

TEST REPORT

According to : FCC 47CFR part 15 subpart C

Test Report No. : CTK-2013-01030
Date of Issue : June 25, 2013
FCC ID : TN8-OWC-401T
Equipment Under Test : OWC-401T
Kind of Product : Wireless Charging Pad
Applicant : OPENTECH Inc.
Applicant Address : 13F, SJ-Technoville 60-19, Gasan-Dong, Geumcheon-Gu, Seoul, Korea, 153-801
Manufacturer : OPENTECH Inc.
Manufacturer Address : 13F, SJ-Technoville 60-19, Gasan-Dong, Geumcheon-Gu, Seoul, Korea, 153-801
Contact Person : Jae Sung, Kim / Project Manager
Telephone : +82-2-3397-0184
Received Date : June 7, 2013
Test period : Start : June 7, 2013 End : June 25, 2013
Test Results : In Compliance Not in Compliance

The test results presented in this report relate only to the object tested.

Tested by



Young-taek Lee
Test Engineer
Date: June 25, 2013

Reviewed by



Young-Joon, Park
Technical Manager
Date: June 25, 2013



REPORT REVISION HISTORY

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1.0 General Product Description

Type of equipment	Wireless Charging Pad
Equipment model name	OWC-401T
Frequency Range	110 kHz – 205 kHz
Antenna type	Coil antenna
Power Source	TRAVEL ADAPTER Input : AC 100-240 V, 50/60 Hz Output : DC 5 V, 2.0 A Test Voltage and Frequency : AC 120 V, 60 Hz

1.1 Model Differences

Not applicable

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
TRAVEL ADAPTER	TIANJIN E&P ELECTRONICS Inc.	ETA-U90KWK	DK3D301TS/B-E	Verification
Wireless Charging Cover	OPENTECH Inc.	OWC-300R	-	-
Wireless Charging Cover	RFTech Co., Ltd.	EBC-1G6WWE	RT0C802AS/4-E	-
Mobile Phone	Samsung Electronics Co., Ltd.	SCH-I535	-	A3LSCHI535

1.4 EUT Operating Modes

Equipment under test was operated during the measurement under the following conditions:

- Charging and communication mode

Modulation Type : CW (Continuous Wave)

Output Power : Max. 7.46 dBuV/m (Frequency 123.40 kHz, Test Distance 3 m)

TX Duty Cycle : 100 % by measurement

1.5 Test Modes

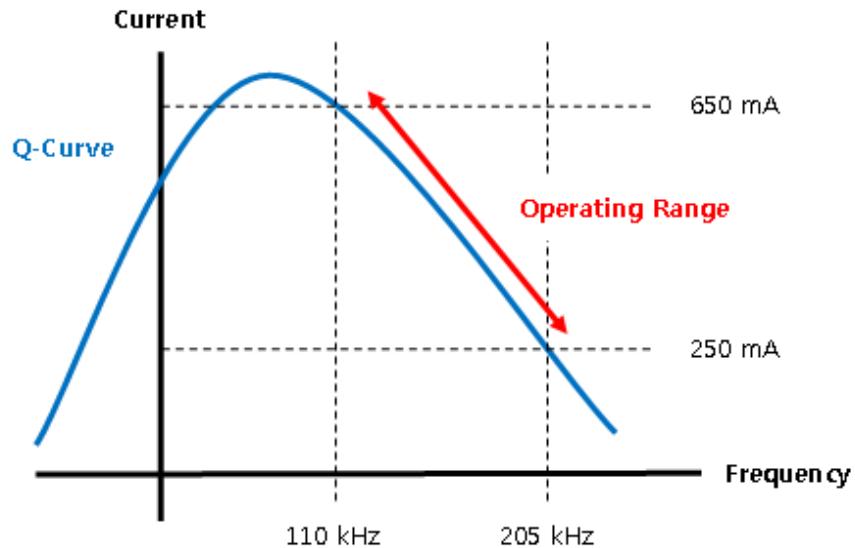
This device has been tested below conditions:

[Test Mode #1]

Frequency	Charging current	Note
110 kHz	650 mA	Low Frequency, Max. Load
157.5 kHz	425 mA	Middle Frequency, Medium Load
205 kHz	250 mA	High Frequency, Min. Load

This device has been tested with the various resistors to simulate the various load conditions of the client device. The charging current was controlled from 250 mA (Min.) to 650 mA (Max.) using the resistors and three types of Jig board with circular coil.

- 1) EUT has a range of the operating frequency from 110 kHz to 205 kHz and It has a range of the output current from 250 mA to 650 mA when output voltage is DC 5 V.
- 2) If the operating frequency is 110 kHz, the maximum output current is 650 mA and If the operating frequency is 205 kHz, the minimum output current is 250 mA.



- 3) To the simulation of the power transmission in from 110 kHz to 205 kHz. In the full range of the operating frequency, Normal operating condition, the test frequency is three which are the High, Middle and Low frequency of 110 kHz, 157.5 kHz and 205 kHz.
- 4) In order to operate EUT in three operating frequencies, three types of Test Jig were used.
- 5) The Wireless Charging Cover was used as Test Jig is actually used with the EUT.
- 6) The EUT to operate at a steady-state output current, the Wireless Charging Cover was not to combined with a smart phone. The DC output of the Wireless Charging Cover was connected to the resistor. As follows, the three types of Test Jig was prepared and tested.
- 7) Test Jig #1
Operating Frequency : 110 kHz, Output Voltage : DC 5 V, Output Current : 0.65 A
Calculation of resistor value : $I = \frac{V}{R}$, $0.65 A = \frac{5V}{R}$, $R = \frac{5V}{0.65 A}$, $R \approx 7.69 \Omega$
- 8) Test Jig #2
Operating Frequency : 157.5 kHz, Output Voltage : DC 5 V, Output Current : 0.425 A
Calculation of resistor value : $I = \frac{V}{R}$, $0.425 A = \frac{5V}{R}$, $R = \frac{5V}{0.425 A}$, $R \approx 11.76 \Omega$
- 9) Test Jig #3
Operating Frequency : 205 kHz, Output Voltage : DC 5 V, Output Current : 0.25 A
Calculation of resistor value : $I = \frac{V}{R}$, $0.25 A = \frac{5V}{R}$, $R = \frac{5V}{0.25 A}$, $R = 20 \Omega$

[Test Mode #2]

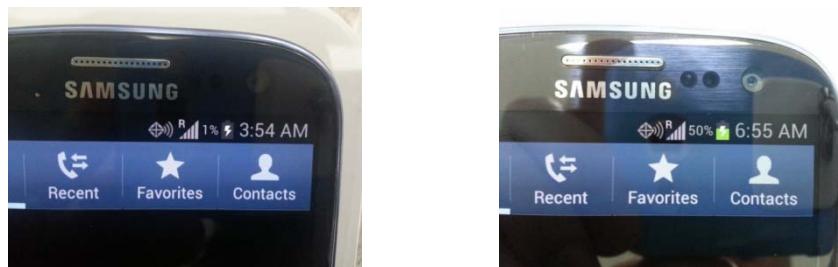
Support Equipment	Battery status	Note
Mobile Phone	< 1%	Max. Load
Mobile Phone	50 %	Medium Load

Note : The Charging is not operation when 100% fully charged status.

This device has been tested with the Mobile phone.

Mobile phone is on Airplane Mode.

Mobile phone's battery status was checked by display battery percentage function.



1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea.

1.8 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m OATS, 3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	10 m OATS, 3 m & 10 m SAC and Conducted Test Site	 R-948, C-986 T-1843
KOREA	KCC	EMI (10 m OATS, 10 m SAC and Conducted Test Site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and Interruptions)	 No. 51, KR0025
International	KOLAS	EMC	



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2.0 Summary of tests

FCC Part Section(s)	Parameter	Status (note 1)
15.203	Antenna requirement	N/A
15.204	External radio frequency power amplifier and antenna modifications	N/A
15.207	Conducted emissions	Complies
15.209	Radiated emissions	Complies

Footnotes for N/A's:

§ 15.203 is not applicable because the transmitter is provided with an integral antenna.
§ 15.204 is not applicable because the transmitter is provided with an integral antenna.

2.1 Power line conducted emissions (Section 15.207)

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

* Measurement procedures was In accordance with ANSI C63.4-2009 7.3.3, 7.3.4

Limit

-15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

EUT Operating Modes

The EUT is an intentional radiator is operated at 110 kHz to 205 kHz.
We have tested three frequencies, Low (110 kHz), Middle (157.5 kHz), High (205 kHz), for power line conducted emissions test.

* Middle (157.5 kHz) : Exactly half way between 110 kHz and 205 kHz.

Test Results

The requirements are:

Complies

[Test Mode #1]

[Operating Frequency : 110 kHz]

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
29.751	38.9	11.1	Average

[Operating Frequency : 157.5 kHz]

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
29.787	44.7	5.3	Average

[Operating Frequency : 205 kHz]

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
29.229	41.3	8.7	Average

[Test Mode #2]

[< 1 % Battery Status]

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
29.913	52.3	7.7	Quasi-peak

[50 % Battery Status]

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
29.863	39.7	10.3	Average



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Test Data

[Operating Frequency : 110 kHz]

[HOT : AC 120 V]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.532500	30.3	1000.0	9.000	On	L1	10.1	25.7	56.0
3.889500	29.3	1000.0	9.000	On	L1	9.7	26.7	56.0
4.569000	29.6	1000.0	9.000	On	L1	9.7	26.4	56.0
19.446000	36.8	1000.0	9.000	On	L1	9.8	23.2	60.0
23.838000	38.8	1000.0	9.000	On	L1	10.0	21.2	60.0
29.418000	44.9	1000.0	9.000	On	L1	10.0	15.1	60.0

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.510000	28.2	1000.0	9.000	On	L1	10.1	17.8	46.0
0.510000	28.1	1000.0	9.000	On	L1	10.1	17.9	46.0
15.729000	27.6	1000.0	9.000	On	L1	9.8	22.4	50.0
18.433500	31.4	1000.0	9.000	On	L1	9.8	18.6	50.0
23.842500	33.7	1000.0	9.000	On	L1	10.0	16.3	50.0
29.751000	38.9	1000.0	9.000	On	L1	10.0	11.1	50.0

[NEUTRAL : AC 0 V]

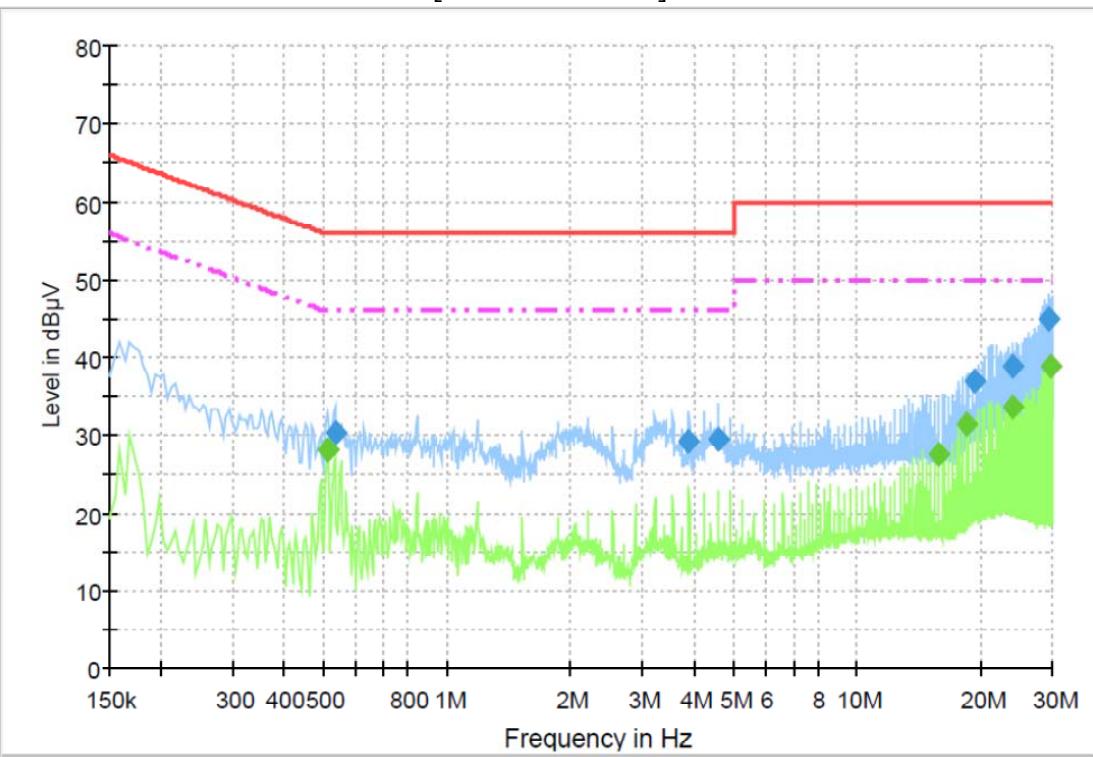
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.505500	29.7	1000.0	9.000	On	N	10.1	26.3	56.0
4.195500	28.6	1000.0	9.000	On	N	9.7	27.4	56.0
4.866000	29.1	1000.0	9.000	On	N	9.7	26.9	56.0
19.288500	34.8	1000.0	9.000	On	N	10.0	25.2	60.0
21.799500	34.7	1000.0	9.000	On	N	10.0	25.3	60.0
29.985000	29.7	1000.0	9.000	On	N	10.2	30.3	60.0

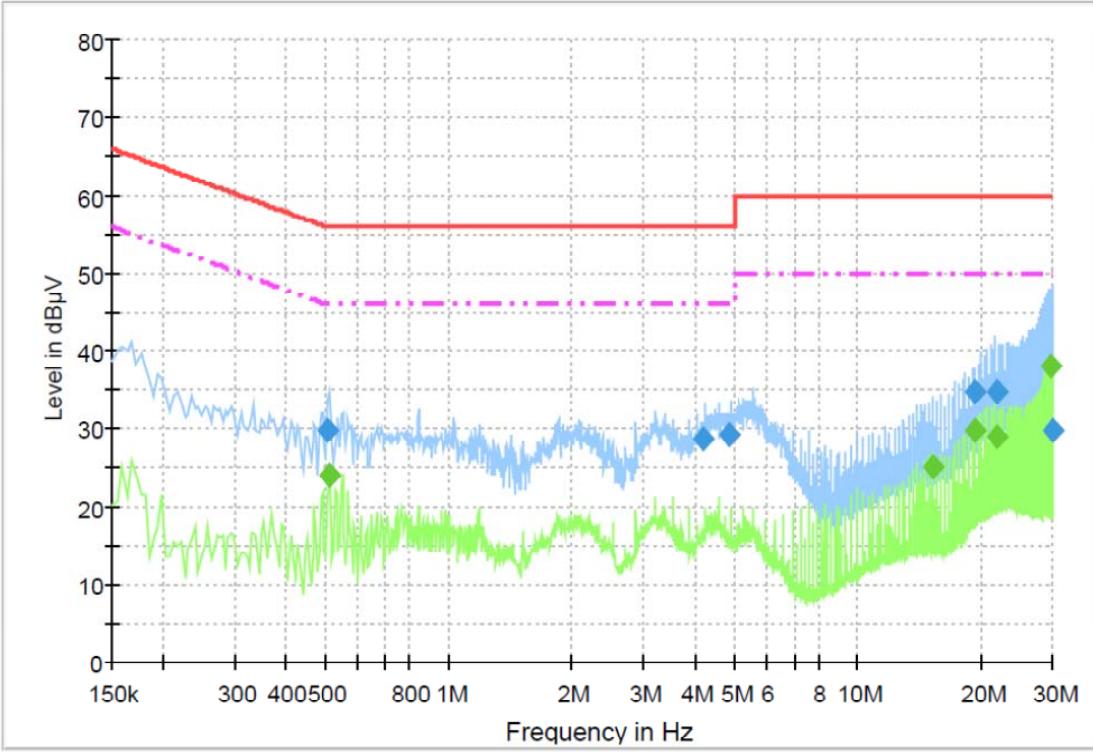
Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.510000	24.0	1000.0	9.000	On	N	10.1	22.0	46.0
0.510000	23.9	1000.0	9.000	On	N	10.1	22.1	46.0
15.265500	25.2	1000.0	9.000	On	N	9.9	24.8	50.0
19.288500	29.7	1000.0	9.000	On	N	10.0	20.3	50.0
21.799500	29.0	1000.0	9.000	On	N	10.0	21.0	50.0
29.679000	38.1	1000.0	9.000	On	N	10.2	11.9	50.0

[HOT : AC 120 V]



[NEUTRAL : AC 0 V]



[Operating Frequency : 157.5 kHz]

[HOT : AC 120 V]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
1.032000	36.0	1000.0	9.000	On	L1	9.9	20.0	56.0
2.688000	37.7	1000.0	9.000	On	L1	9.8	18.3	56.0
4.344000	36.9	1000.0	9.000	On	L1	9.7	19.1	56.0
19.234500	42.2	1000.0	9.000	On	L1	9.8	17.8	60.0
22.960500	44.4	1000.0	9.000	On	L1	10.0	15.6	60.0
29.782500	53.0	1000.0	9.000	On	L1	10.0	7.0	60.0

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.528000	31.7	1000.0	9.000	On	L1	10.1	14.3	46.0
2.688000	33.6	1000.0	9.000	On	L1	9.8	12.4	46.0
4.344000	33.1	1000.0	9.000	On	L1	9.7	12.9	46.0
19.234500	39.2	1000.0	9.000	On	L1	9.8	10.8	50.0
23.370000	40.8	1000.0	9.000	On	L1	10.0	9.2	50.0
29.778000	44.5	1000.0	9.000	On	L1	10.0	5.5	50.0

[NEUTRAL : AC 0 V]

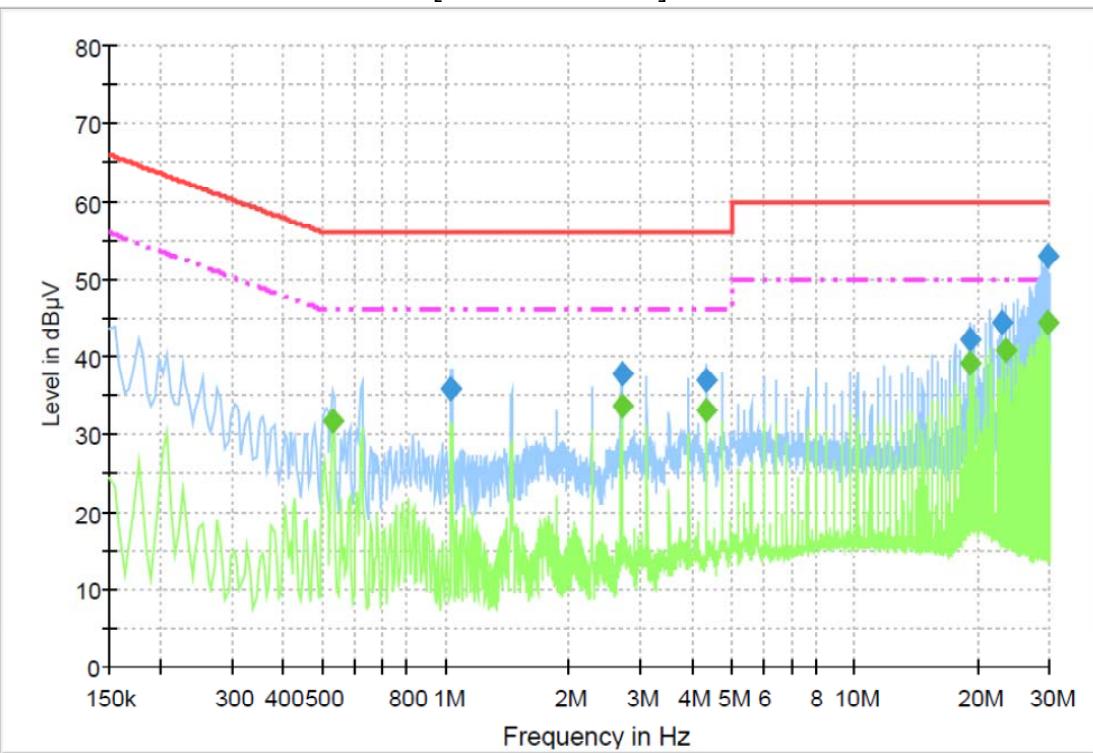
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.688000	35.3	1000.0	9.000	On	N	9.8	20.7	56.0
4.344000	35.9	1000.0	9.000	On	N	9.7	20.1	56.0
4.758000	34.9	1000.0	9.000	On	N	9.7	21.1	56.0
19.234500	41.6	1000.0	9.000	On	N	10.0	18.4	60.0
22.960500	45.9	1000.0	9.000	On	N	10.1	14.1	60.0
29.787000	53.6	1000.0	9.000	On	N	10.2	6.4	60.0

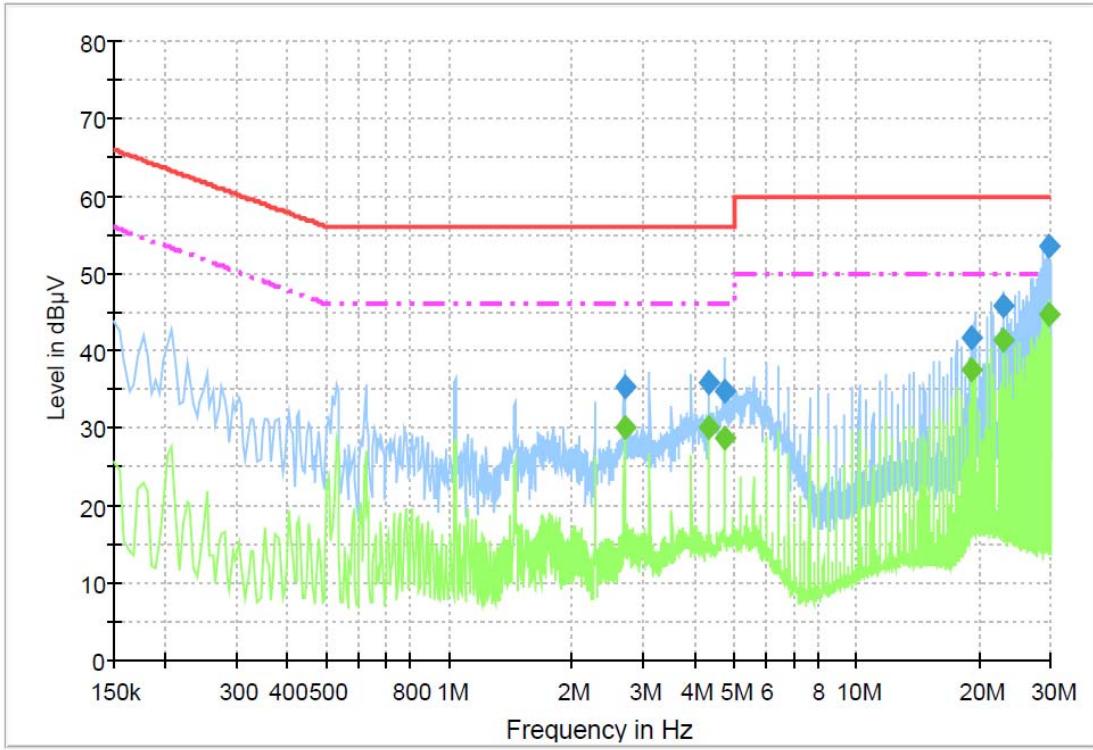
Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.688000	30.2	1000.0	9.000	On	N	9.8	15.8	46.0
4.344000	30.2	1000.0	9.000	On	N	9.7	15.8	46.0
4.758000	28.8	1000.0	9.000	On	N	9.7	17.2	46.0
19.234500	37.6	1000.0	9.000	On	N	10.0	12.4	50.0
22.960500	41.4	1000.0	9.000	On	N	10.1	8.6	50.0
29.787000	44.7	1000.0	9.000	On	N	10.2	5.3	50.0

[HOT : AC 120 V]



[NEUTRAL : AC 0 V]



[Operating Frequency : 205 kHz]

[HOT : AC 120 V]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.159000	41.9	1000.0	9.000	On	L1	10.0	23.7	65.5
0.159000	41.2	1000.0	9.000	On	L1	10.0	24.3	65.5
0.163500	44.9	1000.0	9.000	On	L1	10.1	20.4	65.3
0.496500	27.7	1000.0	9.000	On	L1	10.1	28.3	56.1
23.622000	39.7	1000.0	9.000	On	L1	10.0	20.3	60.0
29.886000	48.1	1000.0	9.000	On	L1	10.0	11.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.163500	33.4	1000.0	9.000	On	L1	10.1	21.9	55.3
0.523500	27.4	1000.0	9.000	On	L1	10.1	18.6	46.0
15.693000	27.6	1000.0	9.000	On	L1	9.8	22.4	50.0
18.334500	30.8	1000.0	9.000	On	L1	9.8	19.2	50.0
23.946000	36.7	1000.0	9.000	On	L1	10.0	13.3	50.0
29.229000	41.3	1000.0	9.000	On	L1	10.0	8.7	50.0

[NEUTRAL : AC 0 V]

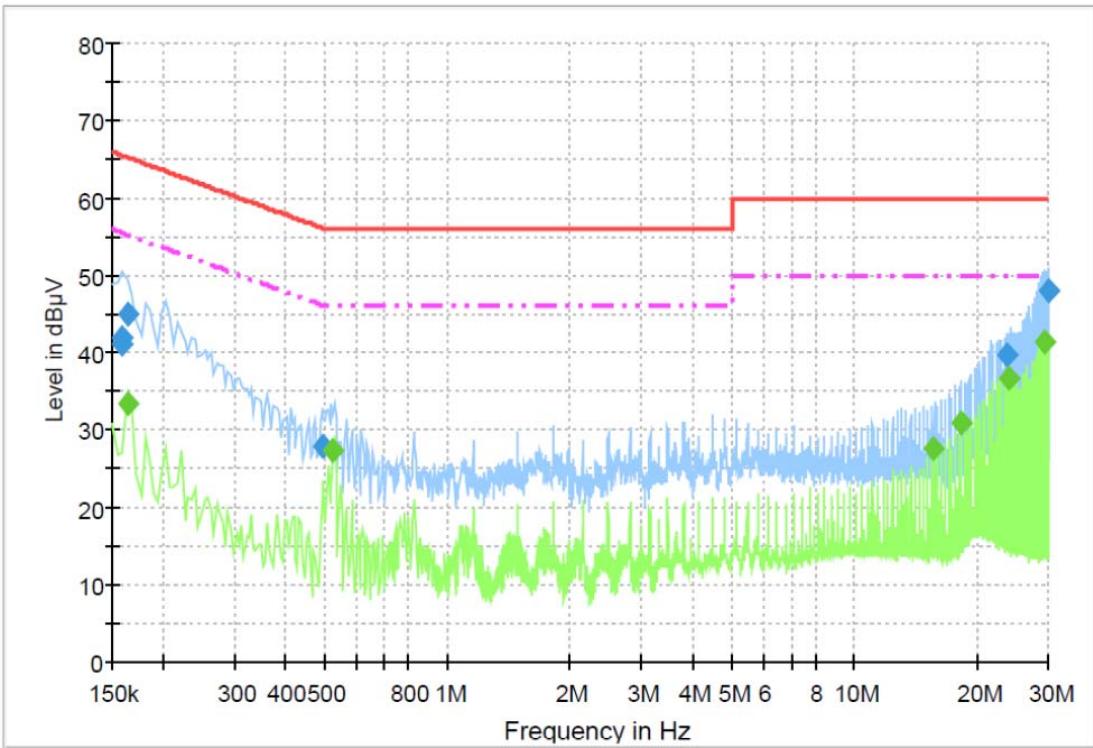
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.159000	38.4	1000.0	9.000	On	N	10.0	27.1	65.5
0.163500	42.3	1000.0	9.000	On	N	10.1	23.0	65.3
0.523500	31.0	1000.0	9.000	On	N	10.1	25.0	56.0
19.311000	35.5	1000.0	9.000	On	N	10.0	24.5	60.0
23.275500	23.1	1000.0	9.000	On	N	10.1	36.9	60.0
28.954500	48.4	1000.0	9.000	On	N	10.2	11.6	60.0

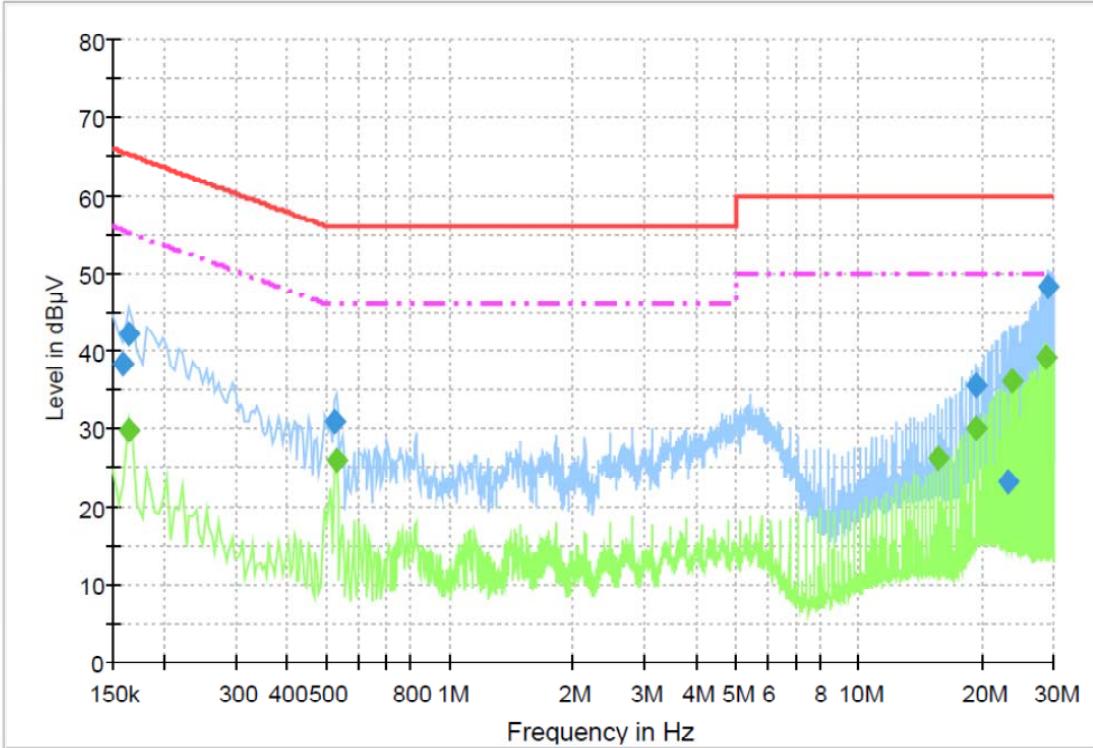
Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.163500	29.8	1000.0	9.000	On	N	10.1	25.5	55.3
0.528000	25.8	1000.0	9.000	On	N	10.1	20.2	46.0
15.684000	26.1	1000.0	9.000	On	N	9.9	23.9	50.0
19.315500	30.1	1000.0	9.000	On	N	10.0	19.9	50.0
23.662500	36.0	1000.0	9.000	On	N	10.2	14.0	50.0
28.621500	39.1	1000.0	9.000	On	N	10.2	10.9	50.0

[HOT : AC 120 V]



[NEUTRAL : AC 0 V]



[< 1 % Battery Status]

[HOT : AC 120 V]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.528000	34.5	1000.0	9.000	On	L1	10.1	21.5	56.0
3.628500	30.5	1000.0	9.000	On	L1	9.7	25.5	56.0
4.668000	32.5	1000.0	9.000	On	L1	9.7	23.5	56.0
19.189500	41.3	1000.0	9.000	On	L1	9.8	18.7	60.0
24.031500	45.1	1000.0	9.000	On	L1	10.0	14.9	60.0
29.913000	52.3	1000.0	9.000	On	L1	10.0	7.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.528000	30.6	1000.0	9.000	On	L1	10.1	15.4	46.0
3.975000	26.8	1000.0	9.000	On	L1	9.7	19.2	46.0
14.005500	28.7	1000.0	9.000	On	L1	9.8	21.3	50.0
19.189500	37.9	1000.0	9.000	On	L1	9.8	12.1	50.0
24.027000	40.1	1000.0	9.000	On	L1	10.0	9.9	50.0
29.908500	41.1	1000.0	9.000	On	L1	10.0	8.9	50.0

[NEUTRAL : AC 0 V]

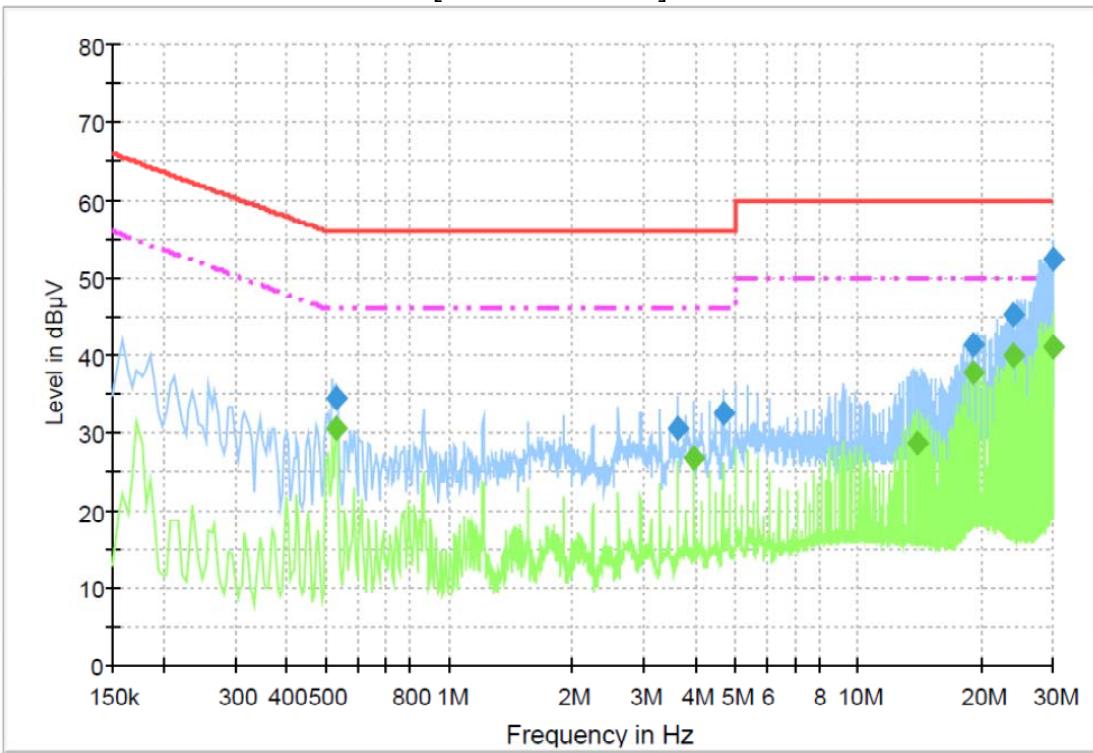
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.528000	32.4	1000.0	9.000	On	N	10.1	23.6	56.0
4.312500	30.9	1000.0	9.000	On	N	9.7	25.1	56.0
4.659000	32.0	1000.0	9.000	On	N	9.7	24.0	56.0
19.509000	41.7	1000.0	9.000	On	N	10.0	18.3	60.0
23.829000	42.9	1000.0	9.000	On	N	10.2	17.1	60.0
29.013000	51.0	1000.0	9.000	On	N	10.2	9.0	60.0

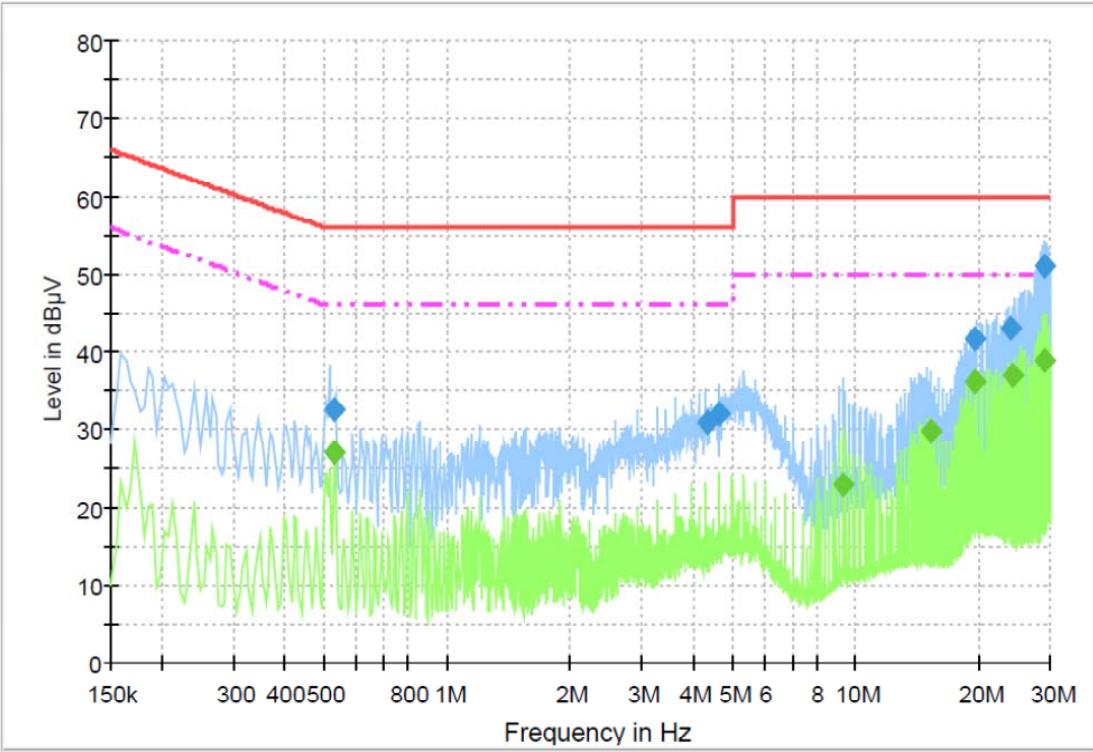
Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.528000	27.0	1000.0	9.000	On	N	10.1	19.0	46.0
9.321000	22.9	1000.0	9.000	On	N	9.8	27.1	50.0
15.360000	29.8	1000.0	9.000	On	N	9.9	20.2	50.0
19.504500	36.1	1000.0	9.000	On	N	10.0	13.9	50.0
24.175500	37.0	1000.0	9.000	On	N	10.2	13.0	50.0
29.017500	39.0	1000.0	9.000	On	N	10.2	11.0	50.0

[HOT : AC 120 V]



[NEUTRAL : AC 0 V]



[50 % Battery Status]

[HOT : AC 120 V]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	40.7	1000.0	9.000	On	L1	9.8	25.3	66.0
0.168000	44.2	1000.0	9.000	On	L1	10.1	20.9	65.1
0.168000	43.9	1000.0	9.000	On	L1	10.1	21.1	65.1
19.365000	36.0	1000.0	9.000	On	L1	9.8	24.0	60.0
23.860500	40.0	1000.0	9.000	On	L1	10.0	20.0	60.0
29.863500	47.4	1000.0	9.000	On	L1	10.0	12.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.523500	31.0	1000.0	9.000	On	L1	10.1	15.0	46.0
0.753000	24.0	1000.0	9.000	On	L1	10.0	22.0	46.0
13.060500	30.3	1000.0	9.000	On	L1	9.8	19.7	50.0
19.365000	32.6	1000.0	9.000	On	L1	9.8	17.4	50.0
22.668000	35.0	1000.0	9.000	On	L1	9.9	15.0	50.0
29.863500	39.7	1000.0	9.000	On	L1	10.0	10.3	50.0

[NEUTRAL : AC 0 V]

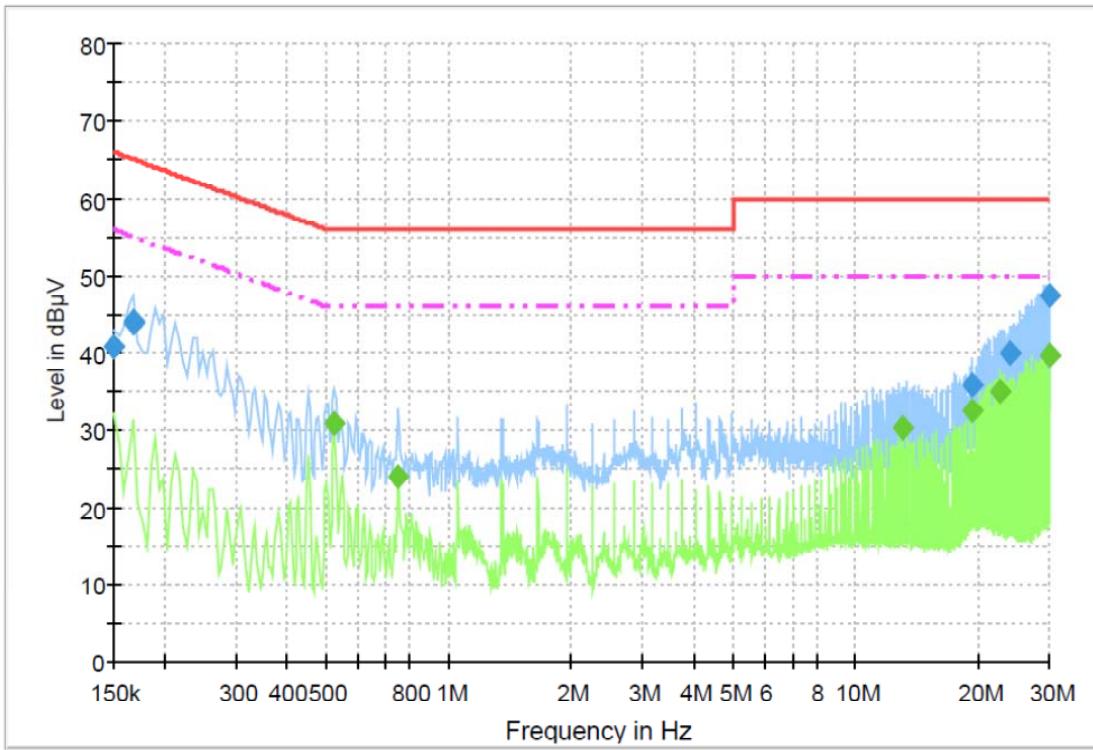
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154500	33.0	1000.0	9.000	On	N	9.9	32.8	65.8
0.168000	41.4	1000.0	9.000	On	N	10.1	23.6	65.1
0.523500	33.5	1000.0	9.000	On	N	10.1	22.5	56.0
19.041000	35.7	1000.0	9.000	On	N	10.0	24.3	60.0
23.685000	40.6	1000.0	9.000	On	N	10.2	19.4	60.0
29.827500	48.5	1000.0	9.000	On	N	10.2	11.5	60.0

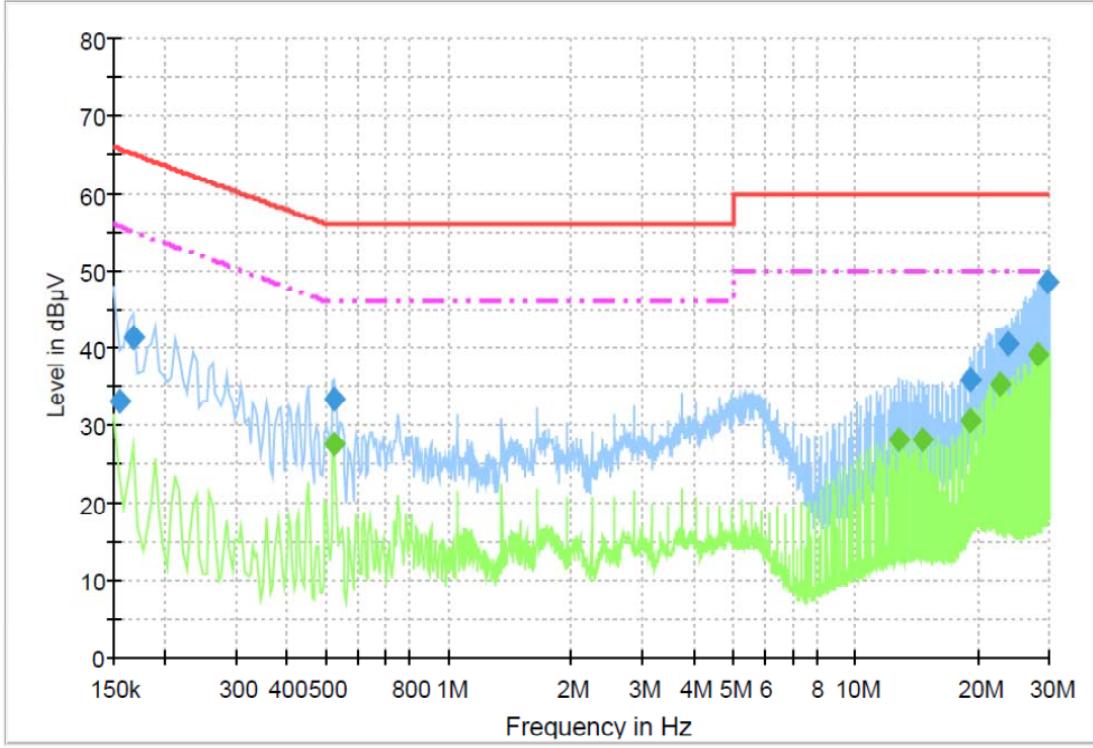
Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.523500	27.7	1000.0	9.000	On	N	10.1	18.3	46.0
12.745500	28.1	1000.0	9.000	On	N	9.8	21.9	50.0
14.541000	28.2	1000.0	9.000	On	N	9.8	21.8	50.0
19.041000	30.7	1000.0	9.000	On	N	10.0	19.3	50.0
22.636500	35.4	1000.0	9.000	On	N	10.1	14.6	50.0
28.180500	39.1	1000.0	9.000	On	N	10.2	10.9	50.0

[HOT : AC 120 V]



[NEUTRAL : AC 0 V]



2.2 Radiated emissions (Section 15.209)

Test Location

10 m SAC (test distance : 10 m, 3 m)
 3 m SAC (test distance : 3 m)

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 1 GHz
 RBW = 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz
 VBW \geq RBW
 Sweep = Auto

Limit

- 15.209(a)

Frequency [MHz]	Field Strength [uV/m]	Measurement Distance [Meters]
0.009-0.490	$2400/F(\text{kHz})$	300
0.490-1.705	$24000/F(\text{kHz})$	30
1.705-30	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

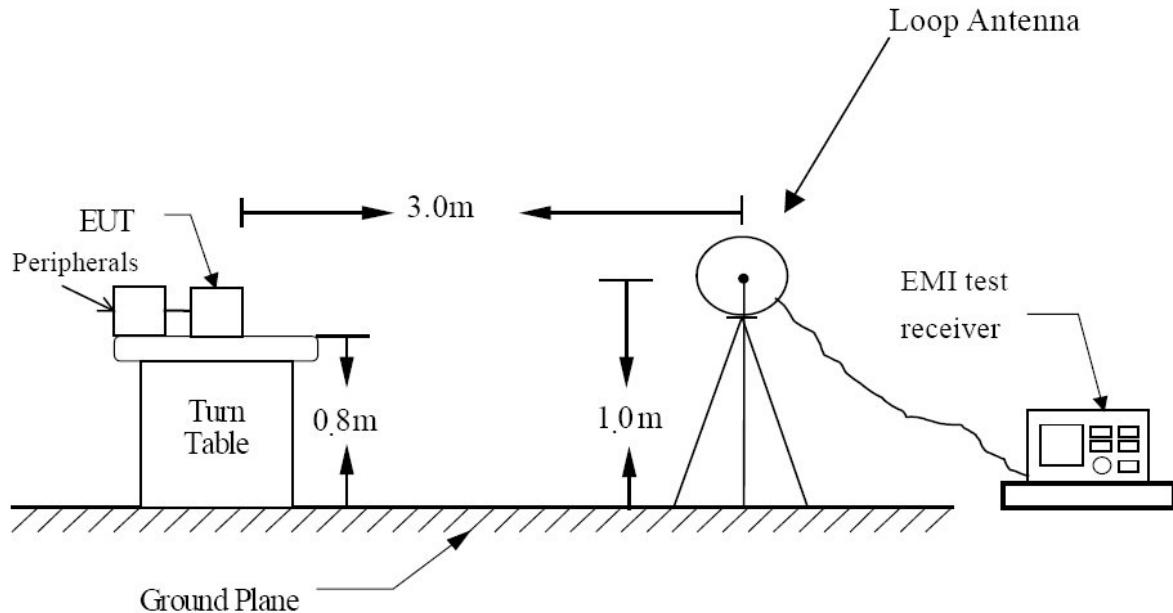
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note :

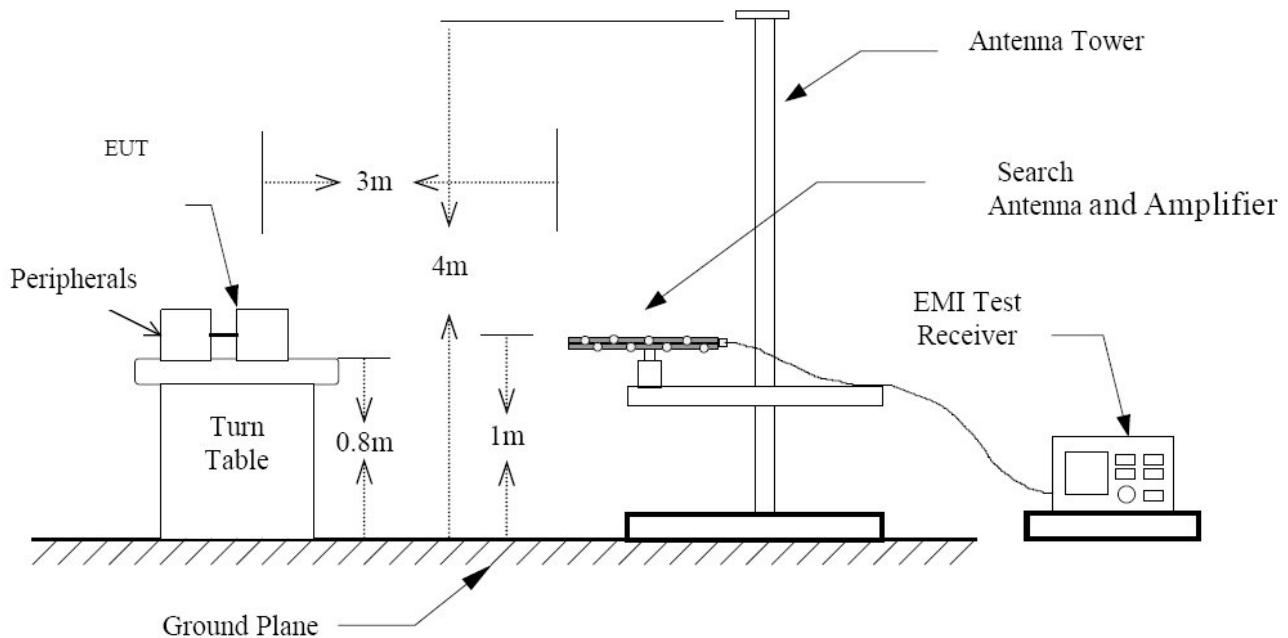
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Test Setup:

1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz





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Test Results

EUT	Wireless Charging Pad	Model	OWC-401T
Frequency Range	9 kHz ~ 1 GHz	Test mode	TX

The requirements are:

Complies

Test Data

Fundamental Test Data

[Test Mode #1]

Operating Frequency : 110 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
113.40	61.38	20.18	5.9	-80	7.46	46.51	39.05	Peak
113.40	61.01	20.18	5.9	-80	7.09	26.51	19.42	Average

Operating Frequency : 157.5 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
157.00	55.68	20.18	5.9	-80	1.76	43.69	41.93	Peak
157.00	55.23	20.18	5.9	-80	1.31	23.69	22.38	Average

Operating Frequency : 205 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
204.00	50.66	20.18	5.9	-80	-3.26	41.41	44.67	Peak
204.00	50.24	20.18	5.9	-80	-3.68	21.41	25.09	Average

[Test Mode #2]

< 1 % Battery Status

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
134.20	54.62	20.18	5.9	-80	0.70	45.05	44.35	Peak
134.20	54.22	20.18	5.9	-80	0.30	25.05	24.75	Average

50 % Battery Status

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
161.20	43.82	20.18	5.9	-80	-10.10	43.46	53.56	Peak
161.20	43.61	20.18	5.9	-80	-10.31	23.46	33.77	Average



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Spurious Test Data

[Test Mode #1]

Operating Frequency : 110 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
370.00	34.61	20.18	5.9	-80	-19.31	36.24	55.55	Peak
370.00	34.55	20.18	5.9	-80	-19.37	16.24	35.61	Average

Operating Frequency : 157.5 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
380.80	30.36	20.18	5.9	-80	-23.56	35.99	59.55	Peak
380.80	30.11	20.18	5.9	-80	-23.81	15.99	39.80	Average

Operating Frequency : 205 kHz

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
467.20	27.72	20.18	5.9	-80	-26.20	34.21	60.41	Peak
467.20	27.51	20.18	5.9	-80	-26.41	14.21	40.62	Average

[Test Mode #2]

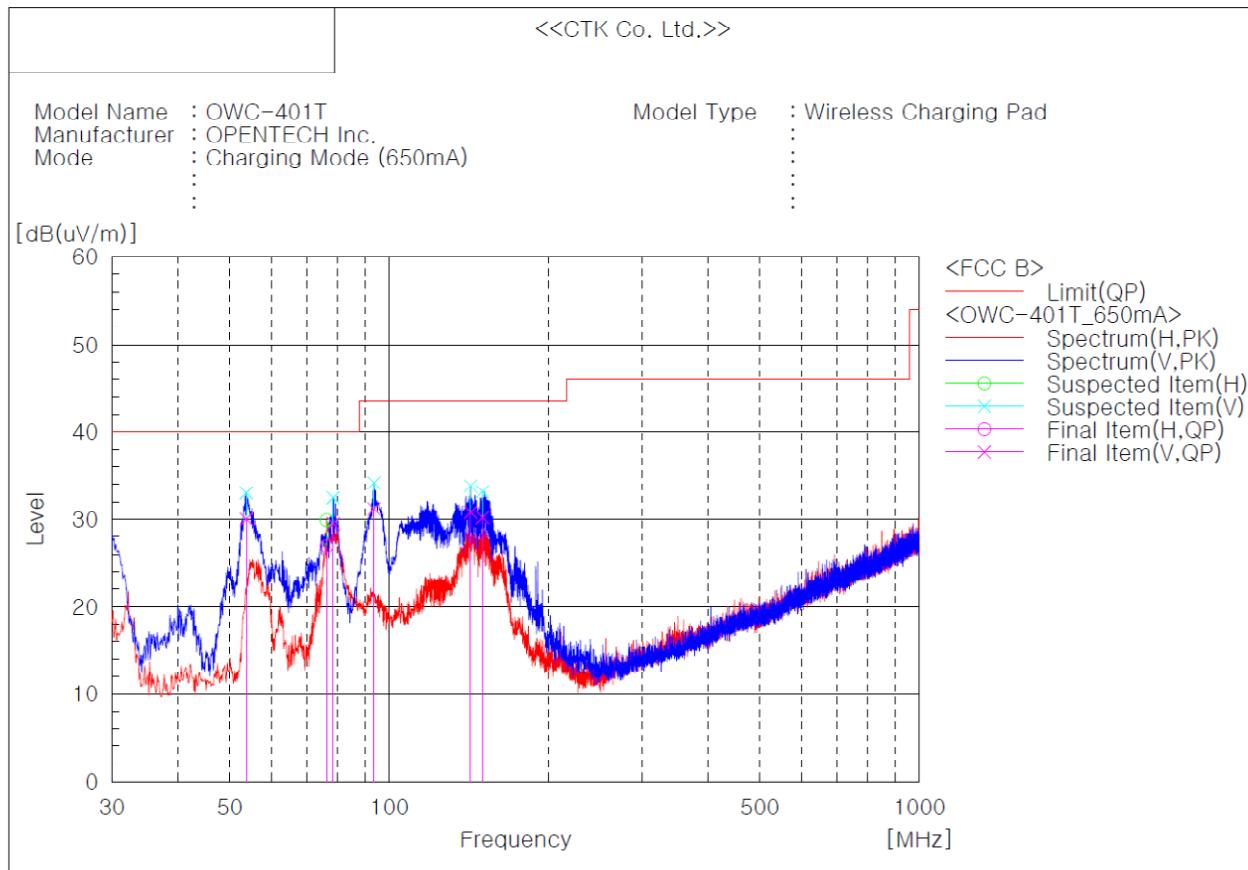
< 1 % Battery Status

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
407.80	30.77	20.18	5.9	-80	-23.15	35.40	58.55	Peak
407.80	30.42	20.18	5.9	-80	-23.50	15.40	38.90	Average

50 % Battery Status

Freq. (kHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Distance Correction	Result (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect Mode
483.40	21.69	20.18	5.9	-80	-32.23	33.92	66.15	Peak
483.40	21.32	20.18	5.9	-80	-32.60	13.92	46.52	Average

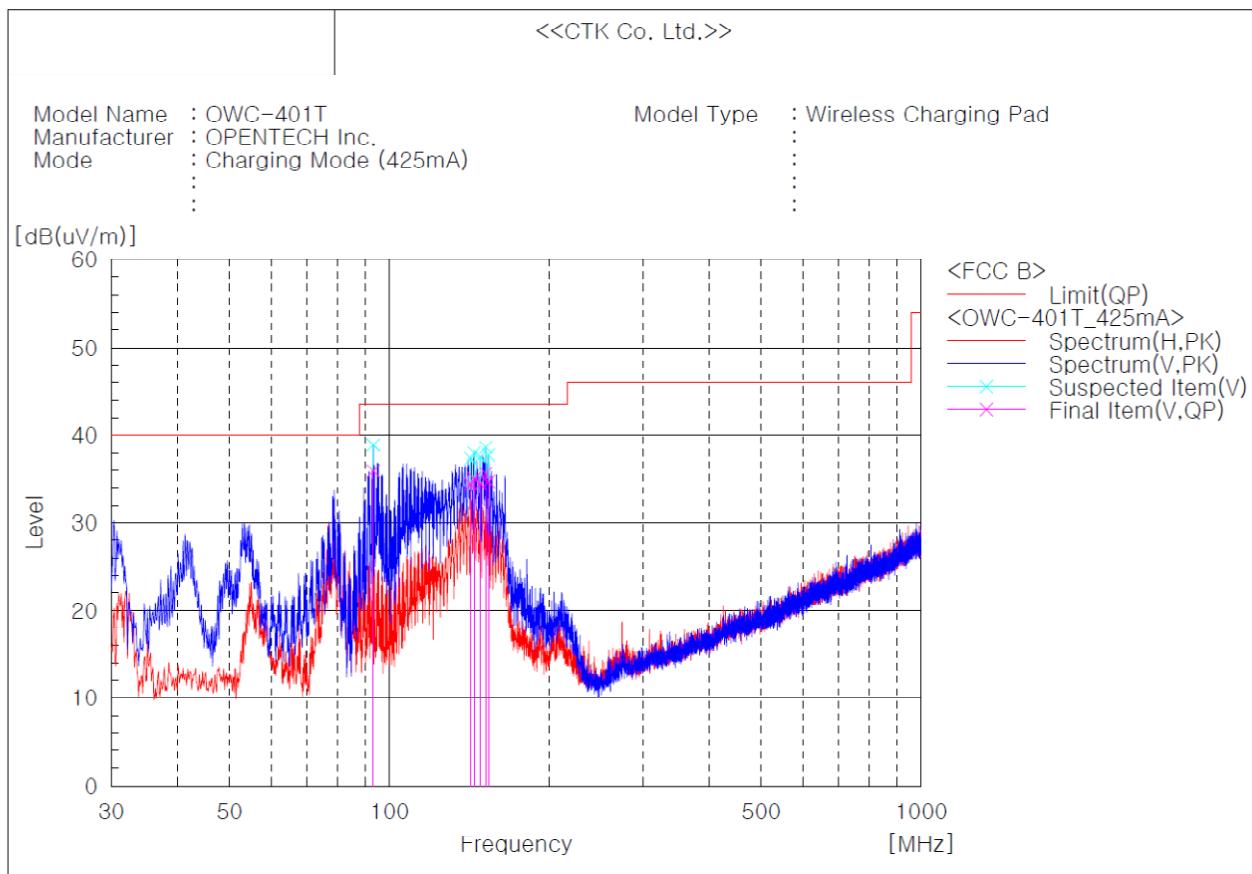
[Operating Frequency : 110 kHz]



Final Result

No.	Frequency [MHz]	(P) [MHz]	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB]	Margin QP [dB]	Height [cm]	Angle [deg]
1	53.765	V	45.2	-15.2	30.0	40.0	10.0	100.0	290.0
2	76.196	H	45.1	-18.2	26.9	40.0	13.1	305.0	70.0
3	78.379	V	47.6	-18.1	29.5	40.0	10.5	100.0	104.0
4	93.656	V	45.5	-14.3	31.2	43.5	12.3	100.0	66.0
5	142.399	V	40.3	-9.5	30.8	43.5	12.7	100.0	290.0
6	150.038	V	38.4	-8.2	30.2	43.5	13.3	100.0	179.0

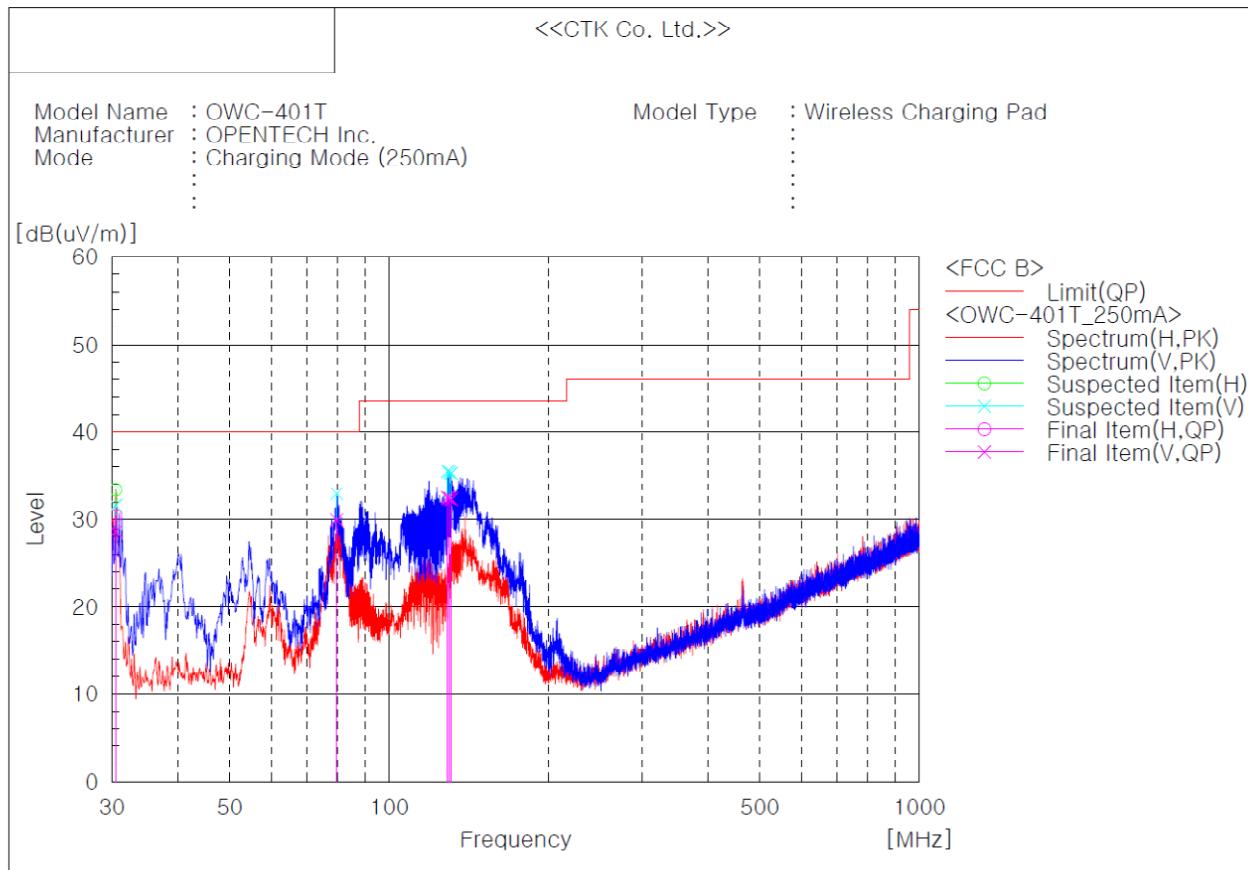
[Operating Frequency : 157.5 kHz]



Final Result

No.	Frequency [MHz]	(P) [dB(uV)]	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	93.293	V	50.2	-14.3	35.9	43.5	7.6	100.0	103.0
2	142.278	V	43.9	-9.5	34.4	43.5	9.1	100.0	252.0
3	144.339	V	44.1	-9.1	35.0	43.5	8.5	100.0	178.0
4	148.219	V	43.0	-8.5	34.5	43.5	9.0	100.0	0.0
5	151.856	V	43.5	-7.9	35.6	43.5	7.9	100.0	215.0
6	153.554	V	42.3	-7.6	34.7	43.5	8.8	100.0	0.0

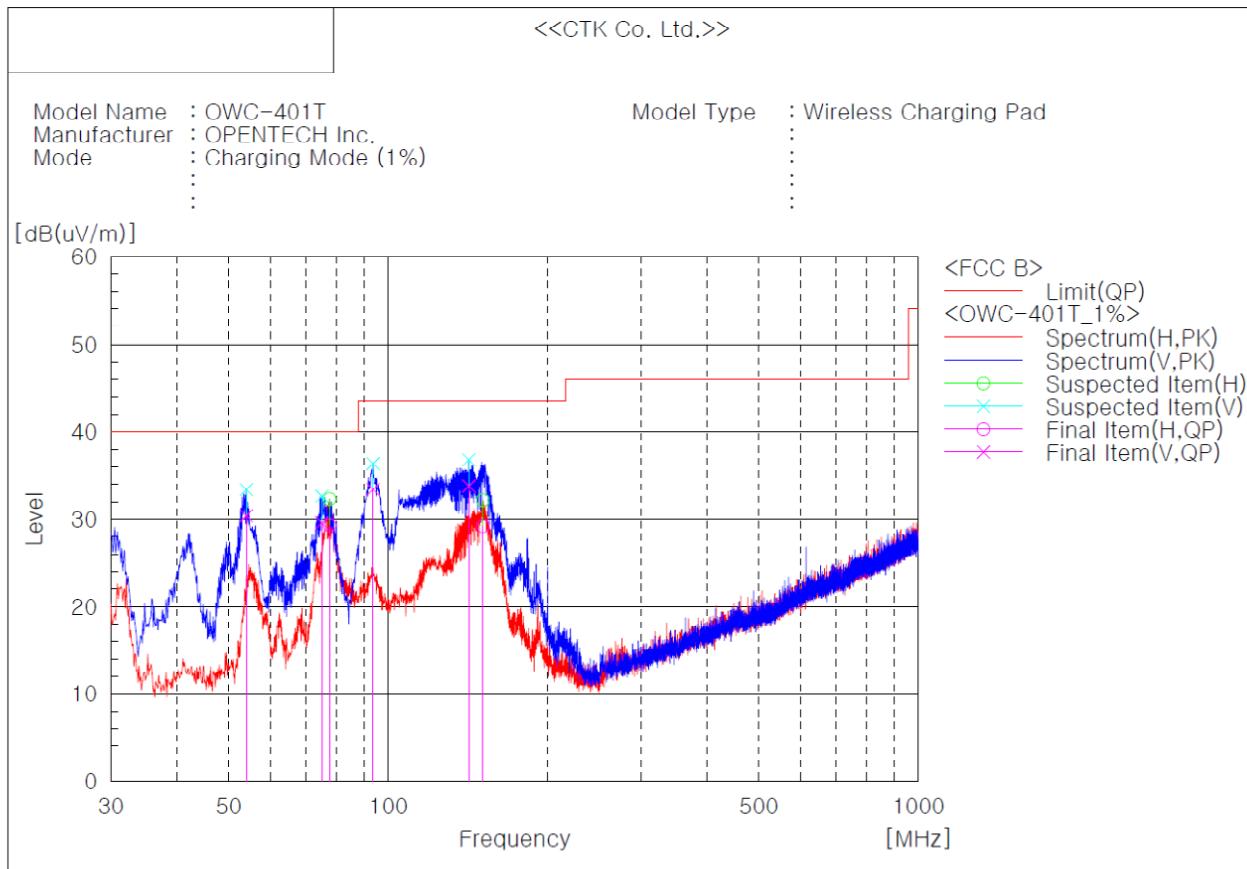
[Operating Frequency : 205 kHz]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB]	Margin QP [dB]	Height [cm]	Angle [deg]
1	30.485	H	45.2	-14.8	30.4	40.0	9.6	205.0	103.0
2	30.485	V	43.4	-14.8	28.6	40.0	11.4	100.0	30.0
3	79.591	V	47.9	-18.0	29.9	40.0	10.1	100.0	142.0
4	128.819	V	44.9	-12.4	32.5	43.5	11.0	100.0	253.0
5	129.668	V	44.6	-12.2	32.4	43.5	11.1	100.0	253.0
6	131.001	V	44.1	-11.8	32.3	43.5	11.2	100.0	253.0

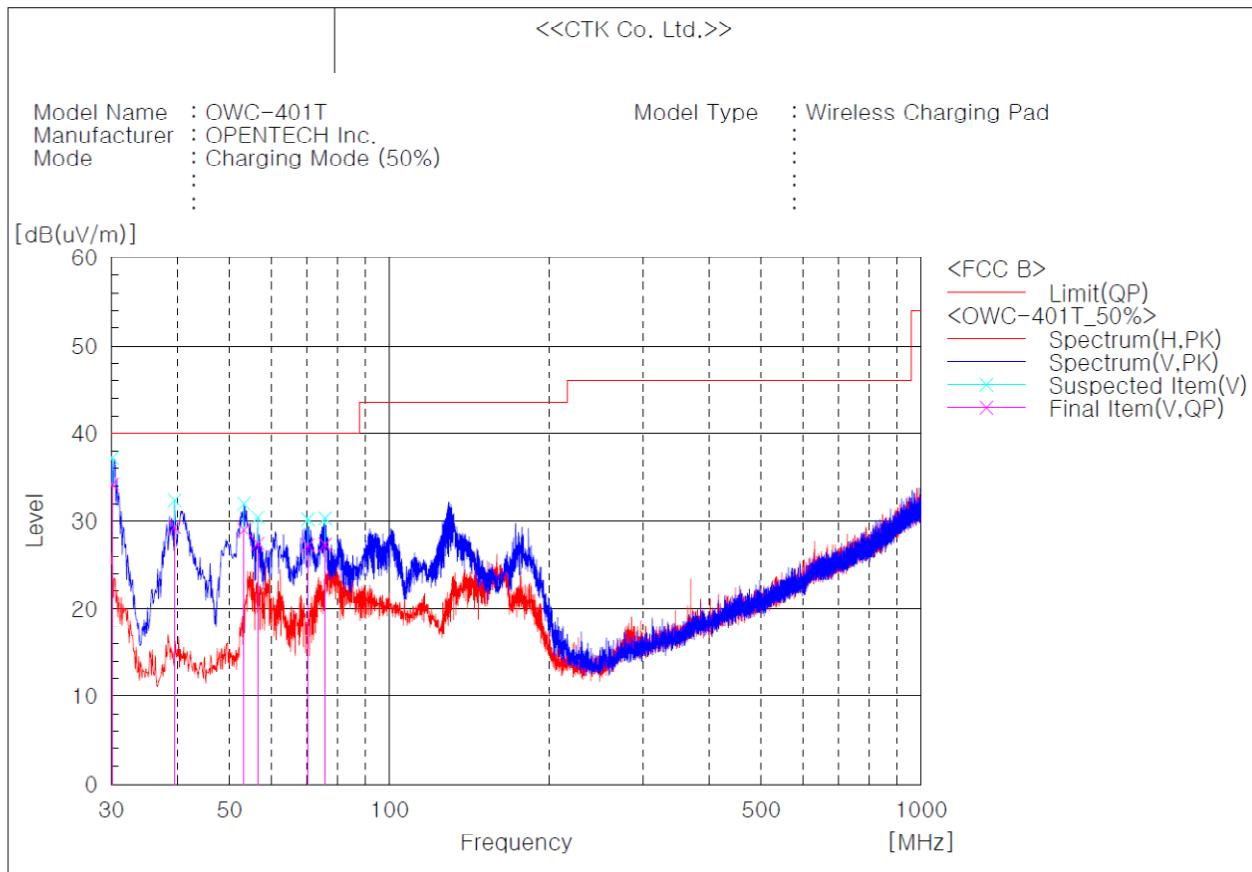
[< 1 % Battery Status]



Final Result

No.	Frequency [MHz]	(P) [dB(uV)]	Reading QP [dB(uV)]	c. f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB]	Margin QP [dB]	Height [cm]	Angle [deg]
1	54.008	V	45.7	-15.3	30.4	40.0	9.6	205.0	290.0
2	74.984	V	47.9	-18.3	29.6	40.0	10.4	100.0	317.0
3	77.530	H	47.4	-18.1	29.3	40.0	10.7	195.0	70.0
4	93.656	V	47.7	-14.3	33.4	43.5	10.1	100.0	167.0
5	141.914	V	43.3	-9.5	33.8	43.5	9.7	100.0	355.0
6	150.886	H	37.3	-8.1	29.2	43.5	14.3	195.0	144.0

[50 % Battery Status]



Final Result

No.	Frequency [MHz]	(P) [dB(uV)]	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB]	Margin QP [dB]	Height [cm]	Angle [deg]
1	30.121	V	48.9	-14.7	34.2	40.0	5.8	100.0	144.0
2	39.458	V	42.9	-13.6	29.3	40.0	10.7	100.0	144.0
3	53.280	V	44.1	-15.1	29.0	40.0	11.0	100.0	70.0
4	56.554	V	42.1	-14.7	27.4	40.0	12.6	294.0	181.0
5	70.255	V	44.0	-16.8	27.2	40.0	12.8	195.0	216.0
6	75.711	V	45.6	-18.3	27.3	40.0	12.7	195.0	216.0



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APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESCI7	100816	2013-12-15
2	LISN	Rohde & Schwarz	ENV216	101235	2013-08-18
3	LISN	Rohde & Schwarz	ENV216	101236	2013-08-06
4	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2013-12-15
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2014-06-06
6	Trilog Broadband Antenna	Rohde & Schwarz	VULB 9161 SE	9161-4133	2014-06-11
7	6dB Attenuator	Rohde & Schwarz	DNF	272.4110.50	2013-11-14
8	AMPLIFIER	Sonoma Instrument Co.	310	291721	2014-03-21
9	Radio Communication Tester	Rohde & Schwarz	CMU200	106765	2014-02-04