



TEST REPORT

No. I15Z43213-EMC01

for

TCL Communication Ltd

HSUPA/HSDPA/UMTS quad band /GSM quad band mobile phone

Model Name: 4034G

FCC ID: 2ACCJH044

with

Hardware Version: PIO

Software Version: SW3D51

Issued Date: 2016-01-19

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

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

Tel: +86(0)10-62304633-2512, Fax: +86(0)10-62304633-2504

Email: ctl_terminals@catr.cn, website: www.chinattl.com



REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z43213-EMC01	Rev.0	1 st edition	2016-01-19

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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℃

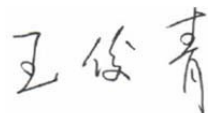
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2015-12-31

Testing End Date: 2015-01-08

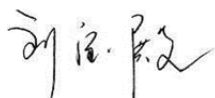
1.4. Signature



Wang Junqing
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



Liu Baodian
Deputy Director of the laboratory
(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: P. R. China
Contact Person: Gong Zhizhou
Contact Email zhizhou.gong@tcl.com
Telephone: 0086-21-51798260
Fax: 0086-21-61460602

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: P. R. China
Contact Person: Gong Zhizhou
Contact Email zhizhou.gong@tcl.com
Telephone: 0086-21-51798260
Fax: 0086-21-61460602

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

3.1. About EUT

Description HSUPA/HSDPA/UMTS quad band /GSM quad band mobile phone

Model Name 4034G
FCC ID 2ACCJH044
Extreme vol. Limits 3.5VDC to 4.2VDC (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
EUT1	014528000100655	PIO	SW3D51

*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-0733
AE2	Battery	/	15TCT-BA-0671
AE3	Travel	/	15TCT-CH-0887
AE4	Travel	/	15TCT-CH-1241
AE5	Travel	/	15TCT-CH-0366
AE6	Travel	/	15TCT-CH-0106
AE7	Travel	/	15TCT-CH-0276
AE8	Travel	/	15TCT-CH-0205
AE9	Travel	/	15TCT-CH-0175
AE10	Travel	/	15TCT-CH-0125
AE11	USB cable	/	15TCT-DC-0306
AE12	USB cable	/	15TCT-DC-0664
AE13	Battery	/	/
AE14	Battery	/	/
AE15	USB cable	/	/
AE16	USB cable	/	/

AE1

Model CAB1500040C1
Manufacturer BYD
Capacitance 1500 mAh
Nominal voltage 3.8 V

AE2

Model CAB1500042C7
Manufacturer WEKEN
Capacitance 1500 mAh
Nominal voltage 3.8 V

AE3

Model CBA0066AG0C2
Manufacturer Tenpao
Length of cable 120cm



AE4	
Model	CBA3002AG0C5
Manufacturer	PUAN
Length of cable	120cm
AE5	
Model	CBA0067AG0C4
Manufacturer	Aohai
Length of cable	/
AE6	
Model	CBA3068AG0C4
Manufacturer	AOHAI
Length of cable	/
AE7	
Model	CBA0067AG0C1
Manufacturer	BYD
Length of cable	/
AE8	
Model	CBA3008AG0C2
Manufacturer	Tenpao
Length of cable	/
AE9	
Model	CBA0066AG0C1
Manufacturer	BYD
Length of cable	120cm
AE10	
Model	CBA3068AG0C1
Manufacturer	BYD
Length of cable	/
AE11	
Model	CDA3122005C1
Manufacturer	JUWEI
Length of cable	100cm
AE12	
Model	CDA3122005C2
Manufacturer	Shenhua
Length of cable	100cm
AE13	
Model	CAB1500041C1
Manufacturer	BYD
Capacitance	1500 mAh

Nominal voltage	3.8 V
AE14	
Model	CAB1500043C7
Manufacturer	WEKEN
Capacitance	1500 mAh
Nominal voltage	3.8 V

AE15	
Model	CDA3122002C1
Manufacturer	JUWEI
Length of cable	/

AE16	
Model	CDA3122002C2
Manufacturer	Shenhua
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+ AE3	Charger
Set.2	EUT1+ AE1/AE2+ AE4	Charger
Set.3	EUT1+ AE1/AE2+ AE5+ AE11/AE12	Charger
Set.4	EUT1+ AE1/AE2+ AE6+ AE11/AE12	Charger
Set.5	EUT1+ AE1/AE2+ AE7+ AE11/AE12	Charger
Set.6	EUT1+ AE1/AE2+ AE8+ AE11/AE12	Charger
Set.7	EUT1+ AE1/AE2+ AE9	Charger
Set.8	EUT1+ AE1/AE2+ AE10+ AE11/AE12	Charger
Set.9	EUT1+ AE1/AE2+ AE11/AE12	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	10-1-13 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	2014

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	2016-12-09	1 year
4	LISN	ENV216	101200	R&S	2016-07-07	1 year
5	EMI Antenna	VULB 9163	9163-514	Schwarzbeck	2017-11-24	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 – 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 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 μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17962.600	50.7	-17.7	45.6	22.800	VERTICAL
17978.750	50.6	-17.7	45.6	22.700	HORIZONTAL
17894.600	50.6	-18.5	45.6	23.500	VERTICAL
17830.850	50.4	-18.5	45.6	23.300	HORIZONTAL
17886.100	50.4	-18.5	45.6	23.300	VERTICAL
17975.350	50.3	-17.7	45.6	22.400	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17818.950	61.8	-18.5	45.6	34.700	HORIZONTAL
17890.350	61.7	-18.5	45.6	34.600	VERTICAL
17944.750	61.5	-17.7	45.6	33.600	VERTICAL
17984.700	61.2	-17.7	45.6	33.300	VERTICAL
17951.550	61.1	-17.7	45.6	33.200	HORIZONTAL
17937.100	61.1	-17.7	45.6	33.200	VERTICAL

Measurement results for Set.2:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17946.450	50.8	-17.7	45.6	22.900	HORIZONTAL
17830.850	50.7	-18.5	45.6	23.600	VERTICAL
17982.150	50.7	-17.7	45.6	22.800	HORIZONTAL
17887.800	50.4	-18.5	45.6	23.300	HORIZONTAL
17871.650	50.4	-18.5	45.6	23.300	VERTICAL
17960.050	50.3	-17.7	45.6	22.400	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17895.450	61.0	-18.5	45.6	33.900	VERTICAL
17919.250	61.0	-17.7	45.6	33.100	HORIZONTAL
17996.600	61.0	-17.7	45.6	33.100	VERTICAL
17937.100	60.7	-17.7	45.6	32.800	HORIZONTAL
17954.100	60.6	-17.7	45.6	32.700	VERTICAL
17878.450	60.5	-18.5	45.6	33.400	VERTICAL

Measurement results for Set.3:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17969.400	50.7	-17.7	45.6	22.800	VERTICAL
17973.650	50.5	-17.7	45.6	22.600	VERTICAL
17864.850	50.4	-18.5	45.6	23.300	VERTICAL
17947.300	50.4	-17.7	45.6	22.500	HORIZONTAL
17890.350	50.4	-18.5	45.6	23.300	VERTICAL
17914.150	50.4	-18.5	45.6	23.300	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17914.150	62.2	-18.5	45.6	35.100	VERTICAL
17969.400	61.4	-17.7	45.6	33.500	VERTICAL
17740.750	61.2	-18.5	45.6	34.100	VERTICAL
17821.500	61.2	-18.5	45.6	34.100	HORIZONTAL
17977.900	61.0	-17.7	45.6	33.100	VERTICAL
17926.900	60.7	-17.7	45.6	32.800	VERTICAL

Measurement results for Set.4:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17863.150	50.8	-18.5	45.6	23.700	VERTICAL
17938.800	50.7	-17.7	45.6	22.800	VERTICAL
17968.550	50.6	-17.7	45.6	22.700	HORIZONTAL
17960.050	50.5	-17.7	45.6	22.600	HORIZONTAL
17802.800	50.5	-18.5	45.6	23.400	HORIZONTAL
17947.300	50.4	-17.7	45.6	22.500	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17932.000	61.5	-17.7	45.6	33.600	VERTICAL
17793.450	61.2	-18.5	45.6	34.100	VERTICAL
17890.350	61.0	-18.5	45.6	33.900	HORIZONTAL
17731.400	60.8	-18.9	45.6	34.100	HORIZONTAL
17900.550	60.7	-18.5	45.6	33.600	VERTICAL
17914.150	60.7	-18.5	45.6	33.600	VERTICAL

Measurement results for Set.5:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17977.050	51.1	-17.7	45.6	23.200	VERTICAL
17970.250	50.8	-17.7	45.6	22.900	VERTICAL
17938.800	50.7	-17.7	45.6	22.800	VERTICAL
17864.850	50.3	-18.5	45.6	23.200	HORIZONTAL
17766.250	50.3	-18.5	45.6	23.200	VERTICAL
17875.050	50.2	-18.5	45.6	23.100	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17998.300	61.6	-17.7	45.6	33.700	VERTICAL
17558.000	60.9	-19.2	45.6	34.500	VERTICAL
17821.500	60.7	-18.5	45.6	33.600	VERTICAL
17765.400	60.7	-18.5	45.6	33.600	HORIZONTAL
17896.300	60.6	-18.5	45.6	33.500	VERTICAL
17766.250	60.6	-18.5	45.6	33.500	VERTICAL

Measurement results for Set.6:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17971.950	50.5	-17.7	45.6	22.600	HORIZONTAL
17866.550	50.5	-18.5	45.6	23.400	VERTICAL
17864.000	50.5	-18.5	45.6	23.400	VERTICAL
17859.750	50.4	-18.5	45.6	23.300	HORIZONTAL
17816.400	50.2	-18.5	45.6	23.100	VERTICAL
17854.650	50.2	-18.5	45.6	23.100	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17930.300	61.5	-17.7	45.6	33.600	HORIZONTAL
17971.950	61.2	-17.7	45.6	33.300	HORIZONTAL
17932.850	60.7	-17.7	45.6	32.800	VERTICAL
17990.650	60.7	-17.7	45.6	32.800	VERTICAL
17948.150	60.7	-17.7	45.6	32.800	HORIZONTAL
17866.550	60.6	-18.5	45.6	33.500	VERTICAL

Measurement results for Set.7:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17975.350	50.3	-17.7	45.6	22.400	HORIZONTAL
17977.900	50.3	-17.7	45.6	22.400	VERTICAL
17951.550	50.3	-17.7	45.6	22.400	HORIZONTAL
17869.950	50.1	-18.5	45.6	23.000	HORIZONTAL
17999.150	50.1	-17.7	45.6	22.200	VERTICAL
17926.900	50.1	-17.7	45.6	22.200	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17932.000	61.3	-17.7	45.6	33.400	VERTICAL
17954.100	61.2	-17.7	45.6	33.300	VERTICAL
17914.150	61.2	-18.5	45.6	34.100	VERTICAL
17977.900	61.1	-17.7	45.6	33.200	HORIZONTAL
17906.500	60.9	-18.5	45.6	33.800	VERTICAL
17894.600	60.9	-18.5	45.6	33.800	VERTICAL

Measurement results for Set.8:
Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17992.350	50.8	-17.7	45.6	22.900	VERTICAL
17999.150	50.7	-17.7	45.6	22.800	HORIZONTAL
17909.900	50.6	-18.5	45.6	23.500	VERTICAL
17976.200	50.4	-17.7	45.6	22.500	HORIZONTAL
17967.700	50.4	-17.7	45.6	22.500	VERTICAL
17918.400	50.2	-17.7	45.6	22.300	HORIZONTAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17926.900	61.1	-17.7	45.6	33.200	VERTICAL
17903.950	61.0	-18.5	45.6	33.900	VERTICAL
17857.200	60.8	-18.5	45.6	33.700	HORIZONTAL
17986.400	60.6	-17.7	45.6	32.700	HORIZONTAL
17989.800	60.6	-17.7	45.6	32.700	VERTICAL
17907.350	60.5	-18.5	45.6	33.400	VERTICAL

Measurement results for Set.9:
USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17992.350	50.6	-17.7	45.6	22.700	VERTICAL
17955.800	50.5	-17.7	45.6	22.600	HORIZONTAL
17884.400	50.5	-18.5	45.6	23.400	VERTICAL
17860.600	50.4	-18.5	45.6	23.300	HORIZONTAL
17797.700	50.3	-18.5	45.6	23.200	VERTICAL
17934.550	50.2	-17.7	45.6	22.300	VERTICAL

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17825.750	61.0	-18.5	45.6	33.900	HORIZONTAL
17941.350	60.7	-17.7	45.6	32.800	VERTICAL
17962.600	60.5	-17.7	45.6	32.600	HORIZONTAL
17996.600	60.5	-17.7	45.6	32.600	HORIZONTAL
17776.450	60.5	-18.5	45.6	33.400	VERTICAL
17754.350	60.4	-18.5	45.6	33.300	VERTICAL

Note: The measurement results of Set.1, Set.2, Set.3, Set.4, Set.5, Set.6, Set.7, Set.8, Set.9 showed here are worst cases of the combinations of different batteries and USB cables.

Charging Mode, Set.1

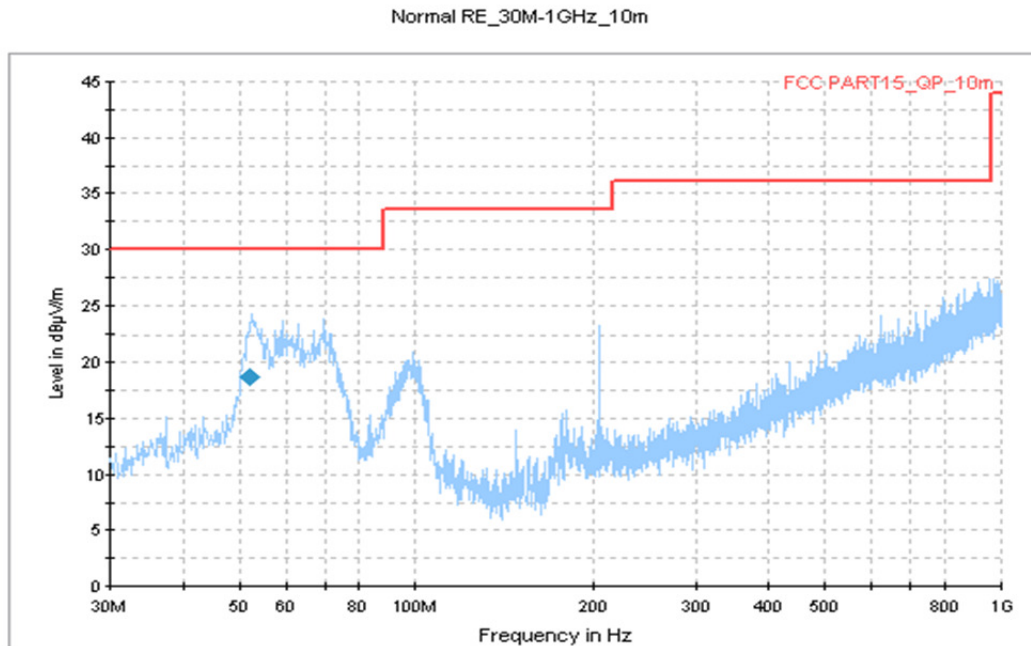


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
52.121000	18.7	375.0	V	164.0	-11.8	11.3	30.0

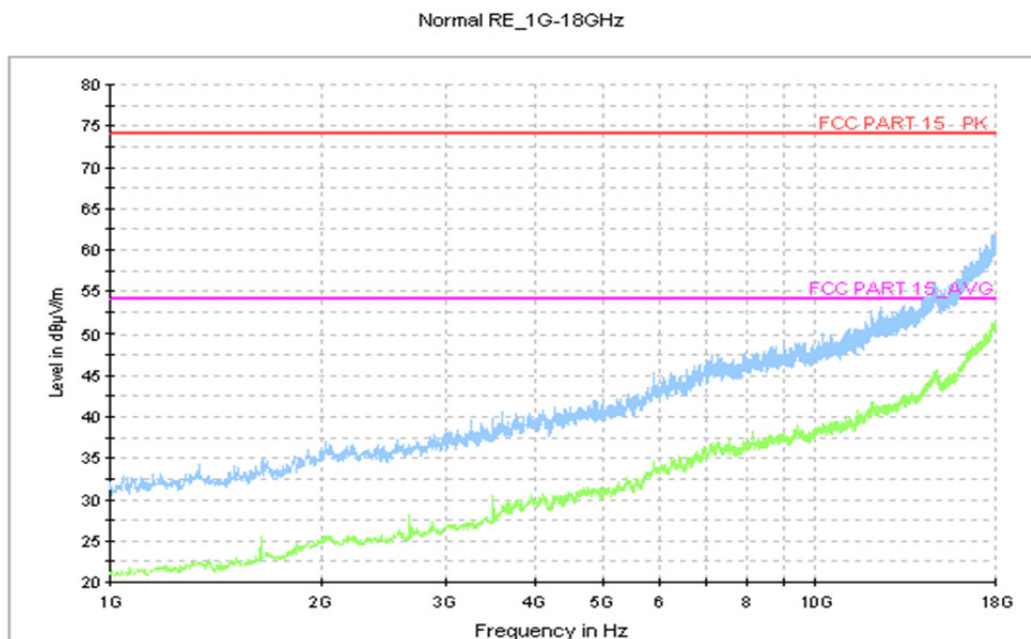


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.2

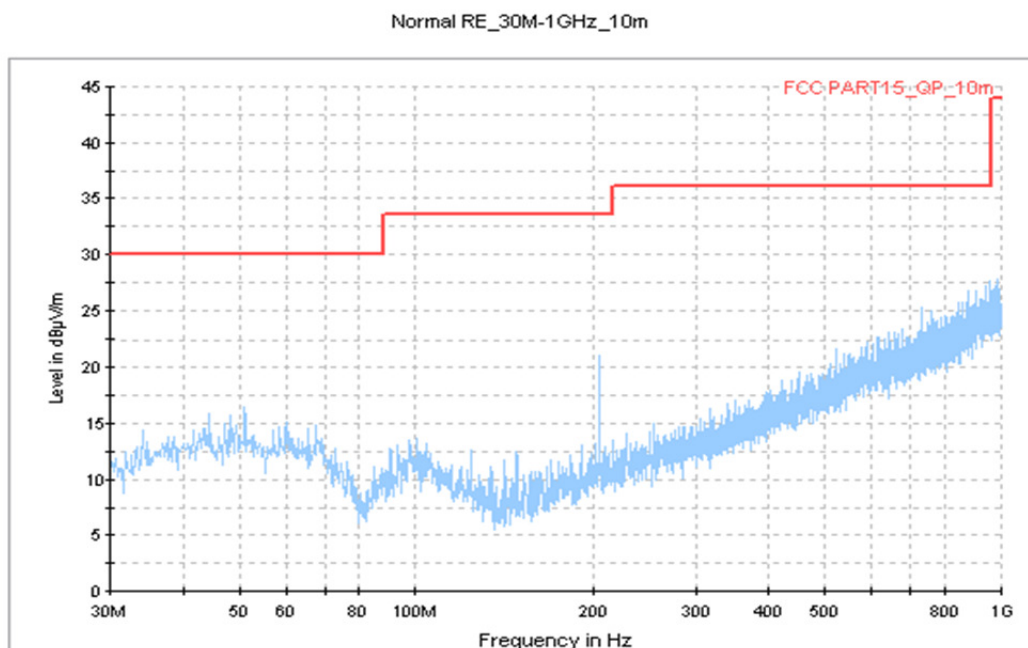


Figure A.1 Radiated Emission from 30MHz to 1GHz

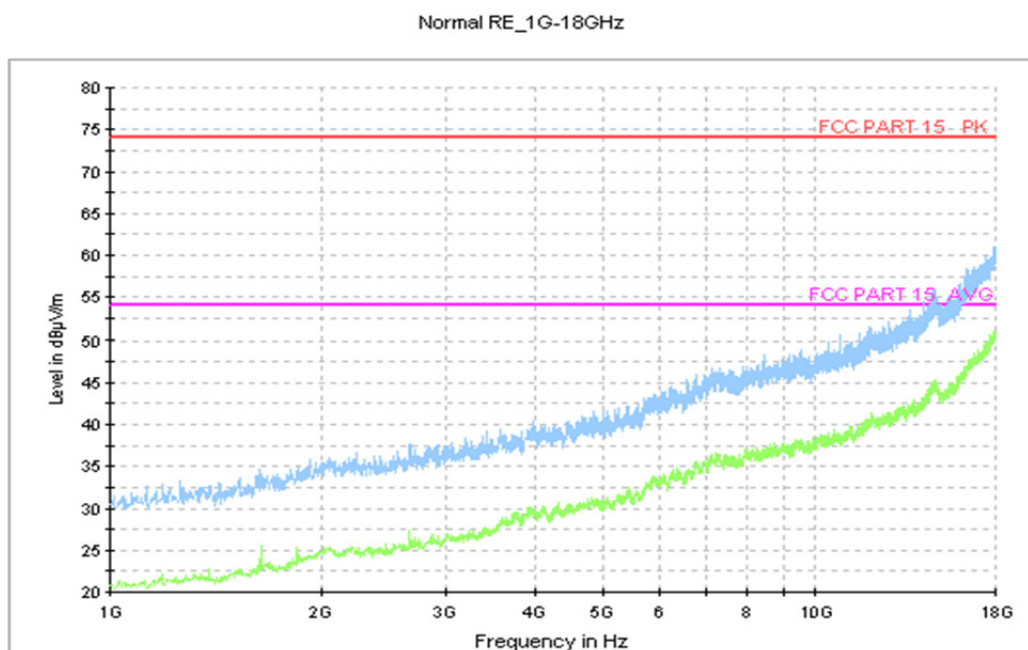


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.3

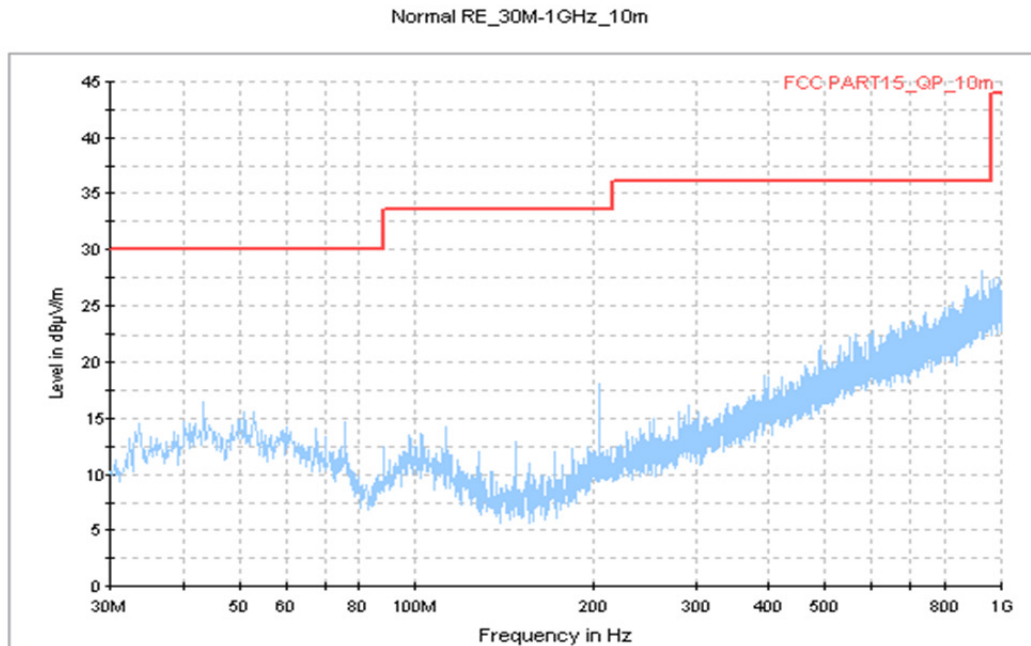


Figure A.1 Radiated Emission from 30MHz to 1GHz

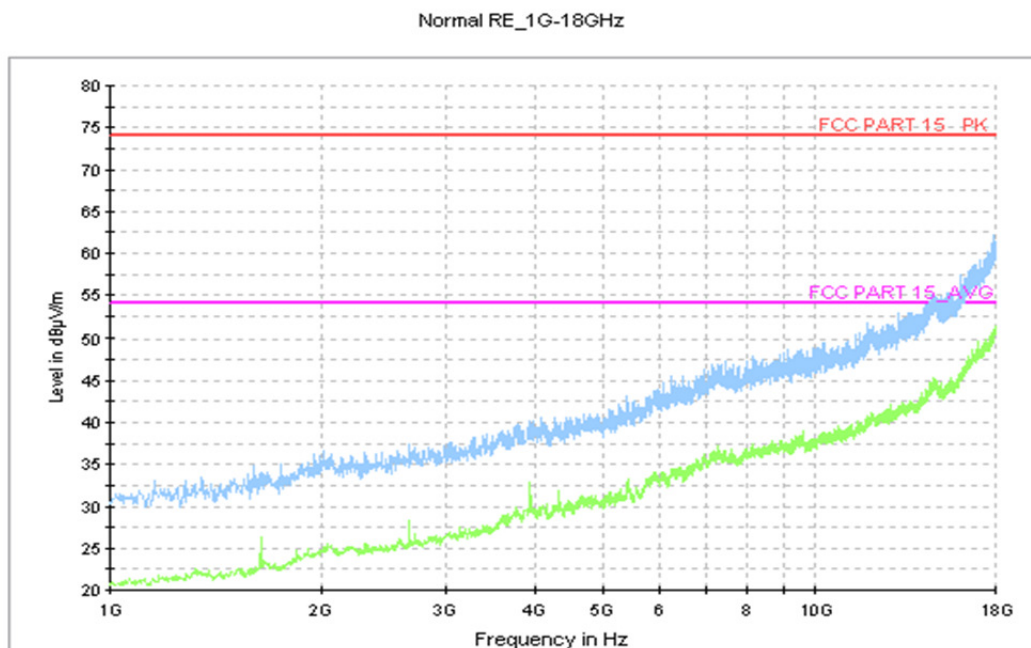


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.4

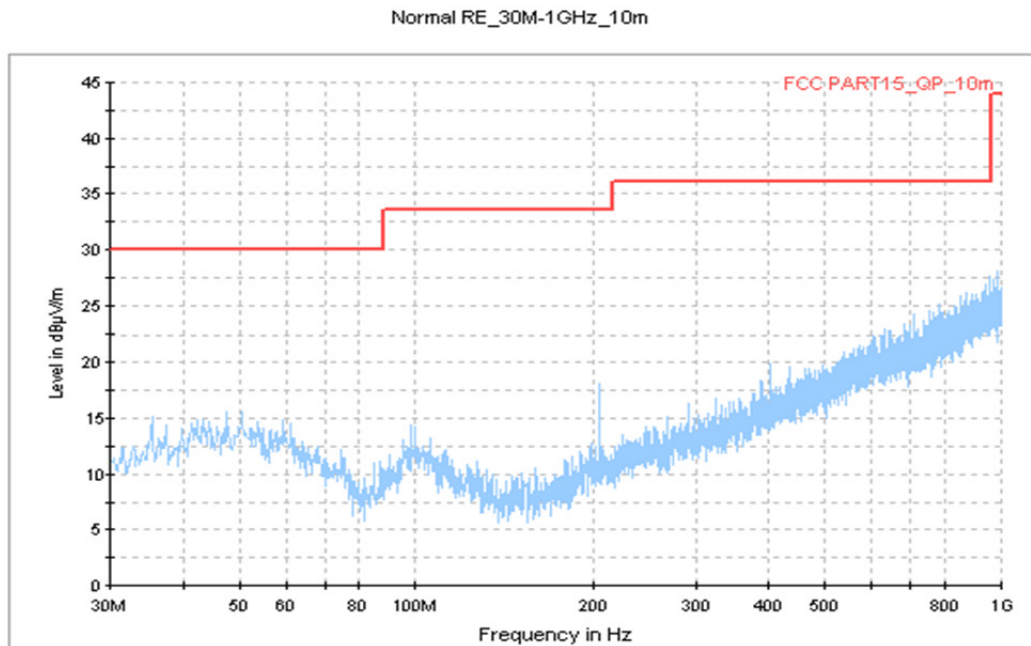


Figure A.1 Radiated Emission from 30MHz to 1GHz

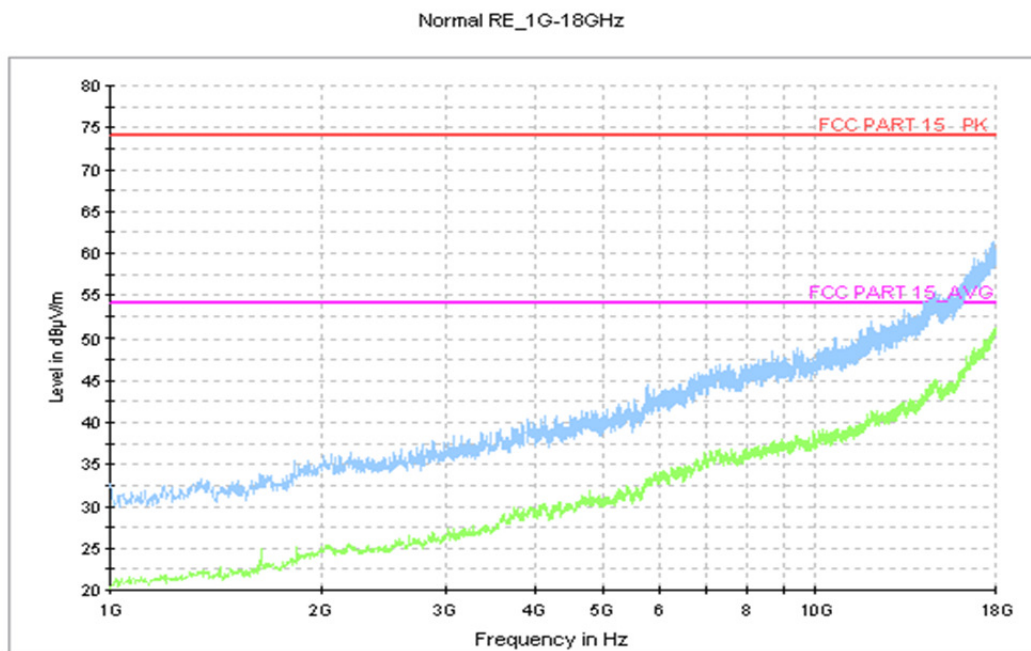


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.5

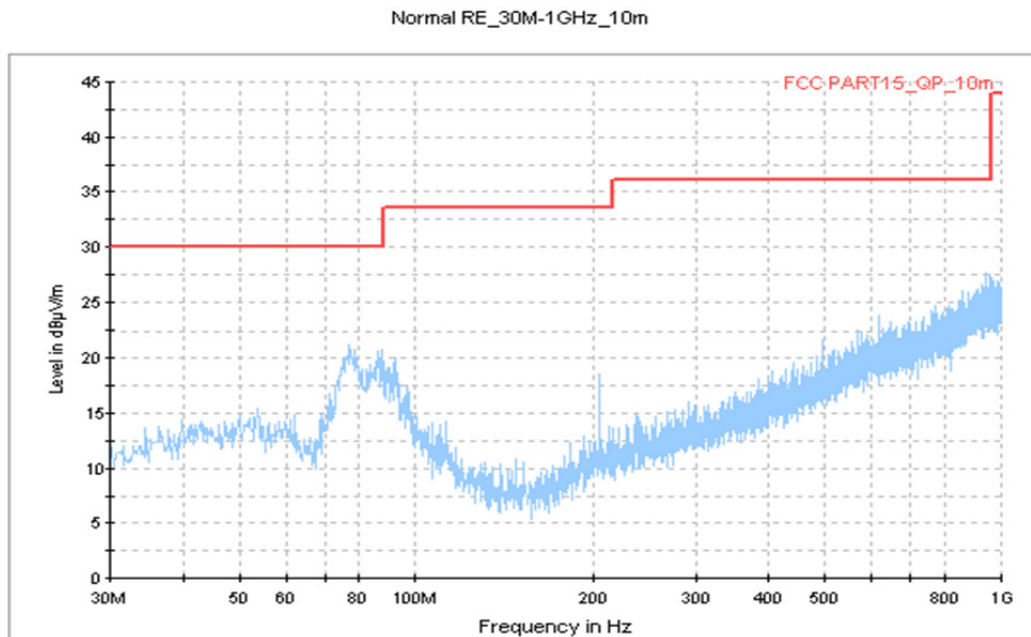


Figure A.1 Radiated Emission from 30MHz to 1GHz

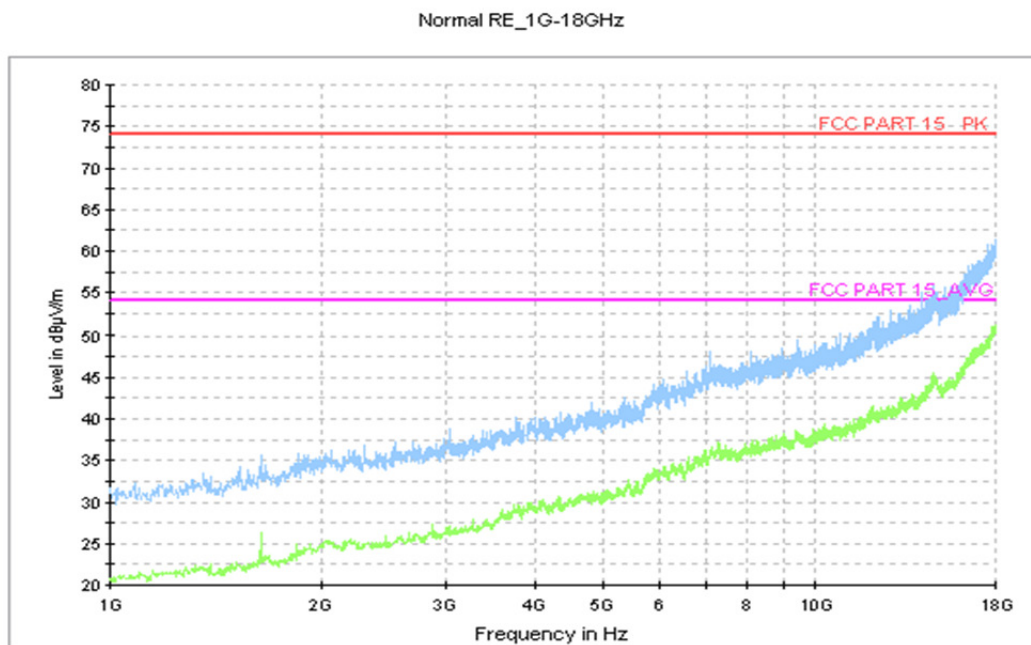


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.6

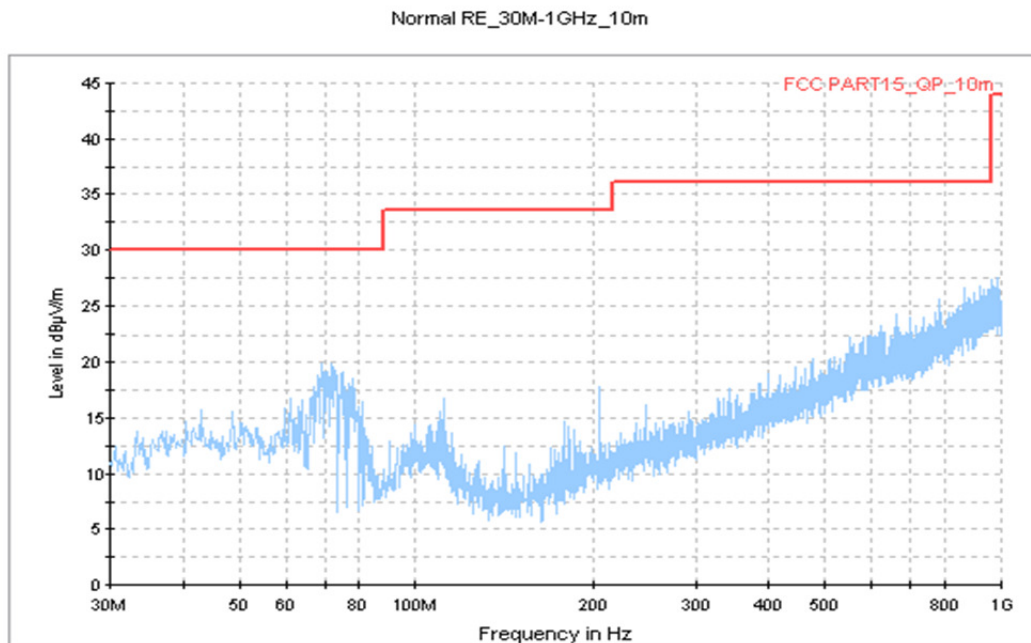


Figure A.1 Radiated Emission from 30MHz to 1GHz

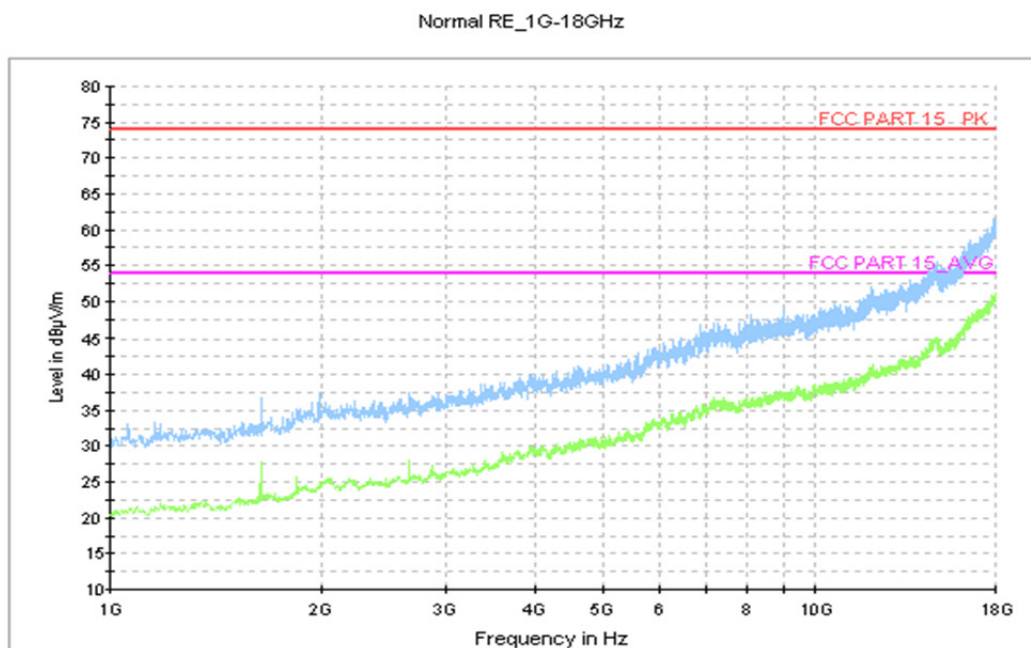


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.7

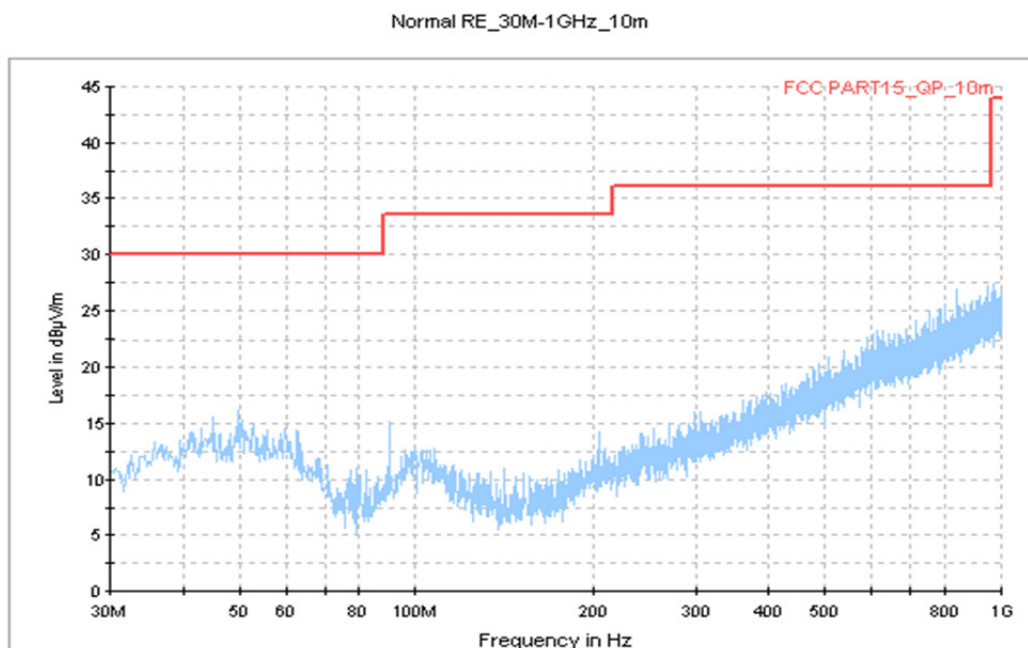


Figure A.1 Radiated Emission from 30MHz to 1GHz

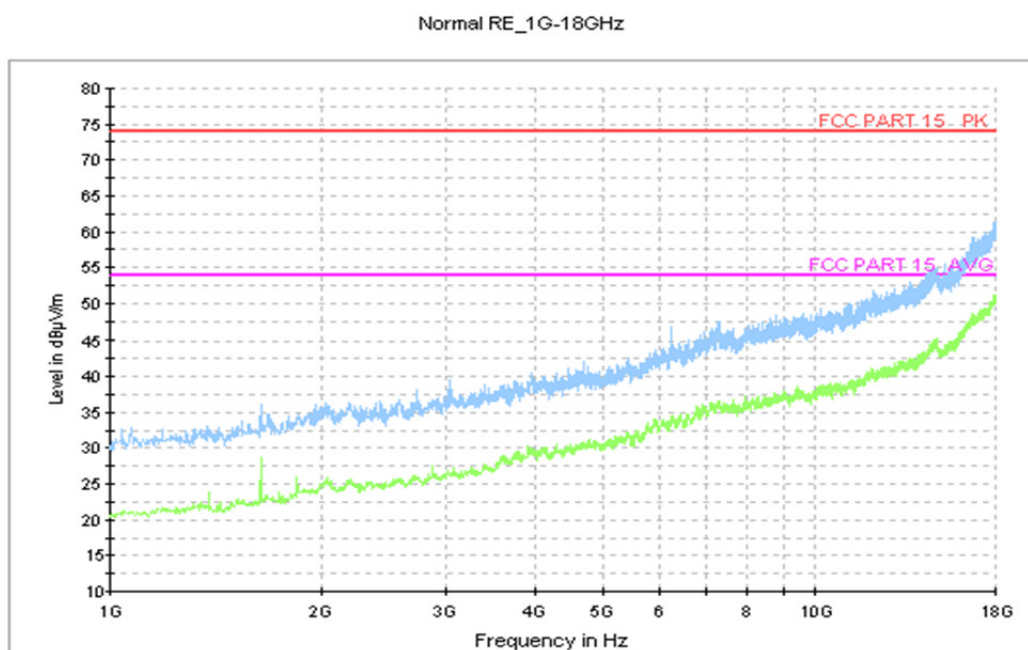


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.8

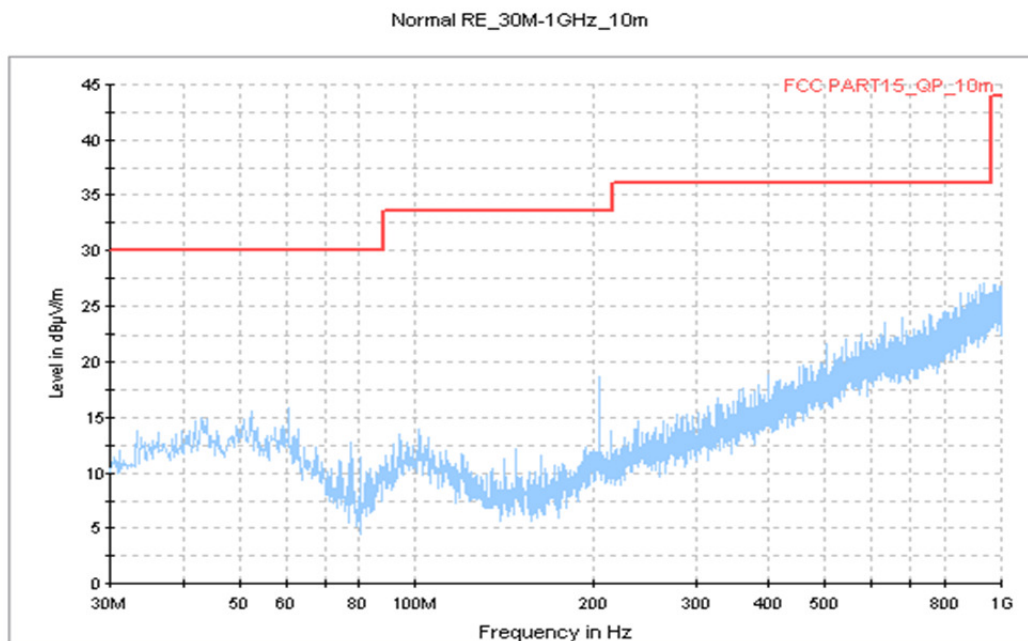


Figure A.1 Radiated Emission from 30MHz to 1GHz

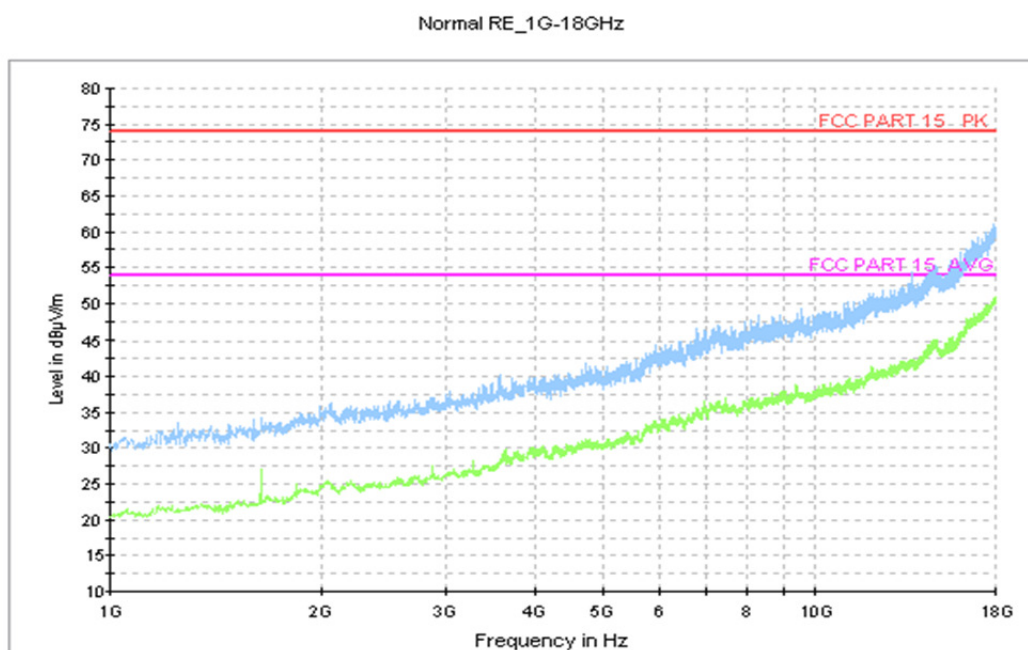


Figure A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.9

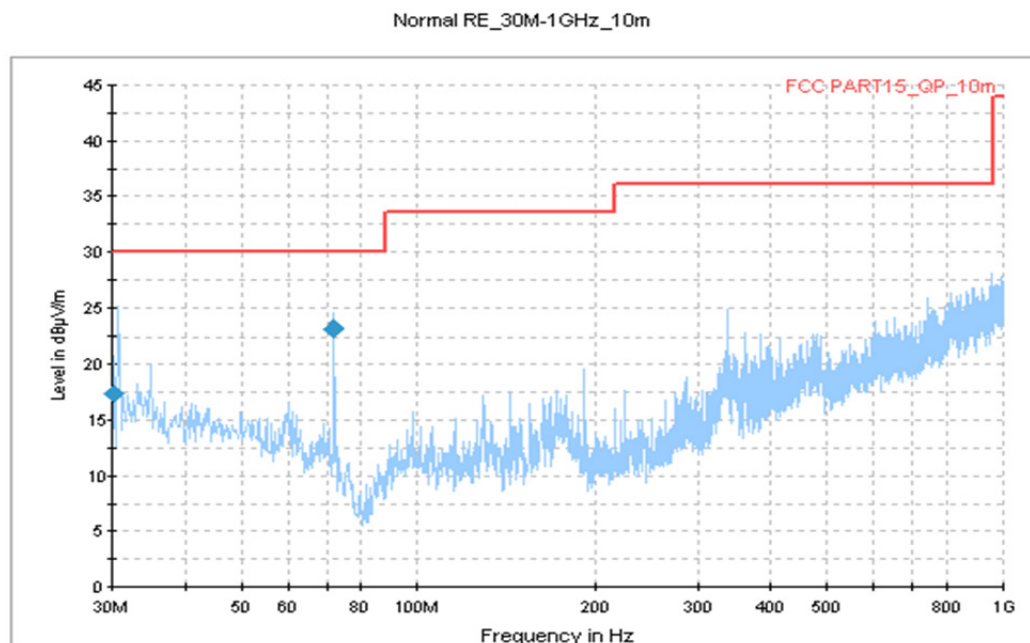


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.307500	17.3	275.0	V	210.0	-14.1	12.7	30.0
72.001000	23.2	275.0	V	210.0	-15.8	6.8	30.0

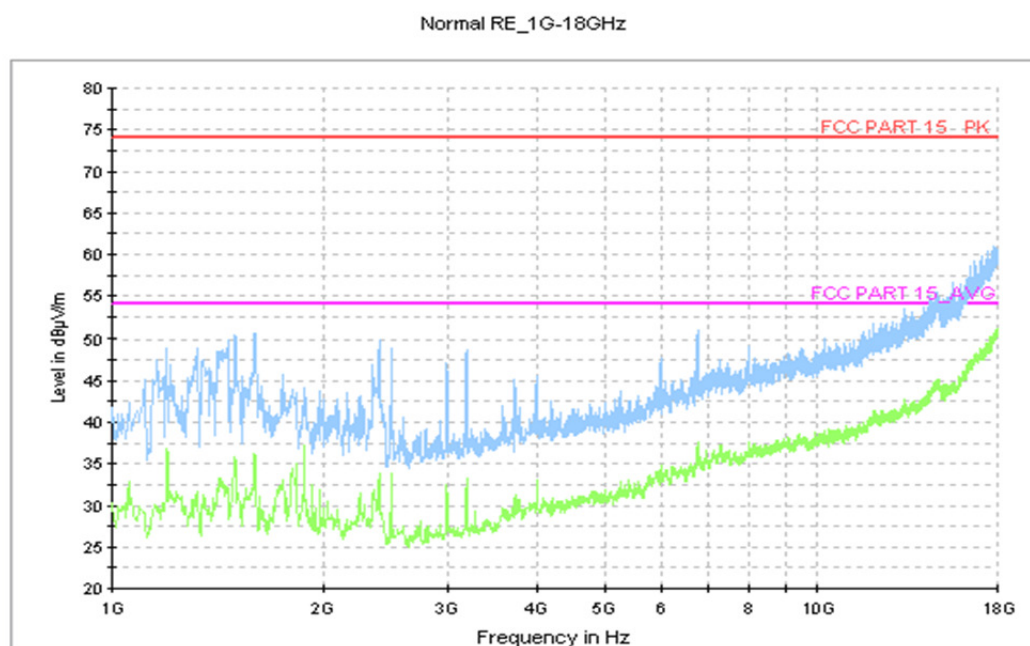


Figure A.4 Radiated Emission from 1GHz to 18GHz

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 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 (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: $U= 2.9$ dB, $k=2$.

Charging Mode, Set.1

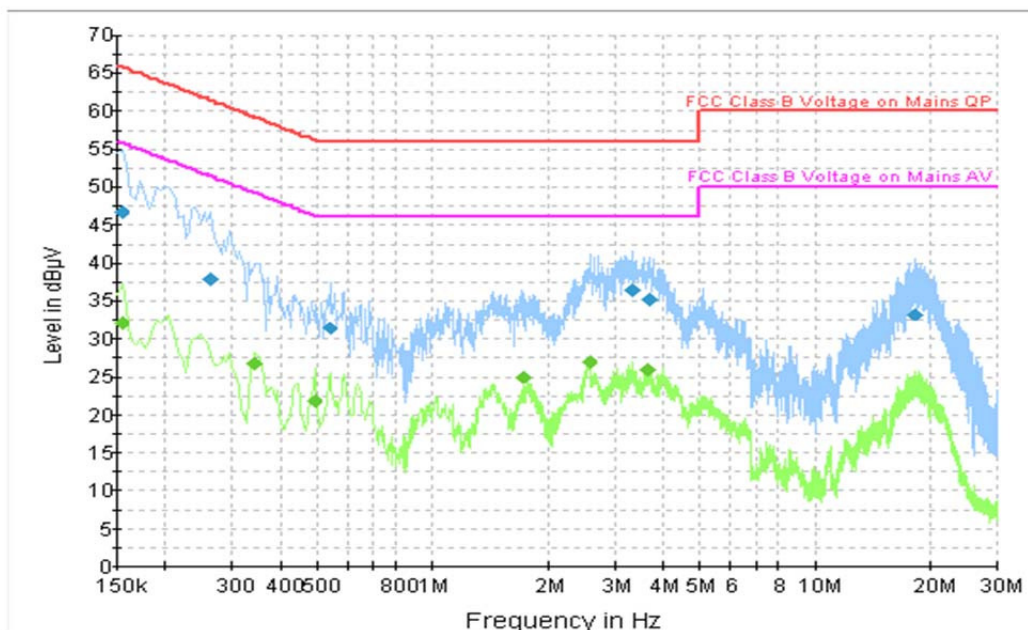


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	46.8	2000.0	9.000	On	L1	20.0	19.0	65.8
0.262500	37.8	2000.0	9.000	On	L1	19.8	23.6	61.4
0.537000	31.4	2000.0	9.000	On	N	19.9	24.6	56.0
3.318000	36.3	2000.0	9.000	On	N	19.4	19.7	56.0
3.669000	35.1	2000.0	9.000	On	L1	19.5	20.9	56.0
18.289500	33.3	2000.0	9.000	On	L1	19.9	26.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	32.0	2000.0	9.000	On	L1	20.0	23.8	55.8
0.343500	26.8	2000.0	9.000	On	L1	19.9	22.3	49.1
0.492000	21.8	2000.0	9.000	On	L1	19.9	24.3	46.1
1.734000	25.0	2000.0	9.000	On	L1	19.7	21.0	46.0
2.562000	26.9	2000.0	9.000	On	L1	19.0	19.1	46.0
3.637500	25.9	2000.0	9.000	On	L1	19.5	20.1	46.0

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

Charging Mode, Set.2

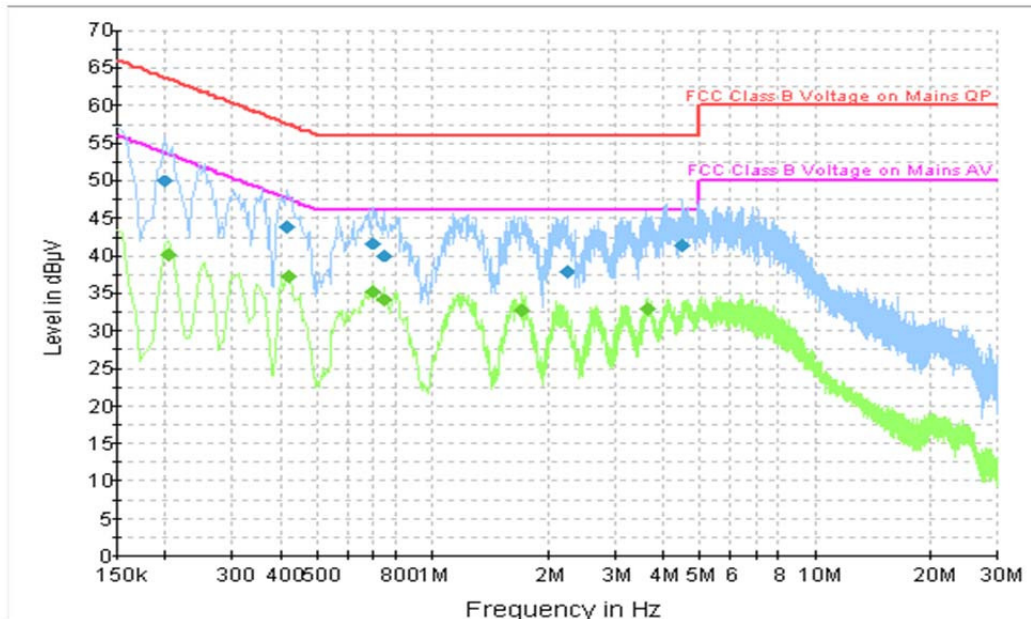


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	49.8	2000.0	9.000	On	L1	19.8	13.8	63.6
0.415500	43.7	2000.0	9.000	On	N	19.9	13.8	57.5
0.694500	41.6	2000.0	9.000	On	L1	19.8	14.4	56.0
0.748500	39.9	2000.0	9.000	On	L1	19.8	16.1	56.0
2.251500	37.8	2000.0	9.000	On	N	19.3	18.2	56.0
4.528500	41.3	2000.0	9.000	On	L1	19.6	14.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	40.1	2000.0	9.000	On	L1	19.8	13.4	53.4
0.420000	37.2	2000.0	9.000	On	L1	19.9	10.3	47.4
0.694500	35.1	2000.0	9.000	On	L1	19.8	10.9	46.0
0.748500	34.0	2000.0	9.000	On	L1	19.8	12.0	46.0
1.711500	32.7	2000.0	9.000	On	L1	19.7	13.3	46.0
3.642000	32.8	2000.0	9.000	On	L1	19.5	13.2	46.0

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

Charging Mode, Set.3

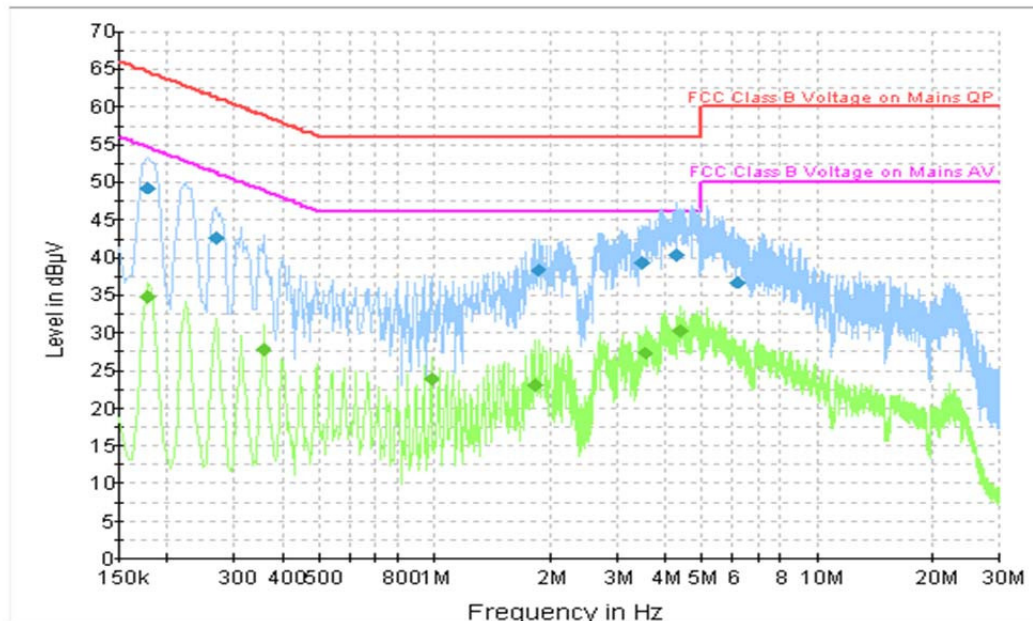


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	49.3	2000.0	9.000	On	L1	19.8	15.4	64.6
0.267000	42.5	2000.0	9.000	On	L1	19.8	18.7	61.2
1.860000	38.4	2000.0	9.000	On	L1	19.7	17.6	56.0
3.471000	39.4	2000.0	9.000	On	N	19.4	16.6	56.0
4.321500	40.2	2000.0	9.000	On	L1	19.6	15.8	56.0
6.148500	36.7	2000.0	9.000	On	N	19.6	23.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	34.7	2000.0	9.000	On	L1	19.8	20.0	54.6
0.357000	27.7	2000.0	9.000	On	L1	19.8	21.1	48.8
0.978000	23.7	2000.0	9.000	On	L1	19.7	22.3	46.0
1.828500	22.9	2000.0	9.000	On	L1	19.7	23.1	46.0
3.565500	27.3	2000.0	9.000	On	L1	19.5	18.7	46.0
4.371000	30.2	2000.0	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.

Charging Mode, Set.4

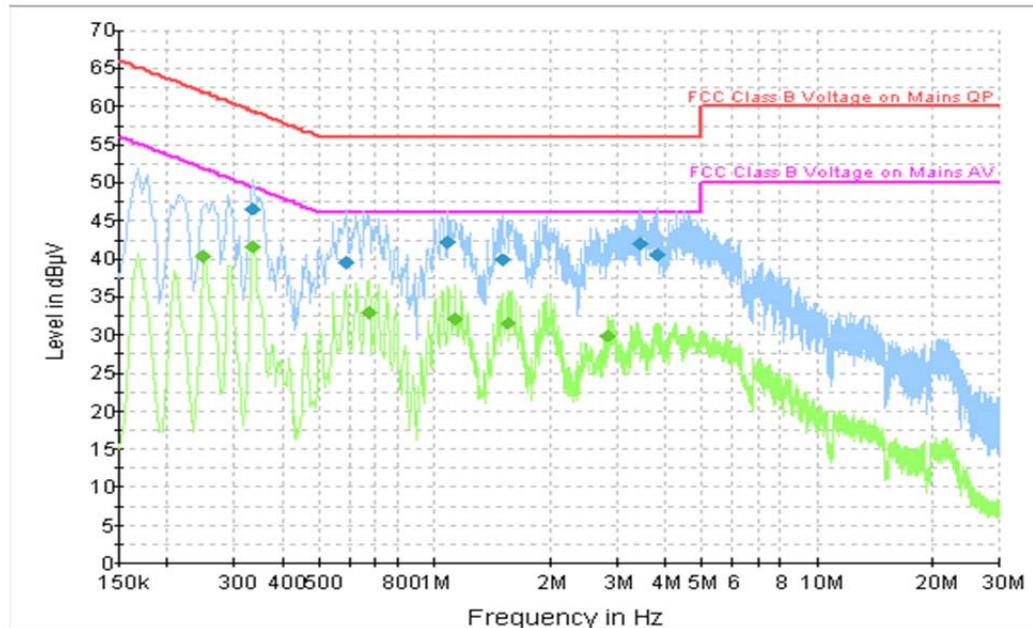


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.334500	46.5	2000.0	9.000	On	L1	19.9	12.8	59.3
0.586500	39.4	2000.0	9.000	On	L1	19.8	16.6	56.0
1.086000	42.1	2000.0	9.000	On	L1	19.7	13.9	56.0
1.504500	39.8	2000.0	9.000	On	L1	19.7	16.2	56.0
3.462000	42.0	2000.0	9.000	On	N	19.4	14.0	56.0
3.808500	40.5	2000.0	9.000	On	N	19.5	15.5	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.249000	40.3	2000.0	9.000	On	L1	19.8	11.5	51.8
0.334500	41.5	2000.0	9.000	On	L1	19.9	7.8	49.3
0.672000	32.9	2000.0	9.000	On	L1	19.8	13.1	46.0
1.131000	32.1	2000.0	9.000	On	L1	19.7	13.9	46.0
1.549500	31.5	2000.0	9.000	On	L1	19.7	14.5	46.0
2.841000	29.9	2000.0	9.000	On	L1	18.9	16.1	46.0

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

Charging Mode, Set.5

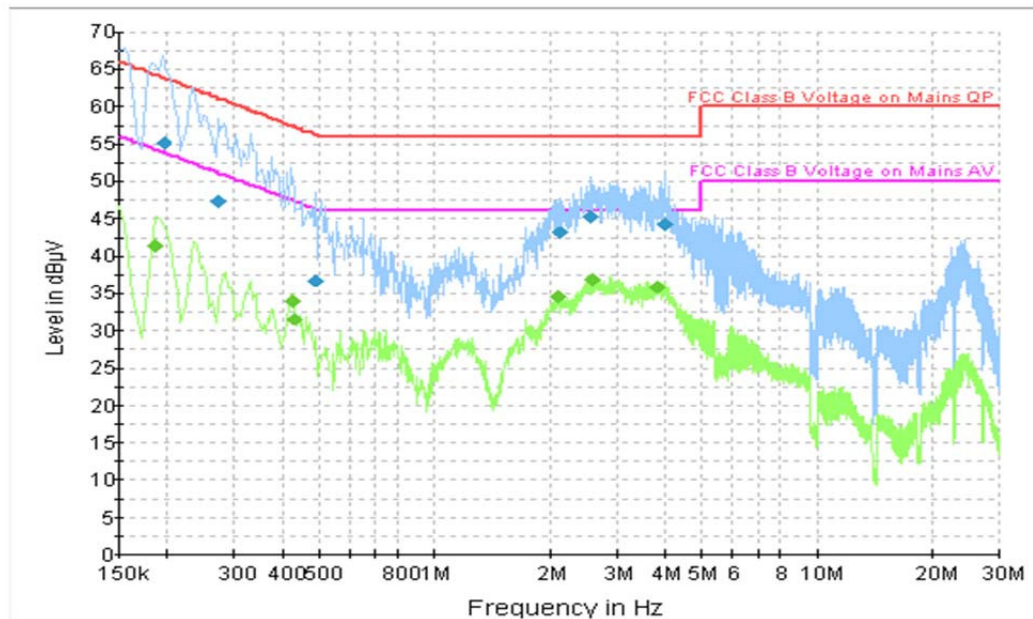


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.195000	55.1	2000.0	9.000	On	L1	19.8	8.7	63.8
0.271500	47.3	2000.0	9.000	On	L1	19.8	13.8	61.1
0.487500	36.7	2000.0	9.000	On	L1	19.9	19.5	56.2
2.112000	43.0	2000.0	9.000	On	L1	19.6	13.0	56.0
2.553000	45.2	2000.0	9.000	On	L1	18.9	10.8	56.0
4.002000	44.2	2000.0	9.000	On	L1	19.5	11.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	41.3	2000.0	9.000	On	L1	19.8	12.9	54.2
0.424500	33.9	2000.0	9.000	On	N	19.9	13.5	47.4
0.433500	31.5	2000.0	9.000	On	N	19.9	15.7	47.2
2.094000	34.5	2000.0	9.000	On	L1	19.7	11.5	46.0
2.589000	36.7	2000.0	9.000	On	L1	19.1	9.3	46.0
3.822000	35.8	2000.0	9.000	On	L1	19.5	10.2	46.0

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

Charging Mode, Set.6

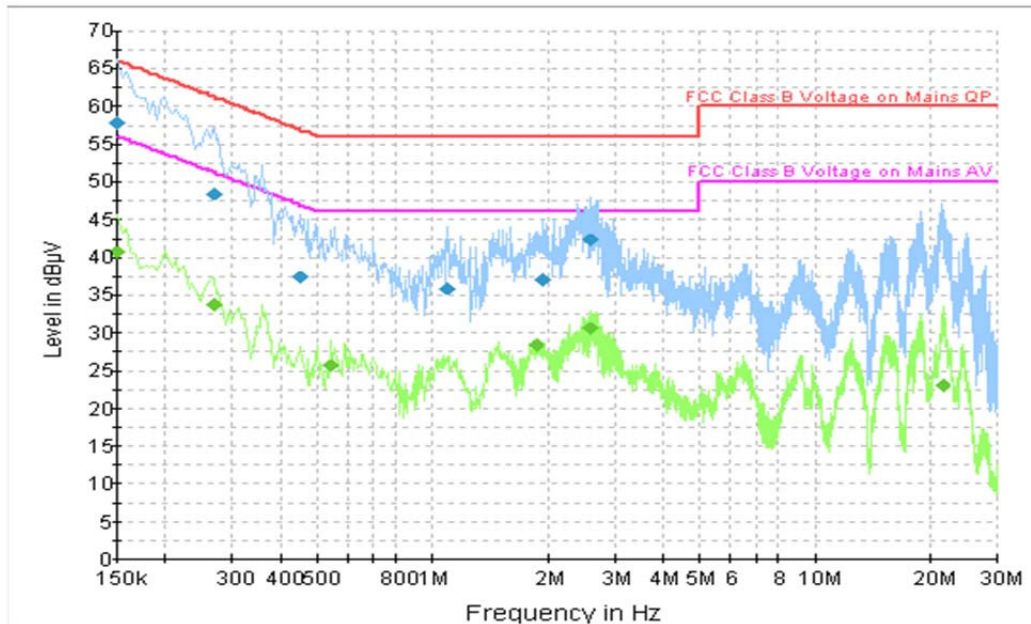


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	57.7	2000.0	9.000	On	L1	20.2	8.3	66.0
0.267000	48.4	2000.0	9.000	On	L1	19.8	12.8	61.2
0.451500	37.3	2000.0	9.000	On	L1	19.9	19.5	56.8
1.095000	35.8	2000.0	9.000	On	N	19.7	20.2	56.0
1.927500	37.0	2000.0	9.000	On	N	19.7	19.0	56.0
2.602500	42.3	2000.0	9.000	On	L1	19.1	13.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	40.7	2000.0	9.000	On	L1	20.2	15.3	56.0
0.267000	33.6	2000.0	9.000	On	L1	19.8	17.6	51.2
0.546000	25.5	2000.0	9.000	On	L1	19.9	20.5	46.0
1.869000	28.4	2000.0	9.000	On	L1	19.7	17.6	46.0
2.602500	30.5	2000.0	9.000	On	L1	19.1	15.5	46.0
21.561000	23.0	2000.0	9.000	On	L1	19.9	27.0	50.0

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

Charging Mode, Set.7

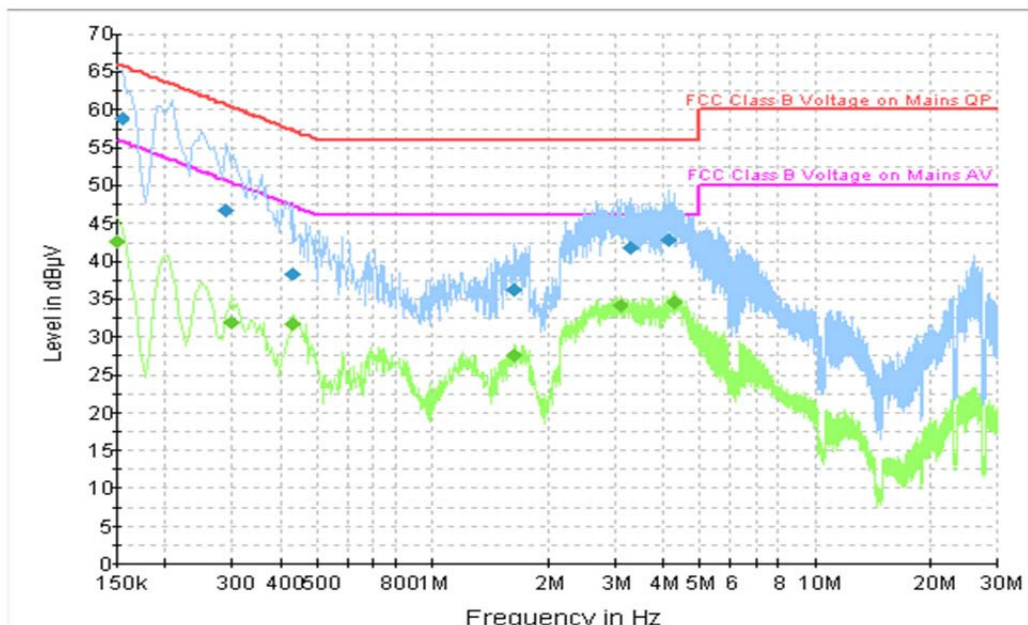


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	58.8	2000.0	9.000	On	L1	20.0	6.9	65.8
0.289500	46.6	2000.0	9.000	On	L1	19.8	13.9	60.5
0.433500	38.3	2000.0	9.000	On	N	19.9	18.9	57.2
1.639500	36.2	2000.0	9.000	On	L1	19.7	19.8	56.0
3.291000	41.8	2000.0	9.000	On	L1	19.4	14.2	56.0
4.146000	42.8	2000.0	9.000	On	L1	19.6	13.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	42.7	2000.0	9.000	On	L1	20.2	13.3	56.0
0.298500	31.8	2000.0	9.000	On	N	19.8	18.5	50.3
0.433500	31.7	2000.0	9.000	On	N	19.9	15.5	47.2
1.639500	27.6	2000.0	9.000	On	L1	19.7	18.4	46.0
3.106500	34.1	2000.0	9.000	On	L1	19.2	11.9	46.0
4.299000	34.5	2000.0	9.000	On	L1	19.6	11.5	46.0

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

Charging Mode, Set.8

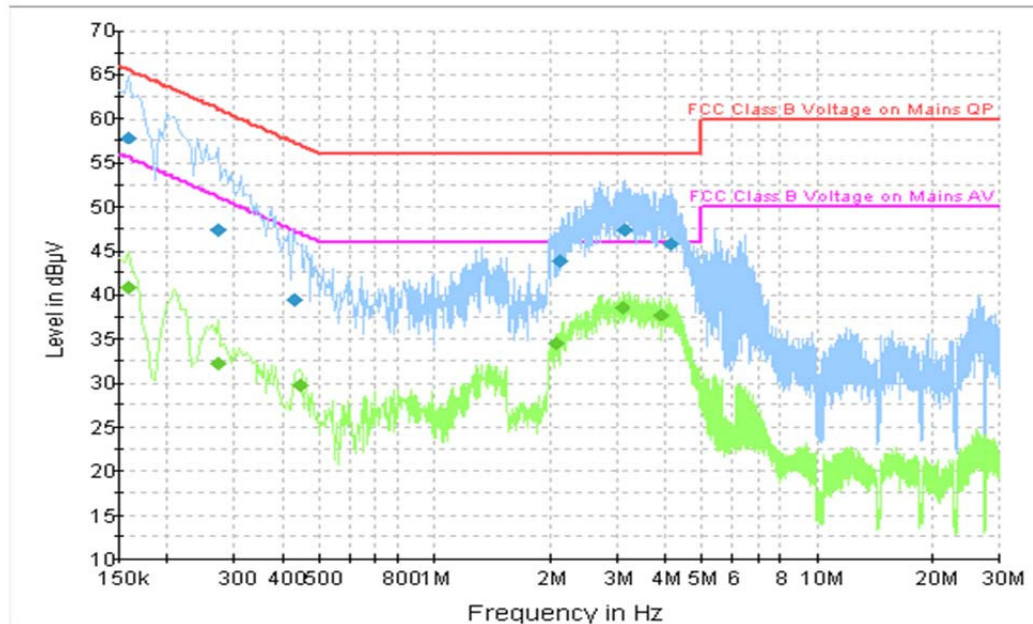


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	57.8	2000.0	9.000	On	L1	19.9	7.8	65.5
0.271500	47.3	2000.0	9.000	On	L1	19.8	13.8	61.1
0.433500	39.4	2000.0	9.000	On	L1	19.9	17.8	57.2
2.121000	43.8	2000.0	9.000	On	L1	19.6	12.2	56.0
3.138000	47.3	2000.0	9.000	On	L1	19.3	8.7	56.0
4.146000	45.7	2000.0	9.000	On	L1	19.6	10.3	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	40.8	2000.0	9.000	On	L1	19.9	14.7	55.5
0.271500	32.3	2000.0	9.000	On	L1	19.8	18.8	51.1
0.442500	29.6	2000.0	9.000	On	L1	19.9	17.4	47.0
2.080500	34.5	2000.0	9.000	On	L1	19.7	11.5	46.0
3.079500	38.6	2000.0	9.000	On	L1	19.2	7.4	46.0
3.939000	37.8	2000.0	9.000	On	L1	19.5	8.2	46.0

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

USB Mode, Set.9

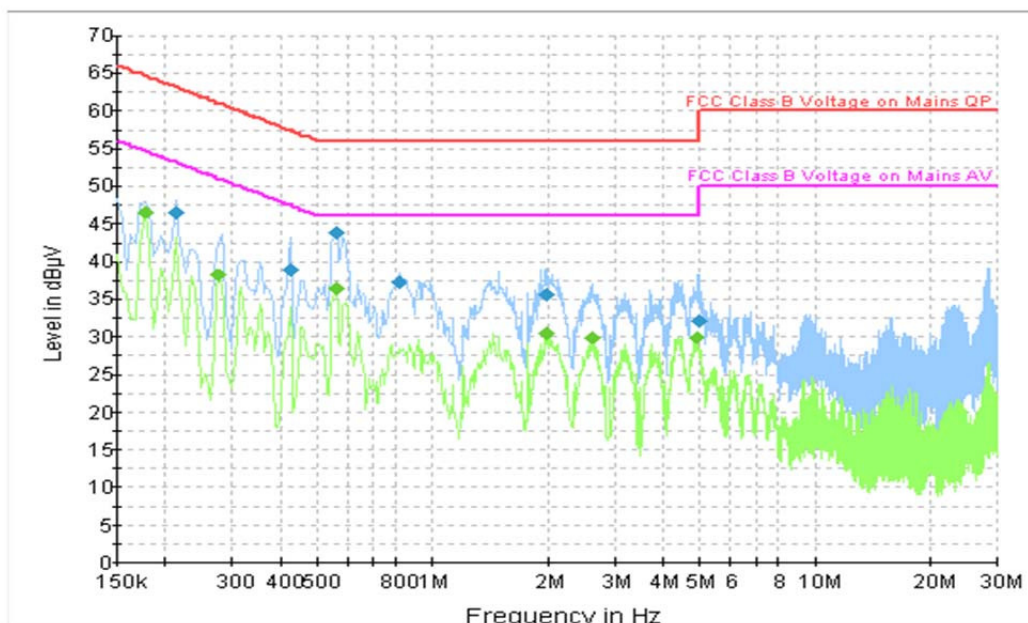


Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	46.3	2000.0	9.000	On	N	19.8	16.8	63.1
0.424500	38.9	2000.0	9.000	On	L1	19.9	18.5	57.4
0.559500	43.7	2000.0	9.000	On	L1	19.9	12.3	56.0
0.816000	37.1	2000.0	9.000	On	N	19.8	18.9	56.0
1.986000	35.5	2000.0	9.000	On	N	19.7	20.5	56.0
4.996500	32.0	2000.0	9.000	On	L1	19.6	24.0	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.5	2000.0	9.000	On	N	19.8	8.1	54.6
0.276000	38.2	2000.0	9.000	On	N	19.8	12.8	50.9
0.559500	36.3	2000.0	9.000	On	L1	19.9	9.7	46.0
1.981500	30.3	2000.0	9.000	On	N	19.7	15.7	46.0
2.620500	29.9	2000.0	9.000	On	L1	19.2	16.1	46.0
4.915500	29.9	2000.0	9.000	On	L1	19.6	16.1	46.0

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

END OF REPORT