Certificate #4312.01

FCC & ISED TEST REPORT

Product Name:	IP Phone
Trade Mark:	GRANDSTREAM
Model No. / HVIN:	GRP2636
Report Number:	220329012EMC-1
Test Standards:	FCC 47 CFR Part 15 Subpart B ICES-003 Issue 7
Test Result:	PASS
Date of Issue:	June 28, 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
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Prepared by: Calvin Chen, Senior Project Engineer

Reviewed by: Eric Yu, Project Supervisor

Approved by: Kevin Liang, Assistant Manager

Date: June 28, 2022

Version

Version No.	Date	Description
V1.0	June 28, 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:	IP Phone
Model No. / HVIN:	GRP2636
Trade Mark:	GRANDSTREAM
DUT Stage:	Production Unit
Rated Voltage:	☒ 100-240V~50/60Hz
	☒ Powered by POE port
Classification of digital devices:	Class B
Highest Internal Frequency:	5825 MHz
Software Version:	1.0.8.11 (Provided by the customer)
Hardware Version:	V1.0 (Provided by the customer)
Sample Received Date:	May 7, 2022
Sample Tested Date:	May 17, 2022 to June 9, 2022

1.2.2 Description of Accessories

Adapter (1)	
Model No.:	GQ12-120100-AU
Input:	100-240 V~50/60 Hz 0.4A Max
Output:	12 V ⎓ 1.0 A
DC Cable:	2.5 Meter, Unshielded without ferrite

Adapter (2)	
Model No.:	DSA-12PFU-12 FUS 120100
Input:	100-240 V~50/60 Hz 0.5A
Output:	12 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 0.5A max
Output:	12 V ⎓ 1.0 A
DC Cable:	2.5 Meter, Unshielded without ferrite

Cable (1)	
Connector:	Ethernet Cable
Cable Type:	Unshielded without ferrite
Length:	1.5 Meter

Cable (2)	
Connector:	Phone Cord
Cable Type:	Unshielded without ferrite
Length:	3.5 Meter

Others
1x Handset, 1x Phone Stand

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	Lenovo	B40-80	MP12NEQ6	UnionTrust
Notebook Adapter	Lenovo	ADLX65NLC3A	5A10J75114	UnionTrust
Mouse	DELL	MS111	CN-011D3V-738	UnionTrust
Headset	YEY	VE120-MV	N/A	UnionTrust
Standard POE Power supply	Social	TL-POE160SN/A	N/A	UnionTrust
IP Phone	GRANDSTREAM	GRP2615	N/A	Applicant
Expansion Module	GRANDSTREAM	GBX20	N/A	Applicant

2) Support Cable

Cable No.	Description	Connector	Length (m)	Supplied by
1	Ethernet Cable	RJ45	1.5 Unshielded without ferrite	Applicant
2	Ethernet Cable	RJ45	2.0 Unshielded without ferrite	UnionTrust
3	Ethernet Cable	RJ45	5.0 Unshielded without ferrite	UnionTrust
4	USB Micro-B Plug Cable	USB	0.2 Shielded without ferrite	Applicant

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 Chamber						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	3m Chamber & Accessory Equipment	ETS-Lindgren	3m	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
☒	Broadband Antenna	ETS-Lindgren	3142E	00201566	11-Nov-2021	10-Nov-2023
☒	Pre-amplifier	ETS-Lindgren	118490	00204683	6-Nov-2021	5-Nov-2022
☒	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	00164202	11-Nov-2021	10-Nov-2023
☒	Pre-amplifier	ETS-Lindgren	118385	00201874	6-Nov-2021	5-Nov-2022
☒	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00200180	19-Jun-2020	18-Jun-2022
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-Lindgren	3116C-PA	00202652	14-Nov-2020	13-Nov-2022
☒	Receiver	ROHDE & SCHWARZ	ESIB26	100114	5-Nov-2021	4-Nov-2022
☒	Pre-amplifier	HP	8447F	2805A02960	5-Nov-2021	4-Nov-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**	**Cal. Due date**
☒	LISN	R&S	ESH2-Z5	860014/024	5-Nov-2021	4-Nov-2022
☒	LISN	ETS-Lindgren	3816/2SH	00201088	5-Nov-2021	4-Nov-2022
☒	Receiver	R&S	ESR7	101181	5-Nov-2021	4-Nov-2022
☒	Shielding room	ETS-Lindgren	843	Euroshiedpn-CT001270-1246	5-Nov-2021	4-Nov-2024
☒	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 (%)
NT/NV	+15 to +35	120V~ 60Hz 230V~ 50Hz	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	24.6	47	101.1	220329012-A01/5	David Zhang
Radiated Emission	24.2	53	100.1	220329012-A01/5	Asia Yan

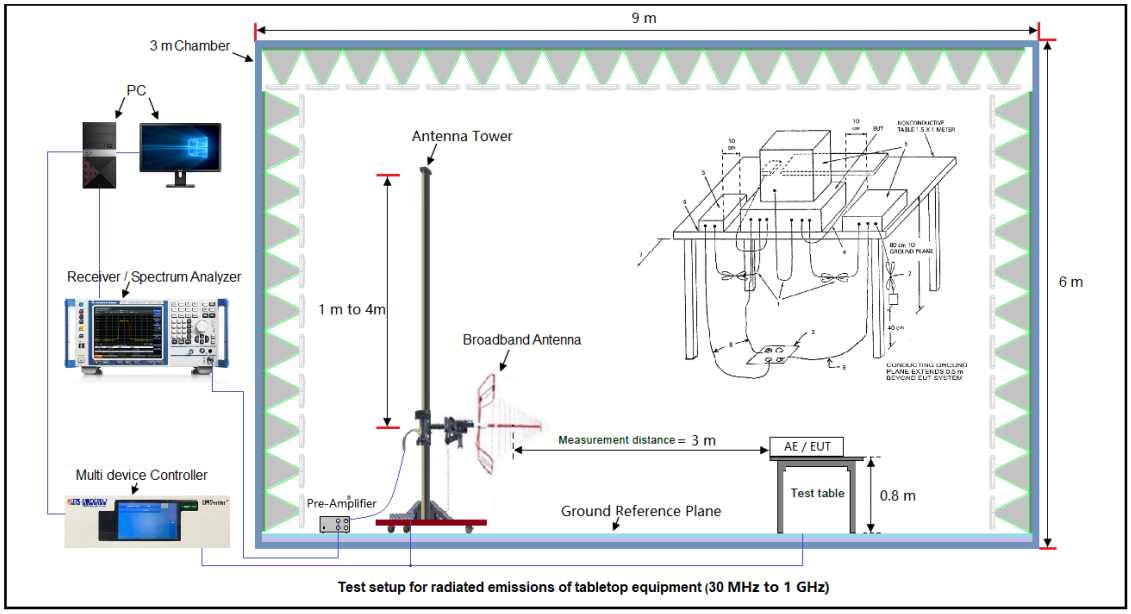
4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	**Test Mode1: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Hands Free** Test Mode 2: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Ringing Test Mode 3: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Handset **Test Mode 4: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Headset** Test Mode 5: AC240V/50Hz (Adaptor 1) + Worse from mode 1 Test Mode 6: Worse from mode 1 (Adaptor 2) Test Mode 7: Worse from mode 1 (Adaptor 3) **Test Mode 8: AC120V/60Hz (POE) + Worse from mode 1** **Test Mode 9: AC240V/50Hz (POE) + Worse from mode 1**
Conducted Emission	**Test Mode1: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Hands Free** Test Mode 2: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Ringing Test Mode 3: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Handset Test Mode 4: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Headset Test Mode 5: AC240V/50Hz (Adaptor 1) + Worse from mode 1 Test Mode 6: Worse from mode 1 (Adaptor 2) Test Mode 7: Worse from mode 1 (Adaptor 3) **Test Mode 8: AC120V/60Hz (POE) + Worse from mode 1** Test Mode 9: AC240V/50Hz (POE) + Worse from mode 1
Remark: The above test modes in boldface were the worst cases	

4.3 TEST SETUP

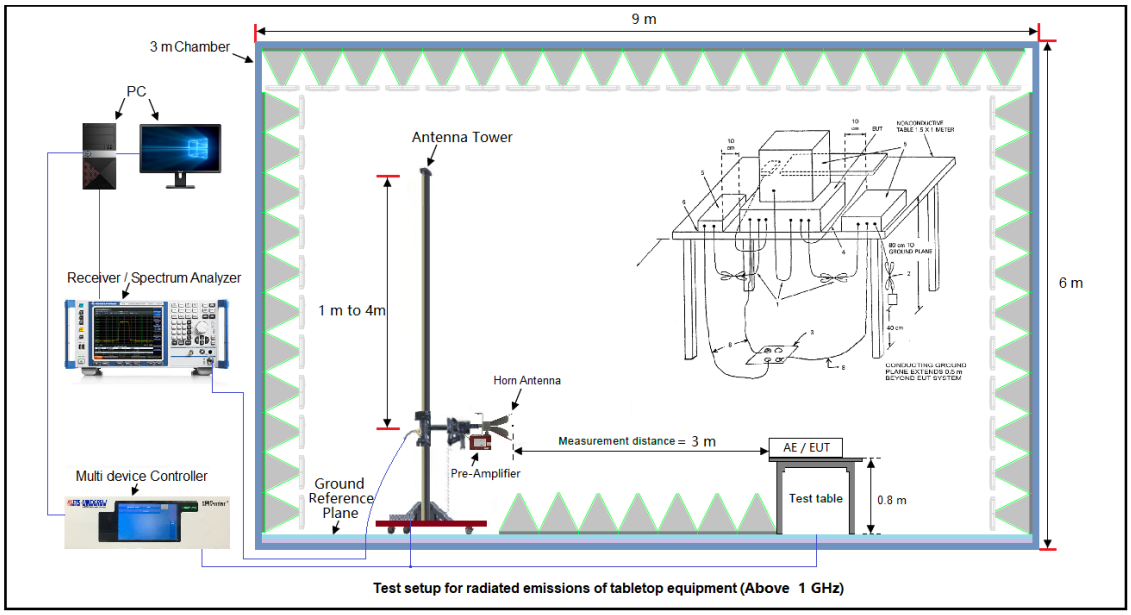
4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz



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

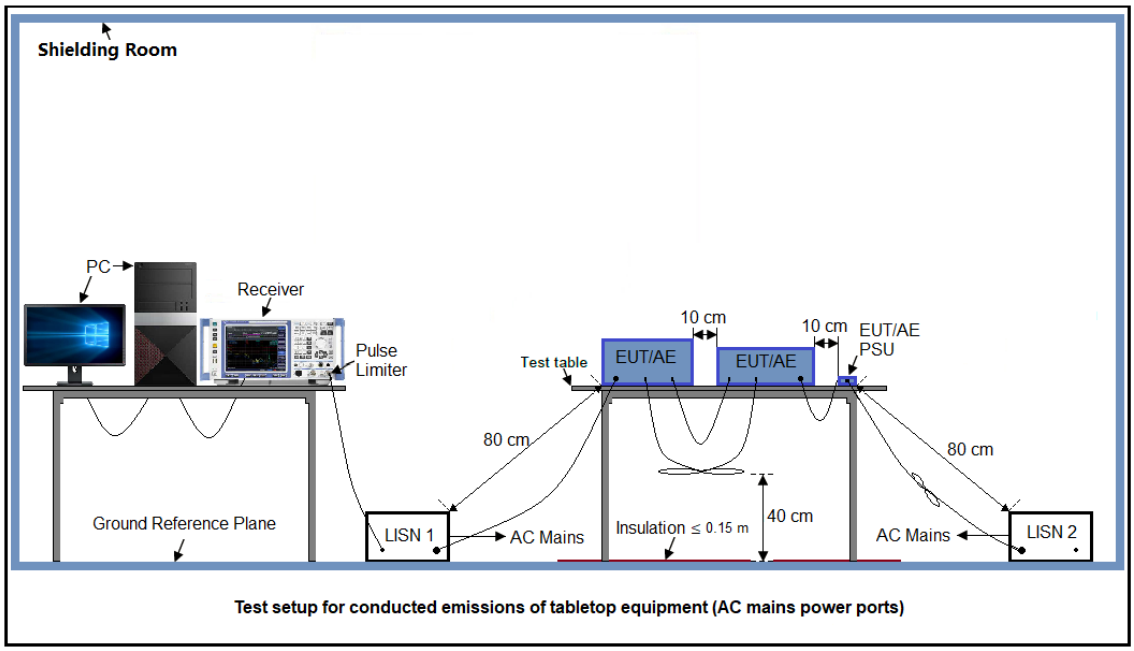
Figure 2. Above 1GHz



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

4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



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

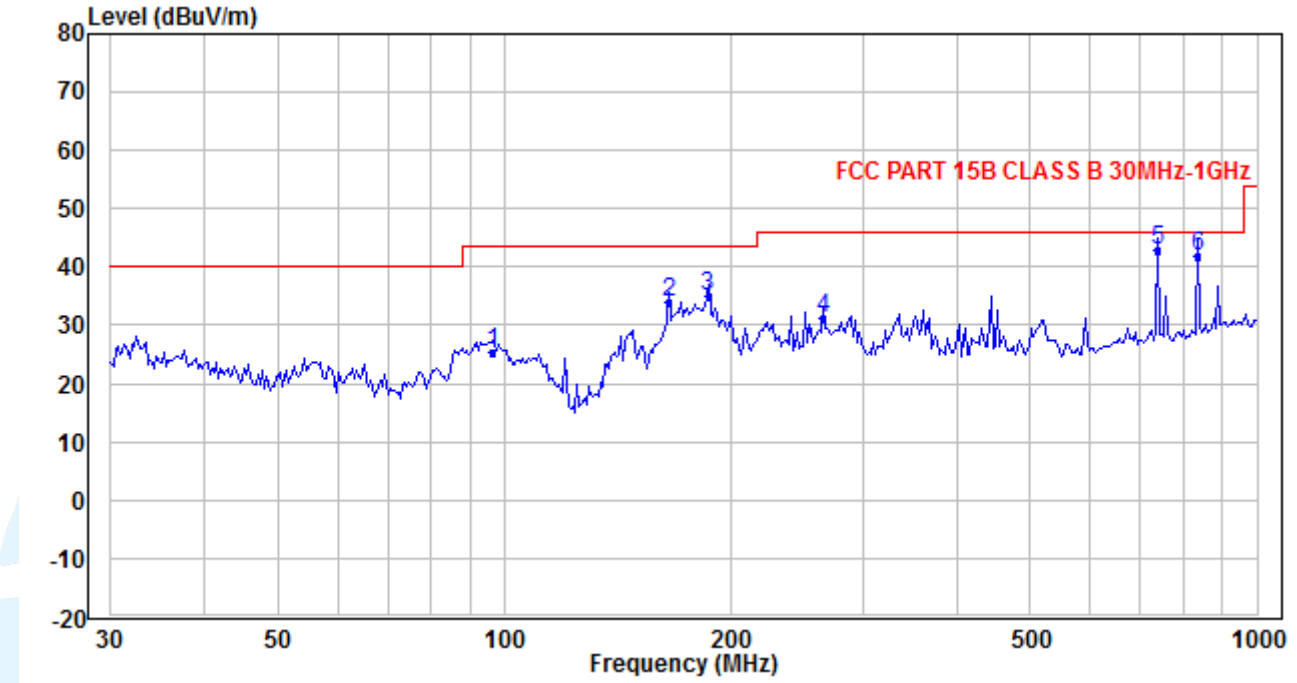
The measurement data as follows:

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

Below 1GHz (Quasi Peak):

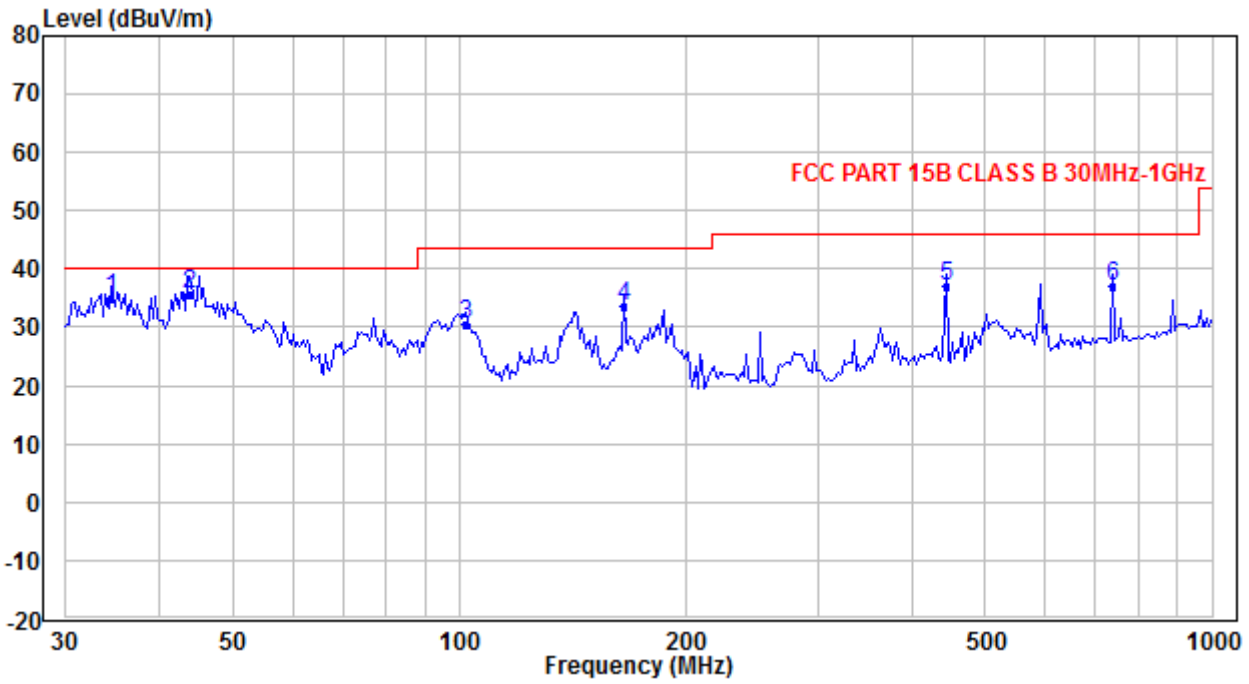
Test Mode1: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Hands Free

Horizontal



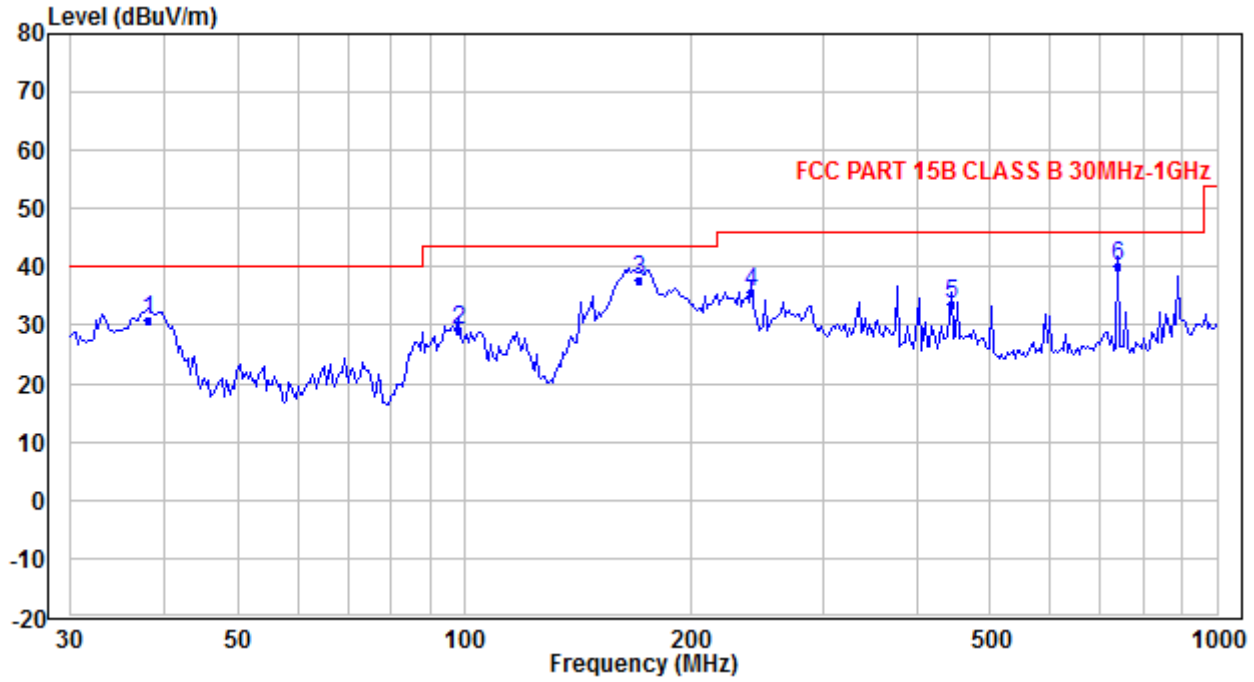
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	96.323	41.23	-15.84	25.39	43.50	-18.11	QP
2	165.472	46.26	-12.42	33.84	43.50	-9.66	QP
3	186.468	45.37	-10.29	35.08	43.50	-8.42	QP
4	264.971	38.97	-7.89	31.08	46.00	-14.92	QP
5	739.214	40.98	2.00	42.98	46.00	-3.02	QP
6	833.013	38.84	2.96	41.80	46.00	-4.20	QP

Vertical



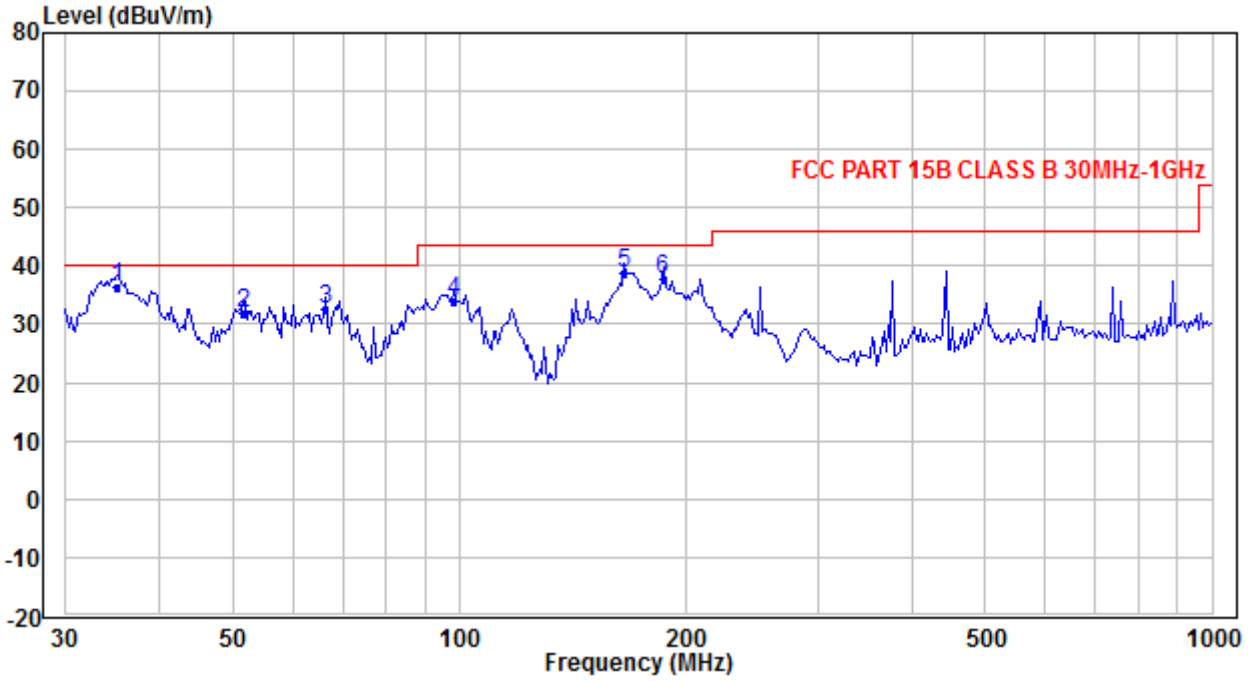
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	34.527	39.54	-4.60	34.94	40.00	-5.06	QP
2	43.845	46.12	-10.40	35.72	40.00	-4.28	QP
3	101.893	46.29	-15.78	30.51	43.50	-12.99	QP
4	165.472	46.15	-12.42	33.73	43.50	-9.77	QP
5	442.572	41.39	-4.30	37.09	46.00	-8.91	QP
6	739.214	35.20	2.00	37.20	46.00	-8.80	QP

Below 1GHz (Quasi Peak):
Test Mode 9: AC240V/50Hz (POE) + Worse from mode 1
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	38.096	37.47	-6.67	30.80	40.00	-9.20	QP
2	98.375	45.25	-16.04	29.21	43.50	-14.29	QP
3	170.189	49.16	-11.45	37.71	43.50	-5.79	QP
4	240.144	44.91	-9.09	35.82	46.00	-10.18	QP
5	442.572	37.91	-4.30	33.61	46.00	-12.39	QP
6	739.214	38.02	2.00	40.02	46.00	-5.98	QP

Vertical



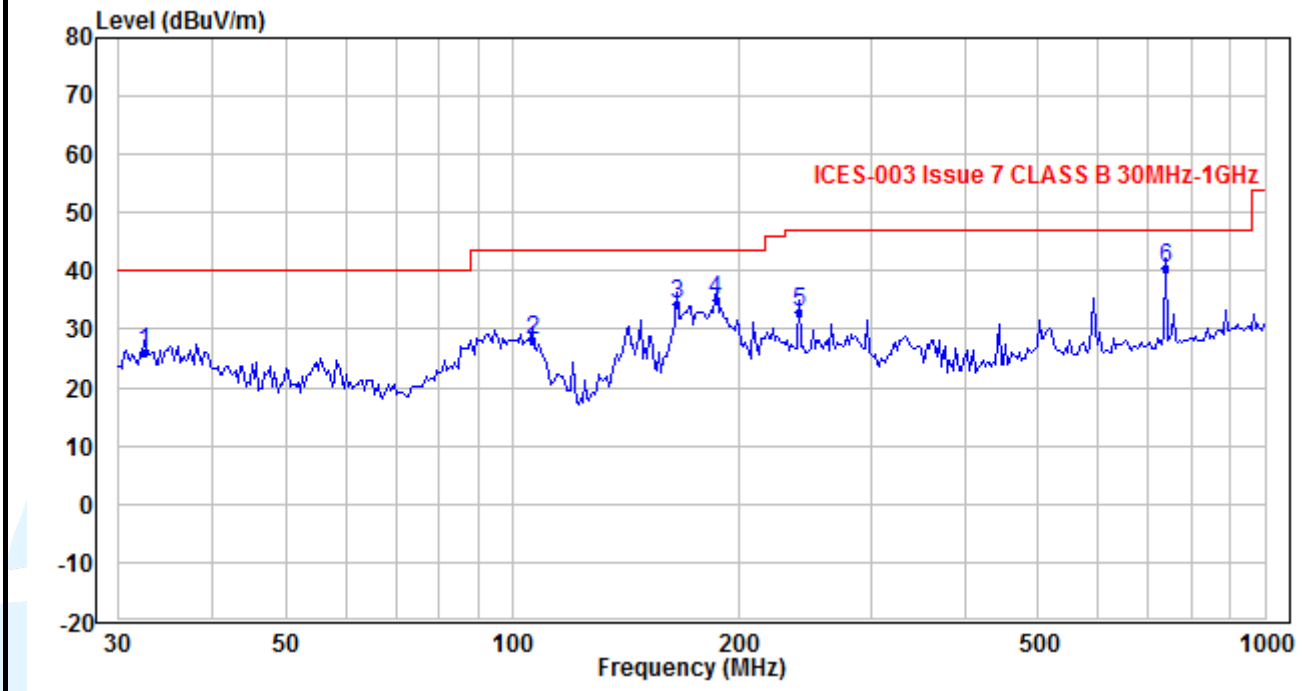
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	35.016	40.55	-4.28	36.27	40.00	-3.73	QP
2	51.536	47.62	-15.63	31.99	40.00	-8.01	QP
3	66.371	49.86	-17.20	32.66	40.00	-7.34	QP
4	98.375	50.14	-16.04	34.10	43.50	-9.40	QP
5	165.472	51.02	-12.42	38.60	43.50	-4.90	QP
6	186.468	48.11	-10.29	37.82	43.50	-5.68	QP

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

Below 1GHz (Quasi Peak):

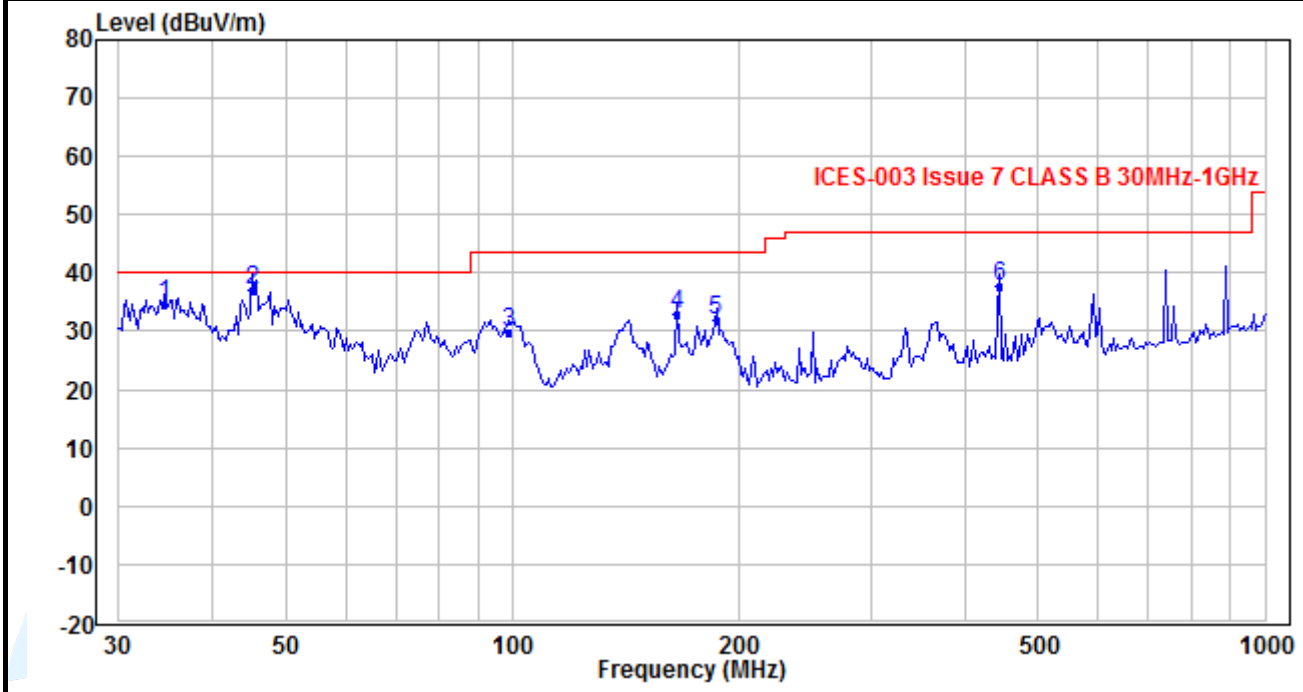
Test Mode 4: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Headset

Horizontal



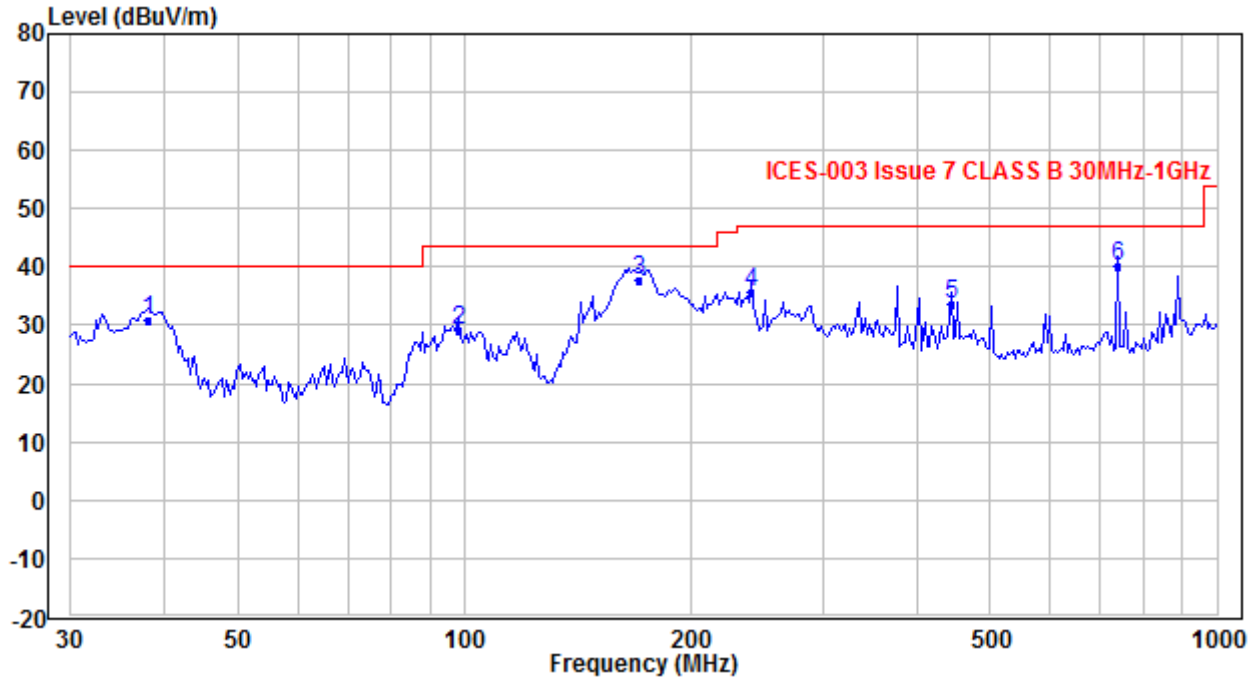
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	32.411	30.86	-4.77	26.09	40.00	-13.91	QP
2	106.281	44.08	-15.82	28.26	43.50	-15.24	QP
3	165.472	46.71	-12.42	34.29	43.50	-9.21	QP
4	186.468	45.21	-10.29	34.92	43.50	-8.58	QP
5	240.144	42.06	-9.09	32.97	47.00	-14.03	QP
6	739.214	38.36	2.00	40.36	47.00	-6.64	QP

Vertical



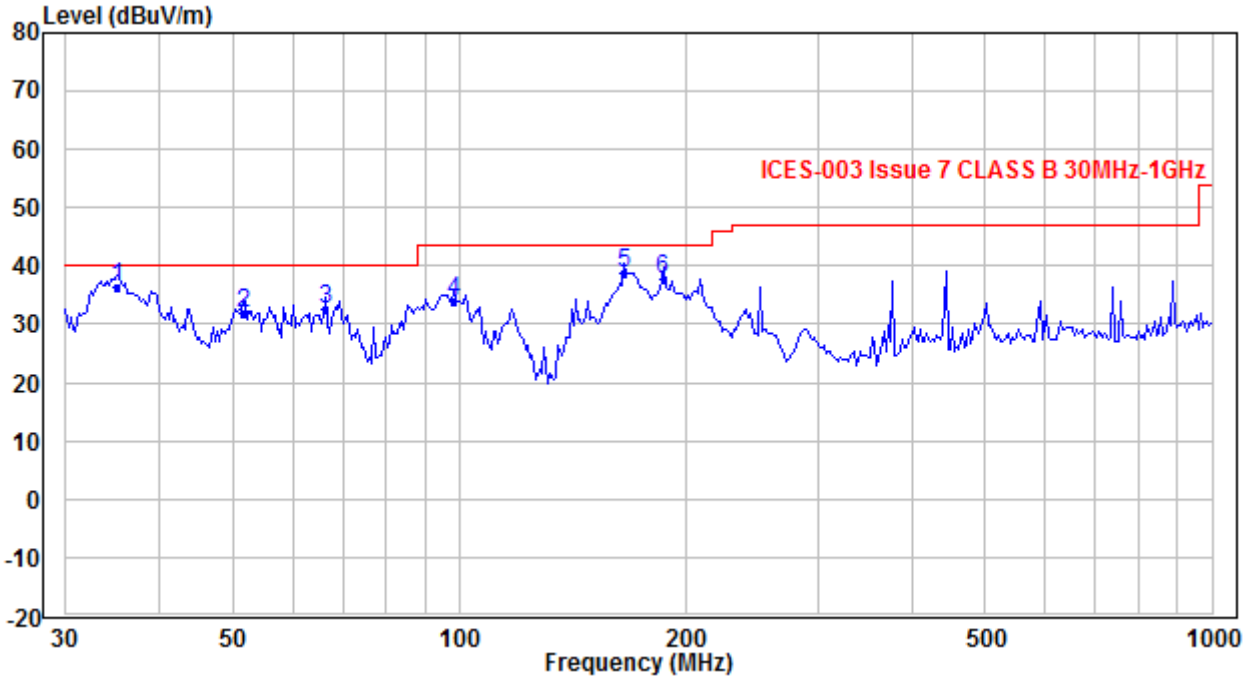
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	34.527	39.13	-4.60	34.53	40.00	-5.47	QP
2	45.095	48.20	-11.32	36.88	40.00	-3.12	QP
3	99.069	45.87	-15.90	29.97	43.50	-13.53	QP
4	165.472	45.23	-12.42	32.81	43.50	-10.69	QP
5	186.468	42.23	-10.29	31.94	43.50	-11.56	QP
6	442.572	42.19	-4.30	37.89	47.00	-9.11	QP

Below 1GHz (Quasi Peak):
Test Mode 9: AC240V/50Hz (POE) + Worse from mode 1
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	38.096	37.47	-6.67	30.80	40.00	-9.20	QP
2	98.375	45.25	-16.04	29.21	43.50	-14.29	QP
3	170.189	49.16	-11.45	37.71	43.50	-5.79	QP
4	240.144	44.91	-9.09	35.82	47.00	-11.18	QP
5	442.572	37.91	-4.30	33.61	47.00	-13.39	QP
6	739.214	38.02	2.00	40.02	47.00	-6.98	QP

Vertical

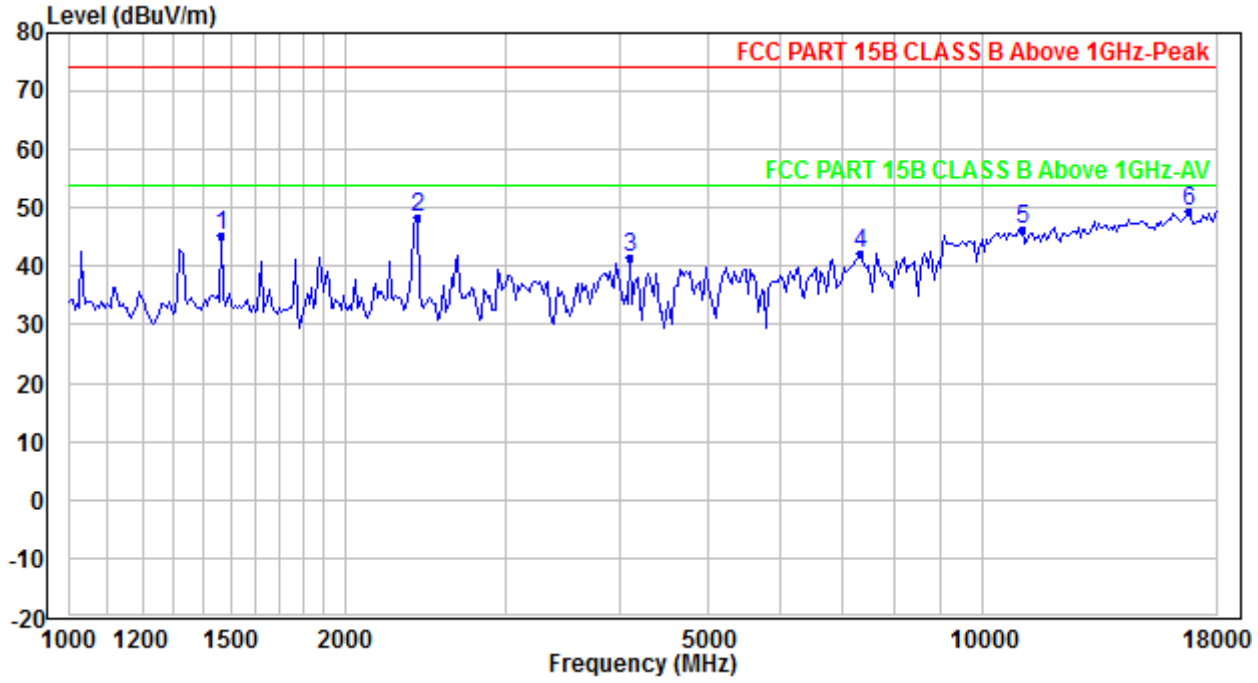


No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	35.016	40.55	-4.28	36.27	40.00	-3.73	QP
2	51.536	47.62	-15.63	31.99	40.00	-8.01	QP
3	66.371	49.86	-17.20	32.66	40.00	-7.34	QP
4	98.375	50.14	-16.04	34.10	43.50	-9.40	QP
5	165.472	51.02	-12.42	38.60	43.50	-4.90	QP
6	186.468	48.11	-10.29	37.82	43.50	-5.68	QP

Above 1GHz (Peak & Average)

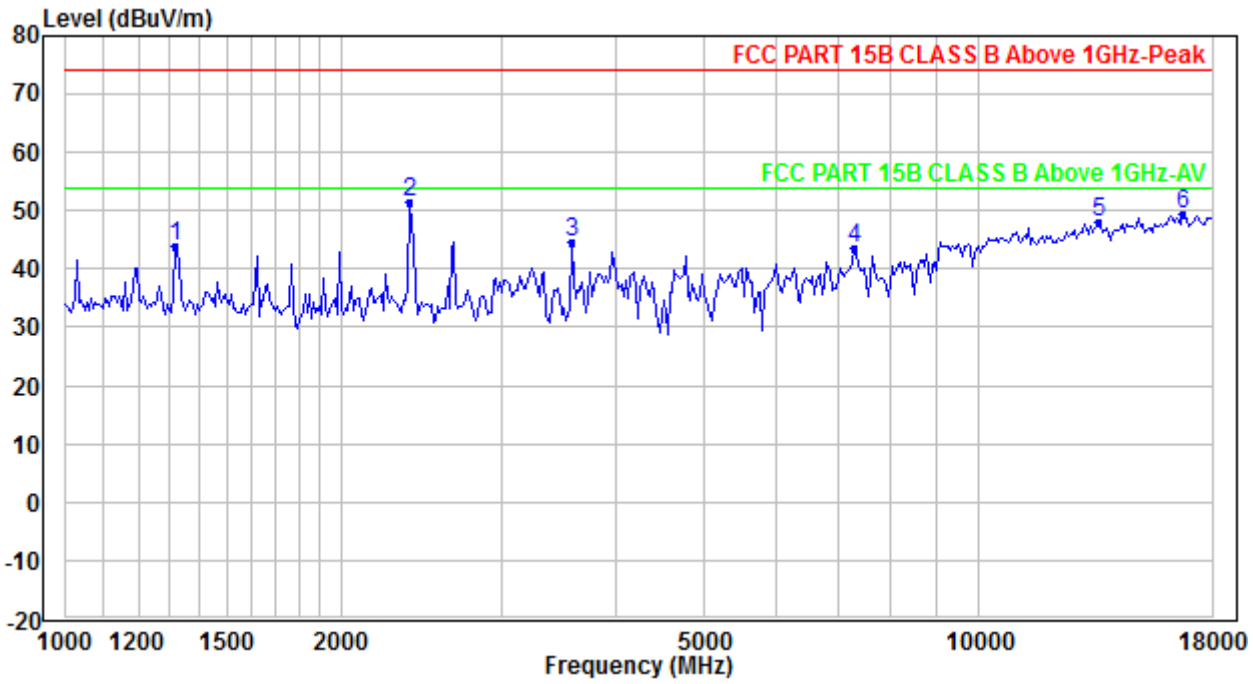
Test Mode1: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Hands Free

Horizontal



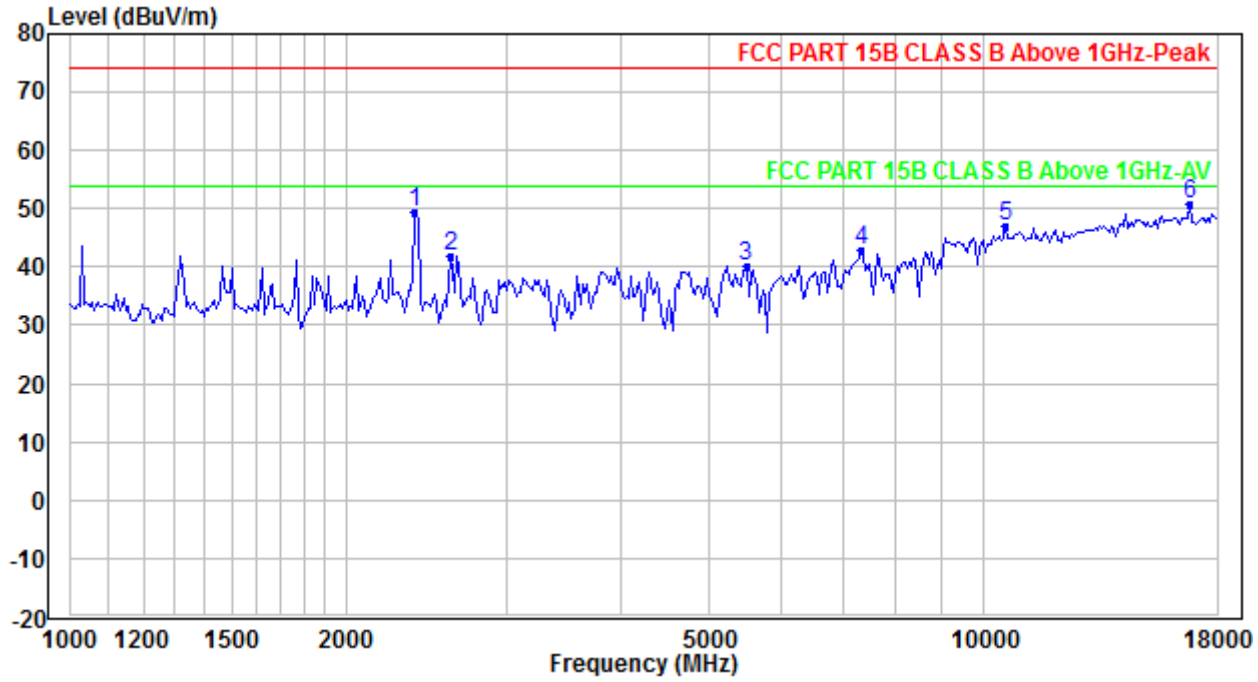
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1465.642	57.56	-12.42	45.14	74.00	-28.86	Peak
2	2398.016	56.82	-8.42	48.40	74.00	-25.60	Peak
3	4109.610	44.30	-2.94	41.36	74.00	-32.64	Peak
4	7334.292	40.52	1.63	42.15	74.00	-31.85	Peak
5	11065.320	38.78	7.38	46.16	74.00	-27.84	Peak
6	16791.350	36.87	12.61	49.48	74.00	-24.52	Peak

Vertical



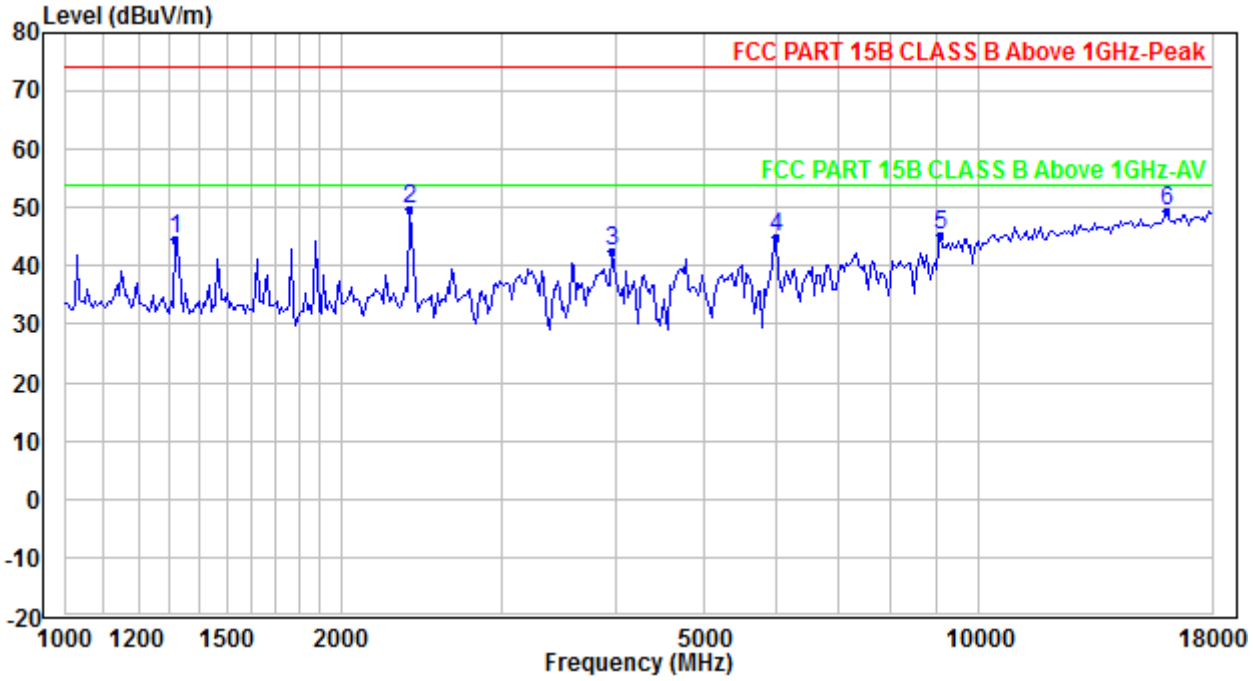
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	1320.528	56.72	-12.89	43.83	74.00	-30.17	Peak
2	2384.166	60.08	-8.46	51.62	74.00	-22.38	Peak
3	3576.241	49.20	-4.67	44.53	74.00	-29.47	Peak
4	7291.932	42.04	1.56	43.60	74.00	-30.40	Peak
5	13552.180	36.54	11.52	48.06	74.00	-25.94	Peak
6	16694.370	36.88	12.52	49.40	74.00	-24.60	Peak

Above 1GHz (Peak & Average)
Test Mode 8: AC120V/60Hz (POE) + Worse from mode 1
Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	2384.166	57.94	-8.46	49.48	74.00	-24.52	Peak
2	2600.579	49.72	-7.83	41.89	74.00	-32.11	Peak
3	5490.089	40.09	0.09	40.18	74.00	-33.82	Peak
4	7334.292	41.42	1.63	43.05	74.00	-30.95	Peak
5	10564.270	40.44	6.49	46.93	74.00	-27.07	Peak
6	16791.350	38.05	12.61	50.66	74.00	-23.34	Peak

Vertical



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1320.528	57.66	-12.89	44.77	74.00	-29.23	Peak
2	2384.166	58.19	-8.46	49.73	74.00	-24.27	Peak
3	3969.238	45.78	-3.21	42.57	74.00	-31.43	Peak
4	5988.431	45.63	-0.53	45.10	74.00	-28.90	Peak
5	9087.293	40.08	5.09	45.17	74.00	-28.83	Peak
6	16031.010	37.48	11.86	49.34	74.00	-24.66	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. For Radiated Emission above 18GHz, there was not any unwanted emission detected.
6. 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.

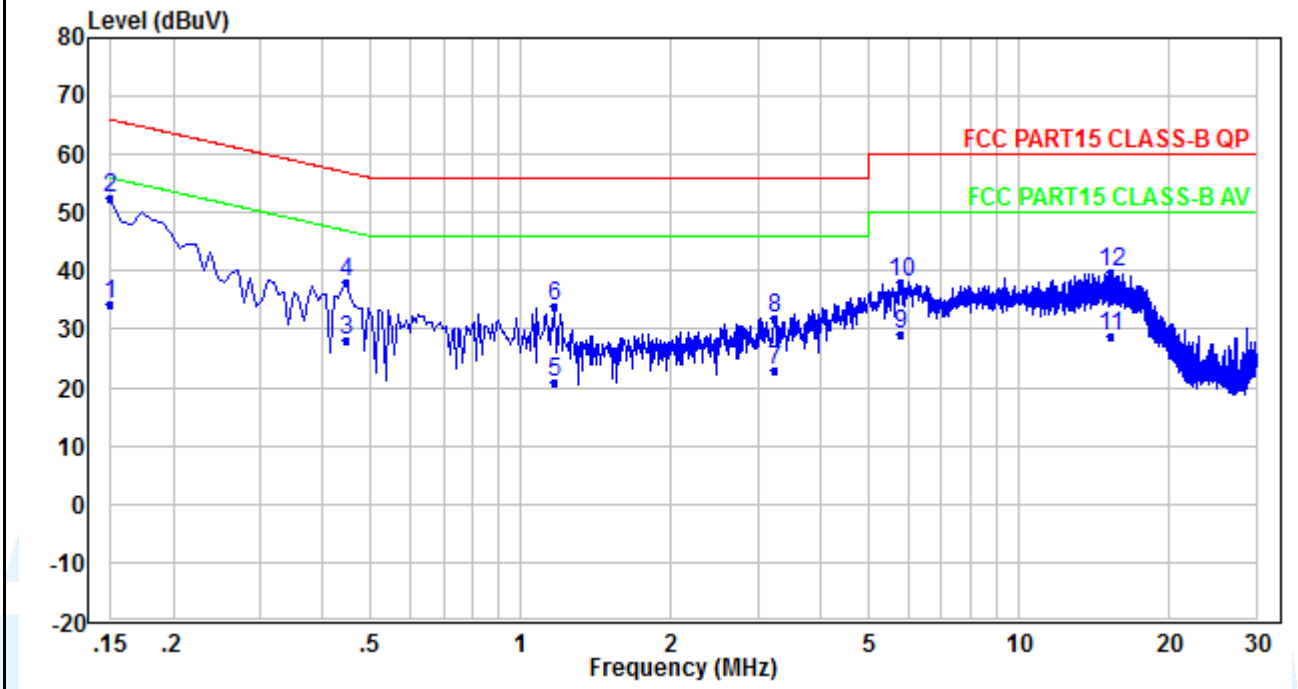
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

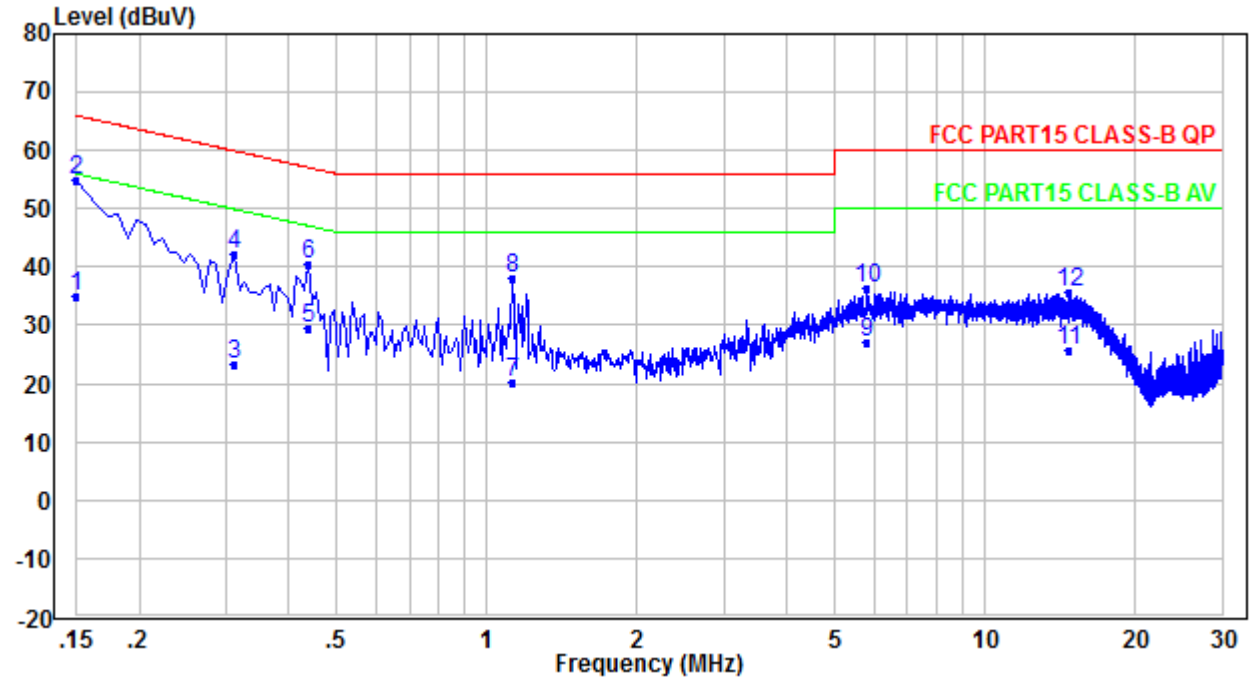
Test Mode1: AC120V/60Hz (Adaptor 1) +PC Port Link+ LAN Port Link + Expansion Module Link (USB Port) + Headset Link + Hands Free

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.150	24.30	10.12	34.42	56.00	-21.58	Average
2	0.150	42.30	10.12	52.42	66.00	-13.58	QP
3	0.446	17.83	10.14	27.97	46.95	-18.98	Average
4	0.446	27.83	10.14	37.97	56.95	-18.98	QP
5	1.166	10.81	10.22	21.03	46.00	-24.97	Average
6	1.166	23.81	10.22	34.03	56.00	-21.97	QP
7	3.229	12.70	10.26	22.96	46.00	-23.04	Average
8	3.229	21.70	10.26	31.96	56.00	-24.04	QP
9	5.781	18.85	10.38	29.23	50.00	-20.77	Average
10	5.781	27.85	10.38	38.23	60.00	-21.77	QP
11	15.339	17.89	10.88	28.77	50.00	-21.23	Average
12	15.339	28.89	10.88	39.77	60.00	-20.23	QP

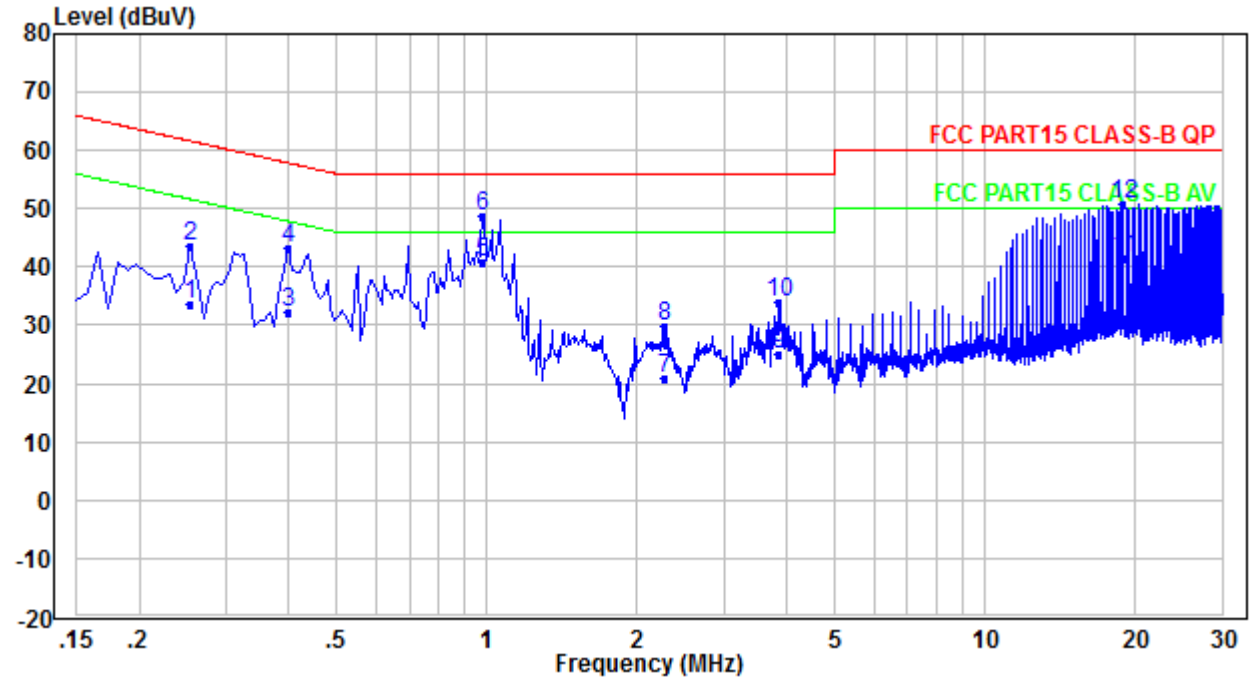
Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.150	24.97	10.11	35.08	56.00	-20.92	Average
2	0.150	44.97	10.11	55.08	66.00	-10.92	QP
3	0.310	13.26	10.11	23.37	49.97	-26.60	Average
4	0.310	32.26	10.11	42.37	59.97	-17.60	QP
5	0.438	19.28	10.12	29.40	47.10	-17.70	Average
6	0.438	30.28	10.12	40.40	57.10	-16.70	QP
7	1.126	9.98	10.15	20.13	46.00	-25.87	Average
8	1.126	27.98	10.15	38.13	56.00	-17.87	QP
9	5.821	16.80	10.41	27.21	50.00	-22.79	Average
10	5.821	25.80	10.41	36.21	60.00	-23.79	QP
11	14.739	14.73	10.82	25.55	50.00	-24.45	Average
12	14.739	24.73	10.82	35.55	60.00	-24.45	QP

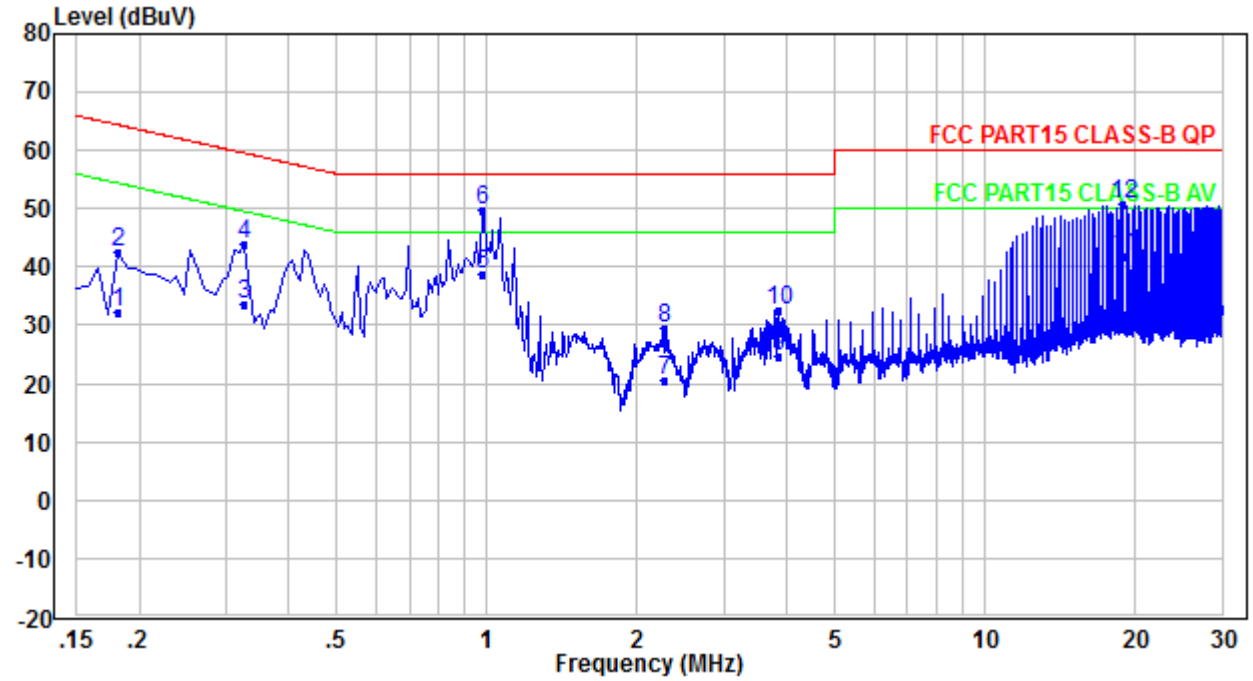
Quasi Peak and Average:
Test Mode 8: AC120V/60Hz (POE) + Worse from mode 1

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.254	23.60	10.13	33.73	51.63	-17.90	Average
2	0.254	33.60	10.13	43.73	61.63	-17.90	QP
3	0.398	22.07	10.12	32.19	47.90	-15.71	Average
4	0.398	33.07	10.12	43.19	57.90	-14.71	QP
5	0.982	30.54	10.22	40.76	46.00	-5.24	Average
6	0.982	38.54	10.22	48.76	56.00	-7.24	QP
7	2.270	10.58	10.24	20.82	46.00	-25.18	Average
8	2.270	19.58	10.24	29.82	56.00	-26.18	QP
9	3.869	14.69	10.29	24.98	46.00	-21.02	Average
10	3.869	23.69	10.29	33.98	56.00	-22.02	QP
11	18.986	30.68	10.96	41.64	50.00	-8.36	Average
12	18.986	39.68	10.96	50.64	60.00	-9.36	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.182	22.27	10.11	32.38	54.39	-22.01	Average
2	0.182	32.27	10.11	42.38	64.39	-22.01	QP
3	0.326	23.64	10.12	33.76	49.55	-15.79	Average
4	0.326	33.64	10.12	43.76	59.55	-15.79	QP
5	0.982	28.52	10.15	38.67	46.00	-7.33	Average
6	0.982	39.52	10.15	49.67	56.00	-6.33	QP
7	2.270	10.45	10.20	20.65	46.00	-25.35	Average
8	2.270	19.45	10.20	29.65	56.00	-26.35	QP
9	3.869	14.38	10.31	24.69	46.00	-21.31	Average
10	3.869	22.38	10.31	32.69	56.00	-23.31	QP
11	18.986	30.86	10.95	41.81	50.00	-8.19	Average
12	18.986	39.86	10.95	50.81	60.00	-9.19	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

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 **********
