



A D T

# FCC TEST REPORT (15.247)

**REPORT NO.:** RF130731C06

**MODEL NO.:** TL-WDN4200

**FCC ID:** TE7WDN4200

**RECEIVED:** Jul. 31, 2013

**TESTED:** Aug. 07 ~ Sep. 06, 2013

**ISSUED:** Oct. 01, 2013

**APPLICANT:** TP-LINK TECHNOLOGIES CO., LTD.

**ADDRESS:** Building 24 (floors 1,3,4,5) and 28 (floors1-4)  
Central Science and Technology Park, Shennan  
Rd, Nanshan, Shenzhen, China

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

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,  
New Taipei City, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei  
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.



A D T

## TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	5
1. CERTIFICATION.....	6
2. SUMMARY OF TEST RESULTS .....	7
2.1 MEASUREMENT UNCERTAINTY.....	7
3. GENERAL INFORMATION.....	8
3.1 GENERAL DESCRIPTION OF EUT .....	8
3.2 DESCRIPTION OF TEST MODES .....	10
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	11
3.3 DESCRIPTION OF SUPPORT UNITS .....	17
3.3.1 CONFIGURATION OF SYSTEM UNDER TEST .....	17
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	18
4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND) .....	19
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	19
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	19
4.1.2 TEST INSTRUMENTS.....	20
4.1.3 TEST PROCEDURES .....	21
4.1.4 DEVIATION FROM TEST STANDARD.....	21
4.1.5 TEST SETUP.....	22
4.1.6 EUT OPERATING CONDITIONS .....	23
4.1.7 TEST RESULTS .....	24
4.2 CONDUCTED EMISSION MEASUREMENT .....	37
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	37
4.2.2 TEST INSTRUMENTS.....	37
4.2.3 TEST PROCEDURES .....	38
4.2.4 DEVIATION FROM TEST STANDARD.....	38
4.2.5 TEST SETUP.....	38
4.2.6 EUT OPERATING CONDITIONS .....	38
4.2.7 TEST RESULTS .....	39
4.3 6dB BANDWIDTH MEASUREMENT.....	41
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	41
4.3.2 TEST SETUP.....	41
4.3.3 TEST INSTRUMENTS.....	41
4.3.4 TEST PROCEDURE.....	41
4.3.5 DEVIATION FROM TEST STANDARD.....	41
4.3.6 EUT OPERATING CONDITIONS .....	41
4.3.7 TEST RESULTS .....	42



4.4	CONDUCTED OUTPUT POWER.....	43
4.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	43
4.4.2	TEST SETUP .....	43
4.4.3	TEST INSTRUMENTS.....	43
4.4.4	TEST PROCEDURES .....	43
4.4.5	DEVIATION FROM TEST STANDARD.....	44
4.4.6	EUT OPERATING CONDITIONS .....	44
4.4.7	TEST RESULTS .....	45
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.2	TEST SETUP.....	47
4.5.3	TEST INSTRUMENTS.....	47
4.5.4	TEST PROCEDURE.....	47
4.5.5	DEVIATION FROM TEST STANDARD.....	47
4.5.6	EUT OPERATING CONDITION.....	47
4.5.7	TEST RESULTS .....	48
4.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT.....	50
4.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	50
4.6.2	TEST SETUP.....	50
4.6.3	TEST INSTRUMENTS.....	50
4.6.4	TEST PROCEDURE.....	50
4.6.5	DEVIATION FROM TEST STANDARD.....	51
4.6.6	EUT OPERATING CONDITION.....	51
4.6.7	TEST RESULTS .....	51
5.	TEST TYPES AND RESULTS (FOR 5.0GHz BAND).....	60
5.1	RADIATED EMISSION MEASUREMENT .....	60
5.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	60
5.1.2	TEST INSTRUMENTS.....	61
5.1.3	TEST PROCEDURES .....	61
5.1.4	DEVIATION FROM TEST STANDARD.....	61
5.1.5	TEST SETUP.....	61
5.1.6	EUT OPERATING CONDITIONS .....	61
5.1.7	TEST RESULTS .....	62
5.2	CONDUCTED EMISSION MEASUREMENT .....	71
5.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	71
5.2.2	TEST INSTRUMENTS.....	71
5.2.3	TEST PROCEDURES .....	71
5.2.4	DEVIATION FROM TEST STANDARD.....	71
5.2.5	TEST SETUP.....	71



A D T

5.2.6	EUT OPERATING CONDITIONS .....	71
5.2.7	TEST RESULTS .....	72
5.3	6dB BANDWIDTH MEASUREMENT .....	74
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	74
5.3.2	TEST SETUP .....	74
5.3.3	TEST INSTRUMENTS.....	74
5.3.4	TEST PROCEDURE.....	74
5.3.5	DEVIATION FROM TEST STANDARD.....	74
5.3.6	EUT OPERATING CONDITIONS .....	74
5.3.7	TEST RESULTS .....	75
5.4	CONDUCTED OUTPUT POWER.....	76
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	76
5.4.2	TEST SETUP .....	76
5.4.3	INSTRUMENTS.....	76
5.4.4	TEST PROCEDURES .....	76
5.4.5	DEVIATION FROM TEST STANDARD.....	76
5.4.6	EUT OPERATING CONDITIONS .....	76
5.4.7	TEST RESULTS .....	77
5.5	POWER SPECTRAL DENSITY MEASUREMENT .....	79
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	79
5.5.2	TEST SETUP.....	79
5.5.3	TEST INSTRUMENTS.....	79
5.5.4	TEST PROCEDURE.....	79
5.5.5	DEVIATION FROM TEST STANDARD.....	79
5.5.6	EUT OPERATING CONDITION.....	79
5.5.7	TEST RESULTS .....	80
5.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	81
5.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	81
5.6.2	TEST SETUP.....	81
5.6.3	TEST INSTRUMENTS.....	81
5.6.4	TEST PROCEDURE.....	81
5.6.5	DEVIATION FROM TEST STANDARD.....	81
5.6.6	EUT OPERATING CONDITION.....	81
5.6.7	TEST RESULTS .....	81
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	89
7.	INFORMATION ON THE TESTING LABORATORIES .....	90
8.	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	91



A D T

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130731C06	Original release	Oct. 01, 2013



A D T

## 1. CERTIFICATION

**PRODUCT:** N900 Wireless Dual Band USB Adapter  
**MODEL NO.:** TL-WDN4200  
**BRAND:** TP-LINK  
**APPLICANT:** TP-LINK TECHNOLOGIES CO., LTD.  
**TESTED:** Aig. 07 ~ Sep. 06, 2013  
**TEST SAMPLE:** PRODUCTION SAMPLE  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: TL-WDN4200) 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:** Ivy Lin, **DATE:** Oct. 01, 2013  
Ivy Lin / Specialist

**APPROVED BY:** Ken Liu, **DATE:** Oct. 01, 2013  
Ken Liu / Senior Manager



## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.98dB at 0.18906MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2485.50MHz, 11490.00MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is murata not a standard connector.

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 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  $k = 2$ .



A D T

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	N900 Wireless Dual Band USB Adapter
<b>MODEL NO.</b>	TL-WDN4200
<b>POWER SUPPLY</b>	5Vdc (host equipment)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz <b>5.0GHz:</b> 5745 ~ 5825MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) <b>5.0GHz:</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	720.109mW for 2412 ~ 2462MHz 505.785mW for 5745 ~ 5825MHz
<b>ANTENNA TYPE</b>	Refer to Note as below
<b>ANTENNA CONNECTOR</b>	Refer to Note as below
<b>DATA CABLE</b>	N/A
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	N/A





**NOTE:**

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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz) (MCS 0 ~ 7/ nss= 1)	3TX
802.11n (40MHz) (MCS 0 ~ 7/ nss= 1)	3TX

\*802.11 abg operate in Ant. 0 only.

2. The EUT uses following antennas.

Frequency (GHz)	Antenna Type	Gain (dBi)			Antenna Connector
		Ant. 0	Ant. 1	Ant. 2	
2.4~2.4835	PIFA	1.68	3.45	0.21	murata
5.15~5.25	PIFA	3.64	2.64	1.67	murata
5.25~5.35	PIFA	3.29	2.73	-0.3	murata
5.725~5.85	PIFA	3.24	1.32	2.53	murata

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

#### 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		

#### FOR 5.0GHz (5745 ~ 5825MHz):

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

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

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

**NOTE:**

**1. 802.11b, 802.11n (20MHz), 802.11n (40MHz):**

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

**2. 802.11g:**

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

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

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

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 (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

#### 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)
-	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	7.2

#### 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 (20MHz)	1 to 11	11	OFDM	BPSK	7.2



**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 (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	15.0

**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 (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	29deg. C, 69%RH	120Vac, 60Hz	Chris Lin, Cedric Wu
RE<1G	27deg. C, 66%RH	120Vac, 60Hz	Martin Lee
PLC	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen



**FOR 5.0GHz (5745 ~ 5825MHz):**

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

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

**NOTE:**  
The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

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

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

**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)
-	802.11n (20MHz)	149 to 165	157	OFDM	BPSK	7.2

**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 (20MHz)	149 to 165	157	OFDM	BPSK	7.2



**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)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

**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)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	27deg. C, 66%RH	120Vac, 60Hz	Martin Lee
RE<1G	27deg. C, 66%RH	120Vac, 60Hz	Martin Lee
PLC	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen

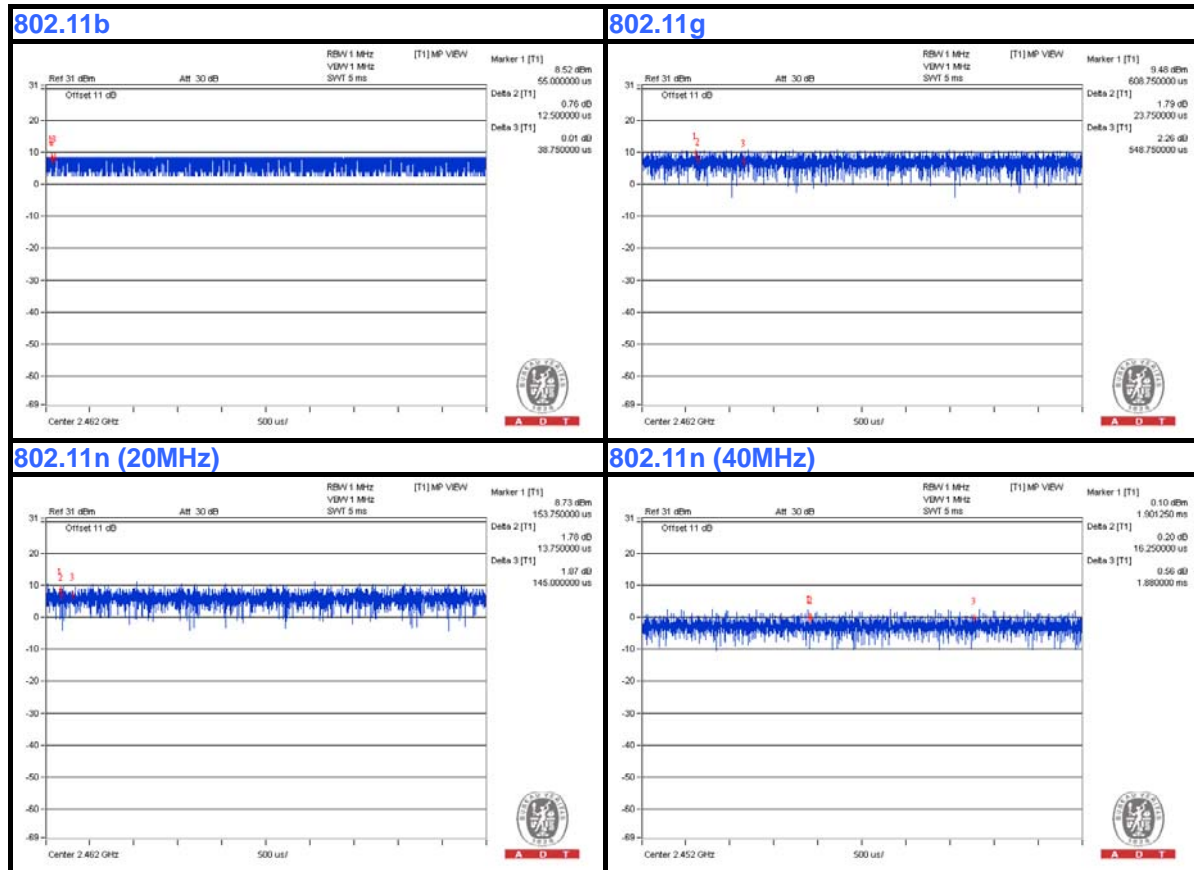


A D T

### 3.3 DUTY CYCLE OF TEST SIGNAL

#### 2.4GHz Band:

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

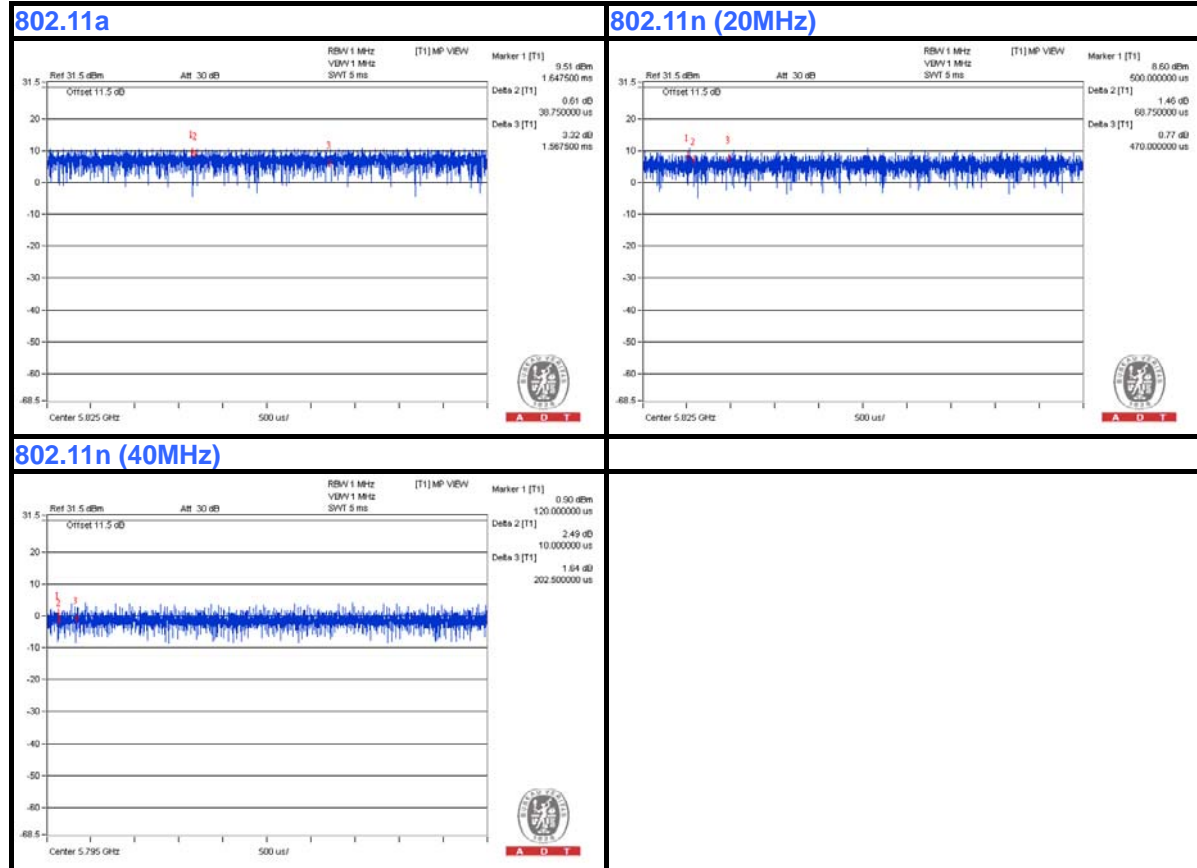




A D T

### 5GHz Band:

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







A D T

### 3.4 DESCRIPTION OF SUPPORT UNITS

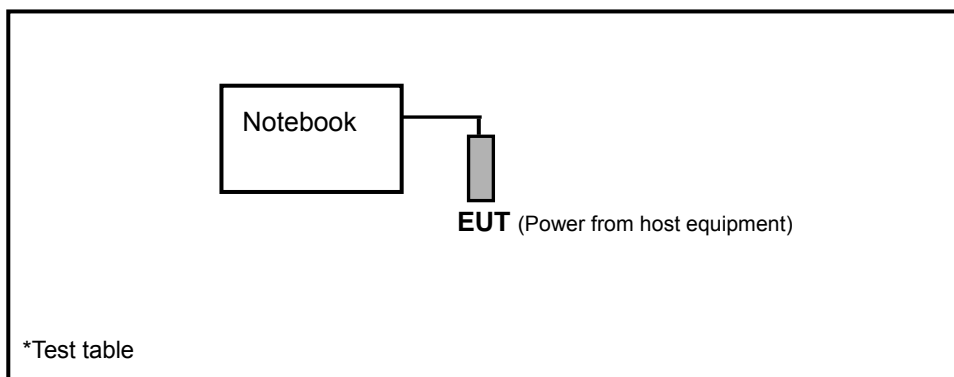
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	0.5m USB cable

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

#### 3.4.1 CONFIGURATION OF SYSTEM UNDER TEST





A D T

### 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 v03r01**

**662911 D01 Multiple Transmitter Output v02**

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.



A D T

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 25, 2012	Oct. 24, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8447D	2944A10738	Oct. 23, 2012	Oct. 22, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	0842014	Apr. 25, 2013	Apr. 24, 2014
Power Sensor	MA2411B	1026085	Oct. 12, 2012	Oct. 11, 2014

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Chamber 4.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 460141.
  5. The IC Site Registration No. is IC7450F-4.



A D T

#### 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. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

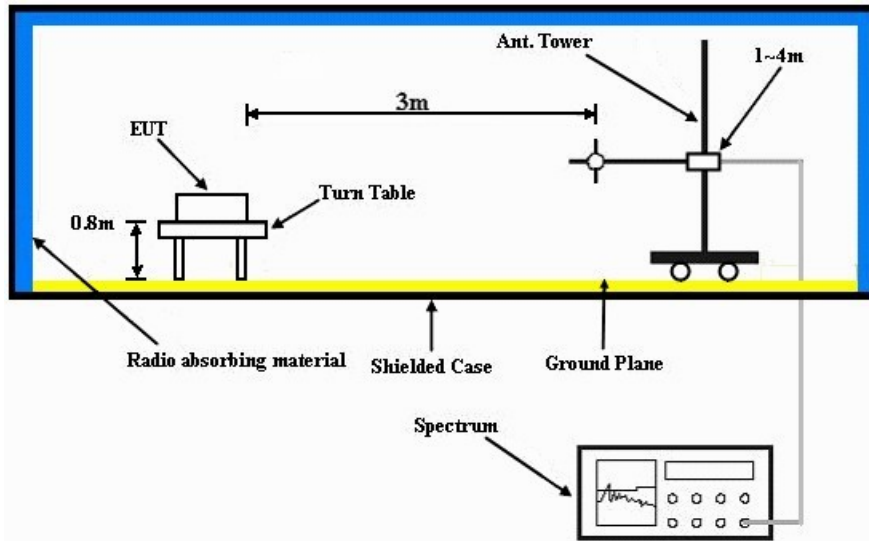
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

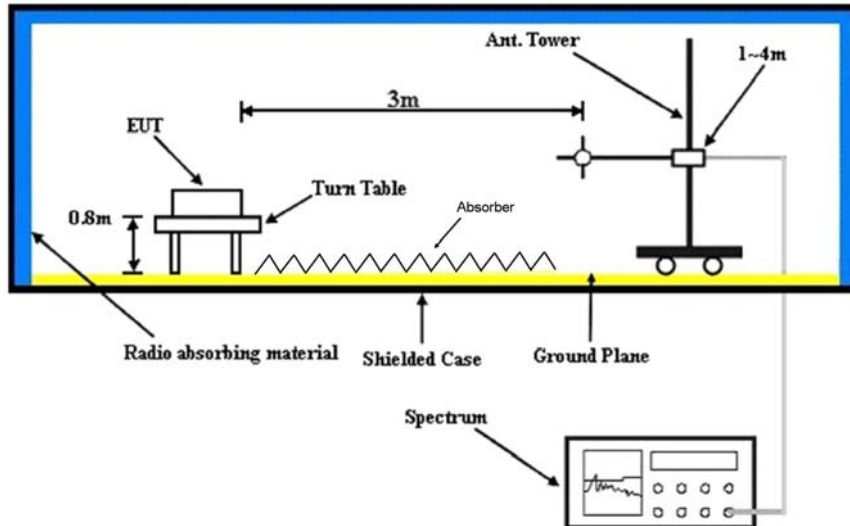
No deviation.

### 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).



A D T

#### 4.1.6 EUT OPERATING CONDITIONS

- a. The EUT was connected to the notebook with USB cable
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.



A D T

### 4.1.7 TEST RESULTS

#### ABOVE 1GHz DATA :

#### 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.3 PK	74.0	-17.7	2.11 H	82	25.30	31.00
2	2390.00	46.3 AV	54.0	-7.7	2.11 H	82	15.30	31.00
3	*2412.00	99.6 PK			2.10 H	81	68.50	31.10
4	*2412.00	95.8 AV			2.10 H	81	64.70	31.10
5	4824.00	49.7 PK	74.0	-24.3	1.00 H	180	45.10	4.60
6	4824.00	43.5 AV	54.0	-10.5	1.00 H	180	38.90	4.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.3 PK	74.0	-19.7	1.00 V	130	23.30	31.00
2	2390.00	43.5 AV	54.0	-10.5	1.00 V	130	12.50	31.00
3	*2412.00	90.8 PK			1.00 V	125	59.70	31.10
4	*2412.00	87.1 AV			1.00 V	125	56.00	31.10
5	4824.00	50.3 PK	74.0	-23.7	1.01 V	223	45.70	4.60
6	4824.00	45.4 AV	54.0	-8.6	1.01 V	223	40.80	4.60

#### REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- “ \* “: Fundamental frequency.





A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.5 PK			2.07 H	79	67.20	31.30
2	*2437.00	94.7 AV			2.07 H	79	63.40	31.30
3	4874.00	50.4 PK	74.0	-23.6	1.00 H	180	45.70	4.70
4	4874.00	44.4 AV	54.0	-9.6	1.00 H	180	39.70	4.70
5	7311.00	52.3 PK	74.0	-21.7	1.25 H	96	41.10	11.20
6	7311.00	41.6 AV	54.0	-12.4	1.25 H	96	30.40	11.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	88.9 PK			1.00 V	309	57.60	31.30
2	*2437.00	85.6 AV			1.00 V	309	54.30	31.30
3	4874.00	51.5 PK	74.0	-22.5	1.00 V	213	46.80	4.70
4	4874.00	46.6 AV	54.0	-7.4	1.00 V	213	41.90	4.70
5	7311.00	51.9 PK	74.0	-22.1	1.10 V	148	40.70	11.20
6	7311.00	39.2 AV	54.0	-14.8	1.10 V	148	28.00	11.20

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	96.7 PK			1.40 H	142	65.30	31.40
2	*2462.00	92.9 AV			1.40 H	142	61.50	31.40
3	2483.50	54.6 PK	74.0	-19.4	1.45 H	150	23.20	31.40
4	2483.50	43.6 AV	54.0	-10.4	1.45 H	150	12.20	31.40
5	4924.00	50.4 PK	74.0	-23.6	1.03 H	1	45.40	5.00
6	4924.00	43.4 AV	54.0	-10.6	1.03 H	1	38.40	5.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	87.4 PK			1.00 V	306	56.00	31.40
2	*2462.00	83.6 AV			1.00 V	306	52.20	31.40
3	2483.50	55.0 PK	74.0	-19.0	1.10 V	310	23.60	31.40
4	2483.50	43.3 AV	54.0	-10.7	1.10 V	310	11.90	31.40
5	4924.00	52.0 PK	74.0	-22.0	1.10 V	222	47.00	5.00
6	4924.00	46.7 AV	54.0	-7.3	1.10 V	222	41.70	5.00

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.0 PK	74.0	-14.0	1.32 H	260	27.90	32.10
2	2390.00	46.8 AV	54.0	-7.2	1.32 H	260	14.70	32.10
3	*2412.00	96.4 PK			1.32 H	262	64.30	32.10
4	*2412.00	87.0 AV			1.32 H	262	54.90	32.10
5	4824.00	48.2 PK	74.0	-25.8	1.00 H	128	42.00	6.20
6	4824.00	35.7 AV	54.0	-18.3	1.00 H	128	29.50	6.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.7 PK	74.0	-11.3	1.00 V	40	30.60	32.10
2	2390.00	47.8 AV	54.0	-6.2	1.00 V	40	15.70	32.10
3	*2412.00	98.2 PK			1.00 V	39	66.10	32.10
4	*2412.00	88.8 AV			1.00 V	39	56.70	32.10
5	4824.00	49.6 PK	74.0	-24.4	1.24 V	158	43.40	6.20
6	4824.00	36.1 AV	54.0	-17.9	1.24 V	158	29.90	6.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.2 PK			2.04 H	78	71.00	32.20
2	*2437.00	92.9 AV			2.04 H	78	60.70	32.20
3	4874.00	53.2 PK	74.0	-20.8	1.28 H	74	46.90	6.30
4	4874.00	39.2 AV	54.0	-14.8	1.28 H	74	32.90	6.30
5	7311.00	55.5 PK	74.0	-18.5	1.08 H	87	44.60	10.90
6	7311.00	42.6 AV	54.0	-11.4	1.08 H	87	31.70	10.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	95.3 PK			1.00 V	304	63.10	32.20
2	*2437.00	85.7 AV			1.00 V	304	53.50	32.20
3	4874.00	48.9 PK	74.0	-25.1	1.08 V	55	42.60	6.30
4	4874.00	37.4 AV	54.0	-16.6	1.08 V	55	31.10	6.30
5	7311.00	52.4 PK	74.0	-21.6	1.10 V	340	41.50	10.90
6	7311.00	39.5 AV	54.0	-14.5	1.10 V	340	28.60	10.90

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.4 PK			1.99 H	81	68.10	32.30
2	*2462.00	91.0 AV			1.99 H	81	58.70	32.30
3	2483.50	62.1 PK	74.0	-11.9	2.10 H	85	29.80	32.30
4	2483.50	45.9 AV	54.0	-8.1	2.10 H	85	13.60	32.30
5	4924.00	53.4 PK	74.0	-20.6	1.39 H	87	46.80	6.60
6	4924.00	39.6 AV	54.0	-14.4	1.39 H	87	33.00	6.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	93.1 PK			1.21 V	305	60.80	32.30
2	*2462.00	83.9 AV			1.21 V	305	51.60	32.30
3	2483.50	56.2 PK	74.0	-17.8	1.25 V	310	23.90	32.30
4	2483.50	44.6 AV	54.0	-9.4	1.25 V	310	12.30	32.30
5	4924.00	49.6 PK	74.0	-24.4	1.17 V	85	43.00	6.60
6	4924.00	37.2 AV	54.0	-16.8	1.17 V	85	30.60	6.60

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.6 PK	74.0	-11.4	2.02 H	122	30.50	32.10
2	2390.00	51.2 AV	54.0	-2.8	2.02 H	122	19.10	32.10
3	*2412.00	104.2 PK			2.03 H	108	72.10	32.10
4	*2412.00	93.1 AV			2.03 H	108	61.00	32.10
5	4824.00	53.0 PK	74.0	-21.0	1.23 H	107	46.80	6.20
6	4824.00	39.2 AV	54.0	-14.8	1.23 H	107	33.00	6.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.0 PK	74.0	-13.0	1.03 V	125	28.90	32.10
2	2390.00	48.8 AV	54.0	-5.2	1.03 V	125	16.70	32.10
3	*2412.00	102.2 PK			1.00 V	123	70.10	32.10
4	*2412.00	90.7 AV			1.00 V	123	58.60	32.10
5	4824.00	48.9 PK	74.0	-25.1	1.32 V	41	42.70	6.20
6	4824.00	36.6 AV	54.0	-17.4	1.32 V	41	30.40	6.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.8 PK			1.37 H	313	80.60	32.20
2	*2437.00	102.8 AV			1.37 H	313	70.60	32.20
3	2485.50	63.4 PK	74.0	-10.6	1.42 H	309	31.10	32.30
4	<b>2485.50</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.42 H</b>	<b>309</b>	<b>20.70</b>	<b>32.30</b>
5	4874.00	52.8 PK	74.0	-21.2	1.08 H	99	46.50	6.30
6	4874.00	38.4 AV	54.0	-15.6	1.08 H	99	32.10	6.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.7 PK			1.71 V	100	72.50	32.20
2	*2437.00	93.3 AV			1.71 V	100	61.10	32.20
3	2484.80	57.4 PK	74.0	-16.6	1.70 V	103	25.10	32.30
4	2484.80	46.9 AV	54.0	-7.1	1.70 V	103	14.60	32.30
5	4874.00	49.2 PK	74.0	-24.8	1.28 V	55	42.90	6.30
6	4874.00	36.7 AV	54.0	-17.3	1.28 V	55	30.40	6.30

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.8 PK			1.35 H	310	78.50	32.30
2	*2462.00	98.9 AV			1.35 H	310	66.60	32.30
3	2483.50	67.9 PK	74.0	-6.1	1.33 H	309	35.60	32.30
4	2483.50	52.9 AV	54.0	-1.1	1.33 H	309	20.60	32.30
5	4924.00	52.6 PK	74.0	-21.4	1.28 H	107	46.00	6.60
6	4924.00	38.7 AV	54.0	-15.3	1.28 H	107	32.10	6.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.0 PK			1.00 V	95	68.70	32.30
2	*2462.00	89.9 AV			1.00 V	95	57.60	32.30
3	2483.50	57.8 PK	74.0	-16.2	1.00 V	103	25.50	32.30
4	2483.50	45.9 AV	54.0	-8.1	1.00 V	103	13.60	32.30
5	4924.00	49.6 PK	74.0	-24.4	1.17 V	52	43.00	6.60
6	4924.00	37.5 AV	54.0	-16.5	1.17 V	52	30.90	6.60

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.





A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.4 PK	74.0	-10.6	1.12 H	19	31.30	32.10
2	2390.00	52.6 AV	54.0	-1.4	1.12 H	19	20.50	32.10
3	*2422.00	102.5 PK			1.35 H	310	70.30	32.20
4	*2422.00	95.7 AV			1.35 H	310	63.50	32.20
5	4844.00	53.1 PK	74.0	-20.9	1.08 H	96	46.80	6.30
6	4844.00	39.3 AV	54.0	-14.7	1.08 H	96	33.00	6.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.5 PK	74.0	-15.5	1.71 V	106	26.40	32.10
2	2390.00	48.2 AV	54.0	-5.8	1.71 V	106	16.10	32.10
3	*2422.00	93.3 PK			1.72 V	82	61.10	32.20
4	*2422.00	86.8 AV			1.72 V	82	54.60	32.20
5	4844.00	48.8 PK	74.0	-25.2	1.18 V	54	42.50	6.30
6	4844.00	37.0 AV	54.0	-17.0	1.18 V	54	30.70	6.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	1.40 H	310	31.40	32.10
2	2390.00	52.6 AV	54.0	-1.4	1.40 H	310	20.50	32.10
3	*2437.00	105.7 PK			1.34 H	310	73.50	32.20
4	*2437.00	100.5 AV			1.34 H	310	68.30	32.20
5	4874.00	53.0 PK	74.0	-21.0	1.23 H	65	46.70	6.30
6	4874.00	39.1 AV	54.0	-14.9	1.23 H	65	32.80	6.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.6 PK	74.0	-17.4	1.78 V	104	24.50	32.10
2	2390.00	46.6 AV	54.0	-7.4	1.78 V	104	14.50	32.10
3	*2437.00	96.9 PK			1.71 V	100	64.70	32.20
4	*2437.00	89.7 AV			1.71 V	100	57.50	32.20
5	4874.00	49.0 PK	74.0	-25.0	1.33 V	95	42.70	6.30
6	4874.00	36.7 AV	54.0	-17.3	1.33 V	95	30.40	6.30

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	102.6 PK			1.39 H	309	70.30	32.30
2	*2452.00	96.1 AV			1.39 H	309	63.80	32.30
3	2483.50	59.9 PK	74.0	-14.1	1.05 H	359	27.60	32.30
4	2483.50	50.4 AV	54.0	-3.6	1.05 H	359	18.10	32.30
5	2486.90	61.8 PK	74.0	-12.2	1.05 H	359	29.50	32.30
6	2486.90	52.5 AV	54.0	-1.5	1.05 H	359	20.20	32.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	93.0 PK			1.70 V	95	60.70	32.30
2	*2452.00	87.3 AV			1.70 V	95	55.00	32.30
3	2483.50	58.3 PK	74.0	-15.7	1.75 V	100	26.00	32.30
4	2483.50	47.6 AV	54.0	-6.4	1.75 V	100	15.30	32.30
5	4904.00	49.5 PK	74.0	-24.5	1.09 V	41	42.90	6.60
6	4904.00	37.1 AV	54.0	-16.9	1.09 V	41	30.50	6.60

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.



A D T

**BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	198.71	34.7 QP	43.5	-8.8	1.57 H	298	51.60	-16.90
2	218.12	36.5 QP	46.0	-9.5	1.00 H	187	53.20	-16.70
3	266.63	41.0 QP	46.0	-5.0	2.25 H	216	54.90	-13.90
4	379.17	35.5 QP	46.0	-10.5	1.69 H	348	46.70	-11.20
5	423.80	26.5 QP	46.0	-19.5	1.00 H	98	36.90	-10.40
6	961.29	35.6 QP	54.0	-18.4	1.47 H	74	36.30	-0.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.36	33.8 QP	40.0	-6.2	1.00 V	12	48.50	-14.70
2	198.71	34.8 QP	43.5	-8.7	1.00 V	7	51.70	-16.90
3	266.63	39.9 QP	46.0	-6.1	1.74 V	6	53.80	-13.90
4	332.60	32.2 QP	46.0	-13.8	1.50 V	170	44.20	-12.00
5	423.80	30.6 QP	46.0	-15.4	2.25 V	194	41.00	-10.40
6	961.29	37.7 QP	54.0	-16.3	1.50 V	353	38.40	-0.70

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	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. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

#### 4.2.3 TEST PROCEDURES

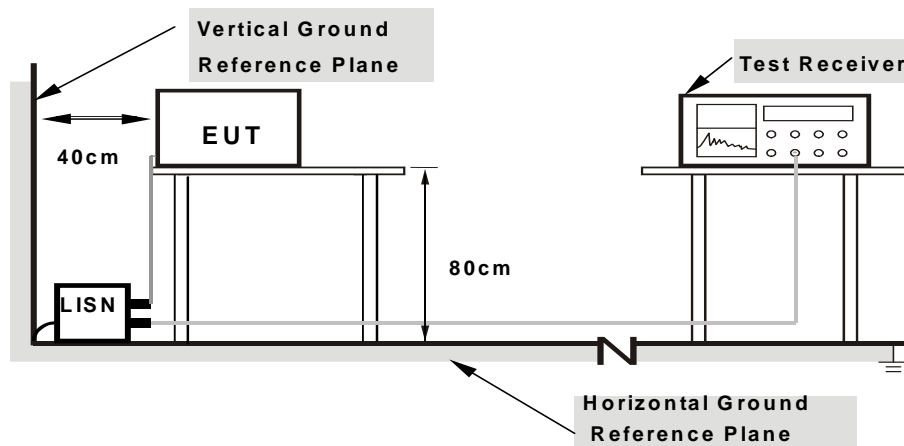
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



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

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

### 4.2.7 TEST RESULTS

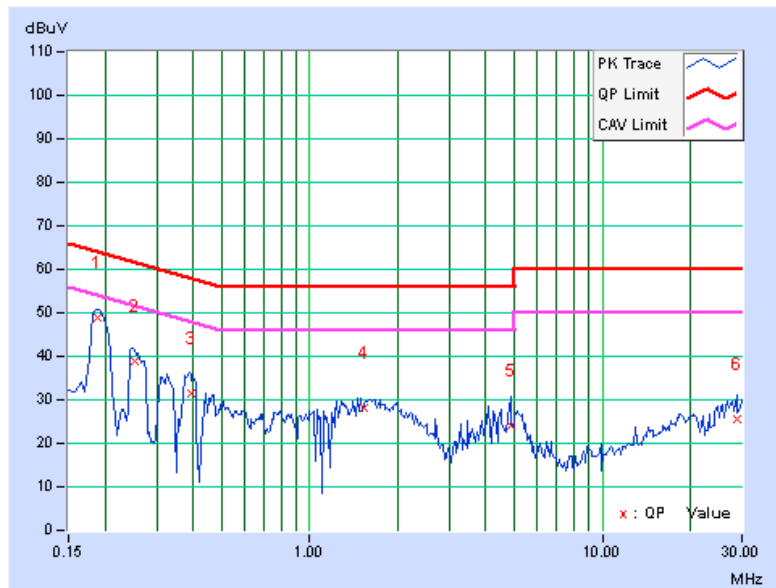
**CONDUCTED WORST-CASE DATA : 802.11n (20MHz)**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	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	0.18906	0.16	48.66	34.94	48.82	35.10	64.08
2	0.25156	0.18	38.87	25.41	39.05	25.59	61.71	51.71	-22.66	-26.12
3	0.39219	0.23	31.35	18.85	31.58	19.08	58.02	48.02	-26.44	-28.94
4	1.53125	0.27	28.02	14.83	28.29	15.10	56.00	46.00	-27.71	-30.90
5	4.88672	0.45	23.47	6.81	23.92	7.26	56.00	46.00	-32.08	-38.74
6	28.78125	1.62	24.02	18.18	25.64	19.80	60.00	50.00	-34.36	-30.20

**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





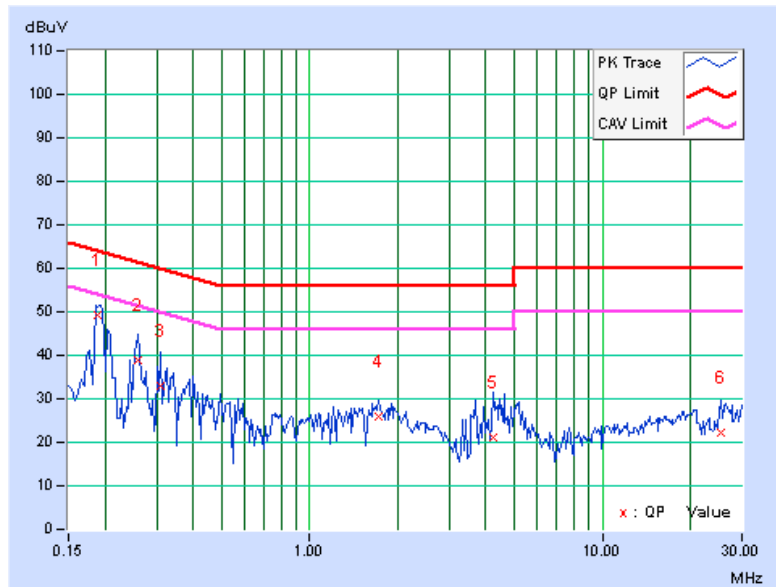
A D T

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	0.18906	0.17	48.93	34.84	49.10	35.01	64.08
2	0.25938	0.19	38.60	24.50	38.79	24.69	61.45	51.45	-22.66	-26.76
3	0.31016	0.21	32.58	18.29	32.79	18.50	59.97	49.97	-27.18	-31.47
4	1.72656	0.27	25.67	12.71	25.94	12.98	56.00	46.00	-30.06	-33.02
5	4.24609	0.39	20.77	4.99	21.16	5.38	56.00	46.00	-34.84	-40.62
6	25.40625	1.12	20.93	11.51	22.05	12.63	60.00	50.00	-37.95	-37.37

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



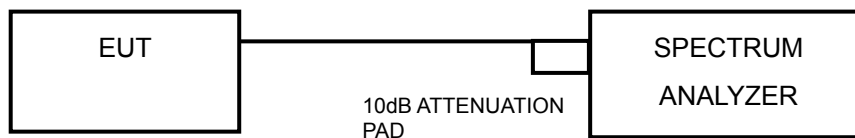


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

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

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

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



## 4.3.7 TEST RESULTS

## 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.17	0.5	PASS
6	2437	12.17	0.5	PASS
11	2462	12.16	0.5	PASS

## 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.57	0.5	PASS
6	2437	16.58	0.5	PASS
11	2462	16.49	0.5	PASS

## 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.70	17.70	17.63	0.5	PASS
6	2437	17.69	17.69	17.69	0.5	PASS
11	2462	17.68	17.67	17.62	0.5	PASS

## 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.51	36.46	36.17	0.5	PASS
6	2437	36.46	36.47	36.15	0.5	PASS
9	2452	36.11	36.22	35.86	0.5	PASS

## 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 v02 Method of conducted output power measurement on IEEE 802.11 devices,

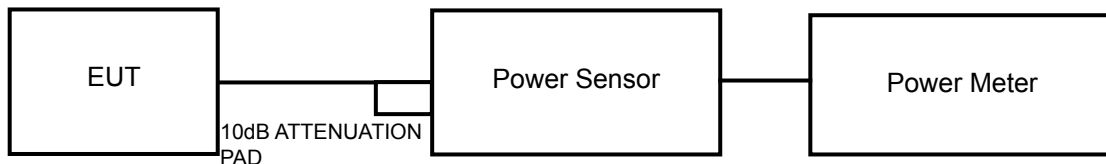
Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

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

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

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

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

Follow KDB 558074 D01 DTS Meas Guidance v03r01 section 9.1.3

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



A D T

#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



### 4.4.7 TEST RESULTS

#### FOR PEAK POWER

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	228.034	23.58	30	PASS
6	2437	102.802	20.12	30	PASS
11	2462	84.140	19.25	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	224.905	23.52	30	PASS
6	2437	246.037	23.91	30	PASS
11	2462	233.884	23.69	30	PASS

##### 802.11n (20MHz)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	23.31	23.12	23.61	649.020	28.12	30	PASS
6	2437	23.13	22.70	24.01	643.566	28.09	30	PASS
11	2462	23.99	23.61	23.80	<b>720.109</b>	28.57	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	CHAIN 2				
3	2422	22.55	22.69	23.67	598.476	27.77	30	PASS
6	2437	23.65	22.81	22.37	595.308	27.75	30	PASS
9	2452	22.52	23.06	23.83	622.497	27.94	30	PASS



A D T

### FOR AVERAGE POWER

#### 802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	47.315	16.75
6	2437	60.534	17.82
11	2462	49.659	16.96

#### 802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	62.806	17.98
6	2437	74.645	18.73
11	2462	62.230	17.94

#### 802.11n (20MHz)

CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.63	17.91	17.89	181.263	22.58
6	2437	18.15	18.54	19.67	229.446	23.61
11	2462	17.40	17.58	17.43	167.569	22.24

#### 802.11n (40MHz)

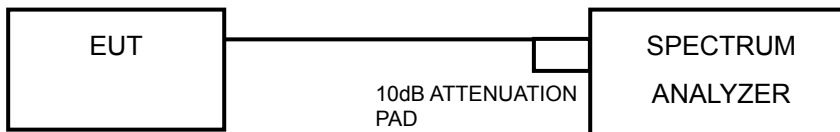
CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	15.39	16.12	16.72	122.509	20.88
6	2437	18.09	17.23	17.11	168.666	22.27
9	2452	15.53	16.31	16.61	124.297	20.94

## 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

Follow 558074 D01 DTS Meas Guidance v03r01 section 10.2

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

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



A D T

#### 4.5.7 TEST RESULTS

##### 802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.43	8	PASS
6	2437	-12.50	8	PASS
11	2462	-13.34	8	PASS

##### 802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.20	8	PASS
6	2437	-10.71	8	PASS
11	2462	-11.37	8	PASS

##### 802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-10.07	4.77	-5.30	7.35	PASS
	6	2437	-7.81	4.77	-3.04	7.35	PASS
	11	2462	-9.91	4.77	-5.14	7.35	PASS
1	1	2412	-9.55	4.77	-4.78	7.35	PASS
	6	2437	-9.48	4.77	-4.71	7.35	PASS
	11	2462	-10.91	4.77	-6.14	7.35	PASS
2	1	2412	-9.88	4.77	-5.11	7.35	PASS
	6	2437	-7.87	4.77	-3.10	7.35	PASS
	11	2462	-10.78	4.77	-6.01	7.35	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.65 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (6.65 - 6) = 7.35\text{dBm}$ .





A D T

### 802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-15.02	4.77	-10.25	7.35	PASS
	6	2437	-12.89	4.77	-8.12	7.35	PASS
	9	2452	-14.37	4.77	-9.60	7.35	PASS
1	3	2422	-14.38	4.77	-9.61	7.35	PASS
	6	2437	-12.21	4.77	-7.44	7.35	PASS
	9	2452	-14.41	4.77	-9.64	7.35	PASS
2	3	2422	-13.56	4.77	-8.79	7.35	PASS
	6	2437	-11.06	4.77	-6.29	7.35	PASS
	9	2452	-14.57	4.77	-9.80	7.35	PASS

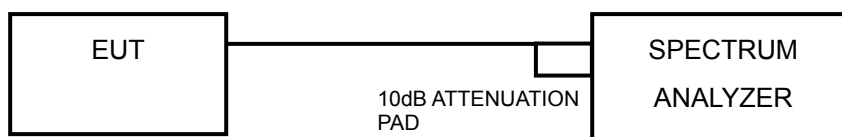
**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.65 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (6.65 - 6) = 7.35\text{dBm}$ .

## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

Below -20dB 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.



A D T

## MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

### 4.6.7 TEST RESULTS

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

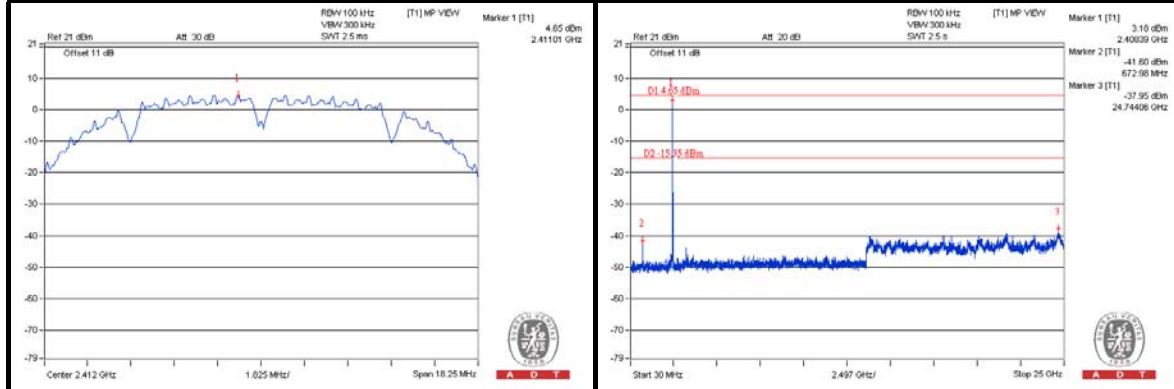
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



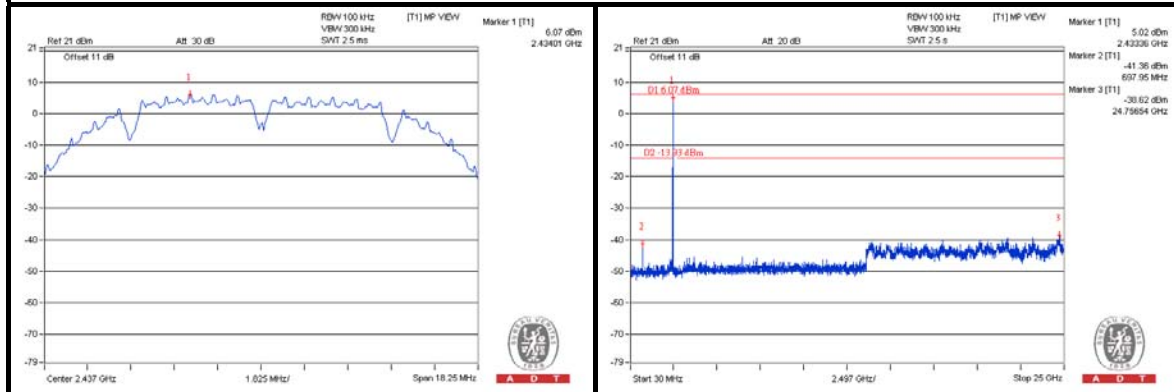
A D T

### 802.11b

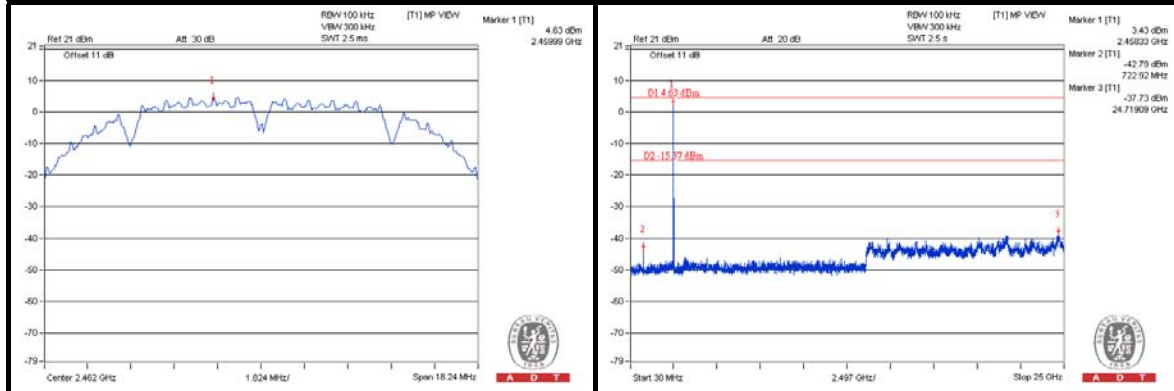
#### CH 1



#### CH 6



#### CH 11

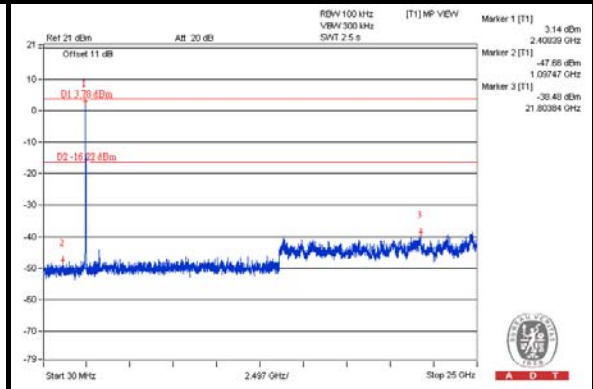
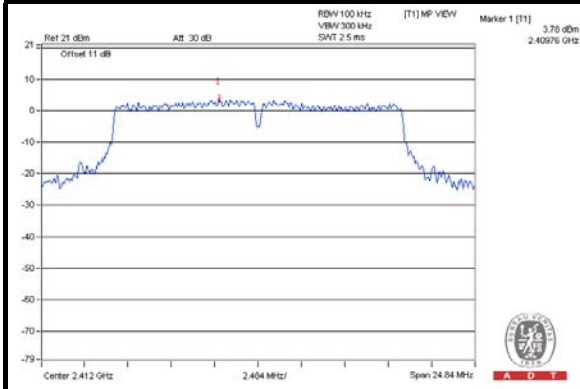




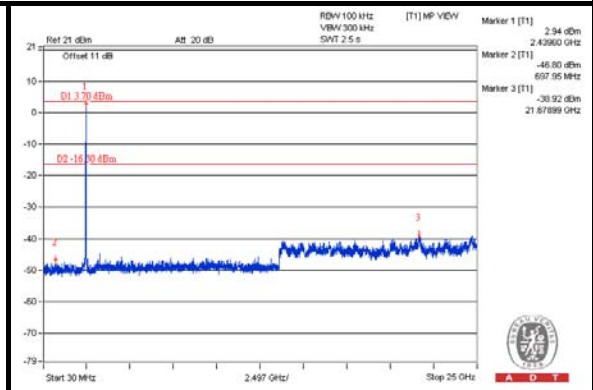
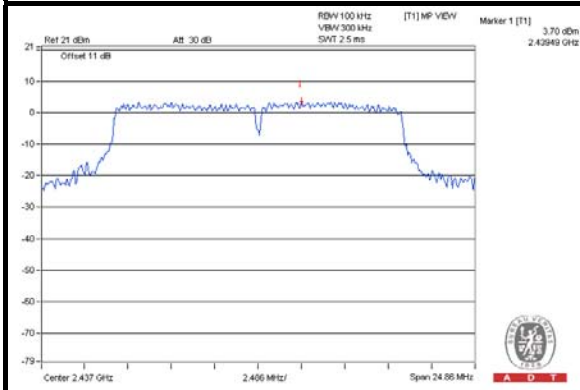
A D T

### 802.11g

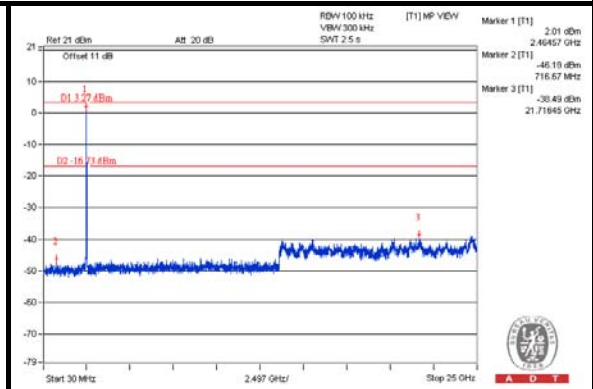
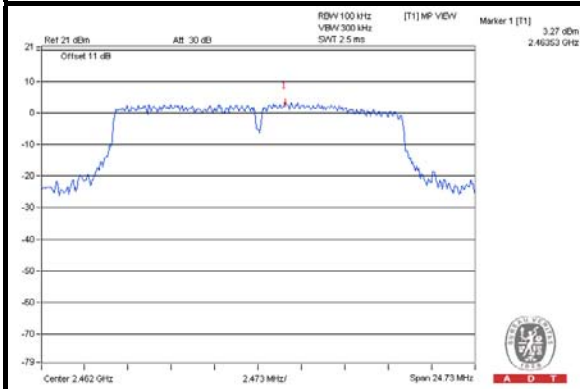
#### CH 1



#### CH 6



#### CH 11



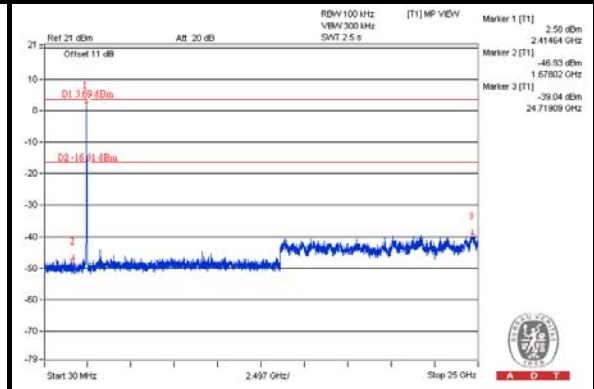
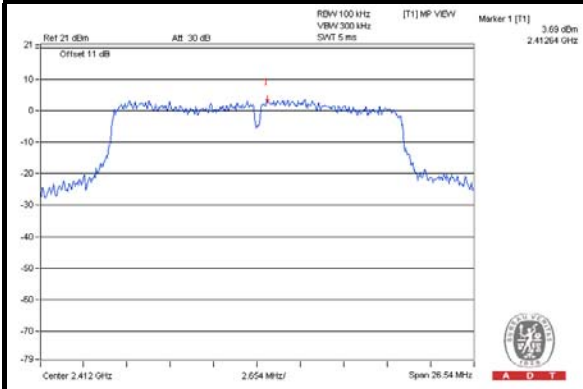


A D T

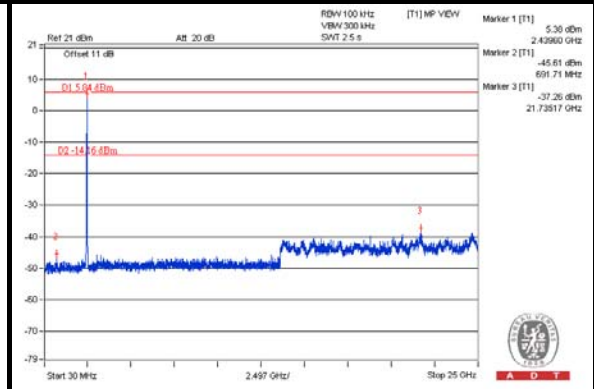
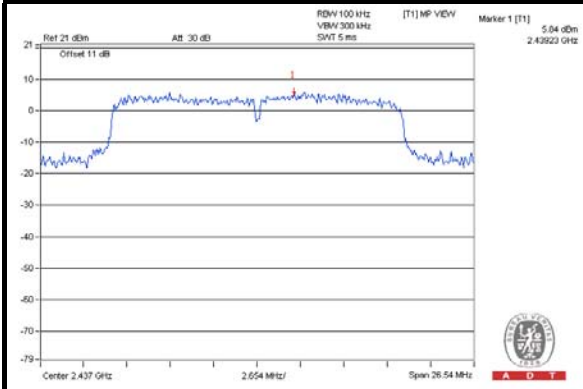
802.11n (20MHz)

CHAIN 0

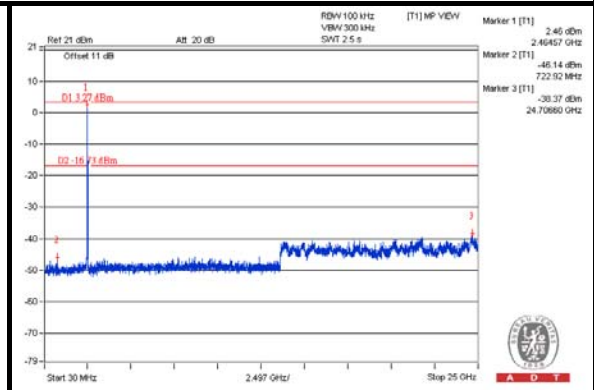
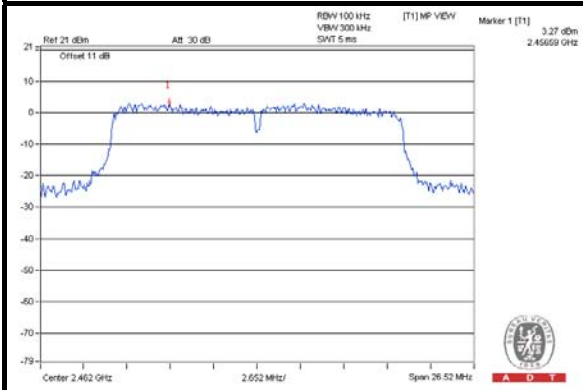
CH 1



CH 6



CH 11

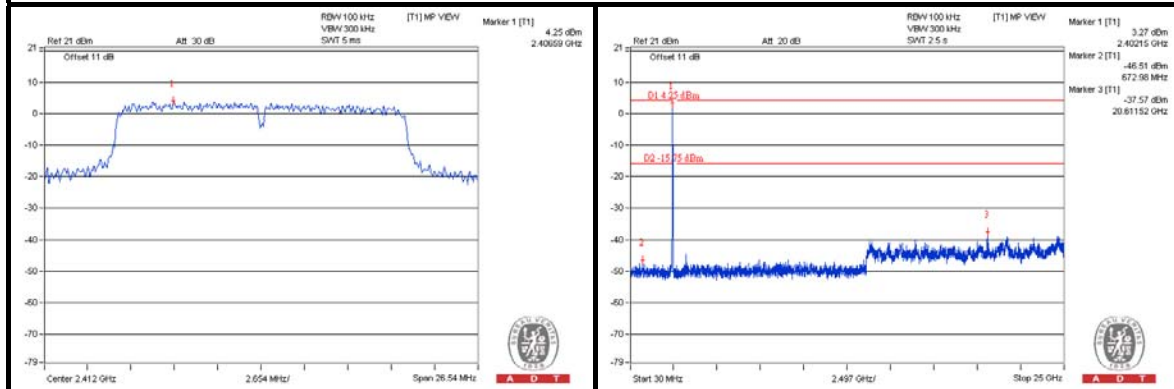




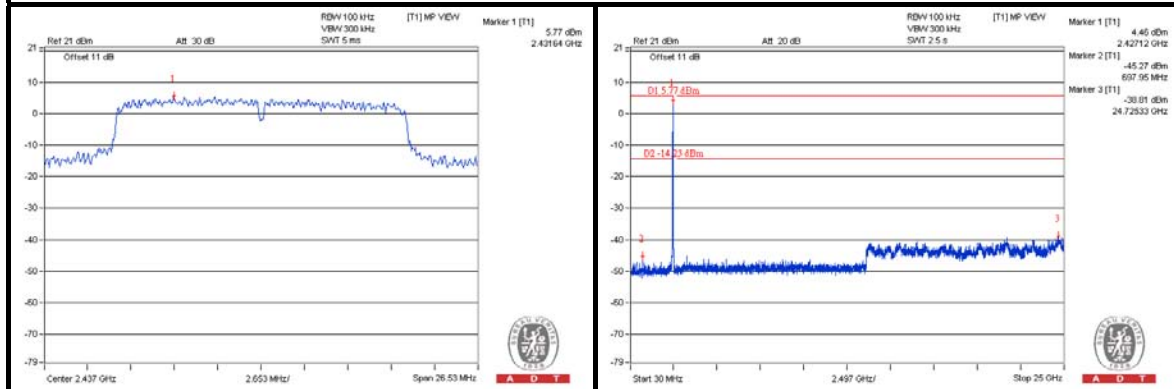
A D T

### CHAIN 1

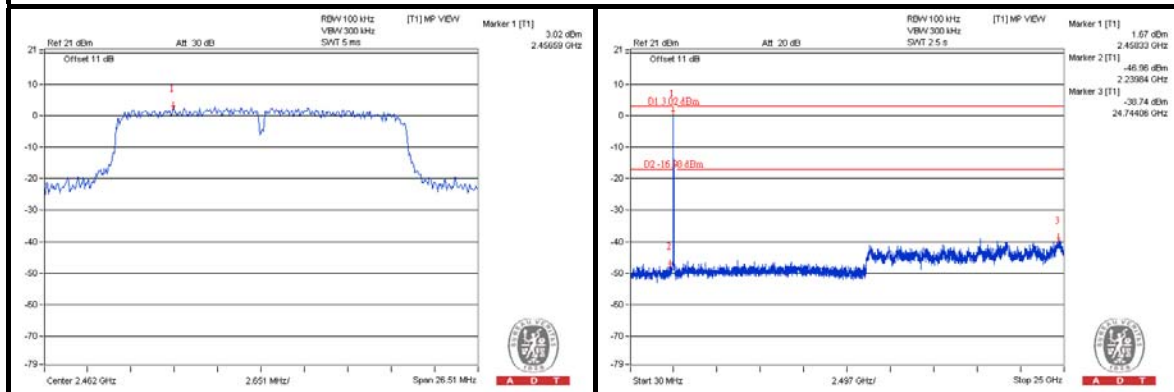
#### CH 1



#### CH 6



#### CH 11

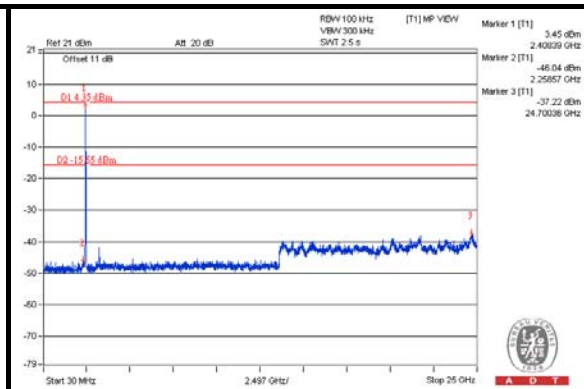
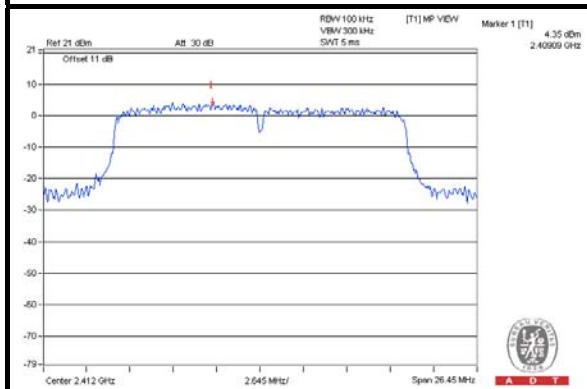




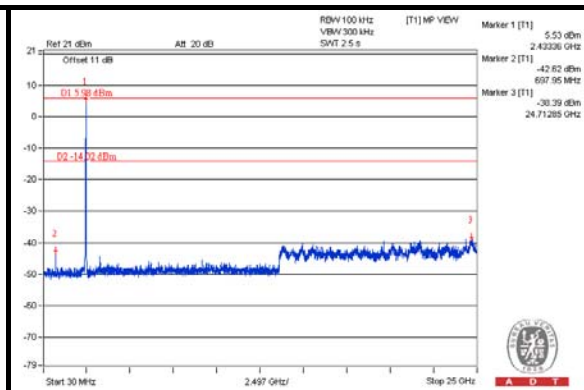
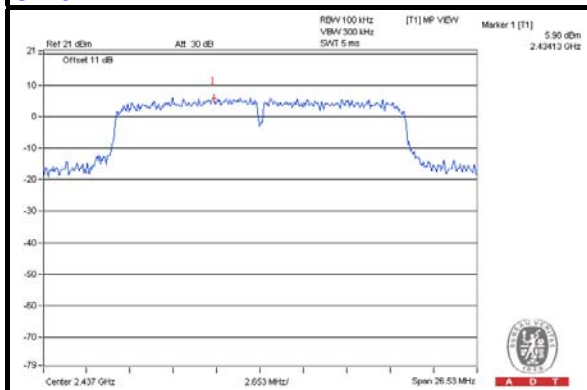
A D T

## CHAIN 2

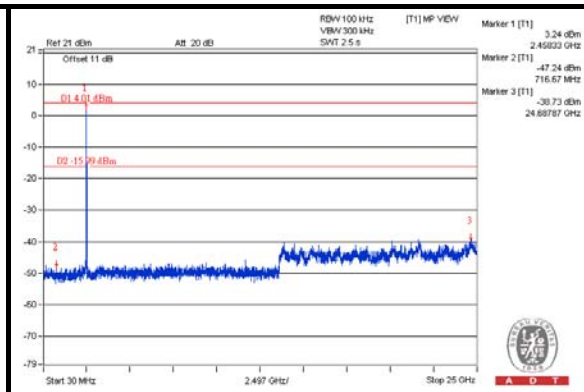
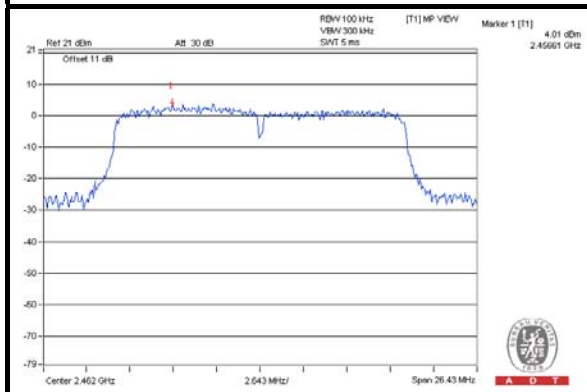
### CH 1



### CH 6



### CH 11



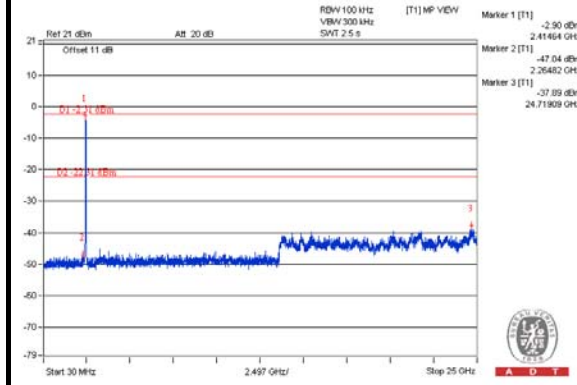
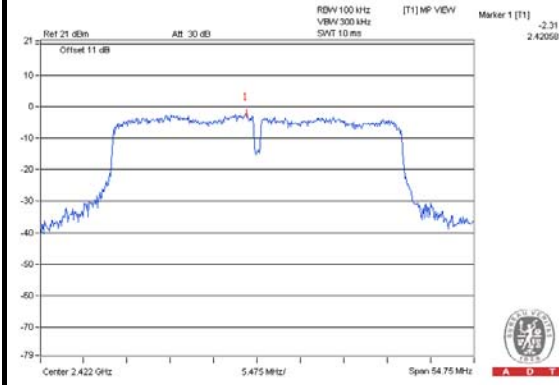




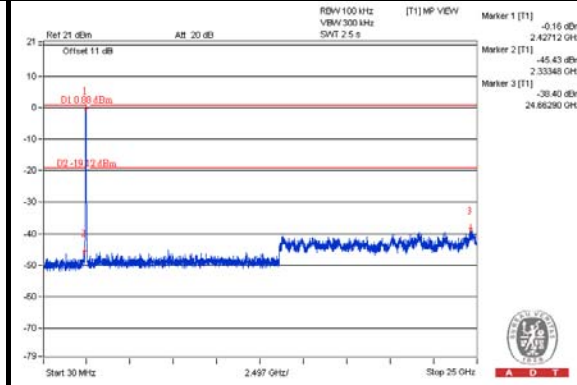
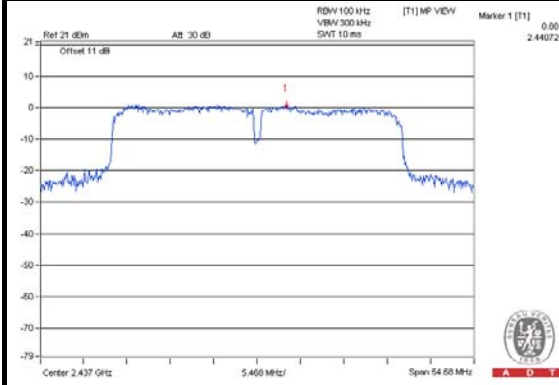
A D T

# 802.11n (40MHz) CHAIN 0

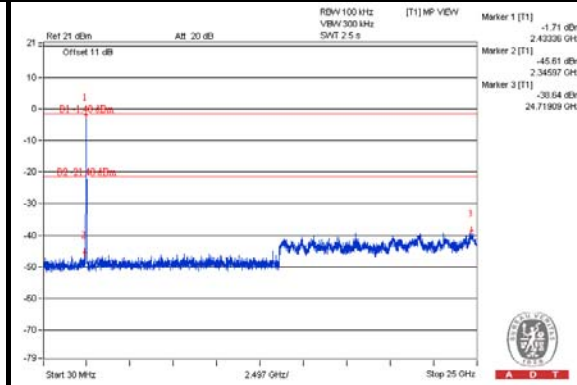
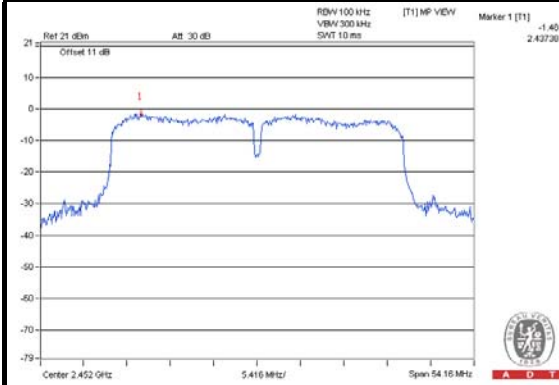
## CH 3



## CH 6



## CH 9

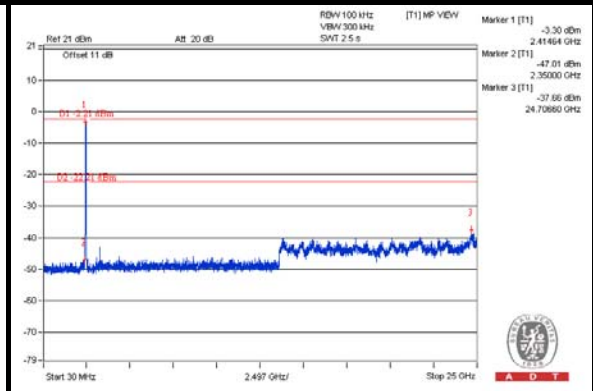
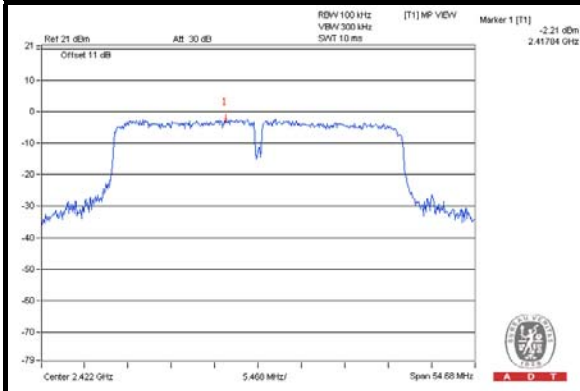




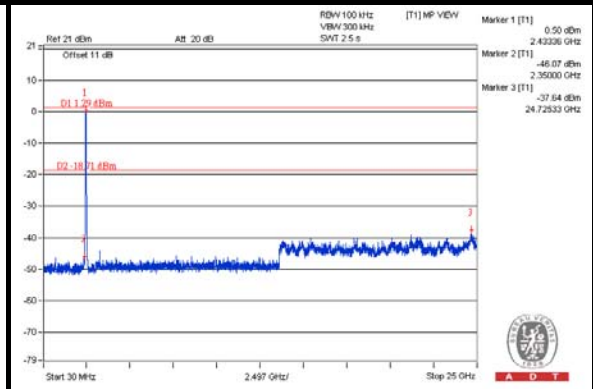
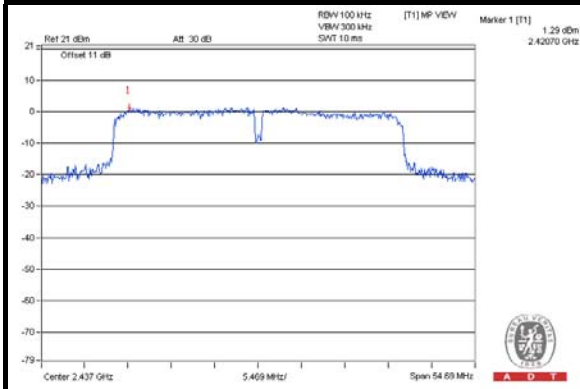
A D T

### CHAIN 1

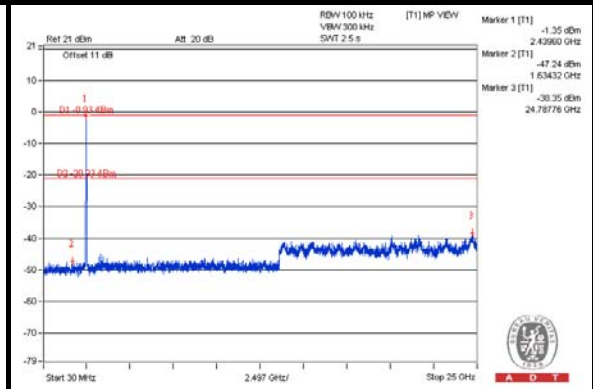
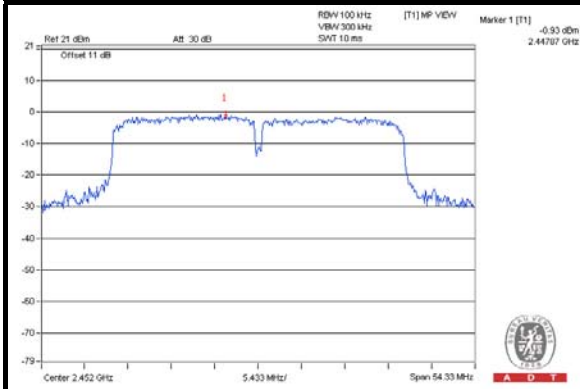
#### CH 3



#### CH 6



#### CH 9

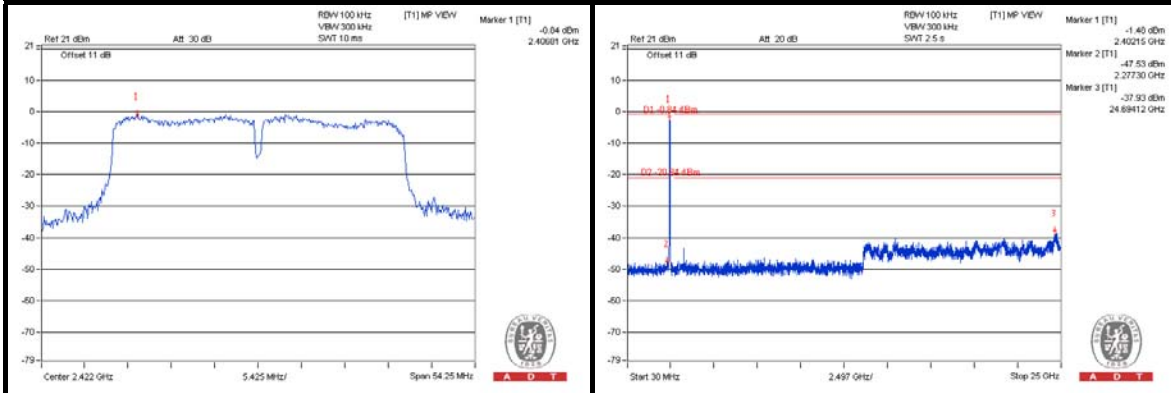




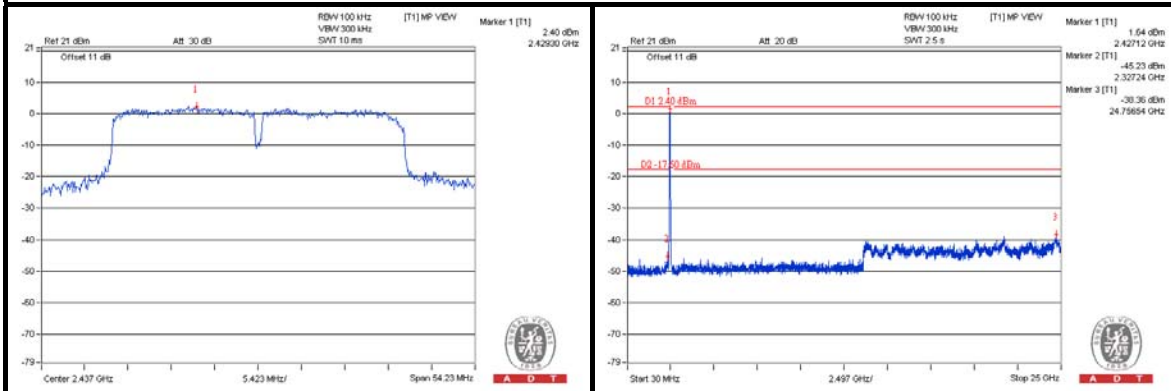
A D T

## CHAIN 2

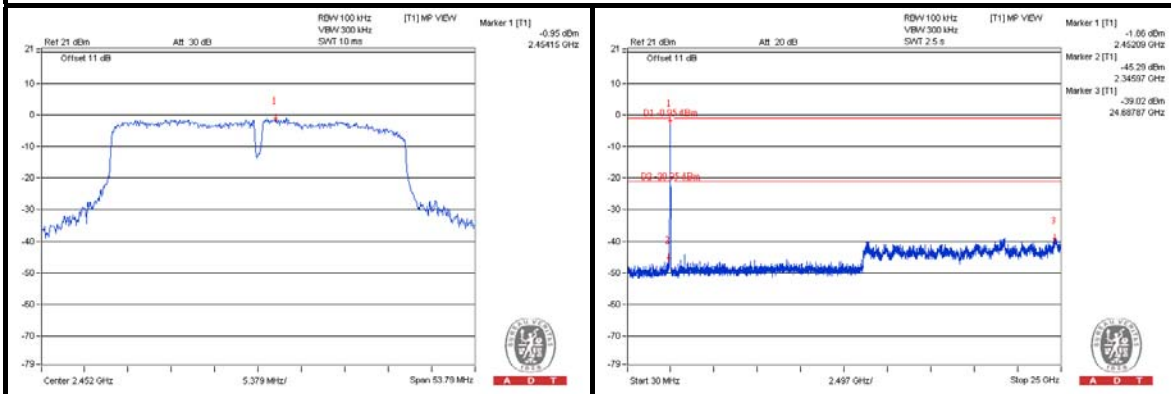
### CH 3



### CH 6



### CH 9





A D T

## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF RADIATED EMISSION 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.



A D T

#### 5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

#### 5.1.3 TEST PROCEDURES

Same as item 4.1.3.

#### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 5.1.5 TEST SETUP

Same as item 4.1.5.

#### 5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



A D T

### 5.1.7 TEST RESULTS

#### ABOVE 1GHz DATA :

##### 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	71.6 PK	84.0	-12.4	1.01 H	196	65.30	6.30
2	#5725.00	62.4 AV	74.8	-12.4	1.01 H	196	56.10	6.30
3	*5745.00	104.0 PK			1.01 H	196	63.80	40.20
4	*5745.00	94.8 AV			1.01 H	196	54.60	40.20
5	11490.00	66.7 PK	74.0	-7.3	1.43 H	290	47.30	19.40
6	11490.00	53.0 AV	54.0	-1.0	1.43 H	290	33.60	19.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	74.2 PK	86.6	-12.4	1.50 V	278	67.90	6.30
2	#5725.00	64.7 AV	77.1	-12.4	1.50 V	278	58.40	6.30
3	*5745.00	106.6 PK			1.50 V	278	66.40	40.20
4	*5745.00	97.1 AV			1.50 V	278	56.90	40.20
5	11490.00	63.1 PK	74.0	-10.9	1.75 V	159	43.70	19.40
6	11490.00	50.2 AV	54.0	-3.8	1.75 V	159	30.80	19.40

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	104.5 PK			1.02 H	196	64.10	40.40
2	*5785.00	95.2 AV			1.02 H	196	54.80	40.40
3	11570.00	67.1 PK	74.0	-6.9	1.44 H	287	48.00	19.10
4	11570.00	52.9 AV	54.0	-1.1	1.44 H	287	33.80	19.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	107.3 PK			1.52 V	277	66.90	40.40
2	*5785.00	97.6 AV			1.52 V	277	57.20	40.40
3	11570.00	63.3 PK	74.0	-10.7	1.77 V	158	44.20	19.10
4	11570.00	50.3 AV	54.0	-3.7	1.77 V	158	31.20	19.10

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	104.4 PK			1.00 H	193	64.00	40.40
2	*5825.00	95.0 AV			1.00 H	193	54.60	40.40
3	#5850.00	76.2 PK	84.4	-8.2	1.00 H	193	69.60	6.60
4	#5850.00	66.8 AV	75.0	-8.2	1.00 H	193	60.20	6.60
5	11650.00	66.0 PK	74.0	-8.0	1.43 H	298	47.10	18.90
6	11650.00	52.3 AV	54.0	-1.7	1.43 H	298	33.40	18.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	103.8 PK			1.24 V	279	63.40	40.40
2	*5825.00	94.0 AV			1.24 V	279	53.60	40.40
3	#5850.00	75.6 PK	83.8	-8.2	1.24 V	279	69.00	6.60
4	#5850.00	65.8 AV	74.0	-8.2	1.24 V	279	59.20	6.60
5	11650.00	62.4 PK	74.0	-11.6	1.77 V	156	43.50	18.90
6	11650.00	49.6 AV	54.0	-4.4	1.77 V	156	30.70	18.90

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.





A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	77.1 PK	89.5	-12.4	1.00 H	191	36.90	40.20
2	#5725.00	65.4 AV	77.8	-12.4	1.00 H	191	25.20	40.20
3	*5745.00	109.5 PK			1.00 H	191	69.30	40.20
4	*5745.00	97.8 AV			1.00 H	191	57.60	40.20
5	11490.00	60.7 PK	74.0	-13.3	1.01 H	124	41.30	19.40
6	11490.00	47.9 AV	54.0	-6.1	1.01 H	124	28.50	19.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	77.4 PK	89.8	-12.4	1.00 V	167	71.10	6.30
2	#5725.00	66.4 AV	78.8	-12.4	1.00 V	167	60.10	6.30
3	*5745.00	109.8 PK			1.00 V	167	69.60	40.20
4	*5745.00	98.8 AV			1.00 V	167	58.60	40.20
5	11490.00	60.2 PK	74.0	-13.8	1.44 V	325	40.80	19.40
6	11490.00	47.1 AV	54.0	-6.9	1.44 V	325	27.70	19.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	109.6 PK			1.00 H	214	69.20	40.40
2	*5785.00	97.8 AV			1.00 H	214	57.40	40.40
3	11570.00	59.4 PK	74.0	-14.6	1.03 H	250	40.30	19.10
4	11570.00	47.6 AV	54.0	-6.4	1.03 H	250	28.50	19.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	109.9 PK			1.00 V	201	69.50	40.40
2	*5785.00	98.9 AV			1.00 V	201	58.50	40.40
3	11570.00	60.3 PK	74.0	-13.7	1.00 V	354	41.20	19.10
4	11570.00	46.6 AV	54.0	-7.4	1.00 V	354	27.50	19.10

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	107.4 PK			1.00 H	193	67.00	40.40
2	*5825.00	95.5 AV			1.00 H	193	55.10	40.40
3	#5850.00	68.3 PK	87.4	-19.1	1.00 H	193	27.80	40.50
4	#5850.00	56.4 AV	75.5	-19.1	1.00 H	193	15.90	40.50
5	11650.00	62.1 PK	74.0	-11.9	1.04 H	159	43.20	18.90
6	11650.00	47.4 AV	54.0	-6.6	1.04 H	159	28.50	18.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	106.9 PK			1.98 V	172	66.50	40.40
2	*5825.00	96.1 AV			1.98 V	172	55.70	40.40
3	#5850.00	67.8 PK	86.9	-19.1	1.98 V	172	27.30	40.50
4	#5850.00	57.0 AV	76.1	-19.1	1.98 V	172	16.50	40.50
5	11650.00	60.4 PK	74.0	-13.6	1.00 V	328	41.50	18.90
6	11650.00	48.4 AV	54.0	-5.6	1.00 V	328	29.50	18.90

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	72.3 PK	85.0	-12.7	1.00 H	172	32.10	40.20
2	#5725.00	61.0 AV	73.7	-12.7	1.00 H	172	20.80	40.20
3	*5755.00	105.0 PK			1.00 H	189	64.80	40.20
4	*5755.00	93.7 AV			1.00 H	189	53.50	40.20
5	11510.00	60.4 PK	74.0	-13.6	1.65 H	147	41.10	19.30
6	11510.00	48.8 AV	54.0	-5.2	1.65 H	147	29.50	19.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	74.1 PK	86.8	-12.7	1.00 V	172	33.90	40.20
2	#5725.00	62.7 AV	75.4	-12.7	1.00 V	172	22.50	40.20
3	*5755.00	106.8 PK			1.00 V	172	66.60	40.20
4	*5755.00	95.4 AV			1.00 V	172	55.20	40.20
5	11510.00	62.5 PK	74.0	-11.5	1.03 V	258	43.20	19.30
6	11510.00	47.9 AV	54.0	-6.1	1.03 V	258	28.60	19.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “: Fundamental frequency.
6. The limit value is defined as per 15.247.
7. “#“:The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	104.0 PK			1.00 H	188	63.60	40.40
2	*5795.00	93.4 AV			1.00 H	188	53.00	40.40
3	#5850.00	71.3 PK	84.0	-12.7	1.00 H	154	30.80	40.50
4	#5850.00	60.7 AV	73.4	-12.7	1.00 H	154	20.20	40.50
5	11590.00	60.5 PK	74.0	-13.5	1.65 H	187	41.50	19.00
6	11590.00	48.2 AV	54.0	-5.8	1.65 H	187	29.20	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	104.3 PK			1.00 V	171	63.90	40.40
2	*5795.00	94.3 AV			1.00 V	171	53.90	40.40
3	#5850.00	71.6 PK	84.3	-12.7	1.00 V	172	31.10	40.50
4	#5850.00	61.6 AV	74.3	-12.7	1.00 V	172	21.10	40.50
5	11590.00	61.3 PK	74.0	-12.7	1.06 V	253	42.30	19.00
6	11590.00	48.5 AV	54.0	-5.5	1.06 V	253	29.50	19.00

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.
7. "#":The radiated frequency is out the restricted band.



A D T

**BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	142.44	25.7 QP	43.5	-17.8	1.50 H	323	40.10	-14.40
2	198.71	35.5 QP	43.5	-8.0	1.00 H	248	52.40	-16.90
3	241.40	40.0 QP	46.0	-6.0	2.25 H	322	55.00	-15.00
4	266.63	40.5 QP	46.0	-5.5	2.00 H	216	54.40	-13.90
5	379.17	36.6 QP	46.0	-9.4	1.00 H	7	47.80	-11.20
6	961.29	34.9 QP	54.0	-19.1	1.63 H	91	35.60	-0.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.36	33.6 QP	40.0	-6.4	1.44 V	65	48.30	-14.70
2	198.71	34.7 QP	43.5	-8.8	2.25 V	147	51.60	-16.90
3	266.63	33.7 QP	46.0	-12.3	1.50 V	36	47.60	-13.90
4	332.60	30.5 QP	46.0	-15.5	1.88 V	65	42.50	-12.00
5	423.80	31.2 QP	46.0	-14.8	1.45 V	236	41.60	-10.40
6	961.29	34.8 QP	54.0	-19.2	2.00 V	145	35.50	-0.70

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



## 5.2 CONDUCTED EMISSION MEASUREMENT

### 5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	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.

### 5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

### 5.2.3 TEST PROCEDURES

Same as item 4.2.3.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 5.2.5 TEST SETUP

Same as item 4.2.5.

### 5.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

### 5.2.7 TEST RESULTS

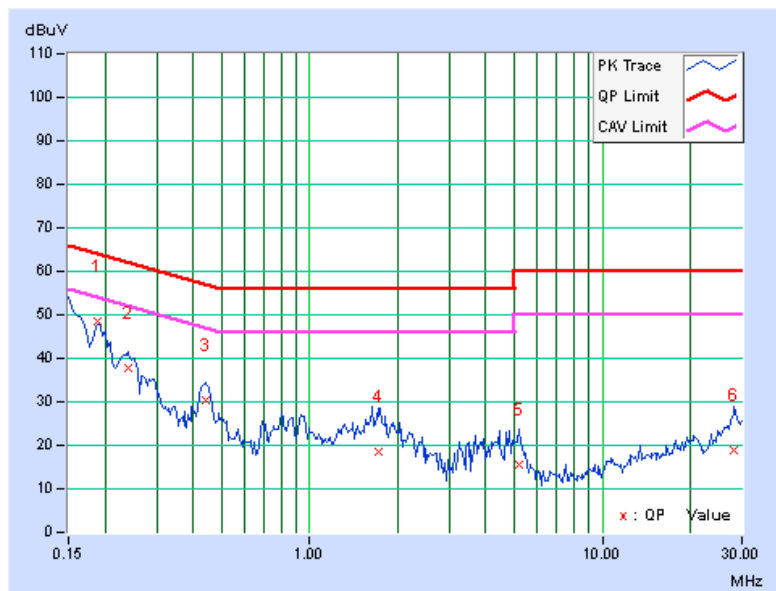
**CONDUCTED WORST-CASE DATA : 802.11n (20MHz)**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
--------------	--------	----------------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.16	48.48	31.49	48.64	31.65	64.08	54.08	-15.44	-22.43
2	0.23984	0.17	37.73	27.69	37.90	27.86	62.10	52.10	-24.20	-24.24
3	0.43906	0.23	30.04	23.53	30.27	23.76	57.08	47.08	-26.81	-23.32
4	1.71484	0.28	18.15	13.77	18.43	14.05	56.00	46.00	-37.57	-31.95
5	5.19141	0.46	15.27	4.75	15.73	5.21	60.00	50.00	-44.27	-44.79
6	27.98438	1.59	17.45	12.38	19.04	13.97	60.00	50.00	-40.96	-36.03

**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







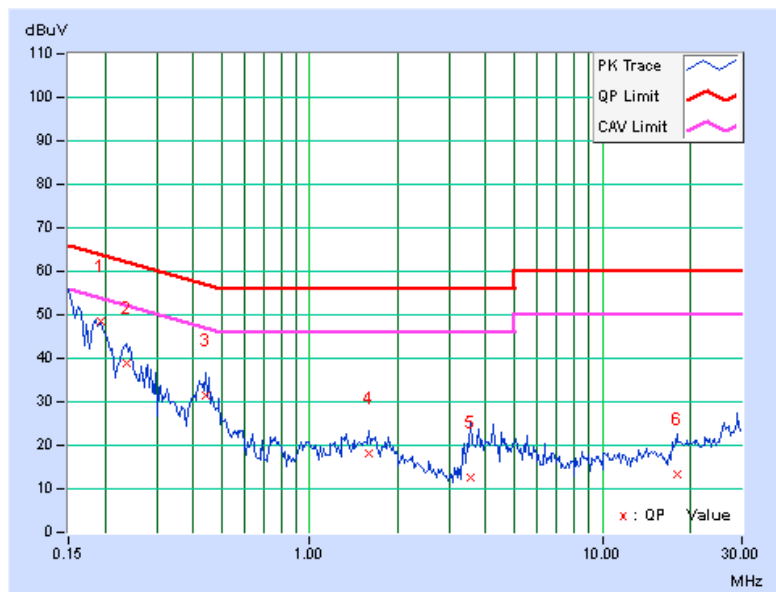
A D T

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19297	0.17	48.26	30.72	48.43	30.89	63.91	53.91	-15.48	-23.02
2	0.23594	0.18	38.72	27.61	38.90	27.79	62.24	52.24	-23.34	-24.45
3	0.44297	0.24	31.21	23.77	31.45	24.01	57.01	47.01	-25.56	-23.00
4	1.58984	0.27	17.95	12.61	18.22	12.88	56.00	46.00	-37.78	-33.12
5	3.57031	0.36	12.05	-0.76	12.41	-0.40	56.00	46.00	-43.59	-46.40
6	18.12109	0.87	12.62	5.46	13.49	6.33	60.00	50.00	-46.51	-43.67

**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





A D T

### **5.3 6dB BANDWIDTH MEASUREMENT**

#### **5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT**

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

#### **5.3.2 TEST SETUP**

Same as item 4.3.2.

#### **5.3.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

#### **5.3.4 TEST PROCEDURE**

Same as item 4.3.4.

#### **5.3.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **5.3.6 EUT OPERATING CONDITIONS**

Same as item 4.3.6.



### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.59	0.5	PASS
157	5785	16.49	0.5	PASS
165	5825	16.43	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.64	17.65	17.61	0.5	PASS
157	5785	17.64	17.63	17.66	0.5	PASS
165	5825	17.44	17.68	17.63	0.5	PASS

#### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.37	36.38	36.39	0.5	PASS
159	5795	36.17	36.52	36.52	0.5	PASS



A D T

## 5.4 CONDUCTED OUTPUT POWER

### 5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v02 Method of conducted output power measurement on IEEE 802.11 devices,

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

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

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

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

### 5.4.2 TEST SETUP

Same as Item 4.4.2.

### 5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 5.4.4 TEST PROCEDURES

Follow KDB 558074 D01 DTS Meas Guidance v03r01 section 9.1.3

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

### 5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



### 5.4.7 TEST RESULTS

#### FOR PEAK POWER

##### 802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	169.824	22.30	30	PASS
157	5785	173.780	22.40	30	PASS
165	5825	162.181	22.10	30	PASS

##### 802.11n (20MHz)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.20	22.40	22.20	505.698	27.04	30	PASS
157	5785	22.10	22.30	22.40	<b>505.785</b>	27.04	30	PASS
165	5825	22.30	22.10	22.20	497.964	26.97	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	CHAIN 2				
151	5755	22.10	22.30	22.20	497.964	26.97	30	PASS
159	5795	22.20	22.10	22.40	501.920	27.01	30	PASS



A D T

**FOR AVERAGE POWER**

**802.11a**

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	52.481	17.20
157	5785	51.286	17.10
165	5825	53.703	17.30

**802.11n (20MHz)**

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.20	17.20	17.20	157.443	21.97
157	5785	17.10	17.10	17.10	153.858	21.87
165	5825	17.30	17.30	17.40	162.360	22.10

**802.11n (40MHz)**

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	17.10	17.30	17.10	156.275	21.94
159	5795	17.20	17.20	17.20	157.443	21.97



A D T

## **5.5 POWER SPECTRAL DENSITY MEASUREMENT**

### **5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT**

The Maximum of Power Spectral Density Measurement is 8dBm.

### **5.5.2 TEST SETUP**

Same as item 4.5.2.

### **5.5.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.5.4 TEST PROCEDURE.**

Same as item 4.5.4.

### **5.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.5.6 EUT OPERATING CONDITION**

Same as item 4.3.6.



A D T

## 5.5.7 TEST RESULTS

### 802.11a

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-11.05	8	PASS
157	5785	-11.14	8	PASS
165	5825	-11.19	8	PASS

### 802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-11.28	4.77	-6.51	6.83	PASS
	157	5785	-11.71	4.77	-6.94	6.83	PASS
	165	5825	-11.56	4.77	-6.79	6.83	PASS
1	149	5745	-11.31	4.77	-6.54	6.83	PASS
	157	5785	-10.46	4.77	-5.69	6.83	PASS
	165	5825	-11.49	4.77	-6.72	6.83	PASS
2	149	5745	-12.42	4.77	-7.65	6.83	PASS
	157	5785	-11.23	4.77	-6.46	6.83	PASS
	165	5825	-11.95	4.77	-7.18	6.83	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.17 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (7.17 - 6) = 6.83\text{dBm}$ .

### 802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-13.04	4.77	-8.27	6.83	PASS
	159	5795	-13.87	4.77	-9.10	6.83	PASS
1	151	5755	-13.89	4.77	-9.12	6.83	PASS
	159	5795	-13.90	4.77	-9.13	6.83	PASS
2	151	5755	-14.34	4.77	-9.57	6.83	PASS
	159	5795	-14.64	4.77	-9.87	6.83	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.17 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (7.17 - 6) = 6.83\text{dBm}$ .





A D T

## **5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

### **5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

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

### **5.6.2 TEST SETUP**

Same as Item 4.6.2

### **5.6.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.6.4 TEST PROCEDURE**

Same as Item 4.6.4

### **5.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.6.6 EUT OPERATING CONDITION**

Same as Item 4.3.6

### **5.6.7 TEST RESULTS**

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

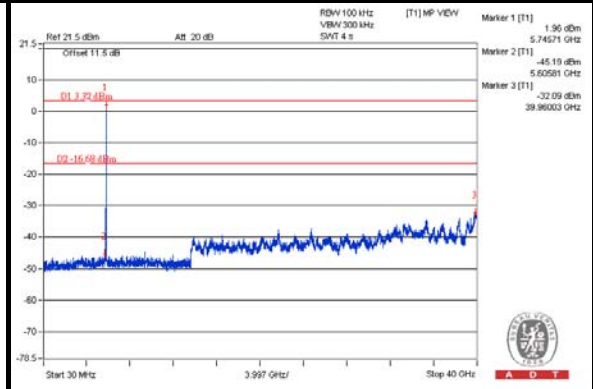
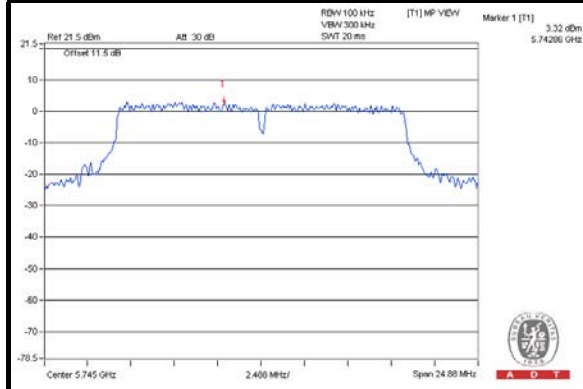
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



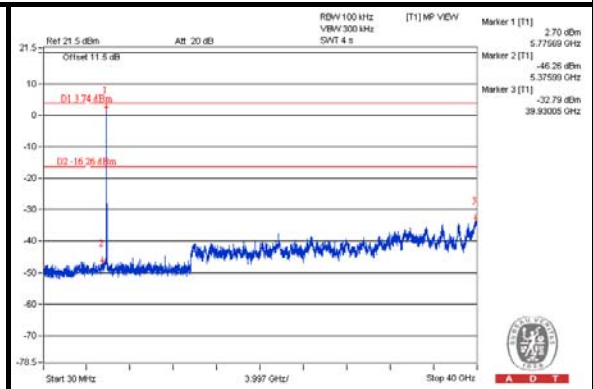
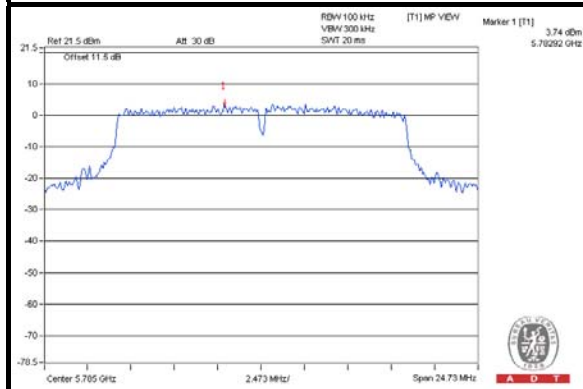
A D T

802.11a

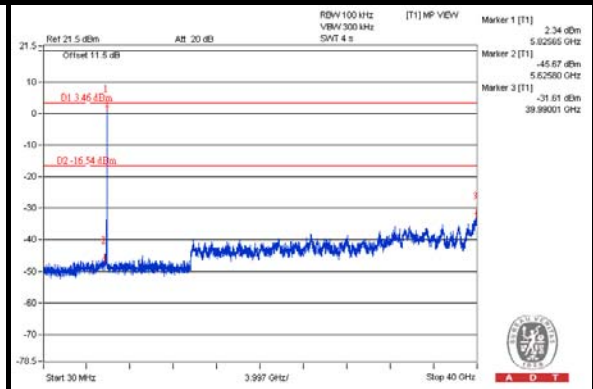
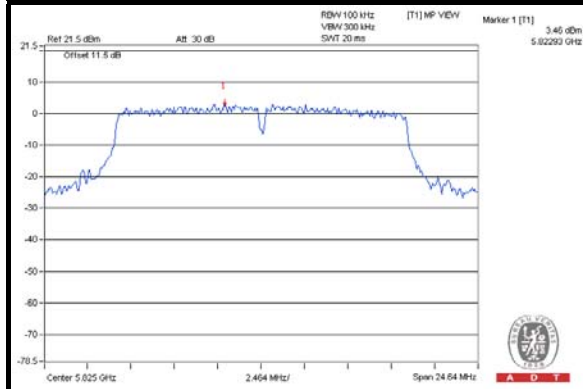
### CH 149



### CH 157



### CH 165



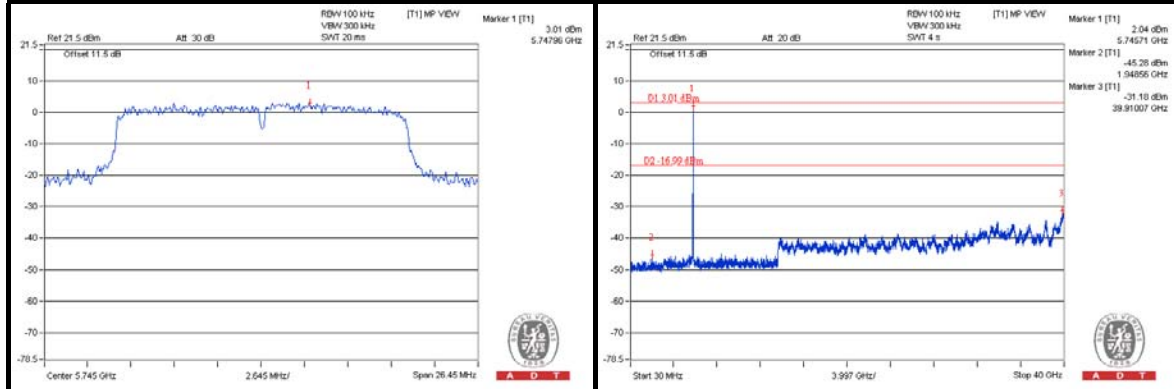


A D T

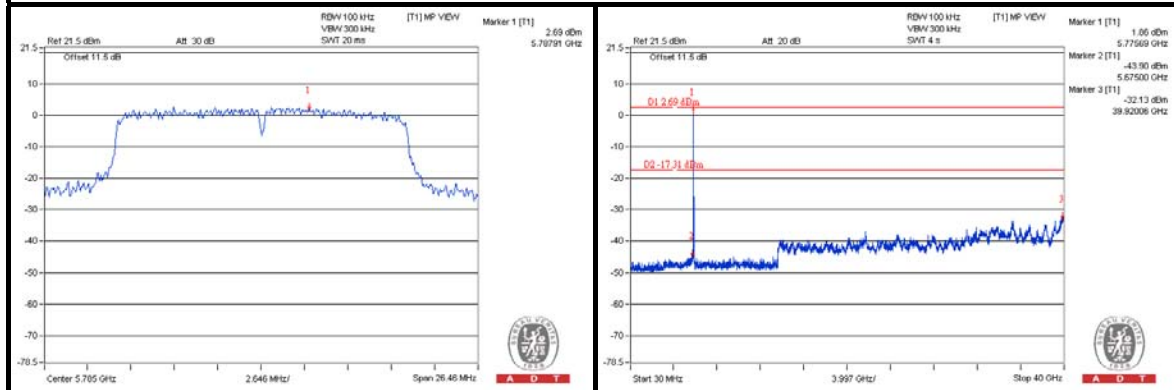
### 802.11n (20MHz)

### CHAIN 0

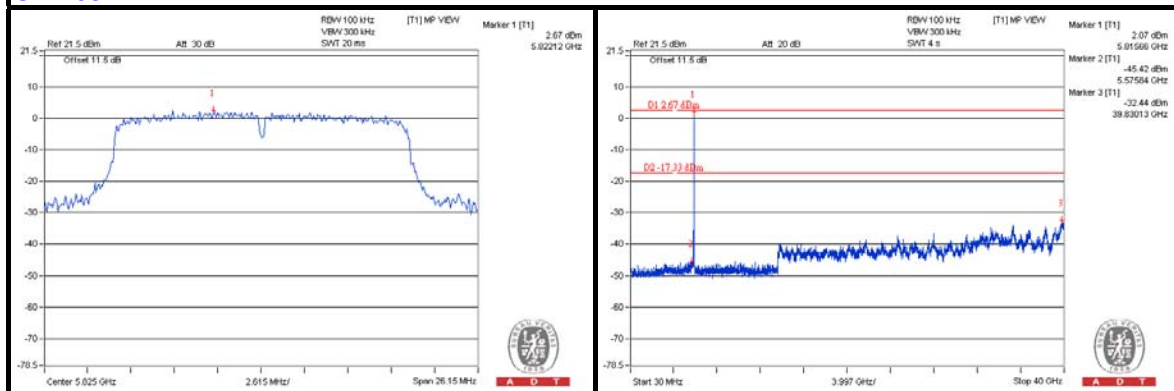
### CH 149



### CH 157



### CH 165

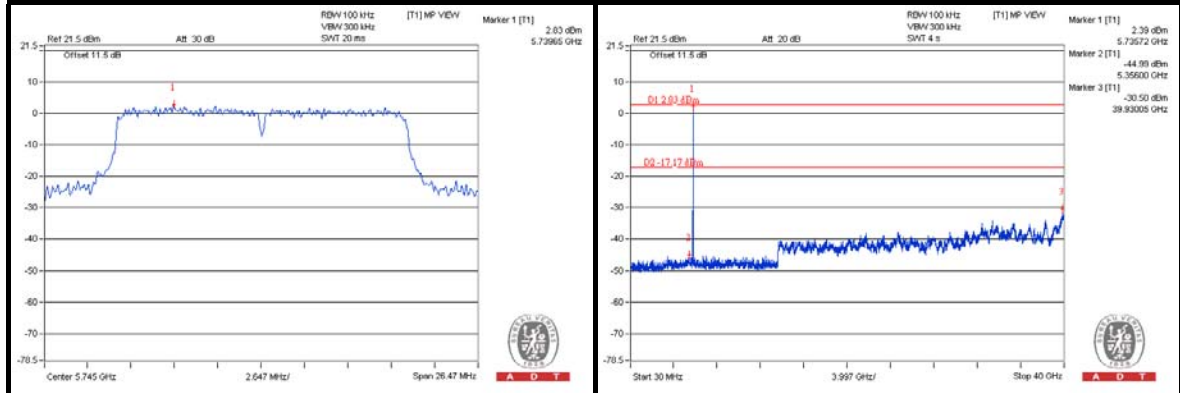




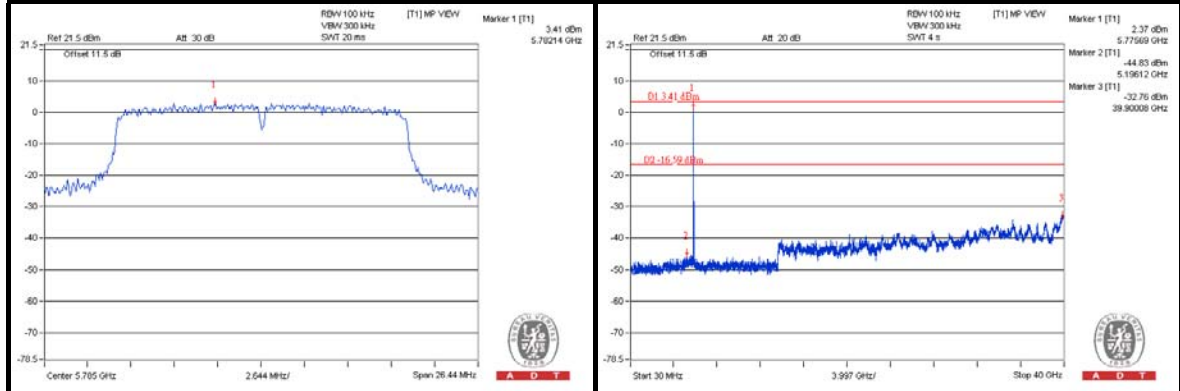
A D T

### CHAIN 1

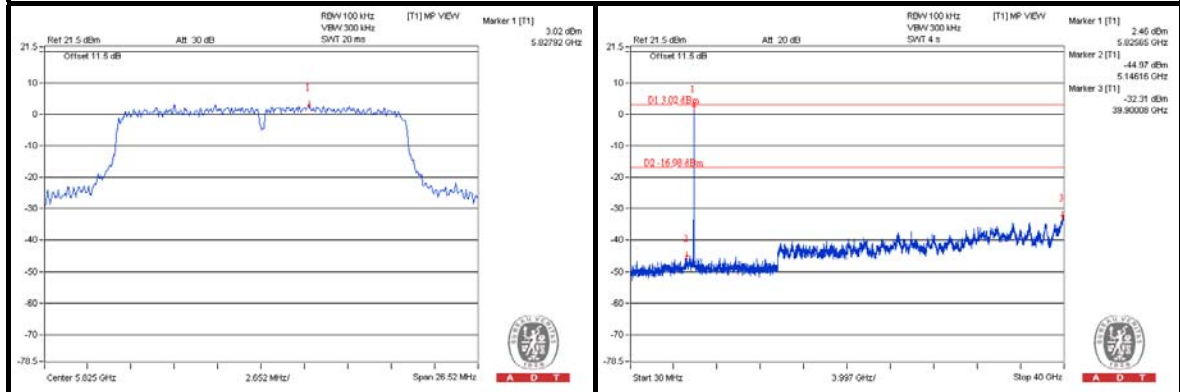
#### CH 149



#### CH 157



#### CH 165

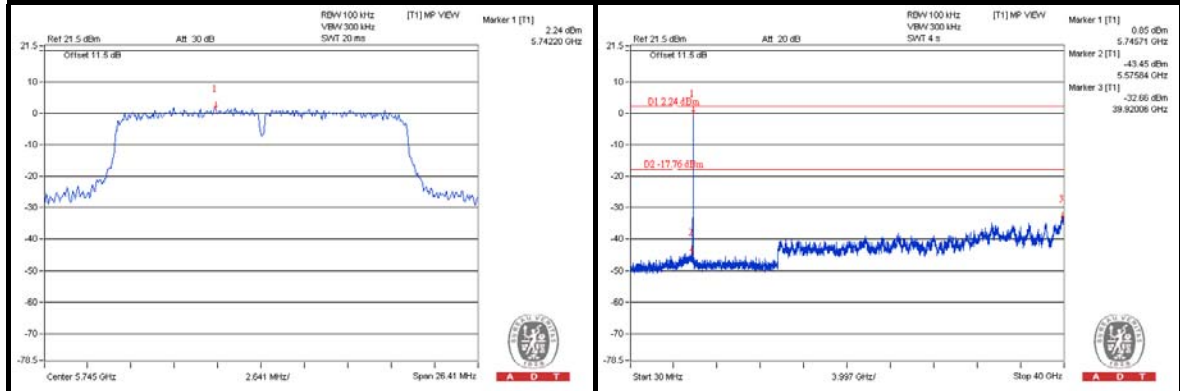




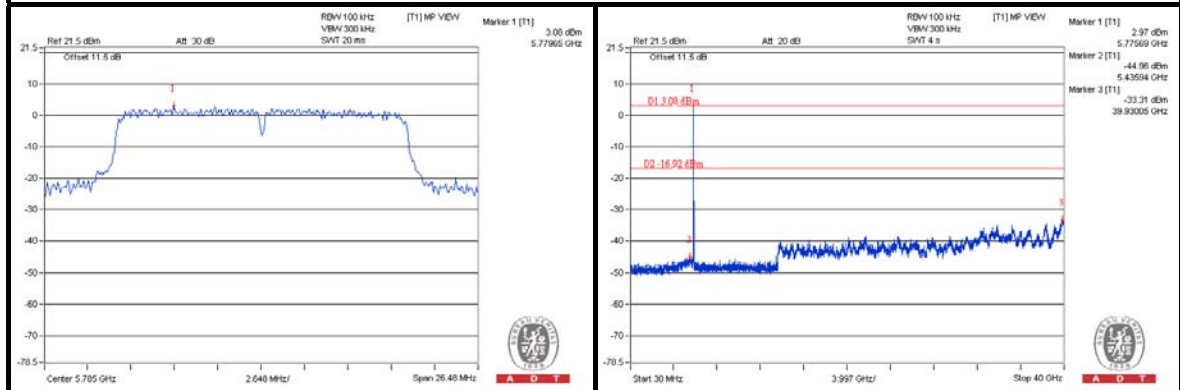
A D T

## CHAIN 2

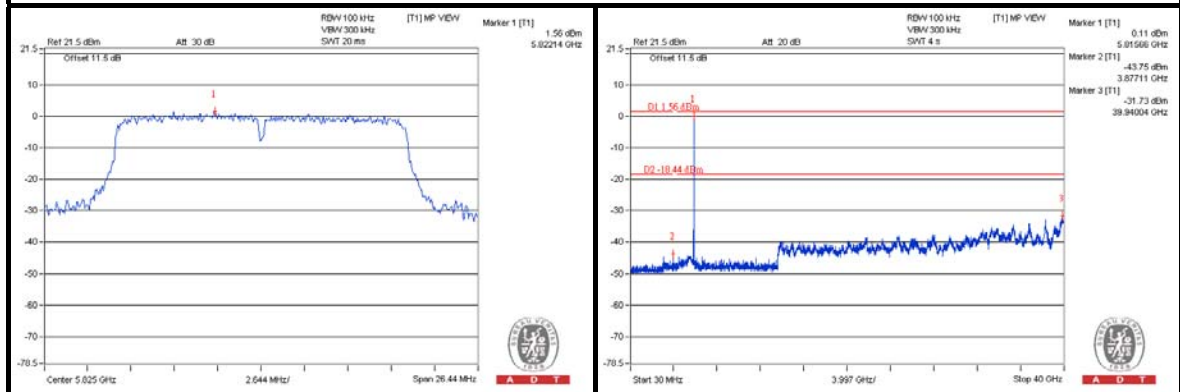
### CH 149



### CH 157



### CH 165



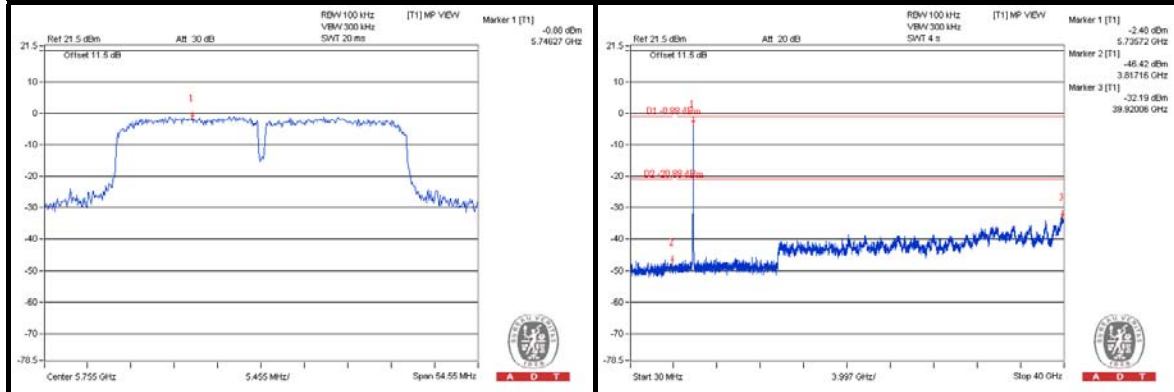


A D T

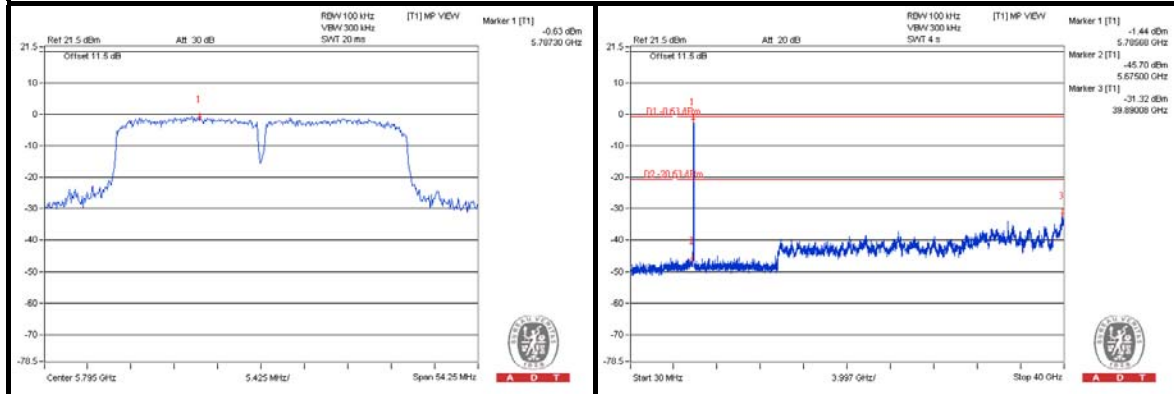
### 802.11n (40MHz)

### CHAIN 0

#### CH 151



#### CH 159

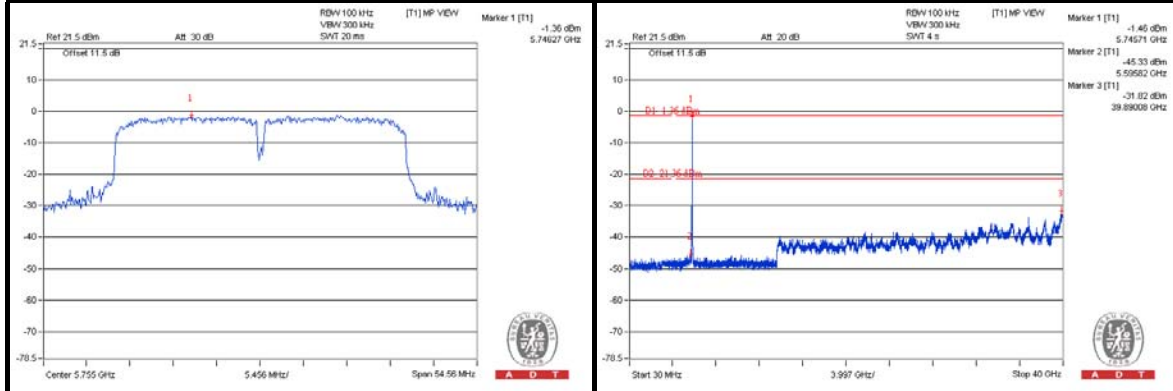




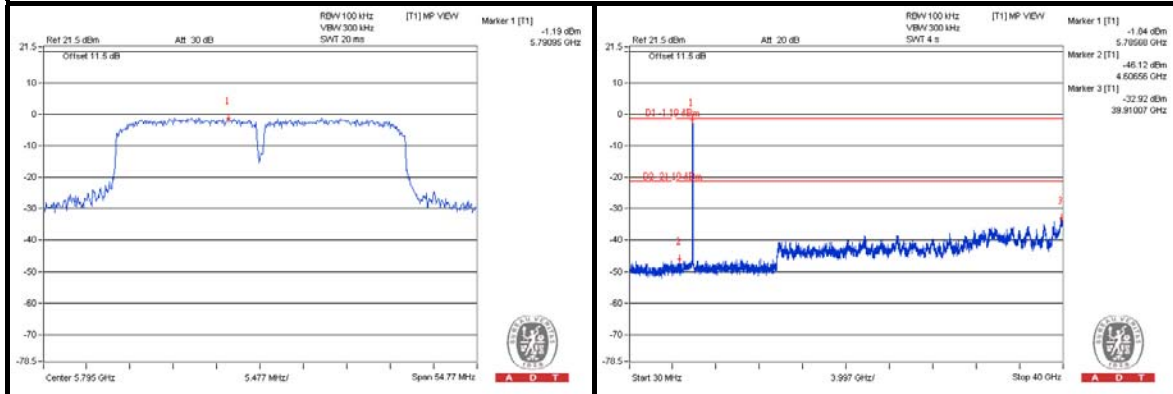
A D T

### CHAIN 1

#### CH 151



#### CH 159

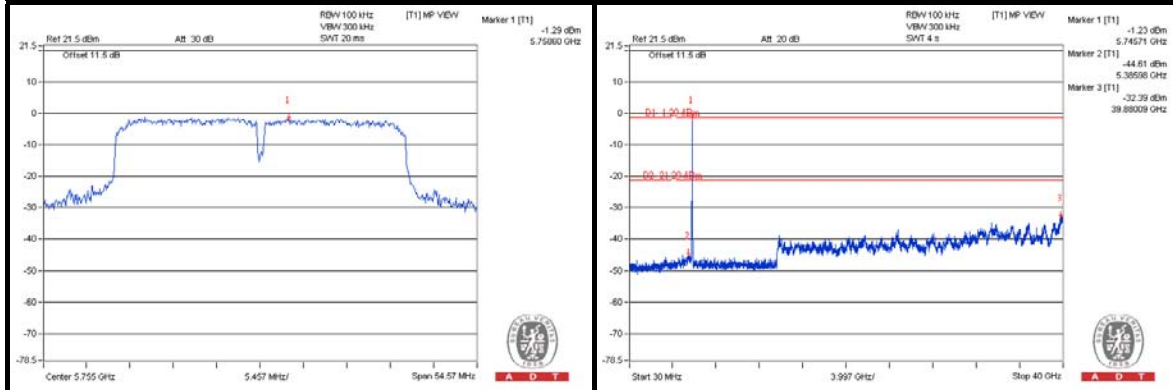




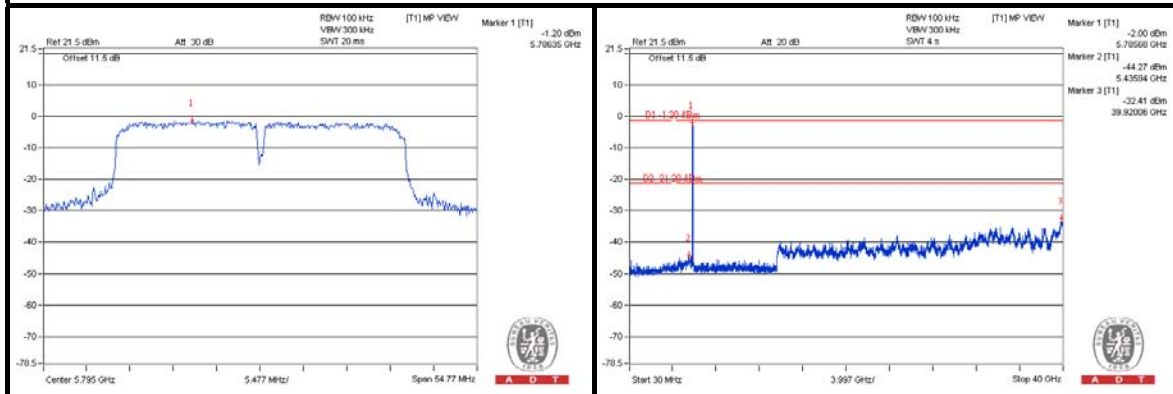
A D T

## CHAIN 2

### CH 151



### CH 159







A D T

## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



A D T

## 7. 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 Lab**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom 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.



A D T

## **8. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

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

**---END---**