



Certificate #4312.01

TEST REPORT

Product Name: Cordless Wi-Fi IP Phone
Trade Mark: GRANDSTREAM
Model No. / HVIN: WP825
Report Number: 210913008EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 7
FCC ID: YZZWP825
Test Result: PASS
Date of Issue: November 12, 2021

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:



Henry Lu
Team Leader

Reviewed by:



Kevin Liang
Assistant Manager

Approved by:



Billy Li
Technical Director

Date:

November 12, 2021

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	November 12, 2021	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	5
1.7 ABNORMALITIES FROM STANDARD CONDITIONS	5
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	12
6.1 RADIATED EMISSION	12
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:	Cordless Wi-Fi IP Phone
Model No. / HVIN:	WP825
Trade Mark:	GRANDSTREAM
DUT Stage:	Identical Prototype
Rated Voltage:	☒ 100-240V~50/60Hz and/or 3.7Vdc (1x3.7V Lithium-ion battery)
Classification of digital devices:	Class B
Highest Internal Frequency:	5825 MHz
Sample Received Date:	September 14, 2021
Sample Tested Date:	September 30, 2021 to October 6, 2021

1.2.2 Description of Accessories

Adapter(1)	
Model No.:	DSA-6PFG-05 FUS 050100
Input:	100-240 V~50/60 Hz 0.2 A
Output:	5.0 V $\equiv$ 1.0 A 5.0W
DC Cable:	1.5 Meter, Unshielded without ferrite

Adapter(2)	
Model No.:	GQ06-050100-ZU
Input:	100-240 V~50/60 Hz 0.3 A Max
Output:	5.0 V $\equiv$ 1.0 A
DC Cable:	1.5 Meter, Unshielded without ferrite

Adapter(3)	
Model No.:	NBS05B050100VU
Input:	100-240 V~50/60 Hz 0.2 A
Output:	5.0 V $\equiv$ 1.0 A
DC Cable:	1.5 Meter, Unshielded without ferrite

Battery	
Model No.:	GS-02
Battery Type:	Lithium-ion
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	2000 mAh

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

Others
Charging base+ Back Scaffold

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
Wireless Home Router	SAGEMCOM	FAST5280	N/A	UnionTrust
3.5mm Headset	SENICC	ST-371	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

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

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

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

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

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	Test Requirement	Test Method	Result
Conducted Emission	FCC 47 CFR Part 15.107 ICES-003 Issue 7 Section 3.2.1	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109 ICES-003 Issue 7 Section 3.2.2	ANSI C63.4-2014	PASS



3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3m SAC	ETS-LINDGREN	3m	N/A	Jan. 22, 2021	Jan. 21, 2024
☒	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14, 2020	Nov. 13, 2022
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 14, 2020	Nov. 13, 2022
☒	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 09, 2021
☒	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. 10, 2020	Nov. 9, 2021
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 14, 2020	Nov. 13, 2022
☒	Pre-amplifier	ETS-Lindgren	00118384	00202652	Nov. 17, 2020	Nov. 16, 2022
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 18, 2020	Nov.17, 2021
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 18, 2020	Nov.17, 2021
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 18, 2020	Nov.17, 2021
☒	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 18, 2020	Nov.17, 2021
☒	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	Powered by Battery or Powered by DC 5.0V/1.0A	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	22.6	53	101.2	Niko Su
Radiated Emission	24.5	46	100.02	Asia Yan

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Charging Station+ WLAN Link + Ringing Test Mode 2: AC120V/60Hz (Adaptor1) + Charging Station + WLAN Link + Voice Test Mode 3: AC120V/60Hz (Adaptor1) + Charging Station + WLAN Link + Voice + Headset Test Mode 4: AC120V/60Hz (Adaptor1) + Charging Handset + Worse from mode 1~3 Test Mode 5: AC240V/50Hz (Adaptor1) + Worse from mode 1~4 Test Mode 6: Worse from mode TM1~TM5(Adaptor2) Test Mode 7: Worse from mode TM1~TM5(Adaptor3) Test Mode 8: Battery + Worse from mode 1~3
Conducted Emission	Test Mode 1: AC120V/60Hz (Adaptor1) + Charging Station+ WLAN Link + Ringing Test Mode 2: AC120V/60Hz (Adaptor1) + Charging Station + WLAN Link + Voice Test Mode 3: AC120V/60Hz (Adaptor1) + Charging Station + WLAN Link + Voice + Headset Test Mode 4: AC120V/60Hz (Adaptor1) + Charging Handset + Worse from mode 1~3(Mode2) Test Mode 5: AC240V/50Hz (Adaptor1) + Worse from mode 1~4 Test Mode 6: Worse from mode TM1~TM5(Adaptor2) Test Mode 7: Worse from mode TM1~TM5(Adaptor3)
Remark: The above test modes in boldface were the worst cases.	

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

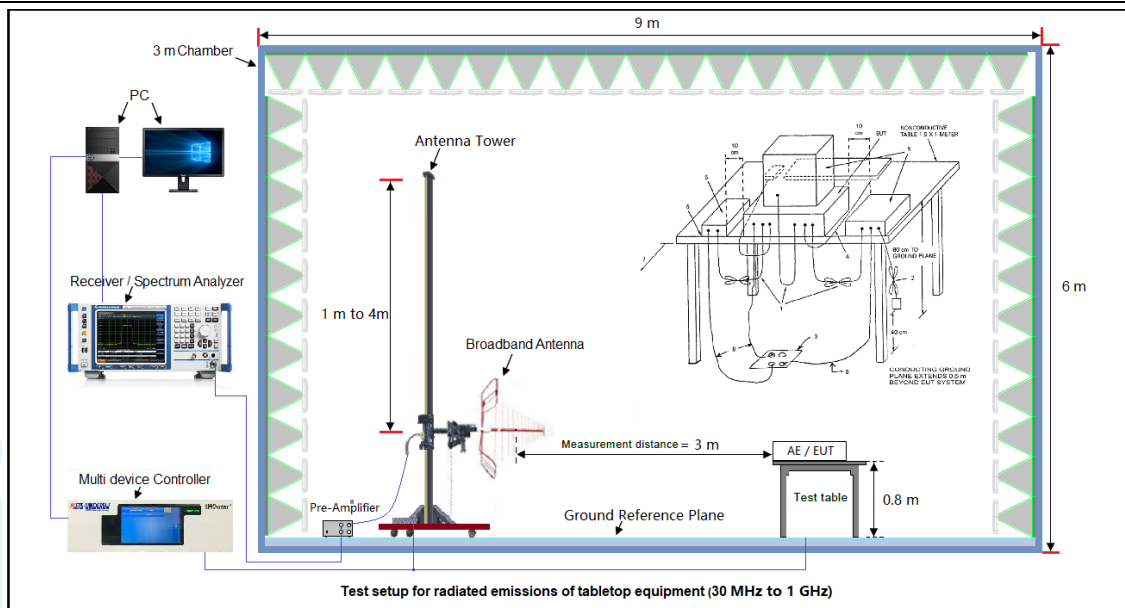
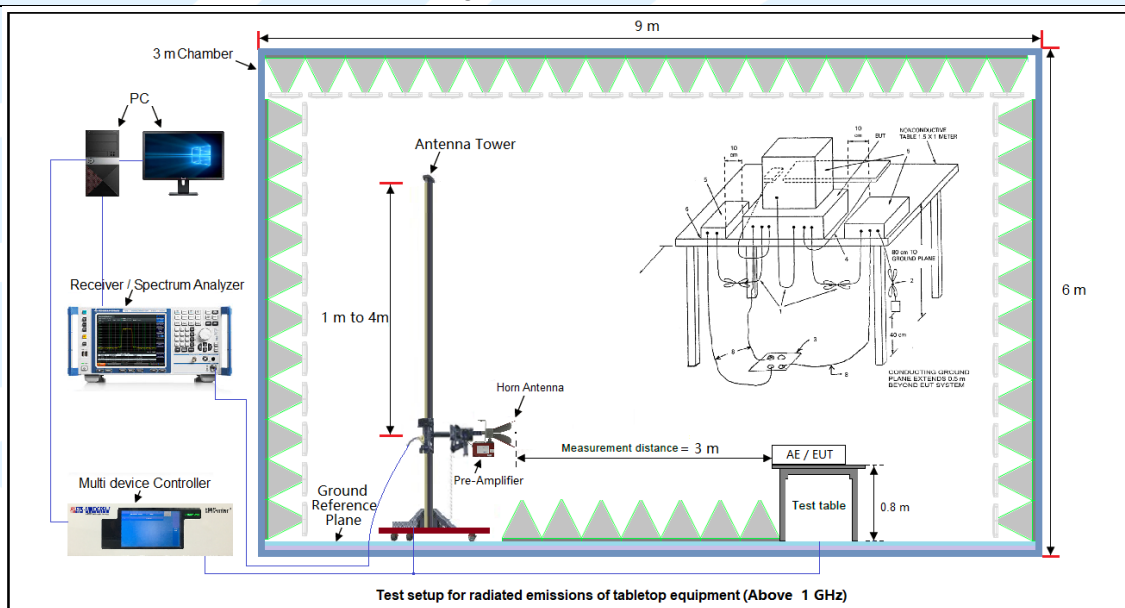
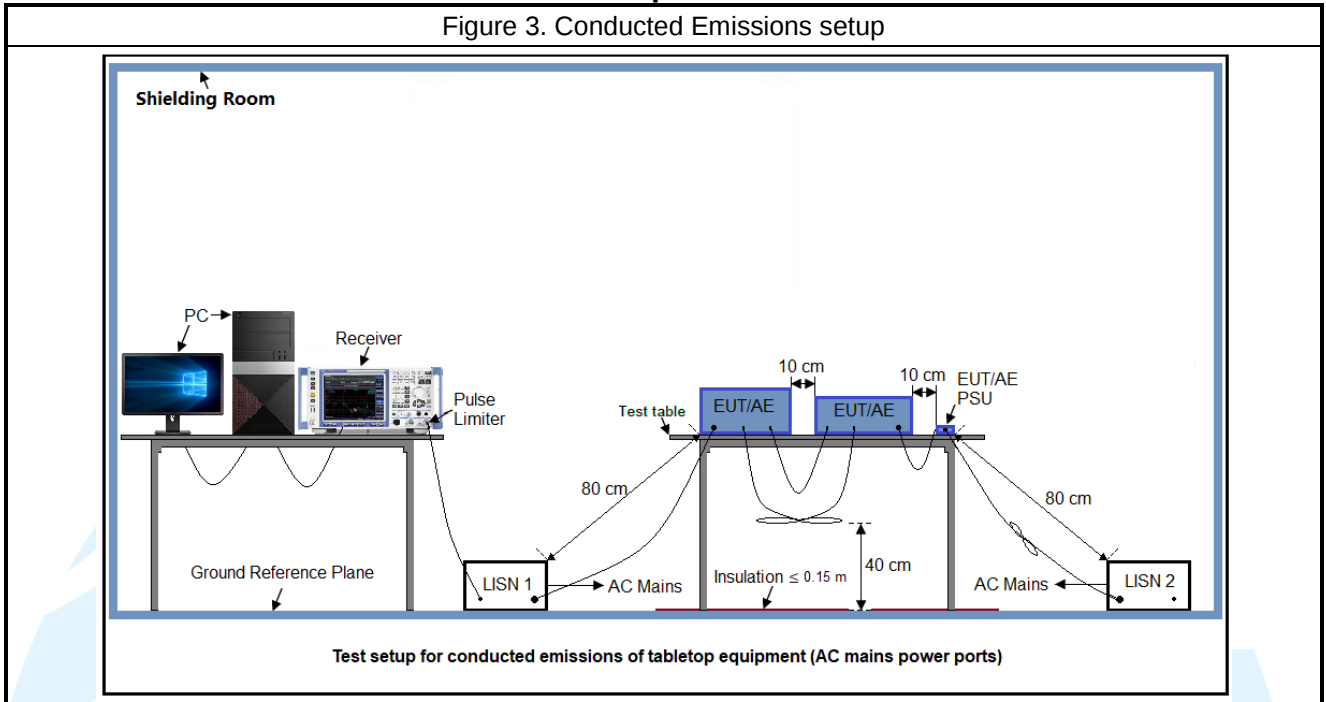


Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



4.4 SYSTEM TEST CONFIGURATION

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

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

5. REFERENCE DOCUMENTS FOR TESTING

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

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

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

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Limits:

Limits for Class B devices

FCC 47 CFR Part 15 Subpart B

Frequency (MHz)	limits at 3m (dB μ V/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 (dB μ V/m)		
	QP Detector	PK Detector	AV Detector
30 – 88	40.0	--	--
88 – 216	43.5	--	--
216 – 230	46.0		

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

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

Remark:

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

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:
 - 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
 - 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
 - 3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
2. Above 1GHz test procedure as below:
 - 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
 - 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
 - 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

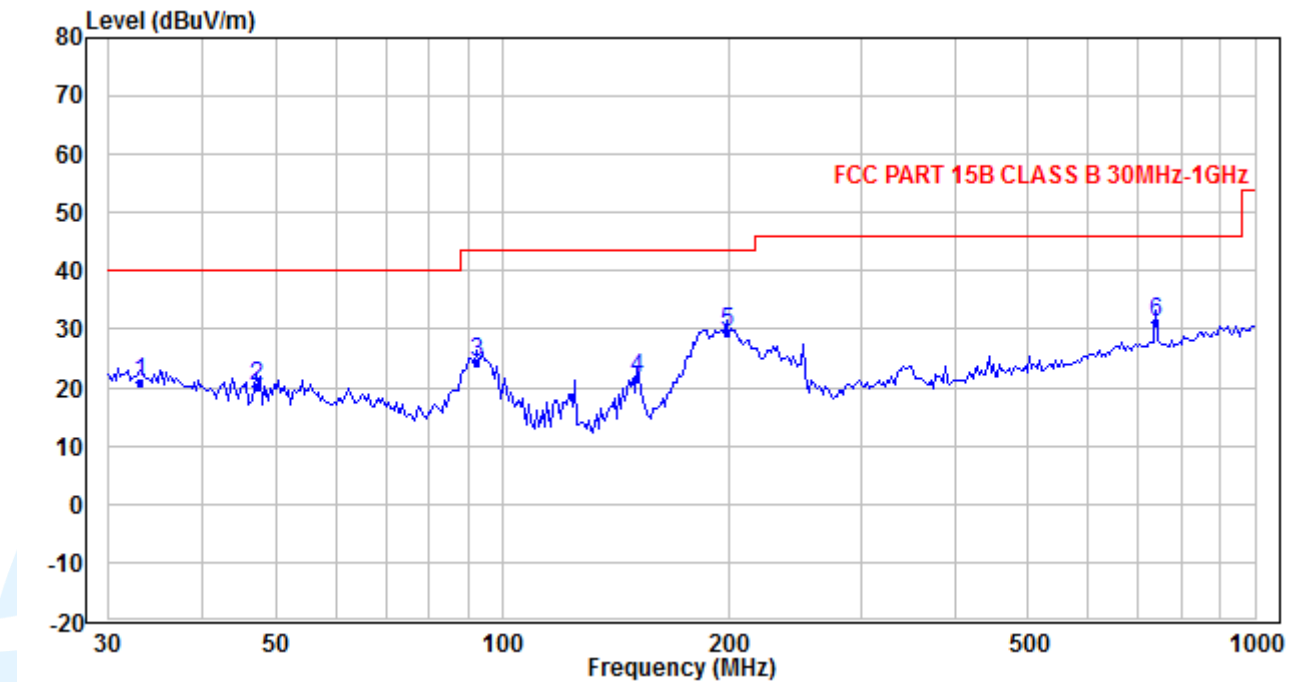
The measurement data as follows:

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

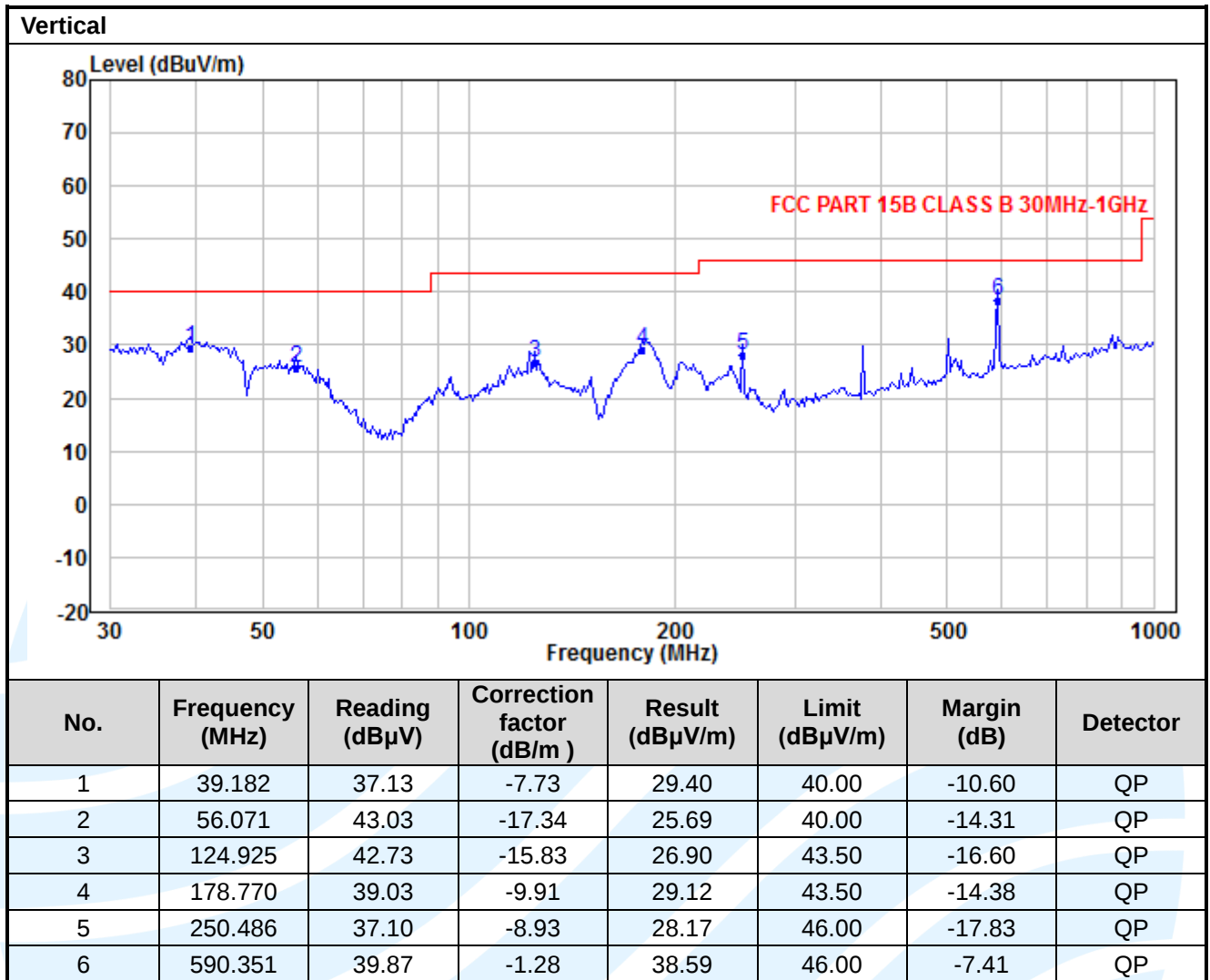
Below 1GHz(Quasi Peak):

Test Mode1

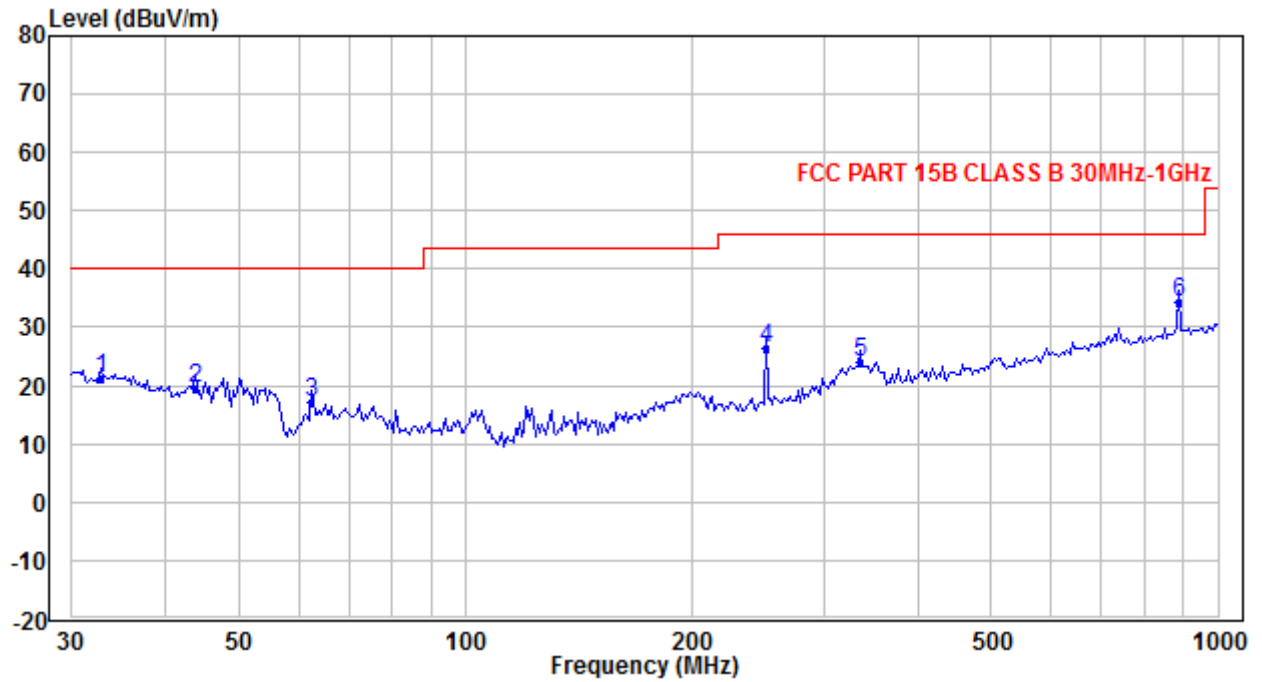
Horizontal



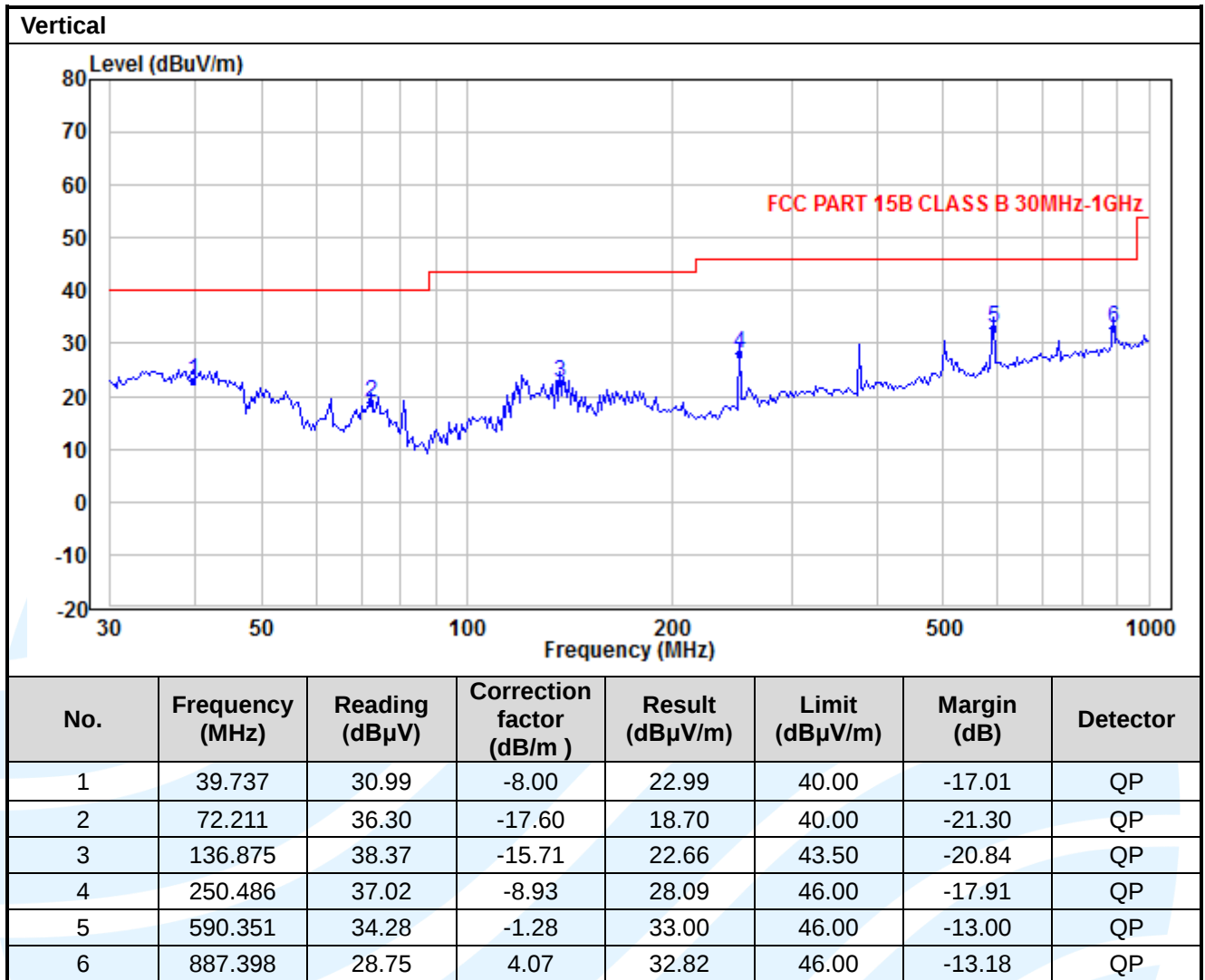
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	33.101	25.54	-4.72	20.82	40.00	-19.18	QP
2	47.037	32.59	-12.41	20.18	40.00	-19.82	QP
3	92.346	40.75	-16.30	24.45	43.50	-19.05	QP
4	151.025	36.68	-15.11	21.57	43.50	-21.93	QP
5	198.642	40.18	-10.58	29.60	43.50	-13.90	QP
6	739.214	29.25	1.93	31.18	46.00	-14.82	QP



Below 1GHz(Quasi Peak):
Test Mode6
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	32.870	25.85	-4.75	21.10	40.00	-18.90	QP
2	43.845	30.01	-10.52	19.49	40.00	-20.51	QP
3	62.304	34.45	-17.37	17.08	40.00	-22.92	QP
4	250.486	35.49	-8.93	26.56	46.00	-19.44	QP
5	334.126	29.86	-5.72	24.14	46.00	-21.86	QP
6	887.398	30.27	4.07	34.34	46.00	-11.66	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

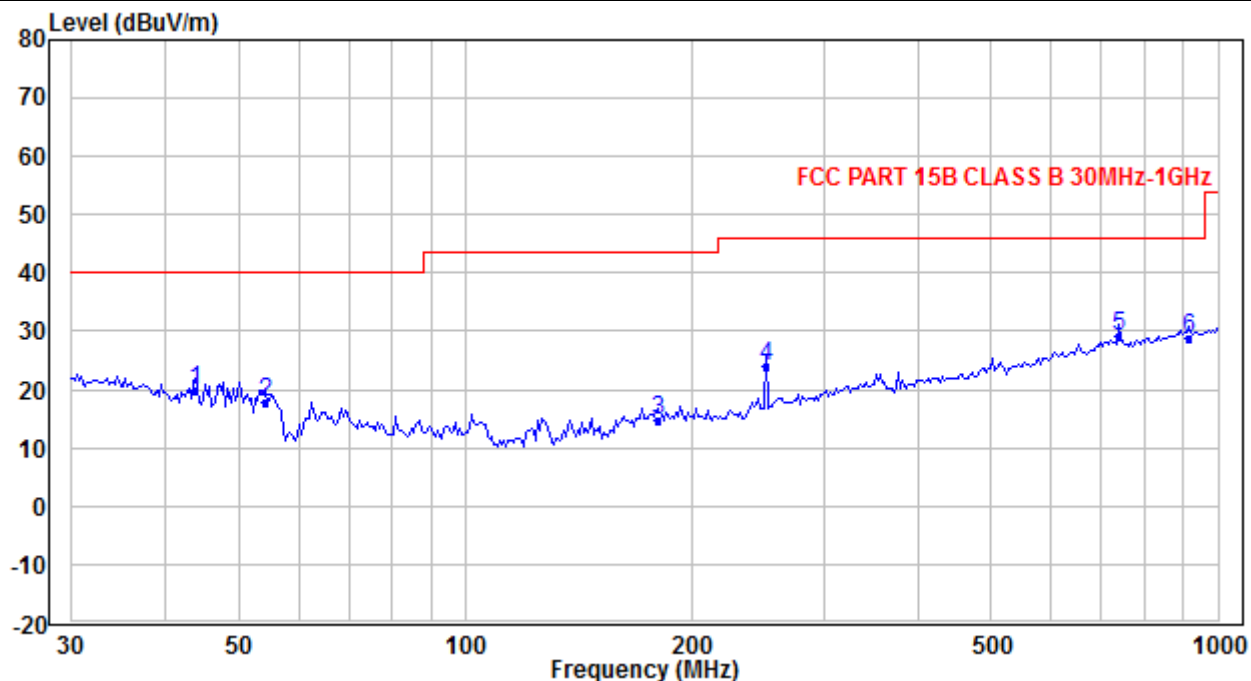
Fax: +86-755-28230886

E-mail: info@uttlab.com

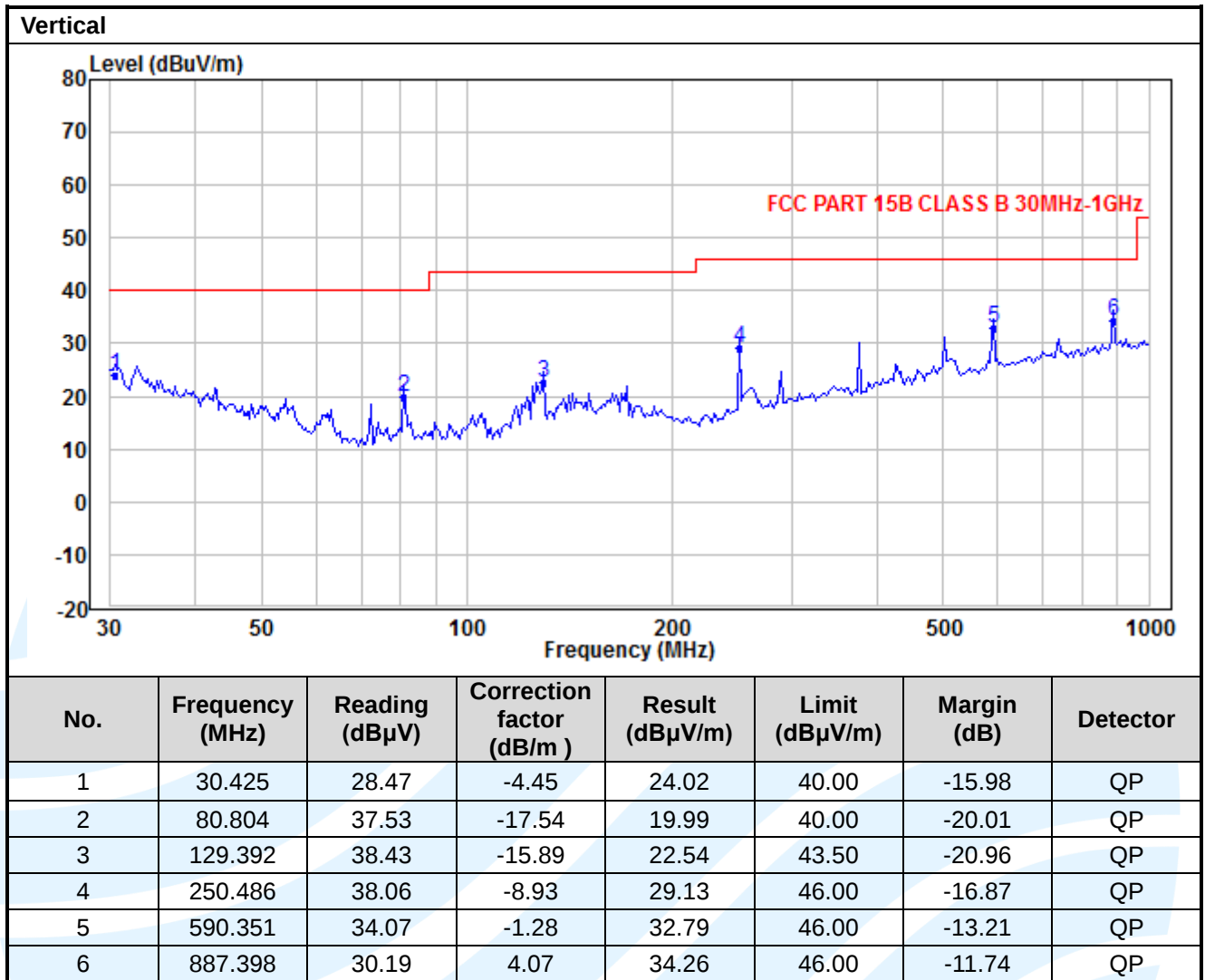
<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Below 1GHz(Quasi Peak):
Test Mode7
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.845	30.33	-10.52	19.81	40.00	-20.19	QP
2	54.135	34.82	-16.89	17.93	40.00	-22.07	QP
3	180.030	25.03	-10.16	14.87	43.50	-28.63	QP
4	250.486	32.92	-8.93	23.99	46.00	-22.01	QP
5	739.214	27.22	1.93	29.15	46.00	-16.85	QP
6	912.695	24.51	4.37	28.88	46.00	-17.12	QP

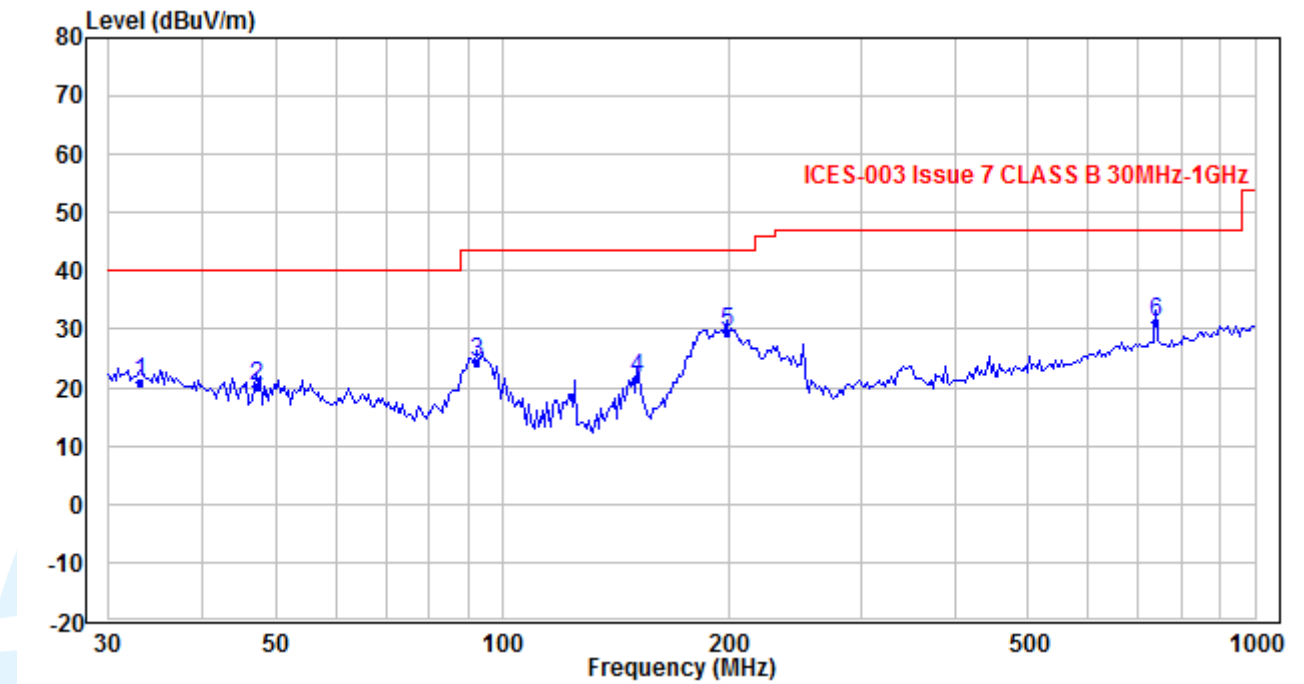


The measurement data for ICES-003 Issue 7 as follows:

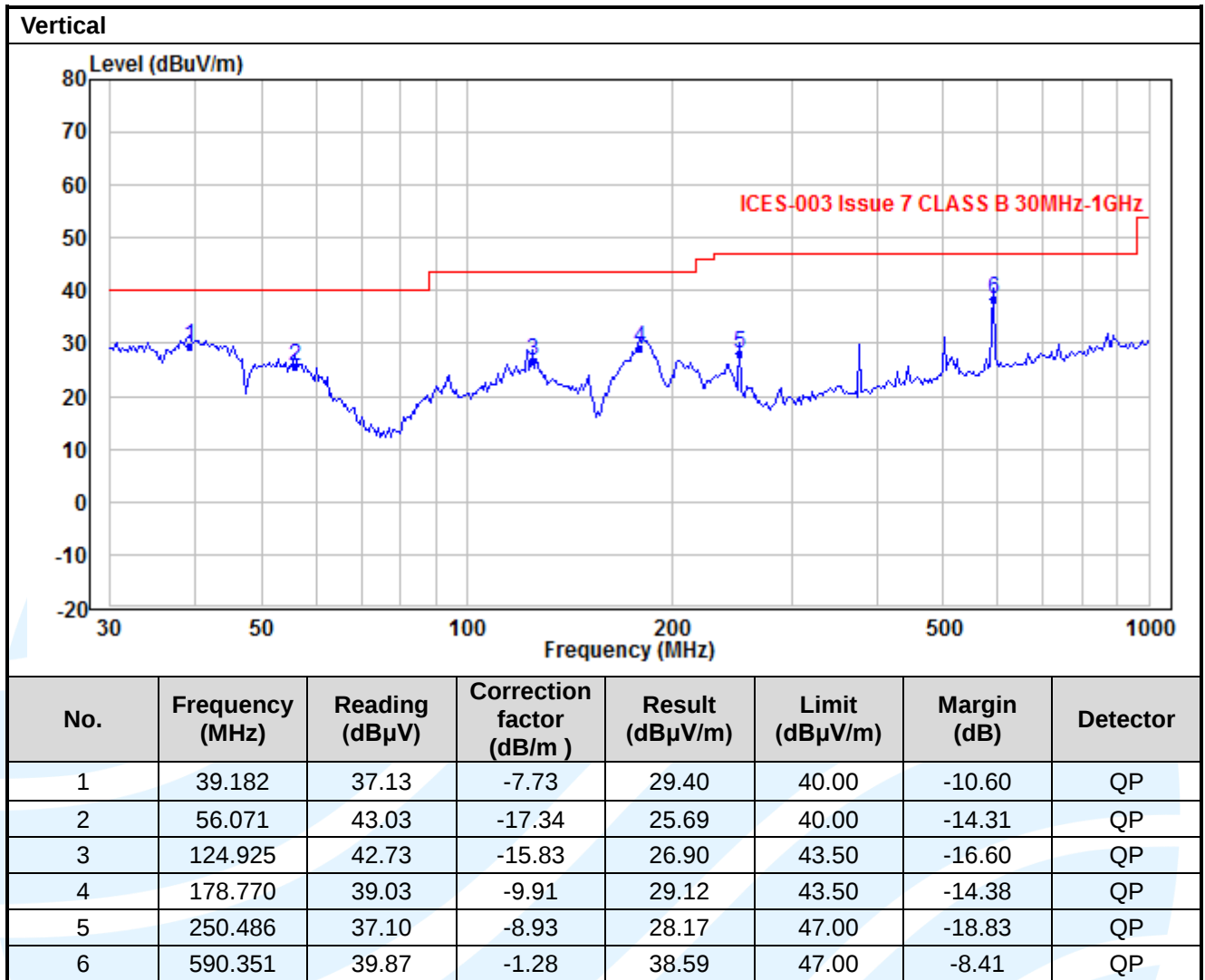
Below 1GHz(Quasi Peak):

Test Mode1

Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	33.101	25.54	-4.72	20.82	40.00	-19.18	QP
2	47.037	32.59	-12.41	20.18	40.00	-19.82	QP
3	92.346	40.75	-16.30	24.45	43.50	-19.05	QP
4	151.025	36.68	-15.11	21.57	43.50	-21.93	QP
5	198.642	40.18	-10.58	29.60	43.50	-13.90	QP
6	739.214	29.25	1.93	31.18	47.00	-15.82	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

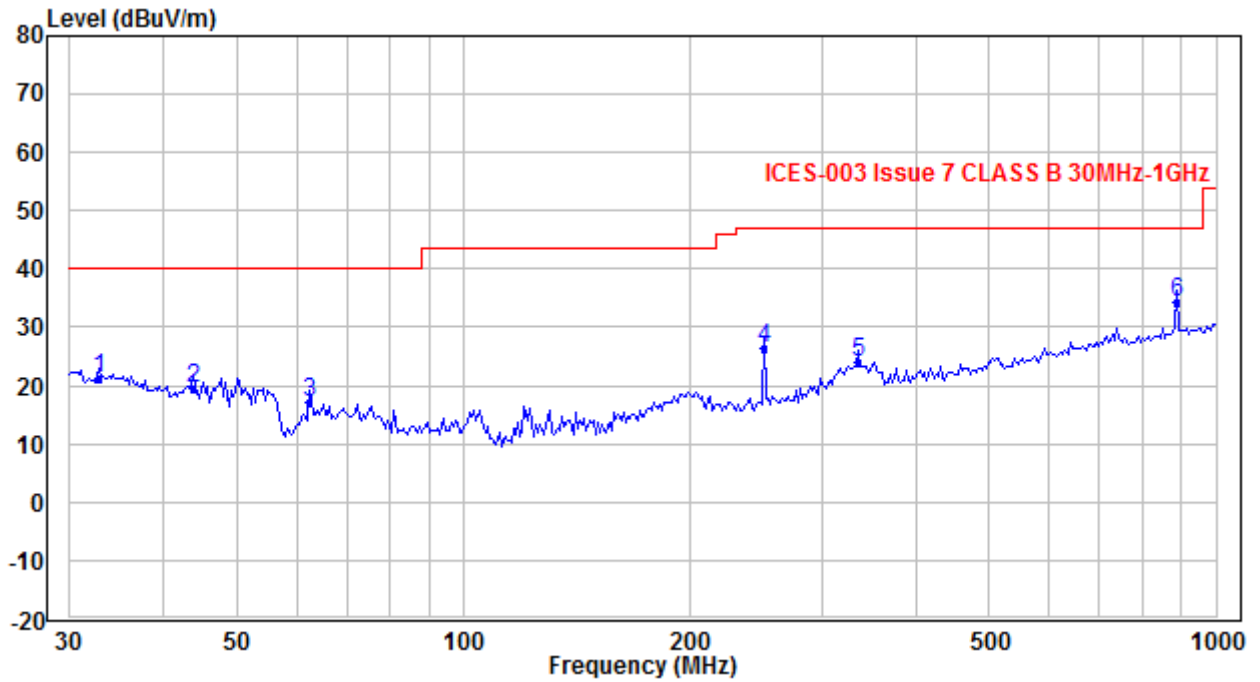
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Below 1GHz(Quasi Peak):
Test Mode6
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	32.870	25.85	-4.75	21.10	40.00	-18.90	QP
2	43.845	30.01	-10.52	19.49	40.00	-20.51	QP
3	62.304	34.45	-17.37	17.08	40.00	-22.92	QP
4	250.486	35.49	-8.93	26.56	47.00	-20.44	QP
5	334.126	29.86	-5.72	24.14	47.00	-22.86	QP
6	887.398	30.27	4.07	34.34	47.00	-12.66	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

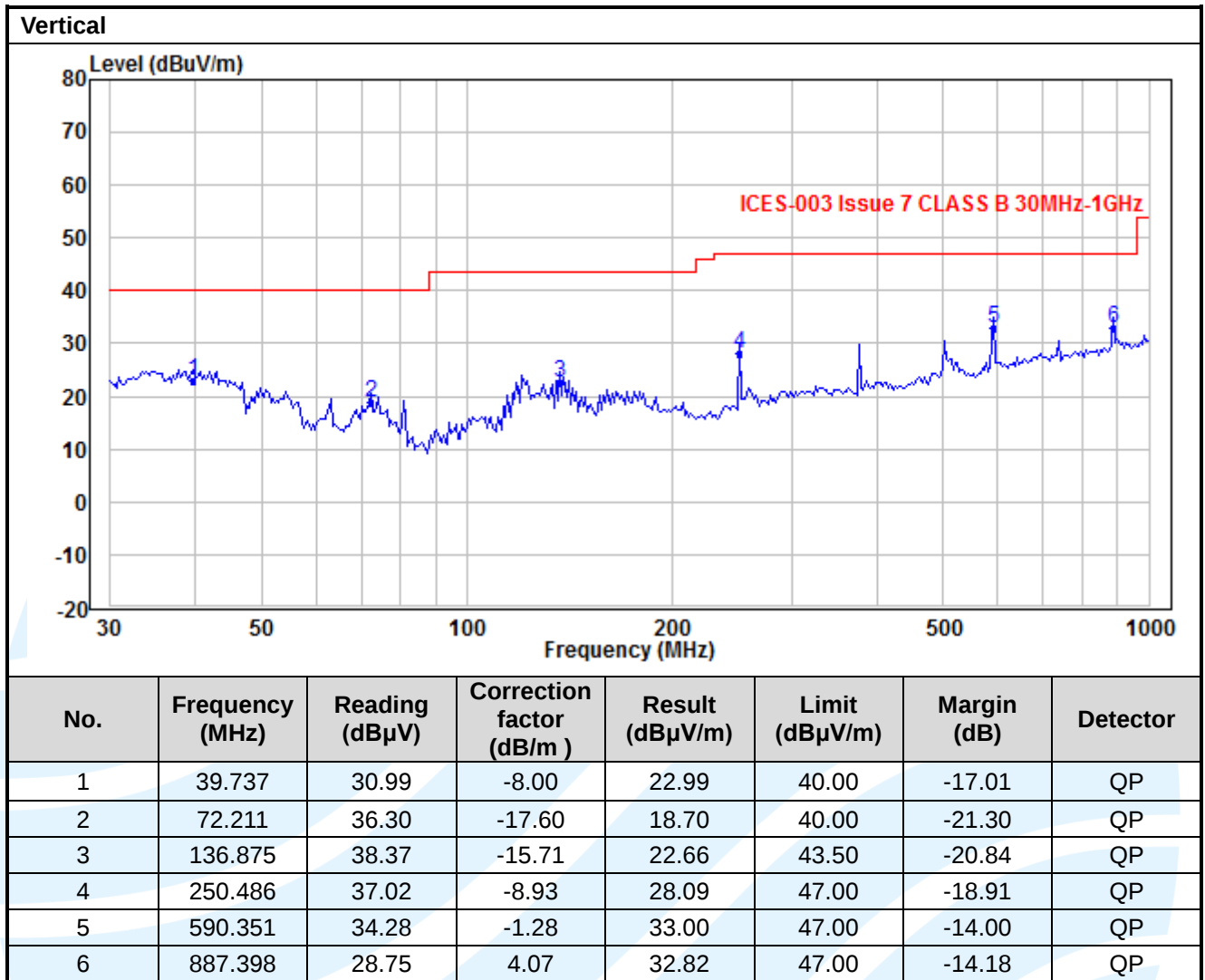
Tel: +86-755-28230888

Fax: +86-755-28230886

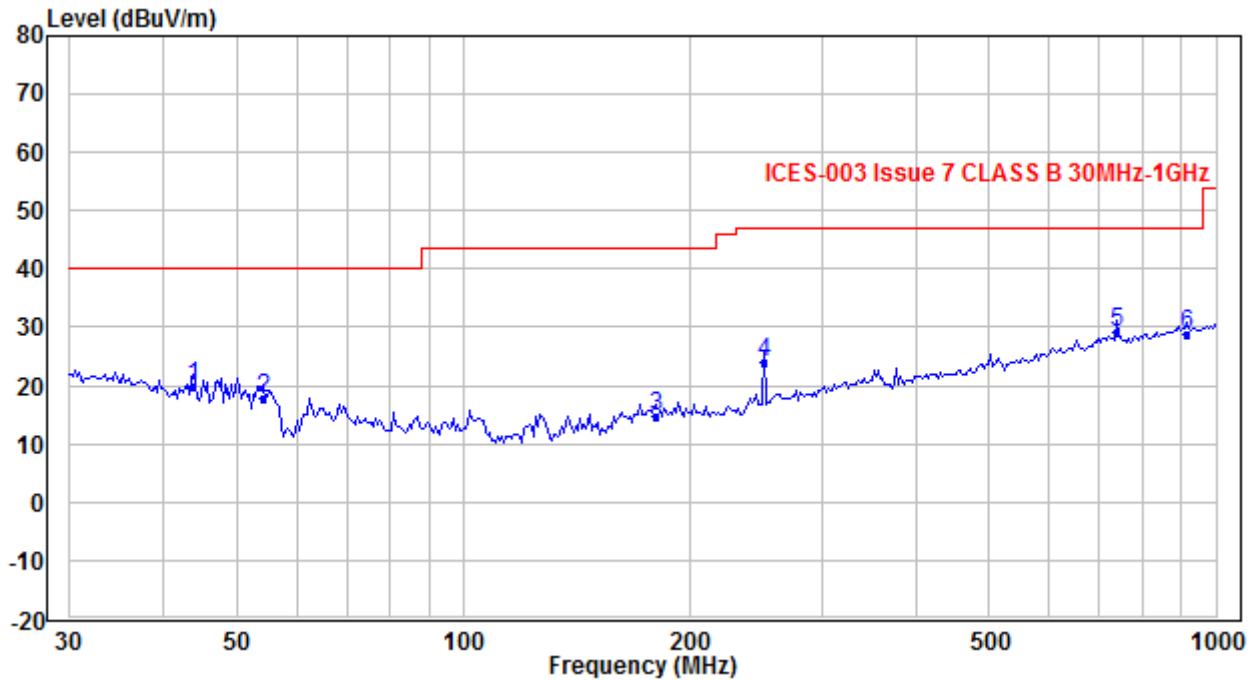
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



Below 1GHz(Quasi Peak):
Test Mode7
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.845	30.33	-10.52	19.81	40.00	-20.19	QP
2	54.135	34.82	-16.89	17.93	40.00	-22.07	QP
3	180.030	25.03	-10.16	14.87	43.50	-28.63	QP
4	250.486	32.92	-8.93	23.99	47.00	-23.01	QP
5	739.214	27.22	1.93	29.15	47.00	-17.85	QP
6	912.695	24.51	4.37	28.88	47.00	-18.12	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

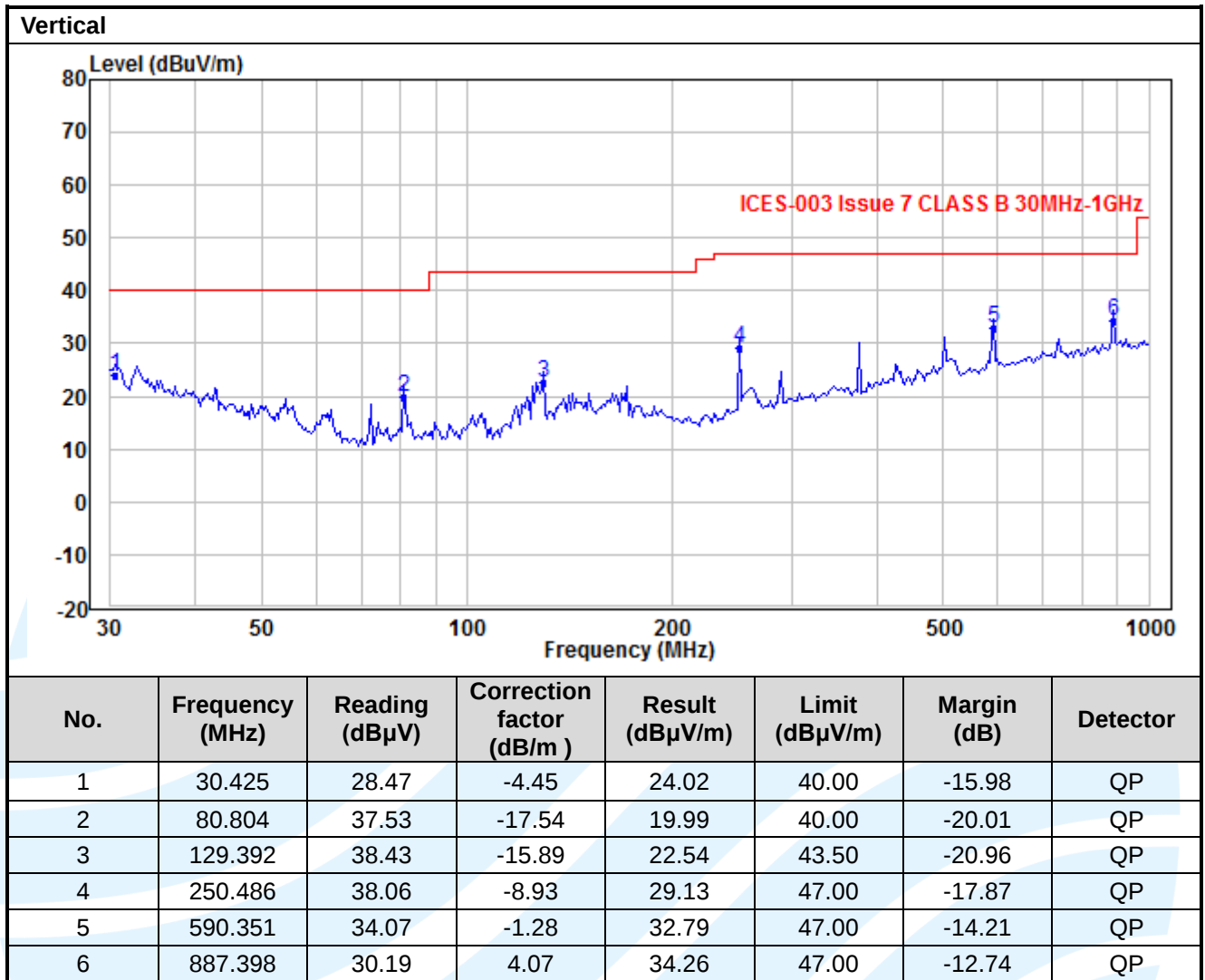
Tel: +86-755-28230888

Fax: +86-755-28230886

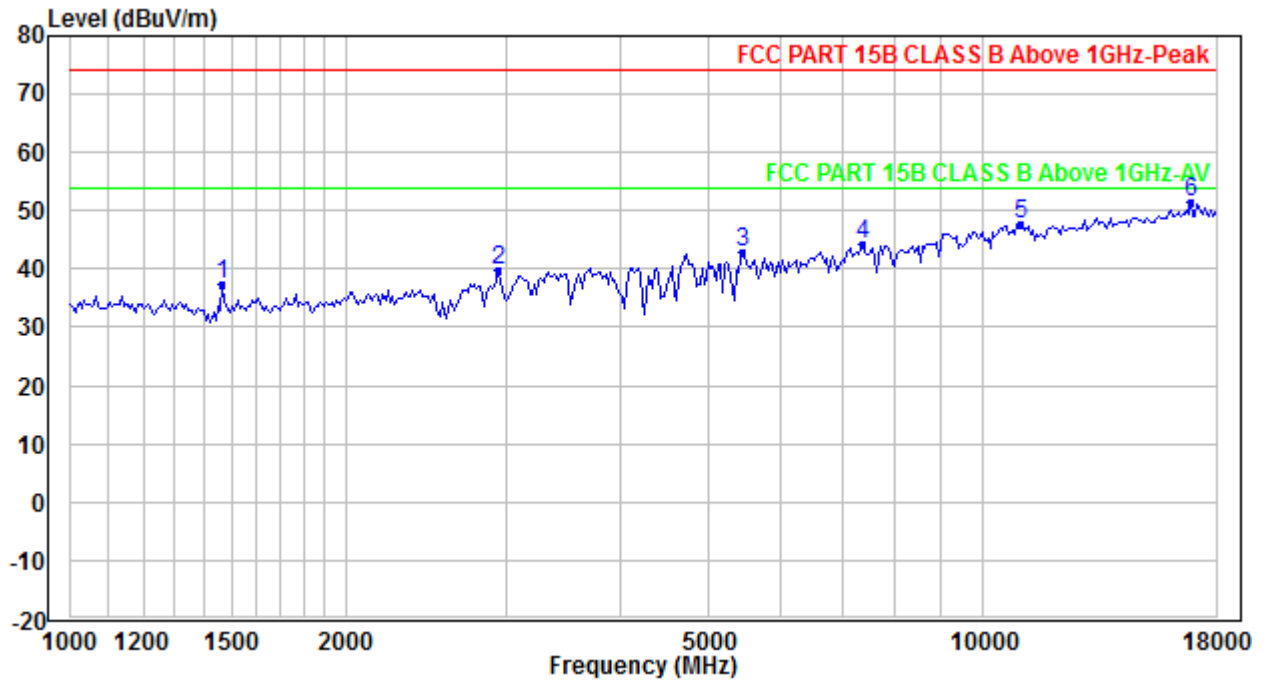
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



Above 1GHz(Peak & Average)
Test Mode1
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1465.642	49.75	-12.42	37.33	74.00	-36.67	Peak
2	2936.954	46.58	-6.93	39.65	74.00	-34.35	Peak
3	5458.380	43.01	-0.08	42.93	74.00	-31.07	Peak
4	7376.898	42.40	1.70	44.10	74.00	-29.90	Peak
5	11001.420	40.18	7.42	47.60	74.00	-26.40	Peak
6	16888.890	38.70	12.68	51.38	74.00	-22.62	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

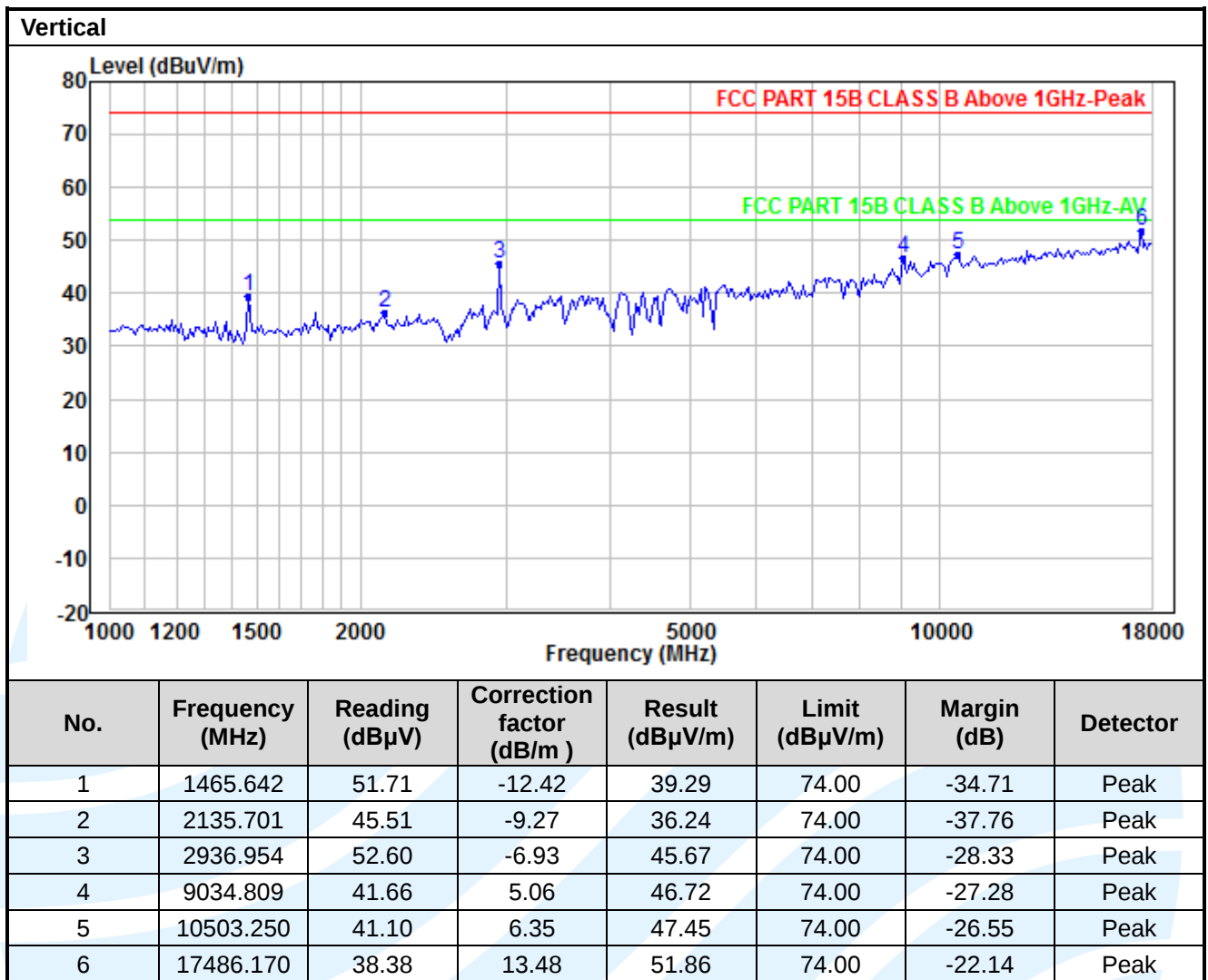
Tel: +86-755-28230888

Fax: +86-755-28230886

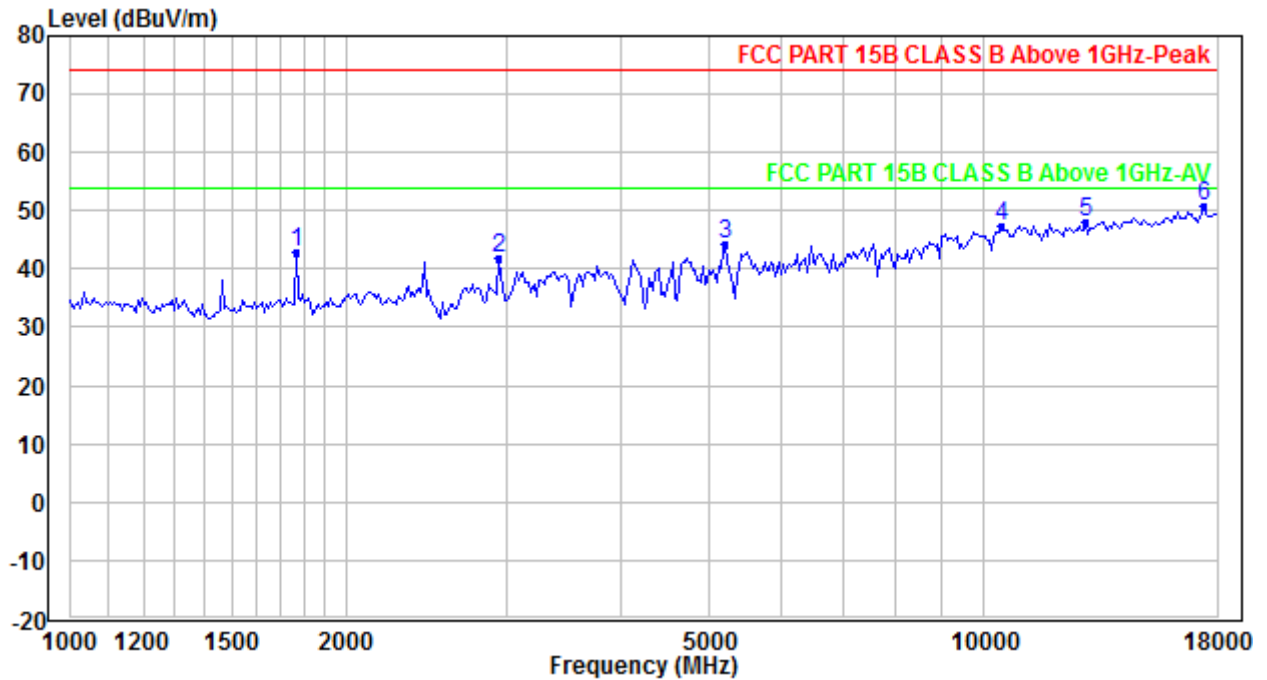
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



Above 1GHz(Peak & Average)
Test Mode6
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1764.113	53.71	-10.79	42.92	74.00	-31.08	Peak
2	2936.954	48.73	-6.93	41.80	74.00	-32.20	Peak
3	5211.218	45.76	-1.43	44.33	74.00	-29.67	Peak
4	10442.590	40.94	6.31	47.25	74.00	-26.75	Peak
5	12938.520	37.86	10.28	48.14	74.00	-25.86	Peak
6	17385.170	37.38	13.33	50.71	74.00	-23.29	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

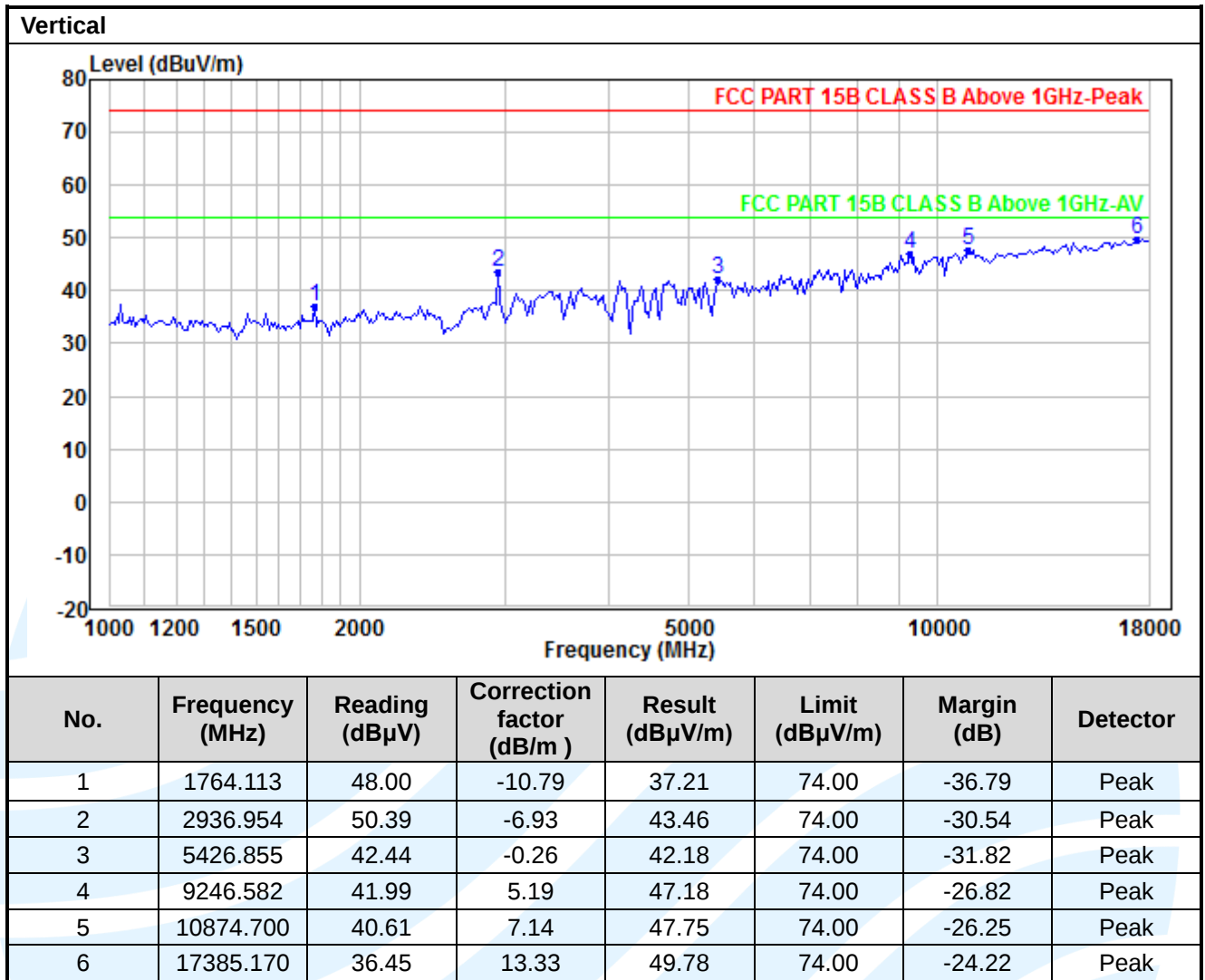
Tel: +86-755-28230888

Fax: +86-755-28230886

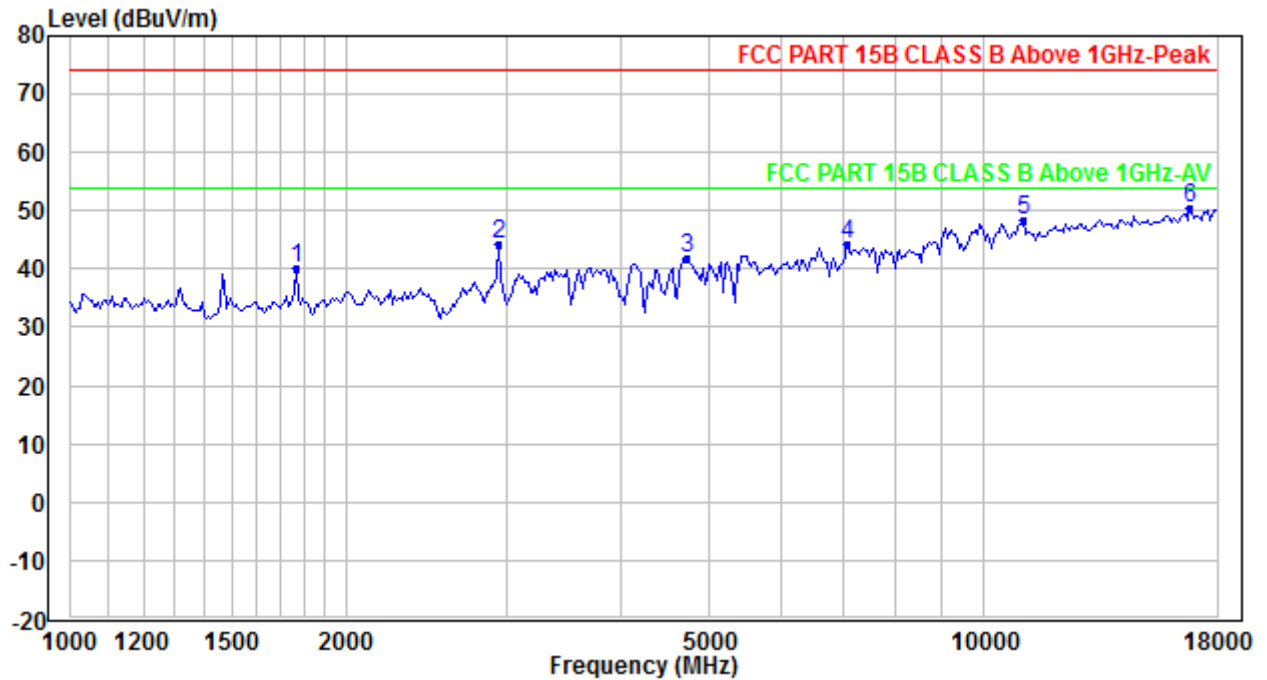
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



Above 1GHz(Peak & Average)
Test Mode7
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1764.113	50.88	-10.79	40.09	74.00	-33.91	Peak
2	2936.954	51.19	-6.93	44.26	74.00	-29.74	Peak
3	4722.526	44.31	-2.39	41.92	74.00	-32.08	Peak
4	7083.775	43.04	1.23	44.27	74.00	-29.73	Peak
5	11065.320	40.90	7.38	48.28	74.00	-25.72	Peak
6	16791.350	37.91	12.61	50.52	74.00	-23.48	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

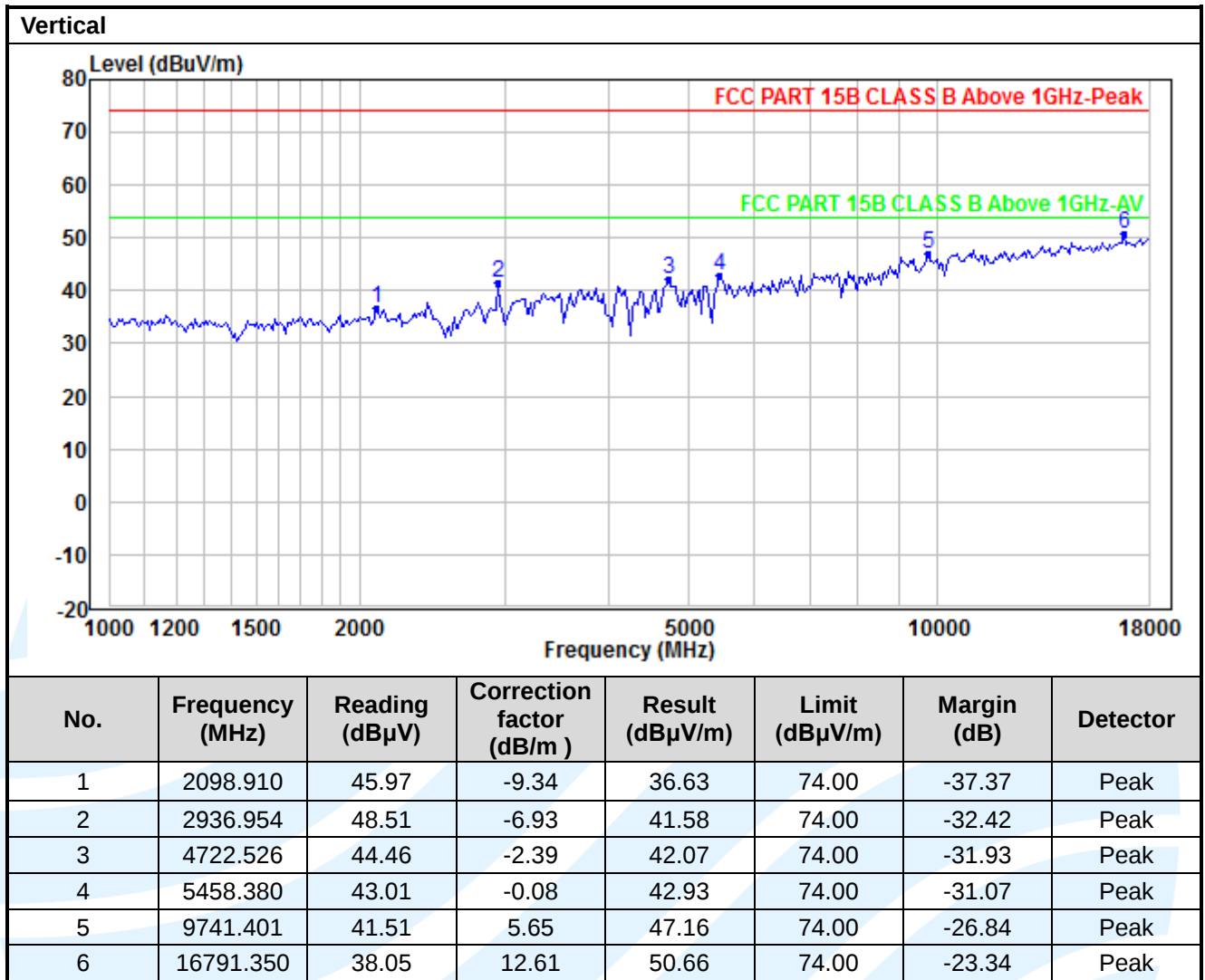
Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2



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. 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.

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

6.2 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.

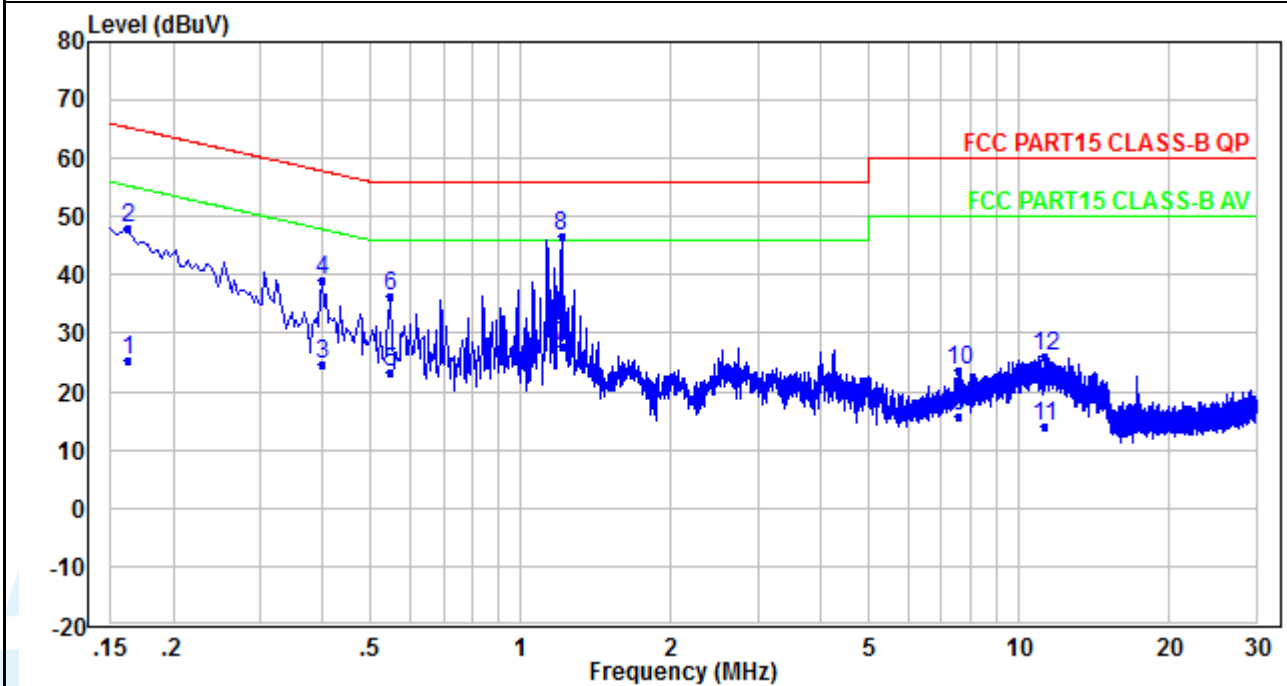
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

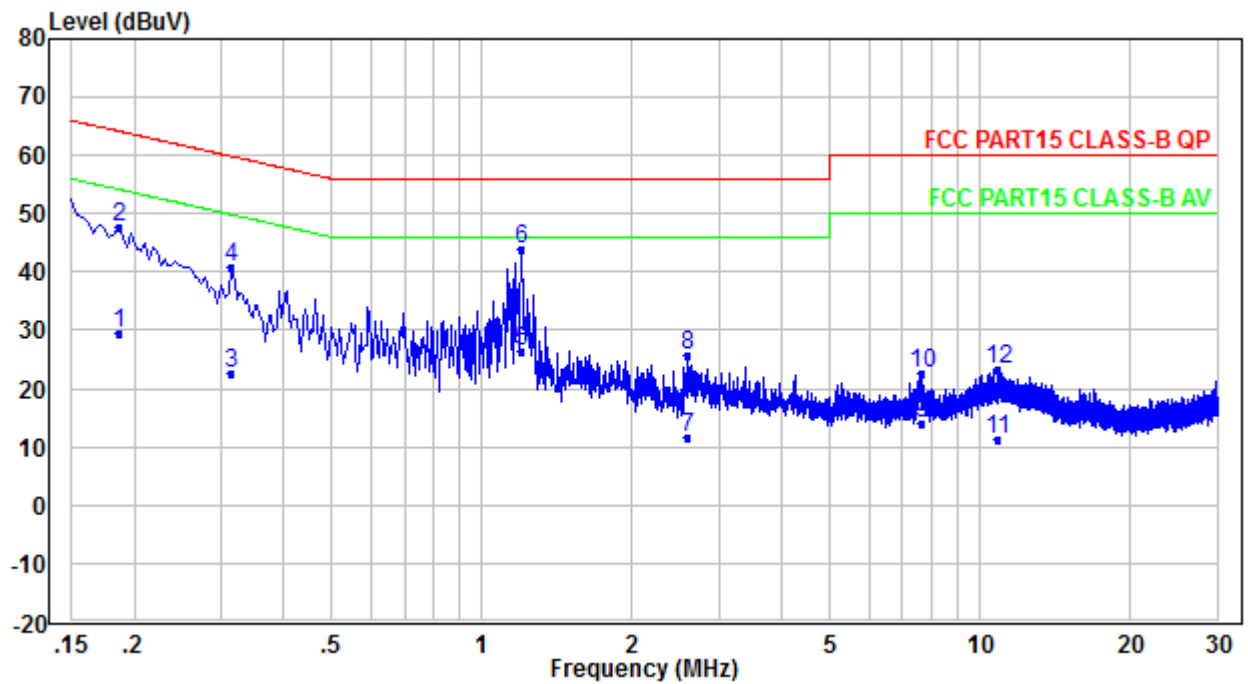
Test Mode4

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.162	15.53	9.75	25.28	55.36	-30.08	Average
2	0.162	38.35	9.75	48.10	65.36	-17.26	QP
3	0.398	14.82	9.79	24.61	47.90	-23.29	Average
4	0.398	29.48	9.79	39.27	57.90	-18.63	QP
5	0.546	13.36	9.84	23.20	46.00	-22.80	Average
6	0.546	26.43	9.84	36.27	56.00	-19.73	QP
7	1.206	17.75	9.90	27.65	46.00	-18.35	Average
8	1.206	36.87	9.90	46.77	56.00	-9.23	QP
9	7.566	5.55	10.24	15.79	50.00	-34.21	Average
10	7.566	13.26	10.24	23.50	60.00	-36.50	QP
11	11.301	3.85	10.29	14.14	50.00	-35.86	Average
12	11.301	15.78	10.29	26.07	60.00	-33.93	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.186	19.66	9.74	29.40	54.21	-24.81	Average
2	0.186	37.97	9.74	47.71	64.21	-16.50	QP
3	0.314	12.86	9.75	22.61	49.86	-27.25	Average
4	0.314	31.19	9.75	40.94	59.86	-18.92	QP
5	1.202	16.36	9.86	26.22	46.00	-19.78	Average
6	1.202	34.03	9.86	43.89	56.00	-12.11	QP
7	2.590	1.71	9.97	11.68	46.00	-34.32	Average
8	2.590	15.57	9.97	25.54	56.00	-30.46	QP
9	7.661	3.86	10.26	14.12	50.00	-35.88	Average
10	7.661	12.19	10.26	22.45	60.00	-37.55	QP
11	10.869	0.75	10.37	11.12	50.00	-38.88	Average
12	10.869	12.78	10.37	23.15	60.00	-36.85	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

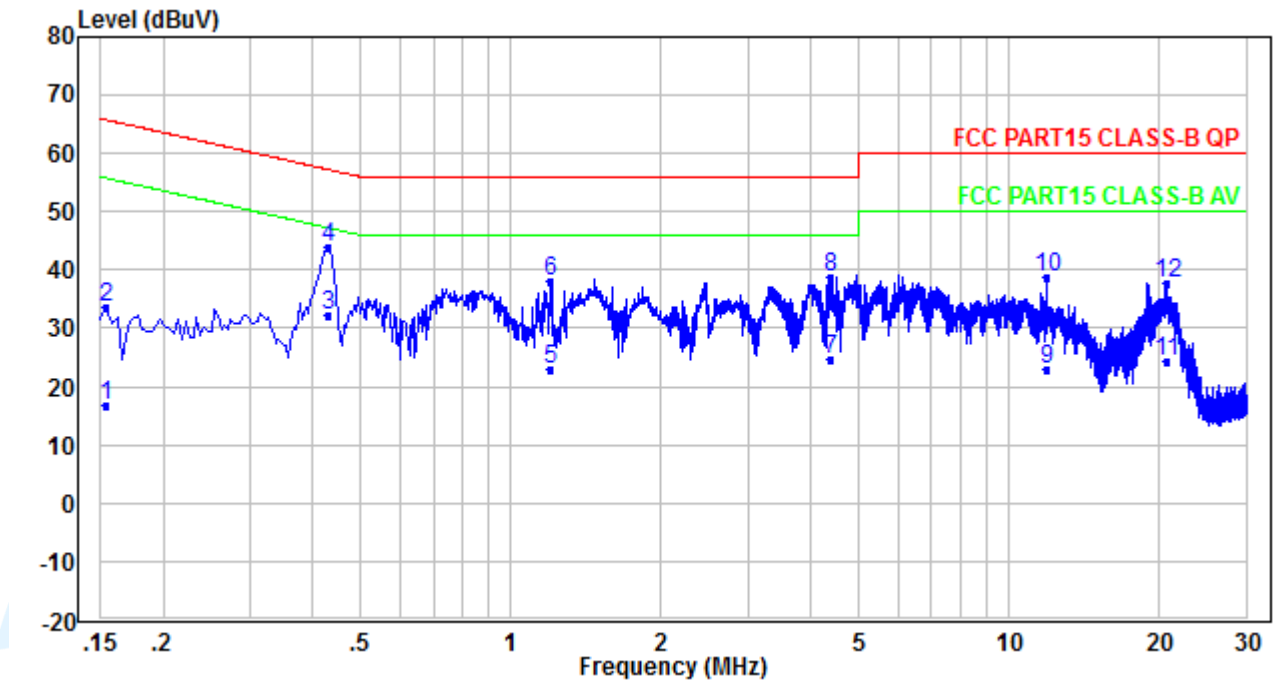
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Quasi Peak and Average: Test Mode6

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.154	7.01	9.75	16.76	55.78	-39.02	Average
2	0.154	23.99	9.75	33.74	65.78	-32.04	QP
3	0.430	22.39	9.81	32.20	47.25	-15.05	Average
4	0.430	34.24	9.81	44.05	57.25	-13.20	QP
5	1.202	13.14	9.90	23.04	46.00	-22.96	Average
6	1.202	28.11	9.90	38.01	56.00	-17.99	QP
7	4.398	14.42	10.16	24.58	46.00	-21.42	Average
8	4.398	28.74	10.16	38.90	56.00	-17.10	QP
9	11.941	12.73	10.30	23.03	50.00	-26.97	Average
10	11.941	28.38	10.30	38.68	60.00	-21.32	QP
11	20.721	13.78	10.54	24.32	50.00	-25.68	Average
12	20.721	27.07	10.54	37.61	60.00	-22.39	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

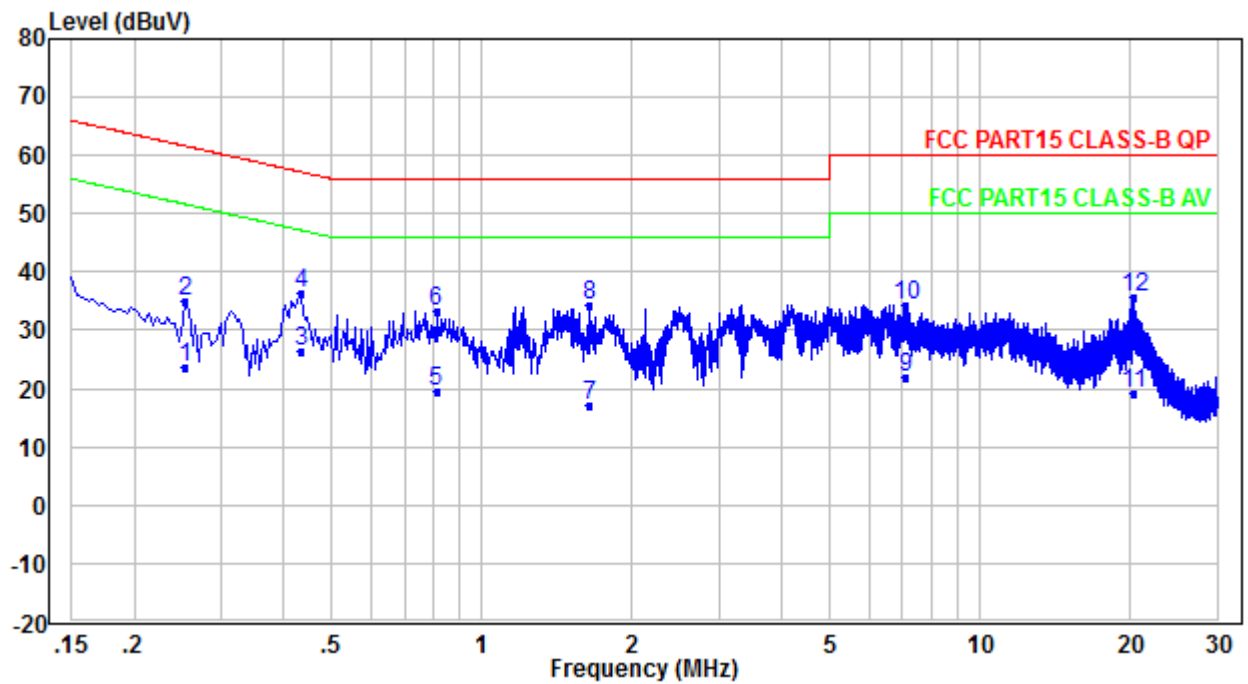
Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Neutral Line



No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.254	13.80	9.75	23.55	51.63	-28.08	Average
2	0.254	25.38	9.75	35.13	61.63	-26.50	QP
3	0.434	16.61	9.78	26.39	47.18	-20.79	Average
4	0.434	26.56	9.78	36.34	57.18	-20.84	QP
5	0.810	9.65	9.78	19.43	46.00	-26.57	Average
6	0.810	23.37	9.78	33.15	56.00	-22.85	QP
7	1.650	7.12	9.92	17.04	46.00	-28.96	Average
8	1.650	24.51	9.92	34.43	56.00	-21.57	QP
9	7.106	11.68	10.24	21.92	50.00	-28.08	Average
10	7.106	24.07	10.24	34.31	60.00	-25.69	QP
11	20.405	8.55	10.52	19.07	50.00	-30.93	Average
12	20.405	25.06	10.52	35.58	60.00	-24.42	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

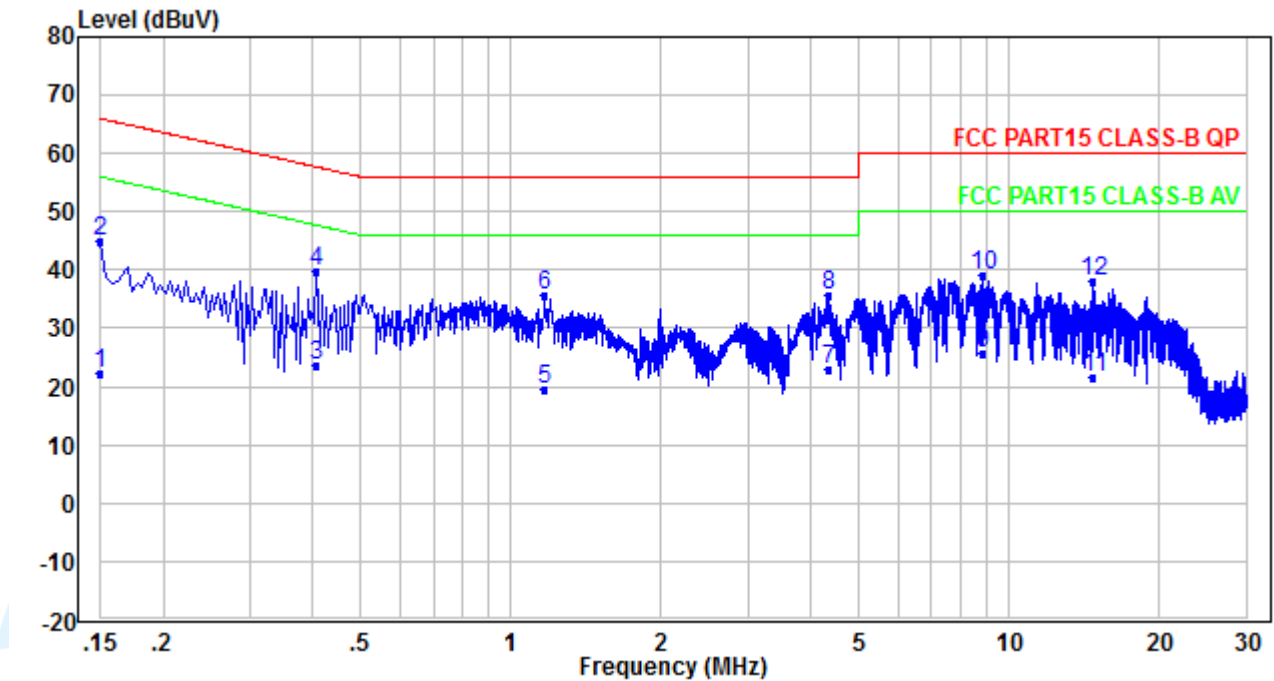
E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-EMC-ICES003-V1.2

Quasi Peak and Average: Test Mode7

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.150	12.46	9.75	22.21	56.00	-33.79	Average
2	0.150	35.04	9.75	44.79	66.00	-21.21	QP
3	0.406	13.84	9.80	23.64	47.73	-24.09	Average
4	0.406	29.98	9.80	39.78	57.73	-17.95	QP
5	1.170	9.72	9.90	19.62	46.00	-26.38	Average
6	1.170	25.77	9.90	35.67	56.00	-20.33	QP
7	4.346	12.68	10.15	22.83	46.00	-23.17	Average
8	4.346	25.57	10.15	35.72	56.00	-20.28	QP
9	8.857	15.36	10.24	25.60	50.00	-24.40	Average
10	8.857	28.84	10.24	39.08	60.00	-20.92	QP
11	14.785	11.33	10.40	21.73	50.00	-28.27	Average
12	14.785	27.82	10.40	38.22	60.00	-21.78	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

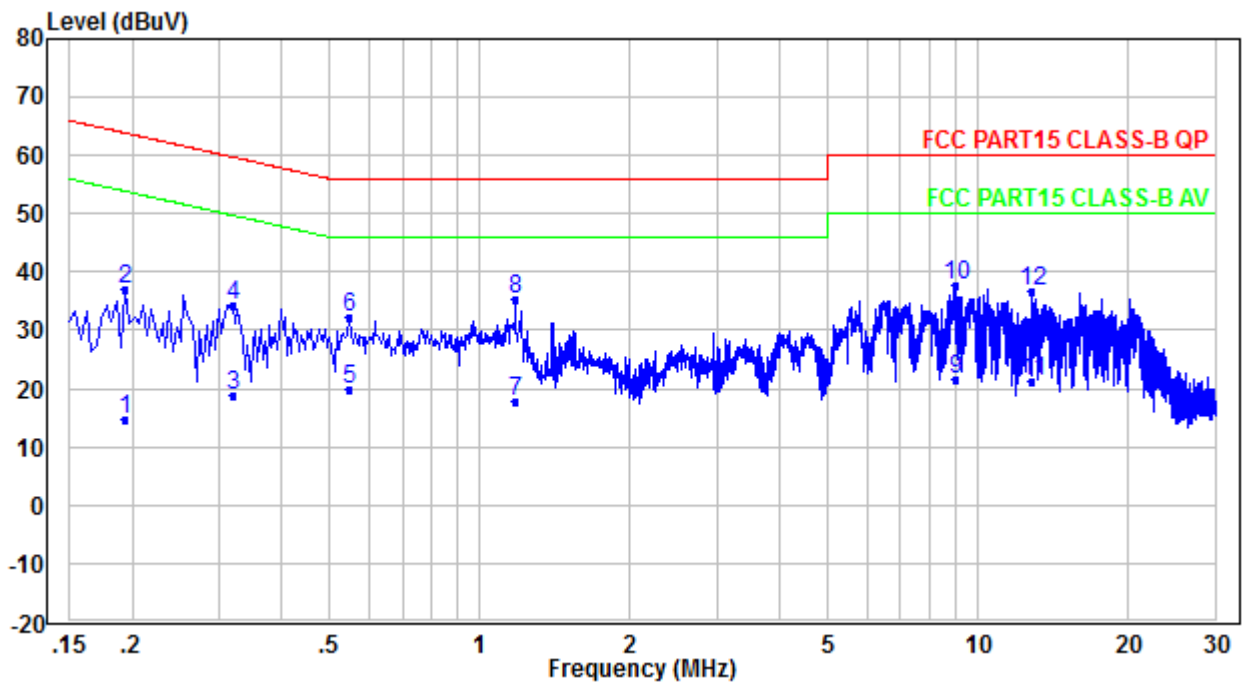
Fax: +86-755-28230886

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	0.194	4.90	9.74	14.64	53.86	-39.22	Average
2	0.194	27.19	9.74	36.93	63.86	-26.93	QP
3	0.318	8.99	9.75	18.74	49.76	-31.02	Average
4	0.318	24.50	9.75	34.25	59.76	-25.51	QP
5	0.546	10.09	9.79	19.88	46.00	-26.12	Average
6	0.546	22.61	9.79	32.40	56.00	-23.60	QP
7	1.178	7.97	9.84	17.81	46.00	-28.19	Average
8	1.178	25.40	9.84	35.24	56.00	-20.76	QP
9	9.025	11.14	10.32	21.46	50.00	-28.54	Average
10	9.025	27.31	10.32	37.63	60.00	-22.37	QP
11	12.869	10.86	10.43	21.29	50.00	-28.71	Average
12	12.869	26.39	10.43	36.82	60.00	-23.18	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

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.
