

TEST REPORT

Report Number 210500153SEL-TEL1

Applicant Name / Address LINE Friends Corporation
5F, 98, Hannam-daero, Yongsan-gu. Seoul, South Korea

Test Sample Description

- Product name BFXMINIONS_21 WIRELESS CHARGER(3in1)

- Model and/or Brand name BF-WCM21

- FCC ID 2AQTSEFWLC3IN1

- IC..... N/A

- Manufacturer Name INTECO (DONGGUAN) TRADING CO.,LTD

- Manufacturer Address NO.1308 2UNIT NO.2 Xian Xi Yi An Jie, Chang'an Town, Dongguan City, Guangdong Province

- Variant model Name..... 8809759893046

Date of receipt of sample(s) 26 May. 2021

Date of Test 08 Jun. 2021 - 03 Aug. 2021

Test standard(s) CFR 47 Part 15 Subpart C 15.209

Test Results & uncertainty See Summary

Issue date 05 Aug. 2021

Note 1. The results shown in this test report refer only to the sample(s) tested.

Note 2: This report shall not be reproduced except in full, without the written approval of Intertek.

Tested by

Name : Criss.Lee
RF Engineer



Approved by

Name : Bran.Ko
RF Technical Manager



Intertek ETL SEMKO Korea Ltd.



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SECTION 2 GENERAL DESCRIPTION

1. Laboratory Information

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2. Applicant Information

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3. Description of EUT

Product name	BFXMINIONS_21 WIRELESS CHARGER(3in1)
Model name	BF-WCM21
Variant model Name	8809759893046
Manufacturer	INTECO (DONGGUAN) TRADING CO.,LTD
Country of Manufacture	China
Rated Voltage	DC 5 V: 2 W(Smart Watch), 5 W, 7.5 W DC 9 V: 10 W
Frequency Range	Mobile Phone: 110 kHz ~ 205 kHz Smart Watch: 325 kHz
Modulation Technique	ASK
Antenna Type	Inductive Loop Coil Antenna

**4. Test Instrument**

Control No.	Equipment	Manufacturer	Model	Serial No.	Cal. Due.
EMC001	EMI Test Receiver	Rohde & Schwarz	ESU40	100478	2022/1/4
EMC002	EMI Test Receiver	Rohde & Schwarz	ESU26	100590	2022/1/4
EMC003	Open Switch and Control Platform	Rohde & Schwarz	OSP130	101467	N/A
EMC007	Two-Line V-Network	Rohde & Schwarz	ENV216	101982	2021/10/5
EMC009	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100465	2023/1/5
EMC025	Biconilog (Type7)	ETS-Lindgren	3142E	00203547	2021/12/6
EMC074	AMP	Rohde & Schwarz	SCU-01D	1904843	2022/6/29
RF003	VECTOR SIGNAL GENERATOR	Rohde & Schwarz	SMBV100A	261569	2022/6/28
RF004	SIGNAL GENERATOR	Rohde & Schwarz	SMB100A	178493	2022/6/28
RF005	SPECTRUM ANALYZER	Rohde & Schwarz	FSW43	103893	2022/6/28
RF010	ATTENUATOR	WEINSCHL	10 dB	TEMPNO.4824	2022/6/28
RF022	System DC Power Supply	KEYSIGHT	N5747A	US16D4132P	2022/6/29
41	Softwarer	Rohde & Schwarz	EMC32	Ver10.30.00	N/A

5. Support Equipment

Description	Manufacturer	Model	Note
Smart Phone	Samsung Electronics Co., Ltd.	S9	-
Smart Phone	Apple Inc.	iPhone 11	-
Adapter	Shenzhen ZONSAN Innovation Technology Co., Ltd	ZX-2U33T	5V 3A, 9V 2A, 12V 1.5A

6. Variants Covered By This Report (Model Distinction)

Model Distinction
8809759893046 The electrical circuit structure and function are the same as the basic model, and there is only a difference in the model name and design, color for marketing purposes.



SECTION 3 SUMMARY

1. Summary of test results

Requirements	FCC Rule	Compliance
Antenna Requirement	15.203	Complied
20 dB Bandwidth	2.1049	Complied
Radiated Emissions	15.209(a)	Complied
Conducted Emissions	15.207(a)	Complied
Test method: According to ANSI C63.10-2013		

2. Measurement Uncertainty

Parameters	Uncertainty ($k = 2$)	
Spurious Emissions (Conducted)	1.32 dB	
Spurious Emissions (Radiated)	9 kHz to 30 MHz	4.5 dB
	30 MHz to 1 GHz	4.6 dB

3. Test Configurations

In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT Mode	Description
5 V (2 W, 5 W, 7.5 W) Charging Mode	Battery less than 1% charged
	Battery less than 50% charged
	Battery 100% fully charged
9 V (10 W) Charging Mode	Battery less than 1% charged
	Battery less than 50% charged
	Battery 100% fully charged



SECTION 4 TEST RESULT

1. Antenna Requirement

1.1 Rule

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

1.2 Test Results – Complied

The antenna of this EUT is Inductive Loop Coil Antenna Type. Therefore the antenna is permanently attached. Please refer to the internal photo. Therefore this EUT Complies with the requirement of §15.203



2. 20 dB Bandwidth

2.1 Rule

None: for reporting purposed only.

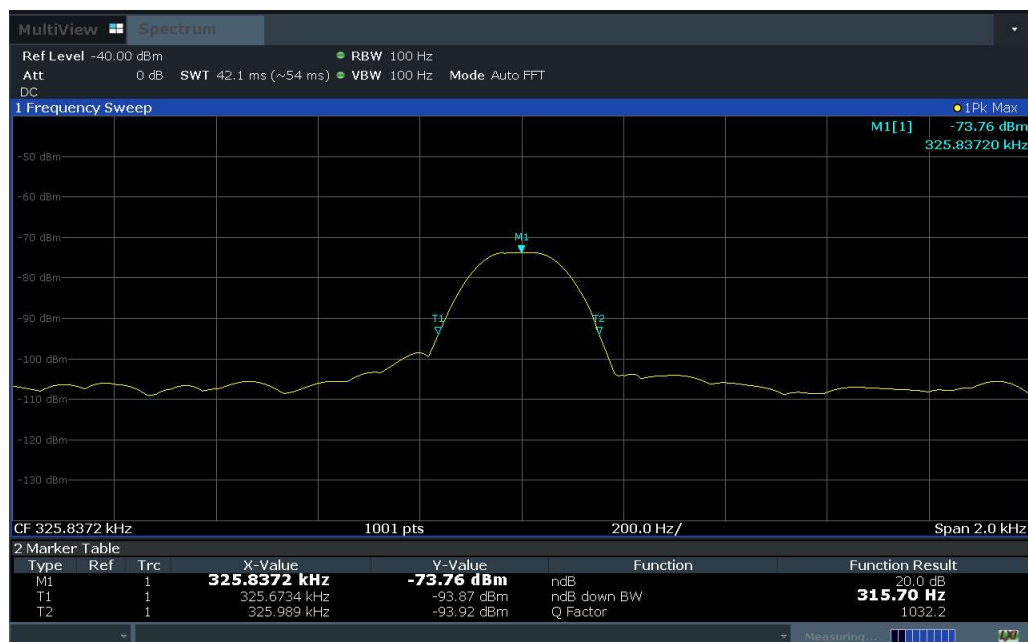
2.2 Measurement Procedure

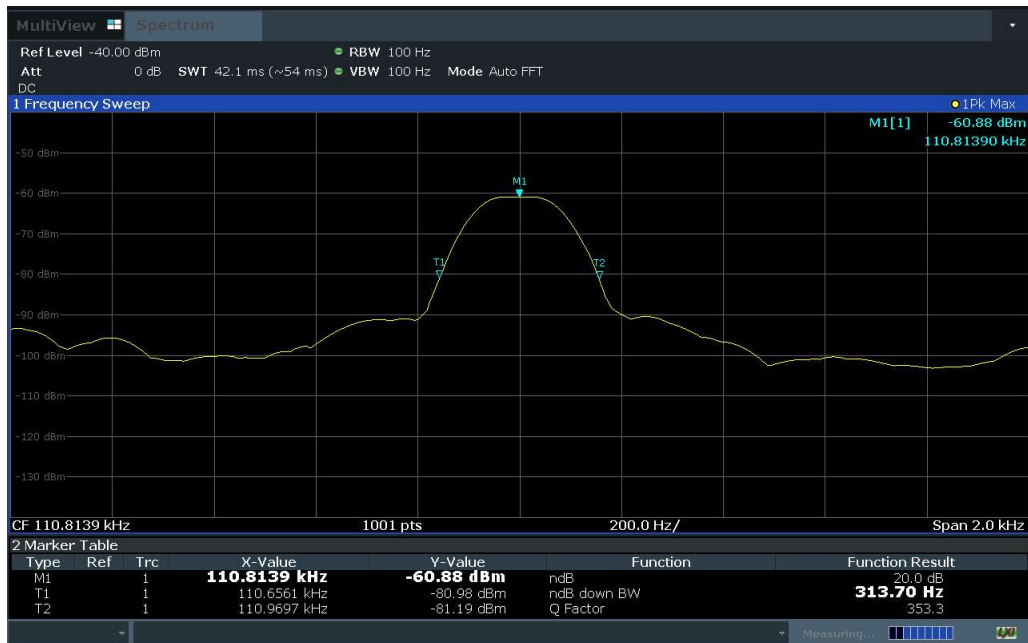
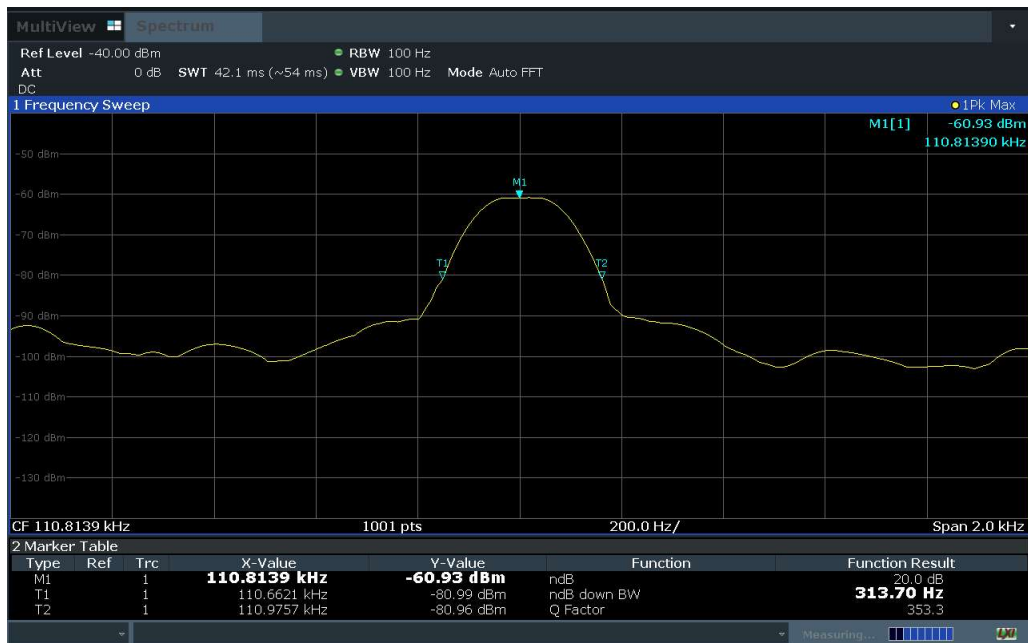
- Span = approximately 2 to 3 times the 20 dB bandwidth, RBW = greater than 1 % of the 20 dB bandwidth, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.
- The marker-to-peak function to set the mark to the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.
The marker-delta reading at this point is 20 dB bandwidth of the emission.

2.3 Test Results – Complied

Test Mode	Test Results(kHz)
5 V (2 W) Charging Mode (Smart Watch)	0.315 7
5 V (5 W) Charging Mode (Mobile Phone)	0.313 7
5 V (7.5 W) Charging Mode (Mobile Phone)	0.313 7
9 V (10 W) Charging Mode (Mobile Phone)	0.313 7

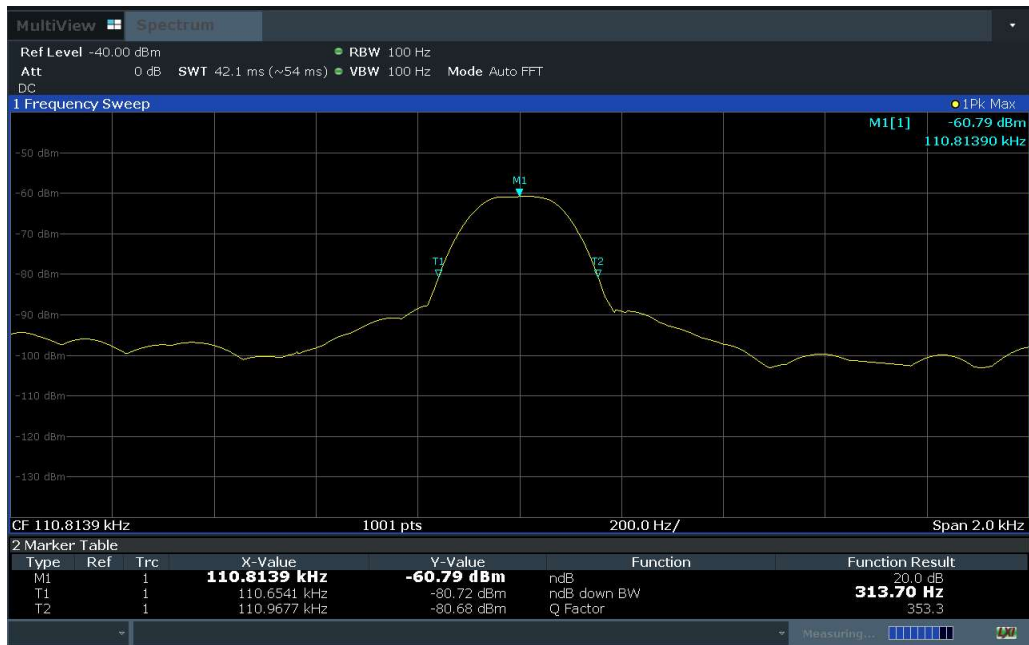
Test Mode - 5 V (2 W) Charging Mode (Smart Watch)



**Test Mode - 5 V (5 W) Charging Mode (Mobile Phone)****Test Mode - 5 V (7.5 W) Charging Mode (Mobile Phone)**



Test Mode - 9 V (10 W) Charging Mode (Mobile Phone)





3. Radiated Emission

3.1 Rule

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	$2\,400/F(\text{kHz})$	300
0.490 - 1.705	$24\,000/F(\text{kHz})$	30
1.705 - 30	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §15.231 and 15.241.

3.2 Measurement Procedure

3.2.1. Test Procedures for emission below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

3.2.2. Test Procedures for emission below 1 000 MHz & above 1 000 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at anechoic chamber test site (below 1 GHz) and 1.5 meters above the ground at anechoic chamber test site (above 1 GHz). The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.



3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength (Keeping antenna aimed at EUT). Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. The test-receiver system was set to quasi peak detect function (below 1 GHz), peak detect function and average detect function (above 1 GHz).

3.3 Test result – Complied

1. Measured value of the Field strength of spurious emissions (Radiated)
2. The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.
3. All radiated testing was measured in one orthogonal EUT position (X-axis)

Field Strength of Fundamental and Spurious Emission Test data

9 kHz ~ 30 MHz (Mobile Phone)

Test Mode – 5 V (5 W) Charging Mode (Battery less than 1 % charged)

- Fundamental

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.09	106.75	11.66	0.20	H	55.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	57.57	72.80	15.23	9.00	H	173.00	19.64
0.77	51.15	69.88	18.72	9.00	H	173.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**Test Mode – 5 V (5 W) Charging Mode (Battery less than 50 % charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.17	106.75	11.58	0.20	H	306.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	57.42	72.80	15.38	9.00	H	188.00	19.64
0.77	50.94	69.88	18.94	9.00	H	188.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

Test Mode – 5 V (5 W) Charging Mode (Battery 100 % fully charged)**- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.70	106.75	11.05	0.20	H	0.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	56.70	72.80	16.10	9.00	H	356.00	19.64
0.77	51.08	69.88	18.80	9.00	H	177.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**Test Mode – 5 V (7.5 W) Charging Mode (Battery less than 1 % charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.13	89.71	105.58	15.86	0.20	H	306.00	19.59

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.76	49.77	70.05	20.28	9.00	H	176.00	19.65
0.88	46.72	68.72	22.00	9.00	H	196.00	19.66

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

Test Mode – 5 V (7.5 W) Charging Mode (Battery less than 50 % charged)**- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.13	89.69	105.57	15.88	0.20	H	55.00	19.59

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.76	49.60	70.05	20.44	9.00	H	174.00	19.65
0.88	46.46	68.72	22.25	9.00	H	174.00	19.66

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**Test Mode – 5 V (7.5 W) Charging Mode (Battery 100 % fully charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.13	90.18	105.57	15.39	0.20	H	0.00	19.59

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.76	49.70	70.05	20.34	9.00	H	186.00	19.65
0.88	45.13	68.72	23.58	9.00	H	186.00	19.66

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

Test Mode – 9 V (10 W) Charging Mode (Battery less than 1 % charged)**- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.69	106.75	11.05	0.20	H	56.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	56.83	72.80	15.97	9.00	H	154.00	19.64
0.77	50.62	69.88	19.25	9.00	H	154.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**Test Mode – 9 V (10 W) Charging Mode (Battery less than 50 % charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.73	106.75	11.02	0.20	H	0.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	57.32	72.80	15.48	9.00	H	188.00	19.64
0.77	50.87	69.88	19.00	9.00	H	188.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

Test Mode – 9 V (10 W) Charging Mode (Battery 100 % fully charged)**- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.61	106.75	11.13	0.20	H	0.00	19.58

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	57.12	72.80	15.68	9.00	H	195.00	19.64
0.77	50.60	69.88	19.27	9.00	H	155.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**30 MHz ~ 1 GHz (Mobile Phone)****Test Mode – 9 V (10 W) Charging Mode (Worst Case: Battery 50 % charged)****- Spurious**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Height [cm]	Pol.	Azimuth [deg]	Corr. [dB/m]
30.14	33.91	40.00	6.09	120.00	100.00	V	0.00	-6.87
32.23	32.10	40.00	7.90	120.00	100.00	V	0.00	-8.07
40.04	30.13	40.00	9.87	120.00	100.00	V	59.00	-12.19
64.30	18.82	40.00	21.18	120.00	200.00	V	337.00	-15.55
280.05	30.26	46.00	15.74	120.00	100.00	H	0.00	-8.57
349.32	31.41	46.00	14.59	120.00	100.00	H	345.00	-5.12
932.77	28.31	46.00	17.69	120.00	300.00	H	298.00	7.81

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

9 kHz ~ 30 MHz (Smart Watch)**Test Mode – 5 V (2 W) Charging Mode (Battery less than 1 % charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.33	67.26	97.34	30.08	9.00	H	3.00	19.61

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.65	52.10	71.29	19.19	9.00	H	171.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**Test Mode – 5 V (2 W) Charging Mode (Battery less than 50 % charged)****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.33	67.13	97.34	30.21	9.00	H	167.00	19.61

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.65	51.97	71.29	19.32	9.00	H	167.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

Test Mode – 5 V (2 W) Charging Mode (Battery 100 % fully charged)**- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.33	67.16	97.34	30.18	9.00	H	180.00	19.61

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.65	52.17	71.29	19.12	9.00	H	180.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

**30 MHz ~ 1 GHz (Smart Watch)****Test Mode – 5 V (2 W) Charging Mode (Worst Case: Battery less than 1 % charged)****- Spurious**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Height [cm]	Pol.	Azimuth [deg]	Corr. [dB/m]
30.62	31.23	40.00	8.77	120.00	100.00	V	171.00	-7.20
31.92	33.99	40.00	6.01	120.00	100.00	V	3.00	-7.96
33.27	32.52	40.00	7.48	120.00	100.00	V	349.00	-8.53
37.41	30.51	40.00	9.49	120.00	100.00	V	135.00	-10.77
38.34	30.49	40.00	9.51	120.00	100.00	V	74.00	-11.32
40.06	31.11	40.00	8.89	120.00	100.00	V	74.00	-12.20
214.72	23.33	43.50	20.17	120.00	100.00	V	123.00	-10.74
262.43	36.02	46.00	9.98	120.00	100.00	H	134.00	-7.61
336.61	41.32	46.00	4.68	120.00	100.00	H	172.00	-6.51
388.34	34.93	46.00	11.07	120.00	100.00	H	0.00	-3.53
638.52	31.70	46.00	14.30	120.00	100.00	H	121.00	1.98

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

9 kHz ~ 30 MHz (Simultaneous Transmission)**Test Mode – Mobile Phone: 10 W Charging Mode + Smart Watch: 2 W Charging Mode****- Fundamental**

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.11	95.58	106.76	11.18	0.20	H	194.00	19.58
0.33	71.49	97.26	25.77	9.00	H	5.00	19.62

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Pol.	Azimuth [deg]	Corr. [dB/m]
0.55	56.93	72.80	15.87	9.00	H	157.00	19.64
0.65	52.02	71.29	19.27	9.00	H	5.00	19.65
0.77	51.31	69.88	18.57	9.00	H	177.00	19.65

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)



Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

30 MHz ~ 1 GHz (Simultaneous Transmission)

Test Mode – Mobile Phone: 10 W Charging Mode + Smart Watch: 2 W Charging Mode

- Spurious

Frequency [MHz]	QuasiPeak [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Bandwidth [kHz]	Height [cm]	Pol.	Azimuth [deg]	Corr. [dB/m]
30.45	33.04	40.00	6.96	120.00	100.00	V	19.00	-7.08
31.73	32.52	40.00	7.48	120.00	100.00	V	0.00	-7.89
32.77	34.63	40.00	5.37	120.00	100.00	V	8.00	-8.26
34.66	31.51	40.00	8.49	120.00	100.00	V	19.00	-9.60
37.58	31.59	40.00	8.41	120.00	100.00	V	76.00	-10.87
40.18	31.42	40.00	8.58	120.00	100.00	V	148.00	-12.27
259.84	33.26	46.00	12.74	120.00	100.00	H	318.00	-7.88
330.88	37.48	46.00	8.52	120.00	100.00	H	355.00	-6.92
346.98	35.49	46.00	10.51	120.00	100.00	H	344.00	-5.36
364.05	33.62	46.00	12.38	120.00	100.00	H	344.00	-4.47
935.10	28.15	46.00	17.85	120.00	400.00	V	301.00	7.72

Note 1 : QuasiPeak[dB(μV)/m] = Reading value[dB(μV)] + Corr.[dB/m]

Note 2 : According to §15.31 (f)(2);

Result at 30m (dBμV/m) = Result at 3m(dBμV/m)-40log(30/3) (dBμV/m)

Result at 300m (dBμV/m) = Result at 3m(dBμV/m)-40log(300/3) (dBμV/m)

Note 3 : The radiation measurements are performed in X, Y, Z axis positioning. And worst case mode is recorded in the report.

Note 4 : According to § 15.31(o), Emission levels are not reported much lower than the limits by over 20 dB.

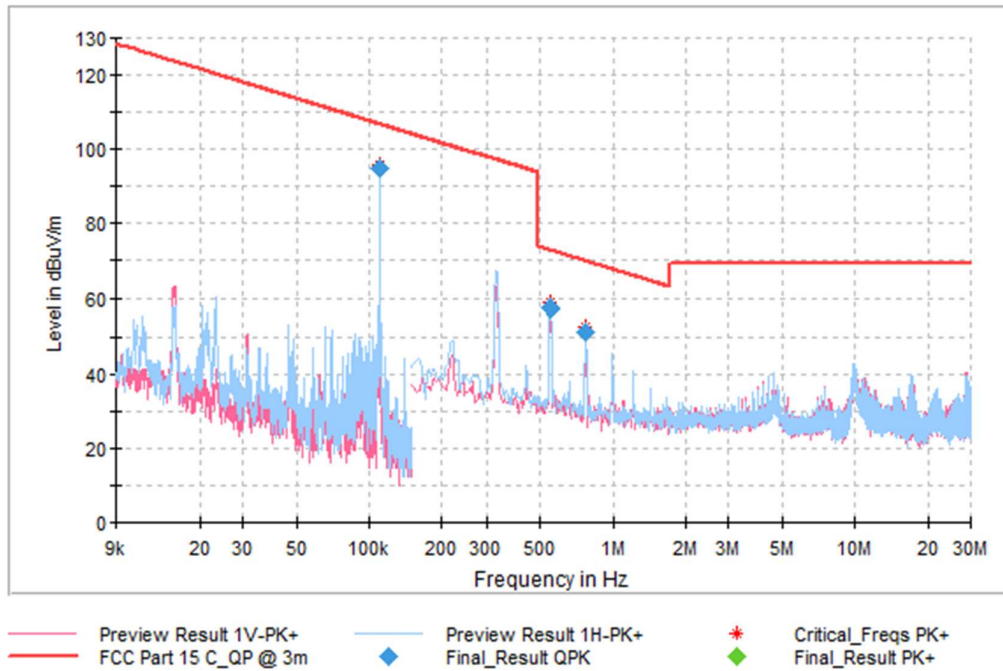


3.4 Test Plot

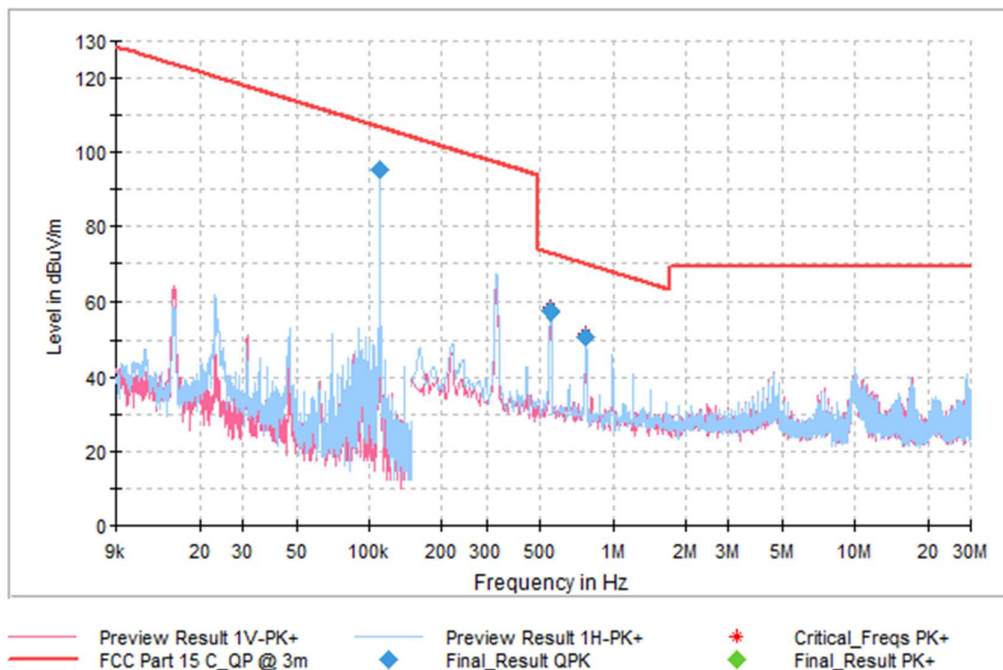
Plot of Field Strength of Fundamental and Spurious Emission (Radiated)

9 kHz ~ 30 MHz (Mobile Phone)

Test Mode - 5 V (5 W) Charging Mode (Battery less than 1 % charged)

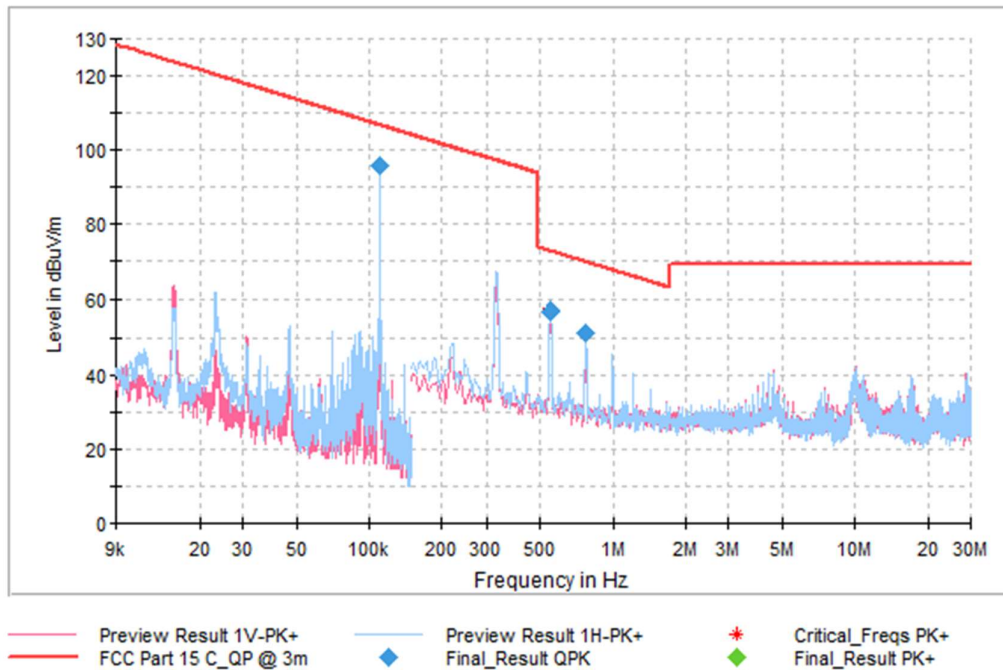


Test Mode - 5 V (5 W) Charging Mode (Battery less than 50 % charged)

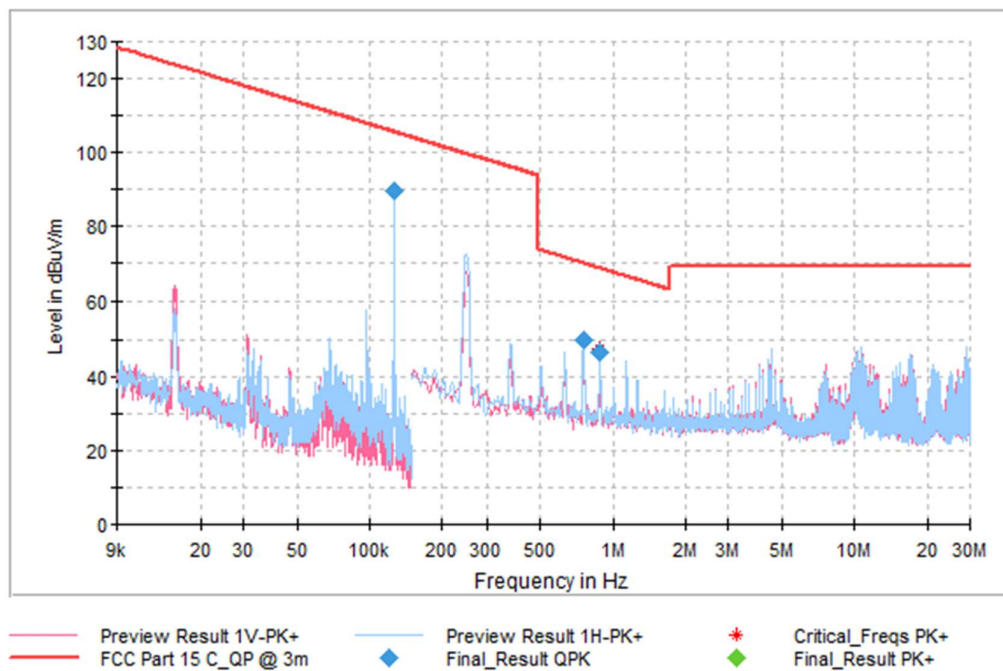




Test Mode - 5 V (5 W) Charging Mode (Battery less than 100 % charged)

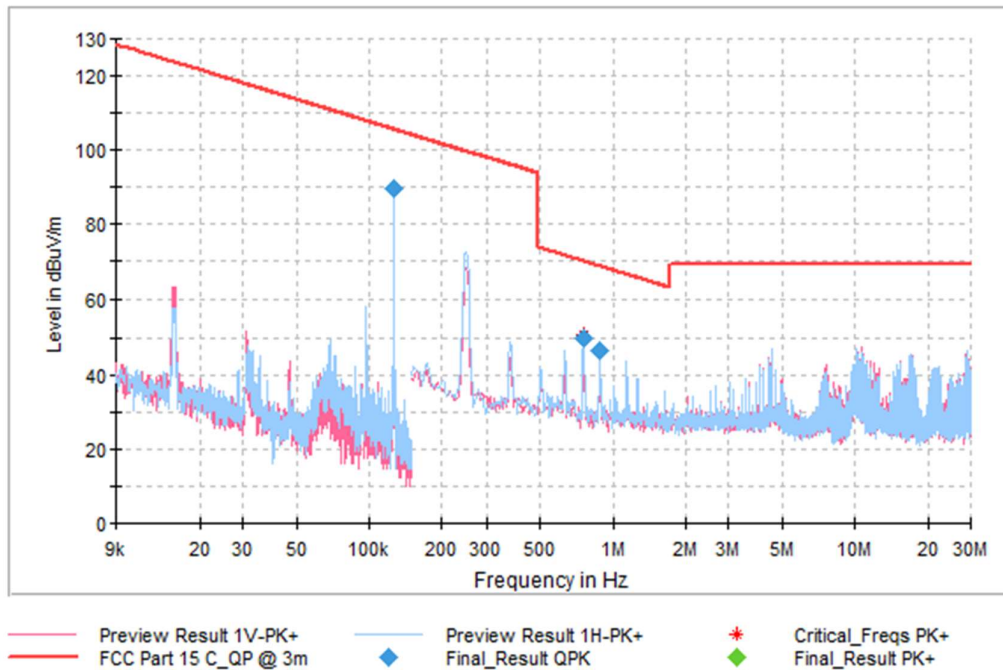


Test Mode - 5 V (7.5 W) Charging Mode (Battery less than 1 % charged)

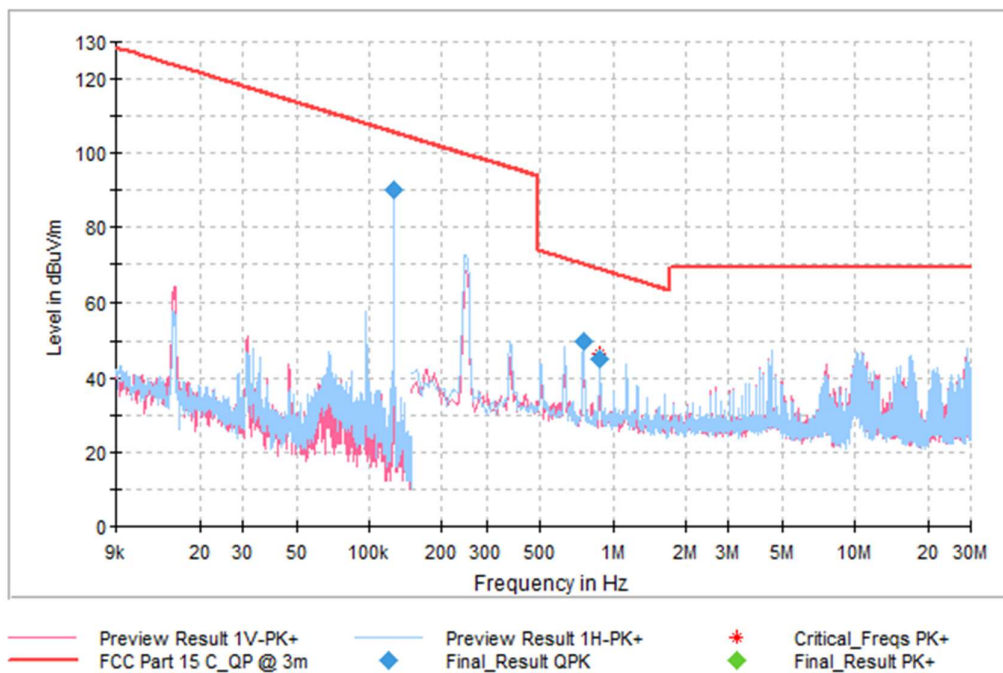




Test Mode - 5 V (7.5 W) Charging Mode (Battery less than 50 % charged)

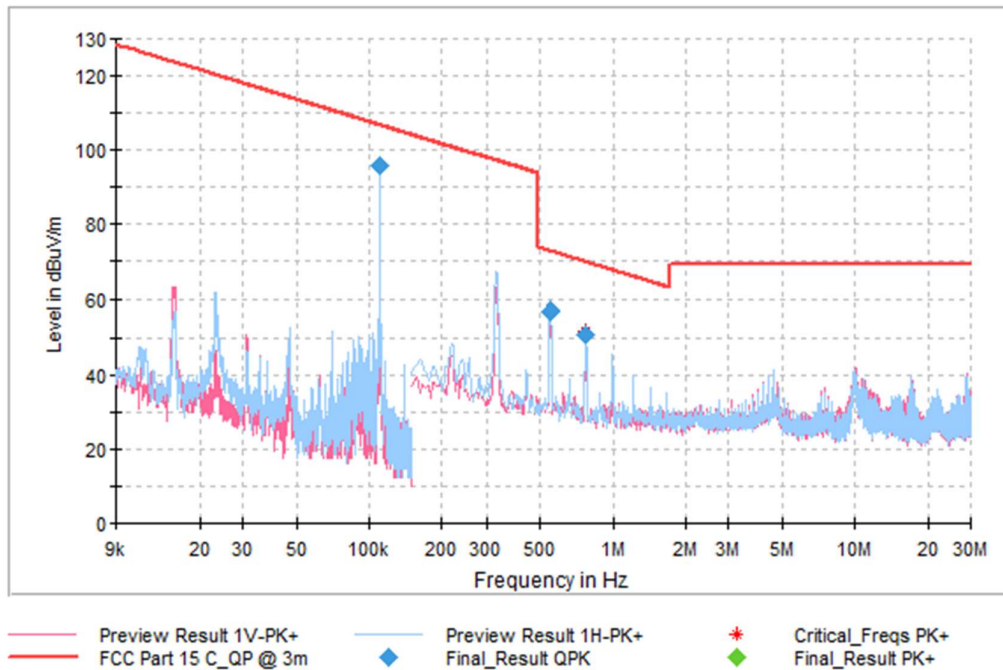


Test Mode - 5 V (7.5 W) Charging Mode (Battery less than 100 % charged)

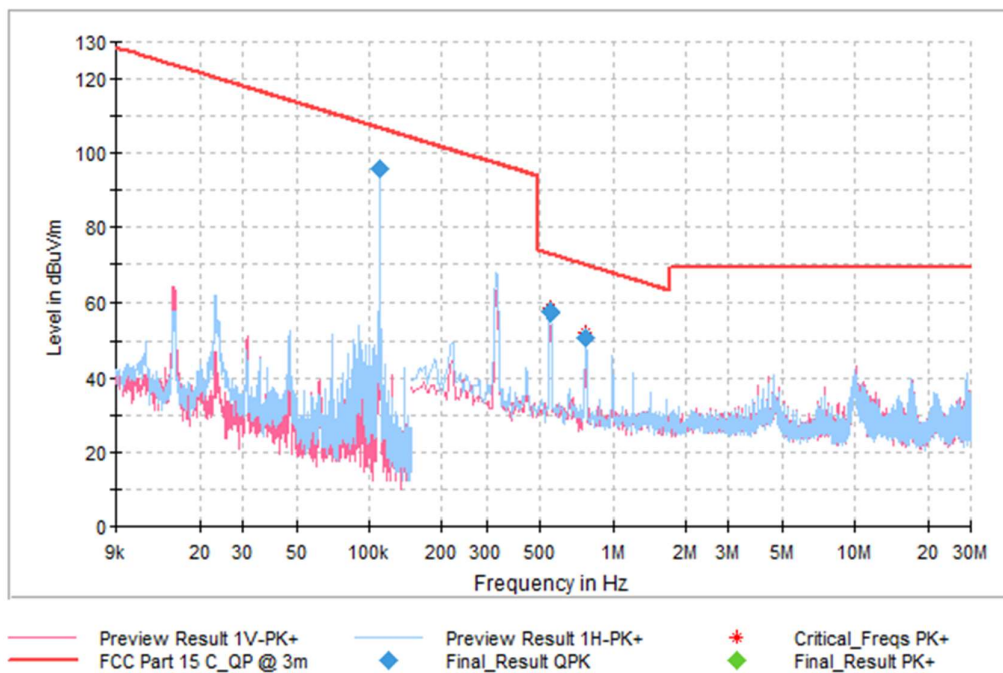




Test Mode - 9 V (10 W) Charging Mode (Battery less than 1 % charged)

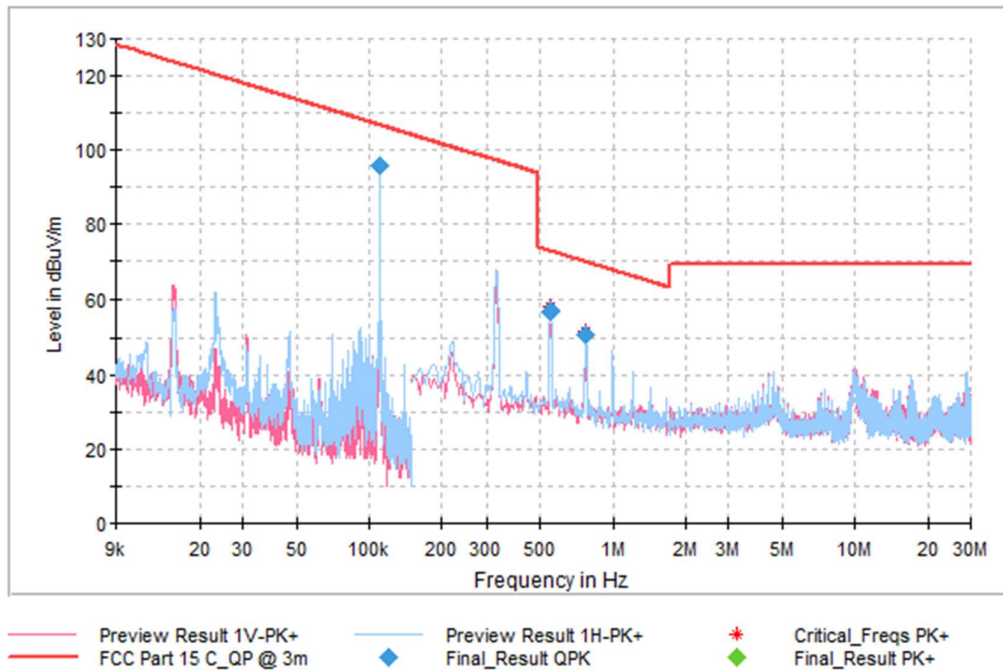


Test Mode - 9 V (10 W) Charging Mode (Battery less than 50 % charged)



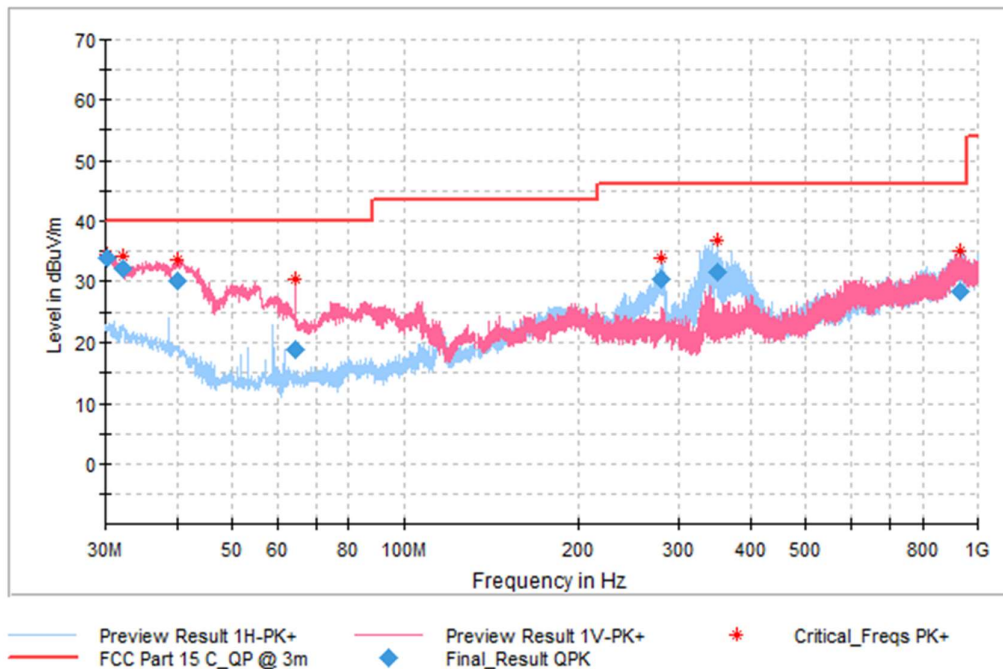


Test Mode - 9 V (10 W) Charging Mode (Battery less than 100 % charged)



30 MHz ~ 1 GHz (Mobile Phone)

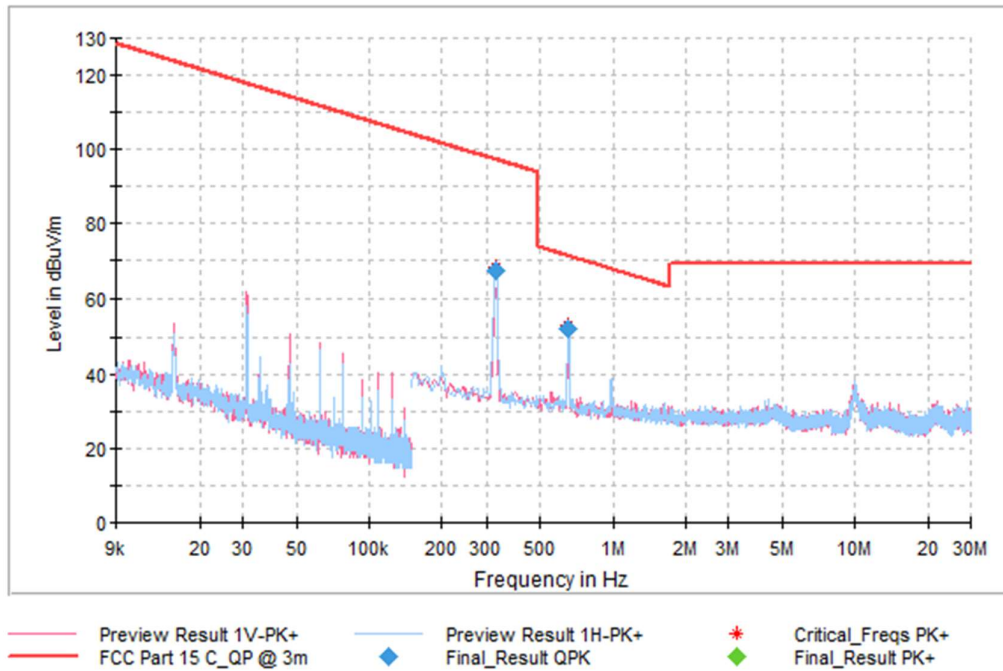
Test Mode – 9 V (10 W) Charging Mode (Worst Case: Battery 50 % charged)



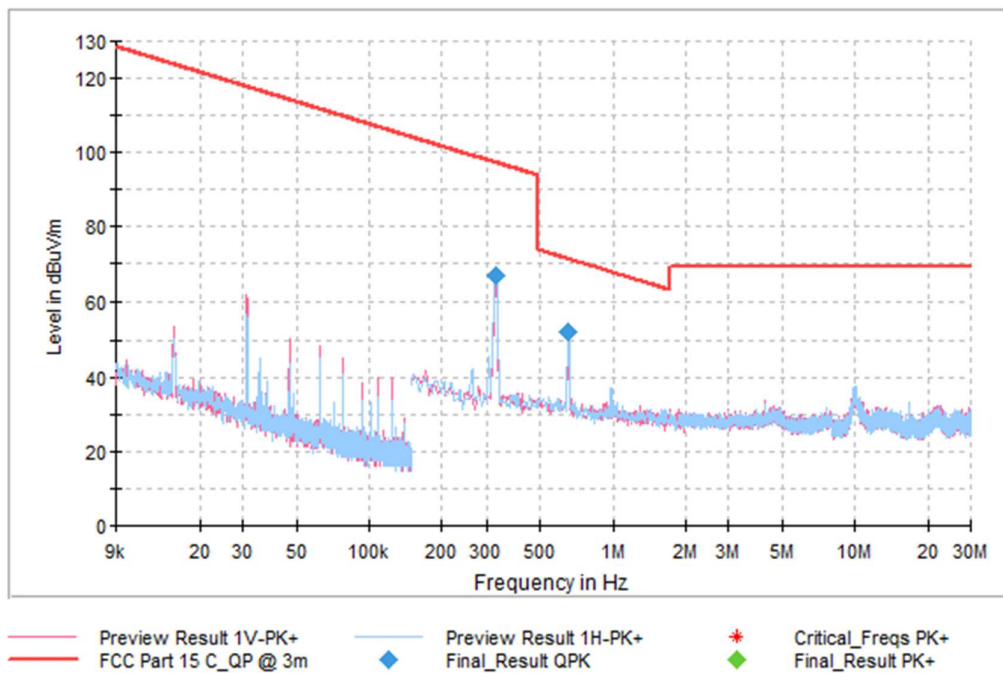


9 kHz ~ 30 MHz (Smart Watch)

Test Mode - 5 V (2 W) Charging Mode (Battery less than 1 % charged)

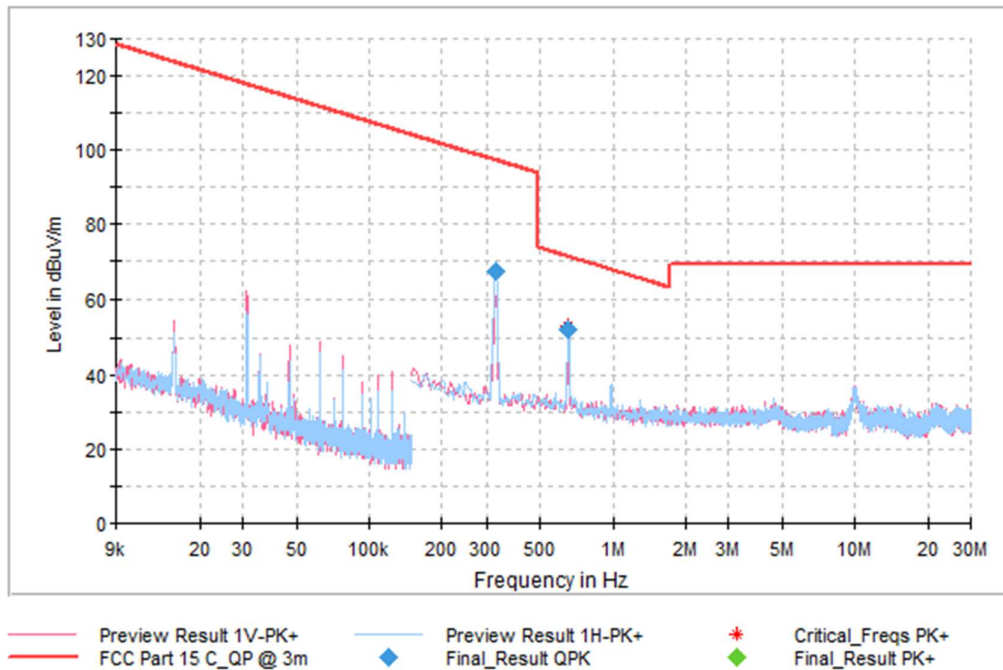


Test Mode - 5 V (2 W) Charging Mode (Battery less than 50 % charged)



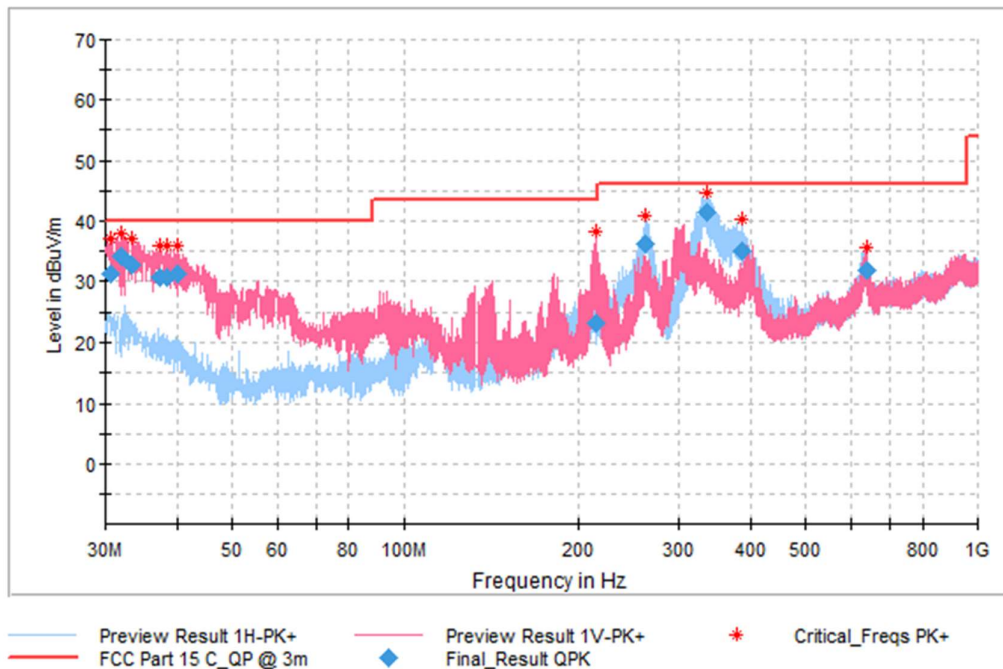


Test Mode - 5 V (2 W) Charging Mode (Battery less than 100 % charged)



30 MHz ~ 1 GHz (Smart Watch)

Test Mode – 5 V (2 W) Charging Mode (Worst Case: Battery less than 1 % charged)





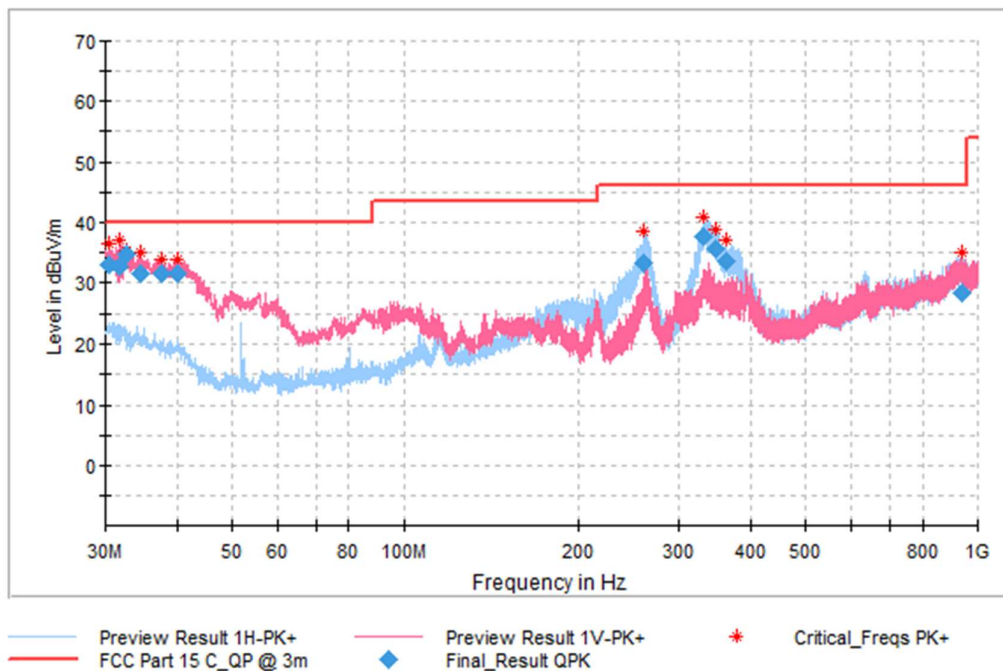
9 kHz ~ 30 MHz (Simultaneous Transmission)

Test Mode - Mobile Phone: 10 W Charging Mode + Smart Watch: 2 W Charging Mode



30 MHz ~ 1 GHz (Simultaneous Transmission)

Test Mode – Mobile Phone: 10 W Charging Mode + Smart Watch: 2 W Charging Mode





4. Conducted Emissions

4.1 Rule

According to §15.207(a), for an intentional radiator 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 in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

Note 1 The lower limit shall apply at the transition frequencies.
Note 2 The limit decreases linearly with the logarithm of the frequency in the range (0.15 ~ 0.5) MHz.
Note 3 Result (dB μ V) = Reading (dB μ V) + Corr. (Insertion Loss (dB) + Cable Loss (dB))
Result: Final value, Reading: Receiver reading value, Corr.: Correction Factor
Margin = Limit – Result

4.2 Measurement Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

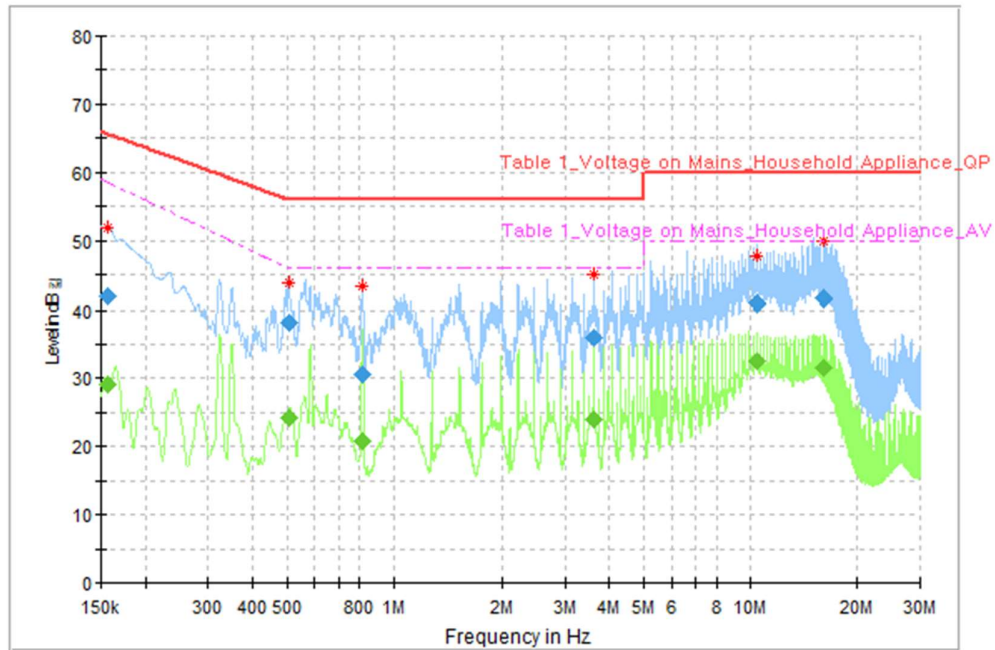
AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.10-2013

1. The test procedure is performed in a 6.5 m $\times$ 3.6 m $\times$ 3.6 m (L $\times$ W $\times$ H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) $\times$ 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.



4.3 Test result – Complied

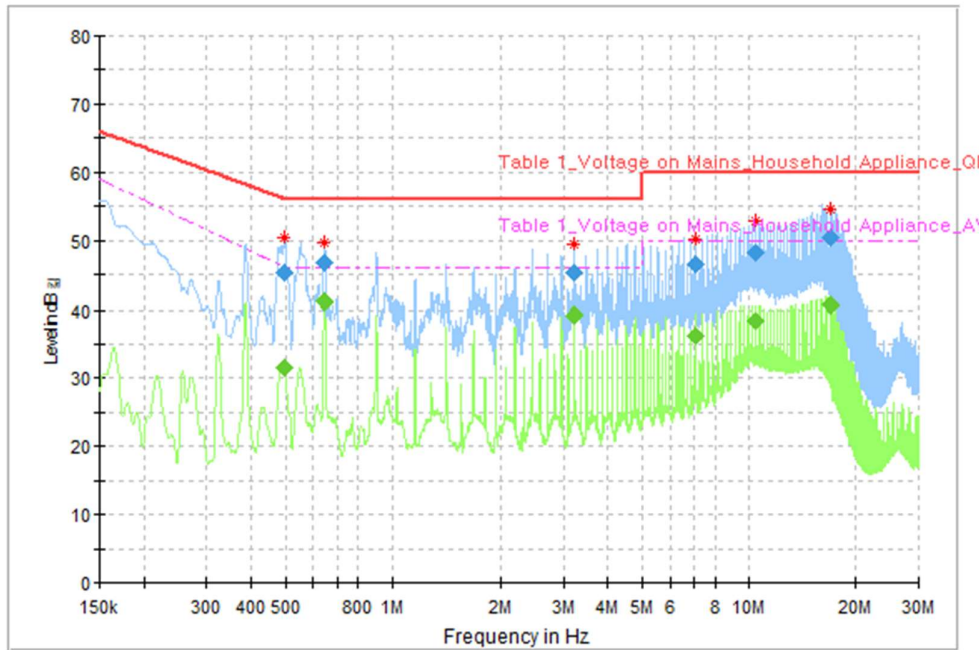
Test Mode - 5 V (5 W) Charging Mode_Neutral / Live



Frequency [MHz]	QuasiPeak [dB(μV)/m]	CAverage [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Line	Corr. [dB/m]
0.156965	41.81	---	65.62	23.81	L1	9.9
0.156965	---	29.05	58.51	29.46	L1	9.9
0.506210	---	24.16	46.00	21.84	N	10.0
0.506210	38.14	---	56.00	17.86	N	10.0
0.813665	30.61	---	56.00	25.39	N	9.9
0.813665	---	20.91	46.00	25.09	N	9.9
3.615585	---	23.96	46.00	22.04	N	10.0
3.615585	36.02	---	56.00	19.98	N	10.0
10.380590	40.74	---	60.00	19.26	N	10.5
10.380590	---	32.54	50.00	17.46	N	10.5
15.986420	41.71	---	60.00	18.29	N	10.6
15.986420	---	31.48	50.00	18.52	N	10.6



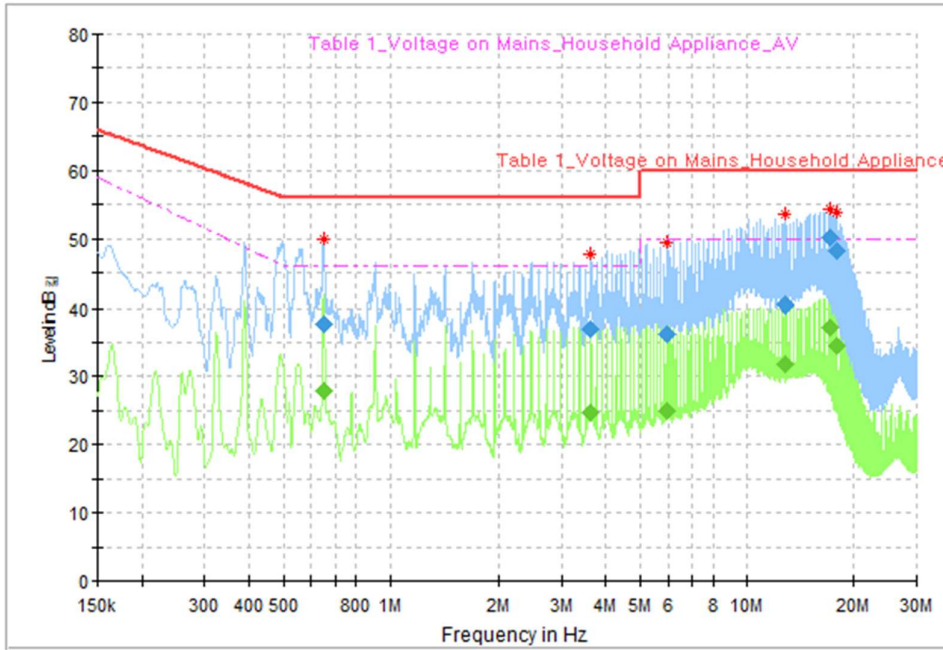
Test Mode - 5 V (7.5 W) Charging Mode_Neutral / Live



Frequency [MHz]	QuasiPeak [dB(μV)/m]	CAverage [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Line	Corr. [dB/m]
0.497255	---	31.61	46.06	14.45	L1	10.0
0.497255	45.30	---	56.05	10.75	L1	10.0
0.644515	---	41.13	46.00	4.87	N	10.0
0.644515	46.77	---	56.00	9.23	N	10.0
3.223555	---	39.25	46.00	6.75	N	10.0
3.223555	45.18	---	56.00	10.82	N	10.0
7.084155	---	36.29	50.00	13.71	N	10.2
7.084155	46.46	---	60.00	13.54	N	10.2
10.434320	---	38.36	50.00	11.64	N	10.5
10.434320	48.20	---	60.00	11.80	N	10.5
16.896845	---	40.58	50.00	9.42	N	10.6
16.896845	50.30	---	60.00	9.70	N	10.6



Test Mode - 9 V (10 W) Charging Mode_Neutral / Live



Frequency [MHz]	QuasiPeak [dB(μV)/m]	CAverage [dB(μV)/m]	Limit [dB(μV/m)]	Margin [dB]	Line	Corr. [dB/m]
0.649490	---	27.97	46.00	18.03	L1	10.0
0.649490	37.61	---	56.00	18.39	L1	10.0
3.631505	---	24.65	46.00	21.35	N	10.0
3.631505	37.02	---	56.00	18.98	N	10.0
5.972740	---	24.95	50.00	25.05	N	10.1
5.972740	36.25	---	60.00	23.75	N	10.1
12.734760	---	31.80	50.00	18.20	N	10.5
12.734760	40.44	---	60.00	19.56	N	10.5
17.152560	---	37.17	50.00	12.83	N	10.6
17.152560	50.16	---	60.00	9.84	N	10.6
17.922690	---	34.53	50.00	15.47	N	10.6
17.922690	48.13	---	60.00	11.87	N	10.6



Report No.: 210500153SEL-TEL1

SECTION 5 REVISION HISTORY

REVISION HISTORY			
Revision	Report No.	Issue Date	Description
0	210500153SEL-TEL1	05 Aug. 2021	Initial

- End -