FCC PART 15B
TEST REPORT

No. I22Z60248-EMC01

for

Shenzhen Tinno Mobile Technology Corp.

Smart phone

Model name: U616AT

FCC ID: XD6U616AT

with

Hardware Version: V1.0

Software Version: U616ATV01.01.10

Issued Date: 2022-05-20

Note:

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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z60248-EMC01	Rev.0	1st edition	2022-04-15
I22Z60248-EMC01	Rev.1	2nd edition	2022-05-20

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: 2022-03-22

Testing End Date: 2022-04-06

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:	Shenzhen Tinno Mobile Technology Corp.
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Contact Email	xiaoping.li@tinno.com
Telephone:	0755-86095550
Fax:	0755-86095551

2.2. Manufacturer Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address:	TINNO Building, No.33, Xiandong Rd, Xili, Nanshan District, Shenzhen, Guangdong Province,PRC
Contact Person	xiaoping.li
Contact Email	xiaoping.li@tinno.com
Telephone:	0755-86095550
Fax:	0755-86095551

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

3.1. About EUT

Description	Smart phone
Model Name	U616AT
FCC ID:	XD6U616AT

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	860325060015823	V1.0	U616ATV01.01.10

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	Battery	/	/
AE2	Charger	/	/
AE3	USB Cable	/	/

AE1

Model	PT34H406082J
Manufacturer	Ningbo Veken Battery Co., Ltd.
Capacity	3310mAh
Nominal Voltage	3.85V

AE2

Model	TN-050200U3
Manufacturer	Dong Guan City GangQi Electronic Co.,Ltd
Length of cable	/

AE3

Model	336275
Manufacturer	SUNTOPS ELECTRONICS CO.,LTD
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 + AE2 + AE3	Charger1 + REAR Camera + GSM 850 idle
Set.2	EUT1 + AE1 + AE2 + AE3	Charger1 + MP4 + WCDMA 850 idle
Set.3	EUT1 + AE1 + AE2	USB + front camera +LTE B5 idle

Note:

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

It supports

GSM Band	PCS1900/GSM850
UMTS Band	FDD Band II(W1900) /FDD Band IV(W1700)/FDD Band V(W850)
LTE Band	FDD2/FDD4/FDD5/FDD12/FDD25/ FDD26/TDD41/FDD66/FDD71

It has MP3, Camera, USB memory, Bluetooth 5.0, Wi-Fi (802.11a/b/g/n/ac, 802.11n supports 20MHz, 802.11ac supports 20MHz, 40MHz and 80MHz bandwidth) ,GPS functions

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE Band 5/12/26/66. 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 M
Ground system resistance	< 4
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 M
Ground system resistance	< 4

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	ESW44	103023	R&S	2022-10-28	1 Year
2	Test Receiver	ESW44	103015	R&S	2022-09-03	1 Year
3	LISN	ENV216	101200	R&S	2022-05-30	1 year
4	Universal Radio Communication Tester	CMW500	116588	R&S	2022-12-20	1 year
5	Test Receiver	ESCI 7	100766	R&S	2022-04-09	1 Year
6	EMI Antenna	VULB 9163	483	SCHWARZBECK	2022-08-24	1 year
7	EMI Antenna	3115	00167250	ETS-Lindgren	2022-07-01	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)
17985.040	40.10	-29.06	46.66	22.50	54.00	13.90	V
17961.580	39.70	-29.06	46.66	22.10	54.00	14.30	V
17991.160	39.70	-29.06	46.66	22.10	54.00	14.30	V
17949.340	39.60	-28.94	46.66	21.88	54.00	14.40	V
17959.200	39.60	-28.94	46.66	21.88	54.00	14.40	H
17940.500	39.60	-28.94	46.66	21.88	54.00	14.40	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)
17780.020	52.10	-29.89	45.95	36.03	74.00	21.90	V
17991.500	51.50	-29.06	46.66	33.90	74.00	22.50	V
17977.900	51.40	-29.06	46.66	33.80	74.00	22.60	H
17940.840	51.30	-28.94	46.66	33.58	74.00	22.70	V
17187.060	50.90	-29.49	42.36	38.02	74.00	23.10	H
17620.560	50.90	-29.40	45.25	35.05	74.00	23.10	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)
17864.340	39.80	-29.39	45.95	23.24	54.00	14.20	V
17974.500	39.80	-29.06	46.66	22.20	54.00	14.20	V
17970.420	39.70	-29.06	46.66	22.10	54.00	14.30	V
17838.840	39.70	-29.68	45.95	23.42	54.00	14.30	H
17956.140	39.60	-28.94	46.66	21.88	54.00	14.40	V
17972.120	39.50	-29.06	46.66	21.90	54.00	14.50	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)
17917.040	51.30	-29.33	46.66	33.97	74.00	22.70	V
17994.220	51.30	-29.06	46.66	33.70	74.00	22.70	H
17366.240	51.00	-29.97	43.36	37.61	74.00	23.00	H
17668.500	51.00	-29.90	45.25	35.65	74.00	23.00	H
17954.780	51.00	-28.94	46.66	33.28	74.00	23.00	V
17750.100	50.90	-29.61	45.95	34.56	74.00	23.10	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)
6053.420	41.40	-37.82	34.40	44.82	54.00	12.60	V
17968.720	40.30	-29.06	46.66	22.70	54.00	13.70	H
17951.040	40.20	-28.94	46.66	22.48	54.00	13.80	V
17359.780	40.20	-29.97	43.36	26.81	54.00	13.80	V
17971.100	40.10	-29.06	46.66	22.50	54.00	13.90	V
17974.160	40.00	-29.06	46.66	22.40	54.00	14.00	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)
17204.740	51.70	-29.49	42.36	38.83	74.00	22.30	V
17951.720	51.50	-28.94	46.66	33.78	74.00	22.50	V
17796.000	51.40	-29.89	45.95	35.33	74.00	22.60	V
17962.260	51.40	-29.06	46.66	33.80	74.00	22.60	V
17948.660	51.40	-28.94	46.66	33.68	74.00	22.60	V
17537.940	51.30	-29.32	44.35	36.27	74.00	22.70	H

Measurement results for Set.1:

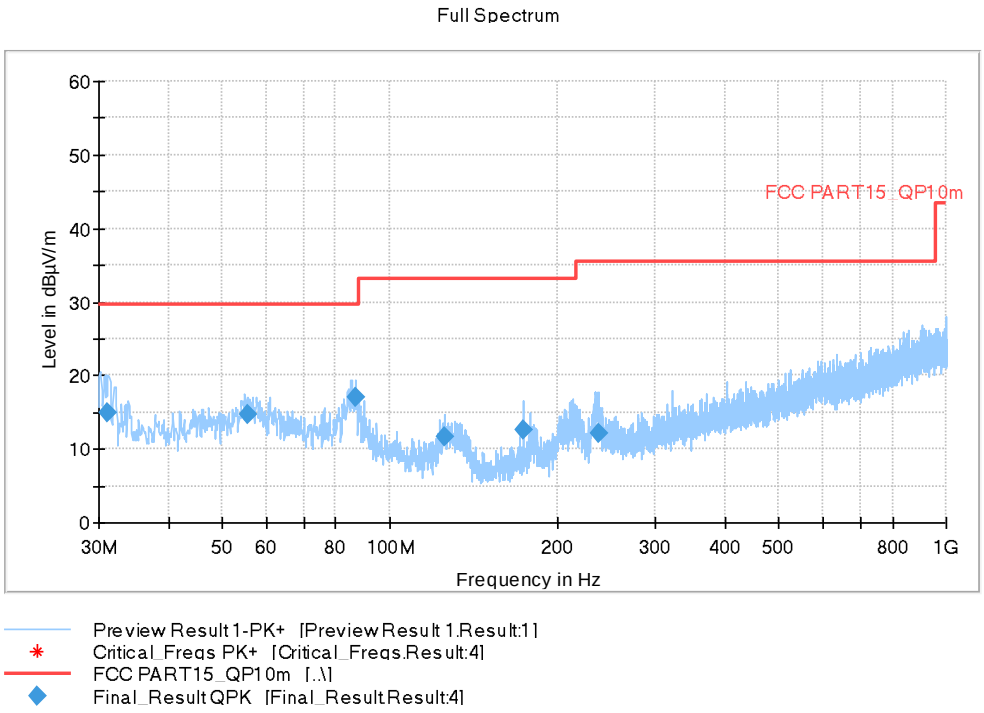

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
31.164000	15.02	29.54	14.52	2000.0	120.000	100.0	V	240.0
55.511000	14.77	29.54	14.77	2000.0	120.000	187.0	V	30.0
86.745000	17.15	29.54	12.39	2000.0	120.000	112.0	V	-30.0
125.448000	11.64	33.06	21.42	2000.0	120.000	112.0	V	30.0
174.045000	12.57	33.06	20.49	2000.0	120.000	111.0	V	60.0
237.483000	12.05	35.56	23.51	2000.0	120.000	100.0	V	210.0

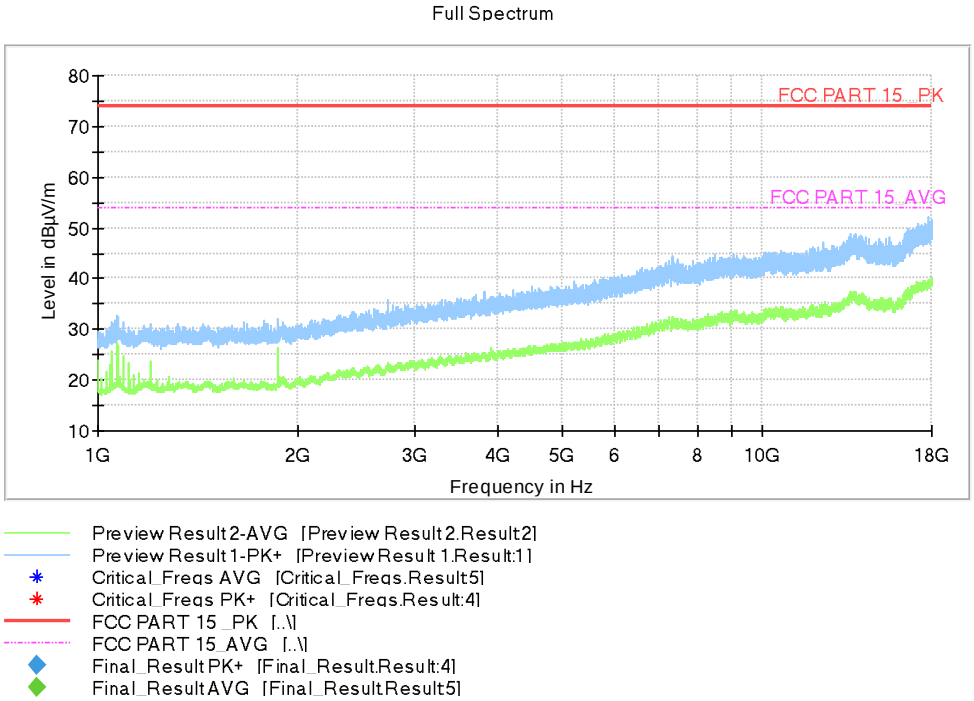

Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2:

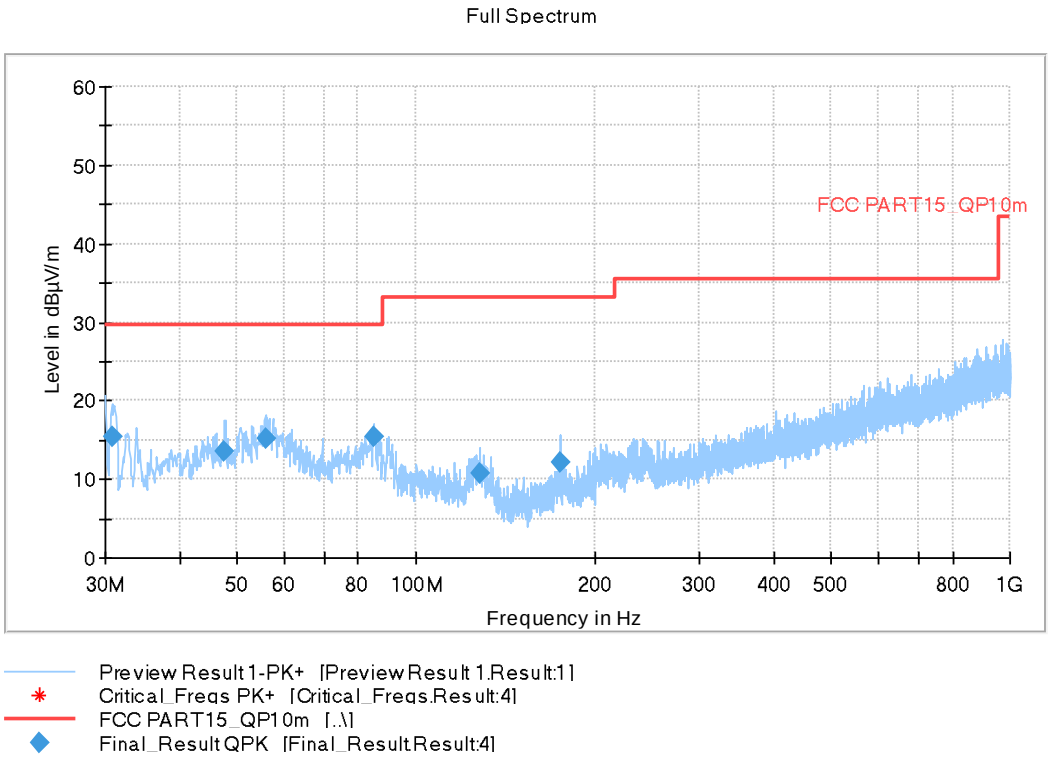

Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.776000	15.50	29.54	14.04	2000.0	120.000	187.0	V	120.0
47.654000	13.43	29.54	16.11	2000.0	120.000	100.0	V	100.0
55.802000	15.15	29.54	14.39	2000.0	120.000	190.0	V	120.0
85.193000	15.43	29.54	14.11	2000.0	120.000	100.0	V	300.0
127.873000	10.79	33.06	22.27	2000.0	120.000	112.0	V	120.0
174.918000	12.25	33.06	20.81	2000.0	120.000	125.0	V	30.0

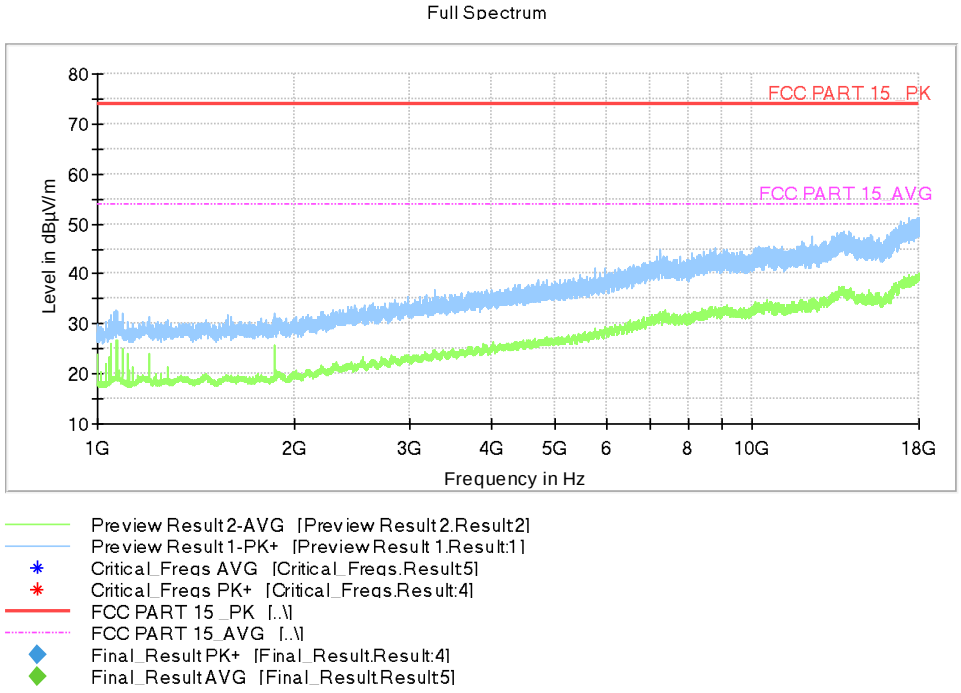

Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

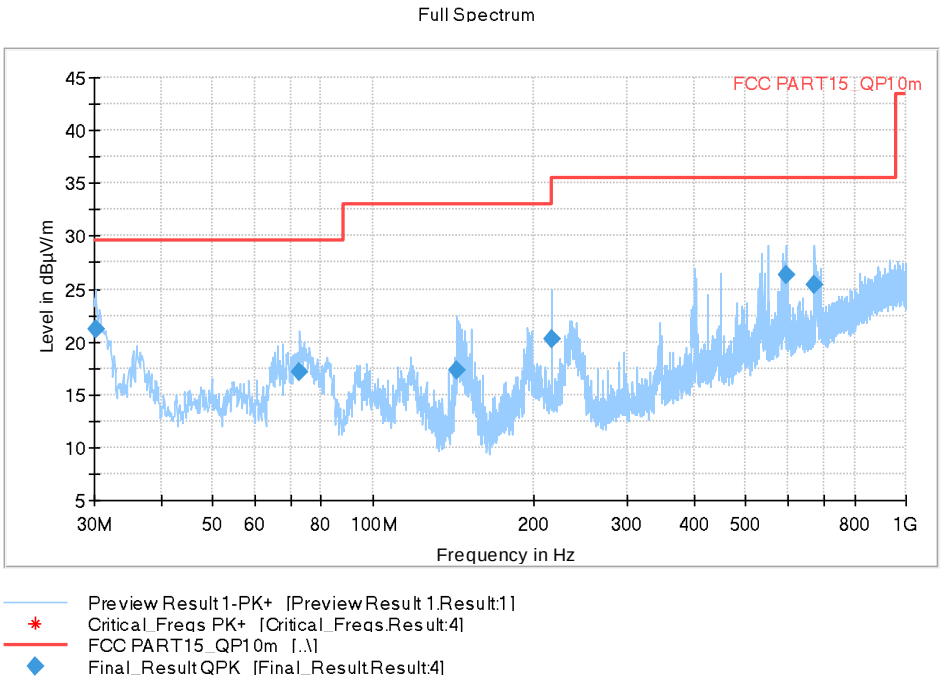

Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.194000	21.24	29.54	8.30	2000.0	120.000	185.0	V	187.0
72.971000	17.18	29.54	12.36	2000.0	120.000	187.0	V	147.0
143.878000	17.29	33.06	15.77	2000.0	120.000	110.0	V	206.0
215.949000	20.22	33.06	12.84	2000.0	120.000	213.0	V	187.0
595.316000	26.25	35.56	9.31	2000.0	120.000	225.0	V	33.0
674.759000	25.45	35.56	10.11	2000.0	120.000	193.0	V	10.0

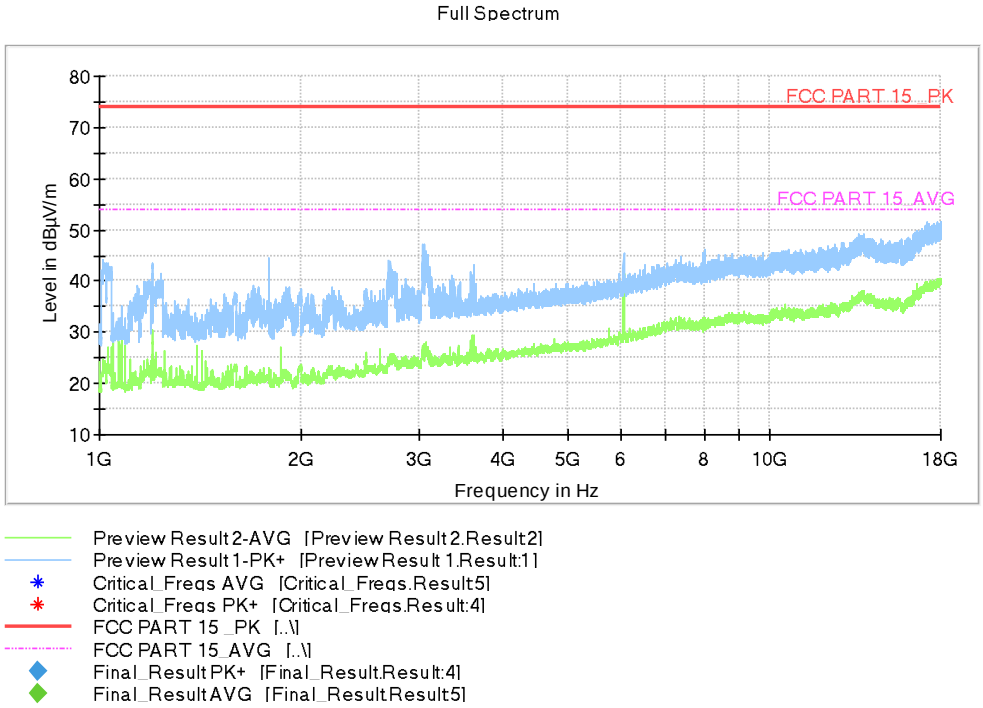

Fig A.6 Radiated Emission from 1GHz to 18GHz

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*= 3.1 dB, *k*=2.

Charging Mode, Set.1:

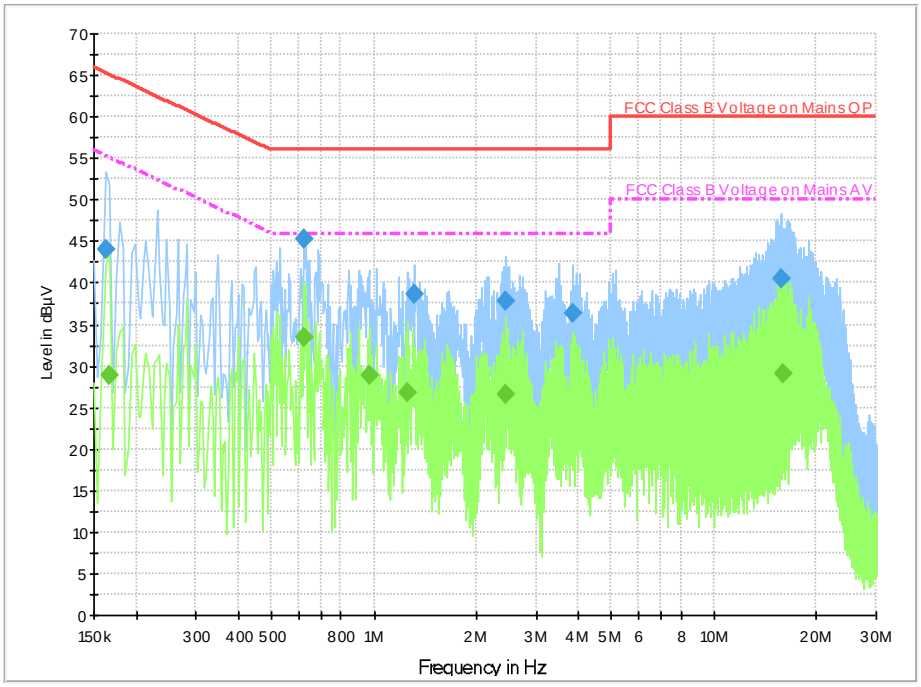

Fig A.7 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.162000	44.1	5000.0	9.000	On	L1	20.0	21.3	65.4	
0.622000	45.4	5000.0	9.000	On	L1	19.7	10.6	56.0	
1.314000	38.6	5000.0	9.000	On	L1	19.5	17.4	56.0	
2.430000	37.9	5000.0	9.000	On	L1	19.5	18.1	56.0	
3.850000	36.4	5000.0	9.000	On	L1	19.5	19.6	56.0	
15.770000	40.5	5000.0	9.000	On	N	20.0	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
0.166000	28.8	5000.0	9.000	On	N	19.7	26.3	55.2	
0.622000	33.4	5000.0	9.000	On	L1	19.7	12.6	46.0	
0.970000	29.0	5000.0	9.000	On	L1	19.6	17.0	46.0	
1.250000	26.8	5000.0	9.000	On	L1	19.5	19.2	46.0	
2.430000	26.6	5000.0	9.000	On	L1	19.5	19.4	46.0	
15.950000	29.1	5000.0	9.000	On	L1	19.9	20.9	50.0	

Charging Mode, Set.2:

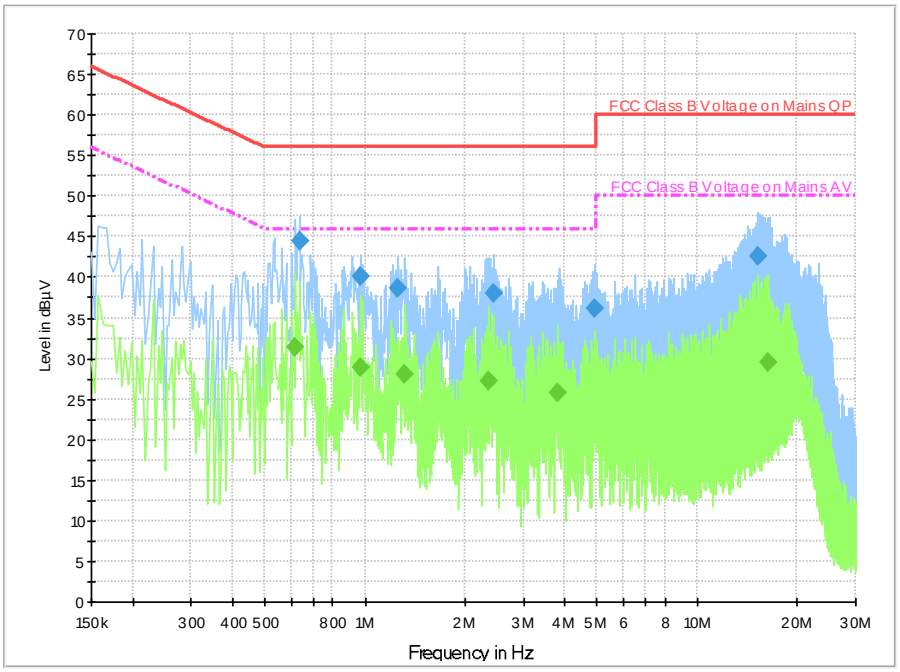

Fig A.8 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.634000	44.4	5000.0	9.000	On	L1	19.7	11.6	56.0	
0.966000	40.0	5000.0	9.000	On	L1	19.6	16.0	56.0	
1.262000	38.6	5000.0	9.000	On	L1	19.5	17.4	56.0	
2.434000	38.0	5000.0	9.000	On	L1	19.5	18.0	56.0	
4.894000	36.1	5000.0	9.000	On	L1	19.6	19.9	56.0	
15.198000	42.5	5000.0	9.000	On	L1	19.9	17.5	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.618000	31.4	5000.0	9.000	On	L1	19.7	14.6	46.0	
0.966000	28.9	5000.0	9.000	On	L1	19.6	17.1	46.0	
1.314000	28.0	5000.0	9.000	On	L1	19.5	18.0	46.0	
2.362000	27.2	5000.0	9.000	On	L1	19.5	18.8	46.0	
3.814000	25.8	5000.0	9.000	On	L1	19.5	20.2	46.0	
16.366000	29.4	5000.0	9.000	On	L1	19.9	20.6	50.0	

USB Mode, Set.3:

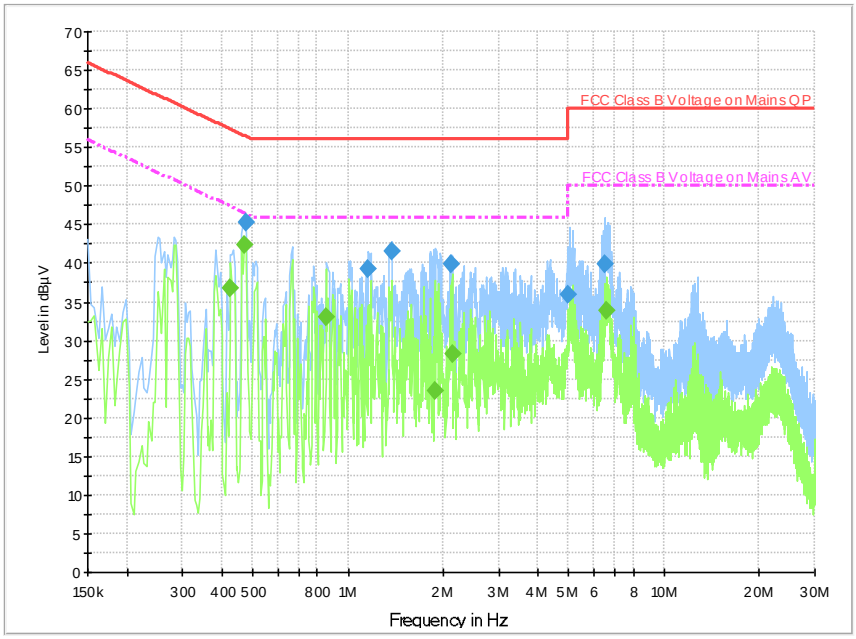

Fig A.9 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.474000	45.3	5000.0	9.000	On	L1	19.9	11.1	56.4	
1.162000	39.2	5000.0	9.000	On	L1	19.6	16.8	56.0	
1.378000	41.6	5000.0	9.000	On	L1	19.5	14.4	56.0	
2.130000	39.9	5000.0	9.000	On	N	19.8	16.1	56.0	
4.946000	35.9	5000.0	9.000	On	N	19.7	20.1	56.0	
6.522000	39.8	5000.0	9.000	On	N	19.7	20.2	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	36.7	5000.0	9.000	On	L1	19.9	10.7	47.3	
0.470000	42.4	5000.0	9.000	On	N	20.0	4.1	46.5	
0.854000	33.1	5000.0	9.000	On	N	19.8	12.9	46.0	
1.882000	23.5	5000.0	9.000	On	L1	19.4	22.5	46.0	
2.134000	28.3	5000.0	9.000	On	L1	19.5	17.7	46.0	
6.614000	33.9	5000.0	9.000	On	L1	19.5	16.1	50.0	

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