FCC PART 15B
TEST REPORT

No. I21Z62139-EMC01

for

TCL Communication Ltd.

LTE / UMTS / GSM mobile phone

Model name: 5033MP/5033EP

FCC ID: 2ACCJH156

with

Hardware Version: PIO

Software Version: RD52

Issued Date: 2021-11-10

Note:

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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z62139-EMC01	Rev.0	1st edition	2021-11-10

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

CONTENTS

1. Test Laboratory

1.1. Testing Location

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° C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2021-11-03

Testing End Date: 2021-11-05

1.4. Signature

Wang Xue

(Prepared this test report)

Zhang Ying

(Reviewed this test report)

Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	LTE / UMTS / GSM mobile phone
Model Name	5033MP/5033EP
FCC ID:	2ACCJH156

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	353514480201071/ 353514480201089	PIO	RD52

*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	Battery1	/	/
AE2	Battery2	/	/
AE3	Charger1	/	/
AE4	Charger2	/	/
AE5	Charger3	/	/
AE6	Data Cable	/	/
AE7	Data Cable	/	/
AE8	Headset1	/	/
AE9	Headset2	/	/
AE10	Headset3	/	/
AE11	Headset4	/	/

AE1

Model	TLi019DA (CAB1930012CA)
Manufacturer	TMB
Capacity	2000mAh
Nominal Voltage	3.85V

AE2

Model	TLi019D7 (CAB1930000C7)
Manufacturer	BYD
Capacity	2000mAh
Nominal Voltage	3.85V

AE3

Model	CBA0058AAAC5 CBA0058AGAC5
Manufacturer	PUAN
Length of cable	/

AE4

Model	CBA0066AAAC5
	CBA0066AGAC5
Manufacturer	PUAN
Length of cable	/

AE5

Model	CBA3068AAAC5
	CBA3068AGAC5
Manufacturer	PUAN
Length of cable	/

AE6

Model	CDA3122005C1
Manufacturer	Juwei
Length of cable	/

AE7

Model	CDA3122005C2
Manufacturer	Shenyang
Length of cable	/

AE8

Model	Headset-W15 A logo(CCB0046A10C1)
Manufacturer	Juwei
Length of cable	/

AE9

Model	Headset-W15 A logo(CCB0046A10C4)
Manufacturer	Meihao
Length of cable	/

AE10

Model	Headset-W15+ A logo(CCB0049A10C1)
Manufacturer	JUWEI
Length of cable	/

AE11

Model	Headset - w15+ no logo (CCB0049A12C1)
Manufacturer	JUWEI
Length of cable	/

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

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1/2 + AE3+AE6/7	Charger1+REAR Camera+GSM 850 idle
Set.2	EUT1+ AE1/2 + AE4+AE6/7	Charger2+MP4+WCDMA 850 idle
Set.3	EUT1+ AE1/2 + AE5+AE6/7	Charger3+ front camera +LTE B5 idle
Set.4	EUT1+ AE1/2 + AE8+AE6/7	USB+Headset1+FM
Set.5	EUT1+ AE1/2 + AE9+AE6/7	USB+Headset2+FM
Set.6	EUT1+ AE1/2 + AE10+AE6/7	USB+Headset3+FM

Note:

The device supports GSM/GPRS/EGPRS 850/900/1800/1900, UMTS FDD Band 2/4/5/8; LTE FDD Band 2/3/4/5/7/8/12/13/17/28/66, TDD Band 38. It has WLAN (802.11b/g/n, 802.11n supports 20MHz bandwidth), Bluetooth (EDR, BLE) and GNSS (GPS&GLONASS&BDS& GALILEO) functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE Band 5, LTE Band 8, LTE Band 12, LTE Band 13, LTE Band 28. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated. Only the worst-case emissions are reported.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2019
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (10 meters×6.7meters×6.1meters) 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, 3m 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 6000 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

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	**CTTL(huayuan North Road)**
2	Conducted Emission	15.107(a)	B.2	P	**CTTL(huayuan North Road)**

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2022-02-23	1 Year
2	LISN	ENV216	101200	R&S	2022-05-30	1 year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2021-12-07	1 year
4	Test Receiver	ESCI 7	100344	R&S	2022-02-23	1 Year
5	EMI Antenna	VULB 9163	01223	Schwarzbeck	2022-03-22	1 year
6	EMI Antenna	3115	6914	ETS-Lindgren	2022-02-03	1 year

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 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 3/10 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 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 3.4, 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.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note：I/O information：Printer – USB, Mouse – PS/2, Keyboard – USB.

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.

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): U = 4.74 dB, k=2.

Measurement results for Set.1:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17976.767	39.2	-29.1	46.7	21.6	54.0	14.8	H
17526.267	39.0	-29.3	44.4	24.0	54.0	15.0	V
17608.433	39.0	-29.5	45.2	23.3	54.0	15.0	V
17942.200	39.0	-28.9	46.7	21.3	54.0	15.0	H
17850.400	39.0	-29.3	46.0	22.4	54.0	15.0	V
17874.767	39.0	-29.4	46.0	22.4	54.0	15.0	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17751.233	48.0	-29.6	46.0	31.7	74.0	26.0	V
17987.533	47.9	-29.1	46.7	30.3	74.0	26.1	V
17932.000	47.8	-29.4	46.7	30.5	74.0	26.2	V
17979.600	47.8	-29.1	46.7	30.2	74.0	26.2	V
17819.800	47.5	-29.6	46.0	31.2	74.0	26.5	V
17873.633	47.4	-29.4	46.0	30.8	74.0	26.6	V

Measurement results for Set.2:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17942.200	39.7	-28.9	46.7	22.0	54.0	14.3	V
17982.433	39.5	-29.1	46.7	21.9	54.0	14.5	V
17956.933	39.4	-28.9	46.7	21.7	54.0	14.6	H
17980.167	39.4	-29.1	46.7	21.8	54.0	14.6	V
17615.800	39.2	-29.5	45.2	23.5	54.0	14.8	V
17988.667	39.2	-29.1	46.7	21.6	54.0	14.8	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17475.833	48.6	-30.1	44.4	34.3	74.0	25.4	H
17826.600	48.1	-29.7	46.0	31.8	74.0	25.9	V
17883.833	48.1	-29.5	46.0	31.7	74.0	25.9	V
17291.100	47.8	-29.7	43.4	34.1	74.0	26.2	V
17570.467	47.7	-29.8	45.2	32.2	74.0	26.3	V
17976.767	47.6	-29.1	46.7	30.0	74.0	26.4	H

Measurement results for Set.3:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17541.567	39.5	-29.5	44.4	24.6	54.0	14.5	H
17967.700	39.2	-29.1	46.7	21.6	54.0	14.8	H
17589.733	39.0	-29.7	45.2	23.4	54.0	15.0	H
17971.100	39.0	-29.1	46.7	21.4	54.0	15.0	V
17987.533	39.0	-29.1	46.7	21.4	54.0	15.0	H
17741.033	39.0	-29.6	46.0	22.7	54.0	15.0	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17517.200	47.9	-29.3	44.4	32.8	74.0	26.1	V
17620.900	47.8	-29.4	45.2	32.0	74.0	26.2	V
17524.000	47.5	-29.3	44.4	32.5	74.0	26.5	H
17960.900	47.5	-29.1	46.7	29.9	74.0	26.5	H
17941.633	47.4	-28.9	46.7	29.7	74.0	26.6	V
17961.467	47.4	-29.1	46.7	29.8	74.0	26.6	V

Measurement results for Set.4:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17983.567	39.5	-29.1	46.7	21.9	54.0	14.5	H
17878.167	39.0	-29.4	46.0	22.4	54.0	15.0	V
17984.133	39.0	-29.1	46.7	21.4	54.0	15.0	H
17537.600	39.0	-29.3	44.4	24.0	54.0	15.0	H
17976.200	39.0	-29.1	46.7	21.4	54.0	15.0	H
17930.300	39.0	-29.4	46.7	21.7	54.0	15.0	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17967.133	48.2	-29.1	46.7	30.6	74.0	25.8	H
17411.233	47.9	-29.4	44.4	33.0	74.0	26.1	H
17531.367	47.8	-29.3	44.4	32.8	74.0	26.2	V
17513.233	47.6	-29.3	44.4	32.5	74.0	26.4	V
17878.167	47.5	-29.4	46.0	30.9	74.0	26.5	V
17499.633	47.5	-29.8	44.4	32.9	74.0	26.5	V

Measurement results for Set.5:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17989.233	39.8	-29.1	46.7	22.2	54.0	14.2	V
17955.233	39.5	-28.9	46.7	21.8	54.0	14.5	H
17989.800	39.4	-29.1	46.7	21.8	54.0	14.6	V
17949.567	39.3	-28.9	46.7	21.6	54.0	14.7	V
17992.633	39.2	-29.1	46.7	21.6	54.0	14.8	H
17535.333	39.2	-29.3	44.4	24.2	54.0	14.8	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17960.900	48.3	-29.1	46.7	30.7	74.0	25.7	V
17930.300	48.2	-29.4	46.7	30.9	74.0	25.8	V
17958.633	48.1	-28.9	46.7	30.4	74.0	25.9	V
17983.567	48.1	-29.1	46.7	30.5	74.0	25.9	H
17249.733	47.7	-30.0	43.4	34.4	74.0	26.3	V
17612.967	47.7	-29.5	45.2	32.0	74.0	26.3	V

Measurement results for Set.6:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17520.600	40.3	-29.3	44.4	25.3	54.0	13.7	V
17988.667	40.2	-29.1	46.7	22.6	54.0	13.8	V
17939.933	39.9	-29.4	46.7	22.6	54.0	14.1	V
17972.233	39.5	-29.1	46.7	21.9	54.0	14.5	H
17924.067	39.3	-29.4	46.7	22.0	54.0	14.7	V
17959.200	39.2	-28.9	46.7	21.5	54.0	14.8	V

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17592.000	47.8	-29.7	45.2	32.2	74.0	26.2	V
17990.367	47.7	-29.1	46.7	30.1	74.0	26.3	V
17988.667	47.7	-29.1	46.7	30.1	74.0	26.3	V
17954.667	47.6	-28.9	46.7	29.9	74.0	26.4	H
17490.000	47.5	-29.8	44.4	32.9	74.0	26.5	H
17428.233	47.5	-29.7	44.4	32.9	74.0	26.5	H

Measurement results for Set.1:

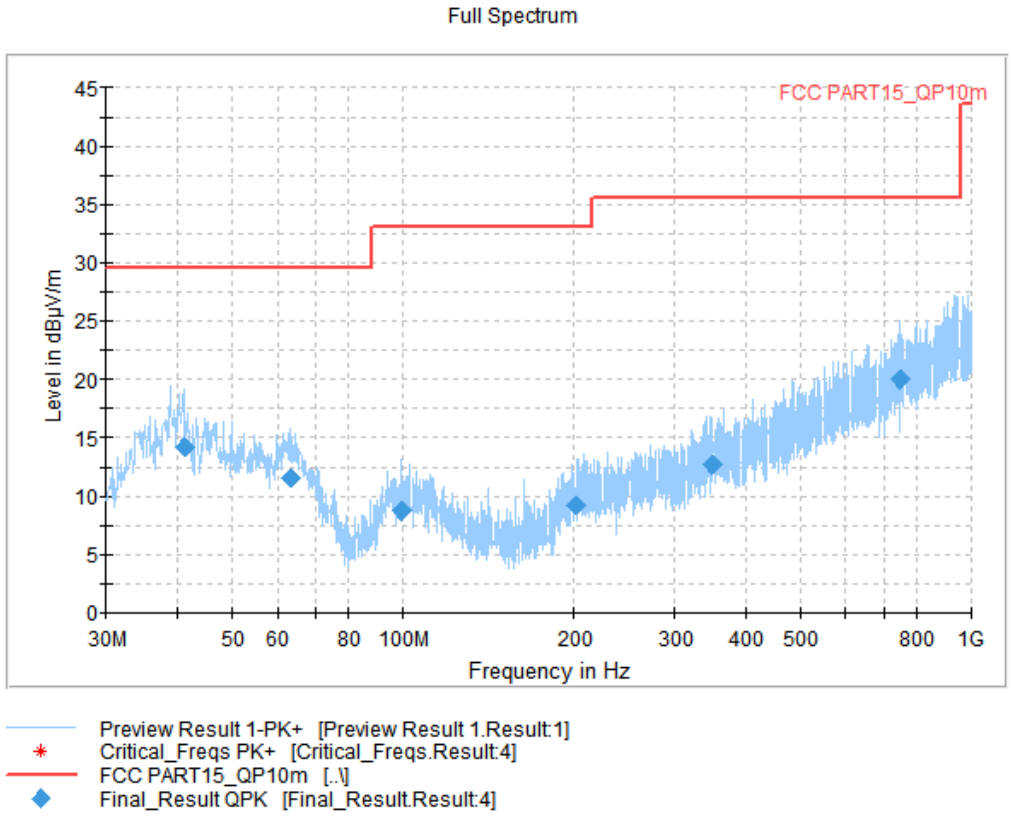

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.058000	14.29	29.54	15.25	2000.0	120.000	230.0	V	107.0
63.271000	11.59	29.54	17.95	2000.0	120.000	335.0	V	294.0
99.355000	8.77	33.06	24.29	2000.0	120.000	114.0	V	210.0
201.981000	9.17	33.06	23.89	2000.0	120.000	189.0	V	300.0
350.003000	12.67	35.56	22.89	2000.0	120.000	122.0	V	210.0
749.352000	20.04	35.56	15.52	2000.0	120.000	333.0	V	179.0

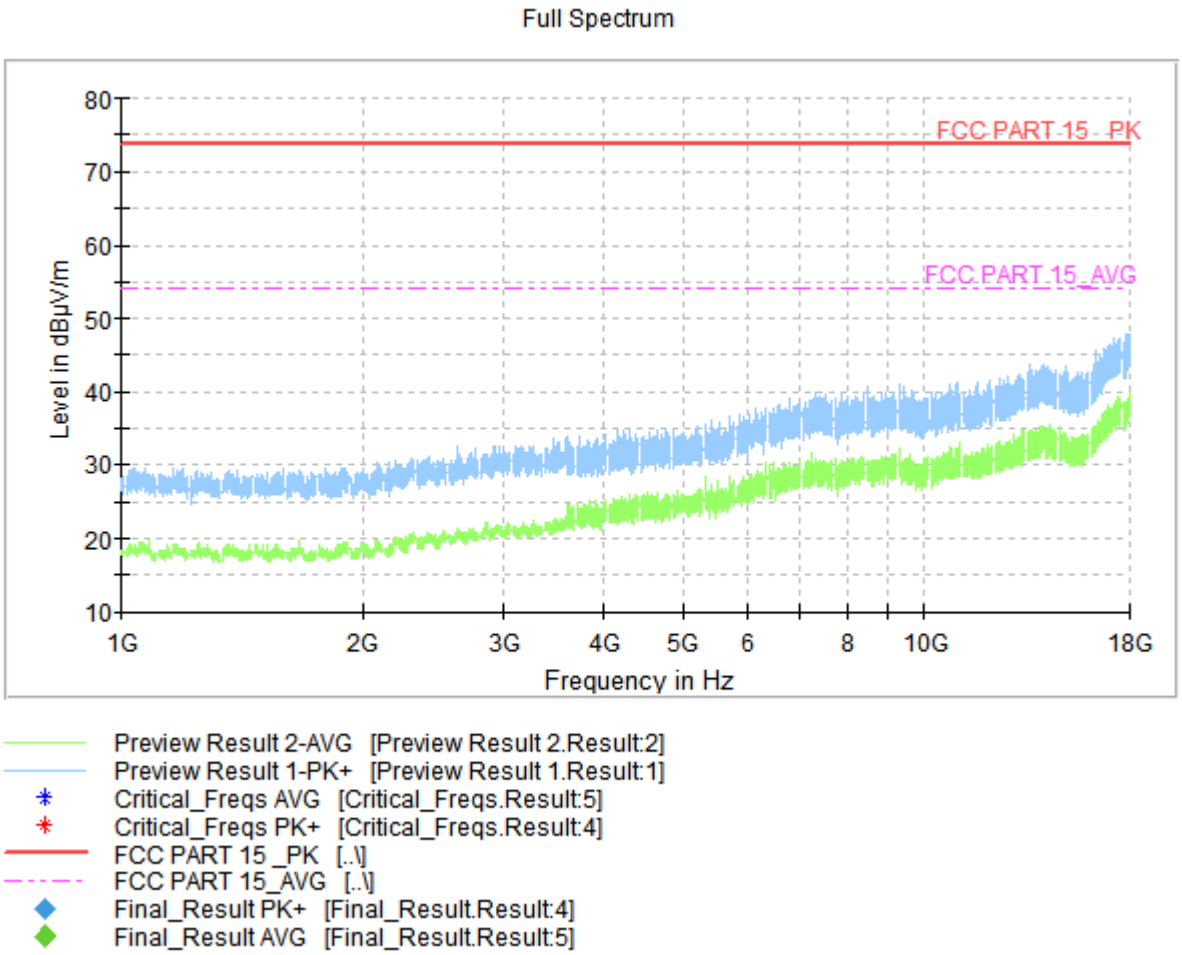

Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2:

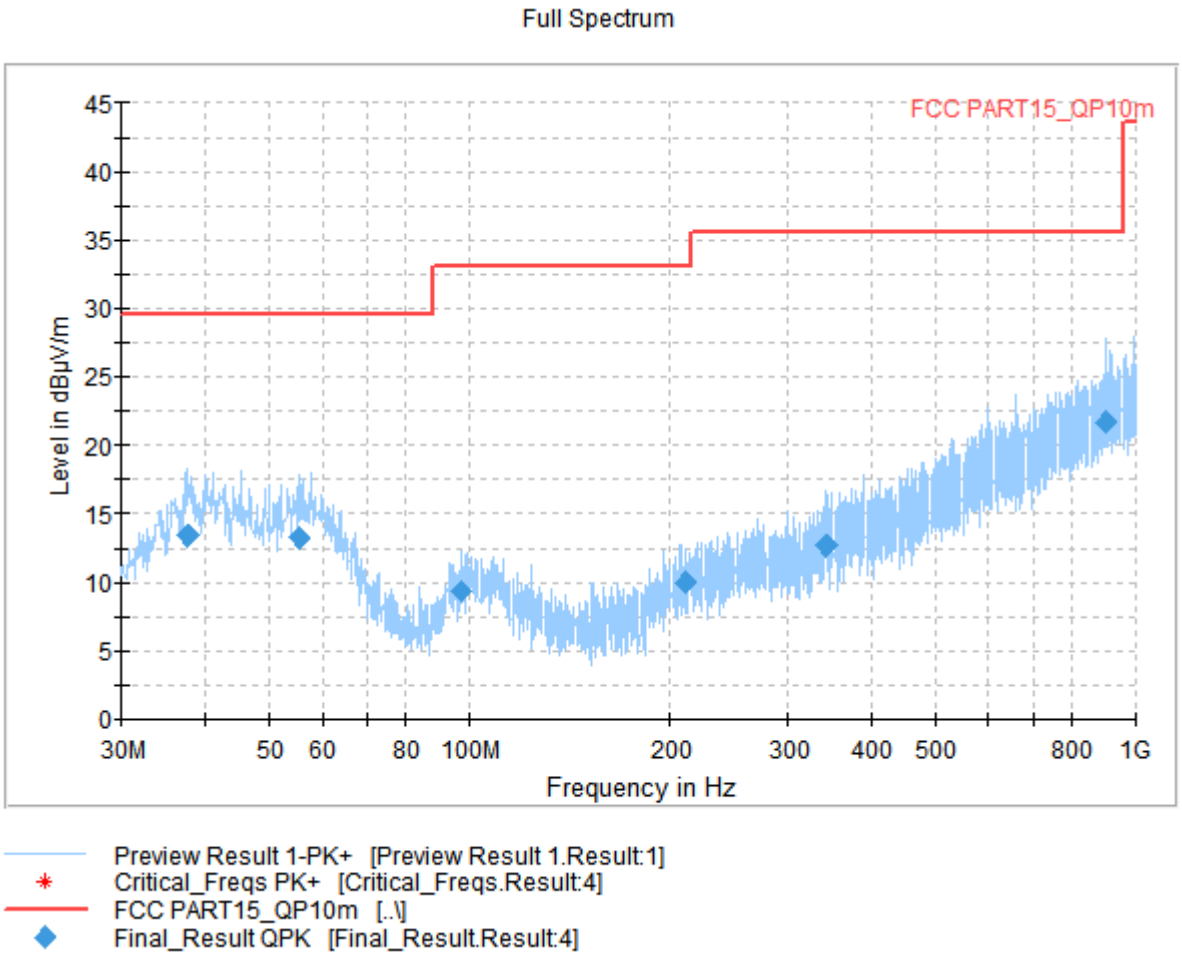

Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
37.663000	13.36	29.54	16.18	2000.0	120.000	286.0	V	30.0
55.511000	13.28	29.54	16.26	2000.0	120.000	335.0	V	291.0
96.833000	9.45	33.06	23.61	2000.0	120.000	123.0	V	268.0
211.002000	9.99	33.06	23.07	2000.0	120.000	335.0	V	-15.0
342.243000	12.64	35.56	22.92	2000.0	120.000	210.0	V	112.0
900.381000	21.79	35.56	13.77	2000.0	120.000	294.0	V	72.0

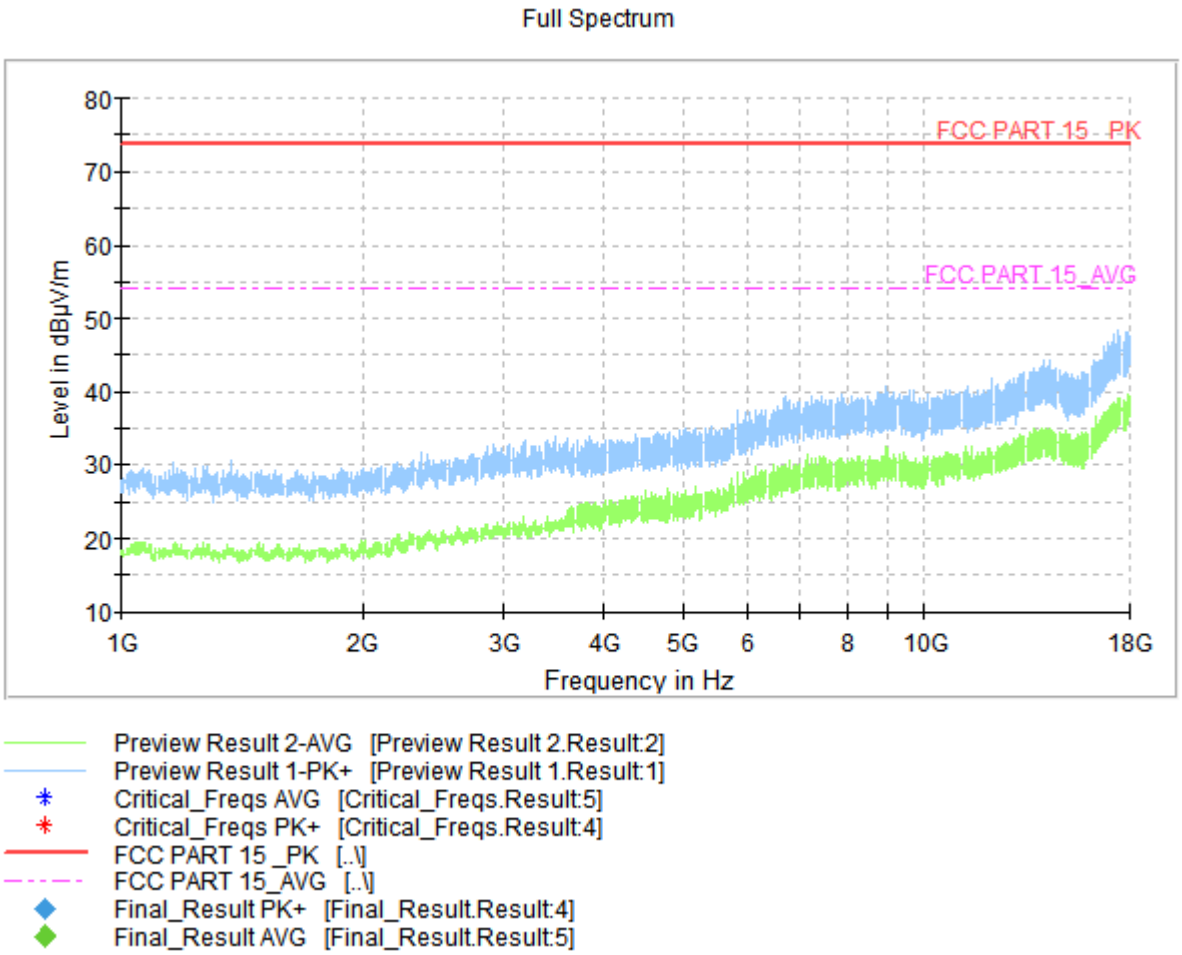

Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

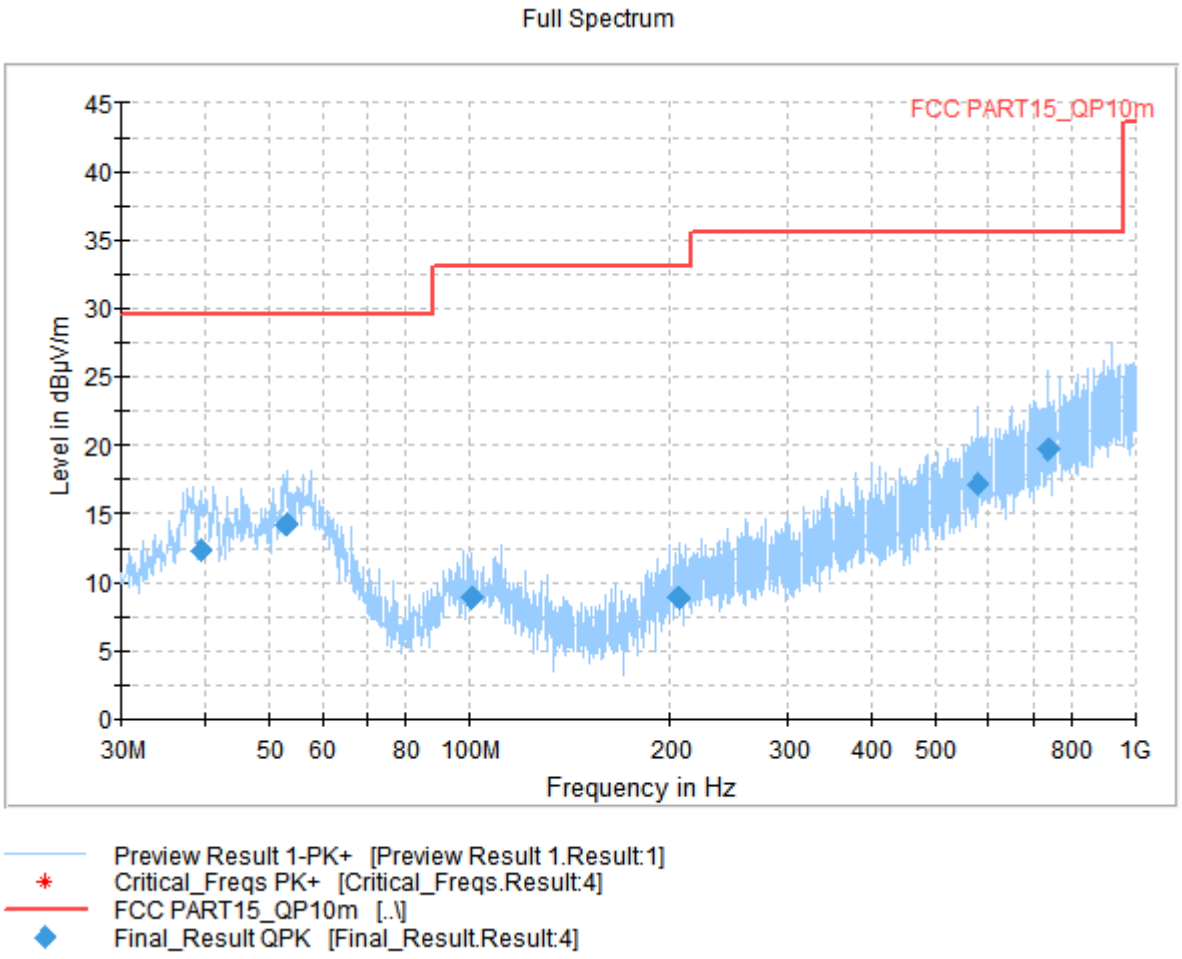

Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
39.312000	12.28	29.54	17.26	2000.0	120.000	120.0	V	278.0
52.795000	14.18	29.54	15.36	2000.0	120.000	117.0	V	300.0
100.422000	8.95	33.06	24.11	2000.0	120.000	199.0	V	259.0
205.667000	8.94	33.06	24.12	2000.0	120.000	110.0	V	22.0
577.856000	17.18	35.56	18.38	2000.0	120.000	319.0	V	300.0
740.913000	19.70	35.56	15.86	2000.0	120.000	108.0	V	203.0

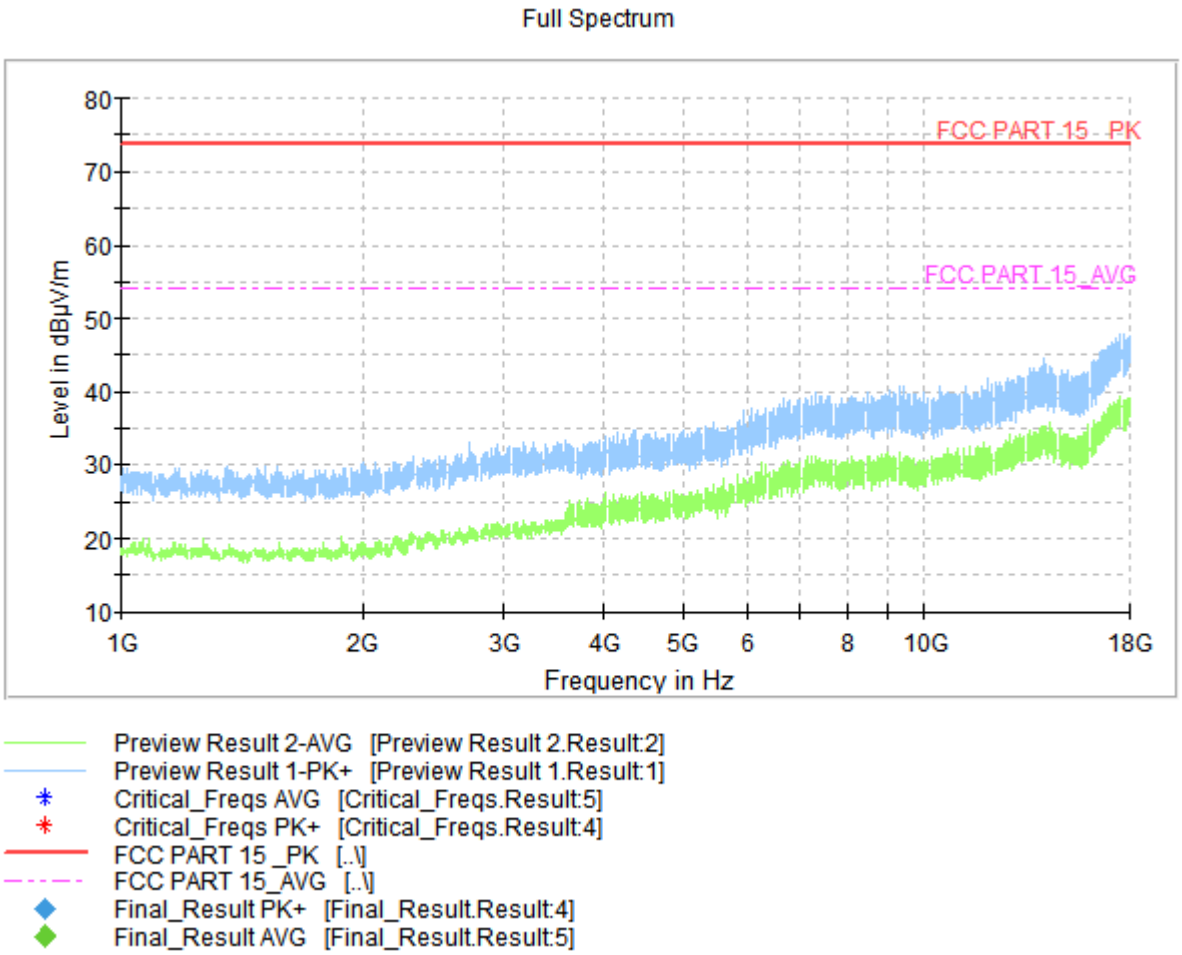

Fig A.6 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.4:

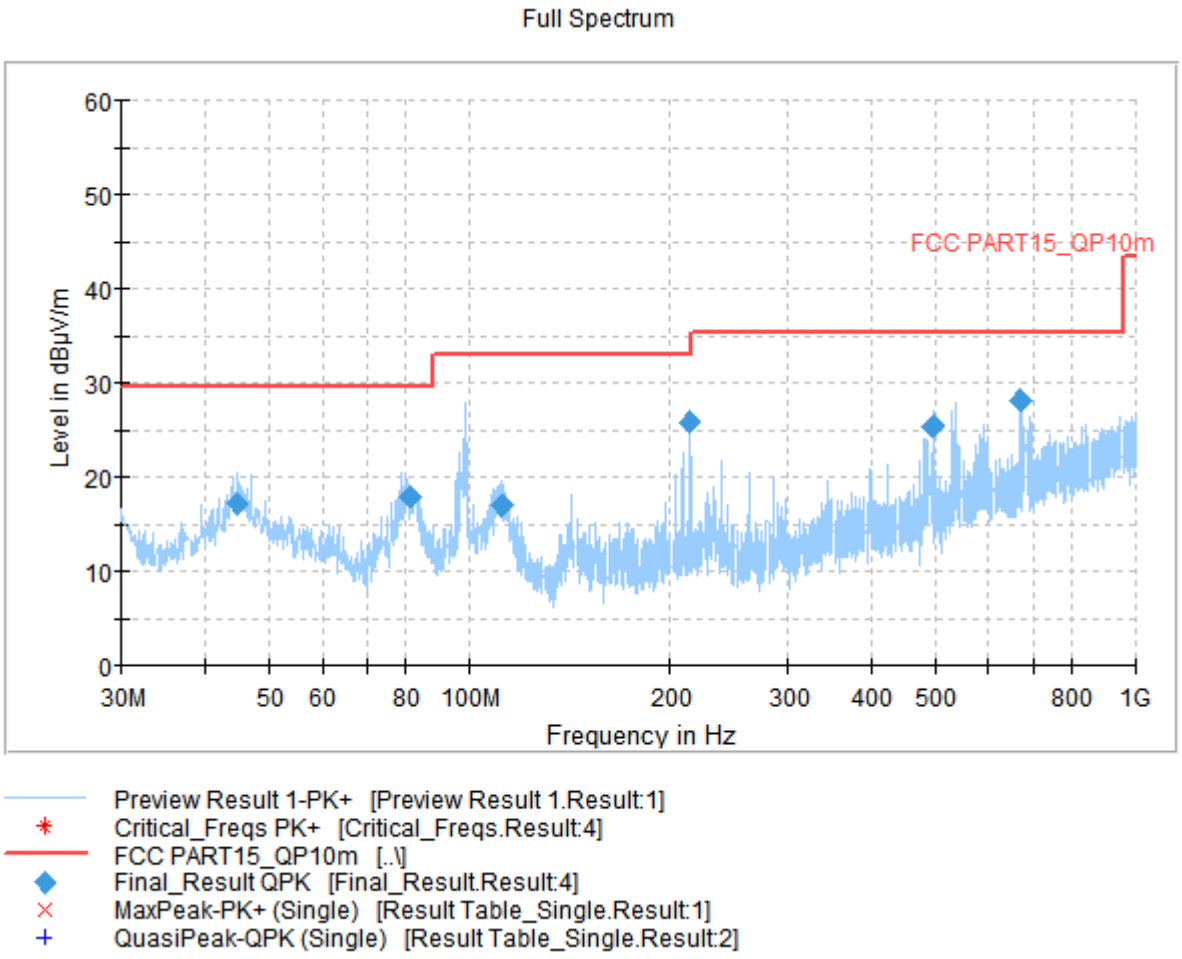

Fig A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
44.841000	17.16	29.54	12.38	2000.0	120.000	125.0	V	109.0
81.022000	17.97	29.54	11.57	2000.0	120.000	122.0	V	281.0
111.771000	17.03	33.06	16.03	2000.0	120.000	120.0	V	210.0
214.300000	25.97	33.06	7.09	2000.0	120.000	108.0	V	206.0
496.279000	25.44	35.56	10.12	2000.0	120.000	218.0	V	6.0
672.916000	28.16	35.56	7.40	2000.0	120.000	191.0	V	-18.0

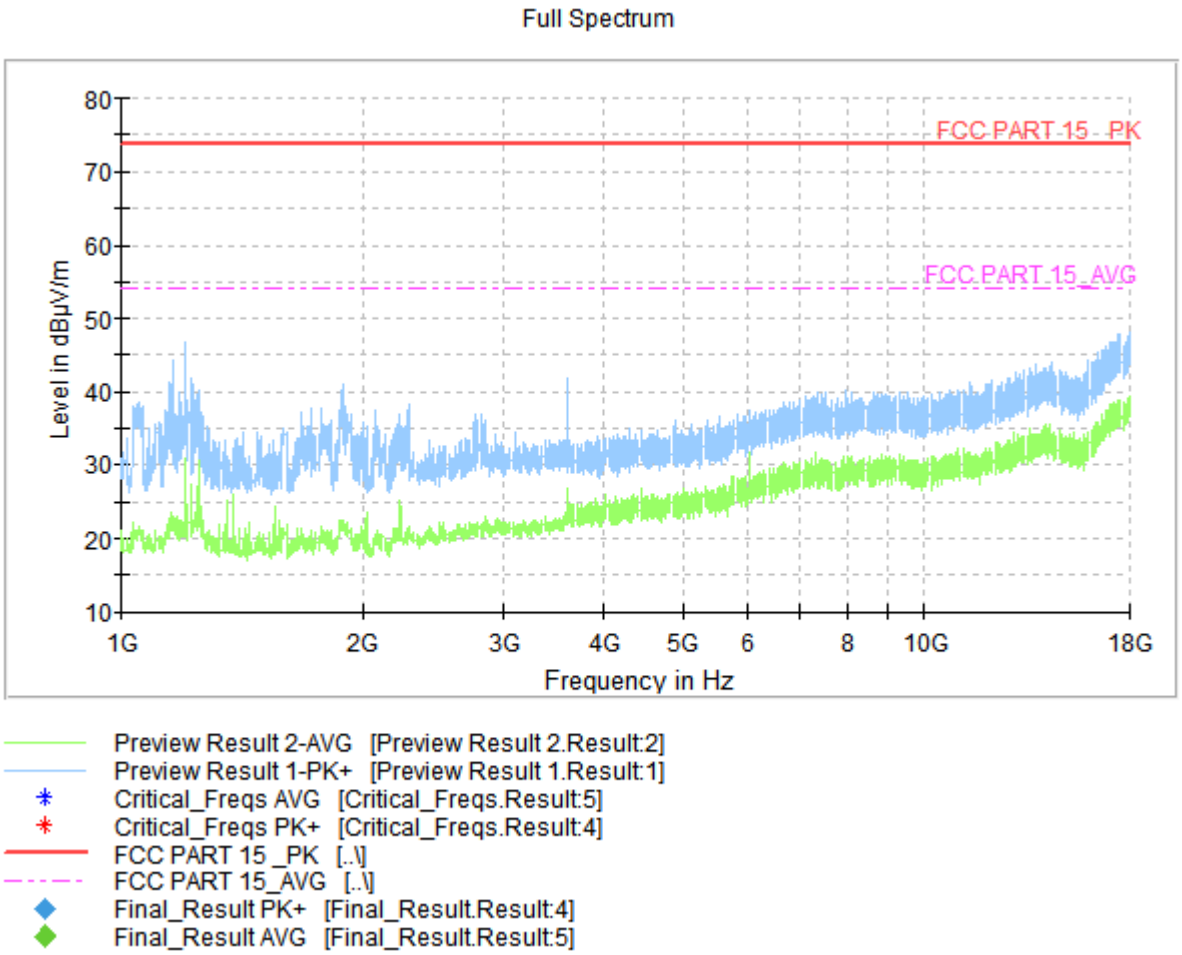

Fig A.8 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.5:

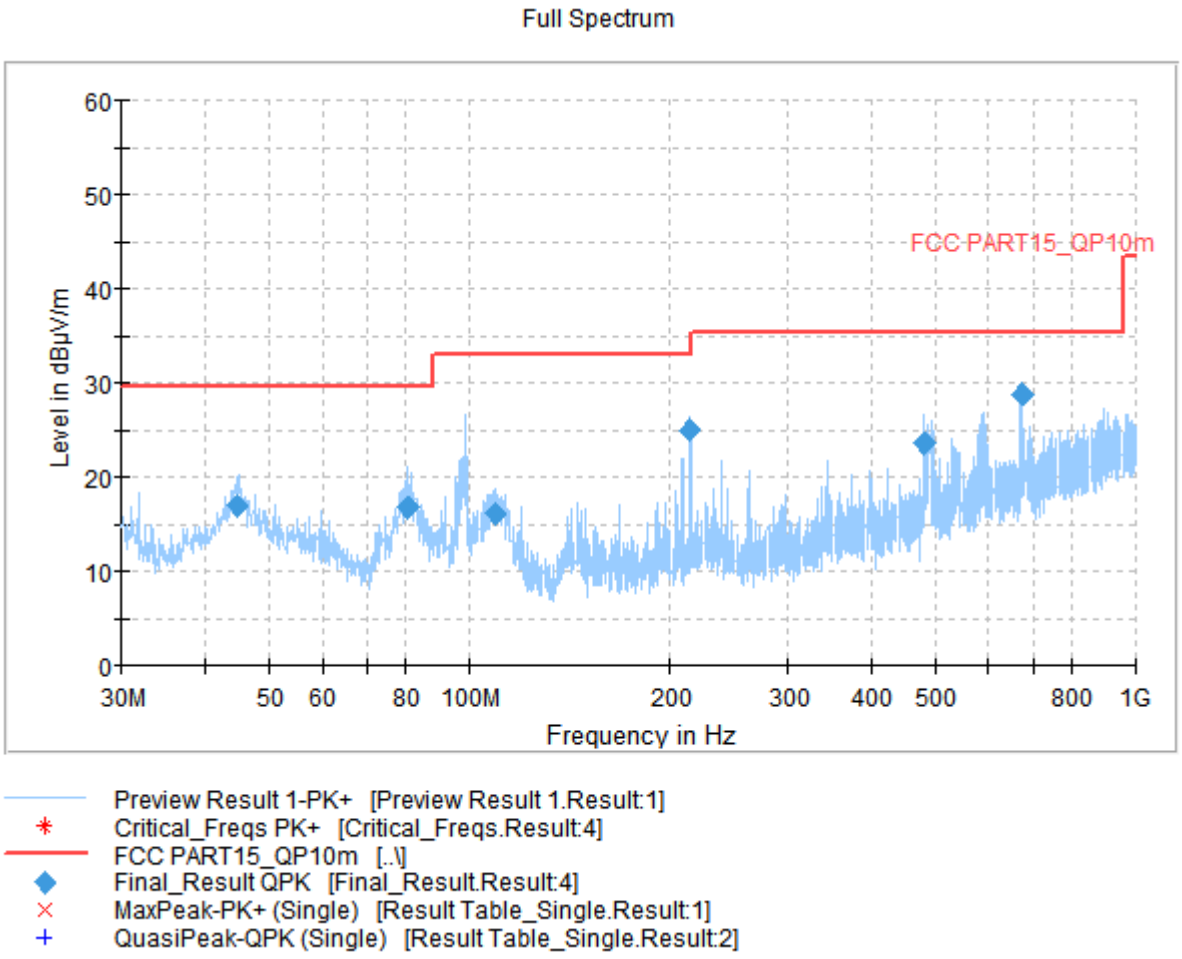

Fig A.9 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
44.647000	16.96	29.54	12.58	2000.0	120.000	123.0	V	62.0
80.537000	16.90	29.54	12.64	2000.0	120.000	190.0	V	120.0
109.346000	16.23	33.06	16.83	2000.0	120.000	122.0	V	-28.0
214.300000	24.95	33.06	8.11	2000.0	120.000	102.0	V	-1.0
482.796000	23.75	35.56	11.81	2000.0	120.000	288.0	V	4.0
674.274000	28.96	35.56	6.60	2000.0	120.000	191.0	V	-21.0

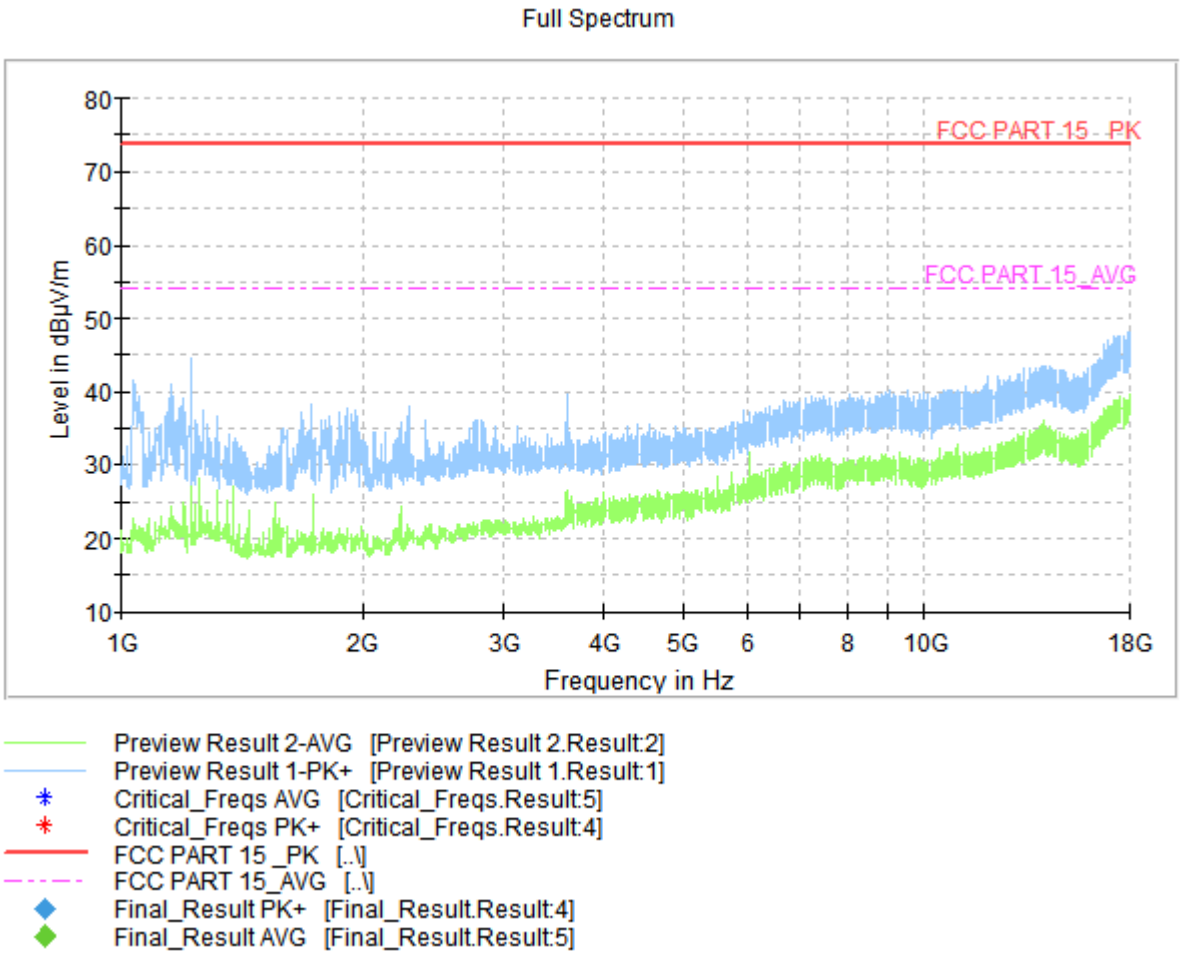

Fig A.10 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.6:

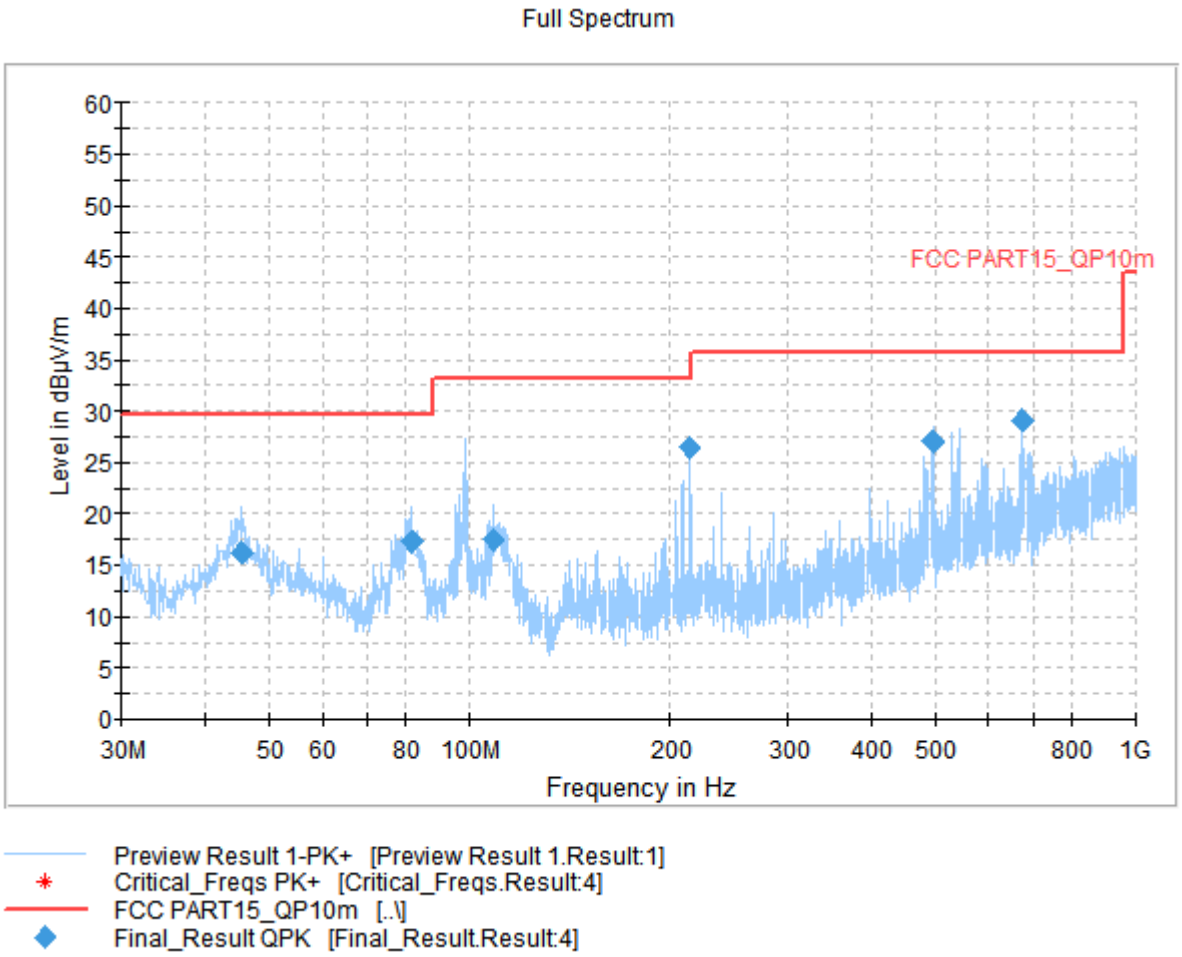

Fig A.11 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
45.520000	16.20	29.54	13.34	2000.0	120.000	194.0	V	30.0
81.798000	17.24	29.54	12.30	2000.0	120.000	184.0	V	272.0
108.667000	17.57	33.06	15.49	2000.0	120.000	122.0	V	0.0
214.300000	26.46	33.06	6.60	2000.0	120.000	100.0	V	201.0
496.085000	27.12	35.56	8.44	2000.0	120.000	230.0	V	-18.0
673.886000	29.17	35.56	6.39	2000.0	120.000	184.0	V	-9.0

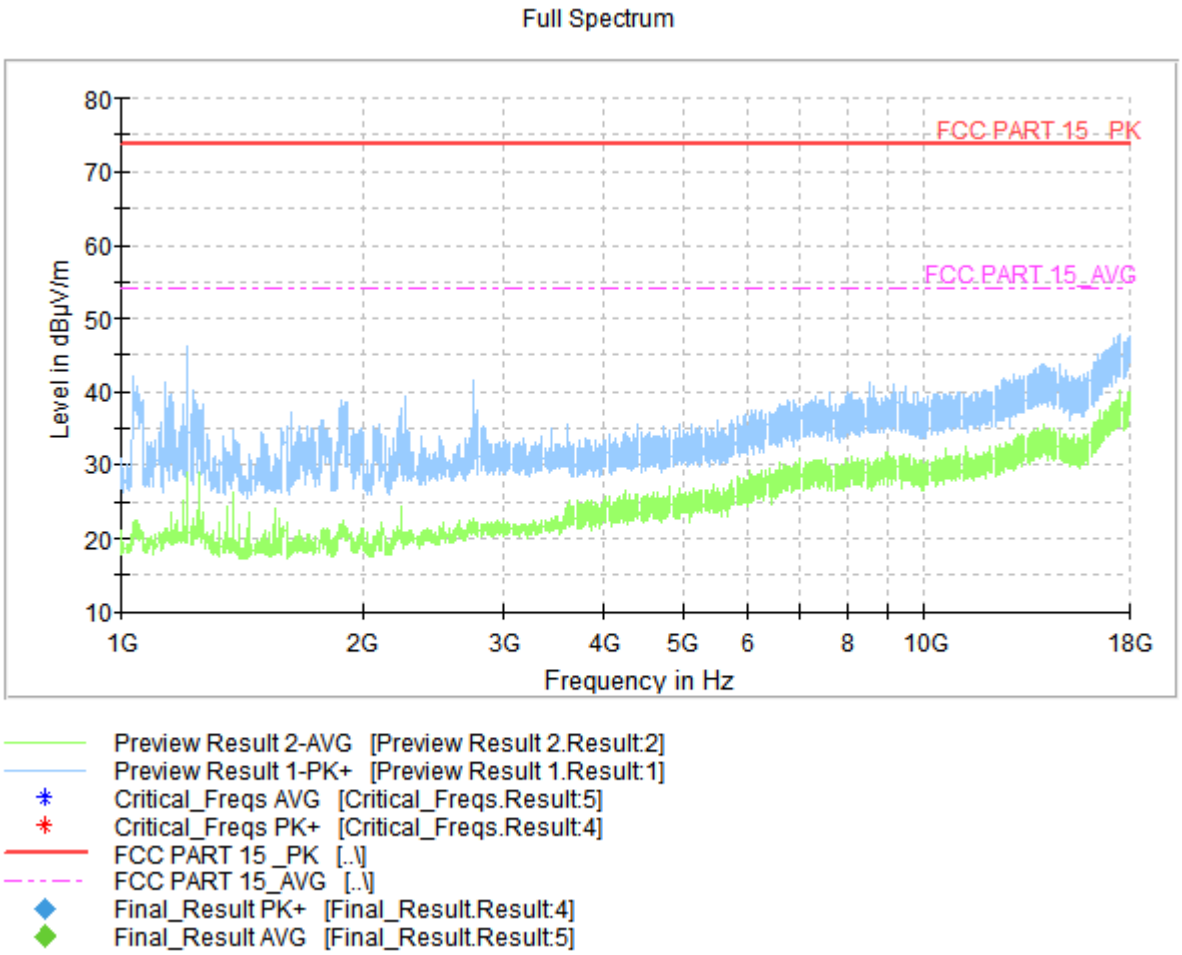

Fig A.12 Radiated Emission from 1GHz to 18GHz

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 M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note：I/O information：Printer – USB, Mouse – PS/2, Keyboard – USB.

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*= 3.1 dB, *k*=2.

Charging Mode, Set.1:

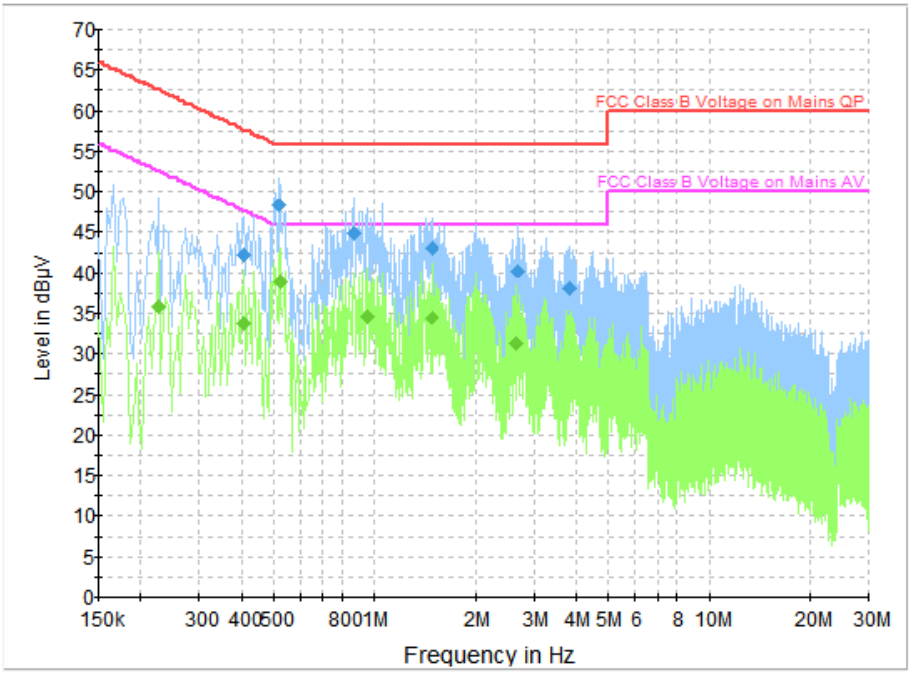

Fig A.13 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.406000	42.2	2000.0	9.000	On	L1	19.9	15.5	57.7	
0.518000	48.4	2000.0	9.000	On	L1	19.9	7.6	56.0	
0.866000	45.0	2000.0	9.000	On	L1	19.6	11.0	56.0	
1.486000	43.1	2000.0	9.000	On	L1	19.5	12.9	56.0	
2.670000	40.3	2000.0	9.000	On	L1	19.5	15.7	56.0	
3.830000	38.1	2000.0	9.000	On	L1	19.5	17.9	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.226000	35.8	2000.0	9.000	On	L1	20.0	16.8	52.6	
0.406000	33.8	2000.0	9.000	On	L1	19.9	14.0	47.7	
0.522000	38.9	2000.0	9.000	On	L1	19.9	7.1	46.0	
0.950000	34.7	2000.0	9.000	On	L1	19.6	11.3	46.0	
1.486000	34.5	2000.0	9.000	On	L1	19.5	11.5	46.0	
2.642000	31.4	2000.0	9.000	On	L1	19.5	14.6	46.0	

Charging Mode, Set.2:

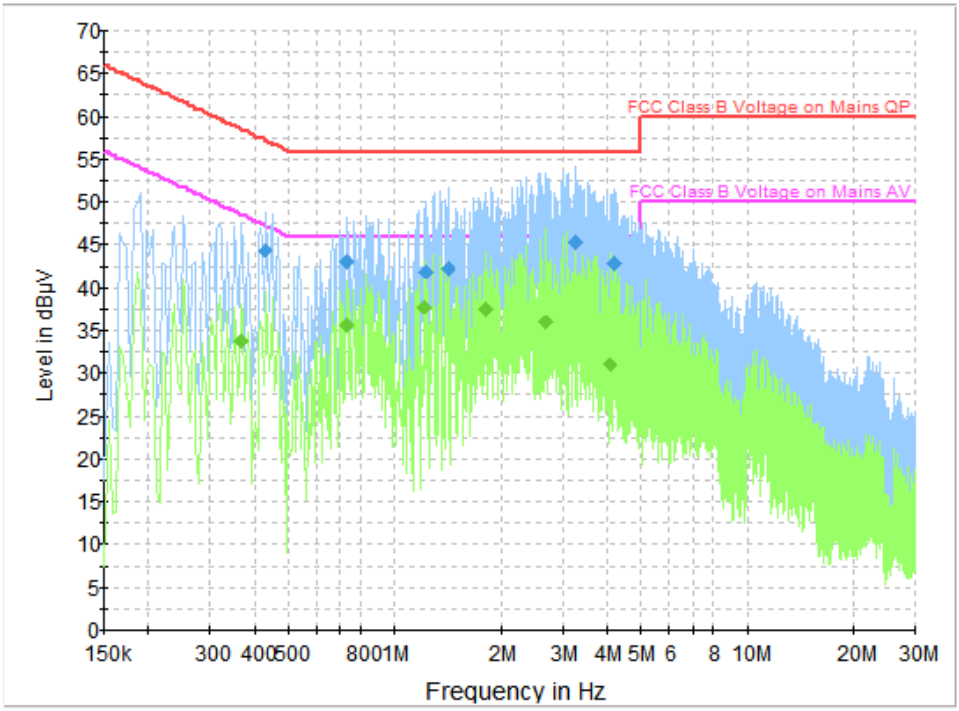

Fig A.14 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.430000	44.5	2000.0	9.000	On	L1	19.9	12.8	57.3	
0.730000	43.0	2000.0	9.000	On	L1	19.7	13.0	56.0	
1.226000	41.9	2000.0	9.000	On	L1	19.5	14.1	56.0	
1.414000	42.2	2000.0	9.000	On	L1	19.5	13.8	56.0	
3.278000	45.4	2000.0	9.000	On	L1	19.5	10.6	56.0	
4.174000	42.9	2000.0	9.000	On	L1	19.6	13.2	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.366000	33.9	2000.0	9.000	On	L1	19.9	14.7	48.6	
0.730000	35.6	2000.0	9.000	On	L1	19.7	10.4	46.0	
1.210000	37.8	2000.0	9.000	On	L1	19.5	8.2	46.0	
1.806000	37.5	2000.0	9.000	On	L1	19.5	8.5	46.0	
2.666000	35.9	2000.0	9.000	On	L1	19.5	10.1	46.0	
4.058000	31.0	2000.0	9.000	On	L1	19.6	15.0	46.0	

Charging Mode, Set.3:

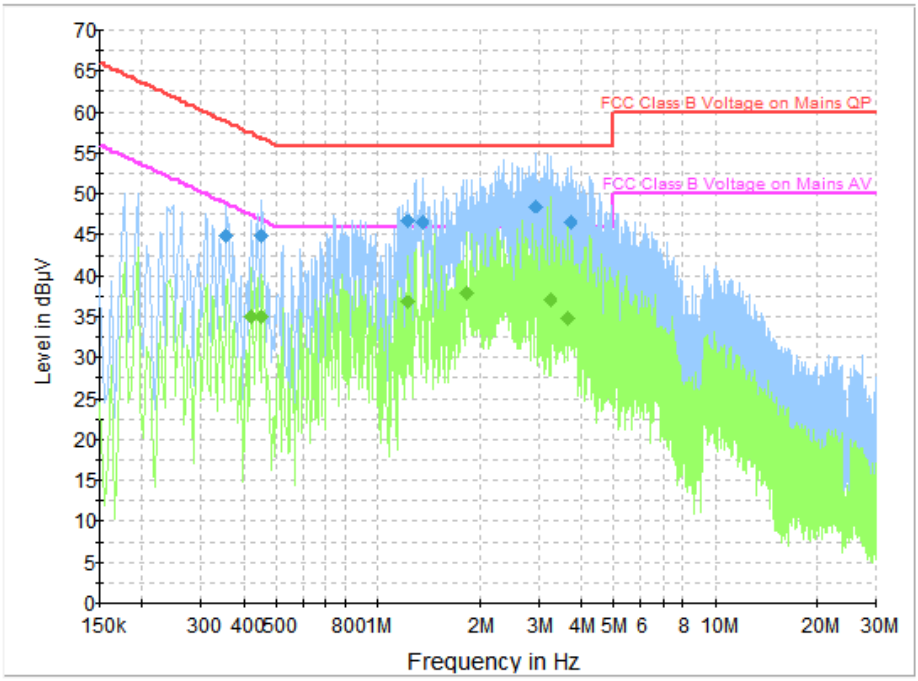

Fig A.15 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.354000	44.8	2000.0	9.000	On	L1	19.9	14.0	58.9	
0.454000	44.9	2000.0	9.000	On	L1	19.9	11.9	56.8	
1.218000	46.7	2000.0	9.000	On	L1	19.5	9.3	56.0	
1.350000	46.6	2000.0	9.000	On	L1	19.5	9.4	56.0	
2.922000	48.5	2000.0	9.000	On	L1	19.5	7.5	56.0	
3.702000	46.5	2000.0	9.000	On	L1	19.5	9.5	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.422000	35.0	2000.0	9.000	On	L1	19.9	12.4	47.4	
0.454000	35.0	2000.0	9.000	On	L1	19.9	11.8	46.8	
1.218000	36.9	2000.0	9.000	On	L1	19.5	9.1	46.0	
1.830000	38.0	2000.0	9.000	On	L1	19.5	8.0	46.0	
3.242000	37.2	2000.0	9.000	On	L1	19.5	8.8	46.0	
3.642000	34.8	2000.0	9.000	On	L1	19.5	11.2	46.0	

USB Mode, Set.4:

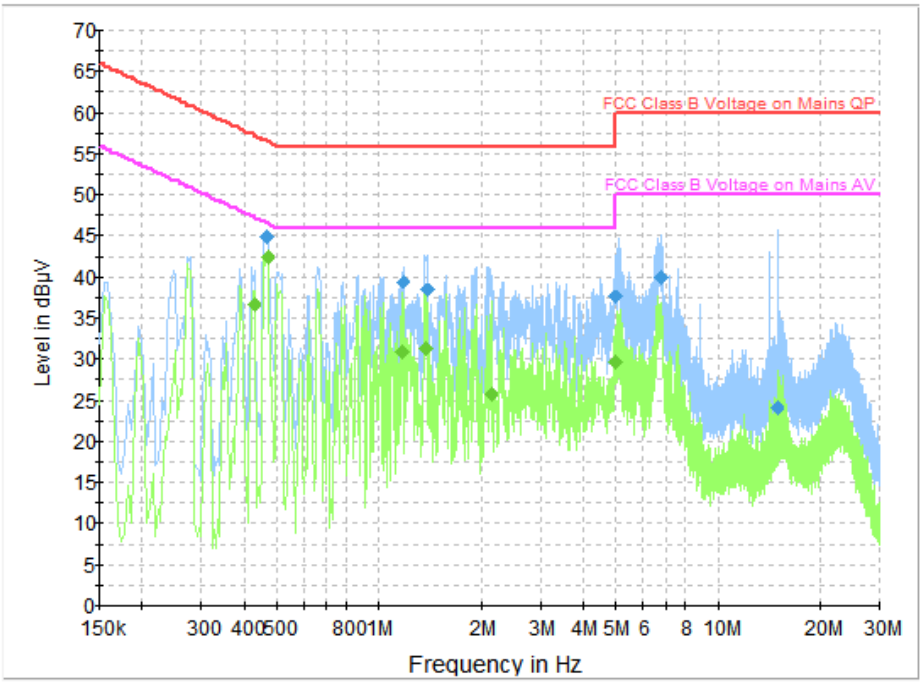

Fig A.16 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.466000	44.9	2000.0	9.000	On	L1	19.9	11.7	56.6	
1.178000	39.5	2000.0	9.000	On	N	19.8	16.5	56.0	
1.386000	38.4	2000.0	9.000	On	L1	19.5	17.6	56.0	
4.994000	37.6	2000.0	9.000	On	L1	19.6	18.4	56.0	
6.754000	39.9	2000.0	9.000	On	L1	19.5	20.1	60.0	
14.858000	24.1	2000.0	9.000	On	L1	19.9	35.9	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.430000	36.7	2000.0	9.000	On	N	19.9	10.5	47.3	
0.470000	42.4	2000.0	9.000	On	N	20.0	4.1	46.5	
1.162000	30.8	2000.0	9.000	On	L1	19.6	15.2	46.0	
1.378000	31.4	2000.0	9.000	On	N	19.8	14.6	46.0	
2.134000	25.8	2000.0	9.000	On	L1	19.5	20.2	46.0	
4.994000	29.6	2000.0	9.000	On	L1	19.6	16.4	46.0	

USB Mode, Set.5:

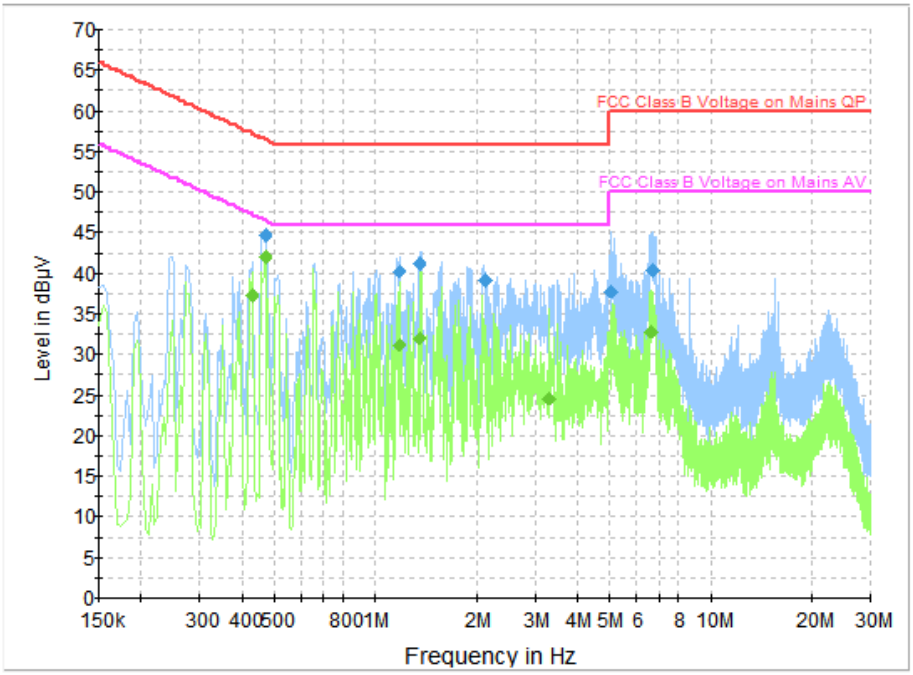

Fig A.17 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.470000	44.7	2000.0	9.000	On	L1	19.9	11.8	56.5	
1.178000	40.3	2000.0	9.000	On	L1	19.5	15.7	56.0	
1.354000	41.3	2000.0	9.000	On	L1	19.5	14.7	56.0	
2.122000	39.1	2000.0	9.000	On	N	19.8	16.9	56.0	
5.034000	37.7	2000.0	9.000	On	L1	19.6	22.3	60.0	
6.682000	40.4	2000.0	9.000	On	L1	19.5	19.6	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.430000	37.3	2000.0	9.000	On	L1	19.9	10.0	47.3	
0.470000	42.1	2000.0	9.000	On	L1	19.9	4.5	46.5	
1.178000	31.3	2000.0	9.000	On	L1	19.5	14.7	46.0	
1.350000	32.1	2000.0	9.000	On	N	19.8	13.9	46.0	
3.298000	24.6	2000.0	9.000	On	N	19.7	21.4	46.0	
6.610000	32.8	2000.0	9.000	On	L1	19.5	17.2	50.0	

USB Mode, Set.6:

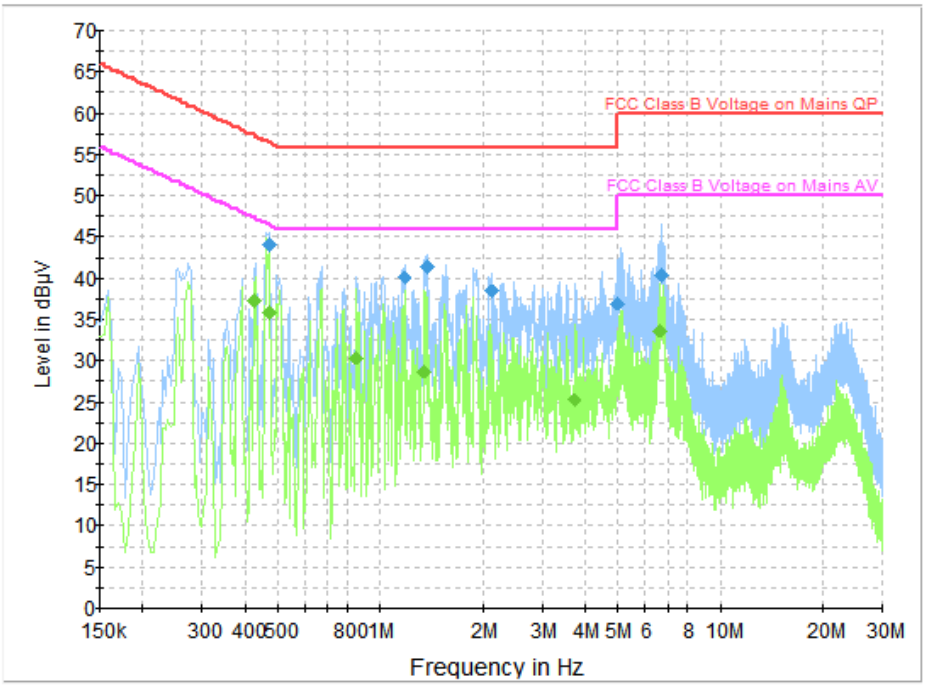

Fig A.18 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.474000	44.0	2000.0	9.000	On	N	20.0	12.4	56.4	
1.178000	40.2	2000.0	9.000	On	L1	19.5	15.8	56.0	
1.374000	41.5	2000.0	9.000	On	L1	19.5	14.5	56.0	
2.126000	38.4	2000.0	9.000	On	L1	19.5	17.6	56.0	
4.990000	37.0	2000.0	9.000	On	L1	19.6	19.0	56.0	
6.670000	40.5	2000.0	9.000	On	N	19.7	19.5	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.426000	37.4	2000.0	9.000	On	L1	19.9	9.9	47.3	
0.474000	35.9	2000.0	9.000	On	N	20.0	10.6	46.4	
0.846000	30.4	2000.0	9.000	On	N	19.8	15.6	46.0	
1.342000	28.7	2000.0	9.000	On	N	19.8	17.3	46.0	
3.722000	25.3	2000.0	9.000	On	N	19.7	20.7	46.0	
6.642000	33.6	2000.0	9.000	On	N	19.7	16.4	50.0	

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