



TEST REPORT

No. I22Z62357-EMC01

for

HMD Global Oy

Smartphone

Model Name: TA-1486

FCC ID: 2AJOTTA-1486

with

Hardware Version: V1.0

Software Version: 00WW_1_010_C01

Issued Date: 2023-02-01

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
I22Z62357-EMC01	Rev.0	1st edition	2023-02-01

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



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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

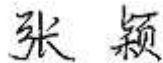
1.3. Testing Environment

Normal Temperature: 15-35° C
Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2023-01-17
Testing End Date: 2023-01-18

1.5. Signature



Zhang Ying

(Prepared this test report)



An Hui

(Reviewed this test report)



Shi Suolan

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: HMD Global Oy
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2.2. Manufacturer Information

Company Name: HMD Global Oy
Address /Post: Bertel Jungin aukio 9, 02600 Espoo, Finland
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Email: reza.serafat@hmdglobal.com
Telephone: +491735287964

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

3.1. About EUT

Description	Smart Phone
Model Name	TA-1486
FCC ID	2AJOTTA-1486
Extreme vol. Limits	3.7VDC 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	Note
UT71a	352739200038971/	V1.00	00WW_1_010_C01	First source
	352739200038989			
UT122a	352739200045851/	V1.00	00WW_1_010_C01	Second source
	352739200045869			

*EUT ID: is used to identify the test sample in the lab internally.

UT25a is first source, and UT23a is second source.

3.3. Internal Identification of AE used during the test

AE ID*	Name	Model	Manufacturer
AE1	Battery	LPN388463	Highpower
AE2-1	Charger	AD-030E	Jiangxi Jian Aohai Technology Co.,Ltd.
AE2-2	Charger	AD-030A	Jiangxi Jian Aohai Technology Co.,Ltd.
AE2-3	Charger	AD-030U	Jiangxi Jian Aohai Technology Co.,Ltd.
AE2-4	Charger	AD-030X	Jiangxi Jian Aohai Technology Co.,Ltd.
AE2-5	Charger	AD-030N	Jiangxi Jian Aohai Technology Co.,Ltd.
AE2-6	Charger	AD-030B	Jiangxi Jian Aohai Technology Co.,Ltd.
AE3	USB cable	CC-3A	Saibao (Jiangxi) Communication Industrial Co.,Ltd
AE4	Headset	NLD-EM301K-17SF	HUIZHOU NEW LEADER INDUSTRY CO., LTD

*AE ID: is used to identify the test sample in the lab internally.

Note: The USB cables are shielded.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.2	UT71a + AE1 + AE2-3 + AE3 + AE4	EUT+CHANGING US + Headset
Set.3	UT71a + AE1 + AE3 + AE4	EUT+USB+ Headset, first source
Set.4	UT122a + AE1 + AE3 + AE4	EUT+USB+ Headset, second source

3.5. Test summary

EUT set-up No.	Test mode	Test result	
		Radiated Emission	Conducted Emission
Set.2	Charger+Real Camera+ RX GSM850	Pass	Pass
Set.2	Charger+Front Camera + RX WCDMA band 5	Pass	Pass
Set.2	Charger+MP4 + RX LTE band 5	Pass	Pass
Set.3	USB TO PC + RX LTE band 12	Pass	Pass
Set.3	USB TO PC + RX LTE band 13	Pass	/
Set.3	USB TO PC + RX LTE band 17	Pass	/
Set.2	Charger+FM+ + RX LTE band 26	Pass	Pass
Set.4	USB TO PC + RX LTE band 12	Pass	/

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	2021
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, 3m/10m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

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

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL (Huayuan bei)
2	Conducted Emission	15.107(a)	B.2	P	CTTL (Huayuan bei)

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCI	100344	R&S	2023-03-21	1 year
2	LISN	ENV216	101200	R&S	2023-06-29	1 Year
3	Test Receiver	ESW44	103144	Rohde & Schwarz	2023-10-25	1 year
4	BiLog Antenna	VULB9163	9163-235	Schwarzbeck	2023-04-19	1 Year
5	EMI Antenna	3115	00167250	ETS-Lindgren	2023-06-20	1 year
6	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
9	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Conducted Emission	EMC32 V8.52.0	R&S
Radiated Emission ((Huayuan bei)	EMC32 V10.60.20	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 3/10 meters 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 USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode.

The EUT was tested while operating in licensed band Rx mode with Camera/MP3. 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.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. 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.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:

Frequency range	Measurement uncertainty
30MHz-1GHz	5.18dB, k=2
1GHz-18GHz	5.54dB, k=2

Measurement results for Set.2, Charger + REAR Camera + GSM 850 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
52.407000	16.80	29.54	12.74	100.0	V	315.0
63.756000	11.83	29.54	17.71	222.0	V	85.0
100.228000	12.88	33.06	20.18	225.0	V	-45.0
151.056000	12.97	33.06	20.09	125.0	V	-17.0
198.683000	12.06	33.06	21.00	100.0	V	135.0
281.327000	11.90	35.56	23.66	125.0	V	22.0

Charging Mode/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)
17997.620	41.30	-29.06	46.66	23.70	54.00	12.70	H
17920.100	41.20	-29.40	46.66	23.94	54.00	12.80	H
17924.520	41.20	-29.40	46.66	23.94	54.00	12.80	V
17999.320	41.20	-29.06	46.66	23.60	54.00	12.80	H
17989.120	41.10	-29.06	46.66	23.50	54.00	12.90	V
17995.240	41.10	-29.06	46.66	23.50	54.00	12.90	V

Charging Mode/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)
17423.700	52.3	-29.7	44.4	37.660	74.00	21.70	V
17991.160	52.1	-29.1	46.7	34.498	74.00	21.90	V
17981.300	51.9	-29.1	46.7	34.298	74.00	22.10	H
17527.060	51.9	-29.3	44.4	36.867	74.00	22.10	V
17997.620	51.6	-29.1	46.7	33.998	74.00	22.40	H
17896.640	51.6	-29.5	46.0	35.180	74.00	22.40	H

Measurement results for Set.2, Charger + Front Camera + WCDMA 850 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
51.534000	16.40	29.54	13.14	100.0	V	216.0
57.645000	14.02	29.54	15.52	125.0	V	252.0
105.078000	12.65	33.06	20.41	100.0	V	216.0
149.601000	11.30	33.06	21.76	182.0	V	-18.0
193.154000	11.99	33.06	21.07	125.0	V	149.0
241.169000	11.70	35.56	23.86	108.0	V	86.0

Charging Mode/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)
17991.160	41.30	-29.06	46.66	23.70	54.00	12.70	H
17912.960	41.10	-29.33	45.95	24.47	54.00	12.90	V
17977.900	41.00	-29.06	46.66	23.40	54.00	13.00	V
17975.520	41.00	-29.06	46.66	23.40	54.00	13.00	H
17891.880	41.00	-29.53	45.95	24.58	54.00	13.00	H
17996.940	41.00	-29.06	46.66	23.40	54.00	13.00	V

Charging Mode/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)
17913.300	52.7	-29.3	46.0	36.072	74.00	21.30	V
17549.840	51.4	-29.5	44.4	36.534	74.00	22.60	V
17986.740	51.4	-29.1	46.7	33.798	74.00	22.60	V
17999.320	51.3	-29.1	46.7	33.698	74.00	22.70	V
17997.280	51.2	-29.1	46.7	33.598	74.00	22.80	H
17998.980	51.2	-29.1	46.7	33.598	74.00	22.80	V

Measurement results for Set.2, Charger + MP4 + LTE band 5 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
45.229000	13.54	29.54	16.00	100.0	V	35.0
51.825000	14.49	29.54	15.05	125.0	V	315.0
64.532000	10.48	29.54	19.06	183.0	V	47.0
105.369000	11.38	33.06	21.68	108.0	V	-43.0
149.504000	11.17	33.06	21.89	202.0	V	-44.0
197.422000	13.18	33.06	19.88	100.0	V	-17.0

Charging Mode/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)
17994.220	41.20	-29.06	46.66	23.60	54.00	12.80	V
17979.940	41.20	-29.06	46.66	23.60	54.00	12.80	V
17991.840	41.10	-29.06	46.66	23.50	54.00	12.90	V
17972.120	41.00	-29.06	46.66	23.40	54.00	13.00	V
17992.860	41.00	-29.06	46.66	23.40	54.00	13.00	V
17540.660	41.00	-29.49	44.35	26.13	54.00	13.00	H

Charging Mode/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)
17984.700	52.7	-29.1	46.7	35.098	74.00	21.30	H
17906.500	51.5	-29.3	46.0	34.872	74.00	22.50	H
17775.600	51.5	-29.6	46.0	35.172	74.00	22.50	H
17967.020	51.5	-29.1	46.7	33.901	74.00	22.50	V
17964.640	51.4	-29.1	46.7	33.801	74.00	22.60	H
17997.620	51.3	-29.1	46.7	33.698	74.00	22.70	H

Measurement results for Set.3, USB + LTE B12 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
59.488000	17.52	29.54	12.02	100.0	V	252.0
95.960000	24.53	33.06	8.53	108.0	V	278.0
215.949000	23.78	33.06	9.28	325.0	H	292.0
239.908000	25.40	35.56	10.16	282.0	H	278.0
528.871000	26.93	35.56	8.63	275.0	V	-18.0
673.789000	30.63	35.56	4.93	183.0	V	-17.0

Charging Mode/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)
6053.080	42.30	-37.82	34.40	45.72	54.00	11.70	V
6053.420	41.40	-37.82	34.40	44.82	54.00	12.60	V
17996.940	41.00	-29.06	46.66	23.40	54.00	13.00	H
17999.320	41.00	-29.06	46.66	23.40	54.00	13.00	V
17992.860	41.00	-29.06	46.66	23.40	54.00	13.00	H
17917.380	41.00	-29.33	46.66	23.67	54.00	13.00	H

Charging Mode/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)
17817.760	52.0	-29.6	46.0	35.676	74.00	22.00	V
17985.720	51.5	-29.1	46.7	33.898	74.00	22.50	H
17371.340	51.2	-30.0	43.4	37.812	74.00	22.80	V
17514.140	51.1	-29.3	44.4	36.003	74.00	22.90	V
17590.300	51.1	-29.7	45.2	35.549	74.00	22.90	V
17423.360	51.1	-29.7	44.4	36.460	74.00	22.90	H

Measurement results for Set.3, USB + LTE B13 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
59.585000	20.19	29.54	9.35	275.0	V	176.0
95.960000	24.49	33.06	8.57	108.0	V	99.0
239.908000	22.83	35.56	12.73	325.0	V	-4.0
408.009000	31.34	35.56	4.22	222.0	H	225.0
496.182000	25.12	35.56	10.44	275.0	V	-31.0
673.304000	30.62	35.56	4.94	183.0	V	-17.0

Charging Mode/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)
6053.080	41.80	-37.82	34.40	45.22	54.00	12.20	V
6052.740	41.70	-37.82	34.40	45.12	54.00	12.30	H
17995.920	41.50	-29.06	46.66	23.90	54.00	12.50	H
17993.880	41.40	-29.06	46.66	23.80	54.00	12.60	H
17991.500	40.90	-29.06	46.66	23.30	54.00	13.10	V
17942.200	40.90	-28.94	46.66	23.18	54.00	13.10	V

Charging Mode/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)
17995.920	52.6	-29.1	46.7	34.998	74.00	21.40	V
17964.640	51.4	-29.1	46.7	33.801	74.00	22.60	H
17983.000	51.2	-29.1	46.7	33.598	74.00	22.80	V
17978.240	51.2	-29.1	46.7	33.601	74.00	22.80	V
17543.380	51.2	-29.5	44.4	36.334	74.00	22.80	V
17987.760	51.1	-29.1	46.7	33.498	74.00	22.90	V

Measurement results for Set.3, USB + LTE B17 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.208000	12.25	29.54	17.29	100.0	V	99.0
59.682000	18.48	29.54	11.06	183.0	V	189.0
95.960000	24.17	33.06	8.89	100.0	V	86.0
408.009000	31.78	35.56	3.78	183.0	H	225.0
543.033000	22.25	35.56	13.31	203.0	V	-31.0
673.013000	31.44	35.56	4.12	175.0	V	-17.0

Charging Mode/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)
6052.740	42.00	-37.82	34.40	45.42	54.00	12.00	V
6053.080	41.60	-37.82	34.40	45.02	54.00	12.40	H
17997.620	41.30	-29.06	46.66	23.70	54.00	12.70	H
17993.540	41.10	-29.06	46.66	23.50	54.00	12.90	H
17994.220	41.10	-29.06	46.66	23.50	54.00	12.90	H
17909.220	41.10	-29.33	45.95	24.47	54.00	12.90	V

Charging Mode/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)
17988.780	51.6	-29.1	46.7	33.998	74.00	22.40	V
17977.220	51.4	-29.1	46.7	33.801	74.00	22.60	V
17648.440	51.4	-29.6	45.2	35.753	74.00	22.60	V
17976.540	51.2	-29.1	46.7	33.601	74.00	22.80	H
17533.860	51.2	-29.3	44.4	36.167	74.00	22.80	H
17973.140	51.1	-29.1	46.7	33.501	74.00	22.90	V

Measurement results for Set.2, Charger + FM+ LTE band 26 idle:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
49.594000	13.59	29.54	15.95	225.0	V	34.0
52.407000	16.27	29.54	13.27	100.0	V	225.0
64.338000	10.27	29.54	19.27	202.0	V	293.0
104.496000	12.91	33.06	20.15	125.0	V	135.0
144.460000	9.84	33.06	23.22	183.0	V	-18.0
194.221000	13.08	33.06	19.98	100.0	V	73.0

Charging Mode/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)
17999.320	41.50	-29.06	46.66	23.90	54.00	12.50	H
17996.600	41.20	-29.06	46.66	23.60	54.00	12.80	H
17980.960	41.10	-29.06	46.66	23.50	54.00	12.90	H
17889.500	41.10	-29.53	45.95	24.68	54.00	12.90	H
17976.540	41.10	-29.06	46.66	23.50	54.00	12.90	H
17898.000	41.10	-29.53	45.95	24.68	54.00	12.90	H

Charging Mode/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)
17982.320	52.4	-29.1	46.7	34.798	74.00	21.60	H
17980.960	51.9	-29.1	46.7	34.298	74.00	22.10	H
17911.600	51.7	-29.3	46.0	35.072	74.00	22.30	V
17947.640	51.6	-28.9	46.7	33.883	74.00	22.40	V
17354.000	51.6	-30.0	43.4	38.212	74.00	22.40	H
17564.800	51.5	-29.8	45.2	36.046	74.00	22.50	H

Measurement results for Set.4, USB + LTE B12 idle, second source:
Charging Mode/QP detector

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
46.199000	13.59	29.54	15.95	120.000	325.0	V
115.263000	21.22	33.06	11.84	120.000	125.0	V
243.303000	21.69	35.56	13.87	120.000	301.0	H
288.117000	19.53	35.56	16.03	120.000	100.0	V
528.289000	27.63	35.56	7.93	120.000	223.0	V
672.334000	31.36	35.56	4.20	120.000	183.0	V

Charging Mode/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)
17561.740	42.7	-29.8	45.2	27.2	54.0	11.3	H
17639.600	42.6	-29.4	45.2	26.8	54.0	11.4	H
17244.520	42.3	-30.0	43.4	29.0	54.0	11.7	H
17633.480	42.3	-29.4	45.2	26.5	54.0	11.7	H
17607.980	42.3	-29.5	45.2	26.6	54.0	11.7	H
17640.620	42.3	-29.6	45.2	26.7	54.0	11.7	V

Charging Mode/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)
17250.300	54.1	-30.0	43.4	40.8	74.0	19.9	H
17352.980	53.1	-30.0	43.4	39.7	74.0	20.9	H
17973.140	53.1	-29.1	46.7	35.5	74.0	20.9	H
17631.780	53.0	-29.4	45.2	37.2	74.0	21.0	V
17532.500	53.0	-29.3	44.4	38.0	74.0	21.0	H
17577.720	52.7	-29.8	45.2	37.2	74.0	21.3	H

Measurement results for Set.2, Charger + REAR Camera + GSM 850 idle:

Full Spectrum

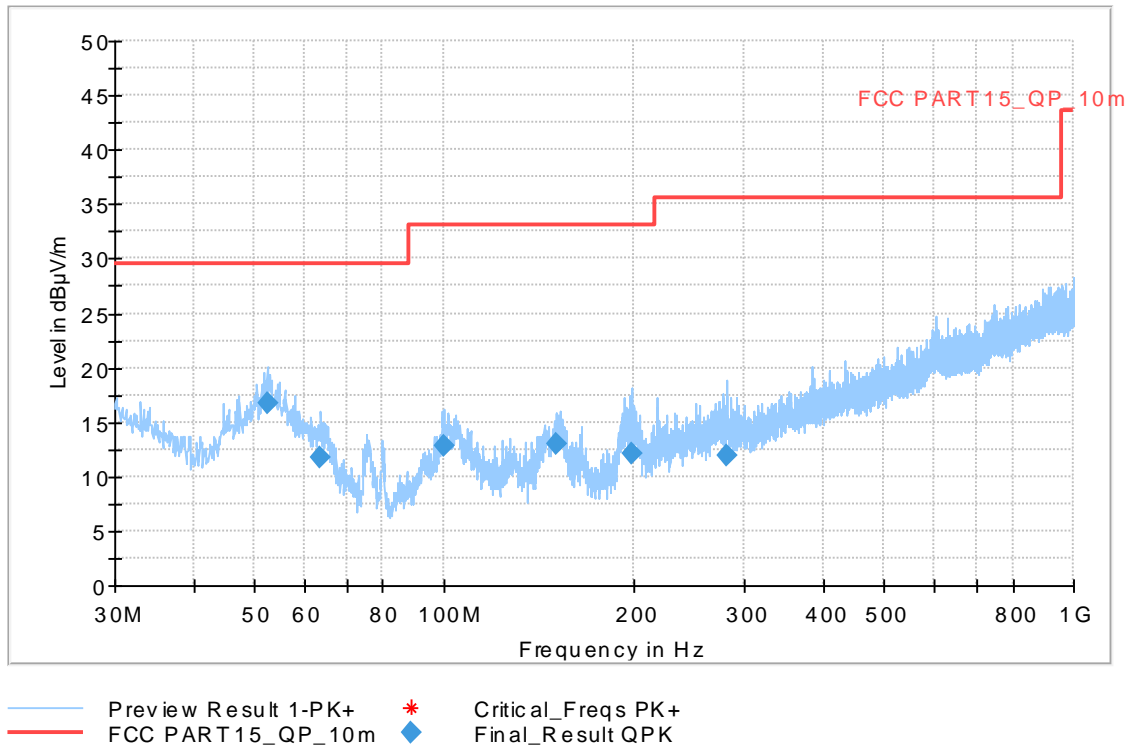


Fig A.1 Radiated Emission from 30MHz to 1GHz

Full Spectrum

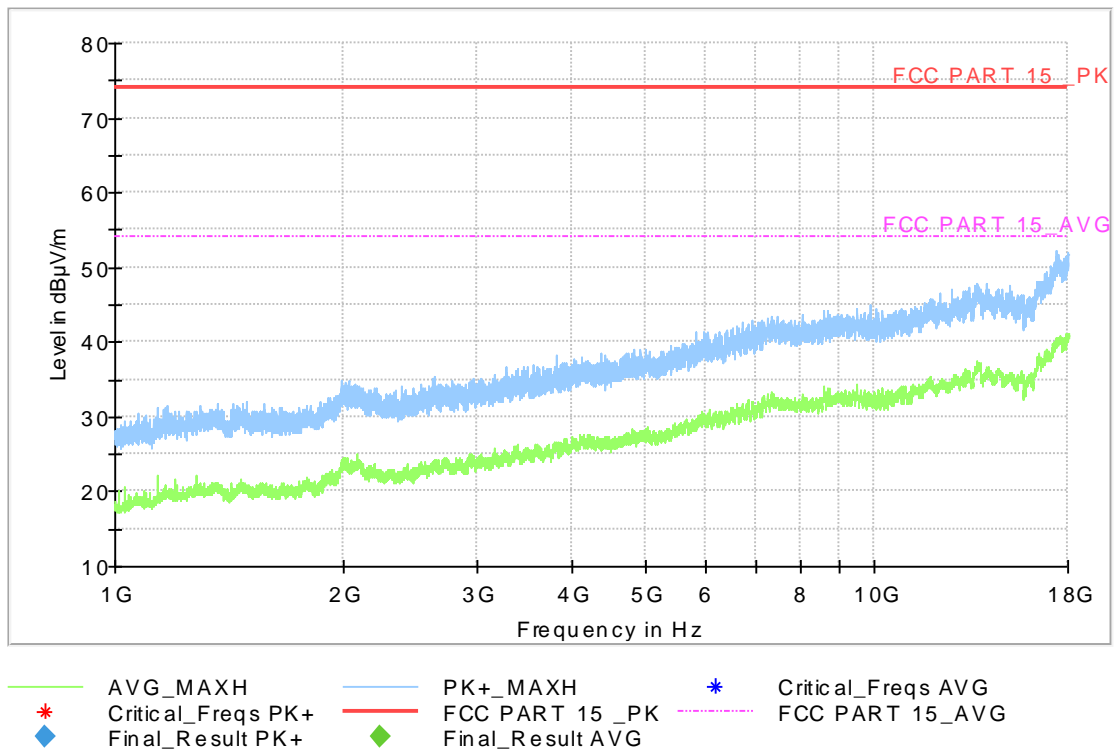


Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2, Charger + Front Camera + WCDMA 850 idle:

Full Spectrum

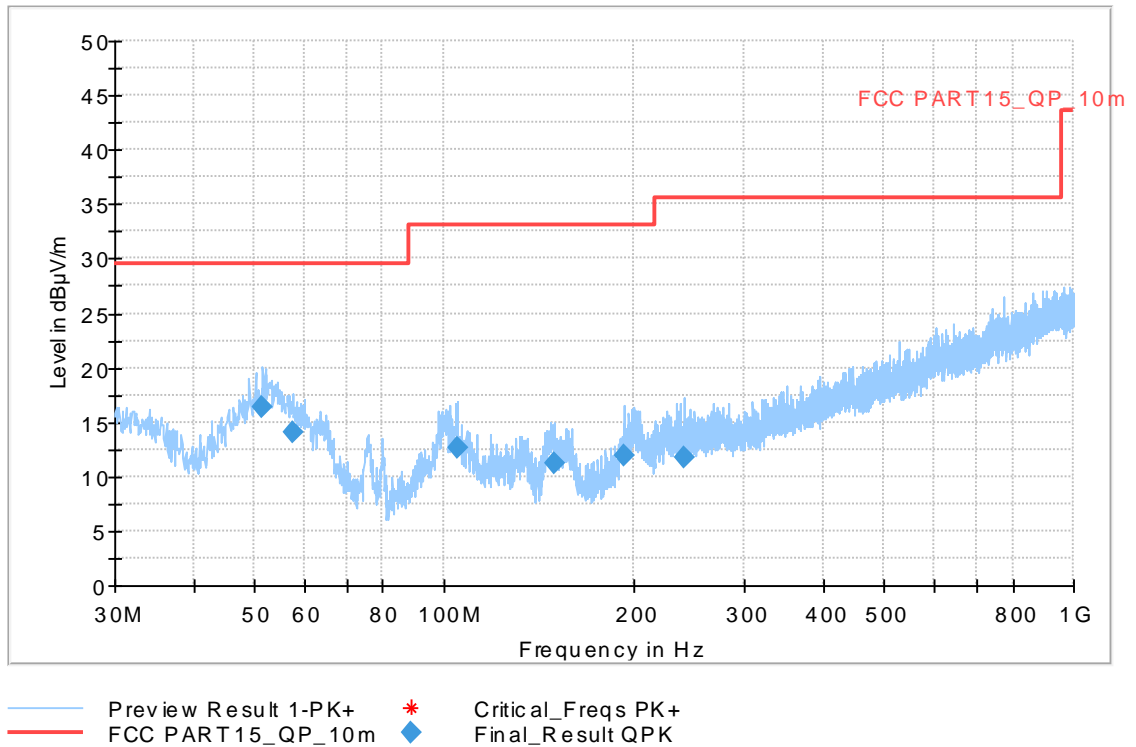


Fig A.3 Radiated Emission from 30MHz to 1GHz

Full Spectrum

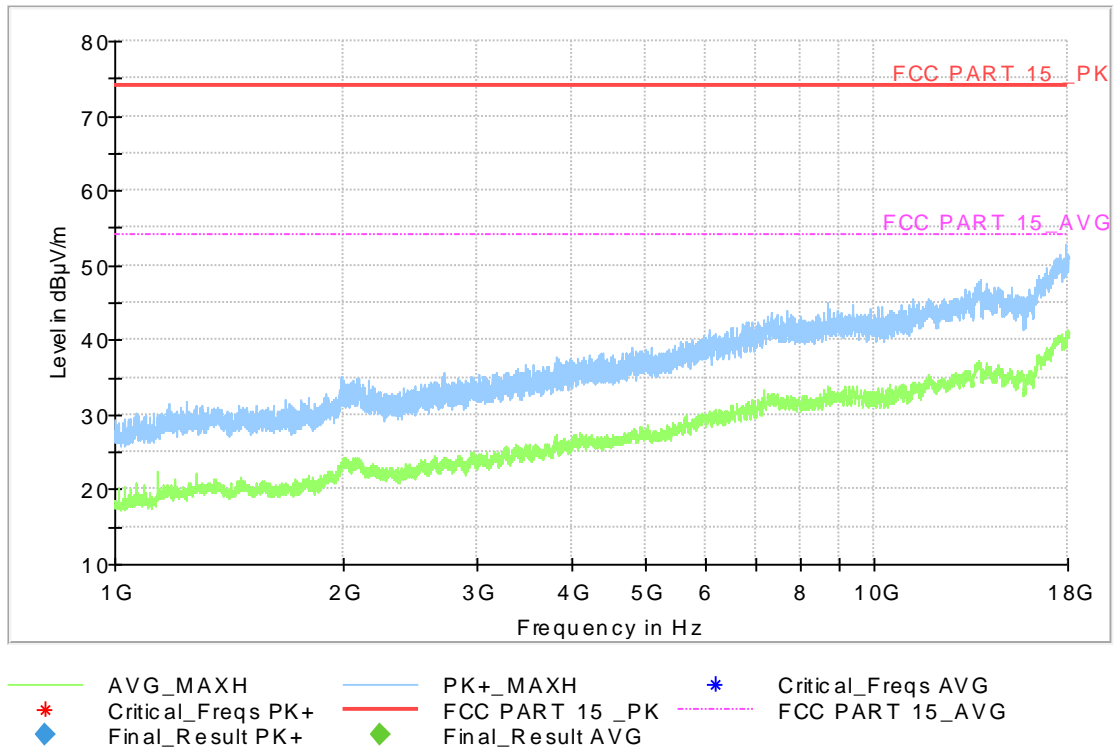


Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2, Charger + MP4 + LTE band 5 idle:

Full Spectrum

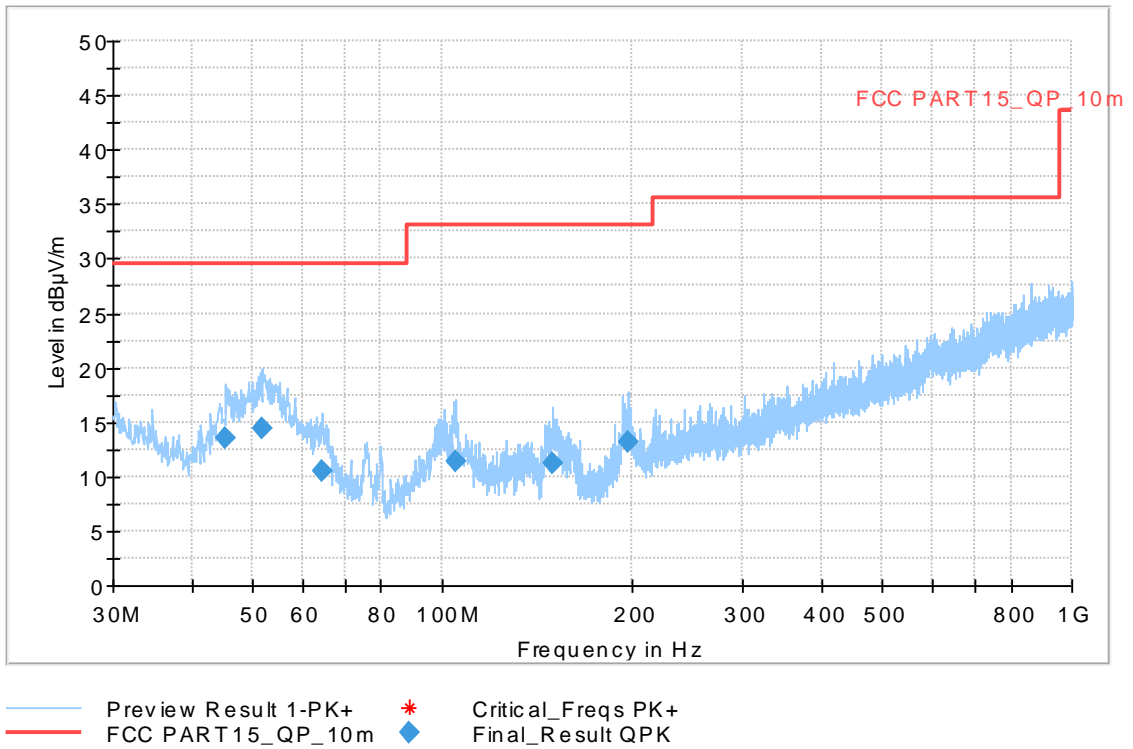


Fig A.5 Radiated Emission from 30MHz to 1GHz

Full Spectrum

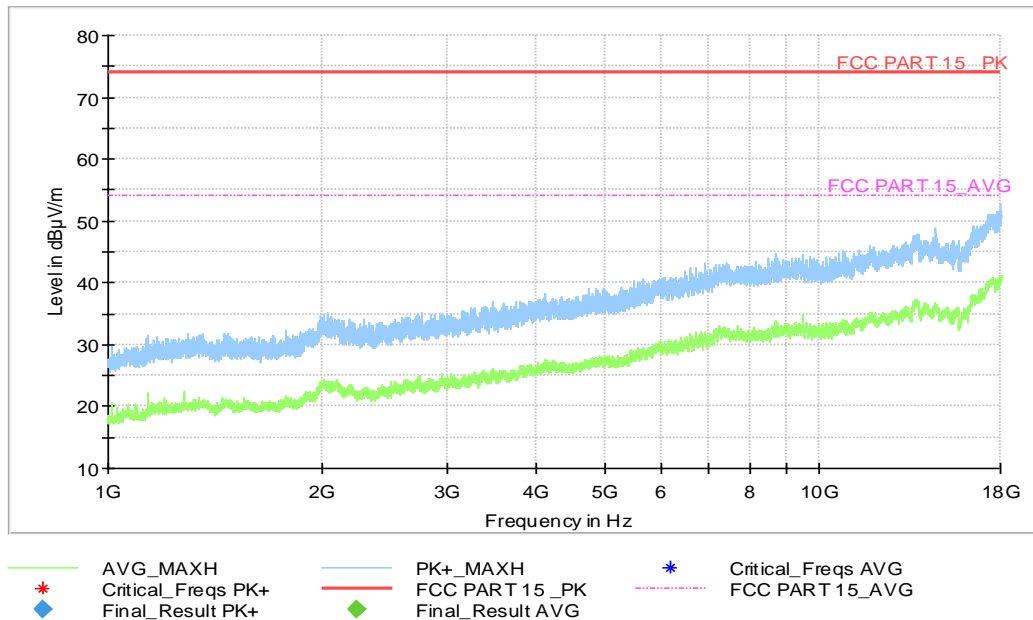


Fig A.6 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3, USB + LTE B12 idle:

Full Spectrum

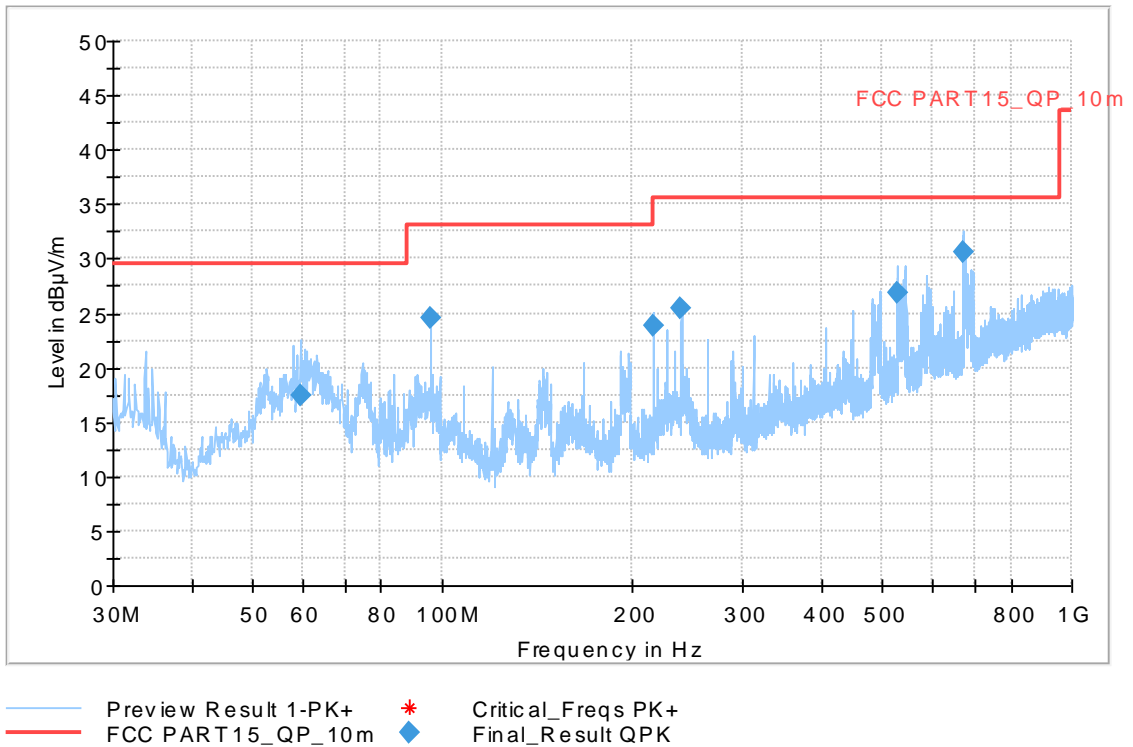


Fig A.7 Radiated Emission from 30MHz to 1GHz

Full Spectrum

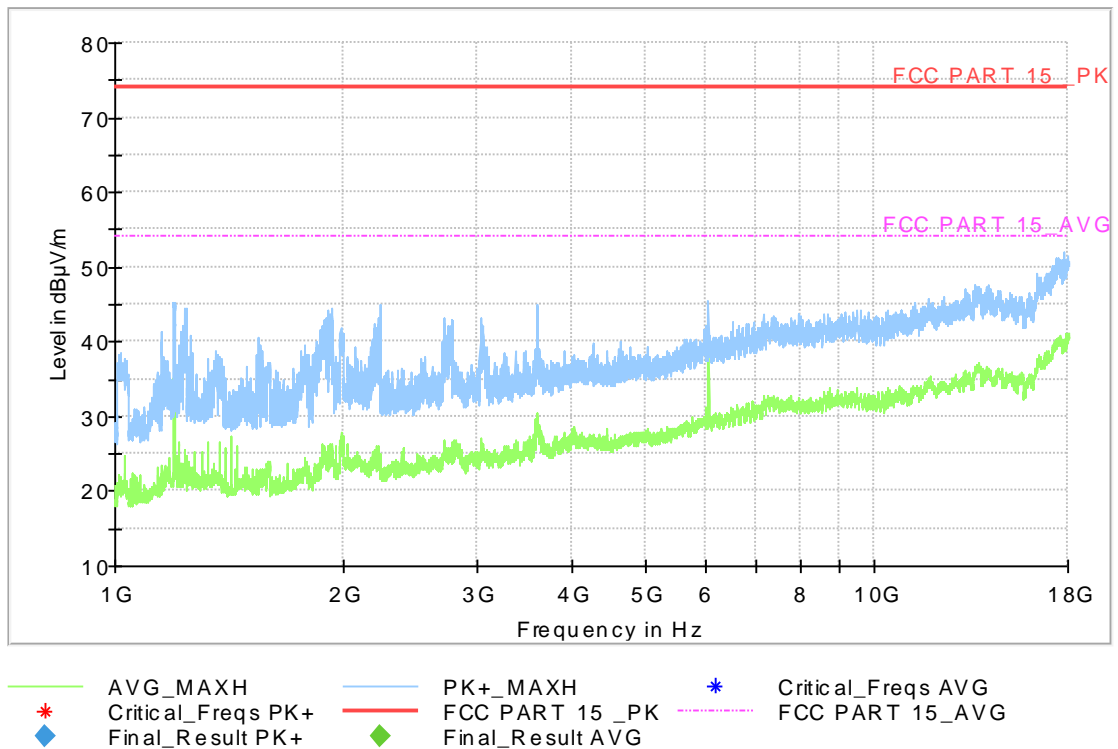


Fig A.8 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3, USB + LTE B13 idle:

Full Spectrum

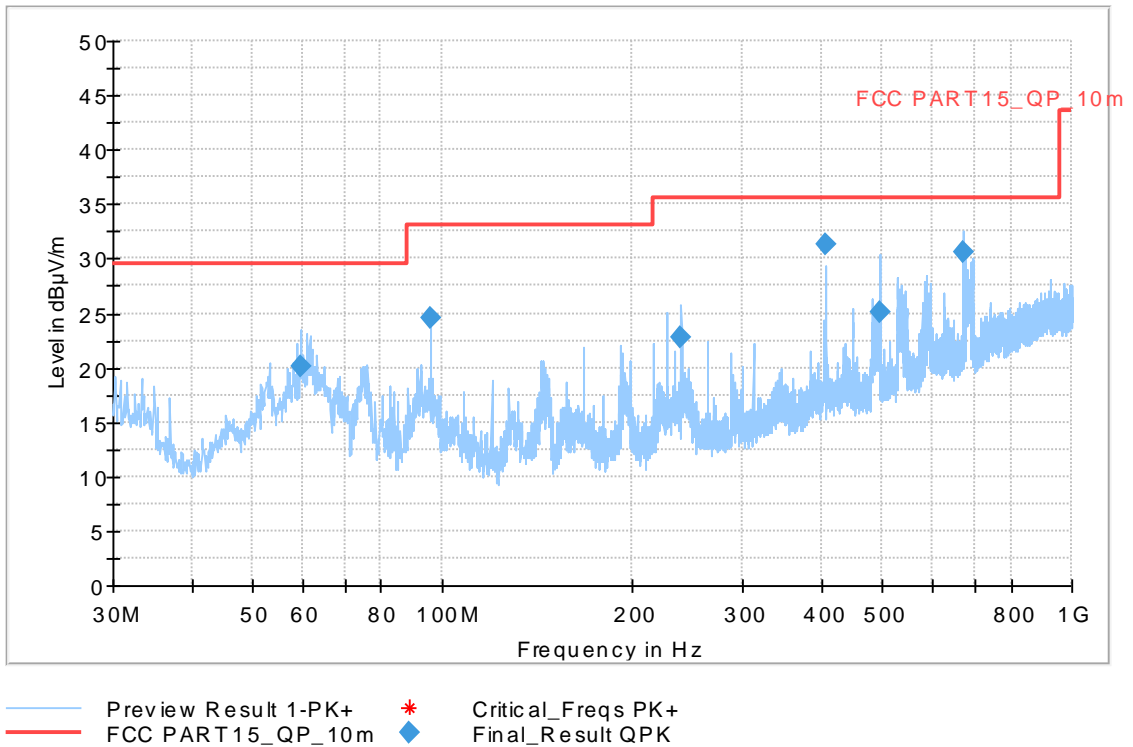


Fig A.9 Radiated Emission from 30MHz to 1GHz

Full Spectrum

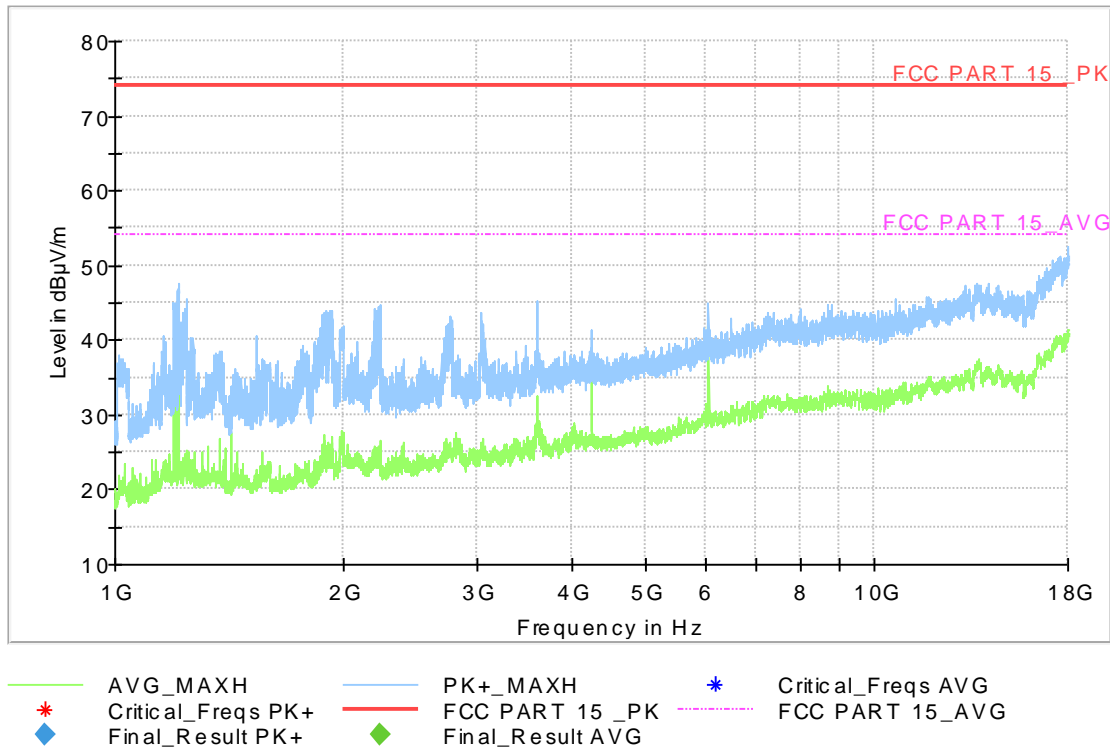


Fig A.10 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3, USB + LTE B17 idle:

Full Spectrum

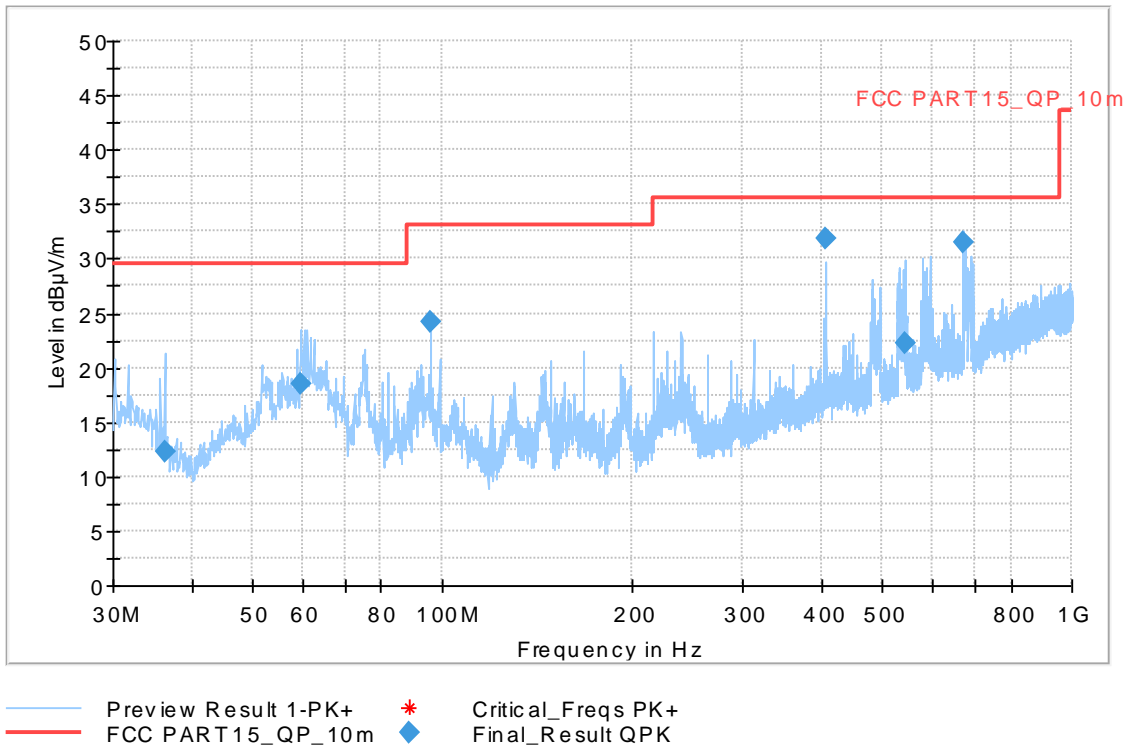


Fig A.11 Radiated Emission from 30MHz to 1GHz

Full Spectrum

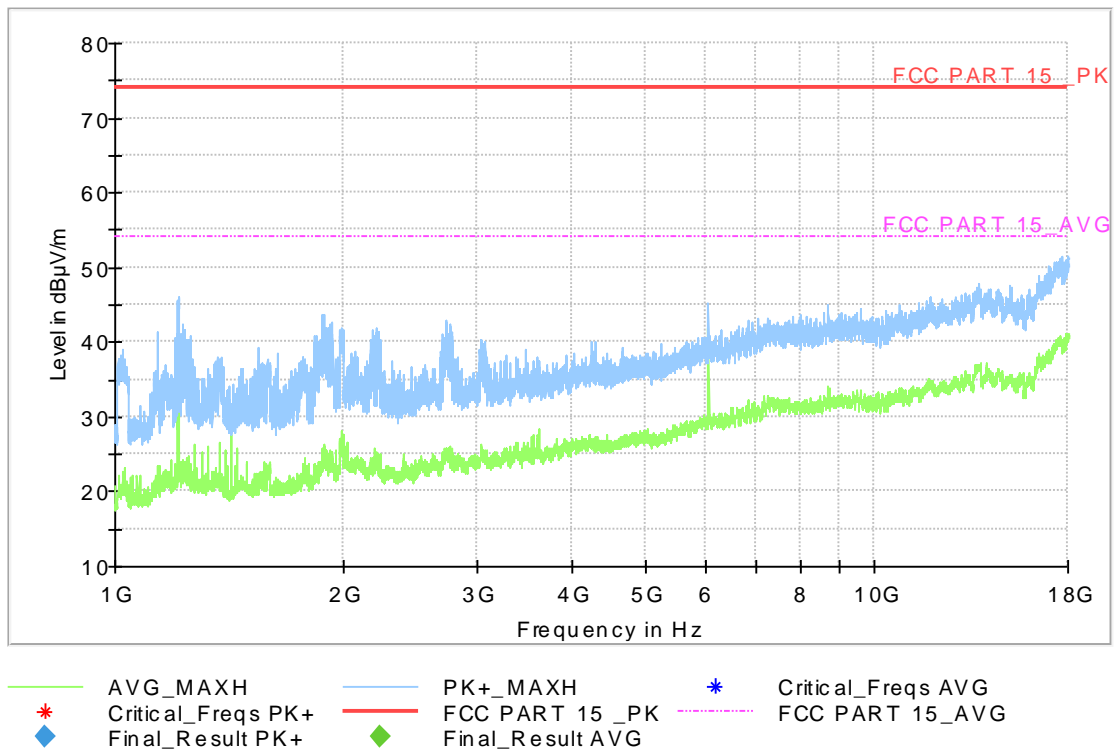


Fig A.12 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2, Charger + FM idle + LTE band26 idle:

Full Spectrum

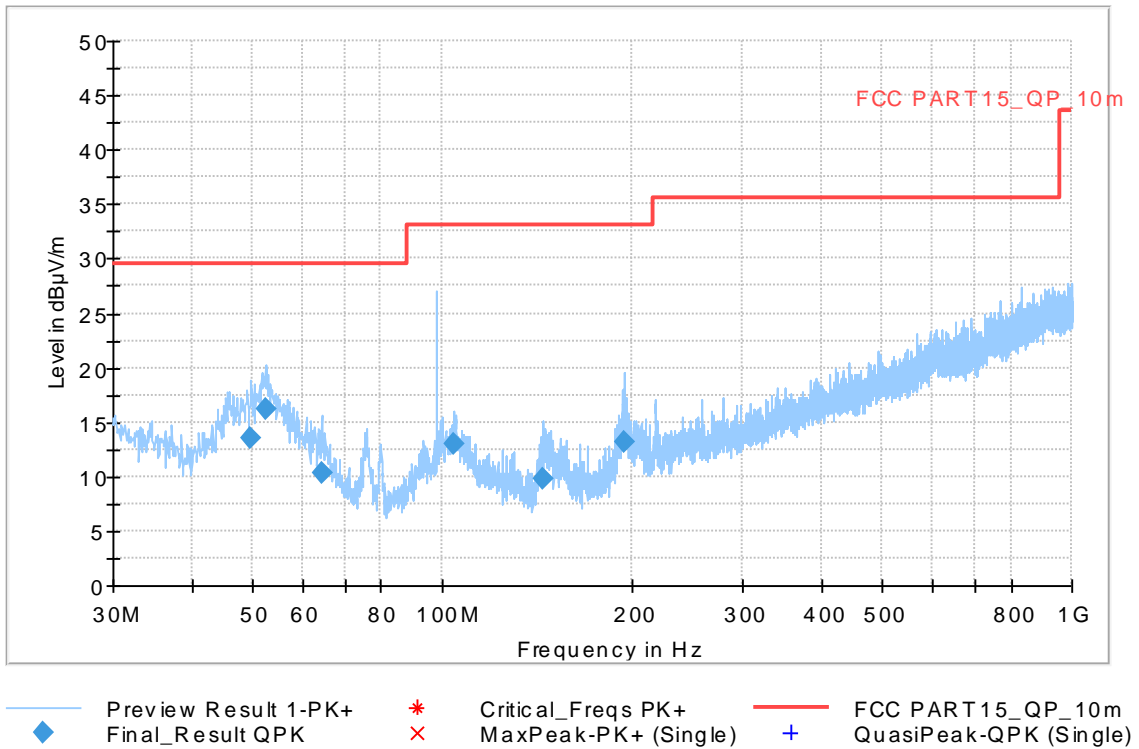


Fig A.13 Radiated Emission from 30MHz to 1GHz

Full Spectrum

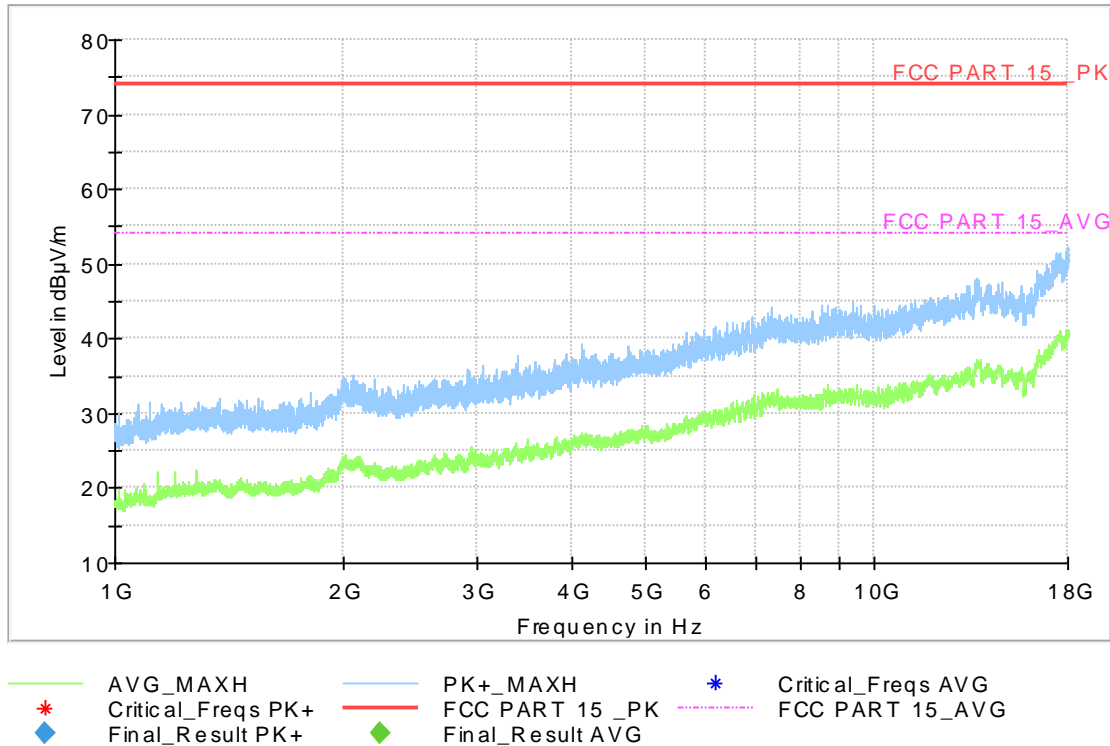


Fig A.14 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.4, USB + LTE B12 idle, second source:

Full Spectrum

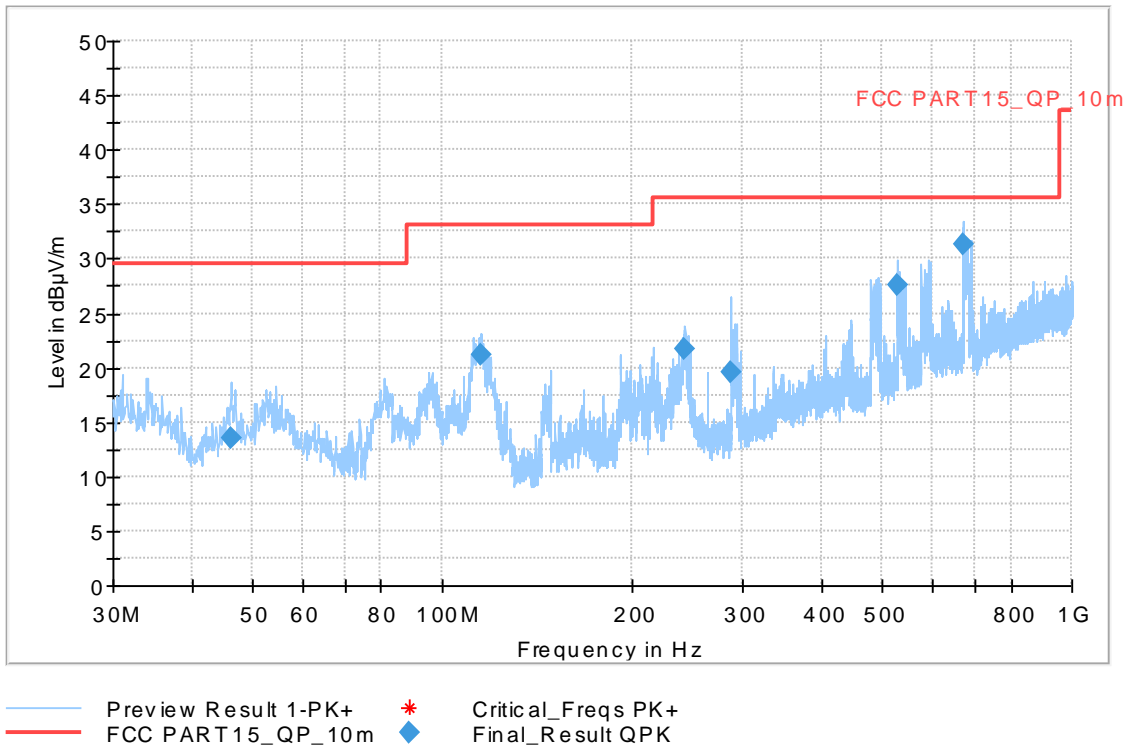


Fig A.15 Radiated Emission from 30MHz to 1GHz

Full Spectrum

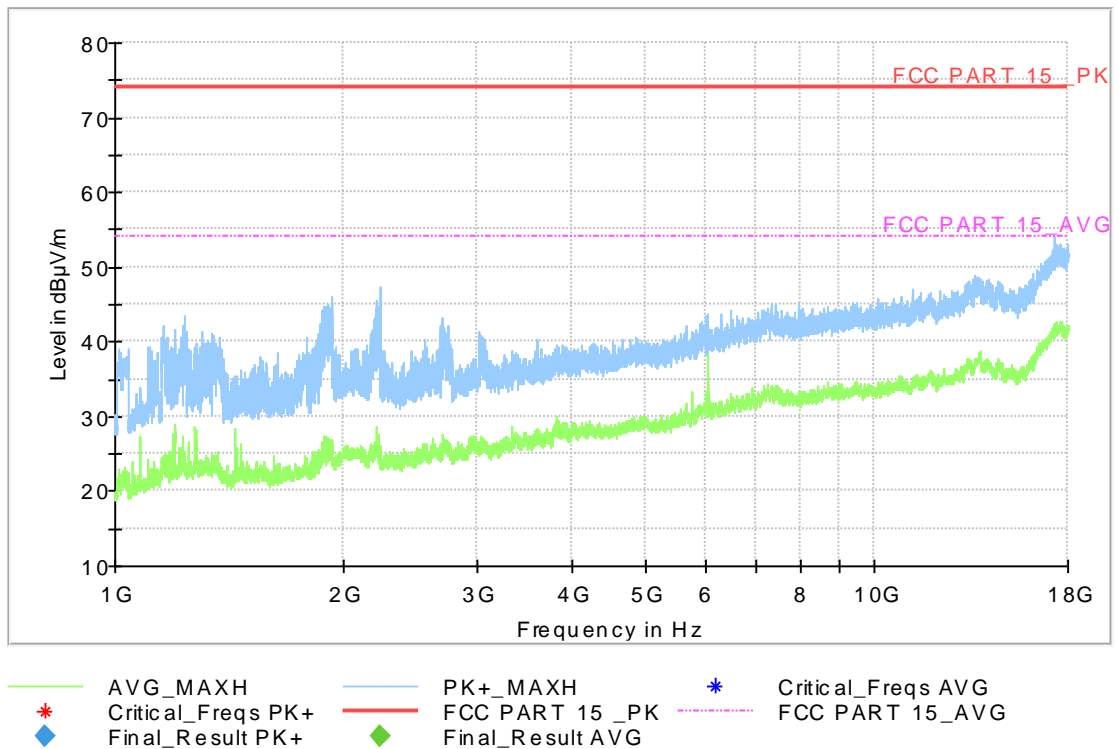


Fig A.16 Radiated Emission from 1GHz to 18GHz

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 and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL M4000E-17, and the serial number of the PC is M706GWXD. 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: $U= 3.08$ dB, $k=2$.

Measurement results for Set.2, Charger + REAR Camera + GSM 850 idle:

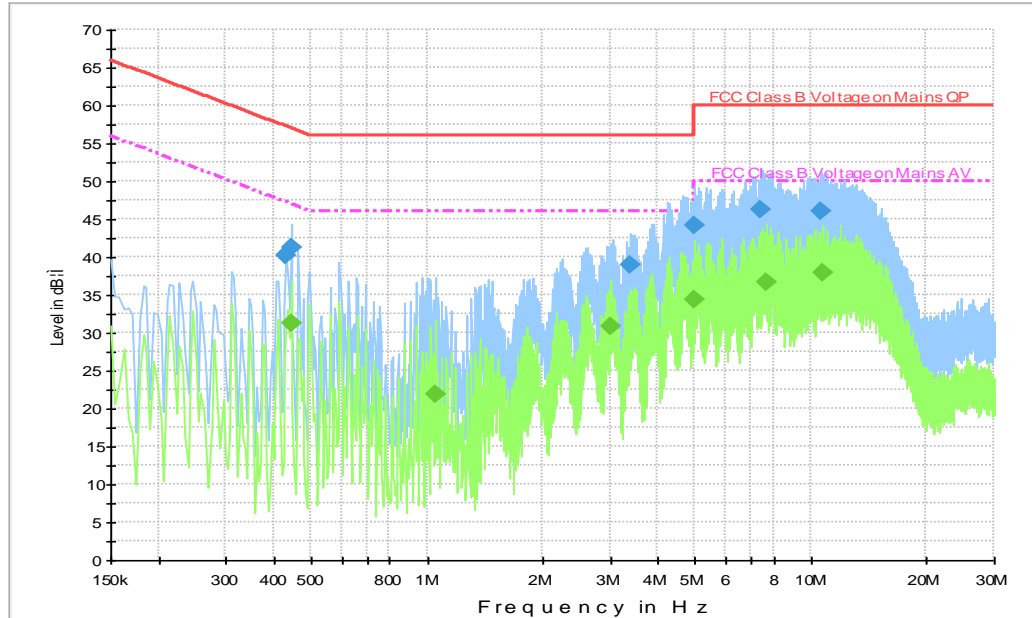


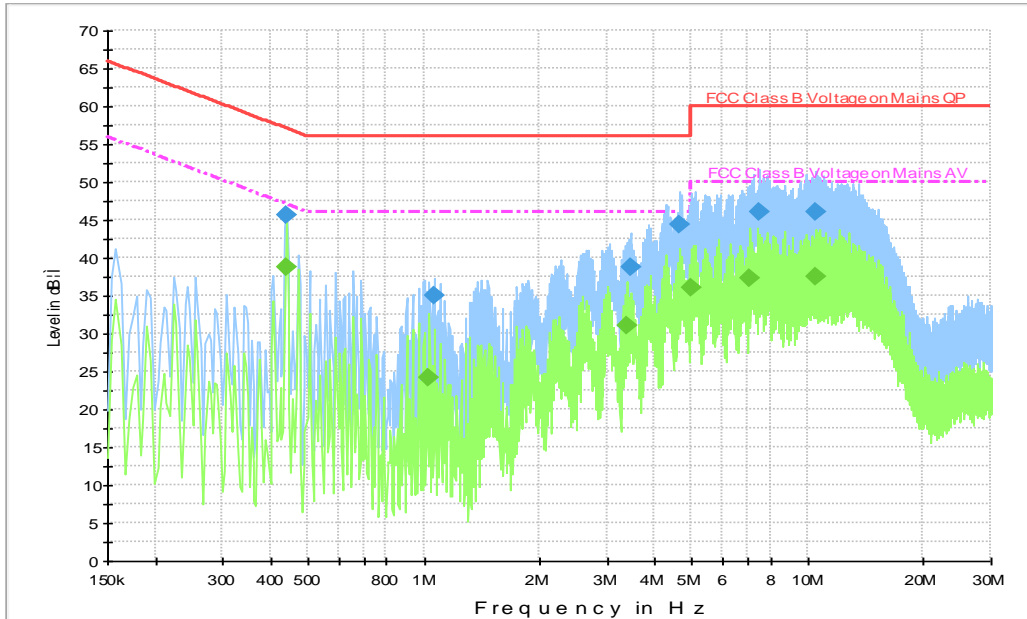
Fig A.17 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.430000	40.2	2000.0	9.000	On	L1	19.7	17.0	57.3
0.442000	41.3	2000.0	9.000	On	L1	19.7	15.8	57.0
3.378000	38.9	2000.0	9.000	On	L1	19.6	17.1	56.0
4.958000	44.2	2000.0	9.000	On	L1	19.6	11.8	56.0
7.430000	46.3	2000.0	9.000	On	L1	19.6	13.7	60.0
10.586000	46.0	2000.0	9.000	On	L1	19.7	14.0	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.442000	31.2	2000.0	9.000	On	L1	19.7	15.8	47.0
1.054000	22.0	2000.0	9.000	On	L1	19.7	24.0	46.0
2.998000	30.9	2000.0	9.000	On	L1	19.6	15.1	46.0
4.946000	34.4	2000.0	9.000	On	L1	19.6	11.6	46.0
7.694000	36.7	2000.0	9.000	On	L1	19.7	13.3	50.0
10.686000	37.8	2000.0	9.000	On	L1	19.7	12.2	50.0

Measurement results for Set.2, Charger + Front camera+ WCDMA band 5 idle:

Fig A.18 Conducted Emission
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.438000	45.7	2000.0	9.000	On	L1	19.7	11.4	57.1
1.066000	35.1	2000.0	9.000	On	L1	19.7	20.9	56.0
3.446000	38.8	2000.0	9.000	On	L1	19.6	17.2	56.0
4.646000	44.3	2000.0	9.000	On	L1	19.6	11.7	56.0
7.466000	46.1	2000.0	9.000	On	L1	19.6	13.9	60.0
10.550000	46.1	2000.0	9.000	On	L1	19.7	13.9	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.438000	38.7	2000.0	9.000	On	L1	19.7	8.4	47.1
1.034000	24.2	2000.0	9.000	On	L1	19.7	21.8	46.0
3.386000	31.0	2000.0	9.000	On	L1	19.6	15.0	46.0
4.998000	36.0	2000.0	9.000	On	L1	19.6	10.0	46.0
7.090000	37.3	2000.0	9.000	On	L1	19.7	12.7	50.0
10.454000	37.6	2000.0	9.000	On	L1	19.7	12.4	50.0

Measurement results for Set.2, Charger + MP4+ LTE band 5 idle:

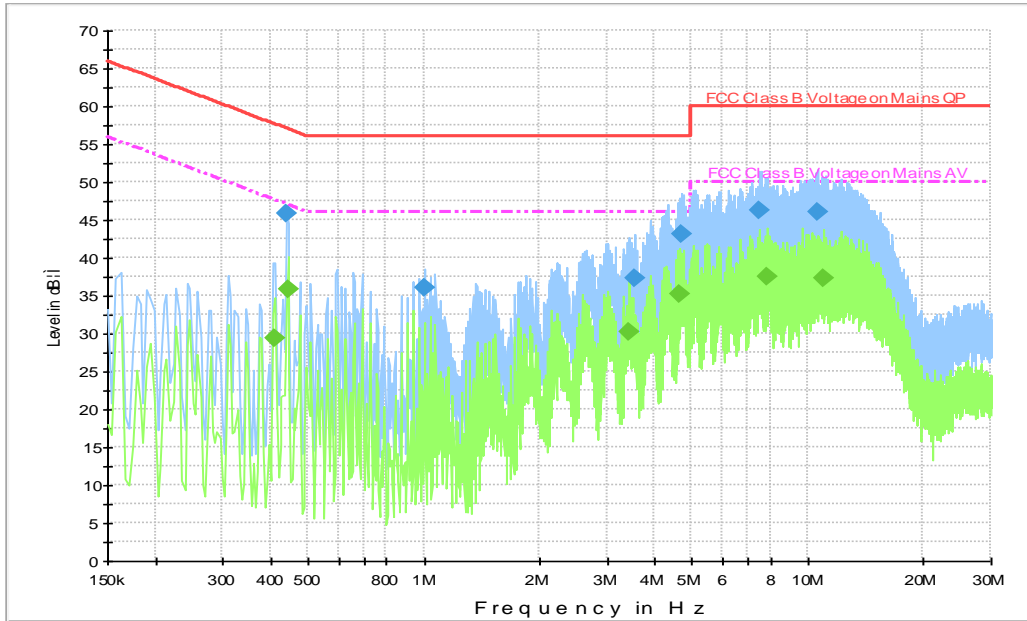


Fig A.19 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.438000	45.8	2000.0	9.000	On	L1	19.7	11.3	57.1
1.006000	36.1	2000.0	9.000	On	L1	19.7	19.9	56.0
3.554000	37.2	2000.0	9.000	On	L1	19.6	18.8	56.0
4.702000	43.2	2000.0	9.000	On	L1	19.6	12.8	56.0
7.498000	46.3	2000.0	9.000	On	L1	19.6	13.7	60.0
10.594000	46.1	2000.0	9.000	On	L1	19.7	13.9	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.410000	29.3	2000.0	9.000	On	L1	19.7	18.4	47.6
0.442000	35.8	2000.0	9.000	On	L1	19.7	11.2	47.0
3.410000	30.3	2000.0	9.000	On	L1	19.6	15.7	46.0
4.614000	35.3	2000.0	9.000	On	L1	19.6	10.7	46.0
7.822000	37.6	2000.0	9.000	On	L1	19.7	12.4	50.0
11.018000	37.4	2000.0	9.000	On	L1	19.7	12.6	50.0

Measurement results for Set.3, USB+ LTE band 12 idle:

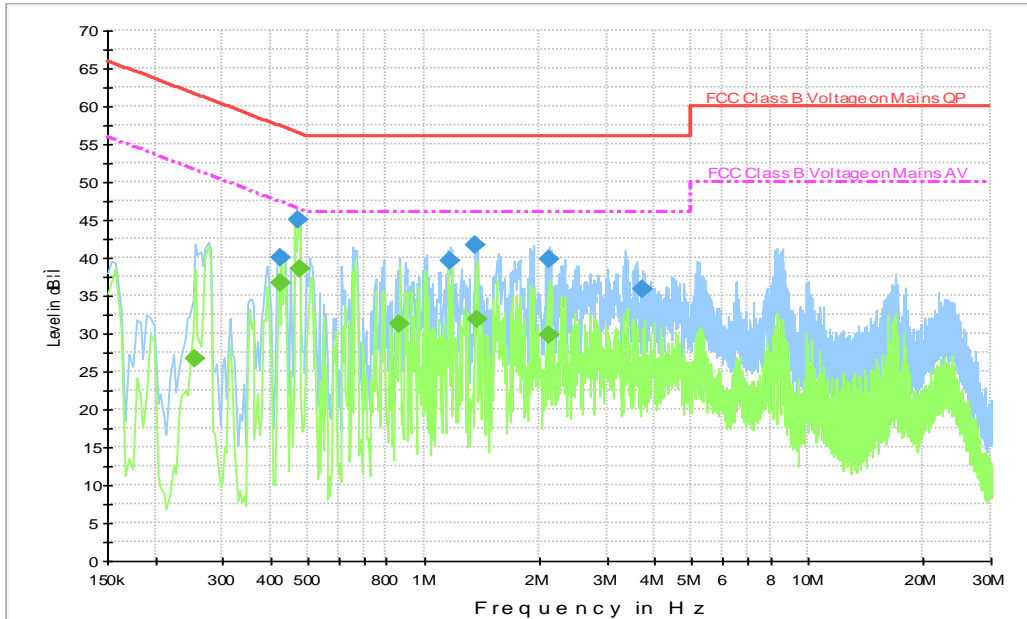


Fig A.20 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.426000	40.0	2000.0	9.000	On	L1	19.7	17.3	57.3
0.470000	45.0	2000.0	9.000	On	L1	19.7	11.6	56.5
1.174000	39.6	2000.0	9.000	On	N	19.6	16.4	56.0
1.366000	41.7	2000.0	9.000	On	L1	19.6	14.3	56.0
2.126000	39.7	2000.0	9.000	On	N	19.6	16.3	56.0
3.714000	35.9	2000.0	9.000	On	N	19.6	20.1	56.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.254000	26.7	2000.0	9.000	On	N	19.7	25.0	51.6
0.426000	36.7	2000.0	9.000	On	L1	19.7	10.7	47.3
0.474000	38.6	2000.0	9.000	On	N	19.7	7.9	46.4
0.866000	31.3	2000.0	9.000	On	L1	19.7	14.7	46.0
1.370000	31.8	2000.0	9.000	On	N	19.6	14.2	46.0
2.126000	29.8	2000.0	9.000	On	N	19.6	16.2	46.0

Measurement results for Set.2, Charger + FM+ LTE band 26 idle:

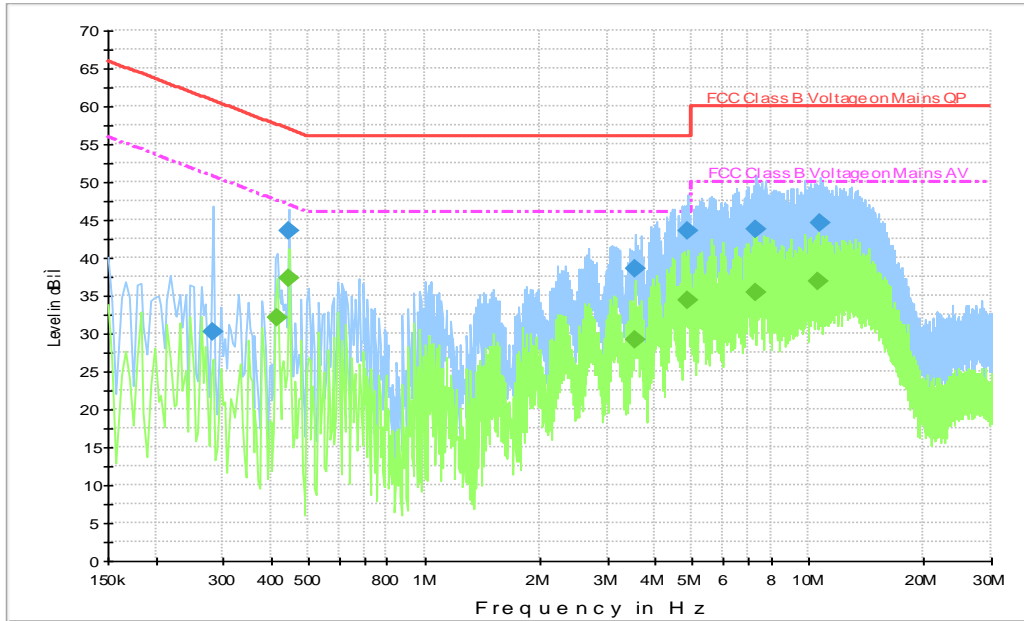


Fig A.21 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.282000	30.2	2000.0	9.000	On	L1	19.7	30.6	60.8
0.442000	43.5	2000.0	9.000	On	L1	19.7	13.5	57.0
3.558000	38.5	2000.0	9.000	On	L1	19.6	17.5	56.0
4.834000	43.4	2000.0	9.000	On	L1	19.6	12.6	56.0
7.310000	43.7	2000.0	9.000	On	L1	19.6	16.3	60.0
10.786000	44.5	2000.0	9.000	On	L1	19.7	15.5	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.414000	32.1	2000.0	9.000	On	L1	19.7	15.4	47.6
0.446000	37.2	2000.0	9.000	On	L1	19.7	9.8	46.9
3.530000	29.2	2000.0	9.000	On	L1	19.6	16.8	46.0
4.834000	34.3	2000.0	9.000	On	L1	19.6	11.7	46.0
7.282000	35.5	2000.0	9.000	On	L1	19.6	14.5	50.0
10.626000	36.9	2000.0	9.000	On	L1	19.7	13.1	50.0



ANNEX B: PERSONS INVOLVED IN THIS TESTING

Test Item	Test operator
Conducted Emission	Zhang Tianli
Radiated Emission	Yan Hanchen & Ding Zai

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