



TEST REPORT

No. I20Z60930-EMC01

for

HMD Global Oy

Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Model Name: TA-1277

FCC ID: 2AJOTTA-1277

with

Hardware Version: 99651_1_10

Software Version: 00WW_0_070

Issued Date: 2020-07-01

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: ctl_terminals@caict.ac.cn, website: www.caict.ac.cn



REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z60930-EMC01	Rev.0	1 st edition	2020-07-01

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	36

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 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 (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2020-06-16

Testing End Date: 2020-06-30

1.5. Signature



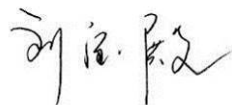
Li Yan

(Prepared this test report)



Zhang Ying

(Reviewed this test report)



Liu Baodian

Deputy Director of the laboratory

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: HMD Global Oy
Address: Bertel Jungin aukio 9,02600 Espoo, Finland
City: /
Postal Code: /
Country: /
Contact: Rosario Casillo
Email: Rosario.Casillo@hmdglobal.com
Telephone: /

2.2. Manufacturer Information

Company Name: HMD Global Oy
Address: Bertel Jungin aukio 9,02600 Espoo, Finland
City: /
Postal Code: /
Country: /
Contact: Rosario Casillo
Email: Rosario.Casillo@hmdglobal.com
Telephone: /

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

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN
Model Name	TA-1277
FCC ID	2AJOTTA-1277
Extreme vol. Limits	3.6VDC to 4.4VDC (nominal: 3.85VDC)

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*	SN or IMEI	HW Version	SW Version
EUT2	353181110001046	99651_1_10	00WW_0_070

*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	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	/
AE6	USB Cable	/	/
AE7	Headset	/	/

AE1

Model	WT242
Manufacturer	Jiade Energy Technology (Zhuhai) Co., Ltd
Capacitance	4380mAh
Nominal voltage	/

AE2

Model	CH-35U
Manufacturer	Shenzhen Tianyin Electronics Co., Ltd
Length of cable	/

AE3

Model	CH-51B
Manufacturer	Shenzhen Tianyin Electronics Co., Ltd
Length of cable	/

AE4

Model	PA-AR5V1A-023
Manufacturer	Yutong electronics(Huizhou) co.,ltd
Length of cable	/



AE5

Model CB-35A
Manufacturer Leagtech Electronics Co.,Ltd
Length of cable /

AE6

Model CB-35A
Manufacturer Shenzhen BRL Technology Co.,Ltd.
Length of cable /

AE7

Model HS-34
Manufacturer New Leader Industry 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 5, LTE Band 12, and LTE BAND 17.

3.5. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT2+ AE1 + AE2+ AE5	Charger+MP3+Front Camera License RX band mode
Set.2	EUT2+ AE1 + AE3+ AE5+ AE7	Charger+Rear Camera
Set.3	EUT2+ AE1 + AE4+ AE6+ AE7	Charger+ MP4
Set.4	EUT2+ AE1 + AE5/AE6+ AE7	USB mode +FM

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×17 meters×10 meters) 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	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m/10m 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

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(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	ESCI 3	100344	Rohde & Schwarz	2021-02-26	1 year
2	LISN	ENV216	101200	R&S	2021-05-17	1 year
3	EMI Antenna	VULB 9163	483	Schwarzbeck	2020-09-17	1 year
4	EMI Antenna	3117	00139065	ETS-Lindgren	2020-11-15	1 year
5	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-05	1 year
7	Signal Generator	SMF100A	101295	R&S	2020-11-06	1 year
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
10	Keyboard	L100	CN0RH659658 907ATOI40	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 V9.01.00	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 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 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, MP3, MP4, Camera, FM 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.

The FM radio mode radiated testing was performed with the Low/Mid/High channel. Only the worst cases 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.

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/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: 5.16dB, 1GHz-18GHz: 5.44dB, $k=2$.

Measurement results for Set.1:

Charging Mode+ MP3+Front Camera /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)
17971.100	47.9	-5.4	33.8	19.516	54.0	6.1	H
17994.333	47.0	-5.4	33.8	18.616	54.0	7.0	H
17996.033	46.9	-5.4	33.8	18.516	54.0	7.1	V
17996.600	46.9	-5.4	33.8	18.516	54.0	7.1	H
17956.367	46.8	-5.4	33.8	18.416	54.0	7.2	H
17981.867	46.8	-5.4	33.8	18.416	54.0	7.2	H

Charging Mode+ MP3+Front Camera /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)
17990.367	56.1	-5.4	33.8	27.716	74.0	17.9	H
17971.100	56.1	-5.4	33.8	27.716	74.0	17.9	H
17986.967	55.8	-5.4	33.8	27.416	74.0	18.2	V
17966.567	55.4	-5.4	33.8	27.016	74.0	18.6	H
17959.767	55.4	-5.4	33.8	27.016	74.0	18.6	H
17899.700	55.3	-5.7	33.8	27.238	74.0	18.7	H

Measurement results for Set.2:
Charging Mode+ Rear Camera /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)
17993.200	47.2	-5.4	33.8	18.816	54.0	6.8	H
17994.900	47.2	-5.4	33.8	18.816	54.0	6.8	H
17984.700	46.9	-5.4	33.8	18.516	54.0	7.1	V
17998.867	46.9	-5.4	33.8	18.516	54.0	7.1	H
17975.633	46.8	-5.4	33.8	18.416	54.0	7.2	H
17952.967	46.8	-5.4	33.8	18.416	54.0	7.2	H

Charging Mode+ Rear Camera /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)
17998.300	56.1	-5.4	33.8	27.716	74.0	17.9	H
17994.333	55.7	-5.4	33.8	27.316	74.0	18.3	H
17965.433	55.4	-5.4	33.8	27.016	74.0	18.6	V
17959.767	55.4	-5.4	33.8	27.016	74.0	18.6	H
17983.000	55.4	-5.4	33.8	27.016	74.0	18.6	H
17999.433	55.4	-5.4	33.8	27.016	74.0	18.6	H

Measurement results for Set.3:
Charger+ MP4 /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)
17890.633	47.2	-5.7	33.8	19.138	54.0	6.8	H
17987.533	46.9	-5.4	33.8	18.516	54.0	7.1	H
17995.467	46.9	-5.4	33.8	18.516	54.0	7.1	V
17881.000	46.8	-5.7	33.8	18.738	54.0	7.2	H
17899.700	46.7	-5.7	33.8	18.638	54.0	7.3	H
17990.367	46.7	-5.4	33.8	18.316	54.0	7.3	H

Charger+ MP4 /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)
17964.300	57.3	-5.4	33.8	28.916	74.0	16.7	H
17936.533	55.7	-5.4	33.8	27.316	74.0	18.3	H
17882.700	55.7	-5.7	33.8	27.638	74.0	18.3	V
17995.467	55.4	-5.4	33.8	27.016	74.0	18.6	H
17912.733	55.4	-5.7	33.8	27.338	74.0	18.6	H
18000.000	55.3	-6.5	33.8	28.041	74.0	18.7	H

Measurement results for Set.4:
USB mode +FM /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)
17966.567	47.1	-5.4	33.8	18.716	54.0	6.9	H
17985.833	46.8	-5.4	33.8	18.416	54.0	7.2	H
17996.033	46.8	-5.4	33.8	18.416	54.0	7.2	V
17993.767	46.7	-5.4	33.8	18.316	54.0	7.3	H
17989.233	46.6	-5.4	33.8	18.216	54.0	7.4	H
17873.633	46.6	-5.7	33.8	18.538	54.0	7.4	H

USB mode +FM /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)
17916.133	55.6	-5.4	33.8	27.216	74.0	18.4	H
17994.333	55.6	-5.4	33.8	27.216	74.0	18.4	H
17993.767	55.3	-5.4	33.8	26.916	74.0	18.7	V
17908.767	55.2	-5.7	33.8	27.138	74.0	18.8	H
17976.767	55.1	-5.4	33.8	26.716	74.0	18.9	H
17985.267	55.1	-5.4	33.8	26.716	74.0	18.9	H

Charging Mode+ MP3, Set.1

Full Spectrum

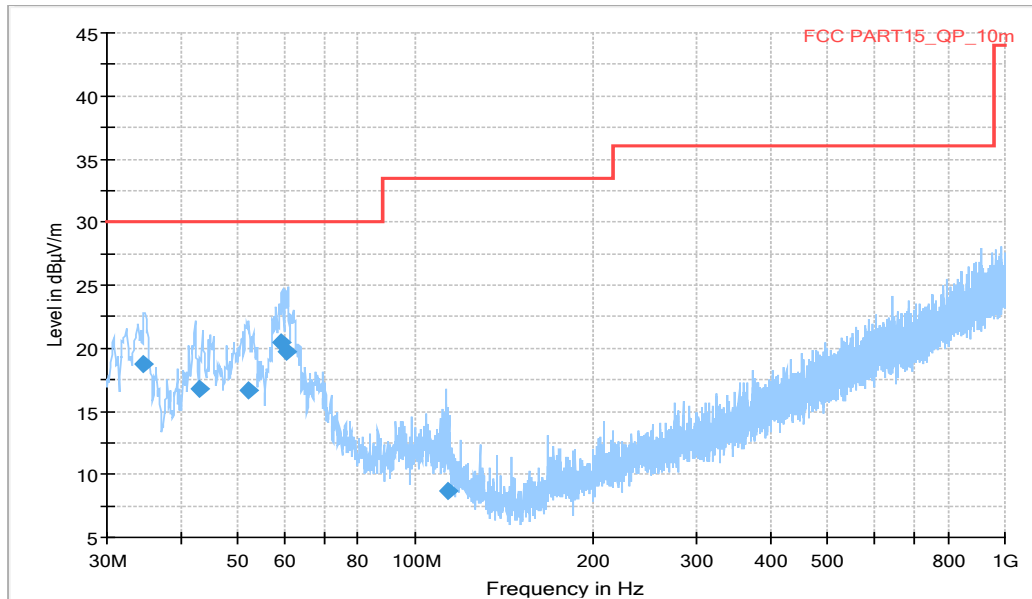


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.453000	18.77	30.00	11.23	1000.0	120.000	208.0	V	210.0
42.919000	16.82	30.00	13.18	1000.0	120.000	381.0	V	-26.0
52.273000	16.60	30.00	13.40	1000.0	120.000	100.0	V	7.0
59.308000	20.42	30.00	9.58	1000.0	120.000	100.0	V	-25.0
60.666000	19.77	30.00	10.23	1000.0	120.000	107.0	V	-29.0
113.34100	8.68	33.50	24.84	1000.0	120.000	112.0	V	16.0

Full Spectrum

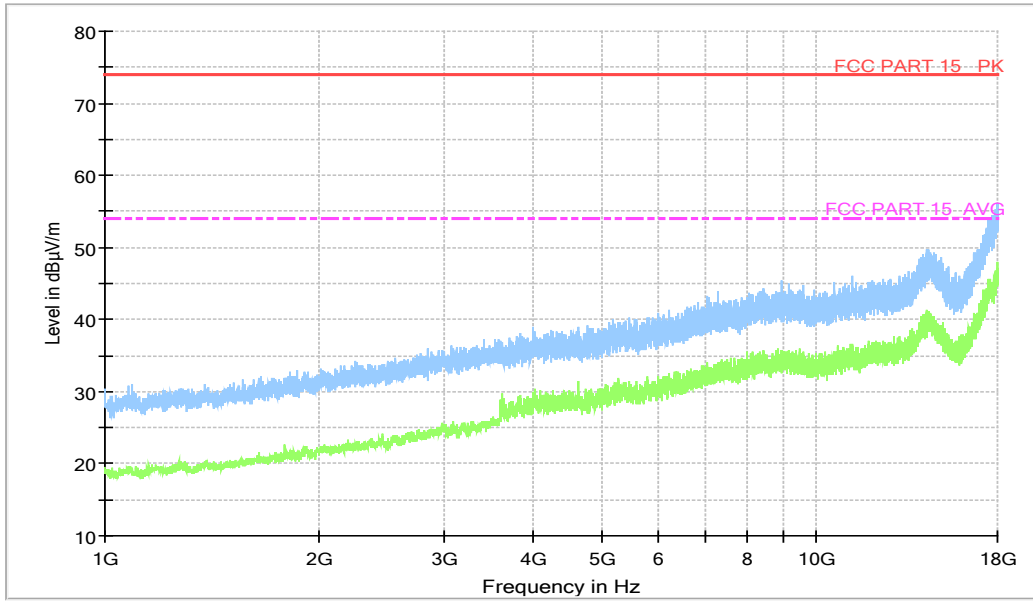


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charger+ Rear Camera, Set.2

Full Spectrum

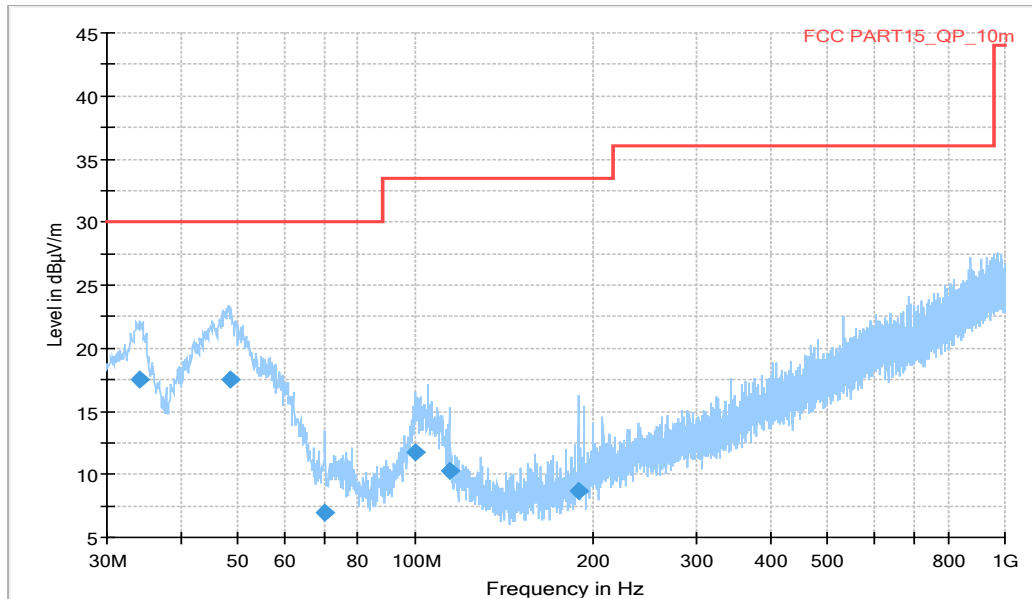


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.106000	17.47	30.00	12.53	1000.0	120.000	277.0	V	156.0
48.573000	17.50	30.00	12.50	1000.0	120.000	118.0	V	-4.0
70.315000	6.94	30.00	23.06	1000.0	120.000	125.0	V	13.0
99.960000	11.69	33.50	21.83	1000.0	120.000	220.0	V	-6.0
114.35300	10.27	33.50	23.25	1000.0	120.000	119.0	V	30.0
188.70600	8.74	33.50	24.78	1000.0	120.000	125.0	V	106.0

Full Spectrum

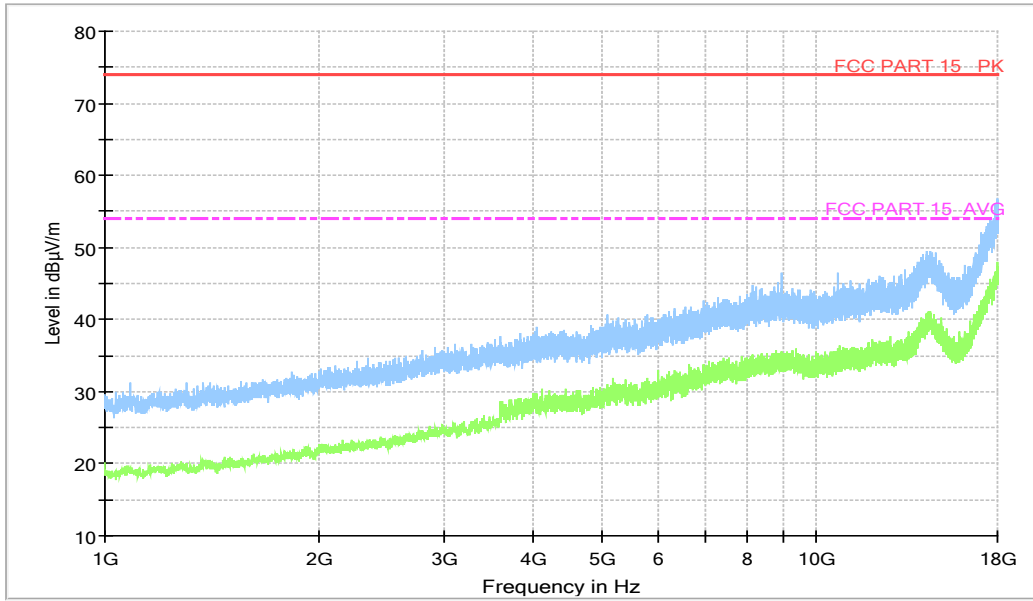


Figure A.4 Radiated Emission from 1GHz to 18GHz

Charger mode +MP4, Set.3

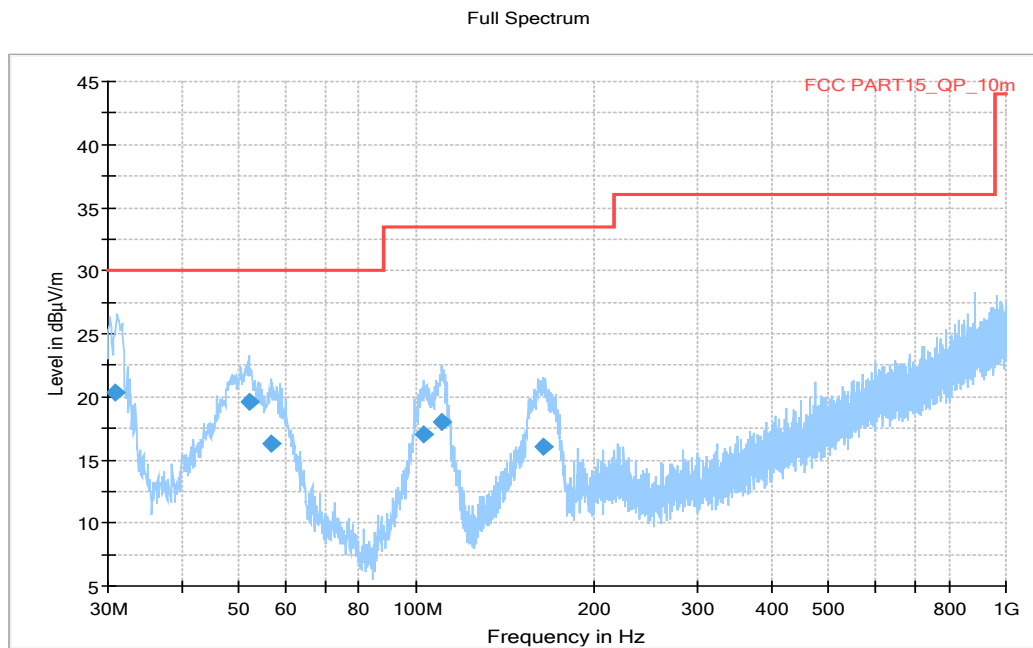


Figure A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.924000	20.32	30.00	9.68	1000.0	120.000	125.0	V	30.0
52.019000	19.54	30.00	10.46	1000.0	120.000	113.0	V	93.0
56.749000	16.33	30.00	13.67	1000.0	120.000	102.0	V	19.0
102.73200	16.99	33.50	16.53	1000.0	120.000	220.0	V	0.0
110.37600	17.97	33.50	15.55	1000.0	120.000	117.0	V	-25.0
164.39100	16.01	33.50	17.51	1000.0	120.000	125.0	V	-11.0

Full Spectrum

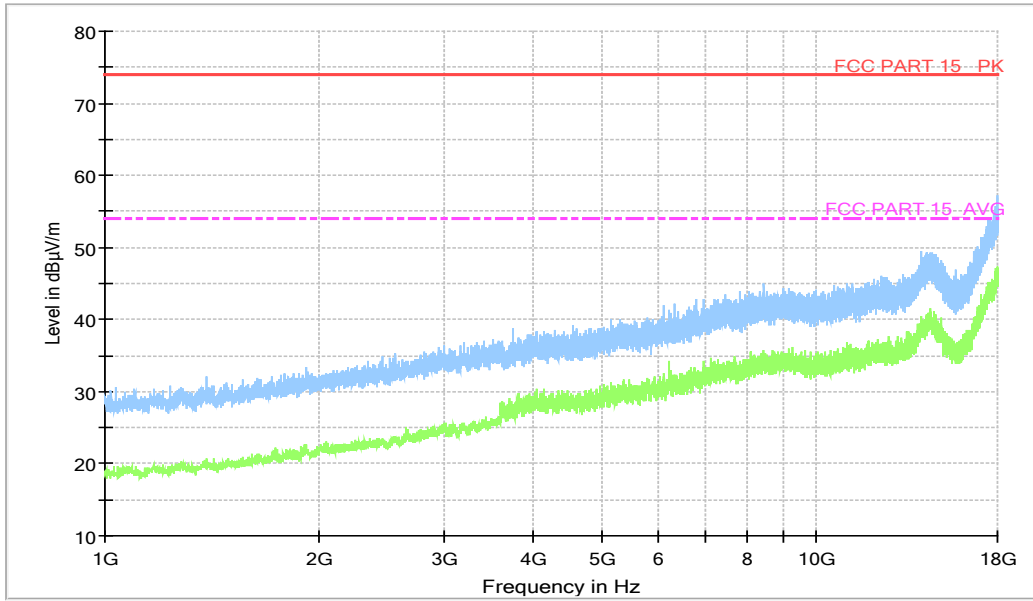


Figure A.6 Radiated Emission from 1GHz to 18GHz

USB mode +FM, Set.4

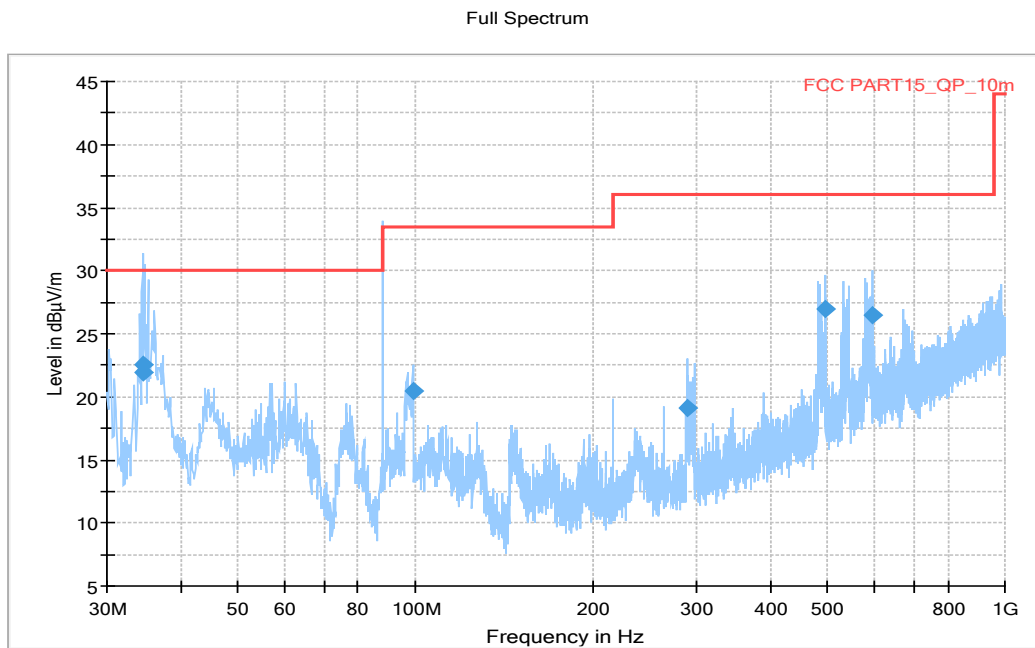


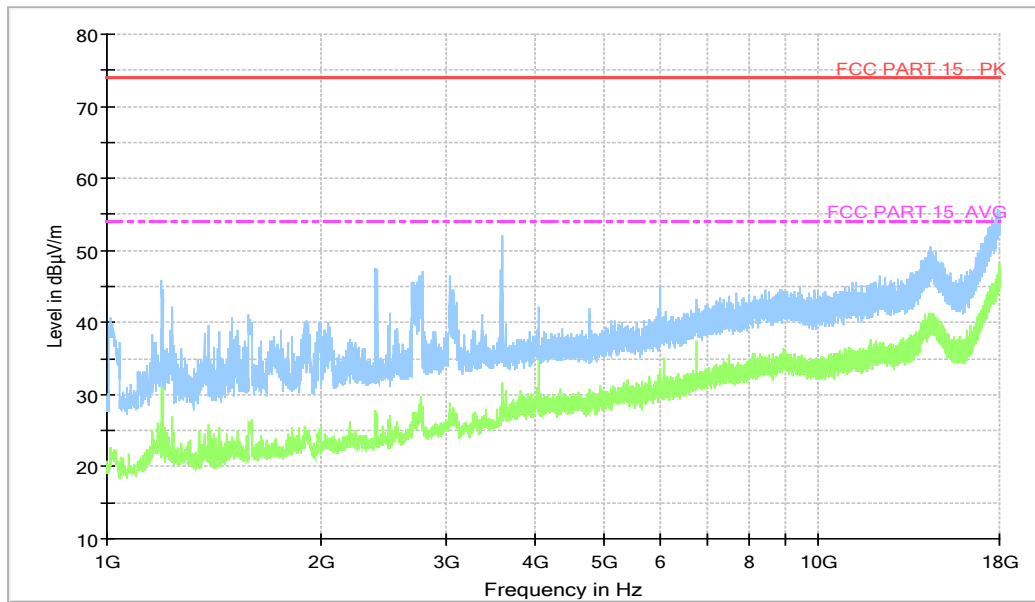
Figure A.7 Radiated Emission from 30MHz to 1GHz

Note: the spike (98MHz) is coming from FM signal source .

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.619000	21.90	30.00	8.10	1000.0	120.000	384.0	V	120.0
34.638000	22.52	30.00	7.48	1000.0	120.000	101.0	V	178.0
99.064000	20.50	33.50	13.02	1000.0	120.000	181.0	V	12.0
288.55600	19.05	36.00	16.97	1000.0	120.000	103.0	V	182.0
496.13600	27.00	36.00	9.02	1000.0	120.000	275.0	V	11.0
595.27400	26.44	36.00	9.58	1000.0	120.000	181.0	V	-4.0

Full Spectrum

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

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

License RX band mode, Set.1

GSM850MHz MID CHANNEL (881.6MHz)

Full Spectrum

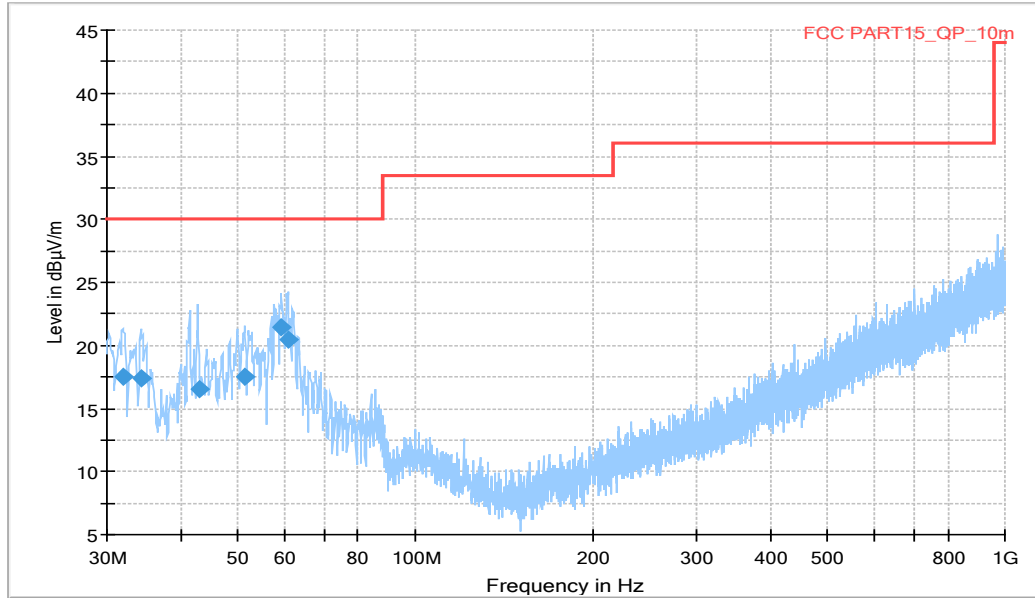


Figure A.9 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.060000	17.55	30.00	12.45	1000.0	120.000	101.0	V	-15.0
34.388000	17.44	30.00	12.56	1000.0	120.000	117.0	V	-30.0
42.924000	16.49	30.00	13.51	1000.0	120.000	191.0	V	210.0
51.497000	17.52	30.00	12.48	1000.0	120.000	404.0	V	60.0
59.257000	21.44	30.00	8.56	1000.0	120.000	103.0	V	-30.0
60.786000	20.42	30.00	9.58	1000.0	120.000	101.0	V	-4.0

Full Spectrum

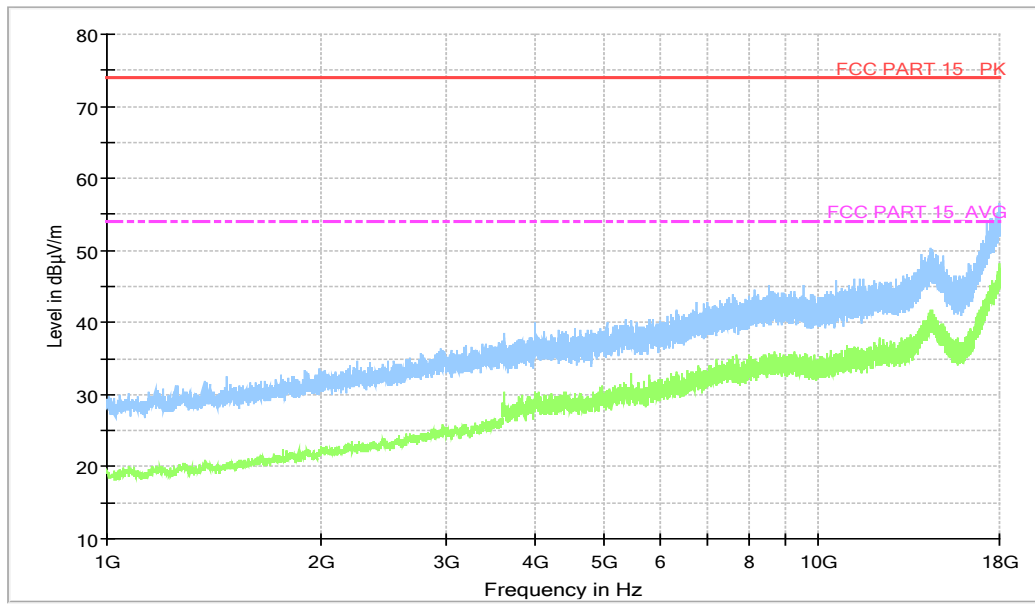


Figure A.10 Radiated Emission from 1GHz to 18GHz

WCDMA Band 5 MID CHANNEL (881.6MHz)

Full Spectrum

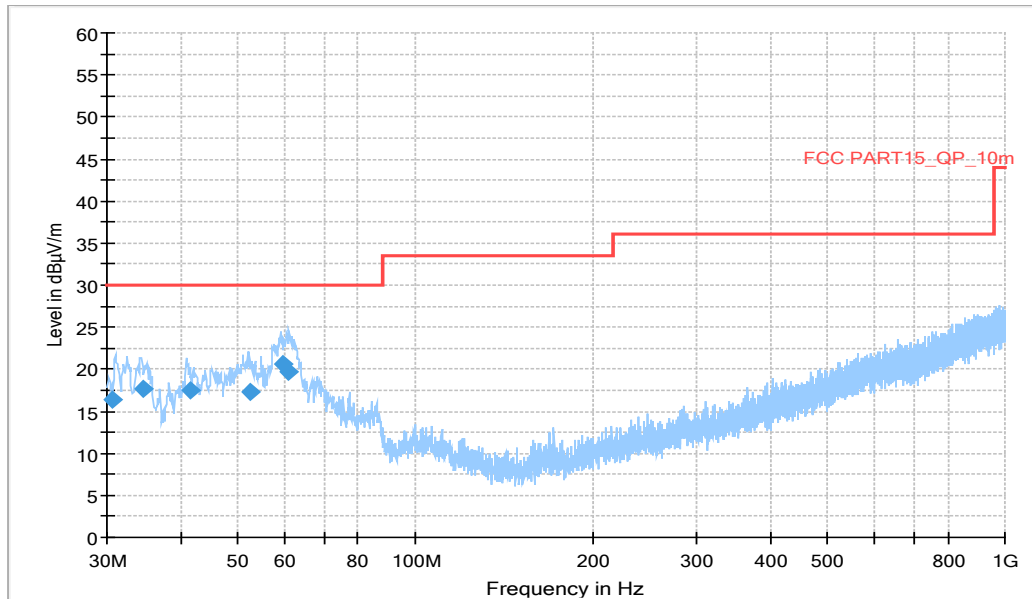


Figure A.11 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.647000	16.37	30.00	13.63	1000.0	120.000	320.0	V	84.0
34.568000	17.73	30.00	12.27	1000.0	120.000	317.0	V	4.0
41.464000	17.43	30.00	12.57	1000.0	120.000	212.0	V	-30.0
52.559000	17.25	30.00	12.75	1000.0	120.000	104.0	V	187.0
59.460000	20.69	30.00	9.31	1000.0	120.000	103.0	V	94.0
61.077000	19.63	30.00	10.37	1000.0	120.000	106.0	V	-10.0

Full Spectrum

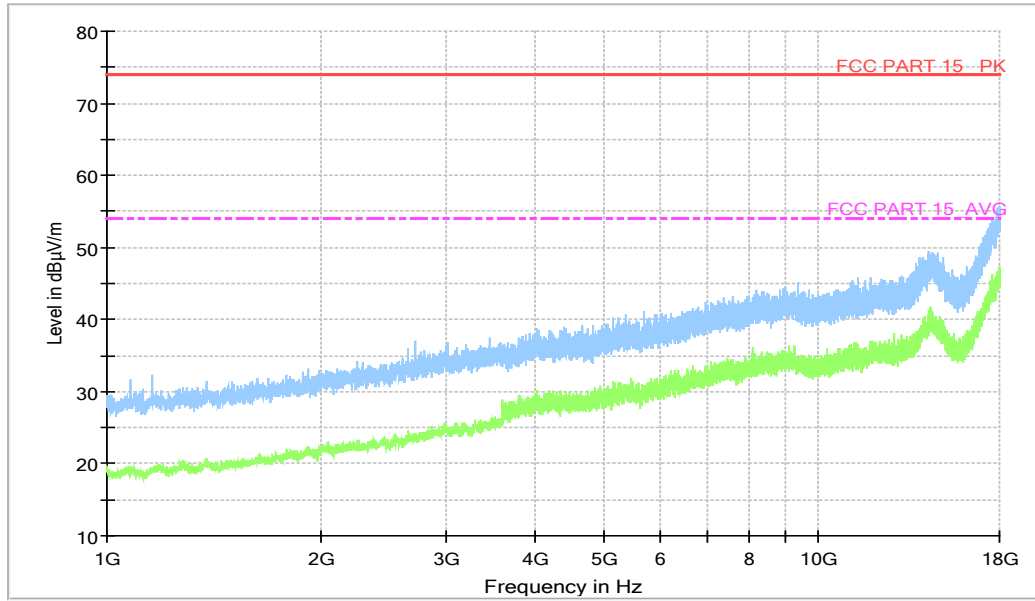


Figure A.12 Radiated Emission from 1GHz to 18GHz

LTE Band 12 MID CHANNEL (737.5MHz)

Full Spectrum

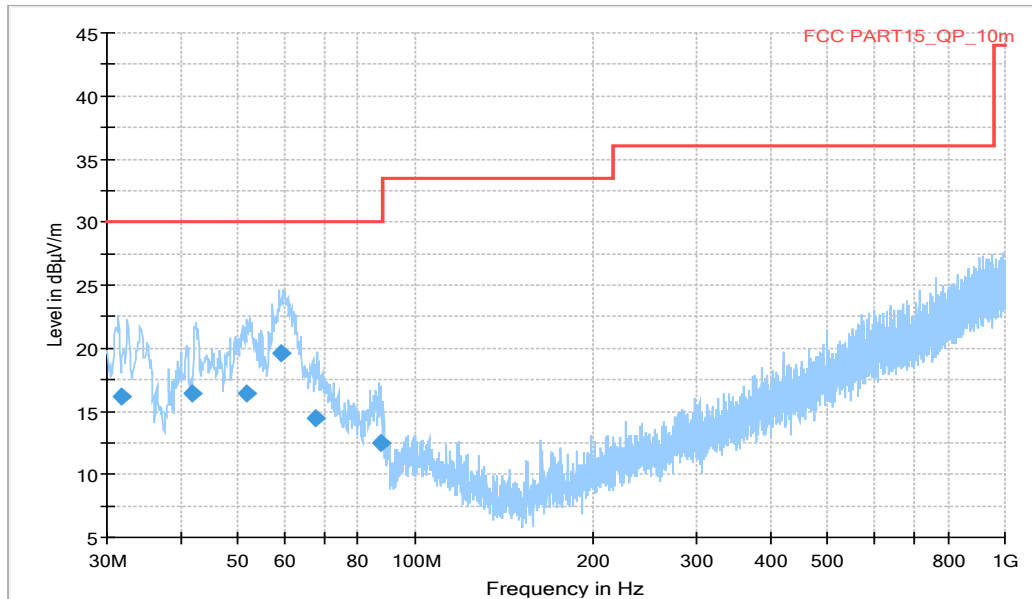


Figure A.13 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
31.778000	16.14	30.00	13.86	1000.0	120.000	225.0	V	2.0
41.742000	16.37	30.00	13.63	1000.0	120.000	225.0	V	168.0
51.807000	16.44	30.00	13.56	1000.0	120.000	410.0	V	73.0
59.266000	19.58	30.00	10.42	1000.0	120.000	125.0	V	-21.0
67.955000	14.39	30.00	15.61	1000.0	120.000	225.0	V	-2.0
87.165000	12.47	30.00	17.53	1000.0	120.000	325.0	V	210.0

Full Spectrum

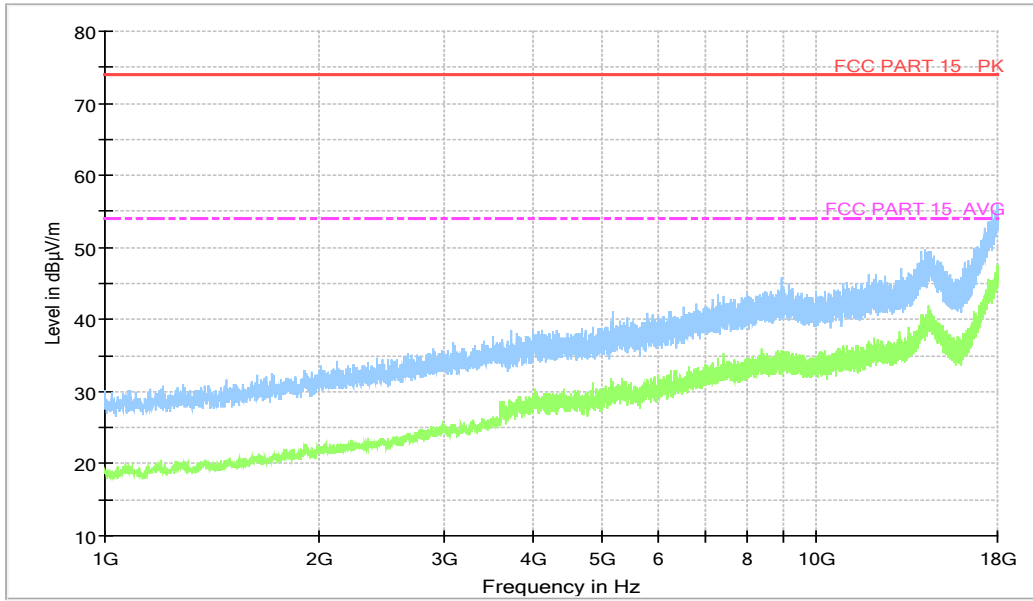


Figure A.14 Radiated Emission from 1GHz to 18GHz

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, charging mode, MP3, MP4, CAMERA and FM mode.

The model of the PC is Lenovo M4000e-17, and the serial number of the PC is M706RMW2. 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: $U= 3.08 \text{ dB}$, $k=2$.

Charger+MP3, Set.1

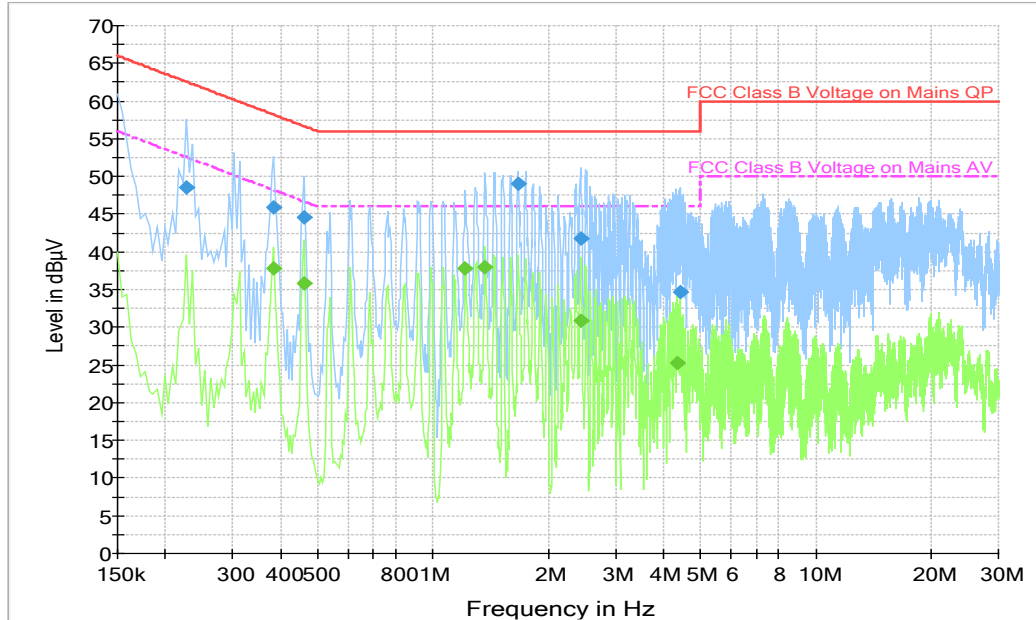


Figure A.15 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.226500	48.6	1000.0	9.000	On	L1	20.0	14.0	62.6
0.384000	45.8	1000.0	9.000	On	L1	20.1	12.3	58.2
0.460500	44.5	1000.0	9.000	On	L1	20.1	12.2	56.7
1.666500	49.0	1000.0	9.000	On	N	19.9	7.0	56.0
2.436000	41.8	1000.0	9.000	On	L1	20.2	14.2	56.0
4.411500	34.6	1000.0	9.000	On	N	20.4	21.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.384000	37.9	1000.0	9.000	On	L1	20.1	10.3	48.2
0.460500	35.9	1000.0	9.000	On	L1	20.1	10.8	46.7
1.212000	37.8	1000.0	9.000	On	N	19.9	8.2	46.0
1.369500	38.0	1000.0	9.000	On	N	19.9	8.0	46.0
2.436000	30.9	1000.0	9.000	On	L1	20.2	15.1	46.0
4.335000	25.3	1000.0	9.000	On	L1	20.7	20.7	46.0

. Charger+ Rear Camera, Set.2

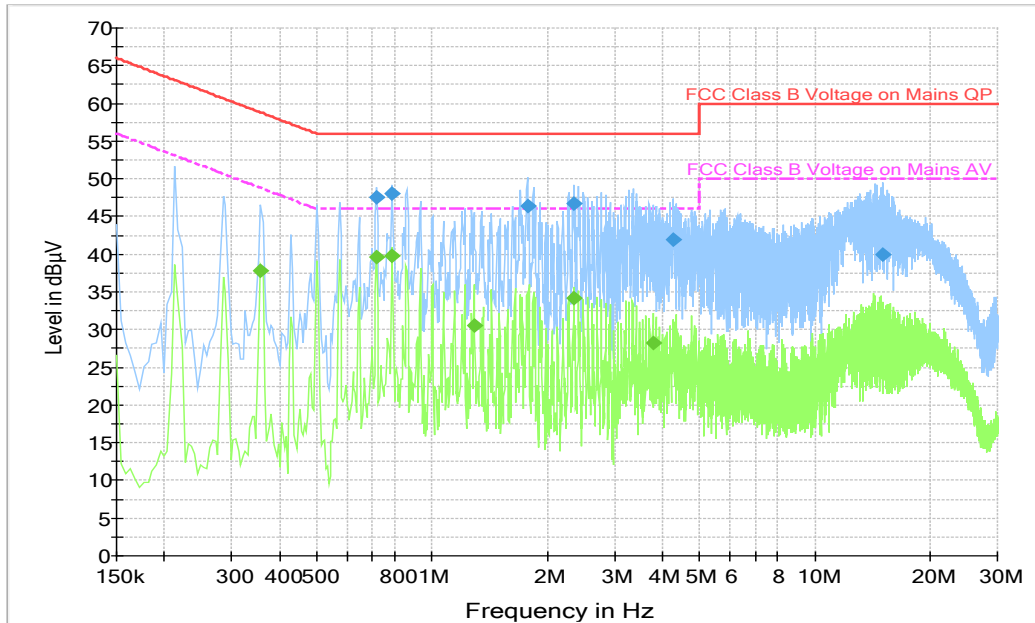


Figure A.16 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.717000	47.5	1000.0	9.000	On	N	20.0	8.5	56.0
0.789000	48.0	1000.0	9.000	On	N	20.0	8.0	56.0
1.774500	46.3	1000.0	9.000	On	L1	20.0	9.7	56.0
2.341500	46.7	1000.0	9.000	On	L1	20.1	9.3	56.0
4.267500	41.9	1000.0	9.000	On	L1	20.6	14.1	56.0
15.063000	39.9	1000.0	9.000	On	L1	24.1	20.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	37.8	1000.0	9.000	On	N	19.9	11.0	48.8
0.717000	39.7	1000.0	9.000	On	L1	20.1	6.3	46.0
0.789000	39.7	1000.0	9.000	On	N	20.0	6.3	46.0
1.288500	30.6	1000.0	9.000	On	N	19.9	15.4	46.0
2.341500	34.2	1000.0	9.000	On	L1	20.1	11.8	46.0
3.777000	28.2	1000.0	9.000	On	N	20.3	17.8	46.0

Charger+MP4, Set.3

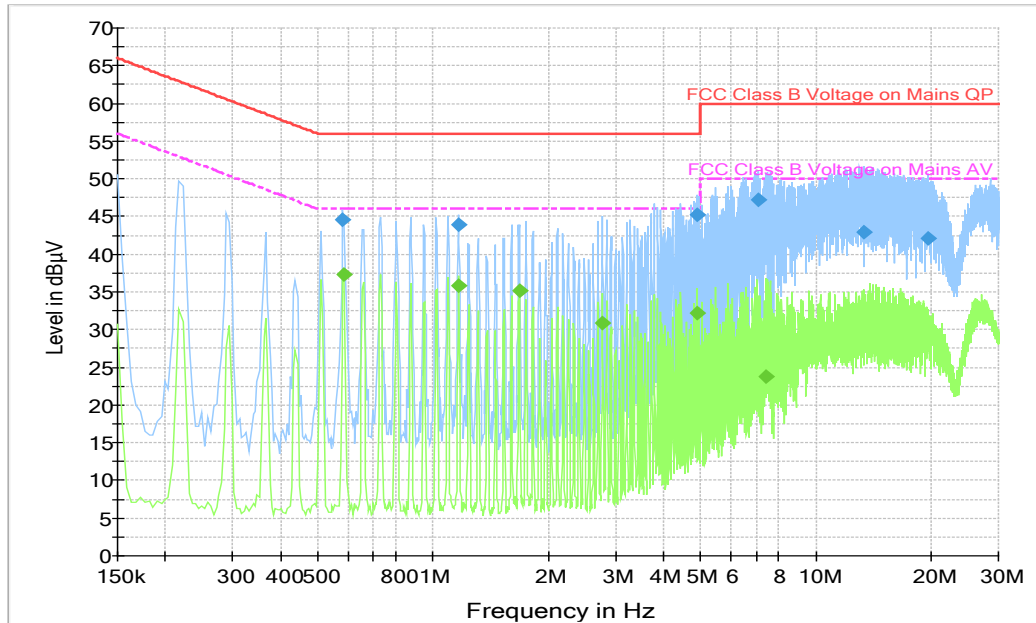


Figure A.17 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.582000	44.5	1000.0	9.000	On	L1	20.1	11.5	56.0
1.167000	43.8	1000.0	9.000	On	L1	19.8	12.2	56.0
4.884000	45.2	1000.0	9.000	On	L1	20.8	10.8	56.0
7.075500	47.3	1000.0	9.000	On	N	21.7	12.7	60.0
13.402500	43.0	1000.0	9.000	On	N	23.4	17.0	60.0
19.707000	42.2	1000.0	9.000	On	N	25.0	17.8	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.586500	37.3	1000.0	9.000	On	L1	20.1	8.7	46.0
1.167000	35.8	1000.0	9.000	On	L1	19.8	10.2	46.0
1.680000	35.2	1000.0	9.000	On	L1	20.0	10.8	46.0
2.769000	30.9	1000.0	9.000	On	L1	20.3	15.1	46.0
4.884000	32.2	1000.0	9.000	On	L1	20.8	13.8	46.0
7.426500	23.8	1000.0	9.000	On	L1	21.6	26.2	50.0

USB mode +FM, Set.4

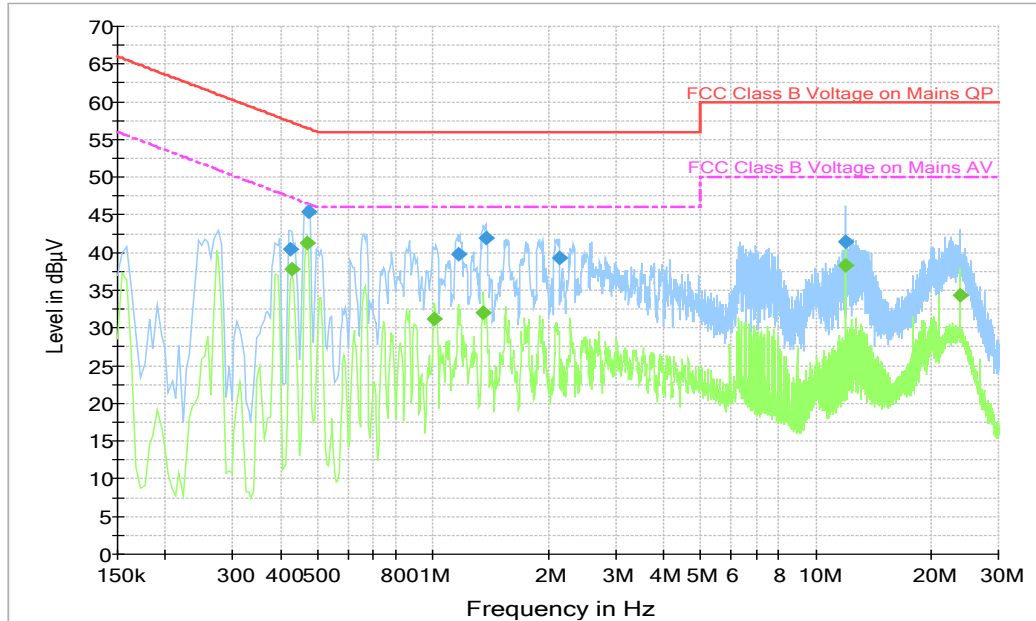


Figure A.18 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.424500	40.5	1000.0	9.000	On	N	19.9	16.9	57.4
0.474000	45.5	1000.0	9.000	On	L1	20.1	11.0	56.4
1.162500	39.8	1000.0	9.000	On	N	19.9	16.2	56.0
1.374000	41.9	1000.0	9.000	On	N	19.9	14.1	56.0
2.134500	39.3	1000.0	9.000	On	N	19.9	16.7	56.0
11.935500	41.4	1000.0	9.000	On	L1	22.7	18.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	37.8	1000.0	9.000	On	L1	20.1	9.5	47.3
0.469500	41.3	1000.0	9.000	On	N	19.9	5.2	46.5
1.009500	31.2	1000.0	9.000	On	L1	19.8	14.8	46.0
1.356000	32.0	1000.0	9.000	On	L1	19.9	14.0	46.0
11.935500	38.3	1000.0	9.000	On	L1	22.7	11.7	50.0
23.869500	34.4	1000.0	9.000	On	L1	25.5	15.6	50.0

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



ANNEX B: Persons involved in this testing

Test Item	Tester
Radiated Emission	Li Pengfei ,Wang Huan,Yan Hanchen
Conducted Emission	Shi Suolan

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