

## FCC Test Report

**Report No.:** RF160113C09-3

**FCC ID:** MSQP008

**Test Model:** P008

**Received Date:** Jan. 13, 2016

**Test Date:** Jan. 26, 2016 ~ Feb. 16, 2016

**Issued Date:** Feb. 23, 2016

**Applicant:** ASUSTek COMPUTER INC.

**Address:** 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

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

**Lab Address:** No. 47-2, 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.	Description	Date Issued
RF160113C09-3	Original Release	Feb. 23, 2016



A D T

## 1 Certificate of Conformity

**Product:** ASUS PAD

**Brand:** ASUS

**Test Model:** P008

**Sample Status:** Identical Prototype

**Applicant:** ASUSTek COMPUTER INC.

**Test Date:** Jan. 26, 2016 ~ Feb. 16, 2016

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10:2013

The above equipment 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 :** Gina Liu , **Date:** Feb. 23, 2016  
Gina Liu / Specialist

**Approved by :** Stanley Wu , **Date:** Feb. 23, 2016  
Stanley Wu / Assistant Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -15.16 dB at 0.51043 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.18 dB at 2492 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB 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:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	ASUS PAD
<b>Brand</b>	ASUS
<b>Test Model</b>	P008
<b>Status of EUT</b>	Identical Prototype
<b>Power Supply Rating</b>	5.0 Vdc (adapter or host equipment) 3.85 Vdc (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 ~ 2462 MHz
<b>Number of Channel</b>	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
<b>Output Power</b>	113.50 mW
<b>Antenna Type</b>	PCB Antenna with 3.6 dBi gain
<b>Antenna Connector</b>	N/A
<b>Accessory Device</b>	Refer to Note as below
<b>Data Cable Supplied</b>	Refer to Note as below

Note:

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

<b>Modulation Mode</b>	<b>TX Function</b>
<b>802.11b</b>	1TX
<b>802.11g</b>	1TX
<b>802.11n (HT20)</b>	1TX
<b>802.11n (HT40)</b>	1TX

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	CHICONY	W12-010N3A	I/P: 100-240Vac, 50/60Hz, 300mA O/P: 5Vdc, 2000mA
Adapter 2	PI	AD2037320	I/P: 100-240Vac, 50/60Hz, 300mA O/P: 5Vdc, 2000mA
Battery	CPT	C11P1514	3.85Vdc, 4680mAh
USB Cable 1	ASAP	LA05US014-1N	0.9m shielded cable w/o core
USB Cable 2	FOXCONN	CUDU01B-AJ000-DF	0.9m shielded cable w/o core
LCD Panel 1	BIEL	ASF8002B BLK TM+FOCAL	8"
LCD Panel 2	GIS	AT0800015001 TM+FOCAL	8"
Photo Camera	CHICONY	CIFE22120003870LH	2M
Video Camera	CHICONY	CBAE83020003873LH	8M
CPU	QUALCOMM	MSM-8956-0-747PNSP-MT-01-0-AA	747 pin
eMMC 1 (=ROM 1)	HYNIX	H9CKNNNBKTMRPR-NUH	16GB
eMMC 2 (=ROM 2)	SAMSUNG	K3QF3F30BM-FGCF	16GB
RAM 1	HYNIX	H26M52208FPR	2GB
RAM 2	SAMSUNG	KLMAG1JENB-B041	2GB
Main Board	ASUS	ZT581KL MB R1.3	--
BT/WLAN Module	QUALCOMM	WCN-3680B	--
WWAN Module	QUALCOMM	WTR-2965	--

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz      **RE<1G**: Radiated Emission below 1 GHz  
**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**.  
**NOTE:** “-” means no effect.

#### **Radiated Emission Test (Above 1 GHz):**

- 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)
-	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 (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

#### **Radiated Emission Test (Below 1 GHz):**

- 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)
-	802.11n (HT40)	3 to 9	3	OFDM	BPSK	MCS0

#### **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)
-	802.11n (HT40)	3 to 9	3	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)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	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.

EUT Configure Mode	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 (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

**Test Condition:**

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
RE $<$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Toby Tian
APCM	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen

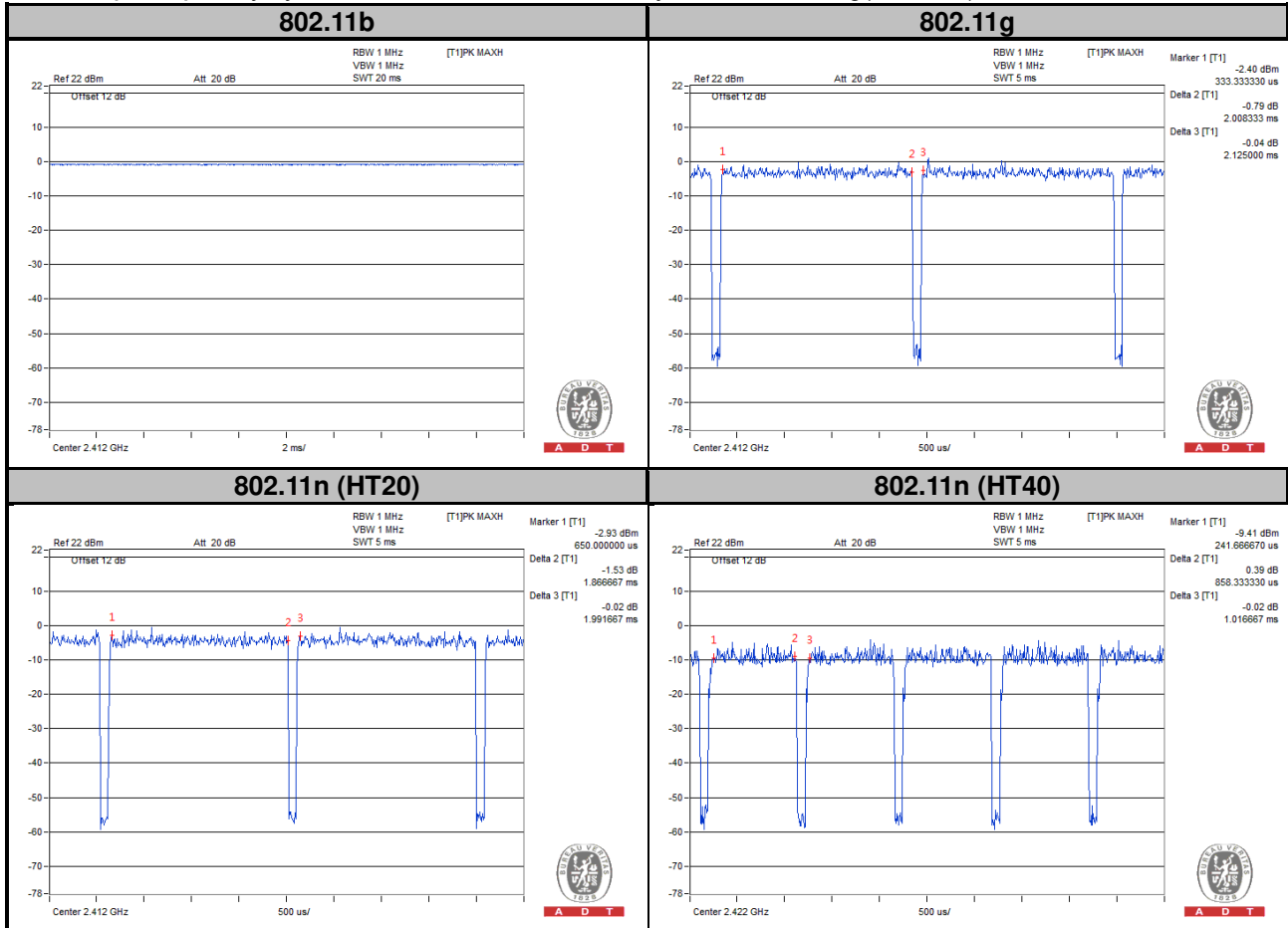
### 3.3 Duty Cycle of Test Signal

**802.11b:** Duty cycle of test signal is 100 %

**802.11g:** Duty cycle =  $2.008/2.125 = 0.945$ , Duty factor =  $10 * \log(1/0.945) = 0.25$

**802.11n (HT20):** Duty cycle =  $1.866/1.991 = 0.937$ , Duty factor =  $10 * \log(1/0.937) = 0.28$

**802.11n (HT40):** Duty cycle =  $0.858/1.016 = 0.844$ , Duty factor =  $10 * \log(1/0.844) = 0.73$



### 3.4 Description of Support Units

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

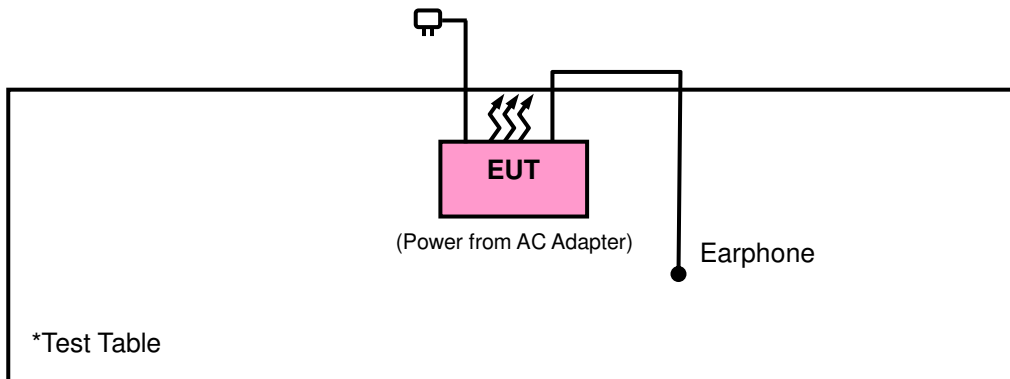
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	N/A	N/A	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).

#### 3.4.1 Configuration of System under Test



### 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 v03r04**

ANSI C63.10-2013

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

**NOTE:** The EUT 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

### 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 20 dB 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 1000 MHz, 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 20 dB under any condition of modulation.

**4.1.2 Test Instruments**

<b>Description &amp; Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Date of Calibration</b>	<b>Due Date of Calibration</b>
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
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

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

#### 4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10 Hz (Duty cycle  $\geq 98 \%$ ) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

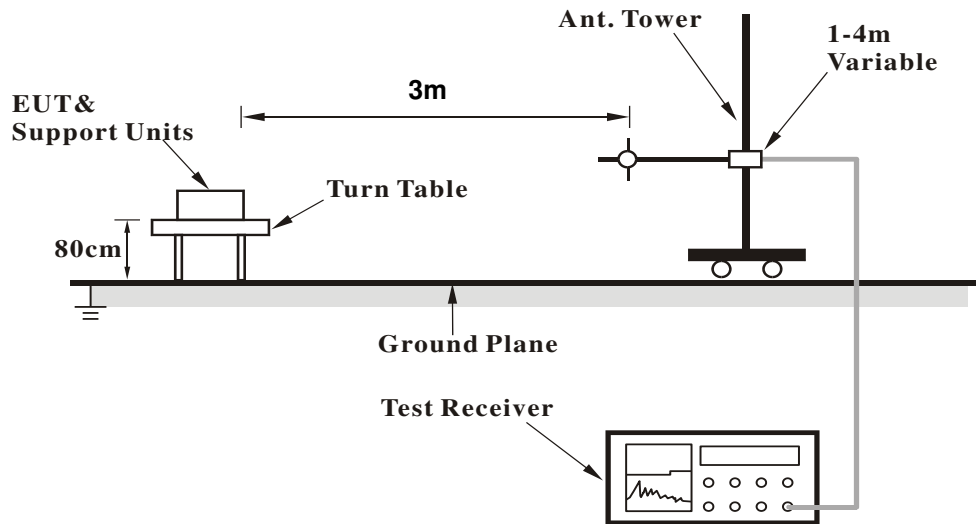
#### 4.1.4 Deviation from Test Standard

No deviation.

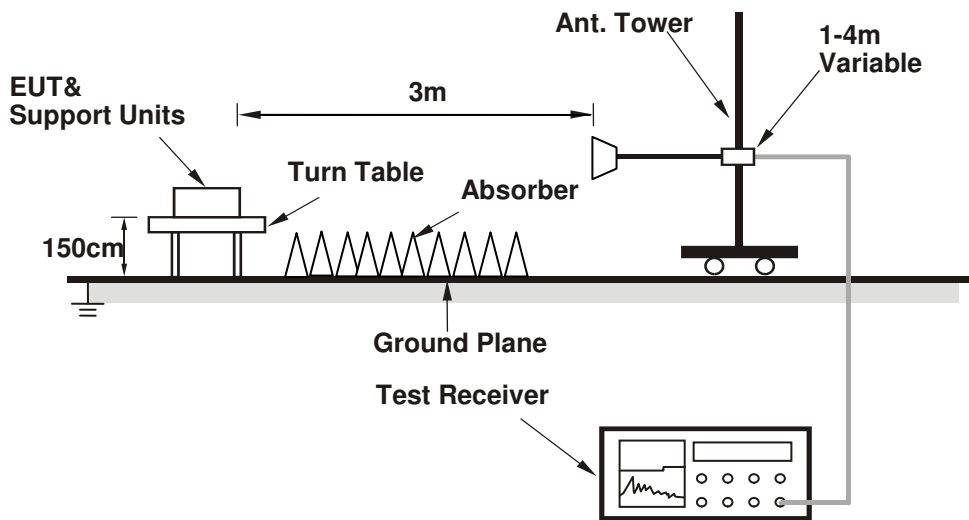


#### 4.1.5 Test Set Up

##### <Frequency Range below 1 GHz>



##### <Frequency Range above 1 GHz>



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

#### 4.1.6 EUT Operating Conditions

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

#### 4.1.7 Test Results

#### Above 1 GHz Data :

#### 802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

#### Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (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	41.38	47.89	54	-12.62	26.91	4.08	37.5	179	242	Average
2388	57.65	64.16	74	-16.35	26.91	4.08	37.5	179	242	Peak
2412	102.31	108.78			26.96	4.09	37.52	179	242	Average
2412	106.61	113.08			26.96	4.09	37.52	179	242	Peak
2500	36.35	42.24	54	-17.65	27.2	4.16	37.25	179	242	Average
2500	57.05	62.94	74	-16.95	27.2	4.16	37.25	179	242	Peak

#### Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (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	39.91	46.47	54	-14.09	26.86	4.08	37.5	184	302	Average
2384	57.25	63.81	74	-16.75	26.86	4.08	37.5	184	302	Peak
2412	100.08	106.55			26.96	4.09	37.52	184	302	Average
2412	104.43	110.9			26.96	4.09	37.52	184	302	Peak
2494	35.75	41.64	54	-18.25	27.2	4.16	37.25	184	302	Average
2494	57.52	63.41	74	-16.48	27.2	4.16	37.25	184	302	Peak

#### Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	39.85	46.36	54	-14.15	26.91	4.08	37.5	178	232	Average
2388	58.88	65.39	74	-15.12	26.91	4.08	37.5	178	232	Peak
2437	102.21	108.49			27.06	4.12	37.46	178	232	Average
2437	106.44	112.72			27.06	4.12	37.46	178	232	Peak
2494	38.14	44.03	54	-15.86	27.2	4.16	37.25	178	232	Average
2494	57.51	63.4	74	-16.49	27.2	4.16	37.25	178	232	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	38.09	44.66	54	-15.91	26.86	4.07	37.5	179	311	Average
2376	57.38	63.95	74	-16.62	26.86	4.07	37.5	179	311	Peak
2437	100.43	106.71			27.06	4.12	37.46	179	311	Average
2437	104.66	110.94			27.06	4.12	37.46	179	311	Peak
2486	37.12	43.14	54	-16.88	27.15	4.15	37.32	179	311	Average
2486	56.99	63.01	74	-17.01	27.15	4.15	37.32	179	311	Peak

**Remarks:**

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

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	37.65	44.21	54	-16.35	26.86	4.08	37.5	178	253	Average
2380	56.72	63.28	74	-17.28	26.86	4.08	37.5	178	253	Peak
2462	102.42	108.58			27.1	4.13	37.39	178	253	Average
2462	106.61	112.77			27.1	4.13	37.39	178	253	Peak
2494	39.18	45.07	54	-14.82	27.2	4.16	37.25	178	253	Average
2494	58.35	64.24	74	-15.65	27.2	4.16	37.25	178	253	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	36.31	42.87	54	-17.69	26.86	4.08	37.5	197	299	Average
2382	56.73	63.29	74	-17.27	26.86	4.08	37.5	197	299	Peak
2462	100.48	106.64			27.1	4.13	37.39	197	299	Average
2462	104.55	110.71			27.1	4.13	37.39	197	299	Peak
2498	38.26	44.15	54	-15.74	27.2	4.16	37.25	197	299	Average
2498	57.48	63.37	74	-16.52	27.2	4.16	37.25	197	299	Peak

**Remarks:**

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

**802.11g**

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

**Antennal Polarity & Test Distance: Horizontal at 3 m**

Frequency (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	47.04	53.57	54	-6.96	26.91	4.08	37.52	161	240	Average
2390	67.32	73.85	74	-6.68	26.91	4.08	37.52	161	240	Peak
2412	98.38	104.85			26.96	4.09	37.52	161	240	Average
2412	108.14	114.61			26.96	4.09	37.52	161	240	Peak
2486	37.53	43.55	54	-16.47	27.15	4.15	37.32	161	240	Average
2486	58.27	64.29	74	-15.73	27.15	4.15	37.32	161	240	Peak

**Antennal Polarity & Test Distance: Vertical at 3 m**

Frequency (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	45.79	52.32	54	-8.21	26.91	4.08	37.52	197	305	Average
2390	66.48	73.01	74	-7.52	26.91	4.08	37.52	197	305	Peak
2412	96.27	102.74			26.96	4.09	37.52	197	305	Average
2412	106.08	112.55			26.96	4.09	37.52	197	305	Peak
2496	36.5	42.39	54	-17.5	27.2	4.16	37.25	197	305	Average
2496	57.64	63.53	74	-16.36	27.2	4.16	37.25	197	305	Peak

**Remarks:**

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



A D T

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	44.94	51.45	54	-9.06	26.91	4.08	37.5	195	240	Average
2386	59.69	66.2	74	-14.31	26.91	4.08	37.5	195	240	Peak
2437	97.49	103.77			27.06	4.12	37.46	195	240	Average
2437	107.48	113.76			27.06	4.12	37.46	195	240	Peak
2490	43.02	48.98	54	-10.98	27.2	4.16	37.32	195	240	Average
2490	58.99	64.95	74	-15.01	27.2	4.16	37.32	195	240	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	42.73	49.29	54	-11.27	26.86	4.08	37.5	216	284	Average
2384	57.15	63.71	74	-16.85	26.86	4.08	37.5	216	284	Peak
2437	95.41	101.69			27.06	4.12	37.46	216	284	Average
2437	105.13	111.41			27.06	4.12	37.46	216	284	Peak
2500	41.94	47.83	54	-12.06	27.2	4.16	37.25	216	284	Average
2500	57.87	63.76	74	-16.13	27.2	4.16	37.25	216	284	Peak

Remarks:

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



A D T

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	37.28	43.91	54	-16.72	26.81	4.05	37.49	175	244	Average
2354	56.33	62.96	74	-17.67	26.81	4.05	37.49	175	244	Peak
2462	99.06	105.22			27.1	4.13	37.39	175	244	Average
2462	108.84	115			27.1	4.13	37.39	175	244	Peak
2484	48.89	54.91	54	-5.11	27.15	4.15	37.32	175	244	Average
2484	68.64	74.66	74	-5.36	27.15	4.15	37.32	175	244	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	36.92	43.49	54	-17.08	26.86	4.07	37.5	216	281	Average
2376	57.63	64.2	74	-16.37	26.86	4.07	37.5	216	281	Peak
2462	96.54	102.7			27.1	4.13	37.39	216	281	Average
2462	106.96	113.12			27.1	4.13	37.39	216	281	Peak
2484	46.49	52.51	54	-7.51	27.15	4.15	37.32	216	281	Average
2484	66.14	72.16	74	-7.86	27.15	4.15	37.32	216	281	Peak

Remarks:

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

**802.11n (HT20)**

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

**Antennal Polarity & Test Distance: Horizontal at 3 m**

Frequency (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	47.44	53.97	54	-6.56	26.91	4.08	37.52	216	246	Average
2390	68.64	75.17	74	-5.36	26.91	4.08	37.52	216	246	Peak
2412	96.33	102.8			26.96	4.09	37.52	216	246	Average
2412	106.58	113.05			26.96	4.09	37.52	216	246	Peak
2498	36.87	42.76	54	-17.13	27.2	4.16	37.25	216	246	Average
2498	57.28	63.17	74	-16.72	27.2	4.16	37.25	216	246	Peak

**Antennal Polarity & Test Distance: Vertical at 3 m**

Frequency (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	46.34	52.87	54	-7.66	26.91	4.08	37.52	182	304	Average
2390	66.6	73.13	74	-7.4	26.91	4.08	37.52	182	304	Peak
2412	94.25	100.72			26.96	4.09	37.52	182	304	Average
2412	104.77	111.24			26.96	4.09	37.52	182	304	Peak
2498	36.48	42.37	54	-17.52	27.2	4.16	37.25	182	304	Average
2498	56.96	62.85	74	-17.04	27.2	4.16	37.25	182	304	Peak

**Remarks:**

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



EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	44.13	50.69	54	-9.87	26.86	4.08	37.5	195	244	Average
2384	58.19	64.75	74	-15.81	26.86	4.08	37.5	195	244	Peak
2437	95.5	101.78			27.06	4.12	37.46	195	244	Average
2437	105.5	111.78			27.06	4.12	37.46	195	244	Peak
2490	42.51	48.47	54	-11.49	27.2	4.16	37.32	195	244	Average
2490	57.48	63.44	74	-16.52	27.2	4.16	37.32	195	244	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	42.21	48.72	54	-11.79	26.91	4.08	37.5	216	281	Average
2386	56.93	63.44	74	-17.07	26.91	4.08	37.5	216	281	Peak
2437	92.71	98.99			27.06	4.12	37.46	216	281	Average
2437	103.26	109.54			27.06	4.12	37.46	216	281	Peak
2490	41.15	47.11	54	-12.85	27.2	4.16	37.32	216	281	Average
2490	57.39	63.35	74	-16.61	27.2	4.16	37.32	216	281	Peak

Remarks:

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



A D T

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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
2336	36.96	43.62	54	-17.04	26.77	4.04	37.47	175	243	Average
2336	57.3	63.96	74	-16.7	26.77	4.04	37.47	175	243	Peak
2462	96.8	102.96			27.1	4.13	37.39	175	243	Average
2462	107.57	113.73			27.1	4.13	37.39	175	243	Peak
2484	51.06	57.08	54	-2.94	27.15	4.15	37.32	175	243	Average
2484	70.6	76.62	74	-3.4	27.15	4.15	37.32	175	243	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	36.83	43.39	54	-17.17	26.86	4.08	37.5	216	284	Average
2384	57.1	63.66	74	-16.9	26.86	4.08	37.5	216	284	Peak
2462	94.57	100.73			27.1	4.13	37.39	216	284	Average
2462	105.25	111.41			27.1	4.13	37.39	216	284	Peak
2484	48.59	54.61	54	-5.41	27.15	4.15	37.32	216	284	Average
2484	65.64	71.66	74	-8.36	27.15	4.15	37.32	216	284	Peak

Remarks:

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

**802.11n (HT40)**

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

**Antennal Polarity & Test Distance: Horizontal at 3 m**

Frequency (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	51.67	58.2	54	-2.33	26.91	4.08	37.52	215	245	Average
2390	70.98	77.51	74	-3.02	26.91	4.08	37.52	215	245	Peak
2422	92.75	99.09			27.01	4.11	37.46	215	245	Average
2422	103.48	109.82			27.01	4.11	37.46	215	245	Peak
2486	39.02	45.04	54	-14.98	27.15	4.15	37.32	215	245	Average
2486	57.55	63.57	74	-16.45	27.15	4.15	37.32	215	245	Peak

**Antennal Polarity & Test Distance: Vertical at 3 m**

Frequency (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	50.82	57.35	54	-3.18	26.91	4.08	37.52	185	305	Average
2390	71.01	77.54	74	-2.99	26.91	4.08	37.52	185	305	Peak
2422	90.59	96.93			27.01	4.11	37.46	185	305	Average
2422	101.34	107.68			27.01	4.11	37.46	185	305	Peak
2484	38.35	44.37	54	-15.65	27.15	4.15	37.32	185	305	Average
2484	57.41	63.43	74	-16.59	27.15	4.15	37.32	185	305	Peak

**Remarks:**

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



EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	49.95	56.48	54	-4.05	26.91	4.08	37.52	196	245	Average
2390	65.78	72.31	74	-8.22	26.91	4.08	37.52	196	245	Peak
2437	92.19	98.47			27.06	4.12	37.46	196	245	Average
2437	103.21	109.49			27.06	4.12	37.46	196	245	Peak
2484	48.15	54.17	54	-5.85	27.15	4.15	37.32	196	245	Average
2484	63.77	69.79	74	-10.23	27.15	4.15	37.32	196	245	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	49.39	55.92	54	-4.61	26.91	4.08	37.52	200	304	Average
2390	64.45	70.98	74	-9.55	26.91	4.08	37.52	200	304	Peak
2437	90.23	96.51			27.06	4.12	37.46	200	304	Average
2437	101.4	107.68			27.06	4.12	37.46	200	304	Peak
2484	46.55	52.57	54	-7.45	27.15	4.15	37.32	200	304	Average
2484	63.45	69.47	74	-10.55	27.15	4.15	37.32	200	304	Peak

## Remarks:

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



A D T

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	41.11	47.64	54	-12.89	26.91	4.08	37.52	178	242	Average
2390	58.35	64.88	74	-15.65	26.91	4.08	37.52	178	242	Peak
2452	93.34	99.54			27.06	4.13	37.39	178	242	Average
2452	103.82	110.02			27.06	4.13	37.39	178	242	Peak
2492	50.82	56.71	54	-3.18	27.2	4.16	37.25	178	242	Average
2492	68.28	74.17	74	-5.72	27.2	4.16	37.25	178	242	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (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	41.28	47.79	54	-12.72	26.91	4.08	37.5	200	303	Average
2386	58.49	65	74	-15.51	26.91	4.08	37.5	200	303	Peak
2452	90.69	96.89			27.06	4.13	37.39	200	303	Average
2452	101.36	107.56			27.06	4.13	37.39	200	303	Peak
2488	48.76	54.72	54	-5.24	27.2	4.16	37.32	200	303	Average
2488	65.94	71.9	74	-8.06	27.2	4.16	37.32	200	303	Peak

Remarks:

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

### 9 kHz ~ 30 MHz DATA:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 30 MHz ~ 1 GHz WORST-CASE DATA:

#### 802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

#### Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (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
131.85	24.23	43.11	43.5	-19.27	11.81	1.14	31.83	137	324	Peak
178.41	31.53	51.24	43.5	-11.97	10.92	1.19	31.82	101	172	Peak
212.36	24.14	44.51	43.5	-19.36	9.89	1.35	31.61	106	290	Peak
419.94	18.51	32.89	46	-27.49	15.73	1.94	32.05	109	21	Peak
563.5	21.22	32.32	46	-24.78	18.77	2.2	32.07	118	278	Peak
689.6	22.98	31.69	46	-23.02	20.69	2.44	31.84	136	64	Peak

#### Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (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
57.16	28.94	47.27	40	-11.06	12.25	0.77	31.35	139	169	Peak
155.13	22.25	40.16	43.5	-21.25	12.72	1.11	31.74	123	327	Peak
185.2	25.8	45.94	43.5	-17.7	10.39	1.23	31.76	129	235	Peak
412.18	19.4	33.89	46	-26.6	15.58	1.93	32	138	318	Peak
515.97	21.12	32.9	46	-24.88	17.68	2.12	31.58	112	21	Peak
633.34	22.22	32.01	46	-23.78	20.01	2.32	32.12	130	269	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 (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
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

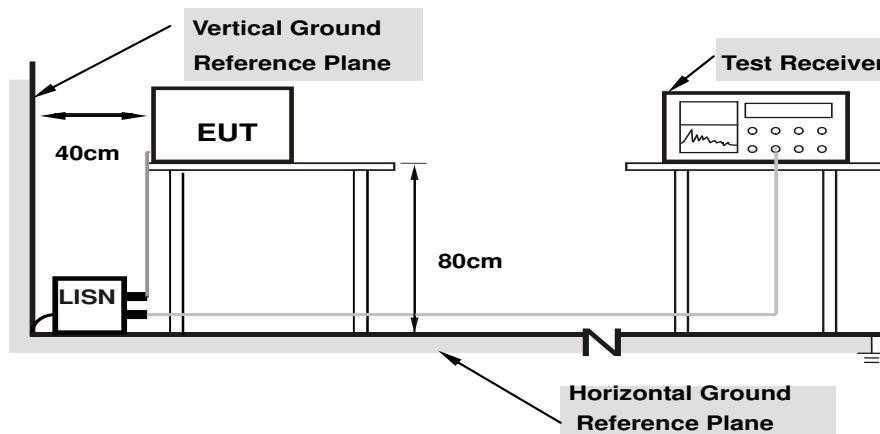
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

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

#### 4.2.6 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.



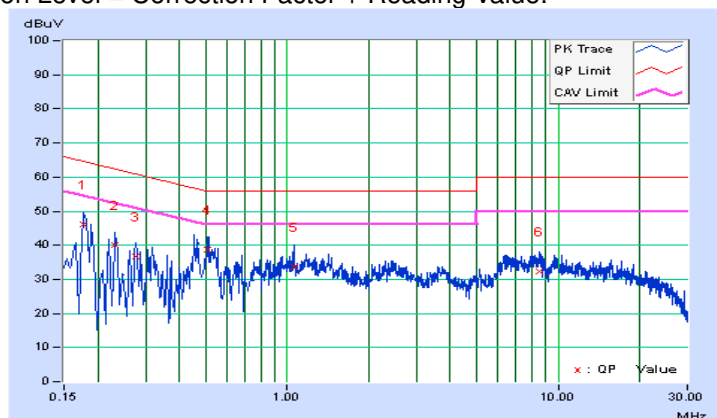
### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17737	10.07	35.91	24.62	45.98	34.69	64.61	54.61	-18.63	-19.92
2	0.23216	10.12	30.00	22.49	40.12	32.61	62.37	52.37	-22.25	-19.76
3	0.27553	10.12	26.66	16.96	36.78	27.08	60.95	50.95	-24.17	-23.87
<b>4</b>	<b>0.51043</b>	<b>10.16</b>	<b>28.68</b>	<b>20.68</b>	<b>38.84</b>	<b>30.84</b>	<b>56.00</b>	<b>46.00</b>	<b>-17.16</b>	<b>-15.16</b>
5	1.06103	10.29	23.22	14.03	33.51	24.32	56.00	46.00	-22.49	-21.68
6	8.54868	10.65	21.60	12.74	32.25	23.39	60.00	50.00	-27.75	-26.61

#### 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.

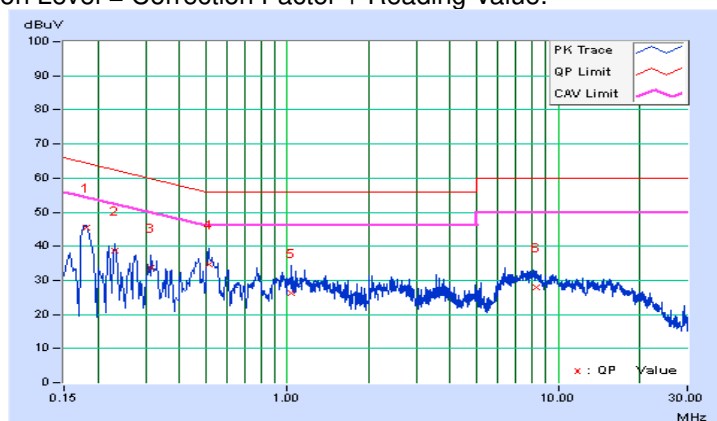


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18075	10.03	35.47	25.17	45.50	35.20	64.45	54.45	-18.95	-19.25
2	0.23211	10.06	28.63	21.65	38.69	31.71	62.37	52.37	-23.69	-20.67
3	0.31422	10.10	23.60	15.94	33.70	26.04	59.86	49.86	-26.16	-23.82
4	0.51312	10.17	24.49	18.56	34.66	28.73	56.00	46.00	-21.34	-17.27
5	1.03366	10.23	16.20	10.41	26.43	20.64	56.00	46.00	-29.57	-25.36
6	8.36491	10.57	17.29	11.16	27.86	21.73	60.00	50.00	-32.14	-28.27

**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.

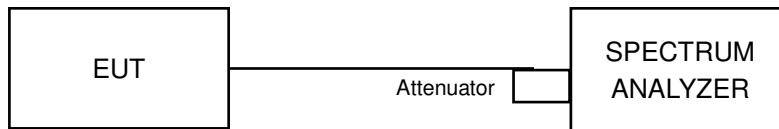


### 4.3 6 dB Bandwidth Measurement

#### 4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB 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) = 100 kHz
- 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.

#### 4.3.7 Test Result

##### 802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.08	0.5	Pass
6	2437	8.11	0.5	Pass
11	2462	8.57	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.36	0.5	Pass
6	2437	16.39	0.5	Pass
11	2462	16.37	0.5	Pass

##### 802.11n (HT20)

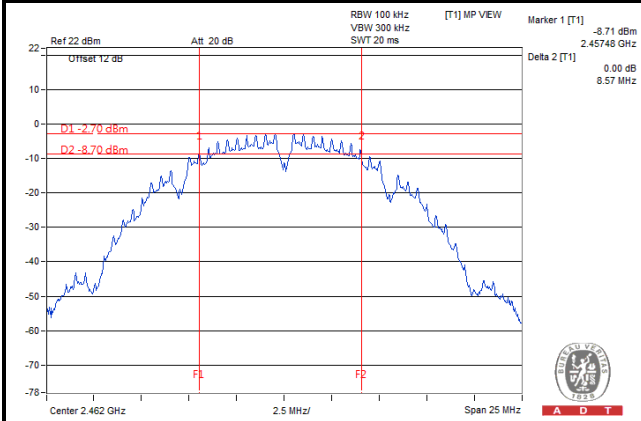
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.21	0.5	Pass
6	2437	17.61	0.5	Pass
11	2462	17.37	0.5	Pass

##### 802.11n (HT40)

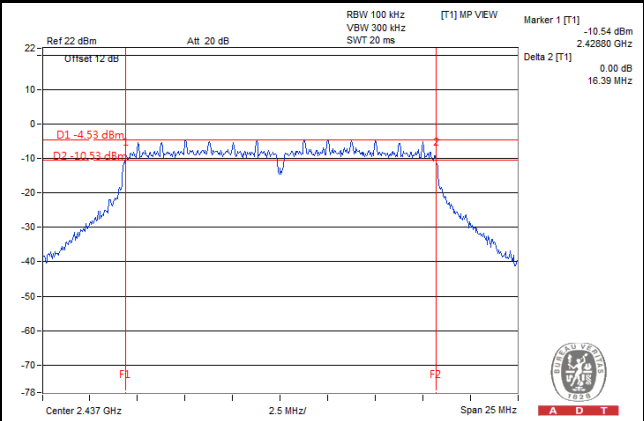
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.47	0.5	Pass
6	2437	35.23	0.5	Pass
9	2452	35.50	0.5	Pass

### Spectrum Plot of Worst Value

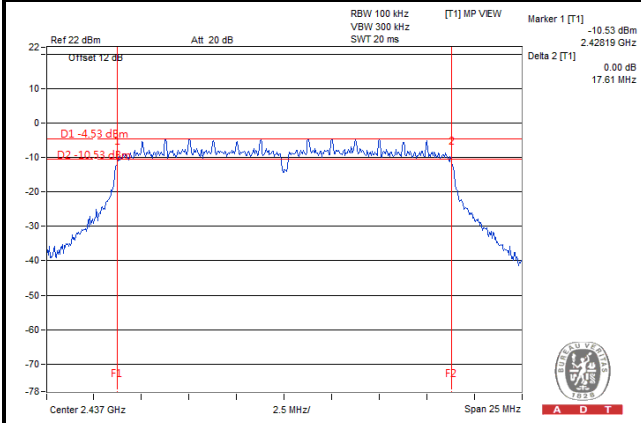
#### 802.11b



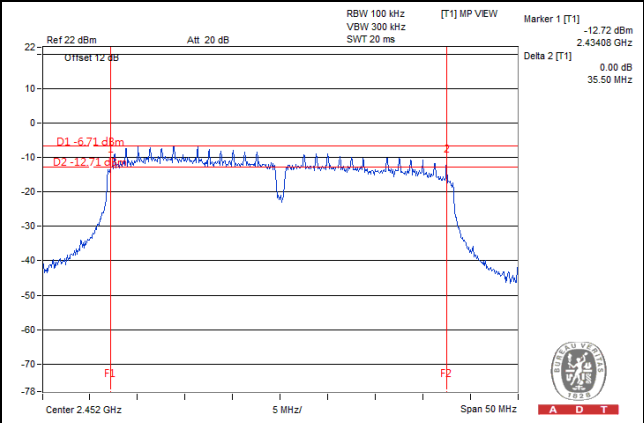
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

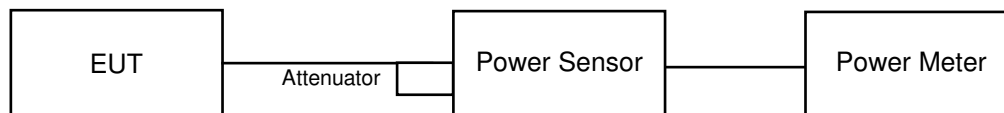


## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

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

### 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 power level.

### 4.4.5 Deviation from Test Standard

No deviation.

### 4.4.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.4.7 Test Results

##### 802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	28.91	14.61	30	Pass
6	2437	25.29	14.03	30	Pass
11	2462	29.31	14.67	30	Pass

##### 802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	105.20	20.22	30	Pass
6	2437	105.44	20.23	30	Pass
11	2462	109.14	20.38	30	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	109.90	20.41	30	Pass
6	2437	111.69	20.48	30	Pass
11	2462	113.50	20.55	30	Pass

##### 802.11n (HT40)

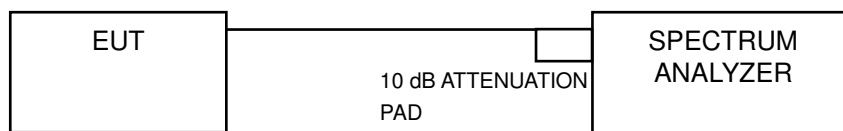
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	101.39	20.06	30	Pass
6	2437	103.99	20.17	30	Pass
9	2452	107.40	20.31	30	Pass

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

### 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 analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set the VBW  $\geq 3 \times \text{RBW}$ .
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



#### 4.5.7 Test Results

##### 802.11b

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-16.79	8	Pass
6	2437	-15.56	8	Pass
11	2462	-17.13	8	Pass

##### 802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-18.83	8	Pass
6	2437	-18.90	8	Pass
11	2462	-18.44	8	Pass

##### 802.11n (HT20)

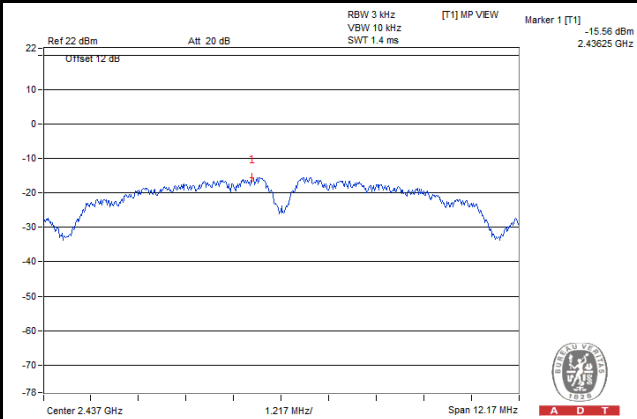
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-20.61	8	Pass
6	2437	-19.45	8	Pass
11	2462	-20.51	8	Pass

##### 802.11n (HT40)

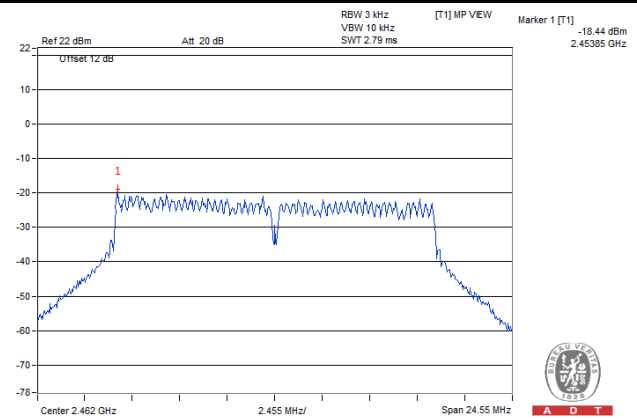
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
3	2422	-21.59	8	Pass
6	2437	-21.25	8	Pass
9	2452	-21.68	8	Pass

### Spectrum Plot of Worst Value

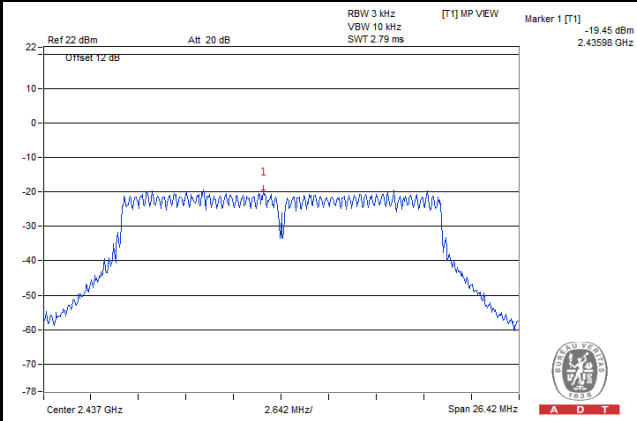
#### 802.11b



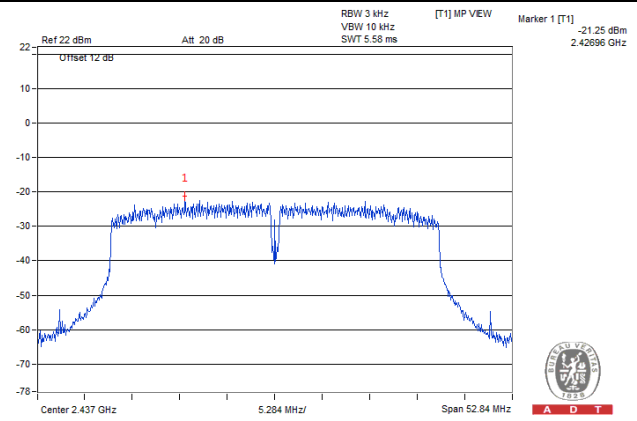
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

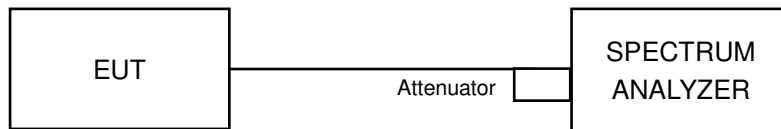


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20 dB of the highest emission level of operating band (in 100 kHz 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.

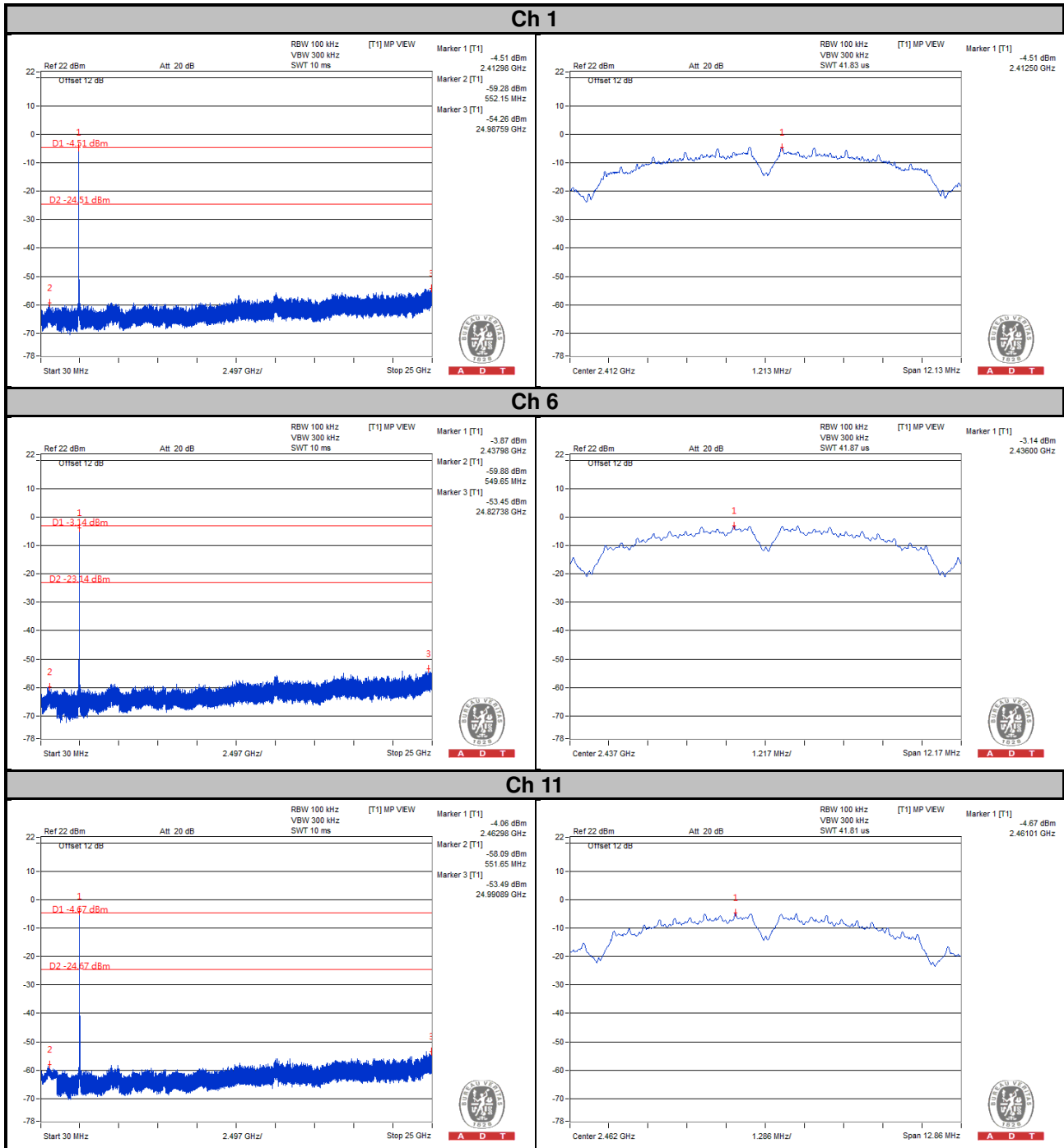
### 4.6.6 EUT Operating Condition

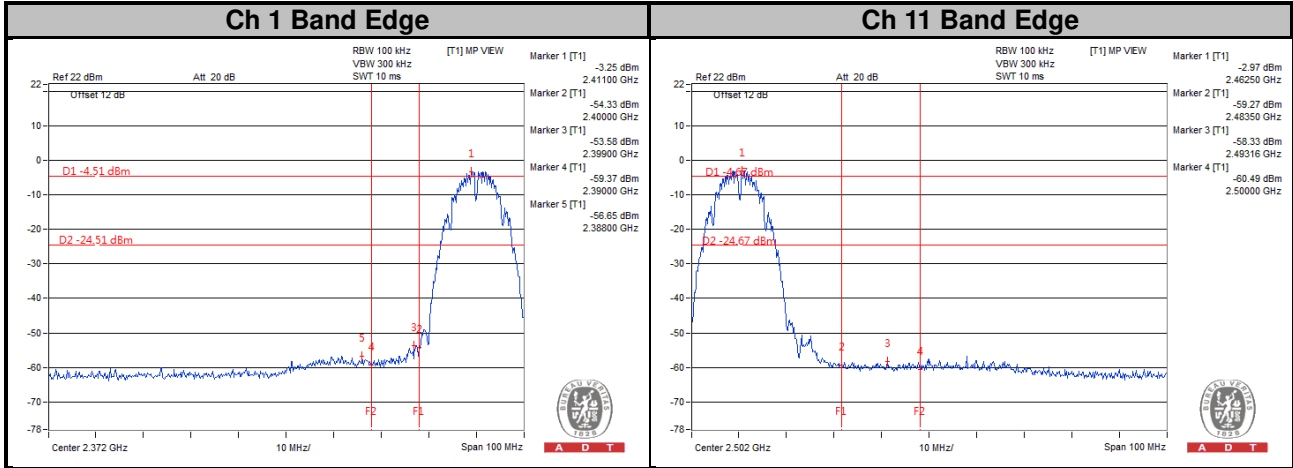
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.6.7 Test Results

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

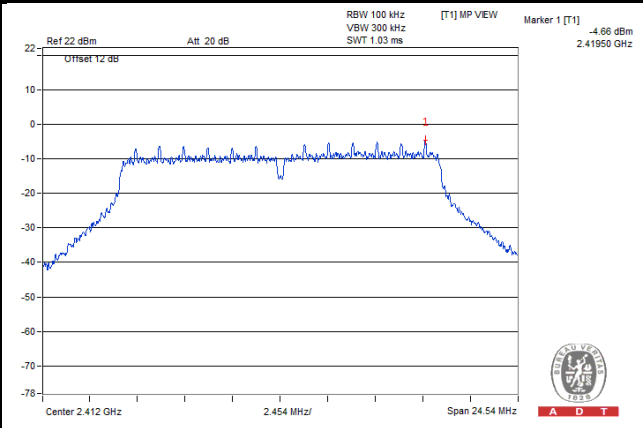
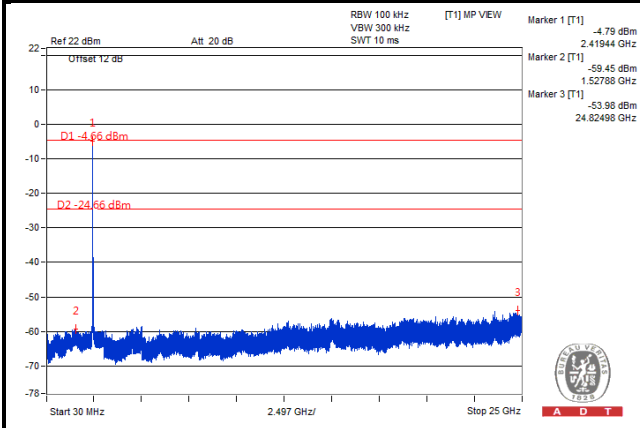
#### 802.11b



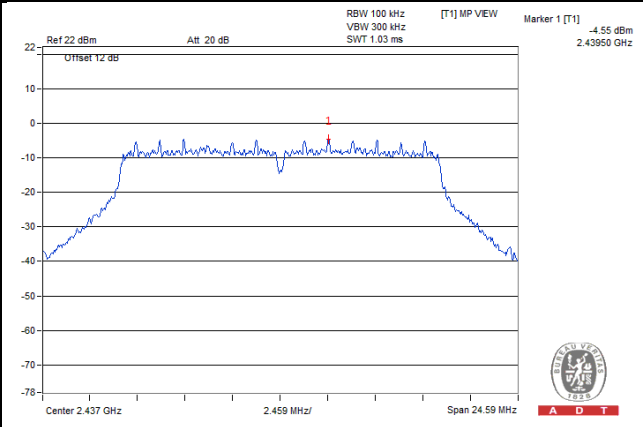
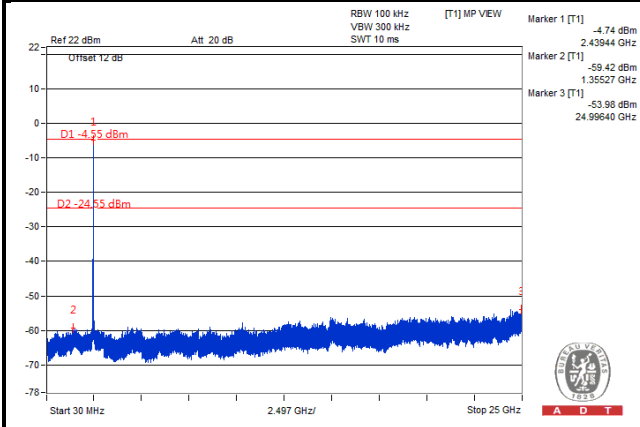


802.11g

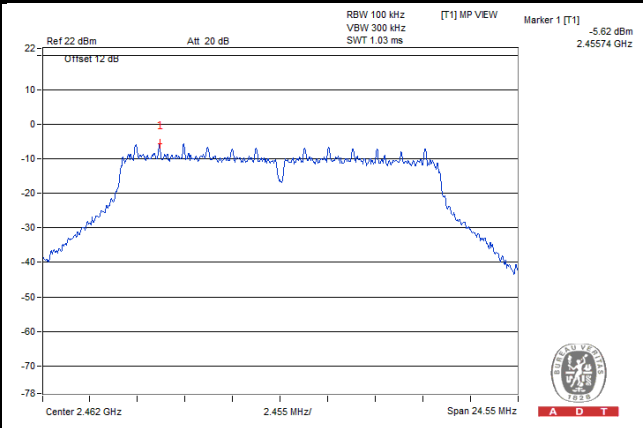
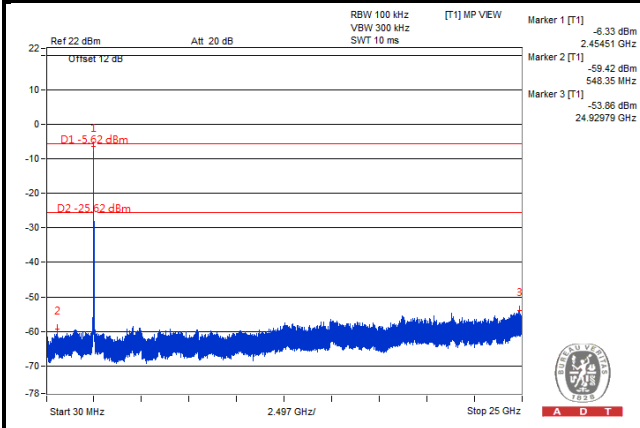
Ch 1

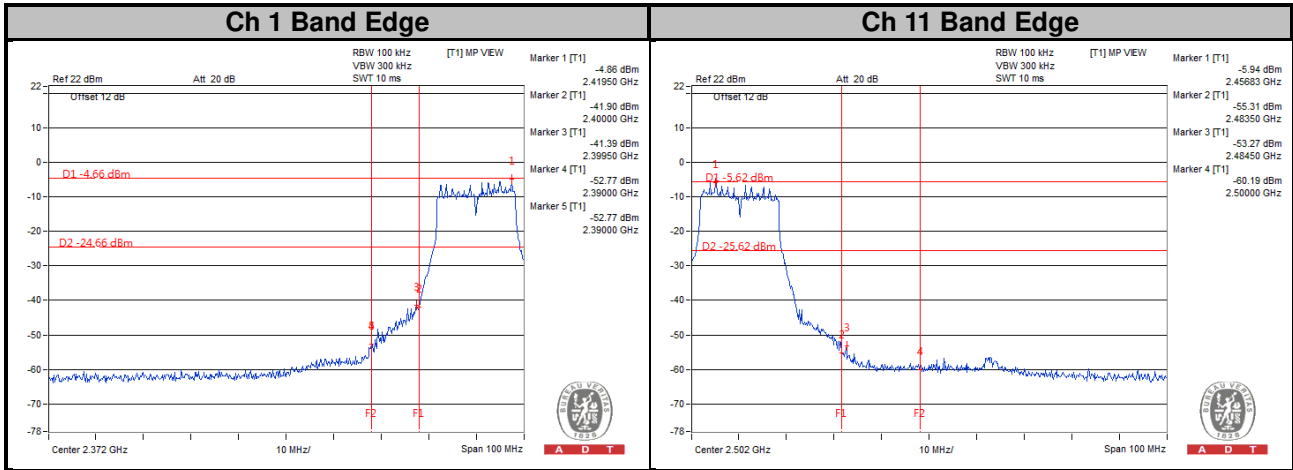


Ch 6



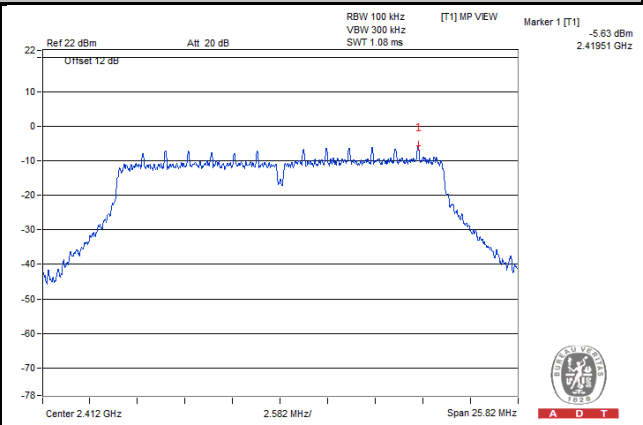
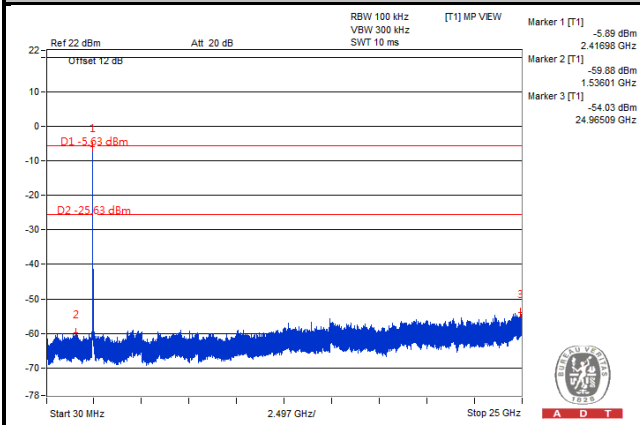
Ch 11



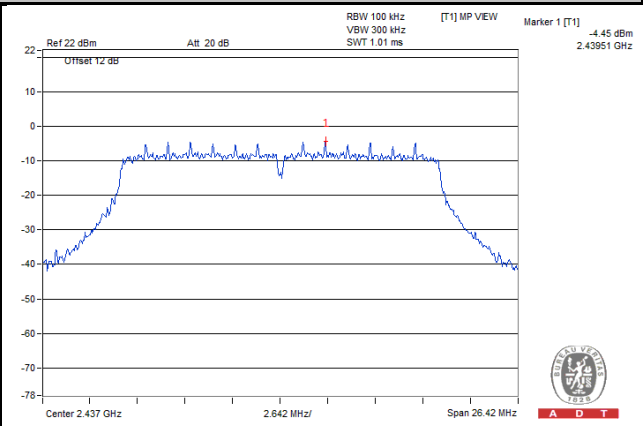
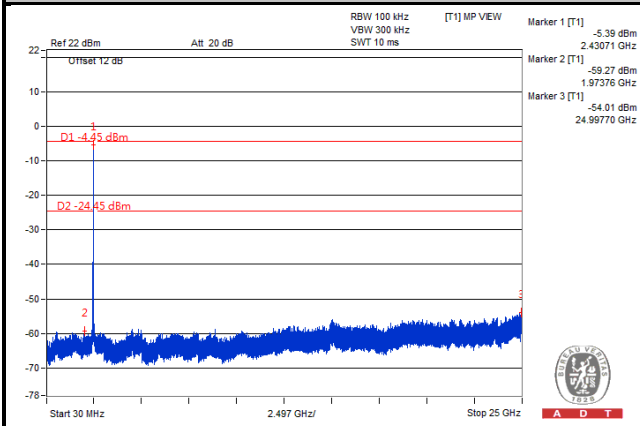


# 802.11n (HT20)

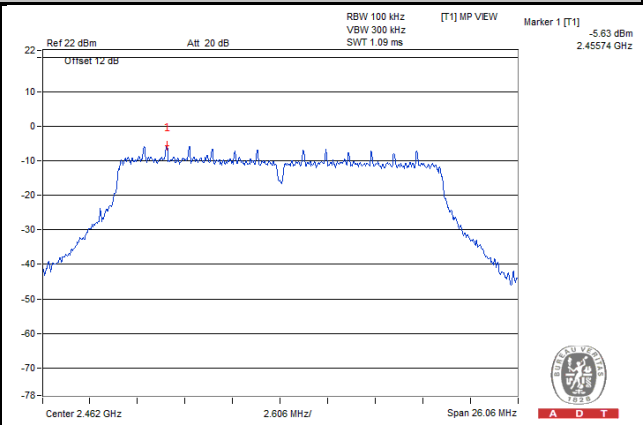
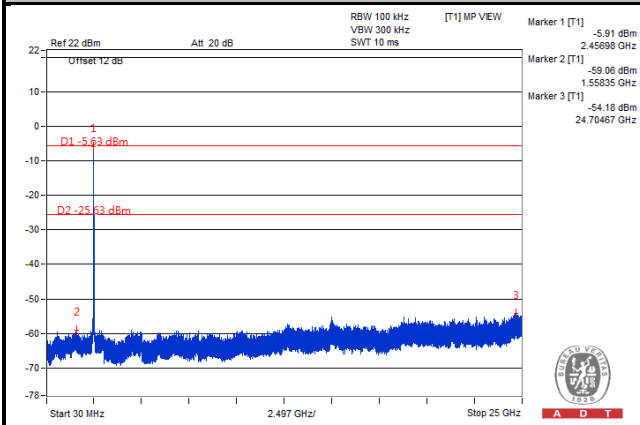
## Ch 1



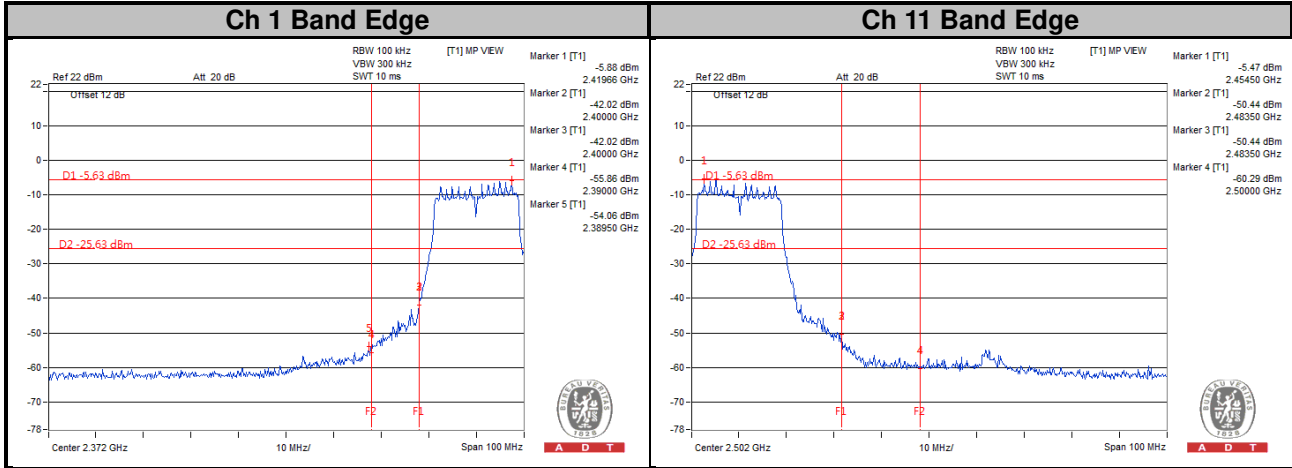
## Ch 6



## Ch 11

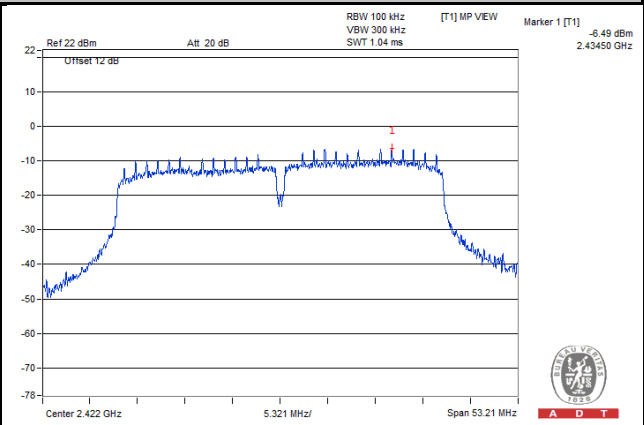
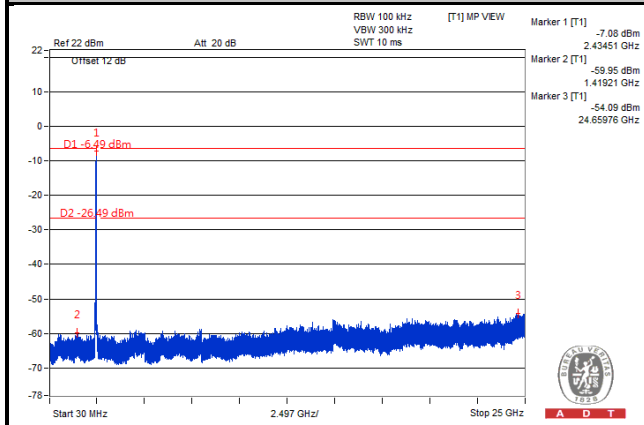




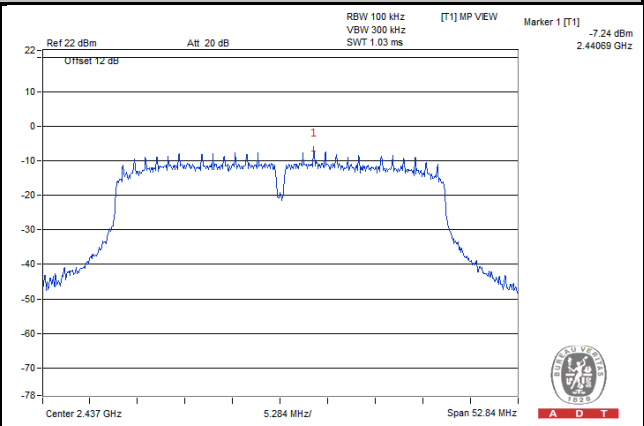
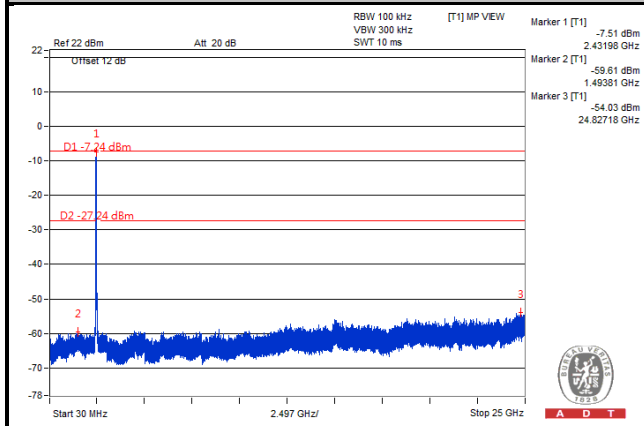


# 802.11n (HT40)

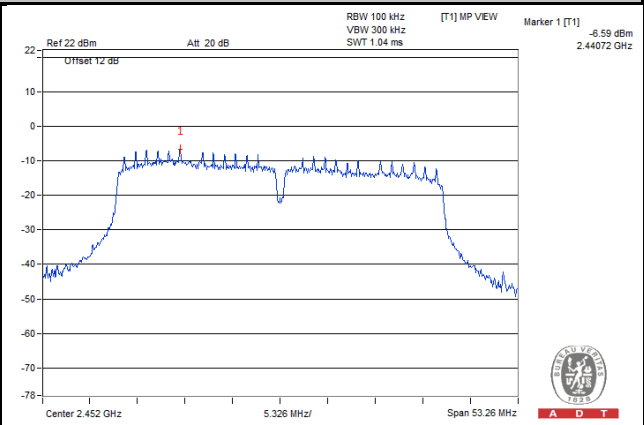
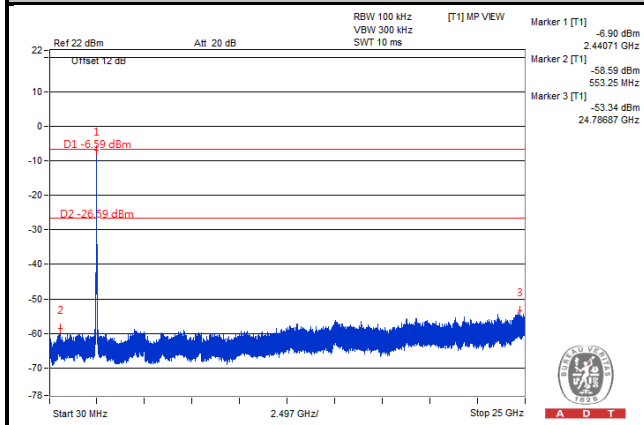
## Ch 3



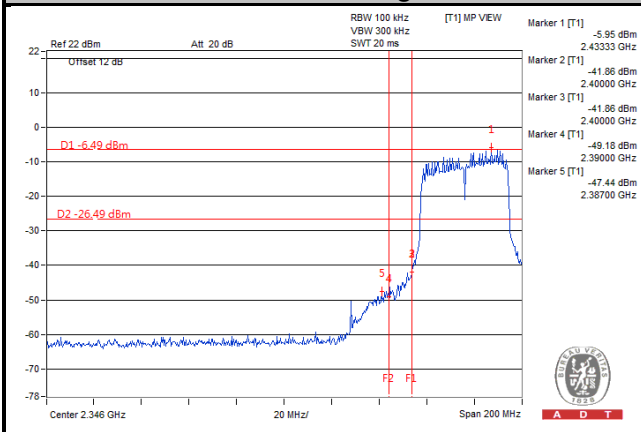
## Ch 6



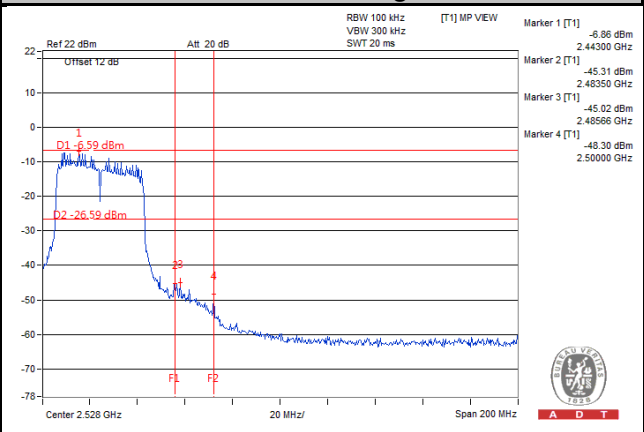
## Ch 9



### Ch 3 Band Edge



### Ch 9 Band Edge





## 5 Pictures of Test Arrangements

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



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## Appendix – 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:

### **Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

### **Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

### **Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**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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