

FCC TEST REPORT

Product Name: Mobile Phone
Trade Mark: MI
Model No.: MDG2
Report Number: 170615001EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart C
Test Result: 2AFZZ-XMSG2
Date of Issue: PASS

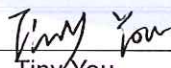
Prepared for:

Xiaomi Communications Co., Ltd.
The Rainbow City of China Resources, NO.68, Qinghe Middle Street,
Haidian District, Beijing, China

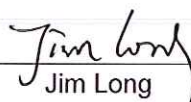
Prepared by:

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Date: July 06, 2017

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Version

Version No.	Date	Description
V1.0	July 06, 2017	Original

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Xiaomi Communications Co., Ltd.
Address of Applicant:	The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone
Model No.:	MDG2
Add. Model No.:	NA
Trade Mark:	MI
DUT Stage:	Production Unit
Power Supply:	AC 120V/60Hz
Classification of digital devices:	Class B
Highest Internal Frequency:	2.0 GHz
Software Version:	QL1515-tissot
Hardware Version:	P3A
Sample Received Date:	June 10, 2017
Sample Tested Date:	June 10, 2017 to July 5, 2017

1.2.2 Description of Accessories

Adapter(1)	
Trade Mark:	MI
Model No.:	MDY-08-EZ
Input:	100-240 V~50/60 Hz 0.35 A Max
Output:	5.0 V $\equiv$ 2.0 A
AC Cable:	N/A
DC Cable:	1.0 Meter, Shielded without ferrite
Manufacturer:	Dongguan Aohai Power Technology Co., Ltd.

Adapter(2)	
Trade Mark:	MI
Model No.:	MDY-08-EZ
Input:	100-240 V~50/60 Hz 0.35 A Max
Output:	5.0 V $\equiv$ 2.0 A
AC Cable:	N/A
DC Cable:	1.0 Meter, Shielded without ferrite
Manufacturer:	Jangsu Chenyang Electron Co., Ltd.

Battery	
Trade Mark:	MI
Model No.:	BN31
Battery Type:	Lithium-ion Polymer Rechargeable Battery
Rated Voltage:	3.85 Vdc
Limited Charge Voltage:	4.4 Vdc
Rated Capacity:	3000 mAh
Manufacturer:	Zhuhai Coslight Battery Co., Ltd.

Cable(1)	
Trade Mark:	MI
Model No.:	L6BU2013-CS-H
Description:	USB Type-C Plug Cable
Cable Type:	Shielded without ferrite
Length:	1.0 Meter

Cable(2)	
Trade Mark:	MI
Model No.:	KLC-2588
Description:	USB Type-C Plug Cable
Cable Type:	Shielded without ferrite
Length:	1.0 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
Wireless AP	SiZong	WN1200A3	WS1505000003	UnionTrust
Key-Press Attenuator	Huaxin	KT2.5-90/1S-2S	N/A	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109

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Tests were sub-contracted. (FCC 47 CFR Part 15.107, FCC 47 CFR Part 15.109)

Compliance Certification Services (Shenzhen) Inc.

Address: No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town, Baoan Distr, Shenzhen, Guangdong, China.

Telephone: +86 (0) 755 28055000

Fax: +86 (0) 755 29055221

1.5 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

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

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program

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requirements in the identified field of testing.

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-30MHz	± 3.2878 dB
2	Radiated emission 30MHz-200MHz	± 3.8928 dB
3	Radiated emission 200MHz-1GHz	± 3.8753 dB
4	Radiated emission 1GHz-8GHz	± 5.3112 dB
5	Radiated emission 8GHz-18GHz	± 5.3493 dB

2. TEST SUMMARY

Test Cases			
Test Item	Test Requirement	Test Method	Result
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS
Note: 1) N/A: In this whole report not application.			

3. EQUIPMENT LIST

Radiated Emission Test Equipment List Chamber 1						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	Feb. 17, 2017	Feb. 16, 2018
☒	High Noise Amplifier	Agilent	8449B	3008A01838	Feb. 11, 2017	Feb. 10, 2018
☒	Horn Antenna	SCHWARZBECK	BBHA9120	D286	Feb. 12, 2017	Feb. 11, 2018
☒	Bilog Antenna	SCHAFFNER	CBL6143	5082	02-12-2017	02-11-2018
☒	Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	Feb. 11, 2017	Feb. 10, 2018
☒	Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
☒	Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
☒	Controller	CT	N/A	N/A	N.C.R	N.C.R
☒	Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
☒	Temp. / Humidity Meter	Anymetre	JR913	N/A	Feb. 15, 2017	Feb. 14, 2018
☒	Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	Feb. 11, 2017	Feb. 10, 2018
☒	LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	Feb. 11, 2017	Feb. 10, 2018
☒	LISN	EMCO	3825/2	8901-1459	Feb. 12, 2017	Feb. 11, 2018
☒	Temp. / Humidity Meter	VICTOR	HTC-1	N/A	Feb. 15, 2017	Feb. 14, 2018
☒	Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

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	3.85	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	25.3	56	101.2	Tiny You
Radiated Emission	25.3	56	101.2	Tiny You

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Mode 1: WCDMA1900 Idle+Adaptor1+Bluetooth Idle+Wlan Idle+Camera+Earphone Mode 2: GSM850 Idle+Adaptor2+Bluetooth Idle+Wlan Idle+MP4+Earphone Mode 3: LTE Band 5 Idle+Adaptor2+Bluetooth Idle+Wlan Idle+FM+Earphone Mode 4: LTE Band 7 Idle+CF Card+USB Link(1)+Bluetooth Idle+Wlan Idle+GPS+Earphone Mode 5: LTE Band 7 Idle+USB Link(2)+Bluetooth Idle+Wlan Idle+GPS+Earphone
Conducted Emission	Mode 1: WCDMA1900 Idle+Adaptor1+Bluetooth Idle+Wlan Idle+Camera+Earphone Mode 2: GSM850 Idle+Adaptor1+Bluetooth Idle+Wlan Idle+MP4+Earphone Mode 3: LTE Band 5 Idle+Adaptor2+Bluetooth Idle+Wlan Idle+FM+Earphone Mode 4: LTE Band 5 Idle+Adaptor2+Bluetooth Idle+Wlan Idle+GPS+Earphone
Remark: The coarse font for worst mode	

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

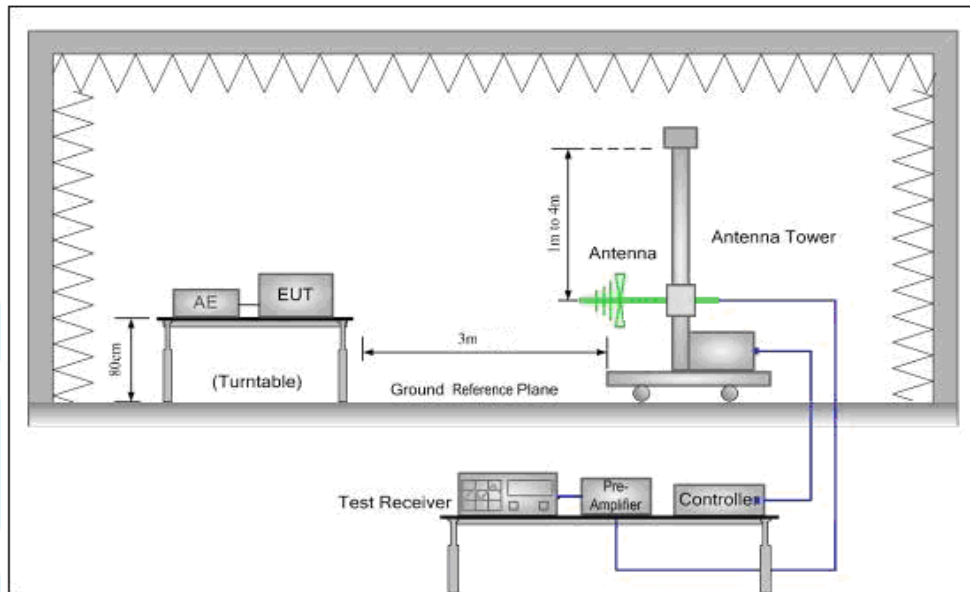
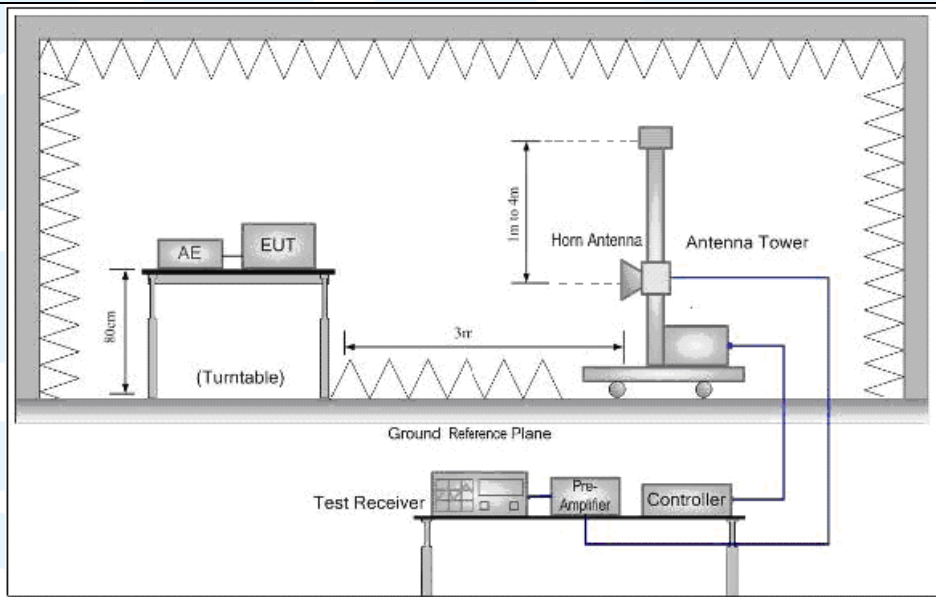
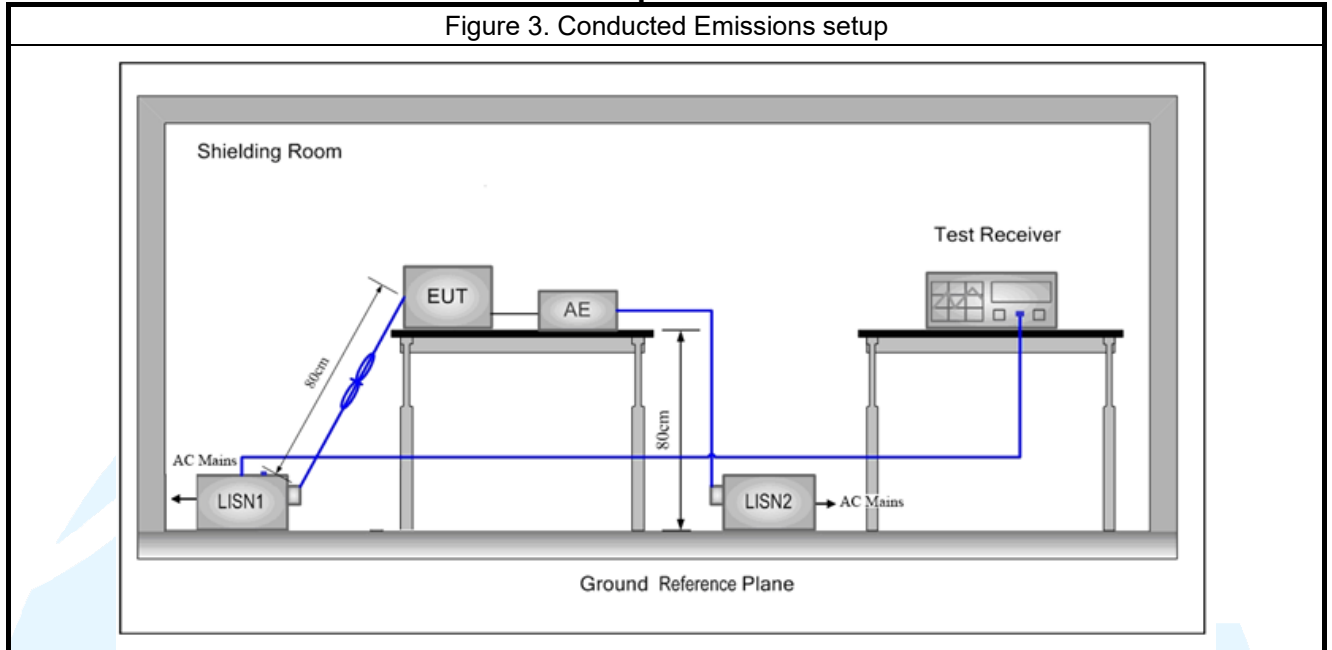


Figure 2. Above 1GHz



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 fifth harmonic 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	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

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

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	10 Hz

Measured frequency range

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

Limits:

Limits for Class B devices

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

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Remark:

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

Test Setup: Refer to section 4.3.1 for details.

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.

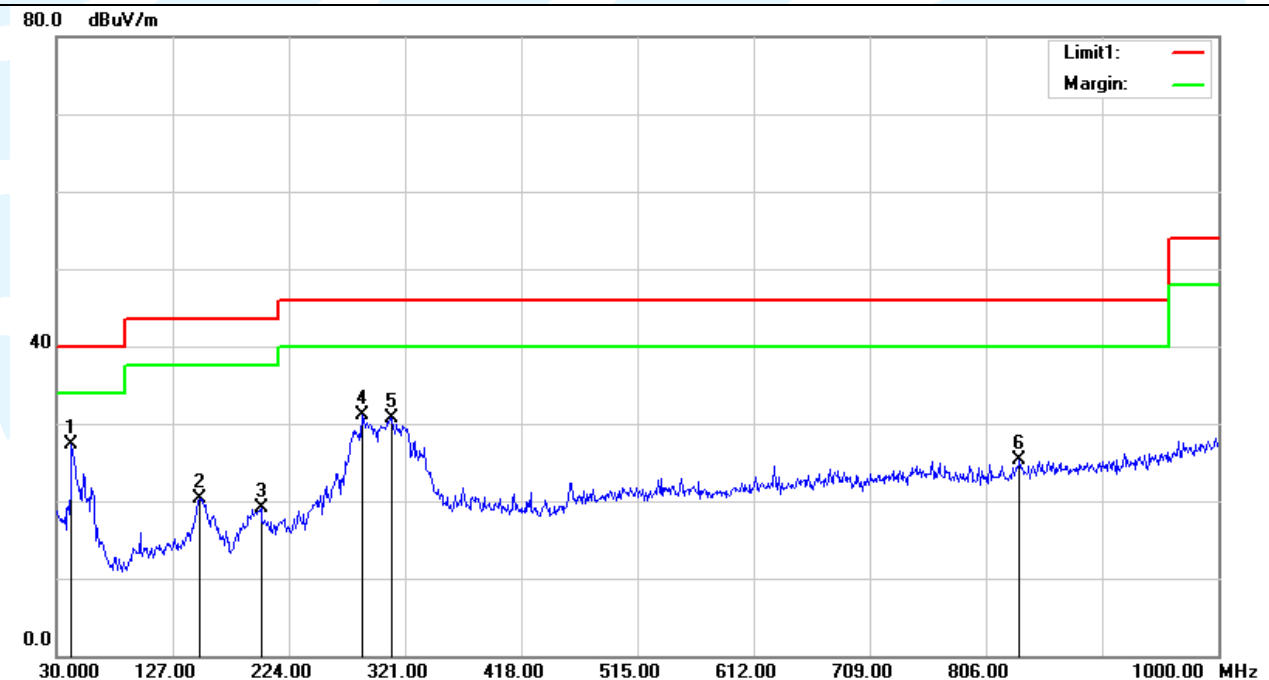
Test Result: Pass

The measurement worst data as follows:

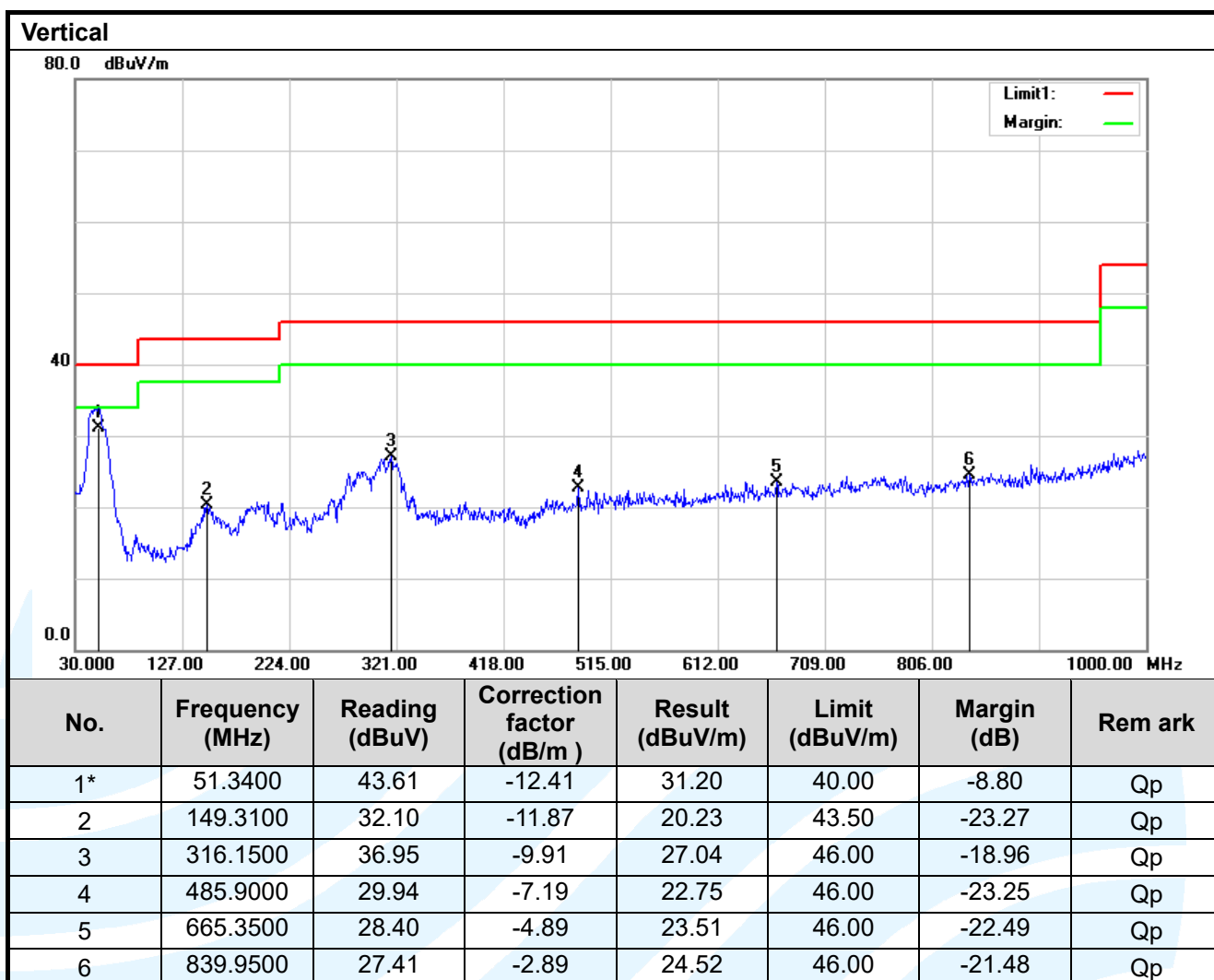
Below 1GHz(Quasi Peak):

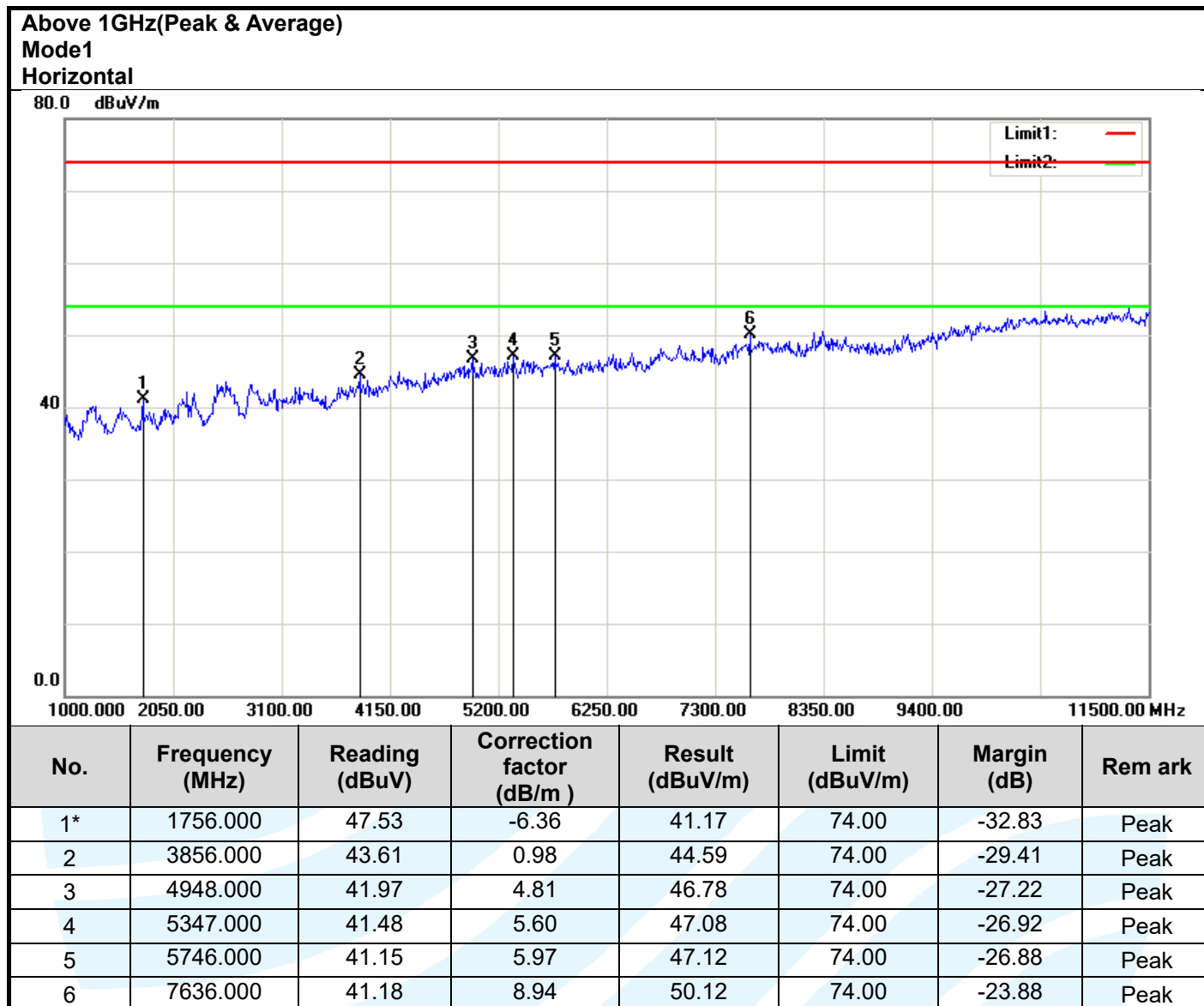
Mode1

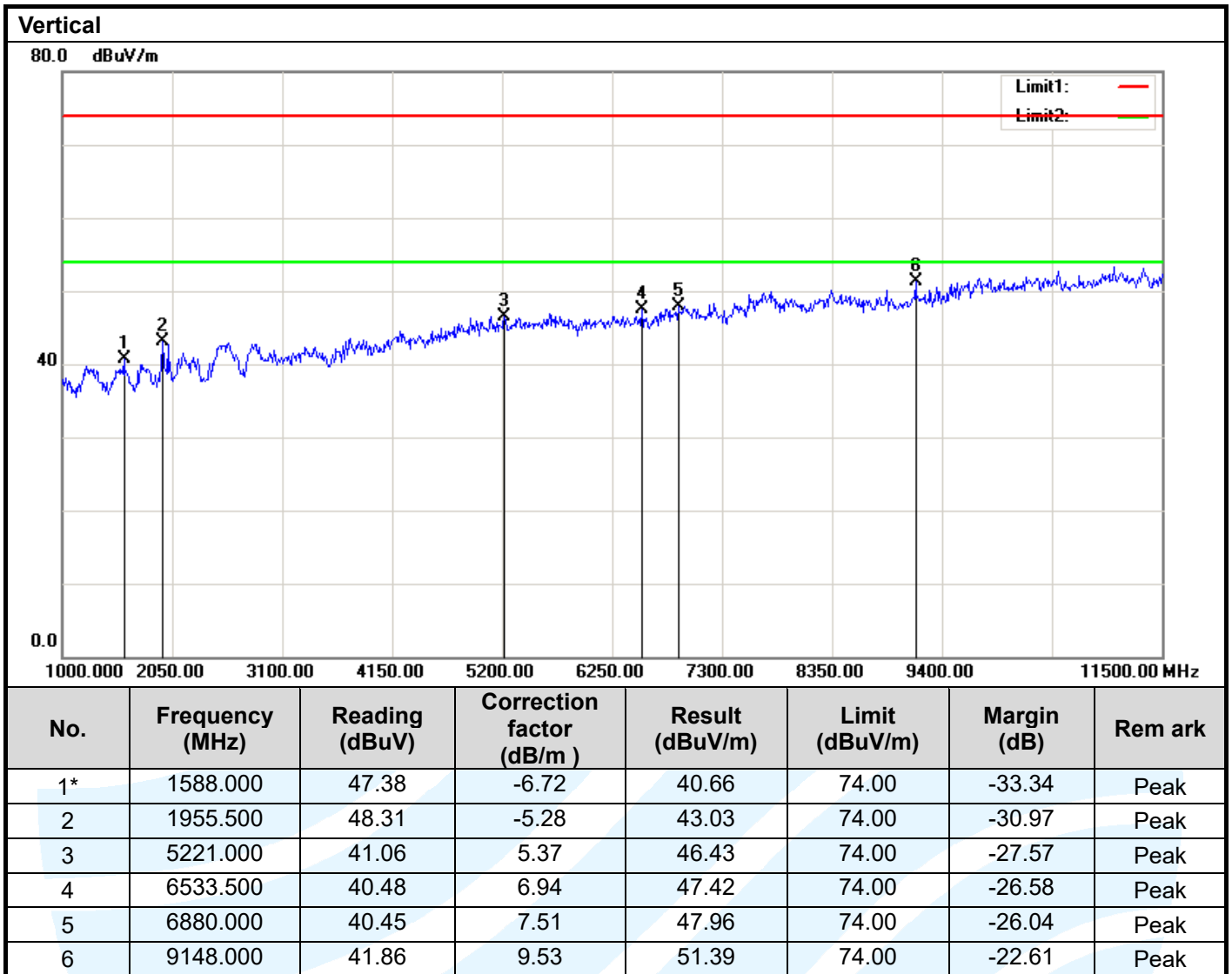
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Rem ark
1*	42.6100	38.83	-11.54	27.29	40.00	-12.71	Qp
2	149.3100	32.19	-11.87	20.32	43.50	-23.18	Qp
3	200.7200	31.32	-12.13	19.19	43.50	-24.31	Qp
4	285.1100	40.90	-9.77	31.13	46.00	-14.87	Qp
5	309.3600	40.68	-9.95	30.73	46.00	-15.27	Qp
6	834.1300	28.39	-3.07	25.32	46.00	-20.68	Qp







Remark:

1. 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

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

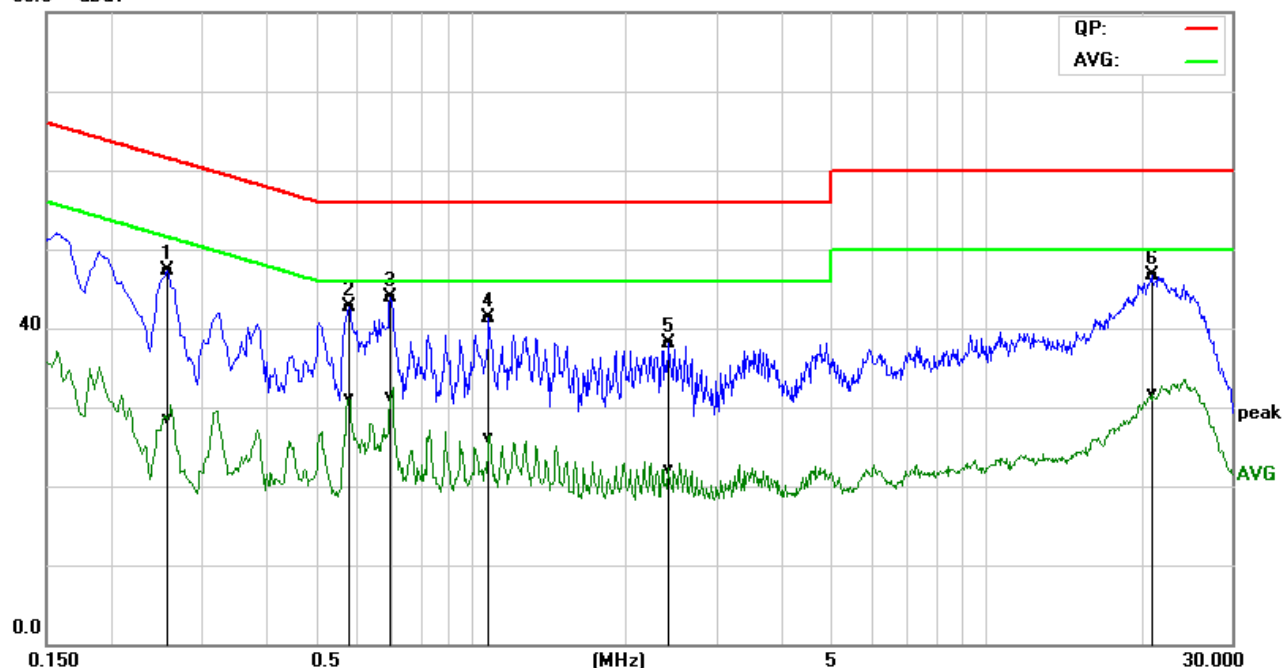
The measurement worst data as follows:

Mode 1

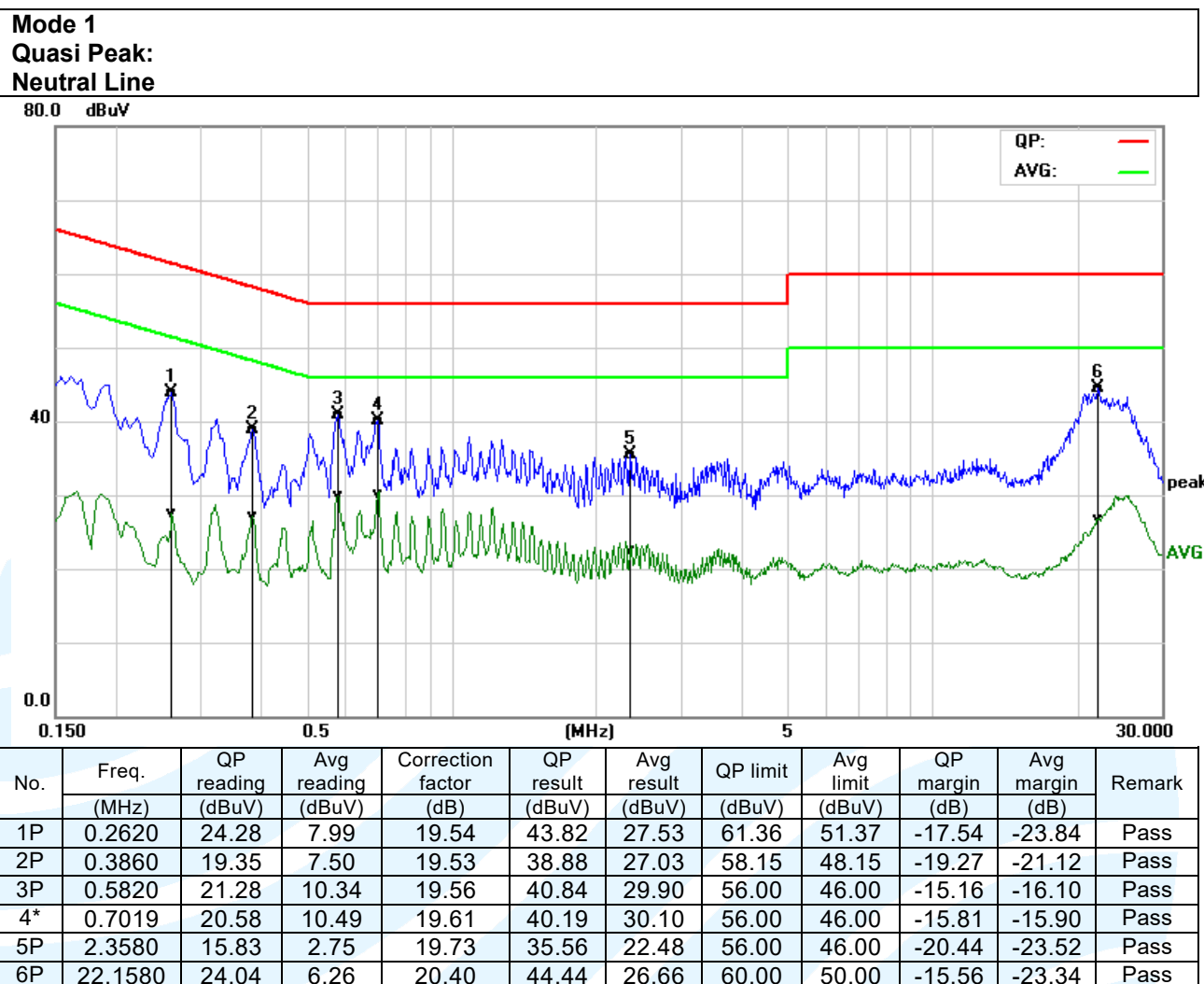
Quasi Peak:

Live Line

80.0 dBuV



No.	Freq. (MHz)	QP reading (dBuV)	Avg reading (dBuV)	Correction factor (dB)	QP result (dBuV)	Avg result (dBuV)	QP limit (dBuV)	Avg limit (dBuV)	QP margin (dB)	Avg margin (dB)	Remark
1P	0.2580	27.70	8.81	19.62	47.32	28.43	61.49	51.50	-14.17	-23.07	Pass
2P	0.5820	23.21	11.48	19.56	42.77	31.04	56.00	46.00	-13.23	-14.96	Pass
3P	0.6980	24.35	11.74	19.61	43.96	31.35	56.00	46.00	-12.04	-14.65	Pass
4*	1.0859	21.80	6.63	19.57	41.37	26.20	56.00	46.00	-14.63	-19.80	Pass
5P	2.4260	18.42	2.29	19.72	38.14	22.01	56.00	46.00	-17.86	-23.99	Pass
6P	20.9420	26.37	11.39	20.34	46.71	31.73	60.00	50.00	-13.29	-18.27	Pass



Remark:

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

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

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

APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photographs.

***** 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.

Labelling Requirements

Each digital device which has been verified as complying with the Class B limits shall have permanently attached in a conspicuous location for the user to observe, a label with the following statement:

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information to User

The following warning or similar statement shall be provided in a conspicuous location in the operator's manual so that the user of a Class B digital device is aware of its interference potential. Additional information about corrective measures may also be provided to the user at the manufacturer's option.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

The instruction manual for a Class B external switching power supply that is separately marketed shall also include sufficient information to insure that the complete system is capable of complying with the requirements for a Class B external switching power supplies. The manual should also caution the user that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment. Finally, the manual should instruct the user to use any special accessories, i.e. shielded cables, necessary for compliance with the standards.

In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required above may be included in the manual in that alternative form, provided that the user can be reasonably expected to have the capability to access information in that form.