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# FCC TEST REPORT

**REPORT NO.:** RF130328C36B

**MODEL NO.:** TL-WR840N

**FCC ID:** TE7WR840NV1

**IC:** 8853A-WR840N

**RECEIVED:** Oct. 21, 2013

**TESTED:** Oct. 21 ~ Oct. 30, 2013

**ISSUED:** Dec. 19, 2013

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

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

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

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130328C36B	Original release.	Dec. 19, 2013



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## 1. CERTIFICATION

**PRODUCT:** 300Mbps Wireless N Router  
**MODEL NO.:** TL-WR840N  
**BRAND:** TP-LINK  
**APPLICANT:** TP-LINK TECHNOLOGIES CO., LTD.  
**TESTED:** Oct. 21 ~ Oct. 30, 2013  
**TEST SAMPLE:** PRODUCTION SAMPLE  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
**Canada RSS-210 Issue 8 (2010-12)**  
**Canada RSS-Gen Issue 3 (2010-12)**  
ANSI C63.10-2009

The above equipment (model: TL-WR840N) 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 :** Suntee Liu , **DATE :** Dec. 19, 2013  
Suntee Liu / Specialist

**APPROVED BY :** Ken Liu , **DATE :** Dec. 19, 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); RSS-210; RSS-Gen				
Standard Section		Test Type and Limit	Result	Remark
FCC Part 15	Canada Standard			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.09dB at 3.64063MHz.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	PASS	Meet the requirement of limit.
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.9dB at 2390.00MHz.
15.247(d)	RSS-210 A8.5	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS-210 A8.2 (a)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.4 (4)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS-210 A8.2 (b)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	-	Antenna Requirement	PASS	No antenna connector is used.

### 2.1 MEASUREMENT UNCERTAINTY

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

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



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	300Mbps Wireless N Router
<b>MODEL NO.</b>	TL-WR840N
<b>POWER SUPPLY</b>	9Vdc (adapter)
<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:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	802.11b, 802.11g, 802.11n (20MHz): 11 802.11n (40MHz): 7
<b>OUTPUT POWER</b>	672.559mW
<b>ANTENNA TYPE</b>	PIFA antenna with 1.5dBi gain
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Adapter

**NOTE:**

- The EUT incorporates a MIMO function. The EUT provides 2 completed transmitters and 2 receivers. Only Chain 0 is available at 802.11b and 802.11g. Chan 0 of 1TX at 802.11n (20MHz) and 802.11n (40MHz) is the worst case.

MODULATION MODE	TX FUNCTION	DESCRIPTION
802.11b	1TX	Chain 0
802.11g	1TX	Chain 0
802.11n (20MHz)	1TX	Chain 0 or Chain 1
802.11n (20MHz)	2TX	Chain 0 and Chain 1
802.11n (40MHz)	1TX	Chain 0 or Chain 1
802.11n (40MHz)	2TX	Chain 0 and Chain 1

- The EUT consumes power from the following adapter.

<b>Brand</b>	TP-LINK
<b>Model</b>	T090060-2B1
<b>Input Power</b>	100-240Vac, 50/60Hz, 0.3A
<b>Output Power</b>	9Vdc, 0.6A
<b>Power Line</b>	1.5m cable without core attached on adapter

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



### 3.2 DESCRIPTION OF TEST MODES

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		





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### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on 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	6	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	6	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	TESTED BY
RE≥1G	25 deg. C, 65% RH	120Vac, 60Hz	Ted Chang
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Ted Chang
PLC	24 deg. C, 64% RH	120Vac, 60Hz	Match Tsui
APCM	24 deg. C, 64% RH	120Vac, 60Hz	Match Tsui

### 3.3 DUTY CYCLE OF TEST SIGNAL

**802.11b:** Duty cycle of test signal is > 98 %

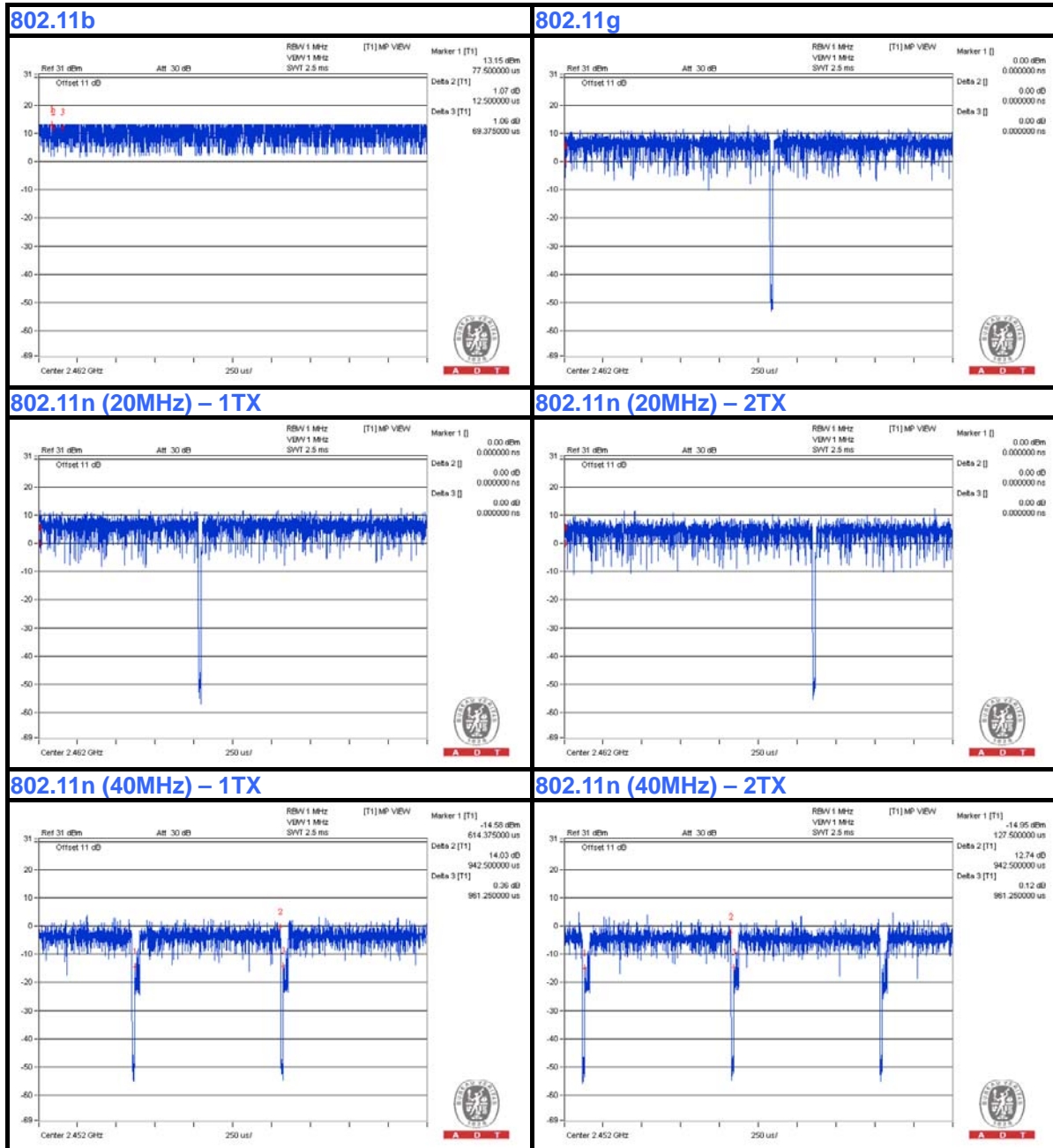
**802.11g:** Duty cycle of test signal is > 98 %

**802.11n (20MHz) – 1TX:** Duty cycle of test signal is > 98 %

**802.11n (20MHz) – 2TX:** Duty cycle of test signal is > 98 %

**802.11n (40MHz) – 1TX:** Duty cycle =  $0.942/0.961 = 0.9802 > 98 \%$

**802.11n (40MHz) – 2TX:** Duty cycle =  $0.942/0.961 = 0.9802 > 98 \%$





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### 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.

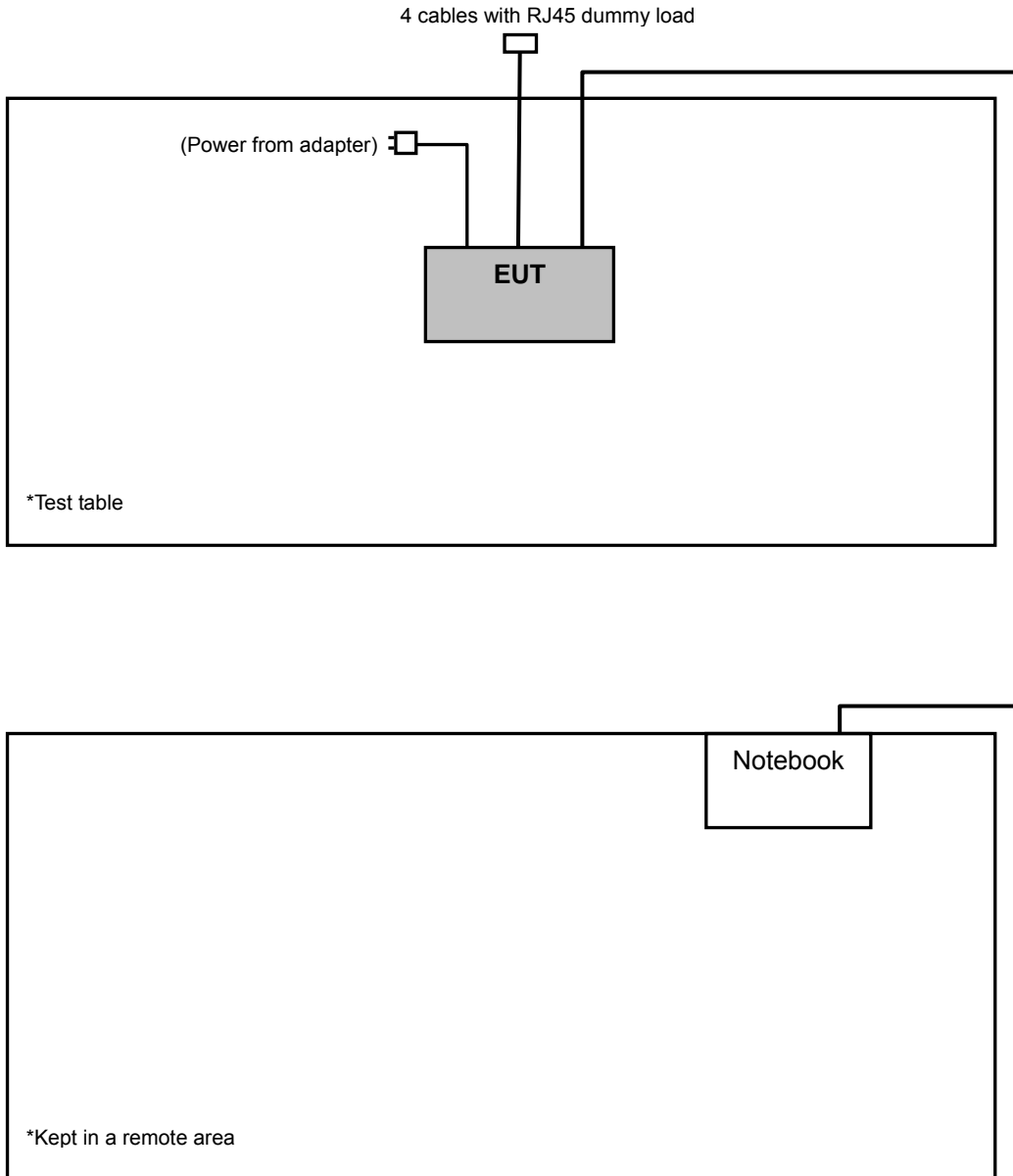
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable

**NOTE:**

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

### 3.4.1 CONFIGURATION OF SYSTEM UNDER TEST





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### 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**

**Canada RSS-210 Issue 8 (2010-12)**

**Canada RSS-Gen Issue 3 (2010-12)**

**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

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 25, 2012	Oct. 24, 2013
			Oct. 24, 2013	Oct. 23, 2014
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
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2012	Oct. 28, 2013
			Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 19, 2012	Oct. 18, 2013
			Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
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
High Speed Peak Power Meter	ML2495A	0842014	Apr. 25, 2013	Apr. 24, 2014
Power Sensor	MA2411B	0738404	Apr. 24, 2013	Apr. 23, 2014

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. The test was performed in HwaYa Chamber 4.
  4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  5. The FCC Site Registration No. is 460141.
  6. The IC Site Registration No. is IC7450F-4.





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#### 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:**

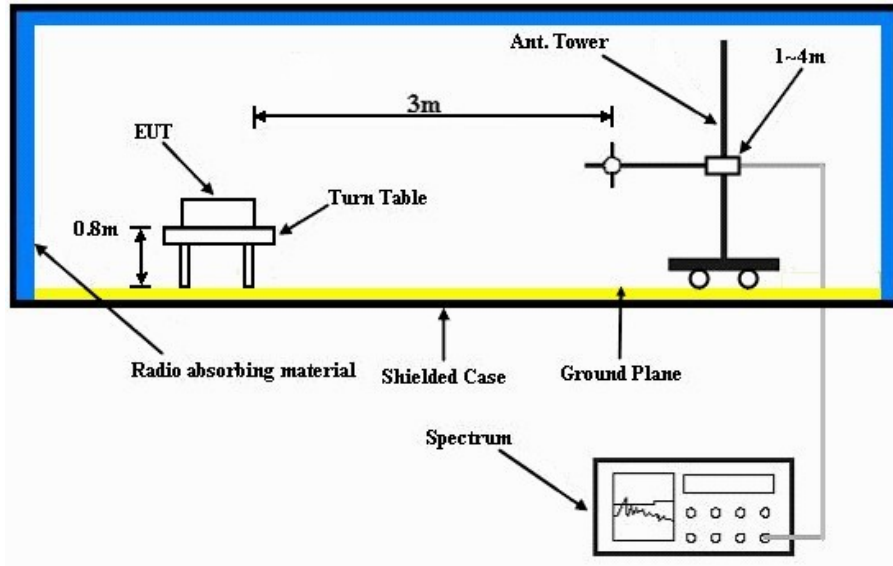
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

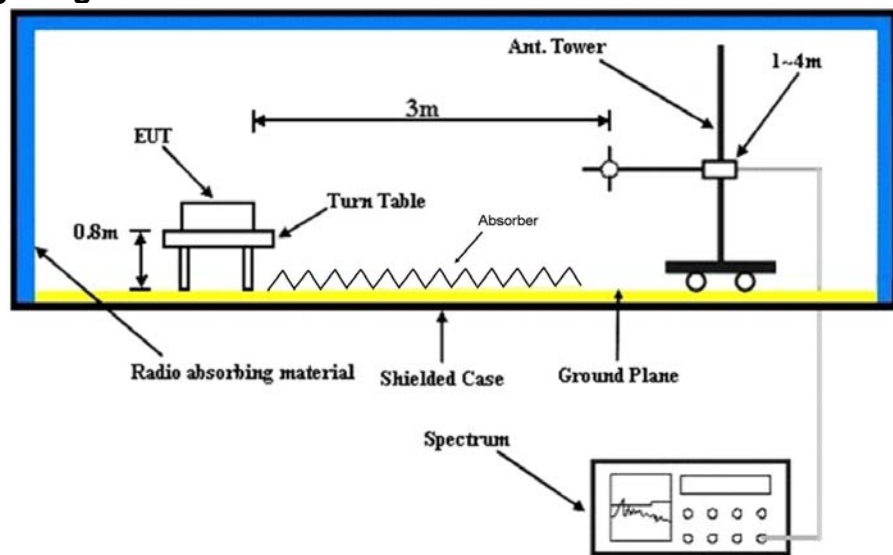
No deviation.

### 4.1.5 TEST SETUP

#### Frequency range 30MHz~1GHz



#### Frequency range above 1GHz



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



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#### 4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared a notebook to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".
- e. The necessary accessories enabled the system in full functions.



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### 4.1.7 TEST RESULT

#### ABOVE 1GHz DATA :

#### 802.11b

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

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	59.0 PK	74.0	-15.0	1.10 H	347	25.60	33.40
2	2390.00	48.4 AV	54.0	-5.6	1.10 H	347	15.00	33.40
3	*2412.00	108.1 PK			1.10 H	347	74.60	33.50
4	*2412.00	104.2 AV			1.10 H	347	70.70	33.50
5	4824.00	52.9 PK	74.0	-21.1	1.42 H	224	49.30	3.60
6	4824.00	47.5 AV	54.0	-6.5	1.42 H	224	43.90	3.60

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	58.8 PK	74.0	-15.2	1.00 V	287	25.40	33.40
2	2390.00	46.4 AV	54.0	-7.6	1.00 V	287	13.00	33.40
3	*2412.00	100.9 PK			1.00 V	287	67.40	33.50
4	*2412.00	97.3 AV			1.00 V	287	63.80	33.50
5	4824.00	52.6 PK	74.0	-21.4	1.00 V	23	49.00	3.60
6	4824.00	45.8 AV	54.0	-8.2	1.00 V	23	42.20	3.60

#### 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

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

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	108.7 PK			1.09 H	346	75.20	33.50
2	*2437.00	105.1 AV			1.09 H	346	71.60	33.50
3	4874.00	52.5 PK	74.0	-21.5	1.13 H	224	48.70	3.80
4	4874.00	45.8 AV	54.0	-8.2	1.13 H	224	42.00	3.80
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	100.3 PK			1.00 V	155	66.80	33.50
2	*2437.00	96.5 AV			1.00 V	155	63.00	33.50
3	4874.00	50.4 PK	74.0	-23.6	1.02 V	125	46.60	3.80
4	4874.00	44.3 AV	54.0	-9.7	1.02 V	125	40.50	3.80

**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	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	109.2 PK			1.06 H	328	75.60	33.60
2	*2462.00	105.5 AV			1.06 H	328	71.90	33.60
3	2483.50	60.4 PK	74.0	-13.6	1.06 H	328	26.70	33.70
4	2483.50	48.9 AV	54.0	-5.1	1.06 H	328	15.20	33.70
5	4924.00	53.1 PK	74.0	-20.9	1.24 H	226	49.20	3.90
6	4924.00	46.8 AV	54.0	-7.2	1.24 H	226	42.90	3.90
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	*2462.00	102.4 PK			1.00 V	273	68.80	33.60
2	*2462.00	98.5 AV			1.00 V	273	64.90	33.60
3	2483.50	59.4 PK	74.0	-14.6	1.00 V	272	25.70	33.70
4	2483.50	46.9 AV	54.0	-7.1	1.00 V	272	13.20	33.70
5	4924.00	51.1 PK	74.0	-22.9	1.00 V	8	47.20	3.90
6	4924.00	42.1 AV	54.0	-11.9	1.00 V	8	38.20	3.90

**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

802.11g

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

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	72.8 PK	74.0	-1.2	1.09 H	347	39.40	33.40
2	2390.00	53.0 AV	54.0	-1.0	1.09 H	347	19.60	33.40
3	*2412.00	108.0 PK			1.09 H	347	74.50	33.50
4	*2412.00	98.1 AV			1.09 H	347	64.60	33.50
5	4824.00	49.5 PK	74.0	-24.5	1.00 H	244	45.90	3.60
6	4824.00	36.1 AV	54.0	-17.9	1.00 H	244	32.50	3.60
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	65.1 PK	74.0	-8.9	1.00 V	152	31.70	33.40
2	2390.00	48.8 AV	54.0	-5.2	1.00 V	152	15.40	33.40
3	*2412.00	97.9 PK			1.00 V	116	64.40	33.50
4	*2412.00	88.1 AV			1.00 V	116	54.60	33.50
5	4824.00	49.3 PK	74.0	-24.7	1.25 V	162	45.70	3.60
6	4824.00	36.1 AV	54.0	-17.9	1.25 V	162	32.50	3.60

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

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

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	64.7 PK	74.0	-9.3	1.39 H	351	31.30	33.40
2	2390.00	48.5 AV	54.0	-5.5	1.39 H	351	15.10	33.40
3	*2437.00	111.2 PK			1.07 H	348	77.70	33.50
4	*2437.00	100.8 AV			1.07 H	348	67.30	33.50
5	4874.00	50.4 PK	74.0	-23.6	1.02 H	62	46.60	3.80
6	4874.00	37.0 AV	54.0	-17.0	1.02 H	62	33.20	3.80
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	57.8 PK	74.0	-16.2	1.00 V	156	24.40	33.40
2	2390.00	46.7 AV	54.0	-7.3	1.00 V	156	13.30	33.40
3	*2437.00	105.2 PK			1.00 V	156	71.70	33.50
4	*2437.00	94.4 AV			1.00 V	156	60.90	33.50
5	4874.00	49.0 PK	74.0	-25.0	1.02 V	152	45.20	3.80
6	4874.00	35.0 AV	54.0	-19.0	1.02 V	152	31.20	3.80

**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.





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

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	106.0 PK			1.00 H	242	72.40	33.60
2	*2462.00	94.6 AV			1.00 H	242	61.00	33.60
3	2483.50	72.2 PK	74.0	-1.8	1.06 H	343	38.50	33.70
4	2483.50	53.0 AV	54.0	-1.0	1.06 H	343	19.30	33.70
5	4924.00	50.9 PK	74.0	-23.1	1.00 H	325	47.00	3.90
6	4924.00	36.4 AV	54.0	-17.6	1.00 H	325	32.50	3.90
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	*2462.00	103.4 PK			1.25 V	154	69.80	33.60
2	*2462.00	92.7 AV			1.25 V	154	59.10	33.60
3	2483.50	66.5 PK	74.0	-7.5	1.25 V	154	32.80	33.70
4	2483.50	49.7 AV	54.0	-4.3	1.25 V	154	16.00	33.70
5	4924.00	50.8 PK	74.0	-23.2	1.00 V	233	46.90	3.90
6	4924.00	35.1 AV	54.0	-18.9	1.00 V	233	31.20	3.90

**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

802.11n (20MHz) – 1TX

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

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	72.1 PK	74.0	-1.9	1.09 H	351	38.70	33.40
2	2390.00	53.1 AV	54.0	-0.9	1.09 H	351	19.70	33.40
3	*2412.00	104.9 PK			1.08 H	347	71.40	33.50
4	*2412.00	94.6 AV			1.08 H	347	61.10	33.50
5	4824.00	49.6 PK	74.0	-24.4	1.02 H	354	46.00	3.60
6	4824.00	36.1 AV	54.0	-17.9	1.02 H	354	32.50	3.60
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	63.5 PK	74.0	-10.5	1.00 V	277	30.10	33.40
2	2390.00	47.2 AV	54.0	-6.8	1.00 V	277	13.80	33.40
3	*2412.00	99.7 PK			1.00 V	276	66.20	33.50
4	*2412.00	89.0 AV			1.00 V	276	55.50	33.50
5	4824.00	49.3 PK	74.0	-24.7	1.02 V	325	45.70	3.60
6	4824.00	36.1 AV	54.0	-17.9	1.02 V	325	32.50	3.60

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

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

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	67.8 PK	74.0	-6.2	1.08 H	348	34.40	33.40
2	2390.00	48.8 AV	54.0	-5.2	1.08 H	348	15.40	33.40
3	*2437.00	110.9 PK			1.08 H	348	77.40	33.50
4	*2437.00	100.2 AV			1.08 H	348	66.70	33.50
5	4874.00	50.6 PK	74.0	-23.4	1.00 H	241	46.80	3.80
6	4874.00	36.3 AV	54.0	-17.7	1.00 H	241	32.50	3.80
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	60.1 PK	74.0	-13.9	1.00 V	153	26.70	33.40
2	2390.00	46.6 AV	54.0	-7.4	1.00 V	153	13.20	33.40
3	*2437.00	104.5 PK			1.00 V	153	71.00	33.50
4	*2437.00	94.3 AV			1.00 V	153	60.80	33.50
5	4874.00	50.4 PK	74.0	-23.6	1.00 V	252	46.60	3.80
6	4874.00	36.3 AV	54.0	-17.7	1.00 V	252	32.50	3.80

**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	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	105.7 PK			1.00 H	343	72.10	33.60
2	*2462.00	95.1 AV			1.00 H	343	61.50	33.60
3	2483.50	73.0 PK	74.0	-1.0	1.00 H	343	39.30	33.70
4	2483.50	52.9 AV	54.0	-1.1	1.00 H	343	19.20	33.70
5	4924.00	50.4 PK	74.0	-23.6	1.00 H	51	46.50	3.90
6	4924.00	35.4 AV	54.0	-18.6	1.00 H	51	31.50	3.90
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	*2462.00	102.3 PK			1.24 V	151	68.70	33.60
2	*2462.00	91.7 AV			1.24 V	151	58.10	33.60
3	2483.50	69.6 PK	74.0	-4.4	1.24 V	151	35.90	33.70
4	2483.50	50.6 AV	54.0	-3.4	1.24 V	151	16.90	33.70
5	4924.00	52.2 PK	74.0	-21.8	1.02 V	59	48.30	3.90
6	4924.00	36.4 AV	54.0	-17.6	1.02 V	59	32.50	3.90

**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

802.11n (20MHz) – 2TX

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

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	73.0 PK	74.0	-1.0	1.38 H	316	39.60	33.40
2	2390.00	52.7 AV	54.0	-1.3	1.38 H	316	19.30	33.40
3	*2412.00	107.0 PK			1.33 H	311	73.50	33.50
4	*2412.00	97.6 AV			1.33 H	311	64.10	33.50
5	4824.00	52.2 PK	74.0	-21.8	1.02 H	59	48.60	3.60
6	4824.00	36.1 AV	54.0	-17.9	1.02 H	59	32.50	3.60
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	64.5 PK	74.0	-9.5	1.00 V	276	31.10	33.40
2	2390.00	48.8 AV	54.0	-5.2	1.00 V	276	15.40	33.40
3	*2412.00	101.5 PK			1.00 V	276	68.00	33.50
4	*2412.00	91.5 AV			1.00 V	276	58.00	33.50
5	4824.00	49.6 PK	74.0	-24.4	1.02 V	342	46.00	3.60
6	4824.00	35.1 AV	54.0	-18.9	1.02 V	342	31.50	3.60

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

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

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	1.36 H	311	30.10	33.40
2	2390.00	48.9 AV	54.0	-5.1	1.36 H	311	15.50	33.40
3	*2437.00	111.2 PK			1.33 H	313	77.70	33.50
4	*2437.00	102.1 AV			1.33 H	313	68.60	33.50
5	4874.00	56.4 PK	74.0	-17.6	1.00 H	201	52.60	3.80
6	4874.00	41.8 AV	54.0	-12.2	1.00 H	201	38.00	3.80
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	58.7 PK	74.0	-15.3	1.00 V	127	25.30	33.40
2	2390.00	46.6 AV	54.0	-7.4	1.00 V	127	13.20	33.40
3	*2437.00	106.7 PK			1.00 V	128	73.20	33.50
4	*2437.00	96.1 AV			1.00 V	128	62.60	33.50
5	4874.00	59.3 PK	74.0	-14.7	1.00 V	212	55.50	3.80
6	4874.00	43.3 AV	54.0	-10.7	1.00 V	212	39.50	3.80

**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.



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

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	108.4 PK			1.29 H	69	74.80	33.60
2	*2462.00	98.2 AV			1.29 H	69	64.60	33.60
3	2483.50	71.2 PK	74.0	-2.8	1.29 H	69	37.50	33.70
4	2483.50	53.0 AV	54.0	-1.0	1.29 H	69	19.30	33.70
5	4924.00	52.8 PK	74.0	-21.2	1.06 H	88	48.90	3.90
6	4924.00	39.1 AV	54.0	-14.9	1.06 H	88	35.20	3.90
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	*2462.00	102.6 PK			1.00 V	274	69.00	33.60
2	*2462.00	92.7 AV			1.00 V	274	59.10	33.60
3	2483.50	66.5 PK	74.0	-7.5	1.00 V	275	32.80	33.70
4	2483.50	47.4 AV	54.0	-6.6	1.00 V	275	13.70	33.70
5	4924.00	50.7 PK	74.0	-23.3	1.09 V	352	46.80	3.90
6	4924.00	37.5 AV	54.0	-16.5	1.09 V	352	33.60	3.90

**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

802.11n (40MHz) – 1TX

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	72.3 PK	74.0	-1.7	1.06 H	352	38.90	33.40
2	2390.00	53.0 AV	54.0	-1.0	1.06 H	352	19.60	33.40
3	*2422.00	101.8 PK			1.06 H	352	68.30	33.50
4	*2422.00	91.4 AV			1.06 H	352	57.90	33.50
5	4844.00	48.6 PK	74.0	-25.4	1.02 H	51	44.90	3.70
6	4844.00	36.2 AV	54.0	-17.8	1.02 H	51	32.50	3.70
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	2390.00	68.8 PK	74.0	-5.2	1.00 V	155	35.40	33.40
2	2390.00	49.7 AV	54.0	-4.3	1.00 V	155	16.30	33.40
3	*2422.00	96.0 PK			1.00 V	155	62.50	33.50
4	*2422.00	85.9 AV			1.00 V	155	52.40	33.50
5	4844.00	50.2 PK	74.0	-23.8	1.02 V	52	46.50	3.70
6	4844.00	36.2 AV	54.0	-17.8	1.02 V	52	32.50	3.70

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. " \* ": Fundamental frequency.





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

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	71.9 PK	74.0	-2.1	1.39 H	352	38.50	33.40
2	2390.00	53.0 AV	54.0	-1.0	1.39 H	352	19.60	33.40
3	*2437.00	103.3 PK			1.08 H	349	69.80	33.50
4	*2437.00	93.7 AV			1.08 H	349	60.20	33.50
5	2483.50	69.5 PK	74.0	-4.5	1.31 H	330	35.80	33.70
6	2483.50	51.4 AV	54.0	-2.6	1.31 H	330	17.70	33.70
7	4874.00	50.6 PK	74.0	-23.4	1.02 H	325	46.80	3.80
8	4874.00	36.0 AV	54.0	-18.0	1.02 H	325	32.20	3.80
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	64.7 PK	74.0	-9.3	1.00 V	155	31.30	33.40
2	2390.00	49.6 AV	54.0	-4.4	1.00 V	155	16.20	33.40
3	*2437.00	98.4 PK			1.00 V	155	64.90	33.50
4	*2437.00	88.5 AV			1.00 V	155	55.00	33.50
5	2483.50	65.2 PK	74.0	-8.8	1.00 V	155	31.50	33.70
6	2483.50	48.4 AV	54.0	-5.6	1.00 V	155	14.70	33.70
7	4874.00	50.4 PK	74.0	-23.6	1.05 V	185	46.60	3.80
8	4874.00	36.0 AV	54.0	-18.0	1.05 V	185	32.20	3.80

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	104.1 PK			1.06 H	344	70.50	33.60
2	*2452.00	94.0 AV			1.06 H	344	60.40	33.60
3	2483.50	71.9 PK	74.0	-2.1	1.00 H	57	38.20	33.70
4	2483.50	52.5 AV	54.0	-1.5	1.00 H	57	18.80	33.70
5	4904.00	50.5 PK	74.0	-23.5	1.00 H	263	46.60	3.90
6	4904.00	36.4 AV	54.0	-17.6	1.00 H	263	32.50	3.90
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	*2452.00	96.1 PK			1.00 V	181	62.50	33.60
2	*2452.00	85.6 AV			1.00 V	181	52.00	33.60
3	2483.50	68.9 PK	74.0	-5.1	1.00 V	181	35.20	33.70
4	2483.50	50.5 AV	54.0	-3.5	1.00 V	181	16.80	33.70
5	4904.00	49.8 PK	74.0	-24.2	1.00 V	288	45.90	3.90
6	4904.00	35.1 AV	54.0	-18.9	1.00 V	288	31.20	3.90

**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.



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802.11n (40MHz) – 2TX

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	72.9 PK	74.0	-1.1	1.09 H	350	39.50	33.40
2	2390.00	52.4 AV	54.0	-1.6	1.09 H	350	19.00	33.40
3	*2422.00	103.2 PK			1.31 H	310	69.70	33.50
4	*2422.00	93.6 AV			1.31 H	310	60.10	33.50
5	4844.00	53.2 PK	74.0	-20.8	1.00 H	340	49.50	3.70
6	4844.00	37.3 AV	54.0	-16.7	1.00 H	340	33.60	3.70
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	2390.00	68.8 PK	74.0	-5.2	1.00 V	278	35.40	33.40
2	2390.00	50.5 AV	54.0	-3.5	1.00 V	278	17.10	33.40
3	*2422.00	97.7 PK			1.00 V	278	64.20	33.50
4	*2422.00	88.0 AV			1.00 V	278	54.50	33.50
5	4844.00	50.4 PK	74.0	-23.6	1.06 V	324	46.70	3.70
6	4844.00	36.2 AV	54.0	-17.8	1.06 V	324	32.50	3.70

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. " \* ": Fundamental frequency.



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

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	70.5 PK	74.0	-3.5	1.11 H	348	37.10	33.40
2	2390.00	52.9 AV	54.0	-1.1	1.11 H	348	19.50	33.40
3	*2437.00	103.8 PK			1.07 H	347	70.30	33.50
4	*2437.00	94.5 AV			1.07 H	347	61.00	33.50
5	2483.50	71.1 PK	74.0	-2.9	1.29 H	326	37.40	33.70
6	2483.50	51.3 AV	54.0	-2.7	1.29 H	326	17.60	33.70
7	4874.00	48.9 PK	74.0	-25.1	1.36 H	165	45.10	3.80
8	4874.00	36.3 AV	54.0	-17.7	1.36 H	165	32.50	3.80
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	66.0 PK	74.0	-8.0	1.00 V	283	32.60	33.40
2	2390.00	50.0 AV	54.0	-4.0	1.00 V	283	16.60	33.40
3	*2437.00	98.4 PK			1.00 V	127	64.90	33.50
4	*2437.00	89.1 AV			1.00 V	127	55.60	33.50
5	2483.50	66.1 PK	74.0	-7.9	1.00 V	281	32.40	33.70
6	2483.50	48.2 AV	54.0	-5.8	1.00 V	281	14.50	33.70
7	4874.00	49.6 PK	74.0	-24.4	1.25 V	333	45.80	3.80
8	4874.00	37.3 AV	54.0	-16.7	1.25 V	333	33.50	3.80

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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			1.07 H	344	69.00	33.60
2	*2452.00	92.3 AV			1.07 H	344	58.70	33.60
3	2483.50	72.2 PK	74.0	-1.8	1.29 H	57	38.50	33.70
4	2483.50	52.6 AV	54.0	-1.4	1.29 H	57	18.90	33.70
5	4904.00	49.6 PK	74.0	-24.4	1.02 H	32	45.70	3.90
6	4904.00	36.4 AV	54.0	-17.6	1.02 H	32	32.50	3.90
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	*2452.00	97.2 PK			1.00 V	130	63.60	33.60
2	*2452.00	86.8 AV			1.00 V	130	53.20	33.60
3	2483.50	64.6 PK	74.0	-9.4	1.00 V	284	30.90	33.70
4	2483.50	48.8 AV	54.0	-5.2	1.00 V	284	15.10	33.70
5	4904.00	49.2 PK	74.0	-24.8	1.02 V	33	45.30	3.90
6	4904.00	36.4 AV	54.0	-17.6	1.02 V	33	32.50	3.90

**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.



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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	181.32	32.0 QP	43.5	-11.5	1.26 H	110	47.30	-15.30
2	249.22	37.1 QP	46.0	-8.9	1.01 H	203	51.50	-14.40
3	450.98	30.6 QP	46.0	-15.4	1.51 H	15	39.50	-8.90
4	499.48	44.2 QP	46.0	-1.8	1.51 H	309	52.50	-8.30
5	625.58	32.9 QP	46.0	-13.1	2.00 H	68	38.70	-5.80
6	749.74	30.2 QP	46.0	-15.8	1.26 H	277	34.00	-3.80
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	140.58	33.9 QP	43.5	-9.6	1.00 V	209	48.40	-14.50
2	249.22	30.1 QP	46.0	-15.9	1.00 V	42	44.50	-14.40
3	450.98	32.6 QP	46.0	-13.4	1.00 V	18	41.50	-8.90
4	499.48	43.6 QP	46.0	-2.4	1.00 V	156	51.90	-8.30
5	600.36	35.1 QP	46.0	-10.9	1.99 V	16	41.40	-6.30
6	749.74	35.9 QP	46.0	-10.1	1.99 V	304	39.70	-3.80

**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



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## 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 (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 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

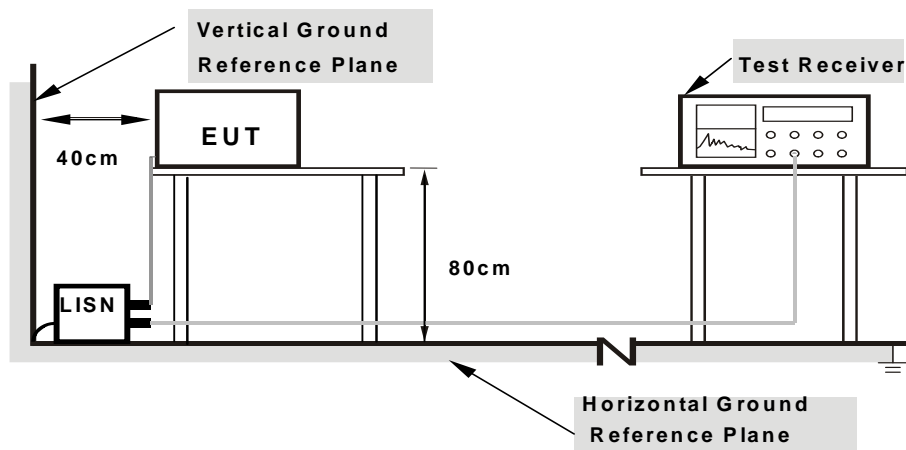
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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





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### 4.2.7 TEST RESULTS

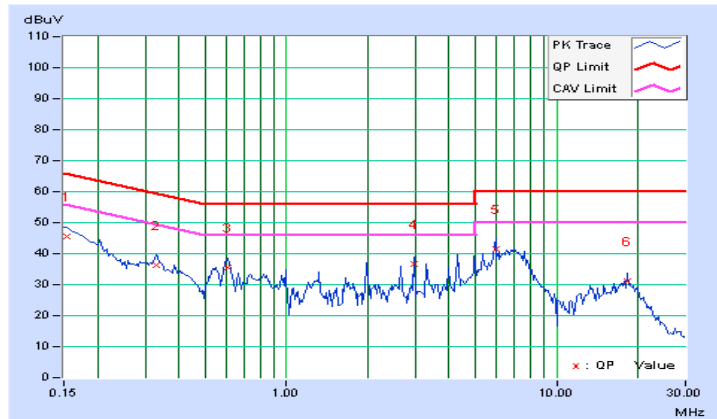
#### CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.16	45.52	33.50	45.68	33.66	65.79	55.79	-20.11	-22.13
2	0.32969	0.21	35.97	23.69	36.18	23.90	59.46	49.46	-23.28	-25.56
3	0.60313	0.24	35.41	26.40	35.65	26.64	56.00	46.00	-20.35	-19.36
4	2.98047	0.34	36.39	26.95	36.73	27.29	56.00	46.00	-19.27	-18.71
5	5.95695	0.50	40.90	29.14	41.40	29.64	60.00	50.00	-18.60	-20.36
6	18.19922	1.14	30.07	20.85	31.21	21.99	60.00	50.00	-28.79	-28.01

#### 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.





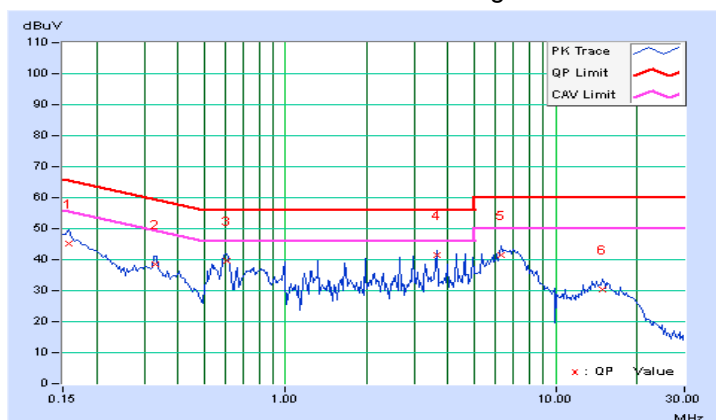
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PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.17	45.07	34.02	45.24	34.19	65.58	55.58	-20.34	-21.39
2	0.33104	0.22	38.45	31.56	38.67	31.78	59.43	49.43	-20.76	-17.65
3	0.60313	0.24	39.25	33.47	39.49	33.71	56.00	46.00	-16.51	-12.29
<b>4</b>	<b>3.64063</b>	<b>0.36</b>	<b>41.24</b>	<b>36.55</b>	<b>41.60</b>	<b>36.91</b>	<b>56.00</b>	<b>46.00</b>	<b>-14.40</b>	<b>-9.09</b>
5	6.28516	0.46	40.90	30.86	41.36	31.32	60.00	50.00	-18.64	-18.68
6	14.88672	0.76	29.44	22.01	30.20	22.77	60.00	50.00	-29.80	-27.23

**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.

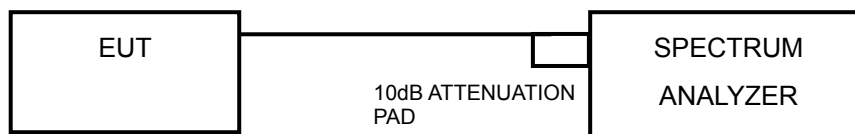


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 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	8.10	0.5	PASS
6	2437	8.12	0.5	PASS
11	2462	8.06	0.5	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.07	0.5	PASS
6	2437	14.25	0.5	PASS
11	2462	15.16	0.5	PASS

#### 802.11n (20MHz) – 1TX

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.31	0.5	PASS
6	2437	15.13	0.5	PASS
11	2462	15.10	0.5	PASS

#### 802.11n (20MHz) – 2TX

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	11.42	13.89	0.5	PASS
6	2437	14.67	13.46	0.5	PASS
11	2462	14.47	14.73	0.5	PASS



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**802.11n (40MHz) – 1TX**

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.91	0.5	PASS
6	2437	35.91	0.5	PASS
9	2452	36.08	0.5	PASS

**802.11n (40MHz) – 2TX**

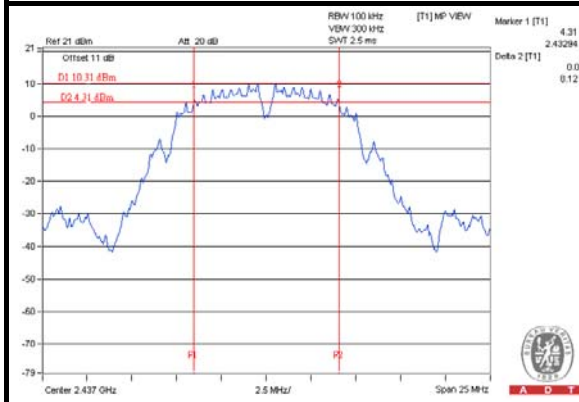
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	24.99	25.00	0.5	PASS
6	2437	35.93	35.90	0.5	PASS
9	2452	36.49	35.88	0.5	PASS



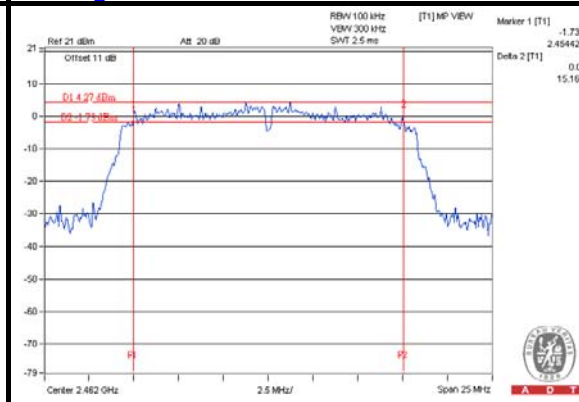
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### SPECTRUM PLOT OF WORST VALUE

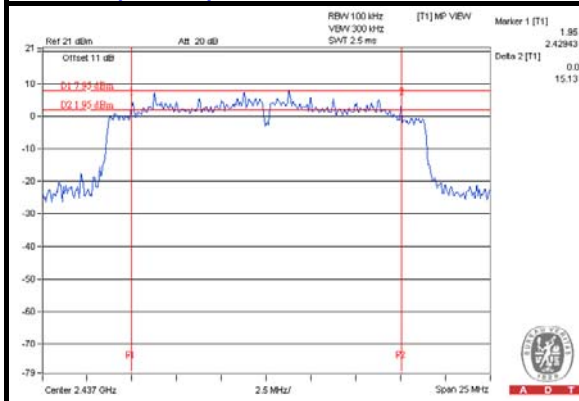
802.11b



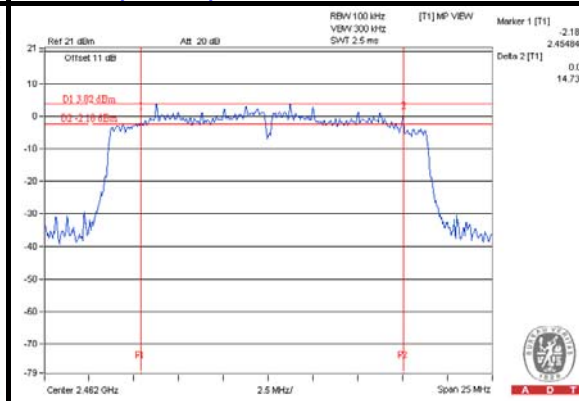
802.11g



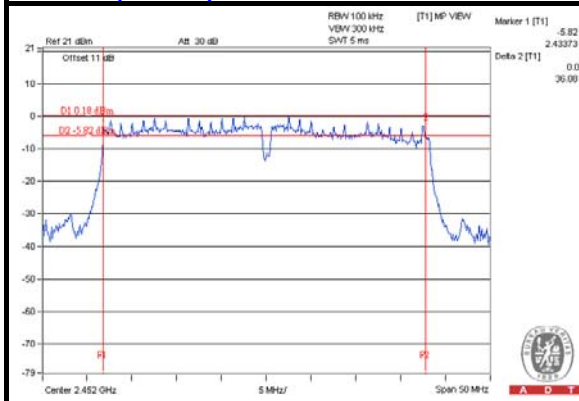
802.11n (20MHz) – 1TX



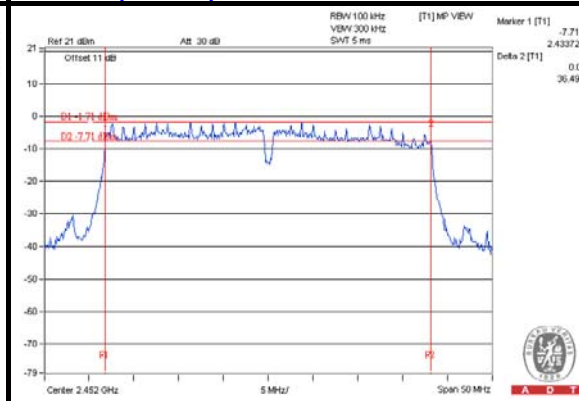
802.11n (20MHz) – 2TX



802.11n (40MHz) – 1TX

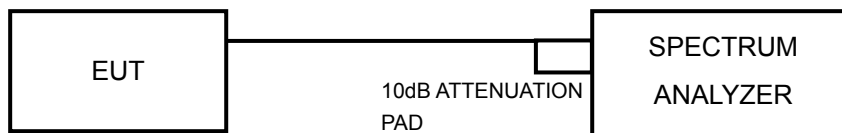


802.11n (40MHz) – 2TX



## 4.4 OCCUPIED BANDWIDTH MEASUREMENT

### 4.4.1 TEST SETUP



### 4.4.2 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300 kHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.5 EUT OPERATING CONDITIONS

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



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#### 4.4.6 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
1	2412	10.44	PASS
6	2437	10.44	PASS
11	2462	10.44	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
1	2412	16.44	PASS
6	2437	16.56	PASS
11	2462	16.44	PASS

##### 802.11n (20MHz) – 1TX

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
1	2412	17.28	PASS
6	2437	17.64	PASS
11	2462	17.40	PASS

##### 802.11n (20MHz) – 2TX

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
1	2412	17.40	17.40	PASS
6	2437	17.40	17.64	PASS
11	2462	17.52	17.40	PASS





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**802.11n (40MHz) – 1TX**

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
3	2422	36.80	PASS
6	2437	37.00	PASS
9	2452	36.80	PASS

**802.11n (40MHz) – 2TX**

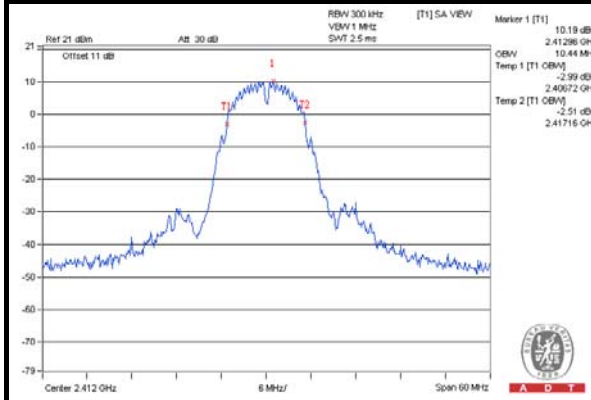
CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
3	2422	36.60	36.60	PASS
6	2437	36.80	36.80	PASS
9	2452	36.60	36.60	PASS



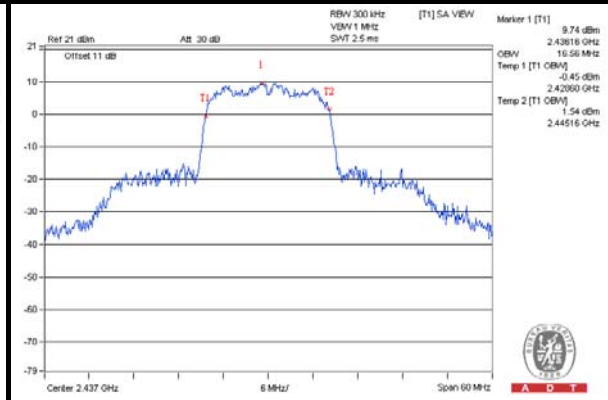
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### SPECTRUM PLOT OF WORST VALUE

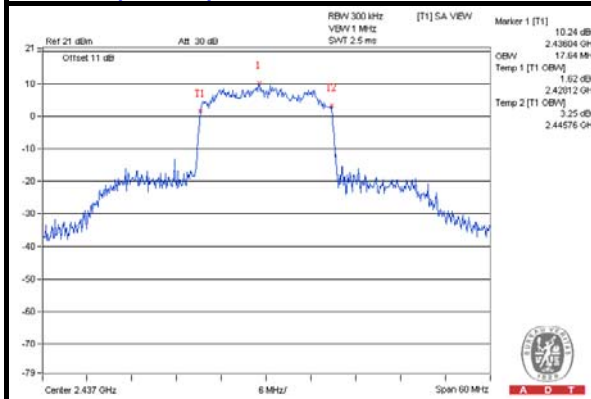
#### 802.11b



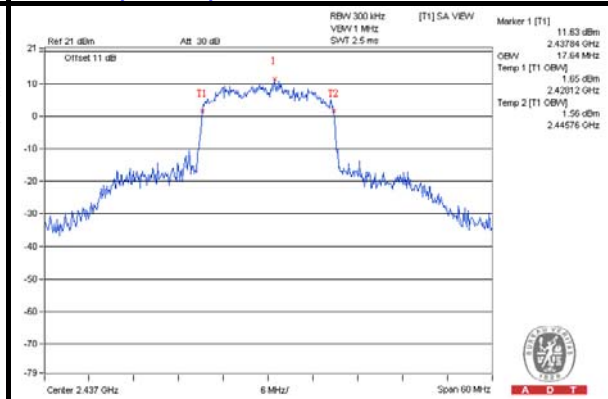
#### 802.11g



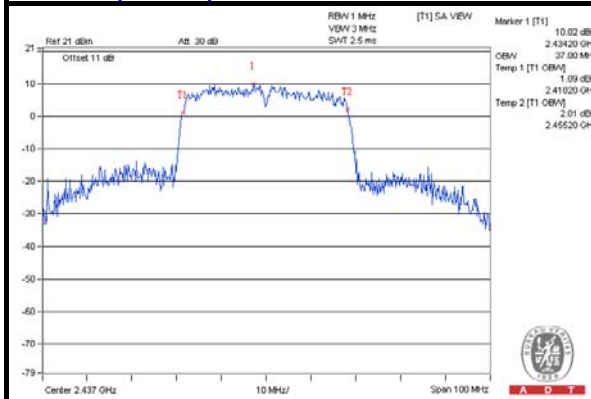
#### 802.11n (20MHz) – 1TX



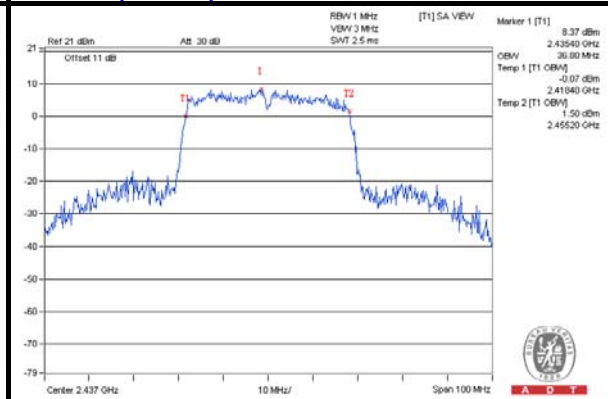
#### 802.11n (20MHz) – 2TX



#### 802.11n (40MHz) – 1TX



#### 802.11n (40MHz) – 2TX



## 4.5 CONDUCTED OUTPUT POWER

### 4.5.1 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,

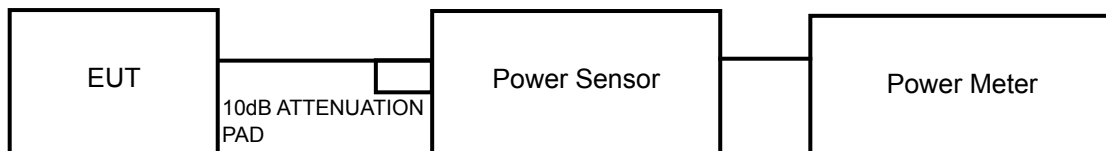
Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

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.

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURES

A peak / average power sensor were 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 power level.



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#### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.5.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



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## 4.5.7 TEST RESULTS

### FOR PEAK POWER

#### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	154.525	21.89	30	PASS
6	2437	152.055	21.82	30	PASS
11	2462	149.279	21.74	30	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	218.776	23.40	30	PASS
6	2437	306.902	24.87	30	PASS
11	2462	276.694	24.42	30	PASS

#### 802.11n (20MHz) – 1TX (Chain 0)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	199.526	23.00	30	PASS
6	2437	287.078	24.58	30	PASS
11	2462	246.037	23.91	30	PASS

#### 802.11n (20MHz) – 1TX (Chain 1)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	164.437	22.16	30	PASS
6	2437	263.633	24.21	30	PASS
11	2462	209.894	23.22	30	PASS

#### 802.11n (20MHz) – 2TX

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	22.19	21.51	307.156	24.87	30	PASS
6	2437	24.62	25.83	<b>672.559</b>	28.28	30	PASS
11	2462	21.38	22.99	336.471	25.27	30	PASS



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### 802.11n (40MHz) – 1TX (Chain 0)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	200.909	23.03	30	PASS
6	2437	260.615	24.16	30	PASS
9	2452	160.325	22.05	30	PASS

### 802.11n (40MHz) – 1TX (Chain 1)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	178.238	22.51	30	PASS
6	2437	222.844	23.48	30	PASS
9	2452	145.546	21.63	30	PASS

### 802.11n (40MHz) – 2TX

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	22.60	22.84	374.279	25.73	30	PASS
6	2437	22.50	23.90	423.299	26.27	30	PASS
9	2452	21.75	22.85	342.376	25.35	30	PASS



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## FOR AVERAGE POWER

### 802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	66.988	18.26
6	2437	64.714	18.11
11	2462	64.565	18.10

### 802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	29.854	14.75
6	2437	65.163	18.14
11	2462	36.813	15.66

### 802.11n (20MHz) – 1TX (Chain 0)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	24.266	13.85
6	2437	63.387	18.02
11	2462	37.584	15.75

### 802.11n (20MHz) – 1TX (Chain 1)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	21.086	13.24
6	2437	55.335	17.43
11	2462	30.974	14.91

### 802.11n (20MHz) – 2TX

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	12.57	13.83	42.227	16.26
6	2437	17.47	19.06	136.385	21.35
11	2462	13.68	14.51	51.584	17.13



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#### 802.11n (40MHz) – 1TX (Chain 0)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	24.044	13.81
6	2437	37.584	15.75
9	2452	24.210	13.84

#### 802.11n (40MHz) – 1TX (Chain 1)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	20.230	13.06
6	2437	33.113	15.20
9	2452	20.941	13.21

#### 802.11n (40MHz) – 2TX

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	13.64	14.58	51.829	17.15
6	2437	14.53	15.54	64.189	18.07
9	2452	12.57	13.54	40.666	16.09

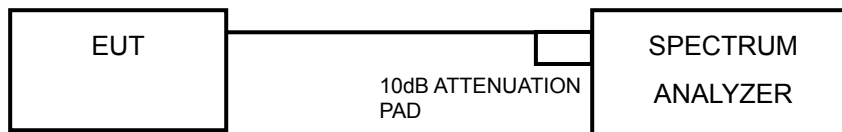


## 4.6 POWER SPECTRAL DENSITY MEASUREMENT

### 4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 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

Follow KDB 558074 D01 DTS Meas Guidance v03r01 section 10.2.

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

Using Method PDPSD (peak PSD).

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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#### 4.6.7 TEST RESULTS

##### 802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.29	8	PASS
6	2437	-11.68	8	PASS
11	2462	-11.97	8	PASS

##### 802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-15.96	8	PASS
6	2437	-12.53	8	PASS
11	2462	-15.17	8	PASS

##### 802.11n (20MHz) – 1TX

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-17.04	8	PASS
6	2437	-13.88	8	PASS
11	2462	-15.08	8	PASS

##### 802.11n (20MHz) – 2TX

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-19.49	3.01	-16.48	8	PASS
	6	2437	-14.19	3.01	-11.18	8	PASS
	11	2462	-18.78	3.01	-15.77	8	PASS
1	1	2412	-17.41	3.01	-14.40	8	PASS
	6	2437	-12.08	3.01	-9.07	8	PASS
	11	2462	-17.07	3.01	-14.06	8	PASS

**NOTE:** Directional gain =  $1.5\text{dBi} + 10\log(2/2) = 1.5\text{dBi} < 6\text{dBi}$ , so the limit no need to reduced.



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### 802.11n (40MHz) – 1TX

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-21.01	8	PASS
6	2437	-20.16	8	PASS
9	2452	-21.61	8	PASS

### 802.11n (40MHz) – 2TX

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-20.98	3.01	-17.97	8	PASS
	6	2437	-20.93	3.01	-17.92	8	PASS
	9	2452	-22.90	3.01	-19.89	8	PASS
1	3	2422	-19.91	3.01	-16.90	8	PASS
	6	2437	-20.09	3.01	-17.08	8	PASS
	9	2452	-22.41	3.01	-19.40	8	PASS

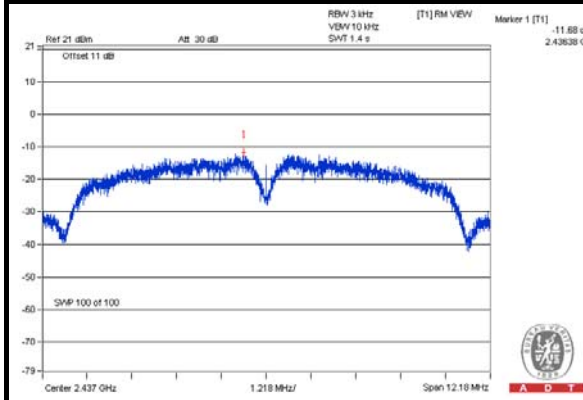
**NOTE:** Directional gain =  $1.5\text{dBi} + 10\log(2/2) = 1.5\text{dBi} < 6\text{dBi}$ , so the limit no need to reduced.



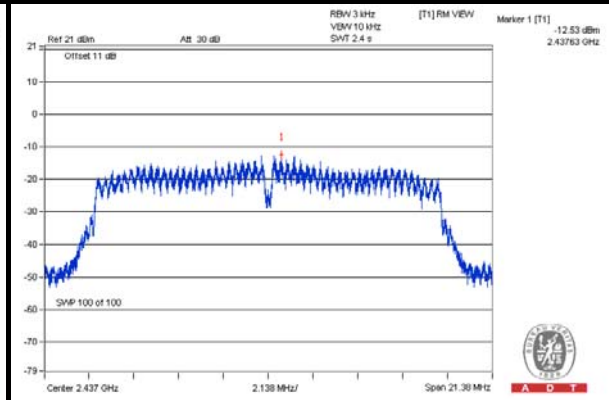
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### SPECTRUM PLOT OF WORST VALUE

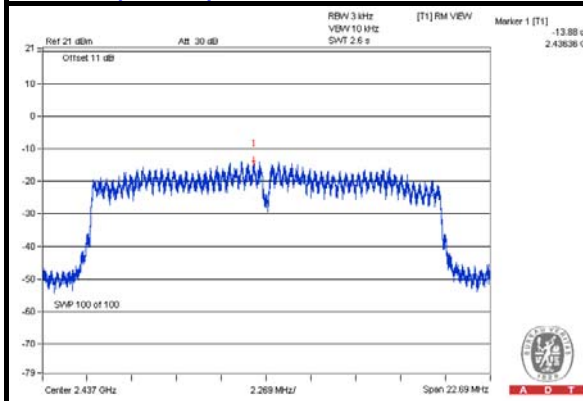
802.11b



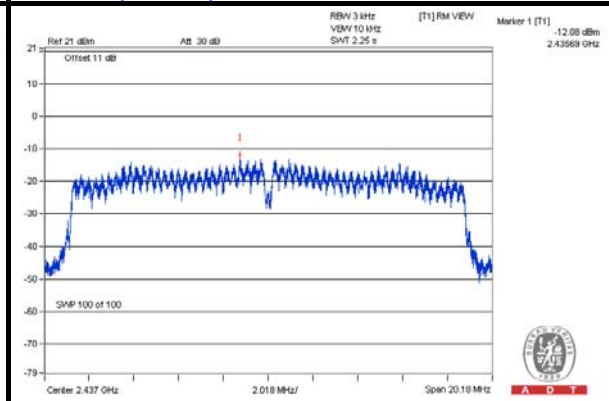
802.11g



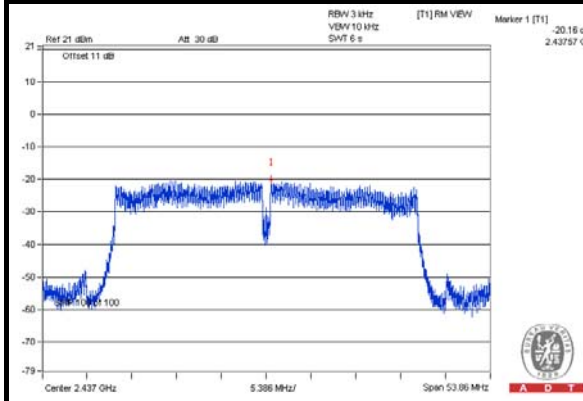
802.11n (20MHz) – 1TX



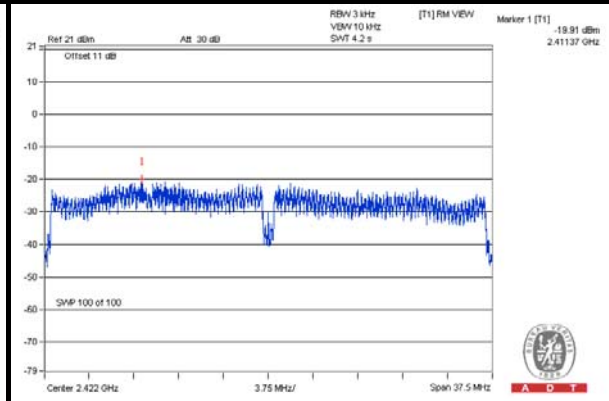
802.11n (20MHz) – 2TX



802.11n (40MHz) – 1TX



802.11n (40MHz) – 2TX



### 4.7 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

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

#### 4.7.2 TEST SETUP



#### 4.7.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.



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#### 4.7.4 TEST PROCEDURE

##### **MEASUREMENT PROCEDURE REF**

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

##### **MEASUREMENT PROCEDURE OOB**

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

#### 4.7.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.7.7 TEST RESULTS

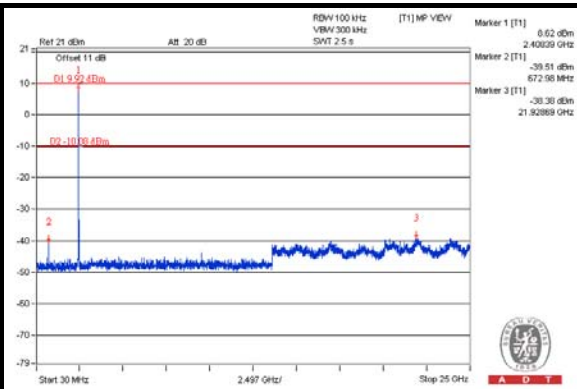
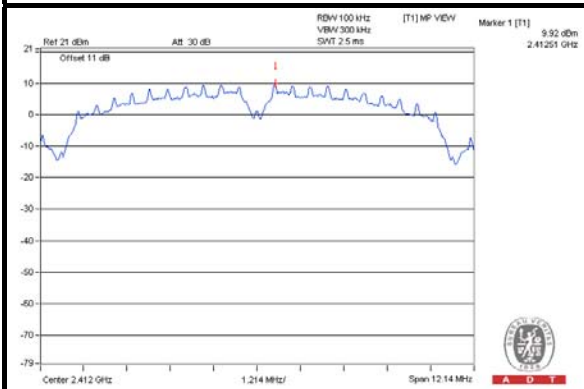
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



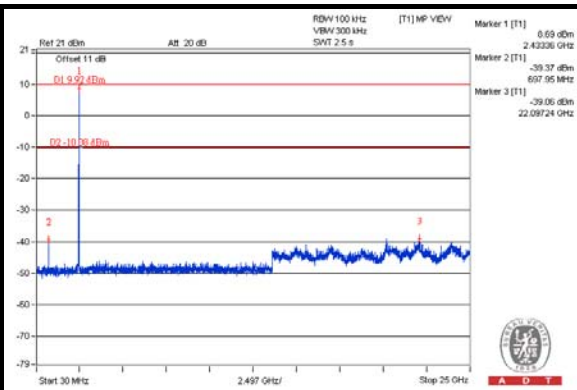
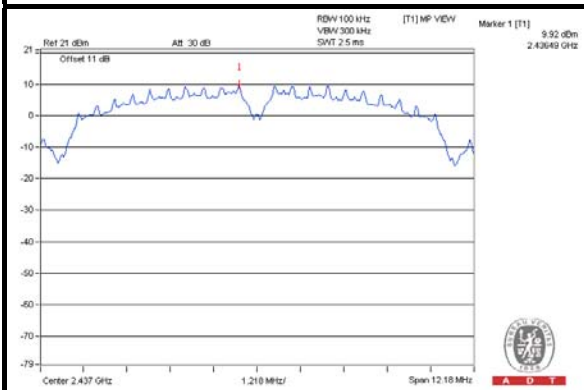
A D T

### 802.11b

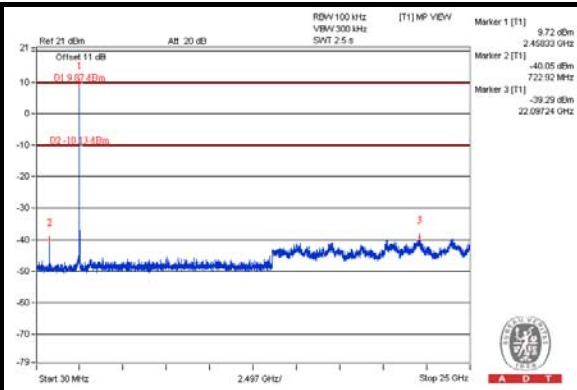
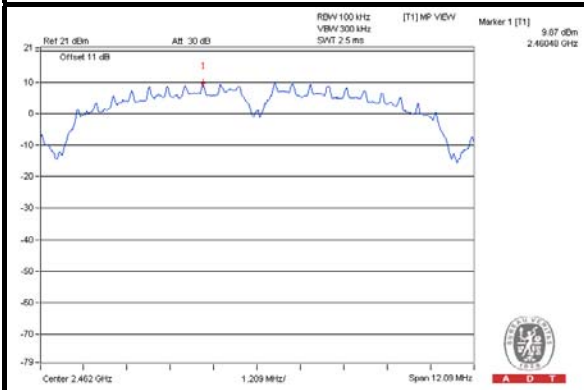
#### CH 1



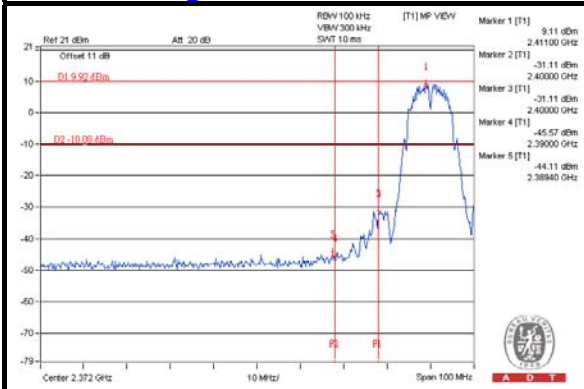
#### CH 6



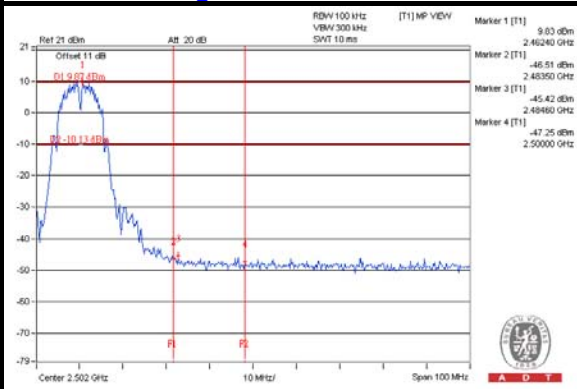
#### CH 11



#### CH 1 Band Edge



#### CH 11 Band Edge

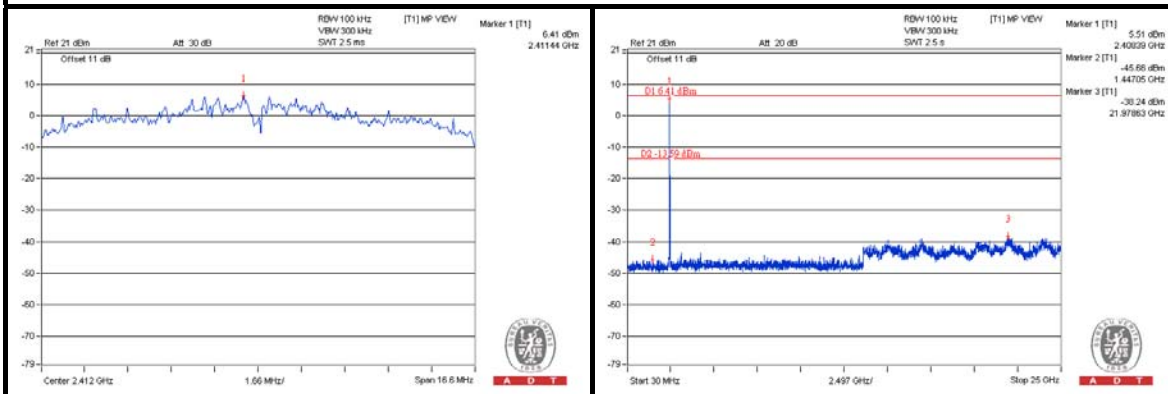




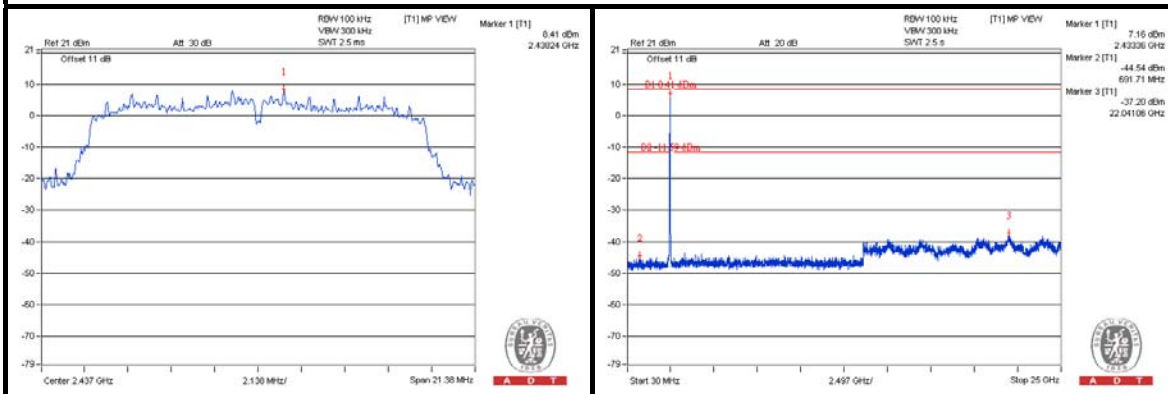
A D T

### 802.11g

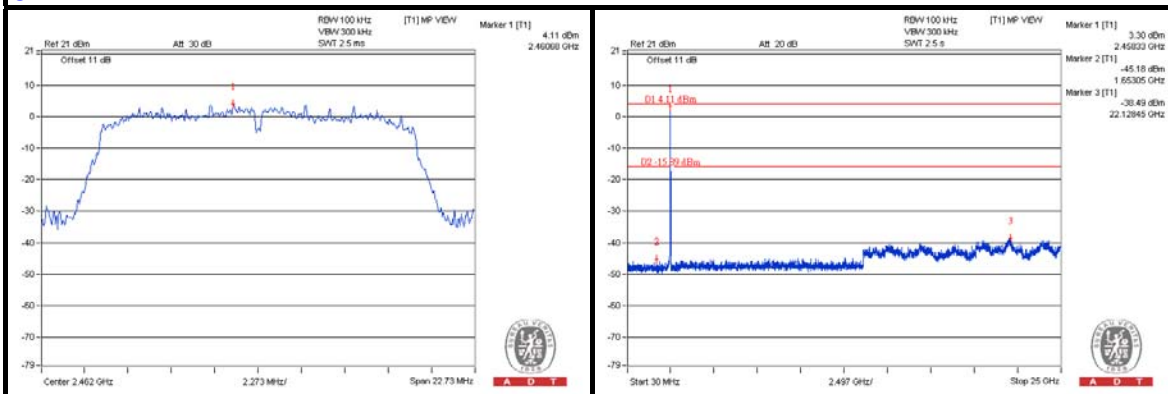
#### CH 1



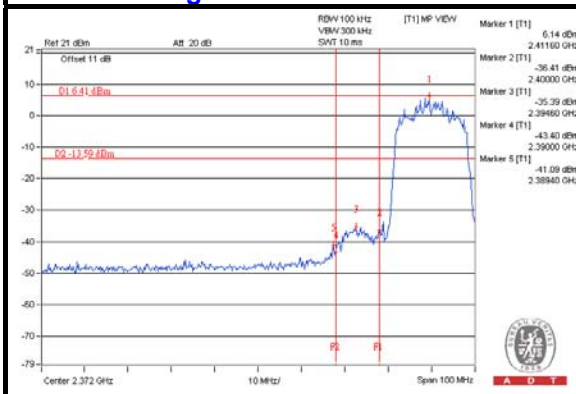
#### CH 6



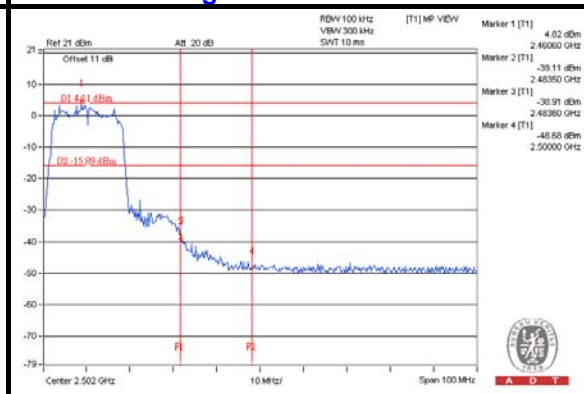
#### CH 11



#### CH 1 Band Edge



#### CH 11 Band Edge



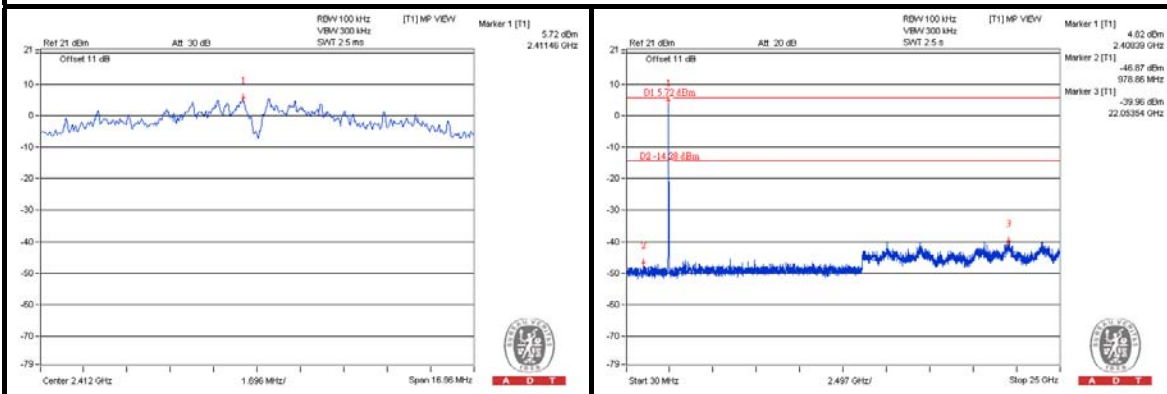




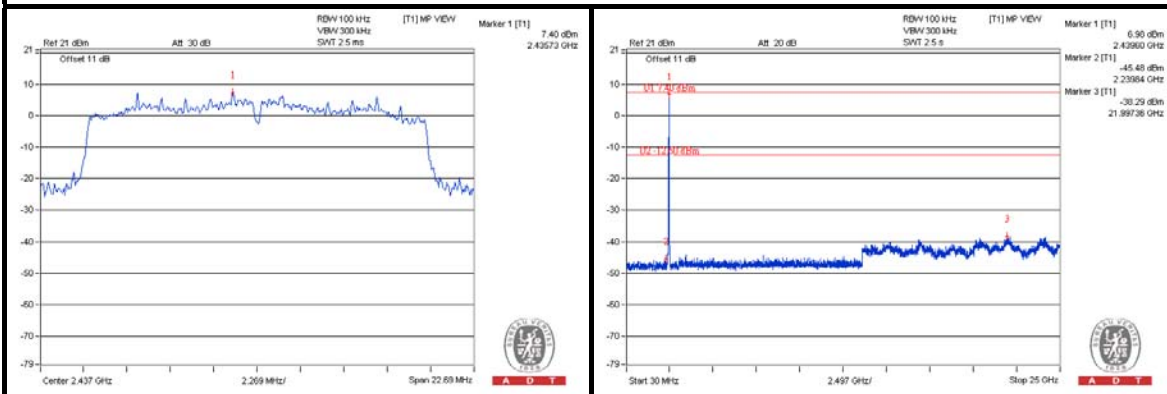
A D T

### 802.11n (20MHz) – 1TX

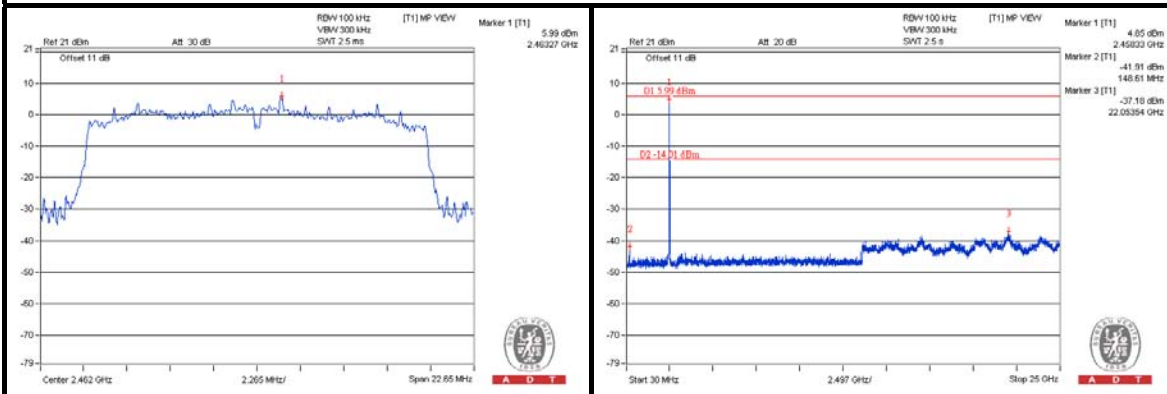
#### CH 1



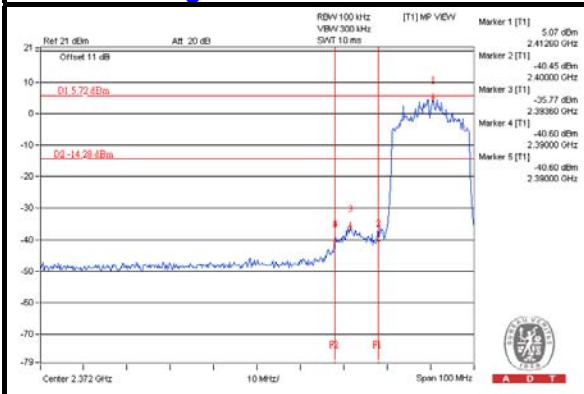
#### CH 6



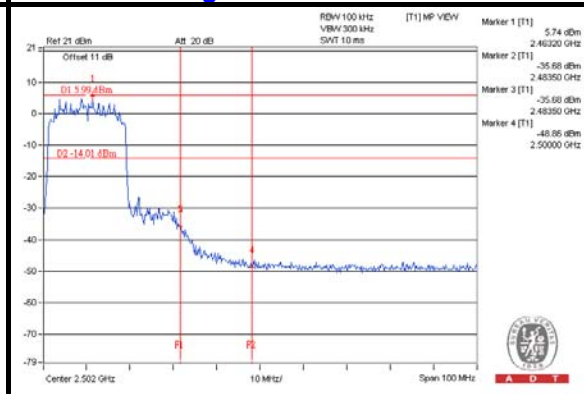
#### CH 11



#### CH 1 Band Edge



#### CH 11 Band Edge

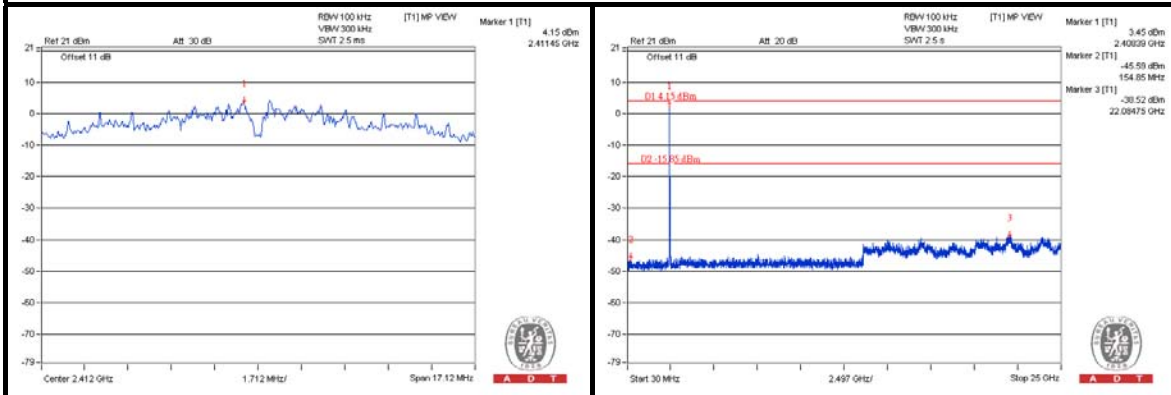




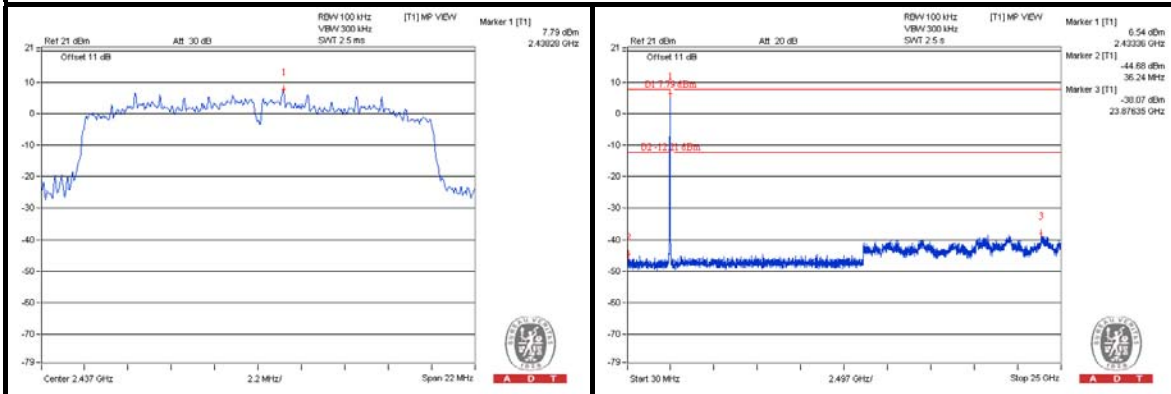
A D T

# 802.11n (20MHz) – 2TX CHAIN 0

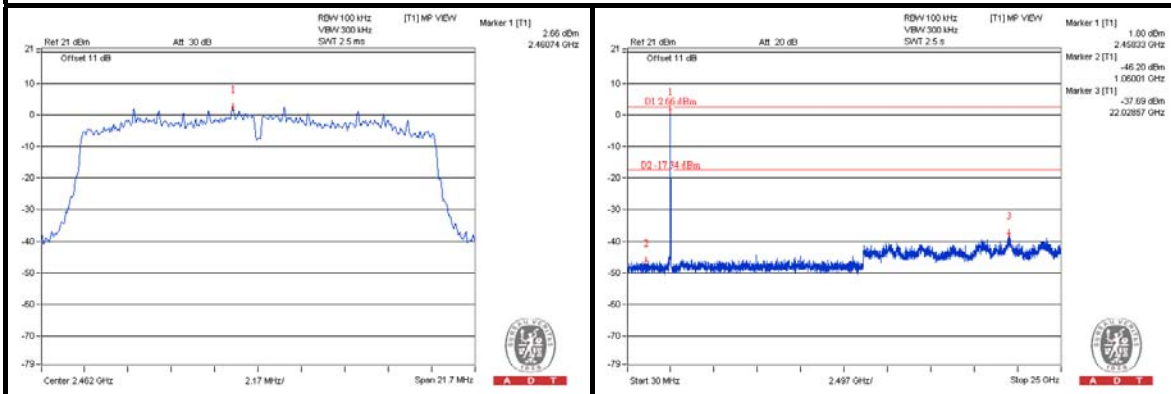
## CH 1



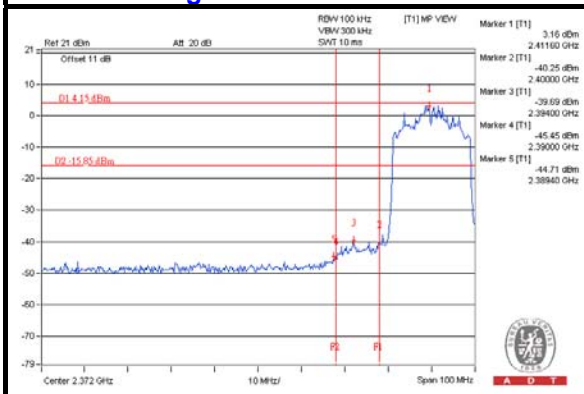
## CH 6



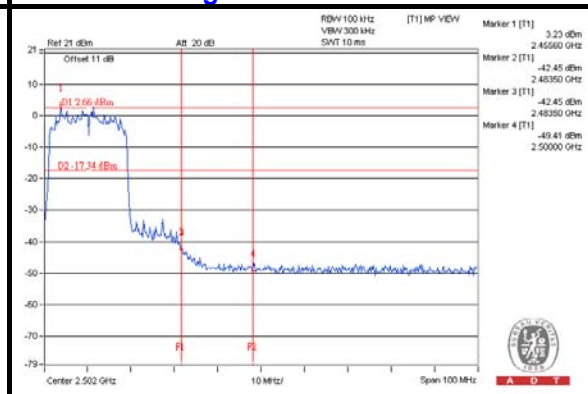
## CH 11



## CH 1 Band Edge



## CH 11 Band Edge

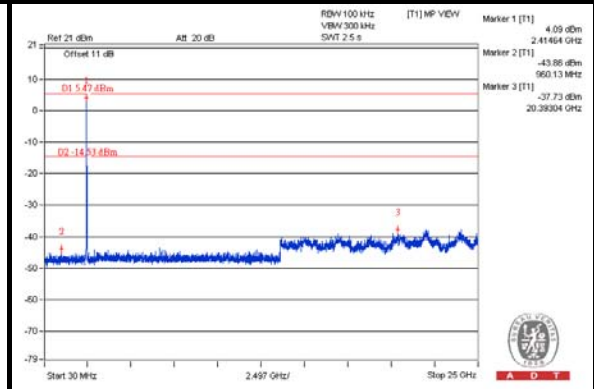
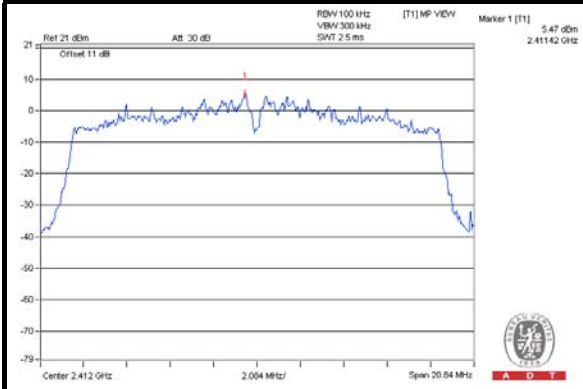




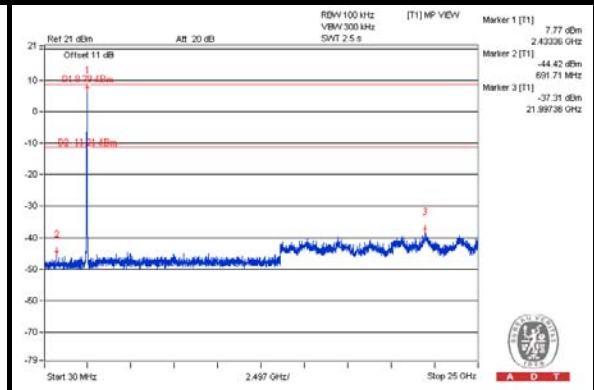
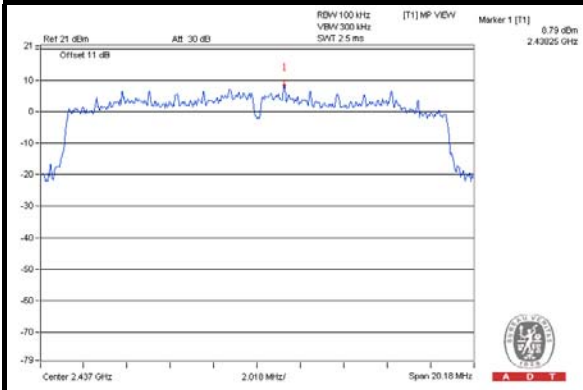
A D T

### CHAIN 1

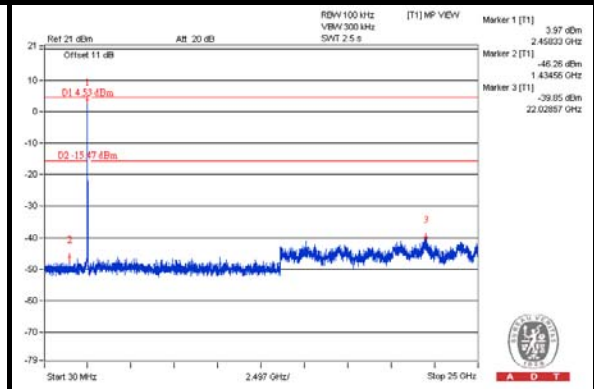
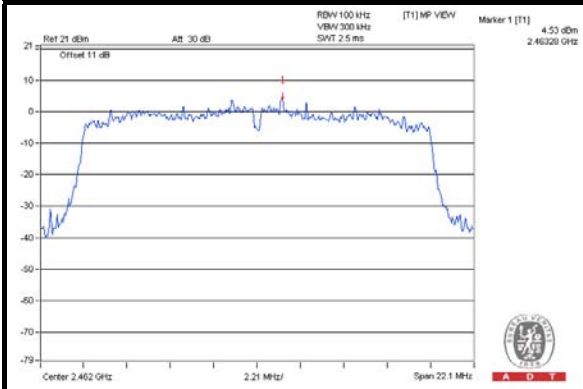
#### CH 1



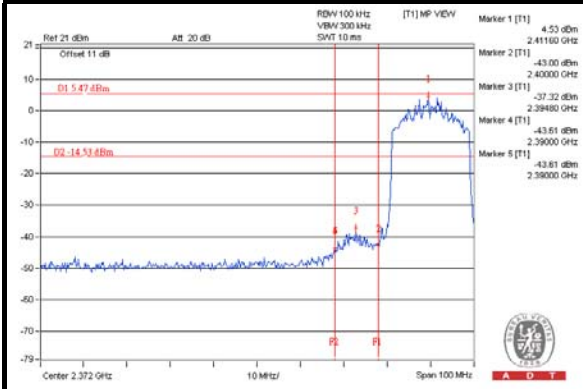
#### CH 6



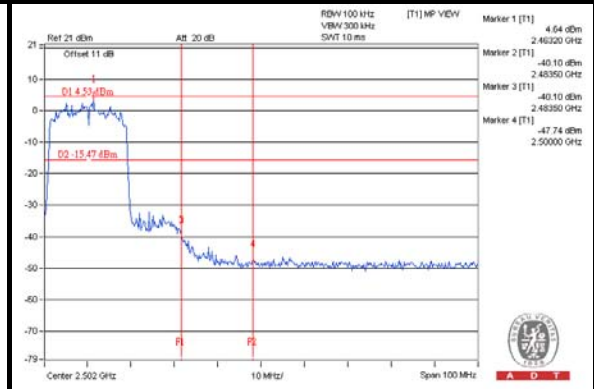
#### CH 11



#### CH 1 Band Edge



#### CH 11 Band Edge

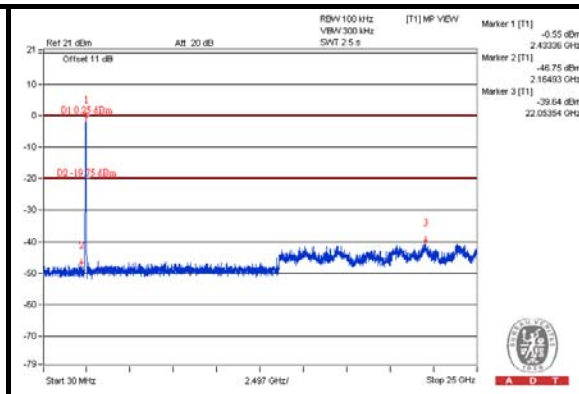
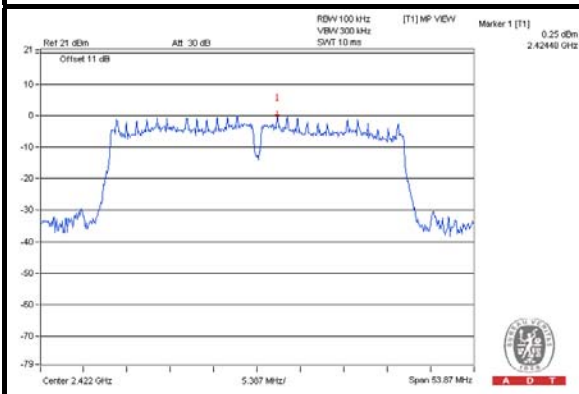




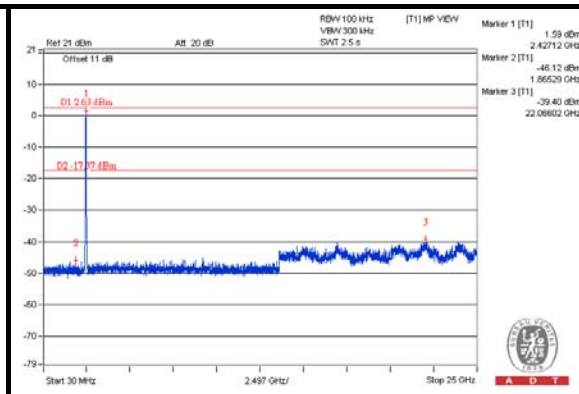
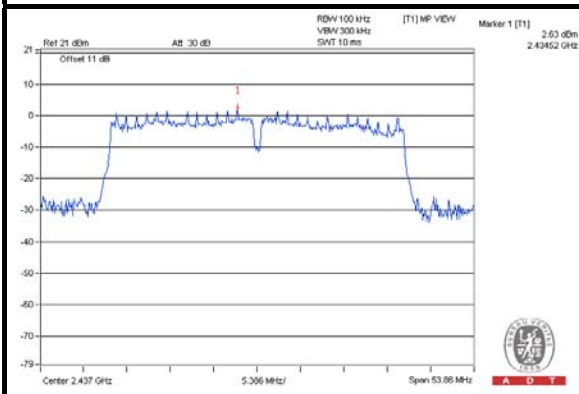
A D T

### 802.11n (40MHz) – 1TX

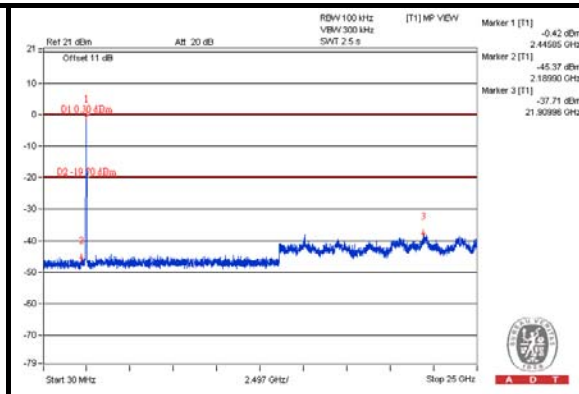
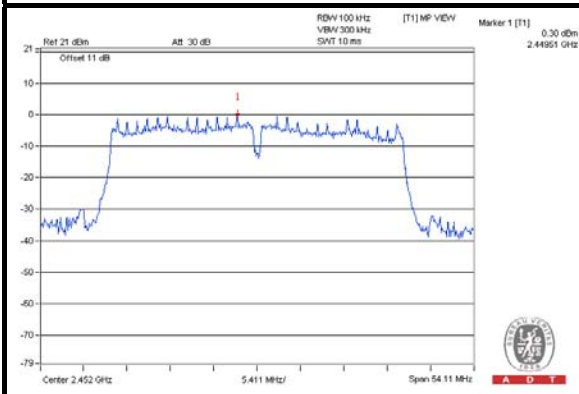
#### CH 3



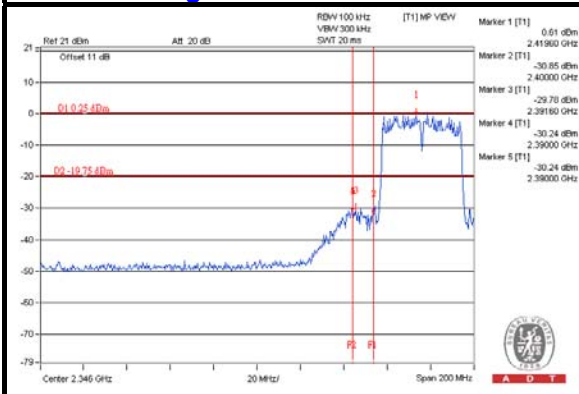
#### CH 6



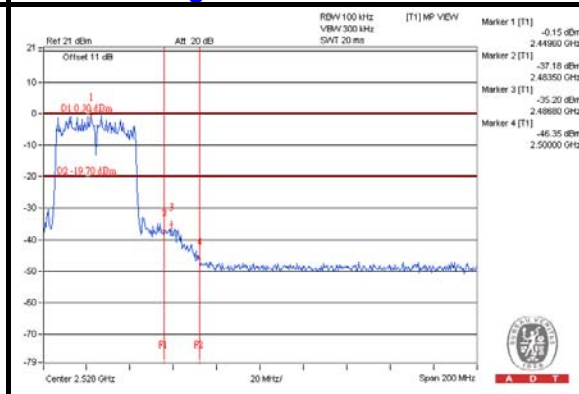
#### CH 9



#### CH 3 Band Edge



#### CH 9 Band Edge

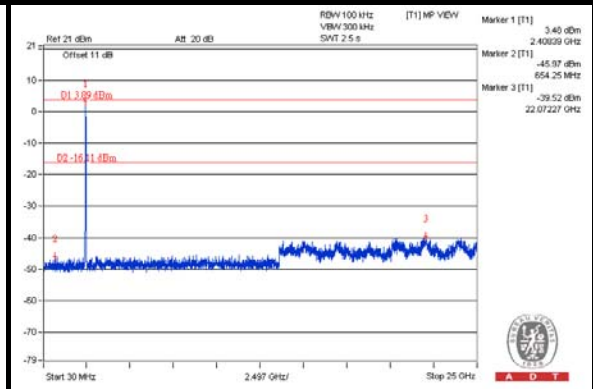
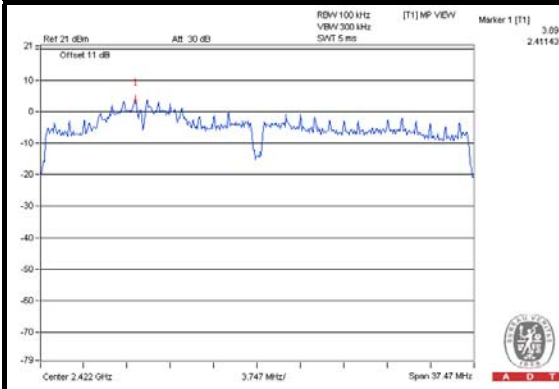




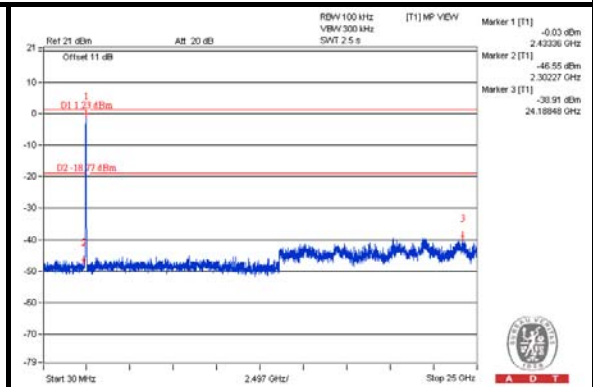
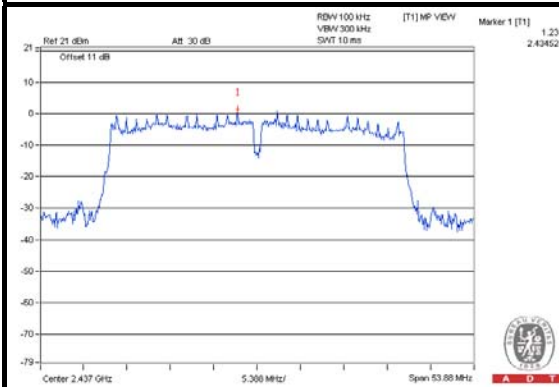
A D T

# 802.11n (40MHz) – 2TX CHAIN 0

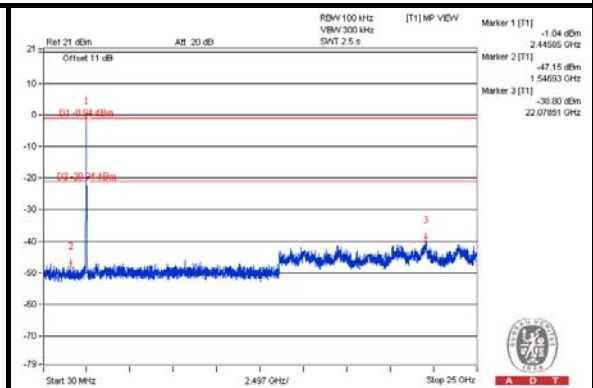
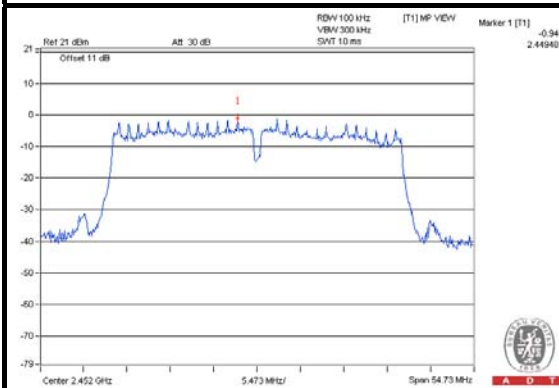
## CH 3



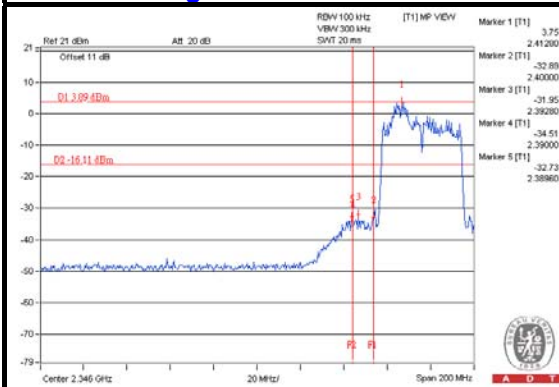
## CH 6



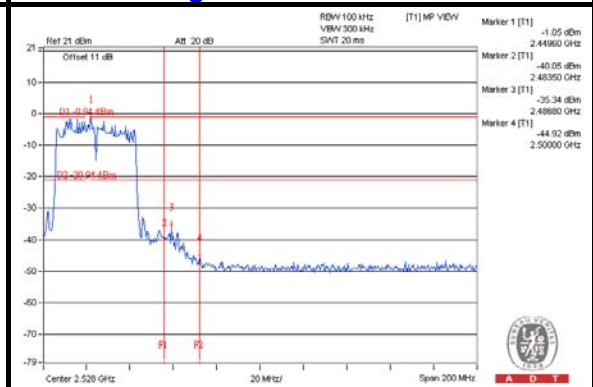
## CH 9



## CH 3 Band Edge



## CH 9 Band Edge

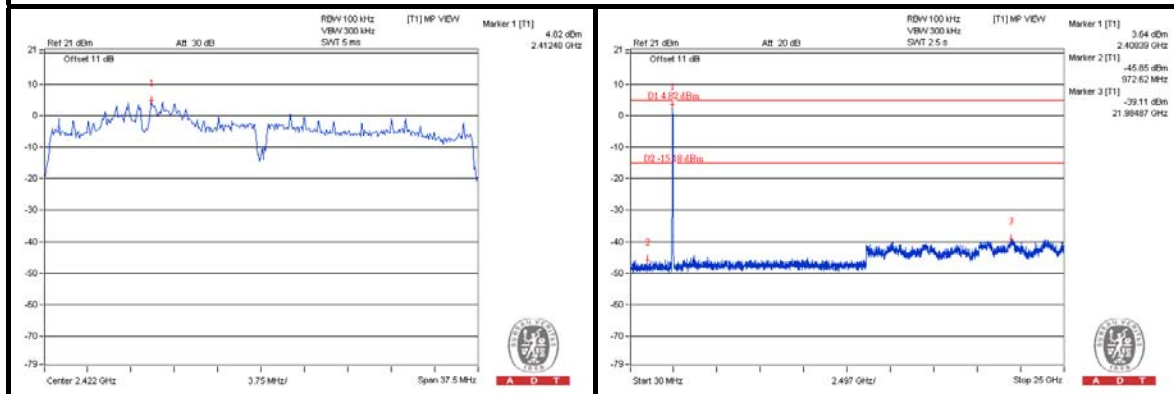




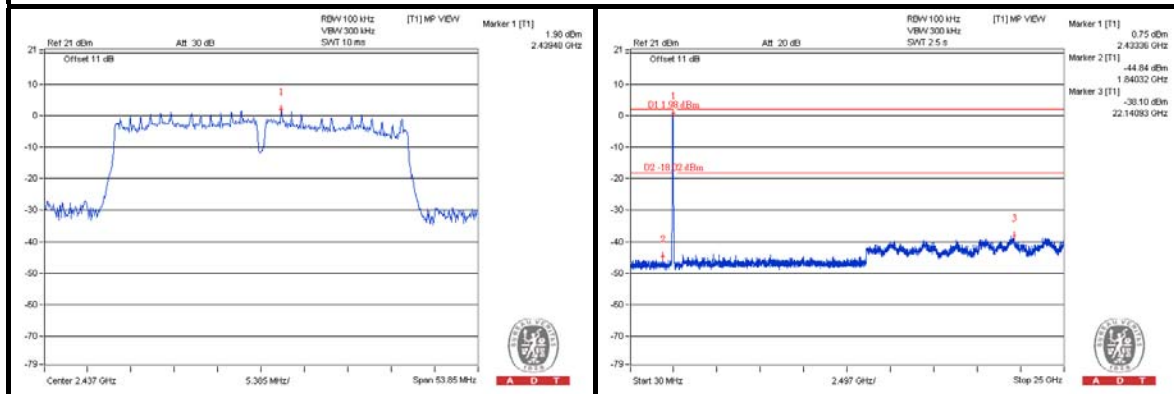
A D T

### CHAIN 1

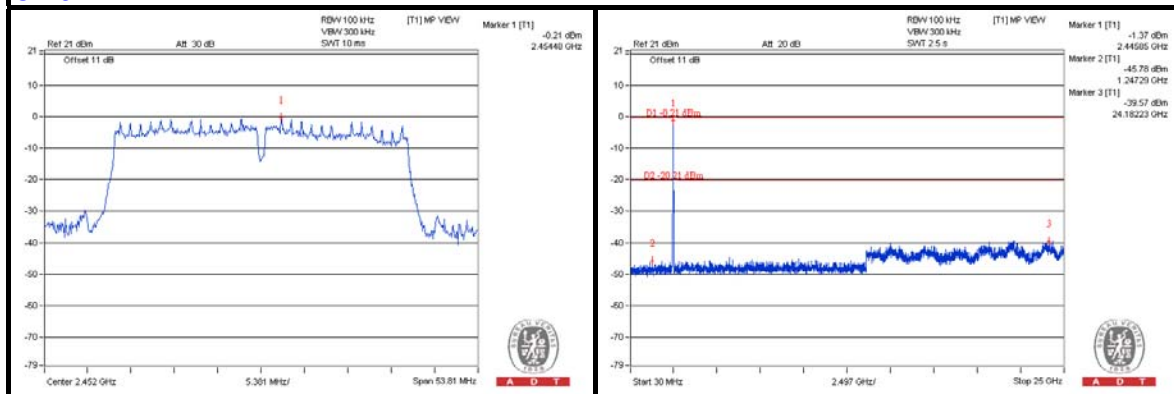
#### CH 3



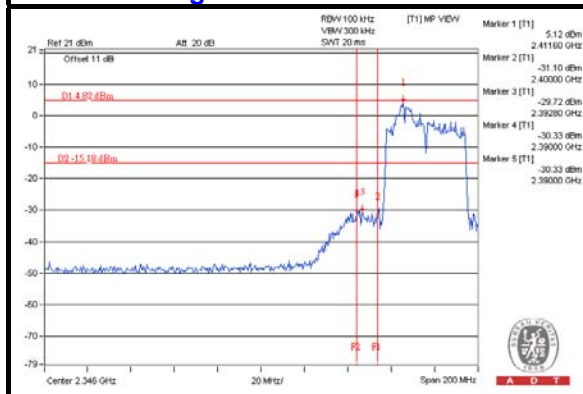
#### CH 6



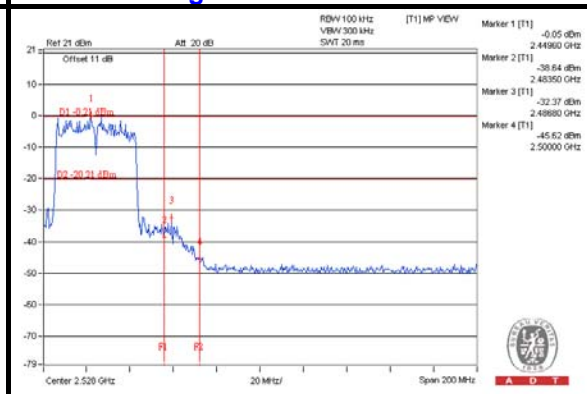
#### CH 9



#### CH 3 Band Edge



#### CH 9 Band Edge





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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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





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## 6. INFORMATION ON THE TESTING LABORATORIES

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

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

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Fax: 886-2-26051924

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

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





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## **7. APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

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

**---END---**