

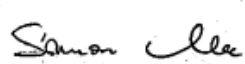

# RF EXPOSURE EVALUATION REPORT

For

## Flextronics International

677 Gibraltar Ct.,  
Milpitas, CA 95035, USA

**FCC ID: 2AF5R-QD10**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Wireless Charger
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<b>Report Number:</b> R1509236-MPE	
<b>Report Date:</b> 2015-11-30	
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\* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\*" (Rev.12)

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**DOCUMENT REVISION HISTORY**

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1509236-MPE	Initial	2015-11-30

## 1 General Description

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### 1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report has been compiled on behalf of *Flextronics International* and their product, *FCC ID: 2AF5R-QD10*, model number: *Wi-Viva QD10*, which henceforth is referred to as the EUT (Equipment under Test.) The EUT is a wireless charger for smart phones.

### 1.2 Mechanical Description of EUT

The EUT measures approximately 168 mm (L), 115 mm (W), 7 mm (H), and weighs approximately 0.2 kg.

*The data gathered are from a typical production sample provided by the manufacturer with serial number: R15090236-1, assigned by BACL.*

### 1.3 Objective

This report is prepared on behalf of *Flextronics International*, in accordance with Part 2, Subpart J and FCC KDB 680106 D01. The objective is to determine exemption from submitting an RF exposure evaluation.

### 1.4 Related Submittal(s)/Grant(s)

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance with FCC Measurement Procedure MP-5 1986, Methods of Measurements of Radio Noise Emissions from ISM equipment and FCC KDB 680106 D01 RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications v02.

### 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

## 1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:

2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.

3. Radio Communication Equipment for Singapore.

4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.

5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).

6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.3-2013, ANSI C63.4-2014, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

## 2 System Test Configuration

### 2.1 Justification

The EUT was configured for testing according to FCC Measurement Procedure MP-5, Methods of Measurements of Radio Noise Emissions from ISM equipment.

### 2.2 EUT Exercise Software

N/A

### 2.3 Equipment Modifications

N/A

### 2.4 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Samsung/Apple	Phone	-	-
Unknown	USB Cable	-	-

### 2.5 EUT Internal Configuration Details

Manufacturer/Product Type	Model/Rev.	Crystals (MHz)
Powerstream/Battery	B500AE	-
Texas Instrument/Transmitter	BQ500212ARGZT	-
TDK/Charging coil 6.3uH	WT505090-10K2-A11-G	-

### 2.6 Power Supply and Line Filter

Manufacturer	Description	Model No.	Serial No.
Samsung	AC/DC Adapter	-	-

### 2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
USB Cable	<1m	EUT	Wall Charger

### 3 Summary of Test Results

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Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
KDB 680106 §5 (2 (f))	Aggregate leakage fields at 10cm surrounding the device	Compliant

## **4 FCC KDB 680106 §5 (2) – Exemption of RF Evaluation Submission**

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### **4.1 Applicable Standards**

As per FCC KDB 680106 § 5 (2):

Inductive wireless power transfer applications that meet all of the following requirements are excluded from submitting an RF exposure evaluation.

- a) Power transfer frequency is less than 1 MHz
- b) Output power from each primary coil is less than 5 watts
- c) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils
- d) Client device is inserted in or placed directly in contact with the transmitter
- e) The maximum coupling surface area of the transmit (charging) device is between 60 cm<sup>2</sup> and 400 cm<sup>2</sup>
- f) Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30% of the MPE limit.

### **4.2 Results**

- a) The EUT operating frequency is 110 kHz - 205 kHz.
- b) Please refer to report R15090236-18 for the field strength level of the fundamental signal measured when the client device 1%, 50% and 100% charged.
- c) The EUT only has one coil for transmitting.
- d) When charging, the client device is put on top of and in direct contact with the EUT.
- e) The maximum coupling surface area of the EUT is 195.5 cm<sup>2</sup>, please refer to the EUT photo for dimensions.
- f) Please refer to the Section 5 of this report for MPE measurement.



## 5 FCC KDB 680106 §5 (2) (f) – Aggregate Leakage Fields

### 5.1 Applicable Standards

As per FCC KDB 680106 § 5 (2) (f):

Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30 % of the MPE limit.

As per FCC § 1.1310 (e):

The table below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

### 5.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with FCC KDB 680106 D01 and Measurement Procedure MP-5, “Methods of Measurements of Radio Noise Emissions from ISM equipment” (FCC §18.311).

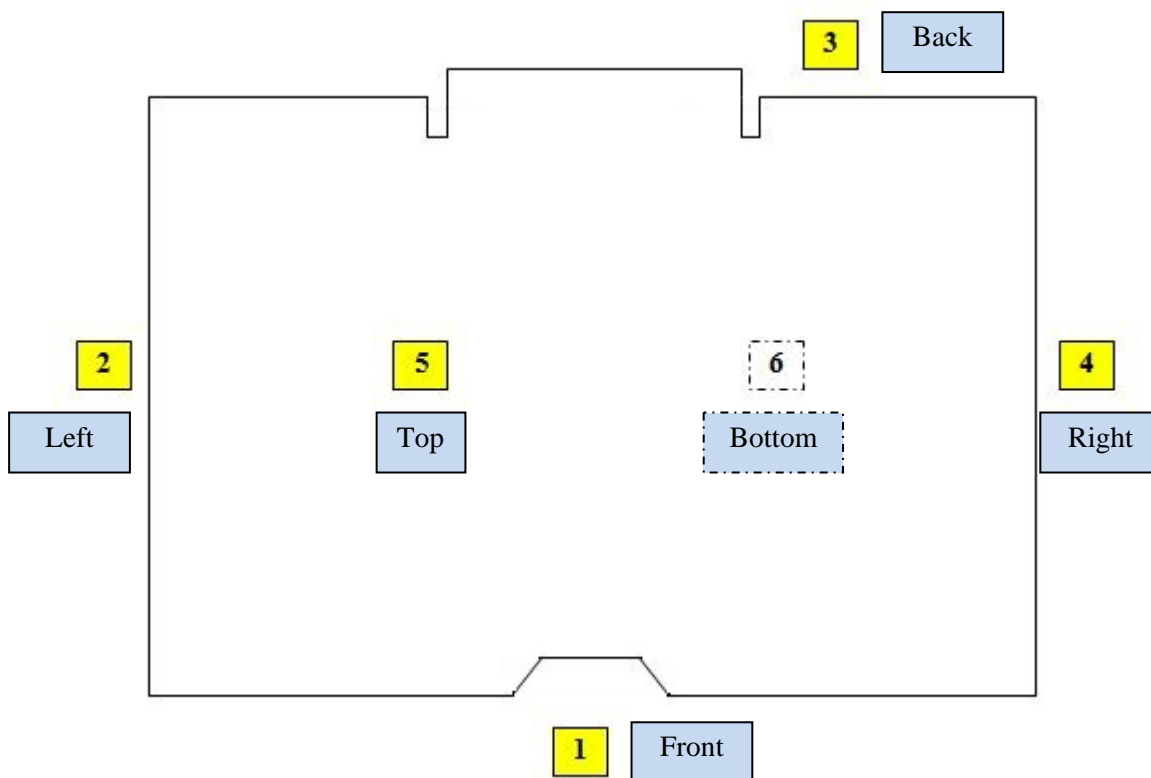
The measuring loop sensor was put 10 centimeters away from each surface of the EUT.

### 5.3 Test Procedure

The spectrum analyzer or receiver was set as:

RBW = 200 Hz  
VBW = 600 kHz  
Sweep = Auto  
Detector = Peak

#### Test Locations:



EUT Top View

*Note: Point 1-6 in the following table indicates each edge/surface of the EUT as shown in the diagram above. The measurement was made at 10 cm away from each edge/surface.*

## 5.4 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
Solar Electronics Co.	Loop Sensor	7334-1	7334140704	2015-09-24	2 years
Hosiwell Cable	Coaxial Cable w/ BNC Connector	RG-58A/U	-	N/A <sup>1</sup>	N/A <sup>1</sup>

Note<sup>1</sup>: cable and attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability:** *BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

## 5.5 Test Environmental Conditions

<b>Temperature:</b>	20-25° C
<b>Relative Humidity:</b>	40-45 %
<b>ATM Pressure:</b>	101.2-103.5 kPa

The testing was performed by Simon Ma on 2015-10-29 in 5m3.

## 5.6 Test Results

Client Device 1% Charged

Location	E Field Reading (dBuV)	ACF (dBuV/m)	Corrected Value (dBuV/m)	Corrected Value (V/m)	Limit (V/m)	%
1	69.85	76.48	146.33	20.73	614	3.38
2	68.54	76.48	145.02	17.82	614	2.90
3	68.85	76.48	145.33	18.47	614	3.01
4	70.9	76.48	147.38	23.39	614	3.81
5	76.69	76.48	153.17	45.55	614	7.42
6	82.33	76.48	158.81	87.20	614	14.20

Location	H Field Reading (dBuA)	ACF (dBuA/m)	Corrected Value (dBuA/m)	Corrected Value (A/m)	Limit (A/m)	%
1	35.8	24.98	60.78	0.0011	1.63	0.07
2	34.51	24.98	59.49	0.0009	1.63	0.06
3	34.87	24.98	59.85	0.0010	1.63	0.06
4	37.02	24.98	62	0.0013	1.63	0.08
5	42.43	24.98	67.41	0.0023	1.63	0.14
6	47.25	24.98	72.23	0.0041	1.63	0.25

## Client Device 50% Charged

Location	E Field Reading (dBuV)	ACF (dBuV/m)	Corrected Value (dBuV/m)	Corrected Value (V/m)	Limit (V/m)	%
1	67	76.48	143.48	14.93	614	2.43
2	55.98	76.48	132.46	4.20	614	0.68
3	52.35	76.48	128.83	2.76	614	0.45
4	58.65	76.48	135.13	5.71	614	0.93
5	71.63	76.48	148.11	25.44	614	4.14
6	75.83	76.48	152.31	41.26	614	6.72

Location	H Field Reading (dBuA)	ACF (dBuA/m)	Corrected Value (dBuA/m)	Corrected Value (A/m)	Limit (A/m)	%
1	30.08	24.98	55.06	0.0006	1.63	0.03
2	22.3	24.98	47.28	0.0002	1.63	0.01
3	14.38	24.98	39.36	0.0001	1.63	0.01
4	25.26	24.98	50.24	0.0003	1.63	0.02
5	37.73	24.98	62.71	0.0014	1.63	0.08
6	41.82	24.98	66.8	0.0022	1.63	0.13

## Client Device 100% Charged

Location	E Field Reading (dBuV)	ACF (dBuV/m)	Corrected Value (dBuV/m)	Corrected Value (V/m)	Limit (V/m)	%
1	66.62	76.53	143.15	14.37	614	2.34
2	63.84	76.53	140.37	10.44	614	1.70
3	63.68	76.53	140.21	10.24	614	1.67
4	67.16	76.53	143.69	15.29	614	2.49
5	80.27	76.53	156.8	69.18	614	11.27
6	84.18	76.53	160.71	108.52	614	17.67

Location	H Field Reading (dBuA)	ACF (dBuA/m)	Corrected Value (dBuA/m)	Corrected Value (A/m)	Limit (A/m)	%
1	43.06	25.03	68.09	0.0025	1.63	0.16
2	39.57	25.03	64.6	0.0017	1.63	0.10
3	28.96	25.03	53.99	0.0005	1.63	0.03
4	41.71	25.03	66.74	0.0022	1.63	0.13
5	46.71	25.03	71.74	0.0039	1.63	0.24
6	52.22	25.03	77.25	0.0073	1.63	0.45