

# Test Report

Product Name	WPC Qi 1.1/1.0 compliance wireless charging micro-USB box
Model No.	Wireless Charger
FCC ID.	MSQ-ASUSWLCHARGER
IC ID.	3568A-ASWLCHARGER

Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt	Jan. 28, 2014
Issued Date	Mar. 05, 2014
Report No.	1420029R-RFUSP20V00
Report Version	V1.0



Testing Laboratory

**0914**

The Test Results relate only to the samples tested.  
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# Test Report Certification

Issued Date: Mar. 05, 2014

Report No.: 1420029R-RFUSP20V00





Product Name	WPC Qi 1.1/1.0 compliance wireless charging micro-USB box
Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan
Manufacturer	ASUSTeK COMPUTER INC.
Model No.	Wireless Charger
FCC ID.	MSQ-ASUSWLCHARGER
IC ID.	3568A-ASWLCHARGER
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	ASUS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 RSS-210 Issue 8, Section 2.5 (Dec, 2010) ANSI C63.10: 2009
Test Result	Complied

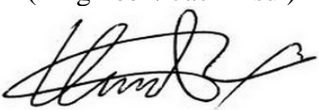
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Documented By :   
 ( Senior Engineering Adm. Specialist /  
 Anita Chou )

Tested By :   
 ( Engineer / Jack Hsu )

Approved By :   
 ( Director / Vincent Lin )

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**1. GENERAL INFORMATION**

**1.1. EUT Description**

Product Name	WPC Qi 1.1/1.0 compliance wireless charging micro-USB box
Trade Name	ASUS
Model No.	Wireless Charger
FCC ID.	MSQ-ASUSWLCHARGER
IC ID.	3568A-ASWLCHARGER
Frequency Range	144kHz
Type of antenna	Coil
Number of Channel	1
USB Cable	Shielded, 1.2m, with one ferrite core bonded.
Power Adapter	MFR: PIE, M/N: AD897320 Input: AC 100-240V~, 50/60Hz, 0.3A Output: 5V <sup>---</sup> , 2A

Center Frequency of Each Channel:

Channel	Frequency
1	144 kHz

Note:

1. The EUT is a WPC Qi 1.1/1.0 compliance wireless charging micro-USB box with a built-in 144kHz transmitter.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209

Test Mode	Mode 1: Transmit
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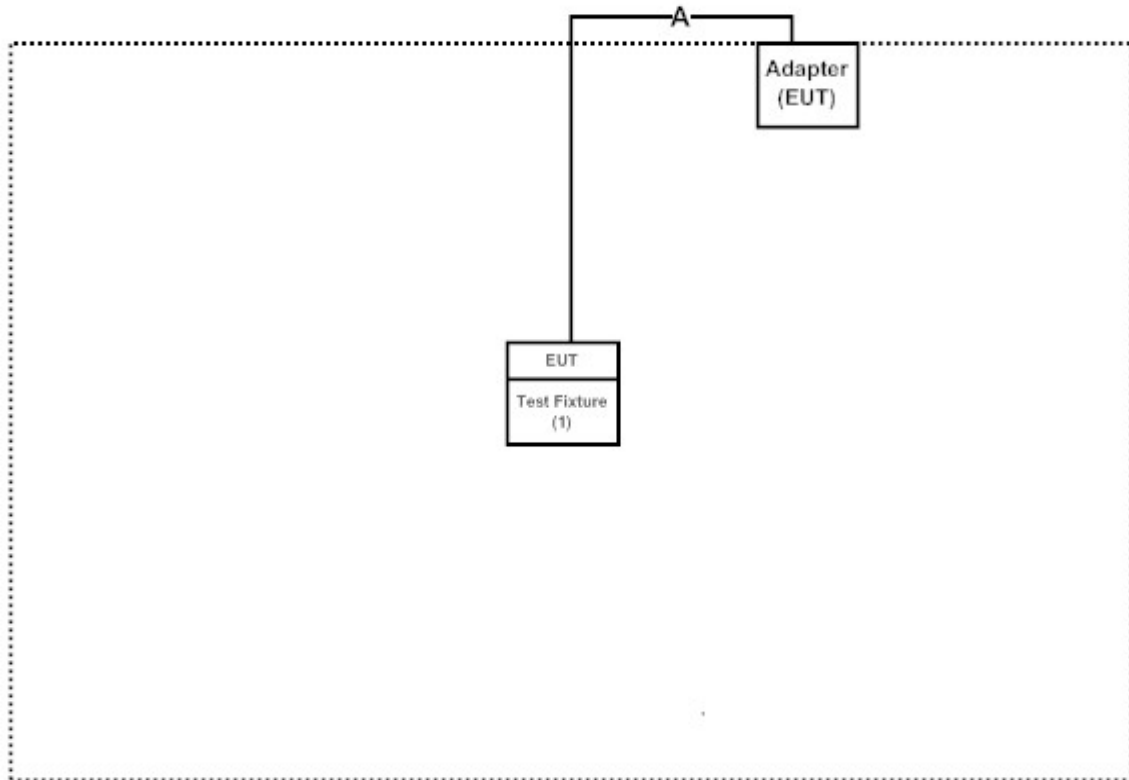
### 1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
(1) Test Fixture	ASUS	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Shielded, 1.2m, with one ferrite core bonded.

### 1.4. Configuration of Test System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Turn on the power of all equipments.
- (3) Put Test Fixture on EUT, start continuous transmit.
- (4) Verify that the EUT works correctly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://tw.quietek.com/tw/emc/accreditations/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
Federal Communications Commission  
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7435 Oakland Mills Road  
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Registration Number: 92195

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FCC Accreditation Number: TW1014

## 2. Conducted Emission

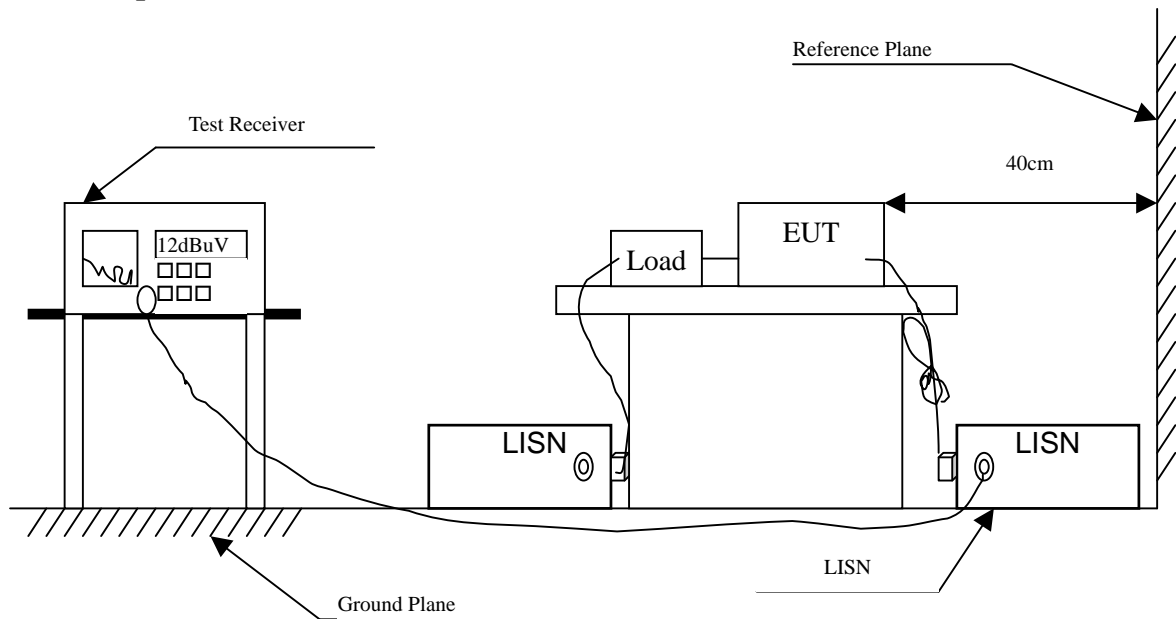
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2014	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

### 2.2. Test Setup



**2.3. Limits**

<b>FCC Part 15 Subpart C Paragraph 15.209 (dBuV) Limit</b>		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

**2.4. Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

**2.5. Uncertainty**

± 2.26 dB



## 2.6. Test Result of Conducted Emission

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.162	9.548	42.130	51.678	-13.979	65.657
0.388	9.587	35.520	45.107	-14.093	59.200
0.806	9.596	25.620	35.216	-20.784	56.000
1.509	9.638	26.290	35.928	-20.072	56.000
2.912	9.700	20.370	30.070	-25.930	56.000
14.920	10.160	21.790	31.950	-28.050	60.000
<b>Average</b>					
0.162	9.548	31.970	41.518	-14.139	55.657
0.388	9.587	28.520	38.107	-11.093	49.200
0.806	9.596	18.990	28.586	-17.414	46.000
1.509	9.638	18.400	28.038	-17.962	46.000
2.912	9.700	11.720	21.420	-24.580	46.000
14.920	10.160	7.300	17.460	-32.540	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.166	9.587	39.790	49.377	-16.166	65.543
0.197	9.589	35.690	45.279	-19.378	64.657
0.384	9.597	35.600	45.197	-14.117	59.314
0.873	9.619	27.200	36.819	-19.181	56.000
11.974	10.070	14.230	24.300	-35.700	60.000
15.045	10.230	13.250	23.480	-36.520	60.000
<b>Average</b>					
0.166	9.587	30.970	40.557	-14.986	55.543
0.197	9.589	26.920	36.509	-18.148	54.657
0.384	9.597	28.410	38.007	-11.307	49.314
0.873	9.619	20.420	30.039	-15.961	46.000
11.974	10.070	-0.600	9.470	-40.530	50.000
15.045	10.230	2.300	12.530	-37.470	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3. Radiated Emission

#### 3.1. Test Equipment

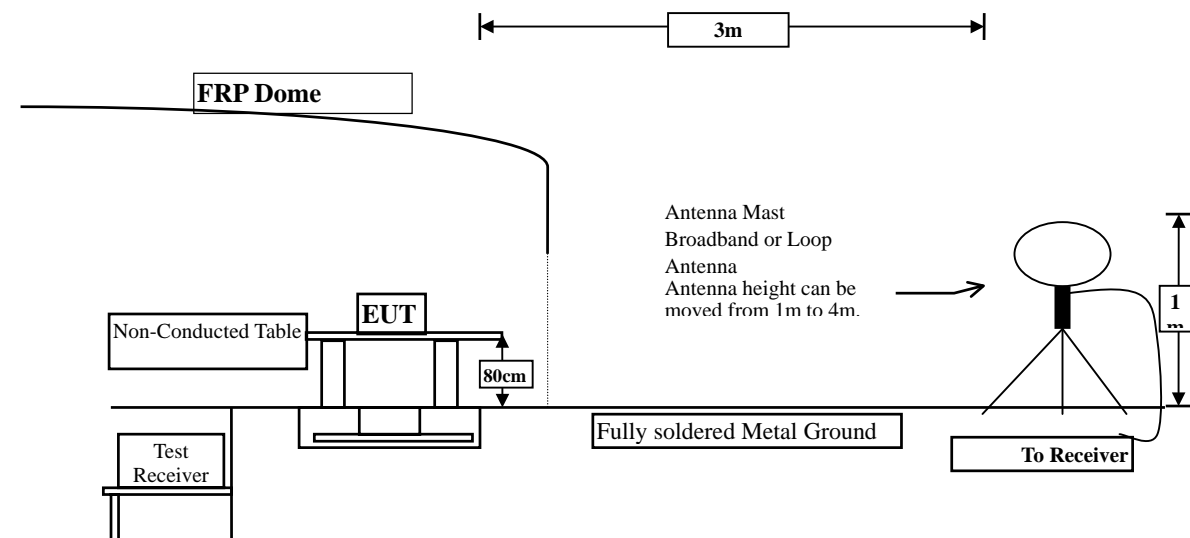
The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2014
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2014
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

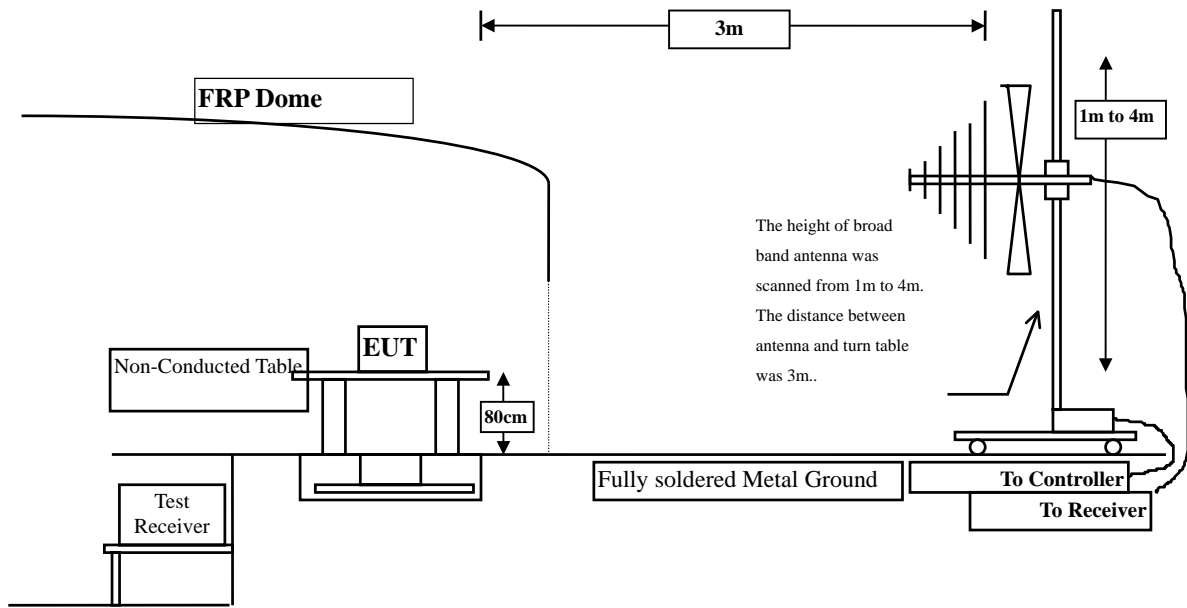
- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by “X” are used to measure the final test results.

#### 3.2. Test Setup

Under 30MHz Test Setup



Radiated Emission Below 1GHz



**3.3. Limits**

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400/F(kHz)	300
0.490- 1.705	24,000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

### 3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

### 3.6. Test Result of Radiated Emission

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Peak</b>					
<b>Horizontal</b>					
0.144	19.913	38.690	58.602	-65.703	124.333
<b>Vertical</b>					
0.144	19.913	33.920	53.832	-70.501	124.333

Note:

1.  $\text{Limit} = 24.433 \text{ dBuV}/300\text{m} = 40 * \text{Log} (300(\text{m})/3(\text{m})) + 24.333 = 104.333 \text{ dBuV/m}$  (Average detector),  
124.333 dBuV/m (Peak detector)
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

**9kHz~30MHz**

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Quasi-Peak</b>					
<b>Horizontal</b>					
0.291	19.799	16.260	36.060	-62.266	98.326
0.436	19.756	19.000	38.756	-56.058	94.814
0.582	19.710	12.000	31.710	-40.596	72.306
0.728	19.646	14.990	34.636	-35.726	70.362
0.837	19.642	13.260	32.902	-36.248	69.150
1.018	19.642	13.550	33.193	-34.256	67.449
1.164	19.666	12.290	31.956	-34.329	66.285
1.310	19.693	14.290	33.983	-31.276	65.259
<b>Vertical</b>					
0.291	19.799	15.290	35.090	-63.236	98.326
0.436	19.756	18.229	37.985	-56.829	94.814
0.582	19.710	10.140	29.850	-42.456	72.306
0.727	19.646	16.150	35.796	-34.578	70.374
0.873	19.641	11.290	30.931	-37.853	68.784
1.018	19.642	14.150	33.793	-33.656	67.449
1.164	19.666	12.140	31.806	-34.479	66.285
1.310	19.693	10.260	29.953	-35.306	65.259

Note:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement Level = Reading Level + Correct Factor.
3. "█" means the worst emission level.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

**30MHz~1GHz**

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
104.615	-16.200	44.308	28.108	-15.392	43.500
232.083	-18.650	36.635	17.985	-28.015	46.000
393.750	-11.212	32.089	20.877	-25.123	46.000
636.250	-5.885	30.457	24.572	-21.428	46.000
844.551	-5.464	29.061	23.597	-22.403	46.000
962.692	-5.530	30.040	24.510	-29.490	54.000
<b>Vertical</b>					
106.170	-16.177	44.449	28.272	-15.228	43.500
230.529	-12.045	44.023	31.979	-14.021	46.000
412.404	-11.506	43.147	31.641	-14.359	46.000
561.635	-9.717	38.638	28.921	-17.079	46.000
824.343	-6.711	36.351	29.640	-16.360	46.000
922.276	-5.034	36.901	31.867	-14.133	46.000

**Note:**

1. The reading levels below 1GHz are quasi-peak values.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.



#### 4. 99% Occupied Bandwidth

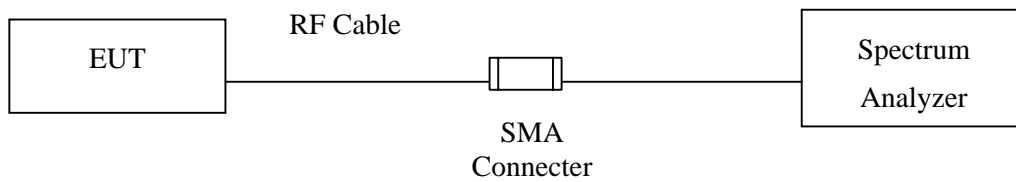
##### 4.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

- Note:
1. All instruments are calibrated every one year.
  2. The test instruments marked by “X” are used to measure the final test results.

##### 4.2. Test Setup



##### 4.3. Limits

No Required

##### 4.4. Uncertainty

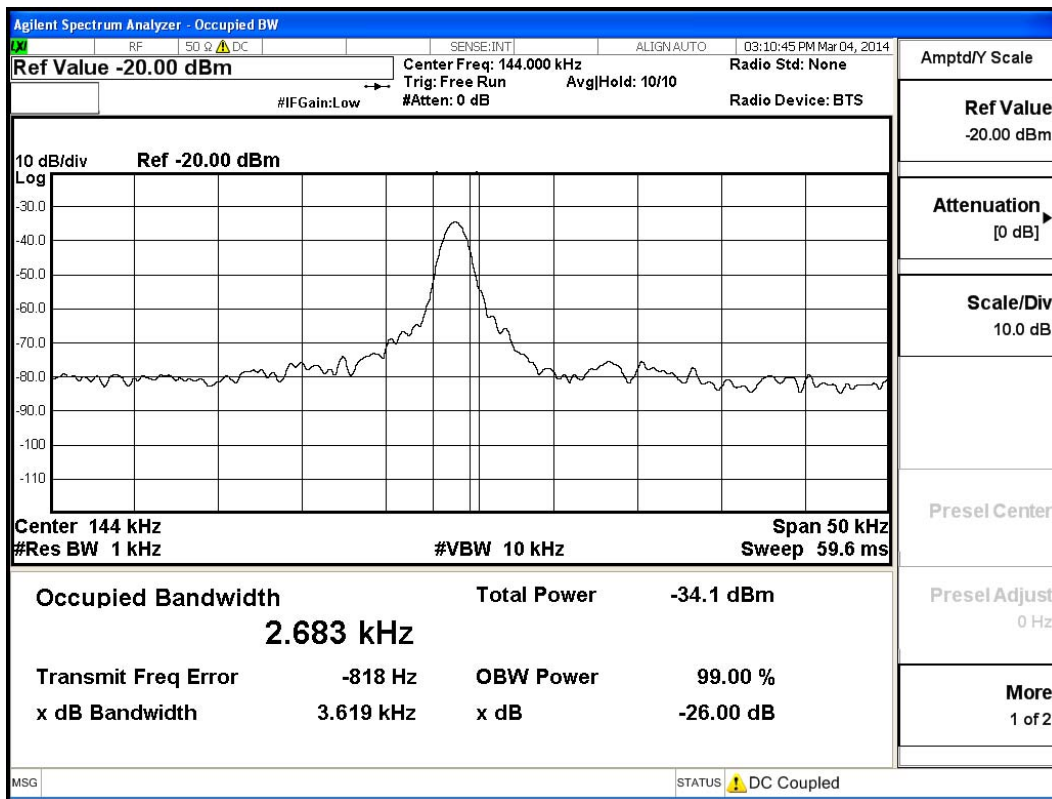
± 150Hz

#### 4.5. Test Result of 99% Occupied Bandwidth

Product : WPC Qi 1.1/1.0 compliance wireless charging micro-USB box  
 Test Item : 99% Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

Channel No.	Frequency (kHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	144	2.683	--	Pass

**Channel 01: (144kHz)**



## **5. EMI Reduction Method During Compliance Testing**

No modification was made during testing.