



TEST REPORT

No. I21Z62705-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE mobile phone

Model Name: 4058R, 4058C

FCC ID: 2ACCJN060

with

Hardware Version: 03

Software Version: NH35

Issued Date: 2022-01-27

Note:

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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z62705-EMC01	Rev.0	1 st edition	2022-01-27

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



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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.

1.2. Testing Location

CTTL (huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35° C
Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2021-12-28
Testing End Date: 2022-01-27

1.5. Signature



Zhang Ying

(Prepared this test report)



An Hui

(Reviewed this test report)



Zhang Xia

Deputy Director of the laboratory

(Approved this test report)



2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
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Fax: +86 755 3661 2000-81722

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

3.1. About EUT

Description	GSM/UMTS/LTE mobile phone
Model Name	4058R, 4058C
FCC ID	2ACCJN060
Extreme vol. Limits	3.8VDC to 4.4VDC (nominal: 3.5VDC)

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
UT12a	016144000013878	03	NH35

*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	TLi017C7	inbuilt
AE4	Charger	UC11	PUAN
AE10	USB Cable	CDA0000187C8	/

AE1

Model	TLi017C7
Manufacturer	Veken
Capacity	1780mAh
Voltage	3.8V

AE4

Model	UC11
Manufacturer	PUAN

AE10

Model	CDA0000187C8
Manufacturer	PUAN

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

Note: The USB cables are shielded.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.3	UT12a + AE1 + AE4 + AE10	Charger
Set.4	UT12a + AE1 + AE10	USB + Camera

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	2020
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	LISN	ENV216	101200	R&S	2022-05-30	1 Year
2	Test Receiver	ESCI 7	100344	R&S	2022-02-23	1 year
3	Test Receiver	ESW44	103023	R&S	2022-10-26	1 year
4	EMI Antenna	VULB 9163	1223	Schwarzbeck	2022-03-22	1 Year
5	EMI Antenna	3115	6914	ETS-Lindgren	2022-02-03	1 year
6	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
9	Mouse	M-UAE119	LZ935220ZRC	Lenovo	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 3/10 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 with FM/Camera/MP3. 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.

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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 5.54 \text{ dB}$, $k=2$.

Measurement results for Set.3, GSM850MHz idle, charger UC11(PUAN):

Note: This was the worst case for GSM850MHz/WCDMA 850MHz/LTE band 5/LTE band 12/LTE band 14 with charger.

Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
39.118000	17.46	29.54	12.08	283.0	V	-30.0
55.317000	11.32	29.54	18.22	175.0	V	150.0
104.108000	10.71	33.06	22.35	183.0	V	-9.0
224.970000	12.93	35.56	22.63	225.0	V	62.0
406.457000	12.94	35.56	22.62	283.0	V	62.0
626.647000	16.95	35.56	18.61	95.0	V	210.0

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)
17978.580	44.0	-29.1	46.7	26.40	54.00	10.00	V
17909.900	43.9	-29.3	46.0	27.27	54.00	10.10	H
18000.000	43.9	-29.2	47.0	26.14	54.00	10.10	V
17988.780	43.8	-29.1	46.7	26.20	54.00	10.20	V
17973.480	43.8	-29.1	46.7	26.20	54.00	10.20	V
17962.260	43.7	-29.1	46.7	26.10	54.00	10.30	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)
17879.980	55.8	-29.4	46.0	39.24	74.00	18.20	V
17909.900	55.3	-29.3	46.0	38.67	74.00	18.70	V
17961.580	55.1	-29.1	46.7	37.50	74.00	18.90	V
17987.760	55.0	-29.1	46.7	37.40	74.00	19.00	H
17969.060	55.0	-29.1	46.7	37.40	74.00	19.00	V

17951.380	55.0	-28.9	46.7	37.28	74.00	19.00	V
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Measurement results for Set.2, USB + Camera:

USB Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
31.261000	28.01	29.54	1.53	103.0	V	263.0
100.519000	17.67	33.06	15.39	325.0	V	300.0
148.728000	25.08	33.06	7.98	175.0	V	-10.0
171.038000	19.14	33.06	13.92	95.0	V	-30.0
441.959000	29.04	35.56	6.52	95.0	V	171.0
577.662000	28.37	35.56	7.19	225.0	V	-10.0

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)
17947.980	44.0	-28.9	46.7	26.28	54.00	10.00	V
17953.080	44.0	-28.9	46.7	26.28	54.00	10.00	V
17965.320	43.9	-29.1	46.7	26.30	54.00	10.10	V
17962.260	43.9	-29.1	46.7	26.30	54.00	10.10	H
17977.900	43.9	-29.1	46.7	26.30	54.00	10.10	V
17994.220	43.9	-29.1	46.7	26.30	54.00	10.10	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)
17915.340	56.1	-29.3	46.7	38.77	74.00	17.90	H
17955.800	55.9	-28.9	46.7	38.18	74.00	18.10	H
17953.760	55.9	-28.9	46.7	38.18	74.00	18.10	V
17933.700	55.8	-29.4	46.7	38.54	74.00	18.20	V
17945.600	55.7	-28.9	46.7	37.98	74.00	18.30	V
17605.260	55.6	-29.5	45.2	39.87	74.00	18.40	H

Measurement results for Set.3, GSM850 idle, charger UC11(PUAN):

Note: This was the worst case for GSM850MHz/WCDMA 850MHz/LTE band 5/LTE band 12/ LTE band 14 with charger.

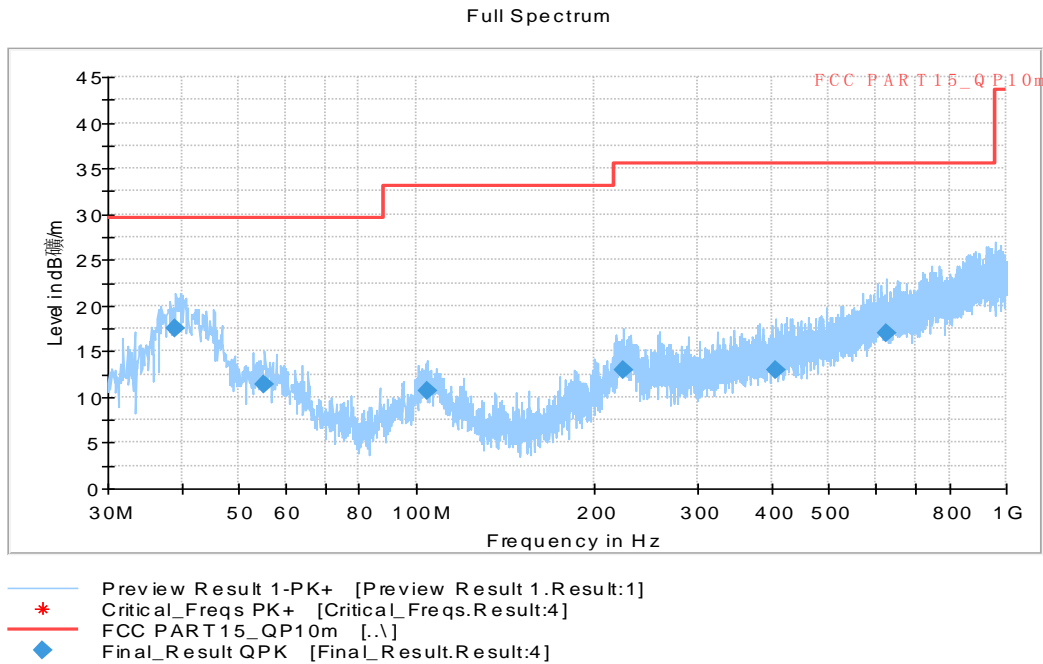


Fig A.1 Radiated Emission from 30MHz to 1GHz

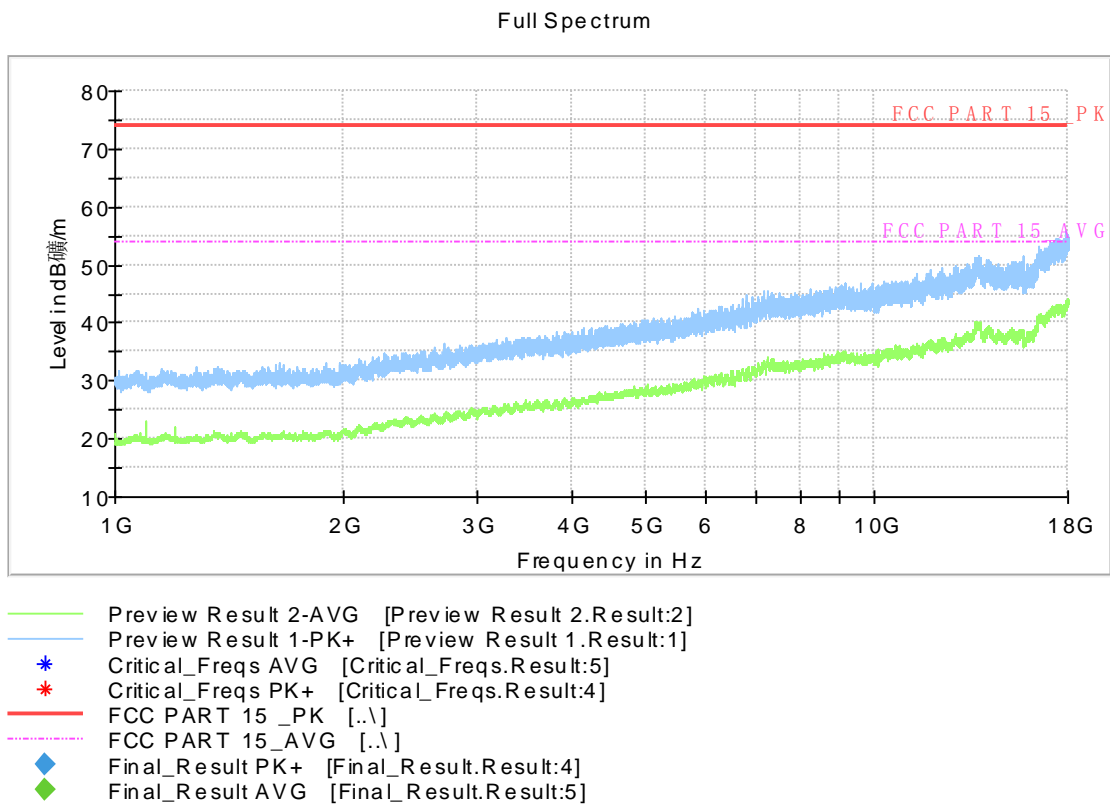


Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.4, USB + Camera:

Full Spectrum

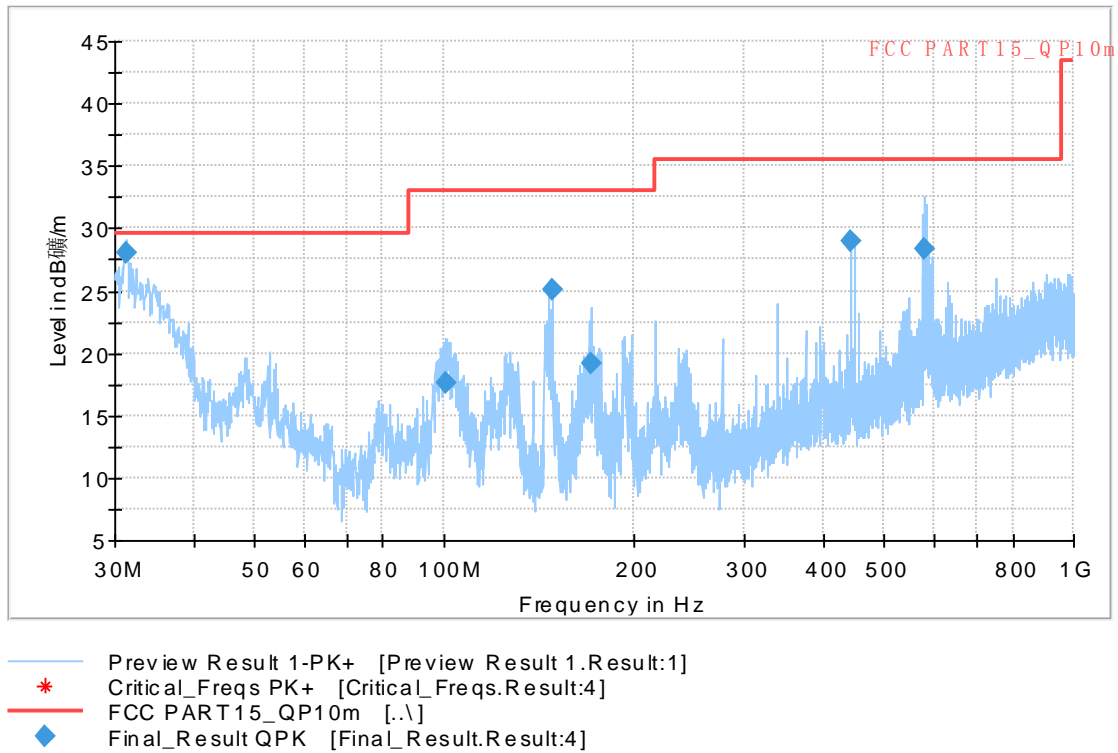


Fig A.3 Radiated Emission from 30MHz to 1GHz

Full Spectrum

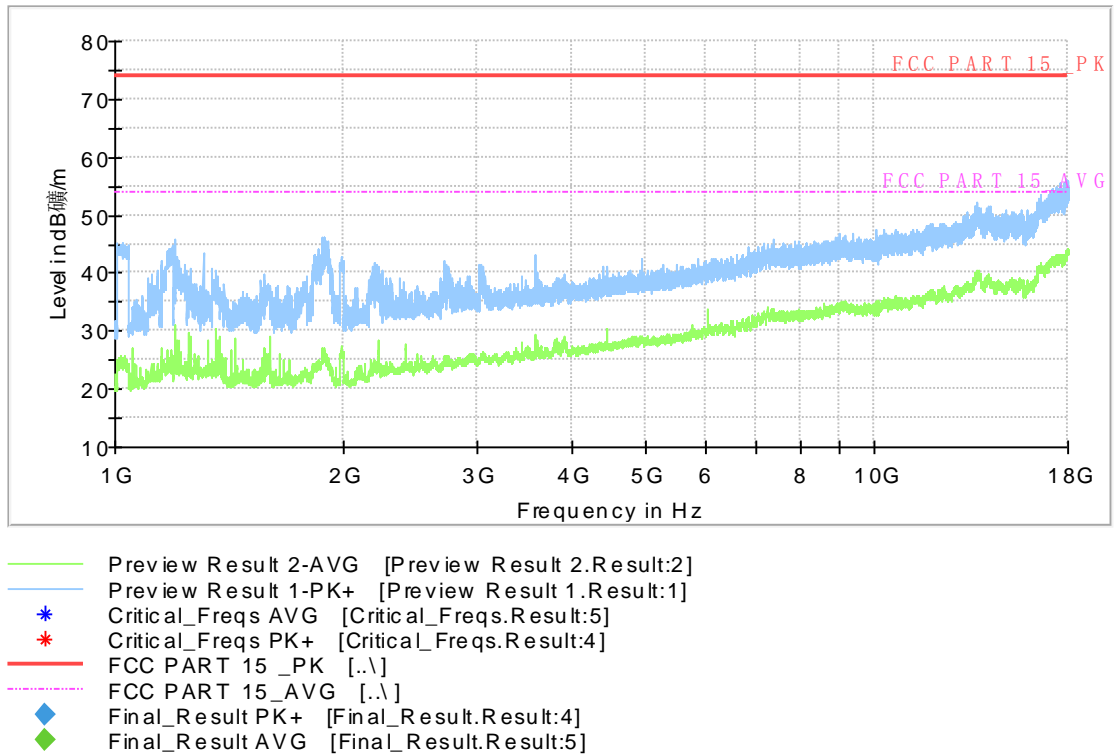


Fig A.4 Radiated Emission from 1GHz to 18GHz

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: $U= 3.08 \text{ dB}$, $k=2$.

Measurement results for Set.3, WCDMA850MHz idle, charger UC11(PUAN):

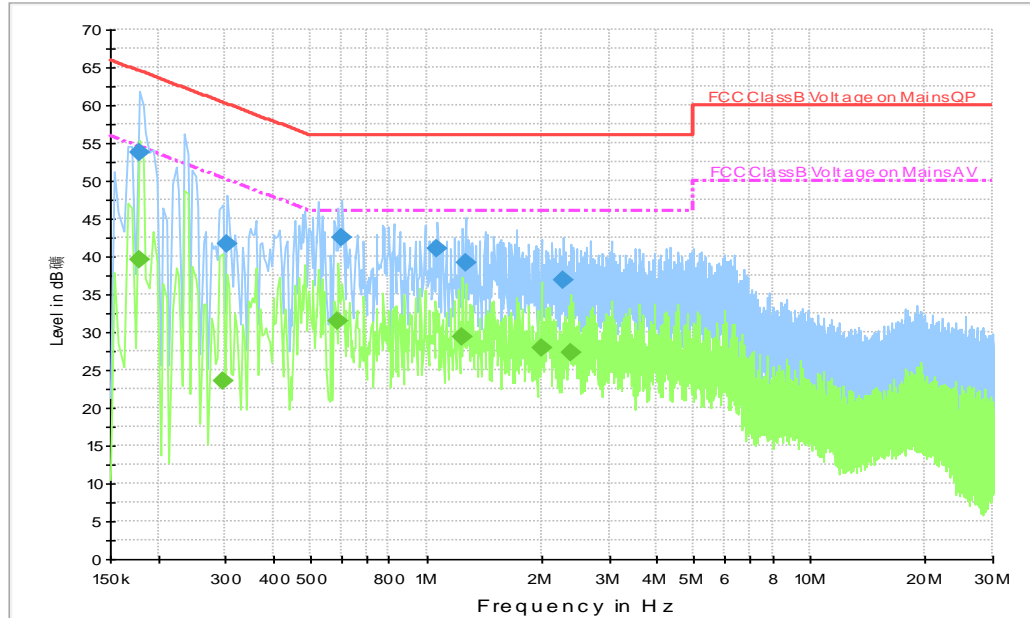


Fig A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.178000	53.7	L1	20.0	10.9	64.6
0.302000	41.7	L1	20.0	18.5	60.2
0.602000	42.4	L1	19.8	13.6	56.0
1.070000	41.0	L1	19.6	15.0	56.0
1.266000	39.2	L1	19.5	16.8	56.0
2.278000	36.9	L1	19.5	19.1	56.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.178000	39.6	L1	20.0	15.0	54.6
0.294000	23.4	N	19.9	27.0	50.4
0.590000	31.4	L1	19.8	14.6	46.0
1.238000	29.5	L1	19.5	16.5	46.0
1.990000	27.9	L1	19.4	18.1	46.0
2.374000	27.2	L1	19.5	18.8	46.0

Measurement results for Set.4, USB + Camera:

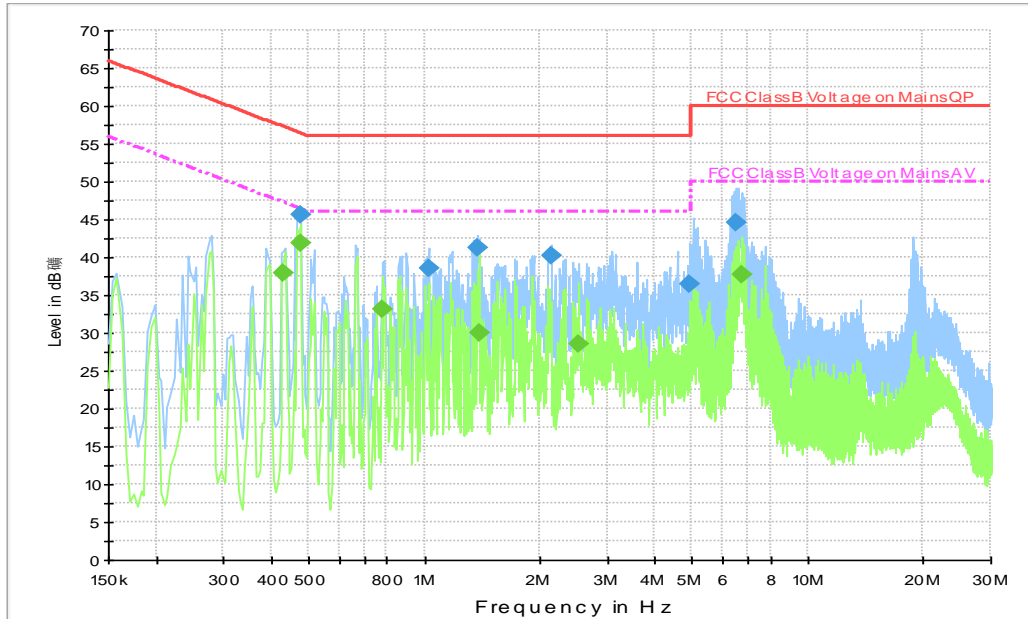


Fig A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.474000	45.6	N	20.0	10.9	56.4
1.026000	38.6	L1	19.6	17.4	56.0
1.374000	41.2	L1	19.5	14.8	56.0
2.134000	40.1	N	19.8	15.9	56.0
4.942000	36.5	N	19.7	19.5	56.0
6.502000	44.6	N	19.7	15.4	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.430000	38.0	L1	19.9	9.3	47.3
0.474000	41.9	N	20.0	4.5	46.4
0.782000	33.1	N	19.8	12.9	46.0
1.386000	30.0	L1	19.5	16.0	46.0
2.522000	28.6	N	19.7	17.4	46.0
6.714000	37.6	L1	19.5	12.4	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	Ding Zai& Zhang Tianli
Radiated Emission	EMC32 V9.01.00	R&S	Yan Hanchen

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