



# FCC TEST REPORT (CO-LOCATED)

**REPORT NO.:** RF110914C18-2  
**MODEL NO.:** DIR-857MO1  
**FCC ID:** KA2IR857MO1  
**RECEIVED:** Sep. 07, 2011  
**TESTED:** Sep. 17 ~ Oct. 27, 2011  
**ISSUED:** Oct. 28, 2011

**APPLICANT:** D-Link Corporation

**ADDRESS:** 17595 Mt. Herrmann, 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.

This test report consists of 35 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval or endorsement by TAF or any government agency. The test results in the report only apply to the tested sample.





## TABLE OF CONTENTS

RELEASE CONTROL RECORD .....	3
1. CERTIFICATION .....	4
2. SUMMARY OF TEST RESULTS .....	5
2.1 MEASUREMENT UNCERTAINTY .....	5
3. GENERAL INFORMATION .....	6
3.1 GENERAL DESCRIPTION OF EUT .....	6
3.2 DESCRIPTION OF TEST MODES .....	8
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	9
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	10
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	11
3.4 DESCRIPTION OF SUPPORT UNITS .....	11
4. TEST TYPES AND RESULTS .....	12
4.1 RADIATED EMISSION MEASUREMENT .....	12
4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	12
4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS .....	12
4.1.3 TEST INSTRUMENTS .....	13
4.1.4 TEST PROCEDURES .....	14
4.1.5 DEVIATION FROM TEST STANDARD .....	14
4.1.6 TEST SETUP .....	15
4.1.7 EUT OPERATING CONDITIONS .....	15
4.1.8 TEST RESULTS .....	16
4.2 CONDUCTED EMISSION MEASUREMENT .....	26
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	26
4.2.2 TEST INSTRUMENTS .....	26
4.2.3 TEST PROCEDURES .....	27
4.2.4 DEVIATION FROM TEST STANDARD .....	27
4.2.5 TEST SETUP .....	28
4.2.6 EUT OPERATING CONDITIONS .....	28
4.2.7 TEST RESULTS .....	29
5. PHOTOGRAPHS OF THE TEST CONFIGURATION .....	33
6. INFORMATION ON THE TESTING LABORATORIES .....	34
7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	35



## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Oct. 28, 2011



## 1. CERTIFICATION

**PRODUCT:** HD Media Router 3000

**MODEL:** DIR-857MO1

**BRAND:** D-Link

**APPLICANT:** D-Link Corporation

**TESTED:** Sep. 17 ~ Oct. 27, 2011

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**

**FCC Part 15, Subpart E (Section 15.407)**

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: DIR-857MO1) 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 : Andrea Hsia , DATE : Oct. 28, 2011  
Andrea Hsia / Specialist

APPROVED BY : Gary Chang , DATE : Oct. 28, 2011  
Gary Chang / Assistant 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 -17.33dB at 0.150MHz.
15.247(d) 15.407(b/1/2/3) (b)(5)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.5dB at 166.00 & 166.60MHz.

### 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	3.34 dB
	200MHz ~1000MHz	3.35 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

<b>EUT</b>	HD Media Router 3000
<b>MODEL NO.</b>	DIR-857MO1
<b>FCC ID</b>	KA2IR857MO1
<b>POWER SUPPLY</b>	3.3Vdc
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	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 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz <b>5.0GHz:</b> 5180 ~ 5240MHz, 5745 ~ 5825MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) <b>5.0GHz:</b> <b>5180 ~ 5240MHz:</b> 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) <b>5745 ~ 5825MHz:</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	652.7mW for 2412 ~ 2462MHz 32.2mW for 5180 ~ 5240MHz 626.0mW for 5745 ~ 5825MHz
<b>ANTENNA TYPE</b>	PIFA antenna with 3.0dBi gain
<b>ANTENNA CONNECTOR</b>	UFL
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	NA

**NOTE:**

1. Simultaneous transmission test result is required and submitted since 2.4 and 5GHz can transmit simultaneously and share a common antenna.

2. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

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

MODULATION MODE	TX FUNCTION
802.11b	3TX
802.11g	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX

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 2.4GHz:

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		

#### Operated in 5180 ~ 5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190MHz	46	5230MHz



### Operated in 5745 ~ 5825MHz

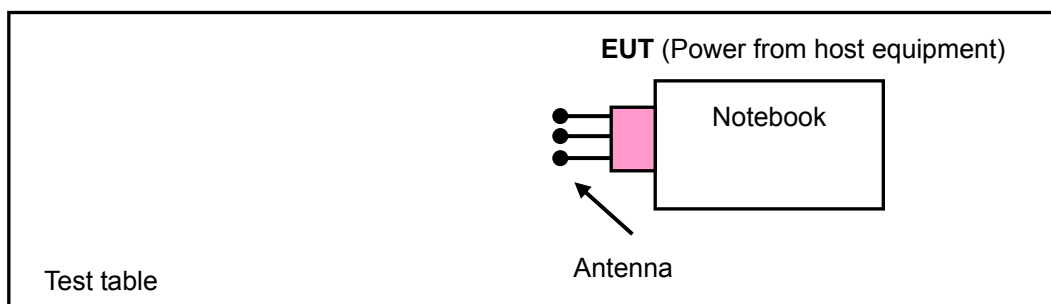
5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz

**CE**: Conducted Emission Measurement

**NOTE**: Test modes as below are composed of the max output power channel of each band.

#### **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.

MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g +802.11an (40MHz)	2412~2462	1 to 11	6 + 38	OFDM	BPSK	6.0
	5190-5230	38 to 46				15.0
802.11g +802.11an (20MHz)	2412~2462	1 to 11	6 + 157	OFDM	BPSK	6.0
	5745~5825	149 to 165				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.

MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g +802.11an (40MHz)	2412~2462	1 to 11	6 + 38	OFDM	BPSK	6.0
	5190-5230	38 to 46				15.0
802.11g +802.11an (20MHz)	2412~2462	1 to 11	6 + 157	OFDM	BPSK	6.0
	5745~5825	149 to 165				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.

MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g +802.11an (40MHz)	2412~2462	1 to 11	6 + 38	OFDM	BPSK	6.0
	5190-5230	38 to 46				15.0
802.11g +802.11an (20MHz)	2412~2462	1 to 11	6 + 157	OFDM	BPSK	6.0
	5745~5825	149 to 165				7.2

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
PLC	25deg. C, 65%RH	120Vac, 60Hz	Match Tsui

**3.3 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)**

**ANSI C63.4-2003**

**ANSI C63.10-2009**

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

**3.4 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	E5420	CHHYLQ1	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

**NOTE:** All power cords of the above support units are non shielded (1.8m).

## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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:

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

#### 4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 06, 2011	Jan. 05, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01911	Nov. 03, 2010	Nov. 02, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
Software	ADT_Radiated_ V7.6.15.9.2	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 Table Controller EMCO	2090	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 Chamber 9.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 460141.
  5. The IC Site Registration No. is IC 7450F-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. The antenna is a broadband antenna, and its height 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.

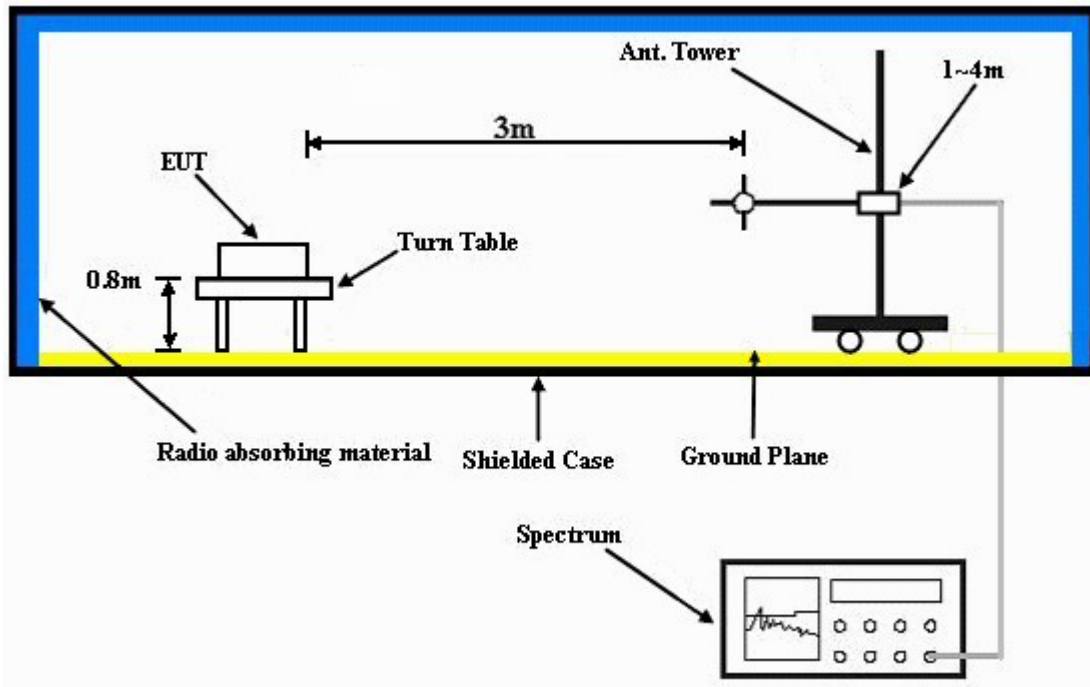
**NOTE:**

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. 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

- a. Plugged the EUT into notebook and placed them on the testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the system in full functions.



## 4.1.8 TEST RESULTS

### 802.11g + 802.11an (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

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	*2437.00	111.2 PK			1.17 H	240	79.60	31.60
2	*2437.00	101.3 AV			1.17 H	240	69.70	31.60
3	2743.00	57.6 PK	74.0	-16.4	1.03 H	280	25.00	32.60
4	2743.00	43.9 AV	54.0	-10.1	1.03 H	280	11.30	32.60
5	4874.00	43.3 PK	74.0	-30.7	1.22 H	108	5.60	37.70
6	4874.00	32.2 AV	54.0	-21.8	1.22 H	108	-5.50	37.70
7	5040.00	56.8 PK	74.0	-17.2	1.22 H	248	18.70	38.10
8	5040.00	47.8 AV	54.0	-6.2	1.22 H	248	9.70	38.10
9	5120.00	56.2 PK	74.0	-17.8	1.01 H	265	18.00	38.20
10	5120.00	43.7 AV	54.0	-10.3	1.01 H	265	5.50	38.20
11	*5190.00	99.8 PK			1.00 H	259	61.50	38.30
12	*5190.00	89.6 AV			1.00 H	259	51.30	38.30
13	7311.00	50.6 PK	74.0	-23.4	1.58 H	328	7.10	43.50
14	7311.00	40.3 AV	54.0	-13.7	1.58 H	328	-3.20	43.50

- 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.



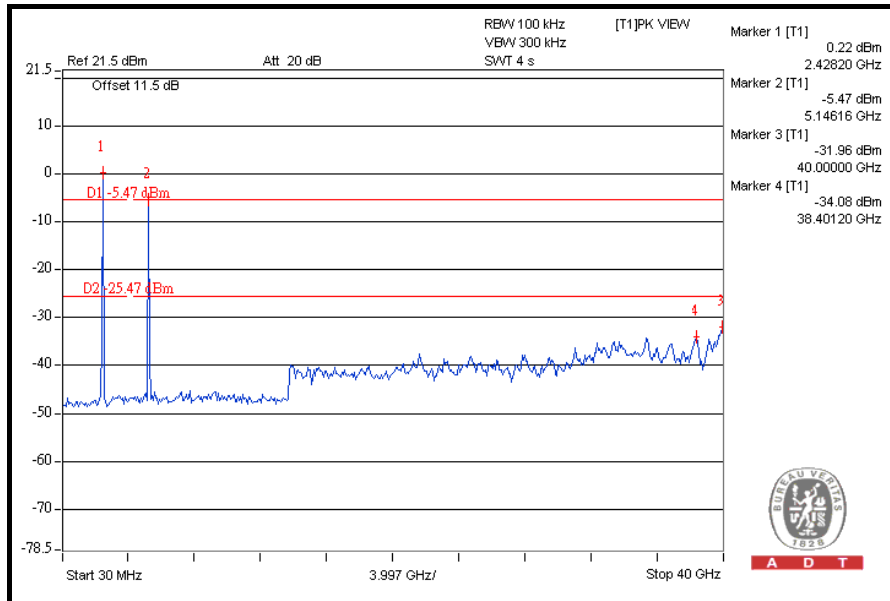


EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

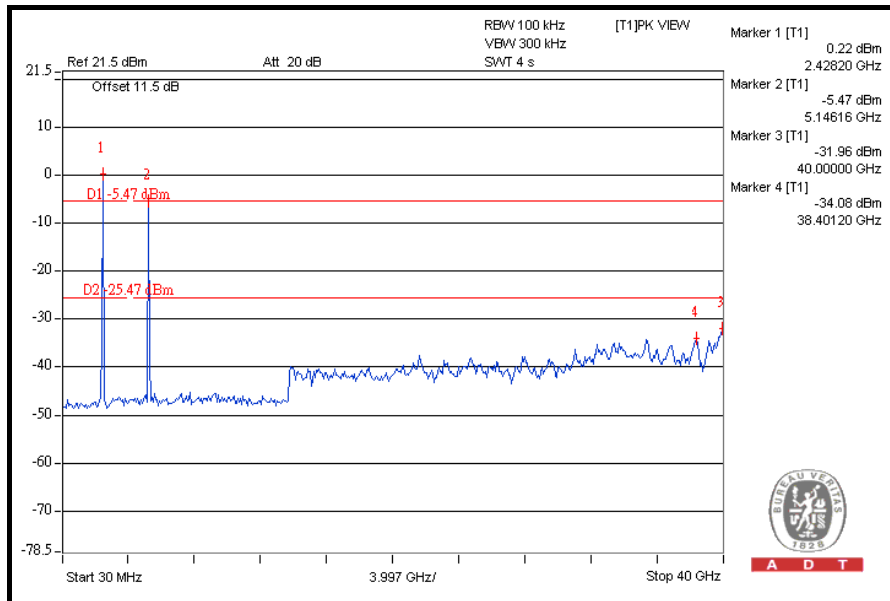
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.6 PK			1.12 V	109	80.90	31.70
2	*2437.00	102.0 AV			1.12 V	109	70.30	31.70
3	2743.00	53.2 PK	74.0	-20.8	1.20 V	58	20.50	32.70
4	2743.00	41.9 AV	54.0	-12.1	1.20 V	58	9.20	32.70
5	4874.00	45.9 PK	74.0	-28.1	1.28 V	322	8.10	37.80
6	4874.00	35.3 AV	54.0	-18.7	1.28 V	322	-2.50	37.80
7	5040.00	57.5 PK	74.0	-16.5	1.41 V	267	19.30	38.20
8	5040.00	48.6 AV	54.0	-5.4	1.41 V	267	10.40	38.20
9	5120.00	58.4 PK	74.0	-15.6	1.15 V	30	20.10	38.30
10	5120.00	45.8 AV	54.0	-8.2	1.15 V	30	7.50	38.30
11	*5190.00	101.1 PK			1.27 V	36	62.70	38.40
12	*5190.00	91.8 AV			1.27 V	36	53.40	38.40
13	7311.00	50.9 PK	74.0	-23.1	1.37 V	95	7.00	43.90
14	7311.00	41.2 AV	54.0	-12.8	1.37 V	95	-2.70	43.90

- 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.

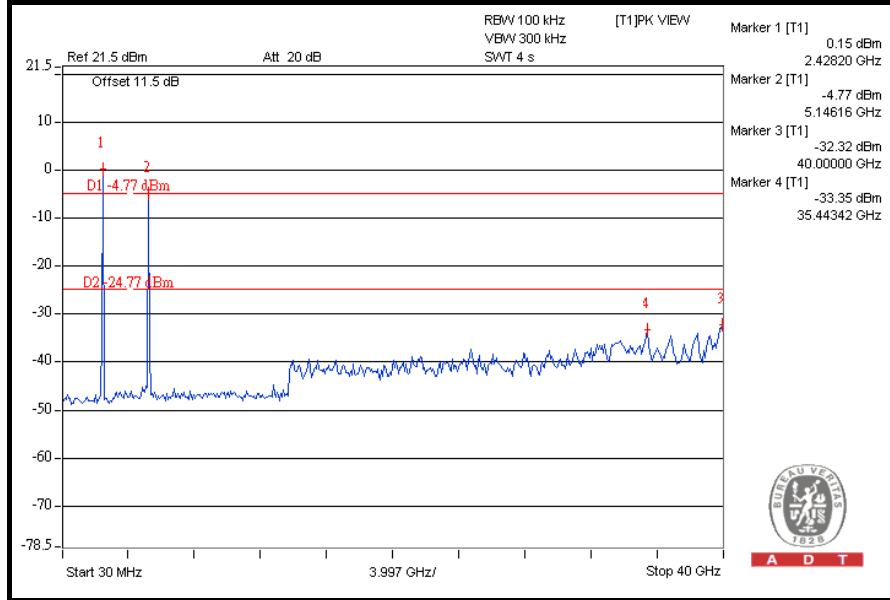
### Conducted Emission of Chain 0



### Conducted Emission of Chain 1



### Conducted Emission of Chain 2





**802.11g + 802.11an (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

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	*2437.00	111.2 PK			1.17 H	240	79.60	31.60
2	*2437.00	101.3 AV			1.17 H	240	69.70	31.60
3	3348.00	46.7 PK	74.0	-27.3	1.02 H	288	12.70	34.00
4	3348.00	33.7 AV	54.0	-20.3	1.02 H	288	-0.30	34.00
5	4874.00	43.3 PK	74.0	-30.7	1.22 H	108	5.60	37.70
6	4874.00	32.2 AV	54.0	-21.8	1.22 H	108	-5.50	37.70
7	5080.00	57.2 PK	74.0	-16.8	1.02 H	267	19.00	38.20
8	5080.00	46.0 AV	54.0	-8.0	1.02 H	267	7.80	38.20
9	5785.00	108.2 PK			1.47 H	258	68.70	39.50
10	5785.00	98.5 AV			1.47 H	258	59.00	39.50
11	7311.00	50.6 PK	74.0	-23.4	1.58 H	328	7.10	43.50
12	7311.00	40.3 AV	54.0	-13.7	1.58 H	328	-3.20	43.50
13	11570.00	55.6 PK	74.0	-18.4	1.28 H	263	6.00	49.60
14	11570.00	45.2 AV	54.0	-8.8	1.28 H	263	-4.40	49.60

- 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.

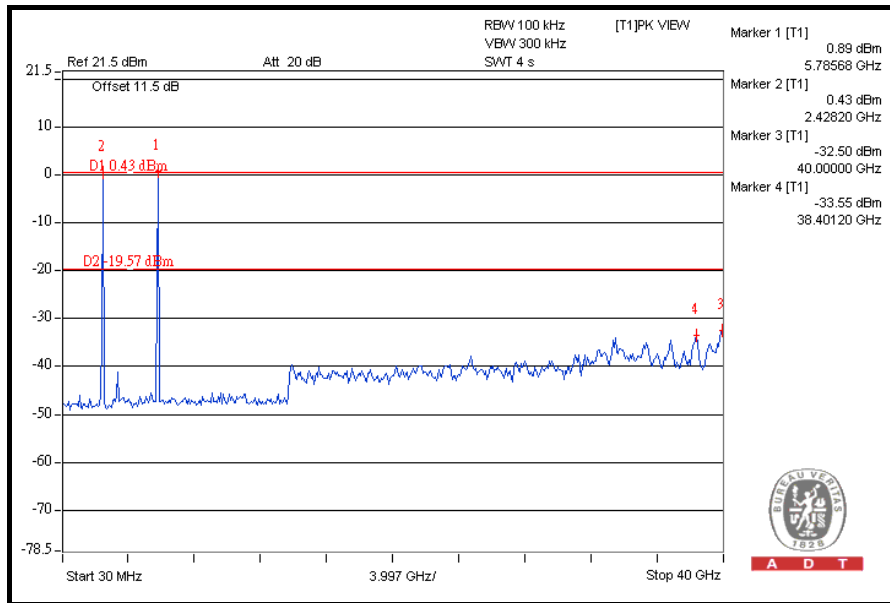


EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

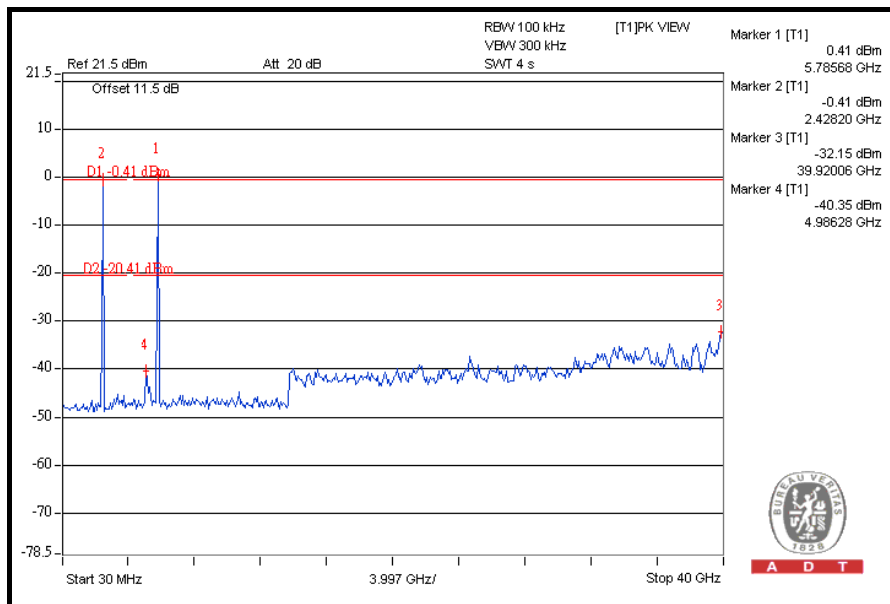
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.6 PK			1.12 V	109	80.90	31.70
2	*2437.00	102.0 AV			1.12 V	109	70.30	31.70
3	3348.00	48.4 PK	74.0	-25.6	1.38 V	106	14.40	34.00
4	3348.00	34.9 AV	54.0	-19.1	1.38 V	106	0.90	34.00
5	4874.00	45.9 PK	74.0	-28.1	1.28 V	322	8.10	37.80
6	4874.00	35.3 AV	54.0	-18.7	1.28 V	322	-2.50	37.80
7	5080.00	59.1 PK	74.0	-14.9	1.02 V	349	20.80	38.30
8	5080.00	49.8 AV	54.0	-4.2	1.02 V	349	11.50	38.30
9	*5785.00	109.8 PK			1.18 V	102	70.20	39.60
10	*5785.00	100.4 AV			1.18 V	102	60.80	39.60
11	7311.00	50.9 PK	74.0	-23.1	1.37 V	95	7.00	43.90
12	7311.00	41.2 AV	54.0	-12.8	1.37 V	95	-2.70	43.90
13	11570.00	60.3 PK	74.0	-13.7	1.30 V	356	10.80	49.50
14	11570.00	47.4 AV	54.0	-6.6	1.30 V	356	-2.10	49.50

- 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.

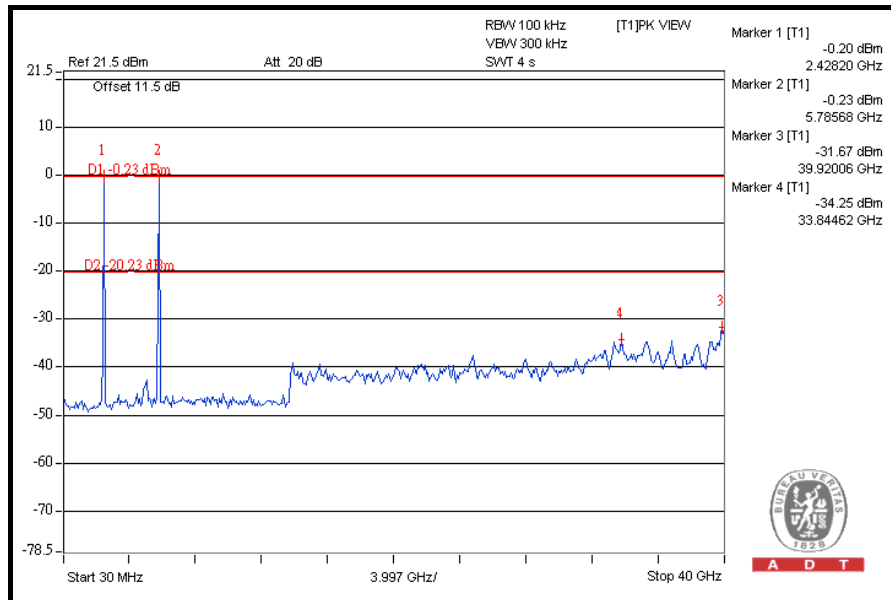
### Conducted Emission of Chain 0



### Conducted Emission of Chain 1



### Conducted Emission of Chain 2



**BELOW 1GHz WORST-CASE DATA : 802.11g + 802.11an (40MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 38	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH	TESTED BY	Sun Lin

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	97.95	33.6 QP	43.5	-9.9	2.00 H	196	25.40	8.20
2	158.22	39.9 QP	43.5	-3.6	2.00 H	202	25.70	14.20
3	<b>166.60</b>	<b>42.0 QP</b>	<b>43.5</b>	<b>-1.5</b>	<b>1.50 H</b>	<b>190</b>	<b>28.60</b>	<b>13.40</b>
4	209.55	38.6 QP	43.5	-4.9	1.00 H	211	27.80	10.80
5	298.21	44.4 QP	46.0	-1.6	1.00 H	349	29.80	14.60
6	663.74	37.1 QP	46.0	-8.9	1.00 H	259	14.30	22.80
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	142.67	31.9 QP	43.5	-11.6	2.00 V	154	18.40	13.50
2	189.33	32.7 QP	43.5	-10.8	1.00 V	292	21.90	10.80
3	300.16	33.1 QP	46.0	-12.9	1.00 V	328	18.40	14.70
4	432.37	27.1 QP	46.0	-18.9	1.00 V	220	9.30	17.80
5	599.58	29.1 QP	46.0	-16.9	1.00 V	334	7.00	22.10
6	663.74	30.1 QP	46.0	-15.9	1.25 V	196	7.30	22.80

- 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.





802.11g + 802.11an (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 6 + CH 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH	TESTED BY	Sun Lin

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	99.89	33.8 QP	43.5	-9.7	2.00 H	358	25.30	8.50
2	156.28	39.7 QP	43.5	-3.8	1.25 H	31	26.00	13.70
3	<b>166.00</b>	<b>42.0 QP</b>	<b>43.5</b>	<b>-1.5</b>	<b>1.25 H</b>	<b>214</b>	<b>28.50</b>	<b>13.50</b>
4	210.89	38.9 QP	43.5	-4.6	1.25 H	204	28.10	10.80
5	298.76	44.0 QP	46.0	-2.0	1.00 H	10	29.40	14.60
6	663.74	37.7 QP	46.0	-8.3	1.00 H	265	14.90	22.80
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	97.95	27.1 QP	43.5	-16.4	1.00 V	235	18.90	8.20
2	189.33	32.6 QP	43.5	-10.9	1.00 V	10	21.80	10.80
3	298.21	33.5 QP	46.0	-12.5	1.00 V	298	18.90	14.60
4	432.37	27.5 QP	46.0	-18.5	1.00 V	352	9.70	17.80
5	663.74	31.4 QP	46.0	-14.6	2.00 V	277	8.60	22.80
6	698.74	30.9 QP	46.0	-15.1	2.00 V	304	7.70	23.20

- 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 $\mu$ 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. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb. 22, 2011	Feb. 21, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Cond_ V7.3.7	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

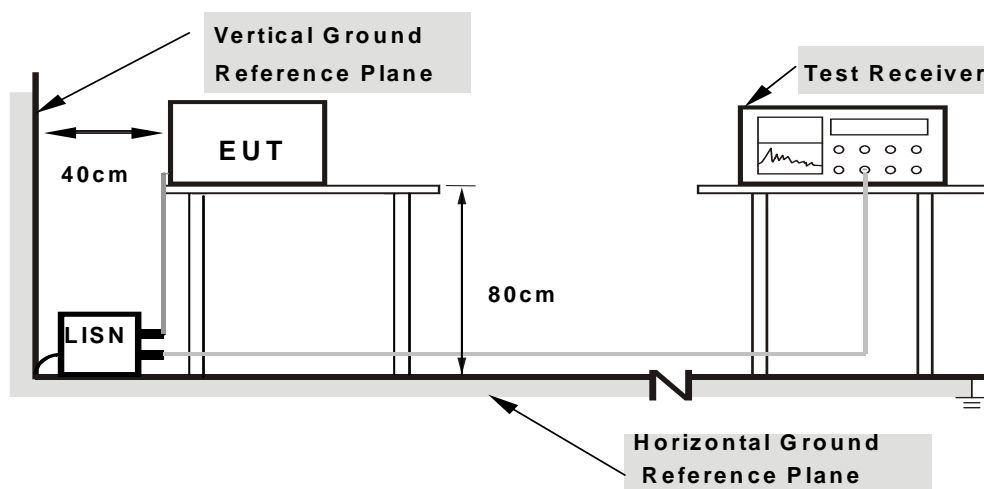
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

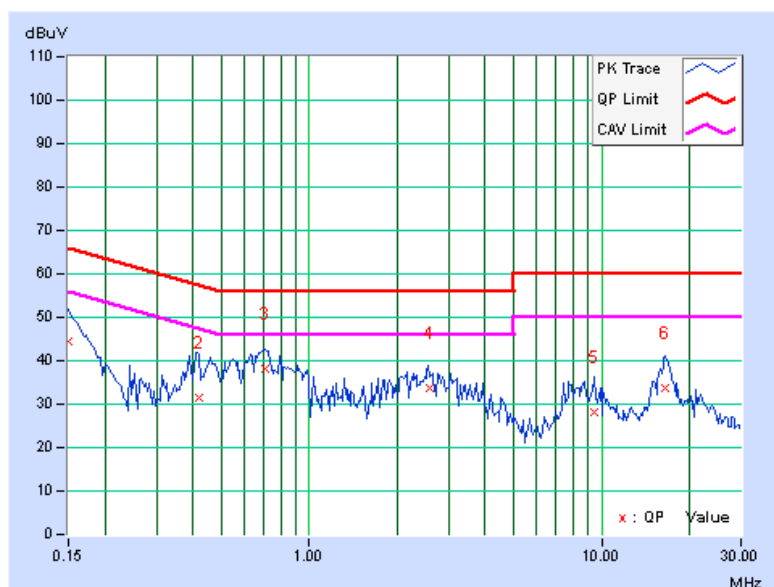
## 4.2.7 TEST RESULTS

### CONDUCTED WORST-CASE DATA: 802.11g + 802.11an (40MHz)

<b>CHANNEL</b>	CH 6 + CH 38	<b>6dB BANDWIDTH</b>	9kHz
<b>PHASE</b>	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	0.150	0.11	44.49	-	44.61	-	66.00	56.00	-21.39	-
2	0.421	0.12	31.54	-	31.66	-	57.44	47.44	-25.77	-
3	0.705	0.14	38.14	-	38.28	-	56.00	46.00	-17.72	-
4	2.572	0.22	33.61	-	33.83	-	56.00	46.00	-22.17	-
5	9.410	0.63	27.50	-	28.13	-	60.00	50.00	-31.87	-
6	16.567	0.95	32.91	-	33.86	-	60.00	50.00	-26.14	-

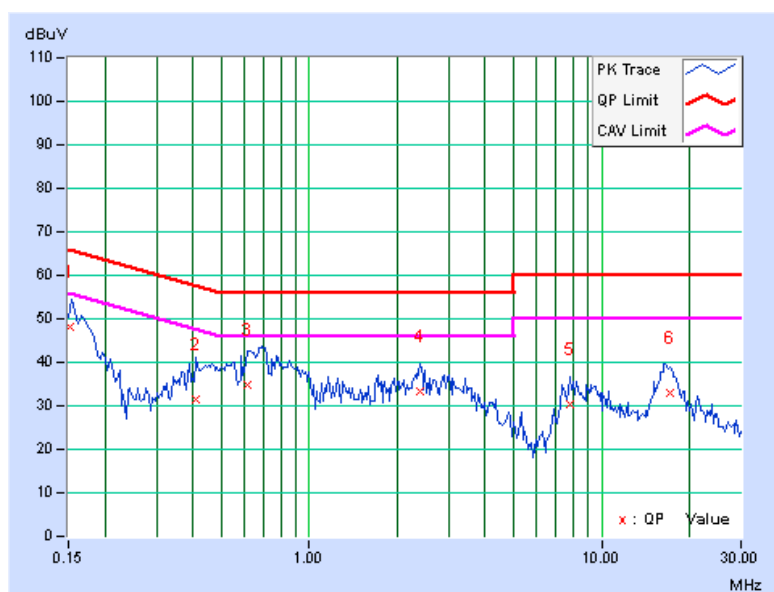
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



<b>CHANNEL</b>	CH 6 + CH 38	<b>6dB BANDWIDTH</b>	9kHz
<b>PHASE</b>	Line 2		

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	0.151	0.13	48.14	-	48.27	-	65.93	55.93	-17.66	-
2	0.408	0.14	31.16	-	31.30	-	57.69	47.69	-26.39	-
3	0.615	0.15	34.57	-	34.72	-	56.00	46.00	-21.28	-
4	2.409	0.22	33.06	-	33.28	-	56.00	46.00	-22.72	-
5	7.844	0.51	30.00	-	30.51	-	60.00	50.00	-29.49	-
6	17.160	0.82	32.04	-	32.86	-	60.00	50.00	-27.14	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

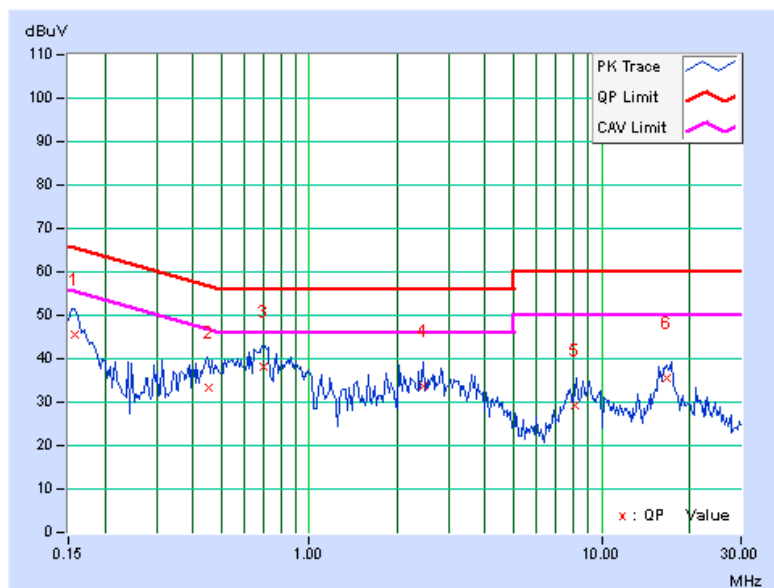


802.11g + 802.11an (20MHz)

<b>CHANNEL</b>	CH 6 + CH 157	<b>6dB BANDWIDTH</b>	9kHz
<b>PHASE</b>	Line 1		

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	0.158	0.12	45.34	-	45.46	-	65.58	55.58	-20.12	-
2	0.451	0.12	33.32	-	33.44	-	56.86	46.86	-23.42	-
3	0.700	0.14	38.09	-	38.23	-	56.00	46.00	-17.77	-
4	2.465	0.22	33.49	-	33.71	-	56.00	46.00	-22.29	-
5	8.153	0.55	28.60	-	29.15	-	60.00	50.00	-30.85	-
6	16.657	0.96	34.44	-	35.40	-	60.00	50.00	-24.60	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



<b>CHANNEL</b>	CH 6 + CH 157	<b>6dB BANDWIDTH</b>	9kHz
<b>PHASE</b>	Line 2		

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	0.150	0.12	48.55	-	48.67	-	66.00	56.00	-17.33	-
2	0.408	0.14	32.01	-	32.15	-	57.69	47.69	-25.54	-
3	0.709	0.16	38.36	-	38.52	-	56.00	46.00	-17.48	-
4	3.227	0.27	30.02	-	30.29	-	56.00	46.00	-25.71	-
5	9.508	0.59	28.98	-	29.57	-	60.00	50.00	-30.43	-
6	16.642	0.81	33.45	-	34.26	-	60.00	50.00	-25.74	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.







## 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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). 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:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**

Tel: 886-3-3183232

Fax: 886-3-3185050

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

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



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

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

**---END---**