

FCC Test Report

Report No.: RF180627C20

Test Model: Ilium Alpha 9-W

FCC ID: ZC4ALPHA9W

Received Date: Jun. 27, 2018

Test Date: Jul. 02 ~ Jul. 18, 2018

Issued Date: Jul. 23, 2018

Applicant: Corporativo Lanix S.A. de C.V.

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

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R.O.C.

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33383, TAIWAN (R.O.C.)

FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF180627C20	Original release	Jul. 23, 2018

1 Certificate of Conformity

Product: Wireless Charger

Brand: Lanix

Test Model: Ilium Alpha 9-W

Sample Status: Production Unit

Applicant: Corporativo Lanix S.A. de C.V.

Test Date: Jul. 02 ~ Jul. 18, 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:** Jul. 23, 2018
Celine Chou / Specialist

Approved by : Bruce Chen , **Date:** Jul. 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 -15.08dB at 10.88475MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -6.1dB at 53.83MHz.

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	Wireless Charger
Test Model	Ilium Alpha 9-W
Sample Status	Production Unit
Power Supply Rating	5Vdc or 9Vdc (adapter)
Operating Frequency	111kHz-148kHz
Antenna Type	Coil antenna
Field Strength	88.5dBuV/m
Dimensions	95mm (Diameter), 15mm (Height), 81g (Weight)
Accessory Device	NA
Data Cable Supplied	NA
Maximum Power Output from the Charging Coil	Less than 5W

Note: The EUT uses following adapter. (for support unit only)

Brand	GIONEE
Model	TC-G300
Input power	100-240Vac, 50/60Hz, 0.5A
Output power	5/9Vdc, 2A

* After per-test, 9Vdc for final test.

3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (kHz)
1	111 (Note)

Note: The worse frequency is 111kHz.

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 (System)	Tested by
RE<1G	23 deg. C, 65% RH	120Vac, 60Hz	Willy Cheng
PLC	22 deg. C, 68% RH	120Vac, 60Hz	Adair Peng

3.3 Description of Support Units

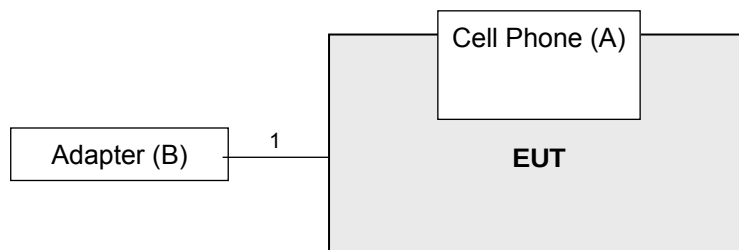
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Cell Phone	Lanix	Ilium Alpha 9	NA	ZC4ALPHA9	Provided by manufacturer
B.	Adapter	GIONEE	TC-G300	NA	NA	Provided by manufacturer

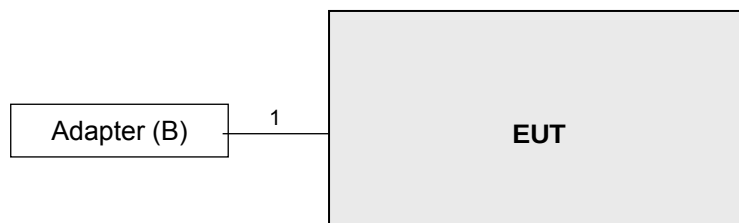
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB	1	1	Y	0	Provided by manufacturer

3.3.1 Configuration of System under Test

Charging Mode (Test Mode A)



Standby Mode (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 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. 03, 2018	Apr. 02, 2019
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-SM-8 000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
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
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018

- 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. 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.
2. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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:

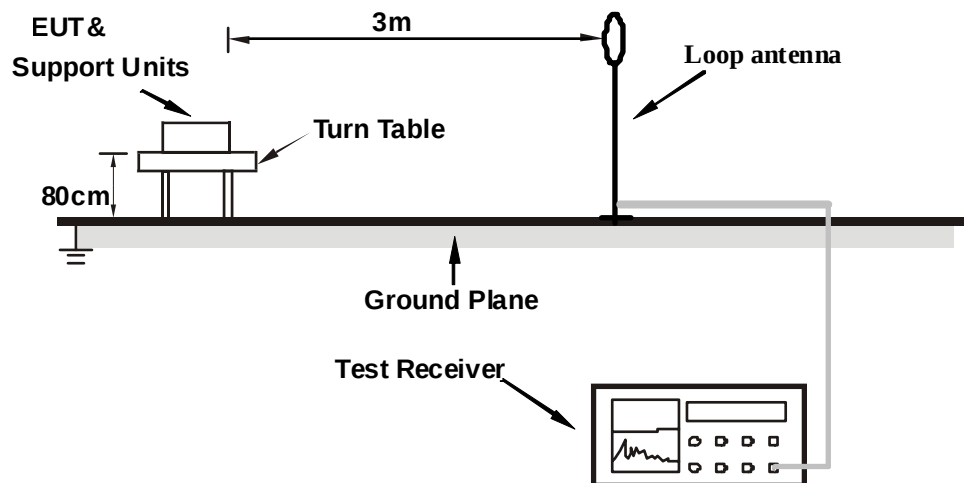
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

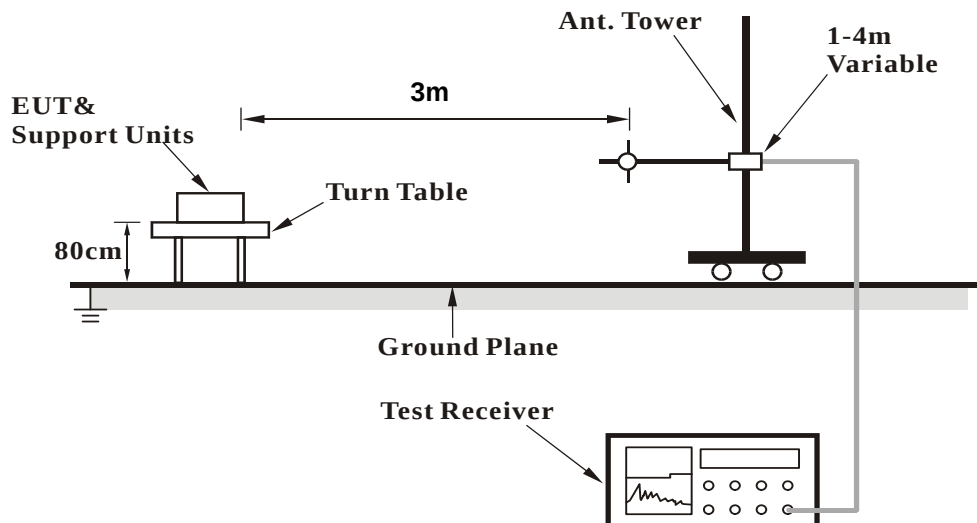
No deviation.

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 cell phone 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	Average 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	*0.111	88.5 AV	106.7	-18.2	1.00	57	68.2	20.3
2	0.682	40.7 QP	70.9	-30.2	1.00	337	20.4	20.3
3	3.229	41.2 QP	69.5	-28.3	1.00	110	20.8	20.4
4	15.149	39.3 QP	69.5	-30.2	1.00	221	18.8	20.5
5	19.474	50.4 QP	69.5	-19.1	1.00	60	30.0	20.4
6	22.695	40.5 QP	69.5	-29.0	1.00	3	20.0	20.5
7	25.674	33.0 QP	69.5	-36.5	1.00	160	12.3	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	*0.111	83.7 AV	106.7	-23.0	1.00	324	63.4	20.3
2	1.259	36.5 QP	65.6	-29.1	1.00	145	16.2	20.3
3	4.431	37.0 QP	69.5	-32.5	1.00	40	16.5	20.5
4	14.043	40.5 QP	69.5	-29.0	1.00	125	20.0	20.5
5	17.311	37.3 QP	69.5	-32.2	1.00	90	16.7	20.6
6	20.532	38.9 QP	69.5	-30.6	1.00	155	18.5	20.4
7	21.637	38.6 QP	69.5	-30.9	1.00	137	18.2	20.4
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	*0.111	81.7 AV	106.7	-25.0	1.00	44	61.4	20.3
2	0.682	39.6 QP	70.9	-31.3	1.00	337	19.3	20.3
3	3.758	39.4 QP	69.5	-30.1	1.00	40	19.0	20.4
4	15.149	38.7 QP	69.5	-30.8	1.00	218	18.2	20.5
5	15.533	37.9 QP	69.5	-31.6	1.00	236	17.3	20.6
6	18.369	35.0 QP	69.5	-34.5	1.00	321	14.5	20.5
7	22.358	34.1 QP	69.5	-35.4	1.00	137	13.6	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	Average 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	0.222	45.5 AV	100.7	-55.2	1.00	24	25.2	20.3
2	3.229	40.9 QP	69.5	-28.6	1.00	291	20.5	20.4
3	12.217	37.5 QP	69.5	-32.0	1.00	256	17.0	20.5
4	14.043	39.4 QP	69.5	-30.1	1.00	288	18.9	20.5
5	19.474	49.1 QP	69.5	-20.4	1.00	336	28.7	20.4
6	20.532	42.3 QP	69.5	-27.2	1.00	184	21.9	20.4
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	0.222	47.8 AV	100.7	-52.9	1.00	186	27.5	20.3
2	1.691	35.4 QP	63.0	-27.6	1.00	277	15.1	20.3
3	3.566	37.0 QP	69.5	-32.5	1.00	286	16.6	20.4
4	11.880	35.2 QP	69.5	-34.3	1.00	256	14.7	20.5
5	21.637	40.3 QP	69.5	-29.2	1.00	258	19.9	20.4
6	22.695	40.7 QP	69.5	-28.8	1.00	289	20.2	20.5
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	0.222	44.1 AV	100.7	-56.6	1.00	231	23.8	20.3
2	1.980	34.4 QP	69.5	-35.1	1.00	264	14.1	20.3
3	3.229	39.7 QP	69.5	-29.8	1.00	291	19.3	20.4
4	11.880	35.2 QP	69.5	-34.3	1.00	256	14.7	20.5
5	14.087	32.4 QP	69.5	-37.1	1.00	208	11.9	20.5
6	22.310	34.1 QP	69.5	-35.4	1.00	241	13.6	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:

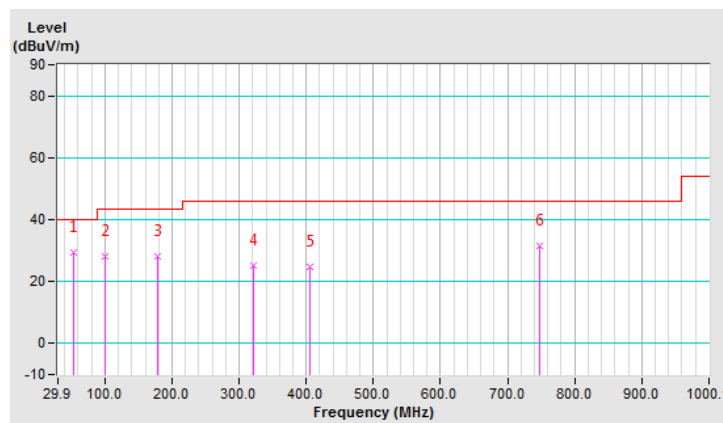
Charging Mode

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	53.23	29.6 QP	40.0	-10.4	1.99 H	99	38.9	-9.3
2	99.89	28.1 QP	43.5	-15.4	1.99 H	112	41.7	-13.6
3	177.67	28.2 QP	43.5	-15.3	1.99 H	104	37.8	-9.6
4	321.54	25.3 QP	46.0	-20.7	1.00 H	249	32.0	-6.7
5	405.15	24.7 QP	46.0	-21.3	1.49 H	11	29.8	-5.1
6	747.34	31.5 QP	46.0	-14.5	1.99 H	213	29.0	2.5

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

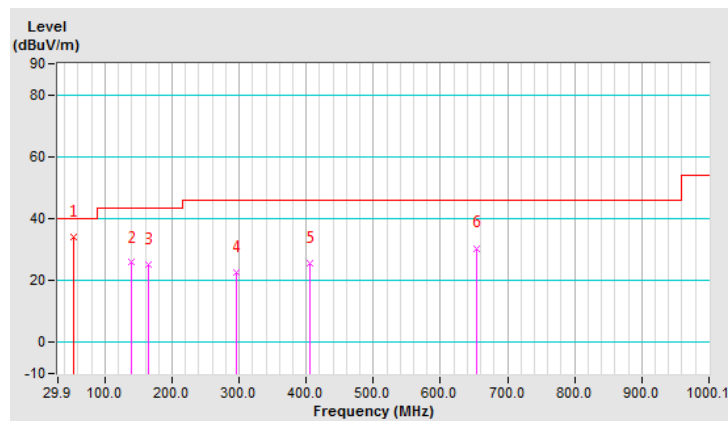


Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	A		

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	53.83	33.9 QP	40.0	-6.1	1.00 V	9	43.2	-9.3
2	138.78	25.8 QP	43.5	-17.7	1.00 V	23	35.5	-9.7
3	164.06	25.1 QP	43.5	-18.4	1.49 V	3	34.0	-8.9
4	296.27	22.7 QP	46.0	-23.3	1.99 V	10	29.9	-7.2
5	405.15	25.6 QP	46.0	-20.4	1.00 V	10	30.7	-5.1
6	654.02	30.5 QP	46.0	-15.5	1.00 V	23	30.2	0.3

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



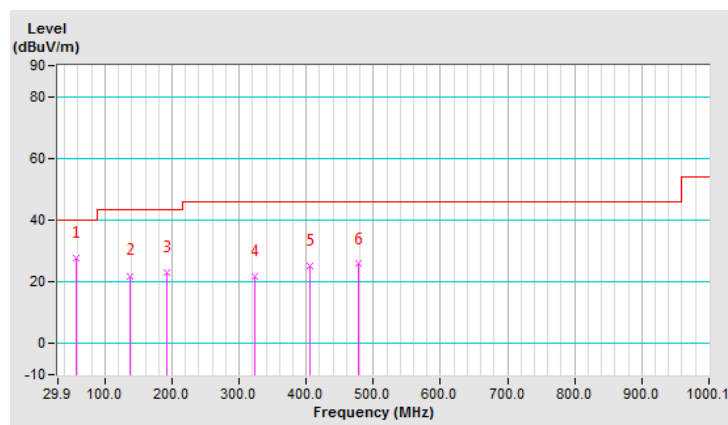
Standby Mode

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	27.6 QP	40.0	-12.4	2.00 H	161	37.1	-9.5
2	136.84	22.0 QP	43.5	-21.5	1.51 H	253	31.8	-9.8
3	191.28	23.2 QP	43.5	-20.3	1.51 H	252	34.4	-11.2
4	323.49	21.8 QP	46.0	-24.2	1.51 H	244	28.3	-6.5
5	405.15	25.0 QP	46.0	-21.0	1.01 H	0	30.1	-5.1
6	477.09	25.8 QP	46.0	-20.2	1.51 H	7	29.1	-3.3

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

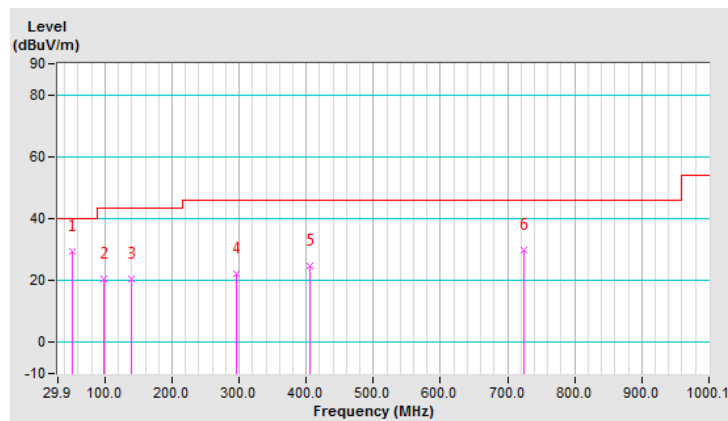


Channel	TX Channel 1	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	B		

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	51.29	29.2 QP	40.0	-10.8	2.00 V	232	38.5	-9.3
2	97.95	20.7 QP	43.5	-22.8	1.00 V	199	34.4	-13.7
3	138.78	20.7 QP	43.5	-22.8	2.00 V	228	30.4	-9.7
4	296.27	22.4 QP	46.0	-23.6	1.49 V	203	29.6	-7.2
5	405.15	24.7 QP	46.0	-21.3	2.00 V	292	29.8	-5.1
6	724.01	29.9 QP	46.0	-16.1	2.00 V	281	28.1	1.8

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



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	ESR3	102412	Feb. 08, 2018	Feb. 07, 2019
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 08, 2017	Sep. 07, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 05, 2018	Feb. 04, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 02, 2017	Aug. 01, 2018
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 2.

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

4.2.3 Test Procedures

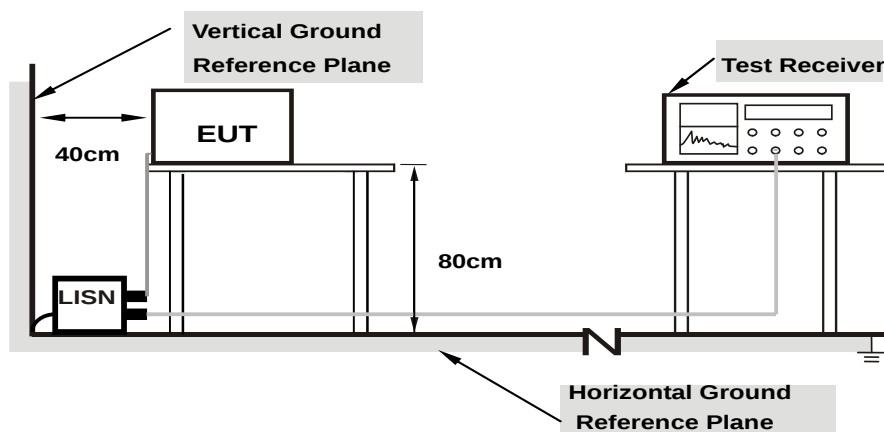
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

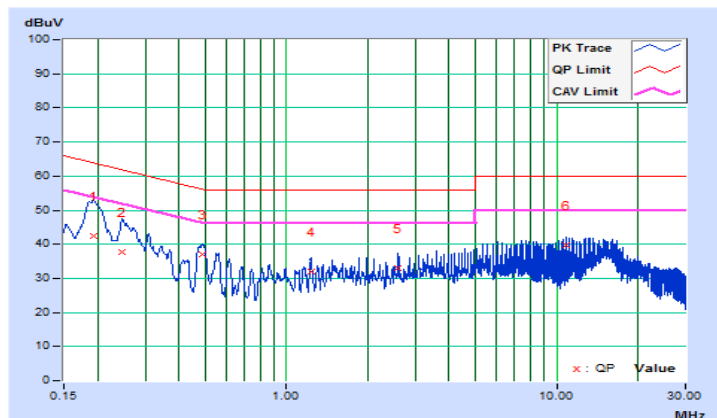
Charging Mode

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	0.19258	10.31	32.12	18.87	42.43	29.18	63.92	53.92	-21.49	-24.74
2	0.24683	10.32	27.53	15.10	37.85	25.42	61.86	51.86	-24.01	-26.44
3	0.48780	10.35	26.81	19.28	37.16	29.63	56.21	46.21	-19.05	-16.58
4	1.23559	10.42	21.60	15.19	32.02	25.61	56.00	46.00	-23.98	-20.39
5	2.59800	10.46	22.45	16.07	32.91	26.53	56.00	46.00	-23.09	-19.47
6	10.88475	10.64	29.00	24.28	39.64	34.92	60.00	50.00	-20.36	-15.08

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.

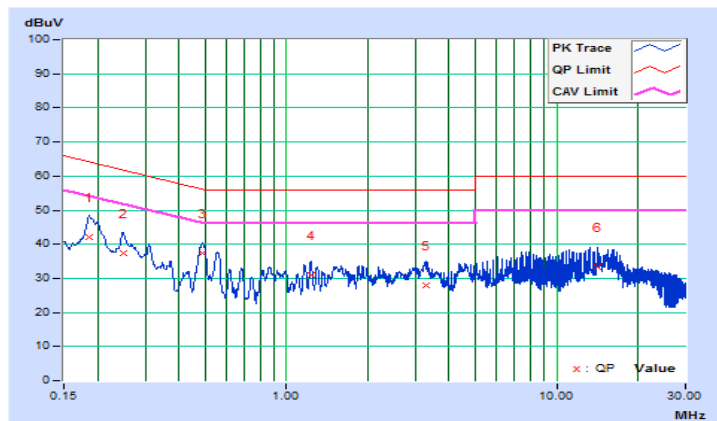


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.18559	10.32	31.93	17.18	42.25	27.50	64.23	54.23	-21.98	-26.73
2	0.24900	10.31	27.21	13.44	37.52	23.75	61.79	51.79	-24.27	-28.04
3	0.48750	10.33	27.03	15.25	37.36	25.58	56.21	46.21	-18.85	-20.63
4	1.23450	10.43	20.61	11.88	31.04	22.31	56.00	46.00	-24.96	-23.69
5	3.30900	10.53	17.52	5.17	28.05	15.70	56.00	46.00	-27.95	-30.30
6	14.10450	10.84	22.49	19.84	33.33	30.68	60.00	50.00	-26.67	-19.32

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.



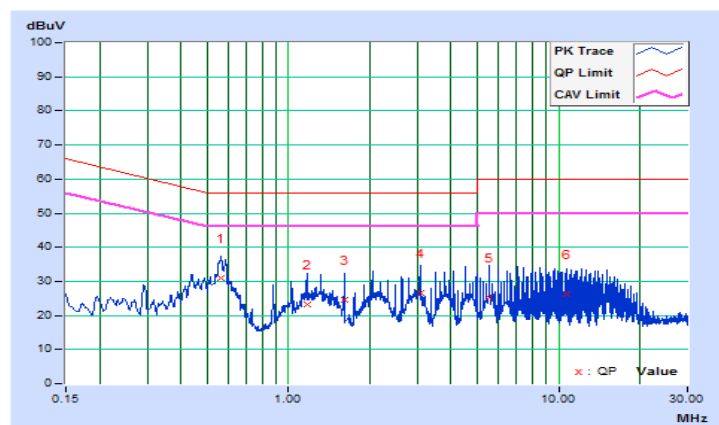
Standby Mode

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	0.56175	10.36	20.78	9.94	31.14	20.30	56.00	46.00	-24.86	-25.70
2	1.17150	10.42	12.92	3.09	23.34	13.51	56.00	46.00	-32.66	-32.49
3	1.60800	10.42	14.32	4.91	24.74	15.33	56.00	46.00	-31.26	-30.67
4	3.07050	10.48	16.13	6.07	26.61	16.55	56.00	46.00	-29.39	-29.45
5	5.55675	10.55	14.71	5.28	25.26	15.83	60.00	50.00	-34.74	-34.17
6	10.67325	10.63	15.75	6.38	26.38	17.01	60.00	50.00	-33.62	-32.99

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.

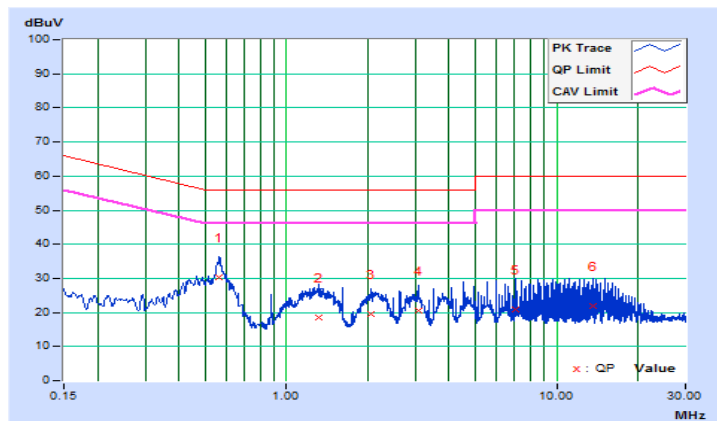


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.56256	10.34	19.98	6.49	30.32	16.83	56.00	46.00	-25.68	-29.17
2	1.31991	10.43	8.25	2.03	18.68	12.46	56.00	46.00	-37.32	-33.54
3	2.04594	10.48	9.18	2.13	19.66	12.61	56.00	46.00	-36.34	-33.39
4	3.07050	10.52	10.15	2.94	20.67	13.46	56.00	46.00	-35.33	-32.54
5	7.01700	10.63	10.37	3.60	21.00	14.23	60.00	50.00	-39.00	-35.77
6	13.59600	10.82	10.93	4.43	21.75	15.25	60.00	50.00	-38.25	-34.75

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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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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