



# VCCI Test Report

Issued date: Jan. 20, 2022

Project No.: 22Q011105

**Product :** Network Camera

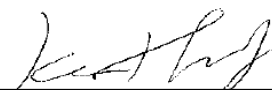
**Model :** IP9165-HT-v2, IP9165-LPC-v2, IP9165-LPR-v2

**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-210148-A1**

**According to**  
**VCCI-CISPR32: 2016, Class B**

**Authorized Signatory :**  / Ken Huang

**Wendell Industrial Co., Ltd**  
**Wendell EMC & RF Laboratory**

Add: 5F-1, No. 188, Baoqiao Road, Xindian District, New Taipei City 23145, Taiwan R.O.C.



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### History of this test report

Report No.	Issue date	Description
WD-EV-R-210148-A0	May 24, 2021	Initial Issue
WD-EV-R-210148-A1	Jan. 20, 2022	Adding model no. *Cancel report no.: WD-EV-R-210148-A0, Issued Date: May 24, 2021

**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-210148-A1	Jan. 20, 2022	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:** IP9165-HT-v2, IP9165-LPC-v2, IP9165-LPR-v2

**Applicant:** VIVOTEK INC.

**Tested:** May 07 ~ May 17, 2021

**Standard:** VCCI-CISPR32: 2016, Class B

The above equipment (Model: IP9165-HT-v2) has been tested by **Wendell EMC & RF 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.

Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.



## 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)

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

W08: No.119, Wugong 3rd Rd., Wugu Dist., New Taipei City 248, 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 is evaluated according to CISPR 16-4-2.

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

Wendell EMC & RF Laboratory  $U_{lab}$  is less than  $U_{cisp}$ , therefore compliance or non-compliance with a disturbance limit shall be determined in the following manner.

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

Please note that the measurement uncertainty ( $U_{lab}$ ) is provided for informational purpose only and is not used in determining the Pass/Fail results.

### 2.2.1 Conducted Emission test

Test Site	Measurement Freq. Range	dB ( $U_{lab}$ )	VCCI Site Registration No.	Note
W01	150 kHz~30 MHz	2.72	C-14684	N/A
W08	150 kHz ~ 30 MHz	2.70	C-20088	N/A

### 2.2.2 Conducted emission at telecom port test

Test Site	Measurement Freq. Range	dB ( $U_{lab}$ )	VCCI Site Registration No.	Note
W01	150 kHz~30 MHz	2.72	T-12224	N/A
W08	150 kHz ~ 30 MHz	2.64	T-20089	N/A

### 2.2.3 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB ( $U_{lab}$ )	VCCI Site Registration No.	Note
W08	30 MHz ~ 200 MHz	V	3.68	R-20086	N/A
	30 MHz ~ 200 MHz	H	2.70		N/A
	200 MHz ~ 1000 MHz	V	5.19		N/A
	200 MHz ~ 1000 MHz	H	3.26		N/A
W08	1 GHz ~ 6 GHz	V	4.98	G-20086	N/A
	1 GHz ~ 6 GHz	H	5.07		N/A





### 3 General Information

#### 3.1 Description of EUT

<b>Product</b>	Network Camera
<b>Brand</b>	VIVOTEK
<b>Model</b>	IP9165-HT-v2, IP9165-LPC-v2, IP9165-LPR-v2
<b>Applicant</b>	VIVOTEK INC.
<b>Received Date</b>	Mar. 22, 2021
<b>EUT Power Rating</b>	24Vac (from AC-AC adapter) or 12Vdc (from AC-DC adapter) or 55Vdc (from PoE injector)
<b>Model Differences</b>	The models are electrically identical, different models no. are for marketing purpose. This series model information is provided by client.
<b>Operating System</b>	N/A
<b>Data Cable Supplied</b>	N/A
<b>Accessory Device</b>	N/A
<b>I/O Port</b>	Please refer to the User's Manual

**Note:**

1. The EUT's highest operating frequency is 3.2GHz. Therefore the radiated emission is tested up to 6GHz.

### 3.2 Description of Test Modes

Test results are presented in the report as below.

Test Mode	Test Condition
<b>Conducted emission test</b>	
A	AC-AC adapter mode
B	AC-DC adapter mode
<b>Conducted emission test at telecom port test</b>	
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)
<b>Radiated emission 30MHz ~ 1GHz test</b>	
A	AC-AC adapter mode
B	AC-DC adapter mode
C	PoE mode
<b>Radiated emission above 1GHz test</b>	
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 50Hz and 60Hz, and 50Hz was the worst case for final test.
2. For conducted emission test at telecom port, the EUT has been pre-tested frequency 50Hz and 60Hz, and 60Hz was the worst case for final test.
3. For radiated emission, the EUT has been pre-tested frequency was 50Hz and 60Hz, and 60Hz was the worst case for final test.



### 3.3 EUT Operating Condition

#### Adapter mode

- a. Placed the EUT on the test table.
- b. Prepare PC to act as a communication partner and placed it outside of testing area.
- c. The EUT was connected to the 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 microphone sent voice signal to EUT.
- g. The EUT sent voice signal to earphone.
- h. The EUT write data with Micro SD card.

#### PoE mode

- a. Placed the EUT on the test table.
- b. Prepare PC and PoE injector to act as a communication partner and placed it outside of testing area.
- c. The EUT was connected to 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 microphone sent voice signal to EUT.
- g. The EUT sent voice signal to earphone.
- h. 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	Desktop PC	DELL	D13M	H6K10 A00	FCC DoC Approved	20m CAT.5E non-shielded RJ45 cable (for adapter mode) 1m CAT.5E non-shielded RJ45 cable (for PoE mode)	1.8m non-shielded cable	-
2	PoE injector	PowerDsine	PD-9501G/AC	N/A	N/A	20m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	Supplied by client
3	1080P monitor	DELL	U2410F	CN-0J257 M-72872-0 54-0NTL	FCC DoC Approved	1.5m non-shielded AV cable with 1 core	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	32GB	N/A	N/A	N/A	N/A	-
6	Multi conductor cable (x8)	N/A	N/A	N/A	N/A	0.5m non-shielded cable	N/A	-
7	Grounding 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:

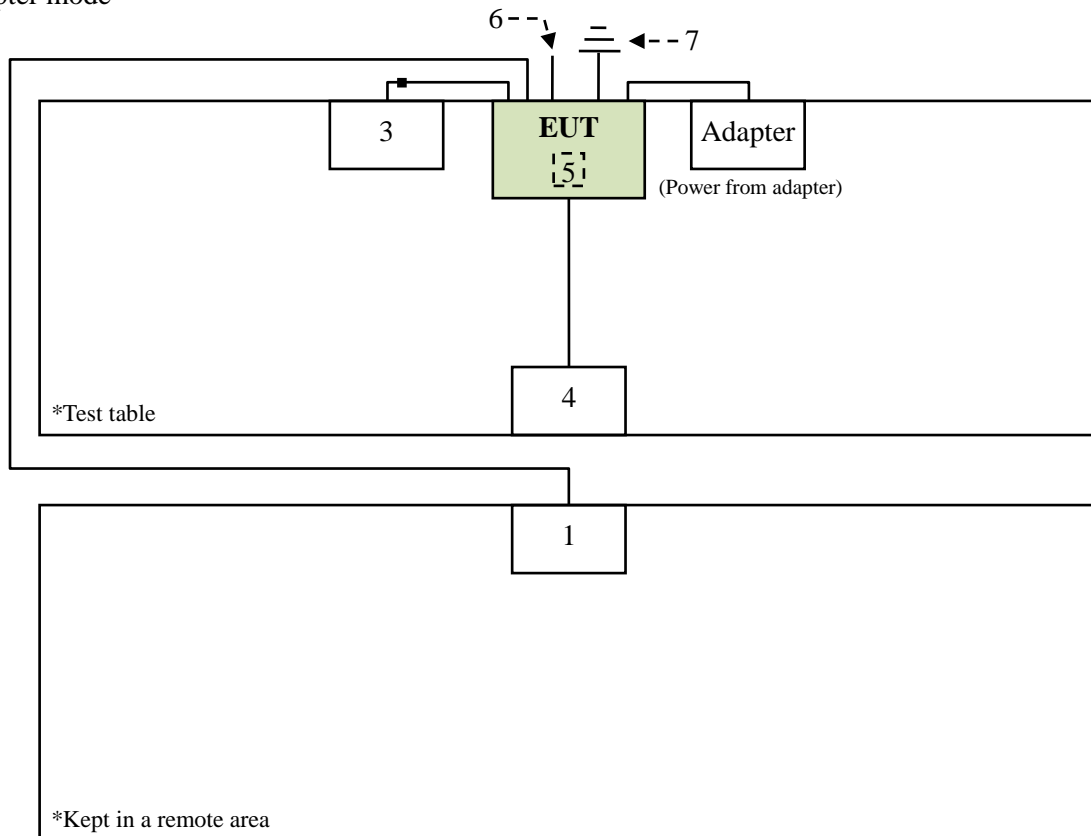
AC-AC adapter (support unit only)	
Brand	ADP
Model	AI PS0220A
Input Power	110/220Vac
Output Power	24Vac
Power line	Input: 1.8m non-shielded cable Output: 1m non-shielded cable

AC-DC adapter (support unit only)	
Brand	SPC
Model	ZZU1588-200120-2A
Input Power	100-240Vac, 1.5A, 50-60Hz
Output Power	12Vdc, 2A
Power line	Output: 1.8m non-shielded cable

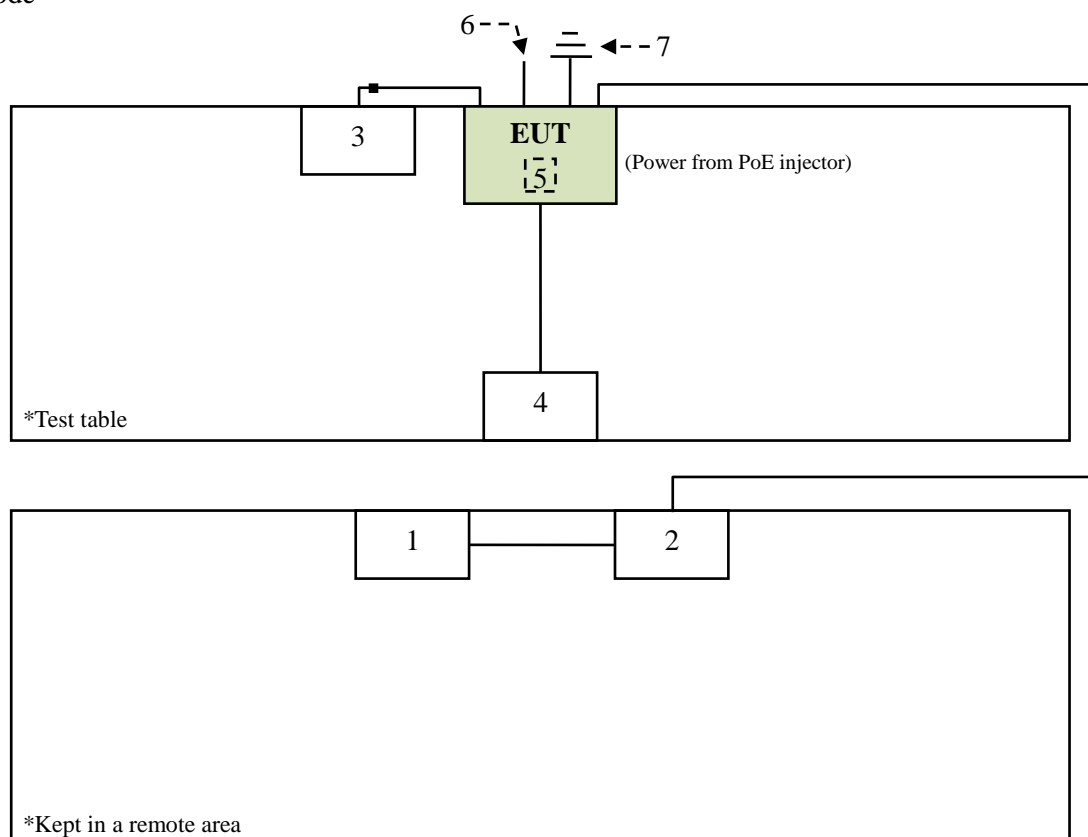
PoE injector (support unit only)	
Brand	PowerDsine
Model	PD-9501G/AC
Input Power	100-240Vac, 1.5A, 50-60Hz
Output Power	55Vdc, 1.35A
Power line	1.8m non-shielded cable

### 3.5 Configuration of System Under Test

Adapter mode



PoE mode



## 4 Emission Test

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

#### 4.1.1 Limit of Conducted Emission Measurement

Class A equipment:

Requirements for conducted emissions from the AC mains power ports of Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(μV)
	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(μV)
	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 + Transient Limiter (If use)  
 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. 29, 2020
2	Pulse limiter	R&S®	ESH3-Z2	CT-2-015	Apr. 27, 2020
3	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 29, 2020
4	V-LISN	SCHWARZBECK	NSLK8127	CT-1-104-1	Apr. 29, 2020
5	Test Cable	Marvelous Microwave Inc	200200.400LL .500A	CT-10-048-1	Apr. 27, 2020
6	50ohm Termination	N/A	N/A	CT-1-065-1	Apr. 28, 2020
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

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

Test Site: W08-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK LISN	R&S®	ENV216	CT-1-025-2	May 27, 2020
2	Test Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	May 25, 2020
3	EMI Test Receiver	R&S	ESR3	CT-1-103	May 21, 2020
4	LISN	SCHWARZBECK	NSLK 8127RC	CT-1-104-1RC	May 27, 2020
5	Transient Limiter	EM Electronics Corporation	EM-7600	CT-1-026	May 25, 2020
6	50ohm Termination	HUBER+SUHNER	N/A	CT-1-109-1	May 26, 2020
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	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 table-top 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 floor-standing EUT was placed insulation support unit from the horizontal ground plane. 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.

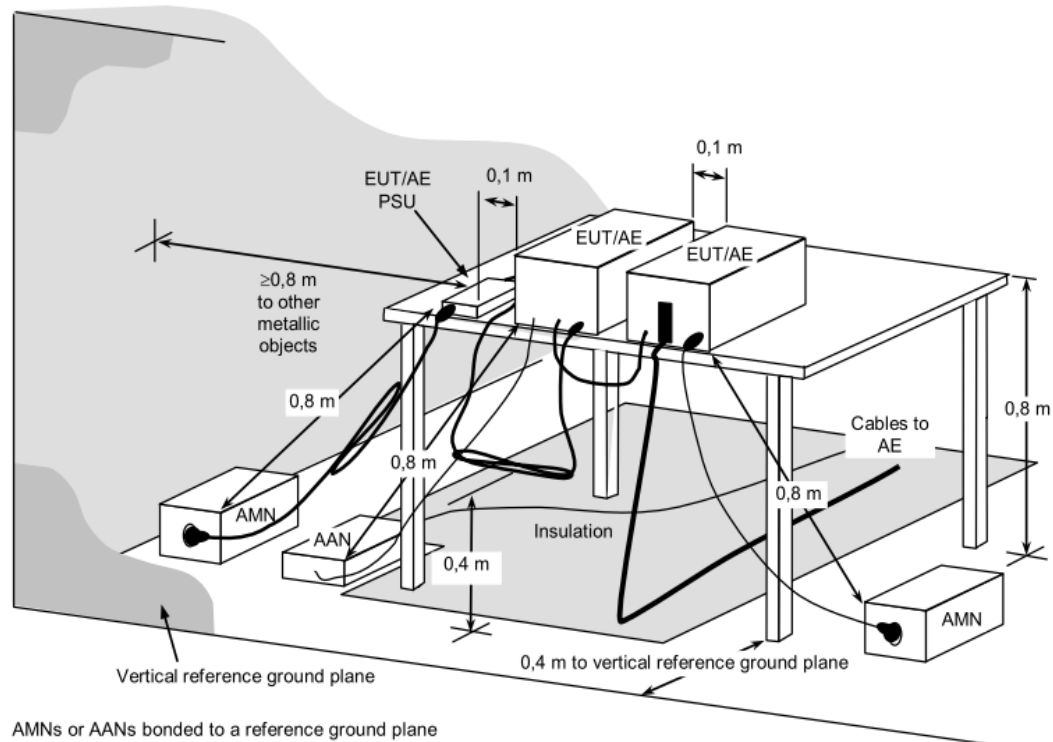
### 4.1.4 Deviation from Test Standard

No deviation

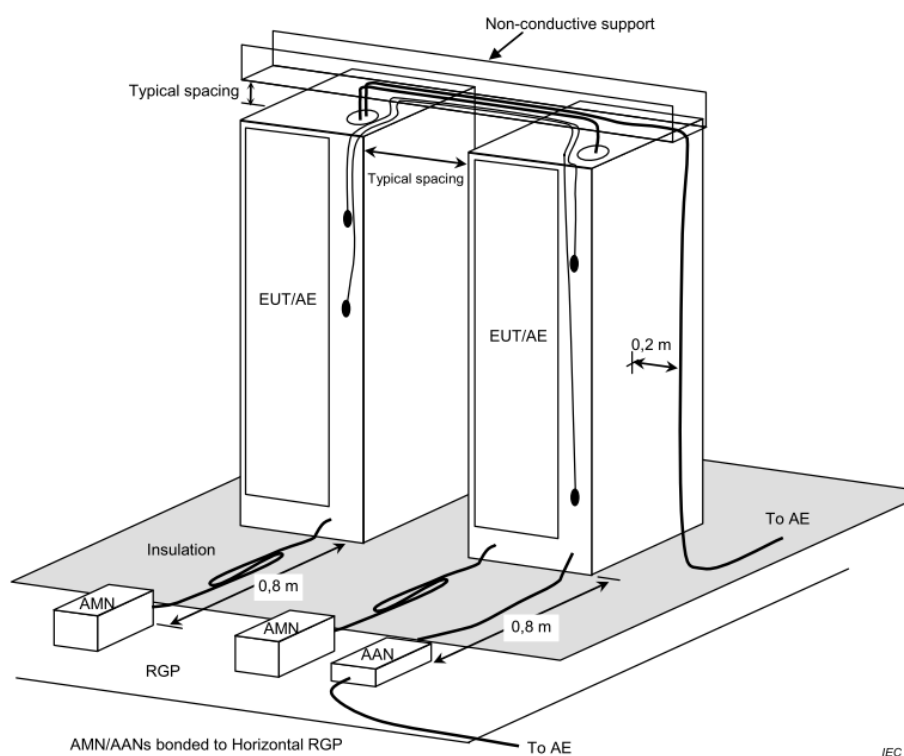


### 4.1.5 Test Setup

### < Table-Top equipment >



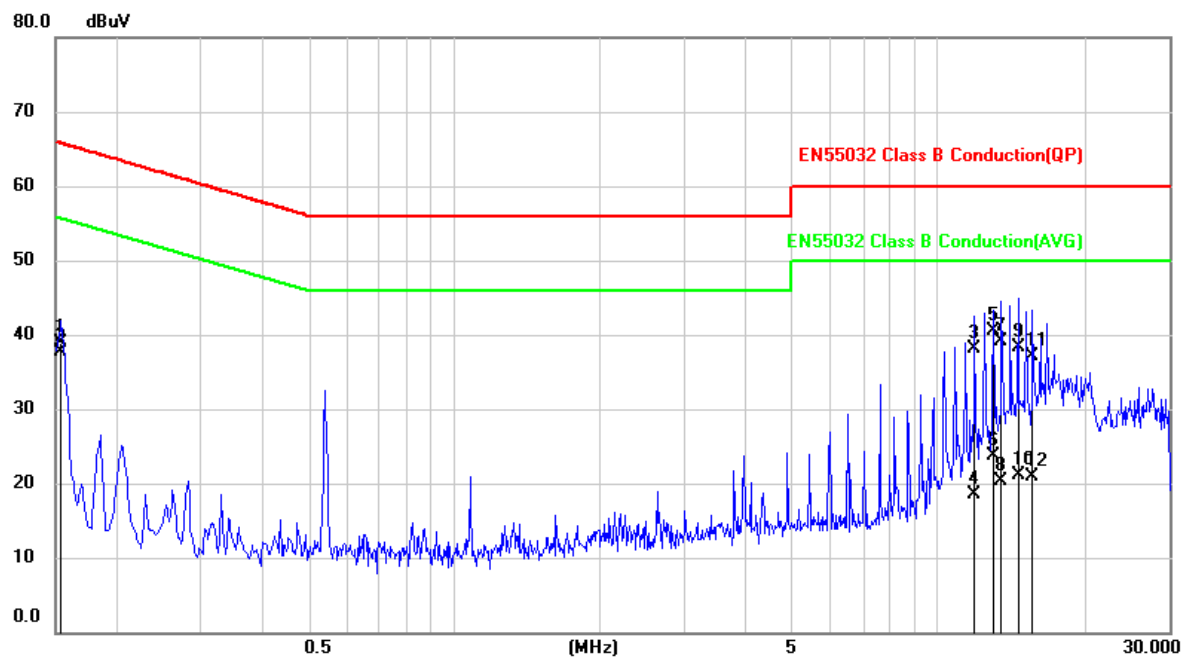
### < Floor-Standing equipment >



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

### 4.1.6 Test Result

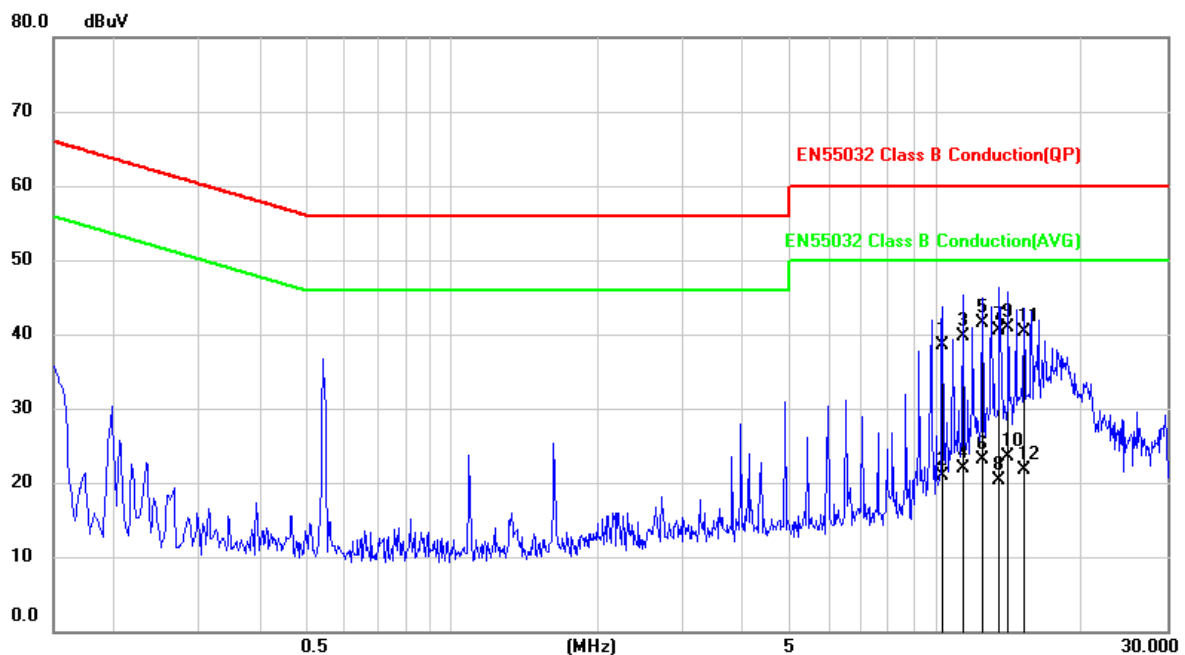
Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Phase	L
Tested by	Guanwei Liao	Test Site	W08
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1525	29.06	9.77	38.83	65.86	-27.03	QP
2	0.1525	27.98	9.77	37.75	55.86	-18.11	AVG
3	11.9270	28.18	9.89	38.07	60.00	-21.93	QP
4	11.9270	8.68	9.89	18.57	50.00	-31.43	AVG
5	12.9991	30.67	9.90	40.57	60.00	-19.43	QP
6	12.9991	13.82	9.90	23.72	50.00	-26.28	AVG
7	13.5467	29.17	9.91	39.08	60.00	-20.92	QP
8	13.5467	10.48	9.91	20.39	50.00	-29.61	AVG
9	14.6276	28.44	9.93	38.37	60.00	-21.63	QP
10	14.6276	11.27	9.93	21.20	50.00	-28.80	AVG
11	15.7190	27.12	9.93	37.05	60.00	-22.95	QP
12	15.7190	10.95	9.93	20.88	50.00	-29.12	AVG

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

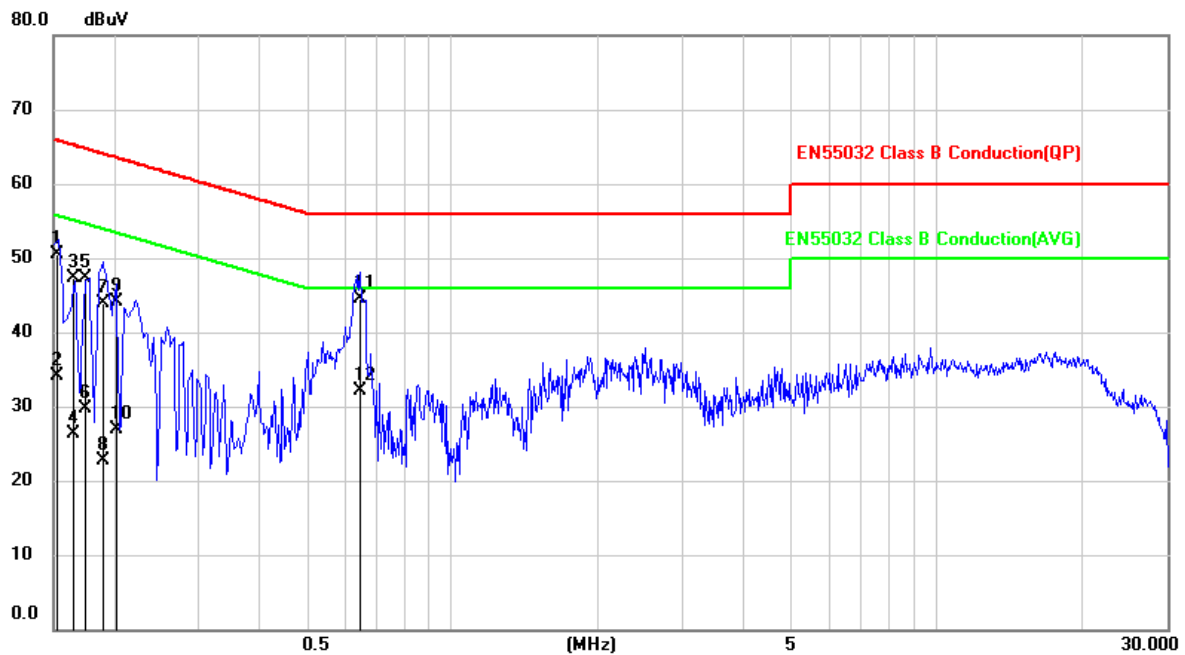
Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Phase	N
Tested by	Guanwei Liao	Test Site	W08
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	10.2888	28.69	9.86	38.55	60.00	-21.45	QP
2	10.2888	11.07	9.86	20.93	50.00	-29.07	AVG
3	11.3710	29.80	9.88	39.68	60.00	-20.32	QP
4	11.3710	11.94	9.88	21.82	50.00	-28.18	AVG
5	12.4551	31.71	9.89	41.60	60.00	-18.40	QP
6	12.4551	13.29	9.89	23.18	50.00	-26.82	AVG
7	13.5516	30.67	9.91	40.58	60.00	-19.42	QP
8	13.5516	10.41	9.91	20.32	50.00	-29.68	AVG
9	14.0823	30.97	9.91	40.88	60.00	-19.12	QP
10	14.0823	13.51	9.91	23.42	50.00	-26.58	AVG
11	15.1735	30.44	9.93	40.37	60.00	-19.63	QP
12	15.1735	11.75	9.93	21.68	50.00	-28.32	AVG

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

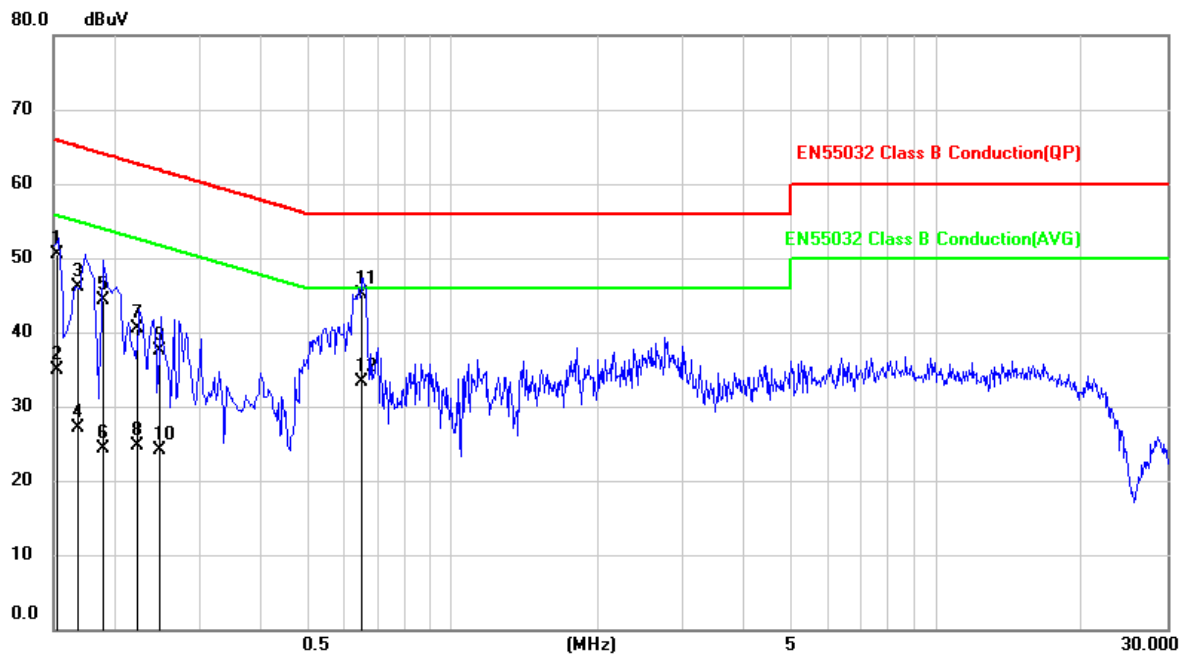
Test Voltage	100Vac, 50Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Phase	L
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1524	40.75	9.77	50.52	65.87	-15.35	QP
2	0.1524	24.35	9.77	34.12	55.87	-21.75	AVG
3	0.1641	37.56	9.77	47.33	65.25	-17.92	QP
4	0.1641	16.60	9.77	26.37	55.25	-28.88	AVG
5	0.1744	37.56	9.77	47.33	64.75	-17.42	QP
6	0.1744	19.93	9.77	29.70	54.75	-25.05	AVG
7	0.1912	34.15	9.76	43.91	63.98	-20.07	QP
8	0.1912	12.95	9.76	22.71	53.98	-31.27	AVG
9	0.2014	34.42	9.76	44.18	63.55	-19.37	QP
10	0.2014	17.07	9.76	26.83	53.55	-26.72	AVG
11	0.6449	34.78	9.76	44.54	56.00	-11.46	QP
12	0.6449	22.29	9.76	32.05	46.00	-13.95	AVG

**Remark:** 1. QP = Quasi Peak, AVG = Average  
2. Correction Factor = Insertion loss of LISN + Cable loss + Transient Limiter (If use)  
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	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Phase	N
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		

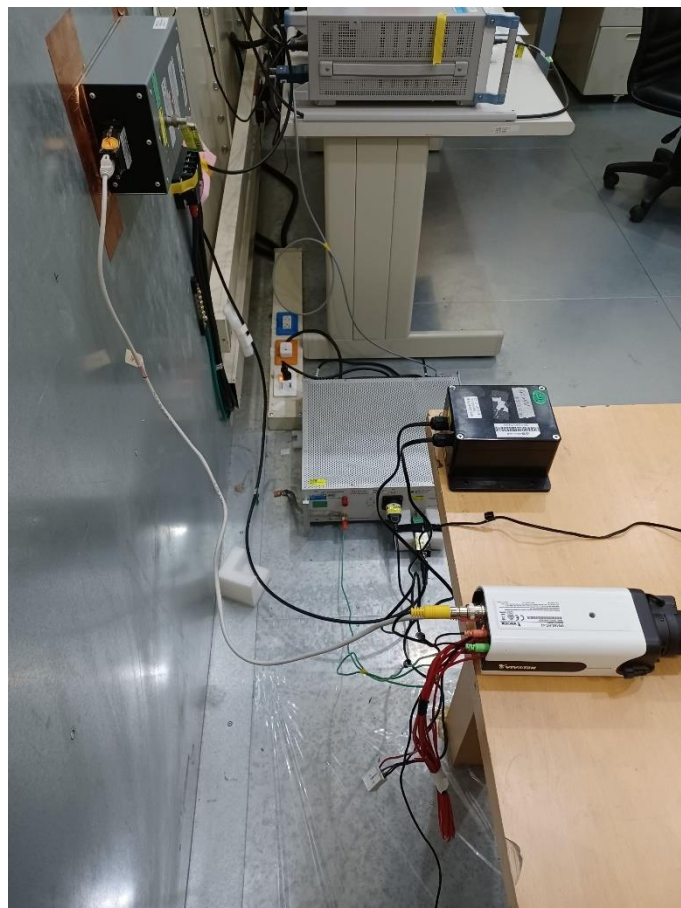


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1517	40.67	9.77	50.44	65.91	-15.47	QP
2	0.1517	25.18	9.77	34.95	55.91	-20.96	AVG
3	0.1693	36.30	9.77	46.07	64.99	-18.92	QP
4	0.1693	17.35	9.77	27.12	54.99	-27.87	AVG
5	0.1901	34.52	9.76	44.28	64.03	-19.75	QP
6	0.1901	14.59	9.76	24.35	54.03	-29.68	AVG
7	0.2221	30.66	9.76	40.42	62.74	-22.32	QP
8	0.2221	14.99	9.76	24.75	52.74	-27.99	AVG
9	0.2476	27.77	9.76	37.53	61.84	-24.31	QP
10	0.2476	14.34	9.76	24.10	51.84	-27.74	AVG
11	0.6480	35.35	9.76	45.11	56.00	-10.89	QP
12	0.6480	23.47	9.76	33.23	46.00	-12.77	AVG

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

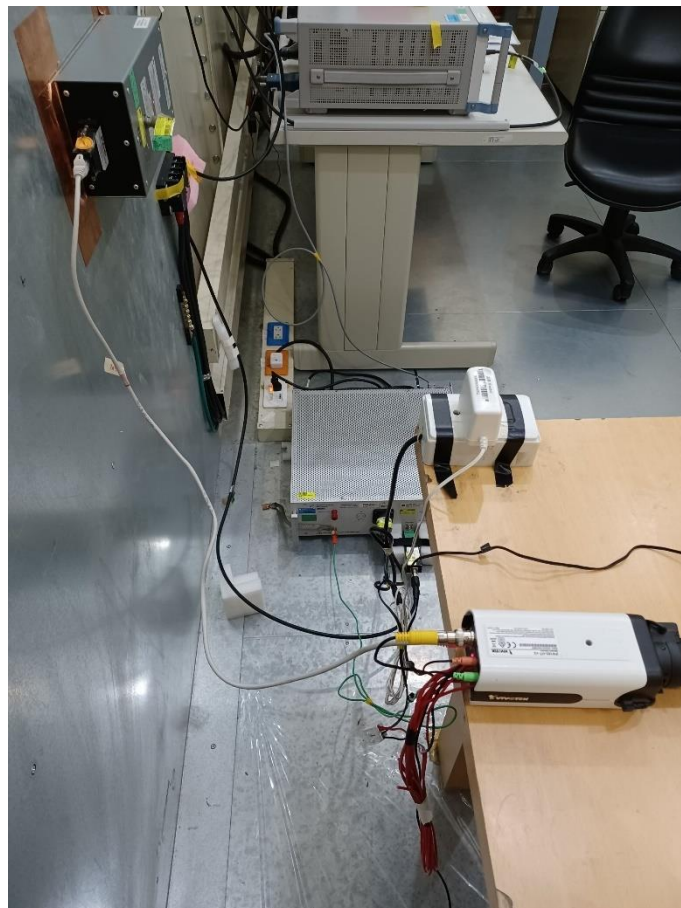
#### 4.1.7 Photographs of Test Configuration

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(μV)
	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(μV)
	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. 29, 2020
2	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 29, 2020
3	Impedance Stabilization Network	TESEQ	T8-CAT6	CT-1-105	Apr. 29, 2020
4	V-LISN	SCHWARZBECK	NSLK8127	CT-1-104-1	Apr. 29, 2020
5	Test Cable	Marvelous Microwave Inc	200200.400LL. 500A	CT-10-048-1	Apr. 27, 2020
6	50ohm Termination	N/A	N/A	CT-1-065-2	Apr. 29, 2020
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

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

Test Site: W08-CE					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	TWO-LINE V-NETWORK LISN	R&S®	ENV216	CT-1-025-2	May 27, 2020
2	Test Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	May 25, 2020
3	EMI Test Receiver	R&S	ESR3	CT-1-103	May 21, 2020
4	LISN	SCHWARZBECK	NSLK 8127RC	CT-1-104-1RC	May 27, 2020
5	ISN	FCC	F-071115-1057 -1-09	CT-1-027	Jun. 01, 2020
6	50ohm Termination	HUBER+SUHNER	N/A	CT-1-109-2	May 26, 2020
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

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



### 4.2.3 Test Procedure

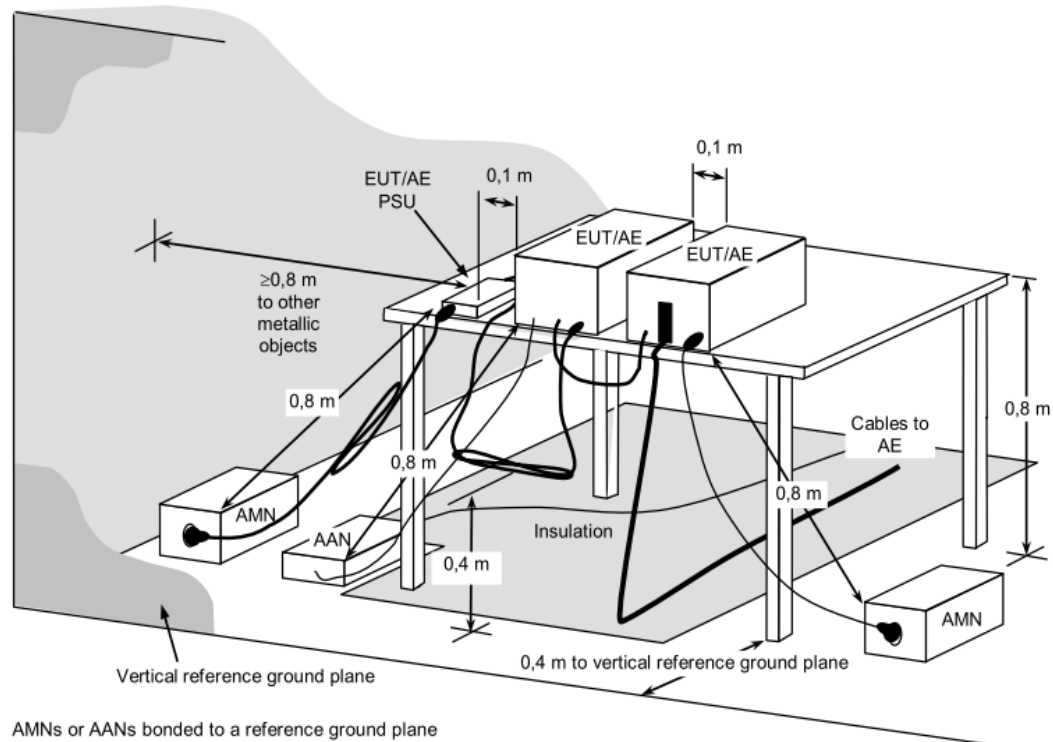
- a. The table-top EUT was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The floor-standing EUT was placed insulation support unit from the horizontal ground plane. The LISN at least 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, 10Gbps and POE mode. Emission frequency and amplitude were recorded, recording at least six highest emissions.
- g. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

### 4.2.4 Deviation from Test Standard

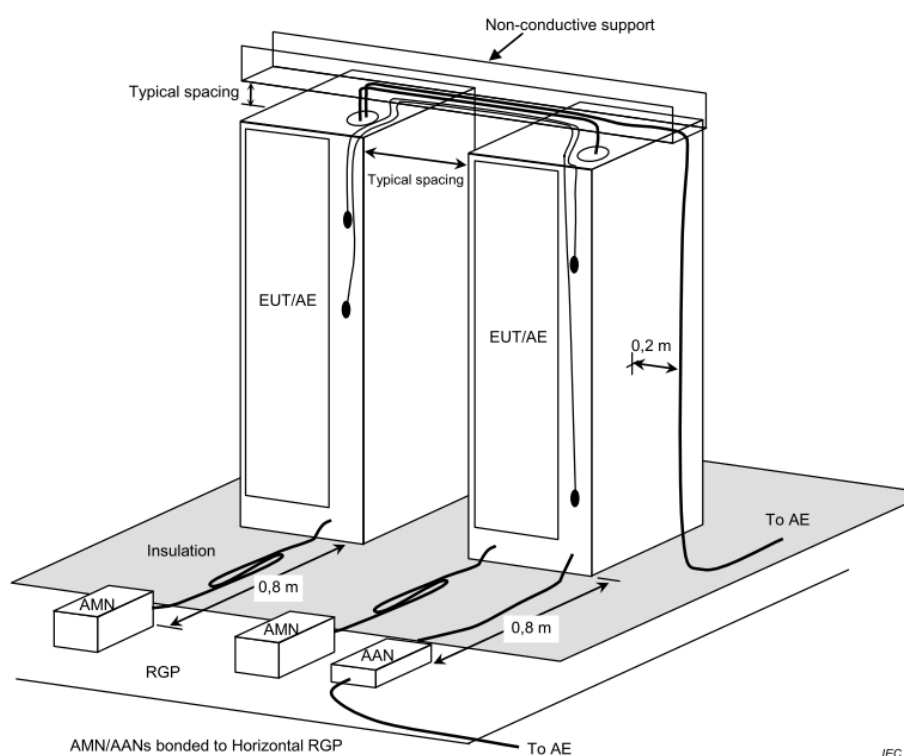
No deviation

### 4.2.5 Test Setup

### < Table-Top equipment >



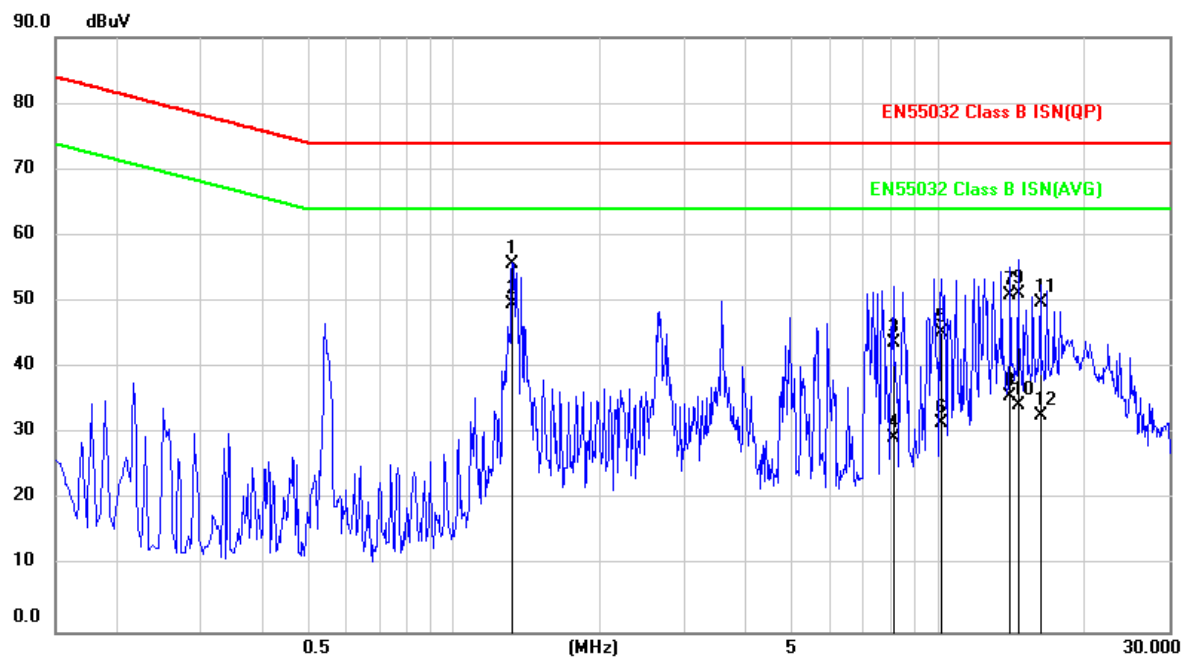
**< Floor-Standing equipment >**



**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	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	A		

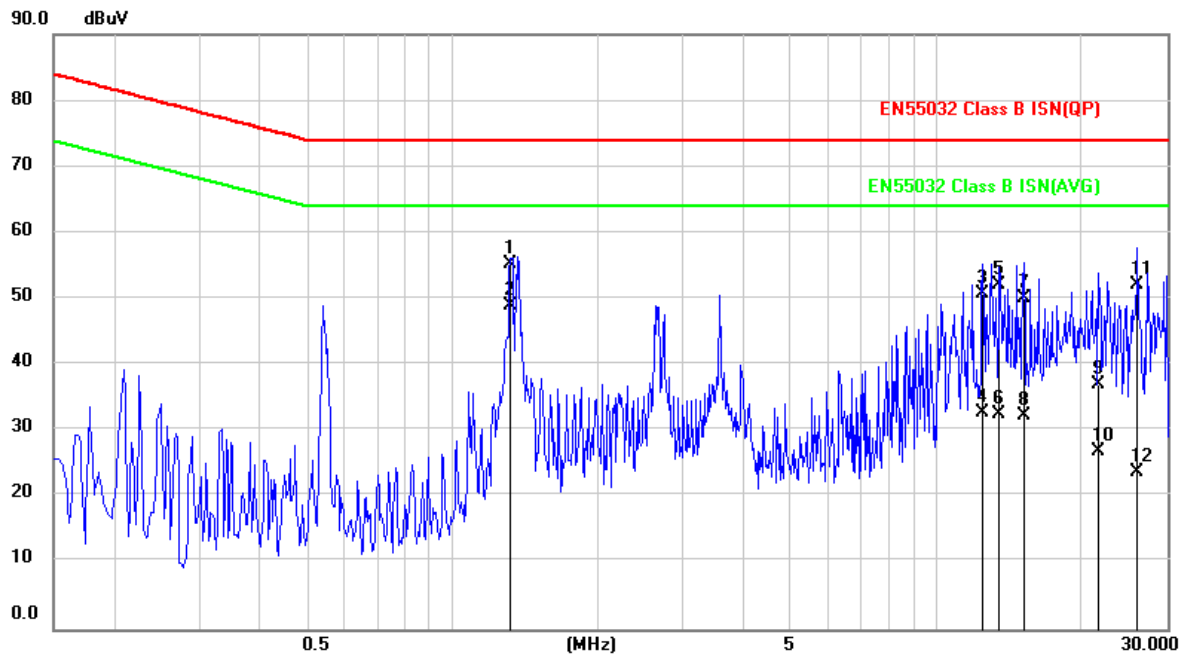


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3178	46.42	9.30	55.72	74.00	-18.28	QP
2	1.3178	40.29	9.30	49.59	64.00	-14.41	AVG
3	8.0978	34.44	9.27	43.71	74.00	-30.29	QP
4	8.0978	20.18	9.27	29.45	64.00	-34.55	AVG
5	10.1631	36.12	9.29	45.41	74.00	-28.59	QP
6	10.1631	22.27	9.29	31.56	64.00	-32.44	AVG
7	14.0750	41.48	9.37	50.85	74.00	-23.15	QP
8	14.0750	26.27	9.37	35.64	64.00	-28.36	AVG
9	14.6155	41.89	9.39	51.28	74.00	-22.72	QP
10	14.6155	24.89	9.39	34.28	64.00	-29.72	AVG
11	16.2514	40.44	9.41	49.85	74.00	-24.15	QP
12	16.2514	23.39	9.41	32.80	64.00	-31.20	AVG

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



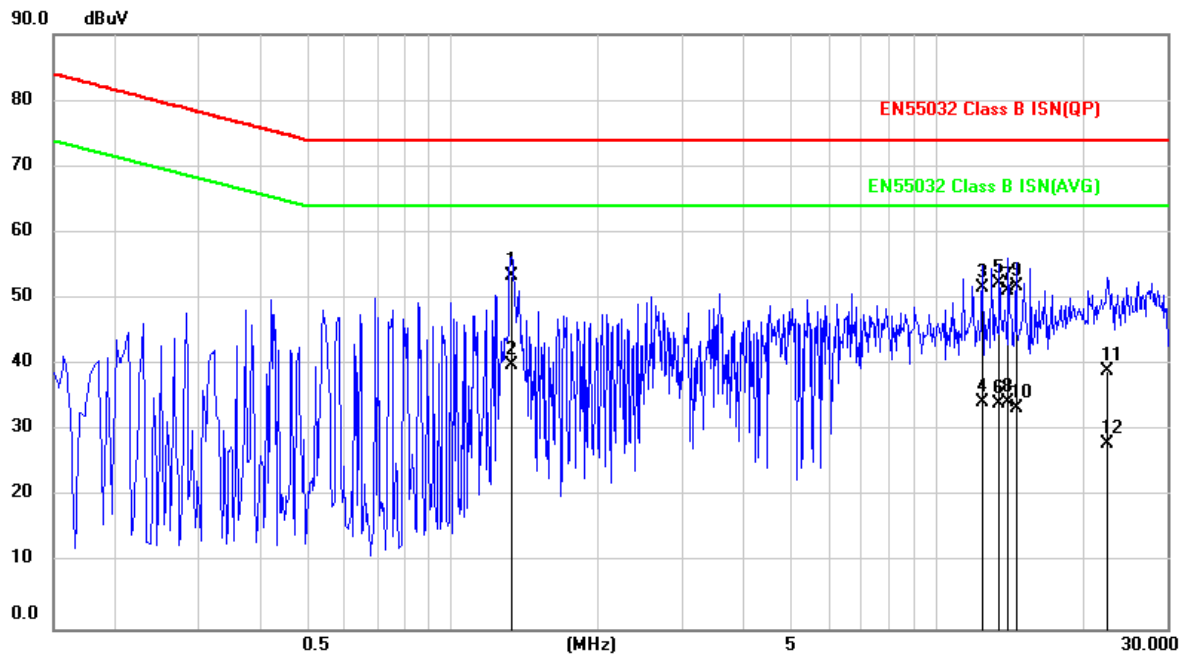
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	A		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3179	45.89	9.30	55.19	74.00	-18.81	QP
2	1.3179	39.55	9.30	48.85	64.00	-15.15	AVG
3	12.4594	41.47	9.34	50.81	74.00	-23.19	QP
4	12.4594	23.33	9.34	32.67	64.00	-31.33	AVG
5	13.5410	42.63	9.36	51.99	74.00	-22.01	QP
6	13.5410	23.23	9.36	32.59	64.00	-31.41	AVG
7	15.1623	40.71	9.40	50.11	74.00	-23.89	QP
8	15.1623	22.79	9.40	32.19	64.00	-31.81	AVG
9	21.6623	27.50	9.54	37.04	74.00	-36.96	QP
10	21.6623	17.39	9.54	26.93	64.00	-37.07	AVG
11	26.0138	42.42	9.66	52.08	74.00	-21.92	QP
12	26.0138	14.12	9.66	23.78	64.00	-40.22	AVG

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

Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	A		

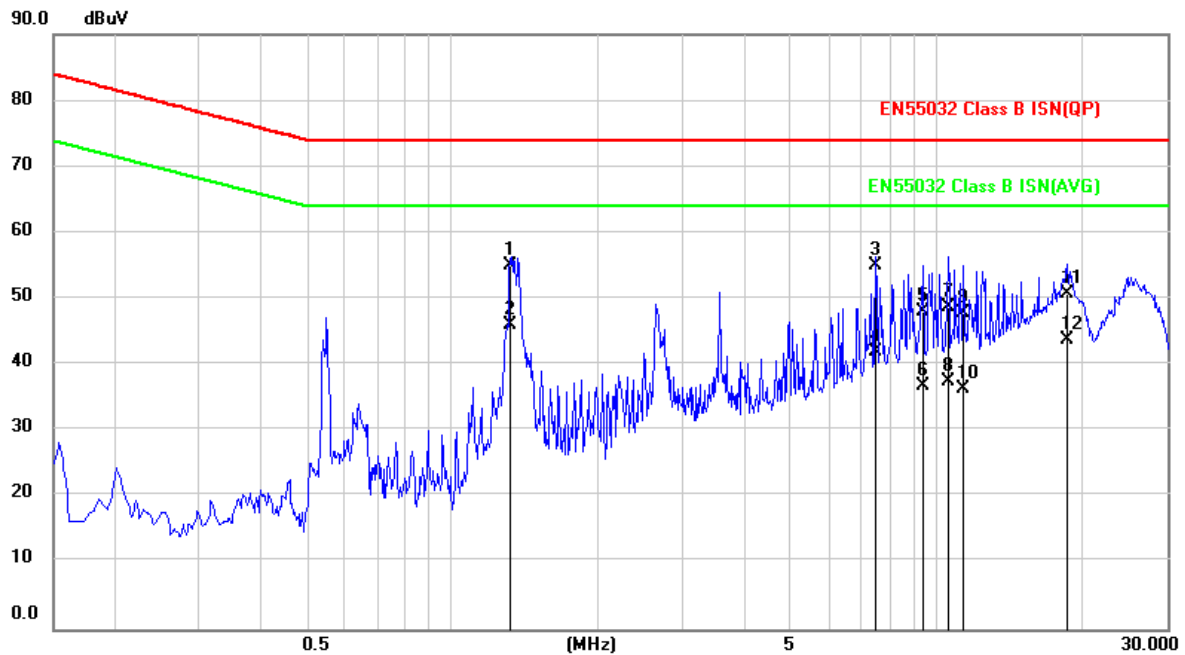


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3253	44.07	9.30	53.37	74.00	-20.63	QP
2	1.3253	30.57	9.30	39.87	64.00	-24.13	AVG
3	12.4592	42.40	9.34	51.74	74.00	-22.26	QP
4	12.4592	25.02	9.34	34.36	64.00	-29.64	AVG
5	13.5341	42.98	9.36	52.34	74.00	-21.66	QP
6	13.5341	24.78	9.36	34.14	64.00	-29.86	AVG
7	14.0739	41.86	9.37	51.23	74.00	-22.77	QP
8	14.0739	24.88	9.37	34.25	64.00	-29.75	AVG
9	14.6263	42.45	9.39	51.84	74.00	-22.16	QP
10	14.6263	24.12	9.39	33.51	64.00	-30.49	AVG
11	22.5516	29.56	9.56	39.12	74.00	-34.88	QP
12	22.5516	18.37	9.56	27.93	64.00	-36.07	AVG

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



Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		

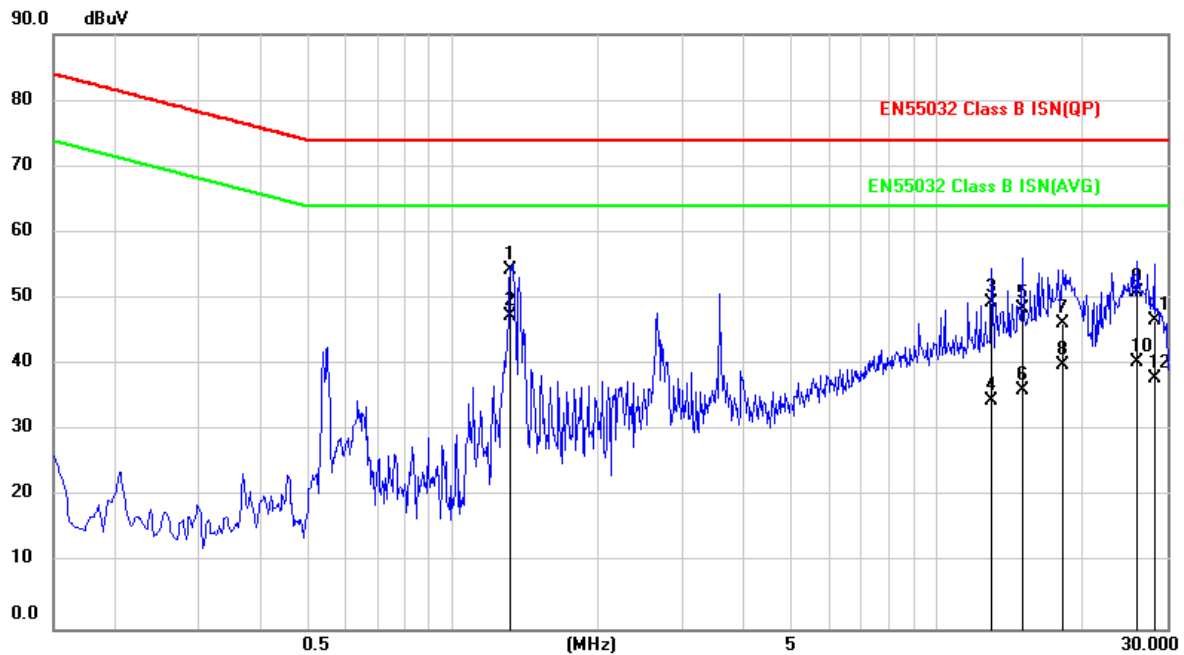


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3167	45.80	9.30	55.10	74.00	-18.90	QP
2	1.3167	36.80	9.30	46.10	64.00	-17.90	AVG
3	7.4999	45.75	9.26	55.01	74.00	-18.99	QP
4	7.4999	32.67	9.26	41.93	64.00	-22.07	AVG
5	9.4019	38.73	9.28	48.01	74.00	-25.99	QP
6	9.4019	27.52	9.28	36.80	64.00	-27.20	AVG
7	10.5979	39.36	9.30	48.66	74.00	-25.34	QP
8	10.5979	28.15	9.30	37.45	64.00	-26.55	AVG
9	11.4128	38.39	9.32	47.71	74.00	-26.29	QP
10	11.4128	27.05	9.32	36.37	64.00	-27.63	AVG
11	18.7028	41.25	9.46	50.71	74.00	-23.29	QP
12	18.7028	34.20	9.46	43.66	64.00	-20.34	AVG

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



Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		

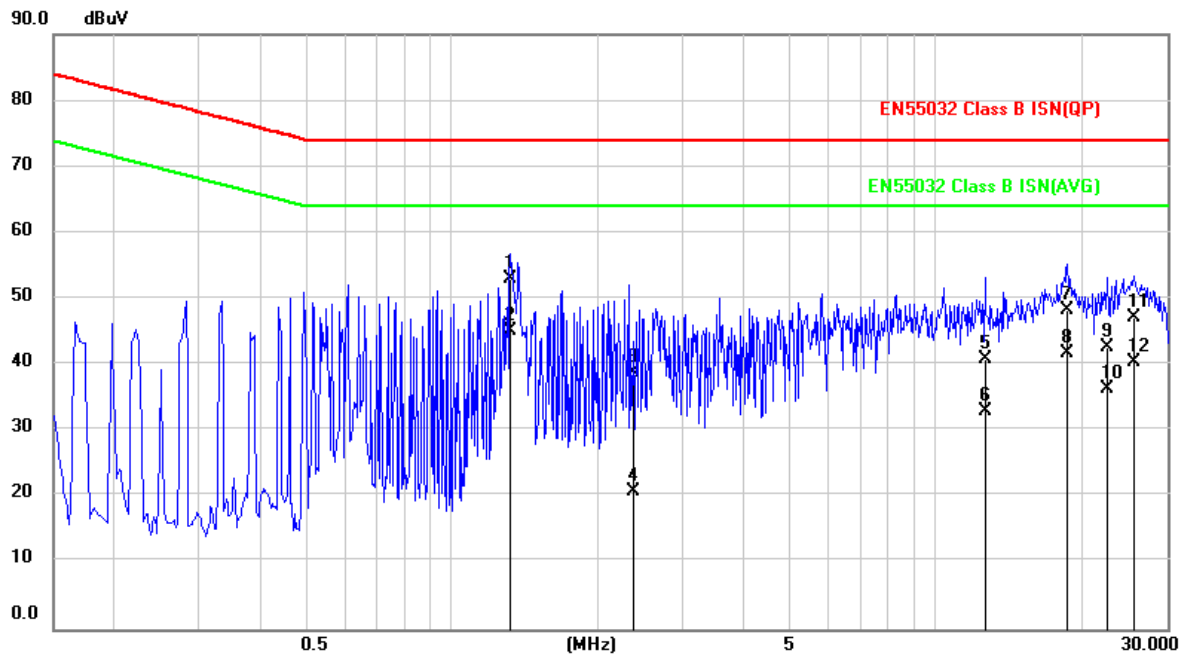


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3192	45.07	9.30	54.37	74.00	-19.63	QP
2	1.3192	38.00	9.30	47.30	64.00	-16.70	AVG
3	13.0065	39.97	9.36	49.33	74.00	-24.67	QP
4	13.0065	25.10	9.36	34.46	64.00	-29.54	AVG
5	15.0834	39.02	9.40	48.42	74.00	-25.58	QP
6	15.0834	26.61	9.40	36.01	64.00	-27.99	AVG
7	18.3029	36.79	9.45	46.24	74.00	-27.76	QP
8	18.3029	30.54	9.45	39.99	64.00	-24.01	AVG
9	26.0140	41.29	9.66	50.95	74.00	-23.05	QP
10	26.0140	30.74	9.66	40.40	64.00	-23.60	AVG
11	28.2108	37.00	9.73	46.73	74.00	-27.27	QP
12	28.2108	28.11	9.73	37.84	64.00	-26.16	AVG

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



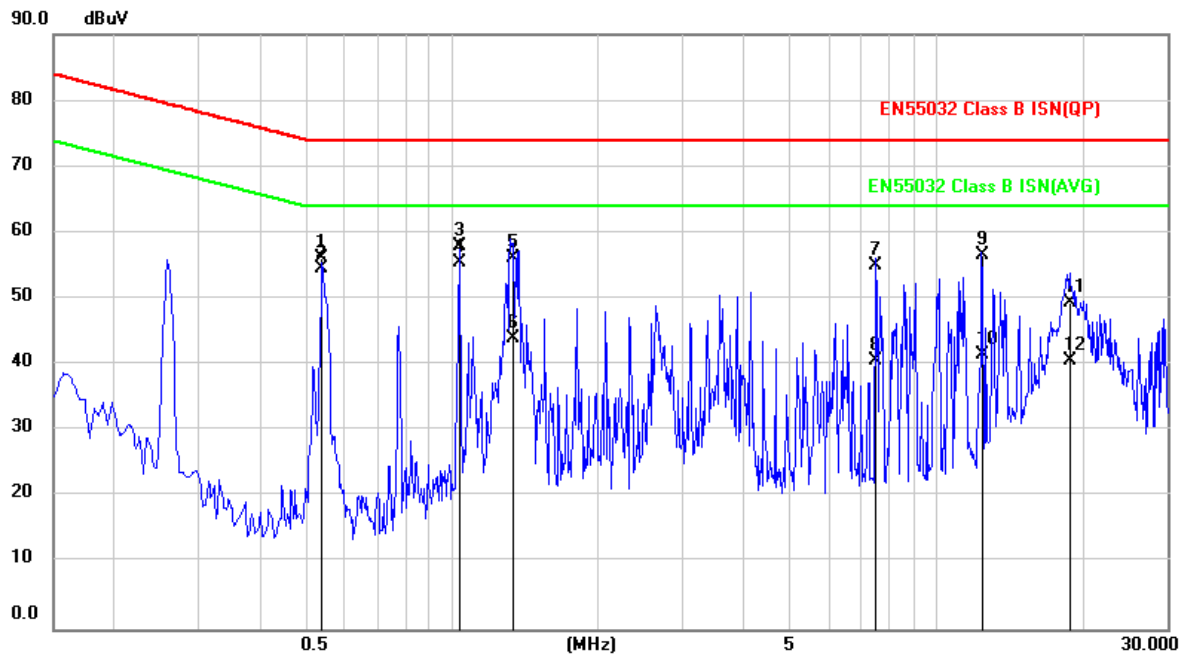
Test Voltage	100Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.3238	43.68	9.30	52.98	74.00	-21.02	QP
2	1.3238	35.75	9.30	45.05	64.00	-18.95	AVG
3	2.3751	29.44	9.26	38.70	74.00	-35.30	QP
4	2.3751	11.55	9.26	20.81	64.00	-43.19	AVG
5	12.6041	31.40	9.35	40.75	74.00	-33.25	QP
6	12.6041	23.67	9.35	33.02	64.00	-30.98	AVG
7	18.7030	38.85	9.46	48.31	74.00	-25.69	QP
8	18.7030	32.37	9.46	41.83	64.00	-22.17	AVG
9	22.6315	32.99	9.57	42.56	74.00	-31.44	QP
10	22.6315	26.68	9.57	36.25	64.00	-27.75	AVG
11	25.6415	37.56	9.65	47.21	74.00	-26.79	QP
12	25.6415	30.71	9.65	40.36	64.00	-23.64	AVG

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

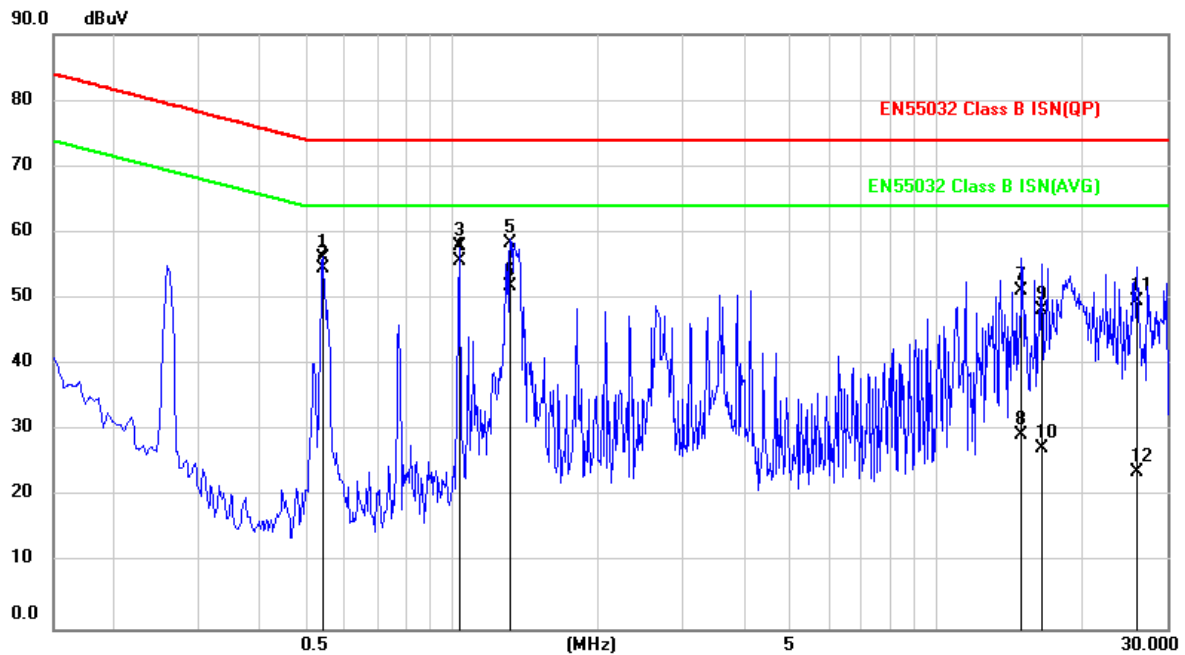
Test Voltage	55Vdc (from PoE)	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (10Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.5403	46.75	9.42	56.17	74.00	-17.83	QP
2	0.5403	45.05	9.42	54.47	64.00	-9.53	AVG
3	1.0358	48.56	9.32	57.88	74.00	-16.12	QP
4	1.0358	46.19	9.32	55.51	64.00	-8.49	AVG
5	1.3398	46.94	9.30	56.24	74.00	-17.76	QP
6	1.3398	34.62	9.30	43.92	64.00	-20.08	AVG
7	7.4999	45.77	9.26	55.03	74.00	-18.97	QP
8	7.4999	31.44	9.26	40.70	64.00	-23.30	AVG
9	12.4999	47.32	9.34	56.66	74.00	-17.34	QP
10	12.4999	32.24	9.34	41.58	64.00	-22.42	AVG
11	18.8168	39.94	9.47	49.41	74.00	-24.59	QP
12	18.8168	31.13	9.47	40.60	64.00	-23.40	AVG

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

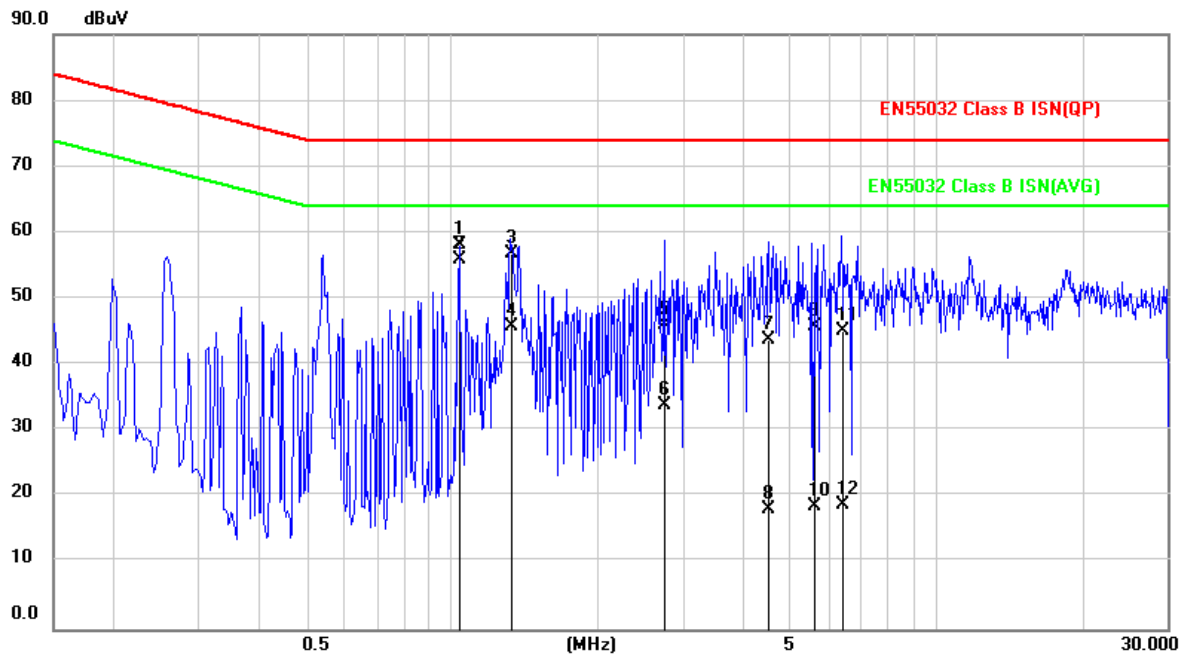
Test Voltage	55Vdc (from PoE)	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (100Mbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.5406	46.76	9.42	56.18	74.00	-17.82	QP
2	0.5406	45.08	9.42	54.50	64.00	-9.50	AVG
3	1.0358	48.55	9.32	57.87	74.00	-16.13	QP
4	1.0358	46.28	9.32	55.60	64.00	-8.40	AVG
5	1.3179	49.10	9.30	58.40	74.00	-15.60	QP
6	1.3179	42.65	9.30	51.95	64.00	-12.05	AVG
7	15.0217	41.69	9.40	51.09	74.00	-22.91	QP
8	15.0217	20.05	9.40	29.45	64.00	-34.55	AVG
9	16.5482	38.82	9.43	48.25	74.00	-25.75	QP
10	16.5482	18.02	9.43	27.45	64.00	-36.55	AVG
11	25.9523	39.90	9.66	49.56	74.00	-24.44	QP
12	25.9523	14.07	9.66	23.73	64.00	-40.27	AVG

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

Test Voltage	55Vdc (from PoE)	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Test Condition	LAN port with ISN (1Gbps)
Tested by	Guanwei Liao	Test Site	W08
Test Mode	C		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	1.0354	48.76	9.32	58.08	74.00	-15.92	QP
2	1.0354	46.67	9.32	55.99	64.00	-8.01	AVG
3	1.3303	47.56	9.30	56.86	74.00	-17.14	QP
4	1.3303	36.38	9.30	45.68	64.00	-18.32	AVG
5	2.7430	36.72	9.25	45.97	74.00	-28.03	QP
6	2.7430	24.72	9.25	33.97	64.00	-30.03	AVG
7	4.5188	34.52	9.24	43.76	74.00	-30.24	QP
8	4.5188	8.97	9.24	18.21	64.00	-45.79	AVG
9	5.6087	36.44	9.24	45.68	74.00	-28.32	QP
10	5.6087	9.30	9.24	18.54	64.00	-45.46	AVG
11	6.4198	35.78	9.25	45.03	74.00	-28.97	QP
12	6.4198	9.47	9.25	18.72	64.00	-45.28	AVG

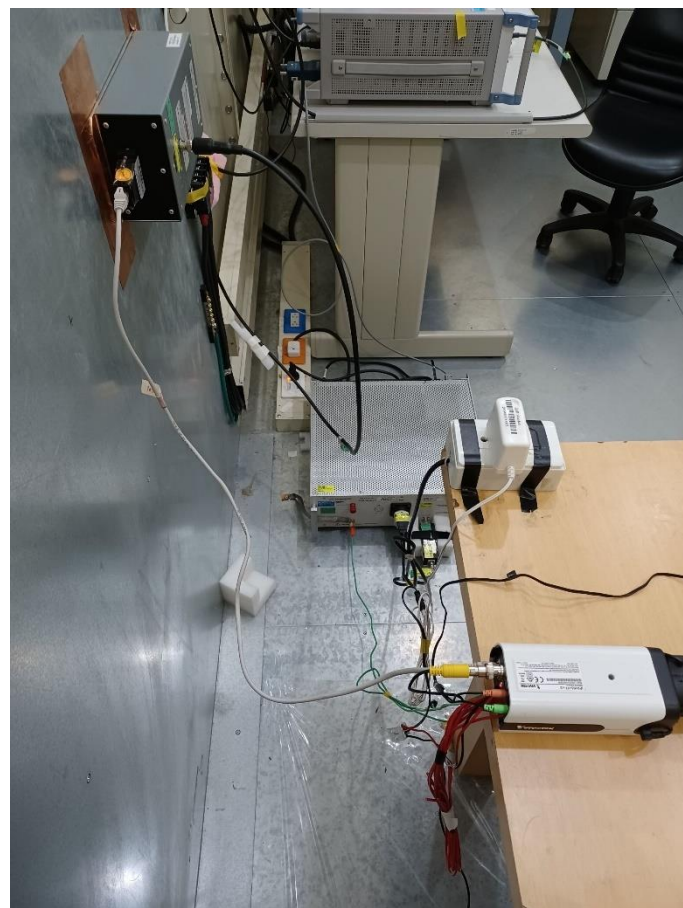
**Remark:** 1. QP = Quasi Peak, AVG = Average  
2. Correction Factor = Insertion loss of ISN + Cable loss  
3. Measurement Value = Reading Level + Correct Factor  
4. Margin Level = Measurement Value - Limit Value

## 4.2.7 Photographs of Test Configuration

Test mode A

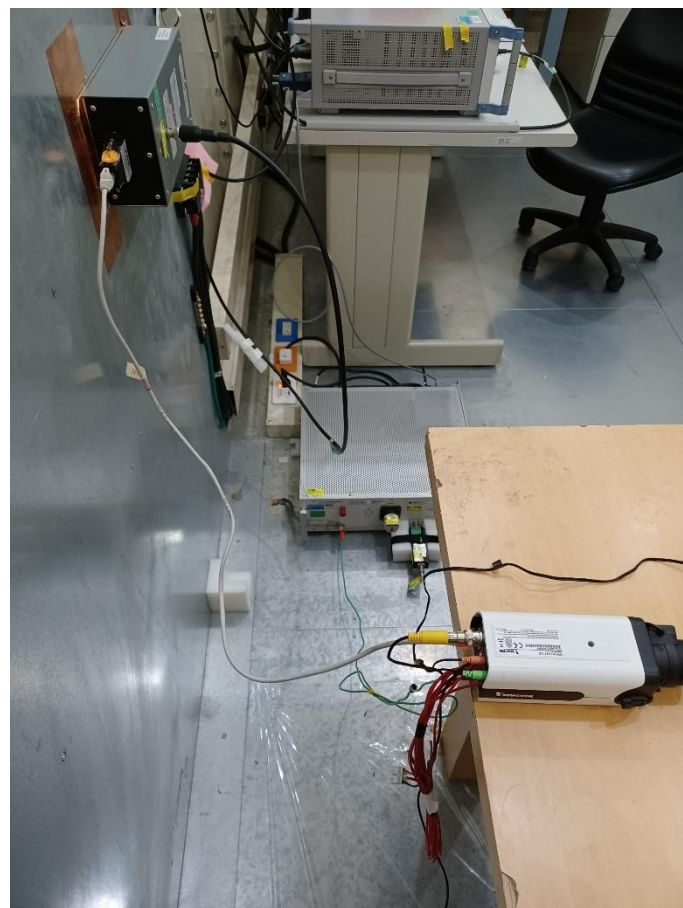


Test mode B





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(μV/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( $\mu\text{V/m}$ )
	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(μV/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( $\mu$ V/m)
	Distance (m)	Detector type/ bandwidth	FSOATS
1000 to 3000	3	Average / 1 MHz	50
3000 to 6000			54
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: W08-966					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Horn Antenna	Schwarzbeck	BBHA 9120D	CT-9-031	Jul. 28, 2020
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Dec. 03, 2020
3	TRILOG Broadband Antenna with 5 dB Attenuator	Schwarzbeck	VULB 9168 & FAT-NM5NF5T3G 2W5	CT-1-002-1	Jul. 29, 2020
4	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Apr. 21, 2021
5	EMI Test Receiver	Keysight	N9038A	CT-9-007	Jul. 28, 2020
6	Preamplifier	EM	EM 330	CT-9-024	Jul. 30, 2020
7	Preamplifier	JPT	JPA0118-55-303K	CT-1-139	Apr. 21, 2021
8	Preamplifier	EMCI	EMC051845SE	CT-9-012	Sep. 04, 2020
9	Preamplifier	EMCI	EMC184045SE	CT-9-013	Sep. 04, 2020
10	Test Cable	EMCI	EMCCFD400-NM-NM-1000	CT-1-132	Jul. 29, 2020
11	Test Cable	PEWC	CFD400NL-LW-N M-NM-3000	CT-1-141	Jul. 30, 2020
12	Test Cable	EMCI	EMCCFD400-NM-NM-15000	CT-1-133	Jul. 30, 2020
13	Test Cable	EMCI	EMC104-SM-35M-600	CT-1-134	Jul. 30, 2020
14	Test Cable	EMCI	EMC104-SM-35M-15000	CT-1-135	Jul. 30, 2020
15	Test Cable	EMCI	EMC102-KM-KM-600	CT-1-136	Jul. 30, 2020
16	Test Cable	MVE	140140.LL404.700	CT-9-066	Apr. 21, 2021
17	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 table-top EUT was placed on the top of a turntable 0.8 meters above the ground at 3 m 966 chamber. The floor-standing EUT was placed insulation support unit from the horizontal ground plane. 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.

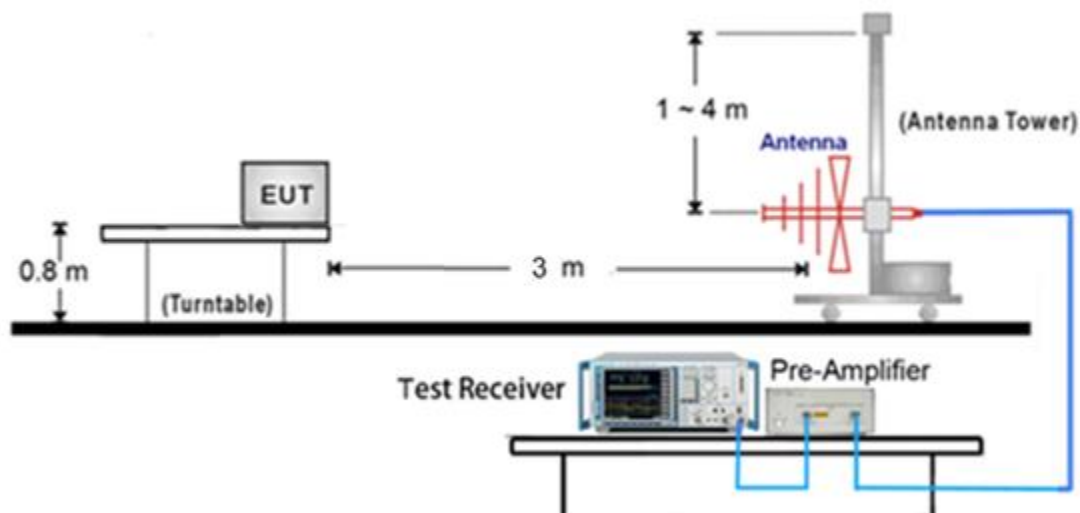
- e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

### 4.3.4 Deviation from Test Standard

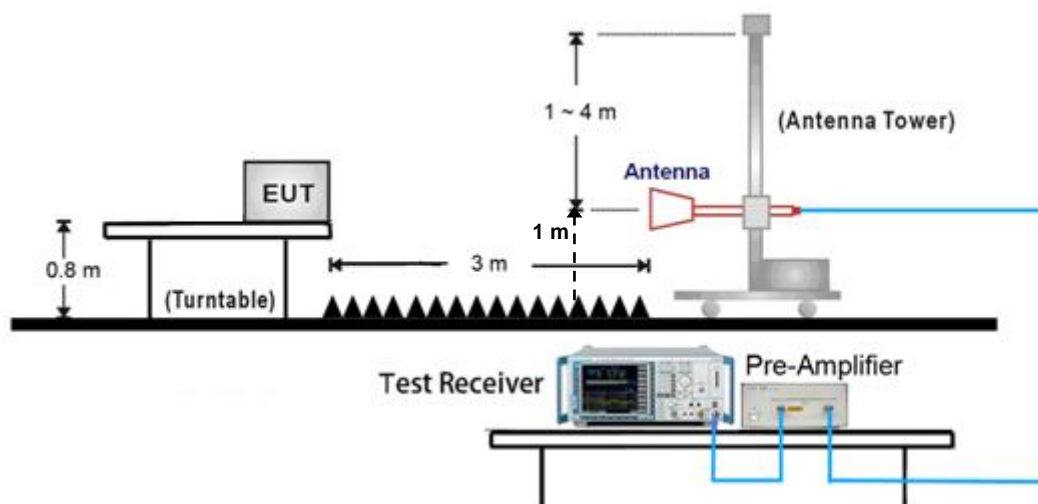
No deviation

### 4.3.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



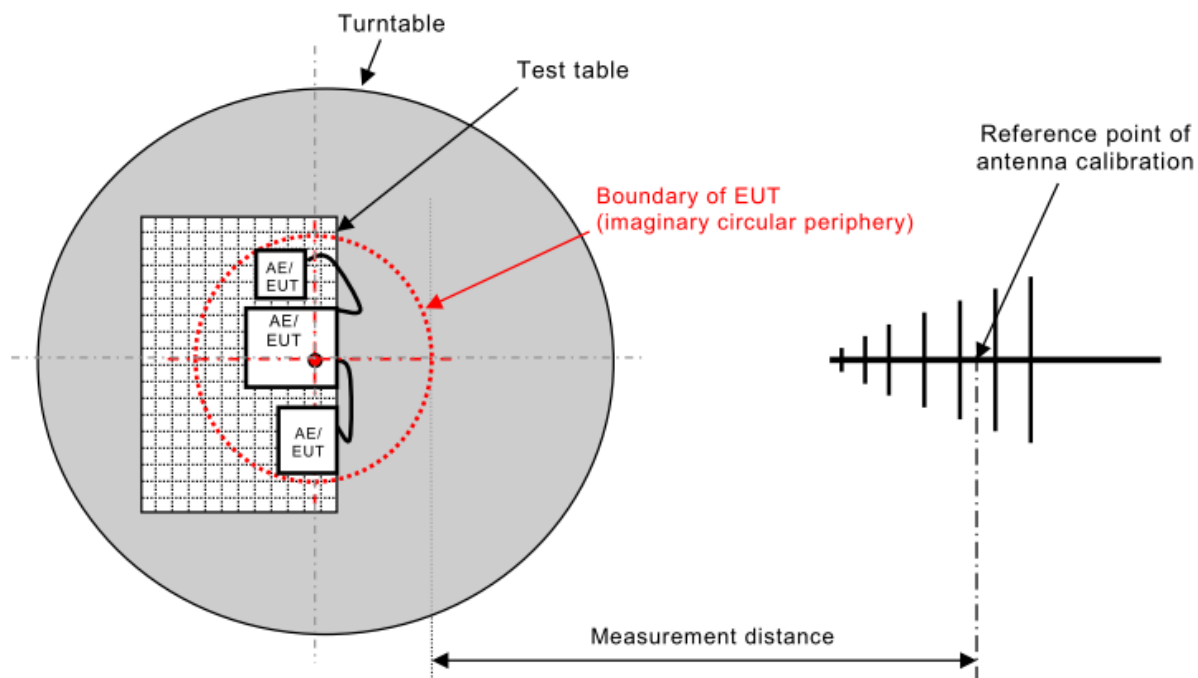
< Radiated Emissions Frequency: above 1GHz >



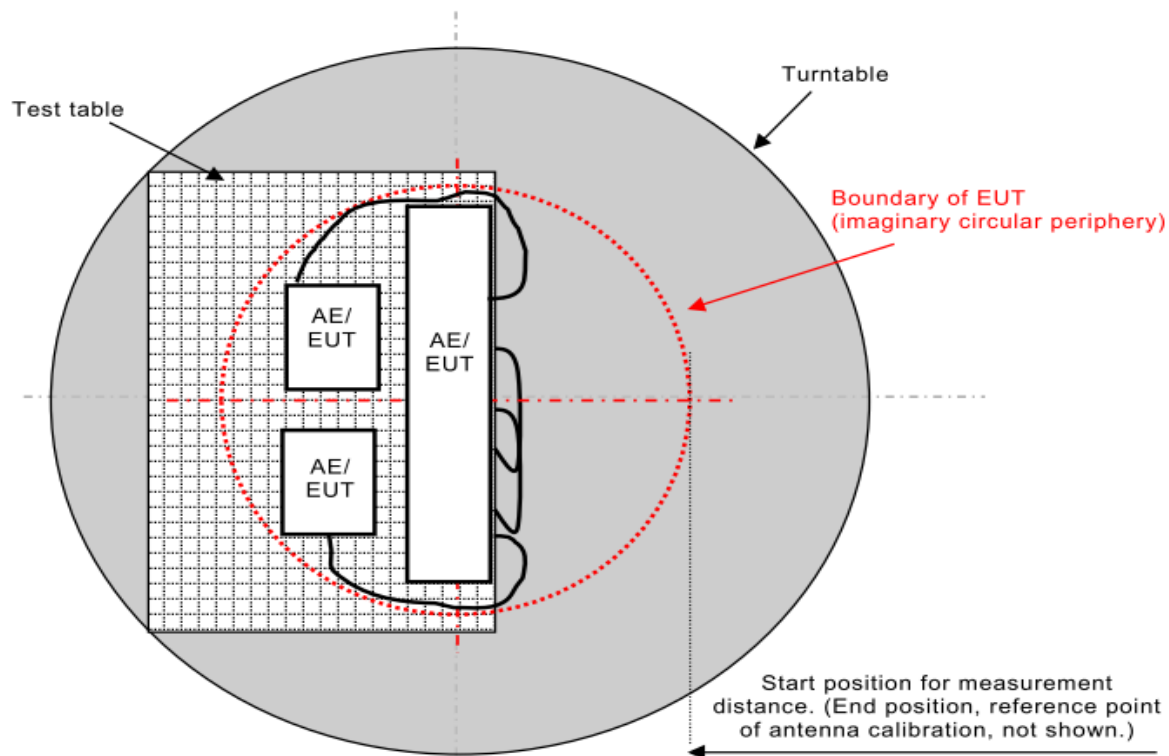
#### Note:

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

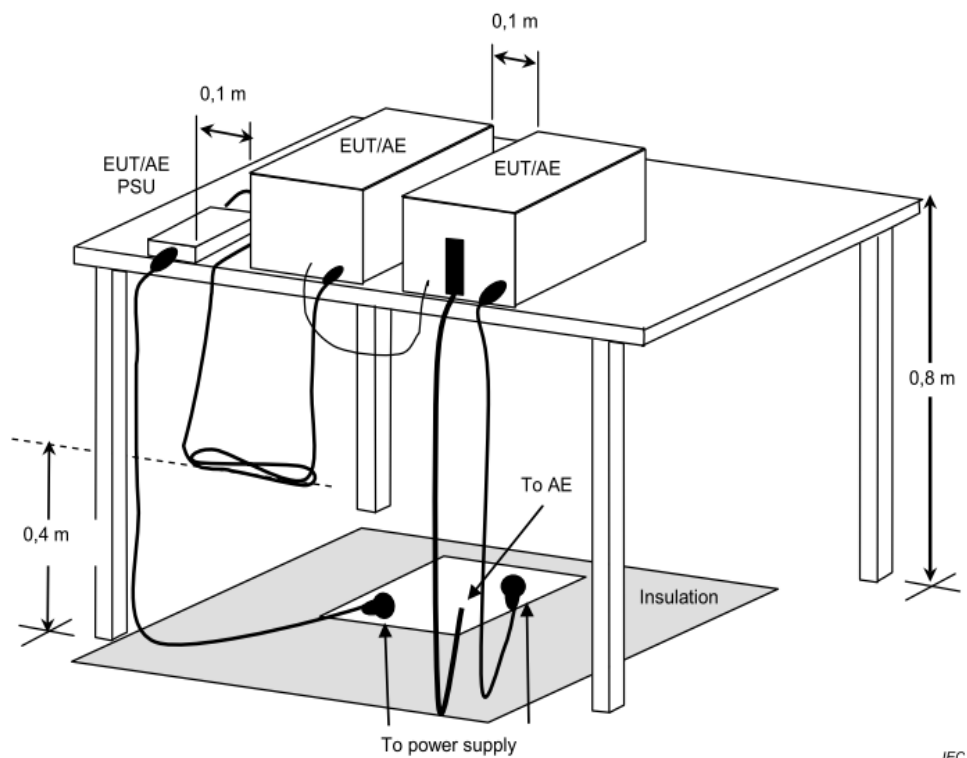
### < EUT placement top view and measurement distance >



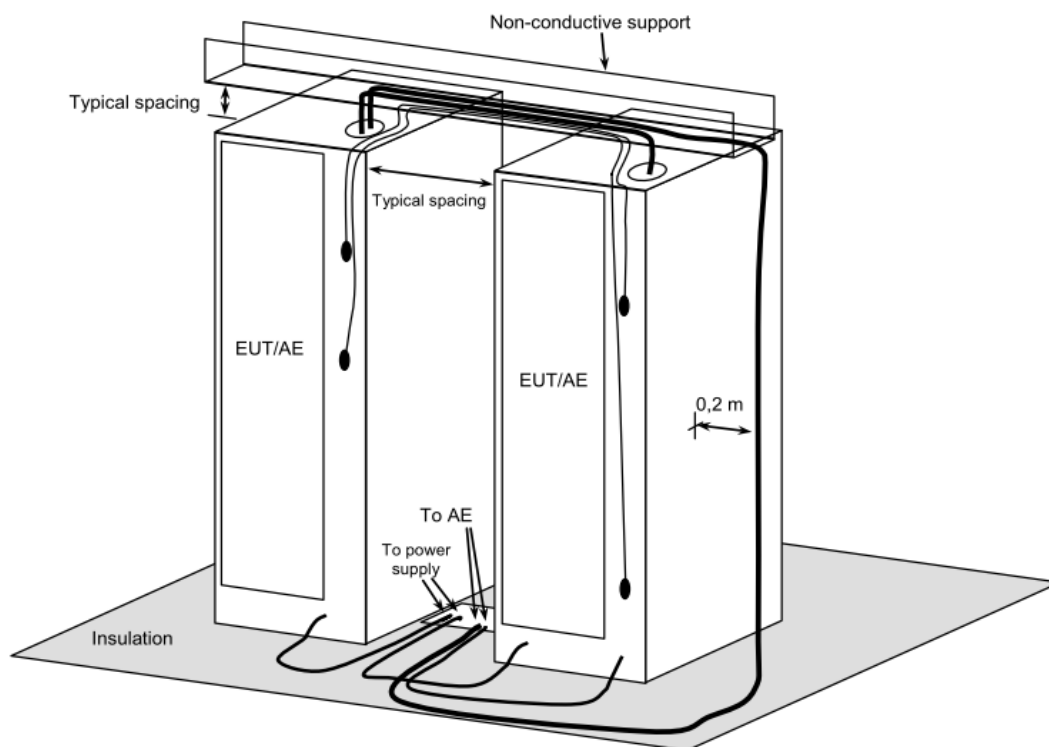
### < Boundary of EUT, Local AE and associated cabling >



### < Table-Top equipment >



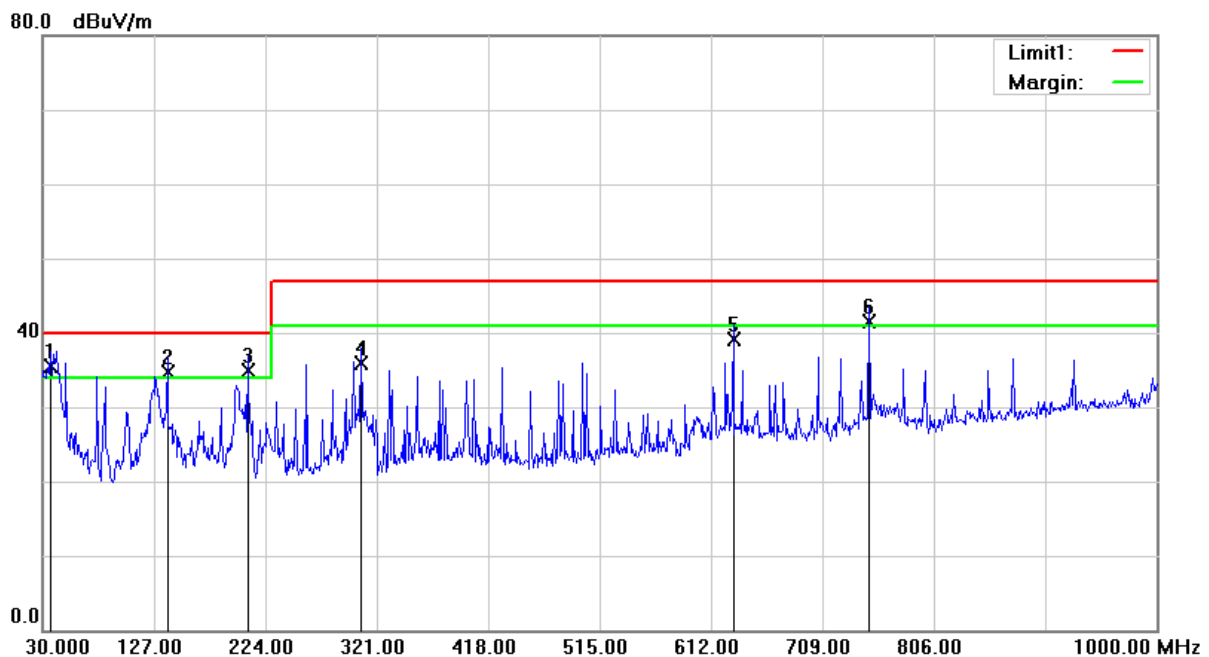
### < Floor-Standing equipment >



**Note:** Please refer to the 4.3.7 for the actual test configuration.

### 4.3.6 Test Result

Test Voltage	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/14	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08	Test Mode	A

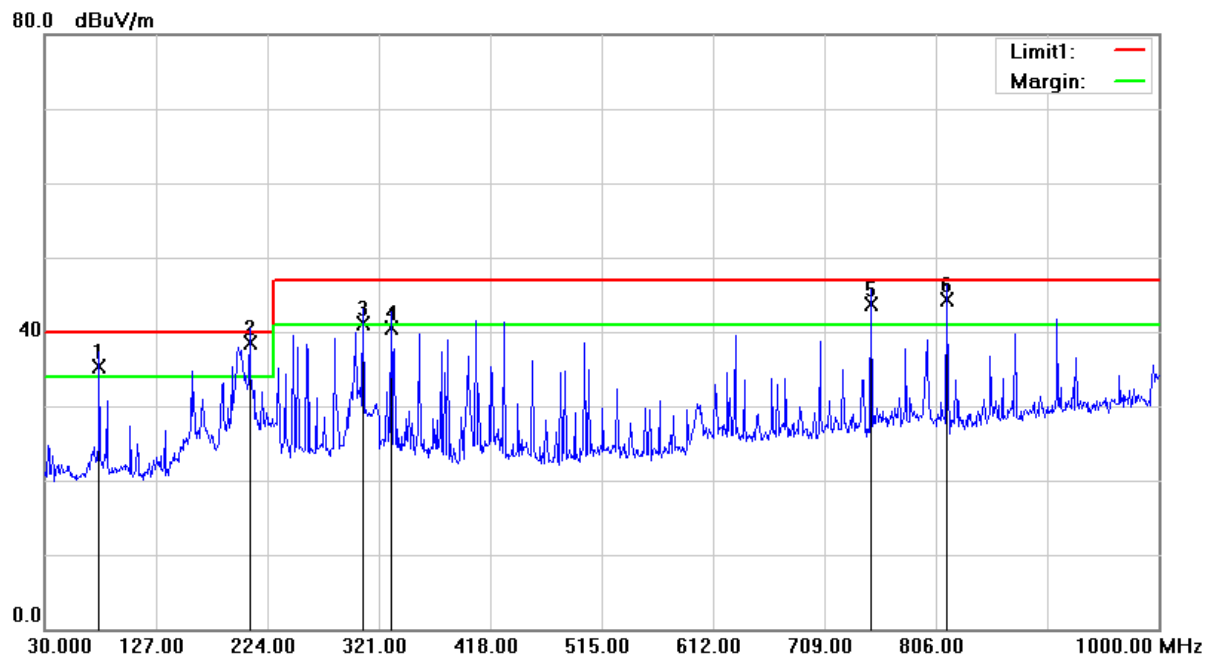


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	36.7900	45.16	-9.75	35.41	40.00	-4.59	84	100	QP
2	138.6400	44.17	-9.54	34.63	40.00	-5.37	141	100	QP
3	208.4800	45.87	-10.90	34.97	40.00	-5.03	0	158	QP
4	307.4200	43.99	-8.05	35.94	47.00	-11.06	0	154	QP
5	631.4000	40.34	-1.24	39.10	47.00	-7.90	344	100	QP
6	749.7400	40.88	0.68	41.56	47.00	-5.44	337	100	QP

**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	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/14	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08	Test Mode	A



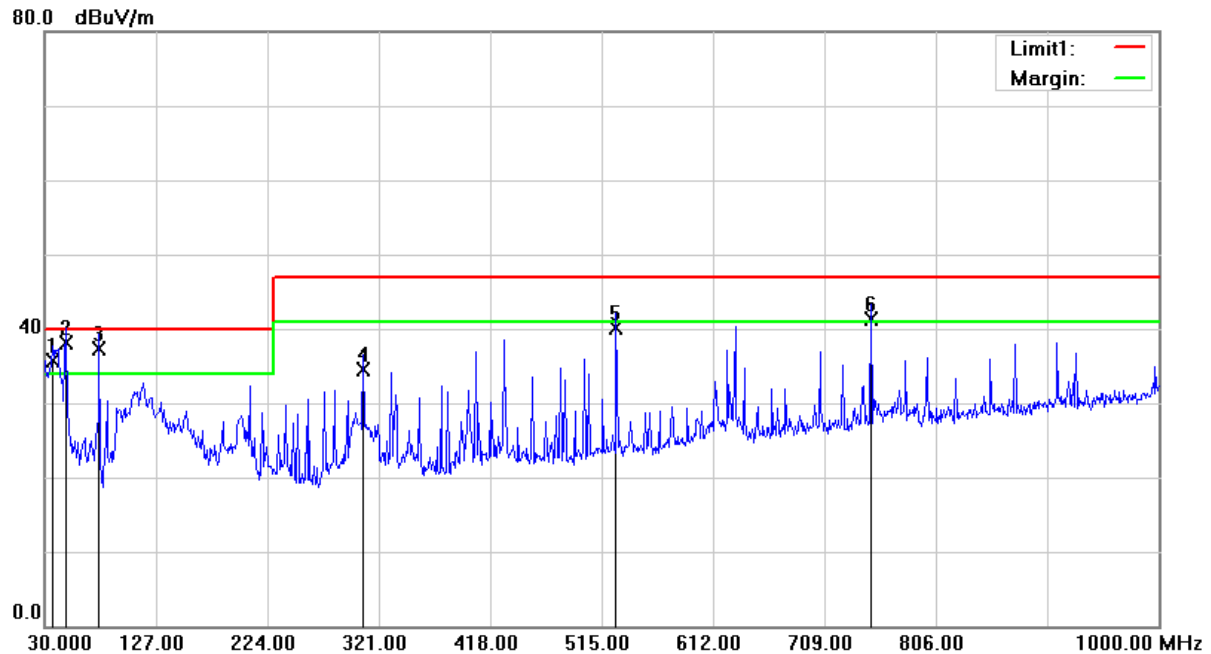
No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	48.66	-13.35	35.31	40.00	-4.69	359	200	QP
2	208.4800	49.39	-10.90	38.49	40.00	-1.51	265	100	QP
3	307.4200	49.17	-8.05	41.12	47.00	-5.88	288	100	QP
4	331.6700	48.02	-7.42	40.60	47.00	-6.40	298	100	QP
5	749.7400	42.98	0.68	43.66	47.00	-3.34	325	100	QP
6	815.7000	42.62	1.68	44.30	47.00	-2.70	178	100	QP

**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





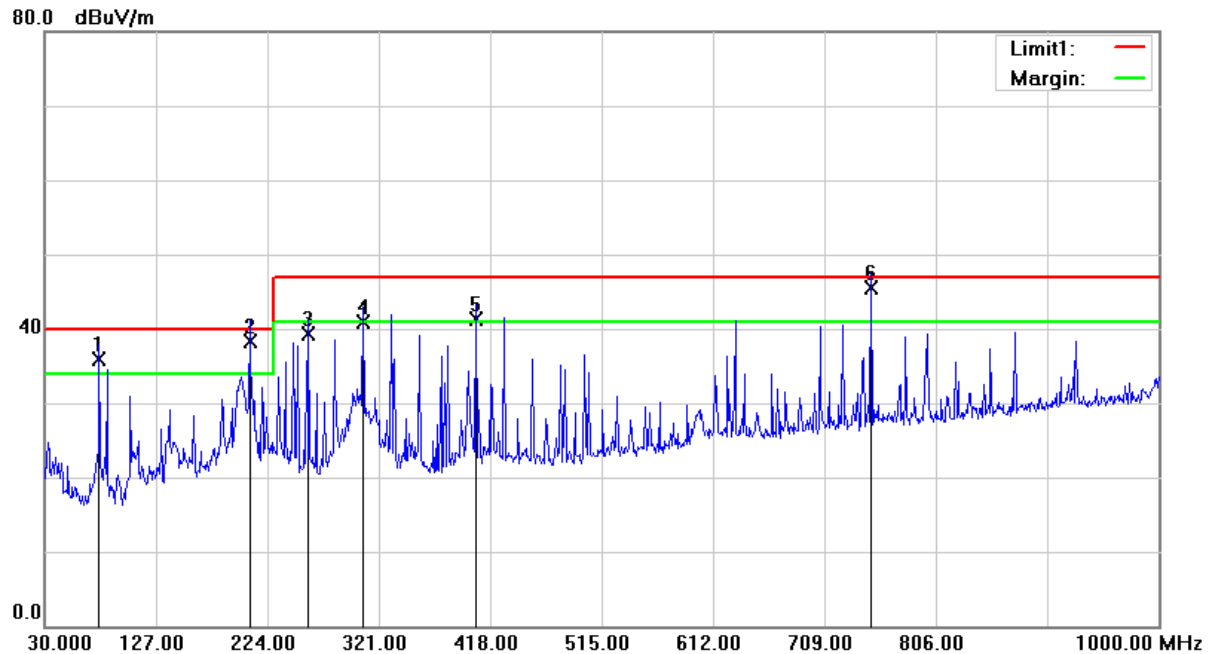
Test Voltage	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/14	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	36.7900	45.44	-9.75	35.69	40.00	-4.31	34	100	QP
2	48.4300	47.27	-9.20	38.07	40.00	-1.93	0	147	QP
3	77.5300	50.61	-13.35	37.26	40.00	-2.74	0	199	QP
4	307.4200	42.62	-8.05	34.57	47.00	-12.43	18	200	QP
5	527.6100	43.42	-3.25	40.17	47.00	-6.83	0	177	QP
6	749.7400	40.71	0.68	41.39	47.00	-5.61	352	200	QP

**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

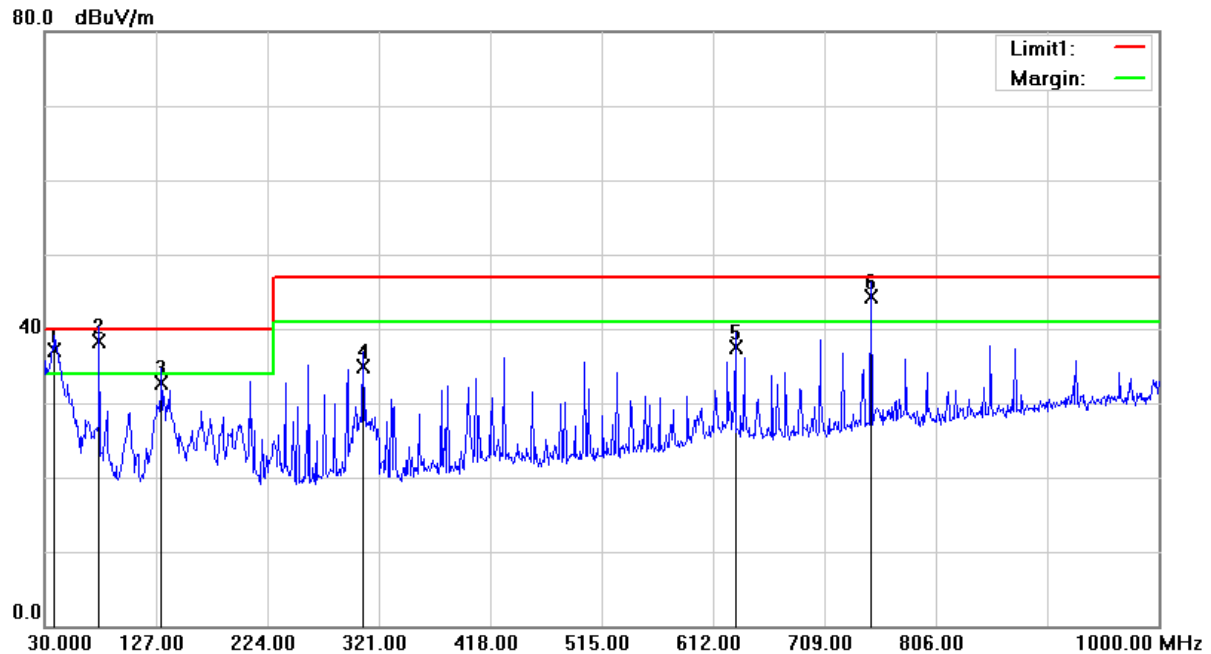
Test Voltage	100Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/14	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	49.32	-13.35	35.97	40.00	-4.03	37	200	QP
2	208.4800	49.28	-10.90	38.38	40.00	-1.62	288	100	QP
3	259.8900	47.65	-8.29	39.36	47.00	-7.64	18	100	QP
4	307.4200	48.91	-8.05	40.86	47.00	-6.14	298	100	QP
5	405.3900	47.36	-6.01	41.35	47.00	-5.65	18	100	QP
6	749.7400	44.74	0.68	45.42	47.00	-1.58	0	111	QP

**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

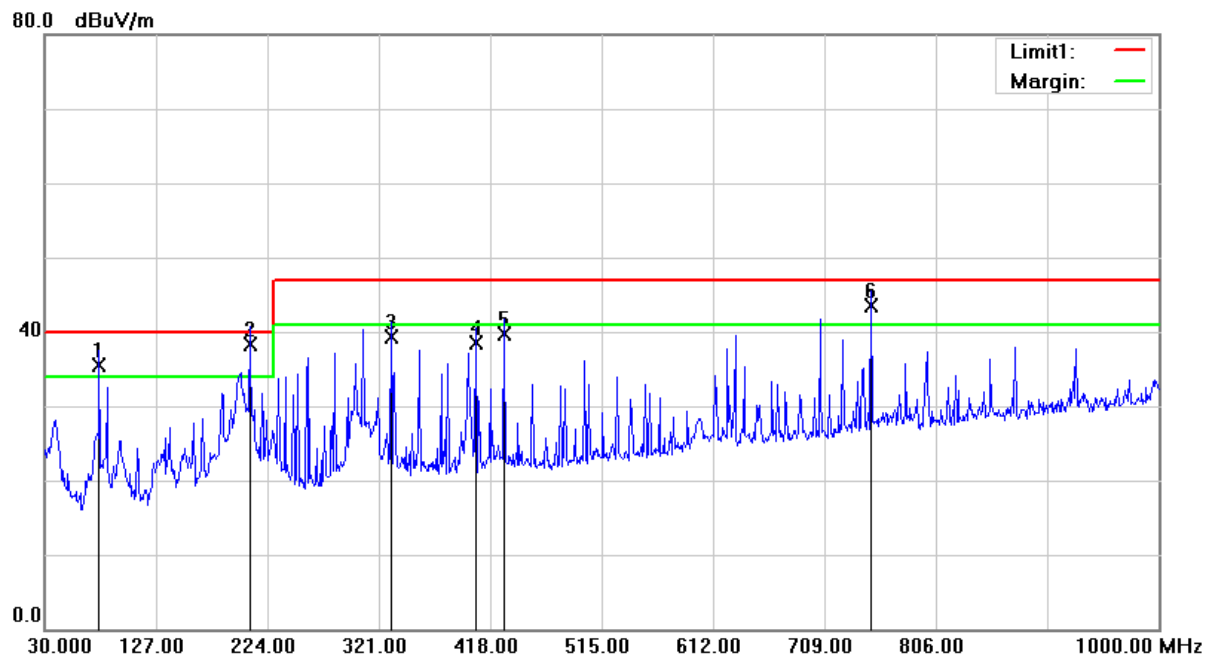
Test Voltage	55Vdc (from PoE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/13	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08	Test Mode	C



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	38.7300	46.78	-9.66	37.12	40.00	-2.88	360	100	QP
2	77.5300	51.66	-13.35	38.31	40.00	-1.69	84	100	QP
3	131.8500	42.67	-10.00	32.67	40.00	-7.33	61	100	QP
4	307.4200	42.86	-8.05	34.81	47.00	-12.19	0	136	QP
5	631.4000	38.73	-1.24	37.49	47.00	-9.51	338	100	QP
6	749.7400	43.57	0.68	44.25	47.00	-2.75	351	100	QP

**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

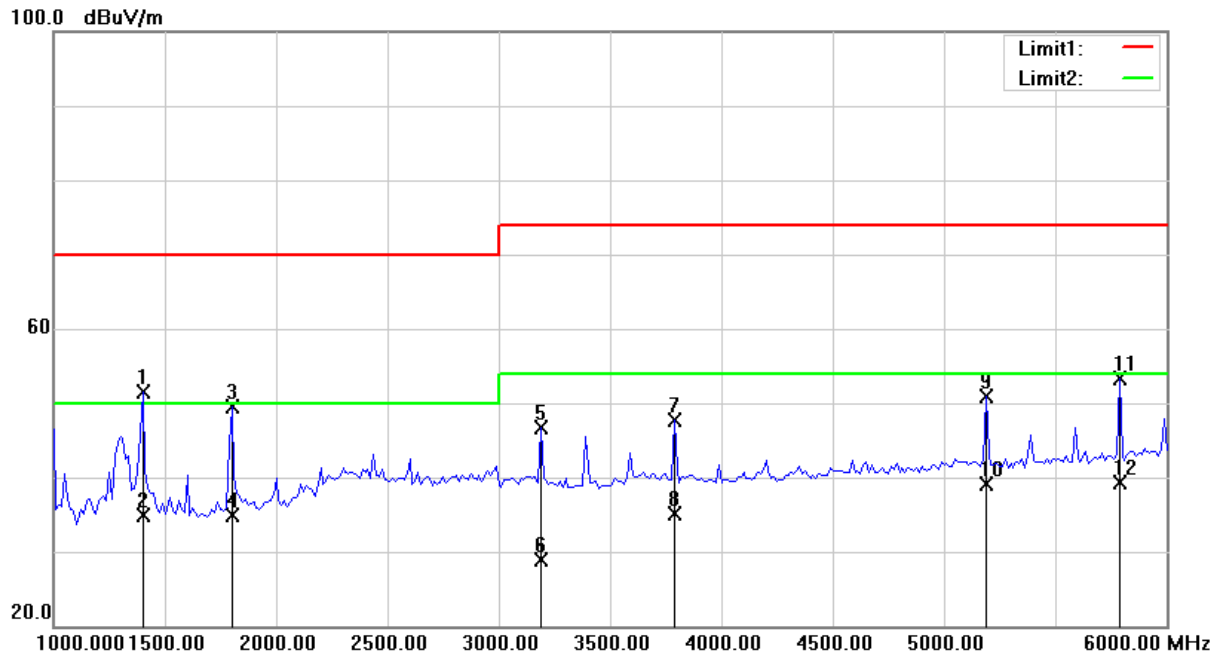
Test Voltage	55Vdc (from PoE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/13	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08	Test Mode	C



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	48.93	-13.35	35.58	40.00	-4.42	0	199	QP
2	208.4800	49.13	-10.90	38.23	40.00	-1.77	275	100	QP
3	331.6700	46.69	-7.42	39.27	47.00	-7.73	298	100	QP
4	405.3900	44.50	-6.01	38.49	47.00	-8.51	18	100	QP
5	429.6400	44.81	-5.14	39.67	47.00	-7.33	15	100	QP
6	749.7400	42.75	0.68	43.43	47.00	-3.57	325	100	QP

**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

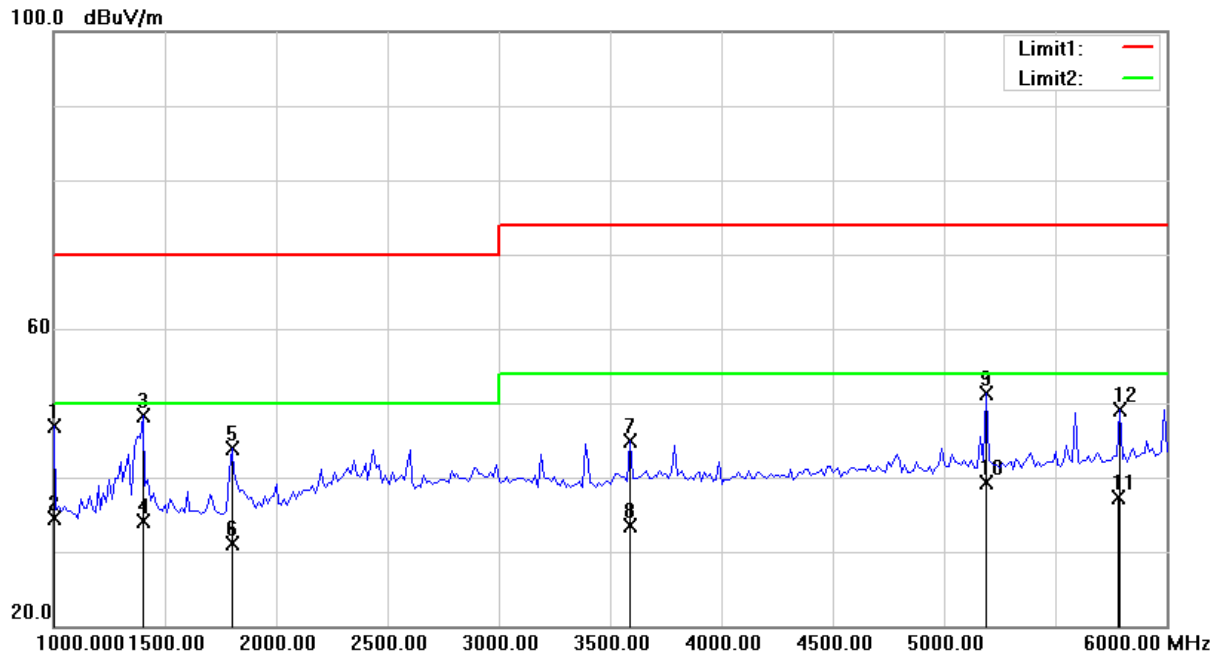
Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Vertical
Test Site	W08	Test Mode	A



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1400.000	62.76	-11.17	51.59	70.00	-18.41	83	100	peak
2	1400.000	46.05	-11.17	34.88	50.00	-15.12	83	100	AVG
3	1800.000	60.20	-10.71	49.49	70.00	-20.51	158	100	peak
4	1800.000	45.67	-10.71	34.96	50.00	-15.04	158	100	AVG
5	3187.500	51.99	-5.34	46.65	74.00	-27.35	142	100	peak
6	3187.500	34.15	-5.34	28.81	54.00	-25.19	142	100	AVG
7	3787.500	51.82	-4.13	47.69	74.00	-26.31	236	100	peak
8	3787.500	39.18	-4.13	35.05	54.00	-18.95	236	100	AVG
9	5187.500	51.14	-0.23	50.91	74.00	-23.09	242	100	peak
10	5187.500	39.34	-0.23	39.11	54.00	-14.89	242	100	AVG
11	5787.500	52.55	0.83	53.38	74.00	-20.62	214	100	peak
12	5787.500	38.44	0.83	39.27	54.00	-14.73	214	100	AVG

**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

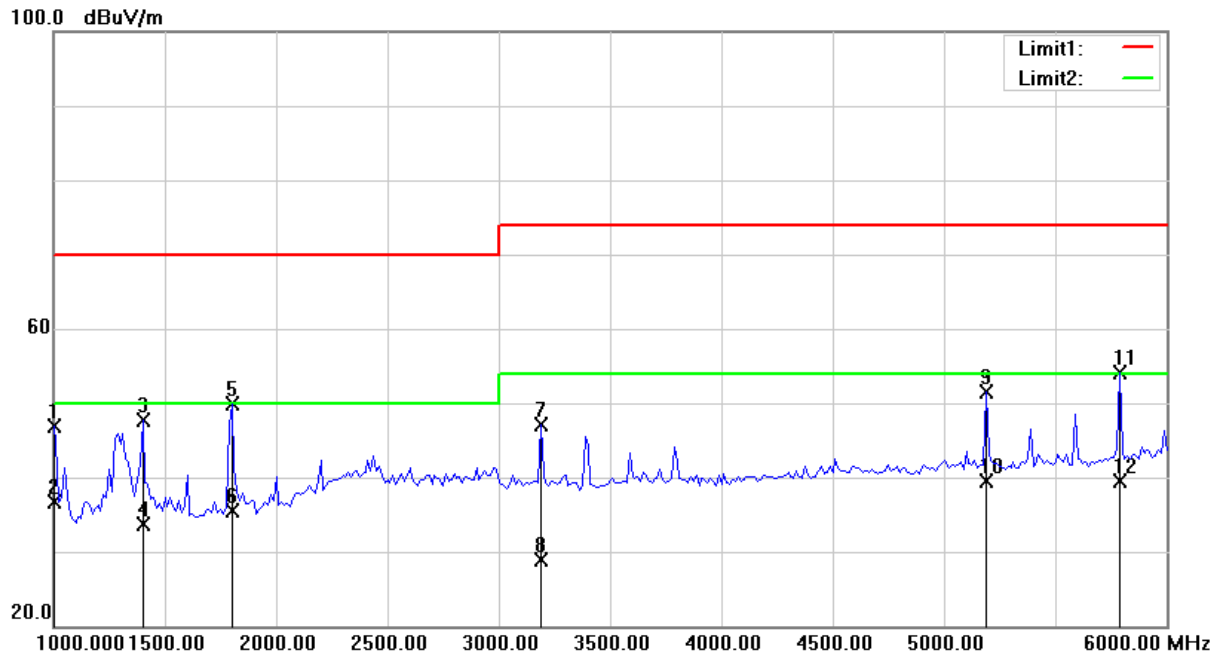
Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Horizontal
Test Site	W08	Test Mode	A



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1000.0000	60.95	-14.07	46.88	70.00	-23.12	201	100	peak
2	1000.0000	48.55	-14.07	34.48	50.00	-15.52	201	100	AVG
3	1400.000	59.41	-11.17	48.24	70.00	-21.76	17	100	peak
4	1400.000	45.25	-11.17	34.08	50.00	-15.92	17	100	AVG
5	1800.000	54.65	-10.71	43.94	70.00	-26.06	120	100	peak
6	1800.000	41.78	-10.71	31.07	50.00	-18.93	120	100	AVG
7	3587.500	49.58	-4.68	44.90	74.00	-29.10	145	100	peak
8	3587.500	38.26	-4.68	33.58	54.00	-20.42	145	100	AVG
9	5187.500	51.54	-0.23	51.31	74.00	-22.69	173	100	peak
10	5187.500	39.52	-0.23	39.29	54.00	-14.71	173	100	AVG
11	5785.500	36.51	0.81	37.32	54.00	-16.68	208	100	AVG
12	5787.500	48.30	0.83	49.13	74.00	-24.87	208	100	peak

**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

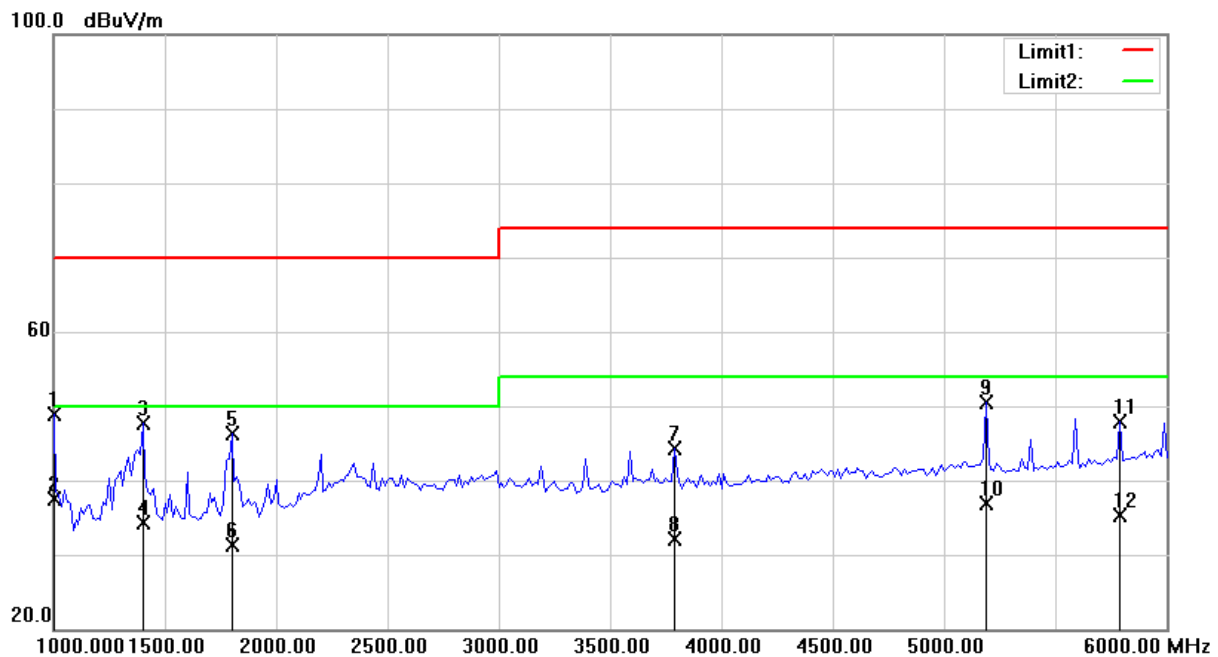
Test Voltage	100Vac, 60Hz	Frequency Range	1 – 6GHz
Environmental Conditions	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Vertical
Test Site	W08	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1000.0000	60.92	-14.07	46.85	70.00	-23.15	167	100	peak
2	1000.0000	50.80	-14.07	36.73	50.00	-13.27	167	100	AVG
3	1400.000	58.88	-11.17	47.71	70.00	-22.29	61	100	peak
4	1400.000	44.80	-11.17	33.63	50.00	-16.37	61	100	AVG
5	1800.000	60.68	-10.71	49.97	70.00	-20.03	151	100	peak
6	1800.000	46.16	-10.71	35.45	50.00	-14.55	151	100	AVG
7	3187.500	52.52	-5.34	47.18	74.00	-26.82	120	100	peak
8	3187.500	34.31	-5.34	28.97	54.00	-25.03	120	100	AVG
9	5187.500	51.71	-0.23	51.48	74.00	-22.52	145	100	peak
10	5187.500	39.71	-0.23	39.48	54.00	-14.52	145	100	AVG
11	5787.500	53.35	0.83	54.18	74.00	-19.82	208	100	peak
12	5787.500	38.71	0.83	39.54	54.00	-14.46	208	100	AVG

**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	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Horizontal
Test Site	W08	Test Mode	B

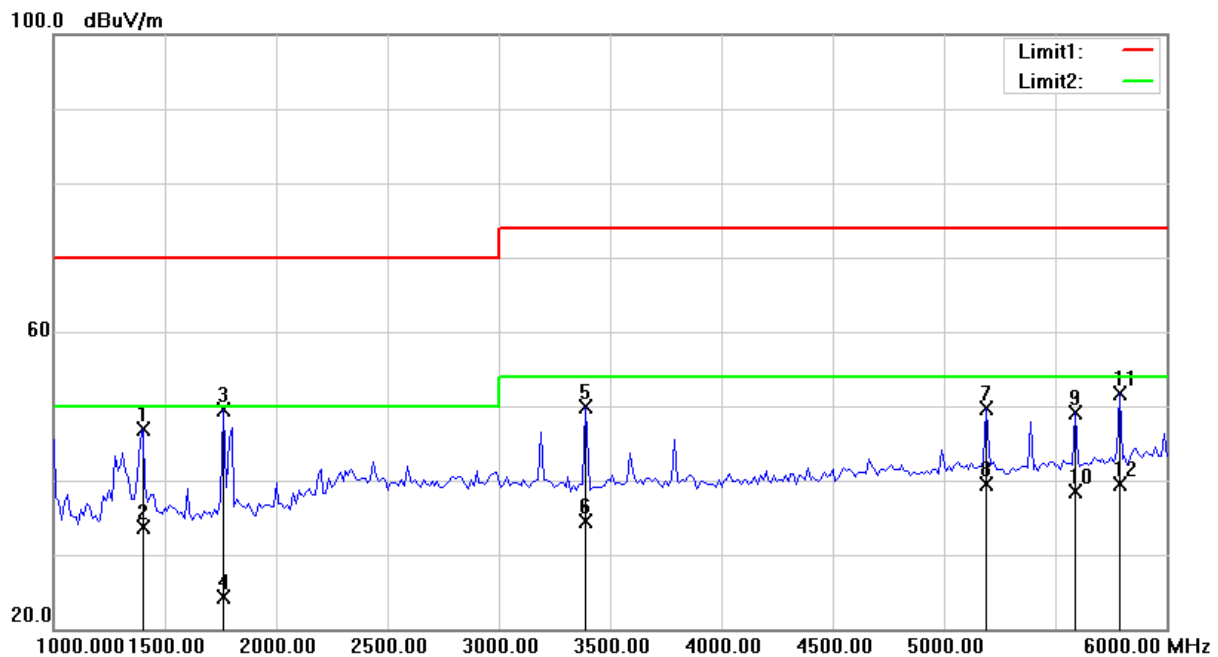


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1000.0000	62.93	-14.07	48.86	70.00	-21.14	157	100	peak
2	1000.0000	51.65	-14.07	37.58	50.00	-12.42	157	100	AVG
3	1400.000	58.92	-11.17	47.75	70.00	-22.25	16	100	peak
4	1400.000	45.44	-11.17	34.27	50.00	-15.73	16	100	AVG
5	1800.000	56.94	-10.71	46.23	70.00	-23.77	123	100	peak
6	1800.000	41.94	-10.71	31.23	50.00	-18.77	123	100	AVG
7	3787.500	48.35	-4.13	44.22	74.00	-29.78	195	100	peak
8	3787.500	36.32	-4.13	32.19	54.00	-21.81	195	100	AVG
9	5187.500	50.82	-0.23	50.59	74.00	-23.41	22	100	peak
10	5187.500	37.16	-0.23	36.93	54.00	-17.07	22	100	AVG
11	5787.500	47.06	0.83	47.89	74.00	-26.11	132	100	peak
12	5787.500	34.44	0.83	35.27	54.00	-18.73	132	100	AVG

**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



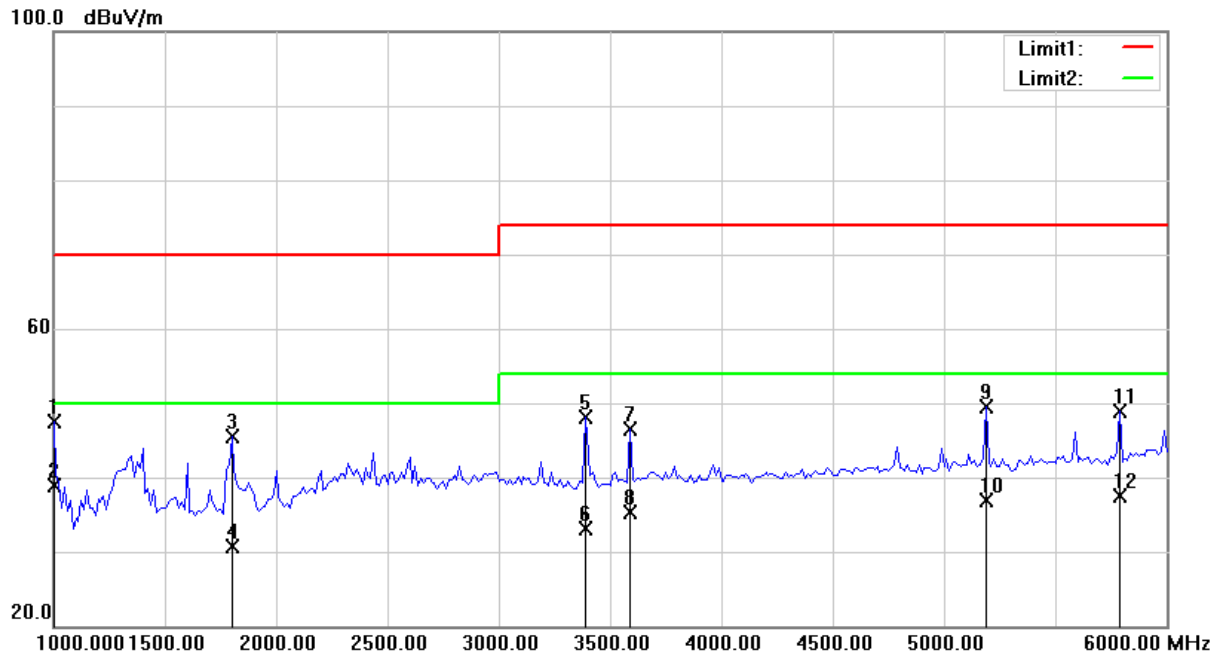
Test Voltage	55Vdc (from PoE)	Frequency Range	1 – 6GHz
Environmental Conditions	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Vertical
Test Site	W08	Test Mode	C



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1400.000	58.13	-11.17	46.96	70.00	-23.04	102	100	peak
2	1400.000	44.93	-11.17	33.76	50.00	-16.24	102	100	AVG
3	1762.500	60.33	-10.92	49.41	70.00	-20.59	33	100	peak
4	1762.500	35.18	-10.92	24.26	50.00	-25.74	33	100	AVG
5	3387.500	55.63	-5.77	49.86	74.00	-24.14	158	100	peak
6	3387.500	40.26	-5.77	34.49	54.00	-19.51	158	100	AVG
7	5187.500	49.92	-0.23	49.69	74.00	-24.31	146	100	peak
8	5187.500	39.65	-0.23	39.42	54.00	-14.58	146	100	AVG
9	5587.500	48.71	0.31	49.02	74.00	-24.98	360	100	peak
10	5587.500	38.10	0.31	38.41	54.00	-15.59	360	100	AVG
11	5787.500	50.85	0.83	51.68	74.00	-22.32	208	100	peak
12	5787.500	38.68	0.83	39.51	54.00	-14.49	208	100	AVG

**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	55Vdc (from PoE)	Frequency Range	1 – 6GHz
Environmental Conditions	25°C, 50% RH	6dB Bandwidth	1MHz
Test Date	2021/05/17	Test Distance	3m
Tested by	Wayne Yang	Polarization	Horizontal
Test Site	W08	Test Mode	C



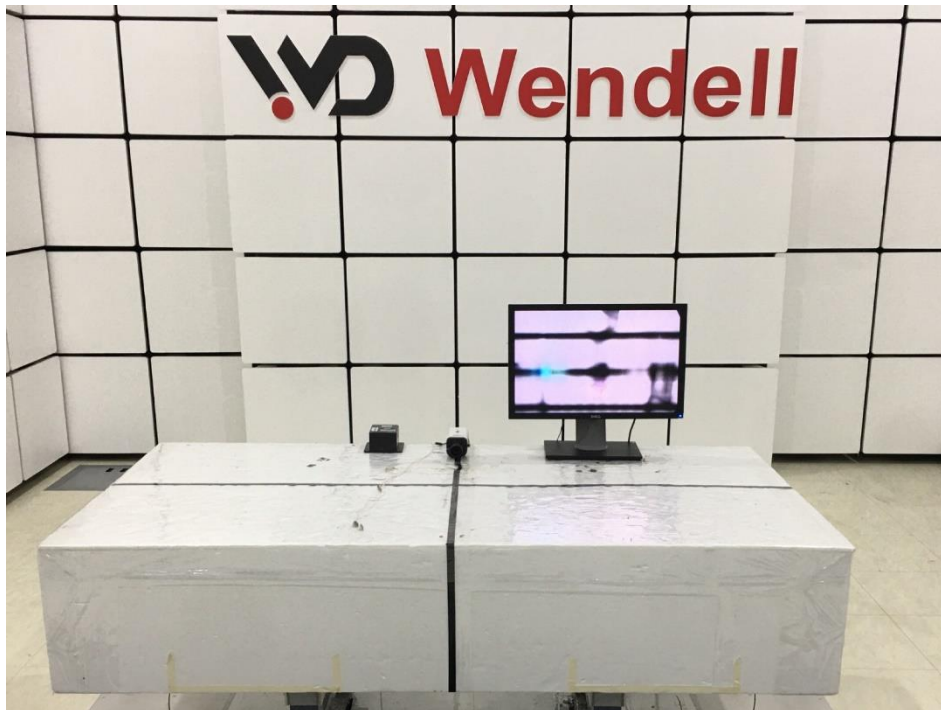
No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1000.0000	61.65	-14.07	47.58	70.00	-22.42	76	100	peak
2	1000.0000	52.89	-14.07	38.82	50.00	-11.18	76	100	AVG
3	1800.000	56.29	-10.71	45.58	70.00	-24.42	151	100	peak
4	1800.000	41.45	-10.71	30.74	50.00	-19.26	151	100	AVG
5	3387.500	53.91	-5.77	48.14	74.00	-25.86	217	100	peak
6	3387.500	38.82	-5.77	33.05	54.00	-20.95	217	100	AVG
7	3587.500	51.18	-4.68	46.50	74.00	-27.50	148	100	peak
8	3587.500	40.05	-4.68	35.37	54.00	-18.63	148	100	AVG
9	5187.500	49.72	-0.23	49.49	74.00	-24.51	151	100	peak
10	5187.500	37.22	-0.23	36.99	54.00	-17.01	151	100	AVG
11	5787.500	48.08	0.83	48.91	74.00	-25.09	204	100	peak
12	5787.500	36.61	0.83	37.44	54.00	-16.56	204	100	AVG

**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

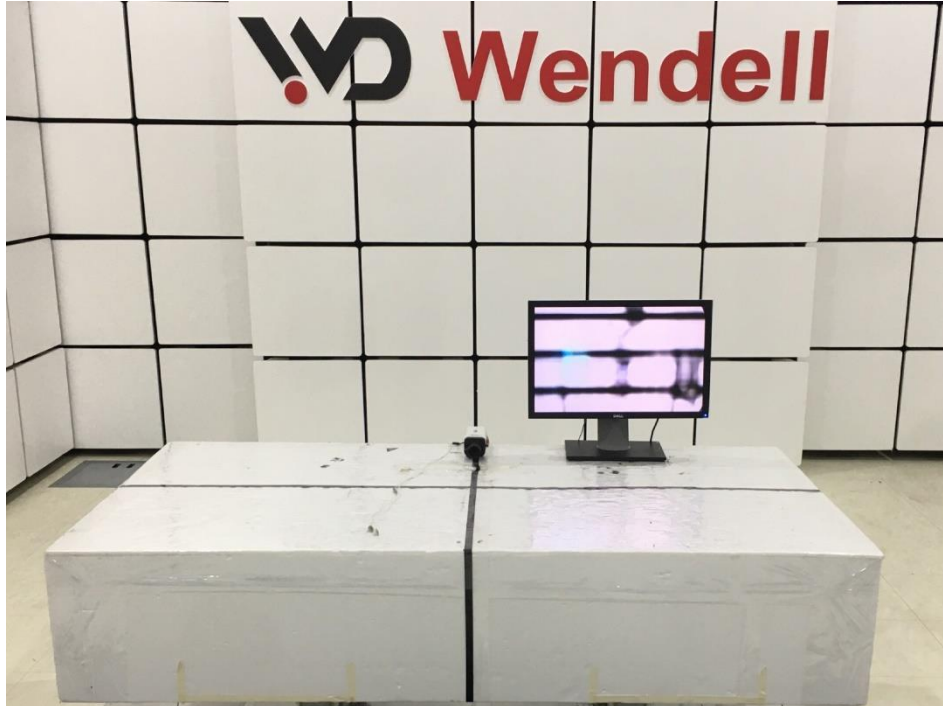
##### Radiated Emission Test (30MHz~1GHz) Test mode A



Test mode B

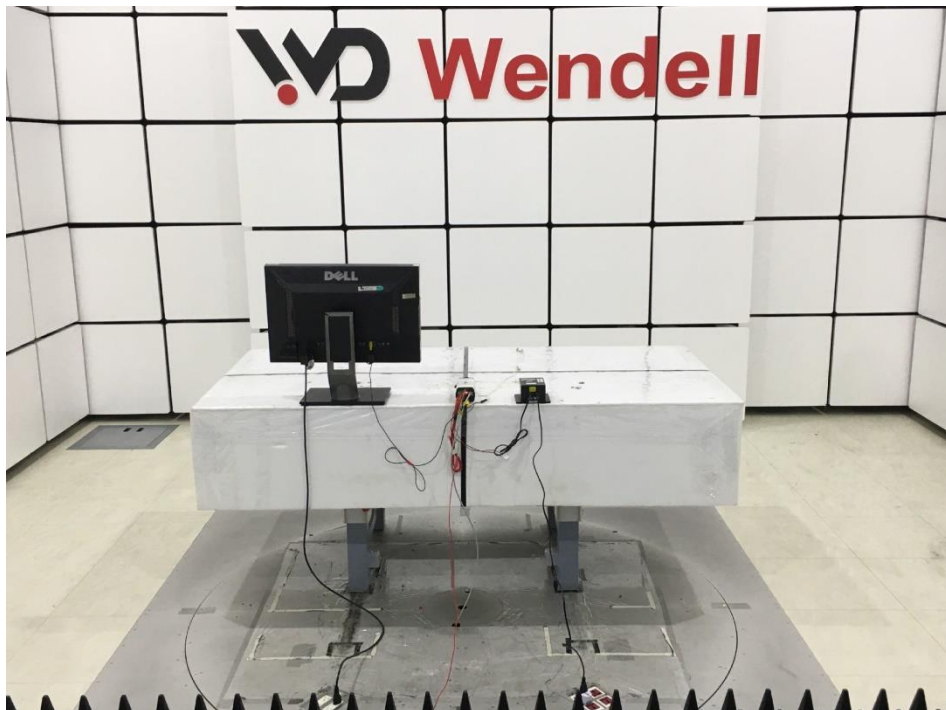
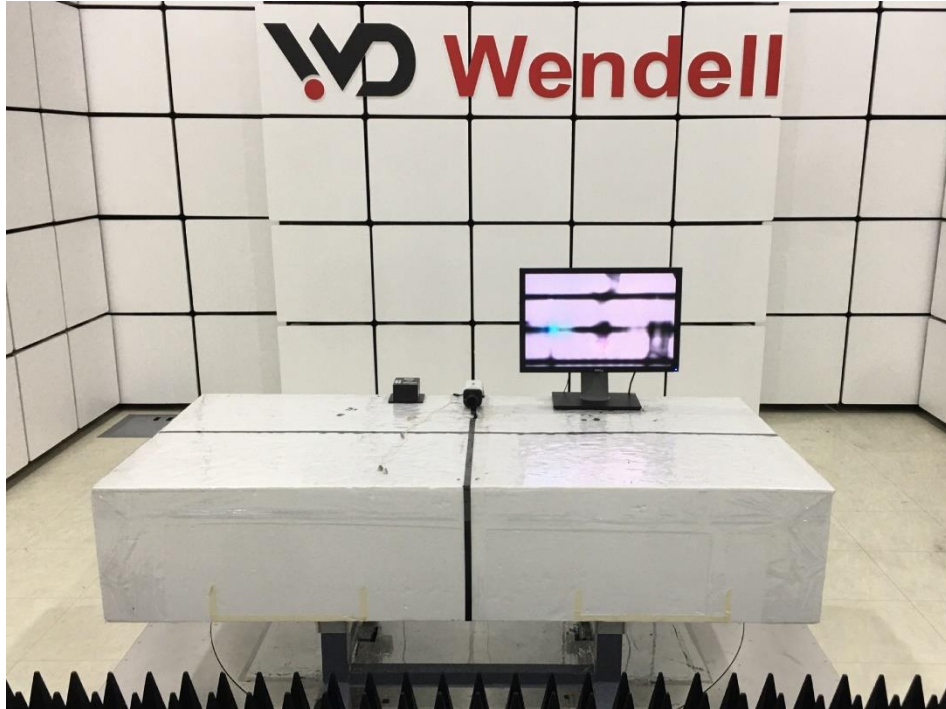


Test mode C

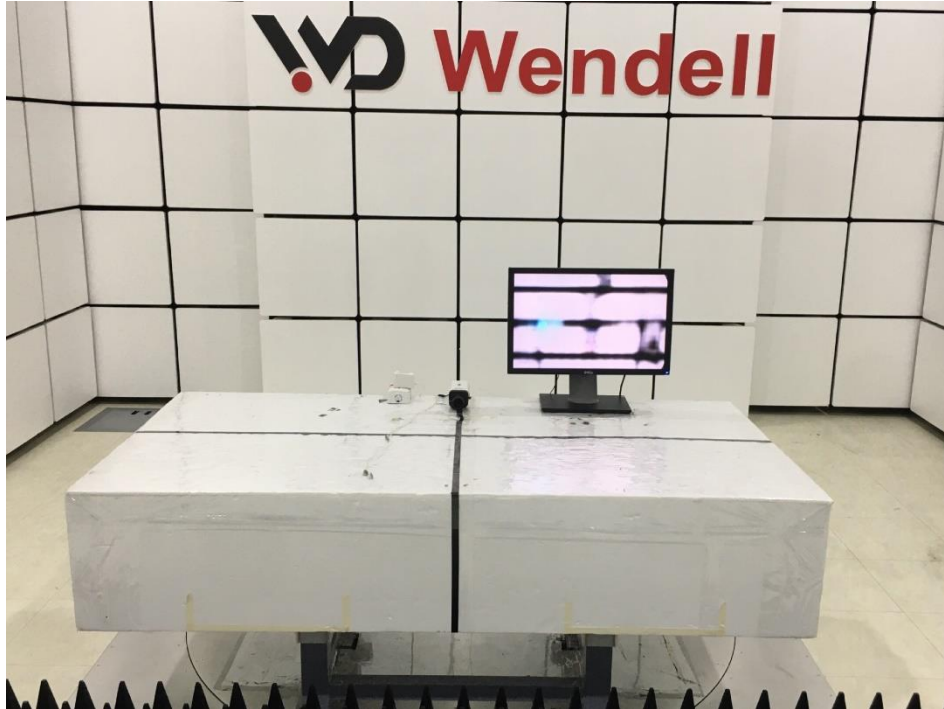




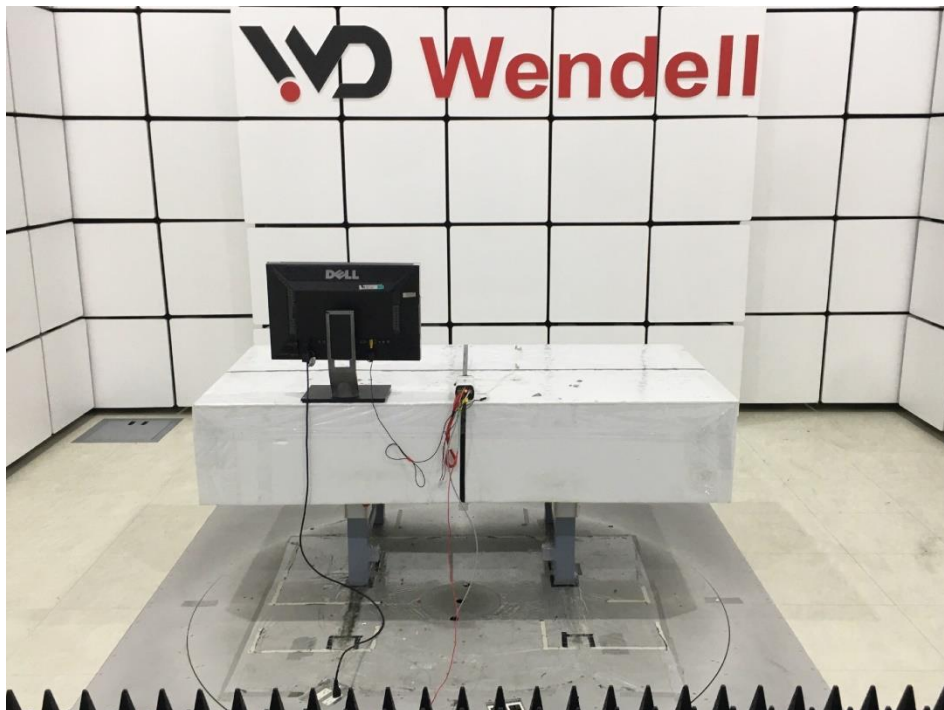
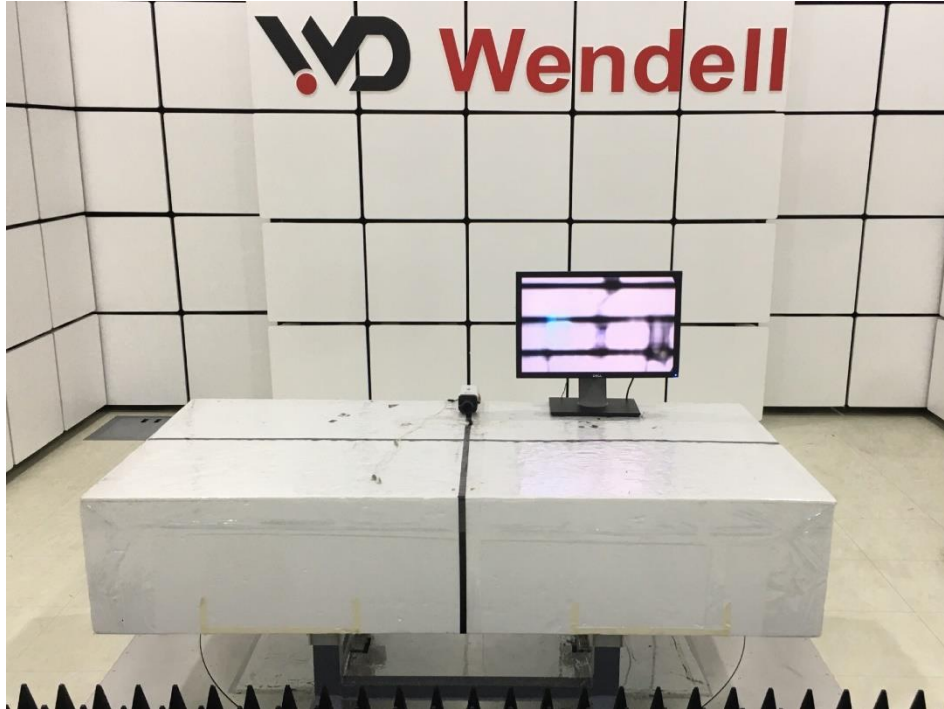
**Radiated Emission Test (Above 1GHz)**  
Test mode A



Test mode B



Test mode C



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