FCC TEST REPORT (15.247)

REPORT NO.:	RF130529C21
MODEL NO.:	BR200-LTE-VZ
FCC ID:	WBV-BR200-WPL
RECEIVED:	May 20, 2013
TESTED:	May 20, 2013 ~ Mar. 07, 2014
ISSUED:	Mar. 20, 2014

APPLICANT:	Aerohive Networks, INC
ADDRESS:	330 Gibraltar Drive, Sunnyvale, CA 94089

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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130529C21	Original release	Mar. 20, 2014

1. CERTIFICATION

PRODUCT:	AP Router
MODEL NO.:	BR200-LTE-VZ
BRAND:	Aerohive
APPLICANT:	Aerohive Networks, INC
TESTED:	May 20, 2013 ~ Mar. 07, 2014
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	ANSI C63.10-2009

The above equipment (model: BR200-LTE-VZ) 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 : _____ **, DATE :** Mar. 20, 2014
Suntee Liu / Specialist

APPROVED BY : _____ **, DATE :** Mar. 20, 2014
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 -10.47dB at 0.35703MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5000.00MHz.
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 UFL 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.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	AP Router
MODEL NO.	BR200-LTE-VZ
POWER SUPPLY	48Vdc (adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11/5.5/2/1Mbps 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 450Mbps
OPERATING FREQUENCY	**2.4GHz:** 2412 ~ 2462MHz **5.0GHz:** 5745 ~ 5825MHz
NUMBER OF CHANNEL	**2.4GHz:** 802.11b, 802.11g, 802.11n (20MHz): 11 **5.0GHz:** 802.11a, 802.11n (20MHz): 5 802.11n (40MHz): 2
OUTPUT POWER	**2.4GHz:** 629.851mW **5.0GHz:** 412.039mW
ANTENNA TYPE	Refer to Note
ANTENNA CONNECTOR	Refer to Note
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT incorporates a MIMO function. The EUT provides 3 completed transmitters and 3 receivers. Chain 0 is used for 802.11a/b/g.

MODULATION MODE	TX FUNCTION	DESCRIPTION
802.11b	1TX	Chain 0
802.11g	1TX	Chain 0
802.11n (20MHz)	3TX	Chain 0 / 1 / 2
802.11a	1TX	Chain 0
802.11an (20MHz)	3TX	Chain 0 / 1 / 2
802.11an (40MHz)	3TX	Chain 0 / 1 / 2

2. The EUT consumes power from the following adapter.

Brand	LEADER ELECTRONICS INC.
Model	NU60-F480125-I1
Input Power	100-240Vac, 50/60Hz, 1.4A
Output Power	48.0Vdc, 1.25A
Power Line	1.8m DC cable with 1 core attached on adapter 1.8m AC cable without core

3. The EUT uses following antennas.

Frequency (MHz)	Type	Connector	Gain (dBi)		
			Chain 0	Chain 1	Chain 2
2412 ~ 2462	PCB Printing	UFL	2.94	5.08	3.81
5745 ~ 5825	PCB Printing	UFL	6.16	4.67	7.21

4. 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		

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	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

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 68%RH	120Vac, 60Hz	Alan Wu
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Martin Lee
PLC	26deg. C, 65%RH	120Vac, 60Hz	Cedric Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

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 **X-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	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	TESTED BY
RE≥1G	25deg. C, 68%RH	120Vac, 60Hz	Brad Tung
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Martin Lee
PLC	26deg. C, 65%RH	120Vac, 60Hz	Cedric Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

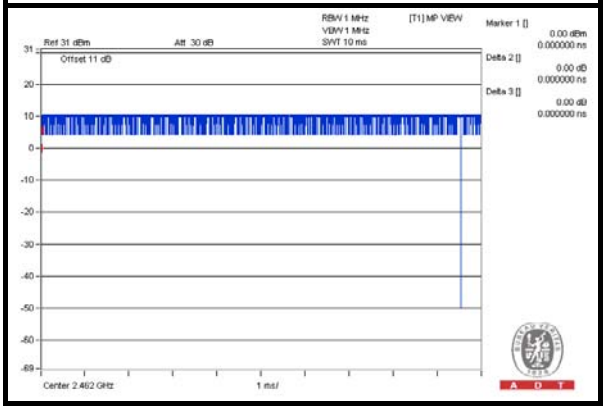
3.3 DUTY CYCLE OF TEST SIGNAL

802.11b: Duty cycle of test signal is 100 %

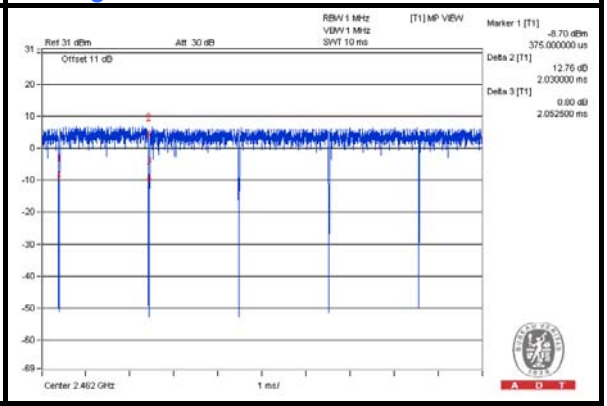
802.11g: Duty cycle = 2.03/2.0525 = 0.989, Duty factor = 10 * log(1/0.989) = 0.05

802.11n (20MHz): Duty cycle = 0.6675/0.685 = 0.974, Duty factor = 10 * log(1/0.974) = 0.11

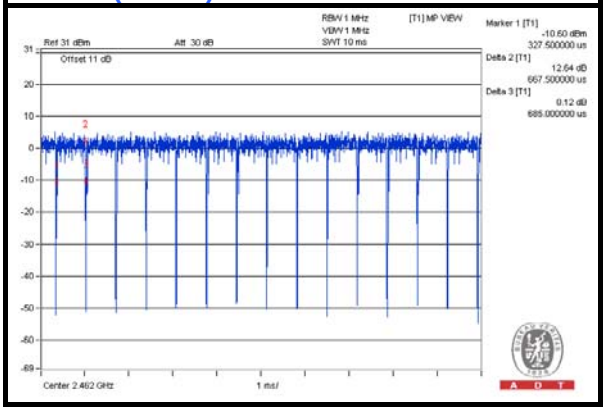
802.11b



802.11g

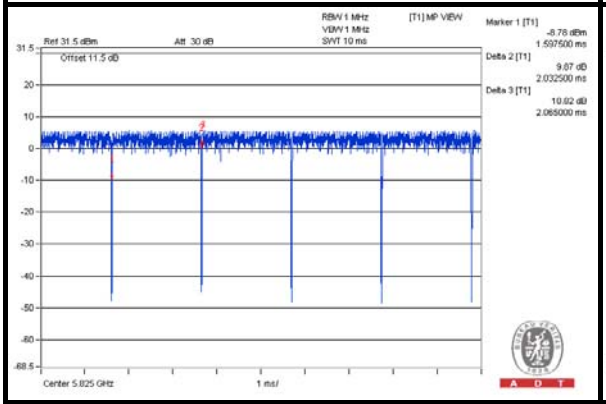
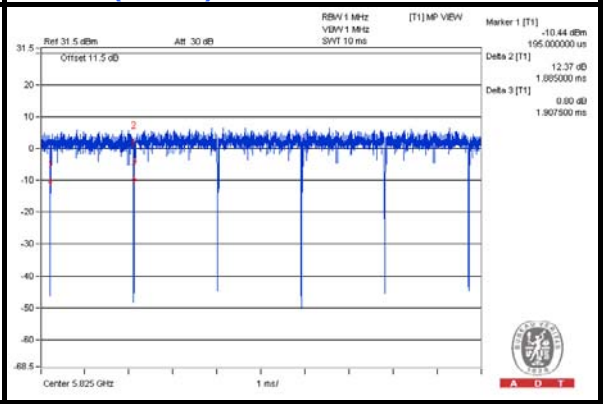
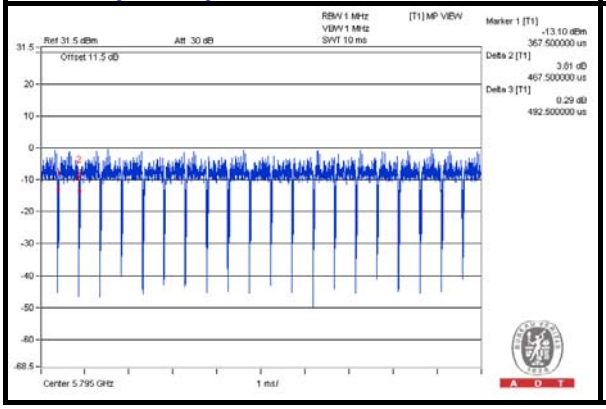


802.11n (20MHz)



5.0GHz Band:

802.11a: Duty cycle = 2.0325/2.065 = 0.984, Duty factor = 10 * log(1/0.984) = 0.07
802.11n (20MHz): Duty cycle = 1.885/1.9075 = 0.988, Duty factor = 10 * log(1/0.988) = 0.05
802.11n (40MHz): Duty cycle = 0.468/0.4925 = 0.950, Duty factor = 10 * log(1/0.950) = 0.22

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	
	

3.4 DESCRIPTION OF SUPPORT UNITS

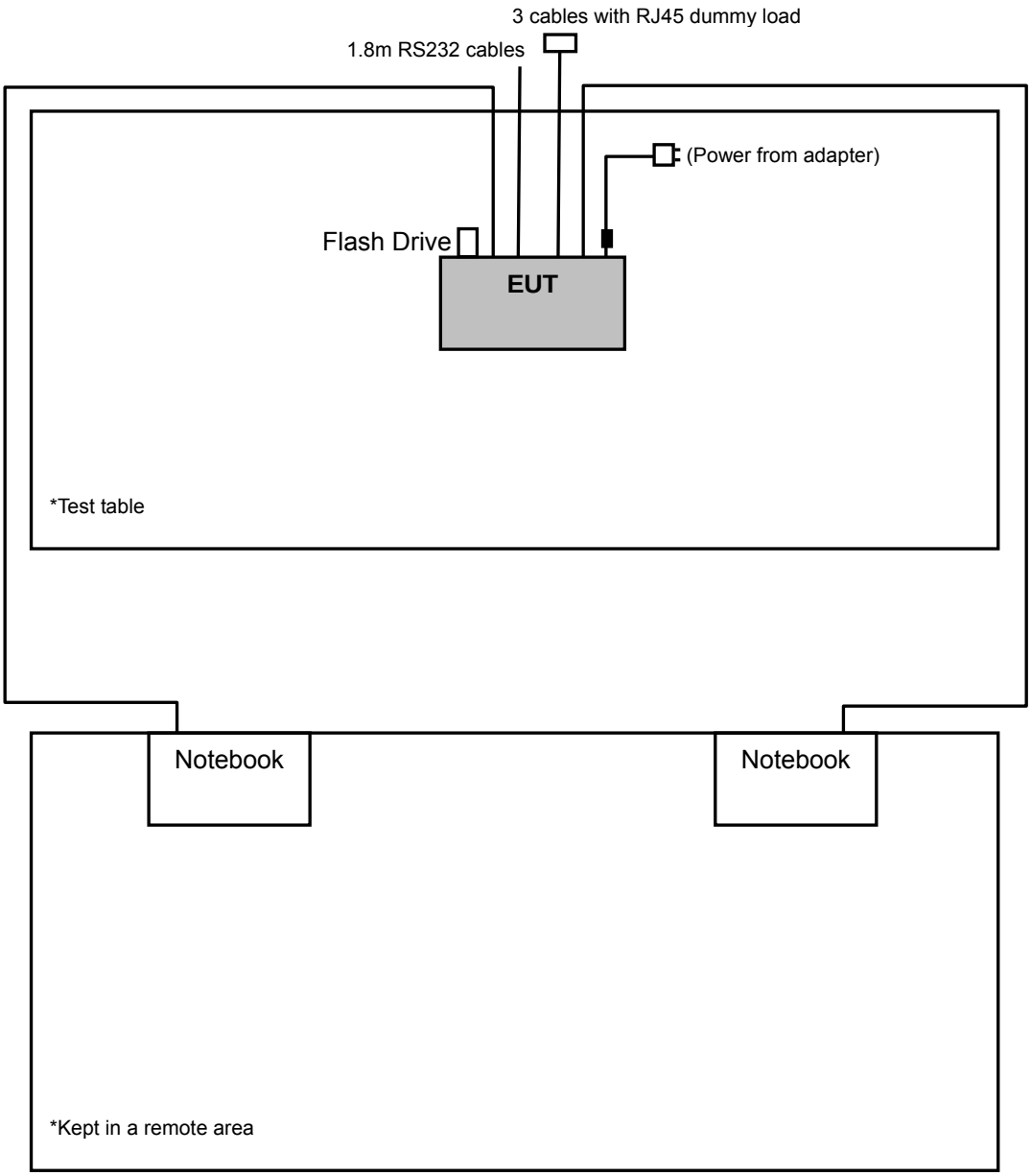
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	USB Flash Drive	Transcend	V85	538455 4488	NA
2	Dummy Load	NA	NA	NA	NA
3	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved
4	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	QDS-BRCM1020

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m RJ45 UTP cable x 3 with load connected to EUT
3	10m RJ45 UTP cable
4	10m RJ45 UTP cable

NOTE:
1. All power cords of the above support units are non-shielded (1.8m).
2. Items 3-4 acted as communication partners to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r01
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Jan. 03, 2013	Jan. 02, 2014
			Jan. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 04, 2013	Mar. 03, 2014
			Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Mar. 20, 2013	Mar. 19, 2014
			Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	9120D	209	Sep. 13, 2012	Sep. 12, 2013
			Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 16, 2014	Jul. 15, 2013
			Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
			Oct. 07, 2013	Oct. 06, 2014
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 2013
			Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 28, 2012	Aug. 27, 2013
			Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 28, 2012	Aug. 27, 2013
			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	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
			Oct. 18, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0842014	Apr. 25, 2013	Apr. 26, 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 test was performed in HwaYa Chamber 3.

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 988962.

5. The IC Site Registration No. is IC 7450F-3.

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:

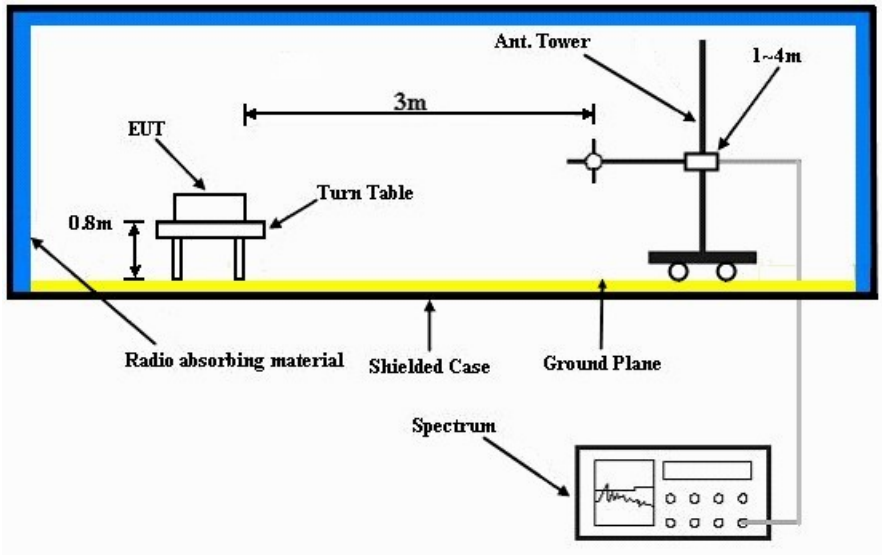
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

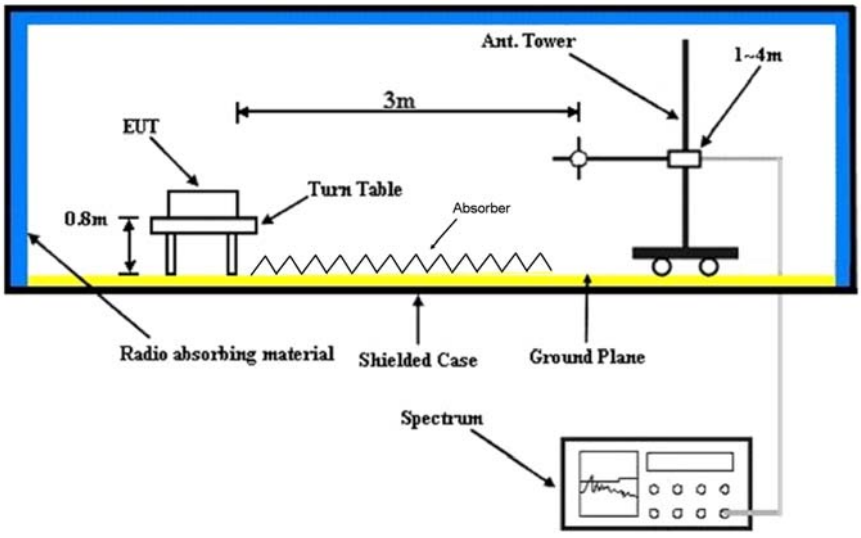
No deviation.

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).

4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Prepared notebooks to act as communication partners and placed them outside of testing area.
c. The communication partners 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 partners sent data to EUT by command "PING".
e. The necessary accessories enabled the system in full functions.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	61.9 PK	74.0	-12.1	1.07 H	12	31.10	30.80
2	2390.00	52.8 AV	54.0	-1.2	1.07 H	12	22.00	30.80
3	*2412.00	112.8 PK			1.09 H	13	81.90	30.90
4	*2412.00	109.0 AV			1.09 H	13	78.10	30.90
5	4824.00	51.6 PK	74.0	-22.4	1.07 H	349	14.60	37.00
6	4824.00	47.5 AV	54.0	-6.5	1.07 H	349	10.50	37.00
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	2390.00	56.9 PK	74.0	-17.1	1.00 V	54	26.10	30.80
2	2390.00	47.5 AV	54.0	-6.5	1.00 V	54	16.70	30.80
3	*2412.00	104.9 PK			1.00 V	50	74.00	30.90
4	*2412.00	101.4 AV			1.00 V	50	70.50	30.90
5	4824.00	46.4 PK	74.0	-27.6	1.00 V	24	9.40	37.00
6	4824.00	40.4 AV	54.0	-13.6	1.00 V	24	3.40	37.00

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	2350.00	58.4 PK	74.0	-15.6	1.04 H	10	27.70	30.70
2	2350.00	50.2 AV	54.0	-3.8	1.04 H	10	19.50	30.70
3	*2437.00	112.7 PK			1.08 H	15	81.70	31.00
4	*2437.00	108.9 AV			1.08 H	15	77.90	31.00
5	4874.00	53.5 PK	74.0	-20.5	1.05 H	346	16.40	37.10
6	4874.00	50.3 AV	54.0	-3.7	1.05 H	346	13.20	37.10
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	2350.00	54.4 PK	74.0	-19.6	1.12 V	43	23.70	30.70
2	2350.00	43.3 AV	54.0	-10.7	1.12 V	43	12.60	30.70
3	*2437.00	104.7 PK			1.18 V	48	73.70	31.00
4	*2437.00	101.1 AV			1.18 V	48	70.10	31.00
5	4874.00	48.6 PK	74.0	-25.4	1.00 V	20	11.50	37.10
6	4874.00	42.2 AV	54.0	-11.8	1.00 V	20	5.10	37.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	111.9 PK			1.33 H	13	80.80	31.10
2	*2462.00	108.1 AV			1.33 H	13	77.00	31.10
3	2483.50	60.9 PK	74.0	-13.1	1.31 H	12	29.70	31.20
4	2483.50	51.1 AV	54.0	-2.9	1.31 H	12	19.90	31.20
5	4924.00	52.8 PK	74.0	-21.2	1.04 H	11	15.60	37.20
6	4924.00	48.7 AV	54.0	-5.3	1.04 H	11	11.50	37.20
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	*2462.00	102.2 PK			1.17 V	51	71.10	31.10
2	*2462.00	98.4 AV			1.17 V	51	67.30	31.10
3	2483.50	56.4 PK	74.0	-17.6	1.18 V	50	25.20	31.20
4	2483.50	44.6 AV	54.0	-9.4	1.18 V	50	13.40	31.20
5	4924.00	47.0 PK	74.0	-27.0	1.00 V	28	9.80	37.20
6	4924.00	41.4 AV	54.0	-12.6	1.00 V	28	4.20	37.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	68.8 PK	74.0	-5.2	1.38 H	15	38.00	30.80
2	2390.00	51.7 AV	54.0	-2.3	1.38 H	15	20.90	30.80
3	*2412.00	109.8 PK			1.37 H	12	78.90	30.90
4	*2412.00	100.0 AV			1.37 H	12	69.10	30.90
5	4824.00	42.6 PK	74.0	-31.4	1.05 H	348	5.60	37.00
6	4824.00	36.8 AV	54.0	-17.2	1.05 H	348	-0.20	37.00
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	2390.00	58.2 PK	74.0	-15.8	1.00 V	117	27.40	30.80
2	2390.00	43.7 AV	54.0	-10.3	1.00 V	117	12.90	30.80
3	*2412.00	102.0 PK			1.00 V	120	71.10	30.90
4	*2412.00	92.9 AV			1.00 V	120	62.00	30.90
5	4824.00	41.8 PK	74.0	-32.2	1.00 V	27	4.80	37.00
6	4824.00	35.4 AV	54.0	-18.6	1.00 V	27	-1.60	37.00

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	114.3 PK			1.36 H	15	83.30	31.00
2	*2437.00	104.8 AV			1.36 H	15	73.80	31.00
3	2483.50	63.7 PK	74.0	-10.3	1.36 H	11	32.50	31.20
4	2483.50	49.8 AV	54.0	-4.2	1.36 H	11	18.60	31.20
5	4874.00	43.9 PK	74.0	-30.1	1.01 H	346	6.80	37.10
6	4874.00	37.9 AV	54.0	-16.1	1.01 H	346	0.80	37.10
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	*2437.00	106.2 PK			1.00 V	121	75.20	31.00
2	*2437.00	96.3 AV			1.00 V	121	65.30	31.00
3	2483.50	56.1 PK	74.0	-17.9	1.00 V	122	24.90	31.20
4	2483.50	43.0 AV	54.0	-11.0	1.00 V	122	11.80	31.20
5	4874.00	42.2 PK	74.0	-31.8	1.00 V	22	5.10	37.10
6	4874.00	36.6 AV	54.0	-17.4	1.00 V	22	-0.50	37.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	110.3 PK			1.34 H	11	79.20	31.10
2	*2462.00	100.5 AV			1.34 H	11	69.40	31.10
3	2483.50	70.5 PK	74.0	-3.5	1.31 H	14	39.30	31.20
4	2483.50	52.3 AV	54.0	-1.7	1.31 H	14	21.10	31.20
5	4924.00	43.0 PK	74.0	-31.0	1.00 H	25	5.80	37.20
6	4924.00	37.5 AV	54.0	-16.5	1.00 H	25	0.30	37.20
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	*2462.00	101.9 PK			1.19 V	124	70.80	31.10
2	*2462.00	92.3 AV			1.19 V	124	61.20	31.10
3	2483.50	61.4 PK	74.0	-12.6	1.19 V	122	30.20	31.20
4	2483.50	45.0 AV	54.0	-9.0	1.19 V	122	13.80	31.20
5	4924.00	41.5 PK	74.0	-32.5	1.00 V	21	4.30	37.20
6	4924.00	36.2 AV	54.0	-17.8	1.00 V	21	-1.00	37.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	70.7 PK	74.0	-3.3	1.16 H	349	39.90	30.80
2	2390.00	52.5 AV	54.0	-1.5	1.16 H	349	21.70	30.80
3	*2412.00	113.2 PK			1.36 H	13	82.30	30.90
4	*2412.00	103.6 AV			1.36 H	13	72.70	30.90
5	4824.00	43.4 PK	74.0	-30.6	1.02 H	346	6.40	37.00
6	4824.00	37.2 AV	54.0	-16.8	1.02 H	346	0.20	37.00
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	2390.00	55.3 PK	74.0	-18.7	1.00 V	229	24.50	30.80
2	2390.00	42.5 AV	54.0	-11.5	1.00 V	229	11.70	30.80
3	*2412.00	103.1 PK			1.00 V	224	72.20	30.90
4	*2412.00	93.9 AV			1.00 V	224	63.00	30.90
5	4824.00	42.7 PK	74.0	-31.3	1.00 V	28	5.70	37.00
6	4824.00	36.9 AV	54.0	-17.1	1.00 V	28	-0.10	37.00

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	114.2 PK			1.35 H	13	83.20	31.00
2	*2437.00	104.8 AV			1.35 H	13	73.80	31.00
3	2483.50	62.8 PK	74.0	-11.2	1.37 H	16	31.60	31.20
4	2483.50	49.3 AV	54.0	-4.7	1.37 H	16	18.10	31.20
5	4874.00	44.4 PK	74.0	-29.6	1.06 H	347	7.30	37.10
6	4874.00	37.8 AV	54.0	-16.2	1.06 H	347	0.70	37.10
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	*2437.00	106.2 PK			1.18 V	48	75.20	31.00
2	*2437.00	96.3 AV			1.18 V	48	65.30	31.00
3	2483.50	55.4 PK	74.0	-18.6	1.11 V	47	24.20	31.20
4	2483.50	43.1 AV	54.0	-10.9	1.11 V	47	11.90	31.20
5	4874.00	43.8 PK	74.0	-30.2	1.00 V	28	6.70	37.10
6	4874.00	36.5 AV	54.0	-17.5	1.00 V	28	-0.60	37.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	25deg. C, 68%RH	TESTED BY	Alan Wu

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	114.9 PK			1.08 H	344	83.80	31.10
2	*2462.00	105.1 AV			1.08 H	344	74.00	31.10
3	2483.50	72.2 PK	74.0	-1.8	1.05 H	342	41.00	31.20
4	2483.50	52.5 AV	54.0	-1.5	1.05 H	342	21.30	31.20
5	4924.00	43.9 PK	74.0	-30.1	1.04 H	348	6.70	37.20
6	4924.00	37.5 AV	54.0	-16.5	1.04 H	348	0.30	37.20
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	*2462.00	103.0 PK			1.00 V	50	71.90	31.10
2	*2462.00	93.6 AV			1.00 V	50	62.50	31.10
3	2483.50	57.5 PK	74.0	-16.5	1.00 V	46	26.30	31.20
4	2483.50	42.8 AV	54.0	-11.2	1.00 V	46	11.60	31.20
5	4924.00	42.2 PK	74.0	-31.8	1.00 V	26	5.00	37.20
6	4924.00	36.2 AV	54.0	-17.8	1.00 V	26	-1.00	37.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%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	125.17	37.9 QP	43.5	-5.6	1.50 H	244	25.50	12.40
2	140.72	38.0 QP	43.5	-5.5	1.99 H	253	24.50	13.50
3	191.28	39.9 QP	43.5	-3.6	1.00 H	247	28.60	11.30
4	197.11	38.4 QP	43.5	-5.1	1.00 H	250	27.50	10.90
5	249.60	44.8 QP	46.0	-1.2	1.00 H	16	31.80	13.00
6	374.04	37.9 QP	46.0	-8.1	1.00 H	280	21.10	16.80
7	624.85	39.9 QP	46.0	-6.1	1.24 H	9	17.00	22.90
8	875.67	40.2 QP	46.0	-5.8	1.50 H	16	13.20	27.00
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	94.06	40.6 QP	43.5	-2.9	2.00 V	261	31.00	9.60
2	249.60	38.8 QP	46.0	-7.2	1.50 V	158	25.80	13.00
3	374.04	41.3 QP	46.0	-4.7	1.25 V	279	24.50	16.80
4	416.81	36.2 QP	46.0	-9.8	1.57 V	15	18.30	17.90
5	624.85	37.3 QP	46.0	-8.7	1.00 V	350	14.40	22.90
6	795.95	39.9 QP	46.0	-6.1	1.75 V	23	14.20	25.70
7	949.55	40.0 QP	46.0	-6.0	1.00 V	293	12.20	27.80

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)
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	100288	Nov. 18, 2012	Nov. 17, 2013
			Nov. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
			Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 24, 2012	Dec. 23, 2013
			Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 09, 2014	Jul. 08, 2013
			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 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

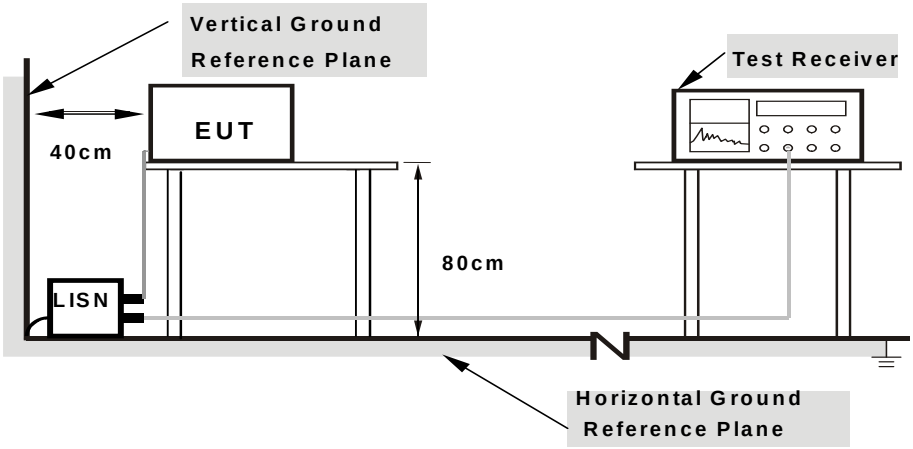
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

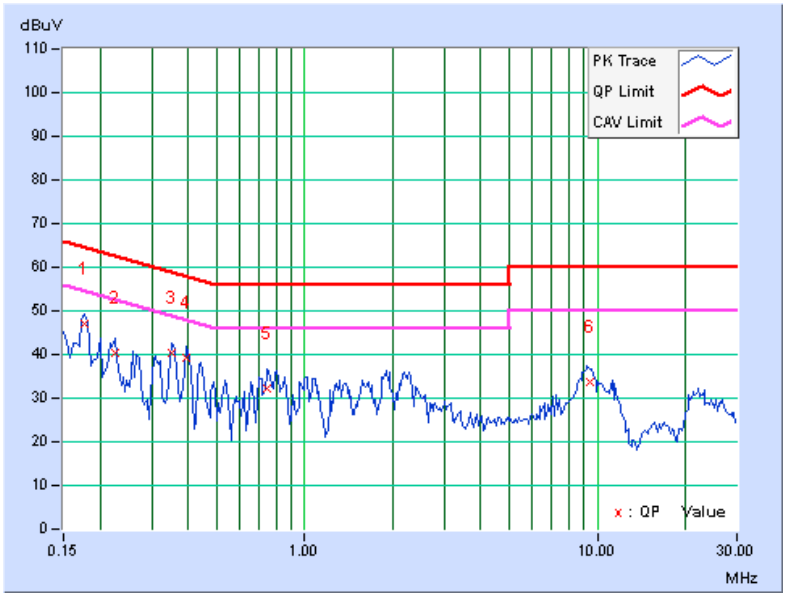
CONDUCTED WORST-CASE DATA：802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.19	46.78	35.21	46.97	35.40	64.61	54.61	-17.64	-19.21
2	0.22422	0.20	40.23	28.70	40.43	28.90	62.66	52.66	-22.23	-23.76
3	0.34922	0.21	40.20	37.91	40.41	38.12	58.98	48.98	-18.57	-10.86
4	0.39219	0.22	39.17	35.06	39.39	35.28	58.02	48.02	-18.63	-12.74
5	0.73984	0.26	32.12	25.06	32.38	25.32	56.00	46.00	-23.62	-20.68
6	9.43359	0.48	33.37	29.01	33.85	29.49	60.00	50.00	-26.15	-20.51

REMARKS:

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

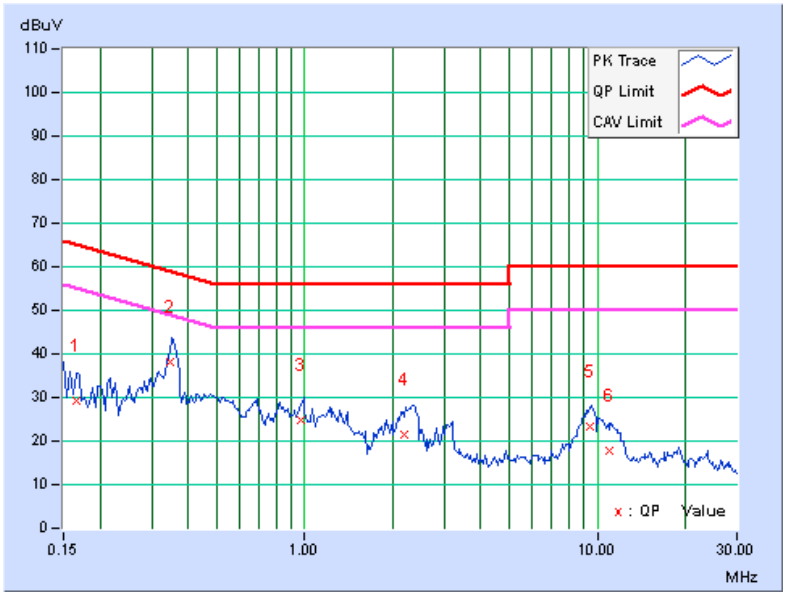


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.19	29.02	13.90	29.21	14.09	65.18	55.18	-35.96	-41.08
2	0.34531	0.25	37.84	29.49	38.09	29.74	59.07	49.07	-20.99	-19.34
3	0.97031	0.26	24.67	16.47	24.93	16.73	56.00	46.00	-31.07	-29.27
4	2.17969	0.33	21.14	10.63	21.47	10.96	56.00	46.00	-34.53	-35.04
5	9.44531	0.56	22.94	17.34	23.50	17.90	60.00	50.00	-36.50	-32.10
6	10.93359	0.59	17.26	11.15	17.85	11.74	60.00	50.00	-42.15	-38.26

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.

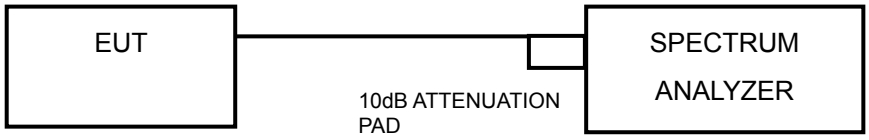


4.3 6dB BANDWIDTH MEASUREMENT

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) ≥ 3 x 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	10.09	0.5	PASS
6	2437	10.15	0.5	PASS
11	2462	10.12	0.5	PASS

802.11g

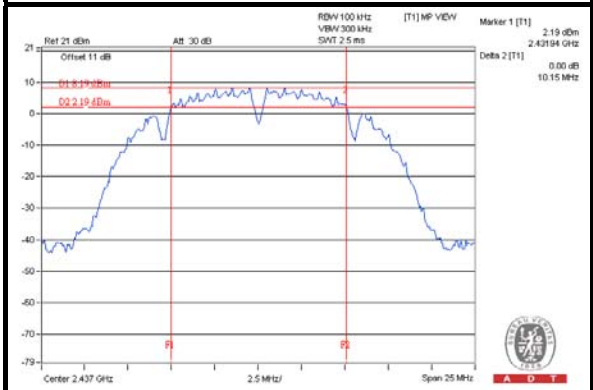
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.44	0.5	PASS
6	2437	16.41	0.5	PASS
11	2462	16.42	0.5	PASS

802.11n (20MHz)

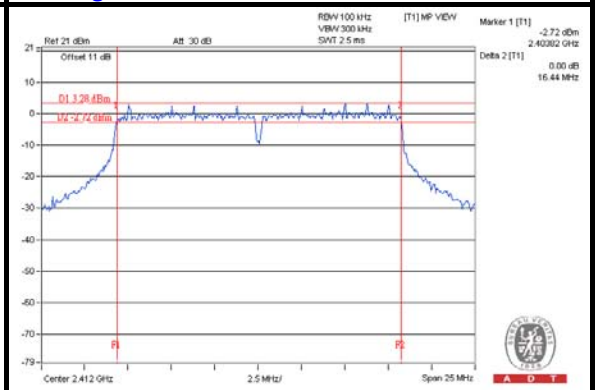
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.62	17.62	17.61	0.5	PASS
6	2437	17.40	17.68	17.66	0.5	PASS
11	2462	17.63	17.66	17.66	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

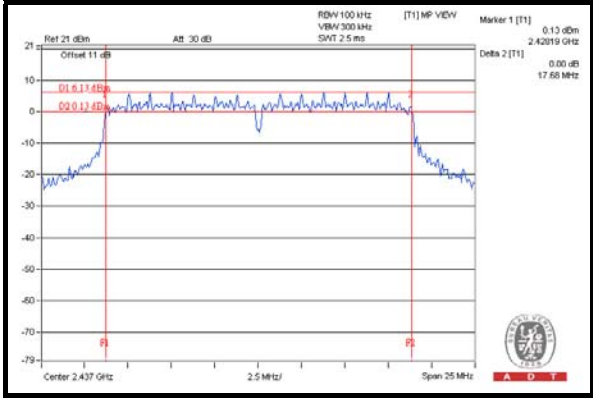
802.11b



802.11g



802.11n (20MHz)



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

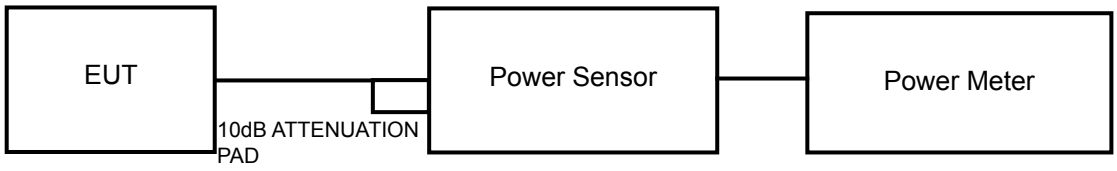
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 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 ≥ 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

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.

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	131.826	21.20	30	PASS
6	2437	134.896	21.30	30	PASS
11	2462	109.648	20.40	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	197.242	22.95	30	PASS
6	2437	295.121	24.70	30	PASS
11	2462	168.655	22.27	30	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	20.60	20.10	20.20	321.857	25.08	30	PASS
6	2437	23.80	22.90	22.90	**629.851**	27.99	30	PASS
11	2462	21.30	21.40	20.90	395.961	25.98	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	79.433	19.00
6	2437	83.176	19.20
11	2462	64.714	18.11

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	31.333	14.96
6	2437	77.625	18.90
11	2462	27.861	14.45

802.11n (20MHz)

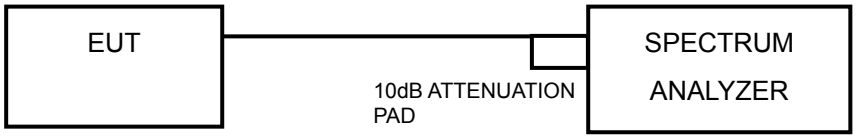
CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	11.60	12.20	12.10	47.268	16.75
6	2437	16.70	16.90	17.00	145.871	21.64
11	2462	12.10	12.60	12.60	52.612	17.21

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

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

4.5.7 TEST RESULTS

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.04	8	PASS
6	2437	-6.80	8	PASS
11	2462	-7.30	8	PASS

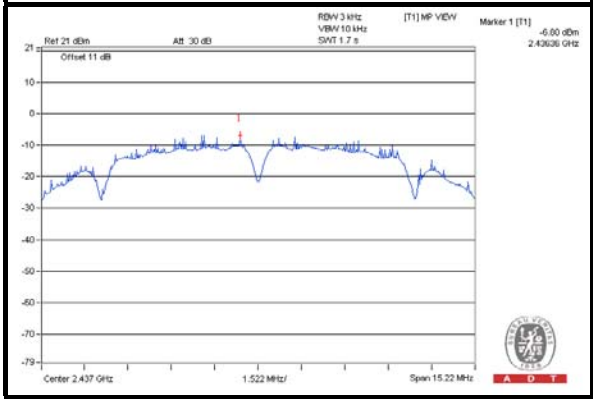
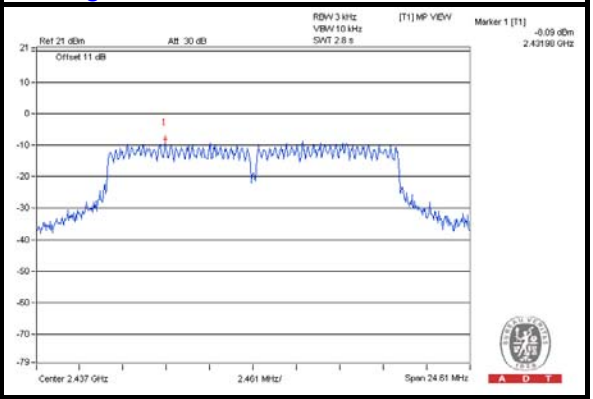
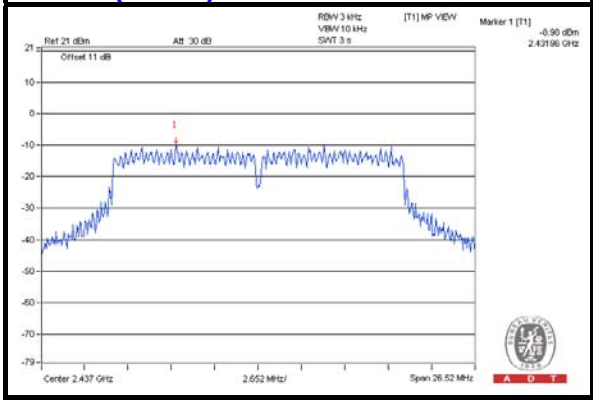
802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.57	8	PASS
6	2437	-8.09	8	PASS
11	2462	-12.60	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	-13.59	4.77	-8.82	5.24	PASS
	6	2437	-10.61	4.77	-5.84	5.24	PASS
	11	2462	-14.61	4.77	-9.84	5.24	PASS
1	1	2412	-12.29	4.77	-7.52	5.24	PASS
	6	2437	-8.98	4.77	-4.21	5.24	PASS
	11	2462	-15.54	4.77	-10.77	5.24	PASS
2	1	2412	-13.28	4.77	-8.51	5.24	PASS
	6	2437	-9.57	4.77	-4.80	5.24	PASS
	11	2462	-14.37	4.77	-9.60	5.24	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 8.76 > 6dBi , so the power density limit shall be reduced to 8-(8.76-6) = 5.24dBm.

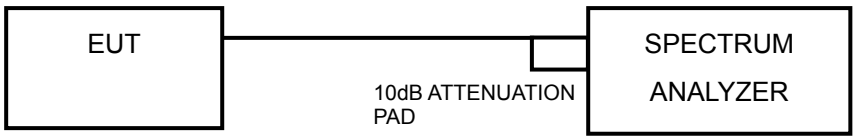
SPECTRUM PLOT OF WORST VALUE	
802.11b	**802.11g**
	
802.11n (20MHz)	
	

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

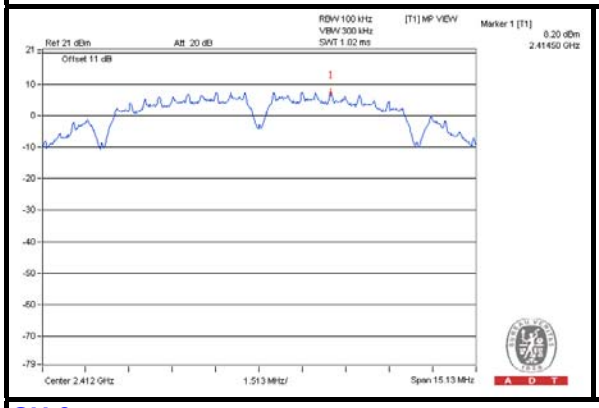
4.6.7 TEST RESULTS

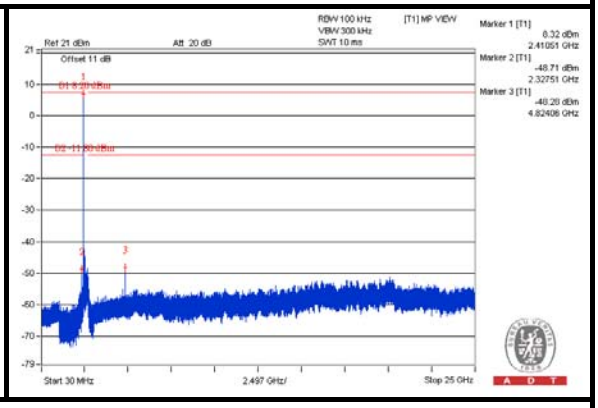
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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

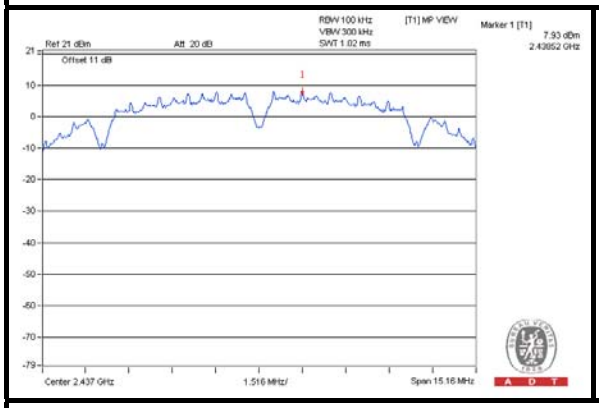
802.11b

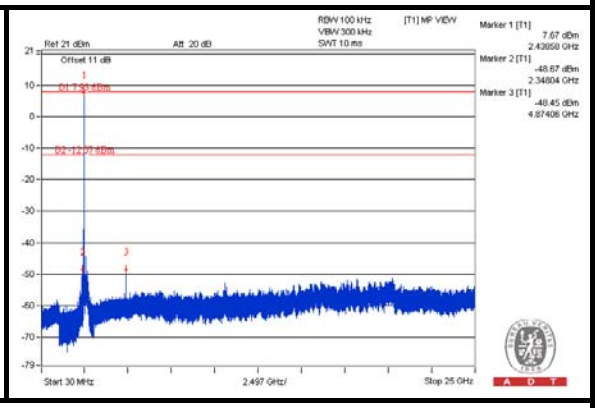
CH 1



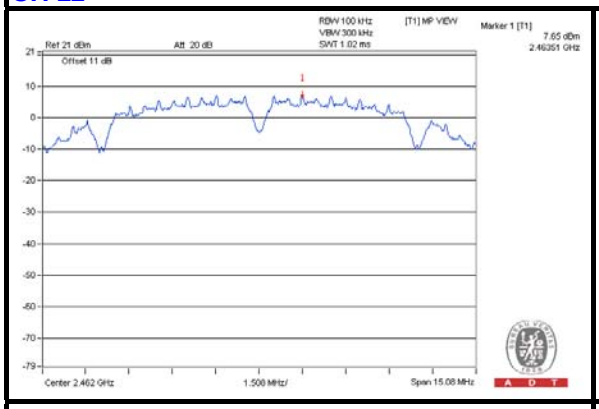


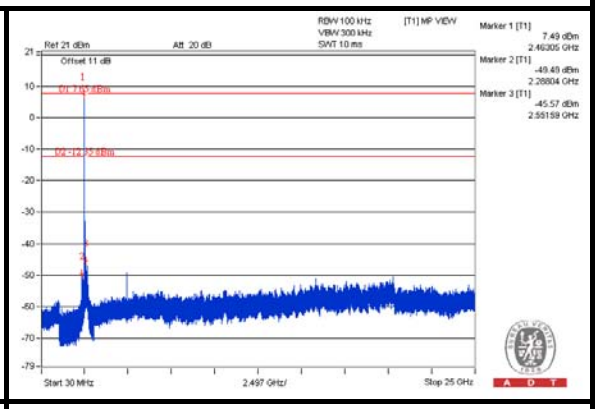
CH 6



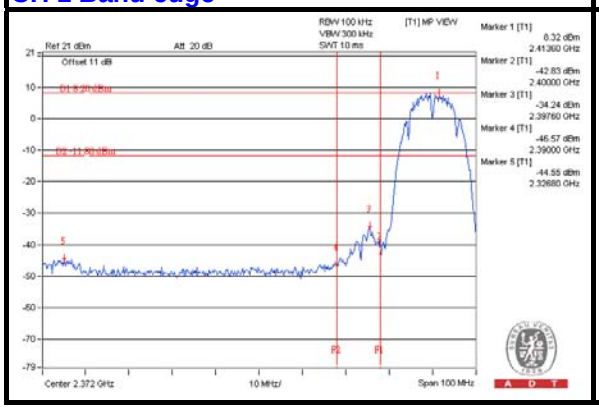


CH 11

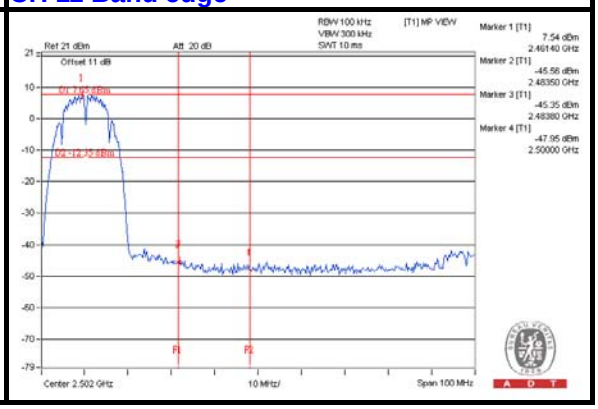




CH 1 Band edge

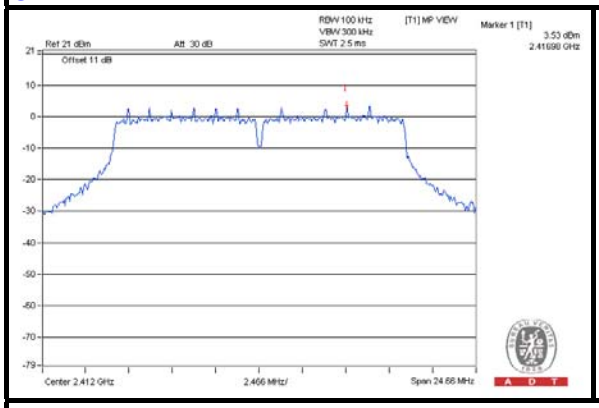


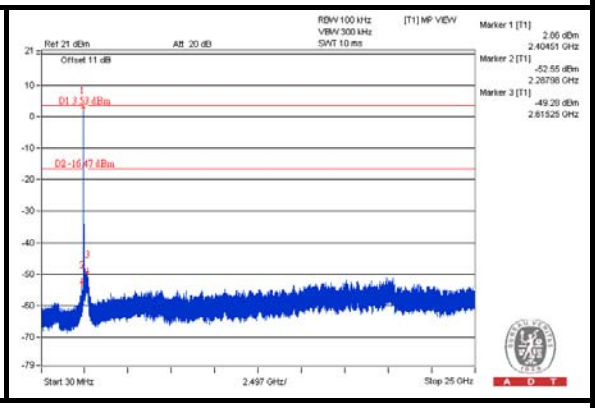
CH 11 Band edge



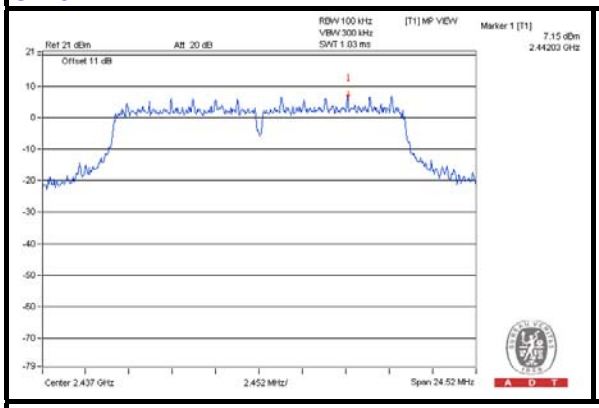
802.11g

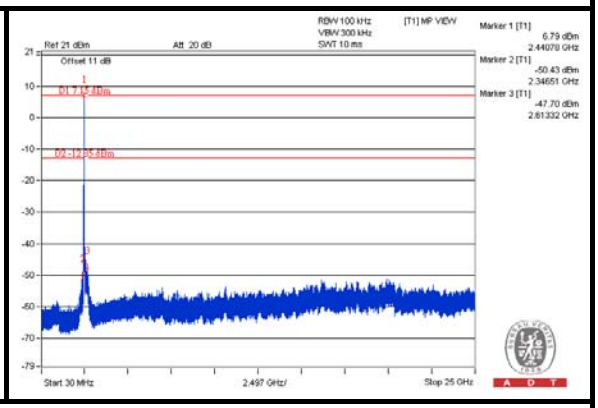
CH 1



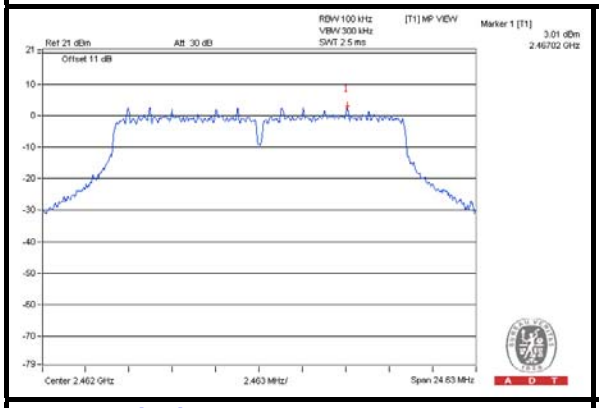


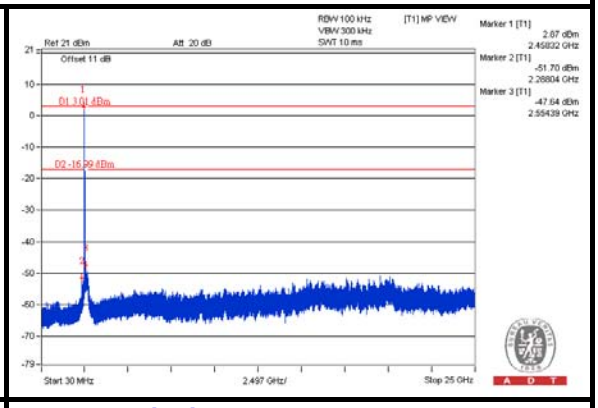
CH 6



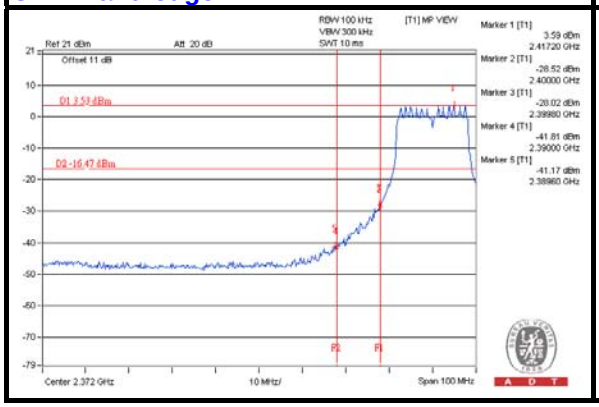


CH 11

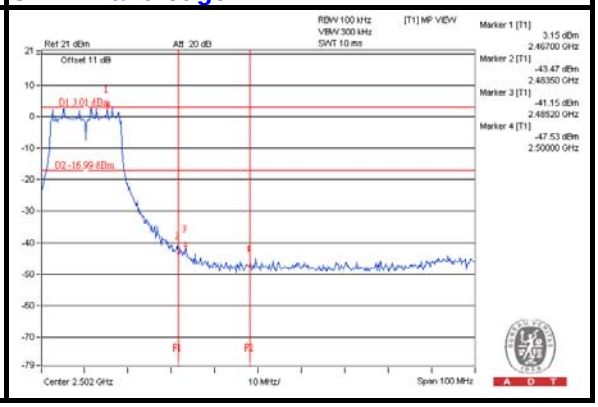




CH 1 Band edge



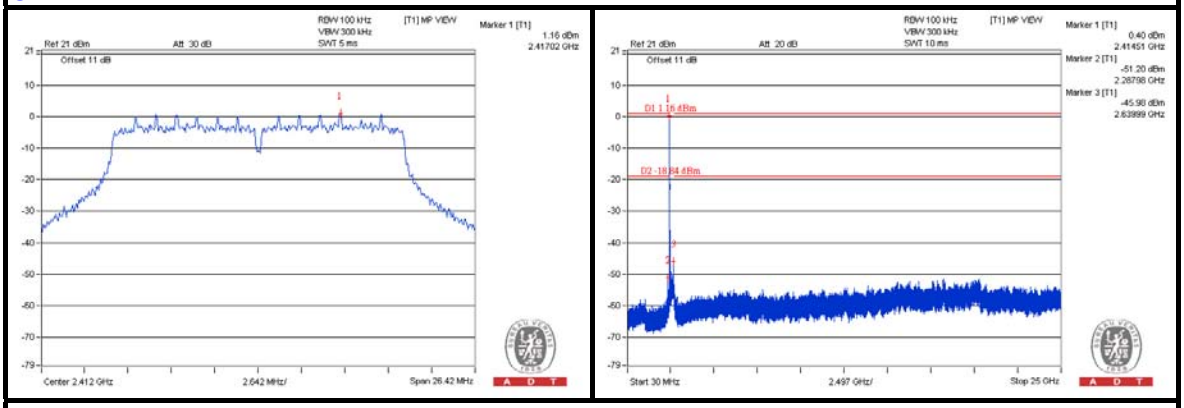
CH 11 Band edge



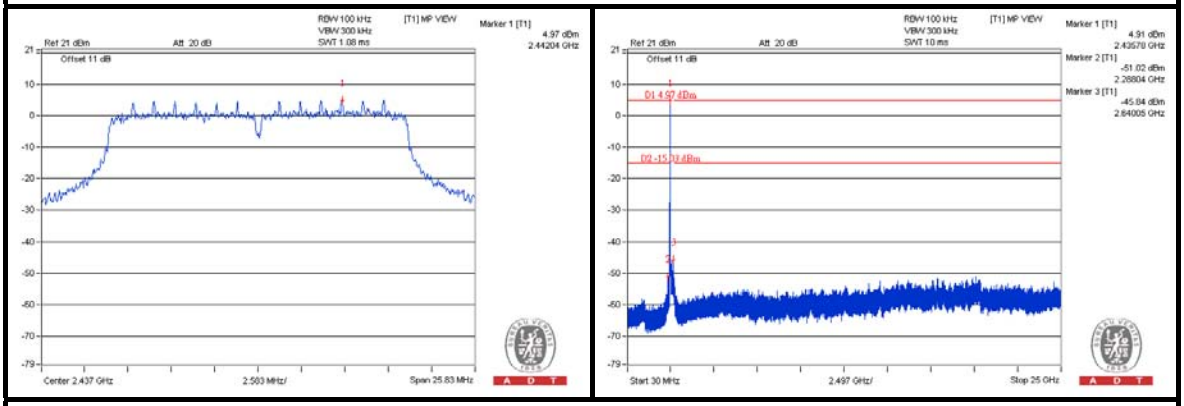
802.11n (20MHz)

CHAIN 0

CH 1



CH 6



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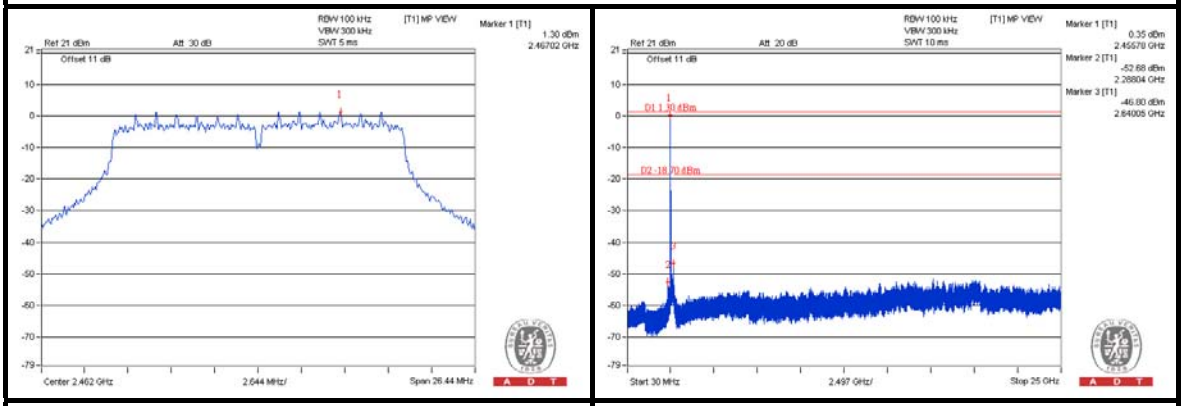

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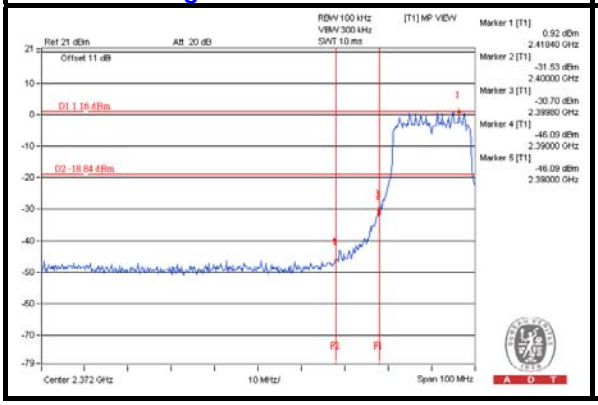
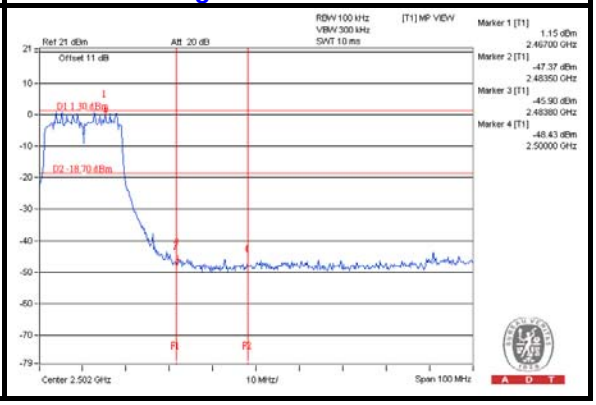
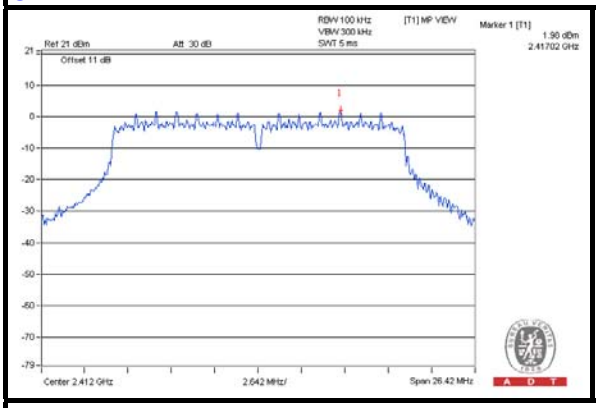


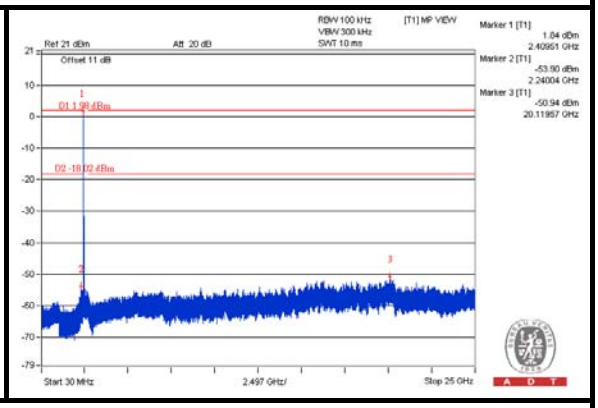
CH 11 Band edge



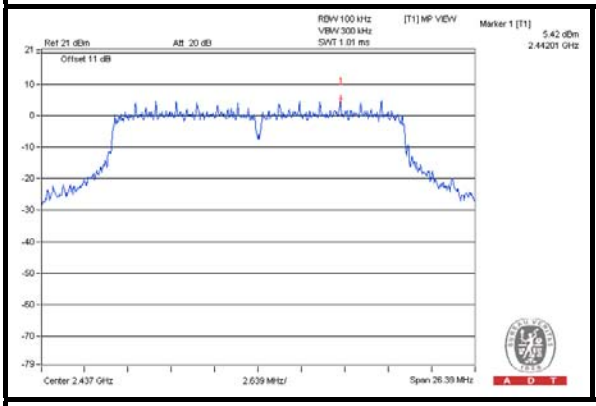
CHAIN 1

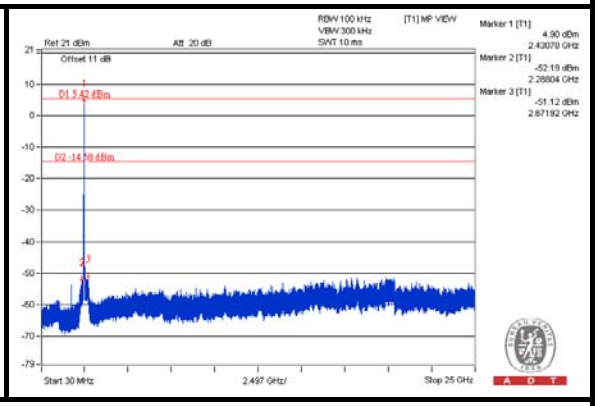
CH 1



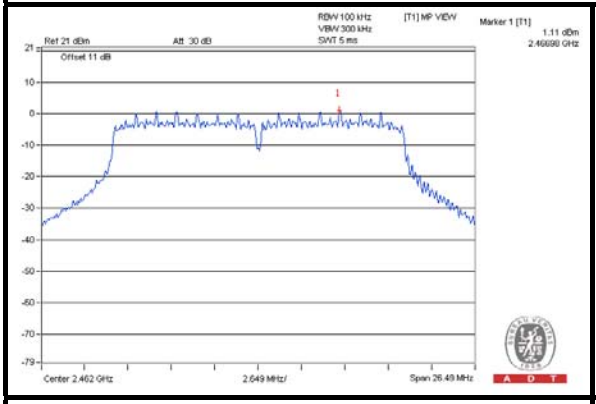


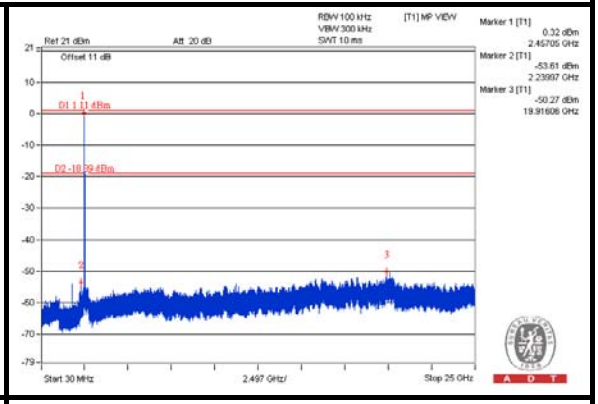
CH 6



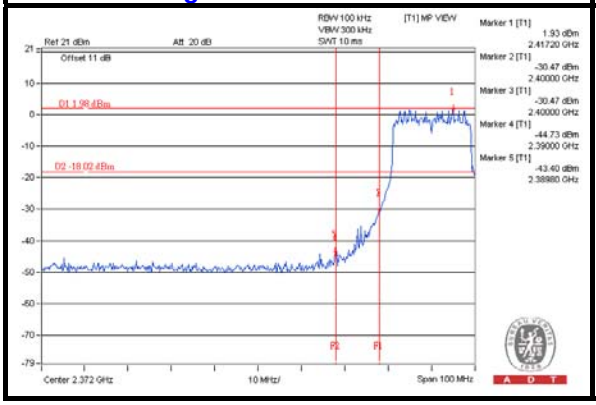


CH 11

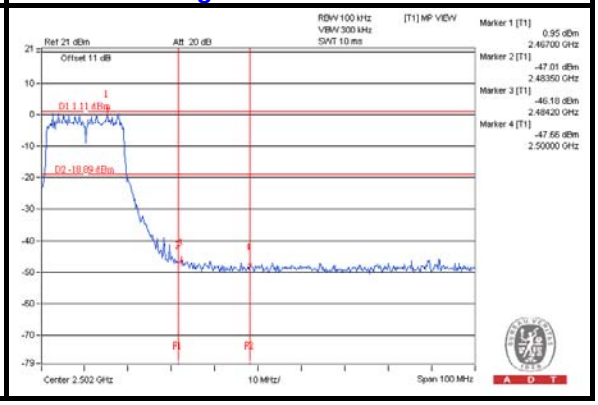




CH 1 Band edge

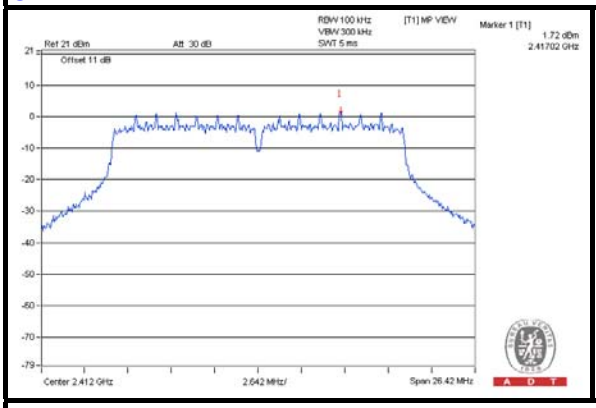


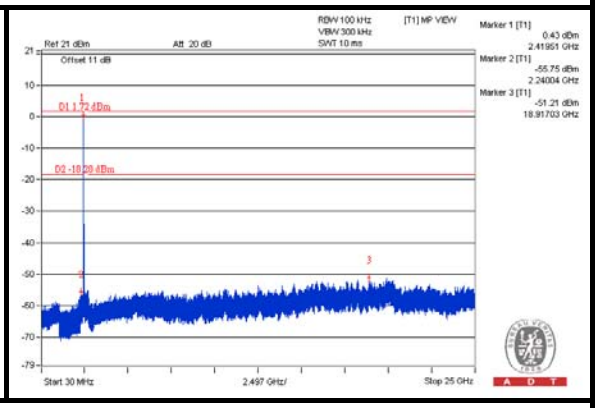
CH 11 Band edge



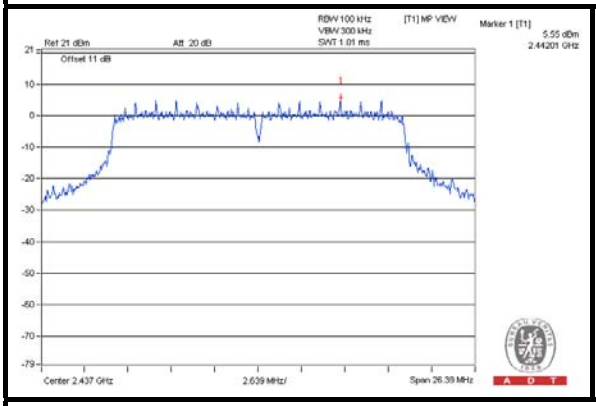
CHAIN 2

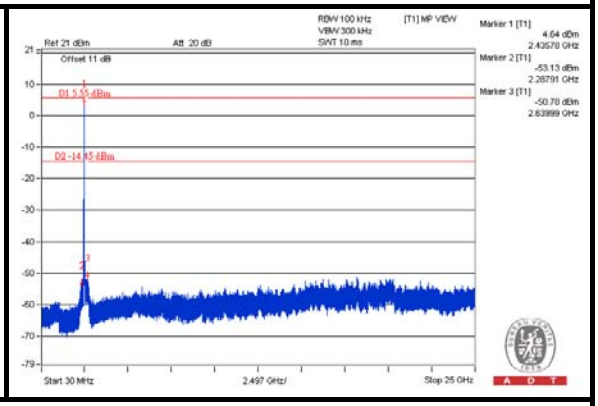
CH 1



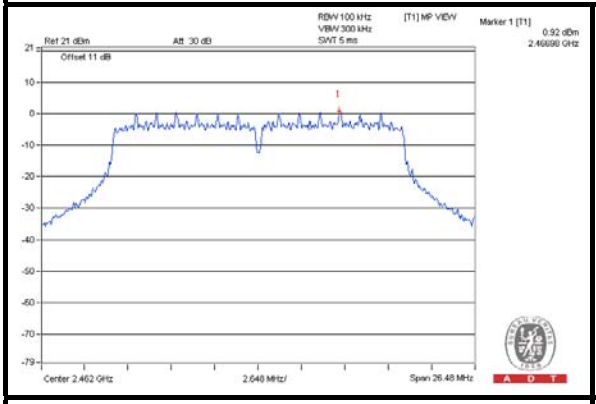


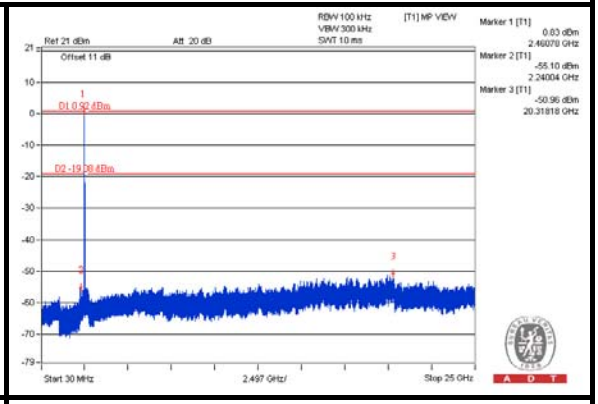
CH 6



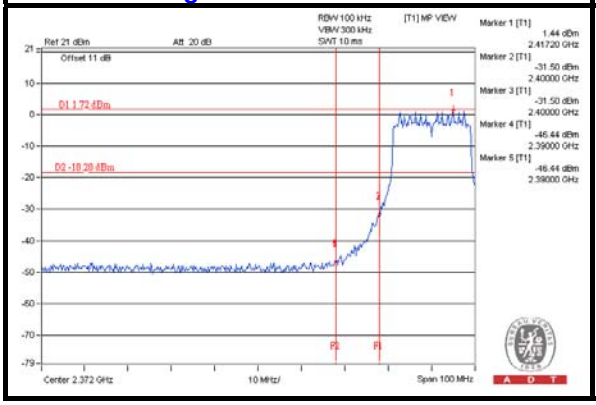


CH 11

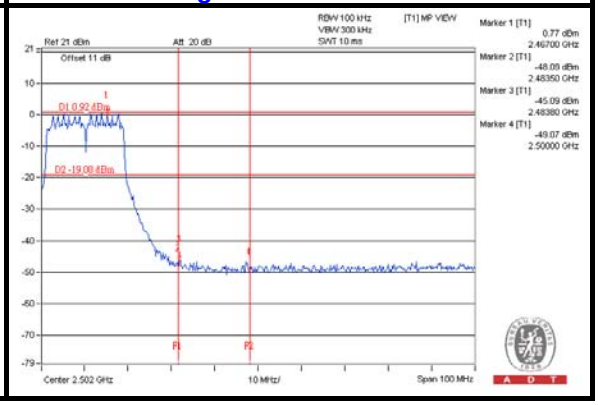




CH 1 Band edge



CH 11 Band edge



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.

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.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	69.0 PK	87.0	-18.0	1.00 H	9	30.30	38.70
2	#5725.00	59.9 AV	77.9	-18.0	1.00 H	9	21.20	38.70
3	*5745.00	107.0 PK			1.00 H	9	68.30	38.70
4	*5745.00	97.9 AV			1.00 H	9	59.20	38.70
5	11490.00	57.2 PK	74.0	-16.8	1.08 H	199	7.70	49.50
6	11490.00	44.2 AV	54.0	-9.8	1.08 H	199	-5.30	49.50
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	59.2 PK	77.2	-18.0	1.00 V	333	20.50	38.70
2	#5725.00	51.0 AV	69.0	-18.0	1.00 V	333	12.30	38.70
3	*5745.00	97.2 PK			1.00 V	333	58.50	38.70
4	*5745.00	89.0 AV			1.00 V	333	50.30	38.70
5	11490.00	57.0 PK	74.0	-17.0	1.21 V	140	7.50	49.50
6	11490.00	44.0 AV	54.0	-10.0	1.21 V	140	-5.50	49.50

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	107.6 PK			1.00 H	12	68.80	38.80
2	*5785.00	98.4 AV			1.00 H	12	59.60	38.80
3	11570.00	57.2 PK	74.0	-16.8	1.05 H	246	7.80	49.40
4	11570.00	44.4 AV	54.0	-9.6	1.05 H	246	-5.00	49.40
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	*5785.00	98.3 PK			1.00 V	114	59.50	38.80
2	*5785.00	89.4 AV			1.00 V	114	50.60	38.80
3	11570.00	57.0 PK	74.0	-17.0	1.14 V	127	7.60	49.40
4	11570.00	44.0 AV	54.0	-10.0	1.14 V	127	-5.40	49.40

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)
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.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	106.7 PK			1.00 H	0	67.80	38.90
2	*5825.00	97.6 AV			1.00 H	0	58.70	38.90
3	#5850.00	62.7 PK	86.7	-24.0	1.00 H	0	23.80	38.90
4	#5850.00	53.6 AV	77.6	-24.0	1.00 H	0	14.70	38.90
5	11650.00	57.2 PK	74.0	-16.8	1.20 H	238	7.90	49.30
6	11650.00	44.0 AV	54.0	-10.0	1.20 H	238	-5.30	49.30
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	*5825.00	97.2 PK			1.00 V	120	58.30	38.90
2	*5825.00	88.7 AV			1.00 V	120	49.80	38.90
3	#5850.00	53.2 PK	77.2	-24.0	1.00 V	120	14.30	38.90
4	#5850.00	44.7 AV	68.7	-24.0	1.00 V	120	5.80	38.90
5	11650.00	57.0 PK	74.0	-17.0	1.32 V	142	7.70	49.30
6	11650.00	43.4 AV	54.0	-10.6	1.32 V	142	-5.90	49.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	5000.00	59.3 PK	74.0	-14.7	1.00 H	354	21.90	37.40
2	5000.00	52.5 AV	54.0	-1.5	1.00 H	354	15.10	37.40
3	#5725.00	72.1 PK	93.1	-21.0	1.00 H	9	33.40	38.70
4	#5725.00	62.9 AV	83.9	-21.0	1.00 H	9	24.20	38.70
5	*5745.00	113.1 PK			1.00 H	9	74.40	38.70
6	*5745.00	103.9 AV			1.00 H	9	65.20	38.70
7	11490.00	57.2 PK	74.0	-16.8	1.08 H	203	7.70	49.50
8	11490.00	44.5 AV	54.0	-9.5	1.08 H	203	-5.00	49.50
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	70.0 PK	91.0	-21.0	1.00 V	294	31.30	38.70
2	#5725.00	60.1 AV	81.1	-21.0	1.00 V	294	21.40	38.70
3	*5745.00	111.0 PK			1.00 V	294	72.30	38.70
4	*5745.00	101.1 AV			1.00 V	294	62.40	38.70
5	11490.00	57.0 PK	74.0	-17.0	1.04 V	115	7.50	49.50
6	11490.00	44.1 AV	54.0	-9.9	1.04 V	115	-5.40	49.50

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	5000.00	60.1 PK	74.0	-13.9	1.00 H	318	22.70	37.40
2	**5000.00**	**53.0 AV**	**54.0**	**-1.0**	**1.00 H**	**318**	**15.60**	**37.40**
3	*5785.00	111.0 PK			1.00 H	331	72.20	38.80
4	*5785.00	102.0 AV			1.00 H	331	63.20	38.80
5	11570.00	58.3 PK	74.0	-15.7	1.24 H	104	8.90	49.40
6	11570.00	46.0 AV	54.0	-8.0	1.24 H	104	-3.40	49.40
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	5360.00	58.6 PK	74.0	-15.4	1.00 V	325	20.60	38.00
2	5360.00	49.7 AV	54.0	-4.3	1.00 V	325	11.70	38.00
3	*5785.00	111.0 PK			1.00 V	295	72.20	38.80
4	*5785.00	101.0 AV			1.00 V	295	62.20	38.80
5	11570.00	57.4 PK	74.0	-16.6	1.06 V	28	8.00	49.40
6	11570.00	45.2 AV	54.0	-8.8	1.06 V	28	-4.20	49.40

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)
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.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	5000.00	60.8 PK	74.0	-13.2	1.00 H	353	23.40	37.40
2	5000.00	52.6 AV	54.0	-1.4	1.00 H	353	15.20	37.40
3	*5825.00	111.4 PK			1.07 H	353	72.50	38.90
4	*5825.00	101.4 AV			1.07 H	353	62.50	38.90
5	#5850.00	63.4 PK	91.4	-28.0	1.07 H	353	24.50	38.90
6	#5850.00	53.4 AV	81.4	-28.0	1.07 H	353	14.50	38.90
7	11650.00	57.0 PK	74.0	-17.0	1.17 H	88	7.70	49.30
8	11650.00	44.0 AV	54.0	-10.0	1.17 H	88	-5.30	49.30
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	*5825.00	108.6 PK			1.02 V	300	69.70	38.90
2	*5825.00	98.4 AV			1.02 V	300	59.50	38.90
3	#5850.00	60.6 PK	88.6	-28.0	1.02 V	300	21.70	38.90
4	#5850.00	50.4 AV	78.4	-28.0	1.02 V	300	11.50	38.90
5	11650.00	56.6 PK	74.0	-17.4	1.04 V	100	7.30	49.30
6	11650.00	43.2 AV	54.0	-10.8	1.04 V	100	-6.10	49.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	77.5 PK	89.2	-11.7	1.00 H	4	38.80	38.70
2	#5725.00	67.6 AV	79.3	-11.7	1.00 H	4	28.90	38.70
3	*5755.00	109.2 PK			1.00 H	4	70.50	38.70
4	*5755.00	99.3 AV			1.00 H	4	60.60	38.70
5	11510.00	59.5 PK	74.0	-14.5	1.24 H	23	10.00	49.50
6	11510.00	46.5 AV	54.0	-7.5	1.24 H	23	-3.00	49.50
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	75.0 PK	86.7	-11.7	1.00 V	43	36.30	38.70
2	#5725.00	65.7 AV	77.4	-11.7	1.00 V	43	27.00	38.70
3	*5755.00	106.7 PK			1.00 V	43	68.00	38.70
4	*5755.00	97.4 AV			1.00 V	43	58.70	38.70
5	11510.00	58.2 PK	74.0	-15.8	1.20 V	87	8.70	49.50
6	11510.00	45.5 AV	54.0	-8.5	1.20 V	87	-4.00	49.50

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%RH	TESTED BY	Brad Tung

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	108.9 PK			1.00 H	333	70.10	38.80
2	*5795.00	98.8 AV			1.00 H	333	60.00	38.80
3	#5850.00	68.9 PK	88.9	-20.0	1.00 H	333	30.00	38.90
4	#5850.00	58.8 AV	78.8	-20.0	1.00 H	333	19.90	38.90
5	11590.00	58.3 PK	74.0	-15.7	1.36 H	221	8.90	49.40
6	11590.00	45.6 AV	54.0	-8.4	1.36 H	221	-3.80	49.40
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	*5795.00	105.4 PK			1.00 V	24	66.60	38.80
2	*5795.00	96.0 AV			1.00 V	24	57.20	38.80
3	#5850.00	65.4 PK	85.4	-20.0	1.00 V	24	26.50	38.90
4	#5850.00	56.0 AV	76.0	-20.0	1.00 V	24	17.10	38.90
5	11590.00	58.0 PK	74.0	-16.0	1.12 V	130	8.60	49.40
6	11590.00	44.6 AV	54.0	-9.4	1.12 V	130	-4.80	49.40

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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	25deg. C, 68%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	136.84	38.0 QP	43.5	-5.5	1.99 H	243	24.70	13.30
2	249.97	43.5 QP	46.0	-2.5	1.00 H	8	30.50	13.00
3	374.04	38.3 QP	46.0	-7.7	1.00 H	290	21.50	16.80
4	412.92	37.2 QP	46.0	-8.8	1.99 H	120	19.40	17.80
5	624.85	40.3 QP	46.0	-5.7	1.24 H	354	17.40	22.90
6	799.84	38.7 QP	46.0	-7.3	1.00 H	358	12.90	25.80
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	249.60	37.0 QP	46.0	-9.0	1.85 V	105	24.00	13.00
2	374.04	38.4 QP	46.0	-7.6	1.24 V	170	21.60	16.80
3	399.31	37.0 QP	46.0	-9.0	1.24 V	155	19.50	17.50
4	500.42	35.8 QP	46.0	-10.2	1.75 V	5	15.90	19.90
5	624.85	36.7 QP	46.0	-9.3	2.25 V	202	13.80	22.90
6	947.60	40.3 QP	46.0	-5.7	1.00 V	261	12.50	27.80

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)
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

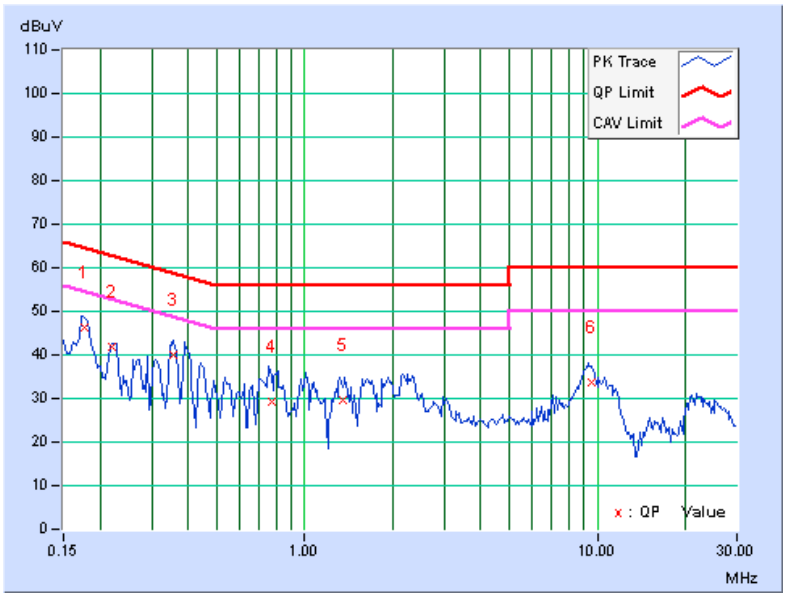
CONDUCTED WORST-CASE DATA：802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.19	46.23	34.73	46.42	34.92	64.61	54.61	-18.19	-19.69
2	0.22031	0.20	41.49	31.13	41.69	31.33	62.81	52.81	-21.12	-21.48
3	0.35703	0.22	39.78	37.84	40.00	38.06	58.80	48.80	-18.80	-10.74
4	0.77500	0.26	29.09	20.97	29.35	21.23	56.00	46.00	-26.65	-24.77
5	1.34766	0.30	29.35	24.52	29.65	24.82	56.00	46.00	-26.35	-21.18
6	9.51953	0.48	33.13	28.88	33.61	29.36	60.00	50.00	-26.39	-20.64

REMARKS:

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

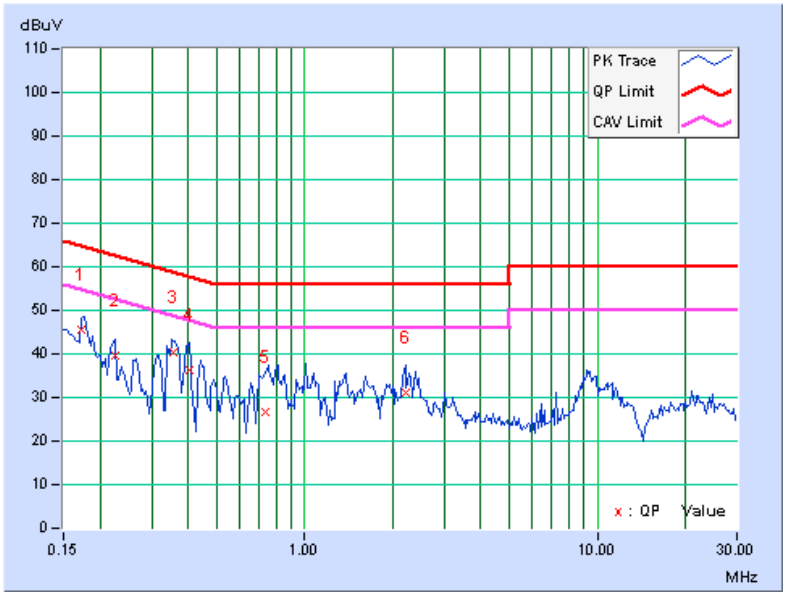


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.19	45.30	32.76	45.49	32.95	64.79	54.79	-19.30	-21.84
2	0.22422	0.20	39.47	30.07	39.67	30.27	62.66	52.66	-22.99	-22.39
3	**0.35703**	**0.25**	**40.02**	**38.07**	**40.27**	**38.32**	**58.80**	**48.80**	**-18.52**	**-10.47**
4	0.40391	0.27	36.01	30.64	36.28	30.91	57.77	47.77	-21.49	-16.86
5	0.73203	0.26	26.43	18.94	26.69	19.20	56.00	46.00	-29.31	-26.80
6	2.20703	0.33	30.83	23.66	31.16	23.99	56.00	46.00	-24.84	-22.01

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.



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

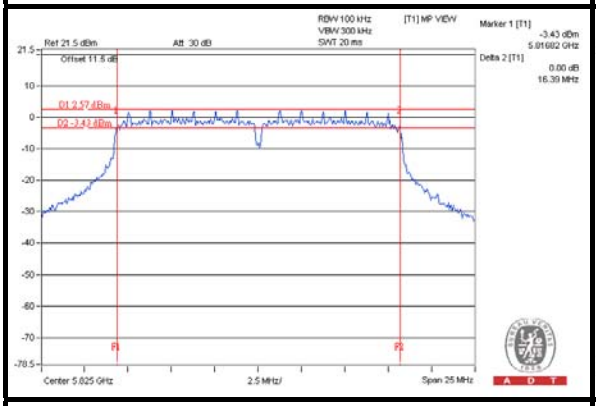
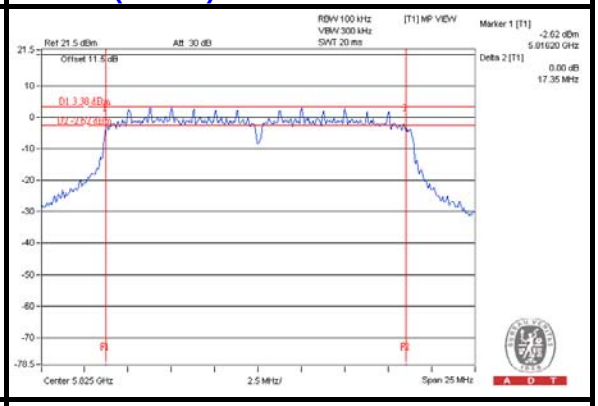
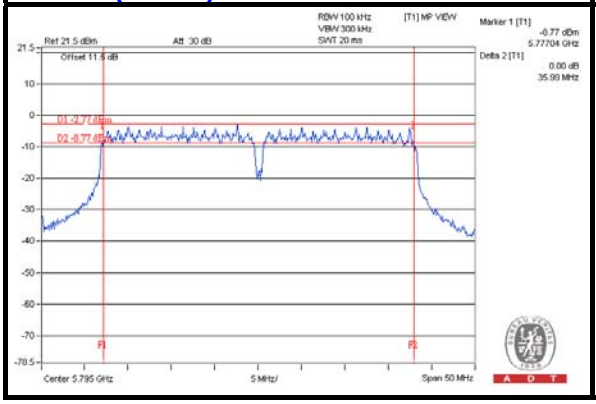
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.37	0.5	PASS
157	5785	16.37	0.5	PASS
165	5825	16.39	0.5	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.94	16.83	17.11	0.5	PASS
157	5785	16.88	16.83	17.21	0.5	PASS
165	5825	16.98	17.22	17.35	0.5	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	35.96	35.92	35.54	0.5	PASS
159	5795	35.99	35.87	35.84	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	
	

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 v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 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 ≥ 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

Same as Item 4.4.4.

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	165.959	22.20	29.84	PASS
157	5785	181.970	22.60	29.84	PASS
165	5825	144.544	21.60	29.84	PASS

NOTE: Max antenna gain = 6.16dBi > 6dBi, so the limit shall be reduced to 30-(6.16-6) = 29.84dBm.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	21.22	21.41	21.29	405.377	26.08	28.79	PASS
157	5785	21.23	21.51	21.39	**412.039**	26.15	28.79	PASS
165	5825	20.47	20.86	19.54	323.278	25.10	28.79	PASS

NOTE: Max antenna gain = 7.21dBi > 6dBi, so the limit shall be reduced to 30-(7.21-6) = 28.79dBm.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	18.40	18.20	18.30	202.860	23.07	28.79	PASS
159	5795	18.30	18.40	18.20	202.860	23.07	28.79	PASS

NOTE: Max antenna gain = 7.21dBi > 6dBi, so the limit shall be reduced to 30-(7.21-6) = 28.79dBm.

FOR AVERAGE POWER

802.11a

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	30.200	14.80
157	5785	28.840	14.60
165	5825	23.442	13.70

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	14.31	14.08	14.01	77.740	18.91
157	5785	14.22	14.16	14.41	80.092	19.04
165	5825	12.03	12.32	12.17	49.502	16.95

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	9.50	9.70	9.50	27.159	14.34
159	5795	9.70	9.60	9.50	27.366	14.37

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.

5.5.7 TEST RESULTS

802.11a

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-12.03	8	PASS
157	5785	-13.20	8	PASS
165	5825	-14.38	8	PASS

802.11n (20MHz)

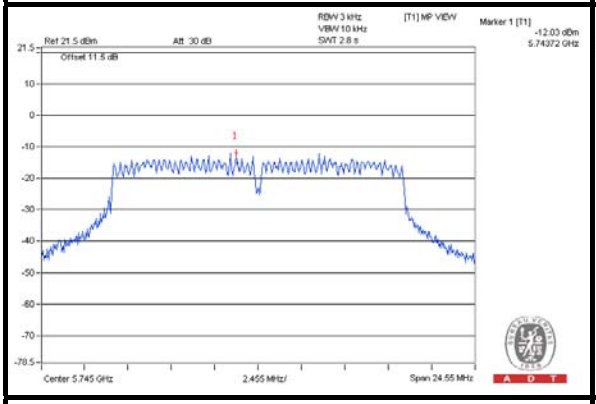
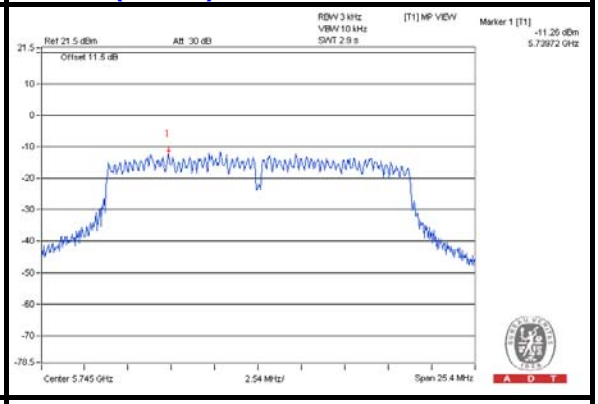
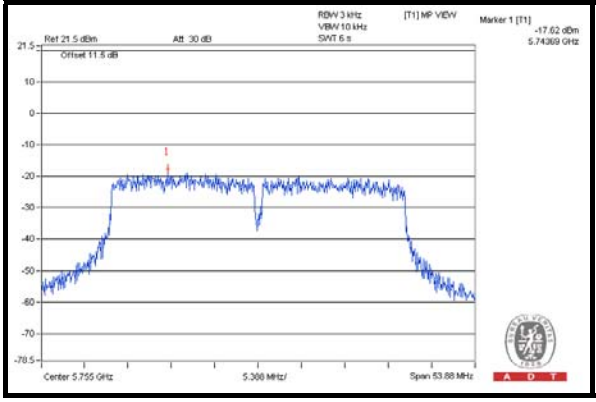
TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-11.26	4.77	-6.49	3.15	PASS
	157	5785	-13.10	4.77	-8.33	3.15	PASS
	165	5825	-13.80	4.77	-9.03	3.15	PASS
1	149	5745	-12.52	4.77	-7.75	3.15	PASS
	157	5785	-11.73	4.77	-6.96	3.15	PASS
	165	5825	-12.36	4.77	-7.59	3.15	PASS
2	149	5745	-12.65	4.77	-7.88	3.15	PASS
	157	5785	-11.45	4.77	-6.68	3.15	PASS
	165	5825	-13.08	4.77	-8.31	3.15	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 10.85 > 6dBi , so the power density limit shall be reduced to 8-(10.85-6) = 3.15dBm.

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	-17.77	4.77	-13.00	3.15	PASS
	159	5795	-18.35	4.77	-13.58	3.15	PASS
1	151	5755	-17.62	4.77	-12.85	3.15	PASS
	159	5795	-19.22	4.77	-14.45	3.15	PASS
2	151	5755	-20.02	4.77	-15.25	3.15	PASS
	159	5795	-19.89	4.77	-15.12	3.15	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 10.85 > 6dBi , so the power density limit shall be reduced to 8-(10.85-6) = 3.15dBm.

SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	
	

5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –20dB 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

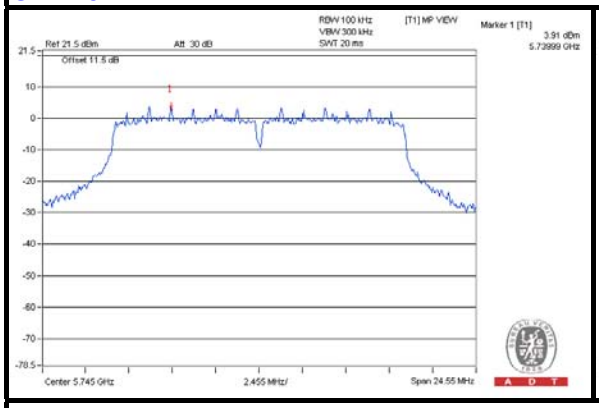
5.6.7 TEST RESULTS

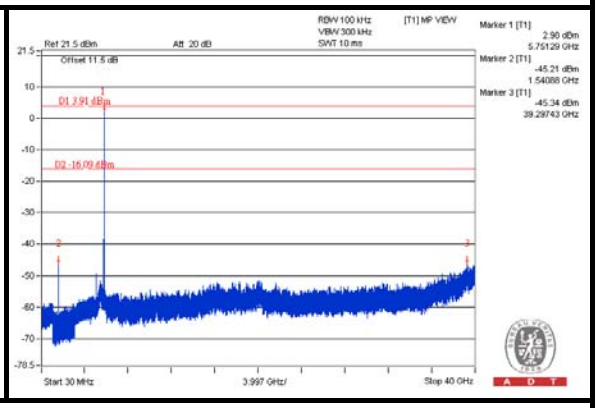
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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.

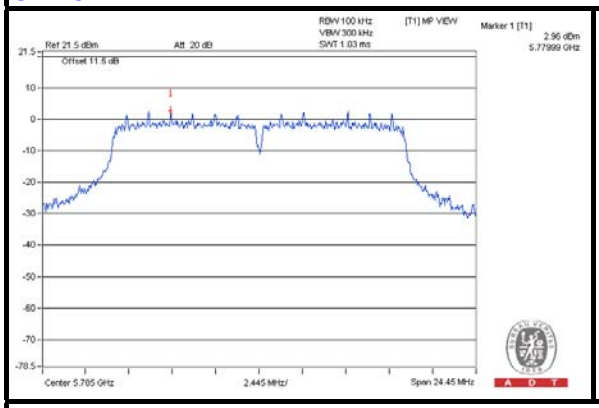
802.11a

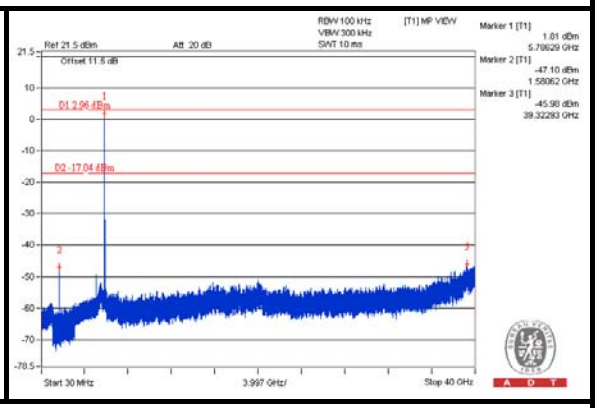
CH 149



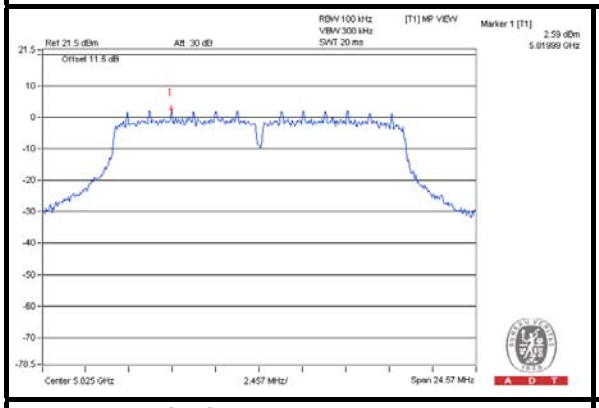


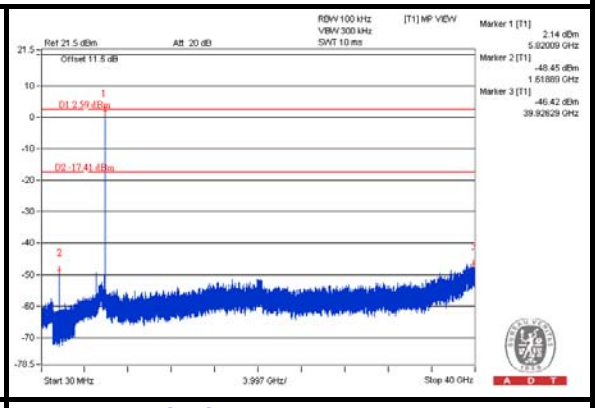
CH 157



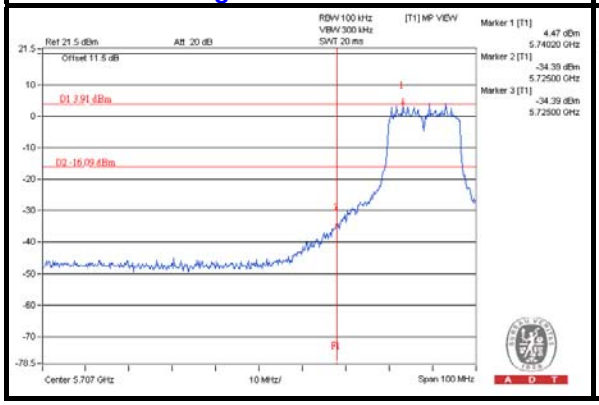


CH 165

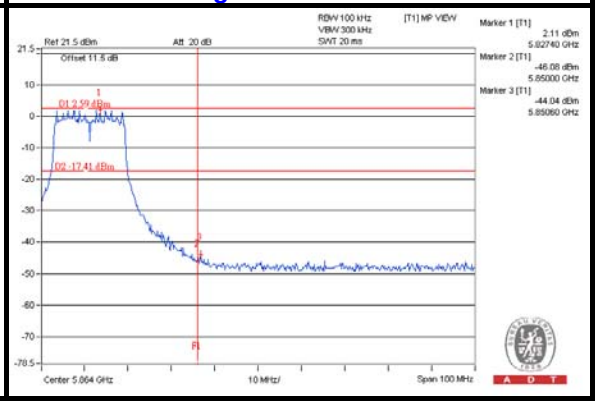




CH 149 Band edge



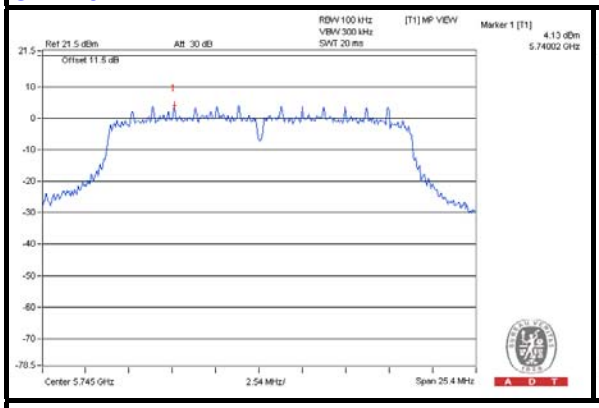
CH 165 Band edge

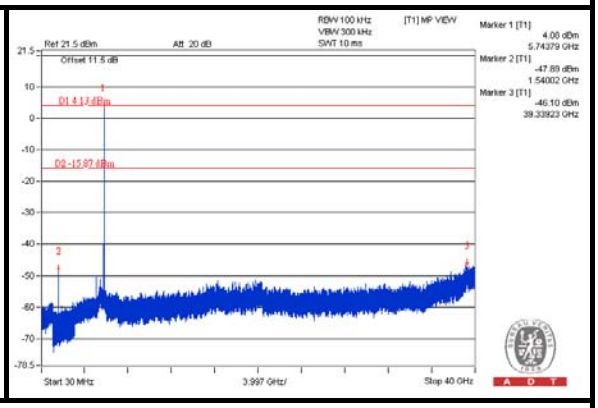


802.11n (20MHz)

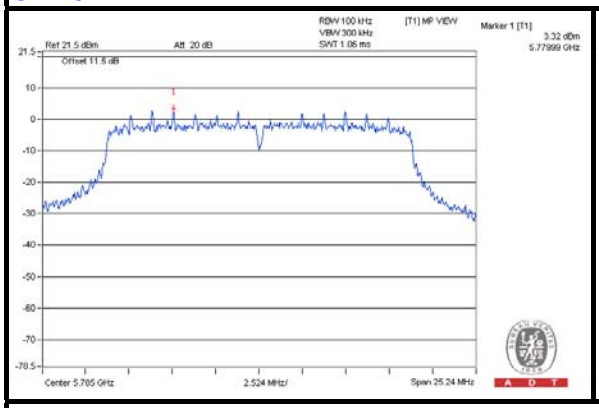
CHAIN 0

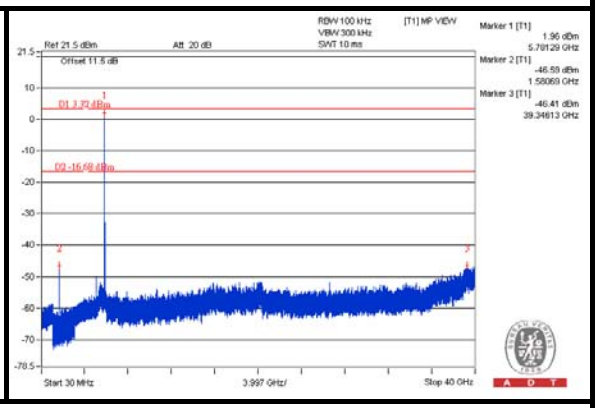
CH 149



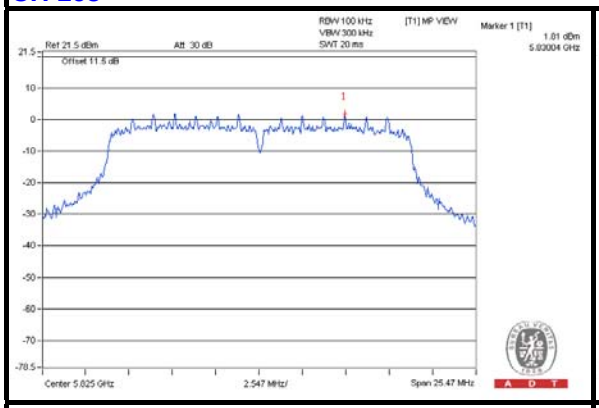


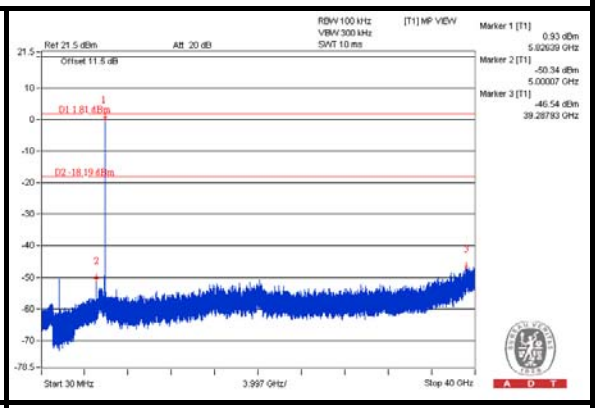
CH 157



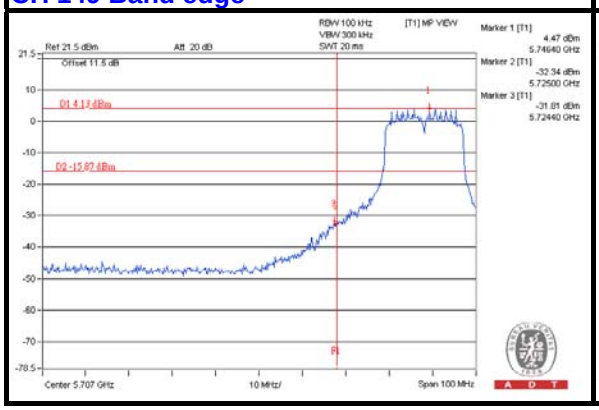


CH 165

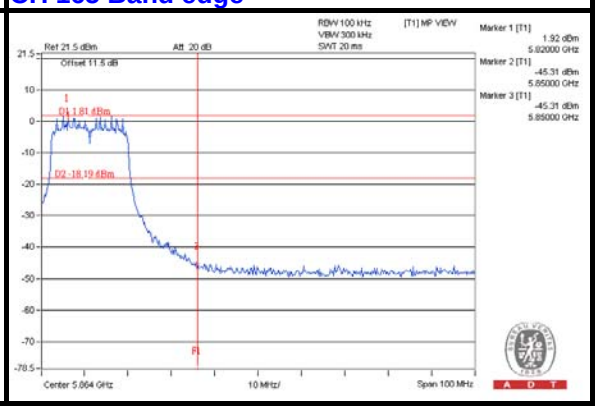




CH 149 Band edge

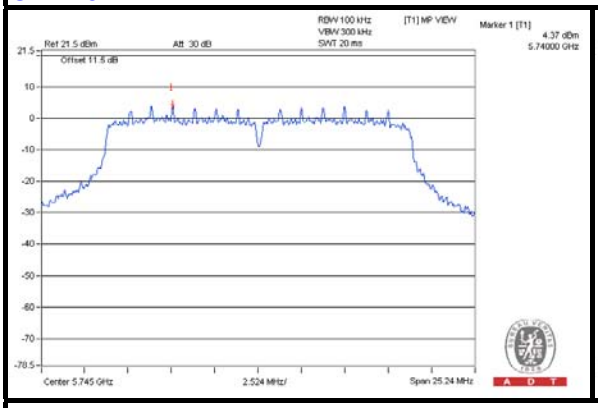


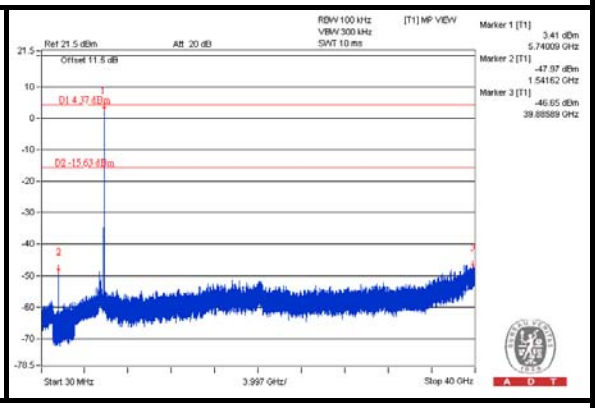
CH 165 Band edge



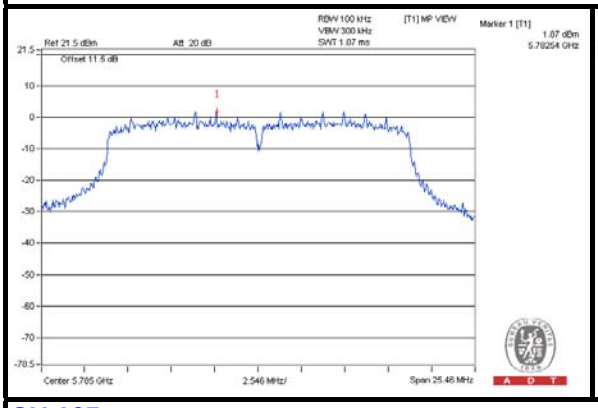
CHAIN 1

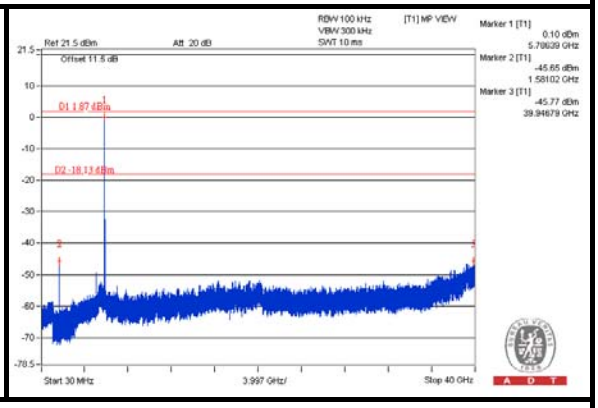
CH 149



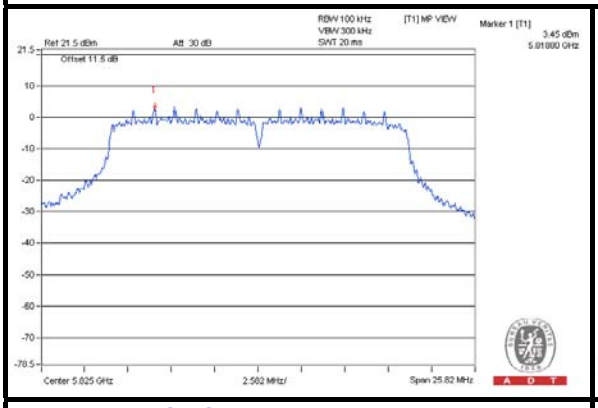


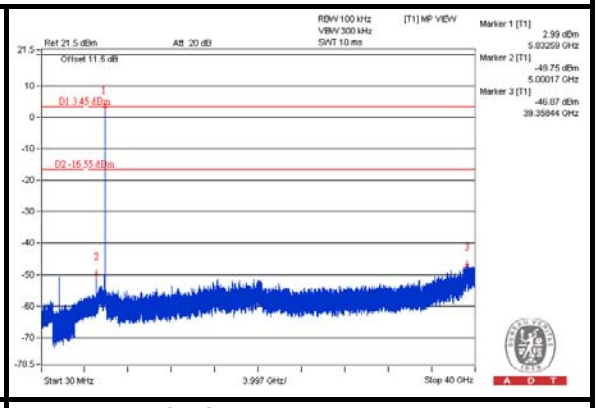
CH 157



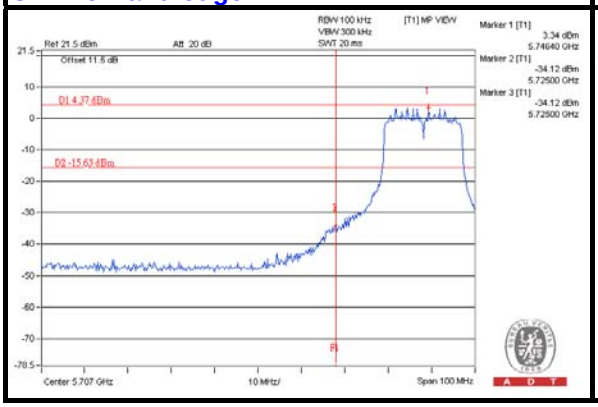


CH 165

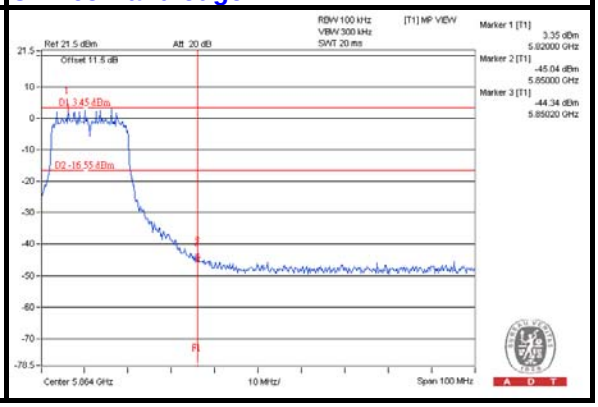




CH 149 Band edge

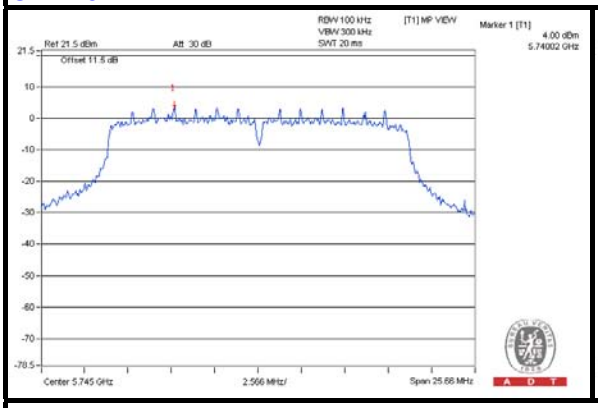


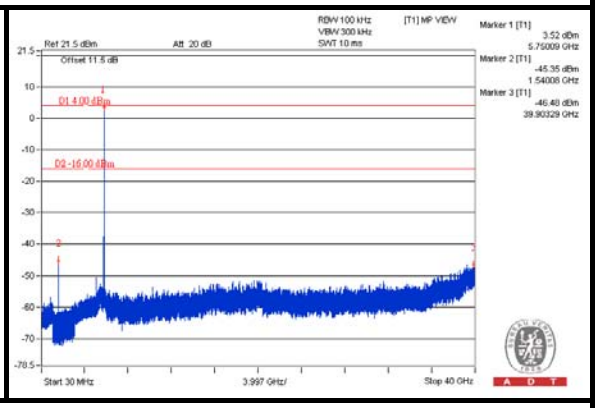
CH 165 Band edge



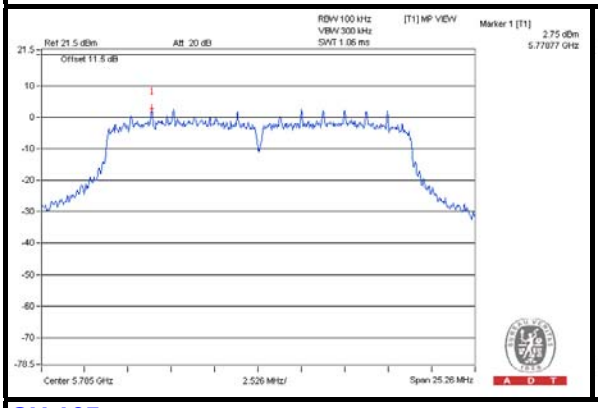
CHAIN 2

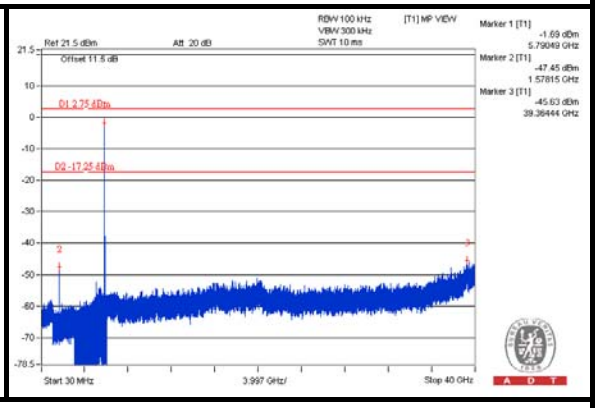
CH 149



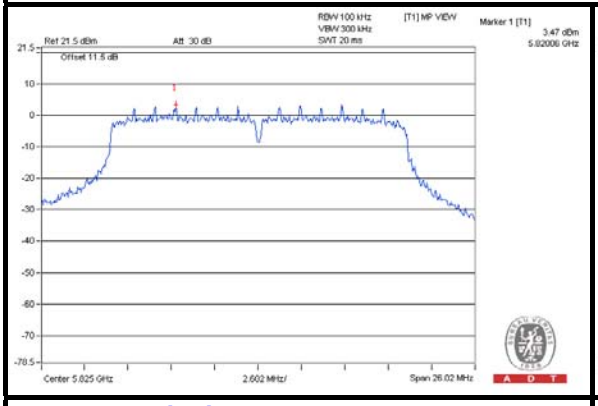


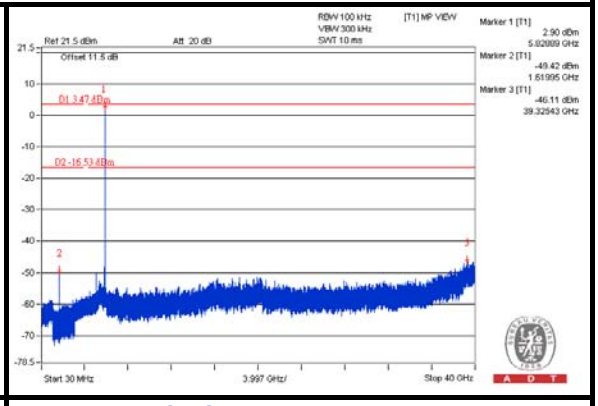
CH 157



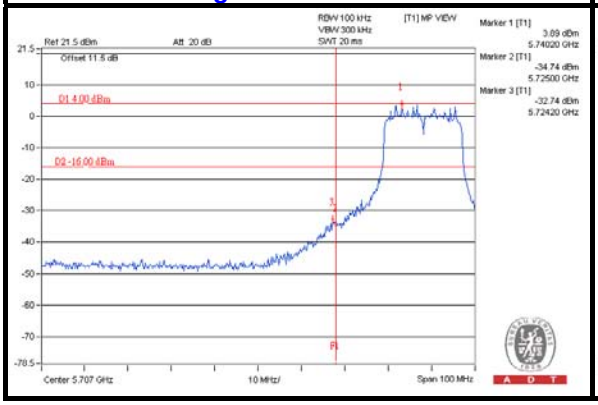


CH 165

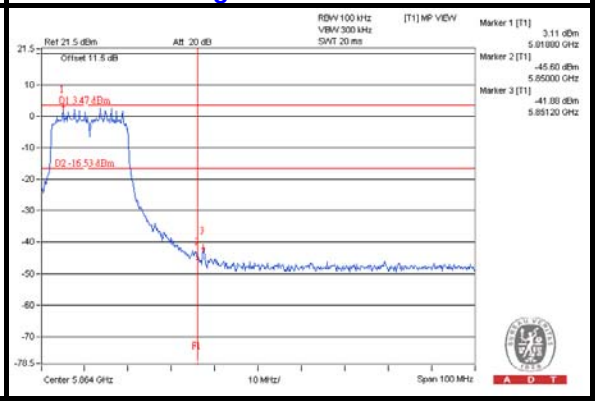




CH 149 Band edge



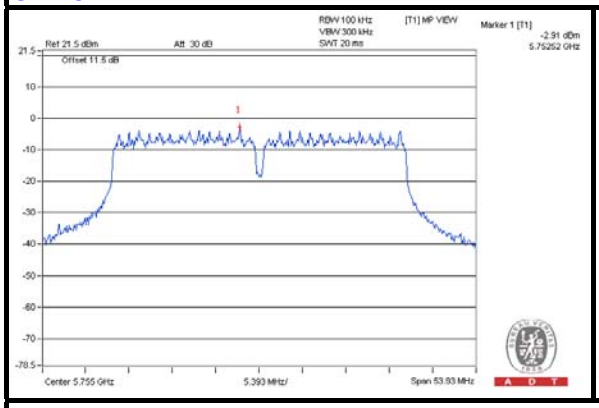
CH 165 Band edge

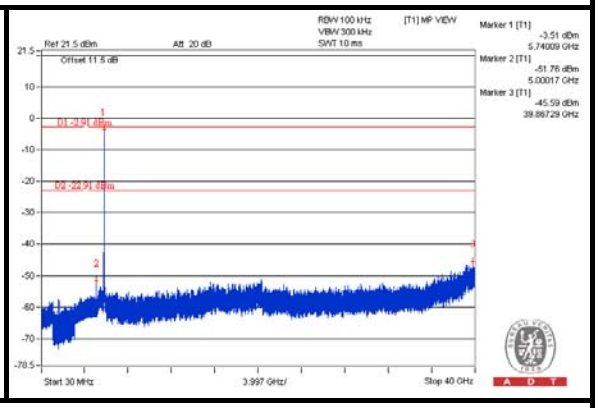


802.11n (40MHz)

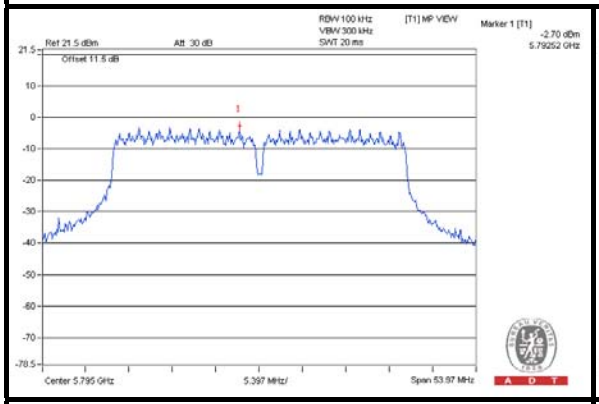
CHAIN 0

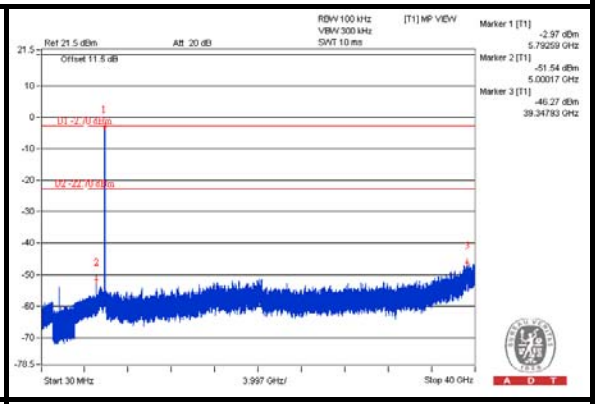
CH 151



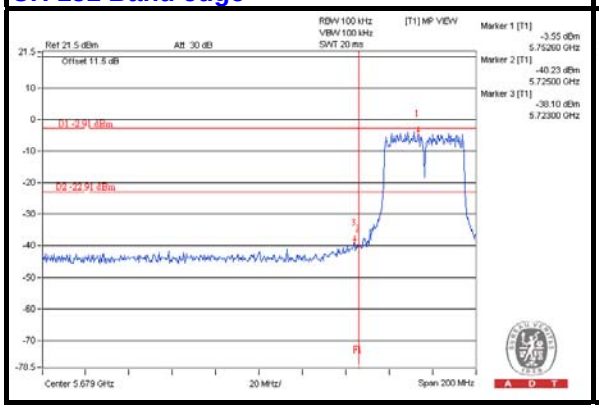


CH 159

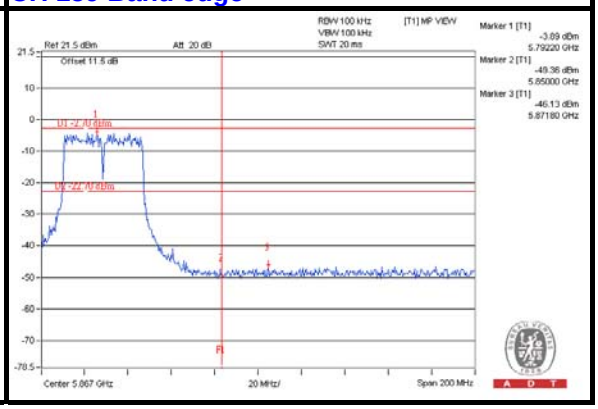




CH 151 Band edge

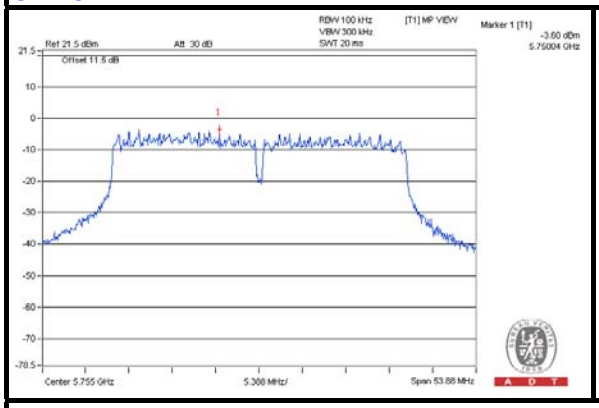


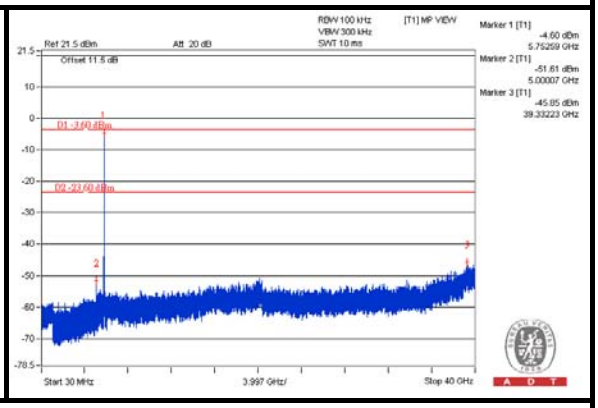
CH 159 Band edge



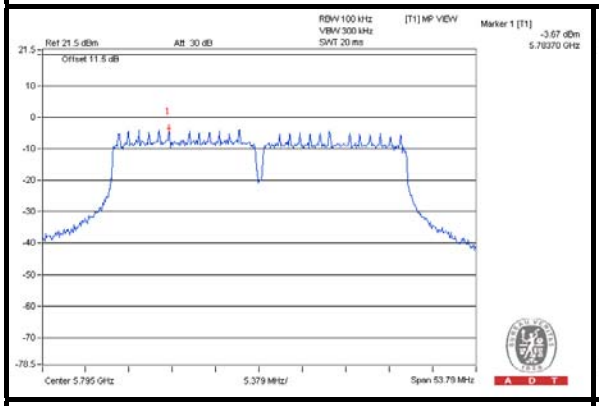
CHAIN 1

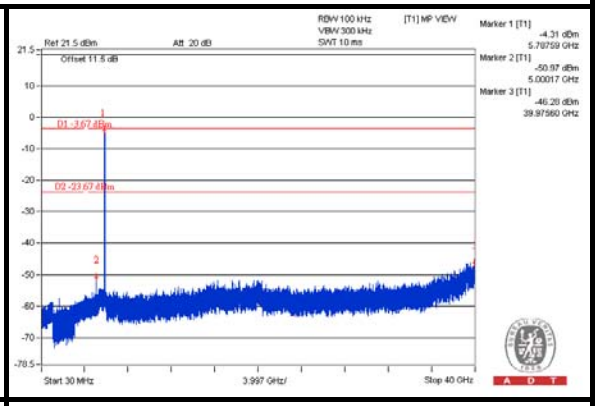
CH 151



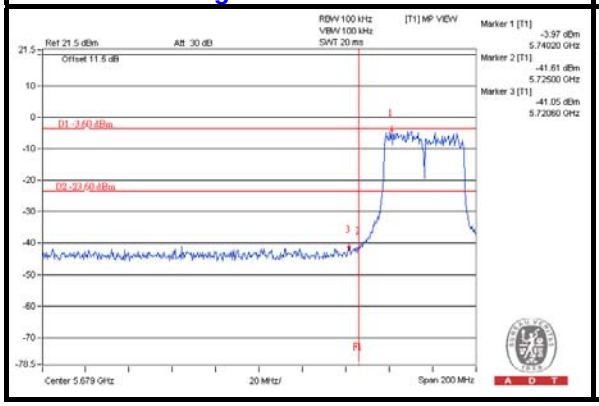


CH 159





CH 151 Band edge



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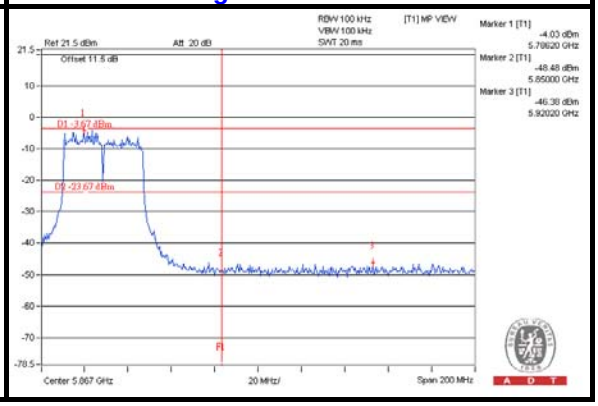
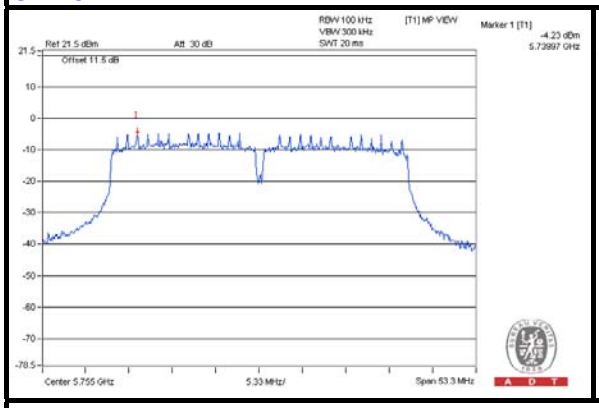
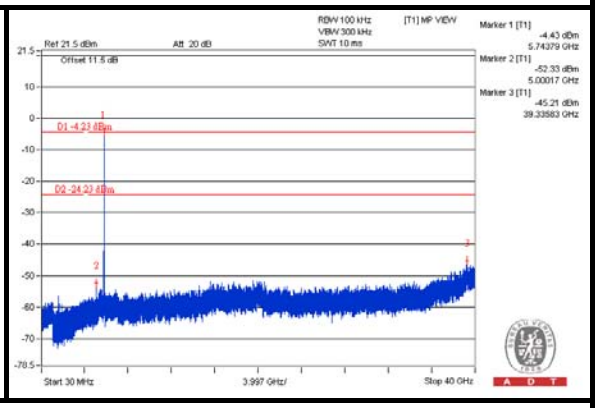


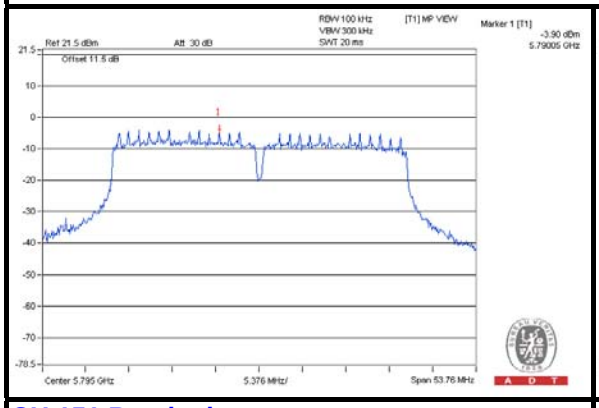
CHAIN 2

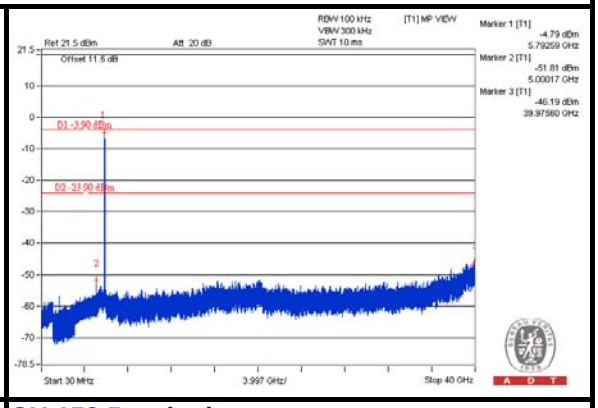
CH 151



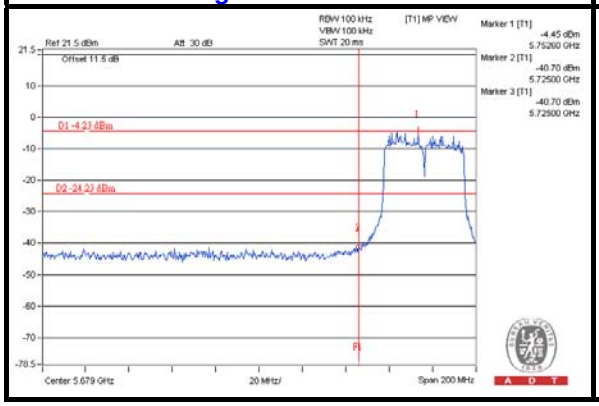


CH 159

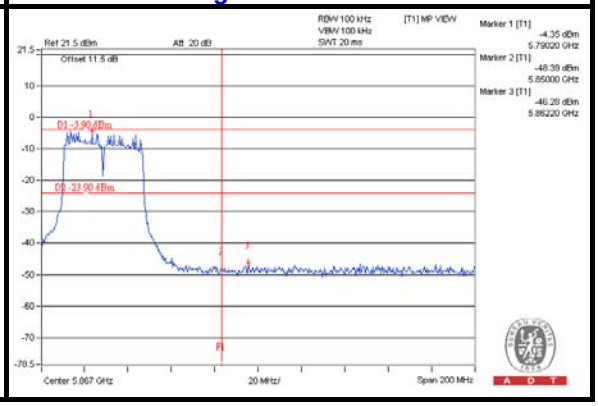




CH 151 Band edge



CH 159 Band edge



6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

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
Web Site: www.bureauveritas-adt.com

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

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---