



# FCC SDoC Test Report

Issued date: Dec. 22, 2021

Project No.: 21Q100102

**Product :** Network Attached Storage

**Model :** A3V2

**Applicant :** Datto, Inc.

**Address :** 101 Merritt 7, 7th Floor, Norwalk, CT 06851

**Report No: WD-EF-R-210364-A0**

**According to**

**47 CFR FCC Part 15, Subpart B, Class B**  
**ICES-003: 2020 Issue 7, Class B**

**ANSI C63.4: 2014**  
**ANSI C63.4a: 2017**

**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-210364-A0	Dec. 22, 2021	Initial Issue

**Declaration**

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.



### History of supplementary report

Report No.	Issue date	Description
WD-EF-R-210364-A0	Dec. 22, 2021	Original report

**Declaration**

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## 1 Certification

**Product:** Network Attached Storage

**Brand Name:** datto

**Model:** A3V2

**Applicant:** Datto, Inc.

**Tested:** Oct. 22 ~ Dec. 08, 2021

**Standard:** 47 CFR FCC Part 15, Subpart B, Class B

ICES-003: 2020 Issue 7, Class B

ANSI C63.4: 2014

ANSI C63.4a: 2017

The above equipment (Model: A3V2) 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	Conducted disturbance at mains terminals	Class B	Pass	Meets the requirements
ICES-003	Radiated disturbance	Class B	Pass	Meets the requirements

**Note:** Test record contained in the referenced test report relate only to the EUT sample and test item.

## **2 Test Configuration of Equipment Under Test**

### **2.1 Test Facility**

#### **Conducted disturbance at mains terminals Test**

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

#### **Conducted disturbance at mains terminals 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  $U_{cispr}$ , 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 Attached Storage
<b>Brand</b>	datto
<b>Model</b>	A3V2
<b>Applicant</b>	Datto, Inc.
<b>Received Date</b>	Oct. 01, 2021
<b>EUT Power Rating</b>	12Vdc (from adapter)
<b>Model Differences</b>	N/A
<b>Operating System</b>	N/A
<b>Data Cable Supplied</b>	N/A
<b>Accessory Device</b>	Adapter
<b>I/O Port</b>	Please refer to the User’s Manual

**Note:**

- The EUT uses the follow adapter:

<b>Adapter (optional)</b>	
<b>Brand</b>	FSP
<b>Model</b>	FSP036-RHBN3
<b>Input Power</b>	100-240Vac, 1.8A, 50-60Hz
<b>Output Power</b>	12Vdc, 3.0A
<b>Power line</b>	Input: 1.8m non-shielded cable Output: 1.8m non-shielded cable with 1 core

<b>Adapter (optional)</b>	
<b>Brand</b>	EDAC
<b>Model</b>	EA1024P3
<b>Input Power</b>	100-240Vac, 1.0A, 50-60Hz
<b>Output Power</b>	12Vdc, 3.0A, 36.0W
<b>Power line</b>	Input: 1.8m non-shielded cable Output: 1.8m non-shielded cable with 1 core



2. The EUT contains following components.

Item	Brand	Model	Spec.	Qty.
Main board	QNAP	Q05X	V1.2	1
CPU	Intel	4305UE	2.00GHz	1
RAM	Kingston	CBD26D4S9S8ME-8	DDR4 8GB	1
HDD	SEAGATE	ST1000VN002	1TB	1
HD Backplane	QNAP	Q06A	V1.0	1
System Fan	Y.S.TECH	FD125015LB	-	1

3. The EUT's highest operating frequency is 2GHz. Therefore the radiated emission is tested up to 10GHz.

### 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	Adapter mode - FSP036-RHBN3
B	Adapter mode - EA1024P3
<b>Radiated emission 30MHz ~ 1GHz test</b>	
A	Adapter mode - FSP036-RHBN3
B	Adapter mode - EA1024P3
<b>Radiated emission above 1GHz test</b>	
A	Adapter mode - FSP036-RHBN3
B	Adapter mode - EA1024P3

### 3.3 EUT Operating Condition

- 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 read/write data with internal HDD and external HDD.
- f. The EUT sent "H" message to monitor and displayed on screen.



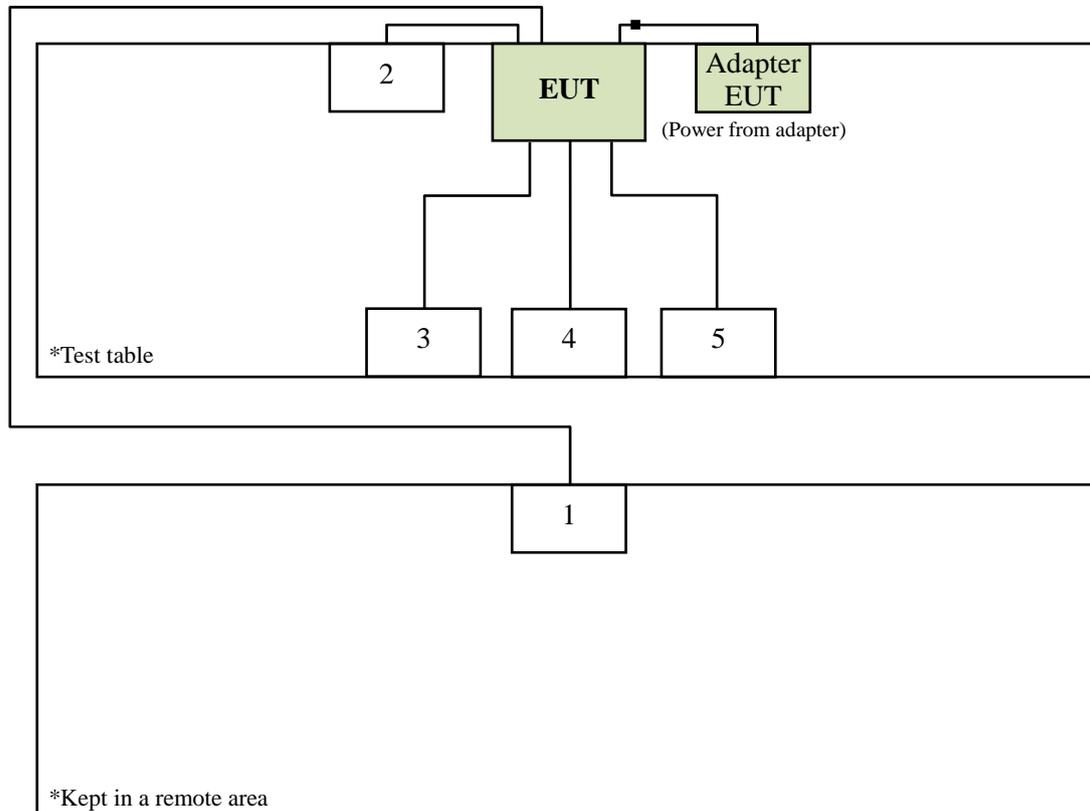
### 3.4 Description of Support Unit

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	PC	DELL	D19M	N/A	PPD-QCN FA335	20m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	-
2	4K Monitor	PHILIPS	276E8V	UKC1926000 441	FCC DoC Approved	1.5m shielded HDMI cable	AC: 1.8m non-shielded cable DC: 1.4m non-shielded cable with 1 core	-
3	Keyboard	DELL	KB4021	N/A	FCC DoC Approved	1.5m non-shielded cable	N/A	-
4	Mouse	DELL	MS111-L	N/A	FCC DoC Approved	1.5m non-shielded cable	N/A	-
5	External Hard Drive	Transcend	TS1TSJ25C3 N	D62397-0399	FCC DoC Approved	1m shielded cable	N/A	-

- Note:**
1. The core(s) is(are) originally attached to the cable(s).
  2. Item 1 acted as communication partners to transfer data.

### 3.5 Configuration of System Under Test





## 4 Emission Test

### 4.1 Conducted Emission Measurement

#### 4.1.1 Limit of Conducted Emission Measurement

Frequency (MHz)	Class A (dB $\mu$ V)		Class B (dB $\mu$ V)	
	Quasi-peak (dB $\mu$ V)	Average (dB $\mu$ V)	Quasi-peak (dB $\mu$ V)	Average (dB $\mu$ V)
0.15 - 0.5	79	66	66 to 56	56 to 46
0.5 - 5	73	60	56	46
5 - 30	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	May 30, 2021
2	Pulse limiter	R&S®	ESH3-Z2	CT-2-015	May 27, 2021
3	EMI Test Receiver	R&S	ESCI	CT-1-024	May 24, 2021
4	V-LISN	SCHWARZBECK	NSLK8127	CT-1-104-1	May 30, 2021
5	Test Cable	Marvelous Microwave Inc	200200.400LL .500A	CT-10-048-1	May 27, 2021
6	50ohm Termination	N/A	N/A	CT-1-065-1	May 31, 2021
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	Jun. 11, 2021
2	Test Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	Jun. 10, 2021
3	EMI Test Receiver	R&S	ESR3	CT-1-103	Jun. 08, 2021
4	LISN	SCHWARZBECK	NSLK 8127RC	CT-1-104-1RC	Jun. 11, 2021
5	Transient Limiter	EM Electronics Corporation	EM-7600	CT-1-026	Jun. 10, 2021
6	50ohm Termination	HUBER+SUHNER	N/A	CT-1-109-1	Jun. 11, 2021
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**

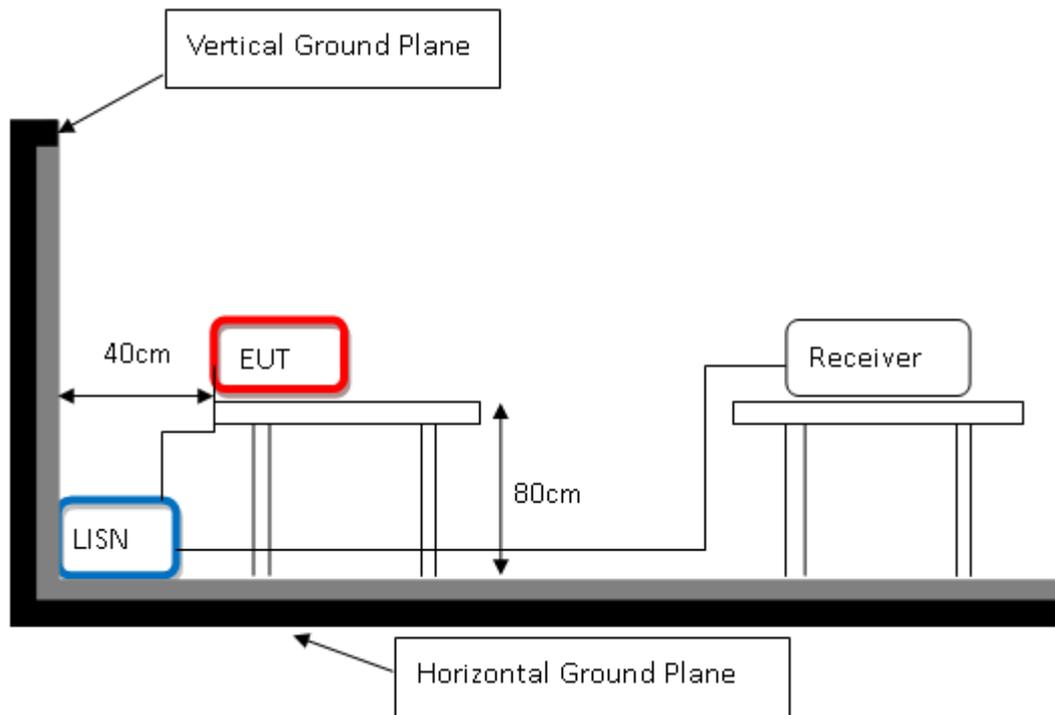
- a. The table-top EUT was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The LISN at least be 80 cm from nearest chassis of EUT. The floor-standing EUT and all cables shall be insulated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

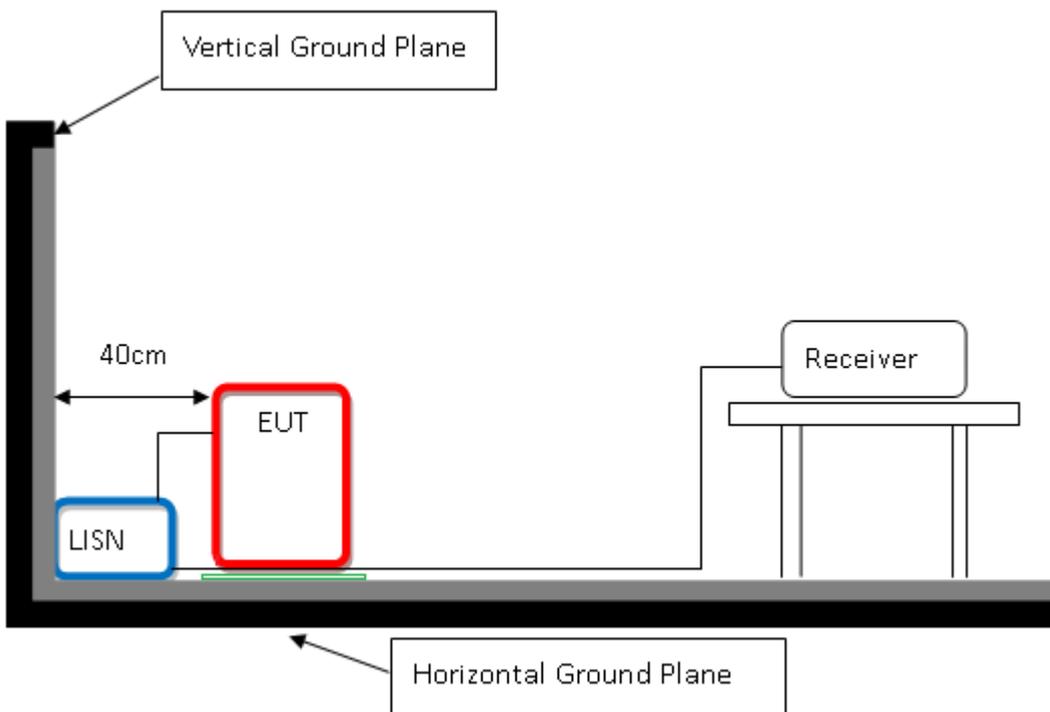
No deviation

### 4.1.5 Test Setup

#### < Table-Top equipment >



#### < Floor-Standing equipment >

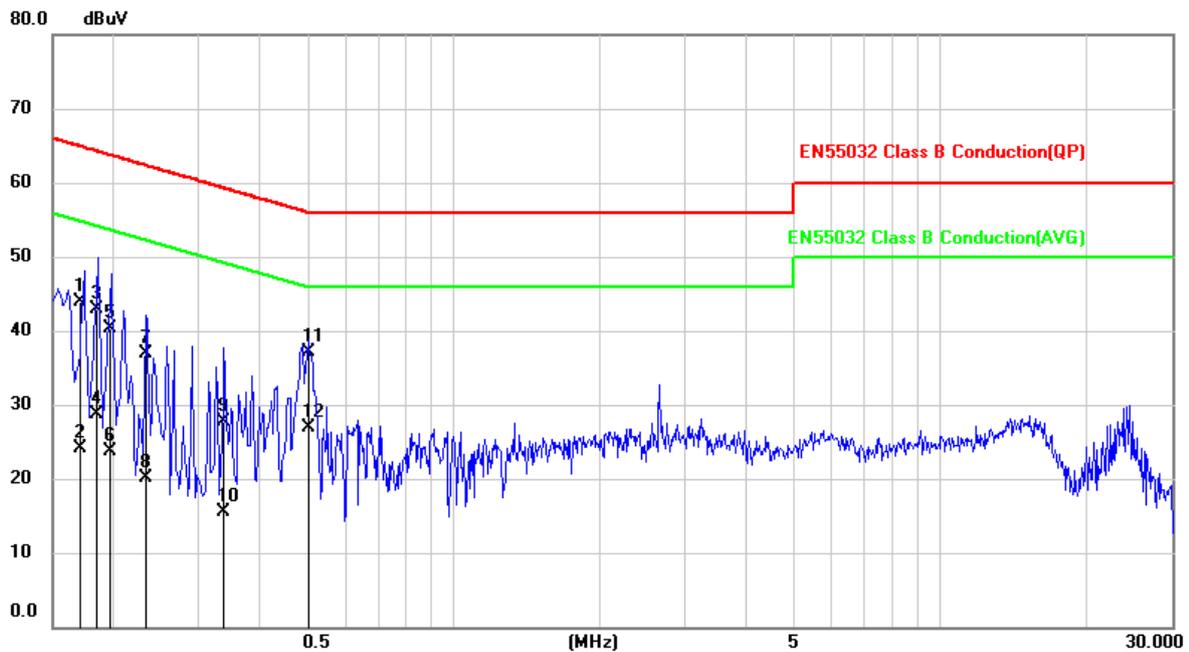


**Note:** Please refer to 4.1.7 for the actual test configuration.



### 4.1.6 Test Result

Test Voltage	120Vac, 60Hz	Frequency Range	0.15-30 MHz
Environmental Conditions	24.6°C, 50% RH	6dB Bandwidth	9 kHz
Test Date	2021/10/22	Phase	L
Tested by	Eric Hsieh	Test Site	W01
Test Mode	A		

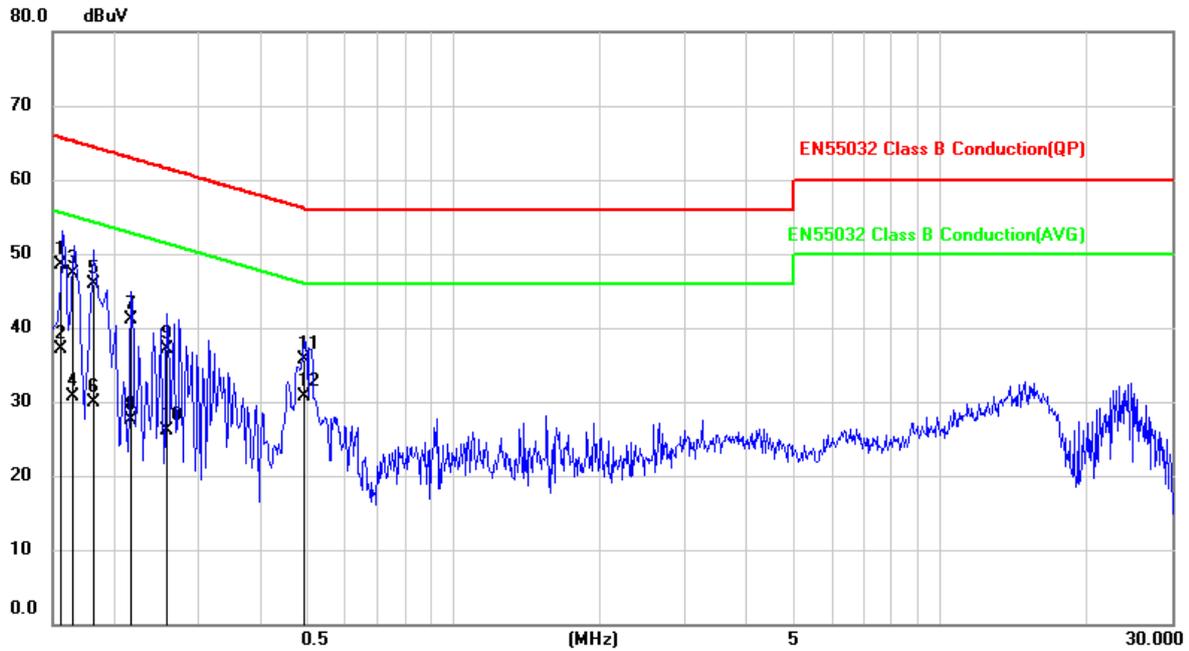


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1703	34.01	9.97	43.98	64.95	-20.97	QP
2	0.1703	14.09	9.97	24.06	54.95	-30.89	AVG
3	0.1843	32.94	9.96	42.90	64.29	-21.39	QP
4	0.1843	18.74	9.96	28.70	54.29	-25.59	AVG
5	0.1964	30.40	9.96	40.36	63.76	-23.40	QP
6	0.1964	13.72	9.96	23.68	53.76	-30.08	AVG
7	0.2323	26.92	9.96	36.88	62.37	-25.49	QP
8	0.2323	10.19	9.96	20.15	52.37	-32.22	AVG
9	0.3384	17.64	9.97	27.61	59.24	-31.63	QP
10	0.3384	5.46	9.97	15.43	49.24	-33.81	AVG
11	0.5025	27.11	9.98	37.09	56.00	-18.91	QP
12	0.5025	17.00	9.98	26.98	46.00	-19.02	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	0.15-30 MHz
<b>Environmental Conditions</b>	24.6°C, 50% RH	<b>6dB Bandwidth</b>	9 kHz
<b>Test Date</b>	2021/10/22	<b>Phase</b>	N
<b>Tested by</b>	Eric Hsieh	<b>Test Site</b>	W01
<b>Test Mode</b>	A		

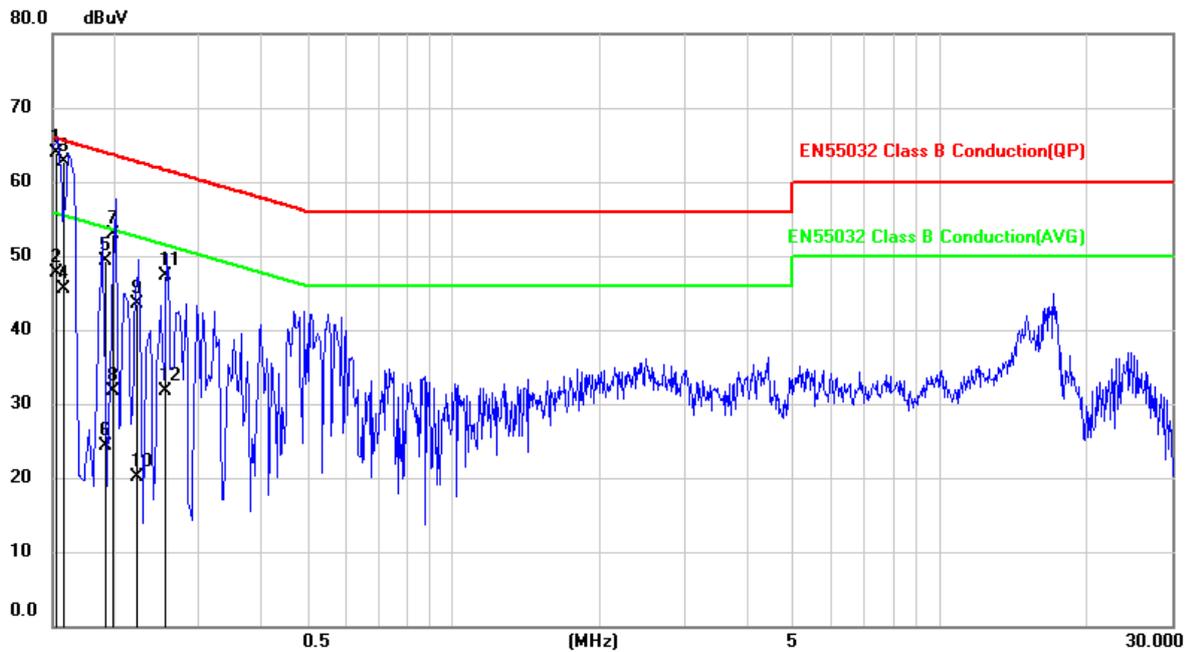


No.	Frequency (MHz)	Reading Level (dB $\mu$ V)	Correct Factor (dB)	Measurement (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector
1	0.1555	38.48	9.98	48.46	65.70	-17.24	QP
2	0.1555	27.07	9.98	37.05	55.70	-18.65	AVG
3	0.1643	37.23	9.98	47.21	65.24	-18.03	QP
4	0.1643	20.69	9.98	30.67	55.24	-24.57	AVG
5	0.1819	35.86	9.98	45.84	64.40	-18.56	QP
6	0.1819	20.01	9.98	29.99	54.40	-24.41	AVG
7	0.2171	31.11	9.98	41.09	62.93	-21.84	QP
8	0.2171	17.48	9.98	27.46	52.93	-25.47	AVG
9	0.2565	27.08	9.98	37.06	61.54	-24.48	QP
10	0.2565	16.17	9.98	26.15	51.54	-25.39	AVG
11	0.4958	25.63	9.99	35.62	56.07	-20.45	QP
12	0.4958	20.78	9.99	30.77	46.07	-15.30	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	24.6°C, 50% RH	6dB Bandwidth	9 kHz
Test Date	2021/10/22	Phase	L
Tested by	Eric Hsieh	Test Site	W01
Test Mode	B		

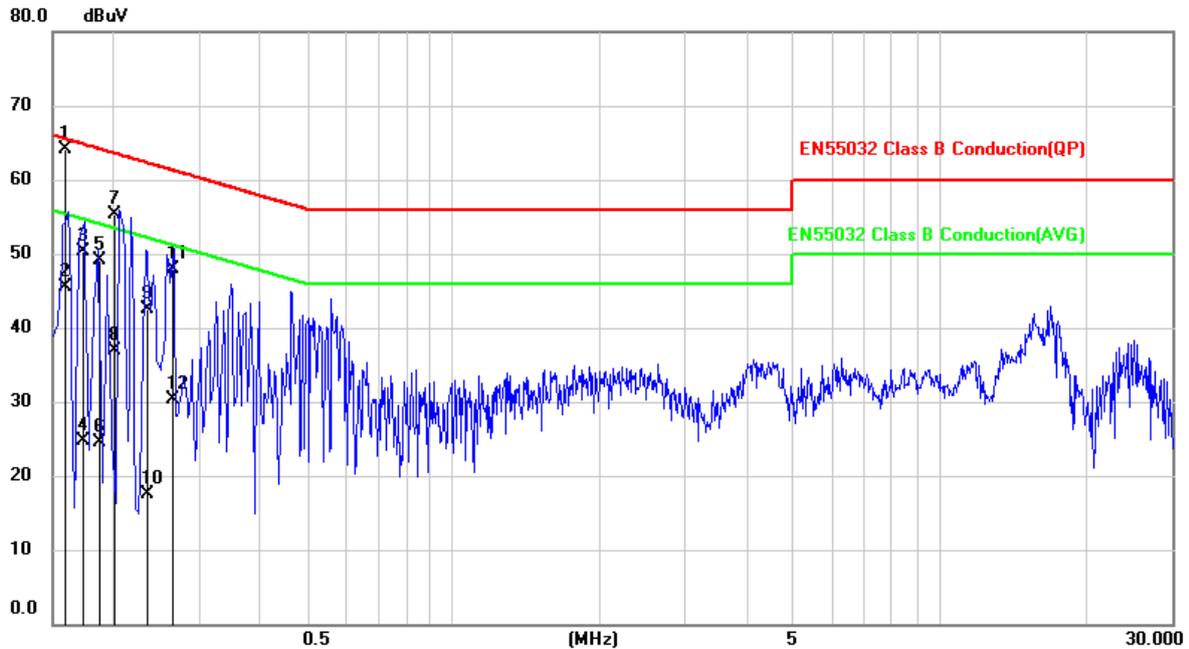


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1522	53.91	9.97	63.88	65.88	-2.00	QP
2	0.1522	37.64	9.97	47.61	55.88	-8.27	AVG
3	0.1582	52.71	9.97	62.68	65.56	-2.88	QP
4	0.1582	35.56	9.97	45.53	55.56	-10.03	AVG
5	0.1923	39.43	9.96	49.39	63.94	-14.55	QP
6	0.1923	14.28	9.96	24.24	53.94	-29.70	AVG
7	0.1986	42.90	9.96	52.86	63.67	-10.81	QP
8	0.1986	21.80	9.96	31.76	53.67	-21.91	AVG
9	0.2229	33.47	9.96	43.43	62.71	-19.28	QP
10	0.2229	10.09	9.96	20.05	52.71	-32.66	AVG
11	0.2559	37.28	9.96	47.24	61.56	-14.32	QP
12	0.2559	21.77	9.96	31.73	51.56	-19.83	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	0.15-30 MHz
<b>Environmental Conditions</b>	24.6°C, 50% RH	<b>6dB Bandwidth</b>	9 kHz
<b>Test Date</b>	2021/10/22	<b>Phase</b>	N
<b>Tested by</b>	Eric Hsieh	<b>Test Site</b>	W01
<b>Test Mode</b>	B		



No.	Frequency (MHz)	Reading Level (dB $\mu$ V)	Correct Factor (dB)	Measurement (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector
1	0.1589	54.18	9.98	64.16	65.52	-1.36	QP
2	0.1589	35.53	9.98	45.51	55.52	-10.01	AVG
3	0.1725	40.23	9.98	50.21	64.84	-14.63	QP
4	0.1725	14.64	9.98	24.62	54.84	-30.22	AVG
5	0.1880	39.05	9.98	49.03	64.12	-15.09	QP
6	0.1880	14.51	9.98	24.49	54.12	-29.63	AVG
7	0.2016	45.32	9.98	55.30	63.54	-8.24	QP
8	0.2016	27.01	9.98	36.99	53.54	-16.55	AVG
9	0.2344	32.61	9.98	42.59	62.29	-19.70	QP
10	0.2344	7.48	9.98	17.46	52.29	-34.83	AVG
11	0.2640	37.88	9.98	47.86	61.30	-13.44	QP
12	0.2640	20.35	9.98	30.33	51.30	-20.97	AVG

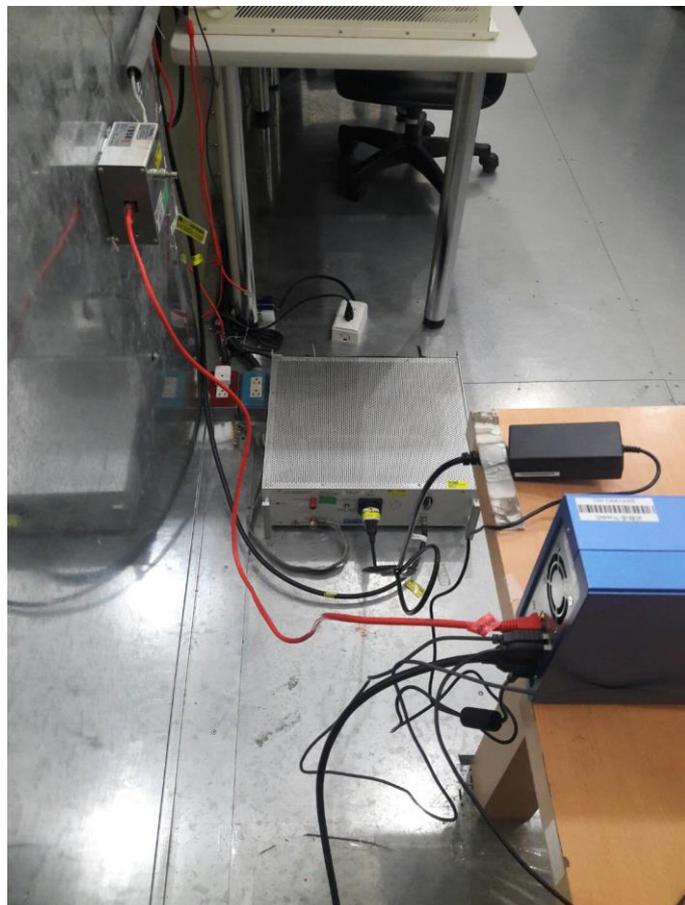
**Remark:** 1. QP = Quasi Peak, AVG = Average  
 2. Correction Factor = Insertion loss of LISN + Cable loss + Transient Limiter (If use)  
 3. Measurement Value = Reading Level + Correct Factor  
 4. Margin Level = Measurement Value - Limit Value

### 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

FCC 15B Radiated Emissions Limits				
Frequency range (MHz)	Class A (3m) Quasi-peak (dBμV/m)	Class A (10m) Quasi-peak (dBμV/m)	Class B (3m) Quasi-peak (dBμV/m)	Class B (10m) Quasi-peak (dBμV/m)
30 - 88	49.5	39.1	40	29.5
88 - 216	54	43.5	43.5	33.1
216 - 230	56.9	46.4	46	35.6
230 - 960				
960 - 1000	60	49.5	54	43.5

ICES-003 Radiated Emissions Limits				
Frequency range (MHz)	Class A (3m) Quasi-peak (dBμV/m)	Class A (10m) Quasi-peak (dBμV/m)	Class B (3m) Quasi-peak (dBμV/m)	Class B (10m) Quasi-peak (dBμV/m)
30 - 88	50	40	40	30
88 - 216	54	43.5	43.5	33.1
216 - 230	56.9	46.4	46	35.6
230 - 960	57	47	47	37
960 - 1000	60	49.5	54	43.5

- 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**

<b>FCC 15B / ICES-003 Radiated Emissions Limits</b>				
<b>Frequency range (GHz)</b>	<b>Class A (3m) (dBμV/m)</b>		<b>Class B (3m) (dBμV/m)</b>	
	<b>Peak</b>	<b>Average</b>	<b>Peak</b>	<b>Average</b>
1 - 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)**

<b>Highest frequency generated or used in the device or on which the device operates or tunes (MHz)</b>	<b>Upper frequency of measurement range (MHz)</b>
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	Aug. 05, 2021
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Dec. 03, 2021
3	TRILOG Broadband Antenna with 5 dB Attenuator	Schwarzbeck	VULB 9168 & MVE2251-06	CT-1-096-1	Aug. 03, 2021
4	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Aug. 24, 2021
5	EMI Test Receiver	Keysight	N9038A	CT-9-007	Aug. 03, 2021
6	Preamplifier	EM	EM 330	CT-9-024	Aug. 09, 2021
7	Preamplifier	SGH & MCL	SGH118 & BW-S15W2+	CT-9-071	Aug. 09, 2021
8	Preamplifier	EMCI	EMC184045SE	CT-9-013	Aug. 24, 2021
9	Test Cable	EMCI	EMCCFD400-NM-NM-1000	CT-1-132	Aug. 09, 2021
10	Test Cable	PEWC	CFD400NL-LW-NM-NM-3000	CT-1-141	Aug. 09, 2021
11	Test Cable	EMCI	EMCCFD400-NM-NM-15000	CT-1-133	Aug. 09, 2021
12	Test Cable	EMCI	EMC104-SM-35M-600	CT-1-134	Aug. 09, 2021
13	Test Cable	MVE	280280.LL266.1400	CT-9-072	Aug. 09, 2021
14	Test Cable	EMCI	EMC102-KM-KM-600	CT-1-136	Aug. 24, 2021
15	Measurement Software	EZ-EMC	Ver : FA-03A2 RE	CT-3-012	No calibration request

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



### 4.2.3 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.

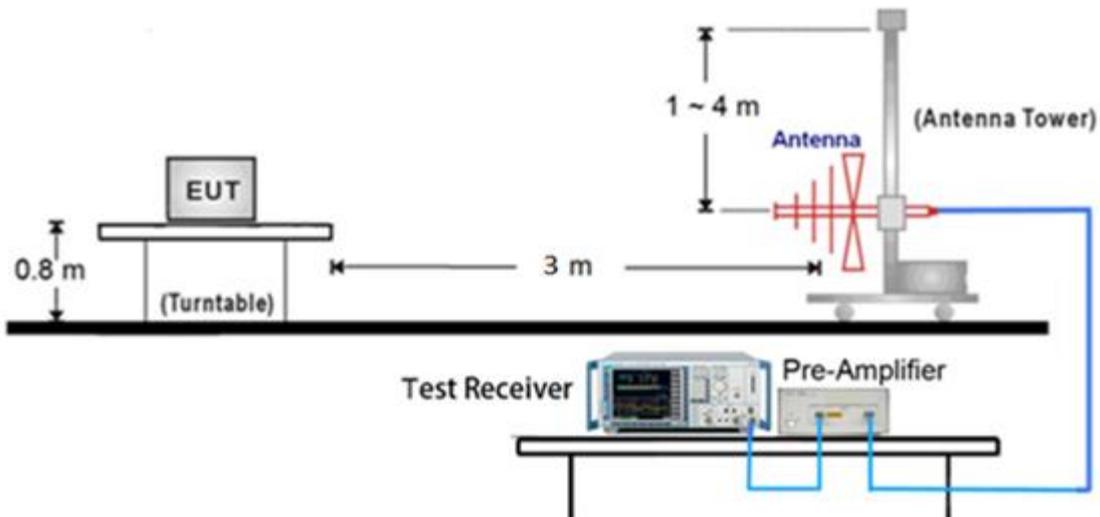
- e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

### 4.2.4 Deviation from Test Standard

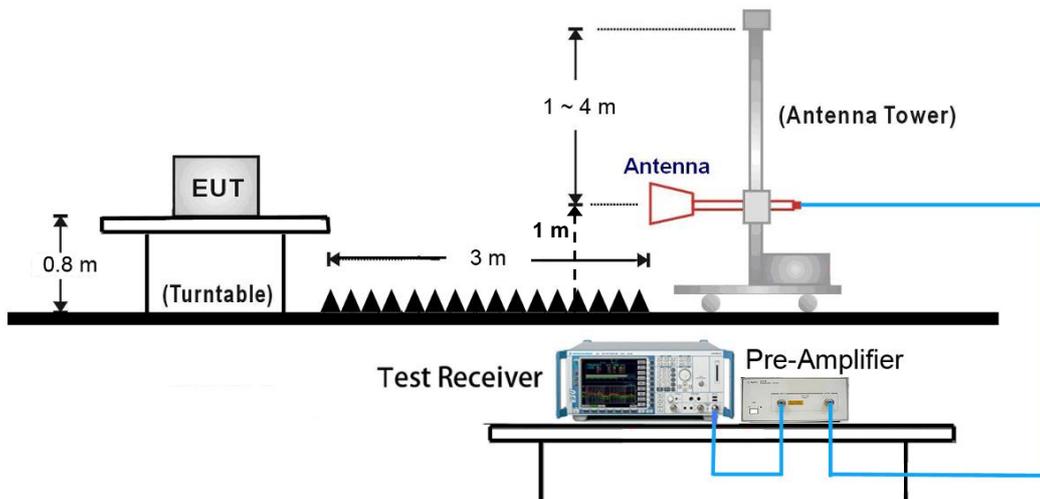
No deviation

## 4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >



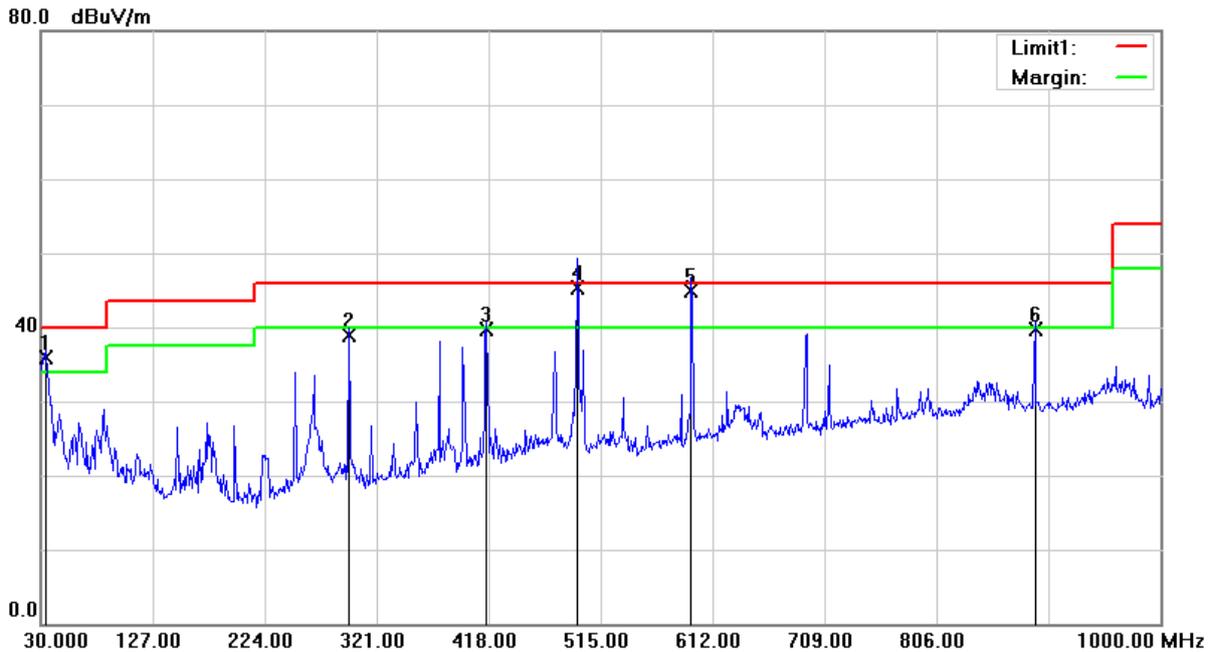
### Note:

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



### 4.2.6 Test Result

<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	30 – 1000 MHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Test Date</b>	2021/12/07	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Vertical
<b>Test Site</b>	W08	<b>Test Mode</b>	A

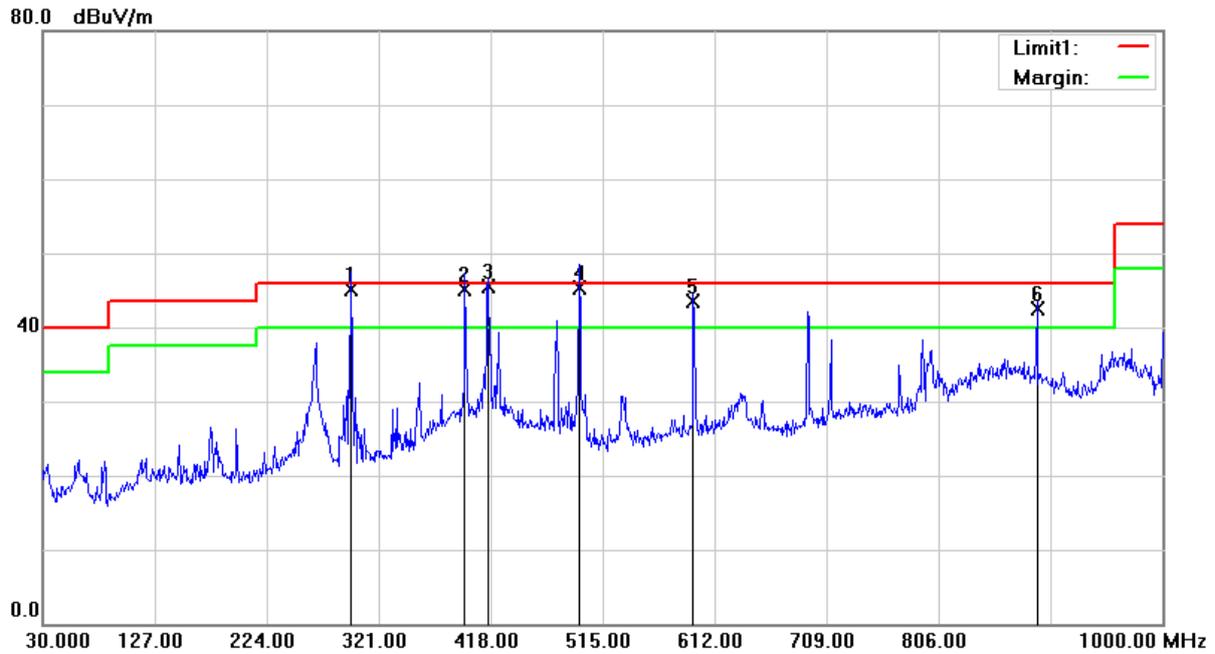


No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	33.8800	47.39	-11.55	35.84	40.00	-4.16	144	100	QP
2	296.7500	48.63	-9.74	38.89	46.00	-7.11	0	200	QP
3	416.0600	46.30	-6.68	39.62	46.00	-6.38	360	200	QP
4	494.6300	50.17	-4.82	45.35	46.00	-0.65	0	129	QP
5	593.5700	47.22	-2.33	44.89	46.00	-1.11	0	125	QP
6	891.3600	37.88	1.89	39.77	46.00	-6.23	257	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	30 – 1000 MHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Test Date</b>	2021/12/07	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Horizontal
<b>Test Site</b>	W08	<b>Test Mode</b>	A

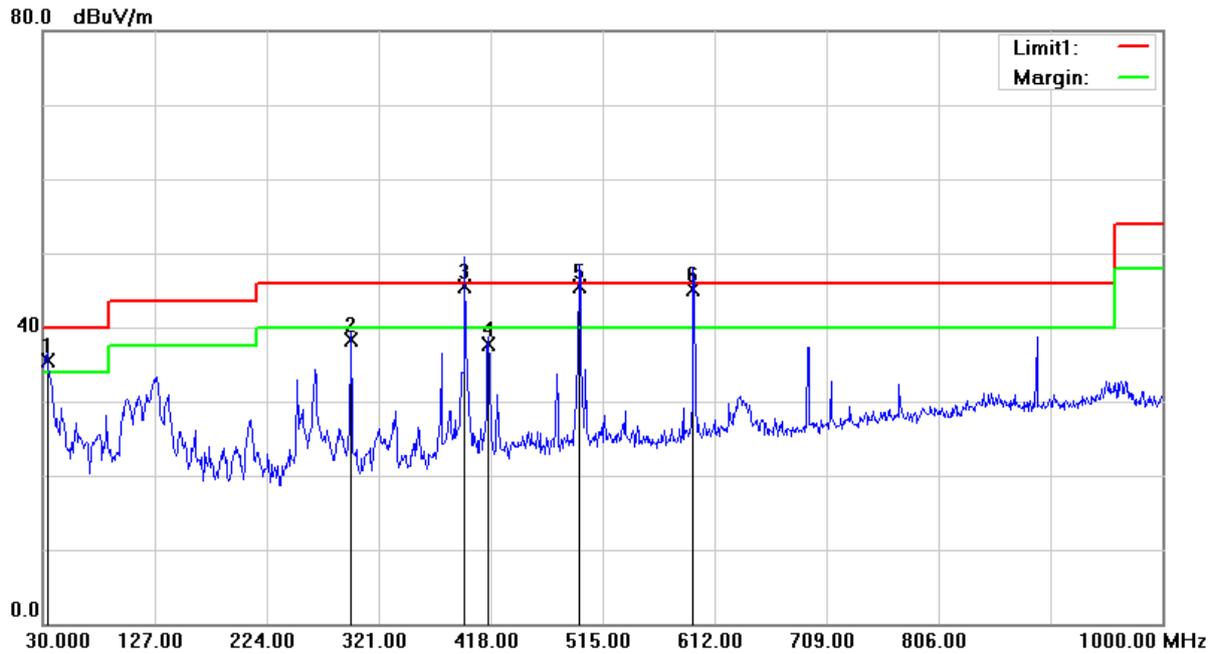


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	296.7500	54.75	-9.74	45.01	46.00	-0.99	132	100	QP
2	395.6900	52.27	-7.17	45.10	46.00	-0.90	118	100	QP
3	416.0600	52.24	-6.68	45.56	46.00	-0.44	188	100	QP
4	494.6300	50.05	-4.82	45.23	46.00	-0.77	267	200	QP
5	593.5700	45.90	-2.33	43.57	46.00	-2.43	311	200	QP
6	891.3600	40.58	1.89	42.47	46.00	-3.53	135	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	30 – 1000 MHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Test Date</b>	2021/12/07	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Vertical
<b>Test Site</b>	W08	<b>Test Mode</b>	B

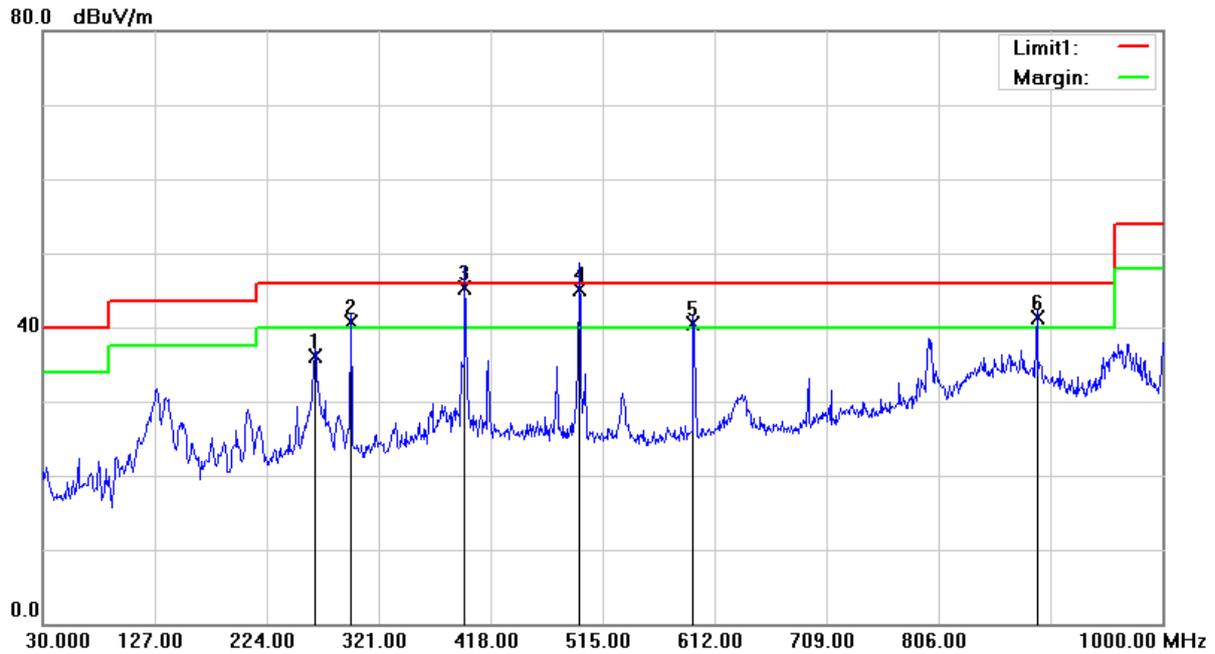


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	33.8800	47.07	-11.55	35.52	40.00	-4.48	111	100	QP
2	296.7500	48.11	-9.74	38.37	46.00	-7.63	174	100	QP
3	395.6900	52.58	-7.17	45.41	46.00	-0.59	319	200	QP
4	416.0600	44.42	-6.68	37.74	46.00	-8.26	0	195	QP
5	494.6300	50.41	-4.82	45.59	46.00	-0.41	0	195	QP
6	593.5700	47.40	-2.33	45.07	46.00	-0.93	307	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	30 – 1000 MHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Test Date</b>	2021/12/07	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Horizontal
<b>Test Site</b>	W08	<b>Test Mode</b>	B

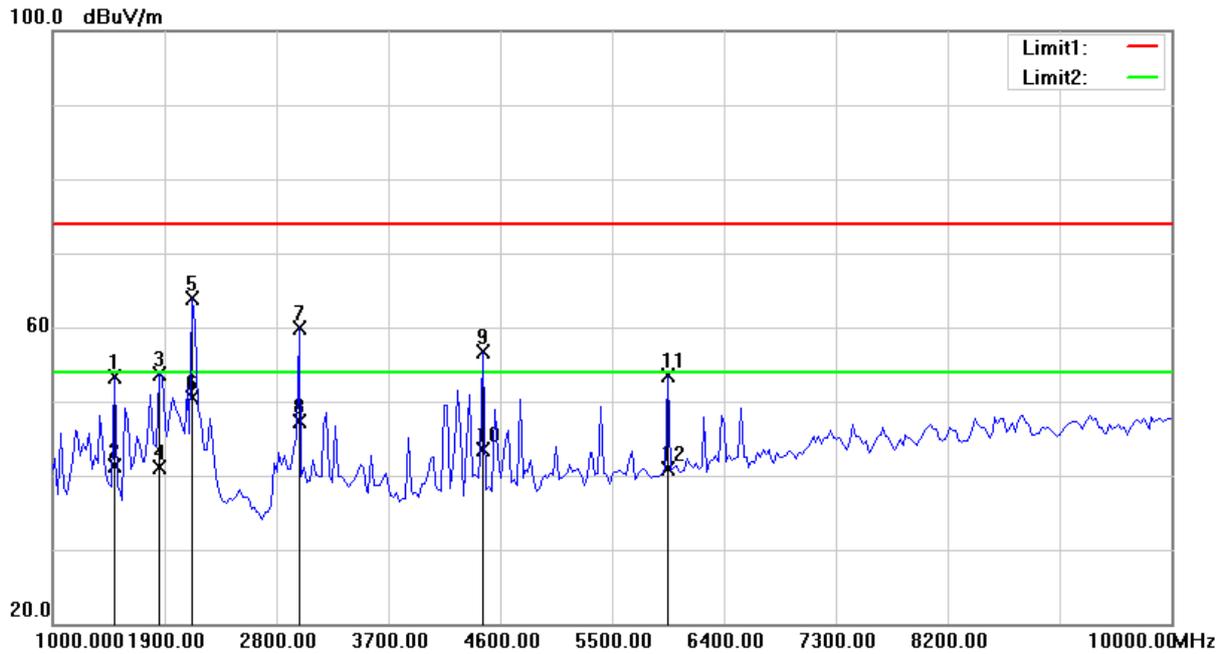


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	265.7100	47.07	-10.94	36.13	46.00	-9.87	145	100	QP
2	296.7500	50.42	-9.74	40.68	46.00	-5.32	88	100	QP
3	395.6900	52.55	-7.17	45.38	46.00	-0.62	205	100	QP
4	494.6300	49.93	-4.82	45.11	46.00	-0.89	287	200	QP
5	593.5700	42.88	-2.33	40.55	46.00	-5.45	269	100	QP
6	891.3600	39.36	1.89	41.25	46.00	-4.75	0	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	1 – 10GHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	1MHz
<b>Test Date</b>	2021/12/08	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Vertical
<b>Test Site</b>	W08	<b>Test Mode</b>	A



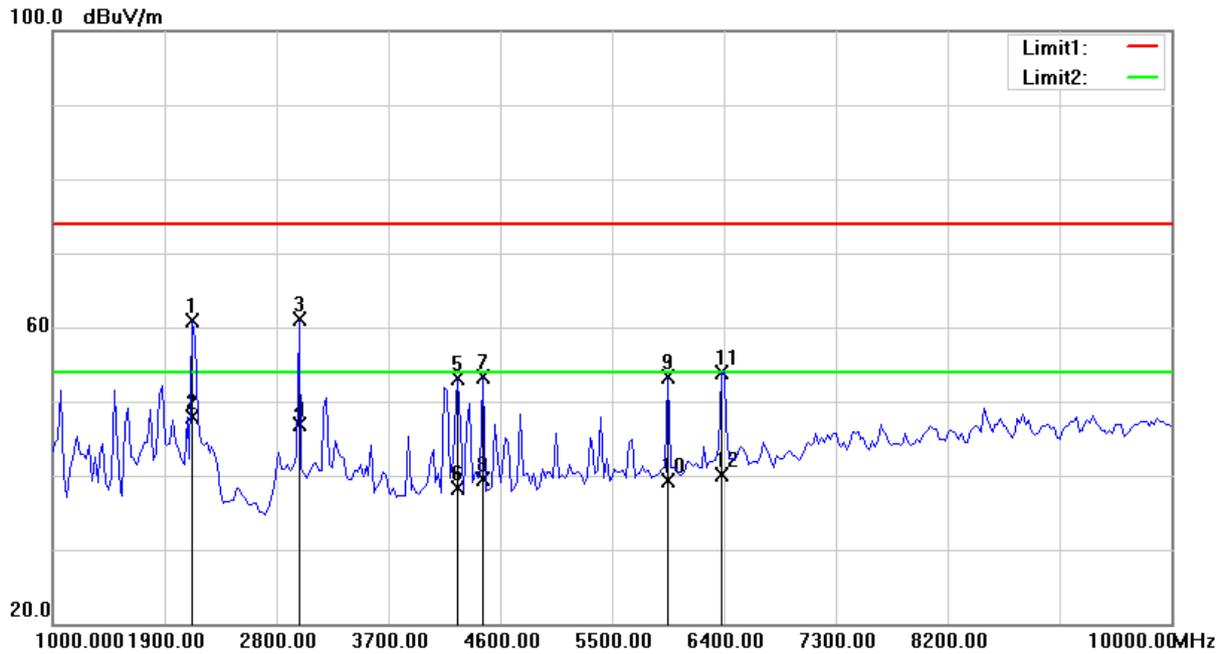
No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1495.000	70.32	-16.97	53.35	74.00	-20.65	153	100	peak
2	1495.000	58.28	-16.97	41.31	54.00	-12.69	153	100	AVG
3	1855.000	70.24	-16.58	53.66	74.00	-20.34	65	100	peak
4	1855.000	57.66	-16.58	41.08	54.00	-12.92	65	100	AVG
5	2125.000	78.67	-14.82	63.85	74.00	-10.15	68	200	peak
6	2125.000	65.33	-14.82	50.51	54.00	-3.49	68	200	AVG
7	2980.000	72.37	-12.43	59.94	74.00	-14.06	301	100	peak
8	2980.000	59.72	-12.43	47.29	54.00	-6.71	301	100	AVG
9	4465.000	65.93	-9.25	56.68	74.00	-17.32	65	100	peak
10	4465.000	52.82	-9.25	43.57	54.00	-10.43	65	100	AVG
11	5950.000	59.45	-5.88	53.57	74.00	-20.43	74	100	peak
12	5950.000	46.77	-5.88	40.89	54.00	-13.11	74	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	1 – 10GHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	1MHz
<b>Test Date</b>	2021/12/08	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Horizontal
<b>Test Site</b>	W08	<b>Test Mode</b>	A

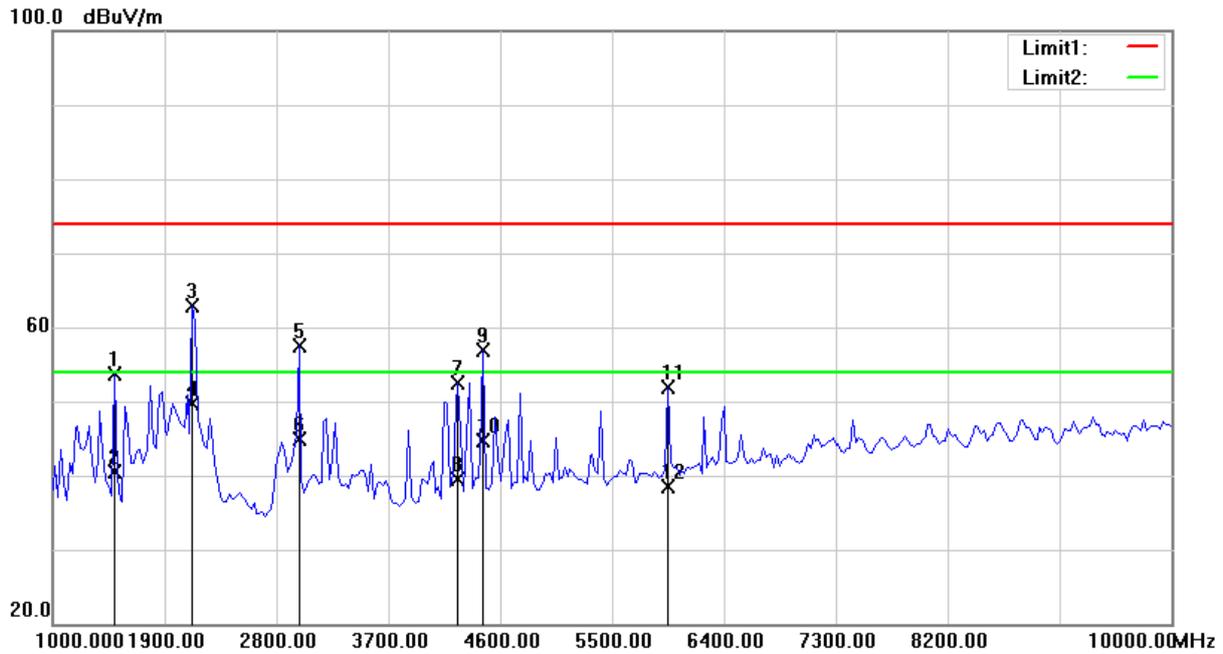


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	2125.000	75.69	-14.82	60.87	74.00	-13.13	339	200	peak
2	2125.000	62.70	-14.82	47.88	54.00	-6.12	339	200	AVG
3	2980.000	73.54	-12.43	61.11	74.00	-12.89	149	100	peak
4	2980.000	59.29	-12.43	46.86	54.00	-7.14	149	100	AVG
5	4262.500	62.92	-9.89	53.03	74.00	-20.97	26	100	peak
6	4262.500	48.21	-9.89	38.32	54.00	-15.68	26	100	AVG
7	4465.000	62.51	-9.25	53.26	74.00	-20.74	0	124	peak
8	4465.000	48.77	-9.25	39.52	54.00	-14.48	0	124	AVG
9	5950.000	59.12	-5.88	53.24	74.00	-20.76	339	200	peak
10	5950.000	45.08	-5.88	39.20	54.00	-14.80	339	200	AVG
11	6377.500	58.11	-4.27	53.84	74.00	-20.16	0	145	peak
12	6377.500	44.37	-4.27	40.10	54.00	-13.90	0	145	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	1 – 10GHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	1MHz
<b>Test Date</b>	2021/12/08	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Vertical
<b>Test Site</b>	W08	<b>Test Mode</b>	B

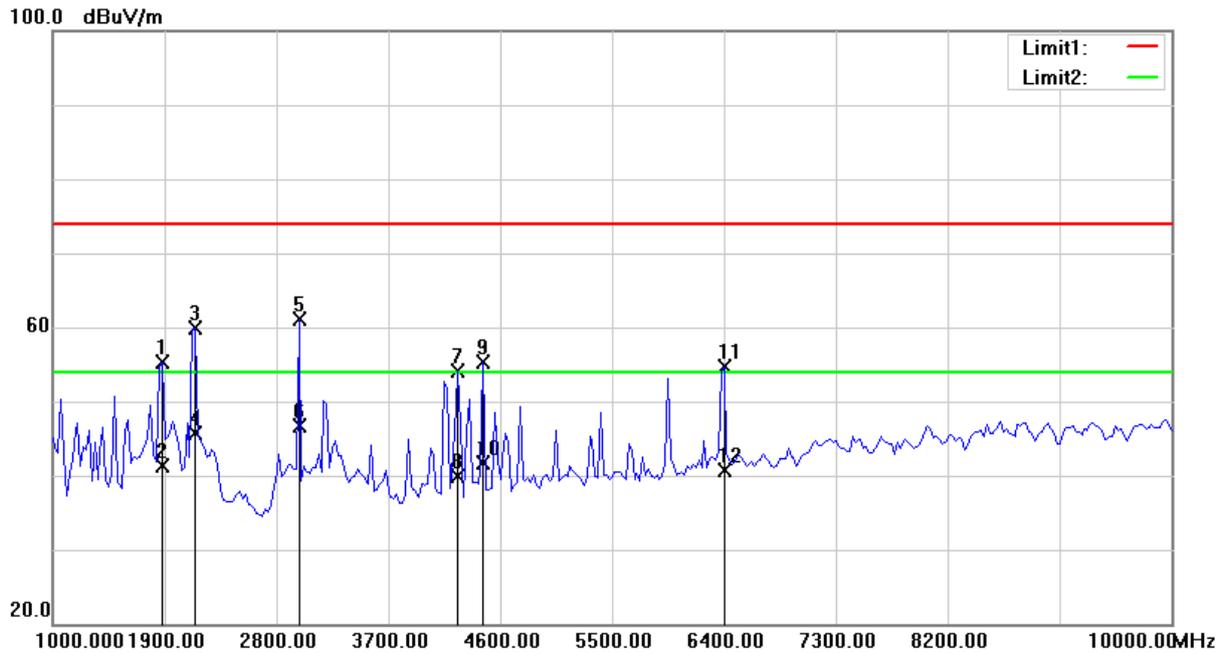


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1495.000	70.70	-16.97	53.73	74.00	-20.27	182	100	peak
2	1495.000	57.44	-16.97	40.47	54.00	-13.53	182	100	AVG
3	2125.000	77.65	-14.82	62.83	74.00	-11.17	135	100	peak
4	2125.000	64.48	-14.82	49.66	54.00	-4.34	135	100	AVG
5	2980.000	70.00	-12.43	57.57	74.00	-16.43	305	100	peak
6	2980.000	57.29	-12.43	44.86	54.00	-9.14	305	100	AVG
7	4262.500	62.46	-9.89	52.57	74.00	-21.43	75	100	peak
8	4262.500	49.39	-9.89	39.50	54.00	-14.50	75	100	AVG
9	4465.000	66.25	-9.25	57.00	74.00	-17.00	72	100	peak
10	4465.000	53.87	-9.25	44.62	54.00	-9.38	72	100	AVG
11	5950.000	57.72	-5.88	51.84	74.00	-22.16	75	100	peak
12	5950.000	44.39	-5.88	38.51	54.00	-15.49	75	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



<b>Test Voltage</b>	120Vac, 60Hz	<b>Frequency Range</b>	1 – 10GHz
<b>Environmental Conditions</b>	24°C, 50% RH	<b>6dB Bandwidth</b>	1MHz
<b>Test Date</b>	2021/12/08	<b>Test Distance</b>	3m
<b>Tested by</b>	Karwin Kao	<b>Polarization</b>	Horizontal
<b>Test Site</b>	W08	<b>Test Mode</b>	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	1877.500	71.79	-16.45	55.34	74.00	-18.66	0	100	peak
2	1877.500	57.66	-16.45	41.21	54.00	-12.79	0	100	AVG
3	2147.500	74.36	-14.52	59.84	74.00	-14.16	0	114	peak
4	2147.500	60.30	-14.52	45.78	54.00	-8.22	0	114	AVG
5	2980.000	73.57	-12.43	61.14	74.00	-12.86	292	200	peak
6	2980.000	59.08	-12.43	46.65	54.00	-7.35	292	200	AVG
7	4262.500	63.95	-9.89	54.06	74.00	-19.94	33	100	peak
8	4262.500	49.77	-9.89	39.88	54.00	-14.12	33	100	AVG
9	4465.000	64.49	-9.25	55.24	74.00	-18.76	359	100	peak
10	4465.000	50.97	-9.25	41.72	54.00	-12.28	359	100	AVG
11	6400.000	58.77	-4.12	54.65	74.00	-19.35	0	118	peak
12	6400.000	44.74	-4.12	40.62	54.00	-13.38	0	118	AVG

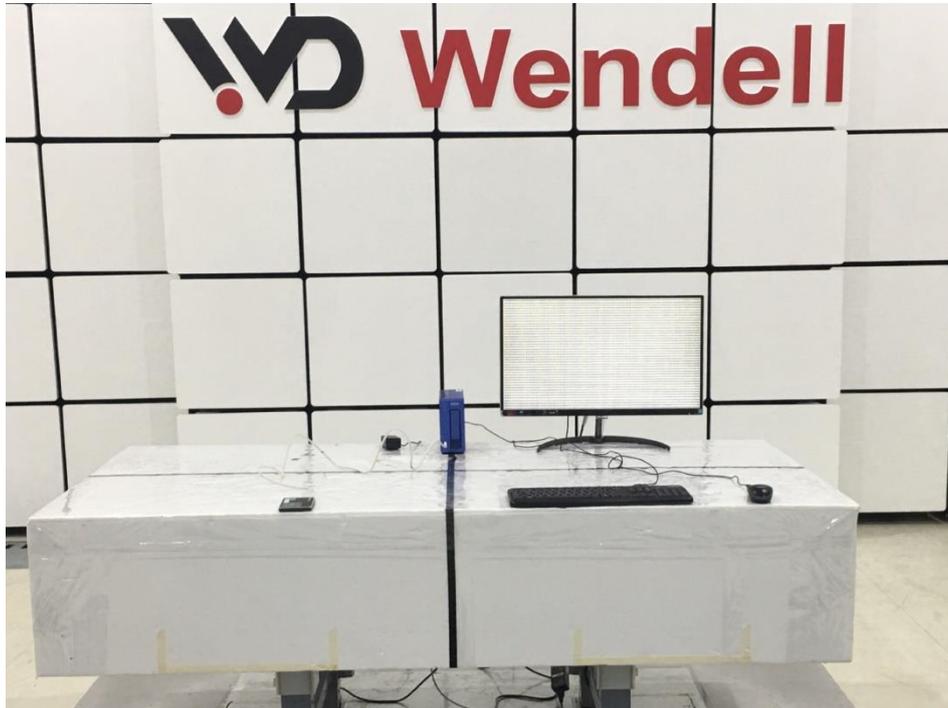
**Remark:** 1. peak = Peak, AVG = Average  
 2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)  
 3. Measurement Value = Reading Level + Correct Factor  
 4. Margin Level = Measurement Value - Limit Value

## 4.2.7 Photographs of Test Configuration

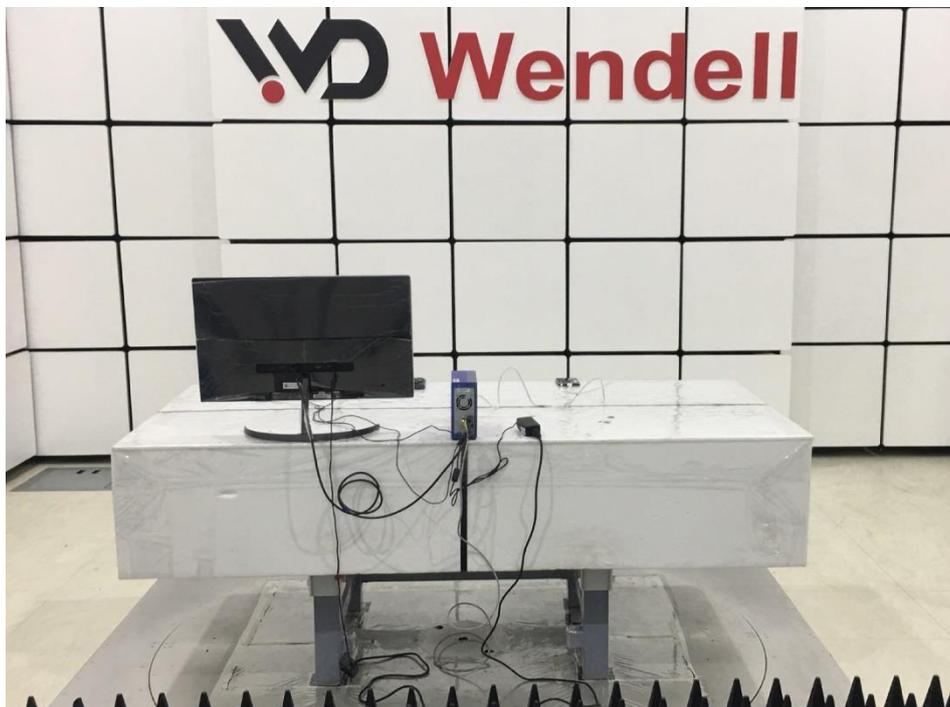
### Radiated Emission Test (30MHz~1GHz) Test mode A



Test mode B



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



Test mode B



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