FCC TEST REPORT

(15.247)

REPORT NO.: RF140107C27

MODEL NO.: Archer D7

FCC ID: TE7D7V1

RECEIVED: Jan. 07, 2014

TESTED: Jul. 17 ~ Aug. 15, 2014

ISSUED: Aug. 20, 2014

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

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

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TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140107C27	Original release	Aug. 20, 2014

1. CERTIFICATION

PRODUCT:	AC1750 Wireless Dual Band Gigabit ADSL2+ Modem Router
MODEL NO.:	Archer D7
BRAND:	TP-LINK
APPLICANT:	TP-LINK TECHNOLOGIES CO., LTD.
TESTED:	Jul. 17 ~ Aug. 15, 2014
TEST SAMPLE:	PROTOTYPE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (model: Archer D7) 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 :** Aug. 20, 2014
Polly Chien / Specialist

APPROVED BY : _____ **, DATE :** Aug. 20, 2014
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.54dB at 0.15802MHz.
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2288.00MHz & 2483.50MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is RP-SMA-Female not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	AC1750 Wireless Dual Band Gigabit ADSL2+ Modem Router
MODEL NO.	Archer D7
POWER SUPPLY	12Vdc (adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps 802.11ac: up to 1300Mbps
OPERATING FREQUENCY	**2.4GHz:** 2412 ~ 2462MHz **5.0GHz:** 5745 ~ 5825MHz
NUMBER OF CHANNEL	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5.0GHz:** 802.11a, 802.11n (HT20): 5 802.11n (HT40): 2 802.11ac (VHT80): 1
OUTPUT POWER	**2.4GHz:** 778.388mW **5.0GHz:** 641.927mW
ANTENNA TYPE	**2.4GHz:** Dipole antenna with 2.0dBi gain **5.0GHz:** Dipole antenna with 3.0dBi gain
ANTENNA CONNECTOR	RP-SMA-Female
DATA CABLE	N/A
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	3TX
802.11g	3TX
802.11a	3TX
802.11n (HT20)	3TX
802.11n (HT40)	3TX
802.11ac (VHT80)	3TX

2. The EUT consumes power from the following adapter.

Brand	Ten Pao International Inc.
Model	S040EU1200250
Input Power	100-240Vac, 50/60Hz, 1.2A Max.
Output Power	12Vdc, 2500mA
Power Line	1.4m cable without core attached on adapter

3. The above EUT information is declared by manufacturer and for more detailed feature 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, 802.11n (HT20):

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 (HT40):

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 (HT20):

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

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

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

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	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)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	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 (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 63%RH	120Vac, 60Hz	Brad Tung
RE<1G	27deg. C, 62%RH	120Vac, 60Hz	Alan Wu
PLC	25deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tasi

FOR 5.0GHz (5745 ~ 5825MHz):

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

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

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 (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)	155	155	OFDM	BPSK	87.8

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 (HT20)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)	155	155	OFDM	BPSK	87.8

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 (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)	155	155	OFDM	BPSK	87.8

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 63%RH	120Vac, 60Hz	Brad Tung
RE<1G	27deg. C, 62%RH	120Vac, 60Hz	Alan Wu
PLC	25deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tasi

3.3 DUTY CYCLE OF TEST SIGNAL

For 2.4GHz Band:

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

Duty cycle of test signal is > 98 %

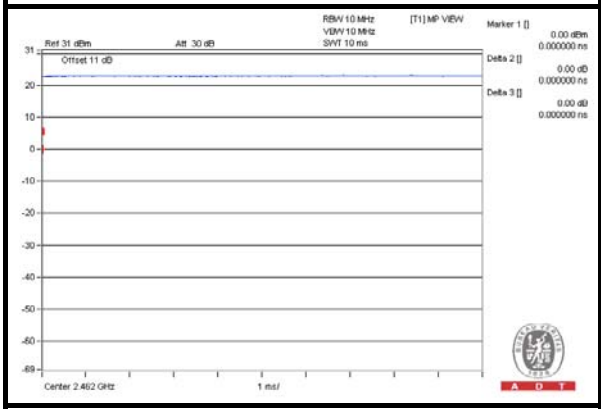
802.11g: Duty cycle = 5.355/5.420 =0.988

802.11n (HT20): Duty cycle = 4.957/5.017 = 0.988

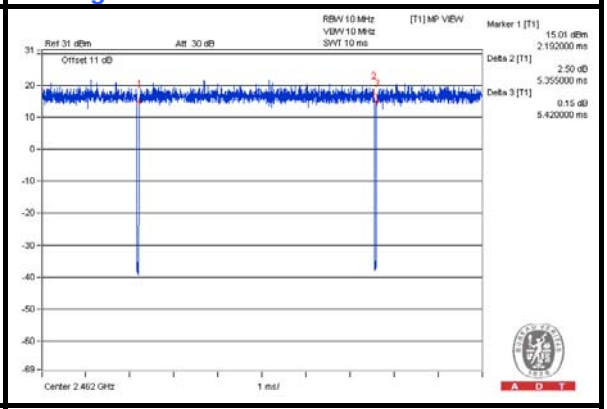
Duty cycle is < 98%, duty factor shall be considered.

802.11n (HT40): Duty cycle = 2.402/2.462 = 0.976, Duty factor = 10 * log(1/0.976) = 0.11

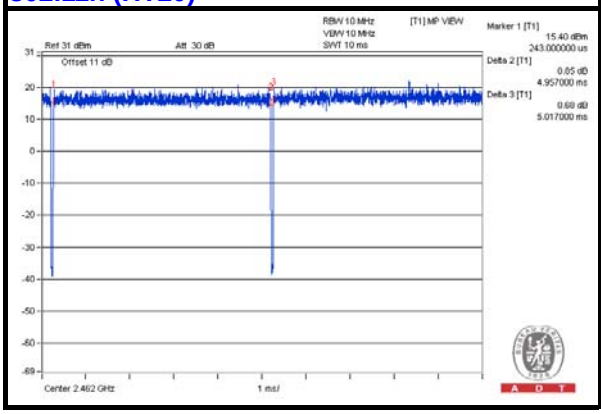
802.11b



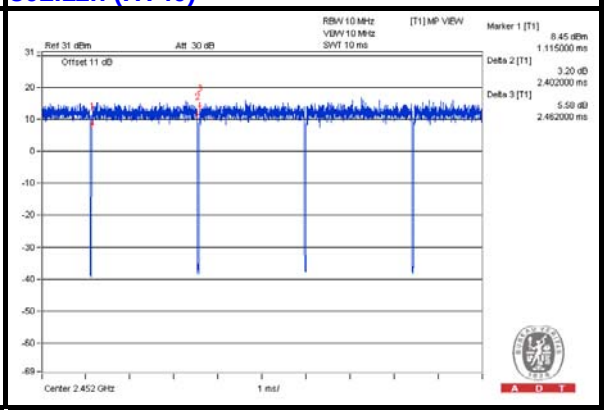
802.11g



802.11n (HT20)



802.11n (HT40)

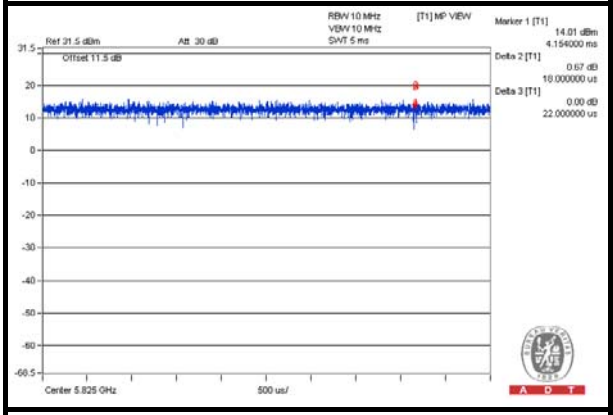


For 5GHz Band:

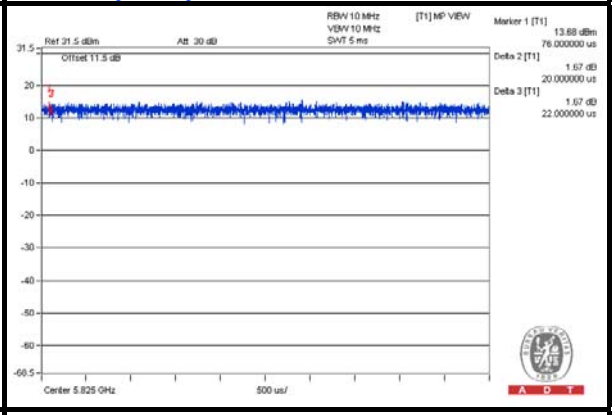
802.11a: Duty cycle of test signal is 100 %, duty factor is not required.

802.11n (HT20), 802.11n (HT40), 802.11ac (VHT80): Duty cycle of test signal is > 98 %

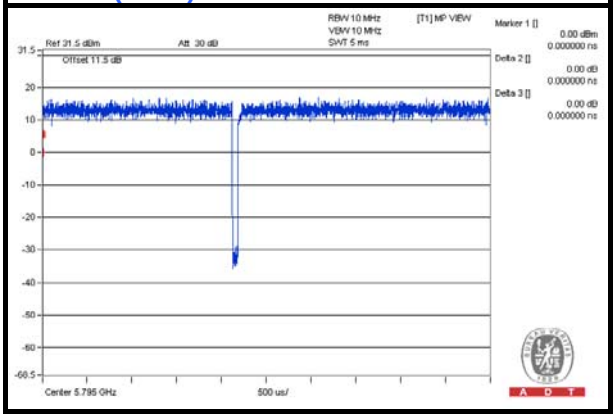
802.11a



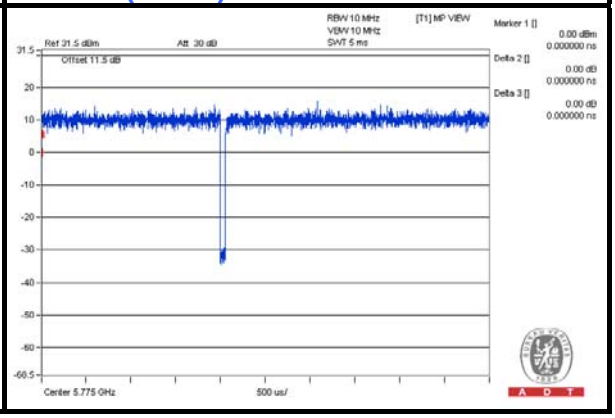
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



3.4 DESCRIPTION OF SUPPORT UNITS

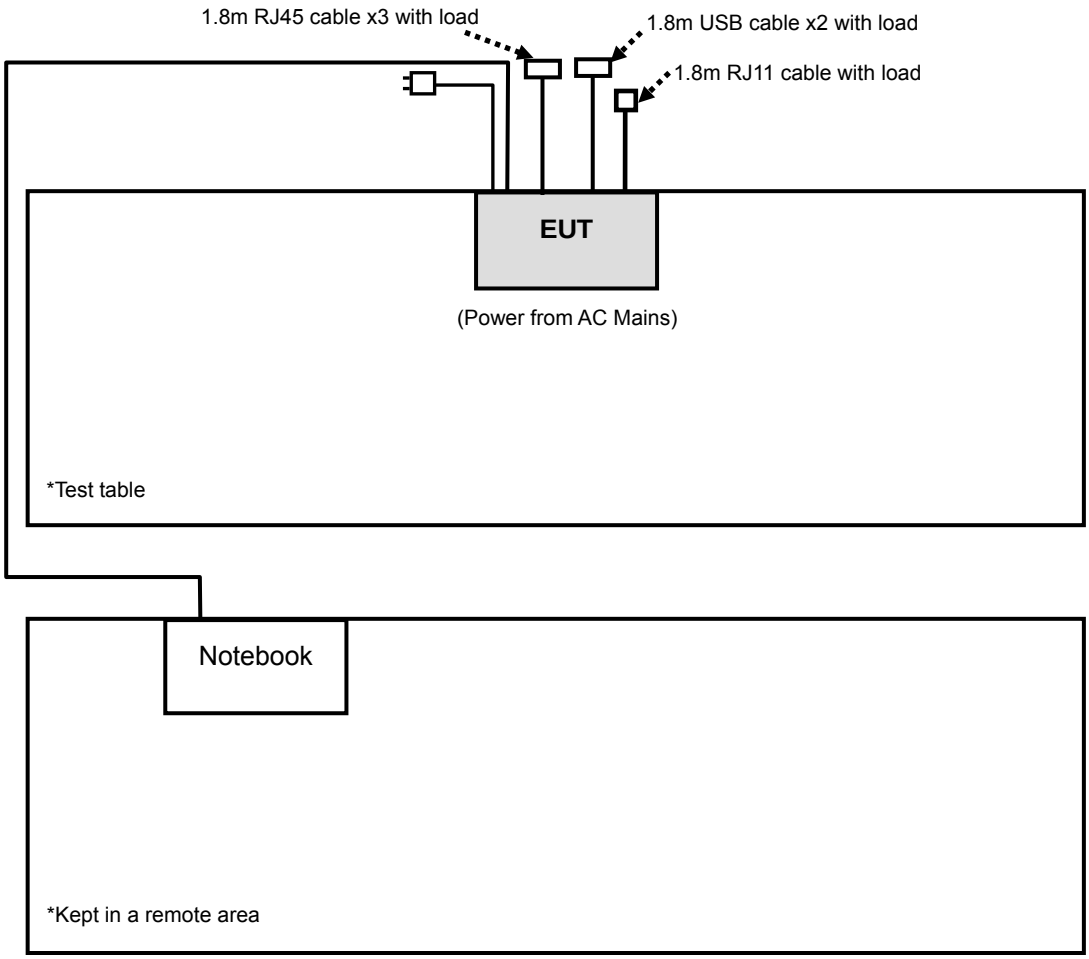
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	QDS-BRCM1020

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	3m LAN cable

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

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r02
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2009

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

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

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

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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

4.1.2 TEST INSTRUMENTS

Tested date: Jul. 09 ~ Jul. 17, 2014

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
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
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	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, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 2014

NOTE:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 4.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. 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. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

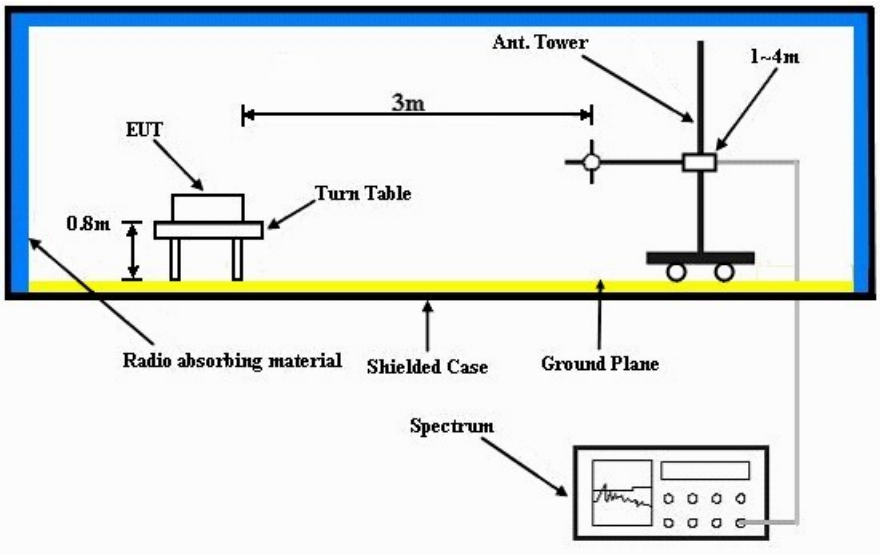
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

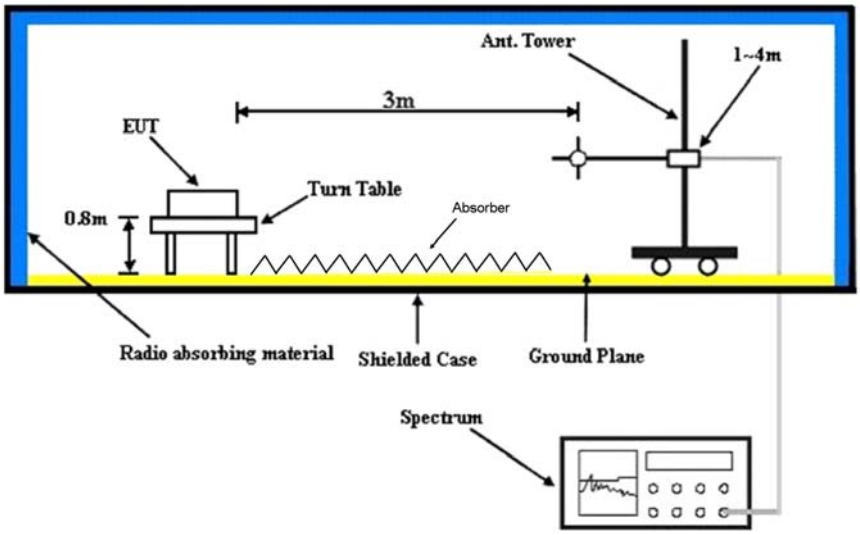
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Prepared notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

4.1.7 TEST RESULTS

ABOVE 1GHz DATA：

802.11b

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

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	53.8 PK	74.0	-20.2	1.33 H	142	21.80	32.00
2	2390.00	47.8 AV	54.0	-6.2	1.33 H	142	15.80	32.00
3	*2412.00	115.5 PK			1.33 H	142	83.50	32.00
4	*2412.00	111.3 AV			1.33 H	142	79.30	32.00
5	4824.00	46.3 PK	74.0	-27.7	1.00 H	100	41.10	5.20
6	4824.00	35.3 AV	54.0	-18.7	1.00 H	100	30.10	5.20
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	2372.00	62.5 PK	74.0	-11.5	1.00 V	1	30.60	31.90
2	2372.00	51.5 AV	54.0	-2.5	1.00 V	1	19.60	31.90
3	*2412.00	117.9 PK			1.00 V	8	85.90	32.00
4	*2412.00	113.8 AV			1.00 V	8	81.80	32.00
5	4824.00	54.3 PK	74.0	-19.7	1.05 V	303	49.10	5.20
6	4824.00	50.3 AV	54.0	-3.7	1.05 V	303	45.10	5.20

REMARKS:

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

CHANNEL	TX Channel 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	111.1 PK			1.34 H	132	79.00	32.10
2	*2437.00	107.4 AV			1.34 H	132	75.30	32.10
3	7311.00	57.2 PK	74.0	-16.8	1.00 H	80	45.90	11.30
4	7311.00	45.5 AV	54.0	-8.5	1.00 H	80	34.20	11.30
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	2288.00	63.5 PK	74.0	-10.5	1.00 V	15	29.00	34.50
2	**2288.00**	**53.0 AV**	**54.0**	**-1.0**	**1.00 V**	**15**	**18.50**	**34.50**
3	*2437.00	113.6 PK			1.00 V	333	81.50	32.10
4	*2437.00	110.6 AV			1.00 V	333	78.50	32.10
5	4874.00	50.5 PK	74.0	-23.5	1.11 V	8	45.20	5.30
6	4874.00	45.3 AV	54.0	-8.7	1.11 V	8	40.00	5.30
7	7311.00	58.5 PK	74.0	-15.5	1.43 V	103	47.20	11.30
8	7311.00	52.0 AV	54.0	-2.0	1.43 V	103	40.70	11.30

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.

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	111.0 PK			1.30 H	124	78.70	32.30
2	*2462.00	107.7 AV			1.30 H	124	75.40	32.30
3	2483.50	59.0 PK	74.0	-15.0	1.30 H	124	26.60	32.40
4	2483.50	45.8 AV	54.0	-8.2	1.30 H	124	13.40	32.40
5	7386.00	56.2 PK	74.0	-17.8	1.00 H	90	44.80	11.40
6	7386.00	47.6 AV	54.0	-6.4	1.00 H	90	36.20	11.40
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	2288.00	63.0 PK	74.0	-11.0	1.00 V	3	28.50	34.50
2	2288.00	52.8 AV	54.0	-1.2	1.00 V	3	18.30	34.50
3	*2462.00	113.4 PK			1.17 V	338	81.10	32.30
4	*2462.00	110.3 AV			1.17 V	338	78.00	32.30
5	2483.50	61.1 PK	74.0	-12.9	1.17 V	338	28.70	32.40
6	2483.50	47.8 AV	54.0	-6.2	1.17 V	338	15.40	32.40
7	7386.00	60.2 PK	74.0	-13.8	1.42 V	102	48.80	11.40
8	7386.00	52.6 AV	54.0	-1.4	1.42 V	102	41.20	11.40

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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.5 PK	74.0	-13.5	1.00 H	199	28.50	32.00
2	2390.00	45.3 AV	54.0	-8.7	1.00 H	199	13.30	32.00
3	*2412.00	101.7 PK			1.00 H	199	69.70	32.00
4	*2412.00	92.0 AV			1.00 H	199	60.00	32.00
5	4824.00	47.6 PK	74.0	-26.4	1.00 H	178	42.40	5.20
6	4824.00	38.2 AV	54.0	-15.8	1.00 H	178	33.00	5.20
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	2390.00	67.5 PK	74.0	-6.5	1.40 V	188	35.50	32.00
2	2390.00	51.3 AV	54.0	-2.7	1.40 V	188	19.30	32.00
3	*2412.00	113.7 PK			1.40 V	177	81.70	32.00
4	*2412.00	103.8 AV			1.40 V	177	71.80	32.00
5	4824.00	49.8 PK	74.0	-24.2	1.08 V	20	44.60	5.20
6	4824.00	40.5 AV	54.0	-13.5	1.08 V	20	35.30	5.20

REMARKS:

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

CHANNEL	TX Channel 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	101.3 PK			1.00 H	192	69.20	32.10
2	*2437.00	92.5 AV			1.00 H	192	60.40	32.10
3	4874.00	47.8 PK	74.0	-26.2	1.00 H	163	42.50	5.30
4	4874.00	38.4 AV	54.0	-15.6	1.00 H	163	33.10	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	*2437.00	112.7 PK			1.69 V	180	80.60	32.10
2	*2437.00	103.3 AV			1.69 V	180	71.20	32.10
3	4874.00	49.8 PK	74.0	-24.2	1.05 V	15	44.50	5.30
4	4874.00	40.4 AV	54.0	-13.6	1.05 V	15	35.10	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.

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	101.0 PK			1.00 H	203	68.70	32.30
2	*2462.00	91.8 AV			1.00 H	203	59.50	32.30
3	2483.50	56.5 PK	74.0	-17.5	1.00 H	203	24.10	32.40
4	2483.50	44.8 AV	54.0	-9.2	1.00 H	203	12.40	32.40
5	4924.00	47.5 PK	74.0	-26.5	1.00 H	145	42.10	5.40
6	4924.00	37.9 AV	54.0	-16.1	1.00 H	145	32.50	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	*2462.00	113.0 PK			1.39 V	178	80.70	32.30
2	*2462.00	103.3 AV			1.39 V	178	71.00	32.30
3	2483.50	63.5 PK	74.0	-10.5	1.42 V	182	31.10	32.40
4	2483.50	49.8 AV	54.0	-4.2	1.42 V	182	17.40	32.40
5	4924.00	49.6 PK	74.0	-24.4	1.10 V	17	44.20	5.40
6	4924.00	40.5 AV	54.0	-13.5	1.10 V	17	35.10	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.

802.11n (HT20)

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

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	64.4 PK	74.0	-9.6	1.00 H	222	32.40	32.00
2	2390.00	46.0 AV	54.0	-8.0	1.00 H	222	14.00	32.00
3	*2412.00	102.0 PK			1.00 H	203	70.00	32.00
4	*2412.00	93.2 AV			1.00 H	203	61.20	32.00
5	4824.00	47.4 PK	74.0	-26.6	1.00 H	145	42.20	5.20
6	4824.00	37.9 AV	54.0	-16.1	1.00 H	145	32.70	5.20
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	2390.00	71.8 PK	74.0	-2.2	1.15 V	180	39.80	32.00
2	2390.00	52.0 AV	54.0	-2.0	1.15 V	180	20.00	32.00
3	*2412.00	112.0 PK			1.15 V	186	80.00	32.00
4	*2412.00	103.0 AV			1.15 V	186	71.00	32.00
5	4824.00	49.3 PK	74.0	-24.7	1.00 V	18	44.10	5.20
6	4824.00	39.7 AV	54.0	-14.3	1.00 V	18	34.50	5.20

REMARKS:

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

CHANNEL	TX Channel 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	103.1 PK			1.00 H	214	71.00	32.10
2	*2437.00	93.2 AV			1.00 H	214	61.10	32.10
3	4874.00	47.8 PK	74.0	-26.2	1.00 H	132	42.50	5.30
4	4874.00	38.4 AV	54.0	-15.6	1.00 H	132	33.10	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	2288.00	64.3 PK	74.0	-9.7	1.00 V	14	29.80	34.50
2	2288.00	52.6 AV	54.0	-1.4	1.00 V	14	18.10	34.50
3	*2437.00	113.1 PK			1.66 V	182	81.00	32.10
4	*2437.00	103.5 AV			1.66 V	182	71.40	32.10
5	4874.00	49.6 PK	74.0	-24.4	1.00 V	23	44.30	5.30
6	4874.00	40.3 AV	54.0	-13.7	1.00 V	23	35.00	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.

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	102.8 PK			1.00 H	230	70.50	32.30
2	*2462.00	92.8 AV			1.00 H	230	60.50	32.30
3	2483.50	62.6 PK	74.0	-11.4	1.00 H	218	30.20	32.40
4	2483.50	46.0 AV	54.0	-8.0	1.00 H	218	13.60	32.40
5	4924.00	47.4 PK	74.0	-26.6	1.00 H	150	42.00	5.40
6	4924.00	38.1 AV	54.0	-15.9	1.00 H	150	32.70	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	*2462.00	113.1 PK			1.12 V	192	80.80	32.30
2	*2462.00	103.4 AV			1.12 V	192	71.10	32.30
3	2483.50	71.3 PK	74.0	-2.7	1.12 V	192	38.90	32.40
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.12 V**	**192**	**20.60**	**32.40**
5	4924.00	49.4 PK	74.0	-24.6	1.00 V	30	44.00	5.40
6	4924.00	39.7 AV	54.0	-14.3	1.00 V	30	34.30	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.

802.11n (HT40)

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

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	61.7 PK	74.0	-12.3	1.00 H	132	29.70	32.00
2	2390.00	46.0 AV	54.0	-8.0	1.00 H	132	14.00	32.00
3	*2422.00	96.2 PK			1.00 H	132	64.10	32.10
4	*2422.00	86.9 AV			1.00 H	132	54.80	32.10
5	4844.00	47.1 PK	74.0	-26.9	1.00 H	152	41.80	5.30
6	4844.00	36.4 AV	54.0	-17.6	1.00 H	152	31.10	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	68.7 PK	74.0	-5.3	1.40 V	201	36.70	32.00
2	2390.00	52.8 AV	54.0	-1.2	1.40 V	201	20.80	32.00
3	*2422.00	108.3 PK			1.39 V	196	76.20	32.10
4	*2422.00	99.1 AV			1.39 V	196	67.00	32.10
5	4844.00	48.5 PK	74.0	-25.5	1.09 V	11	43.20	5.30
6	4844.00	39.1 AV	54.0	-14.9	1.09 V	11	33.80	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.

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	97.6 PK			1.00 H	138	65.50	32.10
2	*2437.00	88.1 AV			1.00 H	138	56.00	32.10
3	4874.00	47.1 PK	74.0	-26.9	1.00 H	170	41.80	5.30
4	4874.00	37.3 AV	54.0	-16.7	1.00 H	170	32.00	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	62.9 PK	74.0	-11.1	1.40 V	171	30.90	32.00
2	2390.00	50.2 AV	54.0	-3.8	1.40 V	171	18.20	32.00
3	*2437.00	109.6 PK			1.40 V	174	77.50	32.10
4	*2437.00	100.1 AV			1.40 V	174	68.00	32.10
5	4874.00	49.1 PK	74.0	-24.9	1.14 V	26	43.80	5.30
6	4874.00	39.3 AV	54.0	-14.7	1.14 V	26	34.00	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.

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	97.0 PK			1.00 H	150	64.70	32.30
2	*2452.00	87.8 AV			1.00 H	150	55.50	32.30
3	2483.50	64.4 PK	74.0	-9.6	1.00 H	134	32.00	32.40
4	2483.50	46.4 AV	54.0	-7.6	1.00 H	134	14.00	32.40
5	4904.00	47.3 PK	74.0	-26.7	1.00 H	176	41.90	5.40
6	4904.00	37.5 AV	54.0	-16.5	1.00 H	176	32.10	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	109.0 PK			1.36 V	196	76.70	32.30
2	*2452.00	100.0 AV			1.36 V	196	67.70	32.30
3	2483.50	72.4 PK	74.0	-1.6	1.36 V	182	40.00	32.40
4	2483.50	52.8 AV	54.0	-1.2	1.36 V	182	20.40	32.40
5	4904.00	49.3 PK	74.0	-24.7	1.07 V	9	43.90	5.40
6	4904.00	39.7 AV	54.0	-14.3	1.07 V	9	34.30	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.

BELOW 1GHz WORST-CASE DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	53.18	32.0 QP	40.0	-8.0	1.99 H	319	46.00	-14.00
2	124.98	33.2 QP	43.5	-10.3	1.99 H	296	48.90	-15.70
3	229.76	40.7 QP	46.0	-5.3	1.00 H	295	56.90	-16.20
4	272.45	39.9 QP	46.0	-6.1	1.00 H	255	53.00	-13.10
5	499.48	38.0 QP	46.0	-8.0	1.99 H	305	46.90	-8.90
6	600.38	40.2 QP	46.0	-5.8	1.49 H	300	47.00	-6.80
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	57.07	35.3 QP	40.0	-4.7	1.00 V	9	49.60	-14.30
2	231.70	33.2 QP	46.0	-12.8	1.00 V	9	49.10	-15.90
3	375.29	33.3 QP	46.0	-12.7	1.25 V	204	44.40	-11.10
4	499.48	36.7 QP	46.0	-9.3	1.25 V	322	45.60	-8.90
5	600.38	36.6 QP	46.0	-9.4	1.00 V	286	43.40	-6.80
6	625.60	36.6 QP	46.0	-9.4	2.00 V	12	42.70	-6.10

REMARKS:

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

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

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

4.2.2 TEST INSTRUMENTS

Tested date: Aug. 15, 2014

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

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

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

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

4.2.3 TEST PROCEDURES

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

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

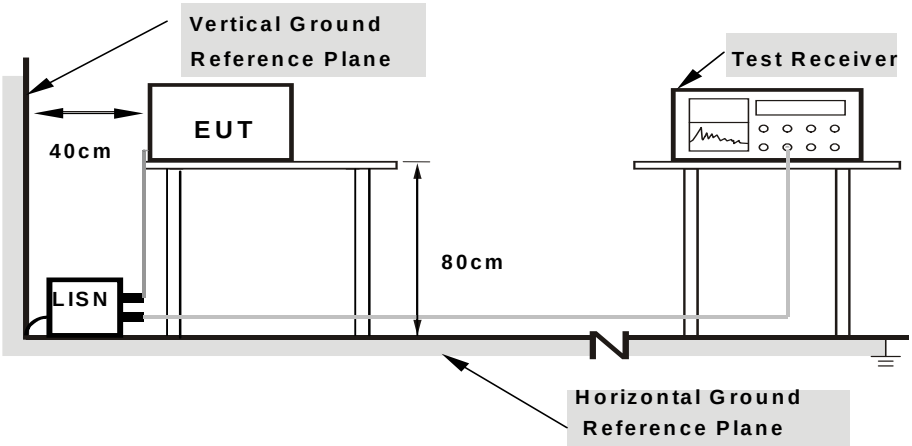
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

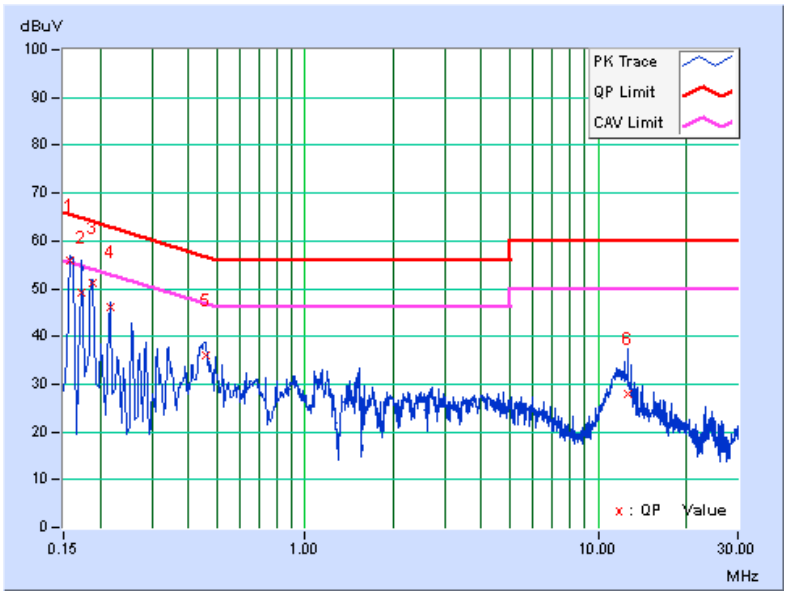
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：802.11b

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15802	0.11	55.80	42.59	55.91	42.70	65.57	55.57	-9.66	-12.87
2	0.17346	0.10	49.11	21.94	49.21	22.04	64.79	54.79	-15.58	-32.75
3	0.18754	0.09	50.95	37.88	51.04	37.97	64.14	54.14	-13.10	-16.17
4	0.21647	0.09	46.07	31.68	46.16	31.77	62.95	52.95	-16.79	-21.18
5	0.45889	0.12	35.94	26.14	36.06	26.26	56.71	46.71	-20.65	-20.45
6	12.61508	0.70	27.30	20.96	28.00	21.66	60.00	50.00	-32.00	-28.34

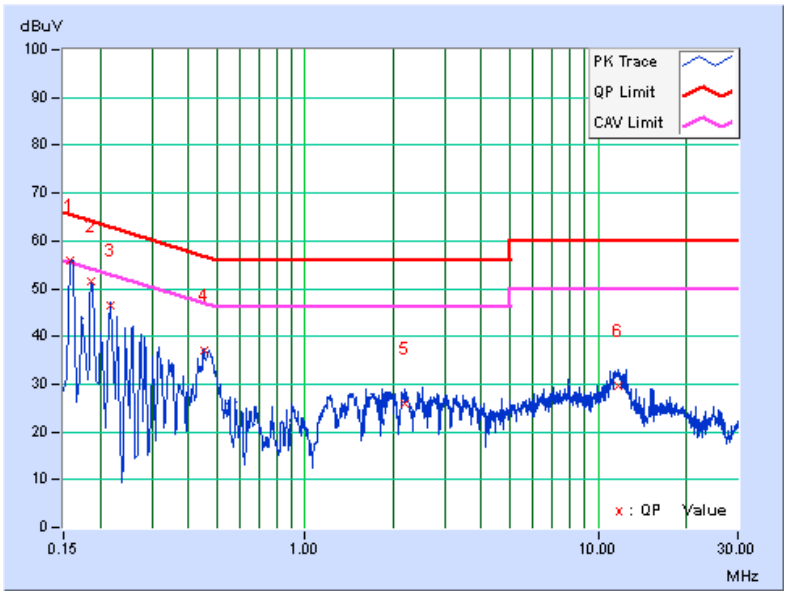
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15802**	**0.06**	**55.97**	**42.72**	**56.03**	**42.78**	**65.57**	**55.57**	**-9.54**	**-12.79**
2	0.18557	0.08	51.50	38.10	51.58	38.18	64.23	54.23	-12.65	-16.05
3	0.21647	0.10	46.40	32.69	46.50	32.79	62.95	52.95	-16.46	-20.17
4	0.45097	0.17	36.90	27.32	37.07	27.49	56.86	46.86	-19.78	-19.36
5	2.18711	0.22	25.61	18.94	25.83	19.16	56.00	46.00	-30.17	-26.84
6	11.66886	0.62	28.90	22.79	29.52	23.41	60.00	50.00	-30.48	-26.59

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

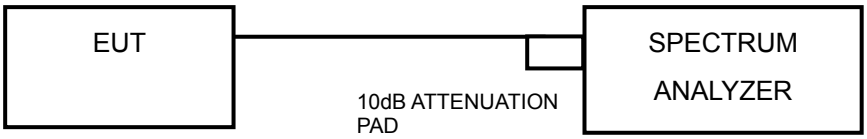


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	7.13	7.56	7.12	0.5	PASS
6	2437	7.59	7.13	7.10	0.5	PASS
11	2462	7.08	7.10	7.07	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.42	16.42	16.42	0.5	PASS
6	2437	16.41	16.41	16.42	0.5	PASS
11	2462	16.43	16.45	16.43	0.5	PASS

802.11n (HT20)

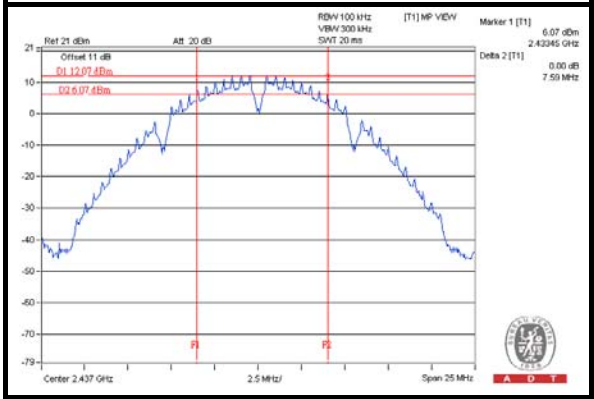
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.65	17.64	17.66	0.5	PASS
6	2437	17.65	17.64	17.65	0.5	PASS
11	2462	17.63	17.64	17.64	0.5	PASS

802.11n (HT40)

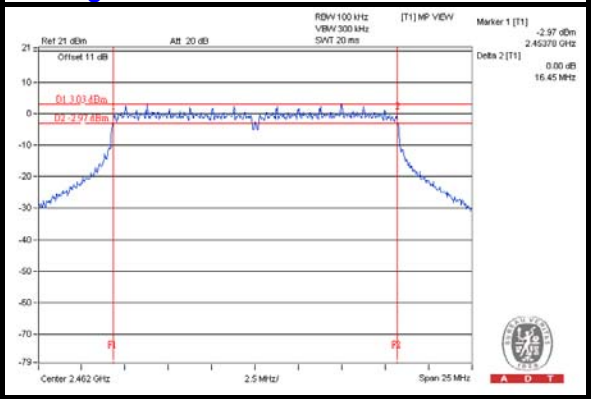
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.45	36.48	36.48	0.5	PASS
6	2437	36.42	36.40	36.40	0.5	PASS
9	2452	36.42	36.46	36.46	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

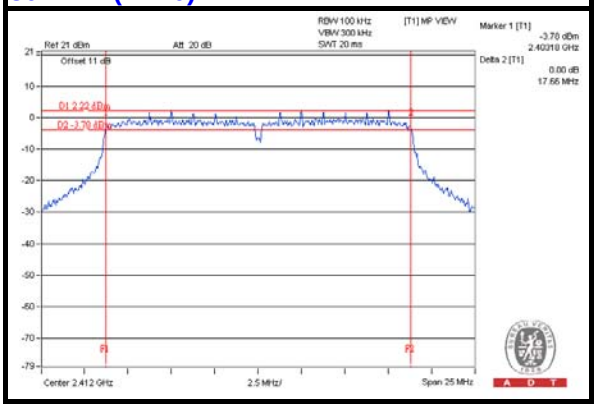
802.11b



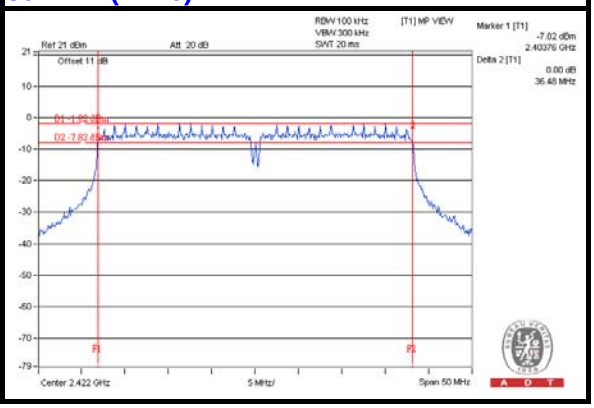
802.11g



802.11n (HT20)



802.11n (HT40)



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

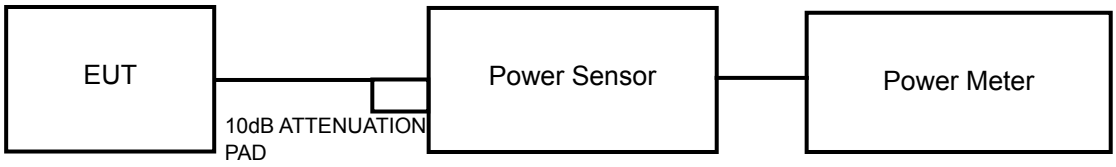
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	24.40	23.98	24.03	**778.388**	28.91	30	PASS
6	2437	22.61	23.19	21.90	545.721	27.37	30	PASS
11	2462	22.30	22.36	22.11	504.566	27.03	30	PASS

802.11g

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	23.30	23.23	23.44	644.974	28.10	30	PASS
6	2437	23.73	23.99	22.42	661.241	28.20	30	PASS
11	2462	23.54	23.20	23.47	657.205	28.18	30	PASS

802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	22.89	23.49	21.82	569.948	27.56	30	PASS
6	2437	22.48	23.29	21.93	546.270	27.37	30	PASS
11	2462	23.27	23.79	22.14	615.338	27.89	30	PASS

802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
3	2422	22.00	22.06	21.58	463.063	26.66	30	PASS
6	2437	23.62	23.37	22.56	627.716	27.98	30	PASS
9	2452	22.02	22.80	22.42	524.349	27.20	30	PASS

FOR AVERAGE POWER

802.11b

CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	20.99	20.85	20.80	367.448	25.65
6	2437	19.59	19.69	18.71	258.404	24.12
11	2462	19.29	19.37	18.89	248.861	23.96

802.11g

CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	14.06	13.47	13.78	71.579	18.55
6	2437	14.04	14.59	13.65	77.299	18.88
11	2462	13.88	13.52	13.31	68.354	18.35

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	14.17	14.12	13.49	74.281	18.71
6	2437	14.08	14.62	13.35	76.186	18.82
11	2462	14.15	14.18	13.48	74.468	18.72

802.11n (HT40)

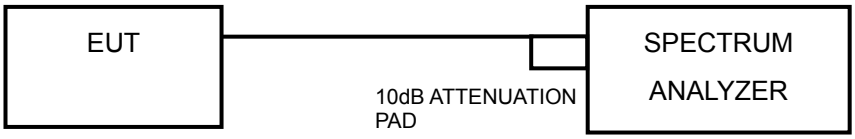
CHAN.	FREQUENCY (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	12.38	12.35	11.82	49.682	16.96
6	2437	13.72	14.34	13.47	72.947	18.63
9	2452	12.68	13.39	12.61	58.601	17.68

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

a. Set the RBW = 3 kHz, VBW =10 kHz, Detector = RMS.
b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
c. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-0.78	4.77	3.99	7.23	PASS
	6	2437	-2.22	4.77	2.55	7.23	PASS
	11	2462	-2.61	4.77	2.16	7.23	PASS
1	1	2412	-1.36	4.77	3.41	7.23	PASS
	6	2437	-2.03	4.77	2.74	7.23	PASS
	11	2462	-1.17	4.77	3.60	7.23	PASS
2	1	2412	-2.19	4.77	2.58	7.23	PASS
	6	2437	-2.93	4.77	1.84	7.23	PASS
	11	2462	-3.18	4.77	1.59	7.23	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 8-(6.77-6) = 7.23dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-11.27	4.77	-6.50	7.23	PASS
	6	2437	-11.18	4.77	-6.41	7.23	PASS
	11	2462	-10.38	4.77	-5.61	7.23	PASS
1	1	2412	-8.20	4.77	-3.43	7.23	PASS
	6	2437	-6.77	4.77	-2.00	7.23	PASS
	11	2462	-7.97	4.77	-3.20	7.23	PASS
2	1	2412	-7.09	4.77	-2.32	7.23	PASS
	6	2437	-11.14	4.77	-6.37	7.23	PASS
	11	2462	-9.70	4.77	-4.93	7.23	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 8-(6.77-6) = 7.23dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-11.85	4.77	-7.08	7.23	PASS
	6	2437	-11.95	4.77	-7.18	7.23	PASS
	11	2462	-12.10	4.77	-7.33	7.23	PASS
1	1	2412	-8.02	4.77	-3.25	7.23	PASS
	6	2437	-10.53	4.77	-5.76	7.23	PASS
	11	2462	-7.27	4.77	-2.50	7.23	PASS
2	1	2412	-11.20	4.77	-6.43	7.23	PASS
	6	2437	-11.16	4.77	-6.39	7.23	PASS
	11	2462	-11.84	4.77	-7.07	7.23	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 8-(6.77-6) = 7.23dBm.

802.11n (HT40)

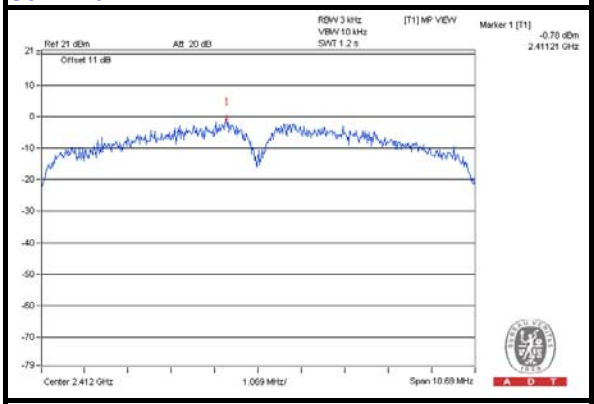
TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-15.98	4.77	-11.21	0.11	-11.10	7.23	PASS
	6	2437	-9.42	4.77	-4.65	0.11	-4.54	7.23	PASS
	9	2452	-15.38	4.77	-10.61	0.11	-10.50	7.23	PASS
1	3	2422	-10.38	4.77	-5.61	0.11	-5.50	7.23	PASS
	6	2437	-13.55	4.77	-8.78	0.11	-8.67	7.23	PASS
	9	2452	-9.08	4.77	-4.31	0.11	-4.20	7.23	PASS
2	3	2422	-16.24	4.77	-11.47	0.11	-11.36	7.23	PASS
	6	2437	-10.04	4.77	-5.27	0.11	-5.16	7.23	PASS
	9	2452	-10.69	4.77	-5.92	0.11	-5.81	7.23	PASS

NOTE:

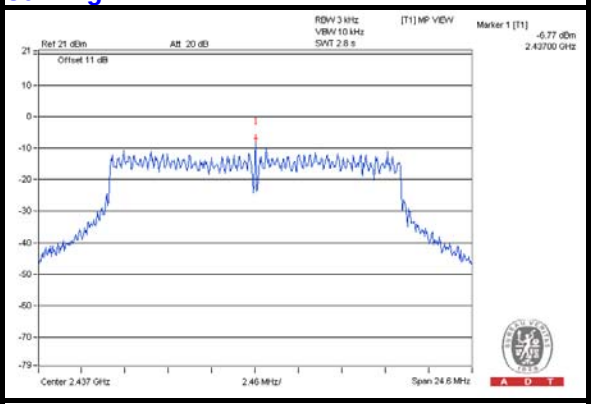
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 8-(6.77-6) = 7.23dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

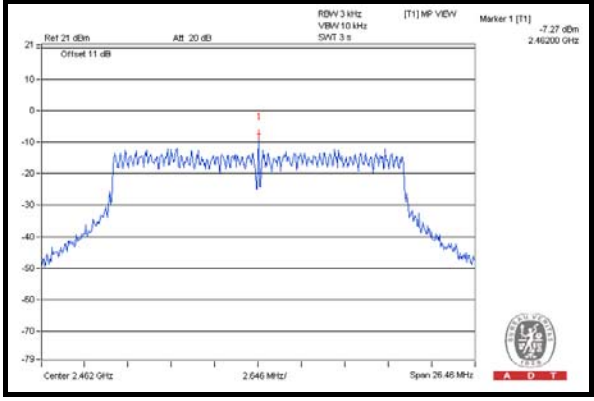
802.11b



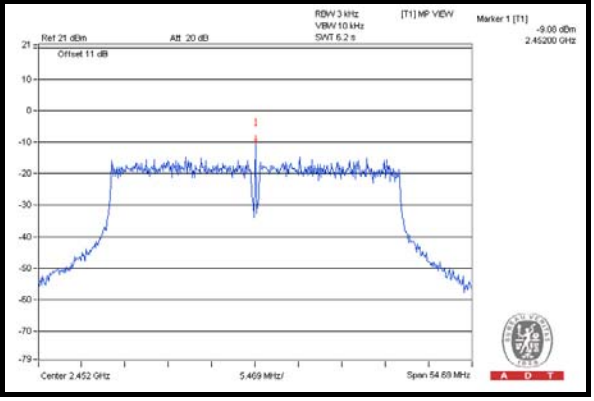
802.11g



802.11n (HT20)



802.11n (HT40)

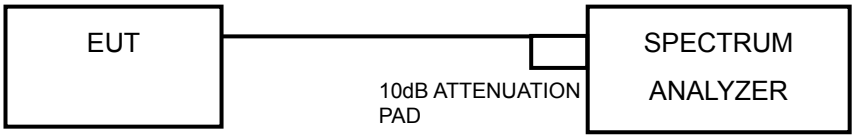


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = average.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

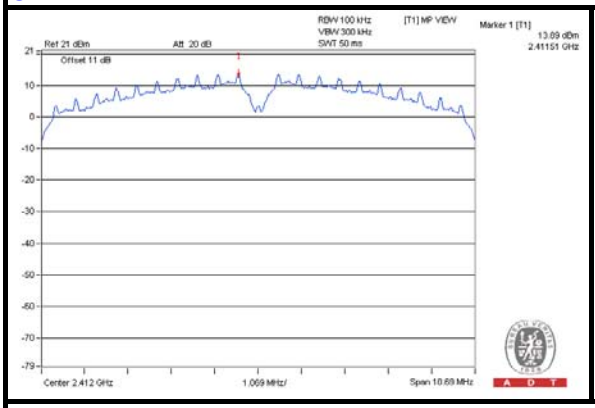
4.6.7 TEST RESULTS

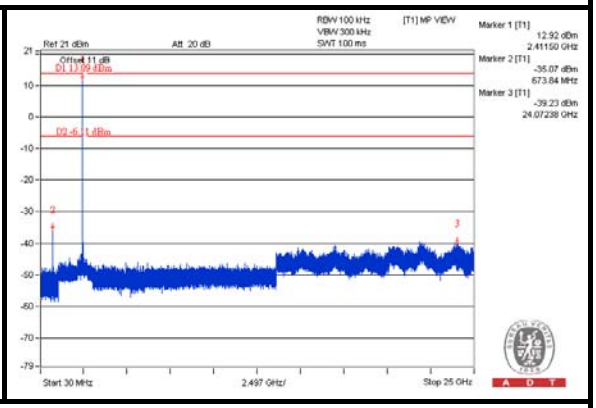
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit. Only worst data of each operating mode is presented.

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

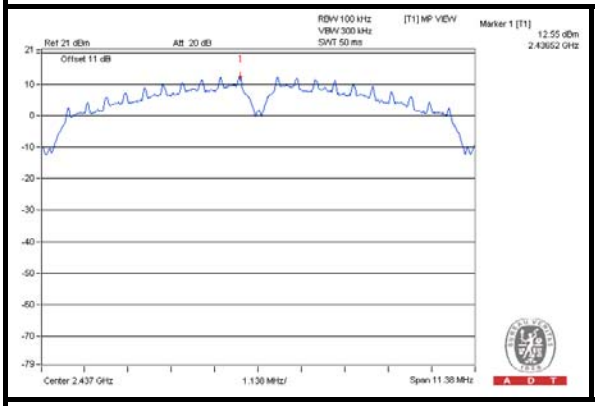
802.11b: CHAIN 0

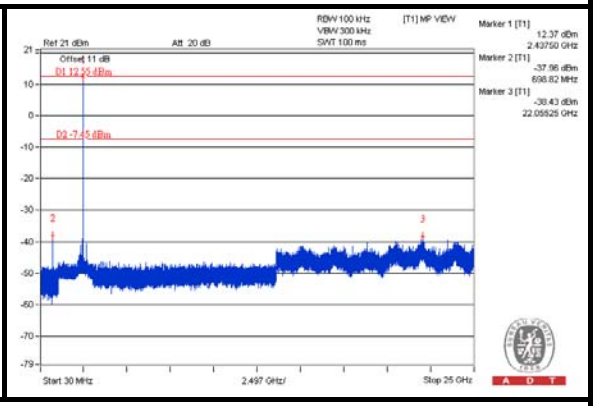
CH 1



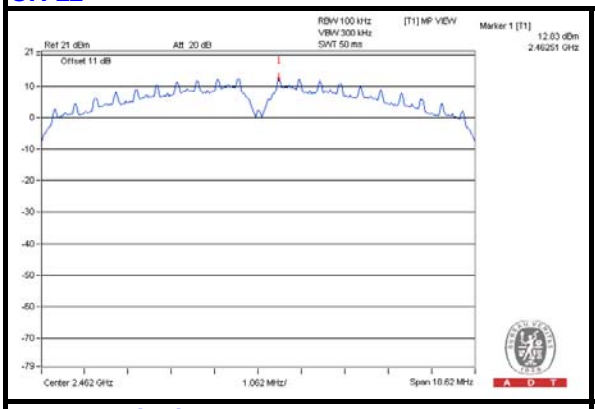


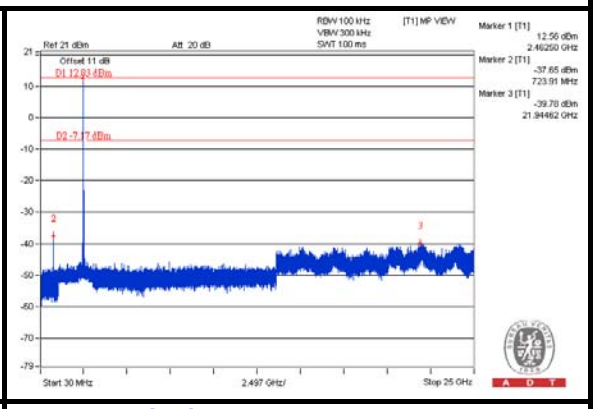
CH 6



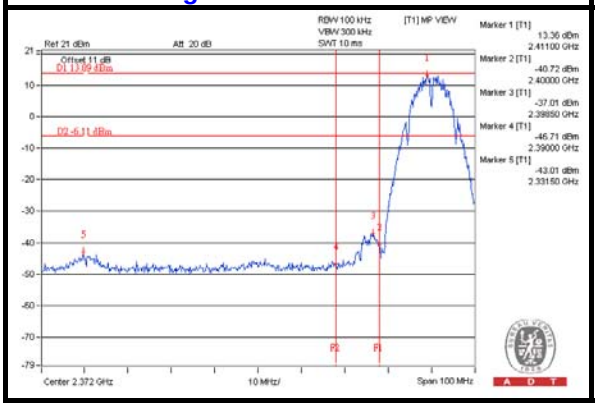


CH 11

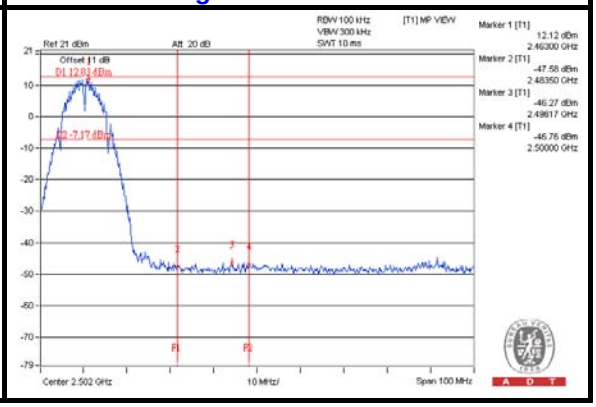




CH 1 Band edge

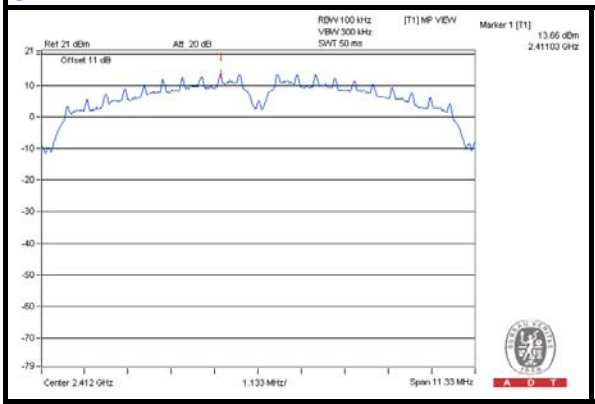


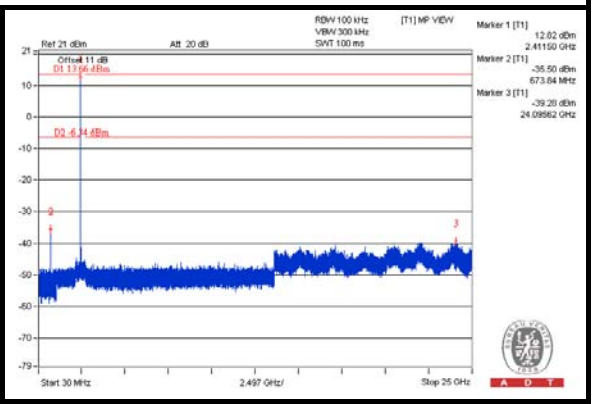
CH 11 Band edge



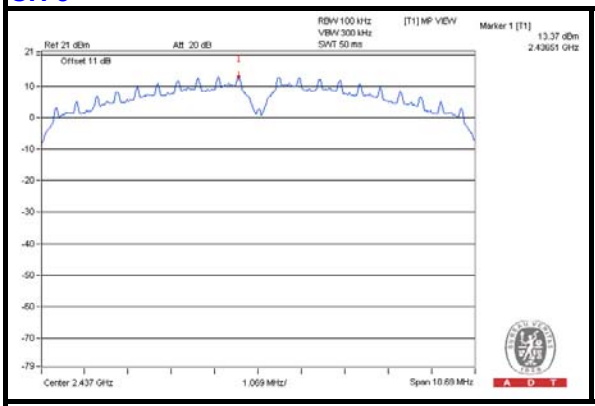
CHAIN 1

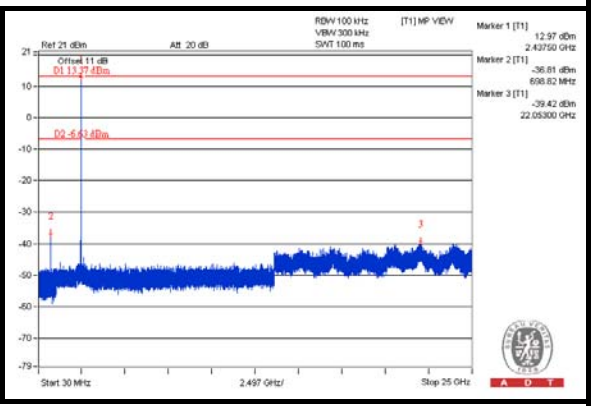
CH 1



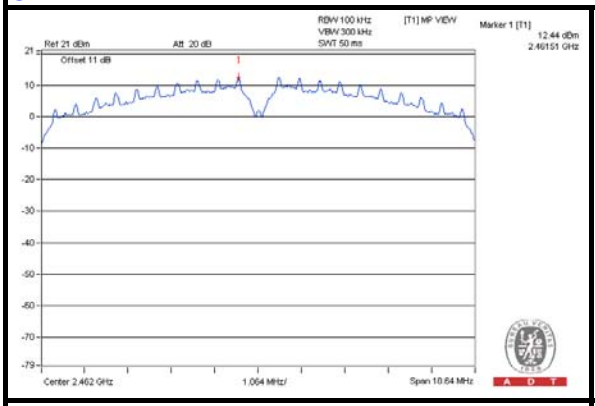


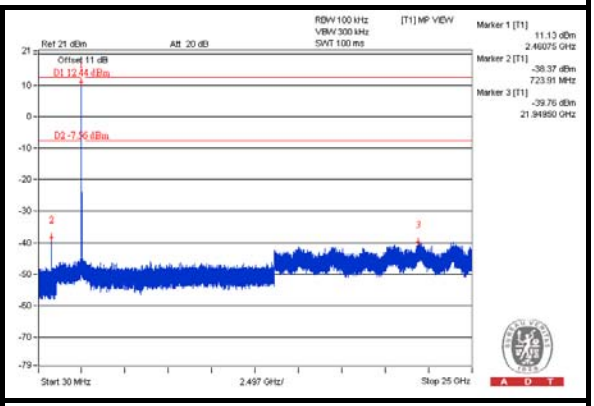
CH 6



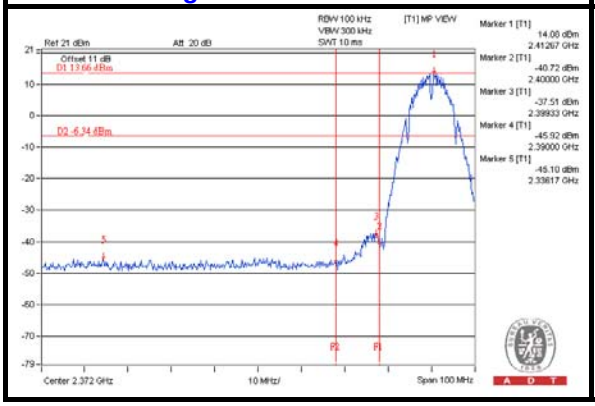


CH 11

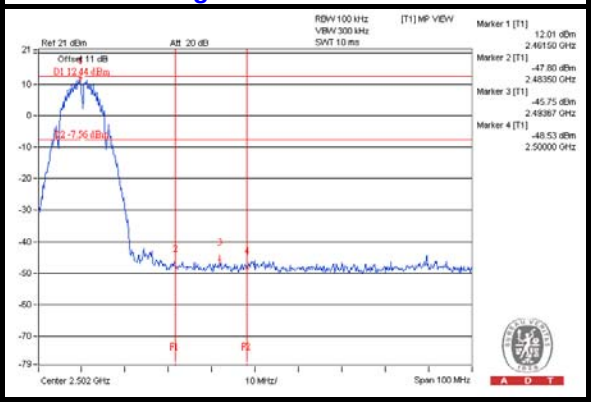




CH 1 Band edge

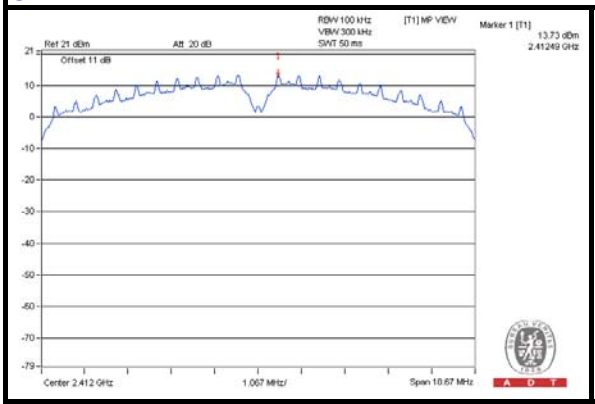


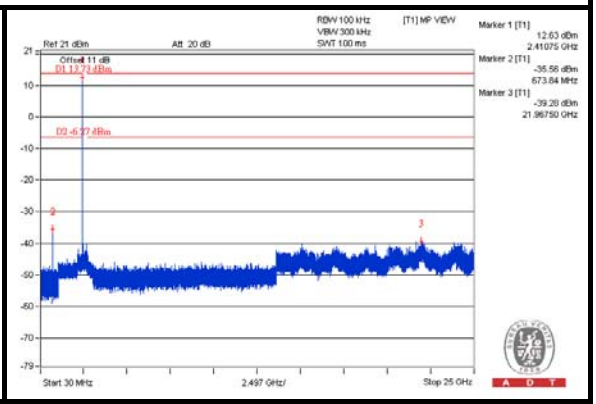
CH 11 Band edge



CHAIN 2

CH 1





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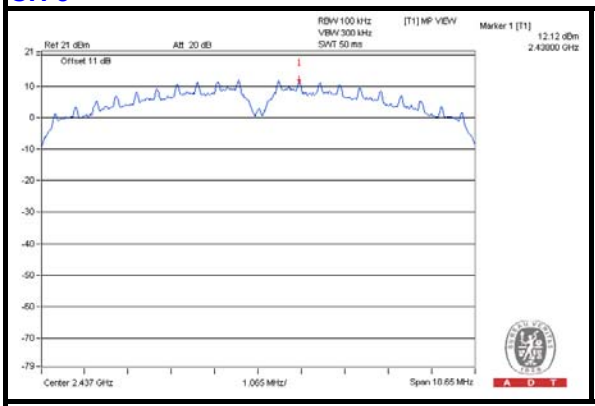
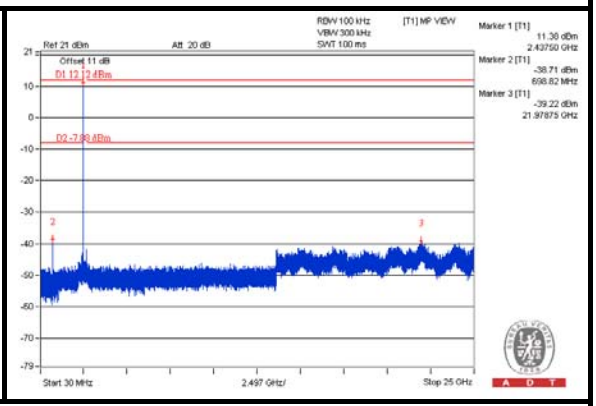
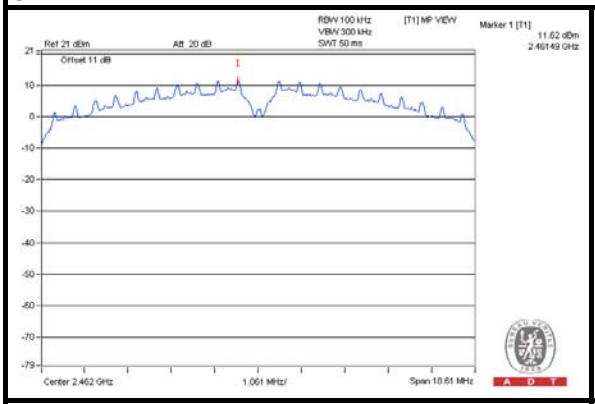
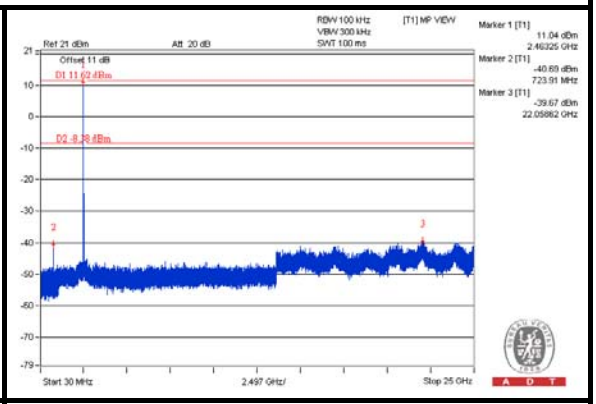


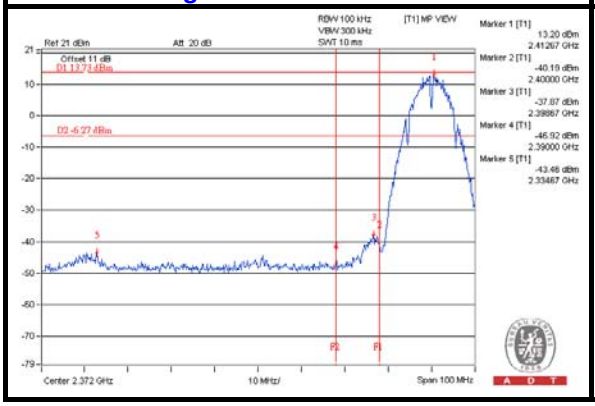


CH 11

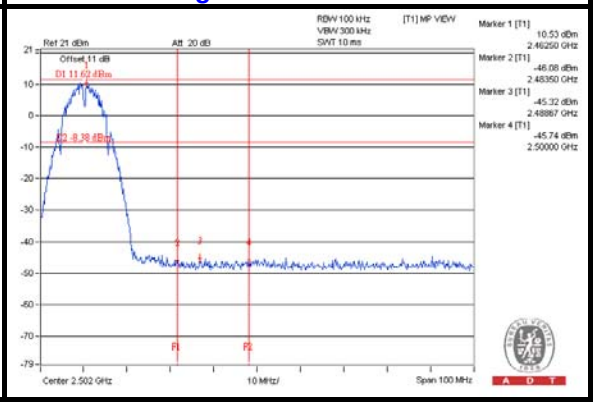




CH 1 Band edge

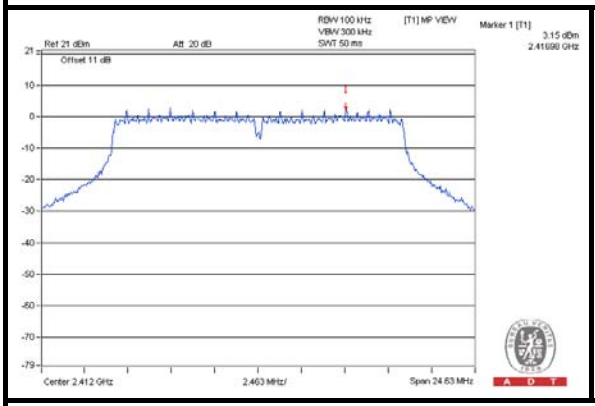


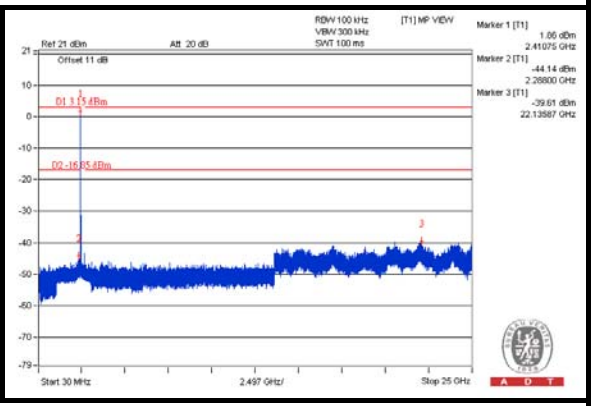
CH 11 Band edge



802.11g: CHAIN 0

CH 1





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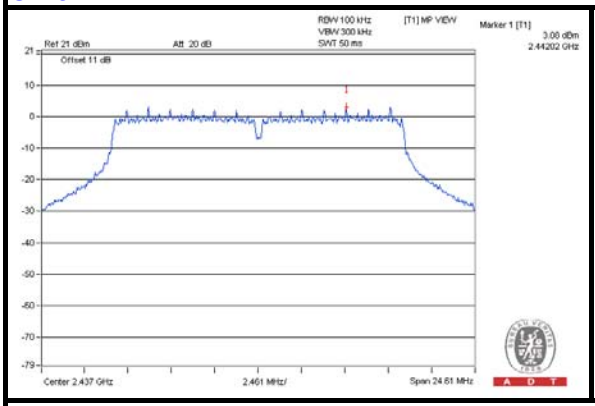

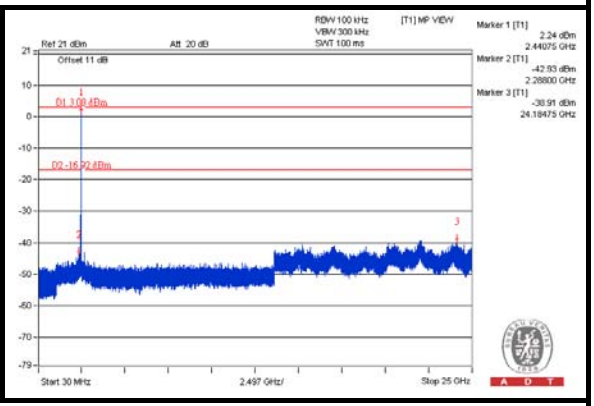

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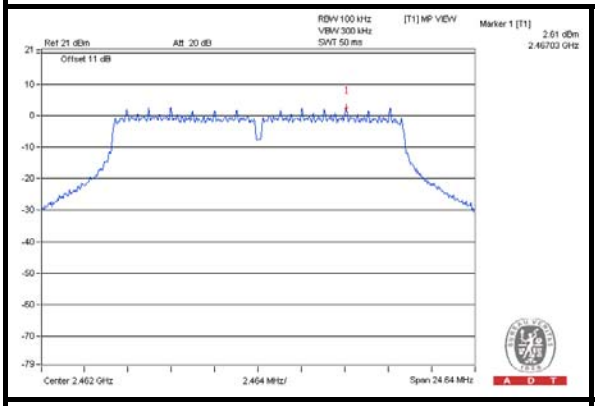

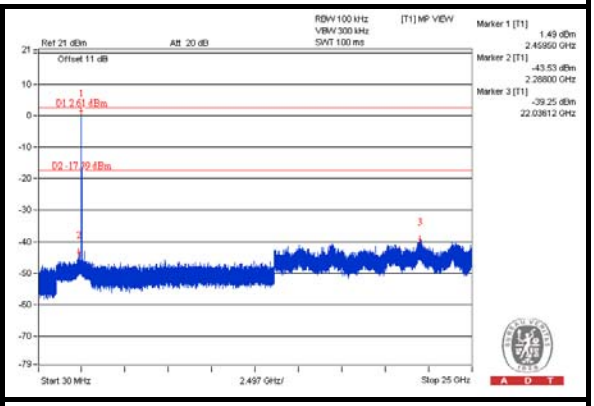

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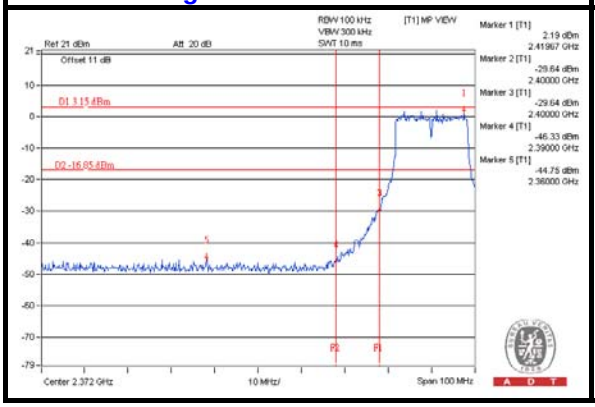

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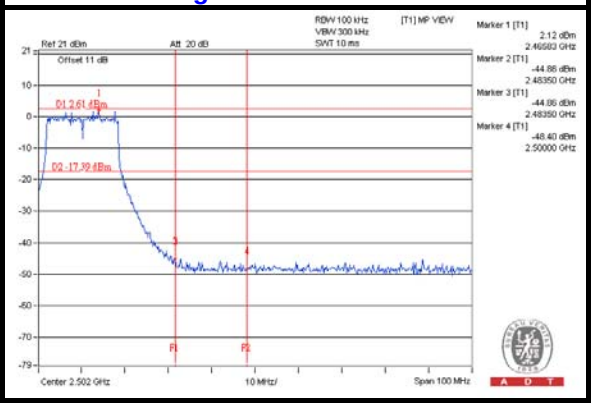

CHAIN 1

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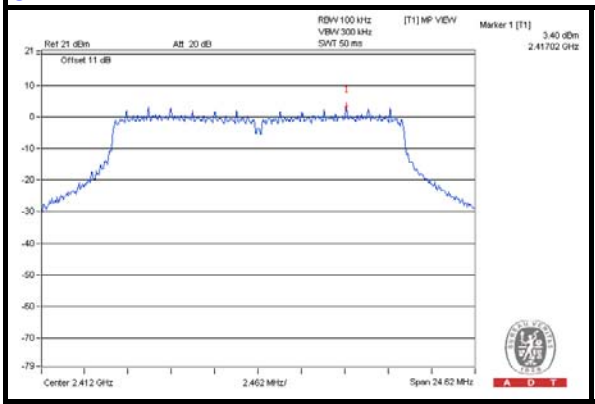

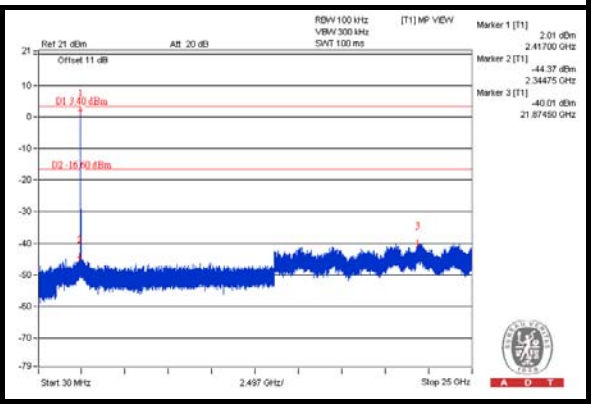

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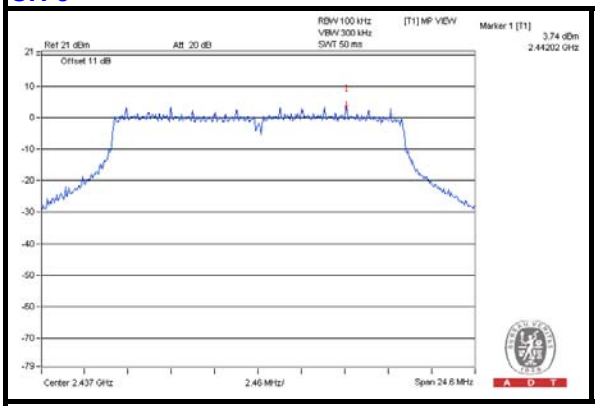

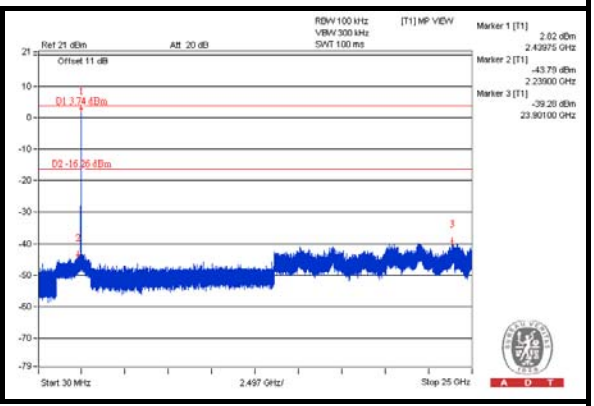

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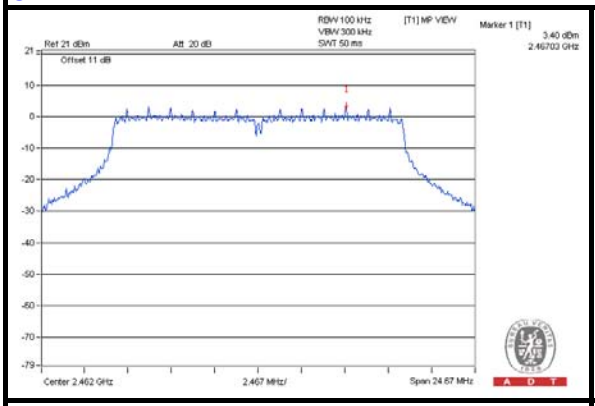

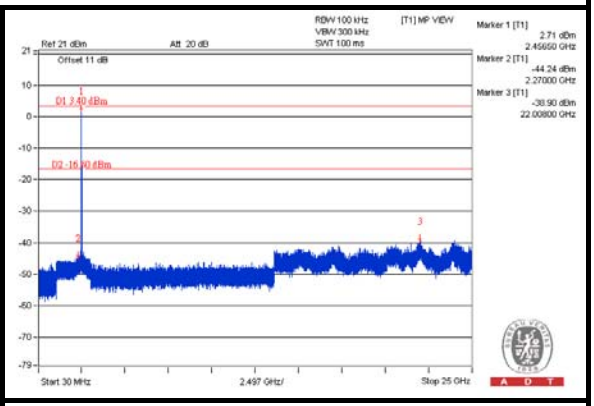

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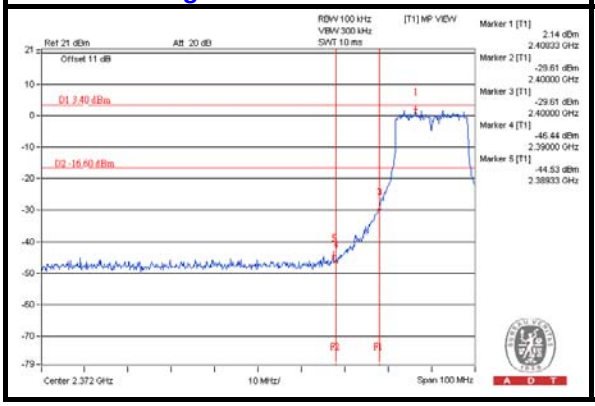

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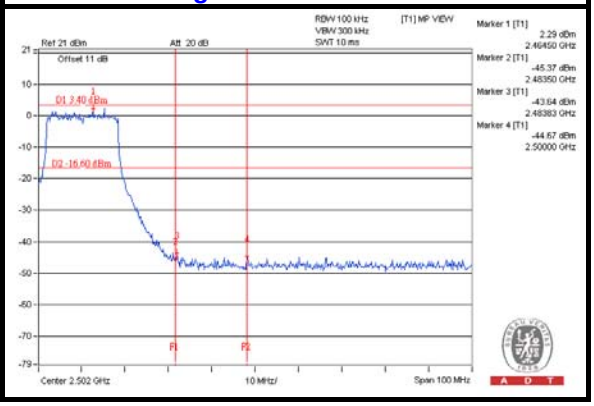

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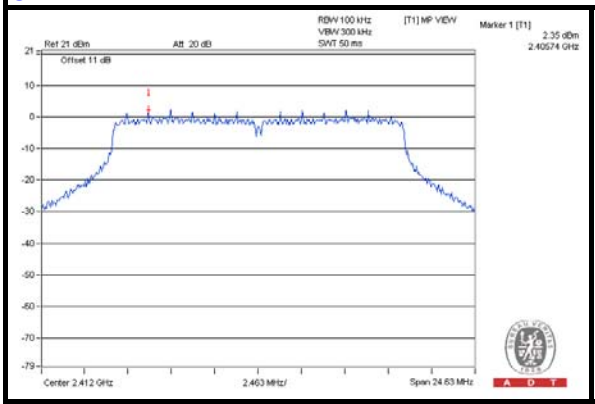
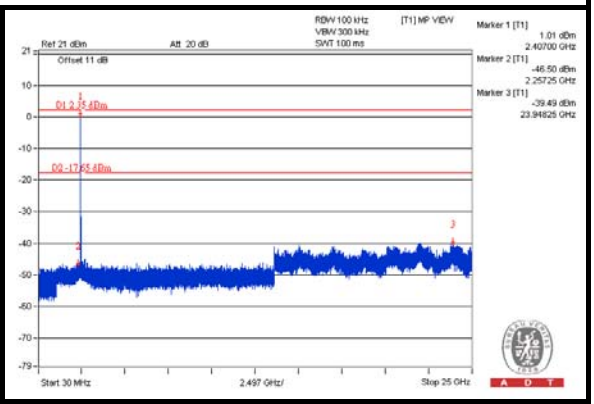
CH 1





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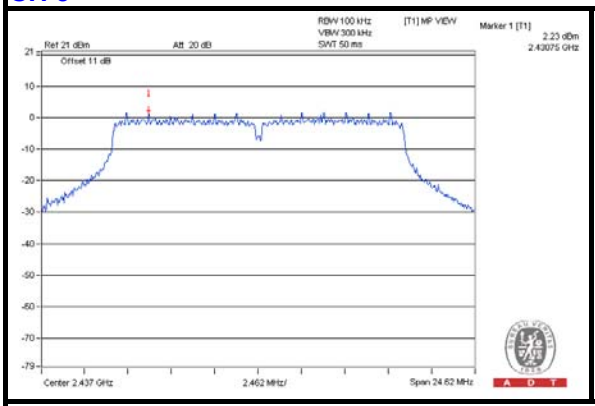

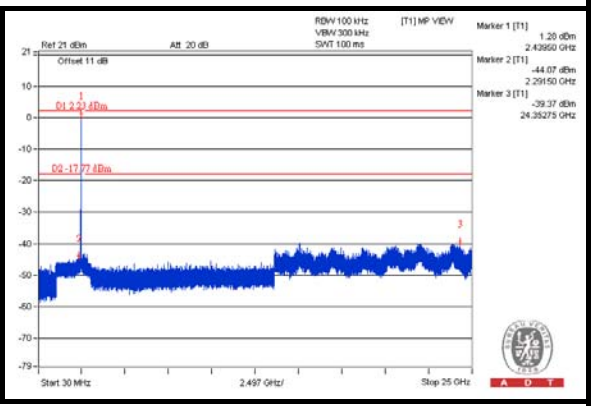

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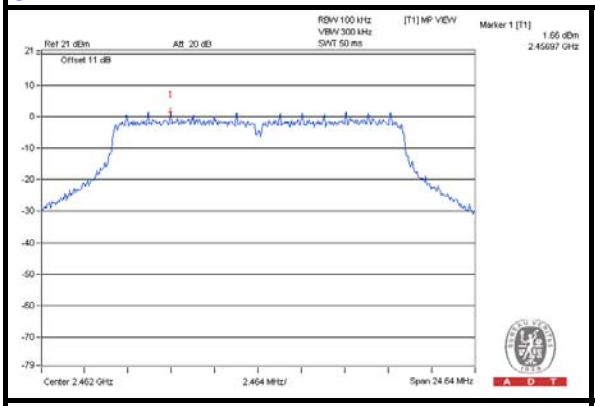

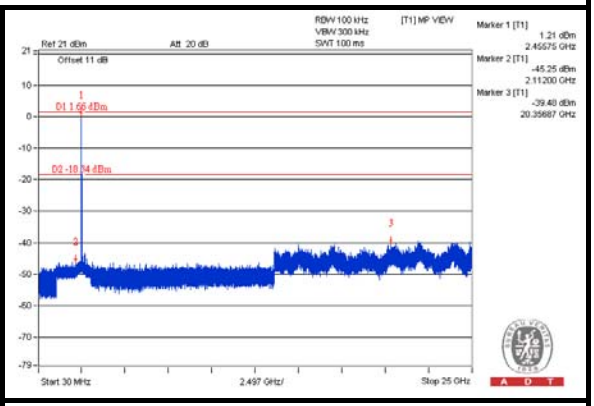

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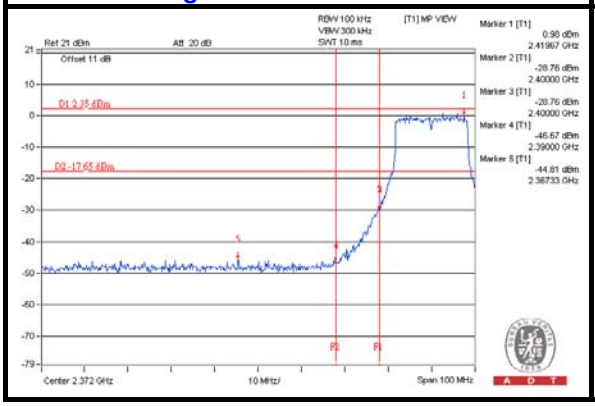

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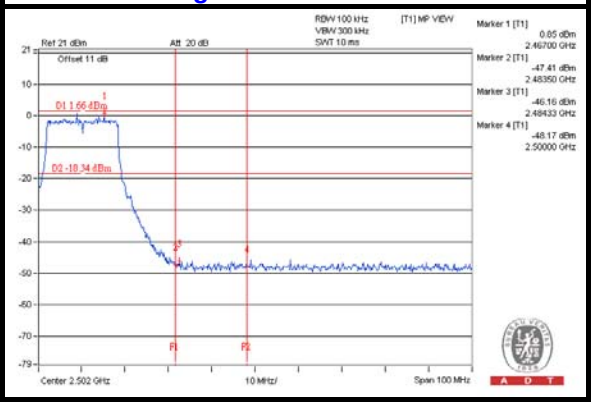

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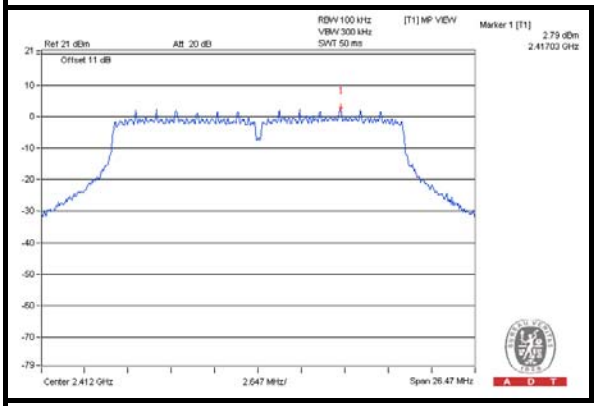

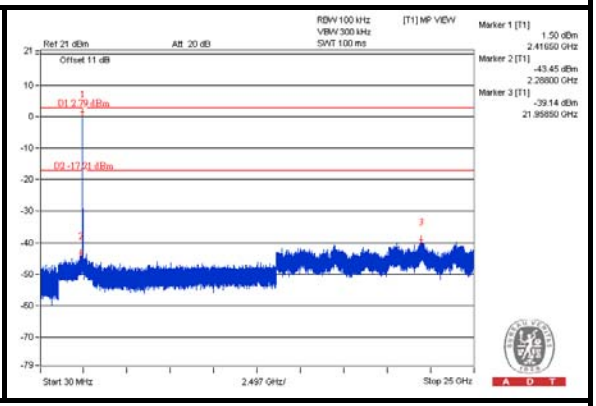

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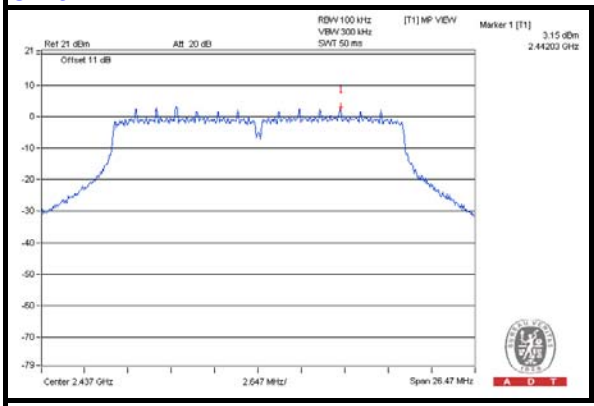

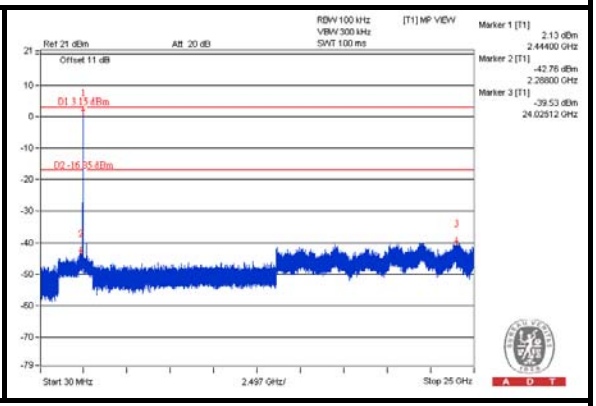

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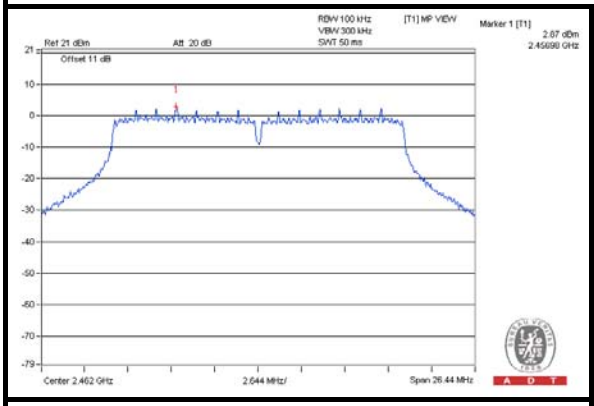

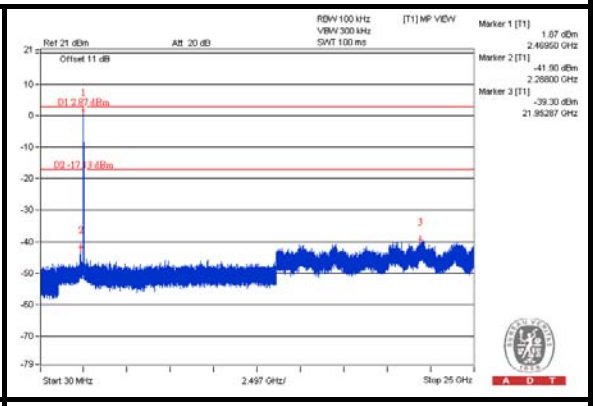

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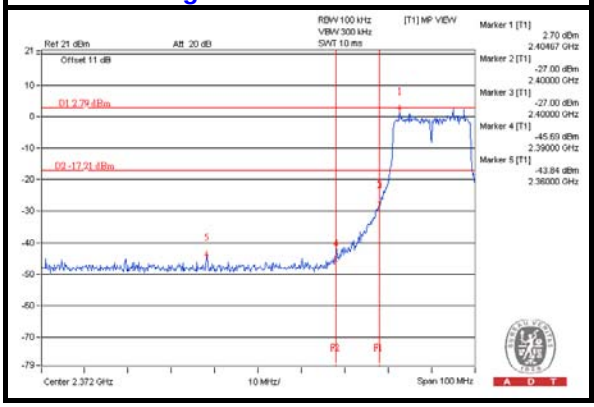

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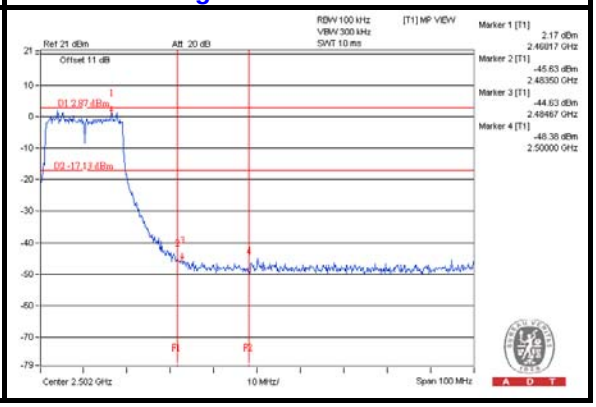
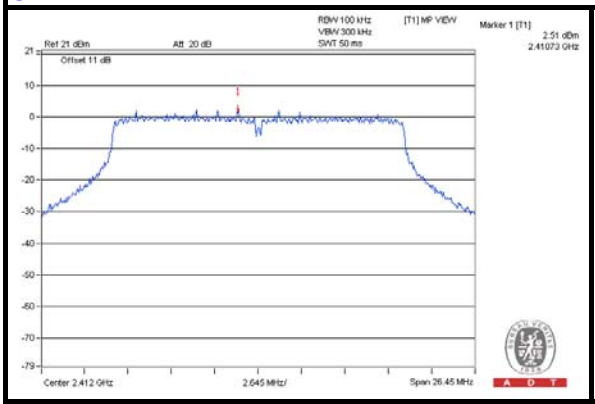
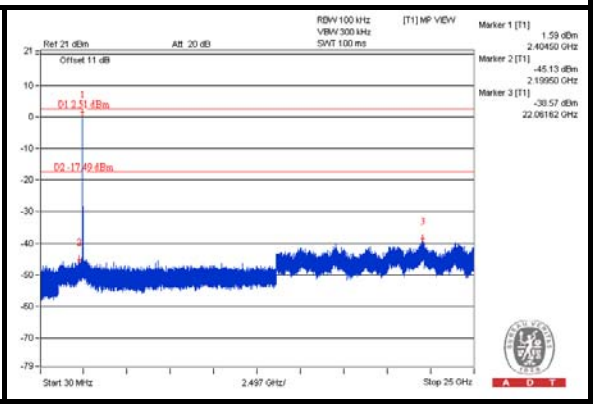


CHAIN 1

CH 1





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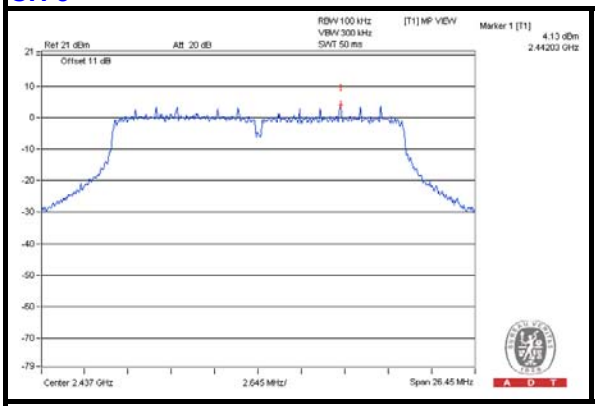

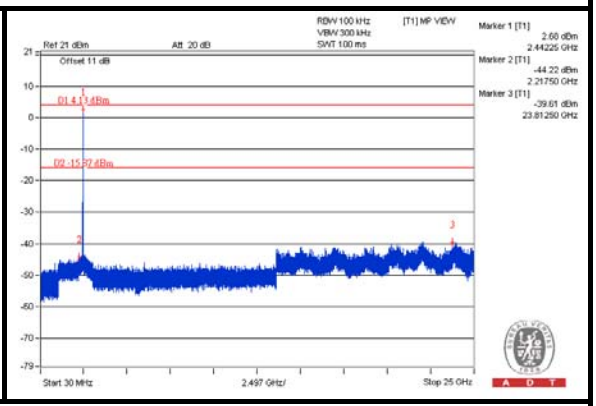

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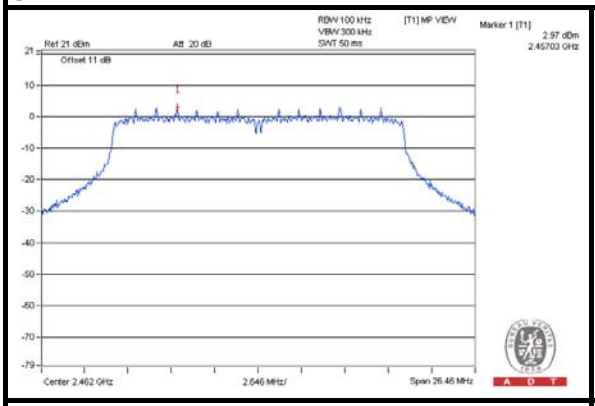

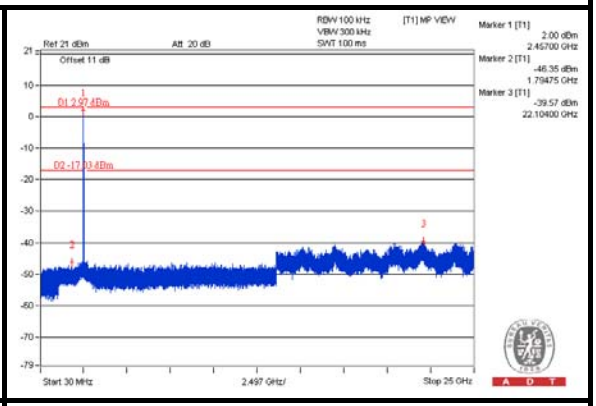

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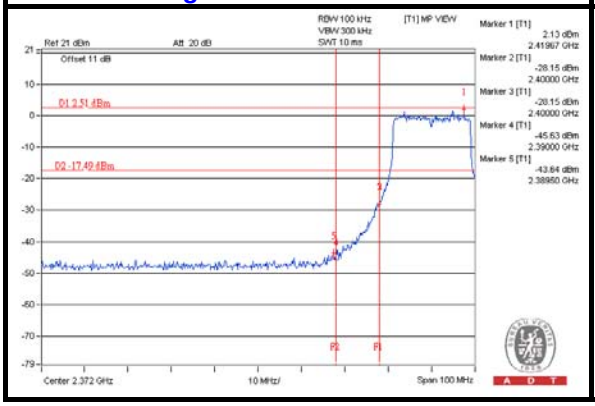

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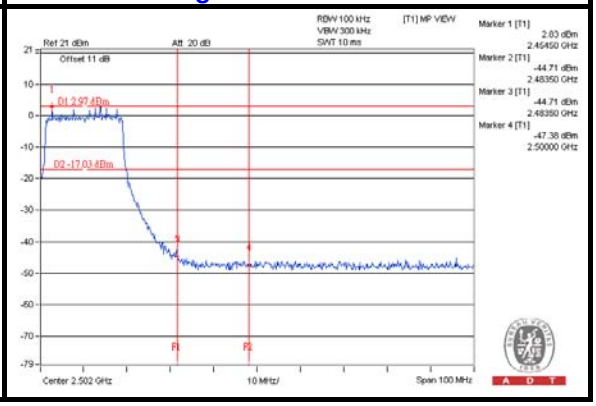

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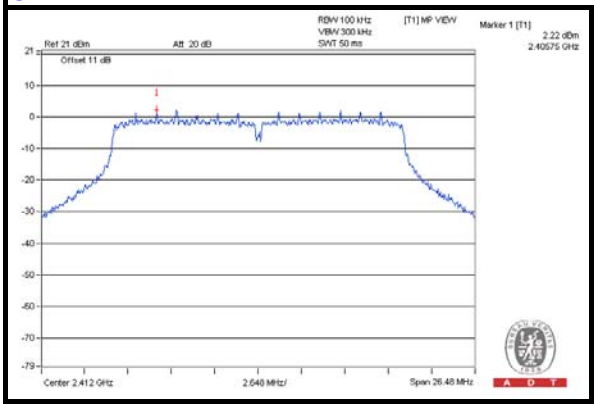

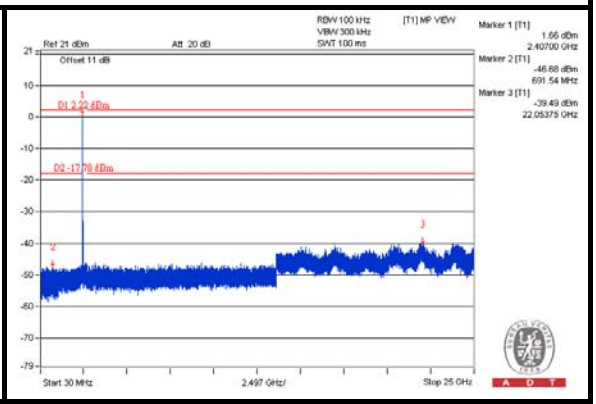

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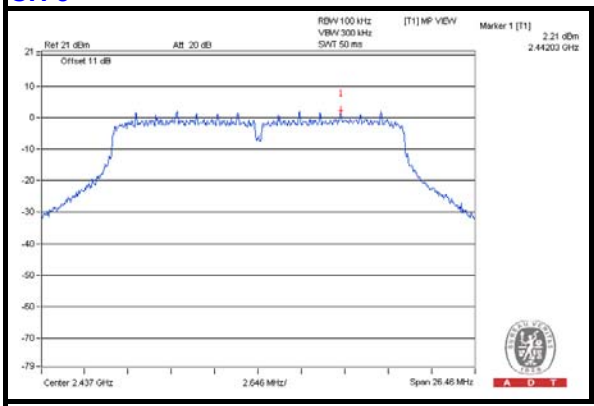

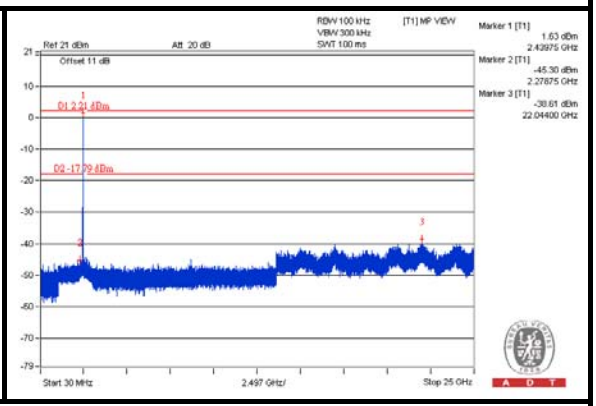

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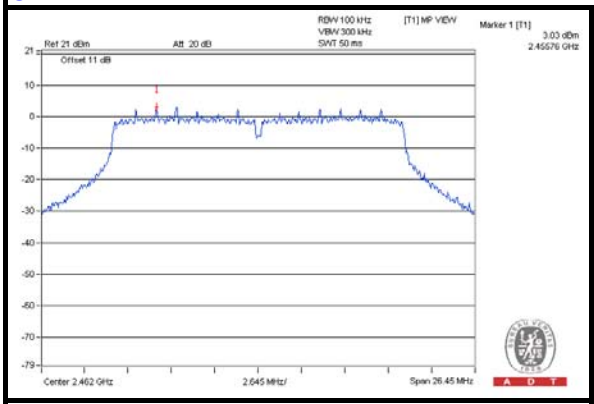

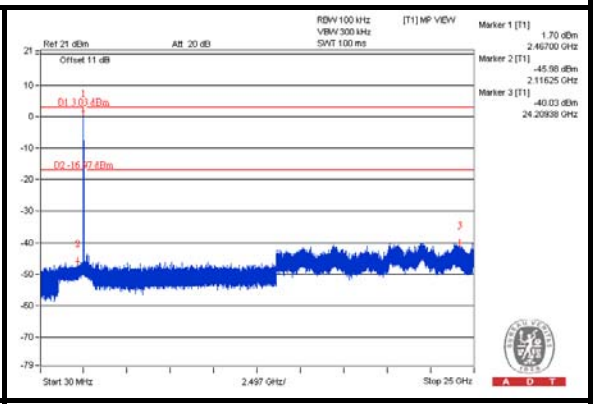

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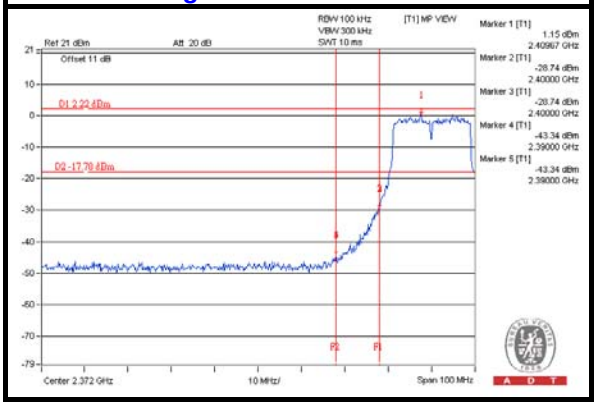

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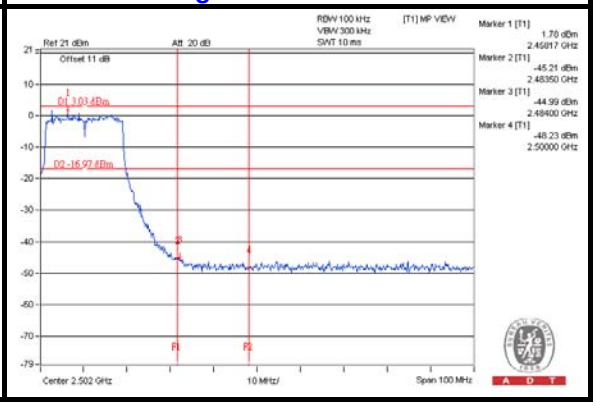

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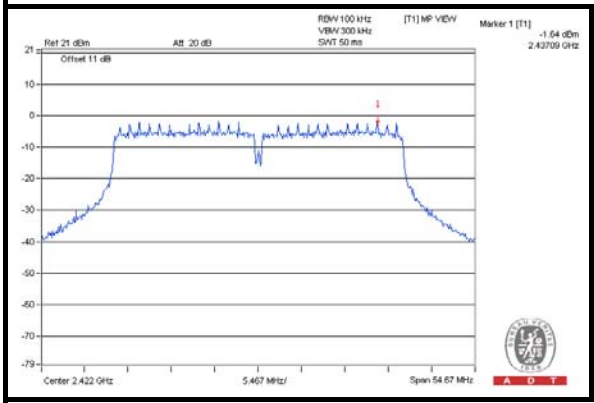

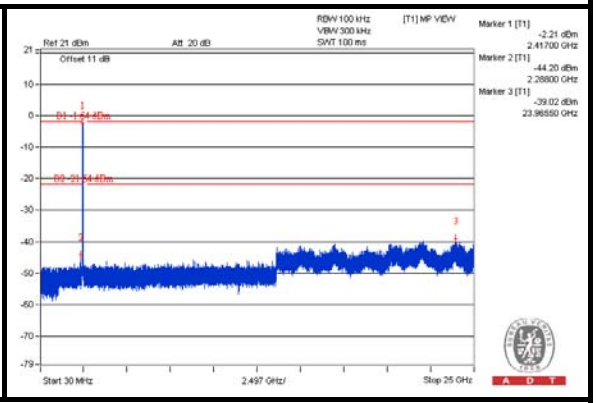

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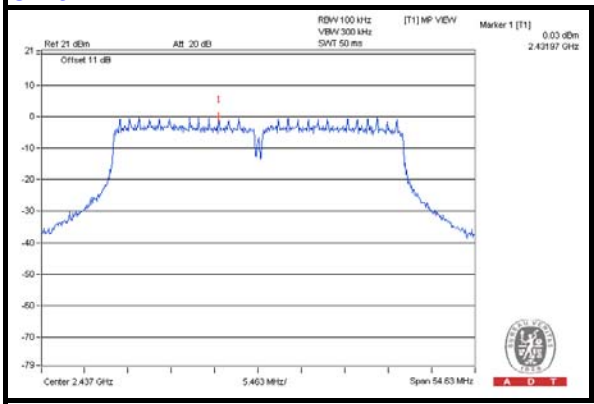

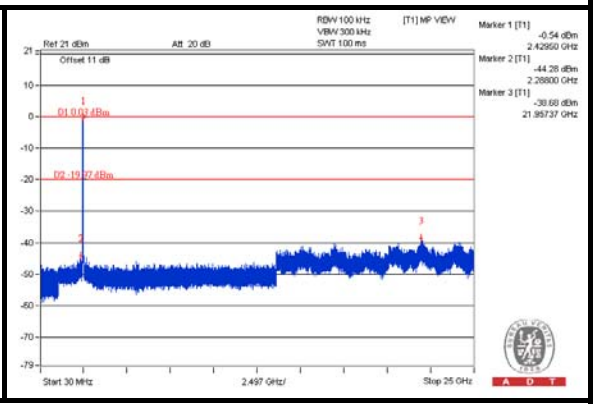

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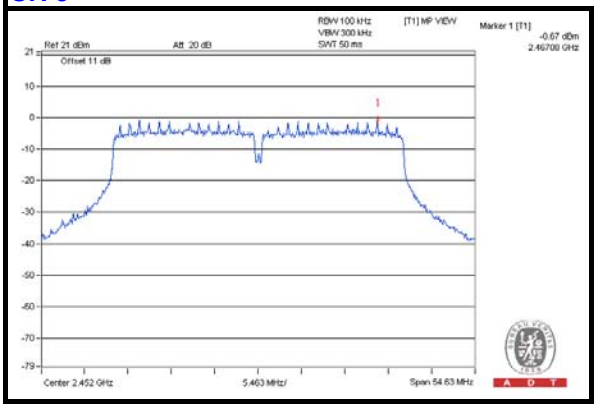

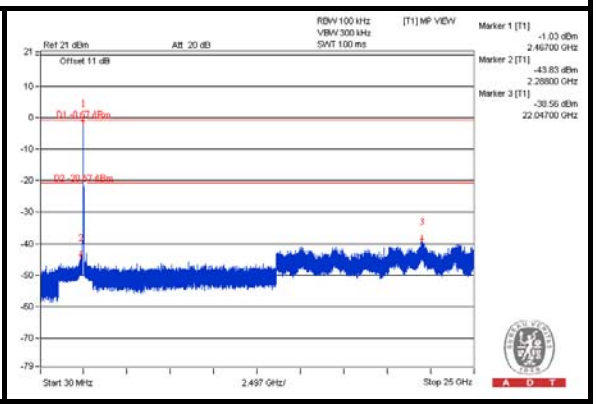

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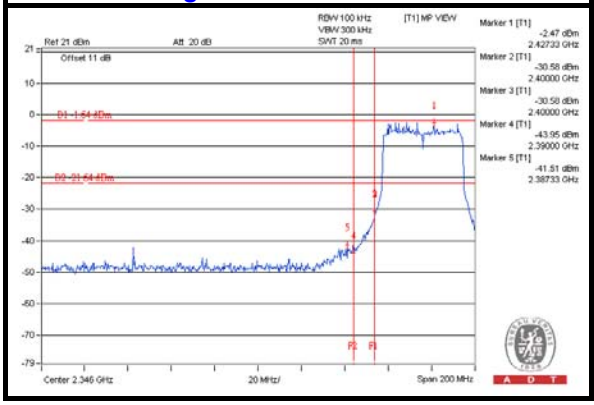

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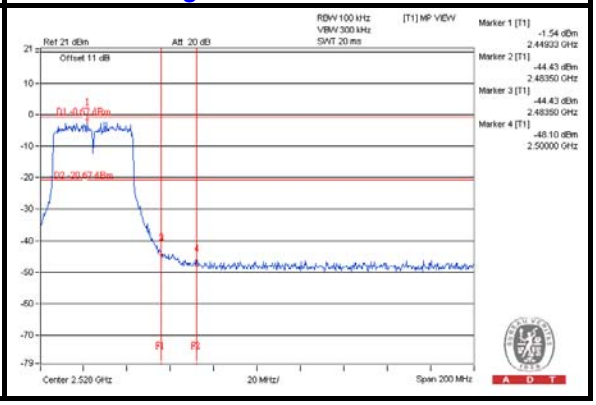
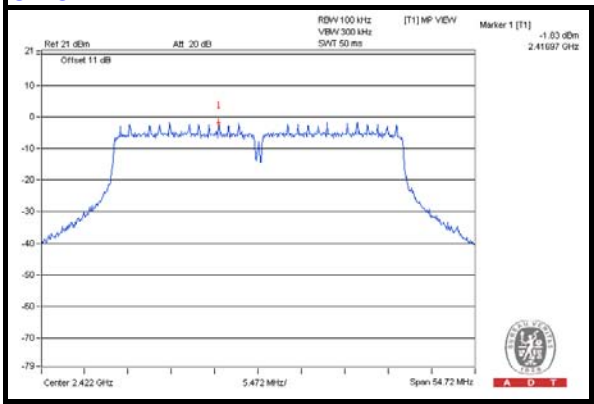
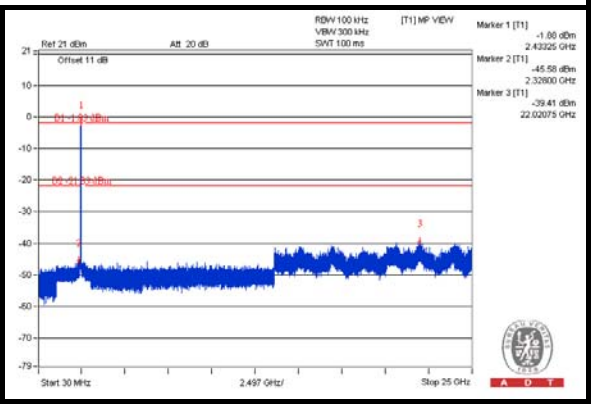


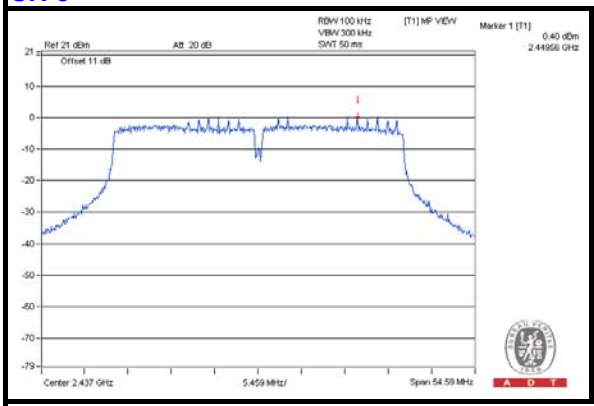
CHAIN 1

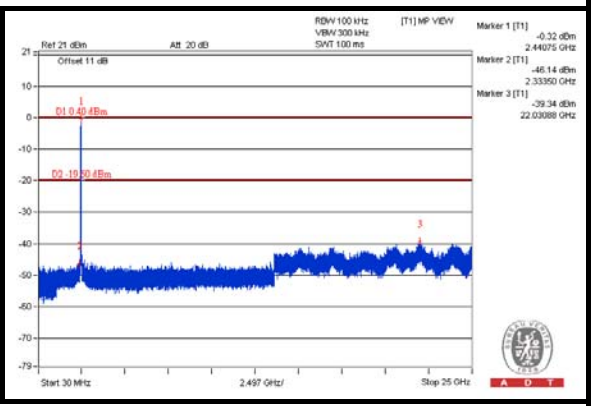
CH 3



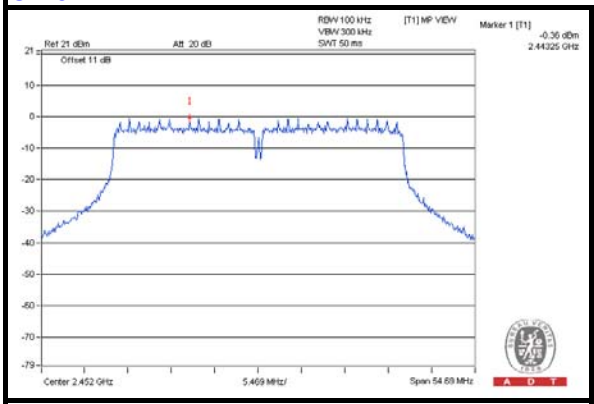


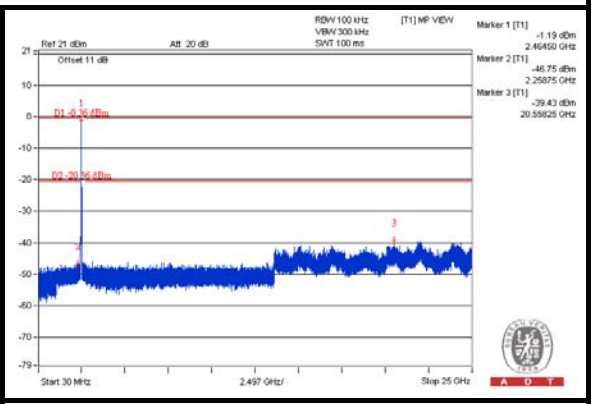
CH 6



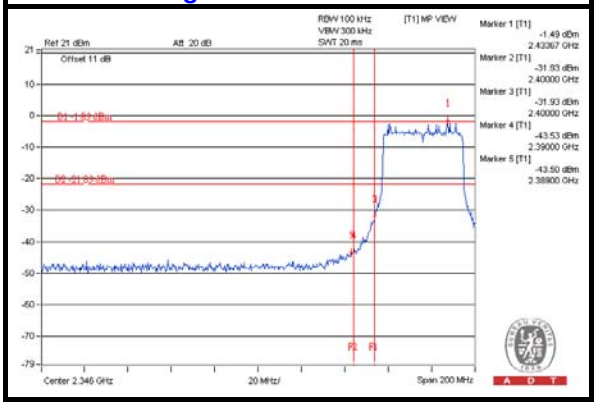


CH 9

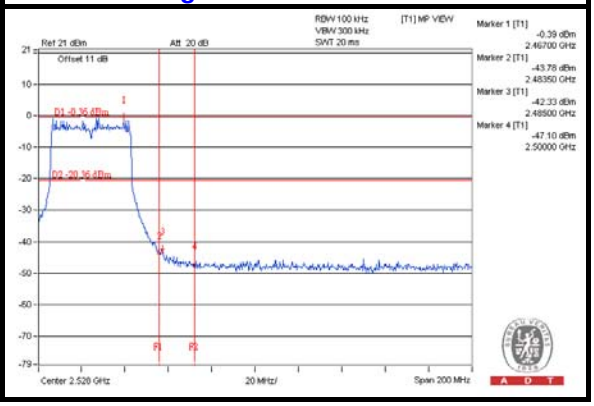




CH 3 Band edge

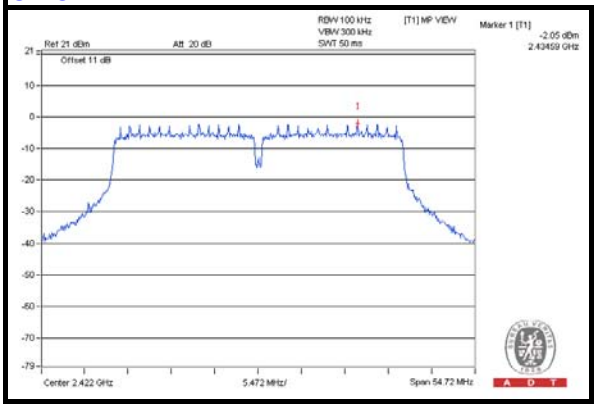


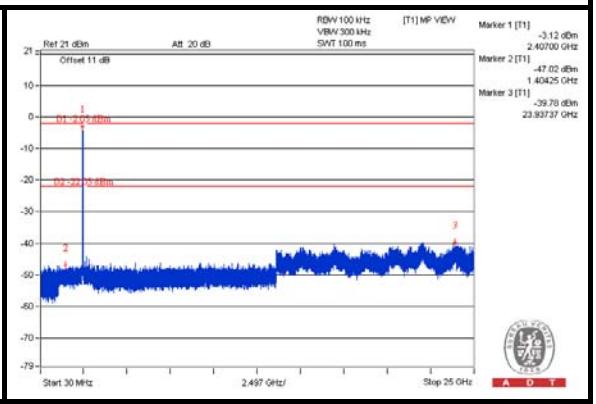
CH 9 Band edge



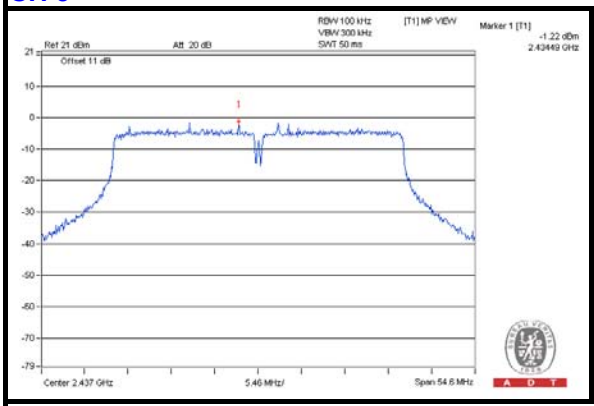
CHAIN 2

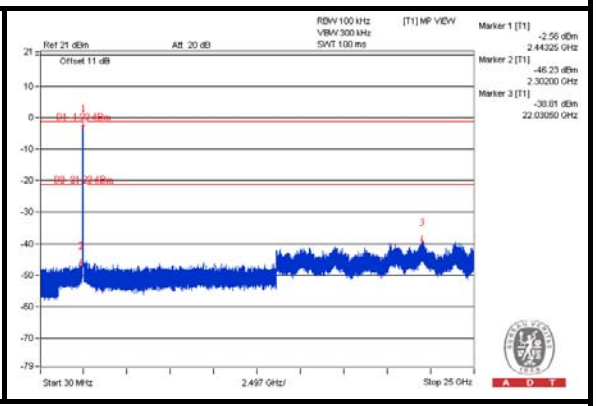
CH 3



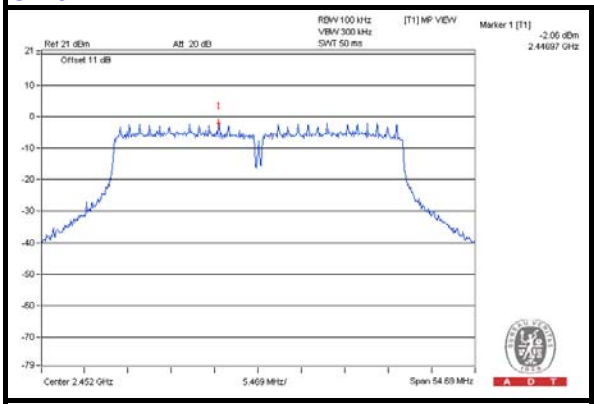


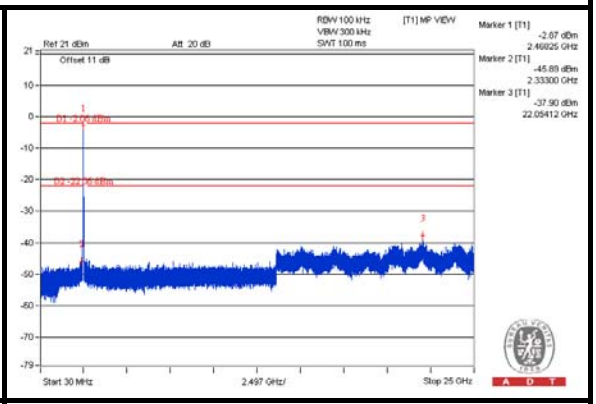
CH 6



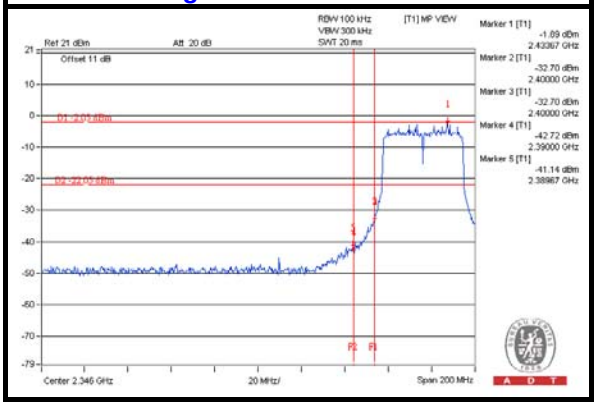


CH 9

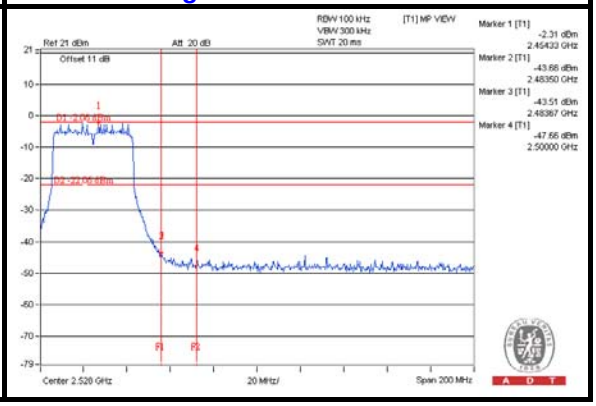




CH 3 Band edge



CH 9 Band edge



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

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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

5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA：

802.11a

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	59.9 PK	82.9	-23.0	1.00 H	15	53.70	6.20
2	#5725.00	49.1 AV	72.1	-23.0	1.00 H	15	42.90	6.20
3	*5745.00	102.9 PK			1.00 H	31	62.80	40.10
4	*5745.00	92.1 AV			1.00 H	31	52.00	40.10
5	11490.00	59.1 PK	74.0	-14.9	1.06 H	227	40.30	18.80
6	11490.00	48.9 AV	54.0	-5.1	1.06 H	227	30.10	18.80
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	72.9 PK	95.9	-23.0	1.40 V	227	66.70	6.20
2	#5725.00	62.1 AV	85.1	-23.0	1.40 V	227	55.90	6.20
3	*5745.00	115.9 PK			1.40 V	148	75.80	40.10
4	*5745.00	105.1 AV			1.40 V	148	65.00	40.10
5	11490.00	59.7 PK	74.0	-14.3	1.25 V	43	40.90	18.80
6	11490.00	49.6 AV	54.0	-4.4	1.25 V	43	30.80	18.80

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.

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	102.8 PK			1.00 H	8	62.60	40.20
2	*5785.00	92.1 AV			1.00 H	8	51.90	40.20
3	11570.00	58.9 PK	74.0	-15.1	1.03 H	71	40.10	18.80
4	11570.00	48.9 AV	54.0	-5.1	1.03 H	71	30.10	18.80
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	*5785.00	115.8 PK			1.42 V	140	75.60	40.20
2	*5785.00	105.4 AV			1.42 V	140	65.20	40.20
3	11570.00	59.6 PK	74.0	-14.4	1.18 V	80	40.80	18.80
4	11570.00	49.2 AV	54.0	-4.8	1.18 V	80	30.40	18.80

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 limit value is defined as per 15.247.

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	103.1 PK			1.00 H	20	62.80	40.30
2	*5825.00	92.8 AV			1.00 H	20	52.50	40.30
3	#5850.00	53.1 PK	83.1	-30.0	1.00 H	1	46.60	6.50
4	#5850.00	42.8 AV	72.8	-30.0	1.00 H	1	36.30	6.50
5	11650.00	59.1 PK	74.0	-14.9	1.00 H	66	40.20	18.90
6	11650.00	49.0 AV	54.0	-5.0	1.00 H	66	30.10	18.90
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	*5825.00	116.1 PK			1.48 V	151	75.80	40.30
2	*5825.00	105.8 AV			1.48 V	151	65.50	40.30
3	#5850.00	66.1 PK	96.1	-30.0	1.48 V	151	59.60	6.50
4	#5850.00	55.8 AV	85.8	-30.0	1.48 V	151	49.30	6.50
5	11650.00	59.6 PK	74.0	-14.4	1.20 V	45	40.70	18.90
6	11650.00	49.5 AV	54.0	-4.5	1.20 V	45	30.60	18.90

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

802.11n (HT20)

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	59.7 PK	82.7	-23.0	1.00 H	22	53.50	6.20
2	#5725.00	48.9 AV	71.9	-23.0	1.00 H	22	42.70	6.20
3	*5745.00	102.7 PK			1.00 H	10	62.60	40.10
4	*5745.00	91.9 AV			1.00 H	10	51.80	40.10
5	11490.00	59.0 PK	74.0	-15.0	1.08 H	210	40.20	18.80
6	11490.00	48.8 AV	54.0	-5.2	1.08 H	210	30.00	18.80
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	72.7 PK	95.7	-23.0	1.40 V	130	66.50	6.20
2	#5725.00	61.9 AV	84.9	-23.0	1.40 V	130	55.70	6.20
3	*5745.00	115.7 PK			1.42 V	150	75.60	40.10
4	*5745.00	104.9 AV			1.42 V	150	64.80	40.10
5	11490.00	59.6 PK	74.0	-14.4	1.18 V	50	40.80	18.80
6	11490.00	49.2 AV	54.0	-4.8	1.18 V	50	30.40	18.80

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.

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	102.6 PK			1.00 H	5	62.40	40.20
2	*5785.00	91.7 AV			1.00 H	5	51.50	40.20
3	11570.00	58.8 PK	74.0	-15.2	1.00 H	67	40.00	18.80
4	11570.00	48.8 AV	54.0	-5.2	1.00 H	67	30.00	18.80
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	*5785.00	115.6 PK			1.50 V	135	75.40	40.20
2	*5785.00	105.2 AV			1.50 V	135	65.00	40.20
3	11570.00	59.3 PK	74.0	-14.7	1.11 V	105	40.50	18.80
4	11570.00	49.0 AV	54.0	-5.0	1.11 V	105	30.20	18.80

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 limit value is defined as per 15.247.

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	103.9 PK			1.00 H	14	63.60	40.30
2	*5825.00	93.7 AV			1.00 H	14	53.40	40.30
3	#5850.00	54.9 PK	83.9	-29.0	1.00 H	27	48.40	6.50
4	#5850.00	44.7 AV	73.7	-29.0	1.00 H	27	38.20	6.50
5	11650.00	59.1 PK	74.0	-14.9	1.00 H	75	40.20	18.90
6	11650.00	48.9 AV	54.0	-5.1	1.00 H	75	30.00	18.90
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	*5825.00	115.9 PK			1.43 V	145	75.60	40.30
2	*5825.00	105.7 AV			1.43 V	145	65.40	40.30
3	#5850.00	66.9 PK	95.9	-29.0	1.43 V	128	60.40	6.50
4	#5850.00	56.7 AV	85.7	-29.0	1.43 V	128	50.20	6.50
5	11650.00	59.5 PK	74.0	-14.5	1.08 V	34	40.60	18.90
6	11650.00	49.1 AV	54.0	-4.9	1.08 V	34	30.20	18.90

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

802.11n (HT40)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	61.0 PK	79.0	-18.0	1.00 H	20	54.80	6.20
2	#5725.00	51.4 AV	69.4	-18.0	1.00 H	20	45.20	6.20
3	*5755.00	99.0 PK			1.00 H	9	58.80	40.20
4	*5755.00	89.4 AV			1.00 H	9	49.20	40.20
5	11510.00	61.1 PK	74.0	-12.9	1.00 H	245	42.30	18.80
6	11510.00	48.4 AV	54.0	-5.6	1.00 H	245	29.60	18.80
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	73.0 PK	91.0	-18.0	1.44 V	108	66.80	6.20
2	#5725.00	63.4 AV	81.4	-18.0	1.44 V	108	57.20	6.20
3	*5755.00	111.0 PK			1.44 V	80	70.80	40.20
4	*5755.00	101.4 AV			1.44 V	80	61.20	40.20
5	11510.00	61.3 PK	74.0	-12.7	1.00 V	77	42.50	18.80
6	11510.00	48.6 AV	54.0	-5.4	1.00 V	77	29.80	18.80

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.

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	99.4 PK			1.00 H	2	59.20	40.20
2	*5795.00	89.4 AV			1.00 H	2	49.20	40.20
3	#5850.00	50.4 PK	79.4	-29.0	1.00 H	324	43.90	6.50
4	#5850.00	40.4 AV	69.4	-29.0	1.00 H	324	33.90	6.50
5	11590.00	59.9 PK	74.0	-14.1	1.00 H	248	41.00	18.90
6	11590.00	48.6 AV	54.0	-5.4	1.00 H	248	29.70	18.90
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	*5795.00	111.4 PK			1.38 V	147	71.20	40.20
2	*5795.00	101.4 AV			1.38 V	147	61.20	40.20
3	#5850.00	62.4 PK	91.4	-29.0	1.38 V	135	55.90	6.50
4	#5850.00	52.4 AV	81.4	-29.0	1.38 V	135	45.90	6.50
5	11590.00	60.0 PK	74.0	-14.0	1.00 V	80	41.10	18.90
6	11590.00	48.7 AV	54.0	-5.3	1.00 V	80	29.80	18.90

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

802.11ac (VHT80)

CHANNEL	TX Channel 155	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	62.4 PK	77.4	-15.0	1.00 H	310	56.20	6.20
2	#5725.00	51.8 AV	66.8	-15.0	1.00 H	310	45.60	6.20
3	*5775.00	97.4 PK			1.02 H	5	57.20	40.20
4	*5775.00	86.8 AV			1.02 H	5	46.60	40.20
5	#5850.00	57.4 PK	77.4	-20.0	1.00 H	30	50.90	6.50
6	#5850.00	46.8 AV	66.8	-20.0	1.00 H	30	40.30	6.50
7	11550.00	59.6 PK	74.0	-14.4	1.00 H	18	40.80	18.80
8	11550.00	48.4 AV	54.0	-5.6	1.00 H	18	29.60	18.80
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	73.4 PK	88.4	-15.0	1.36 V	121	67.20	6.20
2	#5725.00	62.8 AV	77.8	-15.0	1.36 V	121	56.60	6.20
3	*5775.00	108.4 PK			1.36 V	148	68.20	40.20
4	*5775.00	97.8 AV			1.36 V	148	57.60	40.20
5	#5850.00	68.4 PK	88.4	-20.0	1.36 V	300	61.90	6.50
6	#5850.00	57.8 AV	77.8	-20.0	1.36 V	300	51.30	6.50
7	11550.00	59.9 PK	74.0	-14.1	1.00 V	242	41.10	18.80
8	11550.00	48.5 AV	54.0	-5.5	1.00 V	242	29.70	18.80

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.

BELOW 1GHz WORST-CASE DATA：

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	64.83	29.1 QP	40.0	-10.9	1.99 H	182	44.10	-15.00
2	152.15	32.7 QP	43.5	-10.8	1.49 H	265	46.40	-13.70
3	231.70	41.9 QP	46.0	-4.1	1.00 H	105	57.80	-15.90
4	268.57	41.2 QP	46.0	-4.8	1.25 H	281	54.70	-13.50
5	499.48	37.3 QP	46.0	-8.7	3.00 H	163	46.20	-8.90
6	600.38	38.9 QP	46.0	-7.1	1.49 H	315	45.70	-6.80
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	57.07	35.3 QP	40.0	-4.7	1.00 V	18	49.60	-14.30
2	231.70	33.7 QP	46.0	-12.3	1.50 V	31	49.60	-15.90
3	375.29	32.5 QP	46.0	-13.5	1.26 V	192	43.60	-11.10
4	499.48	37.4 QP	46.0	-8.6	1.00 V	211	46.30	-8.90
5	600.38	36.1 QP	46.0	-9.9	1.00 V	271	42.90	-6.80
6	625.60	36.9 QP	46.0	-9.1	1.99 V	353	43.00	-6.10

REMARKS:

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

5.2 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

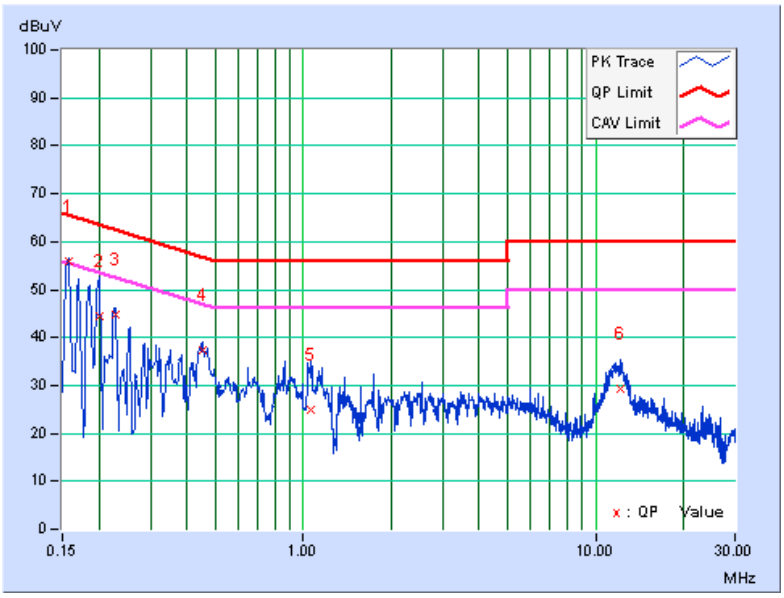
CONDUCTED WORST-CASE DATA：802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.11	55.66	42.35	55.77	42.46	65.58	55.58	-9.81	-13.12
2	0.20084	0.09	44.42	22.84	44.51	22.93	63.58	53.58	-19.07	-30.65
3	0.22672	0.09	44.57	29.95	44.66	30.04	62.57	52.57	-17.91	-22.53
4	0.45097	0.12	37.19	27.11	37.31	27.23	56.86	46.86	-19.55	-19.63
5	1.06182	0.21	24.60	15.73	24.81	15.94	56.00	46.00	-31.19	-30.06
6	12.09896	0.67	28.76	22.53	29.43	23.20	60.00	50.00	-30.57	-26.80

REMARKS:

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

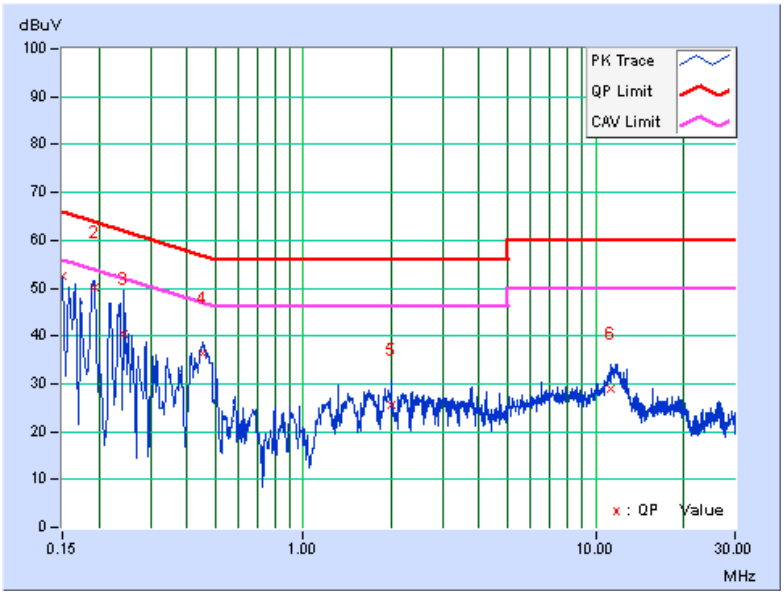


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.05	52.41	34.38	52.46	34.43	66.00	56.00	-13.54	-21.57
2	0.19255	0.08	50.23	36.85	50.31	36.93	63.93	53.93	-13.61	-16.99
3	0.24384	0.11	40.44	22.19	40.55	22.30	61.96	51.96	-21.42	-29.67
4	0.45498	0.17	36.09	26.09	36.26	26.26	56.78	46.78	-20.52	-20.52
5	1.99161	0.22	25.33	18.61	25.55	18.83	56.00	46.00	-30.45	-27.17
6	11.32478	0.60	28.41	22.05	29.01	22.65	60.00	50.00	-30.99	-27.35

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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.56	16.53	16.46	0.5	PASS
157	5785	16.40	16.46	16.47	0.5	PASS
165	5825	16.45	16.45	16.44	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.68	17.68	17.69	0.5	PASS
157	5785	17.68	17.67	17.82	0.5	PASS
165	5825	17.68	17.69	17.74	0.5	PASS

802.11n (HT40)

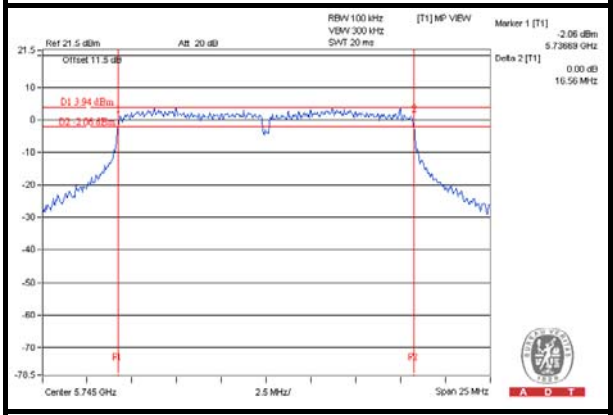
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.51	36.46	36.52	0.5	PASS
159	5795	36.50	36.39	36.54	0.5	PASS

802.11ac (VHT80)

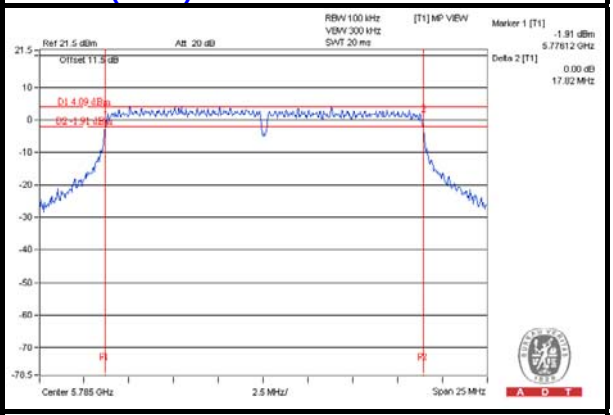
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	76.54	76.57	76.60	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

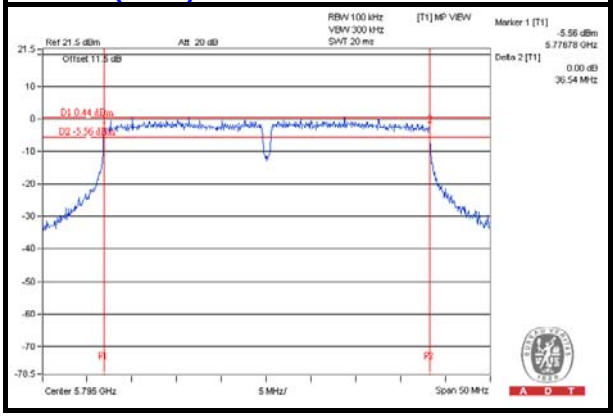
802.11a



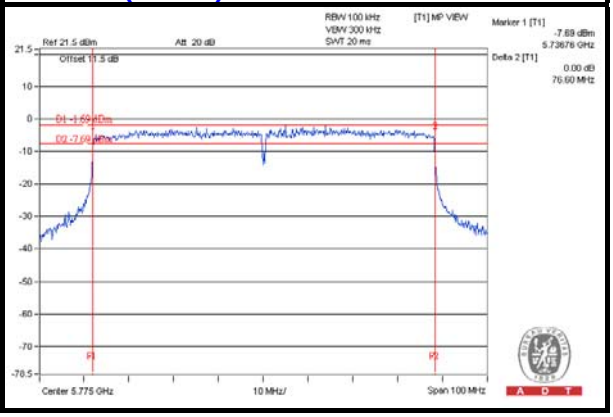
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

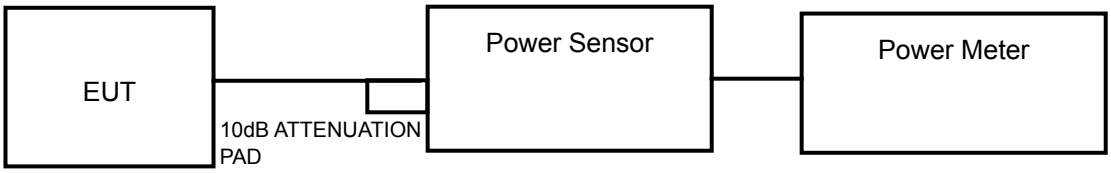
Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

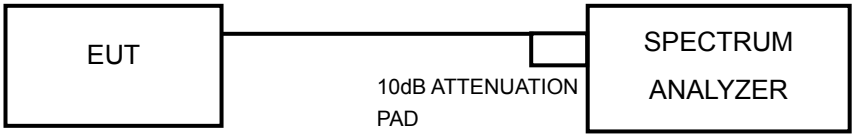
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

5.4.2 TEST SETUP

For 802.11a, 802.11n (HT20), 802.11n (HT40)



For 802.11ac (VHT80)



5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

For 802.11a, 802.11n (HT20), 802.11n (HT40)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (VHT80)

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

1) Set the RBW = 1 MHz.
2) Set the VBW ≥ 3 RBW.
3) Set the span ≥ 1.5 x DTS bandwidth.
4) Detector = peak.
5) Sweep time = auto couple.
6) Trace mode = max hold.
7) Allow trace to fully stabilize.
8) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

FOR PEAK POWER

802.11a

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.87	23.63	22.83	616.184	27.90	30	PASS
157	5785	22.37	23.90	23.50	**641.927**	28.07	30	PASS
165	5825	22.05	23.81	23.15	607.299	27.83	30	PASS

802.11n (HT20)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.47	23.65	22.30	578.167	27.62	30	PASS
157	5785	22.13	23.44	23.35	600.377	27.78	30	PASS
165	5825	21.96	23.36	23.09	577.510	27.62	30	PASS

802.11n (HT40)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	22.38	23.07	23.27	588.074	27.69	30	PASS
159	5795	21.99	23.18	22.12	529.025	27.23	30	PASS

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	22.96	22.85	23.18	598.419	27.77	30	PASS

FOR AVERAGE POWER

802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.28	16.75	16.46	134.036	21.27
157	5785	16.20	17.38	17.26	149.600	21.75
165	5825	15.69	17.59	17.15	146.360	21.65

802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.37	17.29	16.24	139.004	21.43
157	5785	16.17	17.10	17.03	143.152	21.56
165	5825	15.83	17.27	17.00	141.734	21.51

802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	16.14	16.23	16.87	131.732	21.20
159	5795	15.72	16.66	15.76	121.340	20.84

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	16.10	16.18	16.66	128.578	21.09

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/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-8.60	4.77	-3.83	6.23	PASS
	157	5785	-8.33	4.77	-3.56	6.23	PASS
	165	5825	-9.42	4.77	-4.65	6.23	PASS
1	149	5745	-8.22	4.77	-3.45	6.23	PASS
	157	5785	-8.66	4.77	-3.89	6.23	PASS
	165	5825	-8.42	4.77	-3.65	6.23	PASS
2	149	5745	-8.02	4.77	-3.25	6.23	PASS
	157	5785	-8.01	4.77	-3.24	6.23	PASS
	165	5825	-7.98	4.77	-3.21	6.23	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-9.31	4.77	-4.54	6.23	PASS
	157	5785	-9.73	4.77	-4.96	6.23	PASS
	165	5825	-8.30	4.77	-3.53	6.23	PASS
1	149	5745	-8.35	4.77	-3.58	6.23	PASS
	157	5785	-8.52	4.77	-3.75	6.23	PASS
	165	5825	-8.70	4.77	-3.93	6.23	PASS
2	149	5745	-8.96	4.77	-4.19	6.23	PASS
	157	5785	-8.66	4.77	-3.89	6.23	PASS
	165	5825	-7.55	4.77	-2.78	6.23	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-12.66	4.77	-7.89	6.23	PASS
	159	5795	-11.25	4.77	-6.48	6.23	PASS
1	151	5755	-10.59	4.77	-5.82	6.23	PASS
	159	5795	-11.86	4.77	-7.09	6.23	PASS
2	151	5755	-11.69	4.77	-6.92	6.23	PASS
	159	5795	-12.37	4.77	-7.60	6.23	PASS

NOTE: Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

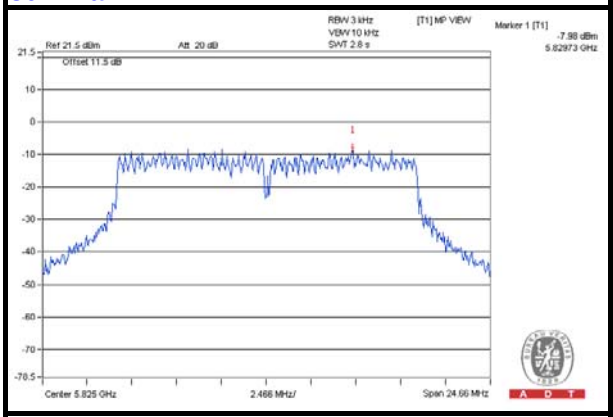
802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	155	5775	-15.78	4.77	-11.01	6.23	PASS
1	155	5775	-15.62	4.77	-10.85	6.23	PASS
2	155	5775	-15.20	4.77	-10.43	6.23	PASS

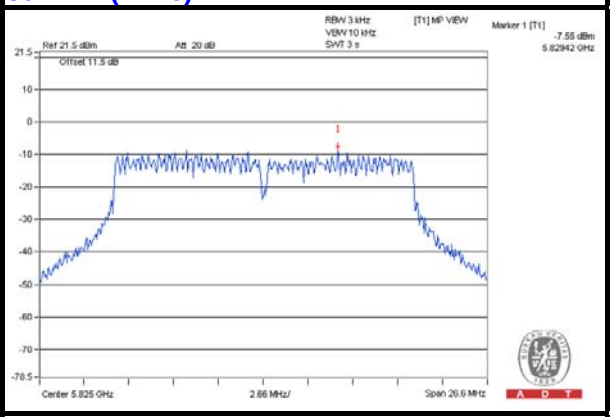
NOTE: Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 8-(7.77-6) = 6.23dBm.

SPECTRUM PLOT OF WORST VALUE

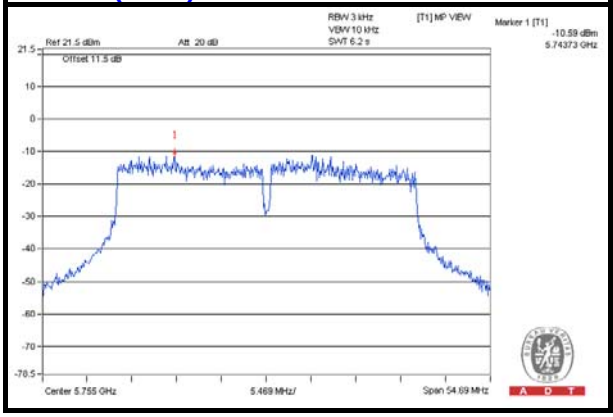
802.11a



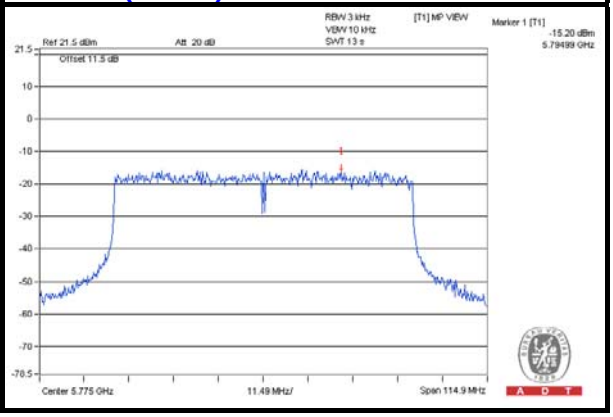
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

5.6.2 TEST SETUP

Same as Item 4.6.2.

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4.

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6.

5.6.7 TEST RESULTS

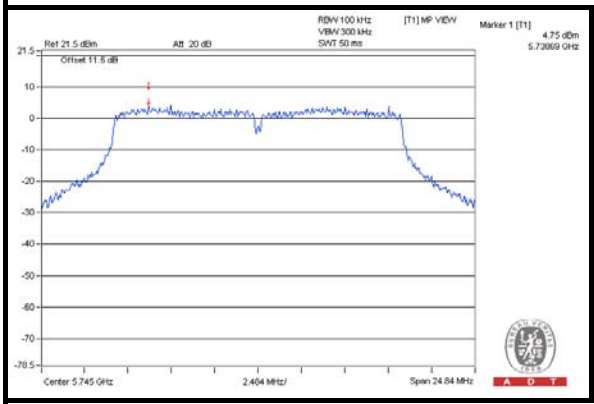
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

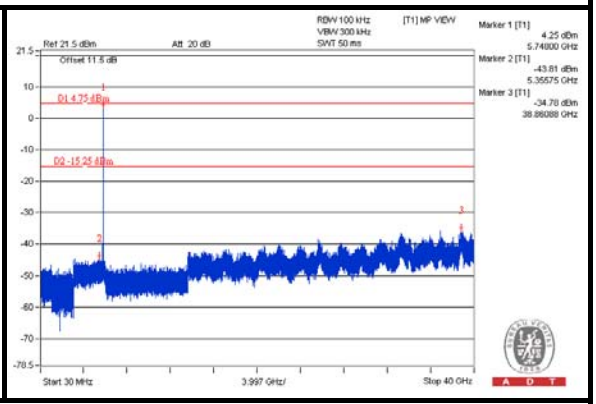
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11a

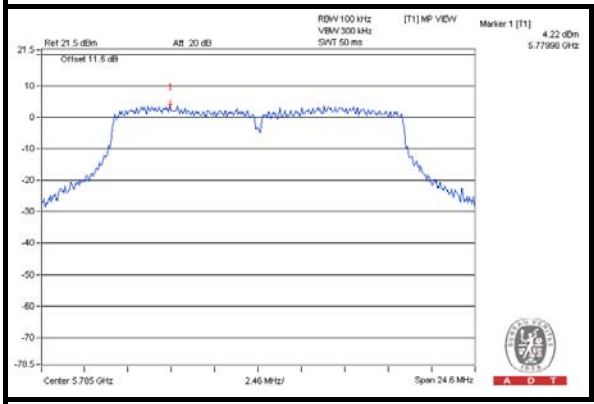
CHAIN 0

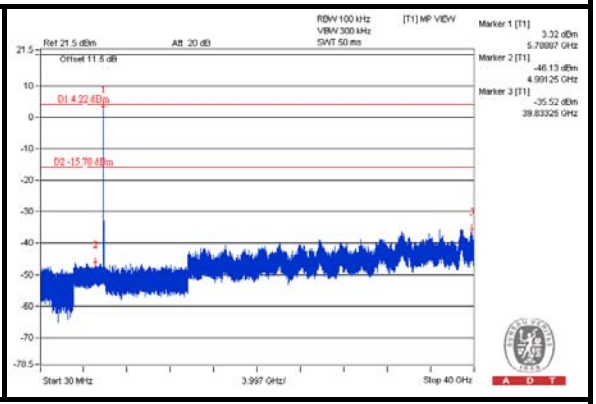
CH 149





CH 157





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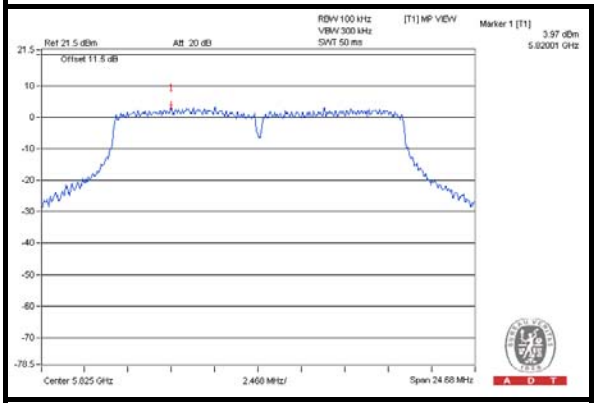
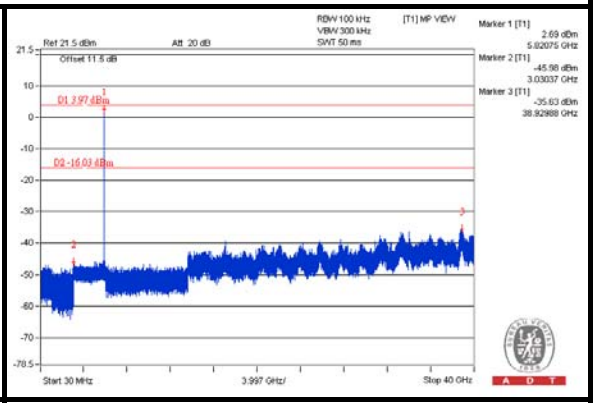
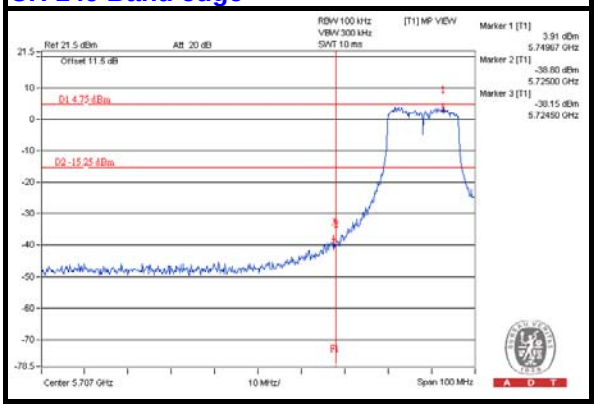




CH 149 Band edge



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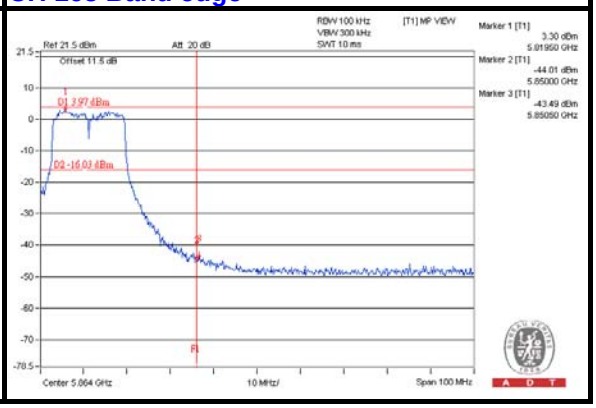

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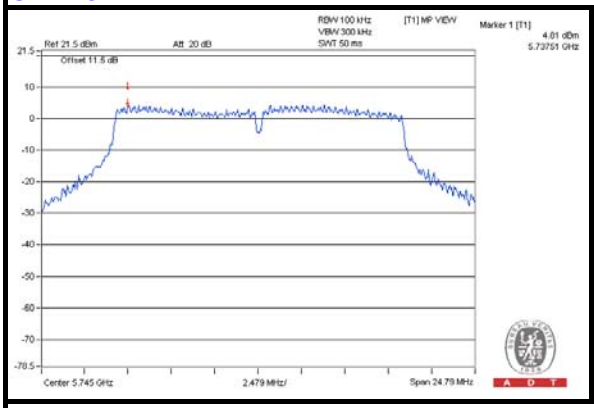

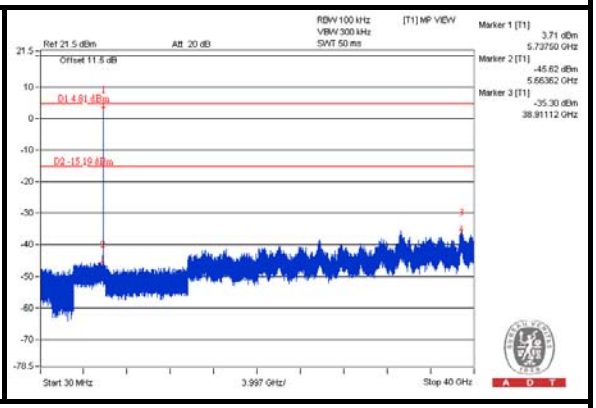

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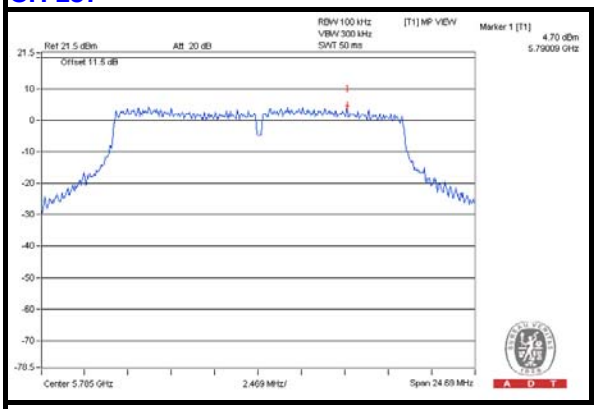

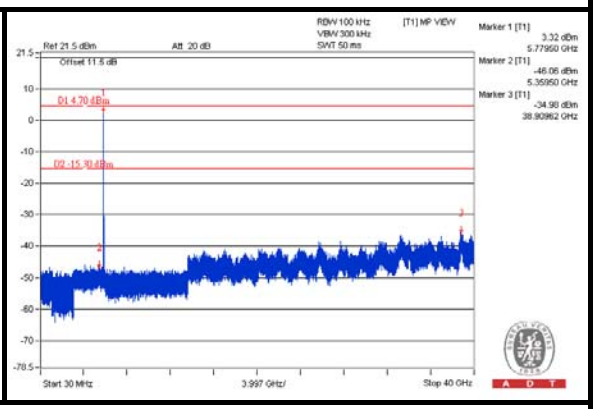

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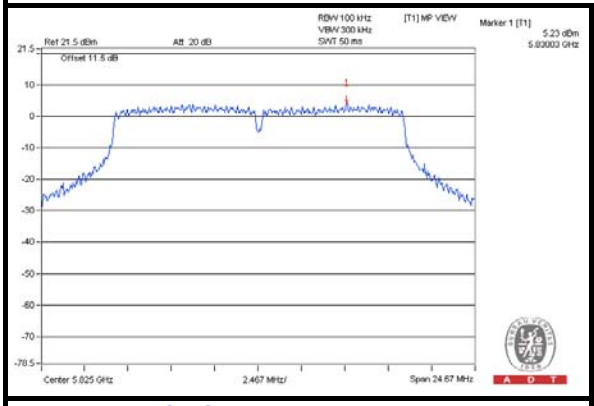
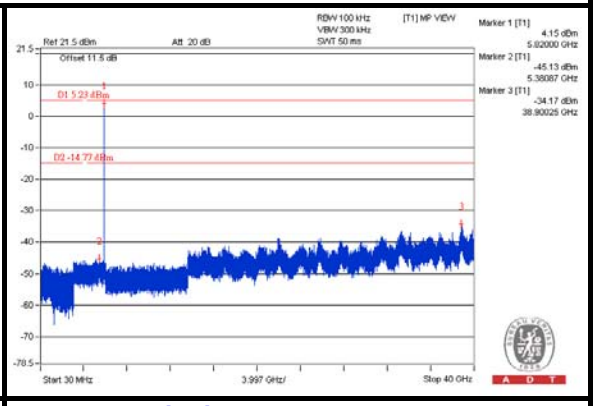
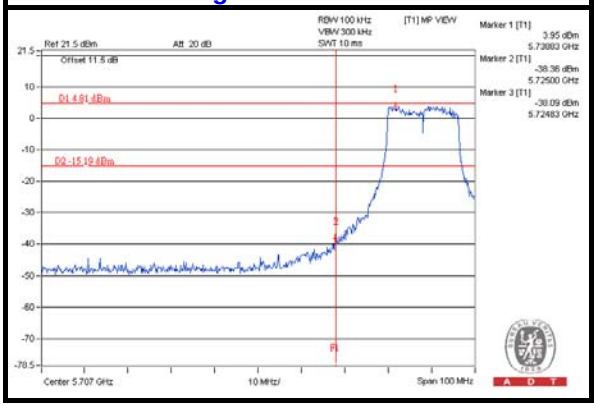
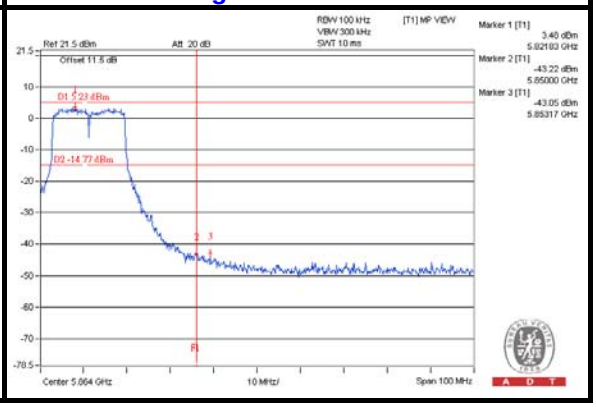




CH 149 Band edge

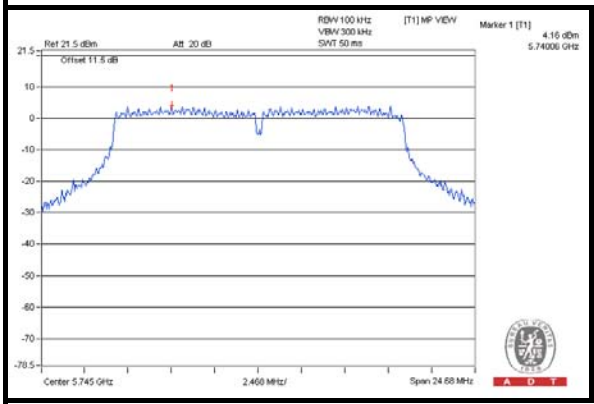


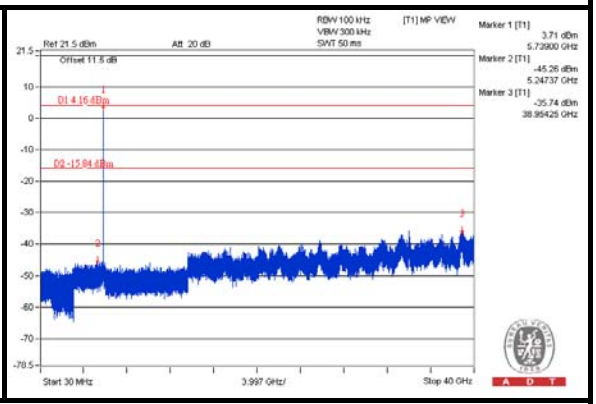
CH 165 Band edge



CHAIN 2

CH 149





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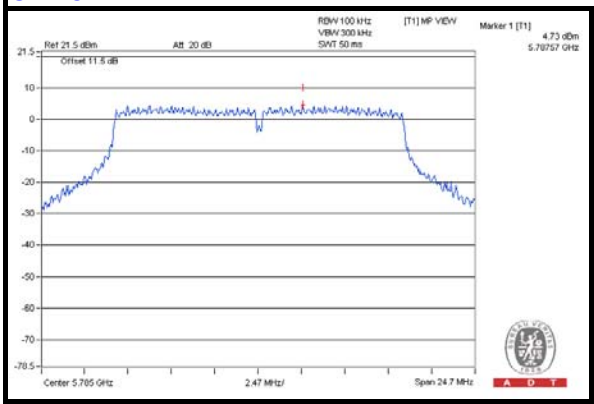

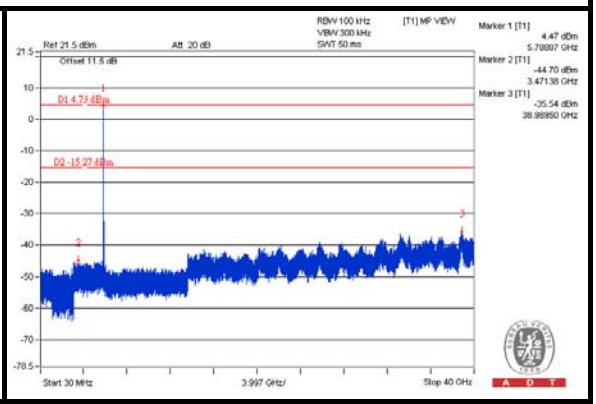

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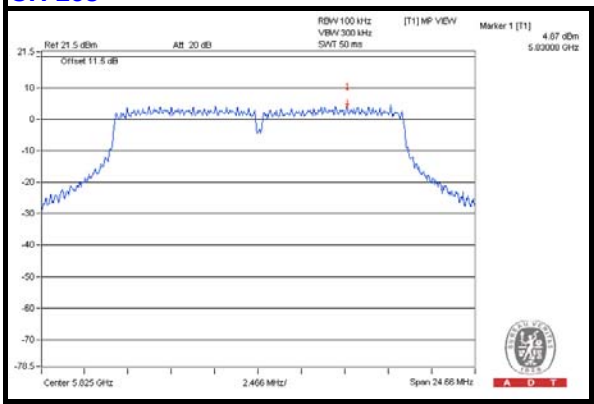
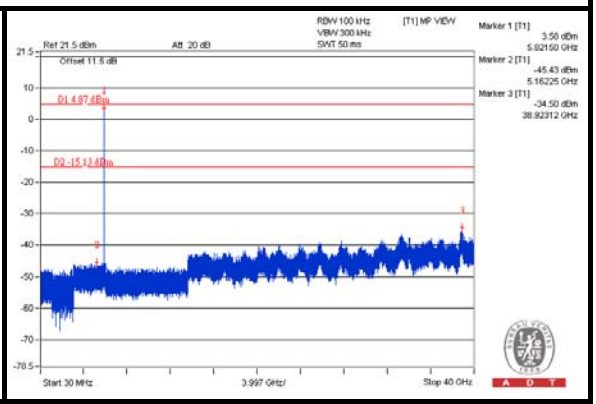
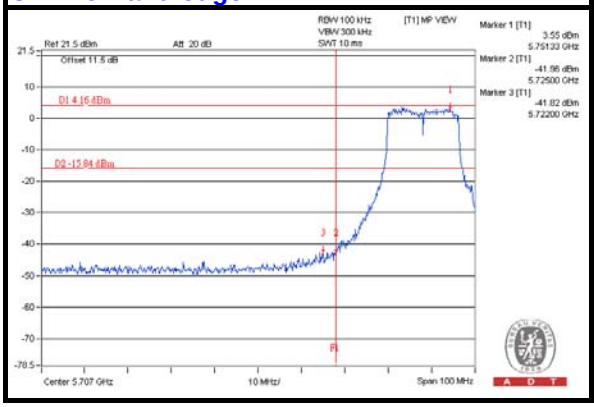
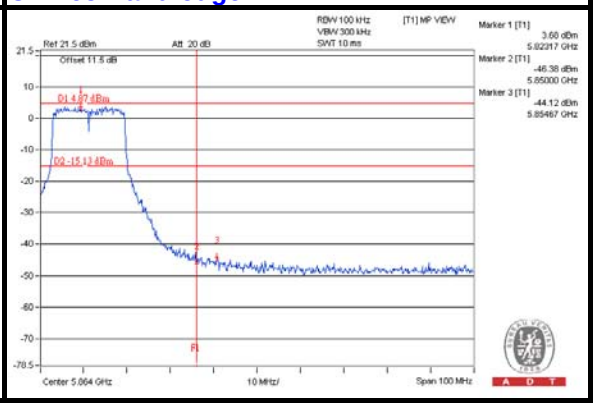




CH 149 Band edge

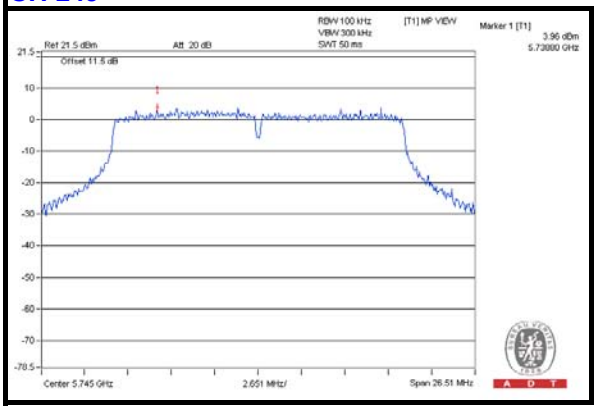


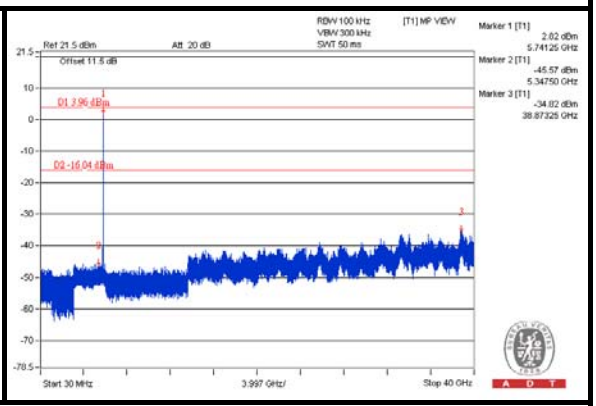
CH 165 Band edge



802.11n (HT20)
CHAIN 0

CH 149





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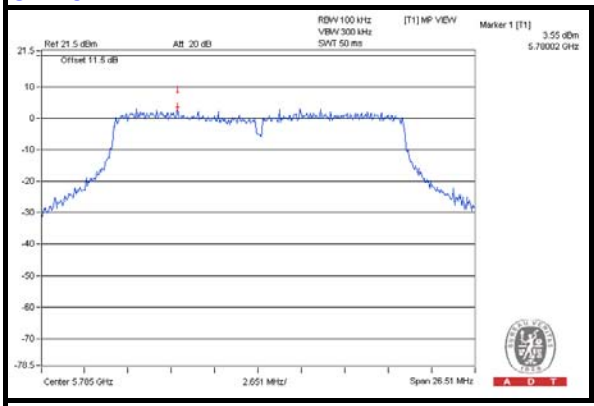

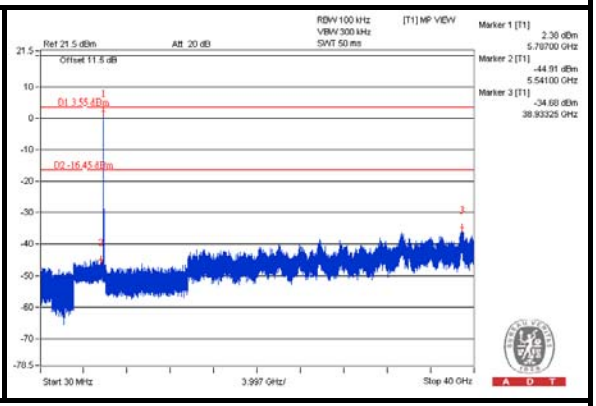

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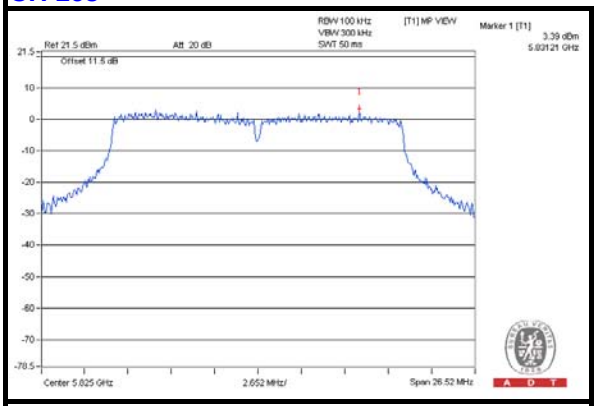
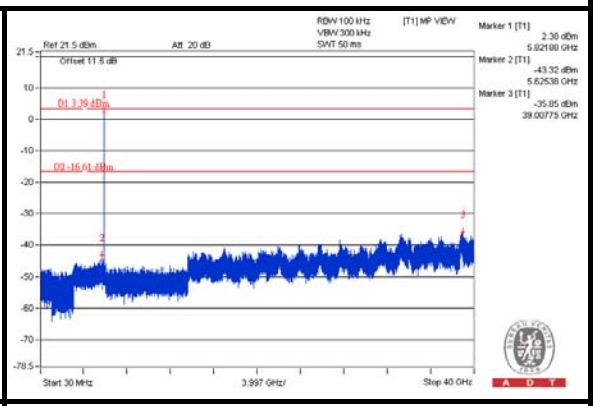
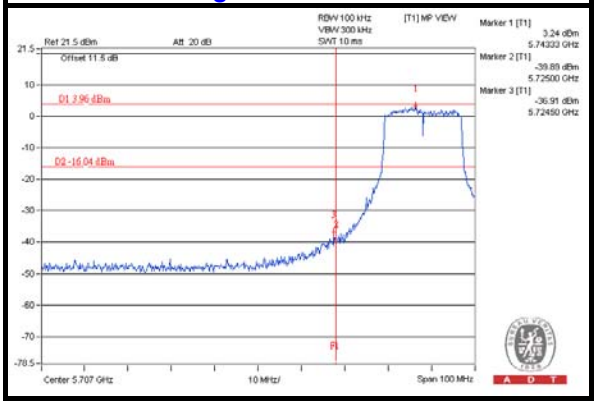




CH 149 Band edge



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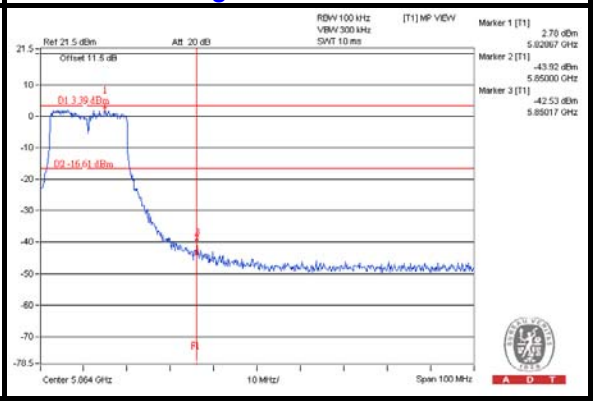
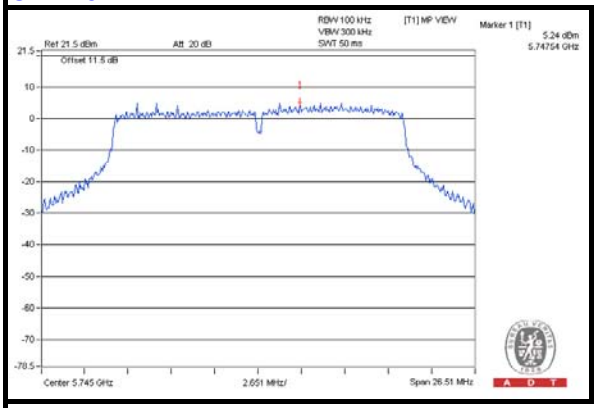
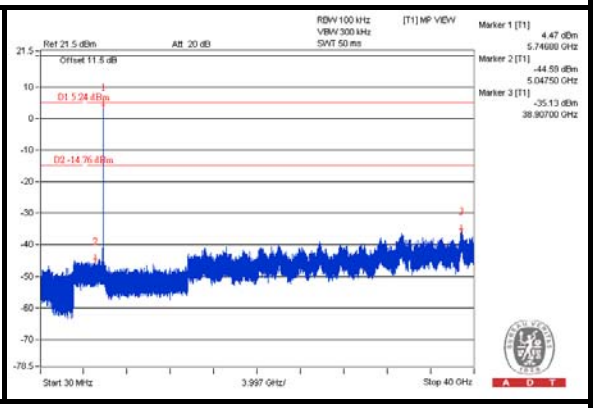


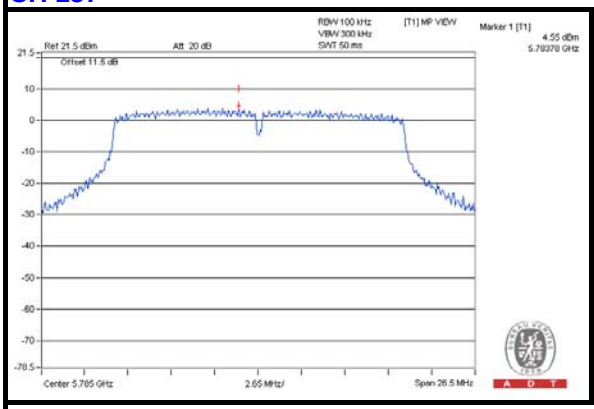
CHAIN 1

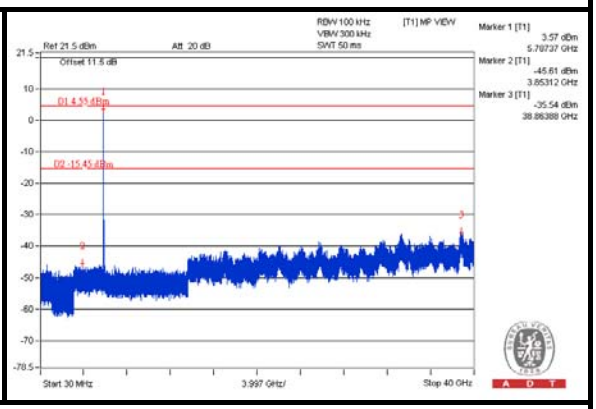
CH 149



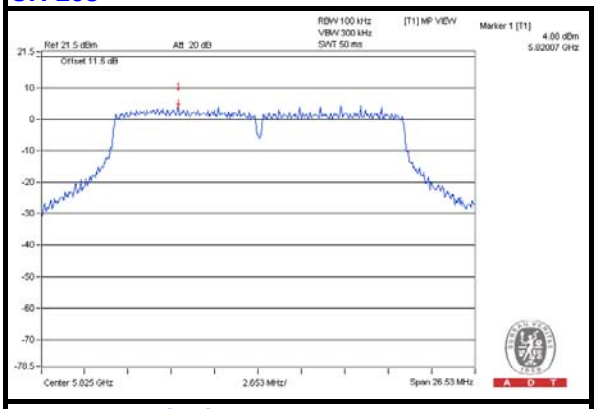


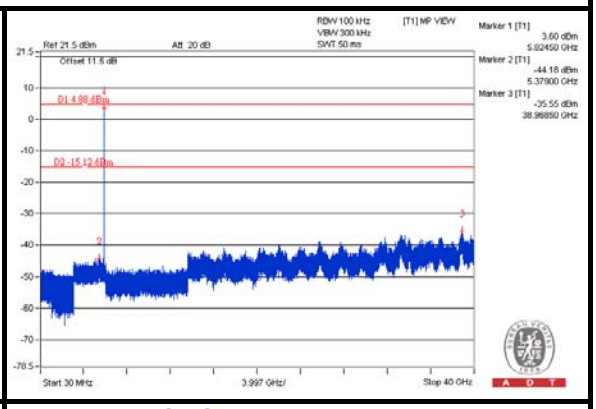
CH 157



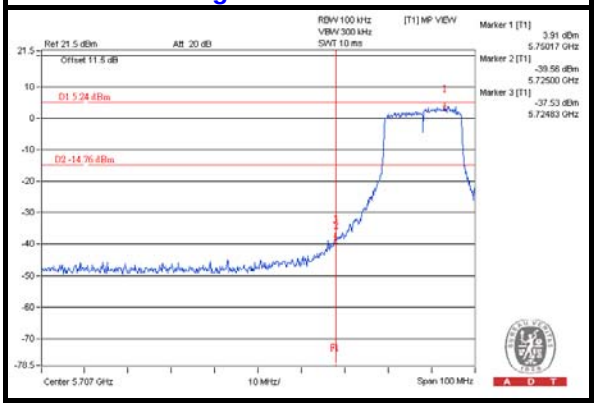


CH 165

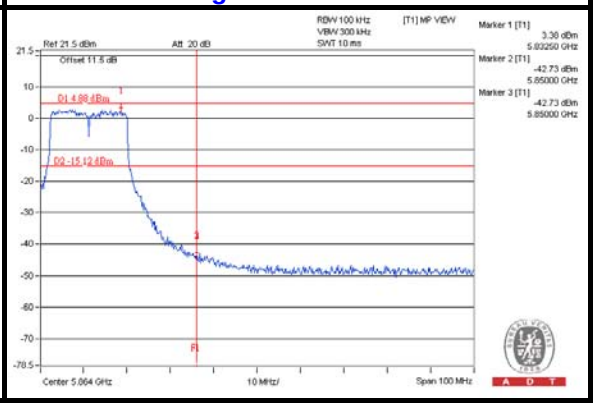




CH 149 Band edge



CH 165 Band edge



CHAIN 2

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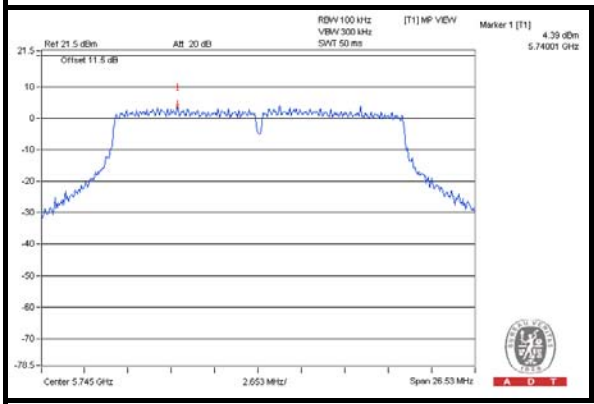

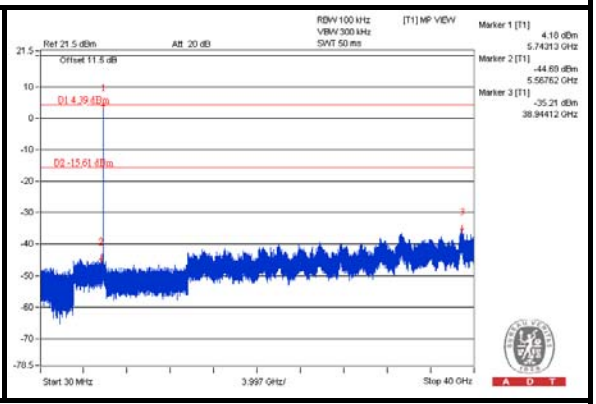

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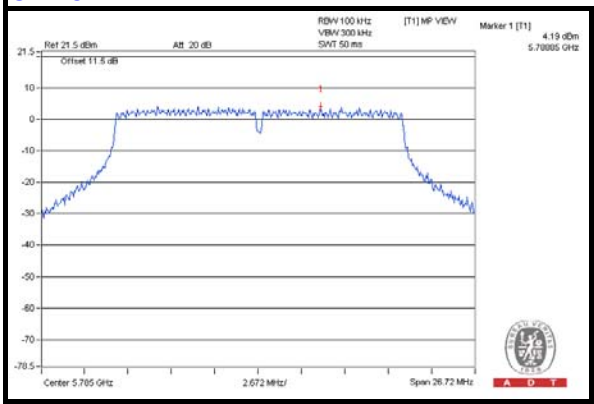
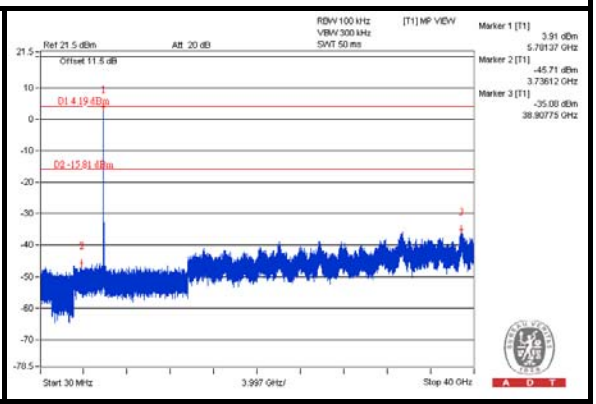
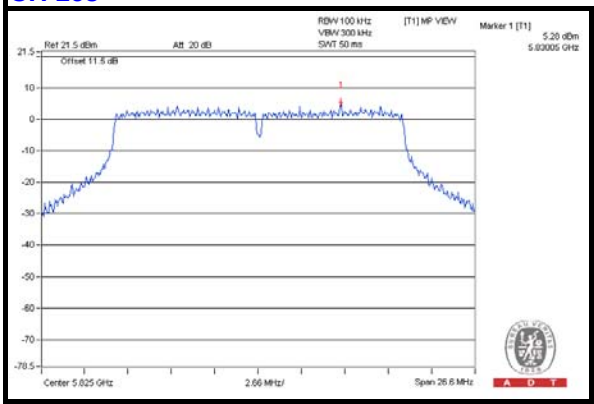
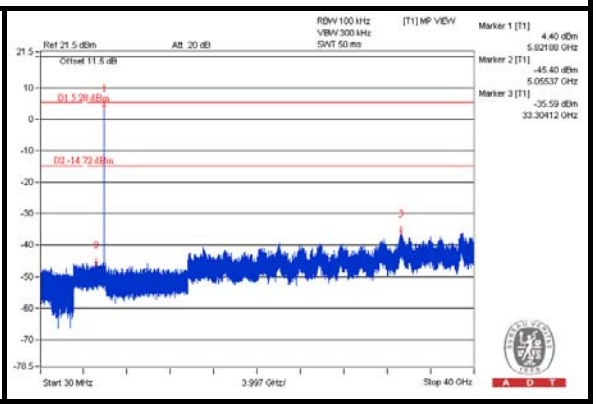


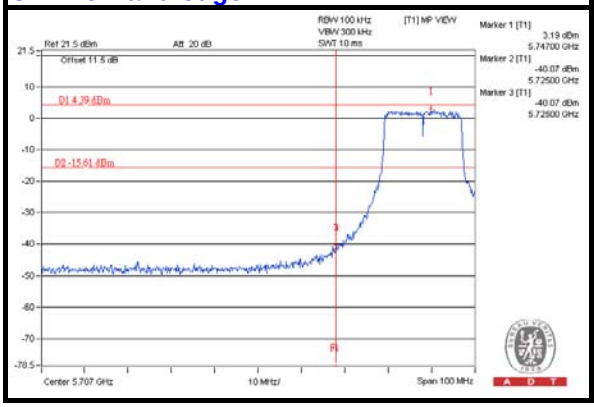


CH 165

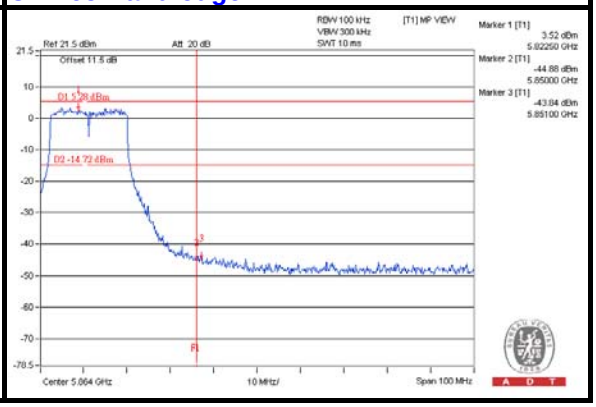




CH 149 Band edge

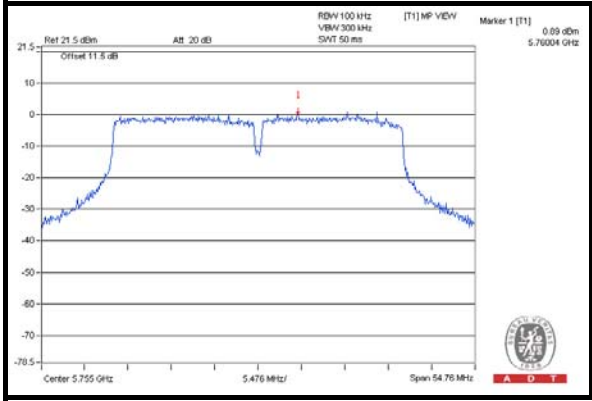


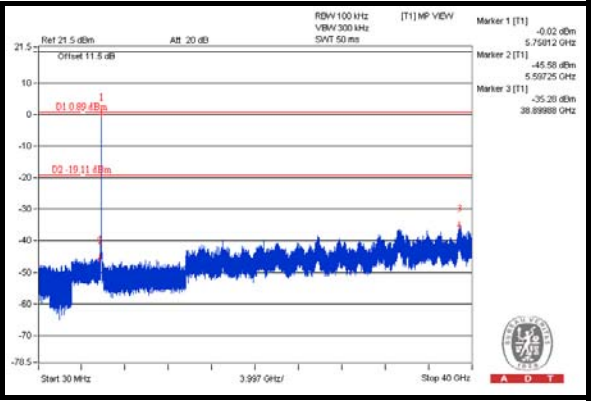
CH 165 Band edge



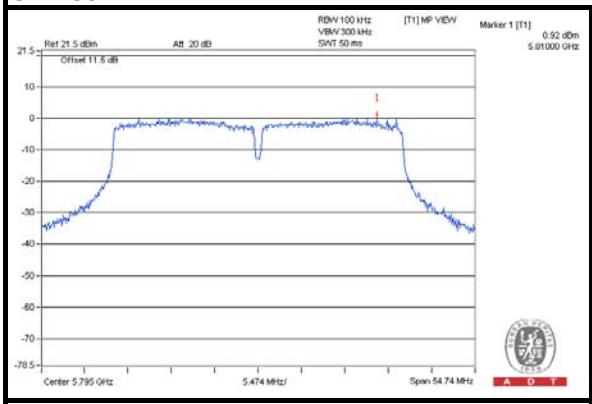
802.11n (HT40)
CHAIN 0

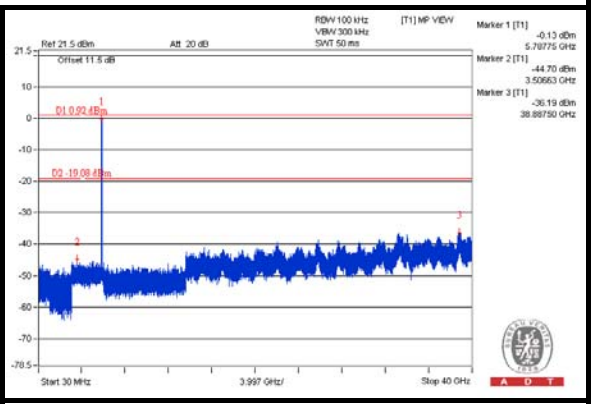
CH 151



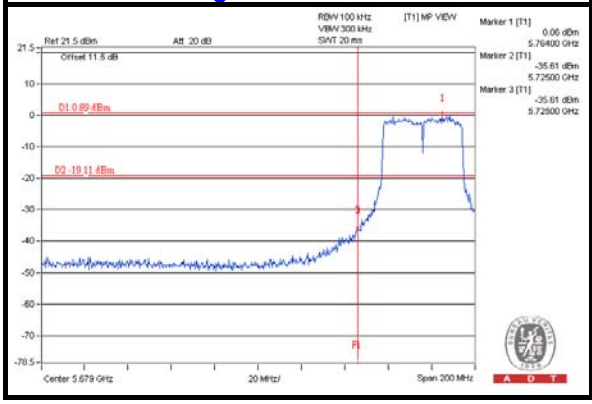


CH 159

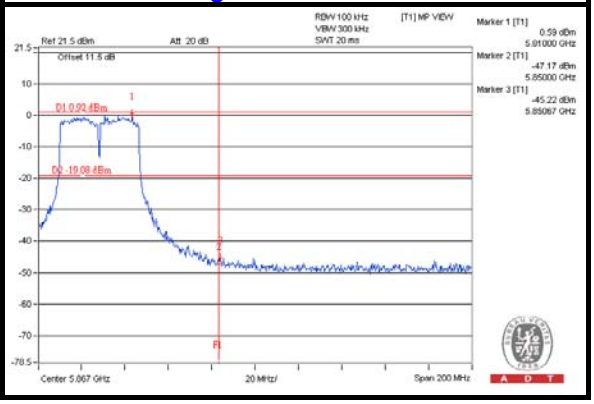




CH 151 Band edge

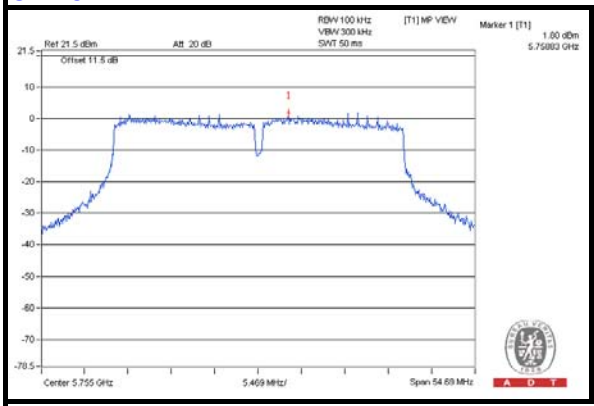


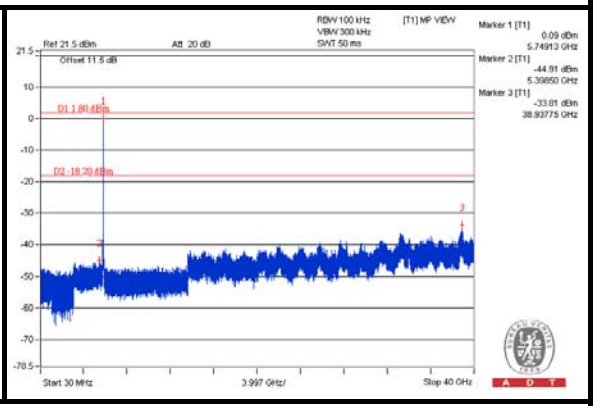
CH 159 Band edge



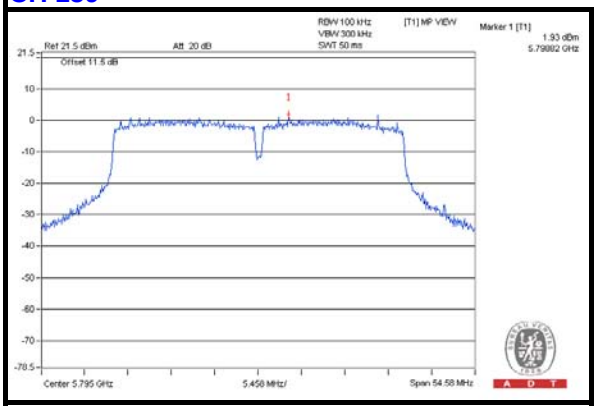
CHAIN 1

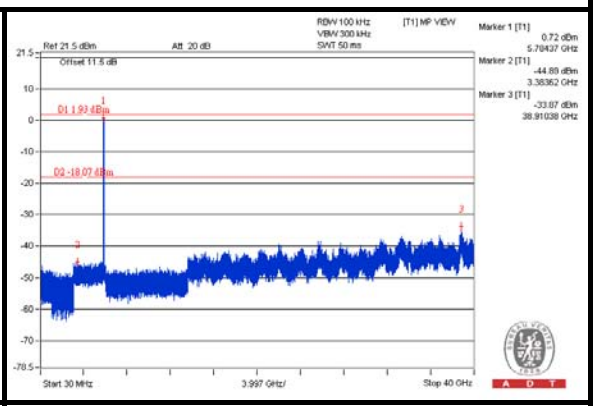
CH 151



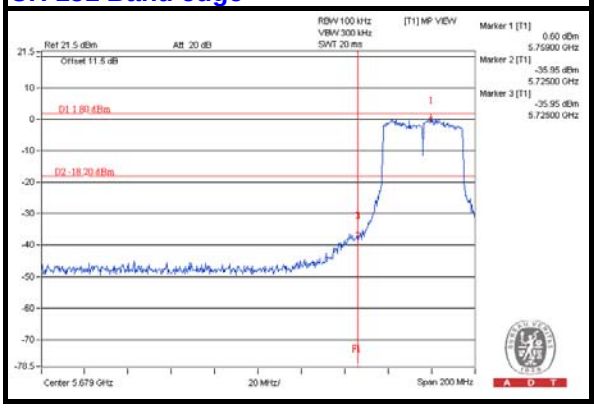


CH 159

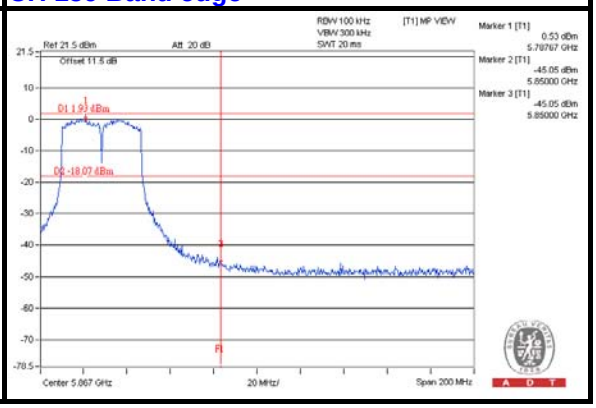




CH 151 Band edge

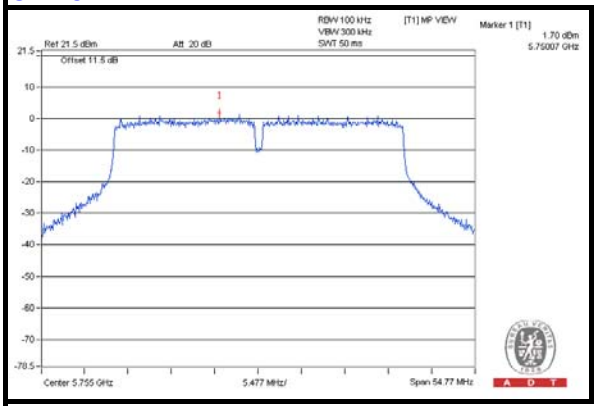


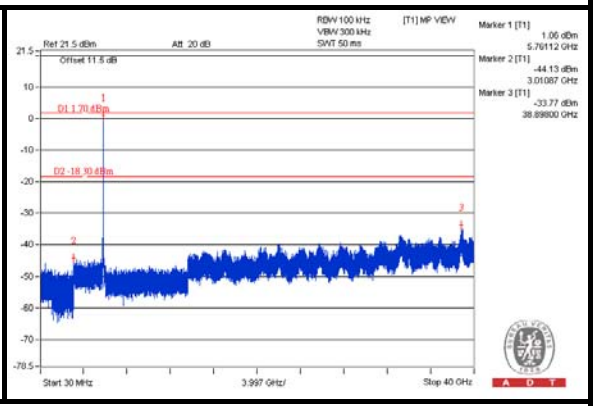
CH 159 Band edge



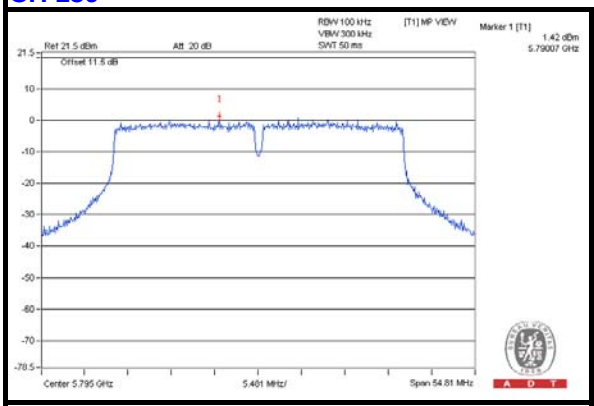
CHAIN 2

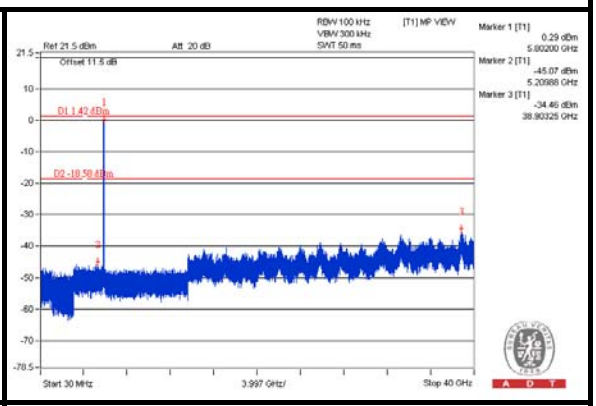
CH 151



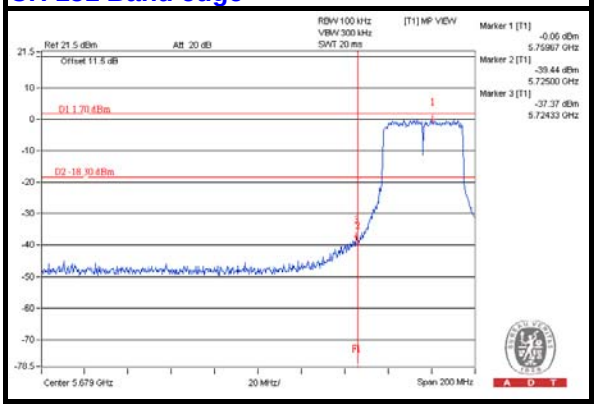


CH 159

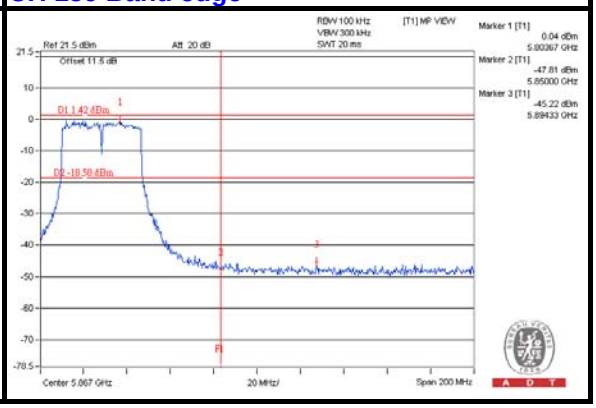




CH 151 Band edge

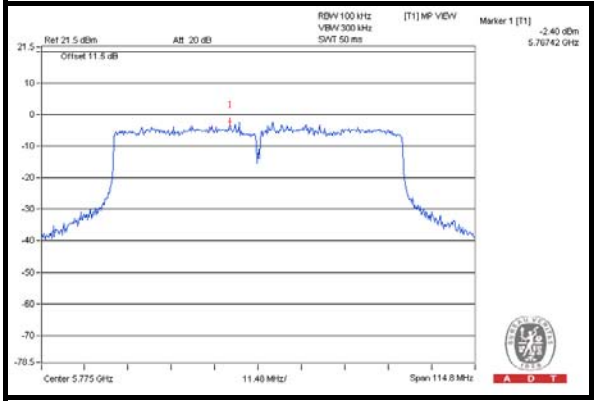


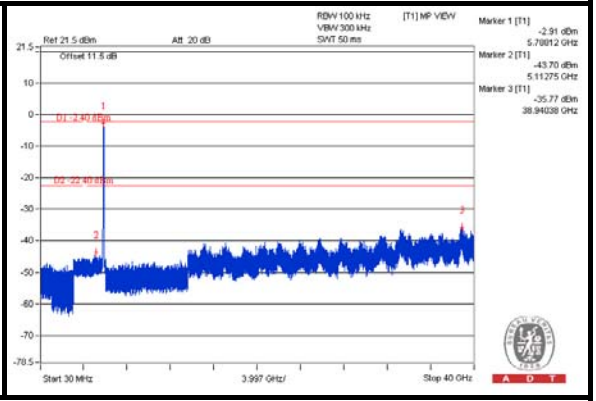
CH 159 Band edge



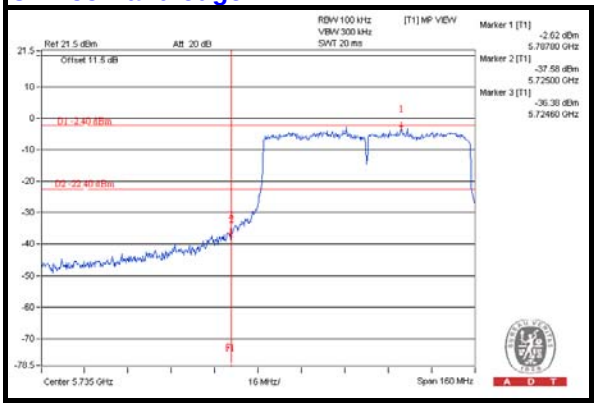
802.11ac (VHT80)
CHAIN 0

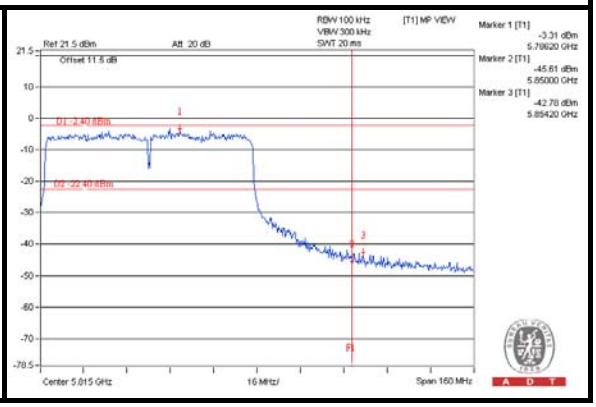
CH 155





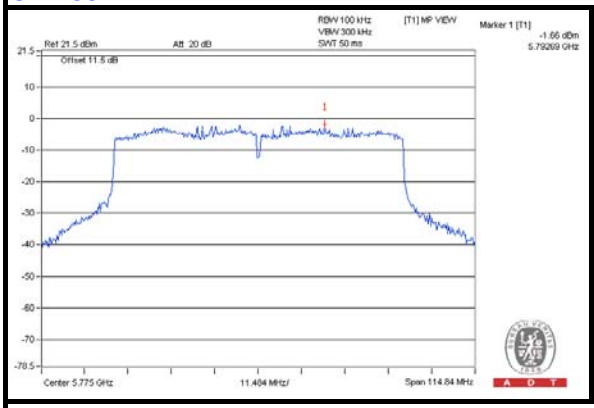
CH 155 Band edge

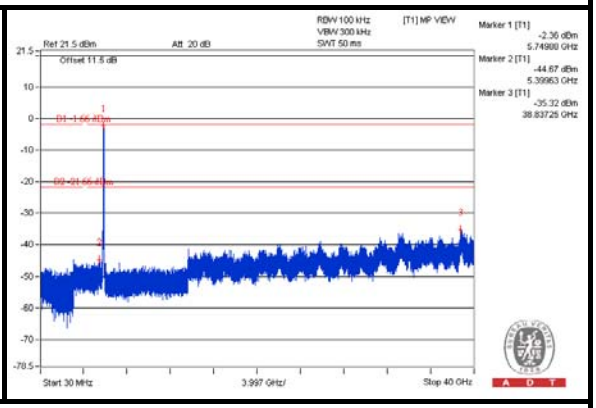




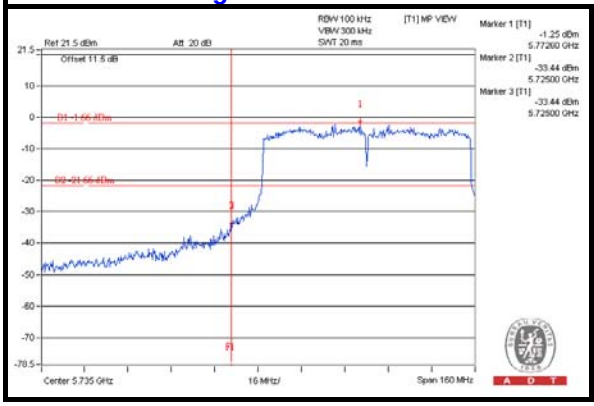
CHAIN 1

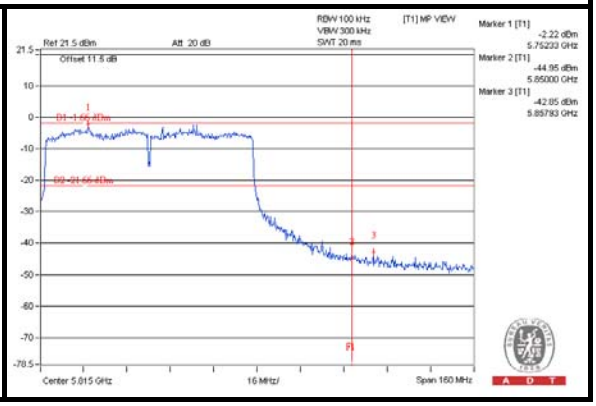
CH 155





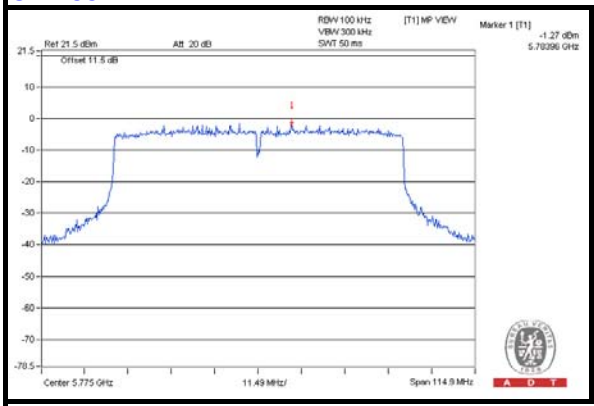
CH 155 Band edge

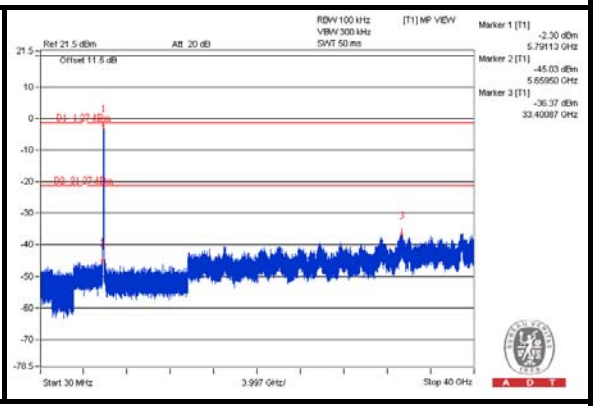




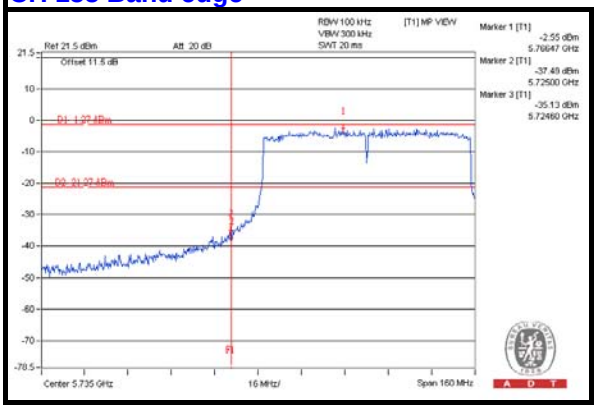
CHAIN 2

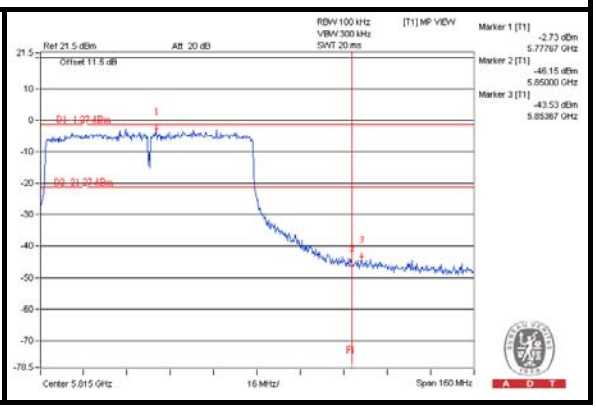
CH 155





CH 155 Band edge





6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

7. INFORMATION ON THE TESTING LABORATORIES

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

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

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

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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

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

---END---