

TEST REPORT

Product Name: AmazonBasics Wireless Tweaked Vertical Ergonomic Optical Mouse
Trade Mark: N/A
Model No.: MD8036
HVIN: MD8036
FCC ID: 2AAIL-MM8036D
Report Number: 181203008EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 6
Test Result: PASS
Date of Issue: March 13, 2019

Prepared for:

DongGuan Mae Tay Electronic Co.,Ltd
Beihuanlu Industrial Area Changping Town Dongguan, Guangdong
China

Prepared by:

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Tested by:



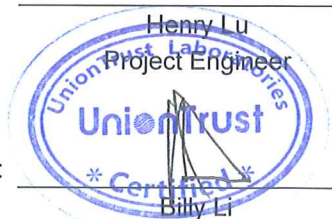
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Date:

March 13, 2019

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Version

Version No.	Date	Description
V1.0	March 13, 2019	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	DongGuan Mae Tay Electronic Co.,Ltd
Address of Applicant:	Beihuanlu Industrial Area Changping Town Dongguan, Guangdong China
Manufacturer:	DongGuan Mae Tay Electronic Co.,Ltd
Address of Manufacturer:	Beihuanlu Industrial Area Changping Town Dongguan, Guangdong China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	AmazonBasics Wireless Tweaked Vertical Ergonomic Optical Mouse
Model No.:	MD8036
HVIN:	MD8036
Trade Mark:	N/A
DUT Stage:	Production Unit
Power Supply:	The dongle is supplied power by USB port
Classification of digital devices:	Class B
Highest Internal Frequency:	2480.85 GHz
Sample Received Date:	December 4, 2018
Sample Tested Date:	December 4, 2018 to December 17, 2018

1.2.2 Description of Accessories

None

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

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
-	-	-	-	-

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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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/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

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: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

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	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 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 6 Section 6.1	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109 ICES-003 Issue 6 Section 6.2	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)
<input checked="" type="checkbox"/>	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
<input type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
<input checked="" type="checkbox"/>	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
<input checked="" type="checkbox"/>	Band Rejection Filter (2400MHz~2500MHz)	Micro-Tronics	BRM50702	G248	Jun. 06, 2018	Jun. 06, 2019
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.160333		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	LISN	R&S	ESH2-Z5	860014/024	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	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	Dongle powered by 5Vdc	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

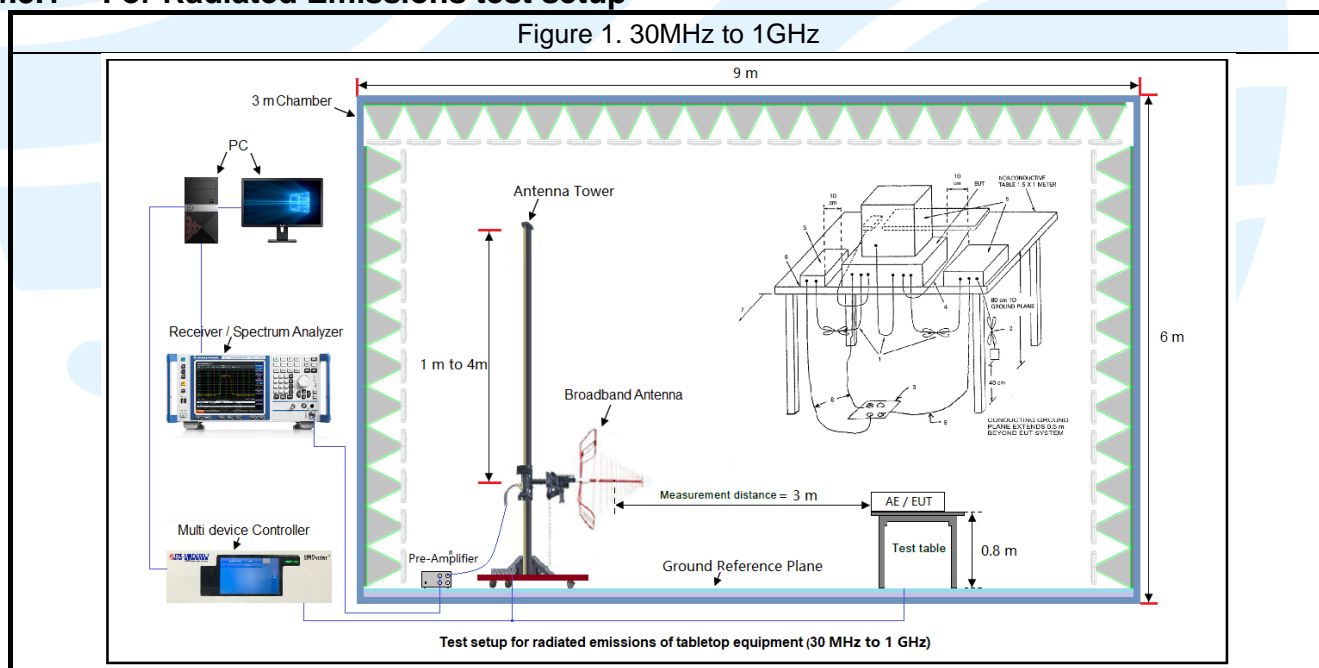
Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Emission	23.5	53	99.8	Gemini Huang
Radiated Emission	25.4	57	99.8	Andy Lin

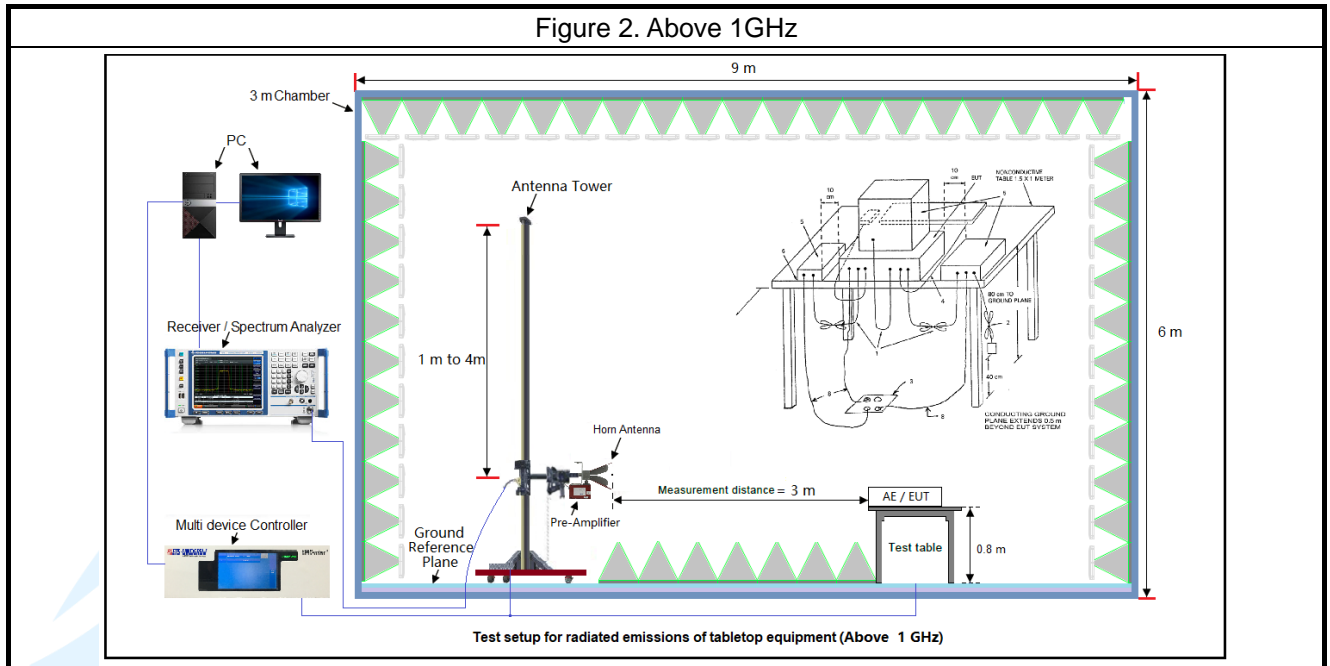
4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Mode 1: Working
Conducted Emission	Mode 1: Working

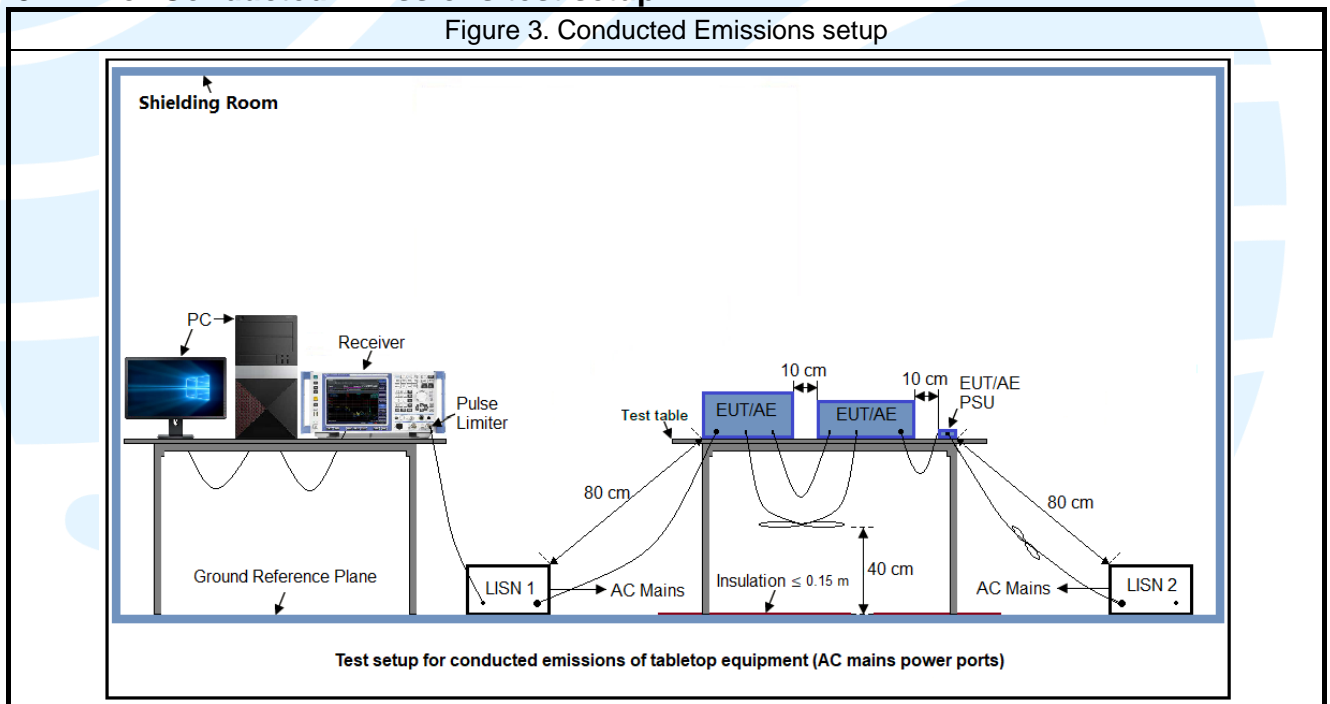
4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup





4.3.2 For Conducted Emissions test 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 6	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
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 6 Clause 6.2

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

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

Remark:

- The lower limit shall apply at the transition frequencies.
- Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
- 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.

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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.

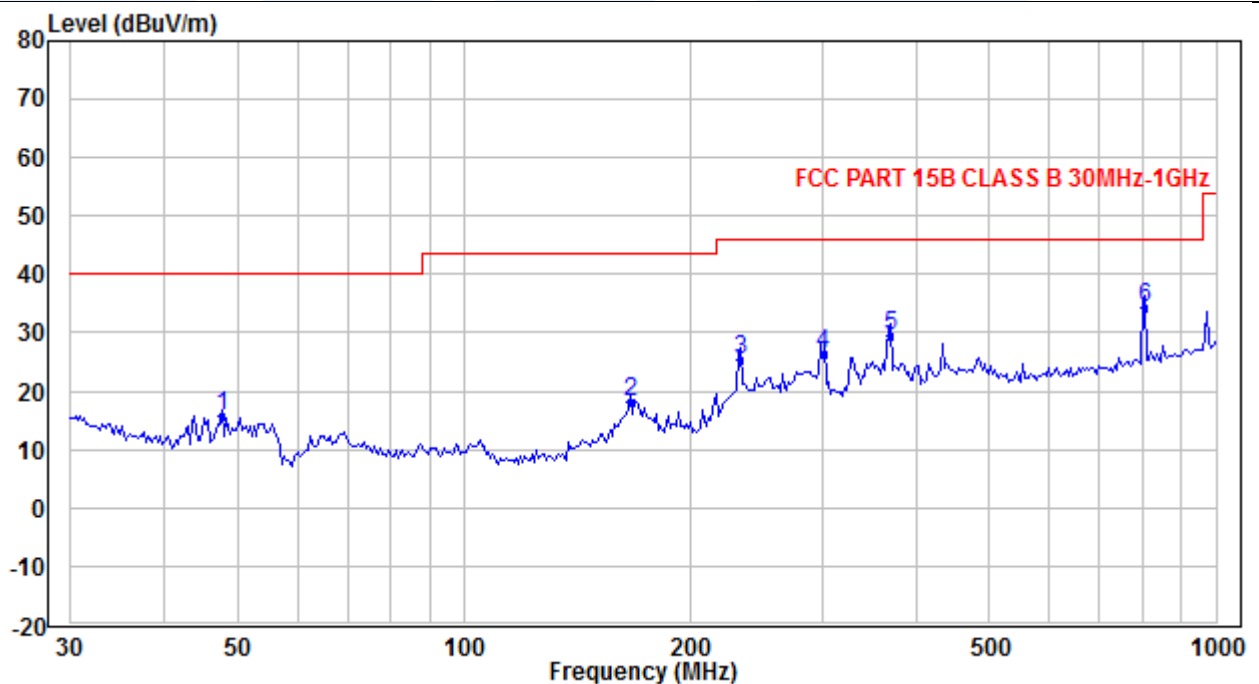
Test Result: Pass

The measurement data as follows:

Below 1GHz(Quasi Peak):

Mode1

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.703	36.53	-20.73	15.80	40.00	-24.20	QP
2*	166.639	35.25	-17.10	18.15	43.50	-25.35	QP
3	233.488	40.42	-14.97	25.45	46.00	-20.55	QP
4	300.699	39.13	-12.78	26.35	46.00	-19.65	QP
5	368.668	39.10	-9.61	29.49	46.00	-16.51	QP
6	804.252	35.73	-1.36	34.37	46.00	-11.63	QP

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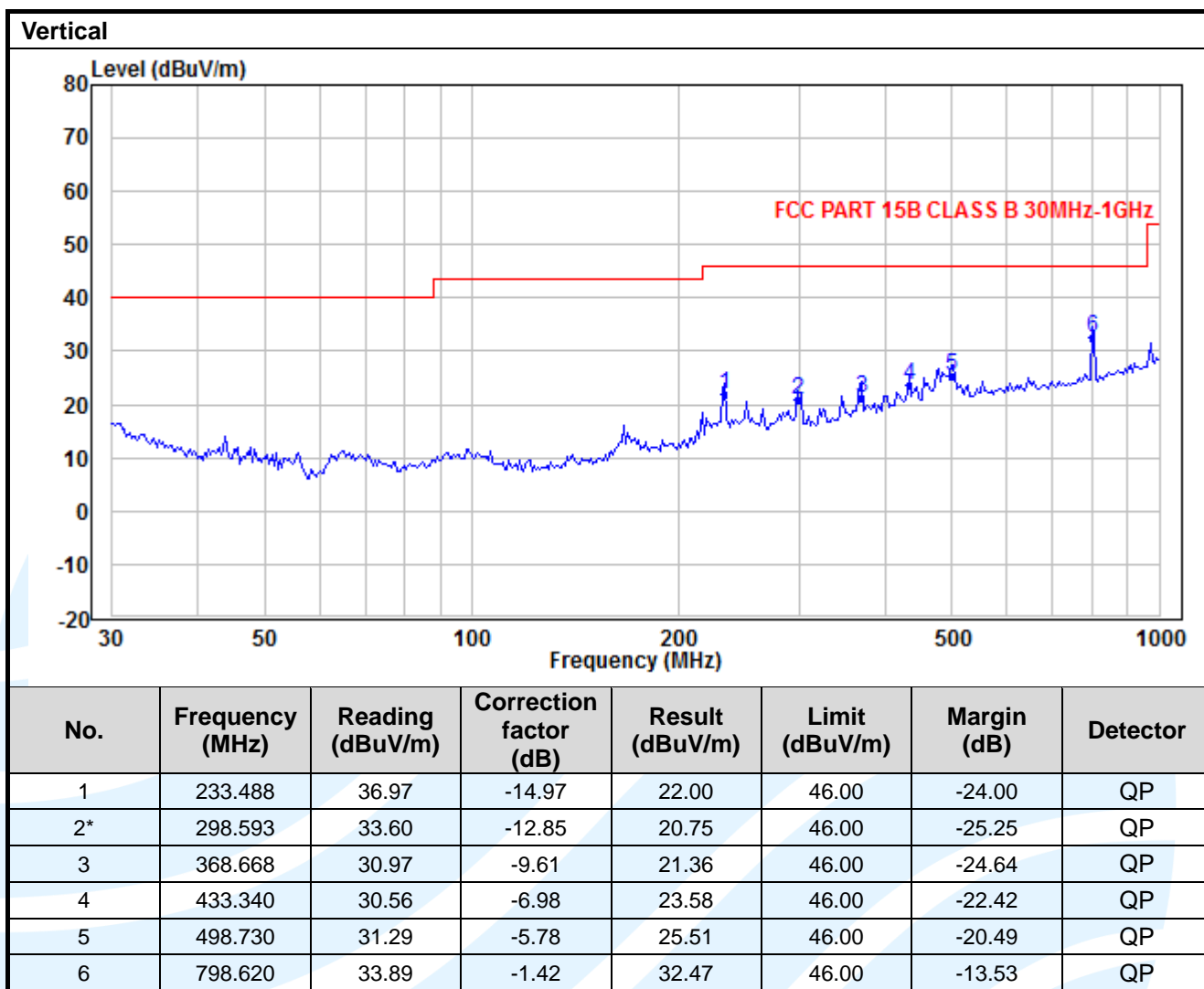
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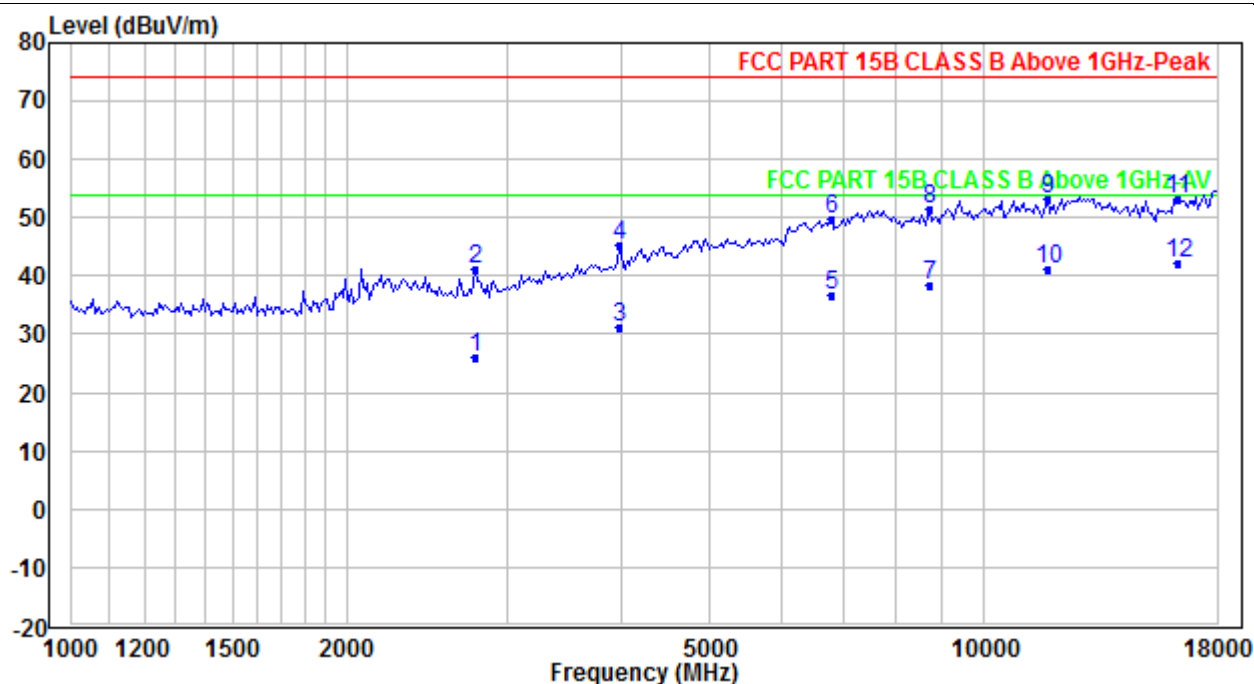
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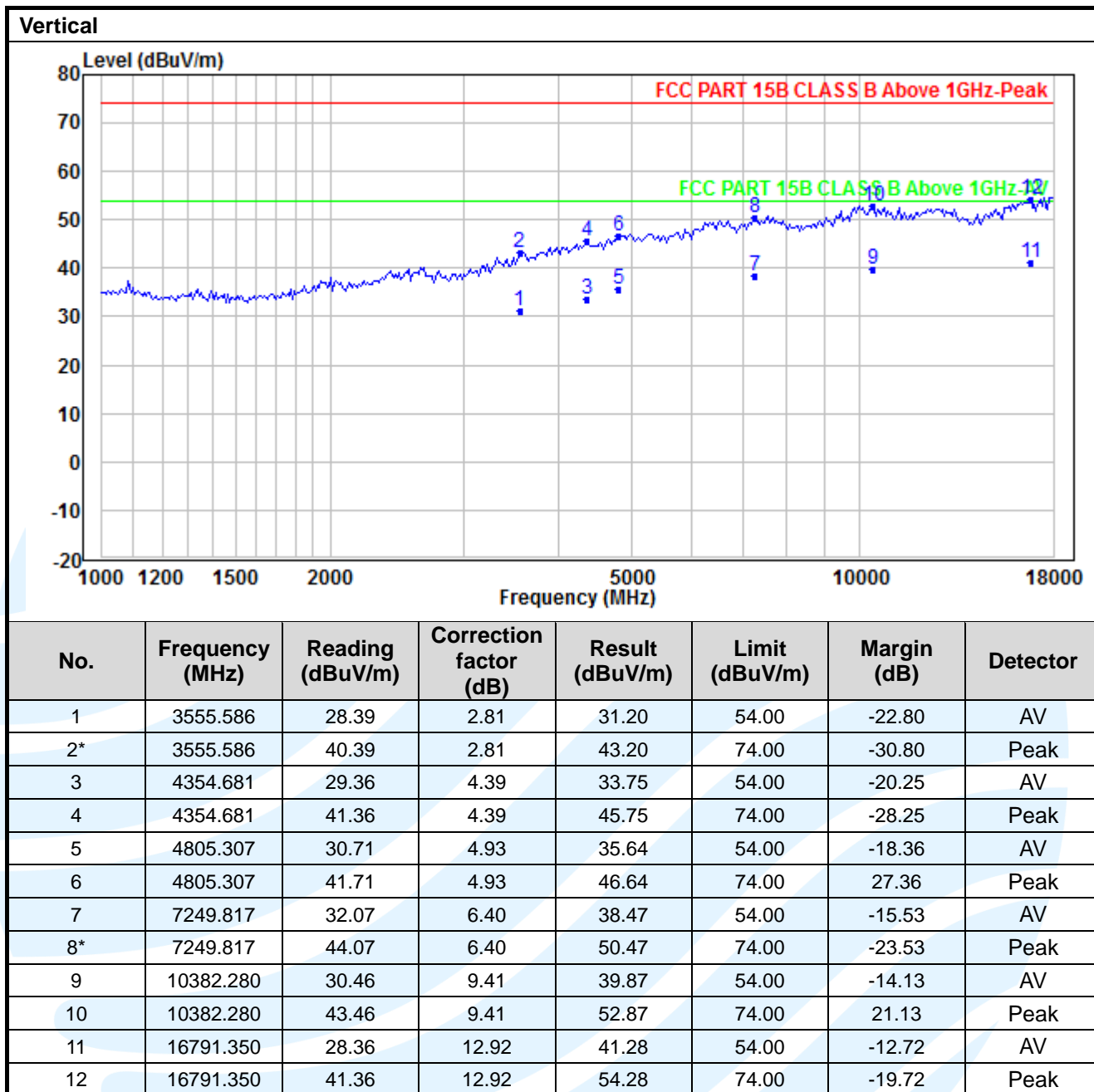
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Above 1GHz(Peak & Average)
Mode1
Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2771.669	28.14	-1.98	26.16	54.00	-27.84	AV
2*	2771.669	43.14	-1.98	41.16	74.00	-32.84	Peak
3	3992.296	28.80	2.49	31.29	54.00	-22.71	AV
4	3992.296	42.80	2.49	45.29	74.00	-28.71	Peak
5	6802.299	29.91	6.80	36.71	54.00	-17.29	AV
6	6802.299	42.91	6.80	49.71	74.00	-24.29	Peak
7	8726.206	30.33	8.09	38.42	54.00	-15.58	AV
8*	8726.206	43.33	8.09	51.42	74.00	-22.58	Peak
9	11725.190	43.24	10.03	53.27	74.00	-20.73	AV
10	11725.190	31.24	10.03	41.27	54.00	-12.73	Peak
11	16312.020	40.32	12.85	53.17	74.00	-20.83	AV
12	16312.020	29.32	12.85	42.17	54.00	-11.83	Peak



6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107
ICES-003 Issue 6 Section 6.2

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.

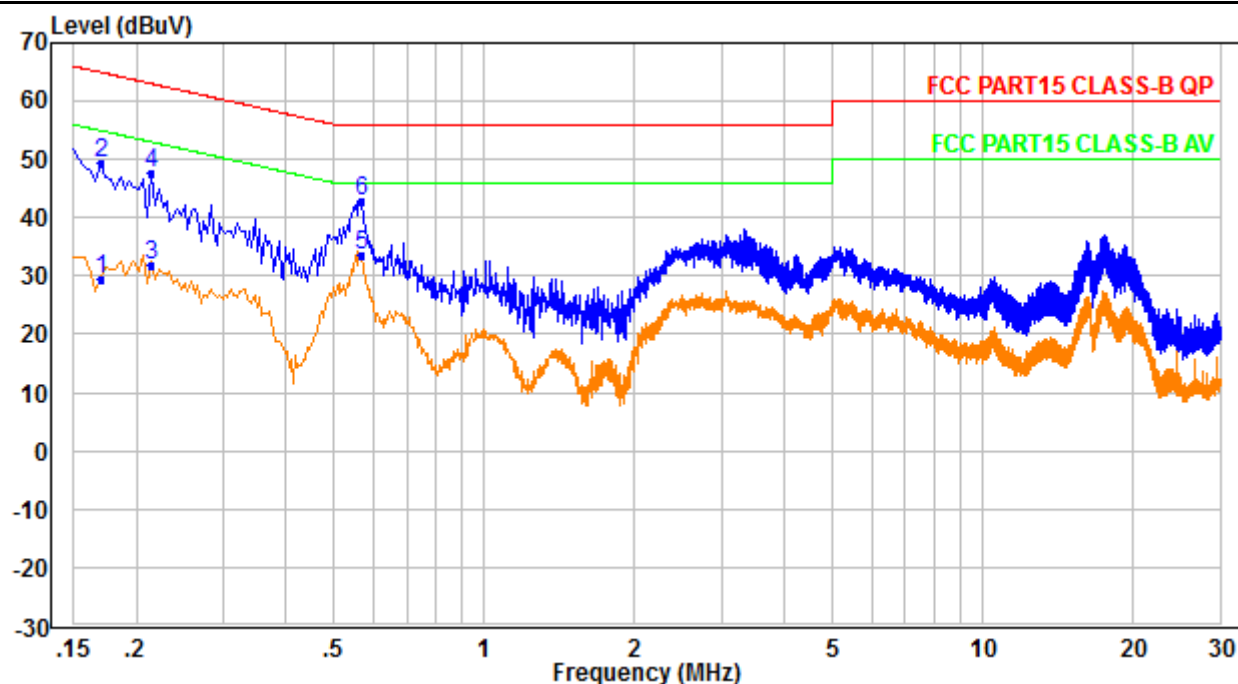
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

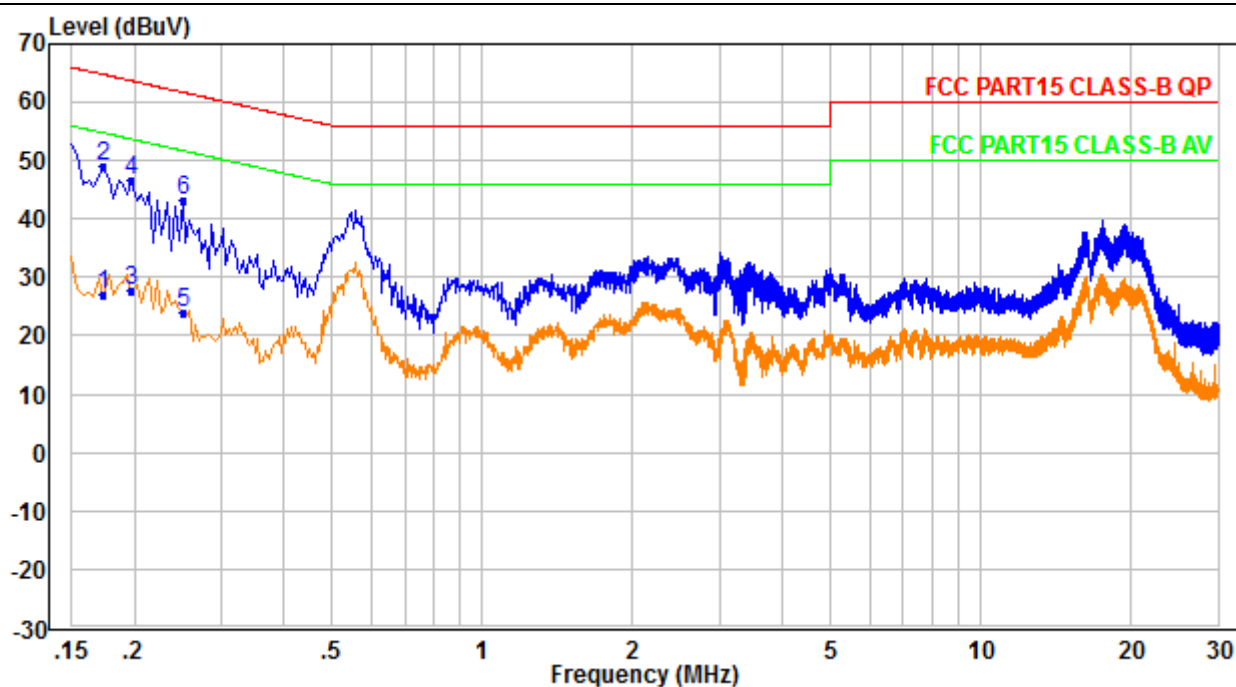
Mode 1

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.170	20.09	9.27	29.36	54.96	-25.60	Average
2	0.170	40.01	9.27	49.28	64.96	-15.68	QP
3	0.214	22.59	9.25	31.84	53.05	-21.21	Average
4	0.214	38.52	9.25	47.77	63.05	-15.28	QP
5	0.566	24.51	9.19	33.70	46.00	-12.30	Average
6	0.566	33.59	9.19	42.78	56.00	-13.22	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.174	17.68	9.42	27.10	54.77	-27.67	Average
2	0.174	39.61	9.42	49.03	64.77	-15.74	QP
3	0.198	18.40	9.39	27.79	53.69	-25.90	Average
4	0.198	37.35	9.39	46.74	63.69	-16.95	QP
5*	0.250	14.61	9.39	24.00	51.76	-27.76	Average
6	0.250	33.65	9.39	43.04	61.76	-18.72	QP

Remark:

1. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

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

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

*** End of Report ***

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