



VCCI Test Report

Issued date: May 14, 2018

Project No.: 17Q111504

Product : Network Camera

Model : IP9165-HT, IP9165-HP, IP9165-LPC, IP9165-HPPM, IP9165-LPCTW

Applicant : VIVOTEK INC.

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

Report No: WD-EV-R-180201-A0

According to
VCCI-CISPR32:2016, Class B

Authorized Signatory :  / Ken Huang



Wendell Industrial Co., Ltd
Wendell Electrical Testing Lab.

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

Table of Contents

1	Certification	5
1.1	Summary of Test Result	6
2	Test Configuration of Equipment Under Test	7
2.1	Test Facility	7
2.2	Measurement Uncertainty	8
2.2.1	Conducted Emission test.....	8
2.2.2	Conducted emission at telecom port test	8
2.2.3	Radiated Emission test.....	8
3	Generation Information	10
3.1	Description of EUT.....	10
3.2	Description of Test Modes.....	12
3.3	EUT Operating Condition	13
3.4	Description of Support Unit	14
3.5	Configuration of System Under Test.....	15
4	Emission Test.....	17
4.1	Conducted Emission Measurement (Frequency Range 150 KHz-30MHz).....	17
4.1.1	Limit of Conducted Emission Measurement	17
4.1.2	Test Instrument	18
4.1.3	Test Procedure.....	19
4.1.4	Deviation from Test Standard	19
4.1.5	Test Setup.....	20
4.1.6	Test Result	21
4.1.7	Photographs of Test Configuration	25
4.2	Conducted Emission at Telecommunication Ports Test	27
4.2.1	Limit of Conducted Emission at Telecommunication Ports Test.....	27
4.2.2	Test Instrument	28
4.2.3	Test Procedure.....	29
4.2.4	Deviation from Test Standard	29
4.2.5	Test Setup.....	30
4.2.6	Test Result	31
4.2.7	Photographs of Test Configuration	40
4.3	Radiated Emission Measurement	43
4.3.1	Limits of Radiated Emission Measurement	43
4.3.2	Test Instrument	45
4.3.3	Test Procedure.....	47
4.3.4	Deviation from Test Standard	47
4.3.5	Test Setup.....	48
4.3.6	Test Result	50
4.3.7	Photographs of Test Configuration	62



History of this test report

Report No.	Issue date	Description
WD-EV-R-180201-A0	May 14, 2018	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-EV-R-180201-A0	May 14, 2018	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: IP9165-HT, IP9165-HP, IP9165-LPC, IP9165-HPPM, IP9165-LPCTW

Applicant: VIVOTEK INC.

Tested: Apr. 10 ~ Apr. 18, 2018

Standard: VCCI-CISPR32:2016, Class B

The above equipment (Model: IP9165-HT) has been tested by **Wendell Electrical Testing Lab.**, 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
VCCI-TECHNICAL REQUIREMENTS (VCCI-CISPR 32: 2016) CISPR 32: 2015	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

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 and Conducted disturbance at telecommunication ports Tests

W01: 5F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan (R.O.C.)

Radiated emission Test (OATS)

W03: No.38-20, Mujiliao, Sanzhi Dist., New Taipei City 252, Taiwan (R.O.C.)

Radiated emission (9*6*6 Chamber), Conducted disturbance at mains terminals and Conducted disturbance at telecommunication ports Tests

W06: No.67-9, Shimen Rd., Tucheng Dist., New Taipei City 23654, 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 uncertainty 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})	VCCI Site Registration No.	Note
W01	150 kHz~30 MHz	3.19	C-4684	N/A
W06	150 kHz ~ 30 MHz	2.81	C-20027	N/A

2.2.2 Conducted emission at telecom port test

Test Site	Measurement Freq. Range	dB (U_{cispr})	VCCI Site Registration No.	Note
W01	150 kHz~30 MHz	3.16	T-2224	N/A
W06	150 kHz ~ 30 MHz	4.54	T-20027	N/A

2.2.3 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB (U_{cispr})	VCCI Site Registration No.	Note
W03	30 MHz ~ 200 MHz	V	4.29	R-20028	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
W03	1 GHz ~ 3 GHz	V	4.47	G-20040	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



Test Site	Measurement Freq. Range	Ant	dB (U_{cispr})	VCCI Site Registration No.	Note
W06	30 MHz ~ 200 MHz	V	4.38	R-20027	N/A
	30 MHz ~ 200 MHz	H	4.05		N/A
	200 MHz ~ 1000 MHz	V	4.05		N/A
	200 MHz ~ 1000 MHz	H	3.91		N/A
W06	1 GHz ~ 6 GHz	V	5.13	G-20039	N/A
	1 GHz ~ 6 GHz	H	5.03		N/A



3 Generation Information

3.1 Description of EUT

Product	Network Camera
Brand	VIVOTEK
Model No.	IP9165-HT, IP9165-HP, IP9165-LPC, IP9165-HPPM, IP9165-LPCTW
Applicant	VIVOTEK INC.
Received date	Apr. 02, 2018
EUT Power Rating	24Vac (from adapter) or 12Vdc (from adapter) or 48Vdc (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 note.

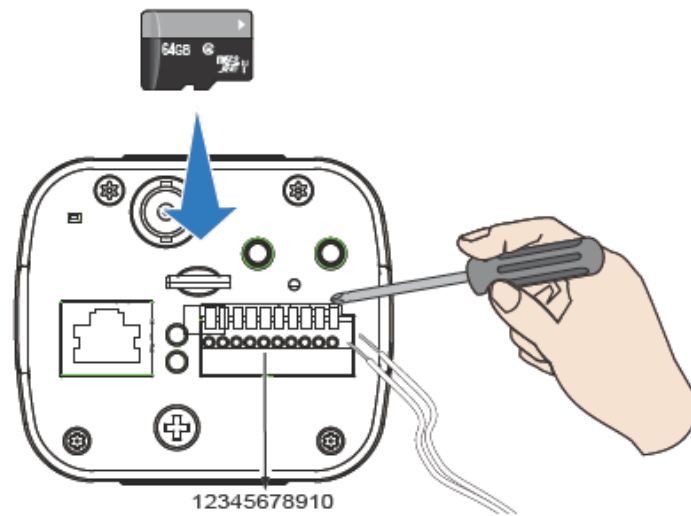
Note:

- The following models are provided to this EUT.

Brand Name	Model No.	Difference	
		ME	Lens
VIVOTEK	IP9165-HT	Iris: 5pin ICR	3.9-10mm iCS
	IP9165-HP	Iris: 4pin ICR	Ricom 3.6-17mm P-iris
	IP9165-LPC	Iris: 5pin IR Pass	Leading 12-40mm P-iris
	IP9165-HPPM	Iris: 4pin ICR	Ricom 3.6-17mm P-iris
	IP9165-LPCTW	Iris: 5pin IR Pass	Leading 12-40mm P-iris

- The EUT's highest operating frequency is 1866MHz. Therefore the radiated emission is tested up to 6GHz.

3. The I/O Ports defines as follow:



1	AC/DC pw	12V or 24V, no polarity
2	AC/DC pw	
3	RS485+	
4	RS485-	
5	DI- (common GND for all DIs)	
6	DI2+	
7	DI1+	
8	DO2-	
9	DO1-	
10	DO+ (5V)	

Pin 1 is on the left.

3.2 Description of Test Modes

Test results are presented in the report as below.

Test Result	Test Condition
Conducted emission test	
A	AC-AC adapter mode
B	AC-DC adapter mode
Conducted emission test at telecom port test	
A	AC-AC adapter mode, LAN (10Mbps/100Mbps/1Gbps)
B	AC-DC adapter mode, LAN (10Mbps/100Mbps/1Gbps)
C	POE mode, LAN (10Mbps/100Mbps/1Gbps)
Radiated emission 30MHz ~ 1GHz test	
A	AC-AC adapter mode
B	AC-DC adapter mode
C	POE mode
Radiated emission above 1GHz test	
A	AC-AC adapter mode
B	AC-DC adapter mode
C	POE mode

Note:

1. For conducted emission, the EUT has been pre-tested frequency was 50MHz and 60MHz, and 50MHz was the worst case for final test.
2. For conducted emission test at telecom port, the EUT has been pre-tested frequency 50MHz and 60MHz, and 60MHz was the worst case for final test.
3. For radiated emission, the EUT has been pre-tested frequency was 50MHz and 60MHz, and 60MHz was the worst case for final test.



3.3 EUT Operating Condition

Test mode A& B

- 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 communication partner sent data to EUT by command "PING" via LAN.
- e. The EUT sent video signal to monitor and displayed on screen.
- f. The server PC show IPCAM's image on browser.
- g. The microphone sent voice signal to EUT.
- h. The EUT sent voice signal to earphone.
- i. The EUT write data with micro SD card.

Test mode C

- a. Placed the EUT on the test table.
- b. Prepared server PC and POE injector to act as a communication partner and placed it outside of testing area.
- c. The EUT was connected to the server PC via LAN and POE.
- d. The communication partner sent data to EUT by command "PING" via LAN.
- e. The EUT sent video signal to monitor and displayed on screen.
- f. The server PC show IPCAM's image on browser.
- g. The microphone sent voice signal to EUT.
- h. The EUT sent voice signal to earphone.
- i. 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	20m non-shielded RJ45 cable 1m non-shielded RJ45 cable	1.8m non-shielded cable	-
2	POE Injector	N/A	N/A	N/A	N/A	20m non-shielded RJ45 cable	N/A	Supplied by client
3	Monitor	DELL	U2410F	CN-0J257M-72872-054-0 NTL	FCC DoC Approved	1.5m non-shielded AV cable to BNC	1.8m non-shielded cable	-
4	Earphone & Microphone	E-books	E-EPA057	N/A	N/A	1.4m non-shielded cable	N/A	-
5	Micro SD Card	ADATA	16GB	N/A	N/A	N/A	N/A	-
6	Console cable (x8)	N/A	N/A	N/A	N/A	40cm non-shielded cable	N/A	-
7	Ground wire	N/A	N/A	N/A	N/A	1m non-shielded cable	N/A	-

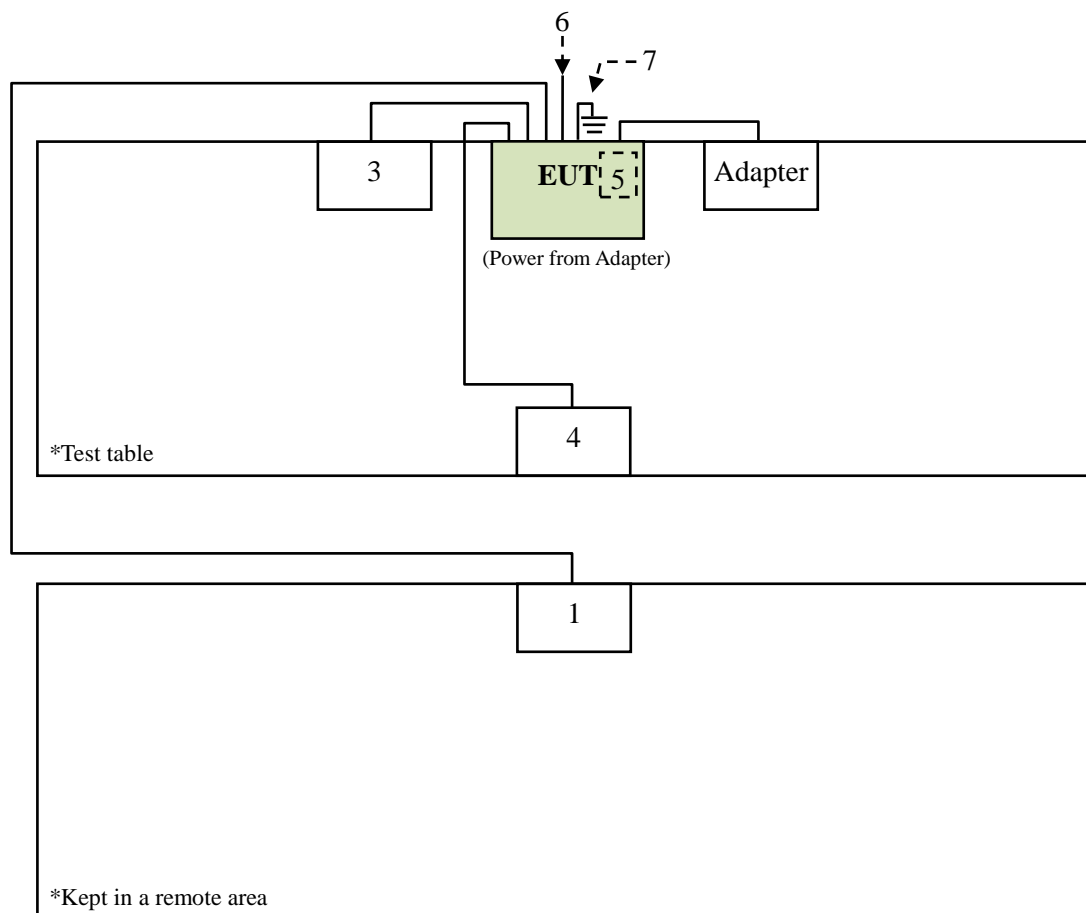
- Note:**
1. The core(s) is(are) originally attached to the cable(s).
 2. Item 1-2 acted as communication partners to transfer data.
 3. The EUT uses the follow adapter and POE:

AC-AC Adapter (Support Unit)	
Brand	AQualities
Model	TAA66-2403500E
Input Power	230Vac, 50Hz
Output Power	24Vac, 3.5A
Power line	Input: 1.8m non-shielded cable Output: 1.8m non-shielded cable

AC-DC Adapter (Support Unit)	
Brand	Honoto
Model	ADS-26SGP-12 12018E
Input Power	100-240Vac, 50/60Hz
Output Power	12Vdc, 1.5A
Power line	Input: 3.6m non-shielded cable Output: 1.8m non-shielded cable

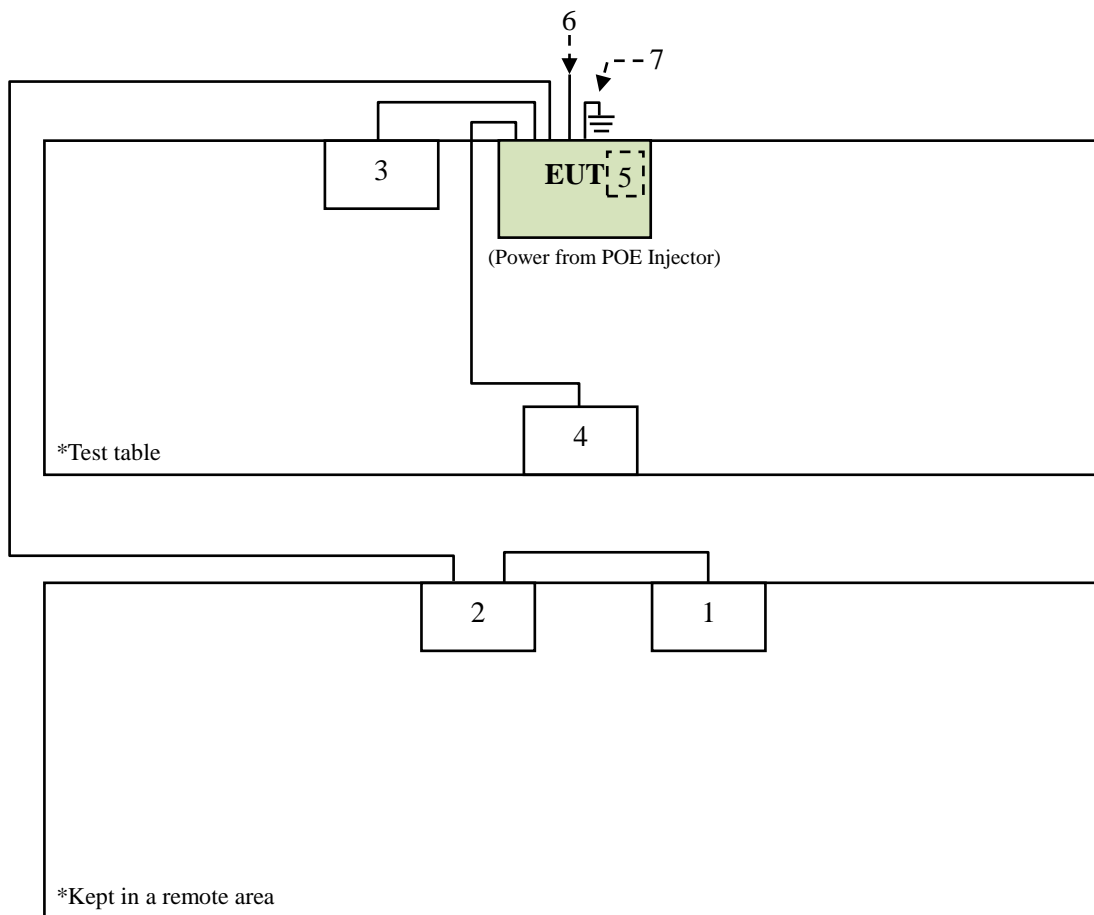
3.5 Configuration of System Under Test

Test mode A & B





Test mode C



4 Emission Test

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

4.1.1 Limit of Conducted Emission Measurement

Class A equipment:

Requirements for conducted emissions from the AC mains power ports of Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(uV)
	Coupling device	Detector type/ bandwidth	
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	79
0.5 to 30			73
0.15 to 0.5	AMN	Average / 9 kHz	66
0.5 to 30			60

Class B equipment:

Requirements for conducted emissions from the AC mains power ports of Class B equipment			
Frequency (MHz)	Measurement		Class B limits dB(uV)
	Coupling device	Detector type/ bandwidth	
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	66 to 56*
0.5 to 5			56
5 to 30			60
0.15 to 0.5	AMN	Average / 9 kHz	56 to 46*
0.5 to 5			46
5 to 30			50

* Decreases with the logarithm of the frequency.

- Note:**
1. The lower limit shall apply at the transition frequencies.
 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 = Insertion loss of LISN + Cable loss
 Margin Level = Measurement Value –Limit Value

4.1.2 Test Instrument

Test Site: W01-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Apr. 10, 2018
2	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 11, 2018
3	V-LISN	Schwarzbeck	NSLK8127	CT-1-104-1	Oct. 17, 2017
4	Test Cable	HANRUIN	5D-FB	CT-1-069-2	Jul. 26, 2017
5	50ohm Termination	N/A	N/A	CT-1-065-1	Apr. 19, 2018
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.

Test Site: W06-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Apr. 10, 2018
2	EMI Test Receiver	R&S	ESR3	CT-1-103	Jun. 21, 2017
3	V-LISN	Schwarzbeck	NSLK8127RC	CT-1-104-1RC	Oct. 17, 2017
4	Test Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-1	Oct. 25, 2017
5	50ohm Termination	HUBER+SUHNER	N/A	CT-1-109-1	Oct. 23, 2017
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.



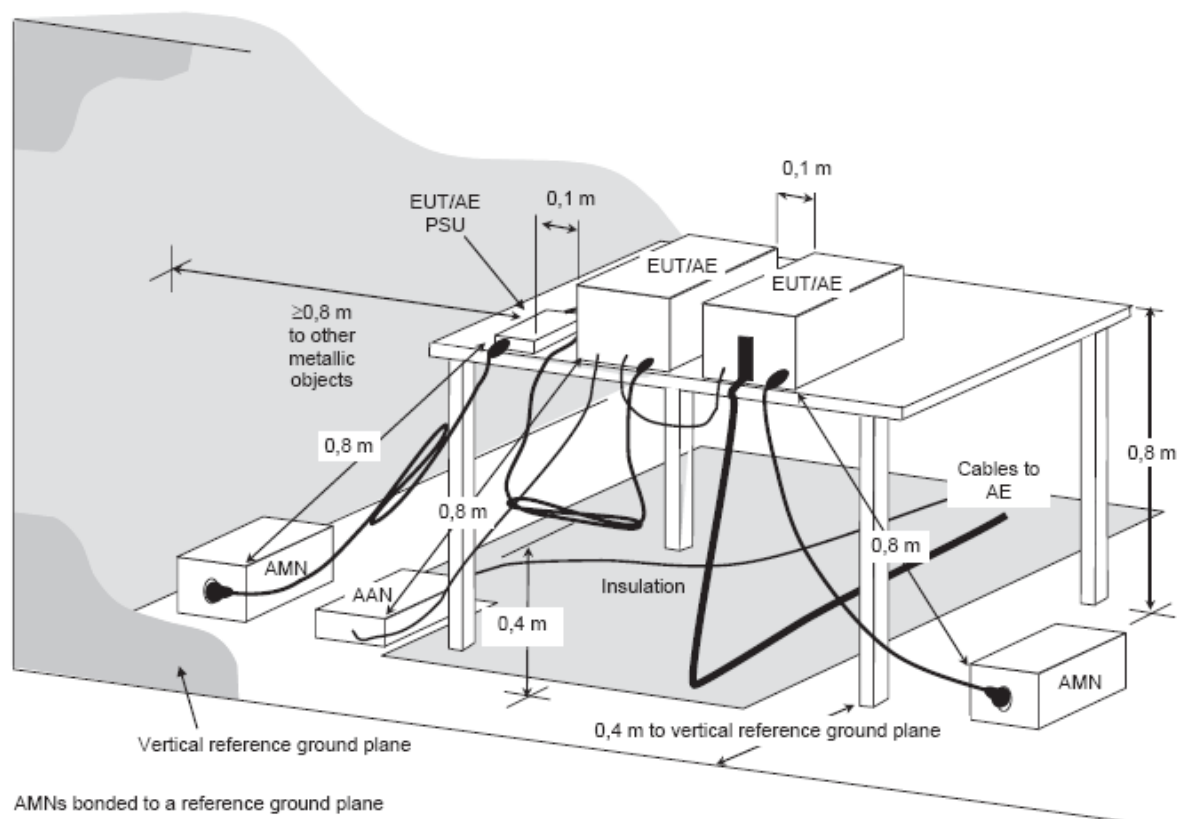
4.1.3 Test Procedure

- 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

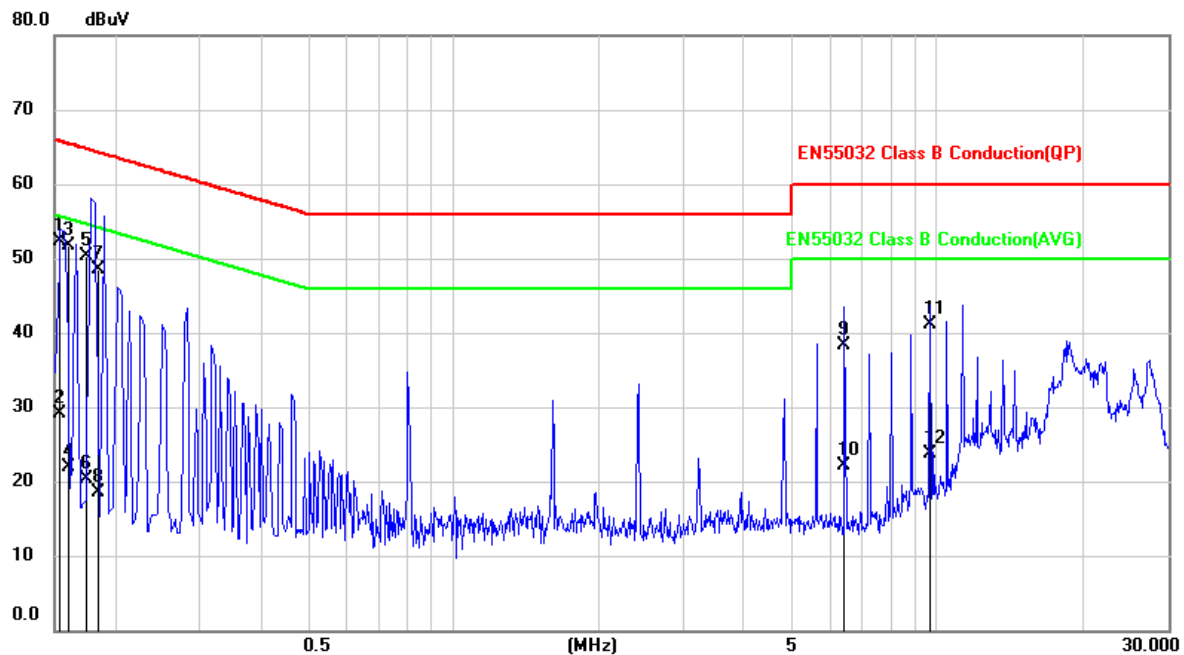
4.1.5 Test Setup



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

4.1.6 Test Result

Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Phase	L
Tested by	Guy Pan	Test Site	W01
Test mode	A		

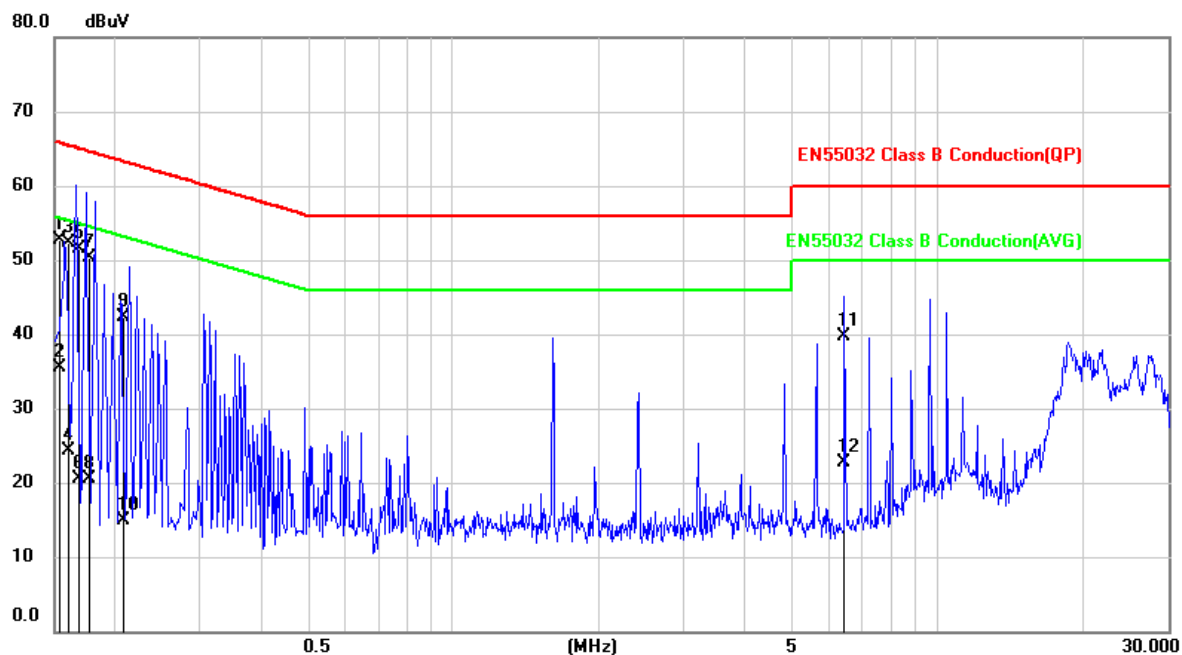


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1525	42.68	9.58	52.26	65.86	-13.60	QP
2	0.1525	19.58	9.58	29.16	55.86	-26.70	AVG
3	0.1613	42.19	9.58	51.77	65.40	-13.63	QP
4	0.1613	12.35	9.58	21.93	55.40	-33.47	AVG
5	0.1737	40.74	9.58	50.32	64.78	-14.46	QP
6	0.1737	10.78	9.58	20.36	54.78	-34.42	AVG
7	0.1850	38.83	9.58	48.41	64.26	-15.85	QP
8	0.1850	8.93	9.58	18.51	54.26	-35.75	AVG
9	6.4384	28.78	9.62	38.40	60.00	-21.60	QP
10	6.4384	12.53	9.62	22.15	50.00	-27.85	AVG
11	9.6640	31.48	9.64	41.12	60.00	-18.88	QP
12	9.6640	14.08	9.64	23.72	50.00	-26.28	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

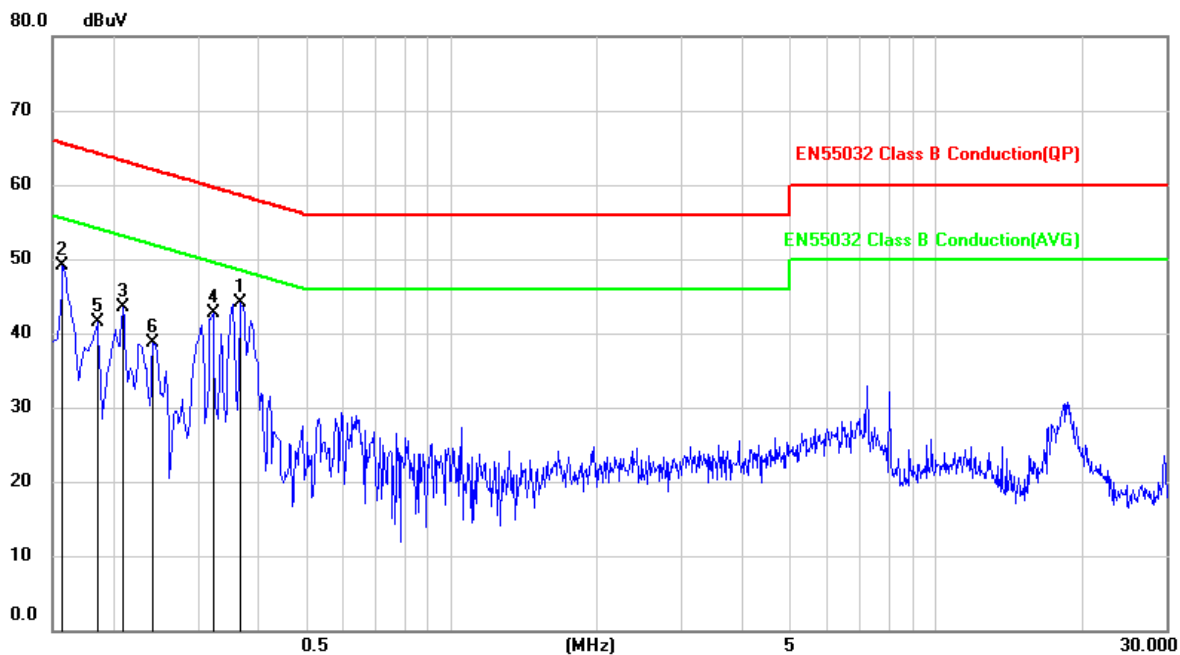
Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Phase	N
Tested by	Guy Pan	Test Site	W01
Test mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1531	43.02	9.67	52.69	65.83	-13.14	QP
2	0.1531	25.82	9.67	35.49	55.83	-20.34	AVG
3	0.1612	42.62	9.67	52.29	65.40	-13.11	QP
4	0.1612	14.65	9.67	24.32	55.40	-31.08	AVG
5	0.1696	41.74	9.67	51.41	64.98	-13.57	QP
6	0.1696	10.83	9.67	20.50	54.98	-34.48	AVG
7	0.1771	40.73	9.66	50.39	64.62	-14.23	QP
8	0.1771	10.86	9.66	20.52	54.62	-34.10	AVG
9	0.2090	32.69	9.66	42.35	63.24	-20.89	QP
10	0.2090	5.29	9.66	14.95	53.24	-38.29	AVG
11	6.4379	29.95	9.70	39.65	60.00	-20.35	QP
12	6.4379	13.03	9.70	22.73	50.00	-27.27	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

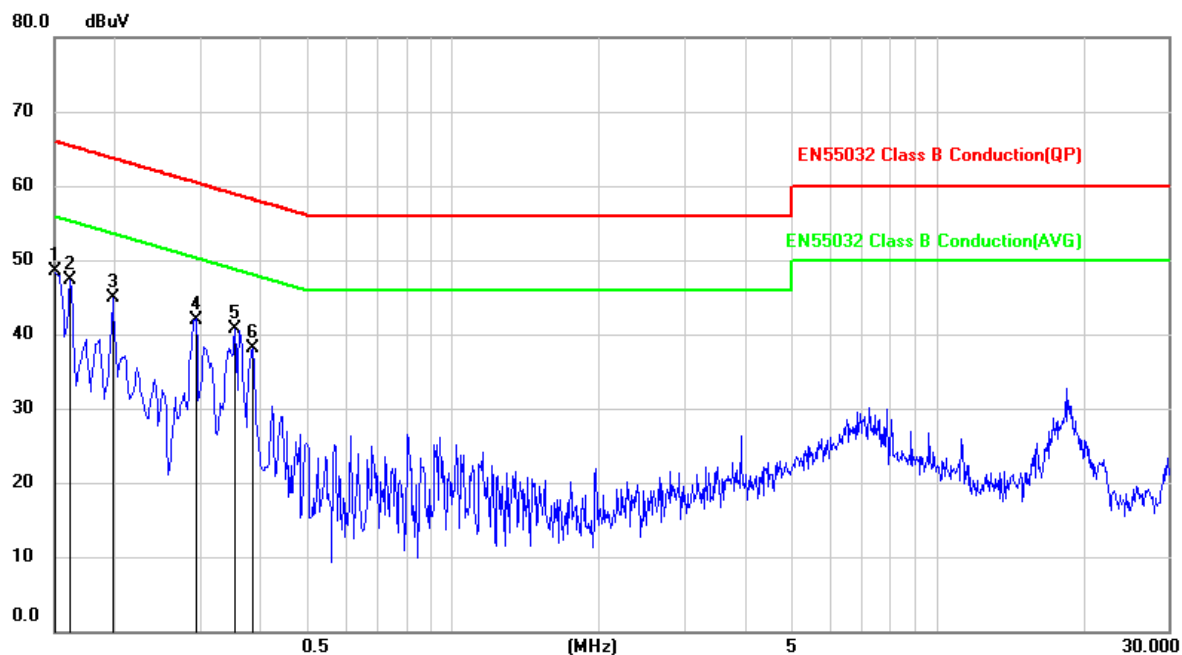
Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Phase	L
Tested by	Guy Pan	Test Site	W01
Test mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3660	34.53	9.57	44.10	58.59	-14.49	peak
2	0.1580	39.57	9.58	49.15	65.57	-16.42	peak
3	0.2100	33.88	9.58	43.46	63.21	-19.75	peak
4	0.3220	33.15	9.57	42.72	59.66	-16.94	peak
5	0.1860	31.86	9.58	41.44	64.21	-22.77	peak
6	0.2420	29.06	9.58	38.64	62.03	-23.39	peak

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	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Phase	N
Tested by	Guy Pan	Test Site	W01
Test mode	B		

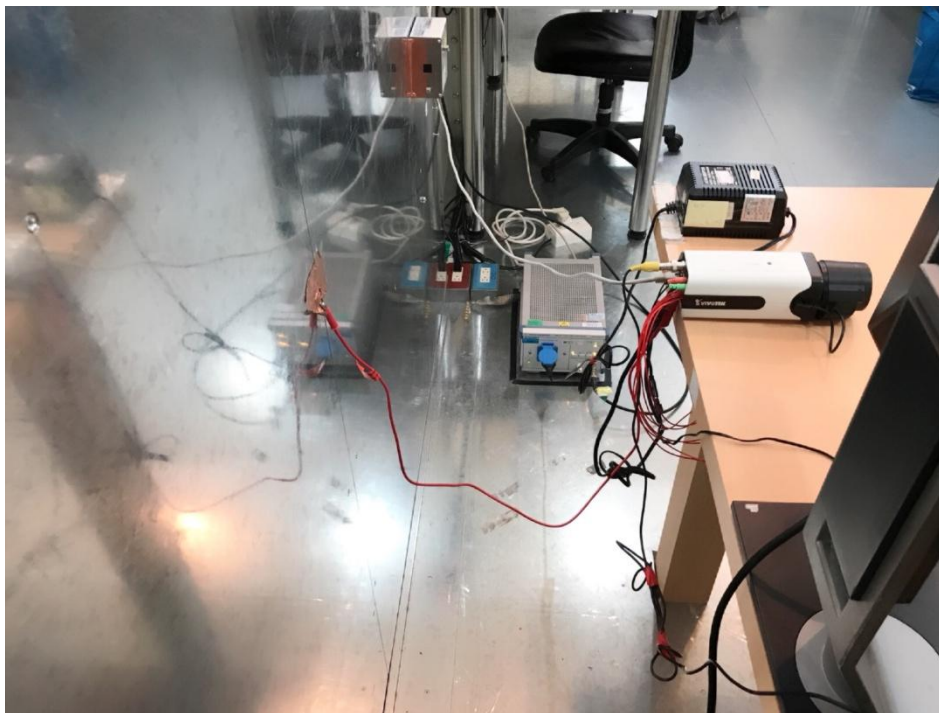


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	38.82	9.67	48.49	66.00	-17.51	peak
2	0.1620	37.68	9.67	47.35	65.36	-18.01	peak
3	0.1980	35.28	9.66	44.94	63.69	-18.75	peak
4	0.2940	32.34	9.66	42.00	60.41	-18.41	peak
5	0.3540	31.05	9.66	40.71	58.87	-18.16	peak
6	0.3860	28.44	9.66	38.10	58.15	-20.05	peak

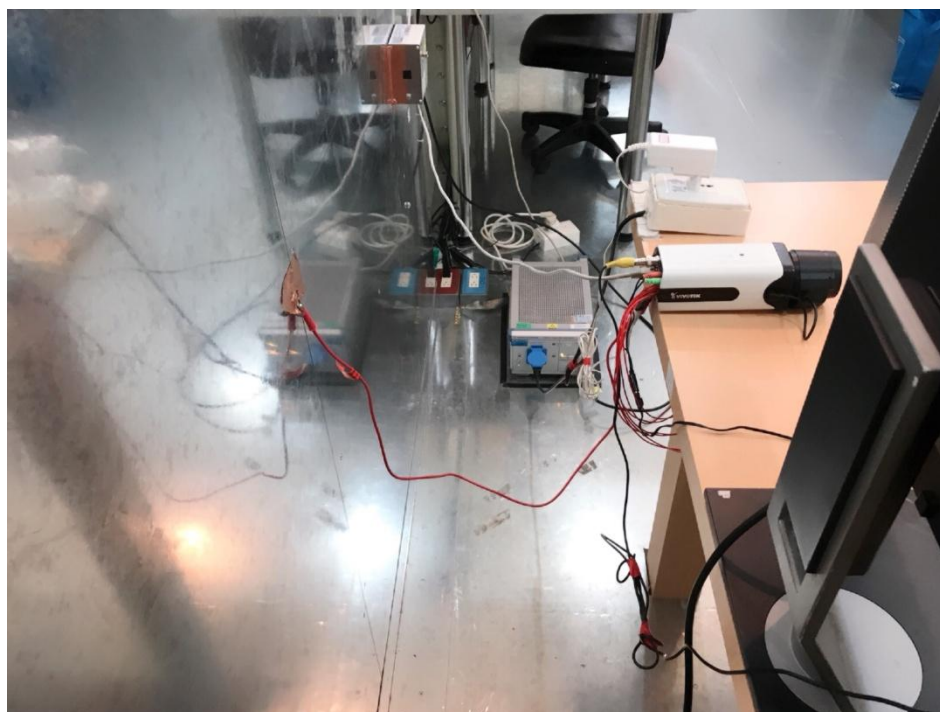
Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of LISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

4.1.7 Photographs of Test Configuration

Test mode A



Test mode B



4.2 Conducted Emission at Telecommunication Ports Test

4.2.1 Limit of Conducted Emission at Telecommunication Ports Test

Class A equipment:

Requirements for asymmetric mode conducted emissions from Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(uV)
	Coupling device	Detector type/ bandwidth	
0.15 to 0.5	AAN	Quasi Peak / 9 kHz	97 to 87*
0.5 to 30			87
0.15 to 0.5	AAN	Average / 9 kHz	84 to 74*
0.5 to 30			74

* Decreases with the logarithm of the frequency.

Class B equipment:

Requirements for asymmetric mode conducted emissions from Class B equipment			
Frequency (MHz)	Measurement		Class B limits dB(uV)
	Coupling device	Detector type/ bandwidth	
0.15 to 0.5	AAN	Quasi Peak / 9 kHz	84 to 74*
0.5 to 30			74
0.15 to 0.5	AAN	Average / 9 kHz	74 to 64*
0.5 to 30			64

* Decreases with the logarithm of the frequency.

- Note:**
1. The lower limit shall apply at the transition frequencies.
 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 = Insertion loss of ISN + Cable loss
 Margin Level = Measurement Value – Limit Value

4.2.2 Test Instrument

Test Site: W01-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Apr. 10, 2018
2	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 11, 2018
3	Impedance Stabilization Network	TESEQ	T8-CAT6	CT-1-105	Oct. 29, 2017
4	V-LISN	Schwarzbeck	NSLK8127	CT-1-104-1	Oct. 17, 2017
5	Test Cable	HANRUIN	5D-FB	CT-1-069-1	Jul. 26, 2017
6	50ohm Termination	N/A	N/A	CT-1-065-2	Apr. 19, 2018
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.

Test Site: W06-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Apr. 10, 2018
2	EMI Test Receiver	R&S	ESR3	CT-1-103	Jun. 21, 2017
3	V-LISN	Schwarzbeck	NSLK8127RC	CT-1-104-1RC	Oct. 17, 2017
4	ISN	FCC	F-071115-1057-1-09	CT-1-027	Apr. 25, 2018
5	Test Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	Oct. 25, 2017
6	50ohm Termination	HUBER+SUHNER	N/A	CT-1-109-2	Oct. 23, 2017
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.

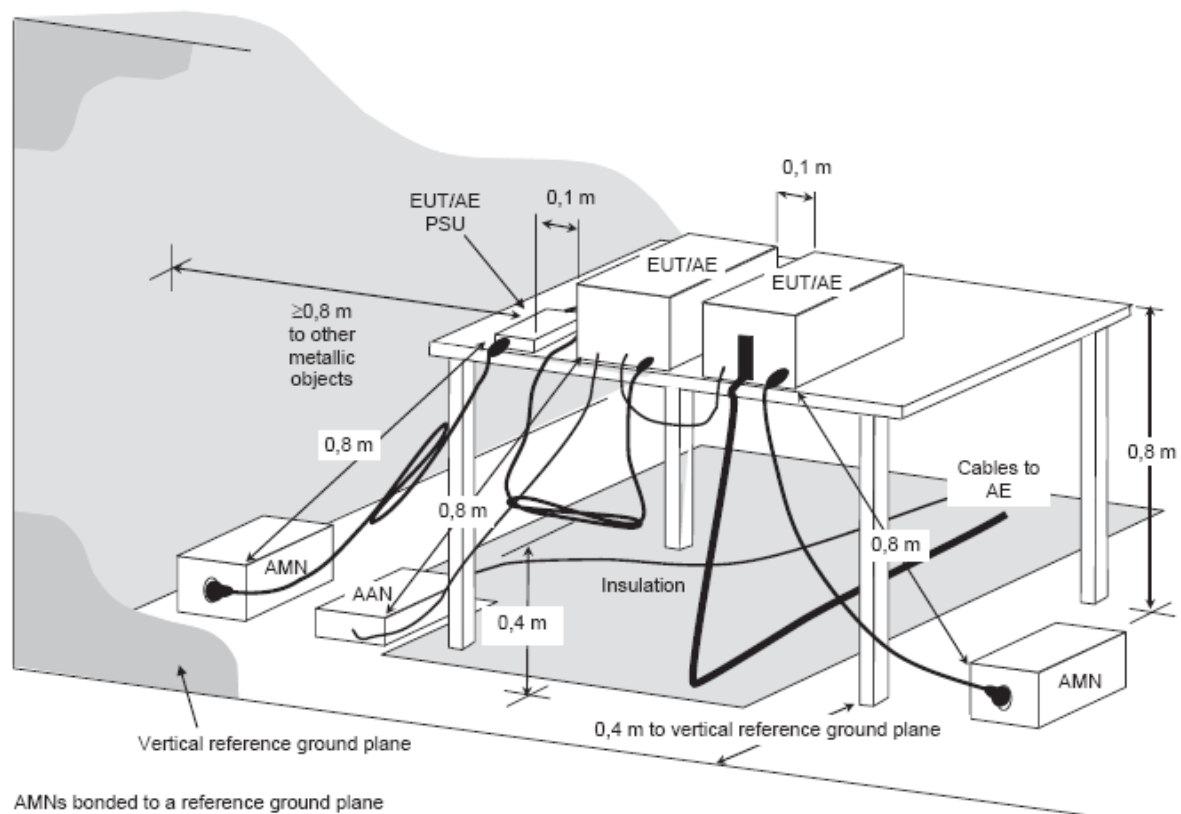


4.2.3 Test Procedure

- 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

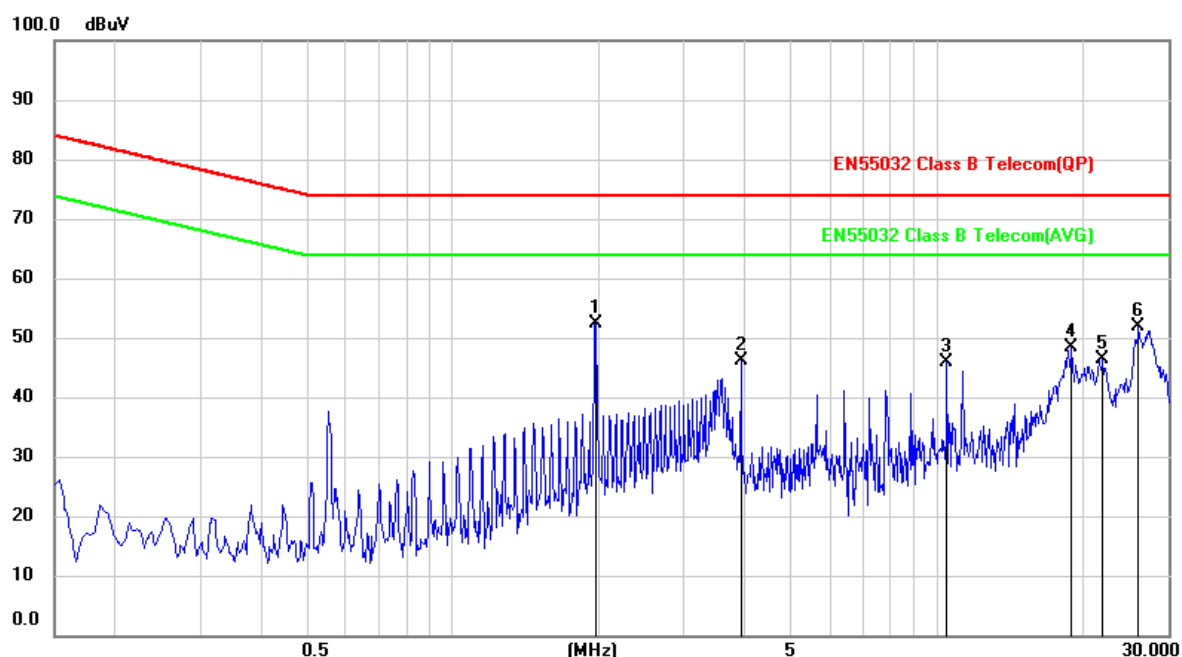
No deviation



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

4.2.6 Test Result

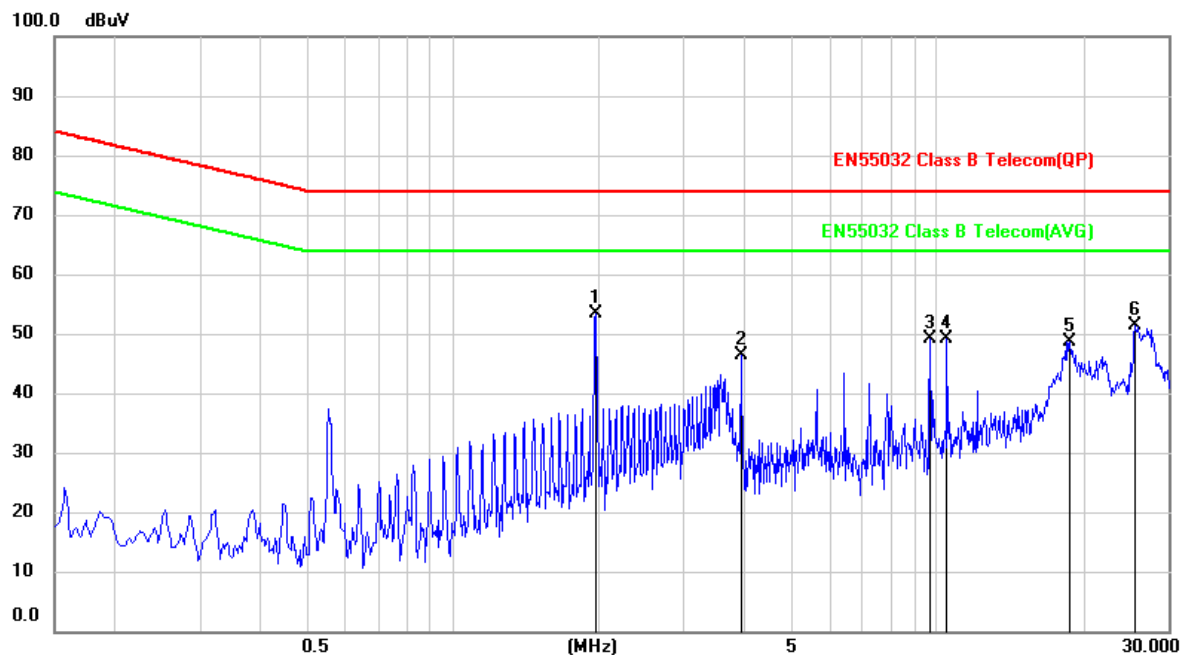
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9700	42.91	9.54	52.45	74.00	-21.55	peak
2	3.9300	36.65	9.52	46.17	74.00	-27.83	peak
3	10.4700	36.25	9.56	45.81	74.00	-28.19	peak
4	18.9500	38.68	9.63	48.31	74.00	-25.69	peak
5	22.0100	36.85	9.65	46.50	74.00	-27.50	peak
6	26.0340	42.16	9.69	51.85	74.00	-22.15	peak

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

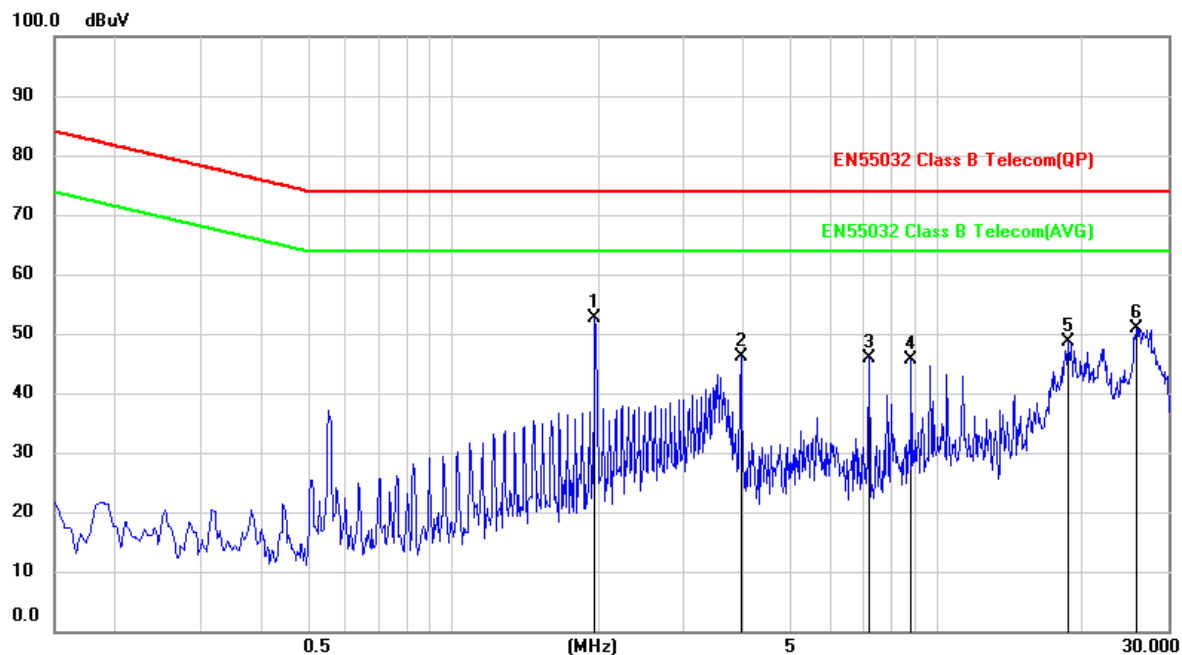
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9740	43.72	9.54	53.26	74.00	-20.74	peak
2	3.9420	36.74	9.52	46.26	74.00	-27.74	peak
3	9.6579	39.53	9.56	49.09	74.00	-24.91	peak
4	10.4619	39.62	9.56	49.18	74.00	-24.82	peak
5	18.7539	38.91	9.63	48.54	74.00	-25.46	peak
6	25.6460	41.58	9.68	51.26	74.00	-22.74	peak

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

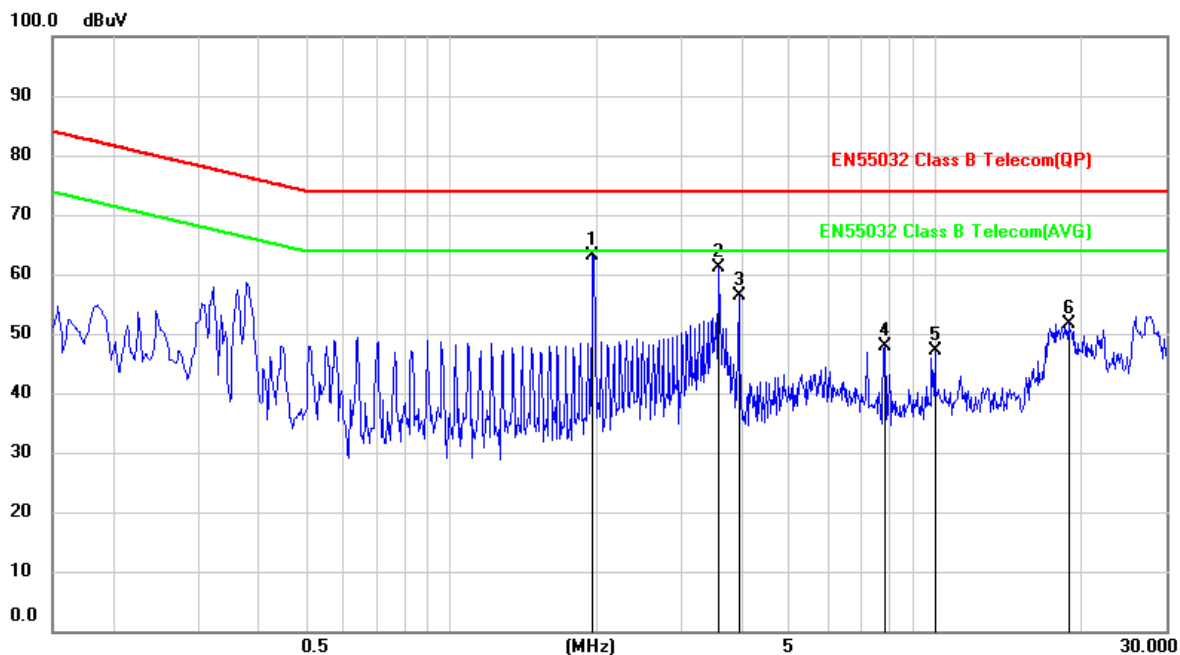
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guy Pan	Test Site	W01
Test mode	A		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9660	42.99	9.54	52.53	74.00	-21.47	peak
2	3.9380	36.57	9.52	46.09	74.00	-27.91	peak
3	7.2460	36.29	9.54	45.83	74.00	-28.17	peak
4	8.8540	36.11	9.55	45.66	74.00	-28.34	peak
5	18.6940	39.08	9.63	48.71	74.00	-25.29	peak
6	25.8380	41.28	9.68	50.96	74.00	-23.04	peak

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

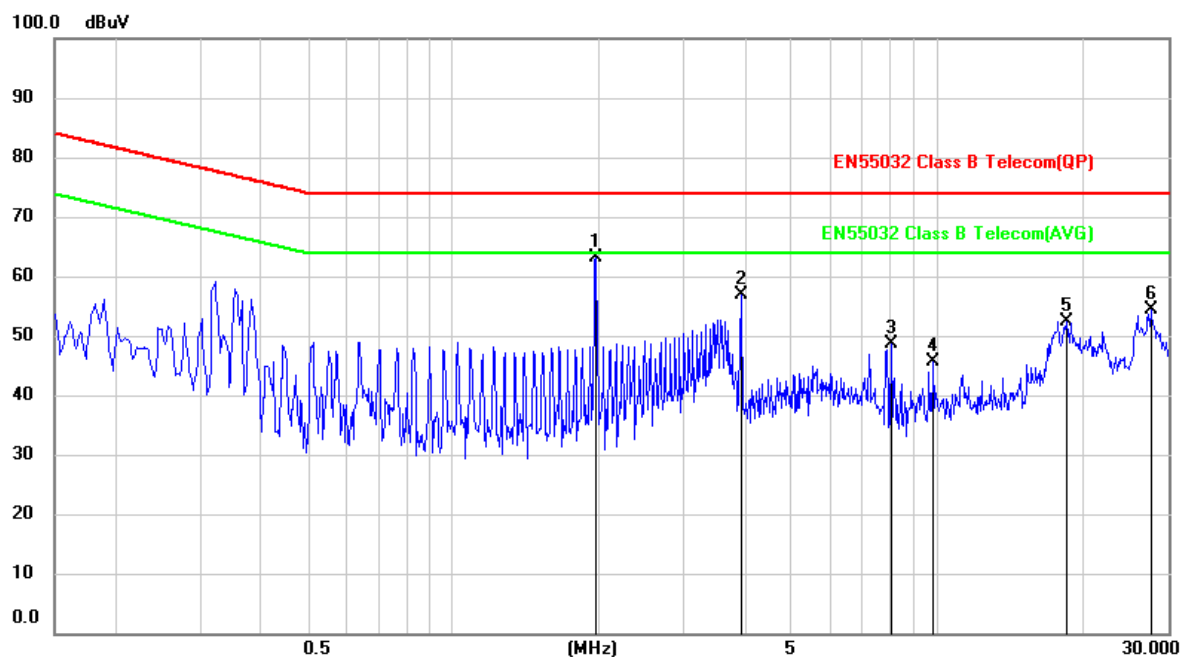
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9660	53.55	9.54	63.09	74.00	-10.91	peak
2	3.5780	51.67	9.52	61.19	74.00	-12.81	peak
3	3.9340	46.89	9.52	56.41	74.00	-17.59	peak
4	7.8740	38.27	9.53	47.80	74.00	-26.20	peak
5	10.0060	37.65	9.56	47.21	74.00	-26.79	peak
6	18.8340	41.99	9.63	51.62	74.00	-22.38	peak

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

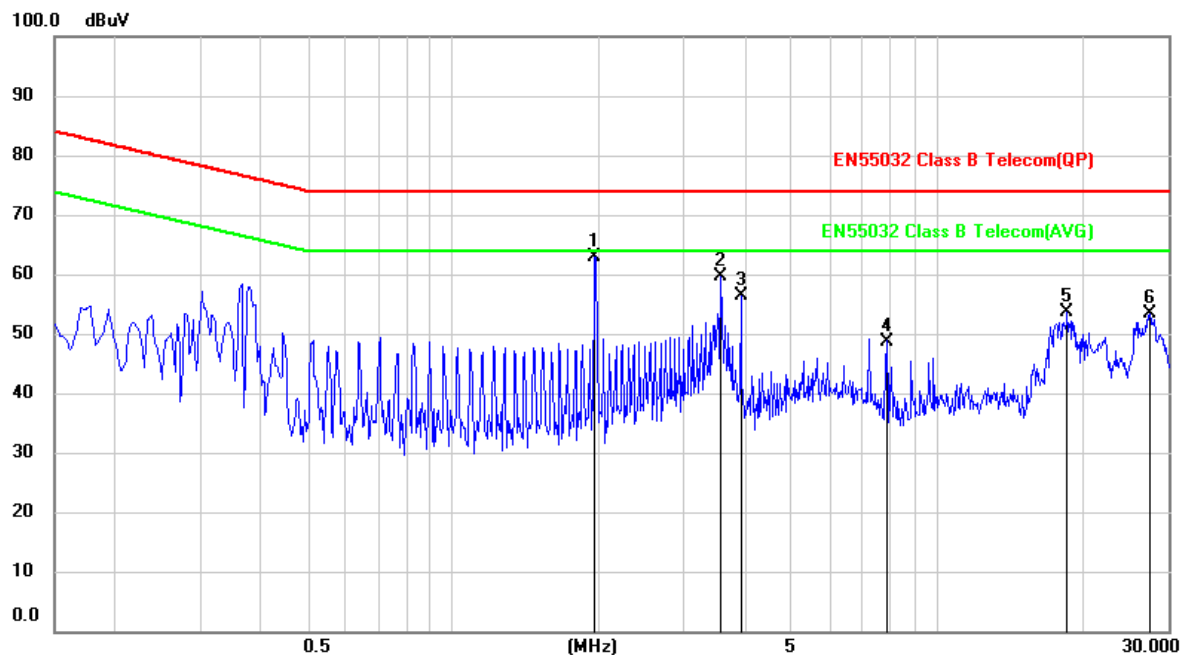
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9700	53.66	9.54	63.20	74.00	-10.80	peak
2	3.9340	47.40	9.52	56.92	74.00	-17.08	peak
3	8.0420	39.04	9.54	48.58	74.00	-25.42	peak
4	9.8300	36.06	9.56	45.62	74.00	-28.38	peak
5	18.4540	42.81	9.63	52.44	74.00	-21.56	peak
6	27.5700	44.55	9.71	54.26	74.00	-19.74	peak

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

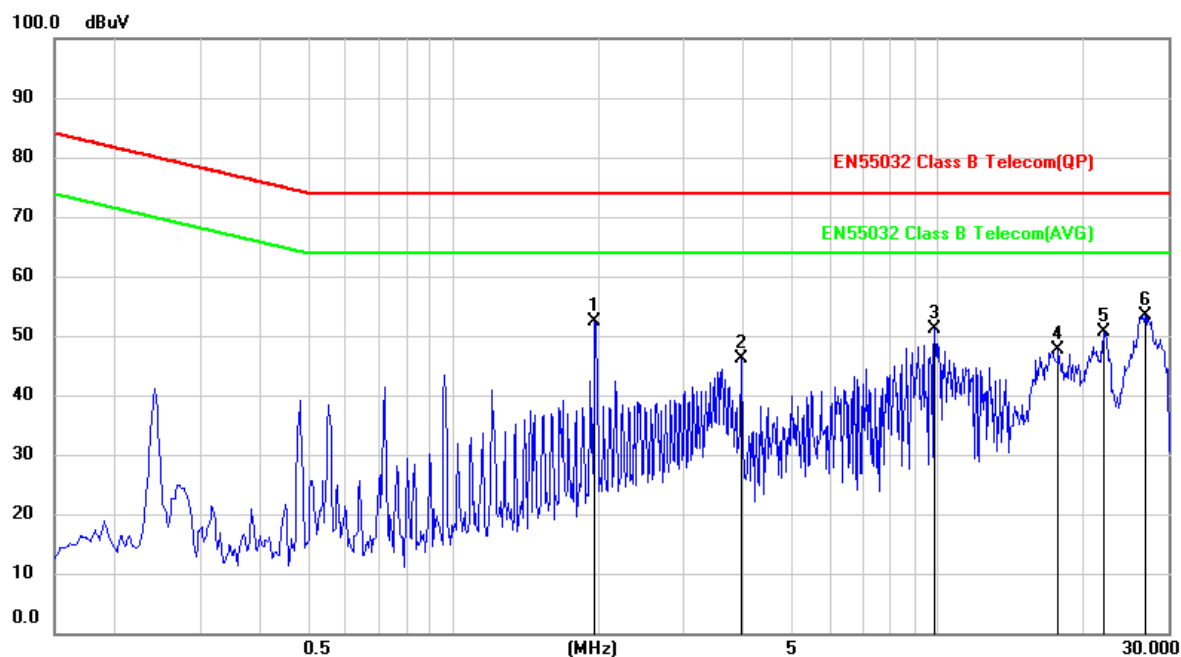
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guy Pan	Test Site	W01
Test mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9620	53.34	9.54	62.88	74.00	-11.12	peak
2	3.5780	50.06	9.52	59.58	74.00	-14.42	peak
3	3.9340	46.90	9.52	56.42	74.00	-17.58	peak
4	7.8620	39.22	9.53	48.75	74.00	-25.25	peak
5	18.5780	43.98	9.63	53.61	74.00	-20.39	peak
6	27.5140	43.66	9.71	53.37	74.00	-20.63	peak

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

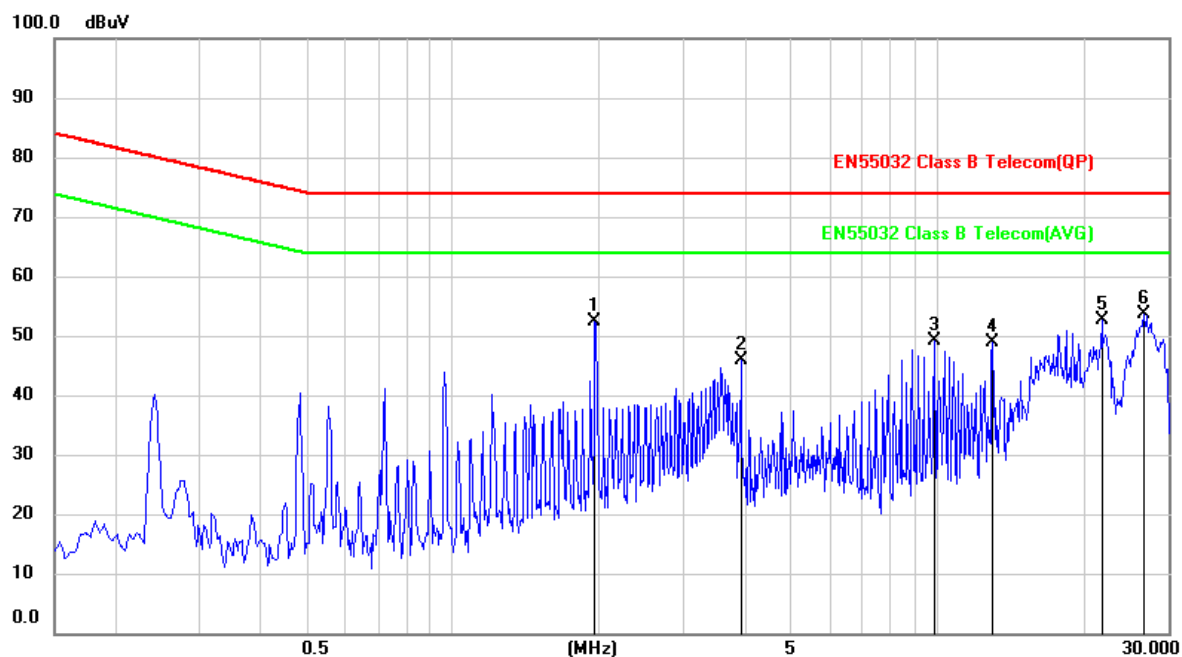
Test Voltage	48Vdc (from POE)	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	C		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9660	42.81	9.54	52.35	74.00	-21.65	peak
2	3.9420	36.65	9.52	46.17	74.00	-27.83	peak
3	9.8700	41.52	9.56	51.08	74.00	-22.92	peak
4	17.8340	38.08	9.62	47.70	74.00	-26.30	peak
5	22.0660	40.88	9.65	50.53	74.00	-23.47	peak
6	26.9380	43.65	9.70	53.35	74.00	-20.65	peak

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

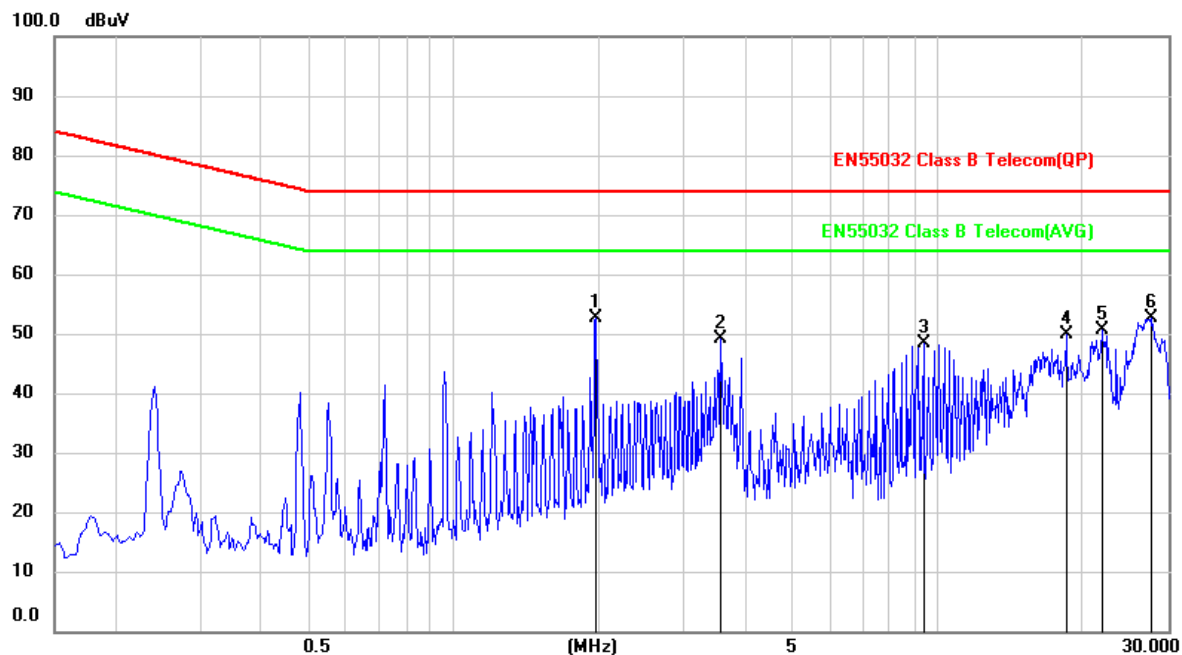
Test Voltage	48Vdc (from POE)	Frequency Range	0.15-30 MHz
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guy Pan	Test Site	W01
Test mode	C		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9660	42.89	9.54	52.43	74.00	-21.57	peak
2	3.9380	36.38	9.52	45.90	74.00	-28.10	peak
3	9.8660	39.61	9.56	49.17	74.00	-24.83	peak
4	13.0060	39.33	9.59	48.92	74.00	-25.08	peak
5	21.9260	42.98	9.65	52.63	74.00	-21.37	peak
6	26.8180	43.89	9.70	53.59	74.00	-20.41	peak

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	26°C, 60% RH	6dB Bandwidth	9 kHz
Test Date	2018/04/18	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guy Pan	Test Site	W01
Test mode	C		

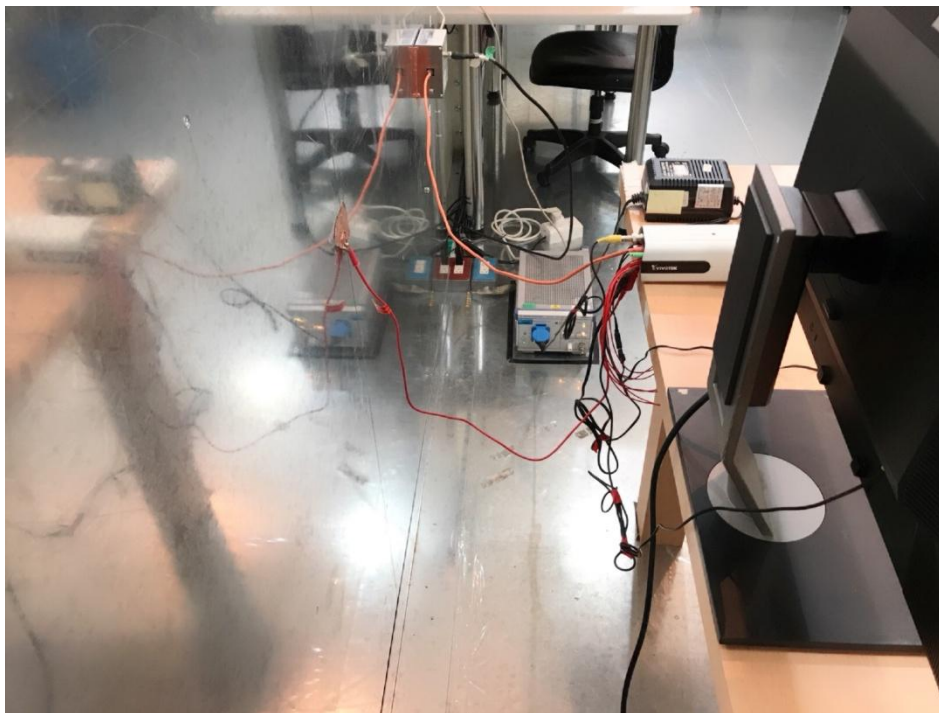


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9700	43.11	9.54	52.65	74.00	-21.35	peak
2	3.5780	39.50	9.52	49.02	74.00	-24.98	peak
3	9.3859	38.87	9.55	48.42	74.00	-25.58	peak
4	18.5020	40.32	9.63	49.95	74.00	-24.05	peak
5	21.8620	41.00	9.65	50.65	74.00	-23.35	peak
6	27.6340	43.00	9.71	52.71	74.00	-21.29	peak

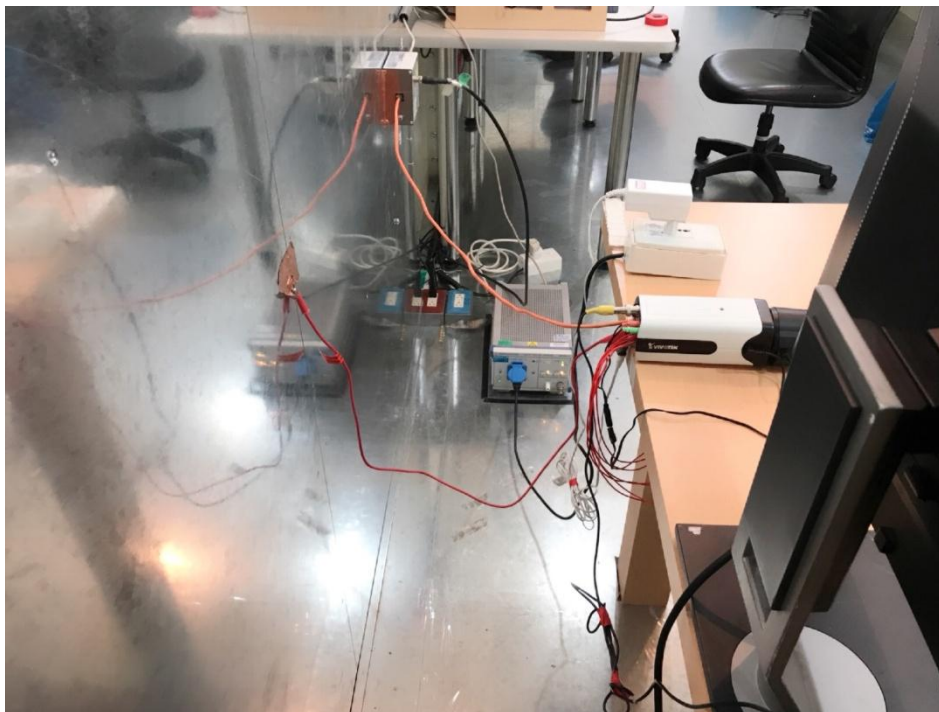
Remark: 1. QP = Quasi Peak, AVG = Average
2. Correction Factor = Insertion loss of ISN + Cable loss
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

4.2.7 Photographs of Test Configuration

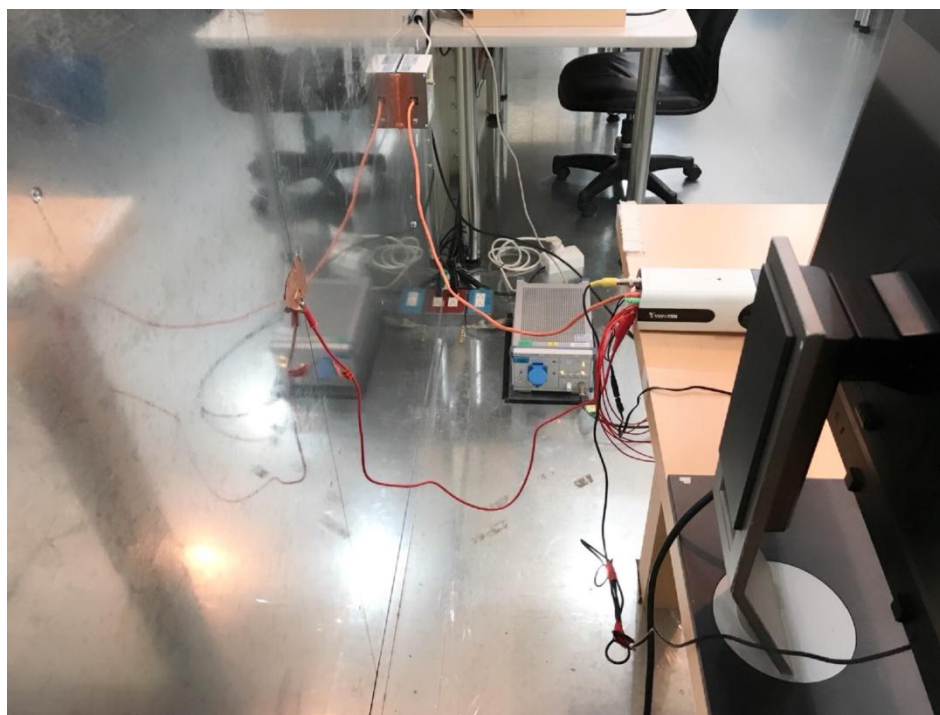
Test mode A



Test mode B



Test mode C



4.3 Radiated Emission Measurement

4.3.1 Limits of Radiated Emission Measurement

According to VCCI-CISPR32 table1 - Required highest frequency for radiated measurement:

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108 \text{ MHz}$	1 GHz
$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz
$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz
$F_x > 1 \text{ GHz}$	$5 \times F_x$ up to a maximum of 6 GHz

Remark:

1. F_x : highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.
2. Where F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

Class A equipment:

Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(uV/m)
	Distance (m)	Detector type/ bandwidth	OATS/SAC
30 to 230	10	Quasi Peak / 120 kHz	40
230 to 1000			47
30 to 230	3		50
230 to 1000			57

Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(uV/m)
	Distance (m)	Detector type/ bandwidth	FSOATS
1000 to 3000	3	Average / 1 MHz	56
3000 to 6000			60
1000 to 3000		Peak / 1 MHz	76
3000 to 6000			80

Class B equipment:

Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment			
Frequency (MHz)	Measurement		Class B limits dB(uV/m)
	Distance (m)	Detector type/ bandwidth	OATS/SAC
30 to 230	10	Quasi Peak / 120 kHz	30
230 to 1000			37
30 to 230	3		40
230 to 1000			47

Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment			
Frequency (MHz)	Measurement		Class B limits dB(uV/m)
	Distance (m)	Detector type/ bandwidth	FSOATS
1000 to 3000	3	Average / 1 MHz	50
3000 to 6000			64
1000 to 3000		Peak / 1 MHz	70
3000 to 6000			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

4.3.2 Test Instrument

Test Site: W03-OATS					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Horn Antenna	Schwarzbeck	BBHA 9120 D	CT-1-001	Apr. 06, 2017
2	Bilog Antenna	Schwarzbeck	VULB 9168	CT-1-002-1	Apr. 05, 2017
3	OATS cable 12m	EMCI	EMCCFD400-N M-NM-12000	CT-1-111	Aug. 15, 2017
4	OATS cable 24m	EMCI	EMCCFD400-N M-NM-24000	CT-1-112	Aug. 15, 2017
5	Preamplifier	EM Electronics Corporation	EM30265	CT-1-013	Jul. 20, 2017
6	Test Cable	HARBOUR	27478-RG400	CT-1-121	Aug. 15, 2017
7	EMI Test Receiver	Keysight	N9038A	CT-1-068(3)	Oct. 13, 2017
8	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.

Test Site: W06-966					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Horn Antenna	Schwarzbeck	BBHA 9120D	CT-9-031	Oct. 26, 2017
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Oct. 27, 2017
3	Bilog Antenna	Schwarzbeck	VULB 9168	CT-9-027-2	Nov. 02, 2017
4	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Apr. 18, 2018
5	EMI Test Receiver	Keysight	N9038A	CT-9-029	Oct. 27, 2017
6	Preamplifier	EMEC	EMC330	CT-9-024	Oct. 20, 2017
7	Preamplifier	EMCI	EMC051845SE	CT-9-012	Oct. 23, 2017
8	Preamplifier	EMCI	EMC184045SE	CT-9-013	Oct. 23, 2017
9	Test Cable	EMEC	EM-CB400	CT-9-001-1	Oct. 20, 2017
10	Test Cable	EMEC	EM-CB400	CT-9-001-2	Oct. 20, 2017
11	Test Cable	EMEC	EM-CB400	CT-9-001-3	Oct. 20, 2017
12	Test Cable	HUBER+SUHNER	SF102	CT-9-002-1	Oct. 23, 2017
13	Test Cable	EMEC	EMC102-KM-K M-600	CT-9-020	Oct. 23, 2017
14	Test Cable	EMEC	EMC102-KM-K M-3000	CT-9-020-1	Oct. 23, 2017
15	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.

Below 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.

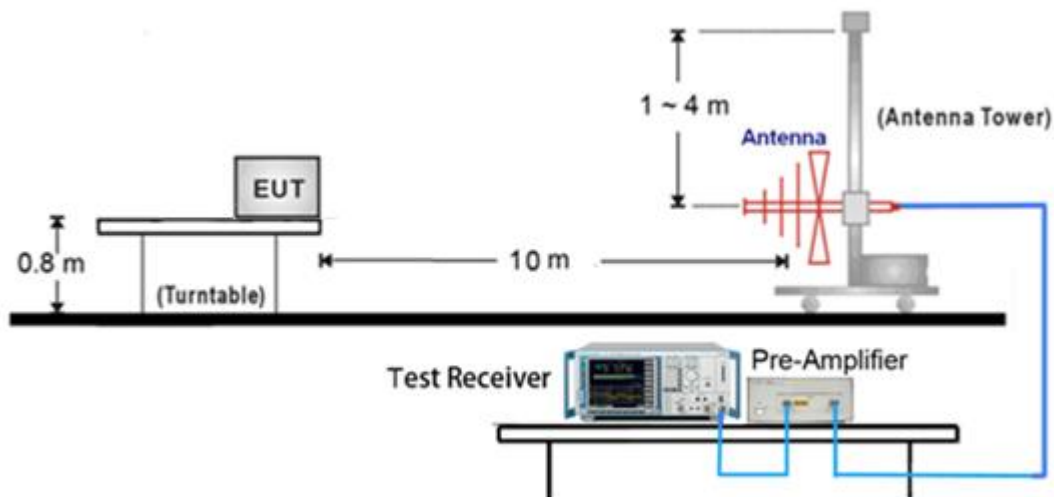
- e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.3.4 Deviation from Test Standard

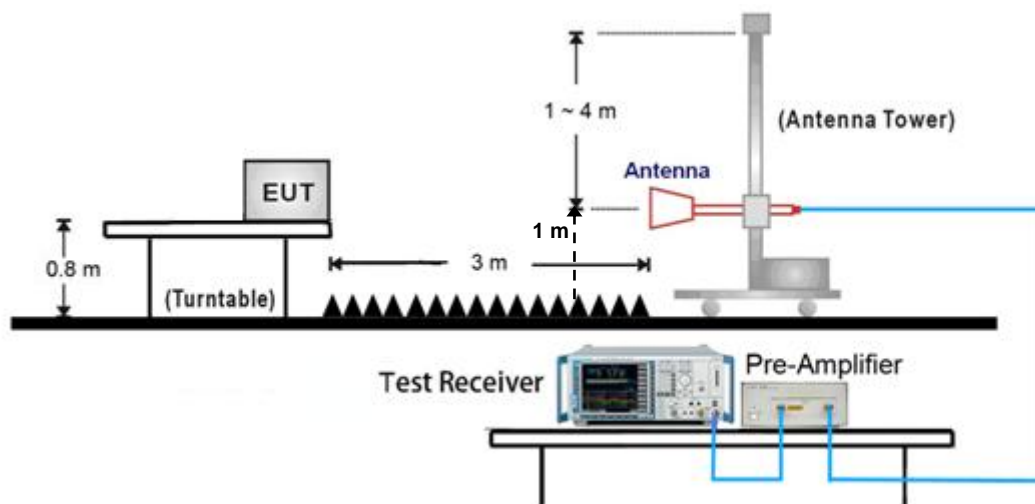
No deviation

4.3.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



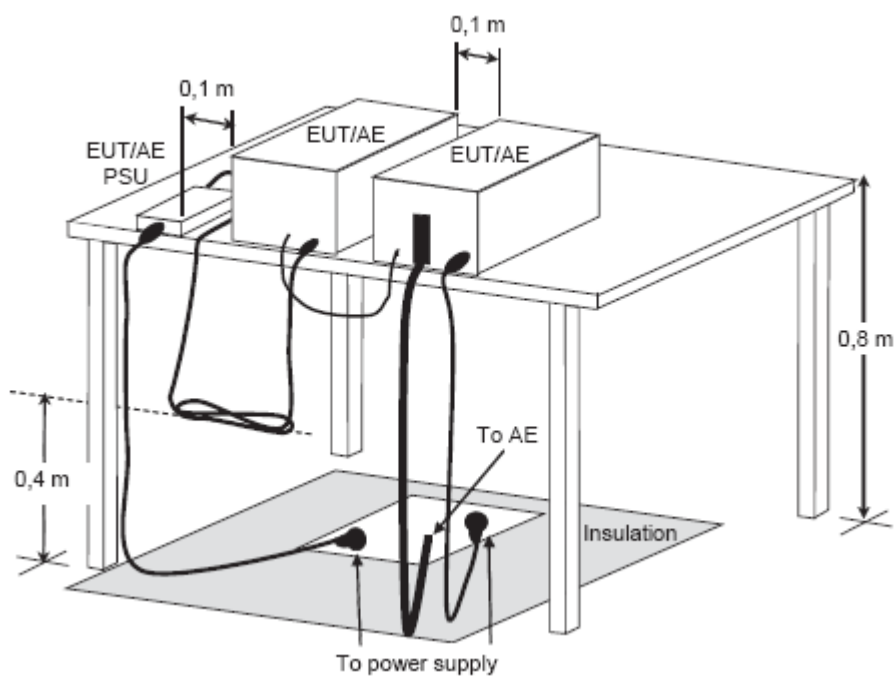
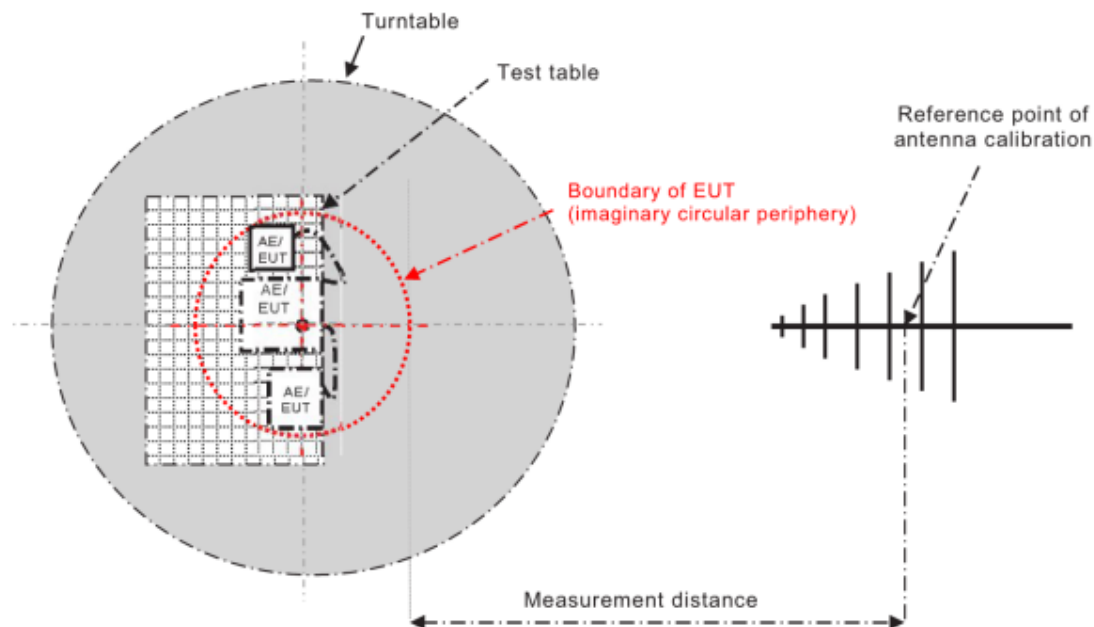
< Radiated Emissions Frequency: above 1GHz >



Note:

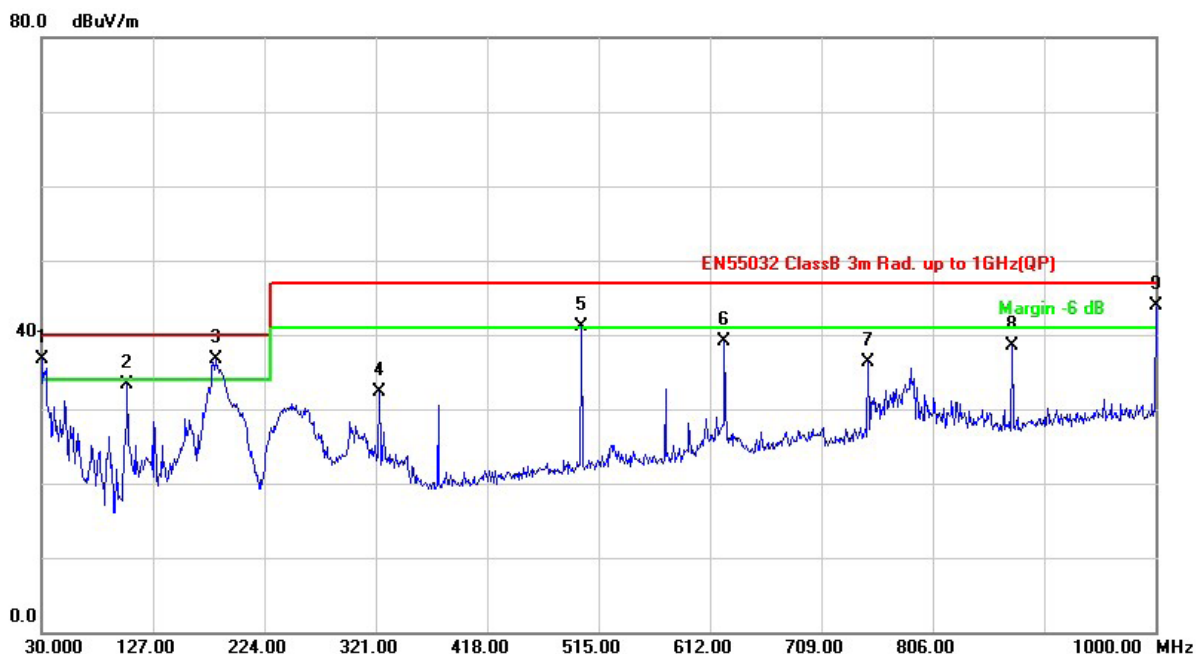
- (1) Please refer to the 4.3.7 for the actual test configuration.
- (2) The formula of measured value as: Test Result = Reading + Correction Factor
- (3) Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
- (4) The test result calculated as following:
 Measurement Value = Reading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

< EUT placement top view and measurement distance >



4.3.6 Test Result

Test Voltage	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	20°C, 65% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/10	Test Distance	10m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	A



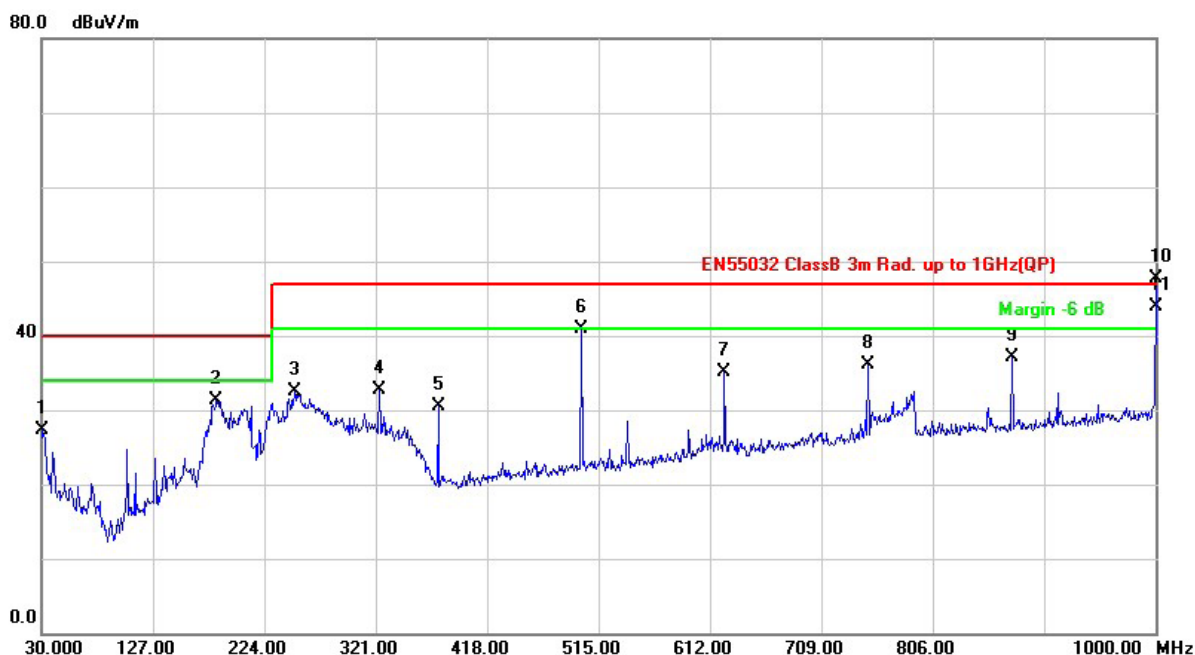
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	30.0000	47.16	-10.44	36.72	40.00	-3.28	peak	101	0
2	104.6900	47.57	-14.18	33.39	40.00	-6.61	peak	100	270
3	181.3200	48.46	-11.71	36.75	40.00	-3.25	peak	100	317
4	323.9100	41.18	-8.83	32.35	47.00	-14.65	peak	100	270
5	500.4500	45.96	-4.78	41.18	47.00	-5.82	peak	196	360
6	624.6100	41.44	-2.27	39.17	47.00	-7.83	peak	100	347
7	749.7400	36.66	-0.26	36.40	47.00	-10.60	peak	100	337
8	874.8700	37.23	1.25	38.48	47.00	-8.52	peak	100	337
9	1000.0000	40.93	2.91	43.84	47.00	-3.16	peak	100	174

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	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	20°C, 65% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/10	Test Distance	10m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	A

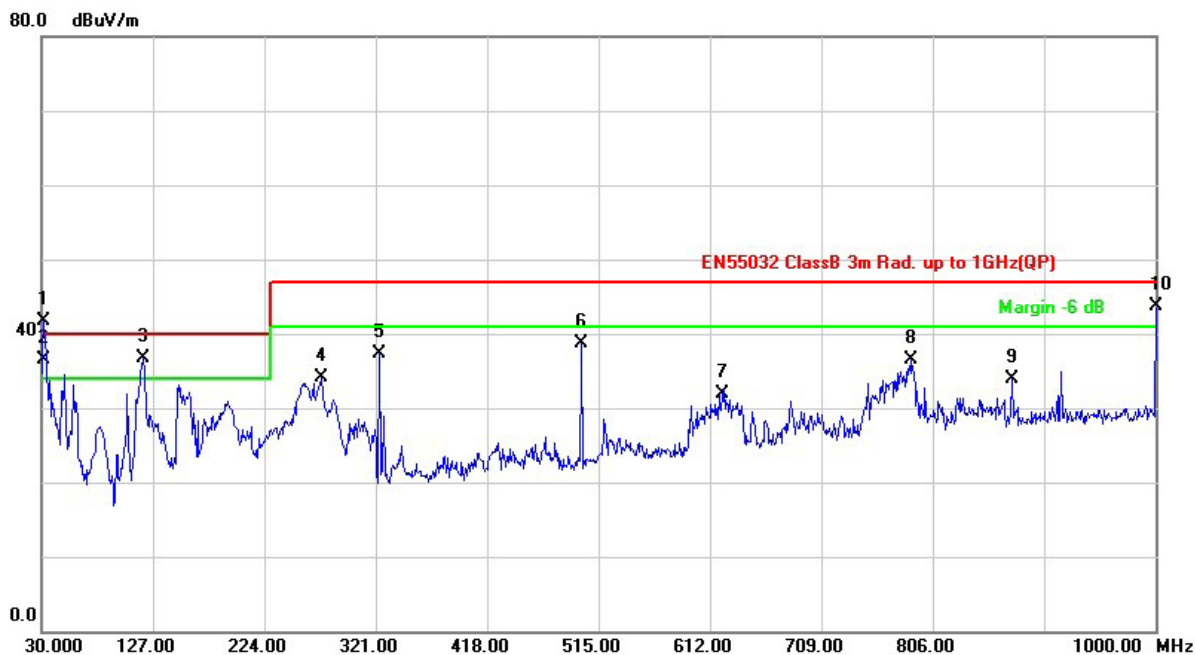


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	30.0000	37.84	-10.44	27.40	40.00	-12.60	peak	200	138
2	182.2899	43.19	-11.81	31.38	40.00	-8.62	peak	150	222
3	250.1900	43.60	-11.13	32.47	47.00	-14.53	peak	200	52
4	323.9100	41.52	-8.83	32.69	47.00	-14.31	peak	100	201
5	375.3200	37.95	-7.45	30.50	47.00	-16.50	peak	100	136
6	500.4500	45.72	-4.78	40.94	47.00	-6.06	peak	100	145
7	624.6100	37.34	-2.27	35.07	47.00	-11.93	peak	150	30
8	749.7400	36.44	-0.26	36.18	47.00	-10.82	peak	100	343
9	874.8700	35.94	1.25	37.19	47.00	-9.81	peak	200	157
10	1000.0000	44.88	2.91	47.79	47.00	0.79	peak	100	352
11	1000.0000	40.90	2.91	43.81	47.00	-3.19	QP	100	352

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	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	20°C, 65% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/10	Test Distance	10m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	B

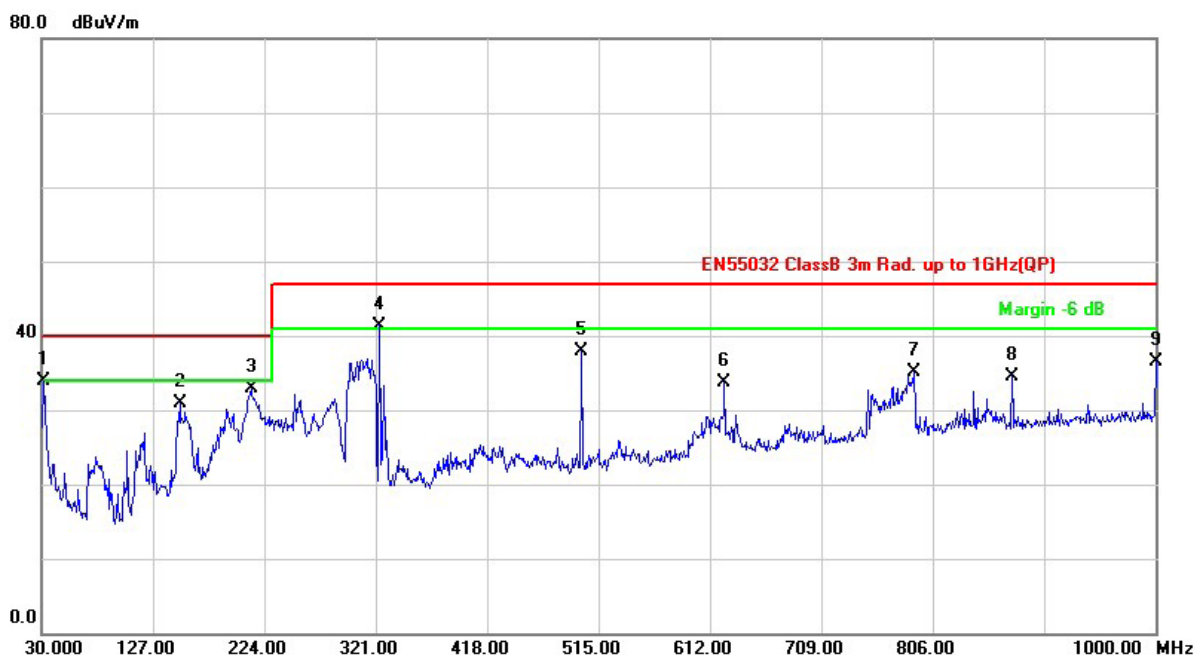


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	31.9400	52.02	-10.35	41.67	40.00	1.67	peak	100	296
2	31.9400	46.87	-10.35	36.52	40.00	-3.48	QP	100	296
3	118.2700	48.98	-12.34	36.64	40.00	-3.36	peak	100	268
4	273.4700	44.21	-10.11	34.10	47.00	-12.90	peak	100	259
5	323.9100	46.08	-8.83	37.25	47.00	-9.75	peak	100	186
6	500.4500	43.41	-4.78	38.63	47.00	-8.37	peak	201	360
7	622.6700	34.24	-2.29	31.95	47.00	-15.05	peak	200	4
8	786.6000	36.41	0.12	36.53	47.00	-10.47	peak	150	192
9	874.8700	32.64	1.25	33.89	47.00	-13.11	peak	100	305
10	1000.0000	40.80	2.91	43.71	47.00	-3.29	peak	200	210

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	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	20°C, 65% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/10	Test Distance	10m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	31.9400	44.35	-10.35	34.00	40.00	-6.00	peak	100	195
2	150.2800	40.70	-9.86	30.84	40.00	-9.16	peak	100	309
3	212.3600	45.42	-12.58	32.84	40.00	-7.16	peak	150	260
4	323.9100	50.23	-8.83	41.40	47.00	-5.60	peak	100	205
5	500.4500	42.66	-4.78	37.88	47.00	-9.12	peak	200	110
6	624.6100	35.98	-2.27	33.71	47.00	-13.29	peak	150	174
7	789.5100	34.90	0.17	35.07	47.00	-11.93	peak	100	224
8	874.8700	33.23	1.25	34.48	47.00	-12.52	peak	100	300
9	1000.0000	33.69	2.91	36.60	47.00	-10.40	peak	100	33

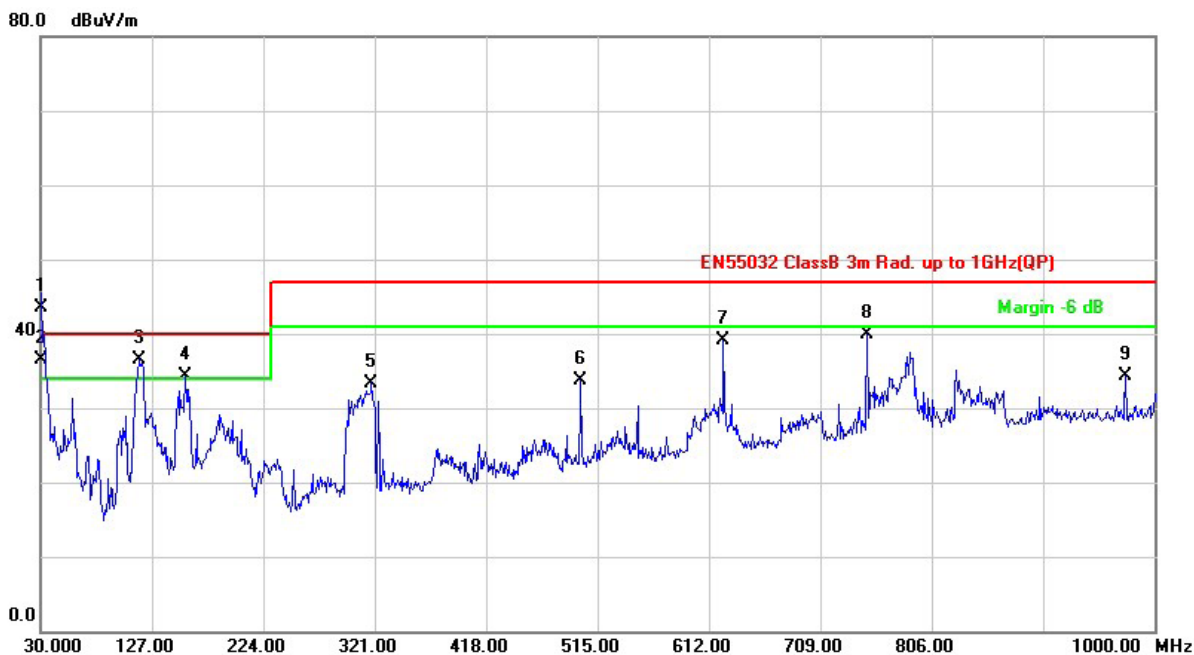
Remark: 1. QP = Quasi Peak

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	22°C , 67% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/17	Test Distance	10m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	C



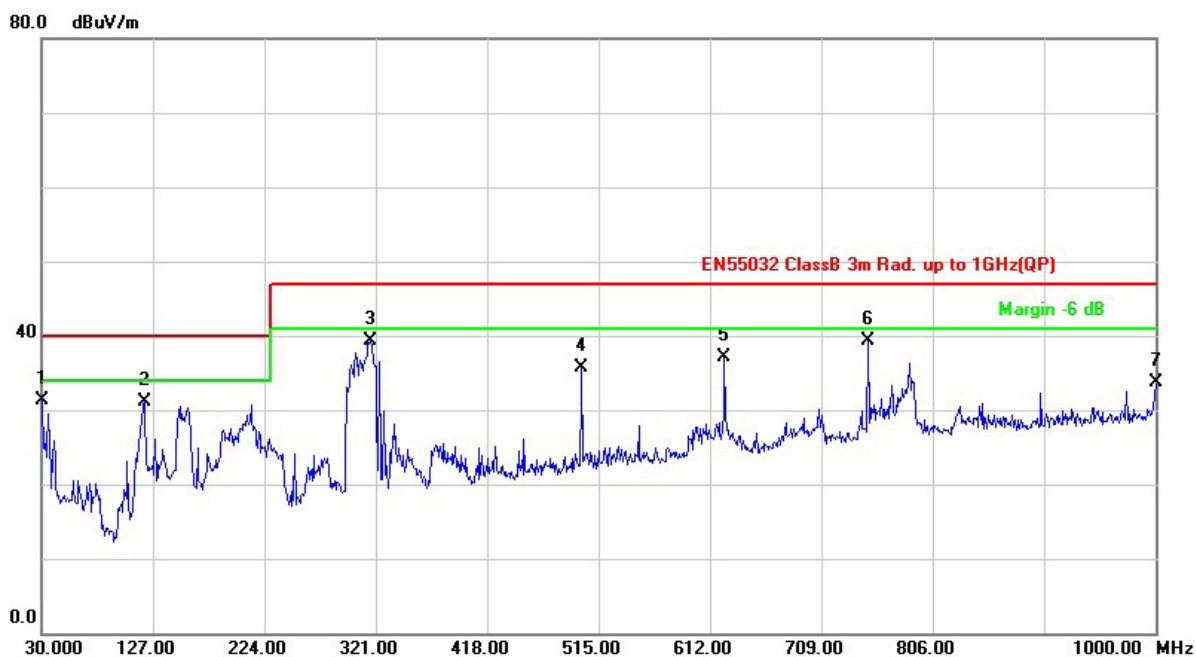
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	30.0000	53.88	-10.44	43.44	40.00	3.44	peak	100	267
2	30.8140	46.90	-10.40	36.50	40.00	-3.50	QP	100	267
3	116.3300	49.11	-12.55	36.56	40.00	-3.44	peak	100	324
4	156.1000	44.05	-9.84	34.21	40.00	-5.79	peak	100	315
5	318.0900	42.30	-8.98	33.32	47.00	-13.68	peak	150	347
6	500.4500	38.56	-4.78	33.78	47.00	-13.22	peak	100	211
7	624.6100	41.37	-2.27	39.10	47.00	-7.90	peak	100	174
8	749.7400	40.24	-0.26	39.98	47.00	-7.02	peak	100	14
9	974.7800	31.64	2.63	34.27	47.00	-12.73	peak	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



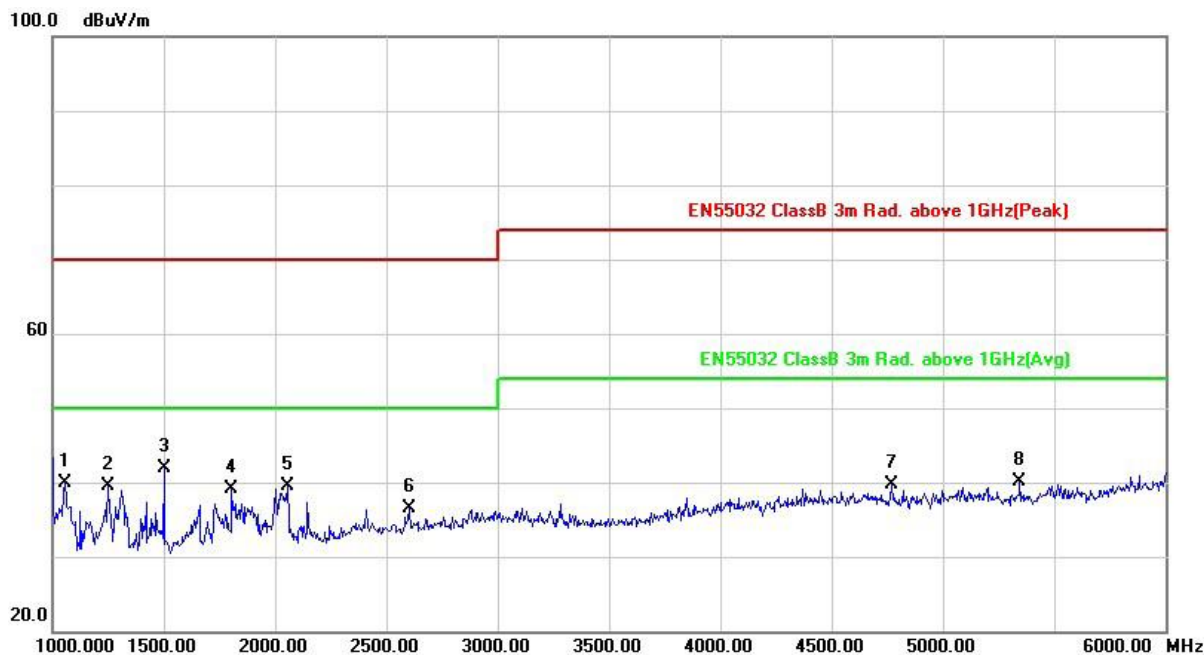
Test Voltage	48Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	22°C , 67% RH	6dB Bandwidth	120 kHz
Test Date	2018/04/17	Test Distance	10m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	C



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	30.0000	41.77	-10.44	31.33	40.00	-8.67	peak	150	206
2	119.2400	43.27	-12.25	31.02	40.00	-8.98	peak	200	270
3	316.1500	48.36	-9.03	39.33	47.00	-7.67	peak	100	251
4	500.4500	40.39	-4.78	35.61	47.00	-11.39	peak	200	60
5	624.6100	39.33	-2.27	37.06	47.00	-9.94	peak	150	215
6	749.7400	39.51	-0.26	39.25	47.00	-7.75	peak	100	308
7	1000.0000	30.76	2.91	33.67	47.00	-13.33	peak	100	56

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

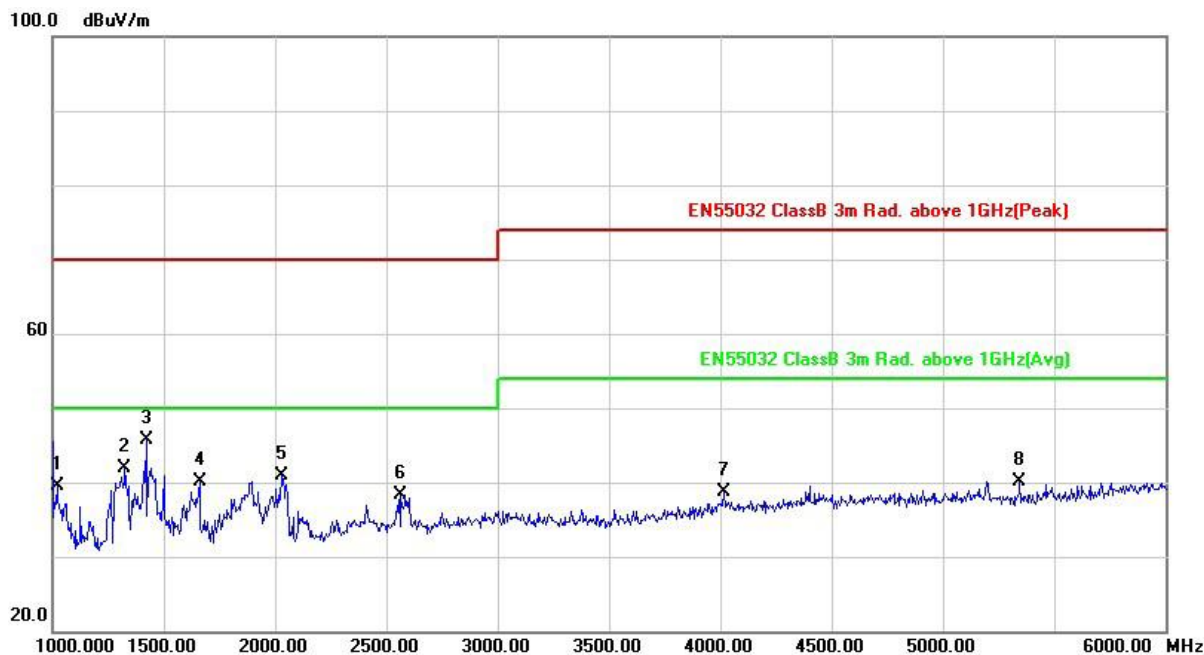
Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	22°C, 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	A



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1055.000	62.27	-22.27	40.00	70.00	-30.00	peak	100	335
2	1250.000	61.12	-21.67	39.45	70.00	-30.55	peak	100	82
3	1500.000	62.83	-20.89	41.94	70.00	-28.06	peak	100	102
4	1805.000	59.22	-20.20	39.02	70.00	-30.98	peak	100	354
5	2055.000	58.95	-19.51	39.44	70.00	-30.56	peak	100	24
6	2600.000	53.60	-17.12	36.48	70.00	-33.52	peak	100	276
7	4770.000	51.29	-11.59	39.70	74.00	-34.30	peak	100	5
8	5345.000	50.98	-10.94	40.04	74.00	-33.96	peak	100	345

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	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	22°C, 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	A



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1020.000	61.97	-22.38	39.59	70.00	-30.41	peak	100	64
2	1325.000	63.41	-21.44	41.97	70.00	-28.03	peak	100	168
3	1420.000	66.89	-21.13	45.76	70.00	-24.24	peak	100	149
4	1660.000	60.59	-20.52	40.07	70.00	-29.93	peak	100	197
5	2030.000	60.53	-19.63	40.90	70.00	-29.10	peak	100	130
6	2565.000	55.47	-17.25	38.22	70.00	-31.78	peak	100	253
7	4015.000	52.05	-13.33	38.72	74.00	-35.28	peak	100	262
8	5345.000	51.05	-10.94	40.11	74.00	-33.89	peak	100	54

Remark: 1. peak = Peak, AVG = Average

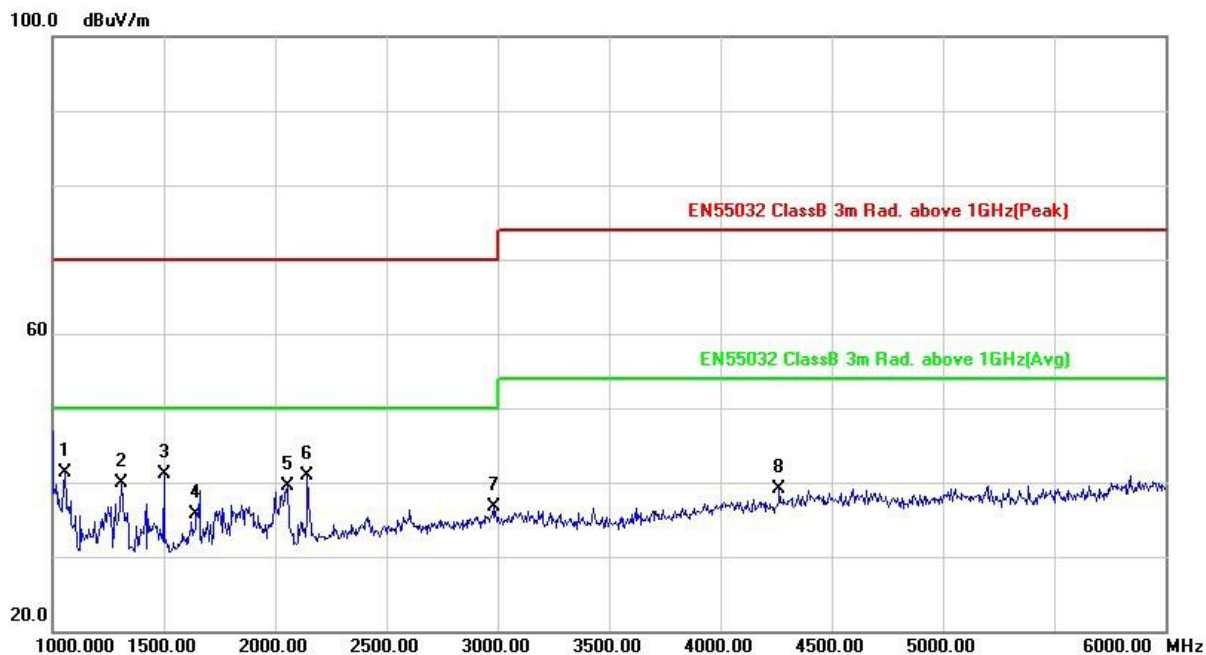
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)

3. Measurement Value = Reading Level + Correct Factor

4. Margin Level = Measurement Value - Limit Value



Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	22°C, 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1055.000	63.47	-22.27	41.20	70.00	-28.80	peak	100	336
2	1310.000	61.47	-21.48	39.99	70.00	-30.01	peak	100	8
3	1500.000	61.98	-20.89	41.09	70.00	-28.91	peak	100	288
4	1645.000	56.28	-20.57	35.71	70.00	-34.29	peak	100	182
5	2055.000	59.04	-19.51	39.53	70.00	-30.47	peak	100	18
6	2145.000	59.93	-19.12	40.81	70.00	-29.19	peak	100	76
7	2980.000	52.32	-15.56	36.76	70.00	-33.24	peak	100	327
8	4265.000	51.67	-12.55	39.12	74.00	-34.88	peak	100	76

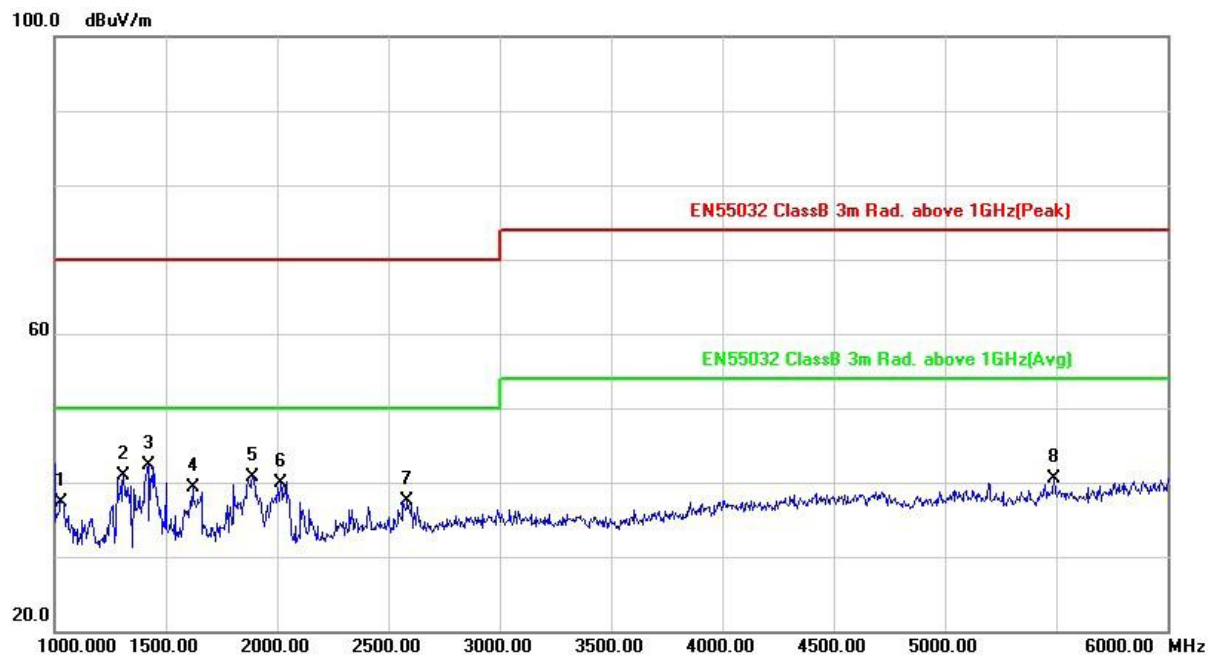
Remark: 1. peak = Peak, AVG = Average

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

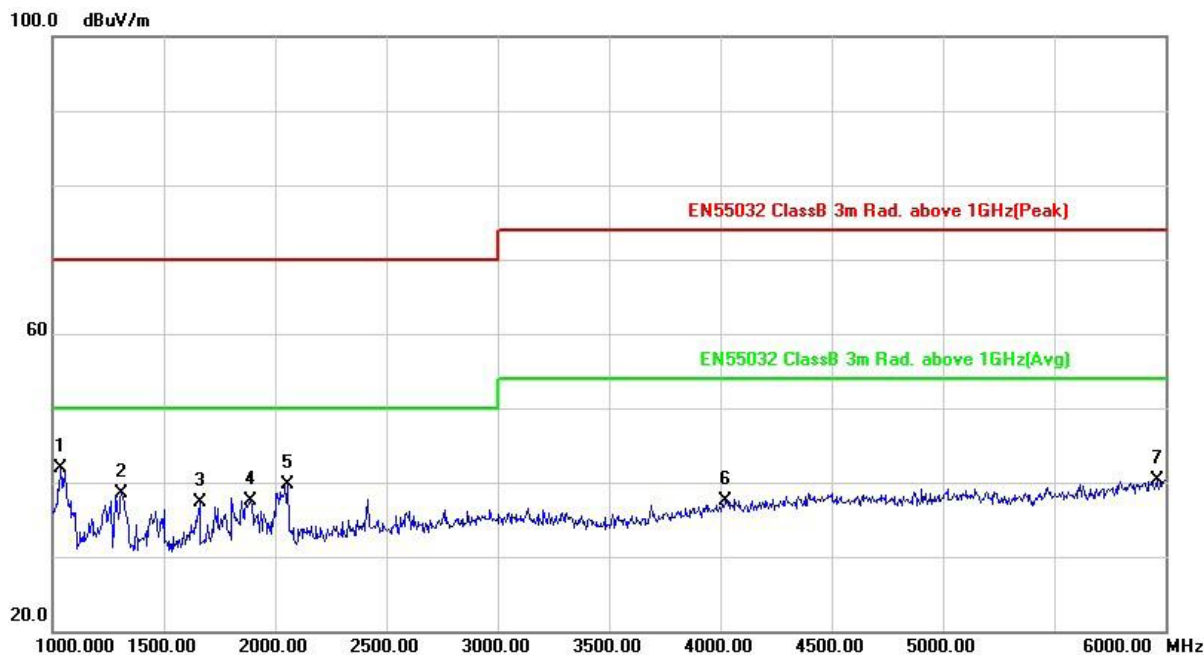
Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	22°C, 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1030.000	59.71	-22.36	37.35	70.00	-32.65	peak	100	352
2	1310.000	62.45	-21.48	40.97	70.00	-29.03	peak	100	178
3	1420.000	63.37	-21.13	42.24	70.00	-27.76	peak	100	178
4	1620.000	59.93	-20.62	39.31	70.00	-30.69	peak	100	178
5	1890.000	60.69	-20.01	40.68	70.00	-29.32	peak	100	149
6	2015.000	59.60	-19.69	39.91	70.00	-30.09	peak	100	140
7	2585.000	54.68	-17.19	37.49	70.00	-32.51	peak	100	255
8	5490.000	51.17	-10.73	40.44	74.00	-33.56	peak	100	333

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

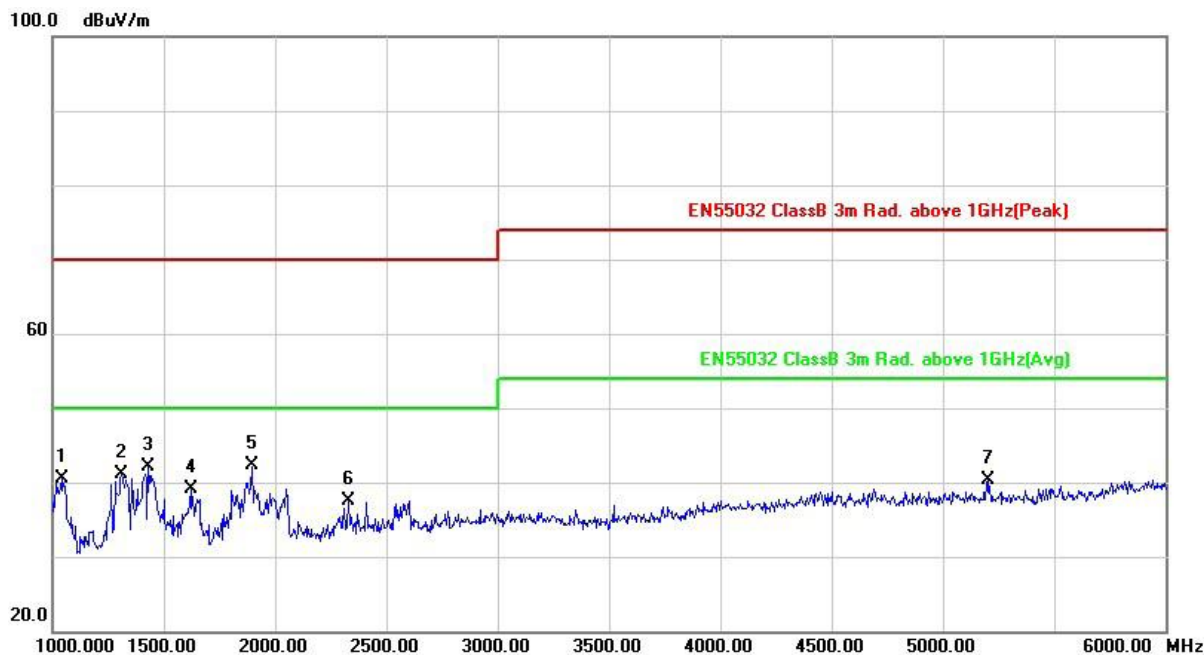
Test Voltage	48Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	22°C, 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Vertical
Test Site	W06	Test mode	C



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1035.000	64.18	-22.34	41.84	70.00	-28.16	peak	100	213
2	1310.000	59.98	-21.48	38.50	70.00	-31.50	peak	100	14
3	1660.000	57.82	-20.52	37.30	70.00	-32.70	peak	100	327
4	1890.000	57.57	-20.01	37.56	70.00	-32.44	peak	100	222
5	2055.000	59.27	-19.51	39.76	70.00	-30.24	peak	100	14
6	4025.000	50.83	-13.31	37.52	74.00	-36.48	peak	100	271
7	5960.000	49.57	-9.19	40.38	74.00	-33.62	peak	100	327

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	22°C , 67% RH	6dB Bandwidth	1MHz
Test Date	2018/04/17	Test Distance	3m
Tested by	Duncan Chang	Polarization	Horizontal
Test Site	W06	Test mode	C



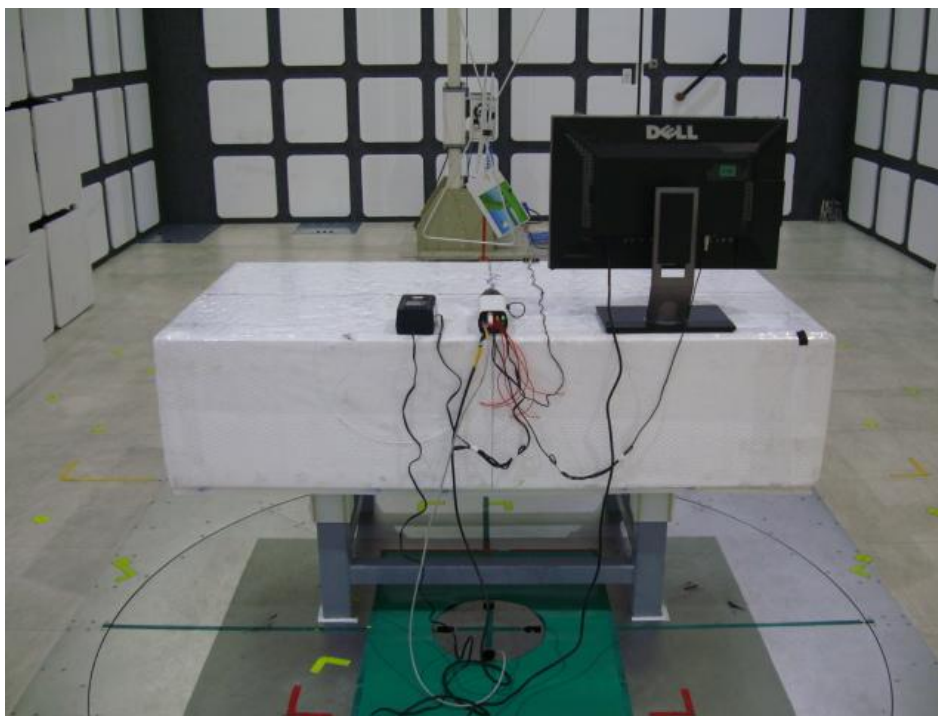
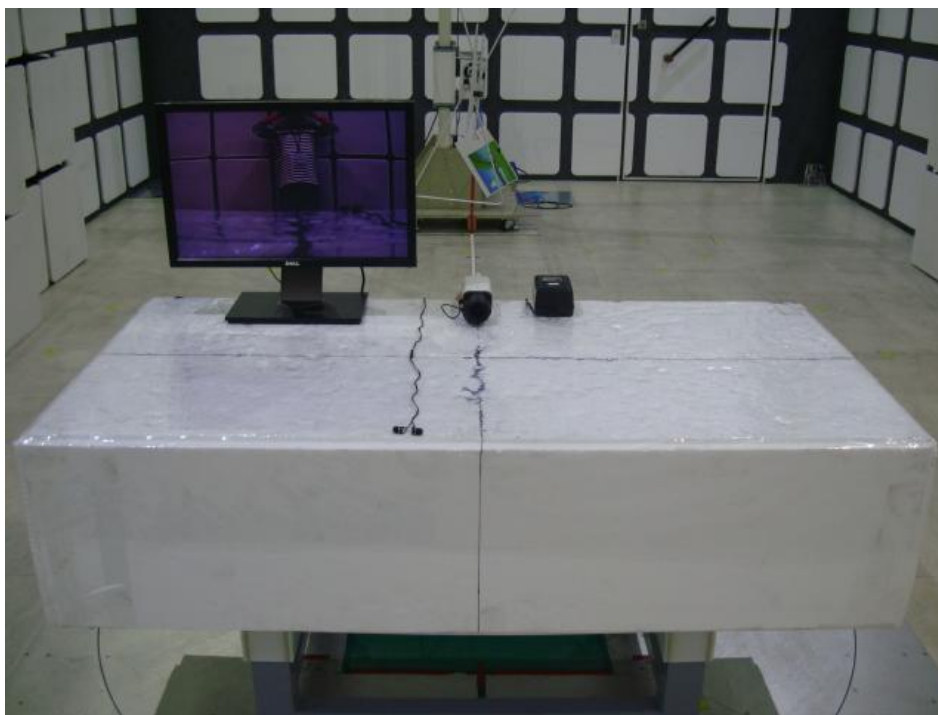
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1040.000	62.80	-22.32	40.48	70.00	-29.52	peak	100	327
2	1310.000	62.56	-21.48	41.08	70.00	-28.92	peak	100	251
3	1430.000	63.23	-21.11	42.12	70.00	-27.88	peak	100	184
4	1620.000	59.74	-20.62	39.12	70.00	-30.88	peak	100	240
5	1895.000	62.20	-20.00	42.20	70.00	-27.80	peak	100	155
6	2330.000	55.71	-18.29	37.42	70.00	-32.58	peak	100	165
7	5200.000	51.51	-11.13	40.38	74.00	-33.62	peak	100	356

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

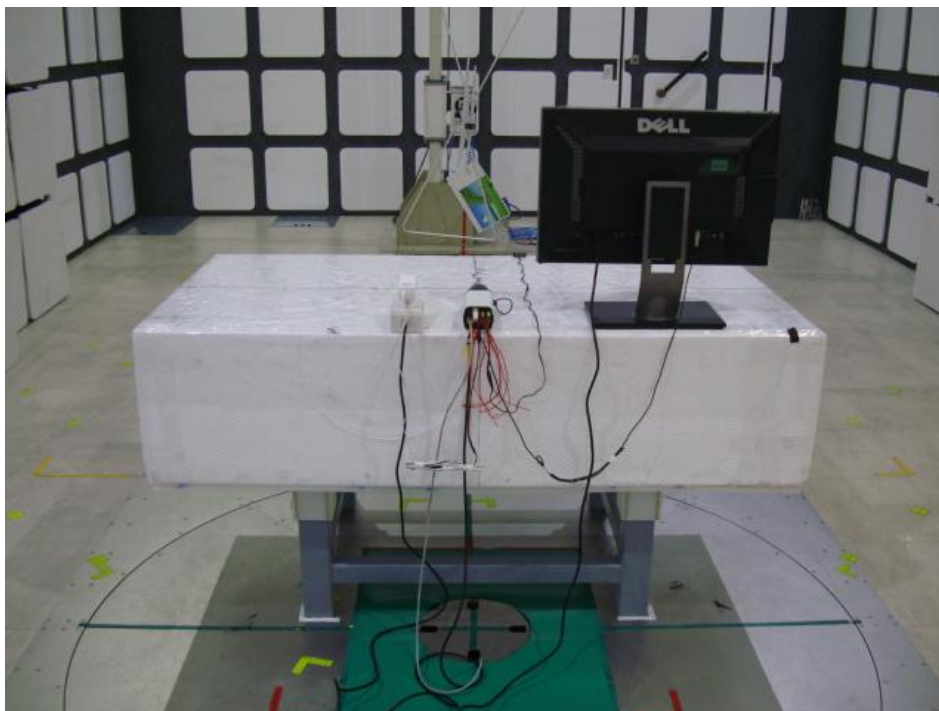
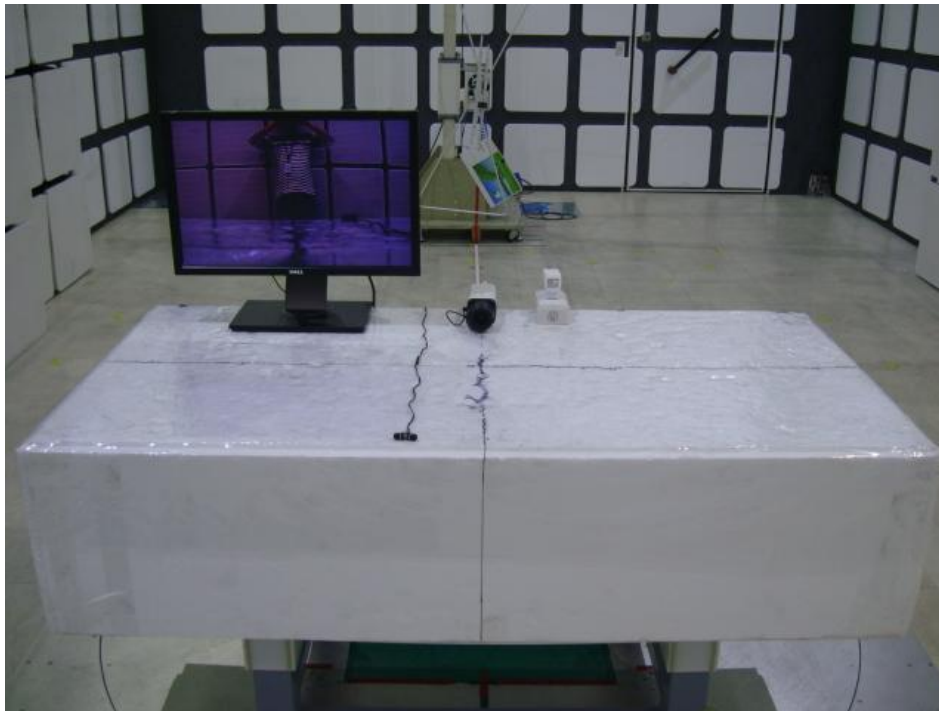
4.3.7 Photographs of Test Configuration

Radiated Emission Test (30MHz~1GHz)

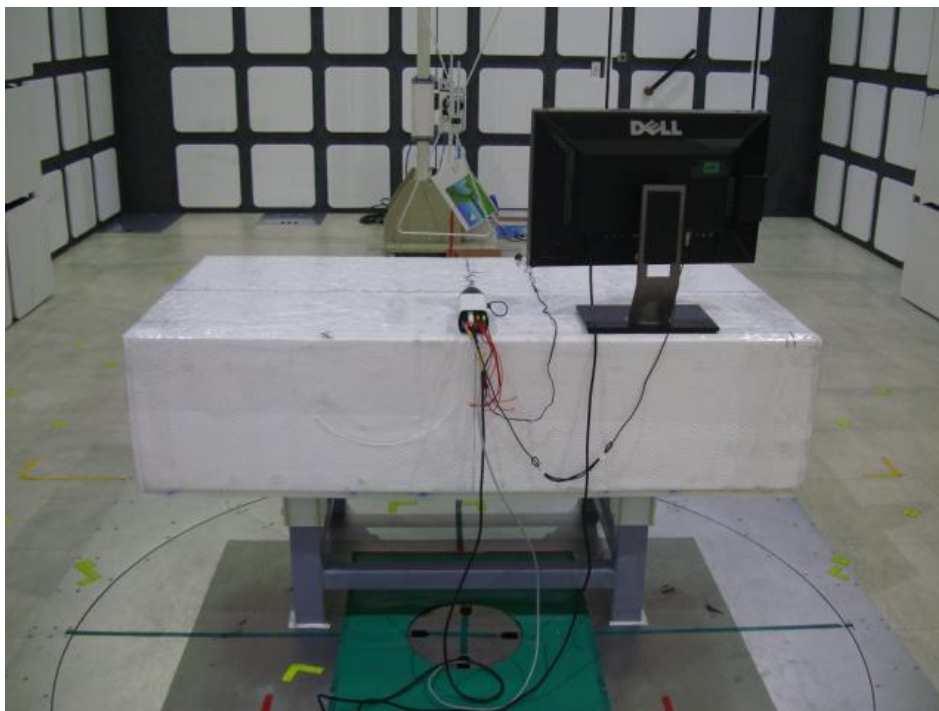
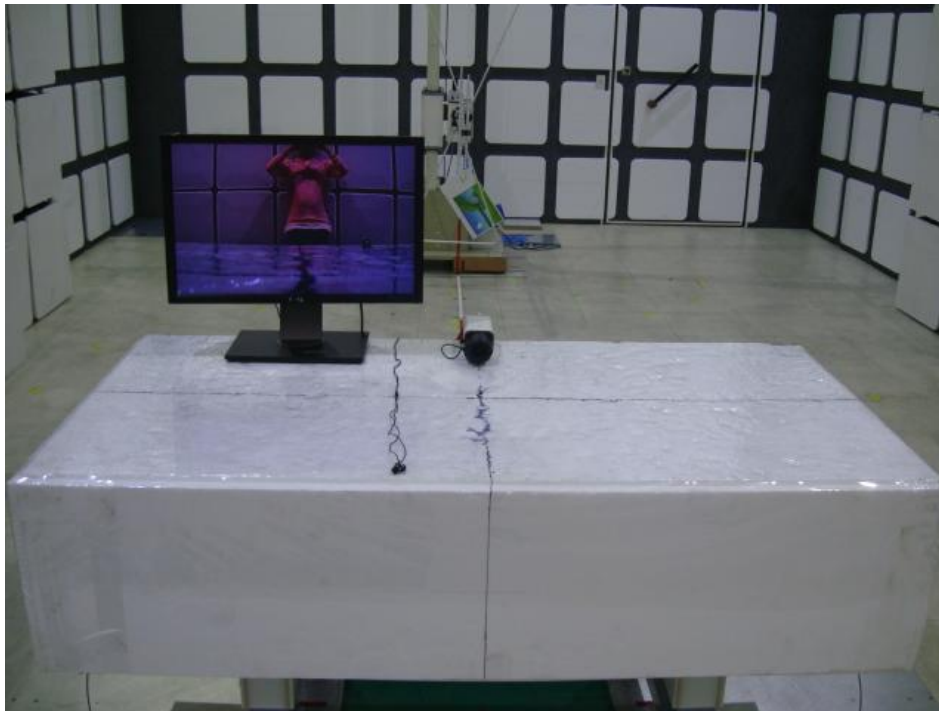
Test mode A



Test mode B

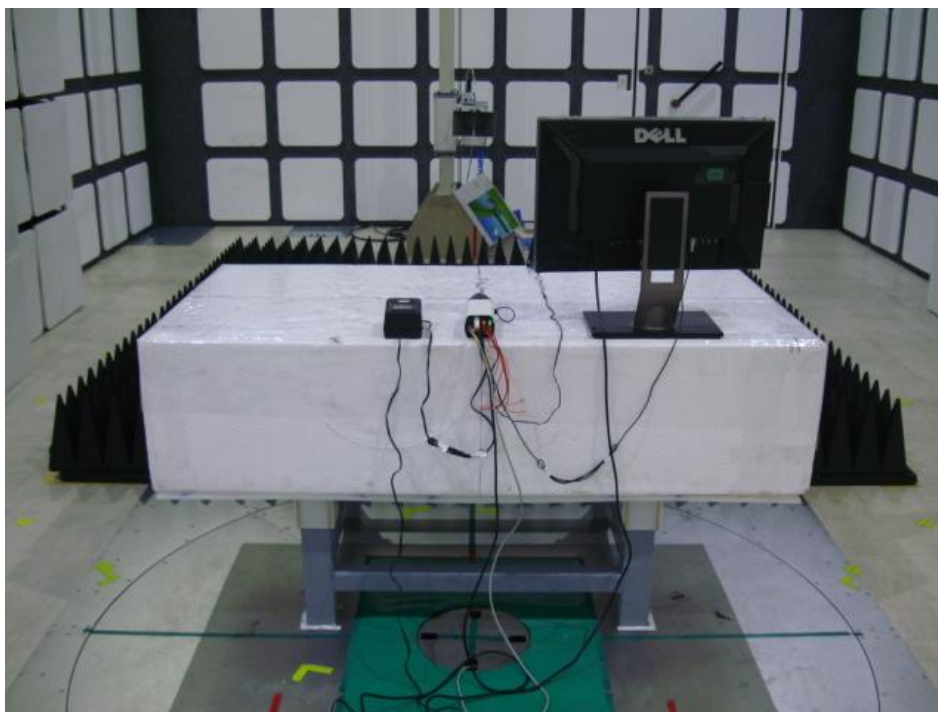
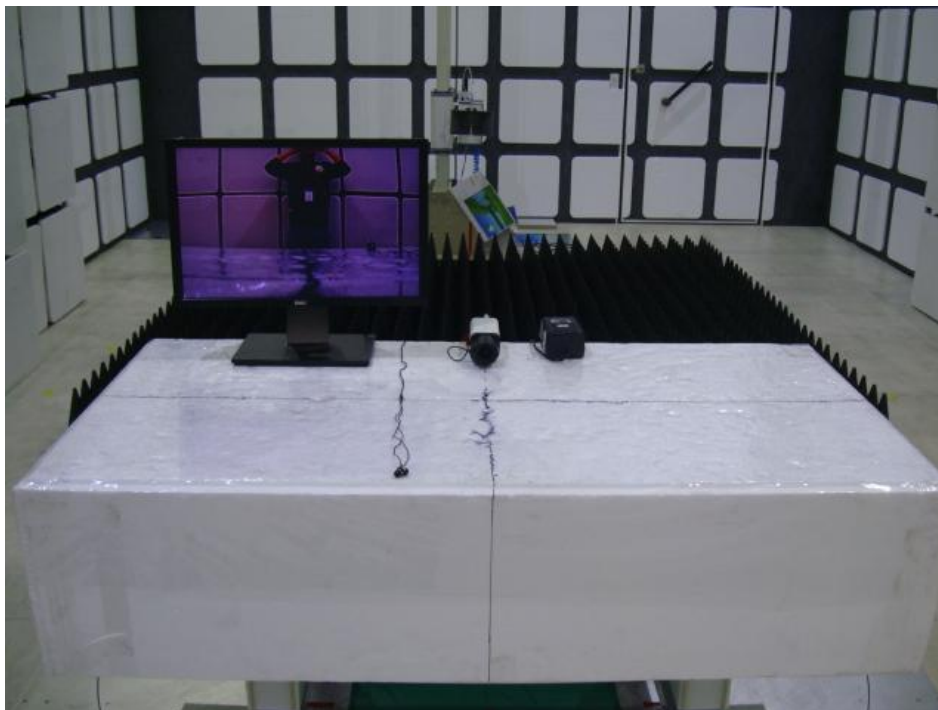


Test mode C

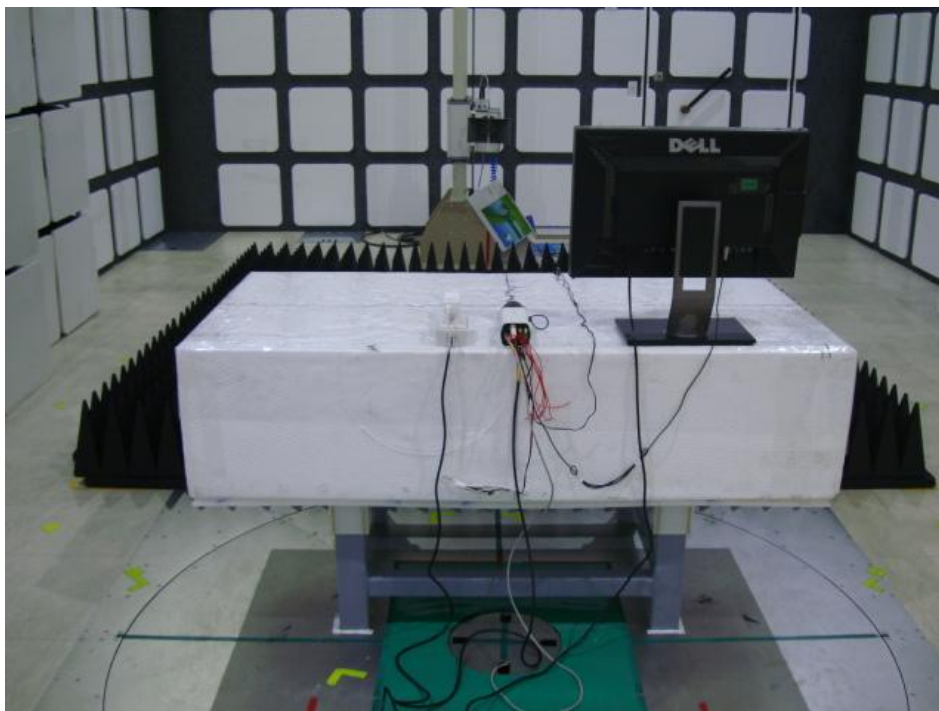


Radiated Emission Test (Above 1GHz)

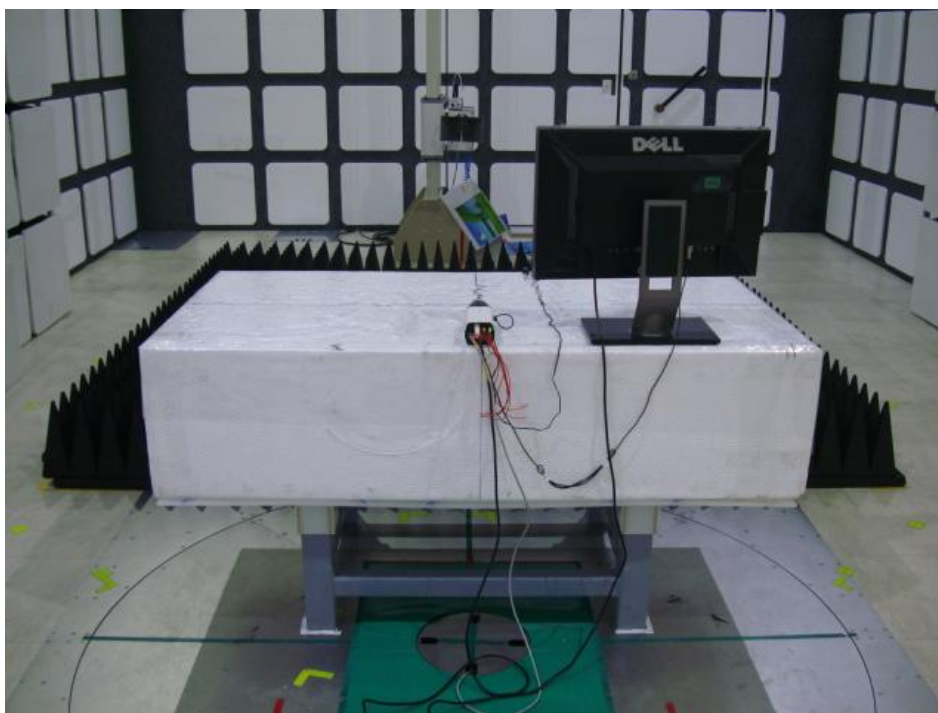
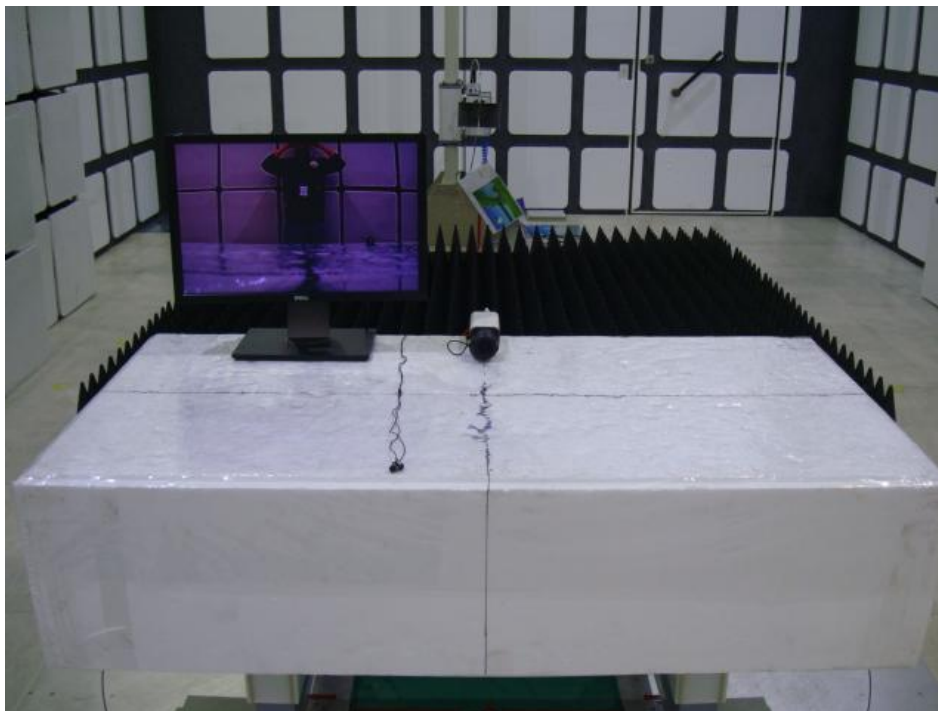
Test mode A



Test mode B



Test mode C



< End Page >