



FCC PART 15B TEST REPORT

No. I21Z62014-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE Mobile phone

Model name: 6002A, 6102A

FCC ID: 2ACCJH145

with

Hardware Version: 05

Software Version: MW59

Issued Date: 2021-11-24

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.

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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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

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

Email: ctl_terminals@caict.ac.cn, website: www.caict.ac.cn



REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z62014-EMC01	Rev.0	1 st edition	2021-11-05
I21Z62014-EMC01	Rev.1	2 nd edition	2021-11-24
I21Z62014-EMC01	Rev.2	3 rd edition	2021-11-26

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



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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: 2021-10-26

Testing End Date: 2021-11-04


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	GSM/UMTS/LTE Mobile phone
Model Name	6002A, 6102A
FCC ID:	2ACCJH145

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	359547300000103	05	MW59
EUT2	359547300000277	05	MW59

*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	Charger4	/	/
AE7	Data Cable	/	/
AE8	Data Cable	/	/
AE9	Headset1	/	/
AE10	Headset2	/	/
AE11	Headset3	/	/

AE1

Model	TLp048A7(CAC4850002C7)
Manufacturer	VEKEN
Capacity	5000mAh
Nominal Voltage	

AE2

Model	TLp048A1(CAC4850000C1)
Manufacturer	BYD
Capacity	5000mAh
Nominal Voltage	

AE3

Model	CBA0059AGTC1
Manufacturer	BYD
Length of cable	/

AE4

Model	CBA0059AGAC5
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Manufacturer	PUAN
Length of cable	/
AE5	
Model	CBA0059AGAC7
Manufacturer	Chenyang
Length of cable	/
AE6	
Model	CBA0059AGTC5
Manufacturer	PUAN
Length of cable	/
AE7	
Model	CDA0000123C8
Manufacturer	PUAN
Length of cable	/
AE8	
Model	CDA0000123C1
Manufacturer	JUWEI
Length of cable	/
AE9	
Model	CCB0046A15C1(WH15)
Manufacturer	JUWEI
Length of cable	/
AE10	
Model	CCB0049A12C1(WH15+)
Manufacturer	JUWEI
Length of cable	/
AE11	
Model	CCB0076A10C1(WH35)
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	EUT1/2+ AE1/2 + AE3+ AE7/8	Charger1+REAR Camera+ GSM 850 idle
Set.2	EUT1/2+ AE1/2 + AE4+ AE7/8	Charger2+MP4+WCDMA 850 idle
Set.3	EUT1/2+ AE1/2 + AE5+ AE7/8	Charger3+ Front Camera + LTE Band 5 idle
Set.4	EUT1/2+ AE1/2 + AE9+ AE7/8	USB+Headset1+FM
Set.5	EUT1/2+ AE1/2 + AE10+ AE7/8	USB+Headset2+FM
Set.6	EUT1/2+ AE1/2 + AE11+ AE7/8	USB+Headset3+FM

Note:

The device supports GSM/GPRS/EGPRS 850/900/1800/1900, UMTS FDD Band 1/2/4/5/8;



LTE FDD Band 2/3/4/5/7/8/12/13/17/26/28/66. It has WLAN (802.11b/g/n, 802.11n supports 20MHz and 40MHz 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 12, LTE Band 13, LTE Band 17 , LTE Band 26 and 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
7	Signal Generator	SMBV100A	260613	R&S	2022-01-06	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 ($\mu\text{V}/\text{m}$)		
	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:

$$\text{Result} = P_{\text{Mea}} + A_{Rpl} = P_{\text{Mea}} + G_A + G_{PL}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 4.74 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17952.400	39.6	-28.9	46.7	21.9	54.0	14.4	V
17978.467	39.5	-29.1	46.7	21.9	54.0	14.5	V
17946.167	39.3	-28.9	46.7	21.6	54.0	14.7	H
17976.767	39.2	-29.1	46.7	21.6	54.0	14.8	V
17964.867	38.9	-29.1	46.7	21.3	54.0	15.1	V
17917.833	38.9	-29.3	46.7	21.6	54.0	15.1	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17935.967	48.3	-29.4	46.7	31.0	74.0	25.7	V
17963.167	47.8	-29.1	46.7	30.2	74.0	26.2	H
17975.067	47.6	-29.1	46.7	30.0	74.0	26.4	H
17388.567	47.5	-29.8	44.4	33.0	74.0	26.5	V
17410.100	47.5	-29.4	44.4	32.6	74.0	26.5	H
17533.067	47.4	-29.3	44.4	32.4	74.0	26.6	V

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

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17968.833	40.0	-29.1	46.7	22.4	54.0	14.0	H
17967.700	39.2	-29.1	46.7	21.6	54.0	14.8	V
17952.400	39.1	-28.9	46.7	21.4	54.0	14.9	H
17624.300	39.0	-29.4	45.2	23.2	54.0	15.0	H
17956.933	39.0	-28.9	46.7	21.3	54.0	15.0	V
17990.933	39.0	-29.1	46.7	21.4	54.0	15.0	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17686.633	47.8	-30.0	45.2	32.5	74.0	26.2	V
17881.567	47.8	-29.5	46.0	31.4	74.0	26.2	V
17631.100	47.6	-29.4	45.2	31.8	74.0	26.4	V
17987.533	47.6	-29.1	46.7	30.0	74.0	26.4	V
17943.333	47.6	-28.9	46.7	29.9	74.0	26.4	H
17491.700	47.5	-29.8	44.4	32.9	74.0	26.5	H

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

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17873.067	39.6	-29.4	46.0	23.0	54.0	14.4	V
17973.933	39.5	-29.1	46.7	21.9	54.0	14.5	H
17958.067	39.4	-28.9	46.7	21.7	54.0	14.6	V
17980.733	39.0	-29.1	46.7	21.4	54.0	15.0	V
17965.433	39.0	-29.1	46.7	21.4	54.0	15.0	H
17296.767	38.9	-29.7	43.4	25.2	54.0	15.1	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17203.833	48.3	-29.5	42.4	35.4	74.0	25.7	H
17943.333	47.9	-28.9	46.7	30.2	74.0	26.1	V
17999.433	47.9	-29.1	46.7	30.3	74.0	26.1	V
17954.667	47.8	-28.9	46.7	30.1	74.0	26.2	H
17979.033	47.6	-29.1	46.7	30.0	74.0	26.4	V
17995.467	47.5	-29.1	46.7	29.9	74.0	26.5	H

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

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17947.300	39.9	-28.9	46.7	22.2	54.0	14.1	V
17979.600	38.9	-29.1	46.7	21.3	54.0	15.1	V
17852.100	38.8	-29.3	46.0	22.2	54.0	15.2	V
17582.367	38.8	-29.7	45.2	23.2	54.0	15.2	V
17495.100	38.8	-29.8	44.4	24.2	54.0	15.2	V
17639.600	38.7	-29.4	45.2	22.9	54.0	15.3	V

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17976.200	48.9	-29.1	46.7	31.3	74.0	25.1	V
17956.367	48.3	-28.9	46.7	30.6	74.0	25.7	V
17953.533	48.0	-28.9	46.7	30.3	74.0	26.0	V
17976.767	48.0	-29.1	46.7	30.4	74.0	26.0	V
17985.833	48.0	-29.1	46.7	30.4	74.0	26.0	H
17529.667	47.9	-29.3	44.4	32.9	74.0	26.1	H

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

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17558.000	39.2	-29.5	44.4	24.3	54.0	14.8	H
17978.467	39.2	-29.1	46.7	21.6	54.0	14.8	H
17956.367	39.2	-28.9	46.7	21.5	54.0	14.8	H
17986.967	39.1	-29.1	46.7	21.5	54.0	14.9	H
17481.500	39.1	-29.8	44.4	24.5	54.0	14.9	H
17815.267	39.0	-29.6	46.0	22.7	54.0	15.0	V

USB Mode/Peak detector

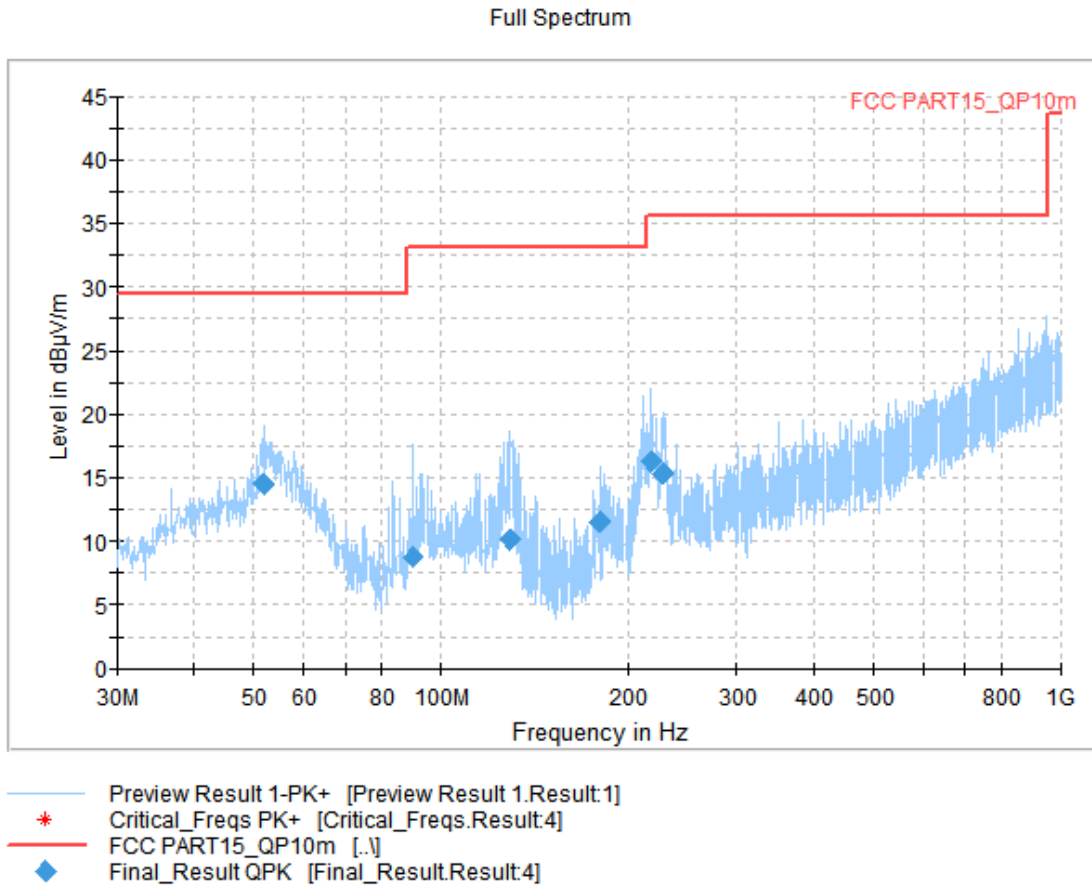
Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17973.933	47.8	-29.1	46.7	30.2	74.0	26.2	H
17901.400	47.7	-29.3	46.0	31.1	74.0	26.3	V
17411.800	47.6	-29.4	44.4	32.7	74.0	26.4	H
17519.467	47.6	-29.3	44.4	32.5	74.0	26.4	H
17157.933	47.5	-29.9	42.4	35.0	74.0	26.5	V
17400.467	47.5	-29.4	44.4	32.6	74.0	26.5	V

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

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17501.333	39.8	-29.3	44.4	24.7	54.0	14.2	V
17990.933	39.8	-29.1	46.7	22.2	54.0	14.2	V
17988.100	39.3	-29.1	46.7	21.7	54.0	14.7	H
17937.667	39.1	-29.4	46.7	21.8	54.0	14.9	H
17896.867	39.0	-29.5	46.0	22.6	54.0	15.0	H
17078.033	38.9	-29.8	42.4	26.3	54.0	15.1	H

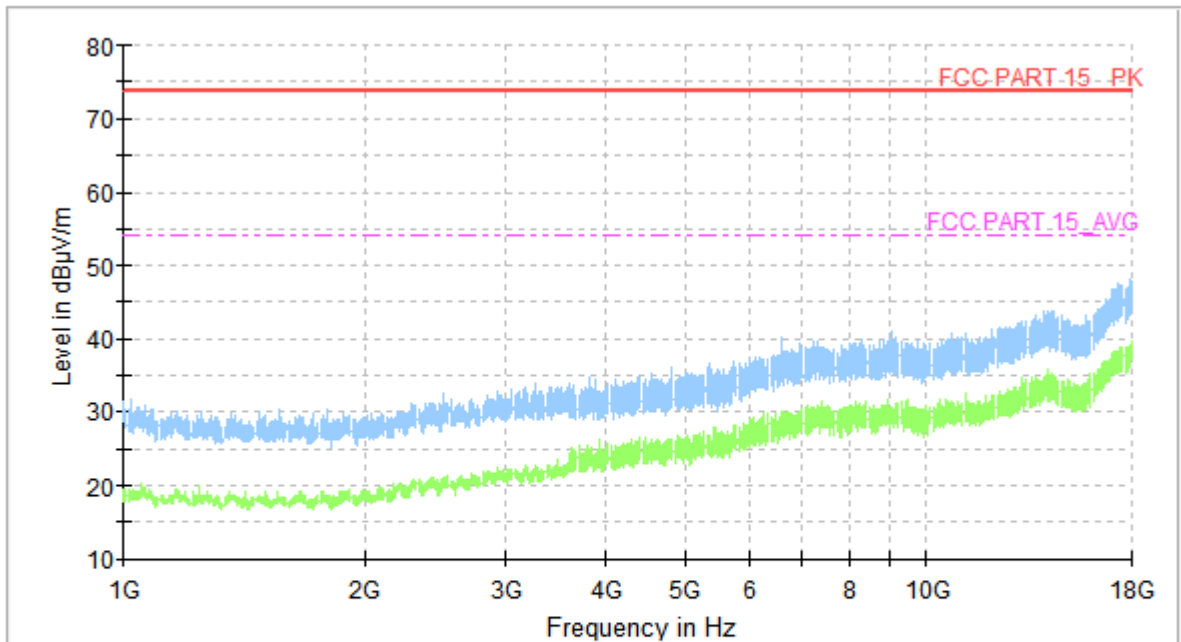
USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17421.433	48.2	-29.7	44.4	33.6	74.0	25.8	V
17501.333	48.0	-29.3	44.4	32.9	74.0	26.0	V
17892.900	48.0	-29.5	46.0	31.6	74.0	26.0	V
17980.733	47.9	-29.1	46.7	30.3	74.0	26.1	H
17996.033	47.8	-29.1	46.7	30.2	74.0	26.2	H
17943.900	47.7	-28.9	46.7	30.0	74.0	26.3	V

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)
51.922000	14.56	29.54	14.98	2000.0	120.000	99.0	V	300.0
90.140000	8.69	33.06	24.37	2000.0	120.000	310.0	V	-1.0
129.716000	10.23	33.06	22.83	2000.0	120.000	125.0	V	14.0
180.544000	11.61	33.06	21.45	2000.0	120.000	125.0	V	67.0
218.277000	16.30	35.56	19.26	2000.0	120.000	109.0	V	159.0
227.686000	15.32	35.56	20.24	2000.0	120.000	116.0	V	155.0

Full Spectrum



- Preview Result 2-AVG [Preview Result 2.Result:2]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- * Critical_Freqs AVG [Critical_Freqs.Result:5]
- * Critical_Freqs PK+ [Critical_Freqs.Result:4]
- FCC PART 15_PK [..]
- - - FCC PART 15_AVG [..]
- ◆ Final_Result PK+ [Final_Result.Result:4]
- ◆ Final_Result AVG [Final_Result.Result:5]

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

Measurement results for Set.2:

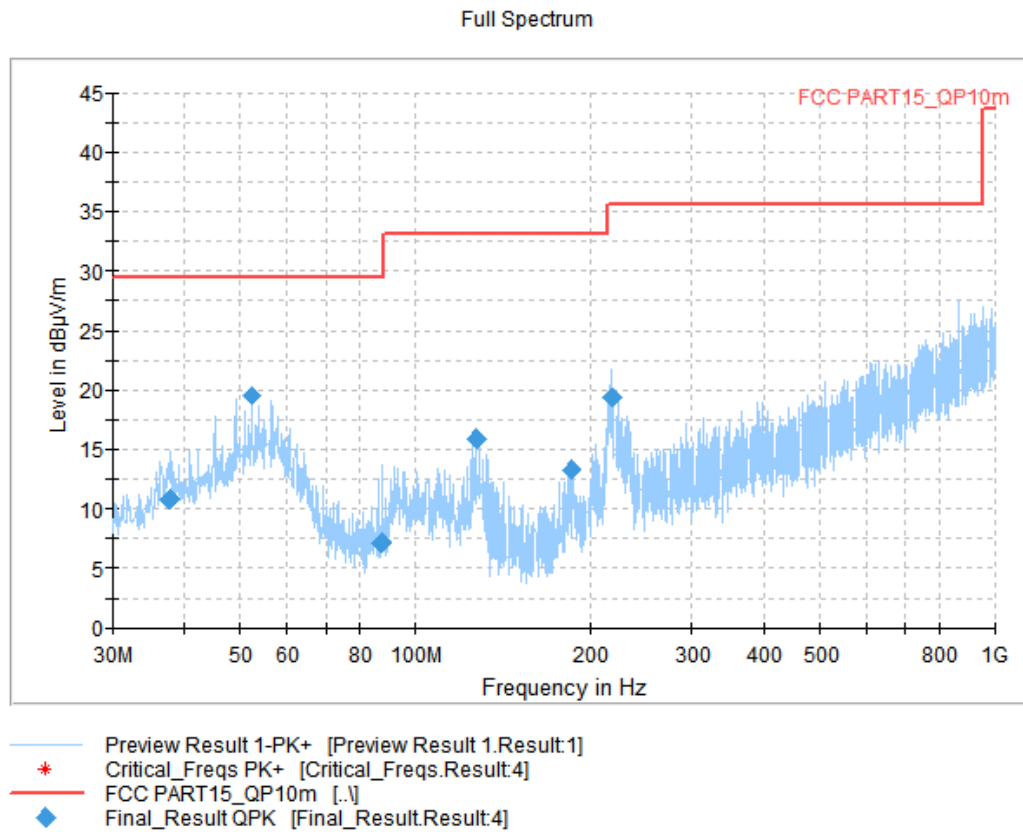


Fig A.3 Radiated Emission from 30MHz to 1GHz

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	10.84	29.54	18.70	2000.0	120.000	109.0	V	87.0
52.116000	19.56	29.54	9.98	2000.0	120.000	104.0	V	-2.0
87.521000	7.19	29.54	22.35	2000.0	120.000	335.0	V	8.0
127.582000	15.90	33.06	17.16	2000.0	120.000	182.0	V	180.0
185.976000	13.29	33.06	19.77	2000.0	120.000	290.0	V	-29.0
218.180000	19.37	35.56	16.19	2000.0	120.000	125.0	V	60.0

Full Spectrum

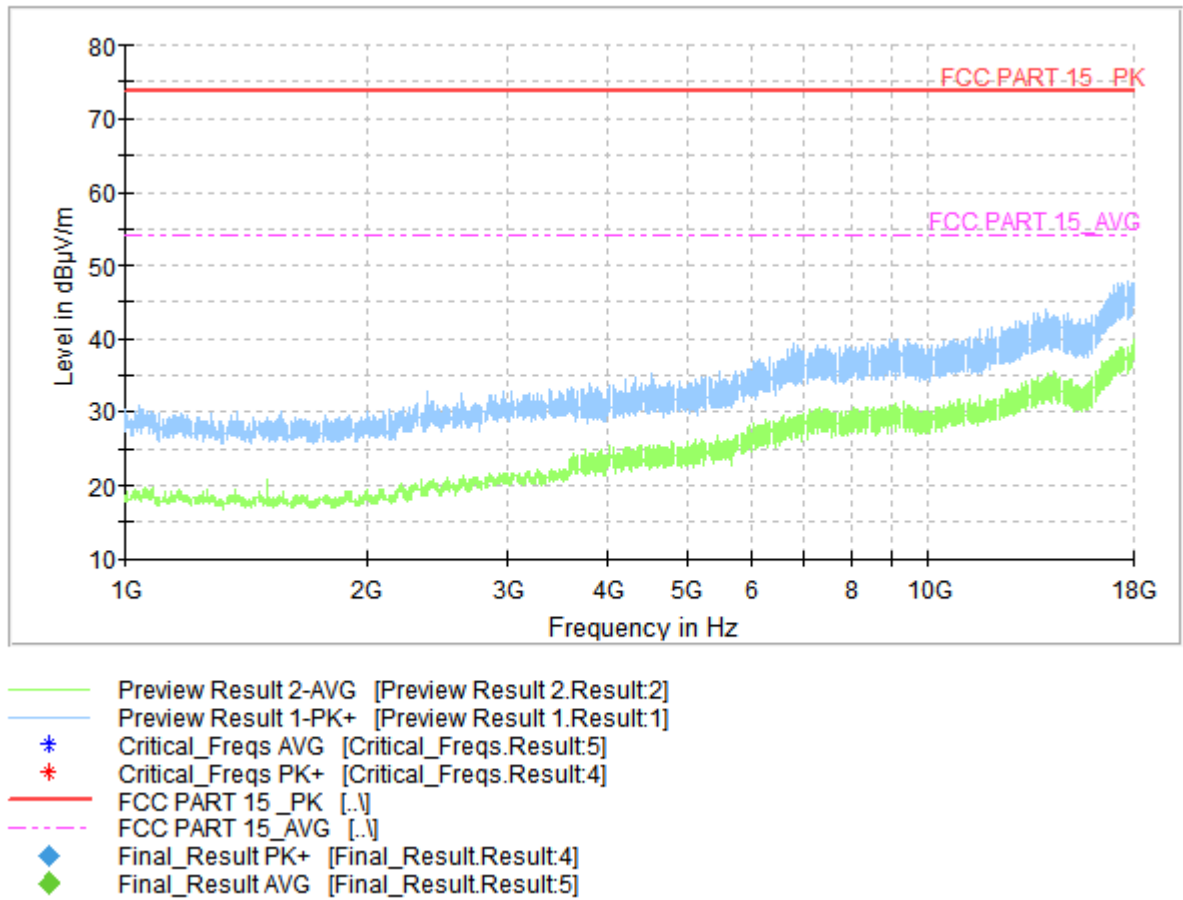


Fig A.4 Radiated Emission from 1GHz to 18GHz

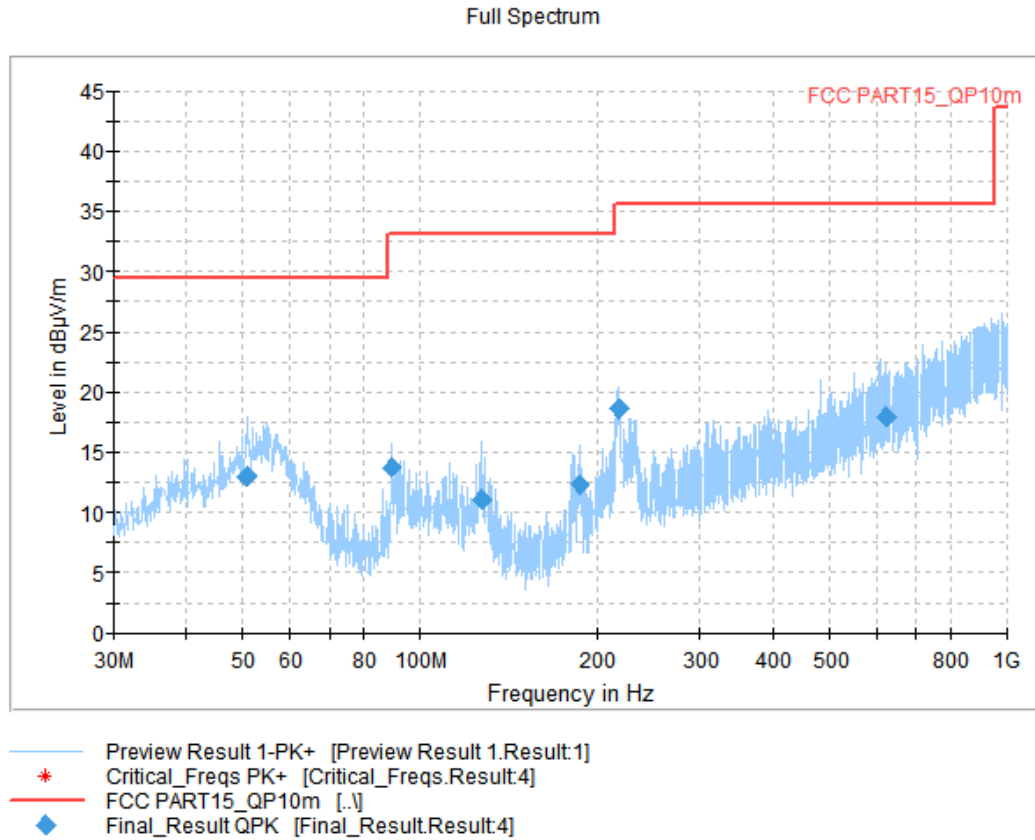
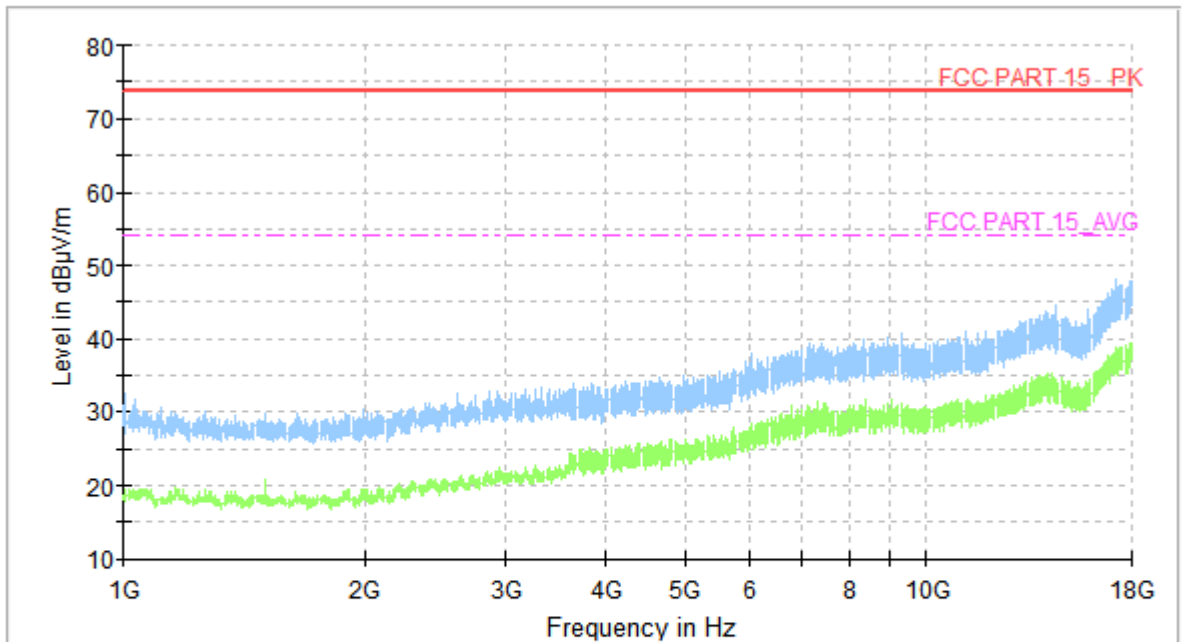
Measurement results for Set.3:


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)
50.758000	12.94	29.54	16.60	2000.0	120.000	105.0	V	62.0
89.461000	13.77	33.06	19.29	2000.0	120.000	106.0	V	-25.0
127.776000	11.08	33.06	21.98	2000.0	120.000	105.0	V	-16.0
187.140000	12.42	33.06	20.64	2000.0	120.000	199.0	V	-29.0
218.568000	18.52	35.56	17.04	2000.0	120.000	108.0	V	30.0
621.506000	17.90	35.56	17.66	2000.0	120.000	333.0	V	100.0

Full Spectrum



- Preview Result 2-AVG [Preview Result 2.Result:2]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- * Critical_Freqs AVG [Critical_Freqs.Result:5]
- * Critical_Freqs PK+ [Critical_Freqs.Result:4]
- FCC PART 15_PK [..]
- - - FCC PART 15_AVG [..]
- ◆ Final_Result PK+ [Final_Result.Result:4]
- ◆ Final_Result AVG [Final_Result.Result:5]

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

Measurement results for Set.4:

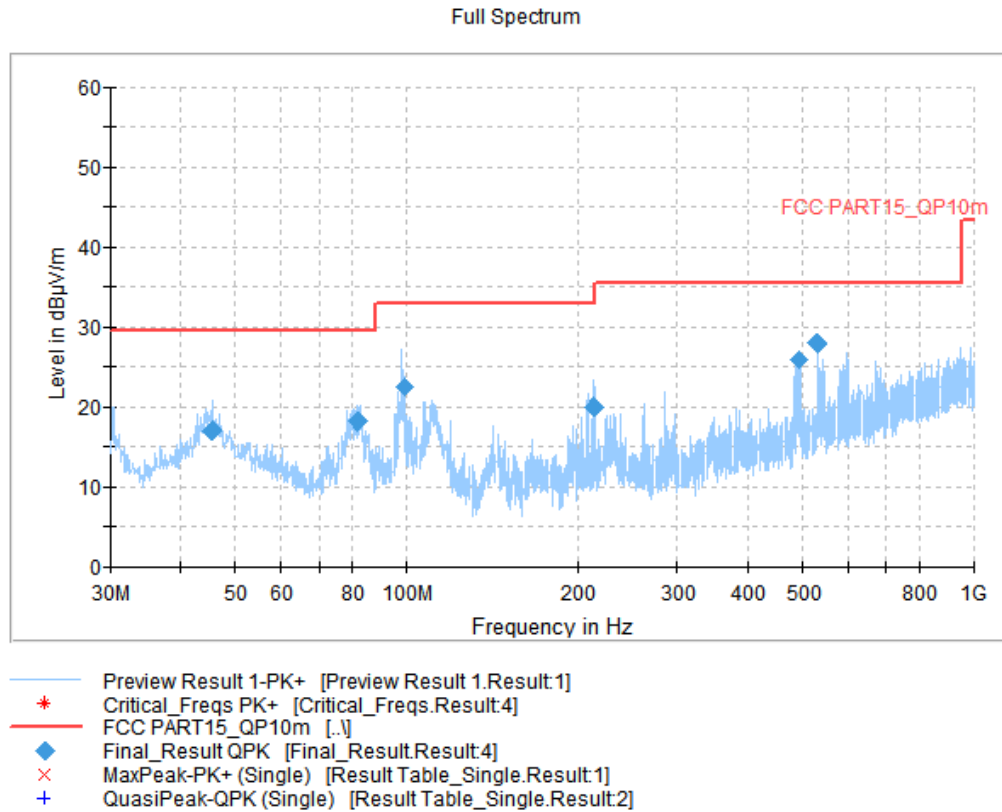
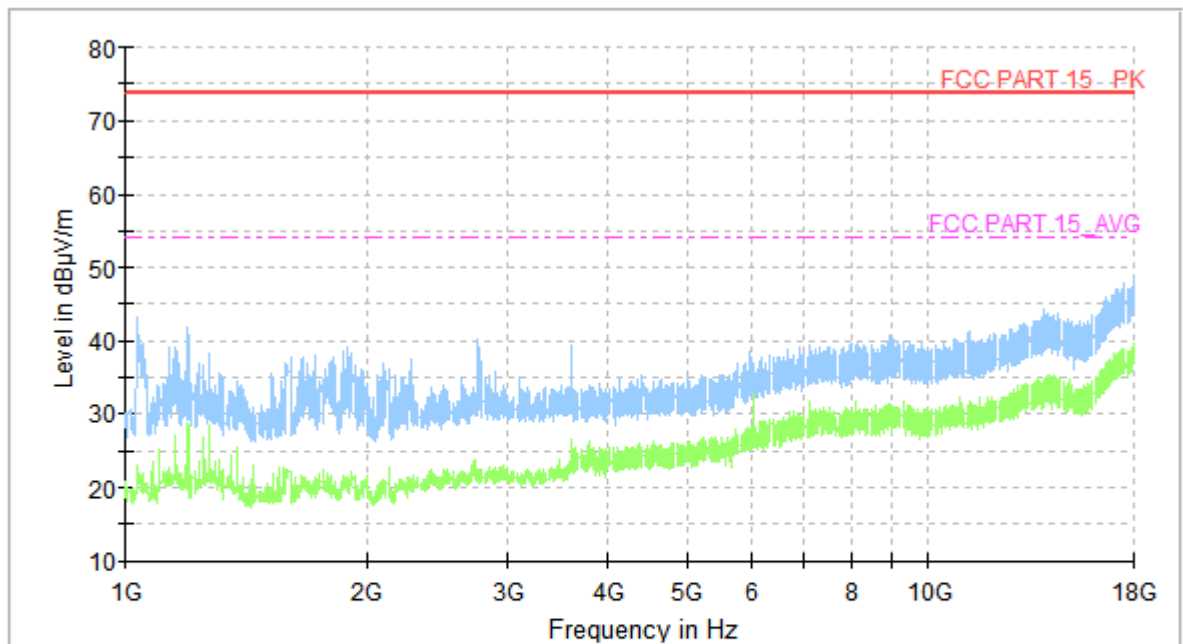


Fig A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
45.326000	17.09	29.54	12.45	2000.0	120.000	114.0	V	120.0
82.089000	18.26	29.54	11.28	2000.0	120.000	184.0	V	107.0
99.161000	22.42	33.06	10.64	2000.0	120.000	103.0	V	24.0
214.300000	19.93	33.06	13.13	2000.0	120.000	122.0	V	193.0
493.951000	25.81	35.56	9.75	2000.0	120.000	288.0	V	-16.0
528.968000	27.85	35.56	7.71	2000.0	120.000	230.0	V	-4.0

Full Spectrum



- Preview Result 2-AVG [Preview Result 2.Result:2]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- * Critical_Freqs AVG [Critical_Freqs.Result:5]
- * Critical_Freqs PK+ [Critical_Freqs.Result:4]
- FCC PART 15 - PK [..]
- - - FCC PART 15 - AVG [..]
- ◆ Final_Result PK+ [Final_Result.Result:4]
- ◆ Final_Result AVG [Final_Result.Result:5]

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

Measurement results for Set.5:

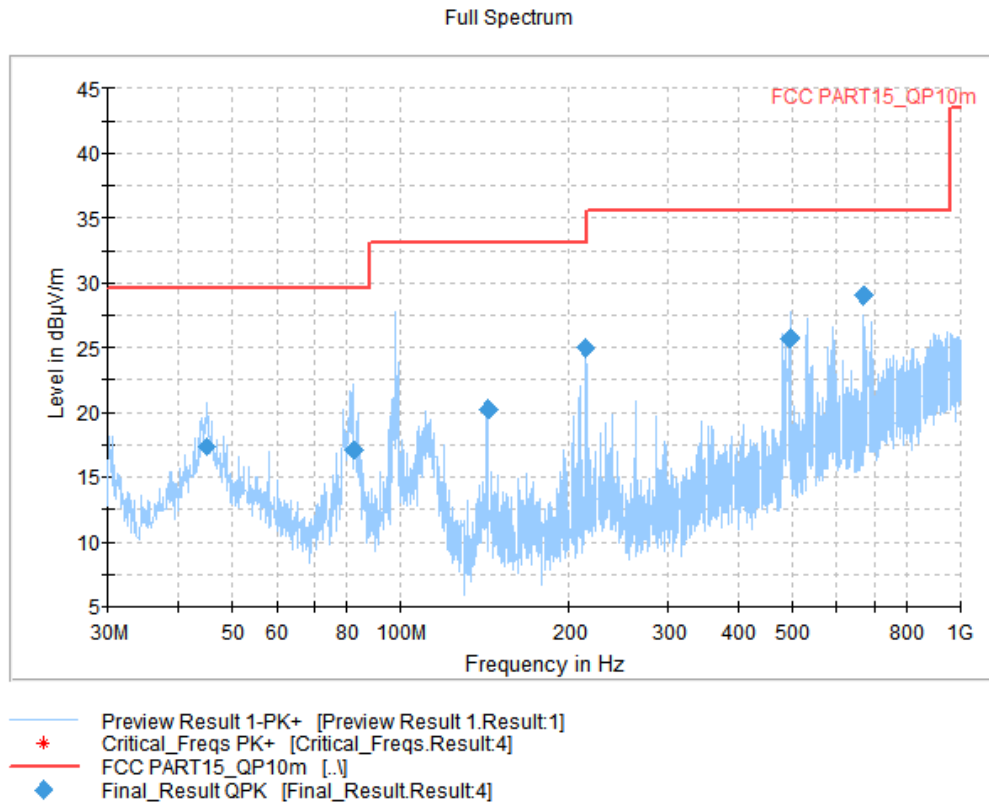


Fig A.9 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
45.035000	17.30	29.54	12.24	2000.0	120.000	300.0	V	157.0
82.477000	17.13	29.54	12.41	2000.0	120.000	116.0	V	99.0
143.005000	20.29	33.06	12.77	2000.0	120.000	122.0	V	30.0
214.494000	25.05	33.06	8.01	2000.0	120.000	114.0	V	2.0
495.018000	25.73	35.56	9.83	2000.0	120.000	302.0	V	9.0
673.110000	28.99	35.56	6.57	2000.0	120.000	183.0	V	-22.0

Full Spectrum

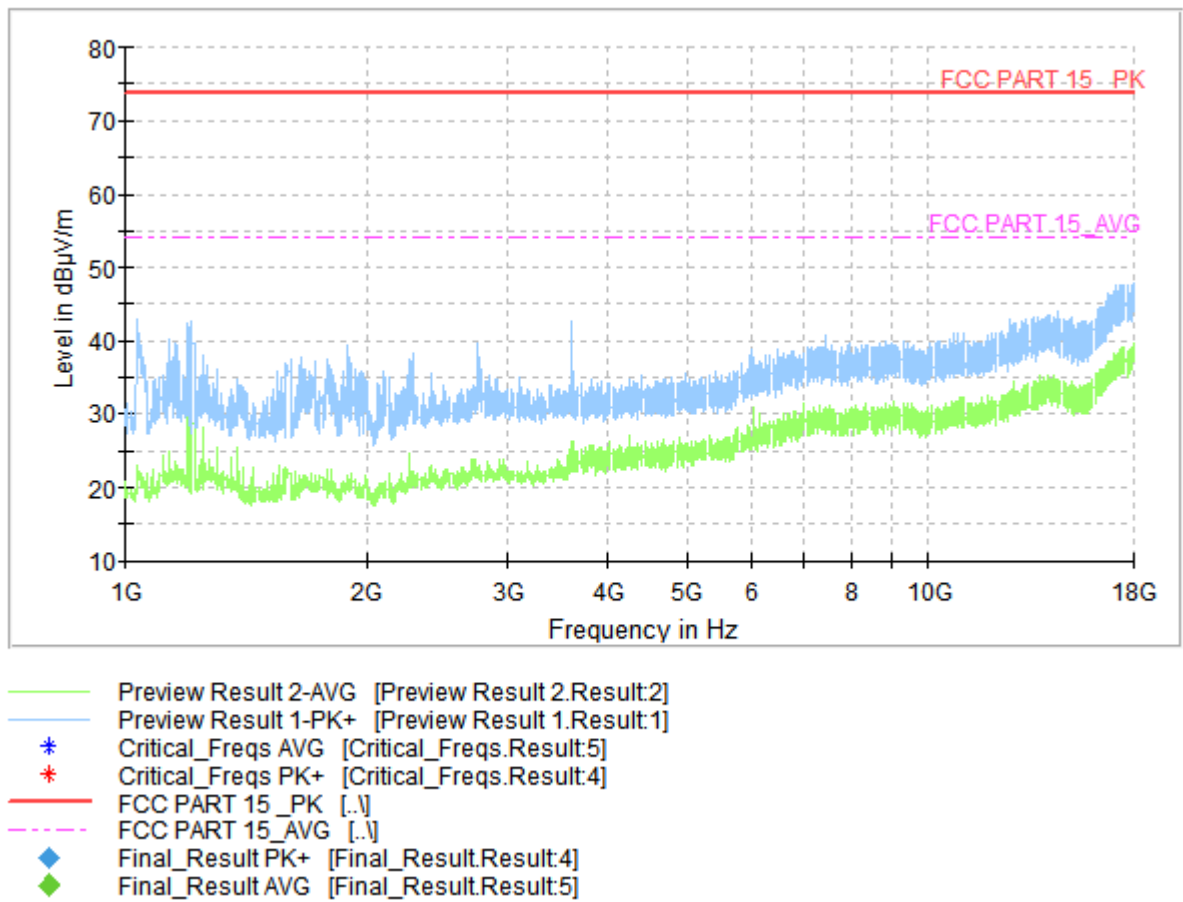


Fig A.10 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.6:

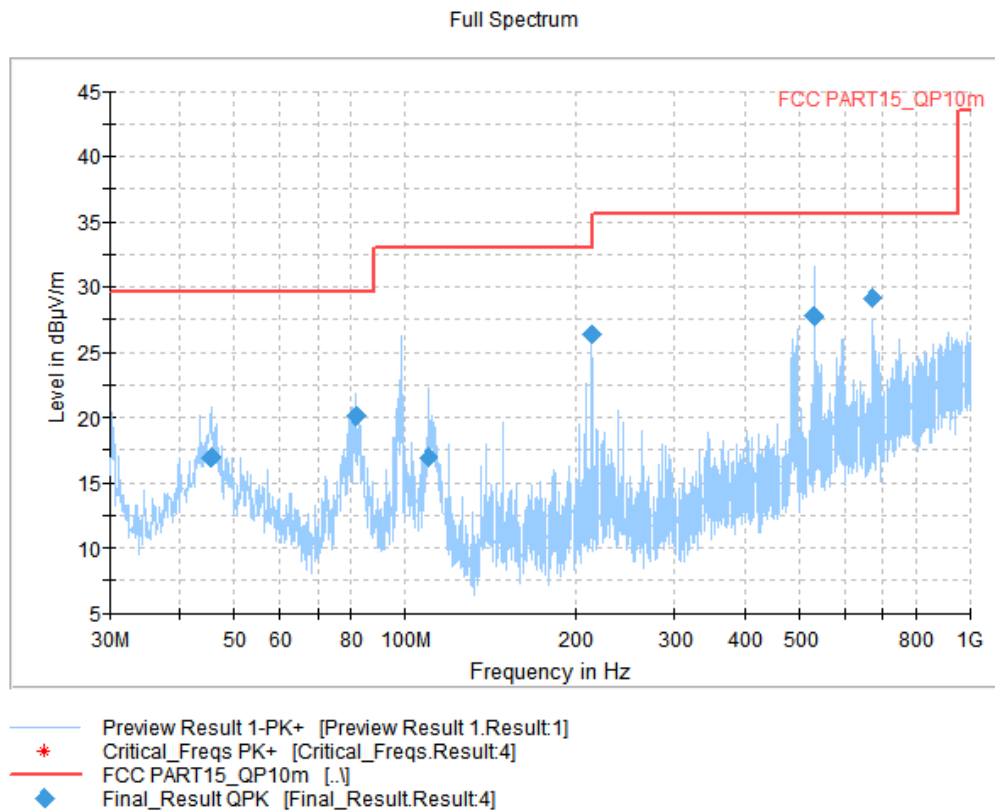
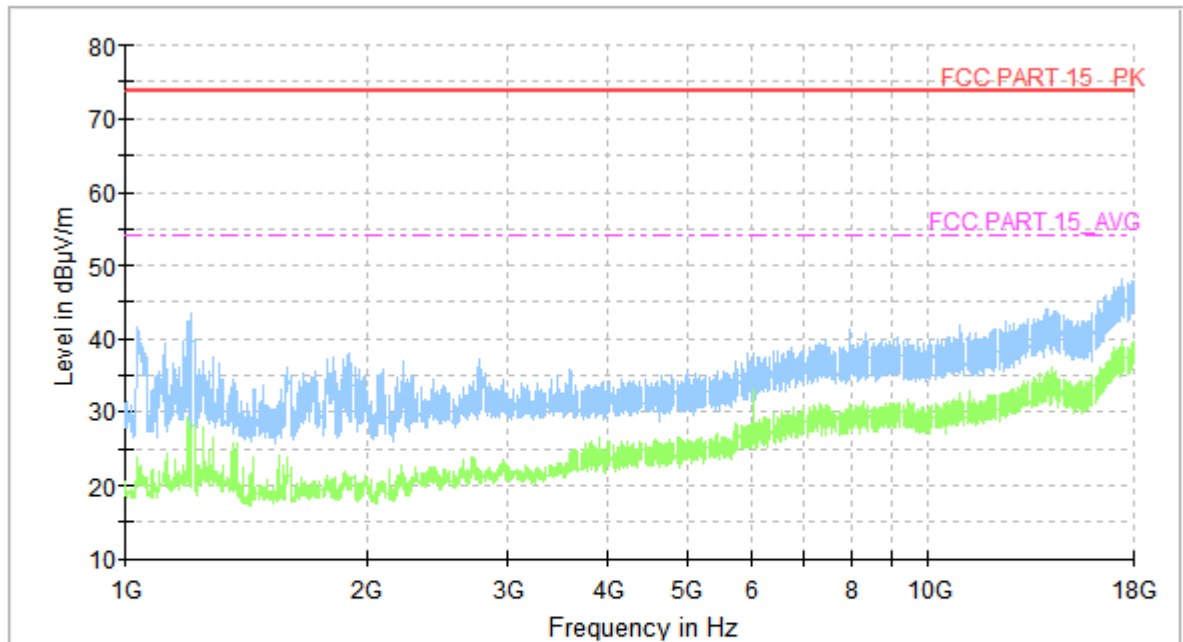


Fig A.11 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
45.229000	16.90	29.54	12.64	2000.0	120.000	212.0	V	151.0
81.895000	20.11	29.54	9.43	2000.0	120.000	182.0	V	272.0
110.122000	16.91	33.06	16.15	2000.0	120.000	103.0	V	210.0
214.397000	26.45	33.06	6.61	2000.0	120.000	123.0	V	7.0
528.871000	27.71	35.56	7.85	2000.0	120.000	230.0	V	-6.0
673.207000	29.19	35.56	6.37	2000.0	120.000	186.0	V	-23.0

Full Spectrum



- Preview Result 2-AVG [Preview Result 2.Result:2]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- * Critical_Freqs AVG [Critical_Freqs.Result:5]
- * Critical_Freqs PK+ [Critical_Freqs.Result:4]
- FCC PART 15 - PK [..]
- - - FCC PART 15 - AVG [..]
- ◆ Final_Result PK+ [Final_Result.Result:4]
- ◆ Final_Result AVG [Final_Result.Result:5]

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 (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

Measurement uncertainty: $U= 3.1 \text{ dB}$, $k=2$.

Charging Mode, Set.1:

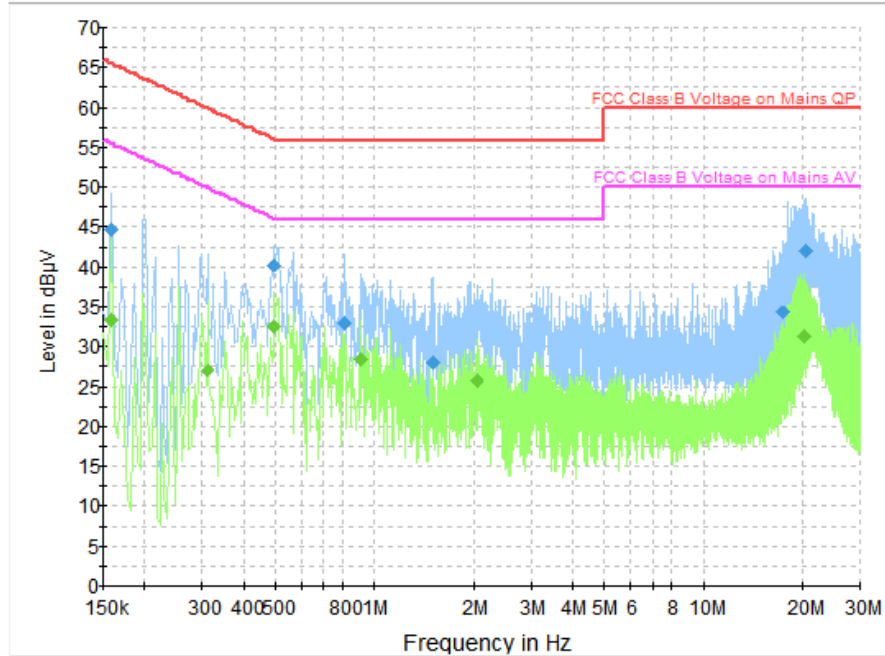


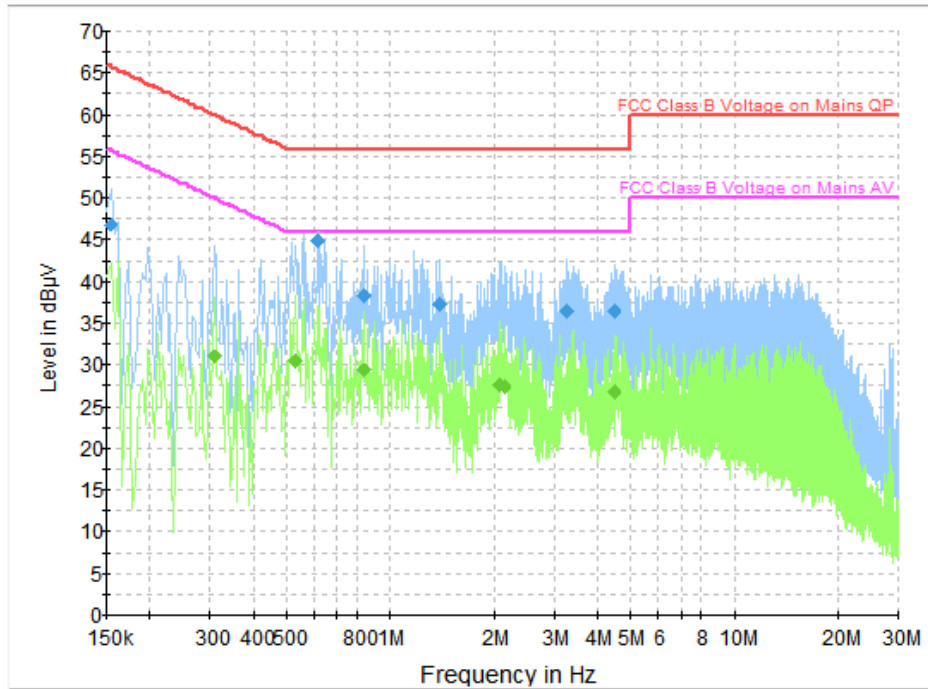
Fig A.13 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	44.7	2000.0	9.000	On	L1	20.0	20.8	65.6	
0.498000	40.2	2000.0	9.000	On	L1	19.9	15.8	56.0	
0.806000	33.0	2000.0	9.000	On	N	19.8	23.0	56.0	
1.514000	28.1	2000.0	9.000	On	N	19.8	27.9	56.0	
17.466000	34.3	2000.0	9.000	On	N	20.0	25.7	60.0	
20.378000	42.1	2000.0	9.000	On	L1	19.9	17.9	60.0	

Final Result 2

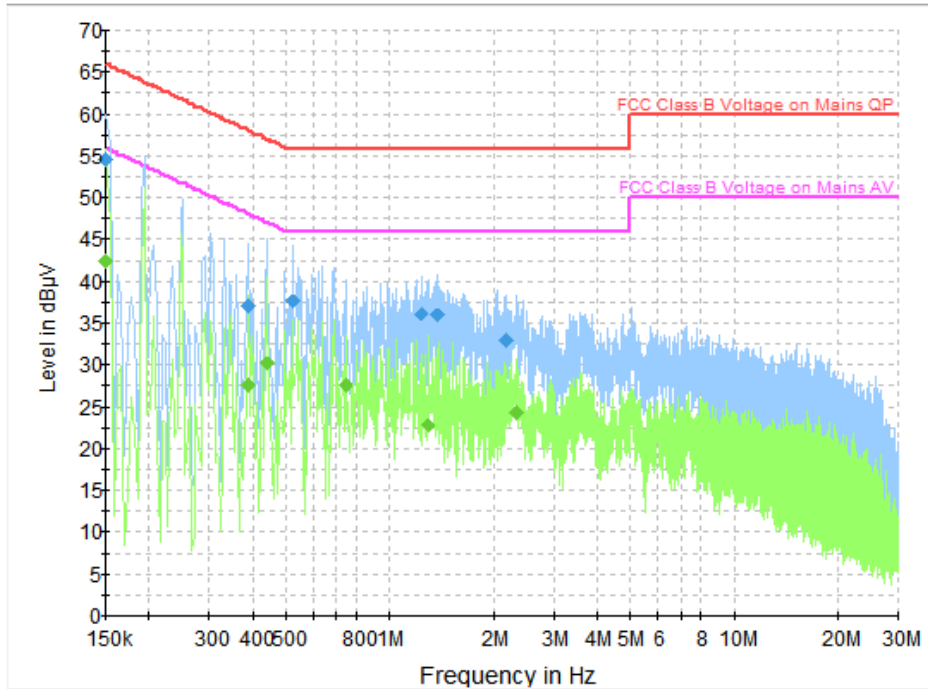
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	33.3	2000.0	9.000	On	L1	20.0	22.2	55.6	
0.310000	27.1	2000.0	9.000	On	N	19.9	22.8	50.0	
0.494000	32.5	2000.0	9.000	On	L1	19.9	13.6	46.1	
0.910000	28.5	2000.0	9.000	On	L1	19.6	17.5	46.0	
2.042000	25.7	2000.0	9.000	On	L1	19.5	20.3	46.0	
20.226000	31.4	2000.0	9.000	On	L1	19.9	18.6	50.0	

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
0.154000	47.0	2000.0	9.000	On	N	19.8	18.8	65.8	
0.614000	44.9	2000.0	9.000	On	L1	19.7	11.1	56.0	
0.834000	38.3	2000.0	9.000	On	L1	19.6	17.7	56.0	
1.386000	37.2	2000.0	9.000	On	L1	19.5	18.8	56.0	
3.278000	36.5	2000.0	9.000	On	L1	19.5	19.5	56.0	
4.486000	36.5	2000.0	9.000	On	L1	19.6	19.5	56.0	

Final Result 2

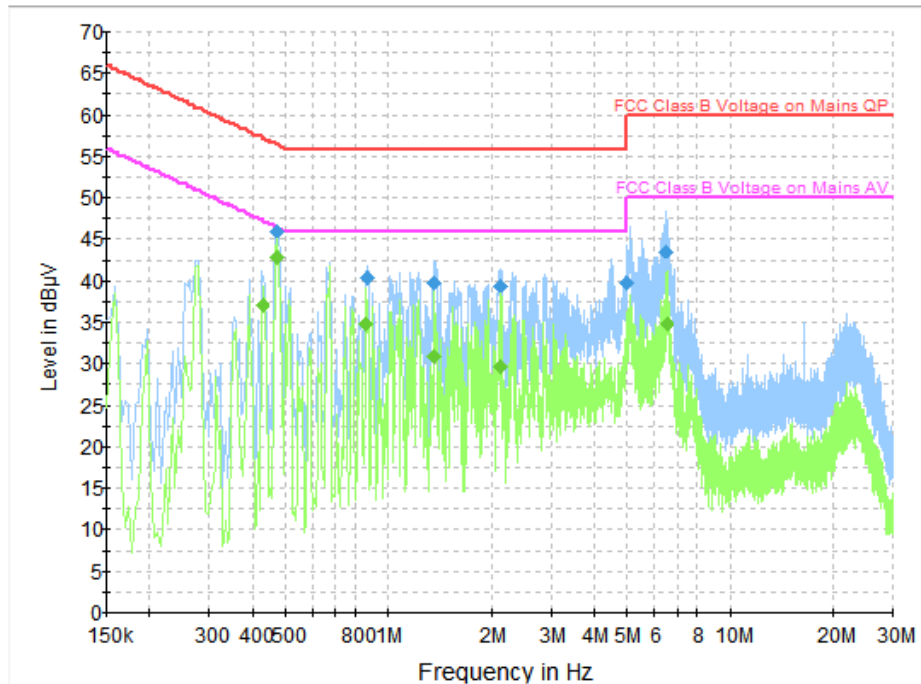
Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.306000	31.0	2000.0	9.000	On	N	19.9	19.1	50.1	
0.530000	30.6	2000.0	9.000	On	L1	19.9	15.4	46.0	
0.834000	29.4	2000.0	9.000	On	L1	19.6	16.6	46.0	
2.086000	27.5	2000.0	9.000	On	L1	19.5	18.5	46.0	
2.134000	27.4	2000.0	9.000	On	L1	19.5	18.6	46.0	
4.486000	26.7	2000.0	9.000	On	L1	19.6	19.3	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
0.150000	54.7	2000.0	9.000	On	L1	20.2	11.3	66.0	
0.386000	37.1	2000.0	9.000	On	L1	19.9	21.0	58.1	
0.522000	37.6	2000.0	9.000	On	L1	19.9	18.4	56.0	
1.238000	36.2	2000.0	9.000	On	N	19.8	19.8	56.0	
1.378000	36.0	2000.0	9.000	On	N	19.8	20.0	56.0	
2.186000	33.0	2000.0	9.000	On	L1	19.5	23.0	56.0	

Final Result 2

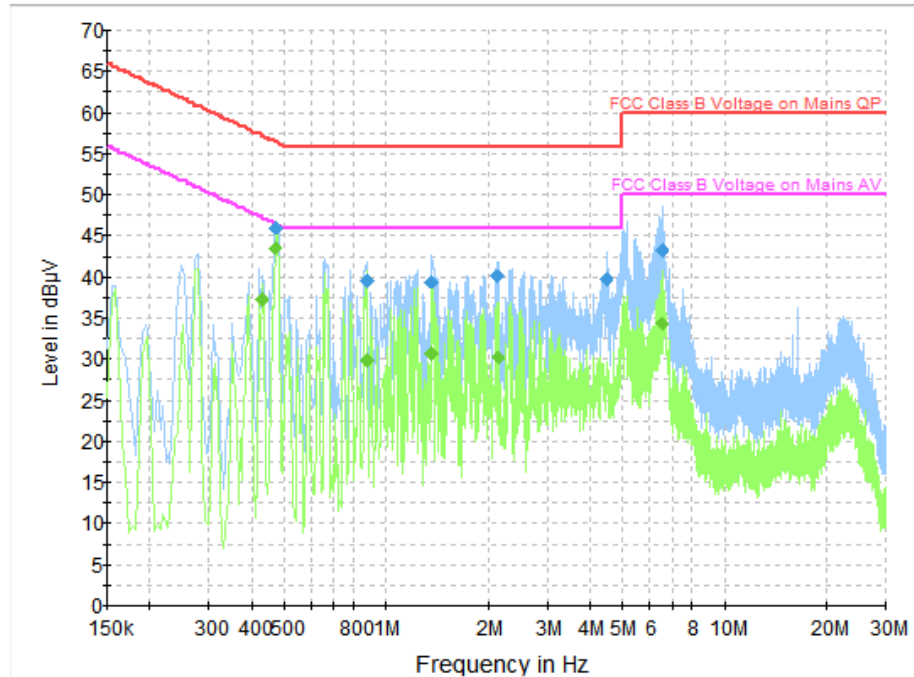
Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	42.4	2000.0	9.000	On	L1	20.2	13.6	56.0	
0.386000	27.5	2000.0	9.000	On	L1	19.9	20.7	48.1	
0.442000	30.2	2000.0	9.000	On	L1	19.9	16.8	47.0	
0.746000	27.6	2000.0	9.000	On	L1	19.7	18.4	46.0	
1.294000	22.8	2000.0	9.000	On	N	19.8	23.2	46.0	
2.322000	24.3	2000.0	9.000	On	L1	19.5	21.7	46.0	

USB Mode, Set.4:

Fig A.16 Conducted Emission from 150kHz to 30MHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.474000	46.0	2000.0	9.000	On	L1	19.9	10.4	56.4	
0.870000	40.5	2000.0	9.000	On	N	19.8	15.5	56.0	
1.358000	39.8	2000.0	9.000	On	N	19.8	16.2	56.0	
2.130000	39.4	2000.0	9.000	On	L1	19.5	16.6	56.0	
4.994000	39.8	2000.0	9.000	On	L1	19.6	16.2	56.0	
6.474000	43.5	2000.0	9.000	On	N	19.7	16.5	60.0	

Final Result 2

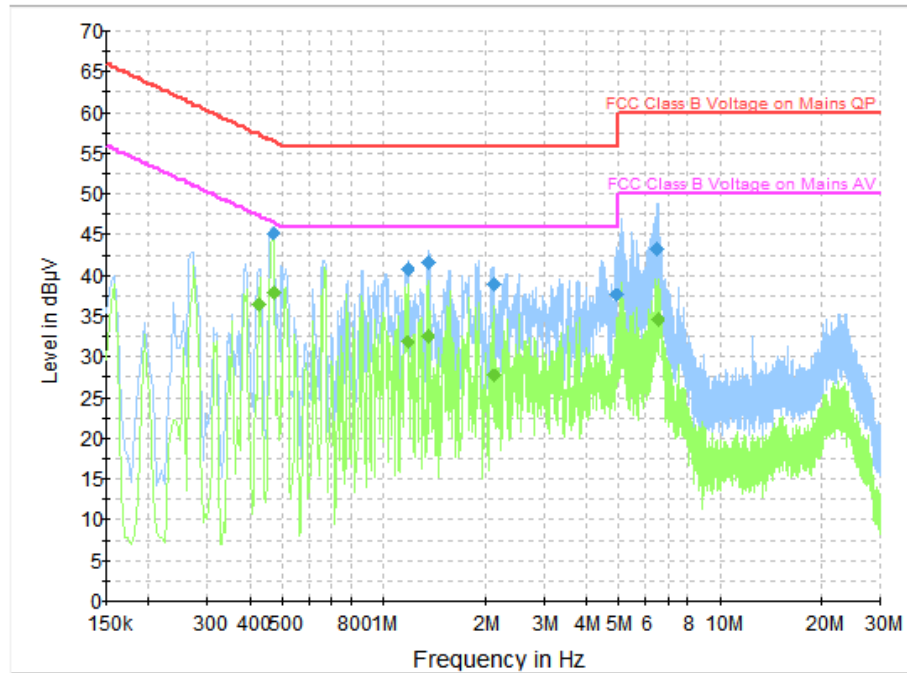
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.430000	37.2	2000.0	9.000	On	L1	19.9	10.1	47.3	
0.474000	42.9	2000.0	9.000	On	L1	19.9	3.6	46.4	
0.862000	34.8	2000.0	9.000	On	N	19.8	11.2	46.0	
1.362000	30.8	2000.0	9.000	On	N	19.8	15.2	46.0	
2.130000	29.8	2000.0	9.000	On	L1	19.5	16.2	46.0	
6.542000	34.9	2000.0	9.000	On	L1	19.5	15.1	50.0	

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
0.474000	46.0	2000.0	9.000	On	L1	19.9	10.4	56.4	
0.874000	39.6	2000.0	9.000	On	N	19.8	16.4	56.0	
1.358000	39.5	2000.0	9.000	On	L1	19.5	16.5	56.0	
2.126000	40.0	2000.0	9.000	On	N	19.8	16.0	56.0	
4.474000	39.7	2000.0	9.000	On	L1	19.6	16.3	56.0	
6.494000	43.3	2000.0	9.000	On	L1	19.5	16.7	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	37.2	2000.0	9.000	On	L1	19.9	10.0	47.3	
0.470000	43.6	2000.0	9.000	On	N	20.0	2.9	46.5	
0.874000	29.9	2000.0	9.000	On	N	19.8	16.1	46.0	
1.362000	30.7	2000.0	9.000	On	N	19.8	15.3	46.0	
2.138000	30.1	2000.0	9.000	On	N	19.8	15.9	46.0	
6.494000	34.4	2000.0	9.000	On	L1	19.5	15.6	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
0.470000	45.3	2000.0	9.000	On	N	20.0	11.2	56.5	
1.178000	40.8	2000.0	9.000	On	N	19.8	15.2	56.0	
1.362000	41.6	2000.0	9.000	On	L1	19.5	14.4	56.0	
2.130000	39.0	2000.0	9.000	On	L1	19.5	17.0	56.0	
4.958000	37.7	2000.0	9.000	On	N	19.7	18.3	56.0	
6.446000	43.3	2000.0	9.000	On	N	19.7	16.7	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	36.5	2000.0	9.000	On	N	19.9	10.8	47.3	
0.474000	37.9	2000.0	9.000	On	L1	19.9	8.5	46.4	
1.178000	31.8	2000.0	9.000	On	N	19.8	14.2	46.0	
1.354000	32.6	2000.0	9.000	On	L1	19.5	13.4	46.0	
2.130000	27.7	2000.0	9.000	On	L1	19.5	18.3	46.0	
6.510000	34.6	2000.0	9.000	On	L1	19.5	15.4	50.0	

END OF REPORT