Certificate #4312.01

TEST REPORT

Product Name:	Analog Telephone Adaptor
Trade Mark:	GRANDSTREAM
Model No. / HVIN:	HT812
Add. Model No.:	N/A
Report Number:	211228019EMC-1
Test Standards:	FCC 47 CFR Part 15 Subpart B ICES-003 Issue 7
FCC ID:	YZZHT812V2
Test Result:	PASS
Date of Issue:	January 20, 2022

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
TEL: +86-755-2823 0888
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Prepared by:	Gavin Xu Project Engineer	Reviewed by:	Kevin Liang Assistant Manager
Approved by:	Technical Director	Date:	January 20, 2022

Version

Version No.	Date	Description
V1.0	January 20, 2022	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:	Analog Telephone Adaptor
Model No.:	HT812
Add. Model No.:	N/A
Trade Mark:	GRANDSTREAM
DUT Stage:	Production Unit
Rated Voltage:	Adapter: Input: 100-240 V~50/60 Hz Output:12 V ⎓ 0.5 A
Classification of digital devices:	Class B
Highest Internal Frequency:	600 MHz
Software Version:	1.0.33.1
Hardware Version:	V4.0
Sample Received Date:	December 28, 2021
Sample Tested Date:	January 3, 2022 to January 6, 2022

1.2.2 Description of Accessories

Adapter 1	
Model No.:	GQ06-120050-ZU
Input:	100-240 V~50/60 Hz,0.3 A Max
Output:	12 V ⎓ 0.5 A
DC Cable:	1.8 Meter, Unshielded without ferrite

Adapter 2	
Model No.:	F06US1200050A
Input:	100-240 V~50/60 Hz,0.2 A Max
Output:	12 V ⎓ 0.5 A
DC Cable:	1.8 Meter, Unshielded without ferrite

Adapter 3	
Model No.:	NBS05B120050VU
Input:	100-240 V~50/60 Hz,0.2 A
Output:	12 V ⎓ 0.5 A
DC Cable:	1.8 Meter, Unshielded without ferrite

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
IP Phone	GRANDSTREAM	GRP2614	N/A	Applicant
Telephone	CHINO E	HCD6238(28)P/TSD16	110100001	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Ethernet Cable	RJ45	1.5 Meter	Applicant
2	Digital Audio Cable	RJ11	1.5 Meter	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 – 3m SAC						
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	ROHDE & SCHWARZ	ESIB26	100114	Nov. 05, 2021	Nov. 04, 2022
☒	Broadband Antenna	ETS-Lindgren	3142E	00201566	Nov. 11, 2021	Nov. 10, 2023
☒	Pre-amplifier	HP	8447F	2805A02960	Nov. 05, 2021	Nov. 04, 2022
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 11, 2021	Nov. 10, 2023
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-Lindgren	3117-PA	00201541	Apr. 30, 2021	Apr. 29, 2023
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	Nov. 05, 2021	Nov. 04, 2022
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 05, 2021	Nov. 04, 2022
☒	Receiver	R&S	ESR7	101181	Nov. 05, 2021	Nov. 04, 2022
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 05, 2021	Nov. 04, 2022
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 05, 2021	Nov. 04, 2022
☒	Test Software	Audix	e3	Software Version: 9 20151119i		

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	Relative Humidity (%)
NT/NV	+15 to +35	1. 120~60Hz 2. 240~50Hz	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Radiated Emission	23.5	45	100.1	Asia Yan
Conducted Emission	24.6	47	101.1	David Zhang

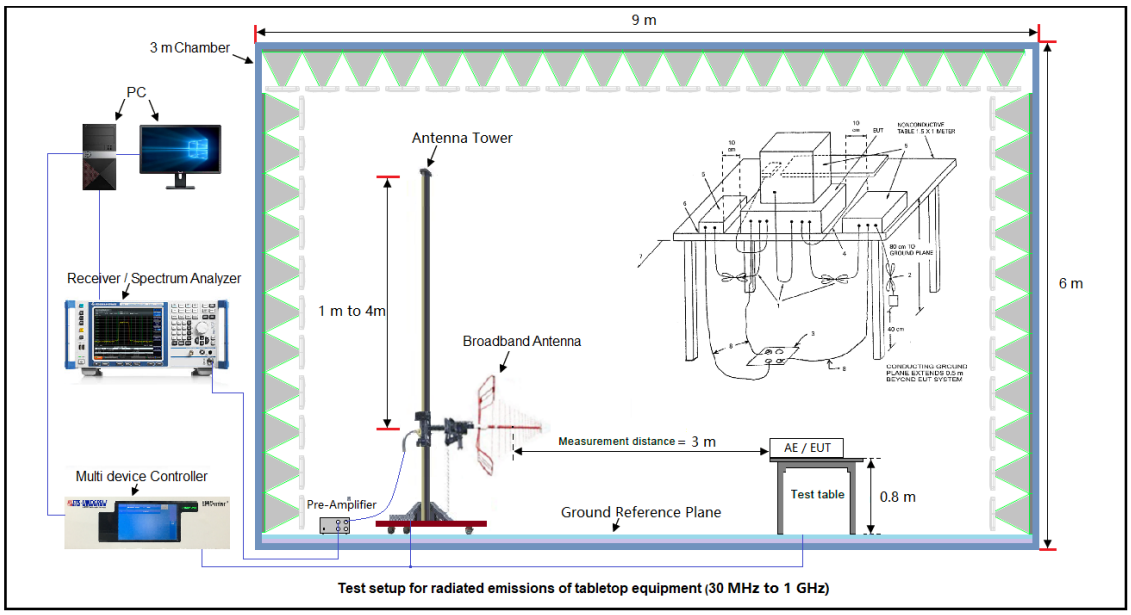
4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Telephone communication + RJ45 communication Test Mode 2: AC120V/60Hz (Adapter2) + Telephone communication + RJ45 communication Test Mode 3: AC120V/60Hz (Adapter3) + Telephone communication + RJ45 communication Test Mode 4: AC240V/50Hz + Worse from mode 1~3
Conducted Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Telephone communication + RJ45 communication Test Mode 2: AC120V/60Hz (Adapter2) + Telephone communication + RJ45 communication Test Mode 3: AC120V/60Hz (Adapter3) + Telephone communication + RJ45 communication Test Mode 4: AC240V/50Hz + Worse from mode 1~3

4.3 TEST SETUP

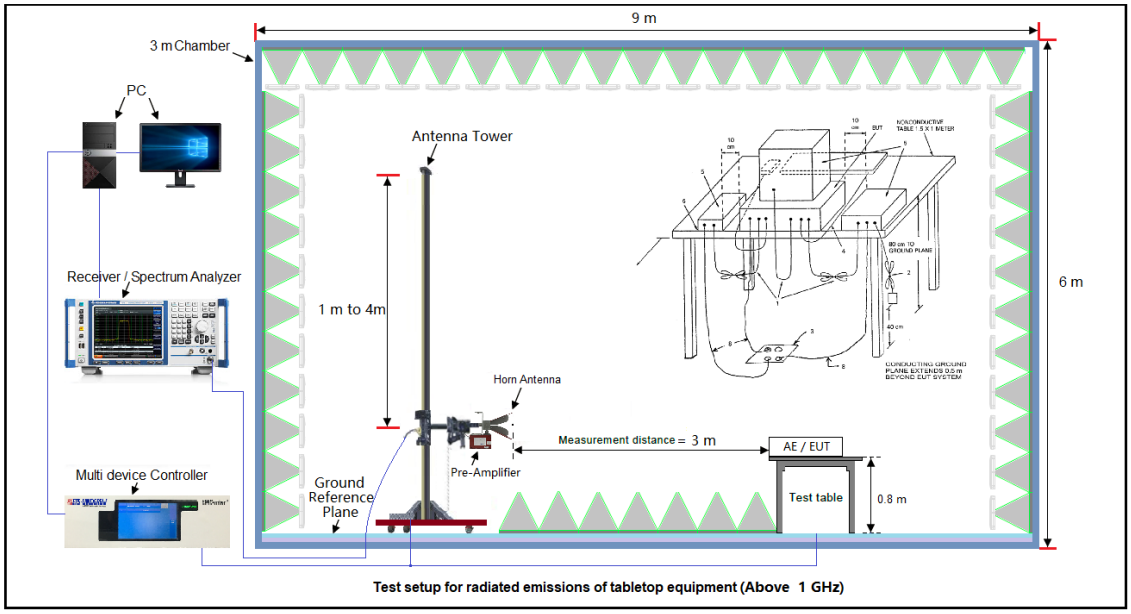
4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz



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

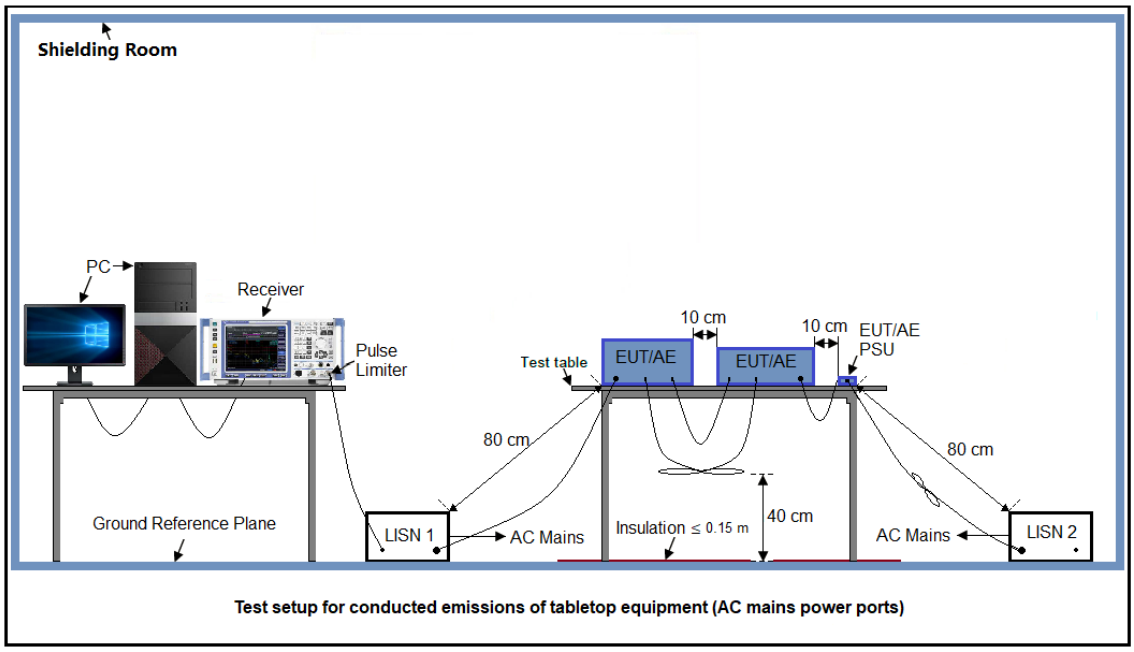
Figure 2. Above 1GHz



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

4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



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:

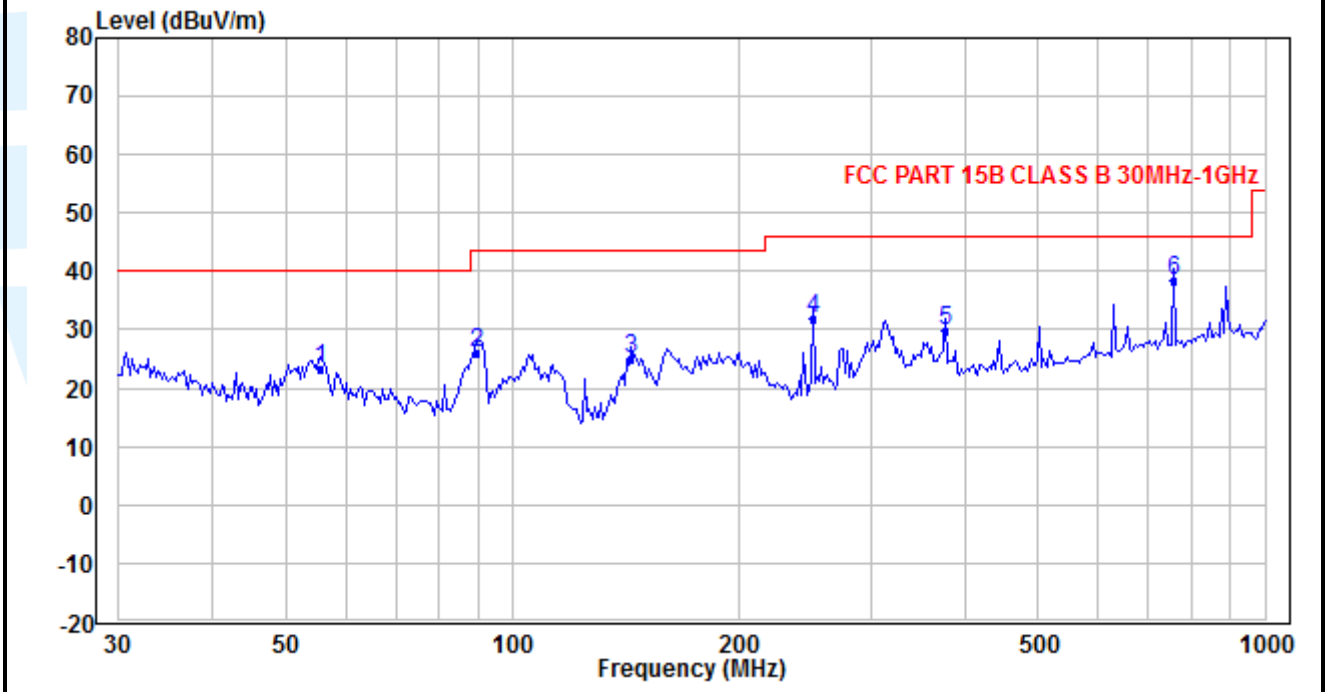
1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal 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

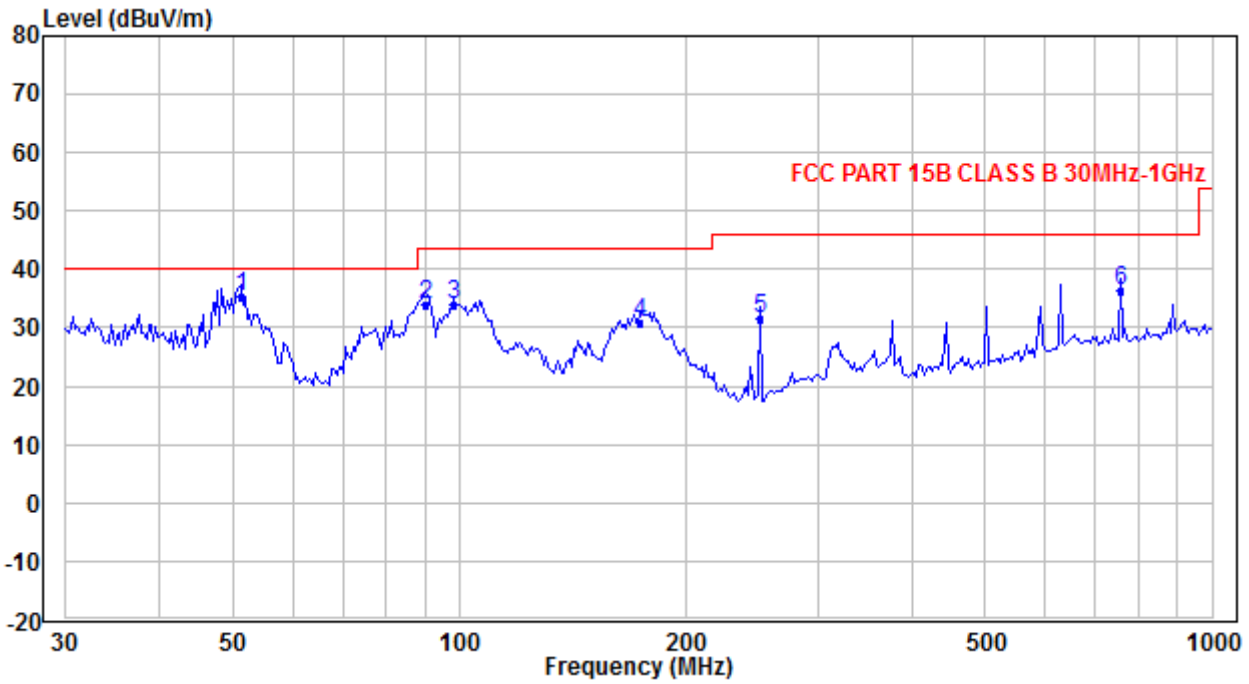
The worst measurement data for FCC 47 CFR Part 15 Subpart B as follows:

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



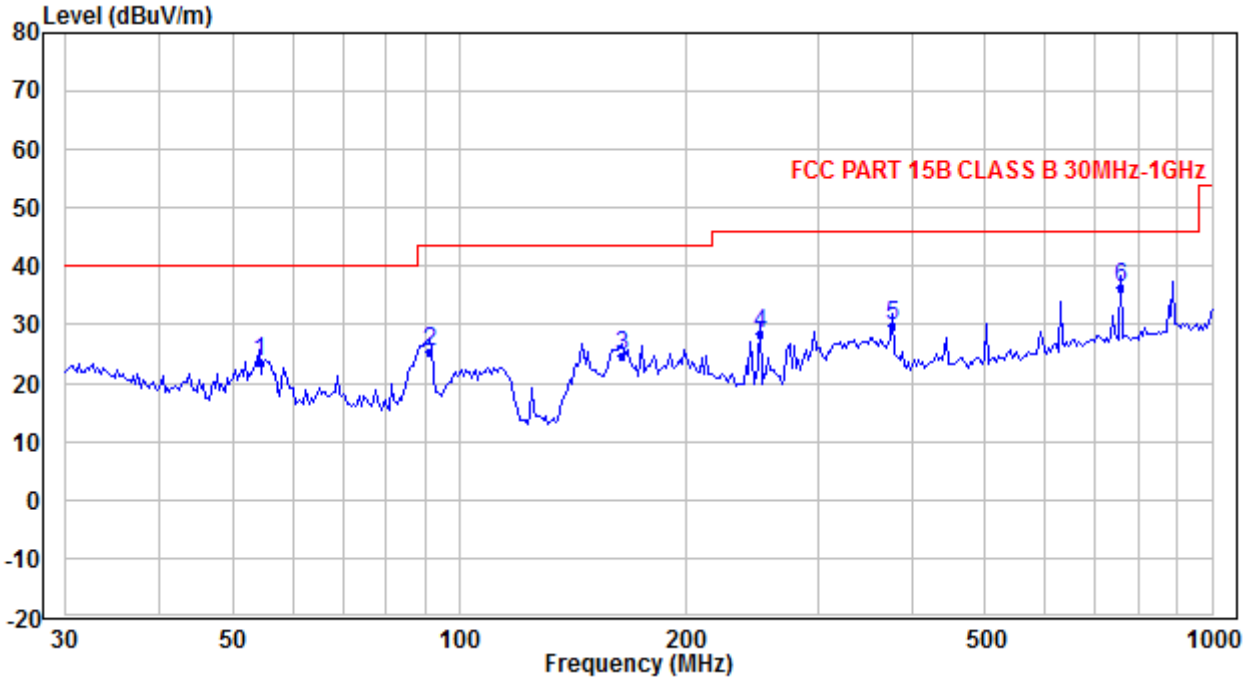
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	55.678	40.69	-17.25	23.44	40.00	-16.56	QP
2	89.787	42.15	-16.14	26.01	43.50	-17.49	QP
3	143.776	40.66	-15.55	25.11	43.50	-18.39	QP
4	250.486	40.92	-8.93	31.99	46.00	-14.01	QP
5	376.523	35.26	-5.43	29.83	46.00	-16.17	QP
6	754.963	36.59	1.81	38.40	46.00	-7.60	QP

Vertical



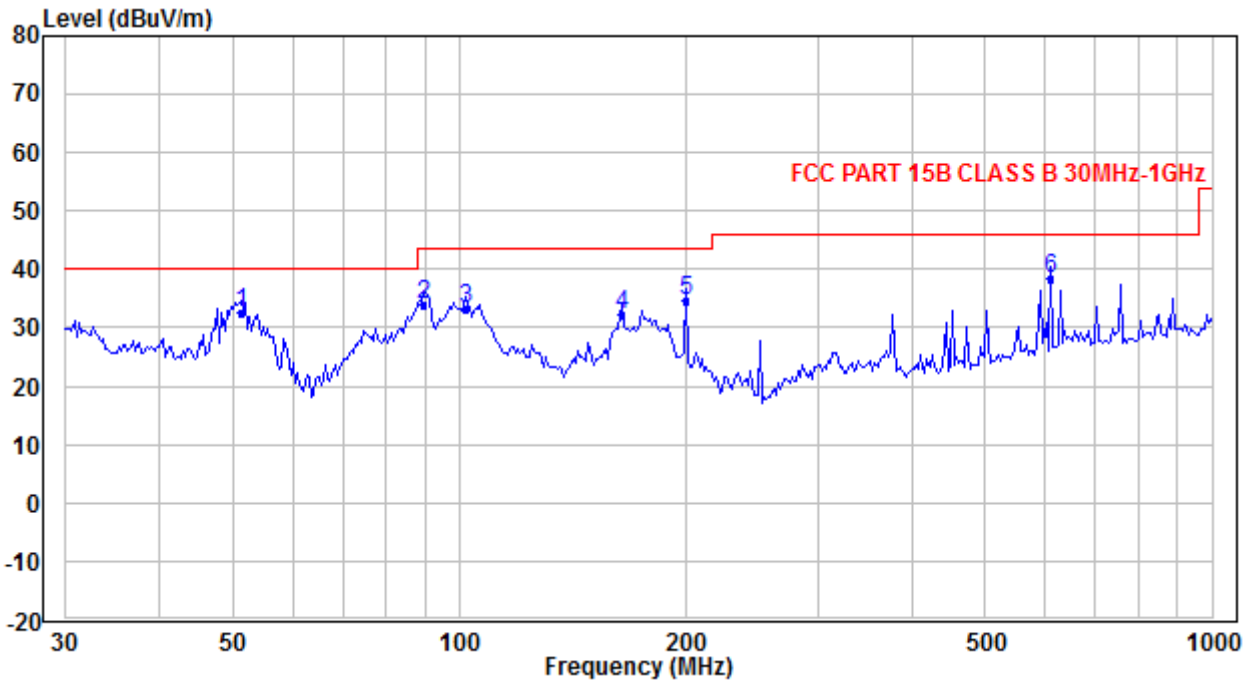
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	51.176	50.66	-15.43	35.23	40.00	-4.77	QP
2	90.420	50.02	-16.12	33.90	43.50	-9.60	QP
3	98.375	49.88	-15.88	34.00	43.50	-9.50	QP
4	173.815	42.20	-11.43	30.77	43.50	-12.73	QP
5	250.486	40.60	-8.93	31.67	46.00	-14.33	QP
6	754.963	34.50	1.81	36.31	46.00	-9.69	QP

Below 1GHz (Quasi Peak):
Test Mode 2
Horizontal



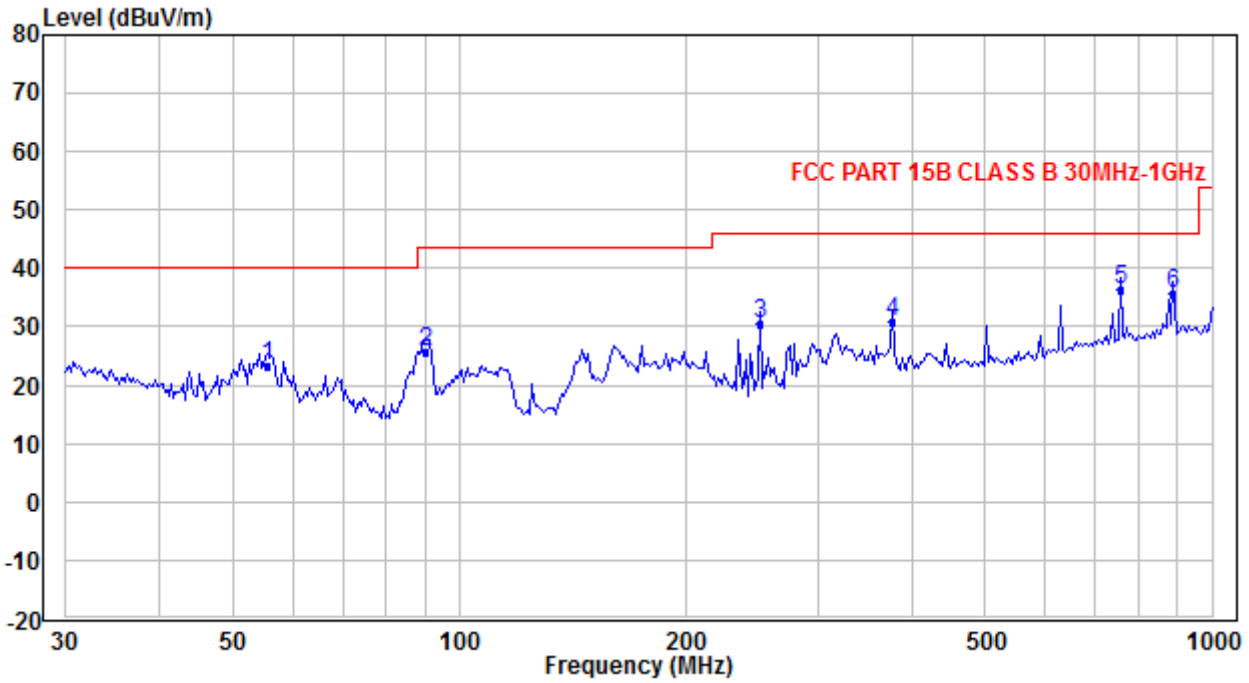
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	54.135	40.66	-16.89	23.77	40.00	-16.23	QP
2	91.057	41.58	-16.19	25.39	43.50	-18.11	QP
3	164.313	37.33	-12.70	24.63	43.50	-18.87	QP
4	250.486	37.29	-8.93	28.36	46.00	-17.64	QP
5	376.523	35.18	-5.43	29.75	46.00	-16.25	QP
6	754.963	34.65	1.81	36.46	46.00	-9.54	QP

Vertical



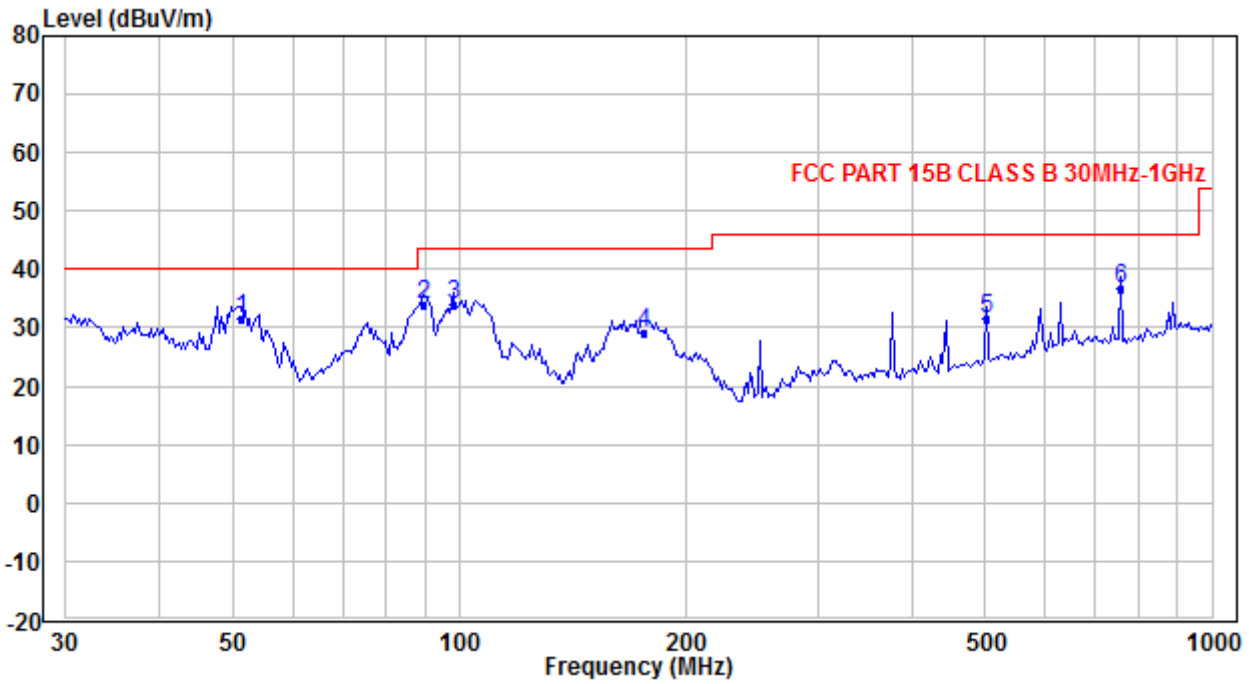
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	51.176	48.13	-15.43	32.70	40.00	-7.30	QP
2	89.787	50.06	-16.14	33.92	43.50	-9.58	QP
3	101.893	49.28	-15.88	33.40	43.50	-10.10	QP
4	164.313	45.03	-12.70	32.33	43.50	-11.17	QP
5	200.043	45.52	-10.99	34.53	43.50	-8.97	QP
6	611.462	39.00	-0.60	38.40	46.00	-7.60	QP

Below 1GHz (Quasi Peak):
Test Mode 3
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	55.678	40.71	-17.25	23.46	40.00	-16.54	QP
2	90.420	41.93	-16.12	25.81	43.50	-17.69	QP
3	250.486	39.51	-8.93	30.58	46.00	-15.42	QP
4	376.523	36.18	-5.43	30.75	46.00	-15.25	QP
5	754.963	34.59	1.81	36.40	46.00	-9.60	QP
6	887.398	31.62	4.07	35.69	46.00	-10.31	QP

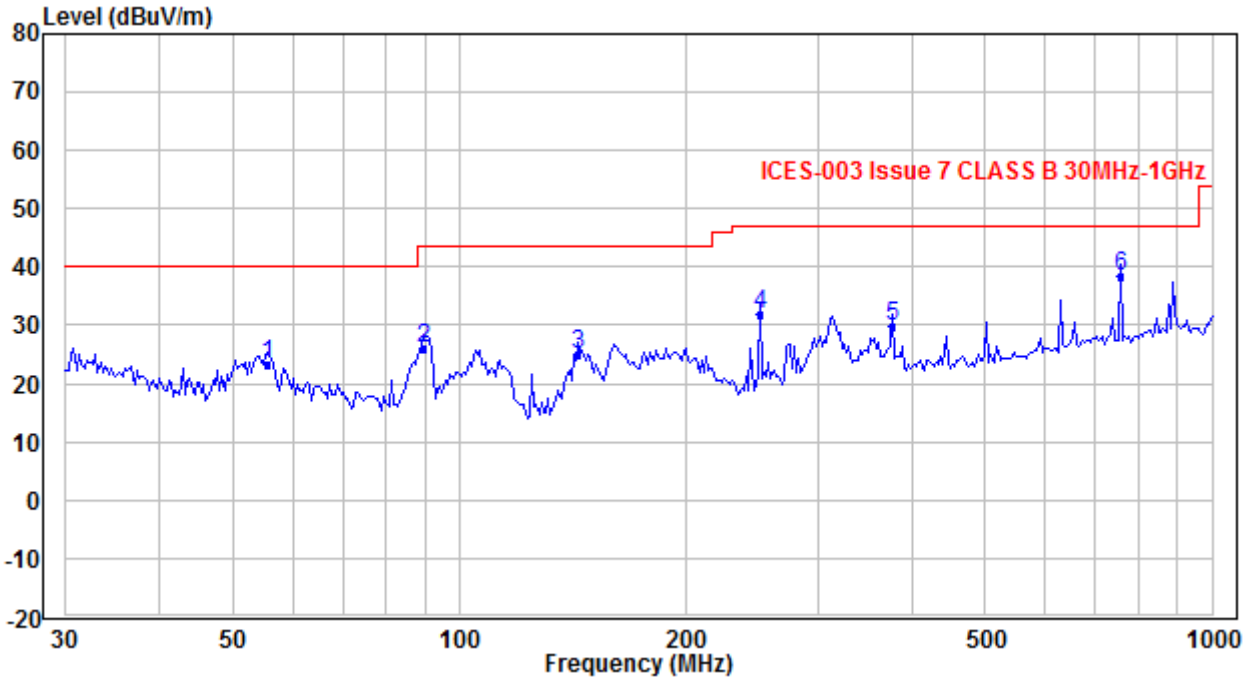
Vertical



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	51.176	47.09	-15.43	31.66	40.00	-8.34	QP
2	89.787	49.94	-16.14	33.80	43.50	-9.70	QP
3	98.375	49.91	-15.88	34.03	43.50	-9.47	QP
4	176.275	39.76	-10.45	29.31	43.50	-14.19	QP
5	502.247	34.32	-2.85	31.47	46.00	-14.53	QP
6	754.963	34.83	1.81	36.64	46.00	-9.36	QP

The worst measurement data for ICES-003 Issue 7 as follows:

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



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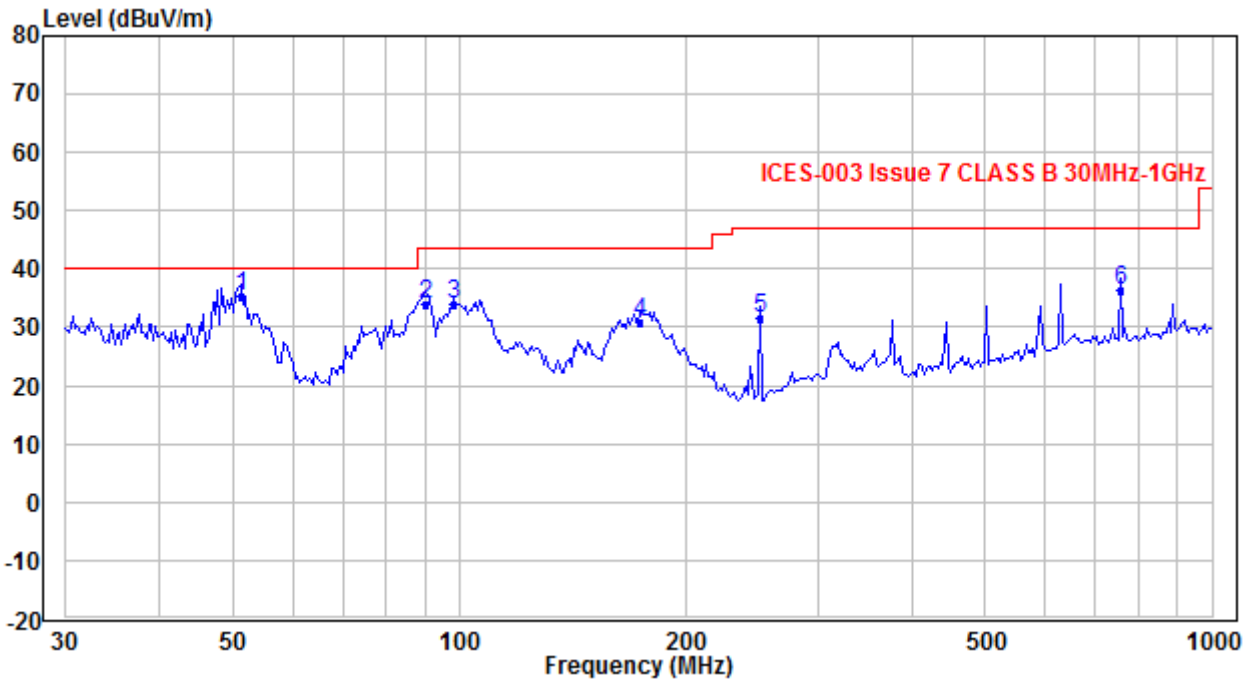
1	55.678	40.69	-17.25	23.44	40.00	-16.56	QP
2	89.787	42.15	-16.14	26.01	43.50	-17.49	QP
3	143.776	40.66	-15.55	25.11	43.50	-18.39	QP
4	250.486	40.92	-8.93	31.99	47.00	-15.01	QP
5	376.523	35.26	-5.43	29.83	47.00	-17.17	QP
6	754.963	36.59	1.81	38.40	47.00	-8.60	QP

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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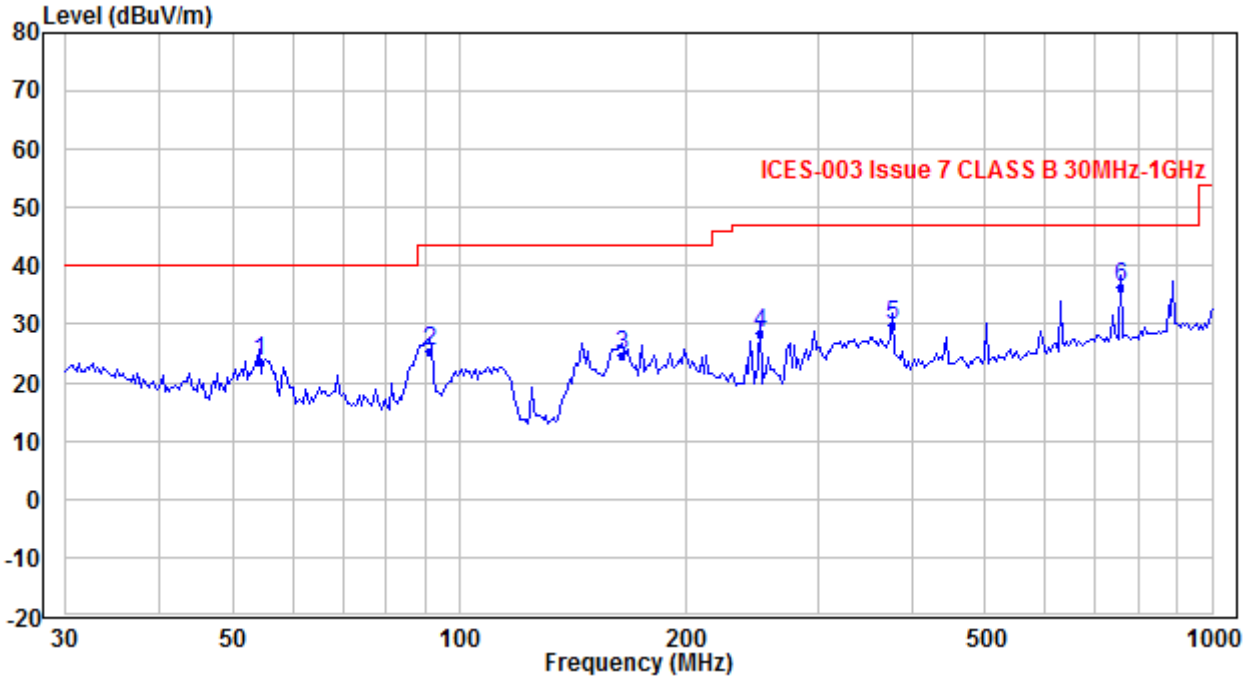
3	98.375	49.88	-15.88	34.00	43.50	-9.50	QP
4	173.815	42.20	-11.43	30.77	43.50	-12.73	QP
5	250.486	40.60	-8.93	31.67	47.00	-15.33	QP
6	754.963	34.50	1.81	36.31	47.00	-10.69	QP

Below 1GHz (Quasi Peak):
Test Mode 2
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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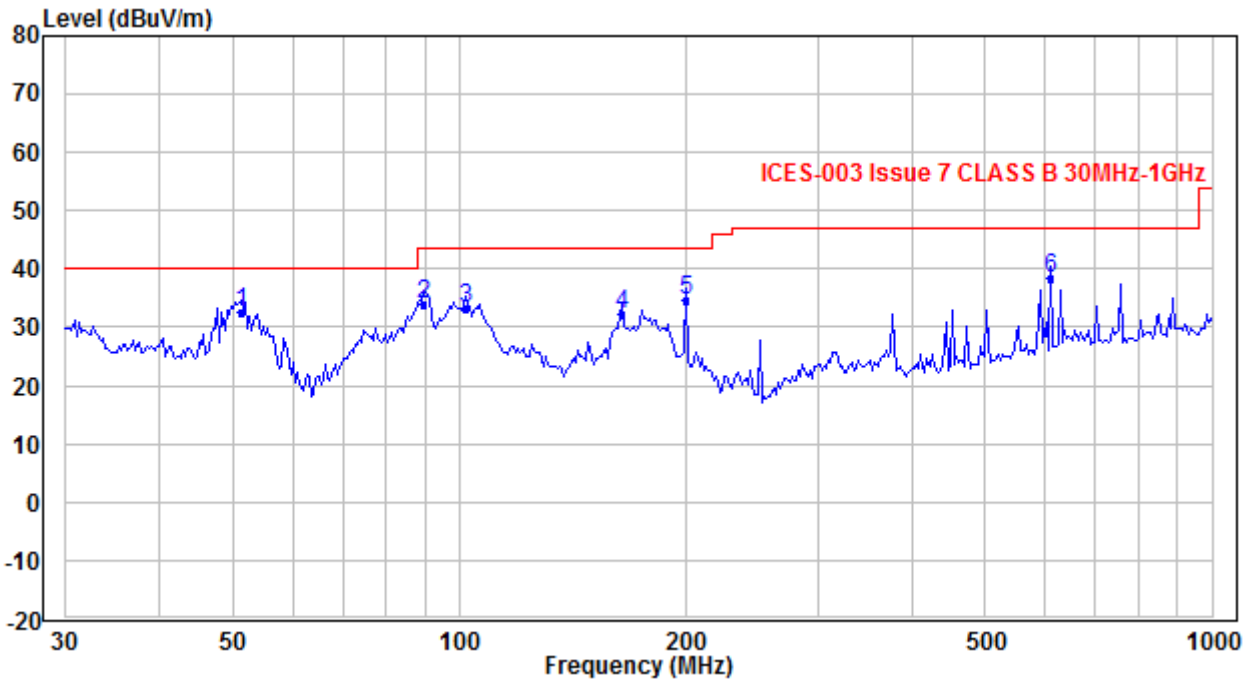
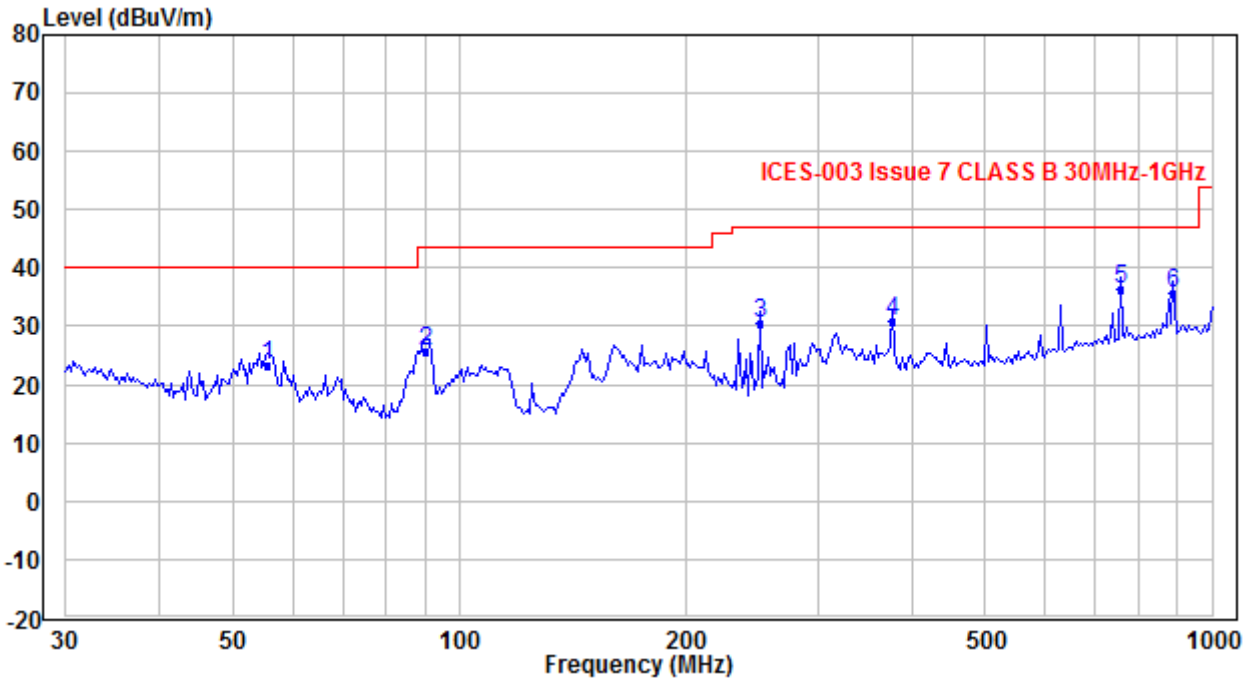
3	164.313	37.33	-12.70	24.63	43.50	-18.87	QP
4	250.486	37.29	-8.93	28.36	47.00	-18.64	QP
5	376.523	35.18	-5.43	29.75	47.00	-17.25	QP
6	754.963	34.65	1.81	36.46	47.00	-10.54	QP

Vertical



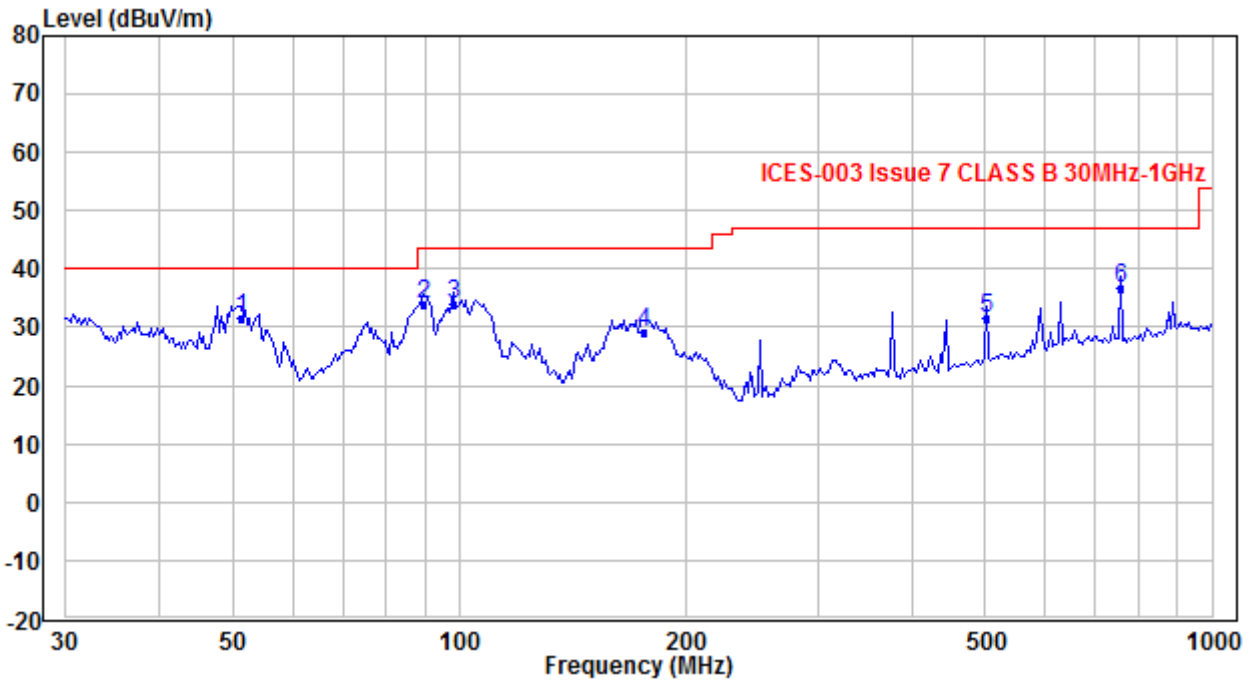
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	51.176	48.13	-15.43	32.70	40.00	-7.30	QP
2	89.787	50.06	-16.14	33.92	43.50	-9.58	QP
3	101.893	49.28	-15.88	33.40	43.50	-10.10	QP
4	164.313	45.03	-12.70	32.33	43.50	-11.17	QP
5	200.043	45.52	-10.99	34.53	43.50	-8.97	QP
6	611.462	39.00	-0.60	38.40	47.00	-8.60	QP

Below 1GHz (Quasi Peak):
Test Mode 3
Horizontal



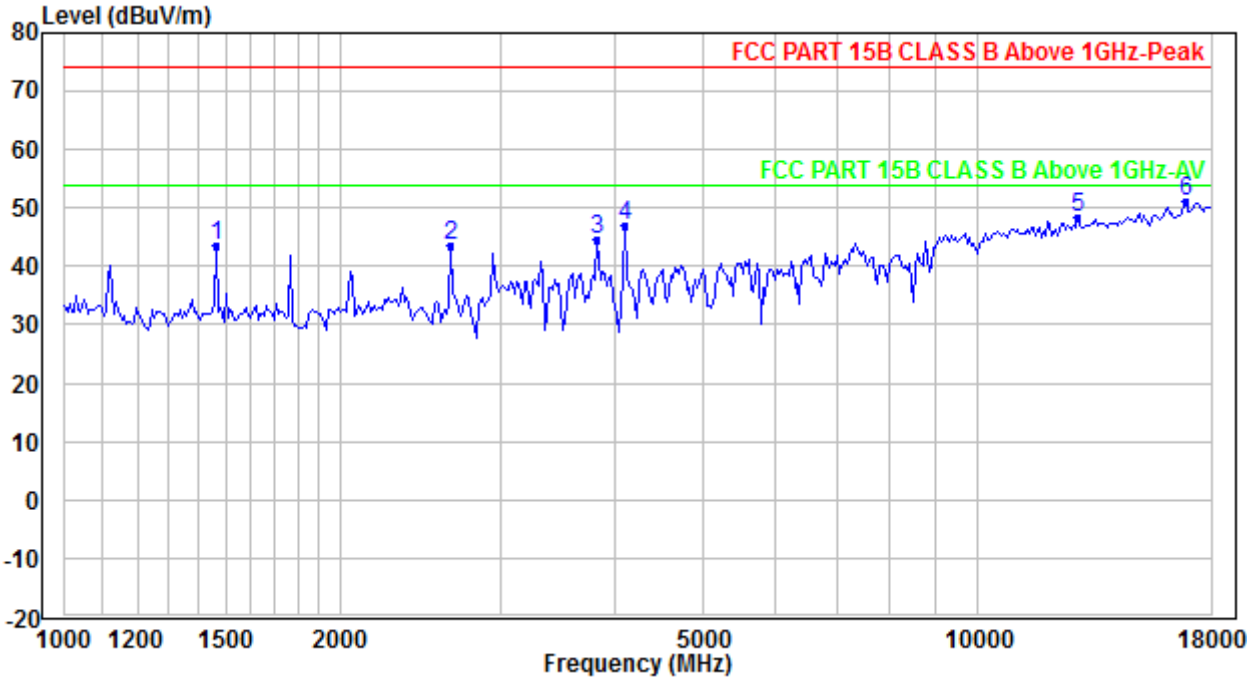
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	55.678	40.71	-17.25	23.46	40.00	-16.54	QP
2	90.420	41.93	-16.12	25.81	43.50	-17.69	QP
3	250.486	39.51	-8.93	30.58	47.00	-16.42	QP
4	376.523	36.18	-5.43	30.75	47.00	-16.25	QP
5	754.963	34.59	1.81	36.40	47.00	-10.60	QP
6	887.398	31.62	4.07	35.69	47.00	-11.31	QP

Vertical



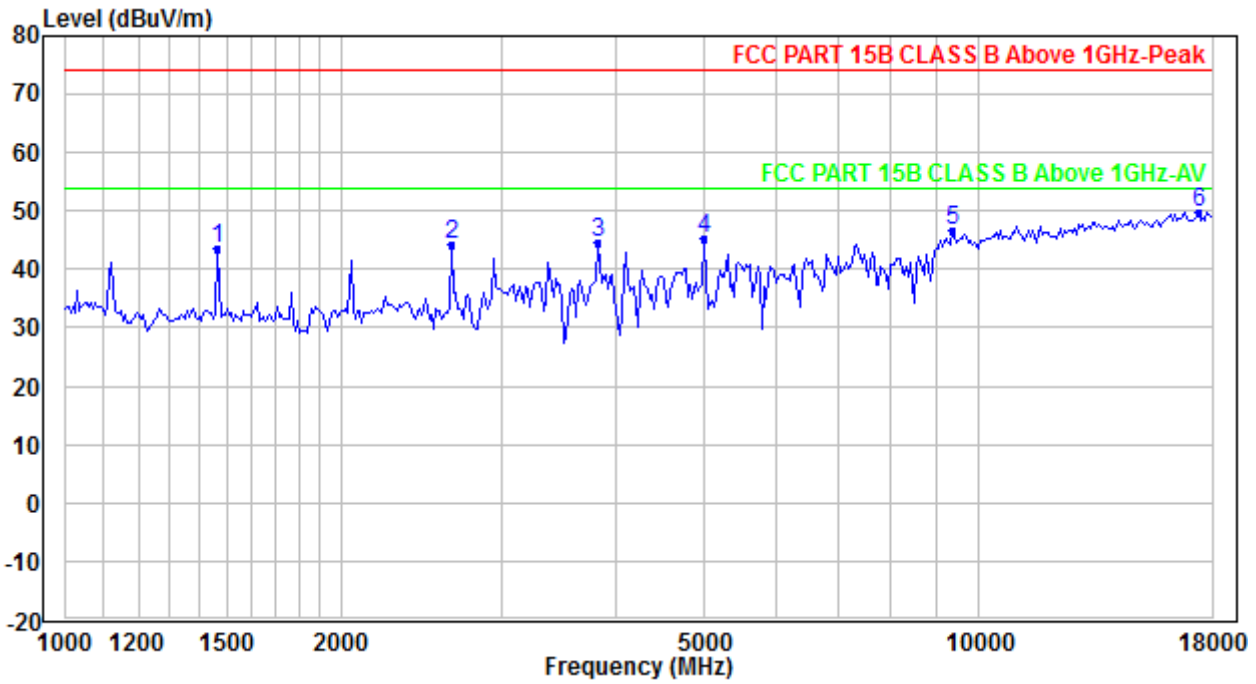
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	51.176	47.09	-15.43	31.66	40.00	-8.34	QP
2	89.787	49.94	-16.14	33.80	43.50	-9.70	QP
3	98.375	49.91	-15.88	34.03	43.50	-9.47	QP
4	176.275	39.76	-10.45	29.31	43.50	-14.19	QP
5	502.247	34.32	-2.85	31.47	47.00	-15.53	QP
6	754.963	34.83	1.81	36.64	47.00	-10.36	QP

Above 1GHz (Peak & Average)
Test Mode 1
Horizontal



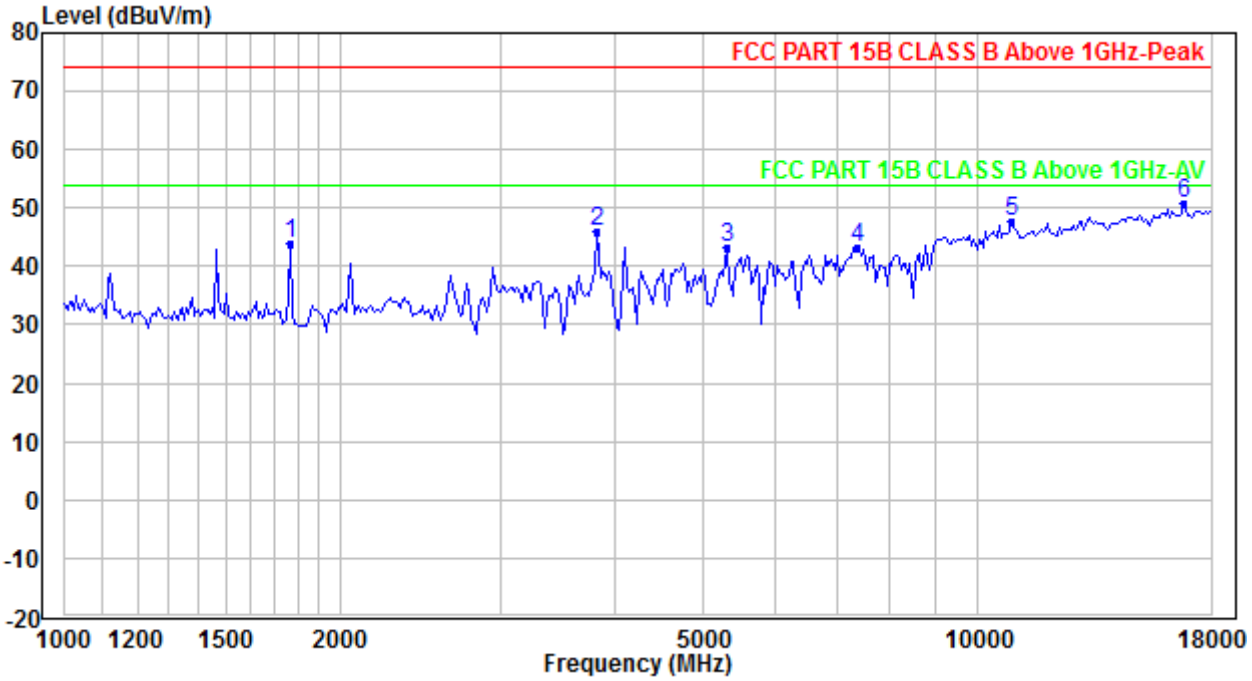
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1465.642	56.06	-12.42	43.64	74.00	-30.36	Peak
2	2646.164	51.43	-7.72	43.71	74.00	-30.29	Peak
3	3833.661	48.45	-3.69	44.76	74.00	-29.24	Peak
4	4109.610	50.03	-2.94	47.09	74.00	-26.91	Peak
5	12863.790	38.31	9.97	48.28	74.00	-25.72	Peak
6	16888.890	38.29	12.68	50.97	74.00	-23.03	Peak

Vertical



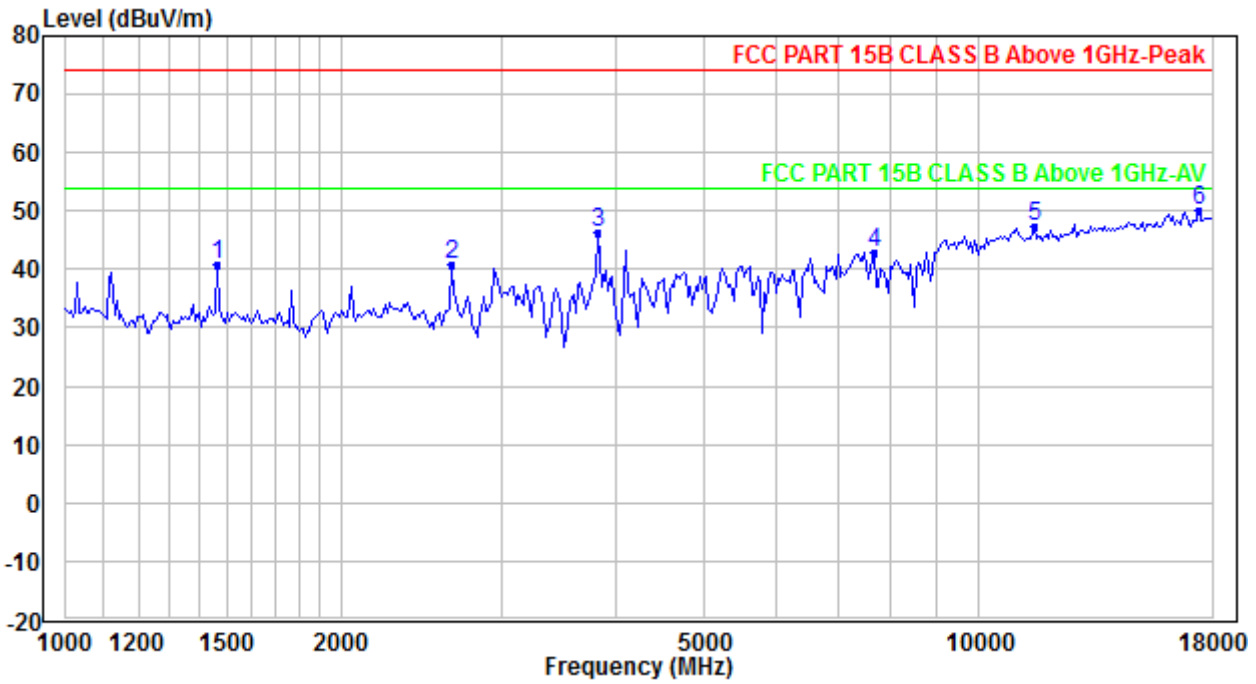
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1465.642	56.09	-12.42	43.67	74.00	-30.33	Peak
2	2646.164	52.08	-7.72	44.36	74.00	-29.64	Peak
3	3833.661	48.16	-3.69	44.47	74.00	-29.53	Peak
4	5004.148	47.46	-2.22	45.24	74.00	-28.76	Peak
5	9354.324	41.40	5.26	46.66	74.00	-27.34	Peak
6	17385.170	36.58	13.33	49.91	74.00	-24.09	Peak

Above 1GHz (Peak & Average)
Test Mode 2
Horizontal



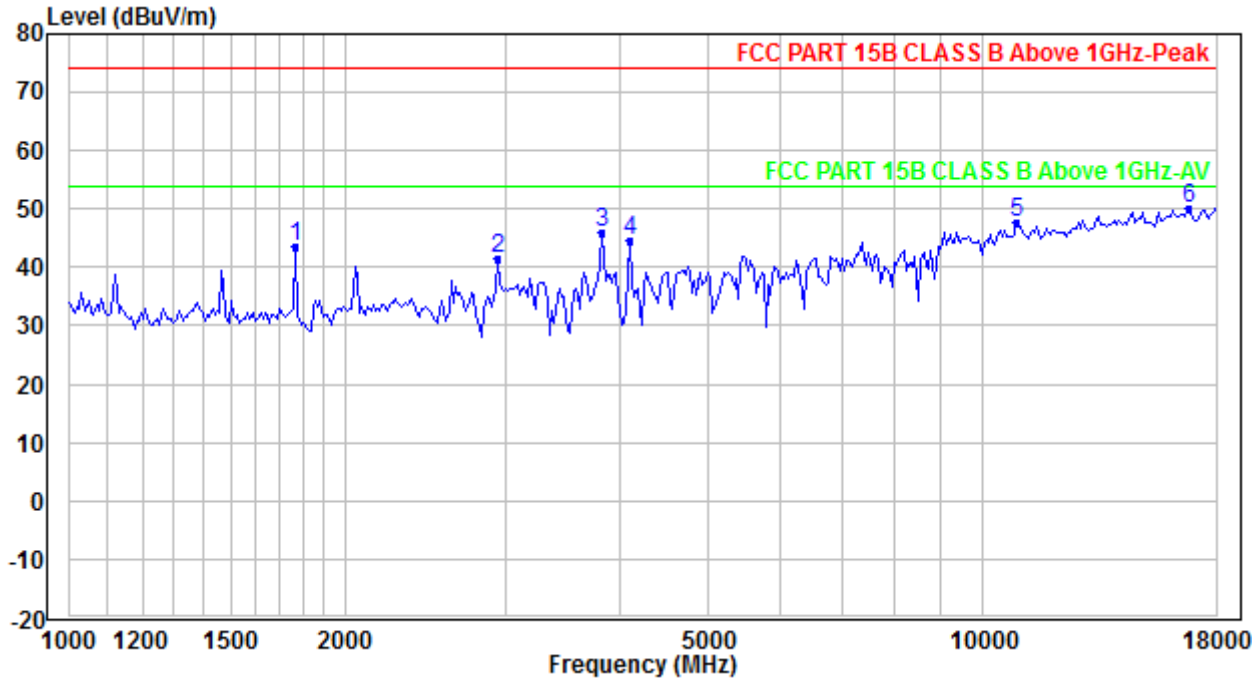
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1764.113	54.62	-10.79	43.83	74.00	-30.17	Peak
2	3833.661	49.78	-3.69	46.09	74.00	-27.91	Peak
3	5302.564	44.20	-0.94	43.26	74.00	-30.74	Peak
4	7376.898	41.65	1.70	43.35	74.00	-30.65	Peak
5	10874.700	40.62	7.14	47.76	74.00	-26.24	Peak
6	16791.350	38.16	12.61	50.77	74.00	-23.23	Peak

Vertical



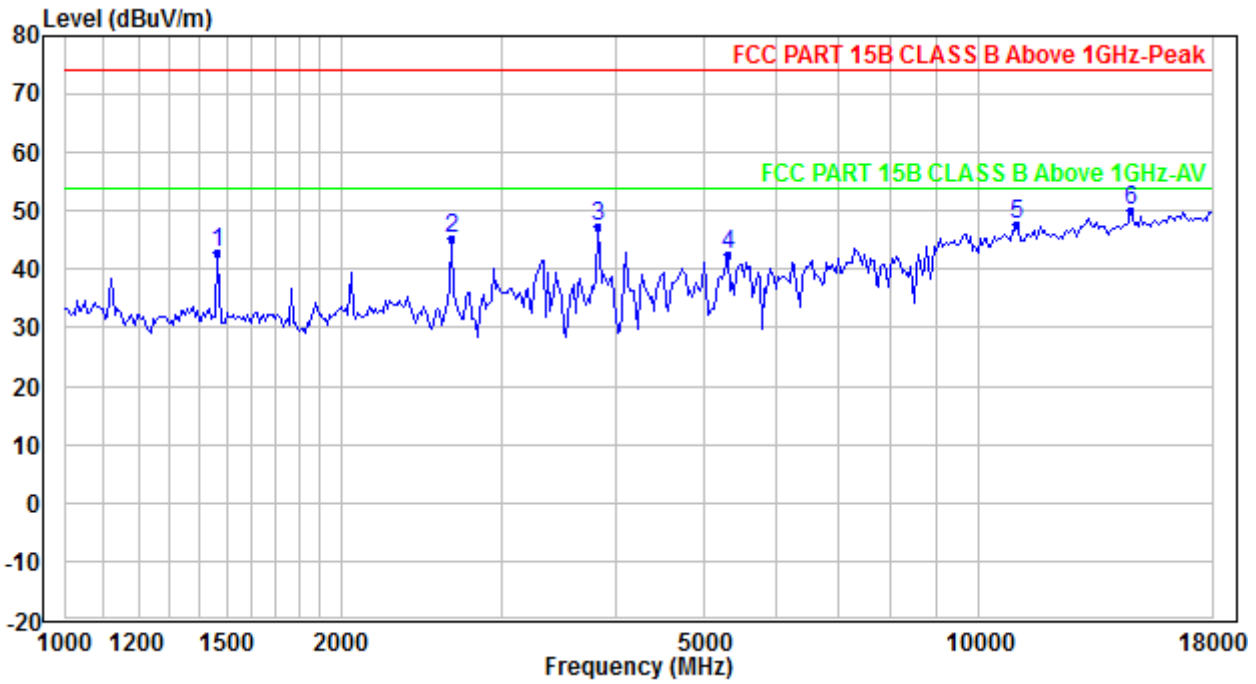
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1465.642	53.24	-12.42	40.82	74.00	-33.18	Peak
2	2646.164	48.56	-7.72	40.84	74.00	-33.16	Peak
3	3833.661	50.03	-3.69	46.34	74.00	-27.66	Peak
4	7682.150	40.71	2.12	42.83	74.00	-31.17	Peak
5	11523.200	40.12	7.11	47.23	74.00	-26.77	Peak
6	17385.170	36.71	13.33	50.04	74.00	-23.96	Peak

Above 1GHz (Peak & Average)
Test Mode 3
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1764.113	54.42	-10.79	43.63	74.00	-30.37	Peak
2	2936.954	48.55	-6.93	41.62	74.00	-32.38	Peak
3	3833.661	49.67	-3.69	45.98	74.00	-28.02	Peak
4	4109.610	47.48	-2.94	44.54	74.00	-29.46	Peak
5	10874.700	40.64	7.14	47.78	74.00	-26.22	Peak
6	16791.350	37.45	12.61	50.06	74.00	-23.94	Peak

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1465.642	55.31	-12.42	42.89	74.00	-31.11	Peak
2	2646.164	53.16	-7.72	45.44	74.00	-28.56	Peak
3	3833.661	51.04	-3.69	47.35	74.00	-26.65	Peak
4	5302.564	43.49	-0.94	42.55	74.00	-31.45	Peak
5	11001.420	40.14	7.42	47.56	74.00	-26.44	Peak
6	14696.950	38.07	11.92	49.99	74.00	-24.01	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. All possible modes of operation were investigated, and testing at two nominal voltages of 240V/50Hz and 120V/60Hz, only the worst-case emissions reported.
5. 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.

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:

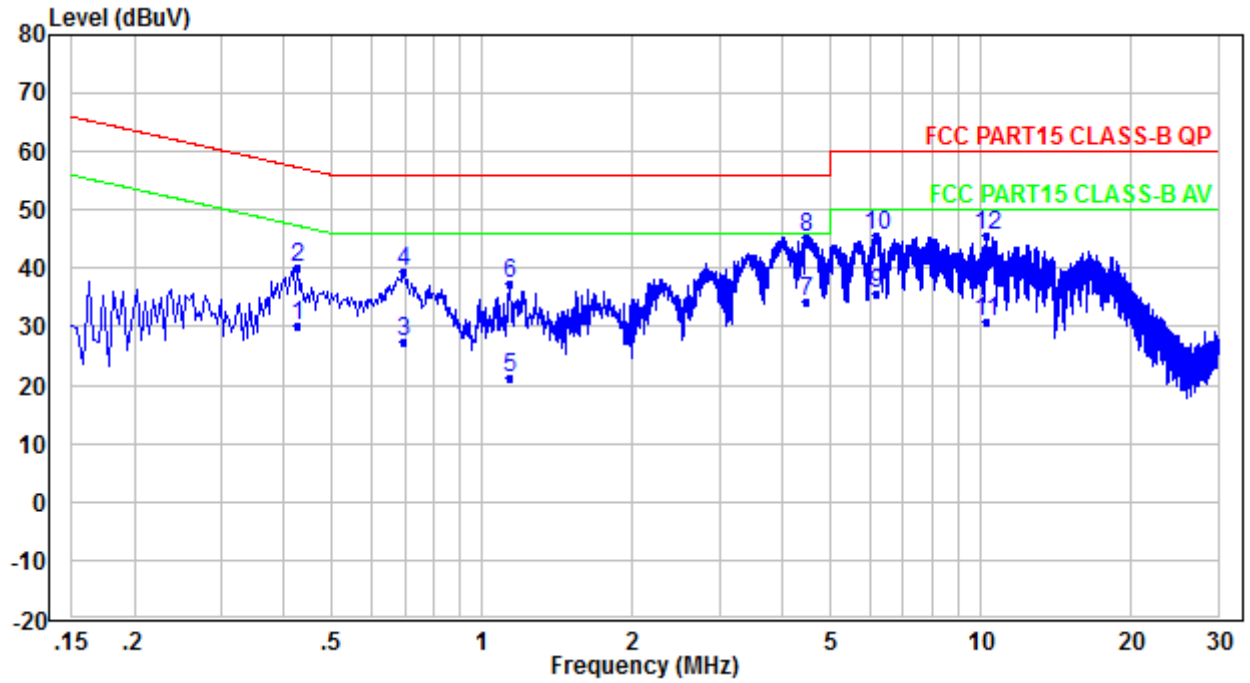
1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak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

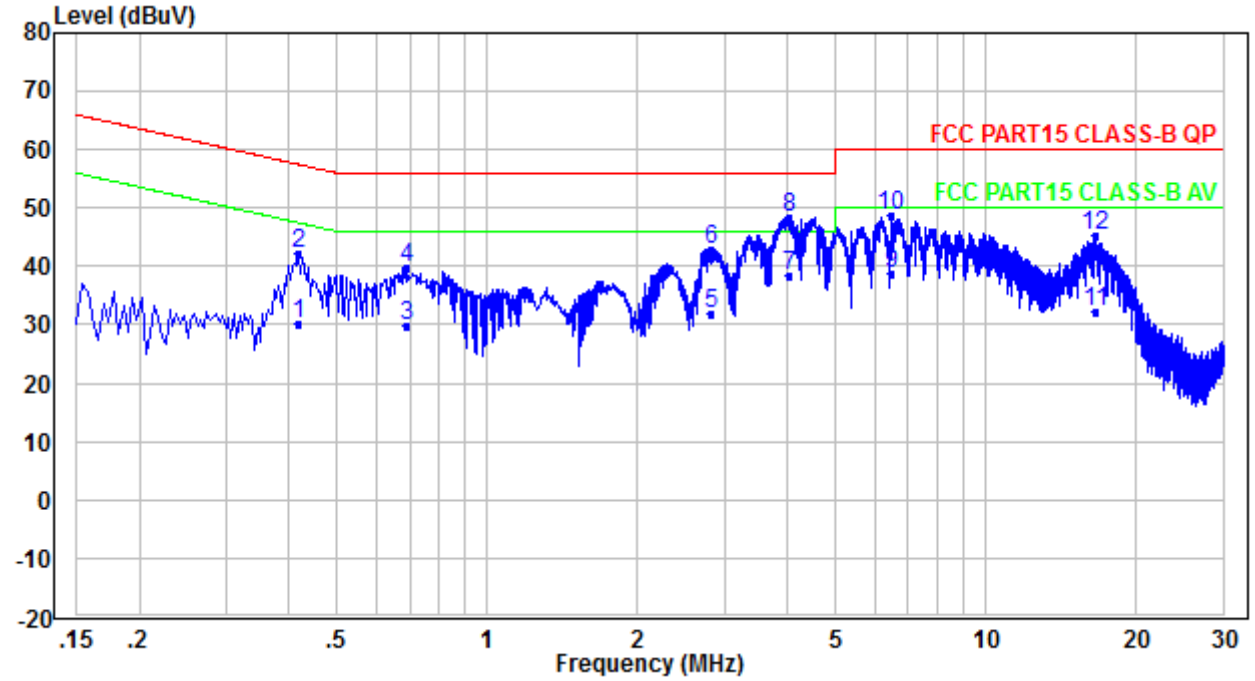
The worst measurement data as follows:
Quasi Peak and Average:
Test Mode 1

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.426	20.46	9.59	30.05	47.33	-17.28	Average
2	0.426	30.46	9.59	40.05	57.33	-17.28	QP
3	0.698	17.79	9.55	27.34	46.00	-18.66	Average
4	0.698	29.79	9.55	39.34	56.00	-16.66	QP
5	1.134	11.75	9.50	21.25	46.00	-24.75	Average
6	1.134	27.75	9.50	37.25	56.00	-18.75	QP
7	4.478	24.88	9.51	34.39	46.00	-11.61	Average
8	4.478	35.88	9.51	45.39	56.00	-10.61	QP
9	6.186	26.26	9.44	35.70	50.00	-14.30	Average
10	6.186	36.26	9.44	45.70	60.00	-14.30	QP
11	10.293	21.43	9.36	30.79	50.00	-19.21	Average
12	10.293	36.43	9.36	45.79	60.00	-14.21	QP

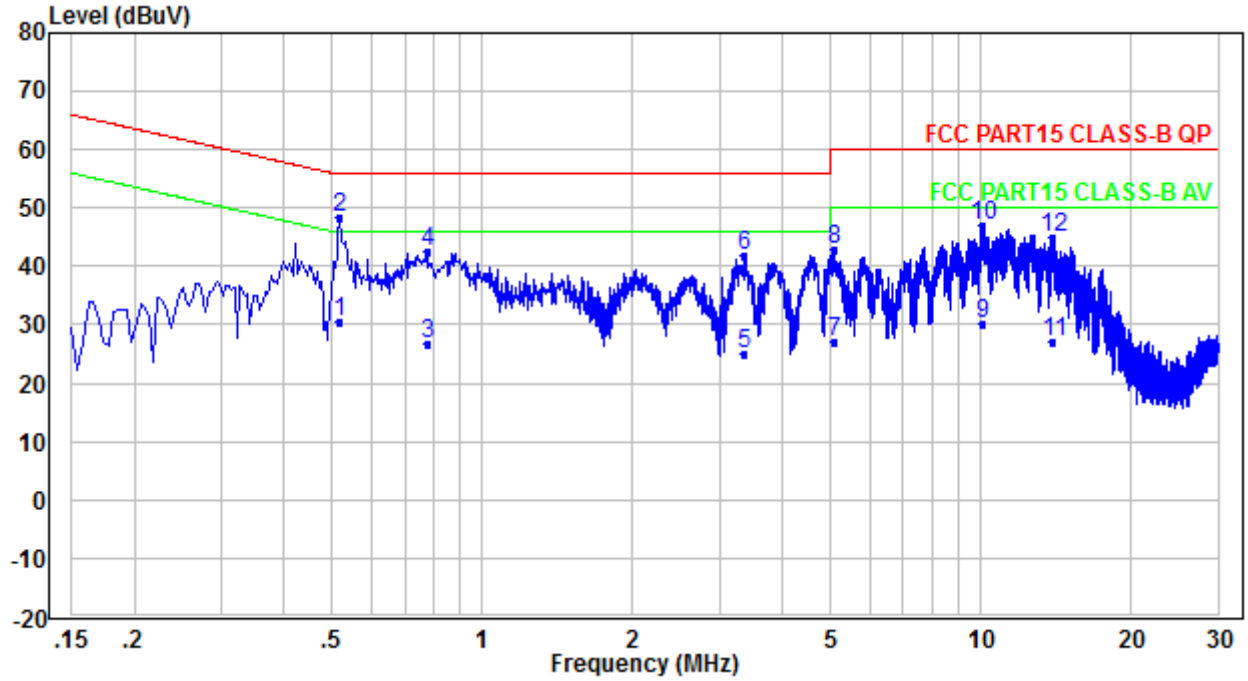
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.418	20.51	9.60	30.11	47.49	-17.38	Average
2	0.418	32.51	9.60	42.11	57.49	-15.38	QP
3	0.690	20.17	9.58	29.75	46.00	-16.25	Average
4	0.690	30.17	9.58	39.75	56.00	-16.25	QP
5	2.818	22.54	9.50	32.04	46.00	-13.96	Average
6	2.818	33.54	9.50	43.04	56.00	-12.96	QP
7	4.054	28.97	9.47	38.44	46.00	-7.56	Average
8	4.054	38.97	9.47	48.44	56.00	-7.56	QP
9	6.450	29.40	9.41	38.81	50.00	-11.19	Average
10	6.450	39.40	9.41	48.81	60.00	-11.19	QP
11	16.581	22.97	9.30	32.27	50.00	-17.73	Average
12	16.581	35.97	9.30	45.27	60.00	-14.73	QP

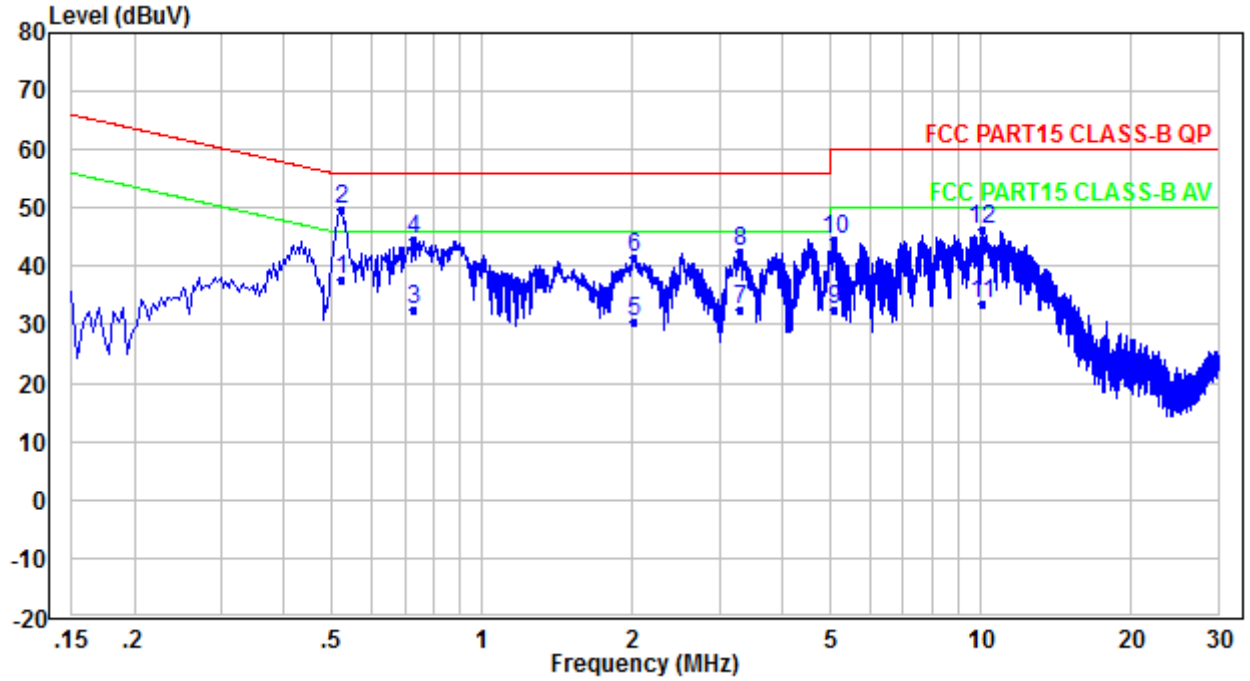
Quasi Peak and Average:
Test Mode 2

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.518	20.85	9.56	30.41	46.00	-15.59	Average
2	0.518	38.85	9.56	48.41	56.00	-7.59	QP
3	0.774	17.12	9.54	26.66	46.00	-19.34	Average
4	0.774	33.12	9.54	42.66	56.00	-13.34	QP
5	3.362	15.43	9.49	24.92	46.00	-21.08	Average
6	3.362	32.43	9.49	41.92	56.00	-14.08	QP
7	5.070	17.48	9.50	26.98	50.00	-23.02	Average
8	5.070	33.48	9.50	42.98	60.00	-17.02	QP
9	10.081	20.72	9.36	30.08	50.00	-19.92	Average
10	10.081	37.72	9.36	47.08	60.00	-12.92	QP
11	14.021	17.64	9.30	26.94	50.00	-23.06	Average
12	14.021	35.64	9.30	44.94	60.00	-15.06	QP

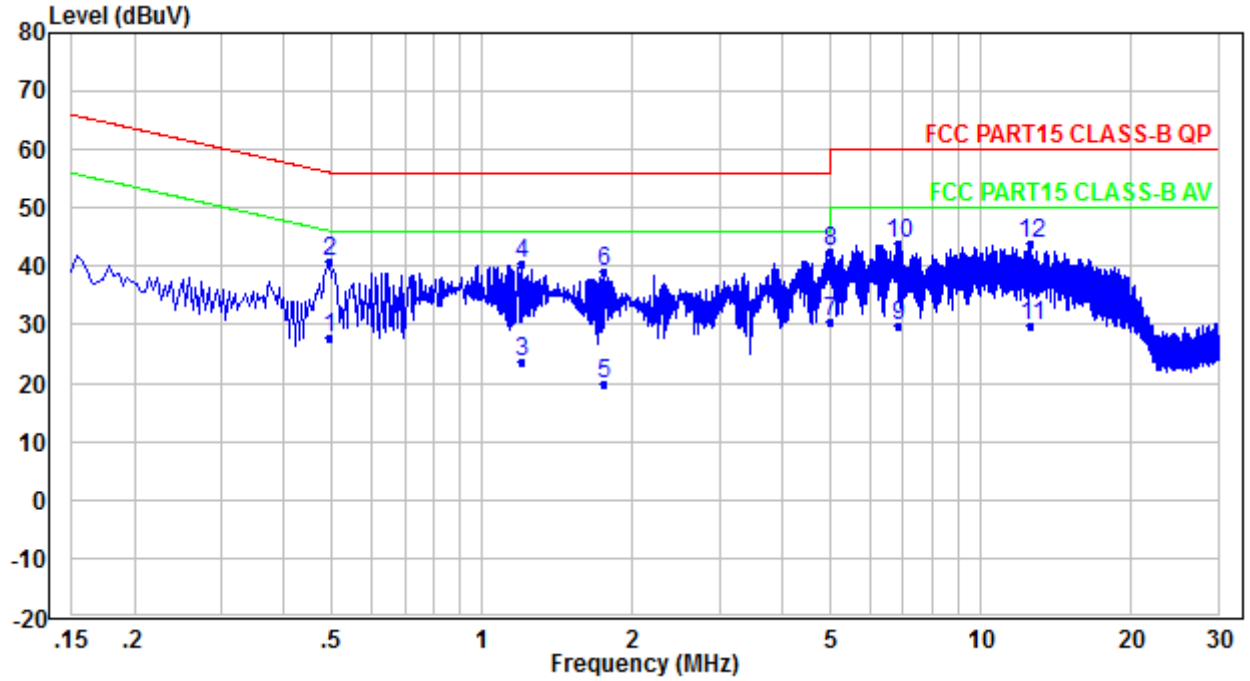
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.522	28.06	9.59	37.65	46.00	-8.35	Average
2	0.522	40.06	9.59	49.65	56.00	-6.35	QP
3	0.726	22.90	9.58	32.48	46.00	-13.52	Average
4	0.726	34.90	9.58	44.48	56.00	-11.52	QP
5	2.022	20.92	9.56	30.48	46.00	-15.52	Average
6	2.022	31.92	9.56	41.48	56.00	-14.52	QP
7	3.306	22.94	9.48	32.42	46.00	-13.58	Average
8	3.306	32.94	9.48	42.42	56.00	-13.58	QP
9	5.106	23.19	9.46	32.65	50.00	-17.35	Average
10	5.106	35.19	9.46	44.65	60.00	-15.35	QP
11	10.053	24.16	9.33	33.49	50.00	-16.51	Average
12	10.053	37.16	9.33	46.49	60.00	-13.51	QP

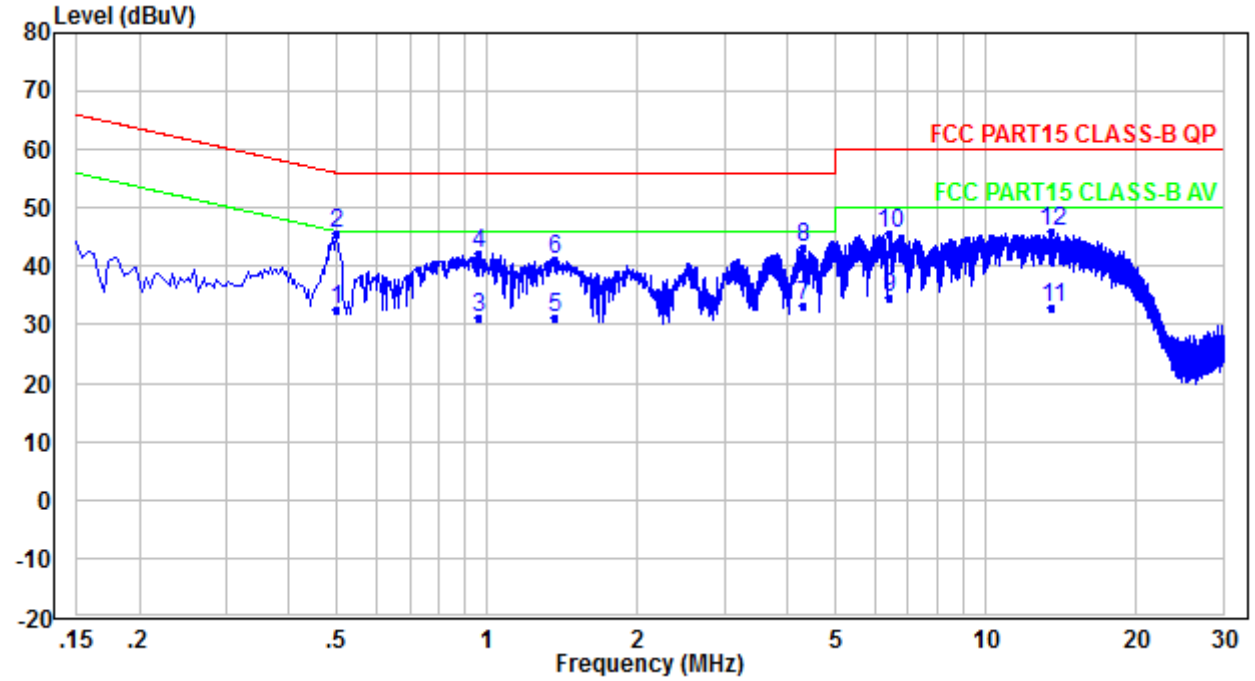
Quasi Peak and Average:
Test Mode 3

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.494	18.11	9.56	27.67	46.10	-18.43	Average
2	0.494	31.11	9.56	40.67	56.10	-15.43	QP
3	1.202	14.13	9.51	23.64	46.00	-22.36	Average
4	1.202	31.13	9.51	40.64	56.00	-15.36	QP
5	1.750	10.53	9.50	20.03	46.00	-25.97	Average
6	1.750	29.53	9.50	39.03	56.00	-16.97	QP
7	5.018	21.16	9.50	30.66	50.00	-19.34	Average
8	5.018	33.16	9.50	42.66	60.00	-17.34	QP
9	6.842	20.44	9.42	29.86	50.00	-20.14	Average
10	6.842	34.44	9.42	43.86	60.00	-16.14	QP
11	12.645	20.65	9.32	29.97	50.00	-20.03	Average
12	12.645	34.65	9.32	43.97	60.00	-16.03	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.498	22.93	9.59	32.52	46.03	-13.51	Average
2	0.498	35.93	9.59	45.52	56.03	-10.51	QP
3	0.958	21.64	9.57	31.21	46.00	-14.79	Average
4	0.958	32.64	9.57	42.21	56.00	-13.79	QP
5	1.366	21.56	9.56	31.12	46.00	-14.88	Average
6	1.366	31.56	9.56	41.12	56.00	-14.88	QP
7	4.314	23.81	9.47	33.28	46.00	-12.72	Average
8	4.314	33.81	9.47	43.28	56.00	-12.72	QP
9	6.422	25.18	9.42	34.60	50.00	-15.40	Average
10	6.422	36.18	9.42	45.60	60.00	-14.40	QP
11	13.633	23.62	9.33	32.95	50.00	-17.05	Average
12	13.633	36.62	9.33	45.95	60.00	-14.05	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.
5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V/50Hz and 120V/60Hz, only the worst-case emissions reported.

APPENDIX 1 PHOTOS OF TEST SETUP

Refer to Appendix 1 for photos of test setup

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***