

TEST REPORT

Applicant Name: Grandstream Networks, Inc.
Address: 126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Report Number: SZ1231219-76762E-EM-00
FCC ID: YZZGWN7801PV2

Test Standard (s)

FCC Part 15, Subpart B (Class A)

Sample Description

Product Type: Enterprise Layer 2+ Managed Network Switch
Model No.: GWN7801P
Multiple Model(s) No.: N/A
Trade Mark: GRANDSTREAM
Date Received: 2023/12/19
Report Date: 2024/02/02

Test Result:	Pass [▲]
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Jason Xiao
EMC Engineer

Approved By:

Alvin Huang

Alvin Huang
Lab Manager

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1231219-76762E-EM-00	Original Report	2024/02/02

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Enterprise Layer 2+ Managed Network Switch
Tested Model	GWN7801P
Multiple Model(s)	N/A
Voltage Range	AC 100-240V 50/60Hz 2.5A
Highest operating frequency [#]	500MHz
Equipment Class [#]	Class A
Built-in power supply board	BOF-150S54E
Sample number	2FHJ-1 (Assigned by BAACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

This test report is in accordance with Part 2-Subpart J, Part 15B Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 15B.

Measurement Uncertainty

Item	Frequency Range		Expanded Measurement uncertainty
Conducted Emissions	AC Mains	150 kHz ~30MHz	3.84dB(k=2, 95% level of confidence)
Radiated Disturbance	30MHz~200MHz	Horizontal	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz	Vertical	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz	Horizontal	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz	Vertical	5.05dB(k=2, 95% level of confidence)
	1GHz~6GHz	/	5.35dB(k=2, 95% level of confidence)
	6GHz~18GHz	/	5.44dB(k=2, 95% level of confidence)
	18GHz~40GHz	/	5.16dB(k=2, 95% level of confidence)

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

Each test item follows test standards and with no deviation.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in worst case condition.

Test Mode: Data transmitting+ full load

EUT exercise software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

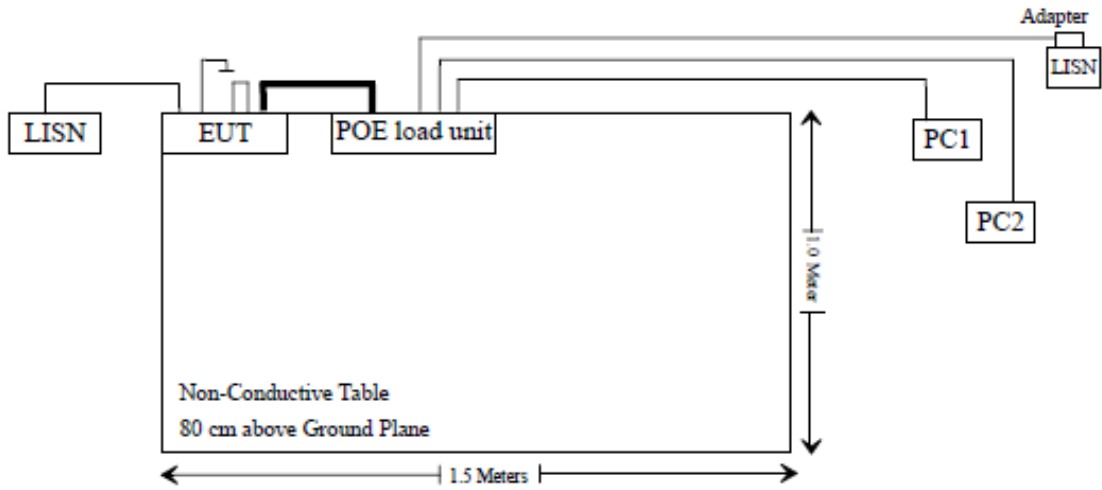
Manufacturer	Description	Model	Serial Number
Grandstream	POE load unit	/	/
Sunlight	Adapter	F12US1200100A	/
DELL	PC1	Latitude E7270	1JH13G2
DELL	PC2	Latitude E5570	GNDLKC2

External I/O Cable

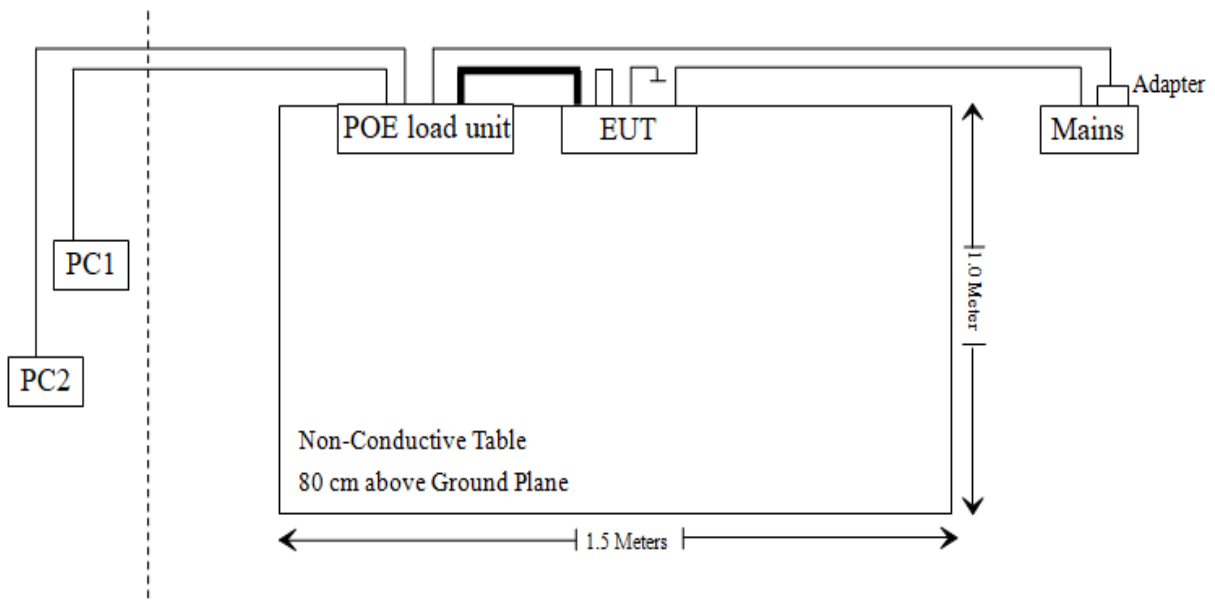
Cable Description	Length (m)	From/Port	To
Un-Shielded detachable AC cable	1.0	EUT	Mains
Un-Shielded detachable fiber cable	0.8	EUT	EUT
Un-Shielded detachable RJ45 cable*8	0.8	EUT	POE load unit
Un-Shielded detachable earth cable	1.2	EUT	earth
Un-Shielded Un-detachable DC cable	1.2	Poe load unit	Adapter
Un-Shielded detachable RJ45 cable	8.0	Poe load unit	PC1
Un-Shielded detachable RJ45 cable	8.0	Poe load unit	PC2

Block Diagram of Test Setup

Conduction emission



Radio emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2023/02/08	2024/02/07
Rohde & Schwarz	LISN	ENV216	101613	2023/02/08	2024/02/07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2023/08/03	2024/08/02
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2023/08/03	2024/08/02
Audix	EMI Test software	E3	191218	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2023/02/08	2024/02/07
Sonoma instrument	Pre-amplifier	310 N	186238	2023/06/08	2024/06/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2024/07/19
Unknown	Cable	Chamber Cable 1	F-03-EM236	2023/08/03	2024/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2023/08/03	2024/08/02
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2023/04/18	2024/04/17
COM-POWER	Pre-amplifier	PA-122	181919	2023/06/29	2024/06/28
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2024/07/25
Unknown	RF Cable	KMSE	0735	2023/10/08	2024/10/07
Unknown	RF Cable	UFA147	219661	2023/10/08	2024/10/07
Audix	EMI Test software	E3	191218(V9)	NCR	NCR

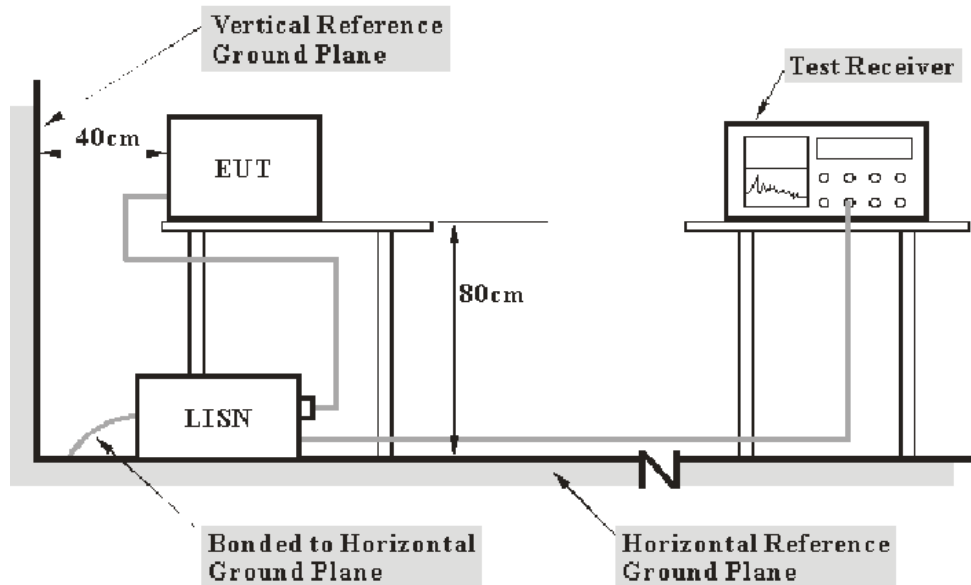
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 - AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.107

EUT Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Level & Over Limit Calculation

The Level is calculated by adding the LISN Factor, Cable Loss and the Read Level. The basic equation is as follows:

$$\text{Level (dBuV)} = \text{Read Level (dBuV)} + \text{LISN Factor} + \text{Cable Loss}$$

The “**Over limit**” column of the following data tables indicates the degree of compliance with the applicable limit.

$$\text{Over Limit (dB)} = \text{Level (dBuV)} - \text{Limit Line (dBuV)}$$

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

Test Data

Environmental Conditions

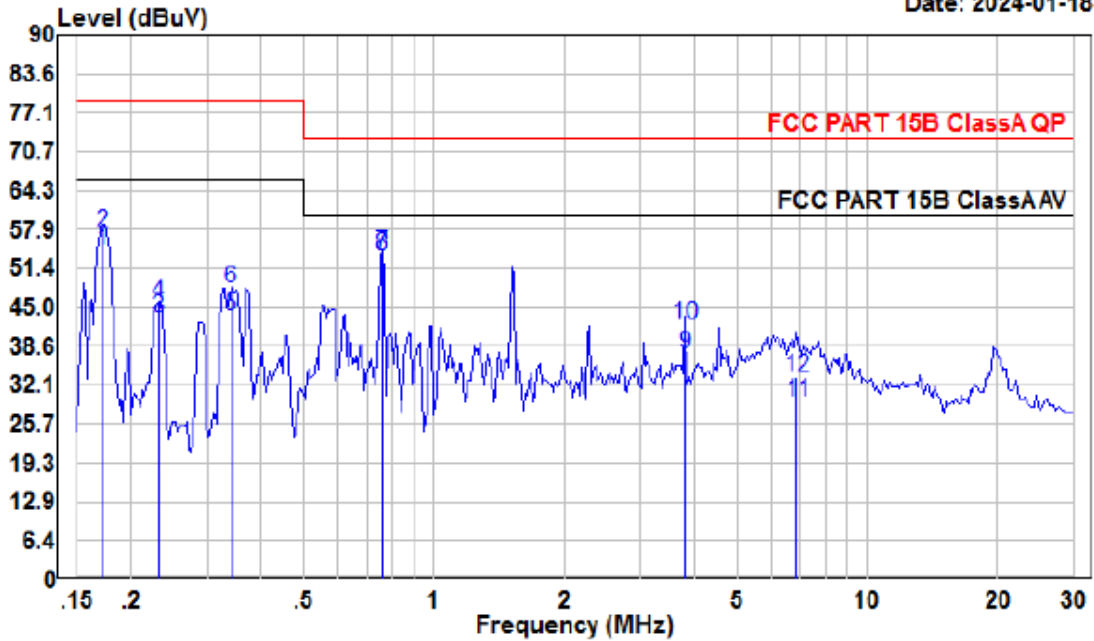
Temperature:	25 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Macy Shi on 2024-01-18.

Test Mode: Data transmitting+ full load

AC 120V/60 Hz, Line

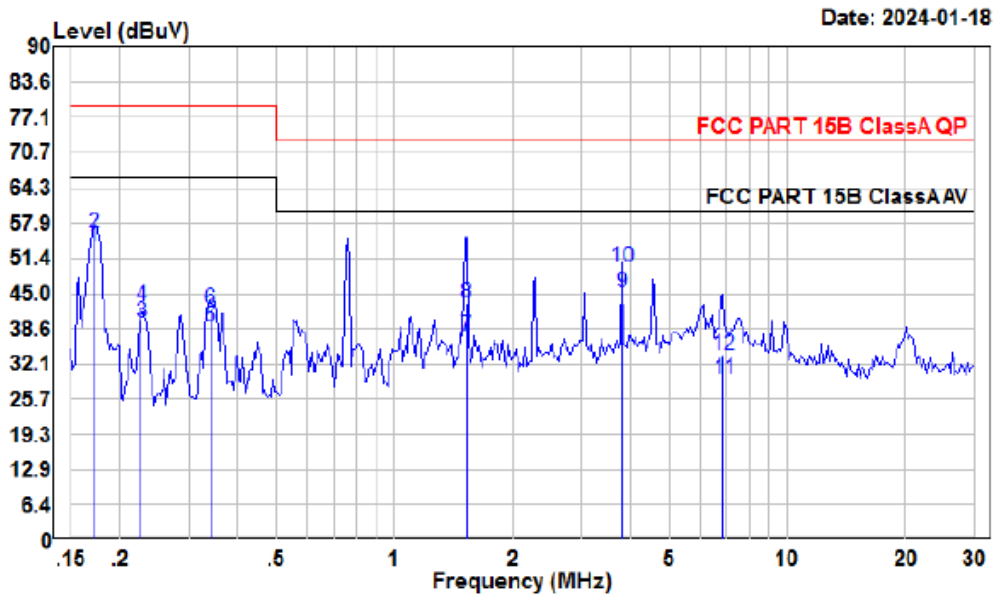
Date: 2024-01-18



Condition: Line
 Project : SZ1231219-76762E-EM
 Test Mode: Data transmitting+ full load
 Tester : Macy.Shi

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.17	33.92	54.27	10.20	10.15	79.00	-24.73	Average
2	0.17	36.92	57.27	10.20	10.15	79.00	-21.73	QP
3	0.23	22.83	43.20	10.20	10.17	79.00	-35.80	Average
4	0.23	25.22	45.59	10.20	10.17	79.00	-33.41	QP
5	0.34	23.18	43.53	10.20	10.15	79.00	-35.47	Average
6	0.34	27.67	48.02	10.20	10.15	79.00	-30.98	QP
7	0.76	33.35	53.89	10.35	10.19	73.00	-19.11	Average
8	0.76	33.14	53.68	10.35	10.19	73.00	-19.32	QP
9	3.80	16.83	37.38	10.29	10.26	73.00	-35.62	Average
10	3.80	21.74	42.29	10.29	10.26	73.00	-30.71	QP
11	6.88	8.96	29.29	10.11	10.22	73.00	-43.71	Average
12	6.88	13.14	33.47	10.11	10.22	73.00	-39.53	QP

AC 120V/60 Hz, Neutral



Date: 2024-01-18

Condition: Neutral
 Project : SZ1231219-76762E-EM
 Test Mode: Data transmitting+ full load
 Tester : Macy.Shi

	Read Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.17	33.14	53.54	10.25	10.15	79.00	-25.46	Average
2	0.17	35.53	55.93	10.25	10.15	79.00	-23.07	QP
3	0.23	19.34	39.78	10.29	10.15	79.00	-39.22	Average
4	0.23	22.23	42.67	10.29	10.15	79.00	-36.33	QP
5	0.34	18.46	38.85	10.24	10.15	79.00	-40.15	Average
6	0.34	21.81	42.20	10.24	10.15	79.00	-36.80	QP
7	1.53	16.99	37.38	10.32	10.07	73.00	-35.62	Average
8	1.53	22.80	43.19	10.32	10.07	73.00	-29.81	QP
9	3.80	24.76	45.23	10.21	10.26	73.00	-27.77	Average
10	3.80	29.17	49.64	10.21	10.26	73.00	-23.36	QP
11	6.88	8.91	29.33	10.20	10.22	73.00	-43.67	Average
12	6.88	13.30	33.72	10.20	10.22	73.00	-39.28	QP

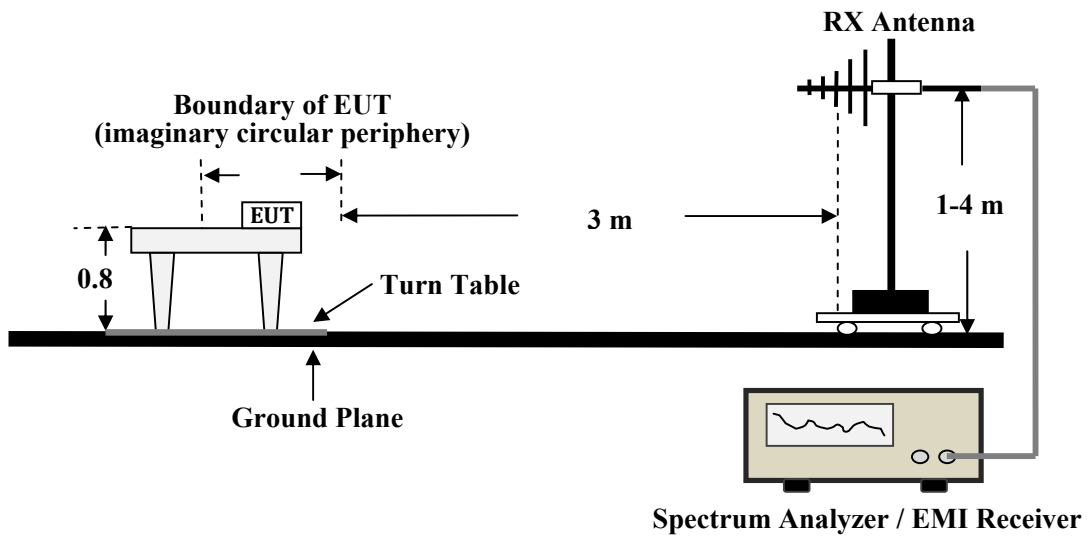
FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

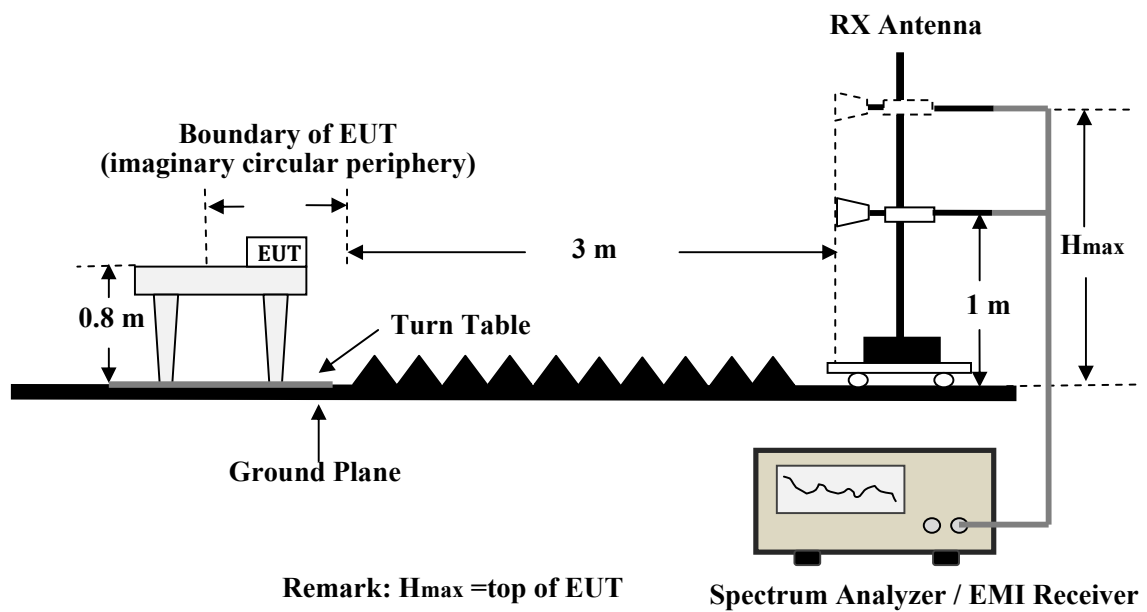
FCC §15.109

EUT Setup

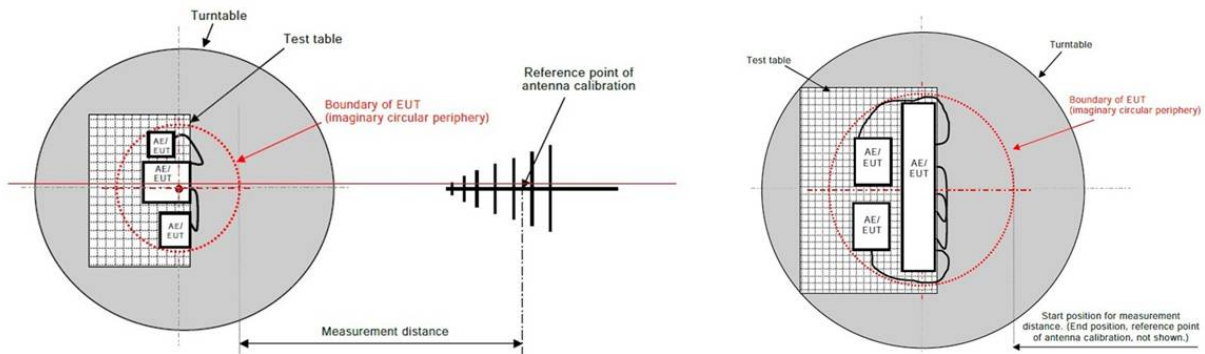
Below 1GHz for Radiated Emissions



Above 1GHz for Radiated Emissions



Radiated Emissions Setup Configuration



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The related limit was specified in FCC Part 15B.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver and Spectrum analyzer Setup

During the radiated emission test, the EMI test receiver and spectrum analyzer setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

Level & Over Limit Calculation

The Level is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Read Level. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

$$\text{Level} = \text{Read Level} + \text{Factor}$$

The “Over limit” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -6 dB means the emission is 6dB below the limit for Class A. The equation for Over Limit calculation is as follows:

$$\text{Over limit} = \text{Level} - \text{Limit}$$

Test Data

Environmental Conditions

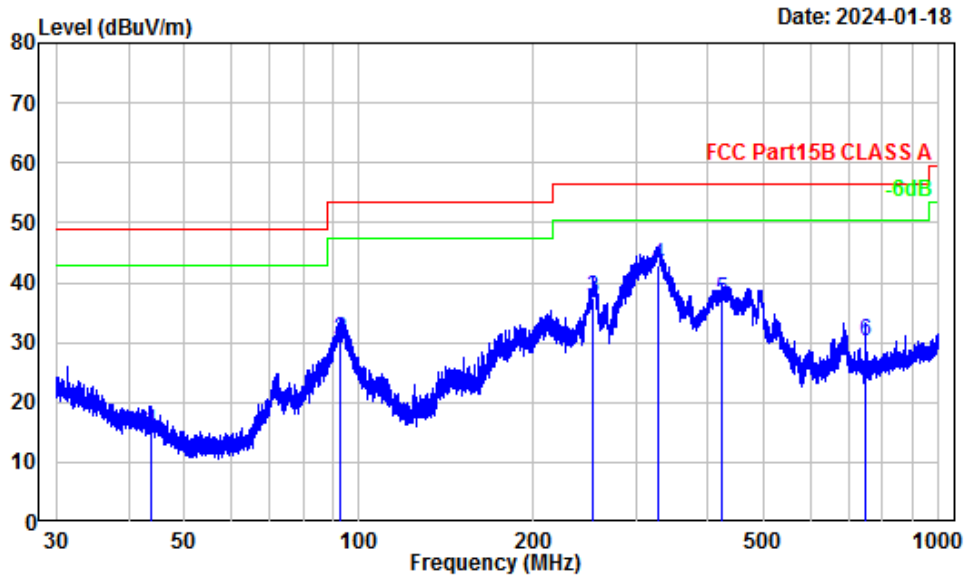
Temperature:	22~26 °C
Relative Humidity:	51~55 %
ATM Pressure:	101.0~101.2 kPa

The testing was performed by Warren Huang on 2024-01-18 for below 1GHz and Dylan Yang on 2024-01-18 for above 1GHz.

Test Mode: Data transmitting+ full load

30 MHz~1 GHz

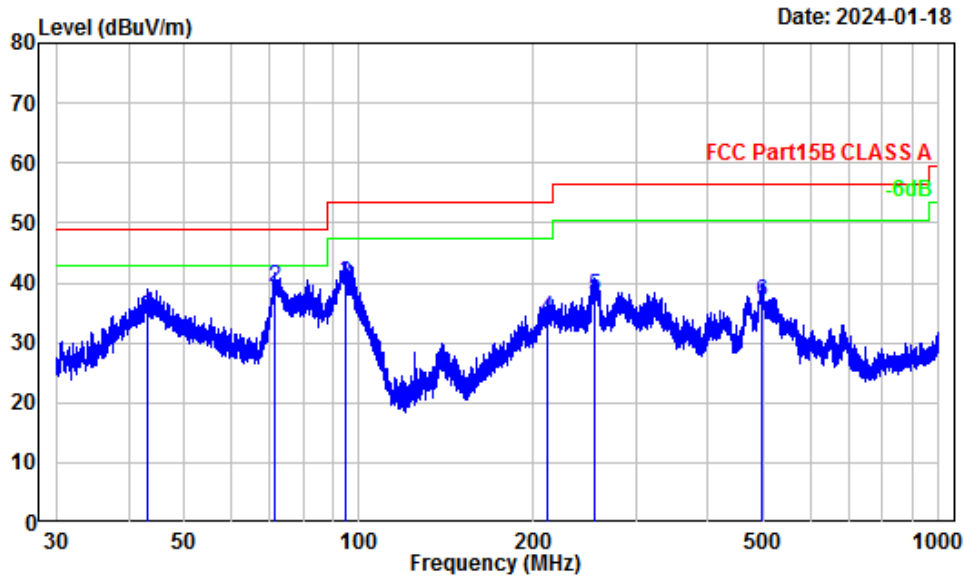
Horizontal



Site : chamber
 Condition : 3m Horizontal
 Project Number: SZ1231219-76762E-EM
 Test Mode : Data transmitting+ full load
 Tester : Warren.Huang

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	43.81	-12.82	28.05	15.23	49.00	-33.77	QP
2	92.58	-15.83	46.17	30.34	53.50	-23.16	QP
3	253.95	-11.70	49.20	37.50	56.40	-18.90	QP
4	327.46	-9.90	52.69	42.79	56.40	-13.61	QP
5	421.69	-6.61	43.63	37.02	56.40	-19.38	QP
6	750.11	-1.67	31.81	30.14	56.40	-26.26	QP

Vertical

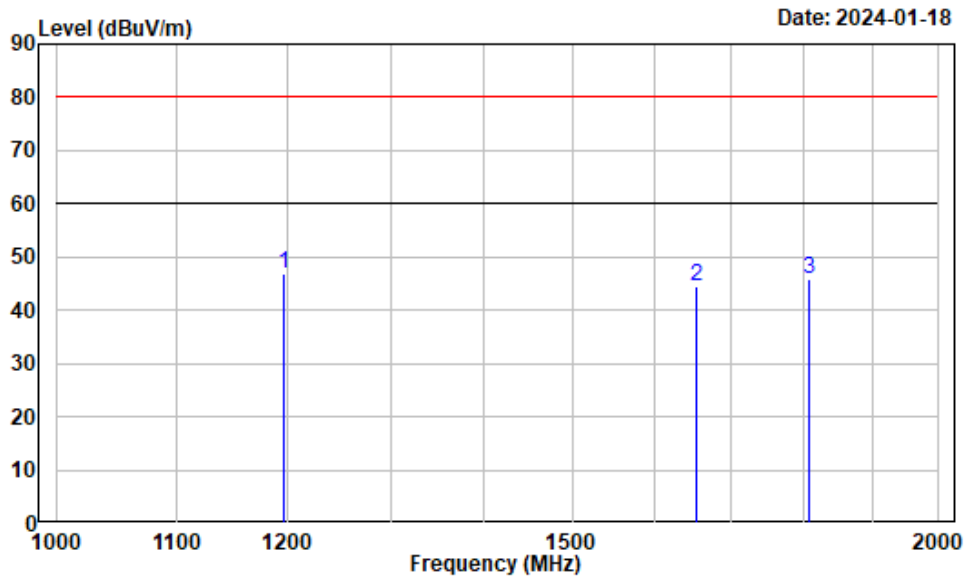


Site : chamber
 Condition : 3m Vertical
 Project Number: SZ1231219-76762E-EM
 Test Mode : Data transmitting+ full load
 Tester : Warren.Huang

	Freq	Factor	Read Level	Level	Limit	Over	Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB		
1	43.03	-13.61	48.41	34.80	49.00	-14.20	QP	
2	71.58	-17.29	56.40	39.11	49.00	-9.89	QP	
3	94.84	-16.33	56.10	39.77	53.50	-13.73	QP	
4	211.90	-12.24	46.30	34.06	53.50	-19.44	QP	
5	255.40	-12.05	49.87	37.82	56.40	-18.58	QP	
6	496.59	-5.31	42.25	36.94	56.40	-19.46	QP	

1 ~ 2GHz

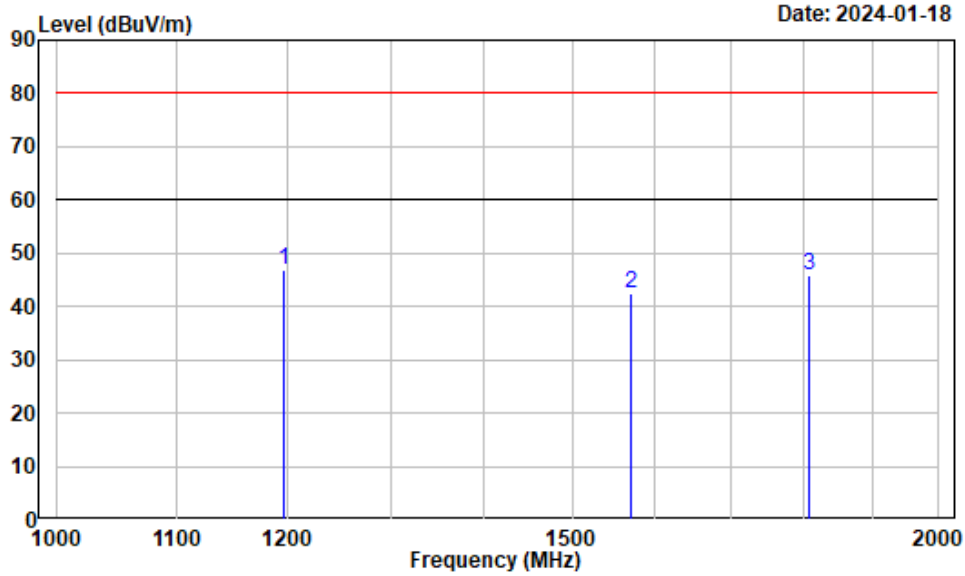
Horizontal



Site : chamber
 Condition : Horizontal
 Project Number: SZ1231219-76762E-EM
 Test Mode : Data transmitting+ full load
 Tester : Dylan.Yang

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1196.250	-8.10	55.07	46.97	80.00	-33.03	Peak
2	1654.375	-6.79	51.16	44.37	80.00	-35.63	Peak
3	1805.625	-6.36	52.06	45.70	80.00	-34.30	Peak

Vertical



Site : chamber
 Condition : Vertical
 Project Number: SZ1231219-76762E-EM
 Test Mode : Data transmitting+ full load
 Tester : Dylan.Yang

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1196.250	-8.10	55.07	46.97	80.00	-33.03	Peak
2	1570.625	-7.06	49.62	42.56	80.00	-37.44	Peak
3	1805.625	-6.36	52.06	45.70	80.00	-34.30	Peak

EUT PHOTOGRAPHS

Please refer to the attachment SZ1231219-76762E-EM External photo and SZ1231219-76762E-EM Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment SZ1231219-76762E-EM Test Setup photo.

******* END OF REPORT *******