

FCC TEST REPORT (15.247)

REPORT NO.: RF141001C39

MODEL NO.: WNDR4300v2

FCC ID: PY314200276

RECEIVED: Sep. 29, 2014

TESTED: Oct. 07 ~ Nov. 12, 2014

ISSUED: Nov. 13, 2014

APPLICANT: NETGEAR INC.

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USA

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
RF141001C39	Original release	Nov. 13, 2014



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1. CERTIFICATION

PRODUCT: N750 Wireless Dual Band Gigabit Router

MODEL NO.: WNDR4300v2

BRAND: NETGEAR

APPLICANT: NETGEAR INC.

TESTED: Oct. 07 ~ Nov. 12, 2014

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

The above equipment (model: WNDR4300v2) 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 :** Nov. 13, 2014
Pettie Chen / Senior Specialist

APPROVED BY :  , **DATE :** Nov. 13, 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 -22.09dB at 0.43543MHz.
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB 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 I-PEX(MHF) not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 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	N750 Wireless Dual Band Gigabit Router
MODEL NO.	WNDR4300v2
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 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n (2.4GHz): up to 300.0Mbps 802.11n (5GHz): up to 450.0Mbps
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	369.863mW for 2412 ~ 2462MHz 379.423mW for 5745 ~ 5825MHz
ANTENNA TYPE	Refer to Note
ANTENNA CONNECTOR	Refer to Note
DATA CABLE	1.5m non-shielded RJ45 cable without core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

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

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11n (20MHz) for 2.4GHz	2TX
802.11n (40MHz) for 2.4GHz	2TX
802.11a	3TX
802.11n (20MHz) for 5GHz	3TX
802.11n (40MHz) for 5GHz	3TX

2. The EUT consumes power from the following adapter.

Adapter 1	
Brand	NETGEAR
Model	AD817F10 (PIE)
PN	332-10301-02
Input Power	100-240Vac, 50/60Hz, 1.0A
Output Power	12Vdc, 1.5A
Power Line	1.8m cable without core attached on adapter

Adapter 2	
Brand	NETGEAR
Model	SAL018F1 NA (CWT)
PN	332-10375-01
Input Power	100-120Vac, 47-63Hz, 0.6A
Output Power	12Vdc, 1.5A
Power Line	1.8m cable without core attached on adapter

Adapter 3	
Brand	NETGEAR
Model	MU18-D120150-A1 (LEI)
PN	332-10268-01
Input Power	100-240Vac, 50/60Hz, 0.6A
Output Power	12Vdc, 1.5A
Power Line	1.85m cable without core attached on adapter

Adapter 4	
Brand	NETGEAR
Model	AD817F20 (PIE)
PN	332-10307-02
Input Power	100-240Vac, 50/60Hz, 0.56A
Output Power	12Vdc, 1.5A
Power Line	1.85m cable without core attached on adapter

*Adapter 1 was the worst for the final report.

3. The following antennas were provided to the EUT.

Ant. NO.	Brand	Model	Ant. Type	Connector Type	Antenna Gain(dBi) Including cable loss	
					2.4GHz	5.0GHz
1, 2	Master Wave Technology Co., Ltd.	98P2LPIPF000	PCB	i-pex(MHF)	3.37	3.03
3	Master Wave Technology Co., Ltd.	98P2LPIPF001	PCB	i-pex(MHF)	2.64	3.31

*Antenna 1, 2 for 2.4GHz band of EUT used only.

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

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

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

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

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		

FOR 5.0GHz (5745 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 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 **X-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

RADIATED EMISSION TEST (BELOW 1GHz):

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

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



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BANDEDGE MEASUREMENT:

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 65%RH	120Vac, 60Hz	Brad Tung
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Alan Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen

FOR 5.0GHz (5745 ~ 5825MHz):

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 **Z-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	157	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)
-	802.11a	149 to 165	157	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)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 65%RH	120Vac, 60Hz	Brad Tung
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Alan Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen

3.3 DUTY CYCLE OF TEST SIGNAL

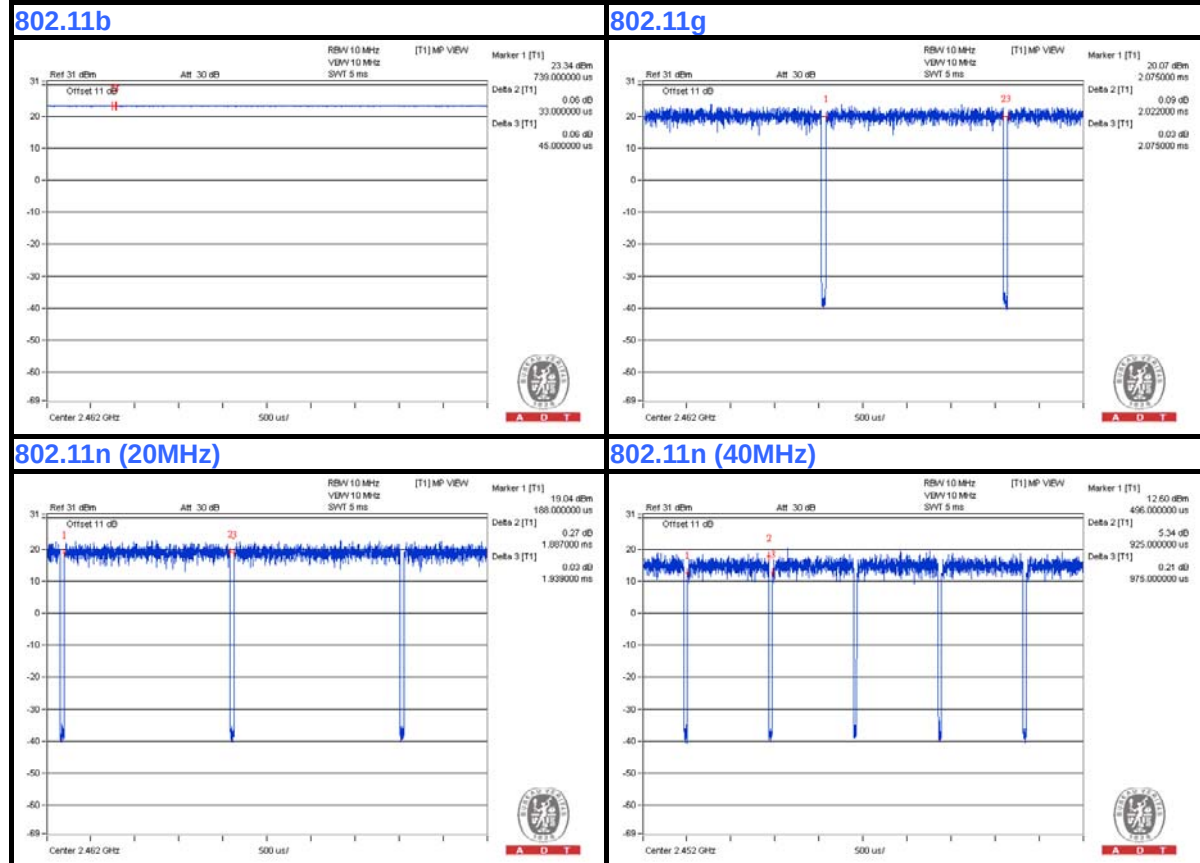
2.4GHz Band:

802.11b: Duty cycle = $0.033/0.045 = 0.733$, Duty factor = $10 * \log(1/0.733) = 1.35$

802.11g: Duty cycle = $2.022/2.075 = 0.974$, Duty factor = $10 * \log(1/0.974) = 0.11$

802.11n (20MHz): Duty cycle = $1.887/1.939 = 0.973$, Duty factor = $10 * \log(1/0.973) = 0.12$

802.11n (40MHz): Duty cycle = $0.925/0.975 = 0.949$, Duty factor = $10 * \log(1/0.949) = 0.23$

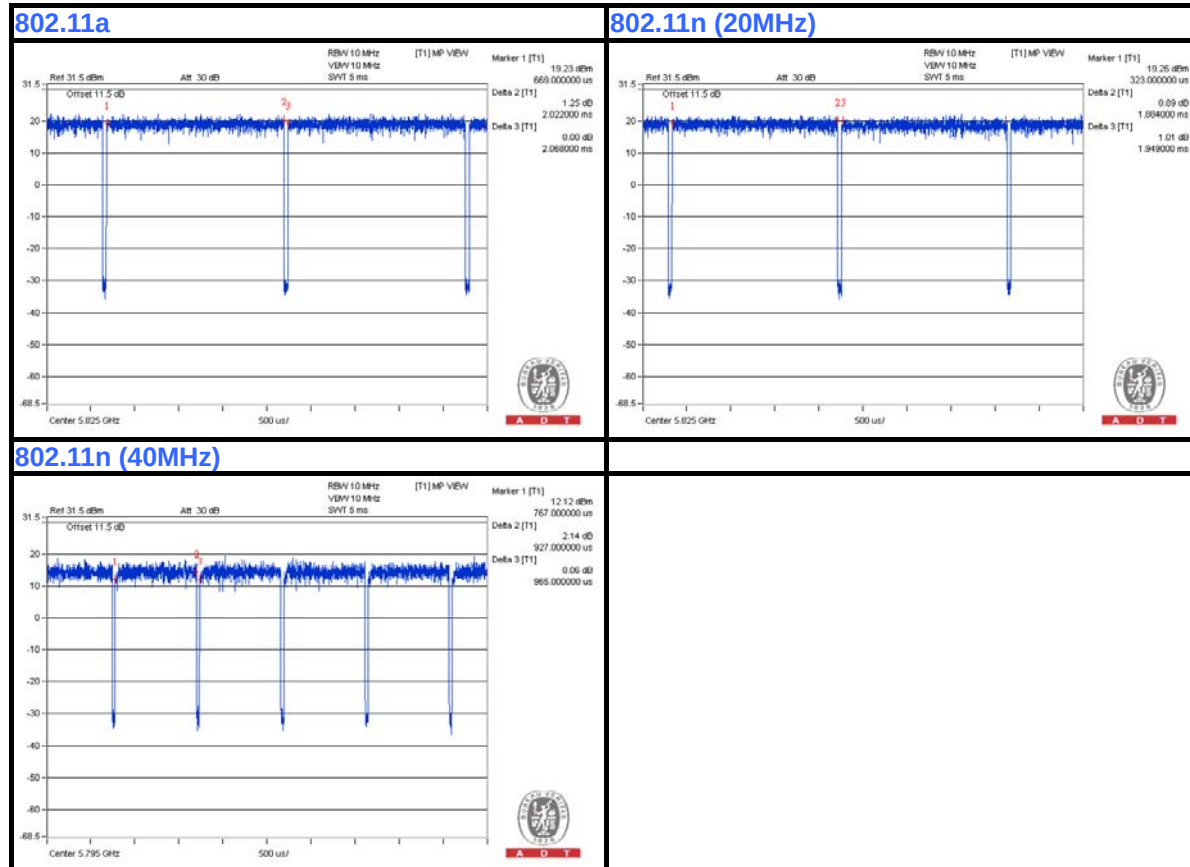


5.0GHz Band:

802.11a: Duty cycle = $2.022/2.068 = 0.978$, Duty factor = $10 * \log(1/0.978) = 0.10$

802.11n (20MHz): Duty cycle = $1.884/1.949 = 0.967$, Duty factor = $10 * \log(1/0.967) = 0.15$

802.11n (40MHz): Duty cycle = $0.927/0.965 = 0.961$, Duty factor = $10 * \log(1/0.961) = 0.17$



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3.4 DESCRIPTION OF SUPPORT UNITS

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

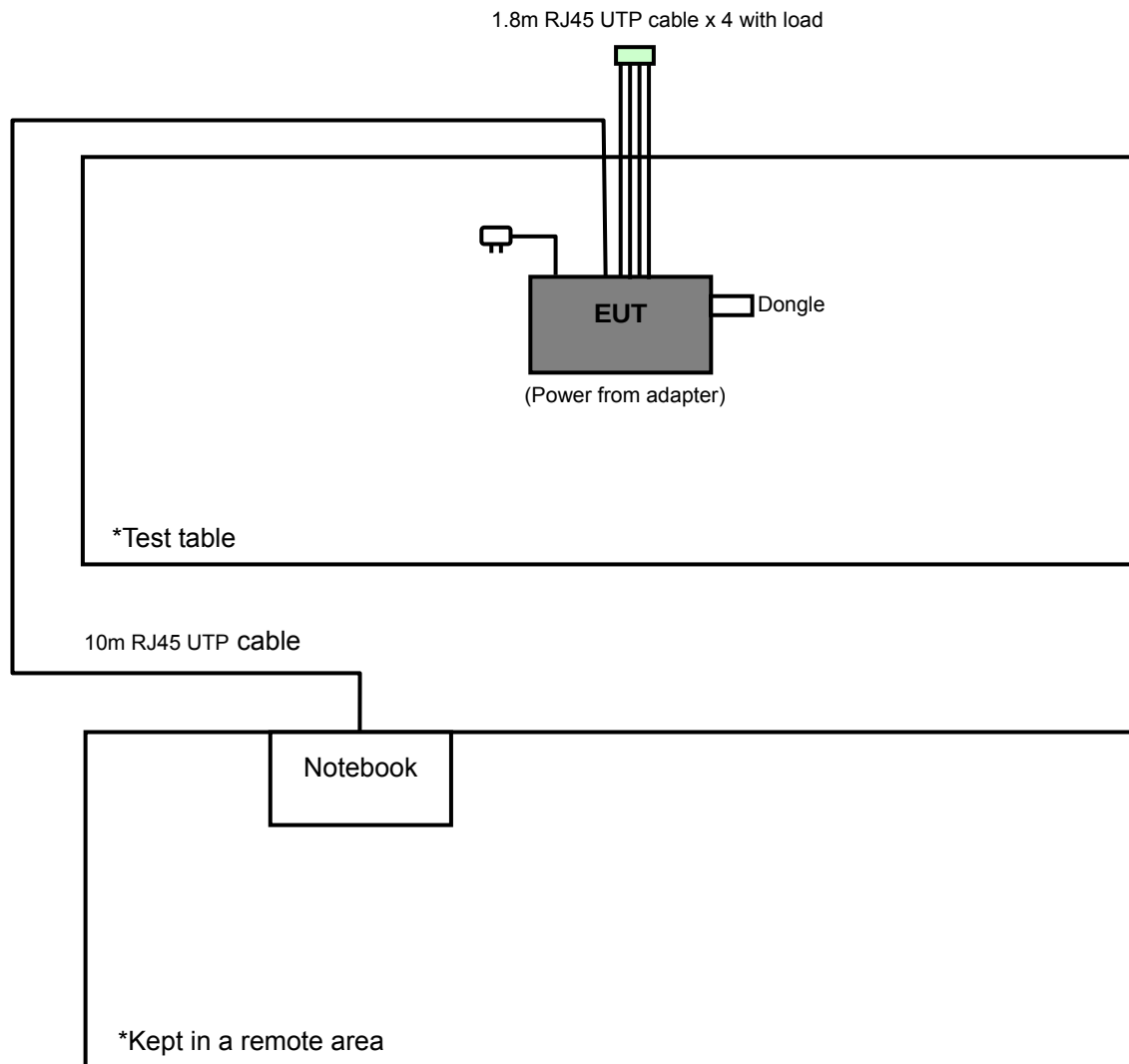
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5420	BPQ8MQ1	FCC DoC Approved
2	Dongle	SANDISK	SDCZ6-1024	NA	NA

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





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3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance 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 (FOR 2.4GHz BAND)

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 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	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	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	8449B	3008A01961	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
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	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
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 4.
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 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

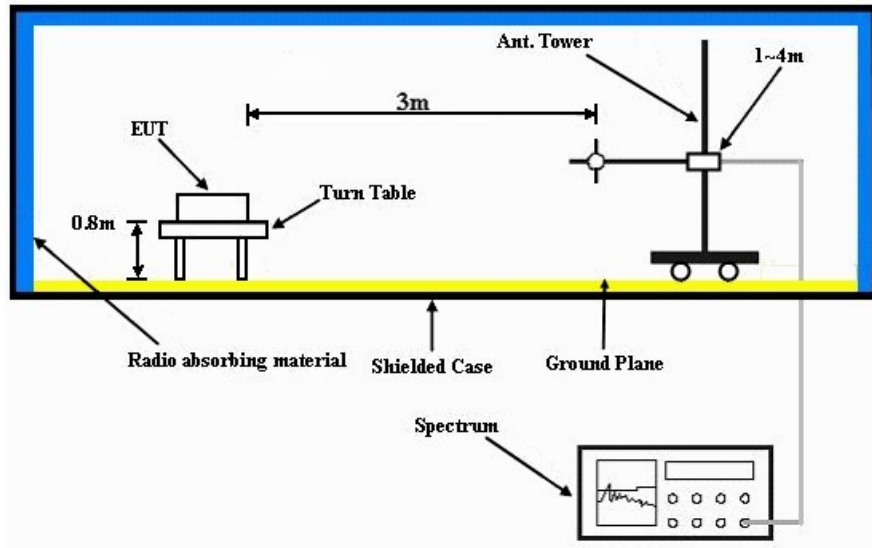
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

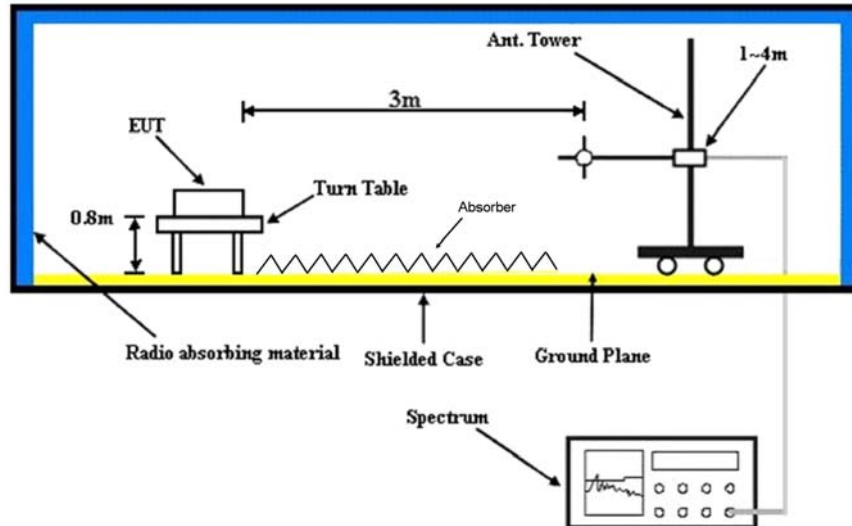
No deviation.

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 ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".
- e. The necessary accessories enabled the system in full functions.

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	2390.00	62.5 PK	74.0	-11.5	1.32 H	159	30.30	32.20
2	2390.00	53.8 AV	54.0	-0.2	1.32 H	159	21.60	32.20
3	*2412.00	115.5 PK			1.32 H	159	83.30	32.20
4	*2412.00	111.8 AV			1.32 H	159	79.60	32.20
5	4824.00	47.2 PK	74.0	-26.8	1.00 H	253	41.90	5.30
6	4824.00	34.1 AV	54.0	-19.9	1.00 H	253	28.80	5.30
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	2390.00	58.3 PK	74.0	-15.7	1.00 V	249	26.10	32.20
2	2390.00	46.7 AV	54.0	-7.3	1.00 V	249	14.50	32.20
3	*2412.00	110.9 PK			1.00 V	249	78.70	32.20
4	*2412.00	107.4 AV			1.00 V	249	75.20	32.20
5	4824.00	51.5 PK	74.0	-22.5	1.00 V	217	46.20	5.30
6	4824.00	41.5 AV	54.0	-12.5	1.00 V	217	36.20	5.30

REMARKS:

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



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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	*2437.00	115.9 PK			1.27 H	134	83.70	32.20
2	*2437.00	112.2 AV			1.27 H	134	80.00	32.20
3	2489.50	60.3 PK	74.0	-13.7	1.27 H	134	27.90	32.40
4	2489.50	50.9 AV	54.0	-3.1	1.27 H	134	18.50	32.40
5	4874.00	51.1 PK	74.0	-22.9	1.44 H	263	45.80	5.30
6	4874.00	40.8 AV	54.0	-13.2	1.44 H	263	35.50	5.30
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	*2437.00	113.6 PK			1.00 V	273	81.40	32.20
2	*2437.00	109.7 AV			1.00 V	273	77.50	32.20
3	4874.00	52.9 PK	74.0	-21.1	1.00 V	217	47.60	5.30
4	4874.00	46.2 AV	54.0	-7.8	1.00 V	217	40.90	5.30
5	7311.00	58.5 PK	74.0	-15.5	1.76 V	331	46.60	11.90
6	7311.00	49.4 AV	54.0	-4.6	1.76 V	331	37.50	11.90

REMARKS:

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



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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	113.4 PK			1.29 H	153	81.10	32.30
2	*2462.00	109.8 AV			1.29 H	153	77.50	32.30
3	2483.50	62.2 PK	74.0	-11.8	1.29 H	153	29.80	32.40
4	2483.50	53.6 AV	54.0	-0.4	1.29 H	153	21.20	32.40
5	4924.00	49.4 PK	74.0	-24.6	1.00 H	251	43.90	5.50
6	4924.00	36.1 AV	54.0	-17.9	1.00 H	251	30.60	5.50
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	*2462.00	113.9 PK			1.00 V	274	81.60	32.30
2	*2462.00	109.9 AV			1.00 V	274	77.60	32.30
3	2483.50	62.3 PK	74.0	-11.7	1.00 V	274	29.90	32.40
4	2483.50	53.3 AV	54.0	-0.7	1.00 V	274	20.90	32.40
5	4924.00	50.4 PK	74.0	-23.6	1.10 V	227	44.90	5.50
6	4924.00	41.4 AV	54.0	-12.6	1.10 V	227	35.90	5.50

REMARKS:

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



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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	68.5 PK	74.0	-5.5	1.05 H	120	36.30	32.20
2	2390.00	51.4 AV	54.0	-2.6	1.05 H	120	19.20	32.20
3	*2412.00	108.0 PK			1.05 H	120	75.80	32.20
4	*2412.00	97.8 AV			1.05 H	120	65.60	32.20
5	4824.00	47.1 PK	74.0	-26.9	1.00 H	115	41.80	5.30
6	4824.00	34.5 AV	54.0	-19.5	1.00 H	115	29.20	5.30
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	2390.00	70.0 PK	74.0	-4.0	1.00 V	125	37.80	32.20
2	2390.00	53.4 AV	54.0	-0.6	1.00 V	125	21.20	32.20
3	*2412.00	112.8 PK			1.00 V	125	80.60	32.20
4	*2412.00	101.4 AV			1.00 V	125	69.20	32.20
5	4824.00	47.2 PK	74.0	-26.8	1.00 V	246	41.90	5.30
6	4824.00	34.9 AV	54.0	-19.1	1.00 V	246	29.60	5.30

REMARKS:

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



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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	67.4 PK	74.0	-6.6	1.95 H	140	35.20	32.20
2	2390.00	51.3 AV	54.0	-2.7	1.95 H	140	19.10	32.20
3	*2437.00	114.0 PK			1.95 H	140	81.80	32.20
4	*2437.00	101.9 AV			1.95 H	140	69.70	32.20
5	7311.00	58.9 PK	74.0	-15.1	1.00 H	100	47.00	11.90
6	7311.00	45.7 AV	54.0	-8.3	1.00 H	100	33.80	11.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.0 PK	74.0	-4.0	1.00 V	160	37.80	32.20
2	2390.00	53.8 AV	54.0	-0.2	1.00 V	160	21.60	32.20
3	*2437.00	116.8 PK			1.00 V	160	84.60	32.20
4	*2437.00	105.1 AV			1.00 V	160	72.90	32.20
5	4874.00	48.1 PK	74.0	-25.9	1.00 V	288	42.80	5.30
6	4874.00	35.6 AV	54.0	-18.4	1.00 V	288	30.30	5.30

REMARKS:

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



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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	108.9 PK			1.04 H	123	76.60	32.30
2	*2462.00	97.8 AV			1.04 H	123	65.50	32.30
3	2483.50	65.7 PK	74.0	-8.3	1.04 H	123	33.30	32.40
4	2483.50	50.4 AV	54.0	-3.6	1.04 H	123	18.00	32.40
5	4924.00	47.4 PK	74.0	-26.6	1.00 H	103	41.90	5.50
6	4924.00	35.0 AV	54.0	-19.0	1.00 H	103	29.50	5.50
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	*2462.00	112.3 PK			1.00 V	162	80.00	32.30
2	*2462.00	101.3 AV			1.00 V	162	69.00	32.30
3	2483.50	71.4 PK	74.0	-2.6	1.00 V	162	39.00	32.40
4	2483.50	53.3 AV	54.0	-0.7	1.00 V	162	20.90	32.40
5	4924.00	47.6 PK	74.0	-26.4	1.00 V	193	42.10	5.50
6	4924.00	35.2 AV	54.0	-18.8	1.00 V	193	29.70	5.50

REMARKS:

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



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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	65.0 PK	74.0	-9.0	1.00 H	244	32.80	32.20
2	2390.00	48.0 AV	54.0	-6.0	1.00 H	244	15.80	32.20
3	*2412.00	106.1 PK			1.00 H	244	73.90	32.20
4	*2412.00	96.2 AV			1.00 H	244	64.00	32.20
5	4824.00	47.8 PK	74.0	-26.2	1.00 H	110	42.50	5.30
6	4824.00	34.7 AV	54.0	-19.3	1.00 H	110	29.40	5.30
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	2390.00	70.9 PK	74.0	-3.1	1.00 V	149	38.70	32.20
2	2390.00	53.5 AV	54.0	-0.5	1.00 V	149	21.30	32.20
3	*2412.00	113.4 PK			1.00 V	149	81.20	32.20
4	*2412.00	102.2 AV			1.00 V	149	70.00	32.20
5	4824.00	47.9 PK	74.0	-26.1	1.00 V	248	42.60	5.30
6	4824.00	35.3 AV	54.0	-18.7	1.00 V	248	30.00	5.30

REMARKS:

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



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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	62.1 PK	74.0	-11.9	1.00 H	244	29.90	32.20
2	2390.00	48.2 AV	54.0	-5.8	1.00 H	244	16.00	32.20
3	*2437.00	112.0 PK			1.00 H	244	79.80	32.20
4	*2437.00	101.0 AV			1.00 H	244	68.80	32.20
5	2483.50	63.2 PK	74.0	-10.8	1.00 H	244	30.80	32.40
6	2483.50	48.0 AV	54.0	-6.0	1.00 H	244	15.60	32.40
7	4874.00	48.5 PK	74.0	-25.5	1.00 H	106	43.20	5.30
8	4874.00	35.4 AV	54.0	-18.6	1.00 H	106	30.10	5.30
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	2390.00	68.6 PK	74.0	-5.4	1.00 V	152	36.40	32.20
2	2390.00	53.2 AV	54.0	-0.8	1.00 V	152	21.00	32.20
3	*2437.00	116.7 PK			1.00 V	152	84.50	32.20
4	*2437.00	105.2 AV			1.00 V	152	73.00	32.20
5	2483.50	68.8 PK	74.0	-5.2	1.00 V	152	36.40	32.40
6	2483.50	53.9 AV	54.0	-0.1	1.00 V	152	21.50	32.40
7	4874.00	48.9 PK	74.0	-25.1	1.00 V	281	43.60	5.30
8	4874.00	35.9 AV	54.0	-18.1	1.00 V	281	30.60	5.30

REMARKS:

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



A D T

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	107.7 PK			1.00 H	242	75.40	32.30
2	*2462.00	97.0 AV			1.00 H	242	64.70	32.30
3	2483.50	66.2 PK	74.0	-7.8	1.00 H	242	33.80	32.40
4	2483.50	47.6 AV	54.0	-6.4	1.00 H	242	15.20	32.40
5	4924.00	48.0 PK	74.0	-26.0	1.00 H	102	42.50	5.50
6	4924.00	35.4 AV	54.0	-18.6	1.00 H	102	29.90	5.50
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	*2462.00	113.1 PK			1.00 V	148	80.80	32.30
2	*2462.00	102.2 AV			1.00 V	148	69.90	32.30
3	2483.50	73.0 PK	74.0	-1.0	1.00 V	148	40.60	32.40
4	2483.50	53.9 AV	54.0	-0.1	1.00 V	148	21.50	32.40
5	4924.00	48.3 PK	74.0	-25.7	1.00 V	202	42.80	5.50
6	4924.00	35.6 AV	54.0	-18.4	1.00 V	202	30.10	5.50

REMARKS:

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



A D T

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	2390.00	61.6 PK	74.0	-12.4	1.03 H	240	29.40	32.20
2	2390.00	45.6 AV	54.0	-8.4	1.03 H	240	13.40	32.20
3	*2422.00	103.6 PK			1.03 H	240	71.30	32.30
4	*2422.00	93.9 AV			1.03 H	240	61.60	32.30
5	4844.00	46.5 PK	74.0	-27.5	1.00 H	111	41.10	5.40
6	4844.00	34.1 AV	54.0	-19.9	1.00 H	111	28.70	5.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.8 PK	74.0	-5.2	1.00 V	149	36.60	32.20
2	2390.00	53.4 AV	54.0	-0.6	1.00 V	149	21.20	32.20
3	*2422.00	110.1 PK			1.00 V	149	77.80	32.30
4	*2422.00	99.4 AV			1.00 V	149	67.10	32.30
5	4844.00	46.9 PK	74.0	-27.1	1.00 V	244	41.50	5.40
6	4844.00	34.8 AV	54.0	-19.2	1.00 V	244	29.40	5.40

REMARKS:

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



A D T

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	59.5 PK	74.0	-14.5	1.00 H	245	27.30	32.20
2	2390.00	45.6 AV	54.0	-8.4	1.00 H	245	13.40	32.20
3	*2437.00	105.4 PK			1.00 H	245	73.20	32.20
4	*2437.00	96.2 AV			1.00 H	245	64.00	32.20
5	2483.50	60.2 PK	74.0	-13.8	1.00 H	245	27.80	32.40
6	2483.50	46.7 AV	54.0	-7.3	1.00 H	245	14.30	32.40
7	4874.00	47.3 PK	74.0	-26.7	1.00 H	102	42.00	5.30
8	4874.00	35.1 AV	54.0	-18.9	1.00 H	102	29.80	5.30
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	2390.00	66.7 PK	74.0	-7.3	1.00 V	149	34.50	32.20
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	149	21.40	32.20
3	*2437.00	112.2 PK			1.00 V	149	80.00	32.20
4	*2437.00	102.4 AV			1.00 V	149	70.20	32.20
5	2483.50	63.0 PK	74.0	-11.0	1.00 V	149	30.60	32.40
6	2483.50	49.4 AV	54.0	-4.6	1.00 V	149	17.00	32.40
7	4874.00	47.9 PK	74.0	-26.1	1.00 V	287	42.60	5.30
8	4874.00	35.4 AV	54.0	-18.6	1.00 V	287	30.10	5.30

REMARKS:

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



A D T

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	*2452.00	102.7 PK			1.00 H	242	70.40	32.30
2	*2452.00	93.6 AV			1.00 H	242	61.30	32.30
3	2483.50	64.4 PK	74.0	-9.6	1.00 H	242	32.00	32.40
4	2483.50	48.4 AV	54.0	-5.6	1.00 H	242	16.00	32.40
5	4904.00	46.8 PK	74.0	-27.2	1.00 H	107	41.40	5.40
6	4904.00	34.5 AV	54.0	-19.5	1.00 H	107	29.10	5.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	109.2 PK			1.00 V	182	76.90	32.30
2	*2452.00	98.9 AV			1.00 V	182	66.60	32.30
3	2483.50	69.1 PK	74.0	-4.9	1.00 V	182	36.70	32.40
4	2483.50	53.2 AV	54.0	-0.8	1.00 V	182	20.80	32.40
5	4904.00	47.3 PK	74.0	-26.7	1.00 V	208	41.90	5.40
6	4904.00	34.7 AV	54.0	-19.3	1.00 V	208	29.30	5.40

REMARKS:

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



A D T

BELOW 1GHz WORST-CASE DATA

802.11g

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	138.56	28.3 QP	43.5	-15.2	2.00 H	286	42.60	-14.30
2	173.49	28.3 QP	43.5	-15.2	1.50 H	116	42.60	-14.30
3	324.84	26.9 QP	46.0	-19.1	1.24 H	138	38.70	-11.80
4	687.70	29.5 QP	46.0	-16.5	1.00 H	303	34.90	-5.40
5	751.73	30.0 QP	46.0	-16.0	1.00 H	57	33.60	-3.60
6	873.97	30.2 QP	46.0	-15.8	2.00 H	13	32.20	-2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.60	30.5 QP	40.0	-9.5	1.00 V	179	45.10	-14.60
2	171.55	31.7 QP	43.5	-11.8	1.00 V	121	45.90	-14.20
3	375.29	29.0 QP	46.0	-17.0	1.50 V	118	40.10	-11.10
4	499.48	31.8 QP	46.0	-14.2	1.00 V	155	40.70	-8.90
5	625.60	33.8 QP	46.0	-12.2	1.00 V	132	40.00	-6.20
6	875.91	30.6 QP	46.0	-15.4	1.00 V	121	32.60	-2.00

REMARKS:

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

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

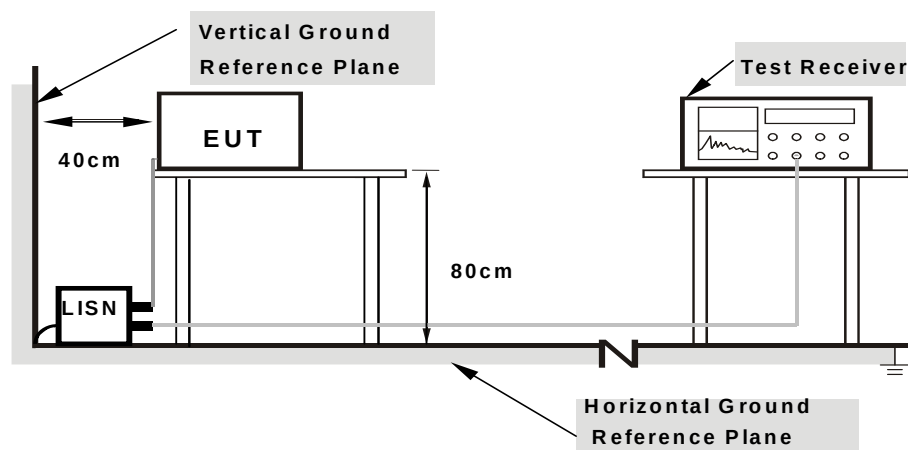
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

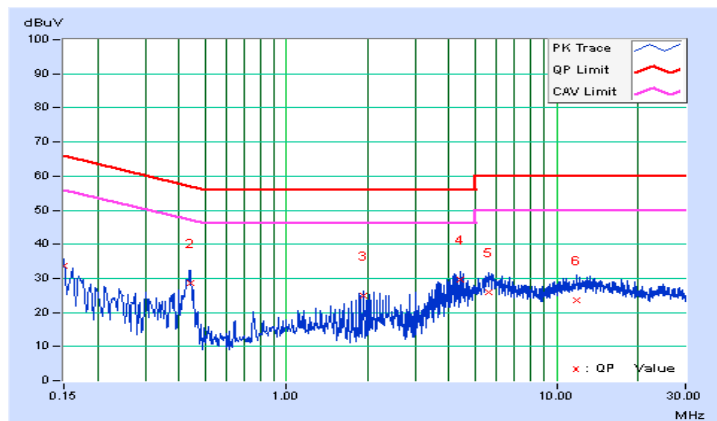
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11g

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	0.15000	0.08	33.61	23.74	33.69	23.82	66.00	56.00	-32.31	-32.18
2	0.44325	0.08	28.39	20.27	28.47	20.35	57.00	47.00	-28.53	-26.65
3	1.92514	0.15	24.91	20.32	25.06	20.47	56.00	46.00	-30.94	-25.53
4	4.43145	0.25	29.54	22.63	29.79	22.88	56.00	46.00	-26.21	-23.12
5	5.61618	0.31	25.75	18.78	26.06	19.09	60.00	50.00	-33.94	-30.91
6	11.86827	0.61	23.07	14.91	23.68	15.52	60.00	50.00	-36.32	-34.48

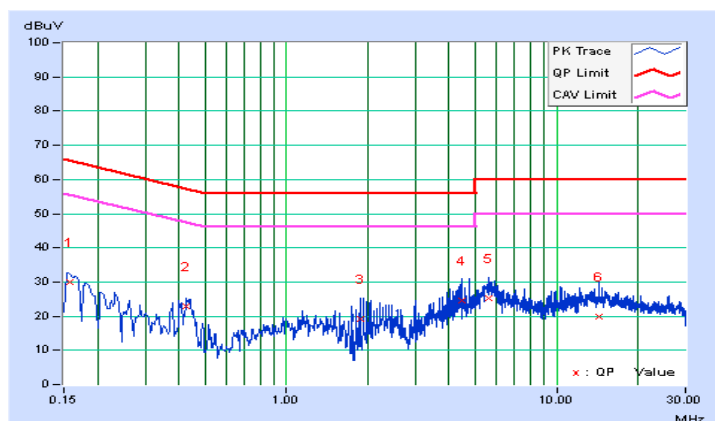
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor +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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq.	Corr. Factor	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	0.15782	0.05	30.00	18.68	30.05	18.73	65.58	55.58	-35.53	-36.85
2	0.42782	0.07	22.68	18.21	22.75	18.28	57.29	47.29	-34.54	-29.01
3	1.87040	0.13	19.08	12.97	19.21	13.10	56.00	46.00	-36.79	-32.90
4	4.43927	0.23	24.51	15.89	24.74	16.12	56.00	46.00	-31.26	-29.88
5	5.62400	0.27	25.01	16.49	25.28	16.76	60.00	50.00	-34.72	-33.24
6	14.37458	0.65	19.30	11.78	19.95	12.43	60.00	50.00	-40.05	-37.57

- 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.

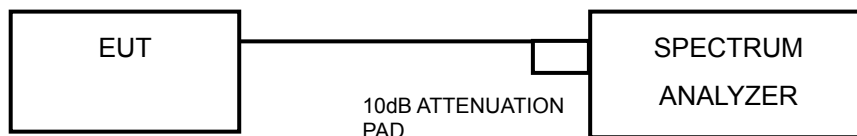


4.3 6dB BANDWIDTH MEASUREMENT

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

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	7.11	7.10	0.5	PASS
6	2437	9.05	9.09	0.5	PASS
11	2462	7.11	7.10	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.13	15.14	0.5	PASS
6	2437	16.34	15.14	0.5	PASS
11	2462	15.14	15.11	0.5	PASS

802.11n (20MHz)

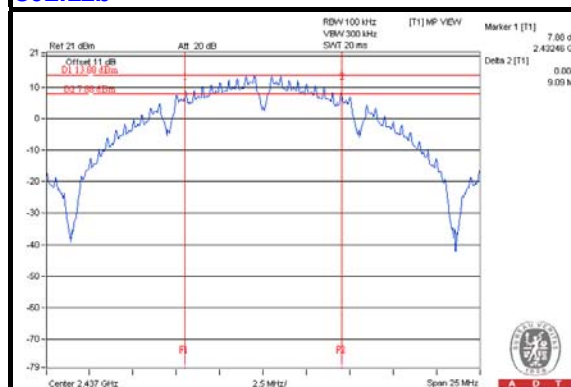
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.14	15.12	0.5	PASS
6	2437	15.16	15.12	0.5	PASS
11	2462	15.13	15.12	0.5	PASS

802.11n (40MHz)

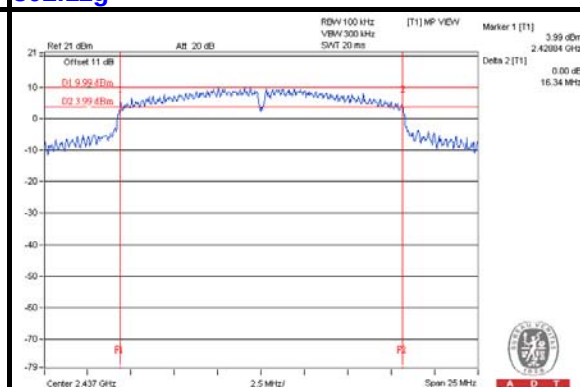
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	33.85	31.36	0.5	PASS
6	2437	31.38	31.30	0.5	PASS
9	2452	32.58	31.35	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

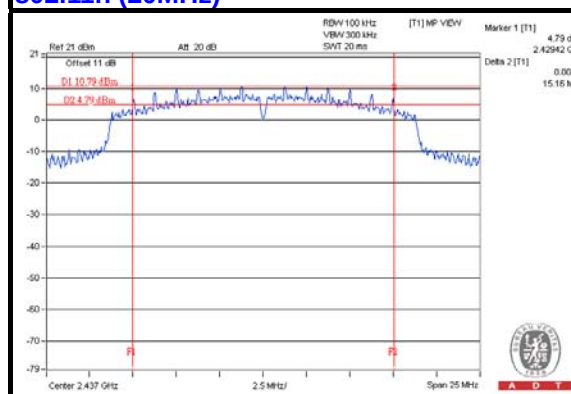
802.11b



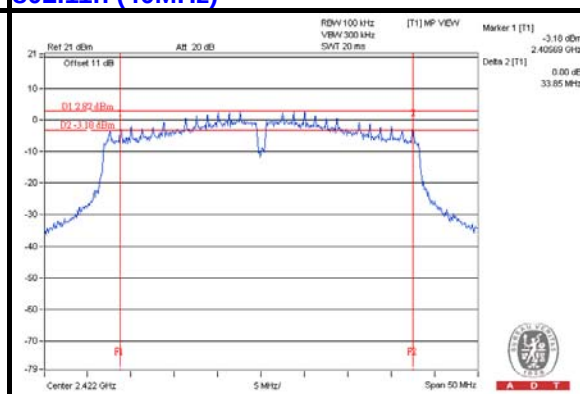
802.11g



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,

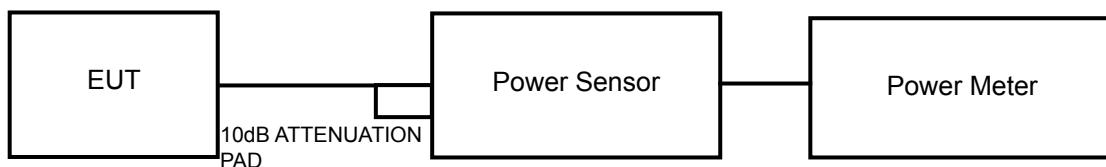
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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 peak power level.



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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	20.79	19.49	208.870	23.20	30	PASS
6	2437	22.70	22.64	369.863	25.68	30	PASS
11	2462	20.49	19.99	211.714	23.26	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	16.88	16.55	93.939	19.73	30	PASS
6	2437	21.72	21.59	292.806	24.67	30	PASS
11	2462	17.77	17.30	113.544	20.55	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	16.25	16.06	82.535	19.17	30	PASS
6	2437	20.79	20.76	239.074	23.79	30	PASS
11	2462	16.58	16.51	90.270	19.56	30	PASS

802.11n (40MHz)

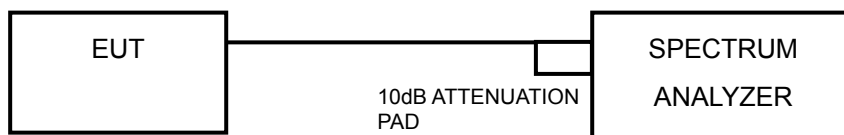
CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	15.27	14.90	64.554	18.10	30	PASS
6	2437	16.97	16.69	96.440	19.84	30	PASS
9	2452	14.74	14.44	57.582	17.60	30	PASS

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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set VBW $\geq 3 \times \text{RBW}$.
- e) Detector = power averaging (RMS) or sample detector (when RMS not available).
- f) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- 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	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-6.10	3.01	1.35	-1.74	7.62	PASS
	6	2437	-5.05	3.01	1.35	-0.69	7.62	PASS
	11	2462	-6.16	3.01	1.35	-1.80	7.62	PASS
1	1	2412	-7.60	3.01	1.35	-3.24	7.62	PASS
	6	2437	-4.90	3.01	1.35	-0.54	7.62	PASS
	11	2462	-6.44	3.01	1.35	-2.08	7.62	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.38 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (6.38 - 6) = 7.62 \text{ dBm}$.

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	-11.90	3.01	0.11	-8.78	7.62	PASS
	6	2437	-7.69	3.01	0.11	-4.57	7.62	PASS
	11	2462	-11.01	3.01	0.11	-7.89	7.62	PASS
1	1	2412	-12.33	3.01	0.11	-9.21	7.62	PASS
	6	2437	-8.05	3.01	0.11	-4.93	7.62	PASS
	11	2462	-11.64	3.01	0.11	-8.52	7.62	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.38 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (6.38 - 6) = 7.62 \text{ dBm}$.

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	-12.71	3.01	0.12	-9.58	7.62	PASS
	6	2437	-8.69	3.01	0.12	-5.56	7.62	PASS
	11	2462	-12.85	3.01	0.12	-9.72	7.62	PASS
1	1	2412	-13.68	3.01	0.12	-10.55	7.62	PASS
	6	2437	-8.93	3.01	0.12	-5.80	7.62	PASS
	11	2462	-13.29	3.01	0.12	-10.16	7.62	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.38 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (6.38 - 6) = 7.62 \text{ dBm}$.

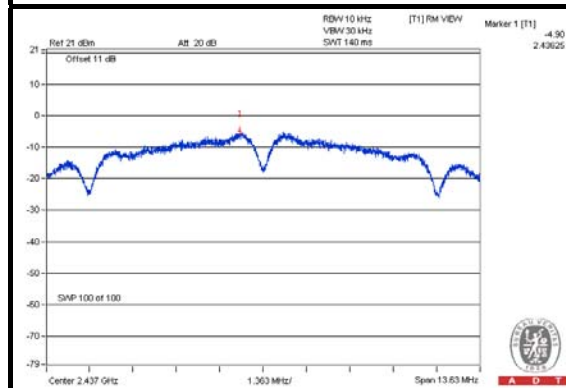
802.11n (40MHz)

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	-15.73	3.01	0.23	-12.49	7.62	PASS
	6	2437	-13.73	3.01	0.23	-10.49	7.62	PASS
	9	2452	-15.45	3.01	0.23	-12.21	7.62	PASS
1	3	2422	-16.32	3.01	0.23	-13.08	7.62	PASS
	6	2437	-14.12	3.01	0.23	-10.88	7.62	PASS
	9	2452	-16.83	3.01	0.23	-13.59	7.62	PASS

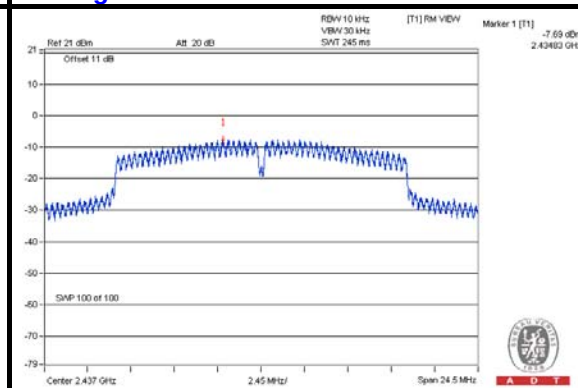
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.38 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (6.38 - 6) = 7.62 \text{ dBm}$.

SPECTRUM PLOT OF WORST VALUE

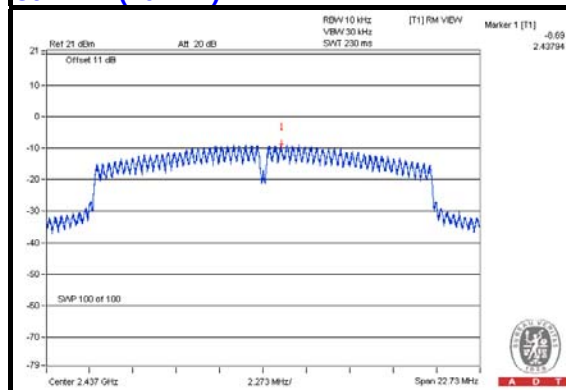
802.11b



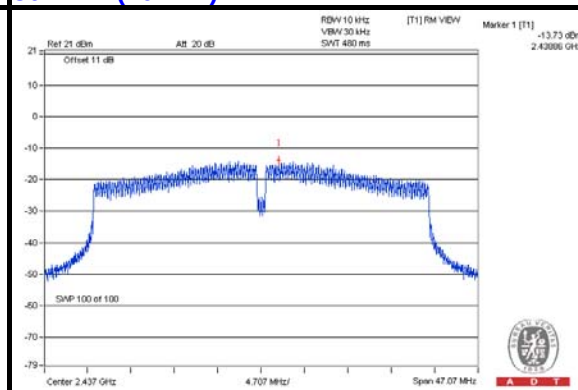
802.11g



802.11n (20MHz)



802.11n (40MHz)

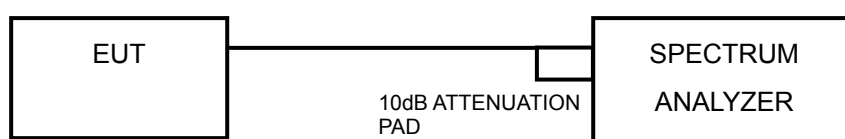


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. 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.

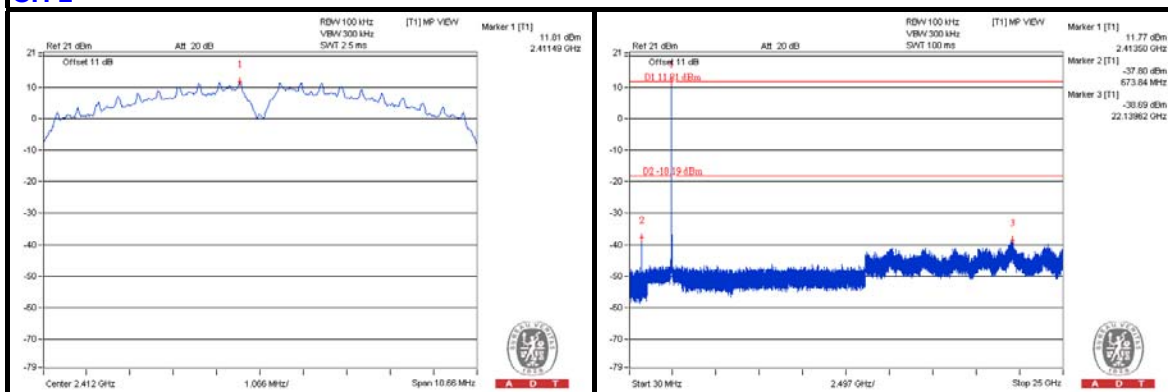
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



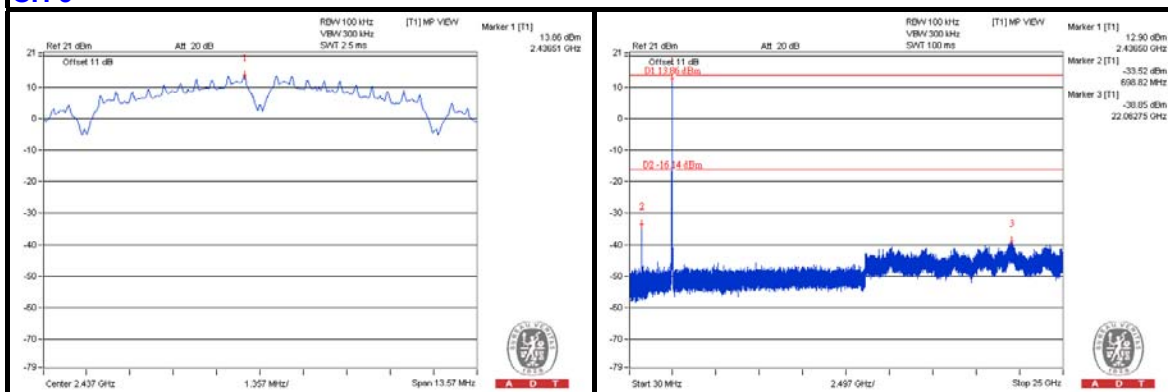
A D T

802.11b
CHAIN 0

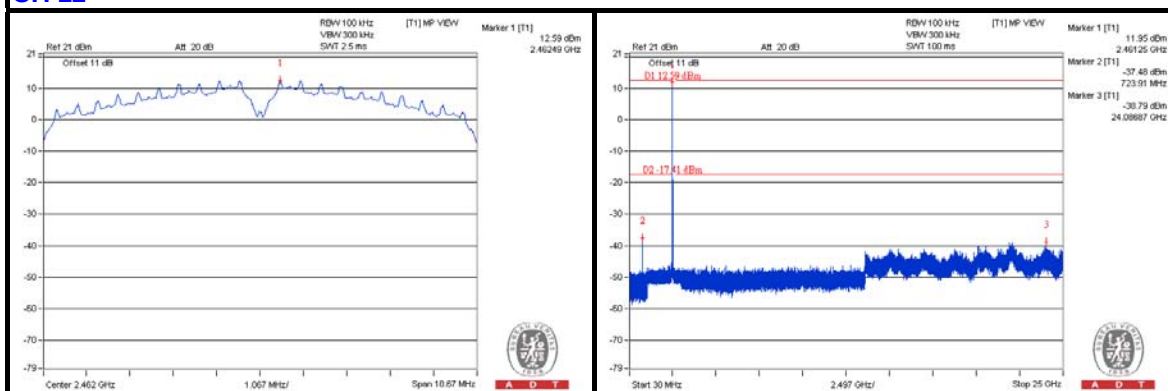
CH 1



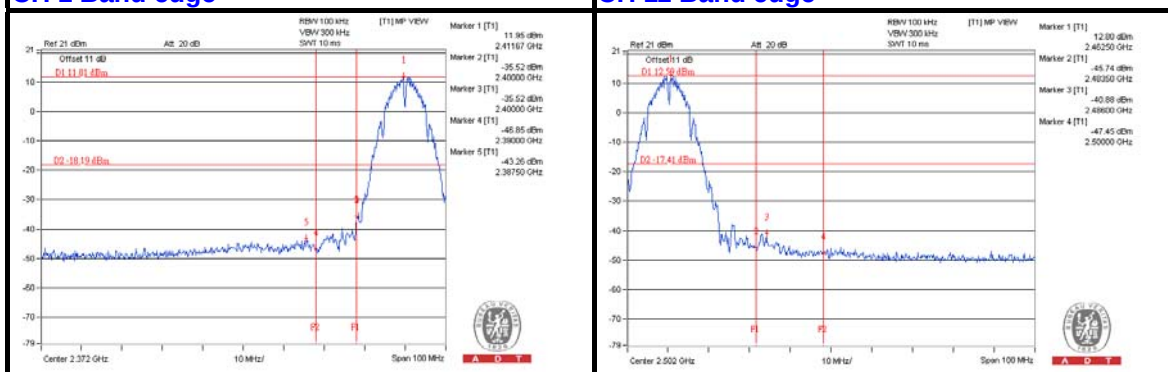
CH 6



CH 11



CH 1 Band edge

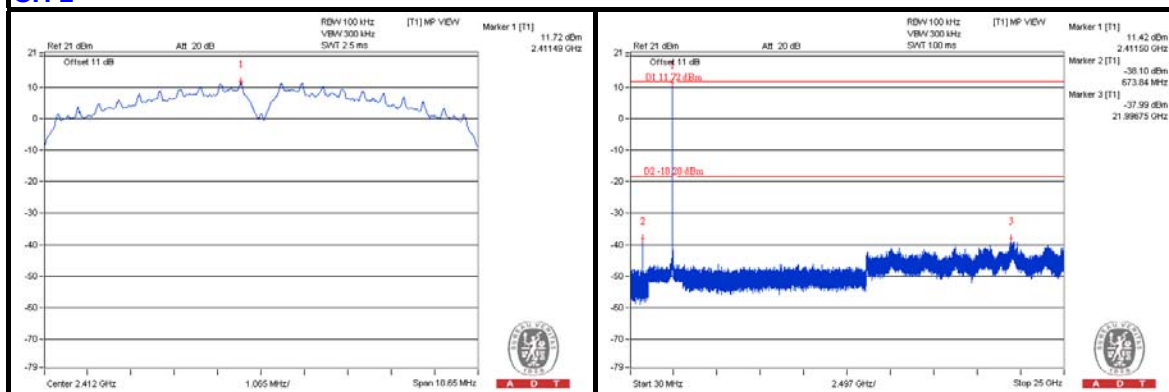




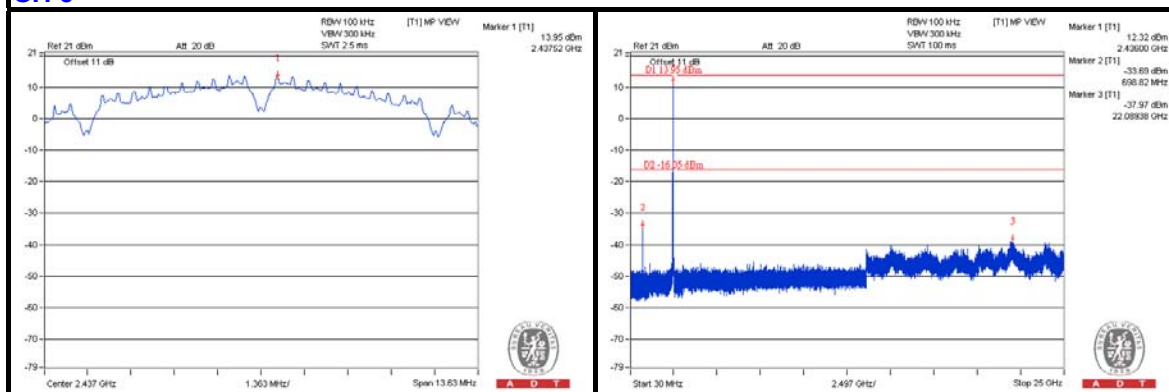
A D T

CHAIN 1

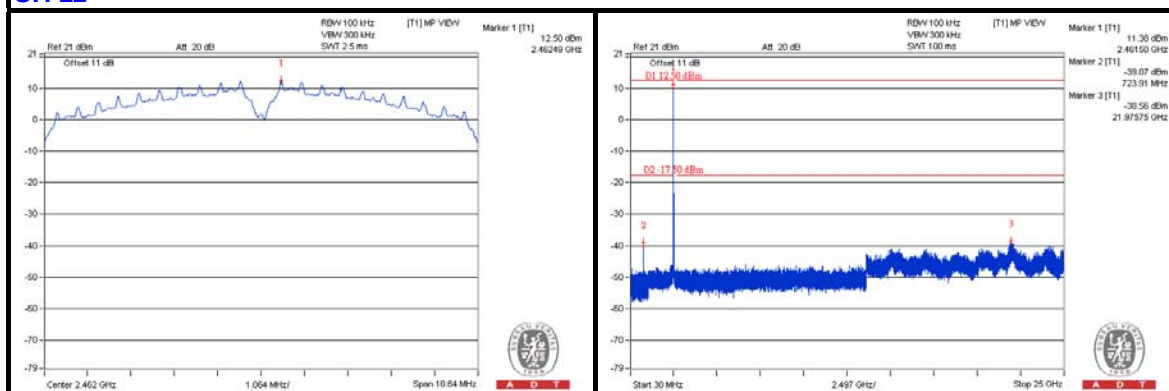
CH 1



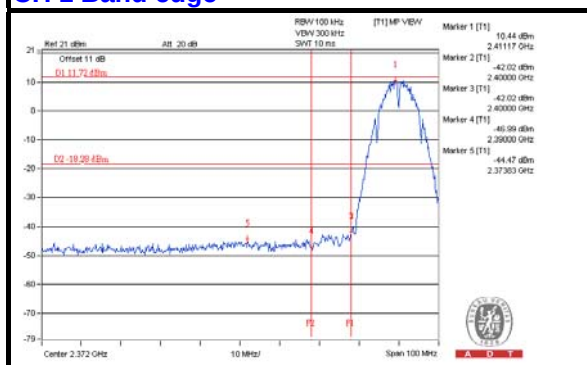
CH 6



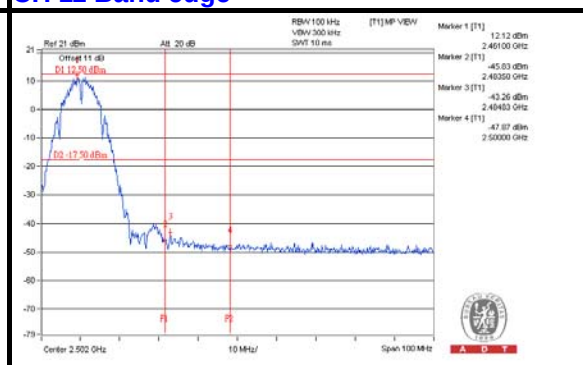
CH 11



CH 1 Band edge



CH 11 Band edge

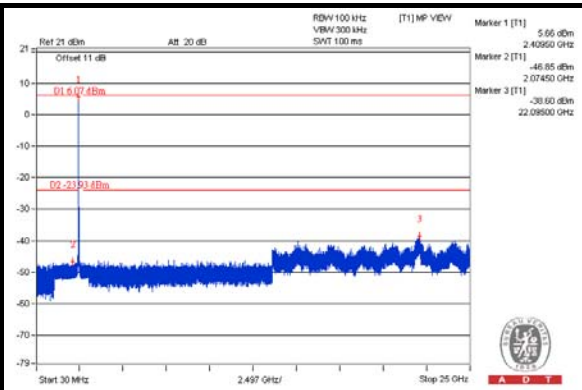
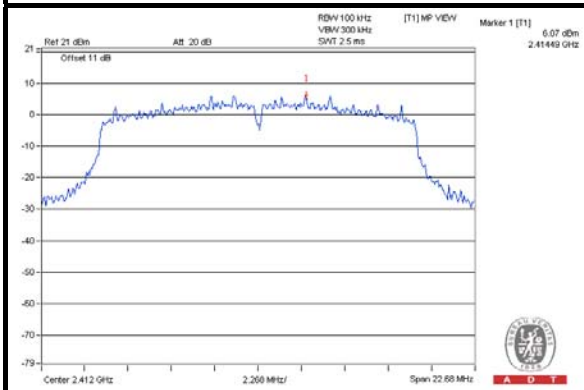




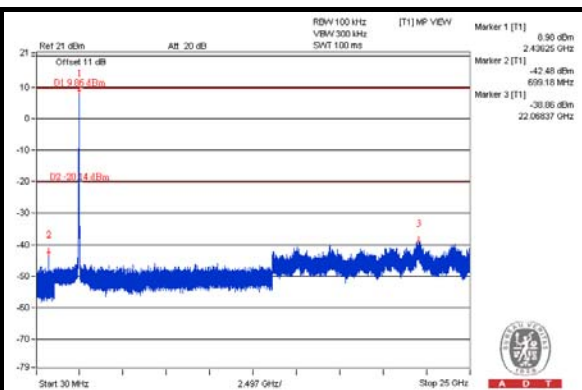
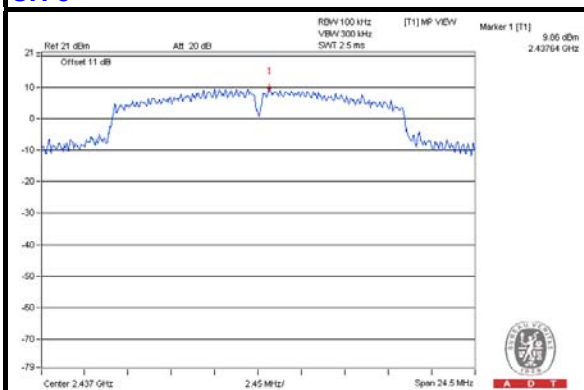
A D T

802.11g
CHAIN 0

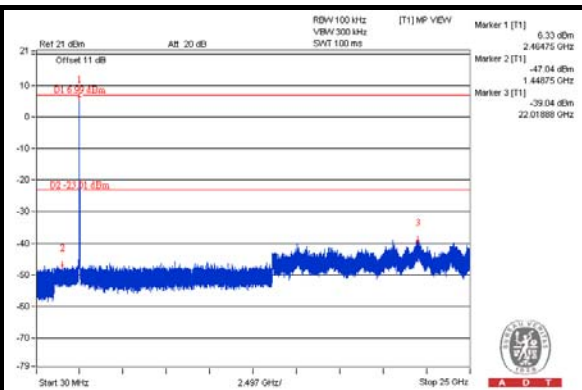
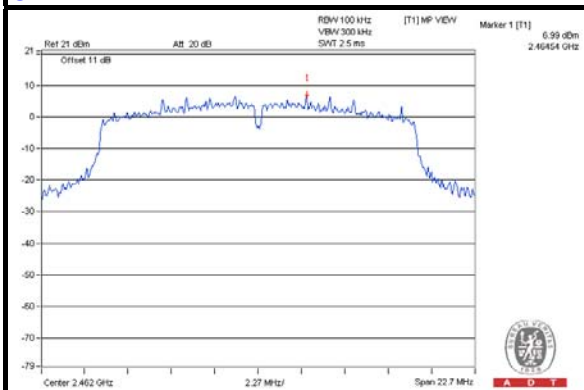
CH 1



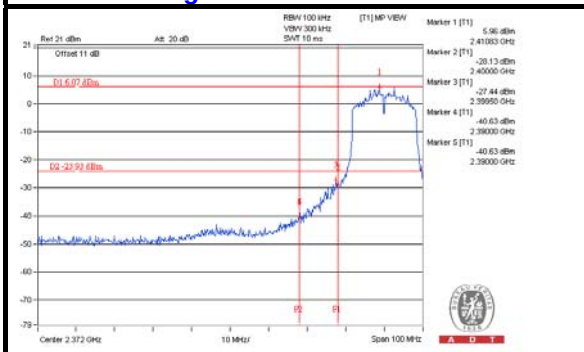
CH 6



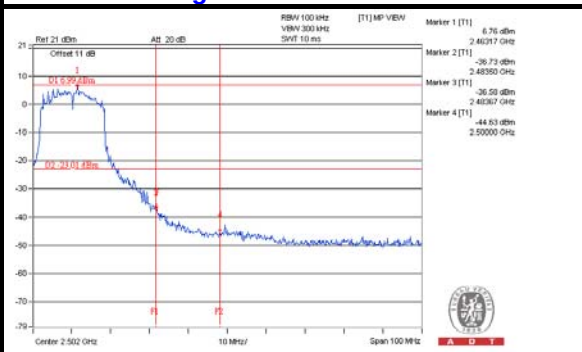
CH 11



CH 1 Band edge



CH 11 Band edge

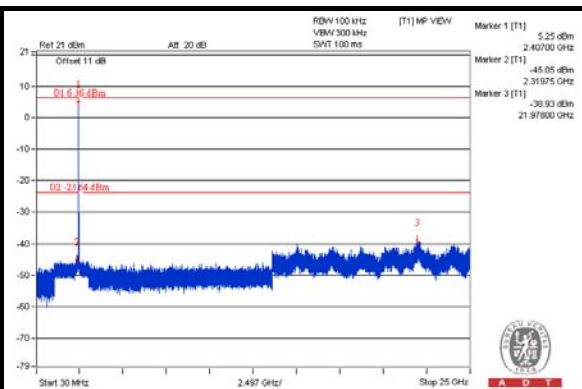
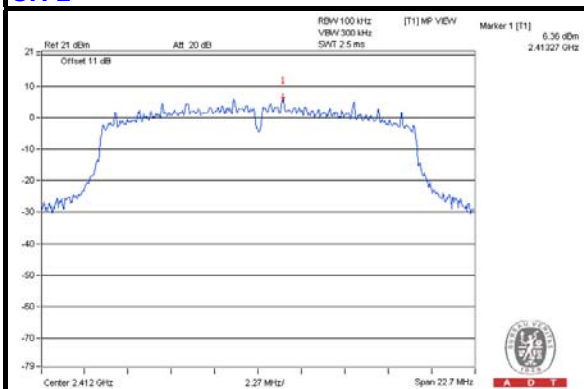




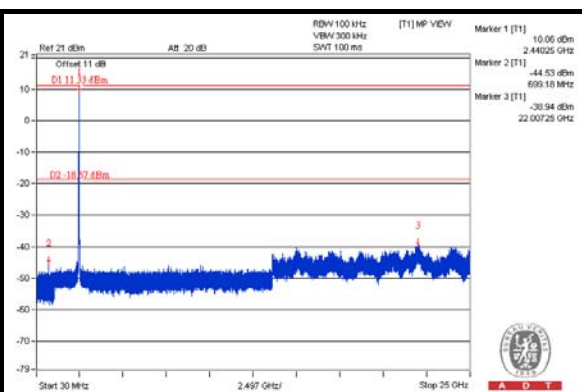
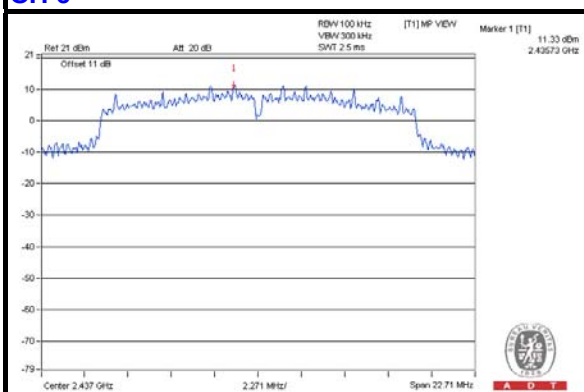
A D T

CHAIN 1

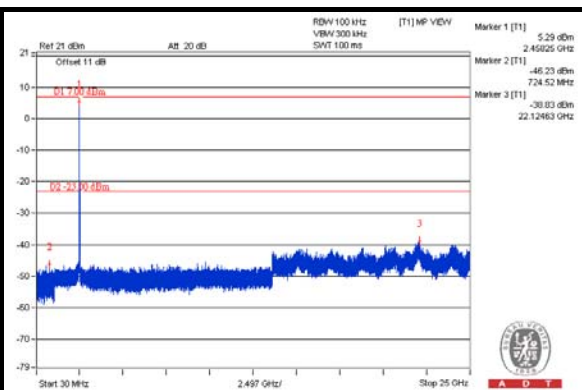
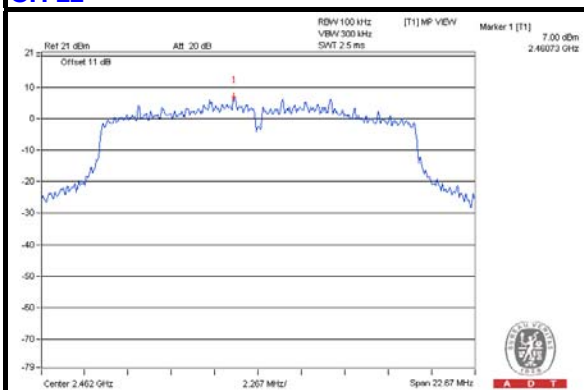
CH 1



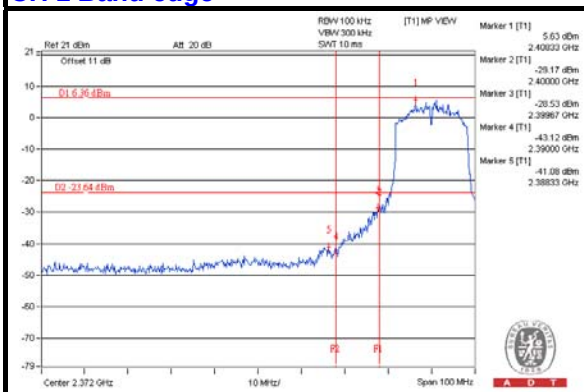
CH 6



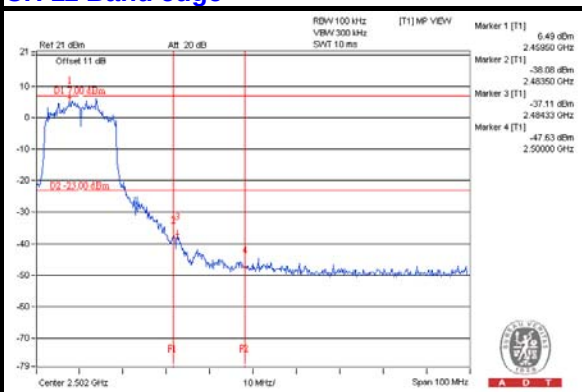
CH 11



CH 1 Band edge



CH 11 Band edge



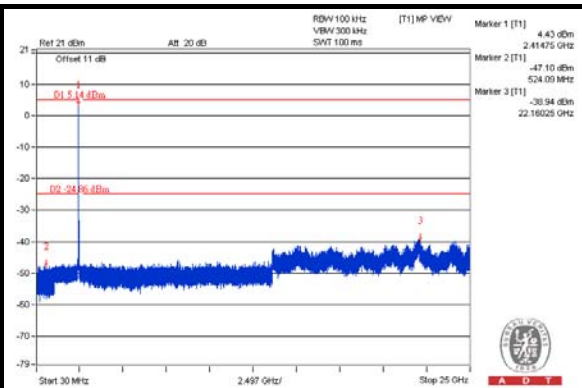
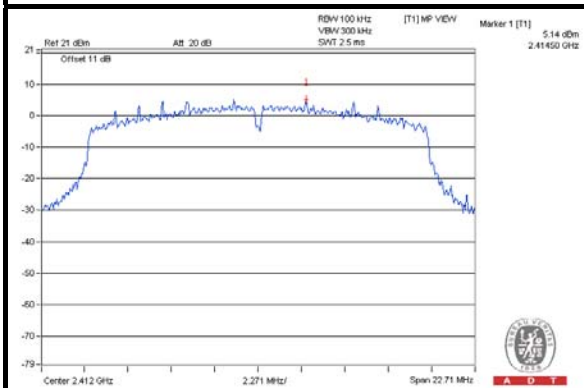


A D T

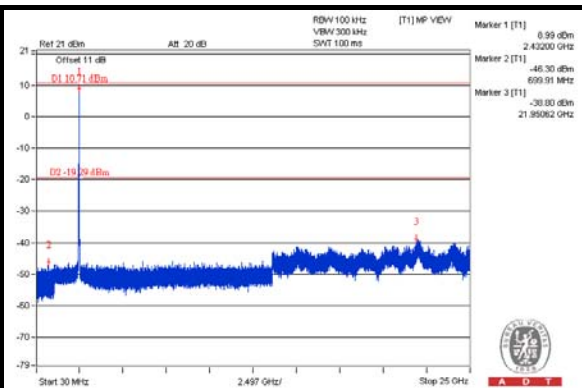
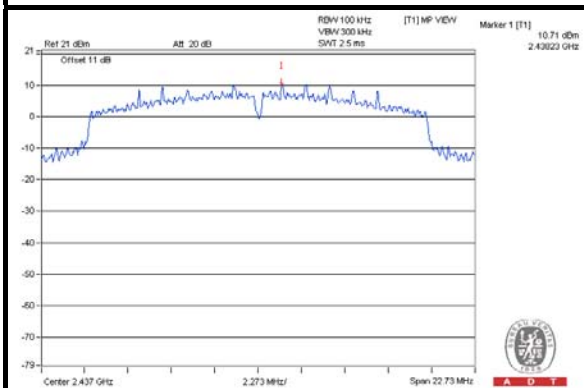
802.11n (20MHz)

CHAIN 0

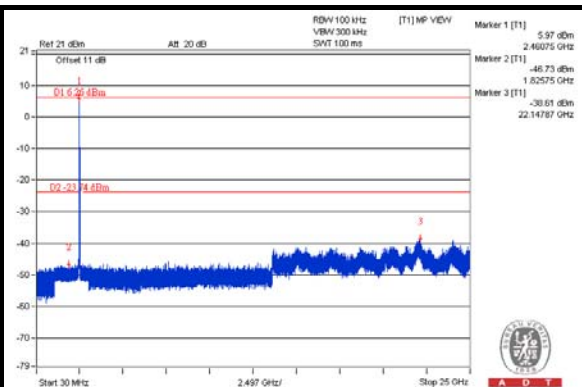
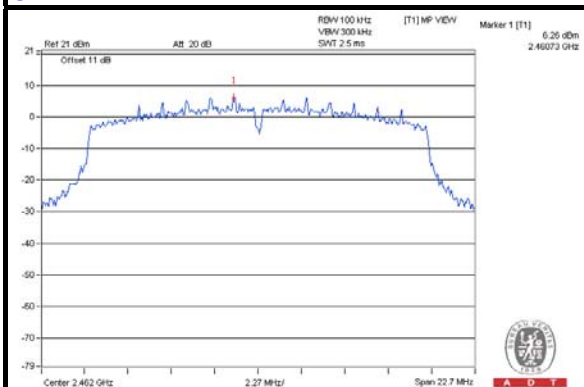
CH 1



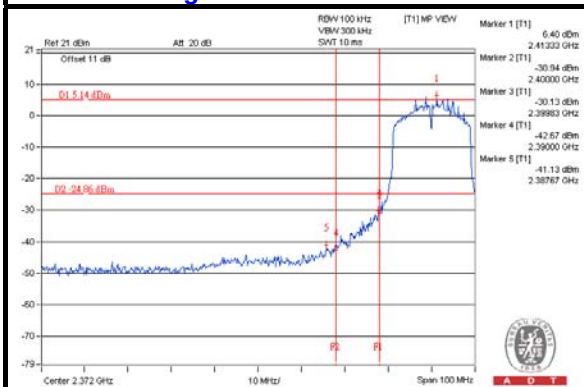
CH 6



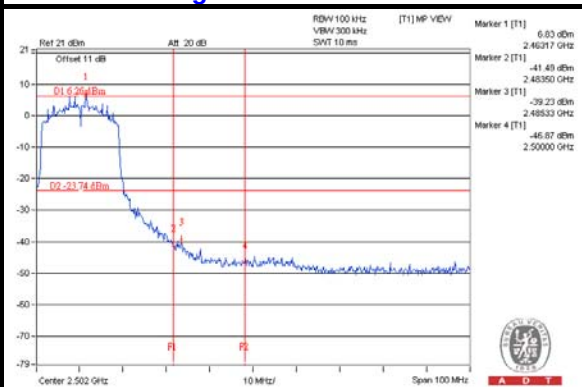
CH 11



CH 1 Band edge



CH 11 Band edge

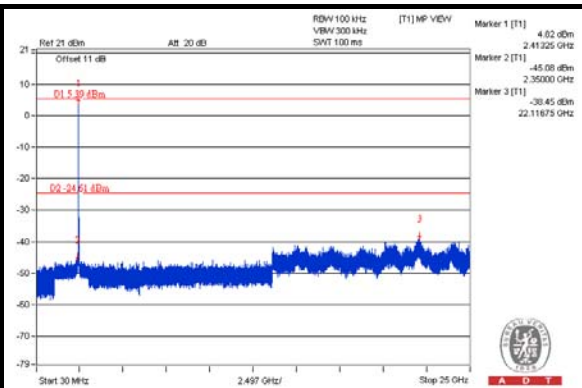
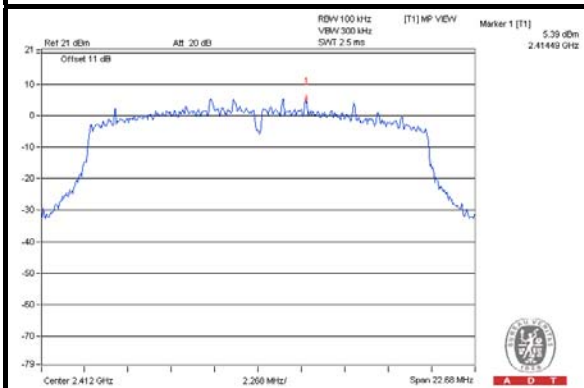




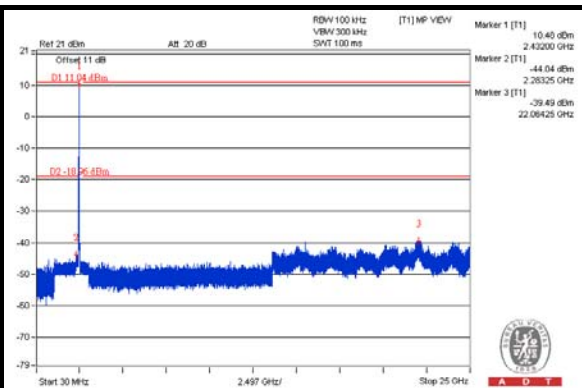
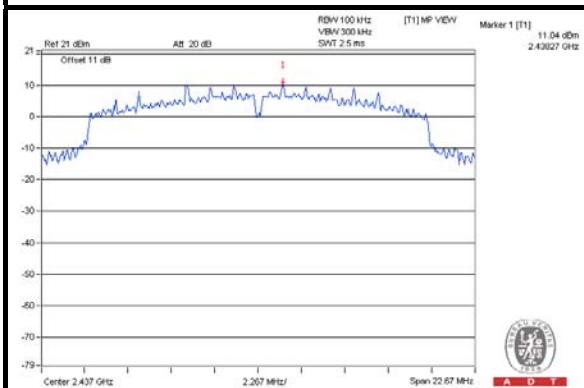
A D T

CHAIN 1

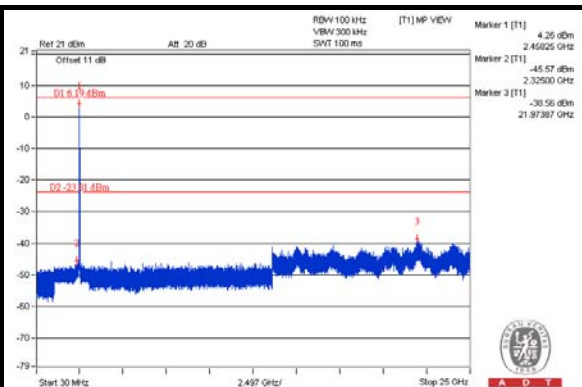
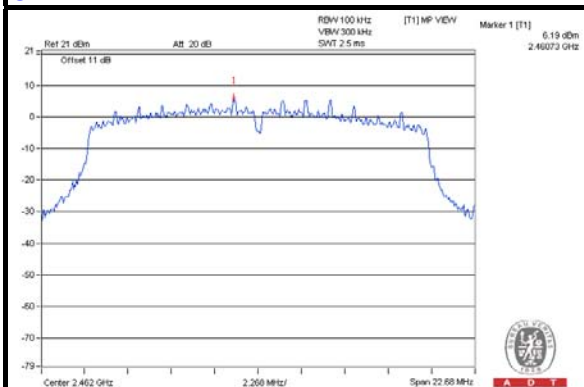
CH 1



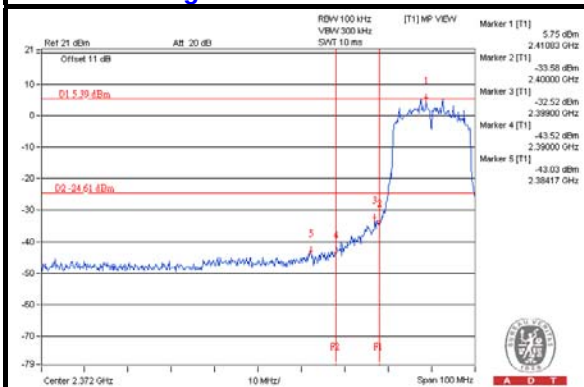
CH 6



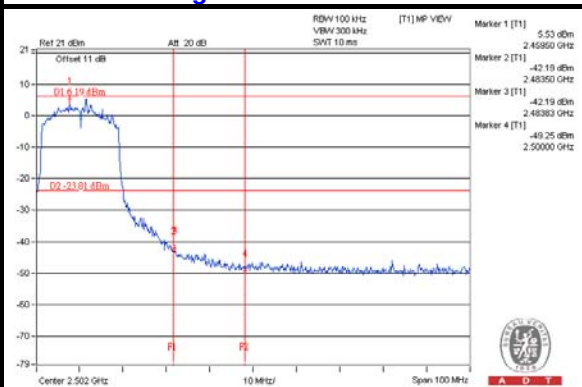
CH 11



CH 1 Band edge



CH 11 Band edge



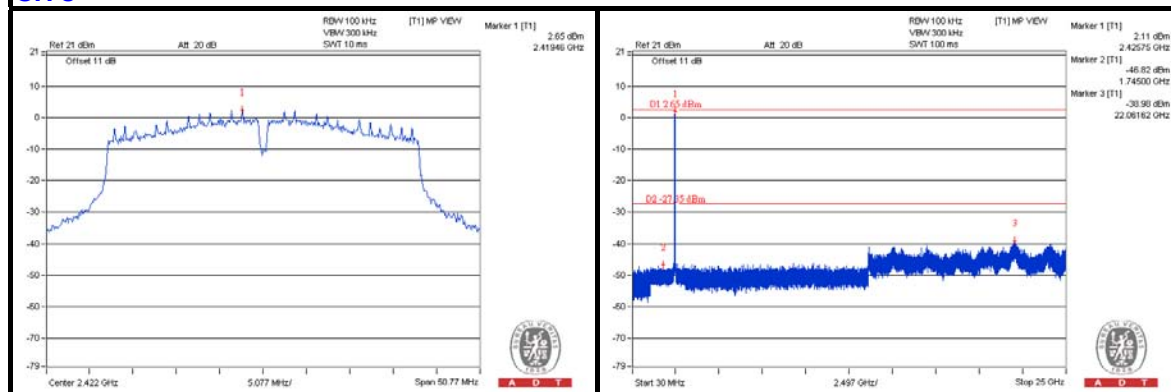


A D T

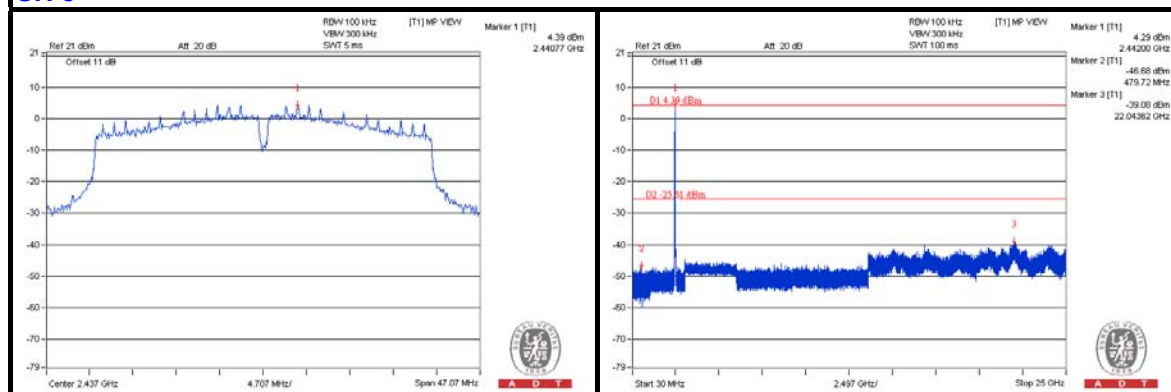
802.11n (40MHz)

CHAIN 0

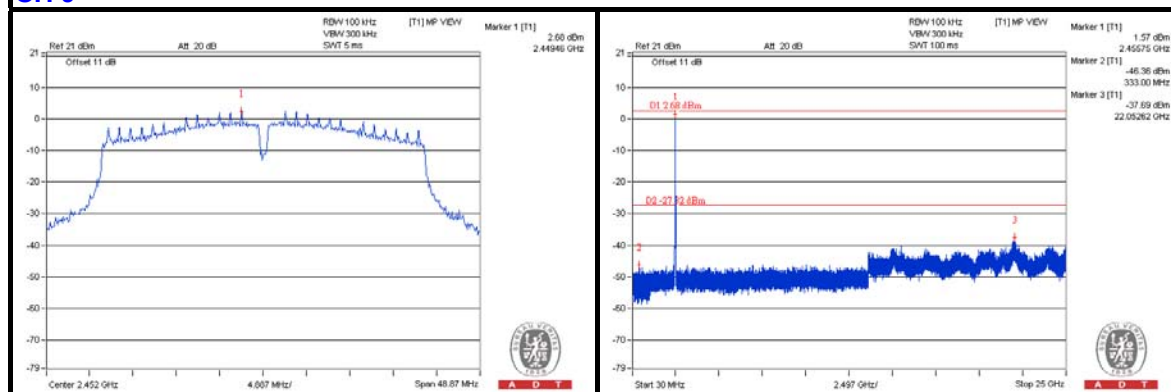
CH 3



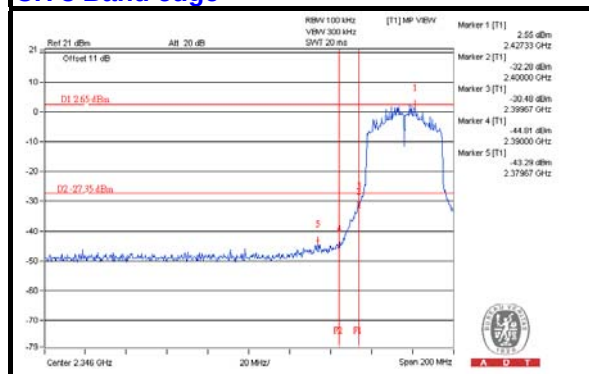
CH 6



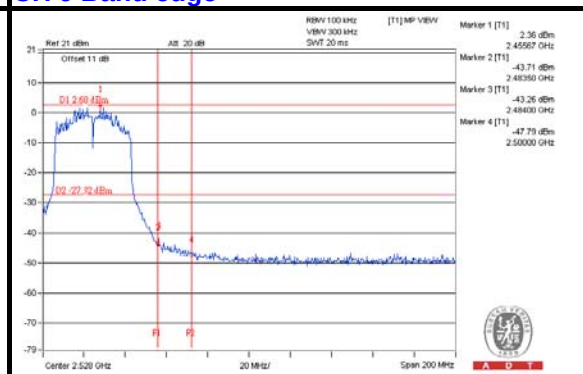
CH 9



CH 3 Band edge



CH 9 Band edge

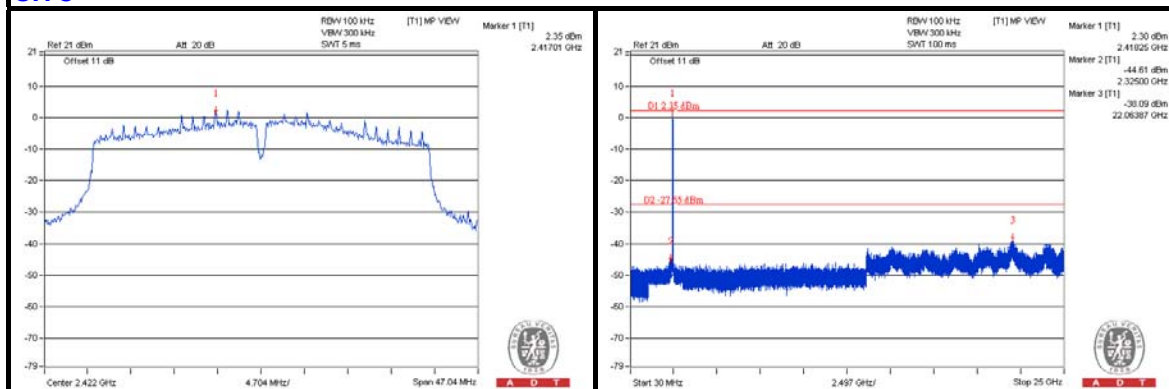




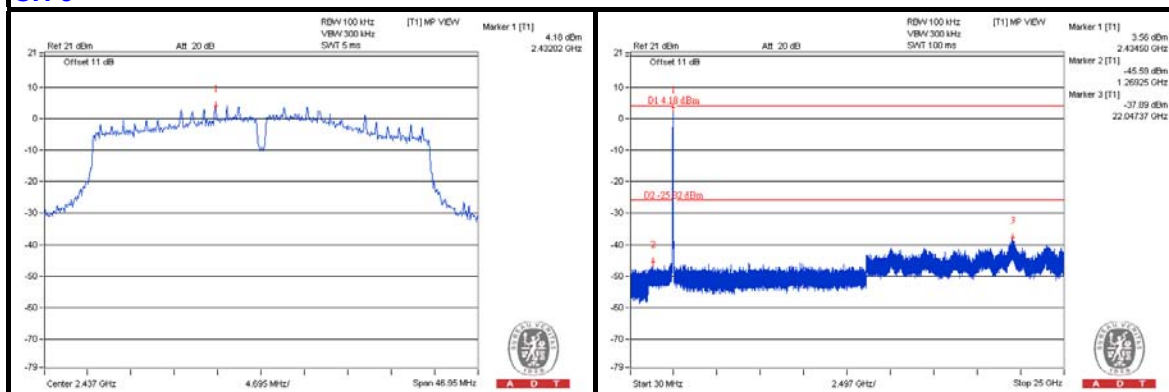
A D T

CHAIN 1

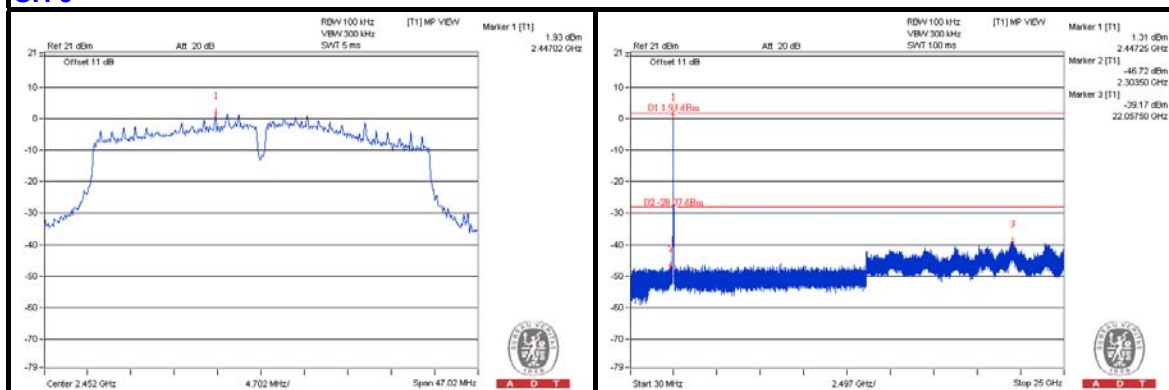
CH 3



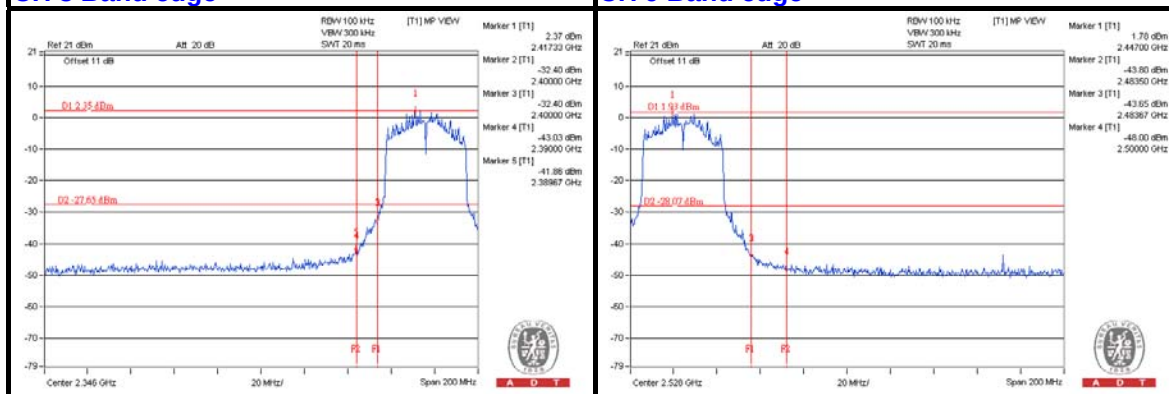
CH 6



CH 9



CH 3 Band edge



5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 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.

5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA :

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5725.00	76.4 PK	81.4	-5.0	1.00 H	279	69.90	6.50
2	#5725.00	66.3 AV	71.3	-5.0	1.00 H	279	59.80	6.50
3	*5745.00	111.4 PK			1.00 H	279	71.00	40.40
4	*5745.00	101.3 AV			1.00 H	279	60.90	40.40
5	11490.00	61.6 PK	74.0	-12.4	1.22 H	51	43.80	17.80
6	11490.00	47.7 AV	54.0	-6.3	1.22 H	51	29.90	17.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	60.5 PK	74.0	-13.5	1.00 V	318	55.10	5.40
2	5000.00	53.1 AV	54.0	-0.9	1.00 V	318	47.70	5.40
3	#5725.00	82.1 PK	91.2	-9.1	1.00 V	270	75.60	6.50
4	#5725.00	72.4 AV	81.5	-9.1	1.00 V	270	65.90	6.50
5	*5745.00	121.2 PK			1.00 V	270	80.80	40.40
6	*5745.00	111.5 AV			1.00 V	270	71.10	40.40
7	11490.00	63.0 PK	74.0	-11.0	1.56 V	126	45.20	17.80
8	11490.00	50.8 AV	54.0	-3.2	1.56 V	126	33.00	17.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	112.4 PK			1.00 H	271	71.80	40.60
2	*5785.00	101.6 AV			1.00 H	271	61.00	40.60
3	11570.00	63.2 PK	74.0	-10.8	1.11 H	53	45.50	17.70
4	11570.00	47.9 AV	54.0	-6.1	1.11 H	53	30.20	17.70
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	5000.00	61.5 PK	74.0	-12.5	1.00 V	317	56.10	5.40
2	5000.00	53.8 AV	54.0	-0.2	1.00 V	317	48.40	5.40
3	*5785.00	120.9 PK			1.00 V	272	80.30	40.60
4	*5785.00	111.0 AV			1.00 V	272	70.40	40.60
5	11570.00	65.6 PK	74.0	-8.4	1.89 V	122	47.90	17.70
6	11570.00	52.2 AV	54.0	-1.8	1.89 V	122	34.50	17.70

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.
6. The limit value is defined as per 15.247.



A D T

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	110.1 PK			1.00 H	278	69.40	40.70
2	*5825.00	100.3 AV			1.00 H	278	59.60	40.70
3	#5850.00	70.1 PK	80.1	-10.0	1.00 H	278	63.30	6.80
4	#5850.00	60.3 AV	70.3	-10.0	1.00 H	278	53.50	6.80
5	11650.00	61.4 PK	74.0	-12.6	1.11 H	43	43.20	18.20
6	11650.00	47.7 AV	54.0	-6.3	1.11 H	43	29.50	18.20
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	5000.00	60.7 PK	74.0	-13.3	1.00 V	317	55.30	5.40
2	5000.00	53.3 AV	54.0	-0.7	1.00 V	317	47.90	5.40
3	*5825.00	120.2 PK			1.00 V	262	79.50	40.70
4	*5825.00	110.3 AV			1.00 V	262	69.60	40.70
5	#5850.00	73.1 PK	90.2	-17.1	1.00 V	262	66.30	6.80
6	#5850.00	63.2 AV	80.3	-17.1	1.00 V	262	56.40	6.80
7	11650.00	66.0 PK	74.0	-8.0	1.48 V	129	47.80	18.20
8	11650.00	51.7 AV	54.0	-2.3	1.48 V	129	33.50	18.20

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.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

802.11n (20MHz)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5725.00	83.9 PK	84.9	-1.0	1.00 H	278	77.40	6.50
2	#5725.00	74.5 AV	75.5	-1.0	1.00 H	278	68.00	6.50
3	*5745.00	114.9 PK			1.00 H	278	74.50	40.40
4	*5745.00	105.5 AV			1.00 H	278	65.10	40.40
5	11490.00	61.3 PK	74.0	-12.7	1.16 H	60	43.50	17.80
6	11490.00	47.8 AV	54.0	-6.2	1.16 H	60	30.00	17.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	61.0 PK	74.0	-13.0	1.00 V	319	55.60	5.40
2	5000.00	52.0 AV	54.0	-2.0	1.00 V	319	46.60	5.40
3	#5725.00	90.0 PK	90.5	-0.5	1.00 V	273	83.50	6.50
4	#5725.00	80.2 AV	80.7	-0.5	1.00 V	273	73.70	6.50
5	*5745.00	120.5 PK			1.00 V	273	80.10	40.40
6	*5745.00	110.7 AV			1.00 V	273	70.30	40.40
7	11490.00	62.7 PK	74.0	-11.3	1.57 V	126	44.90	17.80
8	11490.00	49.7 AV	54.0	-4.3	1.57 V	126	31.90	17.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	114.8 PK			1.00 H	274	74.20	40.60
2	*5785.00	105.2 AV			1.00 H	274	64.60	40.60
3	11570.00	61.2 PK	74.0	-12.8	1.20 H	46	43.50	17.70
4	11570.00	47.9 AV	54.0	-6.1	1.20 H	46	30.20	17.70
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	5000.00	62.1 PK	74.0	-11.9	1.00 V	317	56.70	5.40
2	5000.00	53.7 AV	54.0	-0.3	1.00 V	317	48.30	5.40
3	*5785.00	120.7 PK			1.00 V	272	80.10	40.60
4	*5785.00	111.1 AV			1.00 V	272	70.50	40.60
5	11570.00	65.2 PK	74.0	-8.8	1.83 V	119	47.50	17.70
6	11570.00	52.2 AV	54.0	-1.8	1.83 V	119	34.50	17.70

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.
6. The limit value is defined as per 15.247.



A D T

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	113.2 PK			1.00 H	285	72.50	40.70
2	*5825.00	103.9 AV			1.00 H	285	63.20	40.70
3	#5850.00	68.2 PK	83.2	-15.0	1.00 H	285	61.40	6.80
4	#5850.00	58.9 AV	73.9	-15.0	1.00 H	285	52.10	6.80
5	11650.00	61.3 PK	74.0	-12.7	1.00 H	23	43.10	18.20
6	11650.00	48.2 AV	54.0	-5.8	1.00 H	23	30.00	18.20
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	5000.00	60.6 PK	74.0	-13.4	1.00 V	318	55.20	5.40
2	5000.00	53.1 AV	54.0	-0.9	1.00 V	318	47.70	5.40
3	*5825.00	119.9 PK			1.00 V	267	79.20	40.70
4	*5825.00	110.0 AV			1.00 V	267	69.30	40.70
5	#5850.00	77.1 PK	89.9	-12.8	1.00 V	267	70.30	6.80
6	#5850.00	67.2 AV	80.0	-12.8	1.00 V	267	60.40	6.80
7	11650.00	62.8 PK	74.0	-11.2	1.31 V	141	44.60	18.20
8	11650.00	50.6 AV	54.0	-3.4	1.31 V	141	32.40	18.20

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.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

802.11n (40MHz)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5725.00	81.2 PK	81.7	-0.5	1.54 H	111	74.70	6.50
2	#5725.00	68.3 AV	68.8	-0.5	1.54 H	111	61.80	6.50
3	*5755.00	111.7 PK			1.54 H	111	71.20	40.50
4	*5755.00	98.8 AV			1.54 H	111	58.30	40.50
5	11510.00	60.9 PK	74.0	-13.1	1.00 H	132	43.10	17.80
6	11510.00	47.9 AV	54.0	-6.1	1.00 H	132	30.10	17.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	85.0 PK	85.5	-0.5	1.00 V	264	78.50	6.50
2	#5725.00	74.7 AV	75.2	-0.5	1.00 V	264	68.20	6.50
3	*5755.00	115.5 PK			1.00 V	264	75.00	40.50
4	*5755.00	105.2 AV			1.00 V	264	64.70	40.50
5	11510.00	61.0 PK	74.0	-13.0	1.66 V	108	43.20	17.80
6	11510.00	47.7 AV	54.0	-6.3	1.66 V	108	29.90	17.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5795.00	112.7 PK			1.50 H	124	72.10	40.60
2	*5795.00	100.3 AV			1.50 H	124	59.70	40.60
3	#5850.00	67.7 PK	82.7	-15.0	1.50 H	124	60.90	6.80
4	#5850.00	55.3 AV	70.3	-15.0	1.50 H	124	48.50	6.80
5	11590.00	61.7 PK	74.0	-12.3	1.00 H	145	43.90	17.80
6	11590.00	48.1 AV	54.0	-5.9	1.00 H	145	30.30	17.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	61.3 PK	74.0	-12.7	1.00 V	318	55.90	5.40
2	5000.00	53.6 AV	54.0	-0.4	1.00 V	318	48.20	5.40
3	*5795.00	117.7 PK			1.00 V	265	77.10	40.60
4	*5795.00	107.1 AV			1.00 V	265	66.50	40.60
5	#5850.00	71.0 PK	87.7	-16.7	1.00 V	265	64.20	6.80
6	#5850.00	60.4 AV	77.1	-16.7	1.00 V	265	53.60	6.80
7	11590.00	60.5 PK	74.0	-13.5	1.95 V	114	42.70	17.80
8	11590.00	48.4 AV	54.0	-5.6	1.95 V	114	30.60	17.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



A D T

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 157	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	140.50	30.0 QP	43.5	-13.5	1.99 H	293	44.20	-14.20
2	175.43	30.0 QP	43.5	-13.5	1.49 H	91	44.50	-14.50
3	222.00	24.8 QP	46.0	-21.2	1.49 H	264	41.20	-16.40
4	427.68	32.7 QP	46.0	-13.3	1.24 H	217	42.80	-10.10
5	687.70	28.9 QP	46.0	-17.1	1.24 H	73	34.30	-5.40
6	759.49	33.2 QP	46.0	-12.8	1.24 H	12	36.70	-3.50
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	47.36	31.4 QP	40.0	-8.6	1.00 V	50	45.50	-14.10
2	175.43	31.0 QP	43.5	-12.5	1.00 V	139	45.50	-14.50
3	375.29	26.0 QP	46.0	-20.0	1.24 V	116	37.10	-11.10
4	499.48	27.8 QP	46.0	-18.2	1.24 V	12	36.70	-8.90
5	687.70	28.1 QP	46.0	-17.9	1.24 V	161	33.50	-5.40
6	873.97	29.4 QP	46.0	-16.6	1.00 V	31	31.40	-2.00

REMARKS:

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

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.2.7 TEST RESULTS

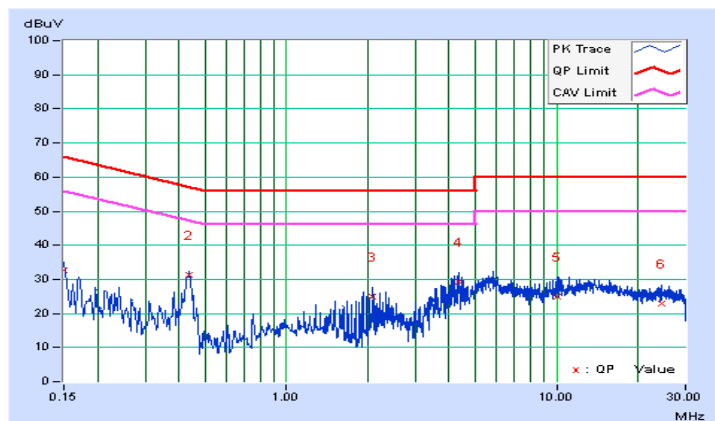
CONDUCTED WORST-CASE DATA : 802.11a

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	0.15000	0.08	32.58	23.18	32.66	23.26	66.00	56.00	-33.34	-32.74
2	0.43543	0.08	31.18	24.98	31.26	25.06	57.15	47.15	-25.89	-22.09
3	2.09327	0.15	24.64	19.95	24.79	20.10	56.00	46.00	-31.21	-25.90
4	4.35716	0.25	29.20	22.01	29.45	22.26	56.00	46.00	-26.55	-23.74
5	10.04621	0.51	24.35	16.41	24.86	16.92	60.00	50.00	-35.14	-33.08
6	24.33726	1.17	21.70	13.88	22.87	15.05	60.00	50.00	-37.13	-34.95

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.

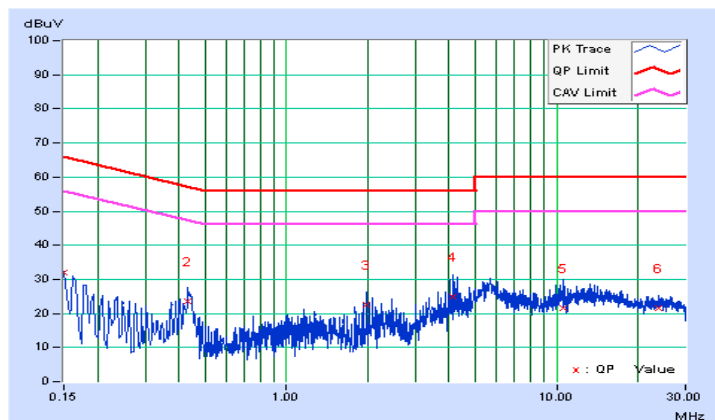


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.05	31.85	22.10	31.90	22.15	66.00	56.00	-34.10	-33.85
2	0.43152	0.07	23.61	20.13	23.68	20.20	57.22	47.22	-33.54	-27.02
3	1.97597	0.14	22.46	15.99	22.60	16.13	56.00	46.00	-33.40	-29.87
4	4.12647	0.21	24.85	17.01	25.06	17.22	56.00	46.00	-30.94	-28.78
5	10.57406	0.47	21.15	12.60	21.62	13.07	60.00	50.00	-38.38	-36.93
6	24.00100	1.00	20.64	13.49	21.64	14.49	60.00	50.00	-38.36	-35.51

REMARKS:

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



5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.

5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.31	15.80	16.38	0.5	PASS
157	5785	16.36	15.73	15.78	0.5	PASS
165	5825	16.35	15.75	15.78	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.03	16.41	16.41	0.5	PASS
157	5785	16.95	16.15	16.68	0.5	PASS
165	5825	17.30	15.75	17.27	0.5	PASS

802.11n (40MHz)

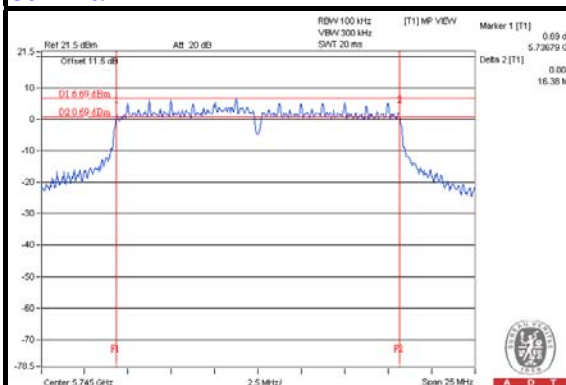
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.12	35.78	35.77	0.5	PASS
159	5795	36.02	35.53	35.75	0.5	PASS



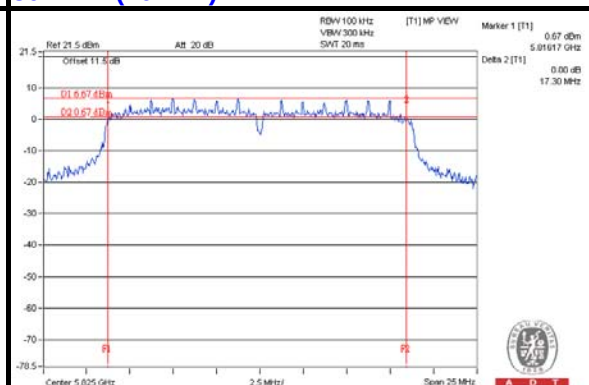
A D T

SPECTRUM PLOT OF WORST VALUE

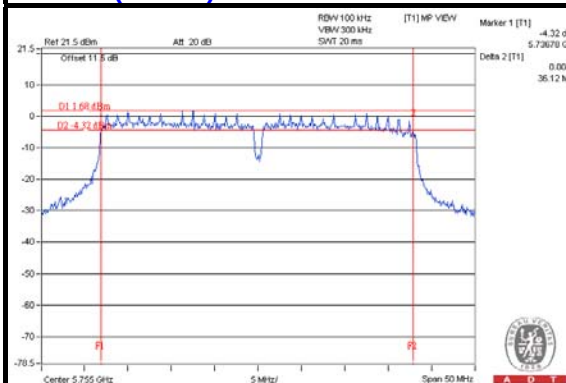
802.11a



802.11n (20MHz)



802.11n (40MHz)



5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

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

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

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.

5.4.2 TEST SETUP

Same as Item 4.4.2.

5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

Same as Item 4.4.4.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

FOR AVERAGE POWER

802.11a

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	19.69	20.85	20.51	327.190	25.15	30	PASS
157	5785	20.77	20.93	21.34	379.423	25.79	30	PASS
165	5825	19.86	20.20	20.36	310.184	24.92	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	CHAIN 2				
149	5745	19.57	20.82	20.43	321.762	25.08	30	PASS
157	5785	20.76	20.96	21.28	378.138	25.78	30	PASS
165	5825	19.83	20.16	20.28	306.574	24.87	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	CHAIN 2				
151	5755	15.03	16.85	15.84	118.630	20.74	30	PASS
159	5795	19.64	19.70	19.11	266.840	24.26	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

5.5.7 TEST RESULTS

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	149	5745	-12.69	4.77	0.10	-7.82	6.10	PASS
	157	5785	-12.92	4.77	0.10	-8.05	6.10	PASS
	165	5825	-12.69	4.77	0.10	-7.82	6.10	PASS
1	149	5745	-12.50	4.77	0.10	-7.63	6.10	PASS
	157	5785	-11.59	4.77	0.10	-6.72	6.10	PASS
	165	5825	-11.69	4.77	0.10	-6.82	6.10	PASS
2	149	5745	-12.64	4.77	0.10	-7.77	6.10	PASS
	157	5785	-12.80	4.77	0.10	-7.93	6.10	PASS
	165	5825	-12.76	4.77	0.10	-7.89	6.10	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.9 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (7.9 - 6) = 6.10 \text{ dBm}$.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	149	5745	-12.73	4.77	0.15	-7.81	6.10	PASS
	157	5785	-13.10	4.77	0.15	-8.18	6.10	PASS
	165	5825	-12.51	4.77	0.15	-7.59	6.10	PASS
1	149	5745	-12.53	4.77	0.15	-7.61	6.10	PASS
	157	5785	-11.67	4.77	0.15	-6.75	6.10	PASS
	165	5825	-12.21	4.77	0.15	-7.29	6.10	PASS
2	149	5745	-12.81	4.77	0.15	-7.89	6.10	PASS
	157	5785	-12.55	4.77	0.15	-7.63	6.10	PASS
	165	5825	-13.18	4.77	0.15	-8.26	6.10	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.9 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (7.9 - 6) = 6.10 \text{ dBm}$.



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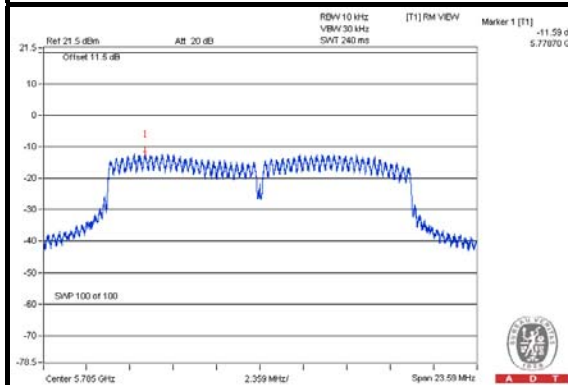
802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	PASS /FAIL
0	151	5755	-17.48	4.77	0.17	-12.54	6.10	PASS
	159	5795	-15.70	4.77	0.17	-10.76	6.10	PASS
1	151	5755	-16.72	4.77	0.17	-11.78	6.10	PASS
	159	5795	-14.64	4.77	0.17	-9.70	6.10	PASS
2	151	5755	-16.71	4.77	0.17	-11.77	6.10	PASS
	159	5795	-15.43	4.77	0.17	-10.49	6.10	PASS

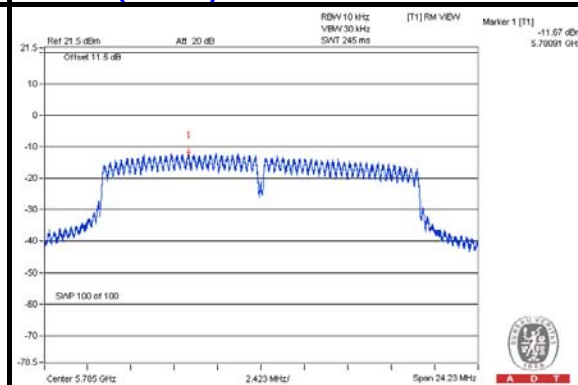
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.9 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $8 - (7.9 - 6) = 6.10 \text{ dBm}$.

SPECTRUM PLOT OF WORST VALUE

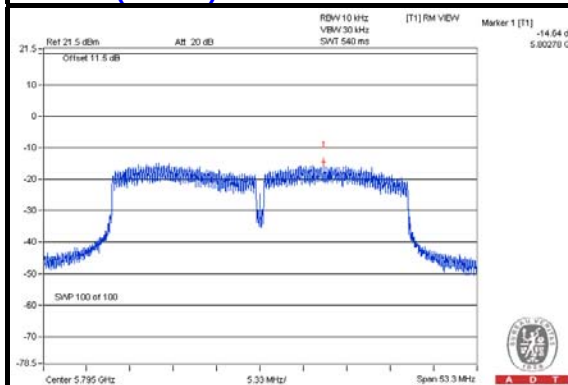
802.11a



802.11n (20MHz)



802.11n (40MHz)



5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

5.6.2 TEST SETUP

Same as Item 4.6.2

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.6.7 TEST RESULTS

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

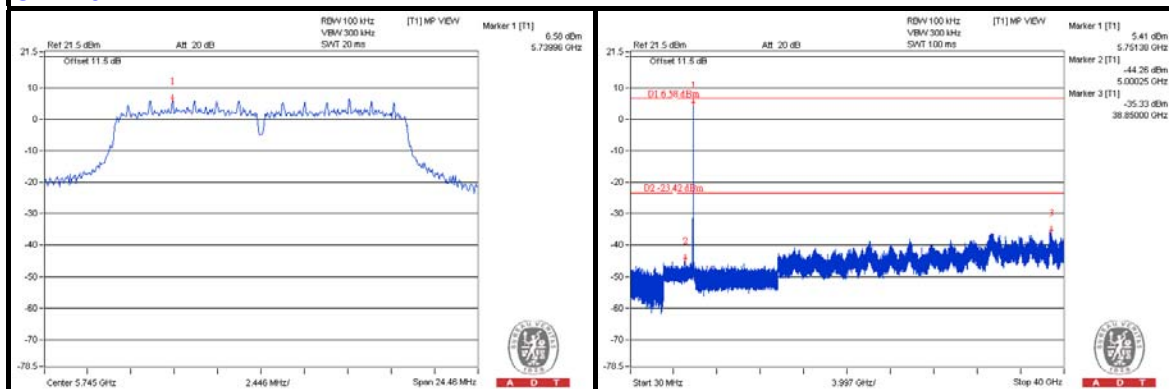
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



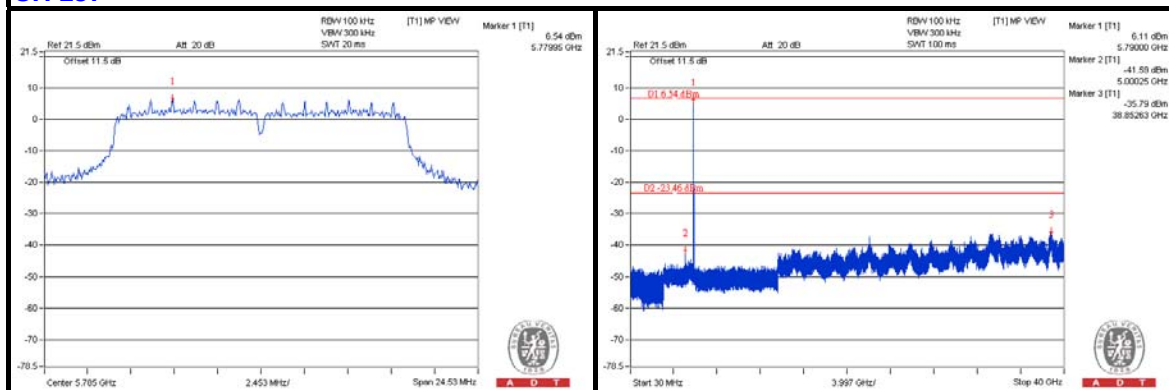
A D T

802.11a
CHAIN 0

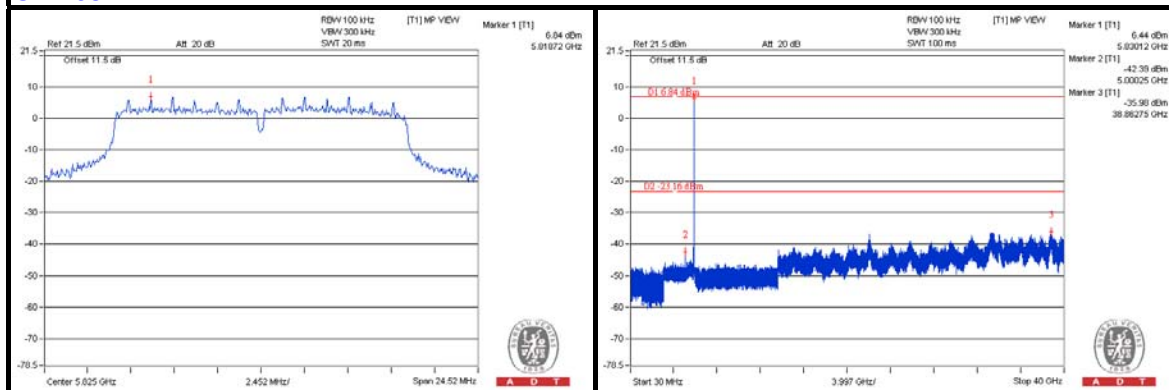
CH 149



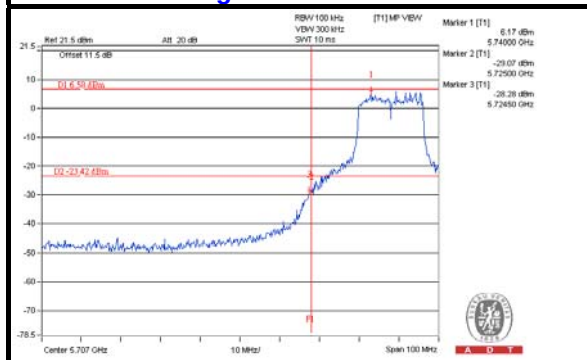
CH 157



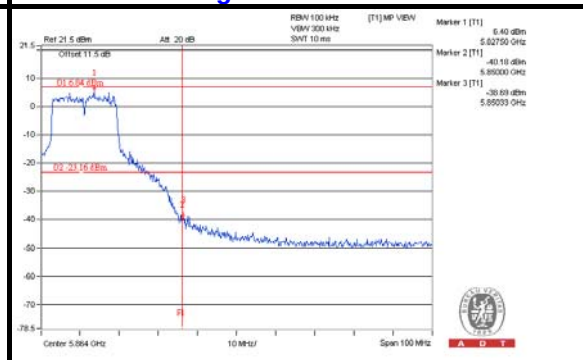
CH 165



CH 149 Band edge



CH 165 Band edge

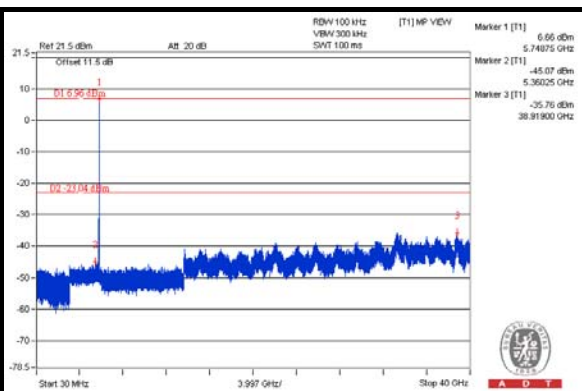
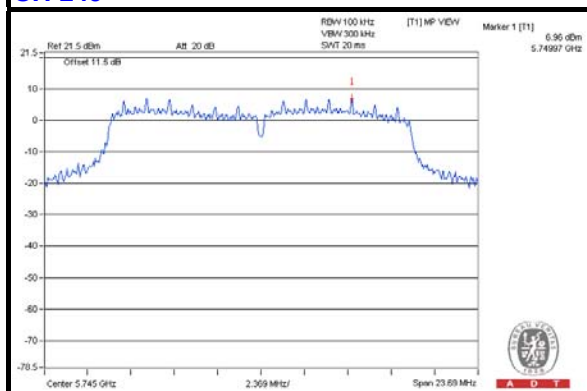




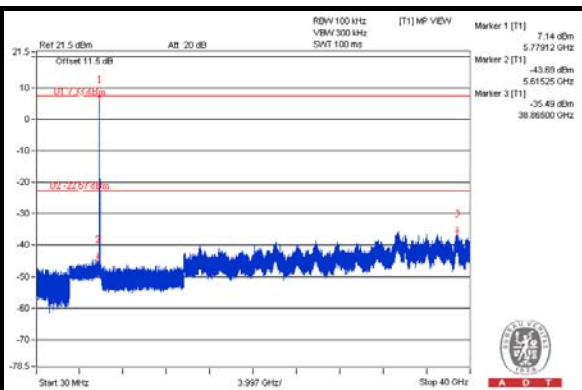
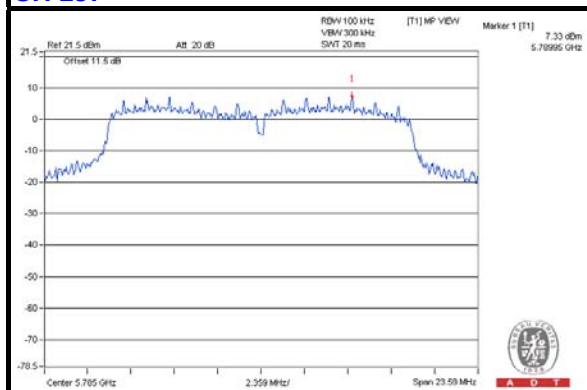
A D T

CHAIN 1

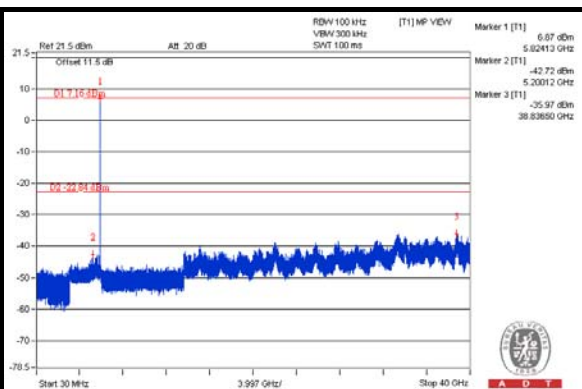
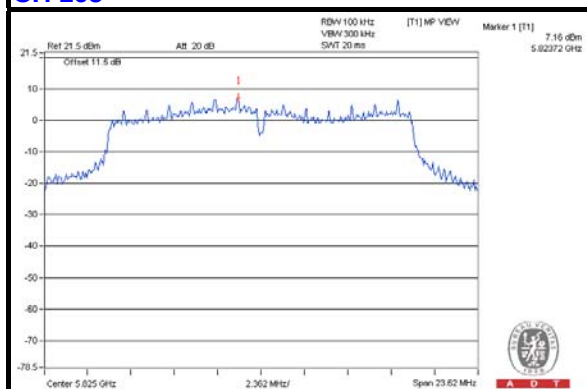
CH 149



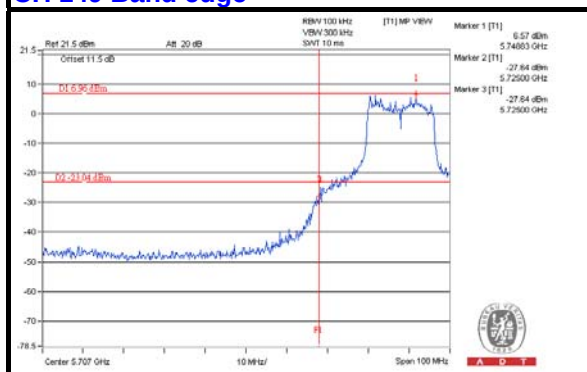
CH 157



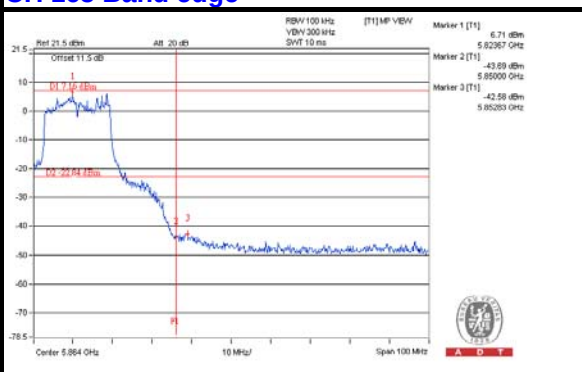
CH 165



CH 149 Band edge



CH 165 Band edge

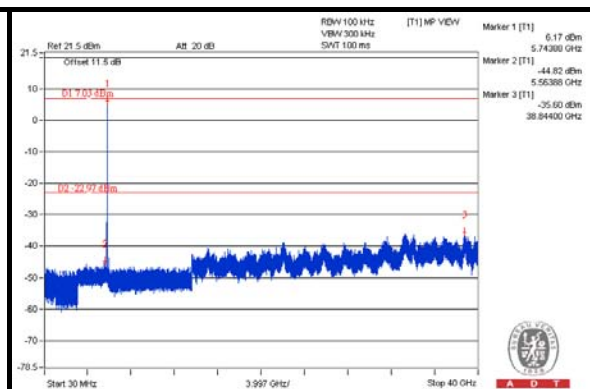
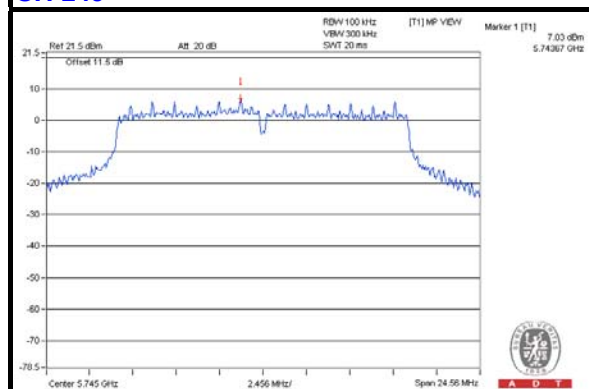




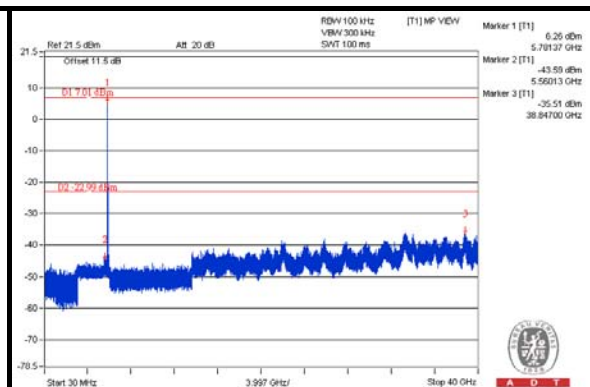
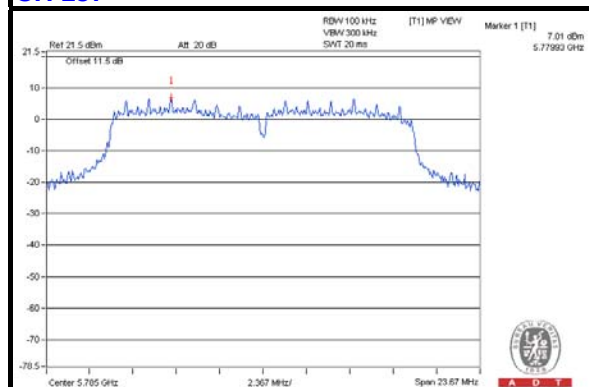
A D T

CHAIN 2

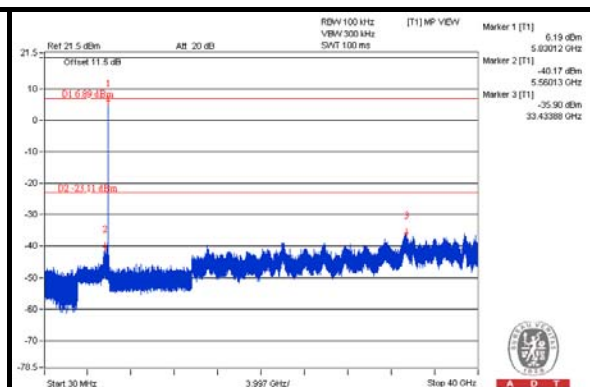
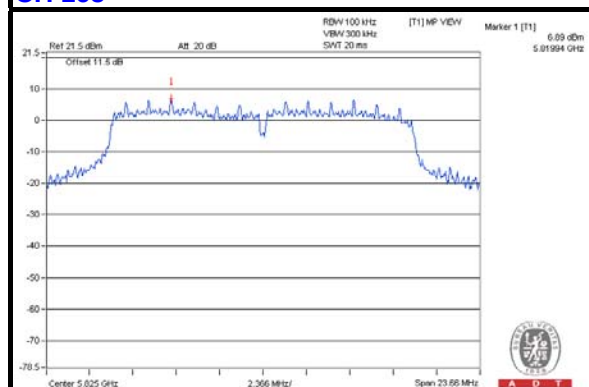
CH 149



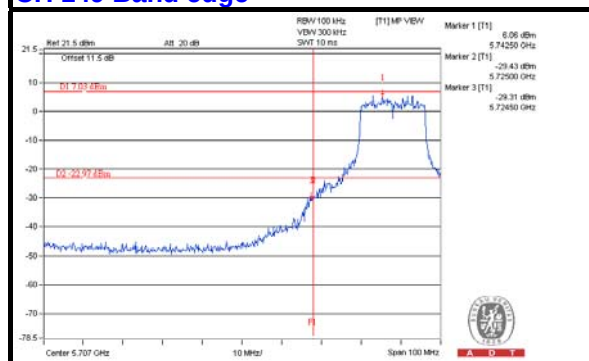
CH 157



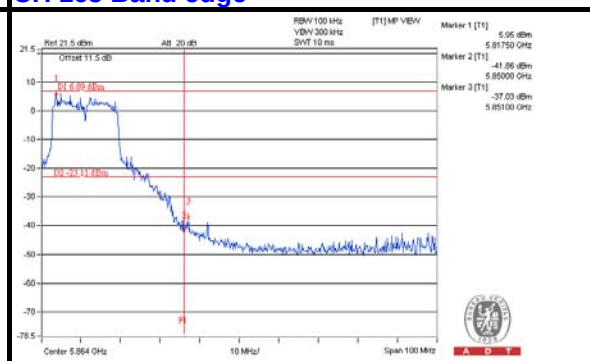
CH 165



CH 149 Band edge



CH 165 Band edge



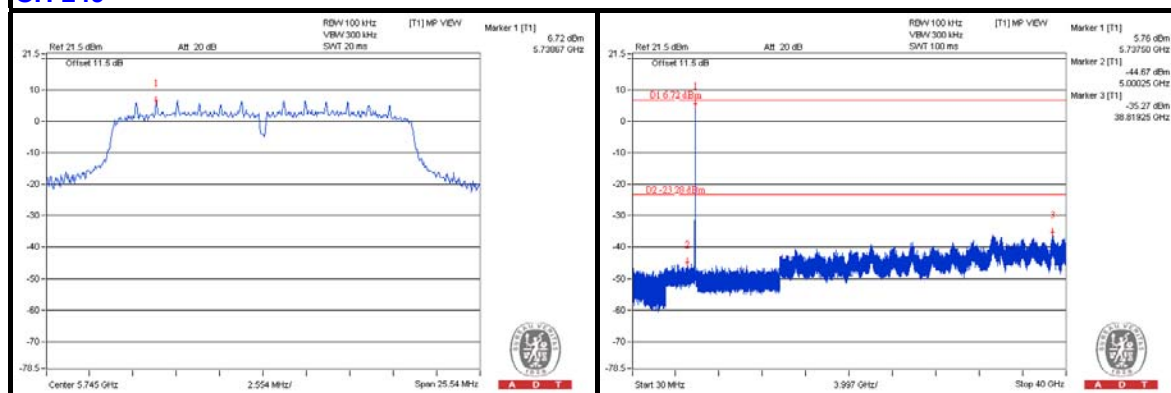


A D T

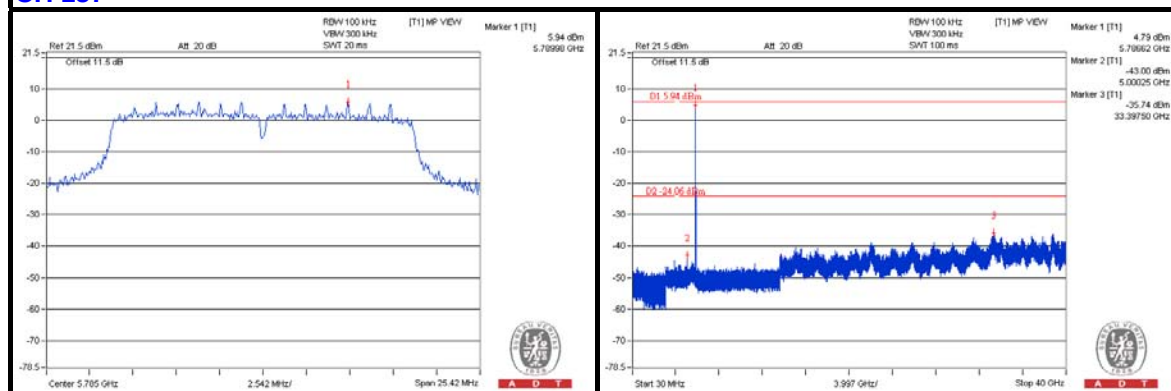
802.11n (20MHz)

CHAIN 0

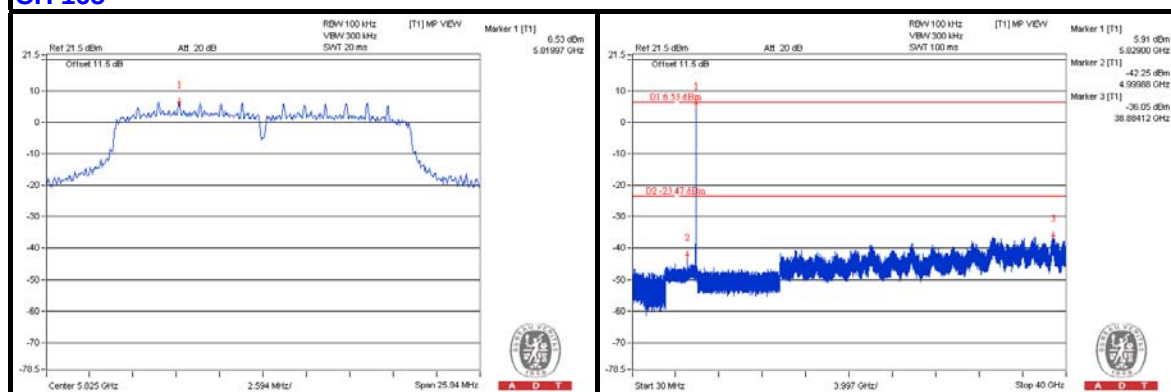
CH 149



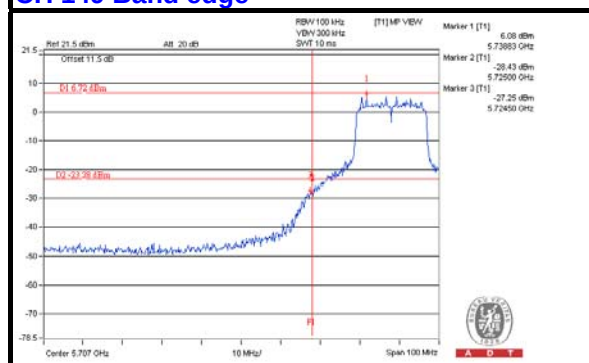
CH 157



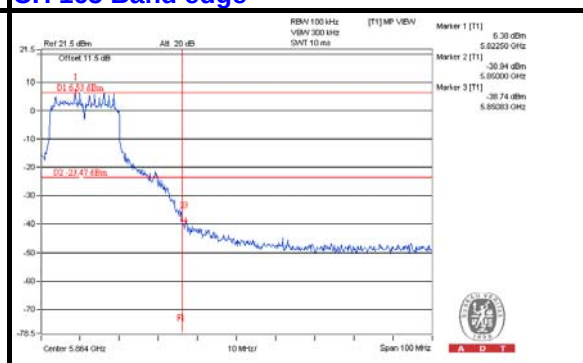
CH 165



CH 149 Band edge



CH 165 Band edge

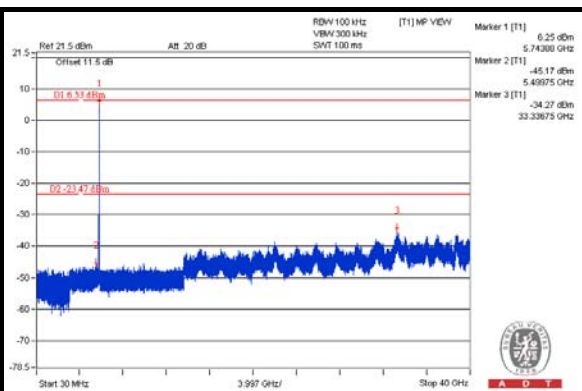
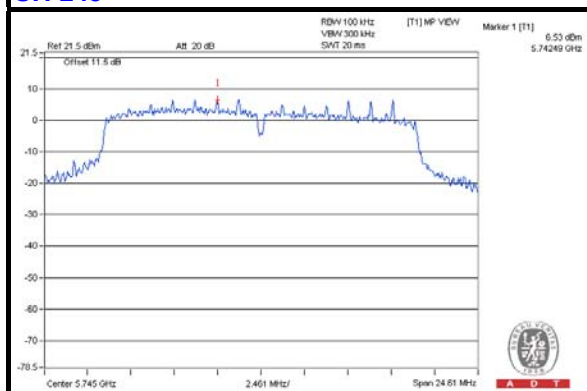




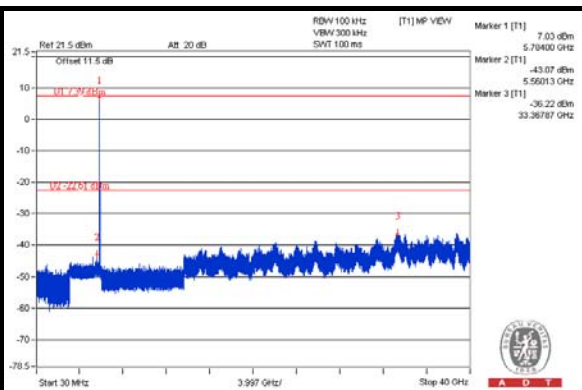
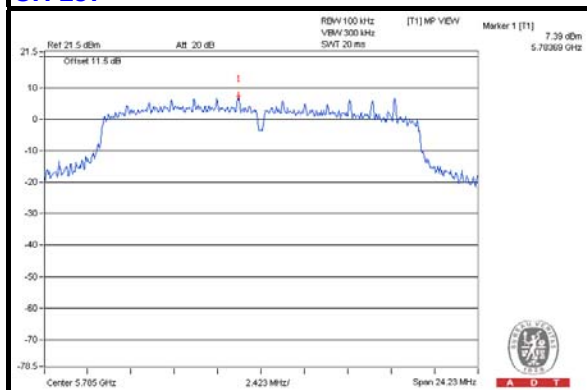
A D T

CHAIN 1

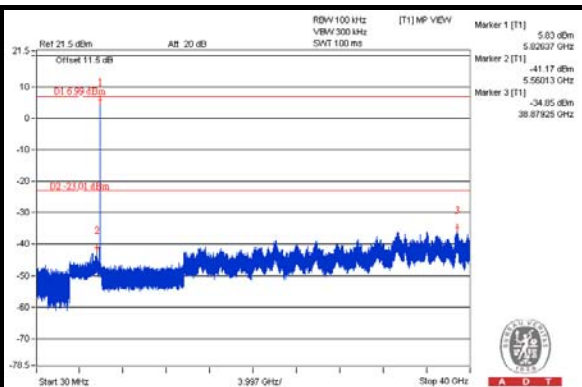
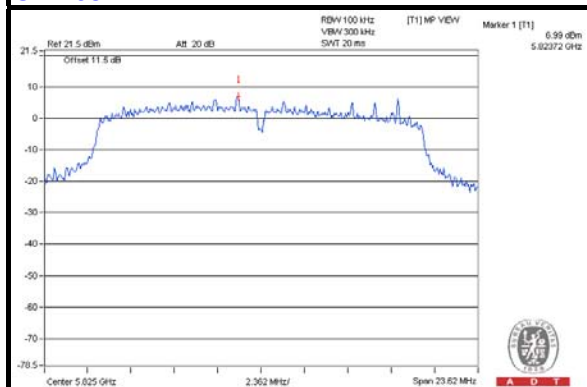
CH 149



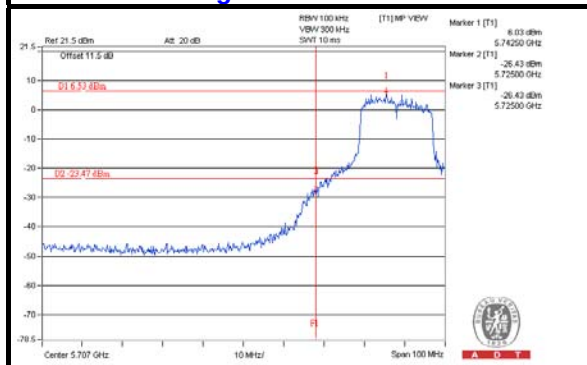
CH 157



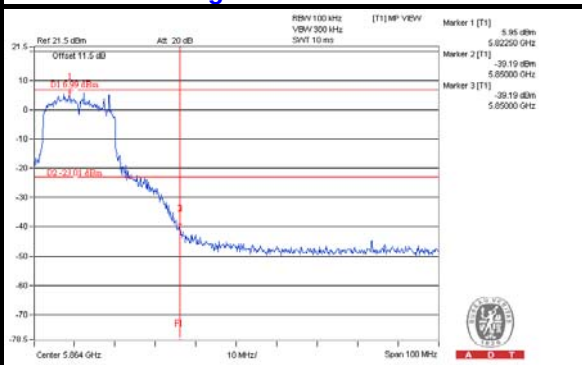
CH 165



CH 149 Band edge



CH 165 Band edge

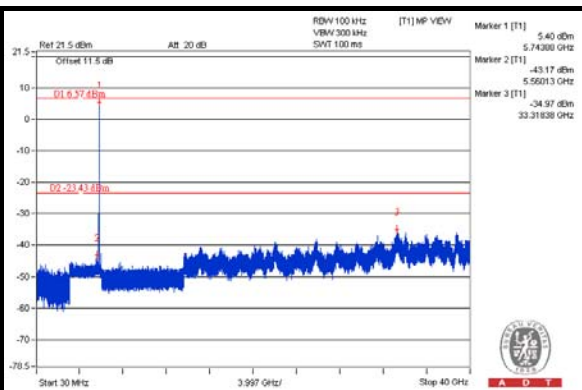
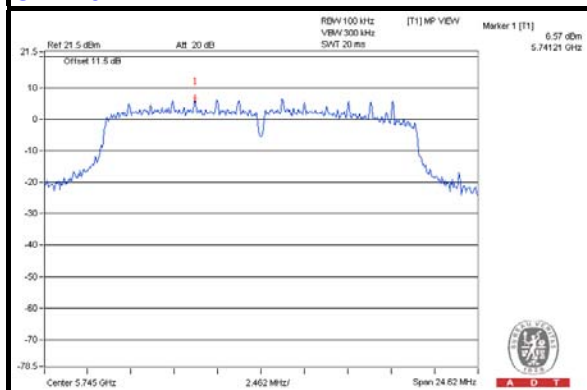




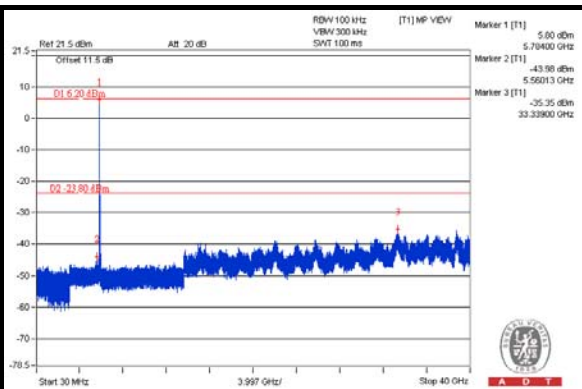
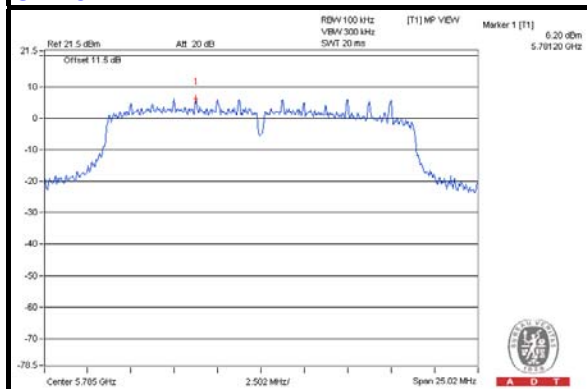
A D T

CHAIN 2

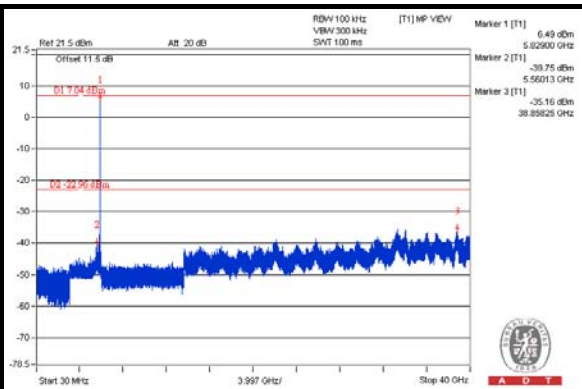
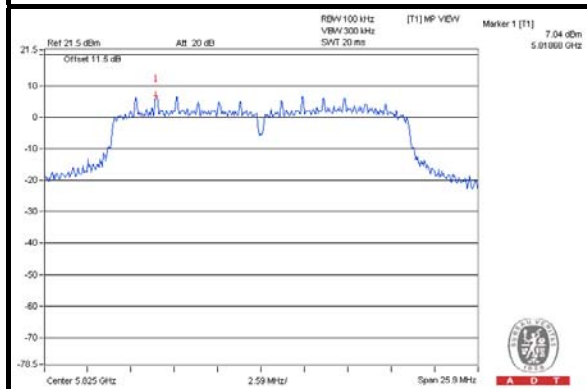
CH 149



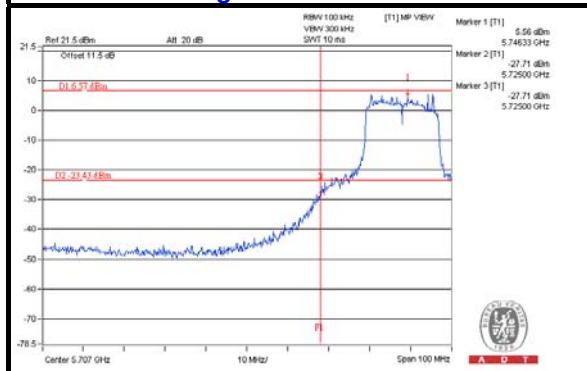
CH 157



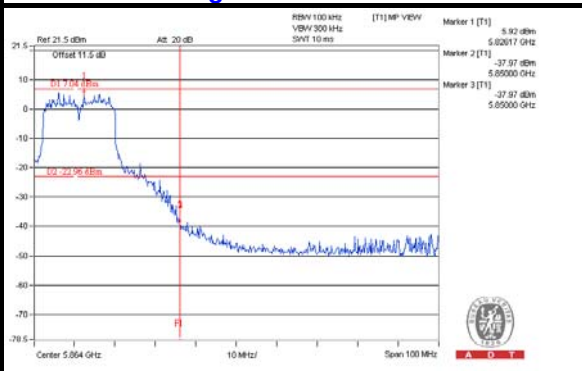
CH 165



CH 149 Band edge



CH 165 Band edge



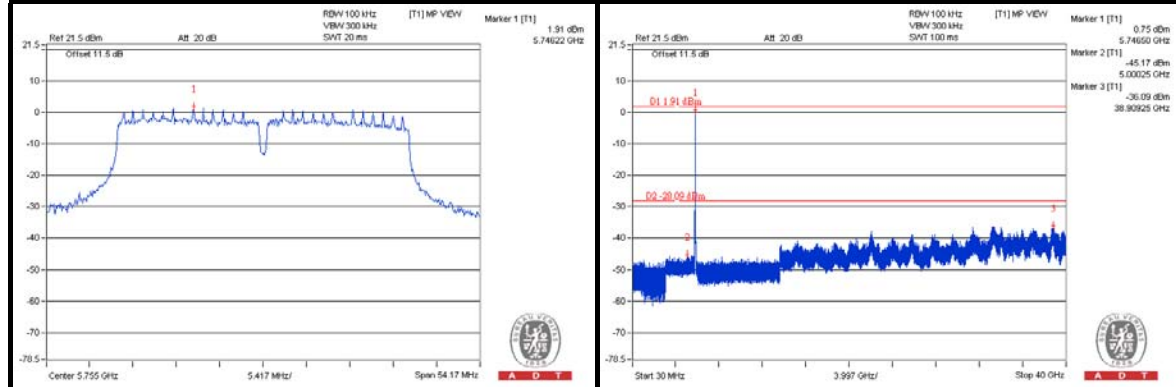


A D T

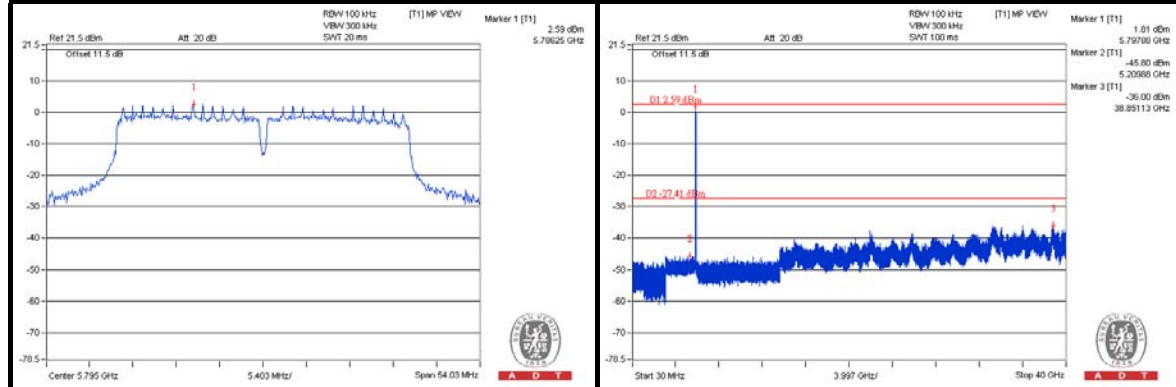
802.11n (40MHz)

CHAIN 0

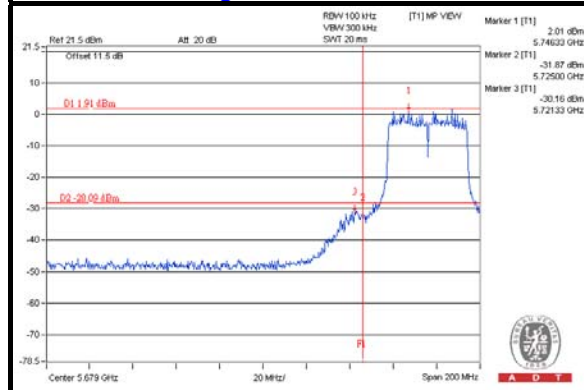
CH 151



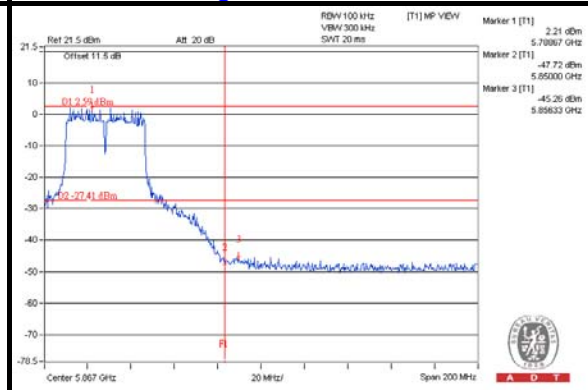
CH 159



CH 151 Band edge



CH 159 Band edge

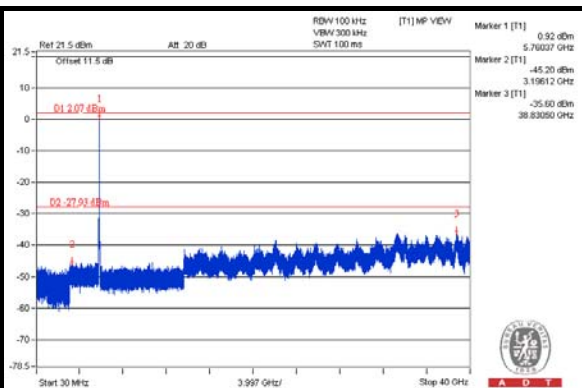
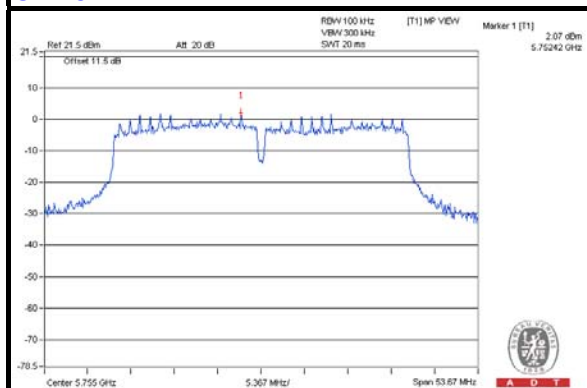




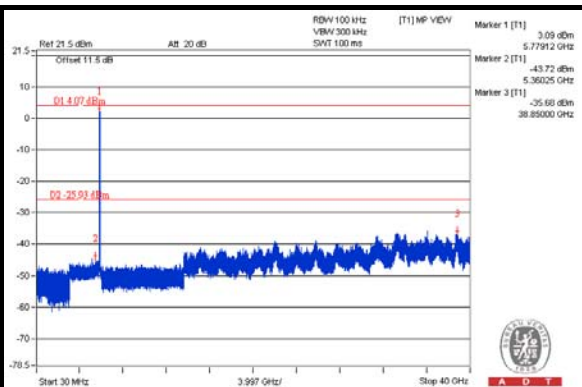
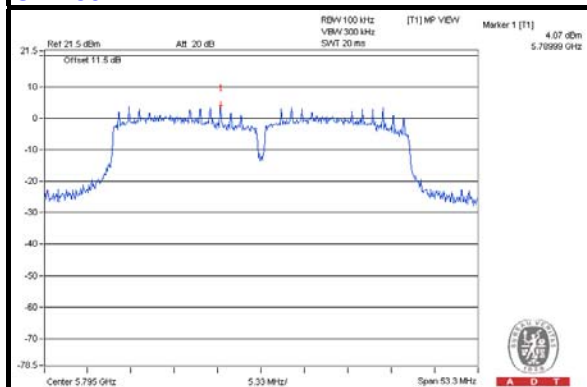
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CHAIN 1

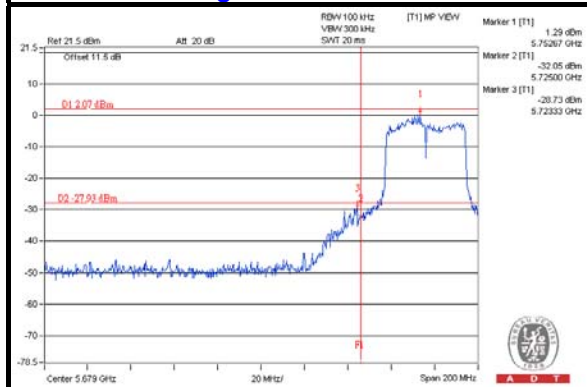
CH 151



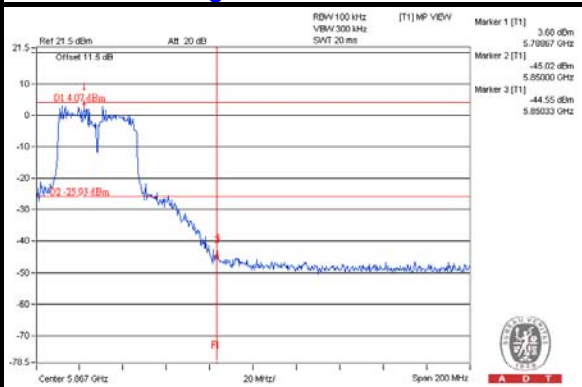
CH 159



CH 151 Band edge



CH 159 Band edge

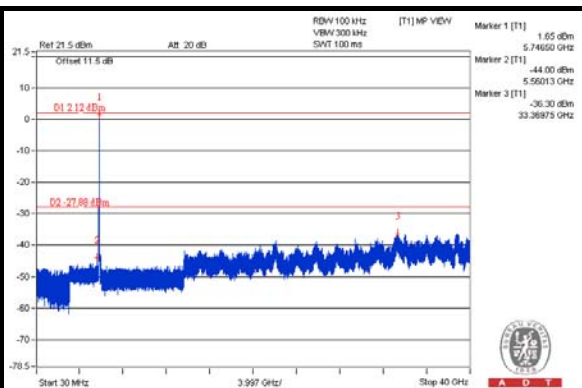
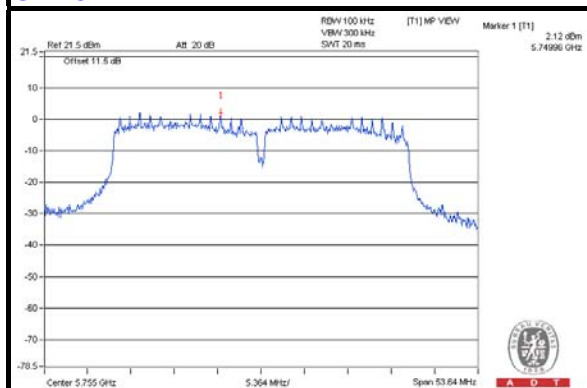




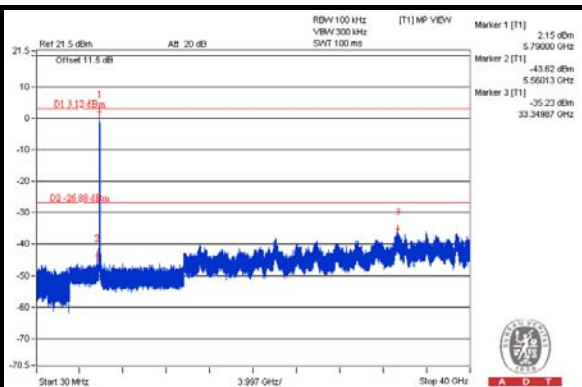
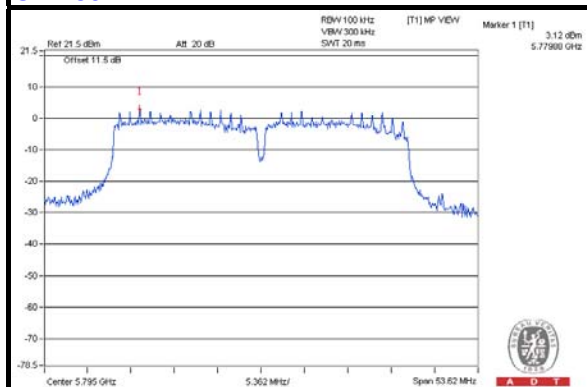
A D T

CHAIN 2

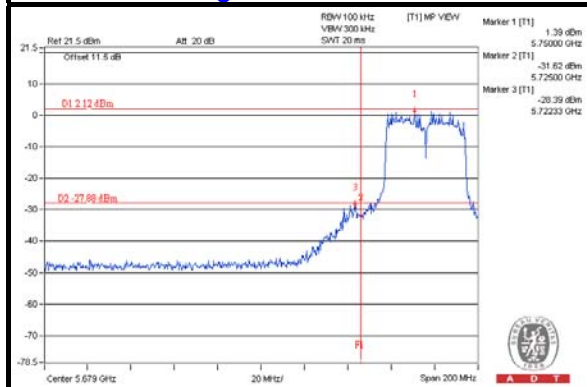
CH 151



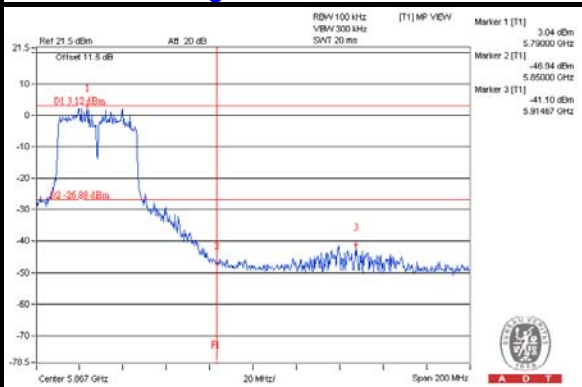
CH 159



CH 151 Band edge



CH 159 Band edge





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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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7. INFORMATION ON THE TESTING LABORATORIES

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

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

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

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

---END---