FCC TEST REPORT

REPORT NO.:	RF140822C02
MODEL NO.:	FORTIAP-24Dxxxxxx (where “x” can be used as “A-Z”, or “0-9”, or “-“, or blank for software changes or marketing purposes only) (Refer to Item 3.1 for more detail)
FCC ID:	TVE-121203
RECEIVED:	Aug. 22, 2014
TESTED:	Aug. 28 ~ Sep. 18, 2014
ISSUED:	Sep. 25, 2014
APPLICANT:	Fortinet Inc.
ADDRESS:	899 Kifer Road Sunnyvale, CA 94086 USA
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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
RF140822C02	Original release.	Sep. 25, 2014

1. CERTIFICATION

PRODUCT:	Secured Wireless Access Point
MODEL NO.:	FORTIAP-24Dxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (Refer to Item 3.1 for more detail)
BRAND:	Fortinet Inc.
APPLICANT:	Fortinet Inc.
TESTED:	Aug. 28 ~ Sep. 18, 2014
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**

The above equipment (model: FORTIAP-24D) 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 :** Sep. 25, 2014

Pettie Chen / Senior Specialist

APPROVED BY : _____ **, DATE :** Sep. 25, 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 -2.75dB at 3.86059MHz.
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2360.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.2dB at 2483.5MHz.
15.247(d)	Antenna Port Emission	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 IPEX 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	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 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	Secured Wireless Access Point
MODEL NO.	FORTIAP-24Dxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (Refer to NOTE for more detail)
POWER SUPPLY	12Vdc from adapter 48Vdc from PoE
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	309.228mW
ANTENNA TYPE	Ant. 1: PCB antenna with 3.01dBi gain Ant. 2: PCB antenna with 2.24dBi gain
ANTENNA CONNECTOR	IPEX
POWER CORD	NA
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	NA

NOTE:

1. All models are listed as below.

Brand	Model	Difference
Fortinet Inc.	FortiAP-24Dxxxxxx	where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only
	FORTIAP-24Dxxxxxx	
	FAP-24Dxxxxxx	

*Model: FORTIAP-24D was the final model.

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

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

3. The EUT use following adapter and PoE. (Support units only)

Adapter	
Brand:	Powertron Electronics Corp.
Model:	PA1024-2HUB PA1024-2HU PA1024-120HUB200
Input:	100-240Vac~50-60Hz 0.6A
Output:	12Vdc / 2.0A 24W Max
Power Cord:	1.5m cable with one core

PoE	
Brand:	EnGenius
Model:	NPE-4818
Rating:	48Vdc, 0.375A

Adapter of PoE	
Brand:	Powertron Electronics Corp.
Model:	PA1040-4DU
Input:	100-240Vac~50-60Hz, 0.6A
Output:	48Vdc, 0.38A, 18.24W Max
Power Cord:	1.55m cable with one core

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

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	√	√	√	√	Power from adapter
B	-	√	√	-	Power from PoE

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

NOTE: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-": Means no effect.

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	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11g	1 to 11	6	OFDM	BPSK	6.0

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, B	802.11g	1 to 11	6	OFDM	BPSK	6.0

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	6.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

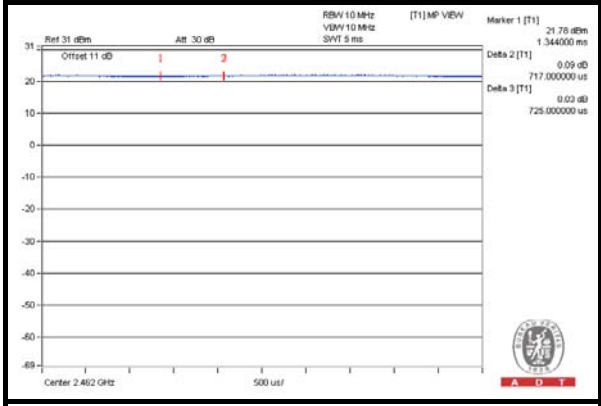
TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Jones Chang
PLC	21deg. C, 72%RH	120Vac, 60Hz	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

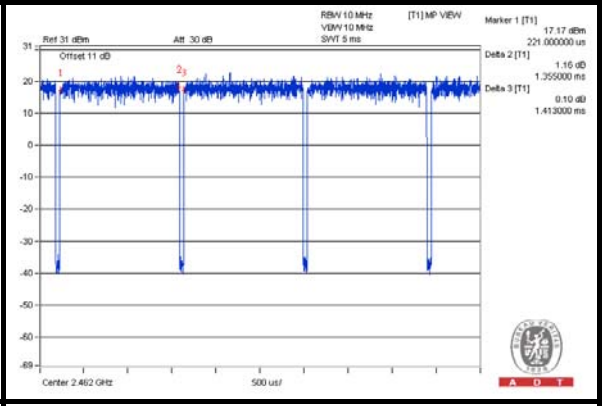
3.3 DUTY CYCLE OF TEST SIGNAL

802.11b: Duty cycle = 0.717/0.725 = 0.989 > 98 %
802.11g: Duty cycle = 1.355/1.413 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11n (20MHz): Duty cycle = 1.27/1.327 = 0.957, Duty factor = 10 * log(1/0.957) = 0.19
802.11n (40MHz): Duty cycle = 0.624/0.674 = 0.926, Duty factor = 10 * log(1/0.926) = 0.33

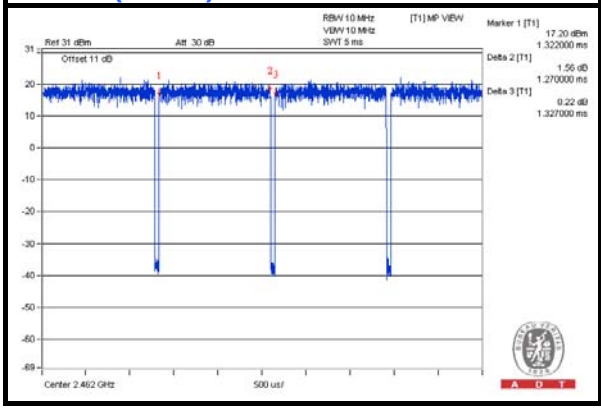
802.11b



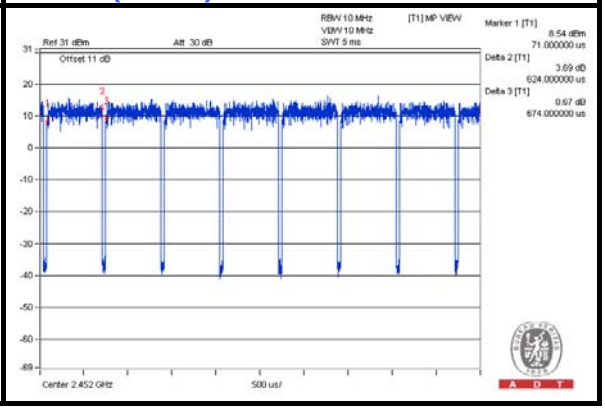
802.11g



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.

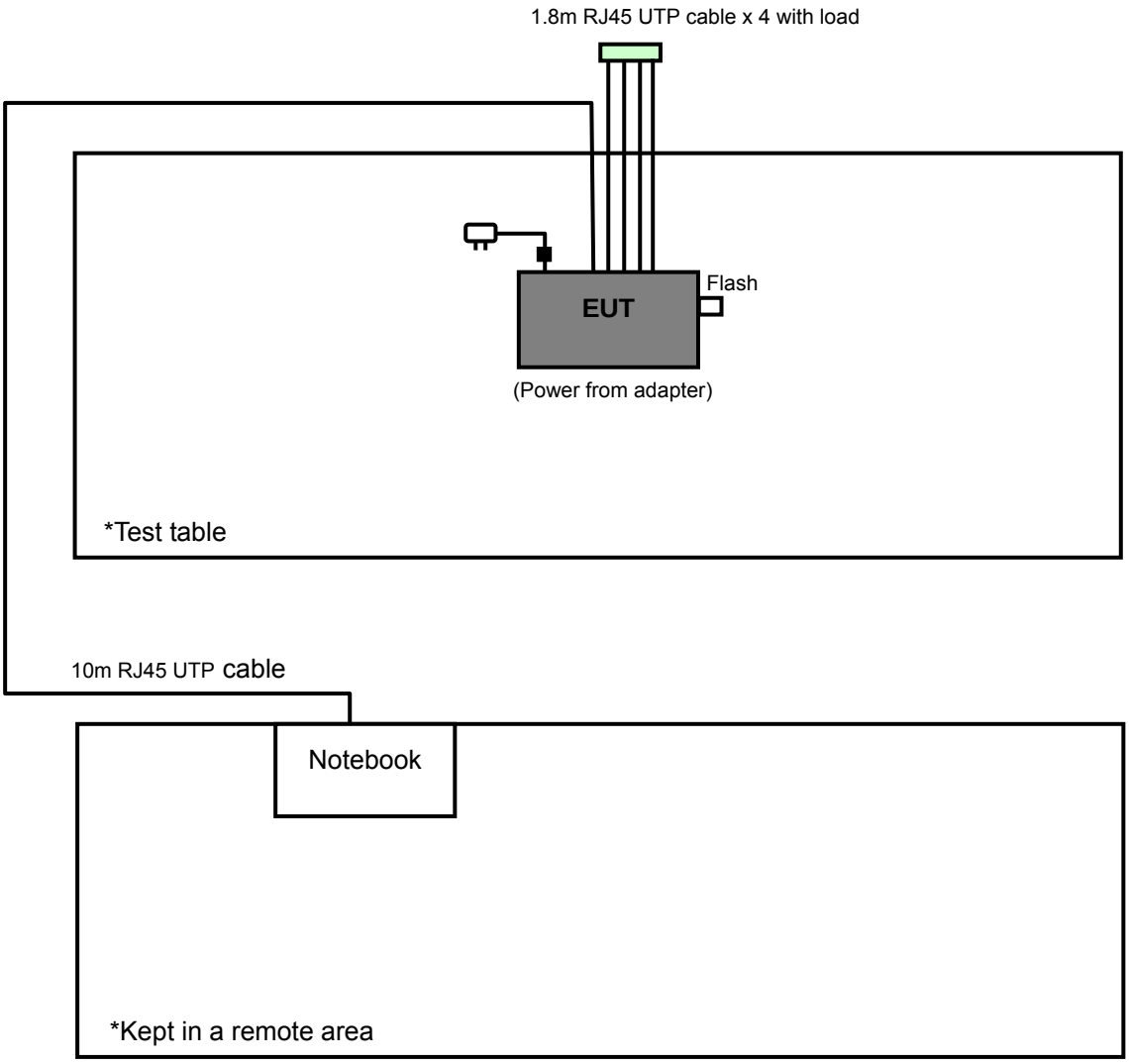
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved
2	JetFlash V85 4GB	Transcend	V85	569992-8209	NA
3	Adapter	Powertron Electronics Corp.	PA1024-2HUB PA1024-2HU PA1024-120HUB200	NA	NA
4	PoE	EnGenius	NPE-4818	NA	NA
5	Adapter of PoE	Powertron Electronics Corp.	PA1040-4DU	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable
2	NA
3	NA
4	10m RJ45 UTP cable
5	NA

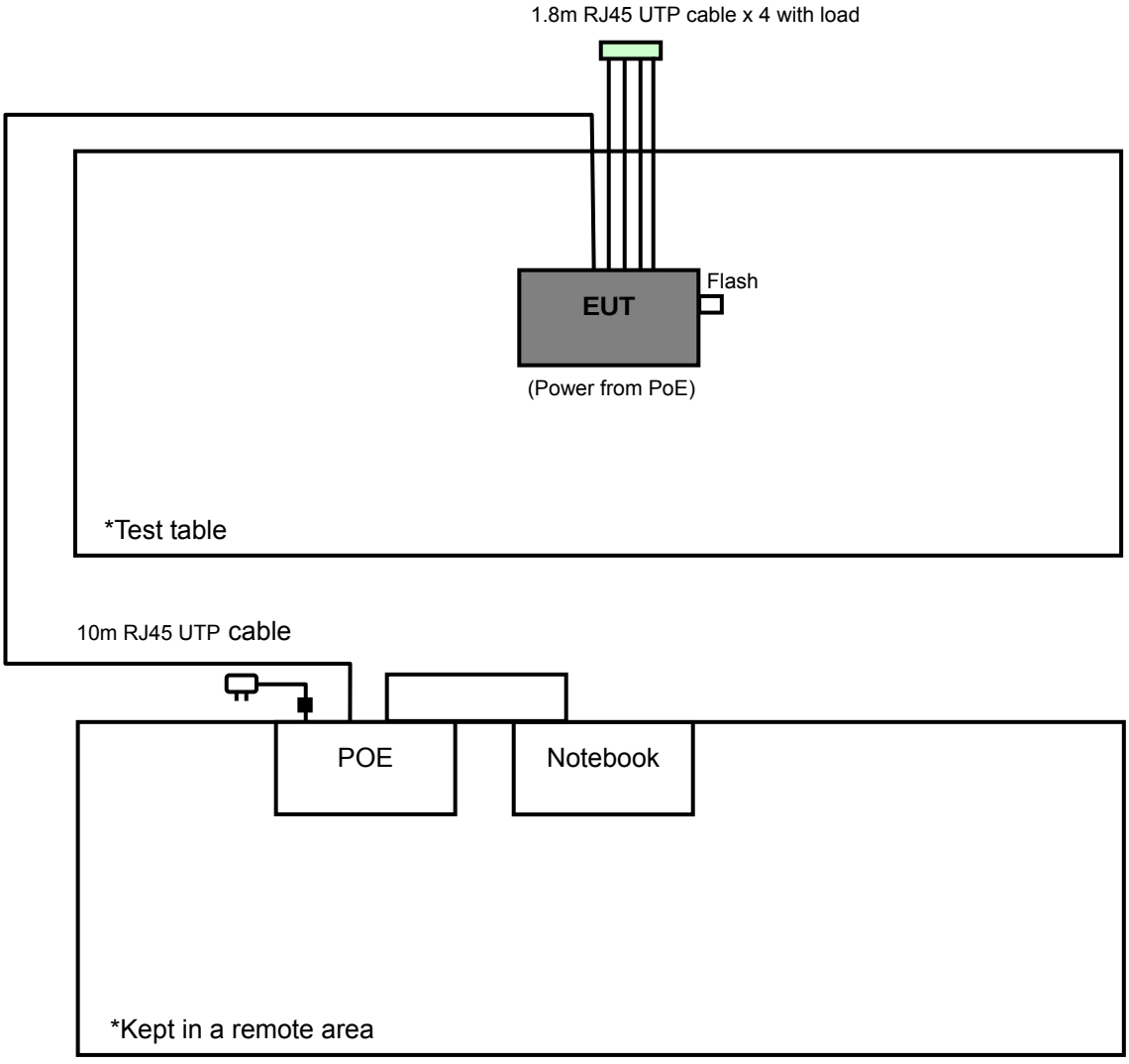
NOTE:
1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1, 4, 5 acted as communication partners to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

Test Mode A



Test Mode B


1.8m RJ45 UTP cable x 4 with load
Flash
EUT
(Power from PoE)
*Test table
10m RJ45 UTP cable
POE
Notebook
*Kept in a remote area

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 v03r02
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

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 30dB 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 30dB 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. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Preamplifier Agilent	8447D	2944A10633	Oct. 07, 2013	Oct. 06, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
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
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015

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. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to 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:

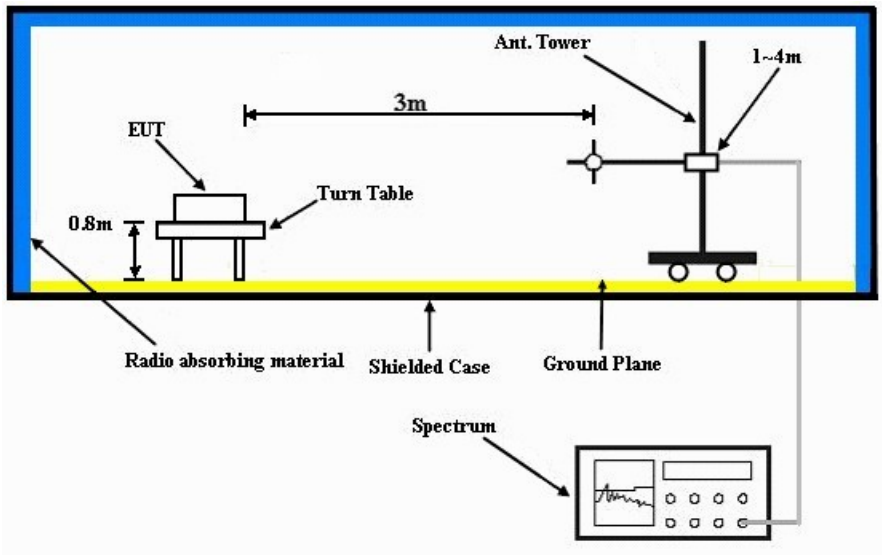
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

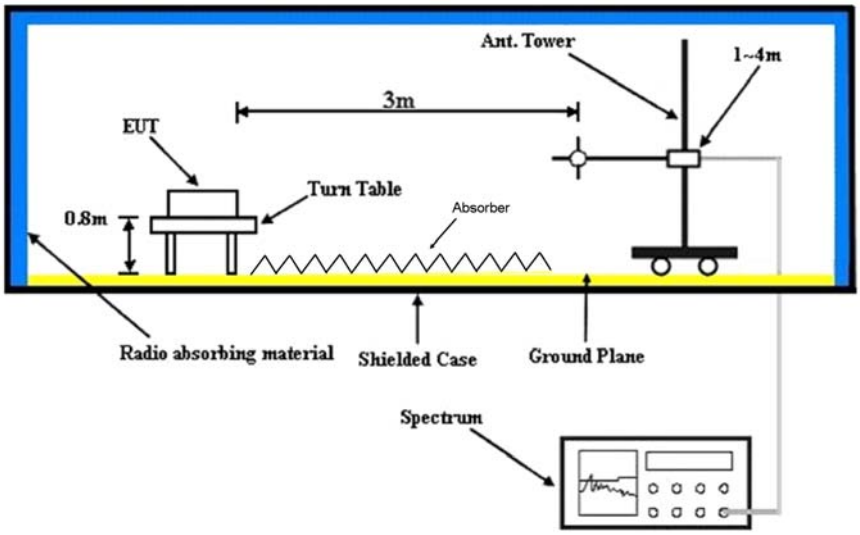
No deviation.

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

4.1.7 TEST RESULTS

ABOVE 1GHz DATA：

802.11b

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

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	2288.00	51.5 PK	74.0	-22.5	1.06 H	1	54.30	-2.80
2	2288.00	46.6 AV	54.0	-7.4	1.06 H	1	49.40	-2.80
3	2360.00	61.8 PK	74.0	-12.2	1.00 H	2	29.10	32.70
4	2360.00	52.7 AV	54.0	-1.3	1.00 H	2	20.00	32.70
5	2390.00	68.6 PK	74.0	-5.4	1.00 H	2	35.80	32.80
6	2390.00	48.8 AV	54.0	-5.2	1.00 H	2	16.00	32.80
7	*2412.00	107.3 PK			1.00 H	4	74.40	32.90
8	*2412.00	103.8 AV			1.00 H	4	70.90	32.90
9	4824.00	55.4 PK	74.0	-18.6	1.00 H	4	53.80	1.60
10	4824.00	51.9 AV	54.0	-2.1	1.00 H	4	50.30	1.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	48.4 PK	74.0	-25.6	1.00 V	300	51.20	-2.80
2	2288.00	43.0 AV	54.0	-11.0	1.00 V	300	45.80	-2.80
3	2360.00	60.7 PK	74.0	-13.3	1.13 V	20	28.00	32.70
4	2360.00	48.3 AV	54.0	-5.7	1.13 V	20	15.60	32.70
5	2390.00	61.3 PK	74.0	-12.7	1.05 V	21	28.50	32.80
6	2390.00	48.2 AV	54.0	-5.8	1.05 V	21	15.40	32.80
7	*2412.00	100.4 PK			1.00 V	327	67.50	32.90
8	*2412.00	96.9 AV			1.00 V	327	64.00	32.90
9	4824.00	51.1 PK	74.0	-22.9	1.01 V	33	49.50	1.60
10	4824.00	46.2 AV	54.0	-7.8	1.01 V	33	44.60	1.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	50.4 PK	74.0	-23.6	1.04 H	8	53.20	-2.80
2	2288.00	45.6 AV	54.0	-8.4	1.04 H	8	48.40	-2.80
3	2360.00	60.9 PK	74.0	-13.1	1.00 H	12	28.20	32.70
4	2360.00	51.6 AV	54.0	-2.4	1.00 H	12	18.90	32.70
5	*2437.00	108.2 PK			1.00 H	360	75.20	33.00
6	*2437.00	104.7 AV			1.00 H	360	71.70	33.00
7	4874.00	54.9 PK	74.0	-19.1	1.00 H	360	53.30	1.60
8	4874.00	52.9 AV	54.0	-1.1	1.00 H	360	51.30	1.60
9	7311.00	56.4 PK	74.0	-17.6	1.27 H	0	48.20	8.20
10	7311.00	45.7 AV	54.0	-8.3	1.27 H	0	37.50	8.20
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	2288.00	48.0 PK	74.0	-26.0	1.05 V	96	50.80	-2.80
2	2288.00	42.7 AV	54.0	-11.3	1.05 V	96	45.50	-2.80
3	2360.00	60.2 PK	74.0	-13.8	1.02 V	63	27.50	32.70
4	2360.00	47.9 AV	54.0	-6.1	1.02 V	63	15.20	32.70
5	*2437.00	103.4 PK			1.00 V	7	70.40	33.00
6	*2437.00	99.7 AV			1.00 V	7	66.70	33.00
7	4874.00	51.7 PK	74.0	-22.3	1.00 V	225	50.10	1.60
8	4874.00	47.1 AV	54.0	-6.9	1.00 V	225	45.50	1.60
9	7311.00	57.5 PK	74.0	-16.5	1.07 V	29	49.40	8.10
10	7311.00	47.7 AV	54.0	-6.3	1.07 V	29	39.60	8.10

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.

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

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	2360.00	59.9 PK	74.0	-14.1	1.00 H	360	27.20	32.70
2	2360.00	51.2 AV	54.0	-2.8	1.00 H	360	18.50	32.70
3	*2462.00	108.5 PK			1.00 H	7	75.40	33.10
4	*2462.00	104.8 AV			1.00 H	7	71.70	33.10
5	2483.50	72.4 PK	74.0	-1.6	1.20 H	7	39.20	33.20
6	2483.50	49.4 AV	54.0	-4.6	1.20 H	7	16.20	33.20
7	4924.00	55.1 PK	74.0	-18.9	1.00 H	352	53.40	1.70
8	4924.00	52.5 AV	54.0	-1.5	1.00 H	352	50.80	1.70
9	7386.00	55.8 PK	74.0	-18.2	1.00 H	51	47.60	8.20
10	7386.00	43.6 AV	54.0	-10.4	1.00 H	51	35.40	8.20
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	2360.00	62.0 PK	74.0	-12.0	1.41 V	63	29.30	32.70
2	2360.00	47.9 AV	54.0	-6.1	1.41 V	63	15.20	32.70
3	*2462.00	105.1 PK			1.09 V	40	72.00	33.10
4	*2462.00	101.5 AV			1.09 V	40	68.40	33.10
5	2483.50	64.1 PK	74.0	-9.9	1.00 V	6	30.90	33.20
6	2483.50	49.2 AV	54.0	-4.8	1.00 V	6	16.00	33.20
7	4924.00	51.4 PK	74.0	-22.6	1.01 V	14	49.70	1.70
8	4924.00	47.1 AV	54.0	-6.9	1.01 V	14	45.40	1.70
9	7386.00	57.4 PK	74.0	-16.6	1.06 V	3	49.20	8.20
10	7386.00	46.6 AV	54.0	-7.4	1.06 V	3	38.40	8.20

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

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

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	2288.00	49.4 PK	74.0	-24.6	1.03 H	10	52.20	-2.80
2	2288.00	43.9 AV	54.0	-10.1	1.03 H	10	46.70	-2.80
3	2360.00	62.3 PK	74.0	-11.7	1.00 H	4	29.60	32.70
4	**2360.00**	**53.0 AV**	**54.0**	**-1.0**	**1.00 H**	**4**	**20.30**	**32.70**
5	2390.00	66.4 PK	74.0	-7.6	1.00 H	4	33.60	32.80
6	2390.00	50.1 AV	54.0	-3.9	1.00 H	4	17.30	32.80
7	*2412.00	107.5 PK			1.00 H	2	74.60	32.90
8	*2412.00	96.5 AV			1.00 H	2	63.60	32.90
9	4824.00	49.4 PK	74.0	-24.6	1.00 H	7	47.80	1.60
10	4824.00	36.3 AV	54.0	-17.7	1.00 H	7	34.70	1.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	47.5 PK	74.0	-26.5	1.00 V	306	50.30	-2.80
2	2288.00	41.7 AV	54.0	-12.3	1.00 V	306	44.50	-2.80
3	2360.00	60.2 PK	74.0	-13.8	1.52 V	47	27.50	32.70
4	2360.00	47.9 AV	54.0	-6.1	1.52 V	47	15.20	32.70
5	2390.00	61.5 PK	74.0	-12.5	1.23 V	2	28.70	32.80
6	2390.00	48.4 AV	54.0	-5.6	1.23 V	2	15.60	32.80
7	*2412.00	100.6 PK			1.00 V	6	67.70	32.90
8	*2412.00	91.0 AV			1.00 V	6	58.10	32.90
9	4824.00	47.1 PK	74.0	-26.9	1.52 V	63	45.50	1.60
10	4824.00	34.1 AV	54.0	-19.9	1.52 V	63	32.50	1.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	51.8 PK	74.0	-22.2	1.54 H	84	54.60	-2.80
2	2288.00	45.7 AV	54.0	-8.3	1.54 H	84	48.50	-2.80
3	2360.00	61.3 PK	74.0	-12.7	1.00 H	12	28.60	32.70
4	2360.00	51.2 AV	54.0	-2.8	1.00 H	12	18.50	32.70
5	*2437.00	113.1 PK			1.00 H	2	80.10	33.00
6	*2437.00	101.3 AV			1.00 H	2	68.30	33.00
7	2483.50	61.9 PK	74.0	-12.1	1.17 H	2	28.70	33.20
8	2483.50	49.7 AV	54.0	-4.3	1.17 H	2	16.50	33.20
9	4874.00	53.8 PK	74.0	-20.2	1.22 H	360	52.20	1.60
10	4874.00	40.2 AV	54.0	-13.8	1.22 H	360	38.60	1.60
11	7311.00	59.3 PK	74.0	-14.7	1.26 H	0	51.10	8.20
12	7311.00	45.6 AV	54.0	-8.4	1.26 H	0	37.40	8.20
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	2288.00	47.8 PK	74.0	-26.2	1.00 V	63	50.60	-2.80
2	2288.00	42.7 AV	54.0	-11.3	1.00 V	63	45.50	-2.80
3	2360.00	61.3 PK	74.0	-12.7	1.49 V	32	28.60	32.70
4	2360.00	47.9 AV	54.0	-6.1	1.49 V	32	15.20	32.70
5	*2437.00	105.7 PK			1.00 V	7	72.70	33.00
6	*2437.00	95.1 AV			1.00 V	7	62.10	33.00
7	2483.50	61.8 PK	74.0	-12.2	1.02 V	63	28.60	33.20
8	2483.50	48.4 AV	54.0	-5.6	1.02 V	63	15.20	33.20
9	4874.00	49.8 PK	74.0	-24.2	1.01 V	335	48.20	1.60
10	4874.00	35.2 AV	54.0	-18.8	1.01 V	335	33.60	1.60
11	7311.00	55.1 PK	74.0	-18.9	1.00 V	63	46.90	8.20
12	7311.00	40.7 AV	54.0	-13.3	1.00 V	63	32.50	8.20

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.

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

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	2288.00	49.5 PK	74.0	-24.5	1.83 H	63	52.30	-2.80
2	2288.00	42.7 AV	54.0	-11.3	1.83 H	63	45.50	-2.80
3	2360.00	60.7 PK	74.0	-13.3	1.00 H	11	28.00	32.70
4	2360.00	51.3 AV	54.0	-2.7	1.00 H	11	18.60	32.70
5	*2462.00	108.1 PK			1.00 H	7	75.00	33.10
6	*2462.00	96.7 AV			1.00 H	7	63.60	33.10
7	2483.50	68.2 PK	74.0	-5.8	1.16 H	360	35.00	33.20
8	2483.50	50.1 AV	54.0	-3.9	1.16 H	360	16.90	33.20
9	4924.00	51.5 PK	74.0	-22.5	1.08 H	357	49.80	1.70
10	4924.00	38.2 AV	54.0	-15.8	1.08 H	357	36.50	1.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	45.8 PK	74.0	-28.2	1.54 V	93	48.60	-2.80
2	2288.00	39.7 AV	54.0	-14.3	1.54 V	93	42.50	-2.80
3	2360.00	60.3 PK	74.0	-13.7	1.24 V	51	27.60	32.70
4	2360.00	47.9 AV	54.0	-6.1	1.24 V	51	15.20	32.70
5	*2462.00	102.4 PK			1.00 V	9	69.30	33.10
6	*2462.00	92.3 AV			1.00 V	9	59.20	33.10
7	2483.50	72.6 PK	74.0	-1.4	1.04 V	100	39.40	33.20
8	2483.50	51.6 AV	54.0	-2.4	1.04 V	100	18.40	33.20
9	4924.00	47.3 PK	74.0	-26.7	1.52 V	63	45.60	1.70
10	4924.00	35.2 AV	54.0	-18.8	1.52 V	63	33.50	1.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	48.8 PK	74.0	-25.2	1.02 H	31	51.60	-2.80
2	2288.00	42.7 AV	54.0	-11.3	1.02 H	31	45.50	-2.80
3	2360.00	61.7 PK	74.0	-12.3	1.00 H	2	29.00	32.70
4	**2360.00**	**53.0 AV**	**54.0**	**-1.0**	**1.00 H**	**2**	**20.30**	**32.70**
5	2390.00	67.2 PK	74.0	-6.8	1.00 H	2	34.40	32.80
6	2390.00	51.7 AV	54.0	-2.3	1.00 H	2	18.90	32.80
7	*2412.00	106.2 PK			1.00 H	2	73.30	32.90
8	*2412.00	95.4 AV			1.00 H	2	62.50	32.90
9	4824.00	48.5 PK	74.0	-25.5	1.00 H	36	46.90	1.60
10	4824.00	35.1 AV	54.0	-18.9	1.00 H	36	33.50	1.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	46.7 PK	74.0	-27.3	1.00 V	36	49.50	-2.80
2	2288.00	41.5 AV	54.0	-12.5	1.00 V	36	44.30	-2.80
3	2360.00	60.3 PK	74.0	-13.7	1.41 V	63	27.60	32.70
4	2360.00	47.9 AV	54.0	-6.1	1.41 V	63	15.20	32.70
5	2390.00	60.7 PK	74.0	-13.3	1.02 V	320	27.90	32.80
6	2390.00	48.2 AV	54.0	-5.8	1.02 V	320	15.40	32.80
7	*2412.00	99.9 PK			1.24 V	52	67.00	32.90
8	*2412.00	90.4 AV			1.24 V	52	57.50	32.90
9	4824.00	46.8 PK	74.0	-27.2	1.05 V	6	45.20	1.60
10	4824.00	34.1 AV	54.0	-19.9	1.05 V	6	32.50	1.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	51.7 PK	74.0	-22.3	1.52 H	320	54.50	-2.80
2	2288.00	45.2 AV	54.0	-8.8	1.52 H	320	48.00	-2.80
3	2360.00	62.0 PK	74.0	-12.0	1.00 H	10	29.30	32.70
4	2360.00	52.3 AV	54.0	-1.7	1.00 H	10	19.60	32.70
5	*2437.00	113.0 PK			1.05 H	51	80.00	33.00
6	*2437.00	101.2 AV			1.05 H	51	68.20	33.00
7	2483.50	61.7 PK	74.0	-12.3	1.02 H	32	28.50	33.20
8	2483.50	49.7 AV	54.0	-4.3	1.02 H	32	16.50	33.20
9	4874.00	53.2 PK	74.0	-20.8	1.05 H	63	51.60	1.60
10	4874.00	39.1 AV	54.0	-14.9	1.05 H	63	37.50	1.60
11	7311.00	59.3 PK	74.0	-14.7	1.01 H	54	51.10	8.20
12	7311.00	44.9 AV	54.0	-9.1	1.01 H	54	36.70	8.20
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	2288.00	46.8 PK	74.0	-27.2	1.05 V	36	49.60	-2.80
2	2288.00	42.4 AV	54.0	-11.6	1.05 V	36	45.20	-2.80
3	2360.00	60.3 PK	74.0	-13.7	1.02 V	32	27.60	32.70
4	2360.00	47.8 AV	54.0	-6.2	1.02 V	32	15.10	32.70
5	*2437.00	105.4 PK			1.02 V	35	72.40	33.00
6	*2437.00	94.5 AV			1.02 V	35	61.50	33.00
7	2483.50	61.8 PK	74.0	-12.2	1.03 V	65	28.60	33.20
8	2483.50	48.4 AV	54.0	-5.6	1.03 V	65	15.20	33.20
9	4874.00	50.1 PK	74.0	-23.9	1.00 V	63	48.50	1.60
10	4874.00	35.1 AV	54.0	-18.9	1.00 V	63	33.50	1.60
11	7311.00	54.0 PK	74.0	-20.0	1.47 V	52	45.80	8.20
12	7311.00	39.7 AV	54.0	-14.3	1.47 V	52	31.50	8.20

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.

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

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	2288.00	48.9 PK	74.0	-25.1	1.06 H	84	51.70	-2.80
2	2288.00	42.4 AV	54.0	-11.6	1.06 H	84	45.20	-2.80
3	2360.00	60.2 PK	74.0	-13.8	1.01 H	84	27.50	32.70
4	2360.00	51.1 AV	54.0	-2.9	1.01 H	84	18.40	32.70
5	*2462.00	107.6 PK			1.02 H	32	74.50	33.10
6	*2462.00	96.2 AV			1.02 H	32	63.10	33.10
7	2483.50	67.7 PK	74.0	-6.3	1.08 H	54	34.50	33.20
8	2483.50	49.7 AV	54.0	-4.3	1.08 H	54	16.50	33.20
9	4924.00	50.2 PK	74.0	-23.8	1.05 H	312	48.50	1.70
10	4924.00	37.8 AV	54.0	-16.2	1.05 H	312	36.10	1.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	44.8 PK	74.0	-29.2	1.02 V	63	47.60	-2.80
2	2288.00	39.7 AV	54.0	-14.3	1.02 V	63	42.50	-2.80
3	2360.00	61.3 PK	74.0	-12.7	1.51 V	52	28.60	32.70
4	2360.00	48.2 AV	54.0	-5.8	1.51 V	52	15.50	32.70
5	*2462.00	102.1 PK			1.02 V	51	69.00	33.10
6	*2462.00	92.1 AV			1.02 V	51	59.00	33.10
7	2483.50	72.2 PK	74.0	-1.8	1.02 V	51	39.00	33.20
8	2483.50	51.2 AV	54.0	-2.8	1.02 V	51	18.00	33.20
9	4924.00	47.2 PK	74.0	-26.8	1.05 V	64	45.50	1.70
10	4924.00	34.2 AV	54.0	-19.8	1.05 V	64	32.50	1.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	51.6 PK	74.0	-22.4	1.27 H	263	50.40	1.20
2	2288.00	47.3 AV	54.0	-6.7	1.27 H	263	46.10	1.20
3	2390.00	66.6 PK	74.0	-7.4	1.20 H	261	33.40	33.20
4	2390.00	52.9 AV	54.0	-1.1	1.20 H	261	19.70	33.20
5	*2422.00	102.6 PK			1.17 H	260	69.30	33.30
6	*2422.00	91.9 AV			1.17 H	260	58.60	33.30
7	4844.00	46.6 PK	74.0	-27.4	1.25 H	24	40.50	6.10
8	4844.00	34.2 AV	54.0	-19.8	1.25 H	24	28.10	6.10
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	2288.00	47.2 PK	74.0	-26.8	1.20 V	33	46.00	1.20
2	2288.00	41.3 AV	54.0	-12.7	1.20 V	33	40.10	1.20
3	2390.00	59.7 PK	74.0	-14.3	1.23 V	105	26.50	33.20
4	2390.00	46.5 AV	54.0	-7.5	1.23 V	105	13.30	33.20
5	*2422.00	96.4 PK			1.00 V	217	63.10	33.30
6	*2422.00	87.3 AV			1.00 V	217	54.00	33.30
7	4844.00	46.3 PK	74.0	-27.7	1.10 V	323	40.20	6.10
8	4844.00	33.6 AV	54.0	-20.4	1.10 V	323	27.50	6.10

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.

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

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	2288.00	51.5 PK	74.0	-22.5	1.25 H	266	50.30	1.20
2	2288.00	46.3 AV	54.0	-7.7	1.25 H	266	45.10	1.20
3	*2437.00	106.5 PK			1.14 H	262	73.10	33.40
4	*2437.00	94.5 AV			1.14 H	262	61.10	33.40
5	2483.50	69.3 PK	74.0	-4.7	1.11 H	261	35.90	33.40
6	2483.50	52.3 AV	54.0	-1.7	1.11 H	261	18.90	33.40
7	4874.00	48.5 PK	74.0	-25.5	1.14 H	241	42.30	6.20
8	4874.00	35.5 AV	54.0	-18.5	1.14 H	241	29.30	6.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	48.7 PK	74.0	-25.3	1.19 V	260	47.50	1.20
2	2288.00	42.9 AV	54.0	-11.1	1.19 V	260	41.70	1.20
3	*2437.00	100.2 PK			1.00 V	217	66.80	33.40
4	*2437.00	90.5 AV			1.00 V	217	57.10	33.40
5	2483.50	62.7 PK	74.0	-11.3	1.21 V	121	29.30	33.40
6	2483.50	47.5 AV	54.0	-6.5	1.21 V	121	14.10	33.40
7	4874.00	46.6 PK	74.0	-27.4	1.04 V	187	40.40	6.20
8	4874.00	34.1 AV	54.0	-19.9	1.04 V	187	27.90	6.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2288.00	51.1 PK	74.0	-22.9	1.25 H	265	49.90	1.20
2	2288.00	47.1 AV	54.0	-6.9	1.25 H	265	45.90	1.20
3	*2452.00	101.7 PK			1.62 H	274	68.30	33.40
4	*2452.00	91.4 AV			1.62 H	274	58.00	33.40
5	2483.50	72.8 PK	74.0	-1.2	1.12 H	263	39.40	33.40
6	2483.50	52.5 AV	54.0	-1.5	1.12 H	263	19.10	33.40
7	4904.00	46.4 PK	74.0	-27.6	1.49 H	206	40.30	6.10
8	4904.00	34.0 AV	54.0	-20.0	1.49 H	206	27.90	6.10
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	2288.00	47.5 PK	74.0	-26.5	1.18 V	280	46.30	1.20
2	2288.00	41.0 AV	54.0	-13.0	1.18 V	280	39.80	1.20
3	*2452.00	97.1 PK			1.17 V	217	63.70	33.40
4	*2452.00	87.9 AV			1.17 V	217	54.50	33.40
5	2483.50	70.6 PK	74.0	-3.4	1.17 V	221	37.20	33.40
6	2483.50	49.3 AV	54.0	-4.7	1.17 V	221	15.90	33.40
7	4904.00	47.4 PK	74.0	-26.6	1.07 V	138	41.30	6.10
8	4904.00	34.2 AV	54.0	-19.8	1.07 V	138	28.10	6.10

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.

BELOW 1GHz WORST-CASE DATA

802.11g

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	47.40	33.3 QP	40.0	-6.7	1.01 H	159	47.90	-14.60
2	107.67	31.6 QP	43.5	-11.9	1.51 H	84	49.10	-17.50
3	237.94	37.3 QP	46.0	-8.7	1.01 H	91	52.10	-14.80
4	375.98	38.4 QP	46.0	-7.6	1.01 H	19	49.10	-10.70
5	624.85	35.1 QP	46.0	-10.9	1.51 H	127	40.60	-5.50
6	875.67	36.4 QP	46.0	-9.6	1.01 H	145	37.50	-1.10
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	47.40	35.3 QP	40.0	-4.7	1.49 V	244	49.90	-14.60
2	375.98	40.0 QP	46.0	-6.0	1.49 V	16	50.70	-10.70
3	675.40	41.7 QP	46.0	-4.3	1.49 V	90	46.50	-4.80
4	780.40	33.7 QP	46.0	-12.3	1.49 V	16	36.00	-2.30
5	875.67	39.1 QP	46.0	-6.9	1.00 V	113	40.20	-1.10
6	959.27	33.7 QP	46.0	-12.3	1.00 V	68	33.00	0.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	57.12	32.8 QP	40.0	-7.2	2.00 H	259	47.40	-14.60
2	125.17	36.3 QP	43.5	-7.2	1.50 H	99	52.10	-15.80
3	247.66	35.4 QP	46.0	-10.6	1.01 H	88	49.70	-14.30
4	374.04	41.9 QP	46.0	-4.1	1.01 H	16	52.60	-10.70
5	675.40	36.5 QP	46.0	-9.5	1.01 H	37	41.30	-4.80
6	875.67	39.0 QP	46.0	-7.0	1.50 H	139	40.10	-1.10
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	51.29	37.0 QP	40.0	-3.0	1.49 V	16	51.50	-14.50
2	125.17	34.3 QP	43.5	-9.2	1.49 V	198	50.10	-15.80
3	374.04	40.8 QP	46.0	-5.2	1.00 V	190	51.50	-10.70
4	624.85	38.2 QP	46.0	-7.8	1.00 V	60	43.70	-5.50
5	675.40	41.7 QP	46.0	-4.3	1.49 V	69	46.50	-4.80
6	875.67	42.1 QP	46.0	-3.9	1.00 V	104	43.20	-1.10

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

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

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

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

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

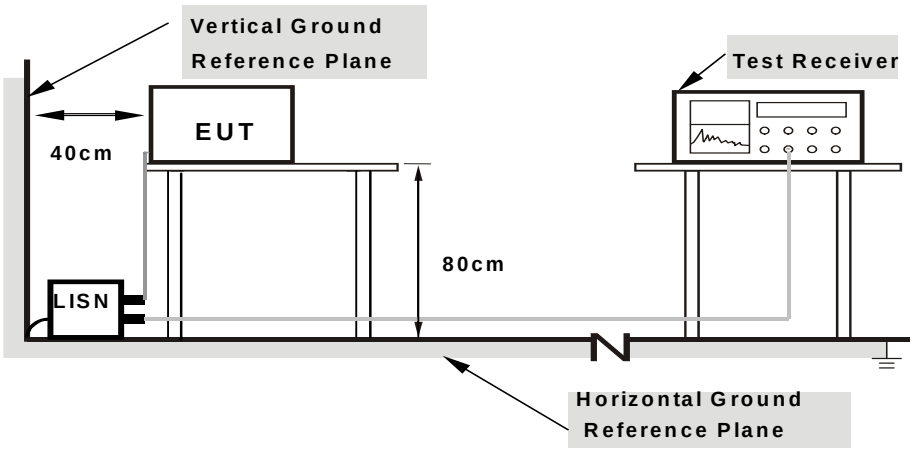
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

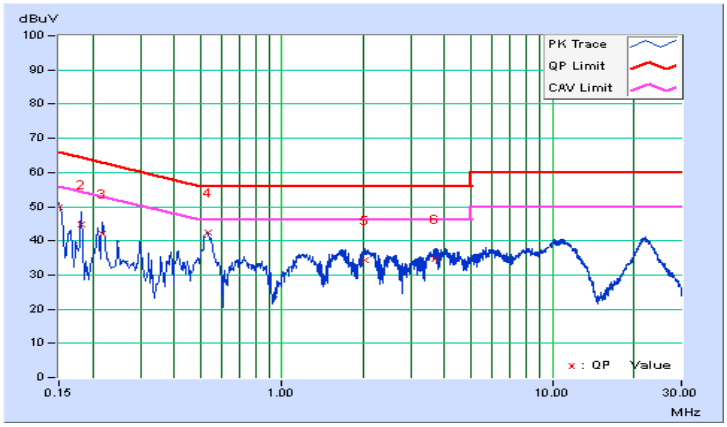
CONDUCTED WORST-CASE DATA：802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.15000	0.11	49.87	33.44	49.98	33.55	66.00	56.00	-16.02	-22.45
2	0.18128	0.10	44.55	27.68	44.65	27.78	64.43	54.43	-19.78	-26.65
3	0.21679	0.09	41.91	27.04	42.00	27.13	62.94	52.94	-20.94	-25.81
4	0.53318	0.13	42.26	35.36	42.39	35.49	56.00	46.00	-13.61	-10.51
5	2.02680	0.25	34.03	26.92	34.28	27.17	56.00	46.00	-21.72	-18.83
6	3.69246	0.26	34.38	27.74	34.64	28.00	56.00	46.00	-21.36	-18.00

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.

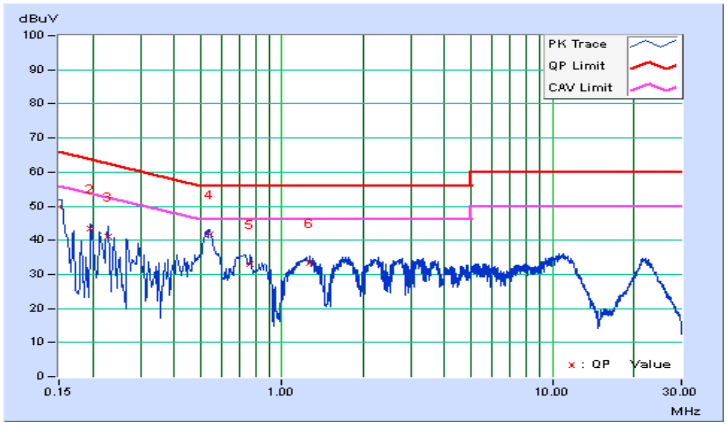


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value		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	0.15000	0.05	49.72	33.11	49.77	33.16	66.00	56.00	-16.23	-22.84
2	0.19692	0.09	43.24	27.70	43.33	27.79	63.74	53.74	-20.41	-25.95
3	0.22820	0.10	41.04	28.40	41.14	28.50	62.51	52.51	-21.37	-24.01
4	0.53804	0.18	41.58	34.09	41.76	34.27	56.00	46.00	-14.24	-11.73
5	0.76386	0.20	32.87	25.52	33.07	25.72	56.00	46.00	-22.93	-20.28
6	1.27018	0.22	33.23	26.69	33.45	26.91	56.00	46.00	-22.55	-19.09

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.

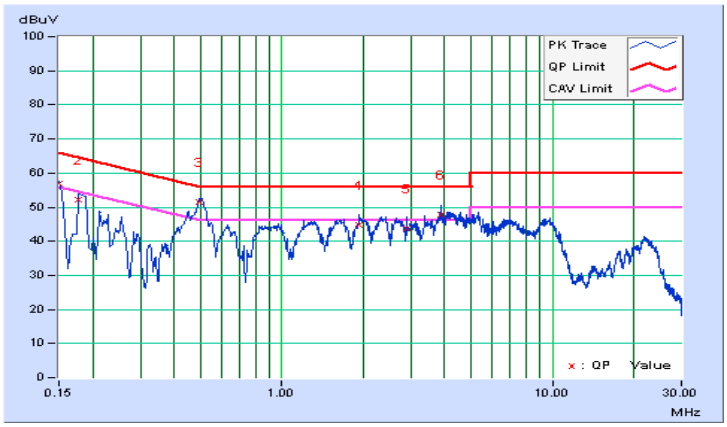


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

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	0.15000	0.11	56.88	43.93	56.99	44.04	66.00	56.00	-9.01	-11.96
2	0.17744	0.10	52.19	39.70	52.29	39.80	64.60	54.60	-12.32	-14.81
3	0.49715	0.13	51.25	40.78	51.38	40.91	56.05	46.05	-4.67	-5.14
4	1.92905	0.25	44.65	39.14	44.90	39.39	56.00	46.00	-11.10	-6.61
5	2.89482	0.25	43.45	40.47	43.70	40.72	56.00	46.00	-12.30	-5.28
6	**3.86059**	**0.26**	**47.56**	**42.99**	**47.82**	**43.25**	**56.00**	**46.00**	**-8.18**	**-2.75**

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.

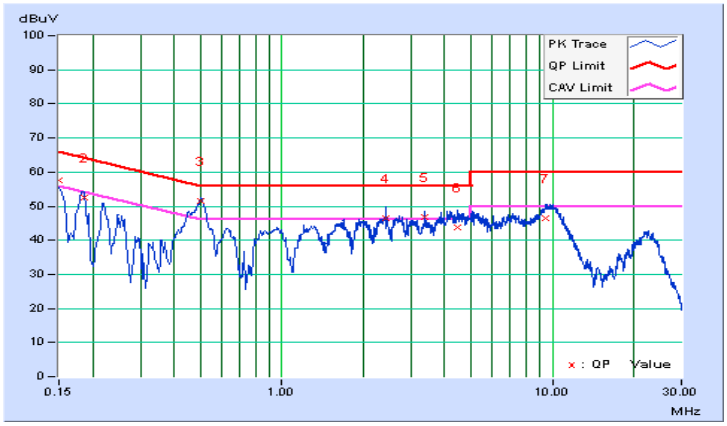


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

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	0.15000	0.05	57.39	45.02	57.44	45.07	66.00	56.00	-8.56	-10.93
2	0.18519	0.08	52.36	41.82	52.44	41.90	64.25	54.25	-11.81	-12.35
3	0.49978	0.18	51.40	42.24	51.58	42.42	56.00	46.00	-4.43	-3.59
4	2.41389	0.23	46.17	41.29	46.40	41.52	56.00	46.00	-9.60	-4.48
5	3.37966	0.25	46.58	42.54	46.83	42.79	56.00	46.00	-9.17	-3.21
6	4.47446	0.28	43.51	36.84	43.79	37.12	56.00	46.00	-12.21	-8.88
7	9.48317	0.52	45.96	39.83	46.48	40.35	60.00	50.00	-13.52	-9.65

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.

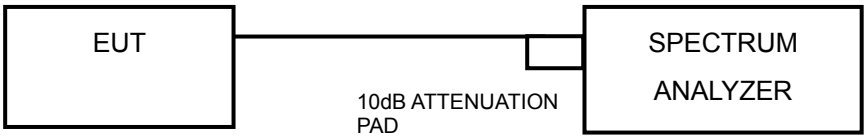


4.3 6dB BANDWIDTH MEASUREMENT

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
		CHAIN 0	CHAIN 1		
1	2412	10.14	10.14	0.5	PASS
6	2437	10.11	10.12	0.5	PASS
11	2462	10.12	10.11	0.5	PASS

802.11g

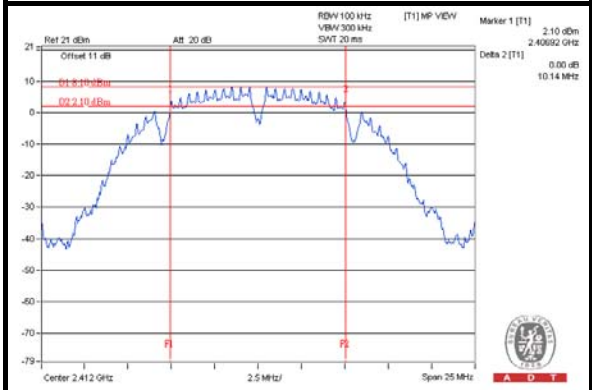
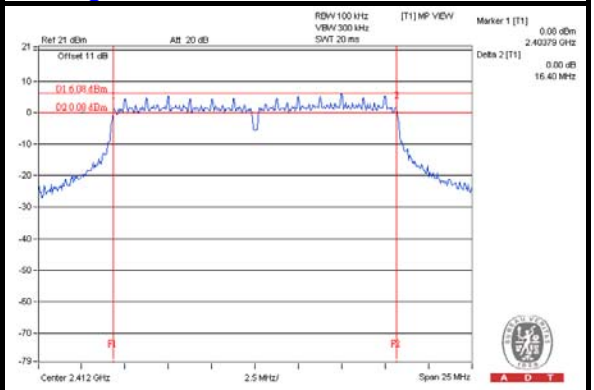
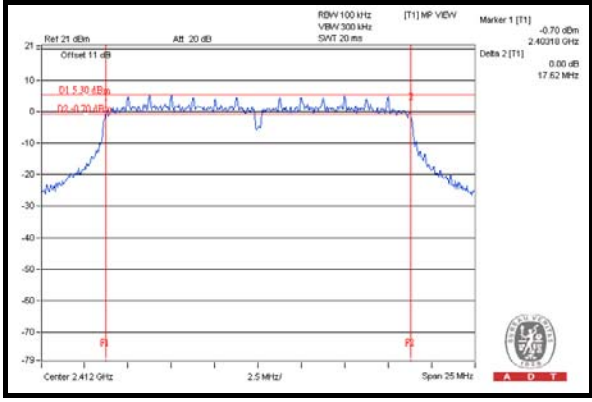
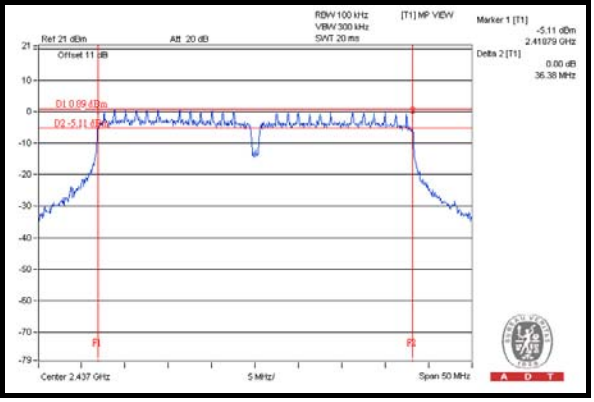
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.40	16.39	0.5	PASS
6	2437	16.36	16.39	0.5	PASS
11	2462	16.40	16.40	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.38	17.62	0.5	PASS
6	2437	16.95	17.35	0.5	PASS
11	2462	17.36	17.59	0.5	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.93	36.16	0.5	PASS
6	2437	36.16	36.38	0.5	PASS
9	2452	36.05	36.06	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

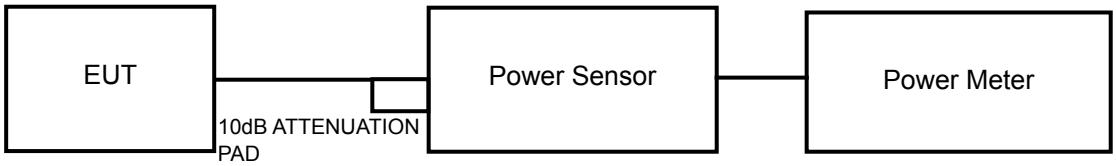
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output 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

An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the 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 AVERAGE POWER

802.11b

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	19.73	20.20	198.685	22.98	30	PASS
6	2437	20.51	20.63	228.071	23.58	30	PASS
11	2462	19.97	20.77	218.711	23.40	30	PASS

802.11g

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	17.05	17.74	110.128	20.42	30	PASS
6	2437	21.63	22.14	309.228	24.90	30	PASS
11	2462	16.73	17.50	103.332	20.14	30	PASS

802.11n (20MHz)

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	17.11	17.53	108.028	20.34	30	PASS
6	2437	21.61	21.75	294.501	24.69	30	PASS
11	2462	16.66	17.59	103.757	20.16	30	PASS

802.11n (40MHz)

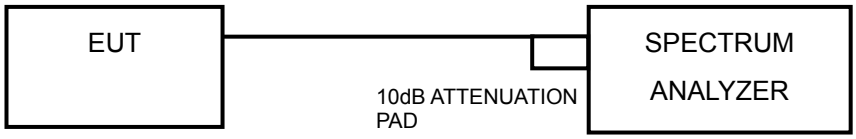
CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	14.01	13.53	47.719	16.79	30	PASS
6	2437	16.24	15.51	77.636	18.90	30	PASS
9	2452	13.77	13.47	46.056	16.63	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 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 instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

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

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-8.84	3.01	-5.83	8	PASS
	6	2437	-9.00	3.01	-5.99	8	PASS
	11	2462	-9.06	3.01	-6.05	8	PASS
1	1	2412	-10.71	3.01	-7.70	8	PASS
	6	2437	-9.80	3.01	-6.79	8	PASS
	11	2462	-8.64	3.01	-5.63	8	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$]=5.64 dBi < 6dBi , so the power density limit no need to reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.07	3.01	0.18	-9.88	8	PASS
	6	2437	-8.99	3.01	0.18	-5.80	8	PASS
	11	2462	-13.97	3.01	0.18	-10.78	8	PASS
1	1	2412	-13.39	3.01	0.18	-10.20	8	PASS
	6	2437	-9.19	3.01	0.18	-6.00	8	PASS
	11	2462	-13.54	3.01	0.18	-10.35	8	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$]=5.64 dBi < 6dBi , so the power density limit no need to reduced.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.47	3.01	0.19	-10.27	8	PASS
	6	2437	-9.44	3.01	0.19	-6.24	8	PASS
	11	2462	-13.88	3.01	0.19	-10.68	8	PASS
1	1	2412	-13.59	3.01	0.19	-10.39	8	PASS
	6	2437	-9.00	3.01	0.19	-5.80	8	PASS
	11	2462	-12.98	3.01	0.19	-9.78	8	PASS

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$]=5.64 dBi < 6dBi , so the power density limit no need to reduced.

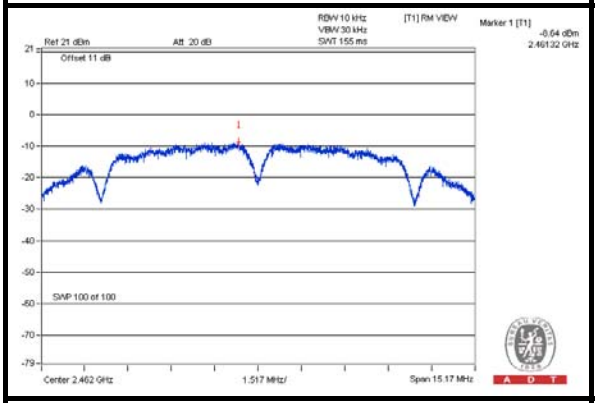
802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	3	2422	-18.52	3.01	0.33	-15.18	8	PASS
	6	2437	-15.96	3.01	0.33	-12.62	8	PASS
	9	2452	-18.49	3.01	0.33	-15.15	8	PASS
1	3	2422	-19.30	3.01	0.33	-15.96	8	PASS
	6	2437	-17.59	3.01	0.33	-14.25	8	PASS
	9	2452	-19.27	3.01	0.33	-15.93	8	PASS

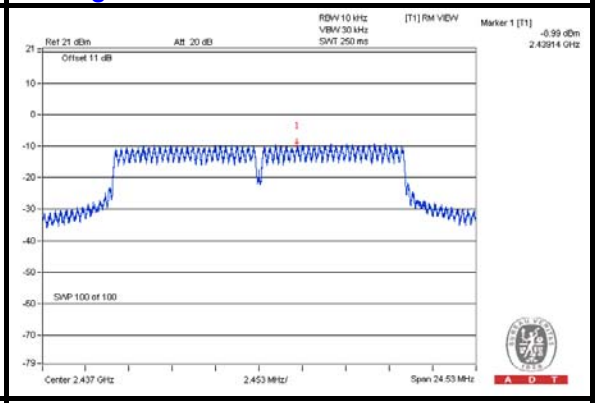
NOTE: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20}$)^2]=5.64 dBi < 6dBi , so the power density limit no need to reduced.

SPECTRUM PLOT OF WORST VALUE

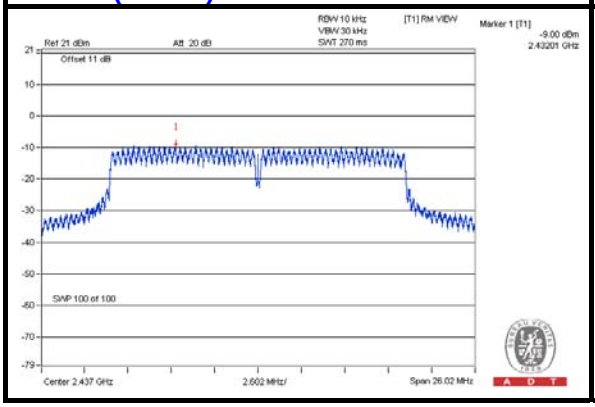
802.11b



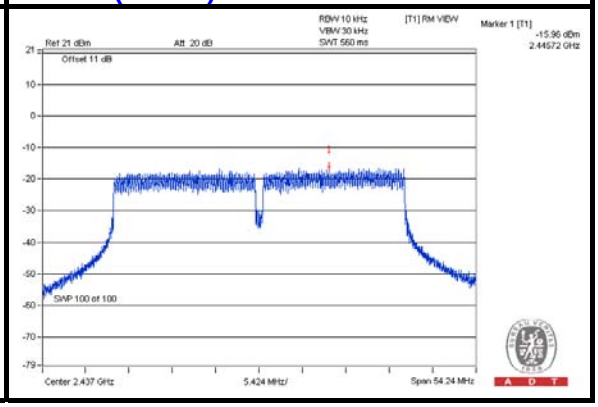
802.11g



802.11n (20MHz)



802.11n (40MHz)

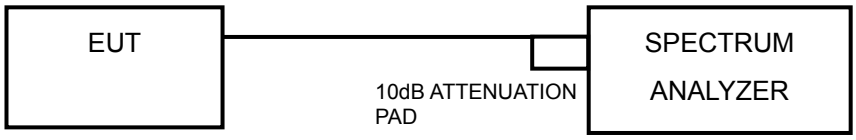


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –30dB 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. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

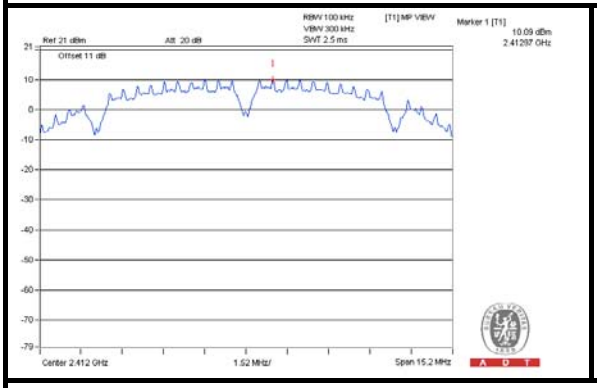
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

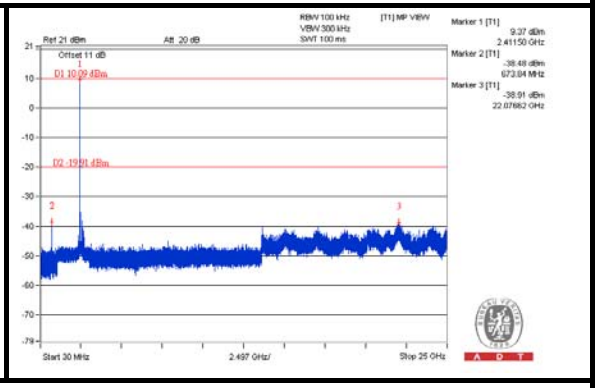
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

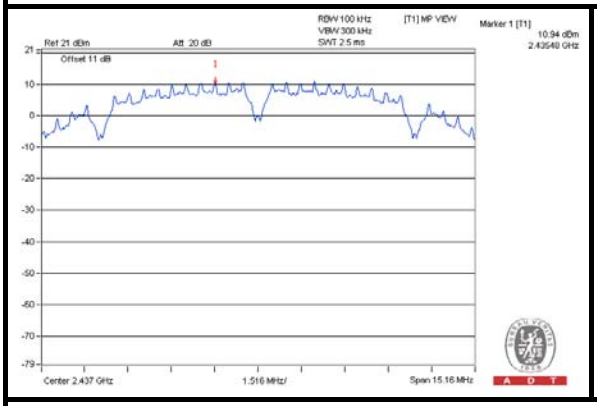
CHAIN 0

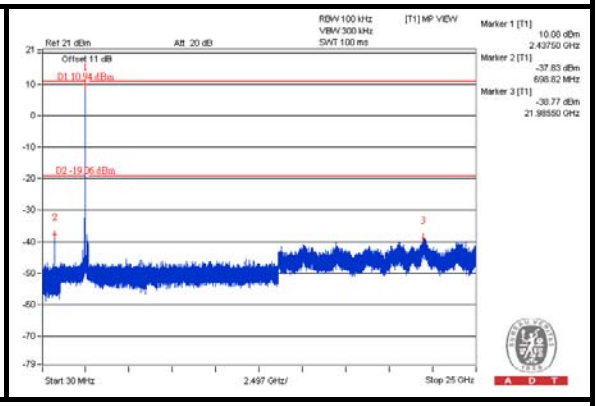
CH 1



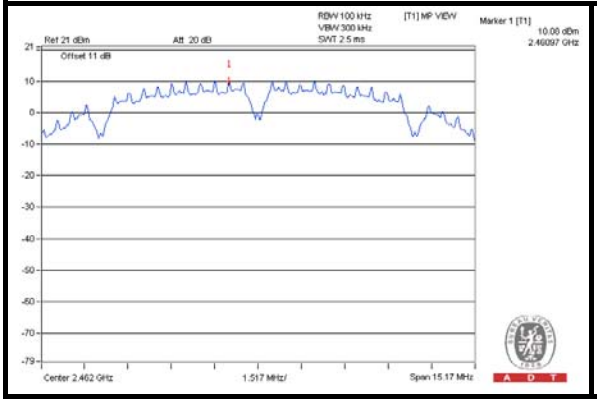


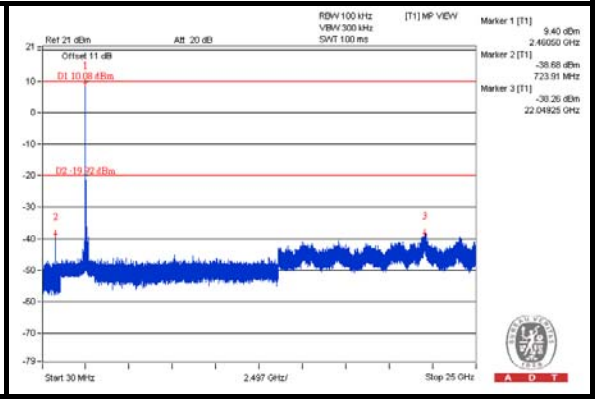
CH 6



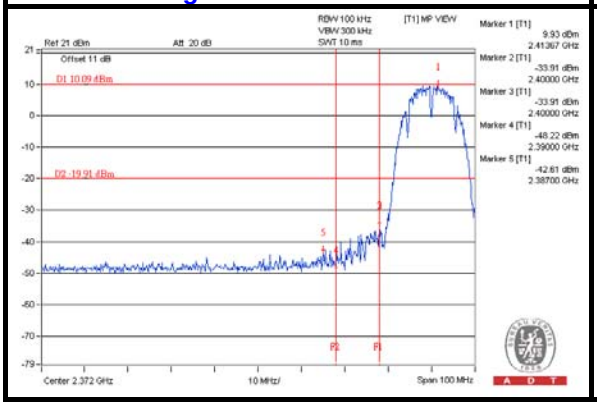


CH 11

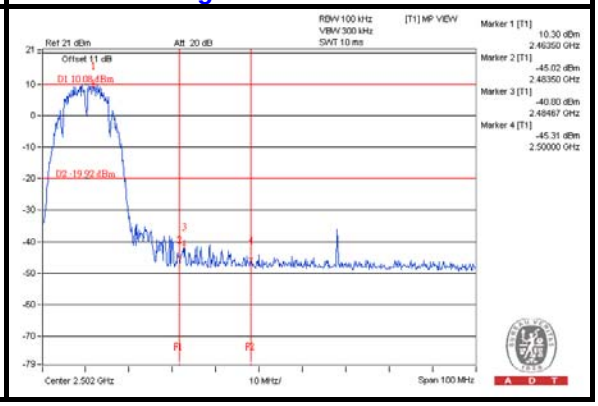




CH 1 Band edge

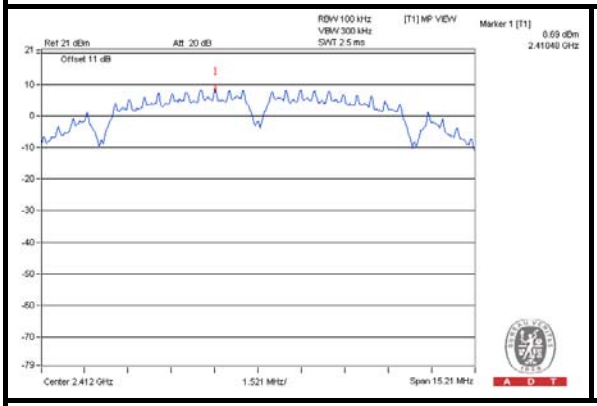


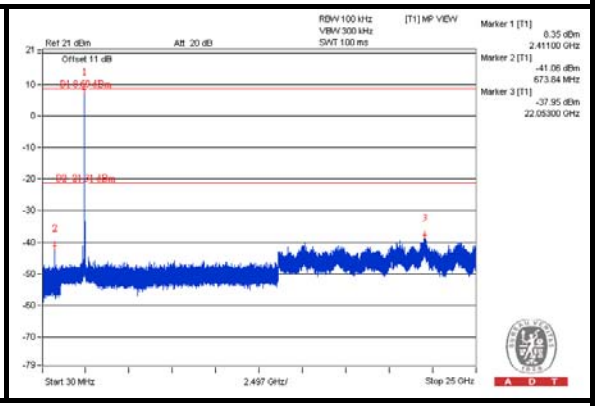
CH 11 Band edge



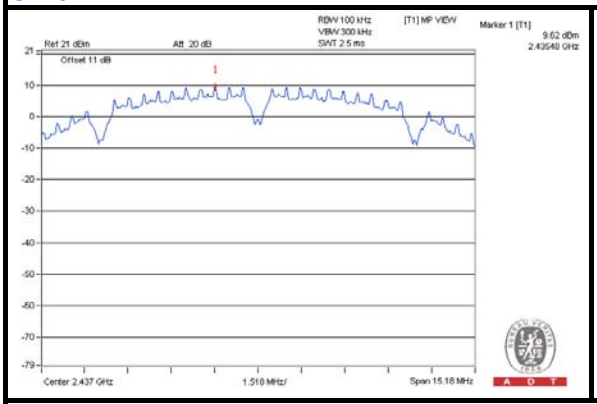
CHAIN 1

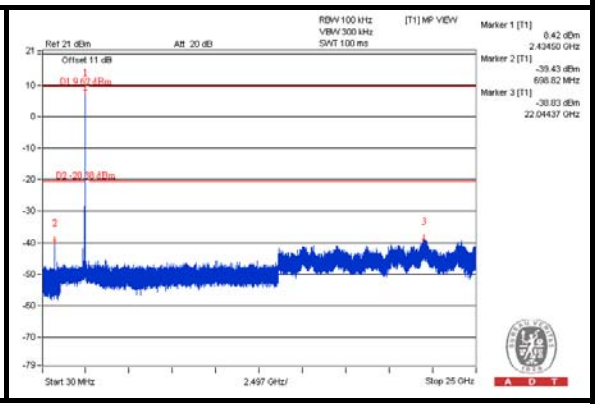
CH 1



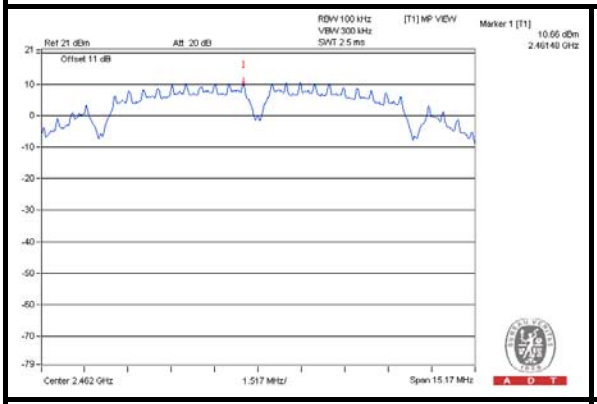


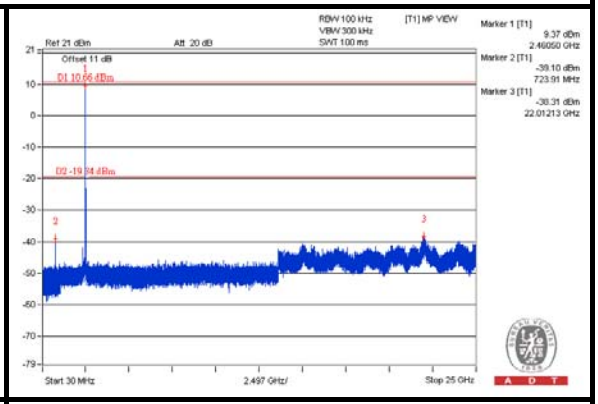
CH 6



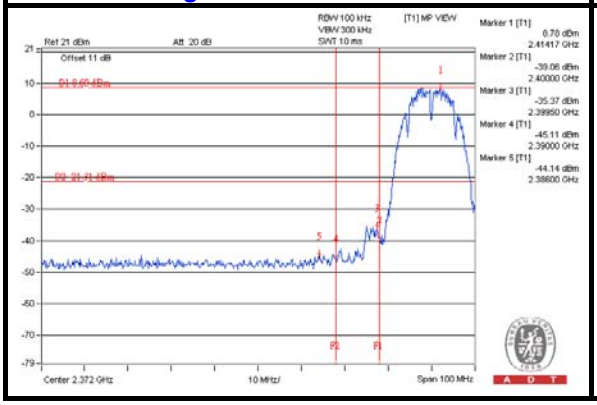


CH 11

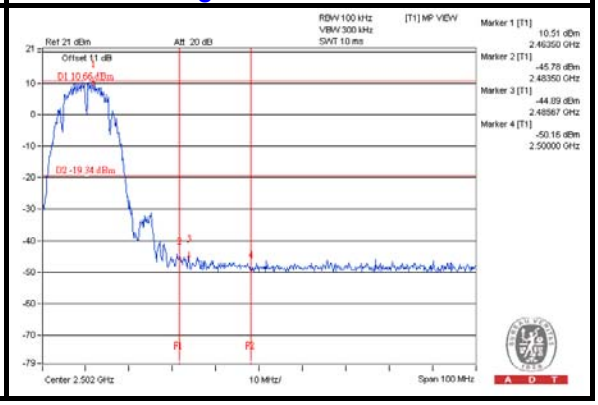




CH 1 Band edge

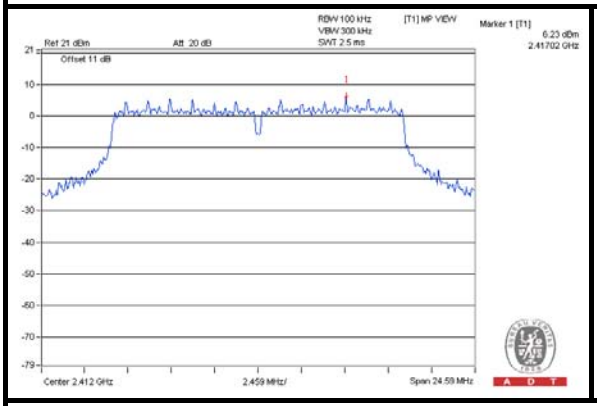


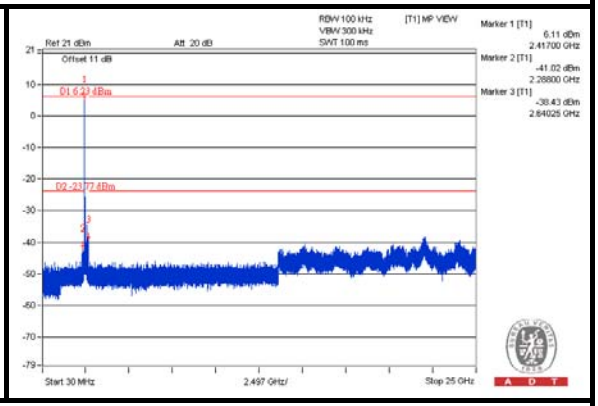
CH 11 Band edge



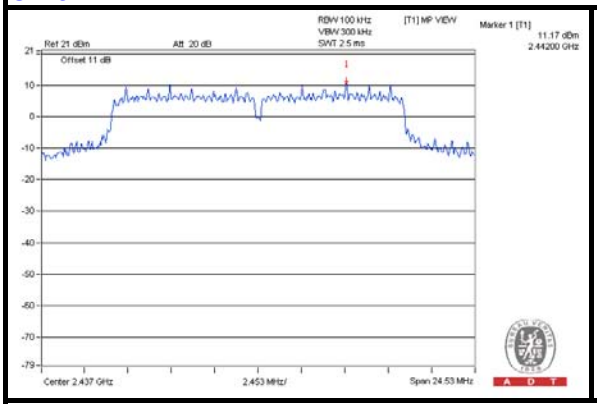
802.11g
CHAIN 0

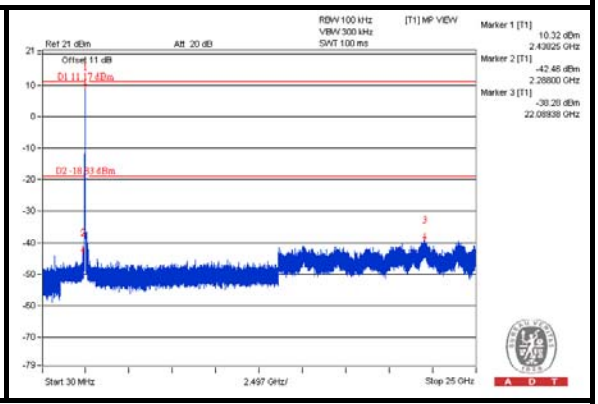
CH 1



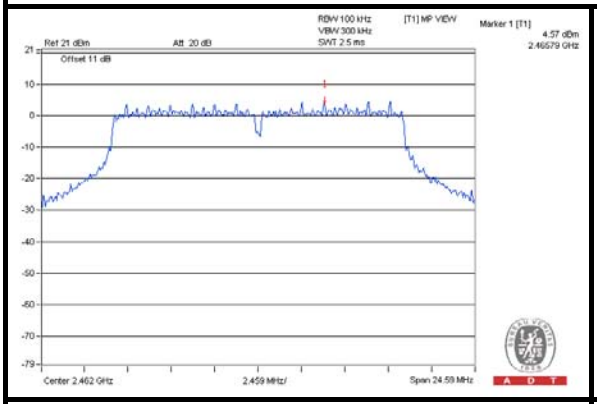


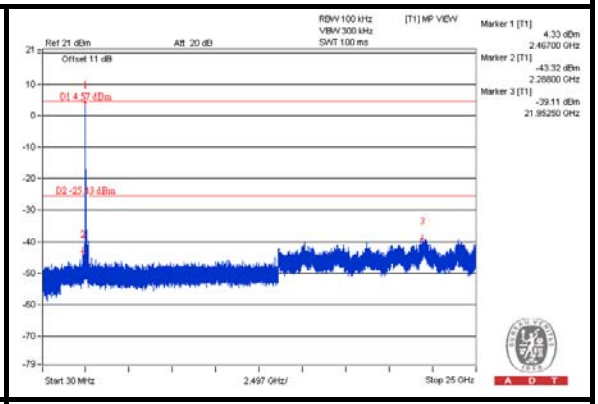
CH 6



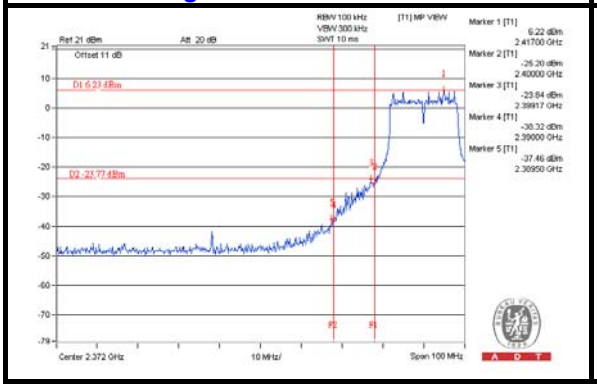


CH 11

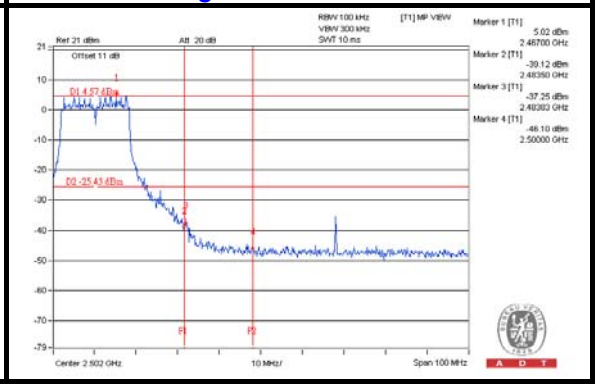




CH 1 Band edge

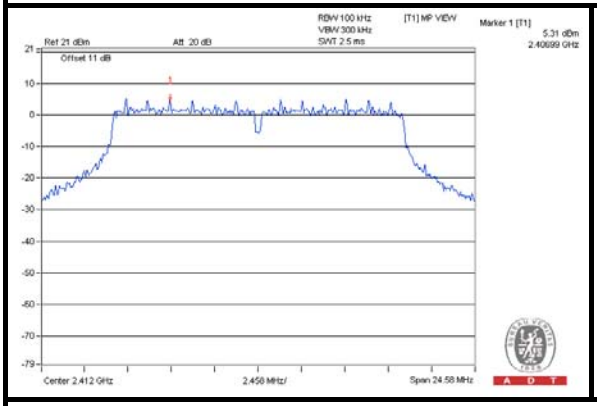


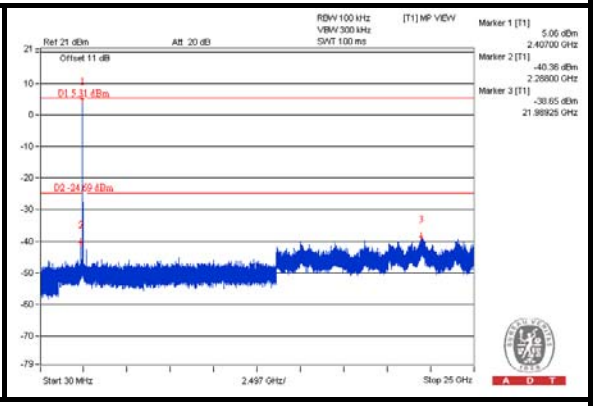
CH 11 Band edge



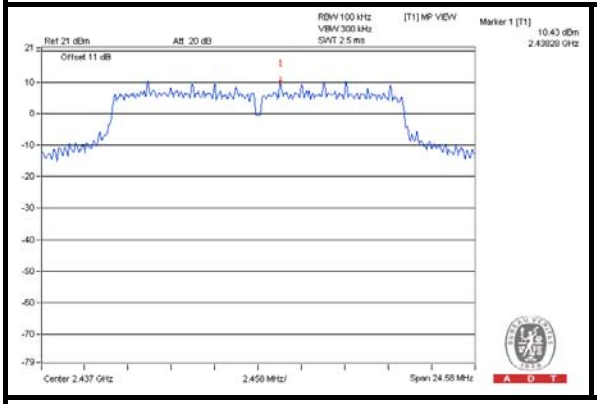
CHAIN 1

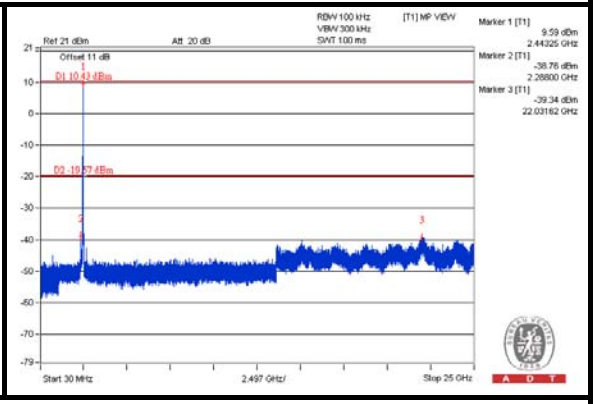
CH 1



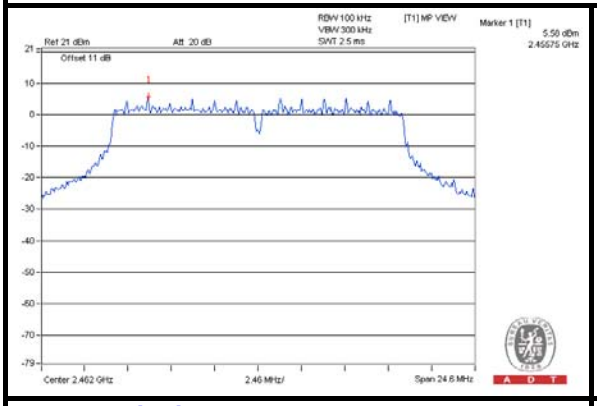


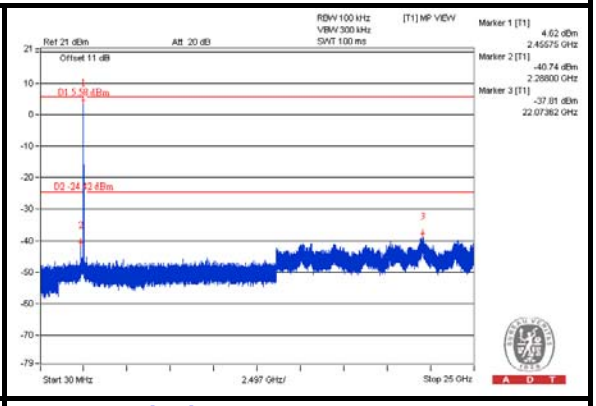
CH 6



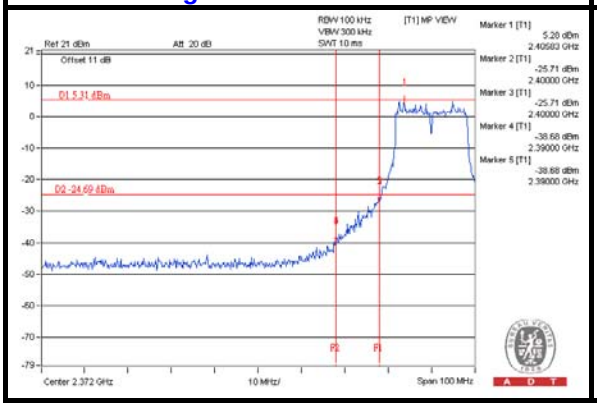


CH 11

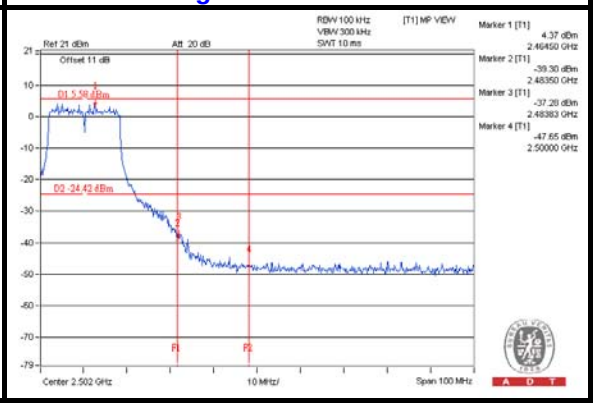




CH 1 Band edge

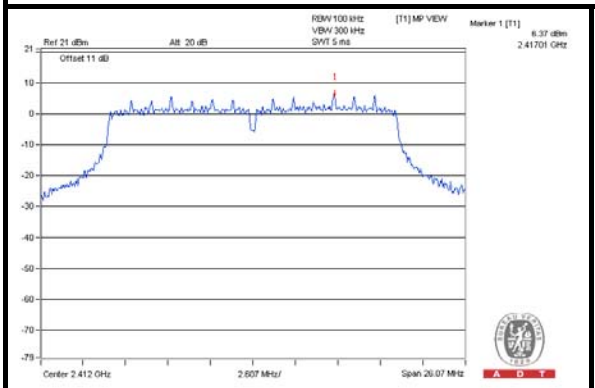


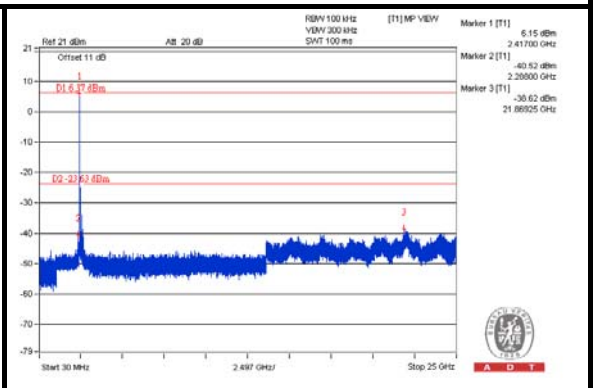
CH 11 Band edge



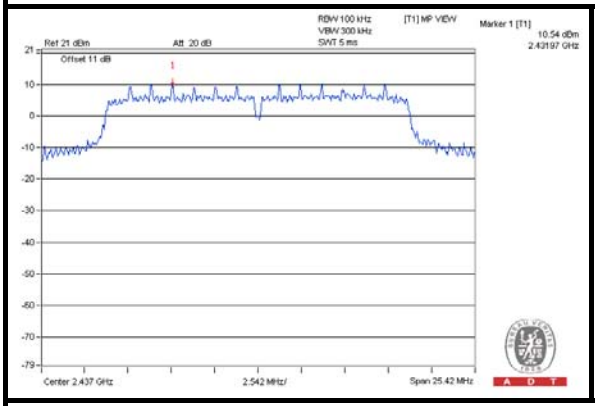
802.11n (20MHz)
CHAIN 0

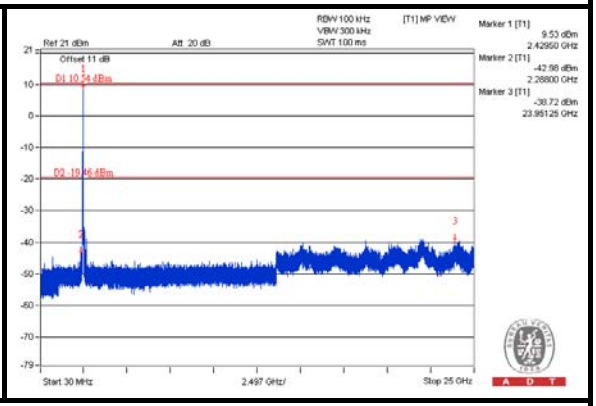
CH 1



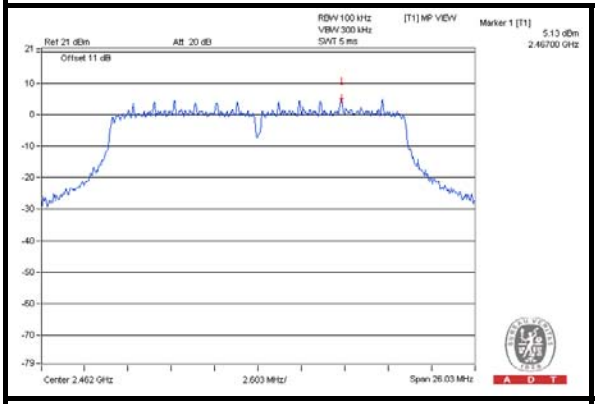


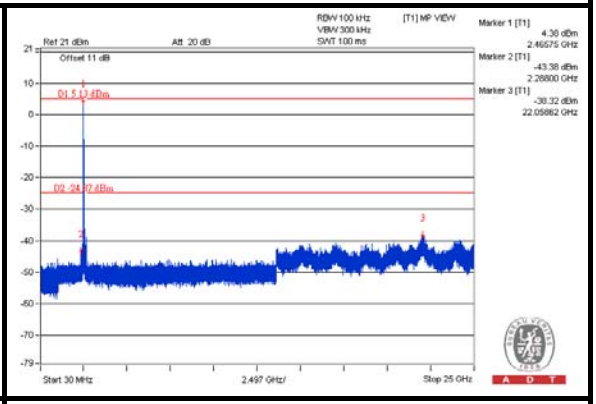
CH 6



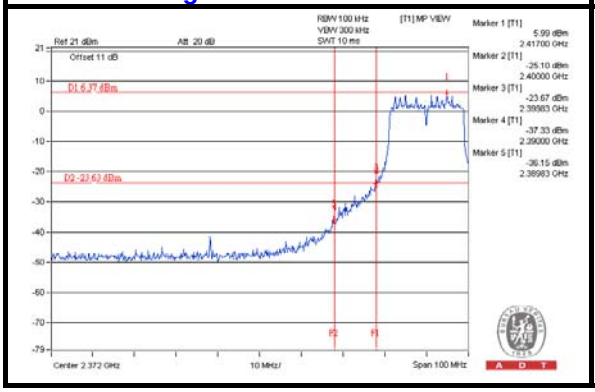


CH 11

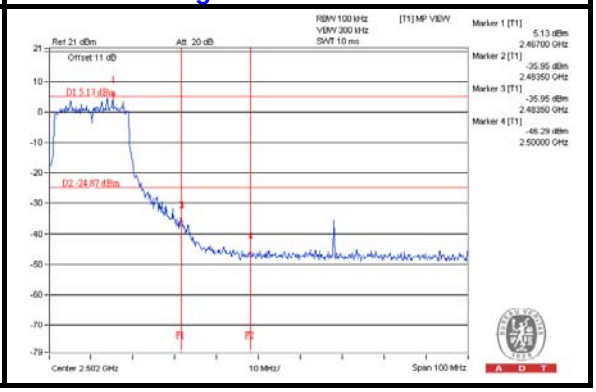




CH 1 Band edge

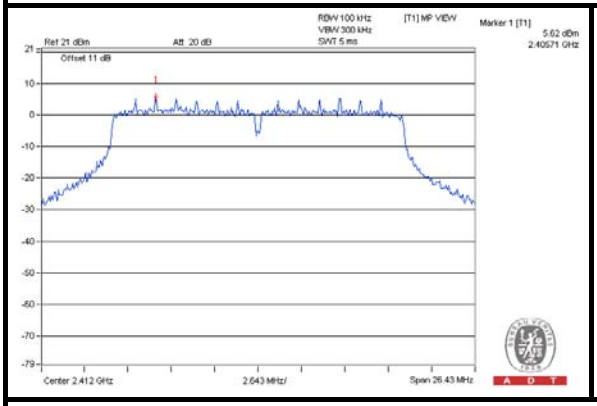


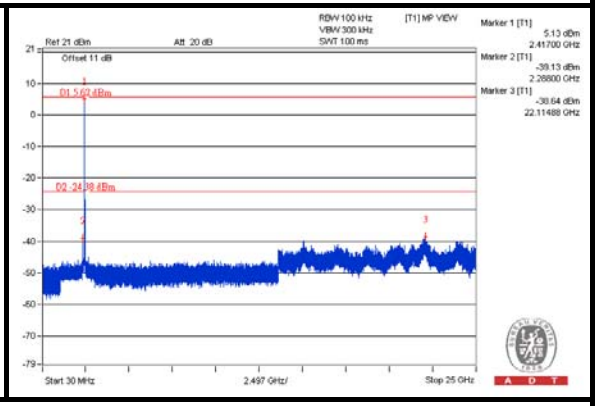
CH 11 Band edge



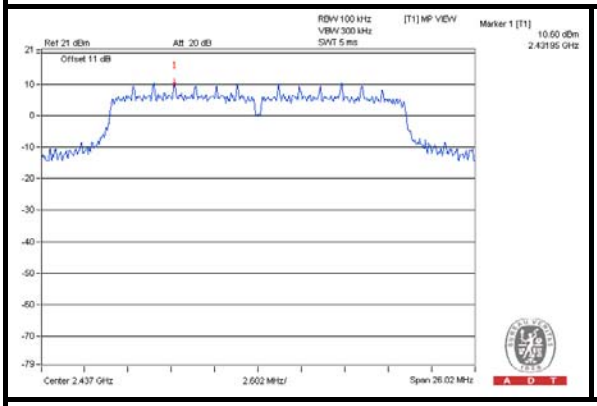
CHAIN 1

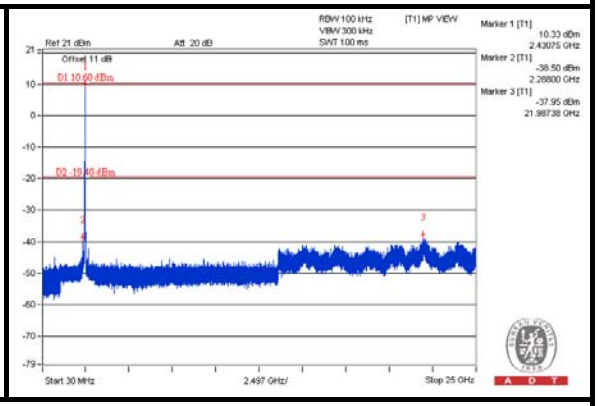
CH 1



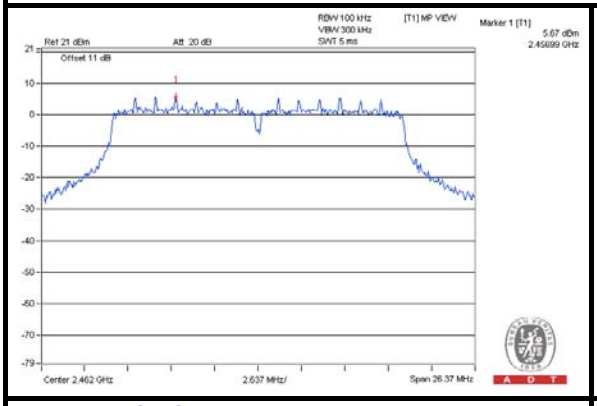


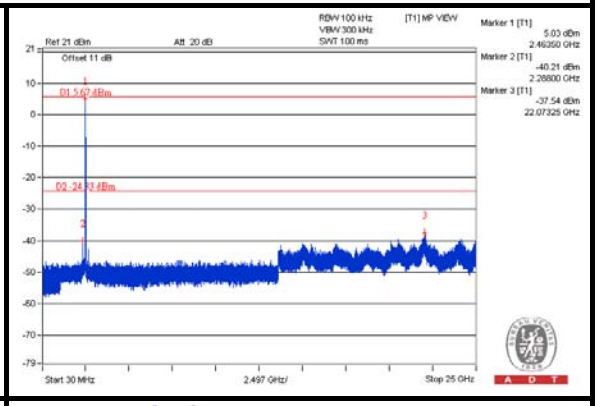
CH 6



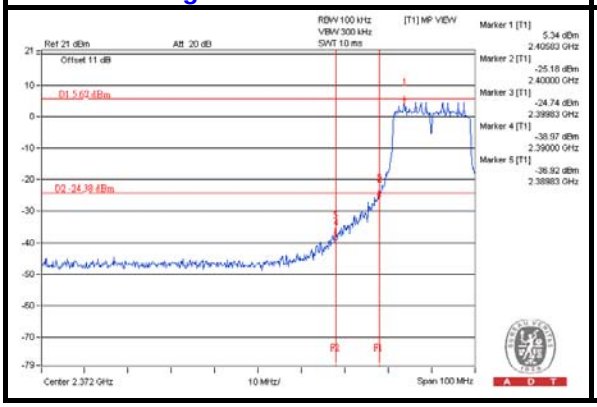


CH 11

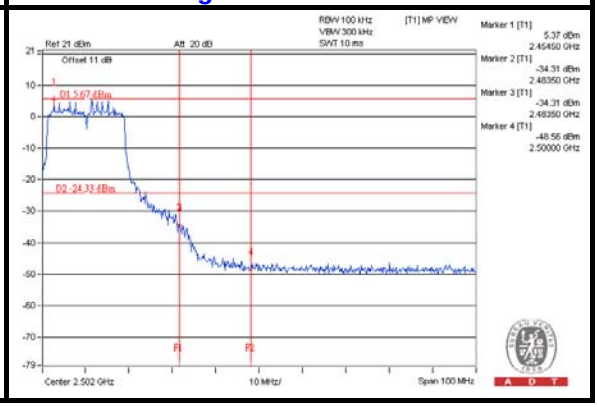




CH 1 Band edge

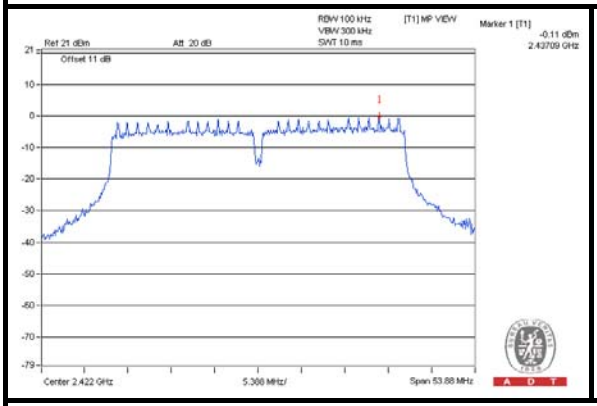


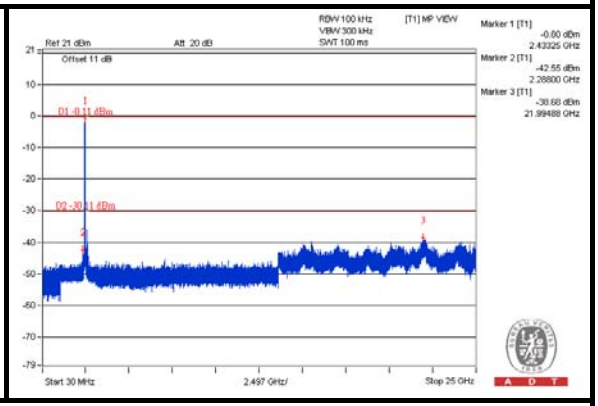
CH 11 Band edge



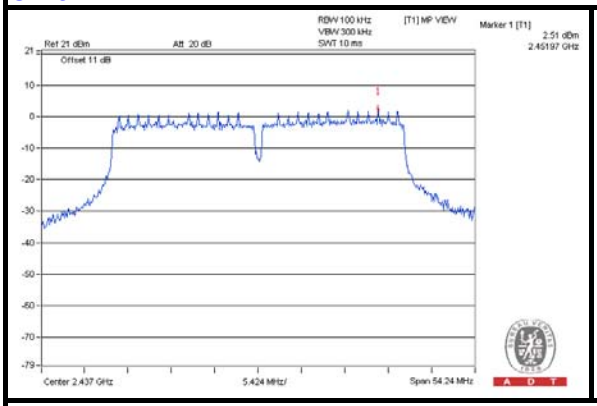
802.11n (40MHz)
CHAIN 0

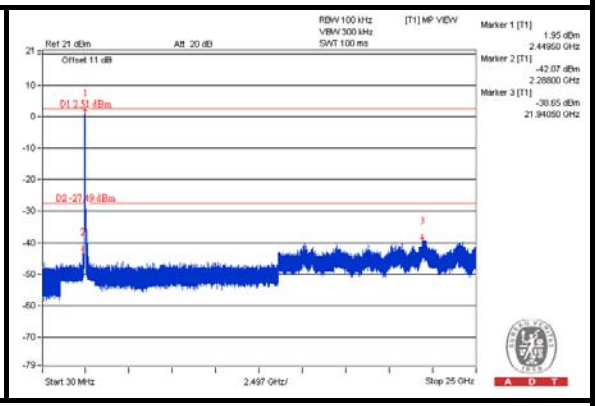
CH 3



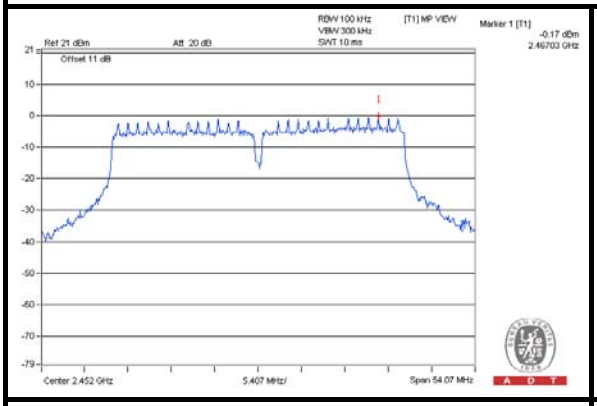


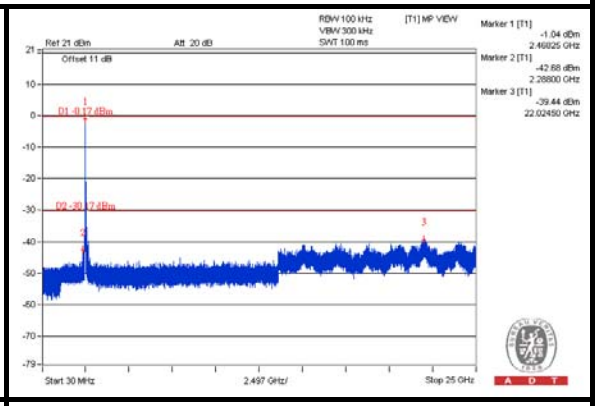
CH 6



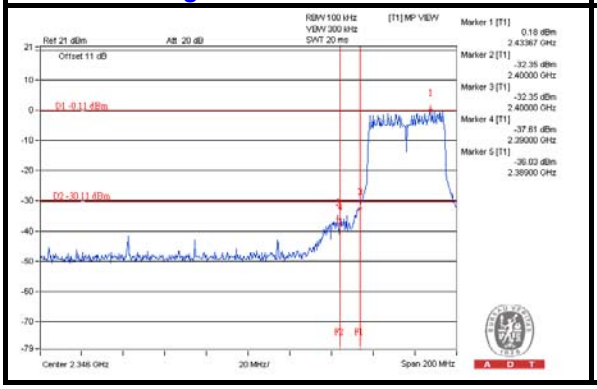


CH 9

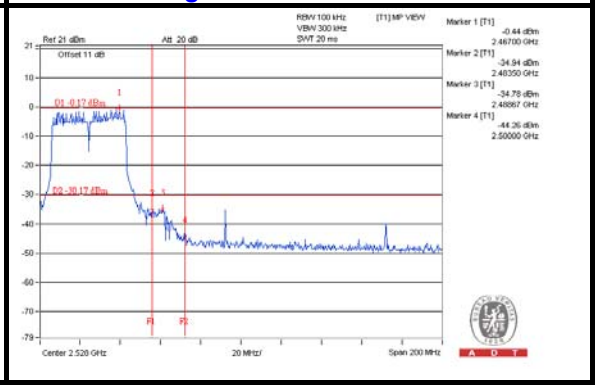




CH 3 Band edge

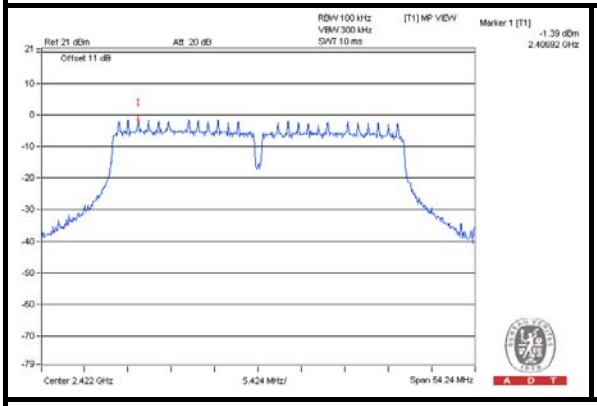


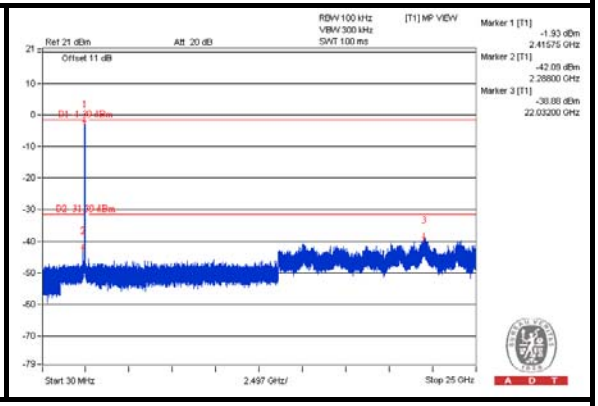
CH 9 Band edge



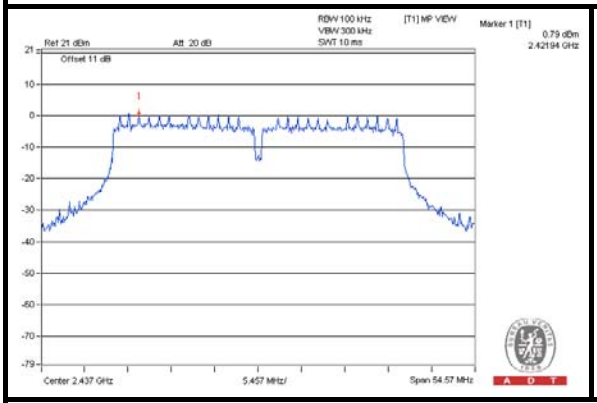
CHAIN 1

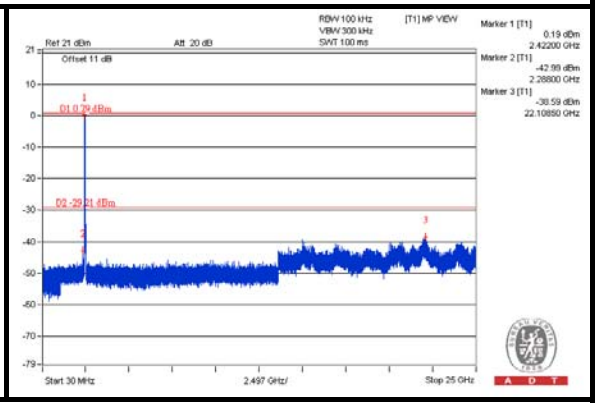
CH 3



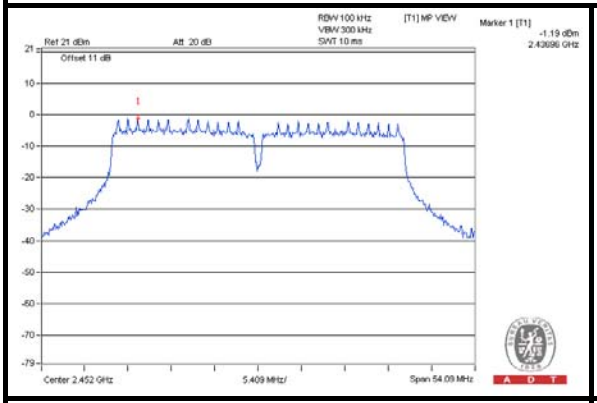


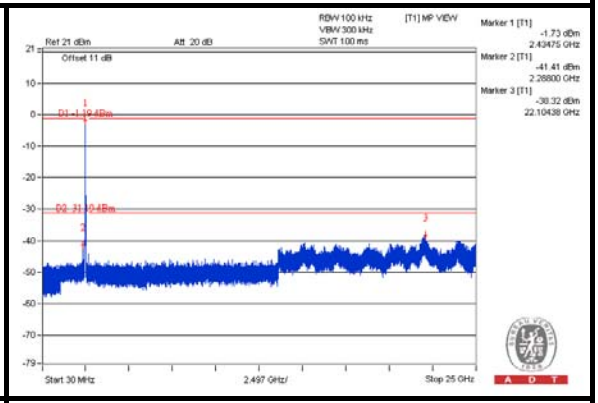
CH 6



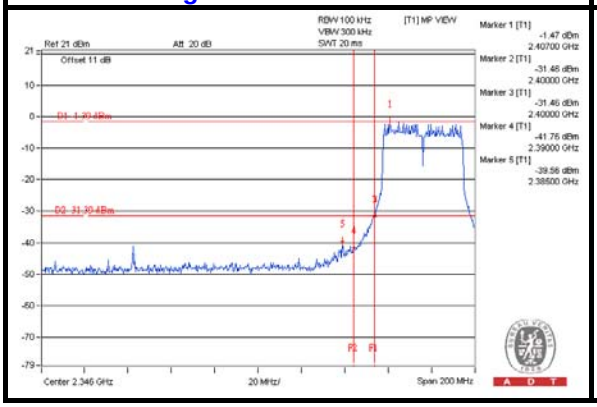


CH 9

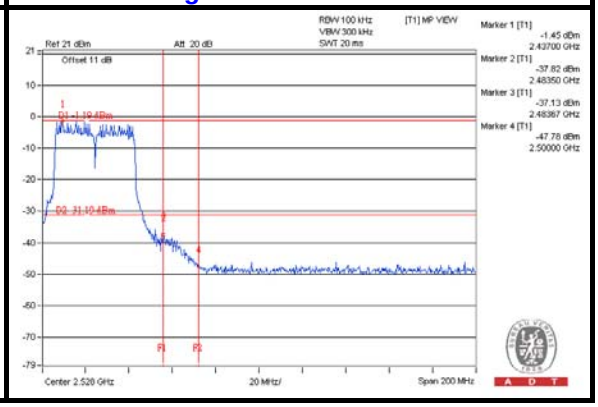




CH 3 Band edge



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:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/ Telecom Lab:
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Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety 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.

7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---