



Certificate #4312.01

TEST REPORT

Product Name: 10 Gigabit and 2 SFP Port SMB
UC/Networking Convergence Wired Gateway
Trade Mark: GRANDSTREAM
Model No.: GCC6011
Report Number: 24042911088EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 7
Test Result: PASS
Date of Issue: May 28, 2024

Prepared for:

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

Prepared by:

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May 28, 2024

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Version

Version No.	Date	Description
V1.0	May 28, 2024	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

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

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	10 Gigabit and 2 SFP Port SMB UC/Networking Convergence Wired Gateway
Model No.:	GCC6011
Trade Mark:	GRANDSTREAM
DUT Stage:	Production Unit
Rated Voltage:	48.0 V $\Rightarrow$ 1.0 A supplied by adapter
Classification of digital devices:	Class B
Highest Internal Frequency:	2.0 GHz
Software Version:	0.0.1.1 (Provided by the customer)
Hardware Version:	V1.2 (Provided by the customer)
Sample Received Date:	April 28, 2024
Sample Tested Date:	May 18, 2024 to May 23, 2024

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.:	GQ48-480100-AU
Input:	100-240 V~50/60 Hz 1.5 A Max
Output:	48.0 V $\Rightarrow$ 1.0 A 48.0W
DC Cable:	1.5 Meter, Unshielded without ferrite

Adapter(2)	
Model No.:	DCT50W480100US-B0
Input:	100-240 V~50/60 Hz 1.3 A Max
Output:	48.0 V $\Rightarrow$ 1.0 A 48.0W
DC Cable:	1.5 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
Notebook	Lenovo	E450	SL10G10780	UnionTrust
Notebook	DELL	Latitude 3400	16238087894	UnionTrust
Mouse	DELL	MS111	CN-011D3V-73826-62N-0LK	UnionTrust
USB flash disk	Kingston	DTSE9	N/A	UnionTrust
SD card	SANDISK	N/A	N/A	UnionTrust
Optical to electrical module	N/A	N/A	N/A	UnionTrust
Network Analyst	Xtramus	nustreams-600	OJNS600C0013	UnionTrust
Load PCB	N/A	N/A	N/A	Applicant

2) Support Cable

Cable No.	Description	Connector	Length(Meter)	Supplied by
1	Ethernet Cable*5	RJ45	1.0 Unshielded without ferrite	UnionTrust
2	Ethernet Cable*1	RJ45	2.0 Unshielded without ferrite	UnionTrust
3	Ethernet Cable*1	RJ45	3.0 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

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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	Cal. Due date
☒	3m SAC	ETS-LINDGREN	3m	Euroshiedpn-CT 001270-1317	11-Nov-2023	10-Nov-2026
☒	Receiver	R&S	ESIB26	100114	27-Oct-2023	26-Oct-2024
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	30-Oct-2023	29-Oct-2024
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	30-Oct-2023	29-Oct-2024
☒	Preamplifier	HP	8447F	2805A02960	31-Oct-2023	30-Oct-2024
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	01-Apr-2024	31-Mar-2025
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	01-Apr-2024	31-Mar-2025
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	30-Oct-2023	29-Oct-2024
☒	Pre-amplifier	ETS-LINDGREN	00118384	00202652	30-Oct-2023	29-Oct-2024
☒	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	Cal. Due date
☒	Receiver	R&S	ESR7	101181	27-Oct-2023	26-Oct-2024
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	27-Oct-2023	26-Oct-2024
☒	LISN	R&S	ESH2-Z5	860014/024	27-Oct-2023	26-Oct-2024
☒	LISN	ETS-Lindgren	3816/2SH	00201088	27-Oct-2023	26-Oct-2024
☒	Test Software	EZ-EMC	EZ-CON	Software Version: EMC-CON 3A1.1		

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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	48.0 V $\pm$ 1.0 A supplied by adapter	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Conducted Emission	23.7	67.2	100.1	S202403072827-ZJA01/2	Linson Xie
Radiated Emission	21.5	52.3	100.1		

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Ethernet Ports Loop transmission+ SFP ports Transmission + USB + SD card Test Mode 2: AC240V/50Hz (Adapter1) + Ethernet Ports Loop transmission+ SFP ports Transmission + USB + SD card Test Mode 3: Worst from test mode1~2 (Adapter 2)
Conducted Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Ethernet Ports Loop transmission+ SFP ports Transmission + USB + SD card Test Mode 2: AC240V/50Hz (Adapter1) + Ethernet Ports Loop transmission+ SFP ports Transmission + USB + SD card Test Mode 3: Worst from test mode1~2 (Adapter 2)
Remark: The above test modes in boldface were the worst cases, only the test data of these modes were reported.	

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

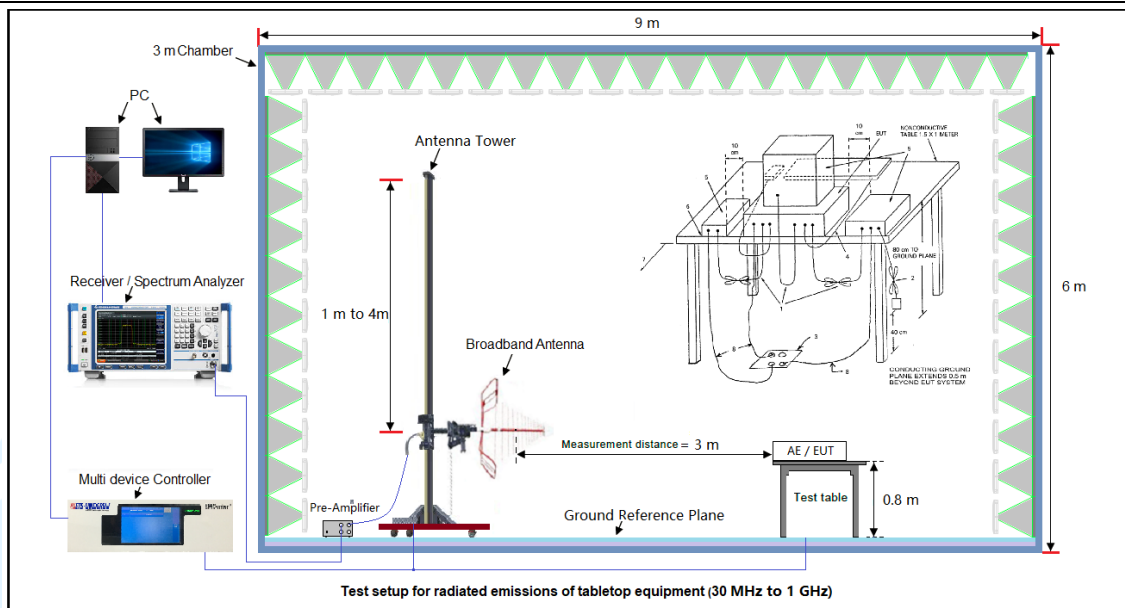
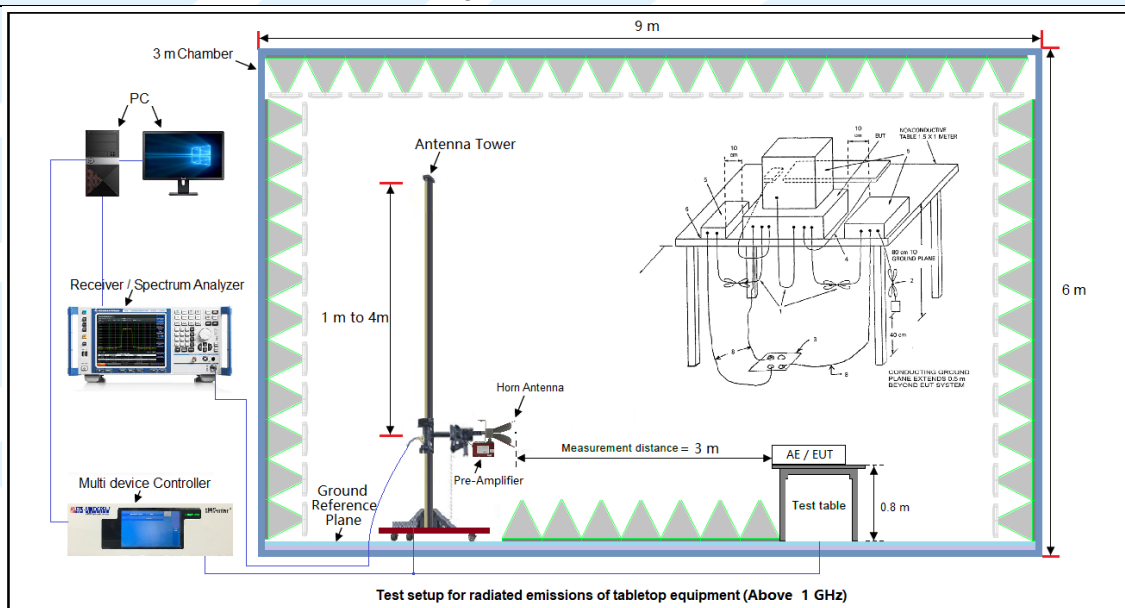
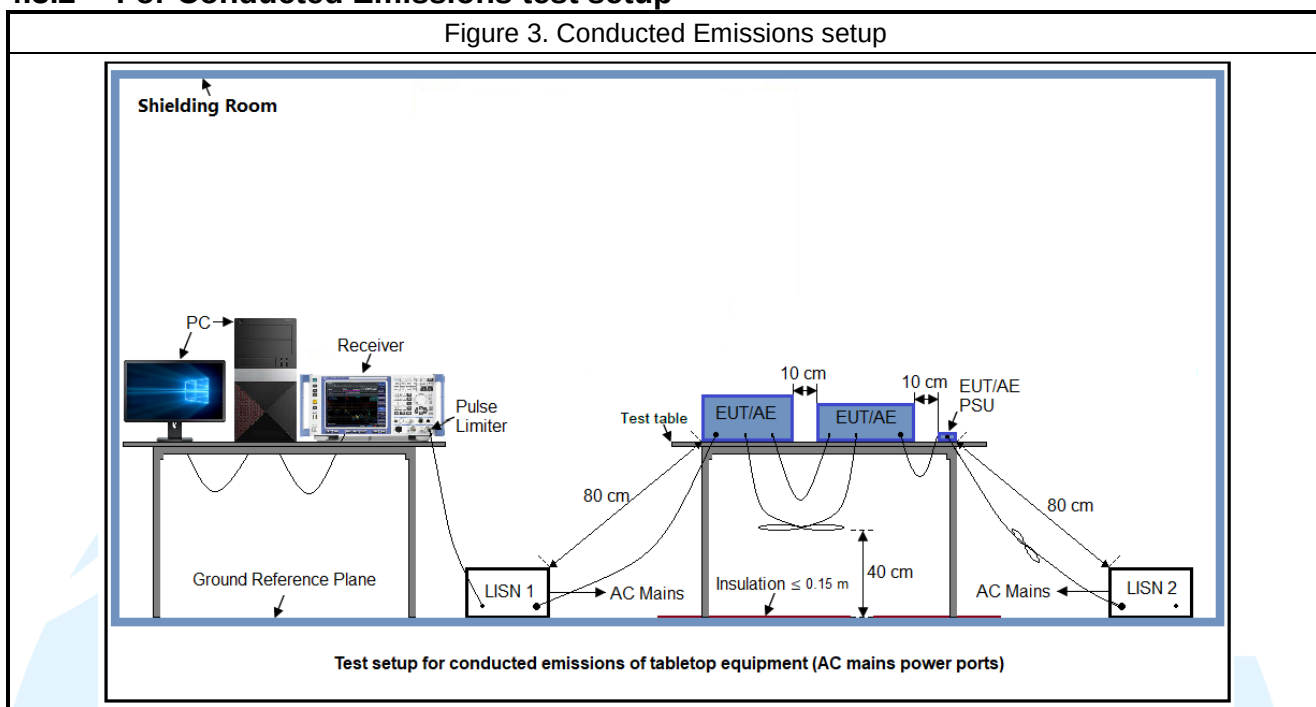


Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



4.4 SYSTEM TEST CONFIGURATION

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

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

5. REFERENCE DOCUMENTS FOR TESTING

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

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

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

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	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		

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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 (dB μ V/m) = 20 log Emission level (μ V/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

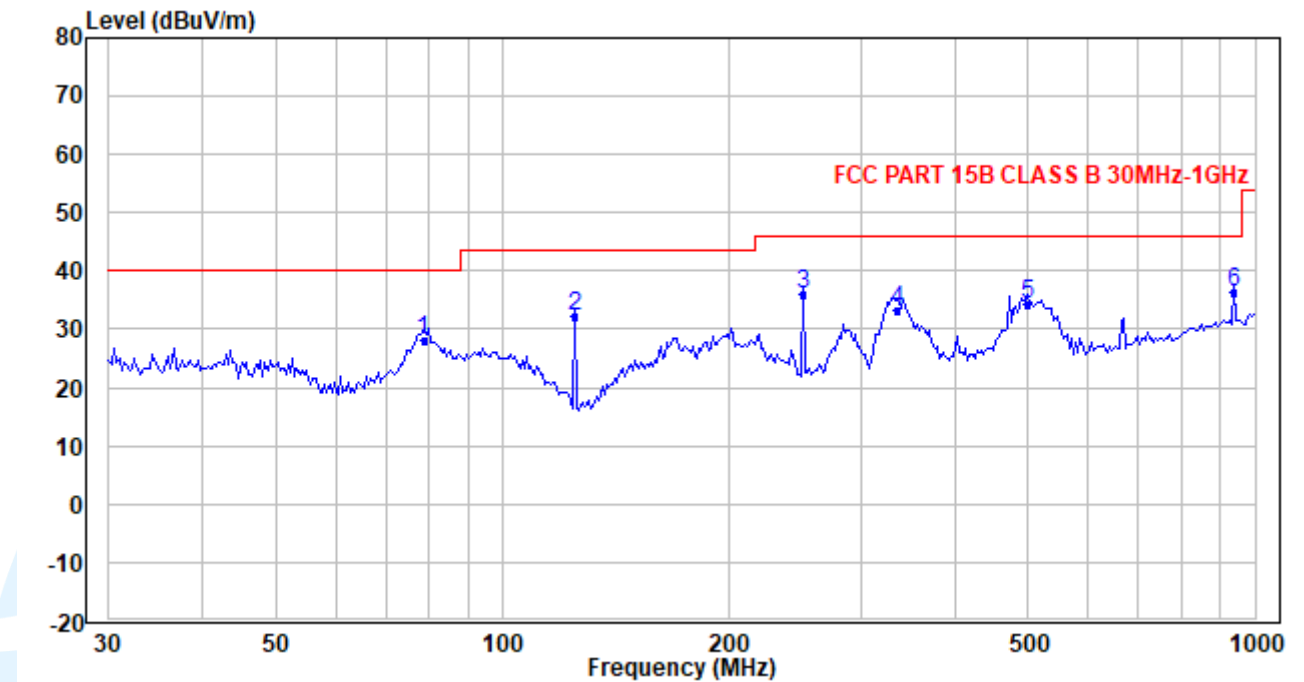
The measurement data as follows:

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

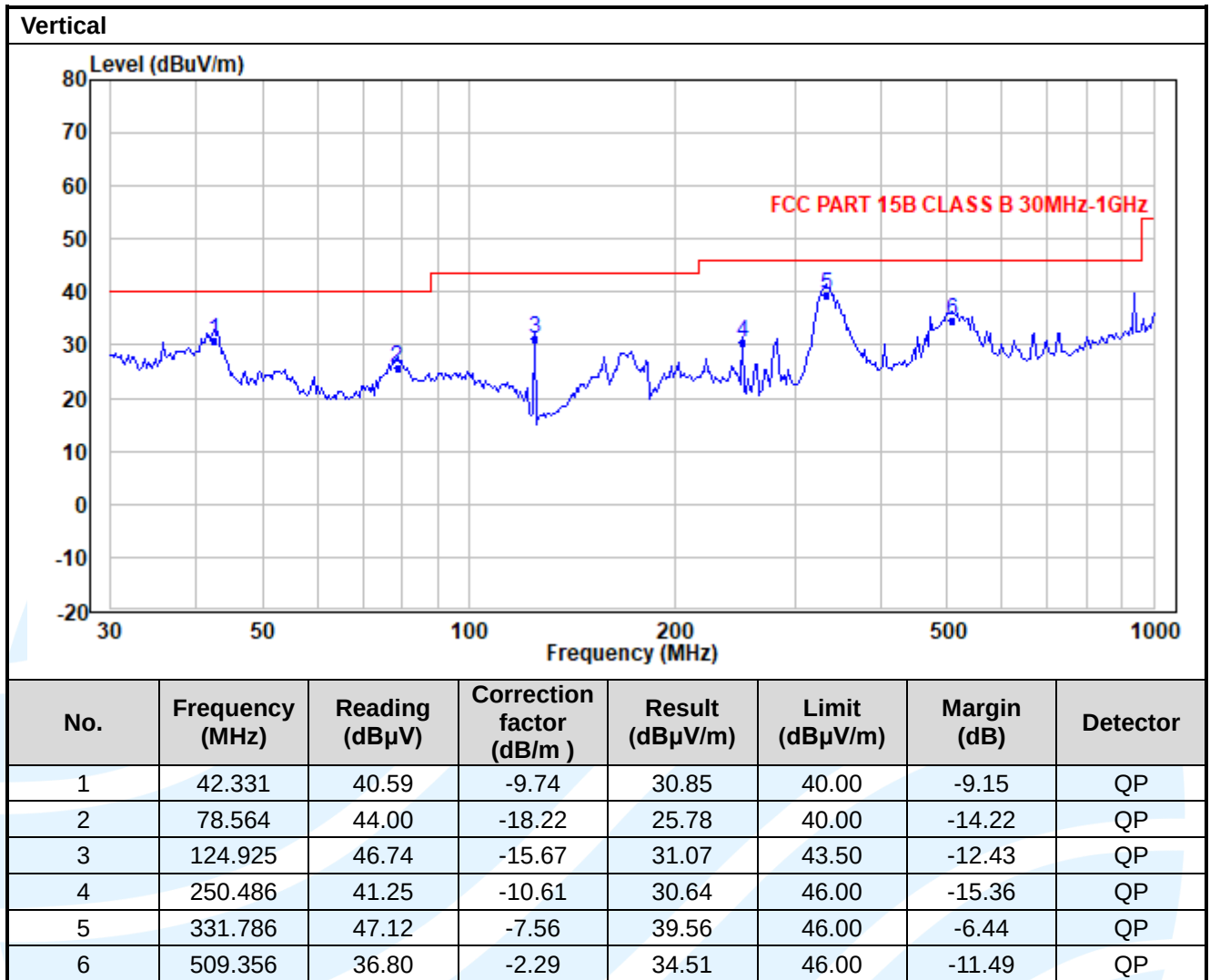
Below 1GHz(Quasi Peak):

Test Mode1

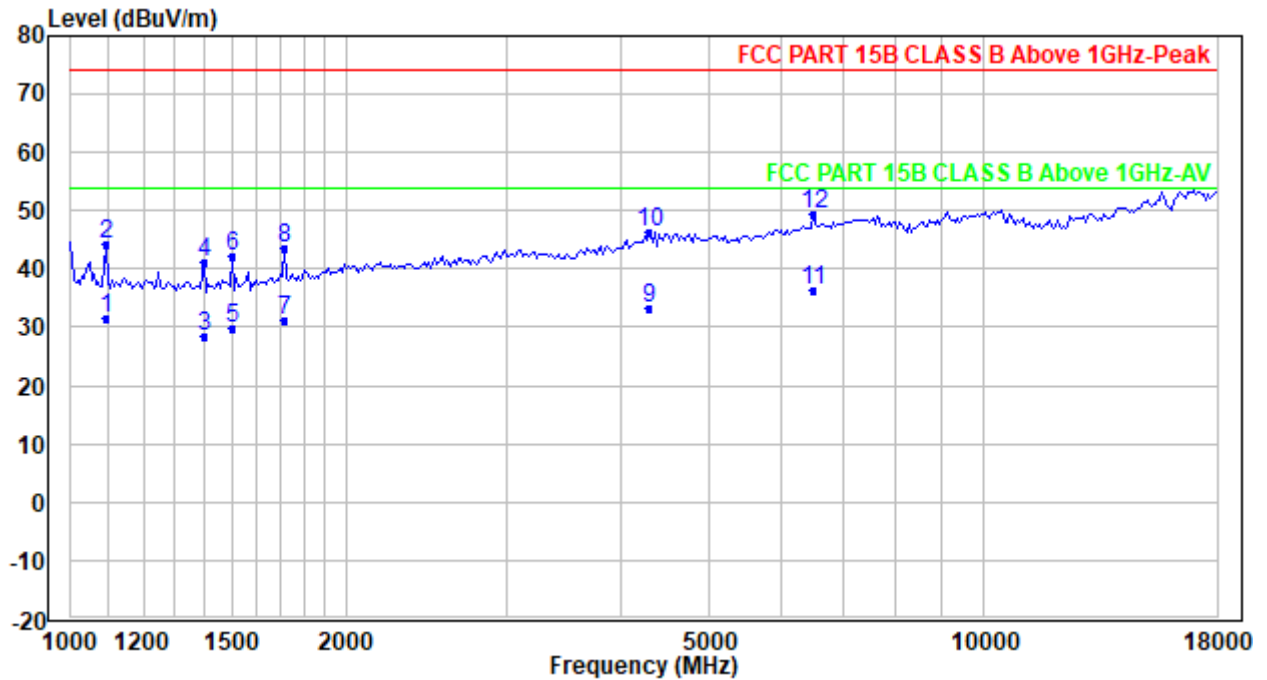
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	78.564	46.46	-18.22	28.24	40.00	-11.76	QP
2	124.925	48.03	-15.67	32.36	43.50	-11.14	QP
3	250.486	46.53	-10.61	35.92	46.00	-10.08	QP
4	334.126	40.81	-7.51	33.30	46.00	-12.70	QP
5	498.730	36.69	-2.54	34.15	46.00	-11.85	QP
6	938.714	31.43	4.93	36.36	46.00	-9.64	QP

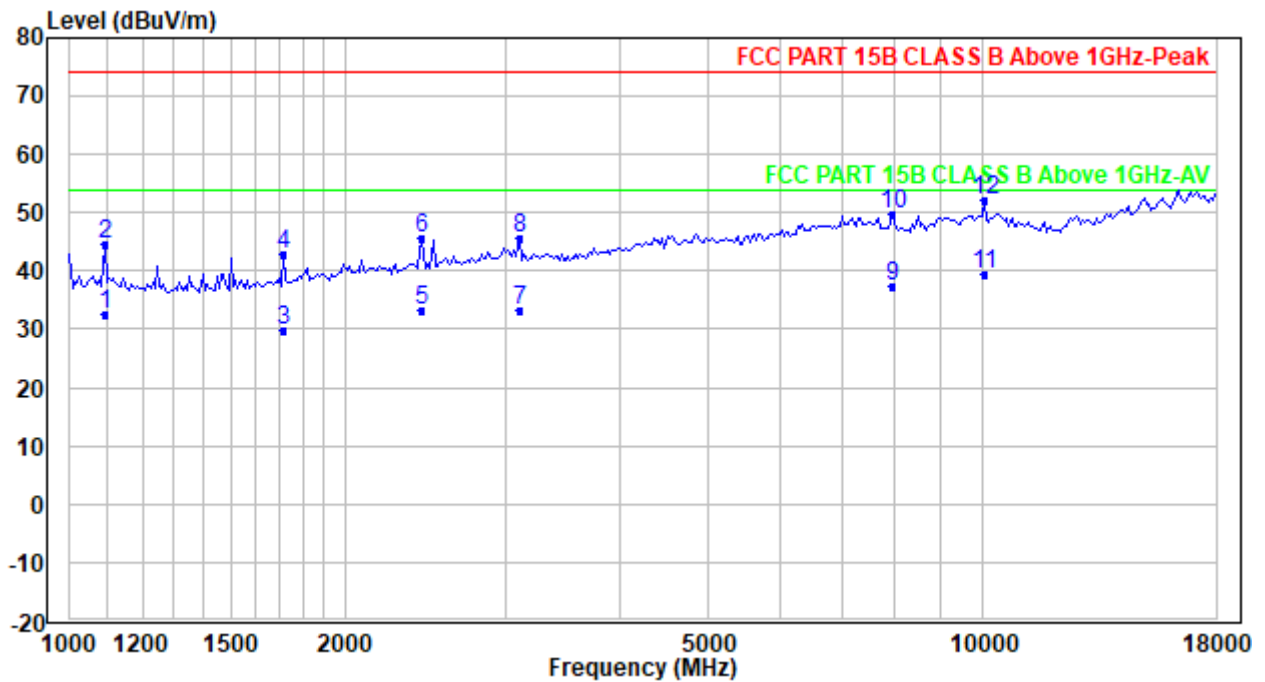


Above 1GHz(Peak & Average)
Test Mode 1:
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1090.771	44.44	-12.95	31.49	54.00	-22.51	Average
2	1090.771	57.05	-12.95	44.10	74.00	-29.90	Peak
3	1399.276	41.55	-13.05	28.50	54.00	-25.50	Average
4	1399.276	54.32	-13.05	41.27	74.00	-32.73	Peak
5	1499.997	43.00	-13.09	29.91	54.00	-24.09	Average
6	1499.997	55.39	-13.09	42.30	74.00	-31.70	Peak
7	1713.754	42.86	-11.57	31.29	54.00	-22.71	Average
8	1713.754	55.19	-11.57	43.62	74.00	-30.38	Peak
9	4304.524	35.86	-2.46	33.40	54.00	-20.60	Average
10	4304.524	48.71	-2.46	46.25	74.00	-27.75	Peak
11	6494.281	35.23	1.23	36.46	54.00	-17.54	Average
12	6494.281	48.02	1.23	49.25	74.00	-24.75	Peak

Vertical



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1090.771	45.62	-12.95	32.67	54.00	-21.33	Average
2	1090.771	57.68	-12.95	44.73	74.00	-29.27	Peak
3	1713.754	41.52	-11.57	29.95	54.00	-24.05	Average
4	1713.754	54.32	-11.57	42.75	74.00	-31.25	Peak
5	2425.957	41.64	-8.40	33.24	54.00	-20.76	Average
6	2425.957	54.09	-8.40	45.69	74.00	-28.31	Peak
7	3112.096	39.04	-5.87	33.17	54.00	-20.83	Average
8	3112.096	51.56	-5.87	45.69	74.00	-28.31	Peak
9	7953.829	36.07	1.21	37.28	54.00	-16.72	Average
10	7953.829	48.63	1.21	49.84	74.00	-24.16	Peak
11	10027.650	35.96	3.33	39.29	54.00	-14.71	Average
12	10027.650	48.75	3.33	52.08	74.00	-21.92	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 AC240V/50Hz and AC120V/60Hz, only the worst case emissions reported.
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.

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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.

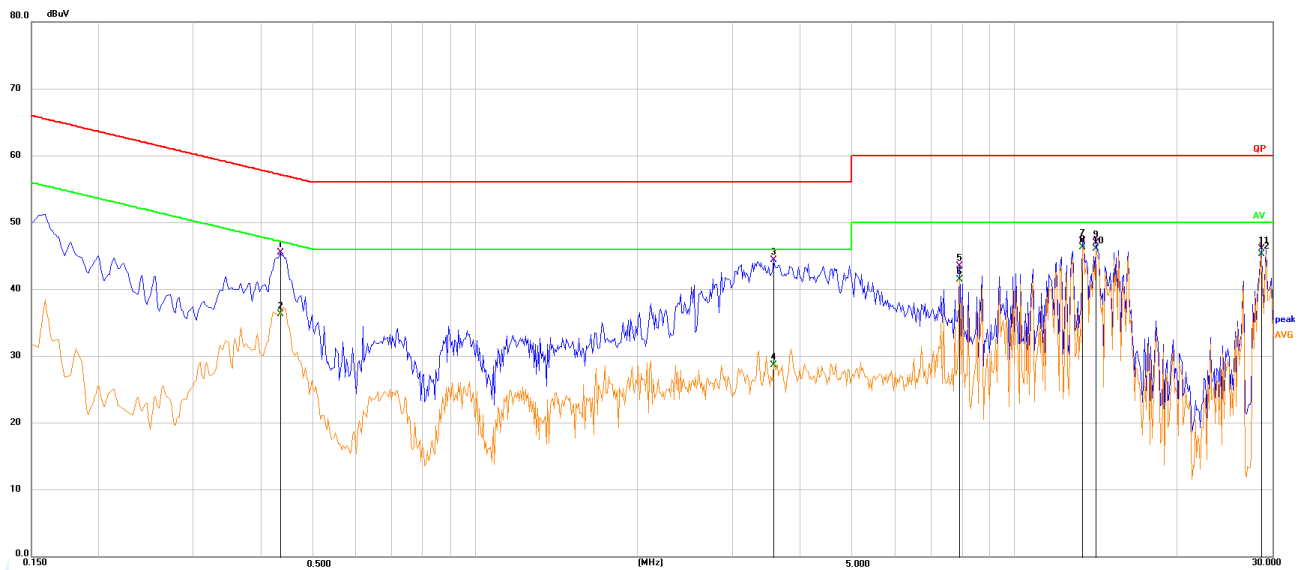
Test Result: Pass

The worst measurement data as follows:

Quasi Peak and Average:

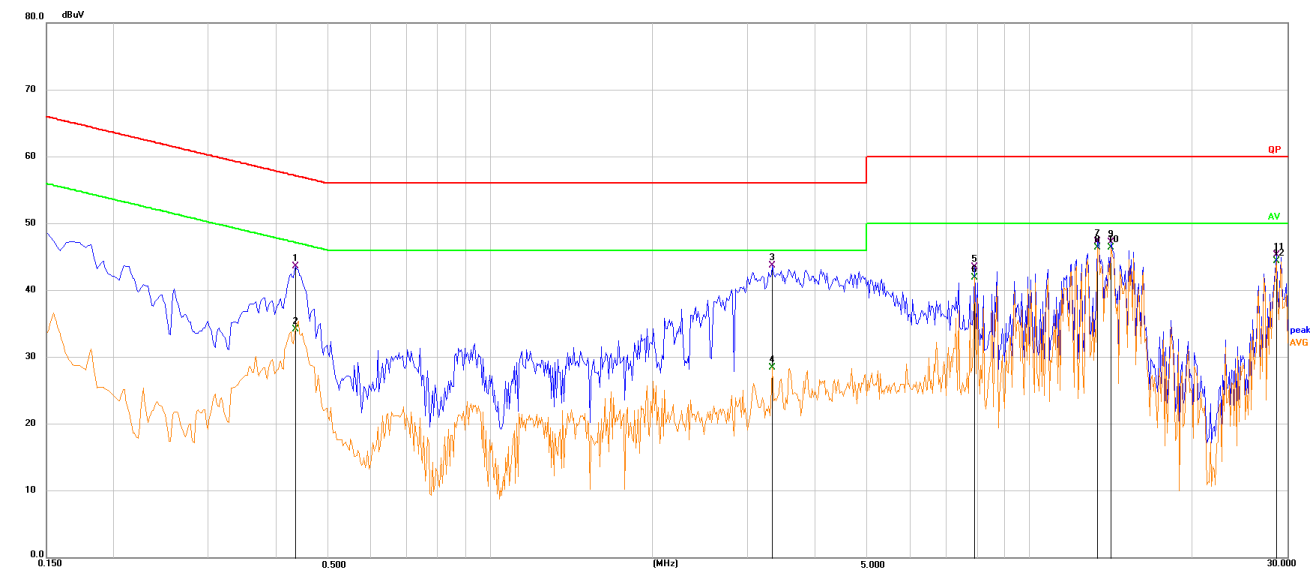
Test Mode 1:

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.4334	35.34	10.14	45.48	57.19	-11.71	QP
2	0.4334	26.15	10.14	36.29	47.19	-10.90	AVG
3	3.5790	34.11	10.24	44.35	56.00	-11.65	QP
4	3.5790	18.42	10.24	28.66	46.00	-17.34	AVG
5	7.9214	33.00	10.49	43.49	60.00	-16.51	QP
6	7.9214	30.96	10.49	41.45	50.00	-8.55	AVG
7	13.3574	36.70	10.49	47.19	60.00	-12.81	QP
8	13.3574	35.79	10.49	46.28	50.00	-3.72	AVG
9	14.2125	36.44	10.50	46.94	60.00	-13.06	QP
10	14.2125	35.56	10.50	46.06	50.00	-3.94	AVG
11	28.6844	35.21	10.90	46.11	60.00	-13.89	QP
12	28.6844	34.39	10.90	45.29	50.00	-4.71	AVG

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.4335	33.33	10.22	43.55	57.19	-13.64	QP
2	0.4335	23.93	10.22	34.15	47.19	-13.04	AVG
3	3.3450	33.45	10.25	43.70	56.00	-12.30	QP
4	3.3450	18.18	10.25	28.43	46.00	-17.57	AVG
5	7.9215	33.21	10.32	43.53	60.00	-16.47	QP
6	7.9215	31.62	10.32	41.94	50.00	-8.06	AVG
7	13.3575	36.76	10.56	47.32	60.00	-12.68	QP
8	13.3575	35.78	10.56	46.34	50.00	-3.66	AVG
9	14.2125	36.53	10.61	47.14	60.00	-12.86	QP
10	14.2125	35.75	10.61	46.36	50.00	-3.64	AVG
11	28.6845	34.44	10.88	45.32	60.00	-14.68	QP
12	28.6845	33.52	10.88	44.40	50.00	-5.60	AVG

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 AC240V/50Hz and AC120V/60Hz, only the worst case emissions reported.

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UTTR-EMC-ICES003-V1.2

APPENDIX 1 PHOTOS OF TEST SETUP

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

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

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

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