



# FCC SDoC 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-EF-R-210148-A1**

**According to**

**47 CFR FCC Part 15, Subpart B, Class B**  
**ICES-003: 2016 Issue 6, Class B**

**ANSI C63.4: 2014**

**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-EF-R-210148-A0	May 24, 2021	Initial Issue
WD-EF-R-210148-A1	Jan. 20, 2022	Adding model no. *Cancel report no.: WD-EF-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-EF-R-210148-A1	Jan. 20, 2022	Original report

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## 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:** 47 CFR FCC Part 15, Subpart B, Class B  
ICES-003: 2016 Issue 6, Class B  
ANSI C63.4: 2014

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
47 CFR FCC Part 15, Subpart B  ICES-003	Conducted disturbance at mains terminals	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 Test**

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

#### **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 ( $U_{lab}$ )	Note
W01	150 kHz ~ 30 MHz	2.72	N/A
W08	150 kHz ~ 30 MHz	2.70	N/A

### 2.2.2 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB ( $U_{lab}$ )	Note
W08	30 MHz ~ 200 MHz	V	3.68	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
	1 GHz ~ 6 GHz	V	4.98	N/A
	1 GHz ~ 6 GHz	H	5.07	N/A
	6 GHz ~ 18 GHz	V	5.09	N/A
	6 GHz ~ 18 GHz	H	4.99	N/A
	18 GHz ~ 40 GHz	V	4.72	N/A
	18 GHz ~ 40 GHz	H	4.72	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 16GHz.

### 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>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

### 3.3 EUT Operating Condition

Adapter mode

- Placed the EUT on the test table.
- Prepare PC to act as a communication partner and placed it outside of testing area.
- The EUT was connected to the PC with LAN cable.
- The communication partner sent data to EUT by command “ping” via LAN.
- The EUT sent video signal to monitor and displayed on screen.
- The microphone sent voice signal to EUT.
- The EUT sent voice signal to earphone.
- The EUT write data with Micro SD card.

PoE mode

- Placed the EUT on the test table.
- Prepare PC and PoE injector to act as a communication partner and placed it outside of testing area.
- The EUT was connected to PC via LAN and PoE.
- The communication partner sent data to EUT by command “ping” via LAN.
- The EUT sent video signal to monitor and displayed on screen.
- The microphone sent voice signal to EUT.
- The EUT sent voice signal to earphone.
- 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	-

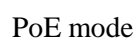
- Note:**
1. The core(s) is(are) originally attached to the cable(s).
  2. Item 1-2 acted as communication partners to transfer data.
  3. The EUT uses the follow adapter and PoE:

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

## Adapter mode



## 4 Emission Test

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

#### 4.1.1 Limit of Conducted Emission Measurement

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 30.0	73	60	60	50

- Note:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  3. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
  4. The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correction Factor = Insertion loss of LISN + Cable loss + 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

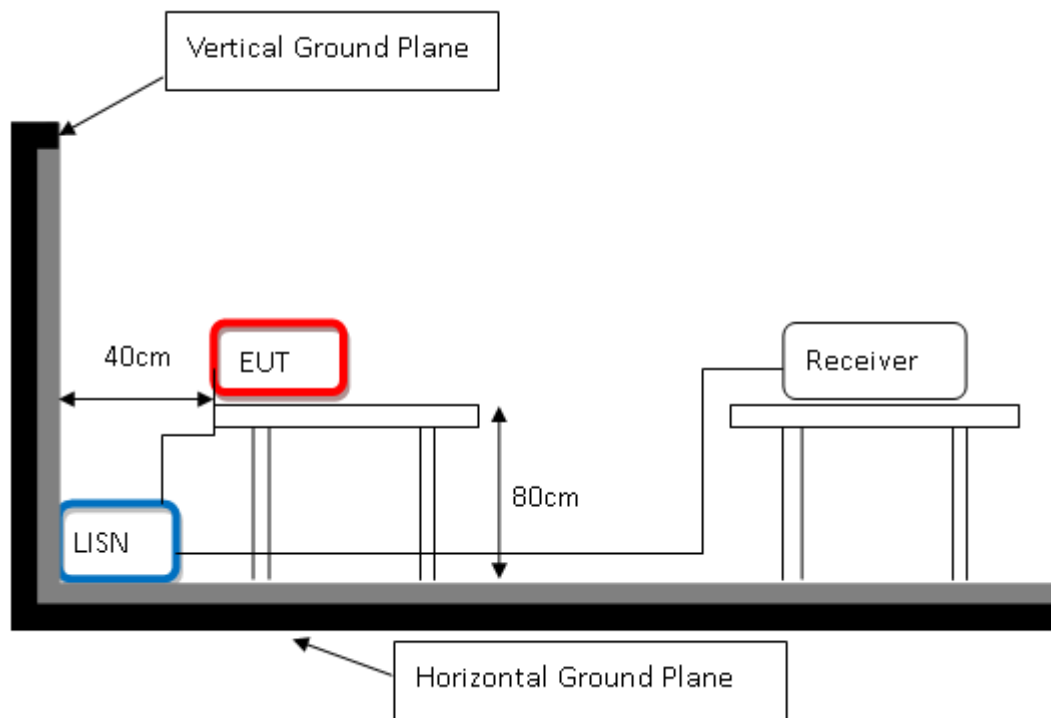
- a. The table-top EUT was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The LISN at least be 80 cm from nearest chassis of EUT. The floor-standing EUT and all cables shall be insulated from the ground plane by up to 12 mm of insulating material if required.
- 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

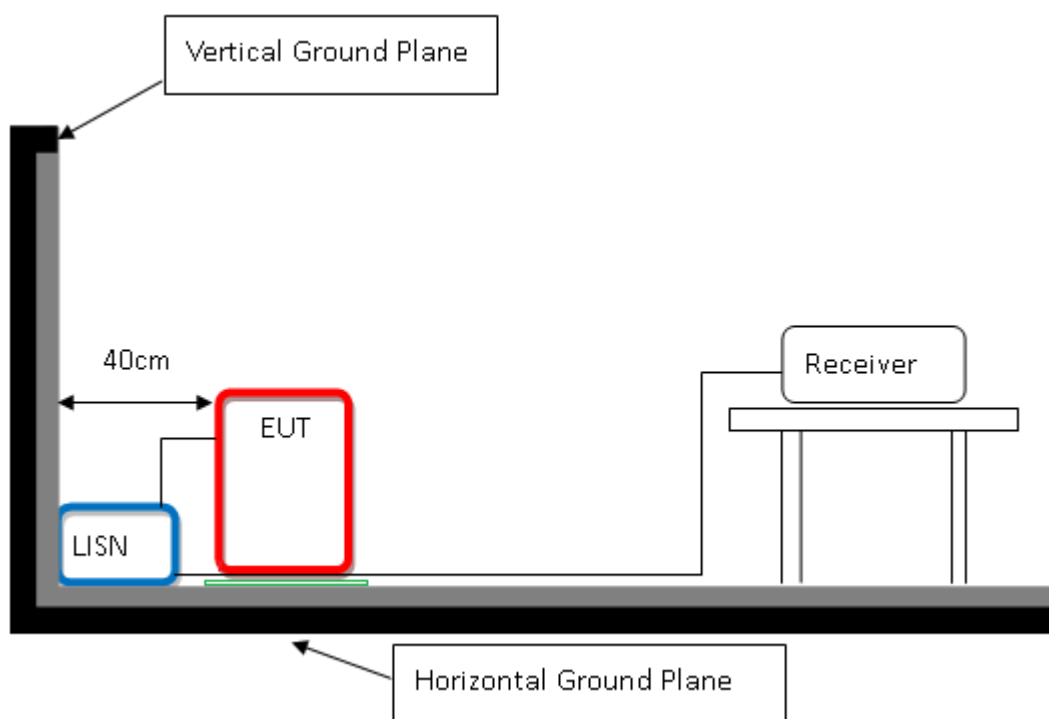
No deviation

### 4.1.5 Test Setup

#### < Table-Top equipment >



#### < Floor-Standing equipment >



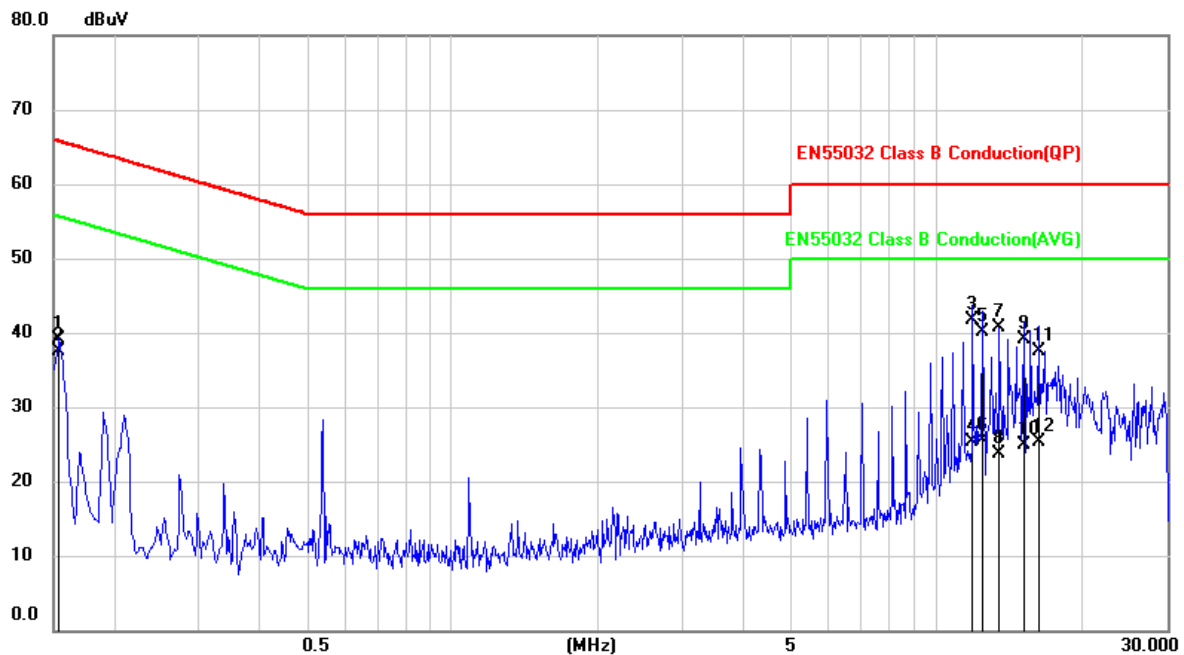
**Note:** Please refer to 4.1.7 for the actual test configuration.





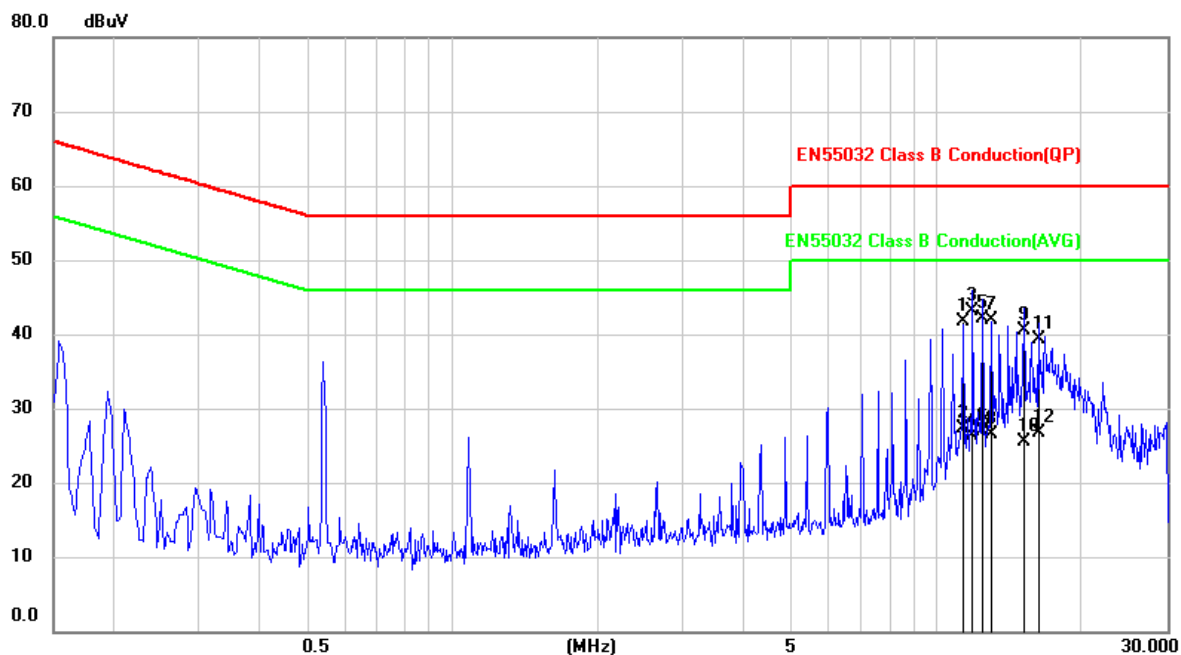
#### 4.1.6 Test Result

Test Voltage	120Vac, 60Hz	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 (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1527	29.26	9.77	39.03	65.85	-26.82	QP
2	0.1527	27.78	9.77	37.55	55.85	-18.30	AVG
3	11.9191	31.85	9.89	41.74	60.00	-18.26	QP
4	11.9191	15.36	9.89	25.25	50.00	-24.75	AVG
5	12.4626	30.26	9.89	40.15	60.00	-19.85	QP
6	12.4626	15.57	9.89	25.46	50.00	-24.54	AVG
7	13.5425	30.77	9.91	40.68	60.00	-19.32	QP
8	13.5425	13.78	9.91	23.69	50.00	-26.31	AVG
9	15.1696	29.20	9.93	39.13	60.00	-20.87	QP
10	15.1696	14.94	9.93	24.87	50.00	-25.13	AVG
11	16.2538	27.49	9.93	37.42	60.00	-22.58	QP
12	16.2538	15.35	9.93	25.28	50.00	-24.72	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

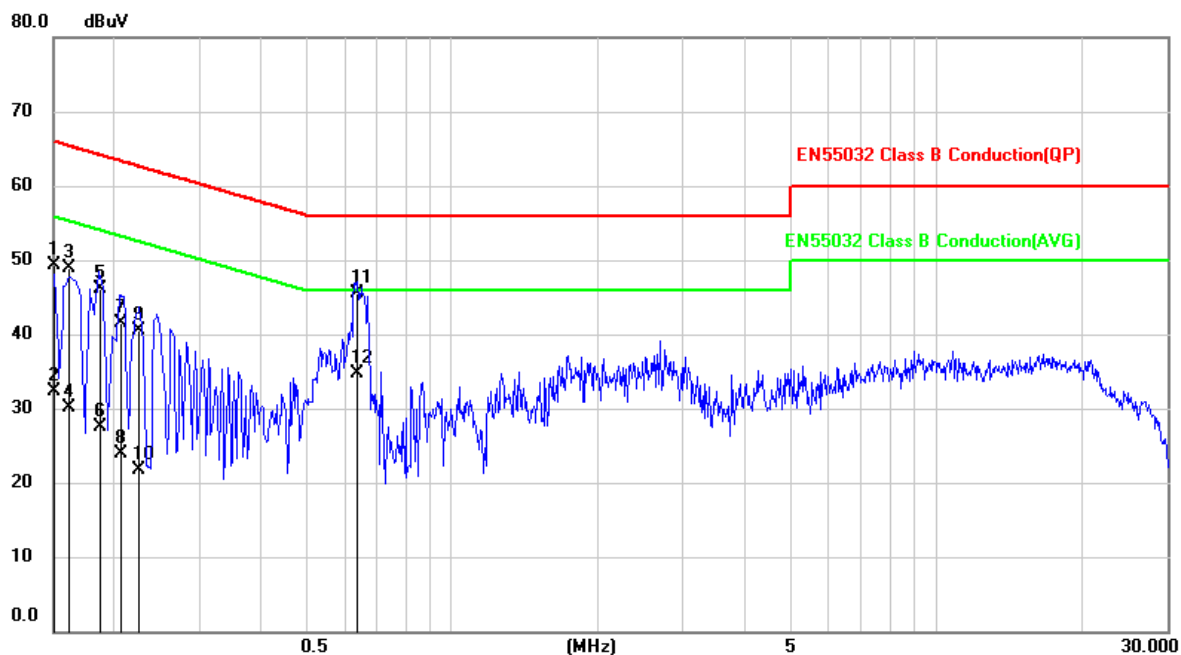


**Remark:**

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



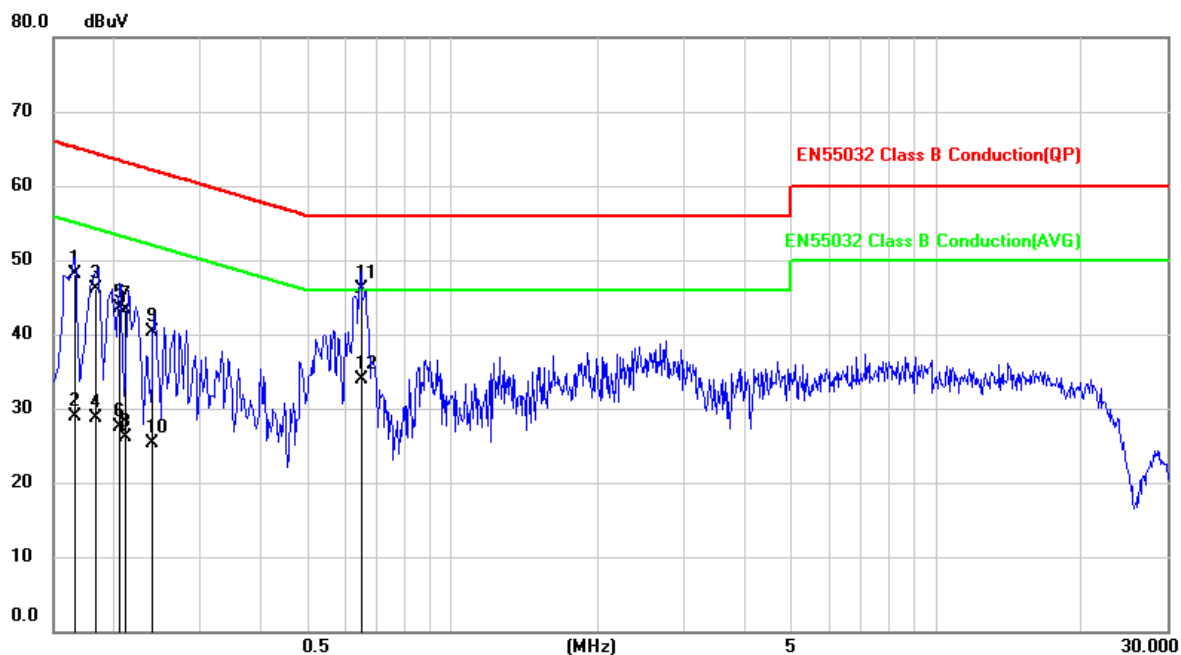
Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	29°C, 38% RH	6dB Bandwidth	9 kHz
Test Date	2021/05/07	Phase	L
Tested by	Guanwei Liao	Test Site	W08
Test Mode	B		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1508	39.49	9.77	49.26	65.96	-16.70	QP
2	0.1508	22.48	9.77	32.25	55.96	-23.71	AVG
3	0.1610	39.11	9.77	48.88	65.41	-16.53	QP
4	0.1610	20.39	9.77	30.16	55.41	-25.25	AVG
5	0.1875	36.34	9.76	46.10	64.15	-18.05	QP
6	0.1875	17.77	9.76	27.53	54.15	-26.62	AVG
7	0.2063	31.66	9.76	41.42	63.35	-21.93	QP
8	0.2063	14.20	9.76	23.96	53.35	-29.39	AVG
9	0.2248	30.79	9.76	40.55	62.64	-22.09	QP
10	0.2248	11.89	9.76	21.65	52.64	-30.99	AVG
11	0.6419	35.80	9.76	45.56	56.00	-10.44	QP
12	0.6419	24.91	9.76	34.67	46.00	-11.33	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	120Vac, 60Hz	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		

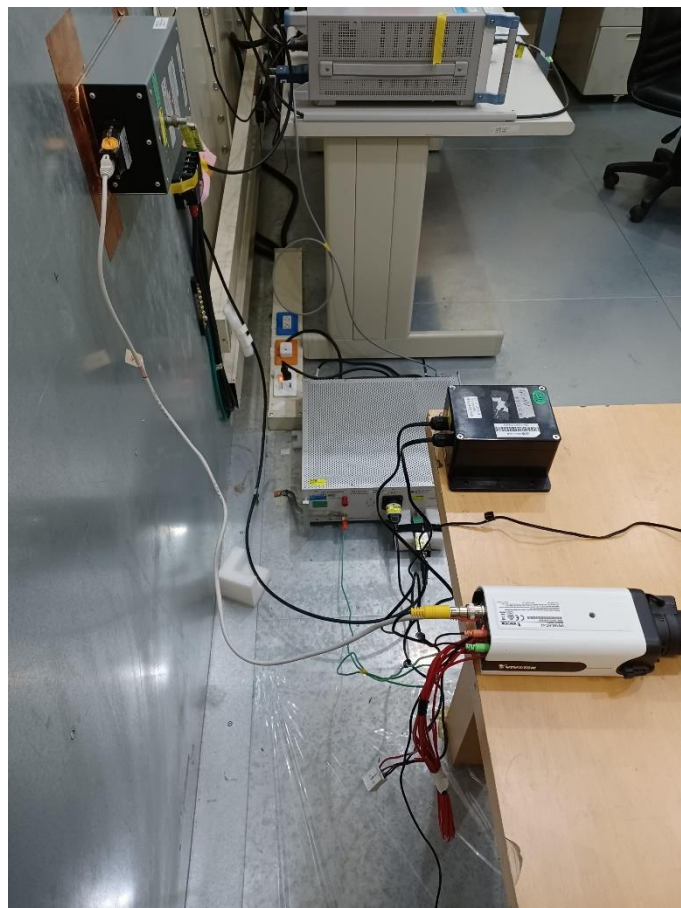


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1663	38.30	9.77	48.07	65.14	-17.07	QP
2	0.1663	19.12	9.77	28.89	55.14	-26.25	AVG
3	0.1829	36.37	9.76	46.13	64.35	-18.22	QP
4	0.1829	18.86	9.76	28.62	54.35	-25.73	AVG
5	0.2040	33.83	9.76	43.59	63.45	-19.86	QP
6	0.2040	17.65	9.76	27.41	53.45	-26.04	AVG
7	0.2112	33.64	9.76	43.40	63.16	-19.76	QP
8	0.2112	16.39	9.76	26.15	53.16	-27.01	AVG
9	0.2403	30.61	9.76	40.37	62.09	-21.72	QP
10	0.2403	15.63	9.76	25.39	52.09	-26.70	AVG
11	0.6537	36.33	9.76	46.09	56.00	-9.91	QP
12	0.6537	24.19	9.76	33.95	46.00	-12.05	AVG

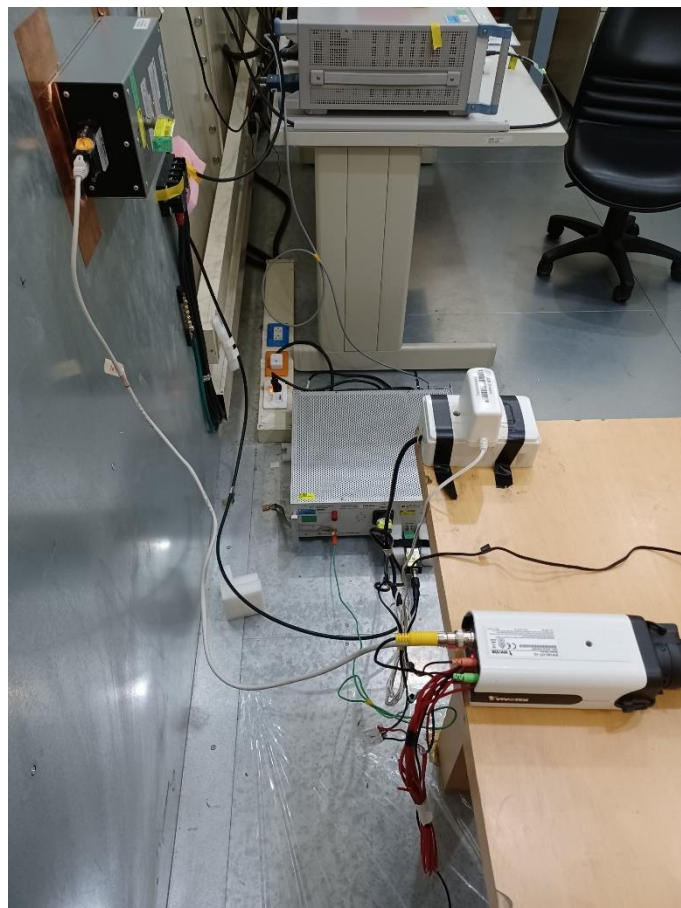
**Remark:** 1. QP = Quasi Peak, AVG = Average  
2. Correction Factor = Insertion loss of LISN + Cable loss + Transient Limiter (If use)  
3. Measurement Value = Reading Level + Correct Factor  
4. Margin Level = Measurement Value - Limit Value

### 4.1.7 Photographs of Test Configuration

Test mode A



Test mode B



## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

Radiated Frequency range 30 MHz to 1000 MHz

Radiated Emissions Limits at 10 meters		
Frequencies (MHz)	FCC 15B/ ICES-003	
	Class A (dBμV/m)	Class B (dBμV/m)
30-88	39.1	29.5
88-216	43.5	33.1
216-230	46.4	35.6
230-960		
960-1000	49.5	43.5

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

- Note:**
1. The lower limit shall apply at the transition frequency.
  2. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
  3. The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain  
 + Cable loss (preamplifier to receiver)  
 Margin Level = Measurement Value - Limit Value



**Radiated Frequency range above 1 GHz**

Radiated Emissions Limits at 3meters				
Frequencies (GHz)	FCC 15B/ ICES-003			
	Class A (dBμV/m)		Class B (dBμV/m)	
	Peak	Average	Peak	Average
1 to 40	80	60	74	54

**Note:** 1. The lower limit shall apply at the transition frequency.  
2. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average  
3. The test result calculated as following:  
Measurement Value = Reading Level + Correct Factor  
Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier ) - preamplifier Gain  
+ Cable loss (preamplifier to receiver )  
Margin Level = Measurement Value - Limit Value

**Frequency Range (For unintentional radiators)**

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



## 4.2.2 Test Instrument

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. 04, 2019
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.

### 4.2.3 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 and all cables shall be insulated from the ground plane by up to 12 mm of insulating material if required. 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.

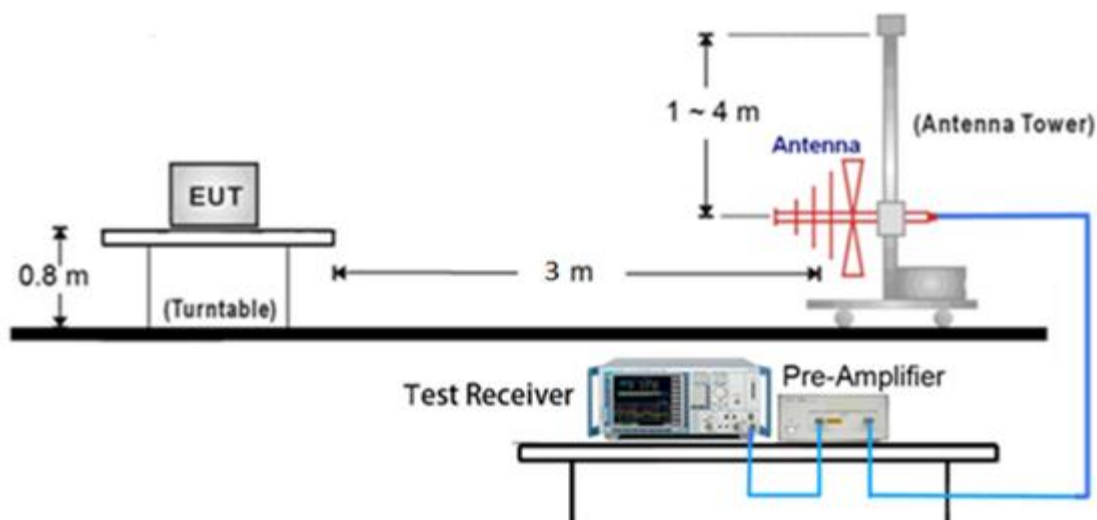
- e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

### 4.2.4 Deviation from Test Standard

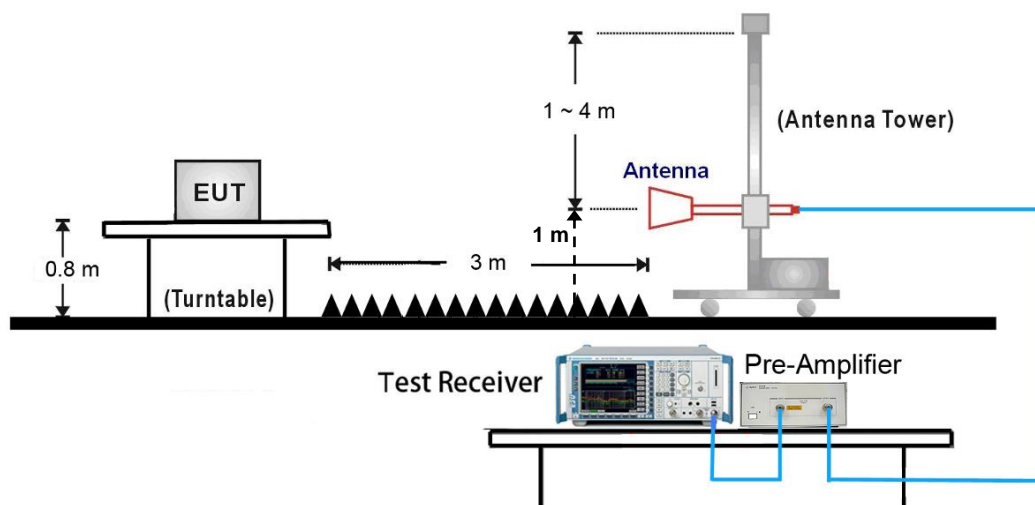
No deviation

## 4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

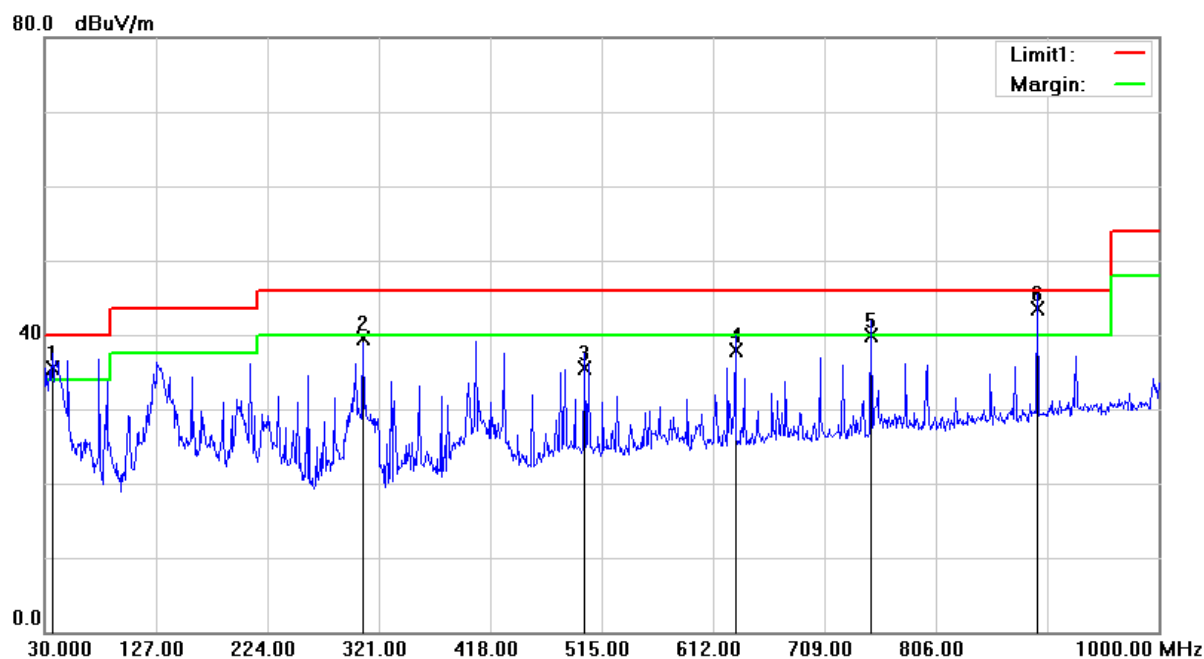


### Note:

- (1) Please refer to the 4.2.7 for the actual test configuration.
- (2) The formula of measured value as: Test Result = Reading + Correction Factor
- (3) Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
- (4) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)  
 Margin Level = Measurement Value - Limit Value

## 4.2.6 Test Result

Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	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

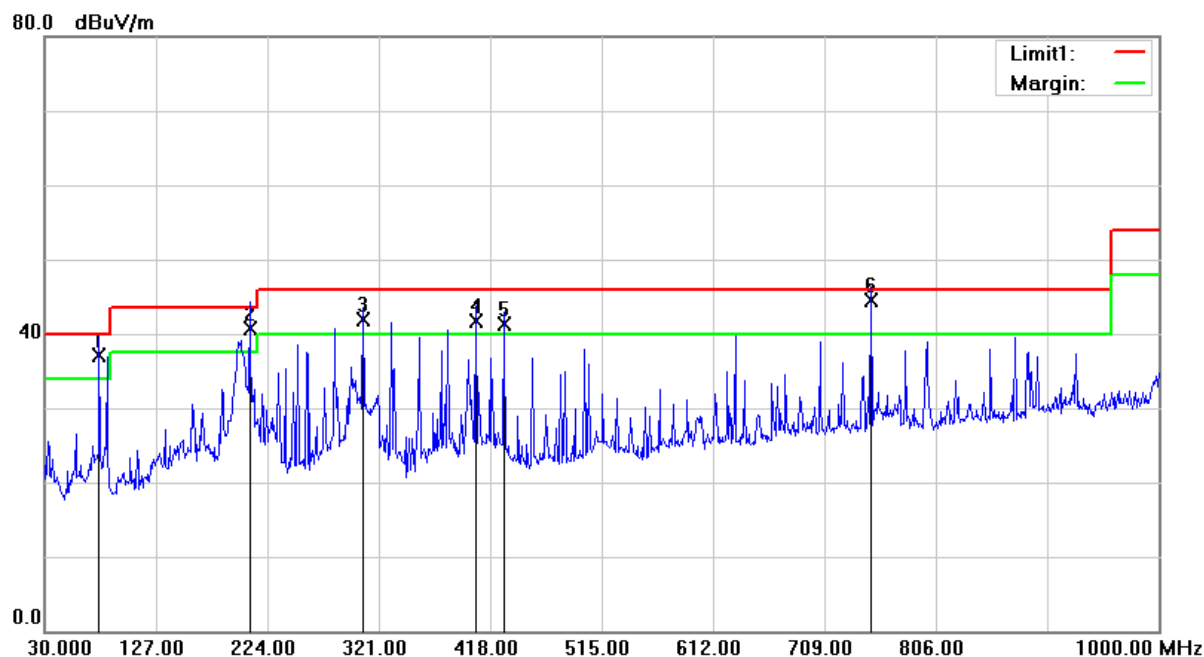


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	36.7900	45.18	-9.75	35.43	40.00	-4.57	64	100	QP
2	307.4200	47.51	-8.05	39.46	46.00	-6.54	0	200	QP
3	500.4500	39.49	-3.99	35.50	46.00	-10.50	155	200	QP
4	631.4000	39.05	-1.24	37.81	46.00	-8.19	334	100	QP
5	749.7400	39.13	0.68	39.81	46.00	-6.19	0	121	QP
6	894.2700	40.46	3.05	43.51	46.00	-2.49	344	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	120Vac, 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 (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	50.41	-13.35	37.06	40.00	-2.94	44	200	QP
2	208.4800	51.70	-10.90	40.80	43.50	-2.70	275	100	QP
3	307.4200	50.00	-8.05	41.95	46.00	-4.05	288	100	QP
4	405.3900	47.71	-6.01	41.70	46.00	-4.30	15	100	QP
5	429.6400	46.47	-5.14	41.33	46.00	-4.67	302	100	QP
6	749.7400	43.82	0.68	44.50	46.00	-1.50	332	100	QP

**Remark:** 1. QP = Quasi Peak

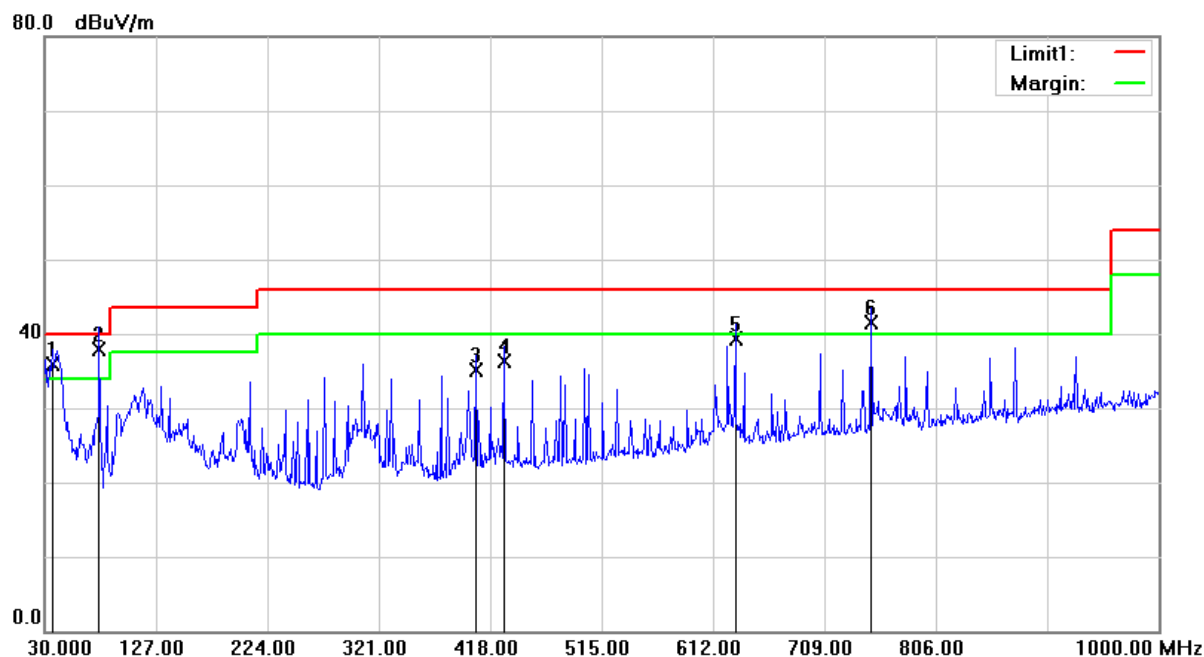
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier ) - preamplifier Gain  
+ Cable loss (preamplifier to receiver )

3. Measurement Value = Reading Level + Correct Factor

4. Margin Level = Measurement Value - Limit Value



Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/15	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08	Test Mode	B



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	36.7900	45.72	-9.75	35.97	40.00	-4.03	0	154	QP
2	77.5300	51.33	-13.35	37.98	40.00	-2.02	41	100	QP
3	405.3900	41.07	-6.01	35.06	46.00	-10.94	335	200	QP
4	429.6400	41.46	-5.14	36.32	46.00	-9.68	0	200	QP
5	631.4000	40.60	-1.24	39.36	46.00	-6.64	131	100	QP
6	749.7400	40.88	0.68	41.56	46.00	-4.44	348	200	QP

**Remark:** 1. QP = Quasi Peak

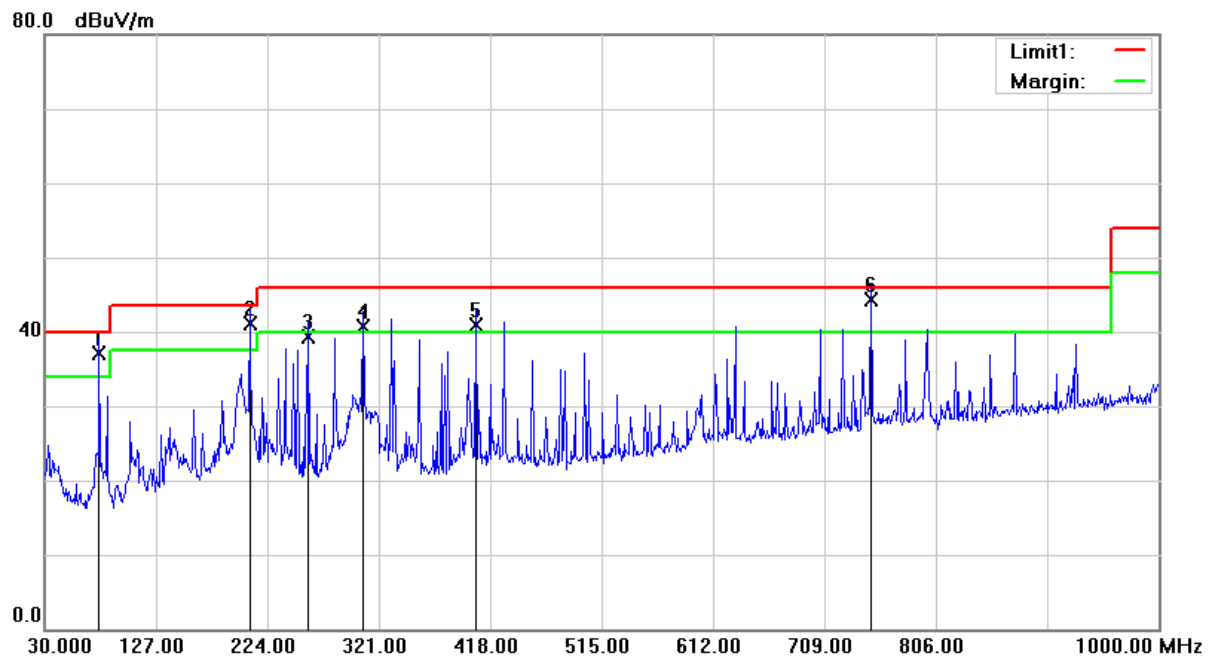
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier ) - preamplifier Gain  
+ Cable loss (preamplifier to receiver )

3. Measurement Value = Reading Level + Correct Factor

4. Margin Level = Measurement Value - Limit Value



Test Voltage	120Vac, 60Hz	Frequency Range	30 – 1000 MHz
Environmental Conditions	25°C, 53% RH	6dB Bandwidth	120 kHz
Test Date	2021/05/15	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08	Test Mode	B

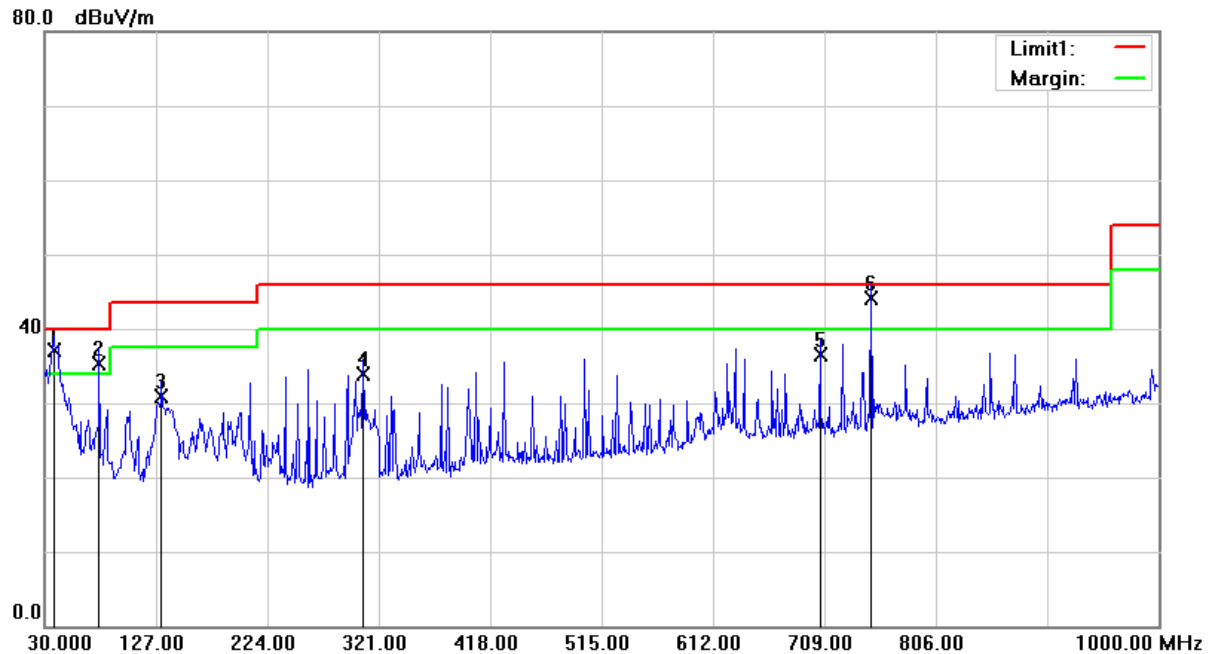


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	50.45	-13.35	37.10	40.00	-2.90	61	200	QP
2	208.4800	52.01	-10.90	41.11	43.50	-2.39	285	100	QP
3	259.8900	47.65	-8.29	39.36	46.00	-6.64	18	100	QP
4	307.4200	48.67	-8.05	40.62	46.00	-5.38	305	100	QP
5	405.3900	46.90	-6.01	40.89	46.00	-5.11	15	100	QP
6	749.7400	43.62	0.68	44.30	46.00	-1.70	0	115	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



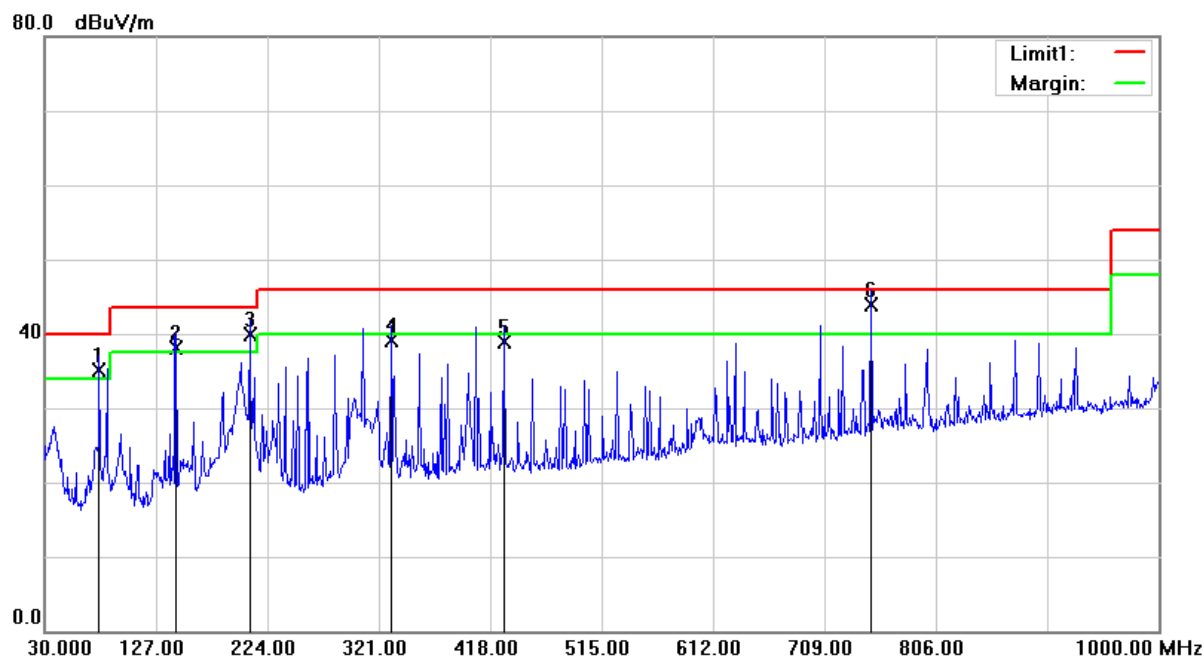
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	37.7600	46.83	-9.67	37.16	40.00	-2.84	0	106	QP
2	77.5300	48.59	-13.35	35.24	40.00	-4.76	0	102	QP
3	131.8500	40.91	-10.00	30.91	43.50	-12.59	41	100	QP
4	307.4200	42.02	-8.05	33.97	46.00	-12.03	0	154	QP
5	705.1200	36.65	-0.22	36.43	46.00	-9.57	0	139	QP
6	749.7400	43.45	0.68	44.13	46.00	-1.87	348	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 (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	77.5300	48.45	-13.35	35.10	40.00	-4.90	360	200	QP
2	144.4600	47.35	-9.25	38.10	43.50	-5.40	21	200	QP
3	208.4800	50.83	-10.90	39.93	43.50	-3.57	278	100	QP
4	331.6700	46.46	-7.42	39.04	46.00	-6.96	295	100	QP
5	429.6400	44.07	-5.14	38.93	46.00	-7.07	8	100	QP
6	749.7400	43.21	0.68	43.89	46.00	-2.11	325	100	QP

**Remark:** 1. QP = Quasi Peak

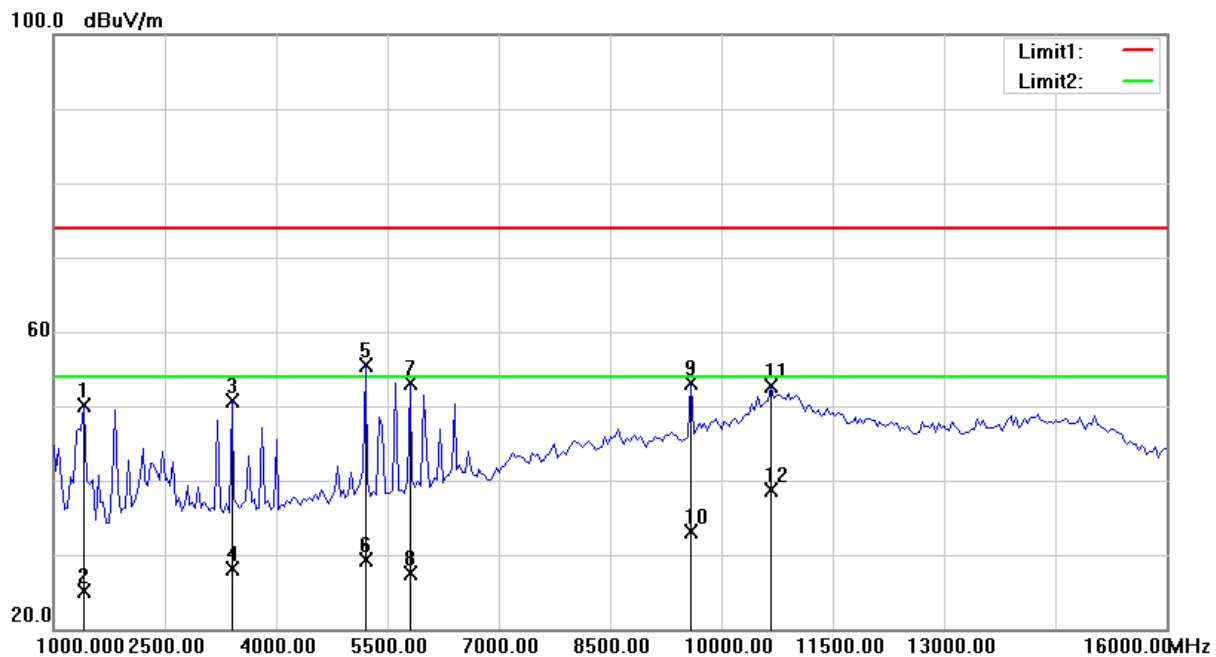
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier ) - preamplifier Gain  
+ Cable loss (preamplifier to receiver )

3. Measurement Value = Reading Level + Correct Factor

4. Margin Level = Measurement Value - Limit Value



Test Voltage	120Vac, 60Hz	Frequency Range	1 – 16GHz
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

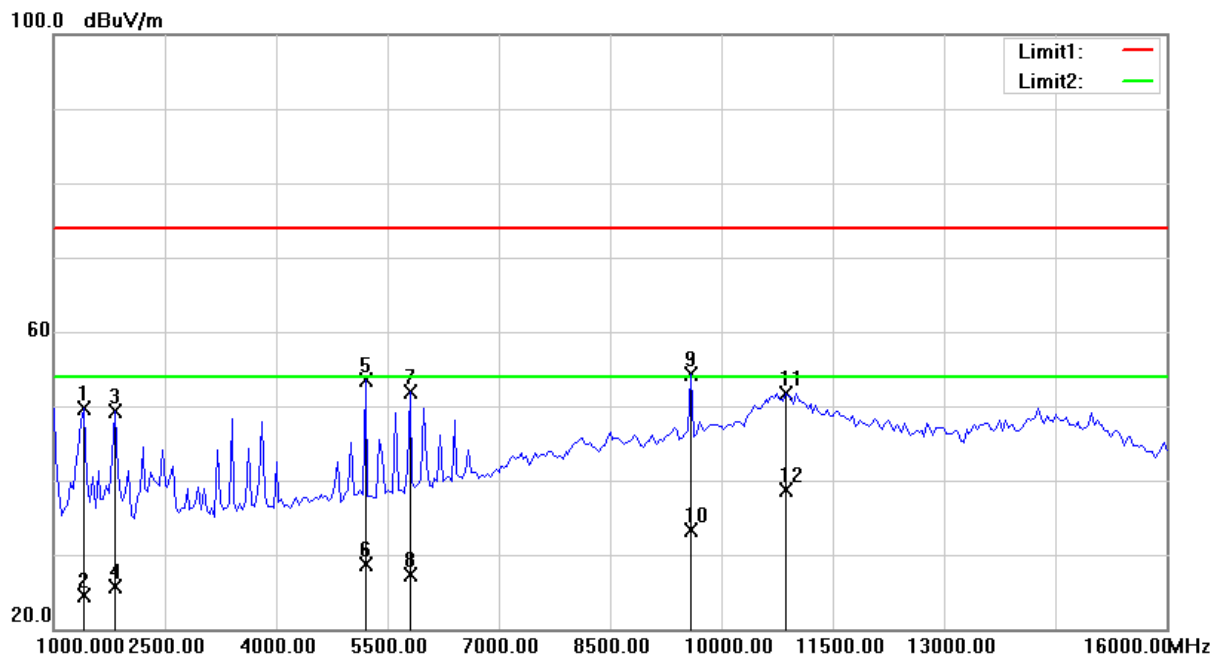


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1412.500	80.57	-30.49	50.08	74.00	-23.92	112	100	peak
2	1412.500	55.60	-30.49	25.11	54.00	-28.89	112	100	AVG
3	3400.000	75.23	-24.45	50.78	74.00	-23.22	146	200	peak
4	3400.000	52.55	-24.45	28.10	54.00	-25.90	146	200	AVG
5	5200.000	74.18	-18.71	55.47	74.00	-18.53	144	100	peak
6	5200.000	48.09	-18.71	29.38	54.00	-24.62	144	100	AVG
7	5800.000	71.27	-18.12	53.15	74.00	-20.85	213	100	peak
8	5800.000	45.58	-18.12	27.46	54.00	-26.54	213	100	AVG
9	9587.500	61.57	-8.51	53.06	74.00	-20.94	18	100	peak
10	9587.500	41.63	-8.51	33.12	54.00	-20.88	18	100	AVG
11	10675.000	61.16	-8.37	52.79	74.00	-21.21	360	202	peak
12	10675.000	47.12	-8.37	38.75	54.00	-15.25	360	202	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	120Vac, 60Hz	Frequency Range	1 – 16GHz
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

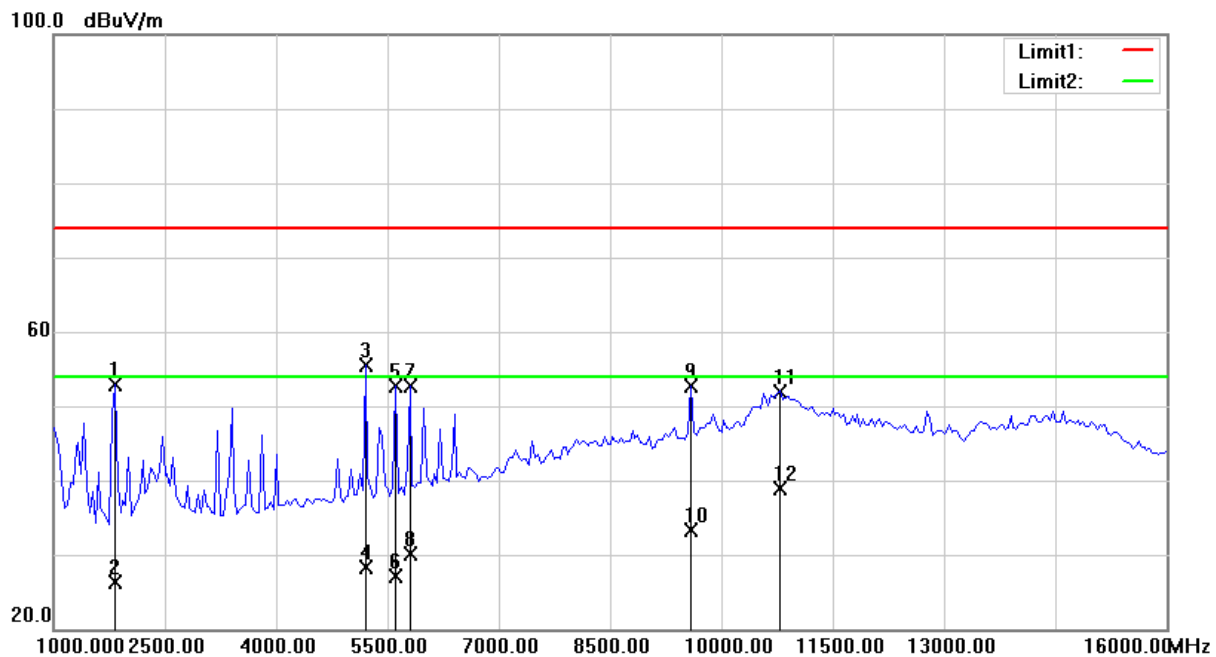


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1412.500	80.27	-30.49	49.78	74.00	-24.22	16	100	peak
2	1412.500	54.92	-30.49	24.43	54.00	-29.57	16	100	AVG
3	1825.000	80.00	-30.65	49.35	74.00	-24.65	155	200	peak
4	1825.000	56.36	-30.65	25.71	54.00	-28.29	155	200	AVG
5	5200.000	72.12	-18.71	53.41	74.00	-20.59	360	285	peak
6	5200.000	47.39	-18.71	28.68	54.00	-25.32	360	285	AVG
7	5800.000	69.95	-18.12	51.83	74.00	-22.17	204	100	peak
8	5800.000	45.45	-18.12	27.33	54.00	-26.67	204	100	AVG
9	9587.500	62.86	-8.51	54.35	74.00	-19.65	166	100	peak
10	9587.500	41.80	-8.51	33.29	54.00	-20.71	166	100	AVG
11	10862.500	59.64	-7.87	51.77	74.00	-22.23	16	300	peak
12	10862.500	46.60	-7.87	38.73	54.00	-15.27	16	300	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	120Vac, 60Hz	Frequency Range	1 – 16GHz
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

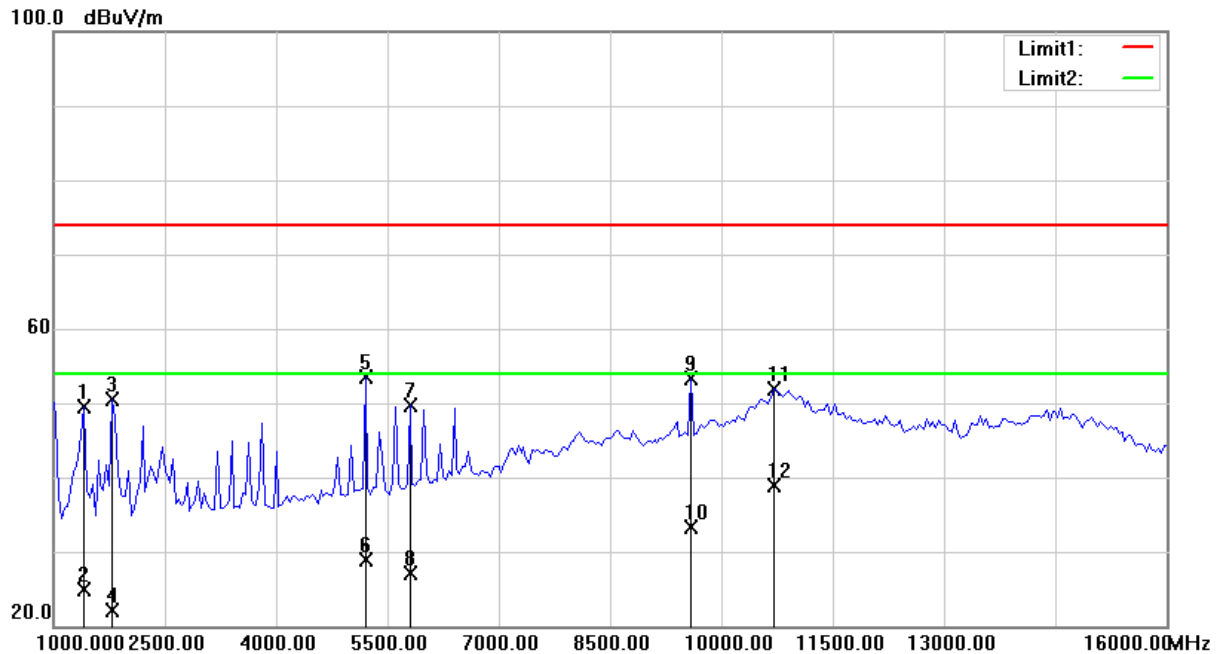


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1825.000	83.59	-30.65	52.94	74.00	-21.06	142	100	peak
2	1825.000	57.03	-30.65	26.38	54.00	-27.62	142	100	AVG
3	5200.000	74.15	-18.71	55.44	74.00	-18.56	151	100	peak
4	5200.000	47.08	-18.71	28.37	54.00	-25.63	151	100	AVG
5	5612.500	71.22	-18.55	52.67	74.00	-21.33	239	100	peak
6	5612.500	45.59	-18.55	27.04	54.00	-26.96	239	100	AVG
7	5800.000	70.75	-18.12	52.63	74.00	-21.37	200	200	peak
8	5800.000	48.13	-18.12	30.01	54.00	-23.99	200	200	AVG
9	9587.500	61.12	-8.51	52.61	74.00	-21.39	20	200	peak
10	9587.500	41.77	-8.51	33.26	54.00	-20.74	20	200	AVG
11	10787.500	60.07	-8.07	52.00	74.00	-22.00	120	100	peak
12	10787.500	46.98	-8.07	38.91	54.00	-15.09	120	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	120Vac, 60Hz	Frequency Range	1 – 16GHz
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



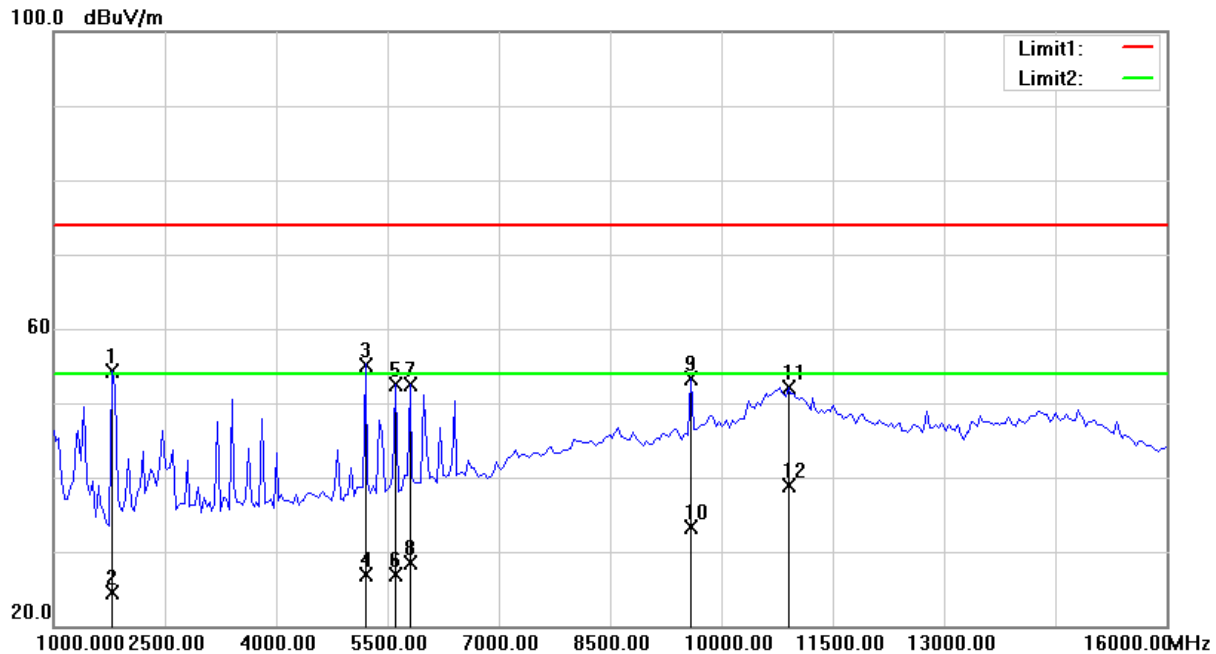
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1412.500	80.03	-30.49	49.54	74.00	-24.46	215	300	peak
2	1412.500	55.36	-30.49	24.87	54.00	-29.13	215	300	AVG
3	1787.500	81.32	-30.79	50.53	74.00	-23.47	360	354	peak
4	1787.500	52.82	-30.79	22.03	54.00	-31.97	360	354	AVG
5	5200.000	72.16	-18.71	53.45	74.00	-20.55	148	200	peak
6	5200.000	47.71	-18.71	29.00	54.00	-25.00	148	200	AVG
7	5800.000	67.87	-18.12	49.75	74.00	-24.25	199	100	peak
8	5800.000	45.17	-18.12	27.05	54.00	-26.95	199	100	AVG
9	9587.500	61.79	-8.51	53.28	74.00	-20.72	168	100	peak
10	9587.500	41.83	-8.51	33.32	54.00	-20.68	168	100	AVG
11	10712.500	60.18	-8.30	51.88	74.00	-22.12	242	200	peak
12	10712.500	47.14	-8.30	38.84	54.00	-15.16	242	200	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 – 16GHz
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

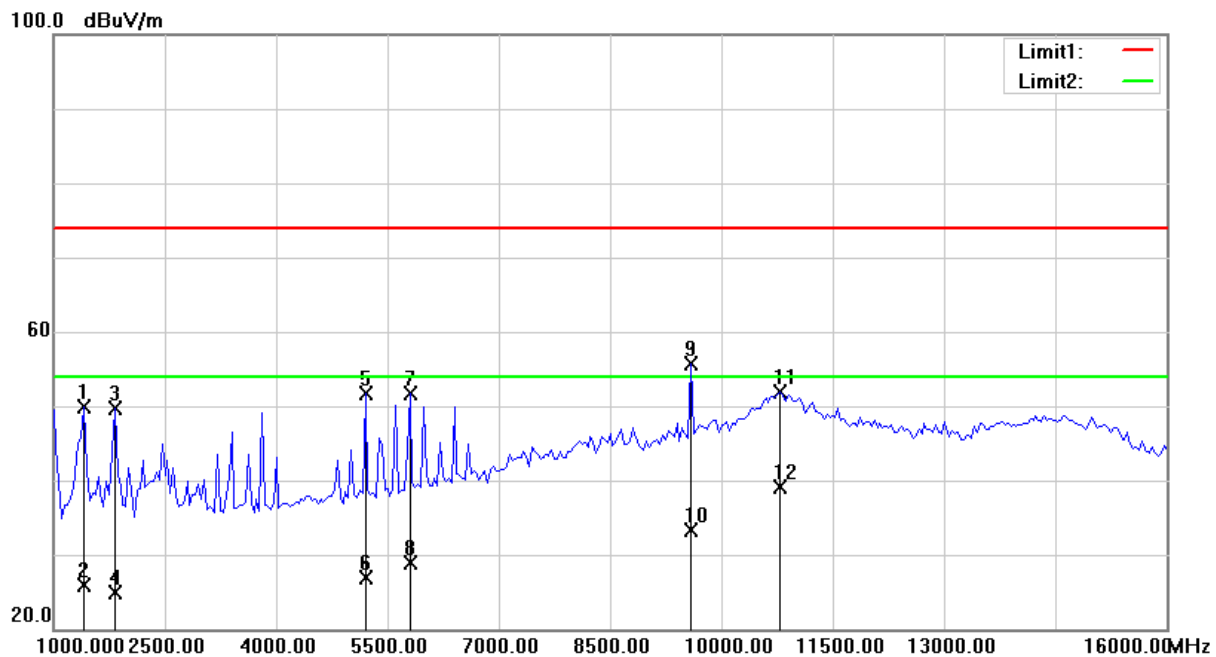


No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1787.500	85.05	-30.79	54.26	74.00	-19.74	269	300	peak
2	1787.500	55.31	-30.79	24.52	54.00	-29.48	269	300	AVG
3	5200.000	73.91	-18.71	55.20	74.00	-18.80	214	100	peak
4	5200.000	45.53	-18.71	26.82	54.00	-27.18	214	100	AVG
5	5612.500	71.01	-18.55	52.46	74.00	-21.54	243	100	peak
6	5612.500	45.39	-18.55	26.84	54.00	-27.16	243	100	AVG
7	5800.000	70.66	-18.12	52.54	74.00	-21.46	192	200	peak
8	5800.000	46.56	-18.12	28.44	54.00	-25.56	192	200	AVG
9	9587.500	61.74	-8.51	53.23	74.00	-20.77	226	200	peak
10	9587.500	41.75	-8.51	33.24	54.00	-20.76	226	200	AVG
11	10900.000	59.98	-7.80	52.18	74.00	-21.82	289	400	peak
12	10900.000	46.72	-7.80	38.92	54.00	-15.08	289	400	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 – 16GHz
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



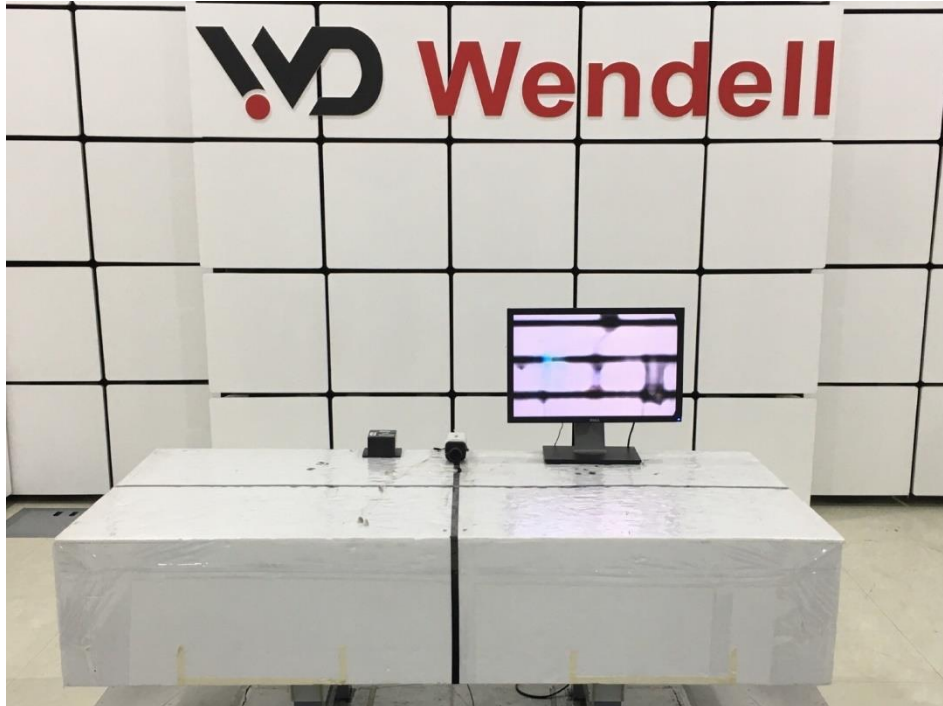
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1412.500	80.40	-30.49	49.91	74.00	-24.09	217	200	peak
2	1412.500	56.44	-30.49	25.95	54.00	-28.05	217	200	AVG
3	1825.000	80.30	-30.65	49.65	74.00	-24.35	360	300	peak
4	1825.000	55.61	-30.65	24.96	54.00	-29.04	360	300	AVG
5	5200.000	70.44	-18.71	51.73	74.00	-22.27	360	199	peak
6	5200.000	45.66	-18.71	26.95	54.00	-27.05	360	199	AVG
7	5800.000	69.78	-18.12	51.66	74.00	-22.34	151	200	peak
8	5800.000	47.00	-18.12	28.88	54.00	-25.12	151	200	AVG
9	9587.500	64.18	-8.51	55.67	74.00	-18.33	164	100	peak
10	9587.500	41.72	-8.51	33.21	54.00	-20.79	164	100	AVG
11	10787.500	59.91	-8.07	51.84	74.00	-22.16	4	300	peak
12	10787.500	47.17	-8.07	39.10	54.00	-14.90	4	300	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

#### 4.2.7 Photographs of Test Configuration

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

Test mode A

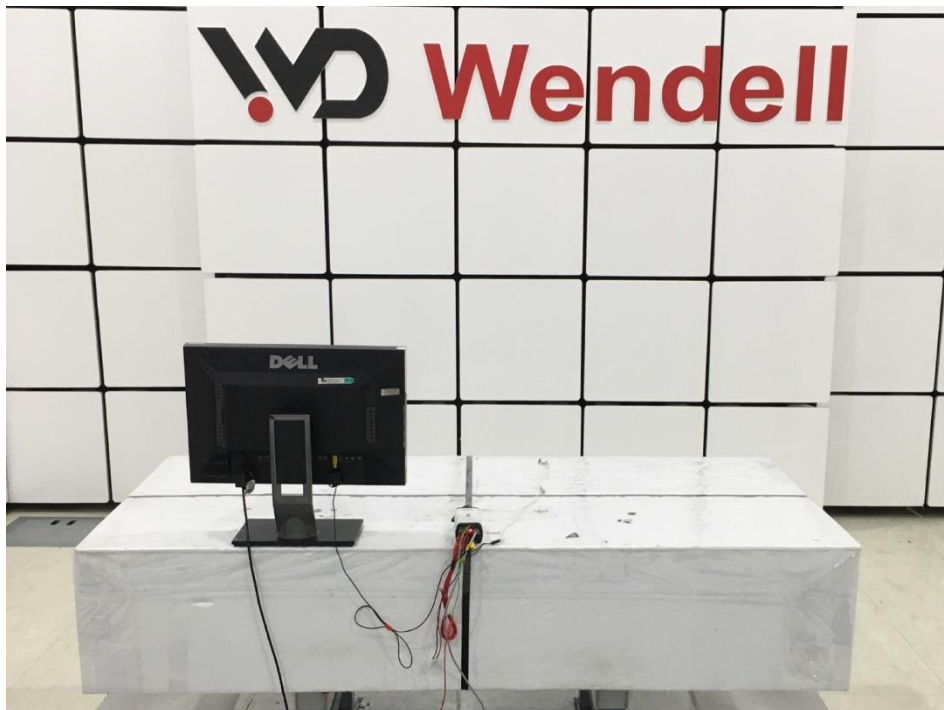




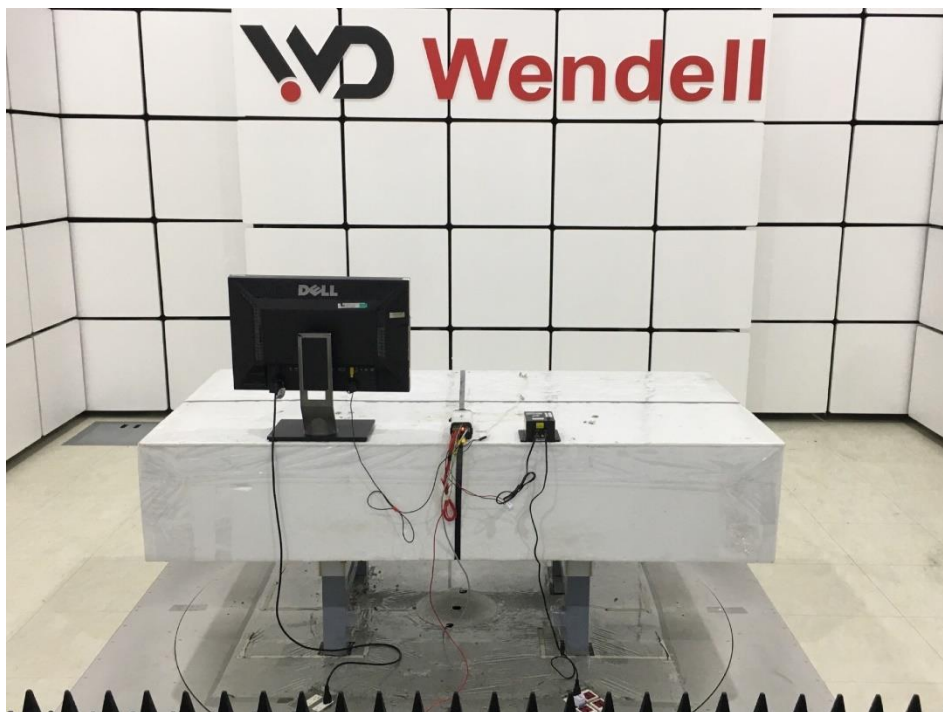
Test mode B



Test mode C



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

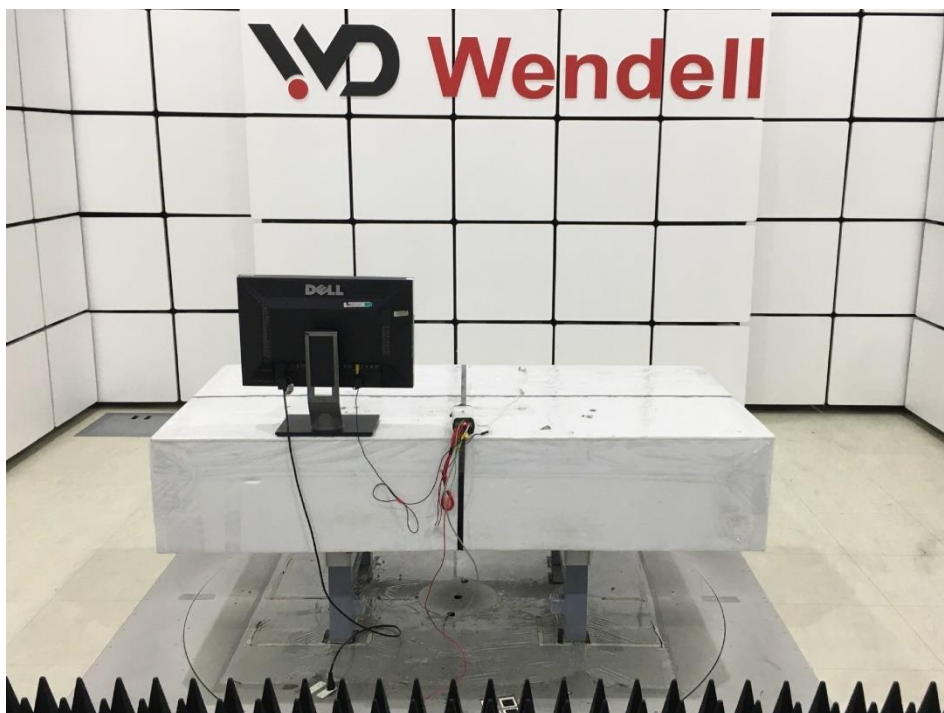


Test mode B





Test mode C



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