FCC 15B TEST REPORT

No. I20Z62131-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE mobile phone

Model Name: 4056S,4056SPP,4056V

FCC ID: 2ACCJN048

with

Hardware Version: 03

Software Version: 5ERAZZ00

Issued Date: 2021-05-06

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
I20Z62131-EMC01	Rev.0	1st edition	2021-04-23
I20Z62131-EMC01	Rev.1	2nd edition.Updata the note in Page 7.	2021-05-06

CONTENTS

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: 2021-01-05

Testing End Date: 2021-02-03

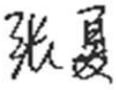
1.4. Signature

An Hui

(Prepared this test report)

Zhang Ying

(Reviewed this test report)



Zhang Xia

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax	0086-755-36612000-81722

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

3.1. About EUT

Description	GSM/UMTS/LTE mobile phone
Model Name	4056S,4056SPP,4056V
FCC ID	2ACCJN048

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	/	03	5FYCZZ00
EUT2	015921000012609	03	5ERAZZ00

*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	/	/
AE4	USB Cable	/	/

AE1

Model	TLi017C7
Manufacturer	VEKEN
Capacity	Typical capacity 1850mAh，rated capacity 1780mAh
Nominal Voltage	/

AE2

Model	UC11US
Manufacturer	PUAN
Length of cable	/

AE3

Model	CDA0000162C2
Manufacturer	Shenghua
Length of cable	/

AE4

Model	CDA0000162C8
Manufacturer	PUAN
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/AE4	Charger1
Set.2	EUT1+ AE1 + AE3/AE4	USB
Set.3	EUT2+ AE1 + AE2+ AE3/AE4	Charger1

Note1:

I20Z62131 is a variant model based on I20Z62110, According to the declaration of changes provided by the applicant and FCC KDB publication 178919; According to the declaration of changes, the following test items and test modes were performed:

Test Item	Mode or Feature	EUT Set-up
Radiated Continuous Emission	GSM850 Idle	Set.3

Other results are inherited from the initial model. The report number of initial model is I20Z62110-EMC01.

Note2：

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE Band 5/12/13. The measurement results showed here are worst cases of different bands.

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 (23 meters × 17meters × 10meters) did not exceed following limits along the EMC 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
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 ℃, 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

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
	BR	Re-use test data from basic model report.

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	A.1	P	**CTTL(huayuan North Road)**
2	Conducted Emission	15.107(a)	A.2	BR	**CTTL(huayuan North Road)**

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	LISN	ENV216	101200	Rohde & Schwarz	2021-05-19	1 Year
2	Test Receiver	ESCI 7	100344	Rohde & Schwarz	2021-02-26	1 Year
3	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-03	1 Year
4	BiLog Antenna	VULB9163	9163-1223	Schwarzbeck	2021-03-18	1 Year
5	Dual-Ridge Waveguide Horn Antenna	3115	167250	ETS-Lindgren	2021-05-14	1 Year
6	Universal Radio Communication Tester	CMW500	116588	R&S	2022-01-07	1 Year
8	PC	M4000e-17	M706GWXD	Lenovo	N/A	N/A
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01.0	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 (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 charging mode. During the test MS 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.

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.

Limit(10m)=Limit(3m)+20[log(3/10)]

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): 30MHz-1GHz：5.16dB, 1GHz-18GHz：5.44dB, *k*=2.

Note： The measurement results showed here are worst cases of the combinations of different Battery, cables and Headset.

Note:The measurement results showed here are worst cases.

Measurement results for Set.1:

EUT1 Charger+REAR Camera+GSM850 idle Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.300000	21.97	30.00	8.03	121.0	V	210.0
35.469000	21.81	30.00	8.19	101.0	V	-20.0
59.063000	12.70	30.00	17.30	208.0	V	5.0
104.718000	13.54	33.50	19.98	121.0	V	-29.0
178.156000	18.46	33.50	15.06	102.0	V	120.0
209.990000	17.59	33.50	15.93	125.0	V	170.0

EUT1 Charger+REAR Camera+GSM850 idle Mode/Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17977.333	48.5	-5.4	43.4	10.516	H	54	5.5
17990.933	48.4	-5.4	33.8	20.016	H	54	5.6
17966.567	48.1	-5.4	43.4	10.116	V	54	5.9
17986.967	48.0	-5.4	43.4	10.016	H	54	6
17981.300	47.9	-5.4	43.4	9.916	H	54	6.1
17998.300	47.8	-5.4	43.4	9.816	H	54	6.2

EUT1 Charger+REAR Camera+GSM850 idle Mode/Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17917.833	57.4	-5.4	43.4	19.416	H	74	16.6
17990.933	57.0	-5.4	33.8	28.616	H	74	17
17988.667	56.6	-5.4	43.4	18.616	V	74	17.4
17977.333	56.5	-5.4	43.4	18.516	H	74	17.5
17958.633	56.3	-5.4	43.4	18.316	H	74	17.7
17897.433	56.2	-5.7	43.4	18.538	H	74	17.8

Measurement results for Set.1:

EUT1 Charger+Front camera Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.002000	21.53	30.00	8.47	125.0	V	210.0
35.658000	21.55	30.00	8.45	291.0	V	153.0
36.675000	20.35	30.00	9.65	111.0	V	110.0
104.538000	13.84	33.50	19.68	125.0	V	291.0
175.283000	17.71	33.50	15.81	108.0	V	-27.0
205.639000	16.82	33.50	16.70	125.0	V	69.0

EUT1 Charger+Front camera Mode/Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17975.633	48.3	-5.4	43.4	10.316	H	54	5.7
17968.833	48.1	-5.4	33.8	19.716	H	54	5.9
17938.800	47.7	-5.4	43.4	9.716	V	54	6.3
17989.800	47.6	-5.4	43.4	9.616	H	54	6.4
17845.867	47.6	-5.7	43.4	9.938	H	54	6.4
17998.300	47.6	-5.4	43.4	9.616	H	54	6.4

EUT1 Charger+Front camera Mode/Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17983.567	57.0	-5.4	43.4	19.016	H	74	17
17983.000	56.7	-5.4	33.8	28.316	H	74	17.3
17996.033	56.3	-5.4	43.4	18.316	V	74	17.7
17924.067	56.2	-5.4	43.4	18.216	H	74	17.8
17897.433	56.1	-5.7	43.4	18.438	H	74	17.9
17987.533	56.1	-5.4	43.4	18.116	H	74	17.9

Measurement results for Set.2:

EUT1 USB+MP4 Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
37.732000	20.11	30.00	9.89	308.0	V	168.0
69.830000	15.49	30.00	14.51	225.0	V	-26.0
93.780000	20.26	33.50	13.26	100.0	V	30.0
144.035000	24.39	33.50	9.13	325.0	H	189.0
240.065000	23.18	36.00	12.84	225.0	H	62.0
672.408000	30.05	36.00	5.97	196.0	V	254.0

EUT1 USB+MP4 Mode /Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17983.567	49.5	-5.4	43.4	11.516	H	54	4.5
17932.000	48.4	-5.4	33.8	20.016	H	54	5.6
17971.667	48.3	-5.4	43.4	10.316	V	54	5.7
17943.333	48.3	-5.4	43.4	10.316	H	54	5.7
17965.433	48.3	-5.4	43.4	10.316	H	54	5.7
17978.467	48.2	-5.4	43.4	10.216	H	54	5.8

EUT1 USB+MP4 Mode /Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17978.467	57.4	-5.4	43.4	19.416	H	74	16.6
17969.967	56.6	-5.4	33.8	28.216	H	74	17.4
17988.667	56.2	-5.4	43.4	18.216	V	74	17.8
17972.800	56.1	-5.4	43.4	18.116	H	74	17.9
17767.100	56.0	-5.7	43.4	18.338	H	74	18
17994.900	56.0	-5.4	43.4	18.016	H	74	18

Set.3:

EUT1 Charger+REAR Camera+GSM850 idle Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.850000	22.50	30.00	7.50	1000.0	120.000	115.0
36.171000	21.43	30.00	8.57	1000.0	120.000	125.0
37.645000	21.11	30.00	8.89	1000.0	120.000	104.0
39.788000	19.31	30.00	10.69	1000.0	120.000	182.0
100.639000	10.01	33.50	23.51	1000.0	120.000	225.0
206.452000	11.44	33.50	22.08	1000.0	120.000	125.0

EUT1 Charger+REAR Camera+GSM850 idle Mode/Average detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17935.967	45.2	-29.4	46.7	27.939	H	54	8.8
17900.833	43.4	-29.3	46.0	26.772	H	54	10.6
17919.533	43.2	-29.3	46.7	25.865	V	54	10.8
17969.967	43.2	-29.1	46.7	25.601	H	54	10.8
17929.167	43.1	-29.4	46.7	25.839	H	54	10.9
17936.533	43.1	-29.4	46.7	25.839	H	54	10.9

EUT1 Charger+REAR Camera+GSM850 idle Mode/Peak detector

Frequency (MHz)	Result (dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dBμV)	Polarity	Limit (dBμV/m)	Margin (dB)
17937.100	51.7	-29.4	46.7	34.439	H	74	22.3
17954.667	51.7	-28.9	46.7	33.983	H	74	22.3
17971.100	51.5	-29.1	46.7	33.901	V	74	22.5
17969.967	51.3	-29.1	46.7	33.701	H	74	22.7
17896.867	51.2	-29.5	46.0	34.780	H	74	22.8
17977.900	51.2	-29.1	46.7	33.601	H	74	22.8

EUT1 Charger+REAR Camera+GSM850 idle Mode, Set.1

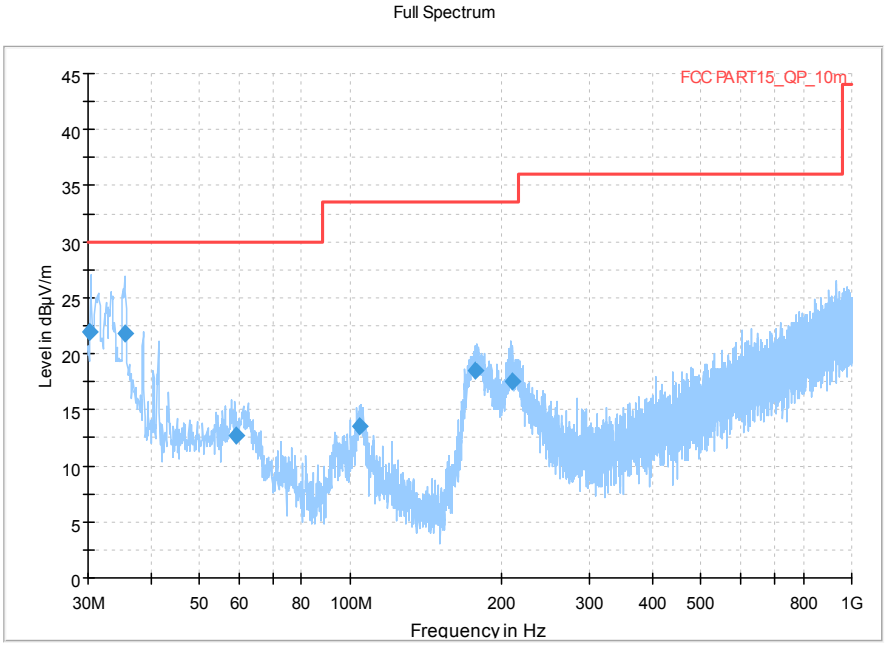


Figure A.1 Radiated Emission from 30MHz to 1GHz

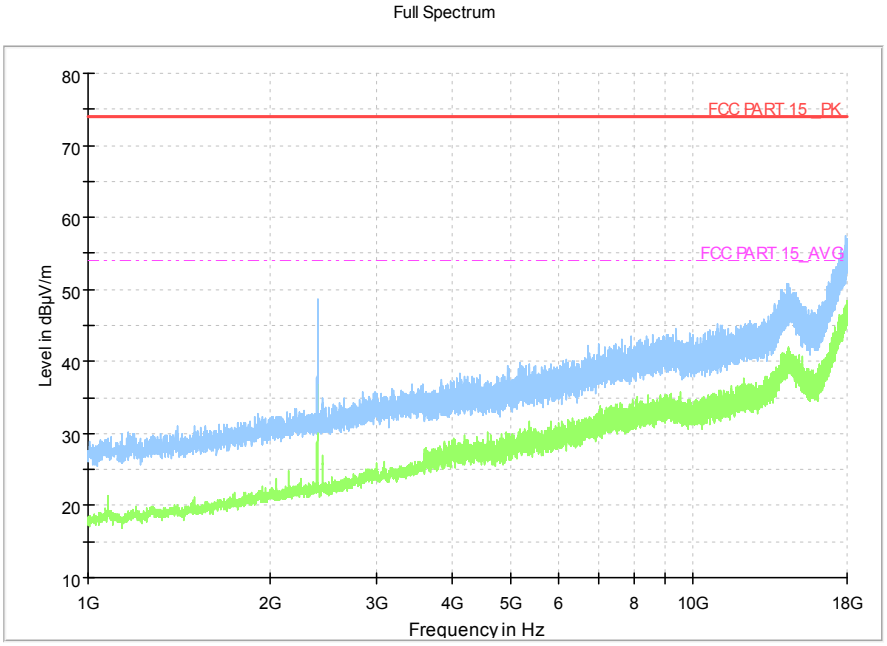


Figure A.2 Radiated Emission from 1GHz to 18GHz

EUT1 Charger+Front camera Mode , Set.1

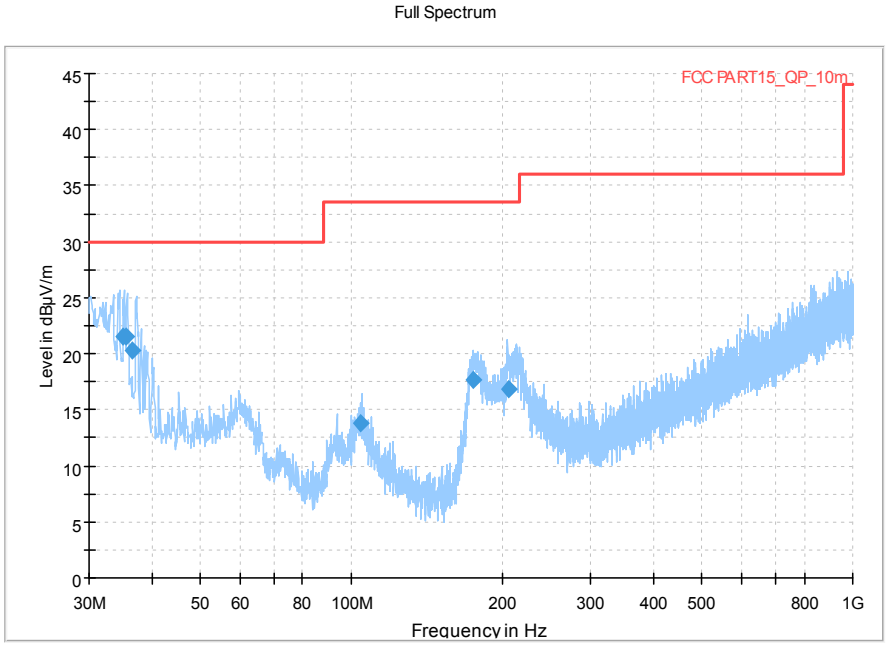


Figure A.3 Radiated Emission from 30MHz to 1GHz

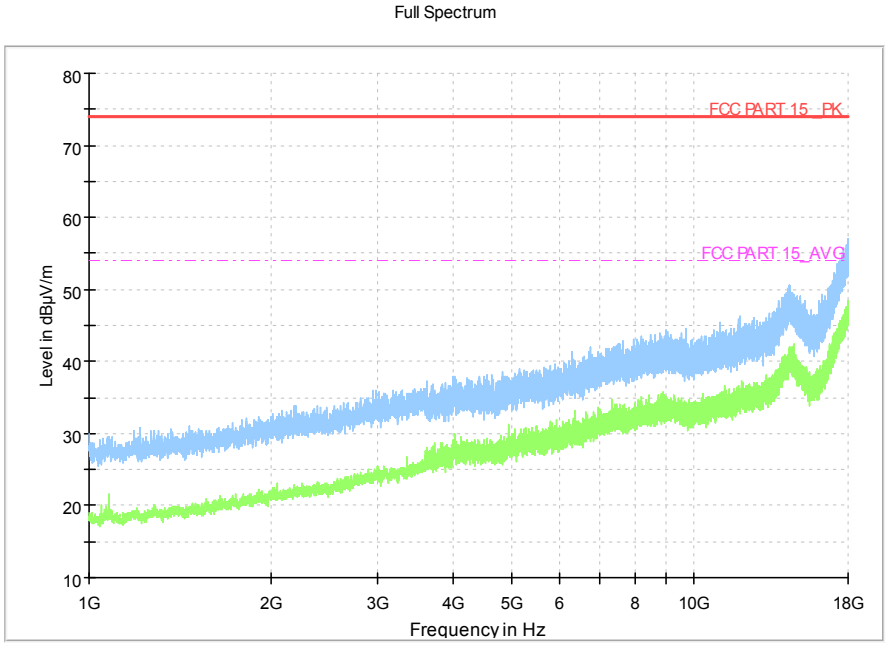


Figure A.4 Radiated Emission from 1GHz to 18GHz

EUT1 USB+MP4 Mode, Set.2

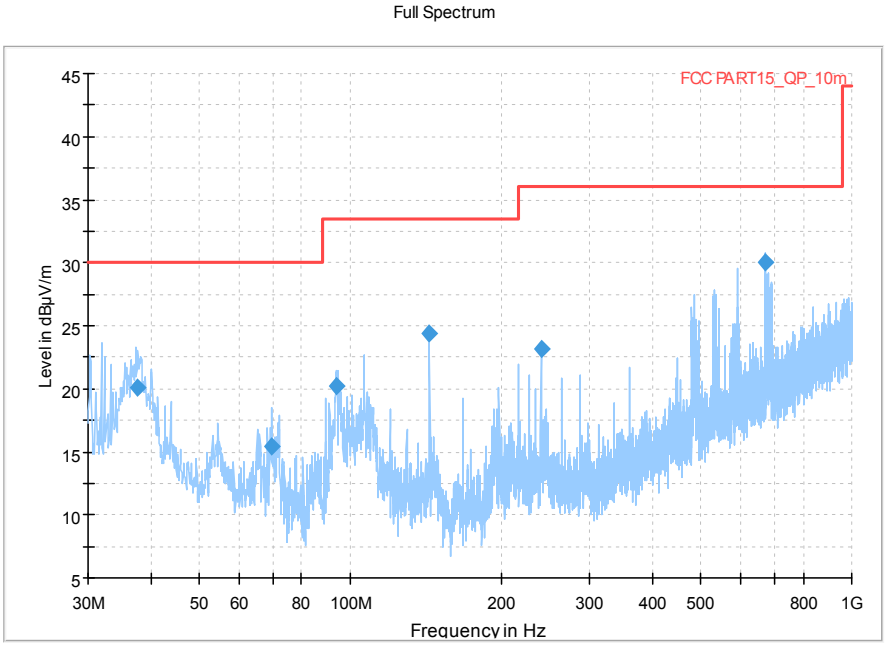


Figure A.5 Radiated Emission from 30MHz to 1GHz

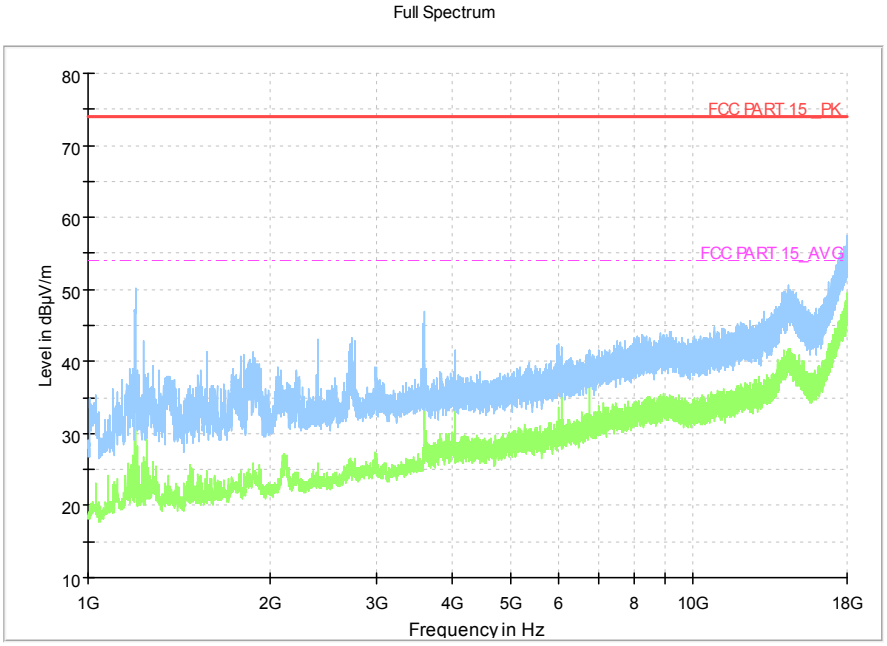


Figure A.6 Radiated Emission from 1GHz to 18GHz

EUT3 Charger+REAR Camera+GSM850 idle Mode, Set.3

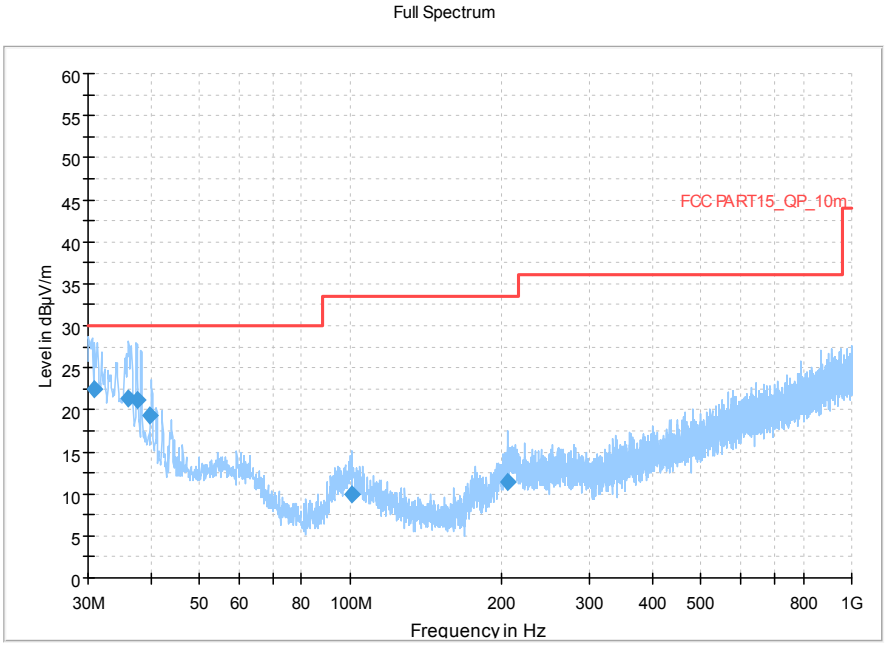


Figure A.7 Radiated Emission from 30MHz to 1GHz

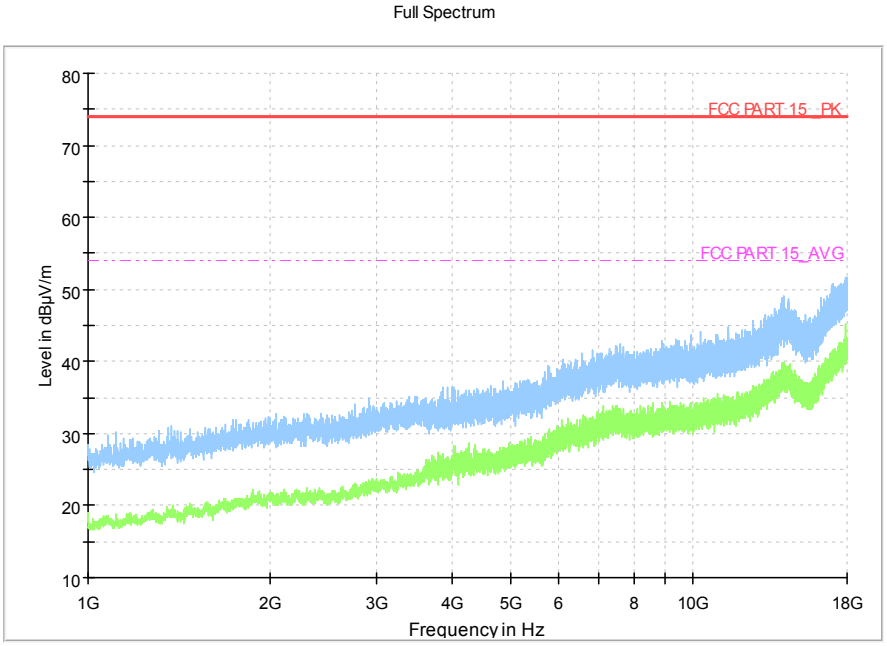


Figure A.8 Radiated Emission from 1GHz to 18GHz

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 charging mode. During the test MS is connected to a charger in the case of charging mode.

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*=3.08dB, *k*=2.

Note： The measurement results showed here are worst cases of the combinations of different Battery, cables and Headset.

Note:The measurement results showed here are worst cases.

EUT1 Charger+REAR Camera, Set.1

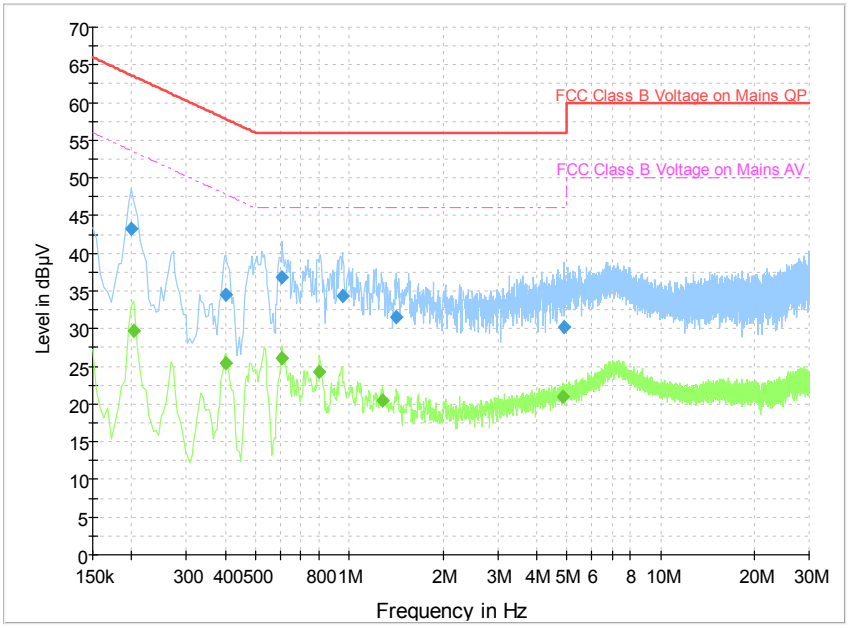


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0. 199500	43. 2	L1	19. 6	20. 4	63. 6
0. 402000	34. 5	N	19. 6	23. 3	57. 8
0. 609000	36. 7	L1	19. 6	19. 3	56. 0
0. 951000	34. 3	L1	19. 6	21. 7	56. 0
1. 414500	31. 5	N	19. 6	24. 5	56. 0
4. 906500	30. 3	L1	19. 8	25. 7	56. 0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0. 204000	29. 7	L1	19. 6	23. 8	53. 4
0. 402000	25. 5	N	19. 6	22. 3	47. 8
0. 609000	26. 0	L1	19. 6	20. 0	46. 0
0. 802500	24. 3	N	19. 5	21. 7	46. 0
1. 284000	20. 5	N	19. 6	25. 5	46. 0
4. 857000	21. 0	L1	19. 8	25. 0	46. 0

EUT1 Charger+Front camera Mode, Set.1

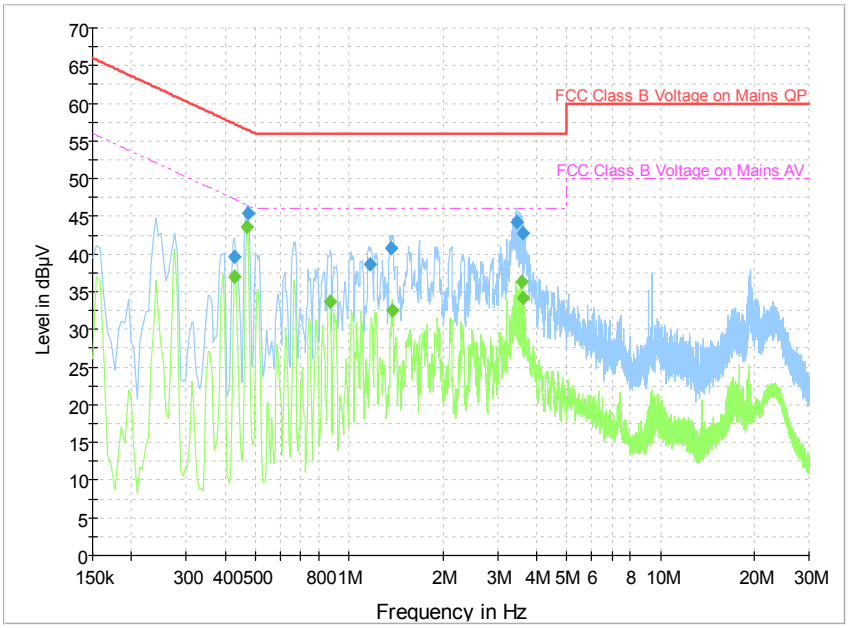


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	39.6	N	19.6	17.7	57.3
0.474000	45.4	L1	19.6	11.0	56.4
1.171500	38.6	L1	19.6	17.4	56.0
1.369500	40.8	N	19.6	15.2	56.0
3.462000	44.2	L1	19.7	11.8	56.0
3.619500	42.7	L1	19.7	13.3	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	37.0	L1	19.6	10.3	47.3
0.469500	43.6	L1	19.6	2.9	46.5
0.865500	33.6	N	19.5	12.4	46.0
1.374000	32.6	L1	19.6	13.4	46.0
3.597000	36.3	N	19.6	9.7	46.0
3.619500	34.1	L1	19.7	11.9	46.0

EUT1 USB+MP4 Mode, Set.2

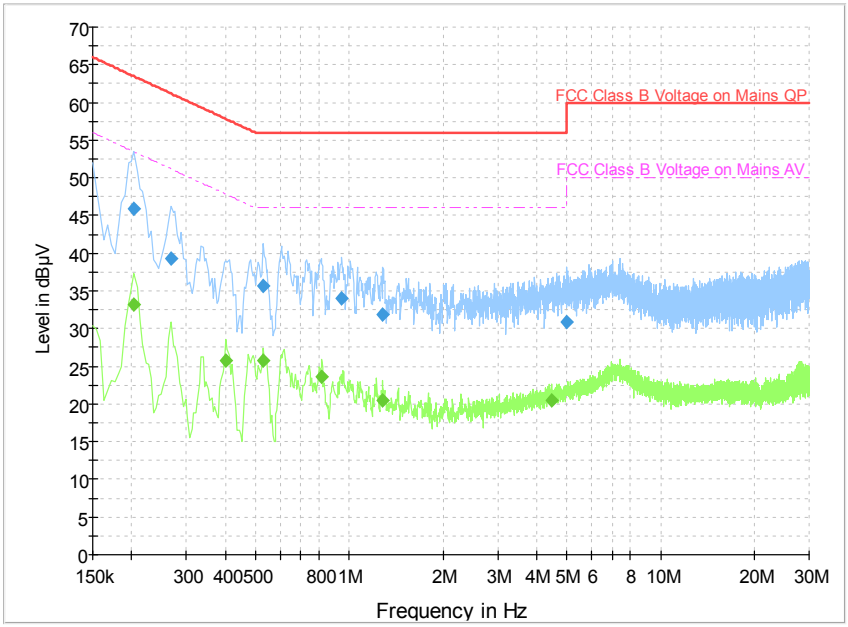


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	46.0	L1	19.6	17.5	63.4
0.267000	39.4	L1	19.6	21.9	61.2
0.528000	35.6	N	19.5	20.4	56.0
0.946500	34.0	N	19.6	22.0	56.0
1.284000	31.8	N	19.6	24.2	56.0
4.992000	30.8	N	19.7	25.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	33.1	L1	19.6	20.3	53.4
0.402000	25.7	N	19.6	22.1	47.8
0.528000	25.7	L1	19.6	20.3	46.0
0.816000	23.6	N	19.5	22.4	46.0
1.279500	20.4	N	19.6	25.6	46.0
4.479000	20.5	N	19.7	25.5	46.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Yang Mengke
Radiated Continuous Emission	Wang Huan, Ding Zai, Zhang Tianli

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