Certificate #4312.01

TEST REPORT

Product Name:	Long Range High Performance DECT VoIP Base Station
Trade Mark:	GRANDSTREAM
Model No.:	DP755
Report Number:	2305255326EMC-1
Test Standards:	FCC 47 CFR Part 15 Subpart B ICES-003 Issue 7
FCC ID:	YZZDP755
Test Result:	PASS
Date of Issue:	July 14, 2023

Prepared for:

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

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
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Prepared by:	Kieron Luo Project Engineer	Reviewed by:	Henry Lu Team Leader
Approved by:	Kevin Jiang Assistant Manager	Date:	July 14, 2023

Version

Version No.	Date	Description
V1.0	July 14, 2023	Original

CONTENTS

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:	Long Range High Performance DECT VoIP Base Station
Model No.:	DP755
Trade Mark:	GRANDSTREAM
DUT Stage:	Identical Prototype
Rated Voltage:	☒ Powered by DC port 5V
	☒ Powered by POE port
Classification of digital devices:	Class B
Highest Internal Frequency:	1928.448 MHz
Software Version:	1.0.1.5 (Provided by the customer)
Hardware Version:	V1.1 (Provided by the customer)
Sample Received Date:	May 25, 2023
Sample Tested Date:	June 5, 2023 to June 8, 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.:	F06US0500100A
Input:	100-240 V~50/60 Hz 0.2 A max
Output:	5 V ⎓ 1 A
DC Cable:	1.5 Meter, Unshielded without ferrite

Adapter 2	
Model No.:	DCT06W050100US-D0
Input:	100-240 V~50/60 Hz 200 mA
Output:	5.0 V ⎓ 1.0 A
DC Cable:	1.5 Meter, Unshielded without ferrite

Adapter 3	
Model No.:	GQ06-050100-ZU
Input:	100-240 V~50/60 Hz 0.3 A Max
Output:	5.0 V ⎓ 1.0 A
DC Cable:	1.5 Meter, Unshielded without ferrite

Cable	
Connector:	Ethernet Cable

Cable Type:	Unshielded without ferrite
Length:	1.5 Meter, Unshielded without ferrite

Others
1x Bracket

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
POE	CISCO	MA-INJ-4	QS-6593-01N A02	UnionTrust
Notebook	Lenovo	Lenovo B40-80	MP12NEQ6	UnionTrust
Mouse	DELL	MS111	CN-011D3V-738	UnionTrust
DECT Phone System	GRANDSTREAM	DP722	207GLXMJB0EFD 68C	Applicant
DECT Phone System	GRANDSTREAM	DP722	207GLXMJB0EFD 6BF	Applicant

Support Cable

Cable No.	Description	Connector	Length(Meter)	Supplied by
1	Ethernet Cable	RJ45	1.5 Unshielded without ferrite	UnionTrust
2	Ethernet Cable	RJ45	2.0 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 POE Port or 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	24.3	58	99.2	S202305251544-ZJA02/4	Andy Lin
Radiated Emission	21.5	60.7	99.3		Lucas Ouyang

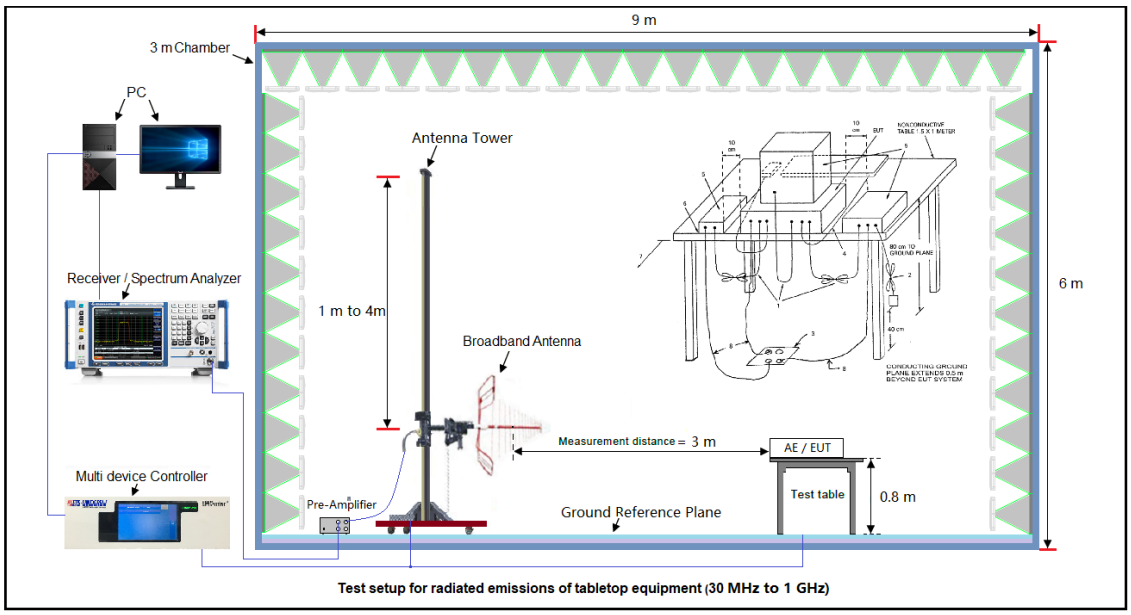
4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Below 1G: Test Mode 1: AC120V/60Hz (Adaptor1) + DECT Standby + RJ45 data transmitting Test Mode 2: AC120V/60Hz (Adaptor2) + DECT Standby + RJ45 data transmitting Test Mode 3: AC120V/60Hz (Adaptor3) + DECT Standby + RJ45 data transmitting **Test Mode 4: AC240V/50Hz + Worse from mode 1~3(Mode2)** Test Mode 5: POE + DECT Standby + RJ45 data transmitting Above 1G: Test Mode 1: AC120V/60Hz (Adaptor1) + DECT Standby + RJ45 data transmitting Test Mode 2: AC120V/60Hz (Adaptor2) + DECT Standby + RJ45 data transmitting Test Mode 3: AC120V/60Hz (Adaptor3) + DECT Standby + RJ45 data transmitting **Test Mode 4: AC240V/50Hz + Worse from mode 1~3(Mode1)** Test Mode 5: POE + DECT Standby + RJ45 data transmitting
Conducted Emission	**Test Mode 1: AC120V/60Hz (Adaptor1) + DECT Link + RJ45 data transmitting** Test Mode 2: AC120V/60Hz (Adaptor2) + DECT Link + RJ45 data transmitting Test Mode 3: AC120V/60Hz (Adaptor3) + DECT Link + RJ45 data transmitting Test Mode 4: AC240V/50Hz + Worse from mode 1~3 Test Mode 5: POE + DECT Standby + RJ45 data transmitting
Remark: The above test modes in boldface were the worst cases.	

4.3 TEST SETUP

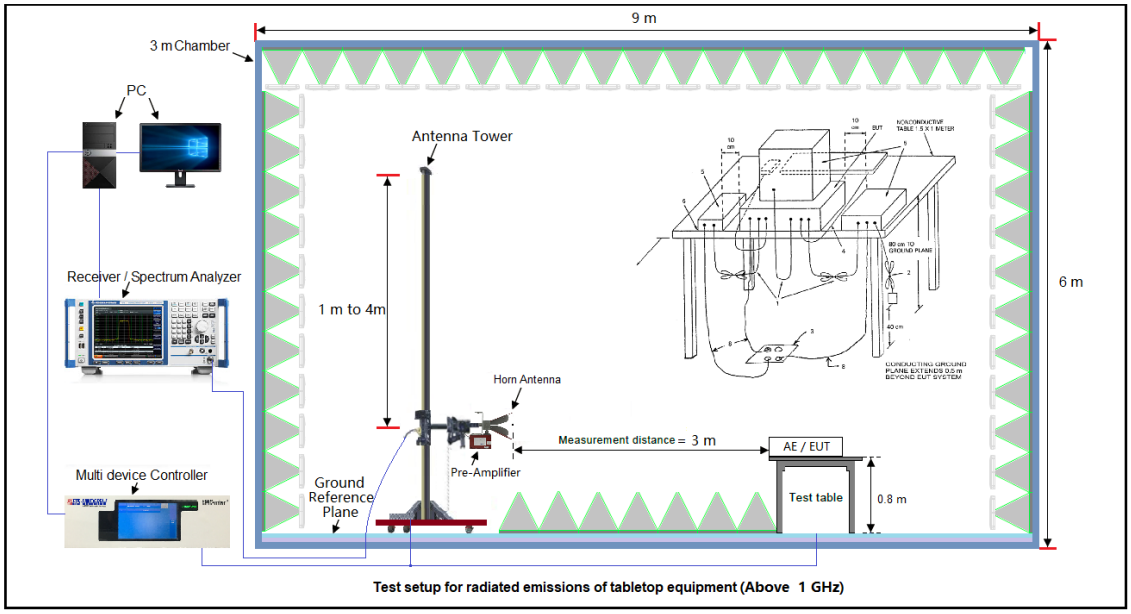
4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

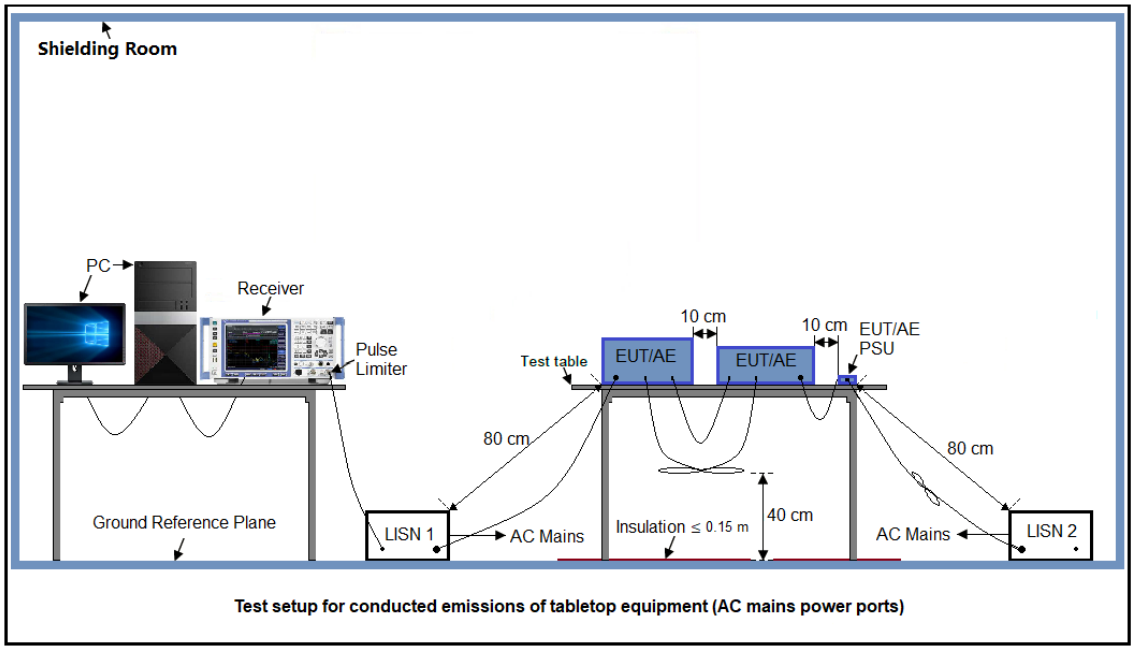
Figure 2. Above 1GHz



Test setup for radiated emissions of tabletop equipment (Above 1 GHz)

4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



Test setup for conducted emissions of tabletop equipment (AC mains power ports)

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.

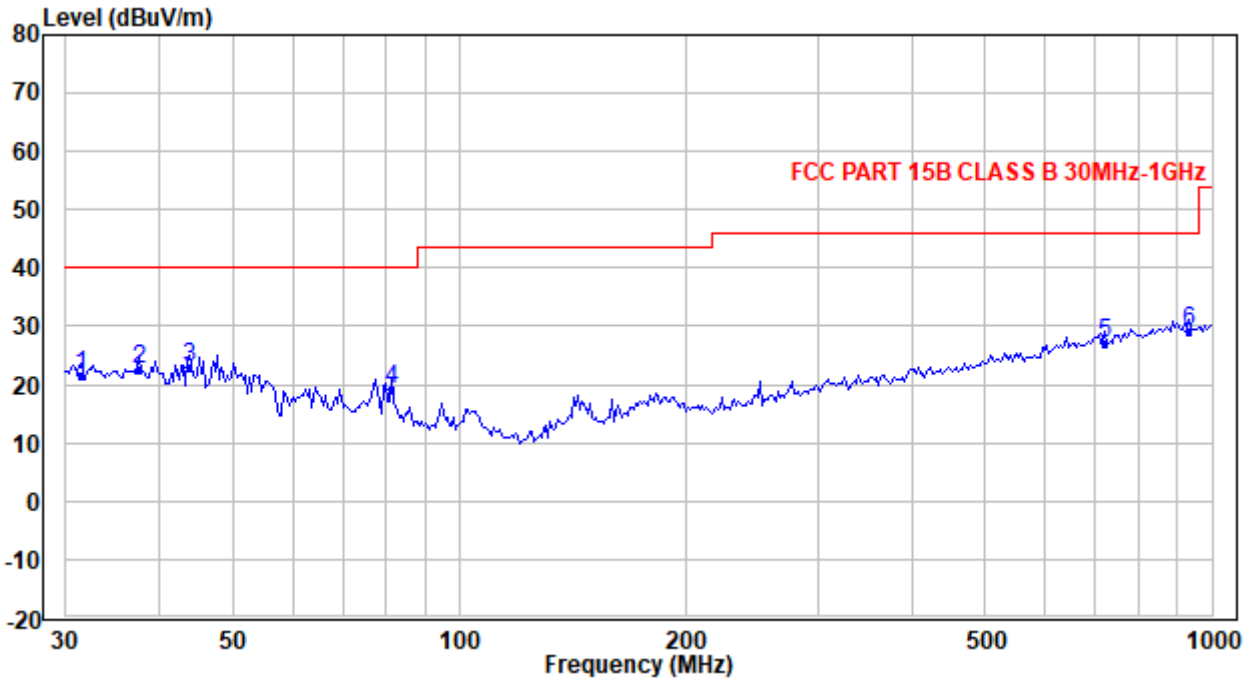
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The worst measurement data as follows:

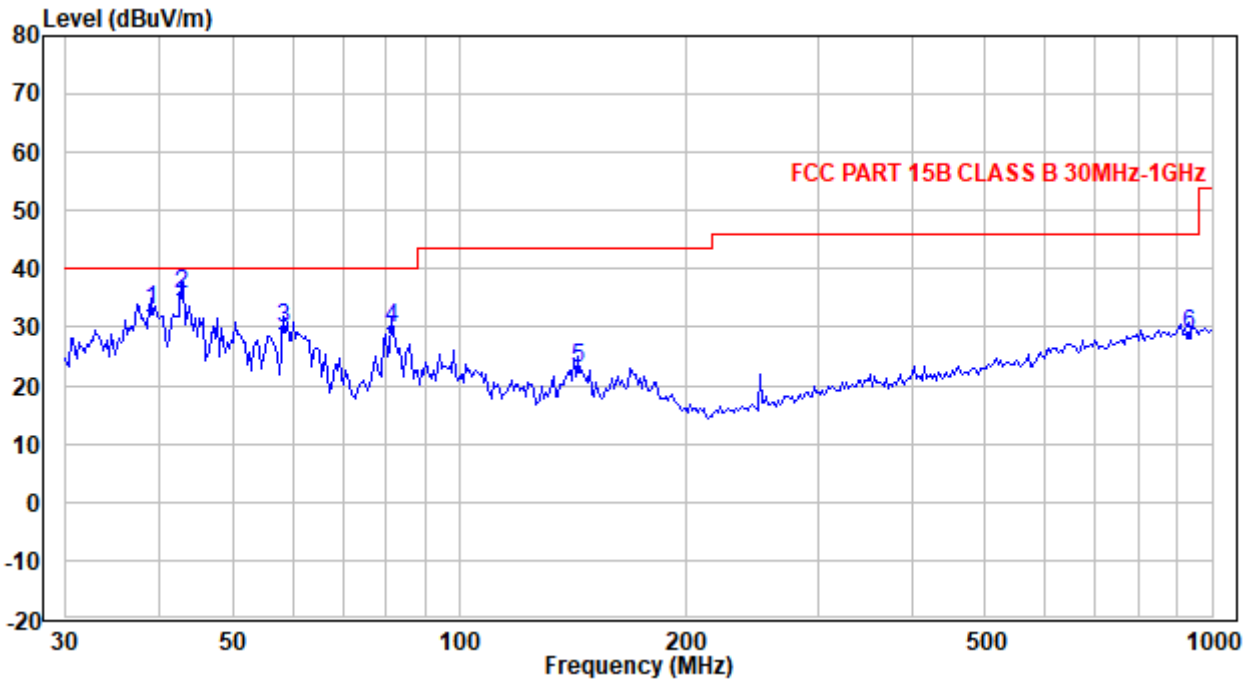
The measurement data for FCC 47 CFR Part 15 Subpart B as follows:

Below 1GHz(Quasi Peak):
Test Mode4
Horizontal



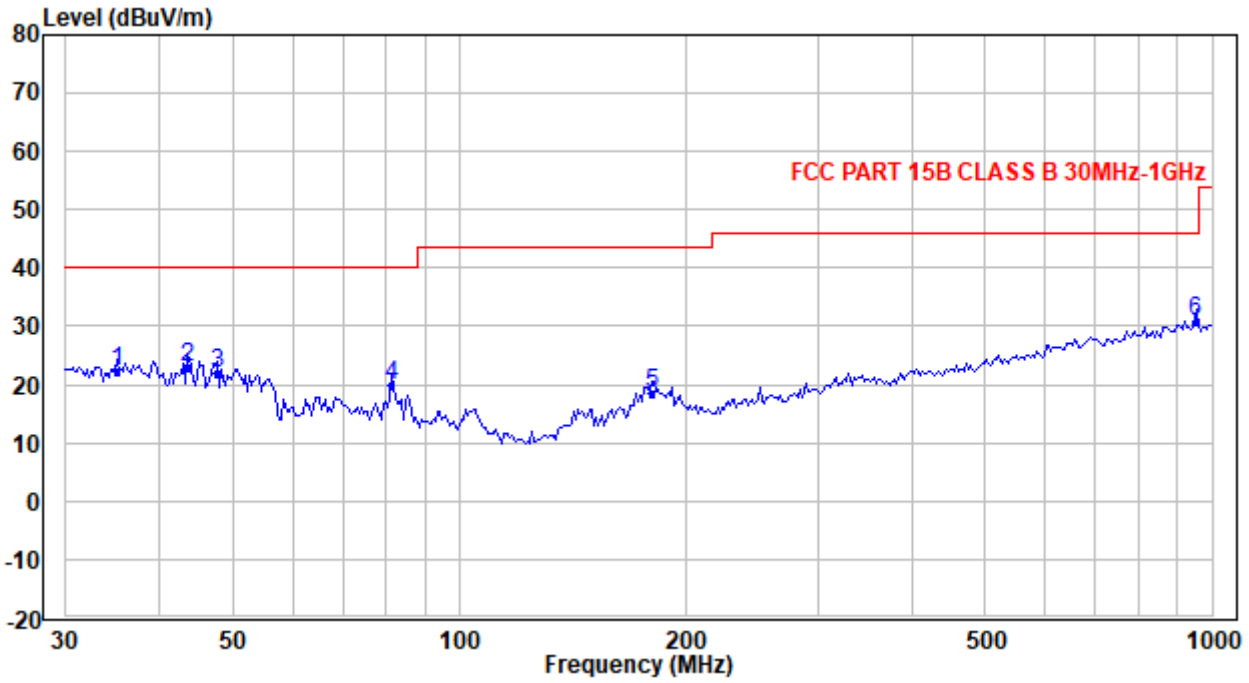
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	31.513	26.83	-5.10	21.73	40.00	-18.27	QP
2	37.565	28.86	-6.35	22.51	40.00	-17.49	QP
3	43.845	33.58	-10.54	23.04	40.00	-16.96	QP
4	81.374	36.42	-17.28	19.14	40.00	-20.86	QP
5	718.725	25.81	1.24	27.05	46.00	-18.95	QP
6	932.141	24.24	4.93	29.17	46.00	-16.83	QP

Vertical



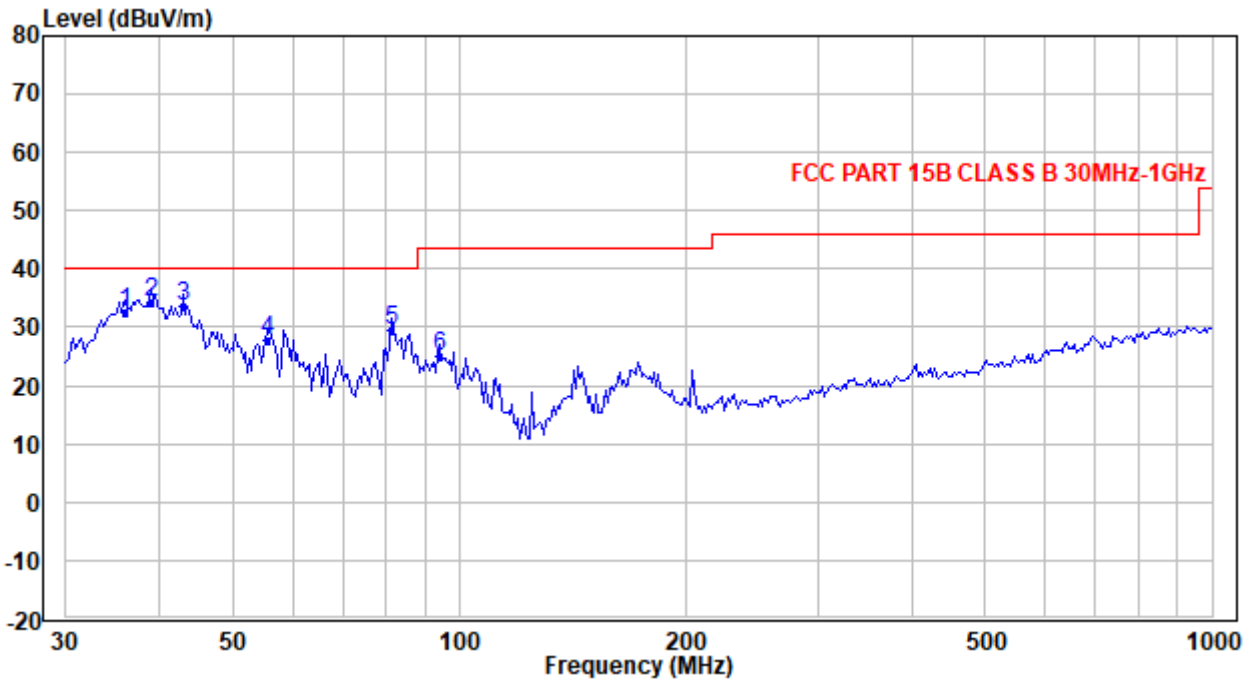
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	38.908	40.33	-7.27	33.06	40.00	-6.94	QP
2	42.630	45.01	-9.21	35.80	40.00	-4.20	QP
3	58.485	47.13	-17.28	29.85	40.00	-10.15	QP
4	81.374	46.95	-17.28	29.67	40.00	-10.33	QP
5	143.776	38.20	-15.35	22.85	43.50	-20.65	QP
6	932.141	23.88	4.93	28.81	46.00	-17.19	QP

Below 1GHz(Quasi Peak):
Test Mode1
Horizontal



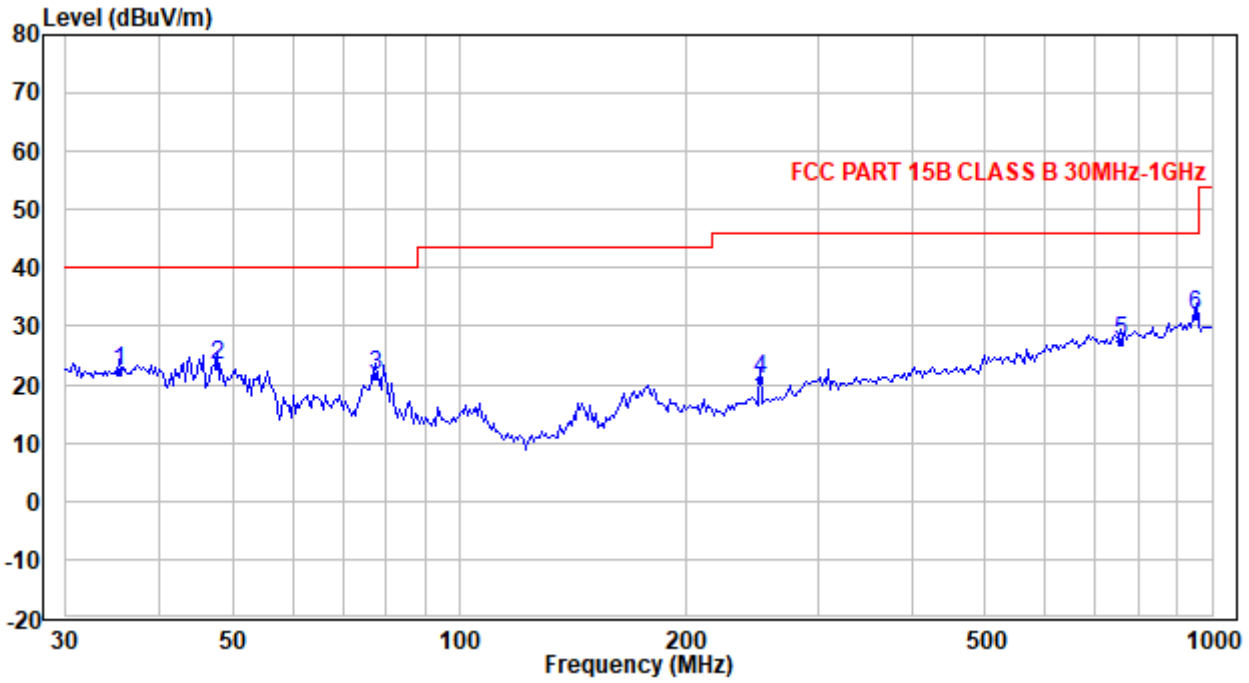
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	35.016	27.89	-5.56	22.33	40.00	-17.67	QP
2	43.538	33.23	-10.14	23.09	40.00	-16.91	QP
3	47.703	35.17	-13.31	21.86	40.00	-18.14	QP
4	81.374	37.31	-17.28	20.03	40.00	-19.97	QP
5	180.030	28.86	-10.26	18.60	43.50	-24.90	QP
6	952.000	26.21	4.60	30.81	46.00	-15.19	QP

Vertical



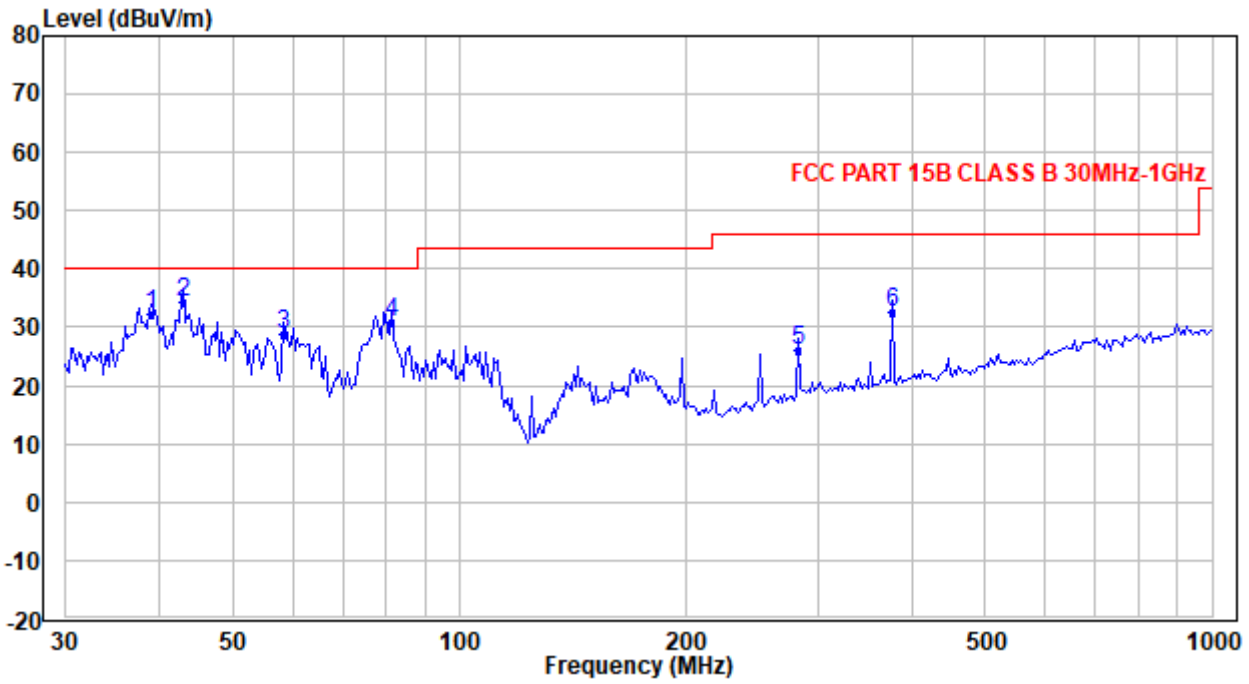
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	36.014	38.44	-5.73	32.71	40.00	-7.29	QP
2	38.908	41.69	-7.27	34.42	40.00	-5.58	QP
3	42.931	43.09	-9.40	33.69	40.00	-6.31	QP
4	55.678	44.59	-16.95	27.64	40.00	-12.36	QP
5	81.374	46.77	-17.28	29.49	40.00	-10.51	QP
6	94.314	40.74	-15.72	25.02	43.50	-18.48	QP

Below 1GHz(Quasi Peak):
Test Mode3
Horizontal



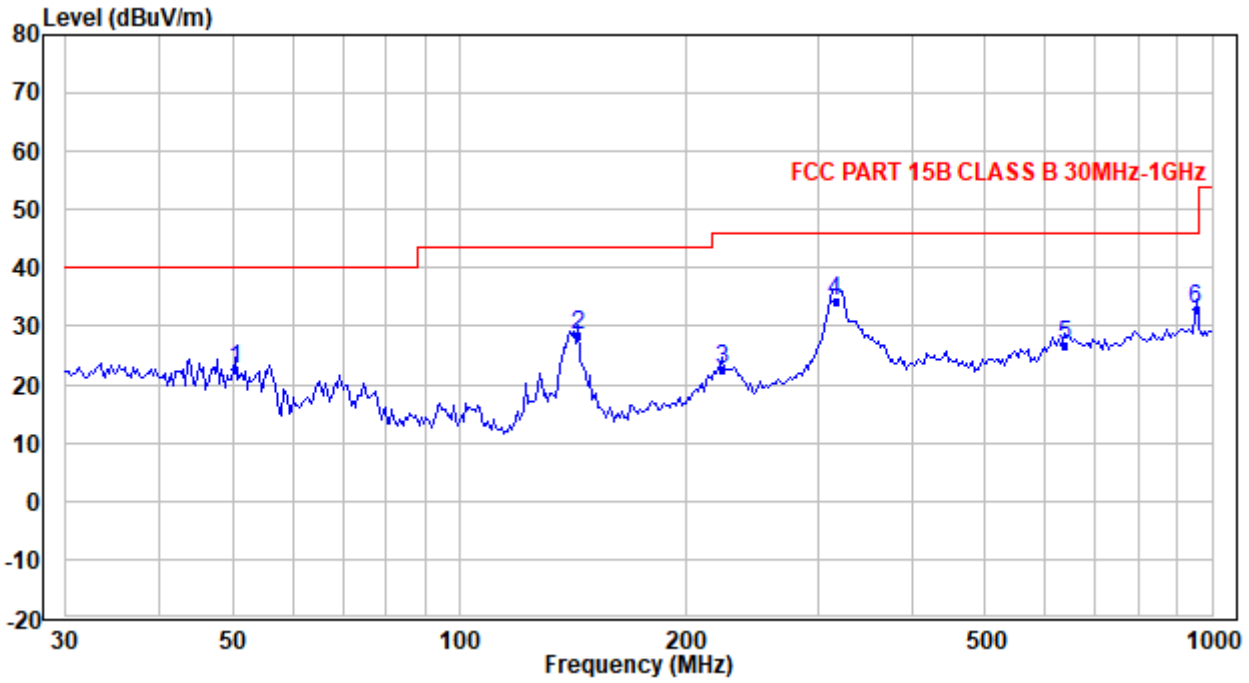
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	35.263	27.86	-5.60	22.26	40.00	-17.74	QP
2	47.703	36.52	-13.31	23.21	40.00	-16.79	QP
3	77.468	38.98	-17.37	21.61	40.00	-18.39	QP
4	250.486	29.82	-8.82	21.00	46.00	-25.00	QP
5	754.963	25.47	2.01	27.48	46.00	-18.52	QP
6	952.000	27.41	4.60	32.01	46.00	-13.99	QP

Vertical



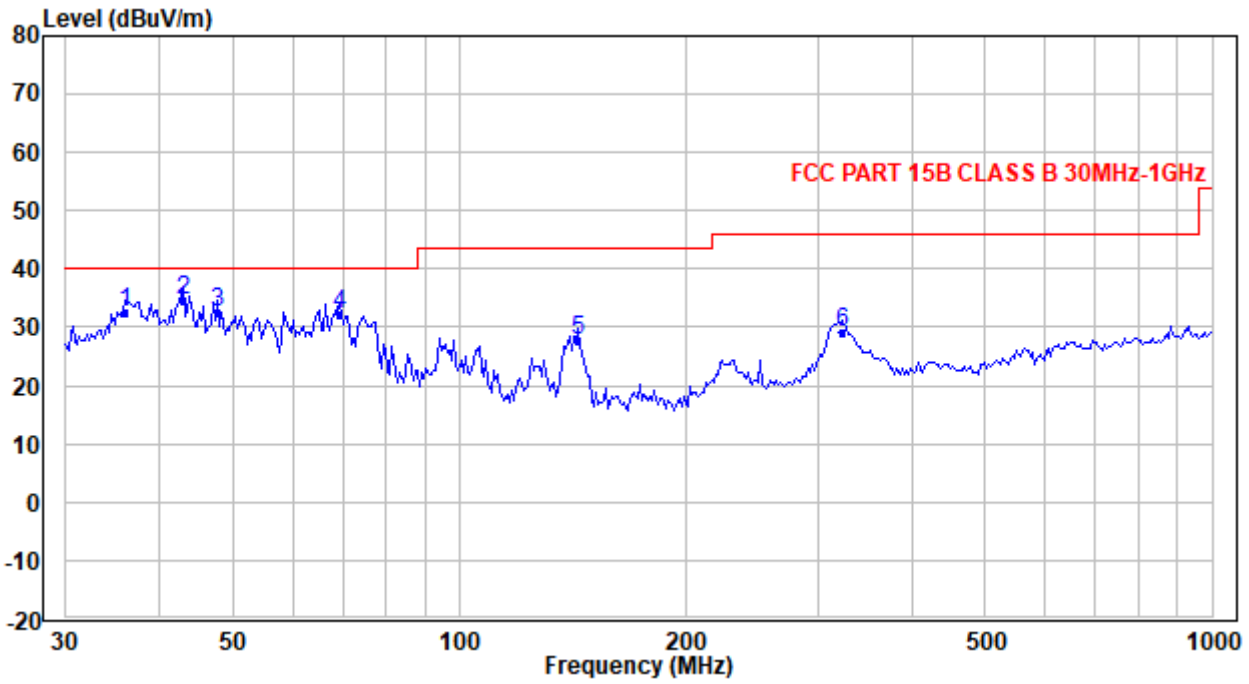
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	38.908	39.37	-7.27	32.10	40.00	-7.90	QP
2	42.931	43.60	-9.40	34.20	40.00	-5.80	QP
3	58.485	46.17	-17.28	28.89	40.00	-11.11	QP
4	81.374	48.11	-17.28	30.83	40.00	-9.17	QP
5	282.270	33.67	-7.47	26.20	46.00	-19.80	QP
6	376.523	37.63	-5.16	32.47	46.00	-13.53	QP

Below 1GHz(Quasi Peak):
Test Mode5
Horizontal



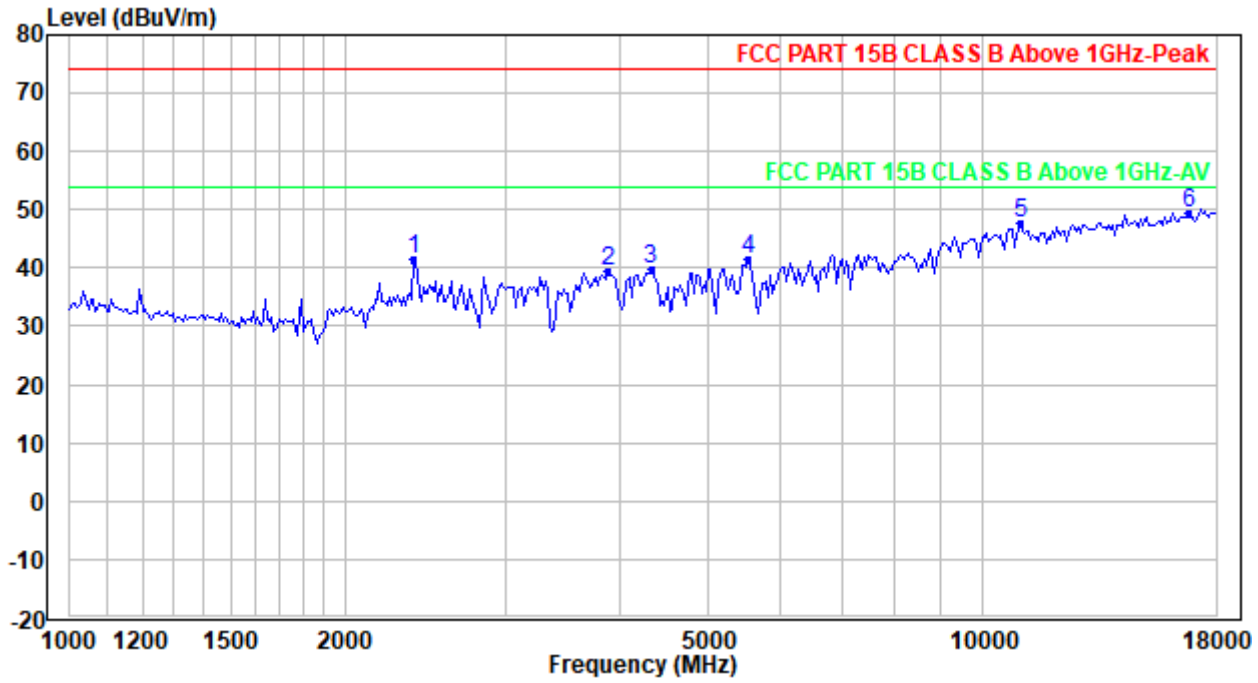
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	50.461	37.49	-14.89	22.60	40.00	-17.40	QP
2	143.776	43.64	-15.35	28.29	43.50	-15.21	QP
3	223.848	33.74	-11.03	22.71	46.00	-23.29	QP
4	315.860	40.38	-5.97	34.41	46.00	-11.59	QP
5	637.795	26.47	0.40	26.87	46.00	-19.13	QP
6	952.000	28.16	4.60	32.76	46.00	-13.24	QP

Vertical



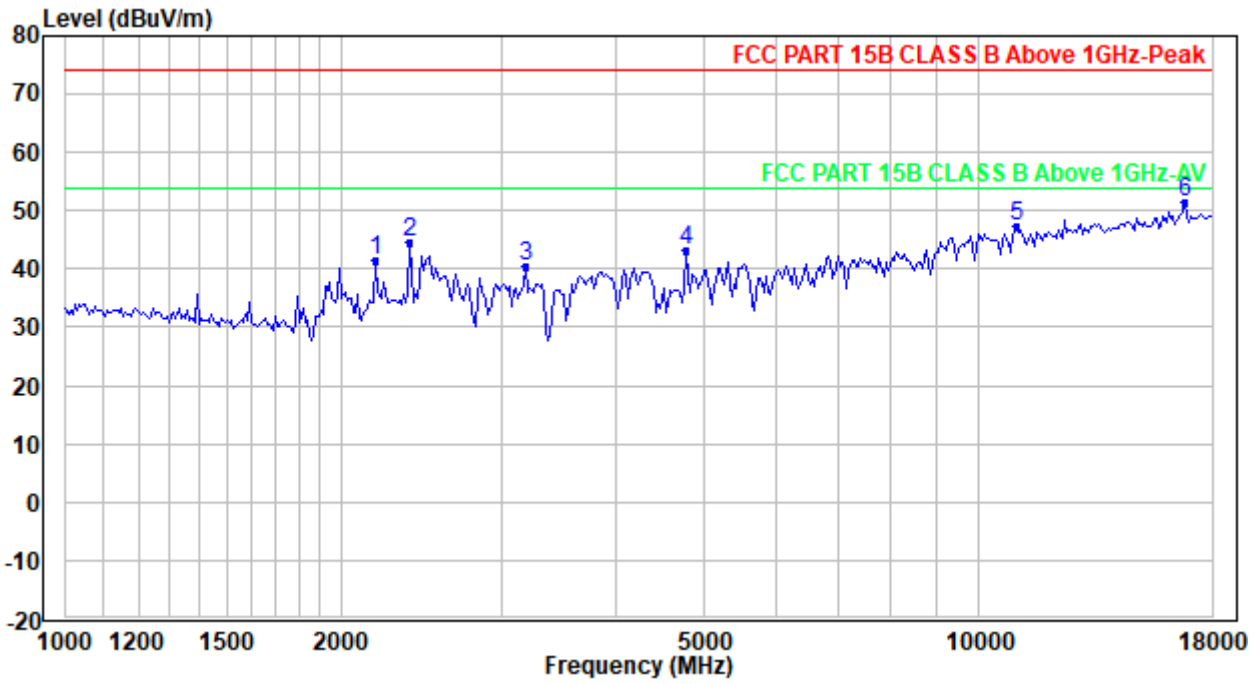
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	36.014	38.34	-5.73	32.61	40.00	-7.39	QP
2	42.931	44.01	-9.40	34.61	40.00	-5.39	QP
3	47.703	45.78	-13.31	32.47	40.00	-7.53	QP
4	69.230	49.64	-17.24	32.40	40.00	-7.60	QP
5	143.776	43.12	-15.35	27.77	43.50	-15.73	QP
6	322.590	34.80	-5.71	29.09	46.00	-16.91	QP

Above 1GHz(Peak & Average)
Test Mode4:
Horizontal



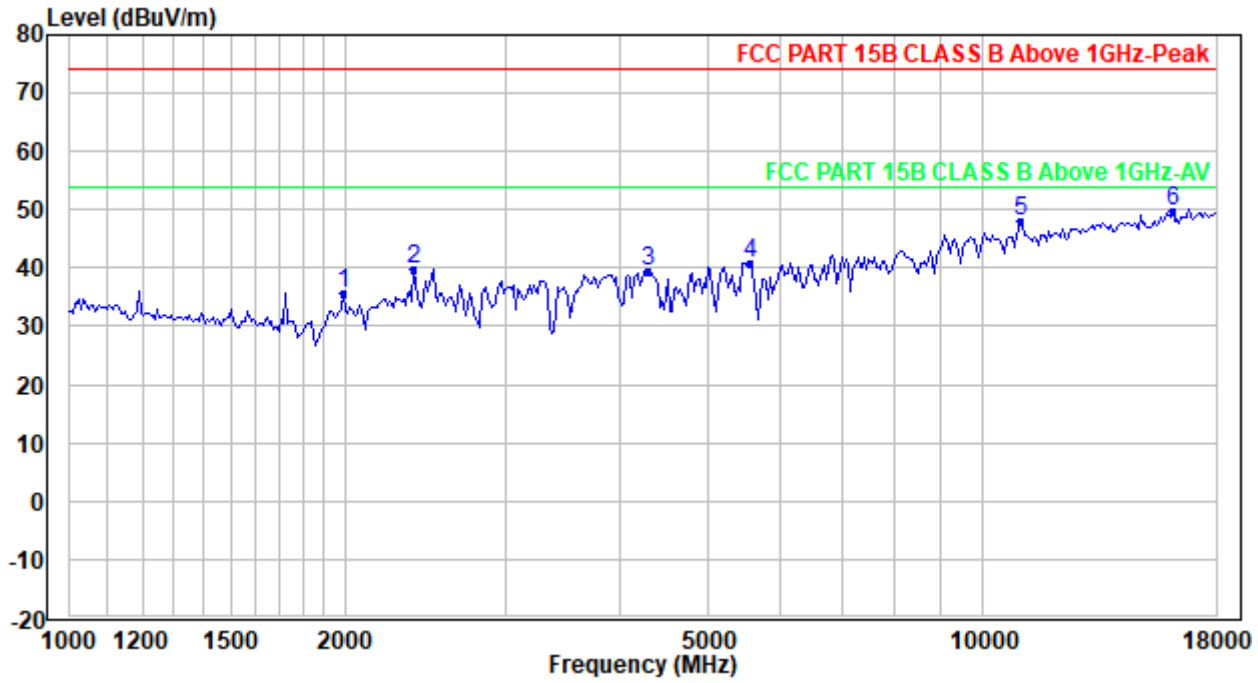
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	2384.166	49.84	-8.46	41.38	74.00	-32.62	Peak
2	3878.331	43.04	-3.53	39.51	74.00	-34.49	Peak
3	4329.530	42.51	-2.64	39.87	74.00	-34.13	Peak
4	5521.982	41.41	0.09	41.50	74.00	-32.50	Peak
5	11001.420	40.45	7.42	47.87	74.00	-26.13	Peak
6	16791.350	36.89	12.61	49.50	74.00	-24.50	Peak

Vertical



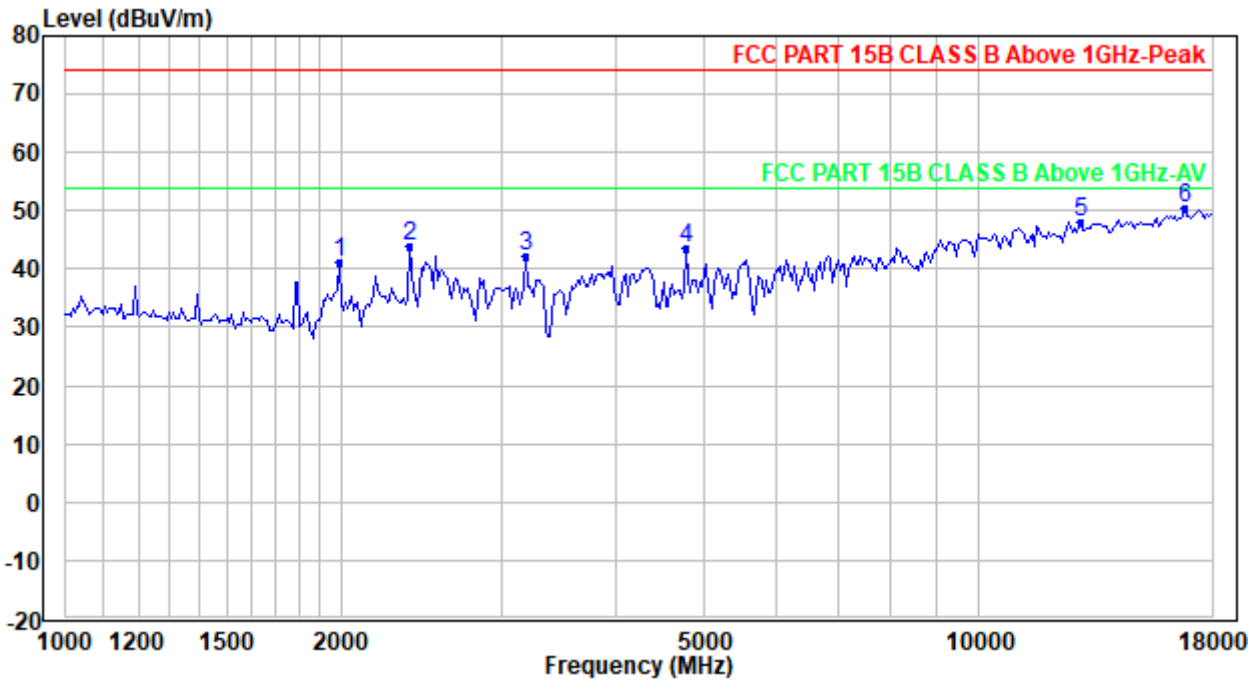
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2185.761	50.68	-9.16	41.52	74.00	-32.48	Peak
2	2384.166	52.99	-8.46	44.53	74.00	-29.47	Peak
3	3185.042	46.53	-6.05	40.48	74.00	-33.52	Peak
4	4777.554	45.52	-2.37	43.15	74.00	-30.85	Peak
5	11001.420	39.95	7.42	47.37	74.00	-26.63	Peak
6	16791.350	38.81	12.61	51.42	74.00	-22.58	Peak

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



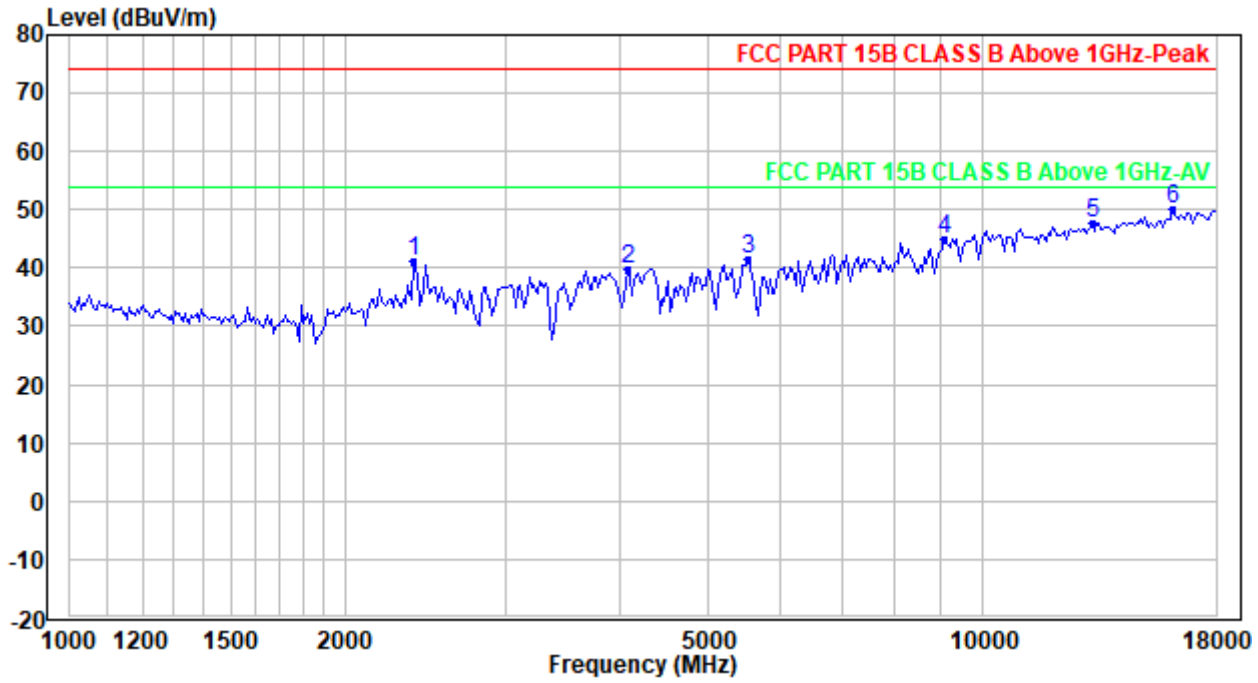
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1992.295	45.39	-9.59	35.80	74.00	-38.20	Peak
2	2384.166	48.34	-8.46	39.88	74.00	-34.12	Peak
3	4304.524	42.28	-2.66	39.62	74.00	-34.38	Peak
4	5554.060	40.89	0.02	40.91	74.00	-33.09	Peak
5	11001.420	40.76	7.42	48.18	74.00	-25.82	Peak
6	16124.140	37.72	11.97	49.69	74.00	-24.31	Peak

Vertical



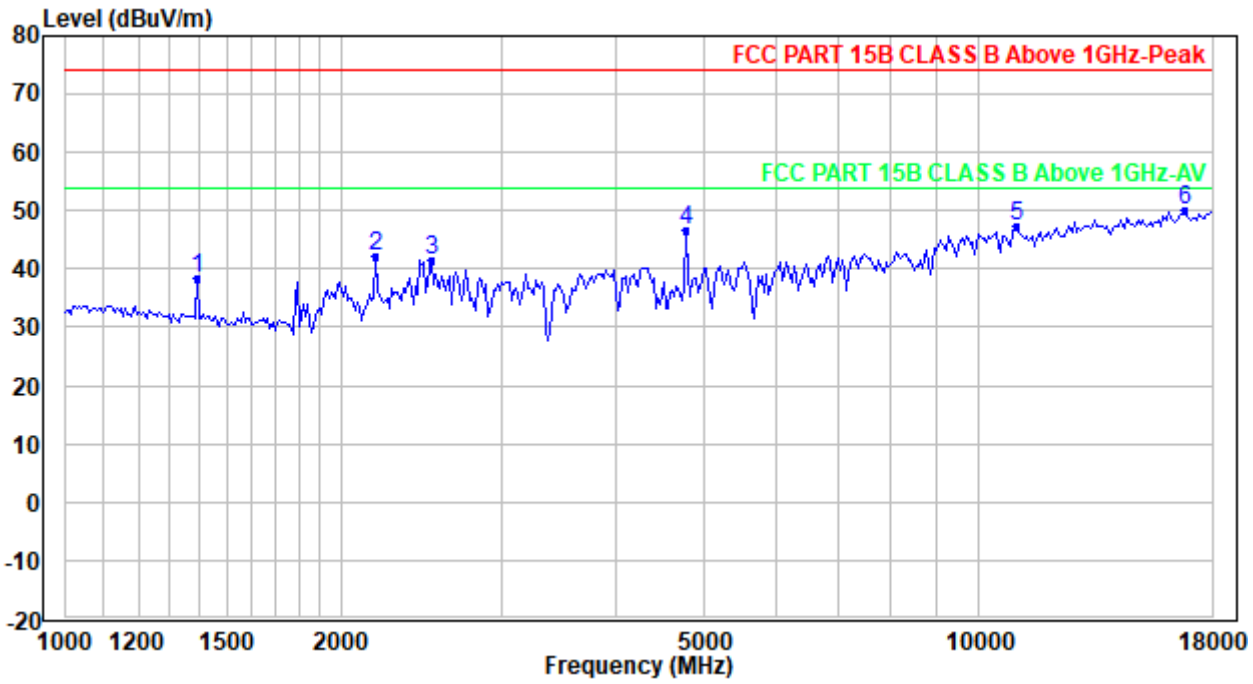
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1992.295	50.93	-9.59	41.34	74.00	-32.66	Peak
2	2384.166	52.23	-8.46	43.77	74.00	-30.23	Peak
3	3185.042	48.31	-6.05	42.26	74.00	-31.74	Peak
4	4777.554	45.88	-2.37	43.51	74.00	-30.49	Peak
5	12938.520	37.92	10.28	48.20	74.00	-25.80	Peak
6	16791.350	37.72	12.61	50.33	74.00	-23.67	Peak

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



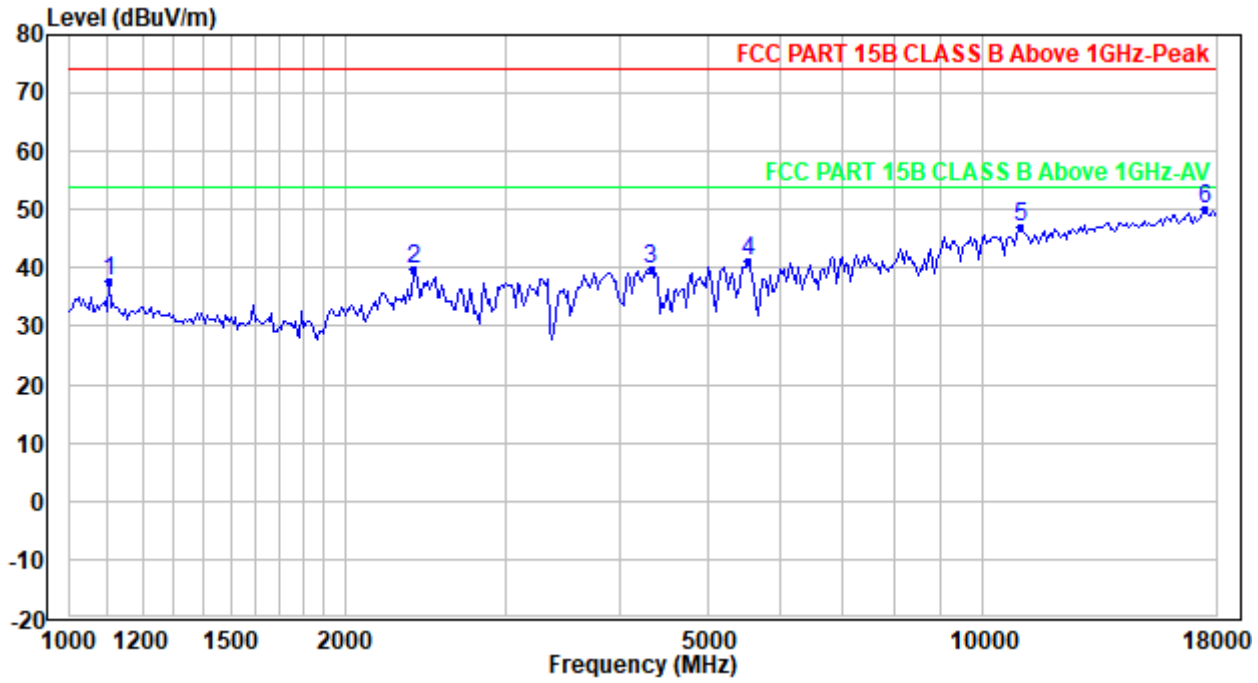
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2384.166	49.74	-8.46	41.28	74.00	-32.72	Peak
2	4085.874	42.81	-2.97	39.84	74.00	-34.16	Peak
3	5521.982	41.45	0.09	41.54	74.00	-32.46	Peak
4	9087.293	40.02	5.09	45.11	74.00	-28.89	Peak
5	13165.320	36.78	10.86	47.64	74.00	-26.36	Peak
6	16124.140	38.14	11.97	50.11	74.00	-23.89	Peak

Vertical



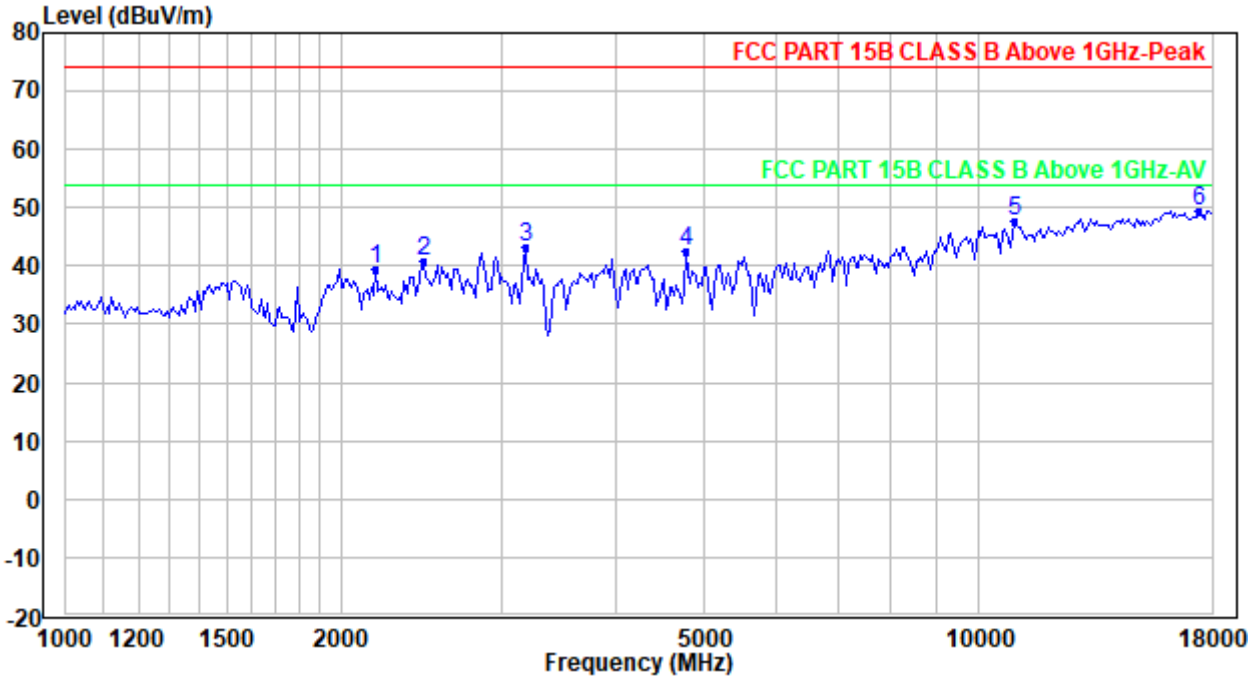
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1391.194	51.02	-12.67	38.35	74.00	-35.65	Peak
2	2185.761	51.20	-9.16	42.04	74.00	-31.96	Peak
3	2511.751	49.71	-8.03	41.68	74.00	-32.32	Peak
4	4777.554	48.95	-2.37	46.58	74.00	-27.42	Peak
5	11001.420	39.84	7.42	47.26	74.00	-26.74	Peak
6	16791.350	37.34	12.61	49.95	74.00	-24.05	Peak

Above 1GHz(Peak & Average)
Test Mode5:
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1103.481	51.20	-13.32	37.88	74.00	-36.12	Peak
2	2384.166	48.24	-8.46	39.78	74.00	-34.22	Peak
3	4329.530	42.48	-2.64	39.84	74.00	-34.16	Peak
4	5521.982	41.06	0.09	41.15	74.00	-32.85	Peak
5	11001.420	39.63	7.42	47.05	74.00	-26.95	Peak
6	17486.170	36.49	13.48	49.97	74.00	-24.03	Peak

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	2185.761	48.50	-9.16	39.34	74.00	-34.66	Peak
2	2468.481	48.83	-8.16	40.67	74.00	-33.33	Peak
3	3185.042	49.15	-6.05	43.10	74.00	-30.90	Peak
4	4777.554	44.78	-2.37	42.41	74.00	-31.59	Peak
5	10937.880	40.45	7.29	47.74	74.00	-26.26	Peak
6	17385.170	36.23	13.33	49.56	74.00	-24.44	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:

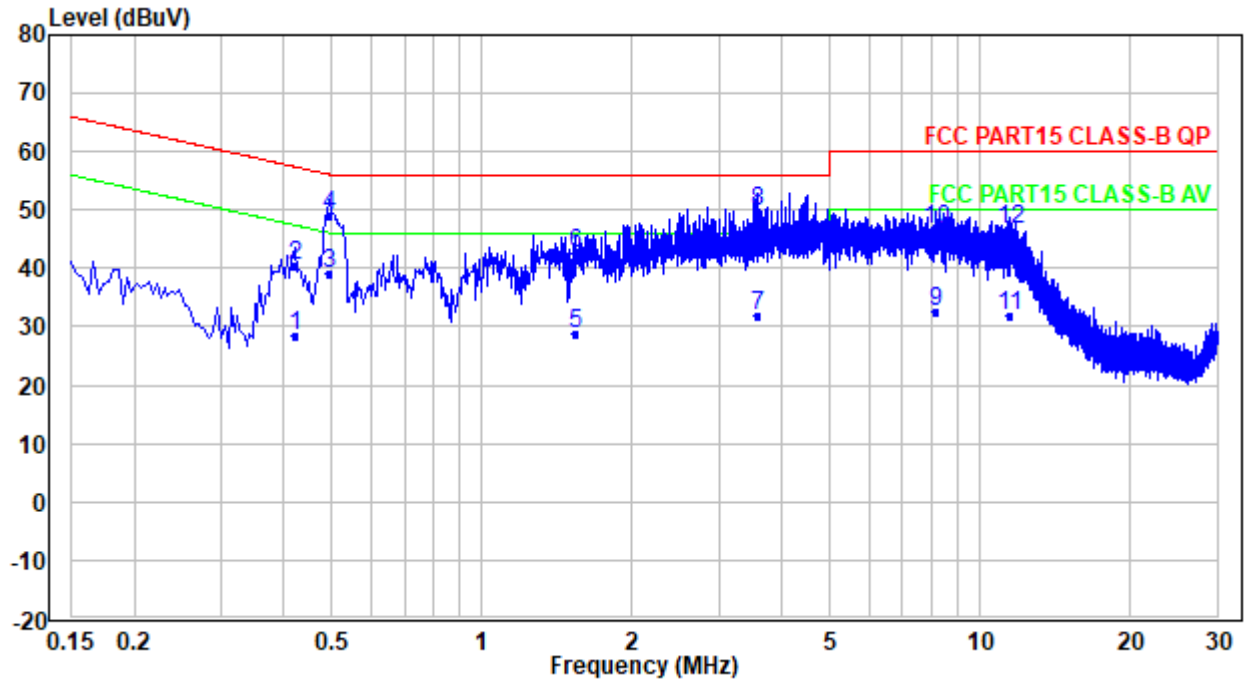
1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak 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

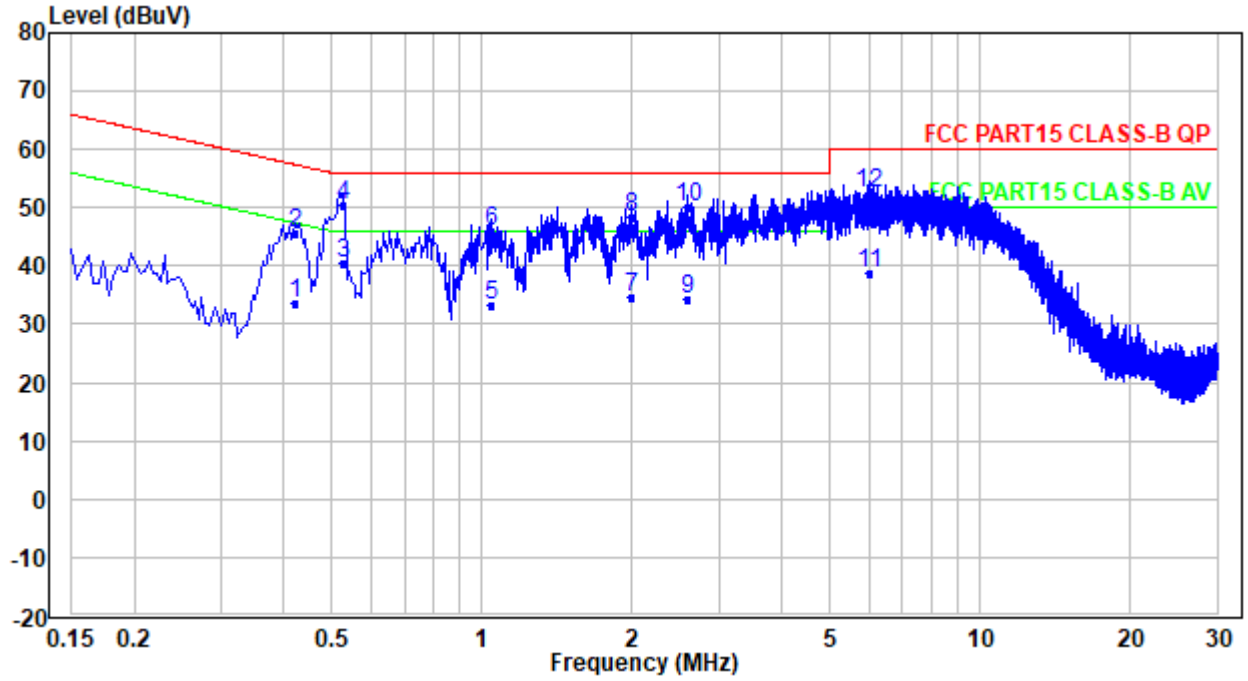
The measurement data as follows:
Quasi Peak and Average:
Test Mode1:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.422	18.50	10.04	28.54	47.41	-18.87	Average
2	0.422	30.50	10.04	40.54	57.41	-16.87	QP
3	0.494	28.91	10.04	38.95	46.10	-7.15	Average
4	0.494	38.91	10.04	48.95	56.10	-7.15	QP
5	1.538	18.62	10.09	28.71	46.00	-17.29	Average
6	1.538	32.62	10.09	42.71	56.00	-13.29	QP
7	3.566	21.68	10.24	31.92	46.00	-14.08	Average
8	3.566	39.68	10.24	49.92	56.00	-6.08	QP
9	8.137	22.13	10.47	32.60	50.00	-17.40	Average
10	8.137	36.13	10.47	46.60	60.00	-13.40	QP
11	11.493	21.19	10.64	31.83	50.00	-18.17	Average
12	11.493	36.19	10.64	46.83	60.00	-13.17	QP

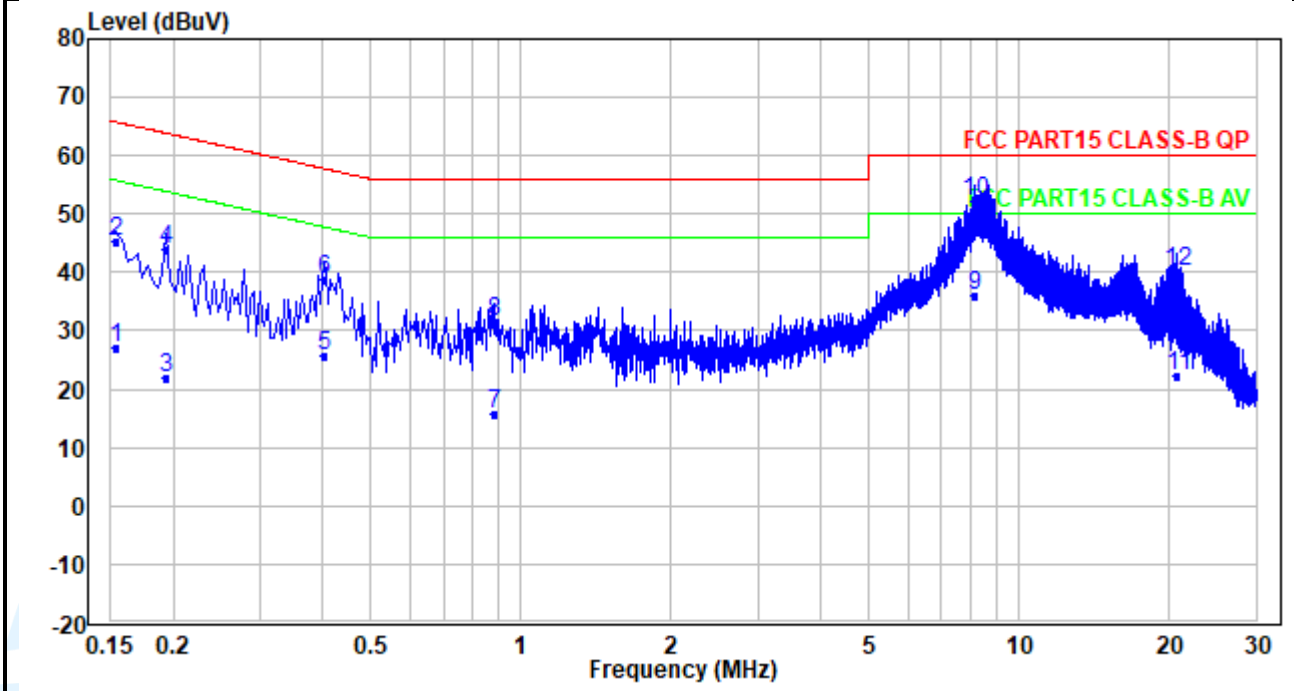
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.422	23.47	10.02	33.49	47.41	-13.92	Average
2	0.422	35.47	10.02	45.49	57.41	-11.92	QP
3	0.526	30.44	10.03	40.47	46.00	-5.53	Average
4	0.526	40.44	10.03	50.47	56.00	-5.53	QP
5	1.046	23.08	10.05	33.13	46.00	-12.87	Average
6	1.046	36.08	10.05	46.13	56.00	-9.87	QP
7	2.006	24.43	10.10	34.53	46.00	-11.47	Average
8	2.006	38.43	10.10	48.53	56.00	-7.47	QP
9	2.594	23.97	10.15	34.12	46.00	-11.88	Average
10	2.594	39.97	10.15	50.12	56.00	-5.88	QP
11	5.986	28.26	10.36	38.62	50.00	-11.38	Average
12	5.986	42.26	10.36	52.62	60.00	-7.38	QP

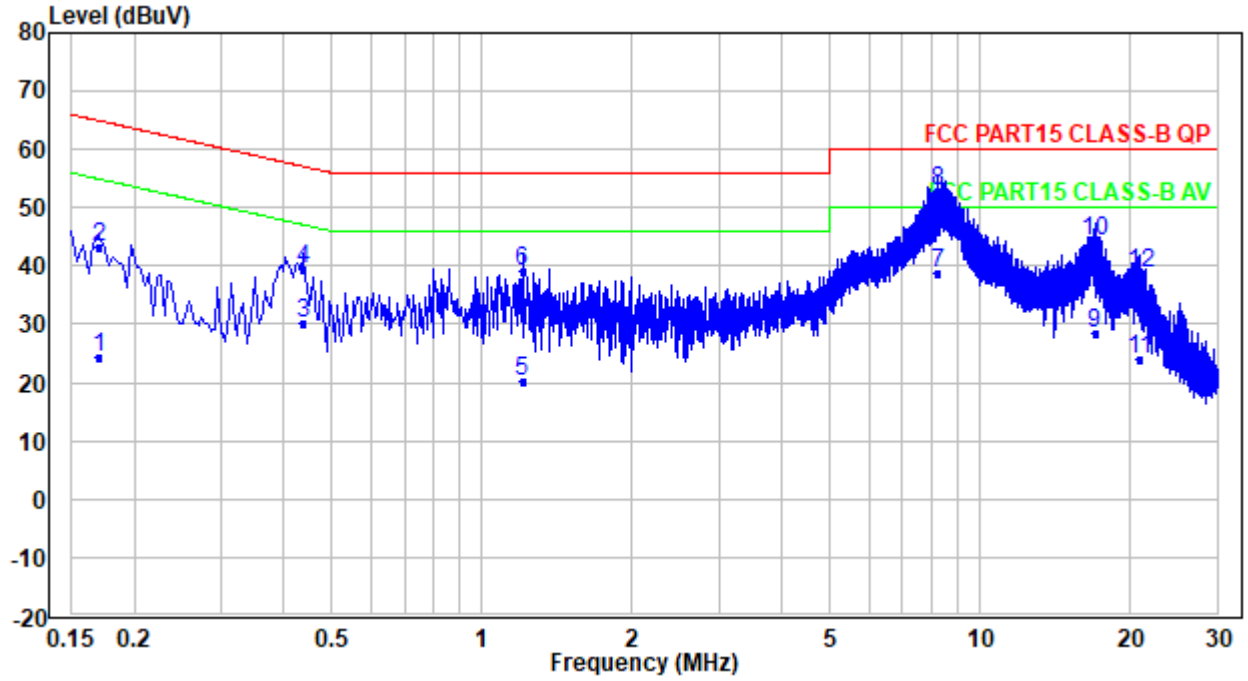
Quasi Peak and Average:
Test Mode2:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.154	17.13	10.03	27.16	55.78	-28.62	Average
2	0.154	35.13	10.03	45.16	65.78	-20.62	QP
3	0.194	11.76	10.02	21.78	53.86	-32.08	Average
4	0.194	33.76	10.02	43.78	63.86	-20.08	QP
5	0.402	15.70	10.04	25.74	47.81	-22.07	Average
6	0.402	28.70	10.04	38.74	57.81	-19.07	QP
7	0.882	5.53	10.06	15.59	46.00	-30.41	Average
8	0.882	21.53	10.06	31.59	56.00	-24.41	QP
9	8.177	25.53	10.48	36.01	50.00	-13.99	Average
10	8.177	41.53	10.48	52.01	60.00	-7.99	QP
11	20.885	10.82	11.32	22.14	50.00	-27.86	Average
12	20.885	28.82	11.32	40.14	60.00	-19.86	QP

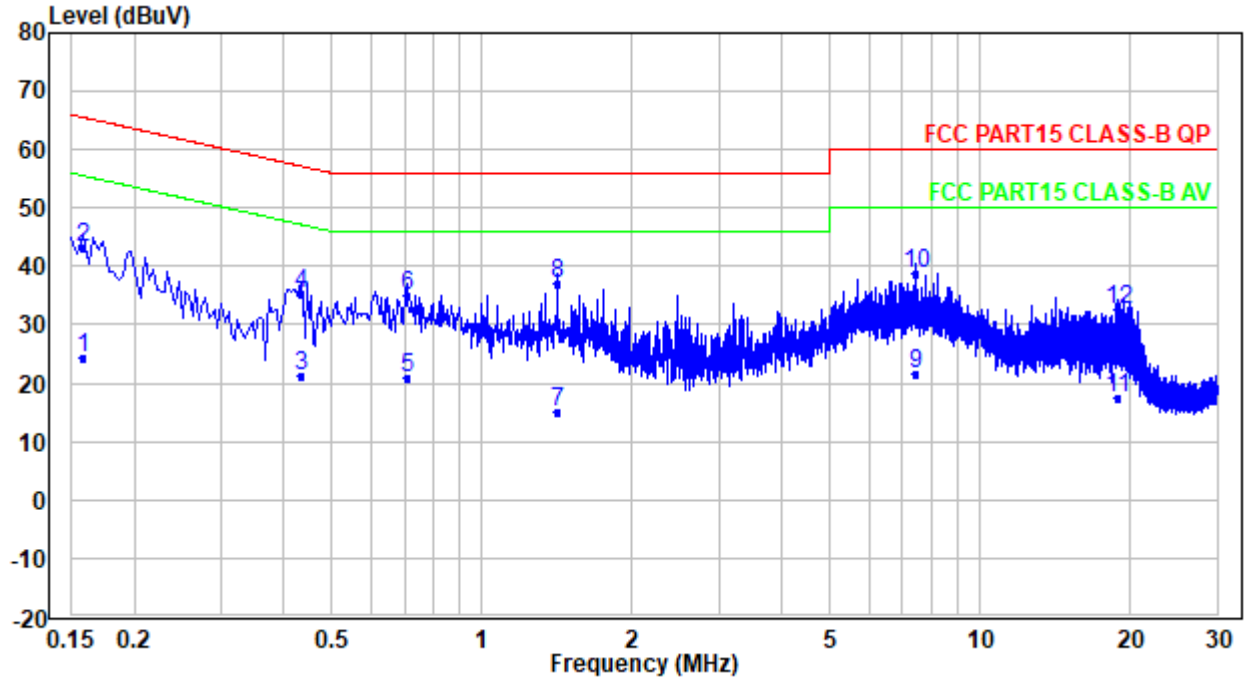
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.170	14.26	10.01	24.27	54.96	-30.69	Average
2	0.170	33.26	10.01	43.27	64.96	-21.69	QP
3	0.438	20.26	10.02	30.28	47.10	-16.82	Average
4	0.438	29.26	10.02	39.28	57.10	-17.82	QP
5	1.206	10.02	10.07	20.09	46.00	-25.91	Average
6	1.206	29.02	10.07	39.09	56.00	-16.91	QP
7	8.273	28.31	10.44	38.75	50.00	-11.25	Average
8	8.273	42.31	10.44	52.75	60.00	-7.25	QP
9	17.045	17.43	10.97	28.40	50.00	-21.60	Average
10	17.045	33.43	10.97	44.40	60.00	-15.60	QP
11	20.949	12.65	11.19	23.84	50.00	-26.16	Average
12	20.949	27.65	11.19	38.84	60.00	-21.16	QP

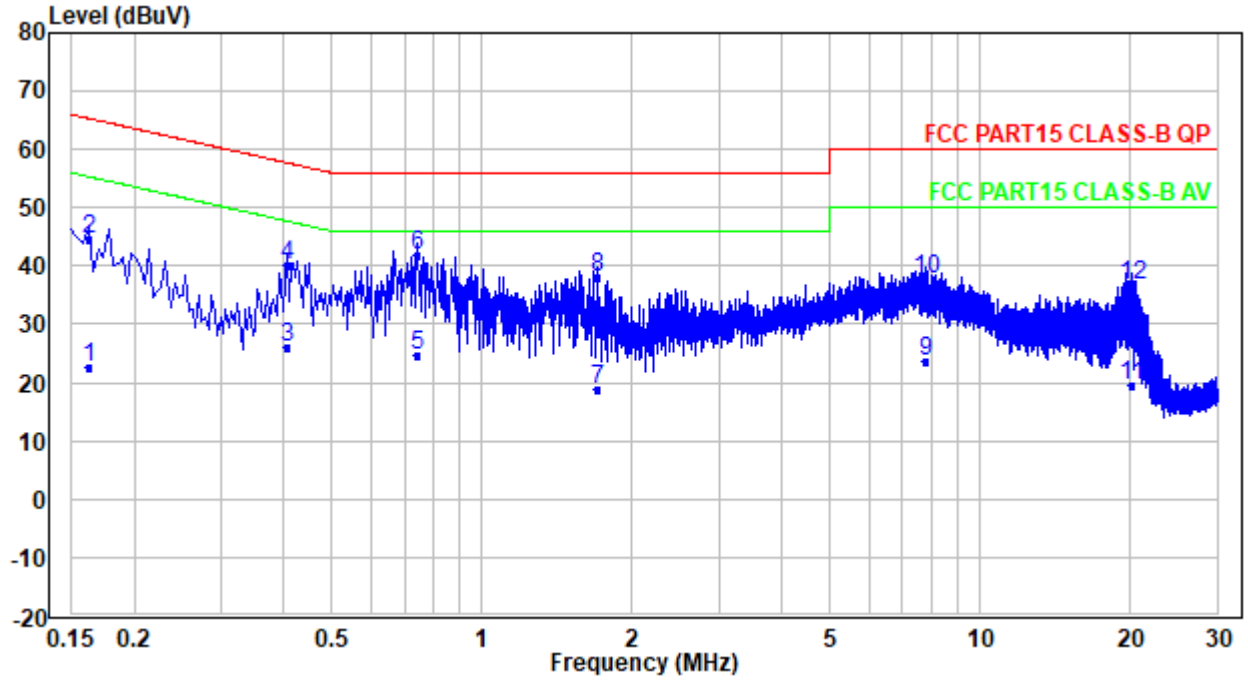
Quasi Peak and Average:
Test Mode3:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.158	14.31	10.03	24.34	55.57	-31.23	Average
2	0.158	33.31	10.03	43.34	65.57	-22.23	QP
3	0.434	11.12	10.04	21.16	47.18	-26.02	Average
4	0.434	25.12	10.04	35.16	57.18	-22.02	QP
5	0.706	10.99	10.05	21.04	46.00	-24.96	Average
6	0.706	24.99	10.05	35.04	56.00	-20.96	QP
7	1.418	4.83	10.09	14.92	46.00	-31.08	Average
8	1.418	26.83	10.09	36.92	56.00	-19.08	QP
9	7.446	11.17	10.45	21.62	50.00	-28.38	Average
10	7.446	28.17	10.45	38.62	60.00	-21.38	QP
11	18.977	6.26	11.19	17.45	50.00	-32.55	Average
12	18.977	21.26	11.19	32.45	60.00	-27.55	QP

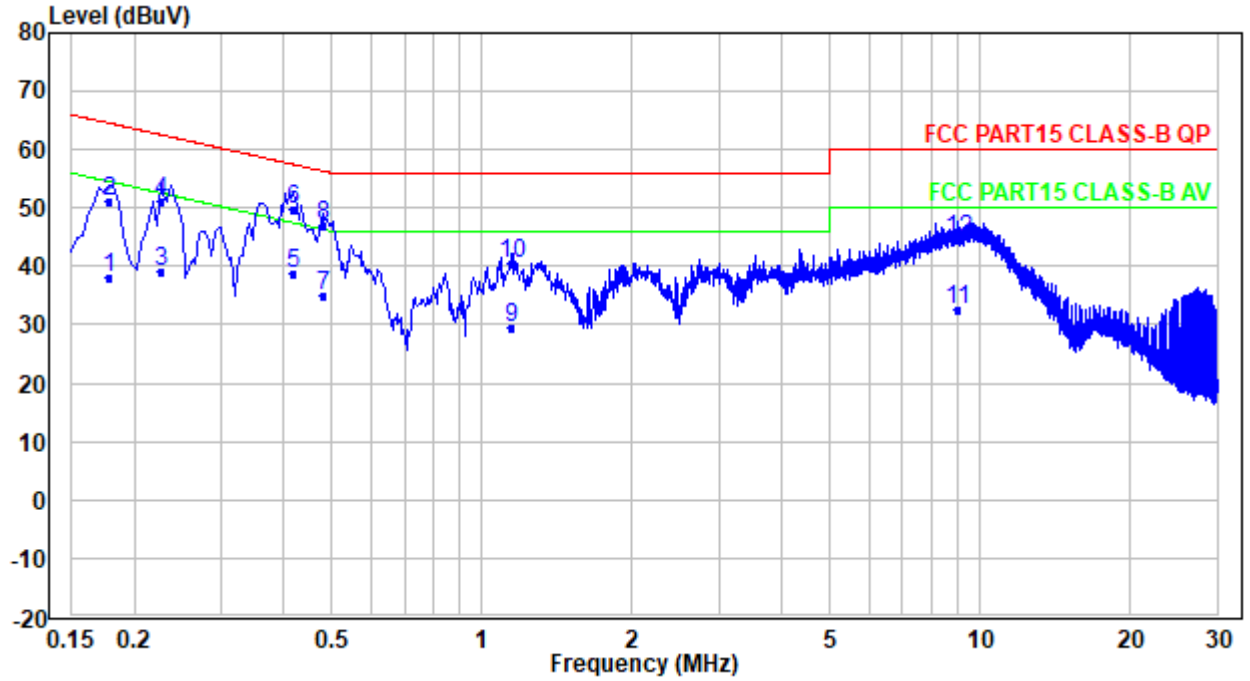
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.162	12.63	10.02	22.65	55.36	-32.71	Average
2	0.162	34.63	10.02	44.65	65.36	-20.71	QP
3	0.406	16.03	10.02	26.05	47.73	-21.68	Average
4	0.406	30.03	10.02	40.05	57.73	-17.68	QP
5	0.742	14.77	10.04	24.81	46.00	-21.19	Average
6	0.742	31.77	10.04	41.81	56.00	-14.19	QP
7	1.710	8.86	10.09	18.95	46.00	-27.05	Average
8	1.710	27.86	10.09	37.95	56.00	-18.05	QP
9	7.817	13.33	10.42	23.75	50.00	-26.25	Average
10	7.817	27.33	10.42	37.75	60.00	-22.25	QP
11	20.245	8.48	11.15	19.63	50.00	-30.37	Average
12	20.245	25.48	11.15	36.63	60.00	-23.37	QP

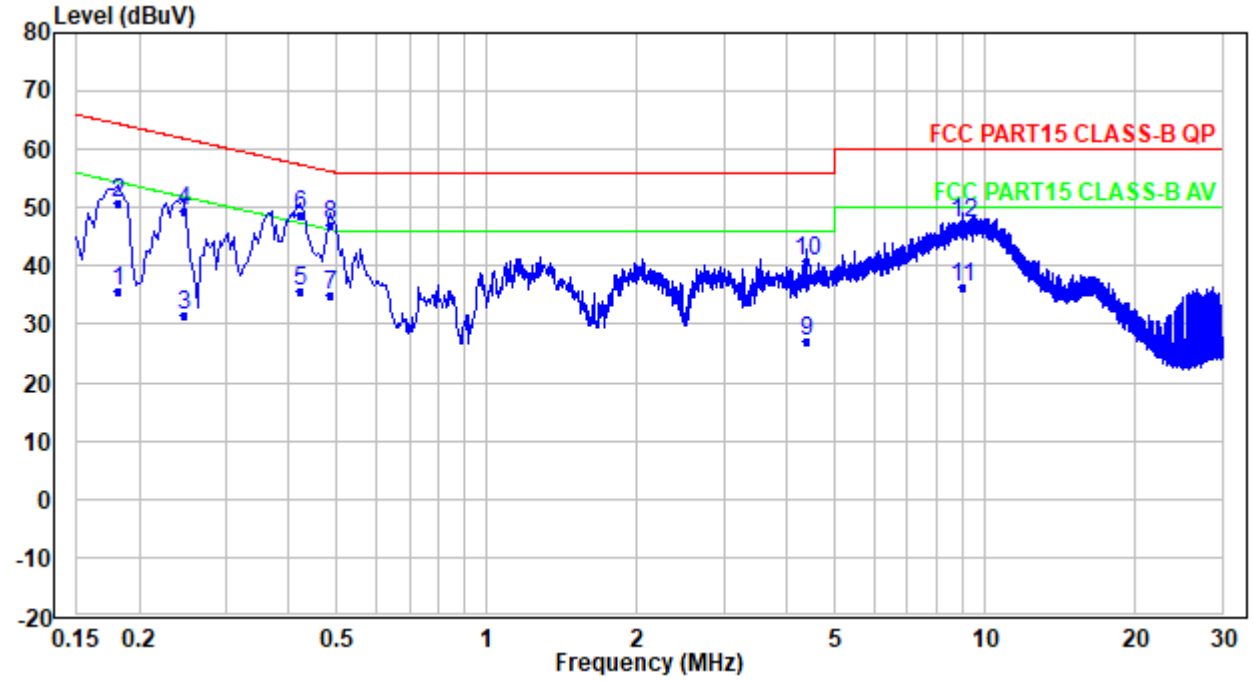
Quasi Peak and Average:
Test Mode5:

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.178	27.95	10.02	37.97	54.58	-16.61	Average
2	0.178	40.95	10.02	50.97	64.58	-13.61	QP
3	0.226	29.04	10.02	39.06	52.60	-13.54	Average
4	0.226	41.04	10.02	51.06	62.60	-11.54	QP
5	0.418	28.63	10.04	38.67	47.49	-8.82	Average
6	0.418	39.63	10.04	49.67	57.49	-7.82	QP
7	0.482	25.00	10.04	35.04	46.30	-11.26	Average
8	0.482	37.00	10.04	47.04	56.30	-9.26	QP
9	1.150	19.25	10.07	29.32	46.00	-16.68	Average
10	1.150	30.25	10.07	40.32	56.00	-15.68	QP
11	9.017	22.14	10.51	32.65	50.00	-17.35	Average
12	9.017	34.14	10.51	44.65	60.00	-15.35	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.182	25.77	10.00	35.77	54.39	-18.62	Average
2	0.182	40.77	10.00	50.77	64.39	-13.62	QP
3	0.246	21.52	10.01	31.53	51.89	-20.36	Average
4	0.246	39.52	10.01	49.53	61.89	-12.36	QP
5	0.422	25.68	10.02	35.70	47.41	-11.71	Average
6	0.422	38.68	10.02	48.70	57.41	-8.71	QP
7	0.486	24.99	10.03	35.02	46.24	-11.22	Average
8	0.486	36.99	10.03	47.02	56.24	-9.22	QP
9	4.374	16.66	10.28	26.94	46.00	-19.06	Average
10	4.374	30.66	10.28	40.94	56.00	-15.06	QP
11	9.013	25.74	10.46	36.20	50.00	-13.80	Average
12	9.013	36.74	10.46	47.20	60.00	-12.80	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 **********