FCC PART 15B
TEST REPORT

No. 24T04Z101463-018

for

POINTMOBILE CO., LTD

Mobile Computer

Model Name: PM452

with

Hardware Version: MP

Software Version: 452.00.XX

Issued Date: 2024-08-26

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:

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: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z101463-018	Rev.0	1st edition	2024-08-09
24T04Z101463-018	Rev.1	2nd edition	2024-08-26

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: 2024-07-16

Testing End Date: 2024-07-22

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:	POINTMOBILE CO., LTD
Address /Post:	A-26F, Building Gasan Publik 178, Digital-ro, Geumcheon-gu Seoul, 08513 Republic of Korea
City:	/
Postal Code:	/
Country:	Republic of Korea
Contact	Hanna Chae
Email	certi.manager@pointmobile.com
Telephone:	+82 10 7773 8827

2.2. Manufacturer Information

Company Name:	POINTMOBILE CO., LTD
Address /Post:	A-26F, Building Gasan Publik 178, Digital-ro, Geumcheon-gu Seoul, 08513 Republic of Korea
City:	/
Postal Code:	/
Country:	Republic of Korea
Contact	Hanna Chae
Email	certi.manager@pointmobile.com
Telephone:	+82 10 7773 8827

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

3.1. About EUT

Description	Mobile Computer
Model Name	PM452
FCC ID:	V2X-PM452

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
UT14a	356658610001989	MP	452.00.XX

*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	Model	Manufacturer
AE1-1	Battery1	451-BTEC	ZhuHai Gushine Electronic Technology Co.,Ltd
AE2	Charger	ICP12-050-2000D	Shenzhen Shi Ying Yuan Electronics Co.,Ltd

*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	Charger1+Camera +GSM 850 idle
Set.2	EUT1 + AE1-1 + AE2	Charger1+WCDMA B5 idle
Set.3	EUT1 + AE1-1 + Cable + PC	USB + LTE B5 idle

Note:

Equipment Under Test (EUT) is a model of mobile computer.

It supports

GSM Band	GSM 850/900 DCS1800 PCS1900
UMTS Band	FDD B1/2/4/5/6/8/19
LTE Band	FDD Bands 1/2/3/4/5/7/8/12/13/17/19/20/25/26/28, TDD Bands 38/40/41

It has MP3, Camera, USB memory, Bluetooth 5.2, GPS and WLAN functions. The EUT supports 802.11b/g/n/ax for 2.4GHz WLAN at 20MHz bandwidth, 802.11a/n/ac/ax for 5GHz and 5.8GHz WLAN , and 802.11ax for 6GHz.

The device contains receivers which tune and operate between 30MHz-960MHz in the following mode: GSM850, WCDMA850, LTE Band 5/12/13/17/19/20/26/28. 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. 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)**

6. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESW44	103144	R&S	2024-11-26	1 year
2	Test Receiver	ESCI 3	100344	R&S	2025-04-01	1 year
3	LISN	ENV216	101200	R&S	2025-05-16	1 year
4	EMI Antenna	VULB 9163	01223	SCHWARZBECK	2024-08-18	1 year
5	EMI Antenna	3115	00167250	ETS-Lindgren	2025-05-11	1 year

Test software information		
Test Item	Software	Version
Radiated Emission	EMC32	V11.50.00
Conducted Emission	EMC32	V8.53.00

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

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz

Shielded room utilized did not exceed following limits along the testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz－1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

7. Measurement Uncertainty

Where relevant, the following measurement uncertainty(worse case) levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Location 1: CTTL(huayuan North Road)

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.72dB(*k*=2)
	1GHz-18GHz	4.84dB(*k*=2)
Conducted Emission	150kHz-30MHz	AC Power Line: 3.08dB(*k*=2)

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 the other device for charging in OTG 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.

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.

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 = 4.84 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)
17749.420	47.60	-21.99	42.24	27.36	54.00	6.40	H
17702.160	47.40	-22.29	42.10	27.59	54.00	6.60	V
17746.360	47.20	-21.99	42.24	26.96	54.00	6.80	H
17719.160	47.10	-22.29	42.10	27.29	54.00	6.90	V
17738.540	47.10	-22.11	42.24	26.97	54.00	6.90	V
17627.360	47.10	-23.04	42.10	28.04	54.00	6.90	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)
17712.700	58.40	-22.29	42.10	38.59	74.00	15.60	V
17630.080	57.60	-23.04	42.10	38.54	74.00	16.40	H
17721.540	57.20	-22.11	42.10	37.21	74.00	16.80	H
17748.400	57.20	-21.99	42.24	36.96	74.00	16.80	H
17784.100	57.10	-22.57	42.24	37.43	74.00	16.90	V
17805.520	57.10	-22.85	42.24	37.72	74.00	16.90	H

Measurement results for Set.2:

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)
17726.300	46.10	-22.11	42.10	26.11	54.00	7.90	V
17731.740	45.80	-22.11	42.10	25.81	54.00	8.20	H
17644.700	45.60	-22.85	42.10	26.35	54.00	8.40	V
17738.880	45.60	-22.11	42.24	25.47	54.00	8.40	H
17741.600	45.60	-21.99	42.24	25.36	54.00	8.40	H
17772.200	45.50	-22.28	42.24	25.54	54.00	8.50	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)
17590.980	56.80	-23.41	42.10	38.11	74.00	17.20	V
17721.540	56.20	-22.11	42.10	36.21	74.00	17.80	H
17830.340	56.10	-23.14	42.24	37.00	74.00	17.90	V
17696.380	56.10	-22.48	42.10	36.48	74.00	17.90	H
17764.380	56.00	-22.28	42.24	36.04	74.00	18.00	H
17680.740	55.90	-22.48	42.10	36.28	74.00	18.10	H

Measurement results for Set.3:

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)
17643.680	45.00	-22.85	42.10	25.75	54.00	9.00	V
17744.320	44.80	-21.99	42.24	24.56	54.00	9.20	V
17998.640	44.80	-23.94	42.33	26.42	54.00	9.20	H
17624.640	44.80	-23.04	42.10	25.74	54.00	9.20	V
17750.780	44.80	-21.99	42.24	24.56	54.00	9.20	V
17727.660	44.70	-22.11	42.10	24.71	54.00	9.30	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)
17815.380	55.90	-22.85	42.24	36.52	74.00	18.10	V
17982.320	55.60	-23.94	42.33	37.22	74.00	18.40	H
17619.880	55.60	-23.23	42.10	36.73	74.00	18.40	H
17731.740	55.50	-22.11	42.10	35.51	74.00	18.50	V
17771.520	55.30	-22.28	42.24	35.34	74.00	18.70	H
17704.200	55.30	-22.29	42.10	35.49	74.00	18.70	H

Measurement results for Set.1:

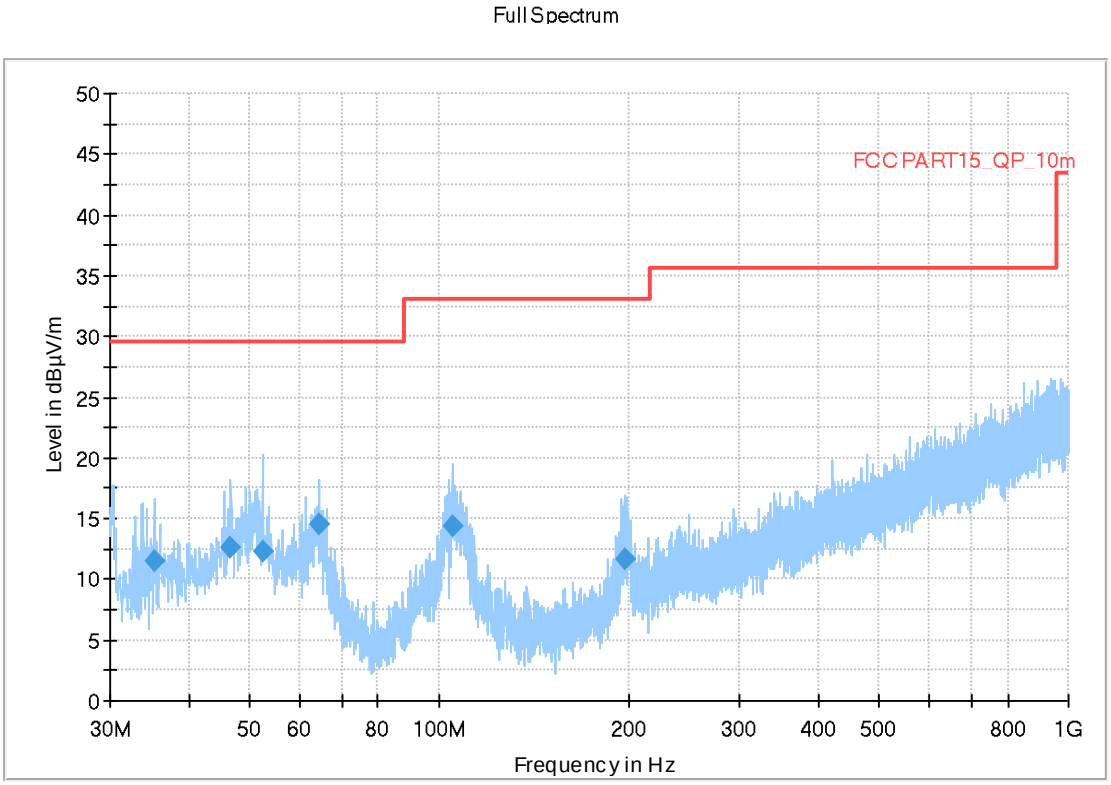

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
35.238000	11.55	29.54	17.99	120.000	300.0	V	45.0
46.684000	12.57	29.54	16.97	120.000	225.0	V	40.0
52.407000	12.31	29.54	17.23	120.000	123.0	V	285.0
64.386500	14.59	29.54	14.95	120.000	275.0	V	45.0
104.835500	14.31	33.06	18.75	120.000	213.0	V	144.0
196.840000	11.70	33.06	21.36	120.000	125.0	V	69.0

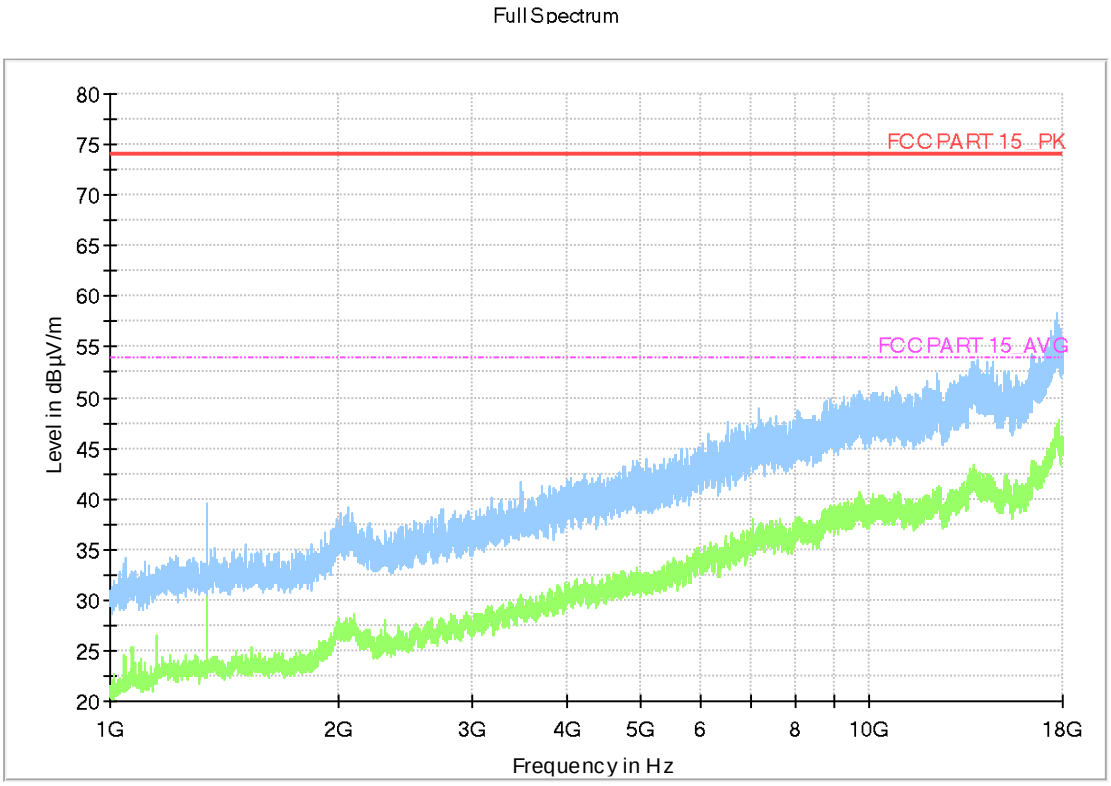

Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2:

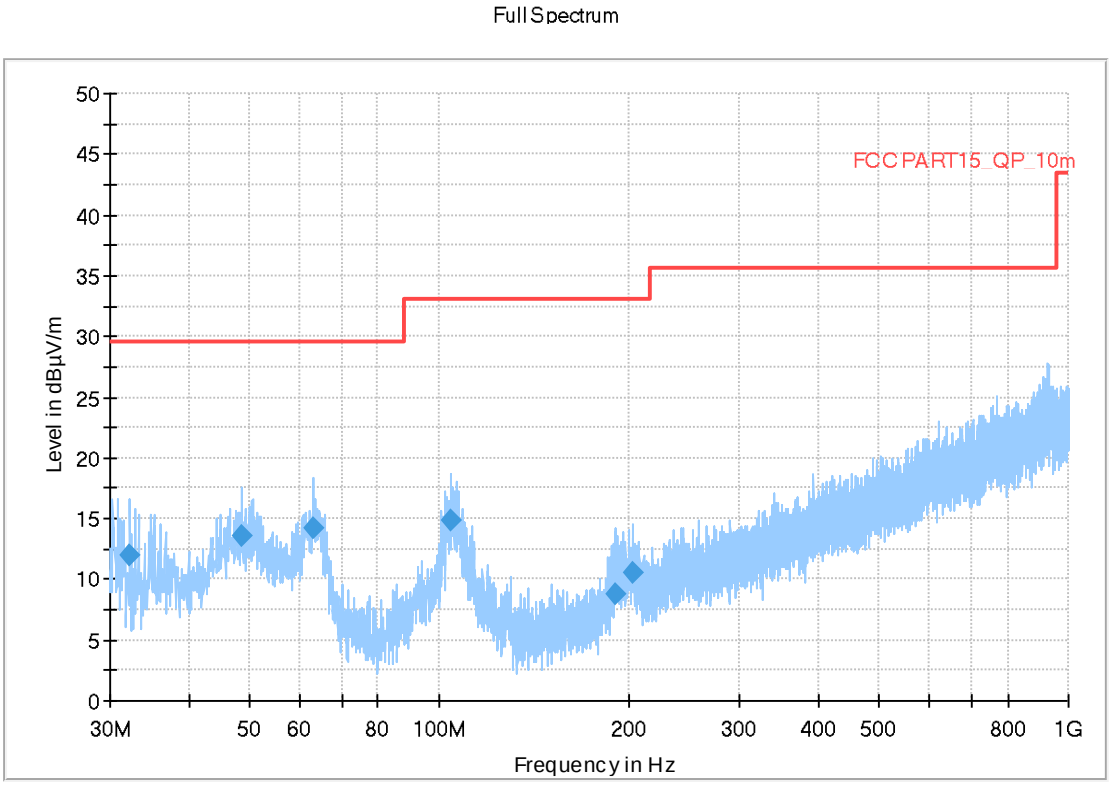

Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.231000	11.93	29.54	17.61	120.000	275.0	V	45.0
48.624000	13.62	29.54	15.92	120.000	115.0	V	-15.0
62.980000	14.26	29.54	15.28	120.000	175.0	V	310.0
104.350500	14.91	33.06	18.15	120.000	104.0	V	135.0
190.389500	8.77	33.06	24.29	120.000	123.0	V	195.0
203.096500	10.55	33.06	22.51	120.000	100.0	V	-8.0

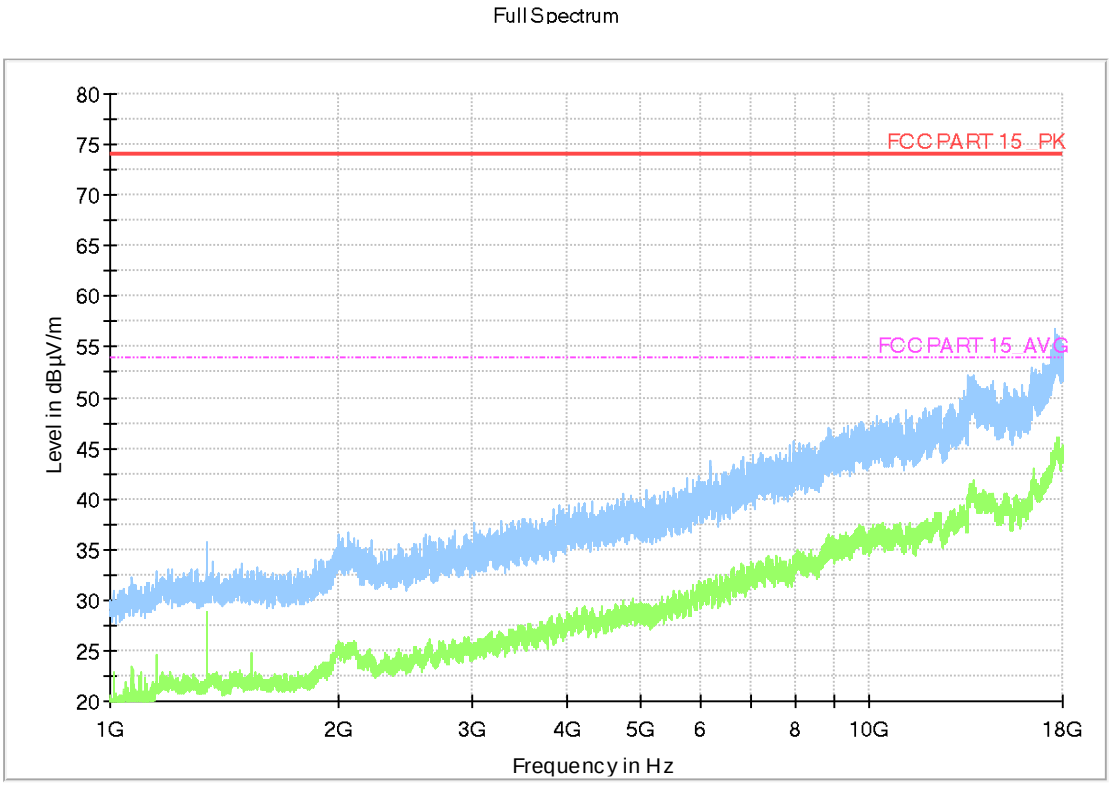

Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

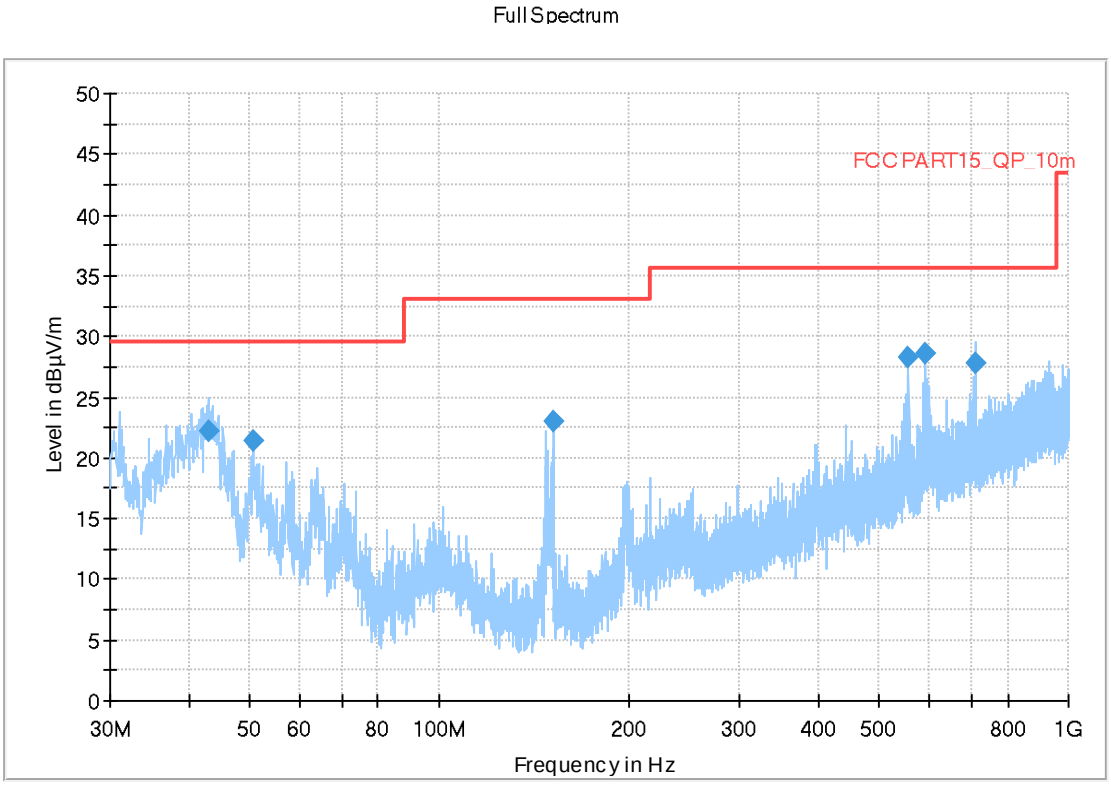

Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
43.095000	22.28	29.54	7.26	120.000	290.0	V	89.0
50.612500	21.37	29.54	8.17	120.000	100.0	V	22.0
151.977500	23.05	33.06	10.01	120.000	176.0	V	-36.0
557.340500	28.34	35.56	7.22	120.000	275.0	V	-44.0
592.212000	28.53	35.56	7.03	120.000	225.0	V	315.0
709.533500	27.86	35.56	7.70	120.000	190.0	V	301.0

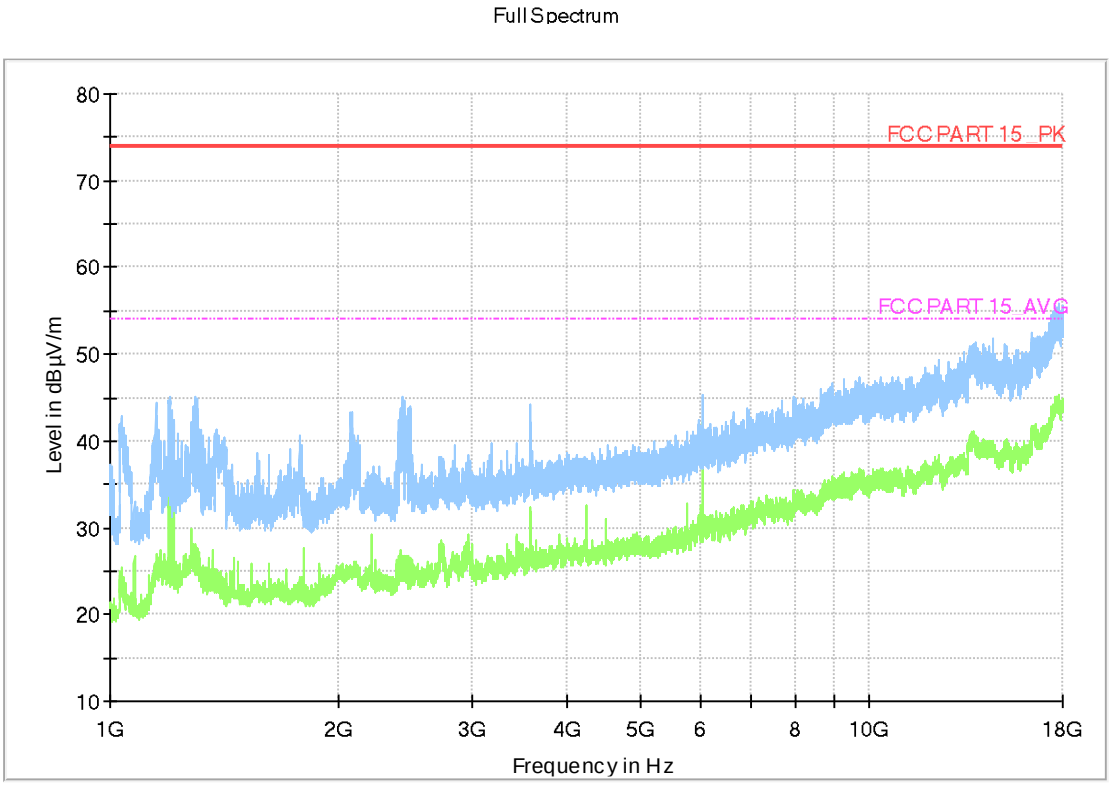

Fig A.6 Radiated Emission from 1GHz to 18GHz

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*= 3.08 dB, *k*=2.

Charging Mode, Set.1:

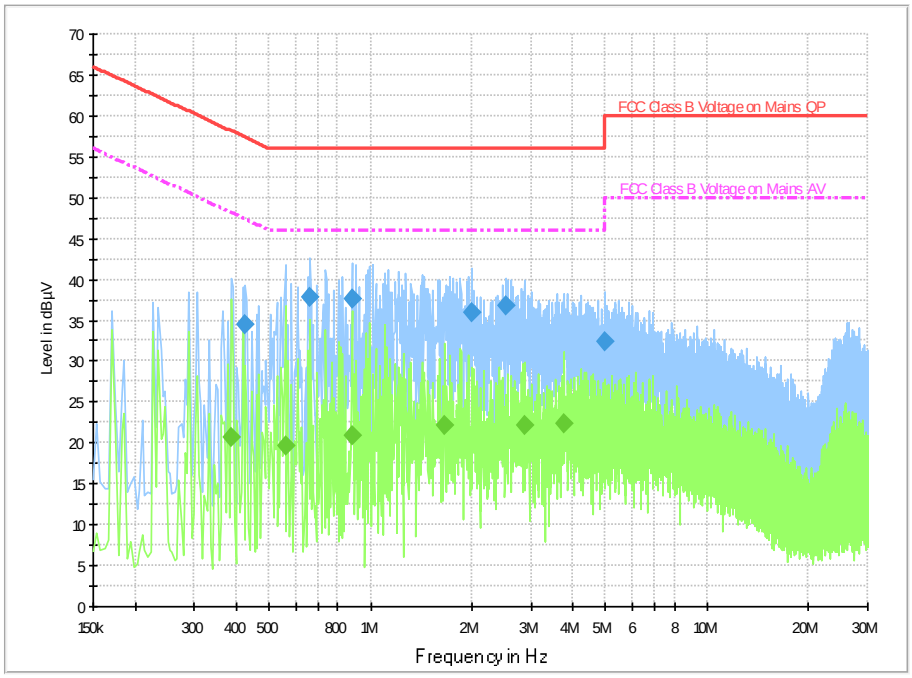

Fig A.7 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.426000	34.5	2000.0	9.000	On	L1	20.0	22.9	57.3	
0.662000	37.8	2000.0	9.000	On	L1	20.0	18.2	56.0	
0.882000	37.6	2000.0	9.000	On	L1	19.9	18.4	56.0	
1.990000	36.0	2000.0	9.000	On	L1	19.8	20.0	56.0	
2.518000	36.7	2000.0	9.000	On	L1	19.8	19.3	56.0	
4.990000	32.3	2000.0	9.000	On	L1	19.8	23.7	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.386000	20.7	2000.0	9.000	On	L1	19.9	27.4	48.1	
0.558000	19.7	2000.0	9.000	On	N	19.9	26.3	46.0	
0.882000	20.9	2000.0	9.000	On	L1	19.9	25.1	46.0	
1.666000	22.2	2000.0	9.000	On	L1	19.8	23.8	46.0	
2.858000	22.1	2000.0	9.000	On	L1	19.8	23.9	46.0	
3.750000	22.4	2000.0	9.000	On	L1	19.8	23.6	46.0	

Charging Mode, Set.2:

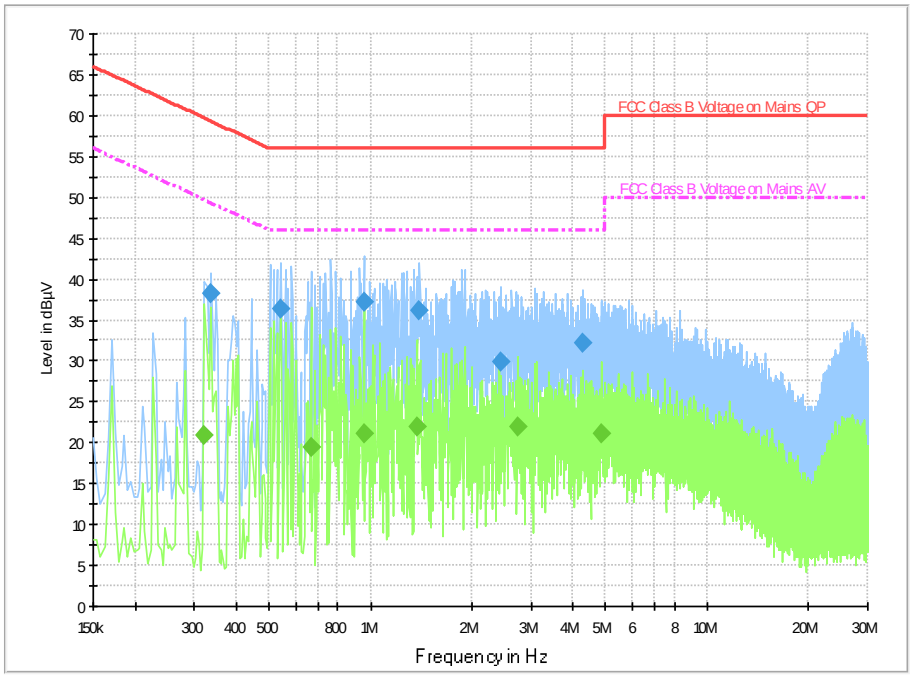

Fig A.8 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.334000	38.1	2000.0	9.000	On	L1	19.9	21.2	59.4	
0.542000	36.3	2000.0	9.000	On	L1	20.0	19.7	56.0	
0.954000	37.3	2000.0	9.000	On	L1	19.9	18.7	56.0	
1.398000	36.2	2000.0	9.000	On	L1	19.9	19.8	56.0	
2.430000	29.9	2000.0	9.000	On	N	19.6	26.1	56.0	
4.254000	32.3	2000.0	9.000	On	L1	19.8	23.7	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.322000	20.9	2000.0	9.000	On	N	19.8	28.7	49.7	
0.666000	19.5	2000.0	9.000	On	L1	20.0	26.5	46.0	
0.954000	21.2	2000.0	9.000	On	L1	19.9	24.8	46.0	
1.370000	22.0	2000.0	9.000	On	L1	19.9	24.0	46.0	
2.754000	21.8	2000.0	9.000	On	L1	19.8	24.2	46.0	
4.850000	21.1	2000.0	9.000	On	L1	19.8	24.9	46.0	

USB Mode, Set.3:

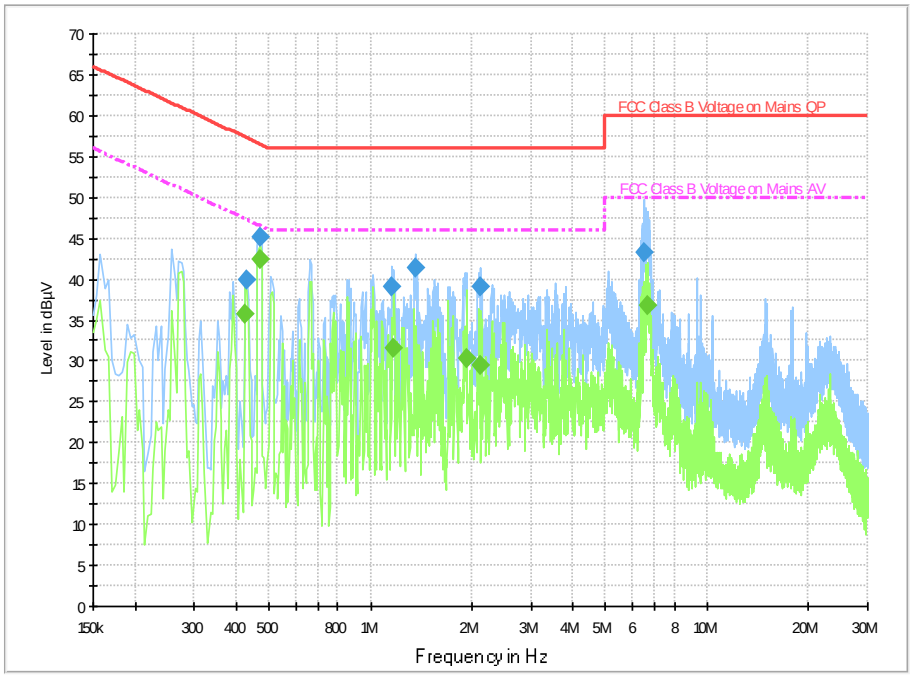

Fig A.9 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.430000	39.9	2000.0	9.000	On	L1	20.0	17.4	57.3	
0.470000	45.1	2000.0	9.000	On	L1	20.0	11.4	56.5	
1.162000	39.1	2000.0	9.000	On	L1	19.9	16.9	56.0	
1.358000	41.4	2000.0	9.000	On	L1	19.9	14.6	56.0	
2.126000	39.0	2000.0	9.000	On	N	19.6	17.0	56.0	
6.502000	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	35.8	2000.0	9.000	On	N	19.9	11.5	47.3	
0.470000	42.5	2000.0	9.000	On	N	19.9	4.1	46.5	
1.174000	31.6	2000.0	9.000	On	L1	19.9	14.4	46.0	
1.926000	30.3	2000.0	9.000	On	L1	19.8	15.7	46.0	
2.126000	29.4	2000.0	9.000	On	N	19.6	16.6	46.0	
6.646000	36.8	2000.0	9.000	On	N	19.7	13.2	50.0	

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