ACCREDITED
Certificate #4312.01

TEST REPORT

Product Name:	Multi-WAN Gigabit VPN Router
Trade Mark:	GRANDSTREAM
Model No.:	GWN7001
Report Number:	2302083910EMC-1
Test Standards:	FCC 47 CFR Part 15 Subpart B ICES-003 Issue 7
FCC ID:	YZZGWN7001
Test Result:	PASS
Date of Issue:	March 3, 2023

Prepared for:

Grandstream Networks, Inc.
126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

Prepared by:

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UnionTrust Laboratories UnionTrust *Certified*

Version

Version No.	Date	Description
V1.0	March 3, 2023	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Grandstream Networks, Inc.
Address of Applicant:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Manufacturer:	Grandstream Networks, Inc.
Address of Manufacturer:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Multi-WAN Gigabit VPN Router
Model No.:	GWN7001
Trade Mark:	GRANDSTREAM
DUT Stage:	Identical Prototype
Rated Voltage:	☒ Powered by DC port 12V
Classification of digital devices:	Class B
Highest Internal Frequency:	1.0 GHz
Sample Received Date:	February 8, 2023
Sample Tested Date:	February 18, 2023 March 1, 2023
Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.	

1.2.2 Description of Accessories

Adapter (1)	
Model No.:	GQ12-120100-AU
Input:	100-240 V~50/60 Hz 0.4 A Max
Output:	12.0 V ⎓ 1.0 A
DC Cable:	2.5 Meter, Unshielded without ferrite

Adapter (2)	
Model No.:	UES12LU-120100SPA
Input:	100-240 V~50/60 Hz 0.5 A
Output:	12.0 V ⎓ 1.0 A 12.0W
DC Cable:	2.5 Meter, Unshielded without ferrite

Adapter (3)	
Model No.:	F12US1200100A
Input:	100-240 V~50/60 Hz 0.5 A Max
Output:	12.0 V ⎓ 1.0 A
DC Cable:	2.5 Meter, Unshielded without ferrite

Cable	
Connector:	Ethernet Cable
Cable Type:	Unshielded without ferrite
Length:	1.5 Meter

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	DELL	Latitude 3400	16238087894	UnionTrust
Mouse	DELL	MS111	CN-011D3V-73826-62N-0LK	UnionTrust
Network tester	KYLAND	Opal10G-2GX8GE-LV-LV	N/A	UnionTrust

Support Cable

Cable No.	Description	Connector	Length(Meter)	Supplied by
1	Ethernet Cable*4	RJ45	1.5 Unshielded without ferrite	UnionTrust
2	Ethernet Cable	RJ45	2.0 Unshielded without ferrite	UnionTrust
3	Ethernet Cable	RJ45	5.0 Unshielded without ferrite	UnionTrust

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.5 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	± 4.7 dB
4	Radiated emission 30MHz-1GHz	± 4.6 dB
5	Radiated emission 1GHz-18GHz	± 4.4 dB
6	Radiated emission 18GHz-26GHz	± 4.6 dB
7	Radiated emission 26GHz-40GHz	± 4.6 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Conducted Emission	FCC 47 CFR Part 15.107 ICES-003 Issue 7 Section 3.2.1	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109 ICES-003 Issue 7 Section 3.2.2	ANSI C63.4-2014	PASS

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3m SAC	ETS-LINDGREN	3m	Euroshiedpn-CT001270-1317	Jan. 22, 2021	Jan. 21, 2024
☒	Receiver	R&S	ESIB26	100114	Nov. 03, 2022	Nov. 02, 2023
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 11, 2021	Nov. 10, 2023
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 11, 2021	Nov. 10, 2023
☒	Preamplifier	HP	8447F	2805A02960	Nov. 01, 2022	Oct. 31, 2023
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	Apr. 17, 2022	Apr. 16, 2024
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	Nov. 01, 2022	Oct. 31, 2023
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 01, 2022	Oct. 31, 2023
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 01, 2022	Oct. 31, 2023
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 01, 2022	Oct. 31, 2023
☒	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 01, 2022	Oct. 31, 2023
☒	Test Software	Audix	e3	Software Version: 9.160323		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NV/NT	+15 to +35	Powered by Adaptor	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test sample

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Conducted Emission	25.2	45.4	100.7	S202302081071-ZJA01/2	Andy Lin
Radiated Emission	24.7	56.2	100.9		Lucas Ouyang

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Gigabit Ethernet ports Loop transmission+ USB OUT Test Mode 2: AC120V/60Hz (Adaptor2) + Gigabit Ethernet ports Loop transmission+ USB OUT Test Mode 3: AC120V/60Hz (Adaptor3) + Gigabit Ethernet ports Loop transmission+ USB OUT
Conducted Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Gigabit Ethernet ports Loop transmission+ USB OUT Test Mode 2: AC120V/60Hz (Adaptor2) + Gigabit Ethernet ports Loop transmission+ USB OUT Test Mode 3: AC120V/60Hz (Adaptor3) + Gigabit Ethernet ports Loop transmission+ USB OUT

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

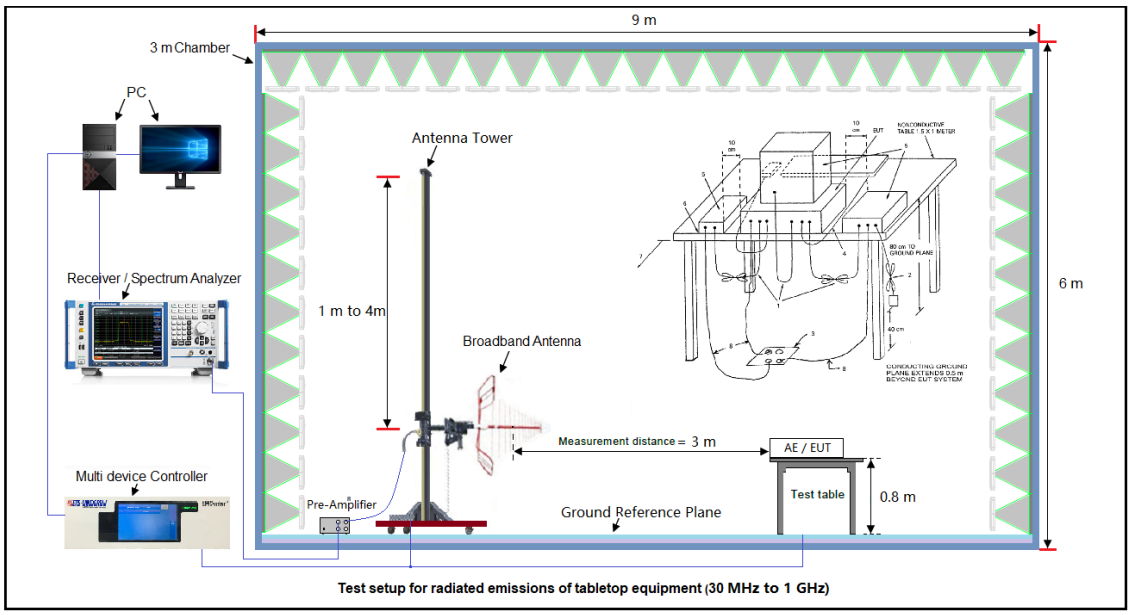
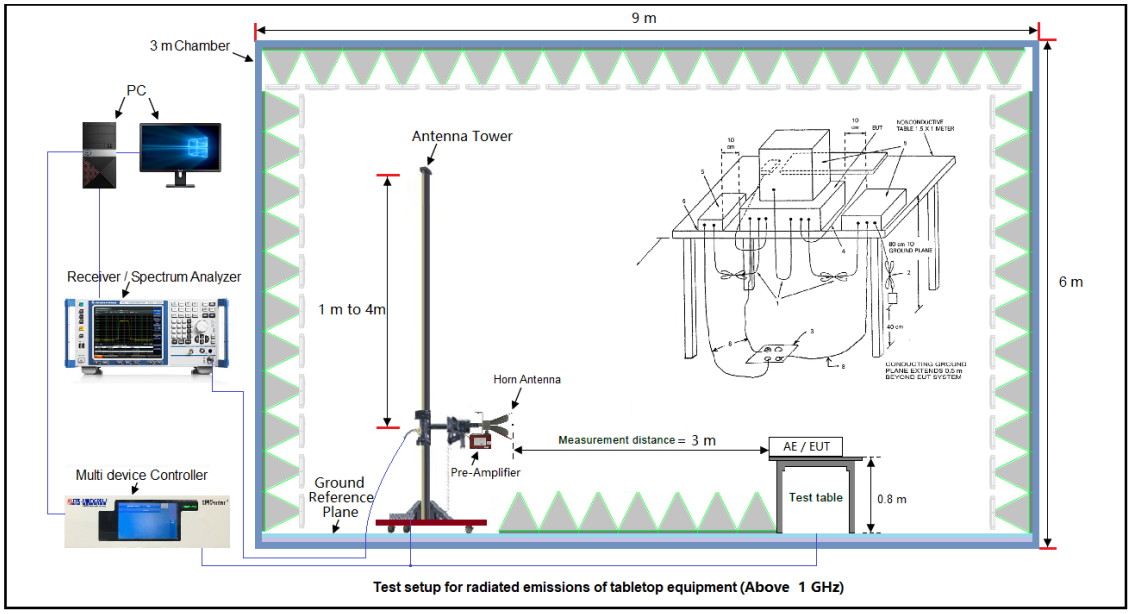
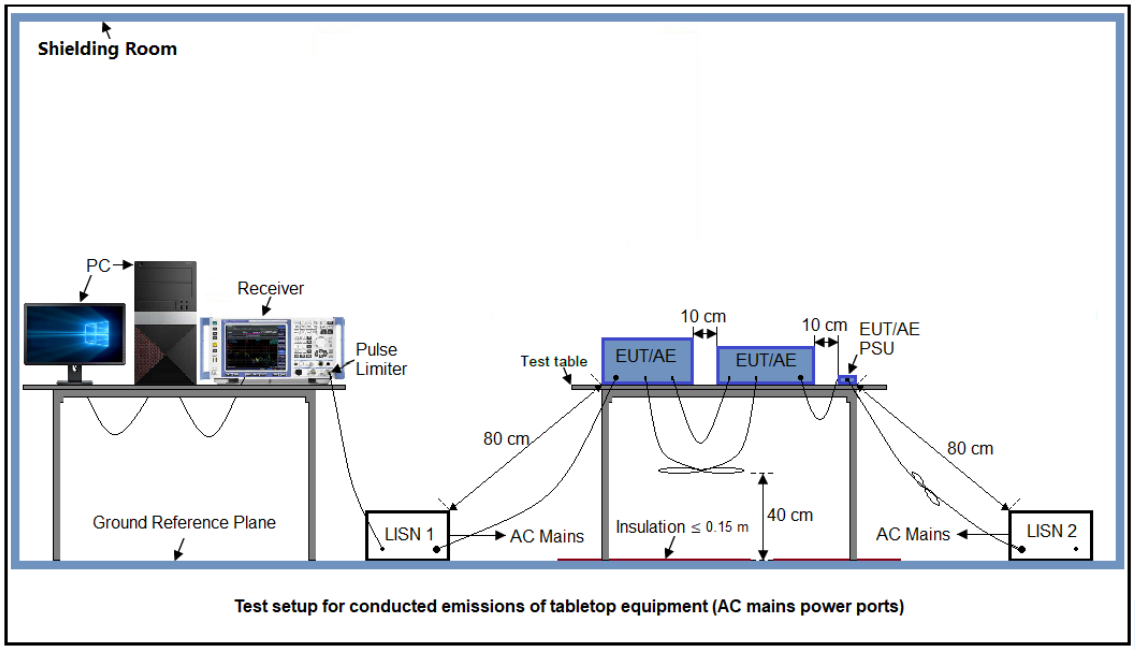


Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators
2	ICES-003 Issue 7	Information Technology Equipment (Including Digital Apparatus)
3	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
4	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions
5	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109
ICES-003 Issue 7 Clause 3.2.2

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
30 ≤ f ≤ 1 000	Quasi Peak	120 kHz	300 kHz
f ≥1000	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

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.

Limits:

Limits for Class B devices

FCC 47 CFR Part 15 Subpart B

Frequency (MHz)	limits at 3m (dBμV/m)		
	QP Detector	PK Detector	AV Detector
30 – 88	40.0	--	--
88 – 216	43.5	--	--
216 – 960	46.0		
960 – 1000	54.0	--	--
Above 1000	--	74.0	54.0

ICES-003 Issue 7

Frequency (MHz)	limits at 3m (dBμV/m)		
	QP Detector	PK Detector	AV Detector
30 – 88	40.0	--	--
88 – 216	43.5	--	--
216 – 230	46.0		

230 – 960	47.0	--	--
960 – 1000	54.0	--	--
Above 1000	--	74.0	54.0

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

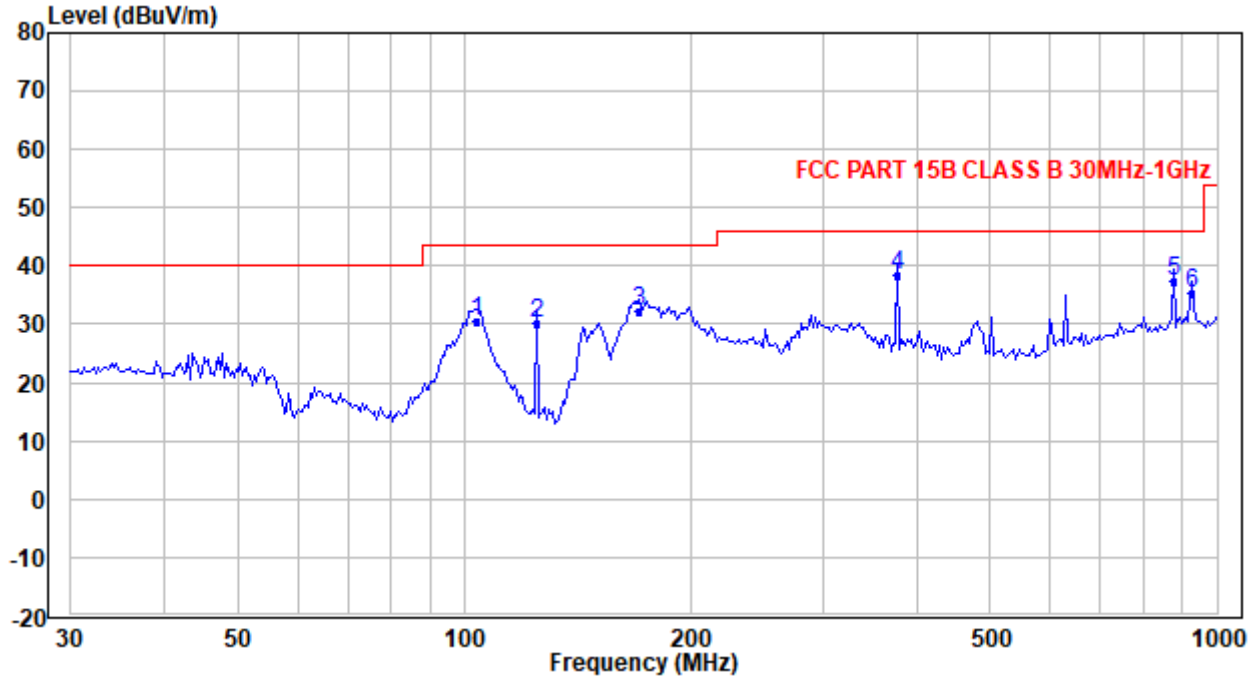
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

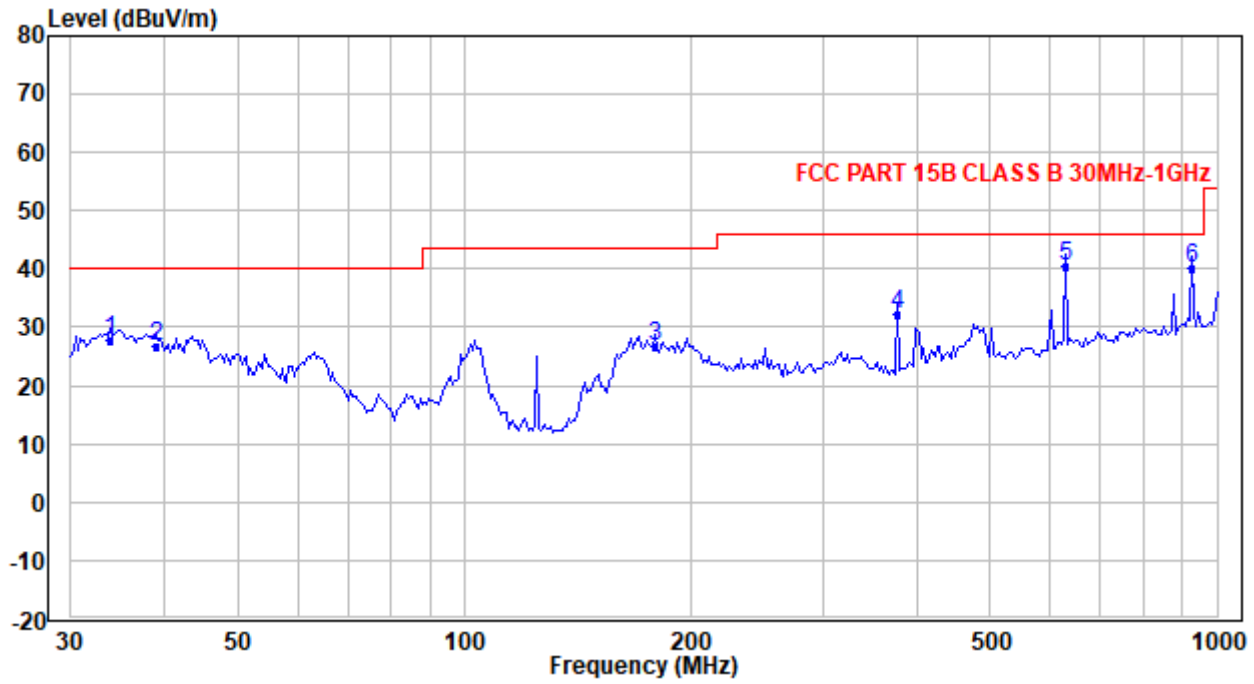
The measurement data for FCC 47 CFR Part 15 Subpart B as follows:

Below 1GHz(Quasi Peak):
Test Mode1
Horizontal



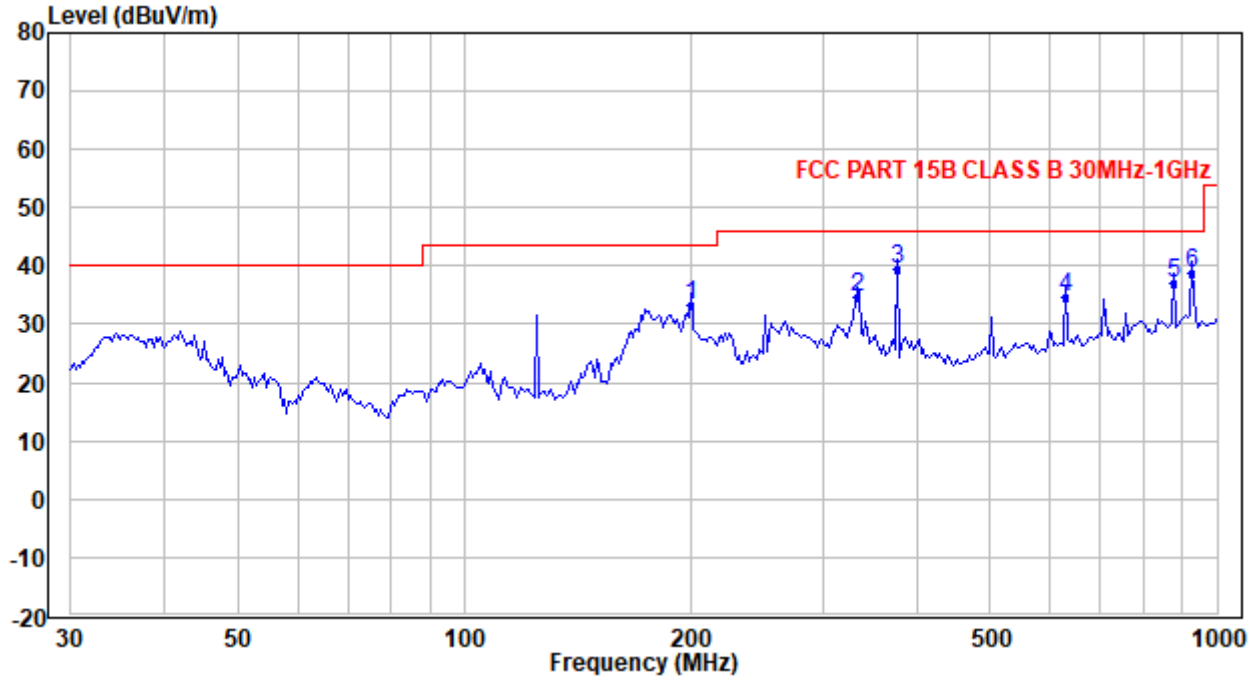
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	104.064	46.08	-15.48	30.60	43.50	-12.90	QP
2	124.925	46.40	-16.10	30.30	43.50	-13.20	QP
3	170.189	43.89	-11.67	32.22	43.50	-11.28	QP
4	376.523	43.69	-5.16	38.53	46.00	-7.47	QP
5	875.013	33.24	4.07	37.31	46.00	-8.69	QP
6	925.613	30.44	4.79	35.23	46.00	-10.77	QP

Vertical



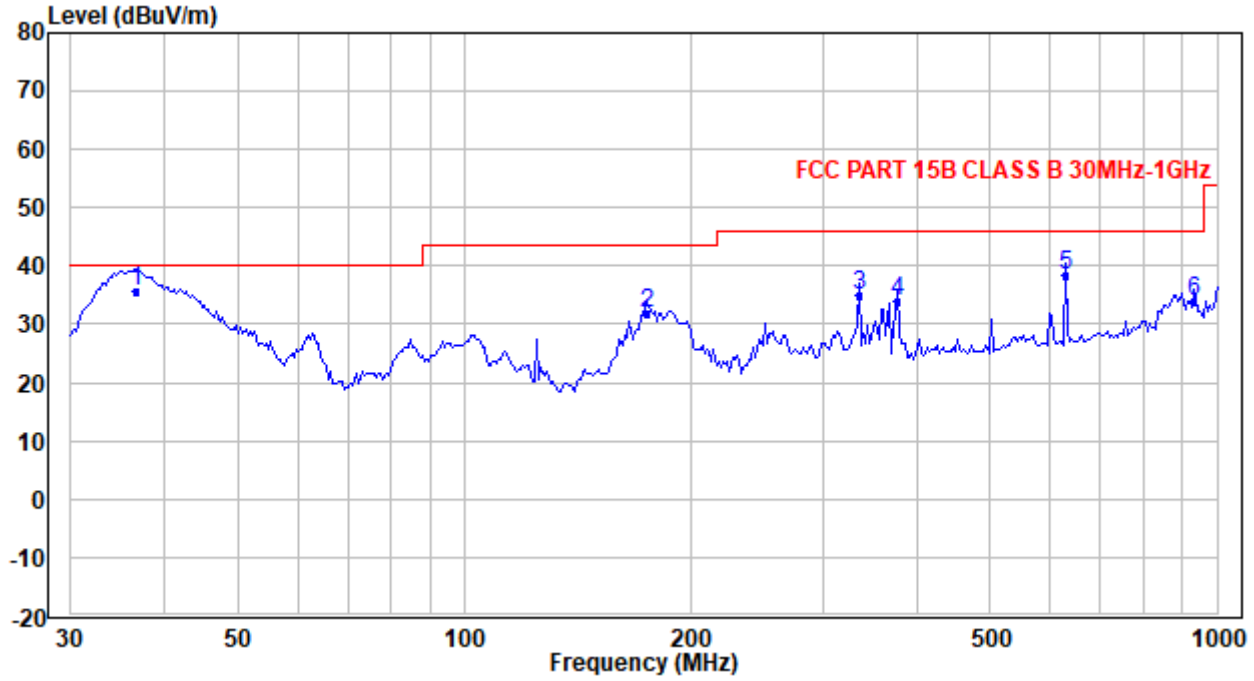
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	33.807	33.10	-5.37	27.73	40.00	-12.27	QP
2	38.908	34.17	-7.27	26.90	40.00	-13.10	QP
3	178.770	36.68	-9.83	26.85	43.50	-16.65	QP
4	376.523	37.51	-5.16	32.35	46.00	-13.65	QP
5	628.894	40.30	0.33	40.63	46.00	-5.37	QP
6	925.613	35.45	4.79	40.24	46.00	-5.76	QP

Below 1GHz(Quasi Peak):
Test Mode2:
Horizontal



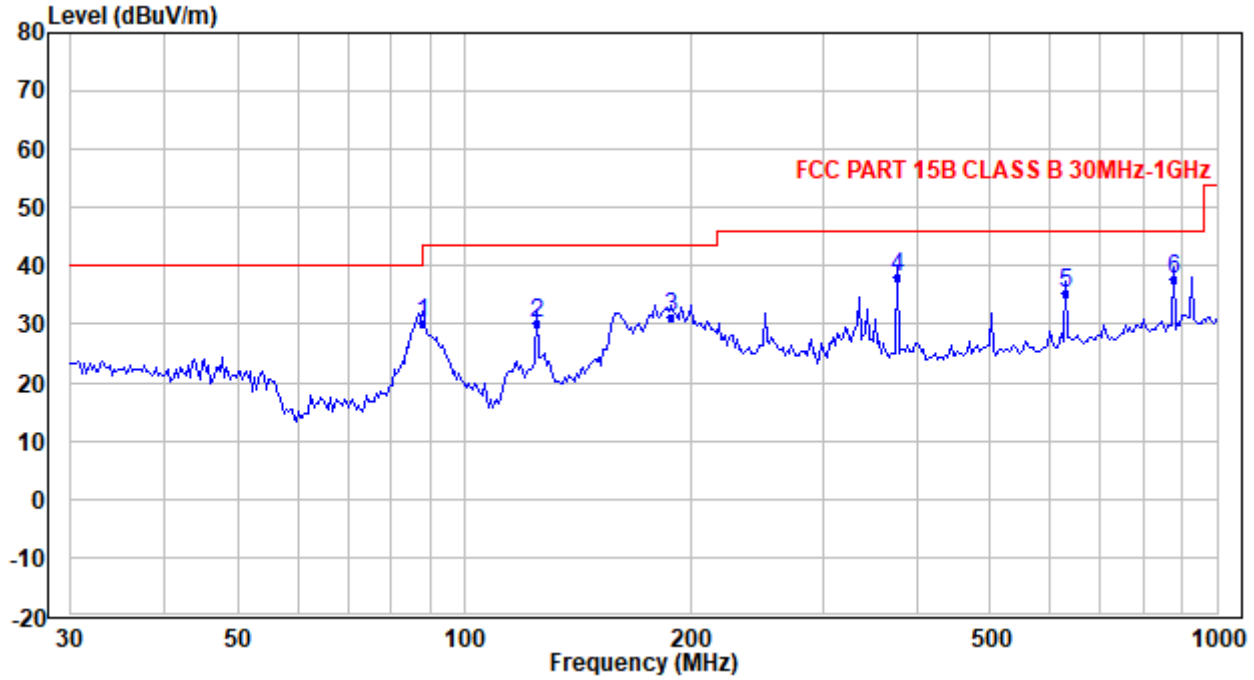
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	200.043	43.75	-10.39	33.36	43.50	-10.14	QP
2	331.786	40.03	-5.52	34.51	46.00	-11.49	QP
3	376.523	44.45	-5.16	39.29	46.00	-6.71	QP
4	628.894	34.40	0.33	34.73	46.00	-11.27	QP
5	875.013	32.83	4.07	36.90	46.00	-9.10	QP
6	925.613	34.00	4.79	38.79	46.00	-7.21	QP

Vertical



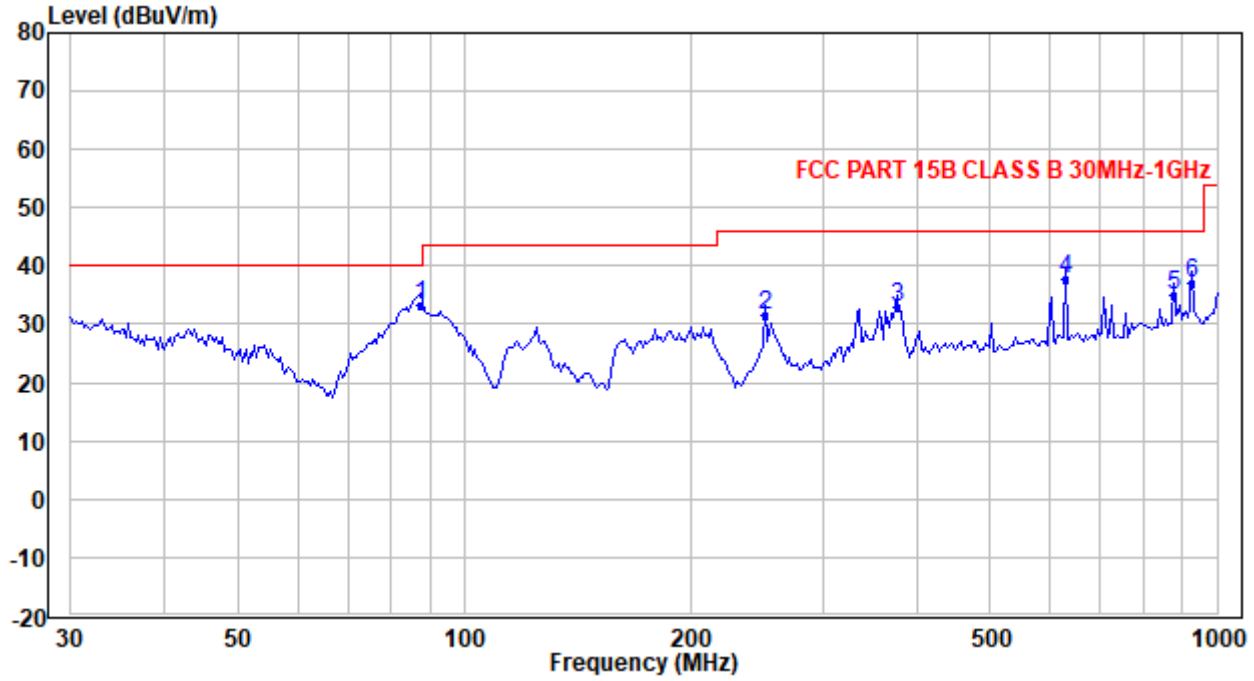
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	36.524	41.49	-5.97	35.52	40.00	-4.48	QP
2	175.040	42.72	-10.87	31.85	43.50	-11.65	QP
3	334.126	40.24	-5.34	34.90	46.00	-11.10	QP
4	376.523	39.00	-5.16	33.84	46.00	-12.16	QP
5	628.894	38.07	0.33	38.40	46.00	-7.60	QP
6	932.141	29.01	4.93	33.94	46.00	-12.06	QP

Below 1GHz(Quasi Peak):
Test Mode3:
Horizontal



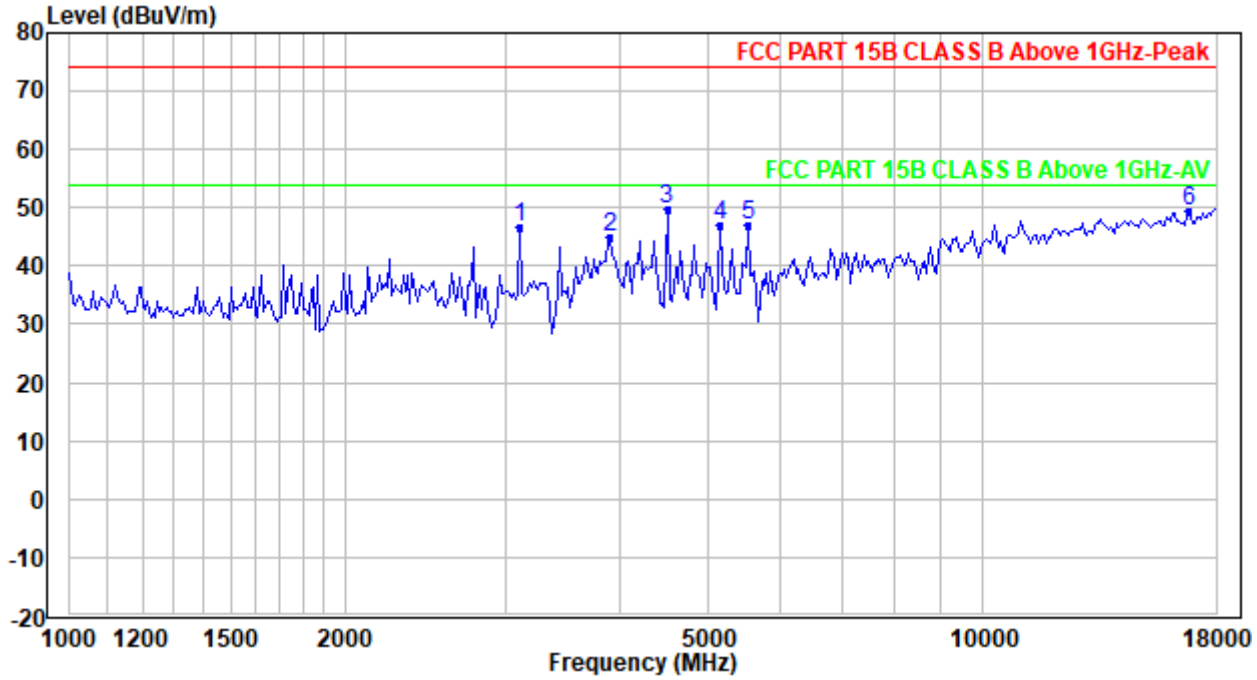
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	87.914	46.53	-16.33	30.20	40.00	-9.80	QP
2	124.925	46.32	-16.10	30.22	43.50	-13.28	QP
3	187.783	41.47	-10.11	31.36	43.50	-12.14	QP
4	376.523	43.21	-5.16	38.05	46.00	-7.95	QP
5	628.894	35.14	0.33	35.47	46.00	-10.53	QP
6	875.013	33.57	4.07	37.64	46.00	-8.36	QP

Vertical



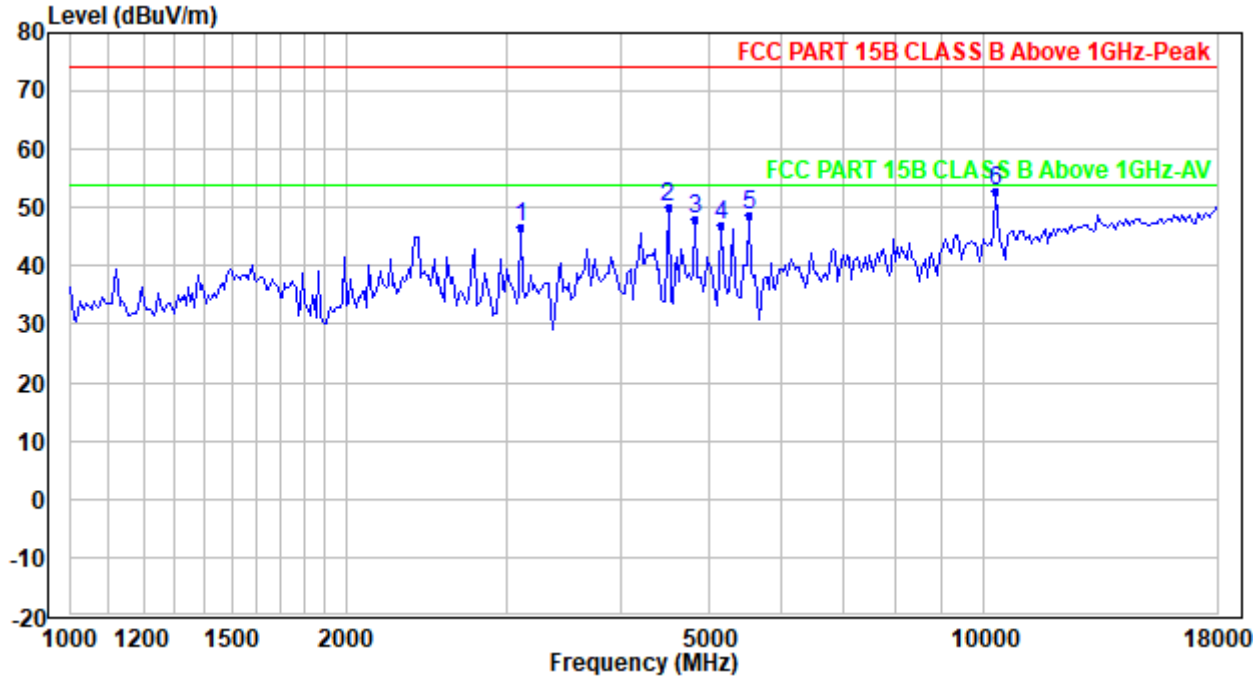
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	87.298	49.68	-16.52	33.16	40.00	-6.84	QP
2	250.486	40.21	-8.82	31.39	46.00	-14.61	QP
3	376.523	38.02	-5.16	32.86	46.00	-13.14	QP
4	628.894	37.45	0.33	37.78	46.00	-8.22	QP
5	875.013	30.87	4.07	34.94	46.00	-11.06	QP
6	925.613	32.15	4.79	36.94	46.00	-9.06	QP

Above 1GHz(Peak & Average)
Test Mode1:
Horizontal



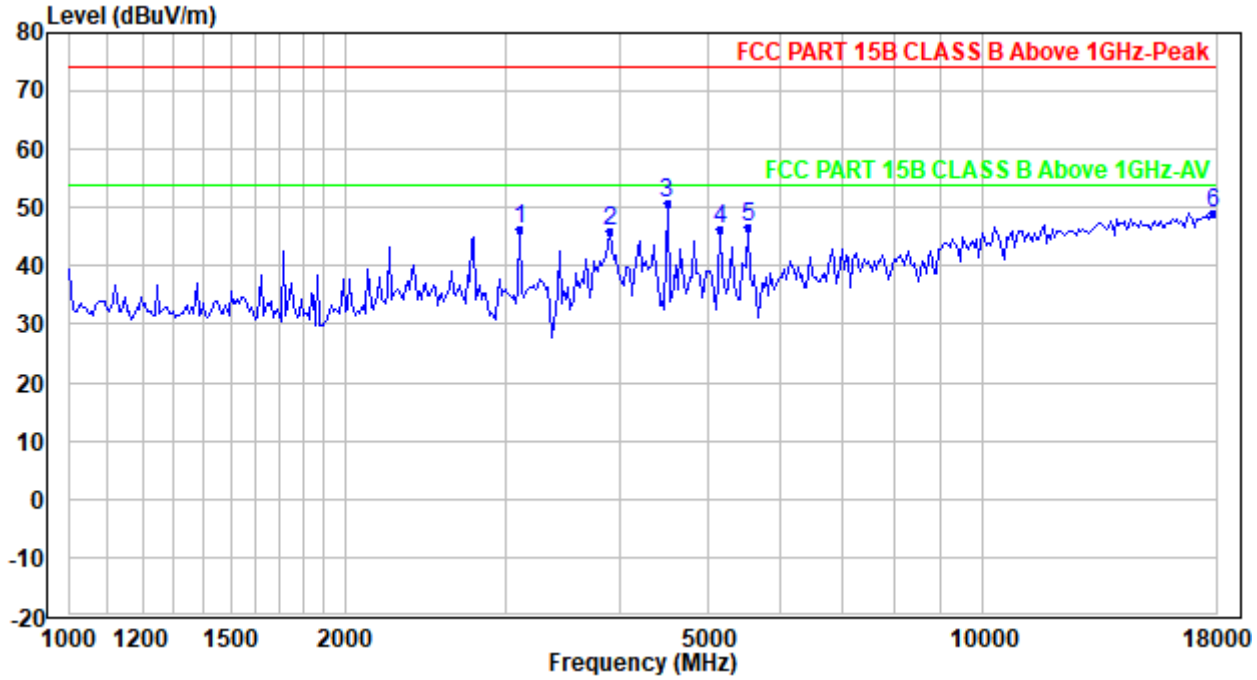
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3112.096	52.83	-6.29	46.54	74.00	-27.46	Peak
2	3900.860	48.53	-3.47	45.06	74.00	-28.94	Peak
3	4508.684	52.43	-2.71	49.72	74.00	-24.28	Peak
4	5151.196	48.97	-1.79	47.18	74.00	-26.82	Peak
5	5521.982	47.16	-0.28	46.88	74.00	-27.12	Peak
6	16791.350	37.02	12.51	49.53	74.00	-24.47	Peak

Vertical



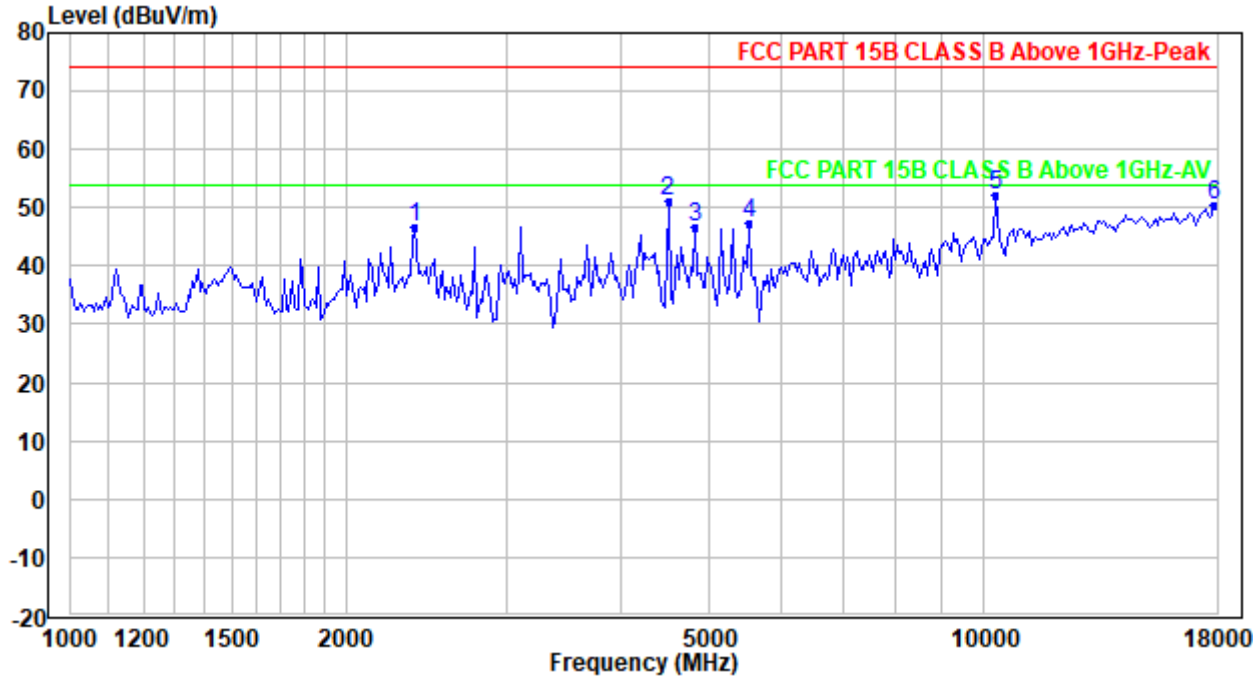
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	3112.096	53.05	-6.29	46.76	74.00	-27.24	Peak
2	4508.684	52.92	-2.71	50.21	74.00	-23.79	Peak
3	4833.222	50.58	-2.40	48.18	74.00	-25.82	Peak
4	5151.196	48.77	-1.79	46.98	74.00	-27.02	Peak
5	5521.982	49.16	-0.28	48.88	74.00	-25.12	Peak
6	10322.320	46.70	6.11	52.81	74.00	-21.19	Peak

Above 1GHz(Peak & Average)
Test Mode2:
Horizontal



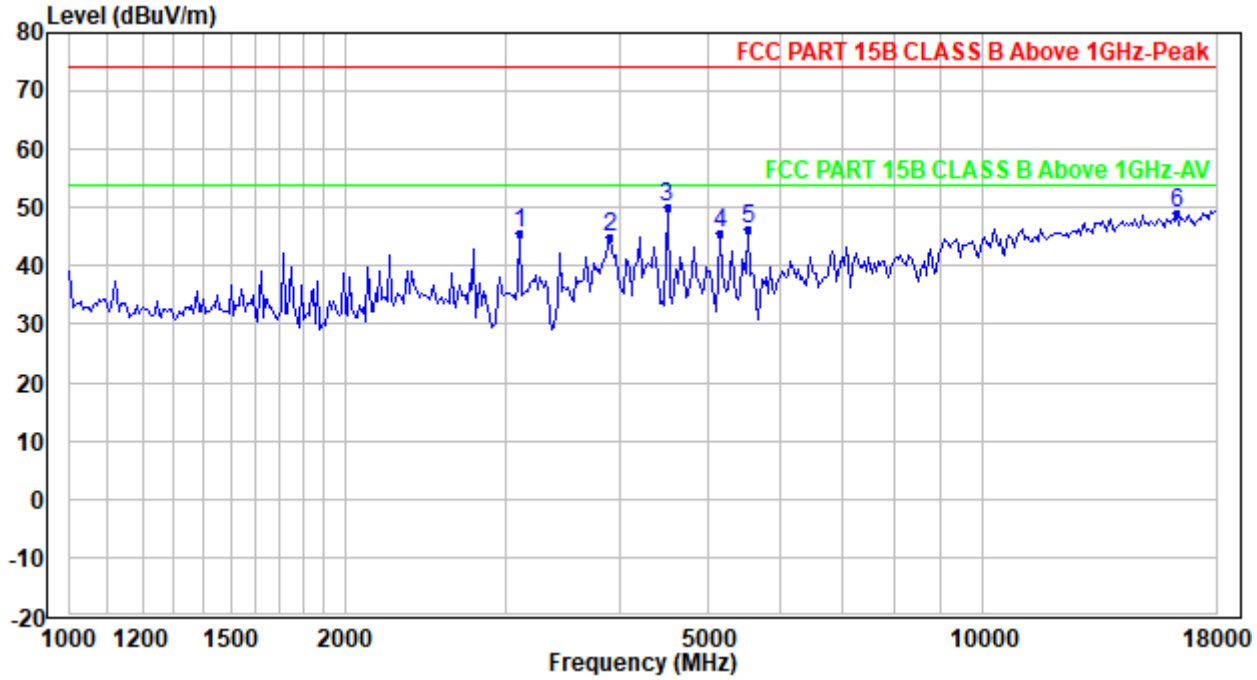
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3112.096	52.66	-6.29	46.37	74.00	-27.63	Peak
2	3900.860	49.31	-3.47	45.84	74.00	-28.16	Peak
3	4508.684	53.35	-2.71	50.64	74.00	-23.36	Peak
4	5151.196	48.19	-1.79	46.40	74.00	-27.60	Peak
5	5521.982	47.04	-0.28	46.76	74.00	-27.24	Peak
6	17896.040	34.10	15.05	49.15	74.00	-24.85	Peak

Vertical



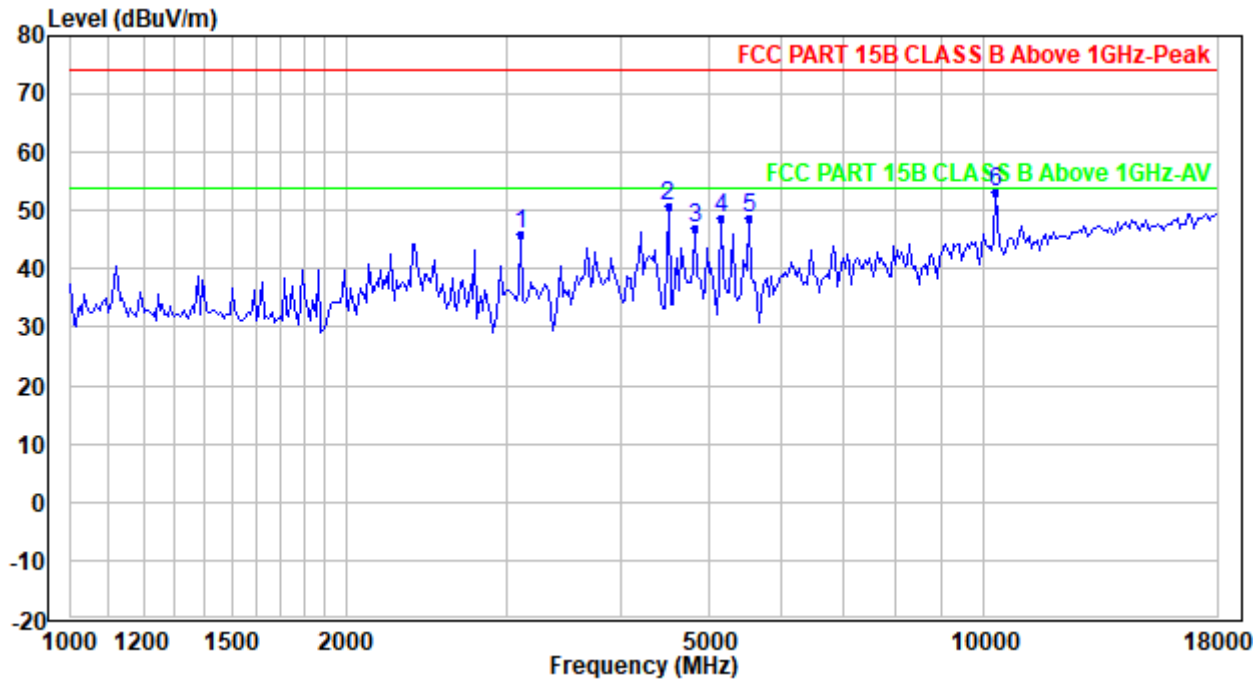
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2384.166	55.16	-8.33	46.83	74.00	-27.17	Peak
2	4508.684	53.83	-2.71	51.12	74.00	-22.88	Peak
3	4833.222	49.09	-2.40	46.69	74.00	-27.31	Peak
4	5521.982	47.67	-0.28	47.39	74.00	-26.61	Peak
5	10322.320	45.94	6.11	52.05	74.00	-21.95	Peak
6	17896.040	35.39	15.05	50.44	74.00	-23.56	Peak

Above 1GHz(Peak & Average)
Test Mode3:
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3112.096	52.02	-6.29	45.73	74.00	-28.27	Peak
2	3900.860	48.34	-3.47	44.87	74.00	-29.13	Peak
3	4508.684	52.70	-2.71	49.99	74.00	-24.01	Peak
4	5151.196	47.53	-1.79	45.74	74.00	-28.26	Peak
5	5521.982	46.76	-0.28	46.48	74.00	-27.52	Peak
6	16312.020	37.09	12.09	49.18	74.00	-24.82	Peak

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	3112.096	52.41	-6.29	46.12	74.00	-27.88	Peak
2	4508.684	53.65	-2.71	50.94	74.00	-23.06	Peak
3	4833.222	49.28	-2.40	46.88	74.00	-27.12	Peak
4	5151.196	50.51	-1.79	48.72	74.00	-25.28	Peak
5	5521.982	48.90	-0.28	48.62	74.00	-25.38	Peak
6	10322.320	47.03	6.11	53.14	74.00	-20.86	Peak

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
5. The limit of ICES-003 in the 230MHz to 960MHz band is higher than that of FCC Part 15B, so the radiation emission test data conform to the limit of ICES-003.

6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107
ICES-003 Issue 7 Section 3.2.1

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range (MHz)	Limits (dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

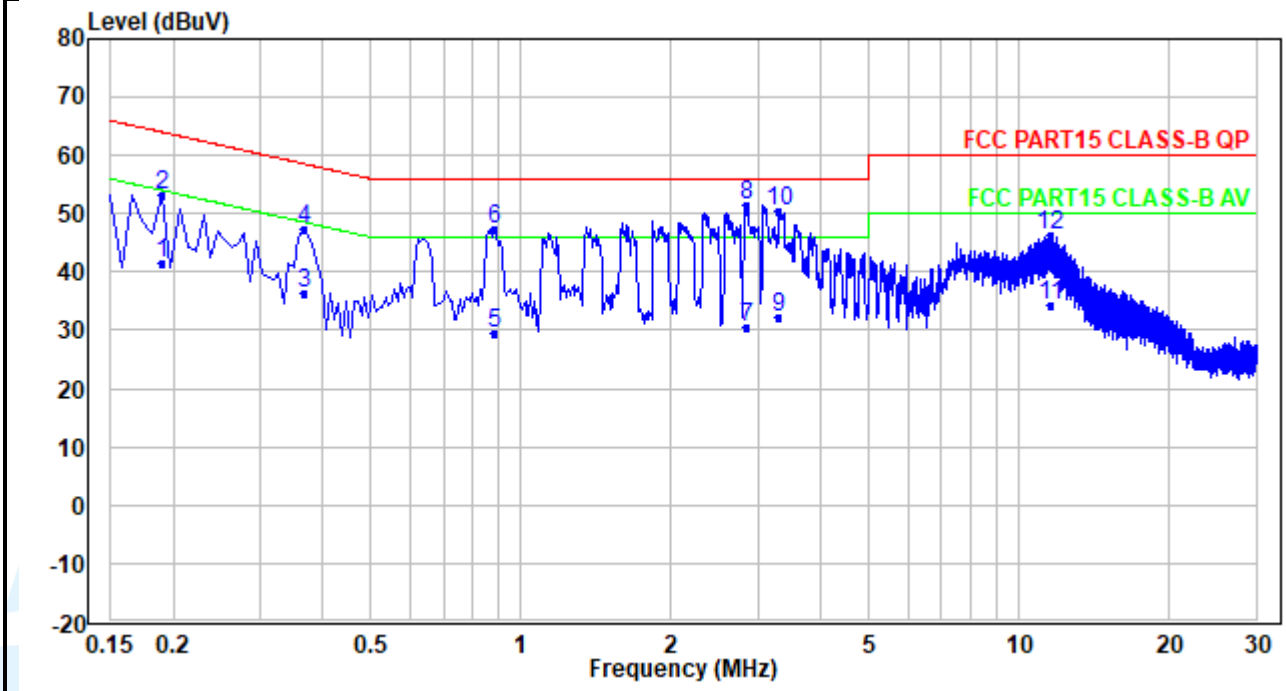
1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

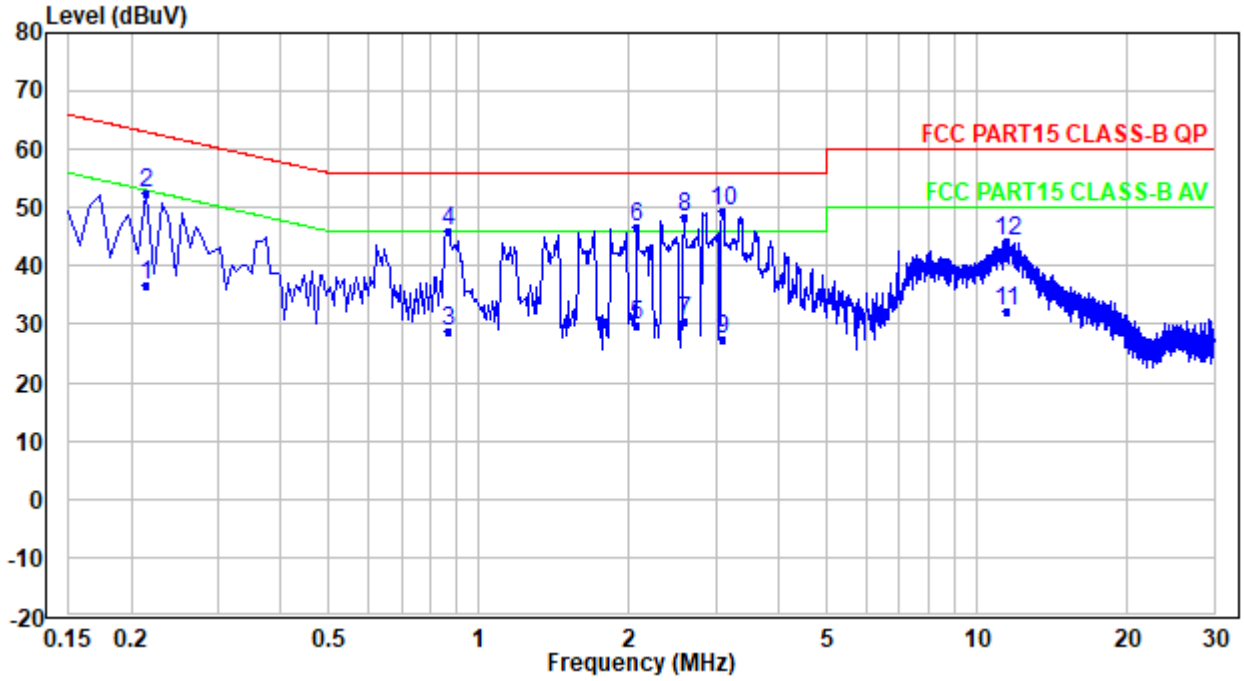
The measurement data as follows:
Quasi Peak and Average:
Test Mode1:

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.190	31.34	10.02	41.36	54.04	-12.68	Average
2	0.190	43.34	10.02	53.36	64.04	-10.68	QP
3	0.366	26.40	10.04	36.44	48.59	-12.15	Average
4	0.366	37.40	10.04	47.44	58.59	-11.15	QP
5	0.886	19.31	10.06	29.37	46.00	-16.63	Average
6	0.886	37.31	10.06	47.37	56.00	-8.63	QP
7	2.845	20.40	10.19	30.59	46.00	-15.41	Average
8	2.845	41.40	10.19	51.59	56.00	-4.41	QP
9	3.301	22.18	10.21	32.39	46.00	-13.61	Average
10	3.301	40.18	10.21	50.39	56.00	-5.61	QP
11	11.556	23.59	10.64	34.23	50.00	-15.77	Average
12	11.556	35.59	10.64	46.23	60.00	-13.77	QP

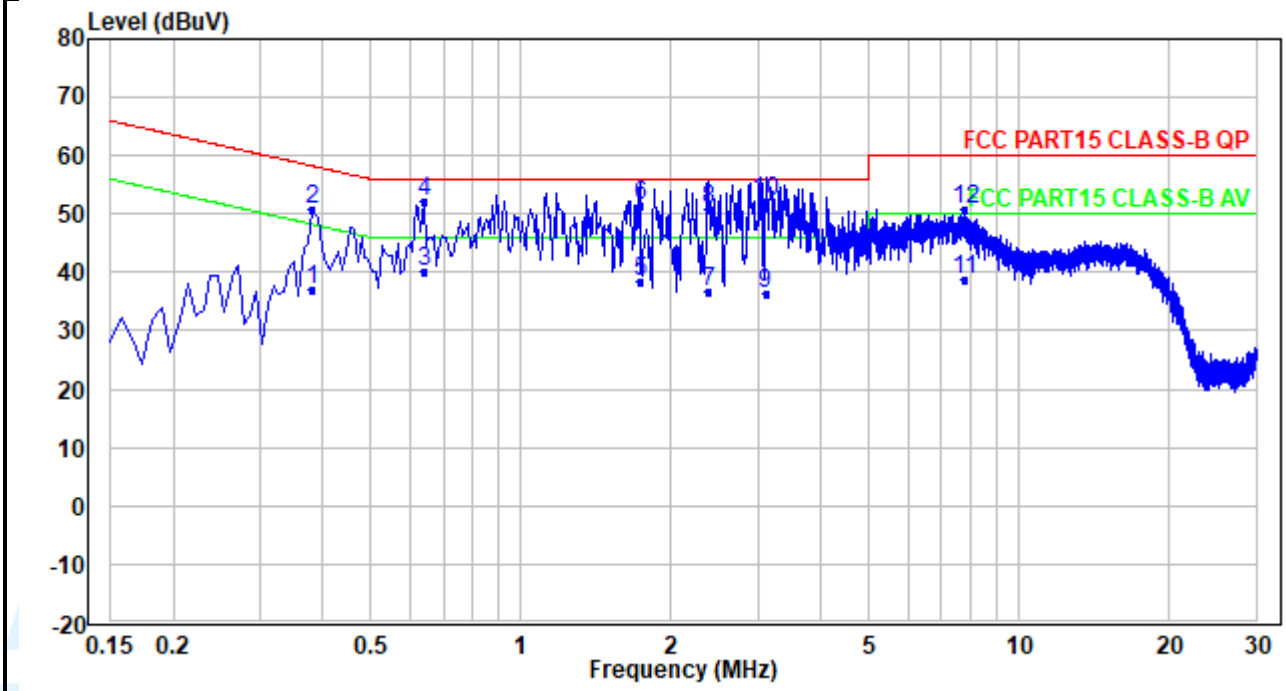
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.214	26.62	10.00	36.62	53.05	-16.43	Average
2	0.214	42.62	10.00	52.62	63.05	-10.43	QP
3	0.870	18.82	10.05	28.87	46.00	-17.13	Average
4	0.870	35.82	10.05	45.87	56.00	-10.13	QP
5	2.078	19.71	10.11	29.82	46.00	-16.18	Average
6	2.078	36.71	10.11	46.82	56.00	-9.18	QP
7	2.582	20.32	10.15	30.47	46.00	-15.53	Average
8	2.582	38.32	10.15	48.47	56.00	-7.53	QP
9	3.085	17.39	10.19	27.58	46.00	-18.42	Average
10	3.085	39.39	10.19	49.58	56.00	-6.42	QP
11	11.500	21.50	10.61	32.11	50.00	-17.89	Average
12	11.500	33.50	10.61	44.11	60.00	-15.89	QP

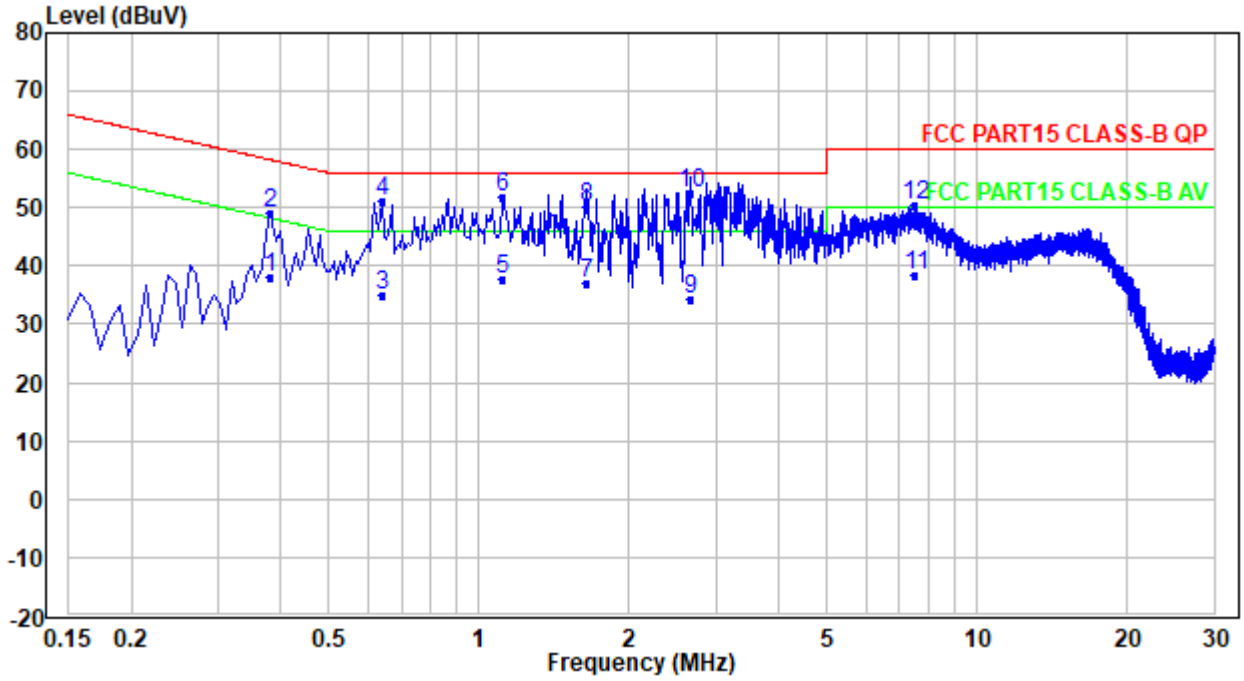
Quasi Peak and Average:
Test Mode2:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.382	26.91	10.04	36.95	48.24	-11.29	Average
2	0.382	40.91	10.04	50.95	58.24	-7.29	QP
3	0.638	30.12	10.05	40.17	46.00	-5.83	Average
4	0.638	42.12	10.05	52.17	56.00	-3.83	QP
5	1.734	28.38	10.11	38.49	46.00	-7.51	Average
6	1.734	41.38	10.11	51.49	56.00	-4.51	QP
7	2.374	26.49	10.16	36.65	46.00	-9.35	Average
8	2.374	40.49	10.16	50.65	56.00	-5.35	QP
9	3.101	26.07	10.21	36.28	46.00	-9.72	Average
10	3.101	42.07	10.21	52.28	56.00	-3.72	QP
11	7.764	28.34	10.46	38.80	50.00	-11.20	Average
12	7.764	40.34	10.46	50.80	60.00	-9.20	QP

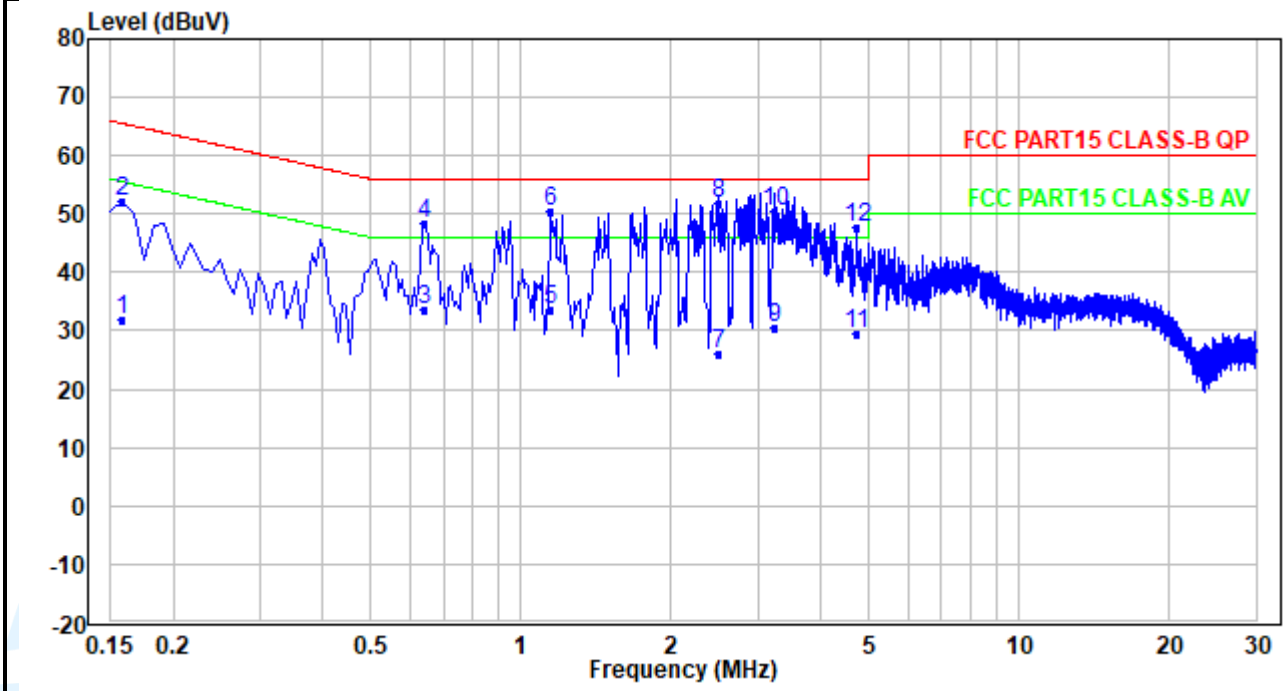
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.382	28.16	10.02	38.18	48.24	-10.06	Average
2	0.382	39.16	10.02	49.18	58.24	-9.06	QP
3	0.638	25.05	10.04	35.09	46.00	-10.91	Average
4	0.638	41.05	10.04	51.09	56.00	-4.91	QP
5	1.118	27.63	10.05	37.68	46.00	-8.32	Average
6	1.118	41.63	10.05	51.68	56.00	-4.32	QP
7	1.646	26.95	10.08	37.03	46.00	-8.97	Average
8	1.646	39.95	10.08	50.03	56.00	-5.97	QP
9	2.669	24.18	10.16	34.34	46.00	-11.66	Average
10	2.669	42.18	10.16	52.34	56.00	-3.66	QP
11	7.541	28.10	10.41	38.51	50.00	-11.49	Average
12	7.541	40.10	10.41	50.51	60.00	-9.49	QP

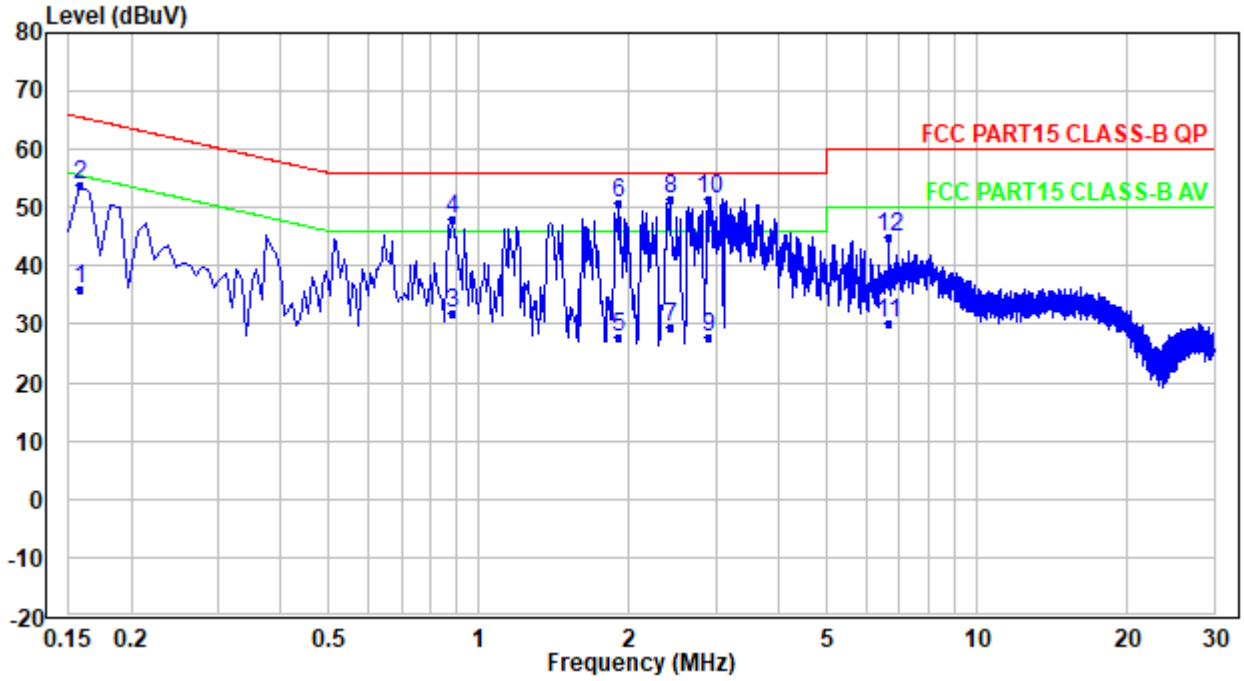
Quasi Peak and Average:
Test Mode3:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.158	22.03	10.03	32.06	55.56	-23.50	Average
2	0.158	42.03	10.03	52.06	65.56	-13.50	QP
3	0.641	23.46	10.05	33.51	46.00	-12.49	Average
4	0.641	38.46	10.05	48.51	56.00	-7.49	QP
5	1.149	23.38	10.07	33.45	46.00	-12.55	Average
6	1.149	40.38	10.07	50.45	56.00	-5.55	QP
7	2.493	15.79	10.16	25.95	46.00	-20.05	Average
8	2.493	41.79	10.16	51.95	56.00	-4.05	QP
9	3.230	20.41	10.21	30.62	46.00	-15.38	Average
10	3.230	40.41	10.21	50.62	56.00	-5.38	QP
11	4.713	19.31	10.30	29.61	46.00	-16.39	Average
12	4.713	37.31	10.30	47.61	56.00	-8.39	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.158	25.97	10.02	35.99	55.57	-19.58	Average
2	0.158	43.97	10.02	53.99	65.57	-11.58	QP
3	0.886	21.89	10.05	31.94	46.00	-14.06	Average
4	0.886	37.89	10.05	47.94	56.00	-8.06	QP
5	1.910	17.77	10.10	27.87	46.00	-18.13	Average
6	1.910	40.77	10.10	50.87	56.00	-5.13	QP
7	2.422	19.49	10.14	29.63	46.00	-16.37	Average
8	2.422	41.49	10.14	51.63	56.00	-4.37	QP
9	2.901	17.45	10.17	27.62	46.00	-18.38	Average
10	2.901	41.45	10.17	51.62	56.00	-4.38	QP
11	6.661	19.67	10.39	30.06	50.00	-19.94	Average
12	6.661	34.67	10.39	45.06	60.00	-14.94	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

********** End of Report **********

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.