

FCC Test Report

(Co-Located)

Report No.: RFBEKK-WTW-P20080111-5

FCC ID: 2AARN-DLWPH-8M

Test Model: DLWPH-8M

Series Model: DLWPH-8M-RW

Received Date: Aug. 06, 2020

Test Date: Oct. 14, 2020

Issued Date: Oct. 21, 2020

Applicant: PHIHONG TECHNOLOGY CO. LTD.

Address: No.568, Fu Xing 3rd Rd., Guishan, Tao Yuan Hsien, 333 Taiwan

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

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FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBEKK-WTW-P20080111-5	Original Release	Oct. 21, 2020

1 Certificate of Conformity

Product: EV charging system module 4G with WI-FI

Brand: Phihong Technology Co., Ltd.

Test Model: DLWPH-8M

Series Model: DLWPH-8M-RW

Sample Status: Engineering Sample

Applicant: PHIHONG TECHNOLOGY CO. LTD.

Test Date: Oct. 14, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

FCC Part 24, Subpart E

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 : _____, **Date:** Oct. 21, 2020
Lena Wang / Specialist



Approved by : _____, **Date:** Oct. 21, 2020
Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247) FCC Part 24, Subpart E			
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.7 dB at 35.82 MHz.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.40 dB at 3760.00 MHz.

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. This test report shows that colocation requirements are investigated and no emissions were recorded over the appropriate limits.

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) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	EV charging system module 4G with WI-FI		
Brand	Phihong Technology Co., Ltd.		
Test Model	DLWPH-8M		
Series Model	DLWPH-8M-RW		
Model Difference	Refer to Note as below		
Status of EUT	Engineering Sample		
Power Supply Rating	10Vdc~35Vdc (for DC power supply)		
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM	
	WCDMA	QPSK	
	HSDPA	BPSK	
	HSUPA	QPSK	
	LTE	QPSK, 16QAM	
Operating Frequency	WLAN	2412 ~ 2462 MHz	
	WCDMA	WCDMA Band II	1852.4 ~ 1907.6 MHz
		WCDMA Band IV	1712.4 ~ 1752.6 MHz
		WCDMA Band V	826.4 ~ 846.6 MHz
	LTE	LTE Band 2	Channel Bandwidth: 1.4 MHz
			1850.7 ~ 1909.3 MHz
			Channel Bandwidth: 3 MHz
			1851.5 ~ 1908.5 MHz
			Channel Bandwidth: 5 MHz
			1852.5 ~ 1907.5 MHz
	LTE	LTE Band 4	Channel Bandwidth: 10 MHz
			1855.0 ~ 1905.0 MHz
			Channel Bandwidth: 15 MHz
			1857.5 ~ 1902.5 MHz
			Channel Bandwidth: 20 MHz
			1860.0 ~ 1900.0 MHz
	LTE	LTE Band 5	Channel Bandwidth: 1.4 MHz
			1710.7 ~ 1754.3 MHz
			Channel Bandwidth: 3 MHz
			1711.5 ~ 1753.5 MHz
			Channel Bandwidth: 5 MHz
			1712.5 ~ 1752.5 MHz
	LTE	LTE Band 12	Channel Bandwidth: 10 MHz
			1715.0 ~ 1750.0 MHz
			Channel Bandwidth: 15 MHz
			1717.5 ~ 1747.5 MHz
			Channel Bandwidth: 20 MHz
			1720.0 ~ 1745.0 MHz
	LTE	LTE Band 13	Channel Bandwidth: 1.4 MHz
			824.7 ~ 848.3 MHz
			Channel Bandwidth: 3 MHz
			825.5 ~ 847.5 MHz
	LTE	LTE Band 14	Channel Bandwidth: 5 MHz
			826.5 ~ 846.5 MHz
	LTE	LTE Band 14	Channel Bandwidth: 10 MHz
			829 ~ 844 MHz
	LTE	LTE Band 12	Channel Bandwidth: 1.4 MHz
			699.7 ~ 715.3 MHz
			Channel Bandwidth: 3 MHz
			700.5 ~ 714.5 MHz
	LTE	LTE Band 13	Channel Bandwidth: 5 MHz
			701.5 ~ 713.5 MHz
	LTE	LTE Band 14	Channel Bandwidth: 10 MHz
			704.0 ~ 711.0 MHz
	LTE	LTE Band 12	Channel Bandwidth 5MHz
			779.5 ~ 784.5MHz
	LTE	LTE Band 13	Channel Bandwidth 10MHz
			782.0MHz
	LTE	LTE Band 14	Channel Bandwidth 5MHz
			790.5 ~ 795.5MHz

	LTE Band 66	Channel Bandwidth 10MHz	793MHz
		Channel Bandwidth 1.4MHz	1710.7 ~ 1779.3MHz
		Channel Bandwidth 3MHz	1711.5 ~ 1778.5MHz
		Channel Bandwidth 5MHz	1712.5 ~ 1777.5MHz
		Channel Bandwidth 10MHz	1715.0 ~ 1775.0MHz
		Channel Bandwidth 15MHz	1717.5 ~ 1772.5MHz
		Channel Bandwidth 20MHz	1720.0 ~ 1770.0MHz
	LTE Band 71	Channel Bandwidth 5MHz	665.5 ~ 695.5MHz
		Channel Bandwidth 10MHz	668.0 ~ 693.0MHz
		Channel Bandwidth 15MHz	670.5 ~ 690.5MHz
		Channel Bandwidth 20MHz	673.0 ~ 688.0MHz
Number of Channel	2.4 GHz: 11 for 802.11b, 802.11g, 802.11n (HT20), 7 for 802.11n (HT40)		
Antenna Type	Refer to Note as below		
Antenna Connector	Refer to Note as below		
Accessory Device	N/A		
Data Cable Supplied	N/A		

Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

2. All models are listed as below.

Brand	Model	Difference of WLAN Antenna type
Phihong Technology Co., Ltd.	DLWPH-8M	internal antenna
	DLWPH-8M-RW	external antenna

3. The antenna information is listed as below.

Antenna Type	WLAN Antenna Gain (dBi)	
	WLAN 2.4GHz	
PCB	3.15	

Brand	Model	Antenna Gain(dBi)				Antenna Type	Connector Type
		WCDMA Band 4 / LTE Band 4 / 66	LTE Band 12	LTE Band 13	LTE Band 71		
Gortec	DR0727-4201BSM	1.70	-1.09	-3.11	-2.45	PCB	SMA Male

4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

WLAN 2.4GHz:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE≥1G	RE<1G	
-	√	√	-

Where RE≥1G: Radiated Emission above 1 GHz RE<1G: Radiated Emission below 1 GHz

Note: Radiated emission test items chosen the worst maximum power radio band.

Radiated Emission Test (Above 1 GHz):

- 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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11n (HT20) + LTE Band 2	2402 ~ 2462 、 1852.5~1907.5	1 to 11 、 18625 to 19175	06 +18900	OFDM 、 QPSK
	LTE Band 2 + 802.11n (HT20)	1852.5~ 1907.5 、 2402 ~ 2462	18625 to 19175 、 1 to 11	18900 + 06	QPSK 、 OFDM

Radiated Emission Test (Below 1 GHz):

- 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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11n (HT20) + LTE Band 2	2402 ~ 2462 、 1852.5~1907.5	1 to 11 、 18625 to 19175	06 +18900	OFDM 、 QPSK
	LTE Band 2 + 802.11n (HT20)	1852.5~ 1907.5 、 2402 ~ 2462	18625 to 19175 、 1 to 11	18900 + 06	QPSK 、 OFDM

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120Vac, 60Hz	Greg Lin
RE<1G	25 deg. C, 65 % RH	120Vac, 60Hz	Greg Lin

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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
A	DC Power Supply	Topward	33010D	807748	NA
B	Ext. Antenna	Gortec	DR0727-4201BSM	NA	NA

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Power cable	1	1	-	0	-

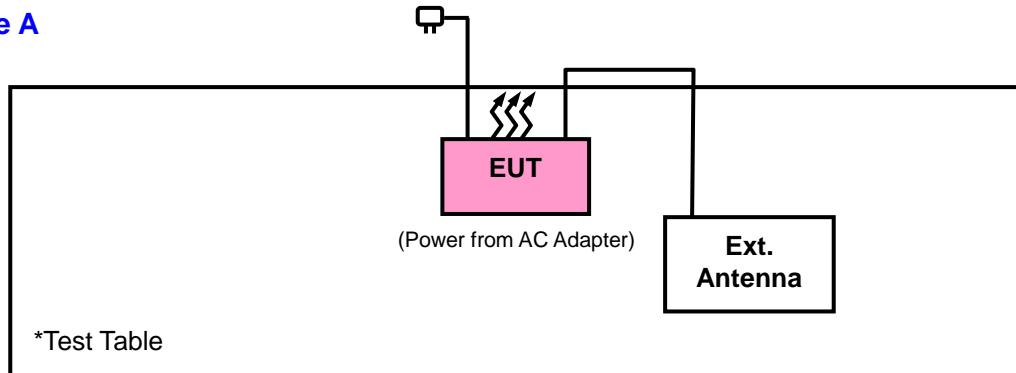
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. DC Power Supply under test table

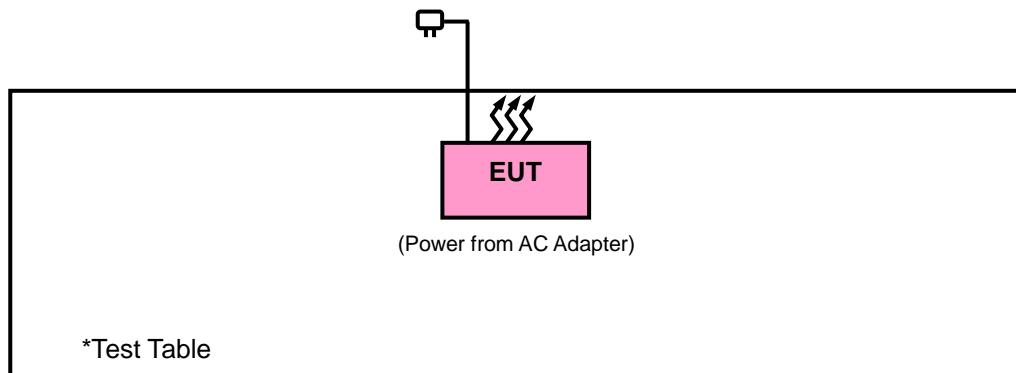
3.3.1 Configuration of System under Test

For WLAN

Mode A



Mode B



For WWAN



Remote site

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 (15.247)

FCC 47 CFR Part 24

ANSI 63.26-2015

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

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

For WLAN

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_{uV/m}) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

For LTE

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit is equal to -13 dBm.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 17, 2020	Sep. 16, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 18, 2020	Feb. 17, 2021
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Jul. 01, 2019	Jun. 30, 2021
DC Power Supply Topward	33010D	807748	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 9.

4.1.3 Test Procedures

For WLAN

For Radiated Emission below 30 MHz

- 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
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 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

For LTE

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- c. E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

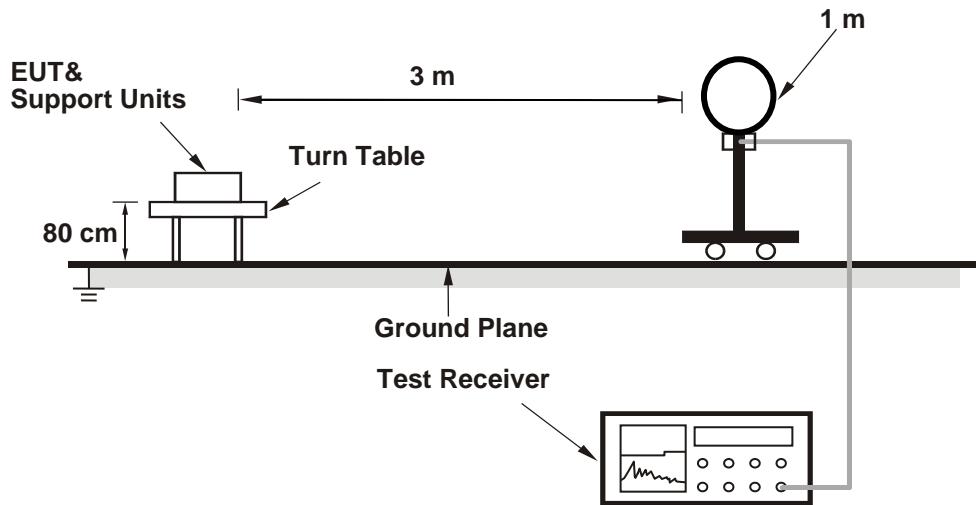
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.1.4 Deviation from Test Standard

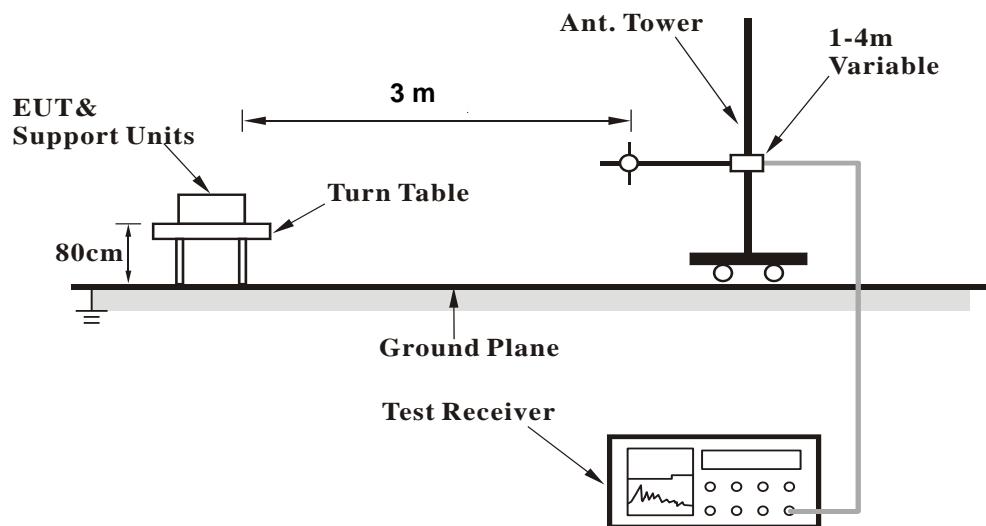
No deviation.

4.1.5 Test Set Up

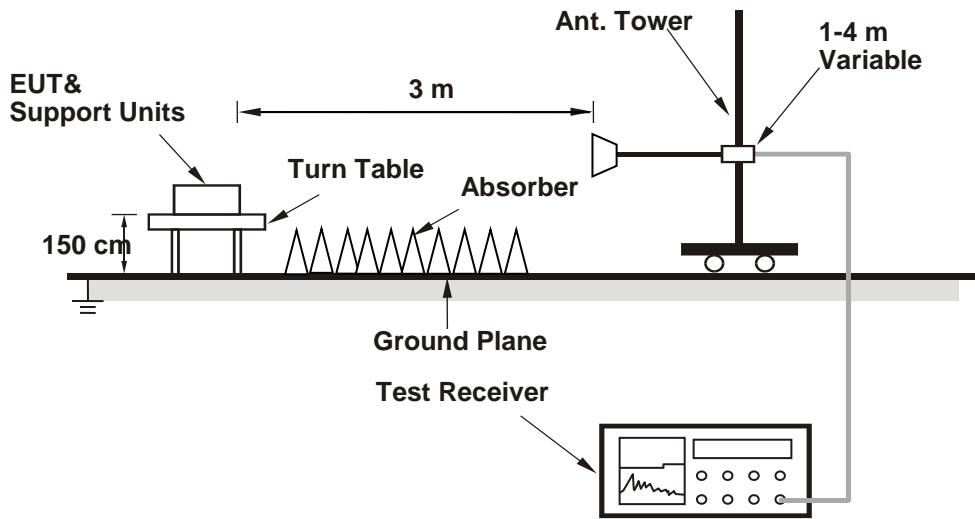
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

802.11n (HT20) + LTE Band 2

Channel	CH 6 + CH 18900	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	100.2 PK			1.43 H	192	69.1	31.1
2	*2437.00	90.3 AV			1.43 H	192	59.2	31.1
3	4874.00	44.4 PK	74.0	-29.6	1.13 H	329	42.4	2.0
4	4874.00	31.4 AV	54.0	-22.6	1.13 H	329	29.4	2.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.2 PK			1.82 V	193	76.1	31.1
2	*2437.00	97.4 AV			1.82 V	193	66.3	31.1
3	4874.00	45.4 PK	74.0	-28.6	1.59 V	172	43.4	2.0
4	4874.00	32.5 AV	54.0	-21.5	1.59 V	172	30.5	2.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

LTE Band 2 + 802.11n (HT20)

Channel	CH 18900 + CH 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m							
No	Frequency (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3760.00	-62.60	-54.10	1.30	-52.80	-13.00	-39.80
Antenna Polarity & Test Distance : Vertical at 3m							
No	Frequency (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3760.00	-59.00	-50.70	1.30	-49.40	-13.00	-36.40

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

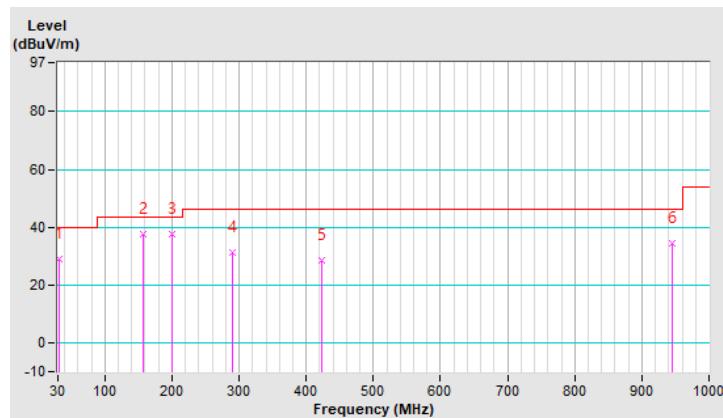
802.11n (HT20) + LTE Band 2

Channel	CH 6 + CH 18900	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	29.1 QP	40.0	-10.9	1.25 H	55	39.8	-10.7
2	157.07	37.5 QP	43.5	-6.0	1.00 H	106	45.8	-8.3
3	200.72	37.7 QP	43.5	-5.8	1.50 H	83	49.3	-11.6
4	290.93	31.3 QP	46.0	-14.7	1.50 H	225	38.6	-7.3
5	423.82	28.6 QP	46.0	-17.4	1.00 H	185	32.9	-4.3
6	944.71	34.3 QP	46.0	-11.7	1.25 H	48	29.0	5.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

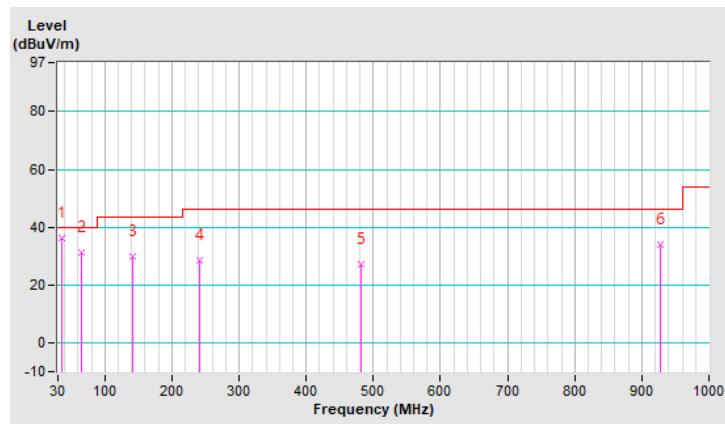


Channel	CH 6 + CH 18900	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.82	36.3 QP	40.0	-3.7	1.25 V	159	46.7	-10.4
2	64.92	31.2 QP	40.0	-8.8	1.00 V	116	41.6	-10.4
3	141.55	29.7 QP	43.5	-13.8	1.25 V	103	38.7	-9.0
4	240.49	28.5 QP	46.0	-17.5	1.00 V	255	37.9	-9.4
5	481.05	27.2 QP	46.0	-18.8	1.50 V	185	30.5	-3.3
6	928.22	33.8 QP	46.0	-12.2	1.00 V	234	28.6	5.2

Remarks:

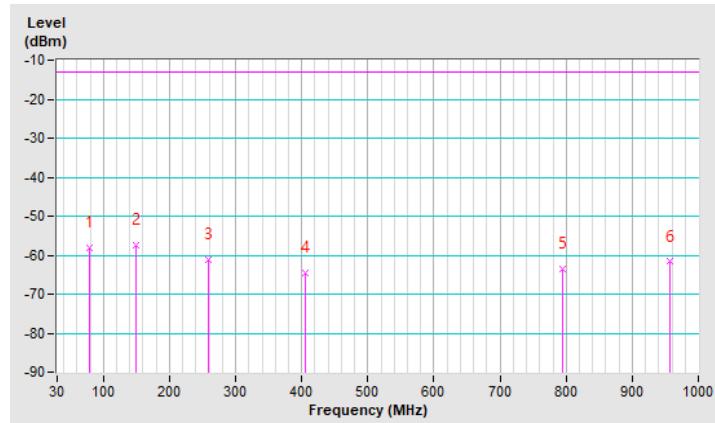
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



LTE Band 2 + 802.11n (HT20)

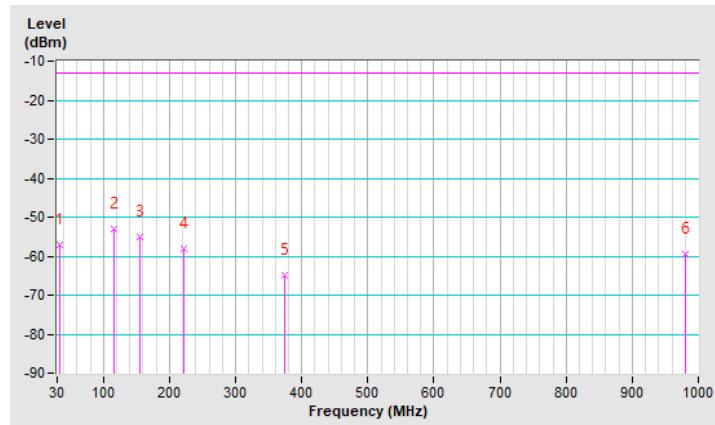
Channel	CH 18900 + CH 6	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m							
No	Frequency (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	78.50	-52.60	-56.10	-2.20	-58.30	-13.00	-45.30
2	148.34	-53.40	-57.40	-0.20	-57.60	-13.00	-44.60
3	258.92	-55.60	-66.40	5.30	-61.10	-13.00	-48.10
4	406.36	-63.50	-69.70	5.20	-64.50	-13.00	-51.50
5	794.36	-69.00	-67.70	4.10	-63.60	-13.00	-50.60
6	957.32	-69.10	-65.60	3.90	-61.70	-13.00	-48.70



Channel	CH 18900 + CH 6	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m							
No	Frequency (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	33.88	-47.40	-45.30	-11.70	-57.00	-13.00	-44.00
2	115.36	-46.50	-53.50	0.30	-53.20	-13.00	-40.20
3	156.10	-54.30	-55.30	0.20	-55.10	-13.00	-42.10
4	222.06	-57.30	-63.50	5.40	-58.10	-13.00	-45.10
5	373.38	-63.60	-70.10	5.30	-64.80	-13.00	-51.80
6	980.60	-69.50	-63.50	3.90	-59.60	-13.00	-46.60



5 Pictures of Test Arrangements

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

Appendix – Information of 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 according to ISO/IEC 17025.

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

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