



Certificate #4312.01

TEST REPORT

Product Name: Analog Telephone Adaptor
Trade Mark: GRANDSTREAM
Model No. / HVIN: HT814
Add. Model No.: N/A
Report Number: 211228024EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 7
FCC ID: YZZHT814V2
Test Result: PASS
Date of Issue: January 20, 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
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by:

Gavin Xu
Project Engineer

Reviewed by:

Kevin Liang
Assistant Manager

Approved by:

Billy Li
Technical Director

Date:

January 20, 2022

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

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Version

Version No.	Date	Description
V1.0	January 20, 2022	Original

**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

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com<http://www.uttlab.com>UTTR-EMC-ICES003-V1.2

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	12
6. EMC REQUIREMENTS SPECIFICATION	13
6.1 RADIATED EMISSION	13
6.2 CONDUCTED EMISSION	32
APPENDIX 1 PHOTOS OF TEST SETUP	39
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS	39

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 Adaptor
Model No.:	HT814
Add. Model No.:	N/A
Trade Mark:	GRANDSTREAM
DUT Stage:	Production Unit
Rated Voltage:	Adapter: Input: 100-240 V~50/60 Hz Output: 12 V $\equiv$ 1.0 A
Classification of digital devices:	Class B
Highest Internal Frequency:	600 MHz
Software Version:	1.0.33.1
Hardware Version:	V3.0
Sample Received Date:	December 28, 2021
Sample Tested Date:	January 3, 2022 to January 6, 2022

1.2.2 Description of Accessories

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

Adapter 2	
Model No.:	F12US1200100A
Input:	100-240 V~50/60 Hz, 0.5 A Max
Output:	12 V $\equiv$ 1.0 A
DC Cable:	2.5 Meter, Unshielded without ferrite

Adapter 3	
Model No.:	DSA-12PFU-12 FUS 120100
Input:	100-240 V~50/60 Hz, 0.5 A
Output:	12 V $\equiv$ 1.0 A
DC Cable:	2.5 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
IP Phone	GRANDSTREAM	GRP2614	N/A	Applicant
Telephone	CHINO E	HCD6238(28)P/TSD1 6	110100001	UnionTrust

2) Support Cable

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

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)
☒	3m SAC	ETS-Lindgren	3m	Euroshiedpn-CT001270-1317	Jan. 22, 2021	Jan. 21, 2024
☒	Receiver	ROHDE & SCHWARZ	ESIB26	100114	Nov. 05, 2021	Nov. 04, 2022
☒	Broadband Antenna	ETS-Lindgren	3142E	00201566	Nov. 11, 2021	Nov. 10, 2023
☒	Pre-amplifier	HP	8447F	2805A02960	Nov. 05, 2021	Nov. 04, 2022
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 11, 2021	Nov. 10, 2023
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-Lindgren	3117-PA	00201541	Apr. 30, 2021	Apr. 29, 2023
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	Nov. 05, 2021	Nov. 04, 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 (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 05, 2021	Nov. 04, 2022
☒	Receiver	R&S	ESR7	101181	Nov. 05, 2021	Nov. 04, 2022
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 05, 2021	Nov. 04, 2022
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 05, 2021	Nov. 04, 2022
☒	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	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
Radiated Emission	23.5	45	100.1	Asia Yan
Conducted Emission	24.5	49	101.1	David Zhang

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Telephone communication + RJ45 communication Test Mode 2: AC120V/60Hz (Adapter2) + Telephone communication + RJ45 communication Test Mode 3: AC120V/60Hz (Adapter3) + Telephone communication + RJ45 communication Test Mode 4: AC240V/50Hz + Worse from mode 1~3
Conducted Emission	Test Mode 1: AC120V/60Hz (Adapter1) + Telephone communication + RJ45 communication Test Mode 2: AC120V/60Hz (Adapter2) + Telephone communication + RJ45 communication Test Mode 3: AC120V/60Hz (Adapter3) + Telephone communication + RJ45 communication Test Mode 4: AC240V/50Hz + Worse from mode 1~3

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

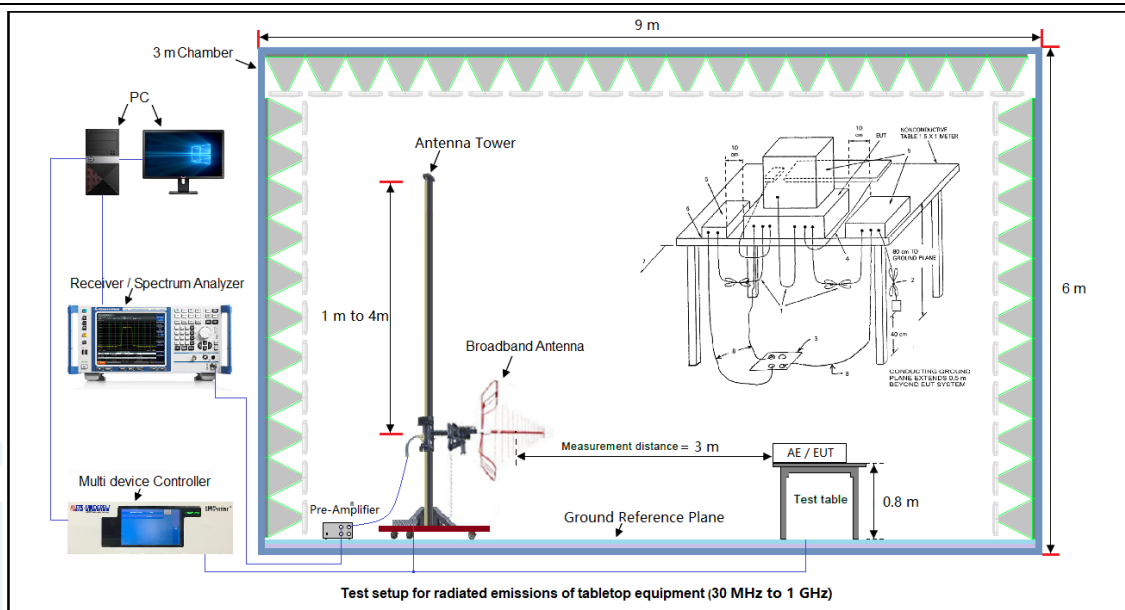
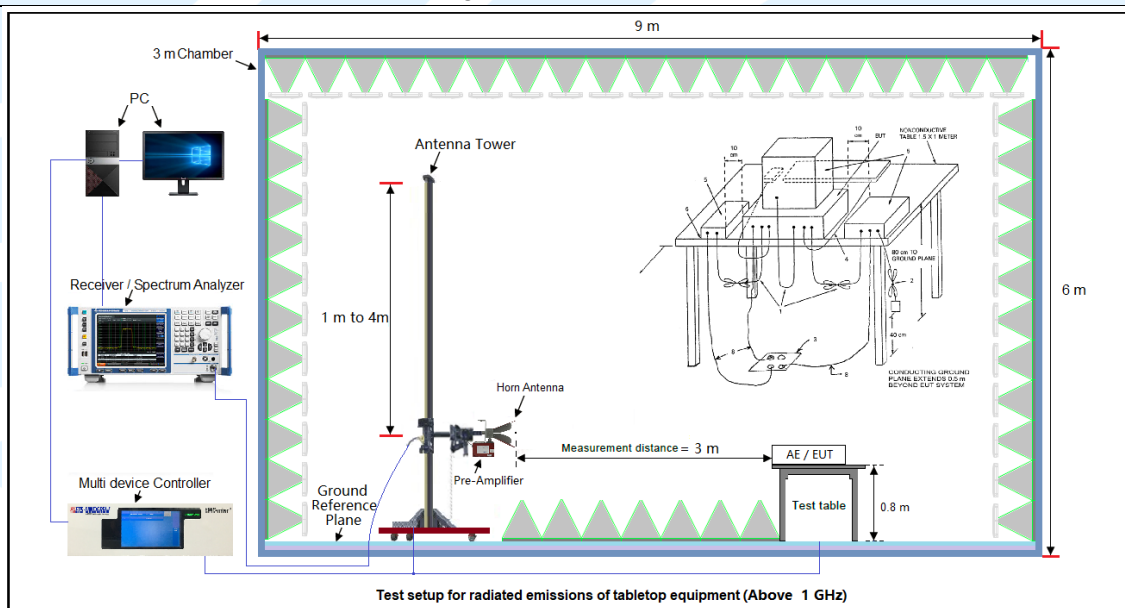
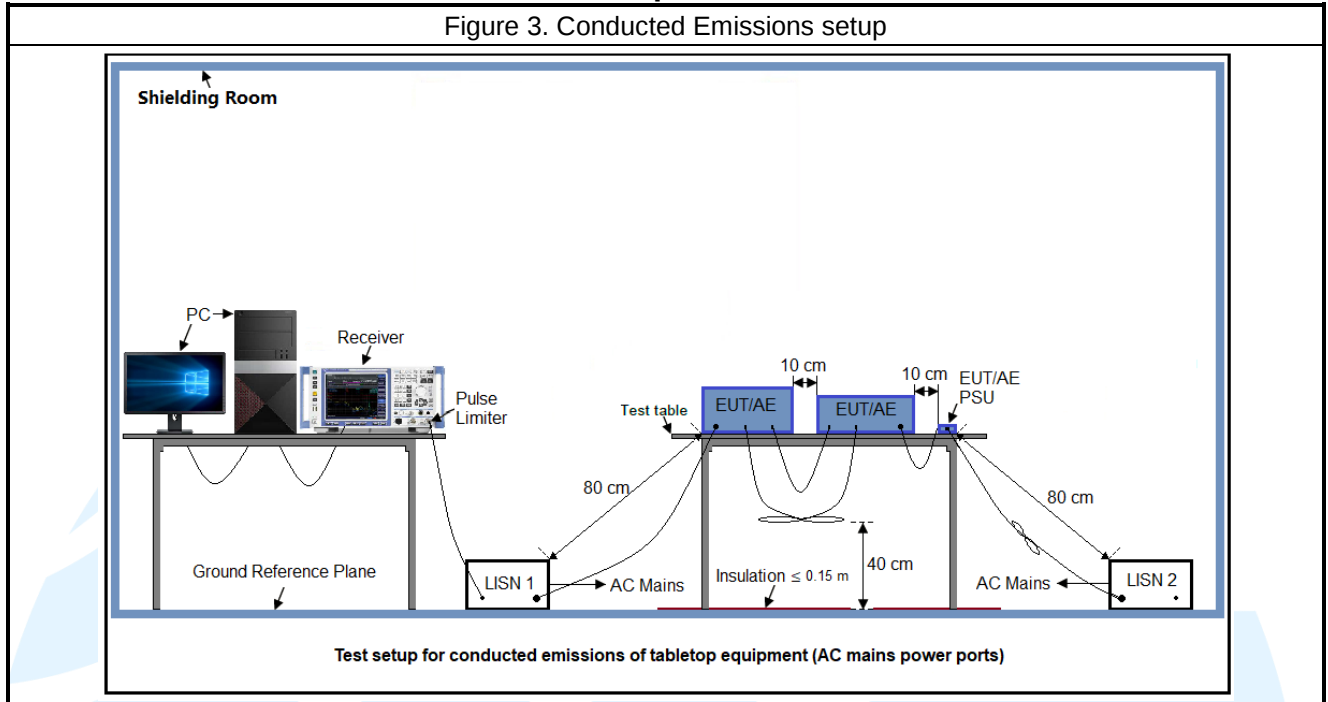


Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup



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

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

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com
<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

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	--	--
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:

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

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

- 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.

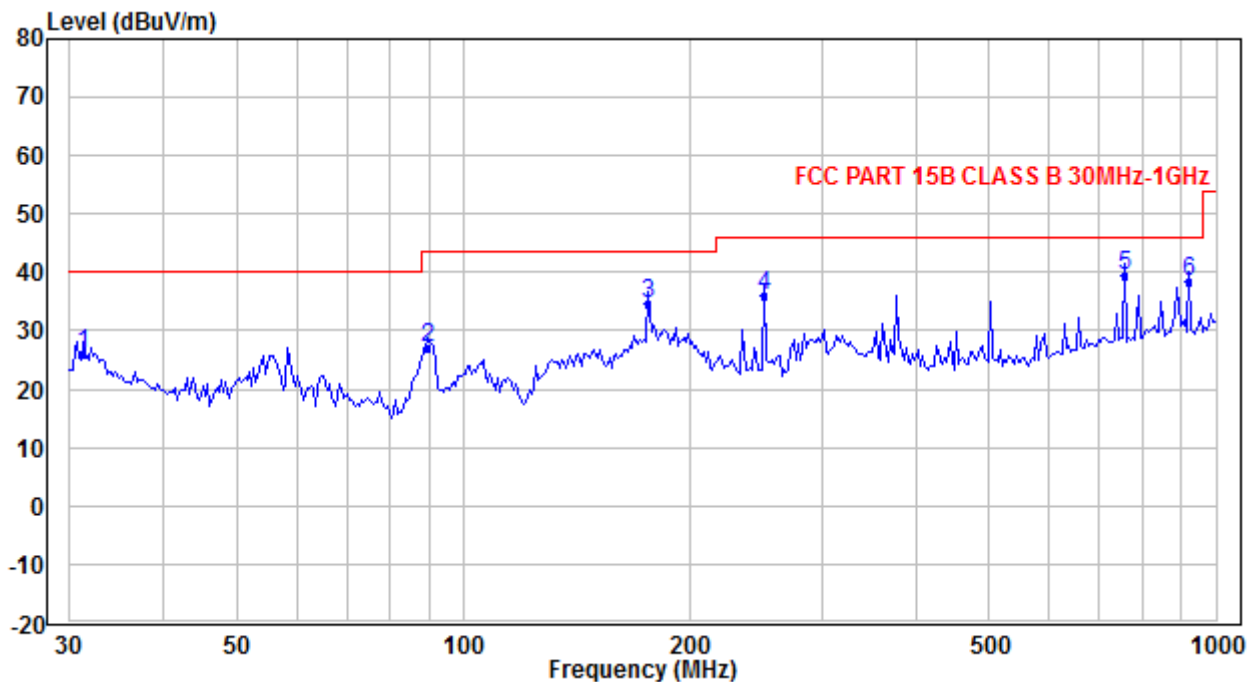
Test Result: Pass

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

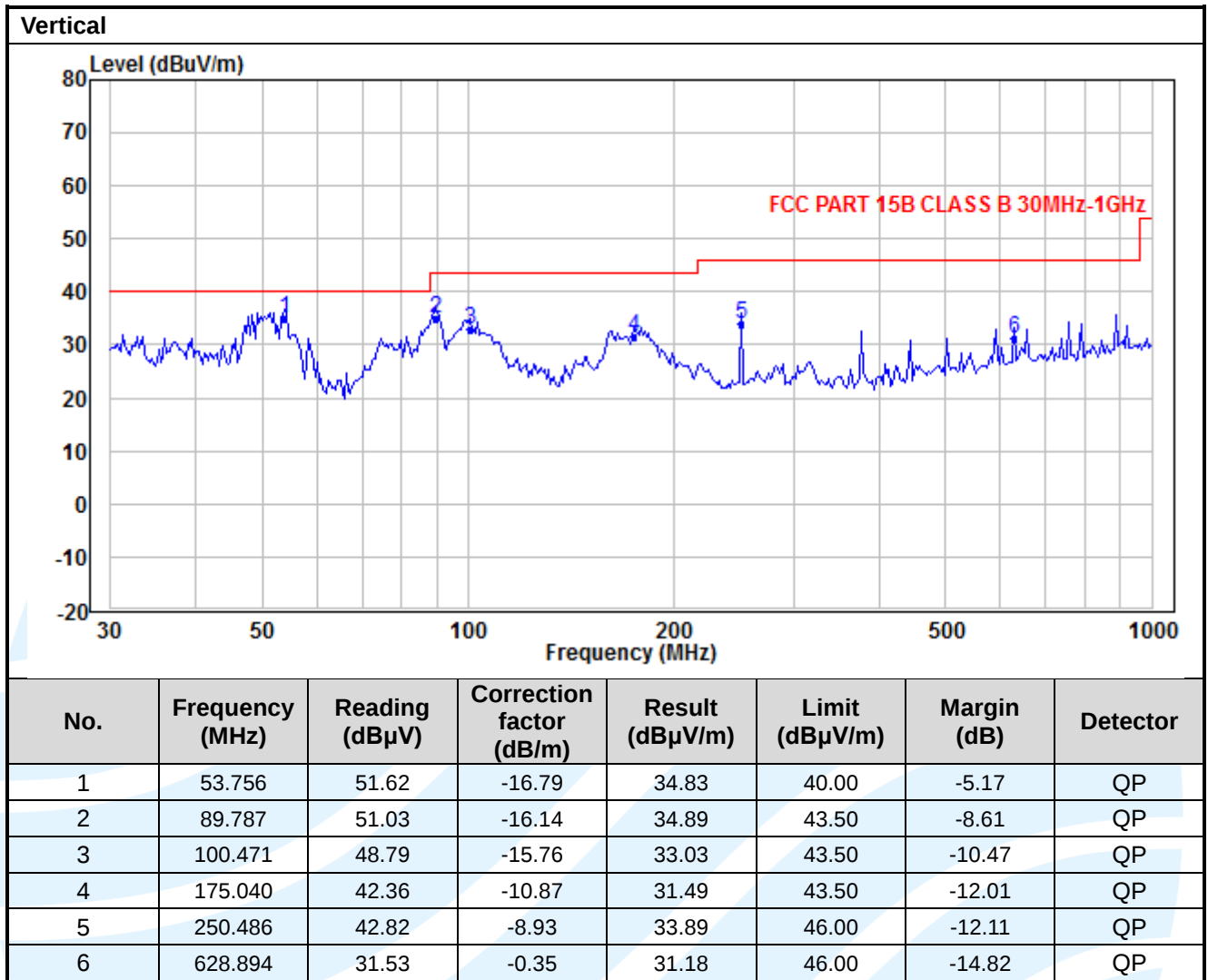
Below 1GHz (Quasi Peak):

Test Mode 1

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.292	30.79	-4.75	26.04	40.00	-13.96	QP
2	89.787	43.06	-16.14	26.92	43.50	-16.58	QP
3	176.275	45.18	-10.45	34.73	43.50	-8.77	QP
4	250.486	44.81	-8.93	35.88	46.00	-10.12	QP
5	754.963	37.72	1.81	39.53	46.00	-6.47	QP
6	919.132	34.05	4.24	38.29	46.00	-7.71	QP



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

Tel: +86-755-28230888

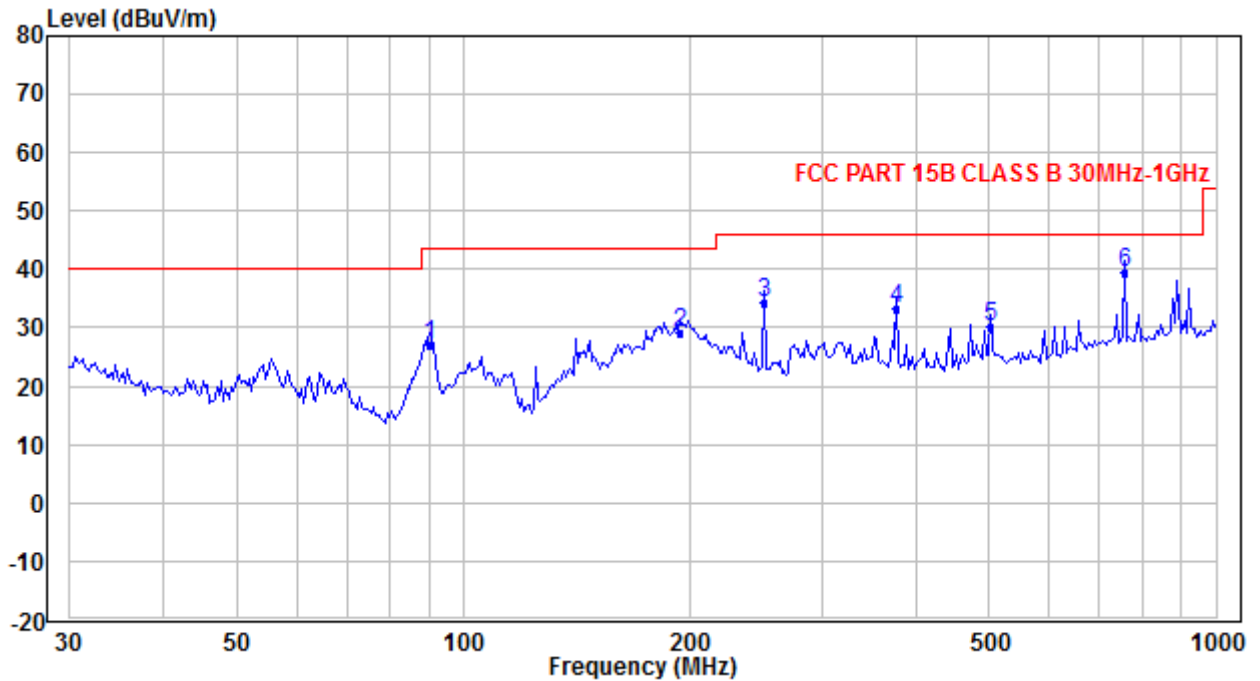
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Below 1GHz (Quasi Peak):
Test Mode 2
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	90.420	43.26	-16.12	27.14	43.50	-16.36	QP
2	194.499	39.90	-10.68	29.22	43.50	-14.28	QP
3	250.486	43.12	-8.93	34.19	46.00	-11.81	QP
4	376.523	38.66	-5.43	33.23	46.00	-12.77	QP
5	502.247	33.04	-2.85	30.19	46.00	-15.81	QP
6	754.963	37.69	1.81	39.50	46.00	-6.50	QP

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

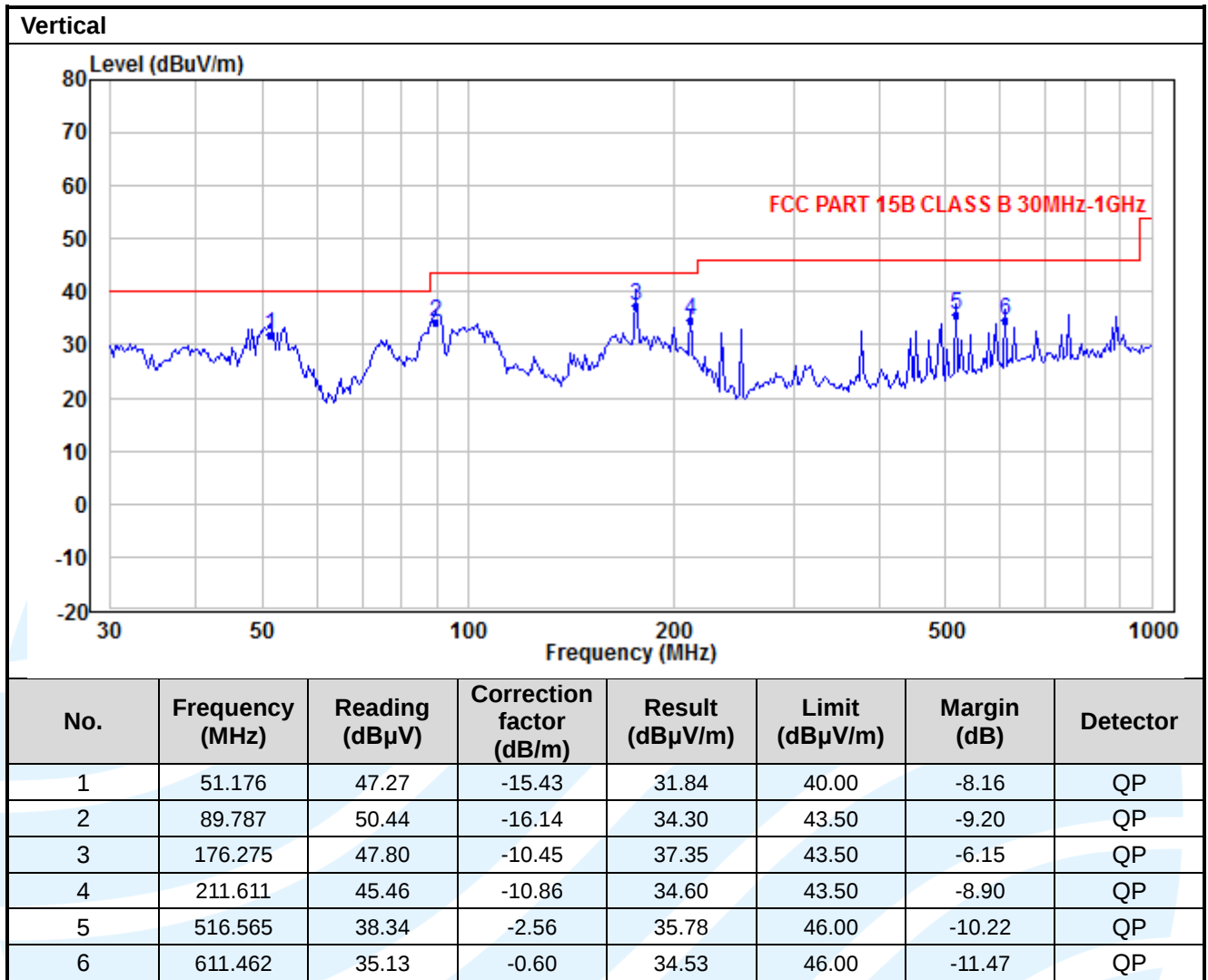
Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



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

Tel: +86-755-28230888

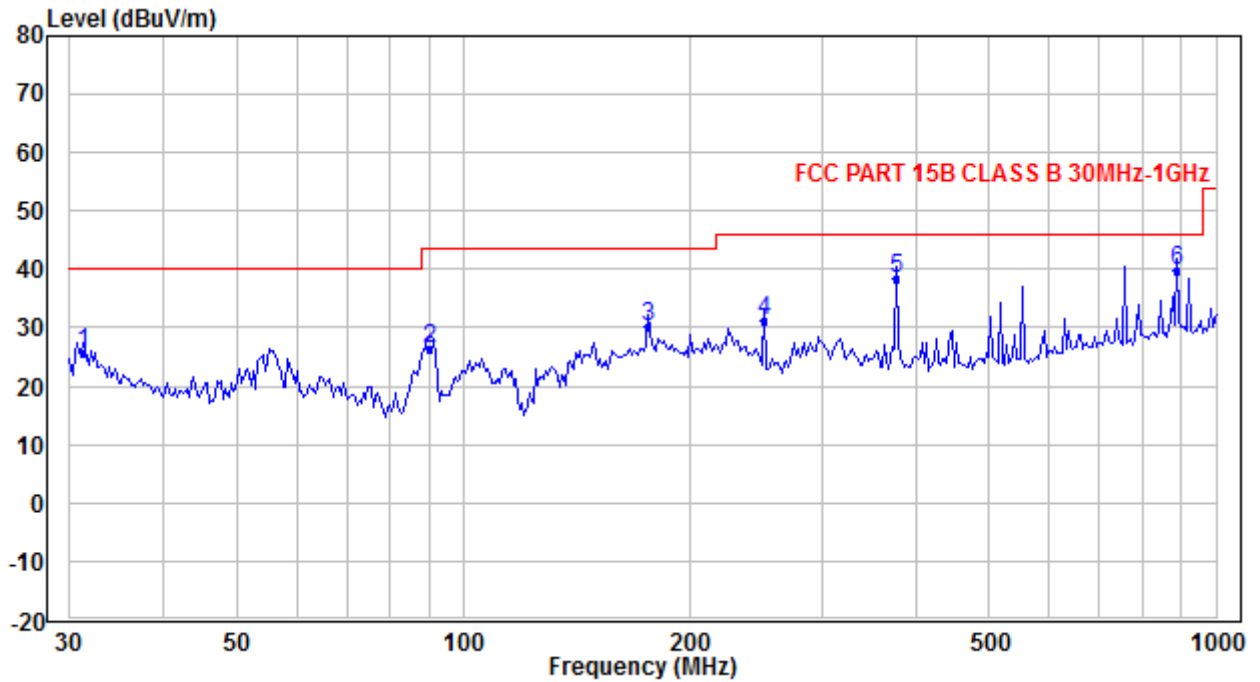
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

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



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.292	30.32	-4.75	25.57	40.00	-14.43	QP
2	90.420	42.47	-16.12	26.35	43.50	-17.15	QP
3	176.275	40.61	-10.45	30.16	43.50	-13.34	QP
4	250.486	40.03	-8.93	31.10	46.00	-14.90	QP
5	376.523	43.75	-5.43	38.32	46.00	-7.68	QP
6	887.398	35.87	4.07	39.94	46.00	-6.06	QP

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

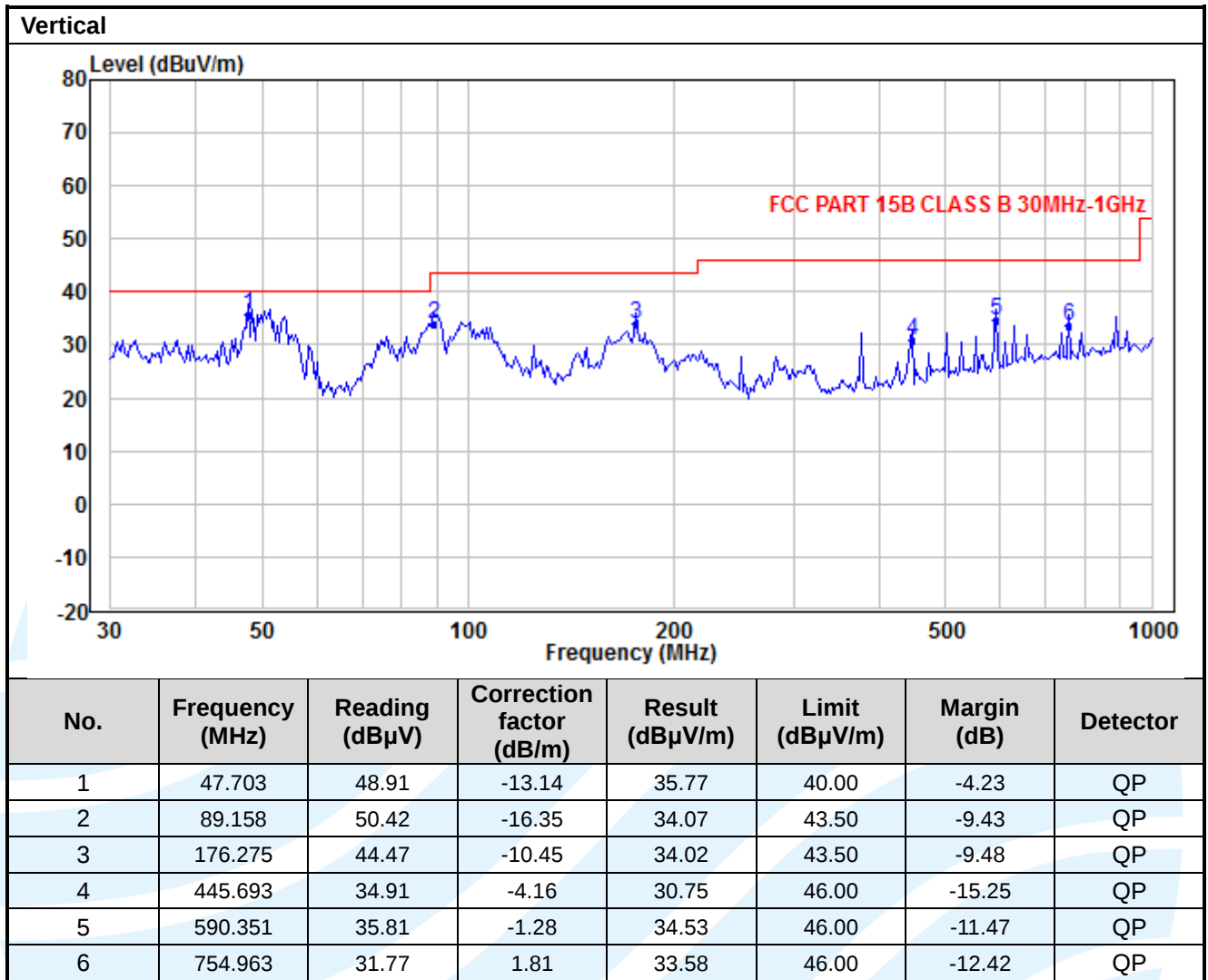
Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

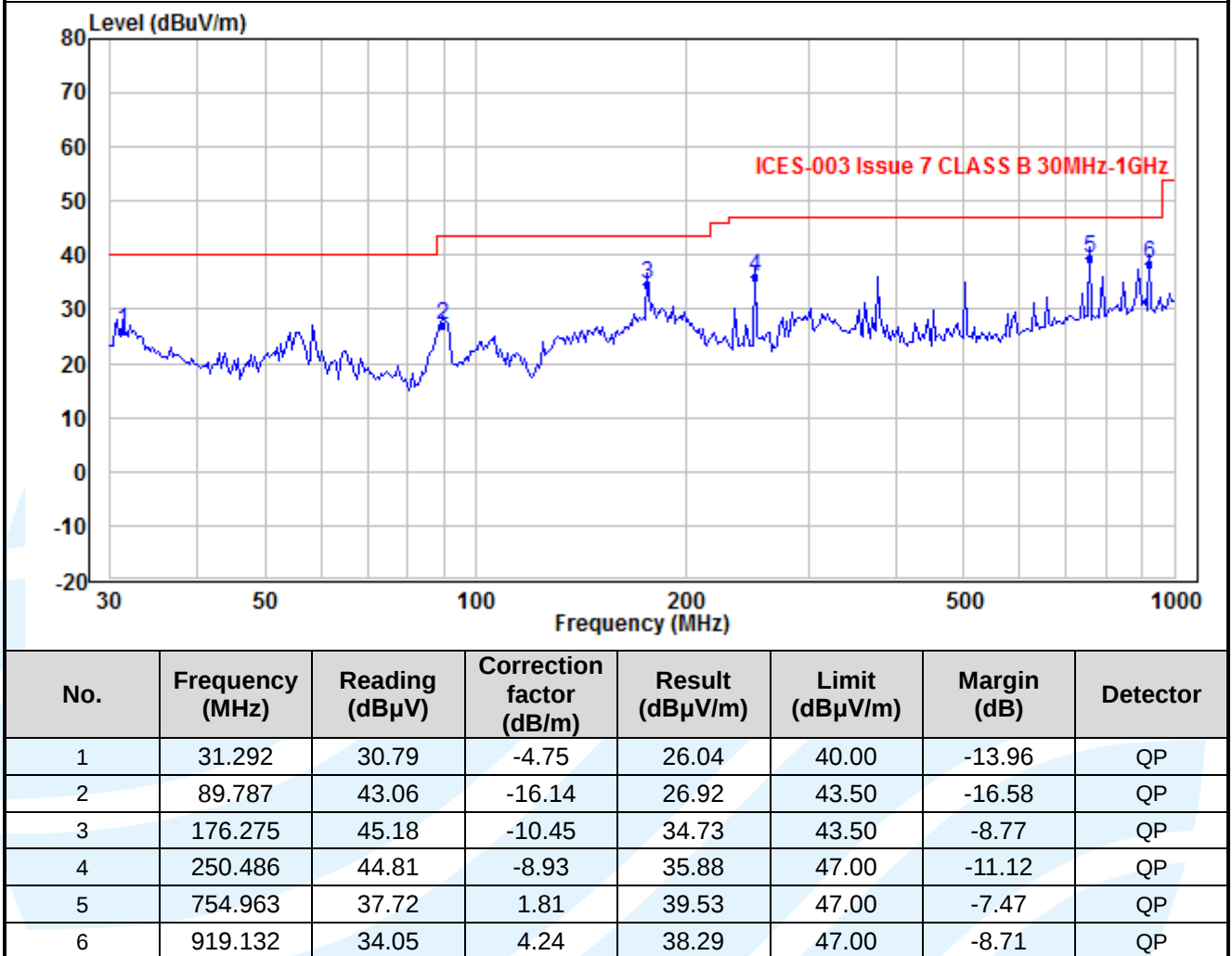


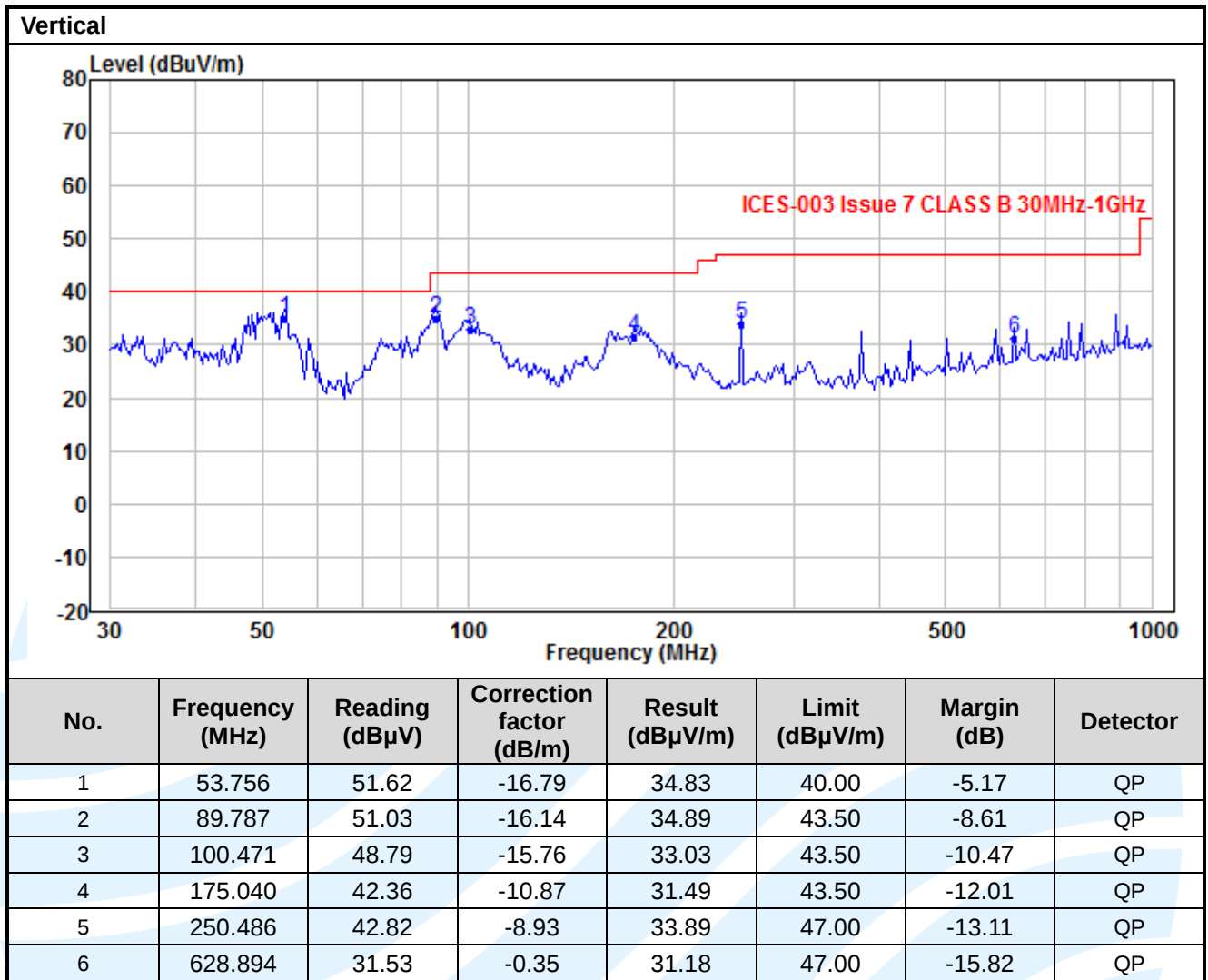
The worst measurement data for ICES-003 Issue 7 as follows:

Below 1GHz(Quasi Peak):

Test Mode 1

Horizontal





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

Tel: +86-755-28230888

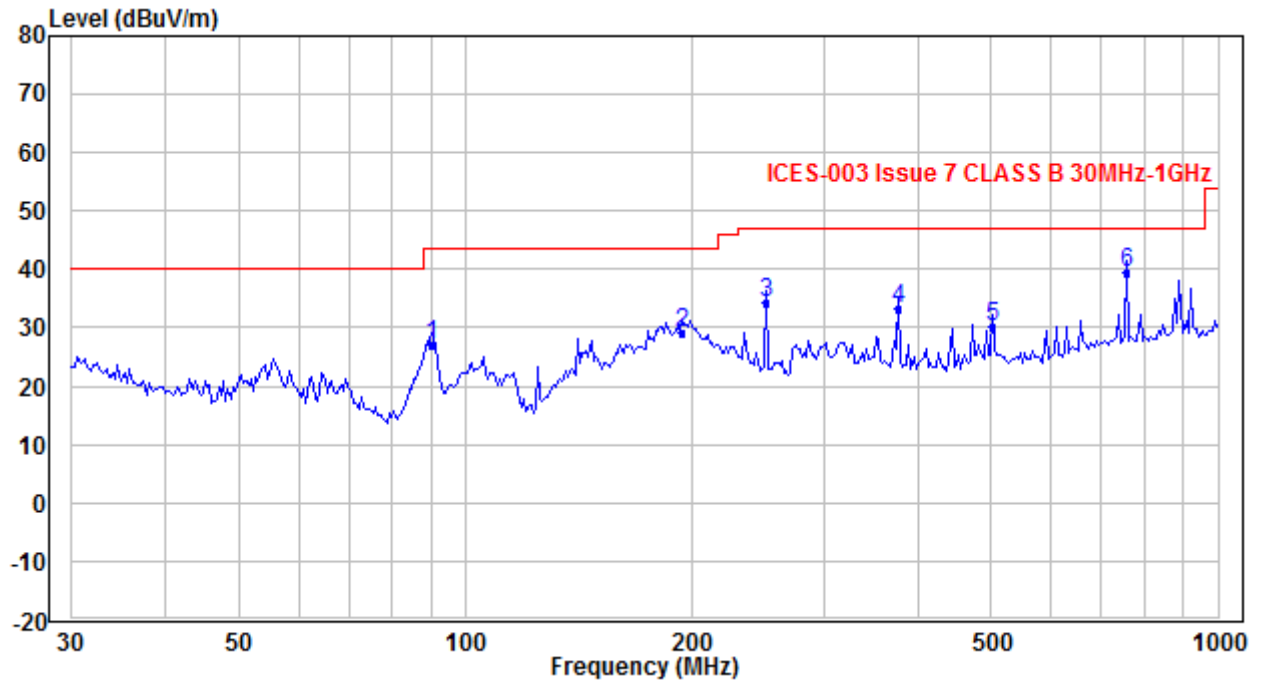
Fax: +86-755-28230886

E-mail: info@uttlab.com

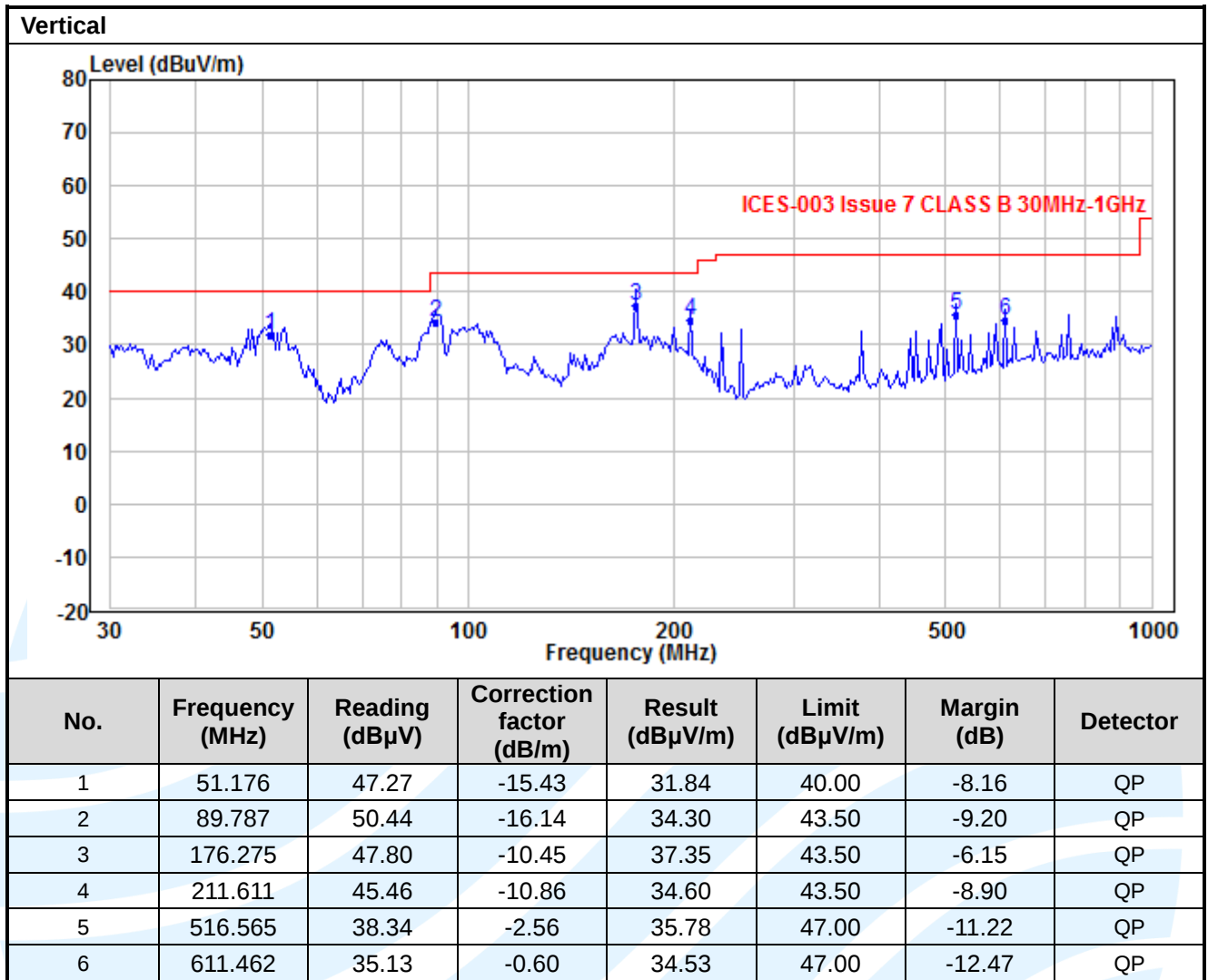
<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Below 1GHz (Quasi Peak):
Test Mode 2
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	90.420	43.26	-16.12	27.14	43.50	-16.36	QP
2	194.499	39.90	-10.68	29.22	43.50	-14.28	QP
3	250.486	43.12	-8.93	34.19	47.00	-12.81	QP
4	376.523	38.66	-5.43	33.23	47.00	-13.77	QP
5	502.247	33.04	-2.85	30.19	47.00	-16.81	QP
6	754.963	37.69	1.81	39.50	47.00	-7.50	QP



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

Tel: +86-755-28230888

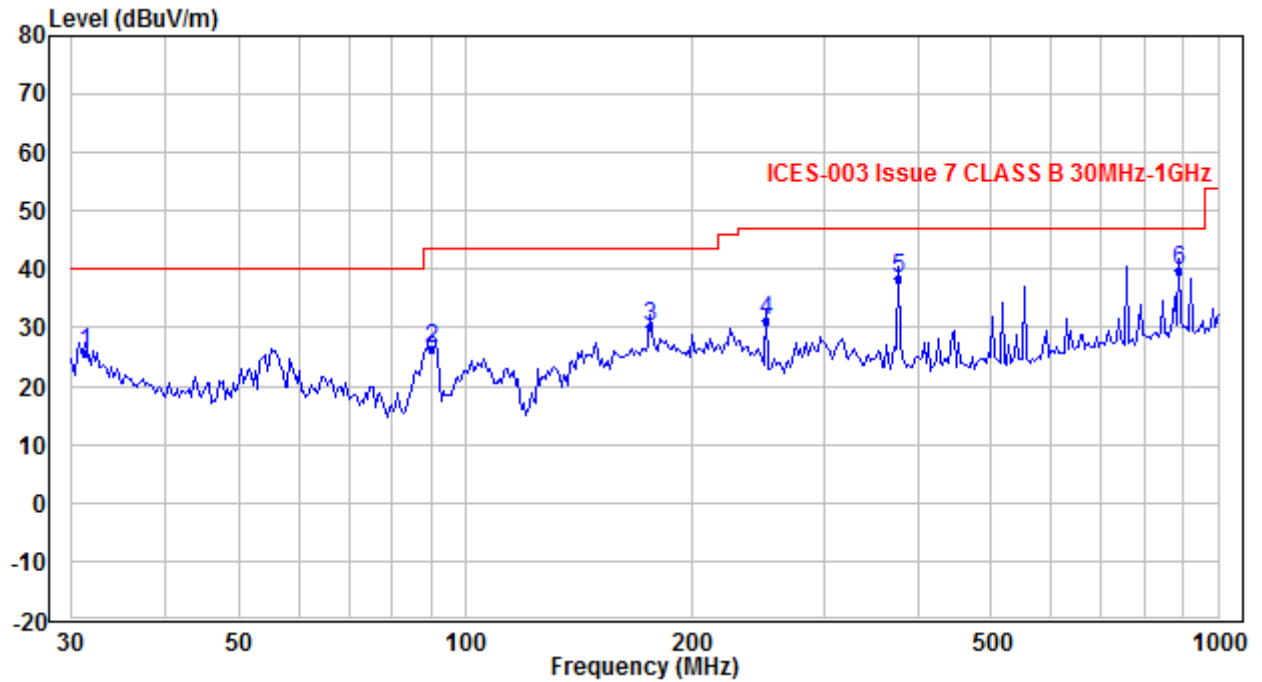
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

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



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.292	30.32	-4.75	25.57	40.00	-14.43	QP
2	90.420	42.47	-16.12	26.35	43.50	-17.15	QP
3	176.275	40.61	-10.45	30.16	43.50	-13.34	QP
4	250.486	40.03	-8.93	31.10	47.00	-15.90	QP
5	376.523	43.75	-5.43	38.32	47.00	-8.68	QP
6	887.398	35.87	4.07	39.94	47.00	-7.06	QP

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

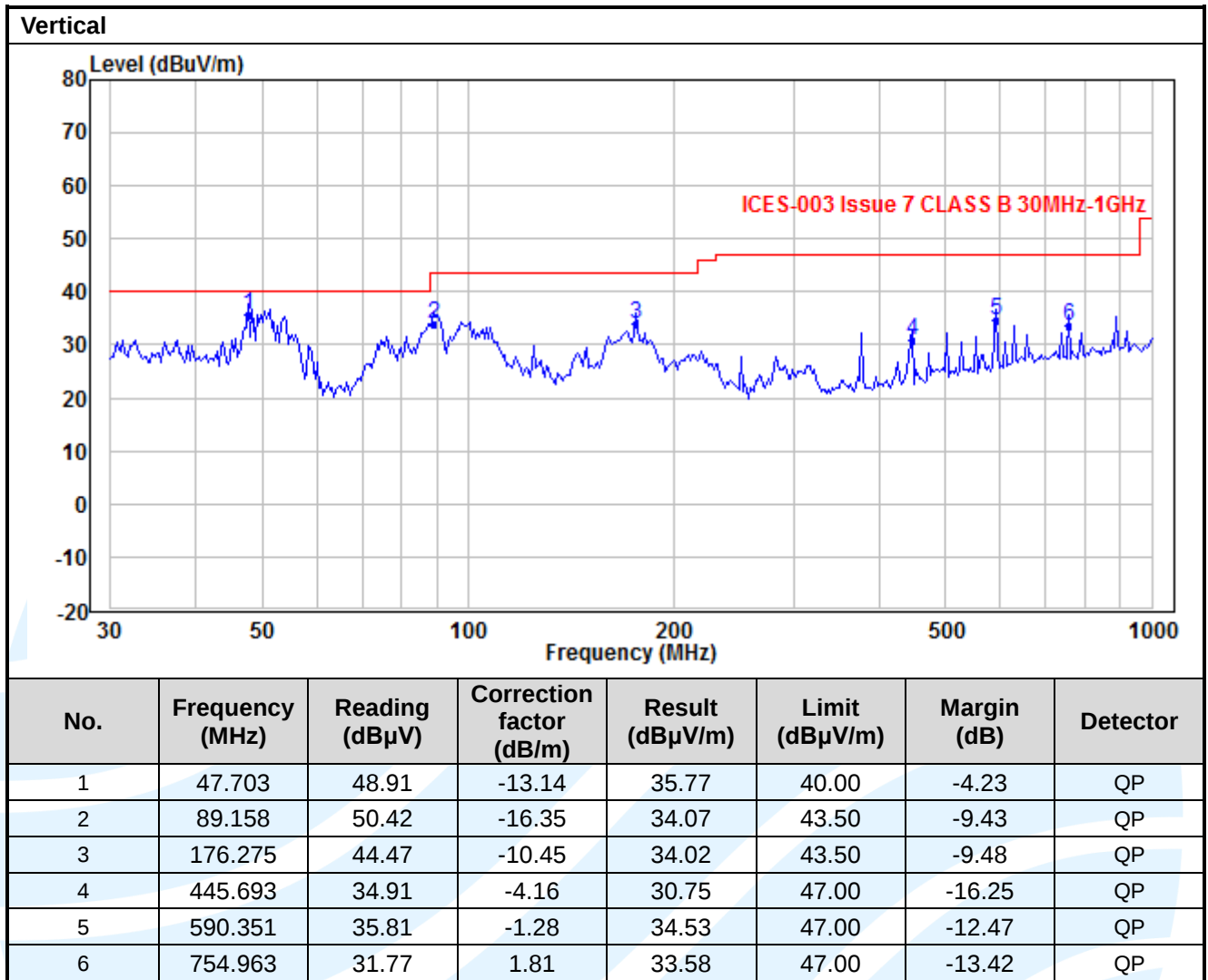
Tel: +86-755-28230888

Fax: +86-755-28230886

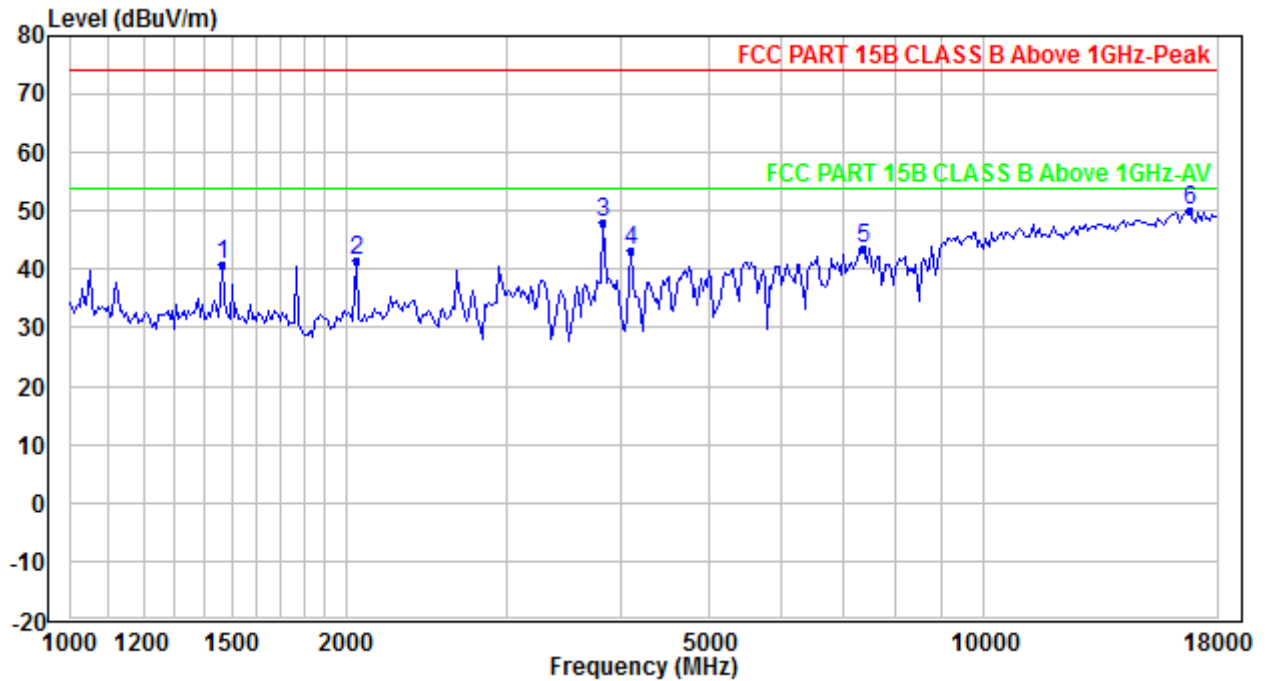
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



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	1465.642	53.28	-12.42	40.86	74.00	-33.14	Peak
2	2050.838	51.04	-9.45	41.59	74.00	-32.41	Peak
3	3833.661	51.90	-3.69	48.21	74.00	-25.79	Peak
4	4109.610	46.09	-2.94	43.15	74.00	-30.85	Peak
5	7376.898	41.89	1.70	43.59	74.00	-30.41	Peak
6	16791.350	37.59	12.61	50.20	74.00	-23.80	Peak

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

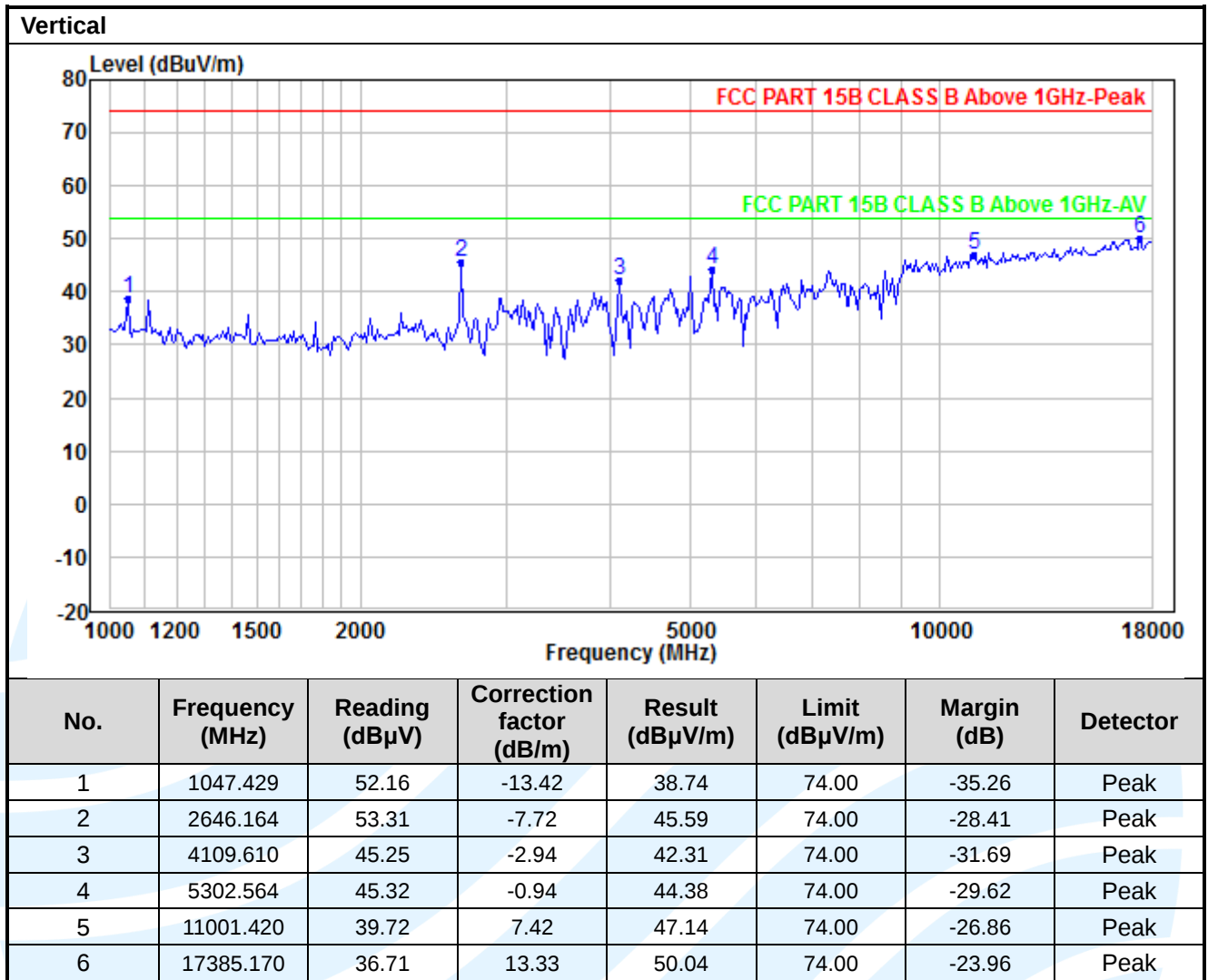
Tel: +86-755-28230888

Fax: +86-755-28230886

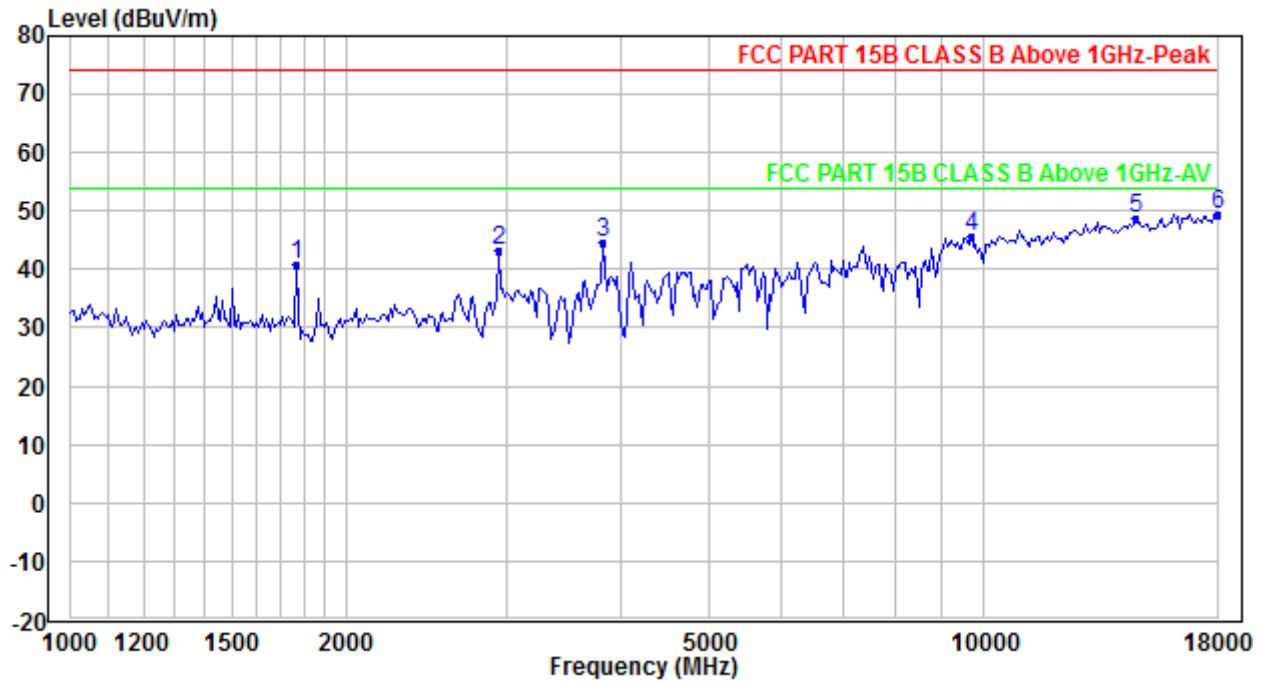
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



Above 1GHz (Peak & Average)
Test Mode 2
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1764.113	51.76	-10.79	40.97	74.00	-33.03	Peak
2	2936.954	50.21	-6.93	43.28	74.00	-30.72	Peak
3	3833.661	48.31	-3.69	44.62	74.00	-29.38	Peak
4	9685.139	40.11	5.57	45.68	74.00	-28.32	Peak
5	14696.950	36.95	11.92	48.87	74.00	-25.13	Peak
6	18000.000	34.75	14.71	49.46	74.00	-24.54	Peak

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

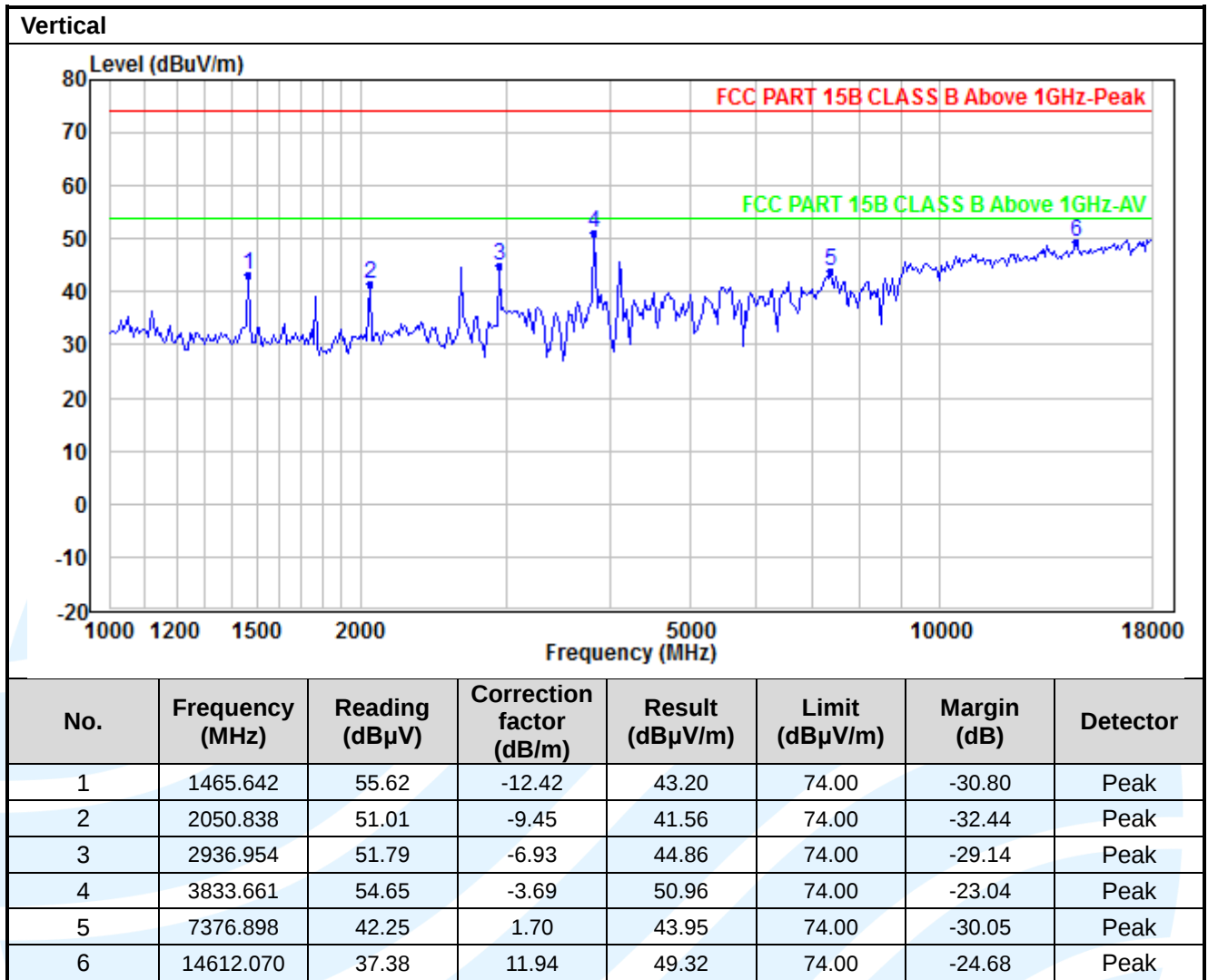
Tel: +86-755-28230888

Fax: +86-755-28230886

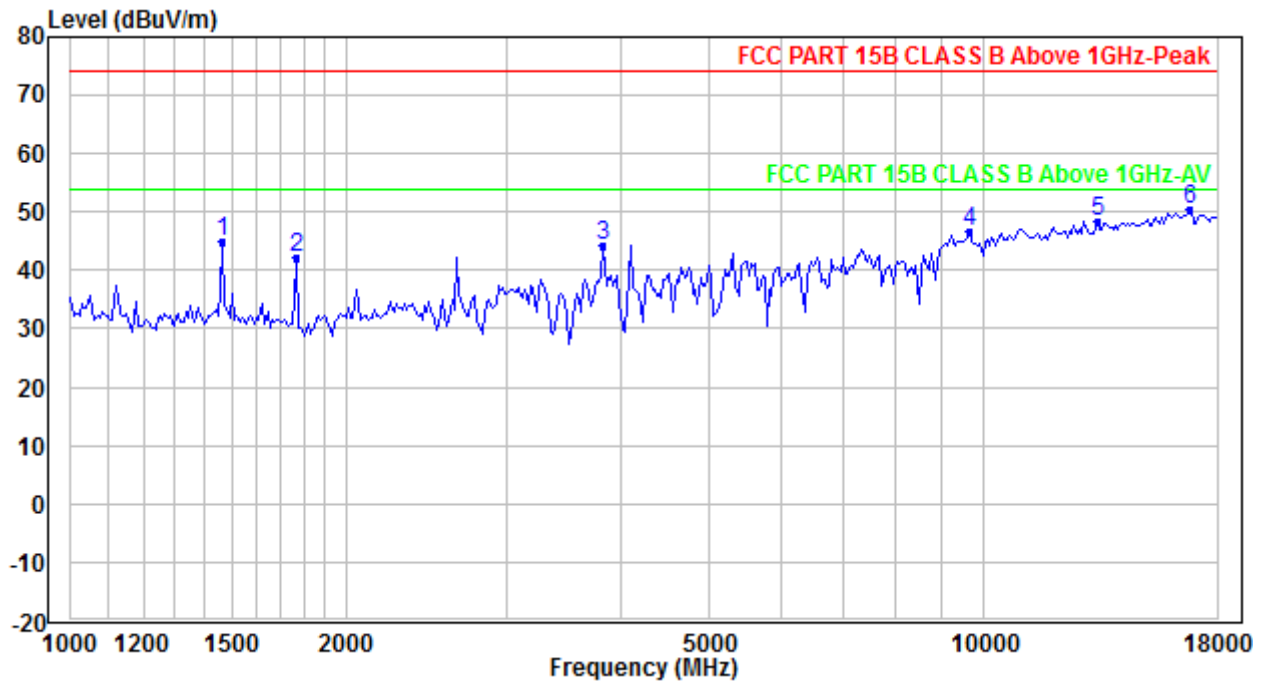
E-mail: info@uttlab.com

<http://www.uttlab.com>

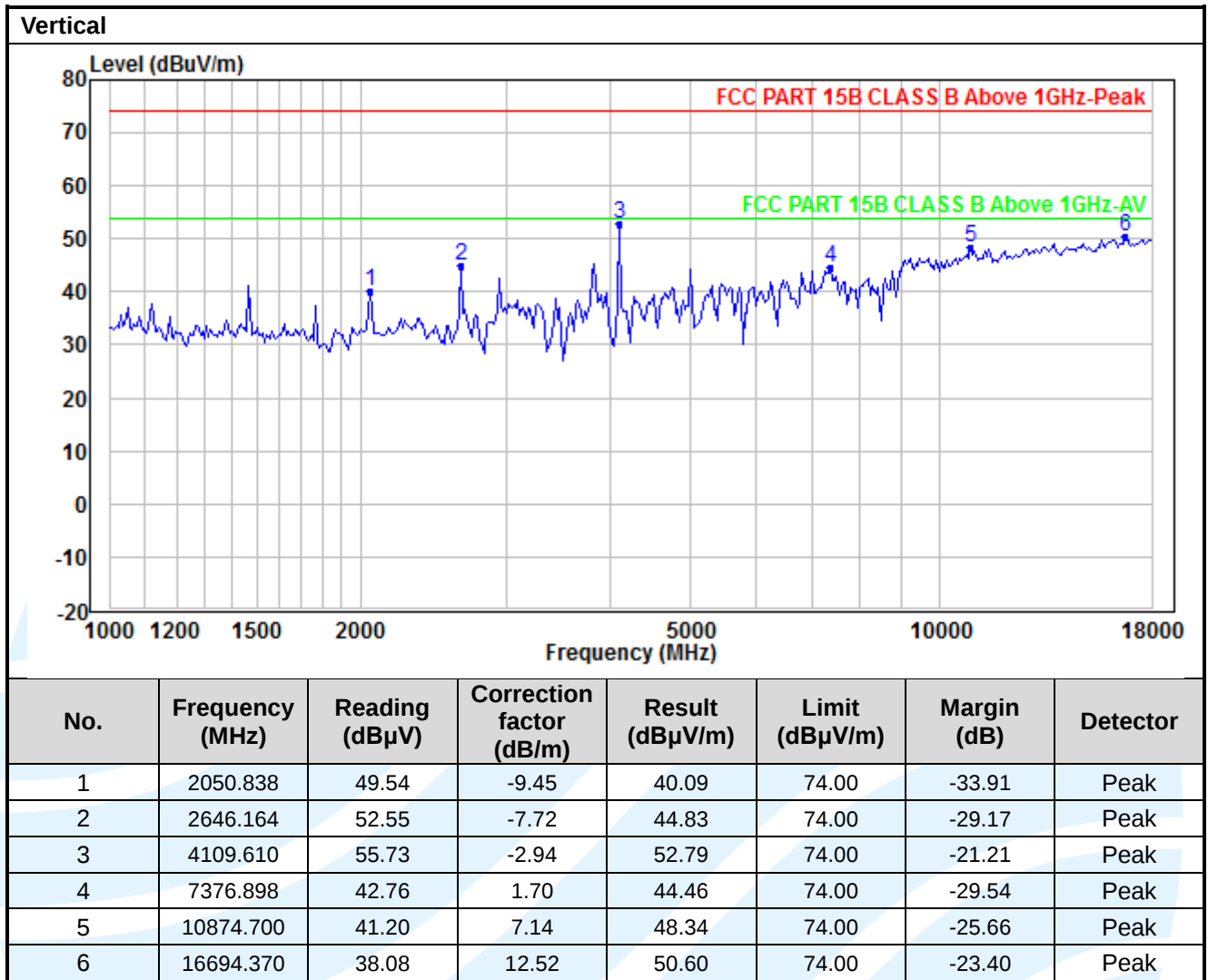
UTTR-EMC-ICES003-V1.2



Above 1GHz (Peak & Average)
Test Mode 3
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1465.642	57.25	-12.42	44.83	74.00	-29.17	Peak
2	1764.113	53.08	-10.79	42.29	74.00	-31.71	Peak
3	3833.661	47.92	-3.69	44.23	74.00	-29.77	Peak
4	9629.201	41.24	5.51	46.75	74.00	-27.25	Peak
5	13318.720	37.16	11.16	48.32	74.00	-25.68	Peak
6	16791.350	37.91	12.61	50.52	74.00	-23.48	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. 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.

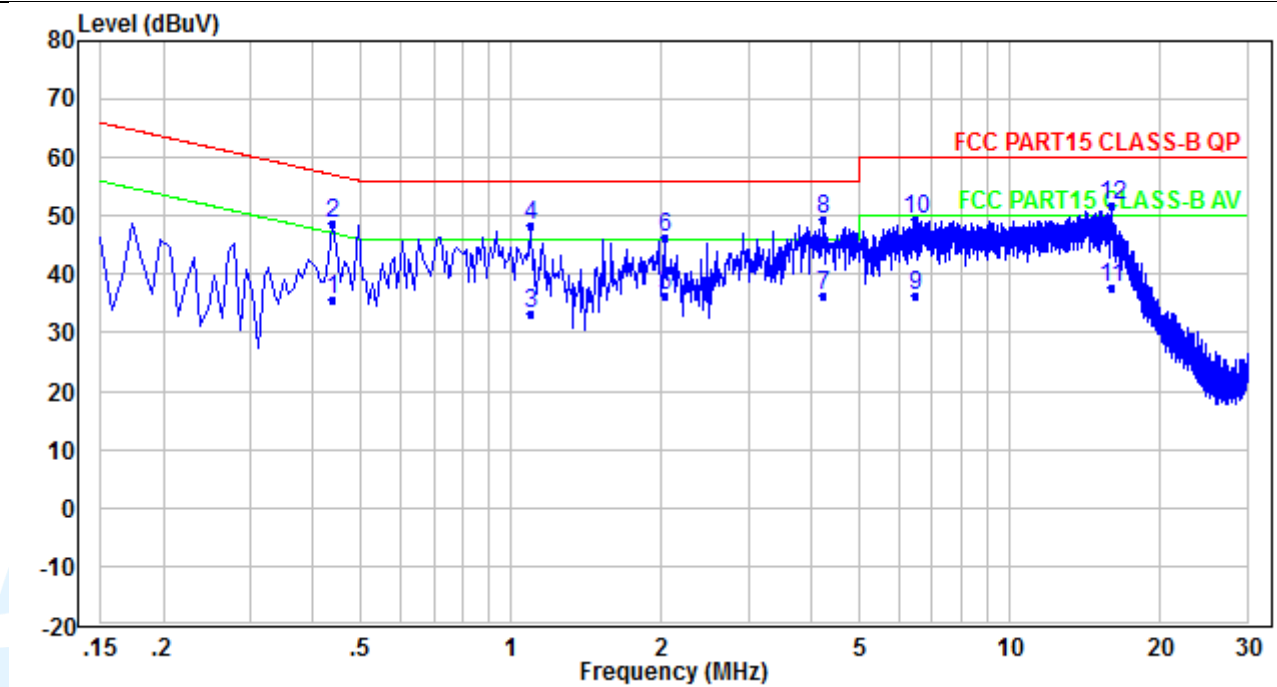
Test Result: Pass

The worst measurement data as follows:

Quasi Peak and Average:

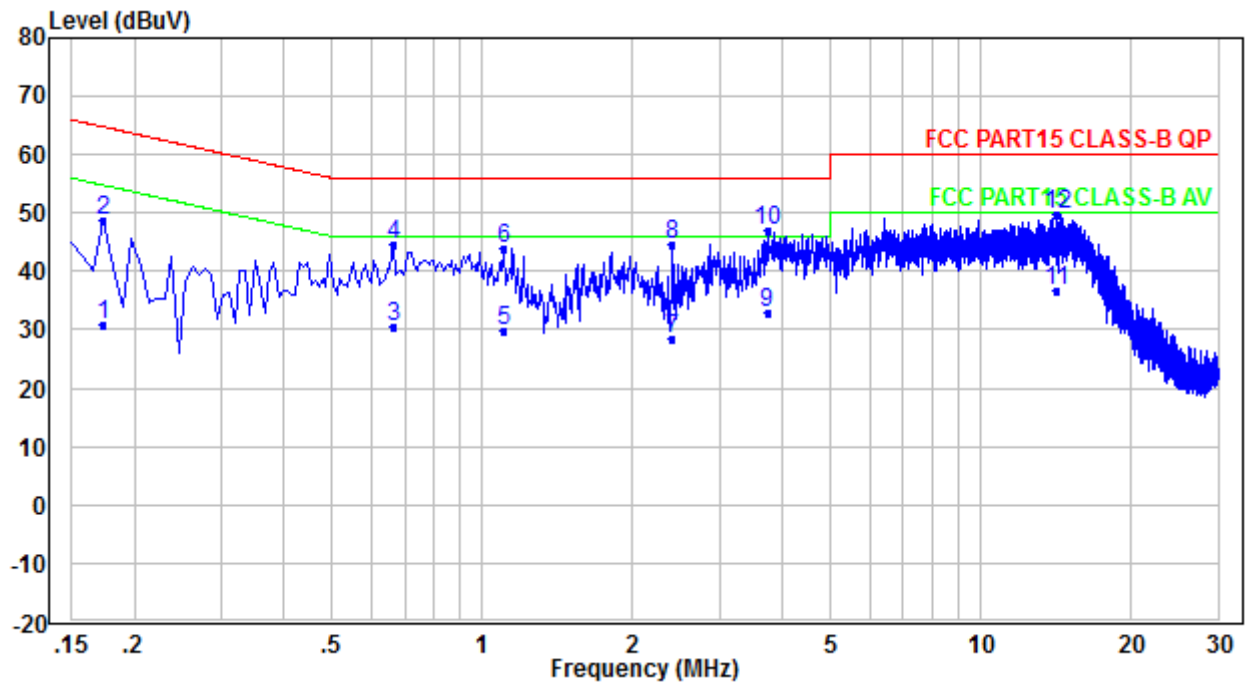
Test Mode 1

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.438	26.20	9.58	35.78	47.10	-11.32	Average
2	0.438	39.20	9.58	48.78	57.10	-8.32	QP
3	1.094	23.73	9.50	33.23	46.00	-12.77	Average
4	1.094	38.73	9.50	48.23	56.00	-7.77	QP
5	2.030	26.76	9.50	36.26	46.00	-9.74	Average
6	2.030	36.76	9.50	46.26	56.00	-9.74	QP
7	4.221	26.95	9.50	36.45	46.00	-9.55	Average
8	4.221	39.95	9.50	49.45	56.00	-6.55	QP
9	6.477	26.92	9.44	36.36	50.00	-13.64	Average
10	6.477	39.92	9.44	49.36	60.00	-10.64	QP
11	16.035	28.38	9.27	37.65	50.00	-12.35	Average
12	16.035	42.38	9.27	51.65	60.00	-8.35	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.174	21.09	9.64	30.73	54.77	-24.04	Average
2	0.174	39.09	9.64	48.73	64.77	-16.04	QP
3	0.662	20.94	9.58	30.52	46.00	-15.48	Average
4	0.662	34.94	9.58	44.52	56.00	-11.48	QP
5	1.102	20.36	9.57	29.93	46.00	-16.07	Average
6	1.102	34.36	9.57	43.93	56.00	-12.07	QP
7	2.414	19.03	9.52	28.55	46.00	-17.45	Average
8	2.414	35.03	9.52	44.55	56.00	-11.45	QP
9	3.733	23.40	9.49	32.89	46.00	-13.11	Average
10	3.733	37.40	9.49	46.89	56.00	-9.11	QP
11	14.243	27.34	9.34	36.68	50.00	-13.32	Average
12	14.243	40.34	9.34	49.68	60.00	-10.32	QP

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

Tel: +86-755-28230888

Fax: +86-755-28230886

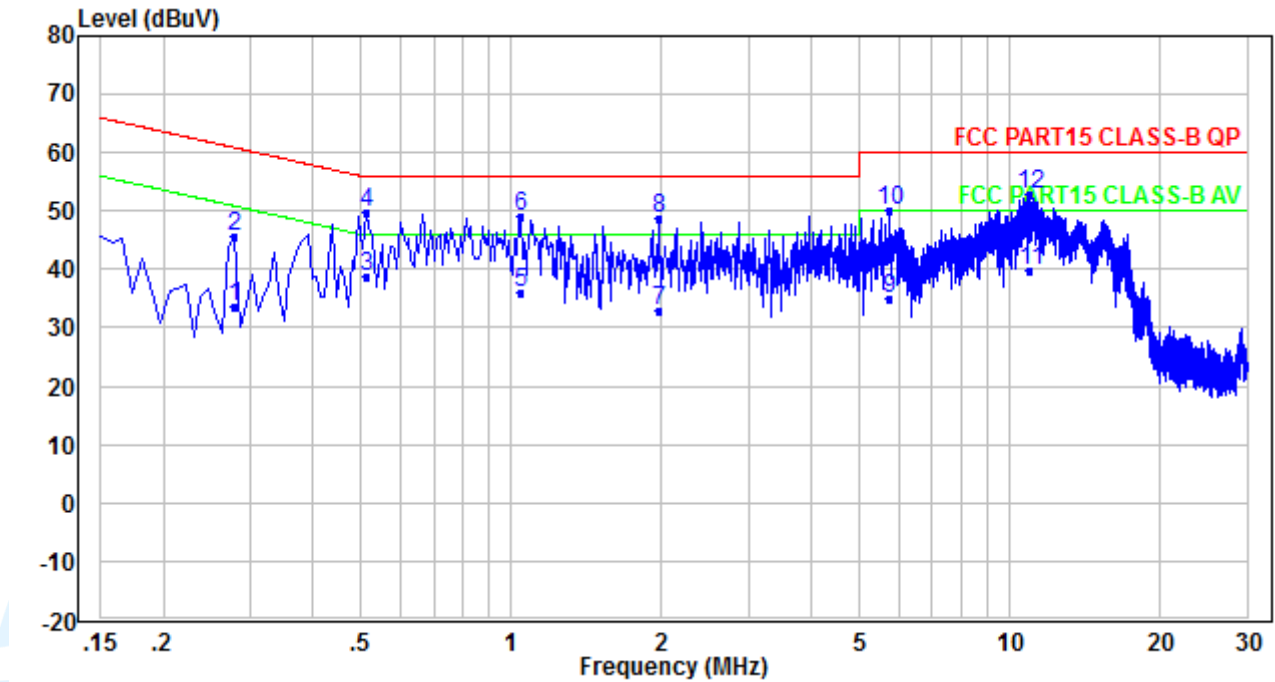
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

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	0.278	24.09	9.61	33.70	50.88	-17.18	Average
2	0.278	36.09	9.61	45.70	60.88	-15.18	QP
3	0.510	29.36	9.56	38.92	46.00	-7.08	Average
4	0.510	40.36	9.56	49.92	56.00	-6.08	QP
5	1.046	26.48	9.50	35.98	46.00	-10.02	Average
6	1.046	39.48	9.50	48.98	56.00	-7.02	QP
7	1.974	23.39	9.50	32.89	46.00	-13.11	Average
8	1.974	39.39	9.50	48.89	56.00	-7.11	QP
9	5.765	25.60	9.46	35.06	50.00	-14.94	Average
10	5.765	40.60	9.46	50.06	60.00	-9.94	QP
11	11.028	30.52	9.35	39.87	50.00	-10.13	Average
12	11.028	43.52	9.35	52.87	60.00	-7.13	QP

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

Tel: +86-755-28230888

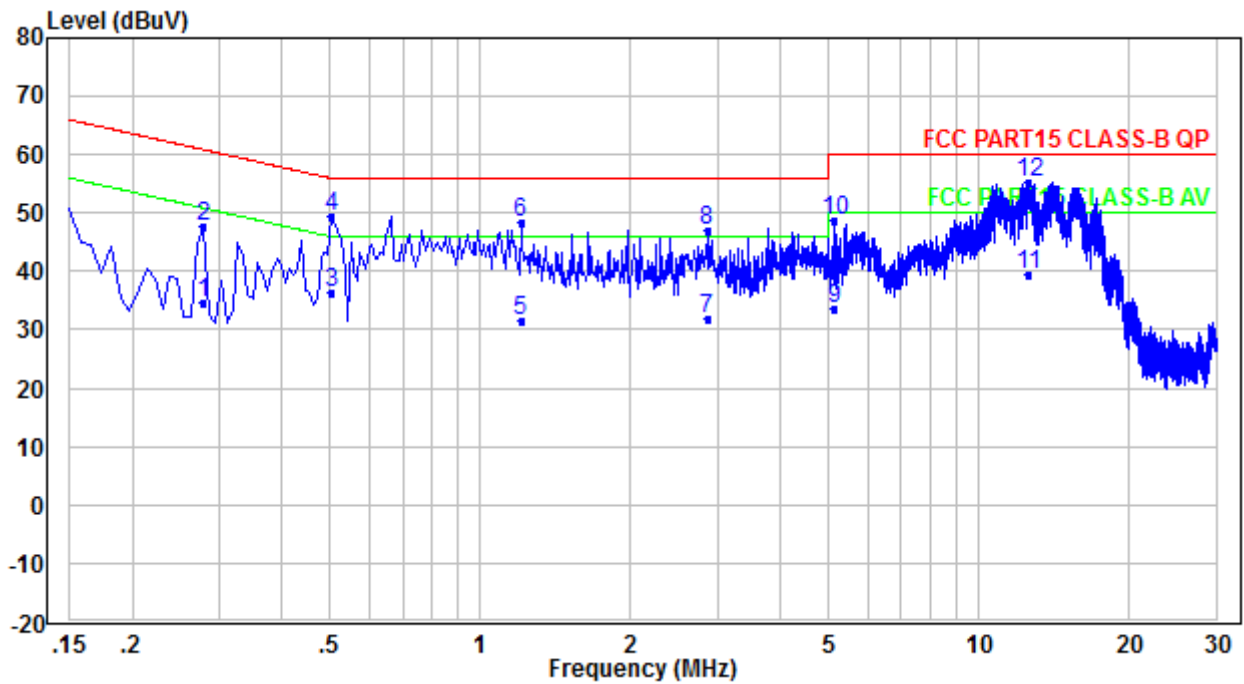
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.278	24.98	9.63	34.61	50.88	-16.27	Average
2	0.278	37.98	9.63	47.61	60.88	-13.27	QP
3	0.502	26.84	9.59	36.43	46.00	-9.57	Average
4	0.502	39.84	9.59	49.43	56.00	-6.57	QP
5	1.206	21.89	9.57	31.46	46.00	-14.54	Average
6	1.206	38.89	9.57	48.46	56.00	-7.54	QP
7	2.853	22.54	9.50	32.04	46.00	-13.96	Average
8	2.853	37.54	9.50	47.04	56.00	-8.96	QP
9	5.157	24.15	9.46	33.61	50.00	-16.39	Average
10	5.157	39.15	9.46	48.61	60.00	-11.39	QP
11	12.595	29.95	9.33	39.28	50.00	-10.72	Average
12	12.595	45.95	9.33	55.28	60.00	-4.72	QP

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

Tel: +86-755-28230888

Fax: +86-755-28230886

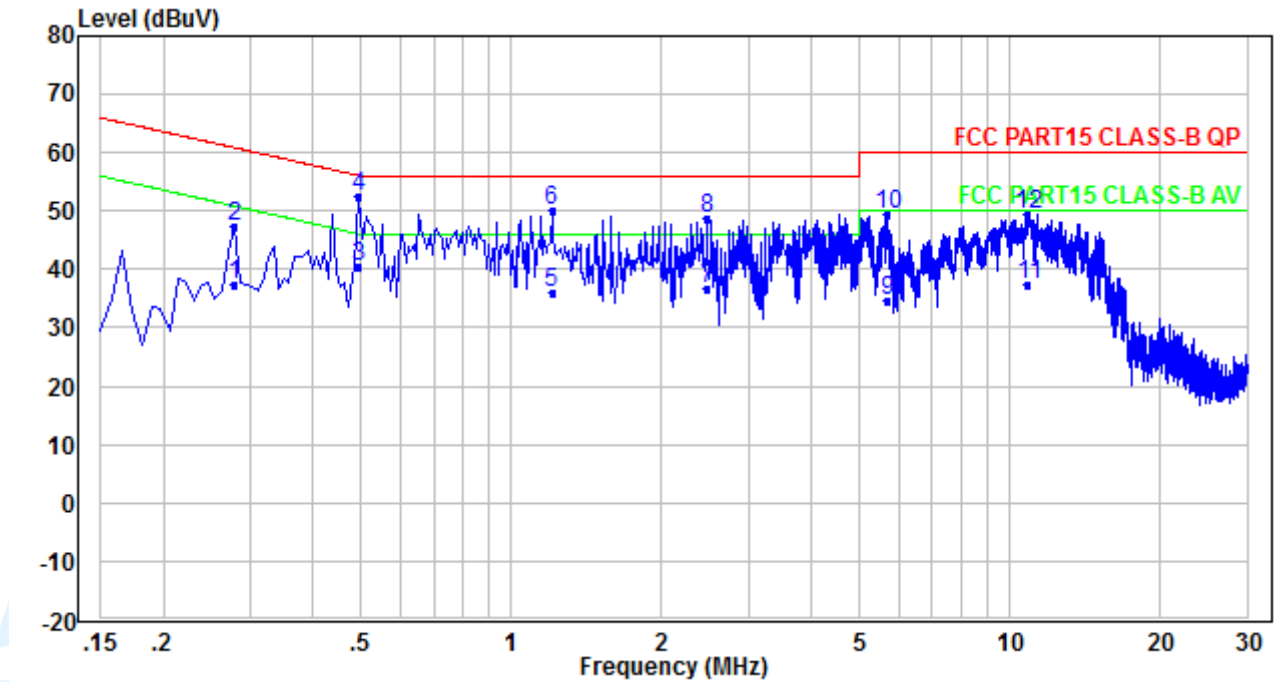
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Quasi Peak and Average: Test Mode 4

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.278	27.71	9.61	37.32	50.88	-13.56	Average
2	0.278	37.71	9.61	47.32	60.88	-13.56	QP
3	0.494	30.89	9.56	40.45	46.10	-5.65	Average
4	0.494	42.89	9.56	52.45	56.10	-3.65	QP
5	1.206	26.66	9.51	36.17	46.00	-9.83	Average
6	1.206	40.66	9.51	50.17	56.00	-5.83	QP
7	2.470	27.27	9.49	36.76	46.00	-9.24	Average
8	2.470	39.27	9.49	48.76	56.00	-7.24	QP
9	5.709	25.02	9.47	34.49	50.00	-15.51	Average
10	5.709	40.02	9.47	49.49	60.00	-10.51	QP
11	10.908	28.00	9.34	37.34	50.00	-12.66	Average
12	10.908	40.00	9.34	49.34	60.00	-10.66	QP

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

Tel: +86-755-28230888

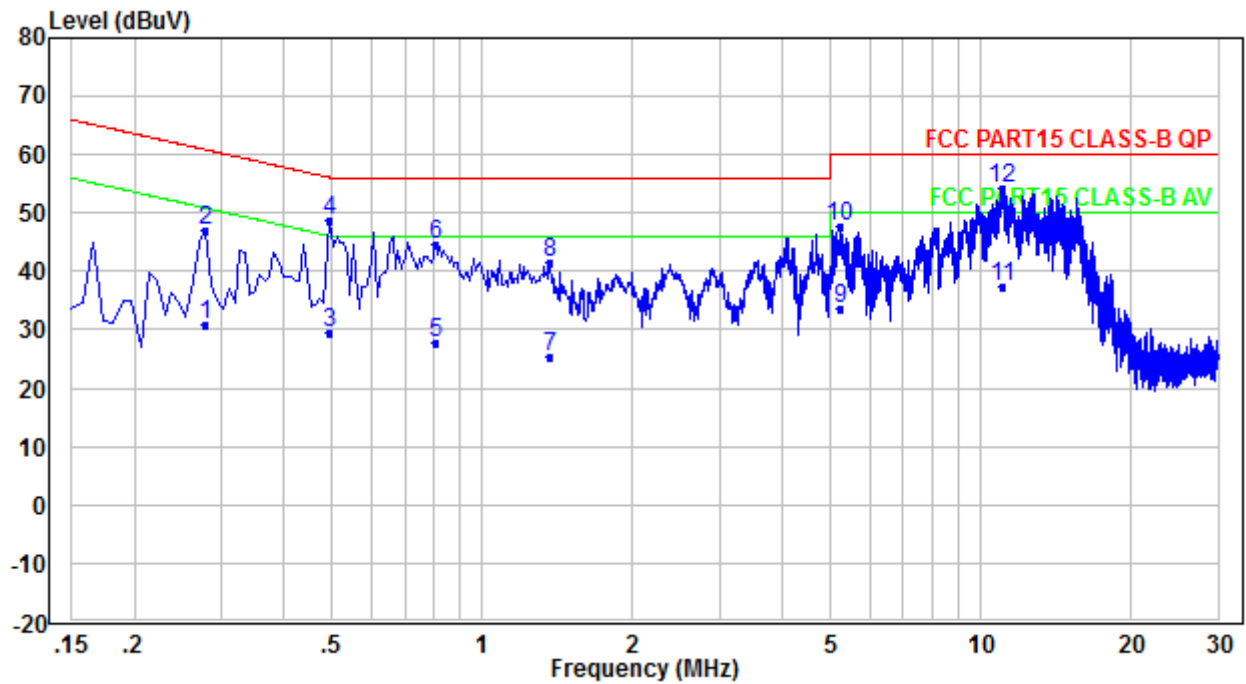
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.278	21.30	9.63	30.93	50.88	-19.95	Average
2	0.278	37.30	9.63	46.93	60.88	-13.95	QP
3	0.494	20.05	9.59	29.64	46.10	-16.46	Average
4	0.494	39.05	9.59	48.64	56.10	-7.46	QP
5	0.806	18.16	9.58	27.74	46.00	-18.26	Average
6	0.806	35.16	9.58	44.74	56.00	-11.26	QP
7	1.366	15.94	9.56	25.50	46.00	-20.50	Average
8	1.366	31.94	9.56	41.50	56.00	-14.50	QP
9	5.213	24.17	9.46	33.63	50.00	-16.37	Average
10	5.213	38.17	9.46	47.63	60.00	-12.37	QP
11	11.036	28.05	9.34	37.39	50.00	-12.61	Average
12	11.036	45.05	9.34	54.39	60.00	-5.61	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.

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

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

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 ***

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.
