

# FCC TEST REPORT (15.407)

**REPORT NO.:** RF130715C29-2

**MODEL NO.:** WAP-7420

**FCC ID:** 2AATB-000002

**RECEIVED:** Jul. 15, 2013

**TESTED:** Jul. 18, 2013 ~ Aug. 07, 2013

**ISSUED:** Aug. 14, 2013

**APPLICANT:** TATUNG TECHNOLOGY INC

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

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**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130715C29-2	Original release	Aug. 14, 2013

## 1. CERTIFICATION

**PRODUCT:** Video Bridge  
**MODEL NO.:** WAP-7420  
**BRAND:** TATUNG TECHNOLOGY INC  
**APPLICANT:** TATUNG TECHNOLOGY INC  
**TESTED:** Jul. 18, 2013 ~ Aug. 07, 2013  
**TEST SAMPLE:** Production Unit  
**STANDARDS:** **FCC Part 15, Subpart E (Section 15.407)**  
ANSI C63.10-2009

The above equipment (model: WAP-7420) 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 :** Vera Huang , **DATE :** Aug. 14, 2013  
Vera Huang / Specialist  
**APPROVED BY :** Sam chen , **DATE :** Aug. 14, 2013  
Sam Chen / Assistant Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.95dB at 16.22656MHz.
15.407(b/1/2/3)(b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.43dB at 5470MHz.
15.407(a/1/2)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 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

<b>EUT</b>	Video Bridge
<b>MODEL NO.</b>	WAP-7420
<b>POWER SUPPLY</b>	9Vdc (adapter)
<b>MODULATION TYPE</b>	64QAM, 16QAM, QPSK, BPSK
<b>MODULATION TECHNOLOGY</b>	OFDM
<b>TRANSFER RATE</b>	802.11n: up to MCS7
<b>OPERATING FREQUENCY</b>	5270 ~ 5310MHz, 5510 ~ 5670MHz
<b>NUMBER OF CHANNEL</b>	5270 ~ 5310MHz: 2 for 802.11n (40MHz) 5510 ~ 5670MHz: 3 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	155.955mW
<b>ANTENNA TYPE</b>	PCB antenna with 2.99dBi gain (5270 ~ 5310MHz) PCB antenna with 3.88dBi gain (5510 ~ 5670MHz)
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	Refer to Note as below
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to Note as below

#### NOTE:

1. The EUT has following accessories.

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter	DVE	DSA-9PFB-09 FUS 090100	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 9Vdc, 1A

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

MODULATION MODE	TX FUNCTION
802.11n (40MHz)	4TX

3. The above EUT information is declared by the 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 5270 ~ 5310MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

#### FOR 5510 ~ 5670MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510MHz	134	5670MHz
110	5550MHz		



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission **APCM**: Antenna Port Conducted 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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	5270-5310	54 to 62	54, 62	OFDM	BPSK	13.5
802.11n (40MHz)	5510-5670	102 to 134	102, 110, 134	OFDM	BPSK	13.5

#### 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. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	5270-5310	54 to 62	54	OFDM	BPSK	13.5
802.11n (40MHz)	5510-5670	102 to 134	134	OFDM	BPSK	13.5

#### POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

TEST CONDITION
WLAN (5G) Link + Adapter

### **BANDEDGE MEASUREMENT:**

- ☒ 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. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	5270-5310	54 to 62	54, 62	OFDM	BPSK	13.5
802.11n (40MHz)	5510-5670	102 to 134	102, 110, 134	OFDM	BPSK	13.5

### **ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	5270-5310	54 to 62	54, 62	OFDM	BPSK	13.5
802.11n (40MHz)	5510-5670	102 to 134	102, 110, 134	OFDM	BPSK	13.5

### **TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE $<$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

### 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.

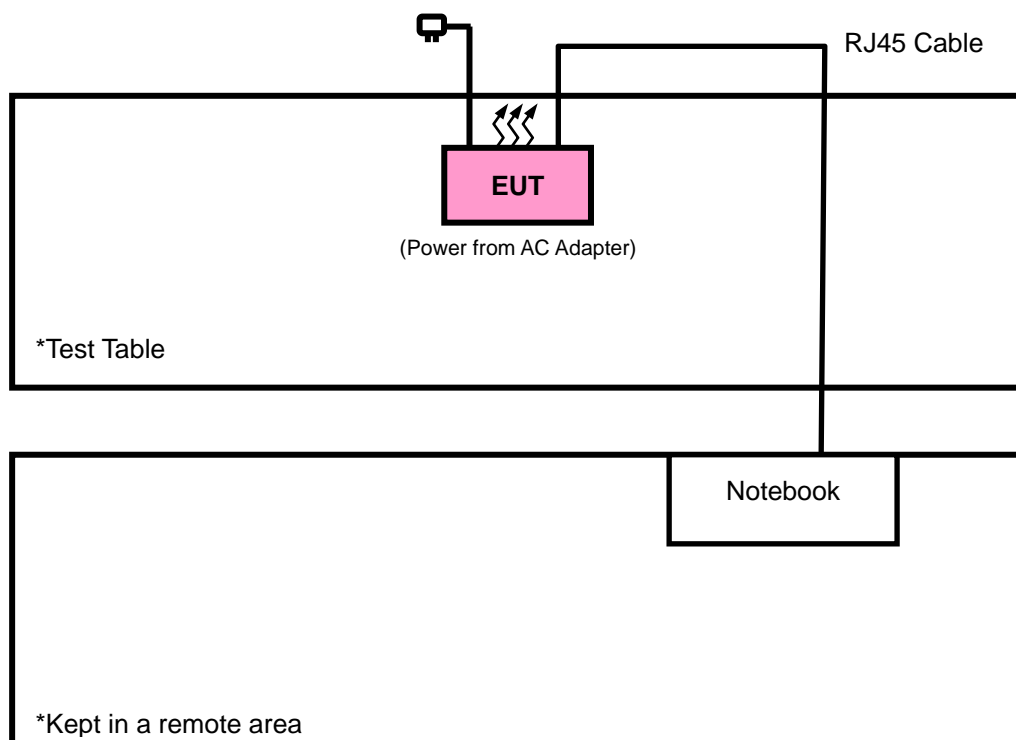
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	Inspiron 14R	8LRKKW1	N/A

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

#### NOTE:

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

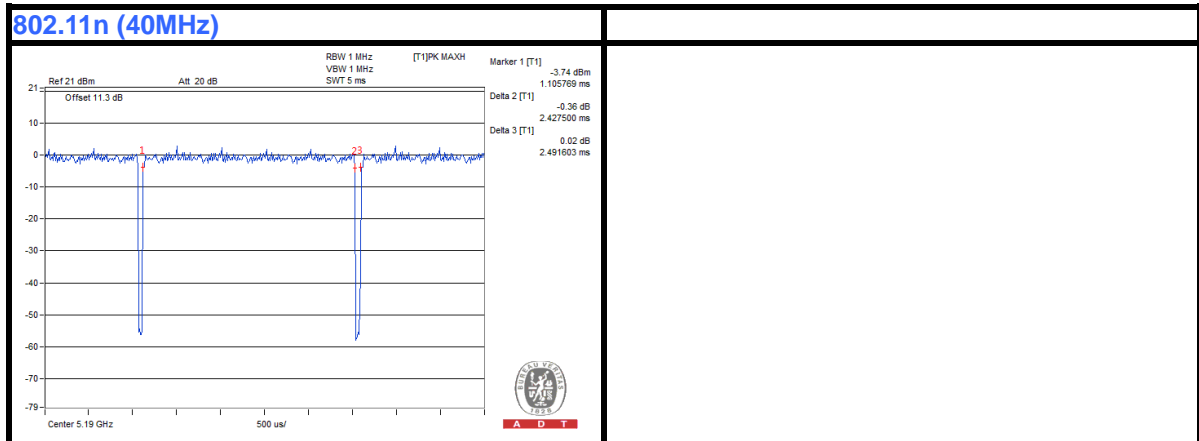
#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.4 DUTY CYCLE OF TEST SIGNAL

If duty cycle is < 98%, duty factor shall be considered.

**802.11n (40MHz):** Duty cycle =  $2.428/2.492 = 0.974$ , Duty factor =  $10 * \log(1/0.974) = 0.11$



### 3.5 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 E (15.407)

ANSI C63.10-2009

KDB 789033 D01 General UNII Test Procedures v01r02

662911 D01 Multiple Transmitter Output v01 r02

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B. 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:**

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

APPLICABLE TO	LIMIT	
	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
√	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
	PK	PK
	-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	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 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 10.
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 690701.
6. The IC Site Registration No. is IC 7450F-10.

#### 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 meter 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 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

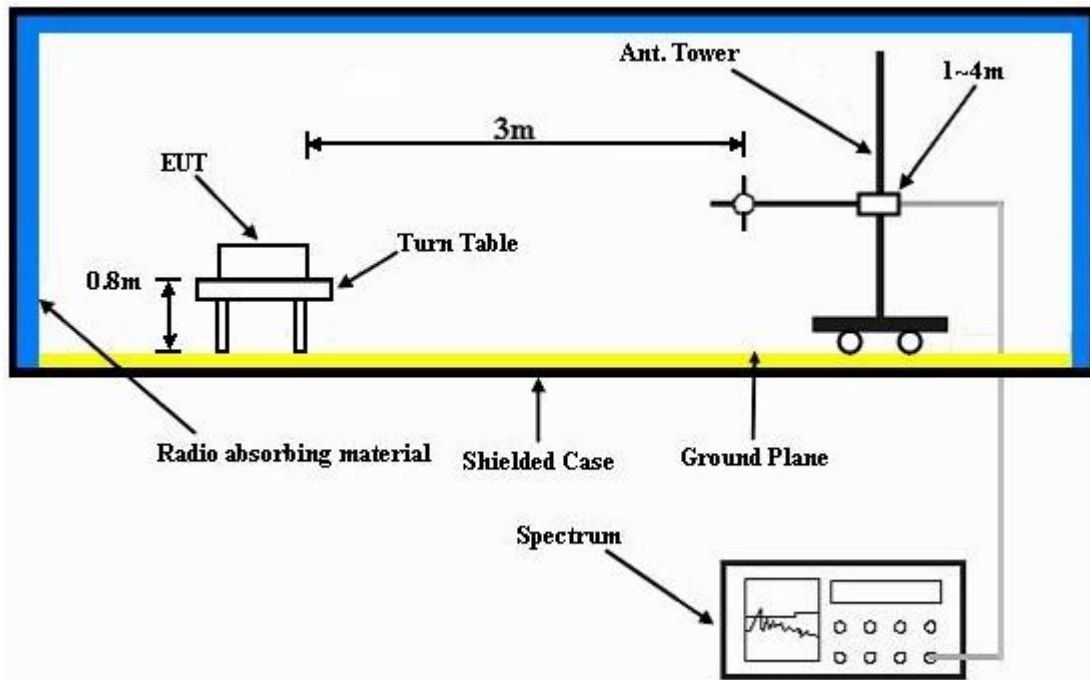
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency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

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



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## 4.1.8 TEST RESULTS

## ABOVE 1GHz DATA:

## 802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5106	48.11	39.58	54	-5.89	34.45	8.07	33.99	105	348	Average
5106	61.63	53.1	74	-12.37	34.45	8.07	33.99	105	348	Peak
5270	105.69	96.91			34.5	8.29	34.01	105	348	Average
5270	112.48	103.7			34.5	8.29	34.01	105	348	Peak
5438	47.74	38.8	54	-6.26	34.5	8.48	34.04	105	348	Average
5438	62.48	53.54	74	-11.52	34.5	8.48	34.04	105	348	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5112	44.99	36.43	54	-9.01	34.45	8.1	33.99	121	177	Average
5112	62.41	53.85	74	-11.59	34.45	8.1	33.99	121	177	Peak
5270	101.06	92.28			34.5	8.29	34.01	121	177	Average
5270	107.91	99.13			34.5	8.29	34.01	121	177	Peak
5440	44.69	35.75	54	-9.31	34.5	8.48	34.04	121	177	Average
5440	61.64	52.7	74	-12.36	34.5	8.48	34.04	121	177	Peak

REMARKS: 5270MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5092	45.12	36.59	54	-8.88	34.44	8.07	33.98	104	355	Average
5092	58.04	49.51	74	-15.96	34.44	8.07	33.98	104	355	Peak
5310	99.75	90.95			34.5	8.32	34.02	104	355	Average
5310	107.23	98.43			34.5	8.32	34.02	104	355	Peak
5350	52.54	43.69	54	-1.46	34.5	8.38	34.03	102	10	Average
5350	62.7	53.85	74	-11.3	34.5	8.38	34.03	102	10	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5104	43.8	35.28	54	-10.2	34.44	8.07	33.99	111	106	Average
5104	56.51	47.99	74	-17.49	34.44	8.07	33.99	111	106	Peak
5310	95.26	86.46			34.5	8.32	34.02	111	106	Average
5310	102.28	93.48			34.5	8.32	34.02	111	106	Peak
5350	46.2	37.35	54	-7.8	34.5	8.38	34.03	111	106	Average
5350	58.04	49.19	74	-15.96	34.5	8.38	34.03	111	106	Peak

REMARKS: 5310MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	50.08	41.12	54	-3.92	34.5	8.51	34.05	100	342	Average
5460	64.93	55.97	74	-9.07	34.5	8.51	34.05	100	342	Peak
5470	67.87	58.91	68.3	-0.43	34.5	8.51	34.05	100	9	Peak
5510	101.85	92.83			34.51	8.57	34.06	100	9	Average
5510	107.68	98.66			34.51	8.57	34.06	100	9	Peak
5725	52.91	43.7	68.3	-15.39	34.67	8.65	34.11	100	9	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	43.08	34.12	54	-10.92	34.5	8.51	34.05	100	113	Average
5460	53.29	44.33	74	-20.71	34.5	8.51	34.05	100	113	Peak
5470	55.31	46.35	68.3	-12.99	34.5	8.51	34.05	100	113	Peak
5510	97.4	88.38			34.51	8.57	34.06	100	113	Average
5510	95.8	86.78			34.51	8.57	34.06	100	113	Peak
5725	51.45	42.24	68.3	-16.85	34.67	8.65	34.11	100	113	Peak

**REMARKS:**

- 5510MHz: Fundamental frequency.
- 5470MHz & 5725MHz: Out of restricted band



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	49.1	40.14	54	-4.9	34.5	8.51	34.05	100	8	Average
5460	60.04	51.08	74	-13.96	34.5	8.51	34.05	100	8	Peak
5470	63.55	54.59	68.3	-4.75	34.5	8.51	34.05	100	8	Peak
5550	106.22	97.16			34.54	8.59	34.07	100	8	Average
5550	112.7	103.64			34.54	8.59	34.07	100	8	Peak
5725	57.74	48.53	68.3	-10.56	34.67	8.65	34.11	100	8	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	46.49	37.53	54	-7.51	34.5	8.51	34.05	125	191	Average
5460	57.69	48.73	74	-16.31	34.5	8.51	34.05	125	191	Peak
5470	58.39	49.43	68.3	-9.91	34.5	8.51	34.05	125	191	Peak
5550	102.71	93.65			34.54	8.59	34.07	125	191	Average
5550	109.66	100.6			34.54	8.59	34.07	125	191	Peak
5724	56.8	47.59	68.3	-11.5	34.67	8.65	34.11	125	191	Peak

**REMARKS:**

1. 5550MHz: Fundamental frequency.
2. 5470MHz & 5725MHz: Out of restricted band



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 134	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	45.38	36.42	54	-8.62	34.5	8.51	34.05	119	89	Average
5460	60.67	51.71	74	-13.33	34.5	8.51	34.05	119	89	Peak
5470	58.77	49.81	68.3	-9.53	34.5	8.51	34.05	119	89	Peak
5670	106.43	97.27			34.63	8.63	34.1	119	89	Average
5670	112.27	103.11			34.63	8.63	34.1	119	89	Peak
5725	67.62	58.41	68.3	-0.68	34.67	8.65	34.11	119	89	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	42.85	33.89	54	-11.15	34.5	8.51	34.05	100	343	Average
5460	58.38	49.42	74	-15.62	34.5	8.51	34.05	100	343	Peak
5470	58.28	49.32	68.3	-10.02	34.5	8.51	34.05	100	343	Peak
5670	100.26	91.1			34.63	8.63	34.1	100	343	Average
5670	107.6	98.44			34.63	8.63	34.1	100	343	Peak
5725	61.53	52.32	68.3	-6.77	34.67	8.65	34.11	100	343	Peak

**REMARKS:**

- 5670MHz: Fundamental frequency.
- 5470MHz & 5725MHz: Out of restricted band



A D T

## BELOW 1GHz WORST-CASE DATA : 802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	33.78	51.97	40	-6.22	12.35	0.8	31.34	100	151	Peak
125.04	34.9	54.23	43.5	-8.6	11.35	1.21	31.89	100	354	Peak
200.1	30.6	51.42	43.5	-12.9	9.36	1.59	31.77	100	179	Peak
349.7	27.44	42.9	46	-18.56	14.15	2.23	31.84	100	132	Peak
400.1	26.96	41.3	46	-19.04	15.35	2.43	32.12	100	156	Peak
624.8	28.5	37.6	46	-17.5	19.9	3.16	32.16	100	261	Peak
ANTENNA POLARITY & test distance: VERTICAL at 3 m										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	38.12	56.31	40	-1.88	12.35	0.8	31.34	100	215	QP
68.61	33.84	53.83	40	-6.16	10.89	0.89	31.77	100	142	Peak
125.04	32.86	52.19	43.5	-10.64	11.35	1.21	31.89	100	168	Peak
549.9	32.44	42.98	46	-13.56	18.46	2.95	31.95	100	127	Peak
650	31.51	40.08	46	-14.49	20.21	3.24	32.02	100	209	Peak
850.2	29.95	35.12	46	-16.05	22.88	3.82	31.87	100	154	Peak



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 134	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
55.92	33.86	52.05	40	-6.14	12.35	0.8	31.34	100	148	Peak
125.04	34.25	53.58	43.5	-9.25	11.35	1.21	31.89	100	269	Peak
200.1	30.97	51.79	43.5	-12.53	9.36	1.59	31.77	100	251	Peak
349.7	27.33	42.79	46	-18.67	14.15	2.23	31.84	100	114	Peak
724.9	29.37	36.34	46	-16.63	21.16	3.5	31.63	100	132	Peak
799.8	30.96	36.47	46	-15.04	22.23	3.69	31.43	100	185	Peak
ANTENNA POLARITY & test distance: VERTICAL at 3 m										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	38.22	56.41	40	-1.78	12.35	0.8	31.34	100	116	QP
68.34	32.98	52.97	40	-7.02	10.89	0.89	31.77	100	152	Peak
125.04	32.8	52.13	43.5	-10.7	11.35	1.21	31.89	100	236	Peak
479.9	27.71	39.92	46	-18.29	16.93	2.71	31.85	100	39	Peak
549.9	32.9	43.44	46	-13.1	18.46	2.95	31.95	100	112	Peak
680.1	29.66	37.57	46	-16.34	20.57	3.36	31.84	100	108	Peak



## 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 0.50MHz.  
 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	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2013	Jul. 01, 2014
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 2.  
 3. The VCCI Site Registration No. is C-2047.

#### 4.2.3 TEST PROCEDURES

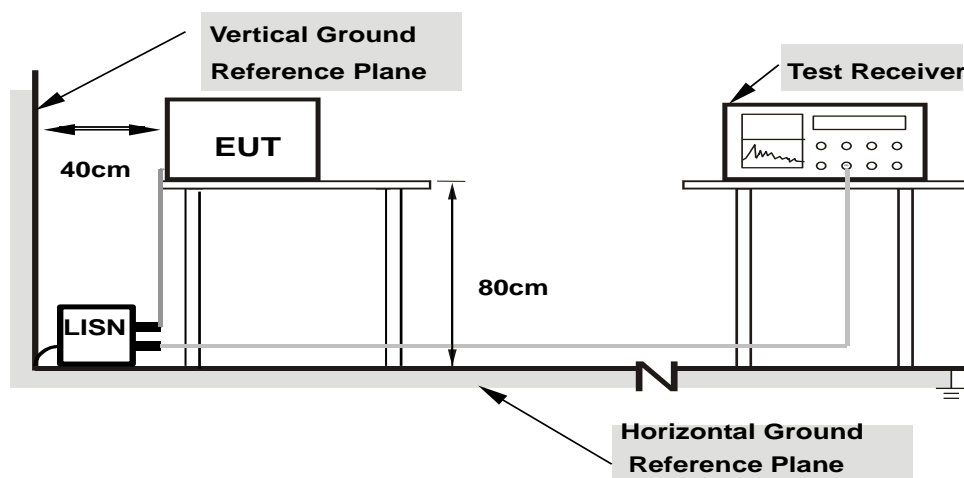
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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

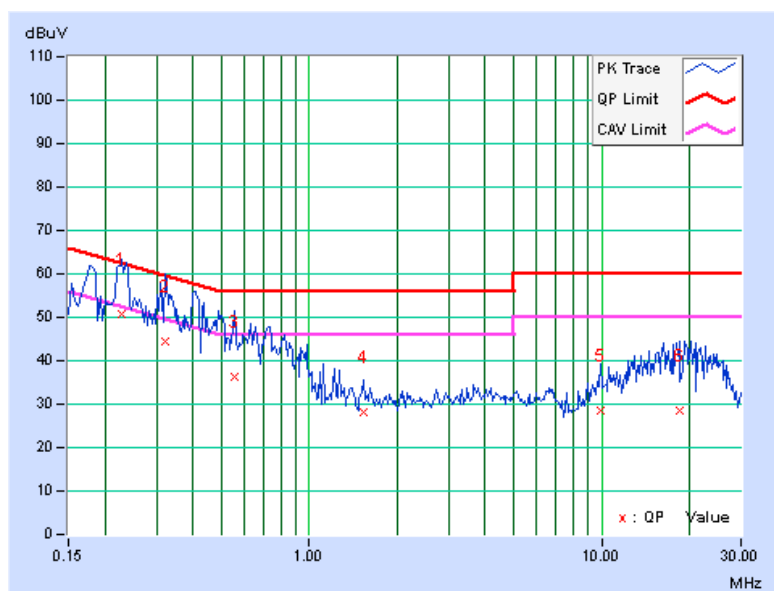
### CONDUCTED WORST-CASE DATA : 802.11n (40MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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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	0.22812	0.18	50.39	25.19	50.57	25.37	62.52	52.52	-11.95	-27.15
2	0.32188	0.19	44.30	20.61	44.49	20.80	59.66	49.66	-15.16	-28.85
3	0.55625	0.23	36.05	24.85	36.28	25.08	56.00	46.00	-19.72	-20.92
4	1.53906	0.28	28.01	17.93	28.29	18.21	56.00	46.00	-27.71	-27.79
5	9.96875	0.43	28.18	20.99	28.61	21.42	60.00	50.00	-31.39	-28.58
6	18.61719	0.61	27.84	21.00	28.45	21.61	60.00	50.00	-31.55	-28.39

### 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

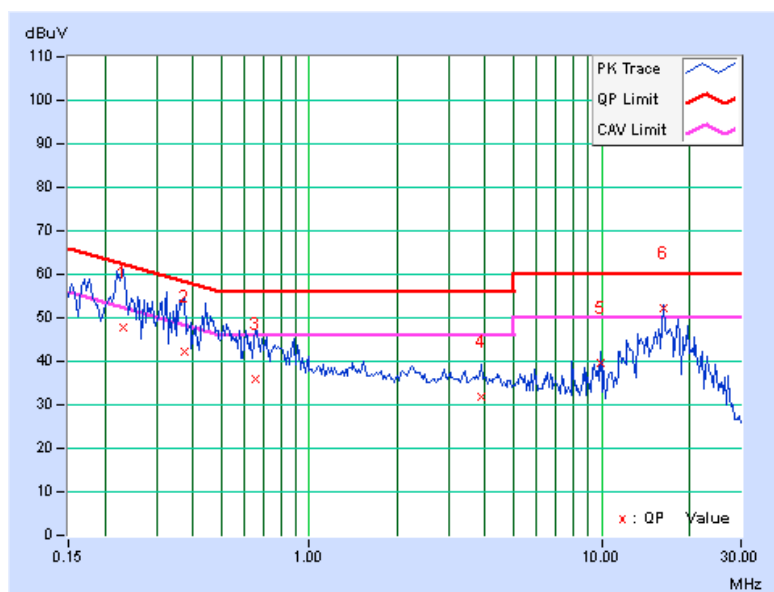


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	0.19	47.41	29.77	47.60	29.96	62.38	52.38	-14.78	-22.42
2	0.37266	0.24	42.16	36.13	42.40	36.37	58.44	48.44	-16.04	-12.07
3	0.65391	0.24	35.65	25.35	35.89	25.59	56.00	46.00	-20.11	-20.41
4	3.87500	0.38	31.29	24.91	31.67	25.29	56.00	46.00	-24.33	-20.71
5	9.93750	0.48	39.10	21.65	39.58	22.13	60.00	50.00	-20.42	-27.87
6	16.22656	0.64	51.41	31.32	52.05	31.96	60.00	50.00	-7.95	-18.04

#### 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



### 4.3 PEAK TRANSMIT POWER MEASUREMENT

#### 4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.250 ~ 5.350GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.470 ~ 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

**NOTE:** Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

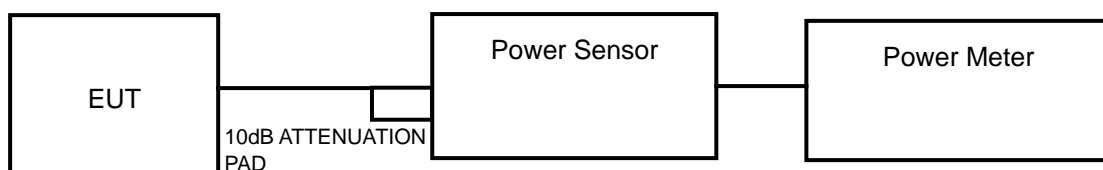
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

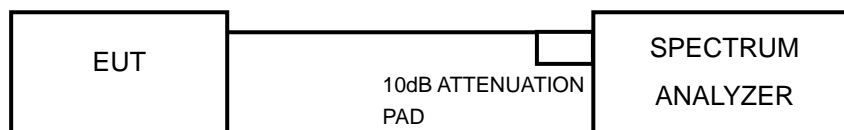
For power measurements on all other devices: Array Gain =  $10 \log(NANT/NSS)$  dB.

#### 4.3.2 TEST SETUP

##### FOR POWER OUTPUT MEASUREMENT



##### FOR 26dB BANDWIDTH



### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

### 4.3.4 TEST PROCEDURE

#### FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

#### FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

### 4.3.7 TEST RESULTS

#### POWER OUTPUT:

##### 802.11n (40MHz)

CH.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)				TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3				
54	5270	15.92	15.25	15.58	15.21	141.906	21.52	24	PASS
62	5310	10.27	9.44	10.15	9.63	38.994	15.91	24	PASS
102	5510	10.95	10.6	11.19	11.13	50.003	16.99	24	PASS
110	5550	15.98	15.47	15.92	15.56	149.968	21.76	24	PASS
134	5670	16.01	15.76	16.25	15.58	155.955	21.93	24	PASS

#### 26dB BANDWIDTH:

##### 802.11n (40MHz)

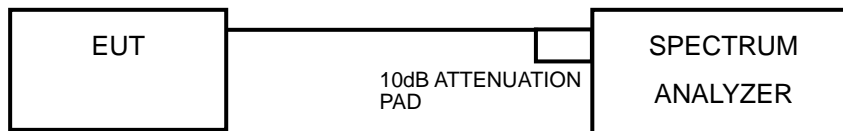
CH.	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)				PASS / FAIL
		chain 0	chain 1	CHAIN 2	CHAIN 3	
54	5270	52.51	48.70	53.08	50.59	PASS
62	5310	44.31	44.25	44.38	44.18	PASS
102	5510	44.53	44.42	44.58	44.35	PASS
110	5550	53.11	53.00	57.58	50.75	PASS
134	5670	52.89	50.74	58.50	50.73	PASS

## 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.250 ~ 5.350GHz	11dBm
5.470 ~ 5.725GHz	11dBm

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

Using method SA-2 alternative

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW  $\geq$  1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = 30ms
- 5) Perform a single sweep.
- 6) Record the max value and add 10 log (1/duty cycle)



#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

#### 4.4.7 TEST RESULTS

For 5270 ~ 5310 MHz

802.11n (40MHz)

CH.	CHAN. FREQ. (MHz)	PSD W/O DUTY FACTOR (dBm)				DUTY FACTOR	PSD W/ DUTY FACTOR (dBm)				TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3			
54	5270	0.69	0.41	0.39	0.06	0.11	0.80	0.52	0.50	0.17	6.53	7.99	PASS
62	5310	-4.92	-5.35	-5.34	-5.66	0.11	-4.81	-5.24	-5.23	-5.55	0.82	7.99	PASS

#### NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $2.99\text{dBi} + 10\log(4) = 9.01\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11-(9.01-6) = 7.99\text{dBm}$ .
3. Refer to section 3.3 for duty cycle spectrum plot.

For 5510 ~ 5670 MHz

802.11n (40MHz)

CH.	CHAN. FREQ. (MHz)	PSD W/O DUTY FACTOR (dBm)				DUTY FACTOR	PSD W/ DUTY FACTOR (dBm)				TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3			
102	5510	-3.70	-3.94	-3.89	-3.98	0.11	-3.59	-3.83	-3.78	-3.87	2.26	7.1	PASS
110	5550	1.26	0.80	0.94	0.67	0.11	1.37	0.91	1.05	0.78	7.06	7.1	PASS
134	5670	1.10	0.65	1.11	0.71	0.11	1.21	0.76	1.22	0.82	7.03	7.1	PASS

**NOTE:**

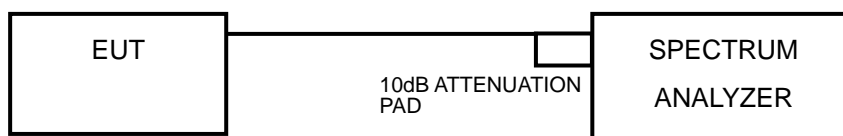
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $3.88\text{dBi} + 10\log(4) = 9.9\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11-(9.9-6) = 7.1\text{dBm}$ .
3. Refer to section 3.3 for duty cycle spectrum plot.

## 4.5 PEAK POWER EXCURSION MEASUREMENT

### 4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB.

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

- 1) Set RBW = 1 MHz, VBW  $\geq$  3 MHz, Detector = peak.
- 2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
- 3) Use the peak search function to find the peak of the spectrum.
- 4) Measure the PPSD.
- 5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITIONS

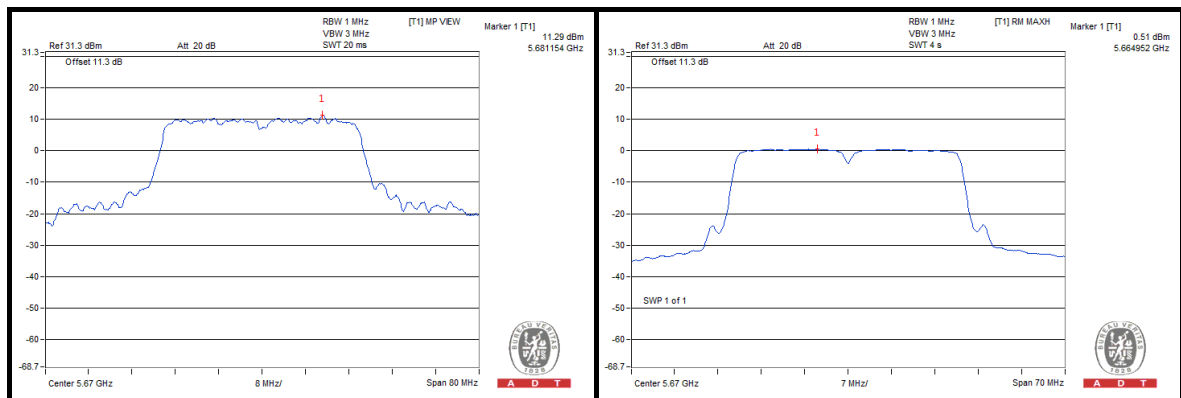
Same as 4.2.6

## 4.5.7 TEST RESULTS

### 802.11n (40MHz)

Modulation Mode	Modulation type	Channel Frequency (MHz)	PEAK VALUE (dBm)				PPSD WITHOUT DUTY FACTOR (dBm)			
			CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3	CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
HT 40 _MCS0	BPSK	5670	10.15	9.61	9.98	9.60	1.10	0.65	1.11	0.71
	QPSK		9.98	9.47	9.64	10.24	0.81	0.55	1.04	0.41
	16QAM		10.33	9.89	10.12	9.83	0.94	0.64	0.77	0.42
	64QAM		11.30	11.28	11.29	10.19	0.83	0.60	0.51	0.26

PPSD WITH DUTY FACTOR (dBm)				PEAK Excursion (dB)				LIMIT (dB)	PASS /FAIL
CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3	CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3		
1.21	0.76	1.22	0.82	8.94	8.85	8.76	8.78	13	PASS
0.92	0.66	1.15	0.52	9.06	8.81	8.49	9.72	13	PASS
1.05	0.75	0.88	0.53	9.28	9.14	9.24	9.30	13	PASS
0.94	0.71	0.62	0.37	10.36	10.57	10.67	9.82	13	PASS

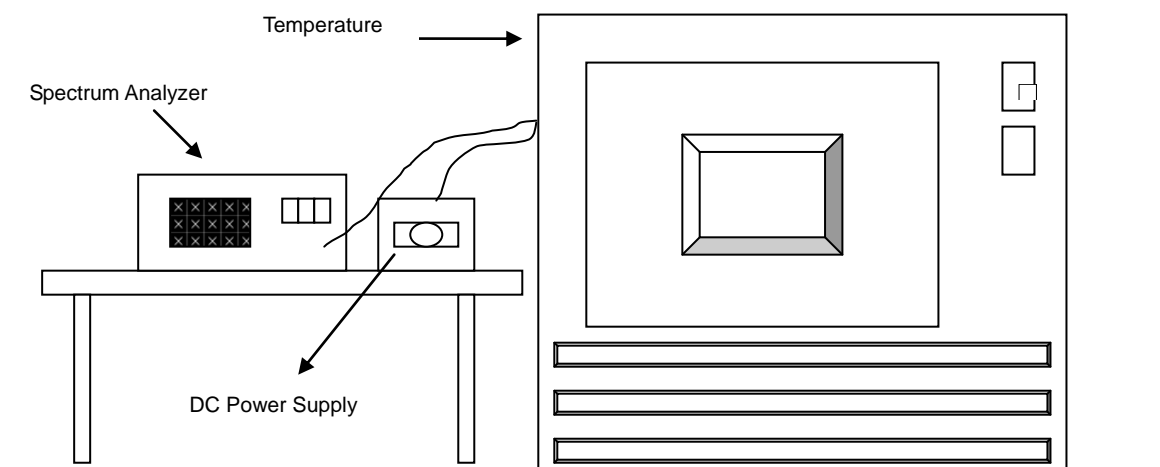


## 4.6 FREQUENCY STABILITY

### 4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

#### 4.6.4 TEST PROCEDURE

- a. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
- b. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
- c. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

#### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.



## 4.6.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5310MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	9.0	5310.067067	12.630	5310.067185	12.653	5310.066761	12.573	5310.066934	12.605
40	9.0	5310.068824	12.961	5310.068483	12.897	5310.068107	12.826	5310.067980	12.802
30	9.0	5310.069344	13.059	5310.069269	13.045	5310.069715	13.129	5310.069618	13.111
20	9.0	5310.072451	13.644	5310.072103	13.579	5310.072090	13.576	5310.072073	13.573
10	9.0	5310.071733	13.509	5310.071874	13.536	5310.071339	13.435	5310.071455	13.457
0	9.0	5310.070838	13.340	5310.070226	13.225	5310.070299	13.239	5310.070191	13.219
-10	9.0	5310.069064	13.006	5310.068496	12.899	5310.068611	12.921	5310.068777	12.952
-20	9.0	5310.068308	12.864	5310.068105	12.826	5310.068567	12.913	5310.068378	12.877
-30	9.0	5310.066902	12.599	5310.066930	12.605	5310.067143	12.645	5310.067478	12.708

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5310MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	8.5	5310.072016	13.562	5310.071971	13.554	5310.071700	13.503	5310.071820	13.525
	9.0	5310.072451	13.644	5310.072103	13.579	5310.072090	13.576	5310.072073	13.573
	9.5	5310.073698	13.879	5310.073406	13.824	5310.073225	13.790	5310.073401	13.823

## 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.

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



A D T

## **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---**