

FCC TEST REPORT

(CO-LOCATED)

REPORT NO.: RF120302C15E-1

MODEL NO.: DIR-836L

FCC ID: KA2IR636LA1

RECEIVED: Sep. 08, 2012

TESTED: Oct. 08 ~ Oct. 10, 2012

ISSUED: Oct. 11, 2012

APPLICANT: D-Link Corporation

ADDRESS: 17595 Mt. Hermann, Fountain Valley, CA 92708,
U.S.A.

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 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 Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120302C15E-1	Original release	Oct. 11, 2012



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1. CERTIFICATION

PRODUCT: Wireless N750 Dual Band Gigabit Cloud Router
(refer to item 3.1 for more detail)

MODEL NO.: DIR-836L

BRAND: D-Link

APPLICANT: D-Link Corporation

TESTED: Oct. 08 ~ Oct. 10, 2012

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10-2009

The above equipment (Model: DIR-836L) 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 :  , **DATE** : Oct. 11, 2012
Pettie Chen / Senior Specialist

APPROVED BY :  , **DATE** : Oct. 11, 2012
Ken Liu / Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207 15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.63dB at 10.53887MHz.
15.247(d) 15.407(b)(1/2/3) (b)(5)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.8dB at 375.32MHz.

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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wireless N750 Dual Band Gigabit Cloud Router (refer to NOTE for more detail)
MODEL NO.	DIR-836L
POWER SUPPLY	12Vdc (adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	123.32mW
ANTENNA TYPE	PCB antenna with 0dBi gain
ANTENNA CONNECTOR	UFL
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. A Certified 5G WLAN module (FCC ID: KA2IR836LMO1) is installed in this device.
2. The following product names are provided to this EUT.

PRODUCT NAME	DESCRIPTION
Wireless N750 Dual Band Gigabit Cloud Router	All product names are electrically identical, different product names are for marketing purpose.
Cloud Router 2500	

3. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

4. The EUT consumes power from the following adapter.

ADAPTER 1	
BRAND:	D-Link
MODEL:	CG2412-B IW
INPUT:	100-240Vac, 0.6A, 50-60Hz
OUTPUT:	+12Vdc, 2A
POWER LINE:	1.5m non-shielded cable without core

ADAPTER 2	
BRAND:	D-Link
MODEL:	SAG024F 4 US 24.0W
INPUT:	100-240Vac, 47-63Hz, 0.8A
OUTPUT:	12.0Vdc, 2.0A
POWER LINE:	1.5m non-shielded cable without core

ADAPTER 3 (New adapter)	
BRAND:	Atech OEM Inc.
MODEL:	ADS0271-W 120200
INPUT:	100-240Vac, 50-60Hz, 0.6A
OUTPUT:	12.0V / 2.0A
POWER LINE:	1.1m non-shielded cable without core

*After radiated emission pre-testing, adapter 3 is the worst case for final test.

5. 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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE>1G	RE<1G	CE	
-	√	√	√	EUT with Adapter 2

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
CE: Conducted Emission Measurement

NOTE:

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

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. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz) + 802.11an (40MHz)	2412-2462	1 to 11	11 + 38	OFDM	BPSK	7.2
		5190-5230	38 to 46		OFDM	BPSK	15.0
	802.11n (20MHz) + 802.11an (20MHz)	2412-2462	1 to 11	11 + 157	OFDM	BPSK	7.2
		5745-5825	149 to 165		OFDM	BPSK	7.2

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. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz) + 802.11an (40MHz)	2412-2462	1 to 11	11 + 38	OFDM	BPSK	7.2
		5190-5230	38 to 46		OFDM	BPSK	15.0
	802.11n (20MHz) + 802.11an (20MHz)	2412-2462	1 to 11	11 + 157	OFDM	BPSK	7.2
		5745-5825	149 to 165		OFDM	BPSK	7.2

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. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
	802.11n (20MHz) + 802.11an (40MHz)	2412-2462	1 to 11	11 + 38	OFDM	BPSK	7.2
		5190-5230	38 to 46		OFDM	BPSK	15.0
	802.11n (20MHz) + 802.11an (20MHz)	2412-2462	1 to 11	11 + 157	OFDM	BPSK	7.2
		5745-5825	149 to 165		OFDM	BPSK	7.2

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE>1G	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Anderson Hong
CE	25deg. C, 65%RH	120Vac, 60Hz	Chris 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.

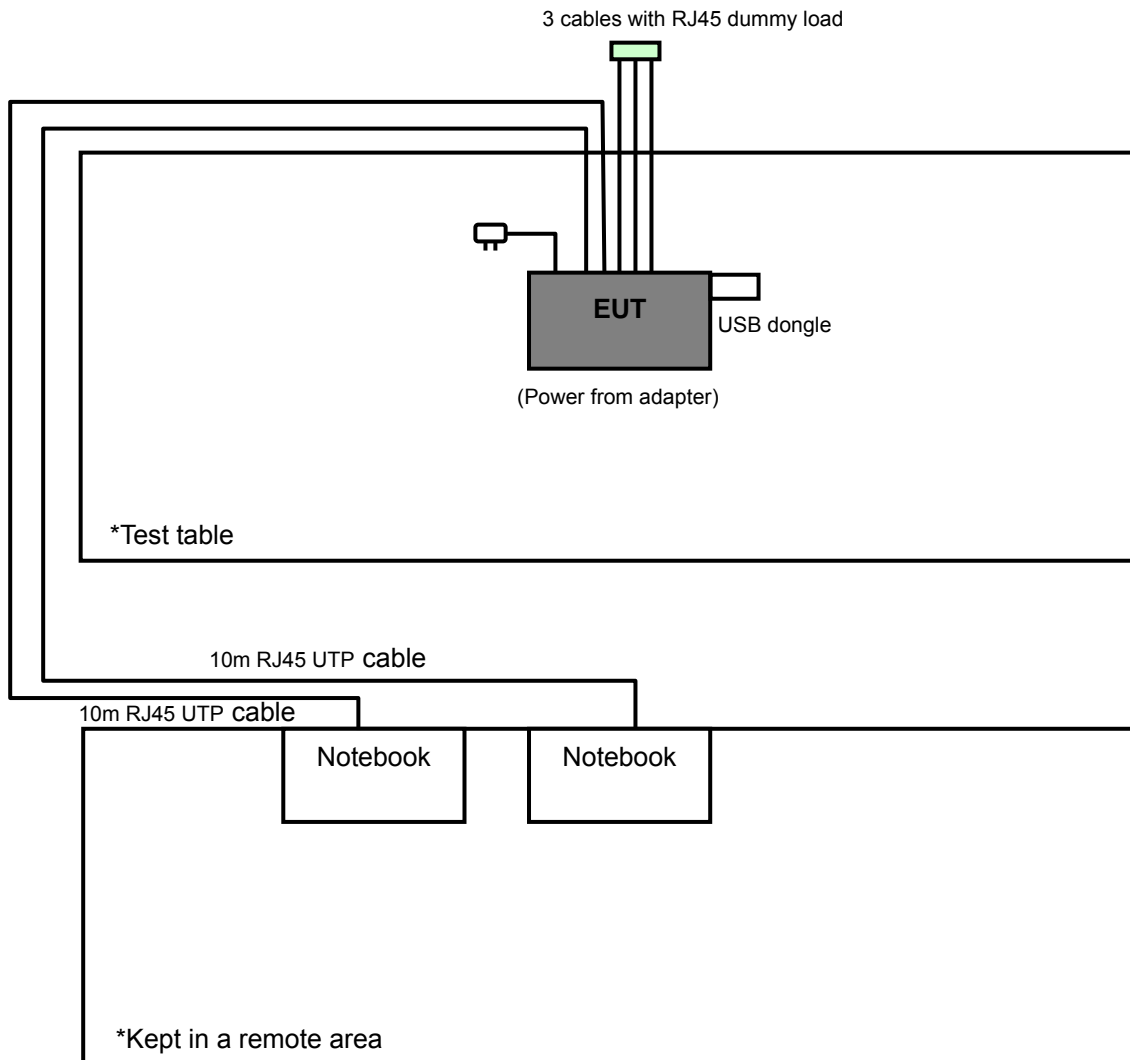
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	E5410	1HC2XM1	FCC DoC Approved
2	NOTEBOOK	DELL	E5420	33MJMQ1	FCC DoC Approved
3	USB DONGLE	TRANSCEND	V85	569992-8206	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable
2	10m RJ45 UTP cable
3	NA

NOTE:

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

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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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 (Section 15.247)

FCC Part 15, Subpart E (Section 15.407)

558074 D01 DTS Meas Guidance v01

789033 D01 General UNII Test Procedures v01r01

ANSI C63.10-2009

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

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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 (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) *NOTE 3
	PK	PK
5150 ~ 5250	-27	68.3

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

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 03, 2012	Jan. 02, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP 40	100039	Feb. 03, 2012	Feb. 02, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2012	Jan. 04, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10738	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Nov. 03, 2011	Nov. 02, 2012
Software ADT	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT	TT100.	TT93021704	NA	NA
Turn Table Controller ADT	SC100.	SC93021704	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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 4.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 460141.
 6. The IC Site Registration No. is IC7450F-4.

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

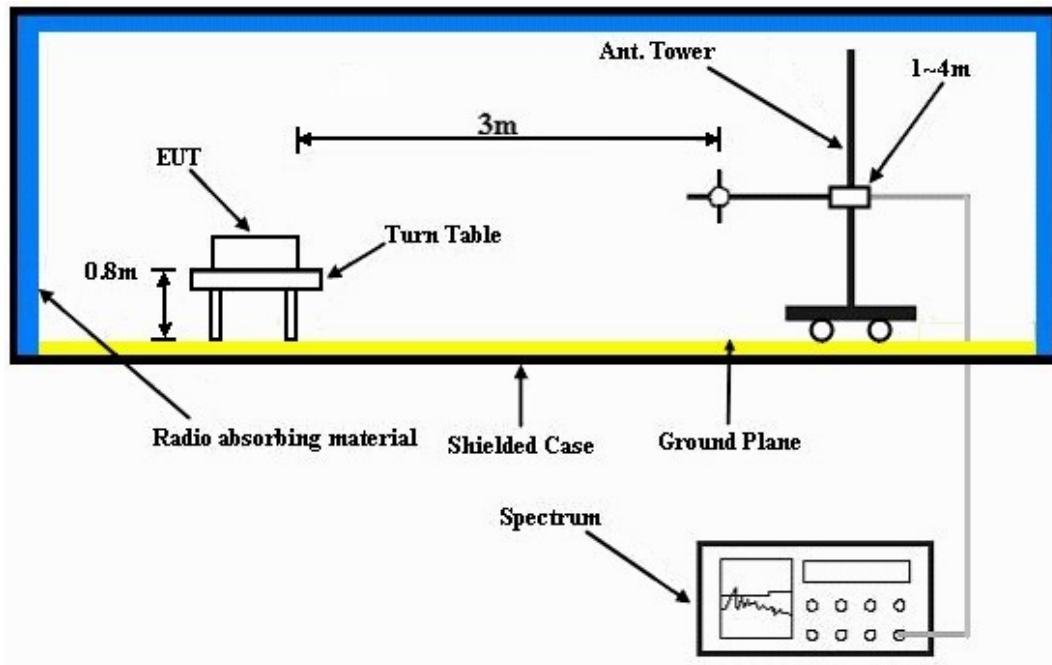
NOTE:

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

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- Prepared notebooks to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and run 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.

4.1.8 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

802.11n (20MHz) + 802.11an (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	*2462.00	107.7 PK			1.26 H	241	76.47	31.23
2	*2462.00	98.3 AV			1.26 H	241	67.07	31.23
3	2483.50	62.3 PK	74.0	-11.7	1.26 H	241	30.99	31.31
4	2483.50	46.4 AV	54.0	-7.6	1.26 H	241	15.09	31.31
5	2728.00	56.2 PK	74.0	-17.8	1.23 H	221	24.20	32.02
6	2728.00	45.3 AV	54.0	-8.7	1.23 H	221	13.30	32.02
7	4924.00	54.5 PK	74.0	-19.5	1.30 H	228	17.22	37.28
8	4924.00	40.0 AV	54.0	-14.0	1.30 H	228	2.72	37.28
9	5150.00	53.9 PK	74.0	-20.1	1.02 H	49	16.13	37.77
10	5150.00	40.9 AV	54.0	-13.1	1.02 H	49	3.13	37.77
11	*5190.00	105.3 PK			1.02 H	49	67.46	37.84
12	*5190.00	95.2 AV			1.02 H	49	57.36	37.84
13	7500.00	51.6 PK	74.0	-22.4	1.33 H	113	7.48	44.12
14	7500.00	39.0 AV	54.0	-15.0	1.33 H	113	-5.12	44.12
15	#10380.00	57.1 PK	68.3	-11.2	1.35 H	135	8.30	48.80

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.

5. “ * “: Fundamental frequency.

6. The limit value is defined as per 15.247.

7. “ # “: The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	*2462.00	109.4 PK			1.00 V	331	78.17	31.23
2	*2462.00	100.3 AV			1.00 V	331	69.07	31.23
3	2483.50	69.2 PK	74.0	-4.8	1.00 V	15	37.89	31.31
4	2483.50	49.5 AV	54.0	-4.5	1.00 V	15	18.19	31.31
5	2728.00	56.6 PK	74.0	-17.4	1.00 V	73	24.60	32.02
6	2728.00	45.3 AV	54.0	-8.7	1.00 V	73	13.30	32.02
7	4924.00	43.3 PK	74.0	-30.7	1.21 V	321	6.02	37.28
8	4924.00	33.4 AV	54.0	-20.6	1.21 V	321	-3.88	37.28
9	5150.00	54.0 PK	74.0	-20.0	1.08 V	333	16.23	37.77
10	5150.00	40.6 AV	54.0	-13.4	1.08 V	333	2.83	37.77
11	*5190.00	104.4 PK			1.08 V	333	66.56	37.84
12	*5190.00	94.3 AV			1.08 V	333	56.46	37.84
13	7500.00	50.7 PK	74.0	-23.3	1.42 V	33	6.58	44.12
14	7500.00	37.9 AV	54.0	-16.1	1.42 V	33	-6.22	44.12
15	#10380.00	57.6 PK	68.3	-10.7	1.00 V	69	8.80	48.80

- 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.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. “#”: The radiated frequency is out the restricted band.

802.11n (20MHz) + 802.11an (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	*2462.00	107.7 PK			1.30 H	245	76.47	31.23
2	*2462.00	98.2 AV			1.30 H	245	66.97	31.23
3	2483.50	62.6 PK	74.0	-11.4	1.30 H	245	31.29	31.31
4	2483.50	46.7 AV	54.0	-7.3	1.30 H	245	15.39	31.31
5	#3224.00	40.3 PK	87.7	-47.4	1.12 H	53	7.30	33.04
6	#3224.00	27.5 AV	78.2	-50.7	1.12 H	53	-5.50	33.04
7	4924.00	52.5 PK	74.0	-21.5	1.00 H	123	15.22	37.28
8	4924.00	37.8 AV	54.0	-16.2	1.00 H	123	0.52	37.28
9	*5785.00	111.6 PK			1.15 H	42	72.70	38.87
10	*5785.00	101.4 AV			1.15 H	42	62.50	38.87
11	7500.00	51.0 PK	74.0	-23.0	1.36 H	111	6.89	44.12
12	7500.00	38.4 AV	54.0	-15.6	1.36 H	111	-5.71	44.12
13	11570.00	62.7 PK	74.0	-11.3	1.15 H	63	13.49	49.21
14	11570.00	49.7 AV	54.0	-4.3	1.15 H	63	0.49	49.21

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.
5. “ * ”: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “ # ”: The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	*2462.00	109.7 PK			1.00 V	338	78.50	31.23
2	*2462.00	100.6 AV			1.00 V	338	69.40	31.23
3	2483.50	69.4 PK	74.0	-4.6	1.00 V	10	38.09	31.31
4	2483.50	49.8 AV	54.0	-4.2	1.00 V	10	18.49	31.31
5	#3224.00	40.9 PK	89.7	-48.8	1.08 V	234	7.90	33.04
6	#3224.00	27.9 AV	80.6	-52.7	1.08 V	234	-5.10	33.04
7	4924.00	43.7 PK	74.0	-30.3	1.25 V	318	6.42	37.28
8	4924.00	33.8 AV	54.0	-20.2	1.25 V	318	-3.48	37.28
9	*5785.00	113.7 PK			1.00 V	35	74.83	38.87
10	*5785.00	103.7 AV			1.00 V	35	64.83	38.87
11	7500.00	50.2 PK	74.0	-23.8	1.49 V	36	6.09	44.12
12	7500.00	37.4 AV	54.0	-16.6	1.49 V	36	-6.71	44.12
13	11570.00	59.8 PK	74.0	-14.2	1.15 V	330	10.59	49.21
14	11570.00	46.6 AV	54.0	-7.4	1.15 V	330	-2.61	49.21

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.
5. “ * “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.

BELOW 1GHz WORST-CASE DATA

802.11n (20MHz) + 802.11an (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 38	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	111.48	35.0 QP	43.5	-8.5	1.25 H	72	24.35	10.69
2	249.22	38.4 QP	46.0	-7.6	1.25 H	172	25.42	12.94
3	375.32	43.2 QP	46.0	-2.8	2.00 H	191	26.33	16.86
4	625.58	41.2 QP	46.0	-4.9	1.25 H	219	18.61	22.54
5	749.74	42.3 QP	46.0	-3.7	1.00 H	236	18.21	24.08
6	875.84	42.6 QP	46.0	-3.4	1.50 H	243	16.46	26.16
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	35.82	37.1 QP	40.0	-2.9	1.00 V	119	24.64	12.50
2	72.68	33.3 QP	40.0	-6.7	1.00 V	262	21.63	11.65
3	375.32	36.0 QP	46.0	-10.0	1.00 V	271	19.16	16.86
4	466.50	37.9 QP	46.0	-8.1	1.25 V	304	18.68	19.24
5	625.58	40.8 QP	46.0	-5.2	1.50 V	197	18.30	22.54
6	875.84	42.3 QP	46.0	-3.8	1.00 V	247	16.09	26.16

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.



A D T

802.11n (20MHz) + 802.11an (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 11 + CH 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anderson Hong

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	111.48	34.4 QP	43.5	-9.2	1.50 H	61	23.66	10.69
2	249.22	37.3 QP	46.0	-8.7	1.00 H	179	24.37	12.94
3	375.32	39.9 QP	46.0	-6.1	1.25 H	17	23.07	16.86
4	625.58	39.6 QP	46.0	-6.4	1.25 H	36	17.08	22.54
5	749.74	41.8 QP	46.0	-4.2	1.00 H	233	17.74	24.08
6	875.84	43.0 QP	46.0	-3.1	1.50 H	233	16.79	26.16
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	37.76	36.8 QP	40.0	-3.2	1.00 V	94	23.98	12.81
2	375.32	35.3 QP	46.0	-10.7	1.50 V	320	18.45	16.86
3	466.50	37.4 QP	46.0	-8.6	1.00 V	302	18.13	19.24
4	625.58	38.6 QP	46.0	-7.4	1.00 V	114	16.08	22.54
5	749.74	39.6 QP	46.0	-6.4	1.25 V	62	15.55	24.08
6	837.04	42.0 QP	46.0	-4.0	1.50 V	205	16.28	25.71

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 OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 2013
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 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

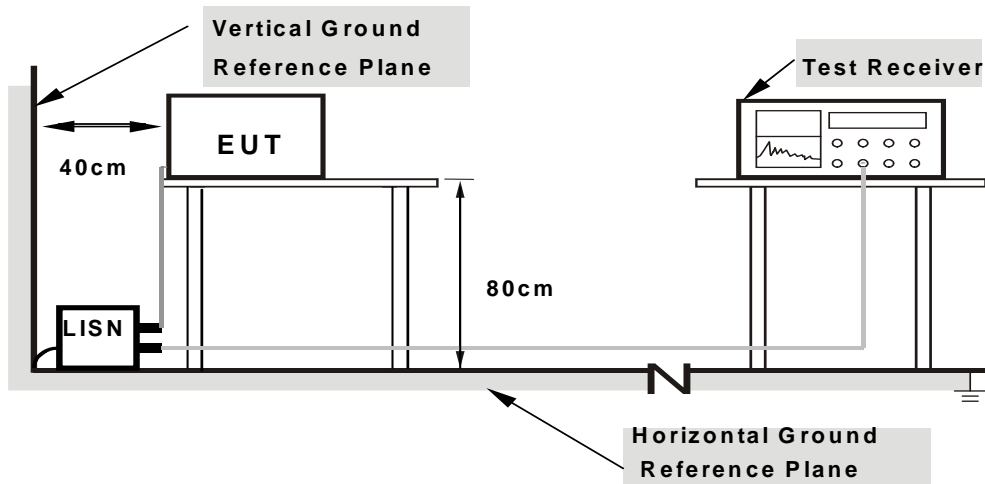
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. 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 CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

For 2.4GHz band + 5GHz Band 1

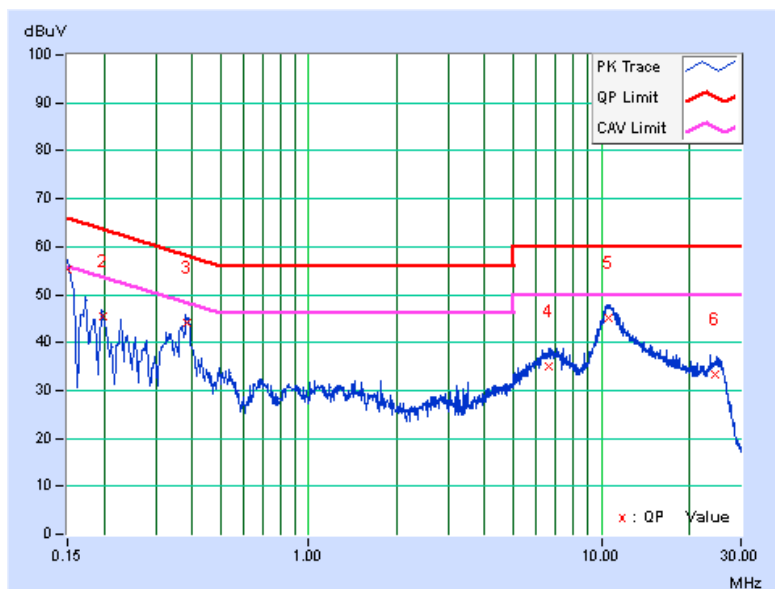
CONDUCTED WORST-CASE DATA: 802.11n (20MHz) + 802.11an (40MHz)

CHANNEL	CH 11 + CH 38	6dB BANDWIDTH	9kHz
PHASE	Line 1		

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	0.11	55.07	38.57	55.18	38.68	66.00	56.00	-10.82	-17.32
2	0.19717	0.13	45.35	31.90	45.48	32.03	63.73	53.73	-18.25	-21.70
3	0.38604	0.13	44.03	37.10	44.16	37.23	58.15	48.15	-13.99	-10.92
4	6.58195	0.47	34.39	29.47	34.86	29.94	60.00	50.00	-25.14	-20.06
5	10.53887	0.67	44.28	39.70	44.95	40.37	60.00	50.00	-15.05	-9.63
6	24.38418	1.38	31.90	27.77	33.28	29.15	60.00	50.00	-26.72	-20.85

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.

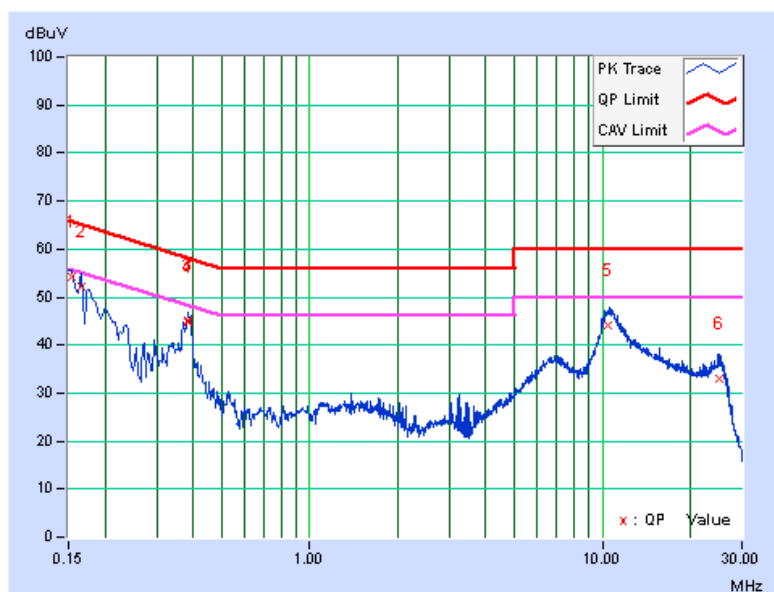


CHANNEL	CH 11 + CH 38	6dB BANDWIDTH	9kHz
PHASE	Line 2		

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	0.15391	0.13	54.23	38.97	54.36	39.10	65.79	55.79	-11.43	-16.69
2	0.16526	0.13	52.07	36.37	52.20	36.50	65.20	55.20	-13.00	-18.70
3	0.38199	0.15	44.83	37.79	44.98	37.94	58.24	48.24	-13.26	-10.30
4	0.38460	0.15	44.76	38.11	44.91	38.26	58.18	48.18	-13.27	-9.92
5	10.41766	0.61	43.54	39.07	44.15	39.68	60.00	50.00	-15.85	-10.32
6	24.95895	1.14	32.02	27.90	33.16	29.04	60.00	50.00	-26.84	-20.96

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.



For 2.4GHz band + 5GHz Band 4

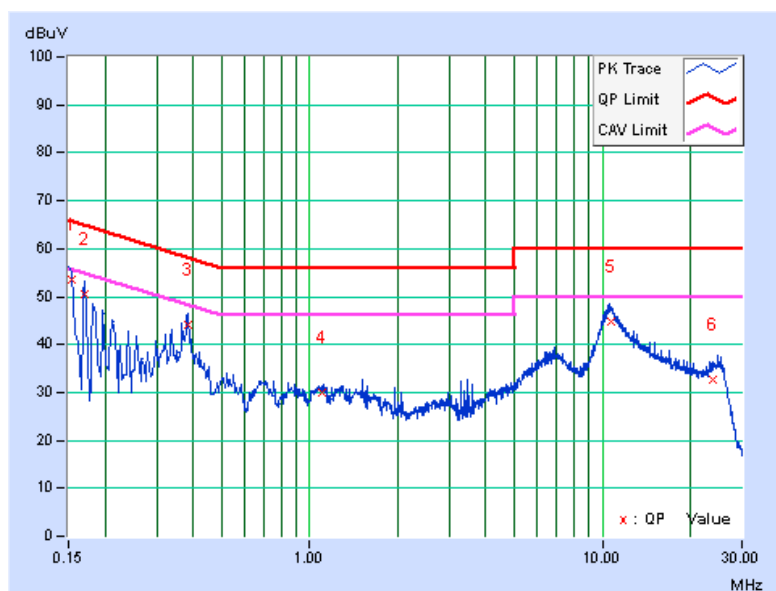
802.11an (20MHz)

CHANNEL	CH 11 + CH 157	6dB BANDWIDTH	9kHz
PHASE	Line 1		

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	0.15391	0.12	53.28	37.86	53.40	37.98	65.79	55.79	-12.39	-17.81
2	0.16967	0.12	50.50	35.29	50.62	35.41	64.98	54.98	-14.36	-19.57
3	0.38199	0.13	43.96	36.49	44.09	36.62	58.24	48.24	-14.15	-11.62
4	1.09593	0.19	29.68	23.56	29.87	23.75	56.00	46.00	-26.13	-22.25
5	10.70584	0.68	43.94	39.47	44.62	40.15	60.00	50.00	-15.38	-9.85
6	23.77422	1.35	31.36	27.30	32.71	28.65	60.00	50.00	-27.29	-21.35

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.

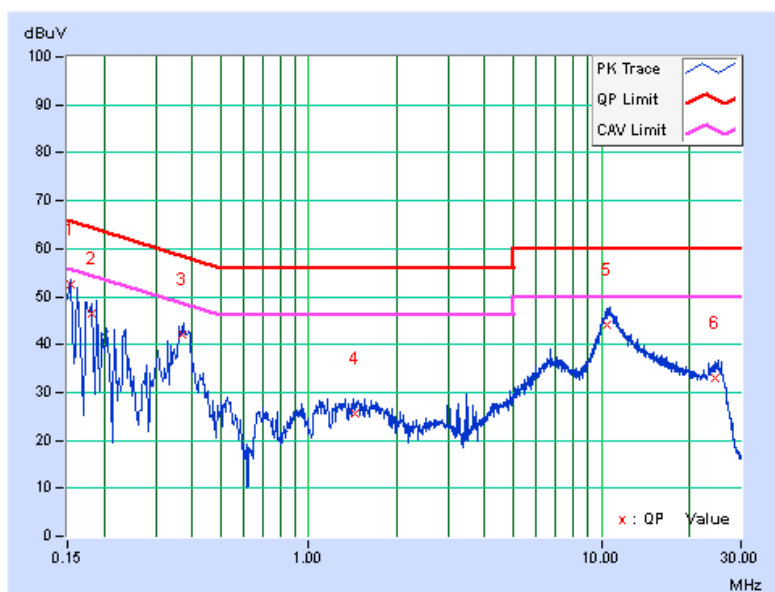


CHANNEL	CH 11 + CH 157	6dB BANDWIDTH	9kHz
PHASE	Line 2		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.13	52.39	38.40	52.52	38.53	65.79	55.79	-13.27	-17.26
2	0.18075	0.13	46.28	29.78	46.41	29.91	64.45	54.45	-18.04	-24.54
3	0.36816	0.15	41.93	35.04	42.08	35.19	58.54	48.54	-16.46	-13.35
4	1.43248	0.22	25.33	18.36	25.55	18.58	56.00	46.00	-30.45	-27.42
5	10.42157	0.61	43.36	38.79	43.97	39.40	60.00	50.00	-16.03	-10.60
6	24.37636	1.12	31.80	27.68	32.92	28.80	60.00	50.00	-27.08	-21.20

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.





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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:

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Fax: 886-2-26051924

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Tel: 886-3-5935343

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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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7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---