

FCC Test Report

Report No.: RF181018C34

FCC ID: K7SF8J233

Test Model: F8J233

Received Date: Oct. 18, 2018

Test Date: Oct. 30, 2018

Issued Date: Nov. 21, 2018

Applicant: Belkin International, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF181018C34	Original release	Nov. 21, 2018

1 Certificate of Conformity

Product: BOOST↑CHARGE™

Brand: belkin

Model No.: F8J233

Sample Status: Engineering sample

Applicant: Belkin International, Inc.

Test Date: Oct. 30, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.209)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Nov. 21, 2018
Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Nov. 21, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.209)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -15.79dB at 0.16569MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -11.1dB at 259.38MHz and 35.83MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	BOOST↑CHARGE™
Test Model	F8J233
Sample Status	Engineering sample
Power Supply Rating	5Vdc (Adapter) 3.83Vdc (Battery)
Modulation Type	FSK
Operating Frequency	326.5 kHz
Antenna Type	Coil antenna
Field Strength	49.5dBuV/m
Dimension for Apple watch inductive coil	7.95cm ² (diameter = 31.82mm)
Accessory Device	NA
Data Cable Supplied	0.17m shielded USB cable without core
Maximum Power Output for Apple watch inductive coil	Less than 5W

Note:

1. The EUT uses following battery.

Brand	Dongguan Amperex Technology Limited
Model	B03543
Power Rating	3.83Vdc, 2200mAh

2. The EUT has a wireless inductive charging coil for charging Apple watch.

3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (kHz)
1	326.5

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE<1G	PLC	
A	√	√	EUT wireless charging to Apple watch + AC adapter
B	√	-	Standby Mode + AC adapter

Where **RE<1G**: Radiated Emission below 1GHz **PLC**: Power Line Conducted Emission

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel
A, B	1	1

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel
A	1	1

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz 3.83Vdc	Willy Cheng
PLC	22 deg. C, 67% RH	120Vac, 60Hz	Willy Cheng

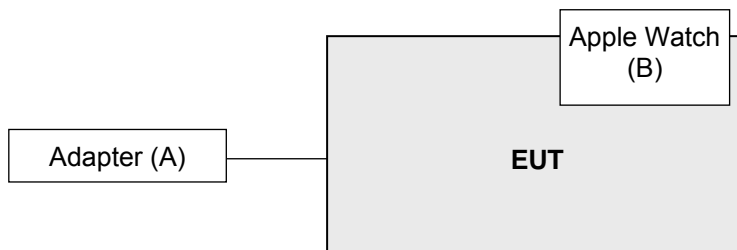
3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

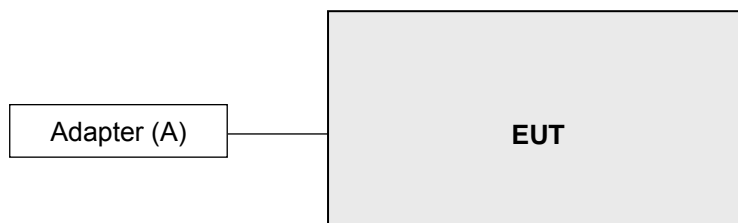
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	Apple	A1385	NA	NA	-
B.	Apple Watch	Apple	A1889	FH7V1006J97R	BCG-A1889	Provided by client

3.3.1 Configuration of System under Test

Test Mode A



Test Mode B



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.209)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

FOR FREQUENCY BELOW 30MHz

Frequency (MHz)	Field Strength (dBuV/m)		Measurement Distance (meters)
	uV/m	dBuV/m	
0.009 – 0.490	2400 / F (kHz)	48.52-13.80	300
0.490 – 1.705	24000 / F (kHz)	33.80-22.97	30
1.705 – 30.0	30	29.54	30

FOR FREQUENCY BETWEEN 30-1000MHz

Frequency (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30-88	90	39.1	100	40.0
88-216	150	43.5	150	43.5
216-960	210	46.4	200	46.0
Above 960	300	49.5	500	54.0

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is 7450F-3.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

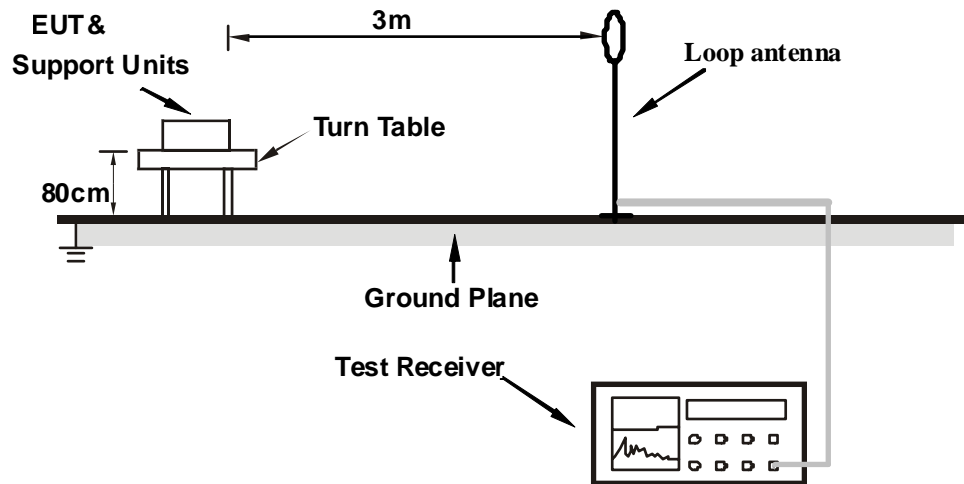
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

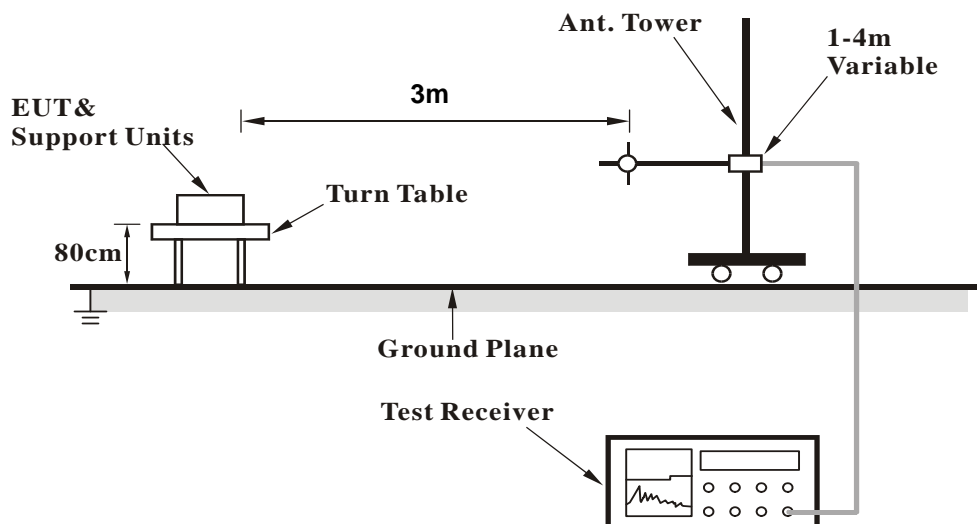
No deviation.

4.1.5 Test Set Up

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

Test Mode A

- a. Put the Apple watch on the EUT (wireless charging) during the test.

Test Mode B

- a. Set the EUT under standby mode during the test.

4.1.7 Test Results

Below 30MHz Data:

EUT Wireless Charging to Apple Watch Mode + AC adapter

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	A		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.3265	49.5	97.3	-47.8	1.0	225	29.4	20.1
2	3.229	40.3	69.5	-29.2	1.0	118	20.7	19.6
3	4.623	35.0	69.5	-34.5	1.0	205	14.7	20.3
4	13.034	35.8	69.5	-33.7	1.0	103	14.0	21.8
5	17.311	37.7	69.5	-31.8	1.0	279	15.9	21.8
6	23.800	39.6	69.5	-29.9	1.0	246	17.6	22.0
7	25.098	36.8	69.5	-32.7	1.0	100	14.8	22.0
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.3265	45.9	97.3	-51.4	1.0	318	25.8	20.1
2	2.460	34.0	69.5	-35.5	1.0	297	14.3	19.7
3	9.141	35.5	69.5	-34.0	1.0	12	13.9	21.6
4	14.091	36.1	69.5	-33.4	1.0	281	14.3	21.8
5	15.677	36.5	69.5	-33.0	1.0	337	14.7	21.8
6	21.637	35.3	69.5	-34.2	1.0	9	13.4	21.9
7	24.473	35.4	69.5	-34.1	1.0	348	13.4	22.0
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.3265	43.7	97.3	-53.6	1.0	209	23.6	20.1
2	3.229	42.6	69.5	-26.9	1.0	205	23.0	19.6
3	15.581	38.8	69.5	-30.7	1.0	126	17.0	21.8
4	19.474	43.3	69.5	-26.2	1.0	325	21.5	21.8
5	23.367	43.5	69.5	-26.0	1.0	86	21.5	22.0
6	23.800	43.4	69.5	-26.1	1.0	185	21.4	22.0
7	25.098	40.9	69.5	-28.6	1.0	69	18.9	22.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

Standby Mode + AC adapter

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	B		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.653	39.8	71.3	-31.5	1.0	167	19.6	20.2
2	3.229	47.5	69.5	-22.0	1.0	212	27.9	19.6
3	13.322	43.0	69.5	-26.5	1.0	54	21.2	21.8
4	18.369	44.5	69.5	-25.0	1.0	199	22.7	21.8
5	22.214	48.3	69.5	-21.2	1.0	164	26.4	21.9
6	23.800	47.4	69.5	-22.1	1.0	103	25.4	22.0
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.653	41.7	71.3	-29.6	1.0	347	21.5	20.2
2	3.229	45.1	69.5	-24.4	1.0	198	25.5	19.6
3	15.581	43.8	69.5	-25.7	1.0	277	22.0	21.8
4	17.792	43.9	69.5	-25.6	1.0	4	22.1	21.8
5	23.367	48.4	69.5	-21.1	1.0	197	26.4	22.0
6	23.800	44.7	69.5	-24.8	1.0	159	22.7	22.0
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.653	39.3	71.3	-32.0	1.0	138	19.1	20.2
2	3.229	50.6	69.5	-18.9	1.0	175	31.0	19.6
3	15.581	45.7	69.5	-23.8	1.0	134	23.9	21.8
4	17.792	46.5	69.5	-23.0	1.0	73	24.7	21.8
5	19.474	47.0	69.5	-22.5	1.0	4	25.2	21.8
6	21.637	45.1	69.5	-24.4	1.0	30	23.2	21.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

Below 1GHz Data:

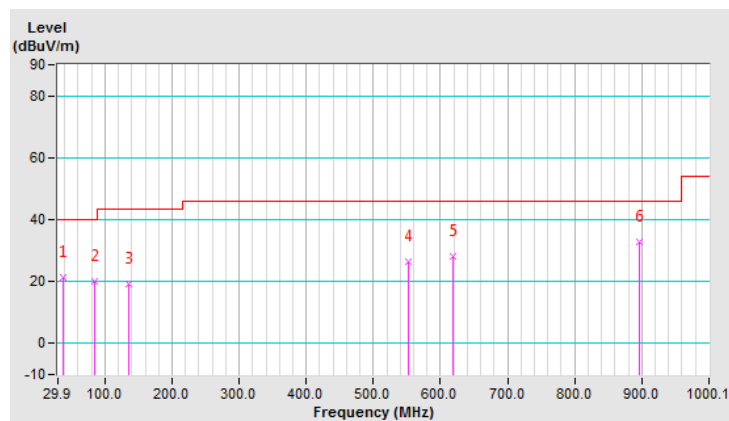
EUT Wireless Charging to Apple Watch Mode + AC adapter

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.78	21.2 QP	40.0	-18.8	2.00 H	178	31.6	-10.4
2	84.43	20.2 QP	40.0	-19.8	2.00 H	119	34.5	-14.3
3	134.97	19.1 QP	43.5	-24.4	2.00 H	15	29.2	-10.1
4	552.91	26.5 QP	46.0	-19.5	1.00 H	14	29.1	-2.6
5	619.00	28.1 QP	46.0	-17.9	2.00 H	309	28.8	-0.7
6	896.97	32.8 QP	46.0	-13.2	1.50 H	99	28.8	4.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

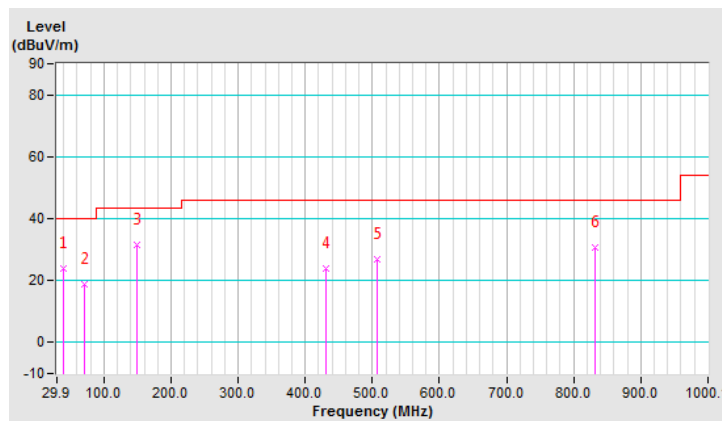


Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	23.9 QP	40.0	-16.1	1.00 V	4	33.9	-10.0
2	70.82	18.7 QP	40.0	-21.3	1.00 V	262	30.2	-11.5
3	148.67	31.5 QP	43.5	-12.0	1.49 V	352	40.5	-9.0
4	430.44	23.7 QP	46.0	-22.3	1.49 V	56	28.3	-4.6
5	506.25	26.8 QP	46.0	-19.2	1.49 V	77	30.2	-3.4
6	832.83	30.8 QP	46.0	-15.2	1.99 V	169	28.0	2.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



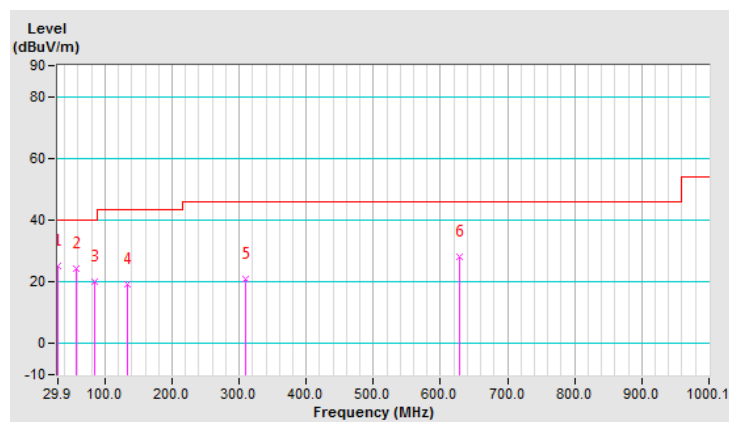
Standby Mode + AC adapter

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.56	25.0 QP	40.0	-15.0	1.00 H	13	36.1	-11.1
2	56.69	24.2 QP	40.0	-15.8	2.00 H	13	33.8	-9.6
3	84.43	20.0 QP	40.0	-20.0	2.00 H	282	34.3	-14.3
4	133.03	19.3 QP	43.5	-24.2	2.00 H	4	29.7	-10.4
5	309.92	20.9 QP	46.0	-25.1	1.00 H	189	27.9	-7.0
6	628.72	28.0 QP	46.0	-18.0	1.50 H	336	28.5	-0.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

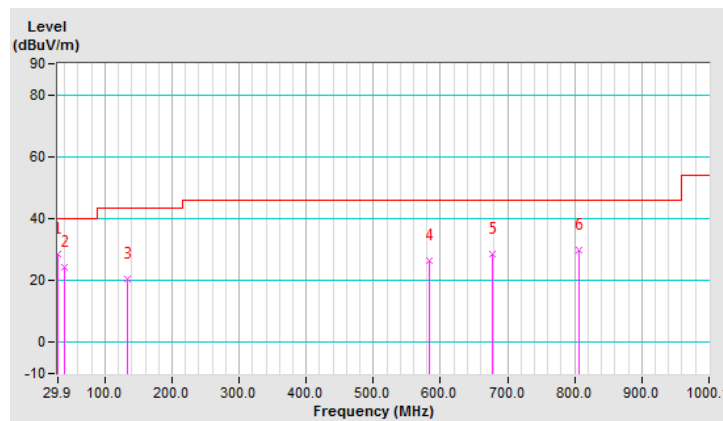


Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	28.7 QP	40.0	-11.3	1.00 V	343	39.8	-11.1
2	39.72	24.4 QP	40.0	-15.6	1.00 V	249	34.4	-10.0
3	133.03	20.4 QP	43.5	-23.1	1.00 V	14	30.8	-10.4
4	584.01	26.5 QP	46.0	-19.5	1.50 V	310	28.0	-1.5
5	677.31	28.6 QP	46.0	-17.4	2.00 V	6	28.5	0.1
6	805.61	29.7 QP	46.0	-16.3	1.50 V	318	27.1	2.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

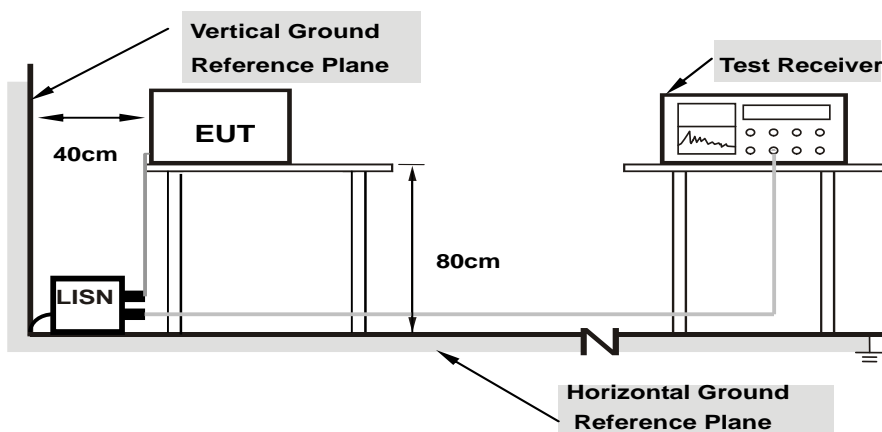
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

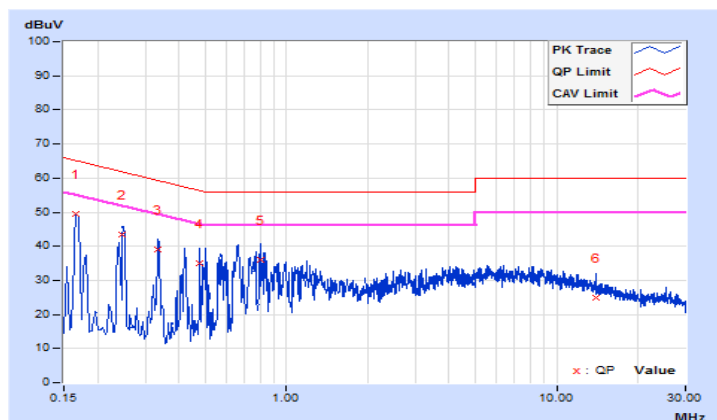
EUT Wireless Charging to Apple Watch Mode + AC adapter

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16569	9.73	39.65	28.05	49.38	37.78	65.17	55.17	-15.79	-17.39
2	0.24775	9.73	33.64	19.99	43.37	29.72	61.83	51.83	-18.46	-22.11
3	0.33377	9.74	29.34	13.66	39.08	23.40	59.36	49.36	-20.28	-25.96
4	0.47844	9.74	25.20	3.75	34.94	13.49	56.37	46.37	-21.43	-32.88
5	0.79906	9.70	26.44	10.07	36.14	19.77	56.00	46.00	-19.86	-26.23
6	13.94448	9.91	15.05	7.99	24.96	17.90	60.00	50.00	-35.04	-32.10

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

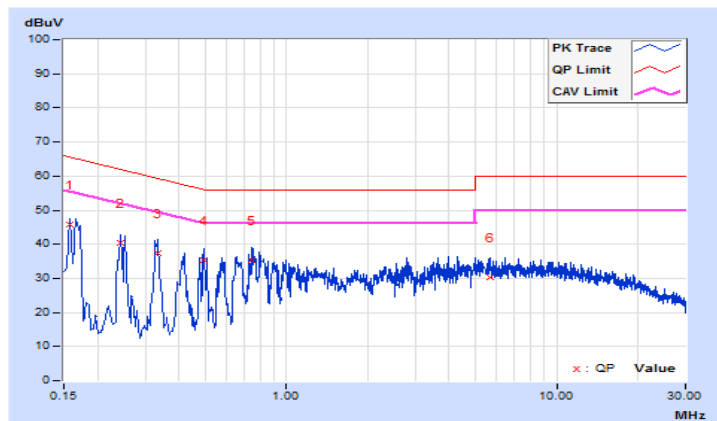


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.72	35.93	19.26	45.65	28.98	65.58	55.58	-19.93	-26.60
2	0.24384	9.73	30.84	17.90	40.57	27.63	61.96	51.96	-21.39	-24.33
3	0.33377	9.74	27.64	13.55	37.38	23.29	59.36	49.36	-21.98	-26.07
4	0.49454	9.75	25.49	10.26	35.24	20.01	56.09	46.09	-20.85	-26.08
5	0.74823	9.73	25.67	14.29	35.40	24.02	56.00	46.00	-20.60	-21.98
6	5.68265	9.84	20.55	12.76	30.39	22.60	60.00	50.00	-29.61	-27.40

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Tel: 886-3-6668565

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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