

FCC Test Report

Report No.: RF171226C04

FCC ID: K7SF7U054

Test Model: F7U054

Received Date: Dec. 26, 2017

Test Date: Dec. 27, 2017 ~ Jan. 22, 2018

Issued Date: Jan. 23, 2018

Applicant: Belkin International., Inc

Address: 12045 East Waterfront Drive, Playa Vista, CA 90094

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	7
3.2.1 Test Mode Applicability and Tested Channel Detail	8
3.3 Description of Support Units	9
3.3.1 Configuration of System under Test	9
3.4 General Description of Applied Standards	9
4 Test Types and Results	10
4.1 Radiated Emission and Bandedge Measurement	10
4.1.1 Limits of Radiated Emission and Bandedge Measurement	10
4.1.2 Test Instruments	11
4.1.3 Test Procedures	12
4.1.4 Deviation from Test Standard	12
4.1.5 Test Set Up	13
4.1.6 EUT Operating Conditions	13
4.1.7 Test Results	14
4.2 Conducted Emission Measurement	18
4.2.1 Limits of Conducted Emission Measurement	18
4.2.2 Test Instruments	18
4.2.3 Test Procedures	19
4.2.4 Deviation from Test Standard	19
4.2.5 Test Setup	19
4.2.6 EUT Operating Conditions	19
4.2.7 Test Results	20
5 Pictures of Test Arrangements	24
Appendix – Information on the Testing Laboratories	25

Release Control Record

Issue No.	Description	Date Issued
RF171226C04	Original release	Jan. 23, 2018

1 Certificate of Conformity

Product: 7.5W Wireless Charging Pad

Brand: belkin

Model No.: F7U054

Sample Status: Engineering sample

Applicant: Belkin International., Inc

Test Date: Dec. 27, 2017 ~ Jan. 22, 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:** Jan. 23, 2018
Celine Chou / Specialist

Approved by : Bruce Chen , **Date:** Jan. 23, 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 -15.11dB at 0.42334MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -7.0dB at 30.90MHz.

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) ($\pm$)
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	7.5W Wireless Charging Pad
Test Model	F7U054
Sample Status	Engineering sample
Power Supply Rating	15Vdc (adapter)
Modulation Type	FSK
Operating Frequency	127.8 kHz
Antenna Type	Coil antenna
Field Strength	75.5dBuV/m
Dimensions	16.26cm ² (diameter = 45.5mm)
Accessory Device	Adapter
Data Cable Supplied	NA
Maximum Power Output from the Charging Coil	Less than 7.5W

Note:

1. The EUT uses following adapter.

Brand	belkin
Model	ADS-26FSG-12 15023EPCU ADS-26FSG-12 15023EPC
Input power	100-240Vac, 50/60Hz, Max. 0.7A
Output power	15Vdc, 1.5A
Power Line	1.45m cable without core attached on adapter

2. The following samples are provided for testing.

Sample	DC jack to main PCBA connection	Shield used	PCB Manufacturer
DVT Config 1	No connector on main PCBA. Wire from dc jack soldered directly to PCBA	Shield with no bump and 3 circular holes.	SCC
DVT Config 2	No connector on main PCBA. Wire from dc jack soldered directly to PCBA	Shield with no bump and 3 circular holes.	Dynamic
DVT1.2 Config 1	Connector used on main PCBA. Wire from dc jack is connected to main PCBA with a connector	Shield with no bump and 3 circular holes + 4 square holes.	SCC
DVT1.2 Config 2	Connector used on main PCBA. Wire from dc jack is connected to main PCBA with a connector	Shield with no bump and 3 circular holes + 4 square holes.	Dynamic
PVT1.2 Config 2	Connector used on main PCBA. Wire from dc jack is connected to main PCBA with a connector	Shield with bump and 3 circular holes.	Dynamic
PVT1.3 Config 2	Daughter board used on main PCBA. Wire from dc jack is connected to main PCBA with a daughter PCB	Shield with bump and 3 circular holes.	Dynamic

* After pre-test, DVT Config 1 was worst case and chosen for final test.

* The EUT has two appearance colors for sale (black and white).

3. The EUT has a wireless inductive charging coil for charging iPhone.

3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (kHz)
1	127.8

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE<1G	PLC	
A	√	√	Charging Mode
B	√	√	Standby Mode

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

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, B	1	1

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	24 deg. C, 65% RH	120Vac, 60Hz	Adair Peng
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Adair Peng

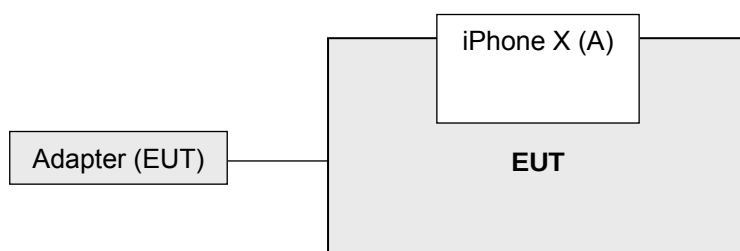
3.3 Description of Support Units

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.

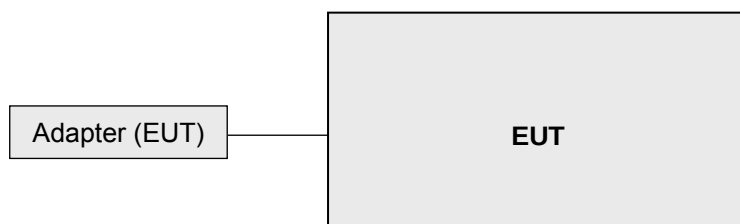
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPhone X	Apple	A1901	NA	FCC DoC Approved	Provided by manufacturer

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 02, 2017	May 01, 2018
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 EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 05, 2017	Apr. 04, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	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

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 IC 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. Both X and Y axes 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:

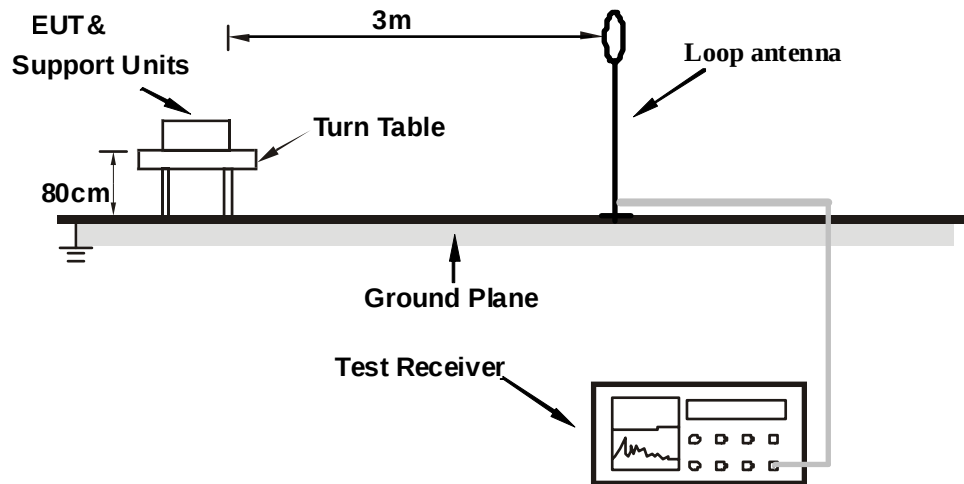
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

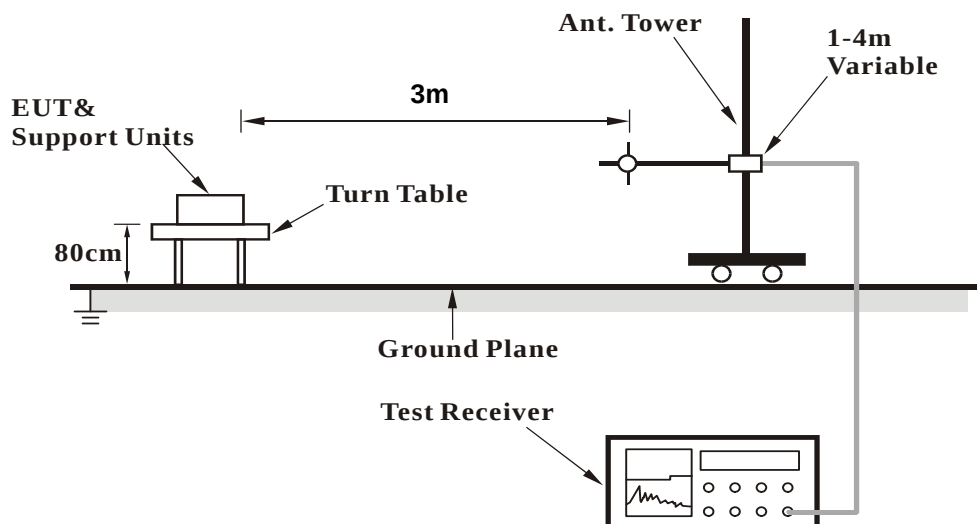
No deviation.

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

- The EUT powered by adapter.
- Put the iPhone X on the EUT (wireless charging) during the test.

Test Mode B

- The EUT powered by adapter.

4.1.7 Test Results

Below 30MHz Data:

Charging Mode

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	*0.127	75.5	105.5	-30.0	1.00	306	55.2	20.3
2	0.609	44.6	71.9	-27.3	1.00	278	24.3	20.3
3	1.329	43.7	65.1	-21.4	1.00	235	23.4	20.3
4	2.468	37.7	69.5	-31.8	1.00	23	17.4	20.3
5	13.625	36.1	69.5	-33.4	1.00	41	15.6	20.5
6	18.843	35.4	69.5	-34.1	1.00	25	14.9	20.5
7	24.962	35.6	69.5	-33.9	1.00	180	15.0	20.6
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	*0.127	71.4	105.5	-34.1	1.00	25	51.1	20.3
2	0.369	51.8	96.3	-44.5	1.00	8	31.5	20.3
3	3.548	43.6	69.5	-25.9	1.00	27	23.2	20.4
4	8.047	35.8	69.5	-33.7	1.00	31	15.4	20.4
5	13.625	36.4	69.5	-33.1	1.00	81	15.9	20.5
6	18.304	38.3	69.5	-31.2	1.00	12	17.8	20.5
7	23.162	37.1	69.5	-32.4	1.00	15	16.6	20.5

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
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

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	*0.127	62.6	105.5	-42.9	1.00	111	42.3	20.3
2	0.254	48.5	99.5	-51.0	1.00	127	28.3	20.3
3	1.209	44.5	66.0	-21.5	1.00	137	24.2	20.3
4	4.268	36.9	69.5	-32.7	1.00	340	16.4	20.5
5	10.146	35.3	69.5	-34.3	1.00	307	14.8	20.5
6	17.884	35.4	69.5	-34.1	1.00	243	14.9	20.5
7	25.741	36.7	69.5	-32.9	1.00	58	16.0	20.7
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	*0.127	56.7	105.5	-48.8	1.00	209	36.4	20.3
2	0.254	47.2	99.5	-52.4	1.00	8	26.9	20.3
3	1.269	44.8	65.5	-20.7	1.00	348	24.6	20.3
4	3.548	43.1	69.5	-26.4	1.00	296	22.7	20.4
5	9.606	36.1	69.5	-33.4	1.00	321	15.7	20.5
6	16.624	37.0	69.5	-32.5	1.00	223	16.5	20.6
7	18.363	38.1	69.5	-31.4	1.00	2	17.6	20.5

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
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:

Charging Mode

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 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	57.12	26.5 QP	40.0	-13.5	2.00 H	231	40.9	-14.4
2	160.17	28.8 QP	43.5	-14.7	1.50 H	243	42.6	-13.8
3	263.22	25.0 QP	46.0	-21.0	1.00 H	225	39.0	-14.0
4	362.37	19.6 QP	46.0	-26.4	1.00 H	113	31.4	-11.8
5	634.57	22.4 QP	46.0	-23.6	1.50 H	252	29.0	-6.6
6	836.78	26.3 QP	46.0	-19.7	1.50 H	301	29.8	-3.5
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	57.12	26.0 QP	40.0	-14.0	1.00 V	14	40.4	-14.4
2	138.78	23.0 QP	43.5	-20.5	1.00 V	285	37.7	-14.7
3	160.17	24.6 QP	43.5	-18.9	1.00 V	164	38.4	-13.8
4	261.27	18.5 QP	46.0	-27.5	1.49 V	162	32.6	-14.1
5	486.81	20.6 QP	46.0	-25.4	1.99 V	93	30.2	-9.6
6	677.35	23.7 QP	46.0	-22.3	1.99 V	248	29.9	-6.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Standby Mode

Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 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	57.12	26.8 QP	40.0	-13.2	1.99 H	352	41.2	-14.4
2	140.72	23.5 QP	43.5	-20.0	1.99 H	238	37.9	-14.4
3	160.17	24.5 QP	43.5	-19.0	1.49 H	222	38.3	-13.8
4	263.22	21.6 QP	46.0	-24.4	1.00 H	244	35.6	-14.0
5	515.97	20.7 QP	46.0	-25.3	1.49 H	188	29.8	-9.1
6	694.85	23.5 QP	46.0	-22.5	1.00 H	281	29.5	-6.0
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	30.90	33.0 QP	40.0	-7.0	1.00 V	231	49.1	-16.1
2	59.06	23.0 QP	40.0	-17.0	1.00 V	15	37.3	-14.3
3	136.84	22.4 QP	43.5	-21.1	1.00 V	245	37.2	-14.8
4	164.06	21.1 QP	43.5	-22.4	1.00 V	140	35.1	-14.0
5	504.31	20.6 QP	46.0	-25.4	1.50 V	140	29.9	-9.3
6	599.58	23.0 QP	46.0	-23.0	1.50 V	5	30.3	-7.3

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)
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	ESCS 30	100288	Aug. 17, 2017	Aug. 16, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 08, 2017	Sep. 07, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 02, 2017	Aug. 01, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	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 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

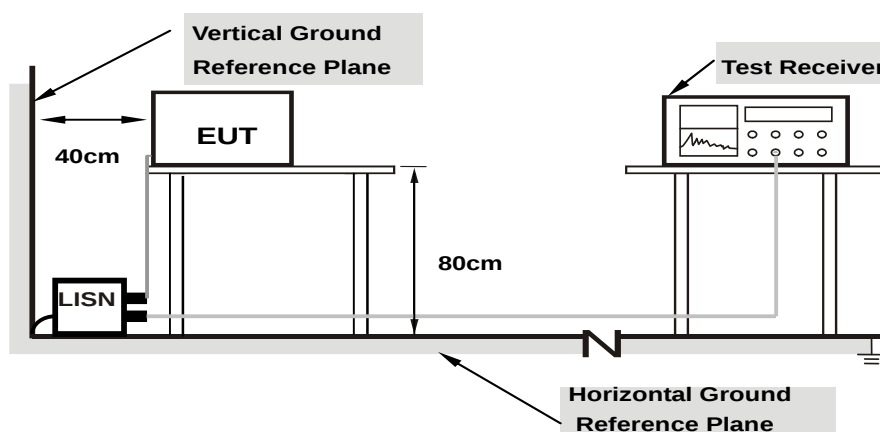
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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

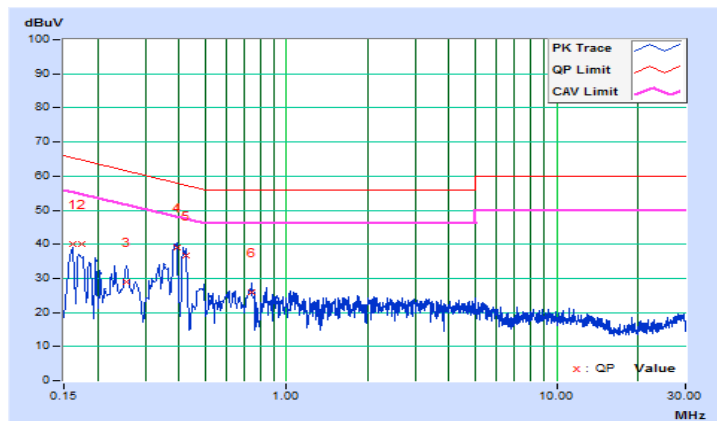
Charging Mode

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	0.16096	10.45	29.45	13.97	39.90	24.42	65.41	55.41	-25.51	-30.99
2	0.17420	10.45	29.72	14.13	40.17	24.58	64.76	54.76	-24.59	-30.18
3	0.25458	10.46	18.35	12.01	28.81	22.47	61.61	51.61	-32.80	-29.14
4	0.39219	10.49	28.43	20.29	38.92	30.78	58.02	48.02	-19.10	-17.24
5	0.42334	10.49	26.27	21.78	36.76	32.27	57.38	47.38	-20.62	-15.11
6	0.74008	10.47	15.31	11.45	25.78	21.92	56.00	46.00	-30.22	-24.08

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.

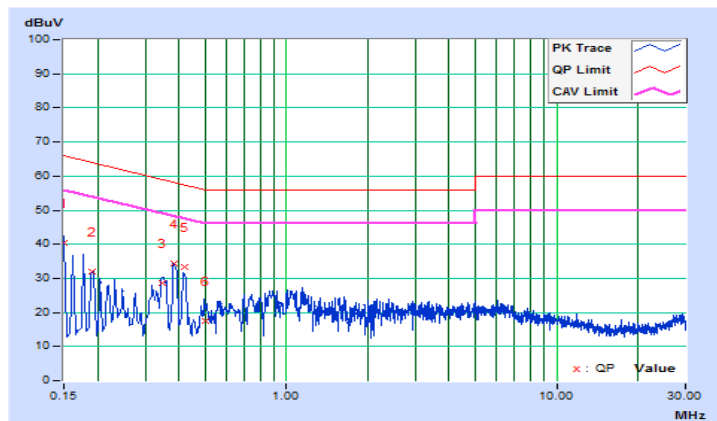


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.15000	10.19	30.24	14.12	40.43	24.31	66.00	56.00	-25.57	-31.69
2	0.19003	10.22	21.69	6.19	31.91	16.41	64.04	54.04	-32.13	-37.63
3	0.34560	10.24	18.54	13.87	28.78	24.11	59.07	49.07	-30.29	-24.96
4	0.38460	10.24	24.25	21.79	34.49	32.03	58.18	48.18	-23.69	-16.15
5	0.41979	10.25	22.92	19.89	33.17	30.14	57.45	47.45	-24.28	-17.31
6	0.49846	10.25	7.23	0.23	17.48	10.48	56.03	46.03	-38.55	-35.55

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.



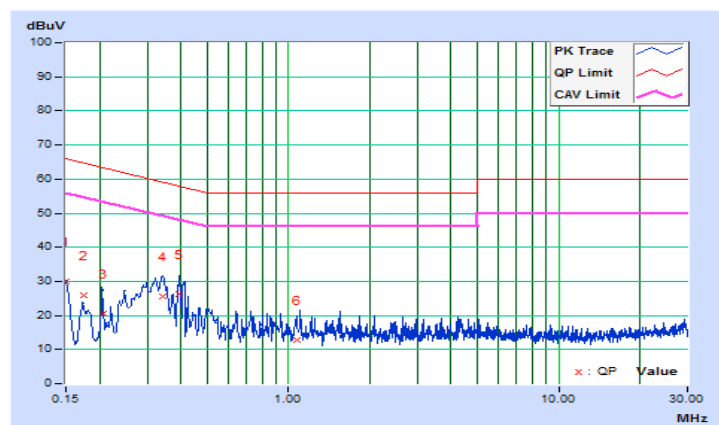
Standby Mode

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.45	19.51	3.51	29.96	13.96	66.00	56.00	-36.04	-42.04
2	0.17374	10.45	15.54	1.81	25.99	12.26	64.78	54.78	-38.79	-42.52
3	0.20511	10.45	9.96	1.88	20.41	12.33	63.40	53.40	-42.99	-41.07
4	0.34108	10.48	15.19	4.13	25.67	14.61	59.18	49.18	-33.51	-34.57
5	0.39219	10.49	15.61	3.76	26.10	14.25	58.02	48.02	-31.92	-33.77
6	1.07025	10.46	2.49	1.01	12.95	11.47	56.00	46.00	-43.05	-34.53

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.

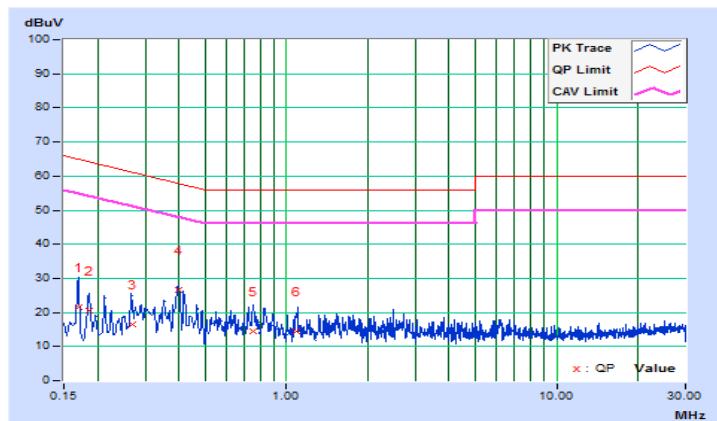


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16967	10.21	11.50	2.45	21.71	12.66	64.98	54.98	-43.27	-42.32
2	0.18508	10.21	10.46	2.22	20.67	12.43	64.25	54.25	-43.58	-41.82
3	0.26765	10.23	6.24	1.75	16.47	11.98	61.19	51.19	-44.72	-39.21
4	0.40024	10.25	16.21	4.79	26.46	15.04	57.85	47.85	-31.39	-32.81
5	0.74990	10.26	4.14	1.11	14.40	11.37	56.00	46.00	-41.60	-34.63
6	1.08444	10.26	4.28	1.23	14.54	11.49	56.00	46.00	-41.46	-34.51

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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

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.

--- END ---