



TEST REPORT

No. I15Z40879-EMC01

for

TCL Communication Ltd.

CDMA+LTE mobile phone for Sprint

Model Name: 5017B

FCC ID: 2ACCJB011

with

Hardware Version:VE

Software Version: 5017BA0B

Issued Date: 2015-05-25

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

FCC 2.948 Listed: No.525429

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z40879-EMC01	Rev.0	1 st edition	2015-05-19
I15Z40879-EMC02	Rev.1	2 nd edition	2015-05-25

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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: 2015-05-09
Testing End Date: 2015-05-14

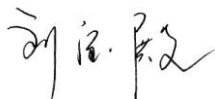
1.4. Signature



Zhang Hui
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



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(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech
Park, Pudong Area, Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
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2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech
Park, Pudong Area, Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Telephone: +86 21 51798260
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	CDMA+LTE mobile phone for Sprint
Model Name	5017B
FCC ID	2ACCJB011
Extreme vol. Limits	3.5VDC to 4.35VDC (nominal: 3.8VDC)

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
EUT2	35820406010198	VE	5017BA0B

*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	/	15TCT-BA-0280
AE2	Battery	/	15TCT-BA-0275
AE3	Battery	/	15TCT-BA-0274
AE4	Battery	/	15TCT-BA-0279
AE5	USB cable	/	15TCT-DC-0180
AE6	USB cable	/	15TCT-DC-0181
AE7	Travel charger	/	15TCT-CH-0313
AE8	Travel charger	/	15TCT-CH-0311

AE1,AE2,AE3,AE4

Model	TLi020F2
Manufacturer	SCUD
Capacitance	2000 mAh
Nominal voltage	3.8 V

AE5,AE6

Model	CDA3122006C2
Manufacturer	Shenghua
Length of cable	100cm

AE7,AE8

Model	CBA0058AG1C1
Manufacturer	BYD
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	EUT2 + AE1 + AE5 + AE7	Charger
Set.2	EUT2 + AE1 + AE5	USB mode

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	10-1-14 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009

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 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 °C, Max. = 35 °C
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
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	Section 5	B.1	P	A
2	Conducted Emission	15.107(a)	Section 5	B.2	P	A

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTUR E	CAL DUE DATE	CALIBRATI ON INTERVAL
1	Test Receiver	ESU26	100235	R&S	2016-03-02	1 year
2	Universal Radio Communication Tester	CMU200	109914	R&S	2016-03-26	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2015-12-09	1 year
4	LISN	ENV216	101200	R&S	2015-07-07	1 year
5	EMI Antenna	VULB 9163	9163-301	Schwarzbeck	2017-12-16	3 years
6	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 years
7	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
8	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
9	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
10	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

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 (USB mode of MS and charging 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 - 2009, 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 USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

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): $U = 4.3 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
17999.433	43.4	-17.7	45.6	15.500	HORIZONTAL
17997.167	43.4	-17.7	45.6	15.500	HORIZONTAL
17995.467	43.3	-17.7	45.6	15.400	VERTICAL
18000.000	43.3	-45.6	44.5	44.366	HORIZONTAL
17978.467	43.3	-17.7	45.6	15.400	HORIZONTAL
17963.733	43.3	-17.7	45.6	15.400	HORIZONTAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
17981.300	55.5	-17.7	45.6	27.600	HORIZONTAL
17994.333	55.4	-17.7	45.6	27.500	HORIZONTAL
18000.000	55.4	-45.6	44.5	56.466	VERTICAL
17999.433	55.3	-17.7	45.6	27.400	HORIZONTAL
17989.800	55.2	-17.7	45.6	27.300	HORIZONTAL
17972.233	55.0	-17.7	45.6	27.100	HORIZONTAL

Measurement results for Set.2:**USB Mode/Average detector**

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17982.433	43.6	-17.7	45.6	15.700	HORIZONTAL
17997.167	43.5	-17.7	45.6	15.600	HORIZONTAL
18000.000	43.4	-45.6	44.5	44.466	VERTICAL
17983.567	43.4	-17.7	45.6	15.500	HORIZONTAL
17988.100	43.4	-17.7	45.6	15.500	HORIZONTAL
17984.700	43.4	-17.7	45.6	15.500	HORIZONTAL

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17988.100	56.8	-17.7	45.6	28.900	HORIZONTAL
17986.967	55.5	-17.7	45.6	27.600	HORIZONTAL
17988.667	55.5	-17.7	45.6	27.600	VERTICAL
17999.433	55.4	-17.7	45.6	27.500	HORIZONTAL
17981.867	55.3	-17.7	45.6	27.400	HORIZONTAL
17939.933	55.2	-17.7	45.6	27.300	HORIZONTAL

Note: The measurement results of Set.1, Set.2 showed here are worst cases of the combinations of different batteries and USB cables.

Charging Mode, Set.1

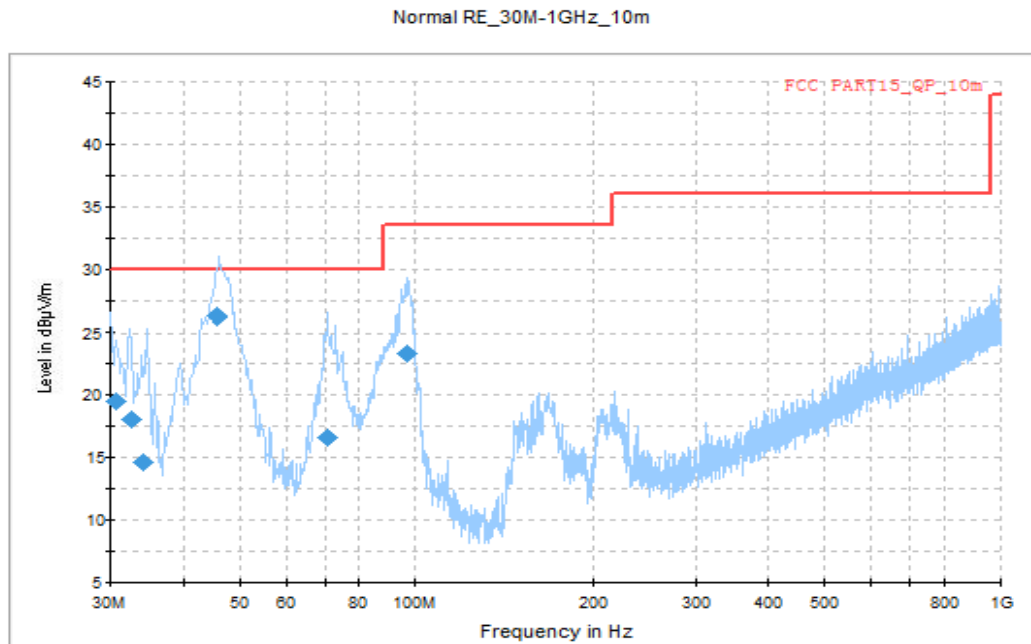


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.600000	19.5	325.0	V	-4.0	-13.9	10.5	30.0
32.748000	18.0	100.0	V	2.0	-13.4	12.0	30.0
34.056000	14.6	325.0	V	86.0	-13.2	15.4	30.0
45.836500	26.2	175.0	V	8.0	-11.7	3.8	30.0
70.814000	16.6	199.0	V	61.0	-15.4	13.4	30.0
97.119000	23.4	289.0	V	285.0	-13.1	10.1	33.5

Normal RE_1G-18GHz_directly

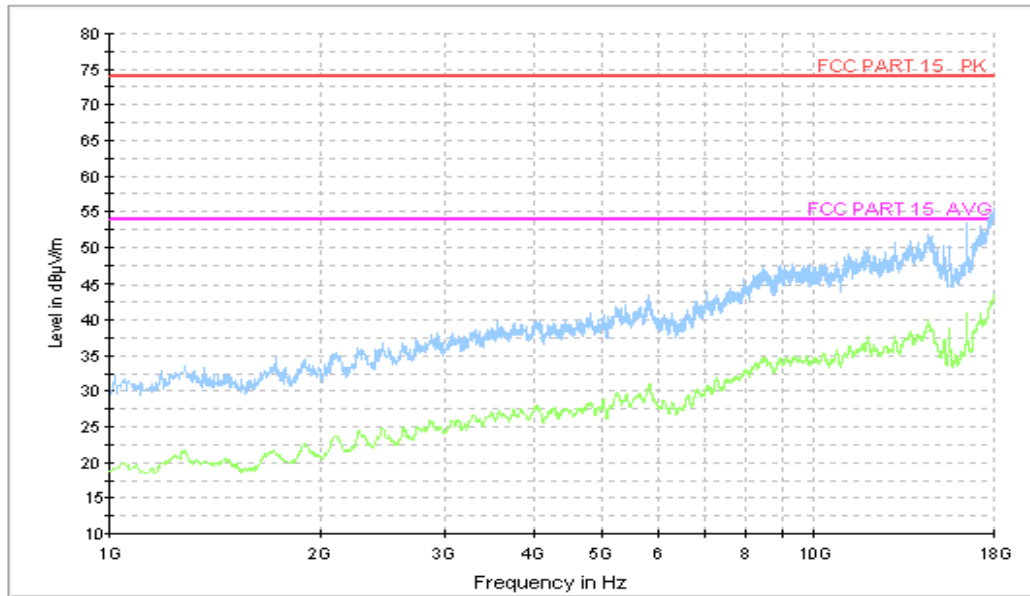


Figure A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.2

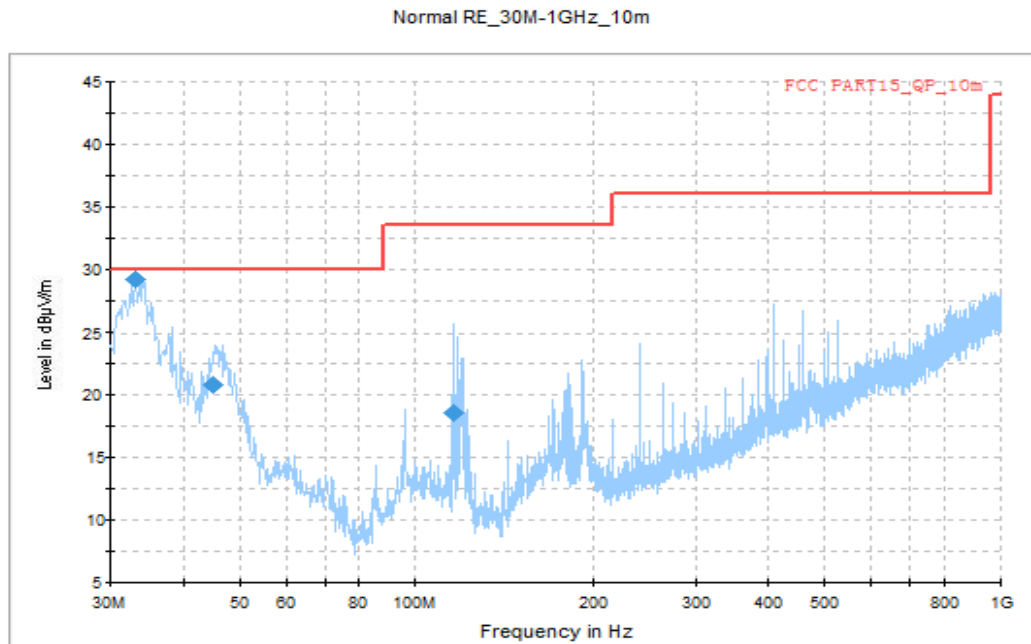


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
33.224000	29.2	294.0	V	272.0	-13.3	-1.2	30.0
45.026000	20.9	375.0	V	150.0	-11.7	9.1	30.0
116.244500	18.6	400.0	H	259.0	-14.3	14.9	33.5

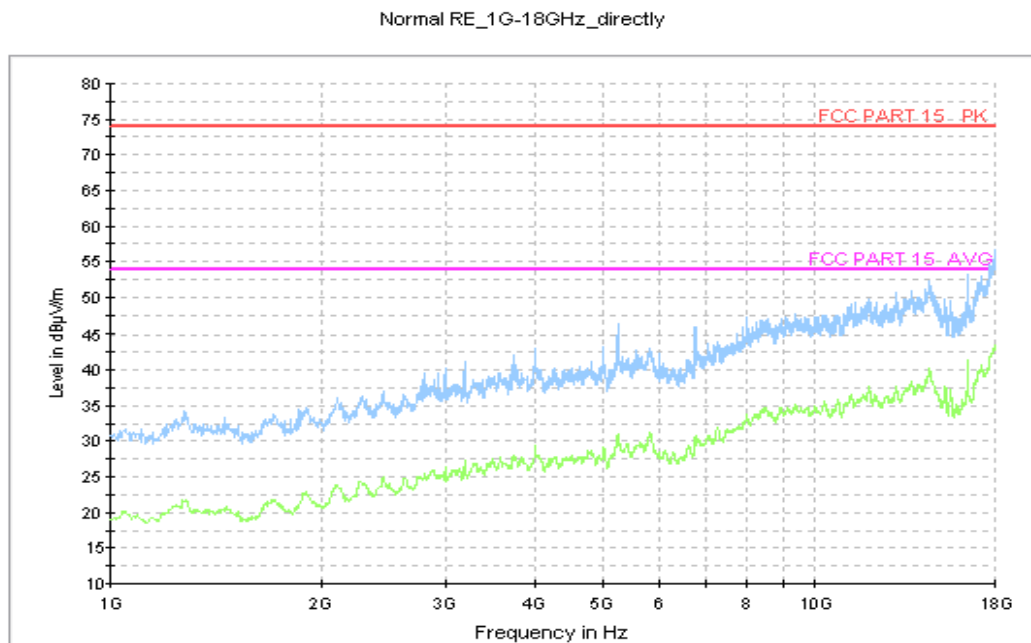


Figure A.4 Radiated Emission from 1GHz to18GHz

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 - 2009, section 7.3.

A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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: $U= 2.9$ dB, $k=2$.

Charging Mode, Set.1

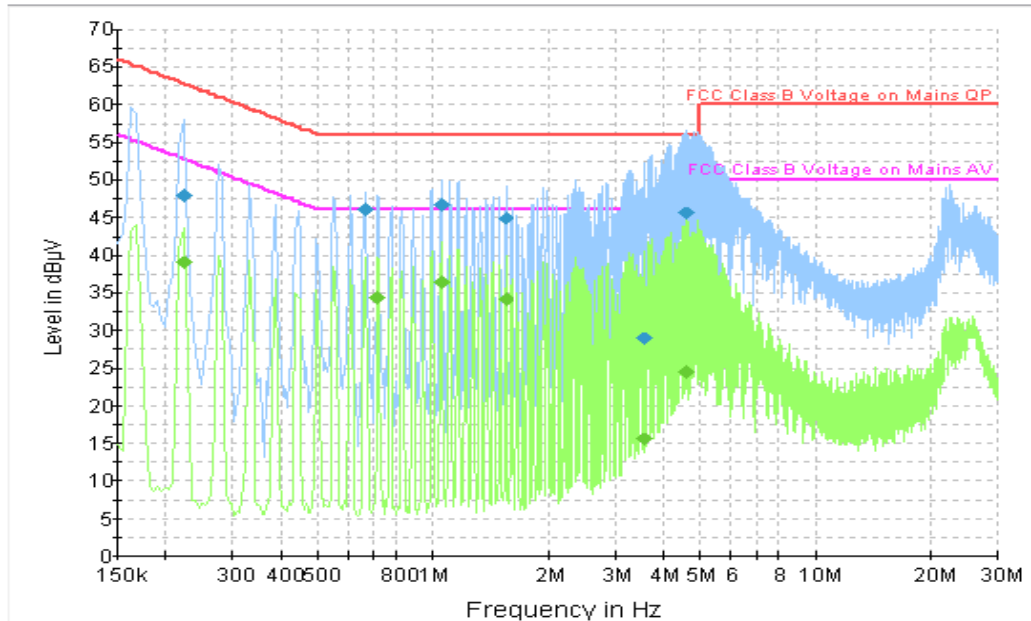


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.222000	48.0	1000.0	9.000	On	L1	19.7	14.8	62.7
0.663000	46.1	1000.0	9.000	On	N	19.8	9.9	56.0
1.050000	46.7	1000.0	9.000	On	L1	19.7	9.3	56.0
1.549500	45.0	1000.0	9.000	On	N	19.7	11.0	56.0
3.592500	28.9	1000.0	9.000	On	N	19.7	27.1	56.0
4.596000	45.5	1000.0	9.000	On	N	19.6	10.5	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.222000	39.0	1000.0	9.000	On	L1	19.7	13.7	52.7
0.717000	34.3	1000.0	9.000	On	L1	19.8	11.7	46.0
1.050000	36.3	1000.0	9.000	On	L1	19.7	9.7	46.0
1.549500	34.2	1000.0	9.000	On	N	19.7	11.8	46.0
3.588000	15.5	1000.0	9.000	On	L1	19.7	30.5	46.0
4.591500	24.5	1000.0	9.000	On	N	19.6	21.5	46.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

USB Mode, Set.2

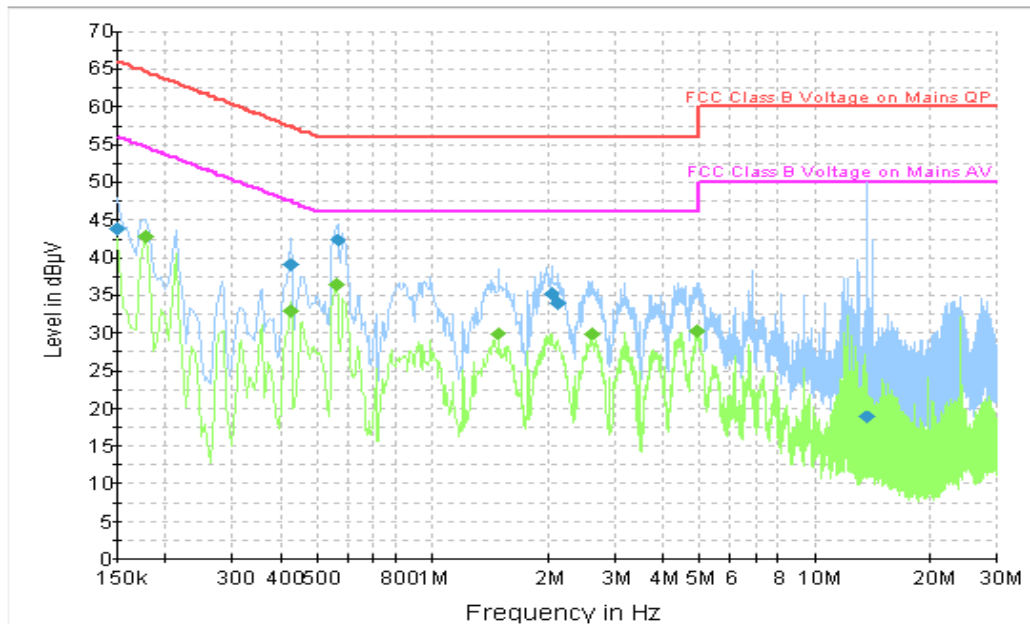


Figure A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	43.7	1000.0	9.000	On	L1	20.1	22.3	66.0
0.424500	39.0	1000.0	9.000	On	L1	19.8	18.4	57.4
0.564000	42.3	1000.0	9.000	On	L1	19.8	13.7	56.0
2.053500	35.1	1000.0	9.000	On	L1	19.6	20.9	56.0
2.125500	33.8	1000.0	9.000	On	N	19.6	22.2	56.0
13.722000	18.8	1000.0	9.000	On	L1	20.1	41.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	42.8	1000.0	9.000	On	N	19.7	11.8	54.6
0.424500	32.8	1000.0	9.000	On	L1	19.8	14.5	47.4
0.559500	36.3	1000.0	9.000	On	L1	19.8	9.7	46.0
1.486500	29.8	1000.0	9.000	On	L1	19.6	16.2	46.0
2.620500	29.9	1000.0	9.000	On	N	19.7	16.1	46.0
4.960500	30.2	1000.0	9.000	On	L1	19.6	15.8	46.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

END OF REPORT