


TEST REPORT

Product Name: Ture wireless headphones

Trade Mark:  or PHILIPS

Model No.: TAT1209

Add. Model No.: TAT1209xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)

Report Number: 2308286618EMC-1

Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 7

Test Result: PASS

Date of Issue: January 10, 2024

Prepared for:

MMD Hong Kong Holding Limited
Units 1208-11,12th Floor,C-Bons International Center, 108 Wai Yip
Street, Kwun Tong, Kowloon,Hong Kong

Prepared by:

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Version

Version No.	Date	Description
V1.0	January 10, 2024	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	MMD Hong Kong Holding Limited
Address of Applicant:	Units 1208-11,12th Floor,C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon,Hong Kong
Manufacturer:	MMD Hong Kong Holding Limited
Address of Manufacturer:	Units 1208-11,12th Floor,C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon,Hong Kong

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Ture wireless headphones
Model No.:	TAT1209
Add. Model No.:	TAT1209xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)
Trade Mark:	 or PHILIPS
DUT Stage:	Production Unit
Rated Voltage:	<input checked="" type="checkbox"/> DC 3.7V by Lithium-ion Battery <input checked="" type="checkbox"/> DC 5V Charged by the Type-C USB Port
Classification of digital devices:	Class B
Highest Internal Frequency:	2.480 GHz
Software Version:	Earphone: V01 Charging Box:V1.2
Hardware Version:	Earphone: V04 Charging Box: V05
Sample Received Date:	August 10, 2023
Sample Tested Date:	August 29, 2023 to August 31, 2023
Note:	The additional model TAT1209xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination) is identical with the test model TAT1209 except the model number and color for marketing purpose.

1.2.2 Description of Accessories

Cable	
Description:	USB Type-C Plug Cable
Cable Type:	Unshielded without ferrite
Length:	0.3 Meter

Battery (Charging Box)	
Model No.:	751235
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	300 mAh

Battery (Earbuds)	
Model No.:	WEL 501012
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	40 mAh

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
AC Adapter	HUAWEI	HW-050200Co2	N/A	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, China 518109
 Telephone: +86 (0) 755 2823 0888
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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 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.

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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
<input checked="" type="checkbox"/>	3m Chamber & Accessory Equipment	ETS-Lindgren	3m	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	00164202	11-Nov-2021	10-Nov-2023
<input checked="" type="checkbox"/>	Pre-amplifier	ETS-Lindgren	118385	00201874	11-Nov-2021	10-Nov-2023
<input checked="" type="checkbox"/>	Receiver	ROHDE & SCHWARZ	ESIB26	100114	3-Nov-2021	2-Nov-2023
<input checked="" type="checkbox"/>	Pre-amplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Broadband Antenna (Pre-amplifier)	ETS-Lindgren	3142E	00201566	11-Nov-2021	10-Nov-2023
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	11-Nov-2021	10-Nov-2023
<input checked="" type="checkbox"/>	Multi device Controller	ETS-Lindgren	7006-001	00160105	N/A	N/A
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
<input checked="" type="checkbox"/>	LISN	R&S	ESH2-Z5	860014/024	1-Nov-2022	31-Oct-2023
<input type="checkbox"/>	LISN	ETS-Lindgren	3816/2SH	00201088	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	101181	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Shielding room	ETS-Lindgren	843	Euroshiedpn-CT001270-1246	5-Nov-2021	4-Nov-2024
<input checked="" type="checkbox"/>	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 (V)	Relative Humidity (%)
NT/NV	+15 to +35	120V ~60Hz And or DC 3.7V	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

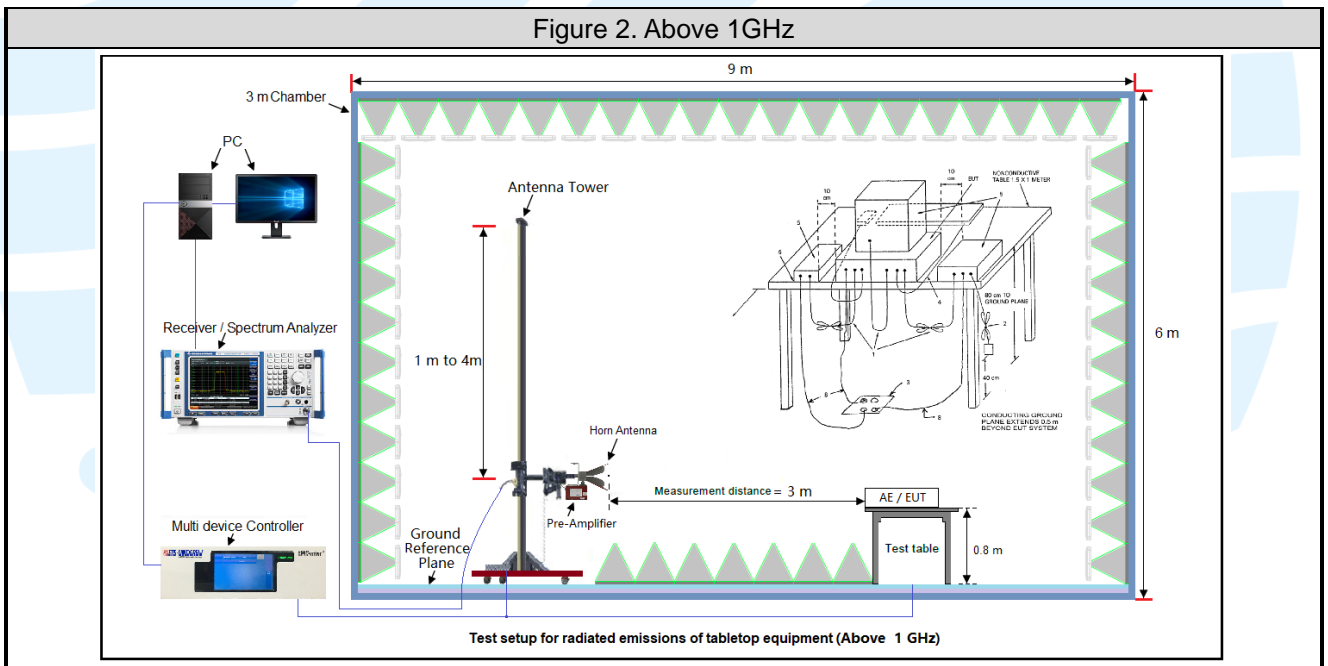
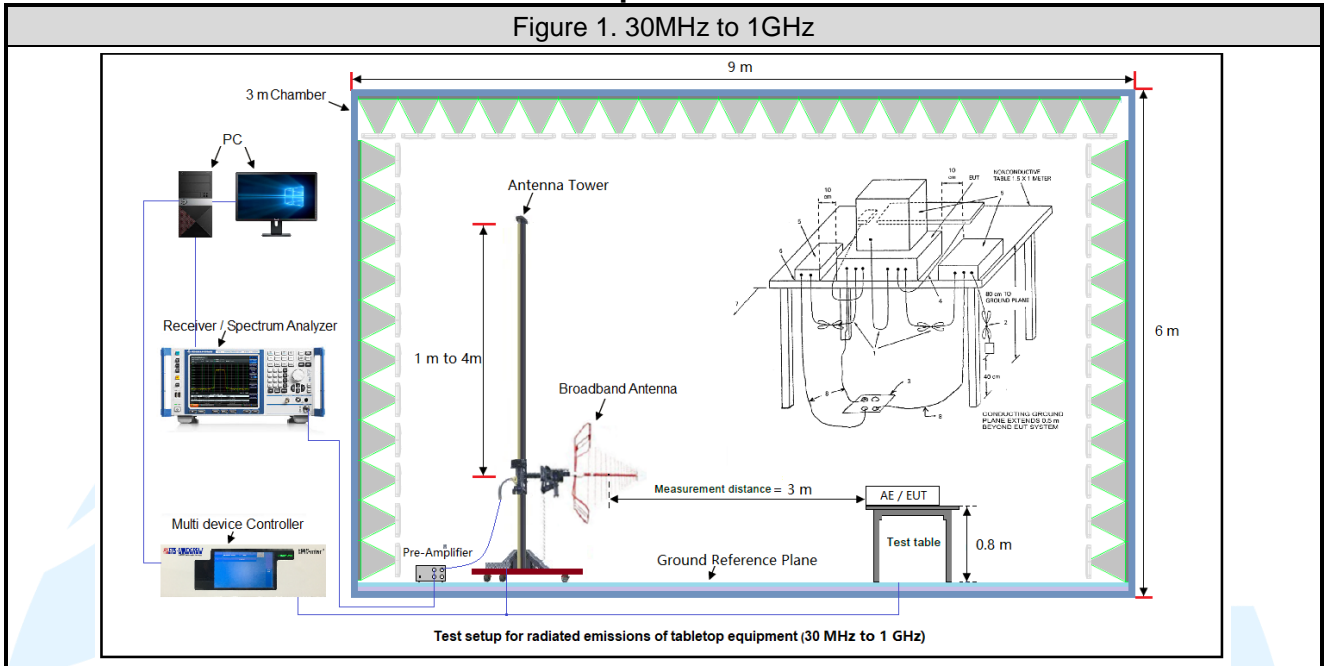
Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Conducted Emission	24.8	53.7	98.9	S202308101964-ZJA07/14	Lucas Ouyang
Radiated Emission	24.5	62.6	98.8	S202308101964-ZJA07/14	Bowie Zhang

4.2 TEST MODES

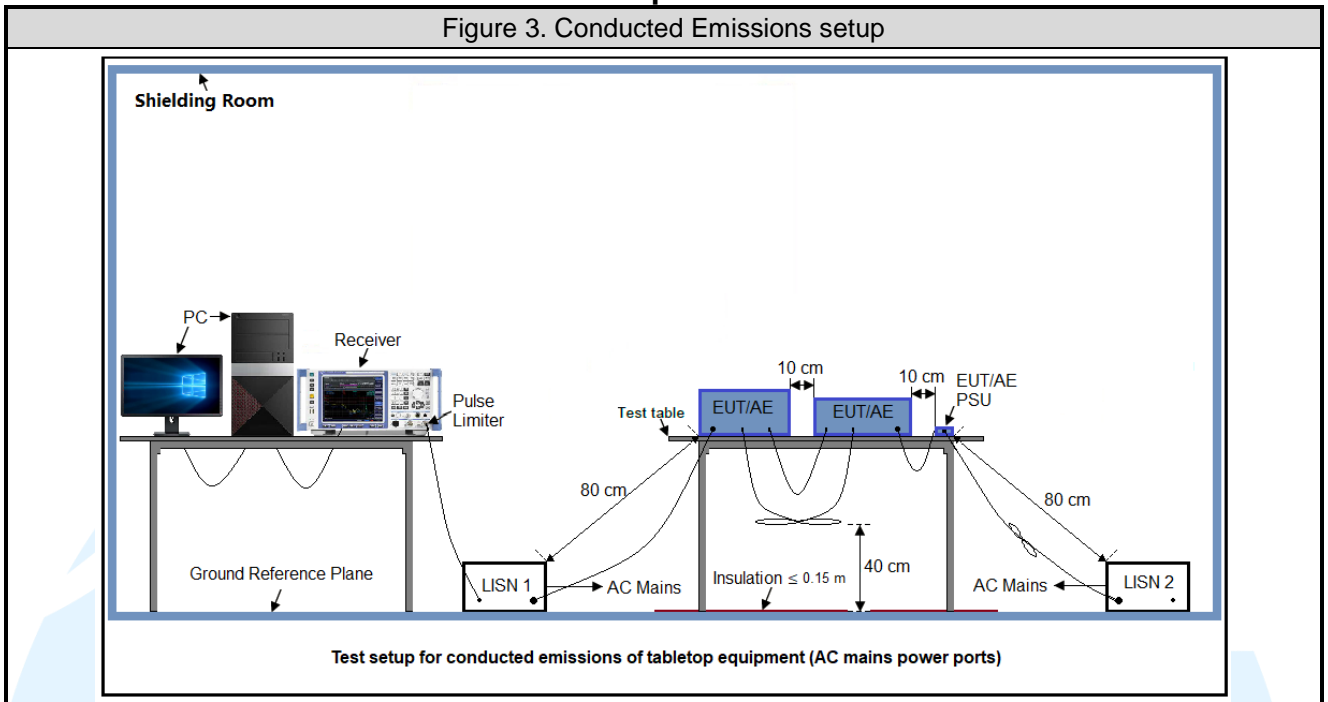
Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: Charging the earphone+ Charging the Charging BOX Test Mode 2: Charging the earphones by charging BOX Test Mode 3: Charging the Charging BOX Test Mode 4: BT Playing
Conducted Emission	Test Mode 1: Charging the earphone+ Charging the Charging BOX Test Mode 2: Charging the Charging BOX
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



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 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:

FCC 47 CFR Part 15 Subpart B

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

ICES-003 Issue 7

Frequency (MHz)	limits at 3m (dB μ V/m)		
	QP Detector	PK Detector	AV Detector
30 – 88	40.0	--	--
88 – 216	43.5	--	--

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216 – 230	46.0		
230 – 960	47.0	--	--
960 – 1000	54.0	--	--
Above 1000	--	74.0	54.0

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBµV/m) = 20 log Emission level (µV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

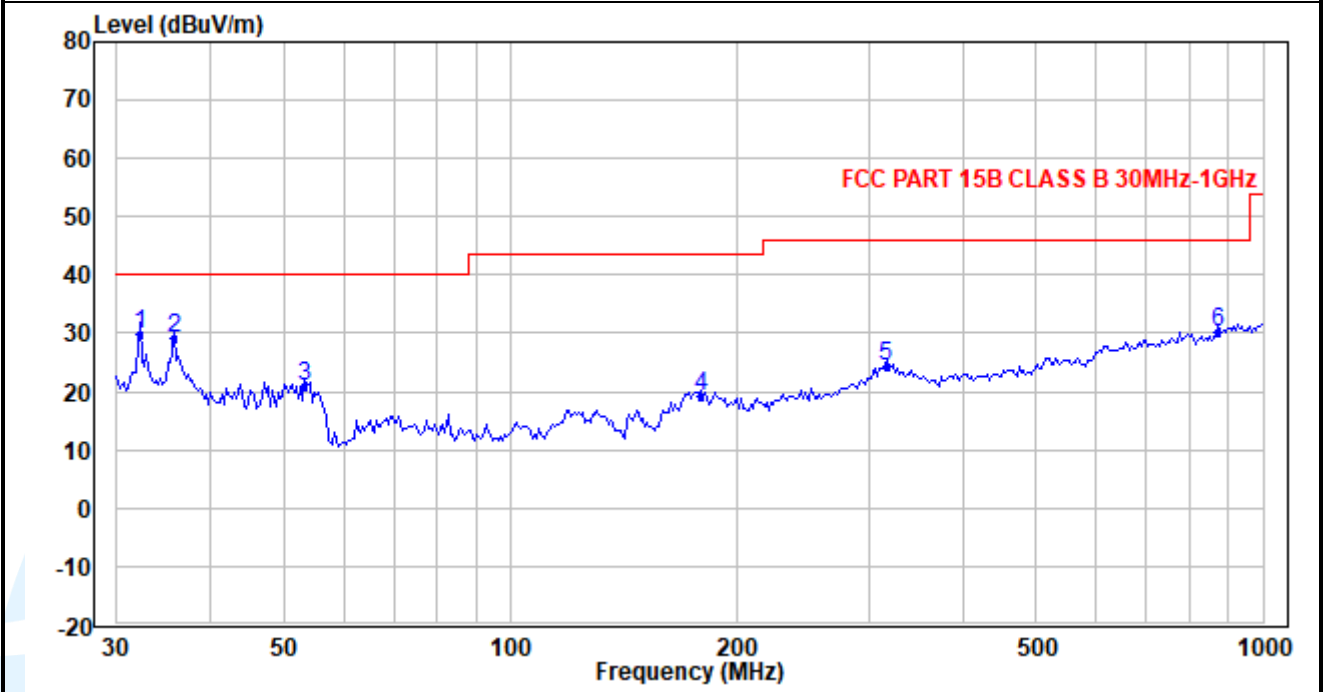
- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

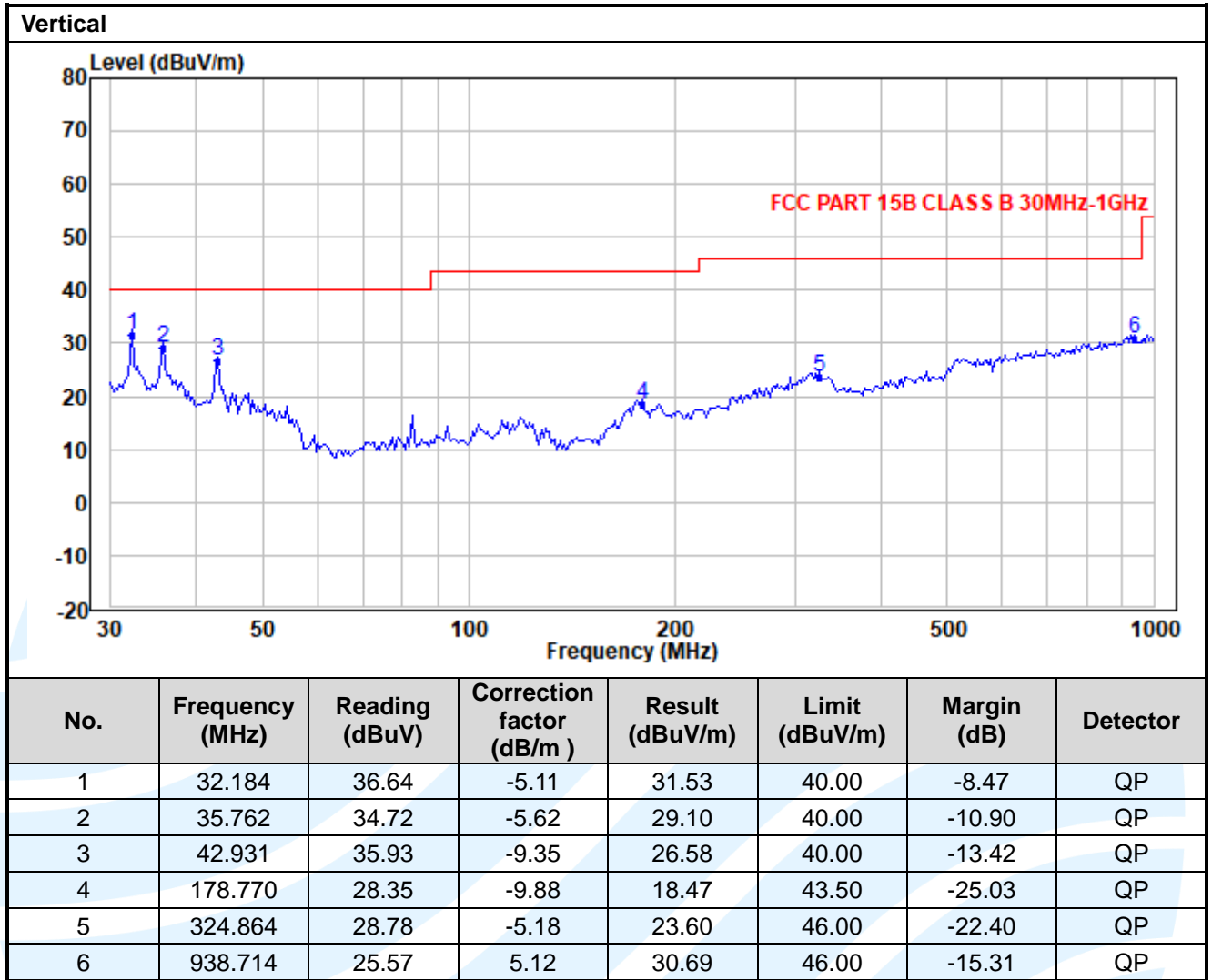
Test Result: Pass

The worst measurement data as follows:

Below 1GHz(Quasi Peak):
 Test Mode1
 Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.184	34.96	-5.11	29.85	40.00	-10.15	QP
2	35.762	34.84	-5.62	29.22	40.00	-10.78	QP
3	53.379	36.89	-16.14	20.75	40.00	-19.25	QP
4	178.770	29.19	-9.88	19.31	43.50	-24.19	QP
5	315.860	30.00	-5.61	24.39	46.00	-21.61	QP
6	868.886	26.23	4.10	30.33	46.00	-15.67	QP



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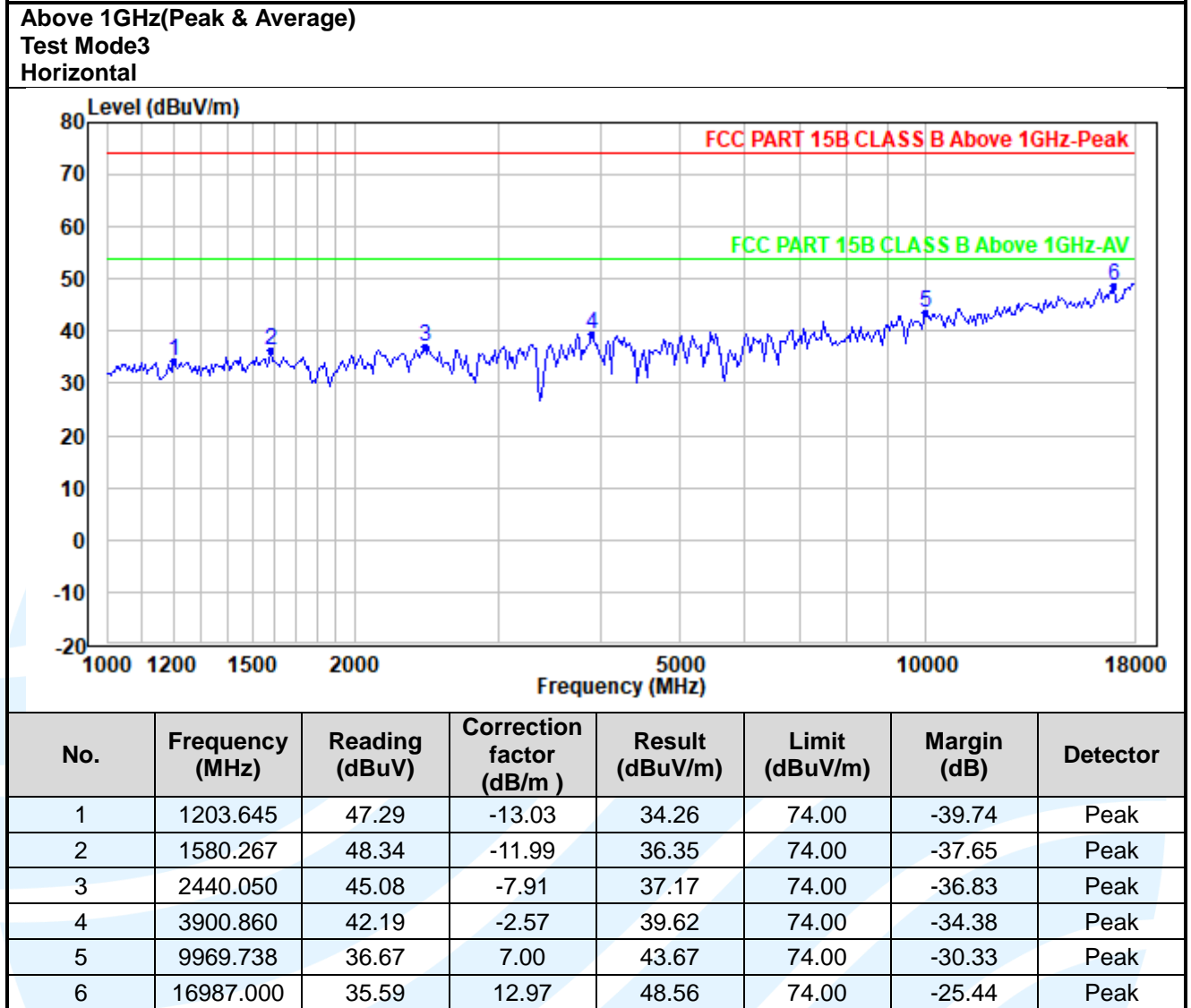
Tel: +86-755-28230888

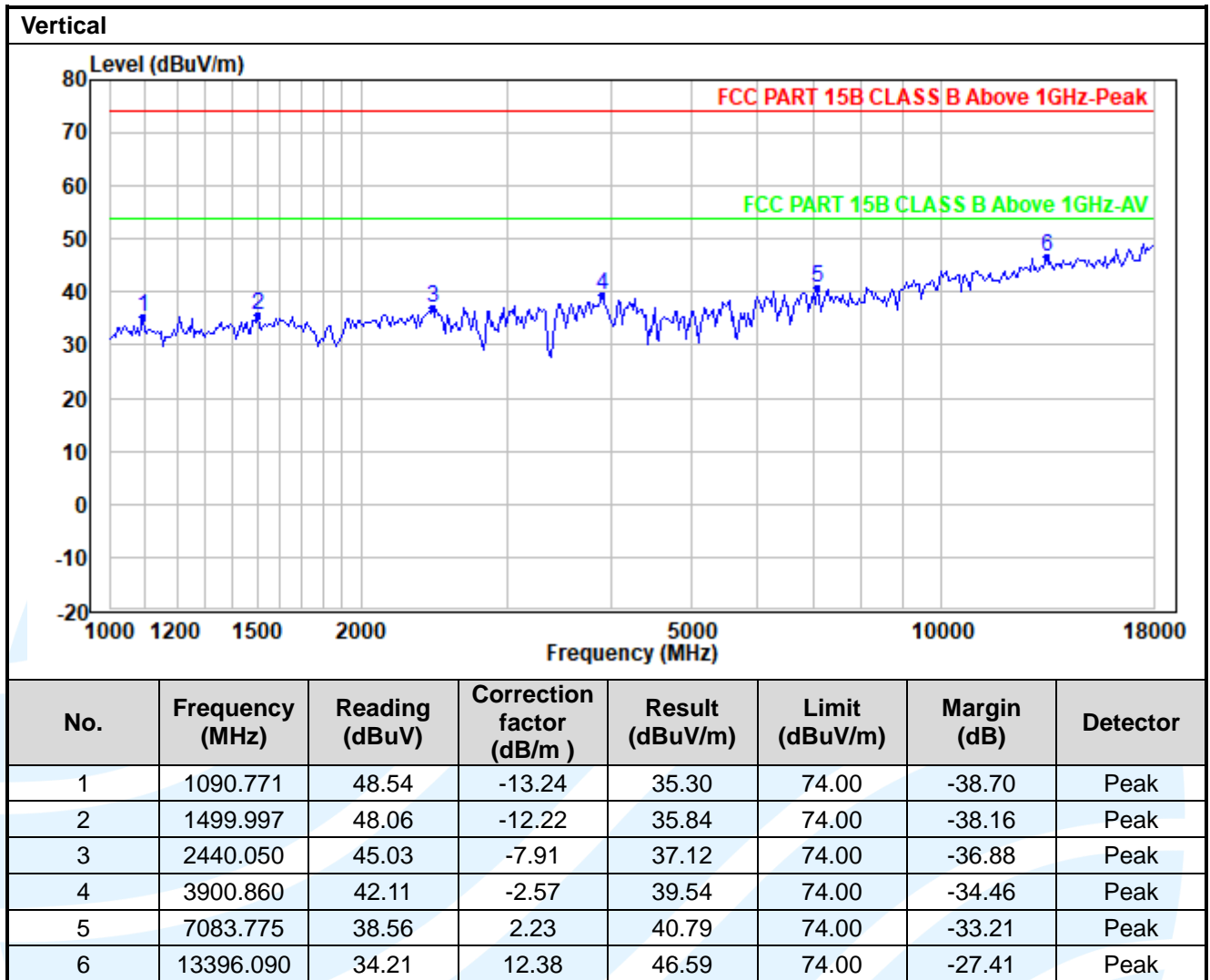
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Remark:

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, 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.
7. The limit of ICES-003 in the 230MHz to 960MHz band is higher than that of FCC Part 15B, so the radiation emission test data conform to the limit of ICES-003.

6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107
ICES-003 Issue 7 Section 3.2.1

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

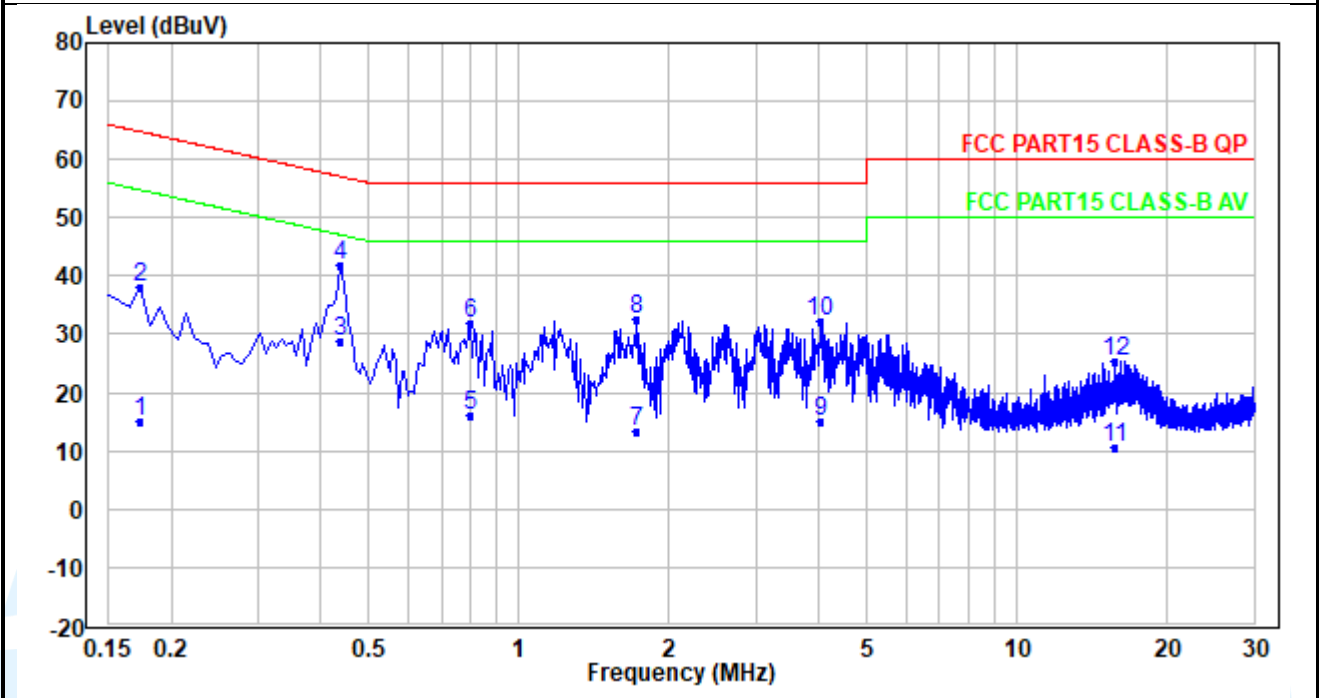
- 1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- 2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

Equipment Used: Refer to section 3 for details.

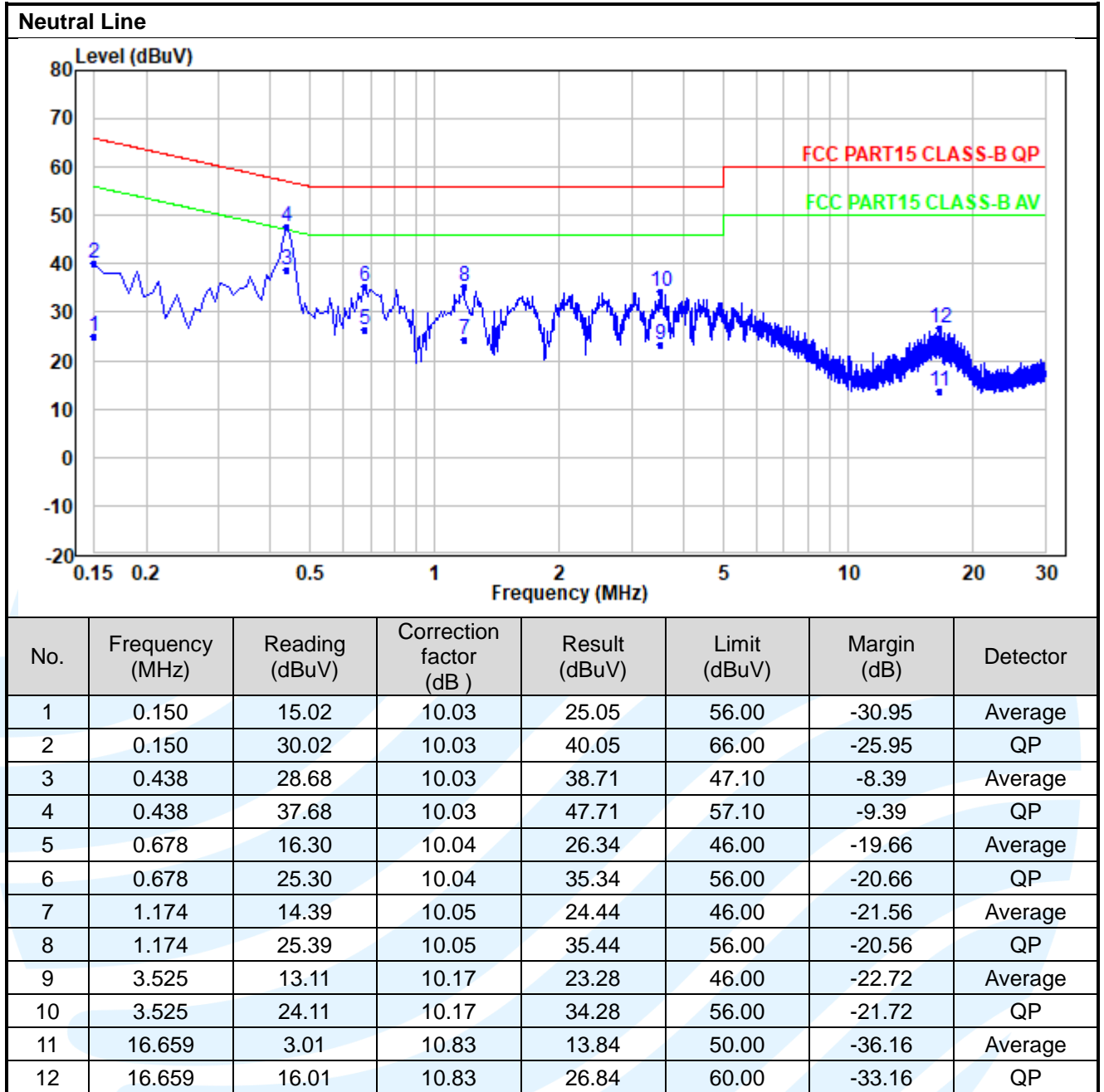
Test Result: Pass

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

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.174	5.10	10.04	15.14	54.77	-39.63	Average
2	0.174	28.10	10.04	38.14	64.77	-26.63	QP
3	0.438	18.88	10.05	28.93	47.10	-18.17	Average
4	0.438	31.88	10.05	41.93	57.10	-15.17	QP
5	0.798	5.93	10.05	15.98	46.00	-30.02	Average
6	0.798	21.93	10.05	31.98	56.00	-24.02	QP
7	1.726	3.32	10.09	13.41	46.00	-32.59	Average
8	1.726	22.32	10.09	32.41	56.00	-23.59	QP
9	4.021	4.97	10.21	15.18	46.00	-30.82	Average
10	4.021	21.97	10.21	32.18	56.00	-23.82	QP
11	15.723	-0.29	10.76	10.47	50.00	-39.53	Average
12	15.723	14.71	10.76	25.47	60.00	-34.53	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, only the worst-case emissions reported.

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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.
