TEST REPORT

OF

FCC Part 15 Subpart C §15.209

FCC ID : A3LEPPA710

Equipment Under Test	:	WIRELESS CHARGER
Model Name	:	EP-PA710
Applicant	:	Samsung Electronics Co., Ltd.
Manufacturer	:	Samsung Electronics Co., Ltd.
Date of Test(s)	:	2016.04.12 ~ 2016.04.25
Date of Issue	:	2016.04.25

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date:** **2016.04.25**

Youngmin Park

Approved By: **Date:** **2016.04.25**

Hyunchae You

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1. General Information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

Phone No. : +82 31 688 0901
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1.2. Details of applicant

Applicant : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea
Contact Person : Kim, Kyung-Won
Phone No. : +82 31 301 0274

1.3. Description of EUT

Kind of Product	WIRELESS CHARGER
Model Name	EP-PA710
Power Supply	DC 12 V
Operating Temperature	-20 ℃ ~ 60 ℃
Frequency Range	110 ㎑ ~ 148 ㎑
Antenna Type	Inductive loop coil antenna

1.4. Declarations by the manufacturer

- The EUT has 2 loop coil antennas and can transmit simultaneously.

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	100768	Mar. 30, 2016	Annual	Mar. 30, 2017
Signal Generator	R&S	SMBV100A	255834	Jun. 22, 2015	Annual	Jun. 22, 2016
DC Power Supply	Agilent	U8002A	MY50060028	Mar. 21, 2016	Annual	Mar. 21, 2017
Mobile Test Unit	R&S	CMW 500	144034	Feb. 29, 2016	Annual	Feb. 28, 2017
Test Receiver	R&S	ESU26	100109	Mar. 07, 2016	Annual	Mar. 07, 2017
Test Receiver	R&S	ESCI 7	100911	Dec. 22, 2015	Annual	Dec. 22, 2016
Loop Antenna	R&S	HFH2-Z2	100118	Jun. 04, 2015	Biennial	Jun. 04, 2017
Two-Line V-Network	R&S	ENV216	100190	Dec. 21, 2015	Annual	Dec. 21, 2016
Turn Table	INN-CO	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Shield Room	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N/A	N.C.R.	N/A	N.C.R.

1.6. Sample calculation

Where relevant, the following sample calculation is provided:

Field strength level (dBμV/m) = Measured level (dBμV) + Antenna factor (dB) + Cable loss (dB)

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1.7. Worst case of test configurations

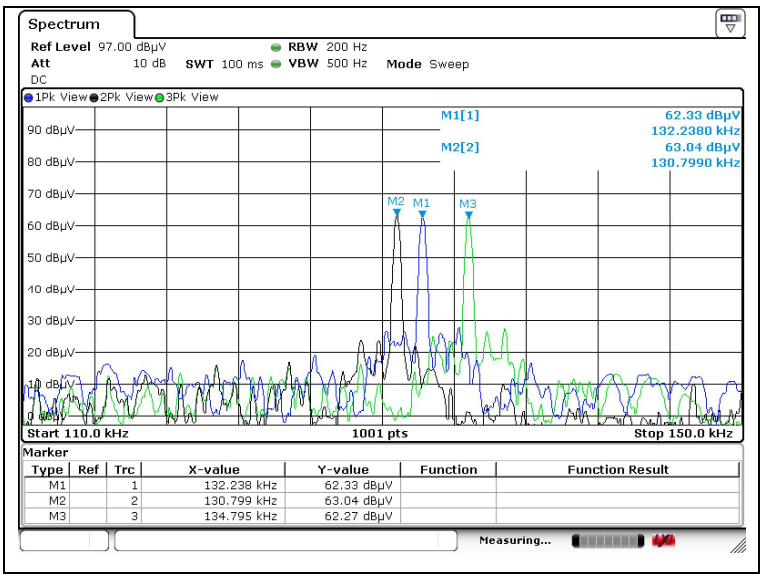
In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT configuration	Mode	Description
Charging Mode with client device (Model : SM-G930F, FCC ID : A3LSMG930F)	Ant 1	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery
	Ant 2	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery
	Ant 1 + 2	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery

Operating configurations :

Client device (SM- G930F)

- While the client device was in airplane mode (Trace#1 “M1”)
- While the client device was connected to an active data connection (Trace#2 “M2”)
  The device was tested under all modes and bands like 2G and 3G.
  In the result, **PCS GSM / GPRS1900 / 1 TX** was found in **Middle channel**.
- While the wireless charger is charging with the client device turned off. (Trace#3 “M3”)



Plot – fundamental emission comparison

- The level of Trace#2 was more than Trace#1 and 3 so Trace#2 was selected.
- Trace#2 as **PCS GSM / GPRS1900 / 1 TX** which was found in **Middle channel** should be tested with the client device as a worst case.

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1.8. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart C §15.209		
Section in FCC Part 15 Subpart C	**Test Item**	**Result**
15.209 15.209(a)	Radiated emission, Spurious Emission and Field Strength of Fundamental	Complied
2.1049	20 ㏈ Bandwidth	Complied
15.207	Transmitter AC Power Line Conducted Emission	Complied

1.9. Test Report Revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL009736	2016.04.25	Initial

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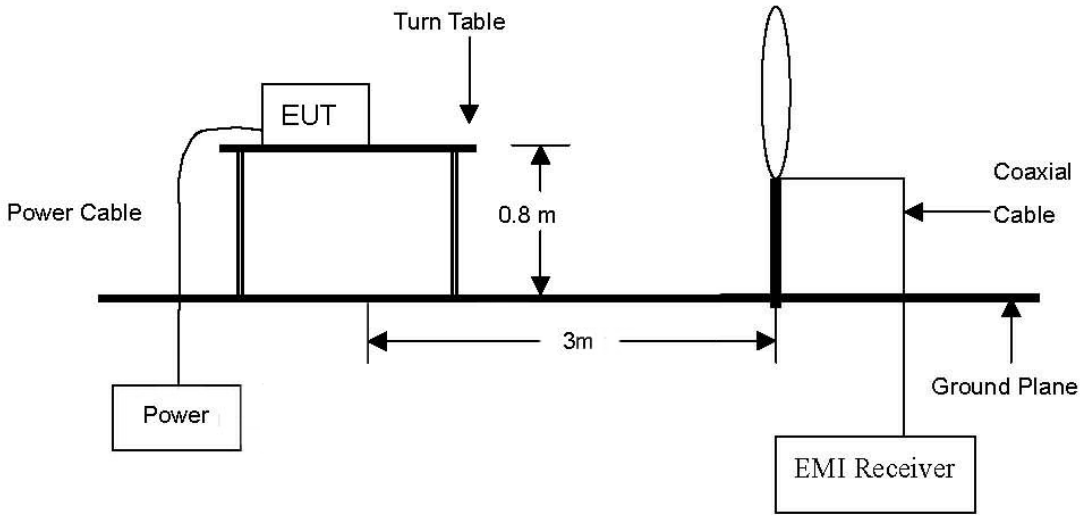
2. Field Strength of Fundamental and Spurious Emission

2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.



2.2. Limit

2.2.1. Radiated emission limits, general requirements

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 (㎒)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009 - 0.490	2 400/F(㎑)	300
0.490 - 1.705	24 000/F(㎑)	30
1.705 - 30.0	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 ㎒, 76-88 ㎒, 174-216 ㎒ or 470-806 ㎒. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections §15.231 and §15.241

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2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10:2009

2.3.1. Test Procedures for emission from 9 ㎑ to 30 ㎒

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. 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.
c. 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.
d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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2.4. Field Strength of Fundamental Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical. The field strength of spurious emission was measured in one orthogonal EUT position (x-axis). Definition of DUT for a orthogonal plane was described in the test setup photo.

Test condition: Ant 1

Radiated Emissions			Ant.	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m	Limit (dBμV/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.128	63.80	Average	H	19.59	0.05	83.44	3.44	25.46	22.02
Charging mode with client (less than 50 % battery status)									
0.129	59.40	Average	H	19.59	0.05	79.04	-0.96	25.39	26.35
Charging mode with client (100 % battery status)									
0.129	59.40	Average	H	19.59	0.05	79.04	-0.96	25.39	26.35

Test condition: Ant 2

Radiated Emissions			Ant.	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m	Limit (dBμV/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.129	62.50	Average	H	19.59	0.05	82.14	2.14	25.39	23.25
Charging mode with client (less than 50 % battery status)									
0.129	59.20	Average	H	19.59	0.05	78.84	-1.16	25.39	26.55
Charging mode with client (100 % battery status)									
0.129	59.20	Average	H	19.59	0.05	78.84	-1.16	25.39	26.55

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Test condition: Ant 1 + 2

Radiated Emissions			Ant.	Correction Factors		Total		FCC Limit	
Frequency (㎒)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m	Limit (dBμV/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.135	63.60	Average	H	19.58	0.05	83.23	3.23	25.00	21.77
Charging mode with client (less than 50 % battery status)									
0.125	63.70	Average	H	19.59	0.05	83.34	3.34	25.67	22.33
Charging mode with client (100 % battery status)									
0.136	62.40	Average	H	19.58	0.05	82.03	2.03	24.93	22.90

Note;
1. According to §15.31 (f)(2) 300 m Result(dBμV/m) = 3 m Result(dBμV/m) – 40log(300/3) (dBμV/m).
2. According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 ㎑, 110 – 490 ㎑ and above 1 ㎓ in these three bands on measurements employing an average detector.
3. The limit above was calculated based on table of §15.209 (a).

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2.5. Spurious Emission Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Test condition: Ant 1

Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	27.60	Average	H	19.70	0.02	47.32	-32.68	36.48	69.16
0.072	18.30	Average	H	19.66	0.04	38.00	-42.00	30.46	72.46
0.094	36.60	Quasi Peak	H	19.61	0.05	56.26	-23.74	28.14	51.88
0.384	43.20	Average	H	19.46	0.04	62.70	-17.30	15.92	33.22
0.640	34.80	Quasi Peak	H	19.40	0.04	54.24	14.24	31.48	17.24
0.898	29.61	Quasi Peak	H	19.40	0.03	49.04	9.04	28.54	19.50
1.154	25.90	Quasi Peak	H	19.39	0.03	45.32	5.32	26.36	21.04
Above 2.000	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	27.30	Average	H	19.70	0.02	47.02	-32.98	36.48	69.46
0.042	17.50	Average	H	19.70	0.02	37.22	-42.78	35.14	77.92
0.094	36.84	Quasi Peak	H	19.61	0.05	56.50	-23.50	28.14	51.64
0.388	39.30	Average	H	19.46	0.04	58.80	-21.20	15.83	37.03
0.647	31.20	Quasi Peak	H	19.40	0.04	50.64	10.64	31.39	20.75
0.904	26.30	Quasi Peak	H	19.40	0.03	45.73	5.73	28.48	22.75
1.163	22.01	Quasi Peak	H	19.39	0.03	41.43	1.43	26.29	24.86
Above 2.000	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	25.20	Average	H	19.70	0.02	44.92	-35.08	36.48	71.56
0.042	18.20	Average	H	19.70	0.02	37.92	-42.08	35.14	77.22
0.094	36.90	Quasi Peak	H	19.61	0.05	56.56	-23.44	28.14	51.58
0.417	39.10	Average	H	19.44	0.04	58.58	-21.42	15.20	36.62
0.693	31.00	Quasi Peak	H	19.40	0.04	50.44	10.44	30.79	20.35
0.972	26.50	Quasi Peak	H	19.40	0.03	45.93	5.93	27.85	21.92
1.246	21.50	Quasi Peak	H	19.39	0.03	40.92	0.92	25.69	24.77
Above 2.000	Not detected	-	-	-	-	-	-	-	-

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Test condition: Ant 2

Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	27.90	Average	H	19.70	0.02	47.62	-32.38	36.48	68.86
0.072	18.60	Average	H	19.66	0.04	38.30	-41.70	30.46	72.16
0.094	36.61	Quasi Peak	H	19.61	0.05	56.27	-23.73	28.14	51.87
0.389	41.90	Average	H	19.46	0.04	61.40	-18.60	15.81	34.41
0.647	33.90	Quasi Peak	H	19.40	0.04	53.34	13.34	31.39	18.05
0.906	28.63	Quasi Peak	H	19.40	0.03	48.06	8.06	28.46	20.40
1.165	24.50	Quasi Peak	H	19.39	0.03	43.92	3.92	26.28	22.36
Above 2.000	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	27.60	Average	H	19.70	0.02	47.32	-32.68	36.48	69.16
0.094	36.62	Quasi Peak	H	19.61	0.05	56.28	-23.72	28.14	51.86
0.386	39.40	Average	H	19.46	0.04	58.90	-21.10	15.87	36.97
0.644	31.30	Quasi Peak	H	19.40	0.04	50.74	10.74	31.43	20.69
0.902	26.10	Quasi Peak	H	19.40	0.03	45.53	5.53	28.50	22.97
1.157	21.20	Quasi Peak	H	19.39	0.03	40.62	0.62	26.34	25.72
Above 2.000	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.036	27.90	Average	H	19.70	0.02	47.62	-32.38	36.48	68.86
0.094	36.63	Quasi Peak	H	19.61	0.05	56.29	-23.71	28.14	51.85
0.244	13.30	Average	H	19.53	0.05	32.88	-47.12	19.86	66.98
0.386	39.30	Average	H	19.46	0.04	58.80	-21.20	15.87	37.07
0.643	31.40	Quasi Peak	H	19.40	0.04	50.84	10.84	31.44	20.60
0.902	26.00	Quasi Peak	H	19.40	0.03	45.43	5.43	28.50	23.07
Above 1.000	Not detected	-	-	-	-	-	-	-	-

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Test condition: Ant 1 + 2

Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.035	24.00	Average	H	19.70	0.02	43.72	-36.28	36.72	73.00
0.058	16.80	Average	H	19.68	0.03	36.51	-43.49	32.34	75.83
0.094	36.62	Quasi Peak	H	19.61	0.05	56.28	-23.72	28.14	51.86
0.377	43.20	Average	H	19.46	0.04	62.70	-17.30	16.08	33.38
0.403	42.90	Average	H	19.45	0.04	62.39	-17.61	15.50	33.11
0.627	34.50	Quasi Peak	H	19.40	0.04	53.94	13.94	31.66	17.72
0.673	34.50	Quasi Peak	H	19.40	0.04	53.94	13.94	31.04	17.10
0.879	29.60	Quasi Peak	H	19.40	0.03	49.03	9.03	28.72	19.69
0.942	29.20	Quasi Peak	H	19.40	0.03	48.63	8.63	28.12	19.49
1.129	25.62	Quasi Peak	H	19.39	0.03	45.04	5.04	26.55	21.51
1.211	25.21	Quasi Peak	H	19.39	0.03	44.63	4.63	25.94	21.31
Above 2.000	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.035	23.70	Average	H	19.70	0.02	43.42	-36.58	36.72	73.30
0.054	16.00	Average	H	19.69	0.03	35.72	-44.28	32.96	77.24
0.094	36.60	Quasi Peak	H	19.61	0.05	56.26	-23.74	28.14	51.88
0.374	42.90	Average	H	19.46	0.04	62.40	-17.60	16.15	33.75
0.412	42.00	Average	H	19.44	0.04	61.48	-18.52	15.31	33.83
0.624	34.20	Quasi Peak	H	19.40	0.04	53.64	13.64	31.70	18.06
0.685	33.60	Quasi Peak	H	19.40	0.04	53.04	13.04	30.89	17.85
0.875	28.00	Quasi Peak	H	19.40	0.03	47.43	7.43	28.76	21.33
0.960	28.60	Quasi Peak	H	19.40	0.03	48.03	8.03	27.96	19.93
1.123	24.60	Quasi Peak	H	19.39	0.03	44.02	4.02	26.60	22.58
1.234	25.20	Quasi Peak	H	19.39	0.03	44.62	4.62	25.78	21.16
Above 2.000	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dBμV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBμV/m) at 3 m	Actual (dBμV/m) at 300 m or 30 m	Limit (dBμV/m) at 300 m or 30 m	Margin (dB)
0.035	23.60	Average	H	19.70	0.02	43.32	-36.68	36.72	73.40
0.056	14.20	Average	H	19.69	0.03	33.92	-46.08	32.64	78.72
0.094	36.61	Quasi Peak	H	19.61	0.05	56.27	-23.73	28.14	51.87
0.385	41.90	Average	H	19.46	0.04	61.40	-18.60	15.90	34.50
0.408	41.42	Average	H	19.45	0.04	60.91	-19.09	15.39	34.48
0.641	33.60	Quasi Peak	H	19.40	0.04	53.04	13.04	31.47	18.43
0.680	33.10	Quasi Peak	H	19.40	0.04	52.54	12.54	30.95	18.41
0.898	27.80	Quasi Peak	H	19.40	0.03	47.23	7.23	28.54	21.31
0.952	28.00	Quasi Peak	H	19.40	0.03	47.43	7.43	28.03	20.60
1.150	22.80	Quasi Peak	H	19.39	0.03	42.22	2.22	26.39	24.17
1.225	24.40	Quasi Peak	H	19.39	0.03	43.82	3.82	25.84	22.02
Above 2.000	Not detected	-	-	-	-	-	-	-	-

Note;

1. According to §15.31 (f)(2)
   - 300 m Result(dBμV/m) = 3 m Result(dBμV/m) – 40log(300/3) (dBμV/m)
   - 30 m Result(dBμV/m) = 3 m Result(dBμV/m) – 40log(30/3) (dBμV/m)
2. According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 ㎒ were calculated as below.
   - 9 ㎑ to 490 ㎑ : 20log(2 400 / F (㎑)) at 300 m (dBμV/m)
   - 490 ㎑ to 1 705 ㎑ : 20log(24 000 / F (㎑)) at 30 m (dBμV/m)
3. According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 ㎑, 110 – 490 ㎑ and above 1 ㎓ in these three bands on measurements employing an average detector.

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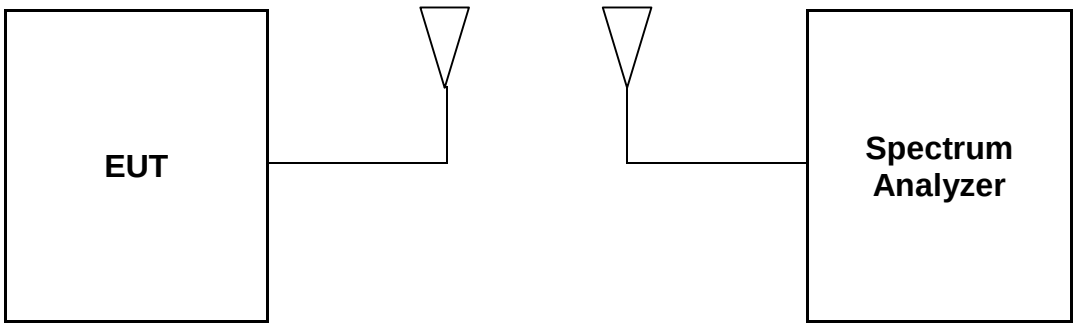
3. 20 ㎧ Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purposed only

3.3. Test Procedure

20 ㎧ Bandwidth

a. Span = approximately 2 to 3 times the 20 ㎧ bandwidth, RBW = greater than 1 % of the 20 ㎧ bandwidth, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.

b. The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 ㎧ 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 ㎧ bandwidth of the emission.

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3.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test condition	EUT status	20 dB Bandwidth (㎑)	Limit
Ant 1	With client device (100 % battery status)	0.533	Reporting proposed only
Ant 2	With client device (100 % battery status)	0.539	Reporting proposed only
Ant 1 + 2	With client device (100 % battery status)	0.550	Reporting proposed only

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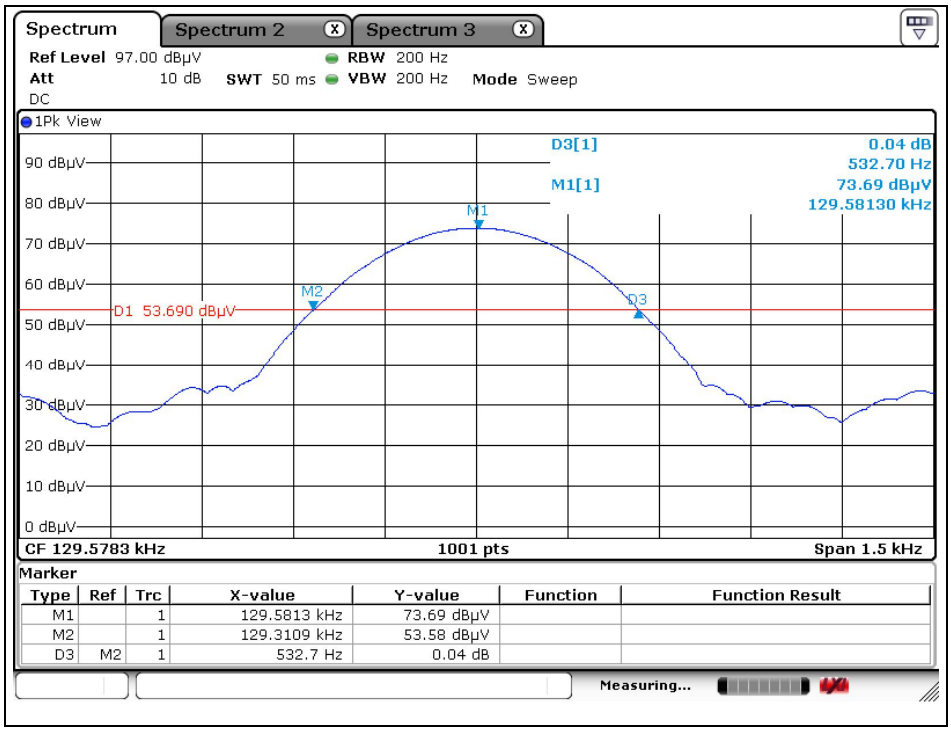
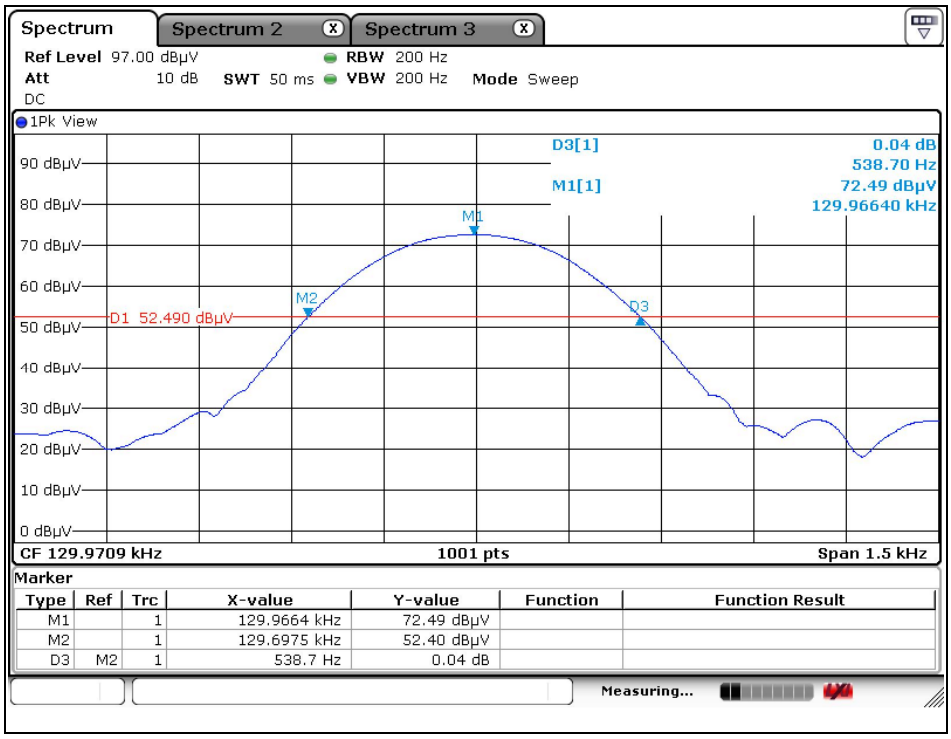
20 dB Bandwidth

Ant 1



Ant 2



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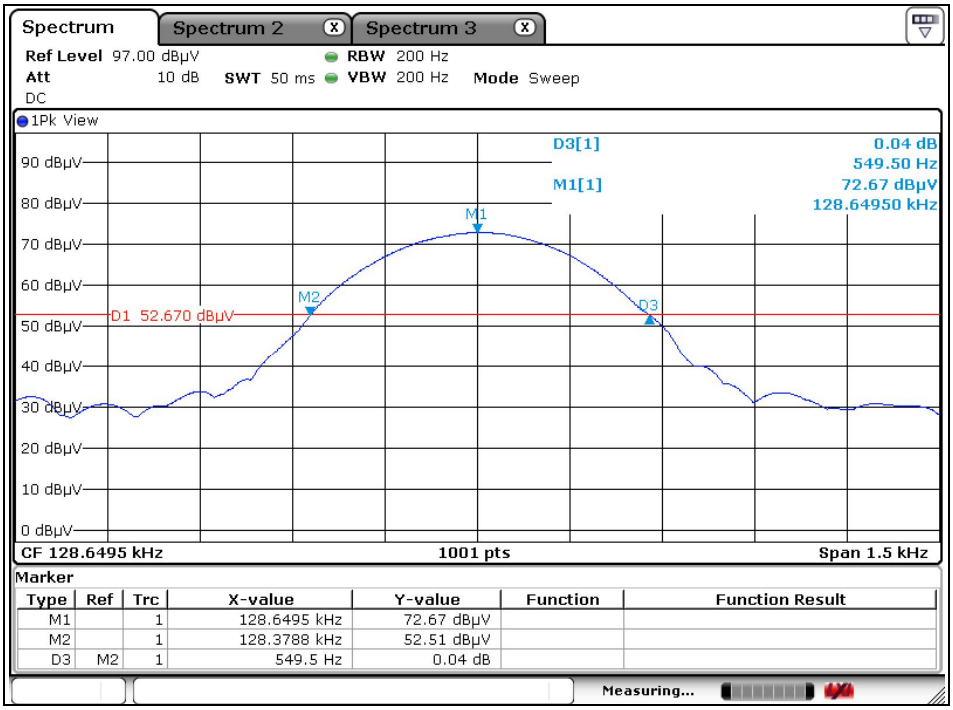
Ant 1 + 2

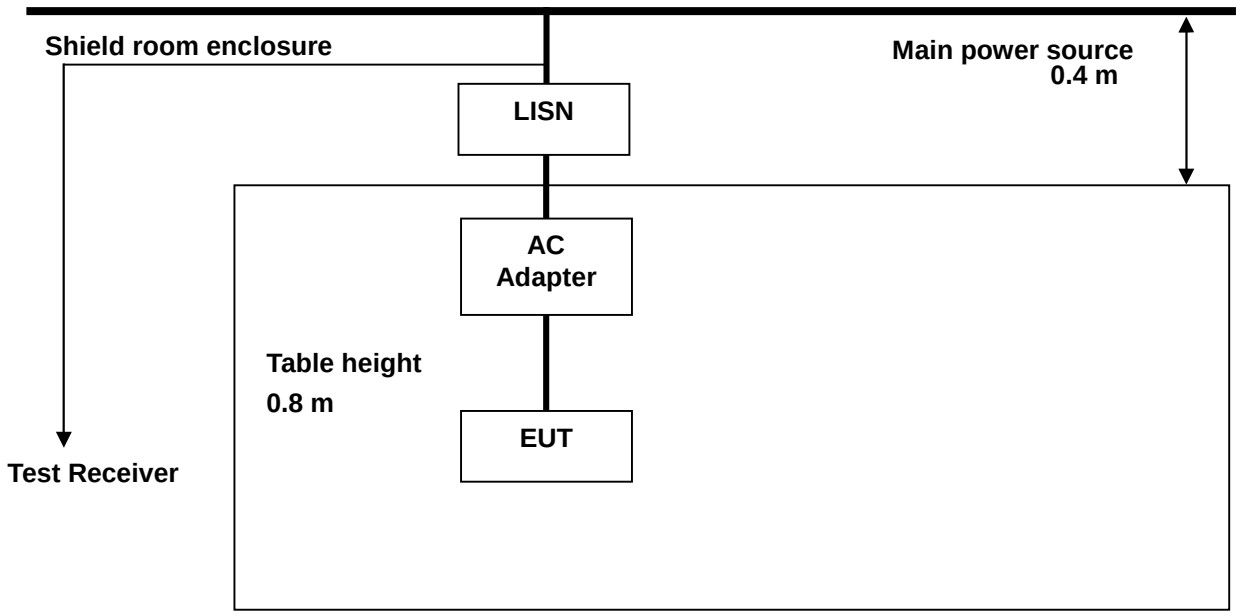


Note ;

All antennas of operation were investigated and the worst-case antenna was reported considered the highest exposure.

4. Transmitter AC Power Line Conducted Emission

4.1. Test Setup



4.2. Limit

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 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 μH /50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (㎒)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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4.3. Test Procedures

AC conducted emissions from the EUT were measured according to the dictates of ANSI C63.10:2009

1. The test procedure is performed in a 6.5 m × 3.5 m× 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W)× 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. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

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4.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Frequency range : 0.15 ㎒ – 30 ㎒
Measured Bandwidth : 9 ㎑

Test condition: Ant 1

Charging mode with Client device (1 % status)

FREQ.	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.49	46.20	37.70	N	56.17	46.17	9.97	8.47
0.55	46.10	37.30	N	56.00	46.00	9.90	8.70
0.61	43.40	32.90	N	56.00	46.00	12.60	13.10
1.15	33.90	24.90	N	56.00	46.00	22.10	21.10
3.88	39.20	26.00	N	56.00	46.00	16.80	20.00
20.49	34.40	27.30	N	60.00	50.00	25.60	22.70
0.49	40.00	30.70	H	56.17	46.17	16.17	15.47
0.55	39.10	30.80	H	56.00	46.00	16.90	15.20
0.90	39.10	31.10	H	56.00	46.00	16.90	14.90
5.48	41.90	37.40	H	60.00	50.00	18.10	12.60
13.56	34.00	31.60	H	60.00	50.00	26.00	18.40
14.00	26.70	21.40	H	60.00	50.00	33.30	28.60

Note ;

1. Line (H): Hot, Line (N): Neutral
2. All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

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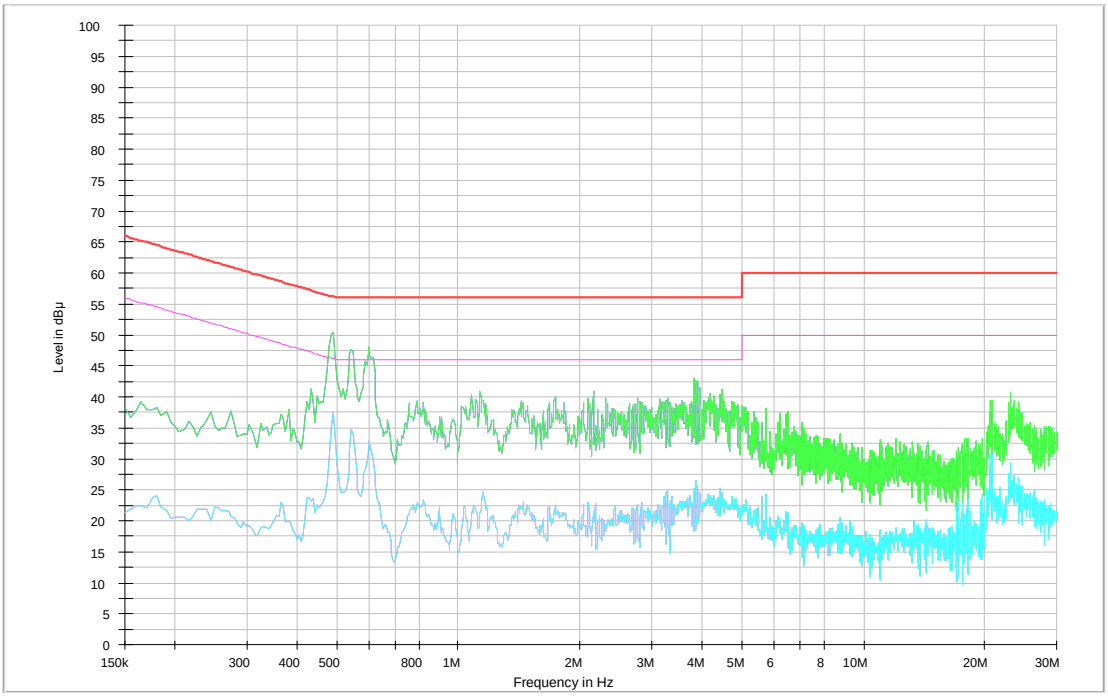
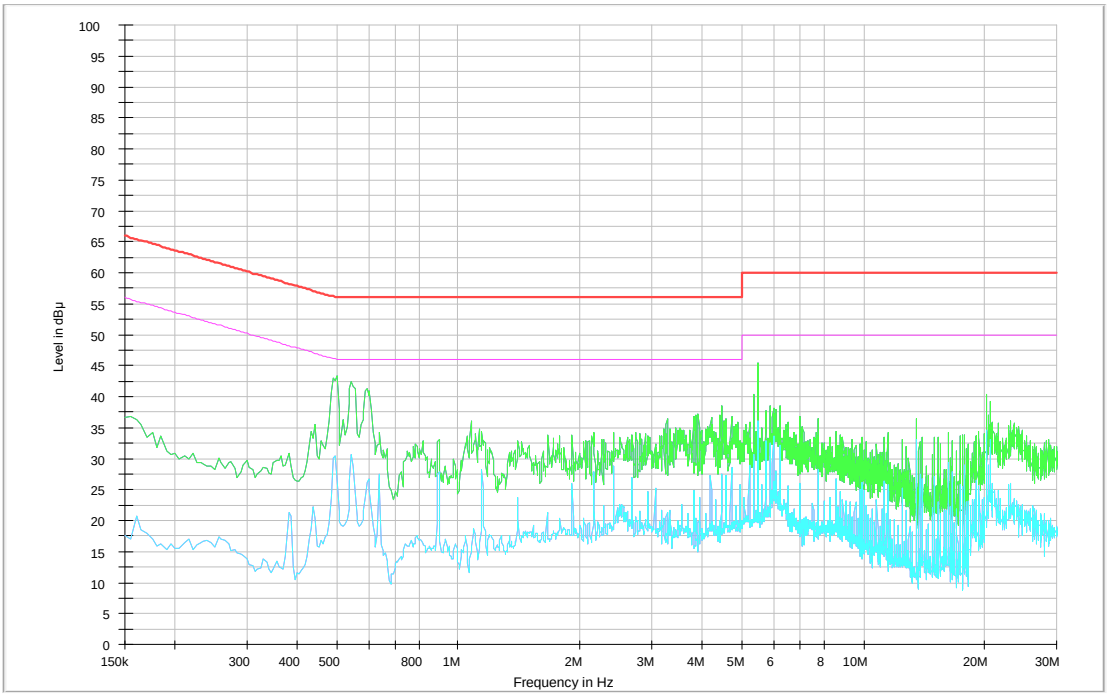
Test mode: (Neutral)



Test mode: (Hot)



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Test condition: Ant 2

Charging mode with Client device (1 % status)

FREQ.	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.51	45.90	36.20	N	56.00	46.00	10.10	9.80
0.55	46.00	36.40	N	56.00	46.00	10.00	9.60
0.60	43.40	31.80	N	56.00	46.00	12.60	14.20
3.28	34.60	24.60	N	56.00	46.00	21.40	21.40
20.36	35.40	30.60	N	60.00	50.00	24.60	19.40
20.64	34.60	29.40	N	60.00	50.00	25.40	20.60
0.47	29.30	22.10	H	56.51	46.51	27.21	24.41
0.56	37.20	27.10	H	56.00	46.00	18.80	18.90
2.51	27.30	21.60	H	56.00	46.00	28.70	24.40
5.36	27.50	21.80	H	60.00	50.00	32.50	28.20
5.62	47.40	45.10	H	60.00	50.00	12.60	4.90
20.27	29.20	25.60	H	60.00	50.00	30.80	24.40

Note ;

1. Line (H): Hot, Line (N): Neutral
2. All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

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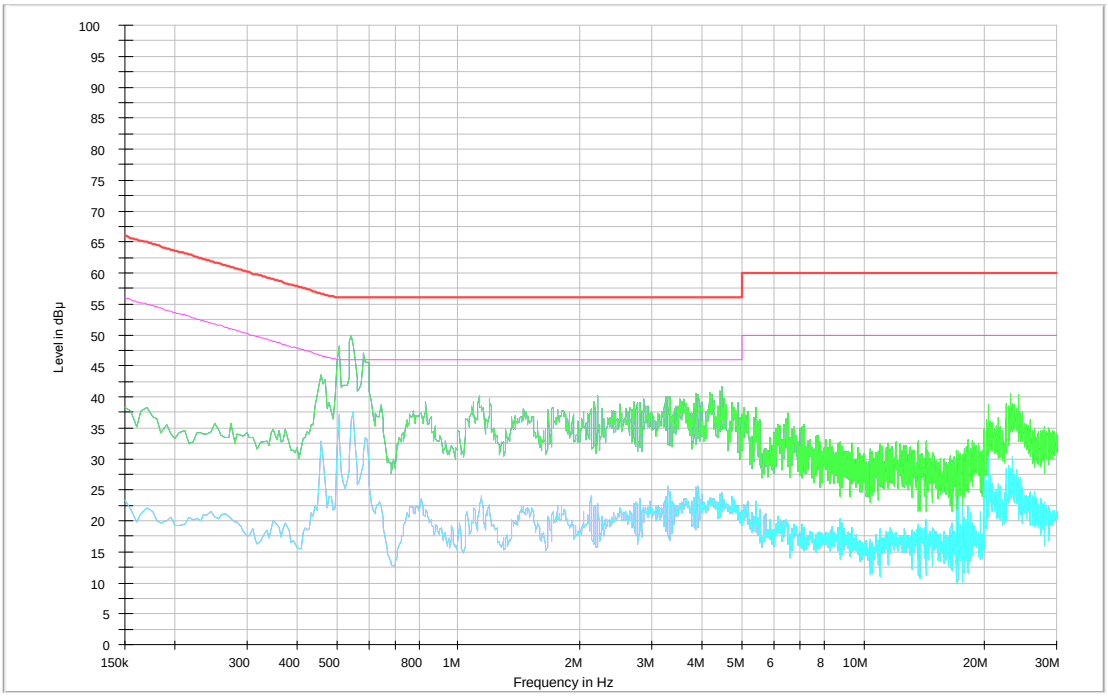
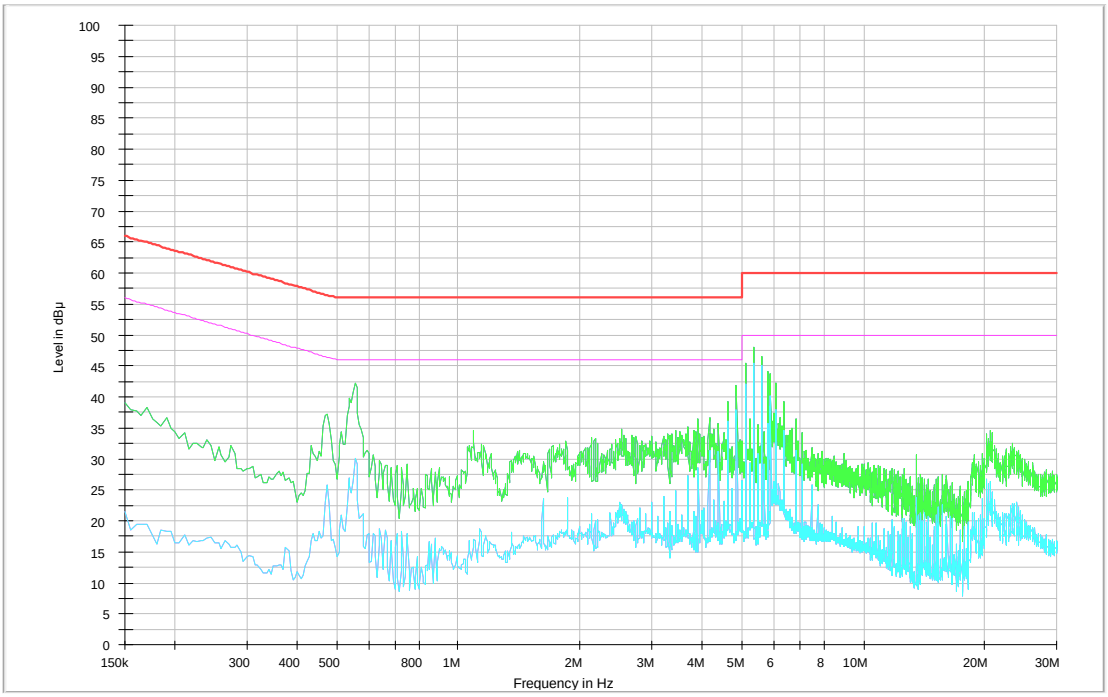
Test mode: (Neutral)



Test mode: (Hot)



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Test condition: Ant 1 + 2

Charging mode with Client device (1 % status)

FREQ.	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	41.90	31.00	N	65.46	55.46	23.56	24.46
0.41	42.00	30.50	N	57.65	47.65	15.65	17.15
0.59	40.10	30.30	N	56.00	46.00	15.90	15.70
5.66	37.40	31.60	N	60.00	50.00	22.60	18.40
20.55	32.40	26.90	N	60.00	50.00	27.60	23.10
23.17	32.40	27.20	N	60.00	50.00	27.60	22.80
0.41	35.70	26.80	H	57.65	47.65	21.95	20.85
0.58	34.50	24.00	H	56.00	46.00	21.50	22.00
1.52	34.50	23.60	H	56.00	46.00	21.50	22.40
5.49	44.60	42.50	H	60.00	50.00	15.40	7.50
5.63	46.40	45.70	H	60.00	50.00	13.60	4.30
20.26	32.10	26.80	H	60.00	50.00	27.90	23.20

Note ;

1. Line (H): Hot, Line (N): Neutral
2. All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

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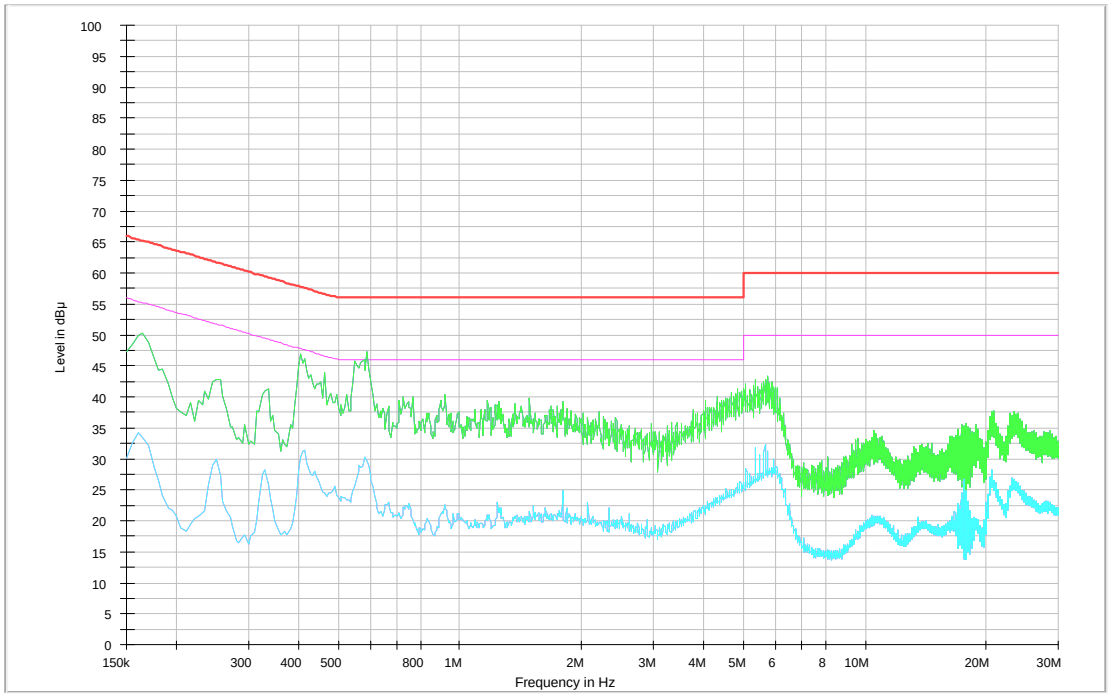
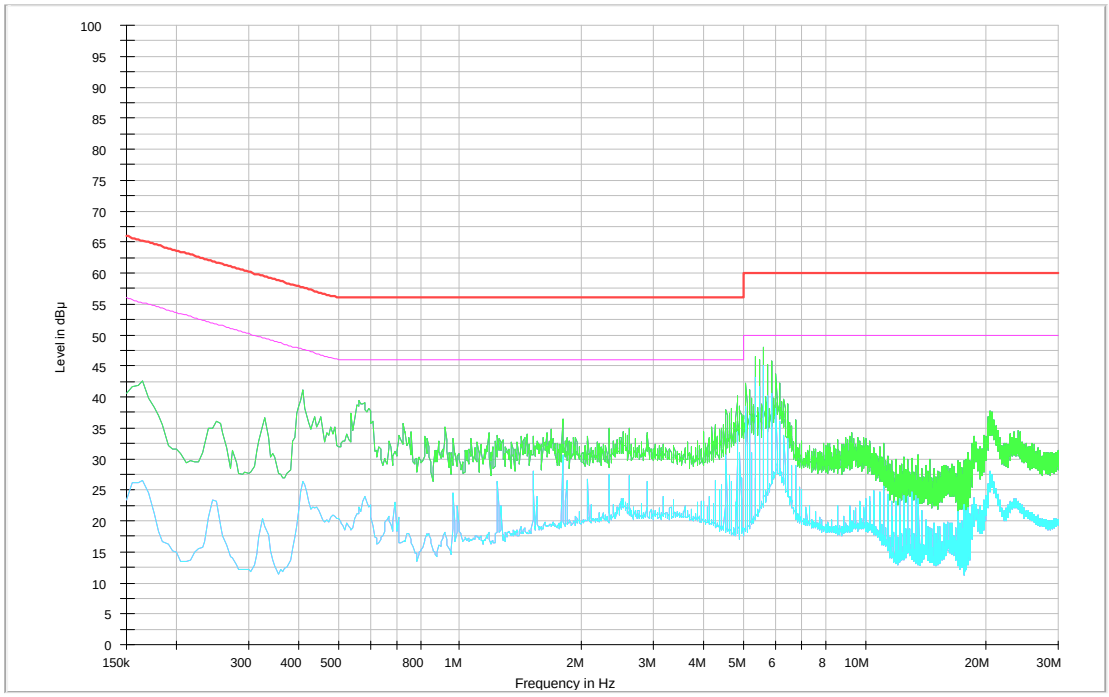
Test mode: (Neutral)



Test mode: (Hot)



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