



FCC 15B TEST REPORT

No. I20Z60463-EMC01

for

TCL Communication Ltd.

LTE/UMTS/GSM mobile phone

Model Name: 5061A

FCC ID: 2ACCJH125

with

Hardware Version: PIO

Software Version: v6H1H

Issued Date: 2020-05-07

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z60463-EMC01	Rev.0	1 st edition	2020-05-07

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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: 2020-03-31

Testing End Date: 2020-04-29

1.4. Signature



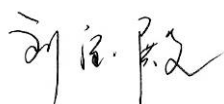
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2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
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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
City: Hong Kong
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Country: China
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	LTE/UMTS/GSM mobile phone
Model Name	5061A
FCC ID	2ACCJH125

The Equipment under Test (EUT) is a model of LTE/UMTS/GSM mobile phone with integrated antenna and inbuilt battery.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

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	355823110201247	PIO	v6H1H

*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	Battery	/	/
AE3	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	/
AE6	USB Cable	/	/
AE7	Headset	/	/
AE8	Headset	/	/
AE9	Headset	/	/
AE10	Headset	/	(No test)
AE11	Headset	/	(No test)
AE12	Headset	/	(No test)

AE1

Model	CAC4850000C1
Manufacturer	BYD
Capacitance	/
Nominal voltage	/



AE2

Model	CAC4850002C7
Manufacturer	VEKEN
Capacitance	/
Nominal voltage	/

AE3

Model	CBA0059AGAC5
Manufacturer	PUAN
Length of cable	/

AE4

Model	CBA0059AGAC7,
Manufacturer	Chenyang
Length of cable	/

AE5

Model	CDA0000123C2,
Manufacturer	SHENGHUA
Length of cable	/

AE6

Model	CDA0000123C1,
Manufacturer	JUWEI
Length of cable	/

AE7

Model	CCB0049A10C1
Manufacturer	
Length of cable	/

AE8

Model	CCB0049A10C4
Manufacturer	MEIHAO
Length of cable	/

AE9

Model	CCB0023A12C1,
Manufacturer	JUWEI
Length of cable	/

AE10

Model	CCB0049A12C1
Manufacturer	JUWEI
Length of cable	/

AE11

Model	CCB0049A12C4
Manufacturer	MEIHAO
Length of cable	/

AE12

Model	CCB0023A14C1
Manufacturer	JUWEI
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	EUT2+ AE1/E2 + AE3 + AE5/AE6	Charger+MP3+GNSS + GSM850 idle
Set.2	EUT2+ AE1/E2 + AE4 + AE5/AE6	Charger+CAMERA + WCDMA850 idle
Set.3	EUT2+AE1/E2+AE5/AE6+E7/AE8/AE9	USB mode +FM + LTE FDD Band 13

Note:

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE B5, LTE B12, LTE B13, and LTE B17.

The EUT was tested while operating in licensed band RX mode. All licensed band receivers 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	10-1-16 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 M
Ground system resistance	< 4
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 M
Ground system resistance	< 4

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/4	The test is performed in test location 1/2/4 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)	A.1	P	1
2	Conducted Emission	15.107(a)	A.2	P	1

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	LISN	ENV216	101200	Rohde & Schwarz	1 Years	2020-05-27
2	Test Receiver	ESCI	100948	Rohde & Schwarz	1 Years	2020-07-11
3	Test Receiver	ESU26	100235	Rohde & Schwarz	1 Years	2021-03-05
4	BiLog Antenna	VULB9163	9163-483	Schwarzbeck	1 Years	2020-09-17
5	EMI Antenna	3115	00167250	ETS-Lindgren	1 Years	2020-05-15
	Universal Radio Communication Tester	CMW500	150344	R&S	1 Years	2020-11-17
6	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	L100	CN0RH659658 907ATOI40	DELL	N/A	N/A
9	Mouse	M-UAE119	LZ935220ZRC	Lenovo	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 and FM 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 2.2, 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 ($\mu\text{V/m}$)		
	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: 5.16dB, 1GHz-18GHz: 5.44dB, $k=2$.

Measurement results for Set.1:

Charger+MP3+GNSS + GSM850 idle

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.799000	11.95	30.00	18.05	102.0	V	17.0
48.490000	17.48	30.00	12.52	111.0	V	20.0
98.930000	17.08	33.50	16.44	108.0	V	205.0
117.143000	21.81	33.50	11.71	105.0	V	210.0
217.575000	22.08	36.00	13.94	102.0	V	17.0
334.751000	21.84	36.00	14.18	109.0	V	15.0

Charger+MP3+GNSS + GSM850 idle Average detector

Frequency (MHz)	Result (dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17980.733	43.7	-17.7	45.6	15.800	H	54.0	10.3
17952.400	43.2	-17.7	45.6	15.300	H	54.0	10.8
17951.833	43.2	-17.7	45.6	15.300	V	54.0	10.8
17911.600	43.1	-18.5	45.6	16.000	H	54.0	10.9
17939.933	43.0	-17.7	45.6	15.100	H	54.0	11.0
17983.000	43.0	-17.7	45.6	15.100	H	54.0	11.0

Charger+MP3+GNSS + GSM850 idle Peak detector

Frequency (MHz)	Result (dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17970.533	52.1	-17.7	45.6	24.200	H	74.0	21.9
17997.167	51.9	-17.7	45.6	24.000	H	74.0	22.1
17884.400	51.8	-18.5	45.6	24.700	V	74.0	22.2
17937.100	51.7	-17.7	45.6	23.800	H	74.0	22.3
17984.133	51.7	-17.7	45.6	23.800	H	74.0	22.3
17838.500	51.6	-18.5	45.6	24.500	H	74.0	22.4

Measurement results for Set.2:
USB & FM Mode QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
42.037000	21.42	30.00	8.58	225.0	V	61.0
43.543000	19.17	30.00	10.83	105.0	V	74.0
45.876000	18.24	30.00	11.76	121.0	V	178.0
115.554000	20.64	33.50	12.88	119.0	V	95.0
214.374000	22.74	33.50	10.78	103.0	V	16.0
332.982000	23.32	36.00	12.70	107.0	V	-21.0

USB & FM Mode & FM Mode/Average detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17939.933	43.7	-17.7	45.6	15.800	H	54.0	10.3
17967.133	43.6	-17.7	45.6	15.700	H	54.0	10.4
17954.100	43.3	-17.7	45.6	15.400	V	54.0	10.7
17979.600	43.2	-17.7	45.6	15.300	H	54.0	10.8
17983.567	43.1	-17.7	45.6	15.200	H	54.0	10.9
17941.067	43.1	-17.7	45.6	15.200	H	54.0	10.9

USB & FM Mode & FM Mode/Peak detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17872.500	52.1	-18.5	45.6	25.000	H	74.0	21.9
17994.900	51.7	-17.7	45.6	23.800	H	74.0	22.3
17907.633	51.6	-18.5	45.6	24.500	V	74.0	22.4
17968.267	51.5	-17.7	45.6	23.600	H	74.0	22.5
17951.833	51.2	-17.7	45.6	23.300	H	74.0	22.8
17964.867	51.2	-17.7	45.6	23.300	H	74.0	22.8

Measurement results for Set.3:
USB & FM Mode QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
32.522000	21.14	30.00	8.86	1000.0	120.000	184.0
140.640000	26.36	33.50	7.16	1000.0	120.000	104.0
206.826000	18.50	33.50	15.02	1000.0	120.000	102.0
281.498000	23.59	36.00	12.43	1000.0	120.000	104.0
399.796000	32.66	36.00	3.36	1000.0	120.000	211.0
450.010000	33.55	36.00	2.47	1000.0	120.000	275.0

USB & FM Mode Average detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17990.367	44.4	-17.7	45.6	16.500	H	54.0	9.6
17995.467	44.3	-17.7	45.6	16.400	H	54.0	9.7
17985.267	44.2	-17.7	45.6	16.300	V	54.0	9.8
17975.633	44.0	-17.7	45.6	16.100	H	54.0	10.0
17930.867	43.9	-17.7	45.6	16.000	H	54.0	10.1
17925.767	43.7	-17.7	45.6	15.800	H	54.0	10.3

USB & FM Mode Peak detector

Frequency (MHz)	Result (dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity	Limit (dB μ V/m)	Margin (dB)
17977.900	52.7	-17.7	45.6	24.800	H	74.0	21.3
17950.133	52.6	-17.7	45.6	24.700	H	74.0	21.4
17959.200	52.6	-17.7	45.6	24.700	V	74.0	21.4
17966.000	52.3	-17.7	45.6	24.400	H	74.0	21.7
17925.767	52.2	-17.7	45.6	24.300	H	74.0	21.8
17841.333	52.0	-18.5	45.6	24.900	H	74.0	22.0

Sample calculation: Peak detector, 17998.867MHz

Result =P_{Mea} (5.20dB μ V)+ G_A (45.6dB/m)+ G_{PL}(-17.7 dB) =33.1dB μ V/m

Charger+MP3+GNSS + GSM850 idle, Set.1

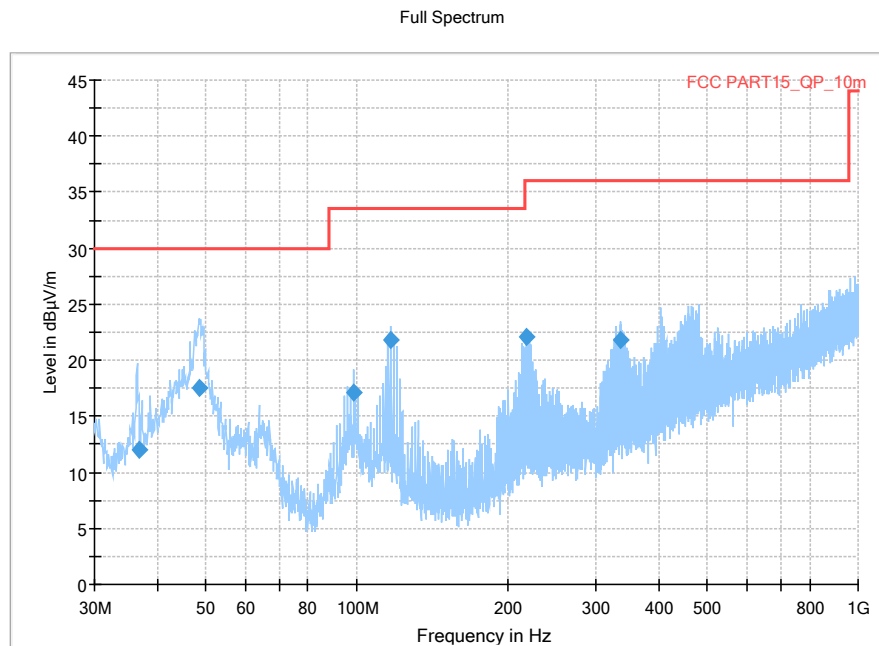


Figure A.1 Radiated Emission from 30MHz to 1GHz

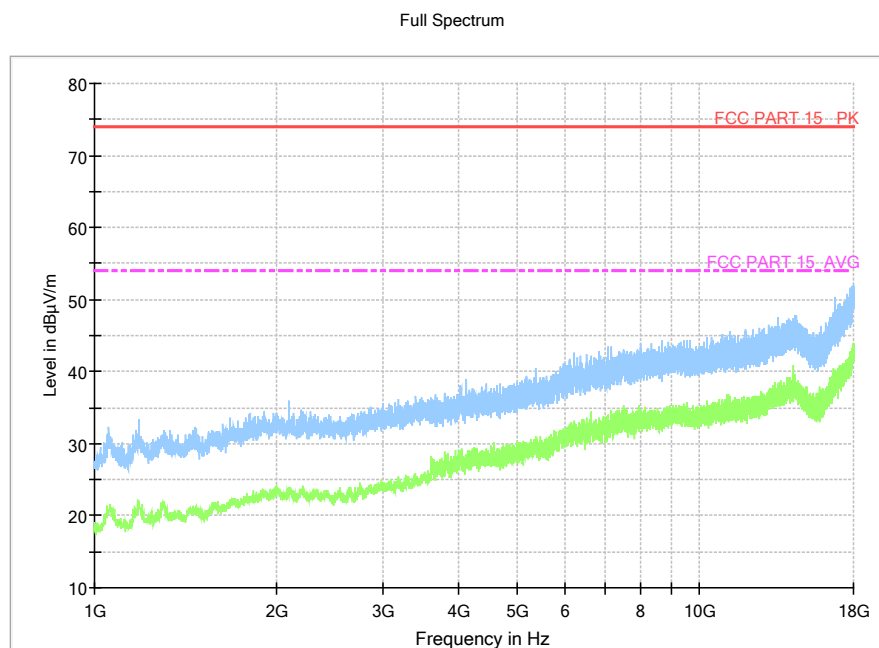


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charger+CAMERA + WCDMA850 idle, Set.2

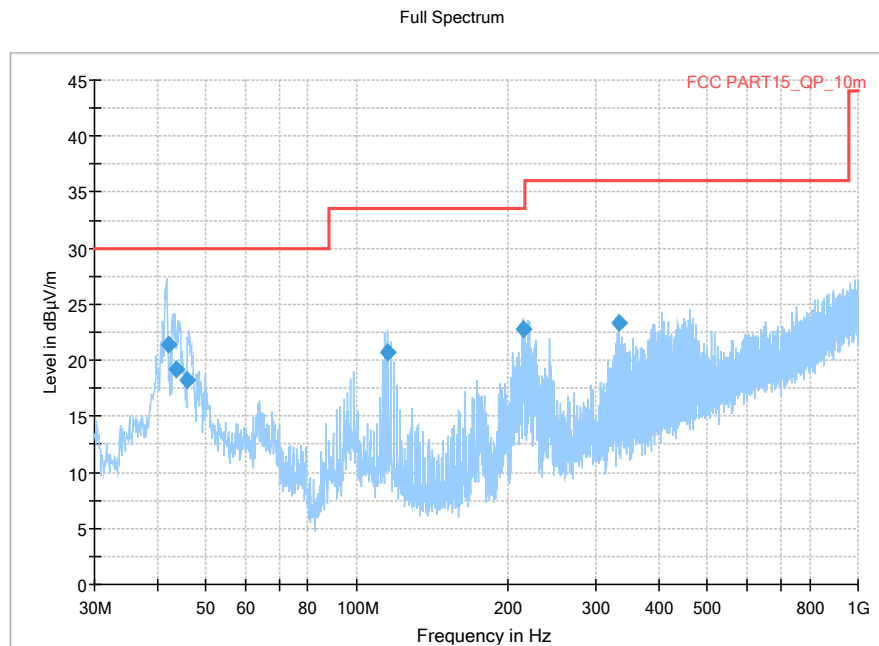


Figure A.3 Radiated Emission from 30MHz to 1GHz

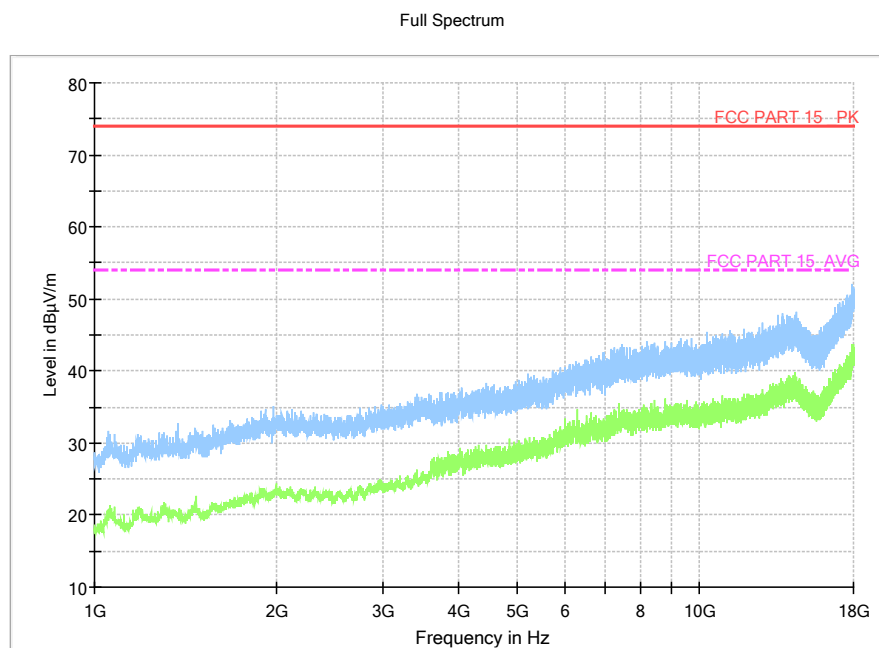


Figure A.4 Radiated Emission from 1GHz to 18GHz

USB mode +FM + LTE FDD Band 13, Set.3

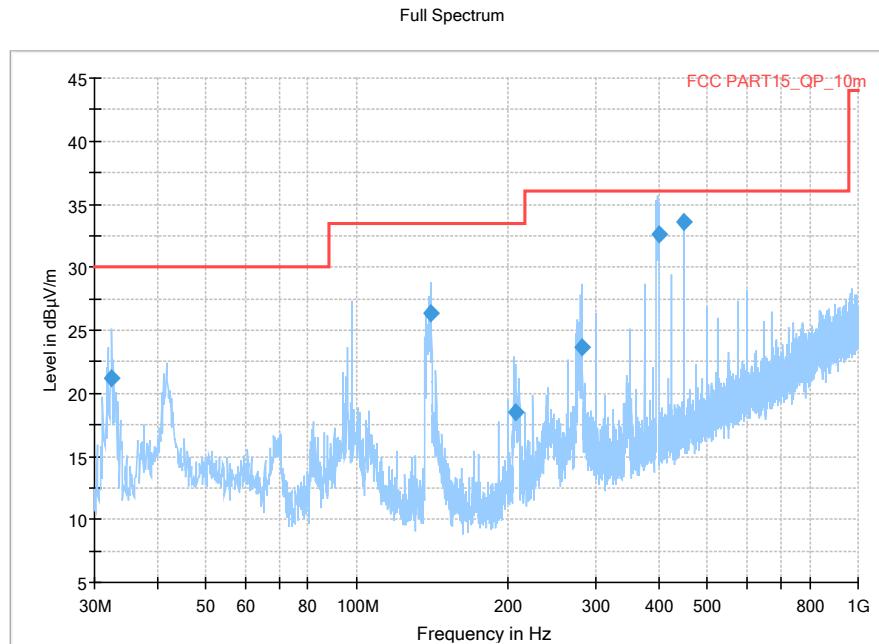


Figure A.5 Radiated Emission from 30MHz to 1GHz

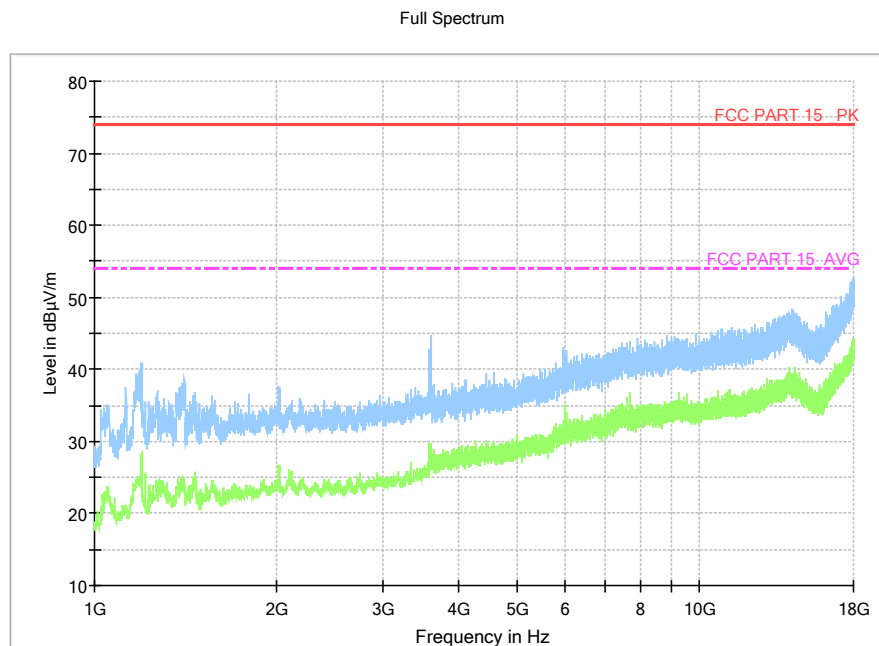


Figure A.6 Radiated Emission from 1GHz to 18GHz

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

Charger+MP3+GNSS + GSM850 idle, Set.1

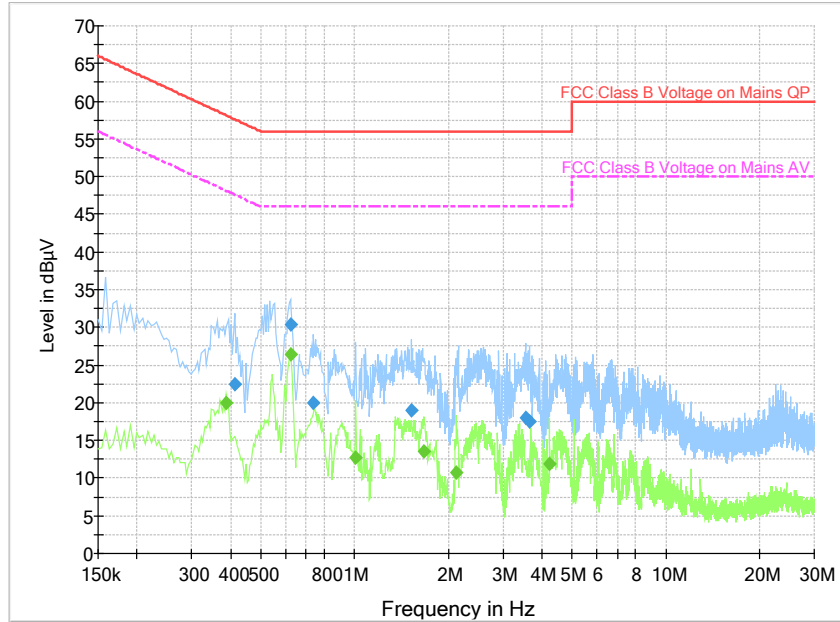


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.411000	22.4	N	19.9	35.3	57.6
0.622500	30.5	L1	19.9	25.5	56.0
0.739500	20.0	N	19.9	36.0	56.0
1.522500	19.0	N	19.8	37.0	56.0
3.538500	18.0	N	19.8	38.0	56.0
3.655500	17.5	N	19.8	38.5	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.388500	20.0	L1	19.8	28.1	48.1
0.622500	26.5	L1	19.9	19.5	46.0
1.009500	12.8	L1	19.8	33.2	46.0
1.671000	13.5	L1	19.8	32.5	46.0
2.125500	10.8	L1	19.8	35.2	46.0
4.240500	11.9	L1	19.8	34.1	46.0

Charger+CAMERA + WCDMA850 idle, Set.2

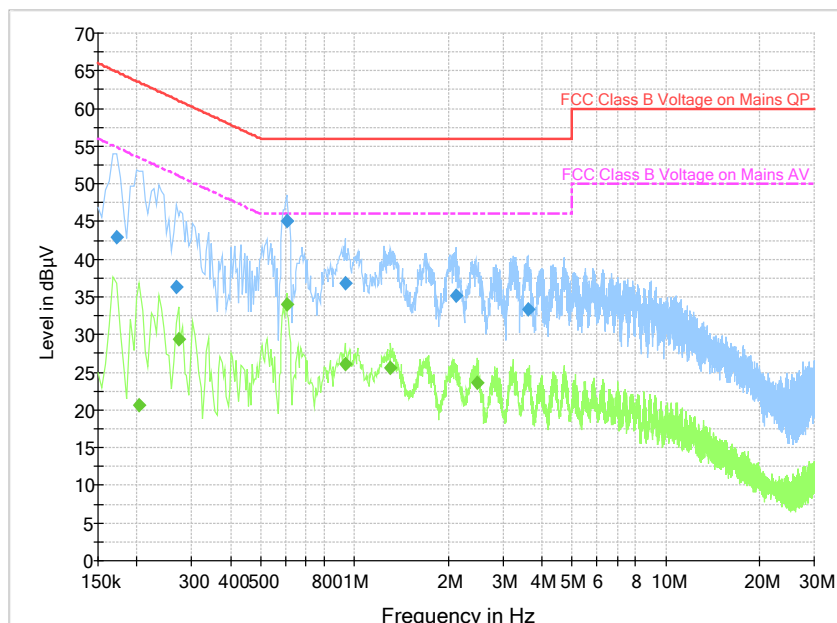


Figure A.12 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.172500	43.0	L1	19.8	21.9	64.8
0.267000	36.3	L1	19.8	24.9	61.2
0.604500	45.1	L1	19.9	10.9	56.0
0.933000	36.8	L1	19.8	19.2	56.0
2.116500	35.2	L1	19.8	20.8	56.0
3.601500	33.4	L1	19.8	22.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.204000	20.7	L1	19.8	32.8	53.4
0.271500	29.4	L1	19.8	21.6	51.1
0.604500	33.9	L1	19.9	12.1	46.0
0.933000	26.1	L1	19.8	19.9	46.0
1.306500	25.7	L1	19.8	20.3	46.0
2.485500	23.7	L1	19.8	22.3	46.0

USB mode +FM + LTE FDD Band 13, Set.3

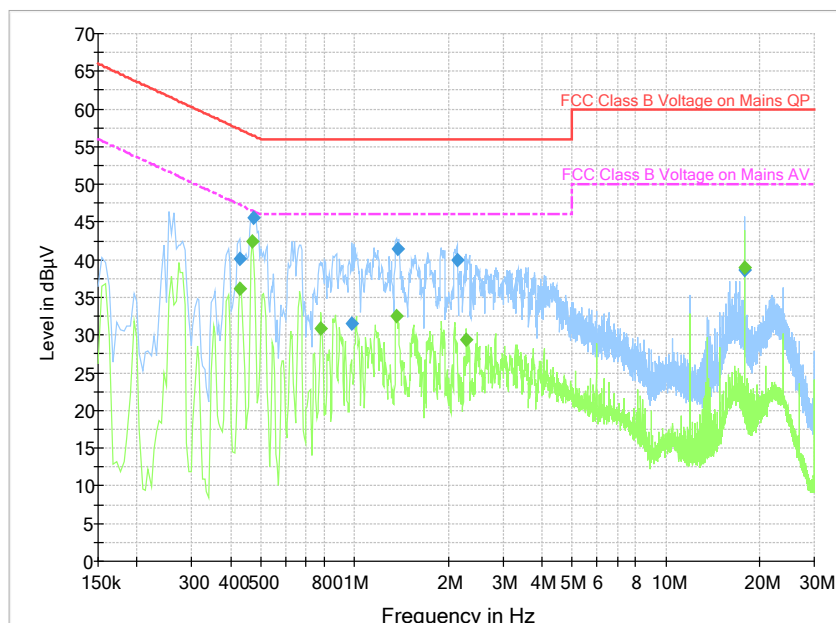


Figure A.13 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.429000	40.2	L1	19.8	17.1	57.3
0.474000	45.5	L1	19.8	10.9	56.4
0.982500	31.6	L1	19.8	24.4	56.0
1.378500	41.4	L1	19.8	14.6	56.0
2.134500	40.0	N	19.8	16.0	56.0
17.934000	38.7	L1	20.0	21.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.429000	36.1	N	19.9	11.1	47.3
0.469500	42.4	N	19.9	4.1	46.5
0.780000	30.8	N	19.9	15.2	46.0
1.365000	32.5	L1	19.8	13.5	46.0
2.292000	29.4	N	19.8	16.6	46.0
17.929500	39.0	N	20.0	11.0	50.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Wang Huan
Radiated Continuous Emission	Yan Hanchen

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