TEST REPORT

Applicant Name :	Grandstream Networks, Inc.
Address :	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Report Number :	RA230117-02723E-EM-00
FCC ID:	YZZGWN7811P

Test Standard (s)

FCC PART 15B, CLASS A

Sample Description

Product Type:	Enterprise Layer 3 Managed Network Switch
Model No.:	GWN7811P
Trade Mark:	GRANDSTREAM
Date Received:	2023-01-17
Date of Test:	2023-01-30 to 2023-01-31
Report Date:	2023-02-03

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Zeki Ma

Zeki Ma
EMC Engineer

Approved By:

Candy Li

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230117-02723E-EM-00	Original Report	2023-02-03

Test Report Declaration

Applicant	:	Grandstream Networks, Inc.
Manufacturer	:	Grandstream Networks, Inc.
Product	:	Enterprise Layer 3 Managed Network Switch
Model No.	:	GWN7811P
Trade Mark	:	GRANDSTREAM

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B Class A
ANSI C63.4-2014

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class A limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

1. TEST RESULTS SUMMARY

Test Items	Test Standard	Test Results
Conducted Emission (150kHz-30MHz)	FCC Part 15 Subpart B, Section 15.107	Pass
Radiated Emission (30-1000MHz)	FCC Part 15 Subpart B, Section 15.109	Pass
Radiated Emission (Above 1GHz)	FCC Part 15 Subpart B, Section 15.109	Pass

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

Product	:	Enterprise Layer 3 Managed Network Switch
Model No.	:	GWN7811P
Rating	:	AC 100-240V, 50/60Hz (Note: The AC line length is 1.1meters.)
Remark(s)	:	The EUT highest operating frequency is 800MHz, the radiated emission measurement shall be made up to 5.0GHz
Applicant	:	Grandstream Networks, Inc.
Address	:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Manufacturer	:	Grandstream Networks, Inc.
Address	:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Sample Number	:	RA230117-02723E-EM-S1

2.2.Test mode

Test mode: System operation with Full load

2.3.General disclaimer

1. Each test item follows test standard and with no deviation.
2. The test results presented in this report relate only to the object tested. The information supplied by the customer can affect the validity of results.

2.4.Accessory and Auxiliary Equipment and Cables and Software

POE Load plate	:	GWN78XX_POE_LOAD_V1.0A
Network cable	:	Network cable length 1.5meters.
Optical fiber	:	Optical fiber length 2.5meters.
Play flow software	:	SecureCRT.exe
Software version		9.3

2.5.Description of Test Facility

Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

2.6.Measurement Uncertainty

Conduction Emission Expanded Uncertainty (150kHz-30MHz)	:	*U=2.72dB, k=2*
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	*U=4.28dB, k=2*
Radiated emission expanded uncertainty (1GHz-18GHz)	:	*U=4.98dB, k=2*

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1.For Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1.	EMI Test Receiver	Rohde& Schwarz	ESCI	100784	2022/11/25	2023/11/24
2.	L.I.S.N.	Rohde& Schwarz	ENV216	101314	2022/11/25	2023/11/24
3.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	2022/12/07	2023/12/06
4.	RF Coaxial Cable	Unknown	No.17	N0350	2022/11/25	2023/11/24
5.	Conducted Emission Test Software: e3 19821b (V9)					

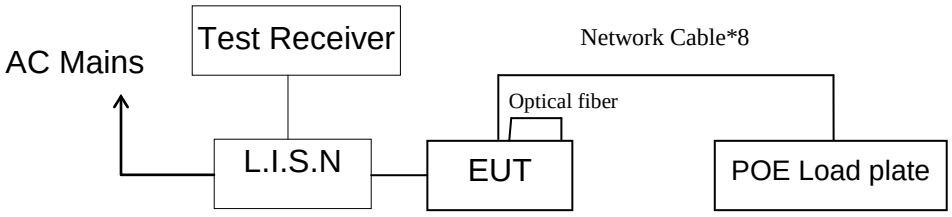
3.2.For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1.	Test Receiver	Rohde& Schwarz	ESR	102725	2022/11/25	2023/11/24
2.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101949	2022/11/25	2023/11/24
3.	Amplifier	SONOMA INSTRUMENT	310 N	186131	2022/11/08	2023/11/07
4.	Preamplifier	A.H. Systems, inc.	PAM-0118P	135	2022/11/08	2023/11/07
5.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	2021/07/06	2024/07/05
6.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	2022/11/30	2025/11/29
7.	RF Coaxial Cable	Unknown	No.10	N050	2022/11/25	2023/11/24
8.	RF Coaxial Cable	Unknown	No.11	N1000	2022/11/25	2023/11/24
9.	RF Coaxial Cable	Unknown	No.12	N040	2022/11/25	2023/11/24
10.	RF Coaxial Cable	Unknown	No.13	N300	2022/11/25	2023/11/24
11.	RF Coaxial Cable	Unknown	No.14	N800	2022/11/25	2023/11/24
12.	Radiated Emission Test Software: e3 19821b (V9)					

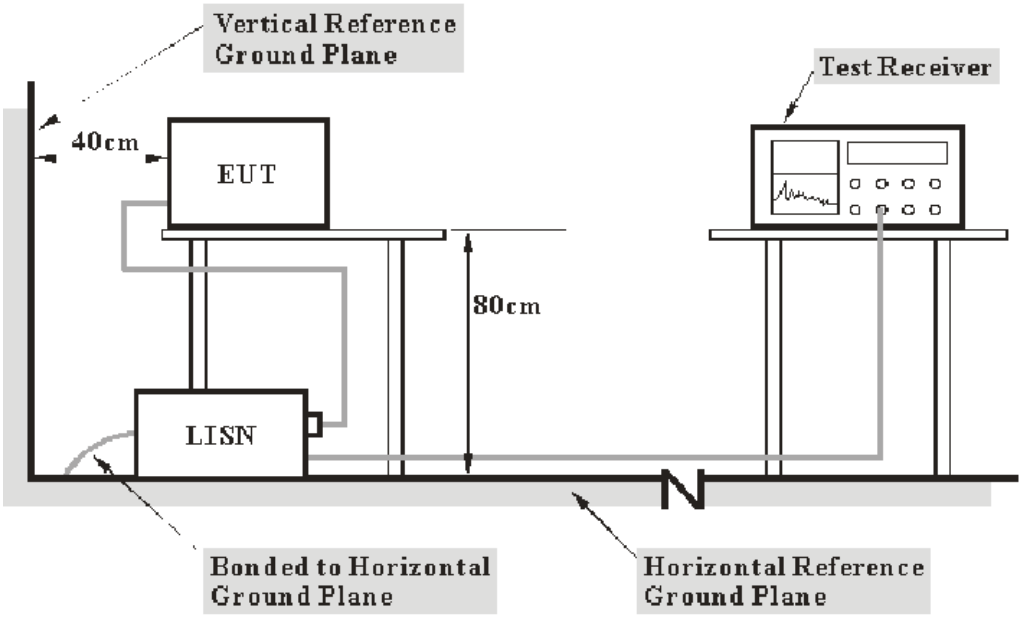
4. CONDUCTED EMISSION MEASUREMENT

4.1.Block Diagram of Test Setup

4.1.1.Block diagram of connection between the EUT and simulators



4.1.2.Test System 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.

4.2.Power Line Conducted Emission Measurement Limits (Class A)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	79.0	66.0
0.50 - 30.00	73.0	60.0
NOTE1: The lower limit shall apply at the transition frequencies.		

4.3.Test mode description

Test mode: System operation with Full load

4.3.1.Environmental Conditions

Temperature : 23℃
Relative Humidity : 52%
ATM Pressure : 101kPa

The testing was performed by Lipa Wu on 2023-01-30.

4.4.Manufacturer

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

4.4.1.Enterprise Layer 3 Managed Network Switch (EUT)

Model Number : GWN7811P
Manufacturer : Grandstream Networks, Inc.

4.5.Operating Condition of EUT

4.5.1.Setup the EUT and simulator as shown as Section 4.1.

4.5.2.Turn on the power of all equipments.

4.5.3.Let the EUT work in test mode and measure it.

4.6.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

4.7.Data Explain

Over limit = Level (dBμV) - Limit (dBμV)

4.8.Power Line Conducted Emission Measurement Results

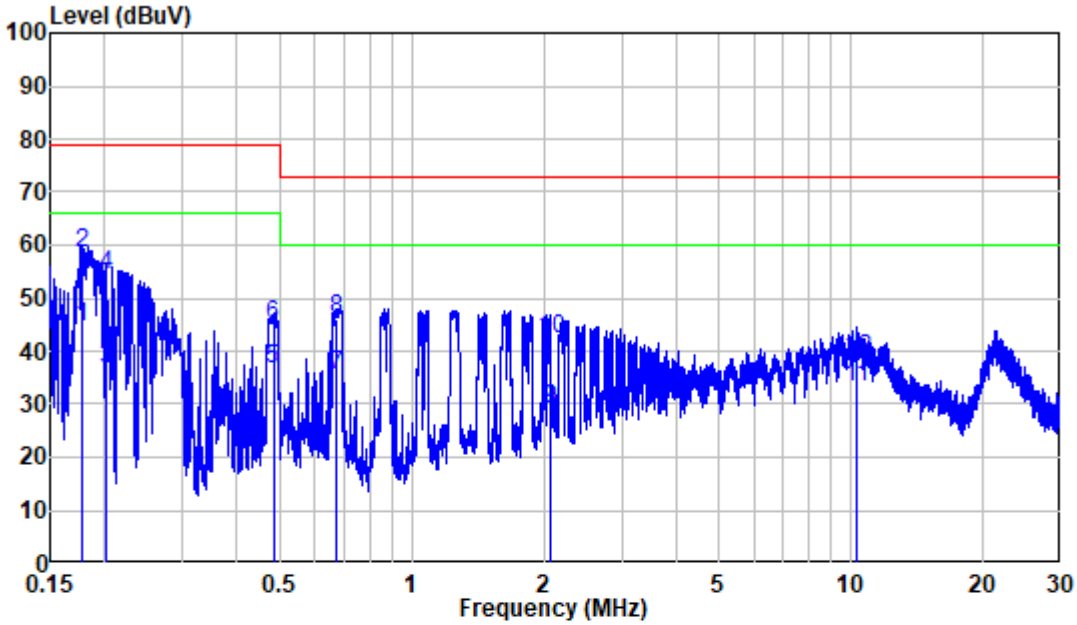
PASS.

The frequency range from 150kHz to 30MHz is checked.

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

The spectral diagrams are attached as below.

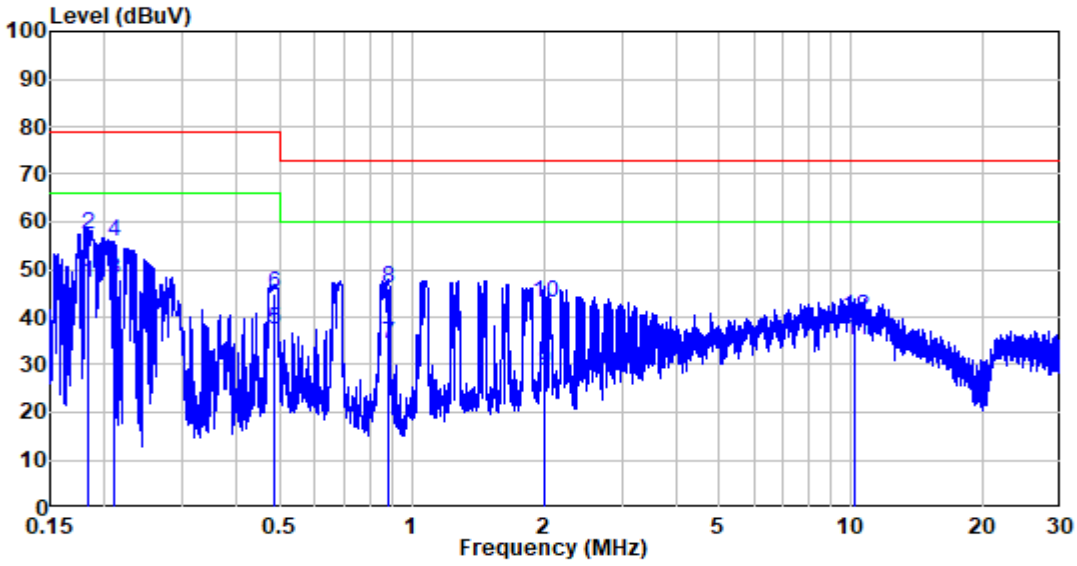
AC 120V/60Hz, Line:



Site : Shielding Room
Condition: Line
Job No. : RA230117-02723E-EM
Mode : System operation with Full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.177	9.90	34.56	44.46	66.00	-21.54	Average
2	0.177	9.90	48.48	58.38	79.00	-20.62	QP
3	0.202	9.90	26.53	36.43	66.00	-29.57	Average
4	0.202	9.90	44.58	54.48	79.00	-24.52	QP
5	0.483	9.80	26.90	36.70	66.00	-29.30	Average
6	0.483	9.80	34.98	44.78	79.00	-34.22	QP
7	0.674	9.90	25.47	35.37	60.00	-24.63	Average
8	0.674	9.90	36.26	46.16	73.00	-26.84	QP
9	2.071	9.92	19.01	28.93	60.00	-31.07	Average
10	2.071	9.92	32.17	42.09	73.00	-30.91	QP
11	10.294	10.00	23.17	33.17	60.00	-26.83	Average
12	10.294	10.00	28.39	38.39	73.00	-34.61	QP

AC 120V/60Hz, Neutral:



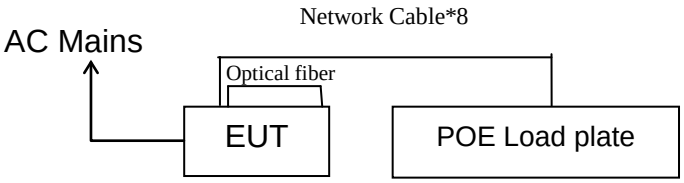
Site : Shielding Room
Condition: Neutral
Job No. : RA230117-02723E-EM
Mode : System operation with Full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.183	9.80	37.25	47.05	66.00	-18.95	Average
2	0.183	9.80	47.41	57.21	79.00	-21.79	QP
3	0.211	9.81	37.93	47.74	66.00	-18.26	Average
4	0.211	9.81	45.93	55.74	79.00	-23.26	QP
5	0.488	9.90	27.59	37.49	66.00	-28.51	Average
6	0.488	9.90	34.95	44.85	79.00	-34.15	QP
7	0.886	9.81	24.48	34.29	60.00	-25.71	Average
8	0.886	9.81	36.21	46.02	73.00	-26.98	QP
9	2.008	9.82	18.81	28.63	60.00	-31.37	Average
10	2.008	9.82	33.23	43.05	73.00	-29.95	QP
11	10.220	10.00	25.19	35.19	60.00	-24.81	Average
12	10.220	10.00	30.12	40.12	73.00	-32.88	QP

5. RADIATED EMISSION MEASUREMENT

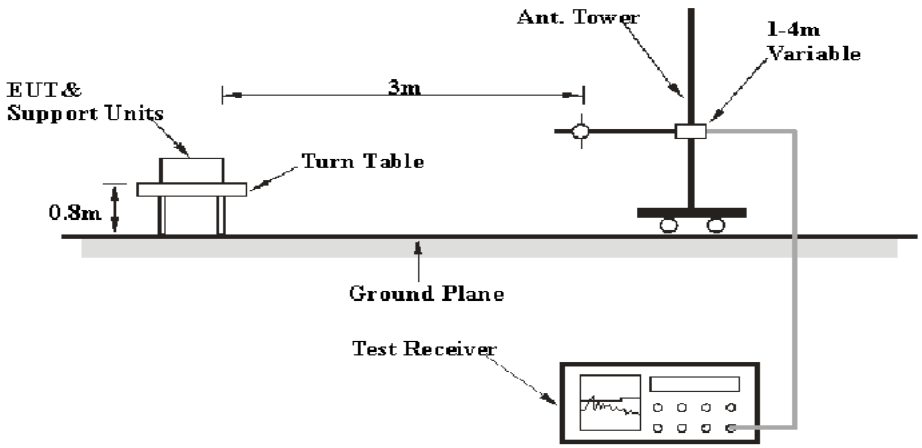
5.1.Block Diagram of Test Setup

5.1.1.Block diagram of connection between the EUT and simulators

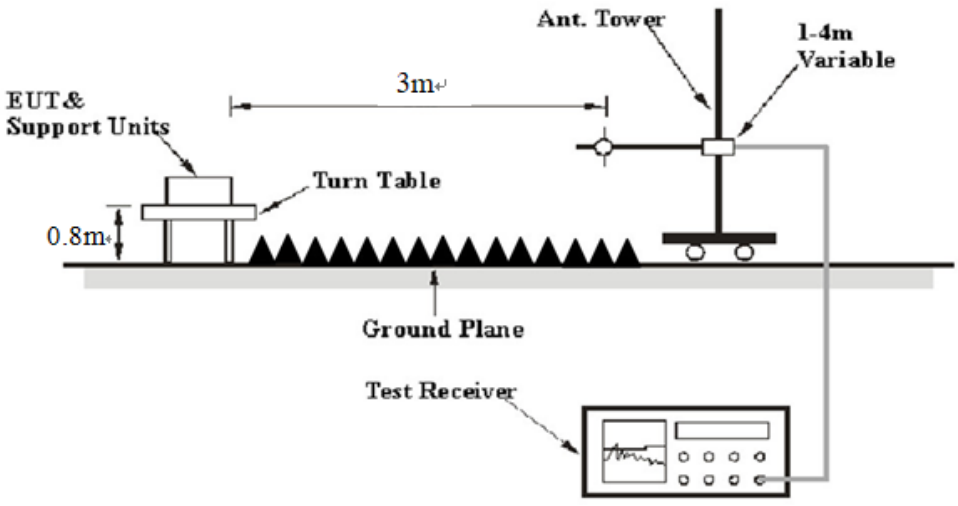


5.1.2.Test System Setup

Below 1GHz:



Above 1GHz:



5.2.Radiated Emission Limit (Class A)

All emanations from a Class A device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Below 1GHz:

Frequency MHz	Distance Meters	Field Strengths Limit dB(μV/m)
30-88	3	49.54
88-216	3	53.98
216-960	3	56.9
960-1000	3	60.0
Remark: (1) Emission level dB(μV) = 20 log Emission level μV/m. (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument antenna and the closest point of any part of the device or system.		

Above 1GHz:

Frequency MHz	Distance Meters	Field Strengths Limit(dBμV/m)	
		Peak	Average
Above 1000MHz	3	80.0	60.0

5.3.Test mode description

Test mode: System operation with Full load

5.3.1.Environmental Conditions

Temperature : 24℃
Relative Humidity : 53%
ATM Pressure : 101kPa

The testing was performed by Jason Liu on 2023-01-31.

5.4.Manufacturer

The following equipments are installed on Radiated Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

5.4.1.Enterprise Layer 3 Managed Network Switch (EUT)

Model Number : GWN7811P
Manufacturer : Grandstream Networks, Inc.

5.5.Operating Condition of EUT

5.5.1.Setup the EUT and simulator as shown as Section 5.1.

5.5.2.Turn on the power of all equipments.

5.5.3.Let the EUT work in test mode and measure it.

5.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

The bandwidth of the Receiver is set at 9kHz in 9kHz-30MHz, 120 kHz in 30-1000MHz, and 1MHz for above 1GHz.

The frequency range from 30MHz to 5GHz is investigated.

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 40 GHz, whichever is lower.

5.7.Data Sample

Over Limit (dB) = Level(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

The “Over Limit” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over Limit of -7dB means the emission is 7dB below the limit.

5.8.Radiated Emission Measurement Result

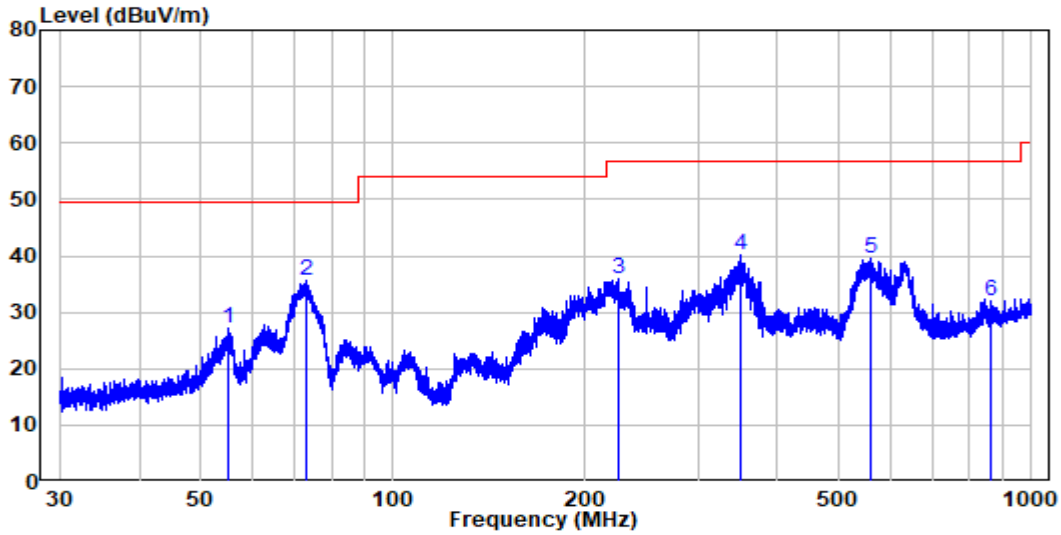
PASS.

The frequency range from 30MHz to 5GHz is investigated.

The spectral diagrams are attached as below.

Below1GHz:

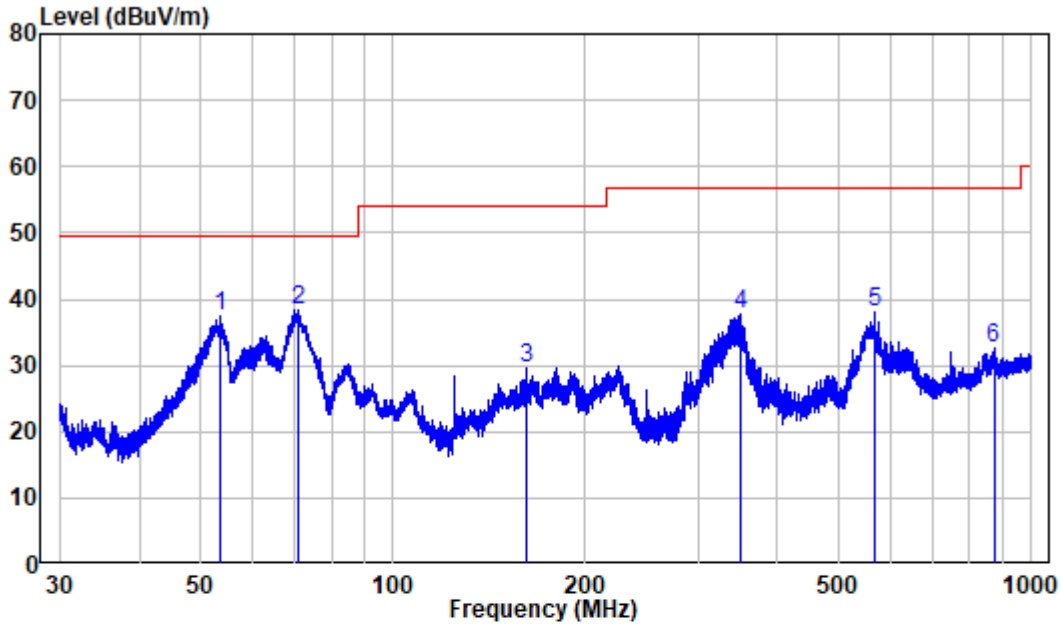
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA230117-02723E-EM
Test Mode: System operation with full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	55.027	-10.28	37.58	27.30	49.54	-22.24	Peak
2	72.974	-15.83	51.39	35.56	49.54	-13.98	Peak
3	225.111	-11.26	47.14	35.88	56.90	-21.02	Peak
4	350.016	-7.31	47.47	40.16	56.90	-16.74	Peak
5	559.465	-4.05	43.47	39.42	56.90	-17.48	Peak
6	862.678	0.46	31.59	32.05	56.90	-24.85	Peak

Vertical

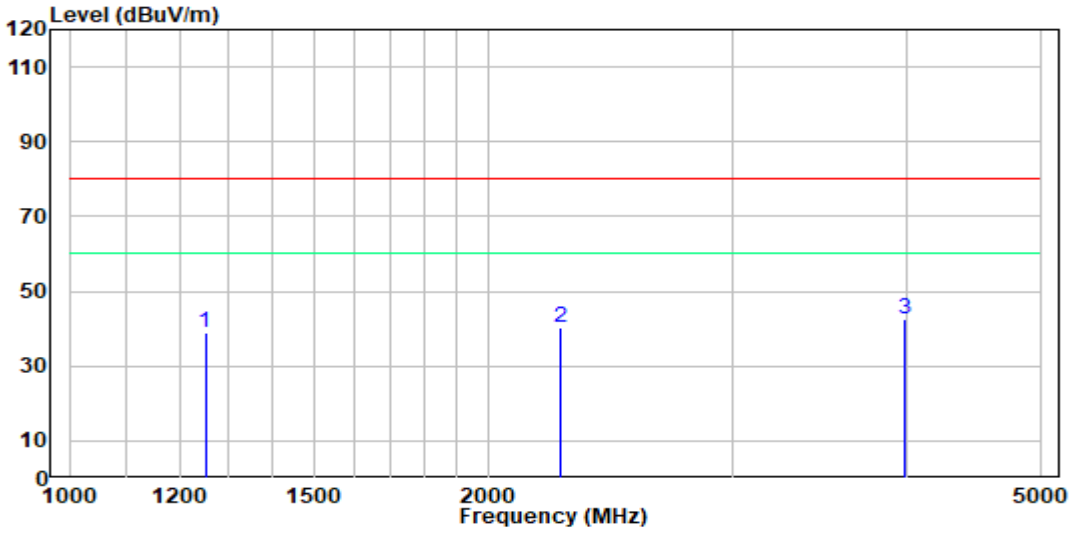


Site : chamber
Condition: 3m VERTICAL
Job No. : RA230117-02723E-EM
Test Mode: System operation with full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	53.764	-10.30	47.85	37.55	49.54	-11.99	Peak
2	70.832	-15.12	53.49	38.37	49.54	-11.17	Peak
3	161.191	-14.24	43.73	29.49	53.98	-24.49	Peak
4	349.710	-7.29	44.91	37.62	56.90	-19.28	Peak
5	566.622	-3.88	41.82	37.94	56.90	-18.96	Peak
6	873.331	1.12	31.40	32.52	56.90	-24.38	Peak

Above 1GHz:

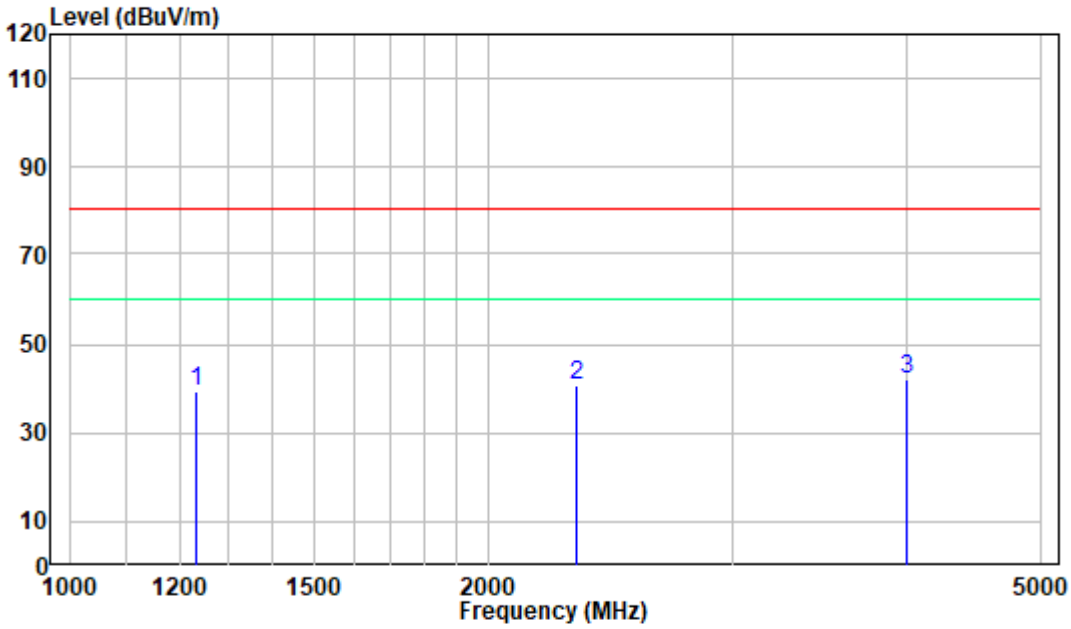
Horizontal



Site : chamber
Condition: 3m Horizontal
Job No. : RA230117-02723E-EM
Test Mode: System operation with full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1252.000	-10.11	48.86	38.75	80	-41.25	Peak
2	2258.000	-7.21	47.48	40.27	80	-39.73	Peak
3	3987.000	-5.45	47.80	42.35	80	-37.65	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : RA230117-02723E-EM
Test Mode: System operation with full load

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1235.000	-10.15	49.36	39.21	80	-40.79	Peak
2	2316.000	-7.22	48.09	40.87	80	-39.13	Peak
3	3998.000	-5.44	47.72	42.28	80	-37.72	Peak

Note:

1) Level= Reading + Factor
2) Over Limit = Level–Limit
3) For below 1GHz testing, if the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.
4) For above 1GHz testing, the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, so just peak value was recorded.

---------- THE END OF TEST REPORT ----------