



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF140624C19-7  
**MODEL NO.:** OP82300  
**FCC ID:** NM80P82300  
**RECEIVED:** Jun. 24, 2014  
**TESTED:** Jul. 23, 2014 ~ Sep. 12, 2014  
**ISSUED:** Sep. 18, 2014

**APPLICANT:** HTC Corporation

**ADDRESS:** 1F, 6-3 Baoqiang Road, Xindian District, New Taipei City, Taiwan 231

**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
RF140624C19-7	Original release	Sep. 18, 2014

## 1. CERTIFICATION

**PRODUCT:** Tablet  
**MODEL NO.:** 0P82300  
**BRAND:** HTC  
**APPLICANT:** HTC Corporation  
**TESTED:** Jul. 23, 2014 ~ Sep. 12, 2014  
**TEST SAMPLE:** Production Unit  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: 0P82300) 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** : Ivonne Wu , **DATE** : Sep. 18, 2014  
Ivonne Wu / Supervisor

**APPROVED BY** : Sam Chen , **DATE** : Sep. 18, 2014  
Sam Chen / Senior Project Engineer

## 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 -13.31dB at 1.14614MHz.
15.205 & 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.58dB at 2484.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	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>	0P82300
<b>POWER SUPPLY</b>	5.0Vdc (adapter or host equipment) 3.8Vdc (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 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	181.13mW
<b>ANTENNA TYPE</b>	Refer to Note as below
<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's accessories list refers to Ext. Pho.
2. There're 2 configurations for the EUT listed as below.  
Main sample (A): Battery 1 + eMMC 16G  
2<sup>nd</sup> sample (B): Battery 2 + eMMC 32G  
✧ Only the worst test data was presented in the report.



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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	1TX / 2TX
802.11n (40MHz)	1TX / 2TX
802.11ac (80MHz)	1TX / 2TX

4. The antenna information is listed as below.

	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
WLAN	2412~2462	PCB	Ant-1: -3.37 Ant-2: -5.2
	5180~5240		Ant-1: -5.6 Ant-2: -7
	5260~5320		Ant-1: -5.95 Ant-2: -7
	5500~5700		Ant-1: -6.14 Ant-2: -7.1
	5745~5825		Ant-1: -6.35 Ant-2: -7.2
Bluetooth EDR	2402~2480	PCB	-3.37
Bluetooth LE 4.0	2402~2480	PCB	-3.37

5. 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

#### WLAN 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	Main sample with Chain 0
B	√	-	-	√	Main sample with Chain 0+1
C	√	√	-	-	2 <sup>nd</sup> sample with Chain 0

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 **X-plane**.

#### RADIATED EMISSION TEST (ABOVE 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	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
B	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
C	802.11n (20MHz)	1 to 11	11	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, C	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0



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

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	11	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	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
B	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11n (40MHz)	3 to 9	3, 6, 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	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
B	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0



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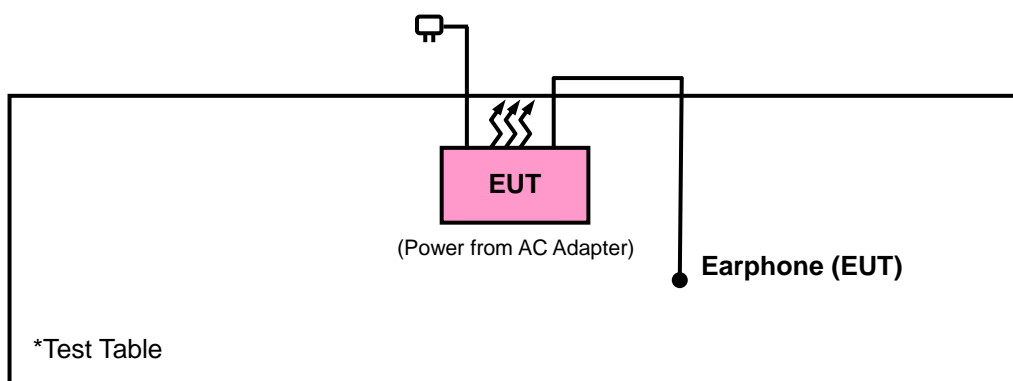
**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Will Chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Will Chen
PLC	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang

### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.4 DUTY CYCLE TEST SIGNAL

#### MODE A

#### WLAN 2.4GHZ

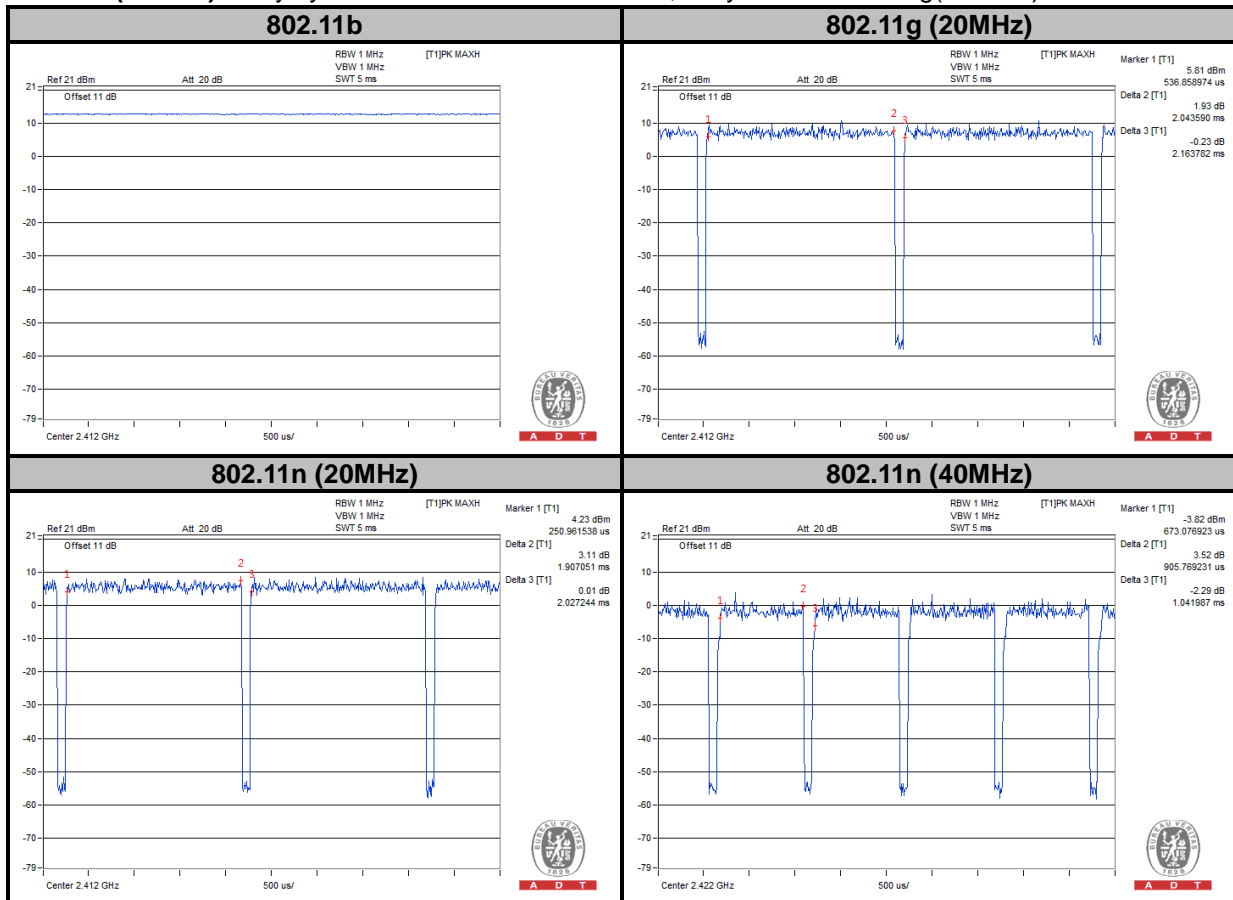
**802.11b:** Duty cycle of test signal is 100 %, duty factor is not required.

If duty cycle is < 98%

**802.11g:** Duty cycle =  $2.043/2.164 = 0.944$ , Duty factor =  $10 * \log(1/0.944) = 0.25$

**802.11n (20MHz):** Duty cycle =  $1.907/2.027 = 0.941$ , Duty factor =  $10 * \log(1/0.941) = 0.26$

**802.11n (40MHz):** Duty cycle =  $905.77/1041.99 = 0.869$ , Duty factor =  $10 * \log(1/0.869) = 0.61$





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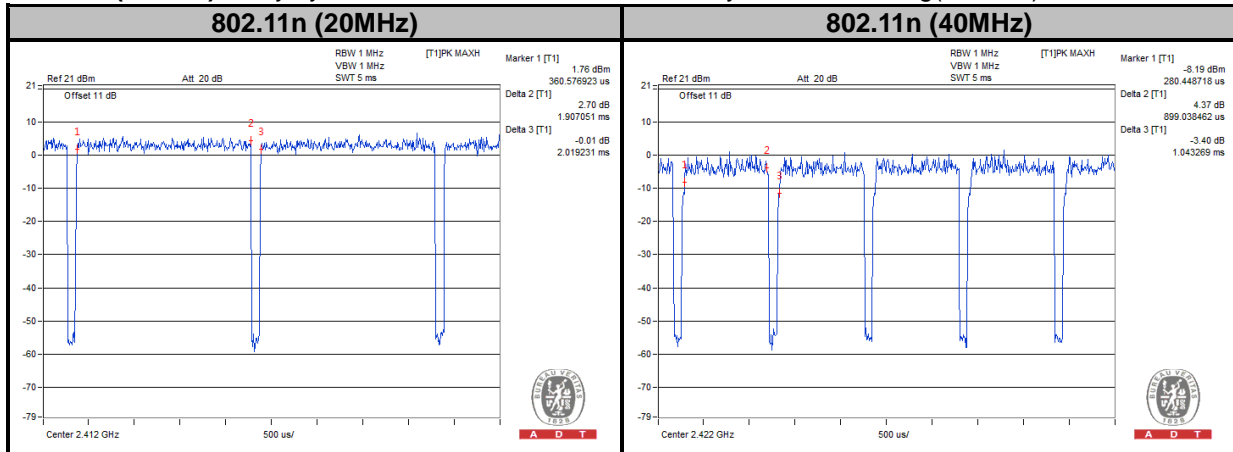
### MODE B

### WLAN 2.4GHz

If duty cycle is < 98%

**802.11n (20MHz):** Duty cycle =  $1.907/2.019 = 0.944$ , Duty factor =  $10 * \log(1/0.944) = 0.25$

**802.11n (40MHz):** Duty cycle =  $899.04/1043.27 = 0.862$ , Duty factor =  $10 * \log(1/0.862) = 0.64$



### 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)**

**558074 D01 DTS Meas Guidance v03r02**

**662911 D01 Multiple Transmitter Output v02r01**

ANSI C63.10-2009

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.



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#### 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, 2014	Apr. 14, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27, 2014	Feb. 26, 2015
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	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
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 2950114	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	1145013	Jan. 15, 2014	Jan. 14, 2015
Power Sensor	MA2411B	1126085	Jan. 15, 2014	Jan. 14, 2015

- 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:**

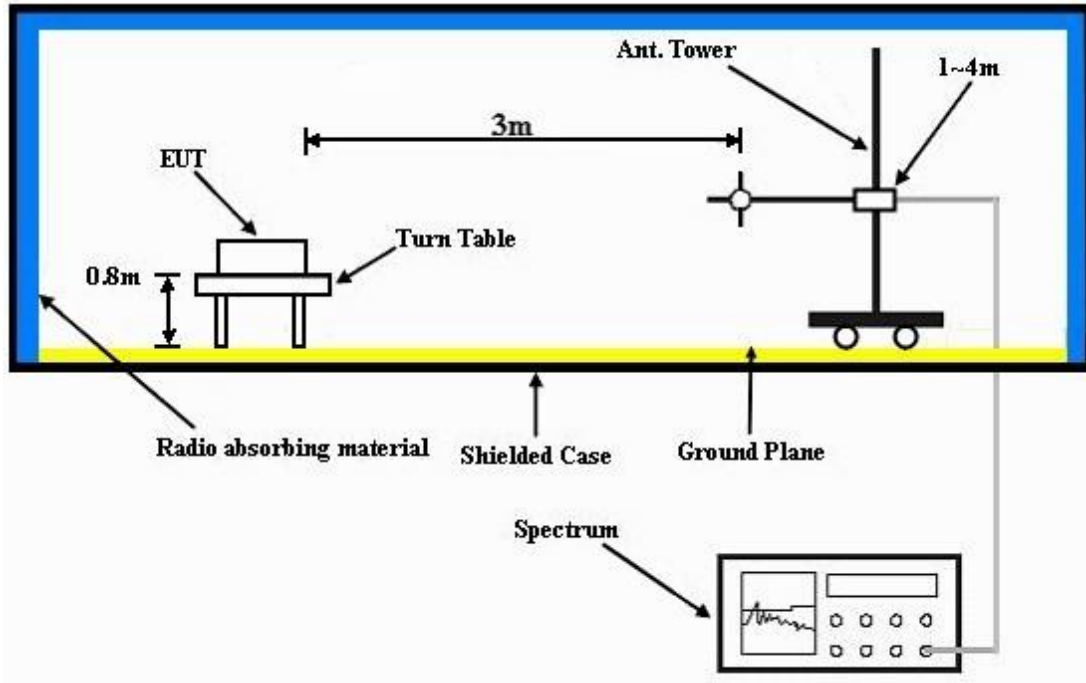
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

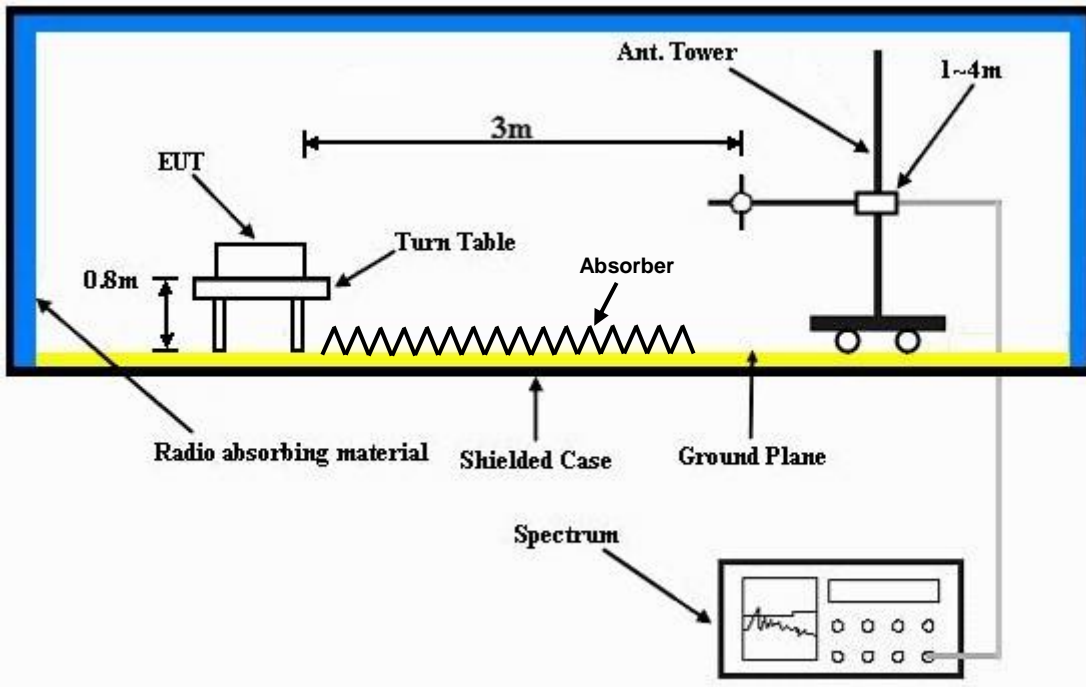
No deviation.

**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

MODE A

802.11b

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

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	48.93	47.2	54	-5.07	31.8	5.4	35.47	100	348	Average
2390	57.76	56.03	74	-16.24	31.8	5.4	35.47	100	348	Peak
2412	104.98	103.21			31.81	5.43	35.47	100	348	Average
2412	107.69	105.92			31.81	5.43	35.47	100	348	Peak
2486	42.02	40.03	54	-11.98	31.88	5.53	35.42	100	348	Average
2486	56.46	54.47	74	-17.54	31.88	5.53	35.42	100	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
2388	47.08	45.37	54	-6.92	31.8	5.4	35.49	100	360	Average
2388	57.15	55.44	74	-16.85	31.8	5.4	35.49	100	360	Peak
2412	102.68	100.91			31.81	5.43	35.47	100	360	Average
2412	105.12	103.35			31.81	5.43	35.47	100	360	Peak
2490	41.59	39.58	54	-12.41	31.9	5.53	35.42	100	360	Average
2490	57.14	55.13	74	-16.86	31.9	5.53	35.42	100	360	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2354	40.04	38.45	54	-13.96	31.76	5.33	35.5	122	351	Average
2354	55.6	54.01	74	-18.4	31.76	5.33	35.5	122	351	Peak
2437	103.36	101.51			31.85	5.46	35.46	122	351	Average
2437	106.05	104.2			31.85	5.46	35.46	122	351	Peak
2484	40.6	38.64	54	-13.4	31.88	5.5	35.42	122	351	Average
2484	57.03	55.07	74	-16.97	31.88	5.5	35.42	122	351	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	40.08	38.39	54	-13.92	31.78	5.4	35.49	100	360	Average
2382	55.77	54.08	74	-18.23	31.78	5.4	35.49	100	360	Peak
2437	102.52	100.67			31.85	5.46	35.46	100	360	Average
2437	105.17	103.32			31.85	5.46	35.46	100	360	Peak
2484	40.57	38.61	54	-13.43	31.88	5.5	35.42	100	360	Average
2484	56	54.04	74	-18	31.88	5.5	35.42	100	360	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2354	40.13	38.54	54	-13.87	31.76	5.33	35.5	121	349	Average
2354	55.71	54.12	74	-18.29	31.76	5.33	35.5	121	349	Peak
2462	104.97	103.04			31.87	5.5	35.44	121	349	Average
2462	107.6	105.67			31.87	5.5	35.44	121	349	Peak
2484	48.89	46.93	54	-5.11	31.88	5.5	35.42	121	349	Average
2484	58.23	56.27	74	-15.77	31.88	5.5	35.42	121	349	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	40.12	38.41	54	-13.88	31.8	5.4	35.49	100	0	Average
2388	56.36	54.65	74	-17.64	31.8	5.4	35.49	100	0	Peak
2462	102.37	100.44			31.87	5.5	35.44	100	0	Average
2462	104.99	103.06			31.87	5.5	35.44	100	0	Peak
2488	46.61	44.6	54	-7.39	31.9	5.53	35.42	100	0	Average
2488	57.29	55.28	74	-16.71	31.9	5.53	35.42	100	0	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

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	51.43	49.7	54	-2.57	31.8	5.4	35.47	148	169	Average
2390	61.35	59.62	74	-12.65	31.8	5.4	35.47	148	169	Peak
2412	101.48	99.71			31.81	5.43	35.47	148	169	Average
2412	109.11	107.34			31.81	5.43	35.47	148	169	Peak
2484	40.91	38.95	54	-13.09	31.88	5.5	35.42	148	169	Average
2484	56.07	54.11	74	-17.93	31.88	5.5	35.42	148	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
2390	47.43	45.7	54	-6.57	31.8	5.4	35.47	106	0	Average
2390	56.5	54.77	74	-17.5	31.8	5.4	35.47	106	0	Peak
2412	95.81	94.04			31.81	5.43	35.47	106	0	Average
2412	103.89	102.12			31.81	5.43	35.47	106	0	Peak
2486	45.27	43.28	54	-8.73	31.88	5.53	35.42	106	0	Average
2486	56.99	55	74	-17.01	31.88	5.53	35.42	106	0	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	47.43	45.7	54	-6.57	31.8	5.4	35.47	148	174	Average
2390	55.9	54.17	74	-18.1	31.8	5.4	35.47	148	174	Peak
2437	104.84	102.99			31.85	5.46	35.46	148	174	Average
2437	112.68	110.83			31.85	5.46	35.46	148	174	Peak
2483.5	47.28	45.32	54	-6.72	31.88	5.5	35.42	148	174	Average
2483.5	57.32	55.36	74	-16.68	31.88	5.5	35.42	148	174	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
2324	43.6	42.09	54	-10.4	31.73	5.3	35.52	106	0	Average
2324	55.82	54.31	74	-18.18	31.73	5.3	35.52	106	0	Peak
2437	96.55	94.7			31.85	5.46	35.46	106	0	Average
2437	104.41	102.56			31.85	5.46	35.46	106	0	Peak
2494	44	41.98	54	-10	31.9	5.53	35.41	106	0	Average
2494	54.94	52.92	74	-19.06	31.9	5.53	35.41	106	0	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2324	44.56	43.05	54	-9.44	31.73	5.3	35.52	148	174	Average
2324	55.7	54.19	74	-18.3	31.73	5.3	35.52	148	174	Peak
2462	102.89	100.96			31.87	5.5	35.44	148	174	Average
2462	110.18	108.25			31.87	5.5	35.44	148	174	Peak
2483.5	50.95	48.99	54	-3.05	31.88	5.5	35.42	148	174	Average
2483.5	61.73	59.77	74	-12.27	31.88	5.5	35.42	148	174	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	44.09	42.38	54	-9.91	31.8	5.4	35.49	102	333	Average
2388	55.78	54.07	74	-18.22	31.8	5.4	35.49	102	333	Peak
2462	94.93	93			31.87	5.5	35.44	102	333	Average
2462	102.8	100.87			31.87	5.5	35.44	102	333	Peak
2483.5	47.58	45.62	54	-6.42	31.88	5.5	35.42	102	333	Average
2483.5	56.81	54.85	74	-17.19	31.88	5.5	35.42	102	333	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 (20MHz)**

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

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	46.64	44.91	54	-7.36	31.8	5.4	35.47	100	350	Average
2390	60.22	58.49	74	-13.78	31.8	5.4	35.47	100	350	Peak
2412	98.29	96.52			31.81	5.43	35.47	100	350	Average
2412	107.01	105.24			31.81	5.43	35.47	100	350	Peak
2490	41.56	39.55	54	-12.44	31.9	5.53	35.42	100	350	Average
2490	56.25	54.24	74	-17.75	31.9	5.53	35.42	100	350	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	44.84	43.11	54	-9.16	31.8	5.4	35.47	101	360	Average
2390	56.72	54.99	74	-17.28	31.8	5.4	35.47	101	360	Peak
2412	98.1	96.33			31.81	5.43	35.47	101	360	Average
2412	105.81	104.04			31.81	5.43	35.47	101	360	Peak
2488	41.32	39.31	54	-12.68	31.9	5.53	35.42	101	360	Average
2488	56.19	54.18	74	-17.81	31.9	5.53	35.42	101	360	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2354	41.74	40.15	54	-12.26	31.76	5.33	35.5	120	324	Average
2354	55.97	54.38	74	-18.03	31.76	5.33	35.5	120	324	Peak
2437	98.57	96.72			31.85	5.46	35.46	120	324	Average
2437	107.2	105.35			31.85	5.46	35.46	120	324	Peak
2486	43	41.01	54	-11	31.88	5.53	35.42	120	324	Average
2486	57.28	55.29	74	-16.72	31.88	5.53	35.42	120	324	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
2372	41.19	39.53	54	-12.81	31.78	5.37	35.49	100	360	Average
2372	55.65	53.99	74	-18.35	31.78	5.37	35.49	100	360	Peak
2437	97.43	95.58			31.85	5.46	35.46	100	360	Average
2437	105.43	103.58			31.85	5.46	35.46	100	360	Peak
2486	41.49	39.5	54	-12.51	31.88	5.53	35.42	100	360	Average
2486	56.05	54.06	74	-17.95	31.88	5.53	35.42	100	360	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	40.49	38.8	54	-13.51	31.78	5.4	35.49	120	351	Average
2384	55.63	53.94	74	-18.37	31.78	5.4	35.49	120	351	Peak
2462	98.73	96.8			31.87	5.5	35.44	120	351	Average
2462	107.11	105.18			31.87	5.5	35.44	120	351	Peak
2484	52.4	50.44	54	-1.6	31.88	5.5	35.42	120	351	Average
2484	66.01	64.05	74	-7.99	31.88	5.5	35.42	120	351	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
2346	40.55	38.98	54	-13.45	31.74	5.33	35.5	100	2	Average
2346	55.89	54.32	74	-18.11	31.74	5.33	35.5	100	2	Peak
2462	97.03	95.1			31.87	5.5	35.44	100	2	Average
2462	105.35	103.42			31.87	5.5	35.44	100	2	Peak
2484	51.51	49.55	54	-2.49	31.88	5.5	35.42	100	2	Average
2484	65.67	63.71	74	-8.33	31.88	5.5	35.42	100	2	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

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	48.66	46.95	54	-5.34	31.8	5.4	35.49	100	351	Average
2388	60.64	58.93	74	-13.36	31.8	5.4	35.49	100	351	Peak
2422	95.7	93.9			31.83	5.43	35.46	100	351	Average
2422	104.42	102.62			31.83	5.43	35.46	100	351	Peak
2484	42.57	40.61	54	-11.43	31.88	5.5	35.42	100	351	Average
2484	56.46	54.5	74	-17.54	31.88	5.5	35.42	100	351	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	46.23	44.52	54	-7.77	31.8	5.4	35.49	101	360	Average
2386	57.55	55.84	74	-16.45	31.8	5.4	35.49	101	360	Peak
2422	94.82	93.02			31.83	5.43	35.46	101	360	Average
2422	103.03	101.23			31.83	5.43	35.46	101	360	Peak
2490	41.79	39.78	54	-12.21	31.9	5.53	35.42	101	360	Average
2490	55.64	53.63	74	-18.36	31.9	5.53	35.42	101	360	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	44.4	42.69	54	-9.6	31.8	5.4	35.49	122	324	Average
2388	56.55	54.84	74	-17.45	31.8	5.4	35.49	122	324	Peak
2437	95.52	93.67			31.85	5.46	35.46	122	324	Average
2437	104.1	102.25			31.85	5.46	35.46	122	324	Peak
2486	46.62	44.63	54	-7.38	31.88	5.53	35.42	122	324	Average
2486	60.01	58.02	74	-13.99	31.88	5.53	35.42	122	324	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
2342	42	40.43	54	-12	31.74	5.33	35.5	100	0	Average
2342	55.56	53.99	74	-18.44	31.74	5.33	35.5	100	0	Peak
2437	95.56	93.71			31.85	5.46	35.46	100	0	Average
2437	103.13	101.28			31.85	5.46	35.46	100	0	Peak
2484	43.03	41.07	54	-10.97	31.88	5.5	35.42	100	0	Average
2484	56.46	54.5	74	-17.54	31.88	5.5	35.42	100	0	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 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2356	41.51	39.88	54	-12.49	31.76	5.37	35.5	121	326	Average
2356	55.84	54.21	74	-18.16	31.76	5.37	35.5	121	326	Peak
2452	93.66	91.79			31.85	5.46	35.44	121	326	Average
2452	102.63	100.76			31.85	5.46	35.44	121	326	Peak
2486	49.93	47.94	54	-4.07	31.88	5.53	35.42	121	326	Average
2486	62.61	60.62	74	-11.39	31.88	5.53	35.42	121	326	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
2350	40.98	39.41	54	-13.02	31.74	5.33	35.5	100	360	Average
2350	56.41	54.84	74	-17.59	31.74	5.33	35.5	100	360	Peak
2452	93	91.13			31.85	5.46	35.44	100	360	Average
2452	101.29	99.42			31.85	5.46	35.44	100	360	Peak
2486	45.45	43.46	54	-8.55	31.88	5.53	35.42	100	360	Average
2486	57.13	55.14	74	-16.87	31.88	5.53	35.42	100	360	Peak

**REMARKS:**

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



A D T

**MODE B**

**802.11n (20MHz)**

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

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	42.83	41.1	54	-11.17	31.8	5.4	35.47	103	16	Average
2390	57.94	56.21	74	-16.06	31.8	5.4	35.47	103	16	Peak
2412	95.28	93.51			31.81	5.43	35.47	103	16	Average
2412	102.74	100.97			31.81	5.43	35.47	103	16	Peak
2488	41.23	39.22	54	-12.77	31.9	5.53	35.42	103	16	Average
2488	56.21	54.2	74	-17.79	31.9	5.53	35.42	103	16	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	47.62	45.89	54	-6.38	31.8	5.4	35.47	108	53	Average
2390	62.86	61.13	74	-11.14	31.8	5.4	35.47	108	53	Peak
2412	98.26	96.49			31.81	5.43	35.47	108	53	Average
2412	105.4	103.63			31.81	5.43	35.47	108	53	Peak
2498	41.15	39.13	54	-12.85	31.9	5.53	35.41	108	53	Average
2498	56.15	54.13	74	-17.85	31.9	5.53	35.41	108	53	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2374	40.49	38.83	54	-13.51	31.78	5.37	35.49	100	15	Average
2374	55.71	54.05	74	-18.29	31.78	5.37	35.49	100	15	Peak
2437	94	92.15			31.85	5.46	35.46	100	15	Average
2437	101.42	99.57			31.85	5.46	35.46	100	15	Peak
2492	40.88	38.86	54	-13.12	31.9	5.53	35.41	100	15	Average
2492	55.45	53.43	74	-18.55	31.9	5.53	35.41	100	15	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
2356	41.7	40.07	54	-12.3	31.76	5.37	35.5	112	56	Average
2356	55.91	54.28	74	-18.09	31.76	5.37	35.5	112	56	Peak
2437	97.89	96.04			31.85	5.46	35.46	112	56	Average
2437	105.82	103.97			31.85	5.46	35.46	112	56	Peak
2488	42.05	40.04	54	-11.95	31.9	5.53	35.42	112	56	Average
2488	55.79	53.78	74	-18.21	31.9	5.53	35.42	112	56	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	40.55	38.82	54	-13.45	31.8	5.4	35.47	100	16	Average
2390	56.23	54.5	74	-17.77	31.8	5.4	35.47	100	16	Peak
2462	94.51	92.58			31.87	5.5	35.44	100	16	Average
2462	102.13	100.2			31.87	5.5	35.44	100	16	Peak
2484	43.95	41.99	54	-10.05	31.88	5.5	35.42	100	16	Average
2484	58.04	56.08	74	-15.96	31.88	5.5	35.42	100	16	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	40.69	39	54	-13.31	31.78	5.4	35.49	108	59	Average
2382	56.67	54.98	74	-17.33	31.78	5.4	35.49	108	59	Peak
2462	98.15	96.22			31.87	5.5	35.44	108	59	Average
2462	105.45	103.52			31.87	5.5	35.44	108	59	Peak
2484	46.1	44.14	54	-7.9	31.88	5.5	35.42	108	59	Average
2484	60.51	58.55	74	-13.49	31.88	5.5	35.42	108	59	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	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

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	45.74	44.01	54	-8.26	31.8	5.4	35.47	100	16	Average
2390	57.6	55.87	74	-16.4	31.8	5.4	35.47	100	16	Peak
2422	93.17	91.37			31.83	5.43	35.46	100	16	Average
2422	100.91	99.11			31.83	5.43	35.46	100	16	Peak
2484	41.63	39.67	54	-12.37	31.88	5.5	35.42	100	16	Average
2484	56.38	54.42	74	-17.62	31.88	5.5	35.42	100	16	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	49.71	47.98	54	-4.29	31.8	5.4	35.47	108	53	Average
2390	60.68	58.95	74	-13.32	31.8	5.4	35.47	108	53	Peak
2422	96.63	94.83			31.83	5.43	35.46	114	294	Average
2422	103.86	102.06			31.83	5.43	35.46	114	294	Peak
2498	42.16	40.14	54	-11.84	31.9	5.53	35.41	114	294	Average
2498	57.15	55.13	74	-16.85	31.9	5.53	35.41	114	294	Peak

REMARKS:

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	43.05	41.36	54	-10.95	31.78	5.4	35.49	100	15	Average
2384	56.17	54.48	74	-17.83	31.78	5.4	35.49	100	15	Peak
2437	92.04	90.19			31.85	5.46	35.46	100	15	Average
2437	99.58	97.73			31.85	5.46	35.46	100	15	Peak
2494	41.51	39.49	54	-12.49	31.9	5.53	35.41	100	15	Average
2494	56.42	54.4	74	-17.58	31.9	5.53	35.41	100	15	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	44.15	42.42	54	-9.85	31.8	5.4	35.47	140	356	Average
2390	56.57	54.84	74	-17.43	31.8	5.4	35.47	140	356	Peak
2437	95.65	93.8			31.85	5.46	35.46	140	356	Average
2437	103.26	101.41			31.85	5.46	35.46	140	356	Peak
2484	42.41	40.45	54	-11.59	31.88	5.5	35.42	140	356	Average
2484	56.97	55.01	74	-17.03	31.88	5.5	35.42	140	356	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 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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	41.16	39.5	54	-12.84	31.78	5.37	35.49	100	16	Average
2380	55.38	53.72	74	-18.62	31.78	5.37	35.49	100	16	Peak
2452	91.81	89.94			31.85	5.46	35.44	100	16	Average
2452	98.94	97.07			31.85	5.46	35.44	100	16	Peak
2484	45.39	43.43	54	-8.61	31.88	5.5	35.42	100	16	Average
2484	57	55.04	74	-17	31.88	5.5	35.42	100	16	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
2372	42.11	40.45	54	-11.89	31.78	5.37	35.49	113	55	Average
2372	56.41	54.75	74	-17.59	31.78	5.37	35.49	113	55	Peak
2452	95.13	93.26			31.85	5.46	35.44	113	55	Average
2452	101.95	100.08			31.85	5.46	35.44	113	55	Peak
2484	48.45	46.49	54	-5.55	31.88	5.5	35.42	137	355	Average
2484	61.33	59.37	74	-12.67	31.88	5.5	35.42	137	355	Peak

**REMARKS:**

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



A D T

**MODE C**

**802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
2360	40.93	39.3	54	-13.07	31.76	5.37	35.5	149	346	Average
2360	56.7	55.07	74	-17.3	31.76	5.37	35.5	149	346	Peak
2462	99.65	97.72			31.87	5.5	35.44	149	346	Average
2462	107.25	105.32			31.87	5.5	35.44	149	346	Peak
2484	53.42	51.46	54	-0.58	31.88	5.5	35.42	149	346	Average
2484	68.24	66.28	74	-5.76	31.88	5.5	35.42	149	346	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	40.84	39.2	54	-13.16	31.76	5.37	35.49	103	5	Average
2368	56.21	54.57	74	-17.79	31.76	5.37	35.49	103	5	Peak
2462	97.43	95.5			31.87	5.5	35.44	103	5	Average
2462	105.38	103.45			31.87	5.5	35.44	103	5	Peak
2484	52.28	50.32	54	-1.72	31.88	5.5	35.42	103	5	Average
2484	67.86	65.9	74	-6.14	31.88	5.5	35.42	103	5	Peak

**REMARKS:**

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





A D T

**BELOW 1GHz WORST-CASE DATA:**

**MODE A**

**802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

**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
92.37	32.8	54.41	43.5	-10.7	9.1	1.11	31.82	252	176	Peak
162.57	36.41	56.57	43.5	-7.09	10.58	1.52	32.26	163	279	Peak
217.65	33.76	52.76	46	-12.24	11.58	1.65	32.23	128	254	Peak
526.8	20.73	29.52	46	-25.27	20.66	2.7	32.15	192	342	Peak
675.9	24.84	30.55	46	-21.16	23.36	3.05	32.12	147	350	Peak
889.4	27.7	30.84	46	-18.3	24.92	3.49	31.55	166	273	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
65.91	27.14	50.87	40	-12.86	7.59	0.9	32.22	108	66	Peak
199.29	24.49	44.3	43.5	-19.01	10.84	1.65	32.3	162	248	Peak
234.12	23.14	41.14	46	-22.86	12.31	1.85	32.16	122	279	Peak
503.7	20.9	30.99	46	-25.1	19.38	2.63	32.1	126	308	Peak
680.1	24.9	30.65	46	-21.1	23.31	3.05	32.11	174	247	Peak
870.5	26.08	29.71	46	-19.92	24.6	3.44	31.67	166	276	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value



A D T

MODE C

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

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
86.43	24.39	46.46	40	-15.61	8.73	1.11	31.91	103	221	Peak
170.13	27.89	48.61	43.5	-15.61	10	1.52	32.24	162	177	Peak
239.25	36.03	53.78	46	-9.97	12.54	1.85	32.14	104	152	Peak
332.2	32.21	46.57	46	-13.79	15.54	2.19	32.09	181	210	Peak
482	28.15	38.77	46	-17.85	18.93	2.56	32.11	155	106	Peak
722.1	30.47	36.06	46	-15.53	23.36	3.16	32.11	107	189	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
30	30.85	44.58	40	-9.15	17.8	0.74	32.27	114	138	Peak
96.42	29.36	50.7	43.5	-14.14	9.42	1.28	32.04	104	118	Peak
207.39	28.81	48.21	43.5	-14.69	11.22	1.65	32.27	112	187	Peak
349.7	33.08	46.56	46	-12.92	16.4	2.19	32.07	150	157	Peak
722.8	30.58	36.17	46	-15.42	23.36	3.16	32.11	181	53	Peak
887.3	35.55	38.7	46	-10.45	24.92	3.49	31.56	109	18	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	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Shielded Room 1.
  3. The VCCI Site Registration No. is C-2040.

#### 4.2.3 TEST PROCEDURES

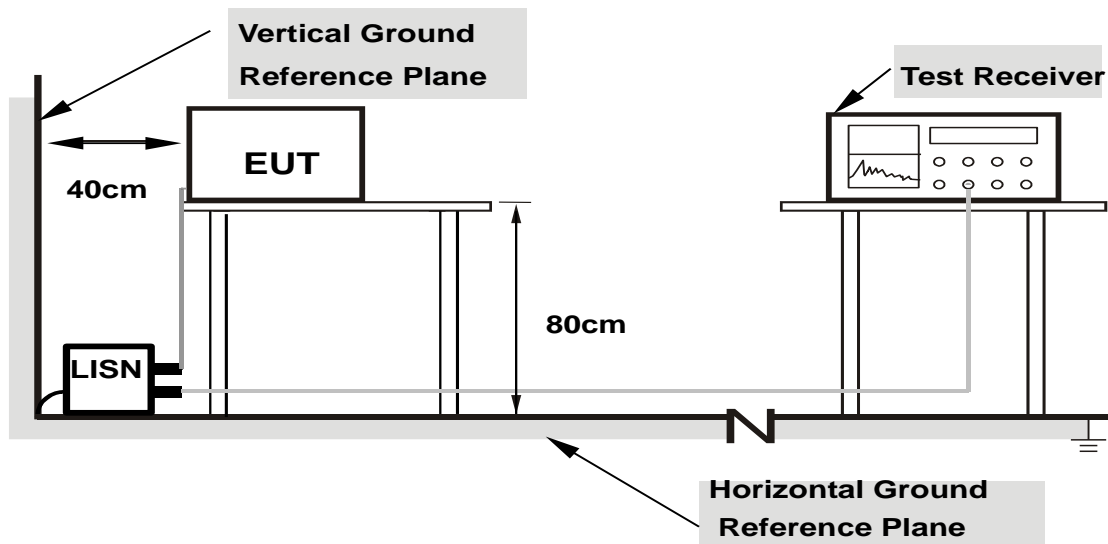
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.

4.2.7 TEST RESULTS

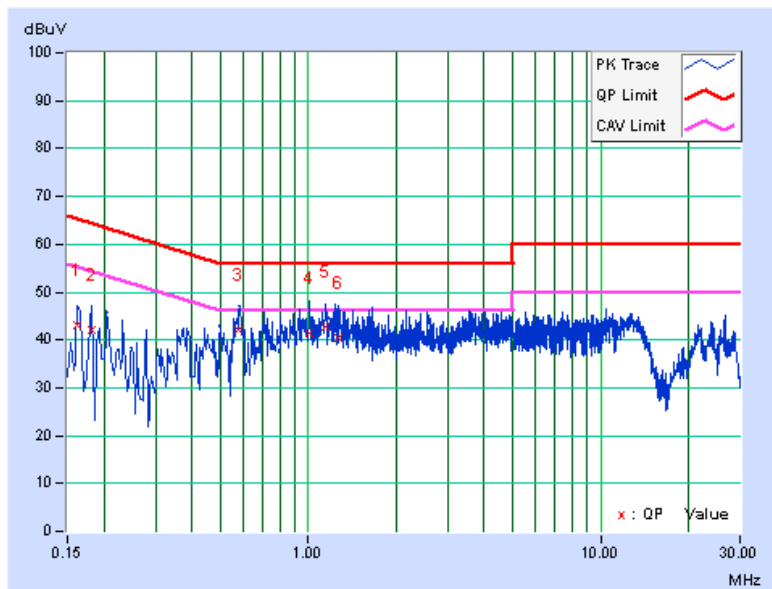
CONDUCTED WORST-CASE DATA :

PHASE	Line 1	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.16181	0.08	42.90	26.25	42.98	26.33	65.37
2	0.18122	0.07	41.92	26.49	41.99	26.56	64.43	54.43	-22.44	-27.87
3	0.58010	0.09	42.05	32.15	42.14	32.24	56.00	46.00	-13.86	-13.76
4	1.00629	0.11	41.26	29.82	41.37	29.93	56.00	46.00	-14.63	-16.07
5	1.14614	0.12	42.57	31.37	42.69	31.49	56.00	46.00	-13.31	-14.51
6	1.26018	0.12	40.17	30.49	40.29	30.61	56.00	46.00	-15.71	-15.39

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

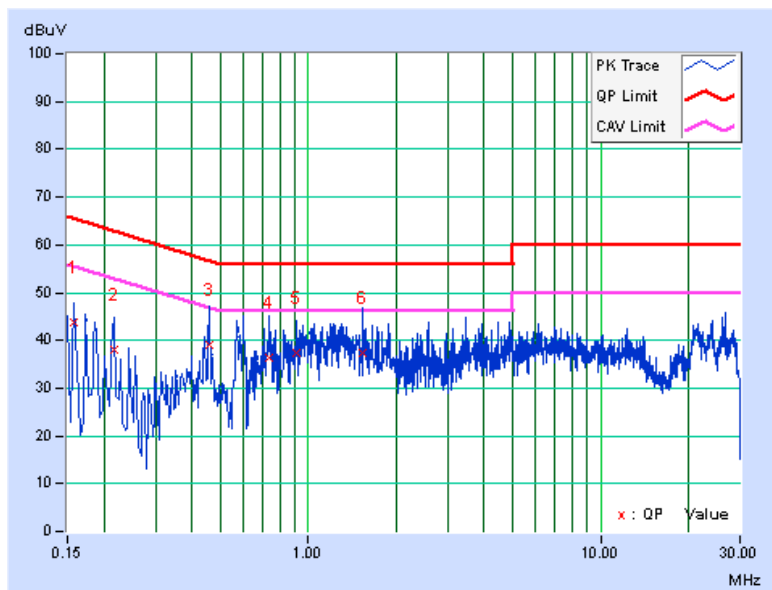


PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.15782	0.05	43.81	26.11	43.86	26.16	65.58
2	0.21647	0.05	37.96	20.98	38.01	21.03	62.95	52.95	-24.94	-31.92
3	0.45889	0.07	39.04	27.65	39.11	27.72	56.71	46.71	-17.60	-18.99
4	0.73650	0.08	36.45	27.21	36.53	27.29	56.00	46.00	-19.47	-18.71
5	0.90854	0.09	37.24	27.66	37.33	27.75	56.00	46.00	-18.67	-18.25
6	1.54196	0.12	37.31	27.23	37.43	27.35	56.00	46.00	-18.57	-18.65

**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

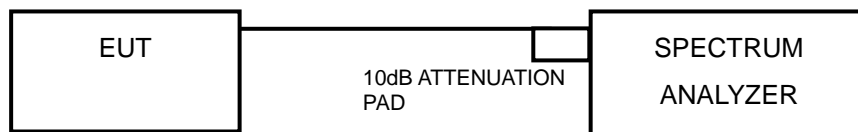


## 4.3 6dB BANDWIDTH MEASUREMENT

### 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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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.





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#### 4.3.7 TEST RESULTS

##### MODE A

##### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.09	0.5	PASS
6	2437	8.07	0.5	PASS
11	2462	8.08	0.5	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.50	0.5	PASS
6	2437	16.14	0.5	PASS
11	2462	16.37	0.5	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.64	0.5	PASS
6	2437	17.61	0.5	PASS
11	2462	17.62	0.5	PASS

##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.75	0.5	PASS
6	2437	35.96	0.5	PASS
9	2452	36.14	0.5	PASS



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**MODE B**

**802.11n (20MHz)**

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.64	17.63	0.5	PASS
6	2437	16.40	17.63	0.5	PASS
11	2462	16.38	17.66	0.5	PASS

**802.11n (40MHz)**

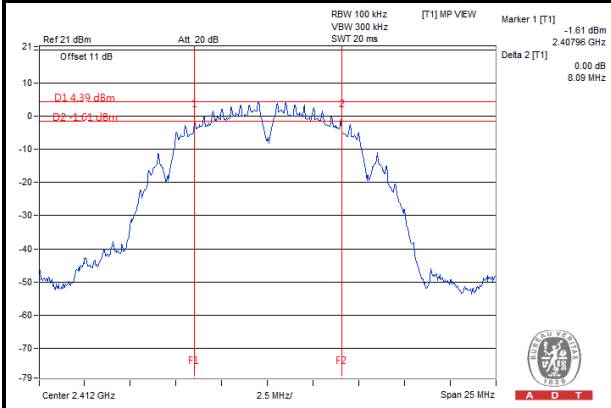
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.45	36.43	0.5	PASS
6	2437	36.34	36.40	0.5	PASS
9	2452	35.83	36.00	0.5	PASS



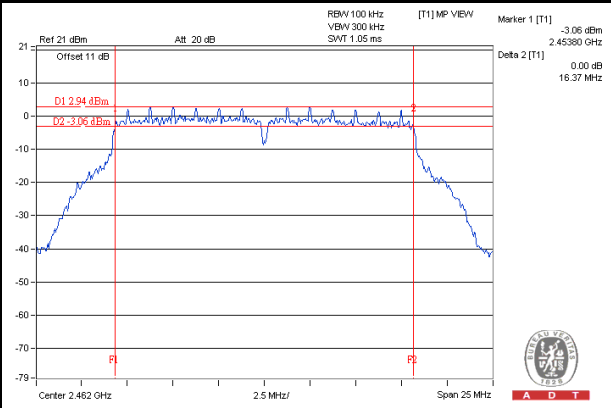
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### SPECTRUM PLOT OF WORST VALUE

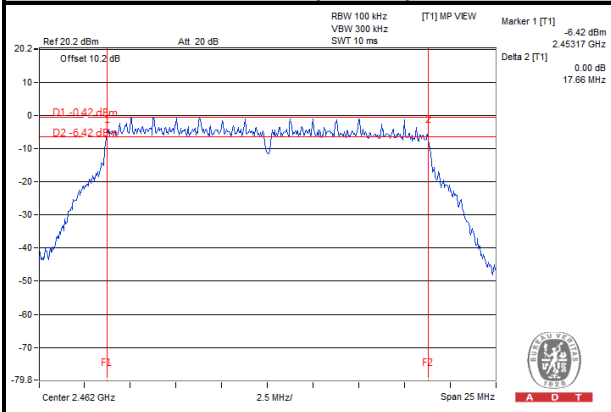
#### 802.11b



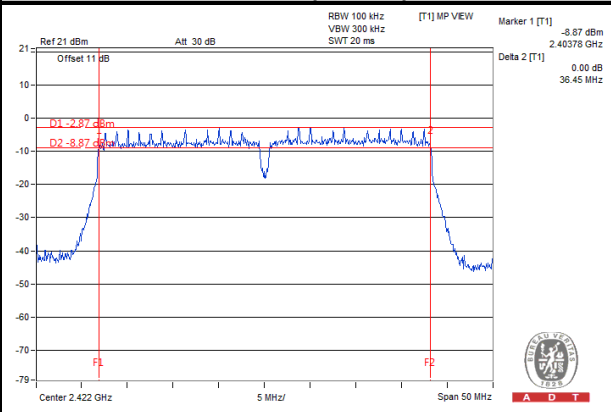
#### 802.11g



#### 802.11n (20MHz)



#### 802.11n (40MHz)



## 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)

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

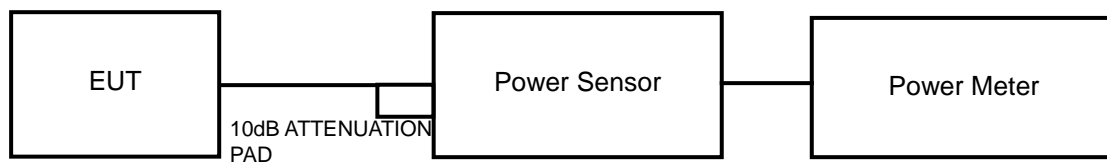
Array Gain = 0 dB (i.e., no array gain) for NANT  $\leq$  4;

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

Array Gain =  $5 \log(\text{NANT}/\text{NSS})$  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 =  $10 \log(\text{NANT}/\text{NSS})$  dB.

### 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 section 4.3.6.



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#### 4.4.7 TEST RESULTS

##### MODE A

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	34.75	15.41	30	PASS
6	2437	33.11	15.2	30	PASS
11	2462	42.17	16.25	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	111.69	20.48	30	PASS
6	2437	181.13	22.58	30	PASS
11	2462	132.74	21.23	30	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	70.47	18.48	30	PASS
6	2437	100.23	20.01	30	PASS
11	2462	84.92	19.29	30	PASS

##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
3	2422	80.35	19.05	30	PASS
6	2437	88.31	19.46	30	PASS
9	2452	80.72	19.07	30	PASS



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**MODE B**

**802.11n (20MHz)**

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	18.62	17.63	130.721	21.16	30	PASS
6	2437	19.03	17.61	137.660	21.39	30	PASS
11	2462	18.19	17.71	124.937	20.97	30	PASS

**802.11n (40MHz)**

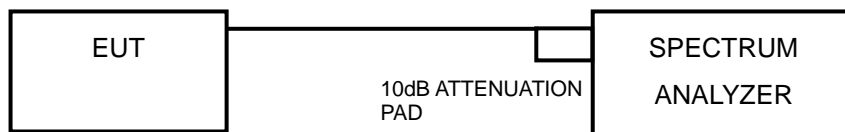
CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	18.33	17.10	119.363	20.77	30	PASS
6	2437	18.21	16.94	115.653	20.63	30	PASS
9	2452	18.40	16.93	118.500	20.74	30	PASS

## 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 section 4.3.6.



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#### 4.5.7 TEST RESULTS

##### MODE A

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-8.83	8	PASS
6	2437	-9.14	8	PASS
11	2462	-8.92	8	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-11.05	8	PASS
6	2437	-8.86	8	PASS
11	2462	-10.69	8	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-13.69	8	PASS
6	2437	-12.34	8	PASS
11	2462	-13.42	8	PASS

##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
3	2422	-15.86	8	PASS
6	2437	-16.31	8	PASS
9	2452	-15.96	8	PASS





**MODE B**

**802.11n (20MHz)**

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-13.48	3.01	-10.47	8	PASS
	6	2437	-12.70	3.01	-9.69	8	PASS
	11	2462	-13.61	3.01	-10.60	8	PASS
1	1	2412	-14.76	3.01	-11.75	8	PASS
	6	2437	-15.69	3.01	-12.68	8	PASS
	11	2462	-15.10	3.01	-12.09	8	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = -1.23 < 6\text{dBi}$ , so the limit no need to reduced.

**802.11n (40MHz)**

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-16.56	3.01	-13.55	8	PASS
	6	2437	-17.14	3.01	-14.13	8	PASS
	9	2452	-16.62	3.01	-13.61	8	PASS
1	3	2422	-18.29	3.01	-15.28	8	PASS
	6	2437	-19.76	3.01	-16.75	8	PASS
	9	2452	-18.29	3.01	-15.28	8	PASS

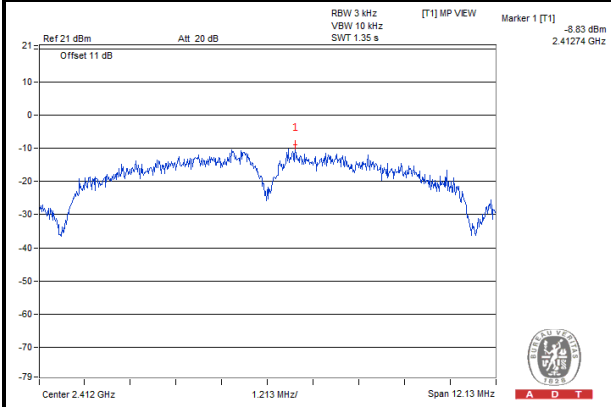
**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = -1.23 < 6\text{dBi}$ , so the limit no need to reduced.



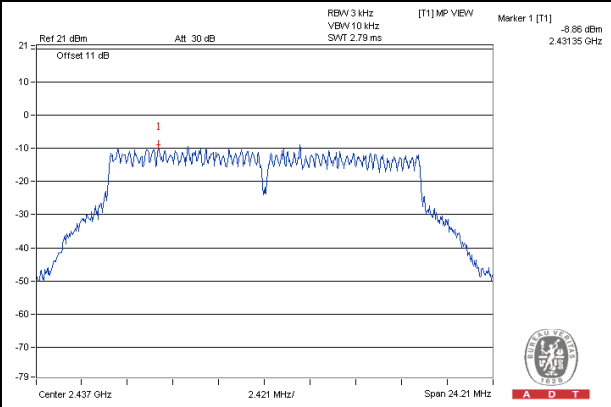
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### SPECTRUM PLOT OF WORST VALUE

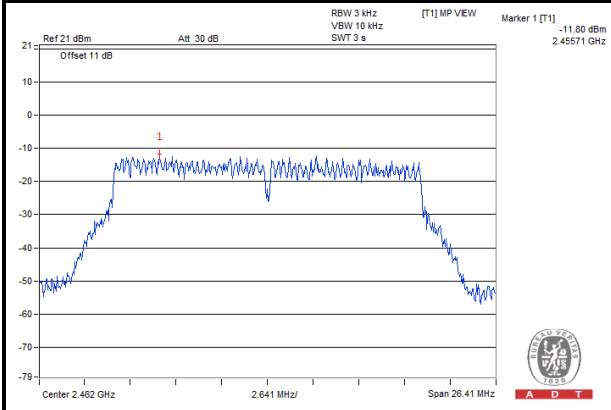
#### 802.11b



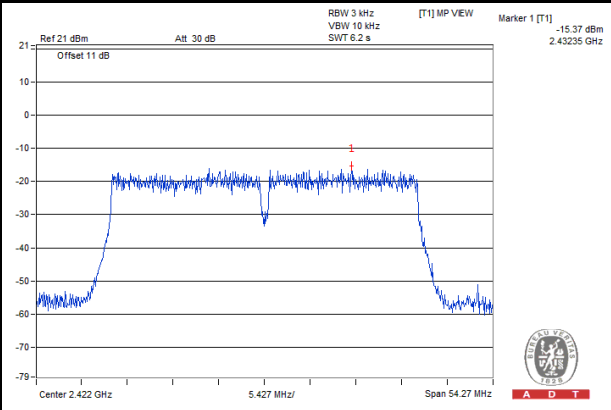
#### 802.11g



#### 802.11n (20MHz)



#### 802.11n (40MHz)

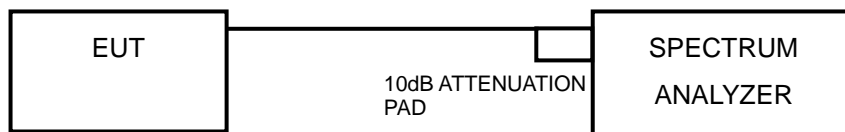


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 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 OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as section 4.3.6.

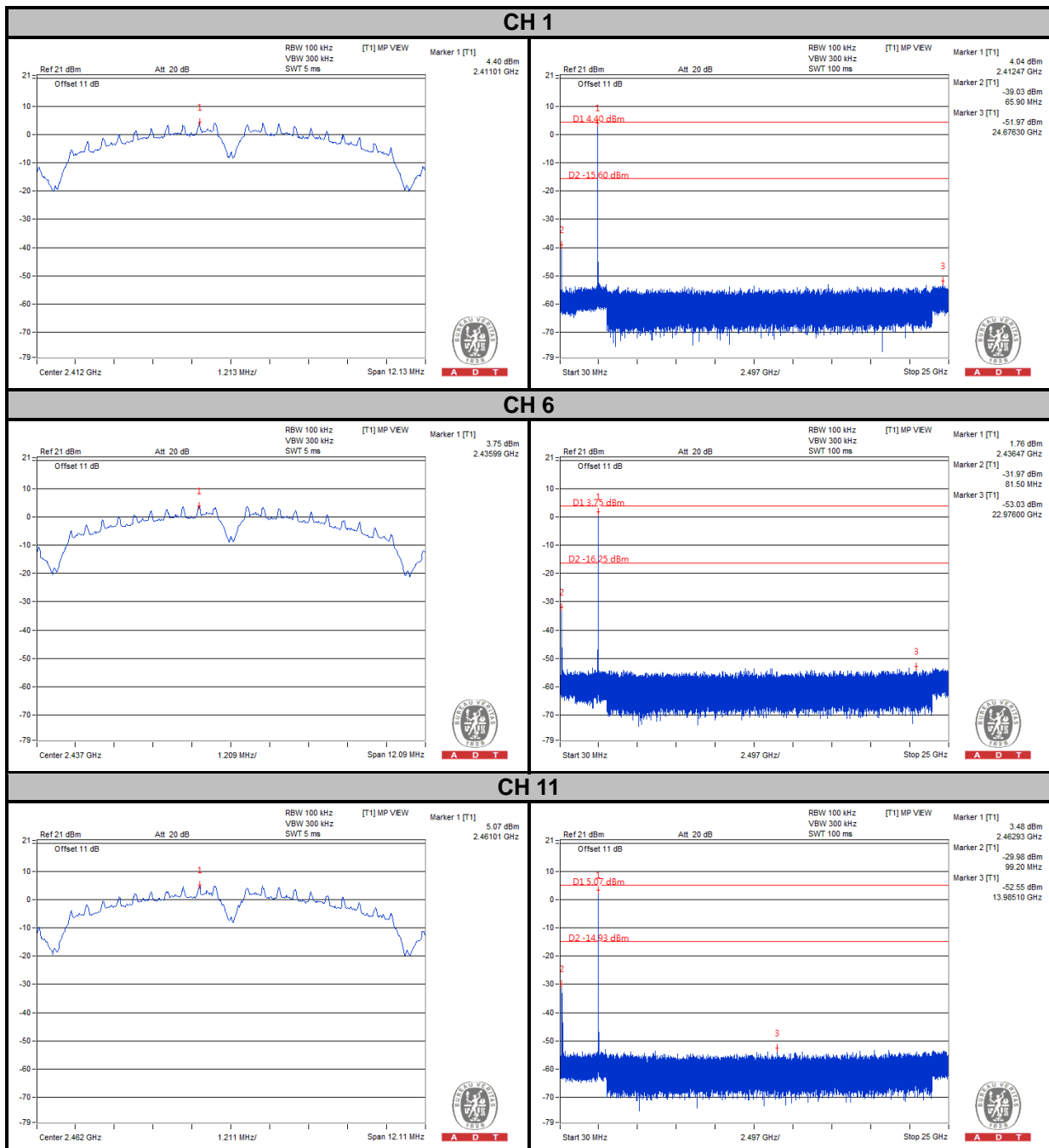
### 4.6.7 TEST RESULTS

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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

### MODE A

#### 802.11b

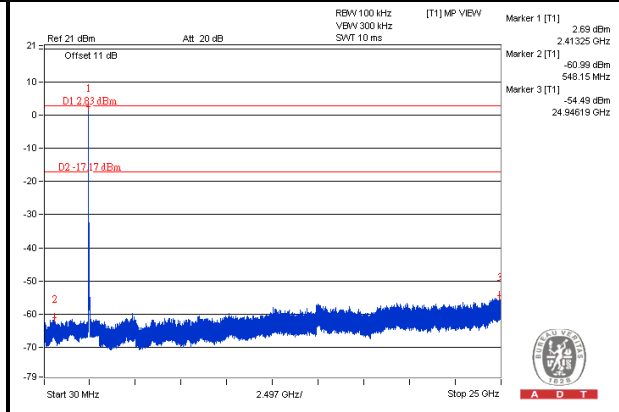
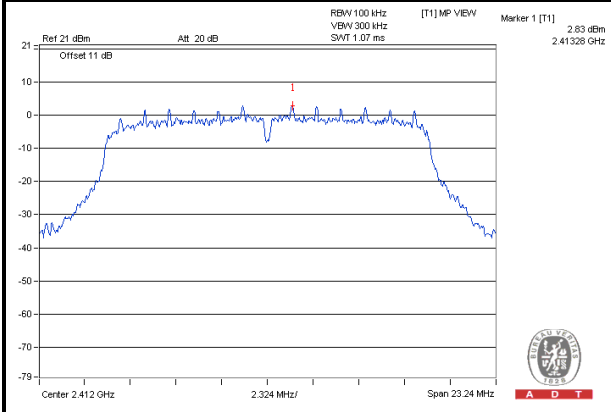




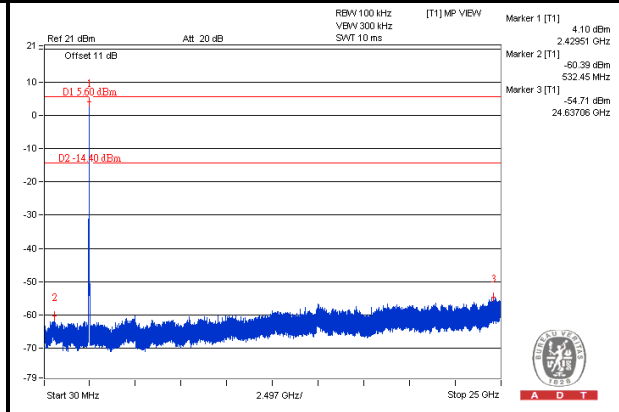
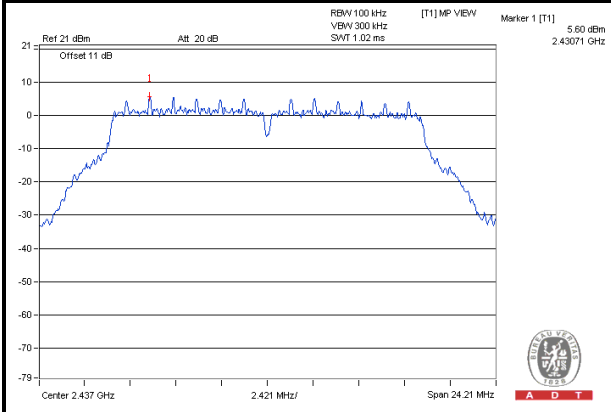
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# 802.11g

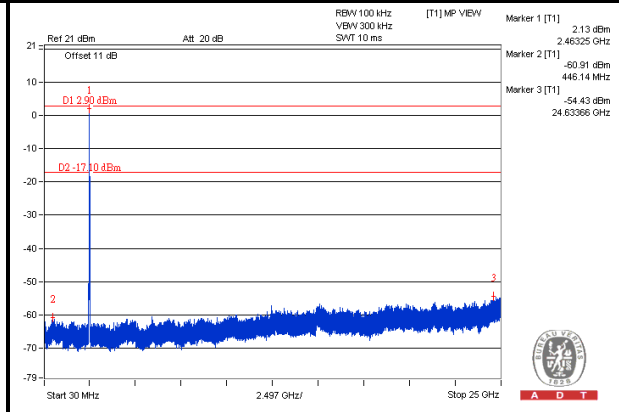
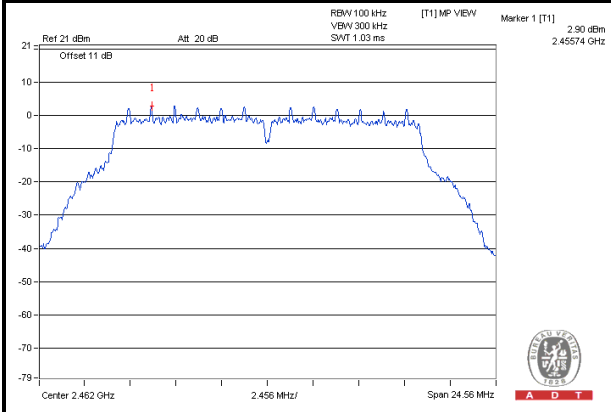
## CH 1



## CH 6



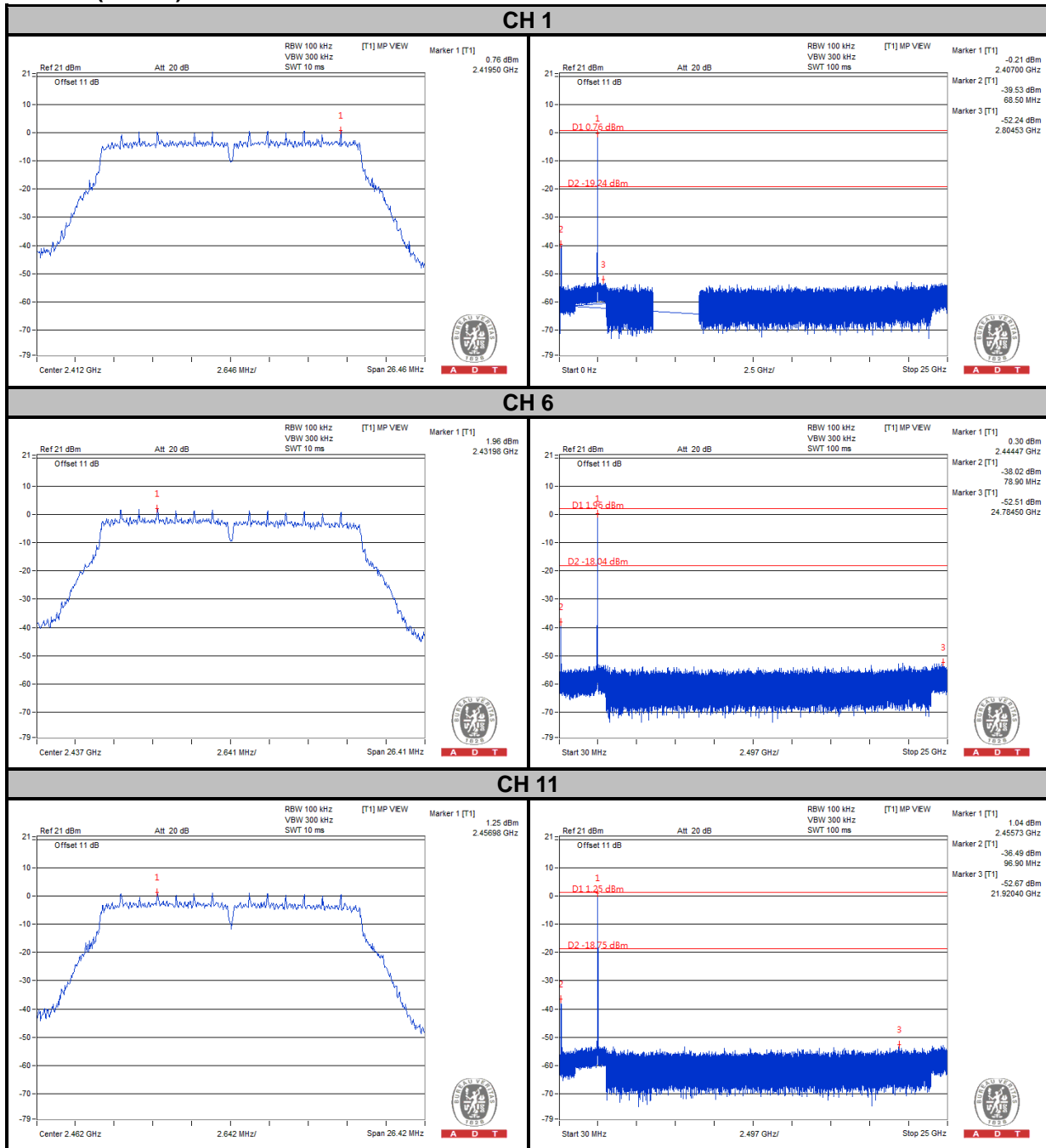
## CH 11





A D T

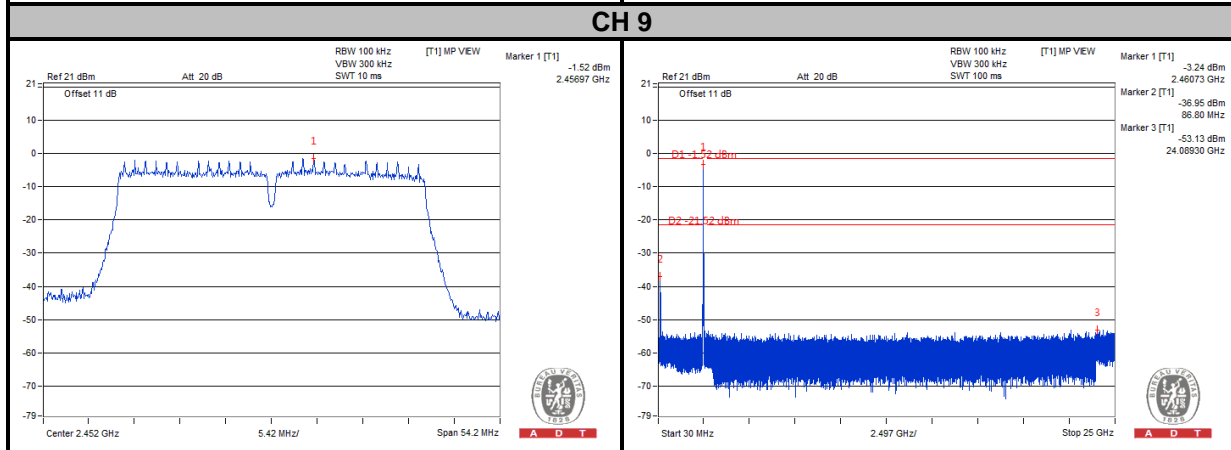
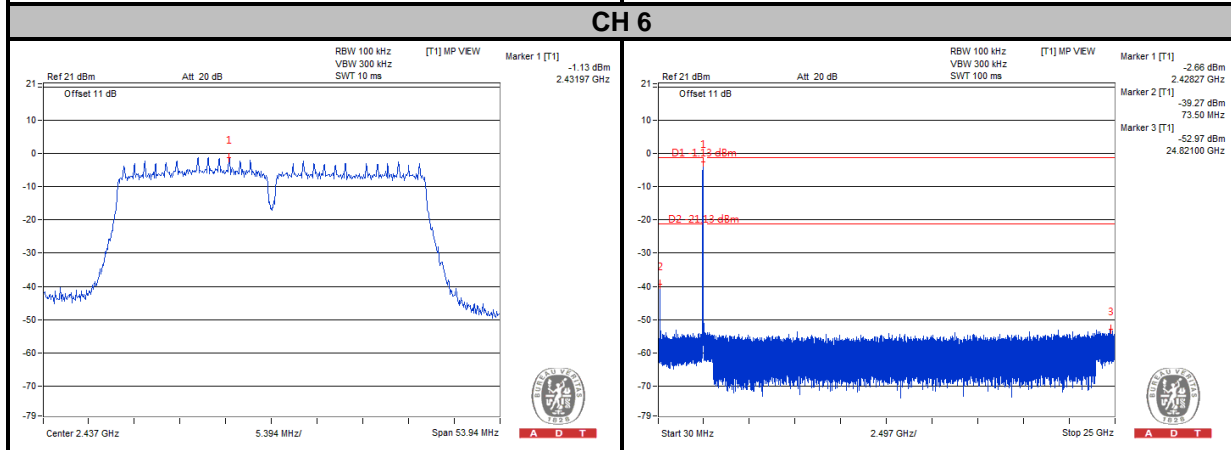
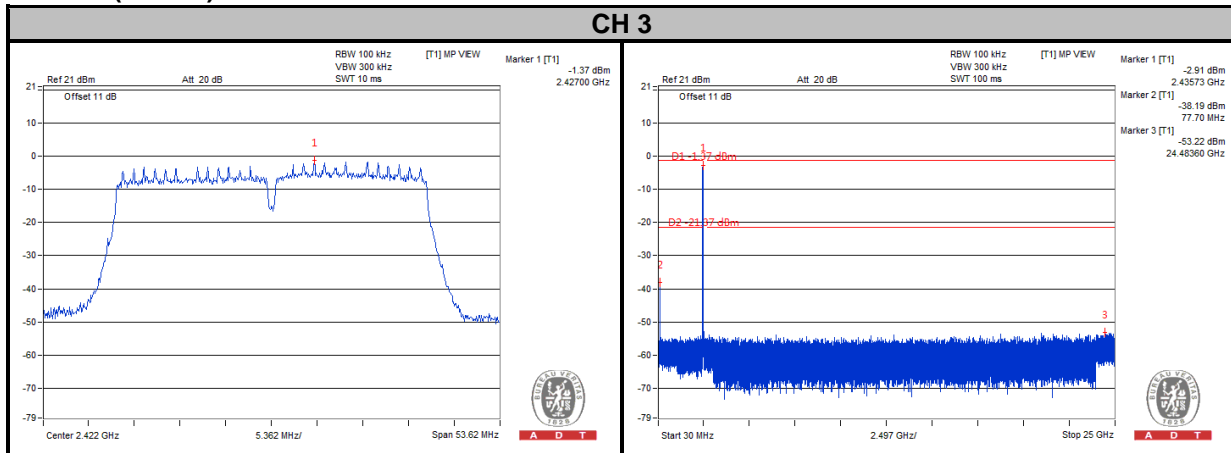
### 802.11n (20MHz)





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### 802.11n (40MHz)

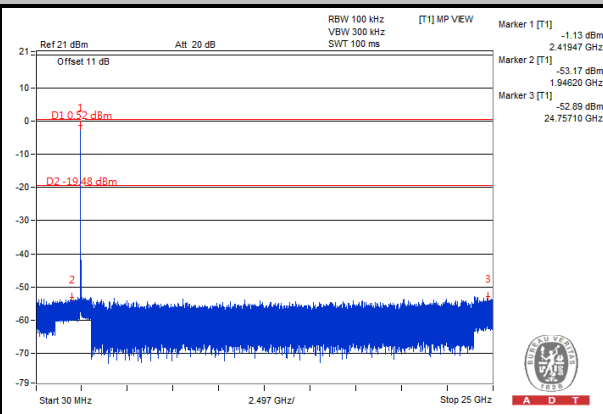
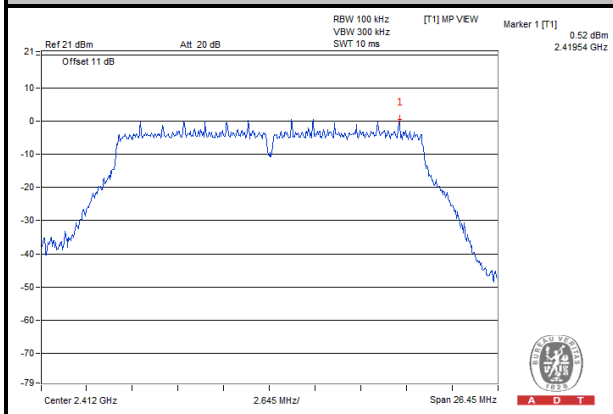




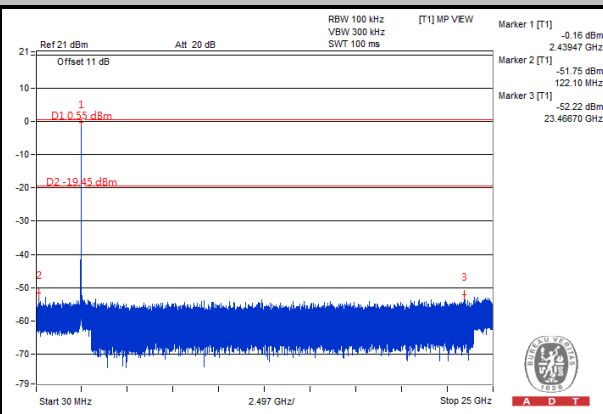
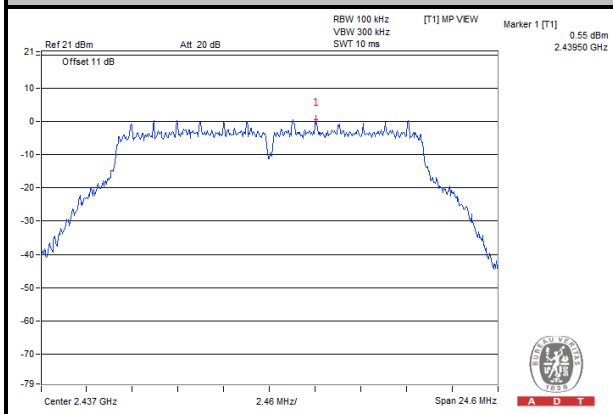
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**MODE B**  
**802.11n (20MHz)**  
**CHAIN 0**

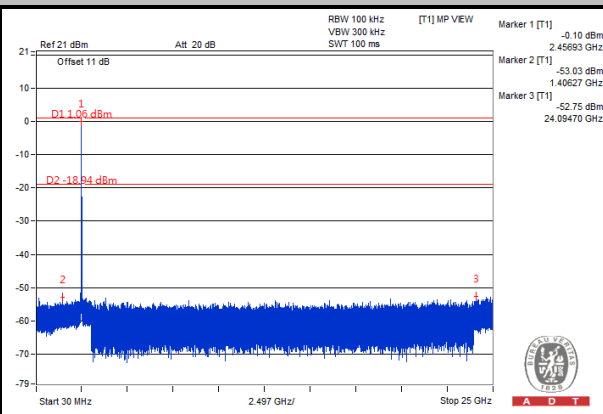
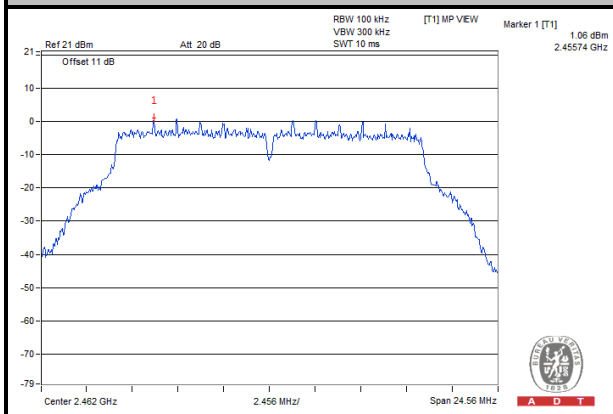
**CH 1**



**CH 6**



**CH 11**

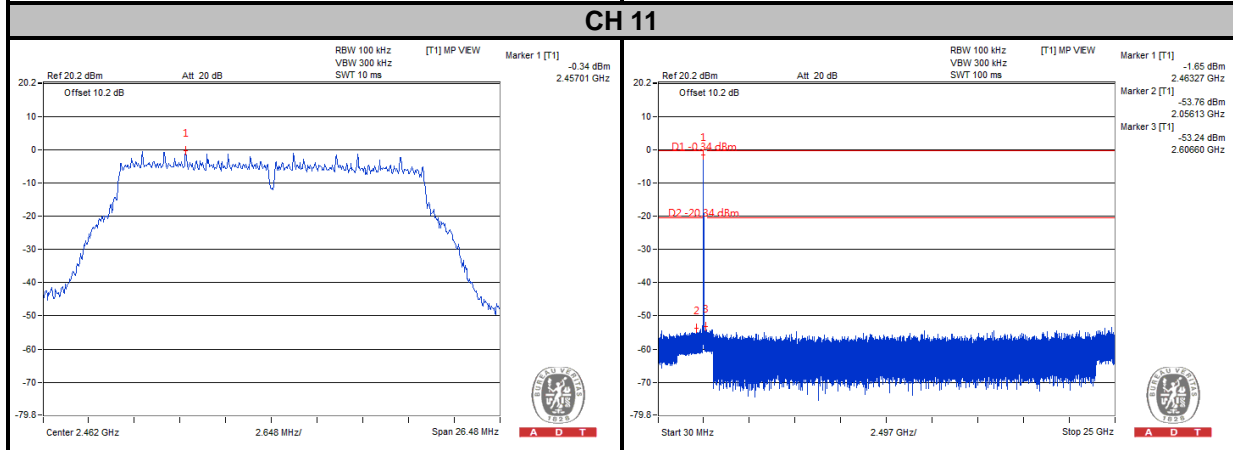
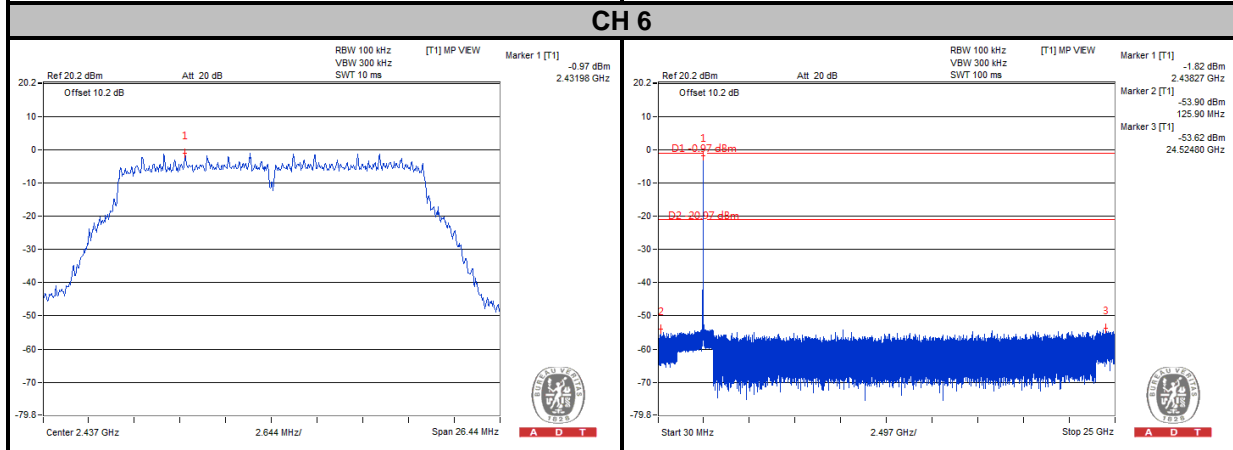
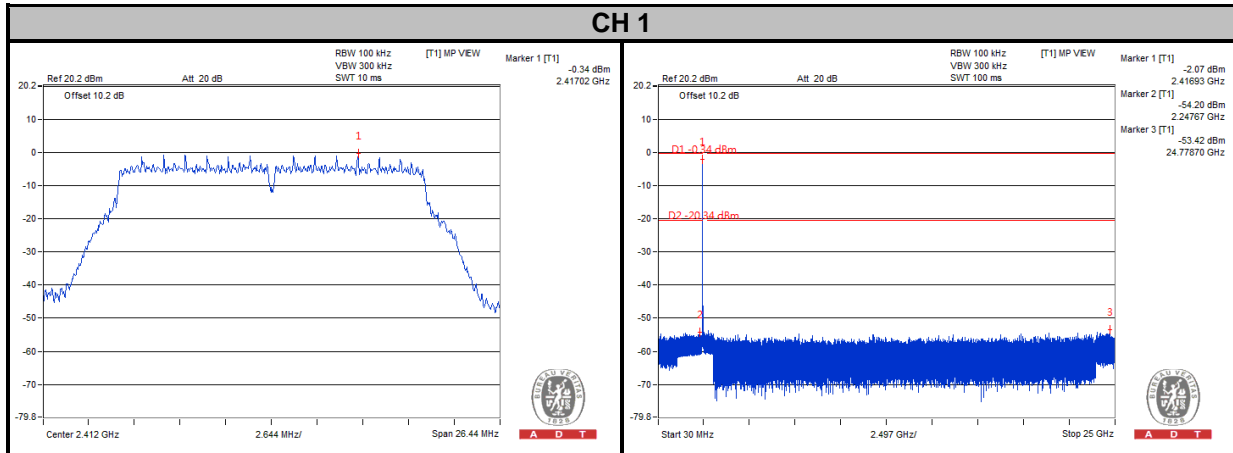






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### CHAIN 1



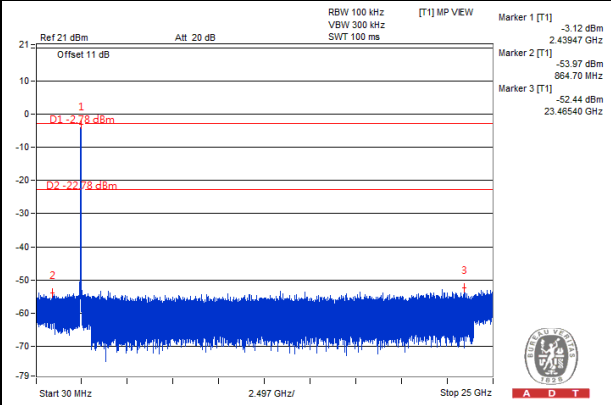
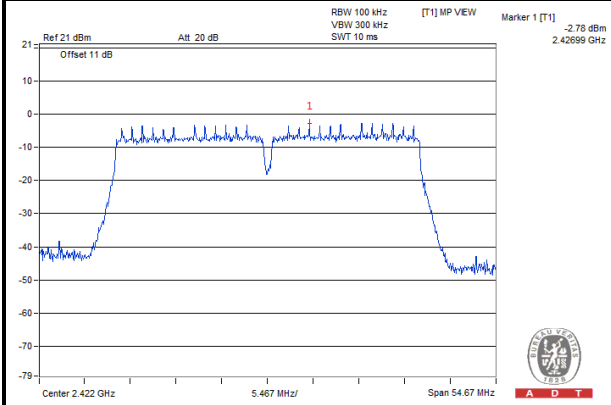


A D T

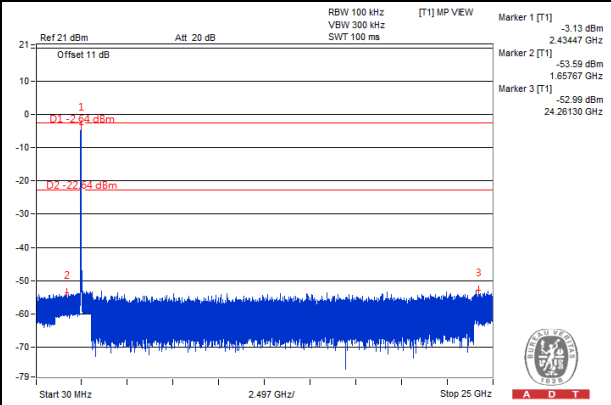
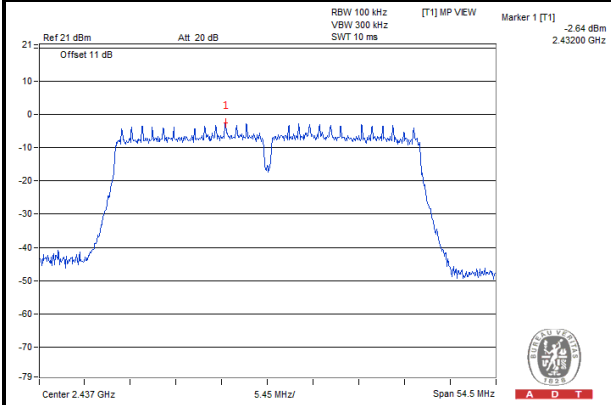
# 802.11n (40MHz)

## CHAIN 0

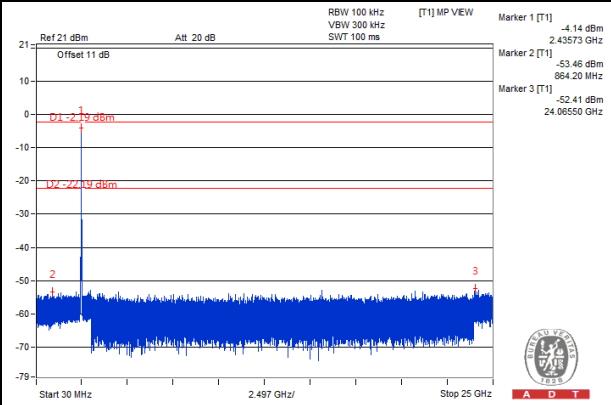
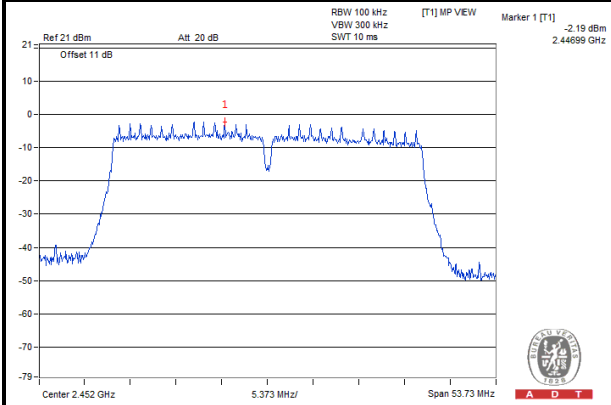
### CH 3



### CH 6



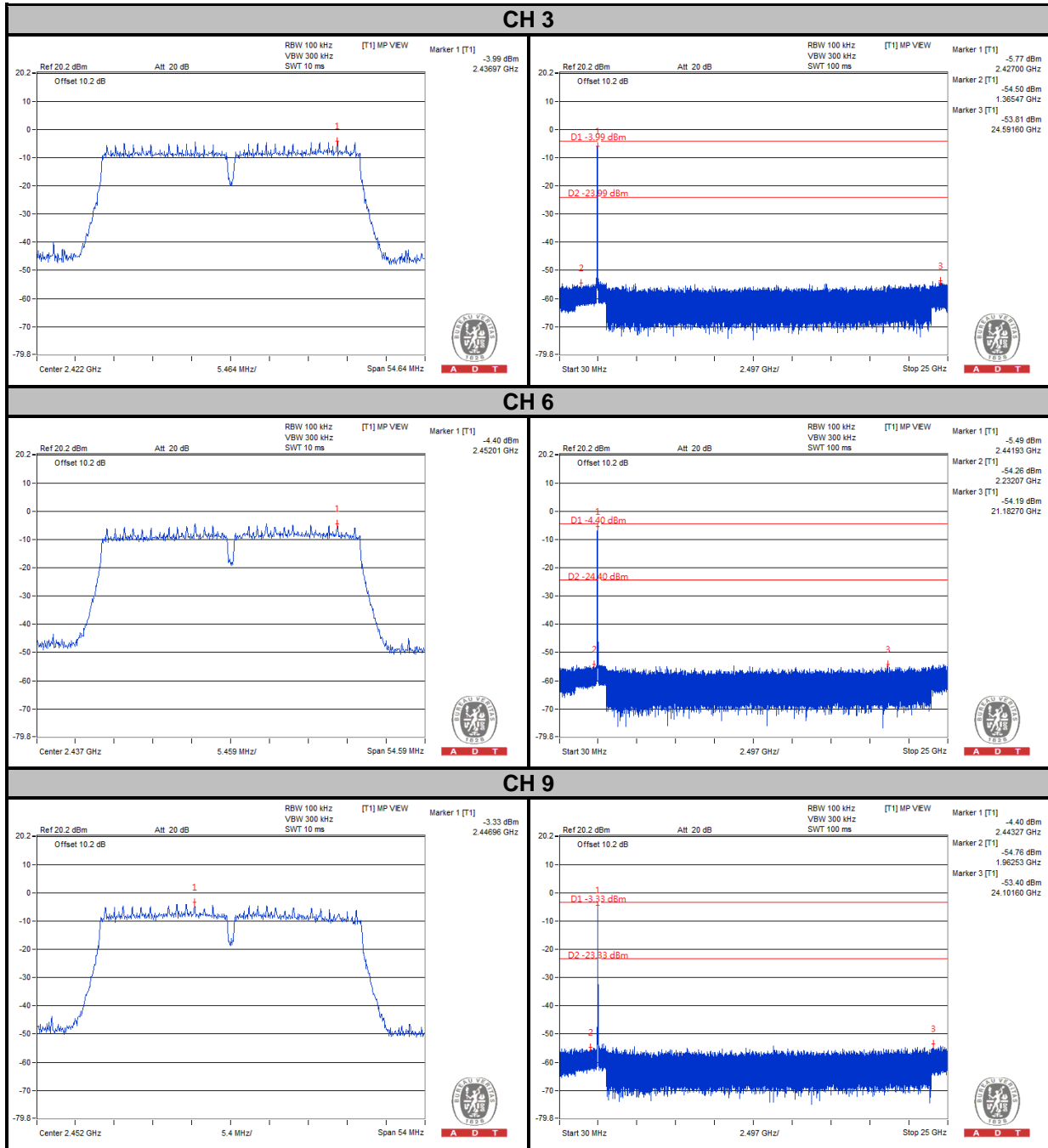
### CH 9





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# CHAIN 1





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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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

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



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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---