



FCC 15B TEST REPORT

No. I21Z60613-EMC01

for

Wingtech Group (Hong Kong) Limited

5G Mobile Phone

Model Name: WTCELERO5G

FCC ID: 2APXW-WTCELERO5G

with

Hardware Version: V1.0

Software Version: WTCELERO5G_0.01.01

Issued Date: 2021-06-04

Note:

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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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z60613-EMC01	Rev.0	1 st edition	2021-06-04

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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: 2021-05-08
Testing End Date: 2021-05-21


1.4. Signature



An Hui
(Prepared this test report)



Zhang Ying
(Reviewed this test report)



Zhang Xia
Deputy Director of the laboratory
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2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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

3.1. About EUT

Description	5G Mobile Phone
Model Name	WTCELERO5G
FCC ID	2APXW-WTCELERO5G

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		V1.0	WTCELERO5G_0.01.01

*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	Note
AE1	Battery	/	/
AE2	Charger	/	/
AE3	USB Cable	/	/
AE4	Headset	/	/

AE1

Model	JU001
Manufacturer	Jiade Energy Technology (Zhuhai) Co.,Ltd
Capacitance	3820mAh
Nominal voltage	3.85V

AE2

Model	BLJ-QC06HU
Manufacturer	Zhongshan Baolijin Electronic Co., Ltd
Length of cable	/

AE3

Model	711300001041
Manufacturer	ShenZhen BRL Technology Co., Ltd
Length of cable	/

AE4

Model	Headset
Manufacturer	/
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	Charger + Back Camera + RX worse case
Set.2	EUT1 + AE1 + AE2 + AE3	Charger + MP4
Set.3	EUT1 + AE1 + AE3 + AE4	USB + FM

Note:

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM 850MHz, WCDMA Band5, LTE Bands 5/12/13/26/71. 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 °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
	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	P	CTTL(huayuan North Road)

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	R&S	2021-09-04	1 year
2	Test Receiver	ESCI	100766	R&S	2022-03-09	1 year
3	LISN	ENV216	101459	R&S	2022-03-22	1 year
4	BiLog Antenna	VULB9163	9163-482	Schwarzbeck	2021-11-04	1 year
5	EMI Antenna	3117	00139065	ETS-Lindgren	2021-10-11	1 year
6	Universal Radio Communication Tester	CMW500	159408	R&S	2022-03-08	1 year
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	KU-1601	2048361	Lenovo	N/A	N/A
9	Mouse	EMS-537A	8021S3MC	Lenovo	N/A	N/A
10	PC	M4000e-17	M706RMW2	Lenovo	N/A	N/A
1	Test Receiver	ESU26	100376	R&S	2021-09-04	1 year

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) 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.

$$\text{Limit}(10\text{m})=\text{Limit}(3\text{m})+20[\log(3/10)]$$

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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz: 5.40dB, 1GHz-18GHz: 4.32dB, $k=2$.

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 + Back Camera +GSM 850MHz idle Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
33.589000	29.3	V	-45.0	-2.2	10.7	40.0
36.402000	23.7	V	199.0	-1.5	16.3	40.0
44.550000	30.1	V	307.0	-0.6	9.9	40.0
75.299000	25.2	V	102.0	-6.1	14.8	40.0
166.673000	27.5	V	180.0	-4.7	16.0	43.5
187.722000	25.1	V	159.0	-2.7	18.4	43.5

EUT1 Charger + Back Camera +GSM 850MHz idle 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)
17689.000	39.09	-22.2	41.2	20.00	V	54.0	14.9
17778.500	38.97	-22.4	41.3	20.08	V	54.0	15.0
17698.000	38.96	-22.2	41.2	19.89	V	54.0	15.0
17680.000	38.95	-22.1	41.2	19.85	V	54.0	15.0
17697.000	38.95	-22.2	41.2	19.88	V	54.0	15.1
17701.000	38.93	-22.2	41.2	19.87	V	54.0	15.1

EUT1 Charger + Back Camera +GSM 850MHz idle 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)
17152.000	51.7	-23.0	41.5	33.10	H	74.0	22.3
17450.500	51.5	-23.2	41.2	33.39	V	74.0	22.5
17898.500	51.2	-22.6	41.3	32.55	V	74.0	22.8
17079.500	51.1	-23.0	41.6	32.52	V	74.0	22.9
17909.000	51.1	-22.6	41.3	32.43	V	74.0	22.9
17703.000	51.1	-22.2	41.2	32.01	H	74.0	22.9

Measurement results for Set.2:
EUT1 Charger+MP4 Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
33.007000	24.9	V	-33.0	-2.3	15.1	40.0
34.559000	25.6	V	244.0	-1.9	14.4	40.0
43.968000	30.0	V	308.0	-0.6	10.0	40.0
73.941000	24.8	V	126.0	-5.8	15.2	40.0
165.509000	27.6	V	187.0	-4.7	15.9	43.5
189.856000	25.2	V	186.0	-2.3	18.3	43.5

EUT1 Charger+MP4 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)
17698.500	39.04	-22.2	41.2	19.98	V	54.0	15.0
17687.000	38.98	-22.1	41.2	19.89	V	54.0	15.0
17738.500	38.91	-22.3	41.2	19.93	H	54.0	15.1
17686.500	38.86	-22.1	41.2	19.76	V	54.0	15.1
17707.500	38.85	-22.2	41.2	19.80	V	54.0	15.2
17691.500	38.84	-22.2	41.2	19.76	V	54.0	15.2

EUT1 Charger+MP4 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)
17781.000	51.55	-22.4	41.3	32.66	V	74.0	22.4
17712.000	51.54	-22.2	41.2	32.50	V	74.0	22.5
16982.000	51.28	-23.0	41.7	32.61	H	74.0	22.7
17854.500	51.14	-22.5	41.3	32.39	V	74.0	22.9
17997.000	50.99	-22.8	41.3	32.45	V	74.0	23.0
17125.000	50.97	-23.0	41.6	32.42	H	74.0	23.0

Measurement results for Set.3:
EUT1 USB + FM Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBUV/m)
35.820000	27.8	V	245.0	-1.6	12.2	40.0
43.192000	25.6	V	282.0	-0.6	14.4	40.0
78.694000	28.0	V	263.0	-6.8	12.0	40.0
203.145000	28.0	H	0.0	-2.1	15.5	43.5
234.767000	30.1	H	102.0	-0.8	15.9	46.0
517.037000	37.7	V	-39.0	6.3	8.3	46.0

EUT1 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)
17699.500	38.86	-22.2	41.2	19.80	V	54.0	15.1
17678.500	38.86	-22.1	41.2	19.75	H	54.0	15.1
17698.500	38.84	-22.2	41.2	19.77	H	54.0	15.2
17689.500	38.83	-22.2	41.2	19.75	V	54.0	15.2
17889.500	38.80	-22.6	41.3	20.12	V	54.0	15.2
17683.000	38.77	-22.1	41.2	19.67	V	54.0	15.2

EUT1 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)
17900.500	51.6	-22.6	41.3	32.98	H	74.0	22.4
17065.500	51.6	-23.0	41.6	32.99	H	74.0	22.4
17758.000	51.4	-22.3	41.3	32.44	H	74.0	22.6
17732.000	51.4	-22.3	41.2	32.38	H	74.0	22.6
17597.000	51.4	-22.3	41.2	32.40	H	74.0	22.6
17749.500	51.2	-22.3	41.3	32.22	V	74.0	22.8

EUT1 Charger+Back Camera+GSM 850MHz idle Mode, Set.1

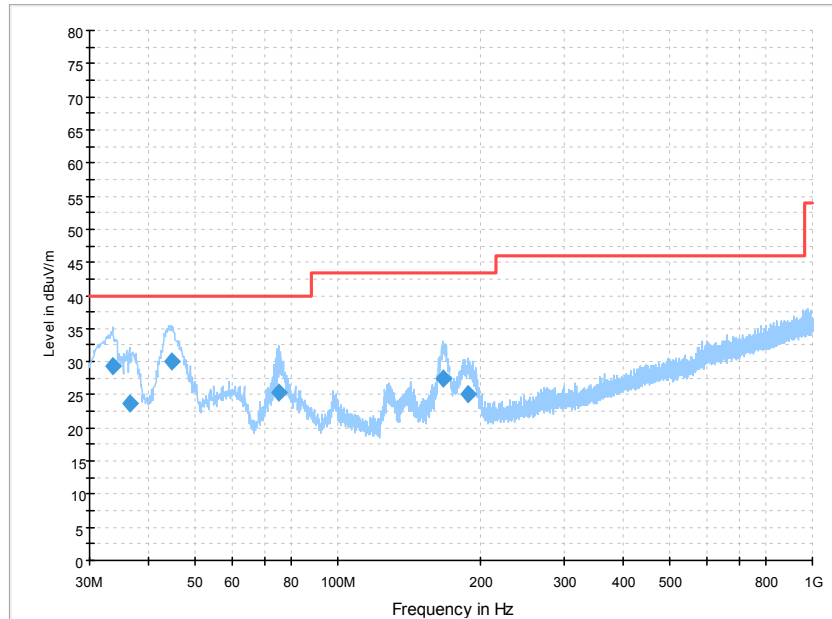


Figure A.1 Radiated Emission from 30MHz to 1GHz

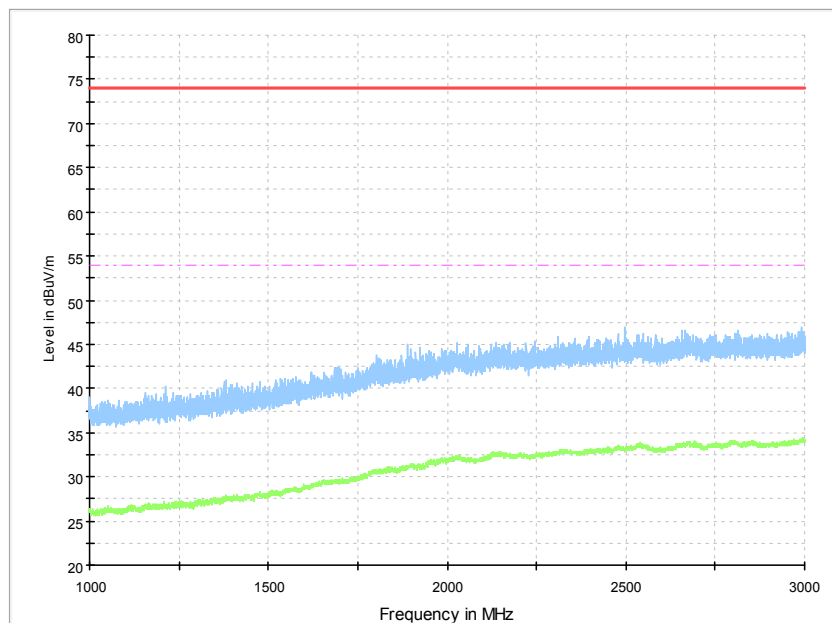


Figure A.2 Radiated Emission from 1GHz to 3GHz

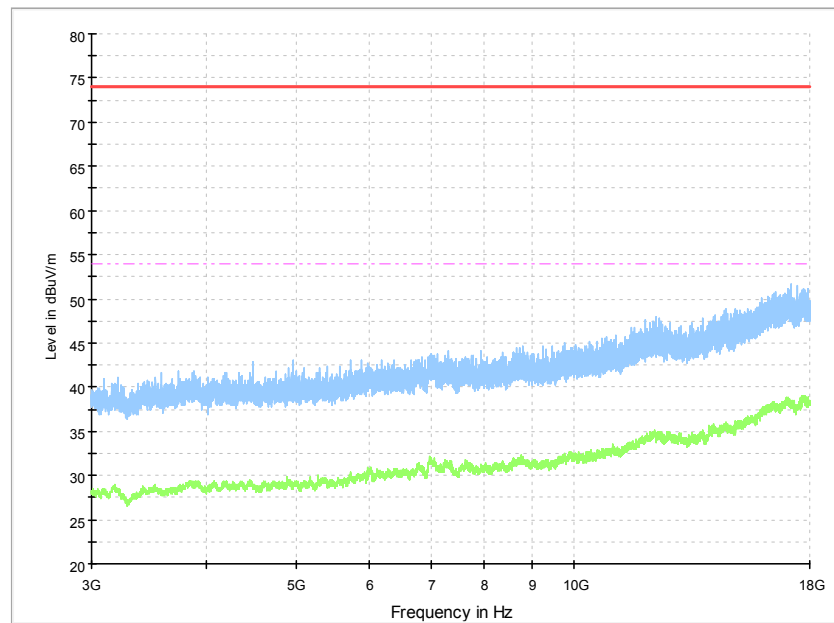


Figure A.3 Radiated Emission from 3GHz to 18GHz

EUT1 Charger+MP4 Mode, Set.2

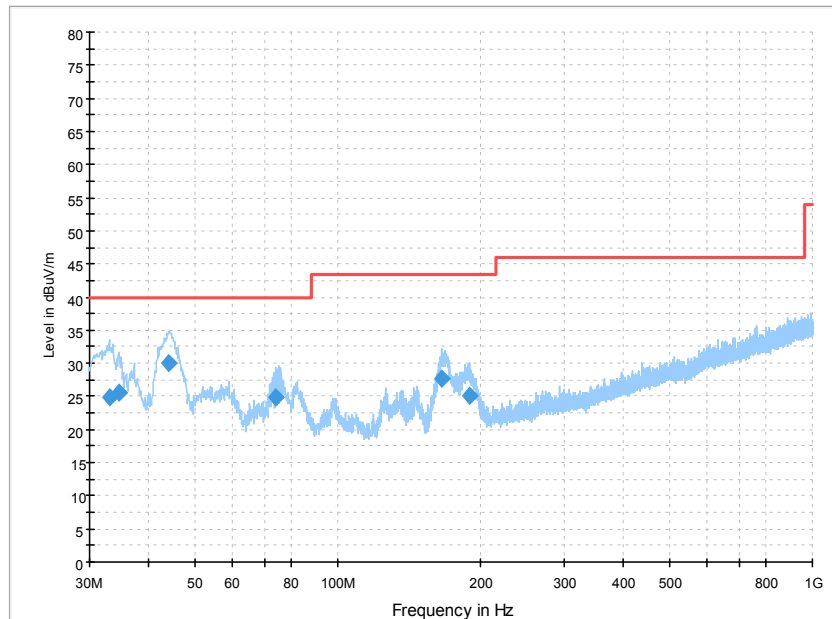


Figure A.4 Radiated Emission from 30MHz to 1GHz

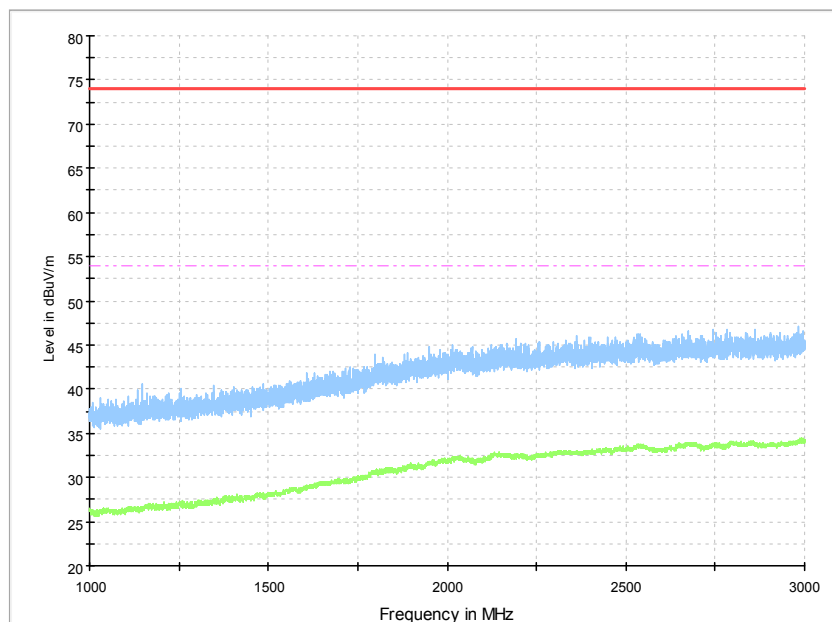


Figure A.5 Radiated Emission from 1GHz to 3GHz

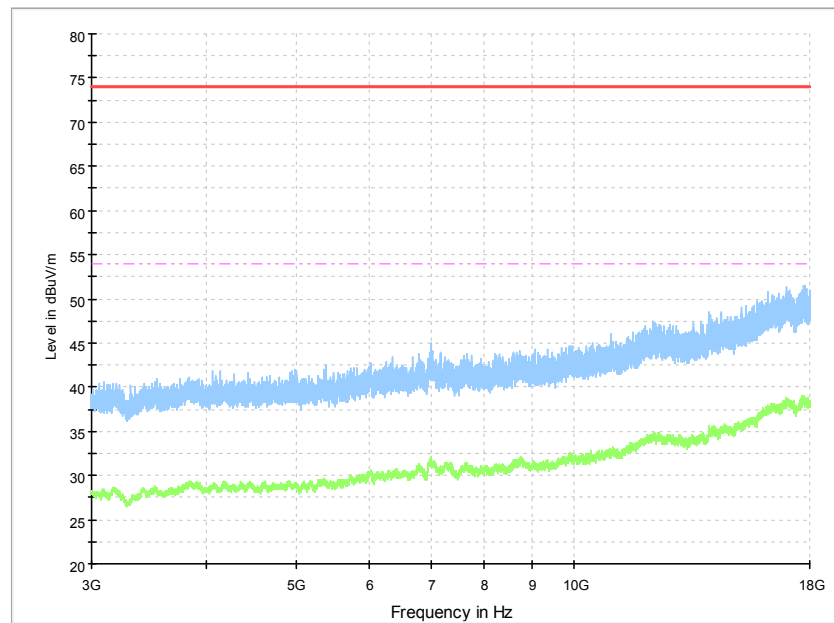


Figure A.56 Radiated Emission from 3GHz to 18GHz

EUT1 USB+FM Mode, Set.3

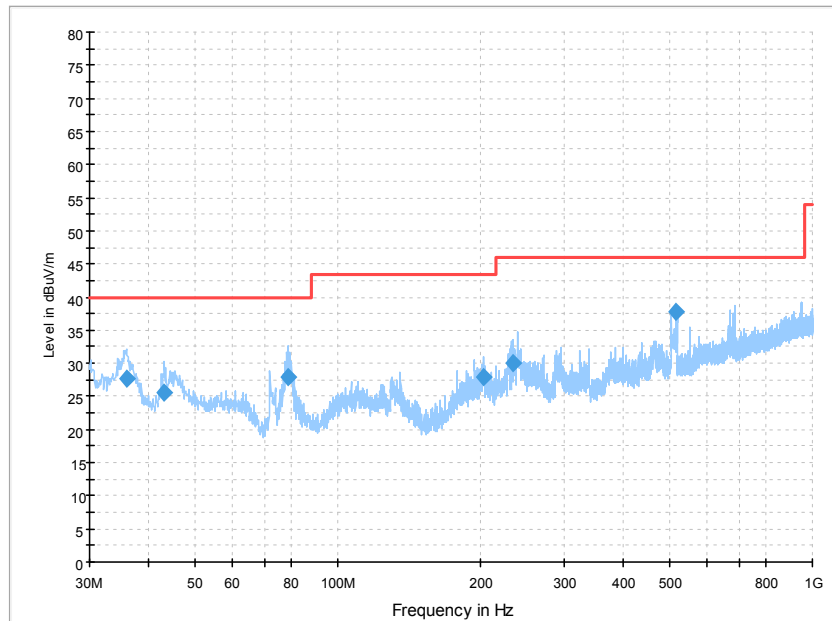


Figure A.7 Radiated Emission from 30MHz to 1GHz

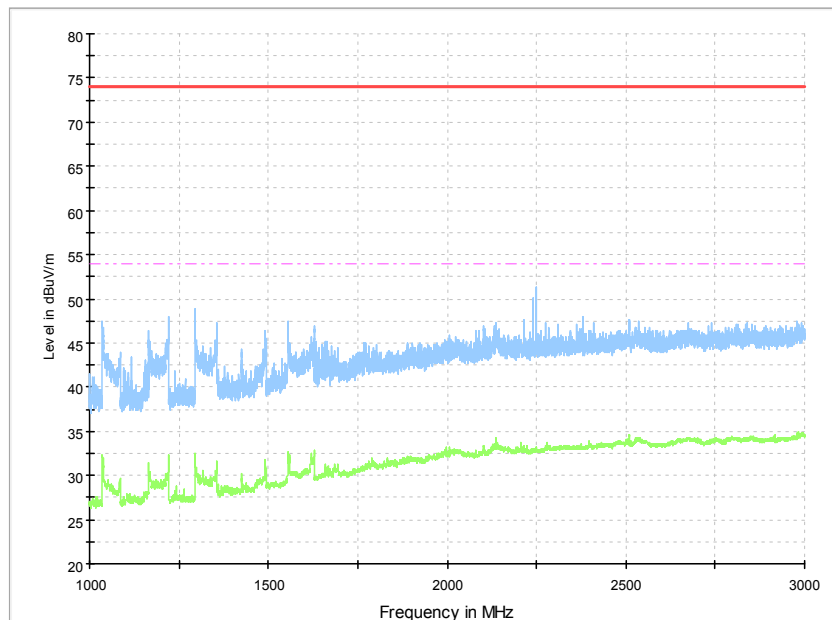


Figure A.8 Radiated Emission from 1GHz to 3GHz

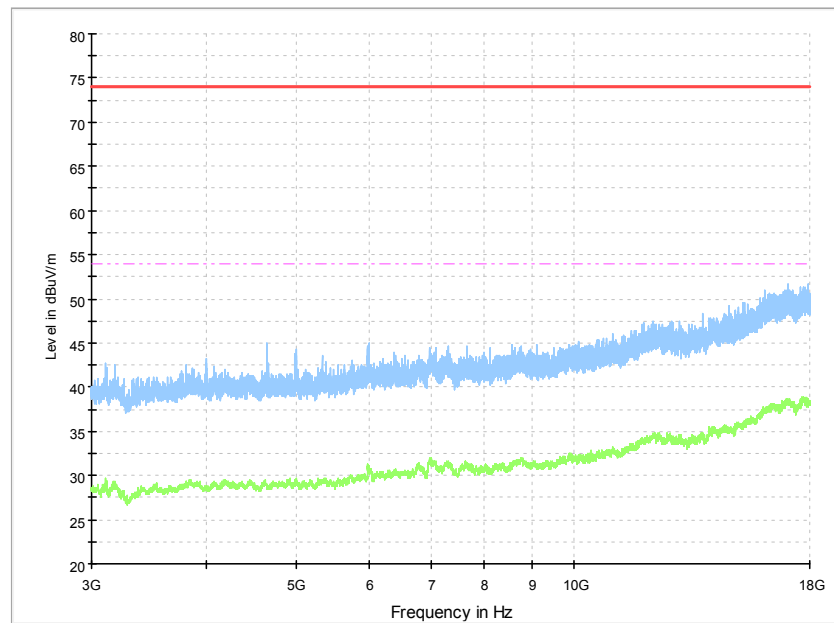


Figure A.9 Radiated Emission from 3GHz to 18GHz

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: $U=3.10\text{dB}$, $k=2$.

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+Back Camera Mode, Set.1

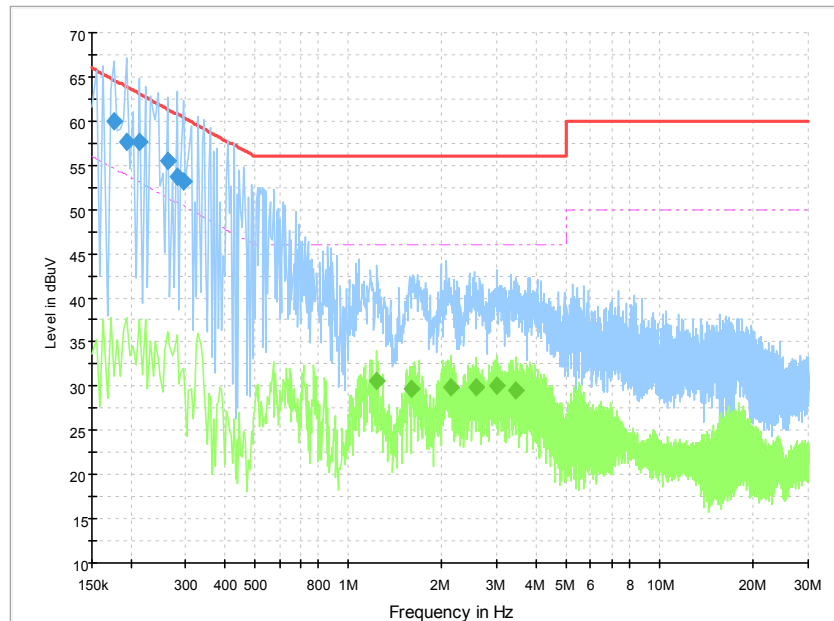


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.177000	59.9	1000.0	9.000	On	L1	19.6	4.7	64.6
0.195000	57.6	1000.0	9.000	On	L1	19.6	6.3	63.8
0.213000	57.7	1000.0	9.000	On	L1	19.7	5.4	63.1
0.262500	55.5	1000.0	9.000	On	L1	19.7	5.8	61.4
0.280500	53.6	1000.0	9.000	On	L1	19.7	7.2	60.8
0.294000	53.2	1000.0	9.000	On	N	19.7	7.2	60.4

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
1.230000	30.5	1000.0	9.000	On	L1	19.7	15.5	46.0
1.599000	29.7	1000.0	9.000	On	L1	19.7	16.3	46.0
2.125500	29.8	1000.0	9.000	On	L1	19.7	16.2	46.0
2.584500	30.0	1000.0	9.000	On	L1	19.7	16.0	46.0
2.980500	30.1	1000.0	9.000	On	L1	19.6	15.9	46.0
3.462000	29.6	1000.0	9.000	On	L1	19.7	16.4	46.0

EUT1 Charger+MP4 Mode, Set.2

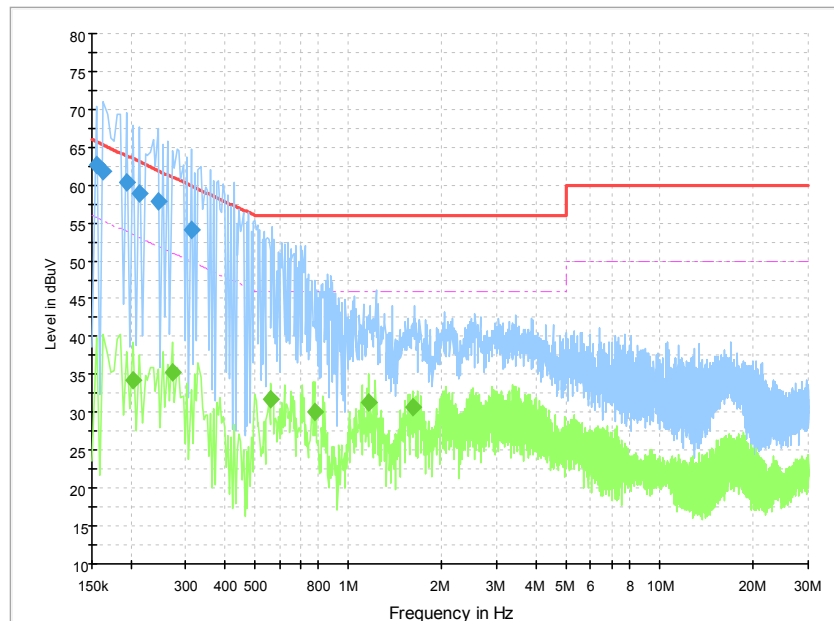


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154500	62.6	1000.0	9.000	On	L1	19.6	3.2	65.8
0.163500	61.7	1000.0	9.000	On	L1	19.7	3.5	65.3
0.195000	60.3	1000.0	9.000	On	L1	19.6	3.5	63.8
0.213000	58.9	1000.0	9.000	On	L1	19.7	4.2	63.1
0.244500	57.8	1000.0	9.000	On	L1	19.7	4.1	61.9
0.312000	54.2	1000.0	9.000	On	L1	19.7	5.7	59.9

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.204000	34.2	1000.0	9.000	On	L1	19.7	19.3	53.4
0.271500	35.3	1000.0	9.000	On	L1	19.7	15.8	51.1
0.564000	31.8	1000.0	9.000	On	L1	19.8	14.2	46.0
0.780000	30.1	1000.0	9.000	On	L1	19.7	15.9	46.0
1.162500	31.3	1000.0	9.000	On	L1	19.7	14.7	46.0
1.612500	30.7	1000.0	9.000	On	L1	19.7	15.3	46.0

EUT1 USB+FM Mode, Set.3

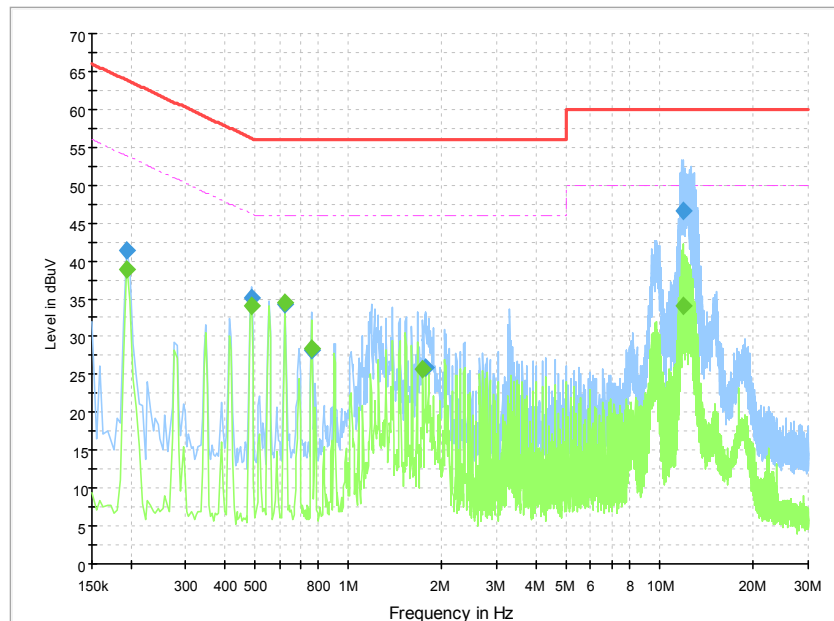


Figure A.12 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.195000	41.4	1000.0	9.000	On	L1	19.6	22.4	63.8
0.487500	35.0	1000.0	9.000	On	N	19.8	21.2	56.2
0.627000	34.2	1000.0	9.000	On	N	19.7	21.8	56.0
0.762000	28.2	1000.0	9.000	On	L1	19.7	27.8	56.0
1.774500	25.9	1000.0	9.000	On	N	19.6	30.1	56.0
11.895000	46.5	1000.0	9.000	On	L1	19.8	13.5	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.195000	38.9	1000.0	9.000	On	N	19.6	14.9	53.8
0.487500	34.1	1000.0	9.000	On	N	19.8	12.1	46.2
0.627000	34.4	1000.0	9.000	On	N	19.7	11.6	46.0
0.762000	28.4	1000.0	9.000	On	L1	19.7	17.6	46.0
1.738500	25.8	1000.0	9.000	On	L1	19.7	20.2	46.0
11.895000	34.2	1000.0	9.000	On	N	19.8	15.8	50.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Li Zongliang
Radiated Continuous Emission	Guo Qian

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