



TEST REPORT

No. I16Z41857-EMC01

for

TCL Communication Ltd.

GSM Quad Band Mobile phone

Model Name: 1054X

Marketing Name: Alcatel 1054X

FCC ID: 2ACCJB074

with

Hardware Version: PIO

Software Version: V1.0

Issued Date: 2016-09-19

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:

FCC 2.948 Listed: No.525429

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16Z41857-EMC01	Rev.0	1 st edition	2016-09-19

CONTENTS

1. TEST LABORATORY	4
1.1. TESTING LOCATION	4
1.2. TESTING ENVIRONMENT	4
1.3. PROJECT DATA	4
1.4. SIGNATURE	4
2. CLIENT INFORMATION	5
2.1. APPLICANT INFORMATION.....	5
2.2. MANUFACTURER INFORMATION.....	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT.....	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	6
3.4. EUT SET-UPS	7
4. REFERENCE DOCUMENTS.....	8
4.1. REFERENCE DOCUMENTS FOR TESTING.....	8
5. LABORATORY ENVIRONMENT.....	9
6. SUMMARY OF TEST RESULTS.....	10
7. TEST EQUIPMENTS UTILIZED.....	11
ANNEX A: MEASUREMENT RESULTS	12

1. Test Laboratory

1.1. Testing Location

Location 1: 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℃

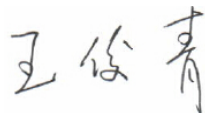
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-09-08

Testing End Date: 2016-09-14

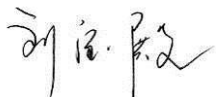
1.4. Signature



Wang Junqing
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



Liu Baodian
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: P. R. China
Contact Person: Smile. Wu
Contact Email: xia.wu@tcl.com
Telephone: (0)21 51798260
Fax: (0)21 6146 0600

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: P. R. China
Contact Person: Smile. Wu
Contact Email: xia.wu@tcl.com
Telephone: (0)21 51798260
Fax: (0)21 6146 0600

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

3.1. About EUT

Description	GSM Quad Band Mobile phone
Model Name	1054X
Marketing Name	Alcatel 1054X
FCC ID	2ACCJB074
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.7VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	358299070001934	PIO	V1.0

*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	/	16TCT-BA-0590
AE2	Battery	/	16TCT-BA-0520
AE3	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	16TCT-DC-0280
AE6	Headset	/	16TCT-HS-0397
AE7	Headset	/	16TCT-HS-0399

AE1, AE2

Model	CAB0800002C1
Manufacturer	BYD
Capacitance	800 mAh
Nominal voltage	3.7 V

AE3

Model	CBA3068AGAC1
Manufacturer	BYD
Length of cable	/

AE4

Model	CBA3068AAAC1
Manufacturer	BYD
Length of cable	/

AE5

Model	CDA0000092C3
Manufacturer	JIAYIKANG
Length of cable	96cm



AE6, AE7

Model CCB0050A10C7

Manufacturer JIAYIKANG

Length of cable 142cm

*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.1	EUT1+ AE1+ AE3+ AE5	Charger
Set.2	EUT1+ AE1+ AE3+ AE5+ AE6	Charger +Headset
Set.3	EUT1+ AE1+ AE5	USB mode

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	10-1-15 Edition
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 (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

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1	The test is performed in test location 1 which is described in section 1.1 of this report

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	1
2	Conducted Emission	15.107(a)	B.2	P	1

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2017-03-02	1 year
2	Test Receiver	ESCI 7	100344	R&S	2017-07-05	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2016-12-09	1 year
4	Universal Radio Communication Tester	CMW500	155415	R&S	2017-01-11	1 year
5	LISN	ENV216	101200	R&S	2017-07-10	1 year
6	EMI Antenna	VULB 9163	9163-301	Schwarzbeck	2017-12-16	3 years
7	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 years
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
10	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
11	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01	R&S
Conducted Emission	EMC32 V8.52.0	R&S

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 DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. 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 ($\mu\text{V/m}$)		
	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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz: 4.86dB, 1GHz-18GHz: 5.26dB, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17928.600	51.5	-17.7	45.6	23.600	H
17983.000	51.5	-17.7	45.6	23.600	H
17994.900	51.3	-17.7	45.6	23.400	V
17975.350	51.1	-17.7	45.6	23.200	V
17915.000	51.0	-17.7	45.6	23.100	V
17992.350	51.0	-17.7	45.6	23.100	V

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17932.850	61.9	-17.7	45.6	34.000	V
17919.250	61.4	-17.7	45.6	33.500	H
17977.050	61.2	-17.7	45.6	33.300	V
17851.250	61.1	-18.5	45.6	34.000	H
17945.600	61.0	-17.7	45.6	33.100	H
17966.000	60.9	-17.7	45.6	33.000	H

Sample calculation: Peak detector, 17932.850MHz

$$\text{Result} = P_{\text{Mea}} (34.000\text{dB}\mu\text{V}) + G_A (45.6\text{dB/m}) + G_{\text{PL}}(-17.7 \text{ dB}) = 61.9\text{dB}\mu\text{V/m}$$

Measurement results for Set.2:
Charging Mode with headset/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17932.850	51.8	-17.7	45.6	23.900	H
17977.900	51.8	-17.7	45.6	23.900	H
17912.450	51.5	-18.5	45.6	24.400	V
17915.000	51.3	-17.7	45.6	23.400	H
17946.450	51.2	-17.7	45.6	23.300	V
17980.450	51.2	-17.7	45.6	23.300	H

Charging Mode with headset /Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17943.050	61.5	-17.7	45.6	33.600	H
17991.500	61.3	-17.7	45.6	33.400	H
17937.950	61.3	-17.7	45.6	33.400	V
17986.400	61.2	-17.7	45.6	33.300	H
17917.550	61.2	-17.7	45.6	33.300	H
17970.250	61.1	-17.7	45.6	33.200	V

Sample calculation: Peak detector, 17943.050MHz

Result =P_{Mea} (33.600dB μ V) + G_A (45.6dB/m) +G_{PL} (-17.7 dB) =61.5dB μ V/m

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

Frequency(MHz)	Result(dBμV/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dBμV)	Polarity
17979.600	52.0	-17.7	45.6	24.100	H
17977.050	51.3	-17.7	45.6	23.400	H
17980.450	51.3	-17.7	45.6	23.400	V
17967.700	51.2	-17.7	45.6	23.300	H
17937.950	51.2	-17.7	45.6	23.300	H
17944.750	51.1	-17.7	45.6	23.200	V

USB Mode/ Peak detector

Frequency(MHz)	Result(dBμV/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dBμV)	Polarity
17999.150	61.6	-17.7	45.6	33.700	H
17864.850	61.3	-18.5	45.6	34.200	H
17980.450	61.1	-17.7	45.6	33.200	V
17925.200	61.1	-17.7	45.6	33.200	V
17975.350	60.9	-17.7	45.6	33.000	H
17927.750	60.9	-17.7	45.6	33.000	V

Sample calculation: Peak detector, 17999.150MHz

$$\text{Result} = P_{\text{Mea}} (33.700\text{dB}\mu\text{V}) + G_A (45.6\text{dB/m}) + G_{\text{PL}} (-17.7 \text{ dB}) = 61.6\text{dB}\mu\text{V/m}$$

Charging Mode, Set.1

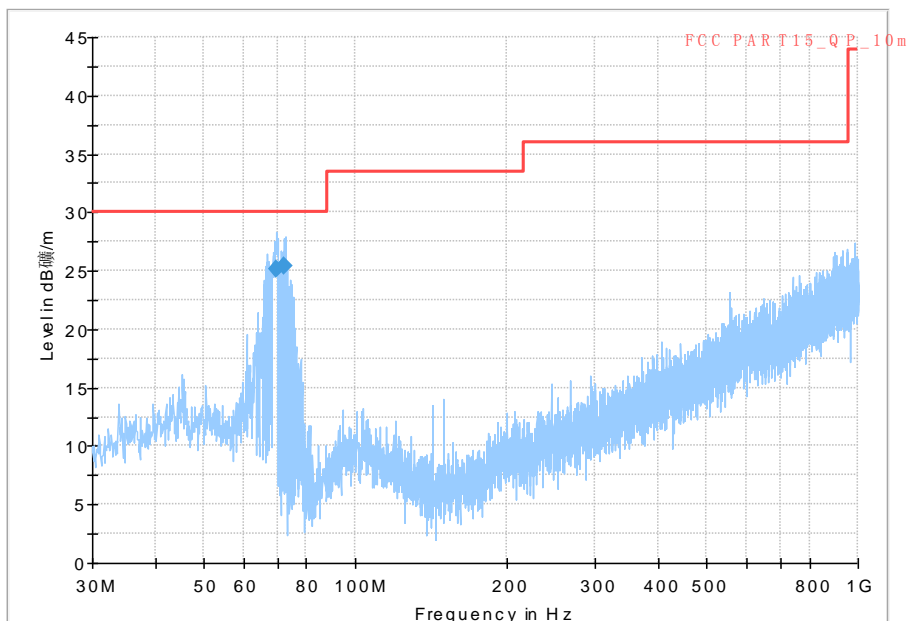


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
69.613000	25.18	30.00	4.82	225.0	V	19.0	-15.2
72.223000	25.41	30.00	4.59	225.0	V	10.0	-15.9

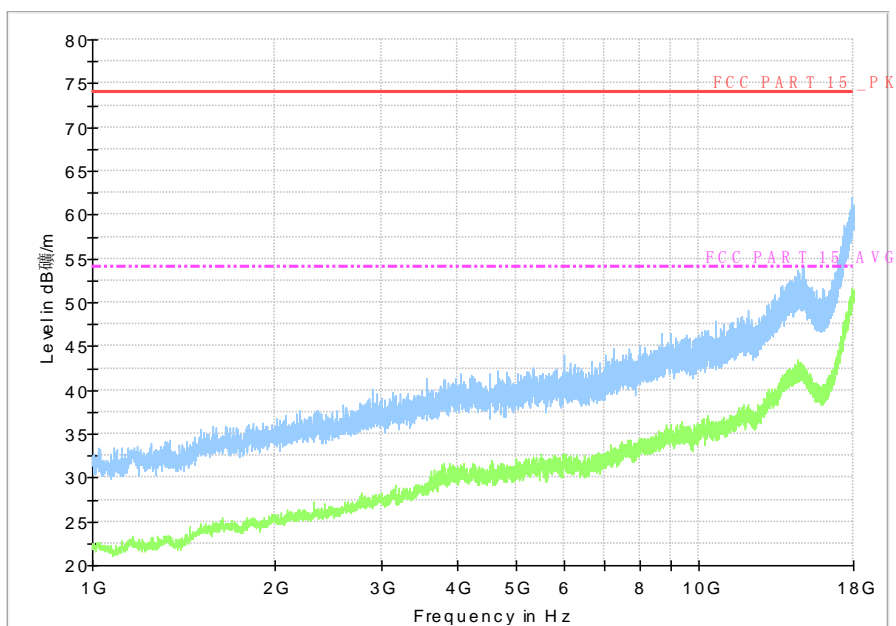


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode with headset, Set.2

Normal RE_30M-1GHz_10m

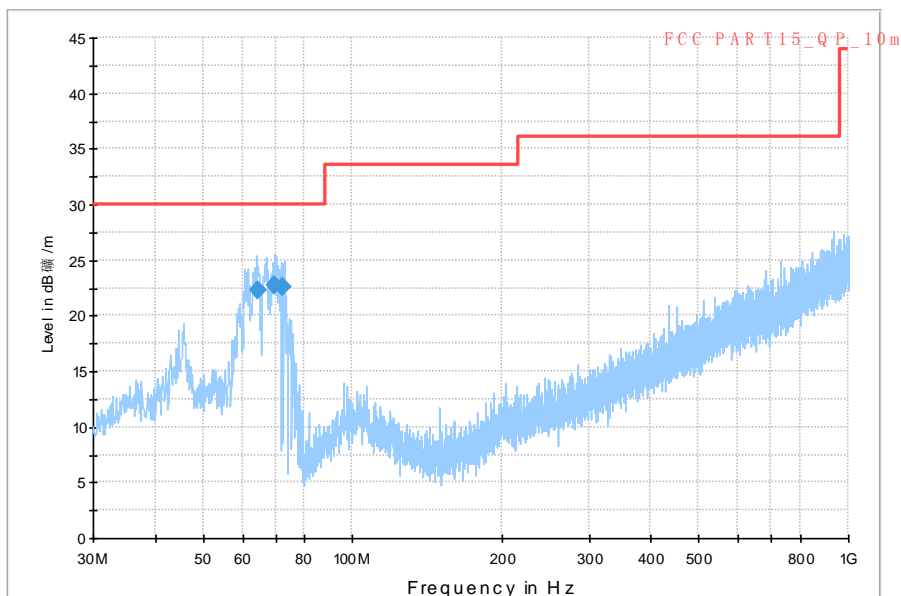


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
64.444000	22.2	100.0	V	300.0	-13.6	7.8	30.0
69.890000	22.7	100.0	V	296.0	-15.3	7.3	30.0
72.320000	22.6	221.0	V	300.0	-15.9	7.4	30.0

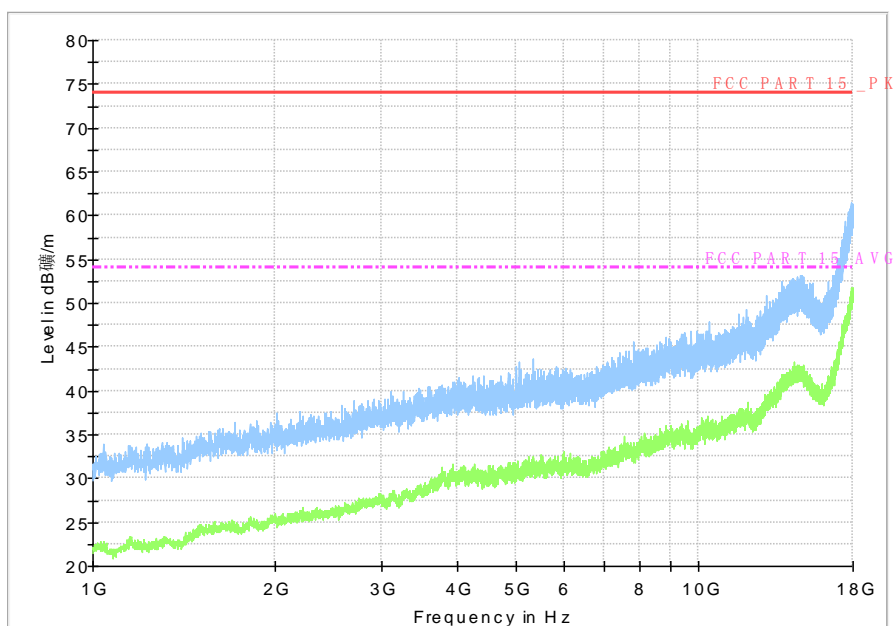


Figure A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

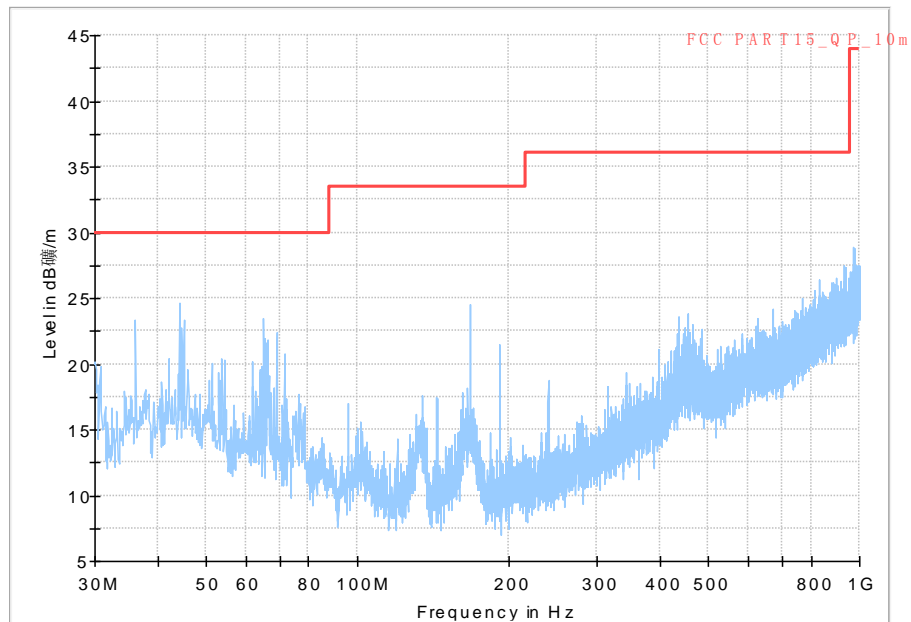


Figure A.5 Radiated Emission from 30MHz to 1GHz

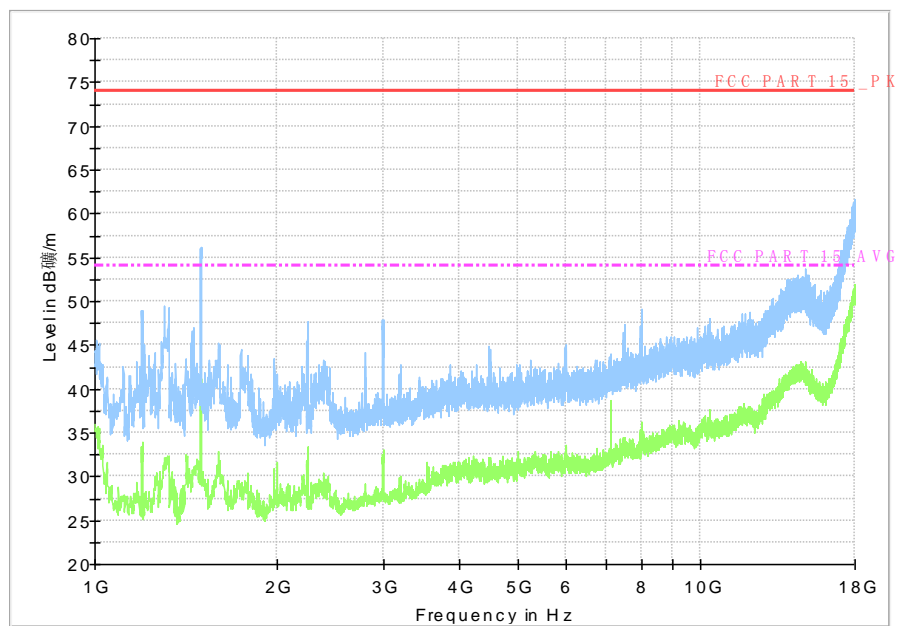


Figure A.6 Radiated Emission from 1GHz to 18GHz

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 OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. 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: $U= 3.38\text{dB}$, $k=2$.

Charging Mode, Set.1

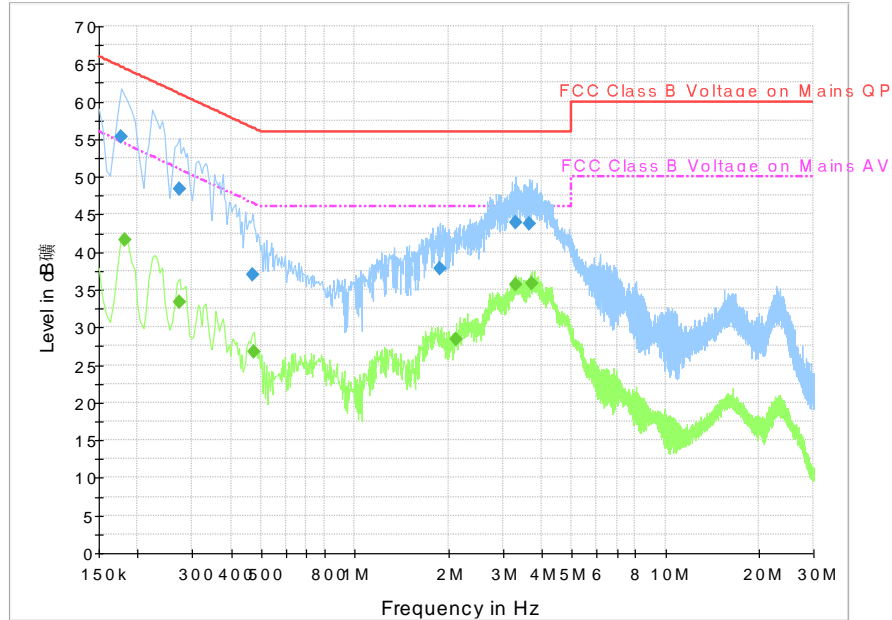


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	55.3	2000.0	9.000	On	L1	19.8	9.4	64.6
0.271500	48.4	2000.0	9.000	On	L1	19.8	12.7	61.1
0.469500	37.1	2000.0	9.000	On	L1	19.9	19.5	56.5
1.878000	37.7	2000.0	9.000	On	N	19.7	18.3	56.0
3.295500	44.0	2000.0	9.000	On	L1	19.4	12.0	56.0
3.660000	43.8	2000.0	9.000	On	L1	19.5	12.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	41.6	2000.0	9.000	On	L1	19.8	12.8	54.4
0.271500	33.4	2000.0	9.000	On	L1	19.8	17.7	51.1
0.474000	26.7	2000.0	9.000	On	N	19.9	19.8	46.4
2.116500	28.4	2000.0	9.000	On	L1	19.6	17.6	46.0
3.286500	35.7	2000.0	9.000	On	L1	19.4	10.3	46.0
3.718500	35.8	2000.0	9.000	On	L1	19.5	10.2	46.0

Charging Mode with headset, Set.2

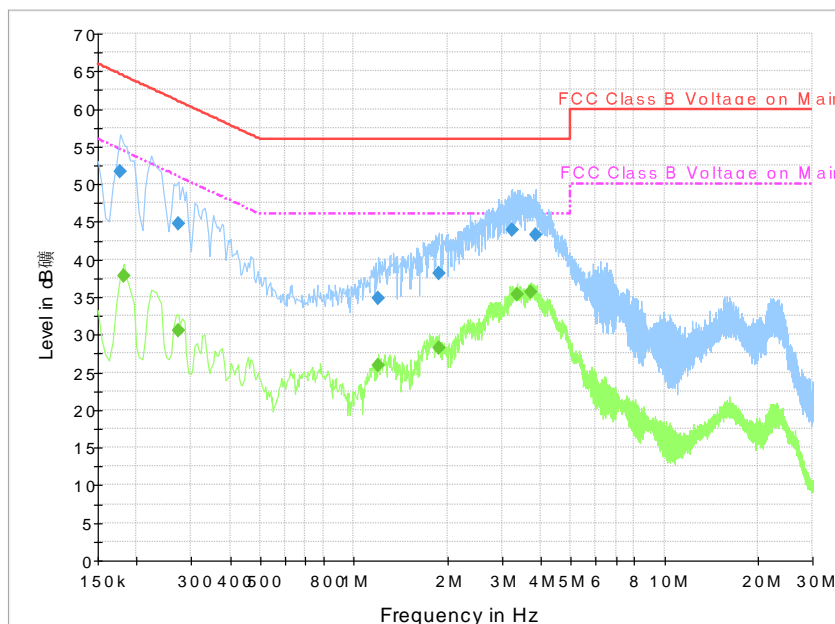


Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	51.7	2000.0	9.000	On	L1	19.8	12.9	64.6
0.271500	44.8	2000.0	9.000	On	L1	19.8	16.3	61.1
1.198500	34.8	2000.0	9.000	On	L1	19.7	21.2	56.0
1.878000	38.1	2000.0	9.000	On	L1	19.7	17.9	56.0
3.228000	43.9	2000.0	9.000	On	L1	19.3	12.1	56.0
3.840000	43.3	2000.0	9.000	On	N	19.5	12.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	37.9	2000.0	9.000	On	N	19.8	16.5	54.4
0.271500	30.5	2000.0	9.000	On	L1	19.8	20.6	51.1
1.198500	26.0	2000.0	9.000	On	L1	19.7	20.0	46.0
1.878000	28.2	2000.0	9.000	On	L1	19.7	17.8	46.0
3.345000	35.4	2000.0	9.000	On	L1	19.4	10.6	46.0
3.705000	35.6	2000.0	9.000	On	L1	19.5	10.4	46.0

USB Mode, Set.3

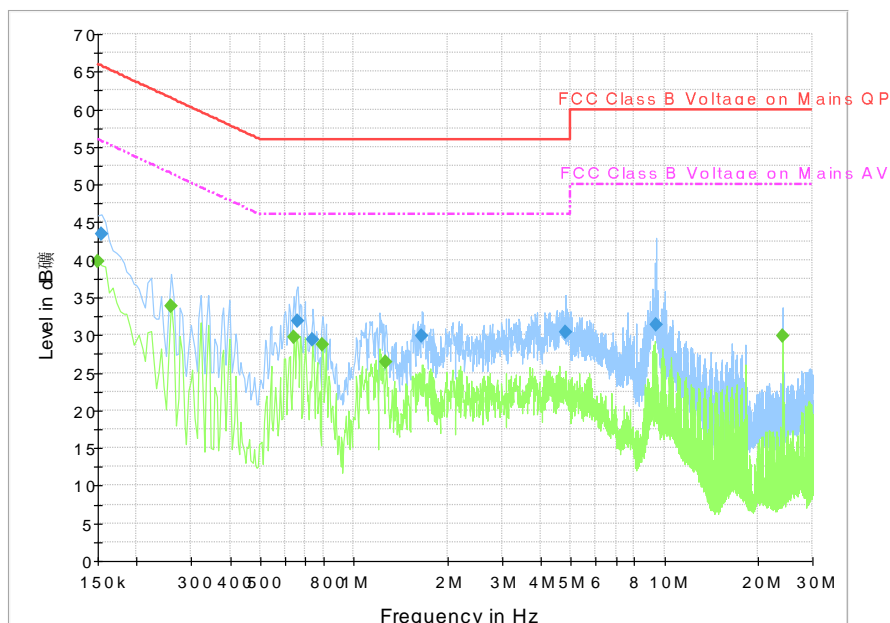


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	43.5	2000.0	9.000	On	N	20.0	22.3	65.8
0.658500	31.9	2000.0	9.000	On	N	19.8	24.1	56.0
0.739500	29.5	2000.0	9.000	On	L1	19.8	26.5	56.0
1.662000	29.8	2000.0	9.000	On	N	19.7	26.2	56.0
4.821000	30.4	2000.0	9.000	On	N	19.6	25.6	56.0
9.406500	31.4	2000.0	9.000	On	N	19.8	28.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	39.7	2000.0	9.000	On	L1	20.2	16.3	56.0
0.258000	33.8	2000.0	9.000	On	N	19.8	17.7	51.5
0.640500	29.8	2000.0	9.000	On	N	19.8	16.2	46.0
0.793500	28.7	2000.0	9.000	On	N	19.8	17.3	46.0
1.270500	26.4	2000.0	9.000	On	N	19.7	19.6	46.0
24.063000	29.9	2000.0	9.000	On	N	20.1	20.1	50.0

END OF REPORT