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TEST REPORT

Report No.: **CTC20221749E06**
FCC ID.....: **2A76QW220**
Applicant.....: **Shenzhen Ntmer Technology Co., Ltd.**
Address.....: 2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone
Community, Yuehai Subdistrict, Nanshan District, Shenzhen,
China
Manufacturer.....: Shenzhen Ntmer Technology Co., Ltd.
Address.....: 2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone
Community, Yuehai Subdistrict, Nanshan District, Shenzhen,
China
Product Name.....: **Portable Computer**
Trade Mark.....: Robo&Kala
Model/Type reference.....: TW220
Listed Model(s): /
Standard.....: **47 CFR FCC Part 18**
Date of receipt of test sample...: Sep. 28, 2022
Date of testing.....: Sep. 29, 2022 ~ Oct. 27, 2022
Date of issue.....: Oct. 28, 2022
Result.....: **PASS**

Compiled by:
(Printed name+signature) Terry Su

Supervised by:
(Printed name+signature) Eric Zhang

Approved by:
(Printed name+signature) Totti Zhao

Testing Laboratory Name.....: **CTC Laboratories, Inc.**

Address.....: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park,
Shenzhen, Guangdong, China

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Table of Contents

Page

1. TEST SUMMARY	3
1.1. TEST STANDARDS	3
1.2. REPORT VERSION	3
1.3. TEST DESCRIPTION	4
1.4. TEST FACILITY	5
1.5. MEASUREMENT UNCERTAINTY	5
1.6. ENVIRONMENTAL CONDITIONS	6
2. GENERAL INFORMATION.....	7
2.1. CLIENT INFORMATION	7
2.2. GENERAL DESCRIPTION OF EUT	7
2.3. ACCESSORY EQUIPMENT INFORMATION.....	8
2.4. DESCRIPTION OF TEST MODES.....	8
2.5. MEASUREMENT INSTRUMENTS LIST	9
3. EMC EMISSION TEST	10
3.1. RADIATED EMISSION.....	10
3.2. CONDUCTED EMISSION (AC MAINS)	16



1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[47 CFR FCC Part 18](#): Industrial, Scientific, and Medical Equipment Unintentional Radiators.

[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 40GHz.

1.2. Report version

Revised No.	Date of issue	Description
01	Oct. 28, 2022	Original



1.3. Test Description

FCC CFR Title 47 FCC Part 18			
Test Item	Standard Section	Result	Test Engineer
Conducted Emissions Test	18.307(b)	Pass	Terry Su
Radiated Emission Test	18.305(b),(c)	Pass	Ice Lu

Note: "N/A" is no application.

The measurement uncertainty is not included in the test result.



1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

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

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test	Measurement Frequency Range	U (dB)	Note
Conducted Emission	9kHz ~ 30MHz	3.08	Main Power Port
Radiated Emission	0.009MHz ~ 30MHz	5.03	3m chamber 2
Radiated Emission	30MHz ~ 1000MHz	4.51	3m chamber 2

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity	55 %
Air Pressure	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Ntmer Technology Co., Ltd.
Address:	2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Ntmer Technology Co., Ltd.
Address:	2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China

2.2. General Description of EUT

Product Name:	Portable Computer
Trade Mark:	Robo&Kala
Model/Type reference:	TW220
Listed Model(s):	/
Power supply:	DC Voltage supplied from AC/DC Adapter 7.74Vdc from 5250mAh Li-ion Battery
Adapter 1 model:	KS65C-GaNC1-CU Input: 100-240V~ 50/60Hz 1.5A Max Output: 5Vdc/3A, 9Vdc/3A, 12Vdc/3A, 15Vdc/3A, 20Vdc/3.25A
Adapter 2 model:	PA-1650-67 Input: 100-240V~ 50/60Hz 1.6A Output: 5Vdc/3A, 9Vdc/3A, 12Vdc/3A, 15Vdc/3A, 20Vdc/3.25A
Hardware version:	V2.0
Firmware version:	N1-SW-9800
Wireless Charger	
Operation Frequency Range:	100kHz ~ 148kHz
Operation Frequency:	146kHz



2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
Smart Pen	TP20	---	Robo&Kala
/	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/

2.4. Description of Test Modes

Test mode	Wireless charging (5V/0.36A)
1	■

Note: ■ is operation mode.

Test item	Test mode
Conducted emission	1
Radiated emission	1

Note: "N/A" is no application.



2.5. Measurement Instruments List

Radiated emission(3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Jan. 12, 2023
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 23, 2022
3	Loop Antenna	LAPLAC	RF300	9138	Dec. 23, 2022
4	Spectrum Analyzer	R&S	FSU26	100105	Dec. 23, 2022
5	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 15, 2023
6	Pre-Amplifier	SONOMA	310	186194	Dec. 23, 2022
7	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 23, 2022
8	Test Receiver	R&S	ESC17	100967	Dec. 23, 2022
9	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101112	Dec. 23, 2022
2	LISN	R&S	ENV216	101113	Dec. 23, 2022
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 23, 2022

Note: The Cal. Interval was one year.



3. EMC EMISSION TEST

3.1. Radiated Emission

LIMIT

FCC CFR Title 47 Part 18 Section 18.305(b):

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500	25	300
		500 or more	$25 \times \sqrt{\text{power}/500}$	¹ 300
	Any non-ISM frequency	Below 500	15	300
		500 or more	$15 \times \sqrt{\text{power}/500}$	¹ 300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 (²)	1,600 (²)
Medical diathermy	Any ISM frequency	Any	25	300
	Any non-ISM frequency	Any	15	300
Ultrasonic	Below 490 kHz	Below 500	2,400/F(kHz)	300
		500 or more	$2,400/F(\text{kHz}) \times \sqrt{\text{power}/500}$	³ 300
	490 to 1,600 kHz	Any	24,000/F(kHz)	30
	Above 1,600 kHz	Any	15	30
Induction cooking ranges	Below 90 kHz	Any	1,500	⁴ 30
	On or above 90 kHz	Any	300	⁴ 30

¹Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

²Reduced to the greatest extent possible.

³Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

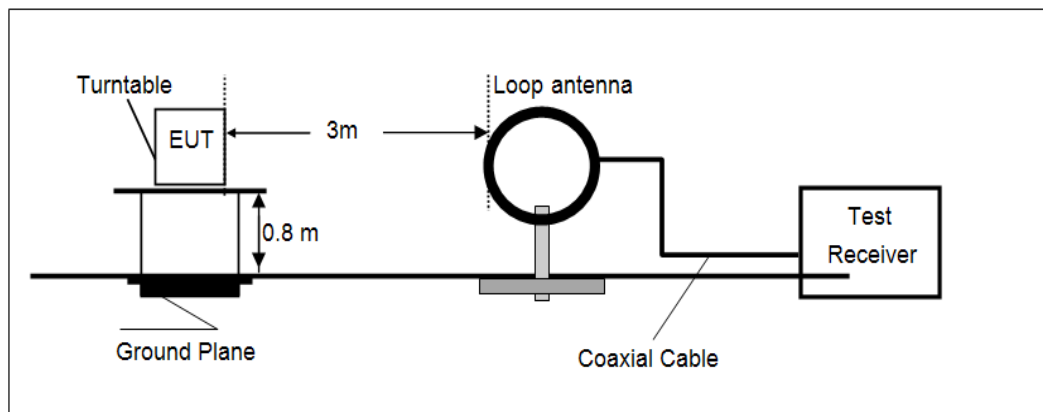
⁴Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

1. This product belongs to non-ISM equipment, the field strength limit is 15uV/m at 300 meter distance.

2. Limit: $20\log^{(15\text{uV/m})} + 40\log^{(300/3)} = 23.52 + 80 = 103.52\text{dBuV/m}$ at 3 meters distance

TEST CONFIGURATION

Radiated Emission Test Set-Up Frequency below 30MHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.4:2014.
 2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
 3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
 5. Use the following spectrum analyzer settings
Span shall wide enough to fully capture the emission being measured;
- 1) 9kHz – 150kHz, RBW=200Hz, Sweep=auto, Detector function=peak, Trace=max hold;
 - 2) 150kHz – 30MHz, RBW=9kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

TEST MODE

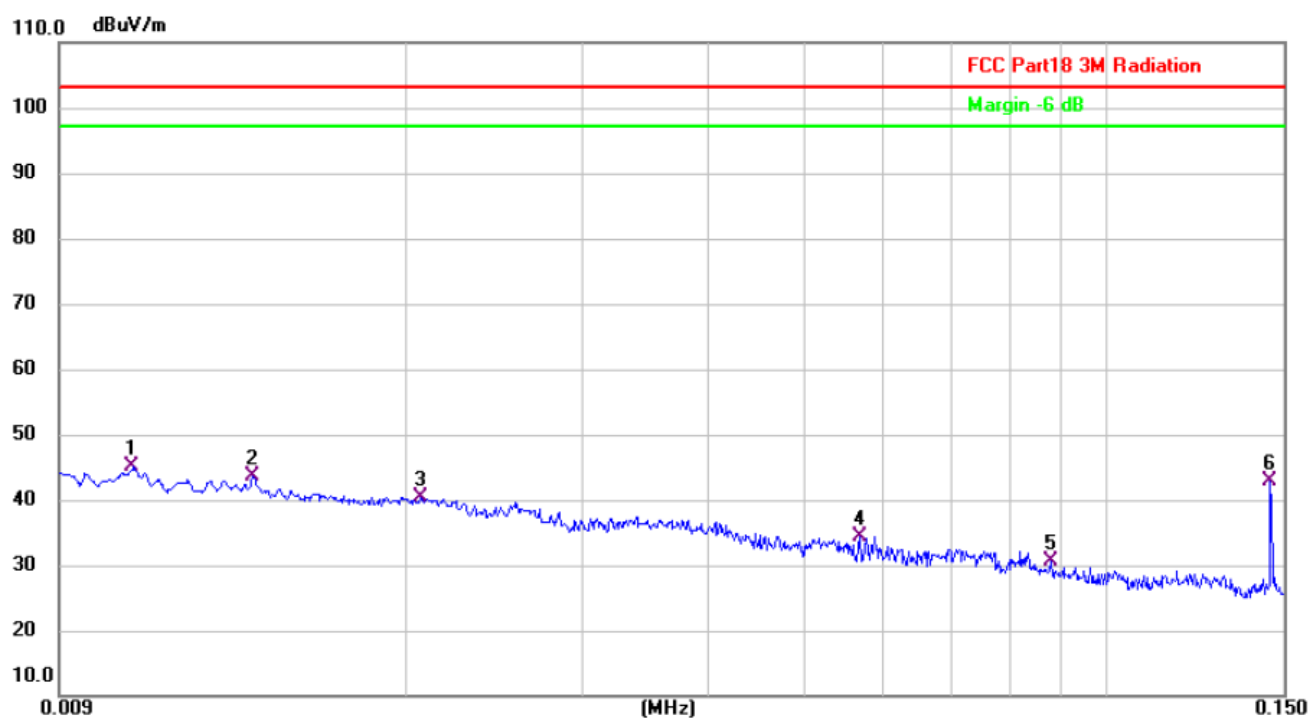
Please refer to the clause 2.4.

TEST RESULTS



9kHz – 150kHz

Test mode	1	Polarization	Horizontal
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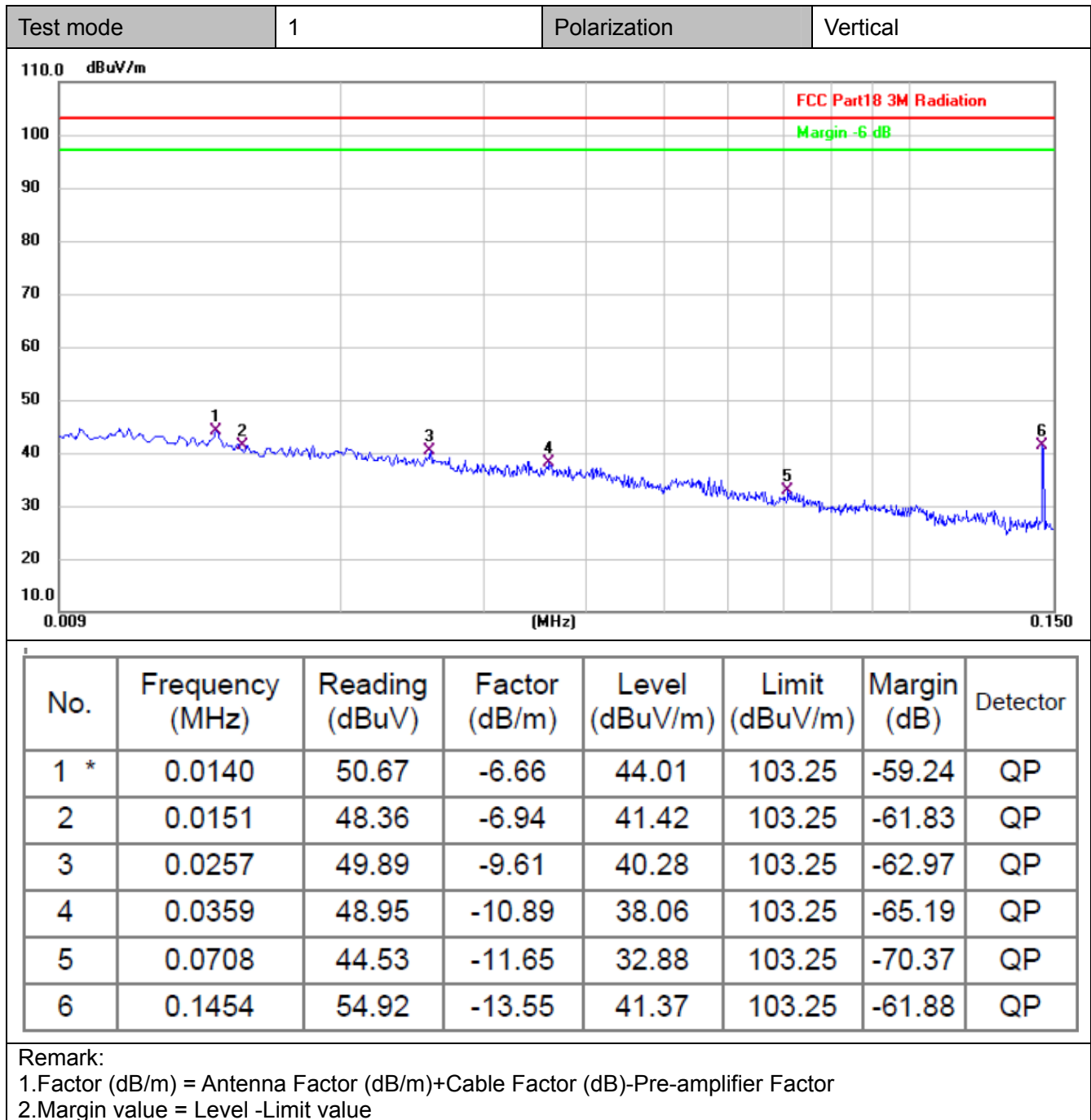


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	0.0106	50.82	-5.80	45.02	103.25	-58.23	QP
2	0.0140	50.17	-6.66	43.51	103.25	-59.74	QP
3	0.0206	48.72	-8.33	40.39	103.25	-62.86	QP
4	0.0567	45.77	-11.49	34.28	103.25	-68.97	QP
5	0.0879	44.15	-13.55	30.60	103.25	-72.65	QP
6	0.1454	56.42	-13.55	42.87	103.25	-60.38	QP

Remark:

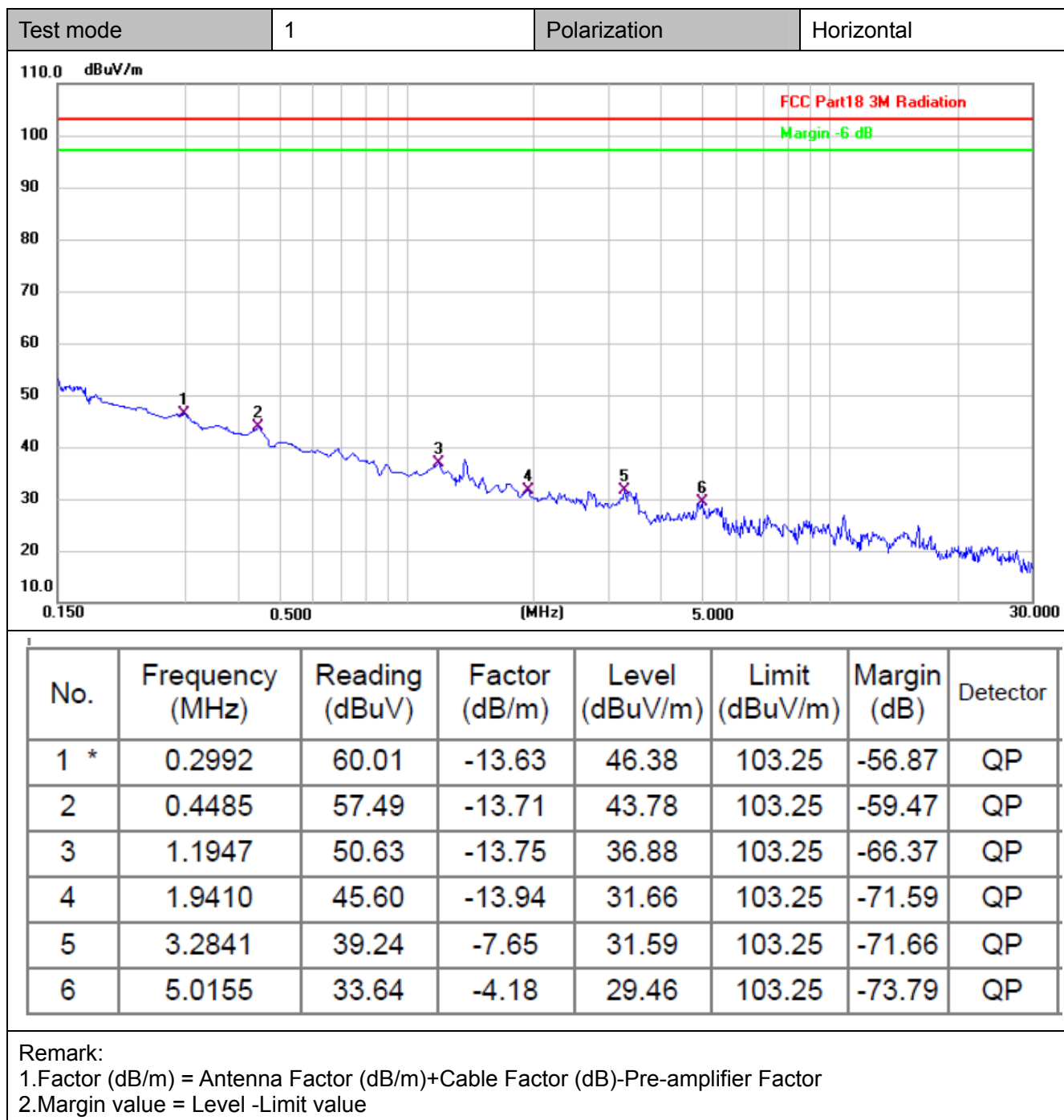
1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

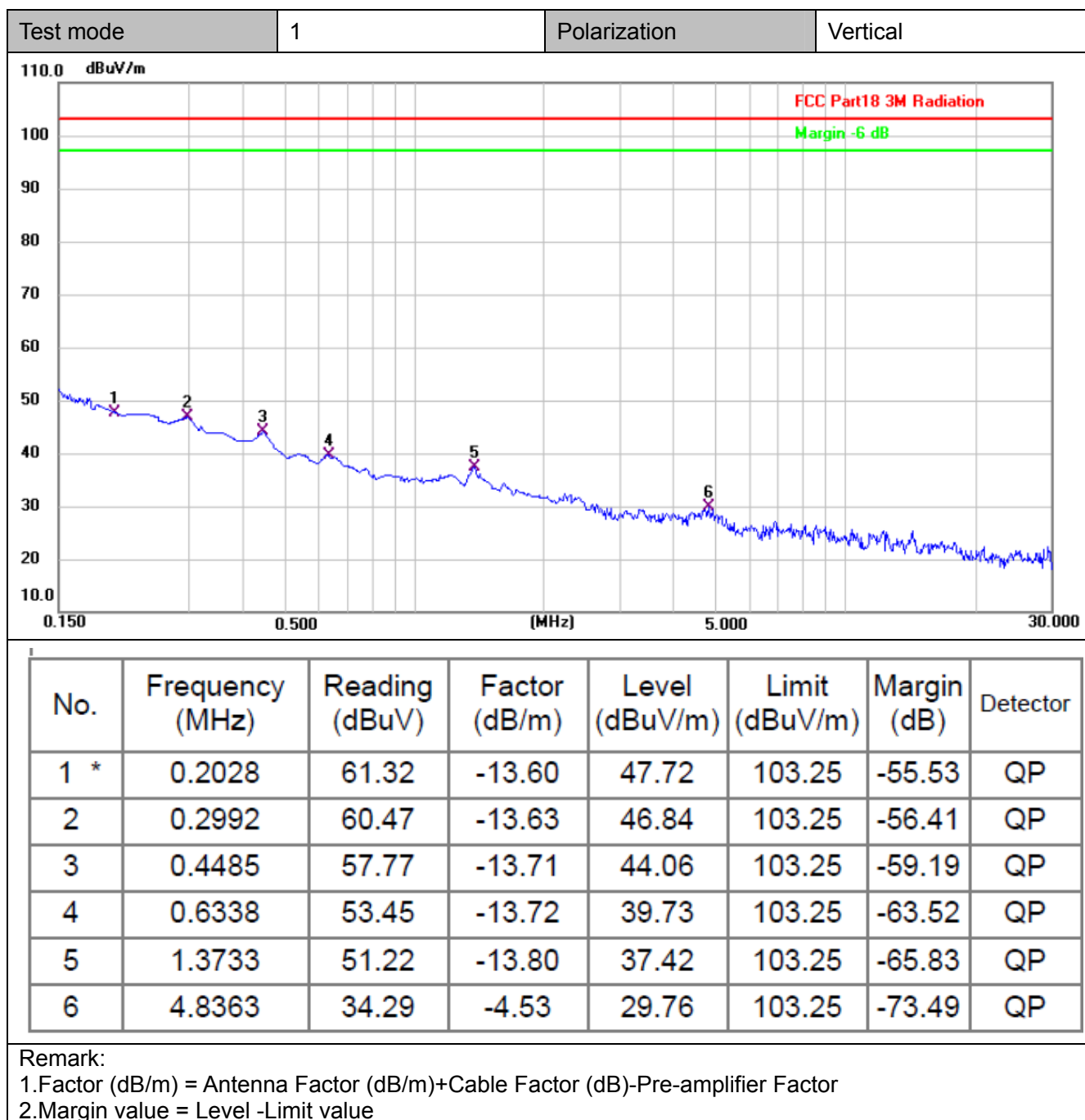
2. Margin value = Level - Limit value





150kHz – 30MHz





3.2. Conducted Emission (AC Mains)

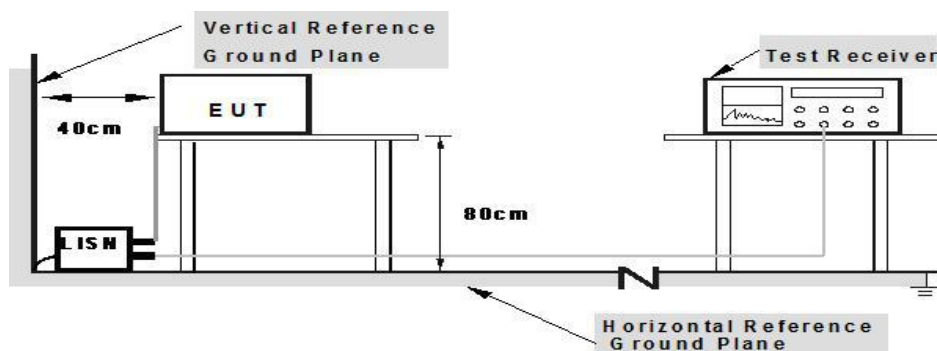
LIMIT

FCC CFR Title 47 Part 18 Section 18.307(b):

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



**Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

TEST PROCEDURE

1. The EUT was setup according to ANSI C63.4-2014.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

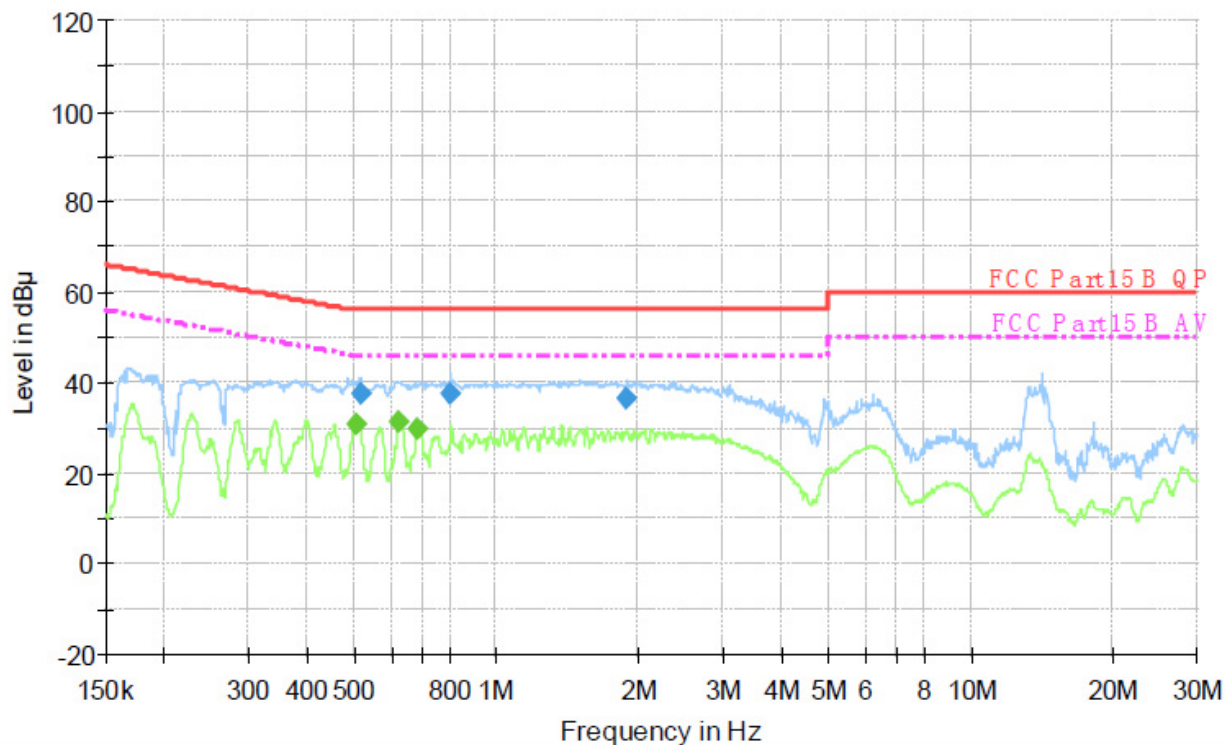
TEST MODE

Please refer to the clause 2.4.

TEST RESULTS



Test mode	1	Terminal	Line
Adapter model	KS65C-GaNC1-CU		



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)	Comment
0.519130	37.8	1000.00	9.000	On	L1	9.7	18.2	56.0	
0.802140	37.8	1000.00	9.000	On	L1	9.7	18.2	56.0	
1.892340	36.3	1000.00	9.000	On	L1	9.7	19.7	56.0	

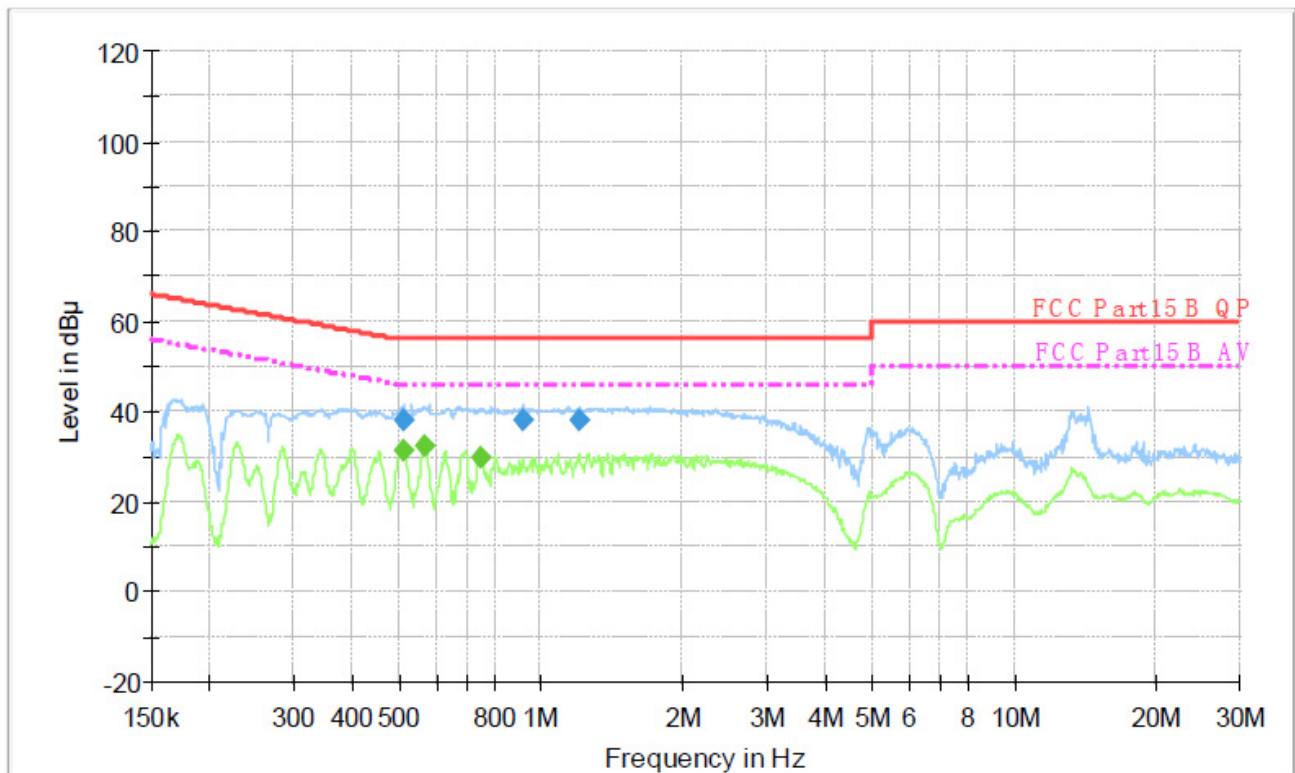
Final Measurement Detector 2

Frequency (MHz)	Average (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)	Comment
0.508870	30.8	1000.00	9.000	On	L1	9.7	15.2	46.0	
0.626270	31.1	1000.00	9.000	On	L1	9.7	14.9	46.0	
0.686490	30.0	1000.00	9.000	On	L1	9.7	16.0	46.0	

Emission Level= Read Level+ Correct Factor



Test mode	1	Terminal	Neutral
Adapter model	KS65C-GaNC1-CU		



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.512950	38.2	1000.00	9.000	On	N	10.0	17.8	56.0	
0.915090	38.0	1000.00	9.000	On	N	10.0	18.0	56.0	
1.210110	37.9	1000.00	9.000	On	N	10.0	18.1	56.0	

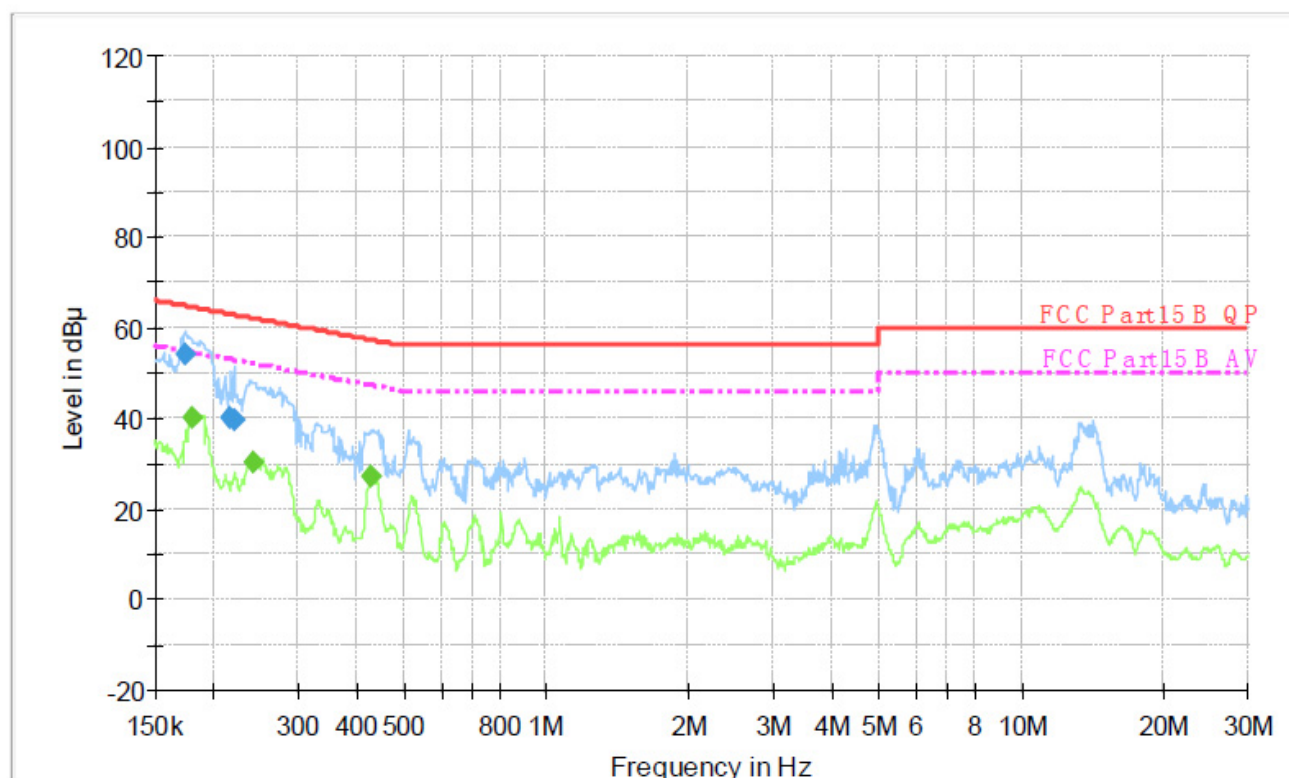
Final Measurement Detector 2

Frequency (MHz)	Average (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.512950	31.1	1000.00	9.000	On	N	10.0	14.9	46.0	
0.569050	32.2	1000.00	9.000	On	N	10.0	13.8	46.0	
0.749510	29.7	1000.00	9.000	On	N	10.0	16.3	46.0	

Emission Level= Read Level+ Correct Factor



Test mode	1	Terminal	Line
Adapter model	PA-1650-67		



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.173180	54.0	1000.00	9.000	On	L1	9.7	10.8	64.8	
0.215700	39.9	1000.00	9.000	On	L1	9.7	23.1	63.0	
0.220050	39.8	1000.00	9.000	On	L1	9.7	23.0	62.8	

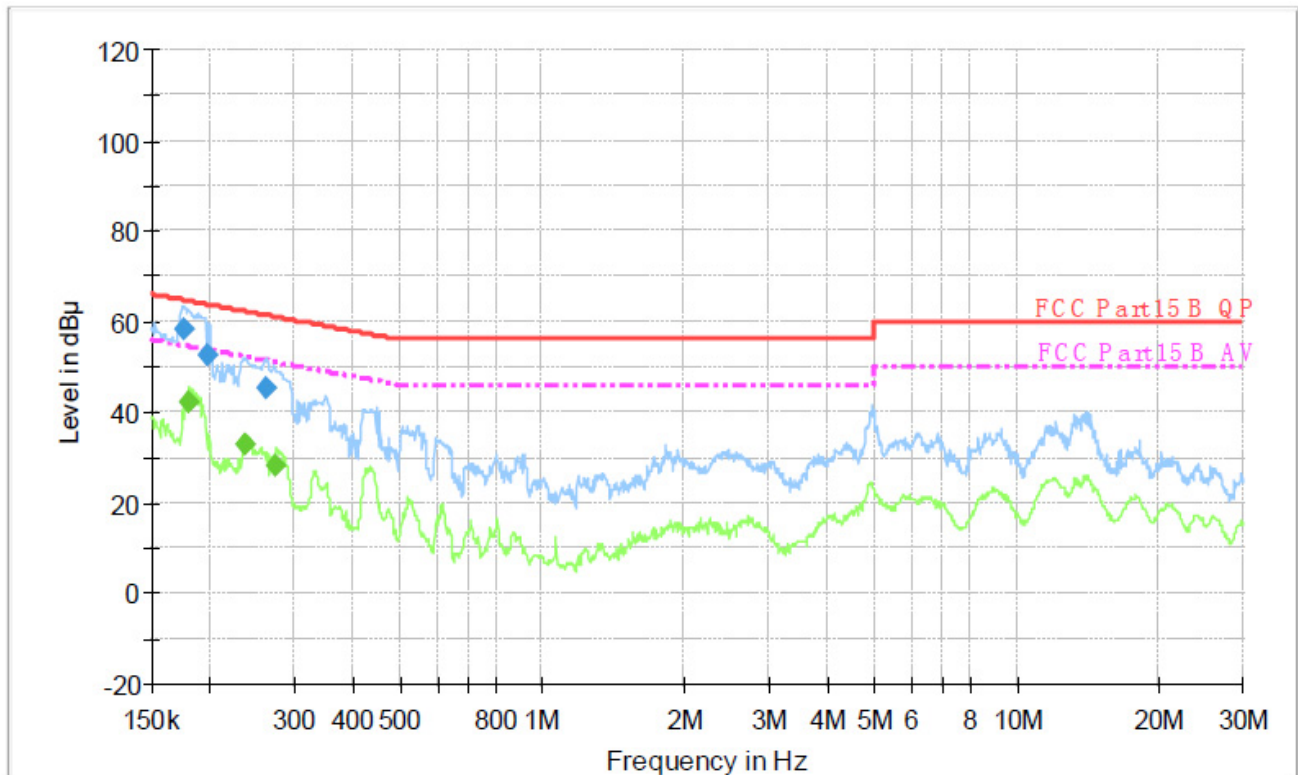
Final Measurement Detector 2

Frequency (MHz)	Average (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.180240	39.9	1000.00	9.000	On	L1	9.7	14.6	54.5	
0.242180	30.1	1000.00	9.000	On	L1	9.7	22.0	52.0	
0.426900	27.3	1000.00	9.000	On	L1	9.7	20.0	47.3	

Emission Level= Read Level+ Correct Factor



Test mode	1	Terminal	Neutral
Adapter model	PA-1650-67		



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.175270	58.4	1000.00	9.000	On	N	10.0	6.3	64.7	
0.197570	52.7	1000.00	9.000	On	N	10.0	11.1	63.7	
0.262310	45.3	1000.00	9.000	On	N	10.0	16.1	61.4	

Final Measurement Detector 2

Frequency (MHz)	Average (dBu V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBu V)	Comment
0.179520	42.2	1000.00	9.000	On	N	10.0	12.3	54.5	
0.237390	32.8	1000.00	9.000	On	N	10.0	19.4	52.2	
0.275180	28.2	1000.00	9.000	On	N	10.0	22.8	51.0	

Emission Level= Read Level+ Correct Factor

*****THE END*****