

FCC TEST REPORT

REPORT NO.: RF140922C14

MODEL NO.: MX64W-HW

FCC ID: UDX-60032015

RECEIVED: Sep. 22, 2014

TESTED: Oct. 01 ~ Oct. 31, 2014

ISSUED: Dec. 04, 2014

APPLICANT: Cisco Systems, Inc.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140922C14	Original release	Dec. 04, 2014

1. CERTIFICATION

PRODUCT: Wireless 802.11abgn/ac Router
MODEL NO.: MX64W-HW
BRAND: Cisco
APPLICANT: Cisco Systems, Inc.
TESTED: Oct. 01 ~ Oct. 31, 2014
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: FCC Part 15, Subpart C (Section 15.247)

The above equipment (model: MX64W-HW) 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** : Dec. 04, 2014
Pettie Chen / Senior Specialist

APPROVED BY :  , **DATE** : Dec. 04, 2014
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.79dB at 0.18903MHz.
15.205 & 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. Minimum passing margin is -1.0dB at 2483.50MHz.
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 RSMA 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	3.63 dB
	200MHz ~1000MHz	3.64 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	Wireless 802.11abgn/ac Router
MODEL NO.	MX64W-HW
POWER SUPPLY	12Vdc (adapter)
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)
OUTPUT POWER	1TX: 279.898 mW 2TX: 620.591 mW
ANTENNA TYPE	Dipole antenna with 3.36dBi gain
ANTENNA CONNECTOR	RSMA
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

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

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

- The EUT consumes power from the following adapters.

Adapter 1	
Brand	DELTA Electronics, INC.
Model	EADP-30HB B
Input Power	100-240Vac, 1A, 50-60Hz
Output Power	12Vdc, 2.5A
Power Line	1.8m DC cable with 1 core

Adapter 2	
Brand	Powertron Electronics Corp.
Model	PA1024-120T1A200 PA10247-2T1
Input Power	100-240Vac, 50-60Hz, 0.6A
Output Power	12Vdc, 2.0A, 24W Max
Power Line	1.55m DC cable with 1 core

*Adapter 1 was the worst for the final report.

- 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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

NOTE:

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX function
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	1TX/2TX
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	1TX/2TX
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2	1TX/2TX

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)	TX function
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0	2TX

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)	TX function
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0	2TX

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)	TX function
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0	1TX/2TX
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0	1TX/2TX
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2	1TX/2TX

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)	TX function
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0	1TX/2TX
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0	1TX/2TX
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2	1TX/2TX

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Tank Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui

3.3 DUTY CYCLE OF TEST SIGNAL

1TX:

802.11b: Duty cycle of test signal is 100 %, duty factor is not required.

802.11g, 802.11n (20MHz): Duty cycle is > 98%, duty factor shall be considered.

802.11g: Duty cycle = $2.055/2.095 = 0.981$

802.11n (20MHz): Duty cycle = $1.913/1.948 = 0.982$



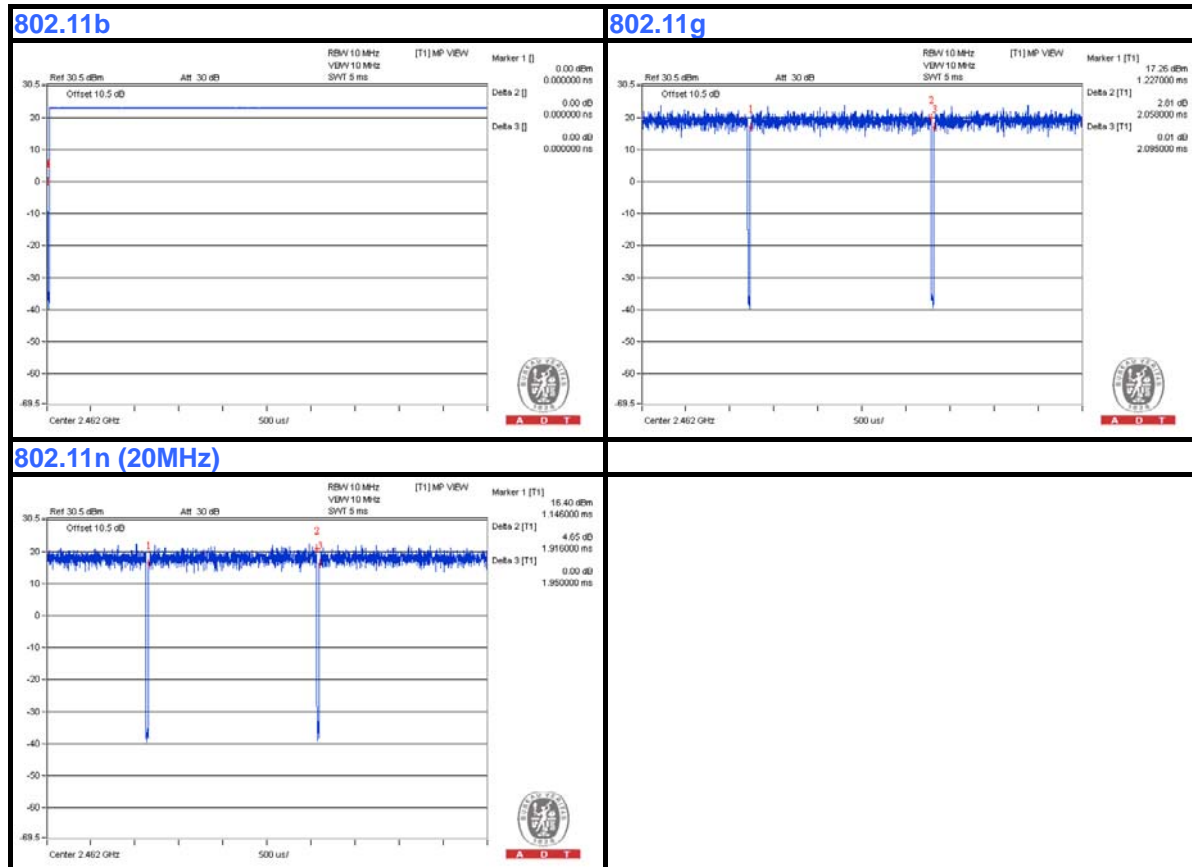
2TX:

802.11b: Duty cycle of test signal is 100 %, duty factor is not required.

802.11g, 802.11n (20MHz): Duty cycle is > 98%, duty factor shall be considered.

802.11g: Duty cycle = $2.058/2.095 = 0.982$

802.11n (20MHz): Duty cycle = $1.913/1.948 = 0.983$



3.4 DESCRIPTION OF SUPPORT UNITS

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

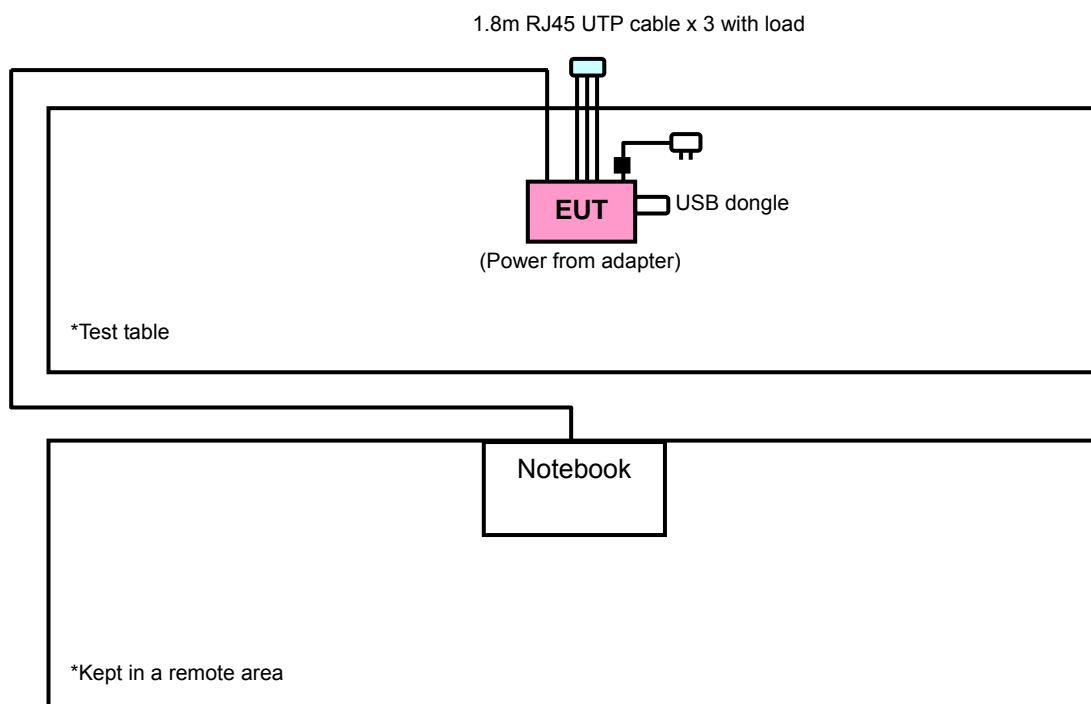
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	USB Dongle	SANDISK	SDCZ6-1024	NA	NA

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

NOTE:

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

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



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	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Feb. 11, 2014	Feb. 10, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Feb. 25, 2014	Feb. 24, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-209	Aug. 25, 2014	Aug. 24, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	248780/4 309222/4 274092/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable Worken	8D-FB	Cable-CH9-01	Aug. 11, 2014	Aug. 10, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	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 9.
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 215374.
5. The IC Site Registration No. is IC 7450F-9.

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:

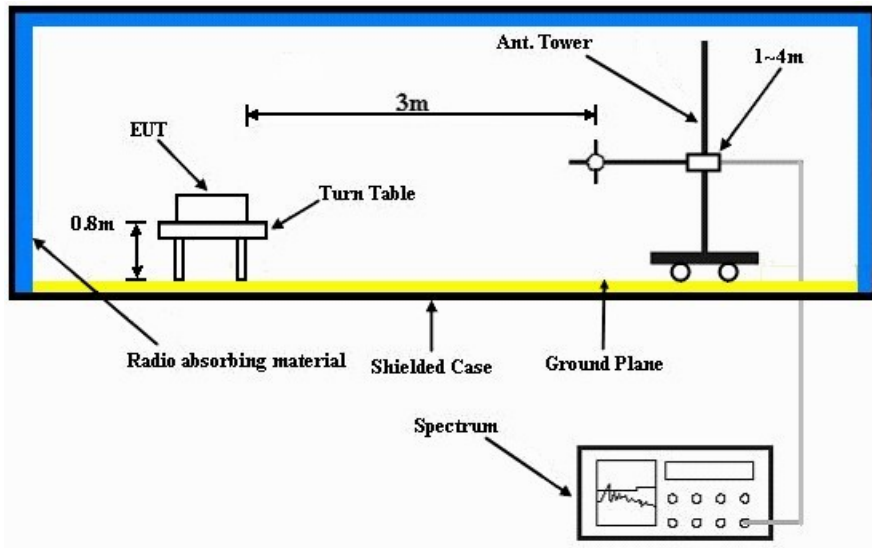
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

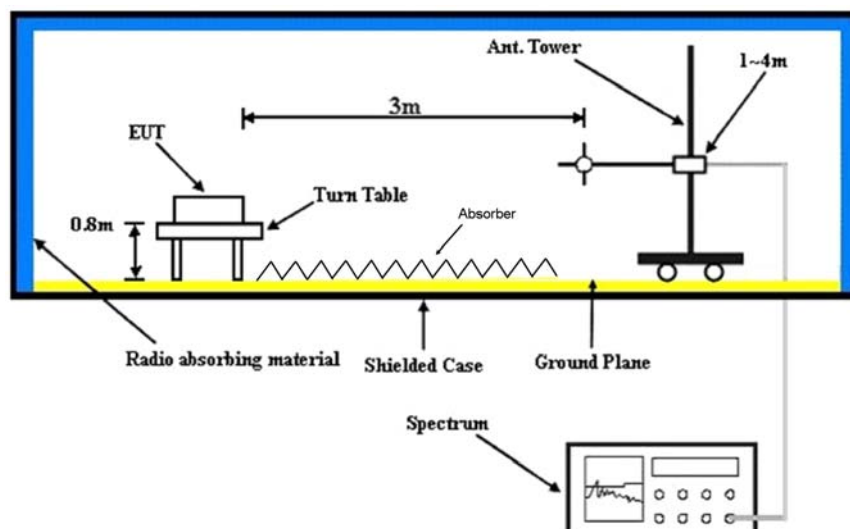
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

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 run 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 :

1TX:

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	2390.00	63.1 PK	74.0	-10.9	1.40 H	136	30.10	33.00
2	2390.00	52.9 AV	54.0	-1.1	1.40 H	136	19.90	33.00
3	*2412.00	115.4 PK			1.33 H	137	82.30	33.10
4	*2412.00	111.7 AV			1.33 H	137	78.60	33.10
5	4824.00	48.8 PK	74.0	-25.2	1.02 H	64	47.30	1.50
6	4824.00	41.4 AV	54.0	-12.6	1.02 H	64	39.90	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.4 PK	74.0	-13.6	1.00 V	63	27.40	33.00
2	2390.00	49.4 AV	54.0	-4.6	1.00 V	63	16.40	33.00
3	*2412.00	109.1 PK			1.00 V	63	76.00	33.10
4	*2412.00	105.5 AV			1.00 V	63	72.40	33.10
5	4824.00	46.1 PK	74.0	-27.9	1.54 V	5	44.60	1.50
6	4824.00	32.7 AV	54.0	-21.3	1.54 V	5	31.20	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	2390.00	62.2 PK	74.0	-11.8	1.06 H	130	29.20	33.00
2	2390.00	50.5 AV	54.0	-3.5	1.06 H	130	17.50	33.00
3	*2437.00	117.8 PK			1.06 H	130	84.50	33.30
4	*2437.00	114.0 AV			1.06 H	130	80.70	33.30
5	2483.50	63.7 PK	74.0	-10.3	1.06 H	130	30.30	33.40
6	2483.50	52.3 AV	54.0	-1.7	1.06 H	130	18.90	33.40
7	4874.00	47.1 PK	74.0	-26.9	1.00 H	216	45.60	1.50
8	4874.00	35.1 AV	54.0	-18.9	1.00 H	216	33.60	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.5 PK	74.0	-13.5	1.00 V	74	27.50	33.00
2	2390.00	49.1 AV	54.0	-4.9	1.00 V	74	16.10	33.00
3	*2437.00	110.6 PK			1.00 V	74	77.30	33.30
4	*2437.00	106.8 AV			1.00 V	74	73.50	33.30
5	2483.50	62.0 PK	74.0	-12.0	1.00 V	74	28.60	33.40
6	2483.50	49.3 AV	54.0	-4.7	1.00 V	74	15.90	33.40
7	4874.00	46.2 PK	74.0	-27.8	1.78 V	48	44.70	1.50
8	4874.00	32.8 AV	54.0	-21.2	1.78 V	48	31.30	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

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	115.9 PK			1.30 H	131	82.50	33.40
2	*2462.00	112.1 AV			1.30 H	131	78.70	33.40
3	2483.50	63.5 PK	74.0	-10.5	1.30 H	131	30.10	33.40
4	2483.50	52.6 AV	54.0	-1.4	1.30 H	131	19.20	33.40
5	4924.00	47.3 PK	74.0	-26.7	1.05 H	115	45.70	1.60
6	4924.00	35.2 AV	54.0	-18.8	1.05 H	115	33.60	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	*2462.00	108.6 PK			1.00 V	252	75.20	33.40
2	*2462.00	104.8 AV			1.00 V	252	71.40	33.40
3	2483.50	62.6 PK	74.0	-11.4	1.00 V	252	29.20	33.40
4	2483.50	52.4 AV	54.0	-1.6	1.00 V	252	19.00	33.40
5	4924.00	46.8 PK	74.0	-27.2	1.00 V	354	45.20	1.60
6	4924.00	32.9 AV	54.0	-21.1	1.00 V	354	31.30	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)
– 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)
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	2390.00	73.0 PK	74.0	-1.0	1.34 H	137	40.00	33.00
2	2390.00	52.6 AV	54.0	-1.4	1.34 H	137	19.60	33.00
3	*2412.00	111.0 PK			1.34 H	137	77.90	33.10
4	*2412.00	100.8 AV			1.34 H	137	67.70	33.10
5	4824.00	48.1 PK	74.0	-25.9	1.02 H	54	46.60	1.50
6	4824.00	35.0 AV	54.0	-19.0	1.02 H	54	33.50	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	1.00 V	63	32.00	33.00
2	2390.00	49.9 AV	54.0	-4.1	1.00 V	63	16.90	33.00
3	*2412.00	105.0 PK			1.00 V	63	71.90	33.10
4	*2412.00	95.0 AV			1.00 V	63	61.90	33.10
5	4824.00	46.1 PK	74.0	-27.9	1.02 V	33	44.60	1.50
6	4824.00	32.8 AV	54.0	-21.2	1.02 V	33	31.30	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	2390.00	68.7 PK	74.0	-5.3	1.05 H	130	35.70	33.00
2	2390.00	52.3 AV	54.0	-1.7	1.05 H	130	19.30	33.00
3	*2437.00	118.5 PK			1.05 H	130	85.20	33.30
4	*2437.00	108.1 AV			1.05 H	130	74.80	33.30
5	2483.50	69.9 PK	74.0	-4.1	1.05 H	130	36.50	33.40
6	2483.50	52.7 AV	54.0	-1.3	1.05 H	130	19.30	33.40
7	4874.00	47.8 PK	74.0	-26.2	1.54 H	96	46.30	1.50
8	4874.00	35.1 AV	54.0	-18.9	1.54 H	96	33.60	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.2 PK	74.0	-10.8	1.00 V	61	30.20	33.00
2	2390.00	49.9 AV	54.0	-4.1	1.00 V	61	16.90	33.00
3	*2437.00	111.4 PK			1.00 V	61	78.10	33.30
4	*2437.00	100.9 AV			1.00 V	61	67.60	33.30
5	2483.50	64.0 PK	74.0	-10.0	1.00 V	61	30.60	33.40
6	2483.50	49.9 AV	54.0	-4.1	1.00 V	61	16.50	33.40
7	4874.00	45.7 PK	74.0	-28.3	1.63 V	99	44.20	1.50
8	4874.00	33.7 AV	54.0	-20.3	1.63 V	99	32.20	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.3 PK			1.00 H	243	74.90	33.40
2	*2462.00	98.3 AV			1.00 H	243	64.90	33.40
3	2483.50	71.6 PK	74.0	-2.4	1.00 H	243	38.20	33.40
4	2483.50	53.0 AV	54.0	-1.0	1.00 H	243	19.60	33.40
5	4924.00	48.2 PK	74.0	-25.8	1.55 H	52	46.60	1.60
6	4924.00	35.1 AV	54.0	-18.9	1.55 H	52	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	*2462.00	105.9 PK			1.00 V	258	72.50	33.40
2	*2462.00	95.7 AV			1.00 V	258	62.30	33.40
3	2483.50	66.8 PK	74.0	-7.2	1.00 V	258	33.40	33.40
4	2483.50	50.8 AV	54.0	-3.2	1.00 V	258	17.40	33.40
5	4924.00	46.1 PK	74.0	-27.9	1.01 V	47	44.50	1.60
6	4924.00	32.8 AV	54.0	-21.2	1.01 V	47	31.20	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)
– 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)
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	2390.00	71.5 PK	74.0	-2.5	1.36 H	138	38.50	33.00
2	2390.00	52.7 AV	54.0	-1.3	1.36 H	138	19.70	33.00
3	*2412.00	109.5 PK			1.36 H	138	76.40	33.10
4	*2412.00	99.0 AV			1.36 H	138	65.90	33.10
5	4824.00	46.7 PK	74.0	-27.3	1.00 H	85	45.20	1.50
6	4824.00	35.1 AV	54.0	-18.9	1.00 H	85	33.60	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.3 PK	74.0	-7.7	1.00 V	71	33.30	33.00
2	2390.00	50.2 AV	54.0	-3.8	1.00 V	71	17.20	33.00
3	*2412.00	104.9 PK			1.00 V	71	71.80	33.10
4	*2412.00	94.3 AV			1.00 V	71	61.20	33.10
5	4824.00	46.7 PK	74.0	-27.3	1.25 V	44	45.20	1.50
6	4824.00	32.7 AV	54.0	-21.3	1.25 V	44	31.20	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	2390.00	72.0 PK	74.0	-2.0	1.07 H	132	39.00	33.00
2	2390.00	53.0 AV	54.0	-1.0	1.07 H	132	20.00	33.00
3	*2437.00	118.1 PK			1.07 H	132	84.80	33.30
4	*2437.00	107.5 AV			1.07 H	132	74.20	33.30
5	2483.50	70.9 PK	74.0	-3.1	1.07 H	132	37.50	33.40
6	2483.50	52.5 AV	54.0	-1.5	1.07 H	132	19.10	33.40
7	4874.00	46.7 PK	74.0	-27.3	1.24 H	114	45.20	1.50
8	4874.00	35.1 AV	54.0	-18.9	1.24 H	114	33.60	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.6 PK	74.0	-9.4	1.00 V	61	31.60	33.00
2	2390.00	50.7 AV	54.0	-3.3	1.00 V	61	17.70	33.00
3	*2437.00	112.6 PK			1.00 V	61	79.30	33.30
4	*2437.00	101.7 AV			1.00 V	61	68.40	33.30
5	2483.50	64.9 PK	74.0	-9.1	1.00 V	61	31.50	33.40
6	2483.50	50.2 AV	54.0	-3.8	1.00 V	61	16.80	33.40
7	4874.00	46.7 PK	74.0	-27.3	1.54 V	84	45.20	1.50
8	4874.00	32.8 AV	54.0	-21.2	1.54 V	84	31.30	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

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	112.1 PK			1.29 H	132	78.70	33.40
2	*2462.00	101.7 AV			1.29 H	132	68.30	33.40
3	2483.50	72.8 PK	74.0	-1.2	1.29 H	132	39.40	33.40
4	2483.50	52.4 AV	54.0	-1.6	1.29 H	132	19.00	33.40
5	4924.00	47.8 PK	74.0	-26.2	1.41 H	88	46.20	1.60
6	4924.00	35.2 AV	54.0	-18.8	1.41 H	88	33.60	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	*2462.00	104.6 PK			1.00 V	252	71.20	33.40
2	*2462.00	94.2 AV			1.00 V	252	60.80	33.40
3	2483.50	66.9 PK	74.0	-7.1	1.00 V	252	33.50	33.40
4	2483.50	49.7 AV	54.0	-4.3	1.00 V	252	16.30	33.40
5	4924.00	47.1 PK	74.0	-26.9	1.84 V	96	45.50	1.60
6	4924.00	33.1 AV	54.0	-20.9	1.84 V	96	31.50	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)
– 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.

2TX:

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	2390.00	63.8 PK	74.0	-10.2	1.09 H	60	30.80	33.00
2	2390.00	53.0 AV	54.0	-1.0	1.09 H	60	20.00	33.00
3	*2412.00	115.8 PK			2.10 H	60	82.70	33.10
4	*2412.00	111.9 AV			2.10 H	60	78.80	33.10
5	4824.00	47.1 PK	74.0	-26.9	1.00 H	155	45.60	1.50
6	4824.00	35.0 AV	54.0	-19.0	1.00 H	155	33.50	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.7 PK	74.0	-11.3	1.00 V	100	29.70	33.00
2	2390.00	51.7 AV	54.0	-2.3	1.00 V	100	18.70	33.00
3	*2412.00	116.0 PK			1.00 V	101	82.90	33.10
4	*2412.00	112.2 AV			1.00 V	101	79.10	33.10
5	4824.00	46.7 PK	74.0	-27.3	1.41 V	8	45.20	1.50
6	4824.00	32.7 AV	54.0	-21.3	1.41 V	8	31.20	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	2390.00	61.2 PK	74.0	-12.8	1.12 H	350	28.20	33.00
2	2390.00	50.2 AV	54.0	-3.8	1.12 H	350	17.20	33.00
3	*2437.00	116.1 PK			2.15 H	60	82.80	33.30
4	*2437.00	112.3 AV			2.15 H	60	79.00	33.30
5	2483.50	63.2 PK	74.0	-10.8	1.02 H	62	29.80	33.40
6	2483.50	50.7 AV	54.0	-3.3	1.02 H	62	17.30	33.40
7	4874.00	46.9 PK	74.0	-27.1	1.54 H	84	45.40	1.50
8	4874.00	35.0 AV	54.0	-19.0	1.54 H	84	33.50	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.3 PK	74.0	-12.7	1.00 V	93	28.30	33.00
2	2390.00	50.5 AV	54.0	-3.5	1.00 V	93	17.50	33.00
3	*2437.00	117.5 PK			1.00 V	93	84.20	33.30
4	*2437.00	113.5 AV			1.00 V	93	80.20	33.30
5	2483.50	62.4 PK	74.0	-11.6	1.00 V	93	29.00	33.40
6	2483.50	51.4 AV	54.0	-2.6	1.00 V	93	18.00	33.40
7	4874.00	46.7 PK	74.0	-27.3	1.14 V	54	45.20	1.50
8	4874.00	32.8 AV	54.0	-21.2	1.14 V	54	31.30	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.4 PK			2.37 H	59	81.00	33.40
2	*2462.00	110.7 AV			2.37 H	59	77.30	33.40
3	2483.50	64.4 PK	74.0	-9.6	1.03 H	64	31.00	33.40
4	2483.50	52.8 AV	54.0	-1.2	1.03 H	64	19.40	33.40
5	4924.00	47.0 PK	74.0	-27.0	1.41 H	58	45.40	1.60
6	4924.00	35.2 AV	54.0	-18.8	1.41 H	58	33.60	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	*2462.00	115.1 PK			1.00 V	102	81.70	33.40
2	*2462.00	111.2 AV			1.00 V	102	77.80	33.40
3	2483.50	62.6 PK	74.0	-11.4	1.00 V	120	29.20	33.40
4	2483.50	51.9 AV	54.0	-2.1	1.00 V	120	18.50	33.40
5	4924.00	46.9 PK	74.0	-27.1	1.51 V	84	45.30	1.60
6	4924.00	32.8 AV	54.0	-21.2	1.51 V	84	31.20	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

802.11g

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	2390.00	72.6 PK	74.0	-1.4	1.09 H	351	39.60	33.00
2	2390.00	52.2 AV	54.0	-1.8	1.09 H	351	19.20	33.00
3	*2412.00	113.9 PK			1.39 H	60	80.80	33.10
4	*2412.00	104.0 AV			1.39 H	60	70.90	33.10
5	4824.00	46.2 PK	74.0	-27.8	1.00 H	265	44.70	1.50
6	4824.00	32.9 AV	54.0	-21.1	1.00 H	265	31.40	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.9 PK	74.0	-3.1	1.00 V	100	37.90	33.00
2	2390.00	52.7 AV	54.0	-1.3	1.00 V	100	19.70	33.00
3	*2412.00	111.9 PK			1.00 V	103	78.80	33.10
4	*2412.00	102.3 AV			1.00 V	103	69.20	33.10
5	4824.00	45.7 PK	74.0	-28.3	1.00 V	122	44.20	1.50
6	4824.00	32.6 AV	54.0	-21.4	1.00 V	122	31.10	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	2390.00	70.9 PK	74.0	-3.1	1.34 H	58	37.90	33.00
2	2390.00	52.7 AV	54.0	-1.3	1.34 H	58	19.70	33.00
3	*2437.00	122.7 PK			1.34 H	60	89.40	33.30
4	*2437.00	113.1 AV			1.34 H	60	79.80	33.30
5	2483.50	71.2 PK	74.0	-2.8	1.01 H	214	37.80	33.40
6	2483.50	53.0 AV	54.0	-1.0	1.01 H	214	19.60	33.40
7	4874.00	46.7 PK	74.0	-27.3	1.00 H	125	45.20	1.50
8	4874.00	32.7 AV	54.0	-21.3	1.00 H	125	31.20	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.3 PK	74.0	-3.7	1.00 V	81	37.30	33.00
2	2390.00	52.6 AV	54.0	-1.4	1.00 V	81	19.60	33.00
3	*2437.00	118.9 PK			1.00 V	100	85.60	33.30
4	*2437.00	109.0 AV			1.00 V	100	75.70	33.30
5	2483.50	69.2 PK	74.0	-4.8	1.00 V	103	35.80	33.40
6	2483.50	52.3 AV	54.0	-1.7	1.00 V	103	18.90	33.40
7	4874.00	45.8 PK	74.0	-28.2	1.00 V	302	44.30	1.50
8	4874.00	32.0 AV	54.0	-22.0	1.00 V	302	30.50	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

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	113.8 PK			1.05 H	216	80.40	33.40
2	*2462.00	103.9 AV			1.05 H	216	70.50	33.40
3	2483.50	72.8 PK	74.0	-1.2	1.03 H	213	39.40	33.40
4	2483.50	52.3 AV	54.0	-1.7	1.03 H	213	18.90	33.40
5	4924.00	45.3 PK	74.0	-28.7	1.00 H	265	43.70	1.60
6	4924.00	31.9 AV	54.0	-22.1	1.00 H	265	30.30	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	*2462.00	110.9 PK			1.00 V	104	77.50	33.40
2	*2462.00	101.0 AV			1.00 V	104	67.60	33.40
3	2483.50	69.8 PK	74.0	-4.2	1.00 V	95	36.40	33.40
4	2483.50	52.0 AV	54.0	-2.0	1.00 V	95	18.60	33.40
5	4924.00	45.4 PK	74.0	-28.6	1.00 V	198	43.80	1.60
6	4924.00	32.8 AV	54.0	-21.2	1.00 V	198	31.20	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)
– 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)
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	2390.00	71.2 PK	74.0	-2.8	1.35 H	130	38.20	33.00
2	2390.00	52.9 AV	54.0	-1.1	1.35 H	130	19.90	33.00
3	*2412.00	113.0 PK			1.34 H	58	79.90	33.10
4	*2412.00	103.4 AV			1.34 H	58	70.30	33.10
5	4824.00	46.2 PK	74.0	-27.8	1.00 H	123	44.70	1.50
6	4824.00	32.4 AV	54.0	-21.6	1.00 H	123	30.90	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.8 PK	74.0	-6.2	1.00 V	100	34.80	33.00
2	2390.00	51.6 AV	54.0	-2.4	1.00 V	100	18.60	33.00
3	*2412.00	109.3 PK			1.00 V	96	76.20	33.10
4	*2412.00	99.4 AV			1.00 V	96	66.30	33.10
5	4824.00	46.4 PK	74.0	-27.6	1.00 V	296	44.90	1.50
6	4824.00	32.7 AV	54.0	-21.3	1.00 V	296	31.20	1.50

REMARKS:

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

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	2390.00	70.3 PK	74.0	-3.7	1.38 H	54	37.30	33.00
2	2390.00	52.7 AV	54.0	-1.3	1.38 H	54	19.70	33.00
3	*2437.00	120.5 PK			1.30 H	124	87.20	33.30
4	*2437.00	110.5 AV			1.30 H	124	77.20	33.30
5	2483.50	70.0 PK	74.0	-4.0	1.06 H	202	36.60	33.40
6	2483.50	52.9 AV	54.0	-1.1	1.06 H	202	19.50	33.40
7	4874.00	45.1 PK	74.0	-28.9	1.00 H	298	43.60	1.50
8	4874.00	33.1 AV	54.0	-20.9	1.00 H	298	31.60	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.3 PK	74.0	-7.7	1.00 V	79	33.30	33.00
2	2390.00	50.7 AV	54.0	-3.3	1.00 V	79	17.70	33.00
3	*2437.00	115.0 PK			1.00 V	94	81.70	33.30
4	*2437.00	104.5 AV			1.00 V	94	71.20	33.30
5	2483.50	65.0 PK	74.0	-9.0	1.00 V	93	31.60	33.40
6	2483.50	50.6 AV	54.0	-3.4	1.00 V	93	17.20	33.40
7	4874.00	45.4 PK	74.0	-28.6	1.00 V	112	43.90	1.50
8	4874.00	33.6 AV	54.0	-20.4	1.00 V	112	32.10	1.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)

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	112.3 PK			1.31 H	59	78.90	33.40
2	*2462.00	102.1 AV			1.31 H	59	68.70	33.40
3	2483.50	72.8 PK	74.0	-1.2	1.04 H	204	39.40	33.40
4	2483.50	52.9 AV	54.0	-1.1	1.04 H	204	19.50	33.40
5	4924.00	45.3 PK	74.0	-28.7	1.00 H	155	43.70	1.60
6	4924.00	32.8 AV	54.0	-21.2	1.00 H	155	31.20	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	*2462.00	109.0 PK			1.55 V	102	75.60	33.40
2	*2462.00	98.8 AV			1.55 V	102	65.40	33.40
3	2483.50	68.8 PK	74.0	-5.2	1.57 V	95	35.40	33.40
4	2483.50	51.2 AV	54.0	-2.8	1.57 V	95	17.80	33.40
5	4924.00	45.1 PK	74.0	-28.9	1.00 V	319	43.50	1.60
6	4924.00	33.2 AV	54.0	-20.8	1.00 V	319	31.60	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)
– 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

802.11b

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

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	44.00	24.7 QP	40.0	-15.3	1.00 H	71	39.40	-14.70
2	89.10	31.4 QP	43.5	-12.1	1.99 H	289	51.20	-19.80
3	163.70	32.7 QP	43.5	-10.8	1.99 H	93	46.80	-14.10
4	322.20	35.3 QP	46.0	-10.7	1.00 H	194	47.20	-11.90
5	435.70	31.8 QP	46.0	-14.2	1.00 H	4	41.20	-9.40
6	836.80	31.3 QP	46.0	-14.7	1.99 H	27	33.60	-2.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	36.70	34.5 QP	40.0	-5.5	1.00 V	170	49.90	-15.40
2	100.00	34.4 QP	43.5	-9.1	1.00 V	254	53.10	-18.70
3	171.50	32.3 QP	43.5	-11.2	1.00 V	290	46.90	-14.60
4	325.40	31.2 QP	46.0	-14.8	1.99 V	151	43.00	-11.80
5	474.60	27.2 QP	46.0	-18.8	1.00 V	287	36.30	-9.10
6	836.80	33.0 QP	46.0	-13.0	1.99 V	16	35.30	-2.30

REMARKS:

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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	ESCI	100612	Sep. 30, 2014	Sep. 29, 2015
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

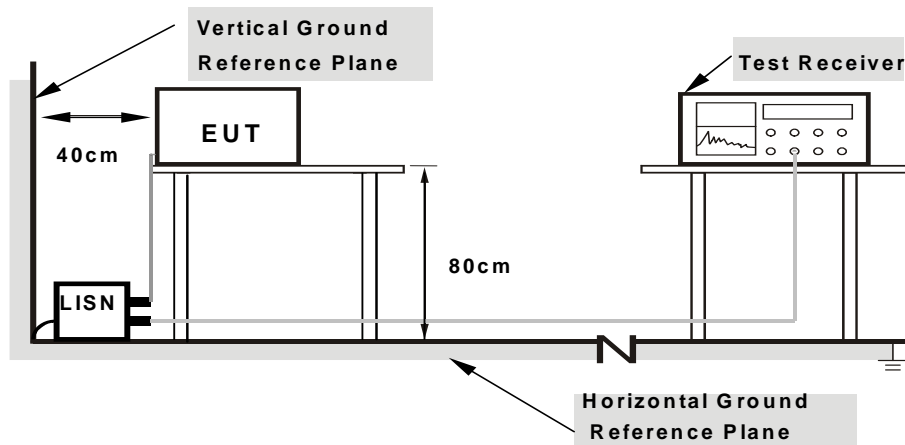
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

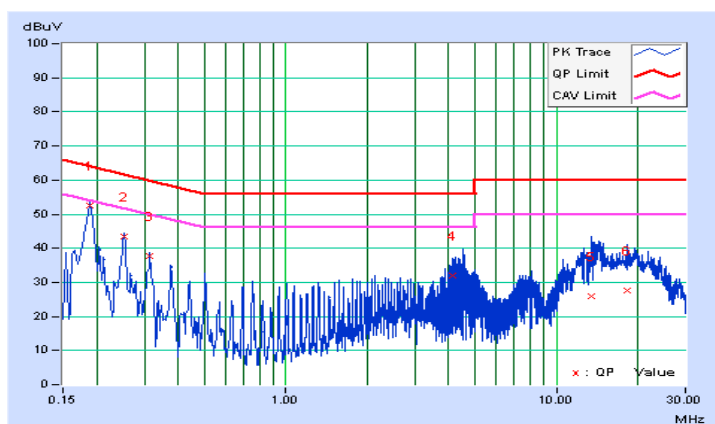
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11b

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18910	0.07	52.49	42.41	52.56	42.48	64.08	54.08	-11.51	-11.59
2	0.25192	0.07	43.21	33.16	43.28	33.23	61.69	51.69	-18.41	-18.46
3	0.31432	0.08	37.76	31.13	37.84	31.21	59.86	49.86	-22.02	-18.65
4	4.15384	0.24	31.66	24.88	31.90	25.12	56.00	46.00	-24.10	-20.88
5	13.46746	0.69	25.33	19.10	26.02	19.79	60.00	50.00	-33.98	-30.21
6	18.37451	0.95	26.50	21.35	27.45	22.30	60.00	50.00	-32.55	-27.70

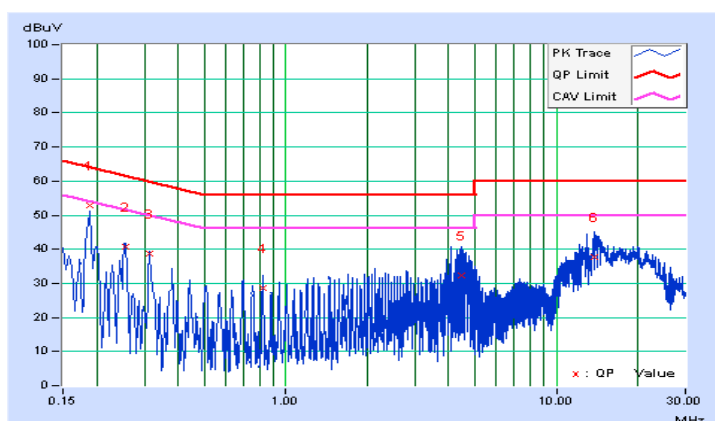
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18903	0.05	52.75	43.24	52.80	43.29	64.08	54.08	-11.28	-10.79
2	0.25458	0.06	40.62	31.12	40.68	31.18	61.61	51.61	-20.93	-20.43
3	0.31432	0.06	38.74	34.13	38.80	34.19	59.86	49.86	-21.05	-15.66
4	0.81861	0.08	28.38	25.94	28.46	26.02	56.00	46.00	-27.54	-19.98
5	4.47055	0.23	32.07	23.99	32.30	24.22	56.00	46.00	-23.70	-21.78
6	13.74116	0.62	36.96	30.04	37.58	30.66	60.00	50.00	-22.42	-19.34

- 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.

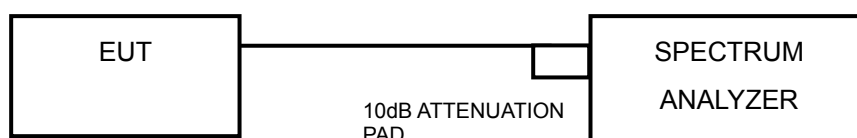


4.3 6dB BANDWIDTH MEASUREMENT

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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

1TX:

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.06	0.5	PASS
6	2437	9.03	0.5	PASS
11	2462	8.11	0.5	PASS

802.11g

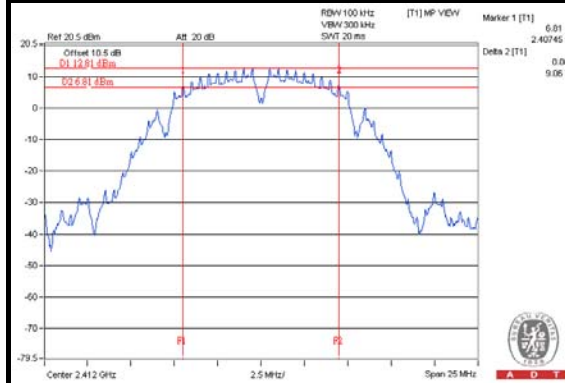
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.39	0.5	PASS
6	2437	16.36	0.5	PASS
11	2462	16.38	0.5	PASS

802.11n (20MHz)

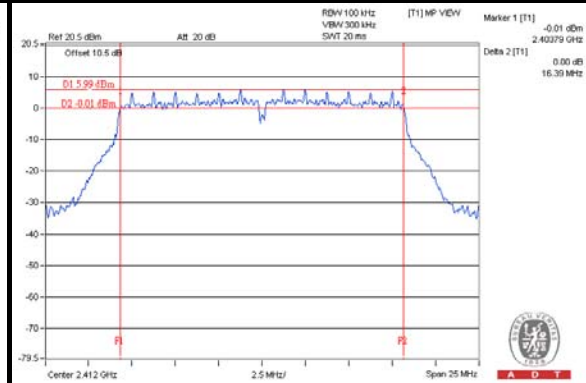
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.62	0.5	PASS
6	2437	17.61	0.5	PASS
11	2462	17.61	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

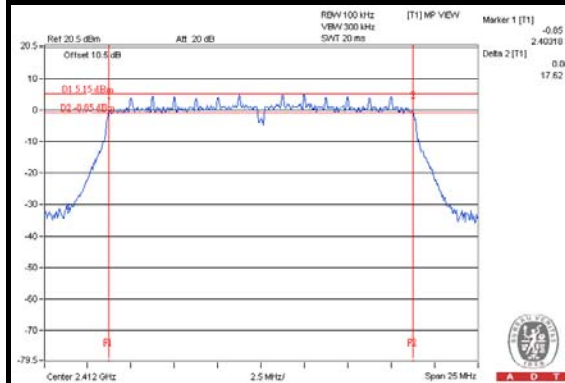
802.11b



802.11g



802.11n (20MHz)



2TX:

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	9.04	9.06	0.5	PASS
6	2437	9.11	9.08	0.5	PASS
11	2462	8.57	8.59	0.5	PASS

802.11g

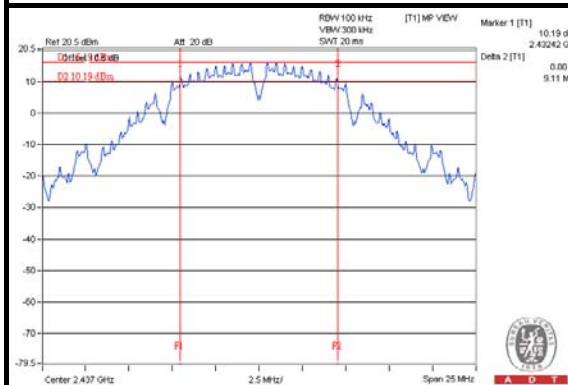
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.42	16.40	0.5	PASS
6	2437	16.40	16.38	0.5	PASS
11	2462	16.40	16.39	0.5	PASS

802.11n (20MHz)

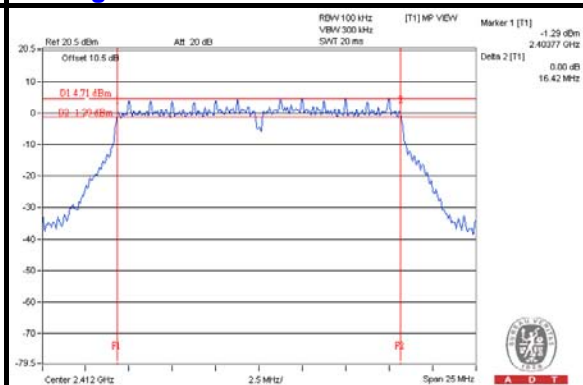
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.69	17.63	0.5	PASS
6	2437	17.66	17.63	0.5	PASS
11	2462	17.65	17.60	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

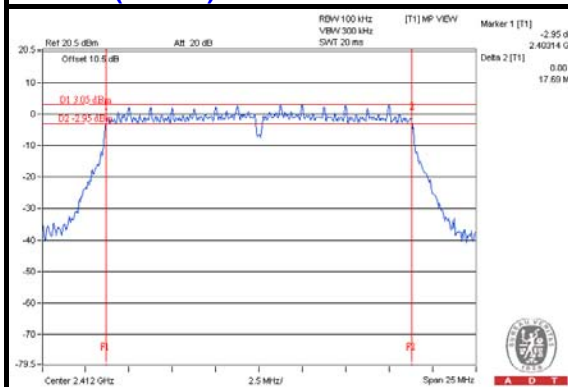
802.11b



802.11g



802.11n (20MHz)



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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

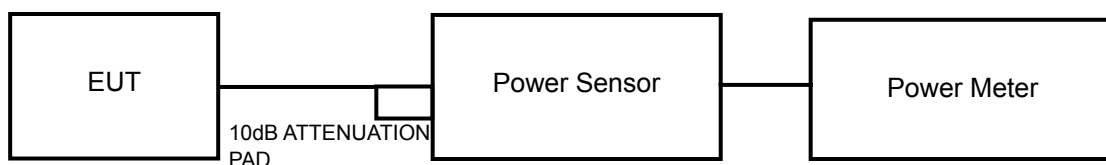
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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 $NANT \geq 5$.

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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

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

1TX:

802.11b

CHANNEL	FREQUENCY (MHz)	AVG. POWER (mW)	AVG. POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	157.036	21.96	30	PASS
6	2437	279.898	24.47	30	PASS
11	2462	141.906	21.52	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	AVG. POWER (mW)	AVG. POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	52.845	17.23	30	PASS
6	2437	224.905	23.52	30	PASS
11	2462	65.615	18.17	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	AVG. POWER (mW)	AVG. POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	44.566	16.49	30	PASS
6	2437	224.905	23.52	30	PASS
11	2462	46.345	16.66	30	PASS

2TX:

802.11b

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	21.88	21.87	307.985	24.89	30	PASS
6	2437	25.34	24.45	620.591	27.93	30	PASS
11	2462	21.17	21.21	263.048	24.20	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	16.24	17.15	93.953	19.73	30	PASS
6	2437	23.19	22.91	403.883	26.06	30	PASS
11	2462	16.40	17.06	94.468	19.75	30	PASS

802.11n (20MHz)

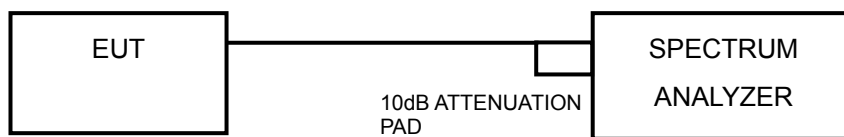
CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	14.61	15.72	66.232	18.21	30	PASS
6	2437	21.92	21.81	307.302	24.88	30	PASS
11	2462	15.39	16.40	78.246	18.93	30	PASS

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

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.



A D T

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

1TX:

802.11b

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
1	2412	-6.68	8	PASS
6	2437	-4.26	8	PASS
11	2462	-6.73	8	PASS

802.11g

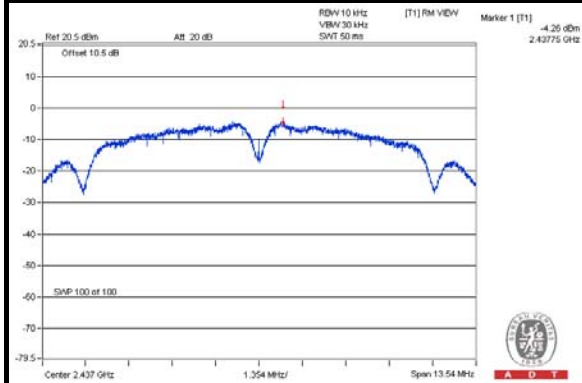
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
1	2412	-12.29	8	PASS
6	2437	-6.23	8	PASS
11	2462	-11.55	8	PASS

802.11n (20MHz)

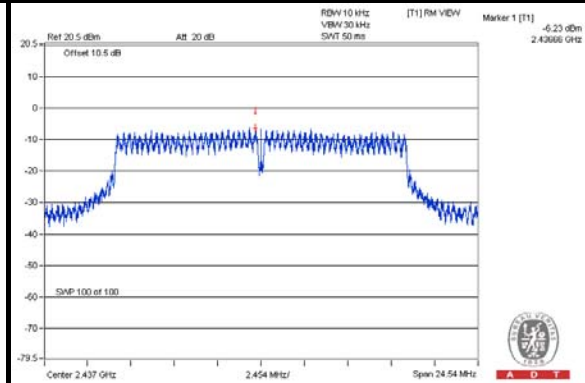
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
1	2412	-14.77	8	PASS
6	2437	-6.98	8	PASS
11	2462	-14.98	8	PASS

SPECTRUM PLOT OF WORST VALUE

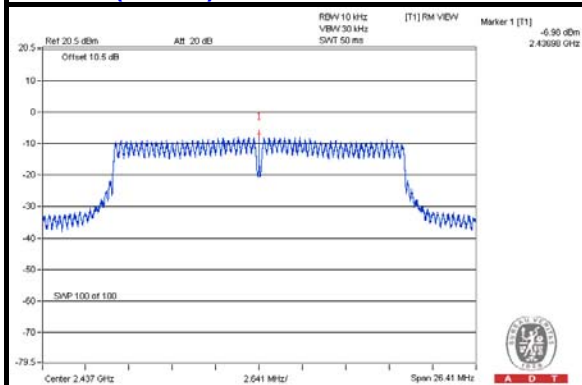
802.11b



802.11g



802.11n (20MHz)



2TX:

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-6.58	3.01	-3.57	7.63	PASS
	6	2437	-3.50	3.01	-0.49	7.63	PASS
	11	2462	-7.22	3.01	-4.21	7.63	PASS
1	1	2412	-6.47	3.01	-3.46	7.63	PASS
	6	2437	-4.15	3.01	-1.14	7.63	PASS
	11	2462	-6.95	3.01	-3.94	7.63	PASS

NOTE: Directional gain = $3.36\text{dBi} + 10\log(2) = 6.37\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.37-6) = 7.63\text{dBm}$.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.81	3.01	-10.80	7.63	PASS
	6	2437	-6.62	3.01	-3.61	7.63	PASS
	11	2462	-12.97	3.01	-9.96	7.63	PASS
1	1	2412	-12.46	3.01	-9.45	7.63	PASS
	6	2437	-7.49	3.01	-4.48	7.63	PASS
	11	2462	-13.37	3.01	-10.36	7.63	PASS

NOTE: Directional gain = $3.36\text{dBi} + 10\log(2) = 6.37\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.37-6) = 7.63\text{dBm}$.

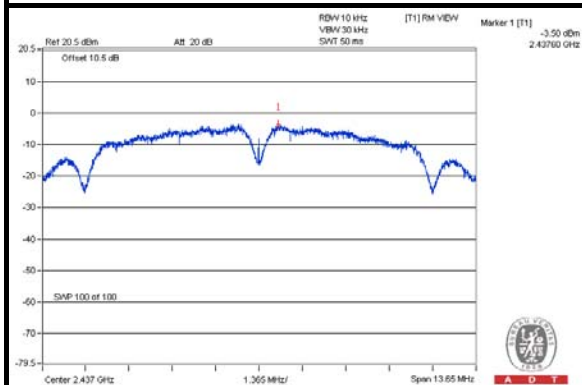
802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-16.80	3.01	-13.79	7.63	PASS
	6	2437	-8.03	3.01	-5.02	7.63	PASS
	11	2462	-15.71	3.01	-12.70	7.63	PASS
1	1	2412	-15.97	3.01	-12.96	7.63	PASS
	6	2437	-9.28	3.01	-6.27	7.63	PASS
	11	2462	-14.46	3.01	-11.45	7.63	PASS

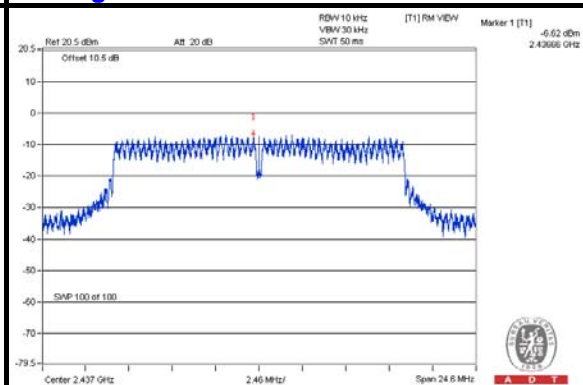
NOTE: Directional gain = $3.36\text{dBi} + 10\log(2) = 6.37\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.37-6) = 7.63\text{dBm}$.

SPECTRUM PLOT OF WORST VALUE

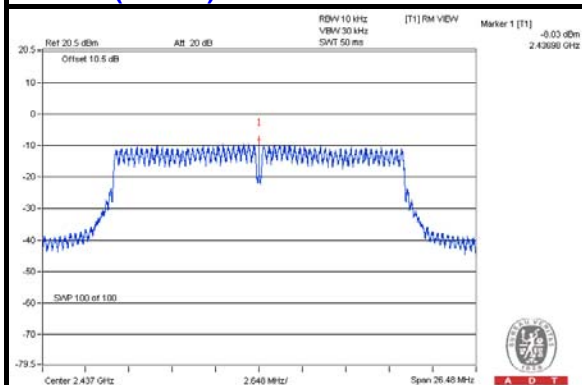
802.11b



802.11g



802.11n (20MHz)

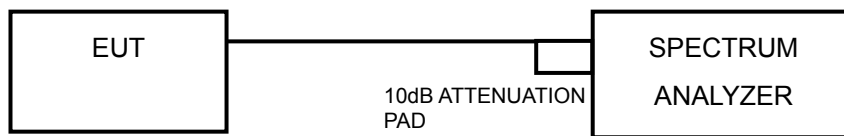


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. 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 $10\log(N)$ since the limit is relative emission limit. Only worst data of each operating mode is presented.

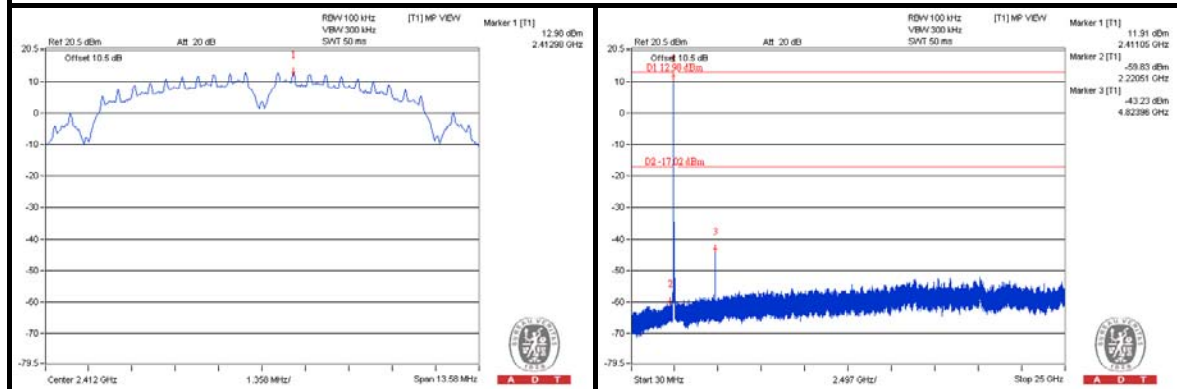
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



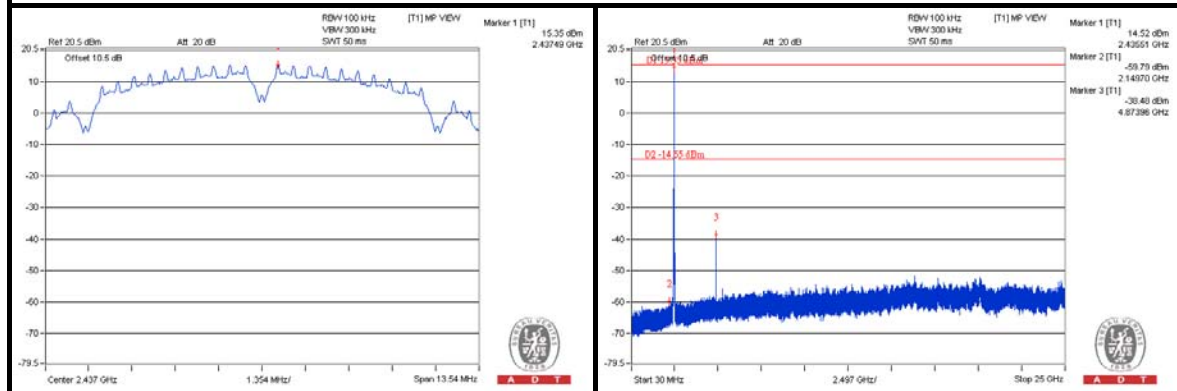
A D T

1TX:
802.11b

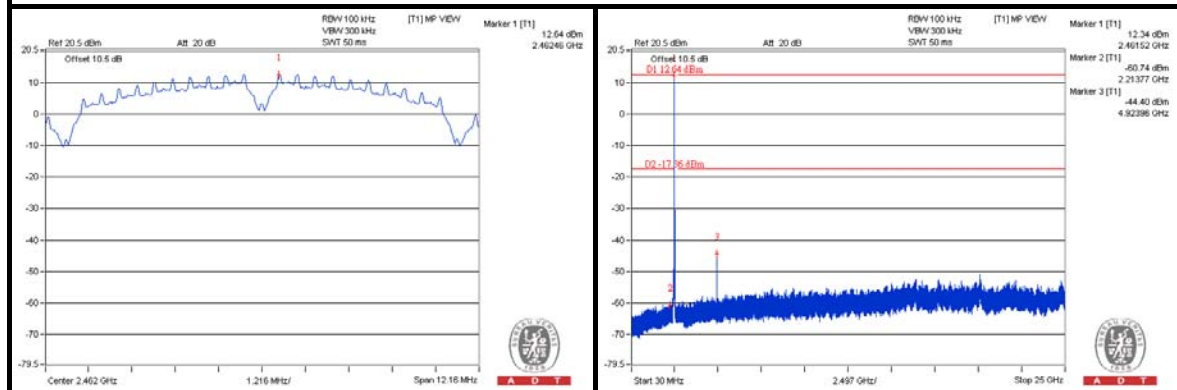
CH 1



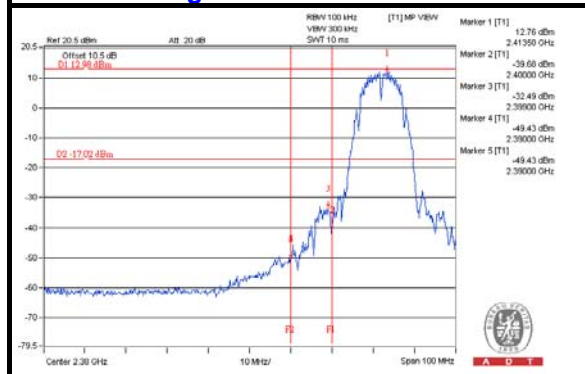
CH 6



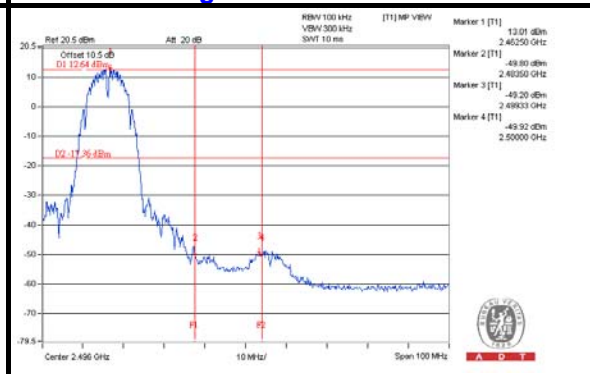
CH 11



CH 1 Band edge



CH 11 Band edge

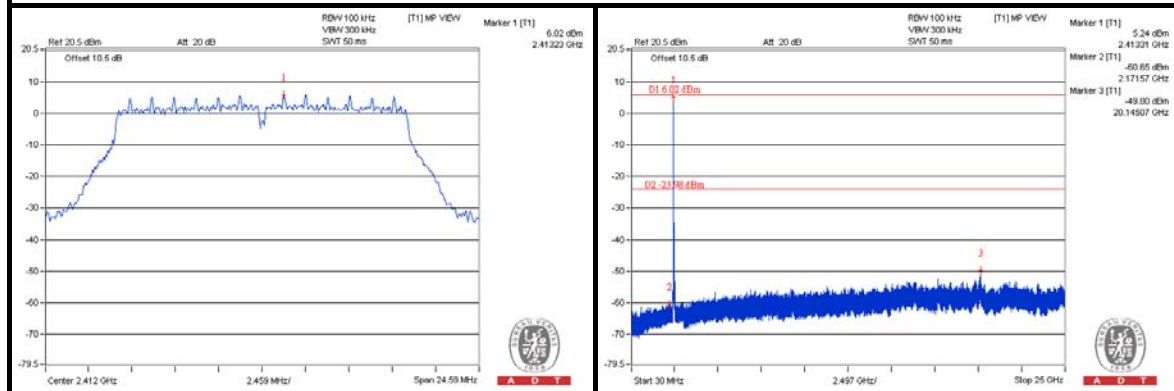




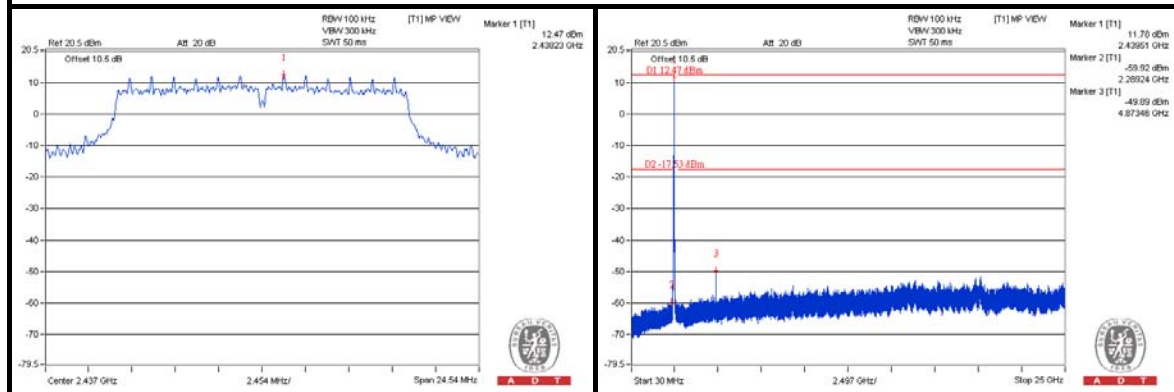
A D T

802.11g

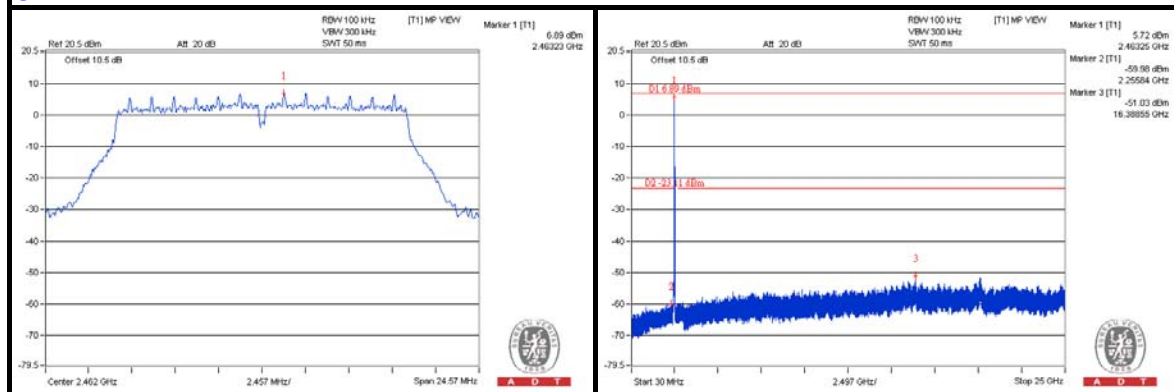
CH 1



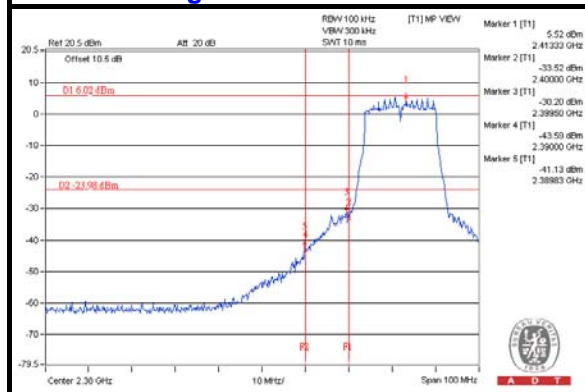
CH 6



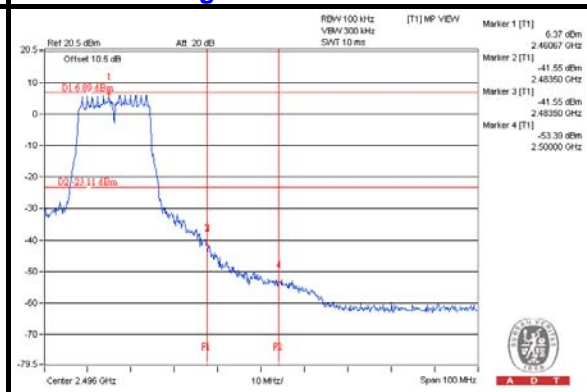
CH 11



CH 1 Band edge

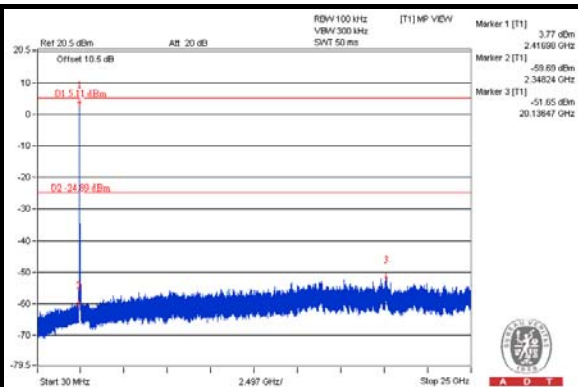
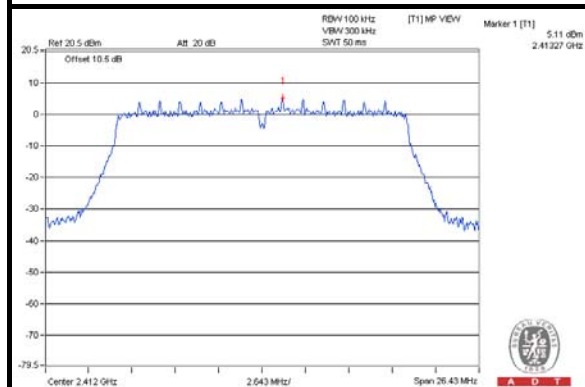


CH 11 Band edge

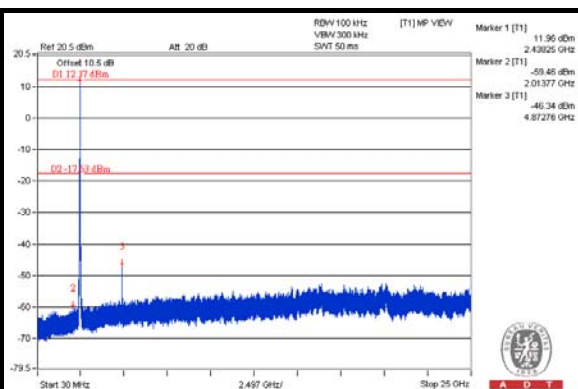
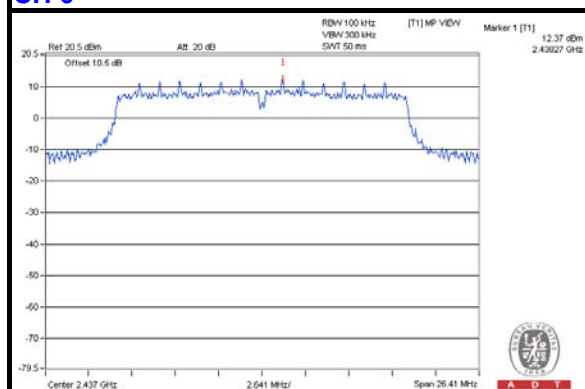


802.11n (20MHz)

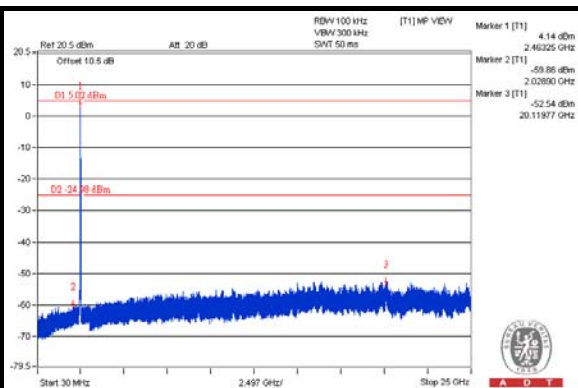
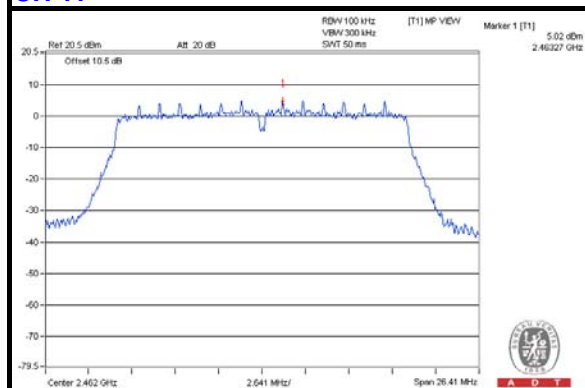
CH 1



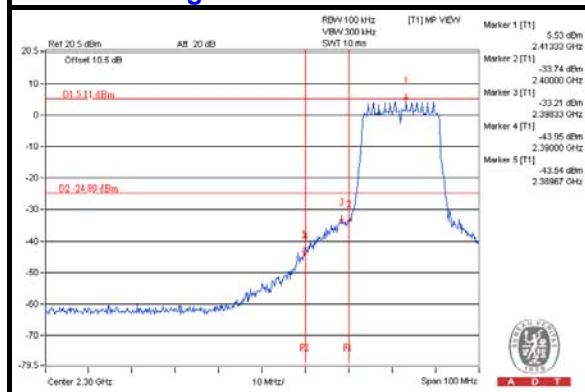
CH 6



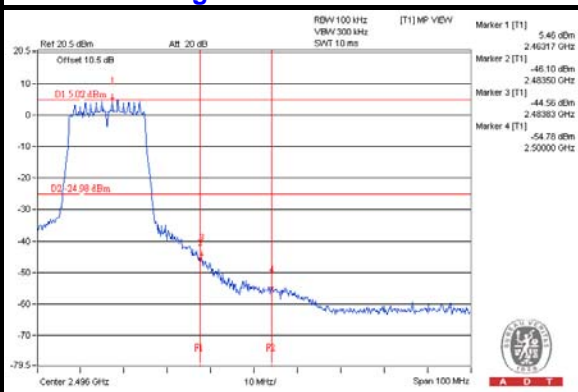
CH 11



CH 1 Band edge



CH 11 Band edge

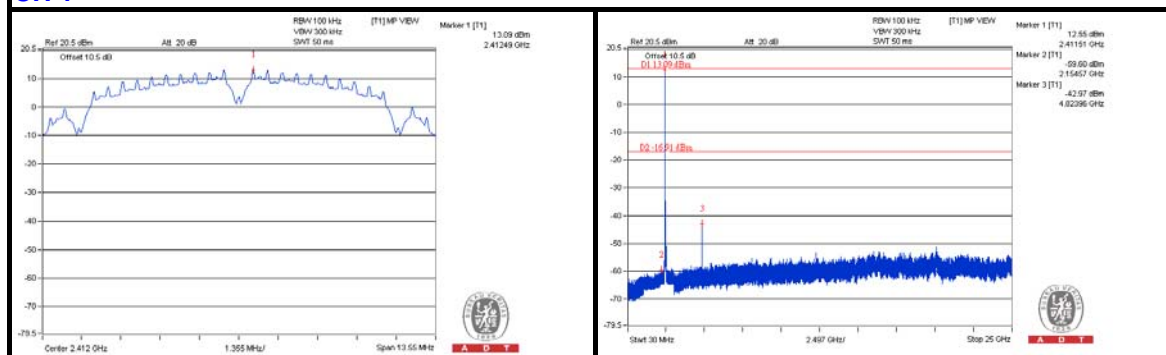




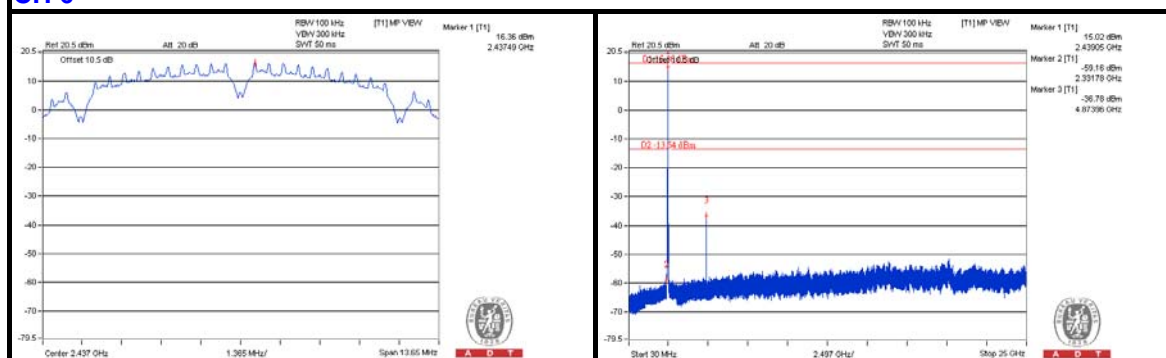
A D T

2TX:
802.11b
CHAIN 0

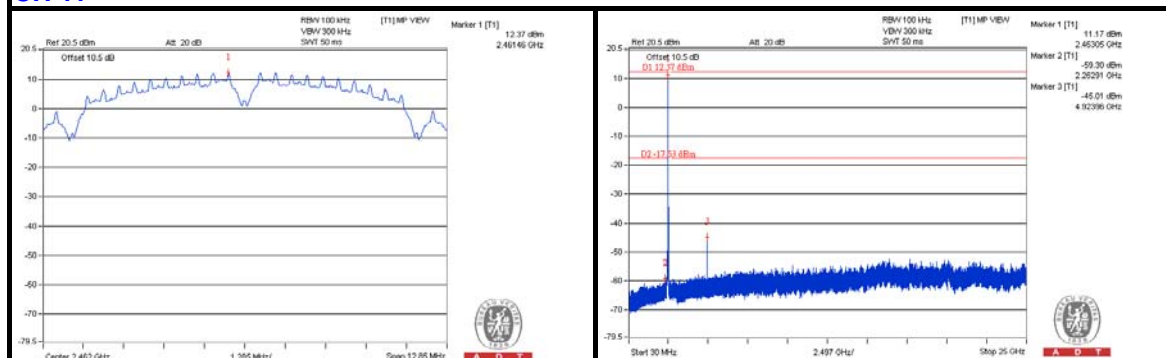
CH 1



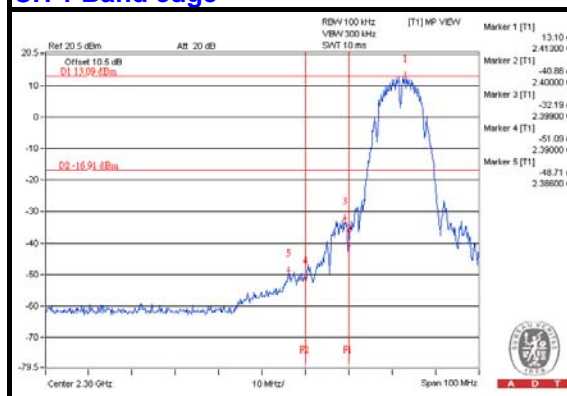
CH 6



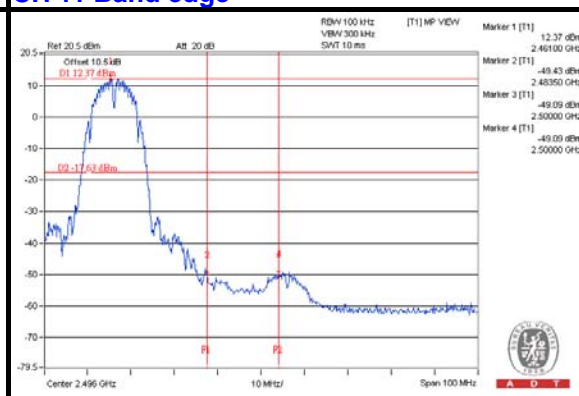
CH 11



CH 1 Band edge



CH 11 Band edge

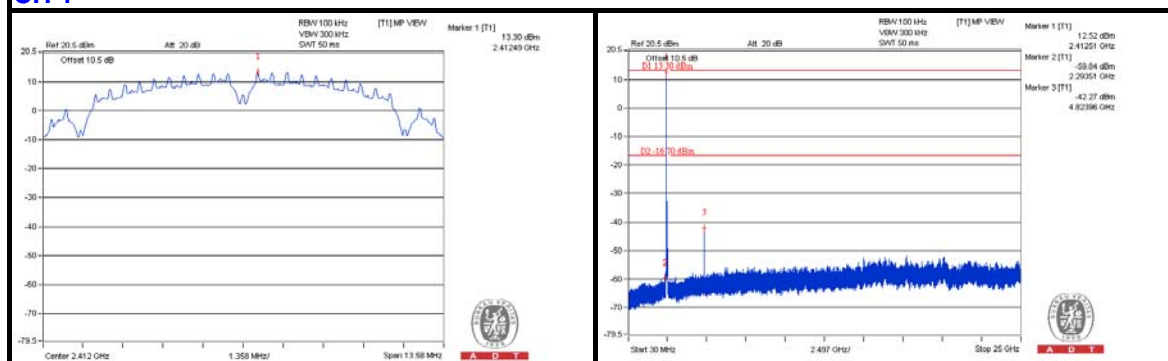




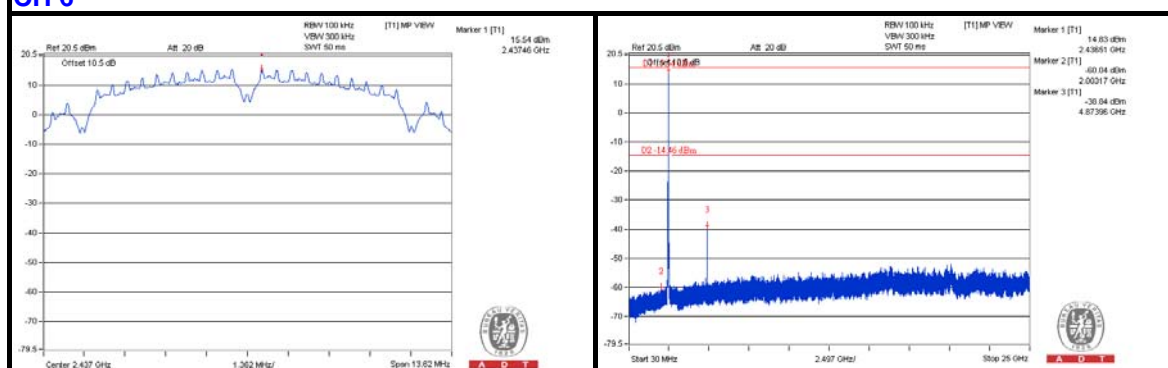
A D T

CHAIN 1

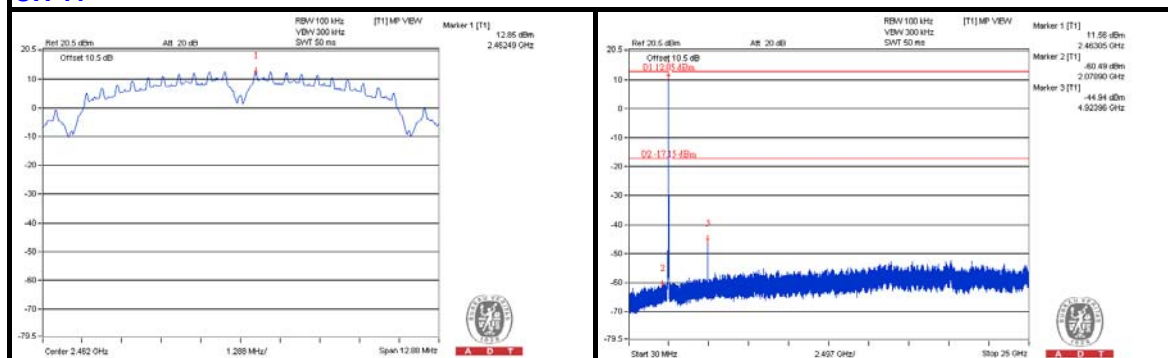
CH 1



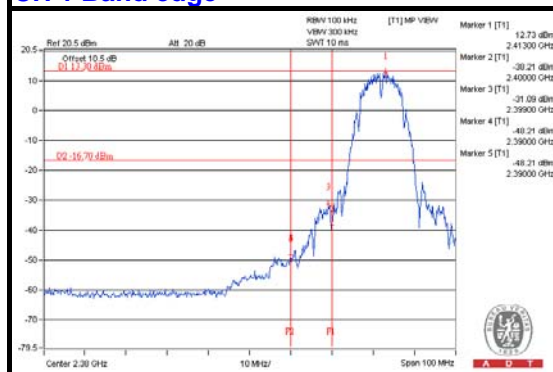
CH 6



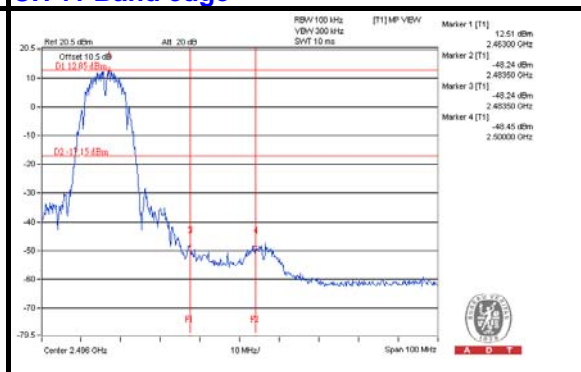
CH 11



CH 1 Band edge



CH 11 Band edge

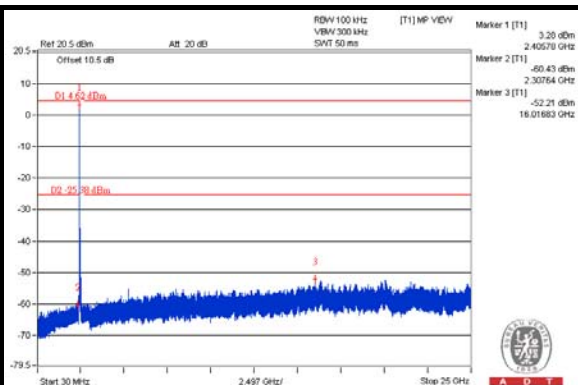
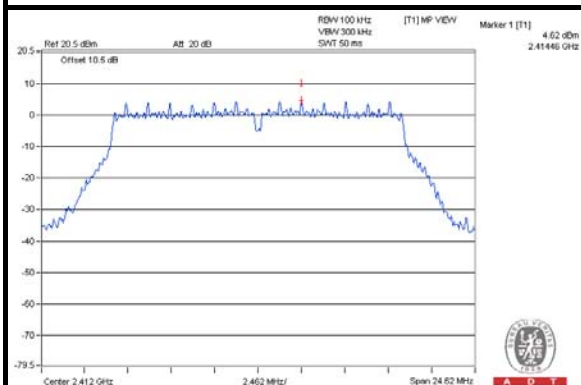




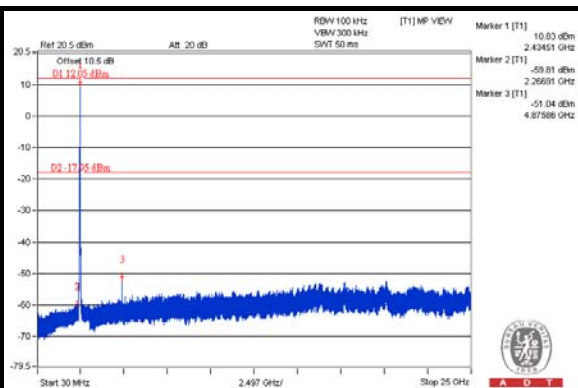
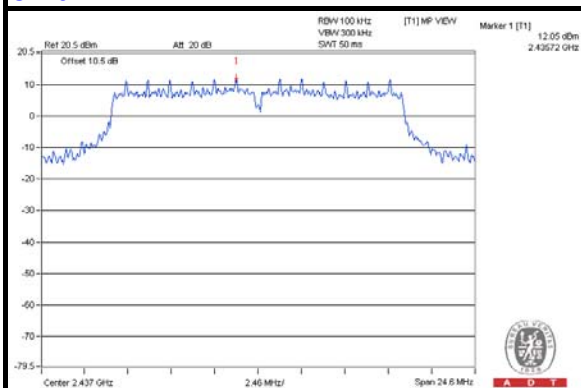
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802.11g
CHAIN 0

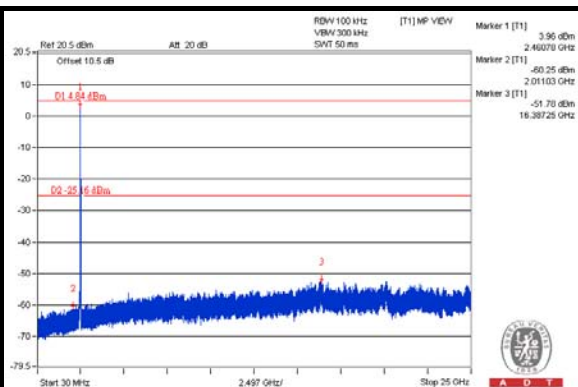
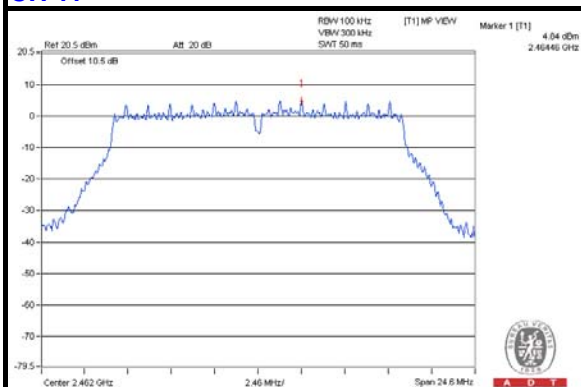
CH 1



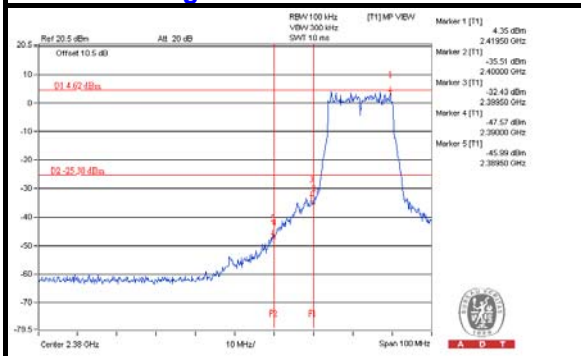
CH 6



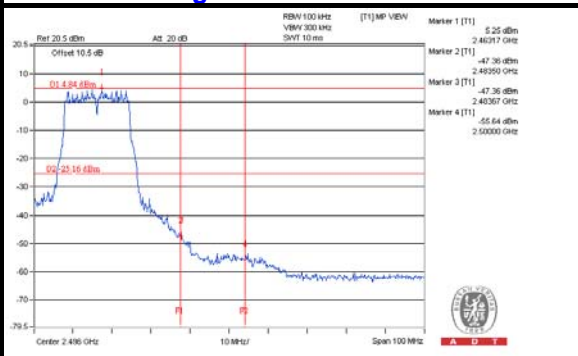
CH 11



CH 1 Band edge

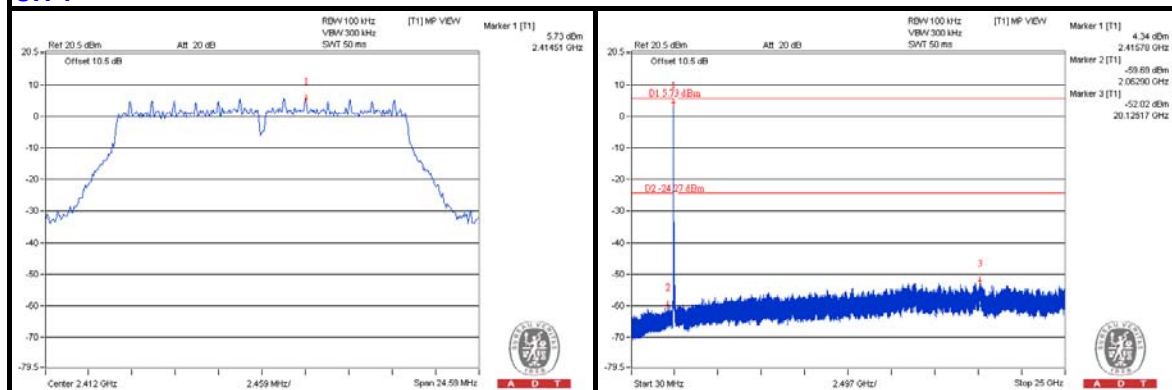


CH 11 Band edge

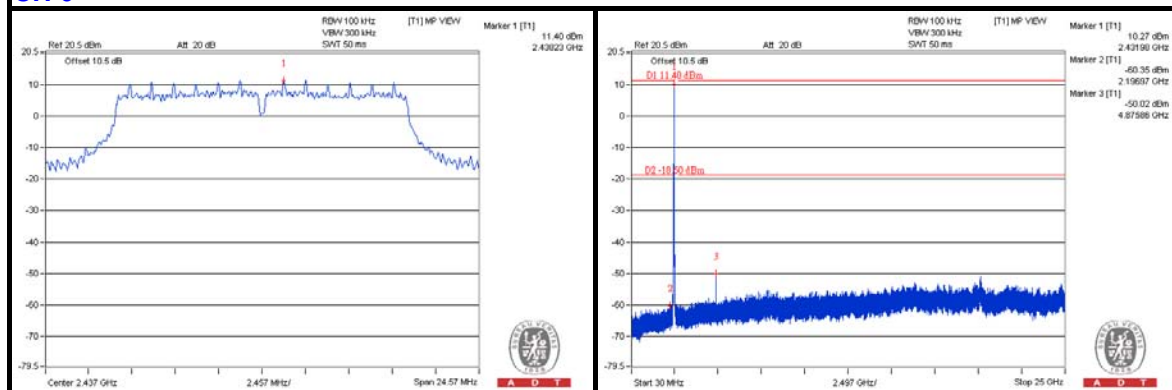


CHAIN 1

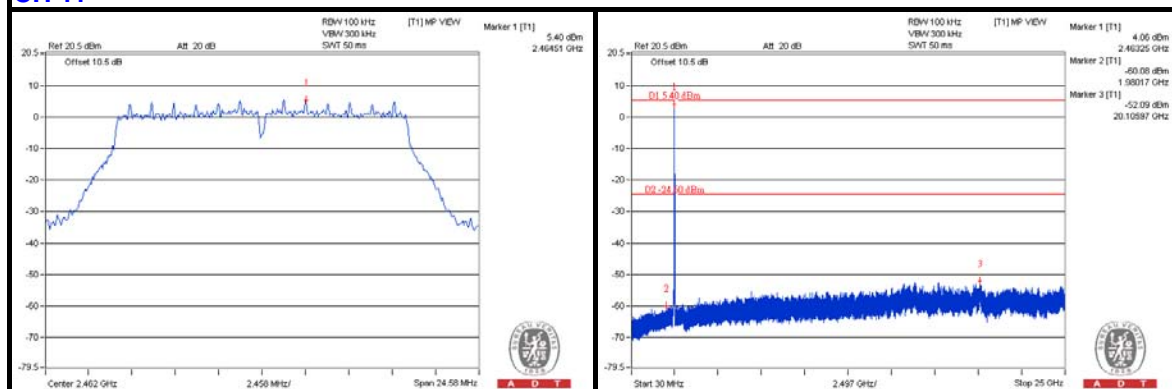
CH 1



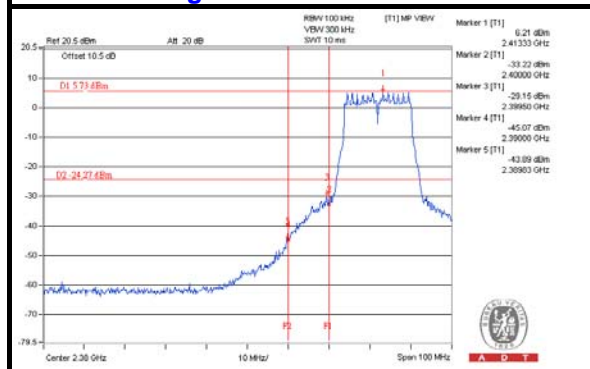
CH 6



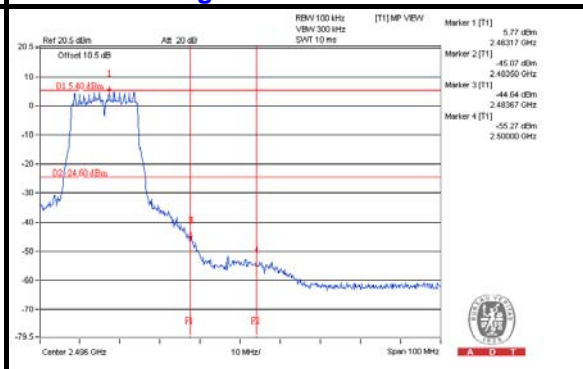
CH 11



CH 1 Band edge



CH 11 Band edge

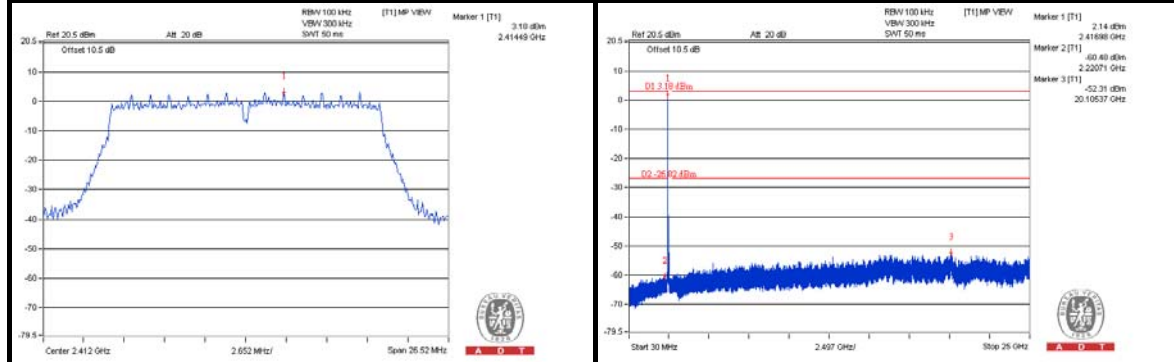




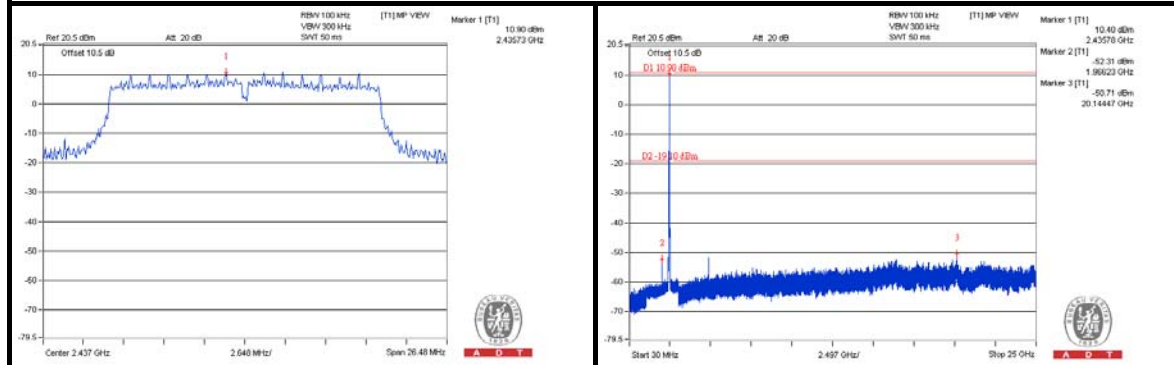
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802.11n (20MHz) CHAIN 0

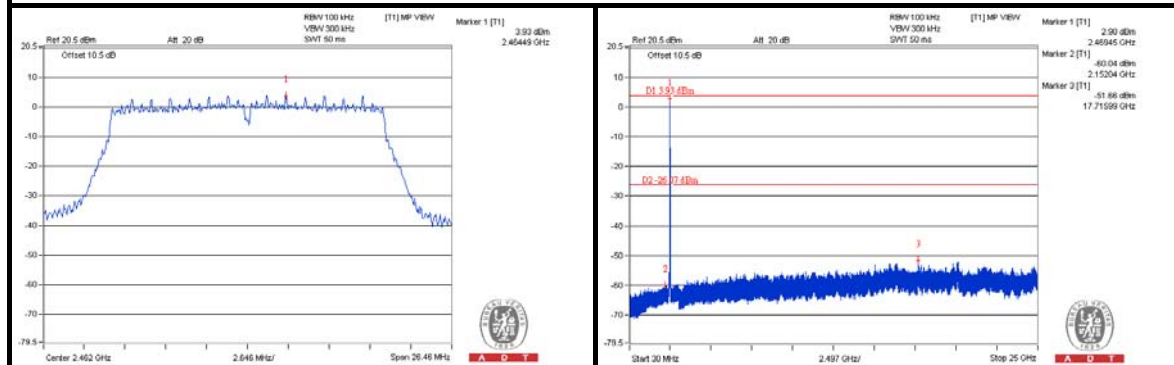
CH 1



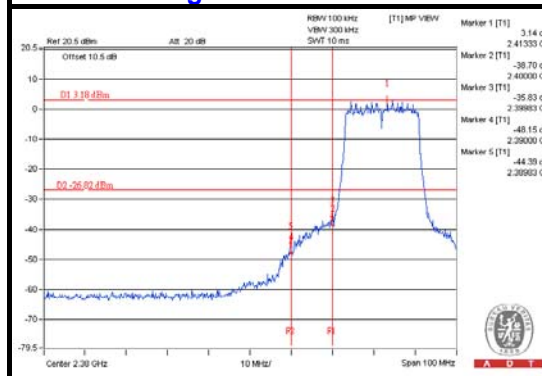
CH 6



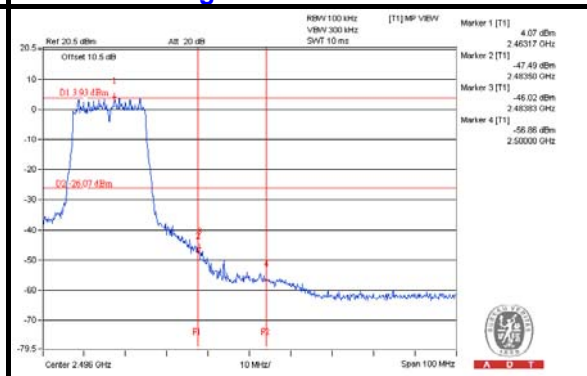
CH 11



CH 1 Band edge

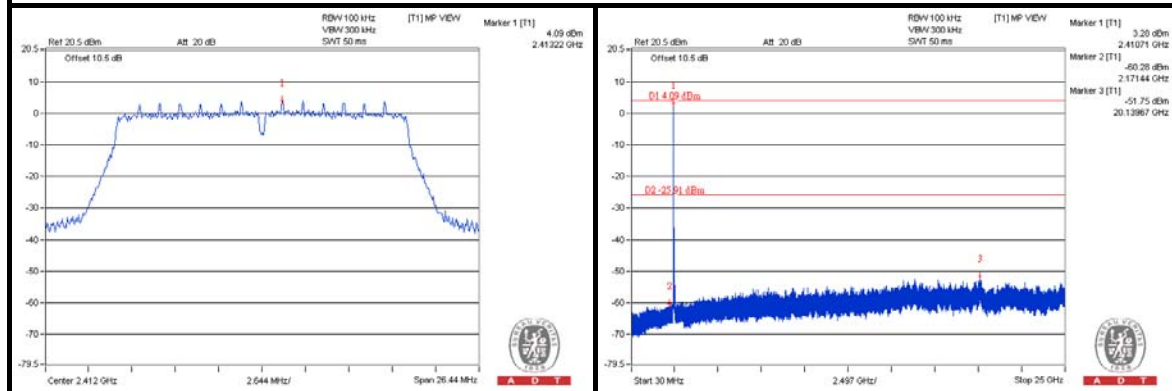


CH 11 Band edge

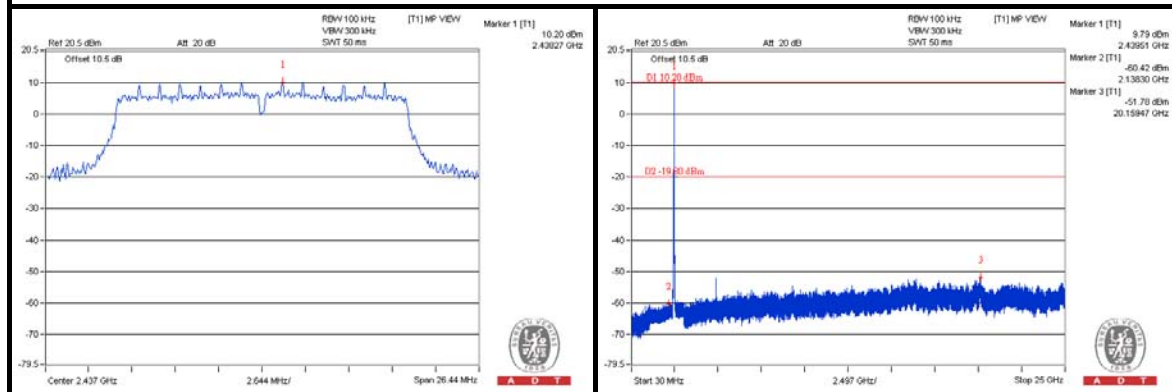


CHAIN 1

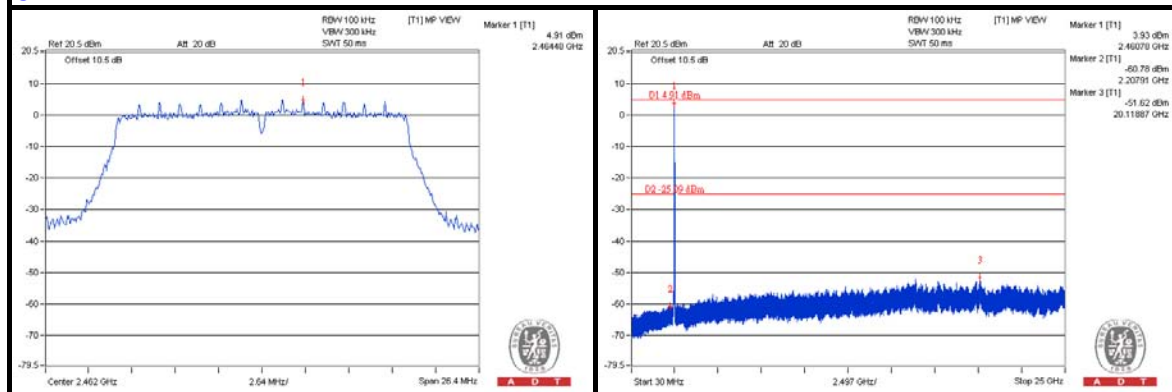
CH 1



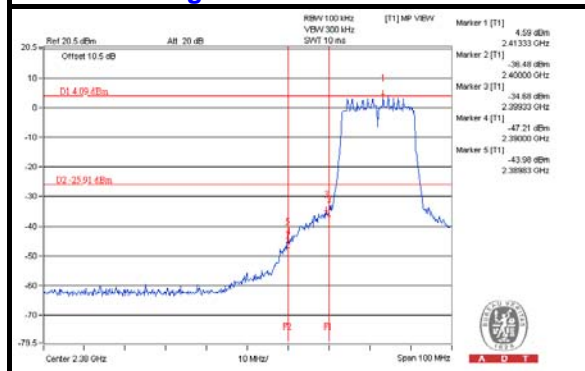
CH 6



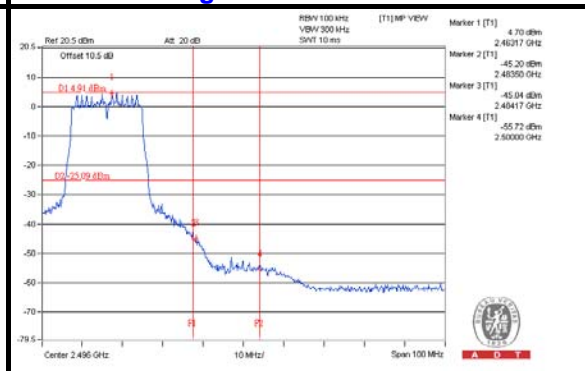
CH 11



CH 1 Band edge



CH 11 Band edge





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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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Web Site: www.bureauveritas-adt.com

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



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

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

---END---