



FCC 15B TEST REPORT

No. I20Z61808-EMC01

for

TCL Communication Ltd.

Mobile WiFi

Model Name: R219t

FCC ID: 2ACCJB142

with

Hardware Version: V2.0

Software Version: R219t_ZZ_02.00_01

Issued Date: 2020-11-27

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z61808-EMC01	Rev.0	1 st edition	2020-11-18
I20Z61808-EMC01	Rev.1	2 nd edition.Update Test Equipments Utilized in page 11	2020-11-27

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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: 2020-10-21

Testing End Date: 2020-11-03

1.4. Signature



An Hui

(Prepared this test report)



Zhang Ying

(Reviewed this test report)



Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address /Post: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science
Park, Shatin, NT, Hong Kong
City: Hong Kong
Postal Code: /
Country: China
Telephone: 0086-755-36611722

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science
Park, Shatin, NT, Hong Kong
City: Hong Kong
Postal Code: /
Country: China
Telephone: 0086-755-36611722

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Mobile WiFi
Model Name	R219t
FCC ID	2ACCJB142

The Equipment under Test (EUT) is a model of Mobile WiFi with integrated antenna.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

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	355097460200295	V2.0	R219t_ZZ_02.00_01

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

3.3. Internal Identification of AE used during the test

AE1	Battery	/	/
AE2	charger	/	/
AE3	charger	/	/
AE8	USB Cable	/	/

AE1

Model	TLi021F7
Manufacturer	VEKEN
Capacity	2150mAh
Nominal Voltage	3.7V

AE2

Model	UC11US
Manufacturer	PUAN
Length of cable	/

AE3

Model	UC11US
Manufacturer	CHENYANG
Length of cable	/



AE8

Model CDA0000158C1
Manufacturer JUWEI
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+AE8	Charger
Set.2	EUT1 + AE1+ AE3+AE8	Charger

Note:

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: none.

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

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/4	The test is performed in test location 1/2/4 which is described in section 1.1 of this report

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

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 7	100344	Rohde & Schwarz	2021-02-26	1 year
3	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-03	1 year
4	BiLog Antenna	VULB9163	9163-1223	Schwarzbeck	2021-03-18	1 year
5	Dual-Ridge Waveguide Horn Antenna	3115	6914	ETS-Lindgren	2021-01-14	1 year
6	LISN	ENV216	101200	Rohde & Schwarz	2021-05-19	1 year

Test Item	Test Software and Version	Software Vendor
Radiated Continuous 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 and FM mode of MS) 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 2.2, 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 ($\mu\text{V/m}$)		
	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.

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:

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

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, $k=2$.

Measurement results for Set.1:

Charger QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.744000	9.86	30.00	20.14	284.0	V	-28.0
62.731000	12.72	30.00	17.28	103.0	V	-24.0
99.558000	8.87	33.50	24.65	215.0	V	201.0
144.109000	11.85	33.50	21.67	116.0	V	19.0
163.273000	10.02	33.50	23.50	117.0	V	20.0
902.256000	21.68	36.00	14.34	100.0	V	241.0

Charger/Average detector

Frequency (MHz)	Result (dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
5573.500	41.3	-34.1	35.1	31.900	H	54	12.7
5800.833	40.9	-33.5	35.1	31.100	H	54	13.1
5836.833	40.9	-33.8	35.1	31.300	V	54	13.1
5795.833	40.8	-33.8	35.1	31.200	H	54	13.2
5687.500	40.8	-33.8	35.1	31.000	H	54	13.2
5757.333	40.7	-33.8	35.1	30.900	H	54	13.3

Charger/Peak detector

Frequency (MHz)	Result (dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
5573.500	41.3	-34.2	35.1	40.400	H	74	32.7
5800.833	40.9	-33.8	35.1	39.600	H	74	33.1
5836.833	40.9	-33.8	35.1	39.600	V	74	33.1
5795.833	40.8	-33.8	35.1	39.500	H	74	33.2
5687.500	40.8	-34.2	35.1	39.900	H	74	33.2
5757.333	40.7	-33.8	35.1	39.400	H	74	33.3

Measurement results for Set.2:
Charger QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
55.613000	12.60	30.00	17.40	225.0	V	-11.0
63.608000	11.87	30.00	18.13	284.0	V	278.0
100.270000	9.31	33.50	24.21	125.0	V	-29.0
143.860000	12.35	33.50	21.17	125.0	V	-3.0
319.587000	12.65	36.00	23.37	286.0	V	206.0
588.886000	17.48	36.00	18.54	225.0	V	60.0

Charger Average detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
5573.500	41.3	-34.1	35.1	31.600	H	54	12.7
5800.833	40.9	-33.8	35.1	31.100	H	54	13.1
5836.833	40.9	-33.5	35.1	30.800	V	54	13.1
5795.833	40.8	-34.6	34.6	32.100	H	54	13.2
5687.500	40.8	-34.6	34.6	32.100	H	54	13.2
5757.333	40.7	-33.8	35.1	30.800	H	54	13.3

Charger Peak detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
5573.500	41.3	-34.1	35.1	41.200	H	74	32.7
5800.833	40.9	-34.1	35.1	40.400	H	74	33.1
5836.833	40.9	-34.2	35.1	40.000	V	74	33.1
5795.833	40.8	-34.6	34.6	40.500	H	74	33.2
5687.500	40.8	-34.0	35.1	39.300	H	74	33.2
5757.333	40.7	-34.1	35.1	39.400	H	74	33.3

Sample calculation: Peak detector, 5757.333MHz

Result =P_{Mea} (39.4dB μ V)+ G_A (35.1dB/m)+ G_{PL}(-34.1 dB) =40.7 dB μ V/m

Charger 1, Set.1

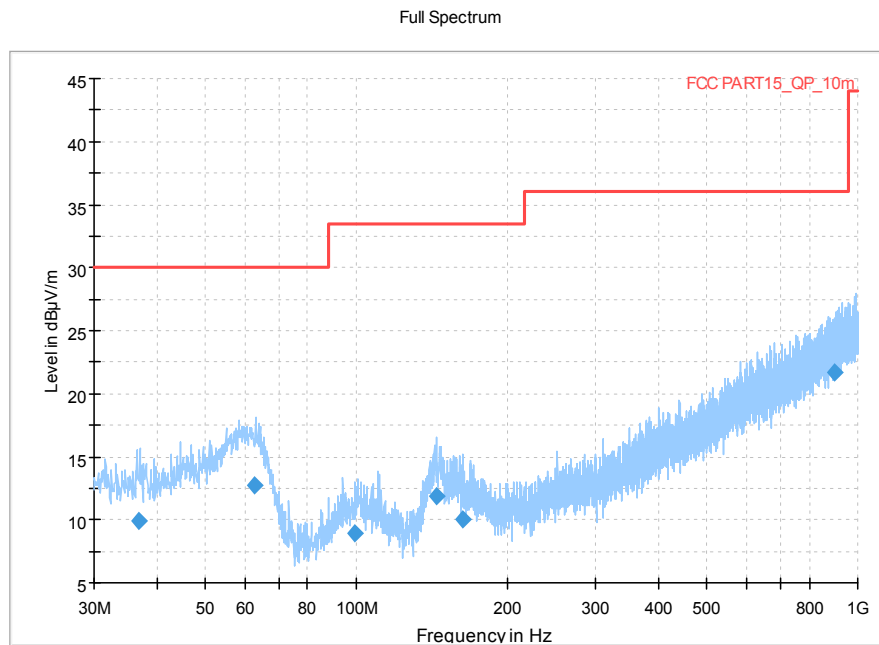


Figure A.1 Radiated Emission from 30MHz to 1GHz

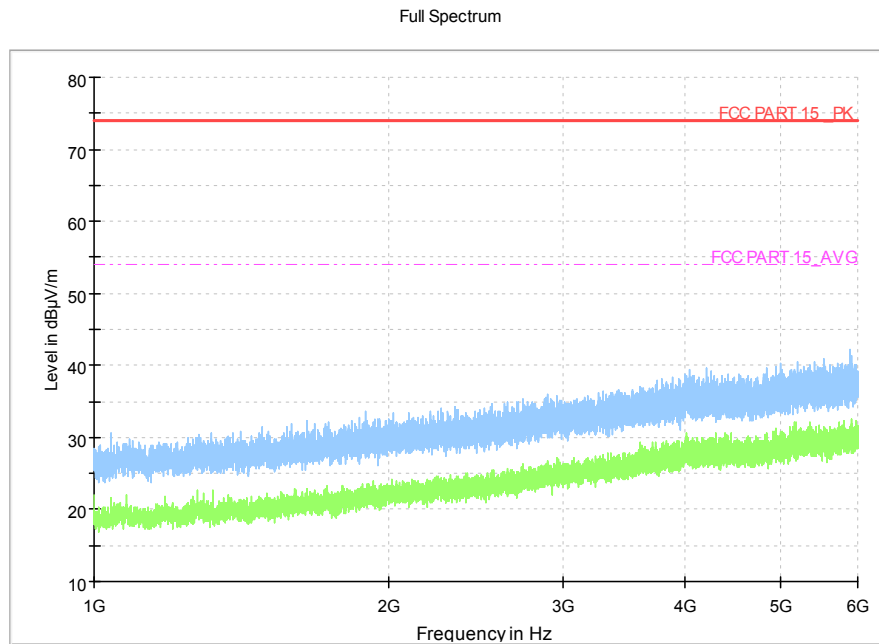


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charger 2, Set.2

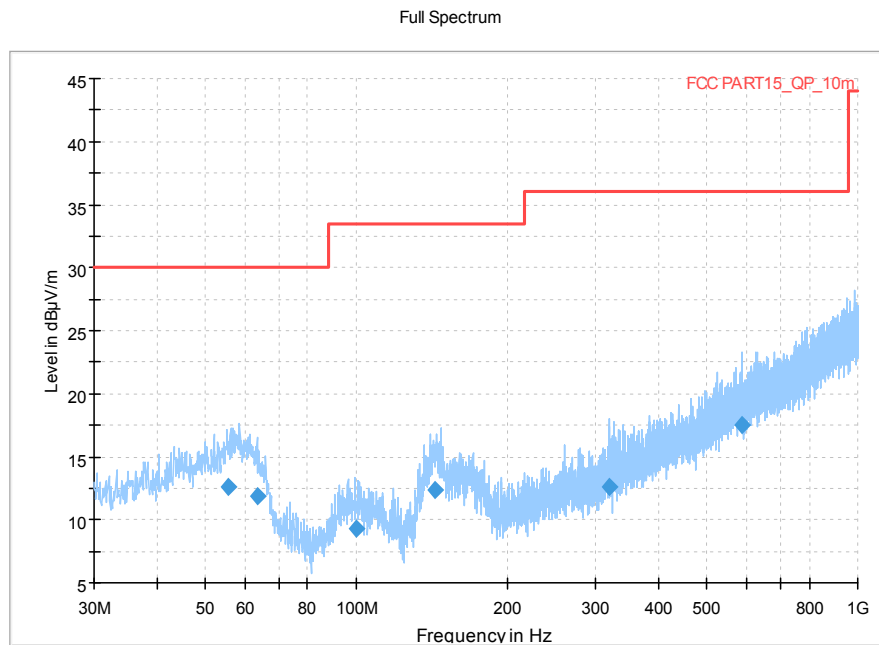


Figure A.3 Radiated Emission from 30MHz to 1GHz

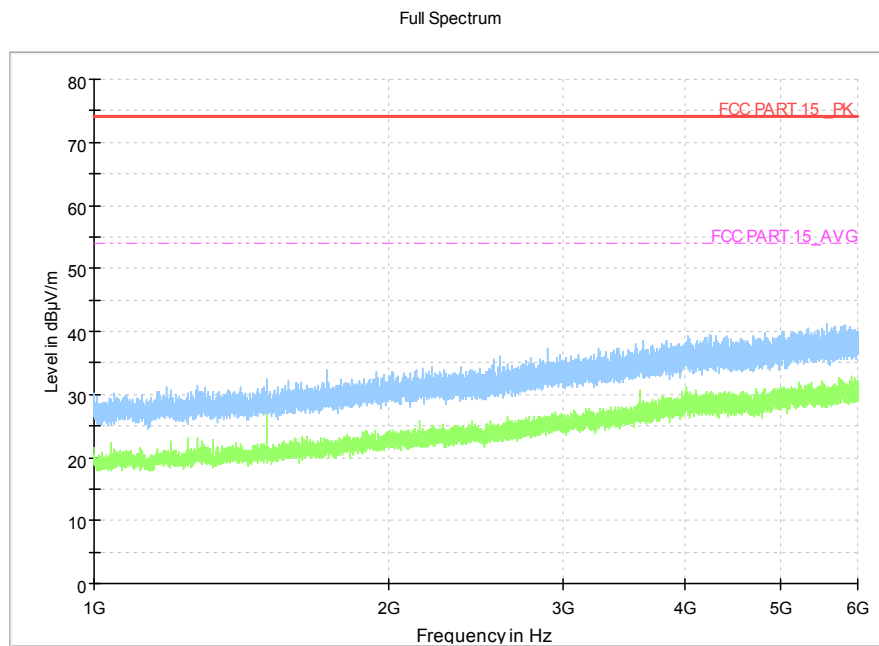


Figure A.4 Radiated Emission from 1GHz to 18GHz

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: $U=3.08\text{dB}$, $k=2$.

Charger 1, Set.1

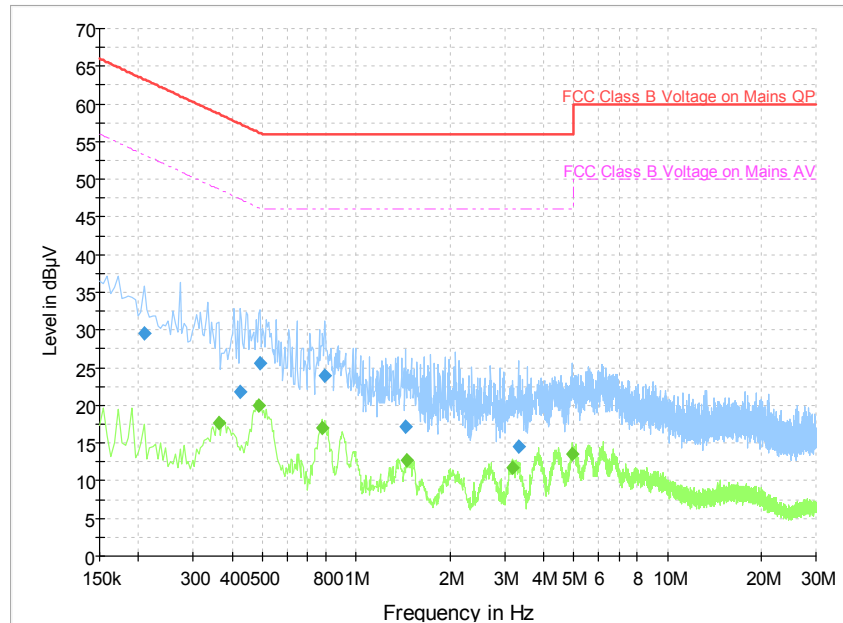


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.208500	29.5	N	19.6	33.8	63.3
0.424500	21.8	N	19.6	35.5	57.4
0.492000	25.6	N	19.6	30.5	56.1
0.793500	24.0	L1	19.6	32.0	56.0
1.441500	17.2	N	19.6	38.8	56.0
3.318000	14.6	N	19.6	41.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.361500	17.7	N	19.6	31.0	48.7
0.487500	20.0	N	19.6	26.2	46.2
0.775500	17.0	N	19.5	29.0	46.0
1.459500	12.6	N	19.6	33.4	46.0
3.169500	11.7	L1	19.7	34.3	46.0
4.960500	13.6	L1	19.8	32.4	46.0

Charger2, Set.2

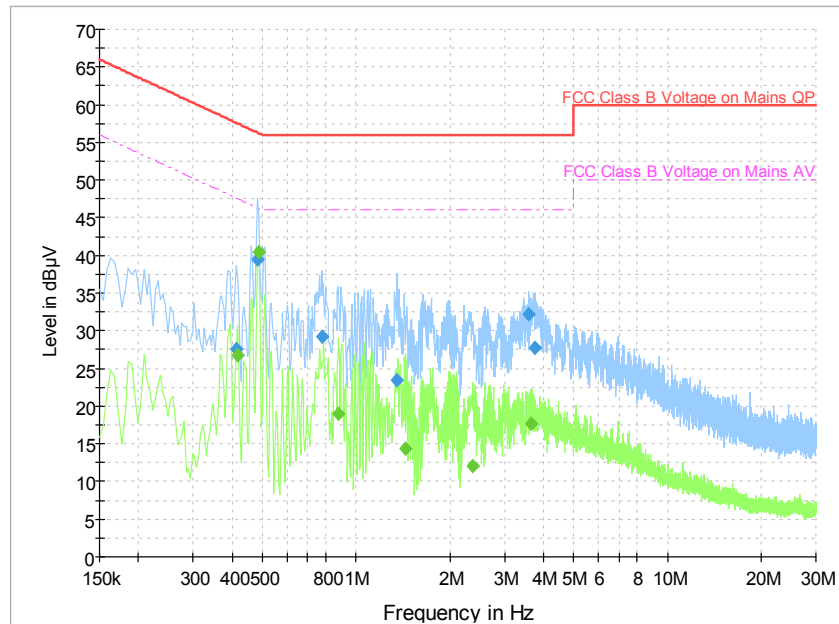


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.411000	27.6	L1	19.6	30.0	57.6
0.483000	39.4	L1	19.6	16.9	56.3
0.775500	29.1	L1	19.6	26.9	56.0
1.356000	23.4	L1	19.6	32.6	56.0
3.592500	32.3	N	19.6	23.7	56.0
3.741000	27.7	N	19.6	28.3	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	26.7	N	19.6	20.8	47.5
0.487500	40.4	N	19.6	5.8	46.2
0.879000	19.0	N	19.5	27.0	46.0
1.437000	14.4	N	19.6	31.6	46.0
2.364000	12.0	N	19.6	34.0	46.0
3.637500	17.6	N	19.6	28.4	46.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Yan Hanchen
Radiated Continuous Emission	Wang Huan

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