

## FCC Test Report (Co-Located)

**Report No.:** RF160321D09-2

**FCC ID:** K7SF9K1124V1

**Test Model:** F9K1124V1

**Received Date:** Mar. 21, 2016

**Test Date:** Mar. 23 ~ 30, 2016

**Issued Date:** Apr. 1, 2016

**Applicant:** Belkin International, Inc.

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

**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.)



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

<b>Release Control Record.....</b>	<b>3</b>
<b>1 Certificate of Conformity.....</b>	<b>4</b>
<b>2 Summary of Test Results .....</b>	<b>5</b>
2.1 Measurement Uncertainty.....	5
2.2 Modification Record.....	5
<b>3 General Information.....</b>	<b>6</b>
3.1 General Description of EUT .....	6
3.2 Description of Test Modes .....	8
3.2.1 Test Mode Applicability and Tested Channel Detail.....	10
3.3 Description of Support Units .....	11
3.3.1 Configuration of System under Test .....	12
3.4 General Description of Applied Standard .....	13
<b>4 Test Types and Results.....</b>	<b>14</b>
4.1 Radiated Emission and Bandedge Measurement.....	14
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	14
4.1.2 Test Instruments .....	15
4.1.3 Test Procedure .....	16
4.1.4 Deviation from Test Standard .....	16
4.1.5 Test Setup .....	17
4.1.6 EUT Operating Condition.....	17
4.1.7 Test Results.....	18
4.2 Conducted Emission Measurement .....	20
4.2.1 Limits of Conducted Emission Measurement.....	20
4.2.2 Test Instruments .....	20
4.2.3 Test Procedure .....	21
4.2.4 Deviation from Test Standard .....	21
4.2.5 Test Setup .....	21
4.2.6 EUT Operating Condition.....	21
4.2.7 Test Results.....	22
<b>5 Pictures of Test Arrangements.....</b>	<b>24</b>
<b>Appendix – Information on the Testing Laboratories .....</b>	<b>25</b>



A D T

### Release Control Record

Issue No.	Description	Date Issued
RF160321D09-2	Original release.	Apr. 1, 2016

## 1 Certificate of Conformity

**Product:** AC1900 DB Wi-Fi Dual-Band AC+ Gigabit Router

**Brand:** Belkin

**Test Model:** F9K1124V1

**Sample Status:** Engineering sample

**Applicant:** Belkin International, Inc.

**Test Date:** Mar. 23 ~ 30, 2016

**Standard:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
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 EMC characteristics under the conditions specified in this report.

**Prepared by :**



( Celia Chen / Supervisor )

, **Date:** Apr. 1, 2016

**Approved by :**



( Rex Lai / Assistant Manager )

, **Date:** Apr. 1, 2016

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -6.25dB at 0.40391MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5860.01MHz.

### 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	Expended Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.78 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	AC1900 DB Wi-Fi Dual-Band AC+ Gigabit Router
Brand	Belkin
Test Model	F9K1124V1
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11a\g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 600Mbps 802.11ac: up to 1300Mbps
Operating Frequency	2412 ~ 2462MHz 5180 ~ 5240MHz 5745 ~ 5825MHz
Number of Channel	<b>2412 ~ 2462MHz</b> 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) <b>5180 ~ 5240MHz</b> 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80) <b>5745 ~ 5825MHz</b> 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80)
Output Power	<b>2412 ~ 2462MHz</b> 792.632mW <b>5180 ~ 5240MHz</b> 293.129 mW <b>5745 ~ 5825MHz</b> 406.579mW
Antenna Type	Refer to table as below
Antenna Connector	Refer to table as below
Accessory Device	Adapter
Data Cable Supplied	N/A
Driver Version	V1.04.03
Product SW Version	V1.04.03
Product HW Version	V1.0
Radio SW Version	V1.04.03
Radio HW Version	V1.0

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides three completed transmitters and four receivers.

Modulation Mode	TX FUNCTION
802.11b	3TX
802.11g	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX
802.11ac (20MHz)	3TX
802.11ac (40MHz)	3TX
802.11ac (80MHz)	3TX

\* The modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz and 802.11ac mode for 20MHz / 40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. The following antennas were applied to the EUT:

E. The following antennas were applied to the EOT:						
Antenna	Brand	Model	Type	Connector	Gain (dBi)	
					2.4GHz	5.0GHz
TX & RX						
1	Airgain	N2420DG	Printed	U.FL	2.71	3.05
2	Airgain	N2420DGCS	Printed	U.FL	2.1	2.4
3	Airgain	N2420DG	Printed	U.FL	2.71	3.05
RX						
4	Airgain	N5X20SD	Printed	U.FL	-	3.48

3. The EUT was power supplied from the following power adapters:

Item	Brand	Model No.	Design No.	Plug Type	Rating
Adapter 1	Belkin	MU24-Y120200-A1	MU24-Y1120-AS1S	US	AC I/P: 100-240V, 50/60Hz, 0.7A DC O/P: 12V, 2A Non-shielded DC (1.5m)
	Belkin	MU24-Y120200-C5	MU24-Y1120-KS1S	EU	
	Belkin	MU24-Y120200-A3	MU24-Y1120-ES1S	AU	
	Belkin	MU24-Y120200-B2	MU24-Y1120-IS1S	UK	
	Four adapters are identical with each other except for their plug type difference				
Adapter 2	Belkin	LW0NCA-US1220		US	AC I/P: 100-240V, 50/60Hz, 0.6A DC O/P: 12V, 2A Non-shielded DC (1.5m)
	Belkin	LW0NCA-EU1220		EU	
	Belkin	LW0NCA-UK1220		UK	
	Three adapters are identical with each other except for their plug type difference				

After pre-tested above two adapters, the **Adapter 1** was the worst case, therefore, only its test data was recorded in this report.

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

### 3.2 Description of Test Modes

#### FOR 2412 ~ 2462MHz

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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

7 channels are provided for 802.11n (40MHz):

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



### FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
42	5210MHz

### FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
155	5775MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	
-	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission

#### **Radiated Emission Test (Above 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	MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11g +802.11a	2412 ~ 2462	1	OFDM
		5180 ~ 5240, 5745 ~ 5825	159	OFDM

#### **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	MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11g +802.11a	2412 ~ 2462	1	OFDM
		5180 ~ 5240, 5745 ~ 5825	159	OFDM

#### **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	MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11g +802.11a	2412 ~ 2462	1	OFDM
		5180 ~ 5240, 5745 ~ 5825	159	OFDM

#### **Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	20deg. C, 70%RH	120Vac, 60Hz	Aaron You
RE<1G	22deg. C, 67%RH	120Vac, 60Hz	Aaron You
PLC	23deg. C, 73%RH	120Vac, 60Hz	Aaron You

### 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.	USB 3.0 Hard Disk	WD	WDBACY5000ABL-PESN	WXD1E91JMPR4	FCC DoC Approved	Provided by Lab
B.	LAN Load	NA	NA	NA	NA	Provided by Lab
C.	Notebook PC	DELL	E6530	9331GV1	FCC DoC Approved	Provided by Lab
D.	Notebook PC	DELL	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab
E.	Notebook PC	DELL	E5410	BW33YM1	FCC DoC Approved	Provided by Lab
F.	Notebook PC	Lenovo	L440	R90HE6YK	FCC DoC Approved	Provided by Lab

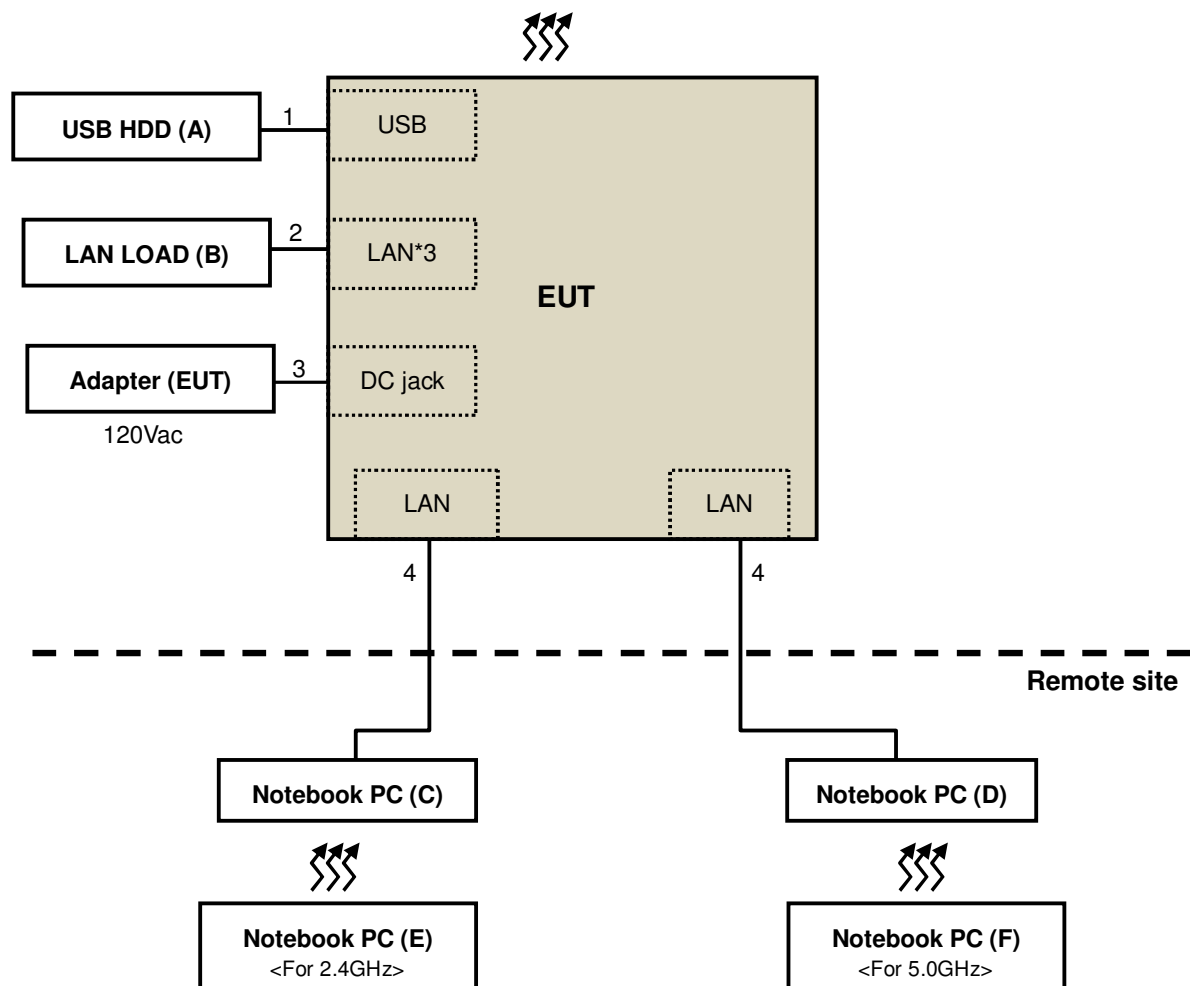
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items C~F acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.5	Y	0	Provided by Lab
2.	LAN cable	3	1.8	N	0	Provided by Lab
3.	DC cable	1	1.5	N	0	Supplied by client
4.	LAN cable	2	10	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

### 3.3.1 Configuration of System under Test



### 3.4 General Description of Applied Standard

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 E (15.407)**  
**KDB 789033 D02 General UNII Test Procedure New Rules v01r01**  
**KDB 662911 D01 Multiple Transmitter Output v02r01**  
**FCC Part 15, Subpart C (15.247)**  
**KDB 558074 D01 DTS Meas Guidance v03r04**  
**KDB 662911 D01 Multiple Transmitter Output v02r01**  
**ANSI C63.10-2013**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000MHz, 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 20dB under any condition of modulation.

#### LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2(dBuV/m) <sup>*1</sup> PK:78.2 (dBuV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge <sup>\*2</sup> within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2016	Feb. 25, 2017
HP Preamplifier	8449B	3008A01201	Feb. 26, 2016	Feb. 25, 2017
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2016	Feb. 28, 2017
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 02, 2016	Feb. 01, 2017
Schwarzbeck Antenna	VULB 9168	139	Jan. 04, 2016	Jan. 03, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Jan. 08, 2016	Jan. 07, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Jan. 21, 2016	Jan. 20, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 04, 2015	May 03, 2016
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 14, 2015	Jul. 13, 2016
EMCO Horn Antenna	3115	00028257	Jan. 19, 2016	Jan. 18, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2015	Apr. 20, 2016
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2015	Apr. 20, 2016

- NOTE:**
1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
  2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  3. The test was performed in Chamber No. 6.
  4. The Industry Canada Reference No. IC 7450E-6.
  5. The FCC Site Registration No. is 447212.

#### 4.1.3 Test Procedure

- 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. All modes of operation were investigated and the worst-case emissions are reported.

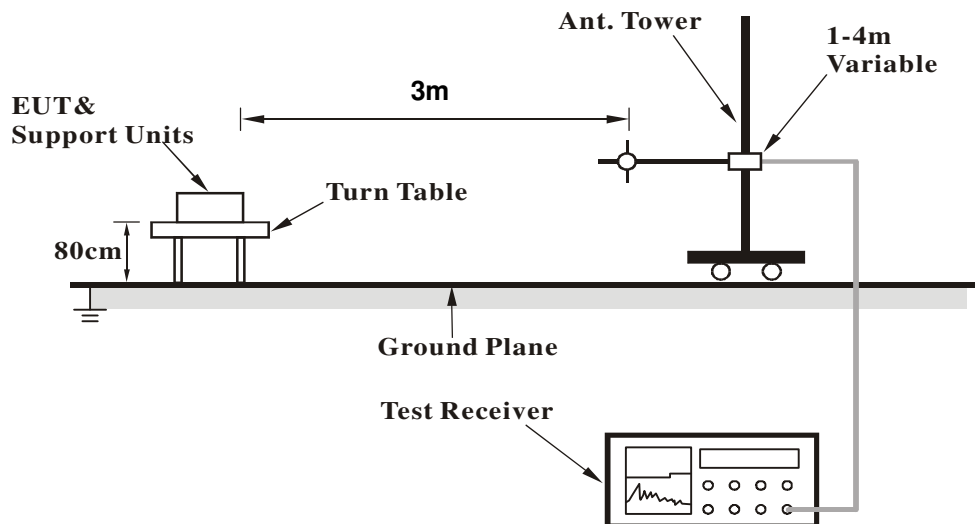
#### 4.1.4 Deviation from Test Standard

No deviation.

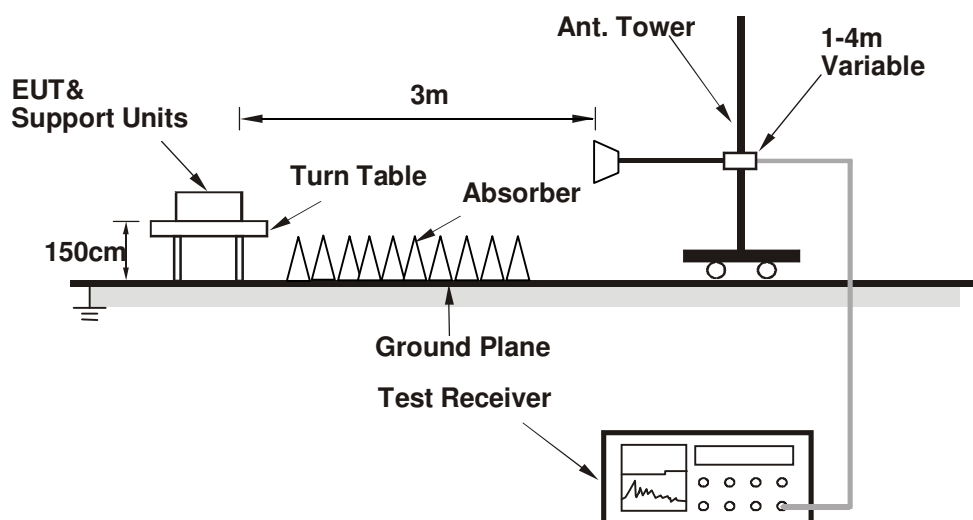


#### 4.1.5 Test Setup

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.1.6 EUT Operating Condition

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".
- The necessary accessories enable the system in full functions.

#### 4.1.7 Test Results

#### ABOVE 1GHz DATA

<b>CHANNEL</b>	TX Channel 1 + 159	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	2390.00	71.3 PK	74.0	-2.7	2.58 H	267	70.13	1.19
2	2390.00	52.8 AV	54.0	-1.2	2.58 H	267	51.60	1.19
3	*2412.00	115.8 PK			2.58 H	267	114.49	1.34
4	*2412.00	105.4 AV			2.58 H	267	104.06	1.34
5	4824.00	48.7 PK	74.0	-25.3	1.79 H	300	40.85	7.84
6	4824.00	34.6 AV	54.0	-19.4	1.79 H	300	26.78	7.84
7	*5795.00	108.9 PK			2.88 H	288	98.65	10.24
8	*5795.00	98.7 AV			2.88 H	288	88.46	10.24
9	#5850.00	71.6 PK	78.2	-6.6	2.88 H	288	61.34	10.29
10	#5860.01	67.2 PK	68.2	-1.0	2.88 H	288	56.88	10.30
11	11590.00	63.7 PK	74.0	-10.3	1.63 H	280	41.32	22.37
12	11590.00	52.5 AV	54.0	-1.6	1.63 H	280	30.08	22.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	2390.00	68.1 PK	74.0	-5.9	2.69 V	283	66.88	1.19
2	2390.00	50.0 AV	54.0	-4.0	2.69 V	283	48.79	1.19
3	*2412.00	113.9 PK			2.69 V	283	112.56	1.34
4	*2412.00	104.7 AV			2.69 V	283	103.38	1.34
5	4824.00	46.5 PK	74.0	-27.5	1.33 V	200	38.69	7.84
6	4824.00	33.2 AV	54.0	-20.8	1.33 V	200	25.33	7.84
7	*5795.00	104.4 PK			1.72 V	275	94.14	10.24
8	*5795.00	95.7 AV			1.72 V	275	85.44	10.24
9	#5850.00	62.9 PK	78.2	-15.3	1.72 V	275	52.59	10.29
10	#5860.01	62.3 PK	68.2	-5.9	1.72 V	275	52.03	10.30
11	11590.00	62.3 PK	74.0	-11.7	2.28 V	251	39.93	22.37
12	11590.00	50.3 AV	54.0	-3.7	2.28 V	251	27.92	22.37

#### REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " \* ": Fundamental frequency.
- " # ": The radiated frequency is out of the restricted band.

# BELOW 1GHz DATA

CHANNEL	TX Channel 1 + 159	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	30.44	32.0 QP	40.0	-8.0	4.00 H	91	43.50	-11.49
2	70.35	32.0 QP	40.0	-8.0	4.00 H	227	43.43	-11.40
3	98.14	33.4 QP	43.5	-10.1	4.00 H	252	47.86	-14.47
4	163.47	32.1 QP	43.5	-11.4	3.81 H	250	41.48	-9.35
5	223.61	32.9 QP	46.0	-13.1	2.94 H	79	44.71	-11.81
6	579.99	39.6 QP	46.0	-6.4	1.36 H	104	41.64	-2.05
7	901.88	37.4 QP	46.0	-8.6	1.00 H	81	34.04	3.34
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	35.26	38.7 QP	40.0	-1.3	1.33 V	131	49.76	-11.03
2	62.64	37.9 QP	40.0	-2.1	1.25 V	0	48.30	-10.39
3	125.01	36.7 QP	43.5	-6.9	1.00 V	125	48.13	-11.48
4	258.14	31.6 QP	46.0	-14.4	2.06 V	121	40.88	-9.25
5	386.72	31.0 QP	46.0	-15.0	2.43 V	111	36.80	-5.81
6	575.53	37.7 QP	46.0	-8.3	2.88 V	136	39.80	-2.10
7	966.68	36.6 QP	54.0	-17.5	3.17 V	116	31.54	5.01

## 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
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Apr. 01, 2015	Mar. 31, 2016
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101197	Apr. 27, 2015	Apr. 26, 2016
LISN With Adapter (for EUT)	AD10	C10Ada-002	Apr. 27, 2015	Apr. 26, 2016
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 25, 2015	Nov. 24, 2016
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 06, 2015	May 05, 2016
Software	Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C10.01	Feb. 15, 2016	Feb. 14, 2017
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-011484	May 19, 2015	May 18, 2016
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 13, 2015	Nov. 12, 2016

Notes: 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 Shielded Room No. 10.

3. The VCCI Site Registration No. C-1852.

#### 4.2.3 Test Procedure

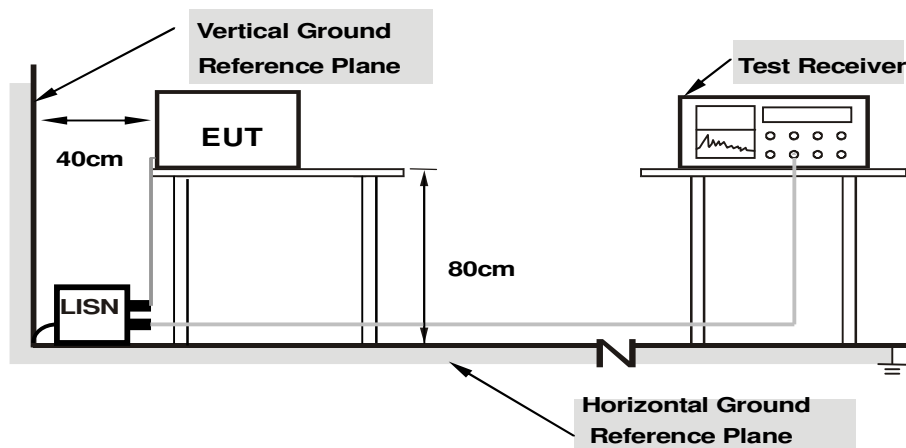
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

#### 4.2.6 EUT Operating Condition

Same as 4.1.6.

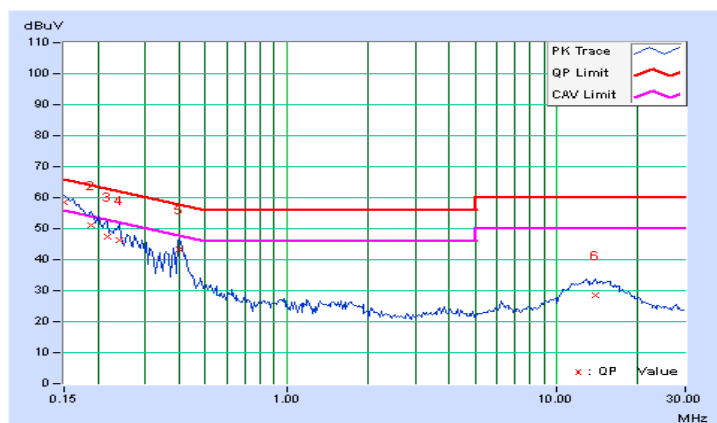
#### 4.2.7 Test Results

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

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15001	9.66	48.99	36.02	58.65	45.68	66.00	56.00	-7.35	-10.32
2	0.18906	9.65	41.40	28.79	51.05	38.44	64.08	54.08	-13.03	-15.64
3	0.21641	9.65	37.63	25.90	47.28	35.55	62.96	52.96	-15.67	-17.40
4	0.23984	9.66	36.72	26.15	46.38	35.81	62.10	52.10	-15.73	-16.30
5	0.40000	9.68	33.83	31.33	43.51	41.01	57.85	47.85	-14.34	-6.84
6	13.87500	10.19	18.35	13.54	28.54	23.73	60.00	50.00	-31.46	-26.27

#### 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

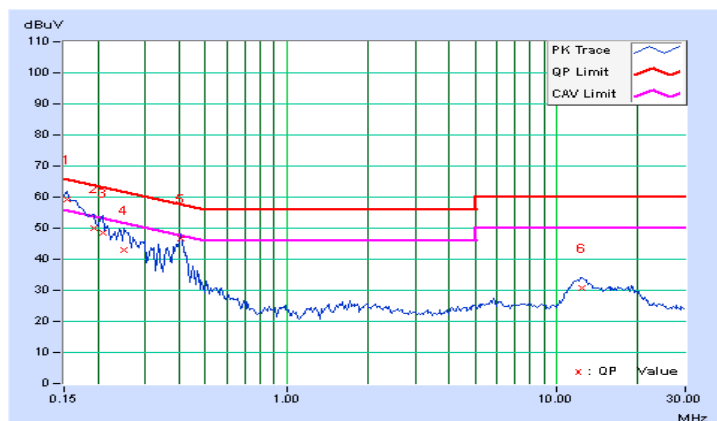


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.69	49.45	36.42	59.14	46.11	65.79	55.79	-6.65	-9.68
2	0.19297	9.69	40.37	28.65	50.06	38.34	63.91	53.91	-13.85	-15.57
3	0.20859	9.69	38.73	25.90	48.42	35.59	63.26	53.26	-14.84	-17.67
4	0.25156	9.70	33.28	23.01	42.98	32.71	61.71	51.71	-18.73	-19.00
5	<b>0.40391</b>	<b>9.72</b>	<b>36.91</b>	<b>31.80</b>	<b>46.63</b>	<b>41.52</b>	<b>57.77</b>	<b>47.77</b>	<b>-11.14</b>	<b>-6.25</b>
6	12.39844	10.25	20.41	15.17	30.66	25.42	60.00	50.00	-29.34	-24.58

#### 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 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 Lab/Telecom Lab**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---