FCC 15B TEST REPORT

No. I21Z60407-EMC01

for

Shenzhen Tinno Mobile Technology Corp.

4G MIFI

Model Name: UM200AA

FCC ID: XD6UM200AA

with

Hardware Version: V1.2

Software Version: UM200AAV01.60_1.10

Issued Date: 2021-04-12

Note:

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Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z60407-EMC01	Rev.0	1st edition	2021-03-03
I21Z60407-EMC01	Rev.1	2nd edition. Delete Conducted Emissions of Set.2.	2021-04-12

CONTENTS

1. Test Laboratory

1.1. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2021-02-01

Testing End Date: 2021-03-03

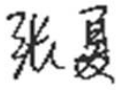
1.4. Signature

An Hui

(Prepared this test report)

Zhang Ying

(Reviewed this test report)



Zhang Xia

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address /Post:	4/F, H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan East Road, Nan Shan District,Shenzhen, P.R.China
Contact Person:	xiaoping.li
Contact Email	xiaoping.li@tinno.com
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2.2. Manufacturer Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address /Post:	4/F, H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan East Road, Nan Shan District,Shenzhen, P.R.China
Contact Person:	xiaoping.li
Contact Email	xiaoping.li@tinno.com
Telephone:	0755-86095550
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	4G MIFI
Model Name	UM200AA
FCC ID	XD6UM200AA

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL,Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	/	V1.0	UM200AAV01.56.11
EUT2	865770050011693	V1.2	UM200AAV01.60_1.10

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	Battery	/	/
AE2	charger	/	/

AE1

Model	LT25H436270J
Manufacturer	Ningbo Veken Battery Co., Ltd.
Capacitance	2500mAh
Nominal voltage	3.85V

AE2

Model	TN-050120U8
Manufacturer	Chongqing Lianmao Electronic Co., Ltd.
Length of cable	/

*AE ID: is used to identify the test sample in the lab internally.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 + AE1 + AE2	Charger
Set.2	EUT2 + AE1 + AE2	Charger

Note： The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: LTE Band 5/12/14. The measurement results showed here are worst cases of different bands.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2019
ANSI C63.4	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	2014

Note: The test methods have no deviation with standards.

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters × 17meters × 10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz－1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
	BR	Re-use test data from basic model report.

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	A.1	P	**CTTL(huayuan North Road)**
2	Conducted Emission	15.107(a)	A.2	BR	**CTTL(huayuan North Road)**

Note: I21Z60407 is a variant model based on I21Z60214. According to the declaration of changes, the following test items and test modes were performed:

Test Item	Mode or Feature	EUT Set-up
Radiated Emission	Charging mode	Set.2

Other results are inherited from the initial model.The report number for initial model is I21Z60214-EMC01 (FCC ID: XD6UM200AA).

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	LISN	ENV216	101200	Rohde & Schwarz	2021-05-19	1 Year
2	Test Receiver	ESCI 3	100344	Rohde & Schwarz	2021-02-26	1 Year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2021-12-07	1 Year
4	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-03	1 Year
5	Antenna	VULB9163	9163-483	Schwarzbeck	2021-03-18	1 Year
6	Antenna	3115	167250	ETS-Lindgren	2021-05-14	1 Year
7	Antenna	VULB9163	9163-1223	Schwarzbeck	2021-03-18	1 Year

Note: The Test Receiver which series number is 100344 was before the CAL. DUE DATE when used.

Test Item	Test Software and Version	Software Vendor
Radiated Emission	EMC32 V9.01.0	R&S
Conducted Emission	EMC32 V8.52.0	R&S

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a).

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (charging mode) at distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.1.2 EUT Operating Mode:

The MS is operating in the charging mode. During the test MS is connected to a charger in the case of charging mode.

The EUT was tested while operating in licensed band Rx mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in Section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit (μV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

Limit(10m)=Limit(3m)+20[log(3/10)]

A.1.4 Test Condition

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	15	Peak, Average

A.1.5 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”. It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

Result = P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}

Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz：5.16dB, 1GHz-18GHz：5.44dB, *k*=2.

Note： The measurement results showed here are worst cases of the combinations of different Battery, cables and Headset.

Note:The measurement results showed here are worst cases.

Measurement results for Set.1:

EUT1 Charger+LTE Band 14 idle Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
40.485000	18.88	30.00	11.12	191.0	V	30.0
44.804000	14.84	30.00	15.16	125.0	V	91.0
57.982000	11.79	30.00	18.21	298.0	V	205.0
95.082000	8.67	33.50	24.85	105.0	V	300.0
157.828000	10.11	33.50	23.41	225.0	V	69.0
193.764000	13.16	33.50	20.36	125.0	V	12.0

EUT1 Charger+LTE Band 14 idle Mode/Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17985.267	51.3	-29.1	46.7	33.698	V	54	2.7
17990.933	51.3	-29.1	46.7	33.698	V	54	2.7
17943.900	51.2	-28.9	46.7	33.483	H	54	2.8
17901.967	50.8	-29.3	46.0	34.172	V	54	3.2
17973.933	50.8	-29.1	46.7	33.201	V	54	3.2
17963.167	50.6	-29.1	46.7	33.001	H	54	3.4

EUT1 Charger+LTE Band 14 idle Mode/Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17898.567	59.9	-29.5	46.0	43.480	H	74	14.1
17992.067	59.4	-29.1	46.7	41.798	V	74	14.6
17910.467	58.6	-29.3	46.0	41.972	V	74	15.4
17949.000	58.6	-28.9	46.7	40.883	H	74	15.4
16876.300	58.6	-29.8	41.5	46.955	V	74	15.4
17999.433	58.5	-29.1	46.7	40.898	H	74	15.5

Measurement results for Set.2:

EUT2 Charger+LTE Band 14 idle Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.402000	17.58	30.00	12.42	102.3	V	2.0
54.929000	12.14	30.00	17.86	125.0	V	30.0
102.168000	8.79	33.50	24.73	320.5	V	30.0
157.652000	10.93	33.50	22.59	107.7	V	194.0
186.946000	11.79	33.50	21.73	114.7	V	120.0
503.845000	15.50	36.00	20.52	310.2	V	197.0

EUT2 Charger+LTE Band 14 idle Mode/Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17983.000	47.8	-29.1	46.7	30.198	H	54	6.2
17889.500	47.4	-29.5	46.0	30.980	H	54	6.6
17963.733	47.3	-29.1	46.7	29.701	V	54	6.7
17967.700	47.3	-29.1	46.7	29.701	H	54	6.7
17890.067	47.2	-29.5	46.0	30.780	H	54	6.8
17996.033	47.2	-29.1	46.7	29.598	H	54	6.8

EUT2 Charger+LTE Band 14 idle Mode/Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17992.633	59.3	-29.1	46.7	41.698	V	74	14.7
17981.867	59.3	-29.1	46.7	41.698	V	74	14.7
17837.367	59.2	-29.7	46.0	42.924	V	74	14.8
17985.833	58.9	-29.1	46.7	41.298	H	74	15.1
17493.400	58.8	-29.8	44.4	44.217	V	74	15.2
17780.700	58.8	-29.9	46.0	42.732	H	74	15.2

EUT1 Charger+LTE Band 14 idle Mode, Set.1

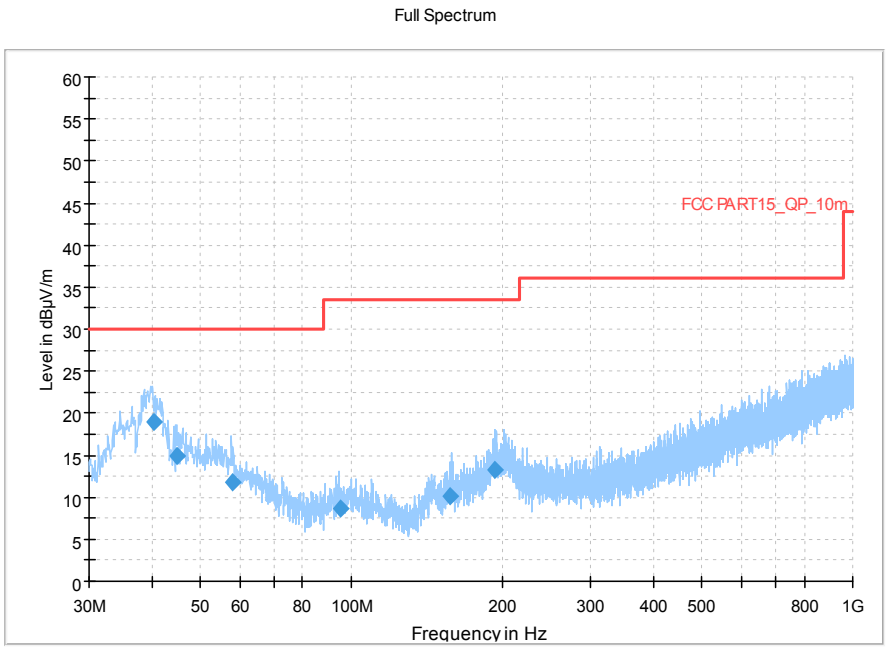

Figure A.1 Radiated Emission from 30MHz to 1GHz

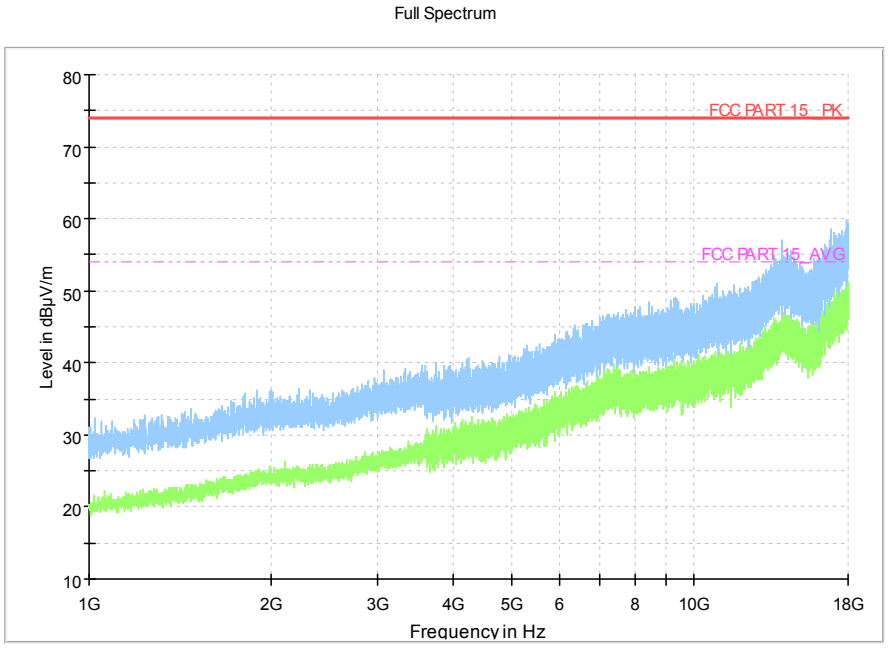

Figure A.2 Radiated Emission from 1GHz to 18GHz

EUT2 Charger+LTE Band 14 idle Mode, Set.2

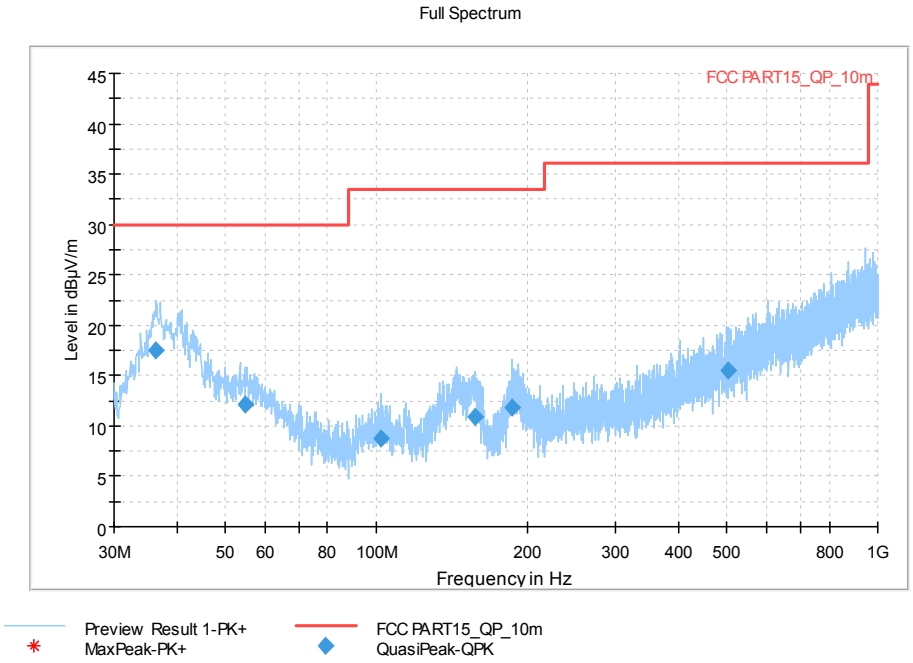

Figure A.3 Radiated Emission from 30MHz to 1GHz

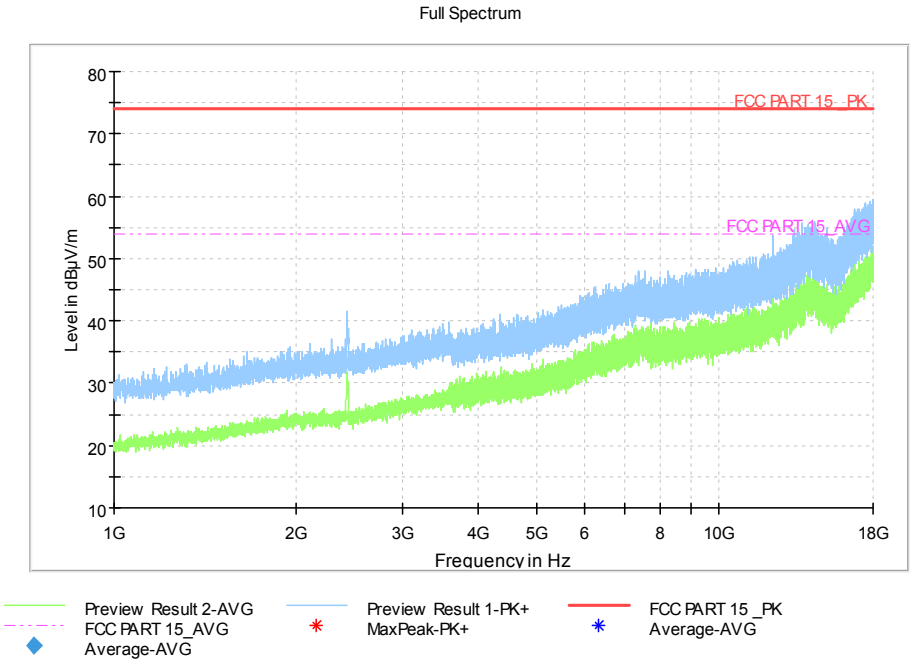

Figure A.4 Radiated Emission from 1GHz to 18GHz

A.2 Conducted Emission

Reference

FCC: CFR Part 15.107(a).

A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

A.2.2 EUT Operating Mode

The MS is operating in the charging mode. During the test MS is connected to a charger in the case of charging mode.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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		

A.2.4 Test Condition in charging mode

Voltage（V）	Frequency（Hz）
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

Measurement uncertainty: *U*=3.08dB, *k*=2.

Note： The measurement results showed here are worst cases of the combinations of different Battery, cables and Headset.

Note:The measurement results showed here are worst cases.

EUT1 Charger+LTE Band 14 idle Mode, Set.1

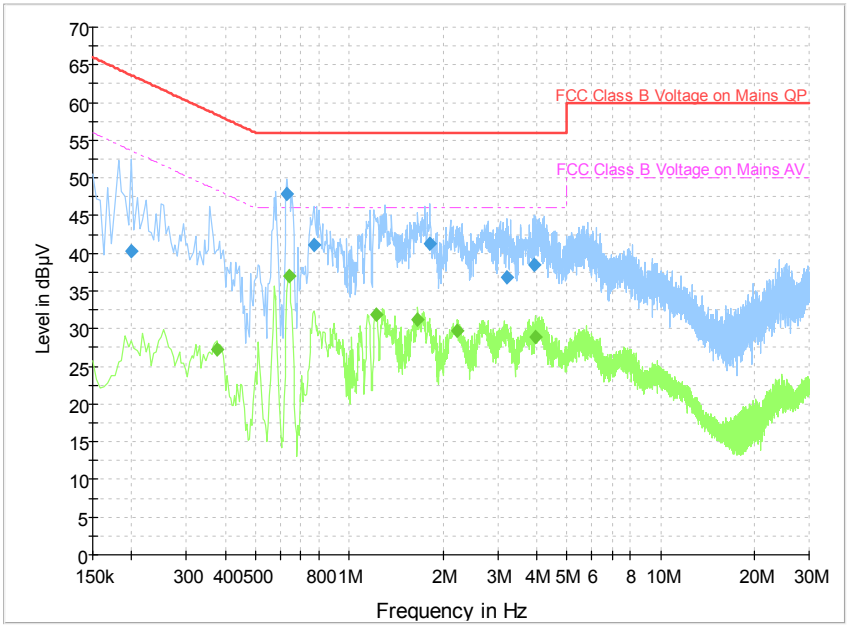

Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	40.3	N	19.6	23.3	63.6
0.631500	47.9	L1	19.6	8.1	56.0
0.771000	41.1	L1	19.6	14.9	56.0
1.815000	41.2	L1	19.5	14.8	56.0
3.214500	36.9	L1	19.7	19.1	56.0
3.943500	38.5	L1	19.7	17.5	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.375000	27.2	L1	19.6	21.1	48.4
0.640500	37.1	L1	19.6	8.9	46.0
1.225500	31.9	L1	19.6	14.1	46.0
1.662000	31.2	L1	19.6	14.8	46.0
2.229000	29.7	L1	19.6	16.3	46.0
3.952500	28.8	L1	19.7	17.2	46.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Yang Mengke
Radiated Continuous Emission	Yan Hanchen，Ding Zai

*****END OF REPORT*****