



TEST REPORT

No. I21Z60426-EMC01

for

Wingtech Group (Hong Kong) Limited

5G Mobile Phone

Model Name: WTRVL5G

FCC ID: 2APXW-WTRVL5G

with

Hardware Version: V1.3

Software Version: WTRVL5G_0.01.10

Issued Date: 2021-04-29

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.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z60426-EMC01	Rev.0	1 st edition	2021-04-29

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

CONTENTS

1. TEST LABORATORY	4
1.1. INTRODUCTION & ACCREDITATION	4
1.2. TESTING LOCATION	4
1.3. TESTING ENVIRONMENT	4
1.4. PROJECT DATA	4
1.5. 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
ANNEX B: PERSONS INVOLVED IN THIS TESTING	25

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 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 (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2021-03-30

Testing End Date: 2021-04-26

1.5. Signature



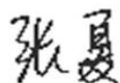
Li Yan

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(Reviewed this test report)



Zhang Xia

Deputy Director of the laboratory

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Wingtech Group (Hong Kong) Limited
Address: Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui
Kowloon, Hong Kong
City: /
Postal Code: /
Country: /
Contact: /
Email: /
Telephone: /

2.2. Manufacturer Information

Company Name: Wingtech Group (Hong Kong) Limited
Address: Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui
Kowloon, Hong Kong
City: /
Postal Code: /
Country: /
Contact: /
Email: /
Telephone: /

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

3.1. About EUT

Description	5G Mobile Phone
Model Name	WTRVL5G
FCC ID	2APXW-WTRVL5G
Extreme vol. Limits	3.6VDC to 4.45VDC (nominal: 3.87VDC)

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*	IME/SNI	HW Version	SW Version
UT94a	357492490017694	V1.3	WTRVL5G_0.01.10

*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	Charger		/
AE2	USB cable		/
AE3	battery		/
AE1			
	Model	BLJ-QC06HU	
	Manufacturer	Zhongshan Baolijin Electronic Co., Ltd.	
	Length of cable	/	
AE2			
	Description	TYPE C 2.0 Cable Assembly	
	Manufacturer	ShenZhen BRL Technology Co., Ltd	□
	Type	771130001041	
	Length of cable	/	
AE3			
	Model	TM001	
	Manufacturer	Jiade Energy Technology (Zhuhai) Co.,Ltd.	
	Length of cable	/	

Note: The USB cables are shielded.

3.4. General Description

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA BAND 5, LTE BAND 12, LTE BAND 13, LTE BAND 26 and LTE BAND 71.



3.5. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	UT94a + AE1 + AE2+ AE3	Charger1+ Camera+ + RX Mode
Set.2	UT94a + AE1 + AE2+ AE3	Charger2+MP4+ RX Mode
Set.3	UT94a + AE2 + AE3	USB SD TO PC +RX 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	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-2 (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, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
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
	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(BDA)
2	Conducted Emission	15.107(a)	A.2	P	CTTL(BDA)

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

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01.00	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 3 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 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, charging mode, MP4, CAMERA, SD and License RX band 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 the 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.

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): 30MHz-1GHz: 5.40dB, 1GHz-18GHz: 4.32dB, $k=2$.

Measurement results for Set.1:

Charger1+ Rear Camera+ RX GSM850 /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)
17698.500	38.49	-22.2	41.2	19.42	54.0	15.5	H
17701.500	38.46	-22.2	41.2	19.40	54.0	15.5	V
17693.500	38.44	-22.2	41.2	19.37	54.0	15.6	V
17634.000	38.41	-22.0	41.2	19.21	54.0	15.6	H
17683.000	38.35	-22.1	41.2	19.26	54.0	15.6	V
17688.000	38.34	-22.2	41.2	19.25	54.0	15.7	H

Charger1+ Rear Camera+ RX GSM850 /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)
16993.500	50.7	-23.0	41.7	32.03	74.0	23.3	H
17692.000	50.7	-22.2	41.2	31.60	74.0	23.3	H
17778.500	50.6	-22.4	41.3	31.68	74.0	23.4	H
17641.500	50.5	-22.0	41.2	31.33	74.0	23.5	V
17659.500	50.5	-22.1	41.2	31.30	74.0	23.5	V
16939.500	50.4	-23.0	41.7	31.78	74.0	23.6	H

Measurement results for Set.2:
Charger1+ MP4+ RX WCDMA850 /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)
17687.500	39.23	-22.1	41.2	20.14	54.0	14.8	H
17697.500	39.19	-22.2	41.2	20.12	54.0	14.8	H
17707.500	39.13	-22.2	41.2	20.09	54.0	14.9	V
17696.000	39.11	-22.2	41.2	20.04	54.0	14.9	V
17774.000	39.11	-22.4	41.3	20.20	54.0	14.9	H
17692.000	39.09	-22.2	41.2	20.02	54.0	14.9	H

Charger1+ MP4+ RX WCDMA850 /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)
16997.500	51.51	-23.0	41.7	32.83	74.0	22.5	H
17019.000	51.26	-23.0	41.7	32.60	74.0	22.7	V
17741.000	50.61	-22.3	41.2	31.64	74.0	23.4	H
17789.000	50.53	-22.4	41.3	31.66	74.0	23.5	H
17940.500	50.50	-22.7	41.3	31.91	74.0	23.5	V
17974.500	50.47	-22.8	41.3	31.95	74.0	23.5	V

Measurement results for Set.3:
USB (SD) mode + RX LTE B12 /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)
17705.500	38.50	-22.2	41.2	19.45	54.0	15.5	H
17755.500	38.50	-22.3	41.3	19.56	54.0	15.5	V
17702.000	38.50	-22.2	41.2	19.44	54.0	15.5	V
17737.000	38.48	-22.3	41.2	19.50	54.0	15.5	V
17789.500	38.46	-22.4	41.3	19.58	54.0	15.5	H
17696.000	38.44	-22.2	41.2	19.37	54.0	15.6	V

USB (SD) mode + RX LTE B12 /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)
17631.000	51.5	-22.0	41.2	32.36	74.0	22.5	V
17905.500	51.3	-22.6	41.3	32.62	74.0	22.7	V
17676.500	51.3	-22.1	41.2	32.14	74.0	22.7	V
17684.500	51.1	-22.1	41.2	32.04	74.0	22.9	H
17017.000	51.0	-23.0	41.7	32.39	74.0	23.0	H
17133.000	51.0	-23.0	41.6	32.49	74.0	23.0	H

Charger1+ Rear Camera+ RX GSM850, Set.1

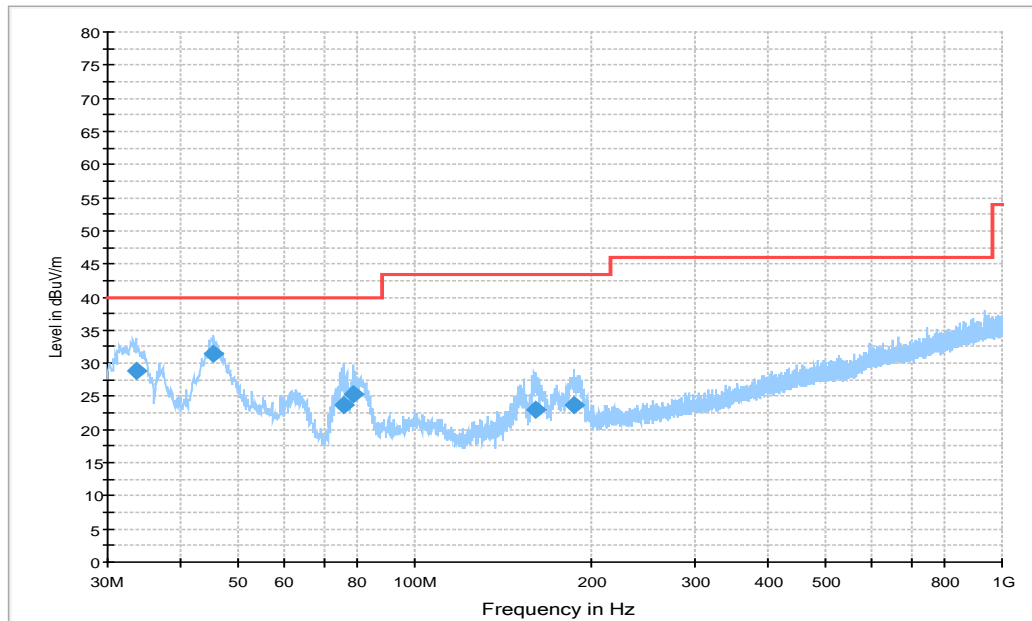


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.492000	28.9	100.0	V	195.0	-2.2	11.1	40.0
45.520000	31.3	100.0	V	59.0	-0.6	8.7	40.0
75.881000	23.6	110.0	V	266.0	-6.2	16.4	40.0
78.403000	25.4	125.0	V	188.0	-6.8	14.6	40.0
160.65900	22.9	100.0	V	194.0	-5.0	20.6	43.5
186.36400	23.7	100.0	V	1.0	-2.9	19.8	43.5

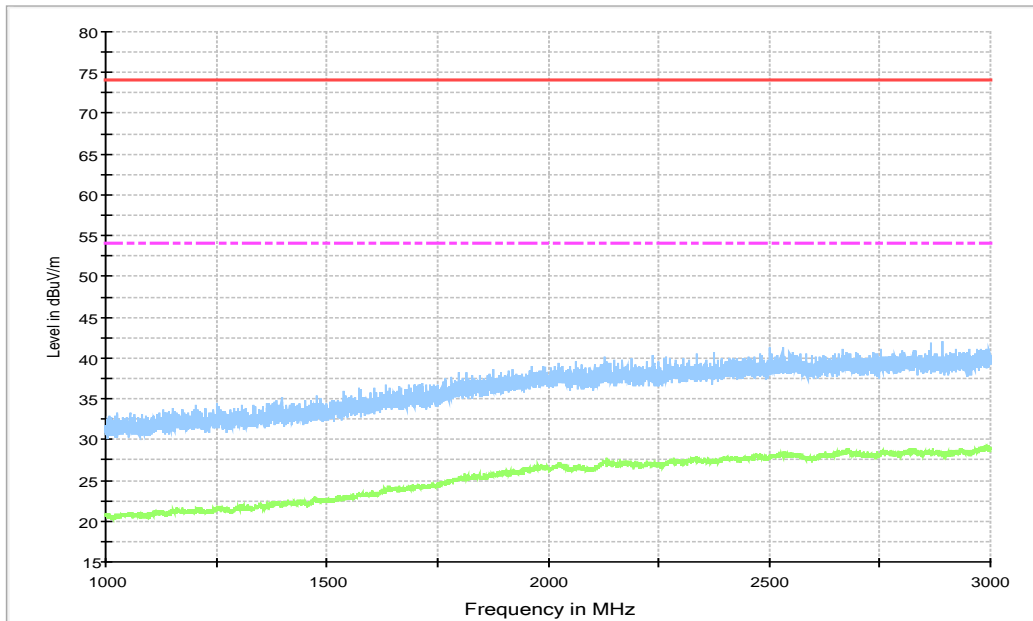


Figure A.2 Radiated Emission from 1GHz to 3GHz

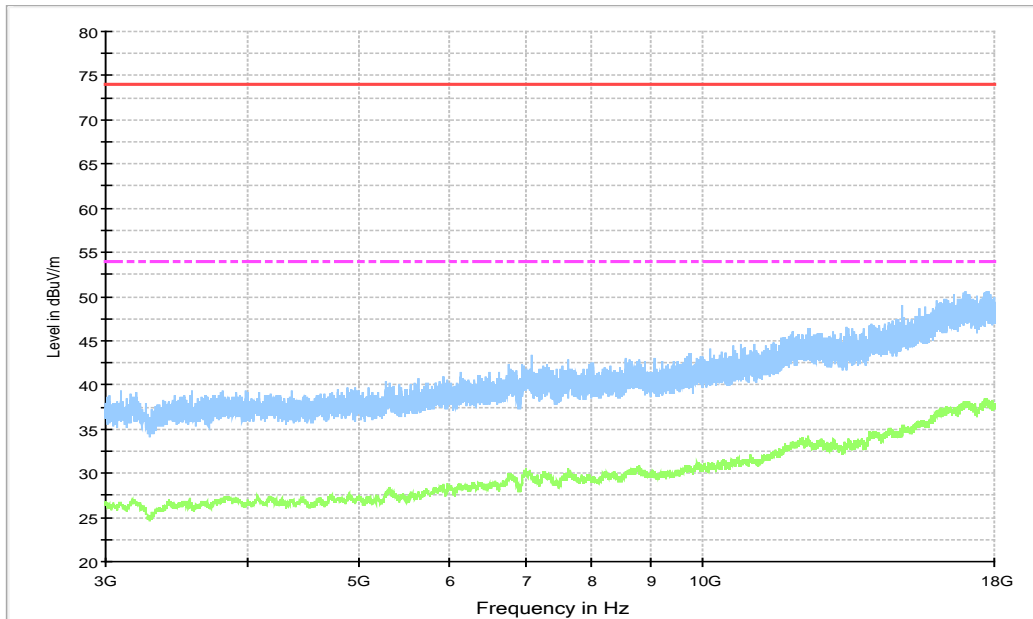


Figure A.3 Radiated Emission from 3GHz to 18GHz

Charger1+MP4+ RX WCDMA850, Set.1

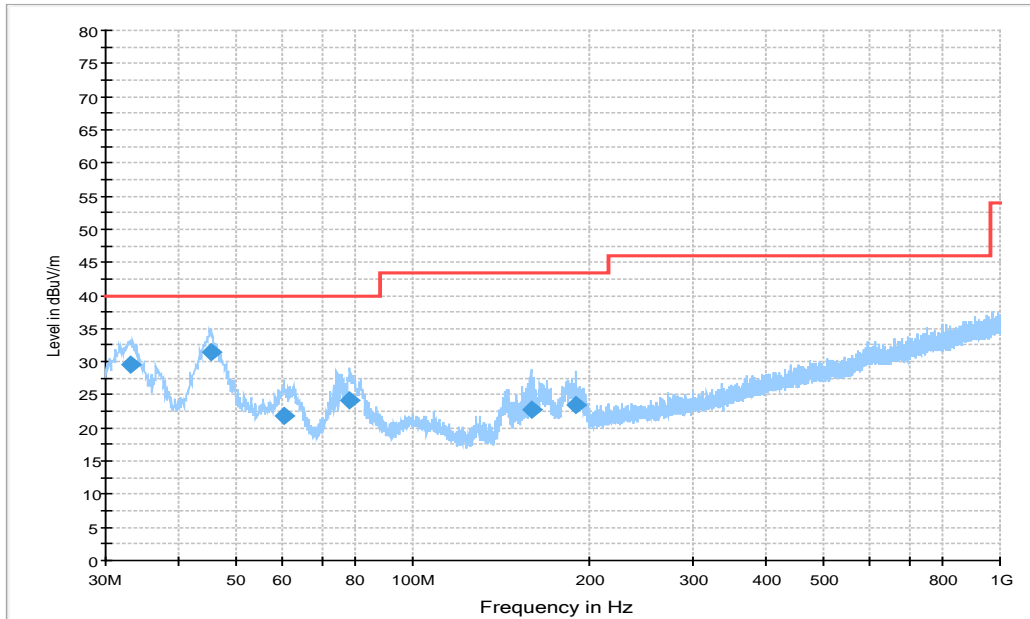


Figure A.4 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.201000	29.5	100.0	V	90.0	-2.2	10.5	40.0
45.423000	31.5	100.0	V	101.0	-0.6	8.5	40.0
60.361000	21.8	100.0	V	-10.0	-1.1	18.2	40.0
78.112000	24.2	100.0	V	288.0	-6.7	15.8	40.0
158.91300	22.7	100.0	V	187.0	-5.1	20.8	43.5
189.08000	23.6	100.0	V	-6.0	-2.5	19.9	43.5

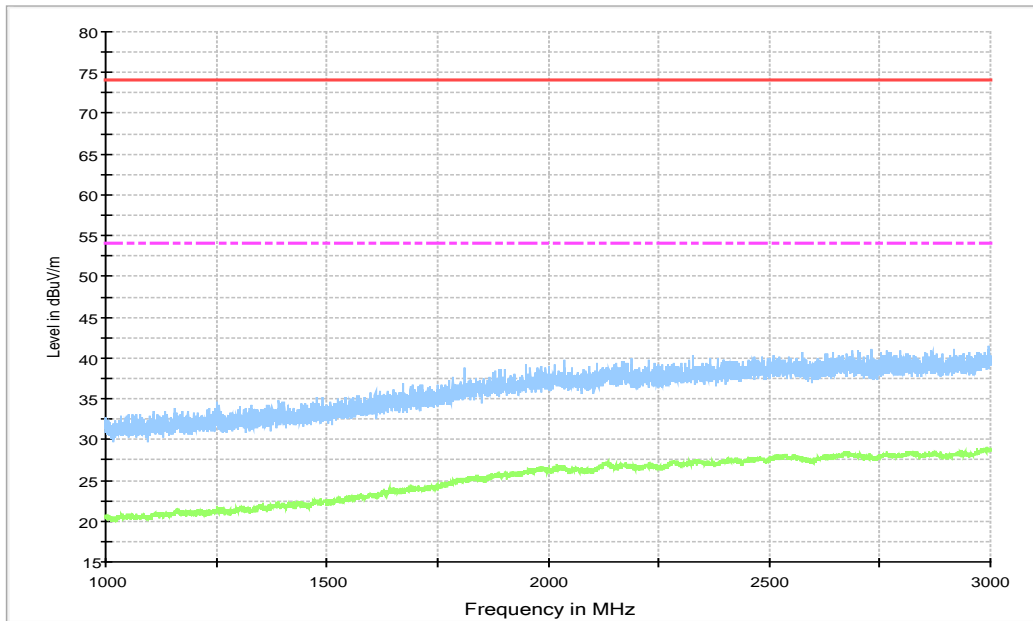


Figure A.5 Radiated Emission from 1GHz to 3GHz

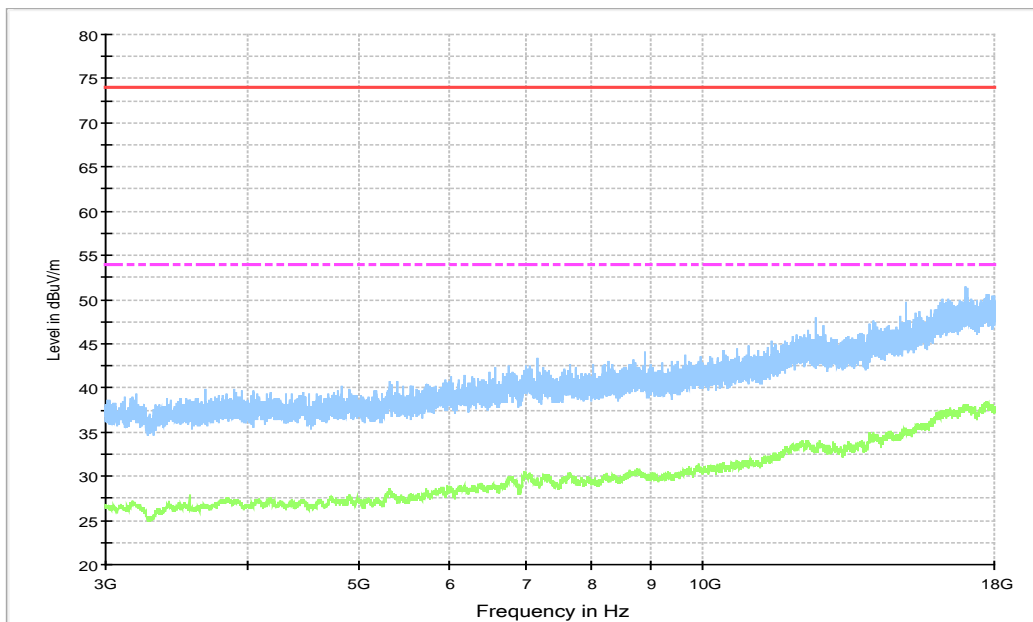


Figure A.6 Radiated Emission from 3GHz to 18GHz

USB (SD) mode + RX LTE B12, Set.3

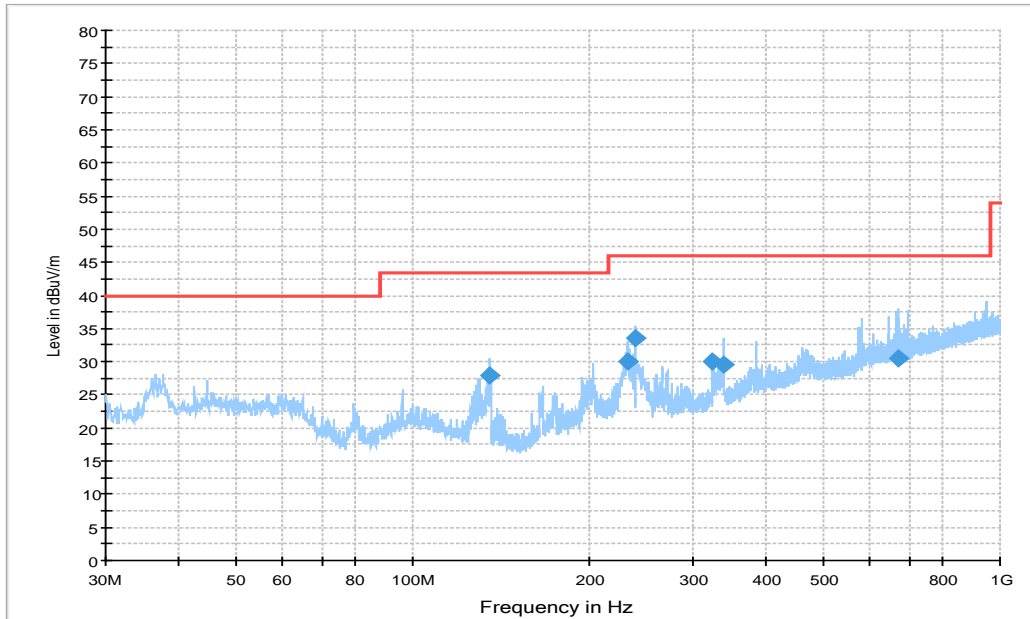


Figure A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
135.43900	27.9	125.0	H	83.0	-5.5	15.6	43.5
232.92400	30.1	100.0	H	80.0	-0.8	15.9	46.0
240.00500	33.5	100.0	H	101.0	-0.6	12.5	46.0
324.10400	30.1	100.0	H	162.0	1.5	15.9	46.0
338.84800	29.6	100.0	H	135.0	2.1	16.4	46.0
673.30400	30.4	100.0	H	309.0	8.9	15.6	46.0

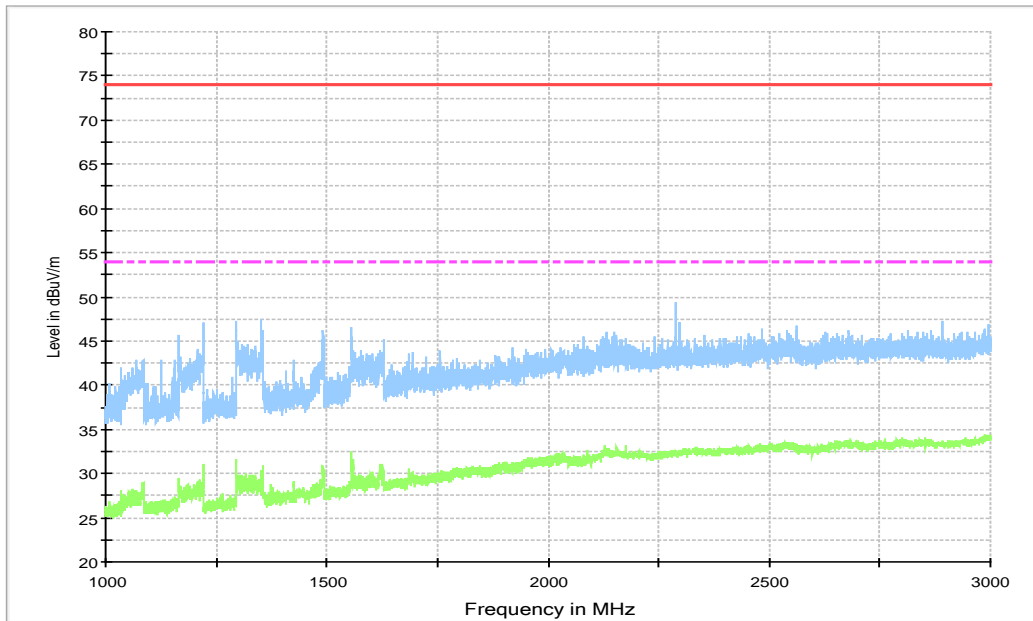


Figure A.8 Radiated Emission from 1GHz to 3GHz

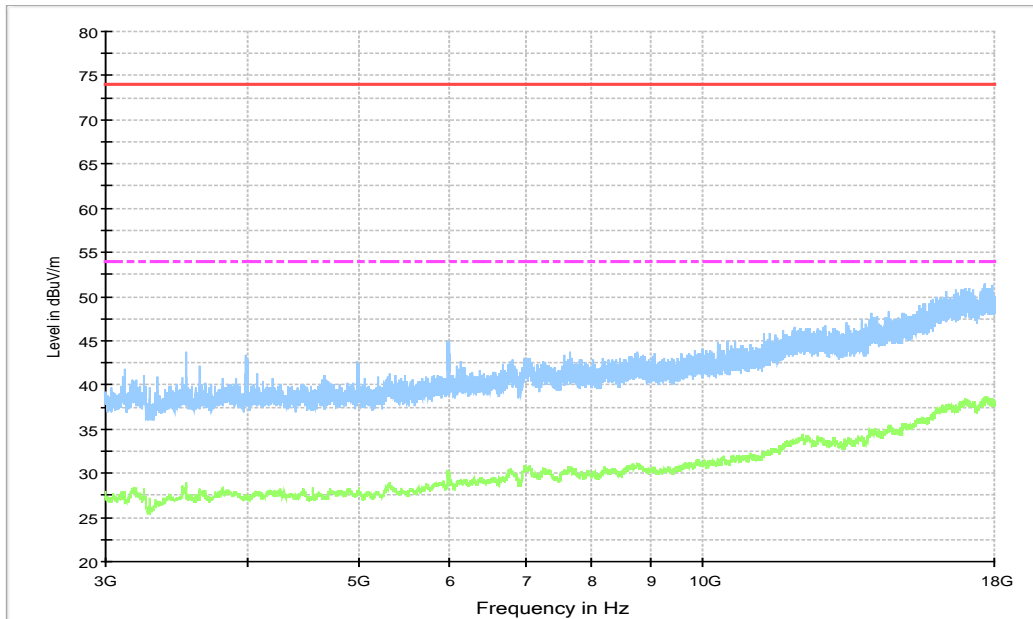


Figure A.9 Radiated Emission from 3GHz to 18GHz

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 USB mode, charging mode.

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: $U= 3.10$ dB, $k=2$.

Charger mode, Set.1

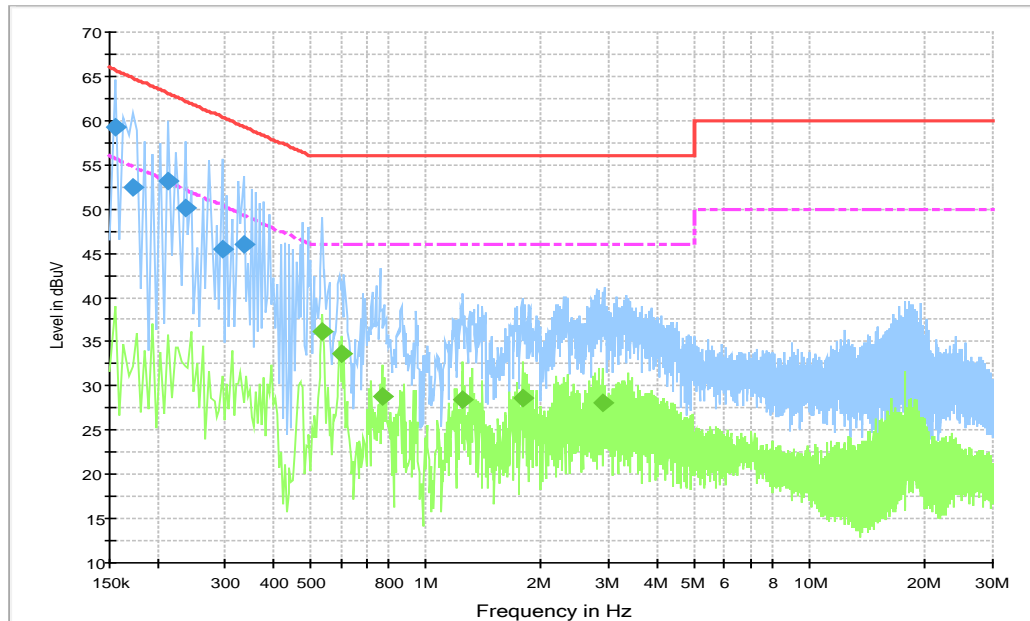


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	59.3	1000.0	9.000	On	L1	19.7	6.4	65.8
0.172500	52.5	1000.0	9.000	On	N	19.9	12.3	64.8
0.213000	53.1	1000.0	9.000	On	L1	19.7	10.0	63.1
0.235500	50.1	1000.0	9.000	On	L1	19.8	12.1	62.3
0.294000	45.5	1000.0	9.000	On	N	19.7	15.0	60.4
0.334500	46.0	1000.0	9.000	On	L1	19.8	13.3	59.3

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.537000	36.2	1000.0	9.000	On	L1	19.8	9.8	46.0
0.604500	33.7	1000.0	9.000	On	L1	19.7	12.3	46.0
0.771000	28.8	1000.0	9.000	On	L1	19.7	17.2	46.0
1.252500	28.4	1000.0	9.000	On	L1	19.6	17.6	46.0
1.792500	28.6	1000.0	9.000	On	L1	19.6	17.4	46.0
2.877000	28.1	1000.0	9.000	On	L1	19.6	17.9	46.0

USB (SD) mode, Set.3

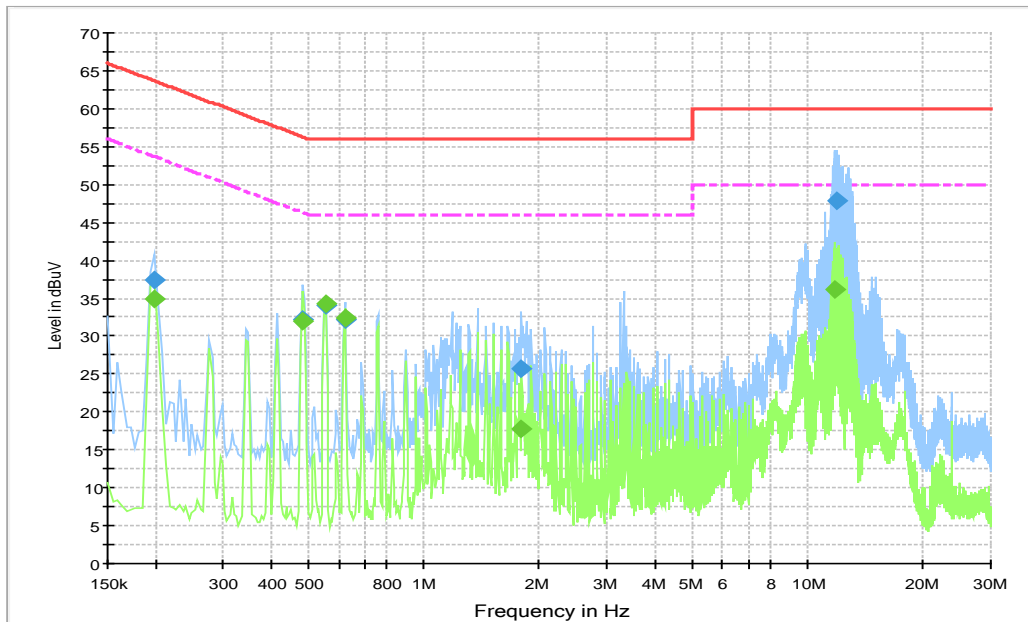


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	37.3	1000.0	9.000	On	L1	19.6	26.3	63.6
0.483000	32.2	1000.0	9.000	On	L1	19.8	24.1	56.3
0.555000	34.1	1000.0	9.000	On	N	19.8	21.9	56.0
0.622500	32.2	1000.0	9.000	On	L1	19.7	23.8	56.0
1.797000	25.7	1000.0	9.000	On	L1	19.7	30.3	56.0
11.854500	47.9	1000.0	9.000	On	L1	19.8	12.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	34.8	1000.0	9.000	On	L1	19.6	18.8	53.6
0.483000	31.9	1000.0	9.000	On	L1	19.8	14.4	46.3
0.555000	34.3	1000.0	9.000	On	N	19.8	11.7	46.0
0.622500	32.4	1000.0	9.000	On	L1	19.7	13.6	46.0
1.797000	17.7	1000.0	9.000	On	L1	19.7	28.3	46.0
11.809500	36.2	1000.0	9.000	On	N	19.8	13.8	50.0



ANNEX B: Persons involved in this testing

Test Item	Tester
Radiated Emission	Li Zongliang
Conducted Emission	Guo Qian

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