TEST REPORT

No. I19Z61344-EMC01

for

OnePlus Technology (Shenzhen) Co., Ltd.

Smart Phone

Model Name: HD1925

FCC ID: 2ABZ2-EE143

with

Hardware Version: 46

Software Version: Oxygen OS 10.0.HD61CB

Issued Date: 2019-10-15

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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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
I19Z61344-EMC01	Rev.0	1st edition	2019-10-15

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

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

2. Test Laboratory

2.1. Testing Location

CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

2.2. Testing Environment

Normal Temperature: 15-35℃

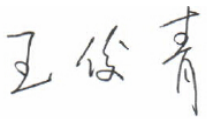
Relative Humidity: 20-75%

2.3. Project data

Testing Start Date: 2019-09-12

Testing End Date: 2019-10-15

2.4. Signature

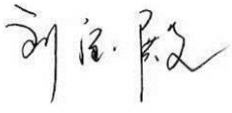


Wang Junqing

(Prepared this test report)

Zhang Ying

(Reviewed this test report)



Liu Baodian

Deputy Director of the laboratory

(Approved this test report)

3. Client Information

3.1. Applicant Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
City:	Shenzhen
Postal Code:	/
Country:	China
Contact Person	Ariel Cheng
Contact Email	ariel.cheng@oneplus.com
Telephone:	13823398081
Fax:	/

3.2. Manufacturer Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
City:	Shenzhen
Postal Code:	/
Country:	China
Contact Person	Ariel Cheng
Contact Email	ariel.cheng@oneplus.com
Telephone:	13823398081
Fax:	/

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

4.1. About EUT

Description	Smart Phone
Model Name	HD1925
FCC ID	2ABZ2-EE143
Extreme vol. Limits	3.6VDC to 4.3VDC (nominal: 3.87VDC)

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.

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	990013820050255	46	Oxygen OS 10.0.HD61CB

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

4.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	Battery	/	Inbuilt
AE2	Charger	/	CH007/008
AE3	USB Cable	/	/
AE4	Charger	/	CH019/021

AE1

Model	BLP745
Manufacturer	Sunwoda Electronic Co.,Ltd.
Capacitance	4010mAh
Nominal voltage	3.87V

AE2

Model	WC0506A5HK
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO.,LTD.
Length of cable	/

AE3

Model	/
Manufacturer	/
Length of cable	/

AE4

Model	WC0506A52GB
Manufacturer	LITE-ON TECHNOLOGY CORP.
Length of cable	/

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

Note: The USB cables are shielded.

4.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1+ AE2 + AE3	Charger
Set.2	EUT1+ AE1+ AE3	USB
Set.3	EUT1+ AE1+ AE3 + AE4	Charger

5. Reference Documents

5.1. 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	2016
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.

6. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) 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, 10 m 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 3000 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

7. 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)**

8. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2020-03-01	1 Year
2	Test Receiver	ESCI3	100344	R&S	2020-02-14	1 Year
3	Universal Radio Communication Tester	CMW500	150344	R&S	2019-12-27	1 year
4	Universal Radio Communication Tester	CMW500	116588	R&S	2019-12-26	1 year
5	LISN	ENV216	101200	R&S	2020-03-14	1 year
6	EMI Antenna	VULB 9163	9163-1222	Schwarzbeck	2020-03-14	1 year
7	EMI Antenna	3115	6914	ETS-Lindgren	2020-01-03	1 year
8	PC	M4000E-17	M706GWXD	LENOVO	N/A	N/A
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A

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 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) 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 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/1MHz	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 = 5.44 dB, k=2.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17826.033	45.7	-25.7	43.4	28.0	H
17948.433	45.6	-25.5	43.4	27.7	H
17945.033	45.5	-25.5	43.4	27.6	V
17960.333	45.5	-25.5	43.4	27.6	H
17953.533	45.5	-25.5	43.4	27.6	H
17950.133	45.4	-25.5	43.4	27.5	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17820.933	57.7	-25.7	43.4	40.0	H
17478.667	57.0	-25.9	40.1	42.8	H
17977.900	56.8	-25.5	43.4	38.9	V
17961.467	56.7	-25.5	43.4	38.8	H
17611.267	56.7	-26.9	43.4	40.2	H
17910.467	56.7	-25.7	43.4	39.0	H

Measurement results for Set.2:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17946.167	46.1	-25.5	43.4	28.2	H
17828.300	45.9	-25.7	43.4	28.2	H
17942.767	45.8	-25.5	43.4	27.9	V
17950.700	45.7	-25.5	43.4	27.8	H
17949.567	45.7	-25.5	43.4	27.8	H
17822.067	45.7	-25.7	43.4	28.0	H

USB Mode/ Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17942.200	58.5	-25.5	43.4	40.6	H
17718.367	57.1	-26.9	43.4	40.6	H
17409.533	56.8	-25.9	40.1	42.6	V
17699.667	56.7	-26.9	43.4	40.2	H
17962.600	56.6	-25.5	43.4	38.7	H
17589.167	56.6	-26.9	43.4	40.1	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)	Antenna Pol. (H/V)
17823.200	46.3	-25.7	43.4	28.6	H
17952.400	46.3	-25.5	43.4	28.4	H
17942.200	46.3	-25.5	43.4	28.4	V
17962.600	46.2	-25.5	43.4	28.3	H
17963.167	46.2	-25.5	43.4	28.3	H
17946.733	46.0	-25.5	43.4	28.1	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17612.400	58.0	-26.9	43.4	41.5	H
17717.233	57.7	-26.9	43.4	41.2	H
17939.367	57.5	-25.5	43.4	39.6	V
17950.700	57.3	-25.5	43.4	39.4	H
17732.533	57.2	-26.9	43.4	40.7	H
17710.433	57.2	-26.9	43.4	40.7	H

Charging Mode, Set.1

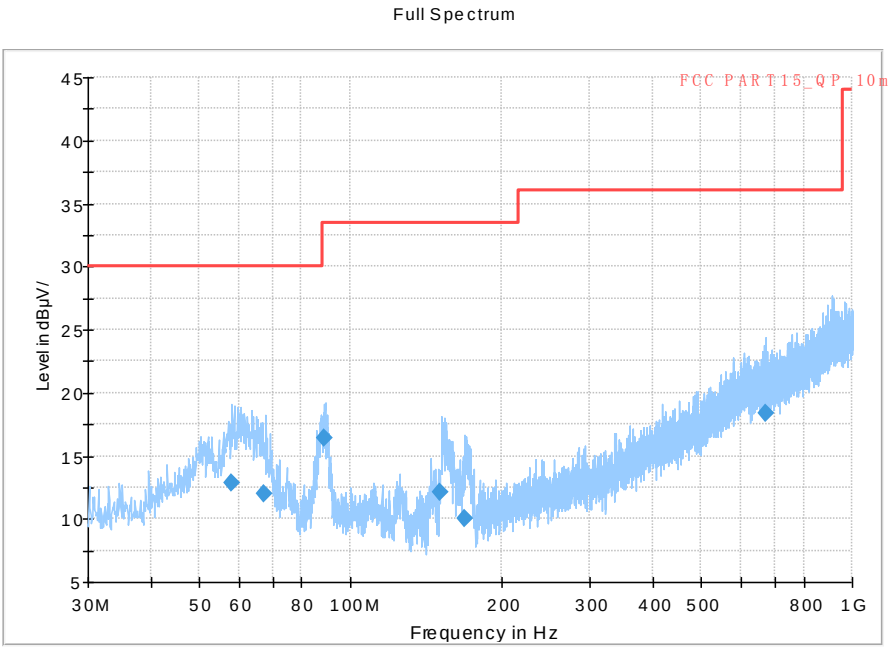


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
57.890000	12.91	30.00	17.09	1000.0	120.000	279.0	V	243.0
67.387000	11.95	30.00	18.05	1000.0	120.000	277.0	V	300.0
88.953000	16.43	33.50	17.09	1000.0	120.000	279.0	V	240.0
151.375000	12.06	33.50	21.46	1000.0	120.000	107.0	V	23.0
168.752000	10.08	33.50	23.44	1000.0	120.000	105.0	V	-30.0
673.821000	18.42	36.00	17.60	1000.0	120.000	381.0	V	30.0

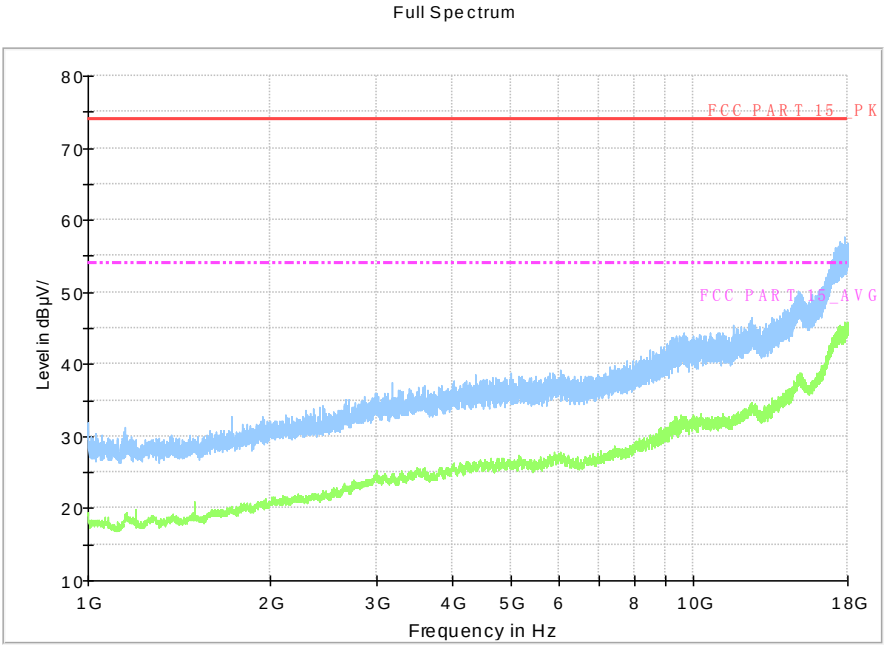


Fig A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.2

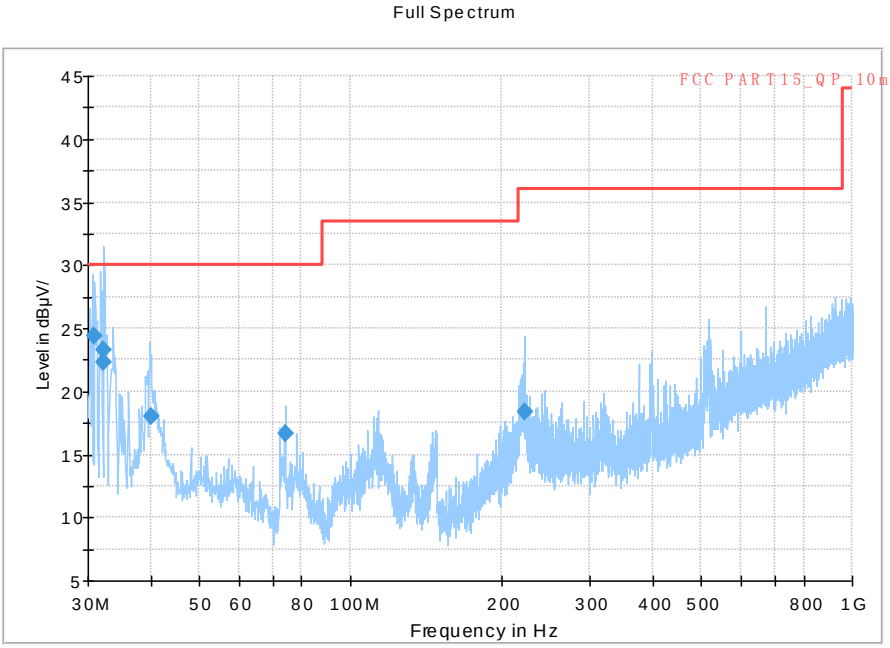


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.780000	24.42	30.00	5.58	1000.0	120.000	100.0	V	30.0
32.226000	23.31	30.00	6.69	1000.0	120.000	104.0	V	61.0
32.231000	22.28	30.00	7.72	1000.0	120.000	298.0	V	60.0
40.037000	17.97	30.00	12.03	1000.0	120.000	276.0	V	23.0
74.135000	16.62	30.00	13.38	1000.0	120.000	209.0	V	284.0
222.674000	18.36	36.00	17.66	1000.0	120.000	125.0	V	180.0

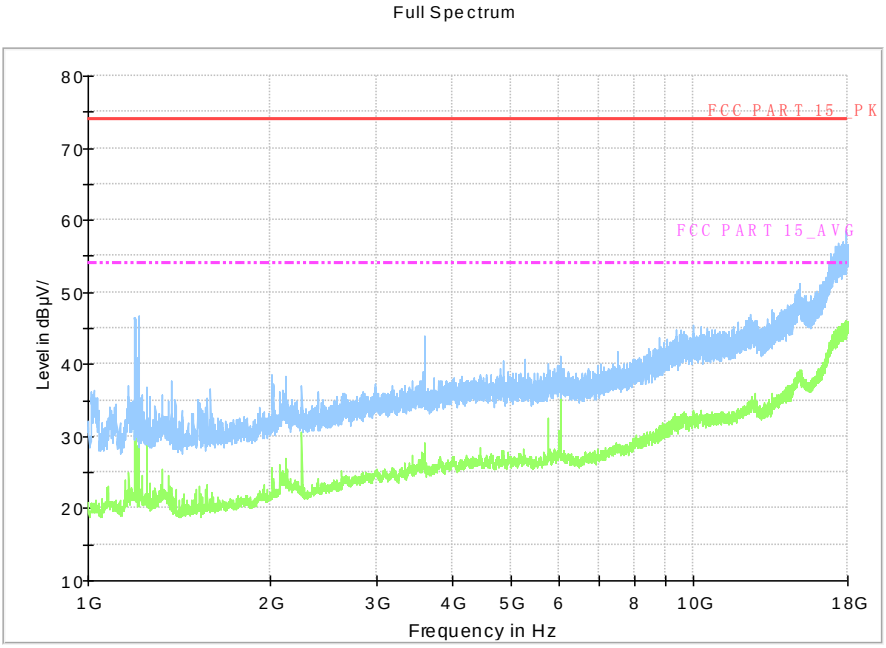


Fig A.4 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.3

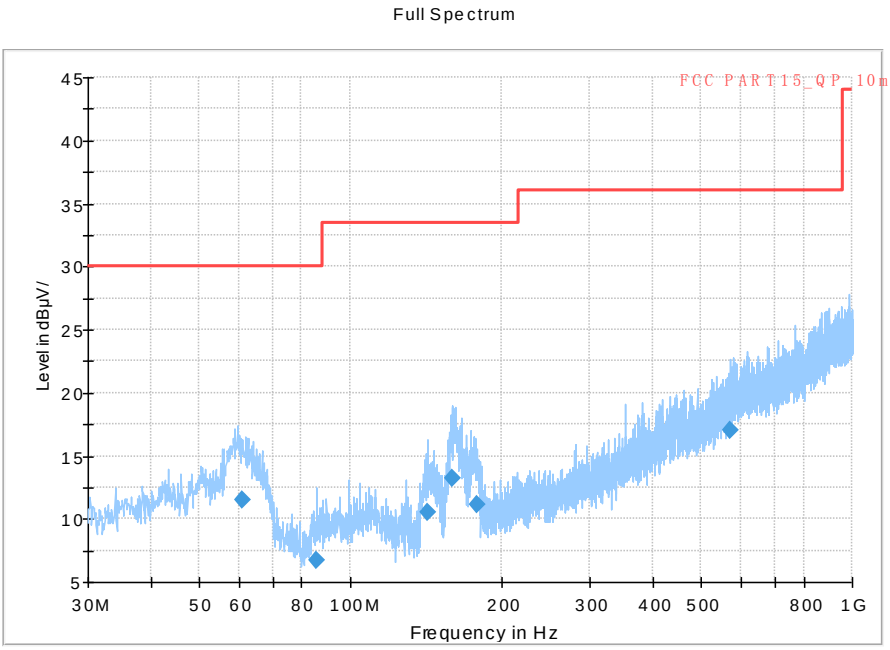


Fig A.5 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
60.712000	11.55	30.00	18.45	1000.0	120.000	225.0	V	-27.0
85.655000	6.71	30.00	23.29	1000.0	120.000	177.0	V	120.0
142.169000	10.48	33.50	23.04	1000.0	120.000	117.0	V	17.0
159.606000	13.28	33.50	20.24	1000.0	120.000	103.0	V	-4.0
178.308000	11.08	33.50	22.44	1000.0	120.000	125.0	V	60.0
571.459000	17.03	36.00	18.99	1000.0	120.000	114.0	V	30.0

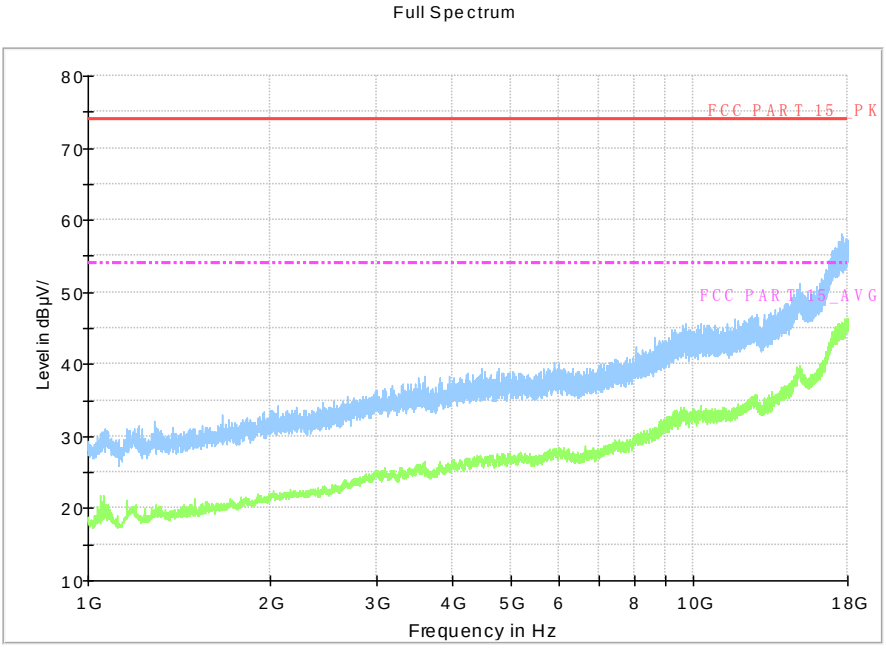


Fig A.6 Radiated Emission from 1GHz to 18GHz

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*= 3.38 dB, *k*=2.

Charging Mode, Set.1

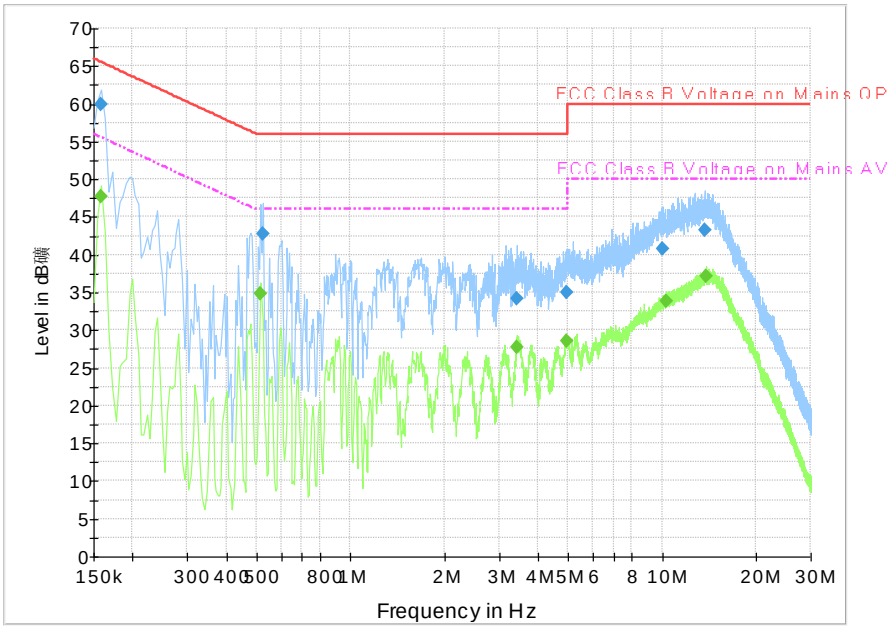


Fig A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.159000	60.0	2000.0	9.000	On	L1	28.7	5.5	65.5	
0.523500	42.8	2000.0	9.000	On	N	19.8	13.2	56.0	
3.412500	34.2	2000.0	9.000	On	N	19.6	21.8	56.0	
4.933500	35.0	2000.0	9.000	On	L1	19.6	21.0	56.0	
10.063500	40.8	2000.0	9.000	On	N	19.7	19.2	60.0	
13.668000	43.2	2000.0	9.000	On	N	19.8	16.8	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.159000	47.7	2000.0	9.000	On	L1	28.7	7.8	55.5	
0.514500	34.9	2000.0	9.000	On	L1	19.8	11.1	46.0	
3.412500	27.7	2000.0	9.000	On	N	19.6	18.3	46.0	
4.965000	28.6	2000.0	9.000	On	N	19.6	17.4	46.0	
10.311000	33.8	2000.0	9.000	On	N	19.7	16.2	50.0	
13.821000	37.2	2000.0	9.000	On	N	19.8	12.8	50.0	

USB Mode, Set.2

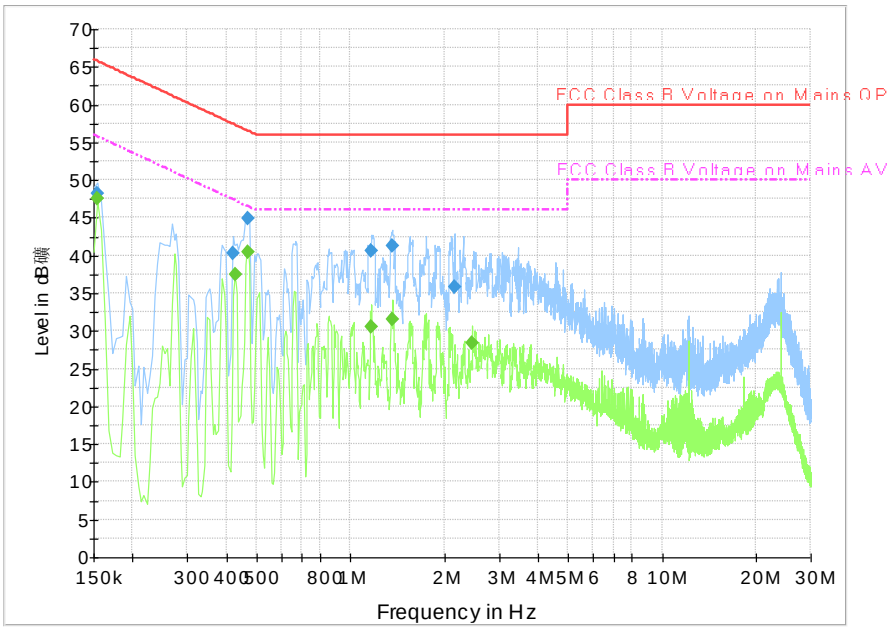


Fig A.8 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	48.2	2000.0	9.000	On	L1	29.7	17.6	65.8	
0.420000	40.2	2000.0	9.000	On	L1	19.8	17.2	57.4	
0.469500	44.9	2000.0	9.000	On	N	19.8	11.6	56.5	
1.171500	40.6	2000.0	9.000	On	L1	19.7	15.4	56.0	
1.360500	41.3	2000.0	9.000	On	N	19.6	14.7	56.0	
2.161500	35.8	2000.0	9.000	On	N	19.6	20.2	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	47.5	2000.0	9.000	On	L1	29.7	8.2	55.8	
0.429000	37.4	2000.0	9.000	On	L1	19.8	9.9	47.3	
0.469500	40.5	2000.0	9.000	On	L1	19.8	6.0	46.5	
1.167000	30.6	2000.0	9.000	On	L1	19.7	15.4	46.0	
1.369500	31.6	2000.0	9.000	On	L1	19.6	14.4	46.0	
2.463000	28.4	2000.0	9.000	On	N	19.6	17.6	46.0	

Charging Mode, Set.3

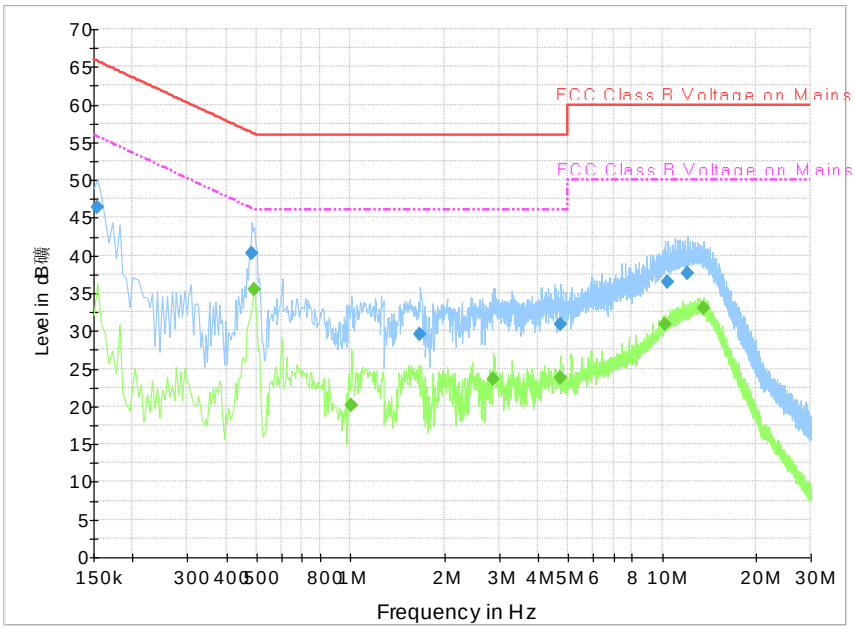


Fig A.9 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	46.4	2000.0	9.000	On	L1	29.7	19.4	65.8	
0.483000	40.2	2000.0	9.000	On	N	19.8	16.0	56.3	
1.675500	29.6	2000.0	9.000	On	N	19.6	26.4	56.0	
4.713000	30.8	2000.0	9.000	On	N	19.6	25.2	56.0	
10.378500	36.5	2000.0	9.000	On	N	19.7	23.5	60.0	
12.057000	37.6	2000.0	9.000	On	N	19.8	22.4	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.492000	35.5	2000.0	9.000	On	N	19.8	10.7	46.1	
1.009500	20.1	2000.0	9.000	On	L1	19.7	25.9	46.0	
2.881500	23.5	2000.0	9.000	On	N	19.6	22.5	46.0	
4.717500	23.8	2000.0	9.000	On	N	19.6	22.2	46.0	
10.189500	30.9	2000.0	9.000	On	N	19.7	19.1	50.0	
13.591500	33.0	2000.0	9.000	On	N	19.8	17.0	50.0	

ANNEX B: PERSONS INVOLVED IN THIS TESTING

Test Item	Test Software and Version	Software Vendor	Test operator
Conducted Emission	EMC32 V8.5.2	R&S	Shi Suolan
Radiated Emission	EMC32 V9.01.00	R&S	Yan Hanchen Li Pengfei

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