FCC Verification Test Report

Issued date: Jan. 26, 2016

Project No.: 15Q120703

Product : Network Camera

Model : IP9181-HP

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-150163-00

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 : Ken Hung / 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-150163-00	Jan. 26, 2016	Initial Issue

History of supplementary report

Report No.	Issue date	Description
WD-EF-R-150163-00	Jan. 26, 2016	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:	IP9181-HP
Applicant:	VIVOTEK INC.
Tested:	Dec. 18 ~ Dec. 22, 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: IP9181-HP) 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, New 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.	IP9181-HP
Applicant	VIVOTEK INC.
EUT Power Rating	12Vdc (from adapter) or 24Vdc (from adapter) or 48Vdc (from POE)
Model Differences	N/A
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 EUT's highest operating frequency is 1600MHz. Therefore the radiated emission is tested up to 6Hz.

3.2 Description of Test Modes

Test results are presented in the report as below.

Test Result	Test Condition
Conducted emission test	
A	DC Adapter mode, Adapter 1
B	AC Adapter mode, Adapter 2
Radiated emission 30MHz ~ 1GHz test	
A	DC Adapter mode, Adapter 1
B	AC Adapter mode, Adapter 2
C	POE mode
Radiated emission above 1GHZ test	
A	DC Adapter mode, Adapter 1
B	AC Adapter mode, Adapter 2
C	POE mode

3.3 EUT Operating Condition

Adapter mode

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 cable.
d. The EUT write data with micro SD card.
e. The microphone sent voice signal to EUT
f. The EUT sent voice signal to earphone.
g. The server PC show EUT’s image on browser.
h. The communication partner sent data to EUT by command "PING" via LAN.

POE mode

a. Placed the EUT on the test table.
b. Prepared POE injector and server PC to act as a communication partner and placed it outside of testing area.
c. The EUT was connected to the POE injector and server PC with LAN cables.
d. The EUT write data with micro SD card.
e. The microphone sent voice signal to EUT
f. The EUT sent voice signal to earphone.
g. The server PC show EUT’s image on browser.
h. The communication partner sent data to EUT by command "PING" via LAN.

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	Earphone & Microphone	E-books	E-EPA038	N/A	N/A	1.9m non-shielded cable	N/A	-
2	Micro SD Card (16GB)	SanDisk	N/A	N/A	N/A	N/A	N/A	-
3	Adapter	OEM	ADS18B-B 120150	N/A	N/A	N/A	1.5m non-shielded cable	Supplied by client
4	Adapter	AQUALITIES	TAA66-2403 500AU	N/A	N/A	N/A	Input: 1.75m non-shielded cable Output: 1.6m non-shielded cable	Supplied by client
5	POE Injector	GeoVision	GV-481	N/A	N/A	20m non-shielded RJ45 cable	-	-
6	Server PC	DELL	OPTIPLEX 380	2C6742S	FCC DoC Approved	20m non-shielded RJ45 cable (for adapter mode), 1m non-shielded RJ45 cable (for POE mode)	1.8m non-shielded cable	-

Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 6 acted as communication partners to transfer data.
3. Item 2 was inserted into EUT during the test.
4. The EUT uses the follow adapters and POE:

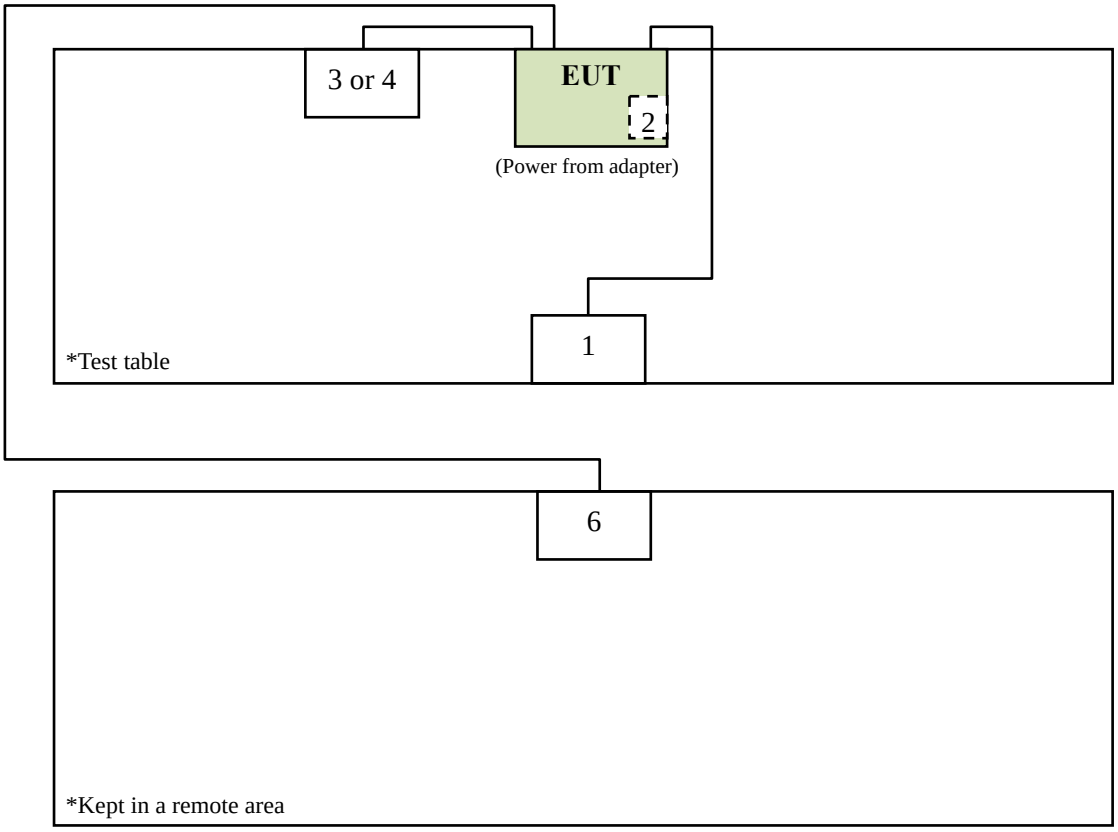
Adapter 1 (Support Unit)	
Brand	OEM
Model	ADS18B-B 120150
Input Power	100-240Vac, 0.5A
Output Power	12Vdc, 1.5A
Power line	1.5m non-shielded cable

Adapter 2 (Support Unit)	
Brand	AQUALITIES
Model	TAA66-2403500AU
Input Power	120Vac
Output Power	24Vac, 3.5A
Power line	Input: 1.75m non-shielded cable Output: 1.6m non-shielded cable

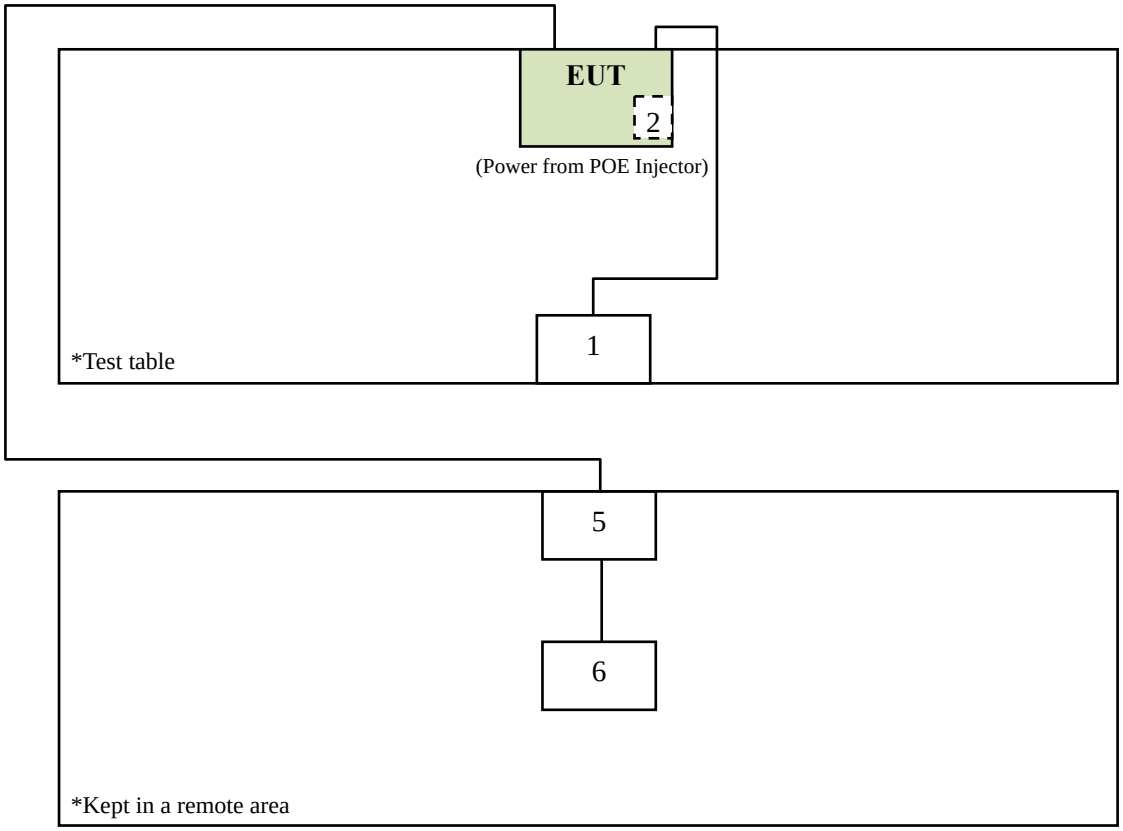
POE Injector (Support Unit)	
Brand	GeoVision
Model	GV-481
Input Power	100-240Vac, 2A
Output Power	48Vdc, 1A

3.5 Configuration of System Under Test

AC Adapter mode and DC Adapter mode



POE mode


EUT
2
(Power from POE Injector)
1
*Test table
5
6
*Kept in a remote area

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.

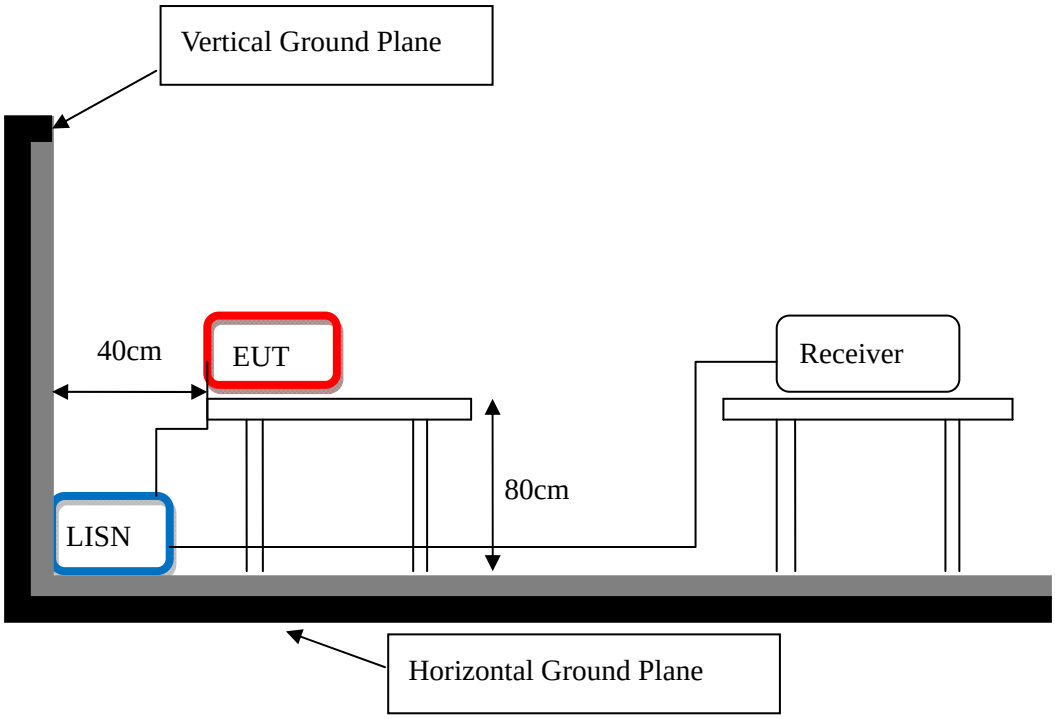
4.1.3 Test Procedure

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

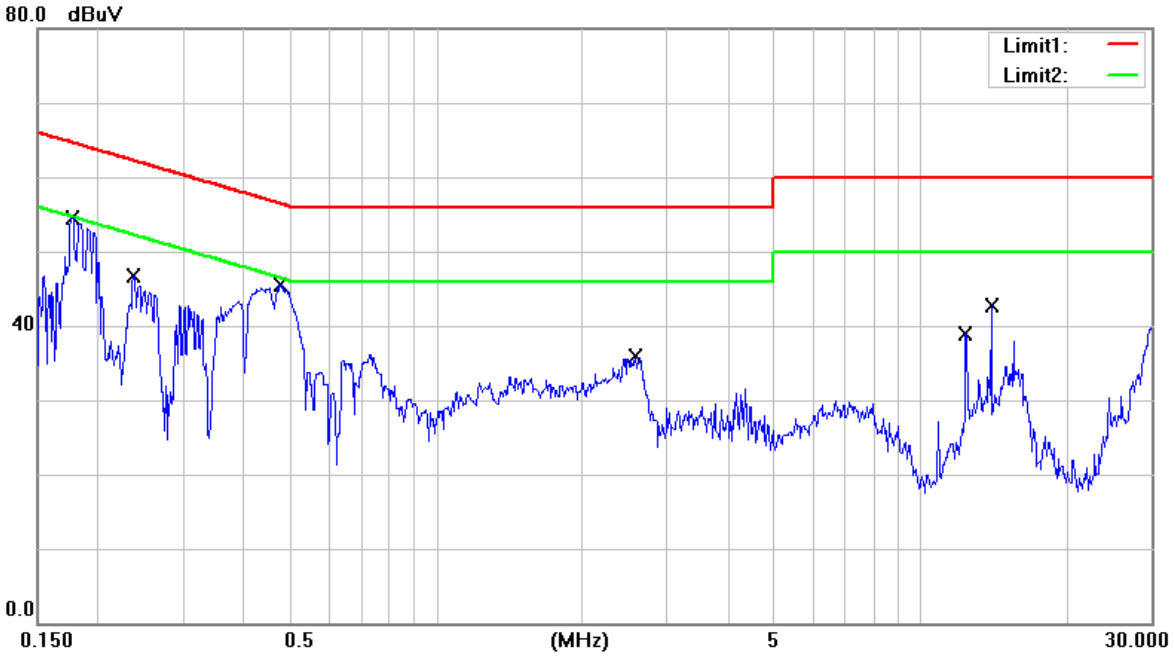
4.1.5 Test Setup



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	24.5℃, 56% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/12/18	**Phase**	L
Tested by	Guanwei Liao	**Test Mode**	A



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1768	40.07	9.66	49.73	64.63	-14.90	QP
2	0.1768	24.73	9.66	34.39	54.63	-20.24	AVG
3	0.2371	31.29	9.66	40.95	62.19	-21.24	QP
4	0.2371	15.56	9.66	25.22	52.19	-26.97	AVG
5	0.4762	33.94	9.67	43.61	56.40	-12.79	QP
6	0.4762	21.16	9.67	30.83	46.40	-15.57	AVG
7	2.5655	22.92	9.71	32.63	56.00	-23.37	QP
8	2.5655	16.54	9.71	26.25	46.00	-19.75	AVG
9	12.4000	30.08	9.85	39.93	60.00	-20.07	QP
10	12.4000	26.48	9.85	36.33	50.00	-13.67	AVG
11	13.9500	32.63	9.87	42.50	60.00	-17.50	QP
12	13.9500	31.20	9.87	41.07	50.00	-8.93	AVG

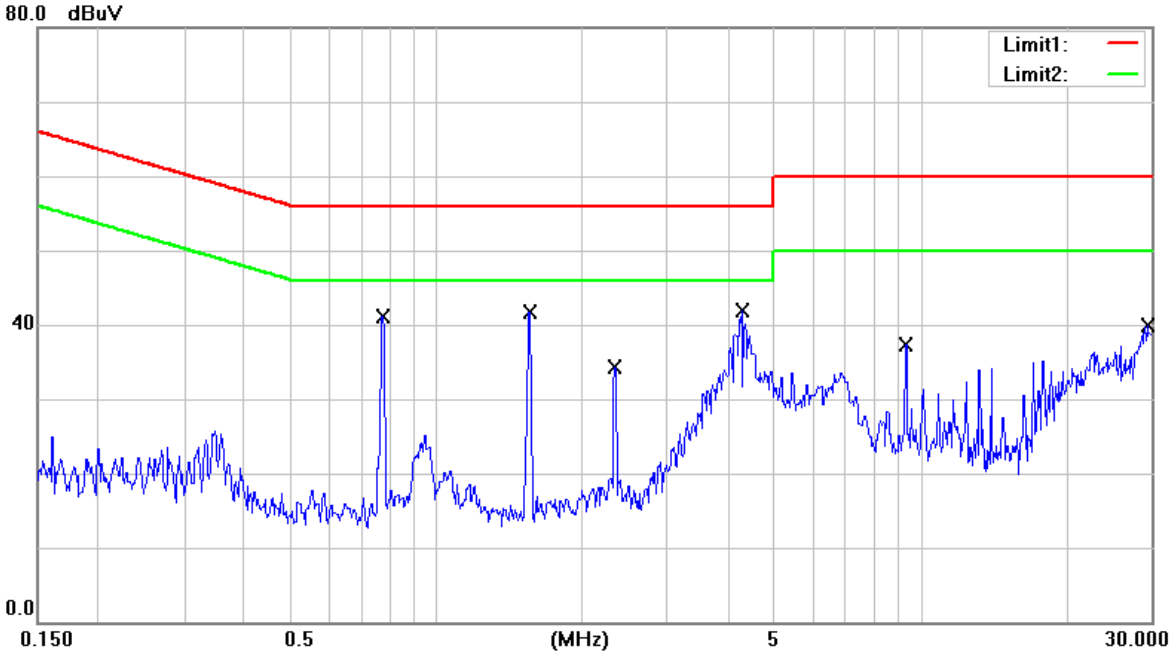
Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value –Limit Value

Test Voltage	120Vac, 60Hz	**Frequency Range**	0.15-30 MHz
Environmental Conditions	24.5℃, 56% RH	**6dB Bandwidth**	9 kHz
Test Date	2015/12/18	**Phase**	N
Tested by	Guanwei Liao	**Test Mode**	A

No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1790	39.87	9.64	49.51	64.53	-15.02	QP
2	0.1790	24.62	9.64	34.26	54.53	-20.27	AVG
3	0.1930	37.63	9.64	47.27	63.90	-16.63	QP
4	0.1930	21.75	9.64	31.39	53.90	-22.51	AVG
5	0.4545	29.28	9.65	38.93	56.79	-17.86	QP
6	0.4545	15.59	9.65	25.24	46.79	-21.55	AVG
7	2.5474	19.63	9.69	29.32	56.00	-26.68	QP
8	2.5474	12.71	9.69	22.40	46.00	-23.60	AVG
9	12.4000	28.27	9.86	38.13	60.00	-21.87	QP
10	12.4000	24.82	9.86	34.68	50.00	-15.32	AVG
11	13.9500	30.81	9.88	40.69	60.00	-19.31	QP
12	13.9500	29.03	9.88	38.91	50.00	-11.09	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

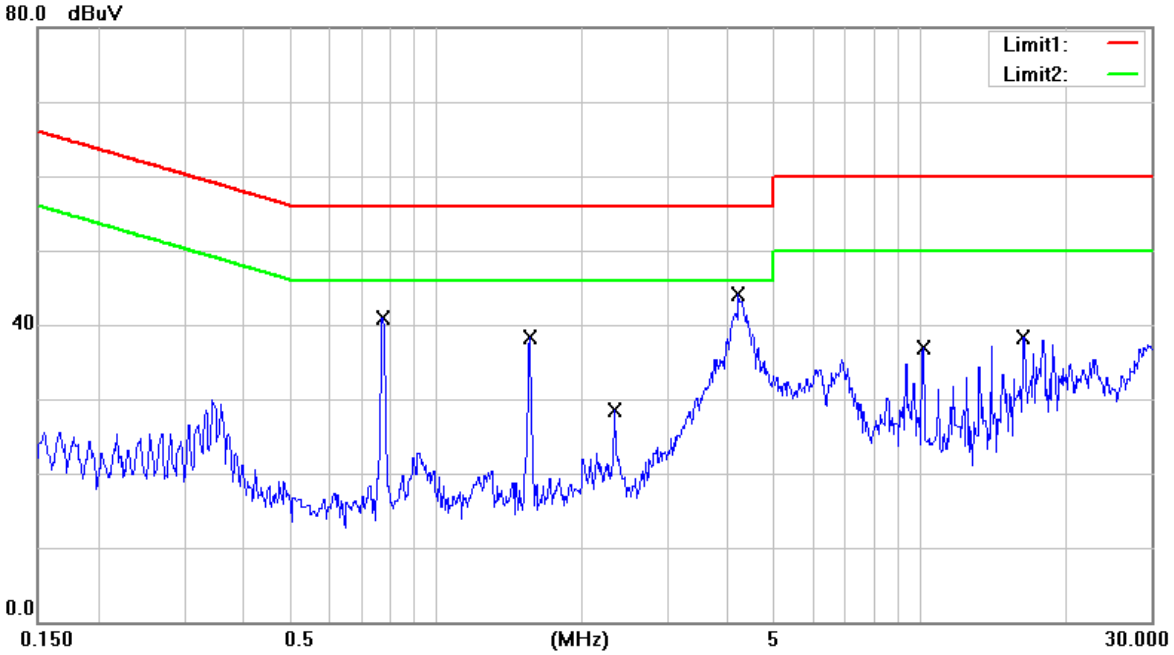
Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	24.5℃, 56% RH	6dB Bandwidth	9 kHz
Test Date	2015/12/18	Phase	L
Tested by	Guanwei Liao	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.7745	28.79	9.68	38.47	56.00	-17.53	QP
2	0.7745	16.57	9.68	26.25	46.00	-19.75	AVG
3	1.5530	38.88	9.70	48.58	56.00	-7.42	QP
4	1.5530	22.40	9.70	32.10	46.00	-13.90	AVG
5	2.3315	23.97	9.71	33.68	56.00	-22.32	QP
6	2.3315	10.97	9.71	20.68	46.00	-25.32	AVG
7	4.2619	29.24	9.74	38.98	56.00	-17.02	QP
8	4.2619	15.42	9.74	25.16	46.00	-20.84	AVG
9	9.3250	16.51	9.81	26.32	60.00	-33.68	QP
10	9.3250	9.06	9.81	18.87	50.00	-31.13	AVG
11	29.3250	23.85	9.84	33.69	60.00	-26.31	QP
12	29.3250	18.25	9.84	28.09	50.00	-21.91	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	24.5℃, 56% RH	6dB Bandwidth	9 kHz
Test Date	2015/12/18	Phase	N
Tested by	Guanwei Liao	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.7745	27.51	9.66	37.17	56.00	-18.83	QP
2	0.7745	15.50	9.66	25.16	46.00	-20.84	AVG
3	1.5530	37.78	9.68	47.46	56.00	-8.54	QP
4	1.5530	21.34	9.68	31.02	46.00	-14.98	AVG
5	2.3270	17.23	9.69	26.92	56.00	-29.08	QP
6	2.3270	8.91	9.69	18.60	46.00	-27.40	AVG
7	4.1855	31.05	9.71	40.76	56.00	-15.24	QP
8	4.1855	17.28	9.71	26.99	46.00	-19.01	AVG
9	10.1000	24.61	9.83	34.44	60.00	-25.56	QP
10	10.1000	15.10	9.83	24.93	50.00	-25.07	AVG
11	16.3250	18.36	9.90	28.26	60.00	-31.74	QP
12	16.3250	9.73	9.90	19.63	50.00	-30.37	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 A

Test mode B

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.

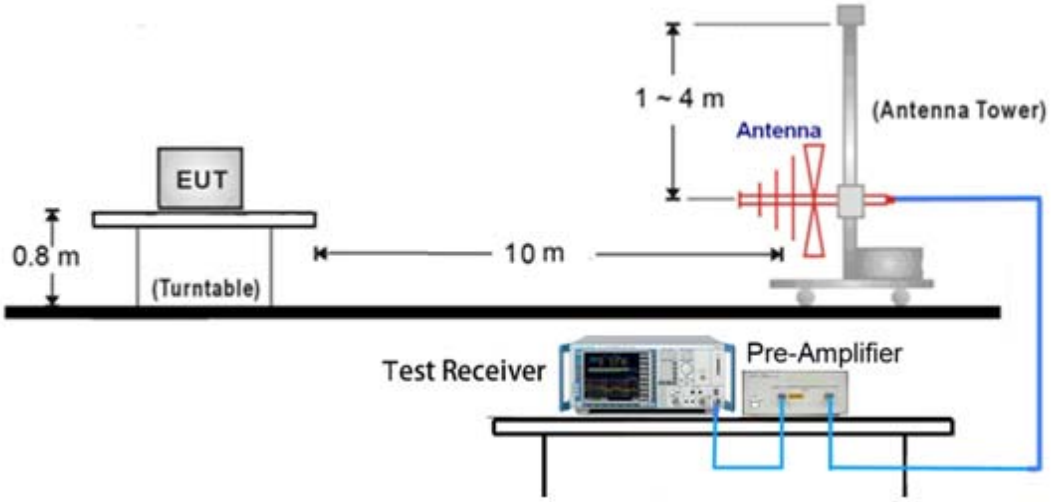
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.2.4 Deviation from Test Standard

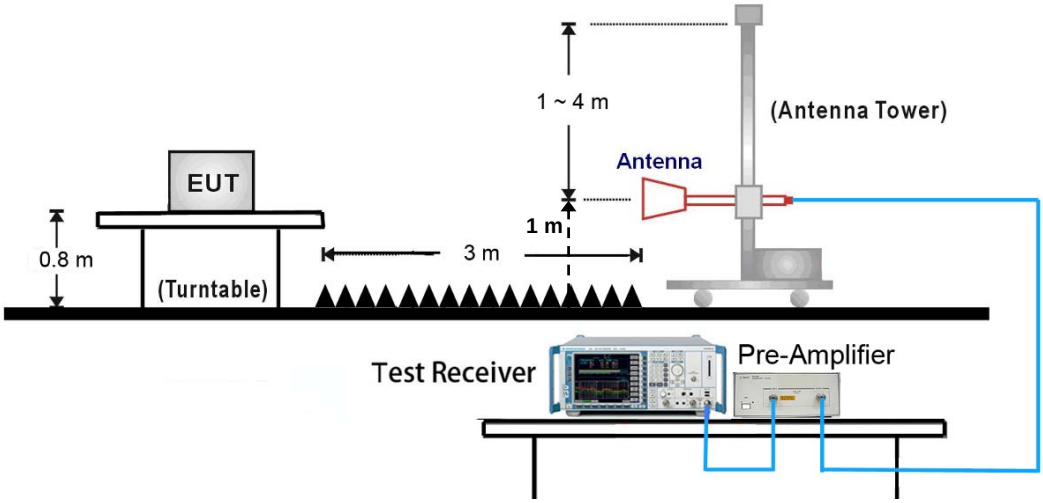
No deviation

4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

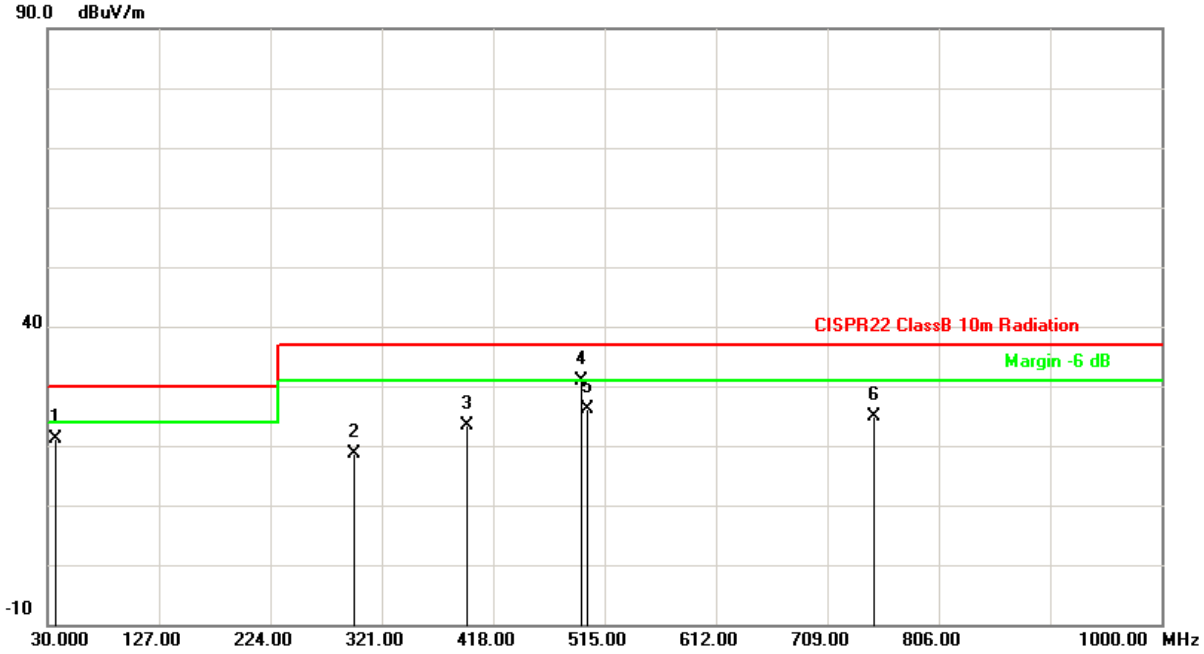


Note:

(1) Please refer to the 4.3.7 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

4.2.6 Test Result

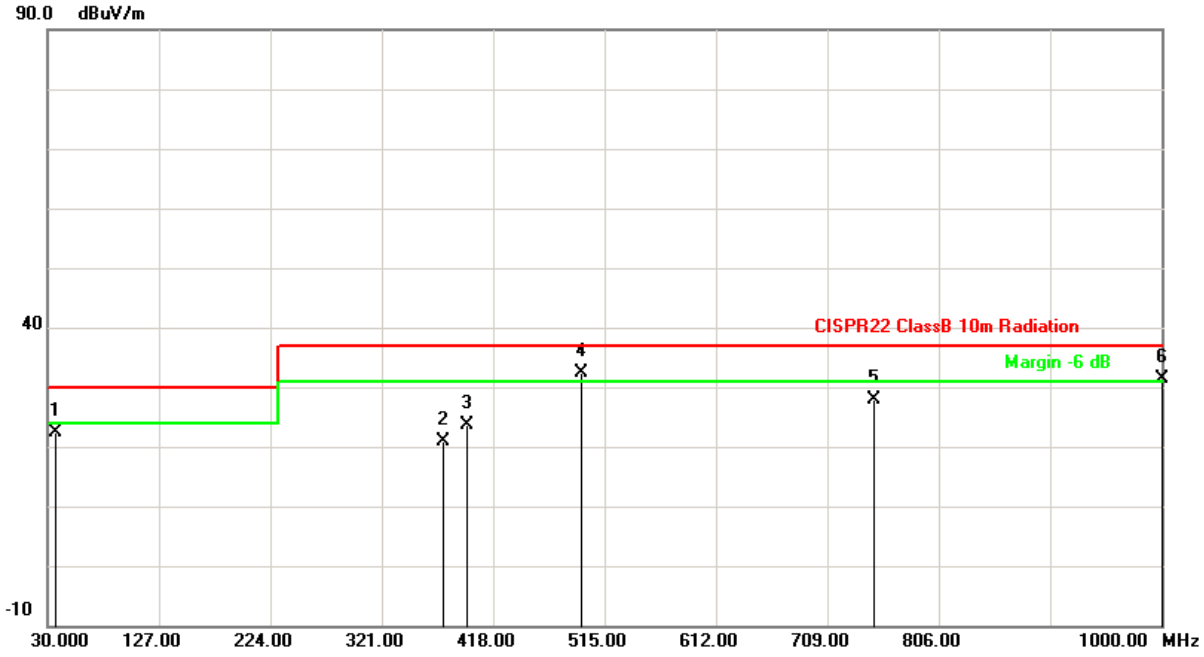
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Vertical
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.2200	45.42	-24.21	21.21	30.00	-8.79	QP	100	287
2	297.0000	45.61	-26.95	18.66	37.00	-18.34	QP	100	261
3	396.0000	47.67	-24.30	23.37	37.00	-13.63	QP	100	264
4	495.0000	52.57	-21.73	30.84	37.00	-6.16	QP	100	255
5	500.0000	47.87	-21.64	26.23	37.00	-10.77	QP	100	254
6	750.0000	41.54	-16.68	24.86	37.00	-12.14	QP	100	249

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

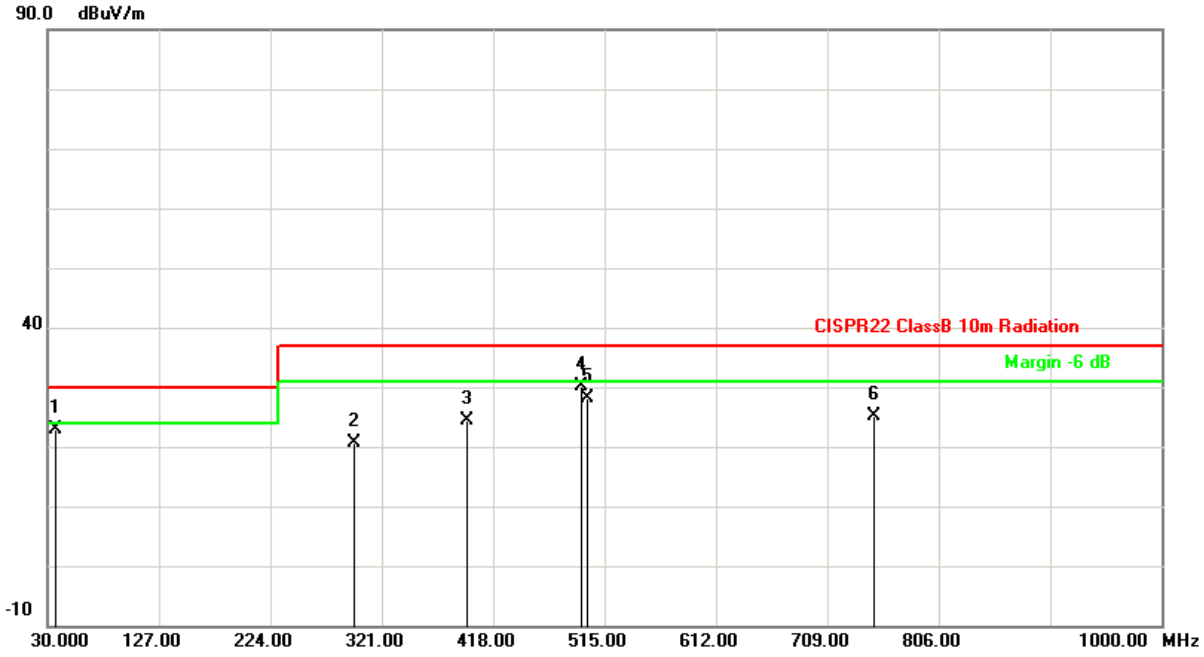
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Horizontal
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.2400	46.65	-24.21	22.44	30.00	-7.56	QP	400	174
2	375.0000	45.81	-24.94	20.87	37.00	-16.13	QP	235	234
3	396.0000	47.96	-24.30	23.66	37.00	-13.34	QP	255	91
4	495.0000	54.01	-21.73	32.28	37.00	-4.72	QP	155	334
5	750.0000	44.68	-16.68	28.00	37.00	-9.00	QP	142	194
6	1000.0000	45.18	-13.81	31.37	37.00	-5.63	QP	168	154

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

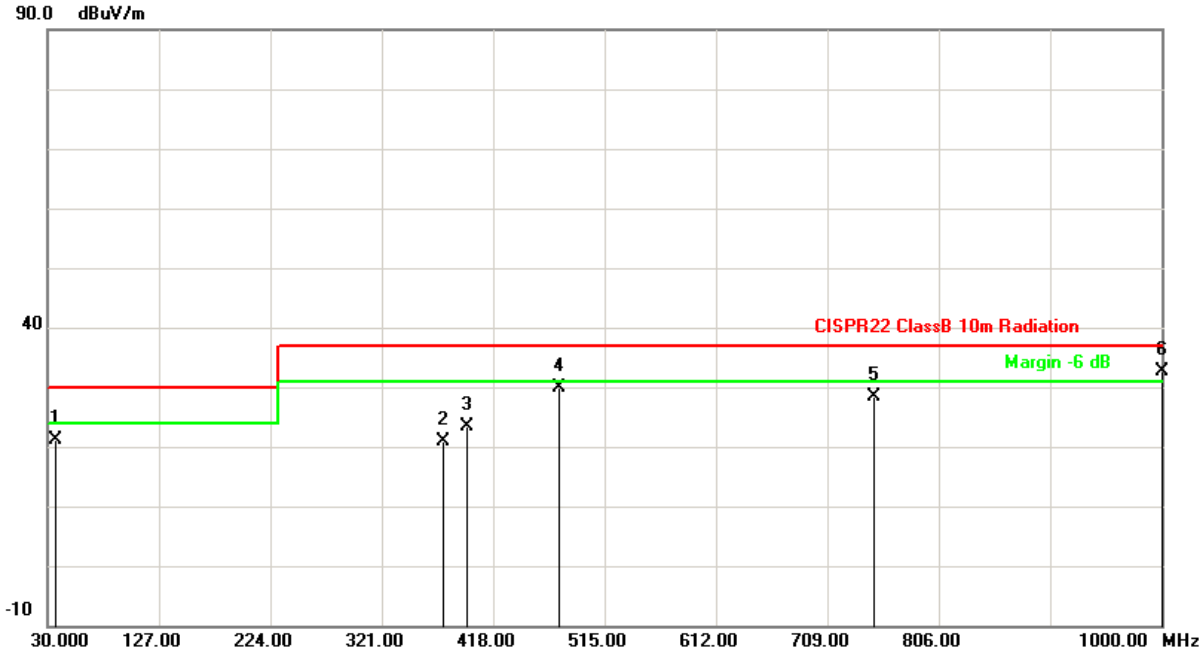
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Vertical
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.2200	47.07	-24.21	22.86	30.00	-7.14	QP	100	102
2	297.0000	47.56	-26.95	20.61	37.00	-16.39	QP	100	260
3	396.0000	48.63	-24.30	24.33	37.00	-12.67	QP	100	265
4	495.0000	51.95	-21.73	30.22	37.00	-6.78	QP	100	287
5	500.0000	49.69	-21.64	28.05	37.00	-8.95	QP	100	286
6	750.0000	41.84	-16.68	25.16	37.00	-11.84	QP	100	244

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

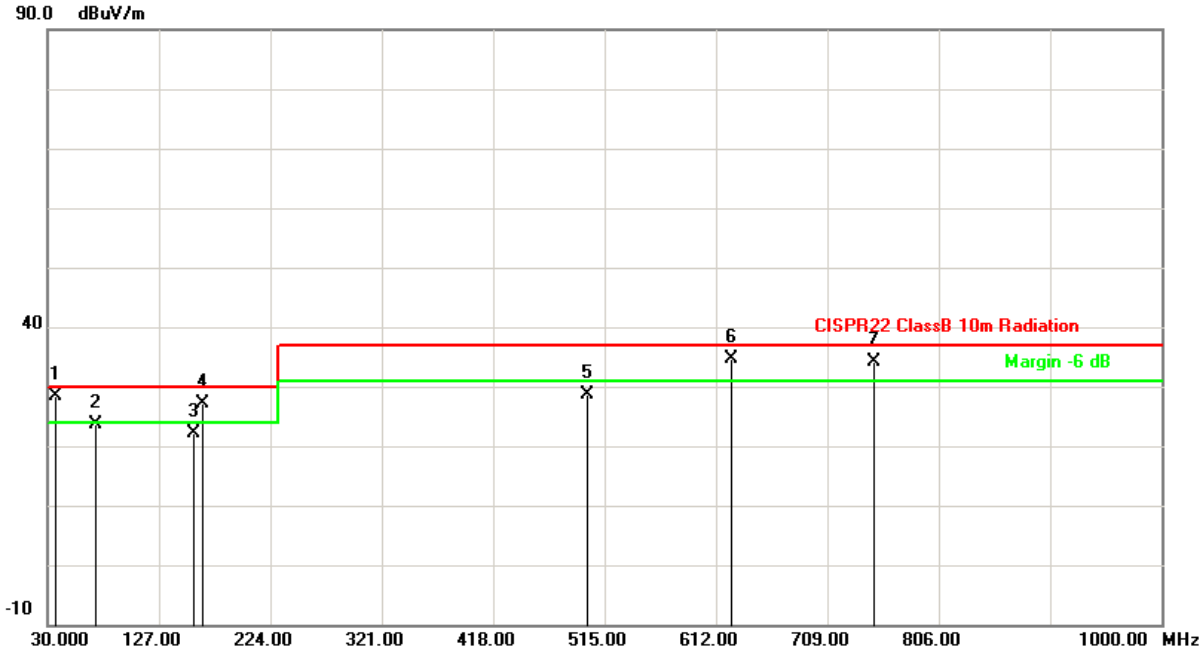
Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Horizontal
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.2000	45.32	-24.20	21.12	30.00	-8.88	QP	400	169
2	375.0000	45.81	-24.94	20.87	37.00	-16.13	QP	235	234
3	396.0000	47.69	-24.30	23.39	37.00	-13.61	QP	246	90
4	475.0000	51.88	-22.08	29.80	37.00	-7.20	QP	175	145
5	750.0000	45.15	-16.68	28.47	37.00	-8.53	QP	143	201
6	1000.0000	46.35	-13.81	32.54	37.00	-4.46	QP	171	168

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

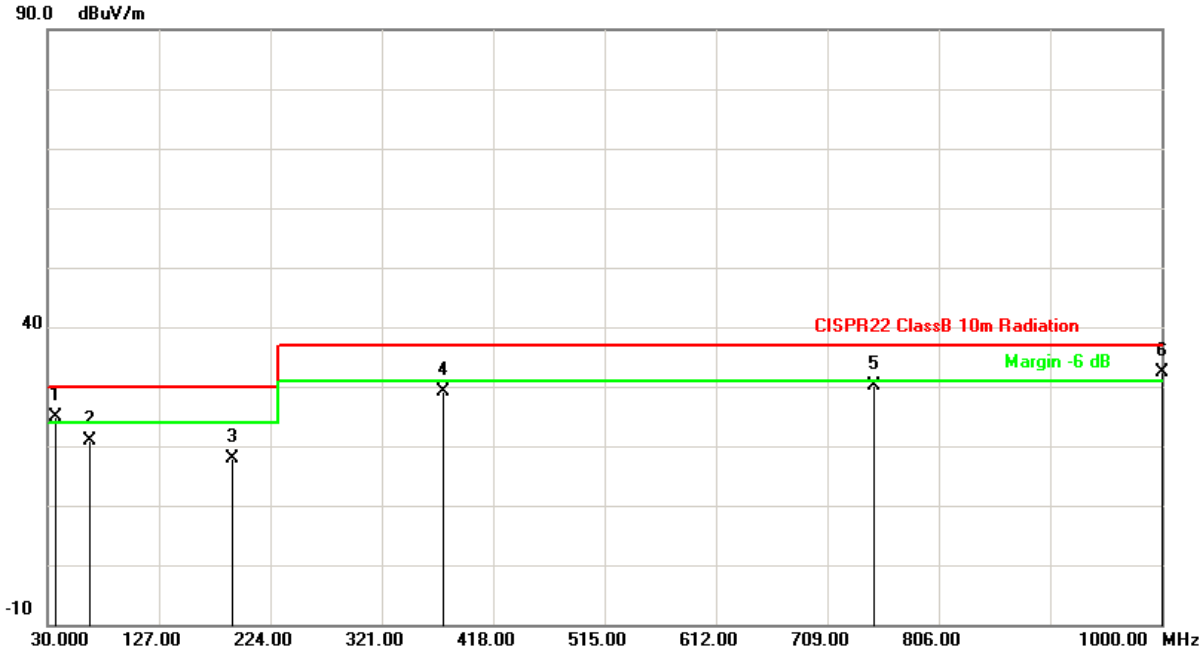
Test Voltage	48Vdc (POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Vertical
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.3500	52.58	-24.21	28.37	30.00	-1.63	QP	100	16
2	72.5630	51.28	-27.58	23.70	30.00	-6.30	QP	100	34
3	157.5120	48.70	-26.51	22.19	30.00	-7.81	QP	100	66
4	165.1300	54.05	-26.93	27.12	30.00	-2.88	QP	100	251
5	500.0110	50.30	-21.64	28.66	37.00	-8.34	QP	116	137
6	625.0140	53.50	-18.90	34.60	37.00	-2.40	QP	106	270
7	750.0160	50.93	-16.68	34.25	37.00	-2.75	QP	100	208

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

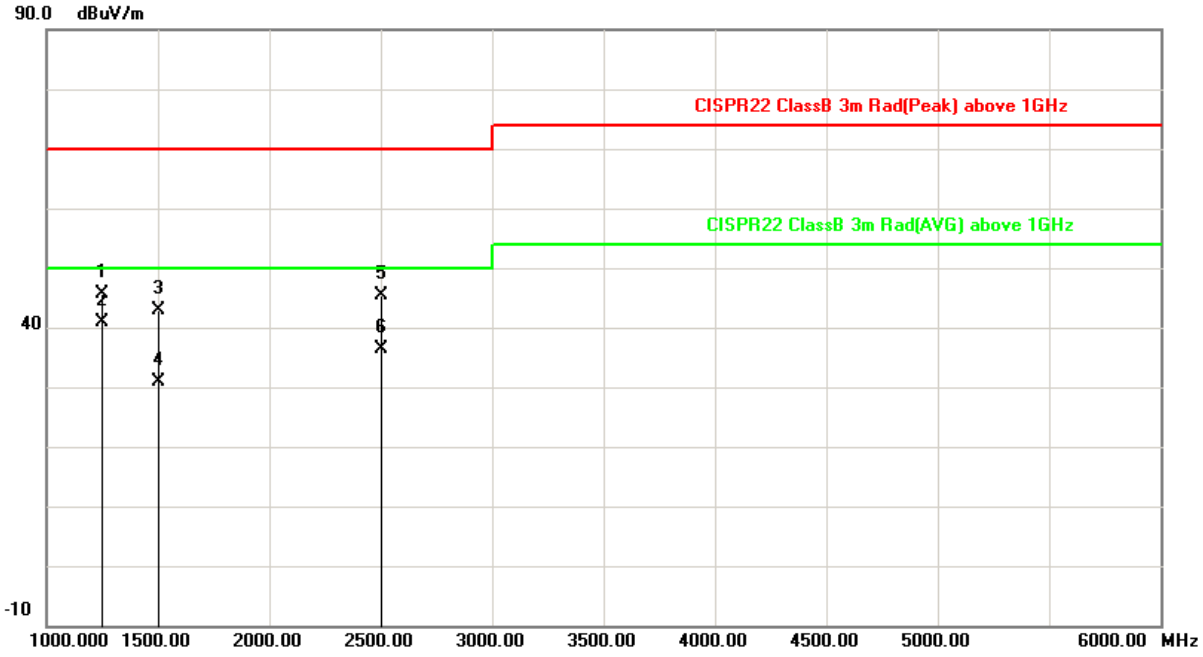
Test Voltage	48Vdc (POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	120 kHz
Test Date	2015/12/21	Test Distance	10m
Tested by	HsiangAn Hung	Polarization	Horizontal
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	37.4970	49.19	-24.19	25.00	30.00	-5.00	QP	400	206
2	67.2610	47.18	-26.39	20.79	30.00	-9.21	QP	400	325
3	191.2260	47.95	-30.15	17.80	30.00	-12.20	QP	400	0
4	375.0080	54.01	-24.94	29.07	37.00	-7.93	QP	221	229
5	750.0100	46.72	-16.68	30.04	37.00	-6.96	QP	145	154
6	1000.0000	46.25	-13.81	32.44	37.00	-4.56	QP	134	308

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

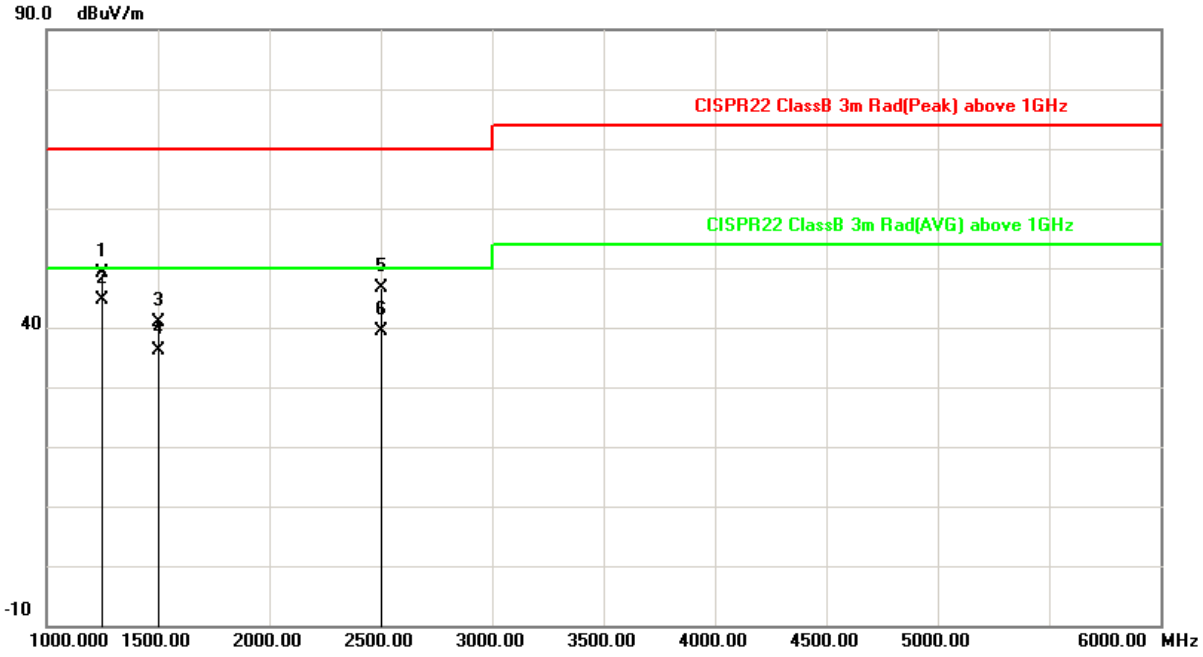
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Vertical
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	58.34	-12.68	45.66	70.00	-24.34	peak	100	210
2	1250.000	53.63	-12.68	40.95	50.00	-9.05	AVG	100	210
3	1500.000	53.71	-10.87	42.84	70.00	-27.16	peak	100	100
4	1500.000	41.83	-10.87	30.96	50.00	-19.04	AVG	100	100
5	2500.000	51.46	-5.99	45.47	70.00	-24.53	peak	100	180
6	2500.000	42.47	-5.99	36.48	50.00	-13.52	AVG	100	180

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

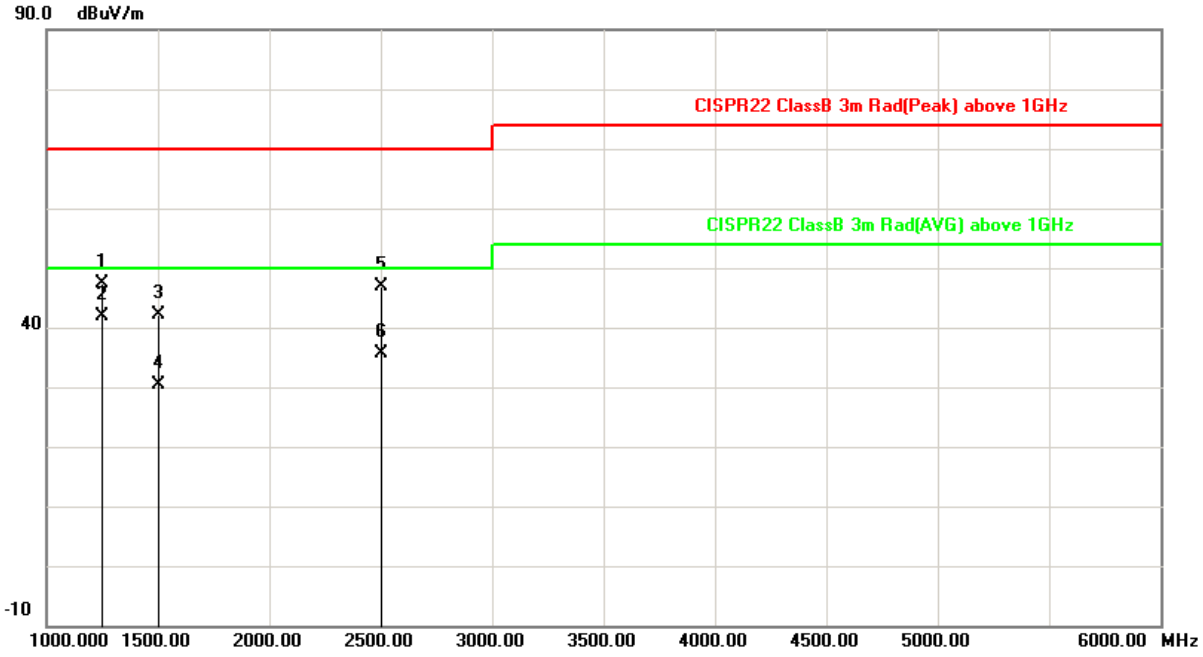
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Horizontal
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	61.77	-12.68	49.09	70.00	-20.91	peak	100	210
2	1250.000	57.42	-12.68	44.74	50.00	-5.26	AVG	100	210
3	1500.000	51.75	-10.87	40.88	70.00	-29.12	peak	100	90
4	1500.000	46.91	-10.87	36.04	50.00	-13.96	AVG	100	90
5	2500.000	52.57	-5.99	46.58	70.00	-23.42	peak	100	180
6	2500.000	45.42	-5.99	39.43	50.00	-10.57	AVG	100	180

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

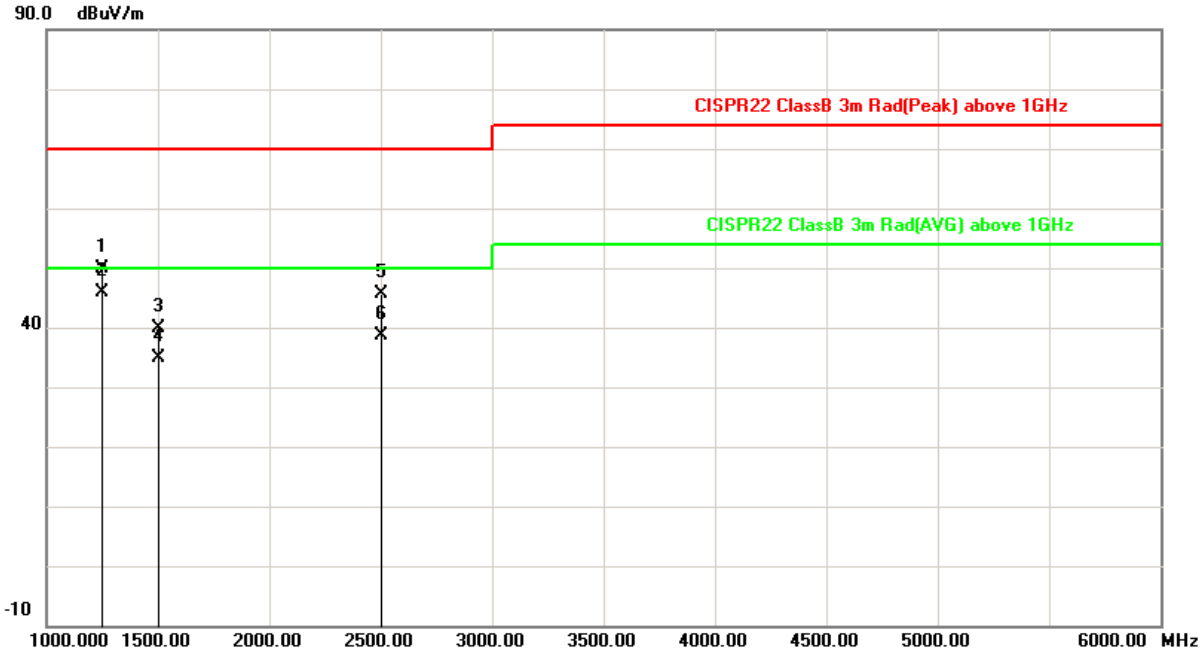
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Vertical
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	59.99	-12.68	47.31	70.00	-22.69	peak	100	210
2	1250.000	54.62	-12.68	41.94	50.00	-8.06	AVG	100	210
3	1500.000	53.01	-10.87	42.14	70.00	-27.86	peak	100	100
4	1500.000	41.15	-10.87	30.28	50.00	-19.72	AVG	100	100
5	2500.000	52.96	-5.99	46.97	70.00	-23.03	peak	100	180
6	2500.000	41.56	-5.99	35.57	50.00	-14.43	AVG	100	180

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

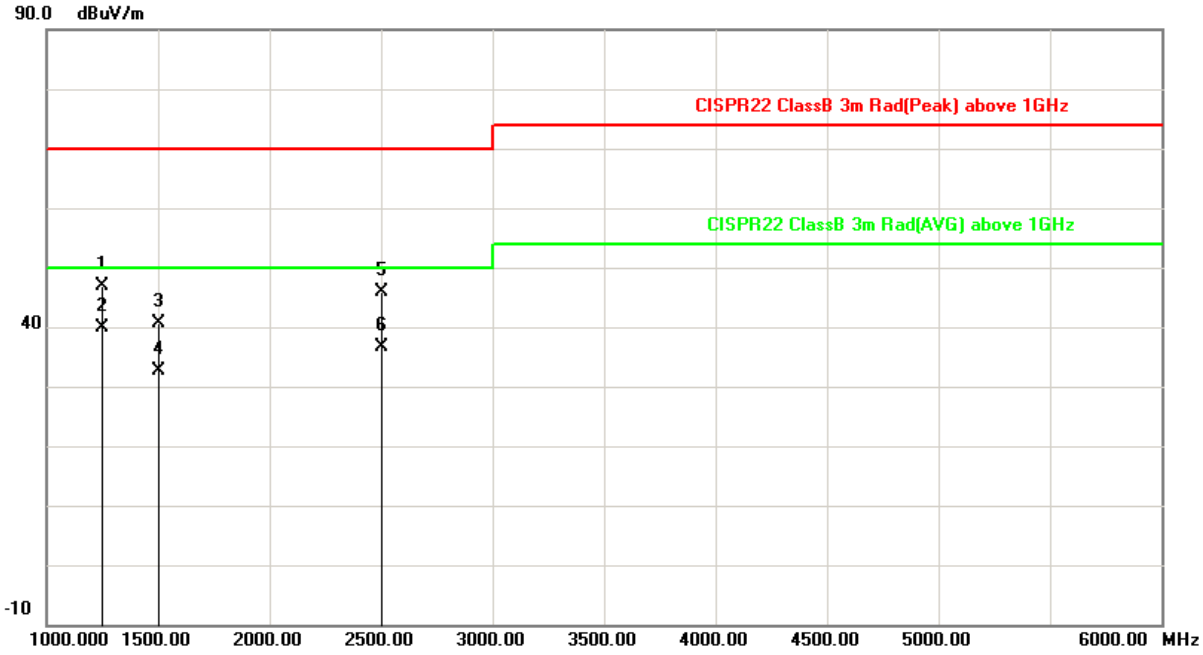
Test Voltage	120Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Horizontal
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	62.46	-12.68	49.78	70.00	-20.22	peak	100	220
2	1250.000	58.67	-12.68	45.99	50.00	-4.01	AVG	100	220
3	1500.000	50.83	-10.87	39.96	70.00	-30.04	peak	100	95
4	1500.000	45.72	-10.87	34.85	50.00	-15.15	AVG	100	95
5	2500.000	51.57	-5.99	45.58	70.00	-24.42	peak	100	180
6	2500.000	44.63	-5.99	38.64	50.00	-11.36	AVG	100	180

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

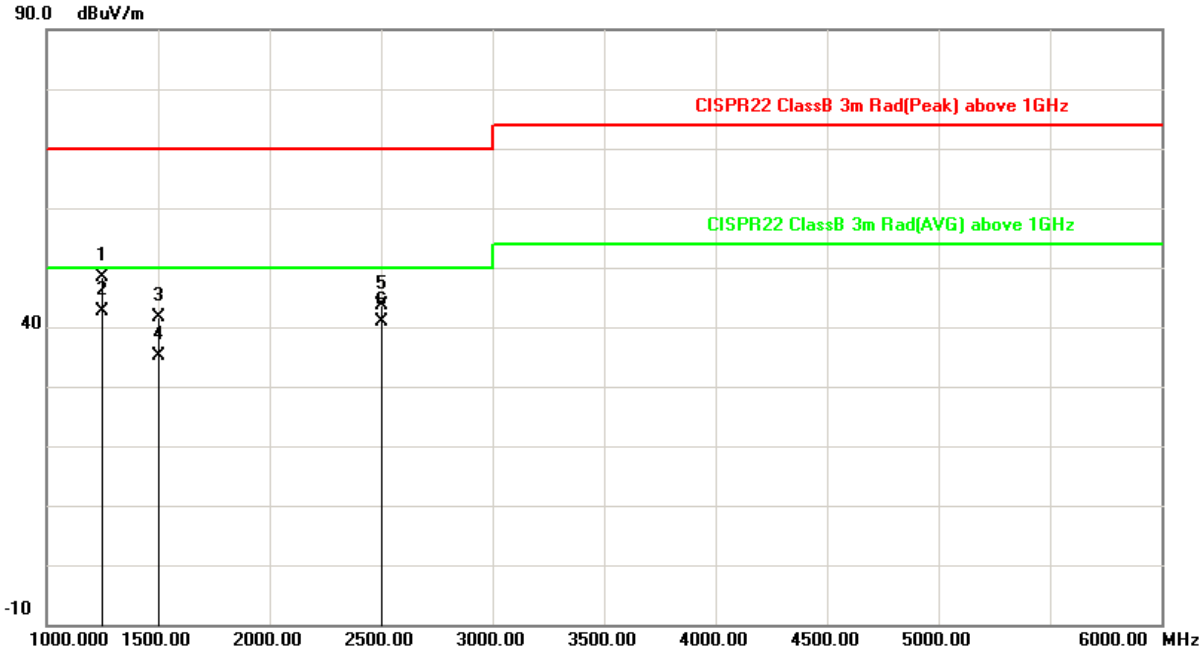
Test Voltage	48Vdc (POE)	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Vertical
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	59.63	-12.68	46.95	70.00	-23.05	peak	100	210
2	1250.000	52.66	-12.68	39.98	50.00	-10.02	AVG	100	210
3	1500.000	51.43	-10.87	40.56	70.00	-29.44	peak	100	100
4	1500.000	43.55	-10.87	32.68	50.00	-17.32	AVG	100	100
5	2500.000	51.83	-5.99	45.84	70.00	-24.16	peak	100	180
6	2500.000	42.69	-5.99	36.70	50.00	-13.30	AVG	100	180

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 (POE)	Frequency Range	1 – 6GHz
Environmental Conditions	18℃, 57% RH	6dB Bandwidth	1MHz
Test Date	2015/12/22	Test Distance	3m
Tested by	Evan Cheng	Polarization	Horizontal
Test Mode	C		

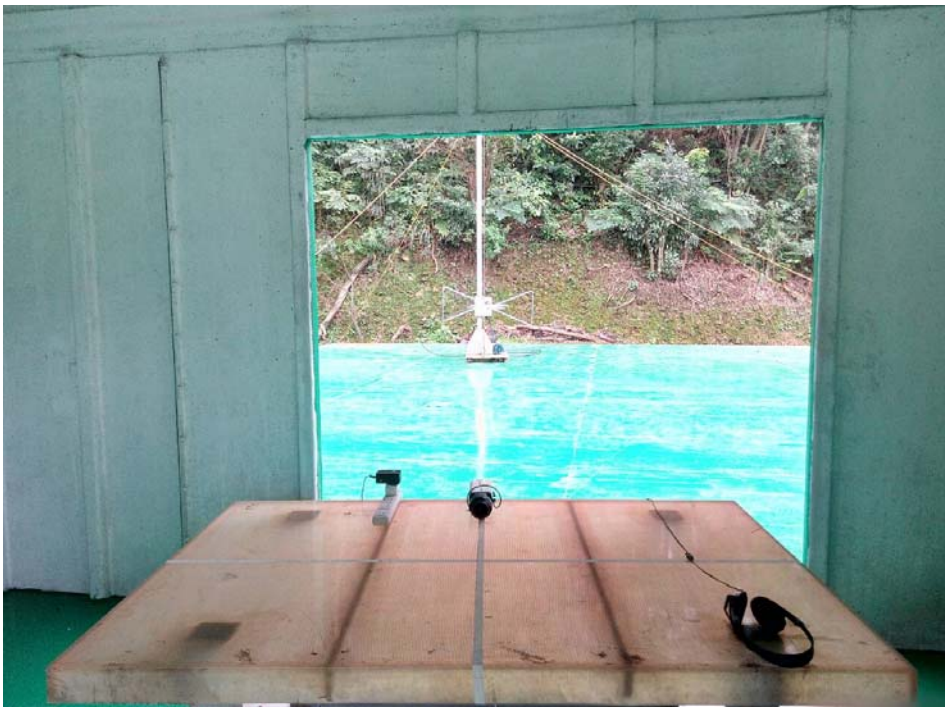


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	61.13	-12.68	48.45	70.00	-21.55	peak	100	220
2	1250.000	55.34	-12.68	42.66	50.00	-7.34	AVG	100	220
3	1500.000	52.43	-10.87	41.56	70.00	-28.44	peak	100	95
4	1500.000	45.95	-10.87	35.08	50.00	-14.92	AVG	100	95
5	2500.000	49.59	-5.99	43.60	70.00	-26.40	peak	100	180
6	2500.000	46.76	-5.99	40.77	50.00	-9.23	AVG	100	180

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

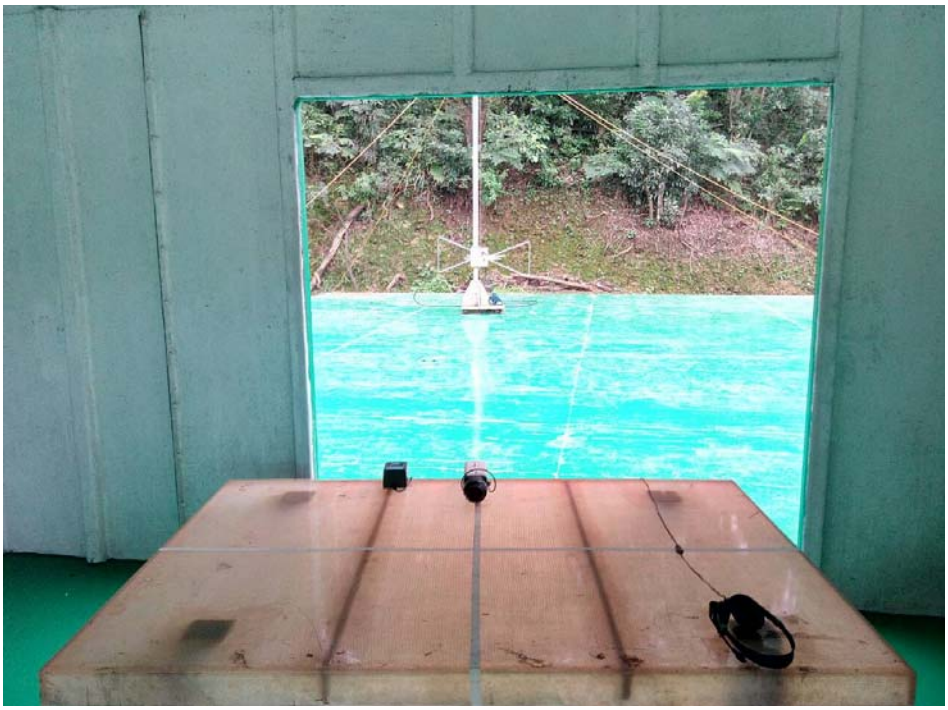
4.2.7 Photographs of Test Configuration

Radiated Emission Test (30MHz~1GHz)
Test Mode A

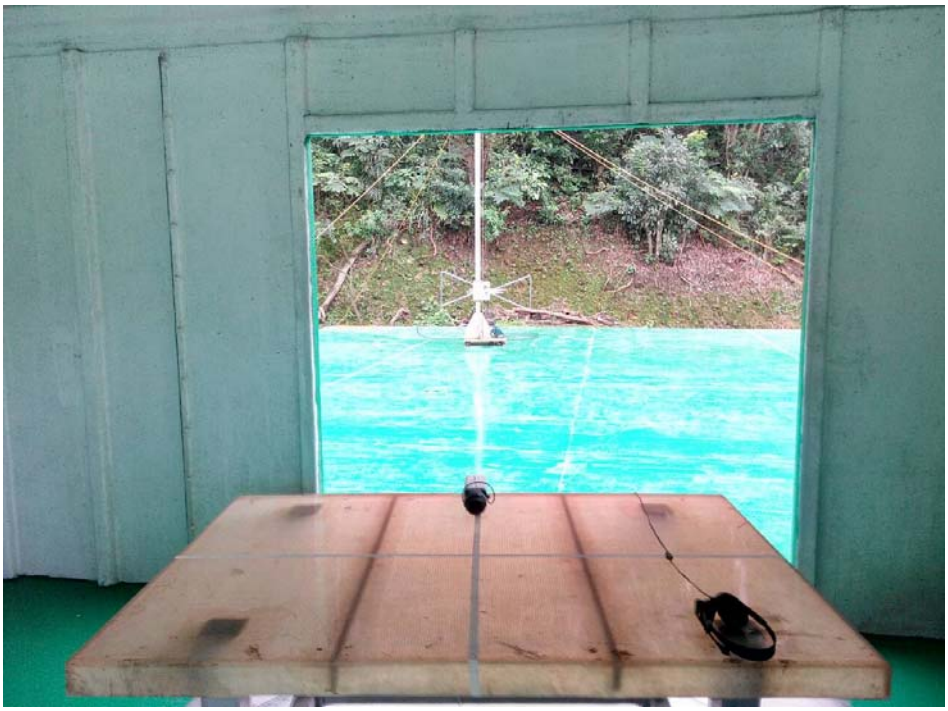


Radiated Emission Test (30MHz~1GHz)

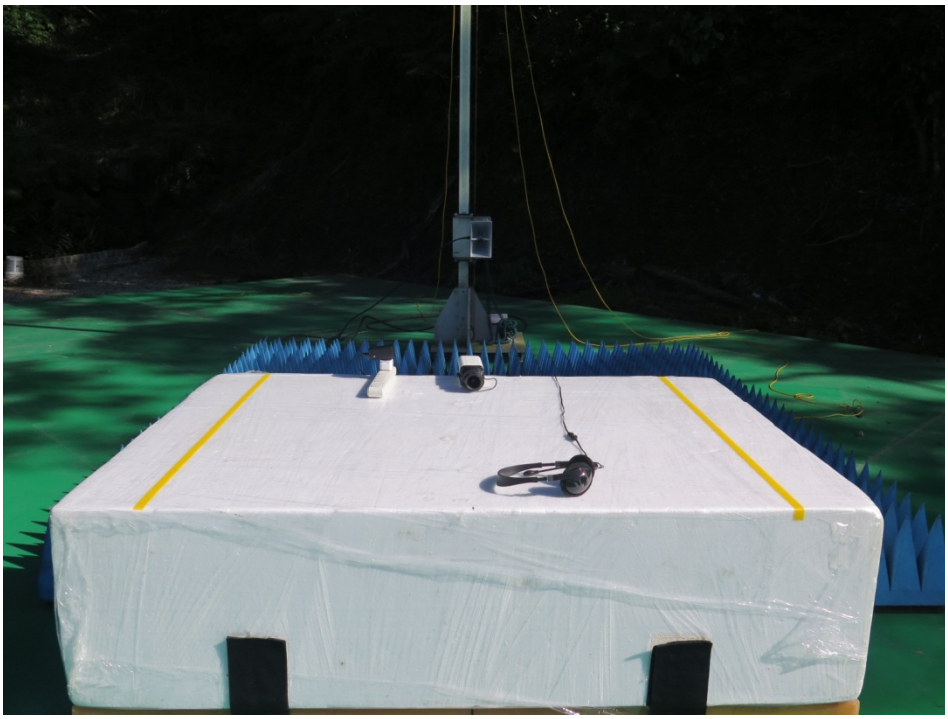
Test Mode B

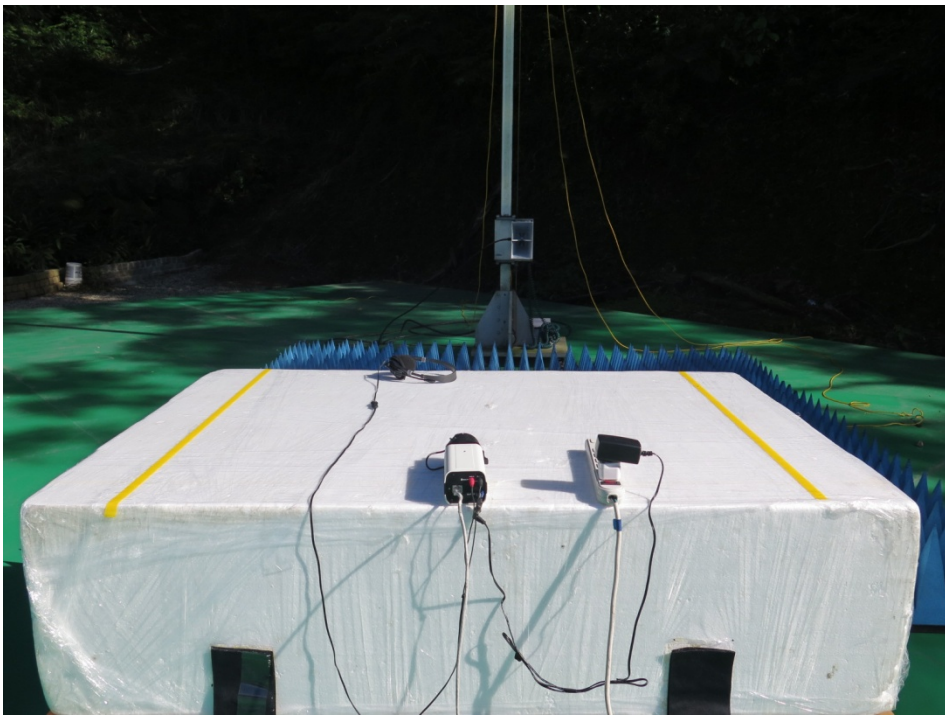


Radiated Emission Test (30MHz~1GHz)
Test Mode C

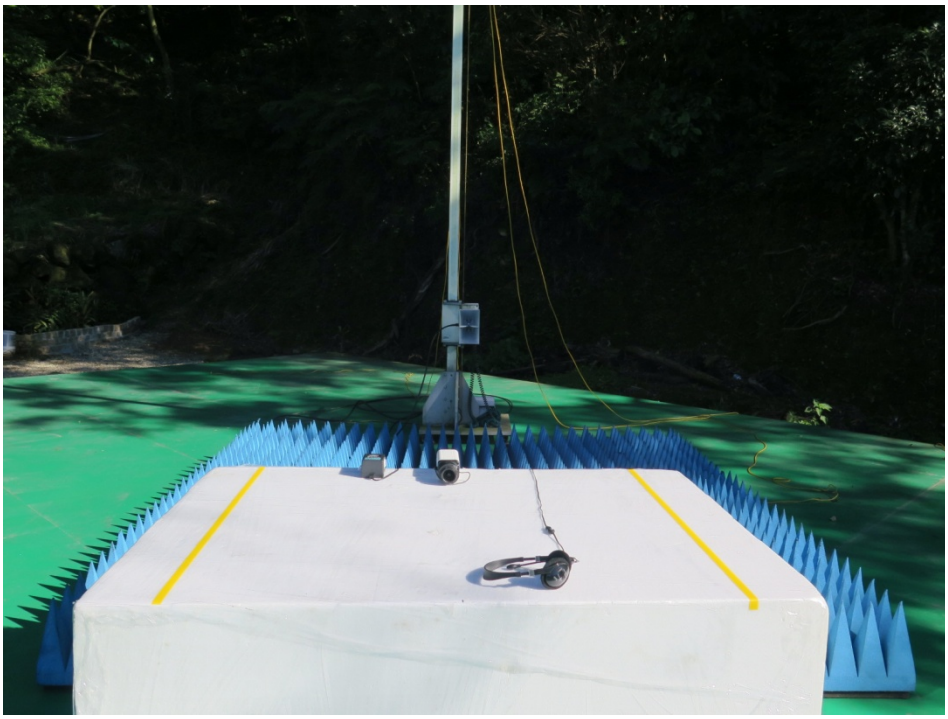


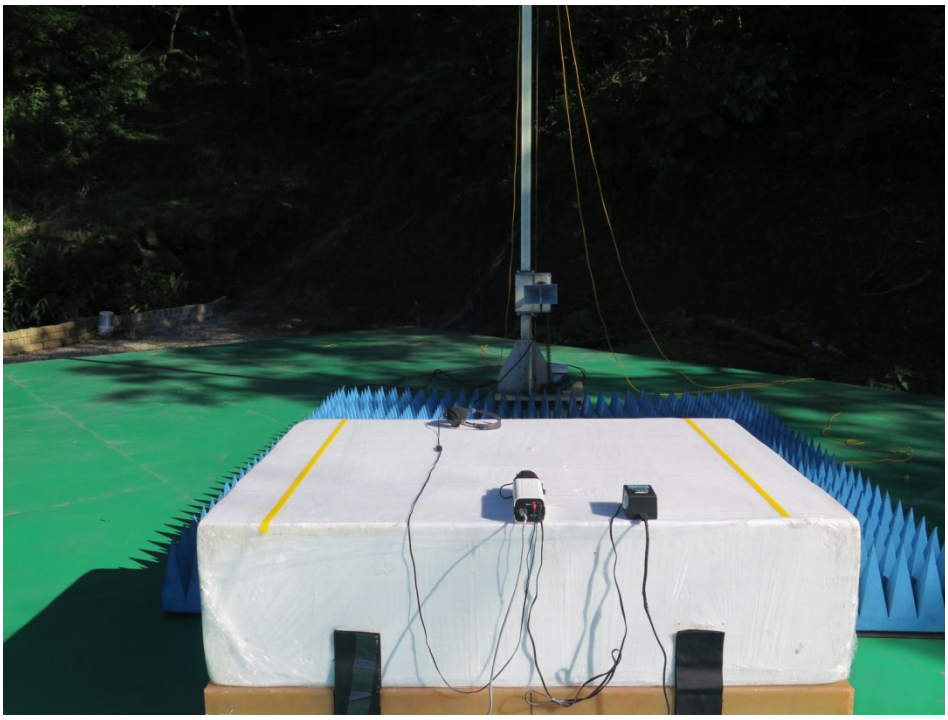
Radiated Emission Test (Above 1GHz)
Test Mode A



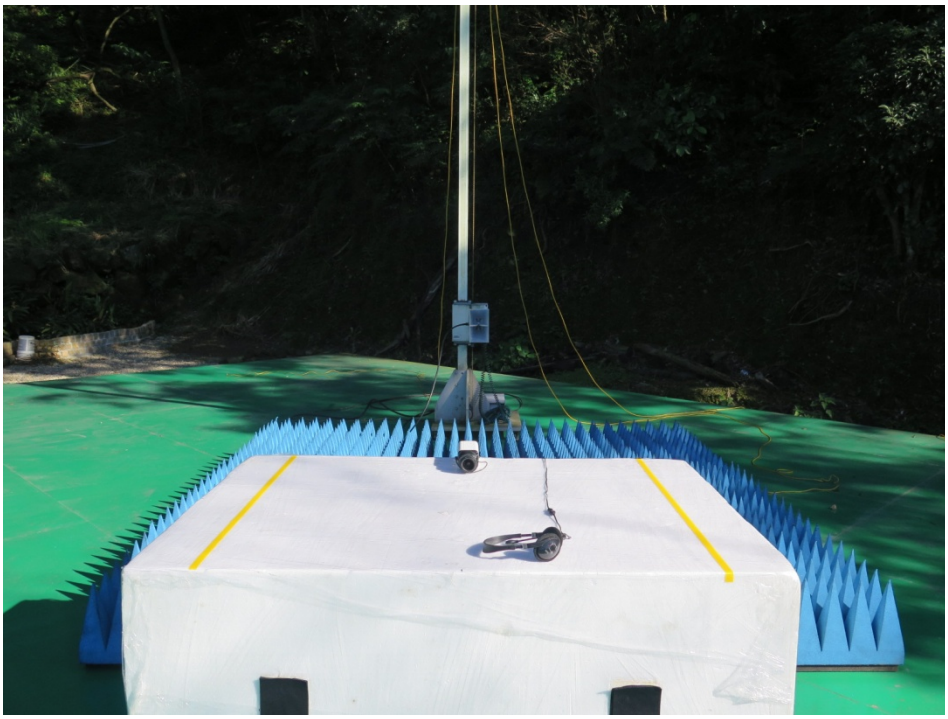


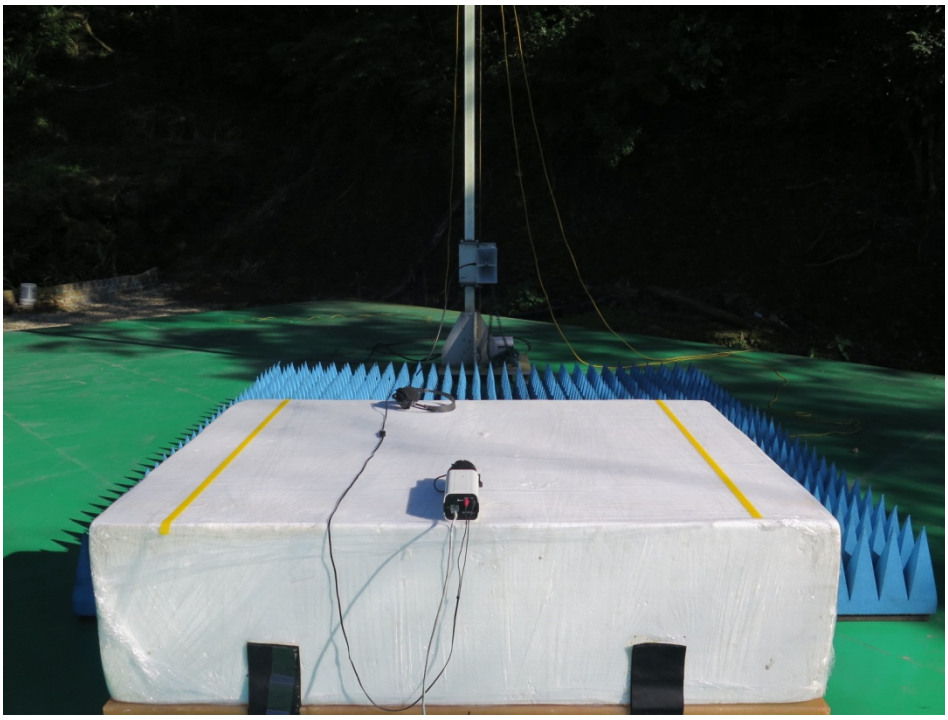
Radiated Emission Test (Above 1GHz)
Test Mode B





Radiated Emission Test (Above 1GHz)
Test Mode C





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