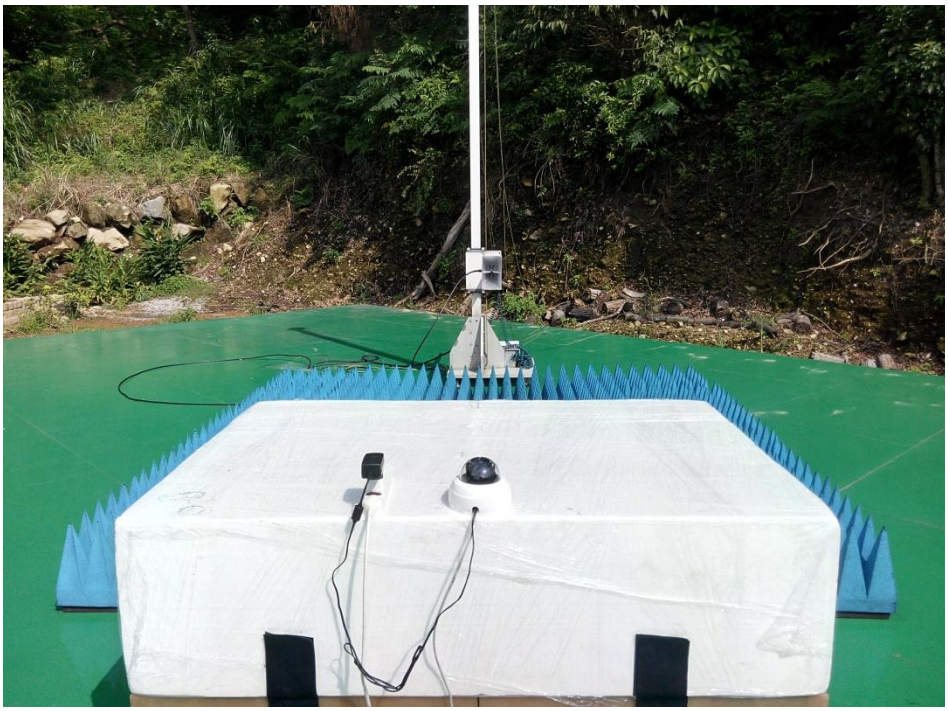
Test mode 3

Test mode 4

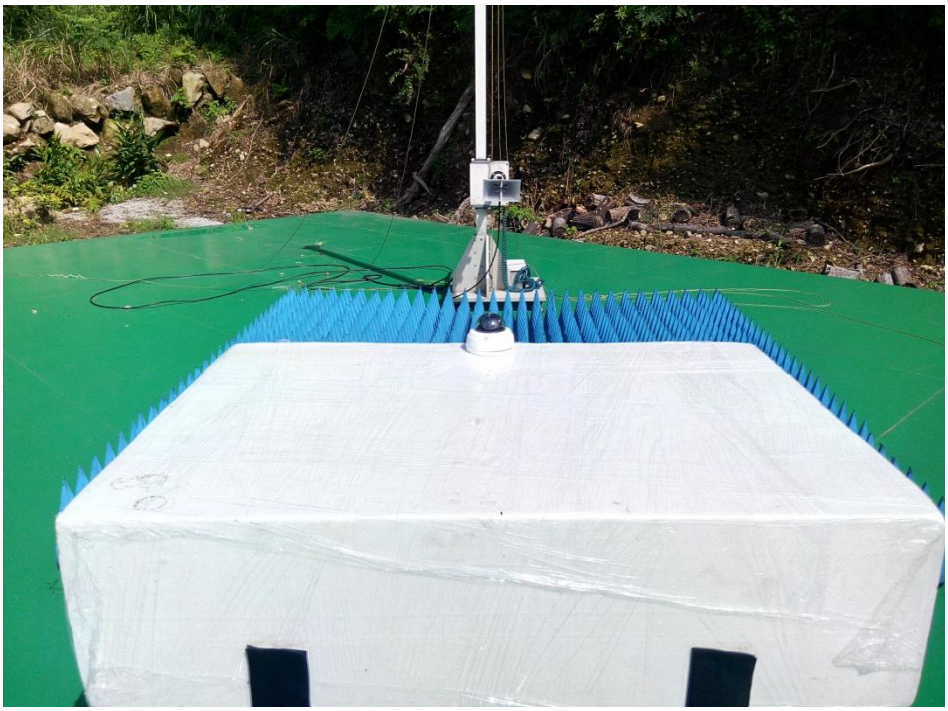
Radiated Emission Test (Above 1GHz)

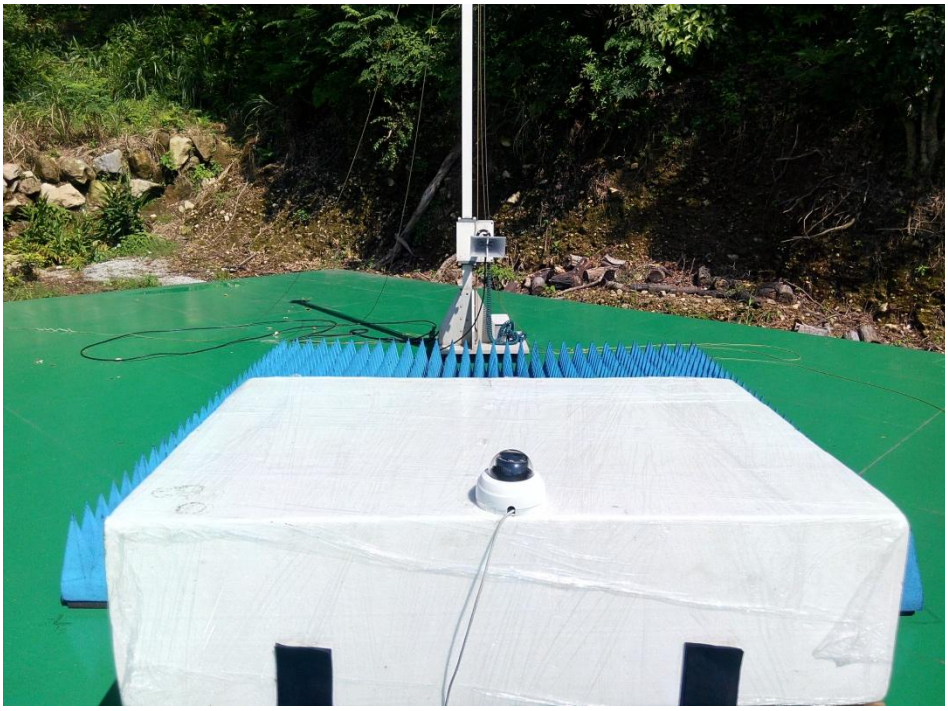
Test mode 1



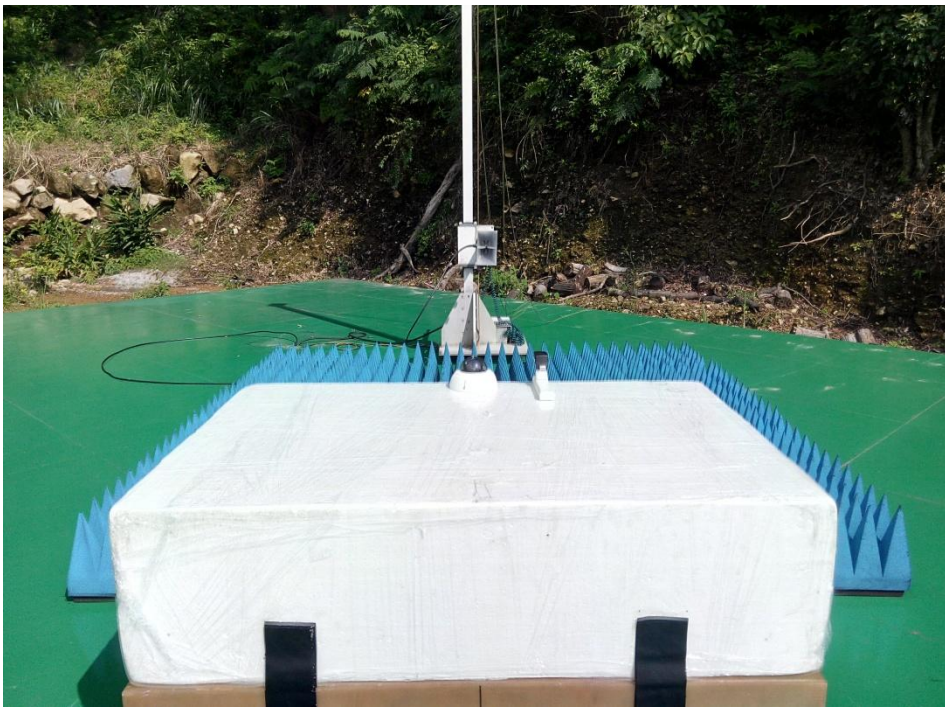


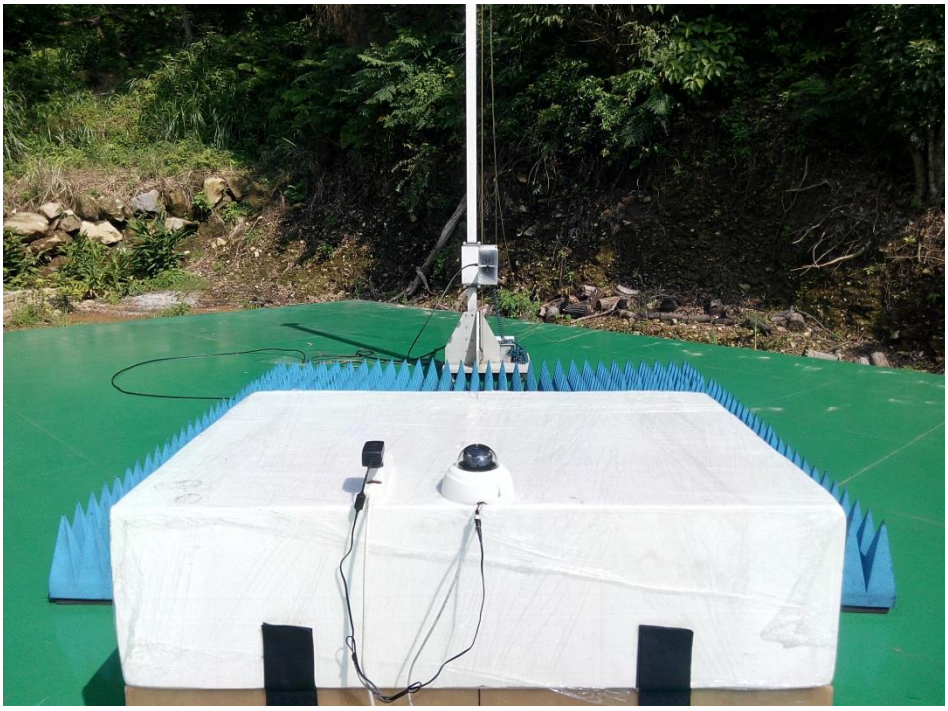
Test mode 2



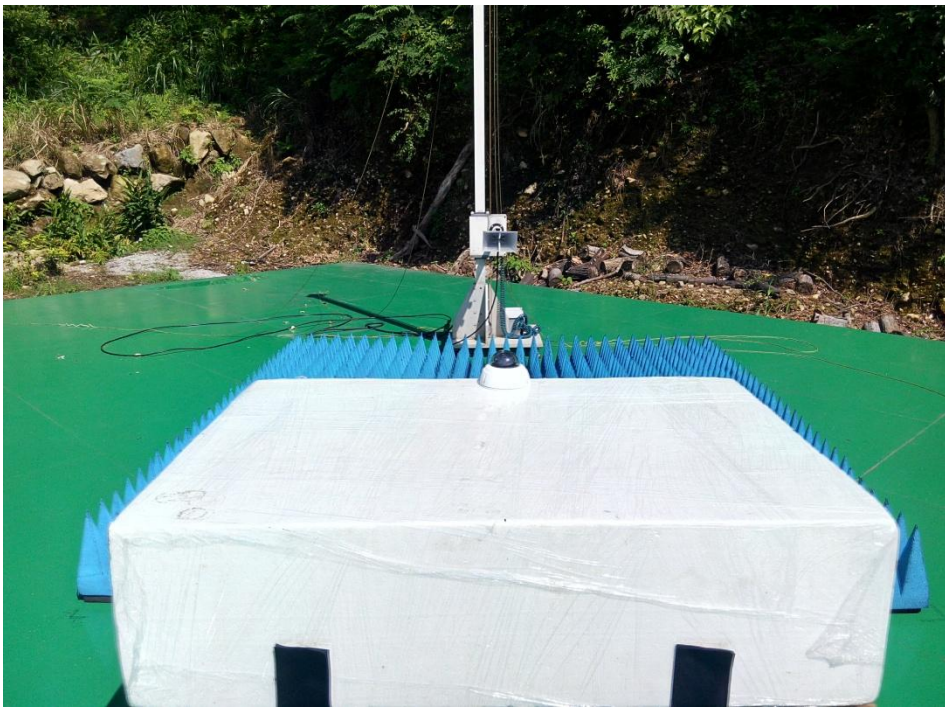


Test mode 3





Test mode 4



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