



Certificate #4312.01

TEST REPORT

Product Name: Analog Telephone Adapter
Trade Mark: GRANDSTREAM
Model No. / HVIN: HT818
Add. Model No.: N/A
Report Number: 220111016EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
 ICES-003 Issue 7
FCC ID: YZZHT818CS
Test Result: PASS
Date of Issue: February 24, 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
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Date: February 24, 2022

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Version

Version No.	Date	Description
V1.0	February 24, 2022	Original



CONTENTS

1. GENERAL INFORMATION	4
1.1 CLIENT INFORMATION	4
1.2 EUT INFORMATION	4
1.2.1 GENERAL DESCRIPTION OF EUT	4
1.2.2 DESCRIPTION OF ACCESSORIES.....	4
1.3 DESCRIPTION OF SUPPORT UNITS	5
1.4 TEST LOCATION	5
1.5 TEST FACILITY	5
1.6 DEVIATION FROM STANDARDS	6
1.7 ABNORMALITIES FROM STANDARD CONDITIONS	6
1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
1.9 MEASUREMENT UNCERTAINTY	6
2. TEST SUMMARY	7
3. EQUIPMENT LIST	8
4. TEST CONFIGURATION	9
4.1 ENVIRONMENTAL CONDITIONS FOR TESTING	9
4.1.1 NORMAL OR EXTREME TEST CONDITIONS	9
4.1.2 RECORD OF NORMAL ENVIRONMENT.....	9
4.2 TEST MODES	9
4.3 TEST SETUP	10
4.3.1 FOR RADIATED EMISSIONS TEST SETUP	10
4.3.2 FOR CONDUCTED EMISSIONS TEST SETUP	11
4.4 SYSTEM TEST CONFIGURATION	11
5. REFERENCE DOCUMENTS FOR TESTING	11
6. EMC REQUIREMENTS SPECIFICATION	12
6.1 RADIATED EMISSION	12
6.2 CONDUCTED EMISSION	26
APPENDIX 1 PHOTOS OF TEST SETUP	33
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS	33

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 Adapter
Model No.:	HT818
Add. Model No.:	N/A
Trade Mark:	GRANDSTREAM
DUT Stage:	Production Unit
Rated Voltage:	12 V \equiv 1.5 A
Classification of digital devices:	Class B
Highest Internal Frequency:	600 MHz
Software Version:	1.0.31.1
Hardware Version:	V1.7
Sample Received Date:	January 12, 2022
Sample Tested Date:	January 22, 2022 to February 15, 2022

1.2.2 Description of Accessories

Adapter 1	
Model No.:	RD1201500-C55-153MG
Input:	100-240 V~50/60 Hz,0.6 A
Output:	12 V \equiv 1.5 A, 18 W
DC Cable:	1.8 Meter, Unshielded without ferrite
Manufacturer:	SHENZHEN RUIDE ELECTRONIC INDUSTRIAL CO., LTD

Adapter 2	
Model No.:	F18W8-120150SPAU
Input:	100-240 V~50/60 Hz,0.6 A
Output:	12 V \equiv 1.5 A, 18 W
DC Cable:	1.8 Meter, Unshielded without ferrite
Manufacturer:	Chenzhou Frecom Electronics Co., Ltd.

Adapter 3	
Model No.:	DSA-18PFR-09 FUS 120150
Input:	100-240 V~50/60 Hz,0.6 A
Output:	12 V \equiv 1.5 A, 18 W
DC Cable:	2.5 Meter, Unshielded without ferrite
Manufacturer:	Dee Van Enterprise Co., Ltd.

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Cable	
Description:	Ethernet Cable (RJ45)
Cable Type:	Unshielded without ferrite
Length:	1.50 Meter

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
Mouse	DELL	MS111	CN-011D3V-738	UnionTrust
IP Phone	GRANDSTREAM	GRP2614	N/A	Applicant
Telephone	CHINO E	HCD6238(28)P/TS D16	110100001	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Ethernet Cable	RJ45	1.5 Meter	UnionTrust
2	Digital Audio Cable	RJ11	1.5 Meter	UnionTrust

1.4 TEST LOCATION

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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

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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 – 3m SAC						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	3M SAC	ETS-LINDGREN	3M	N/A	Jan. 22, 2021	Jan. 21, 2024
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 5, 2021	Nov.4, 2022
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Apr. 30, 2021	Apr. 29, 2023
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 10, 2021	Nov. 9, 2023
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2021	Nov. 9, 2023
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	Apr. 30, 2021	Apr. 29, 2023
<input checked="" type="checkbox"/>	Pre-amplifier	ETS-Lindgren	00118385	00201874	Apr. 30, 2021	Apr. 29, 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 (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 5, 2021	Nov.4, 2022
<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 5, 2021	Nov.4, 2022
<input checked="" type="checkbox"/>	LISN	R&S	ESH2-Z5	860014/024	Nov. 5, 2021	Nov.4, 2022
<input checked="" type="checkbox"/>	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 5, 2021	Nov.4, 2022
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.1603323		

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

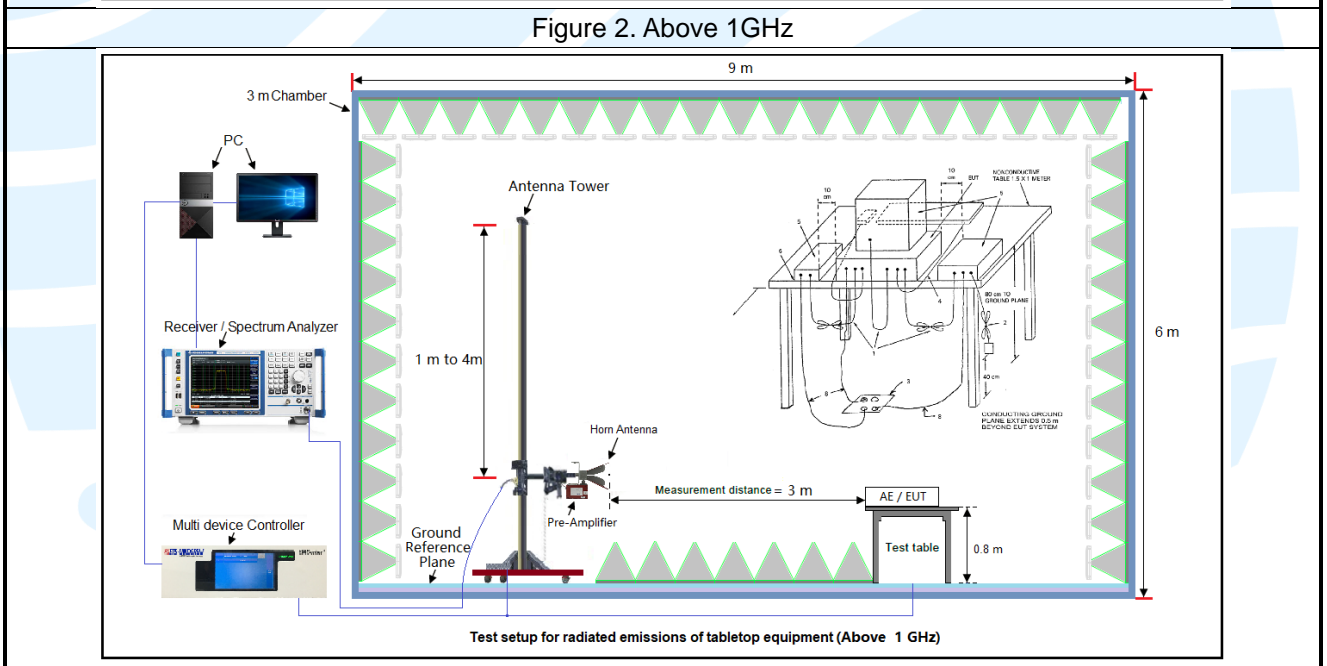
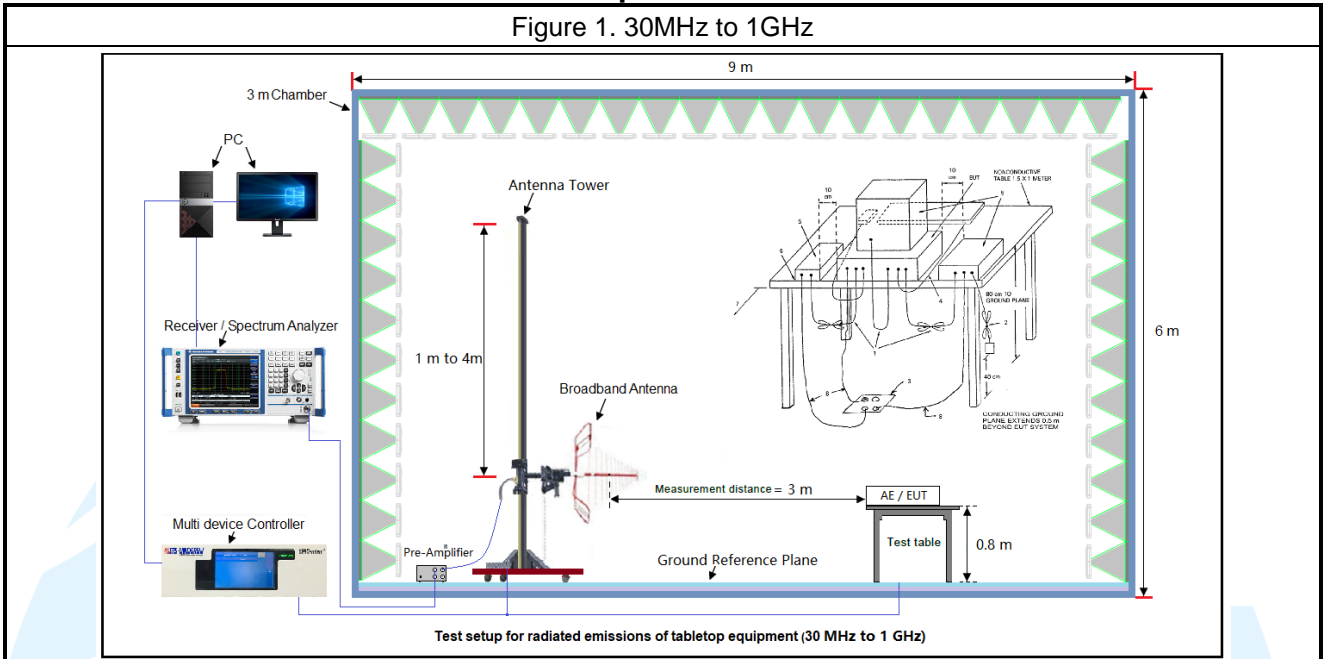
Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Emission	25.6	50.0	100.55	David Zhang
Radiated Emission	24.3	51.0	100.14	Asia Yan

4.2 TEST MODES

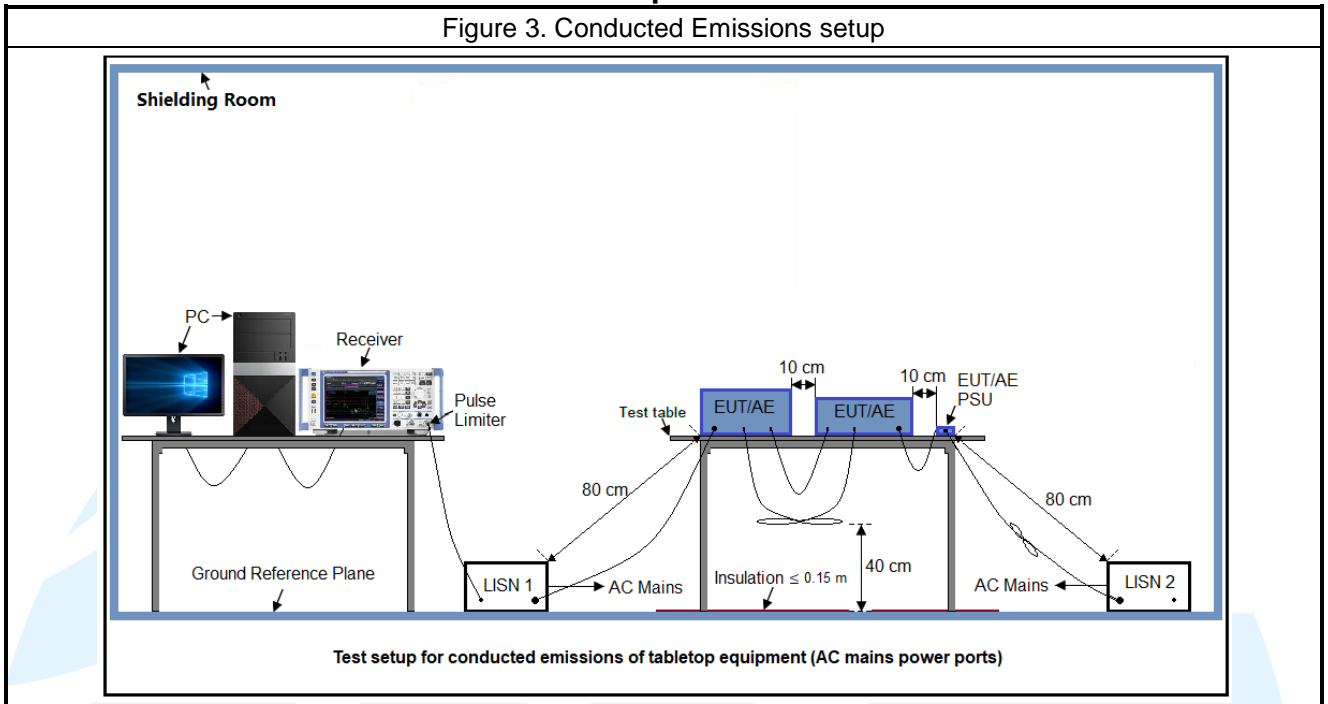
Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Telephone communication Test Mode 2: AC120V/60Hz (Adaptor2) + Telephone communication Test Mode 3: AC120V/60Hz (Adaptor3) + Telephone communication Test Mode 4: AC120V/60Hz (Adaptor1) + RJ45 Data transmitting Test Mode 5: AC120V/60Hz (Adaptor2) + RJ45 Data transmitting Test Mode 6: AC120V/60Hz (Adaptor3) + RJ45 Data transmitting Test Mode 7: AC240V/50Hz + Worse from mode 1~6
Conducted Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Telephone communication Test Mode 2: AC120V/60Hz (Adaptor2) + Telephone communication Test Mode 3: AC120V/60Hz (Adaptor3) + Telephone communication Test Mode 4: AC120V/60Hz (Adaptor1) + RJ45 Data transmitting Test Mode 5: AC120V/60Hz (Adaptor2) + RJ45 Data transmitting Test Mode 6: AC120V/60Hz (Adaptor3) + RJ45 Data transmitting Test Mode 7: AC240V/50Hz + Worse from mode 1~6

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 ≤ 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:

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

Test Procedures:

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

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- 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.

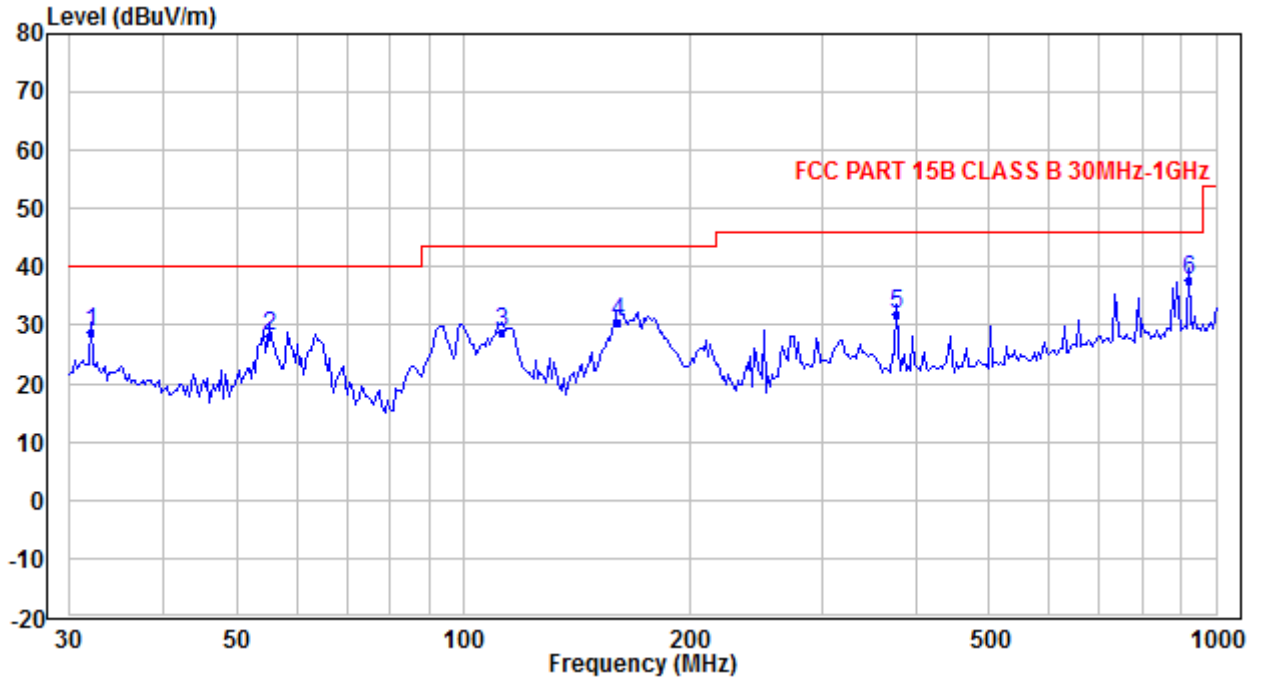
Equipment Used: Refer to section 3 for details.

Test Result: Pass

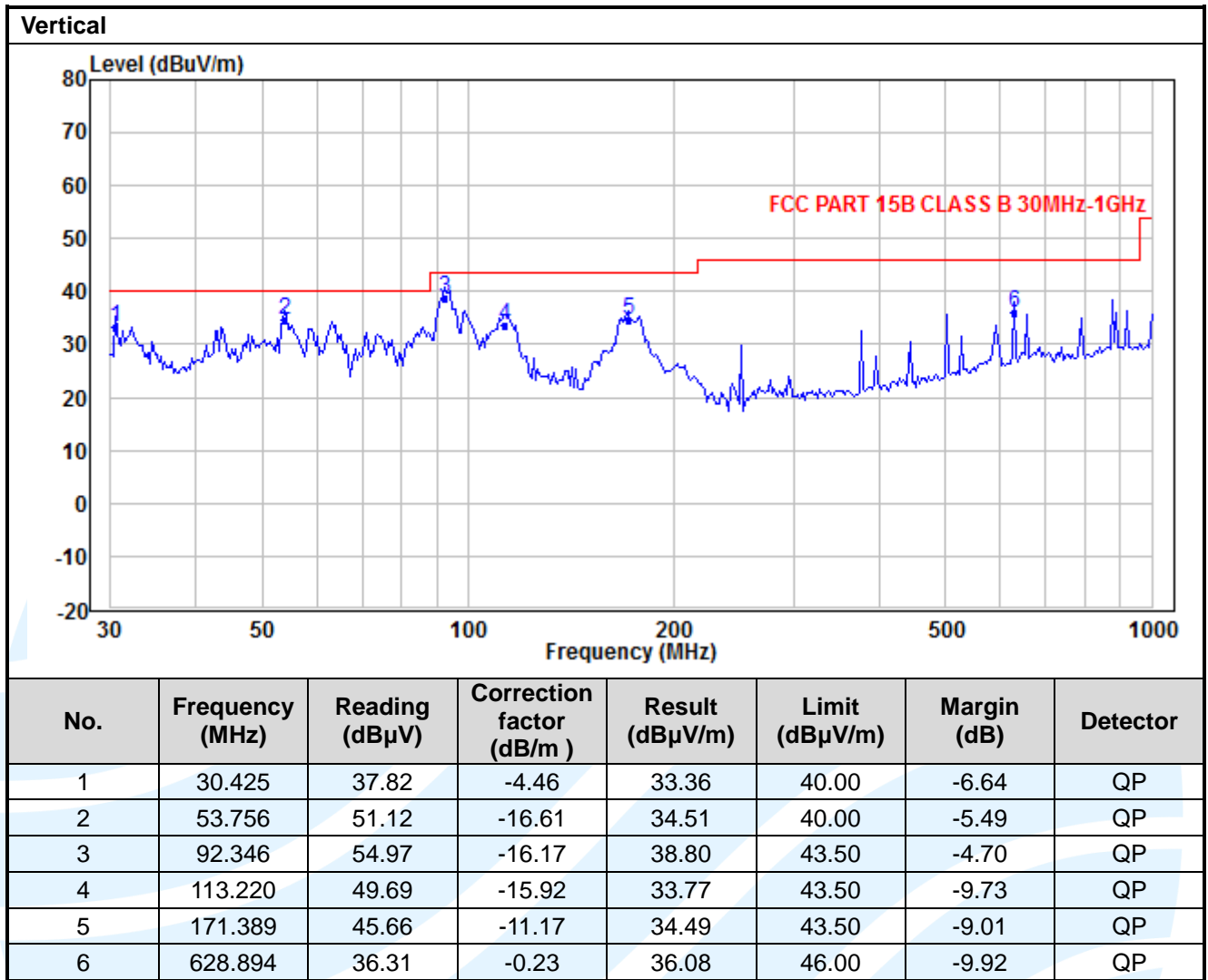
The measurement data as follows:

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

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



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.959	33.37	-4.73	28.64	40.00	-11.36	QP
2	55.288	45.25	-17.11	28.14	40.00	-11.86	QP
3	112.427	44.52	-15.85	28.67	43.50	-14.83	QP
4	160.885	44.00	-13.42	30.58	43.50	-12.92	QP
5	376.523	36.99	-5.26	31.73	46.00	-14.27	QP
6	919.132	33.46	4.42	37.88	46.00	-8.12	QP



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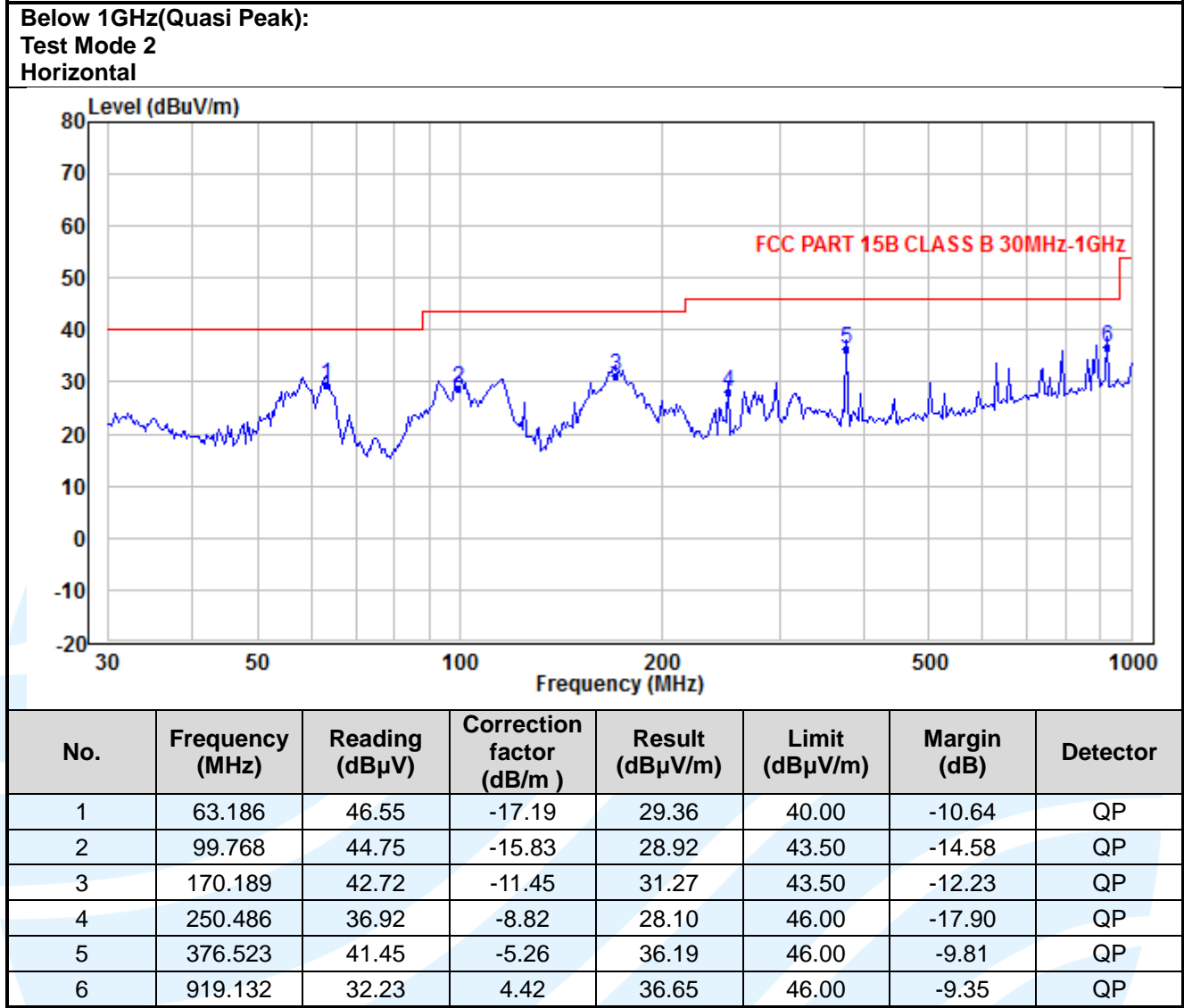
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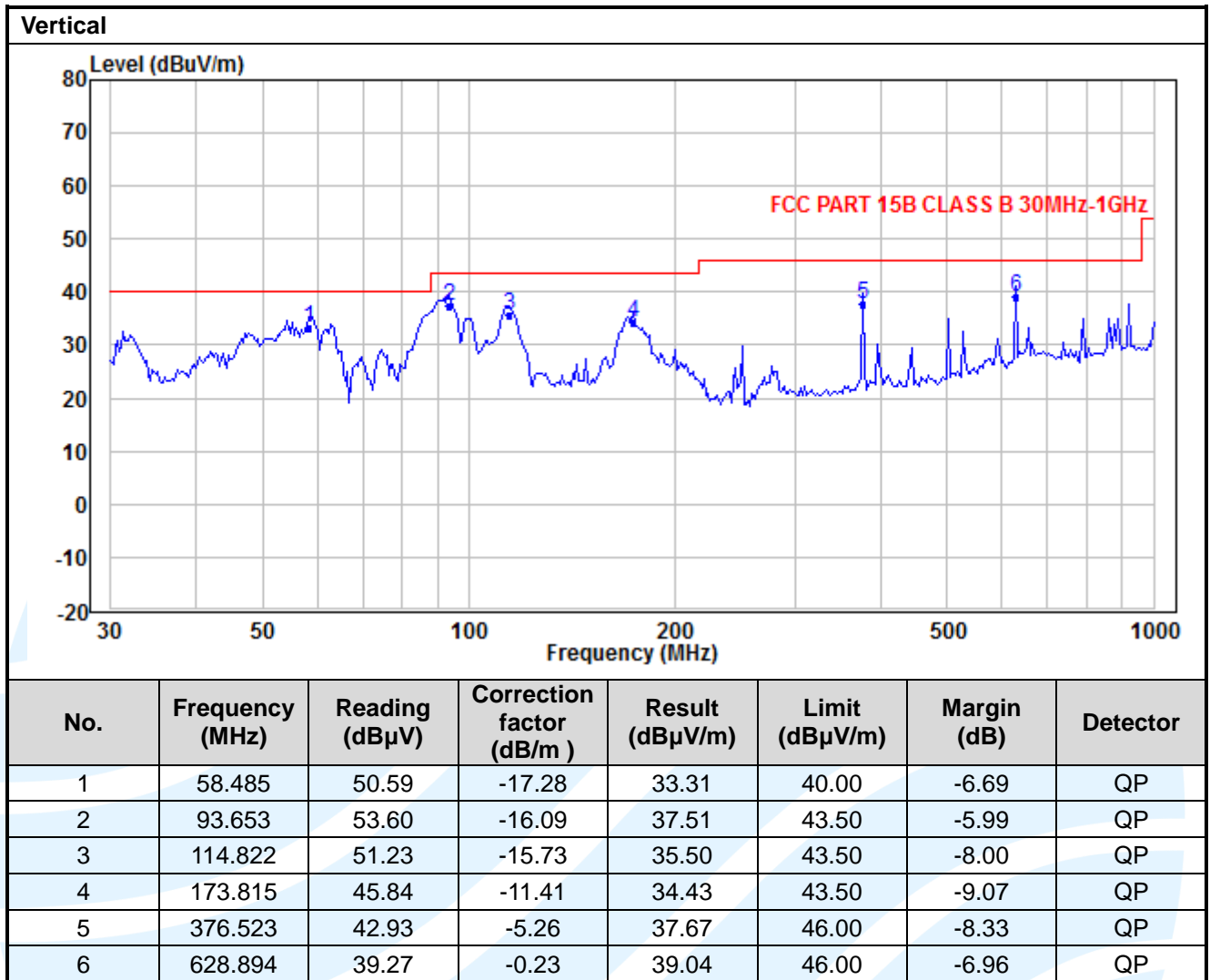
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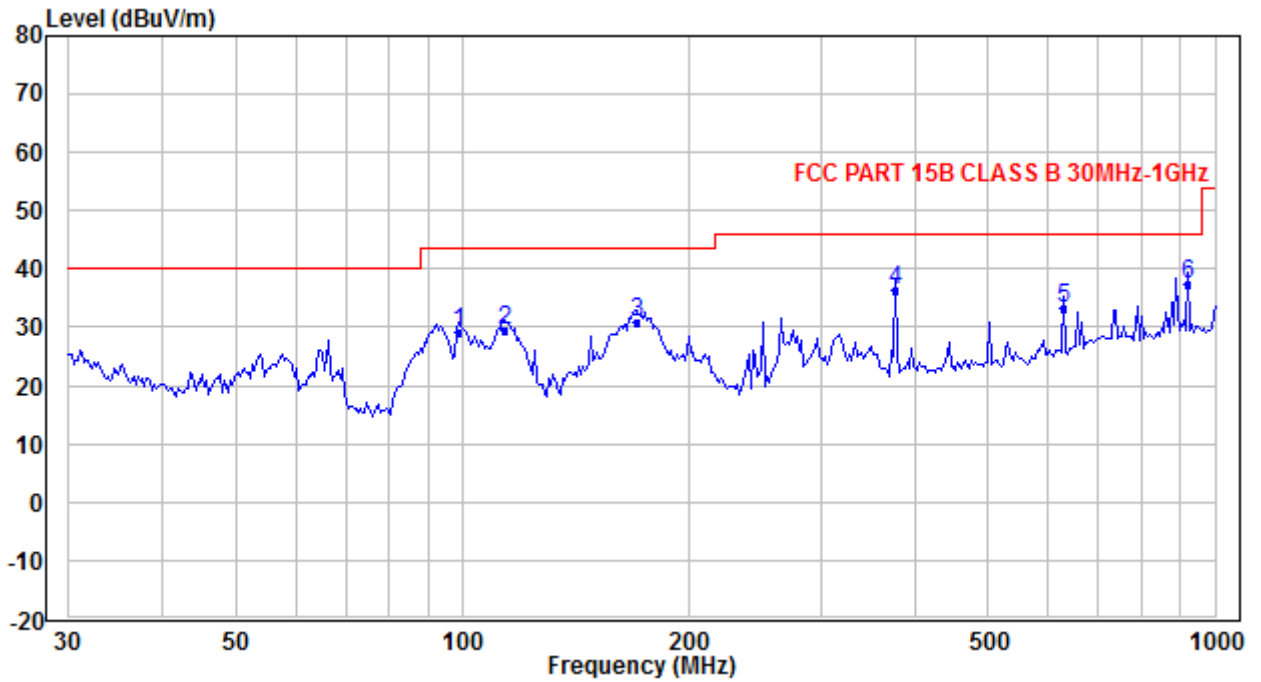
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Below 1GHz(Quasi Peak):
 Test Mode 3
 Horizontal



No.	Frequency (MHz)	Reading (dB μ V)	Correction factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1	99.069	44.90	-15.90	29.00	43.50	-14.50	QP
2	114.018	45.31	-15.99	29.32	43.50	-14.18	QP
3	170.189	42.36	-11.45	30.91	43.50	-12.59	QP
4	376.523	41.58	-5.26	36.32	46.00	-9.68	QP
5	628.894	33.53	-0.23	33.30	46.00	-12.70	QP
6	919.132	33.03	4.42	37.45	46.00	-8.55	QP

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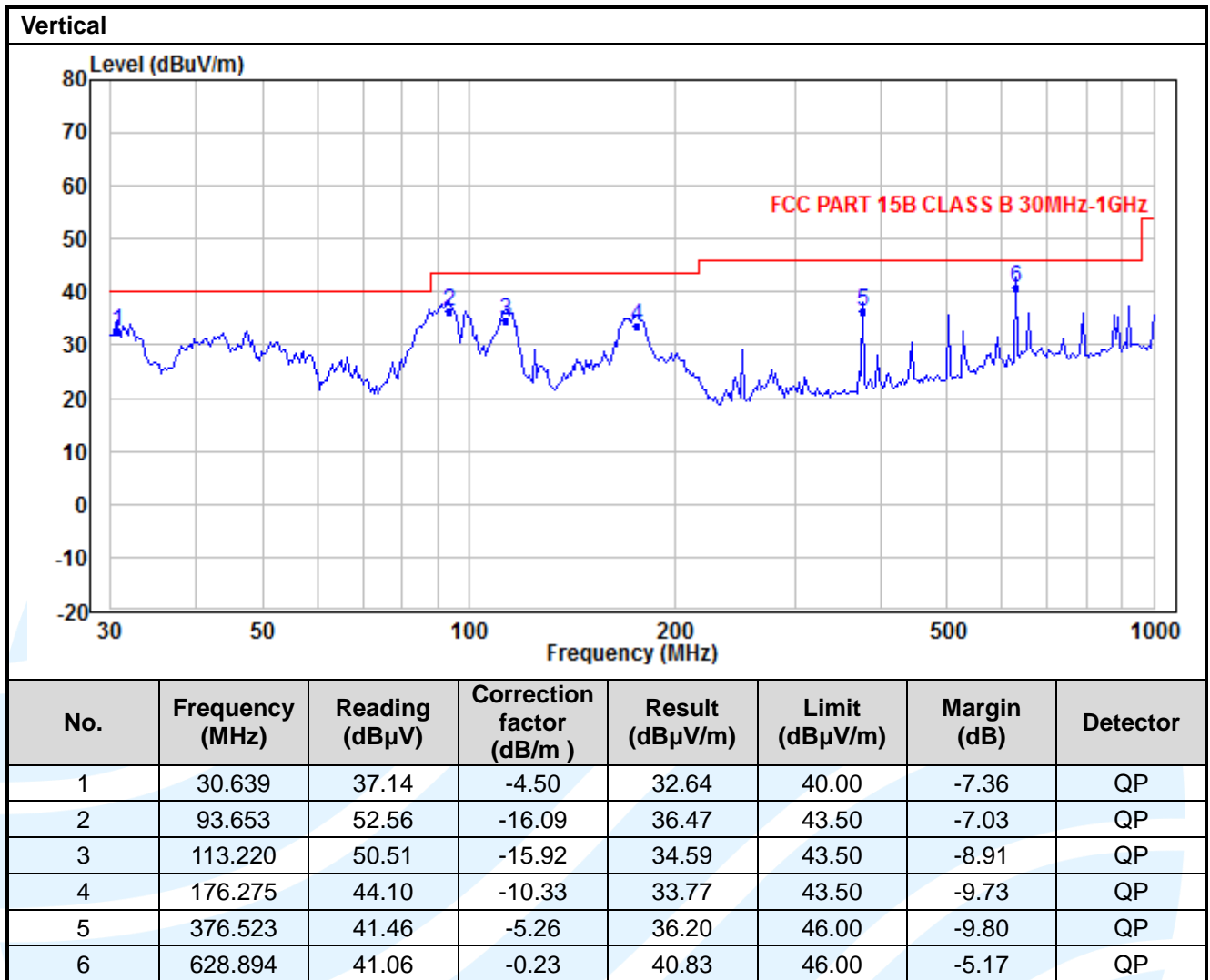
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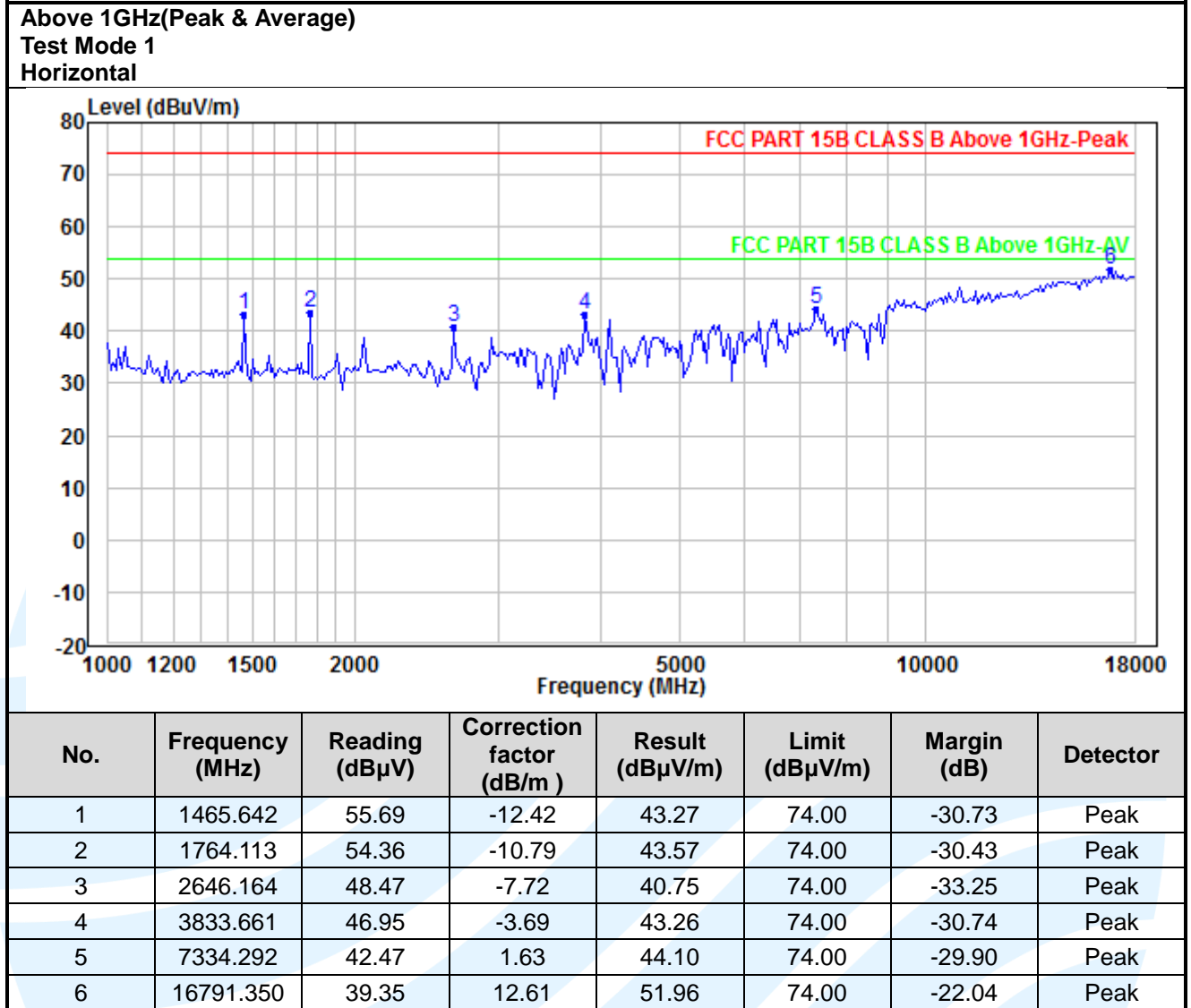
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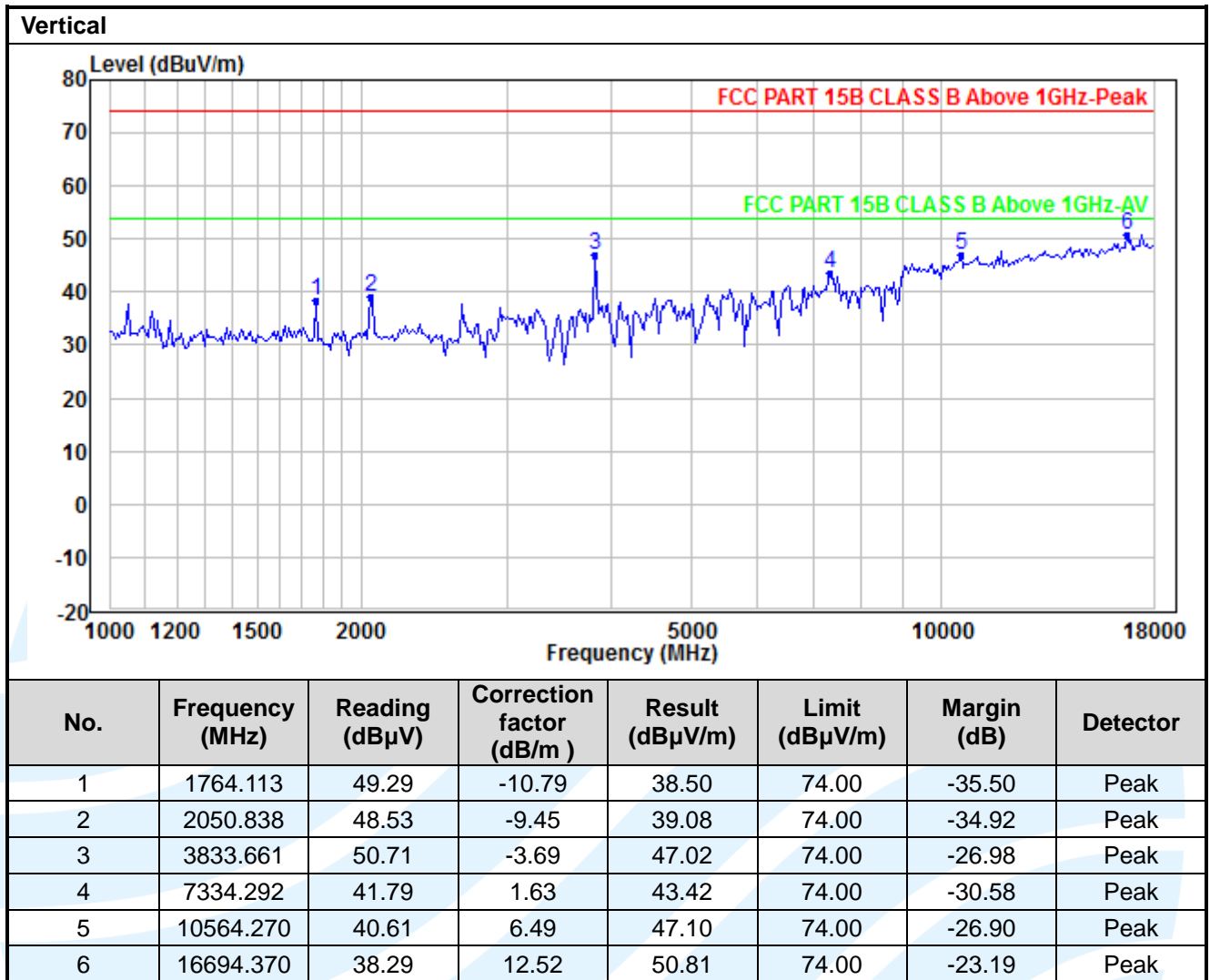
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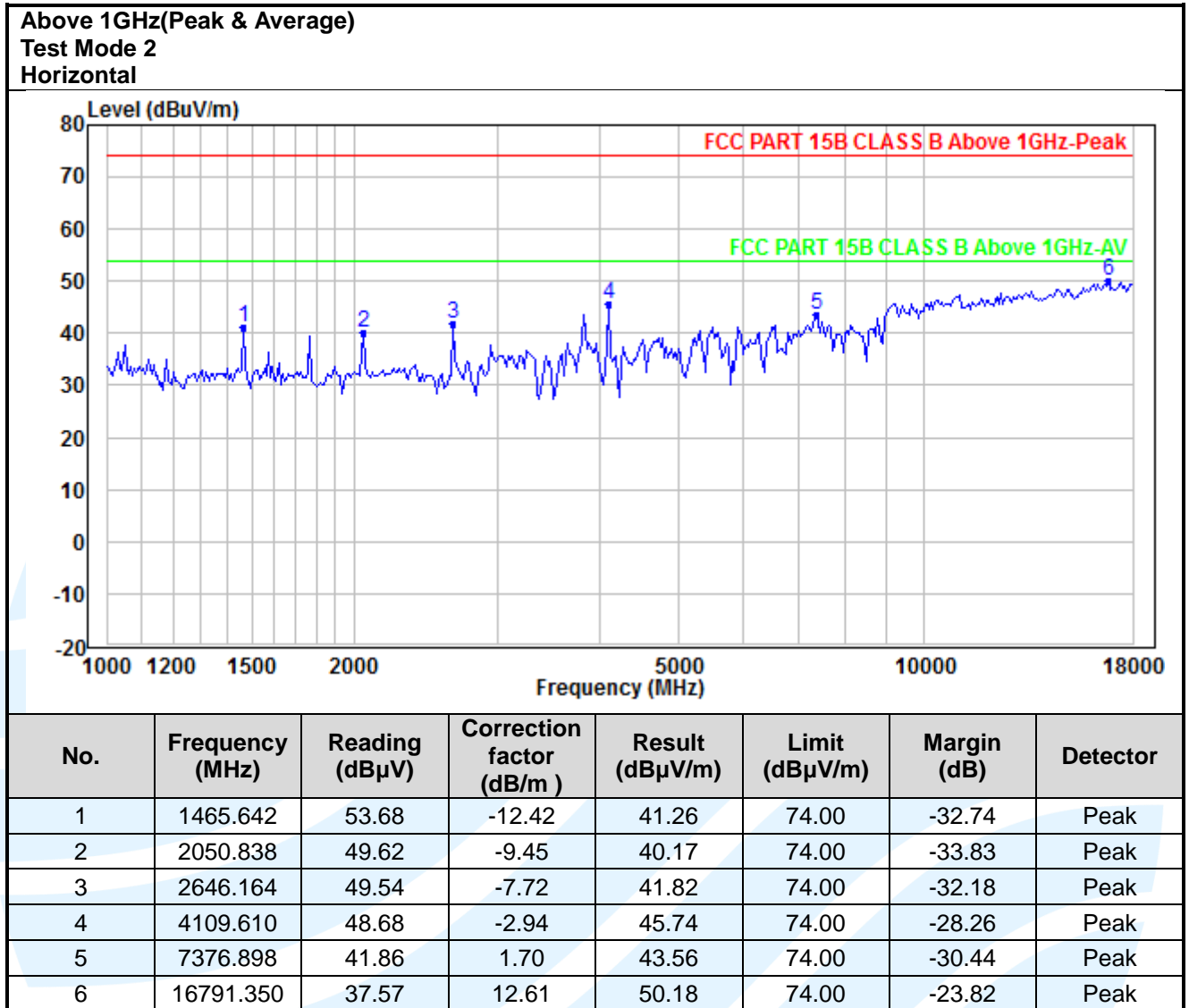
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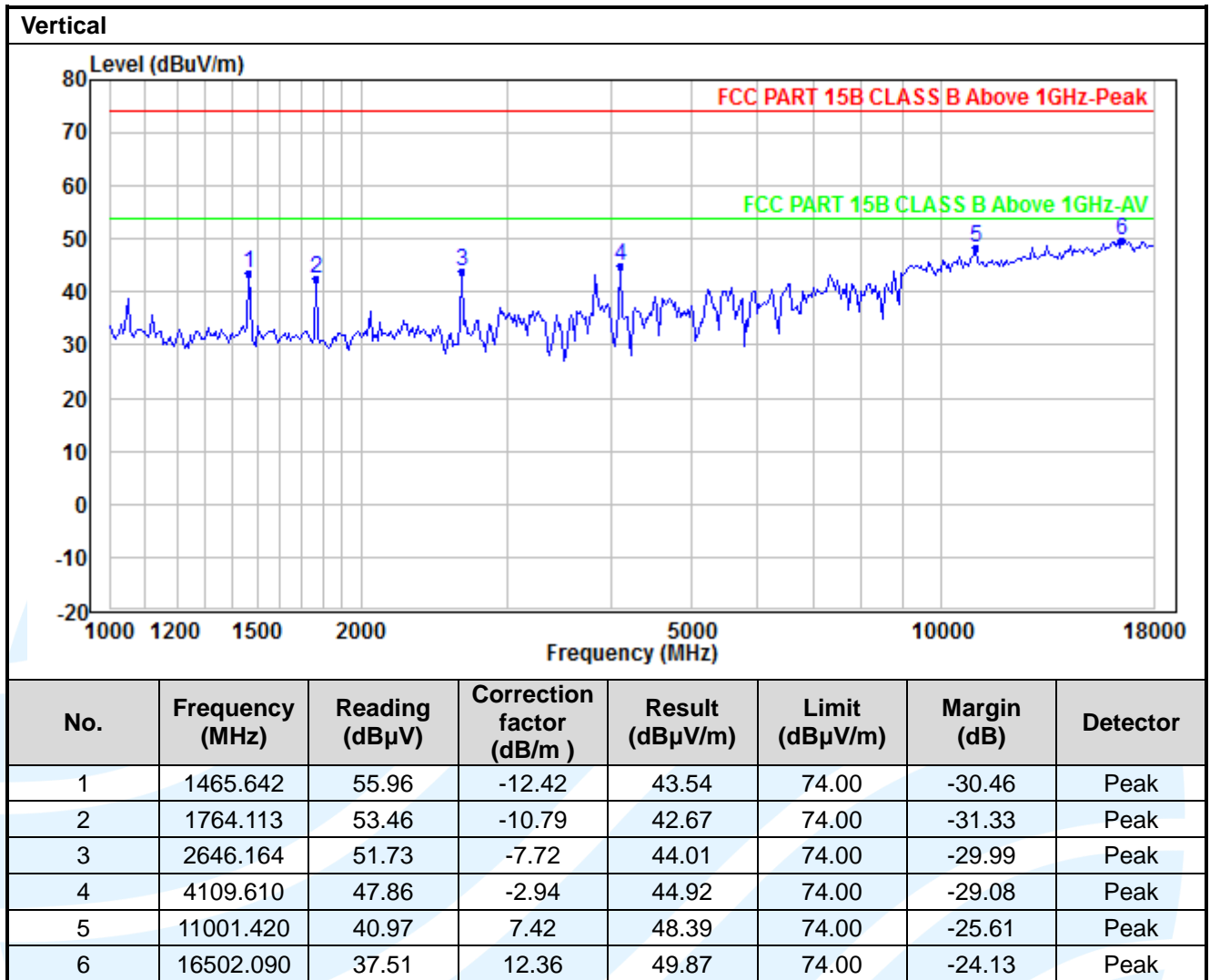
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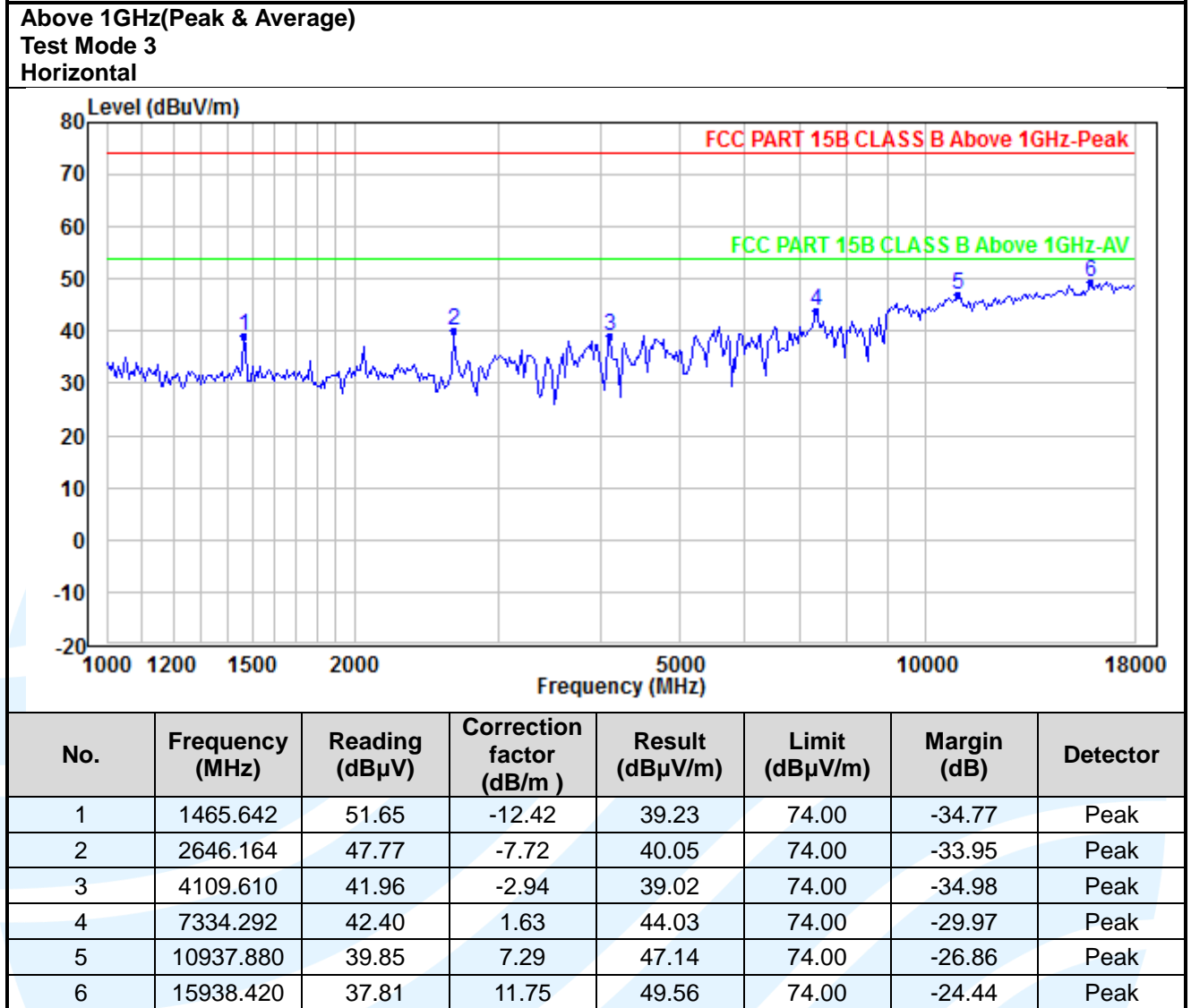
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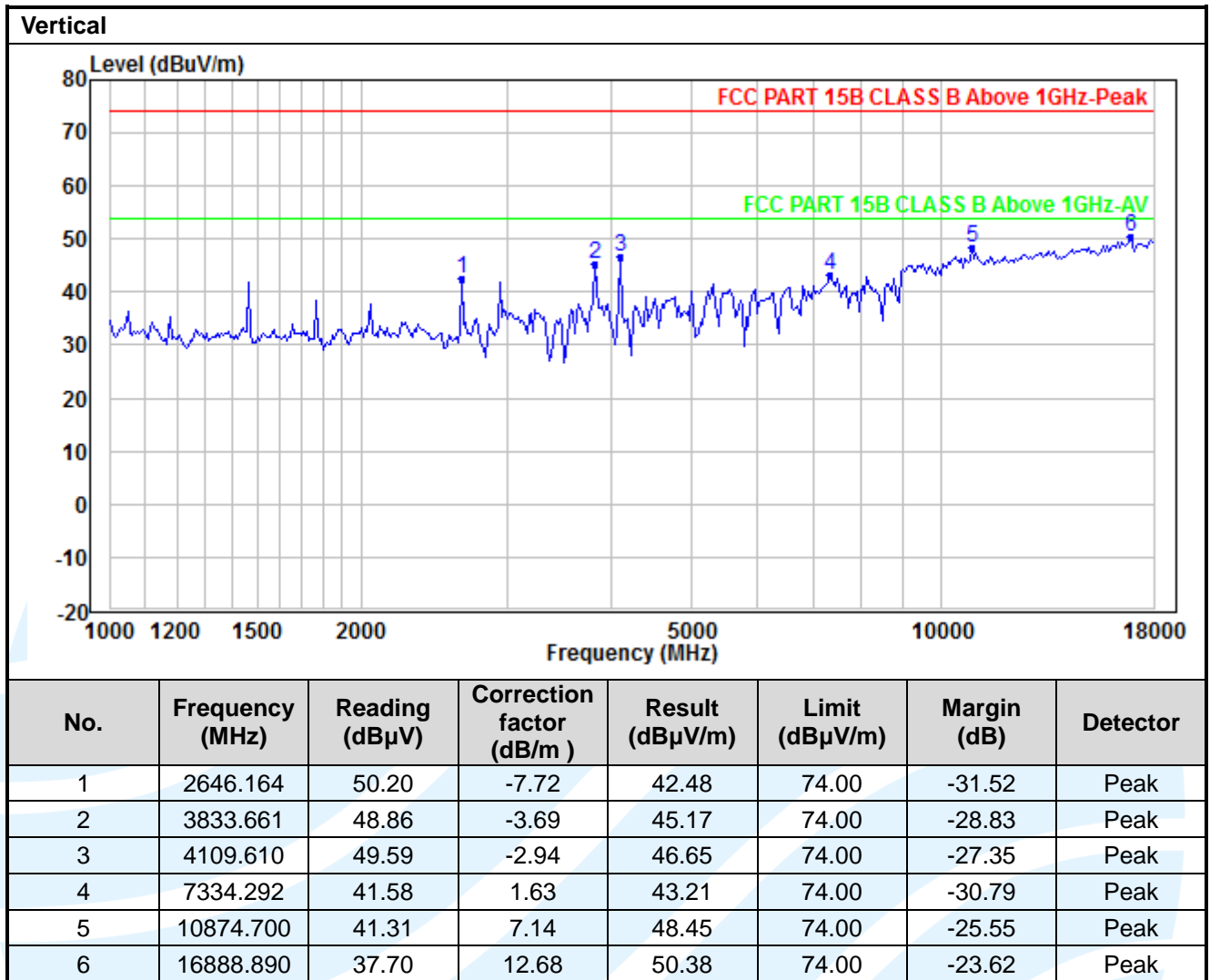
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Remark:

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, and testing at two nominal voltages of 240V/50Hz and 120V/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.
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.

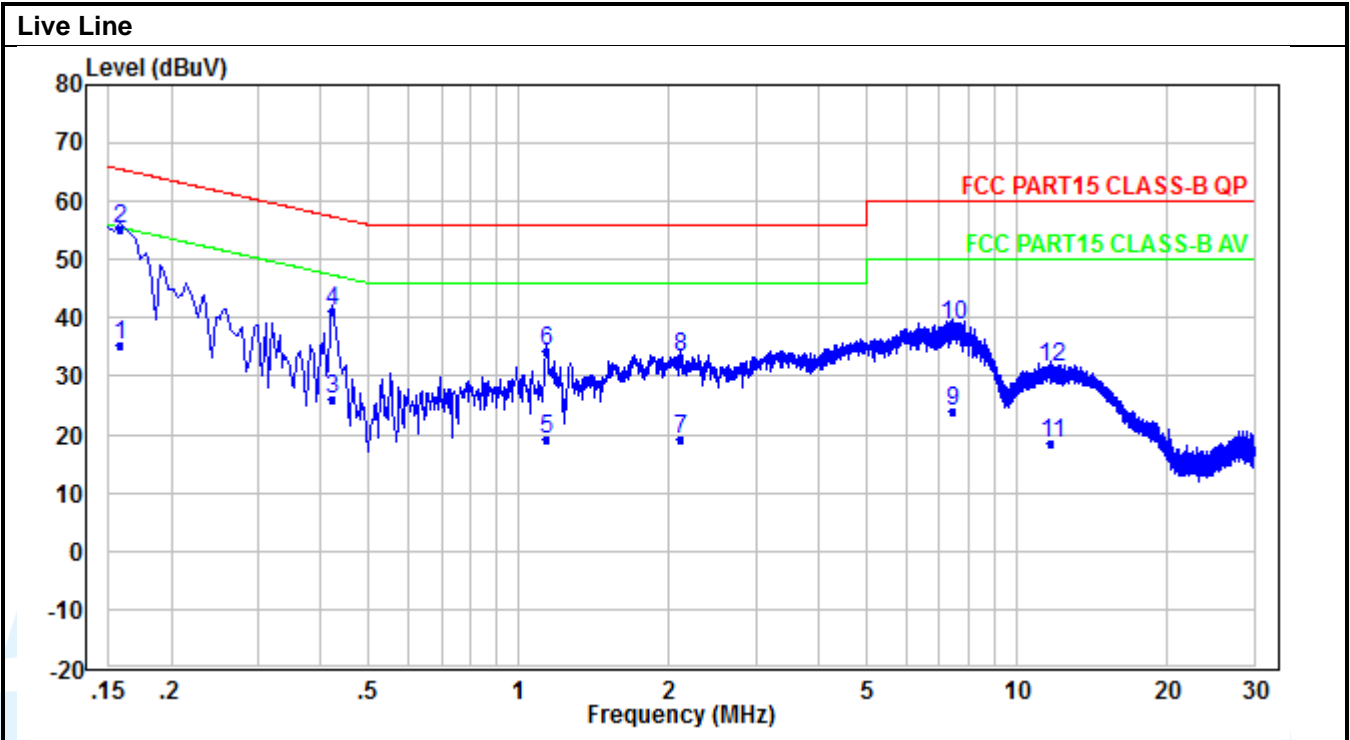
Test Procedures:

- 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.

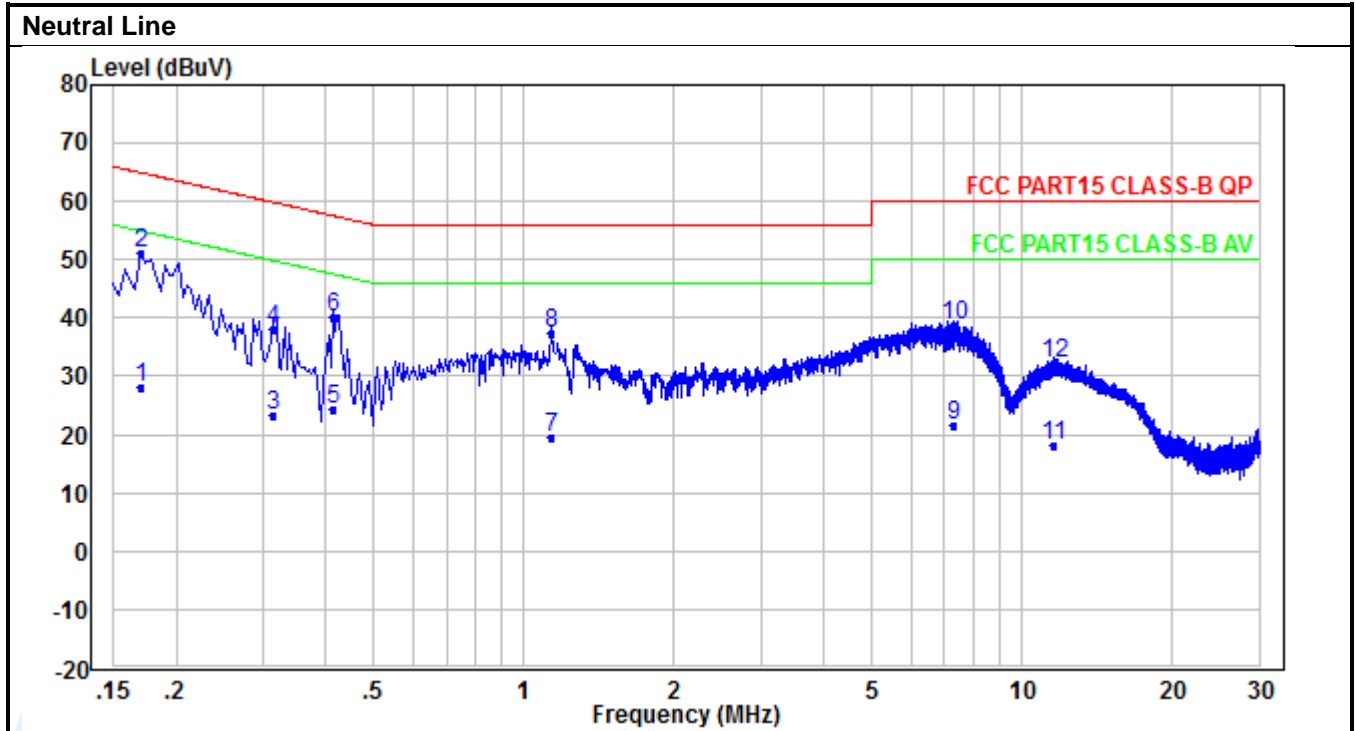
Equipment Used: Refer to section 3 for details.

Test Result: Pass

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



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.158	25.82	9.40	35.22	55.57	-20.35	Average
2	0.158	45.82	9.40	55.22	65.57	-10.35	QP
3	0.422	16.68	9.40	26.08	47.41	-21.33	Average
4	0.422	31.68	9.40	41.08	57.41	-16.33	QP
5	1.134	9.84	9.35	19.19	46.00	-26.81	Average
6	1.134	24.84	9.35	34.19	56.00	-21.81	QP
7	2.110	9.76	9.40	19.16	46.00	-26.84	Average
8	2.110	23.76	9.40	33.16	56.00	-22.84	QP
9	7.418	14.30	9.52	23.82	50.00	-26.18	Average
10	7.418	29.30	9.52	38.82	60.00	-21.18	QP
11	11.749	9.05	9.37	18.42	50.00	-31.58	Average
12	11.749	22.05	9.37	31.42	60.00	-28.58	QP



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.170	18.73	9.41	28.14	54.96	-26.82	Average
2	0.170	41.73	9.41	51.14	64.96	-13.82	QP
3	0.314	13.76	9.41	23.17	49.86	-26.69	Average
4	0.314	28.76	9.41	38.17	59.86	-21.69	QP
5	0.414	14.87	9.41	24.28	47.57	-23.29	Average
6	0.414	30.87	9.41	40.28	57.57	-17.29	QP
7	1.138	10.03	9.42	19.45	46.00	-26.55	Average
8	1.138	28.03	9.42	37.45	56.00	-18.55	QP
9	7.330	12.12	9.50	21.62	50.00	-28.38	Average
10	7.330	29.12	9.50	38.62	60.00	-21.38	QP
11	11.597	8.79	9.38	18.17	50.00	-31.83	Average
12	11.597	22.79	9.38	32.17	60.00	-27.83	QP

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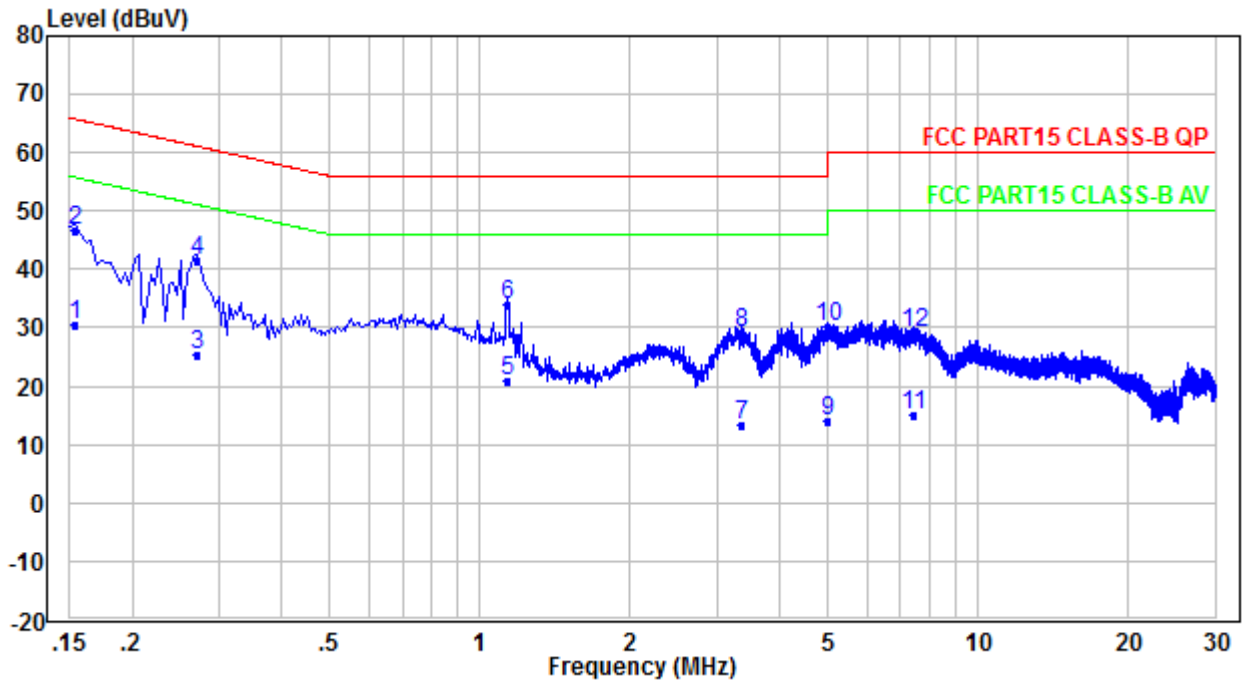
E-mail: info@uttlab.com

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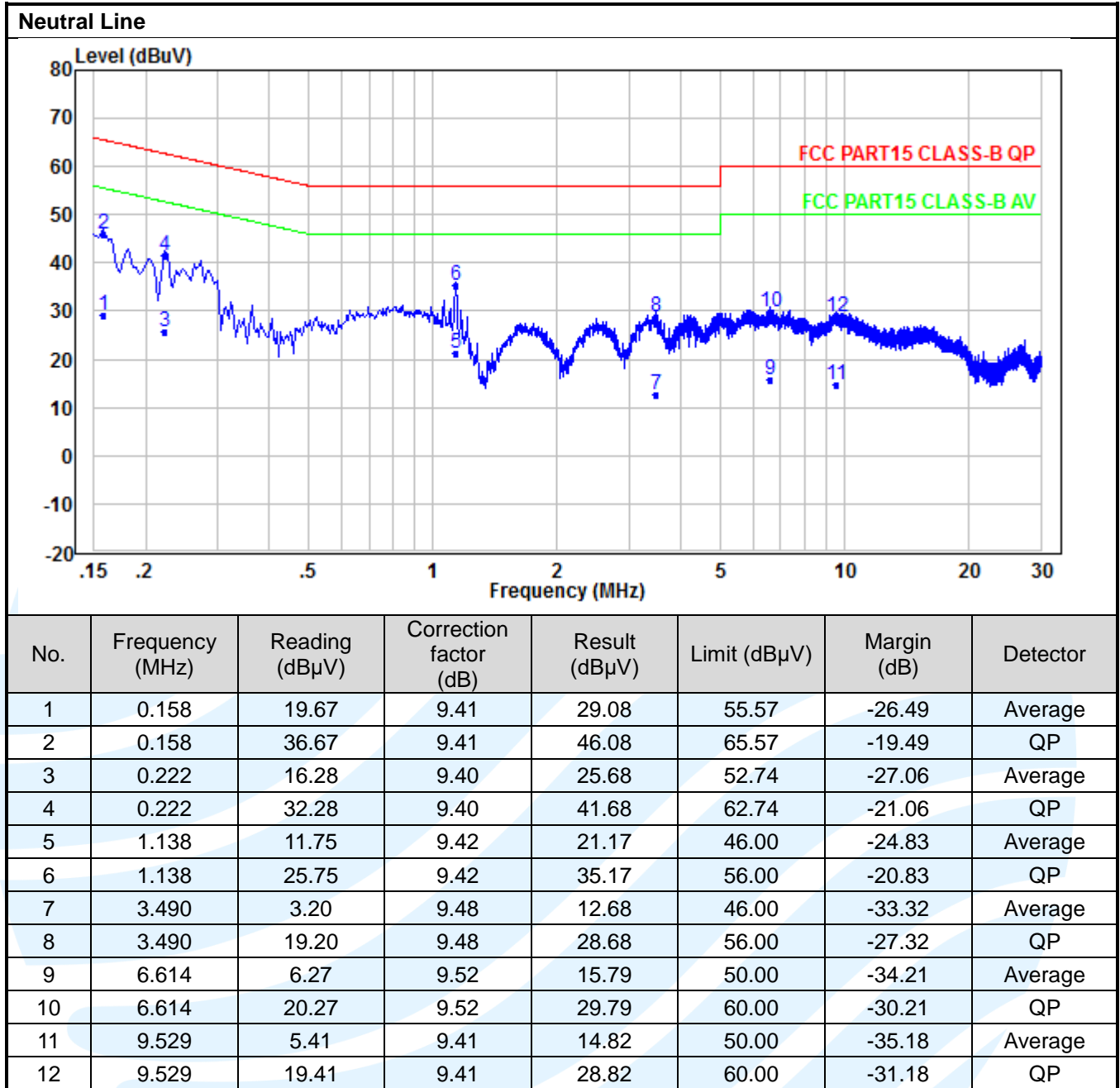
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Quasi Peak and Average:
Test Mode 2

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.154	21.28	9.40	30.68	55.78	-25.10	Average
2	0.154	37.28	9.40	46.68	65.78	-19.10	QP
3	0.270	16.02	9.39	25.41	51.12	-25.71	Average
4	0.270	32.02	9.39	41.41	61.12	-19.71	QP
5	1.138	11.59	9.35	20.94	46.00	-25.06	Average
6	1.138	24.59	9.35	33.94	56.00	-22.06	QP
7	3.362	3.78	9.47	13.25	46.00	-32.75	Average
8	3.362	19.78	9.47	29.25	56.00	-26.75	QP
9	5.002	4.38	9.63	14.01	50.00	-35.99	Average
10	5.002	20.38	9.63	30.01	60.00	-29.99	QP
11	7.426	5.49	9.52	15.01	50.00	-34.99	Average
12	7.426	19.49	9.52	29.01	60.00	-30.99	QP



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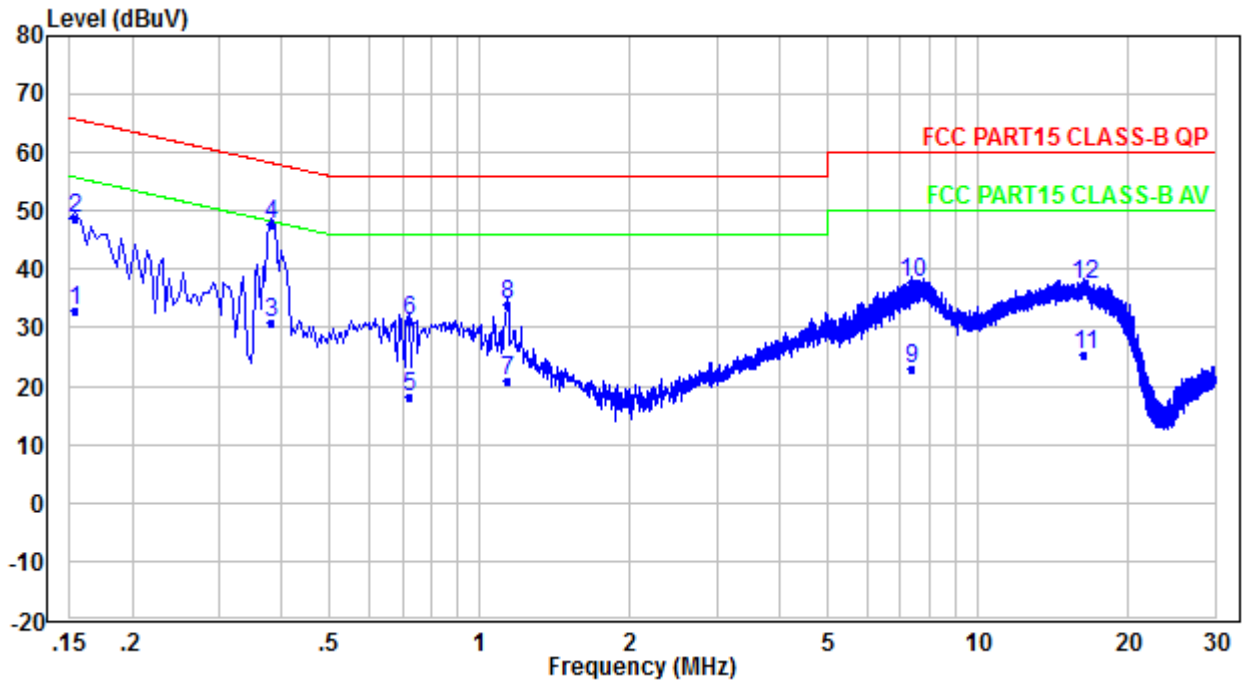
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<http://www.uttlab.com>

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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	0.154	23.40	9.40	32.80	55.78	-22.98	Average
2	0.154	39.40	9.40	48.80	65.78	-16.98	QP
3	0.382	21.40	9.41	30.81	48.24	-17.43	Average
4	0.382	38.40	9.41	47.81	58.24	-10.43	QP
5	0.722	8.94	9.37	18.31	46.00	-27.69	Average
6	0.722	21.94	9.37	31.31	56.00	-24.69	QP
7	1.138	11.59	9.35	20.94	46.00	-25.06	Average
8	1.138	24.59	9.35	33.94	56.00	-22.06	QP
9	7.370	13.27	9.52	22.79	50.00	-27.21	Average
10	7.370	28.27	9.52	37.79	60.00	-22.21	QP
11	16.373	16.16	9.28	25.44	50.00	-24.56	Average
12	16.373	28.16	9.28	37.44	60.00	-22.56	QP

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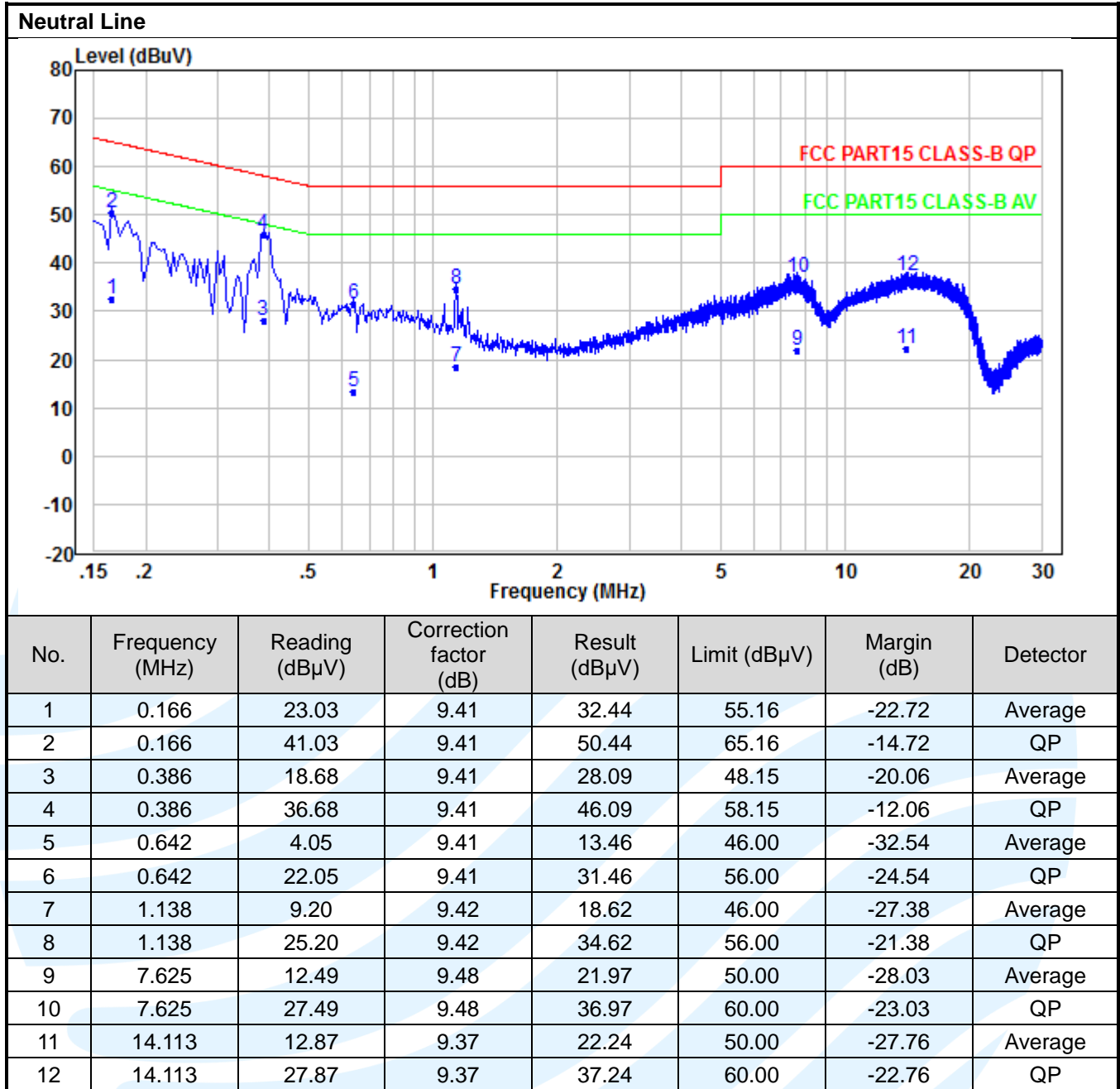
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Remark:

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 ***

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