FCC TEST REPORT
(WLAN 15.247)

REPORT NO.:	RF131105E06
MODEL NO.:	EAP701
FCC ID:	VZ9130004
RECEIVED:	Nov. 5, 2013
TESTED:	Nov. 19 ~ 25, 2013
ISSUED:	Dec. 16, 2013

APPLICANT:	4IPNET, INC.
ADDRESS:	3F-3, No. 369, Fusing N. Rd., Taipei 105, Taiwan,R.O.C.

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

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
RF131105E06	Original release	Dec. 16, 2013

1. CERTIFICATION

PRODUCT:	Enterprise Access Point
MODEL NO.:	EAP701
BRAND:	4ipnet
APPLICANT:	4IPNET, INC.
TESTED:	Nov. 19 ~ 25, 2013
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	ANSI C63.10-2009

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Annie Chang , **DATE:** Dec. 16, 2013

(Annie Chang / Supervisor)

APPROVED BY : Rex. Lai , **DATE:** Dec. 16, 2013

(Rex Lai / Assistant 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 -12.81dB at 0.37266MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00 & 2483.50MHz.
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	No Antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted emissions	150kHz~30MHz	2.41 dB
Radiated emissions	30MHz ~ 1GHz	4.30 dB
	Above 1GHz	3.36 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	Enterprise Access Point
MODEL NO.	EAP701
POWER SUPPLY	5Vdc from AC Adapter or 48Vdc from PoE
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 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	364.4mW
ANTENNA TYPE	PIFA antenna with 2dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	N/A

NOTE:

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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

2. The EUT consumes power from an adapter or PoE:

Item	Brand	Model No.	Spec.
Adapter	Sunny	SYS1460-1005	AC I/P: 100-240V, 1A, 50-60Hz DC O/P: 5V, 2A AC 2Pin, Non-shielded DC cable (1.45m)
PoE	TI	IC TPS23753PW	DC I/P: 48V, 145mA DC O/P: 5V, 1.5A

Note: The above items won't be sold with the EUT.

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

3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Adapter Mode
B	-	√	-	-	PoE Mode

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 **Z-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	54.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	65.0
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	135.0

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)
A & B	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	65.0

POWER LINE CONDUCTED EMISSION TEST:

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	65.0

BANDEDGE MEASUREMENT:

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	54.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	65.0
A	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	135.0

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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	54.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	65.0
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	135.0

TEST CONDITION:

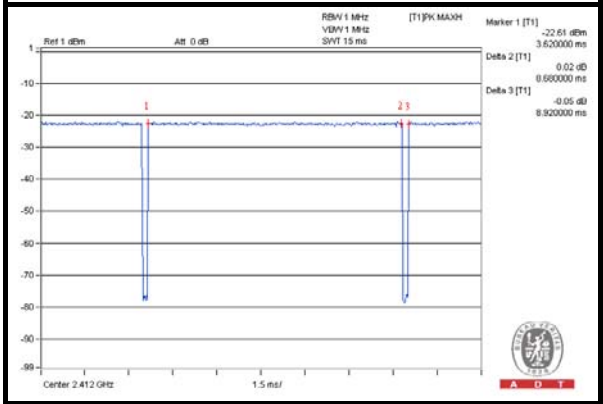
APPLICABLE TO	EUT CONFIGURE MODE	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	A	225eg. C, 75% RH	120Vac, 60Hz	Joey Liu
RE<1G	A	225eg. C, 75% RH	120Vac, 60Hz	Joey Liu
	B	225eg. C, 75% RH	48Vdc (PoE)	Joey Liu
PLC	A	22deg. C, 79% RH	120Vac, 60Hz	Koven Chuang
APCM	A	25deg. C, 60%RH	120Vac, 60Hz	Dalen Dai

3.3 DUTY CYCLE OF TEST SIGNAL

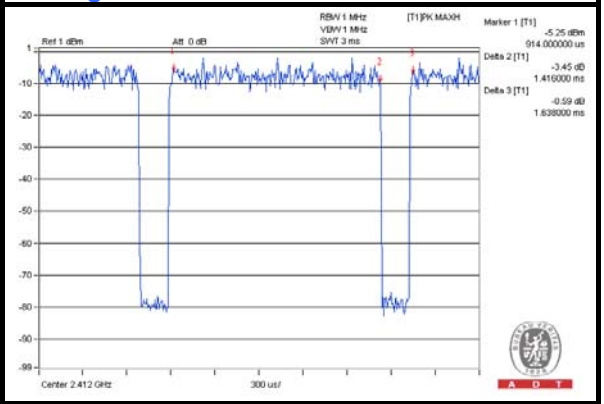
Duty cycle is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 8.68/8.92 = 0.973, Duty factor = 10 * log(1/0.973) = 0.12
802.11g: Duty cycle = 1.416/1.638 = 0.864, Duty factor = 10 * log(1/0.864) = 0.63
802.11n (20MHz): Duty cycle = 1.344/1.566 = 0.858, Duty factor = 10 * log(1/0.858) = 0.67
802.11n (40MHz): Duty cycle = 0.676/0.876 = 0.772, Duty factor = 10 * log(1/0.772) = 1.12

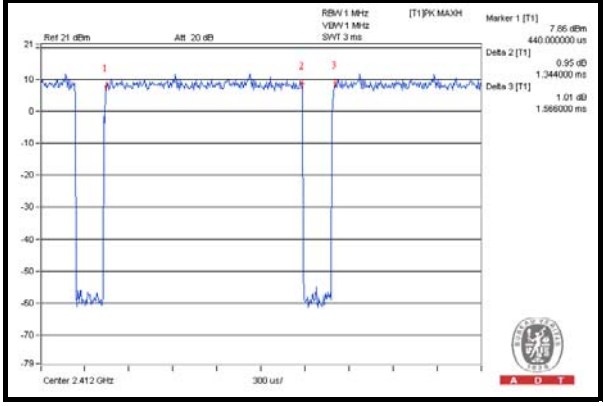
802.11b



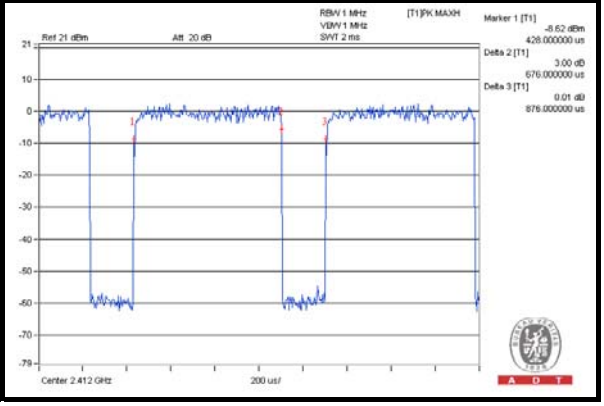
802.11g



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.

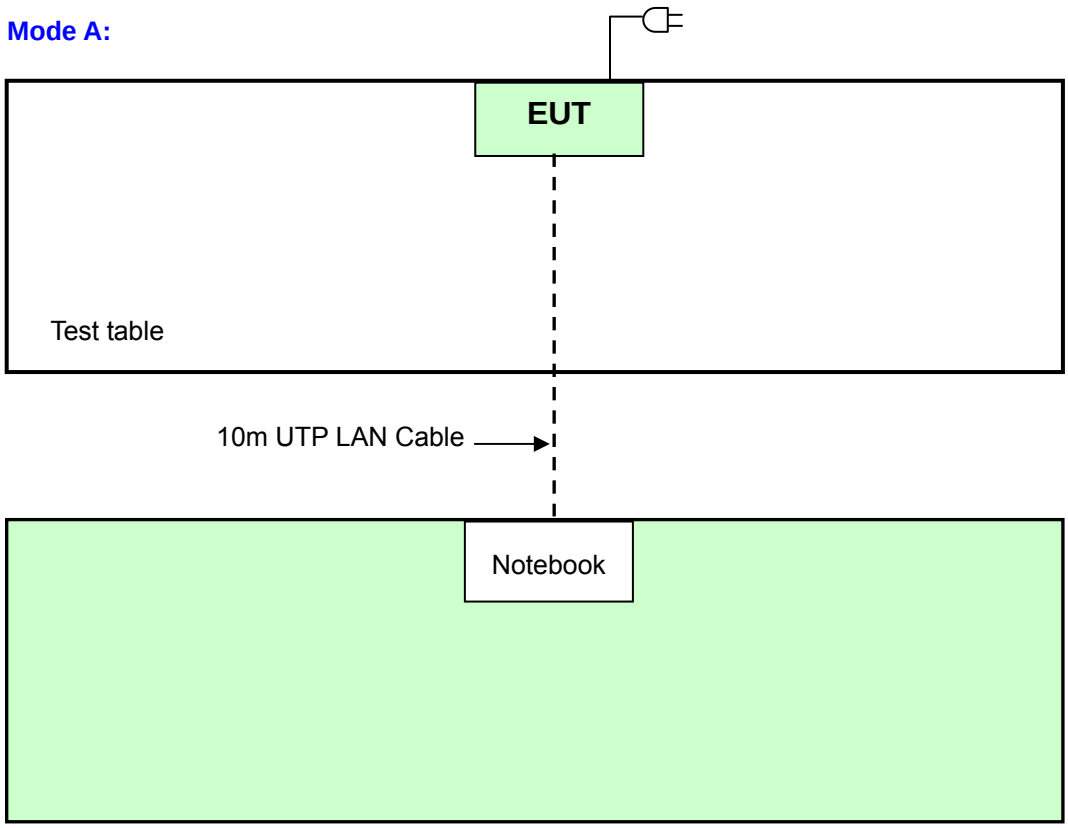
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP27L	8SNZ12S	FCC DoC Approved
2	PoE	TI	IC TPS23753PW	N/A	N/A
3	Adapter	Sunny	SYS1460-1005	N/A	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP LAN Cable (For Mode A only) 1.8m UTP LAN cable (For Mode B only)
2	10m UTP LAN Cable (For Mode B only)
3	N/A

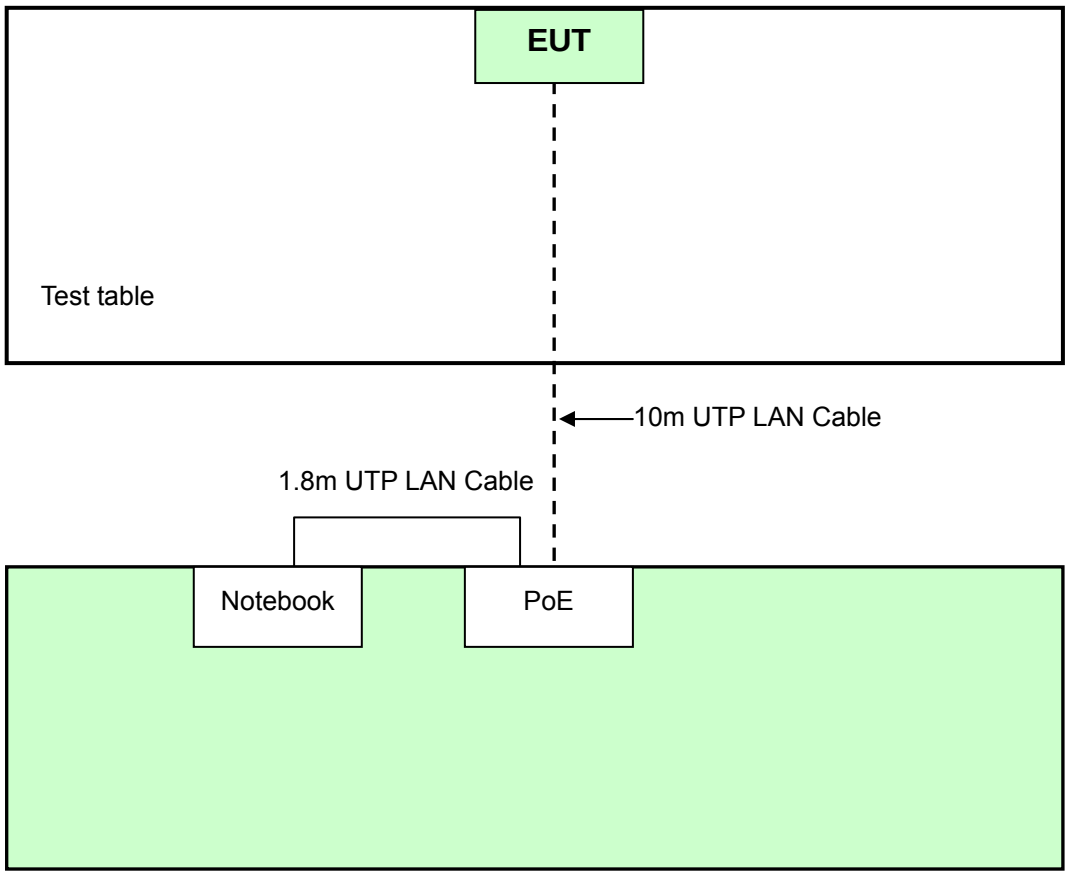
NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. The support units 2-3 were provided by client.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

Mode A:



Mode B:


EUT
Test table
10m UTP LAN Cable
1.8m UTP LAN Cable
Notebook
PoE

3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r01
662911 D01 Multiple Transmitter Output v02
ANSI C63.10-2009

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

NOTE: The product has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2013	Feb. 25, 2014
HP Preamplifier	8449B	3008A01201	Feb. 26, 2013	Feb. 25, 2014
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 03, 2013	Jan. 02, 2014
Schwarzbeck Antenna	VULB 9168	137	Mar. 20, 2013	Mar. 19, 2014
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2014
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF102	CABLE-CH6	Aug. 19, 2013	Aug. 18, 2014
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	May 13, 2013	May 12, 2014
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	May. 17, 2013	May. 16, 2014
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2013	Apr. 23, 2014
Anritsu Power Meter	ML2495A	0842014	Apr. 25, 2013	Apr. 24, 2014

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

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:

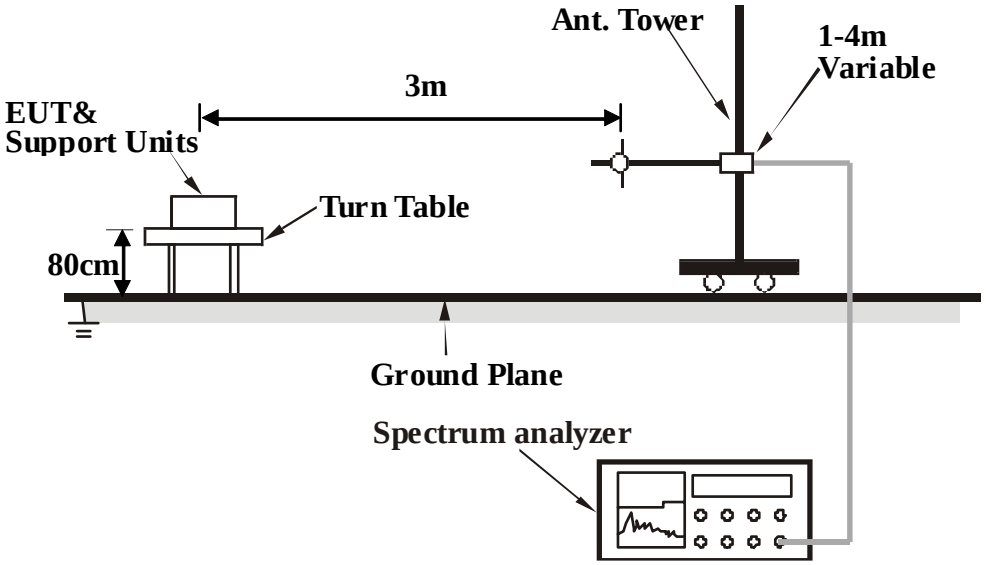
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
3. The resolution 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

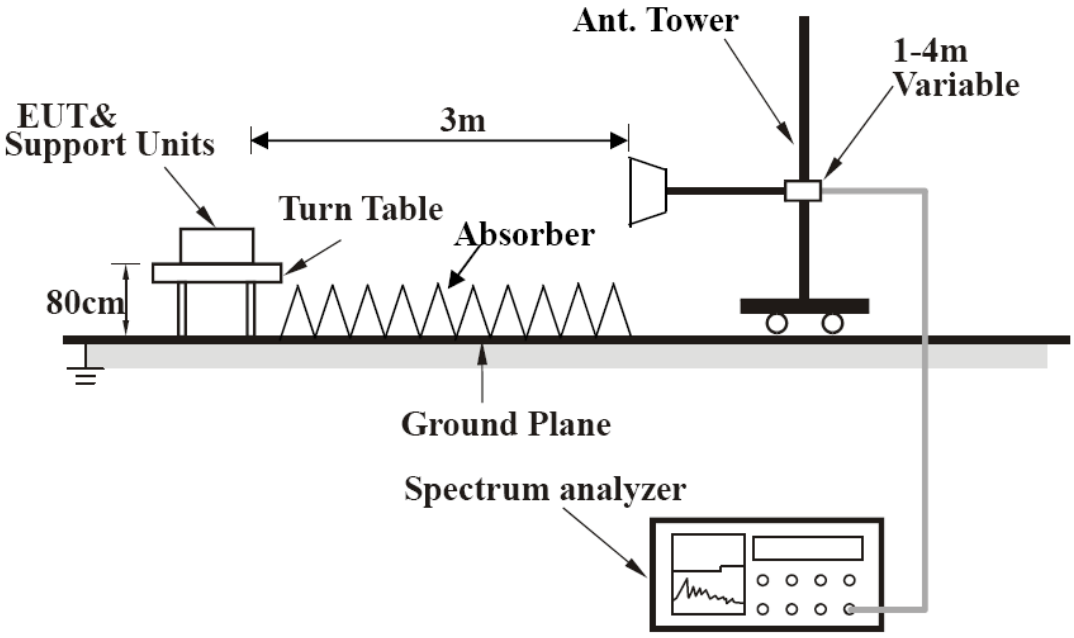
No deviation.

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

<For Mode 1>

a. Connected the EUT with AC adapter placed on testing table.
b. EUT sent and received messages to/from Notebook (kept in a remote area) via wireless transmission.
c. EUT sent and received messages to/from Notebook (kept in a remote area) via an UTP LAN cable (10m).

<For Mode 2>

a. EUT sent and received messages to/from Notebook (kept in a remote area) via wireless transmission.
b. EUT sent and received messages to/from Notebook (kept in a remote area) via POE hub with an UTP LAN cable (10m).

4.1.7 TEST RESULTS

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	60.4 PK	74.0	-13.6	1.20 H	332	64.12	-3.75
2	2390.00	46.6 AV	54.0	-7.4	1.20 H	332	50.34	-3.75
3	*2412.00	102.1 PK			1.20 H	332	105.74	-3.64
4	*2412.00	98.2 AV			1.20 H	332	101.79	-3.64
5	4824.00	43.3 PK	74.0	-30.7	1.20 H	334	39.54	3.73
6	4824.00	33.8 AV	54.0	-20.2	1.20 H	334	30.04	3.73
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	60.3 PK	74.0	-13.7	1.00 V	197	64.05	-3.75
2	2390.00	47.0 AV	54.0	-7.0	1.00 V	197	50.71	-3.75
3	*2412.00	105.7 PK			1.00 V	197	109.36	-3.64
4	*2412.00	100.4 AV			1.00 V	197	104.05	-3.64
5	4824.00	44.9 PK	74.0	-29.2	1.00 V	200	41.12	3.73
6	4824.00	35.6 AV	54.0	-18.4	1.00 V	200	31.86	3.73

REMARKS:

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

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

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	99.9 PK			1.16 H	339	103.39	-3.53
2	*2437.00	96.1 AV			1.16 H	339	99.65	-3.53
3	4874.00	43.0 PK	74.0	-31.0	1.16 H	339	39.28	3.75
4	4874.00	34.0 AV	54.0	-20.0	1.16 H	339	30.24	3.75
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	106.9 PK			1.00 V	174	110.44	-3.53
2	*2437.00	103.0 AV			1.00 V	174	106.49	-3.53
3	4874.00	47.1 PK	74.0	-26.9	1.00 V	174	43.39	3.75
4	4874.00	40.6 AV	54.0	-13.4	1.00 V	174	36.88	3.75

REMARKS:

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

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2462.00	100.3 PK			1.15 H	247	103.74	-3.41
2	*2462.00	96.7 AV			1.15 H	247	100.11	-3.41
3	2483.50	60.4 PK	74.0	-13.6	1.15 H	247	63.72	-3.32
4	2483.50	47.3 AV	54.0	-6.7	1.15 H	247	50.62	-3.32
5	4924.00	64.5 PK	74.0	-9.5	1.15 H	265	60.78	3.74
6	4924.00	34.6 AV	54.0	-19.4	1.15 H	265	30.85	3.74
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	108.1 PK			1.00 V	219	111.50	-3.41
2	*2462.00	104.2 AV			1.00 V	219	107.57	-3.41
3	2483.50	64.1 PK	74.0	-9.9	1.00 V	219	67.45	-3.32
4	2483.50	49.4 AV	54.0	-4.6	1.00 V	219	52.68	-3.32
5	4924.00	47.3 PK	74.0	-26.7	1.00 V	224	43.58	3.74
6	4924.00	40.3 AV	54.0	-13.7	1.00 V	224	36.58	3.74

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

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	65.1 PK	74.0	-8.9	1.22 H	284	68.88	-3.75
2	2390.00	48.3 AV	54.0	-5.7	1.22 H	284	52.06	-3.75
3	*2412.00	99.7 PK			1.22 H	284	103.29	-3.64
4	*2412.00	90.2 AV			1.22 H	284	93.86	-3.64
5	4824.00	41.8 PK	74.0	-32.2	1.22 H	301	38.07	3.73
6	4824.00	30.0 AV	54.0	-24.0	1.22 H	301	26.27	3.73
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	72.5 PK	74.0	-1.5	1.00 V	203	76.29	-3.75
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.00 V**	**203**	**56.72**	**-3.75**
3	*2412.00	106.8 PK			1.00 V	203	110.40	-3.64
4	*2412.00	96.4 AV			1.00 V	203	100.07	-3.64
5	4824.00	41.8 PK	74.0	-32.2	1.00 V	211	38.05	3.73
6	4824.00	30.5 AV	54.0	-23.5	1.00 V	211	26.78	3.73

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

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	100.0 PK			1.14 H	358	103.54	-3.53
2	*2437.00	90.6 AV			1.14 H	358	94.16	-3.53
3	4874.00	41.6 PK	74.0	-32.5	1.14 H	360	37.80	3.75
4	4874.00	30.3 AV	54.0	-23.7	1.14 H	360	26.52	3.75
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	107.3 PK			1.05 V	218	110.84	-3.53
2	*2437.00	97.5 AV			1.05 V	218	100.99	-3.53
3	4874.00	43.9 PK	74.0	-30.1	1.05 V	220	40.15	3.75
4	4874.00	30.3 AV	54.0	-23.7	1.05 V	220	26.54	3.75

REMARKS:

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

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2462.00	100.2 PK			1.12 H	357	103.62	-3.41
2	*2462.00	89.1 AV			1.12 H	357	92.51	-3.41
3	2483.50	69.2 PK	74.0	-4.8	1.12 H	357	72.55	-3.32
4	2483.50	50.5 AV	54.0	-3.5	1.12 H	357	53.81	-3.32
5	4924.00	41.9 PK	74.0	-32.1	1.11 H	348	38.12	3.74
6	4924.00	30.5 AV	54.0	-23.5	1.11 H	348	26.74	3.74
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	106.9 PK			1.28 V	218	110.33	-3.41
2	*2462.00	96.0 AV			1.28 V	218	99.43	-3.41
3	2483.50	72.2 PK	74.0	-1.8	1.28 V	218	75.56	-3.32
4	2483.50	52.2 AV	54.0	-1.8	1.28 V	218	55.55	-3.32
5	4924.00	42.3 PK	74.0	-31.7	1.28 V	221	38.55	3.74
6	4924.00	30.1 AV	54.0	-23.9	1.28 V	221	26.40	3.74

REMARKS:

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

802.11n (20MHz)

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	71.0 PK	74.0	-3.0	1.00 H	327	74.77	-3.75
2	2390.00	52.0 AV	54.0	-2.0	1.00 H	327	55.79	-3.75
3	*2412.00	100.9 PK			1.00 H	328	104.52	-3.64
4	*2412.00	89.5 AV			1.00 H	328	93.17	-3.64
5	4824.00	41.9 PK	74.0	-32.1	1.00 H	327	38.16	3.73
6	4824.00	30.9 AV	54.0	-23.1	1.00 H	327	27.20	3.73
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	72.2 PK	74.0	-1.9	1.02 V	201	75.90	-3.75
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.02 V**	**201**	**56.72**	**-3.75**
3	*2412.00	105.9 PK			1.02 V	204	109.54	-3.64
4	*2412.00	95.3 AV			1.02 V	204	98.95	-3.64
5	4824.00	42.4 PK	74.0	-31.6	1.02 V	207	38.66	3.73
6	4824.00	30.4 AV	54.0	-23.6	1.02 V	207	26.71	3.73

REMARKS:

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

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

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	101.5 PK			1.00 H	330	105.04	-3.53
2	*2437.00	90.1 AV			1.00 H	330	93.58	-3.53
3	4874.00	41.6 PK	74.0	-32.4	1.00 H	331	37.87	3.75
4	4874.00	30.5 AV	54.0	-23.5	1.00 H	331	26.71	3.75
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	107.7 PK			1.00 V	202	111.18	-3.53
2	*2437.00	96.9 AV			1.00 V	202	100.45	-3.53
3	4874.00	42.5 PK	74.0	-31.5	1.00 V	213	38.72	3.75
4	4874.00	30.5 AV	54.0	-23.5	1.00 V	213	26.77	3.75

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)
TEST MODE	A		

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	98.5 PK			1.00 H	325	101.93	-3.41
2	*2462.00	87.5 AV			1.00 H	325	90.95	-3.41
3	2483.50	62.7 PK	74.0	-11.3	1.00 H	325	66.03	-3.32
4	2483.50	47.6 AV	54.0	-6.4	1.00 H	325	50.89	-3.32
5	4924.00	41.9 PK	74.0	-32.1	1.00 H	330	38.19	3.74
6	4924.00	30.1 AV	54.0	-23.9	1.00 H	330	26.37	3.74
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	105.3 PK			1.00 V	204	108.75	-3.41
2	*2462.00	94.7 AV			1.00 V	204	98.15	-3.41
3	2483.50	72.8 PK	74.0	-1.2	1.00 V	202	76.15	-3.32
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.00 V**	**202**	**56.31**	**-3.32**
5	4924.00	42.5 PK	74.0	-31.6	1.00 V	211	38.71	3.74
6	4924.00	30.5 AV	54.0	-23.5	1.00 V	211	26.78	3.74

REMARKS:

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

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.9 PK	74.0	-2.1	1.00 H	232	75.61	-3.75
2	2390.00	50.6 AV	54.0	-3.4	1.00 H	232	54.34	-3.75
3	*2422.00	100.7 PK			1.00 H	232	104.28	-3.59
4	*2422.00	87.4 AV			1.00 H	232	91.02	-3.59
5	4844.00	41.6 PK	74.0	-32.4	1.00 H	235	37.88	3.74
6	4844.00	30.1 AV	54.0	-23.9	1.00 H	235	26.36	3.74
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	72.5 PK	74.0	-1.5	1.00 V	200	76.25	-3.75
2	2390.00	52.2 AV	54.0	-1.8	1.00 V	200	55.94	-3.75
3	*2422.00	106.4 PK			1.00 V	200	109.95	-3.59
4	*2422.00	92.7 AV			1.00 V	200	96.27	-3.59
5	4844.00	42.4 PK	74.0	-31.6	1.00 V	212	38.64	3.74
6	4844.00	30.5 AV	54.0	-23.5	1.00 V	212	26.72	3.74

REMARKS:

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

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

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	99.7 PK			1.12 H	181	103.19	-3.53
2	*2437.00	85.8 AV			1.12 H	181	89.37	-3.53
3	4874.00	42.5 PK	74.0	-31.5	1.12 H	181	38.71	3.75
4	4874.00	30.3 AV	54.0	-23.7	1.12 H	181	26.55	3.75
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	105.4 PK			1.02 V	218	108.92	-3.53
2	*2437.00	91.3 AV			1.02 V	218	94.81	-3.53
3	4874.00	42.2 PK	74.0	-31.8	1.00 V	220	38.47	3.75
4	4874.00	30.6 AV	54.0	-23.4	1.00 V	220	26.88	3.75

REMARKS:

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

CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2452.00	98.7 PK			1.00 H	233	102.20	-3.46
2	*2452.00	85.7 AV			1.00 H	233	89.14	-3.46
3	2483.50	65.9 PK	74.0	-8.1	1.00 H	233	69.23	-3.32
4	2483.50	48.2 AV	54.0	-5.8	1.00 H	233	51.54	-3.32
5	4904.00	42.5 PK	74.0	-31.5	1.00 H	245	38.72	3.76
6	4904.00	30.2 AV	54.0	-23.9	1.00 H	245	26.39	3.76
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2452.00	106.0 PK			1.00 V	218	109.45	-3.46
2	*2452.00	91.9 AV			1.00 V	218	95.39	-3.46
3	2483.50	72.9 PK	74.0	-1.1	1.00 V	218	76.25	-3.32
4	2483.50	52.9 AV	54.0	-1.1	1.00 V	218	56.26	-3.32
5	4904.00	42.2 PK	74.0	-31.8	1.00 V	220	38.44	3.76
6	4904.00	30.3 AV	54.0	-23.7	1.00 V	220	26.55	3.76

REMARKS:

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

BELOW 1GHz WORST-CASE DATA

802.11n (20MHz)

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		

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	108.81	23.7 QP	43.5	-19.8	1.27 H	243	40.36	-16.69
2	149.07	24.0 QP	43.5	-19.5	1.53 H	233	37.41	-13.41
3	290.01	24.4 QP	46.0	-21.6	1.66 H	141	36.13	-11.70
4	358.39	25.0 QP	46.0	-21.1	1.37 H	85	35.30	-10.35
5	576.01	23.1 QP	46.0	-22.9	1.12 H	2	29.07	-5.93
6	773.36	30.1 QP	46.0	-16.0	1.76 H	213	32.15	-2.10
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	51.15	28.0 QP	40.0	-12.0	1.24 V	351	41.46	-13.48
2	77.19	23.1 QP	40.0	-16.9	1.37 V	360	40.51	-17.42
3	148.10	24.0 QP	43.5	-19.5	1.11 V	259	37.61	-13.58
4	384.49	21.5 QP	46.0	-24.6	1.27 V	264	31.28	-9.83
5	500.01	27.3 QP	46.0	-18.7	1.58 V	269	34.68	-7.37
6	773.36	30.1 QP	46.0	-16.0	1.73 V	33	32.15	-2.10

REMARKS:

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

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	B		

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	66.28	20.2 QP	40.0	-19.9	1.03 H	213	35.46	-15.31
2	108.81	22.8 QP	43.5	-20.7	1.00 H	269	39.53	-16.69
3	147.52	22.5 QP	43.5	-21.0	1.45 H	249	36.02	-13.56
4	196.79	16.5 QP	43.5	-27.0	1.27 H	171	32.26	-15.79
5	294.52	24.0 QP	46.0	-22.0	1.67 H	63	35.68	-11.65
6	374.98	23.7 QP	46.0	-22.3	1.53 H	129	33.64	-9.96
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	54.15	27.8 QP	40.0	-12.2	1.14 V	360	40.97	-13.15
2	66.28	28.3 QP	40.0	-11.7	1.34 V	184	43.62	-15.31
3	148.10	21.8 QP	43.5	-21.7	1.27 V	101	35.36	-13.58
4	231.71	21.6 QP	46.0	-24.5	1.55 V	271	36.73	-15.18
5	500.01	28.2 QP	46.0	-17.8	1.64 V	255	35.54	-7.37
6	773.36	28.0 QP	46.0	-18.0	1.12 V	55	30.14	-2.10

REMARKS:

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

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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Jan. 07, 2013	Jan. 06, 2014
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100219	Nov. 28, 2012	Nov. 27, 2013
LISN With Adapter (for EUT)	AD10	C10Ada-001	Nov. 28, 2012	Nov. 27, 2013
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Dec. 05, 2012	Dec. 04, 2013
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Feb. 19, 2013	Feb. 18, 2014
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 06, 2013	Feb. 05, 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 Shielded Room No. 10.

3. The VCCI Site Registration No. C-1852.

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.

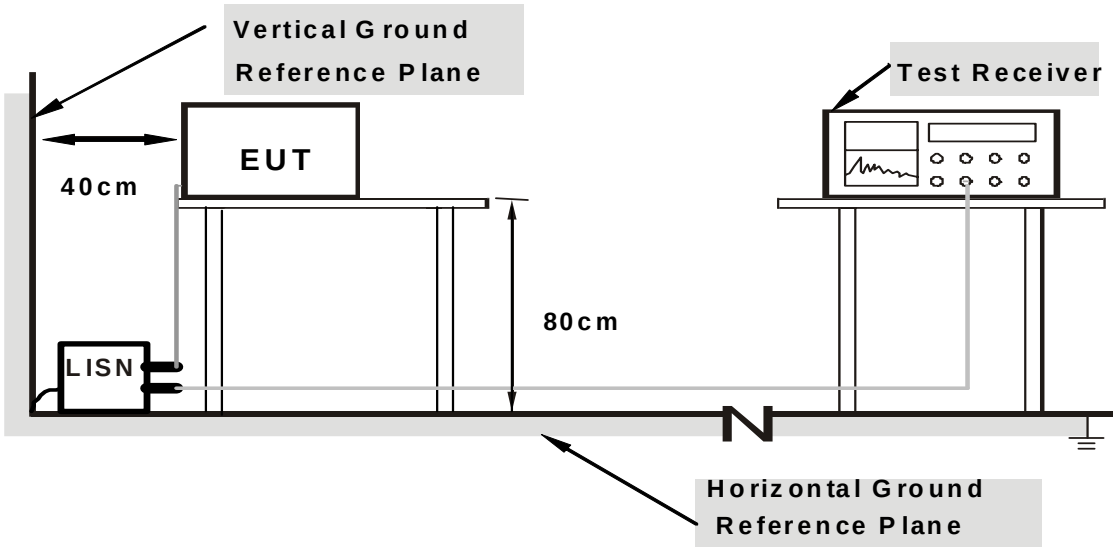
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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: Support units were connected to second LISN.

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

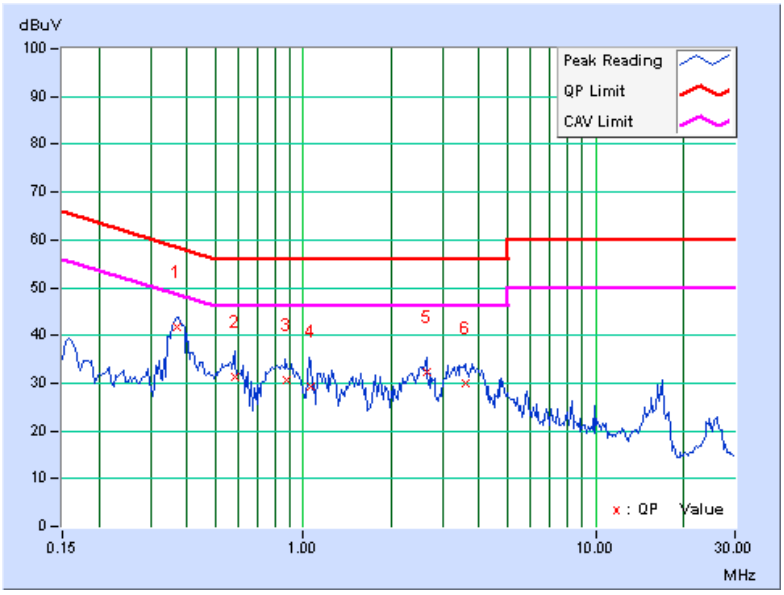
CONDUCTED WORST-CASE DATA：802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.36875	0.18	41.50	33.16	41.68	33.34	58.53	48.53	-16.85	-15.19
2	0.58359	0.20	31.07	22.47	31.27	22.67	56.00	46.00	-24.73	-23.33
3	0.87284	0.21	30.32	21.78	30.53	21.99	56.00	46.00	-25.47	-24.01
4	1.05476	0.21	29.16	16.42	29.37	16.63	56.00	46.00	-26.63	-29.37
5	2.64063	0.30	31.91	22.24	32.21	22.54	56.00	46.00	-23.79	-23.46
6	3.59784	0.35	29.47	19.33	29.82	19.68	56.00	46.00	-26.18	-26.32

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

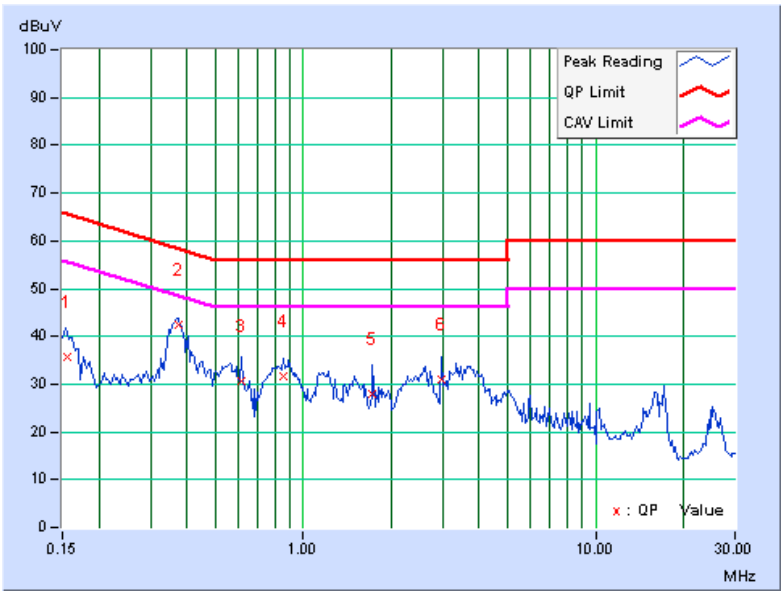


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.15646	0.12	35.63	27.18	35.75	27.30	65.65	55.65	-29.90	-28.35
2	**0.37266**	**0.15**	**42.34**	**35.48**	**42.49**	**35.63**	**58.44**	**48.44**	**-15.95**	**-12.81**
3	0.61511	0.16	30.45	21.22	30.61	21.38	56.00	46.00	-25.39	-24.62
4	0.85313	0.17	31.53	23.25	31.70	23.42	56.00	46.00	-24.30	-22.58
5	1.73075	0.21	27.84	16.95	28.05	17.16	56.00	46.00	-27.95	-28.84
6	2.98438	0.26	30.55	21.45	30.81	21.71	56.00	46.00	-25.19	-24.29

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

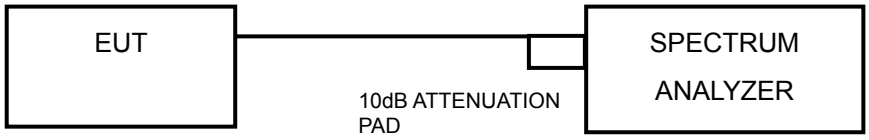


4.3 6dB BANDWIDTH MEASUREMENT

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

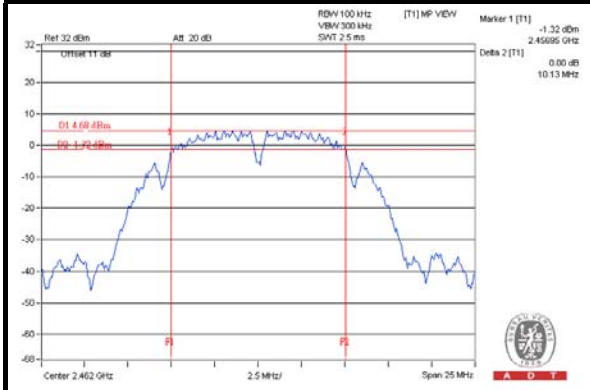
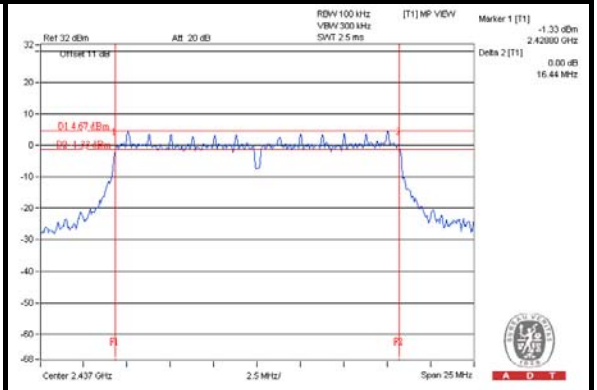
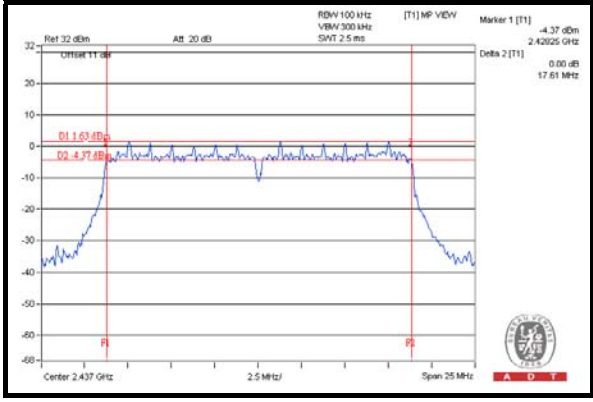
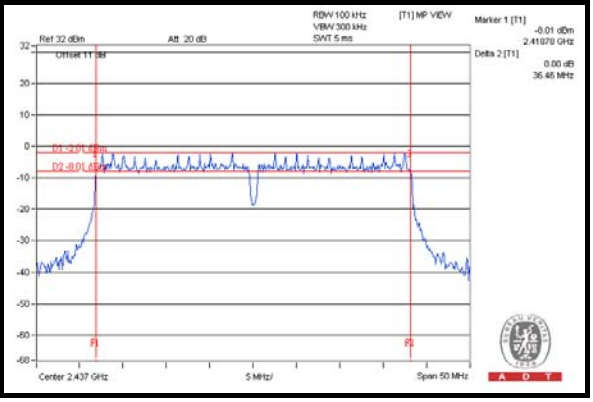
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

Mode A

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
802.11b				
1	2412	10.09	0.5	PASS
6	2437	9.79	0.5	PASS
11	2462	10.13	0.5	PASS
802.11g				
1	2412	16.43	0.5	PASS
6	2437	16.44	0.5	PASS
11	2462	16.44	0.5	PASS

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
802.11n (20MHz)					
1	2412	17.14	17.36	0.5	PASS
6	2437	17.37	17.61	0.5	PASS
11	2462	17.57	17.14	0.5	PASS
802.11n (40MHz)					
3	2422	36.15	36.45	0.5	PASS
6	2437	36.14	36.46	0.5	PASS
9	2452	36.14	36.42	0.5	PASS

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

4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

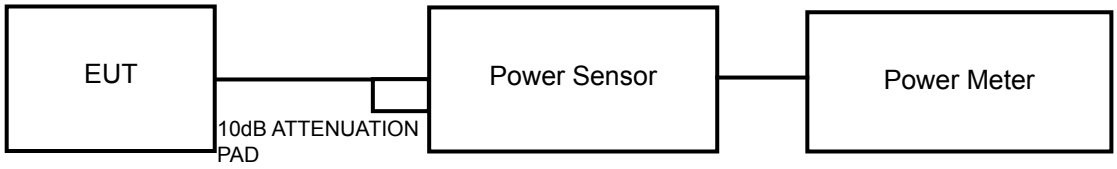
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 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

Mode A

FOR PEAK POWER

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	LIMIT (dBm)	PASS/FAIL
802.11b					
1	2412	19.23	83.8	30	PASS
6	2437	19.28	84.7	30	PASS
11	2462	19.08	80.9	30	PASS
802.11g					
1	2412	23.87	243.8	30	PASS
6	2437	23.93	247.2	30	PASS
11	2462	23.43	220.3	30	PASS

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
802.11n (20MHz)							
1	2412	22.01	21.92	314.5	24.98	30	PASS
6	2437	22.16	21.93	320.4	25.06	30	PASS
11	2462	22.07	21.78	311.7	24.94	30	PASS
802.11n (40MHz)							
3	2422	22.53	22.68	**364.4**	25.62	30	PASS
6	2437	21.98	22.12	320.7	25.06	30	PASS
9	2452	22.48	22.55	356.9	25.53	30	PASS

FOR AVERAGE POWER

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)
802.11b		
1	2412	15.72
6	2437	15.48
11	2462	15.53
802.11g		
1	2412	15.23
6	2437	15.62
11	2462	15.66

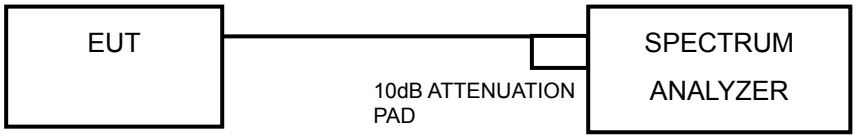
CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	
802.11n (20MHz)				
1	2412	12.73	12.65	15.70
6	2437	12.92	12.55	15.75
11	2462	12.81	12.41	15.62
802.11n (40MHz)				
3	2422	12.13	12.16	15.16
6	2437	12.03	12.07	15.06
9	2452	11.93	11.96	14.96

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.
d. Record the max value and add 10 log (1/duty cycle)

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

Mode A

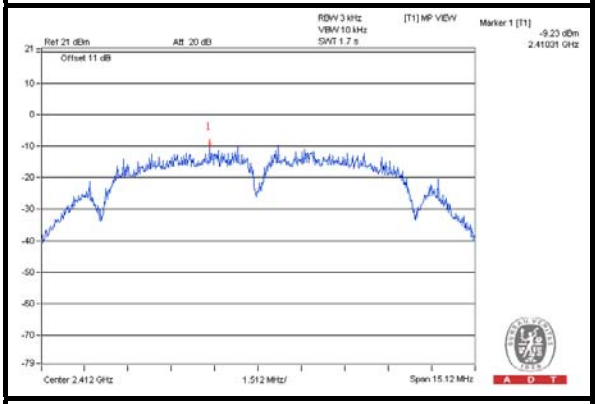
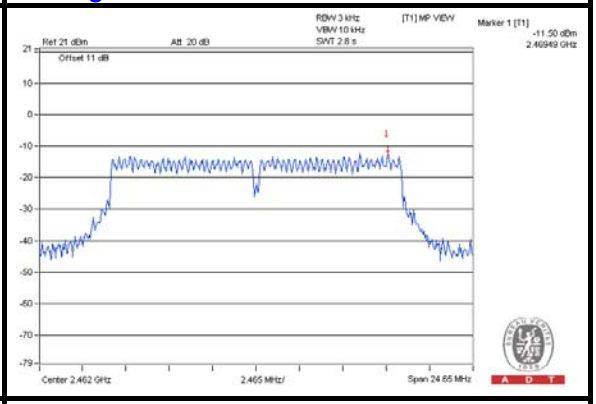
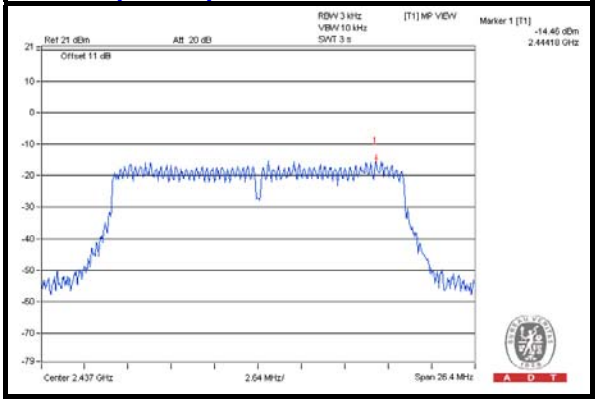
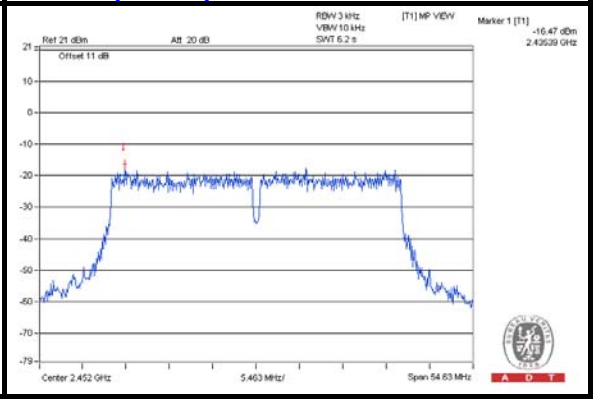
CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
802.11b						
1	2412	-9.23	0.12	-9.11	8	PASS
6	2437	-9.39	0.12	-9.27	8	PASS
11	2462	-10.11	0.12	-9.99	8	PASS
802.11g						
1	2412	-12.04	0.63	-11.41	8	PASS
6	2437	-11.83	0.63	-11.20	8	PASS
11	2462	-11.50	0.63	-10.87	8	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

TX chain	Channel	Freq. (MHz)	PSD W/O DUTY FACTOR (dBm/3kHz)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
802.11n (20MHz)							
0	1	2412	-16.24	0.67	-12.56	8	PASS
	6	2437	-15.98	0.67	-12.30	8	PASS
	11	2462	-15.24	0.67	-11.56	8	PASS
1	1	2412	-15.51	0.67	-11.83	8	PASS
	6	2437	-14.46	0.67	-10.78	8	PASS
	11	2462	-14.57	0.67	-10.89	8	PASS
802.11n (40MHz)							
0	3	2422	-17.75	1.12	-13.62	8	PASS
	6	2437	-17.29	1.12	-13.16	8	PASS
	9	2452	-19.00	1.12	-14.87	8	PASS
1	3	2422	-17.83	1.12	-13.70	8	PASS
	6	2437	-18.01	1.12	-13.88	8	PASS
	9	2452	-16.47	1.12	-12.34	8	PASS

NOTE:

1. Method a of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi which meet the requirement of antenna gain, so the power spectral density limit is not reduced
3. Refer to section 3.3 for duty cycle spectrum plot.

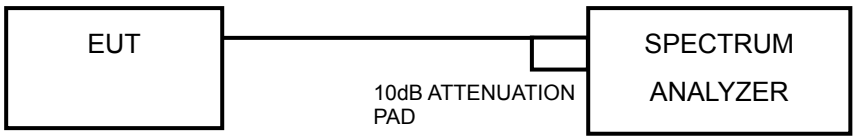
SPECTRUM PLOT OF WORST VALUE	
802.11b	802.11g
	
802.11n (20MHz)	802.11n (40MHz)
	

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below -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

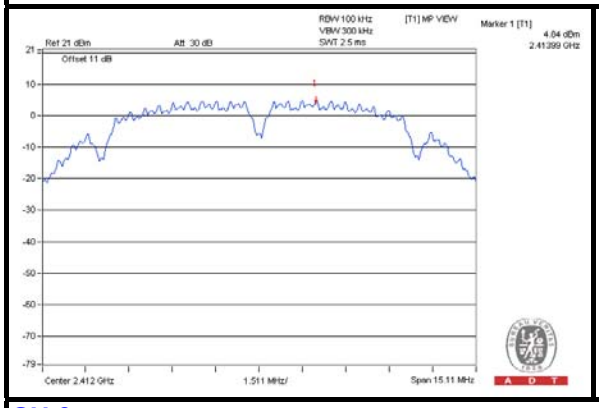
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

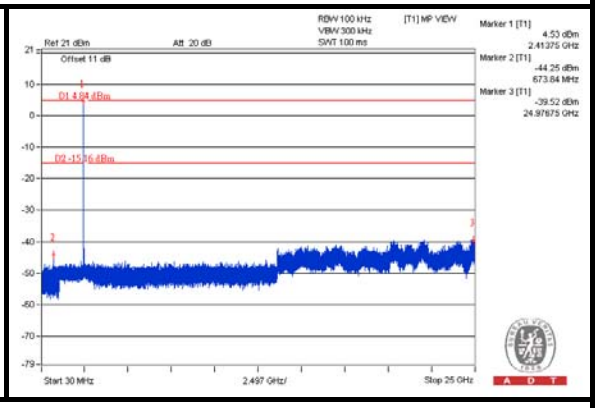
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

Mode A

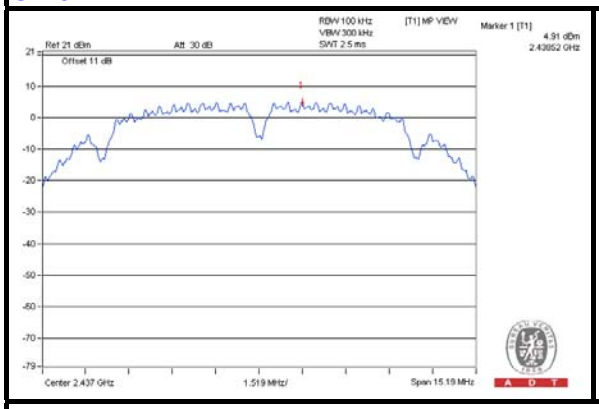
802.11b

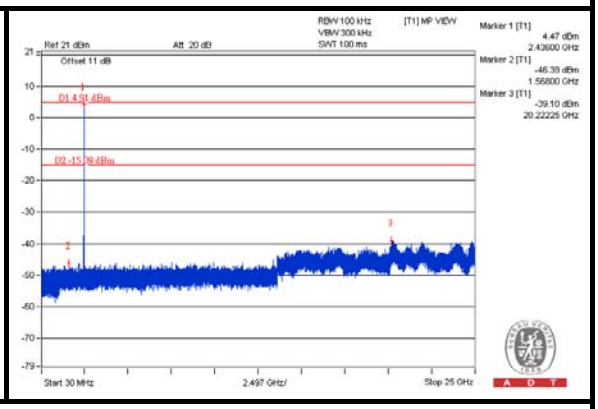
CH 1



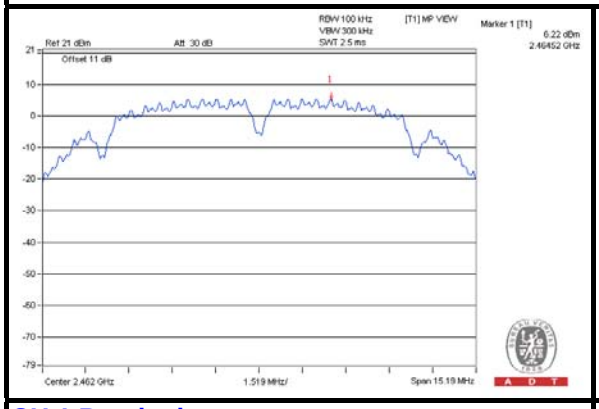


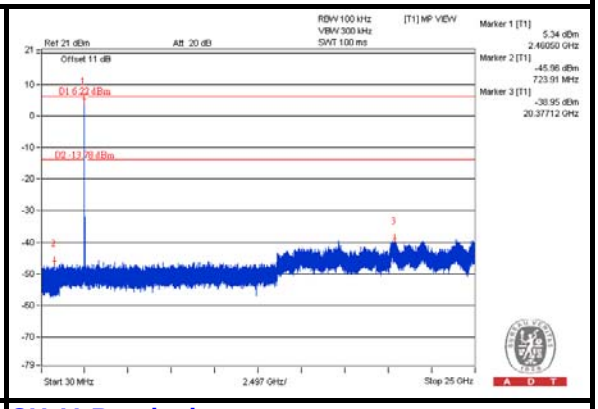
CH 6



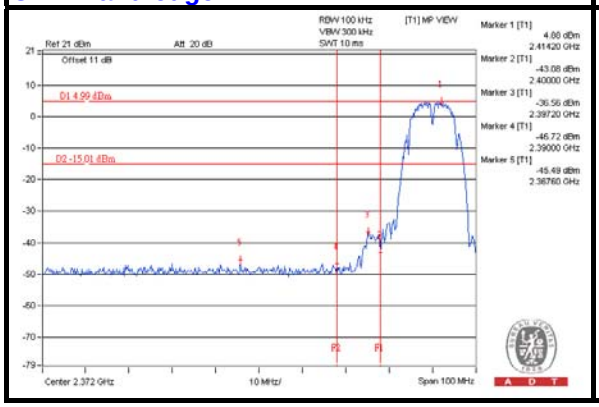


CH 11

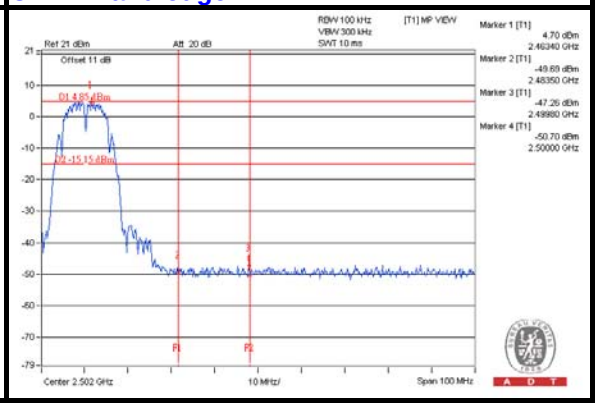




CH 1 Band edge

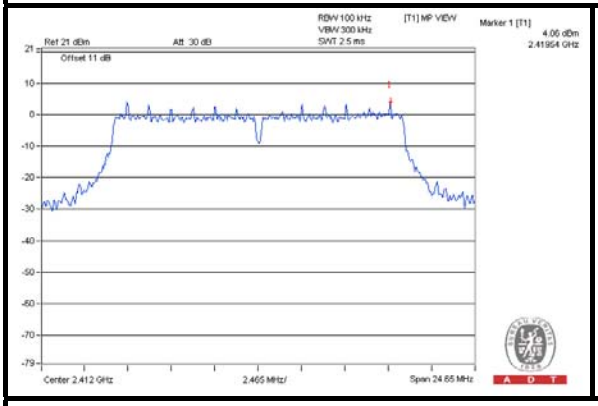


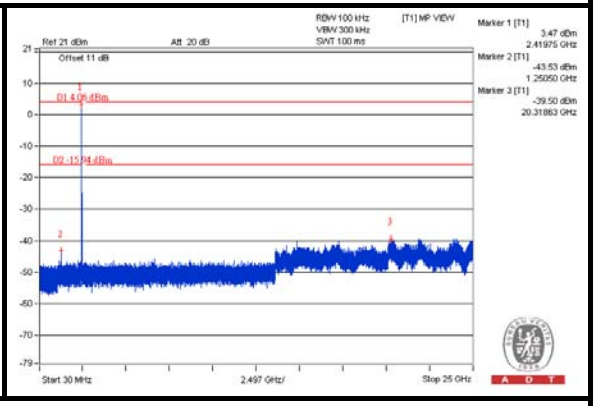
CH 11 Band edge



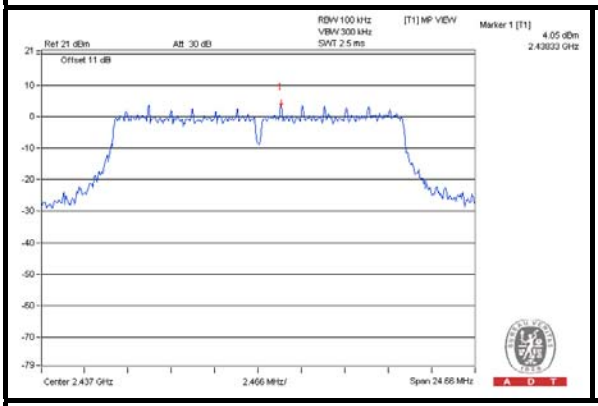
802.11g

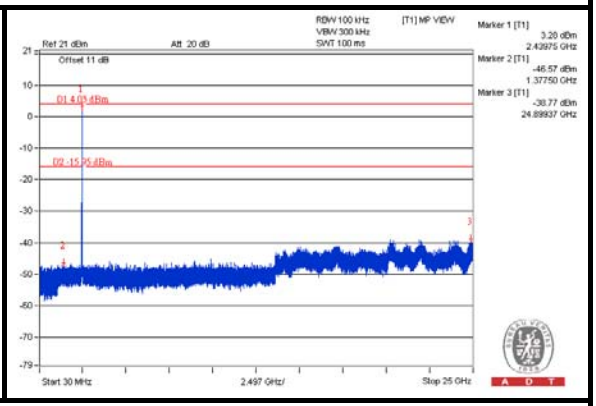
CH 1



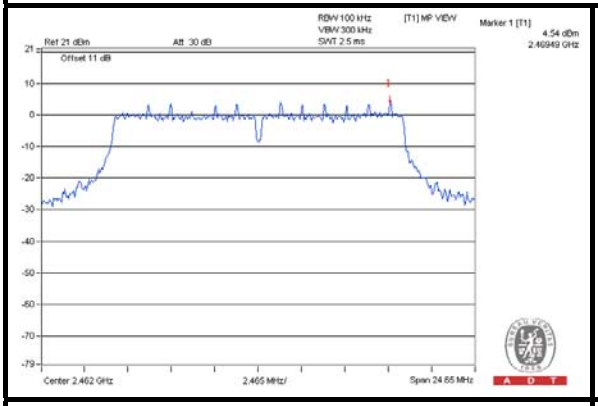


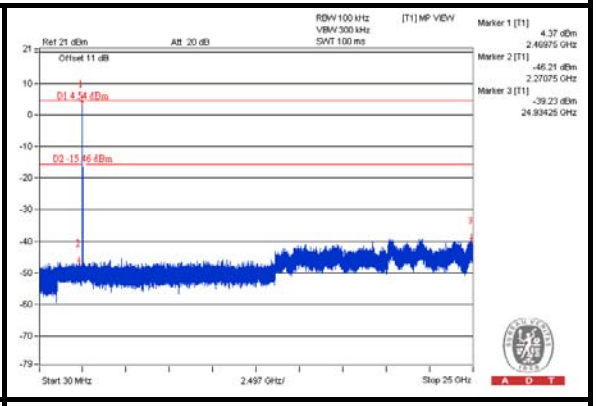
CH 6



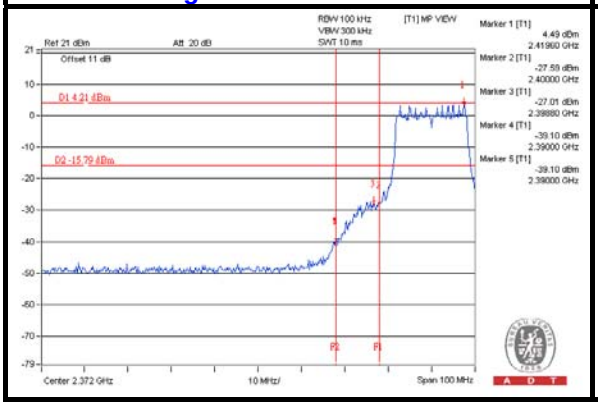


CH 11

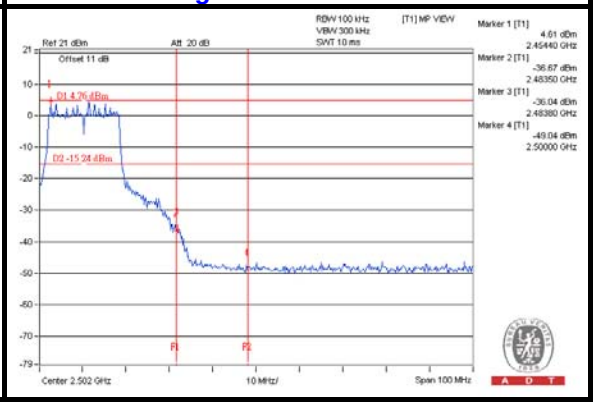




CH 1 Band edge

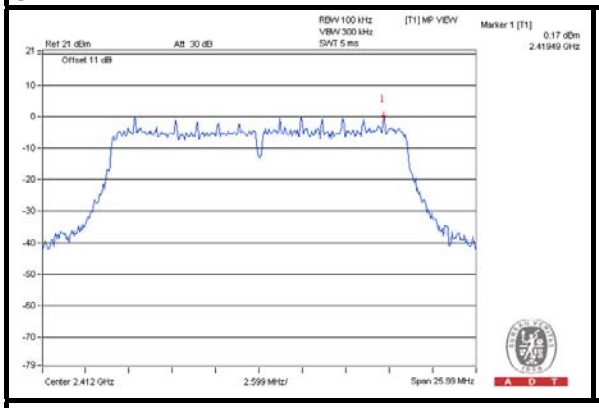


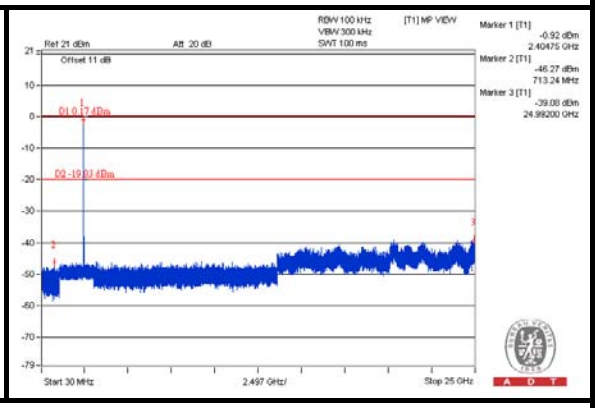
CH 11 Band edge



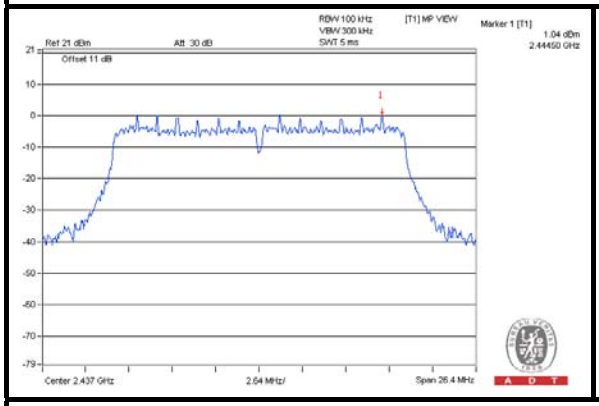
802.11n (20MHz): CHAIN 0

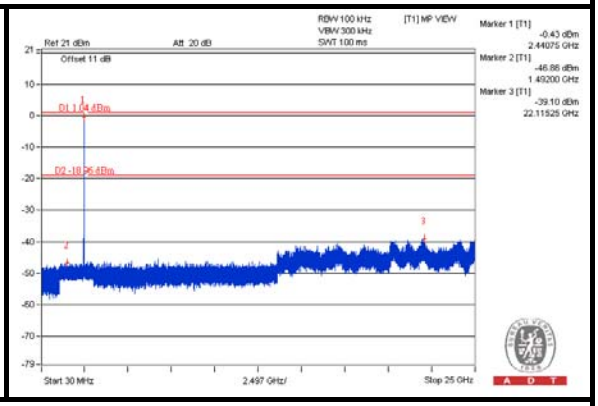
CH 1



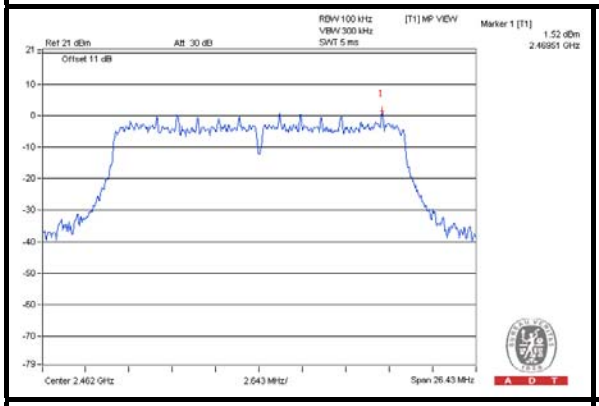


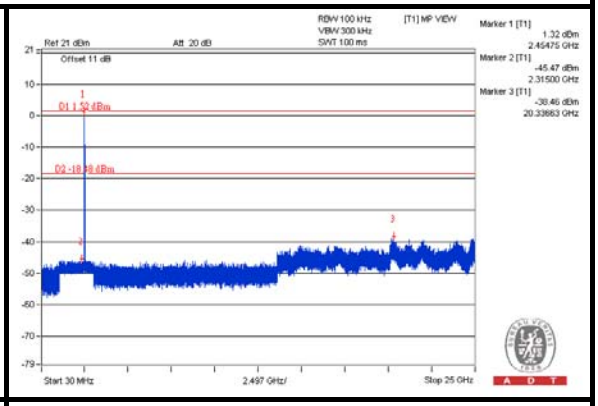
CH 6



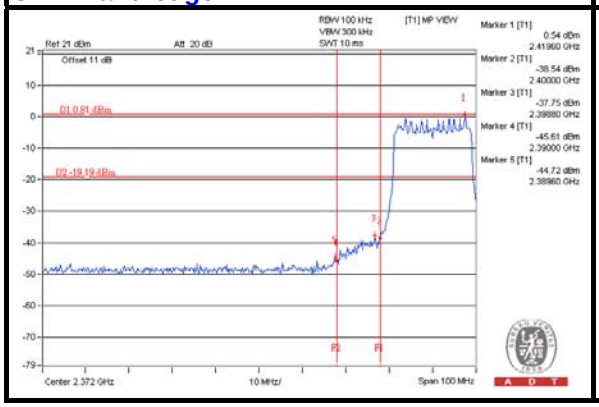


CH 11

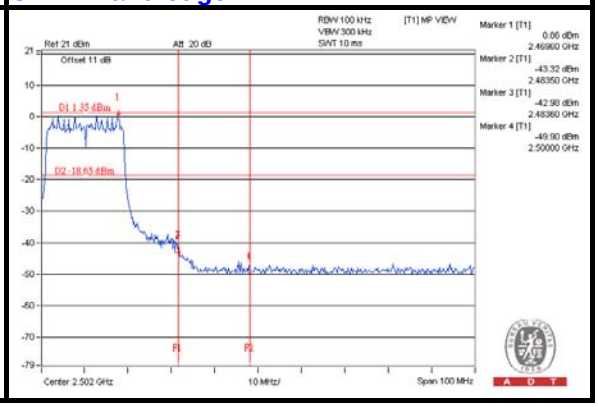




CH 1 Band edge

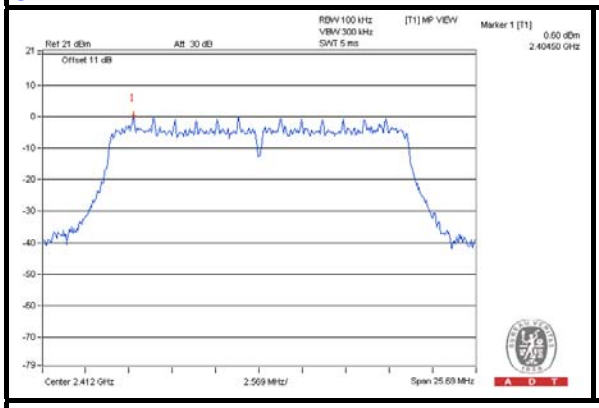


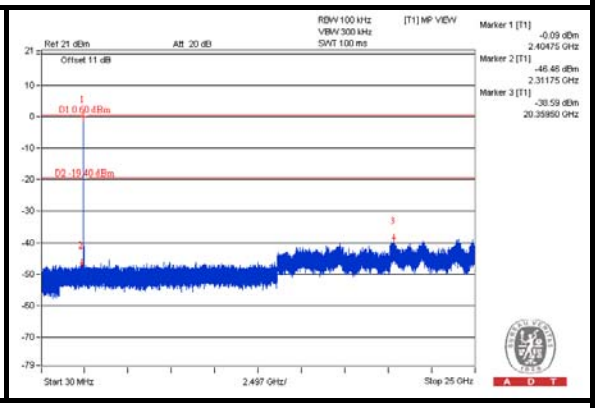
CH 11 Band edge



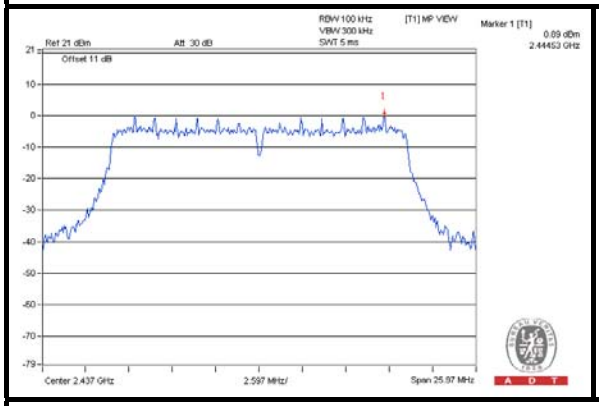
802.11n (20MHz): CHAIN 1

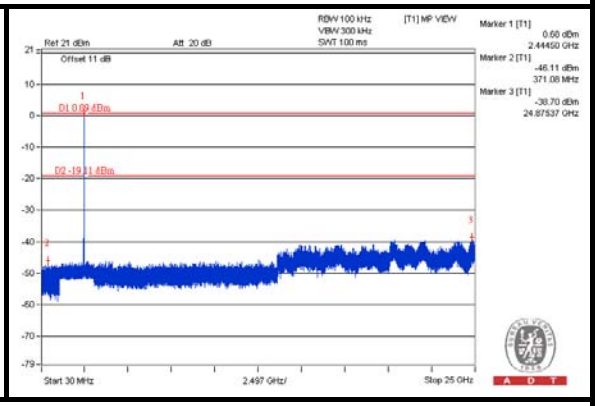
CH 1



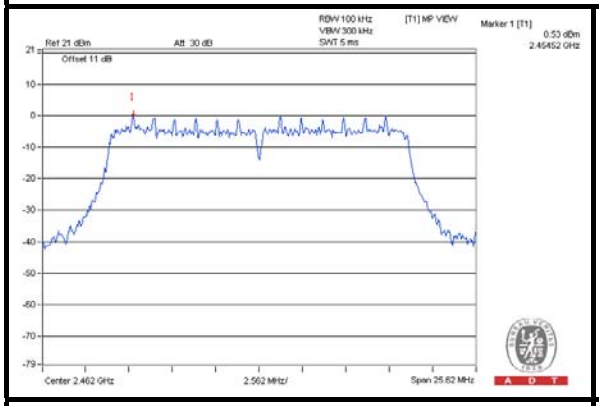


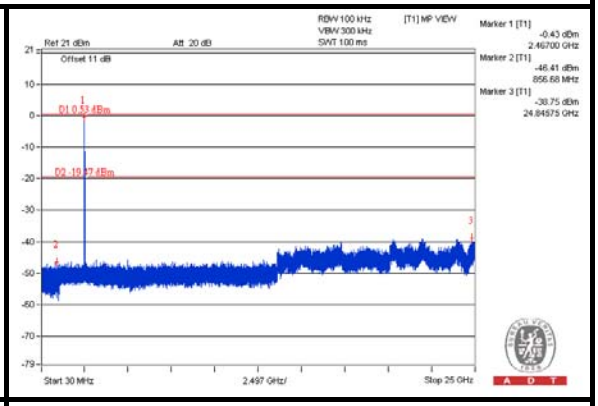
CH 6



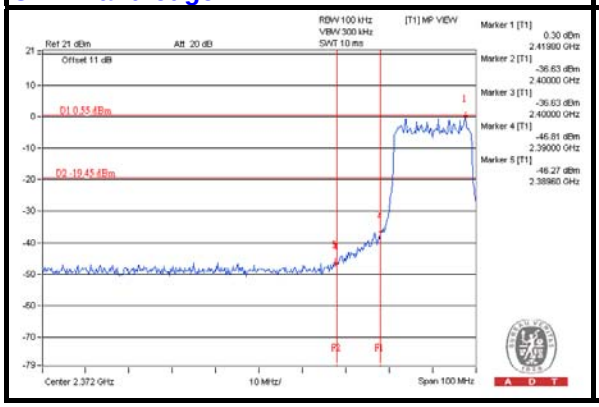


CH 11

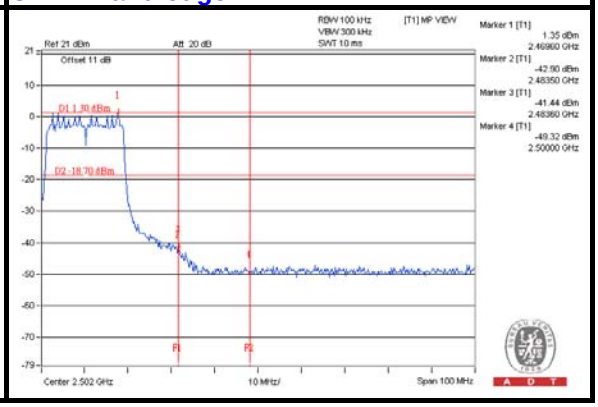




CH 1 Band edge

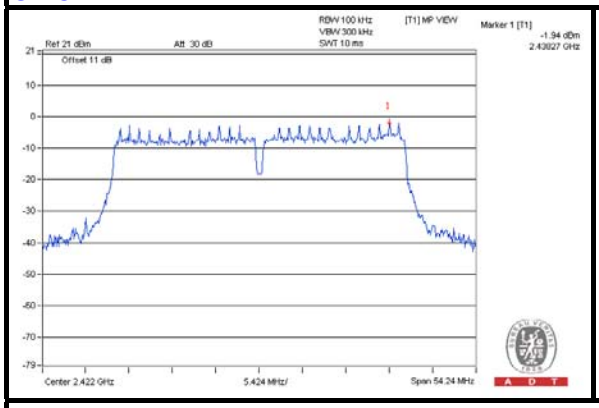


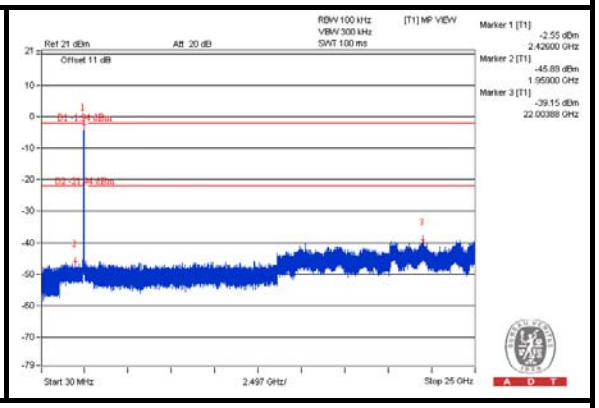
CH 11 Band edge



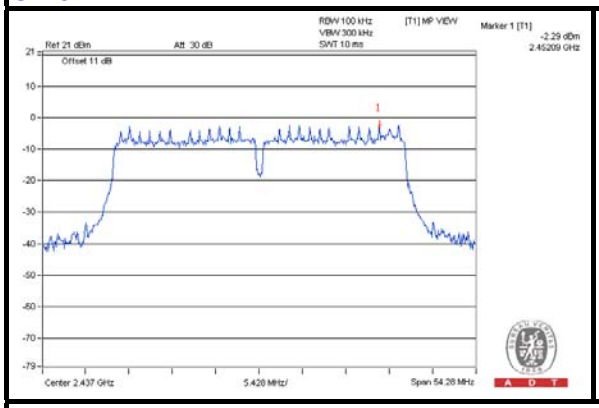
802.11n (40MHz): CHAIN 0

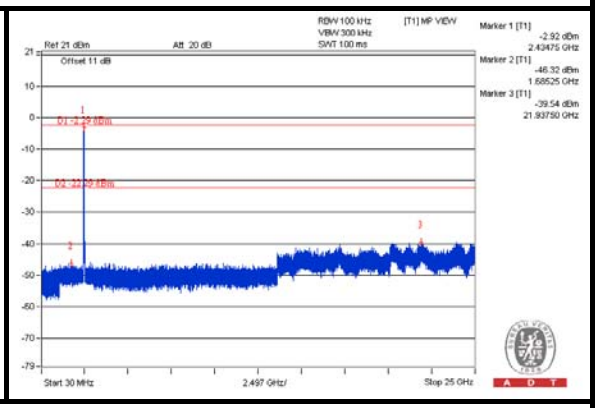
CH 3



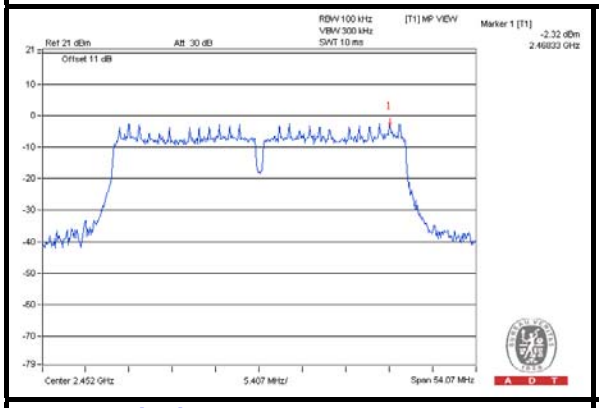


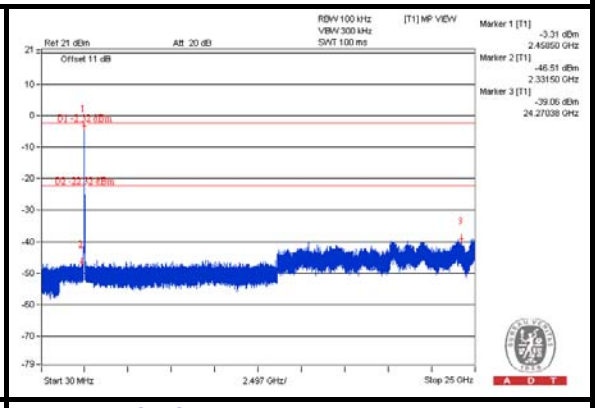
CH 6



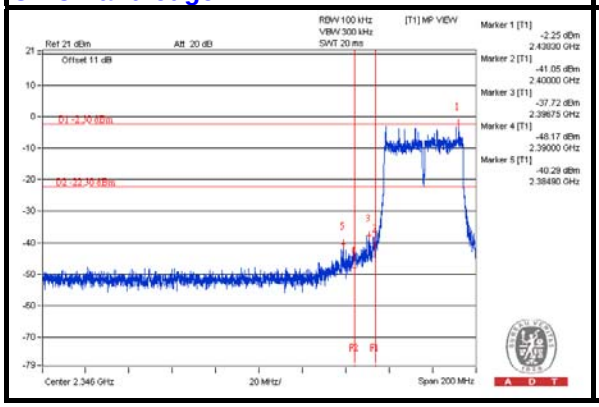


CH 9

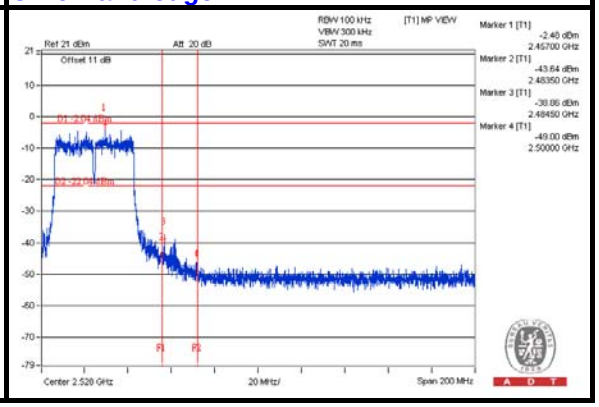




CH 3 Band edge

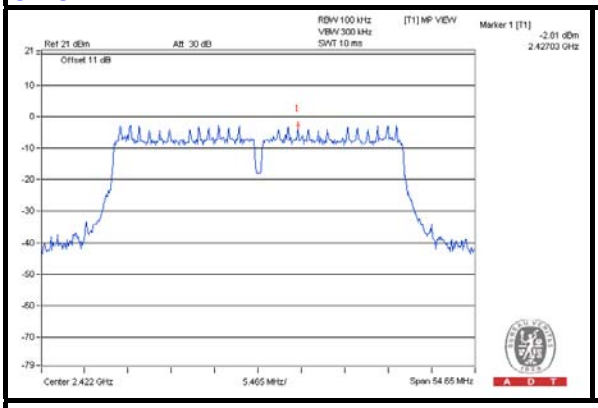


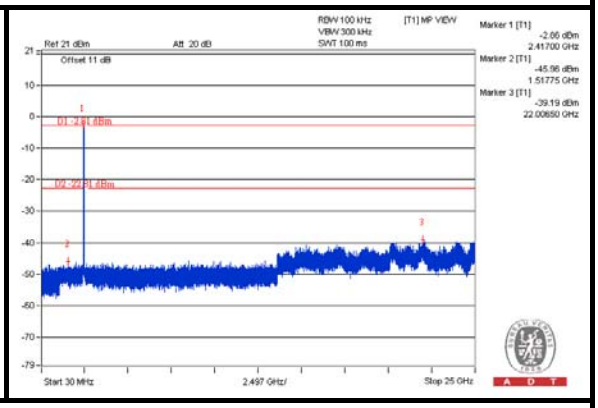
CH 9 Band edge



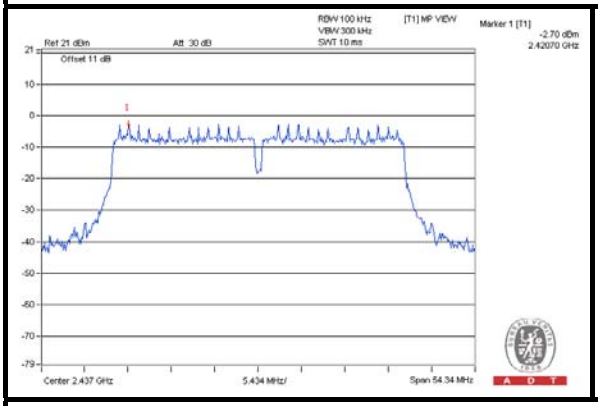
802.11n (40MHz): CHAIN 1

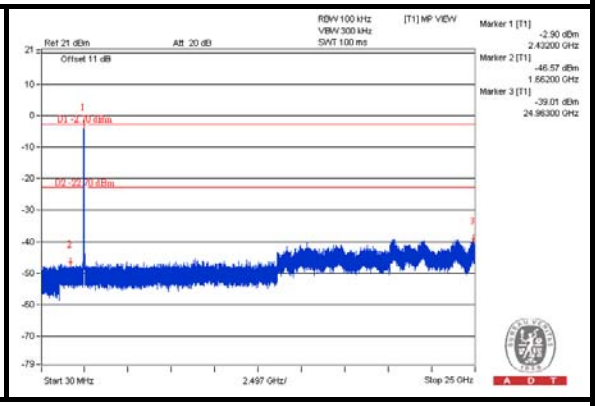
CH 3



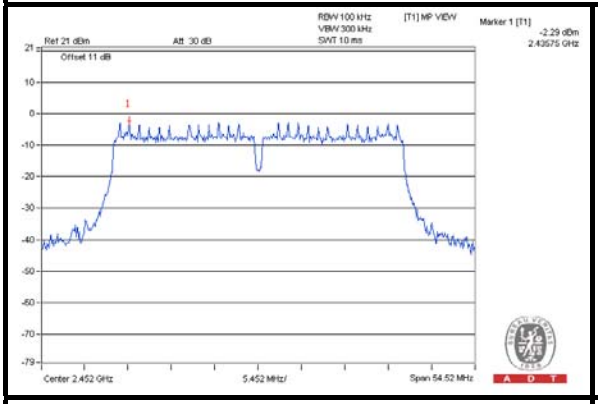


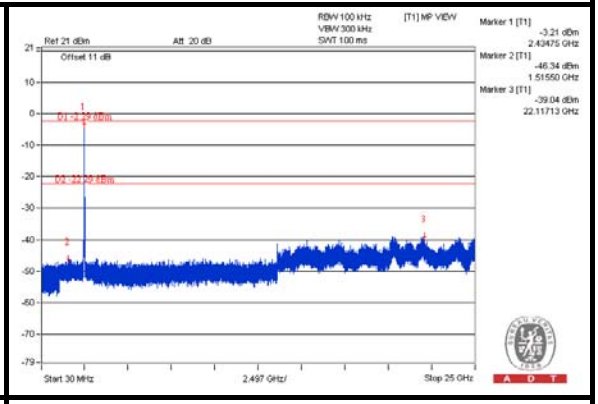
CH 6



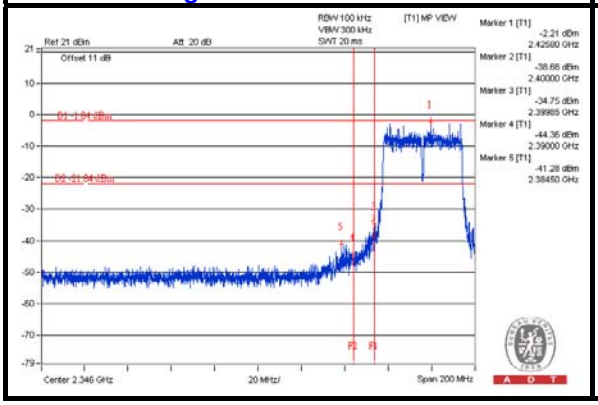


CH 9

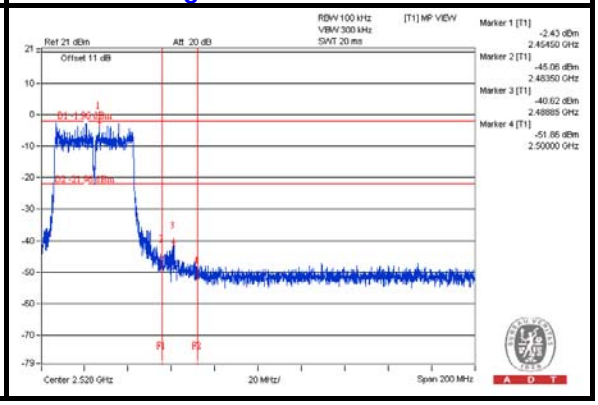




CH 3 Band edge



CH 9 Band edge



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

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

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

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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.

7. 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---