TEST REPORT

No.I15N01256-EMC

for

Huawei Technologies Co., Ltd.

Smart Phone

Model Name: HUAWEI TAG-L13

Marketing Name: HUAWEI GR3

FCC ID: QISTAG-L13

with

Hardware Version: Ver.A

Software Version: TAG-L13C464B006_A

Issued Date: 2016-01-08

Test Laboratory:

FCC 2.948 Listed: No.342690

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15N01256-EMC	Rev.0	1st edition	2016-01-08

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1. Test Laboratory

1.1. Testing Location

Address:	TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China
Postal Code:	518048
Telephone:	+86(755)33322000
Fax:	+86(755)33322000

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

1.3. Project data

Testing Start Date:	2015-12-17
Testing End Date:	2015-12-26

1.4. Signature

Liang Yong
(Prepared this test report)

Du Zhaoxuan
(Reviewed this test report)

Cao Junfei
Director of the laboratory
(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

2.2. Manufacturer Information

Company Name:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

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

3.1. About EUT

Description	Smart Phone
Model Name	HUAWEI TAG-L13
Marketing Name	HUAWEI GR3
FCC ID	QISTAG-L13
TX Band	GSM850/1900,WCDMA Band 2/4/5,LTE Band 2/4/5/7/12/17
RX Band	GSM850/1900,WCDMA Band 2/4/5,LTE Band 2/4/5/7/12/17

The Equipment Under Test (EUT)are a model of Smart Phone with integrated antenna.

The EUT supports GPRS service with multi-slots class 12 and EGPRS service with multi-slots class 12. It has MP3, camera, USB memory, FM radio, GPS receiver , Bluetooth and WLAN functions.

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI
N0.1	868881020008367

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	/
AE2	Travel charger	/
AE3	USB cable	/

AE1-1

Model	HB3742A0EZC+
Manufacturer	Sunwoda electronic Co., Ltd
Capacitance	22000mAh
Nominal voltage	3.8V

AE1-2

Model	HB3742A0EZC+
Manufacturer	Scud (Fujian) Electronics Co., Ltd
Capacitance	2200mAh
Nominal voltage	3.8V

AE2-1

Model	HW-050100E01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/

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SN	B66757F5R00004
AE2-2	
Model	HW-050100U01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	B66660F3G00439
AE2-3	
Model	HW-050100I01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	B71332F6800090
AE2-4	
Model	HW-050100E01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	P66707F5L03115
AE2-5	
Model	HW-050100U01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	P66605F7A02842
AE2-6	
Model	HW-050100U01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	H666LRF6R00755
AE2-7	
Model	HW-050100E01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	H667LJFAH00077
AE2-8	
Model	HW-050100I01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	H7131RF8C00216
AE2-9	
Model	HW-050100R01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	/

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AE2-10

Model	HW-050100B01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	/

AE2-11

Model	HW-050100A01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	/

AE2-12

Model	HW-050100Z01
Manufacturer	Huizhou BYD Electronic CO.,LTD.
Length of cable	/
SN	/

AE2-13

Model	HW-050100R01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	

AE2-14

Model	HW-050100B01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	

AE2-15

Model	HW-050100A01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	

AE2-16

Model	HW-050100Z01
Manufacturer	Dongguan Phitek Electronics Co.,Ltd
Length of cable	/
SN	

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AE2-17

Model	HW-050100R01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	

AE2-18

Model	HW-050100B01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	

AE2-19

Model	HW-050100A01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	

AE2-20

Model	HW-050100Z01
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
Length of cable	/
SN	

AE3-1

Model	130-41040
Manufacturer	CHANGSHU HONGLIN TECHNOLOGY CO.,LTD.
Length of cable	94cm

AE3-2

Model	H09-000473
Manufacturer	SHEN ZHEN PANG NGAI INDUSTRIAL CO., LTD.
Length of cable	95cm

*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+ AE1-1 + AE2-1 + AE3-1	Charging mode
Set.2	EUT1+ AE1-2 + AE2-2 + AE3-2	Charging mode
Set.3	EUT1+ AE1-1 + AE2-3 + AE3-1	Charging mode
Set.4	EUT1+ AE1-2 + AE2-4 + AE3-2	Charging mode
Set.5	EUT1+ AE1-1 + AE2-5 + AE3-1	Charging mode
Set.6	EUT1+ AE1-2 + AE2-6 + AE3-2	Charging mode
Set.7	EUT1+ AE1-1 + AE2-7 + AE3-1	Charging mode
Set.8	EUT1+ AE1-2 + AE2-8 + AE3-2	Charging mode
Set.9	EUT1+ AE1-1 + AE3-1	USB mode
Set.10	EUT1+ AE1-2 + AE3-2	USB mode

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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	10-1-2015 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

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5. LABORATORY ENVIRONMENT

Semi-anechoic chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

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

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. =35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 6 GHz， 3 m distance

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6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:	
P	Pass
NA	Not applicable
F	Fail

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

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7. Test Facilities Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CALDUE DATE	CAL PERIOD
1.	Test Receiver	ESCI	100701	R&S	2016.08.10	1 year
2.	Test Receiver	ESCI	100702	R&S	2016.05.30	1 year
3.	Spectrum Analyzer	FSP 40	100378	R&S	2016.12.18	1 year
4.	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017.01.20	3 years
5.	LISN	ESH2-Z5	100196	R&S	2016.01.13	1 year
6.	Horn Antenna	3117	00066577	ETS-Lindgren	2016.04.01	3 years
7.	Universal Radio Communication Tester	E5515C	GB44051324	Agilent	2016.05.19	1 year
8.	PC	M4099t	SA08850737	Lenovo	/	/
9.	Monitor	L1710d	0M04340B10 01010	Lenovo	/	/
10.	Printer	P1008	VNF6C12491	HP	/	/
11.	Keyboard	KB-0225	0723779	Lenovo	/	/
12.	Mouse	MO28UOL	44B39412	Lenovo	/	/

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ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

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 a distance of 3 meters 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 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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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

Limit from CFR Part 15.109(a)

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 original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/3MHz	15

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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.

Note: the result contains vertical part and Horizontal part

RE Measurement uncertainty: 30M-1GHz: 5.08dB (K=2);
1GHz-18GHz: 4.56 dB (K=2)

Set.1 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14147.000000	56.0	V	11.2	18.0	74.0
15150.000000	56.4	H	12.1	17.6	74.0
15730.000000	57.9	V	12.9	16.1	74.0
16207.000000	57.9	V	13.3	16.1	74.0
16750.000000	58.1	H	14.0	15.9	74.0
17835.000000	58.4	V	14.4	15.6	74.0

Set.1 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14550.000000	43.5	V	11.8	10.5	54.0
15129.000000	44.3	V	12.1	9.7	54.0
15739.000000	45.9	V	12.9	8.1	54.0
16190.000000	45.9	V	13.3	8.1	54.0
16793.000000	46.4	V	14.0	7.6	54.0
17279.000000	46.2	V	14.1	7.8	54.0

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Set.2 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14137.000000	55.9	V	11.2	18.1	74.0
15156.000000	56.1	H	12.1	17.9	74.0
15689.000000	58.0	V	12.8	16.0	74.0
16239.000000	57.8	V	13.3	16.2	74.0
16656.000000	58.3	H	13.9	15.7	74.0
17406.000000	58.0	H	14.3	16.0	74.0

Set.2 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14545.000000	43.6	V	11.8	10.4	54.0
15142.000000	44.6	H	12.1	9.4	54.0
15729.000000	46.0	V	12.9	8.0	54.0
16200.000000	46.0	V	13.3	8.0	54.0
16790.000000	46.4	H	14.0	7.6	54.0
17393.000000	46.2	V	14.3	7.8	54.0

Set.3 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14199.000000	55.5	V	11.3	18.5	74.0
15100.000000	56.2	V	12.0	17.8	74.0
15781.000000	58.1	H	13.0	15.9	74.0
16200.000000	57.9	V	13.3	16.1	74.0
16697.000000	58.2	H	13.9	15.8	74.0
17385.000000	58.2	H	14.3	15.8	74.0

Set.3 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14464.000000	43.4	V	11.6	10.6	54.0
15158.000000	44.3	H	12.1	9.7	54.0
15691.000000	46.0	V	12.8	8.0	54.0
16236.000000	45.9	V	13.3	8.1	54.0
16748.000000	46.2	V	14.0	7.8	54.0
17341.000000	46.0	V	14.2	8.0	54.0

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Set.4 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14553.000000	55.4	H	11.8	18.6	74.0
15109.000000	56.8	H	12.1	17.2	74.0
15734.000000	57.7	V	12.9	16.3	74.0
16226.000000	57.6	V	13.3	16.4	74.0
16755.000000	58.1	H	14.0	15.9	74.0
17452.000000	57.6	V	14.3	16.4	74.0

Set.4 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14155.000000	43.1	V	11.2	10.9	54.0
15134.000000	44.0	V	12.1	10.0	54.0
15777.000000	45.6	V	12.9	8.4	54.0
16200.000000	45.5	V	13.3	8.5	54.0
16821.000000	46.0	V	14.0	8.0	54.0
17331.000000	45.6	V	14.2	8.4	54.0

Set.5 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14524.000000	55.2	V	11.7	18.8	74.0
15092.000000	56.0	V	12.0	18.0	74.0
15710.000000	57.4	V	12.8	16.6	74.0
16200.000000	57.8	V	13.3	16.2	74.0
16784.000000	58.1	H	14.0	15.9	74.0
17482.000000	58.2	H	14.3	15.8	74.0

Set.5 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14529.000000	43.3	H	11.7	10.7	54.0
15074.000000	44.1	V	12.0	9.9	54.0
15780.000000	45.7	V	13.0	8.3	54.0
16205.000000	45.7	H	13.3	8.3	54.0
16790.000000	45.9	V	14.0	8.1	54.0
17400.000000	45.8	V	14.3	8.2	54.0

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Set.6 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14551.000000	55.6	V	11.8	18.4	74.0
15001.000000	56.3	H	11.9	17.7	74.0
15765.000000	59.1	H	12.9	14.9	74.0
16262.000000	57.8	H	13.4	16.2	74.0
16730.000000	58.5	V	13.9	15.5	74.0
17463.000000	58.1	H	14.3	15.9	74.0

Set.6 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14550.000000	43.4	V	11.8	10.6	54.0
15121.000000	44.3	H	12.1	9.7	54.0
15777.000000	45.9	V	12.9	8.1	54.0
16280.000000	45.8	V	13.4	8.2	54.0
16777.000000	46.3	V	14.0	7.7	54.0
17393.000000	46.1	V	14.3	7.9	54.0

Set.7 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14275.000000	55.9	H	11.4	18.1	74.0
15116.000000	56.3	V	12.1	17.7	74.0
15762.000000	58.2	V	12.9	15.8	74.0
16203.000000	57.7	H	13.3	16.3	74.0
16881.000000	58.2	V	14.1	15.8	74.0
17729.000000	57.5	V	14.4	16.5	74.0

Set.7 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14158.000000	43.2	V	11.2	10.8	54.0
15124.000000	44.2	V	12.1	9.8	54.0
15790.000000	45.7	H	13.0	8.3	54.0
16244.000000	45.5	V	13.3	8.5	54.0
16821.000000	45.9	H	14.0	8.1	54.0
17344.000000	45.7	H	14.2	8.3	54.0

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Set.8 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14155.000000	55.7	V	11.2	18.3	74.0
15075.000000	56.1	H	12.0	17.9	74.0
15739.000000	57.9	V	12.9	16.1	74.0
15864.000000	58.2	H	13.0	15.8	74.0
16721.000000	57.9	V	13.9	16.1	74.0
17353.000000	57.2	V	14.2	16.8	74.0

Set.8 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14511.000000	43.1	V	11.7	10.9	54.0
15137.000000	44.0	V	12.1	10.0	54.0
15739.000000	45.7	V	12.9	8.3	54.0
16236.000000	45.4	V	13.3	8.6	54.0
16821.000000	45.9	V	14.0	8.1	54.0
17408.000000	45.6	V	14.3	8.4	54.0

Set.9 USB mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14155.000000	55.5	H	11.2	18.5	74.0
15116.000000	55.7	H	12.1	18.3	74.0
15739.000000	57.8	H	12.9	16.2	74.0
16124.000000	57.8	V	13.3	16.2	74.0
16598.000000	57.6	V	13.8	16.4	74.0
17381.000000	57.9	V	14.3	16.1	74.0

Set.9 USB mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14150.000000	43.1	V	11.2	10.9	54.0
15134.000000	44.1	V	12.1	9.9	54.0
15777.000000	45.7	V	12.9	8.3	54.0
16200.000000	45.5	V	13.3	8.5	54.0
16780.000000	46.0	V	14.0	8.0	54.0
17418.000000	45.6	V	14.3	8.4	54.0

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Set.10 USB mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14101.000000	56.0	V	11.2	18.0	74.0
15142.000000	56.2	V	12.1	17.8	74.0
15764.000000	58.1	V	12.9	15.9	74.0
16247.000000	57.9	V	13.3	16.1	74.0
16754.000000	58.5	H	14.0	15.5	74.0
17854.000000	58.0	V	14.4	16.0	74.0

Set.10 USB mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14524.000000	43.7	H	11.7	10.3	54.0
15171.000000	44.5	V	12.1	9.5	54.0
15758.000000	46.0	H	12.9	8.0	54.0
16192.000000	46.0	V	13.3	8.0	54.0
16748.000000	46.5	V	14.0	7.5	54.0
17295.000000	46.2	V	14.1	7.8	54.0

Note: The measurement result of Set.1,Set.2,Set.3,Set.4,Set.5,Set.6,Set.7,Set.8, Set.9 and Set.10 showed here are worst cases of combinations of different batteries and USB cables.

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Charging mode: Set 1

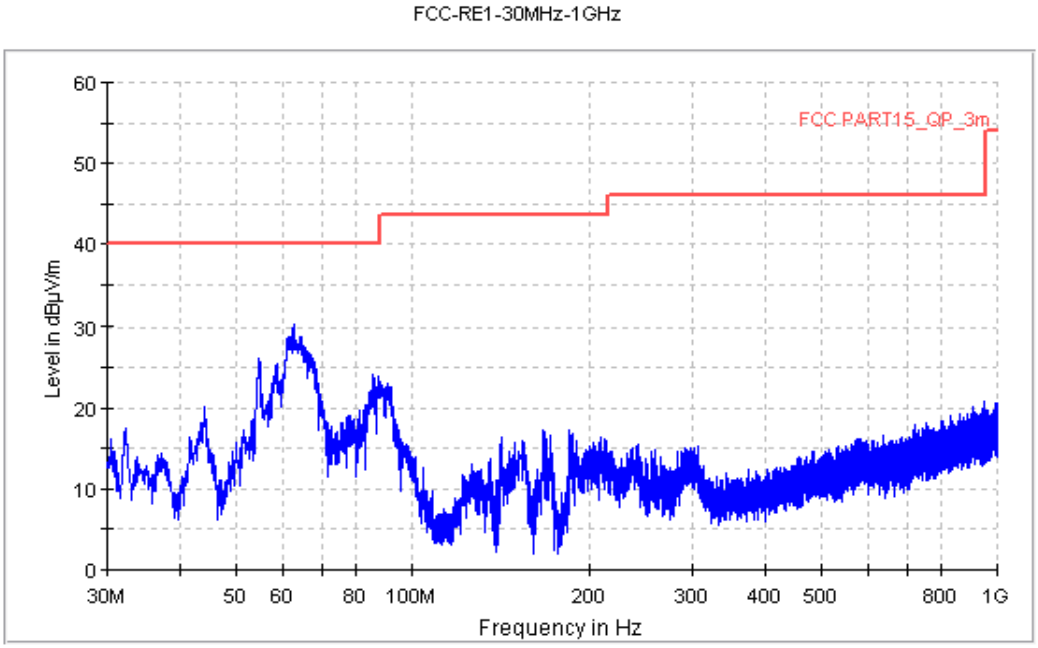

Figure A.1 Radiated Emission from 30MHz to 1GHz

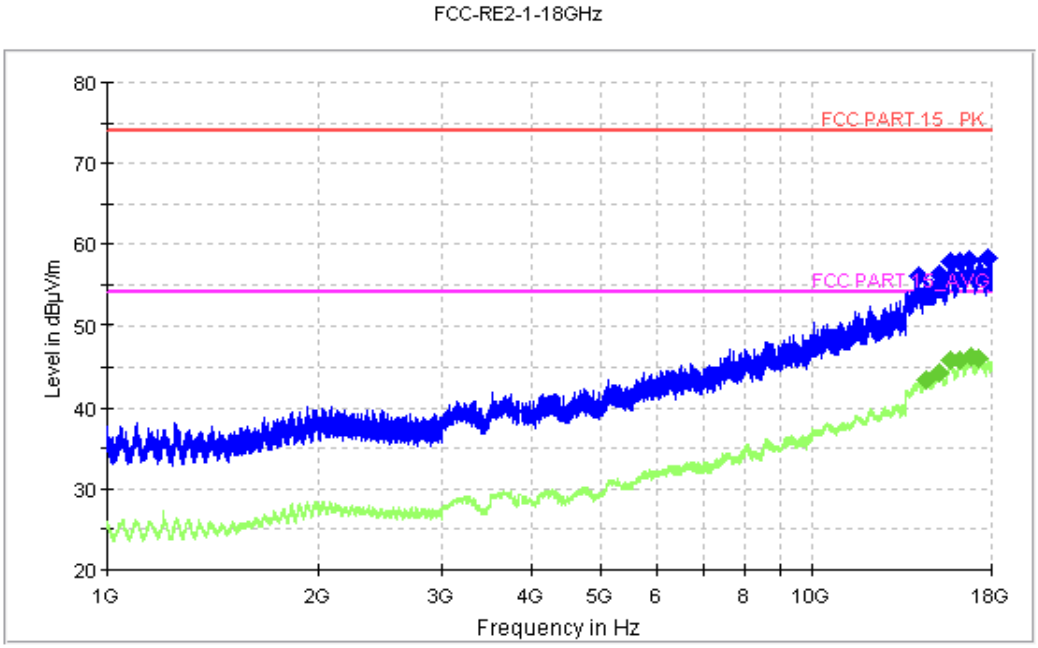

Figure A.2 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 2

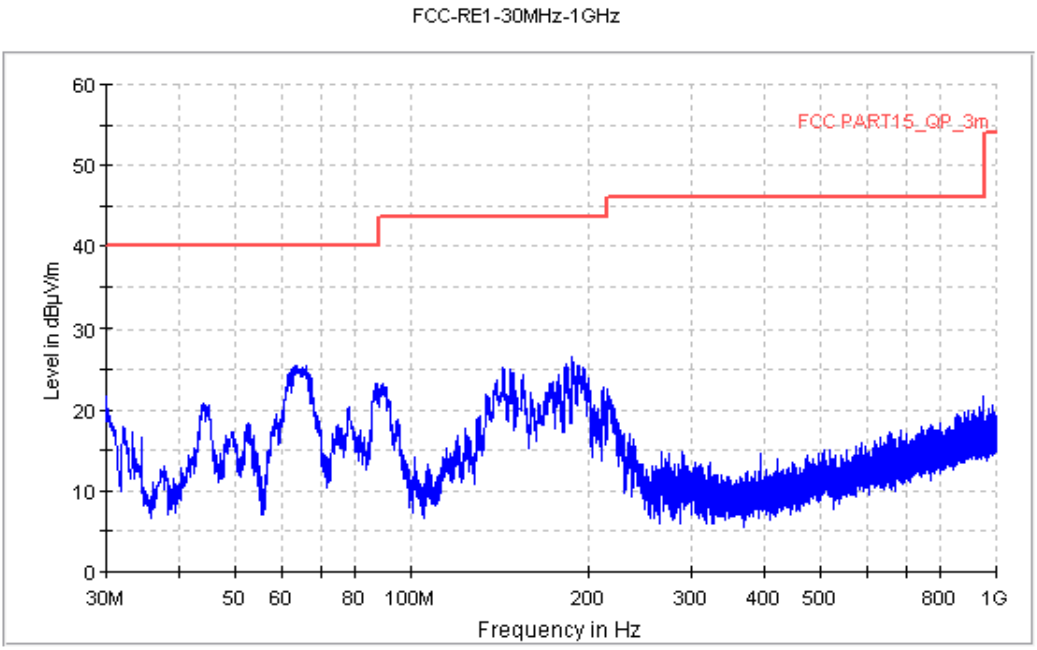

Figure A.3 Radiated Emission from 30MHz to 1GHz

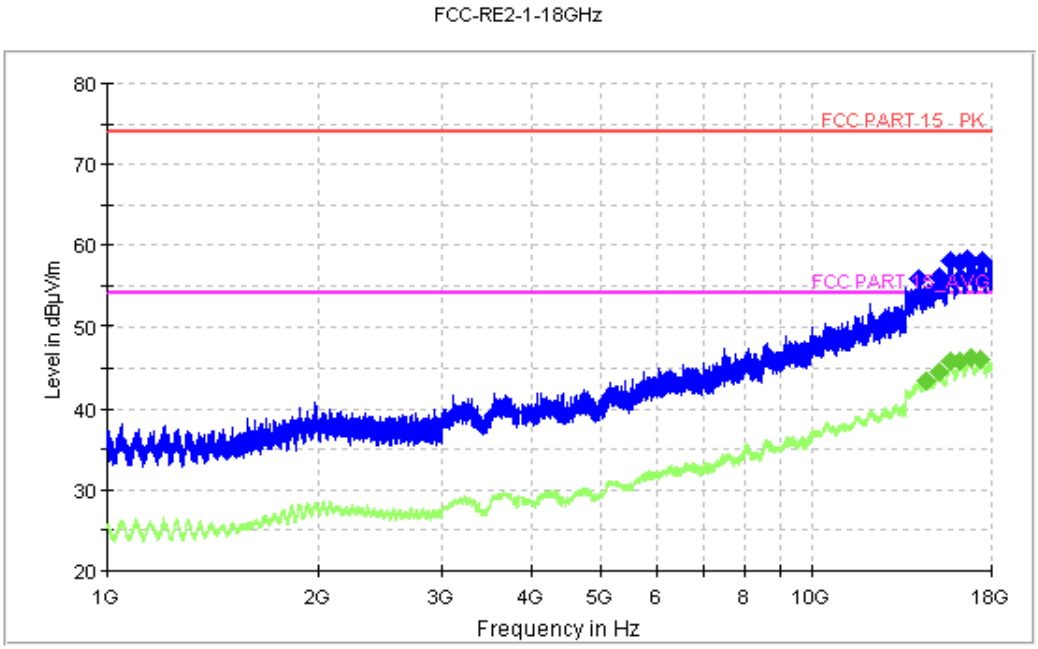

Figure A.4 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 3

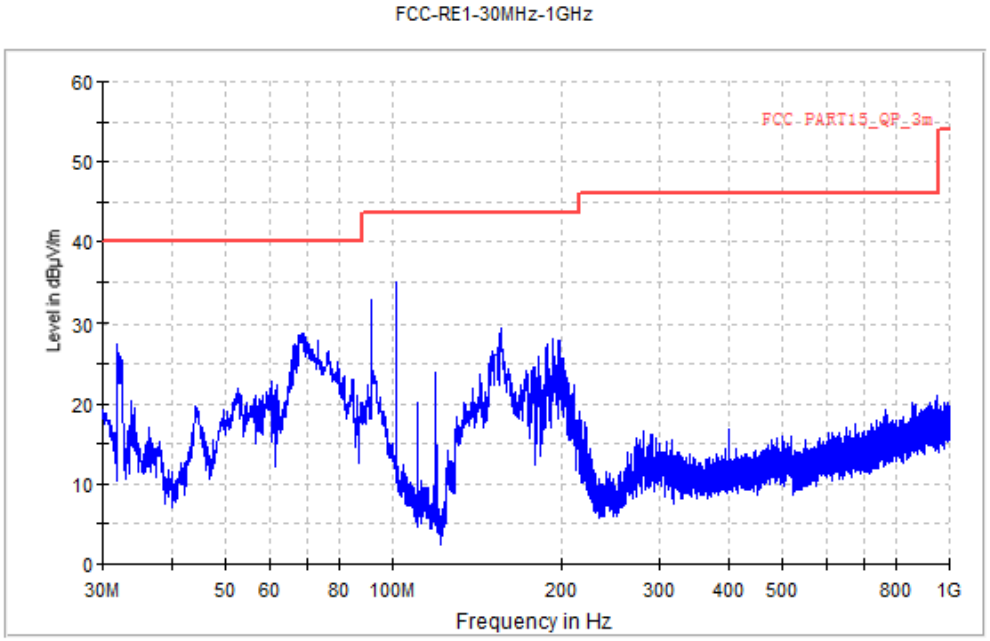

Figure A.5 Radiated Emission from 30MHz to 1GHz

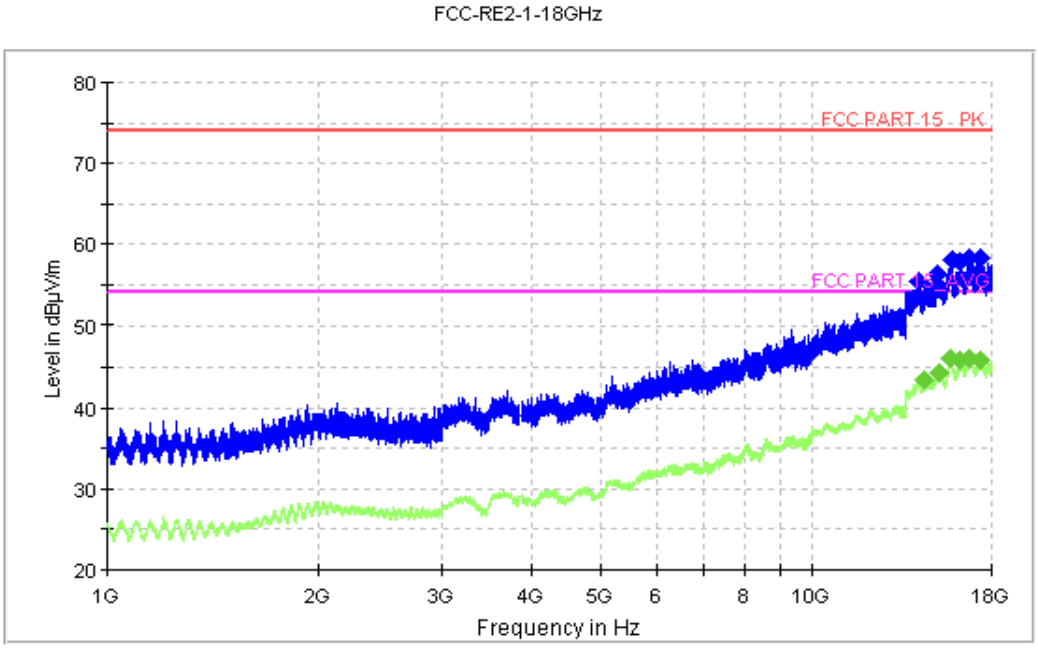

Figure A.6 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 4

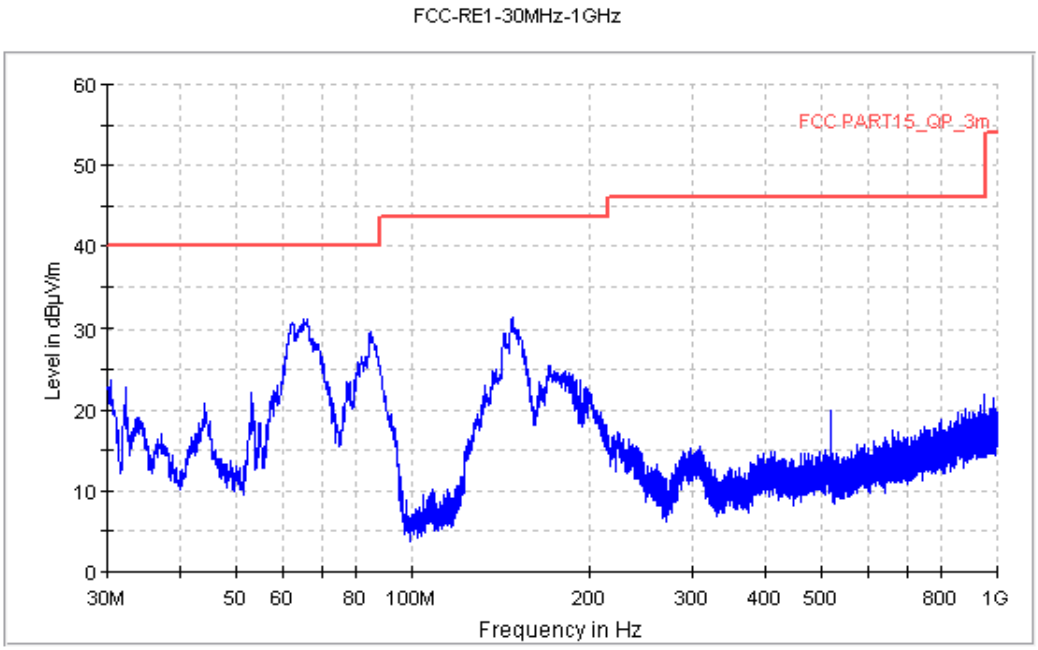

Figure A.7 Radiated Emission from 30MHz to 1GHz

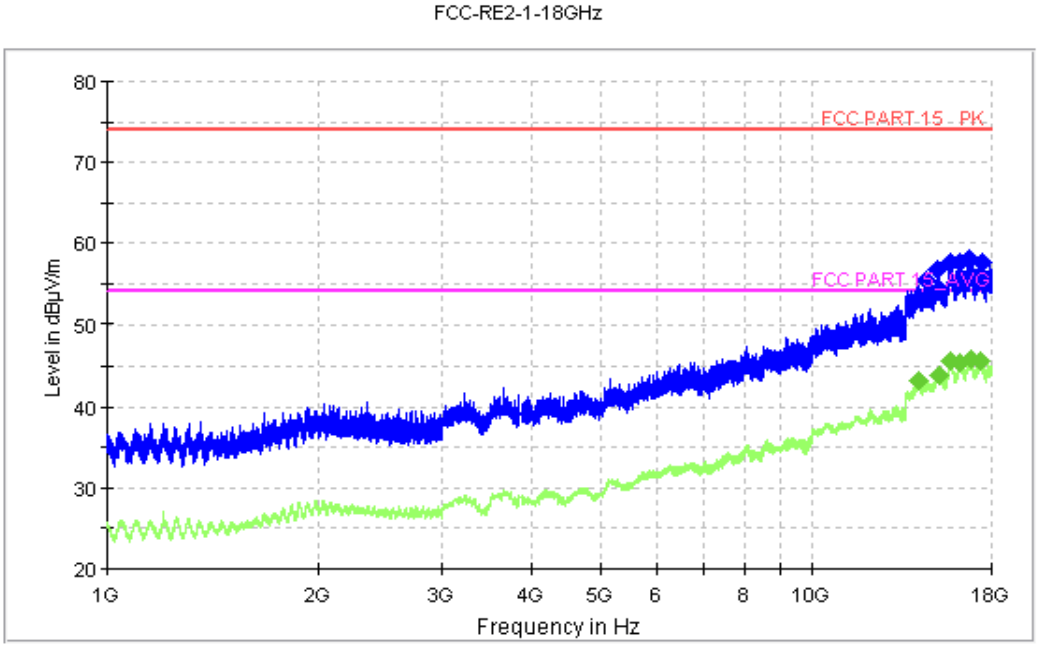

Figure A.8 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 5

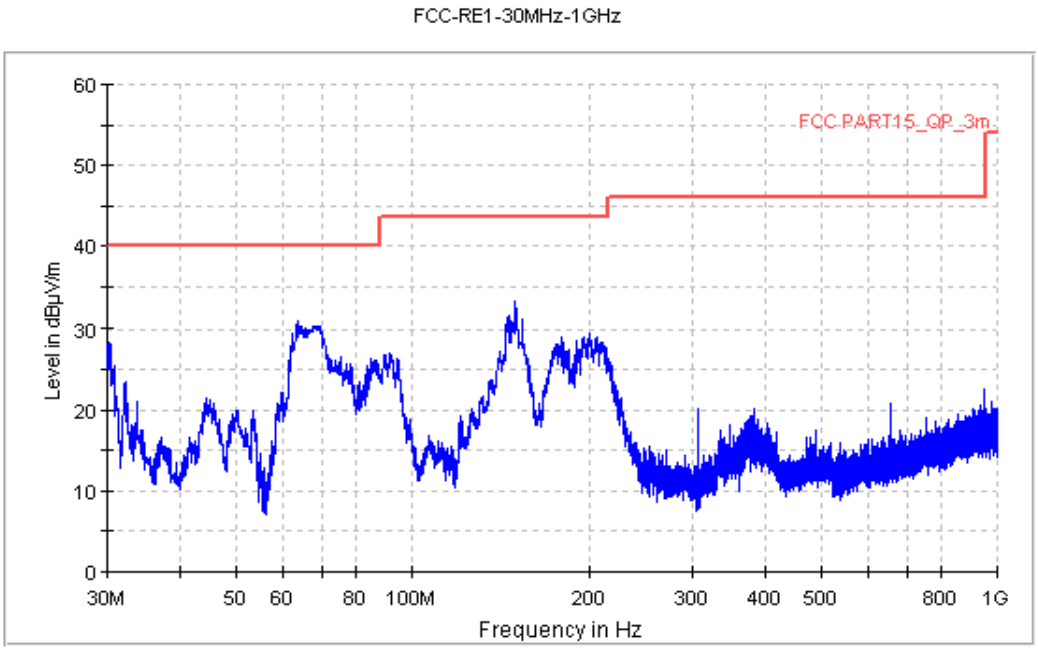

Figure A.9 Radiated Emission from 30MHz to 1GHz

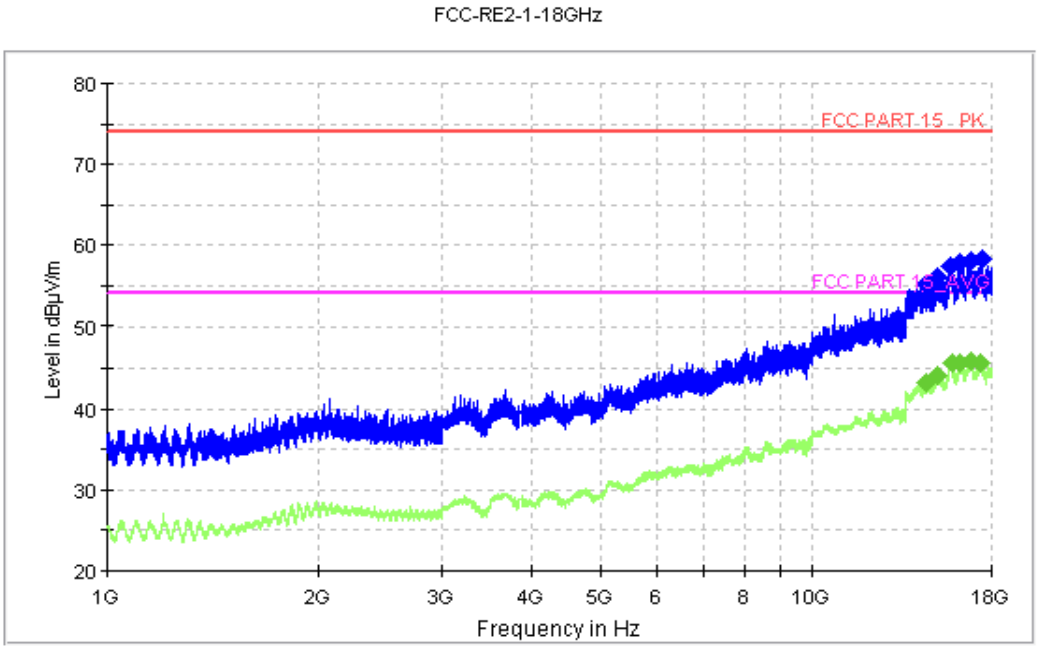

Figure A.10 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 6

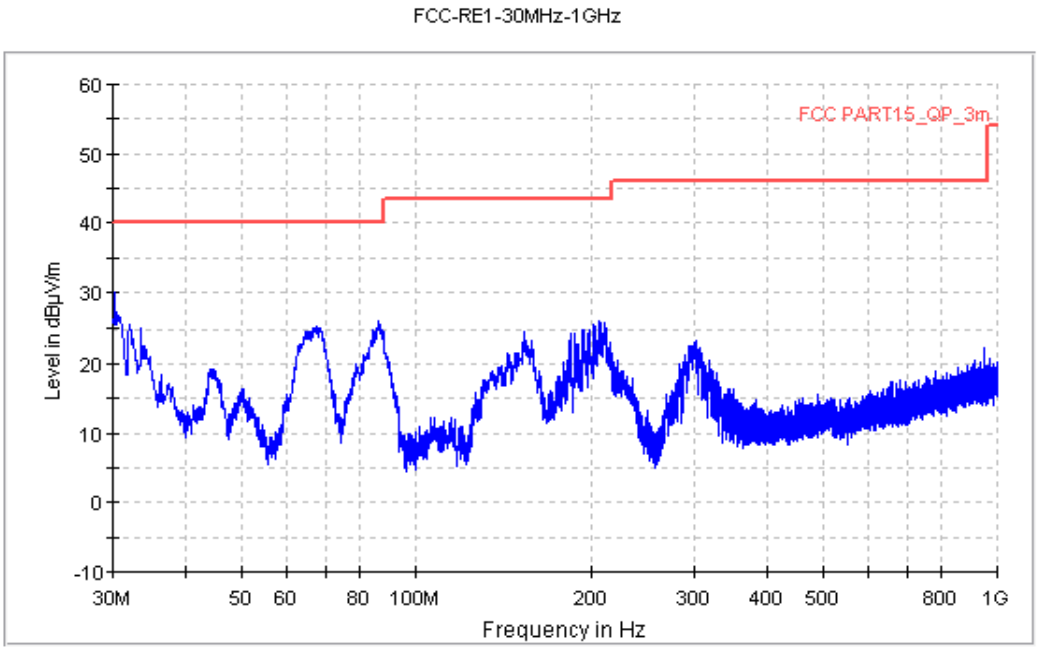

Figure A.11 Radiated Emission from 30MHz to 1GHz

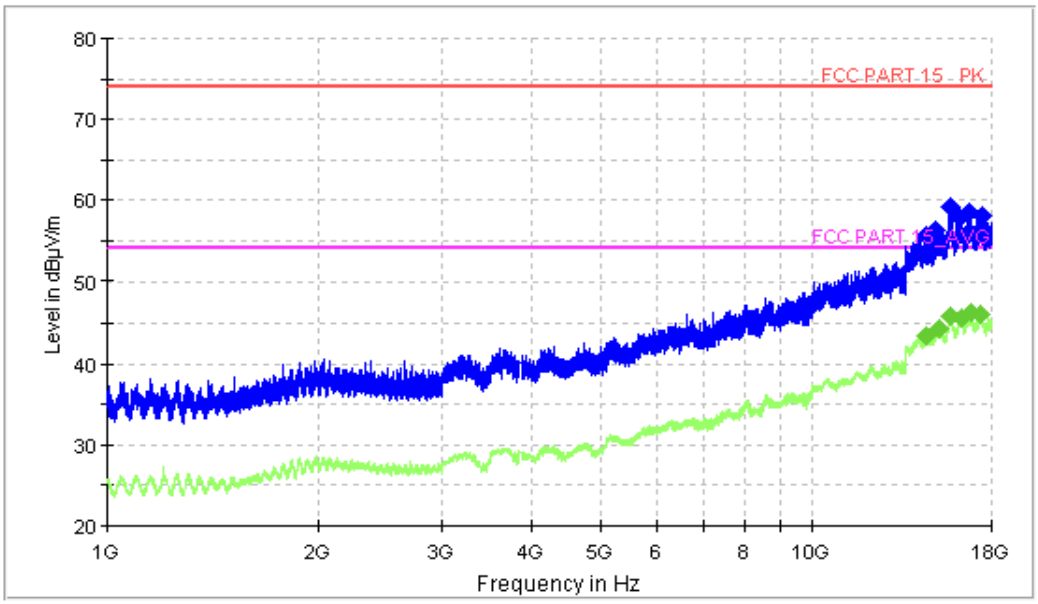

Figure A.12 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 7

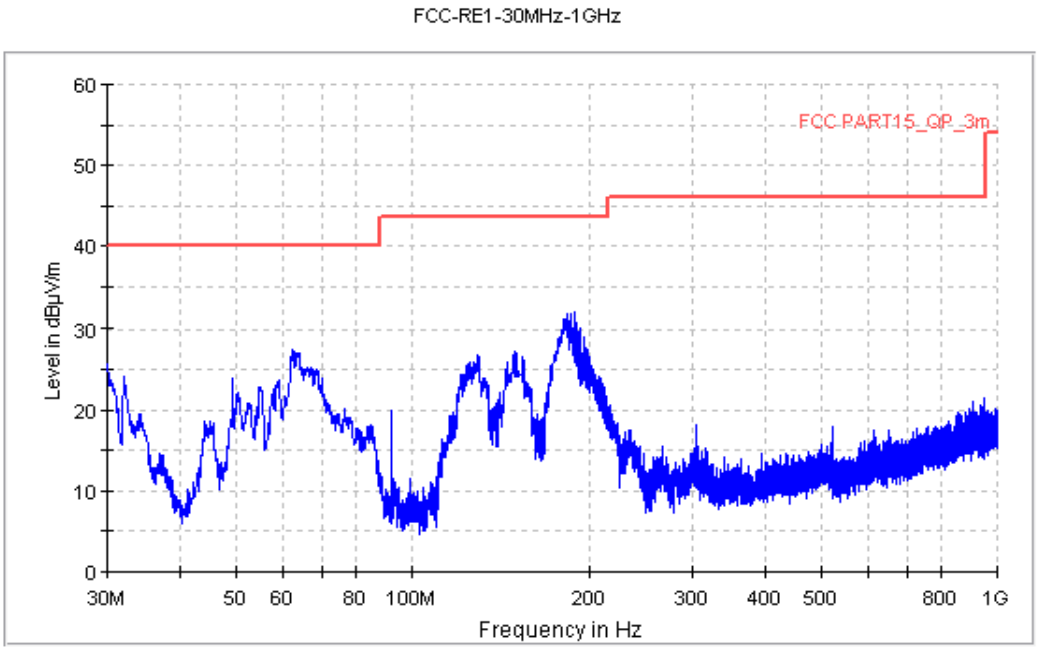

Figure A.13 Radiated Emission from 30MHz to 1GHz

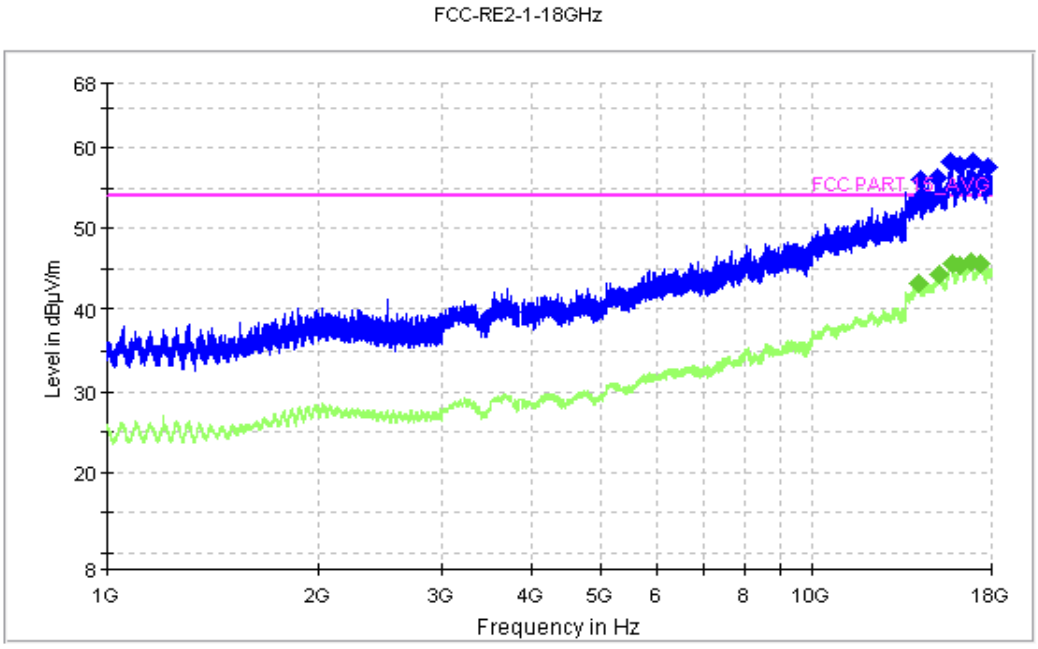

Figure A.14 Radiated Emission from 1GHz to 18GHz

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Charging mode: Set 8

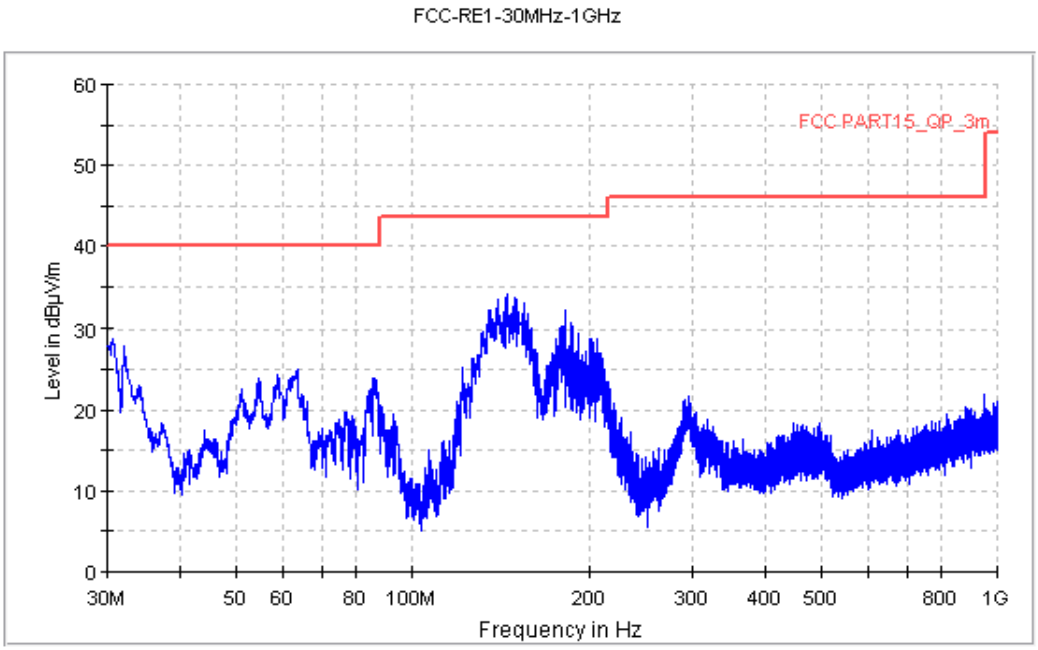

Figure A.15 Radiated Emission from 30MHz to 1GHz

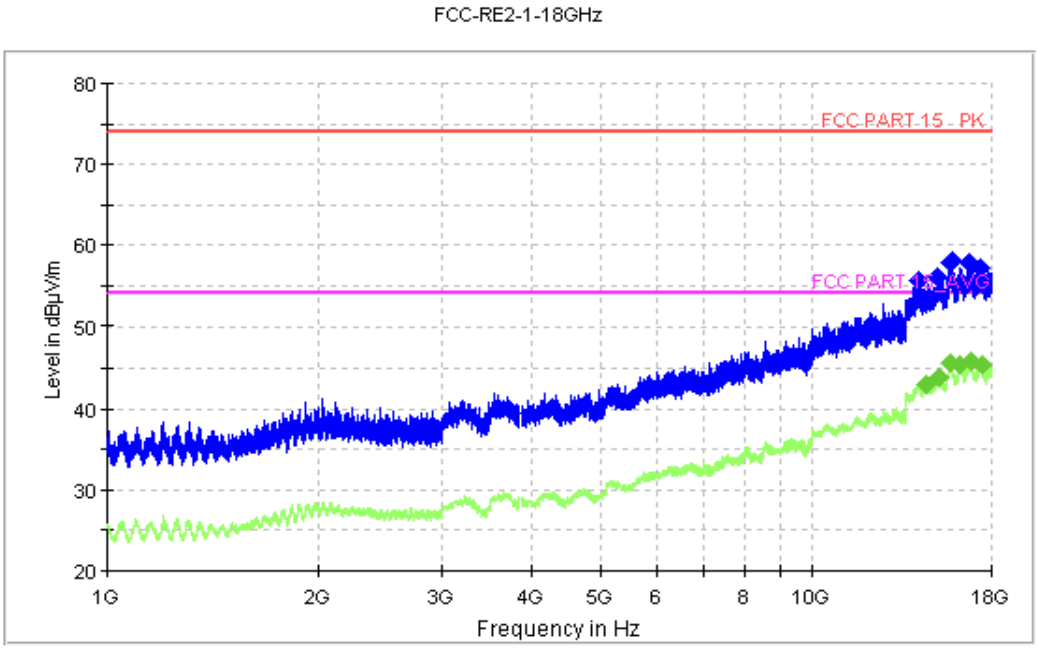

Figure A.16 Radiated Emission from 1GHz to 18GHz

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USB mode: Set.9

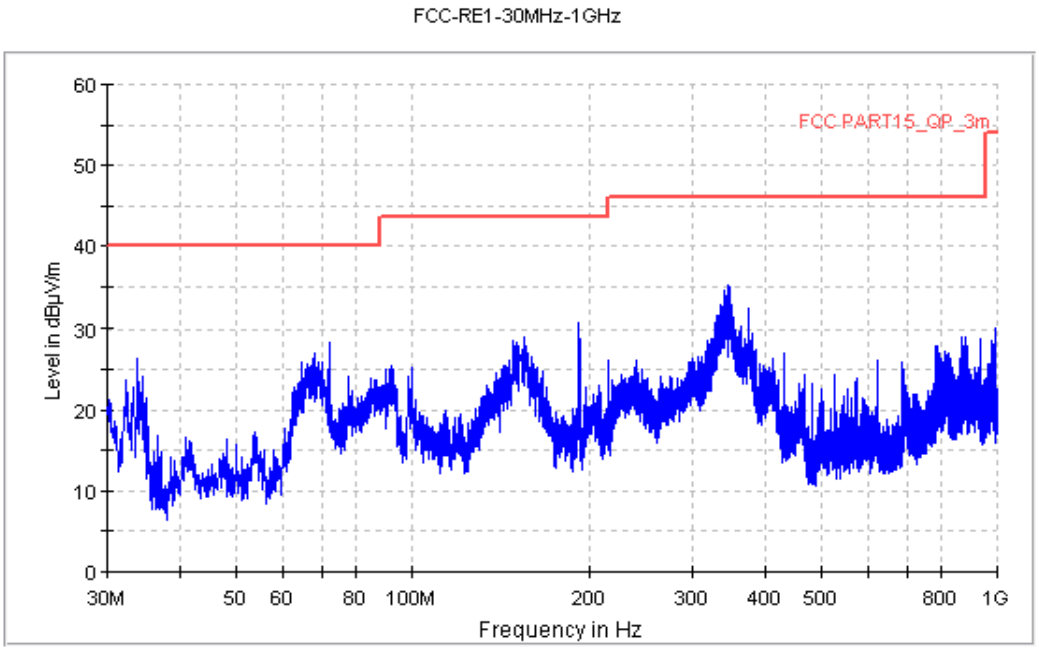

Figure A.17 Radiated Emission from 30MHz to 1GHz

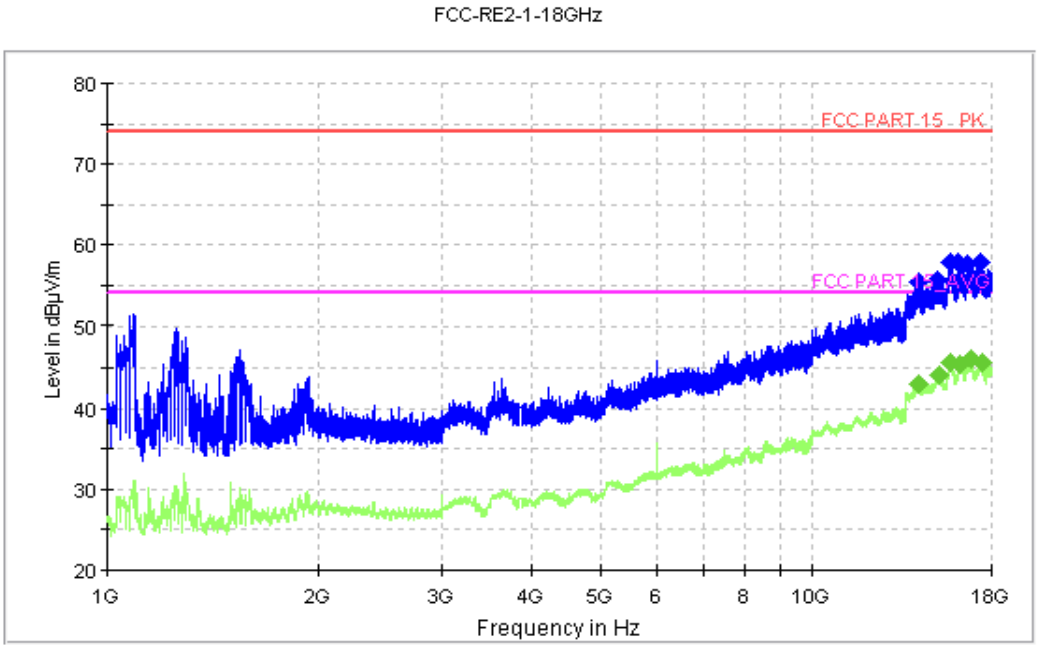

Figure A.18 Radiated Emission from 1GHz to 18GHz

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USB mode: Set.10

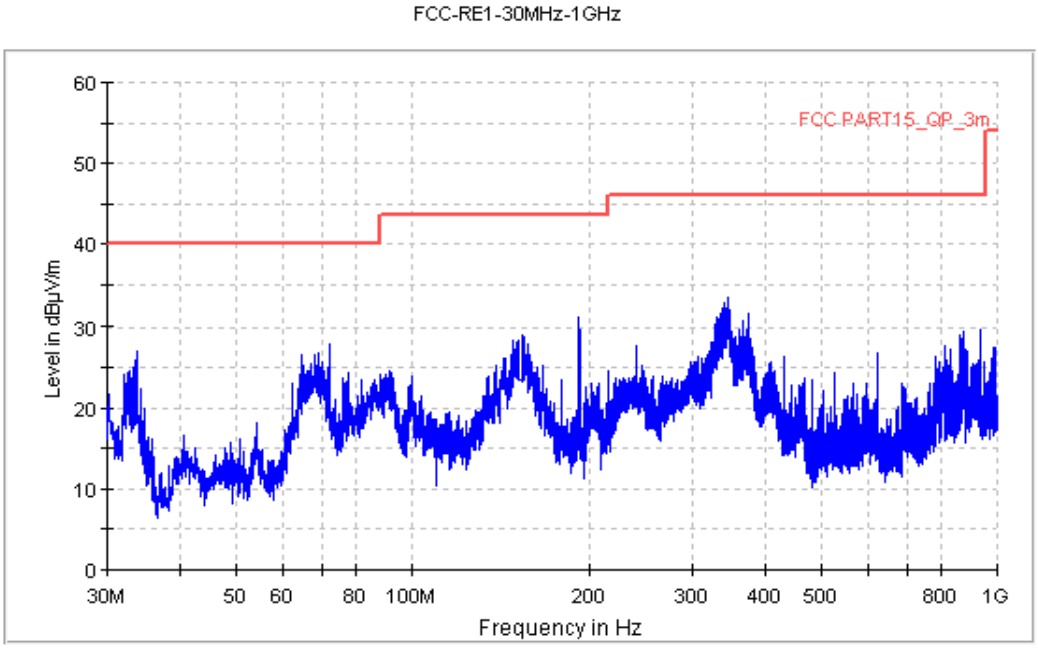

Figure A.19 Radiated Emission from 30MHz to 1GHz

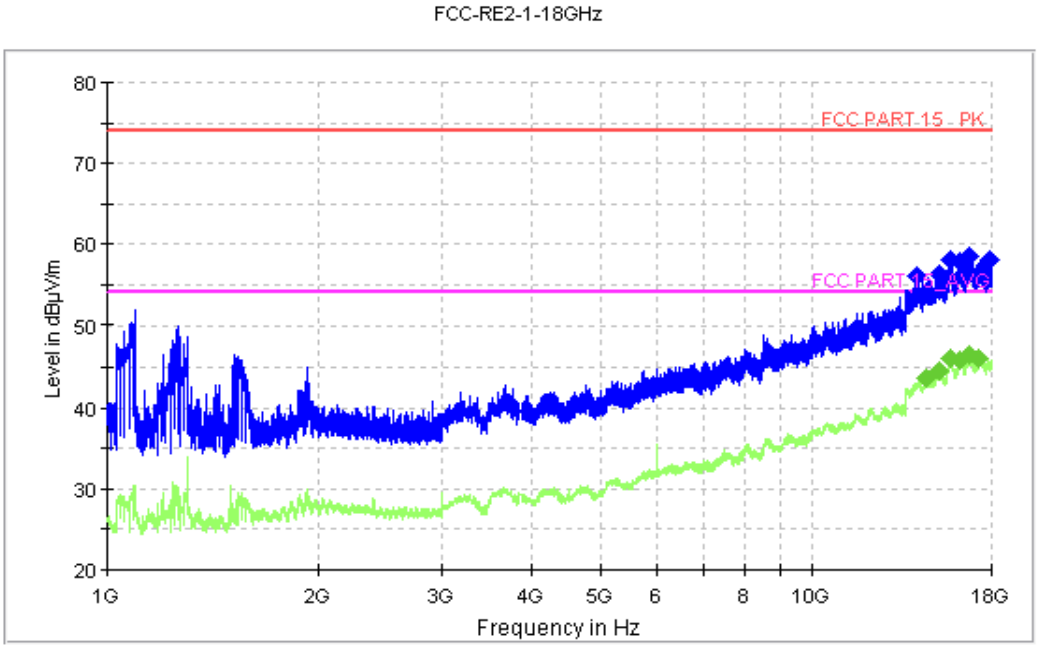

Figure A.20 Radiated Emission from 1GHz to 18GHz

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A.2 Conducted Emission (§15.107(a))

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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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	Sweep Time(s)
9kHz	1

CE Measurement uncertainty: 2.7 dB (K=2)

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A.2.5 Measurement Results

Charging mode:Set.1

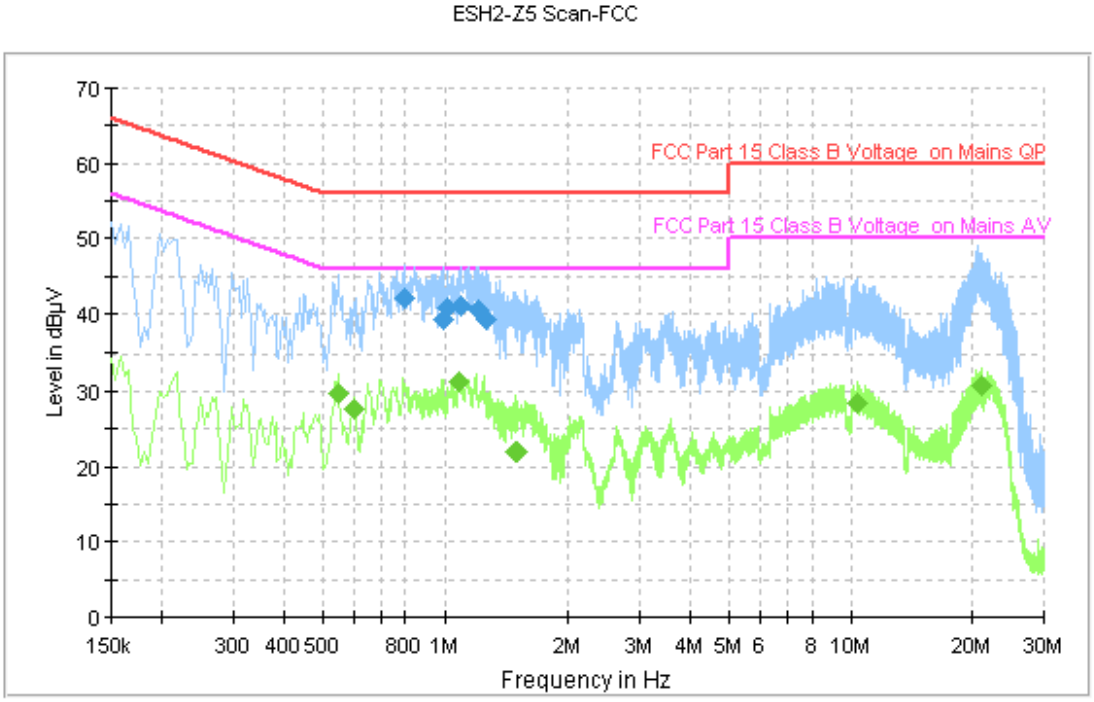

Figure A.21 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.798000	42.0	GND	L1	10.1	14.0	56.0
0.990000	39.3	GND	L1	10.1	16.7	56.0
1.014000	40.8	GND	L1	10.0	15.2	56.0
1.098000	41.1	GND	L1	10.1	14.9	56.0
1.218000	40.5	GND	L1	10.1	15.5	56.0
1.266000	39.4	GND	L1	10.1	16.6	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546000	29.7	GND	L1	10.1	16.3	46.0
0.598000	27.6	GND	L1	10.1	18.4	46.0
1.090000	31.3	GND	L1	10.1	14.7	46.0
1.494000	22.1	GND	L1	10.1	23.9	46.0
10.350000	28.4	GND	L1	10.3	21.6	50.0
20.970000	30.7	GND	L1	10.6	19.3	50.0

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Charging mode:Set.2

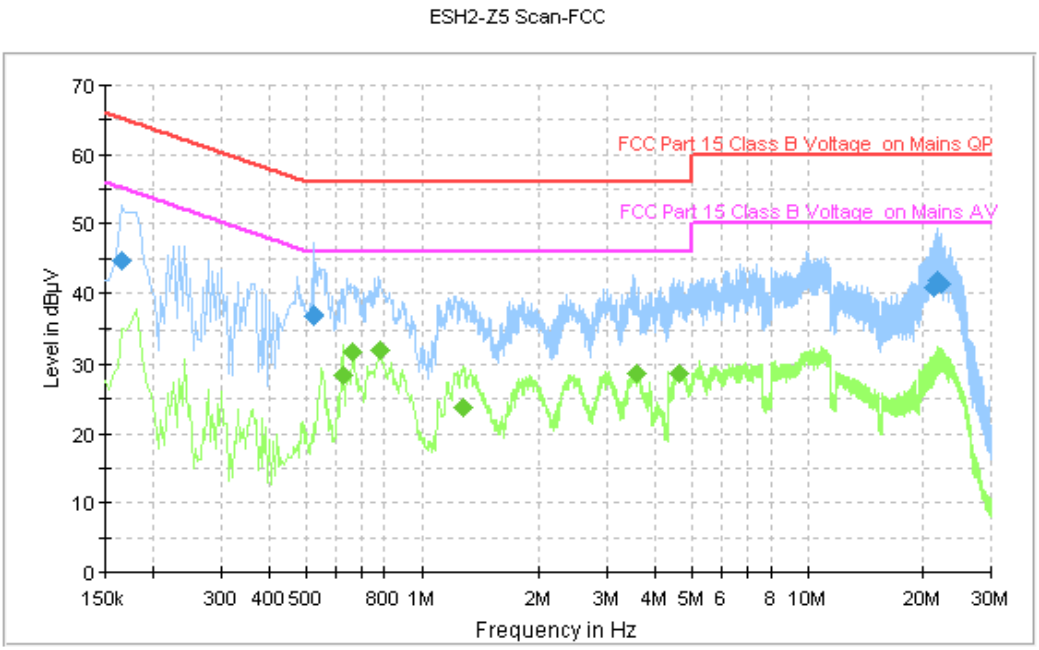

Figure A.22 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	44.7	GND	L1	10.0	20.5	65.2
0.522000	37.0	GND	L1	10.0	19.0	56.0
21.366000	40.7	GND	N	10.7	19.3	60.0
21.686000	41.9	GND	N	10.7	18.1	60.0
21.834000	41.4	GND	N	10.7	18.6	60.0
22.194000	41.4	GND	N	10.7	18.6	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.622000	28.5	GND	L1	10.0	17.5	46.0
0.662000	31.7	GND	L1	10.0	14.3	46.0
0.778000	32.1	GND	L1	10.1	13.9	46.0
1.282000	23.7	GND	L1	10.1	22.3	46.0
3.586000	28.6	GND	L1	10.2	17.4	46.0
4.634000	28.8	GND	L1	10.2	17.2	46.0

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Charging mode:Set.3

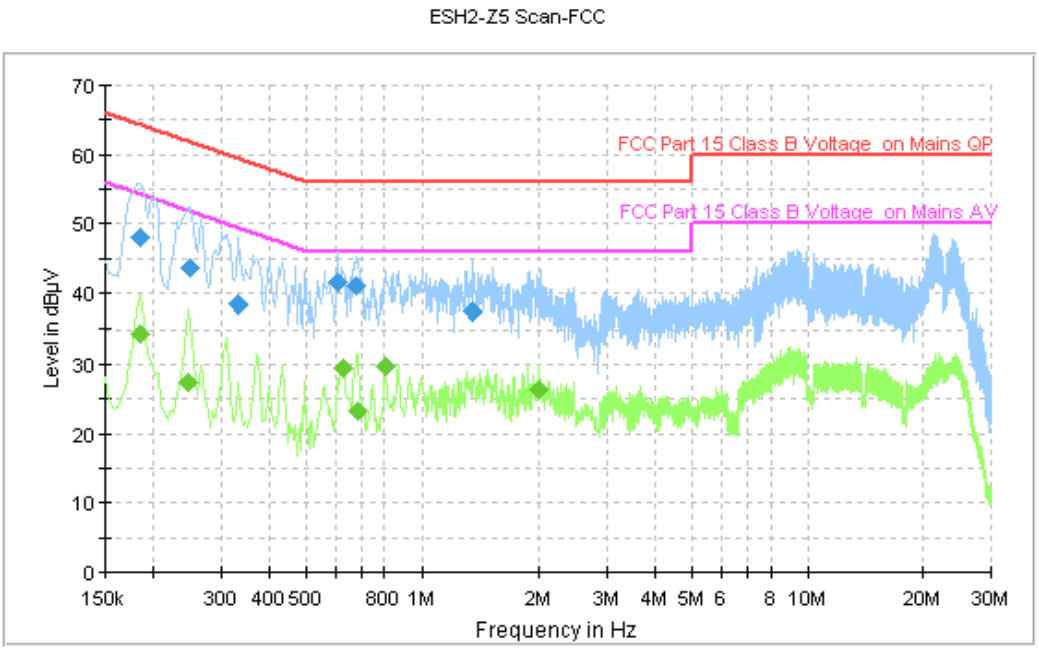

Figure A.23 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	48.0	GND	L1	10.0	16.2	64.2
0.250000	43.5	GND	L1	10.0	18.2	61.8
0.334000	38.4	GND	L1	10.0	21.0	59.4
0.602000	41.6	GND	N	10.1	14.4	56.0
0.674000	41.1	GND	L1	10.0	14.9	56.0
1.358000	37.6	GND	L1	10.1	18.4	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	34.4	GND	L1	10.0	19.8	54.2
0.246000	27.5	GND	L1	10.0	24.4	51.9
0.622000	29.5	GND	L1	10.0	16.5	46.0
0.682000	23.2	GND	L1	10.0	22.8	46.0
0.802000	29.6	GND	L1	10.1	16.4	46.0
1.998000	26.4	GND	L1	10.1	19.6	46.0

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Charging mode:Set.4

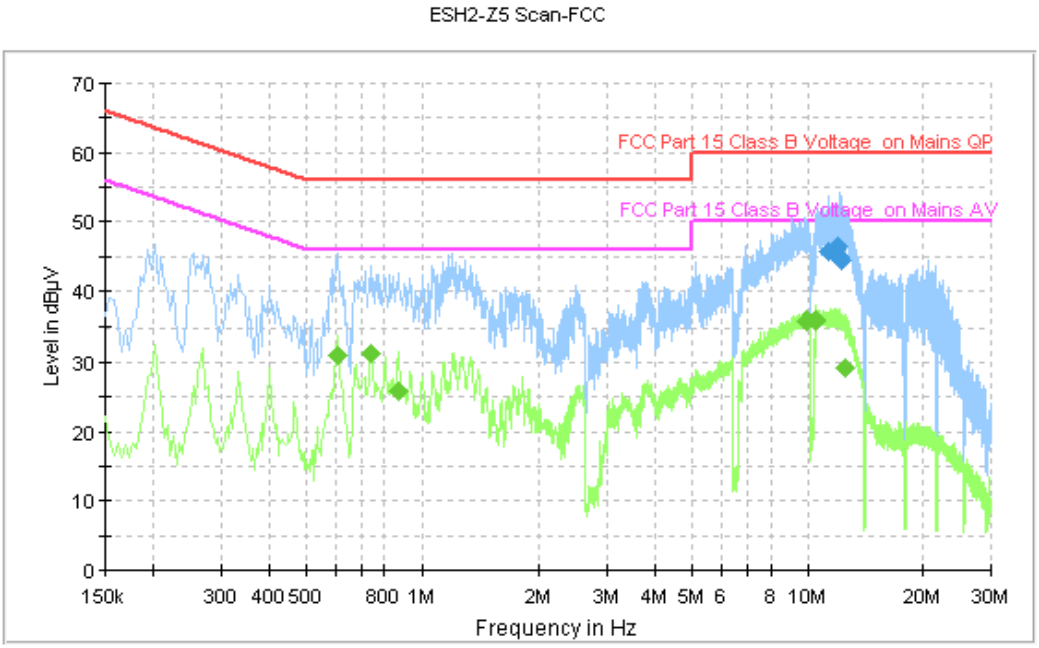

Figure A.24 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
11.278000	45.8	GND	L1	10.3	14.2	60.0
11.766000	46.0	GND	L1	10.3	14.0	60.0
11.834000	46.0	GND	L1	10.4	14.0	60.0
11.986000	46.5	GND	L1	10.4	13.5	60.0
12.094000	44.9	GND	L1	10.4	15.1	60.0
12.202000	44.5	GND	L1	10.4	15.5	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.602000	30.9	GND	L1	10.0	15.1	46.0
0.734000	31.3	GND	L1	10.0	14.7	46.0
0.866000	25.8	GND	L1	10.1	20.2	46.0
9.882000	35.9	GND	L1	10.3	14.1	50.0
10.518000	35.8	GND	L1	10.3	14.2	50.0
12.554000	29.3	GND	L1	10.4	20.7	50.0

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Charging mode:Set.5

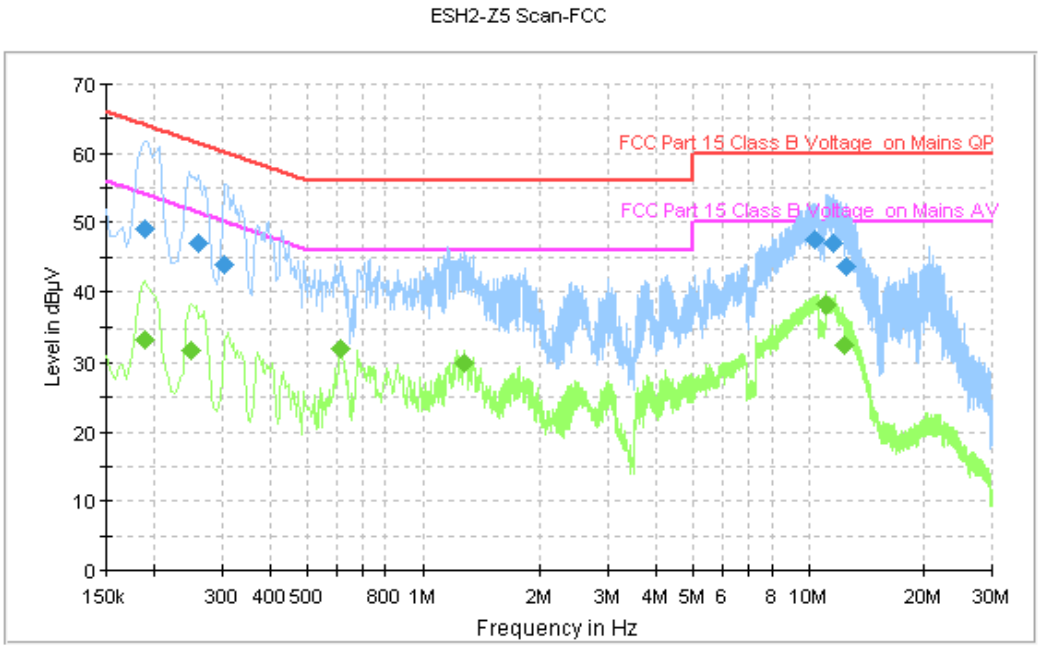

Figure A.25 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	49.0	GND	L1	10.0	15.1	64.0
0.262000	47.1	GND	L1	10.0	14.3	61.4
0.306000	43.8	GND	L1	10.0	16.3	60.1
10.346000	47.4	GND	L1	10.3	12.6	60.0
11.562000	46.9	GND	L1	10.3	13.1	60.0
12.522000	43.6	GND	L1	10.4	16.4	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	33.4	GND	L1	10.0	20.7	54.0
0.250000	31.8	GND	L1	10.0	19.9	51.8
0.614000	31.9	GND	L1	10.0	14.1	46.0
1.286000	30.0	GND	L1	10.1	16.0	46.0
11.046000	38.1	GND	L1	10.3	11.9	50.0
12.422000	32.6	GND	L1	10.4	17.4	50.0

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Charging mode:Set.6

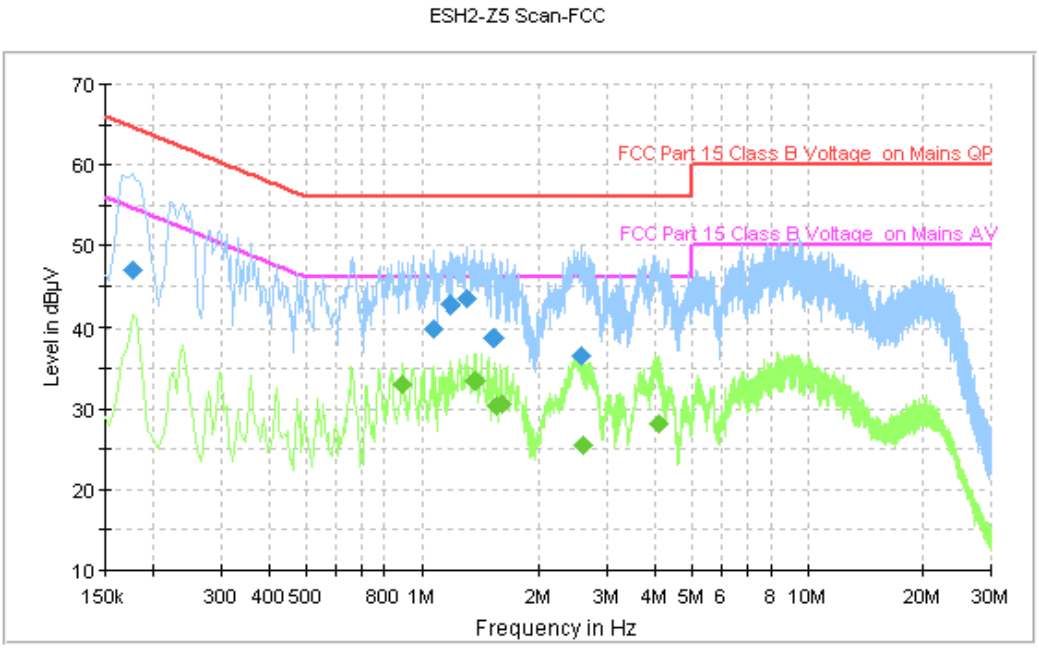

Figure A.26 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.178000	47.0	GND	L1	10.0	17.6	64.6
1.074000	39.8	GND	N	10.1	16.2	56.0
1.190000	42.9	GND	L1	10.1	13.1	56.0
1.306000	43.5	GND	L1	10.1	12.5	56.0
1.534000	38.8	GND	N	10.1	17.2	56.0
2.570000	36.5	GND	L1	10.2	19.5	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.890000	33.0	GND	L1	10.1	13.0	46.0
1.374000	33.4	GND	L1	10.1	12.6	46.0
1.546000	30.3	GND	L1	10.1	15.7	46.0
1.602000	30.7	GND	L1	10.1	15.3	46.0
2.594000	25.4	GND	L1	10.2	20.6	46.0
4.082000	28.2	GND	L1	10.2	17.8	46.0

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Charging mode:Set.7

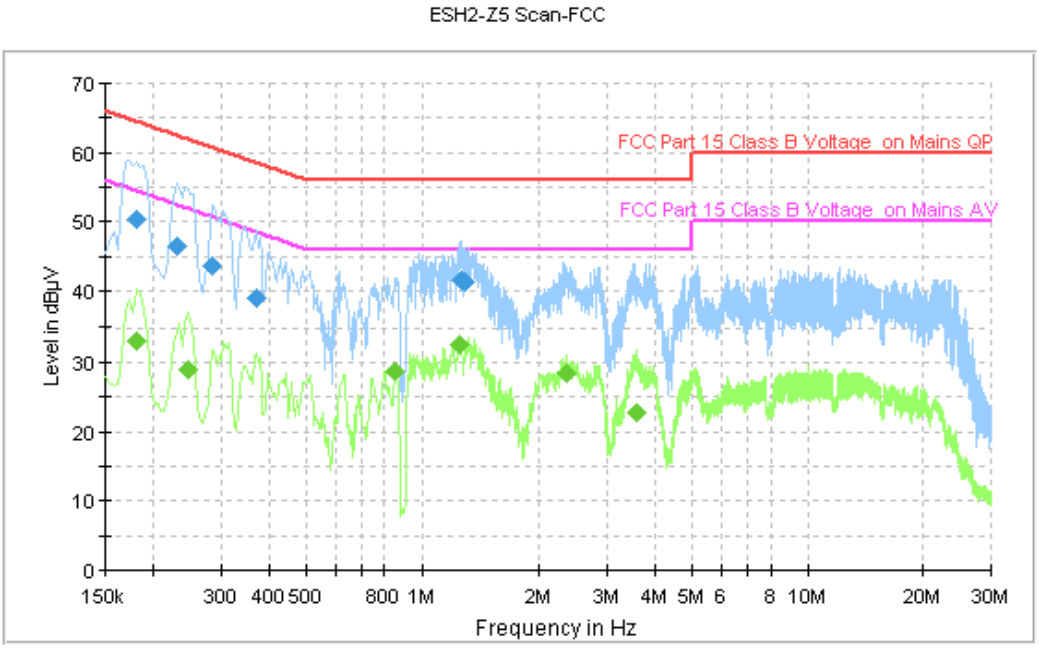

Figure A.27 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	50.4	GND	L1	10.0	14.0	64.4
0.230000	46.6	GND	L1	10.0	15.9	62.4
0.286000	43.6	GND	L1	10.0	17.0	60.6
0.370000	39.1	GND	L1	10.0	19.4	58.5
1.262000	41.5	GND	L1	10.1	14.5	56.0
1.294000	41.3	GND	L1	10.1	14.7	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	33.1	GND	L1	10.0	21.3	54.4
0.246000	29.0	GND	L1	10.0	22.9	51.9
0.854000	28.6	GND	N	10.0	17.4	46.0
1.258000	32.7	GND	L1	10.1	13.3	46.0
2.346000	28.4	GND	L1	10.1	17.6	46.0
3.582000	22.7	GND	L1	10.2	23.3	46.0

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Charging mode:Set.8

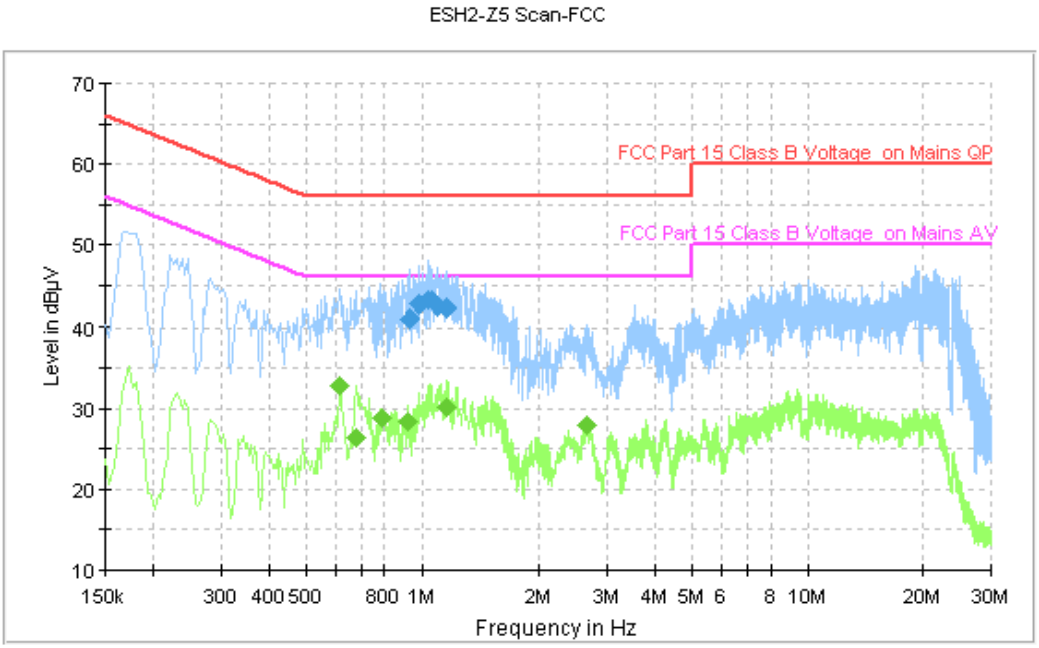

Figure A.28 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.926000	41.0	GND	L1	10.1	15.0	56.0
0.982000	42.7	GND	L1	10.1	13.3	56.0
1.042000	43.1	GND	L1	10.1	12.9	56.0
1.058000	43.3	GND	L1	10.1	12.8	56.0
1.102000	42.6	GND	L1	10.1	13.4	56.0
1.166000	42.4	GND	L1	10.1	13.6	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.614000	32.7	GND	L1	10.0	13.3	46.0
0.674000	26.5	GND	L1	10.0	19.5	46.0
0.790000	28.8	GND	L1	10.1	17.2	46.0
0.918000	28.3	GND	L1	10.1	17.7	46.0
1.166000	30.2	GND	L1	10.1	15.8	46.0
2.662000	27.9	GND	L1	10.2	18.1	46.0

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USB mode: Set.9

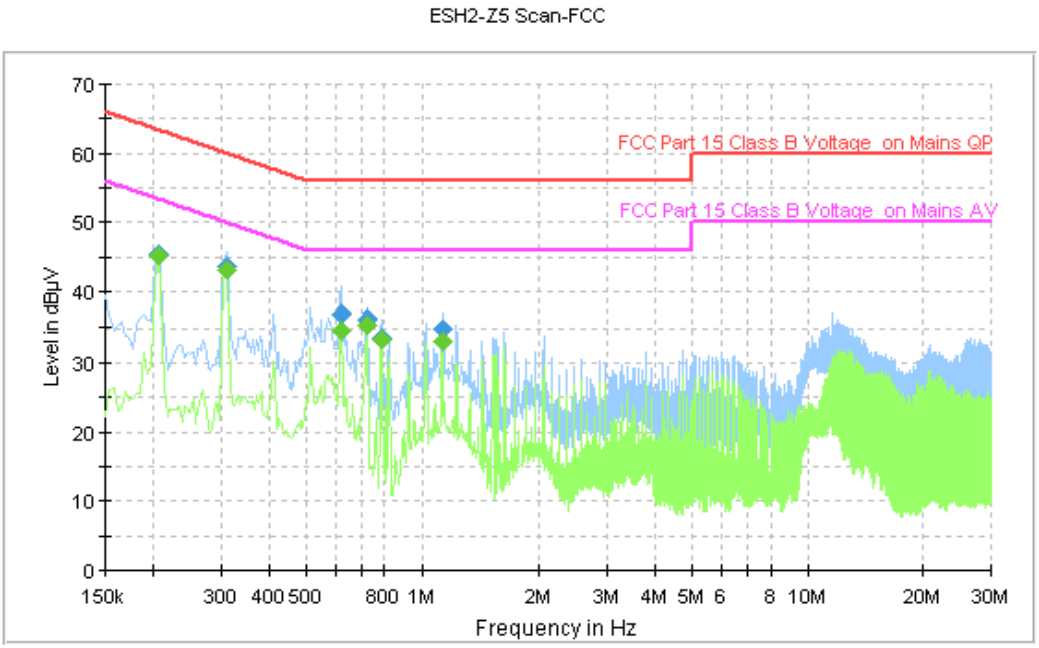

Figure A.29 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	45.6	GND	N	10.1	17.8	63.4
0.310000	43.8	GND	N	10.1	16.2	60.0
0.618000	37.0	GND	N	10.0	19.0	56.0
0.718000	36.1	GND	N	10.0	19.9	56.0
0.786000	33.6	GND	L1	10.1	22.4	56.0
1.130000	34.8	GND	N	10.1	21.2	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	45.3	GND	N	10.1	8.1	53.4
0.310000	43.2	GND	N	10.1	6.8	50.0
0.618000	34.6	GND	N	10.0	11.4	46.0
0.718000	35.5	GND	N	10.0	10.5	46.0
0.786000	33.2	GND	L1	10.1	12.8	46.0
1.130000	33.0	GND	N	10.1	13.0	46.0

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USB mode: Set.10

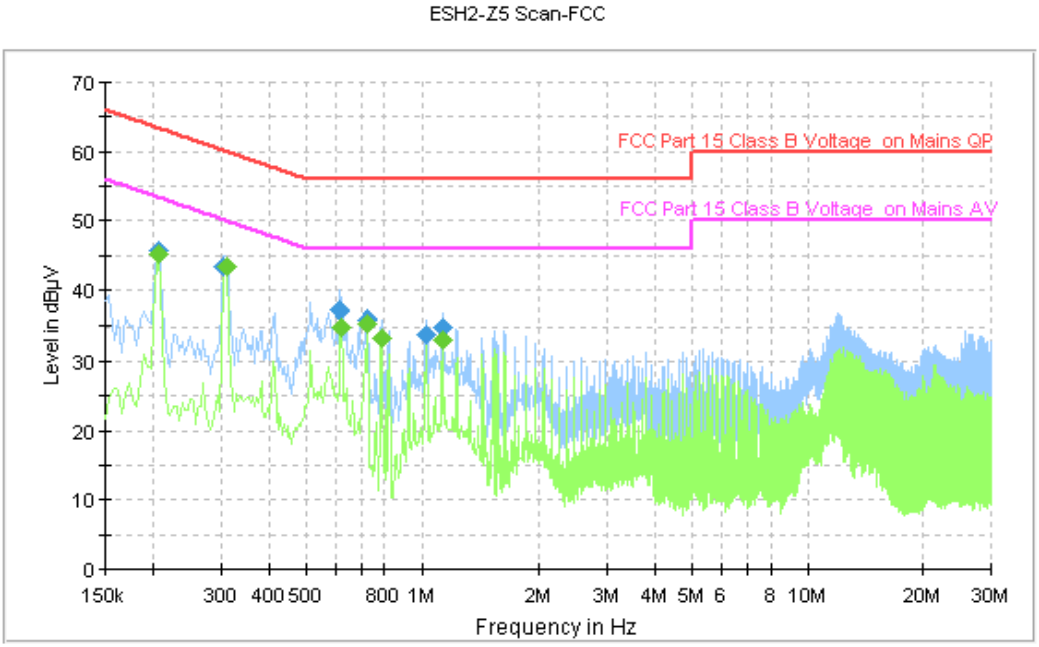

Figure A.30 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	45.6	GND	N	10.1	17.8	63.4
0.306000	43.4	GND	N	10.1	16.7	60.1
0.614000	37.2	GND	N	10.0	18.8	56.0
0.718000	36.0	GND	N	10.0	20.0	56.0
1.026000	33.7	GND	L1	10.0	22.3	56.0
1.130000	34.9	GND	N	10.1	21.1	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	45.3	GND	N	10.1	8.0	53.4
0.310000	43.4	GND	N	10.1	6.6	50.0
0.618000	34.9	GND	N	10.0	11.1	46.0
0.718000	35.4	GND	N	10.0	10.6	46.0
0.786000	33.2	GND	L1	10.1	12.8	46.0
1.130000	33.1	GND	N	10.1	12.9	46.0

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

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