FCC 15B TEST REPORT

No. I20Z60959-EMC01

for

OnePlus Technology (Shenzhen) Co., Ltd.

Smart Phone

Model name: BE2028,BE2025,BE2026

FCC ID: 2ABZ2-EF170

with

Hardware Version: 16

Software Version: 10.5.5.BE88CB

Issued Date: 2020-10-09

Note:

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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z60959-EMC01	Rev.0	1st edition	2020-10-09

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2020-09-09

Testing End Date: 2020-09-15

1.5. Signature

Zhang Ying

(Prepared this test report)

An Hui

(Reviewed this test report)

Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address /Post:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	86 755 61898696-7023
Fax:	/

2.2. Manufacturer Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address /Post:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	86 755 61898696-7023
Fax:	/

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

3.1. About EUT

Description	Smart Phone
Model Name	BE2028,BE2025,BE2026
FCC ID	2ABZ2-EF170
Power Supply	3.87V DC by Battery

This device contains the receivers which tune and operate between 30MHz-960MHz in the following bands:
GSM850MHz, WCDMA850MHz, CDMA BC(0)/BC(10), LTE band12/13/26/71, 5G NR n71.

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
EUT4	990016800073064	16	10.5.5.BE88CB

*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	/	Inbuilt
AE3	Charger	/	/
AE4	Charger	/	/
AE5	Charger	/	/
AE6	USB Cable	/	/
AE7	USB Cable	/	/

AE1

Model	BLP815
Manufacturer	/
Length of cable	/

AE3

Model	WC0506A51JH
Manufacturer	Huizhou Golden Lake Industrial Co,. Ltd.
Length of cable	/

AE4

Model	WC030B51HK
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO LTD
Length of cable	/

AE5

Model	WC0506A51GB
Manufacturer	/
Length of cable	/

AE6

Model	/
Manufacturer	/
Length of cable	/

AE7

Model	/
Manufacturer	/
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.4-1	EUT4 + AE1 + AE3 + AE6	
Set.4-2	EUT4 + AE1 + AE4 + AE6	
Set.4-3	EUT4 + AE1 + AE5 + AE6	
Set.4-4	EUT4 + AE1 + AE3 + AE7	
Set.4-5	EUT4 + AE1 + AE4 + AE7	
Set.4-6	EUT4 + AE1 + AE5 + AE7	
Set.4-7	EUT4 + AE1 + AE6	
Set.4-8	EUT4 + AE1 + AE7	

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to chapter 3 for detailed information, are supplied by the client or manufacturer, which is the basis of testing.

4.2. 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	10-1-19 Edition
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 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	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	Test Receiver	ESCI 3	100344	Rohde & Schwarz	2021-02-26	1 year
2	LISN	ENV216	101200	Rohde & Schwarz	2021-05-19	1 year
3	EMI Antenna	VULB 9163	9163-1223	Schwarzbeck	2021-03-18	1 year
4	EMI Antenna	3115	6914	ETS-Lindgren	2021-01-14	1 year
5	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-03	1 year
6	Universal Radio Communication Tester	CMW500	116588	Rohde & Schwarz	2020-12-05	1 year
7	Universal Radio Communication Tester	CMW500	150344	Rohde & Schwarz	2020-11-17	1 year
8	Signal generator	SMBV100A	260613	Rohde & Schwarz	2020-12-30	1 year
9	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
11	Keyboard	L100	CN0RH659658907ATOI40	DELL	N/A	N/A
12	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

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 and FM mode. During the test MS is connected to a charger.

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 3.1, 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/3MHz	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.

Measurement results for Set.4-1:

Charger AE3 and USB cable AE6, GSM850MHz idle and FM(88MHz) QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
54.777000	10.22	30.00	19.78	110.0	V	104.0
59.322000	11.28	30.00	18.72	202.0	V	11.0
136.848000	15.38	33.50	18.14	101.0	V	15.0
145.264000	13.45	33.50	20.07	125.0	V	14.0
168.904000	9.57	33.50	23.95	102.0	V	-5.0
281.923000	12.87	36.00	23.15	125.0	V	-30.0

Charger AE3 and USB cable AE6, GSM850MHz idle and FM(88MHz) PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17999.433	57.2	-17.7	45.6	29.3	74.0	16.8	H
17981.867	57.0	-17.7	45.6	29.1	74.0	17.0	H
17993.767	56.9	-17.7	45.6	29.0	74.0	17.1	V
17946.167	56.6	-17.7	45.6	28.7	74.0	17.4	H
17942.767	56.3	-17.7	45.6	28.4	74.0	17.7	H
17997.167	56.2	-17.7	45.6	28.3	74.0	17.8	H

Charger AE3 and USB cable AE6, GSM850MHz idle and FM(88MHz) AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17993.200	48.5	-17.7	45.6	20.6	54.0	5.5	H
17998.867	48.4	-17.7	45.6	20.5	54.0	5.6	H
17869.667	48.3	-18.5	45.6	21.2	54.0	5.7	V
17998.300	48.3	-17.7	45.6	20.4	54.0	5.7	H
17967.133	48.2	-17.7	45.6	20.3	54.0	5.8	H
17984.700	48.0	-17.7	45.6	20.1	54.0	6.0	H

Measurement results for Set.4-2:

Charger AE4 and USB cable AE6, WCDMA band 5 idle and FM(98MHz) QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
59.137000	11.61	30.00	18.39	121.0	V	30.0
145.735000	13.74	33.50	19.78	105.0	V	7.0
159.966000	12.09	33.50	21.43	125.0	V	1.0
171.551000	11.69	33.50	21.83	121.0	V	-24.0
303.803000	15.87	36.00	20.15	95.0	V	-27.0
417.187000	14.41	36.00	21.61	101.0	V	210.0

Charger AE4 and USB cable AE6, WCDMA band 5 idle and FM(98MHz) PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17982.433	57.5	-17.7	45.6	29.6	74.0	16.5	H
17971.667	56.8	-17.7	45.6	28.9	74.0	17.2	H
17985.267	56.8	-17.7	45.6	28.9	74.0	17.2	V
17947.867	56.6	-17.7	45.6	28.7	74.0	17.4	H
17928.600	56.5	-17.7	45.6	28.6	74.0	17.5	H
17996.600	56.4	-17.7	45.6	28.5	74.0	17.6	H

Charger AE4 and USB cable AE6, WCDMA band 5 idle and FM(98MHz) AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17984.700	49.1	-17.7	45.6	21.2	54.0	4.9	H
17973.933	48.5	-17.7	45.6	20.6	54.0	5.5	H
18000.000	48.2	-45.6	44.5	49.3	54.0	5.8	V
17904.233	48.2	-18.5	45.6	21.1	54.0	5.8	H
17989.800	47.9	-17.7	45.6	20.0	54.0	6.1	H
17894.600	47.8	-18.5	45.6	20.7	54.0	6.2	H

Measurement results for Set.4-3:

Charger AE5 and USB cable AE6, CDMA BC(0) idle and FM(108MHz) QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
41.811000	10.17	30.00	19.83	125.0	H	30.0
100.875000	8.56	33.50	24.96	125.0	V	286.0
148.081000	12.02	33.50	21.50	106.0	V	-20.0
159.592000	8.08	33.50	25.44	115.0	V	4.0
248.753000	10.20	36.00	25.82	215.0	V	264.0
304.510000	15.19	36.00	20.83	96.0	V	-18.0

Charger AE5 and USB cable AE6, CDMA BC(0) idle and FM(108MHz) PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17996.033	57.9	-17.7	45.6	30.0	74.0	16.1	H
17886.100	56.9	-18.5	45.6	29.8	74.0	17.1	H
17993.200	56.8	-17.7	45.6	28.9	74.0	17.2	V
17887.800	56.8	-18.5	45.6	29.7	74.0	17.2	H
17956.367	56.7	-17.7	45.6	28.8	74.0	17.3	H
17990.367	56.7	-17.7	45.6	28.8	74.0	17.3	H

Charger AE5 and USB cable AE6, CDMA BC(0) idle and FM(108MHz) AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17975.067	48.8	-17.7	45.6	20.9	54.0	5.2	H
17899.700	48.7	-18.5	45.6	21.6	54.0	5.3	H
17967.133	48.5	-17.7	45.6	20.6	54.0	5.5	V
17984.700	48.3	-17.7	45.6	20.4	54.0	5.7	H
17975.633	48.1	-17.7	45.6	20.2	54.0	5.9	H
17930.867	48.1	-17.7	45.6	20.2	54.0	5.9	H

Measurement results for Set.4-4:

Charger AE3 and USB cable AE7, CDMA BC(10) idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
34.462000	8.18	30.00	21.82	225.0	H	106.0
56.906000	11.91	30.00	18.09	225.0	V	-15.0
143.823000	12.57	33.50	20.95	107.0	V	3.0
155.195000	11.91	33.50	21.61	99.0	V	-20.0
297.383000	13.21	36.00	22.81	209.0	V	-30.0
692.787000	18.42	36.00	17.60	325.0	V	104.0

Charger AE3 and USB cable AE7, CDMA BC(10) idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17894.033	56.8	-18.5	45.6	29.7	74.0	17.2	H
17990.367	56.6	-17.7	45.6	28.7	74.0	17.4	H
17994.900	56.6	-17.7	45.6	28.7	74.0	17.4	V
17878.167	56.4	-18.5	45.6	29.3	74.0	17.6	H
17942.200	56.4	-17.7	45.6	28.5	74.0	17.6	H
17986.967	56.3	-17.7	45.6	28.4	74.0	17.7	H

Charger AE3 and USB cable AE7, CDMA BC(10) idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17988.100	48.5	-17.7	45.6	20.6	54.0	5.5	H
17979.600	48.4	-17.7	45.6	20.5	54.0	5.6	H
17983.567	48.4	-17.7	45.6	20.5	54.0	5.6	V
17951.833	48.2	-17.7	45.6	20.3	54.0	5.8	H
17976.767	48.1	-17.7	45.6	20.2	54.0	5.9	H
17994.333	48.1	-17.7	45.6	20.2	54.0	5.9	H

Measurement results for Set.4-5:

Charger AE4 and USB cable AE7, LTE band 12 idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
54.093000	10.76	30.00	19.24	284.0	V	240.0
143.259000	16.95	33.50	16.57	119.0	V	-3.0
162.908000	15.01	33.50	18.51	199.0	V	-9.0
176.696000	14.60	33.50	18.92	211.0	V	-6.0
284.463000	13.10	36.00	22.92	325.0	H	243.0
306.487000	14.08	36.00	21.94	310.0	H	240.0

Charger AE4 and USB cable AE7, LTE band 12 idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17946.733	56.8	-17.7	45.6	28.9	74.0	17.2	H
17915.567	56.8	-17.7	45.6	28.9	74.0	17.2	H
17975.633	56.7	-17.7	45.6	28.8	74.0	17.3	V
17986.400	56.6	-17.7	45.6	28.7	74.0	17.4	H
17998.867	56.5	-17.7	45.6	28.6	74.0	17.5	H
17779.000	56.3	-18.5	45.6	29.2	74.0	17.7	H

Charger AE4 and USB cable AE7, LTE band 12 idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17975.067	49.3	-17.7	45.6	21.4	54.0	4.7	H
17986.400	48.8	-17.7	45.6	20.9	54.0	5.2	H
18000.000	48.5	-45.6	44.5	49.6	54.0	5.5	V
17966.000	48.5	-17.7	45.6	20.6	54.0	5.5	H
17925.200	48.1	-17.7	45.6	20.2	54.0	5.9	H
17963.733	48.0	-17.7	45.6	20.1	54.0	6.0	H

Measurement results for Set.4-5:

Charger AE4 and USB cable AE7, LTE band 13 idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
42.365000	10.52	30.00	19.48	225.0	V	151.0
58.282000	12.63	30.00	17.37	276.0	V	-2.0
139.231000	12.72	33.50	20.80	104.0	V	-30.0
150.335000	12.93	33.50	20.59	97.0	V	-29.0
189.098000	11.45	33.50	22.07	195.0	V	102.0
780.743000	19.66	36.00	16.36	201.0	V	206.0

Charger AE4 and USB cable AE7, LTE band 13 idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17973.933	57.2	-17.7	45.6	29.3	74.0	16.8	H
17907.067	56.9	-18.5	45.6	29.8	74.0	17.1	H
17949.000	56.8	-17.7	45.6	28.9	74.0	17.2	V
17999.433	56.8	-17.7	45.6	28.9	74.0	17.2	H
17680.967	56.7	-18.9	45.6	30.0	74.0	17.3	H
17932.000	56.6	-17.7	45.6	28.7	74.0	17.4	H

Charger AE4 and USB cable AE7, LTE band 13 idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17949.000	48.9	-17.7	45.6	21.0	54.0	5.1	H
17999.433	48.5	-17.7	45.6	20.6	54.0	5.5	H
17898.567	48.4	-18.5	45.6	21.3	54.0	5.6	V
17967.700	48.3	-17.7	45.6	20.4	54.0	5.7	H
17982.433	48.1	-17.7	45.6	20.2	54.0	5.9	H
17889.500	48.0	-18.5	45.6	20.9	54.0	6.0	H

Measurement results for Set.4-5:

Charger AE4 and USB cable AE7, LTE band 26 idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
42.813000	10.43	30.00	19.57	316.0	H	30.0
57.760000	13.28	30.00	16.72	325.0	V	-10.0
145.467000	13.10	33.50	20.42	175.0	V	-17.0
157.375000	9.74	33.50	23.78	325.0	V	66.0
298.334000	15.30	36.00	20.72	125.0	V	-30.0
502.820000	15.66	36.00	20.36	325.0	V	70.0

Charger AE4 and USB cable AE7, LTE band 26 idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
18000.000	54.1	-45.6	44.5	55.2	74.0	19.9	H
17999.433	57.0	-17.7	45.6	29.1	74.0	17.0	H
17998.867	54.5	-17.7	45.6	26.6	74.0	19.5	V
17998.300	54.6	-17.7	45.6	26.7	74.0	19.4	H
17997.733	54.0	-17.7	45.6	26.1	74.0	20.0	H
17997.167	54.6	-17.7	45.6	26.7	74.0	19.4	H

Charger AE4 and USB cable AE7, LTE band 26 idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17899.700	48.4	-18.5	45.6	21.3	54.0	5.6	H
17988.100	48.1	-17.7	45.6	20.2	54.0	5.9	H
17990.367	48.0	-17.7	45.6	20.1	54.0	6.0	V
17996.033	47.8	-17.7	45.6	19.9	54.0	6.2	H
17881.567	47.8	-18.5	45.6	20.7	54.0	6.2	H
17962.033	47.7	-17.7	45.6	19.8	54.0	6.3	H

Measurement results for Set.4-5:

Charger AE4 and USB cable AE7, LTE band 71 idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
50.901000	11.29	30.00	18.71	190.0	V	150.0
82.888000	7.56	30.00	22.44	325.0	V	206.0
126.718000	12.10	33.50	21.42	98.0	V	3.0
142.211000	17.83	33.50	15.69	99.0	V	-30.0
170.899000	16.52	33.50	17.00	102.0	V	-30.0
426.772000	15.72	36.00	20.30	125.0	V	95.0

Charger AE4 and USB cable AE7, LTE band 71 idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17887.800	57.5	-18.5	45.6	30.4	74.0	16.5	H
17969.967	57.2	-17.7	45.6	29.3	74.0	16.8	H
17970.533	56.9	-17.7	45.6	29.0	74.0	17.1	V
17990.933	56.8	-17.7	45.6	28.9	74.0	17.2	H
17961.467	56.7	-17.7	45.6	28.8	74.0	17.3	H
17938.800	56.5	-17.7	45.6	28.6	74.0	17.5	H

Charger AE4 and USB cable AE7, LTE band 71 idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17975.067	48.9	-17.7	45.6	21.0	54.0	5.1	H
17988.100	48.8	-17.7	45.6	20.9	54.0	5.2	H
17970.533	48.5	-17.7	45.6	20.6	54.0	5.5	V
17945.600	48.4	-17.7	45.6	20.5	54.0	5.6	H
17967.700	48.2	-17.7	45.6	20.3	54.0	5.8	H
17913.300	48.1	-18.5	45.6	21.0	54.0	5.9	H

Measurement results for Set.4-6:

Charger AE5 and USB cable AE7, 5G NR SA band 71 idle QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
49.515000	10.47	30.00	19.53	284.0	V	-6.0
73.853000	7.21	30.00	22.79	220.0	V	190.0
100.357000	8.28	33.50	25.24	125.0	V	241.0
138.515000	13.50	33.50	20.02	109.0	V	22.0
166.756000	10.81	33.50	22.71	125.0	V	-30.0
288.006000	12.96	36.00	23.06	125.0	V	94.0

Charger AE5 and USB cable AE7, 5G NR SA band 71 idle PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17998.300	57.1	-17.7	45.6	29.2	74.0	16.9	H
17973.933	56.9	-17.7	45.6	29.0	74.0	17.1	H
17984.133	56.8	-17.7	45.6	28.9	74.0	17.2	V
17982.433	56.7	-17.7	45.6	28.8	74.0	17.3	H
17979.033	56.6	-17.7	45.6	28.7	74.0	17.4	H
17864.567	56.5	-18.5	45.6	29.4	74.0	17.5	H

Charger AE5 and USB cable AE7, 5G NR SA band 71 idle AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17951.267	48.5	-17.7	45.6	20.6	54.0	5.5	H
17976.200	48.1	-17.7	45.6	20.2	54.0	5.9	H
17900.267	47.8	-18.5	45.6	20.7	54.0	6.2	V
17923.500	47.8	-17.7	45.6	19.9	54.0	6.2	H
17997.733	47.8	-17.7	45.6	19.9	54.0	6.2	H
17903.100	47.7	-18.5	45.6	20.6	54.0	6.3	H

Measurement results for Set.4-7:

USB AE6 QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
31.903000	21.90	30.00	8.10	100.0	V	245.0
39.811000	20.23	30.00	9.77	180.0	V	300.0
61.100000	15.88	30.00	14.12	98.0	V	249.0
99.147000	21.19	33.50	12.33	186.0	V	-27.0
176.077000	12.46	33.50	21.06	99.0	V	99.0
233.247000	17.66	36.00	18.36	95.0	V	95.0

USB AE6 PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17983.567	57.2	-17.7	45.6	29.3	74.0	16.8	H
17997.167	57.0	-17.7	45.6	29.1	74.0	17.0	H
17996.033	56.7	-17.7	45.6	28.8	74.0	17.3	V
17956.933	56.5	-17.7	45.6	28.6	74.0	17.5	H
17973.933	56.3	-17.7	45.6	28.4	74.0	17.7	H
17981.300	56.2	-17.7	45.6	28.3	74.0	17.8	H

USB AE6 AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17983.567	49.7	-17.7	45.6	21.8	54.0	4.3	H
17973.933	49.2	-17.7	45.6	21.3	54.0	4.8	H
17981.867	48.6	-17.7	45.6	20.7	54.0	5.4	V
17888.367	48.6	-18.5	45.6	21.5	54.0	5.4	H
17943.333	48.5	-17.7	45.6	20.6	54.0	5.5	H
17977.333	48.5	-17.7	45.6	20.6	54.0	5.5	H

Measurement results for Set.4-8:

USB AE7 QP detector

Frequency (MHz)	QP (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
39.945000	20.88	30.00	9.12	180.0	V	176.0
60.384000	16.64	30.00	13.36	101.0	V	-29.0
99.133000	21.83	33.50	11.69	177.0	V	-29.0
233.113000	15.71	36.00	20.31	120.0	V	115.0
400.018000	25.87	36.00	10.15	325.0	V	182.0
485.757000	21.19	36.00	14.83	286.0	V	-26.0

USB AE7 PK detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17862.300	57.3	-18.5	45.6	30.2	74.0	16.7	H
17980.167	57.2	-17.7	45.6	29.3	74.0	16.8	H
17895.167	57.0	-18.5	45.6	29.9	74.0	17.0	V
17881.000	56.7	-18.5	45.6	29.6	74.0	17.3	H
17955.800	56.5	-17.7	45.6	28.6	74.0	17.5	H
17980.733	56.5	-17.7	45.6	28.6	74.0	17.5	H

USB AE7 AV detector

Frequency (MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity
17967.133	48.8	-17.7	45.6	20.9	54.0	5.2	H
17977.900	48.8	-17.7	45.6	20.9	54.0	5.2	H
17998.867	48.7	-17.7	45.6	20.8	54.0	5.3	V
17981.867	48.5	-17.7	45.6	20.6	54.0	5.5	H
17989.800	48.5	-17.7	45.6	20.6	54.0	5.5	H
17990.367	48.4	-17.7	45.6	20.5	54.0	5.6	H

Sample calculation: AV detector, 17967.133MHz

Result =P_{Mea} (20.9 dBμV)+ G_A (45.6dB/m)+ G_{PL}(-17.7dB) =48.8dBμV/m

Charger AE3 and USB cable AE6, GSM850MHz idle and FM(88MHz), Set.4-1

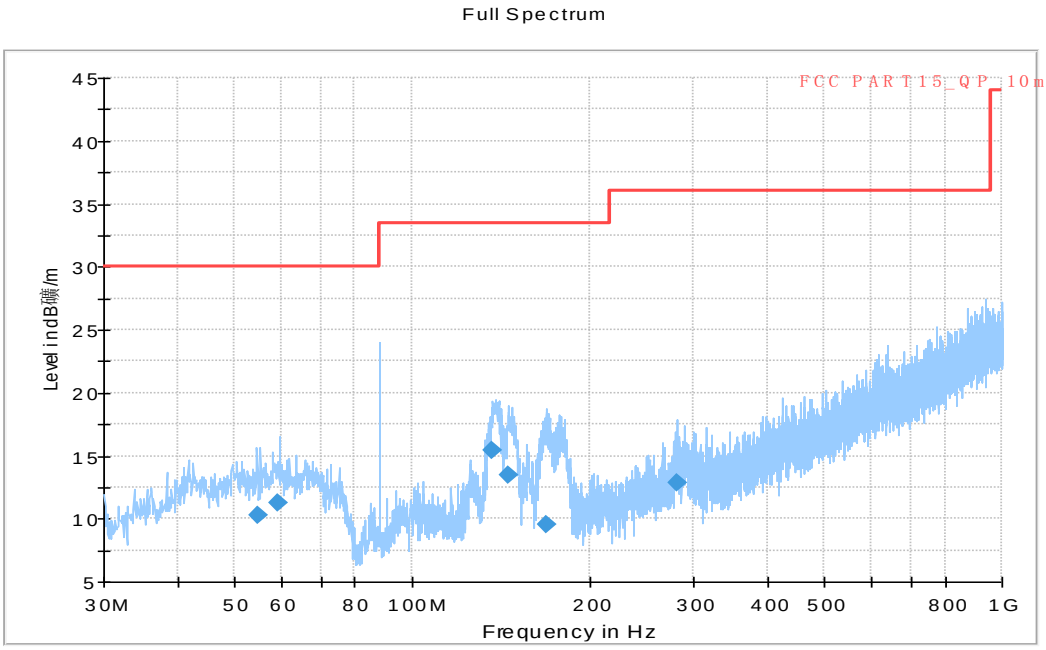

Figure A.1 Radiated Emission from 30MHz to 1GHz

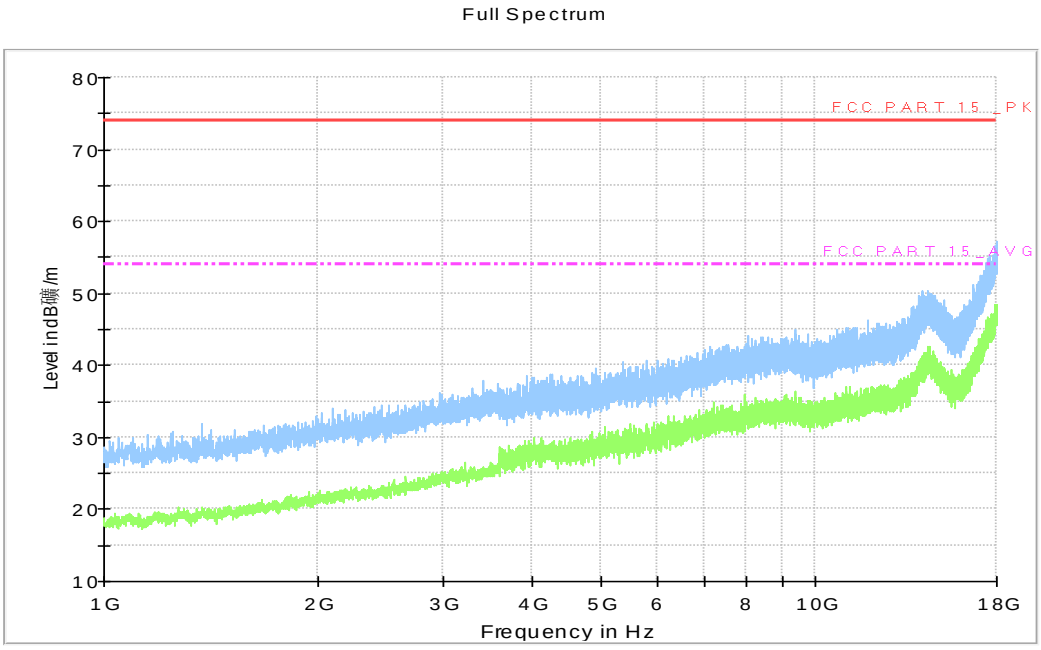

Figure A.2 Radiated Emission from 1GHz to 18GHz

Charger AE4 and USB cable AE6, WCDMA band 5 idle and FM(98MHz), Set.4-2

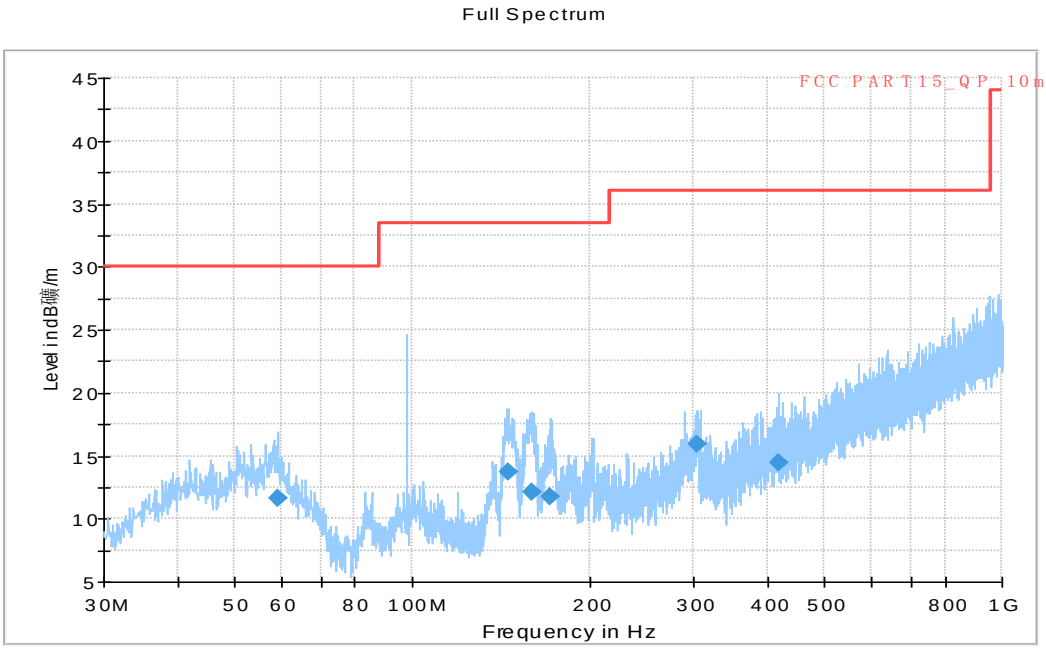

Figure A.3 Radiated Emission from 30MHz to 1GHz

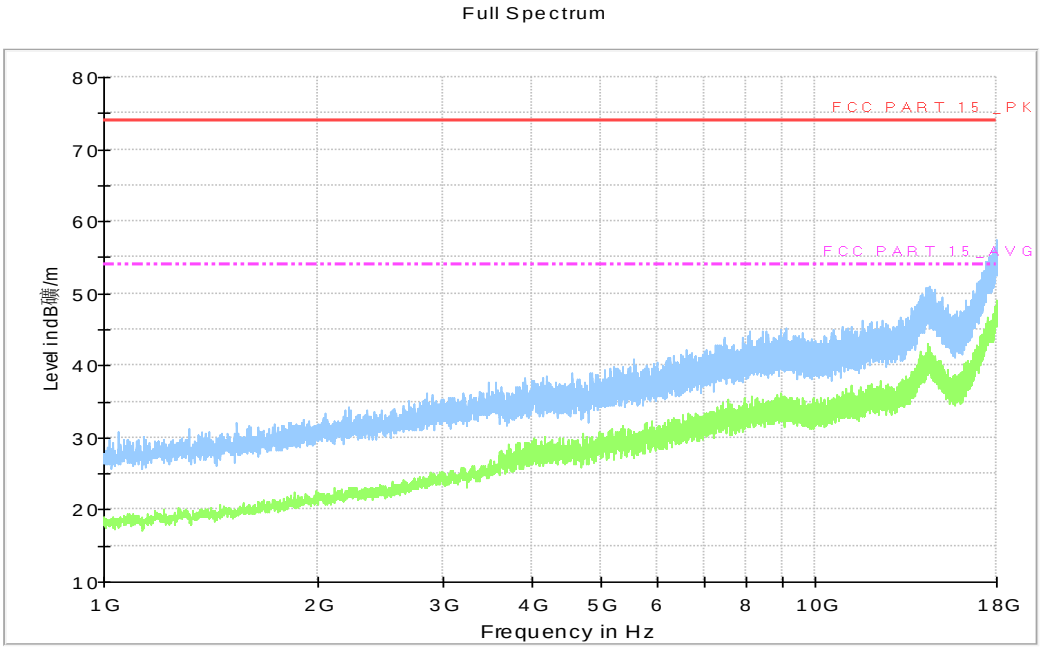

Figure A.4 Radiated Emission from 1GHz to 18GHz

Charger AE5 and USB cable AE6, CDMA BC(0) idle and FM(108MHz), Set.4-3

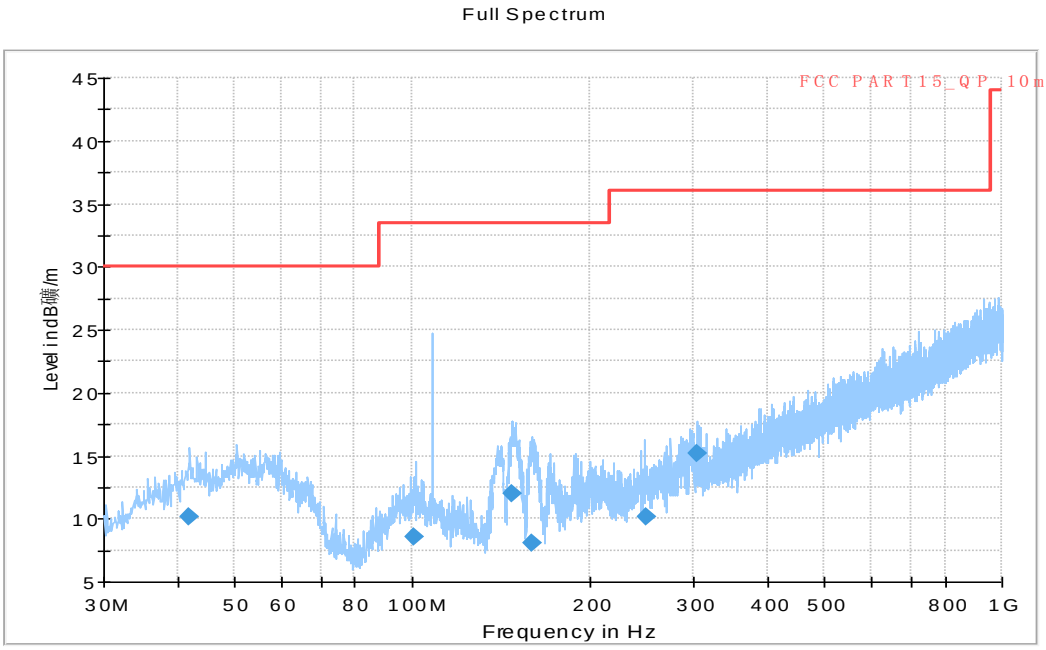

Figure A.5 Radiated Emission from 30MHz to 1GHz

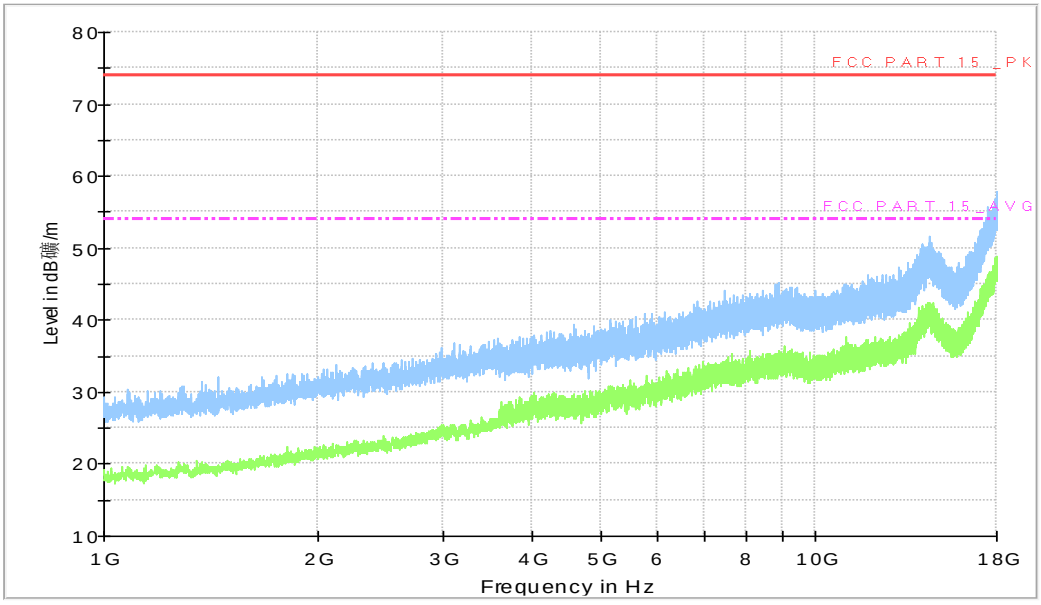

Figure A.6 Radiated Emission from 1GHz to 18GHz

Charger AE3 and USB cable AE7, CDMA BC(10) idle, Set.4-4

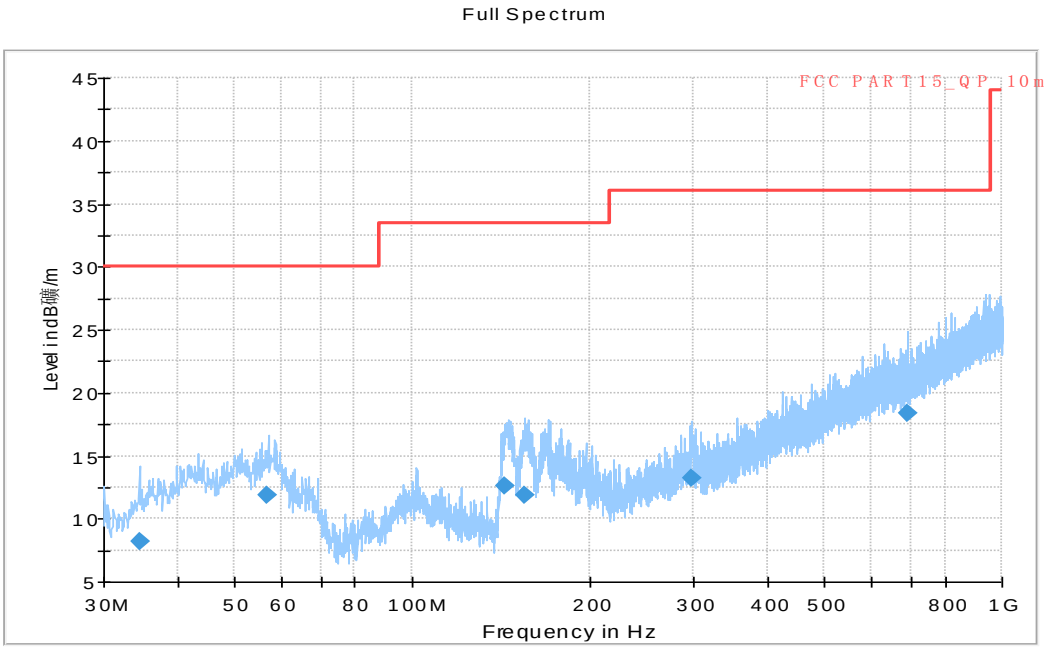

Figure A.7 Radiated Emission from 30MHz to 1GHz

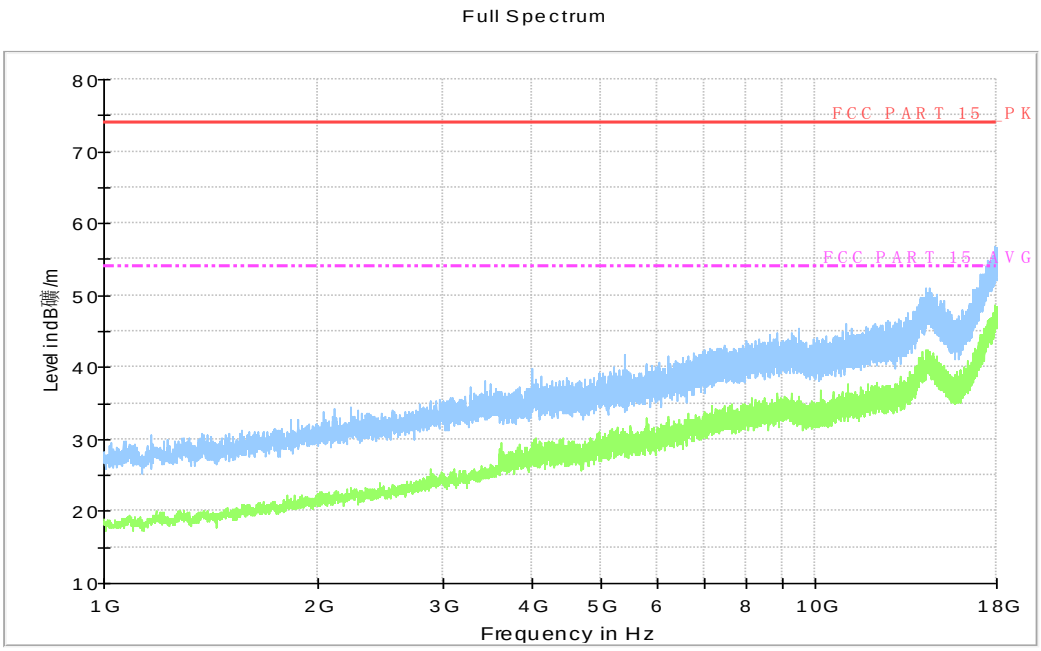

Figure A.8 Radiated Emission from 1GHz to 18GHz

Charger AE4 and USB cable AE7, LTE band 12 idle, Set.4-5

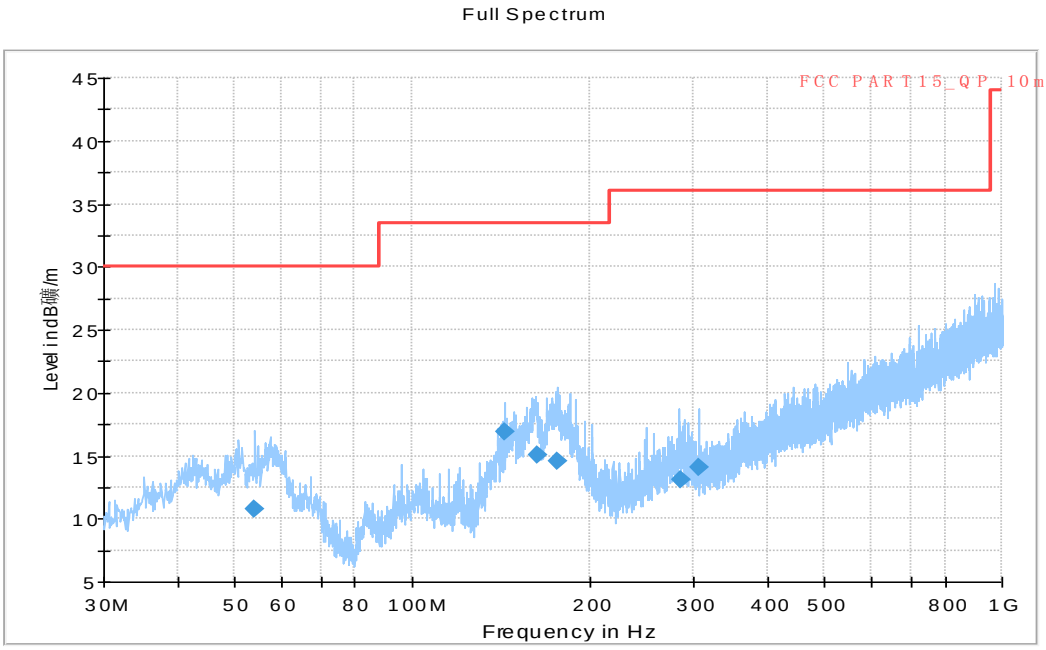

Figure A.9 Radiated Emission from 30MHz to 1GHz

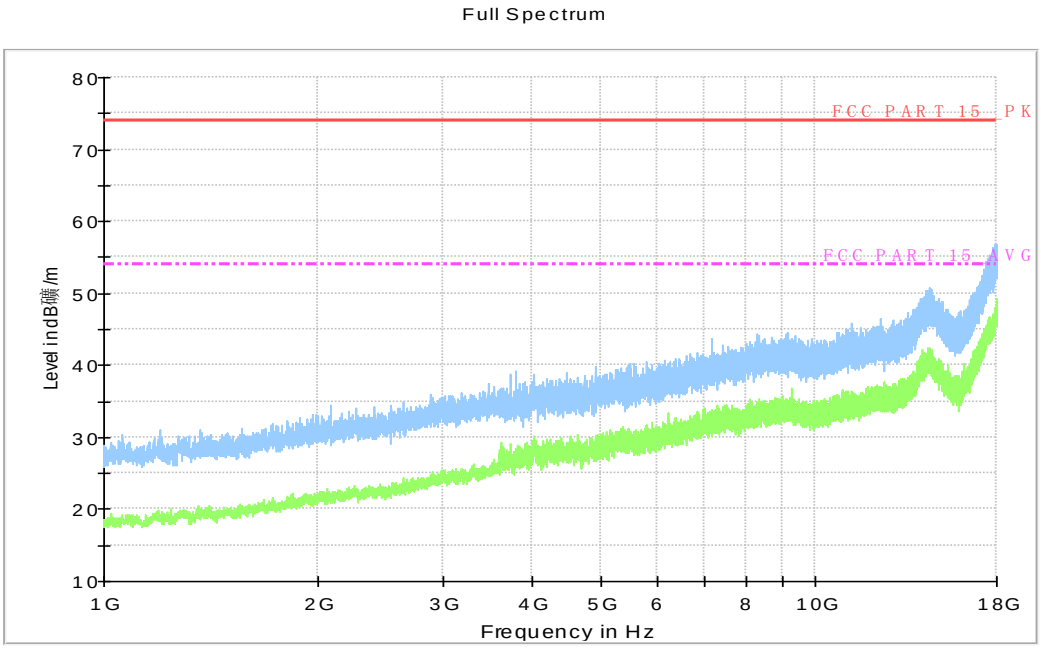

Figure A.10 Radiated Emission from 1GHz to 18GHz

Charger AE4 and USB cable AE7, LTE band 13 idle, Set.4-5

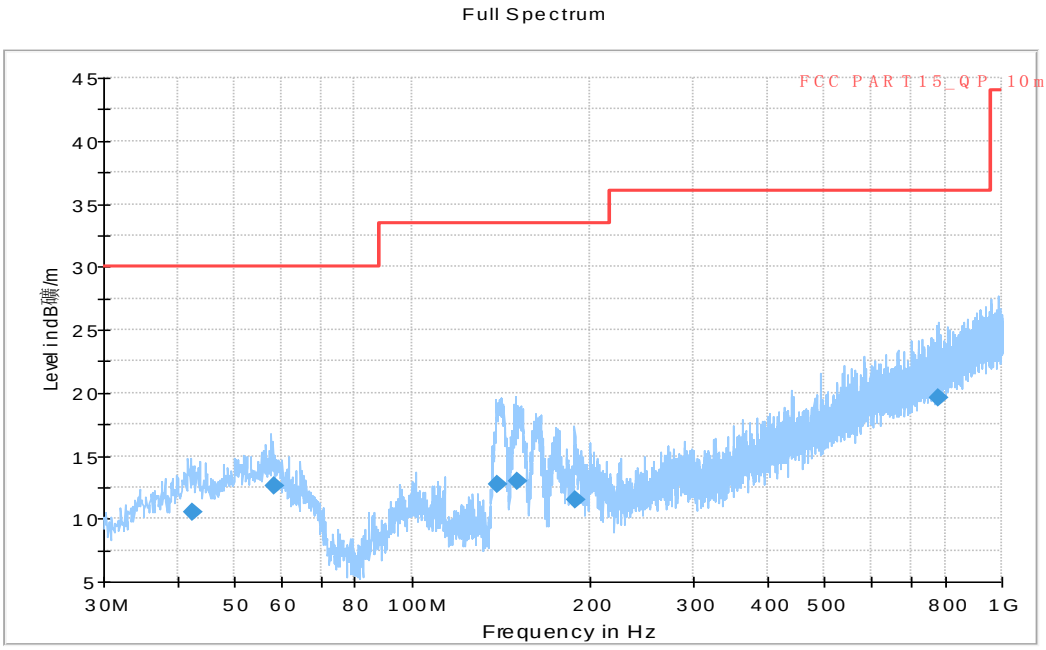

Figure A.11 Radiated Emission from 30MHz to 1GHz

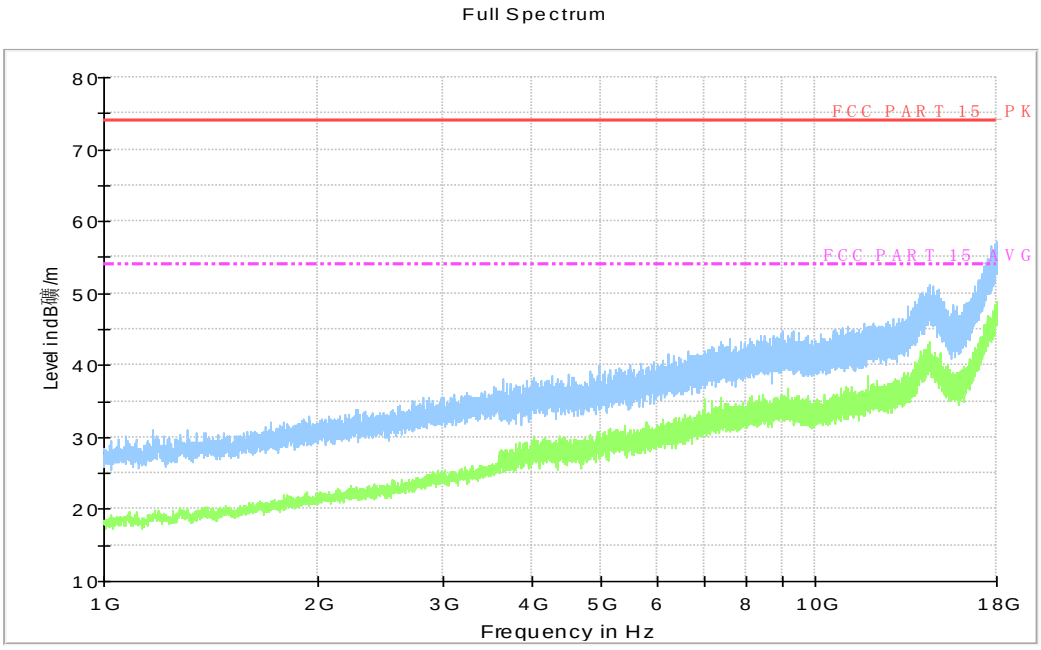

Figure A.12 Radiated Emission from 1GHz to 18GHz

Charger AE4 and USB cable AE7, LTE band 26 idle, Set.4-5

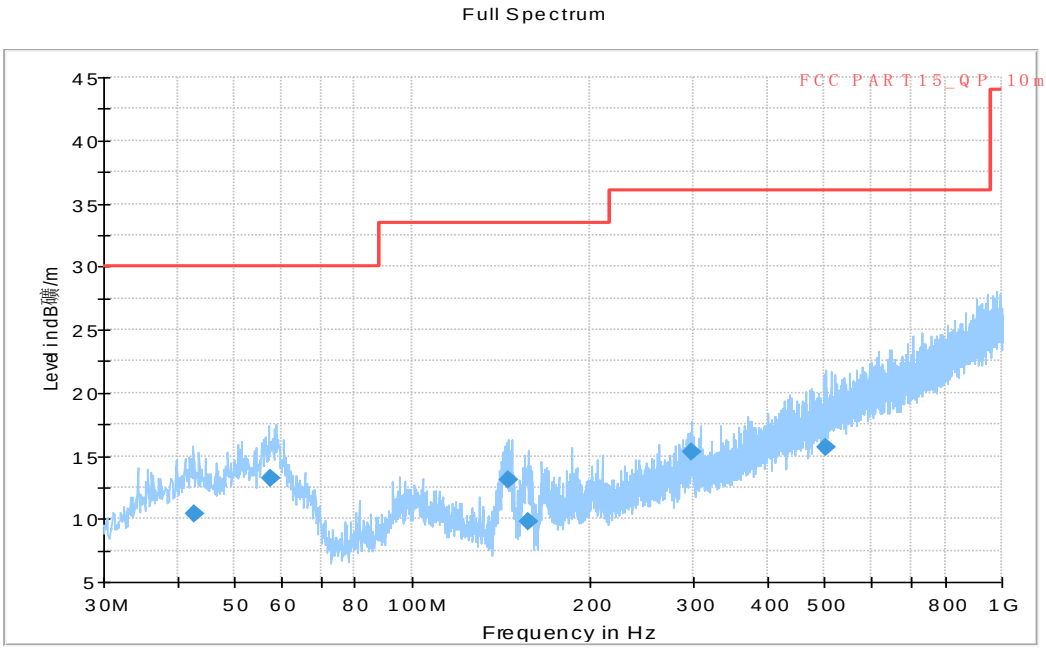

Figure A.13 Radiated Emission from 30MHz to 1GHz

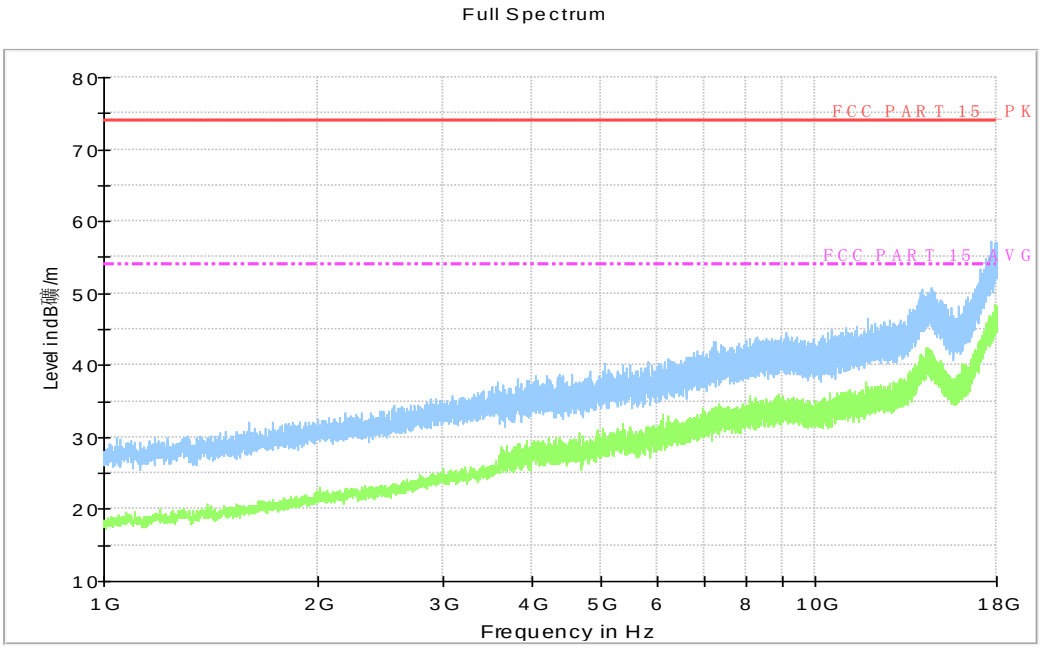

Figure A.14 Radiated Emission from 1GHz to 18GHz

Charger AE4 and USB cable AE7, LTE band 71 idle, Set.4-5

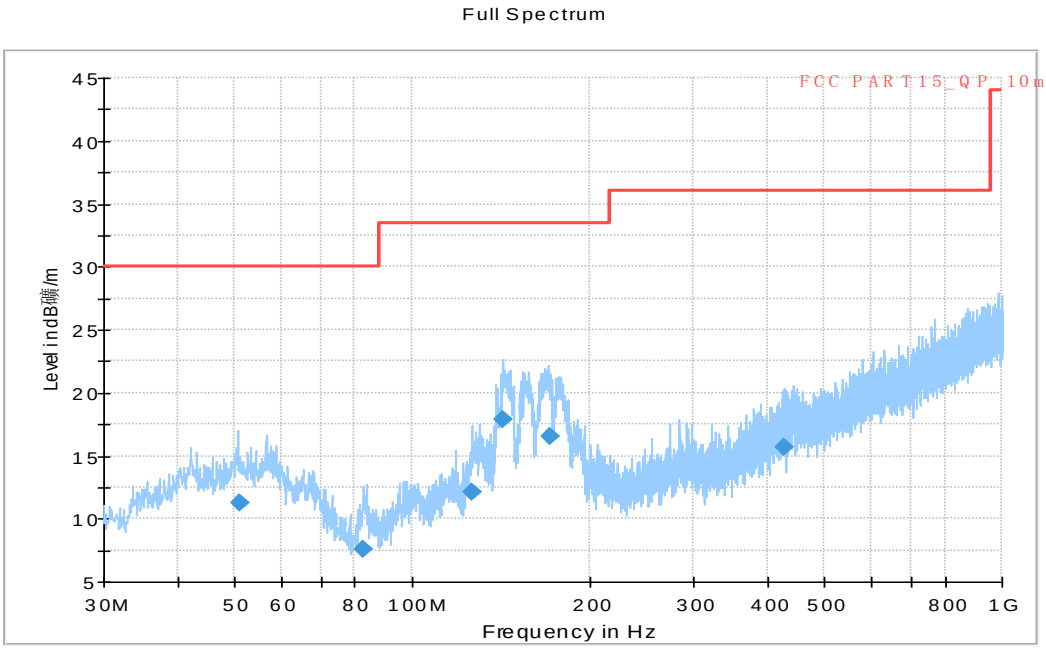

Figure A.15 Radiated Emission from 30MHz to 1GHz

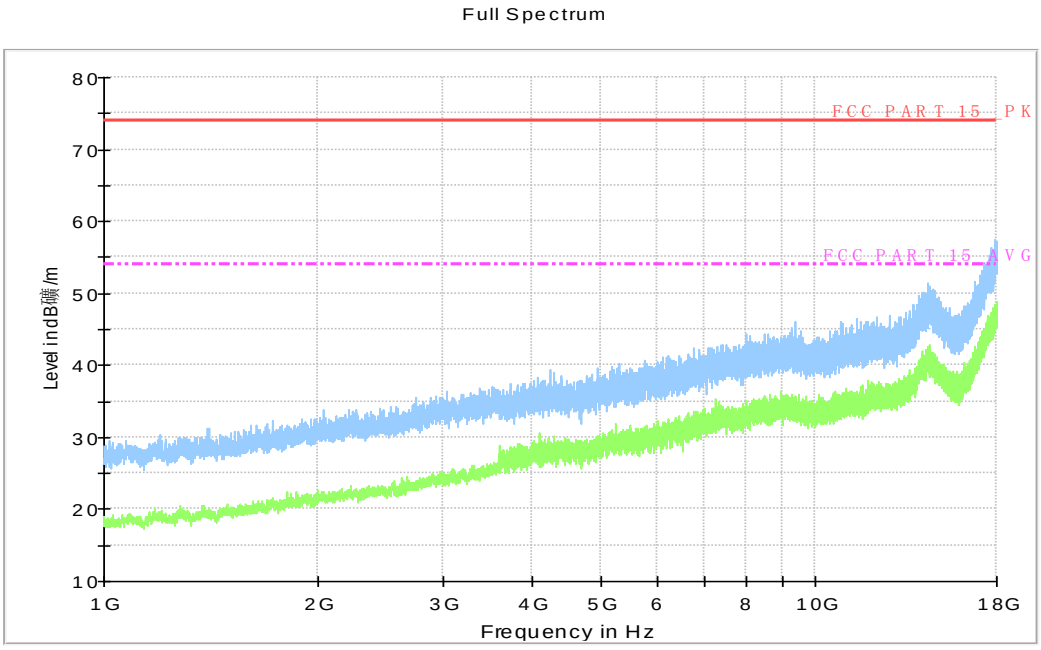

Figure A.16 Radiated Emission from 1GHz to 18GHz

Charger AE5 and USB cable AE7, 5G NR SA band 71, Set.4-6

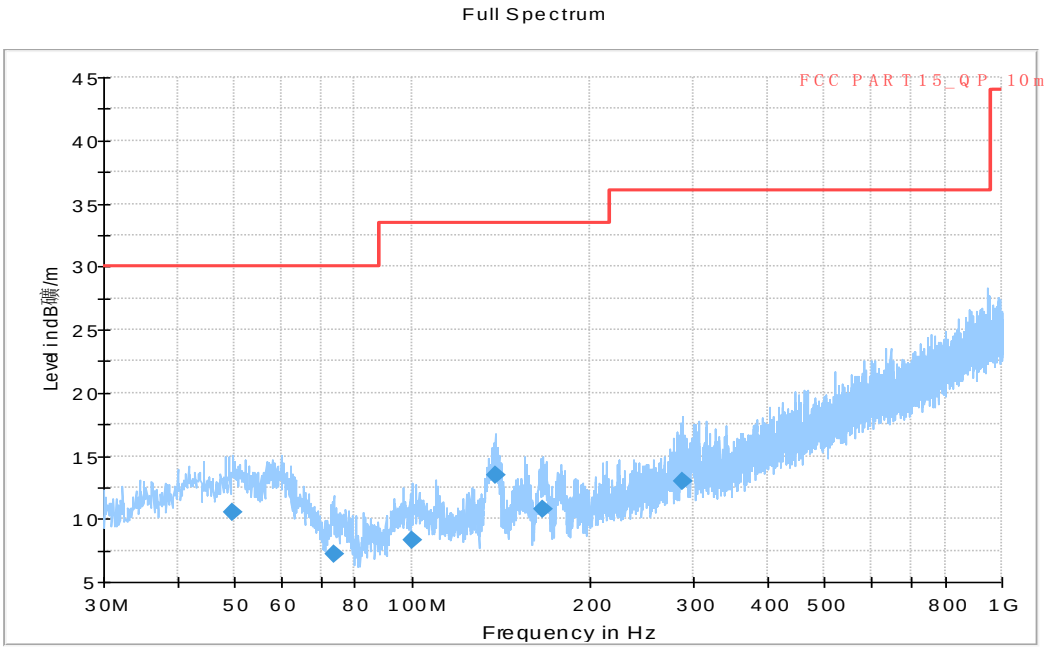

Figure A.17 Radiated Emission from 30MHz to 1GHz

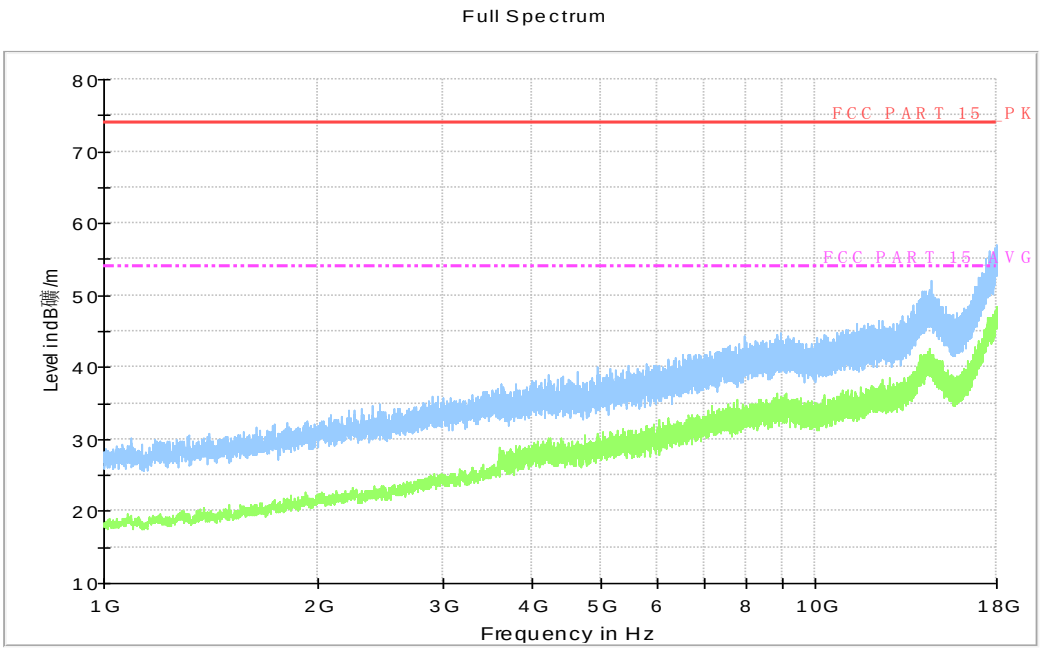

Figure A.18 Radiated Emission from 1GHz to 18GHz

USB AE6, Set.4-7

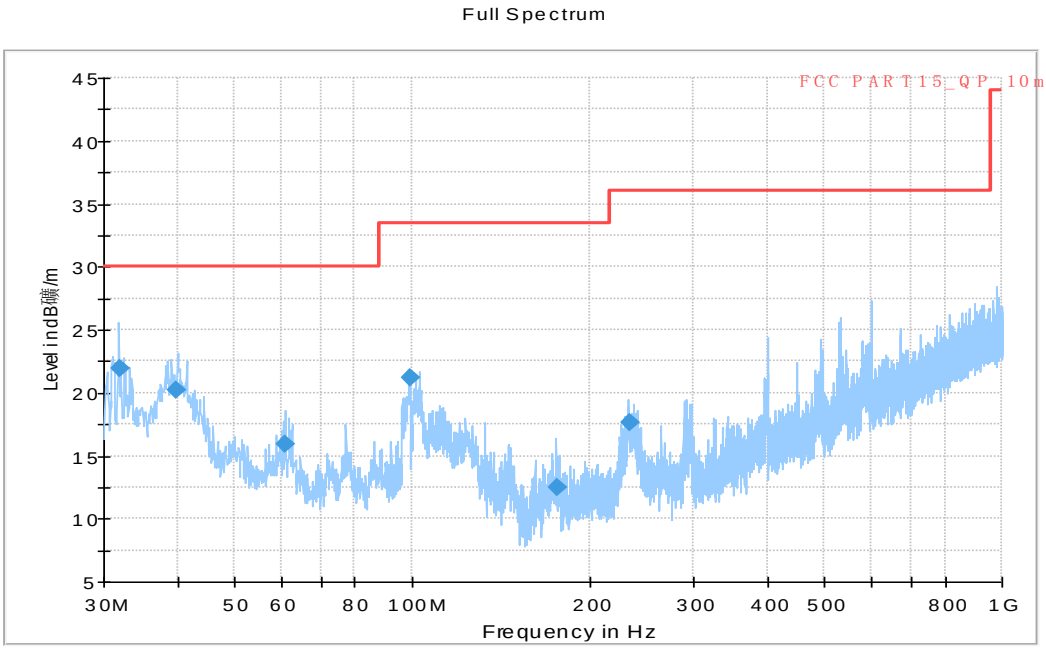

Figure A.19 Radiated Emission from 30MHz to 1GHz

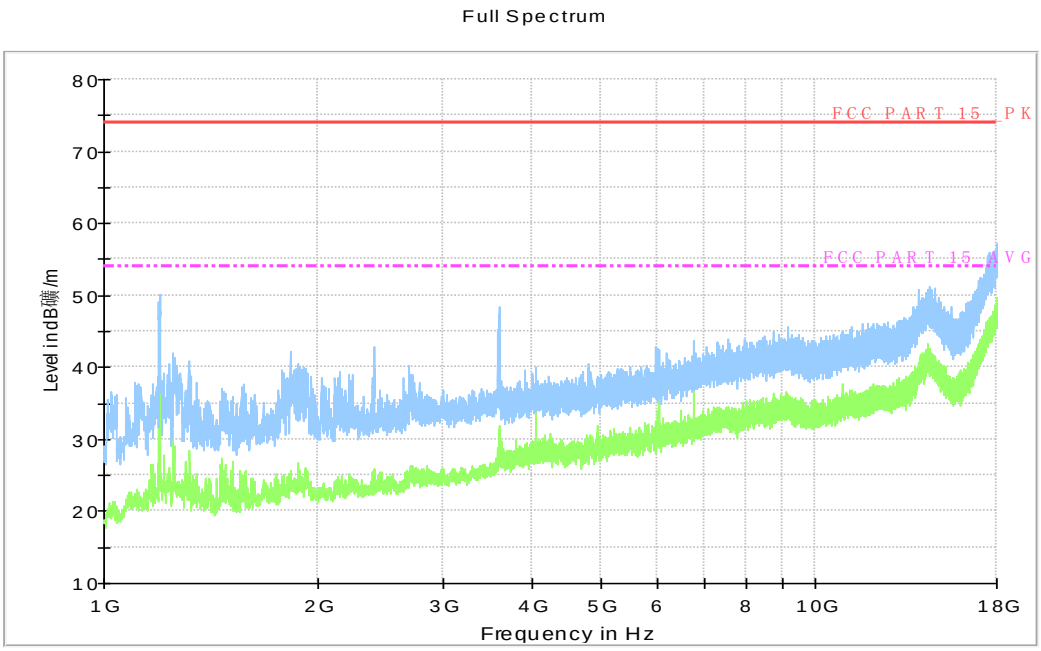

Figure A.20 Radiated Emission from 1GHz to 18GHz

USB AE7, Set.4-8

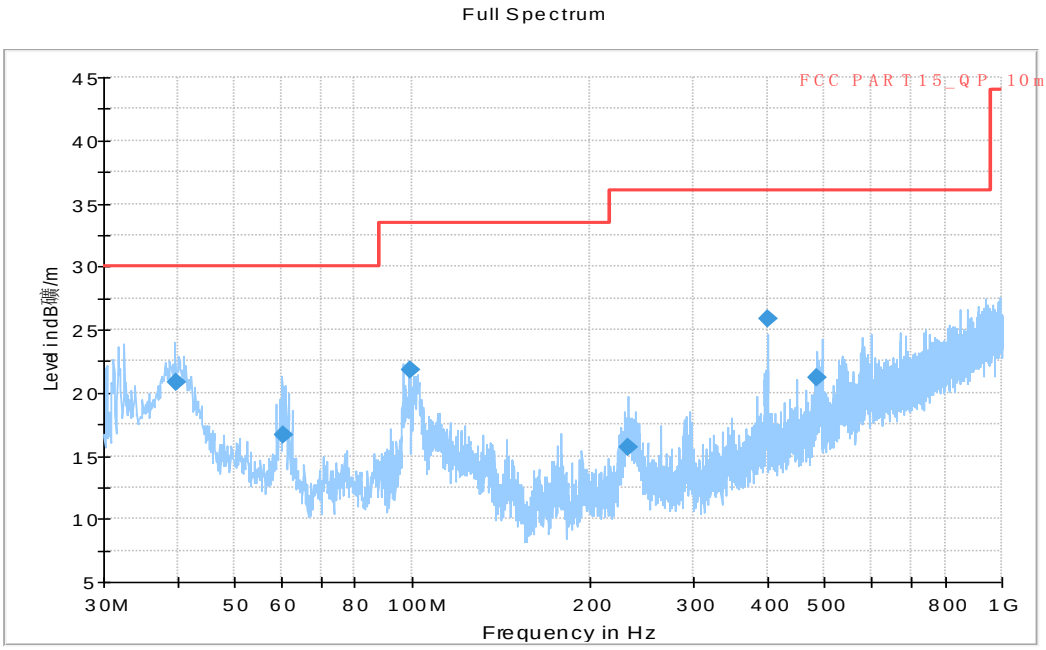

Figure A.21 Radiated Emission from 30MHz to 1GHz

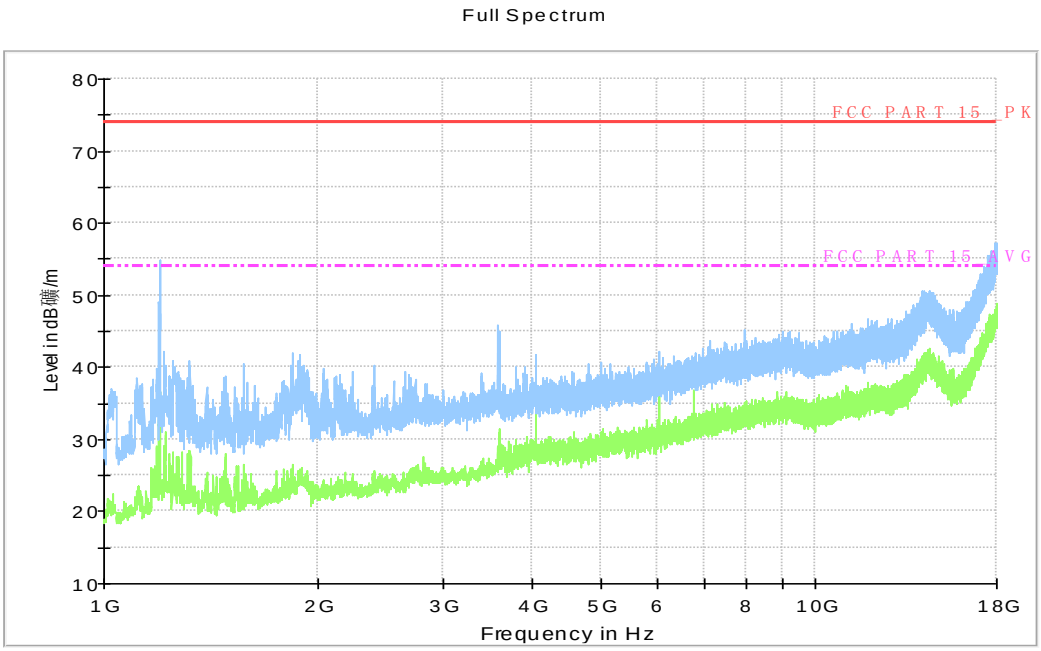

Figure A.22 Radiated Emission from 1GHz to 18GHz

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 and FM 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.

Charger AE3 and USB cable AE6, GSM850MHz idle and FM(88MHz), Set.4-1

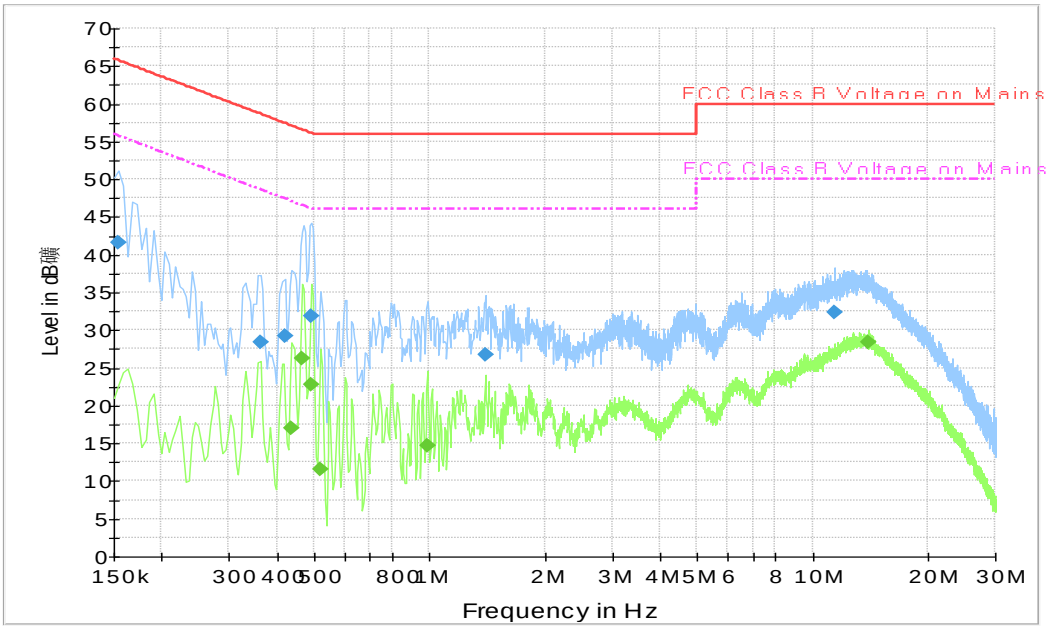

Figure A.23 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	41.6	L1	10.0	24.2	65.8
0.361500	28.4	L1	10.0	30.3	58.7
0.420000	29.2	L1	10.0	28.2	57.4
0.492000	31.9	L1	10.0	24.3	56.1
1.396500	26.7	L1	10.0	29.3	56.0
11.467500	32.3	L1	10.5	27.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.438000	17.1	L1	10.0	30.0	47.1
0.465000	26.2	L1	10.0	20.4	46.6
0.492000	22.8	L1	10.0	23.4	46.1
0.519000	11.6	L1	10.0	34.4	46.0
0.987000	14.7	L1	10.0	31.3	46.0
13.969500	28.5	L1	10.7	21.5	50.0

Charger AE4 and USB cable AE6, GSM850MHz idle and FM(98MHz), Set.4-2

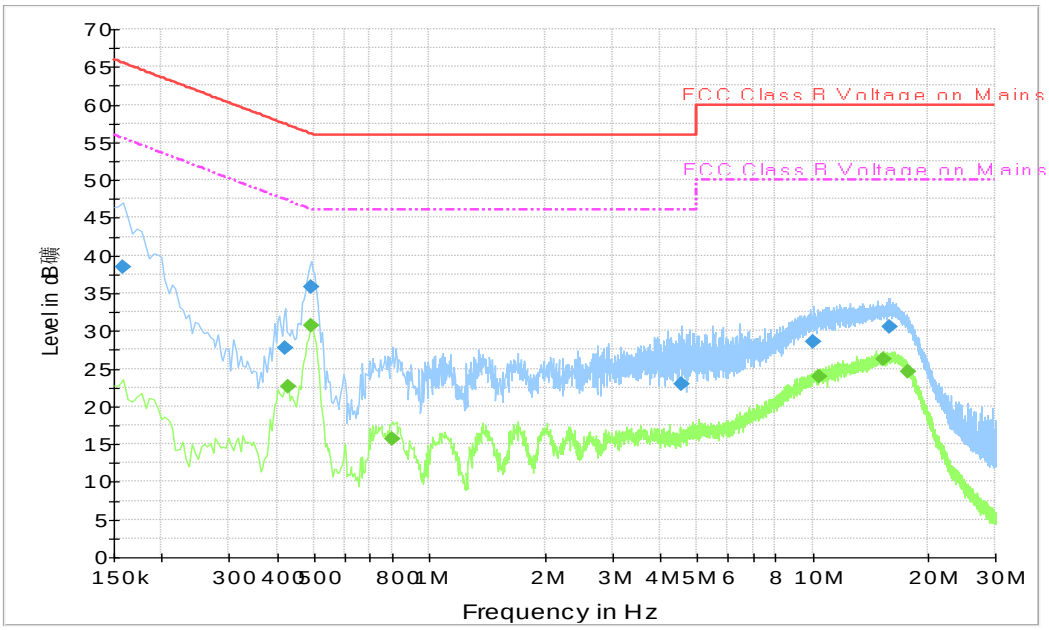

Figure A.24 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	38.4	N	10.0	27.1	65.5
0.420000	27.7	L1	10.0	29.7	57.4
0.492000	35.8	L1	10.0	20.3	56.1
4.551000	23.0	L1	10.2	33.0	56.0
10.023000	28.6	L1	10.4	31.4	60.0
15.967500	30.5	L1	10.8	29.5	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	22.7	N	10.0	24.6	47.3
0.492000	30.6	L1	10.0	15.5	46.1
0.798000	15.7	L1	10.0	30.3	46.0
10.392000	23.9	L1	10.4	26.1	50.0
15.261000	26.2	L1	10.8	23.8	50.0
17.718000	24.5	N	10.7	25.5	50.0

Charger AE5 and USB cable AE7, GSM850MHz idle and FM(108MHz), Set.4-6

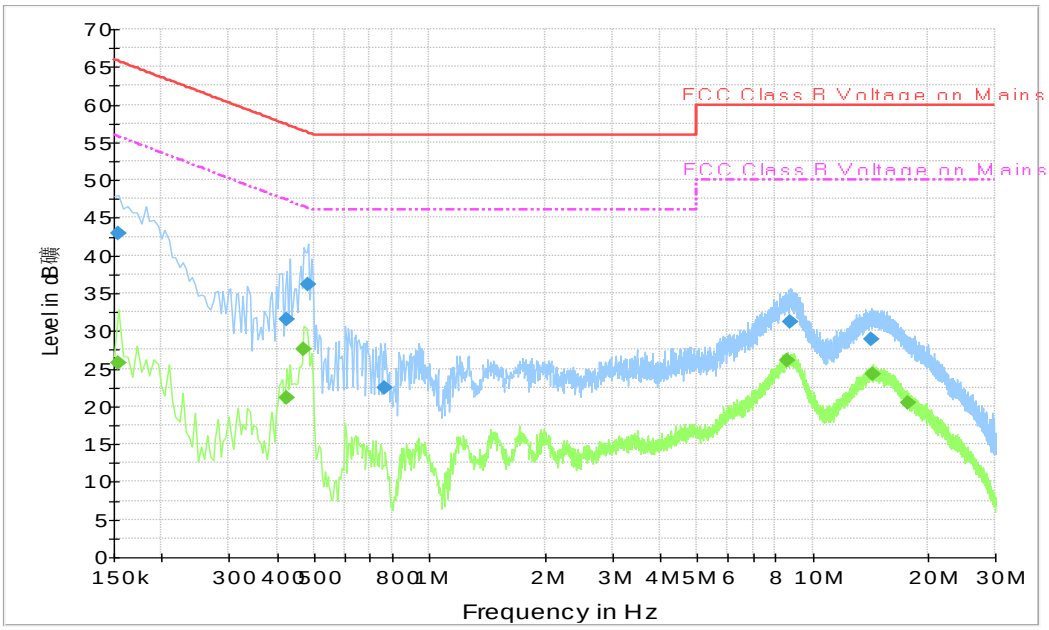

Figure A.25 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	43.0	L1	10.0	22.8	65.8
0.424500	31.6	L1	10.0	25.8	57.4
0.483000	36.1	L1	10.0	20.2	56.3
0.766500	22.4	N	10.0	33.6	56.0
8.781000	31.3	L1	10.3	28.7	60.0
14.298000	28.8	L1	10.7	31.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	25.8	L1	10.0	30.0	55.8
0.424500	21.2	L1	10.0	26.2	47.4
0.469500	27.6	L1	10.0	18.9	46.5
8.583000	26.2	L1	10.3	23.8	50.0
14.433000	24.3	L1	10.7	25.7	50.0
17.839500	20.5	L1	10.9	29.5	50.0

USB AE6, Set.4-7

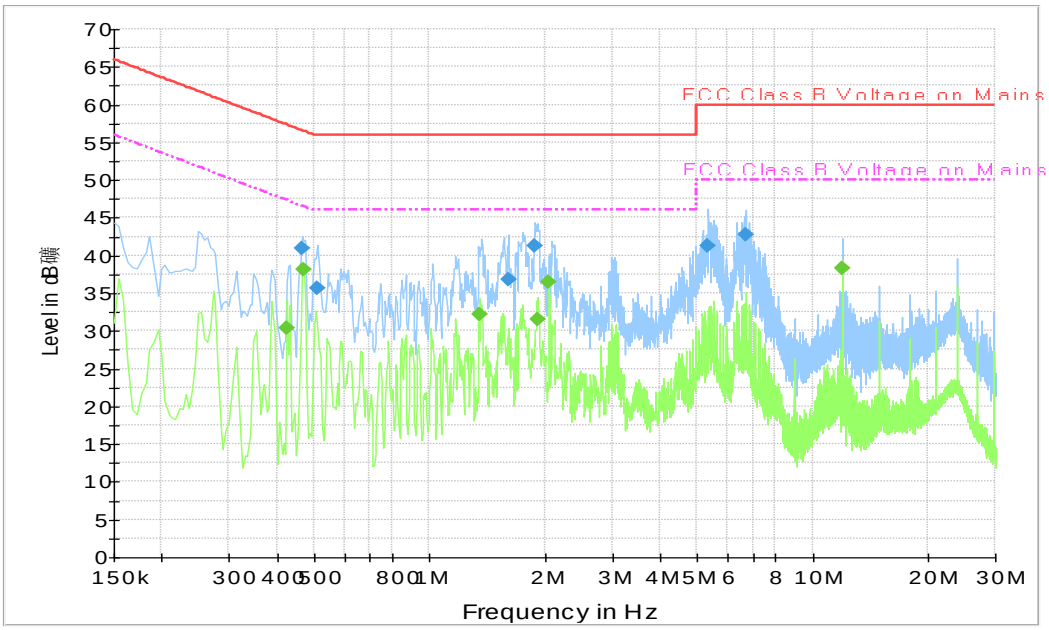

Figure A.26 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.465000	40.9	N	10.0	15.7	56.6
0.510000	35.7	L1	10.0	20.3	56.0
1.608000	36.8	N	10.0	19.2	56.0
1.887000	41.3	L1	10.0	14.7	56.0
5.343000	41.3	N	10.2	18.7	60.0
6.702000	42.7	N	10.3	17.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.424500	30.3	N	10.0	17.1	47.4
0.469500	38.1	L1	10.0	8.4	46.5
1.356000	32.1	L1	10.0	13.9	46.0
1.918500	31.6	N	10.1	14.4	46.0
2.053500	36.5	N	10.1	9.5	46.0
11.935500	38.3	N	10.5	11.7	50.0

USB AE7, Set.4-8

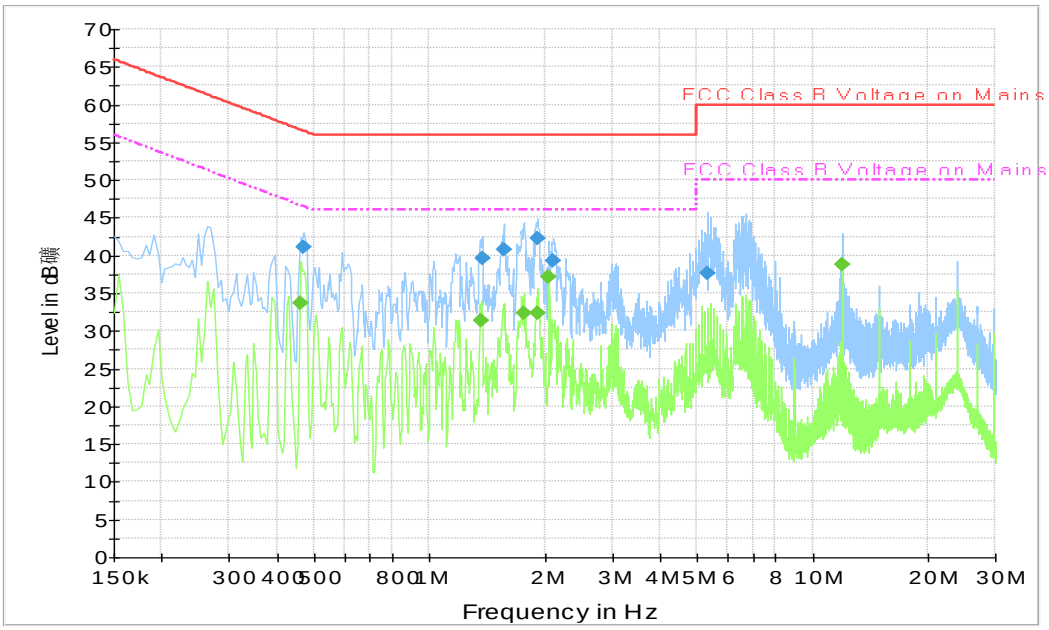

Figure A.27 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.469500	41.1	N	10.0	15.4	56.5
1.374000	39.7	N	10.0	16.3	56.0
1.563000	40.8	N	10.0	15.2	56.0
1.914000	42.3	L1	10.0	13.7	56.0
2.098500	39.3	N	10.1	16.7	56.0
5.329500	37.7	L1	10.2	22.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.460500	33.7	L1	10.0	12.9	46.7
1.365000	31.4	L1	10.0	14.6	46.0
1.765500	32.3	N	10.1	13.7	46.0
1.914000	32.4	L1	10.0	13.6	46.0
2.053500	37.1	N	10.1	8.9	46.0
11.931000	38.7	N	10.5	11.3	50.0

ANNEX B: Persons involved in this testing

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

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