



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF140128C05-1  
**MODEL NO.:** UY3A  
**FCC ID:** HFS-UY3A  
**RECEIVED:** Jan. 28, 2014  
**TESTED:** Feb. 05, 2014 ~ Feb. 08, 2014  
**ISSUED:** Mar. 05, 2014

**APPLICANT:** Quanta Computer Inc.

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Tao Yuan Shien, Taiwan

**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
RF140128C05-1	Original release	Mar. 05, 2014



## 1. CERTIFICATION

**PRODUCT:** Tablet  
**MODEL NO.:** UY3A  
**BRAND:** Quanta  
**APPLICANT:** Quanta Computer Inc.  
**TESTED:** Feb. 05, 2014 ~ Feb. 08, 2014  
**TEST SAMPLE:** PRODUCTION UNIT  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: UY3A) 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** : Rona Chen , **DATE** : Mar. 05, 2014  
Rona Chen / Specialist

**APPROVED BY** : Sam chen , **DATE** : Mar. 05, 2014  
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 C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.25dB at 0.19687MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.02dB at 2484.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	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>	Tablet
<b>MODEL NO.</b>	UY3A
<b>POWER SUPPLY</b>	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion battery)
<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 802.11n: up to MCS7
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	23.13dBm for 2412 ~ 2462MH
<b>ANTENNA TYPE</b>	<b>2.4GHz:</b> PIFA antenna with 0.5dBi gain
<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 contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	TAMURA POWER TECHNOLOGY CO LTD	MII050200B	I/P: 100-240Vac, 300mA O/P: 5.0Vdc, 2000mA
Battery	WELLTECH	EEGU031K2002	3.7Vdc, 4230mAh

2. The EUT provides one completed transmitter and one receiver.

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

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 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
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

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

Where **RE $\geq$ 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 Y-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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

#### **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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	3 to 9	9	OFDM	BPSK	MCS0

#### **POWER LINE CONDUCTED EMISSION TEST:**

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (40MHz)	3 to 9	9	OFDM	BPSK	MCS0



**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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	MCS0
802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	MCS0

**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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥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

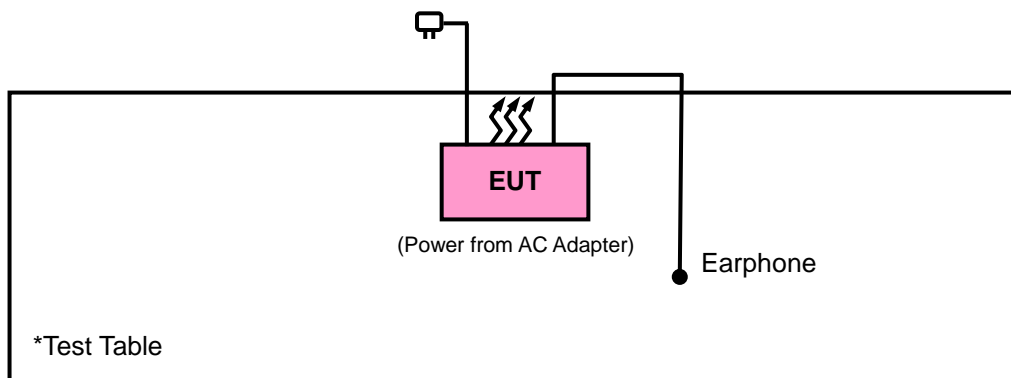
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	MICROPHONE	Acon	CW-010M.V	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m audio cable

- NOTE:** 1. All power cords of the above support units are non shielded (1.8m).  
 2. Item 1 as a communication partner to transfer data.

#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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### 3.4 DUTY CYCLE TEST SIGNAL

#### 2.4GHz

Duty cycle of test signal is > 98 %, duty factor is not required.

**802.11b:** Duty cycle =  $16.827/16.891 = 0.996$

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

**802.11g:** Duty cycle =  $1.383/1.463 = 0.945$ , Duty factor =  $10 * \log(1/0.945) = 0.24$

**802.11n (20MHz):** Duty cycle =  $1.276/1.348 = 0.947$ , Duty factor =  $10 * \log(1/0.9465) = 0.24$

**802.11n (40MHz):** Duty cycle =  $0.627/0.699 = 0.897$ , Duty factor =  $10 * \log(1/0.897) = 0.47$





### **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 C (15.247)**

**ANSI C63.10-2009**

**KDB 558074 D01 DTS Meas Guidance v03r01**

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 (DoC). The test report has been issued separately.

## 4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

### 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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2013	Apr. 14, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU-26	101645	Jul. 16, 2013	Jul. 15, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Loop Antenna	6502	00143303	Jan. 16, 2014	Jan. 15, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Nov. 07, 2013	Nov. 06, 2014
Software BV ADT	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
Power Meter	ML2495A	1232002	Aug. 23, 2013	Aug. 22, 2014
Power Sensor	MA2411B	1207325	Aug. 23, 2013	Aug. 22, 2014

- 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.

#### 4.1.3 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 1kHz (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

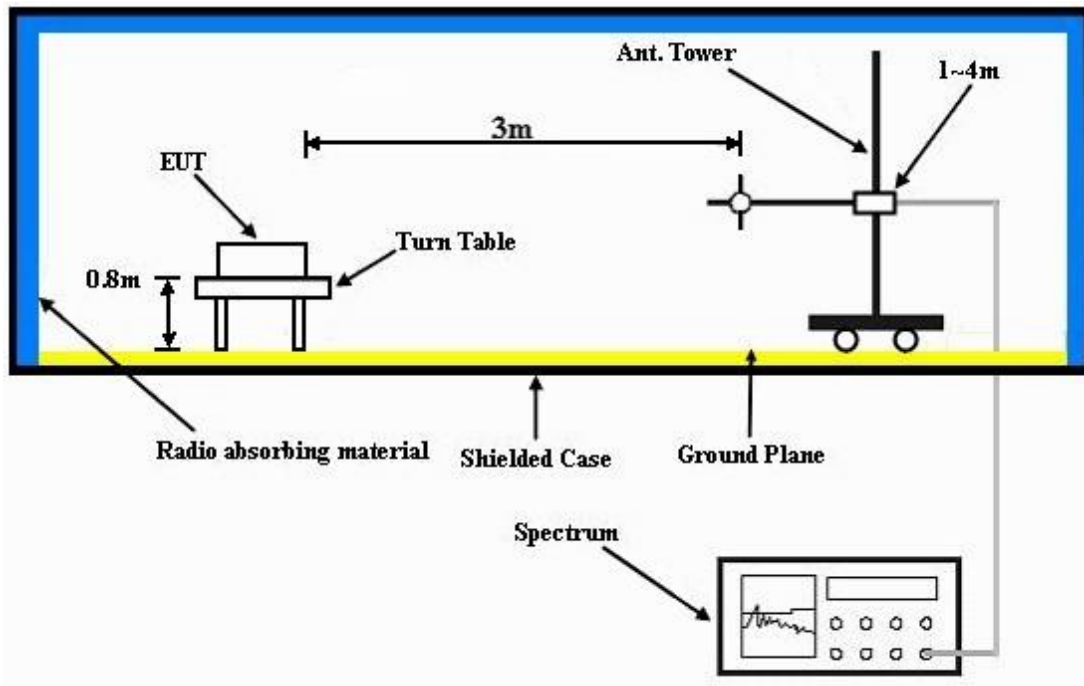
#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

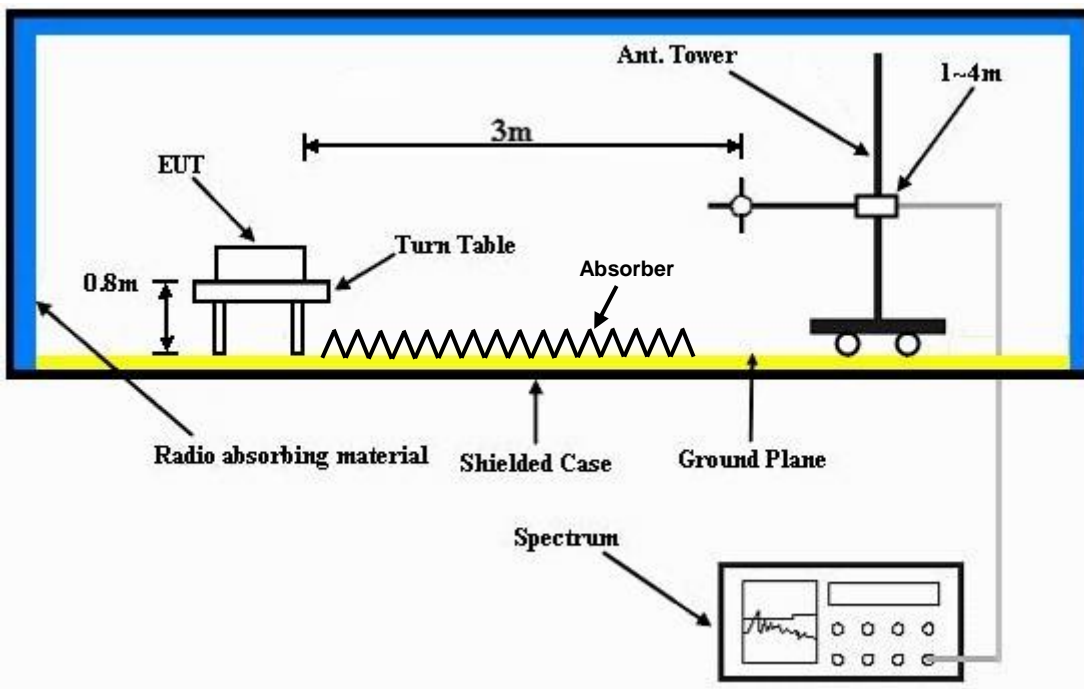


### 4.1.5 TEST SETUP

Frequency Range 30MHz ~ 1GHz



Frequency Range above 1GHz



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



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#### 4.1.6 EUT OPERATING CONDITIONS

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



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#### 4.1.7 TEST RESULTS

##### ABOVE 1GHz WORST-CASE DATA

##### 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
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
2390	35.77	42.84	54	-18.23	26.91	3.54	37.52	100	50	Average
2390	52.56	59.63	74	-21.44	26.91	3.54	37.52	100	50	Peak
2412	102.14	109.16			26.96	3.54	37.52	100	50	Average
2412	106.08	113.1			26.96	3.54	37.52	100	50	Peak
2484	35.34	41.91	54	-18.66	27.15	3.6	37.32	100	50	Average
2484	51.68	58.25	74	-22.32	27.15	3.6	37.32	100	50	Peak
4824	38.33	54.65	54	-15.67	30.99	5.77	53.08	100	142	Average
4824	45.95	62.27	74	-28.05	30.99	5.77	53.08	100	142	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
2390	33.69	40.76	54	-20.31	26.91	3.54	37.52	131	244	Average
2390	52.45	59.52	74	-21.55	26.91	3.54	37.52	131	244	Peak
2412	97.88	104.9			26.96	3.54	37.52	131	244	Average
2412	102.13	109.15			26.96	3.54	37.52	131	244	Peak
2484	34.37	40.94	54	-19.63	27.15	3.6	37.32	131	244	Average
2484	52.39	58.96	74	-21.61	27.15	3.6	37.32	131	244	Peak
4824	46.92	63.24	54	-7.08	30.99	5.77	53.08	100	184	Average
4824	50.19	66.51	74	-23.81	30.99	5.77	53.08	100	184	Peak

##### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
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
2390	35.14	42.21	54	-18.86	26.91	3.54	37.52	100	51	Average
2390	51.82	58.89	74	-22.18	26.91	3.54	37.52	100	51	Peak
2437	101.7	108.54			27.06	3.56	37.46	100	51	Average
2437	105.6	112.44			27.06	3.56	37.46	100	51	Peak
2484	35.04	41.61	54	-18.96	27.15	3.6	37.32	100	51	Average
2484	51.8	58.37	74	-22.2	27.15	3.6	37.32	100	51	Peak
4874	40.16	56.35	54	-13.84	31.06	5.8	53.05	121	36	Average
4874	44.94	61.13	74	-29.06	31.06	5.8	53.05	121	36	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
2390	33.71	40.78	54	-20.29	26.91	3.54	37.52	103	76	Average
2390	50.63	57.7	74	-23.37	26.91	3.54	37.52	103	76	Peak
2437	97.99	104.83			27.06	3.56	37.46	103	76	Average
2437	101.89	108.73			27.06	3.56	37.46	103	76	Peak
2484	34.08	40.65	54	-19.92	27.15	3.6	37.32	103	76	Average
2484	52.31	58.88	74	-21.69	27.15	3.6	37.32	103	76	Peak
4874	48.29	64.48	54	-5.71	31.06	5.8	53.05	100	28	Average
4874	50.97	67.16	74	-23.03	31.06	5.8	53.05	100	28	Peak
2390	33.71	40.78	54	-20.29	26.91	3.54	37.52	103	76	Average

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
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
2390	35.14	42.21	54	-18.86	26.91	3.54	37.52	100	52	Average
2390	50.85	57.92	74	-23.15	26.91	3.54	37.52	100	52	Peak
2462	101.8	108.51			27.1	3.58	37.39	100	52	Average
2462	105.84	112.55			27.1	3.58	37.39	100	52	Peak
2484	37.62	44.19	54	-16.38	27.15	3.6	37.32	100	52	Average
2484	52.57	59.14	74	-21.43	27.15	3.6	37.32	100	52	Peak
4924	43.35	59.43	54	-10.65	31.12	5.83	53.03	121	344	Average
4924	48.66	64.74	74	-25.34	31.12	5.83	53.03	121	344	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
2390	33.99	41.06	54	-20.01	26.91	3.54	37.52	100	75	Average
2390	51.5	58.57	74	-22.5	26.91	3.54	37.52	100	75	Peak
2462	98.38	105.09			27.1	3.58	37.39	100	75	Average
2462	102.41	109.12			27.1	3.58	37.39	100	75	Peak
2484	34.29	40.86	54	-19.71	27.15	3.6	37.32	100	75	Average
2484	51.97	58.54	74	-22.03	27.15	3.6	37.32	100	75	Peak
4924	51.91	67.99	54	-2.09	31.12	5.83	53.03	112	9	Average
4924	54.03	70.11	74	-19.97	31.12	5.83	53.03	112	9	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
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
2386	45.63	52.7	54	-8.37	26.91	3.52	37.5	139	46	Average
2386	69.9	76.97	74	-4.1	26.91	3.52	37.5	139	46	Peak
2412	97.66	104.68			26.96	3.54	37.52	139	46	Average
2412	107	114.02			26.96	3.54	37.52	139	46	Peak
2500	37.73	44.16	54	-16.27	27.2	3.62	37.25	139	46	Average
2500	53.65	60.08	74	-20.35	27.2	3.62	37.25	139	46	Peak
4824	44.57	60.89	54	-9.43	30.99	5.77	53.08	100	228	Average
4824	55.92	72.24	74	-18.08	30.99	5.77	53.08	100	228	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
2386	43.78	50.85	54	-10.22	26.91	3.52	37.5	100	16	Average
2386	69.27	76.34	74	-4.73	26.91	3.52	37.5	100	16	Peak
2412	96.73	103.75			26.96	3.54	37.52	100	16	Average
2412	105.99	113.01			26.96	3.54	37.52	100	16	Peak
2486	37.2	43.77	54	-16.8	27.15	3.6	37.32	100	16	Average
2486	53.46	60.03	74	-20.54	27.15	3.6	37.32	100	16	Peak
4824	45.67	61.99	54	-8.33	30.99	5.77	53.08	114	183	Average
4824	57.2	73.52	74	-16.8	30.99	5.77	53.08	114	183	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
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
2386	36.58	43.65	54	-17.42	26.91	3.52	37.5	112	33	Average
2386	52.64	59.71	74	-21.36	26.91	3.52	37.5	112	33	Peak
2437	98.73	105.57			27.06	3.56	37.46	112	33	Average
2437	107.92	114.76			27.06	3.56	37.46	112	33	Peak
2484	38.12	44.69	54	-15.88	27.15	3.6	37.32	112	33	Average
2484	57.88	64.45	74	-16.12	27.15	3.6	37.32	112	33	Peak
4874	44.89	61.08	54	-9.11	31.06	5.8	53.05	101	274	Average
4874	55.94	72.13	74	-18.06	31.06	5.8	53.05	101	274	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
2384	35.8	42.92	54	-18.2	26.86	3.52	37.5	100	15	Average
2384	53.29	60.41	74	-20.71	26.86	3.52	37.5	100	15	Peak
2437	97.62	104.46			27.06	3.56	37.46	100	15	Average
2437	106.72	113.56			27.06	3.56	37.46	100	15	Peak
2488	37.38	43.88	54	-16.62	27.2	3.62	37.32	100	15	Average
2488	55.9	62.4	74	-18.1	27.2	3.62	37.32	100	15	Peak
4874	46.14	62.33	54	-7.86	31.06	5.8	53.05	125	183	Average
4874	56.73	72.92	74	-17.27	31.06	5.8	53.05	125	183	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
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
2376	35.62	42.74	54	-18.38	26.86	3.52	37.5	112	34	Average
2376	52.63	59.75	74	-21.37	26.86	3.52	37.5	112	34	Peak
2462	96.41	103.12			27.1	3.58	37.39	112	34	Average
2462	105.82	112.53			27.1	3.58	37.39	112	34	Peak
2484	47.15	53.72	54	-6.85	27.15	3.6	37.32	112	34	Average
2484	63.18	69.75	74	-10.82	27.15	3.6	37.32	112	34	Peak
4924	41.6	57.68	54	-12.4	31.12	5.83	53.03	102	270	Average
4924	53.45	69.53	74	-20.55	31.12	5.83	53.03	102	270	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
2374	34.89	42.01	54	-19.11	26.86	3.52	37.5	100	14	Average
2374	52.21	59.33	74	-21.79	26.86	3.52	37.5	100	14	Peak
2462	94.46	101.17			27.1	3.58	37.39	100	14	Average
2462	103.92	110.63			27.1	3.58	37.39	100	14	Peak
2488	45.22	51.72	54	-8.78	27.2	3.62	37.32	100	14	Average
2488	66.23	72.73	74	-7.77	27.2	3.62	37.32	100	14	Peak
4924	43.44	59.52	54	-10.56	31.12	5.83	53.03	122	181	Average
4924	54.32	70.4	74	-19.68	31.12	5.83	53.03	122	181	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.





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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
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
2390	46.18	53.25	54	-7.82	26.91	3.54	37.52	138	44	Average
2390	69.87	76.94	74	-4.13	26.91	3.54	37.52	138	44	Peak
2412	96.71	103.73			26.96	3.54	37.52	138	44	Average
2412	106.03	113.05			26.96	3.54	37.52	138	44	Peak
2484	37.59	44.16	54	-16.41	27.15	3.6	37.32	138	44	Average
2484	52.75	59.32	74	-21.25	27.15	3.6	37.32	138	44	Peak
4824	43.85	60.17	54	-10.15	30.99	5.77	53.08	100	225	Average
4824	55.05	71.37	74	-18.95	30.99	5.77	53.08	100	225	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
2388	44.63	51.68	54	-9.37	26.91	3.54	37.5	100	17	Average
2388	67.76	74.81	74	-6.24	26.91	3.54	37.5	100	17	Peak
2412	95.38	102.4			26.96	3.54	37.52	100	17	Average
2412	104.81	111.83			26.96	3.54	37.52	100	17	Peak
2496	37.22	43.65	54	-16.78	27.2	3.62	37.25	100	17	Average
2496	53.43	59.86	74	-20.57	27.2	3.62	37.25	100	17	Peak
4824	45.12	61.44	54	-8.88	30.99	5.77	53.08	114	183	Average
4824	57.15	73.47	74	-16.85	30.99	5.77	53.08	114	183	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
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
2380	36.45	43.57	54	-17.55	26.86	3.52	37.5	115	36	Average
2380	54.43	61.55	74	-19.57	26.86	3.52	37.5	115	36	Peak
2437	96.27	103.11			27.06	3.56	37.46	115	36	Average
2437	105.9	112.74			27.06	3.56	37.46	115	36	Peak
2484	37.15	43.72	54	-16.85	27.15	3.6	37.32	115	36	Average
2484	55.41	61.98	74	-18.59	27.15	3.6	37.32	115	36	Peak
4874	43.65	59.84	54	-10.35	31.06	5.8	53.05	102	277	Average
4874	54.84	71.03	74	-19.16	31.06	5.8	53.05	102	277	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
2368	35.25	42.42	54	-18.75	26.81	3.52	37.5	100	18	Average
2368	53.02	60.19	74	-20.98	26.81	3.52	37.5	100	18	Peak
2437	94.77	101.61			27.06	3.56	37.46	100	18	Average
2437	104.39	111.23			27.06	3.56	37.46	100	18	Peak
2484	36.72	43.29	54	-17.28	27.15	3.6	37.32	100	18	Average
2484	54.32	60.89	74	-19.68	27.15	3.6	37.32	100	18	Peak
4874	44.51	60.7	54	-9.49	31.06	5.8	53.05	123	183	Average
4874	55.76	71.95	74	-18.24	31.06	5.8	53.05	123	183	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
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
2340	35.28	42.5	54	-18.72	26.77	3.5	37.49	112	35	Average
2340	51.87	59.09	74	-22.13	26.77	3.5	37.49	112	35	Peak
2462	94.67	101.38			27.1	3.58	37.39	112	35	Average
2462	104.07	110.78			27.1	3.58	37.39	112	35	Peak
2484	45.5	52.07	54	-8.5	27.15	3.6	37.32	112	35	Average
2484	63.37	69.94	74	-10.63	27.15	3.6	37.32	112	35	Peak
4924	40.71	56.79	54	-13.29	31.12	5.83	53.03	104	276	Average
4924	51.1	67.18	74	-22.9	31.12	5.83	53.03	104	276	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
2332	34.44	41.71	54	-19.56	26.72	3.48	37.47	100	14	Average
2332	52.18	59.45	74	-21.82	26.72	3.48	37.47	100	14	Peak
2462	93.07	99.78			27.1	3.58	37.39	100	14	Average
2462	102.52	109.23			27.1	3.58	37.39	100	14	Peak
2486	43.94	50.51	54	-10.06	27.15	3.6	37.32	100	14	Average
2486	60.84	67.41	74	-13.16	27.15	3.6	37.32	100	14	Peak
4924	41.68	57.76	54	-12.32	31.12	5.83	53.03	123	180	Average
4924	53.5	69.58	74	-20.5	31.12	5.83	53.03	123	180	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1GHz ~ 25GHz
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
2388	46.55	53.6	54	-7.45	26.91	3.54	37.5	136	46	Average
2388	69.68	76.73	74	-4.32	26.91	3.54	37.5	136	46	Peak
2422	93.33	100.22			27.01	3.56	37.46	136	46	Average
2422	102.76	109.65			27.01	3.56	37.46	136	46	Peak
2484	40.35	46.92	54	-13.65	27.15	3.6	37.32	136	46	Average
2484	62.8	69.37	74	-11.2	27.15	3.6	37.32	136	46	Peak
4844	39.16	55.43	54	-14.84	31.01	5.78	53.06	105	270	Average
4844	49.9	66.17	74	-24.1	31.01	5.78	53.06	105	270	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
2390	46.12	53.19	54	-7.88	26.91	3.54	37.52	100	8	Average
2390	67.9	74.97	74	-6.1	26.91	3.54	37.52	100	8	Peak
2422	92.39	99.28			27.01	3.56	37.46	100	8	Average
2422	101.88	108.77			27.01	3.56	37.46	100	8	Peak
2484	39.97	46.54	54	-14.03	27.15	3.6	37.32	100	8	Average
2484	60.41	66.98	74	-13.59	27.15	3.6	37.32	100	8	Peak
4844	40.99	57.26	54	-13.01	31.01	5.78	53.06	114	178	Average
4844	52.5	68.77	74	-21.5	31.01	5.78	53.06	114	178	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2422MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
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
2384	43.48	50.6	54	-10.52	26.86	3.52	37.5	115	30	Average
2384	63.66	70.78	74	-10.34	26.86	3.52	37.5	115	30	Peak
2437	94.22	101.06			27.06	3.56	37.46	115	30	Average
2437	103.7	110.54			27.06	3.56	37.46	115	30	Peak
2484	45.53	52.1	54	-8.47	27.15	3.6	37.32	115	30	Average
2484	68.69	75.26	74	-5.31	27.15	3.6	37.32	115	30	Peak
4874	40.53	56.72	54	-13.47	31.06	5.8	53.05	101	270	Average
4874	51.5	67.69	74	-22.5	31.06	5.8	53.05	101	270	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
2384	40.87	47.99	54	-13.13	26.86	3.52	37.5	100	8	Average
2384	61.15	68.27	74	-12.85	26.86	3.52	37.5	100	8	Peak
2437	92.9	99.74			27.06	3.56	37.46	100	8	Average
2437	102.19	109.03			27.06	3.56	37.46	100	8	Peak
2484	45.62	52.19	54	-8.38	27.15	3.6	37.32	100	8	Average
2484	69.29	75.86	74	-4.71	27.15	3.6	37.32	100	8	Peak
4874	39.9	56.09	54	-14.1	31.06	5.8	53.05	112	218	Average
4874	50.74	66.93	74	-23.26	31.06	5.8	53.05	112	218	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1GHz ~ 25GHz
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
2390	37.94	45.01	54	-16.06	26.91	3.54	37.52	114	24	Average
2390	58.48	65.55	74	-15.52	26.91	3.54	37.52	114	24	Peak
2452	93.91	100.66			27.06	3.58	37.39	114	24	Average
2452	103.37	110.12			27.06	3.58	37.39	114	24	Peak
2484	49.94	56.51	54	-4.06	27.15	3.6	37.32	114	24	Average
2484	72.98	79.55	74	-1.02	27.15	3.6	37.32	114	24	Peak
4904	38.89	55.01	54	-15.11	31.1	5.81	53.03	100	271	Average
4904	50.71	66.83	74	-23.29	31.1	5.81	53.03	100	271	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
2382	37.43	44.55	54	-16.57	26.86	3.52	37.5	102	9	Average
2382	57.87	64.99	74	-16.13	26.86	3.52	37.5	102	9	Peak
2452	92.16	98.91			27.06	3.58	37.39	102	9	Average
2452	102.05	108.8			27.06	3.58	37.39	102	9	Peak
2484	47.44	54.01	54	-6.56	27.15	3.6	37.32	102	9	Average
2484	71.68	78.25	74	-2.32	27.15	3.6	37.32	102	9	Peak
4904	40.93	57.05	54	-13.07	31.1	5.81	53.03	123	182	Average
4904	52.32	68.44	74	-21.68	31.1	5.81	53.03	123	182	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2452MHz: Fundamental frequency.



BELOW 1GHz WORST-CASE DATA:

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
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	23.24	41.43	40	-16.76	12.35	0.8	31.34	100	132	Peak
146.1	28.7	46.41	43.5	-14.8	12.58	1.33	31.62	100	251	Peak
273.27	24.04	41.89	46	-21.96	12.17	1.93	31.95	100	121	Peak
485.5	21.05	33.08	46	-24.95	17.04	2.73	31.8	100	128	Peak
661.9	25.15	33.43	46	-20.85	20.35	3.29	31.92	100	74	Peak
901.3	28.39	32.91	46	-17.61	23.52	3.97	32.01	100	169	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
76.17	23.41	44.99	40	-16.59	9.09	0.95	31.62	100	235	Peak
142.32	25.85	43.73	43.5	-17.65	12.44	1.31	31.63	100	146	Peak
200.64	20.76	41.51	43.5	-22.74	9.4	1.6	31.75	100	95	Peak
456.1	19.46	32.36	46	-26.54	16.45	2.64	31.99	100	331	Peak
679.4	25.01	32.94	46	-20.99	20.56	3.35	31.84	100	114	Peak
831.3	29.14	34.47	46	-16.86	22.63	3.77	31.73	100	37	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
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 0.50MHz.
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. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-cond2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 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

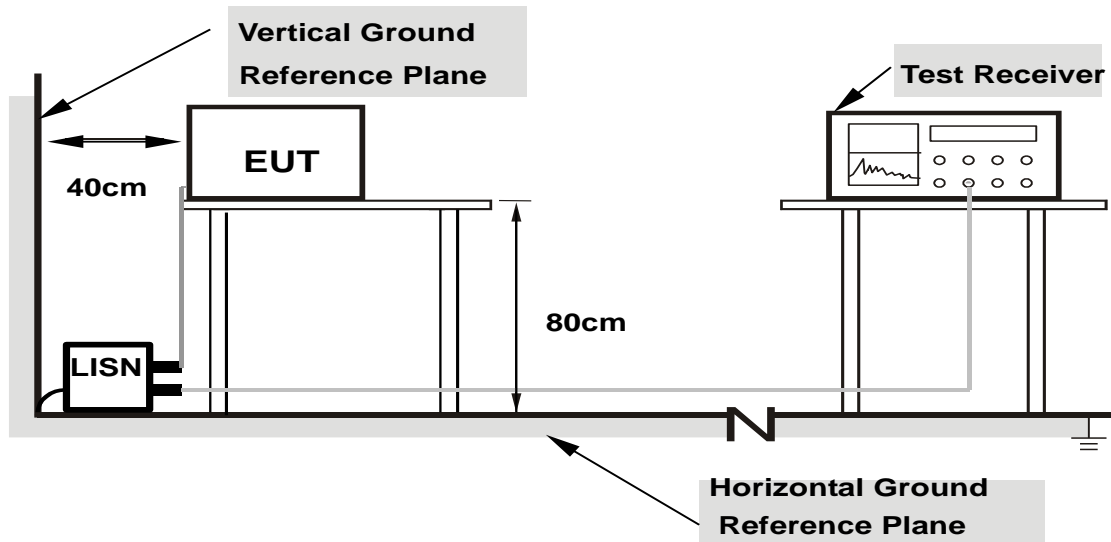
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

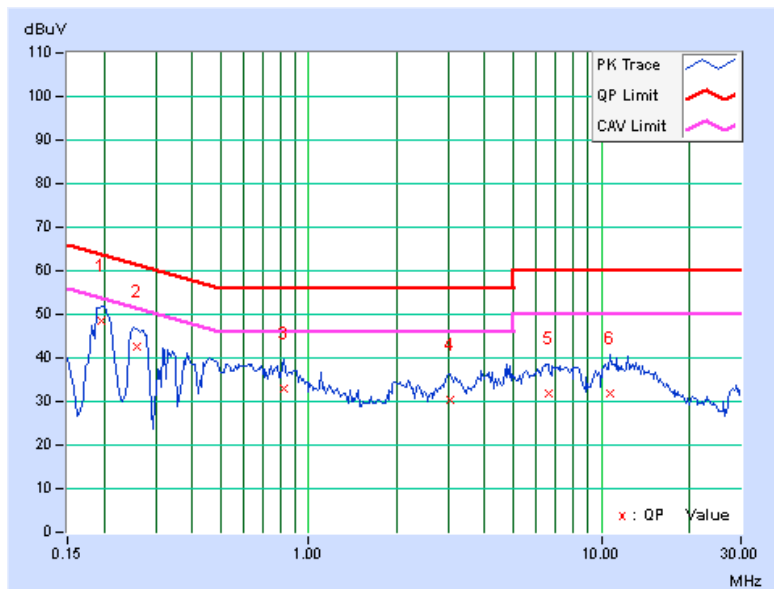
**CONDUCTED WORST-CASE DATA :**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
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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	0.19687	0.28	48.21	37.38	48.49	37.66	63.74	53.74	-15.25	-16.08
2	0.25938	0.29	42.17	31.97	42.46	32.26	61.45	51.45	-19.00	-19.20
3	0.82188	0.33	32.62	24.18	32.95	24.51	56.00	46.00	-23.05	-21.49
4	3.03516	0.40	30.04	22.88	30.44	23.28	56.00	46.00	-25.56	-22.72
5	6.59766	0.46	31.32	22.24	31.78	22.70	60.00	50.00	-28.22	-27.30
6	10.71094	0.50	31.39	21.93	31.89	22.43	60.00	50.00	-28.11	-27.57

**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

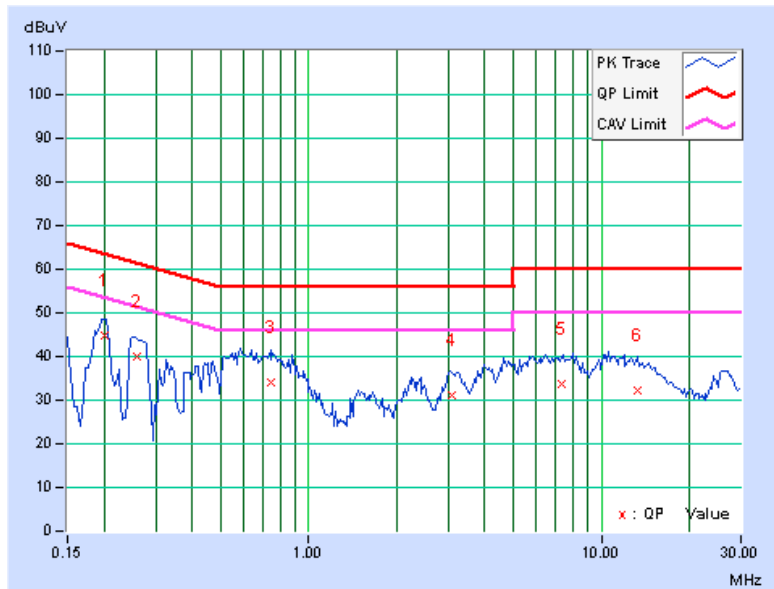


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20075	0.28	44.67	34.56	44.95	34.84	63.58	53.58	-18.63	-18.74
2	0.25938	0.29	39.62	28.87	39.91	29.16	61.45	51.45	-21.55	-22.30
3	0.73984	0.32	33.89	22.59	34.21	22.91	56.00	46.00	-21.79	-23.09
4	3.09766	0.41	30.61	21.40	31.02	21.81	56.00	46.00	-24.98	-24.19
5	7.32031	0.48	33.26	23.13	33.74	23.61	60.00	50.00	-26.26	-26.39
6	13.36328	0.55	31.82	21.69	32.37	22.24	60.00	50.00	-27.63	-27.76

**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

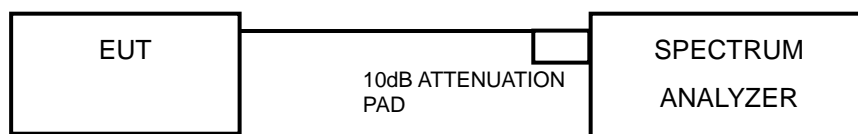


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 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 lowest, middle and highest channel frequencies individually.



#### 4.3.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.58	0.5	PASS
6	2437	10.10	0.5	PASS
11	2462	10.10	0.5	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.69	0.5	PASS
6	2437	15.83	0.5	PASS
11	2462	15.68	0.5	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.63	0.5	PASS
6	2437	17.68	0.5	PASS
11	2462	17.69	0.5	PASS

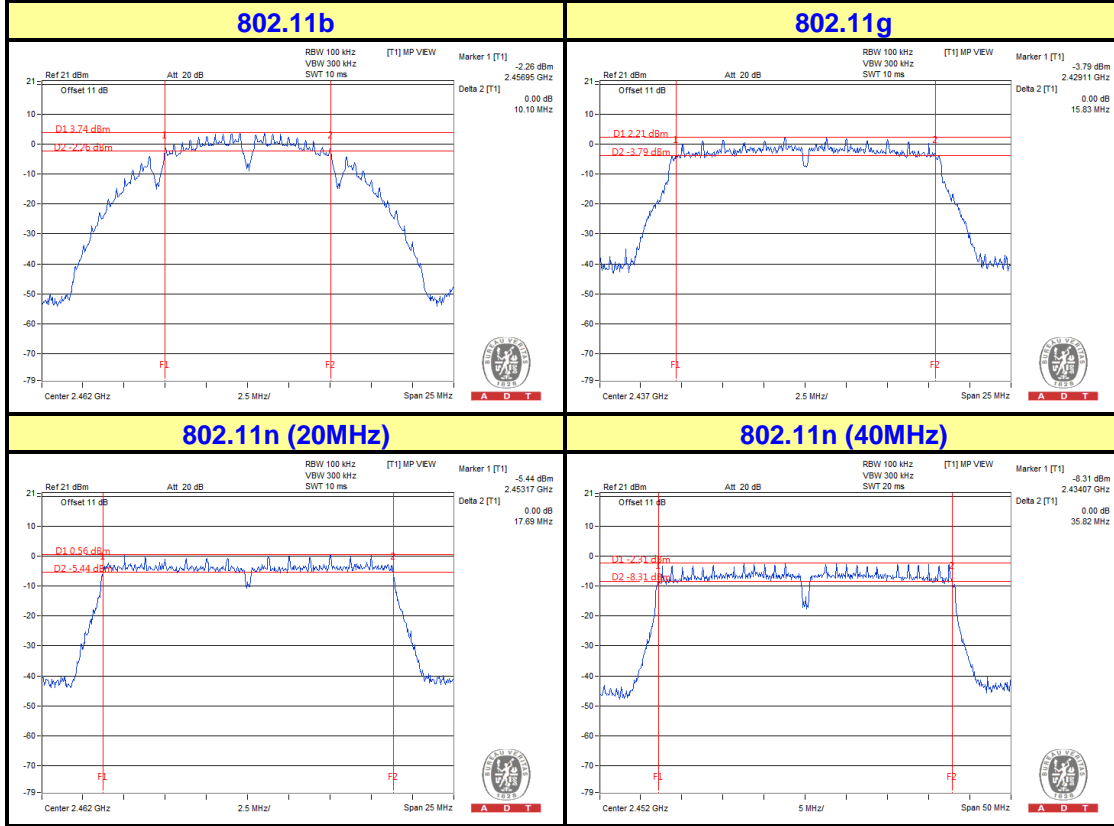
##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.51	0.5	PASS
6	2437	35.66	0.5	PASS
6	2452	35.82	0.5	PASS



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### SPECTRUM PLOT OF WORST VALUE

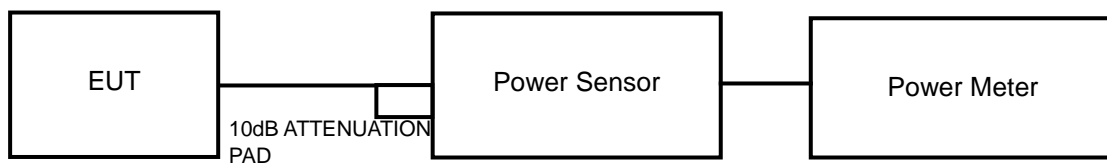


## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.





#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	33.497	15.25	30	PASS
6	2437	31.989	15.05	30	PASS
11	2462	29.040	14.63	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	204.644	23.11	30	PASS
6	2437	205.589	23.13	30	PASS
11	2462	155.597	21.92	30	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	199.067	22.99	30	PASS
6	2437	191.426	22.82	30	PASS
11	2462	127.057	21.04	30	PASS

##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	187.932	22.74	30	PASS
6	2437	203.236	23.08	30	PASS
9	2452	187.499	22.73	30	PASS

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.5.7 TEST RESULTS

##### 802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-9.76	8	PASS
6	2437	-10.19	8	PASS
11	2462	-9.99	8	PASS

##### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.78	8	PASS
6	2437	-11.87	8	PASS
11	2462	-12.22	8	PASS

##### 802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.21	8	PASS
6	2437	-13.36	8	PASS
11	2462	-13.83	8	PASS

##### 802.11n (40MHz)

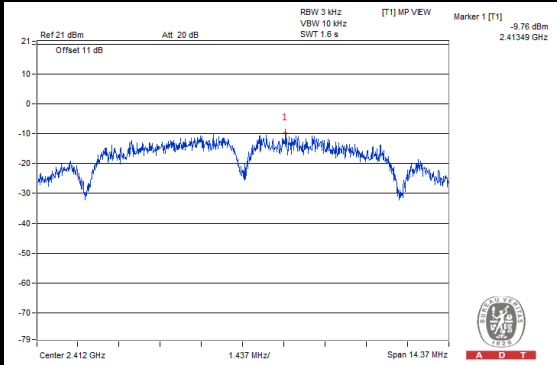
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-15.21	8	PASS
6	2437	-17.33	8	PASS
9	2452	-15.52	8	PASS



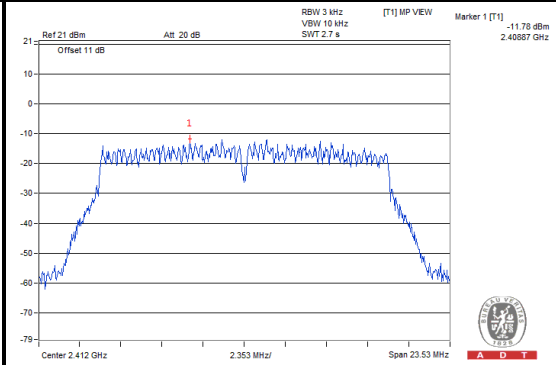
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### SPECTRUM PLOT OF WORST VALUE

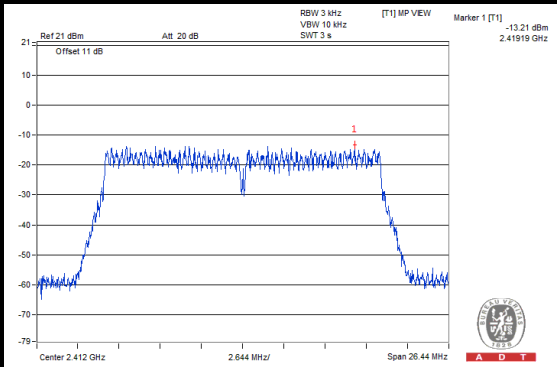
#### 802.11b



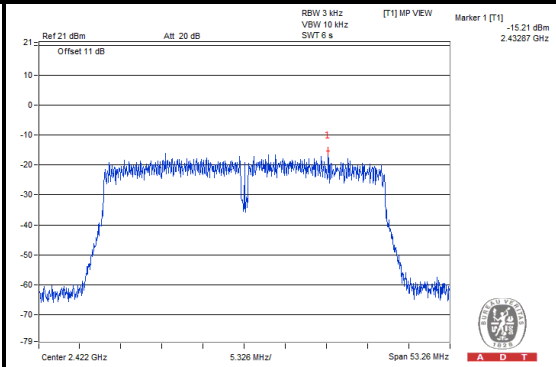
#### 802.11g



#### 802.11n (20MHz)



#### 802.11n (40MHz)

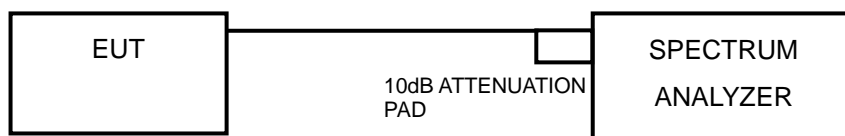


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

## MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Ensure that the number of measurement points  $\geq$  span/RBW
4. According to measurement points to set differ measurement span.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

### 4.6.7 TEST RESULTS

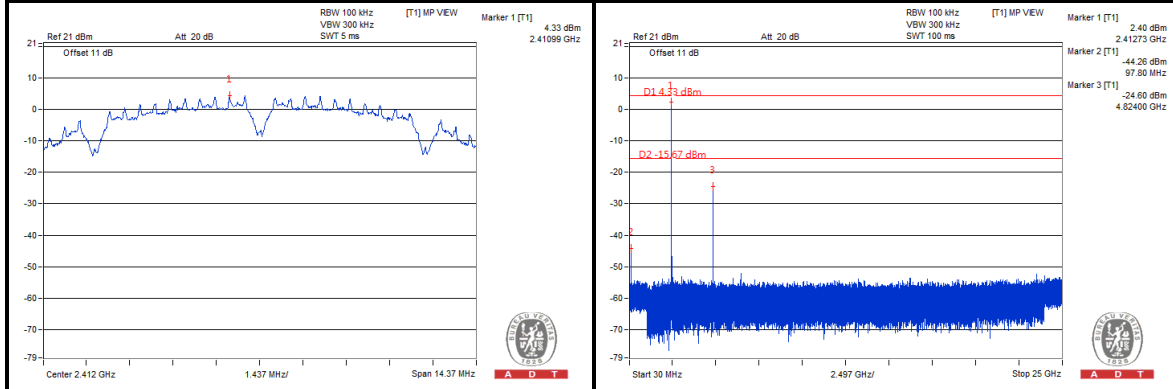
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



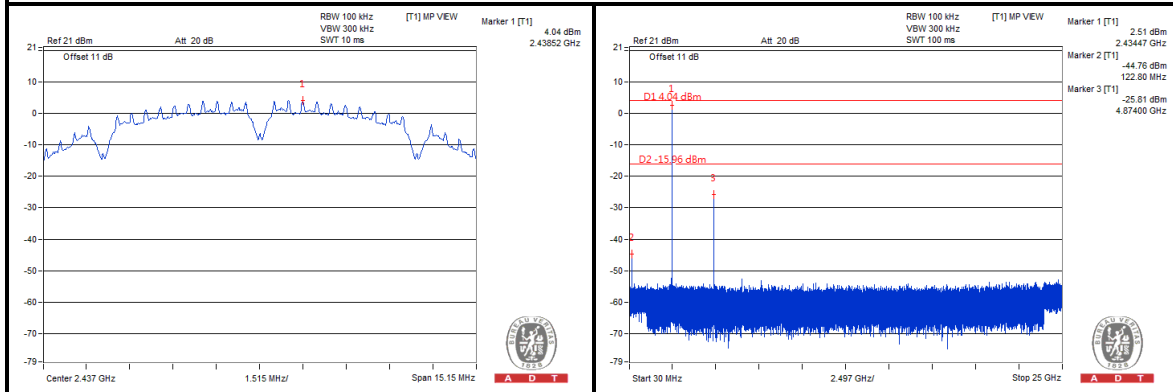
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### 802.11b

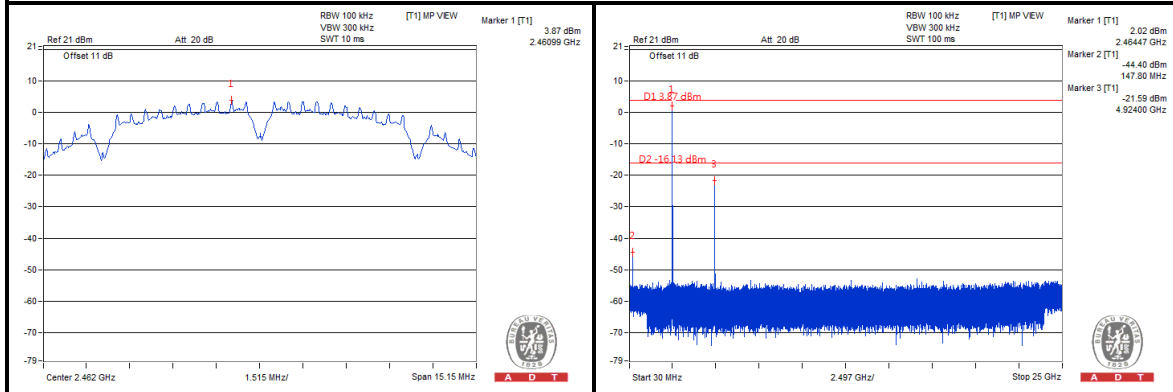
#### CH 1



#### CH 6



#### CH 11

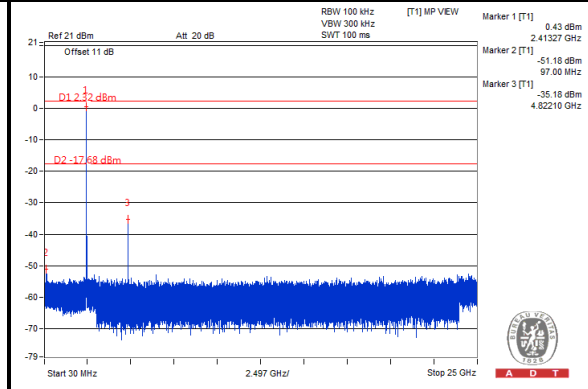
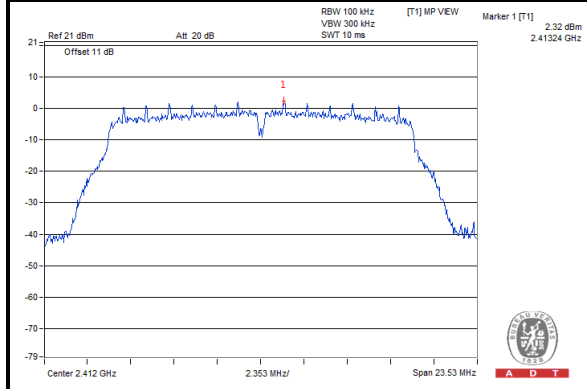




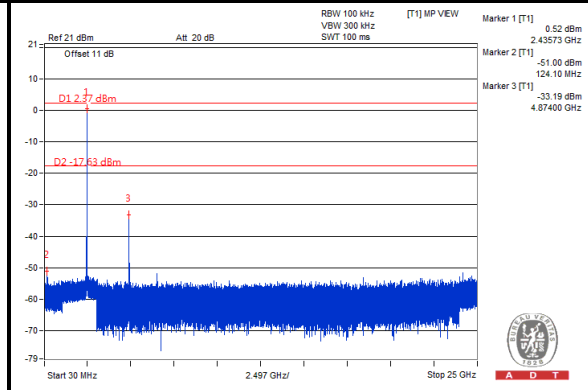
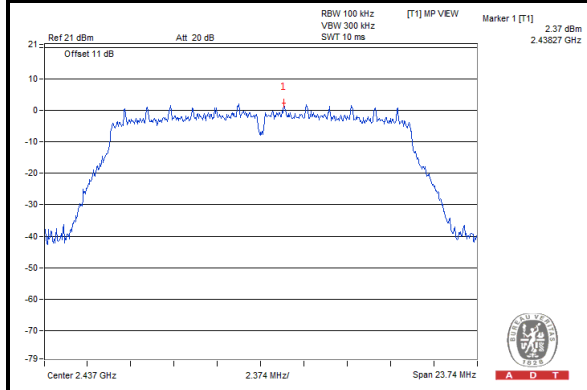
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### 802.11g

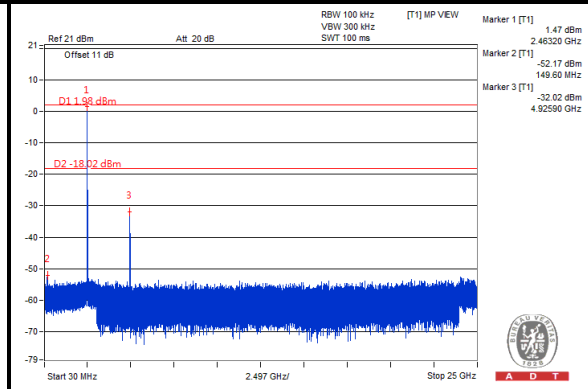
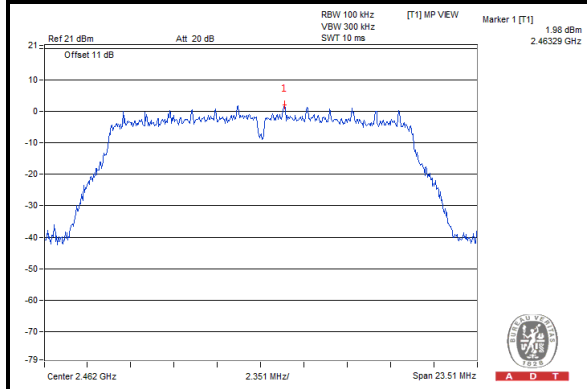
#### CH 1



#### CH 6



#### CH 11



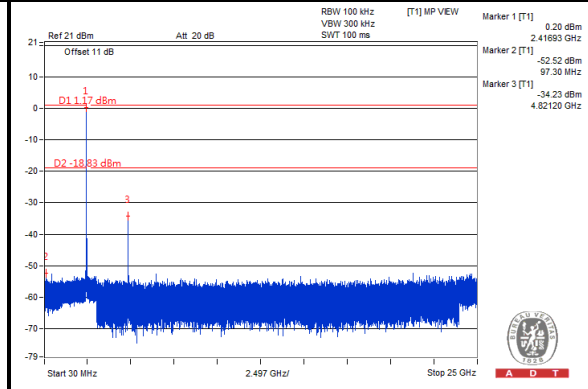
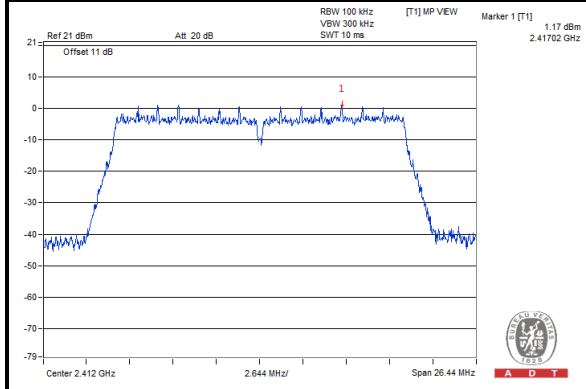




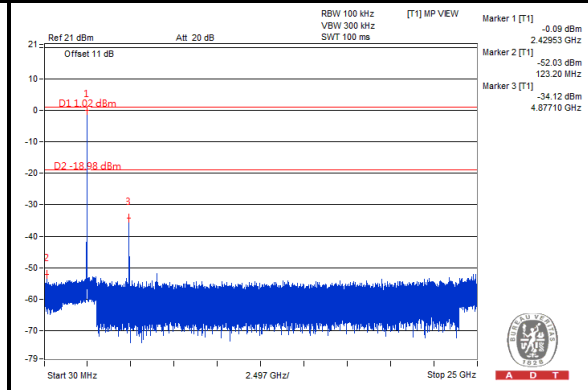
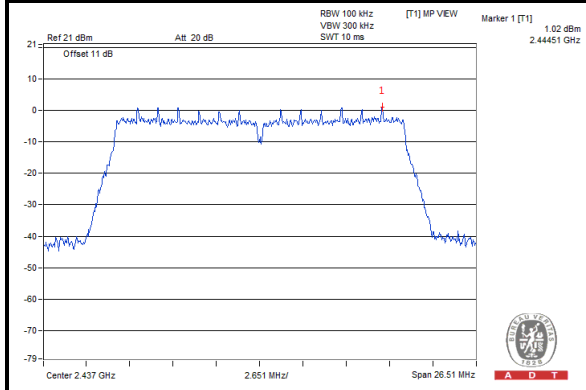
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### 802.11n (20MHz)

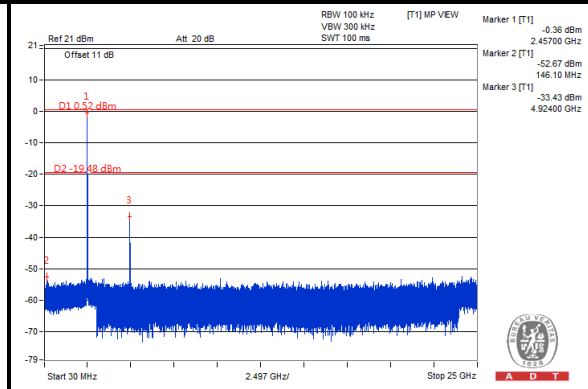
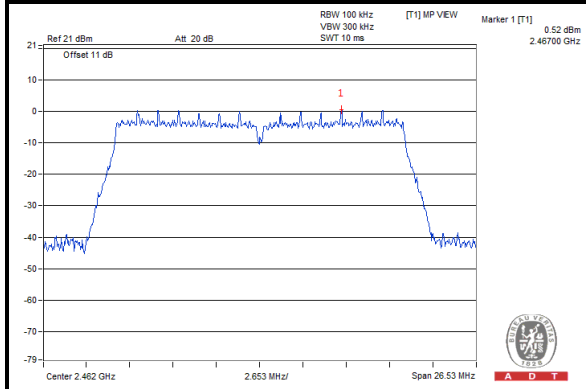
#### CH 1



#### CH 6



#### CH 11

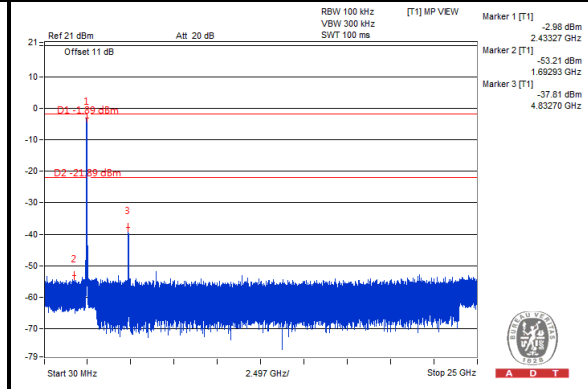
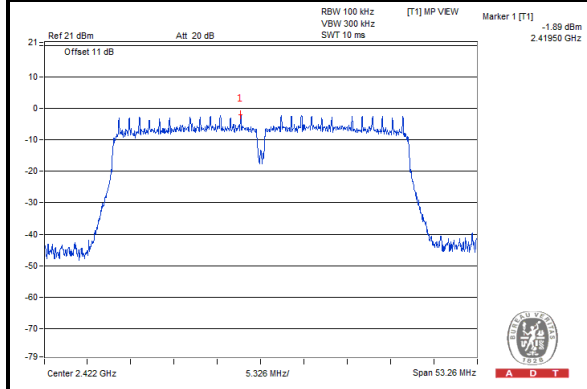




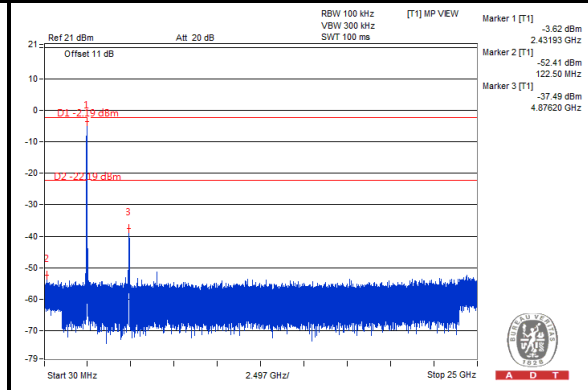
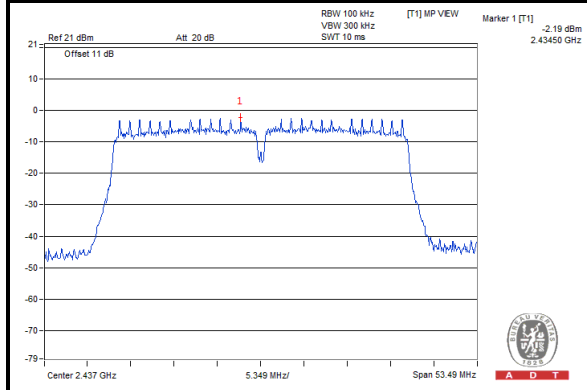
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### 802.11n (40MHz)

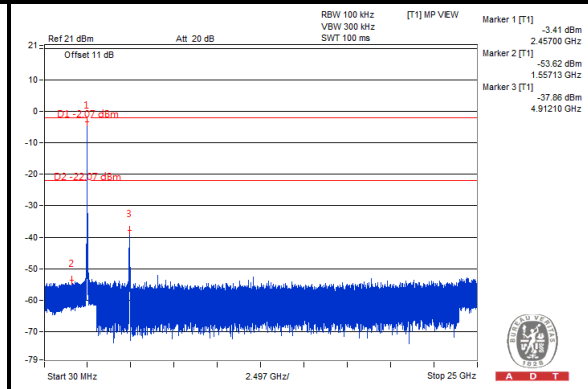
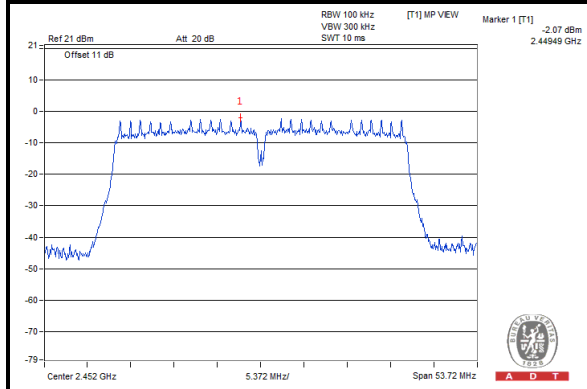
#### CH 3



#### CH 6



#### CH 9





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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.

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



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

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

**---END---**