

TEST REPORT

OF

FCC Part 15 Subpart C §15.207, §15.209 / IC RSS-210 Issue 8, RSS-Gen Issue 3

FCC ID: 2AAJPEP-P100IEWEGWW
IC Certification: 11207A-EPP100IEWE

Equipment Under Test : S Charger pad
Model Name : EP-P100IEWEGWW
Serial No. : N/A
Applicant : Hansol Technics Co., Ltd.
Manufacturer : Hansol Technics Co., Ltd.
Date of Test(s) : 2013.06.03 ~ 2013.06.07
Date of Issue : 2013.07.05

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

Tested By:



Date:

2013.07.05

Alvin Kim

Approved By:



Date:

2013.07.05

Feel Jeong

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 705, Dongchun-Dong Sooji-Gu, Yongin-Shi, Kyungki-Do, South Korea.
- Wireless Div. 3FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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1.2. Details of Applicant

Applicant : Hansol Technics Co., Ltd.

Address : 55, Hansam-ro, Deoksan-myeon, Jincheon-gun, Chungcheongbuk-do, Korea

Contact Person : Lee, Weon-seo

Phone No. : +82 43 530 8554

1.3. Description of EUT

Kind of Product	S Charger Pad
Model Name	EP-P100IEWEGWW
Serial Number	N/A
Power Supply	AC 120 V (Used adapter: DC 5 V / 2 A)
Frequency Range	115 kHz ~ 205 kHz
Operating Conditions	-20 °C ~ 50 °C
Maximum Field strength	84.47 dB _μ N/m at 3 m / 4.47 dB _μ N/m at 300 m
Antenna Type	Inductive loop coil antenna

1.4. Declarations by the manufacturer

- Operation temperature: -20 °C ~ 50 °C

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1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Spectrum Analyzer	R&S	FSW	100578	May. 20, 2013	Annual	May. 20, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 30, 2012	Annual	Oct. 30, 2013
Mobile Test Unit	Agilent	E5515C	GB43345198	Mar. 29, 2013	Annual	Mar. 29, 2014
Test Receiver	R&S	ESU26	100194	Sep. 13, 2012	Annual	Sep. 13, 2013
Loop Antenna	R&S	HFH2-Z2	100118	Aug. 24, 2011	Biennial	Aug. 24, 2013
Loop Antenna	R&S	HZ-10	100143	Jun. 15, 2012	Biennial	Jun. 15, 2014
Bilog Antenna	SCHWARZBECK	VULB9163	390	Apr. 19, 2012	Biennial	Apr. 19, 2014
Antenna Master	INN-CO	MM4000	N/A	N/A	N/A	N.C.R.
Turn Table	INN-CO	DS 1200 S	N/A	N/A	N/A	N.C.R.
Two-Line V-Network	R&S	ENV216	100190	Jan. 14, 2013	Annual	Jan. 14, 2014
Test Receiver	R&S	ESHS10	863365/018	Jul. 03, 2012	Annual	Jul. 03, 2013
Anechoic Chamber	SY Corporation	L x W x H (6.5 m x 3.5 m x 3.5 m)	N/A	N/A	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.6 m)	N/A	N/A	N/A	N.C.R.
Shield Box	TESCOM	TC-5916A	5916A000279	N/A	N/A	N.C.R.

1.6. Sample calculation

Where relevant, the following sample calculation is provided:

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) – amplifier gain (dB)

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	Charging current (mA)	Mobile phone	Description
Charging Mode ¹⁾ with resistive load	300		Minimum resistive load
	600		Medium resistive load
	1 000		Maximum resistive load
Charging Mode ³⁾ with client device		SHV-E300S ²⁾	Less than 1% of battery
		SHV-E300S	Less than 50% of battery
		SHV-E300S	100% full charging of battery

- 1) Test Jig was used during the test to satisfy each current status by using resistive loads.

Output voltage = 5 V, Output current = 300 mA / 600 mA / 1 000 mA

- (Maximum load) $16.67 \Omega = 5 \text{ V} / 0.3 \text{ A}$
- (Medium load) $8.33 \Omega = 5 \text{ V} / 0.6 \text{ A}$
- (Minimum load) $5.00 \Omega = 5 \text{ V} / 1.0 \text{ A}$

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- 2) FCC ID: A3LSHVE300SA (Client device: SHV-E300S)
- 3) WPC device with client device was investigated each battery status and compared in two operating configurations.

Battery status during charging condition

- Less than 1% of battery
- Less than 50% of battery
- 100% of battery



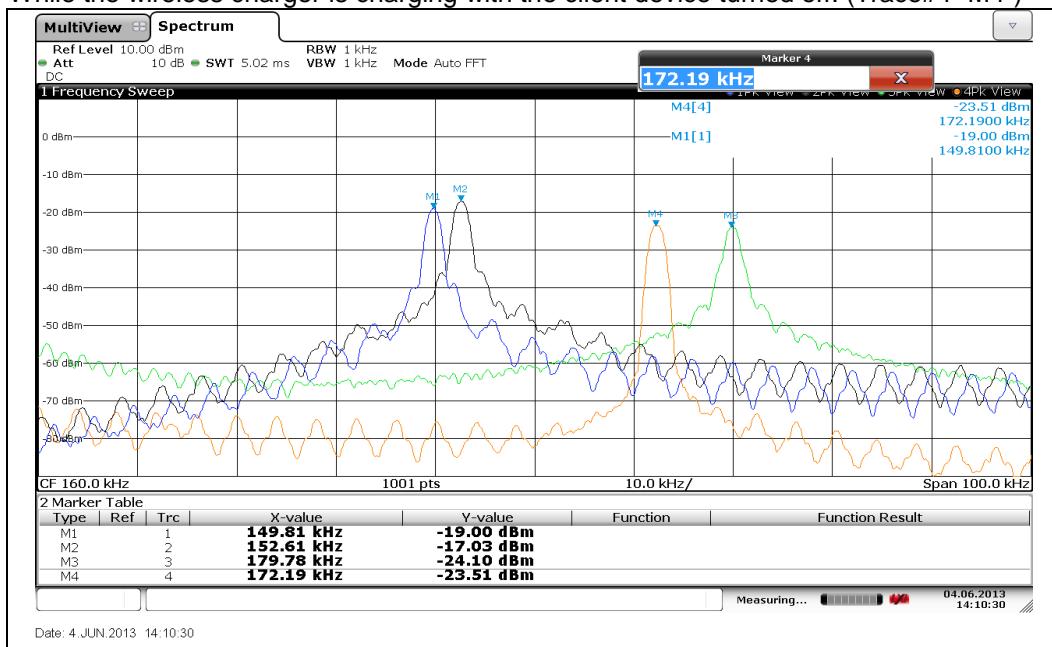
Plot#1 – less than 1% of battery

Plot#2 – less than 50% of battery

Plot#3 – 100% of battery

Operating configurations

- 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, **GSM900 / GPRS / 2 TX** was found in **Middle channel**.
- While the wireless charger is charging without the client device. (Trace#3 "M3")
- While the wireless charger is charging with the client device turned off. (Trace#4 "M4")



Plot#4 – fundamental emission comparison

- The level of Trace#2 was more than Trace#1, 3 and 4 so Trace#2 was selected.
- Trace#2 as **GSM900 / GPRS / 2 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 §15.207, §15.209 / IC RSS-210 Issue 8, RSS-Gen Issue 3			
Section in FCC 15 Subpart C	Section in RSS-210 Issue 8 RSS-Gen, Issue 3	Test Item	Result
15.209 15.209(a)	RSS-210 2.1 RSS-Gen 7.2.5	Radiated emission, Spurious Emission and Field Strength of Fundamental	Complied
2.1049	RSS-Gen 4.6.1	Occupied Bandwidth and 20 dB Bandwidth	Complied
15.207	RSS-Gen 7.2.4	Transmitter AC Power Line Conducted Emission	Complied

1.9. Test Report Revision

Revision	Report number	Description
0	F690501/RF-RTL006611	Initial
1	F690501/RF-RTL006611-1	Modify applicant's information
2	F690501/RF-RTL006611-2	Modify typo error

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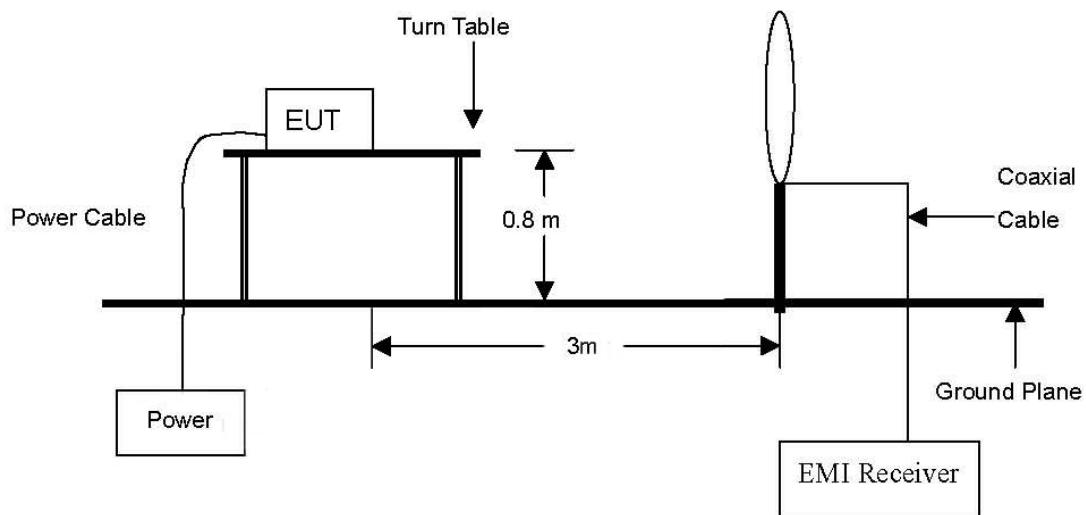
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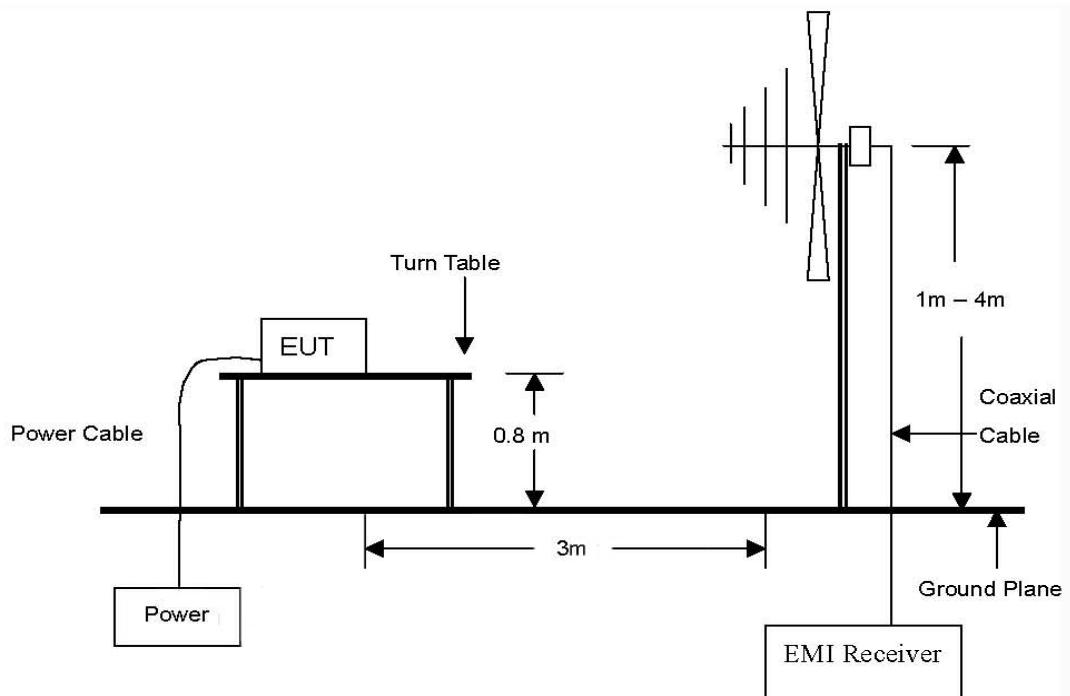
2. Field Strength of Fundamental

2.1. Test Setup

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



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



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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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	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 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., Sections 15.231 and 15.241

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

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

- 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.

2.3.2. Test Procedures for emission from 30 MHz to 1000 MHz

- 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. 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 meter away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

2.4. Test Result

Ambient temperature : $(24 \pm 2)^\circ\text{C}$

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 three orthogonal EUT position (x-axis, y-axis and z-axis). Worst case is z-axis.

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (kHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
Charging mode with resistive load (300 mA status)									
135.84	65.90	Average	H	18.16	0.30	84.36	4.36	24.94	20.58
Charging mode with resistive load (600 mA status)									
135.73	65.70	Average	H	18.16	0.30	84.16	4.16	24.95	20.79
Charging mode with resistive load (1 000 mA status)									
134.58	66.00	Average	H	18.17	0.30	84.47	4.47	25.02	20.55
Charging mode with client (less than 1% battery status)									
128.21	54.20	Average	H	18.17	0.30	72.67	-7.33	25.45	32.78
Charging mode with client (less than 50% battery status)									
158.53	52.00	Average	H	18.14	0.29	70.43	-9.57	23.60	33.17
Charging mode with client (100% battery status)									
128.20	59.10	Average	H	18.17	0.30	77.57	-2.43	25.45	27.88

Note:

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

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3. Spurious Emission

3.1. Test Setup

Same as section 2.1 of this report

3.2. Limit

Same as section 2.2 of this report

3.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

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

- 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 quasi-peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.3.2. Test Procedures for emission from 30 MHz to 1 000 MHz

- 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. 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 meter away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

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3.4. Test Result

Ambient temperature : $(24 \pm 2)^\circ\text{C}$

Relative humidity : 47 % R.H.

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

A. Charging mode with resistive load (300 mA status)

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.42	41.90	Average	H	18.00	0.27	60.17	-19.83	15.14	34.97
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.70	34.00	Q.P	H	18.00	0.25	52.25	12.25	30.70	18.45
0.98	27.80	Q.P	H	18.00	0.22	46.02	6.02	27.78	21.76
1.27	23.20	Q.P	H	18.01	0.26	41.47	1.47	25.53	24.06
1.55	19.30	Q.P	H	18.03	0.29	37.62	-2.38	23.80	26.18
1.83	16.00	Q.P	H	18.04	0.33	34.37	-5.63	30.00	35.63

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
53.56	40.30	Peak	V	14.30	-26.60	28.00	40.00	12.00
185.97	45.00	Peak	V	10.10	-25.30	29.80	43.52	13.72
310.69	43.40	Peak	H	14.30	-24.60	33.10	46.02	12.92
Above 320.00	Not detected	-	-	-	-	-	-	-

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B. Charging mode with resistive load (600 mA status)

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.41	42.40	Average	H	18.00	0.27	60.67	-19.33	15.35	34.68
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 30 m	Limit (dB μ V/m)	Margin (dB)
0.69	33.70	Q.P	H	18.00	0.25	51.95	11.95	30.83	18.88
0.97	27.70	Q.P	H	18.00	0.22	45.92	5.92	27.87	21.95
1.24	23.20	Q.P	H	18.01	0.25	41.46	1.46	25.74	24.28
1.52	19.50	Q.P	H	18.03	0.29	37.82	-2.18	23.97	26.15
1.80	16.40	Q.P	H	18.04	0.33	34.77	-5.23	30.00	35.23

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
44.35	42.90	Peak	V	14.80	-26.70	31.00	40.00	9.00
186.21	46.20	Peak	V	10.20	-25.30	31.10	43.52	12.42
290.61	44.90	Peak	H	13.90	-24.60	34.20	46.02	11.82
Above 300.00	Not detected	-	-	-	-	-	-	-

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C. Charging mode with resistive load (1 000 mA status)

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.40	43.50	Average	H	18.00	0.27	61.77	-18.23	15.56	33.79
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 30 m	Limit (dB μ V/m)	Margin (dB)
0.67	34.80	Q.P	H	18.00	0.25	53.05	13.05	31.08	18.03
0.94	28.90	Q.P	H	18.00	0.23	47.13	7.13	28.14	21.01
1.20	24.60	Q.P	H	18.01	0.25	42.86	2.86	26.02	23.16
1.47	20.80	Q.P	H	18.02	0.28	39.10	-0.90	24.26	25.16
1.74	17.70	Q.P	H	18.04	0.32	36.06	-3.94	30.00	33.94

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
53.20	43.50	Peak	V	14.30	-26.60	31.20	40.00	8.80
186.05	46.50	Peak	V	10.10	-25.30	31.30	43.52	12.22
293.44	43.80	Peak	H	13.90	-24.60	33.10	46.02	12.92
Above 300.00	Not detected	-	-	-	-	-	-	-

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

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.38	29.00	Average	H	18.00	0.27	47.27	-32.73	16.01	48.74
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 30 m	Limit (dB μ V/m)	Margin (dB)
0.63	21.80	Q.P	H	18.00	0.25	40.05	0.05	31.62	31.57
0.88	16.50	Q.P	H	18.00	0.23	34.73	-5.27	28.71	33.98
1.13	13.20	Q.P	H	18.01	0.24	31.45	-8.55	26.54	35.09
1.37	10.60	Q.P	H	18.02	0.27	28.89	-11.11	24.87	35.98

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
53.24	41.00	Peak	V	14.30	-26.60	28.70	40.00	11.30
265.95	46.50	Peak	V	14.70	-24.70	36.50	46.02	9.52
288.63	45.40	Peak	H	13.90	-24.60	34.70	46.02	11.32
Above 290.00	Not detected	-	-	-	-	-	-	-

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

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.47	30.40	Average	H	18.00	0.27	48.67	-31.33	14.16	45.49
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 30 m	Limit (dB μ V/m)	Margin (dB)
0.79	21.00	Q.P	H	18.00	0.24	39.24	-0.76	29.65	30.41
1.10	14.50	Q.P	H	18.01	0.23	32.74	-7.26	26.78	34.04
1.42	9.60	Q.P	H	18.02	0.28	27.90	-12.10	24.56	36.66

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
44.95	40.40	Peak	V	14.80	-26.70	28.50	40.00	11.50
197.97	42.90	Peak	V	11.80	-25.20	29.50	43.52	14.02
265.71	44.60	Peak	H	13.60	-24.70	33.50	46.02	12.52
Above 270.00	Not detected	-	-	-	-	-	-	-

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F. Charging mode with client device (100% battery status)

-Below 30 MHz

Radiated Emissions			Ant	Correction Factors		Total		FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.38	33.50	Average	H	18.00	0.28	51.78	-28.22	16.01	44.23
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m)	Margin (dB)
0.64	24.10	Q.P	H	18.00	0.25	42.35	2.35	31.48	29.13
0.91	16.80	Q.P	H	18.00	0.23	35.03	-4.97	28.42	33.39
1.15	15.20	Q.P	H	18.01	0.24	33.45	-6.55	26.39	32.94
1.40	10.10	Q.P	H	18.02	0.27	28.39	-11.61	24.68	36.29
1.66	10.00	Q.P	H	18.03	0.31	28.34	-11.66	30.00	41.66

-Above 30 MHz

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m) at 3 m	Limit (dB μ V/m)	Margin (dB)
111.97	41.80	Peak	V	11.70	-26.00	27.50	43.52	16.02
234.95	36.20	Peak	V	13.70	-25.00	24.90	46.02	21.12
266.16	43.40	Peak	H	13.60	-24.70	32.30	46.02	13.72
Above 270.00	Not detected	-	-	-	-	-	-	-

Note:

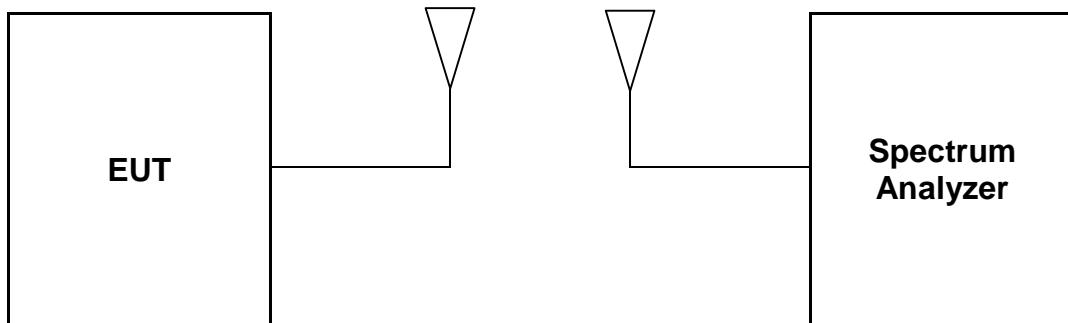
- According to §15.31 (f)(2) 300 m Result(dB μ V/m) = 3 m Result(dB μ V/m) – 40log(300/3) (dB μ V/m)
- 30 m Result(dB μ V/m) = 3 m Result(dB μ V/m) – 40log(30/3) (dB μ V/m)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.

- 9 kHz to 490 kHz = 2 400 / F (kHz) at 300 m

- 490 kHz to 1 705 kHz = 24 000 / F (kHz) at 30 m

4. Occupied Bandwidth & 20 dB Bandwidth

4.1. Test Setup



4.2. Limit

None; for reporting purposes only

4.3. Test Procedure

- a. Set the spectrum analyzer as SPAN = 2 or 3 times necessary bandwidth, RBW = approximately 1 % of the SPAN, VBW is set to 3 times RBW, Detector = sampling, Trace mode = max hold.
- b. Measure lowest and highest frequencies are placed in a running sum until 0.5 % and 99.5 % of the total is reached.
- c. Record the SPAN between the lowest and the highest frequencies for the 99 % occupied bandwidth.

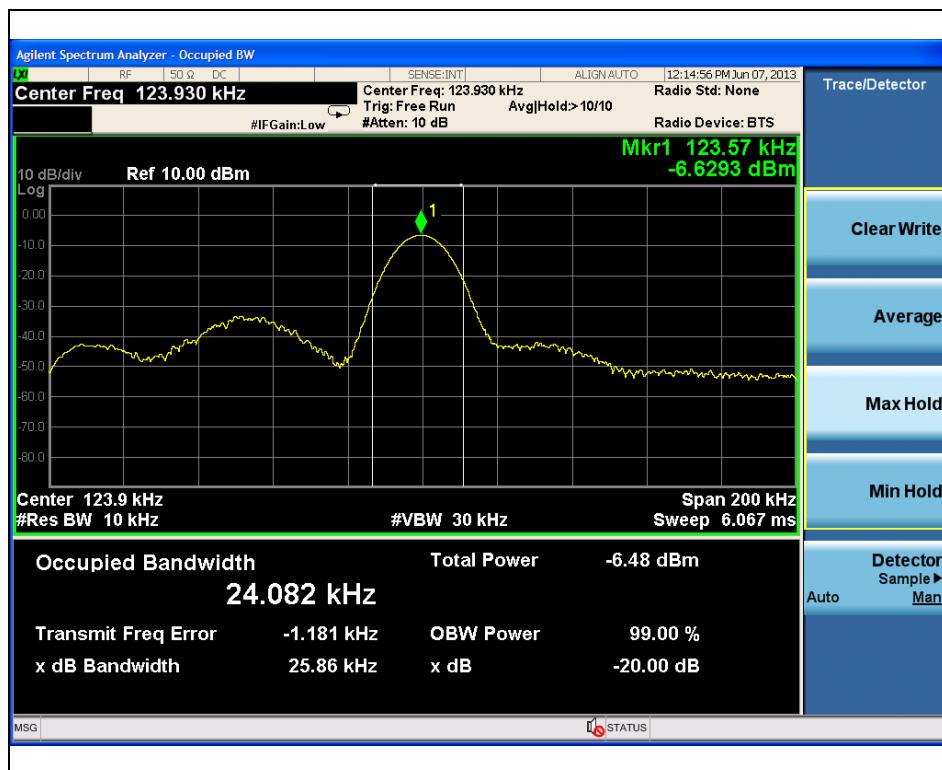
4.4. Test Result

Ambient temperature : $(24 \pm 2)^\circ\text{C}$

Relative humidity : 47 % R.H.

EUT status	Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)	Limit
With client device (100% of battery)	24.08	25.86	Reporting proposed only
with resistive load (1 000 mA)	22.61	26.02	

Occupied Bandwidth & 20 dB Bandwidth (With client device)



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Occupied Bandwidth & 20 dB Bandwidth (With resistive load)

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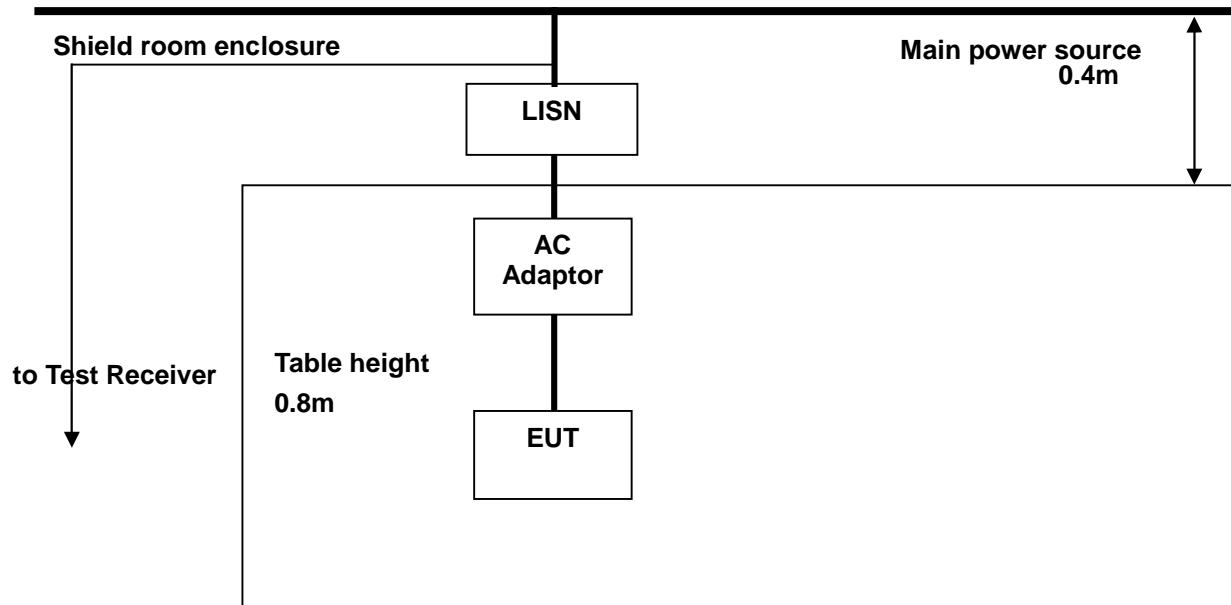
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5. Transmitter AC Power Line Conducted Emission

5.1. Test Setup



5.2. 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 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/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 (MHz)	Conducted limit (dB μ V)	
	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.

5.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The test procedure is performed in a 6.5 m x 3.6 m x 3.6 m (L x W x H) shielded room. The EUT along with its peripherals were placed on a 1.0 m(W) x 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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5.4. Test Results

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

Ambient temperature : (23 ± 2) °C
Relative humidity : 47 % R.H.

Frequency range : 0.15 MHz – 30 MHz

Measured Bandwidth : 9 kHz

A. Charging mode with resistive load (300 mA status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.19	33.08	18.08	N	64.17	54.17	31.09	36.09
0.36	24.09	11.39	N	58.64	48.64	34.55	37.25
0.46	23.39	11.69	N	56.66	46.66	33.27	34.97
5.97	35.17	25.07	N	60.00	50.00	24.83	24.93
22.47	47.08	40.38	N	60.00	50.00	12.92	9.62
23.11	47.19	39.99	N	60.00	50.00	12.81	10.01
0.16	37.60	30.90	L1	65.52	55.52	27.92	24.62
0.59	35.61	28.41	L1	56.00	46.00	20.39	17.59
1.43	34.62	30.52	L1	56.00	46.00	21.38	15.48
6.19	39.12	33.72	L1	60.00	50.00	20.88	16.28
22.84	46.44	39.04	L1	60.00	50.00	13.56	10.96
23.46	45.24	38.84	L1	60.00	50.00	14.76	11.16

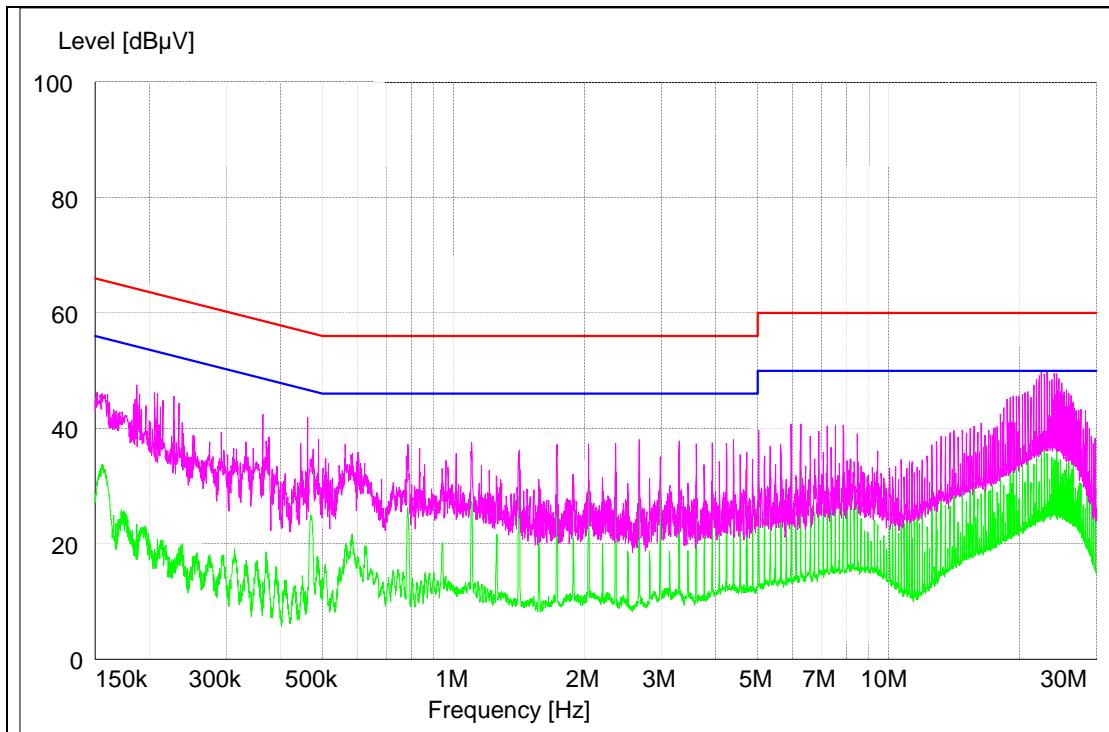
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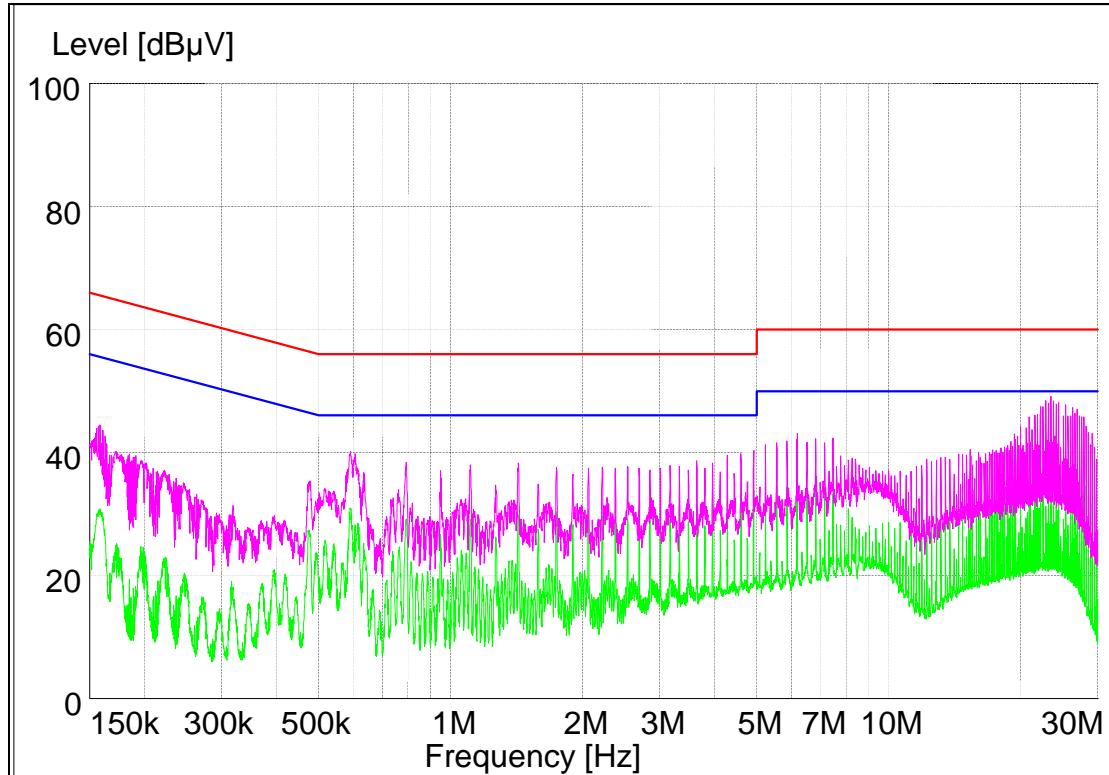
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Test mode: (Neutral)



Test mode: (Hot)



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B. Charging mode with resistive load (600 mA status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.78	29.19	24.89	N	56.00	46.00	26.81	21.11
2.05	31.61	28.41	N	56.00	46.00	24.39	17.59
3.30	31.73	29.23	N	56.00	46.00	24.27	16.77
7.55	35.62	30.62	N	60.00	50.00	24.38	19.38
22.16	44.47	30.47	N	60.00	50.00	15.53	19.53
24.37	45.03	38.93	N	60.00	50.00	14.97	11.07
0.16	40.20	34.90	L1	65.41	55.41	25.21	20.51
1.15	35.32	31.02	L1	56.00	46.00	20.68	14.98
2.13	37.24	32.84	L1	56.00	46.00	18.76	13.16
5.88	38.61	35.11	L1	60.00	50.00	21.39	14.89
22.07	47.24	40.54	L1	60.00	50.00	12.76	9.46
23.70	47.45	40.15	L1	60.00	50.00	12.55	9.85

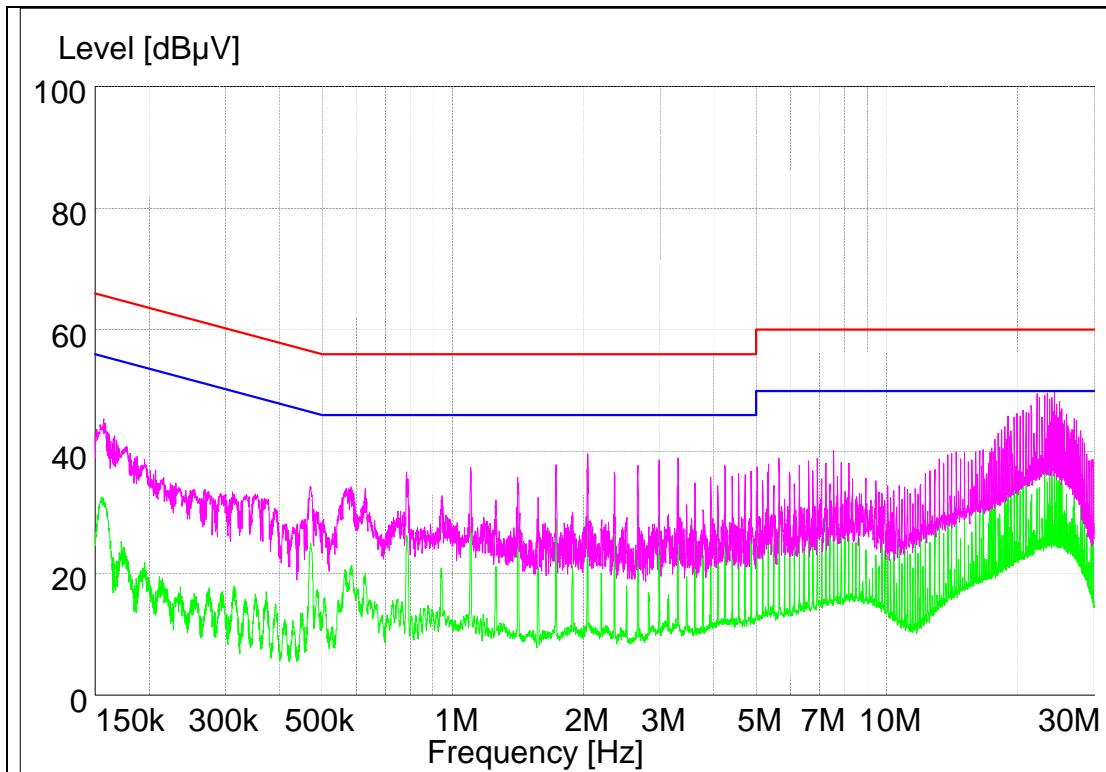
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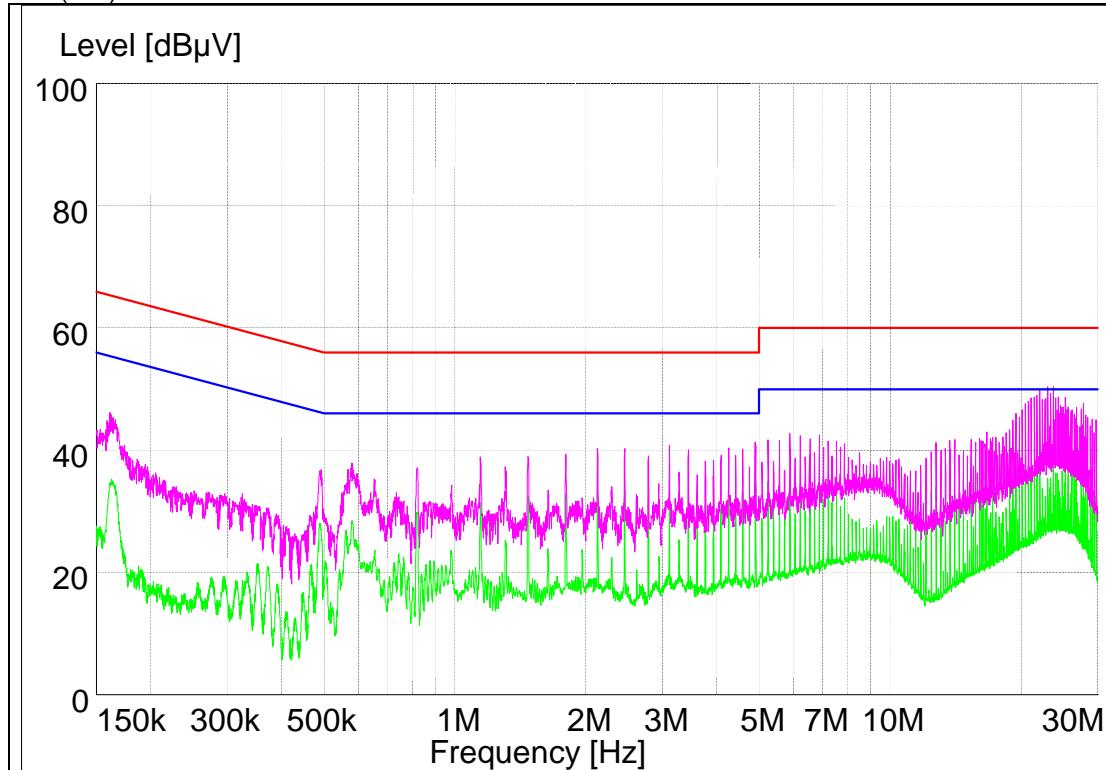
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Test mode: (Neutral)



Test mode: (Hot)



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C. Charging mode with resistive load (1 000 mA status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	41.48	34.88	N	65.52	55.52	24.04	20.64
0.57	35.79	24.99	N	56.00	46.00	20.21	21.01
3.58	34.45	31.15	N	56.00	46.00	21.55	14.85
6.38	34.28	32.18	N	60.00	50.00	25.72	17.82
21.81	47.46	40.66	N	60.00	50.00	12.54	9.34
23.70	45.22	38.62	N	60.00	50.00	14.78	11.38
0.16	42.00	32.50	L1	65.36	55.36	23.36	22.86
0.58	35.21	30.11	L1	56.00	46.00	20.79	15.89
1.09	34.42	30.22	L1	56.00	46.00	21.58	15.78
4.82	38.39	34.19	L1	56.00	46.00	17.61	11.81
22.70	48.14	32.24	L1	60.00	50.00	11.86	17.76
23.34	49.54	42.84	L1	60.00	50.00	10.46	7.16

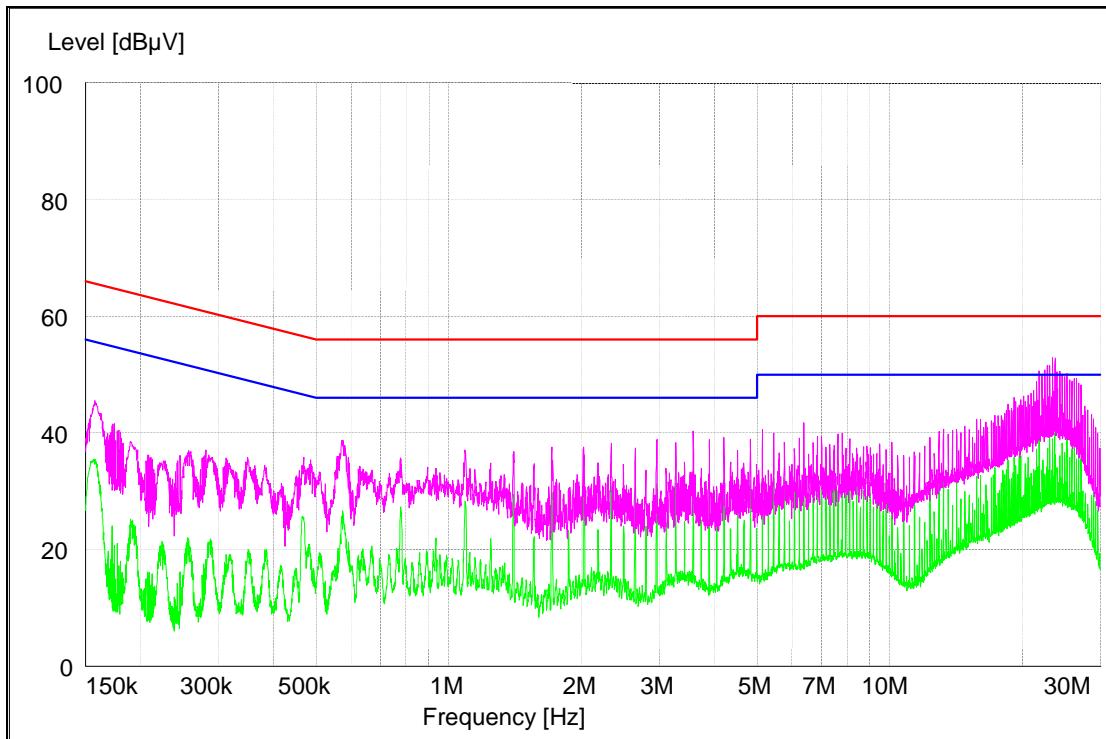
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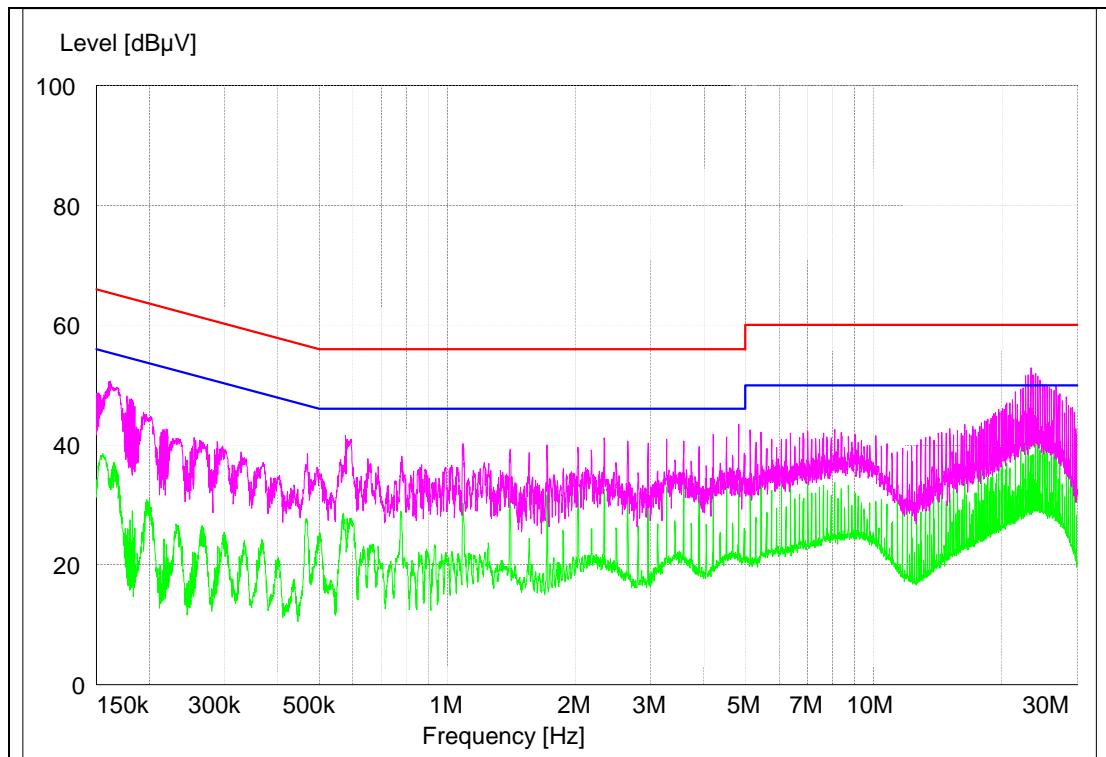
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Test mode: (Neutral)



Test mode: (Hot)



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

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	38.28	25.98	N	65.67	55.67	27.39	29.69
0.86	29.40	25.50	N	56.00	46.00	26.60	20.50
6.04	35.48	32.68	N	60.00	50.00	24.52	17.32
8.28	35.52	32.32	N	60.00	50.00	24.48	17.68
22.77	45.08	38.48	N	60.00	50.00	14.92	11.52
23.82	37.72	32.52	N	60.00	50.00	22.28	17.48
0.16	38.00	25.50	L1	65.67	55.67	27.67	30.17
0.58	32.81	27.31	L1	56.00	46.00	23.19	18.69
1.53	35.34	30.54	L1	56.00	46.00	20.66	15.46
7.51	41.86	37.66	L1	60.00	50.00	18.14	12.34
22.34	47.94	41.24	L1	60.00	50.00	12.06	8.76
23.37	48.24	42.44	L1	60.00	50.00	11.76	7.56

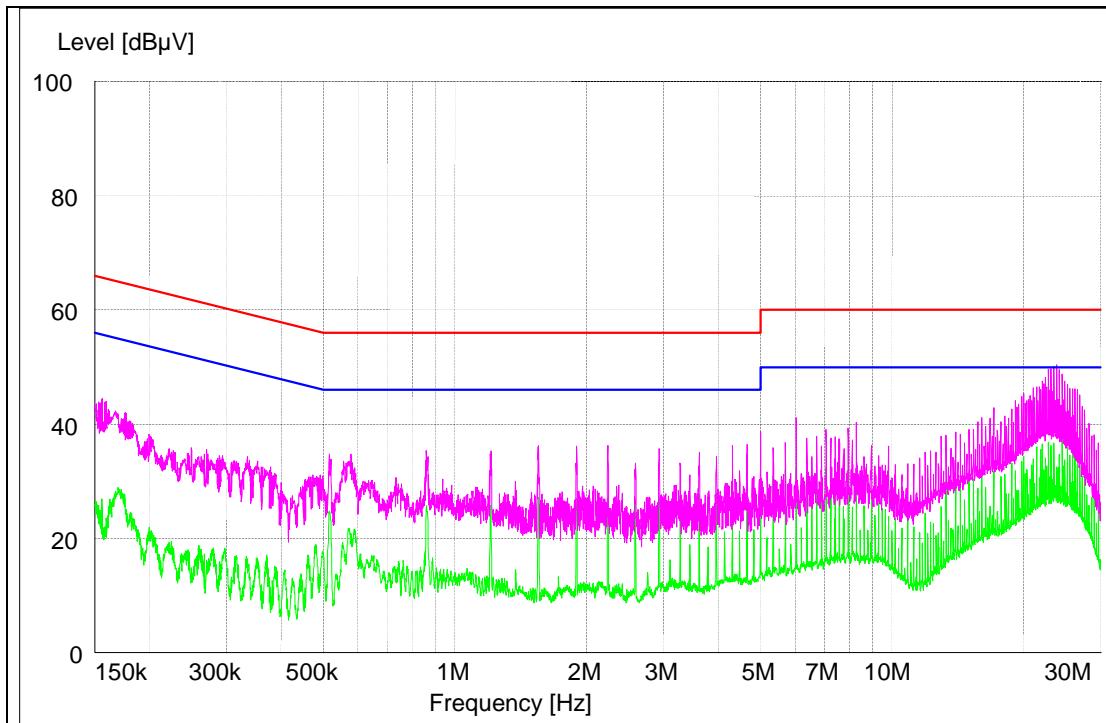
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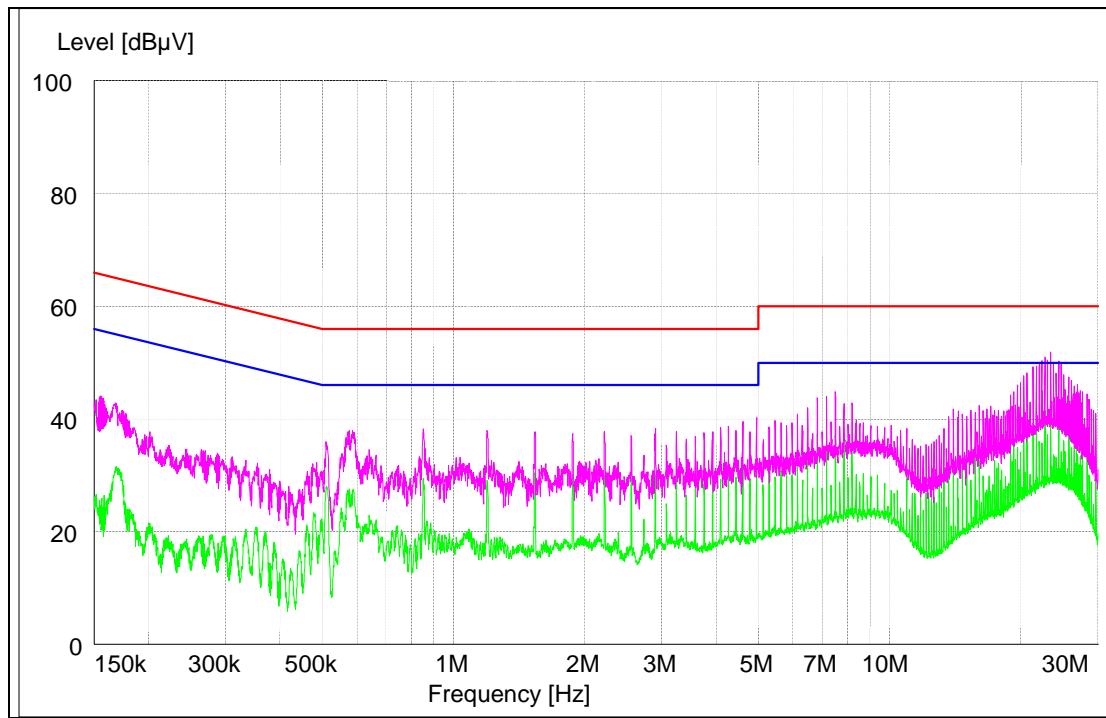
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Test mode: (Neutral)



Test mode: (Hot)



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

FREQ. (MHz)	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	37.78	25.68	N	65.67	55.67	27.89	29.99
0.18	36.88	30.08	N	64.53	54.53	27.65	24.45
0.91	28.70	23.90	N	56.00	46.00	27.30	22.10
6.67	36.79	33.49	N	60.00	50.00	23.21	16.51
22.72	45.48	35.88	N	60.00	50.00	14.52	14.12
23.77	46.42	40.62	N	60.00	50.00	13.58	9.38
0.18	36.90	31.20	L1	64.63	54.63	27.73	23.43
0.90	35.02	29.82	L1	56.00	46.00	20.98	16.18
2.34	33.55	29.05	L1	56.00	46.00	22.45	16.95
6.31	40.72	36.72	L1	60.00	50.00	19.28	13.28
22.34	46.74	40.84	L1	60.00	50.00	13.26	9.16
23.04	38.34	31.44	L1	60.00	50.00	21.66	18.56

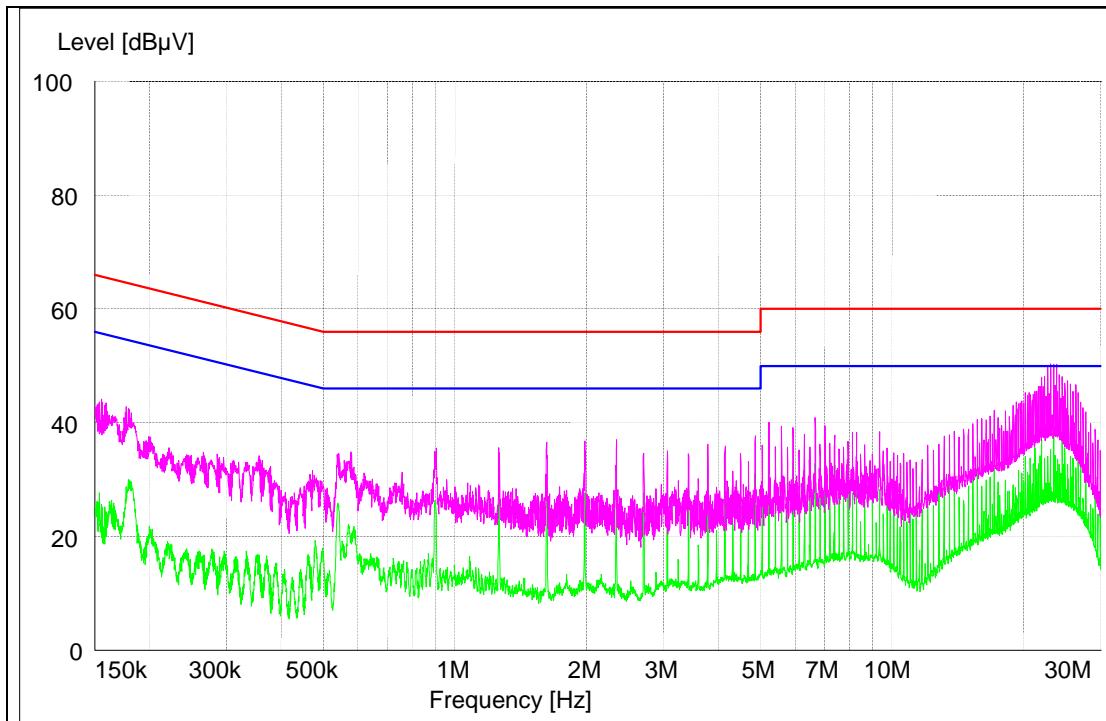
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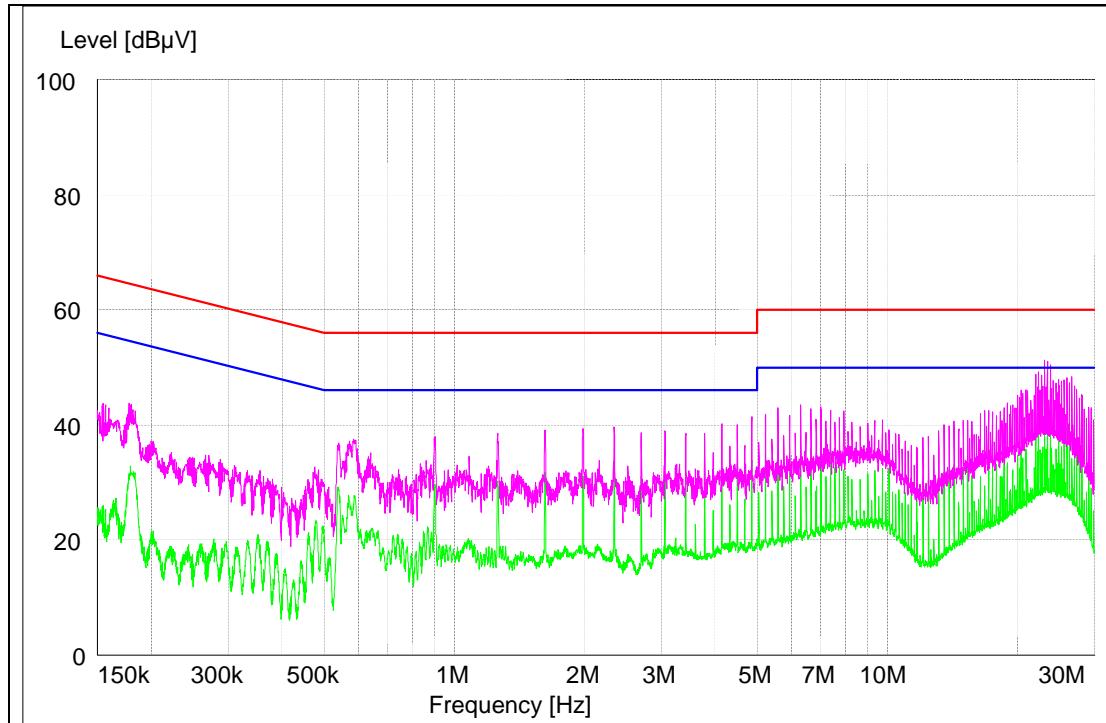
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Test mode: (Neutral)



Test mode: (Hot)



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F. Charging mode with client device (100% battery status)

FREQ. (MHz)	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.18	35.38	29.38	N	64.49	54.49	29.11	25.11
0.54	29.99	25.89	N	56.00	46.00	26.01	20.11
1.62	31.41	28.71	N	56.00	46.00	24.59	17.29
7.92	37.12	34.12	N	60.00	50.00	22.88	15.88
22.70	45.18	38.78	N	60.00	50.00	14.82	11.22
23.79	46.62	40.42	N	60.00	50.00	13.38	9.58
0.18	37.70	32.30	L1	64.49	54.49	26.79	22.19
0.90	34.92	29.72	L1	56.00	46.00	21.08	16.28
1.62	36.64	31.64	L1	56.00	46.00	19.36	14.36
8.28	38.56	36.06	L1	60.00	50.00	21.44	13.94
22.34	46.04	39.44	L1	60.00	50.00	13.96	10.56
23.79	47.25	41.65	L1	60.00	50.00	12.75	8.35

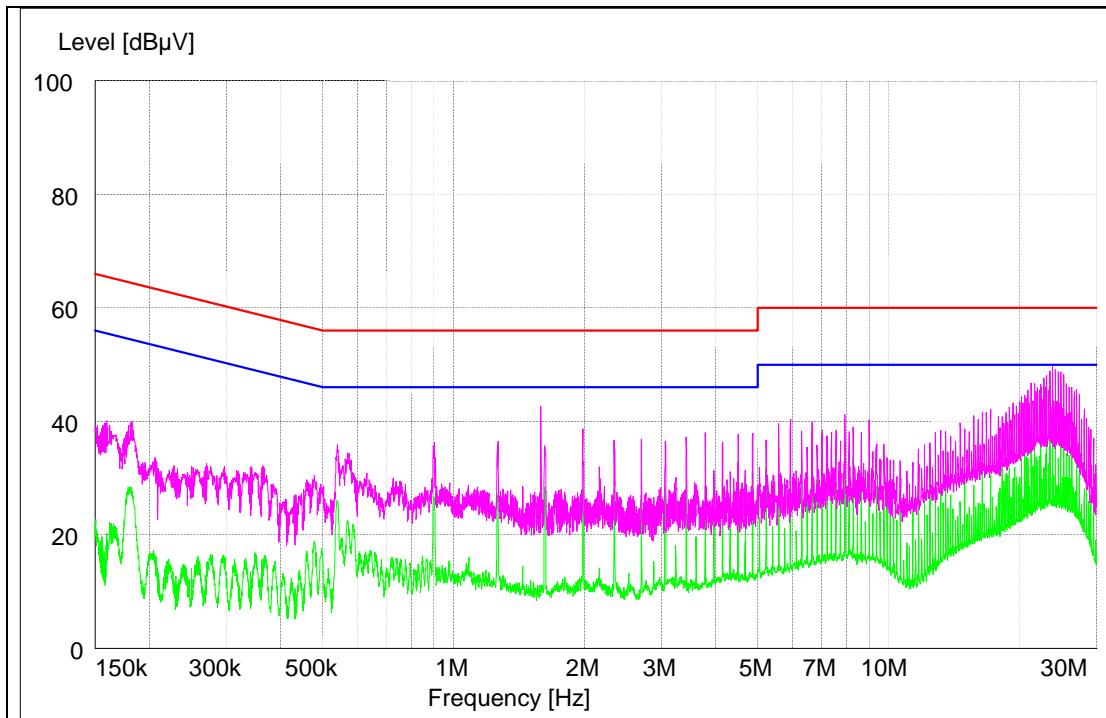
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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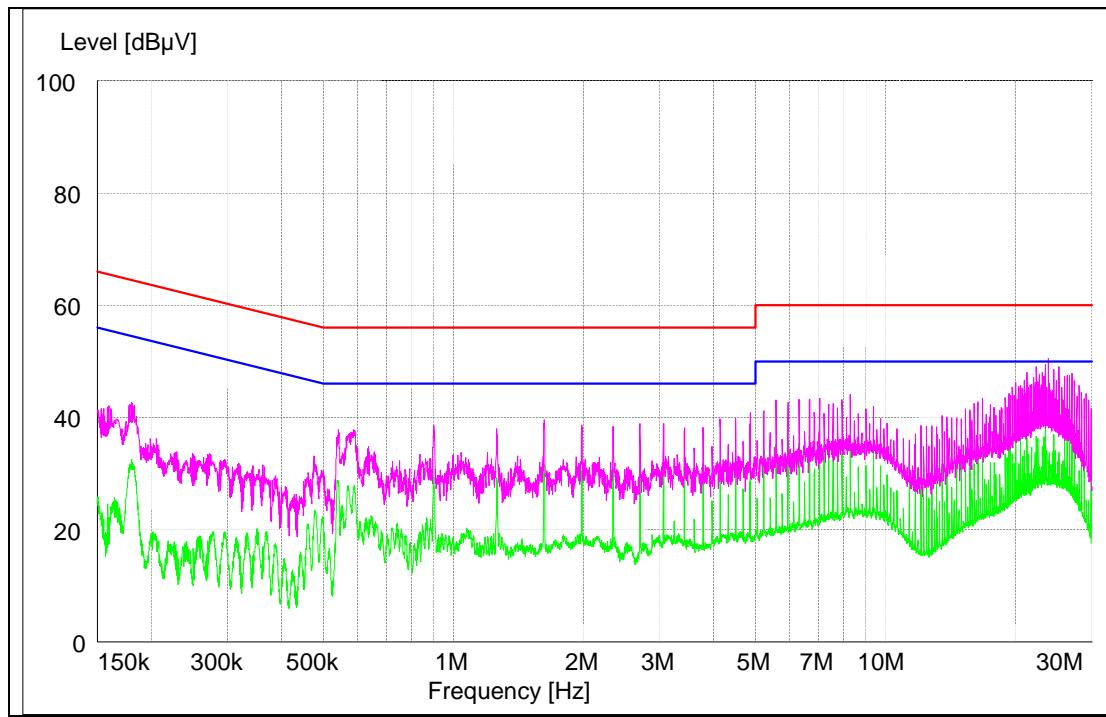
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Test mode: (Neutral)



Test mode: (Hot)



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