FCC Test Report

Report No.:	RF160415D13
FCC ID:	P27RP101V2
Test Model:	RP101XXXXXXXX
Received Date:	Apr. 15, 2016
Test Date:	Apr. 28, 2016
Issued Date:	May 6, 2016
Applicant:	Sercomm Corp.
Address:	8F, No. 3-1, YuangQu St., NanKang, Taipei 115, Taiwan, R.O.C. (NanKang Software Park)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

Testing Laboratory
2021

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF160415D13	Original release.	May 6, 2016

1 Certificate of Conformity

Product:	WiFi Repeater
Brand:	Sercomm, ADT, Icontrol
Test Model:	RP101XXXXXXXX
Sample Status:	Engineering sample
Applicant:	Sercomm Corp.
Test Date:	Apr. 28, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : Jessica Cheng , **Date:** May 6, 2016

Jessica Cheng / Senior Specialist

Approved by : Rex. Lai , **Date:** May 6, 2016

Rex Lai / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.52dB at 0.43125MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.4dB at 2483.50MHz, 2390.00 MHz
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	No antenna connector is used.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.78 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	WiFi Repeater
Brand	Sercomm, ADT, Icontrol
Test Model	RP101XXXXXXXX
Status of EUT	Engineering sample
Power Supply Rating	100-240Vac, 50/60Hz, 100mA
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	990.924mW
Antenna Type	PCB antenna with 1.24dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

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

Modulation Mode	TX Function
802.11b	2TX
802.11g	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (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		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **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	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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

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	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

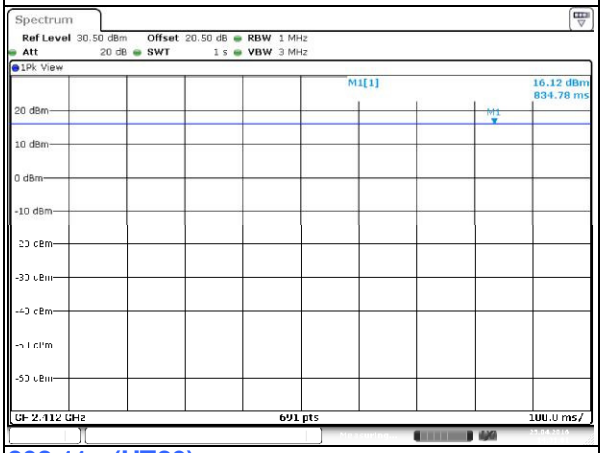
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18deg. C, 73%RH	120Vac, 60Hz	Aaron You
RE<1G	18deg. C, 73%RH	120Vac, 60Hz	Aaron You
PLC	23deg. C, 72%RH	120Vac, 60Hz	Aaron You
APCM	25deg. C, 60%RH	120Vac, 60Hz	Dalen Dai

3.3 Duty Cycle of Test Signal

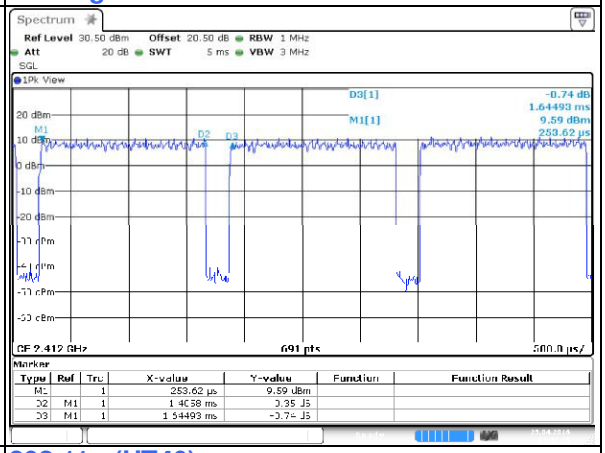
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle of test signal is 100 %
802.11g: Duty cycle = 1.405/1.644 = 0.855, Duty factor = 10 * log(1/0.855) = 0.7
802.11n (HT20): Duty cycle = 1.318/1.543 = 0.854, Duty factor = 10 * log(1/0.854) = 0.7
802.11n (HT40): Duty cycle = 0.623/0.884 = 0.705, Duty factor = 10 * log(1/0.705) = 1.5

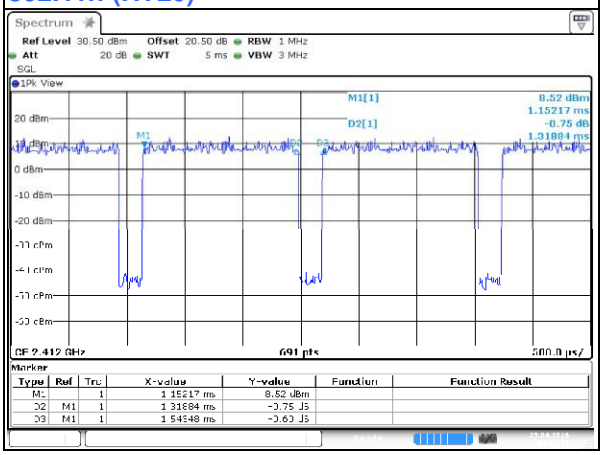
802.11b



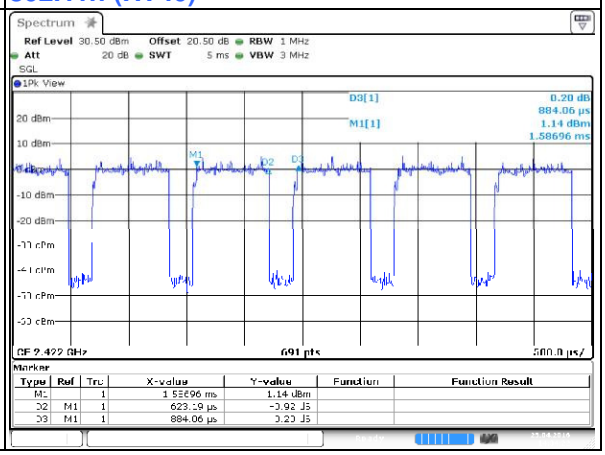
802.11g



802.11n (HT20)



802.11n (HT40)



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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook PC	DELL	E6530	9331GV1	FCC DoC Approved	Provided by Lab

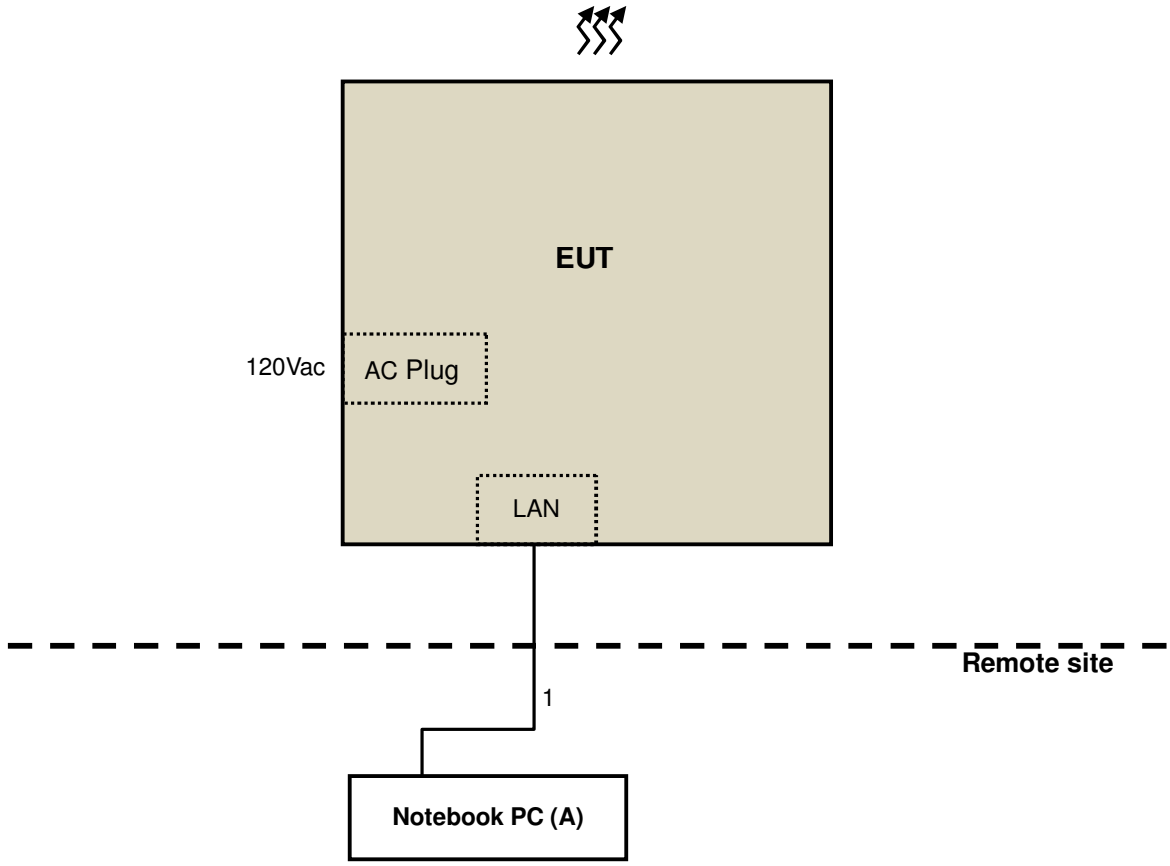
Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	10	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

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)
KDB 558074 D01 DTS Meas Guidance v03r05
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2016	Feb. 25, 2017
HP Preamplifier	8449B	3008A01201	Feb. 26, 2016	Feb. 25, 2017
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2016	Feb. 28, 2017
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 02, 2016	Feb. 01, 2017
Schwarzbeck Antenna	VULB 9168	139	Jan. 04, 2016	Jan. 03, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Jan. 08, 2016	Jan. 07, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Jan. 21, 2016	Jan. 20, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 04, 2015	May 03, 2016
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 14, 2015	Jul. 13, 2016
EMCO Horn Antenna	3115	00028257	Jan. 19, 2016	Jan. 18, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 28, 2016	Apr. 27, 2017
Anritsu Power Meter	ML2495A	0842014	Apr. 28, 2016	Apr. 27, 2017

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

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

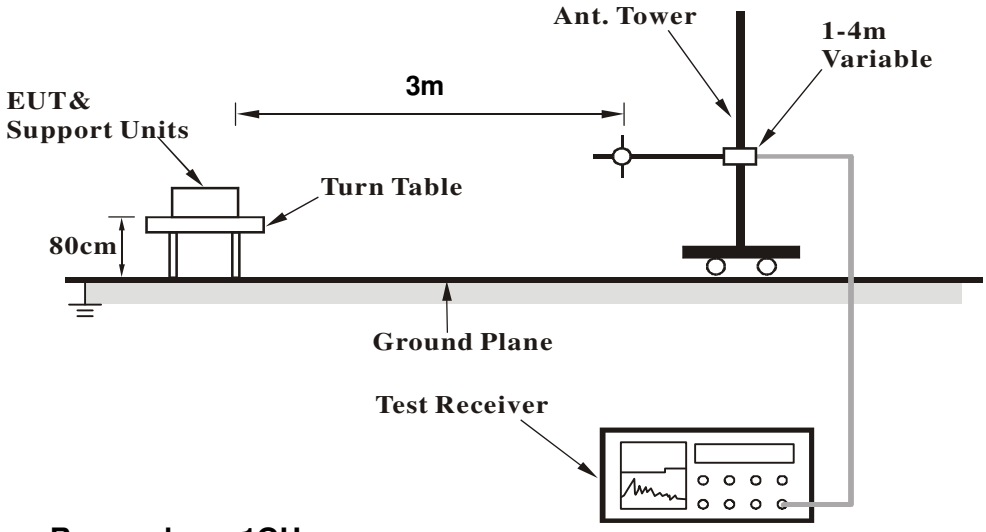
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

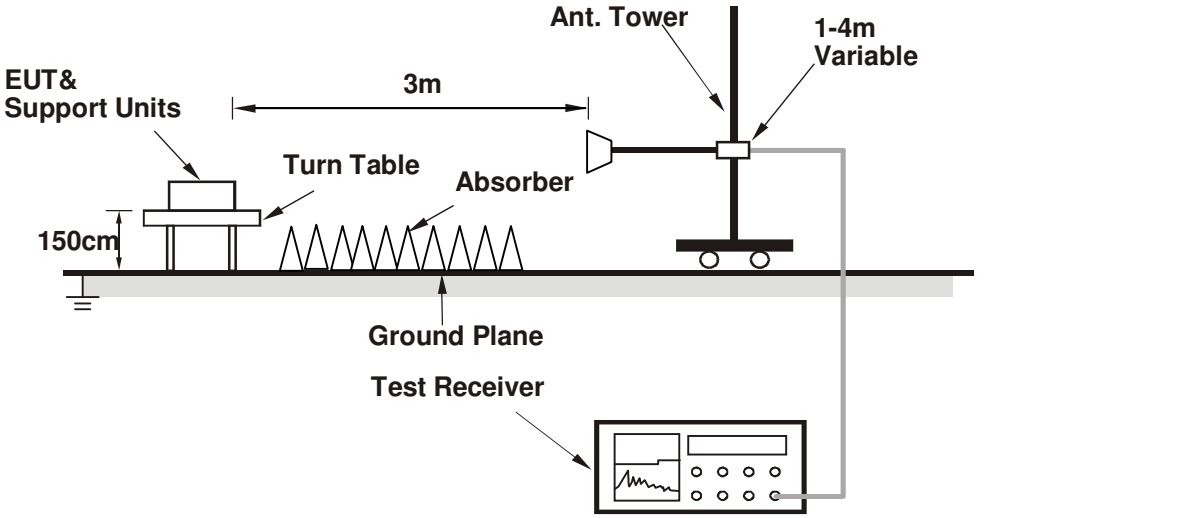
No deviation.

4.1.5 Test Set Up

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

4.1.7 Test Results

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) 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	64.9 PK	74.0	-9.1	1.71 H	40	65.17	-0.31
2	2390.00	53.3 AV	54.0	-0.7	1.71 H	40	53.62	-0.31
3	*2412.00	110.4 PK			1.71 H	40	110.58	-0.17
4	*2412.00	108.0 AV			1.71 H	40	108.17	-0.17
5	4824.00	52.7 PK	74.0	-21.3	1.51 H	192	46.56	6.10
6	4824.00	49.3 AV	54.0	-4.7	1.51 H	192	43.21	6.10
7	#7236.00	57.4 PK	74.0	-16.6	2.60 H	329	43.97	13.43
8	#7236.00	50.2 AV	54.0	-3.8	2.60 H	329	36.73	13.43
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	60.8 PK	74.0	-13.2	2.70 V	92	61.15	-0.31
2	2390.00	50.1 AV	54.0	-3.9	2.70 V	92	50.37	-0.31
3	*2412.00	108.7 PK			2.70 V	92	108.82	-0.17
4	*2412.00	106.3 AV			2.70 V	92	106.42	-0.17
5	4824.00	55.6 PK	74.0	-18.4	1.90 V	290	49.53	6.10
6	4824.00	53.3 AV	54.0	-0.7	1.90 V	290	47.16	6.10
7	#7236.00	54.8 PK	74.0	-19.2	1.72 V	332	41.37	13.43
8	#7236.00	44.2 AV	54.0	-9.8	1.72 V	332	30.79	13.43

REMARKS:

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

CHANNEL	TX Channel 6	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	*2437.00	110.7 PK			1.88 H	45	110.70	-0.01
2	*2437.00	107.7 AV			1.88 H	45	107.72	-0.01
3	4874.00	51.3 PK	74.0	-22.8	1.58 H	191	45.11	6.14
4	4874.00	46.3 AV	54.0	-7.8	1.58 H	191	40.11	6.14
5	7311.00	57.7 PK	74.0	-16.3	2.65 H	327	44.19	13.50
6	7311.00	49.5 AV	54.0	-4.5	2.65 H	327	35.99	13.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	108.6 PK			2.66 V	93	108.64	-0.01
2	*2437.00	105.6 AV			2.66 V	93	105.63	-0.01
3	4874.00	53.4 PK	74.0	-20.6	2.05 V	295	47.22	6.14
4	4874.00	50.0 AV	54.0	-4.0	2.05 V	295	43.85	6.14
5	7311.00	55.1 PK	74.0	-18.9	1.77 V	323	41.62	13.50
6	7311.00	44.1 AV	54.0	-9.9	1.77 V	323	30.60	13.50

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	*2462.00	109.7 PK			2.73 H	296	109.58	0.15
2	*2462.00	107.2 AV			2.73 H	296	107.04	0.15
3	2483.50	64.8 PK	74.0	-9.2	2.73 H	296	64.54	0.29
4	2483.50	53.1 AV	54.0	-0.9	2.73 H	296	52.78	0.29
5	4924.00	49.9 PK	74.0	-24.1	1.50 H	353	43.67	6.21
6	4924.00	43.8 AV	54.0	-10.2	1.50 H	353	37.59	6.21
7	7386.00	56.0 PK	74.0	-18.0	2.51 H	109	42.34	13.70
8	7386.00	42.5 AV	54.0	-11.5	2.51 H	109	28.79	13.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.1 PK			2.03 V	129	107.93	0.15
2	*2462.00	105.7 AV			2.03 V	129	105.54	0.15
3	2483.50	62.6 PK	74.0	-11.5	2.03 V	129	62.26	0.29
4	2483.50	51.1 AV	54.0	-2.9	2.03 V	129	50.85	0.29
5	4924.00	53.2 PK	74.0	-20.8	2.12 V	300	46.98	6.21
6	4924.00	49.4 AV	54.0	-4.6	2.12 V	300	43.20	6.21
7	7386.00	55.0 PK	74.0	-19.0	1.73 V	330	41.32	13.70
8	7386.00	41.6 AV	54.0	-12.4	1.73 V	330	27.94	13.70

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.0 PK	74.0	-1.0	1.21 H	104	73.02	0.00
2	2390.00	52.9 AV	54.0	-1.2	1.21 H	104	52.85	0.00
3	*2412.00	109.2 PK			1.21 H	104	109.17	0.00
4	*2412.00	99.3 AV			1.21 H	104	99.33	0.00
5	4824.00	57.1 PK	74.0	-16.9	3.70 H	211	57.07	0.00
6	4824.00	42.2 AV	54.0	-11.8	3.70 H	211	42.20	0.00
7	#7236.00	53.6 PK	74.0	-20.5	1.41 H	256	53.55	0.00
8	#7236.00	40.6 AV	54.0	-13.4	1.41 H	256	40.57	0.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.7 PK	74.0	-5.3	1.00 V	205	69.00	-0.31
2	2390.00	50.8 AV	54.0	-3.2	1.00 V	205	51.15	-0.31
3	*2412.00	106.3 PK			1.00 V	205	106.44	-0.17
4	*2412.00	97.1 AV			1.00 V	205	97.22	-0.17
5	4824.00	56.4 PK	74.0	-17.6	3.15 V	191	50.28	6.10
6	4824.00	41.6 AV	54.0	-12.4	3.15 V	191	35.46	6.10
7	#7236.00	53.2 PK	74.0	-20.8	1.55 V	30	39.80	13.43
8	#7236.00	40.4 AV	54.0	-13.7	1.55 V	30	26.92	13.43

REMARKS:

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

CHANNEL	TX Channel 6	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	*2437.00	112.2 PK			1.68 H	101	112.19	-0.01
2	*2437.00	102.8 AV			1.68 H	101	102.79	-0.01
3	4874.00	57.9 PK	74.0	-16.1	3.70 H	207	51.77	6.14
4	4874.00	43.1 AV	54.0	-10.9	3.70 H	207	37.00	6.14
5	7311.00	54.8 PK	74.0	-19.3	1.69 H	264	41.25	13.50
6	7311.00	42.1 AV	54.0	-11.9	1.69 H	264	28.64	13.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.1 PK			2.34 V	336	110.15	-0.01
2	*2437.00	99.7 AV			2.34 V	336	99.68	-0.01
3	4874.00	56.4 PK	74.0	-17.6	1.49 V	46	50.22	6.14
4	4874.00	42.8 AV	54.0	-11.2	1.49 V	46	36.69	6.14
5	7311.00	53.7 PK	74.0	-20.3	1.88 V	169	40.16	13.50
6	7311.00	41.0 AV	54.0	-13.0	1.88 V	169	27.46	13.50

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	*2462.00	112.5 PK			1.19 H	12	112.34	0.15
2	*2462.00	103.2 AV			1.19 H	12	103.01	0.15
3	2483.50	73.5 PK	74.0	-0.5	1.19 H	12	73.18	0.29
4	2483.50	51.2 AV	54.0	-2.8	1.19 H	12	50.95	0.29
5	4924.00	57.5 PK	74.0	-16.5	1.57 H	83	51.26	6.21
6	4924.00	44.9 AV	54.0	-9.1	1.57 H	83	38.65	6.21
7	7386.00	54.3 PK	74.0	-19.7	1.74 H	49	40.59	13.70
8	7386.00	42.3 AV	54.0	-11.7	1.74 H	49	28.64	13.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.4 PK			2.83 V	256	110.24	0.15
2	*2462.00	100.9 AV			2.83 V	256	100.75	0.15
3	2483.50	71.6 PK	74.0	-2.4	2.83 V	256	71.34	0.29
4	2483.50	49.6 AV	54.0	-4.4	2.83 V	256	49.29	0.29
5	4924.00	56.4 PK	74.0	-17.6	1.88 V	102	50.16	6.21
6	4924.00	43.8 AV	54.0	-10.2	1.88 V	102	37.59	6.21
7	7386.00	53.8 PK	74.0	-20.2	2.00 V	119	40.11	13.70
8	7386.00	41.4 AV	54.0	-12.7	2.00 V	119	27.65	13.70

REMARKS:

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

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**2390.00**	**73.6 PK**	**74.0**	**-0.4**	**1.07 H**	**78**	**73.91**	**-0.31**
2	2390.00	53.3 AV	54.0	-0.7	1.07 H	78	53.57	-0.31
3	*2412.00	111.9 PK			1.07 H	78	112.06	-0.17
4	*2412.00	102.1 AV			1.07 H	78	102.27	-0.17
5	4824.00	50.7 PK	74.0	-23.3	2.22 H	332	44.60	6.10
6	4824.00	36.6 AV	54.0	-17.4	2.22 H	332	30.54	6.10
7	#7236.00	53.6 PK	74.0	-20.4	1.66 H	214	40.16	13.43
8	#7236.00	41.9 AV	54.0	-12.1	1.66 H	214	28.43	13.43
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	71.0 PK	74.0	-3.0	1.27 V	306	71.27	-0.31
2	2390.00	51.1 AV	54.0	-3.0	1.27 V	306	51.36	-0.31
3	*2412.00	109.5 PK			1.27 V	306	109.68	-0.17
4	*2412.00	99.5 AV			1.27 V	306	99.69	-0.17
5	4824.00	49.4 PK	74.0	-24.6	1.83 V	94	43.26	6.10
6	4824.00	36.0 AV	54.0	-18.0	1.83 V	94	29.89	6.10
7	#7236.00	52.6 PK	74.0	-21.4	1.43 V	132	39.15	13.43
8	#7236.00	41.2 AV	54.0	-12.8	1.43 V	132	27.80	13.43

REMARKS:

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

CHANNEL	TX Channel 6	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	*2437.00	112.4 PK			1.40 H	51	112.40	-0.01
2	*2437.00	102.8 AV			1.40 H	51	102.77	-0.01
3	4874.00	53.0 PK	74.0	-21.0	1.87 H	114	46.83	6.14
4	4874.00	38.8 AV	54.0	-15.2	1.87 H	114	32.69	6.14
5	7311.00	54.0 PK	74.0	-20.0	1.53 H	2	40.53	13.50
6	7311.00	42.1 AV	54.0	-11.9	1.53 H	2	28.64	13.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.3 PK			1.95 V	46	110.27	-0.01
2	*2437.00	99.7 AV			1.95 V	46	99.68	-0.01
3	4874.00	51.3 PK	74.0	-22.7	1.69 V	81	45.19	6.14
4	4874.00	37.4 AV	54.0	-16.6	1.69 V	81	31.26	6.14
5	7311.00	53.3 PK	74.0	-20.7	2.64 V	46	39.76	13.50
6	7311.00	40.7 AV	54.0	-13.3	2.64 V	46	27.16	13.50

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	*2462.00	112.4 PK			1.53 H	59	112.28	0.15
2	*2462.00	102.6 AV			1.53 H	59	102.42	0.15
3	**2483.50**	**73.6 PK**	**74.0**	**-0.4**	**1.53 H**	**59**	**73.35**	**0.29**
4	2483.50	51.1 AV	54.0	-2.9	1.53 H	59	50.84	0.29
5	4924.00	55.2 PK	74.0	-18.8	2.16 H	321	48.98	6.21
6	4924.00	39.5 AV	54.0	-14.5	2.16 H	321	33.26	6.21
7	7386.00	54.3 PK	74.0	-19.8	1.46 H	150	40.55	13.70
8	7386.00	42.3 AV	54.0	-11.7	1.46 H	150	28.61	13.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.6 PK			1.82 V	190	110.48	0.15
2	*2462.00	100.5 AV			1.82 V	190	100.34	0.15
3	2483.50	71.3 PK	74.0	-2.7	1.82 V	190	71.03	0.29
4	2483.50	49.0 AV	54.0	-5.0	1.82 V	190	48.69	0.29
5	4924.00	53.9 PK	74.0	-20.1	1.53 V	20	47.69	6.21
6	4924.00	38.8 AV	54.0	-15.2	1.53 V	20	32.59	6.21
7	7386.00	53.3 PK	74.0	-20.7	1.40 V	100	39.61	13.70
8	7386.00	41.2 AV	54.0	-12.8	1.40 V	100	27.49	13.70

REMARKS:

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

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.8 PK	74.0	-1.2	1.92 H	23	73.13	-0.31
2	**2390.00**	**53.6 AV**	**54.0**	**-0.4**	**1.92 H**	**23**	**53.94**	**-0.31**
3	*2422.00	109.5 PK			1.92 H	23	109.65	-0.11
4	*2422.00	98.1 AV			1.92 H	23	98.23	-0.11
5	4844.00	55.8 PK	74.0	-18.2	1.92 H	309	49.65	6.12
6	4844.00	41.7 AV	54.0	-12.3	1.92 H	309	35.61	6.12
7	7266.00	54.6 PK	74.0	-19.4	2.10 H	154	41.16	13.44
8	7266.00	42.8 AV	54.0	-11.2	2.10 H	154	29.35	13.44
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	1.43 V	213	72.15	-0.31
2	2390.00	51.3 AV	54.0	-2.7	1.43 V	213	51.63	-0.31
3	*2422.00	107.2 PK			1.43 V	213	107.28	-0.11
4	*2422.00	96.4 AV			1.43 V	213	96.52	-0.11
5	4844.00	53.8 PK	74.0	-20.2	1.28 V	220	47.68	6.12
6	4844.00	39.3 AV	54.0	-14.7	1.28 V	220	33.20	6.12
7	7266.00	53.4 PK	74.0	-20.6	1.51 V	61	40.00	13.44
8	7266.00	41.7 AV	54.0	-12.3	1.51 V	61	28.29	13.44

REMARKS:

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

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

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	109.6 PK			1.89 H	28	109.57	-0.01
2	*2437.00	100.2 AV			1.89 H	28	100.21	-0.01
3	4874.00	55.8 PK	74.0	-18.2	1.66 H	200	49.62	6.14
4	4874.00	41.4 AV	54.0	-12.6	1.66 H	200	35.23	6.14
5	7311.00	54.1 PK	74.0	-19.9	1.18 H	23	40.63	13.50
6	7311.00	42.1 AV	54.0	-11.9	1.18 H	23	28.63	13.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.3 PK			1.69 V	188	107.32	-0.01
2	*2437.00	98.0 AV			1.69 V	188	98.03	-0.01
3	4874.00	54.4 PK	74.0	-19.6	2.15 V	55	48.26	6.14
4	4874.00	39.4 AV	54.0	-14.6	2.15 V	55	33.26	6.14
5	7311.00	52.8 PK	74.0	-21.2	1.71 V	217	39.28	13.50
6	7311.00	40.9 AV	54.0	-13.1	1.71 V	217	27.44	13.50

REMARKS:

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

CHANNEL	TX Channel 9	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	*2452.00	107.7 PK			2.07 H	29	107.61	0.09
2	*2452.00	98.9 AV			2.07 H	29	98.85	0.09
3	2483.50	73.3 PK	74.0	-0.7	2.07 H	29	72.99	0.29
4	2483.50	51.1 AV	54.0	-2.9	2.07 H	29	50.78	0.29
5	4904.00	54.9 PK	74.0	-19.1	1.80 H	100	48.76	6.16
6	4904.00	38.9 AV	54.0	-15.2	1.80 H	100	32.69	6.16
7	7356.00	53.9 PK	74.0	-20.1	1.32 H	99	40.28	13.61
8	7356.00	42.3 AV	54.0	-11.7	1.32 H	99	28.69	13.61
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	104.8 PK			2.01 V	55	104.68	0.09
2	*2452.00	96.0 AV			2.01 V	55	95.89	0.09
3	2483.50	70.8 PK	74.0	-3.2	2.01 V	55	70.49	0.29
4	2483.50	48.9 AV	54.0	-5.1	2.01 V	55	48.61	0.29
5	4904.00	52.9 PK	74.0	-21.2	2.35 V	251	46.69	6.16
6	4904.00	36.7 AV	54.0	-17.3	2.35 V	251	30.58	6.16
7	7356.00	52.8 PK	74.0	-21.2	1.60 V	66	39.18	13.61
8	7356.00	40.9 AV	54.0	-13.1	1.60 V	66	27.33	13.61

REMARKS:

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

BELOW 1GHz WORST-CASE DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.70	30.0 QP	40.0	-10.1	4.00 H	107	41.39	-11.44
2	284.82	31.6 QP	46.0	-14.4	3.11 H	282	39.58	-7.96
3	435.02	36.5 QP	46.0	-9.6	2.03 H	60	41.31	-4.86
4	483.43	36.7 QP	46.0	-9.3	1.97 H	225	40.76	-4.09
5	531.68	39.6 QP	46.0	-6.4	1.44 H	100	42.57	-2.98
6	580.04	39.9 QP	46.0	-6.1	1.27 H	135	41.92	-2.05
7	870.12	33.2 QP	46.0	-12.8	1.00 H	350	30.82	2.36
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	35.29	33.1 QP	40.0	-6.9	1.16 V	189	44.15	-11.03
2	193.35	30.4 QP	43.5	-13.1	1.28 V	271	42.26	-11.83
3	338.36	39.8 QP	46.0	-6.2	2.25 V	230	46.89	-7.13
4	531.68	36.9 QP	46.0	-9.1	2.69 V	287	39.87	-2.98
5	676.65	39.4 QP	46.0	-6.6	2.48 V	32	39.69	-0.26
6	949.27	33.5 QP	46.0	-12.5	1.86 V	277	28.78	4.68

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Apr. 12, 2016	Apr. 11, 2017
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101196	Apr. 11, 2016	Apr. 10, 2017
LISN With Adapter (for EUT)	AD10	C10Ada-002	Apr. 11, 2016	Apr. 10, 2017
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 25, 2015	Nov. 24, 2016
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 06, 2015	May 05, 2016
Software	Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C10.01	Feb. 15, 2016	Feb. 14, 2017
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-011484	May 19, 2015	May 18, 2016
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 13, 2015	Nov. 12, 2016

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 Shielded Room No. 10.
3. The VCCI Site Registration No. C-1852.

4.2.3 Test Procedures

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

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

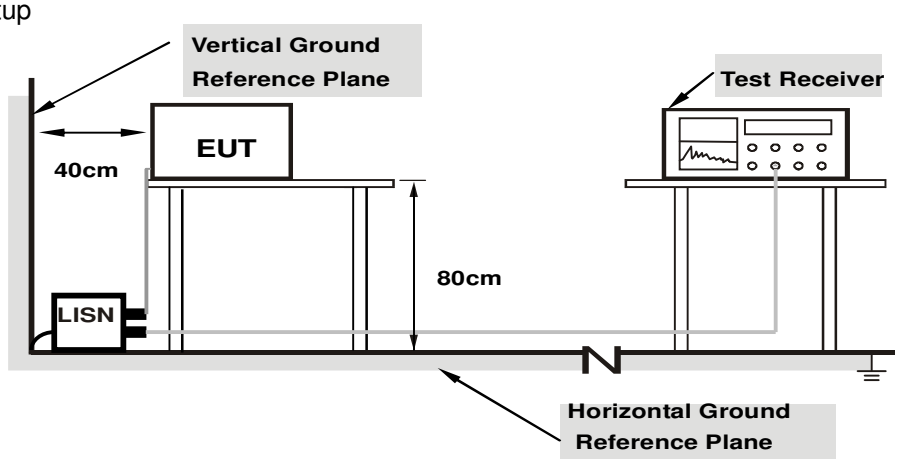
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

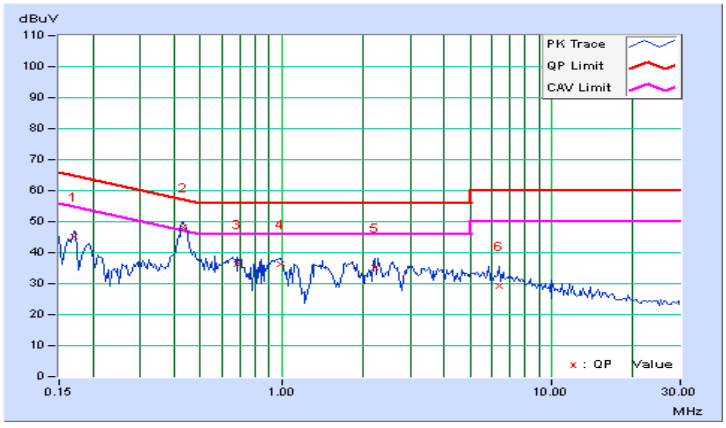
802.11b: CH 1

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	9.66	35.37	29.66	45.03	39.32	64.98	54.98	-19.96	-15.67
2	**0.43125**	**9.68**	**38.65**	**30.02**	**48.33**	**39.70**	**57.23**	**47.23**	**-8.89**	**-7.52**
3	0.68906	9.72	26.61	18.85	36.33	28.57	56.00	46.00	-19.67	-17.43
4	0.99375	9.77	26.65	18.92	36.42	28.69	56.00	46.00	-19.58	-17.31
5	2.22656	9.89	25.20	17.49	35.09	27.38	56.00	46.00	-20.91	-18.62
6	6.43750	10.05	19.11	10.94	29.16	20.99	60.00	50.00	-30.84	-29.01

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

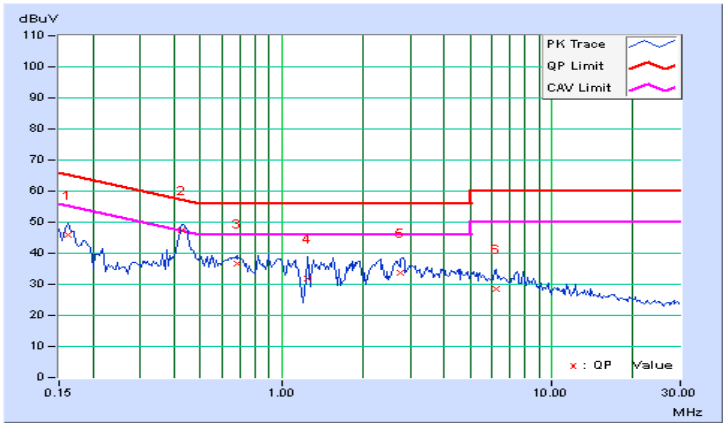


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.69	36.25	27.24	45.94	36.93	65.38	55.38	-19.44	-18.45
2	0.42734	9.72	37.67	28.55	47.39	38.27	57.30	47.30	-9.91	-9.03
3	0.68516	9.76	26.73	18.69	36.49	28.45	56.00	46.00	-19.51	-17.55
4	1.25000	9.82	22.11	3.96	31.93	13.78	56.00	46.00	-24.07	-32.22
5	2.77344	9.98	23.88	15.56	33.86	25.54	56.00	46.00	-22.14	-20.46
6	6.20703	10.14	18.38	10.03	28.52	20.17	60.00	50.00	-31.48	-29.83

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

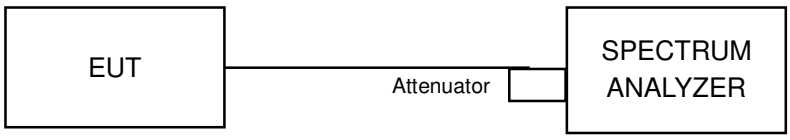


4.3 6dB Bandwidth Measurement

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 fromTest 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 Result

802.11b

Channel	Frequency (MHz)	6db Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	10.11	10.11	0.5	PASS
6	2437	10.10	10.10	0.5	PASS
11	2462	10.10	10.10	0.5	PASS

802.11g

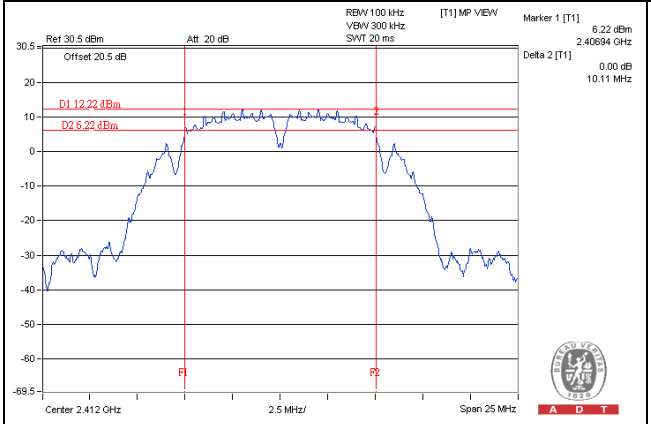
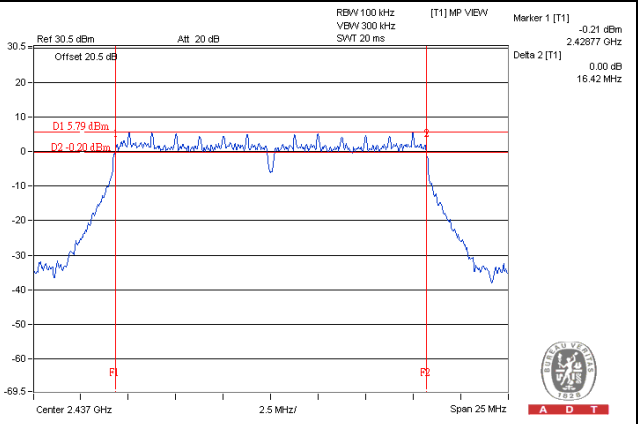
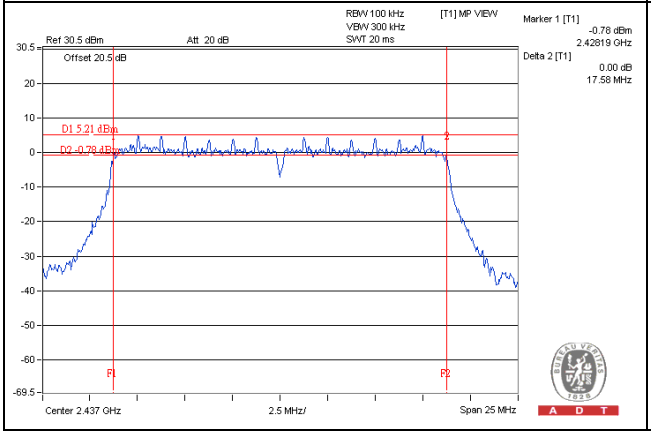
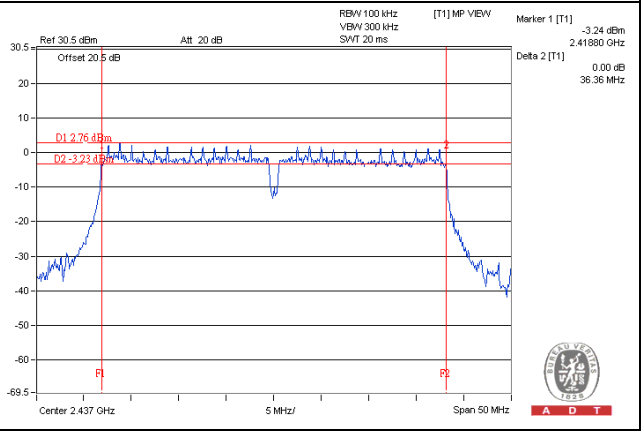
Channel	Frequency (MHz)	6db Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	16.41	16.40	0.5	PASS
6	2437	16.42	16.42	0.5	PASS
11	2462	16.41	16.42	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6db Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	17.36	17.35	0.5	PASS
6	2437	17.58	17.55	0.5	PASS
11	2462	17.56	17.36	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6db Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
3	2422	36.10	35.96	0.5	PASS
6	2437	36.36	35.96	0.5	PASS
9	2452	35.99	35.96	0.5	PASS

Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

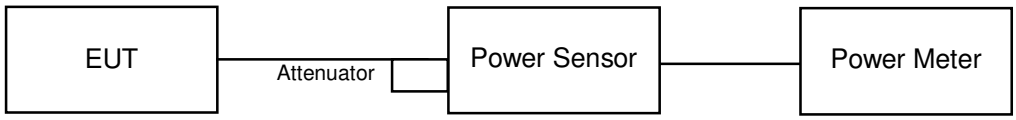
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output 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.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.98	26.92	**990.924**	29.96	30	Pass
6	2437	26.96	26.90	986.371	29.94	30	Pass
11	2462	25.99	25.77	774.764	28.89	30	Pass

802.11g

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.95	26.74	967.513	29.86	30	Pass
6	2437	26.96	26.81	976.325	29.90	30	Pass
11	2462	26.93	26.82	974.013	29.89	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				
1	2412	26.82	26.79	958.368	29.82	30	Pass
6	2437	26.86	26.83	967.237	29.86	30	Pass
11	2462	26.84	26.82	963.898	29.84	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				
3	2422	25.50	25.42	703.150	28.47	30	Pass
6	2437	26.56	26.52	901.643	29.55	30	Pass
9	2452	26.54	26.48	895.448	29.52	30	Pass

FOR AVERAGE POWER

802.11b

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	23.73	23.68	469.394	26.72
6	2437	23.72	23.67	468.314	26.71
11	2462	22.45	22.27	344.447	25.37

802.11g

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.55	17.46	112.604	20.52
6	2437	17.57	17.53	113.772	20.56
11	2462	17.52	17.51	112.858	20.53

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.53	17.47	112.471	20.51
6	2437	17.58	17.56	114.296	20.58
11	2462	17.55	17.54	113.639	20.56

802.11n (HT40)

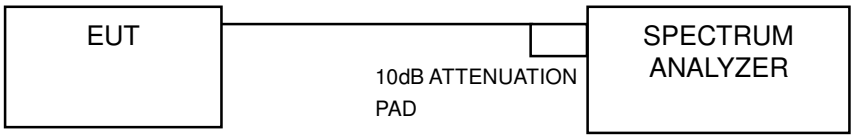
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	15.98	15.78	77.472	18.89
6	2437	17.60	17.56	114.560	20.59
9	2452	17.57	17.52	113.642	20.56

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 analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-6.41	3.01	-3.40	8	Pass
	6	2437	-4.15	3.01	-1.14	8	Pass
	11	2462	-7.43	3.01	-4.42	8	Pass
1	1	2412	-6.38	3.01	-3.37	8	Pass
	6	2437	-3.95	3.01	-0.94	8	Pass
	11	2462	-7.44	3.01	-4.43	8	Pass

NOTE: Directional gain = 1.24dBi + 10log(2) = 4.25dBi <6dBi, so the power spectral density limit is not reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-11.07	3.01	-8.06	8	Pass
	6	2437	-9.79	3.01	-6.78	8	Pass
	11	2462	-11.69	3.01	-8.68	8	Pass
1	1	2412	-9.87	3.01	-6.86	8	Pass
	6	2437	-10.33	3.01	-7.32	8	Pass
	11	2462	-11.30	3.01	-8.29	8	Pass

NOTE: Directional gain = 1.24dBi + 10log(2) = 4.25dBi <6dBi, so the power spectral density limit is not reduced.

802.11n (HT20)

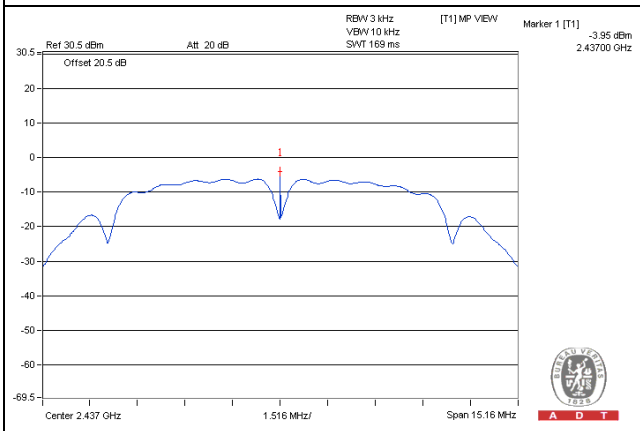
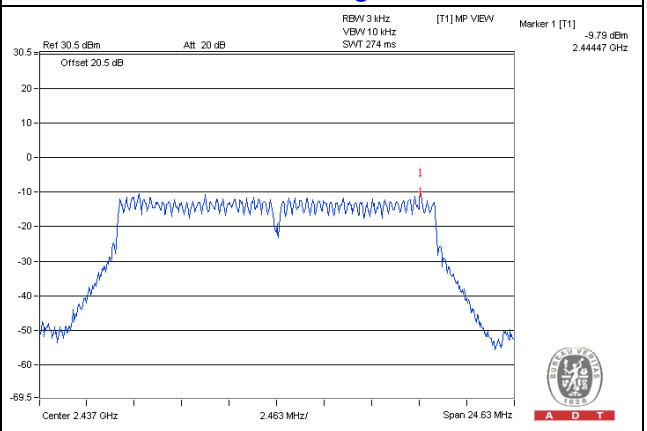
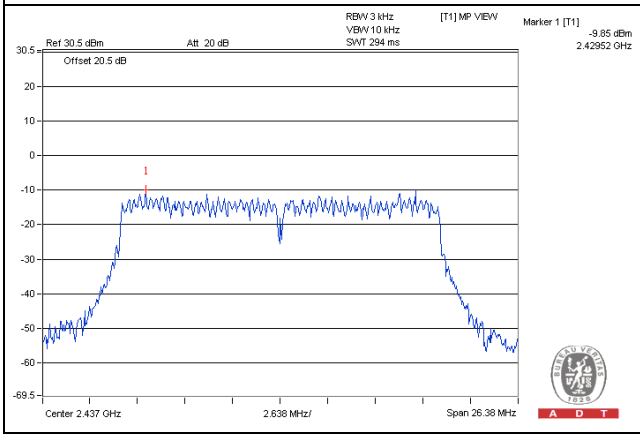
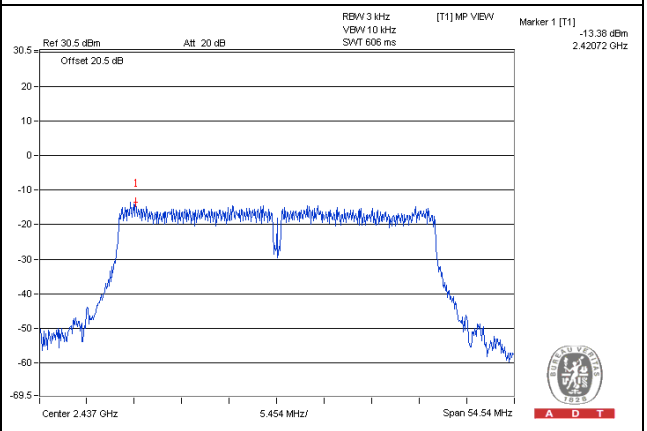
TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-10.96	3.01	-7.95	8	Pass
	6	2437	-9.85	3.01	-6.84	8	Pass
	11	2462	-11.88	3.01	-8.87	8	Pass
1	1	2412	-10.72	3.01	-7.71	8	Pass
	6	2437	-11.50	3.01	-8.49	8	Pass
	11	2462	-11.36	3.01	-8.35	8	Pass

NOTE: Directional gain = 1.24dBi + 10log(2) = 4.25dBi <6dBi, so the power spectral density limit is not reduced.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	3	2422	-16.09	3.01	-13.08	8	Pass
	6	2437	-13.38	3.01	-10.37	8	Pass
	9	2452	-14.00	3.01	-10.99	8	Pass
1	3	2422	-15.43	3.01	-12.42	8	Pass
	6	2437	-13.50	3.01	-10.49	8	Pass
	9	2452	-13.72	3.01	-10.71	8	Pass

NOTE: Directional gain = 1.24dBi + 10log(2) = 4.25dBi <6dBi, so the power spectral density limit is not reduced.

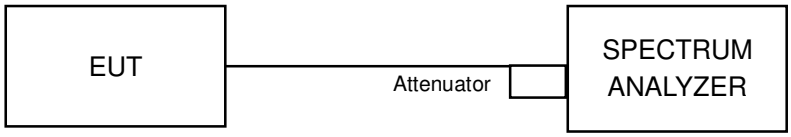
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

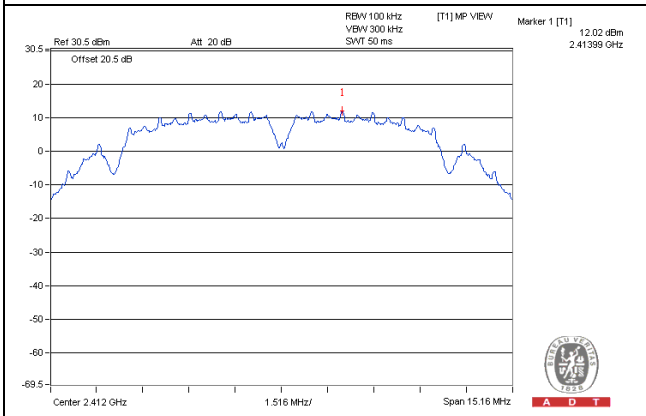
Same as Item 4.3.6

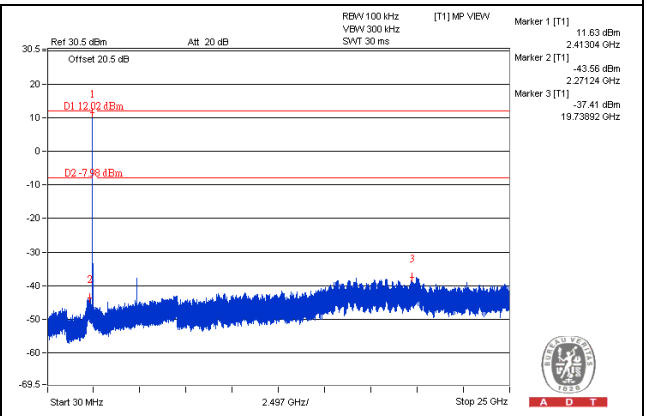
4.6.7 Test Results

The 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.

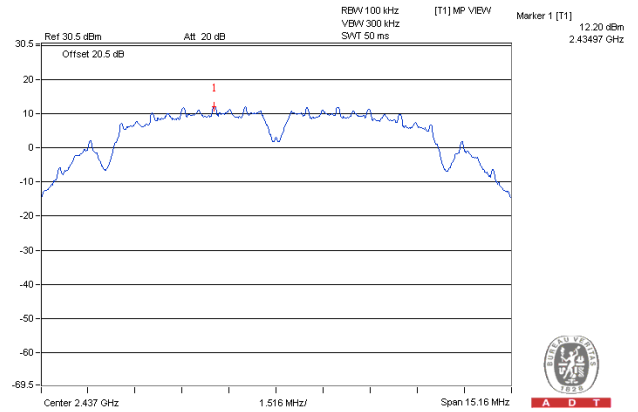
802.11b: CHAIN 0

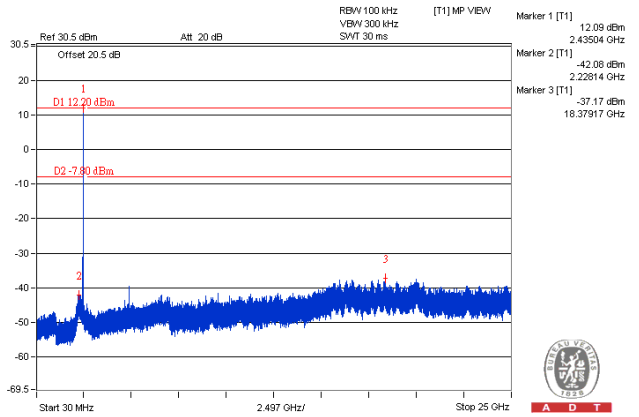
CH 1





CH 6





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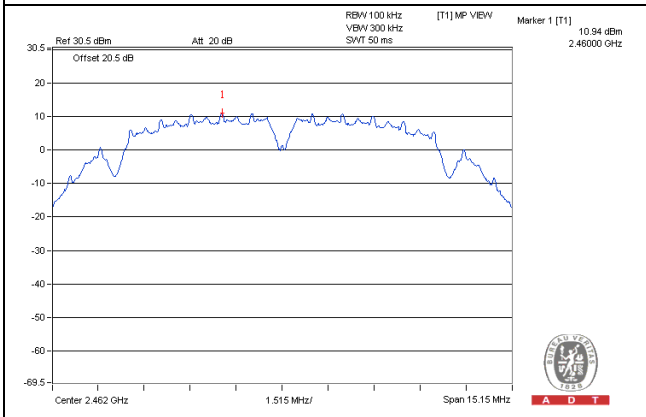
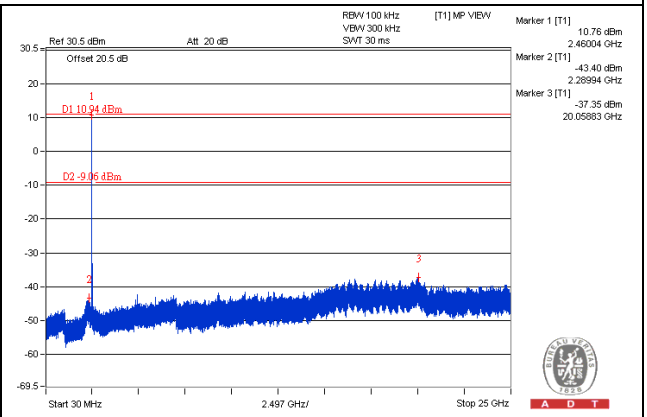
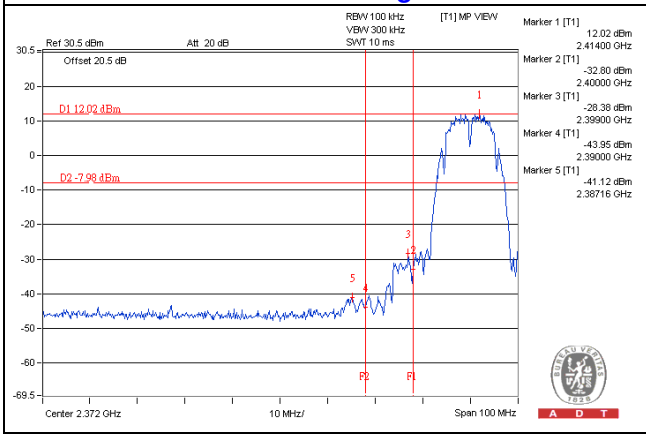
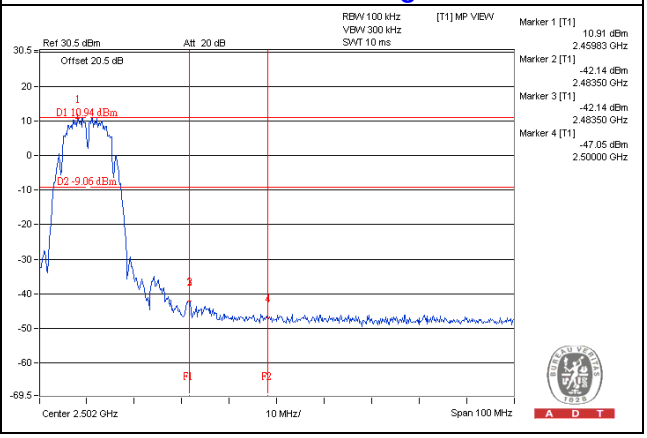




CH 1 Band edge

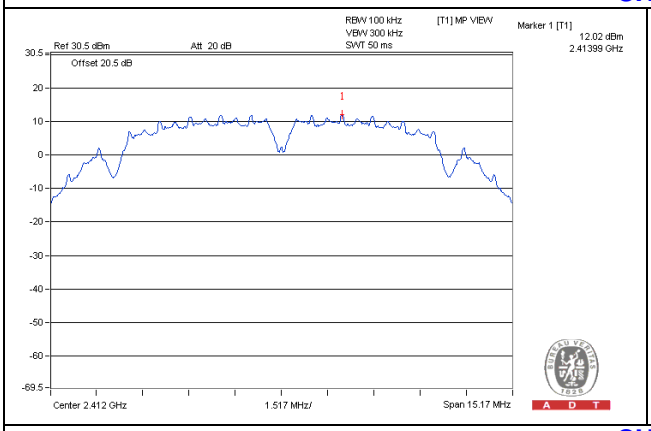


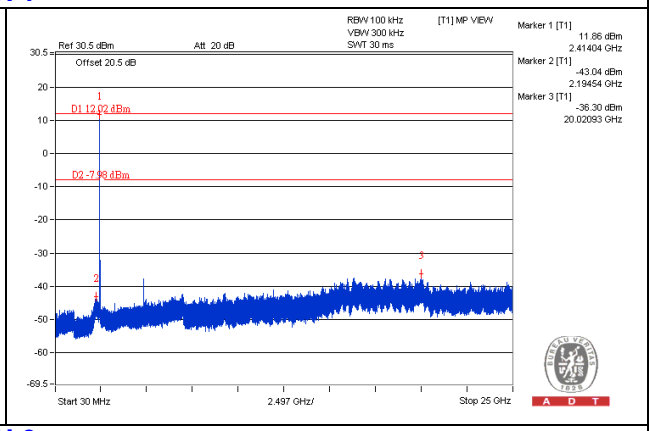
CH 11 Band edge



CHAIN 1

CH 1





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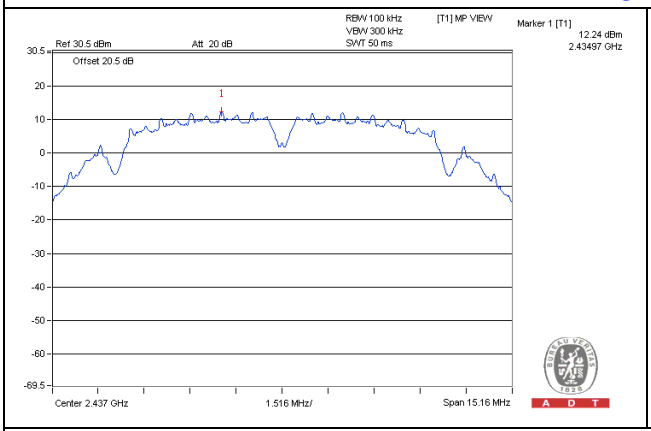

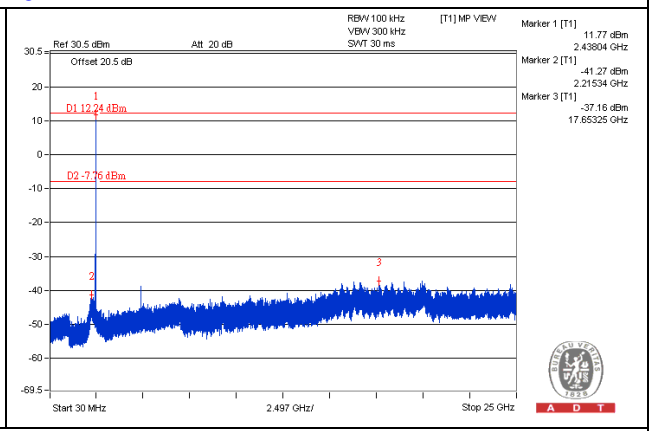

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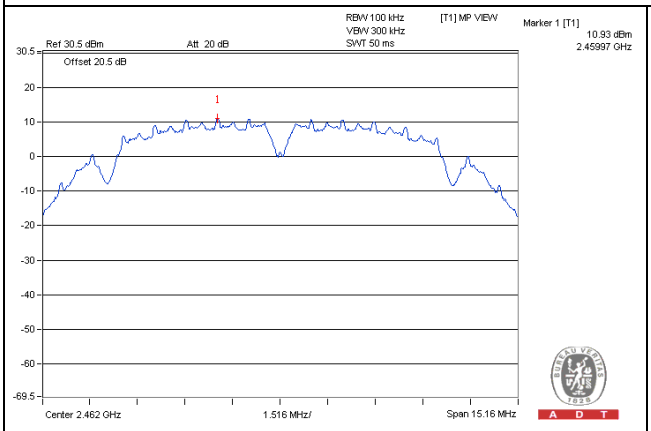
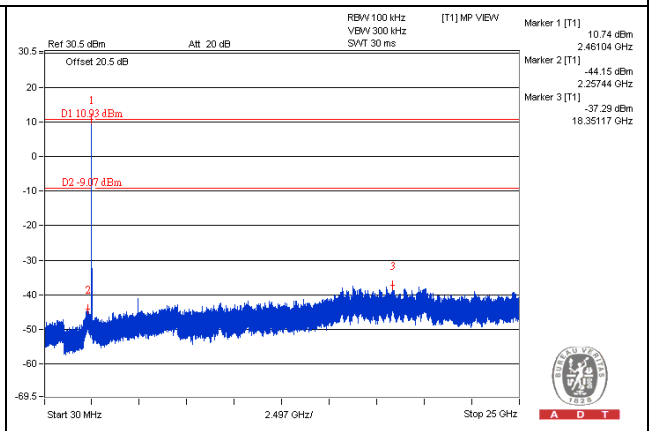
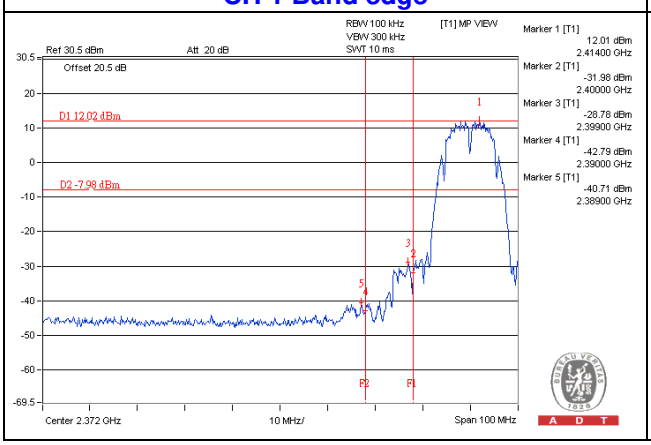
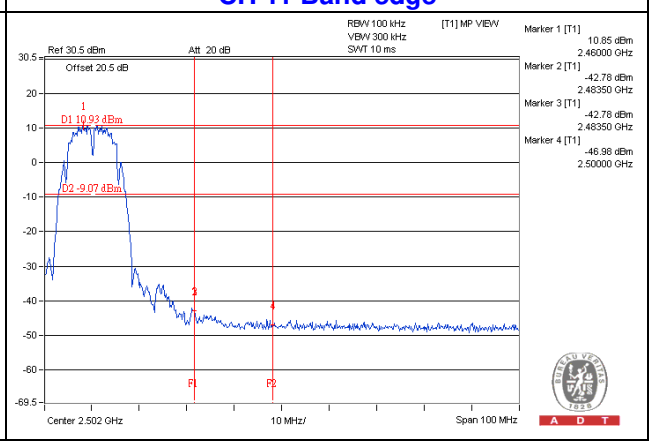




CH 1 Band edge

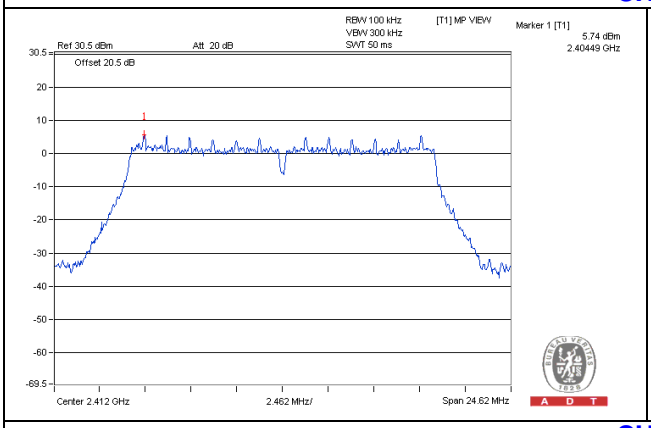


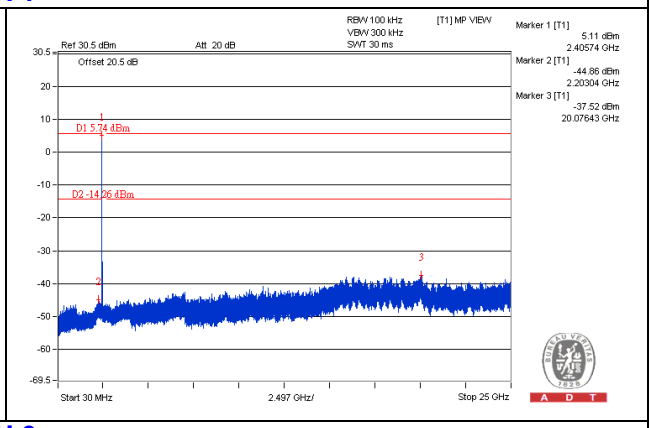
CH 11 Band edge



802.11g CHAIN 0

CH 1





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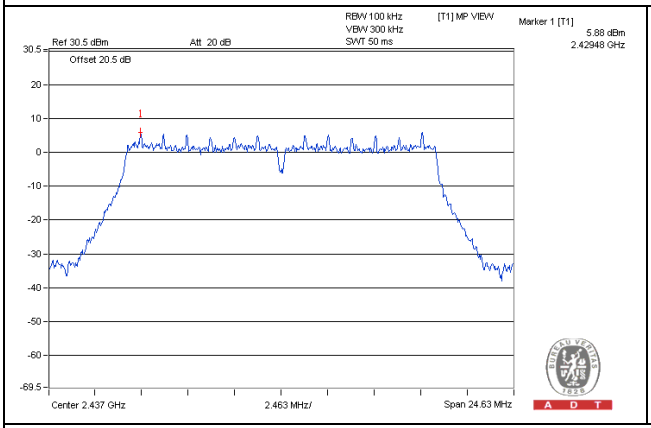

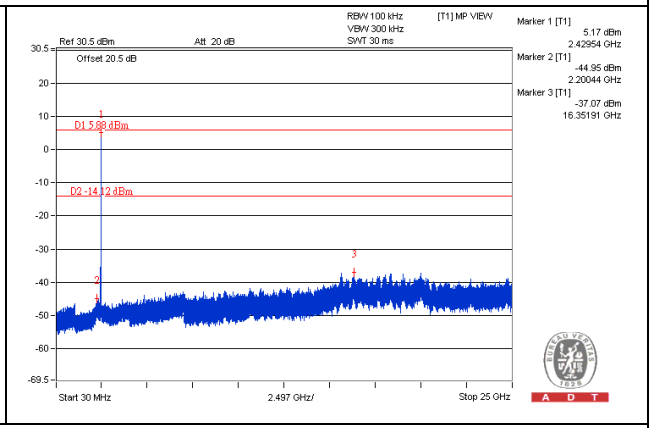

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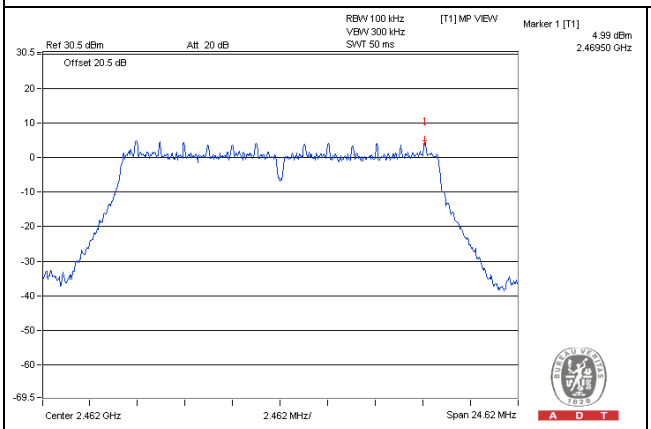
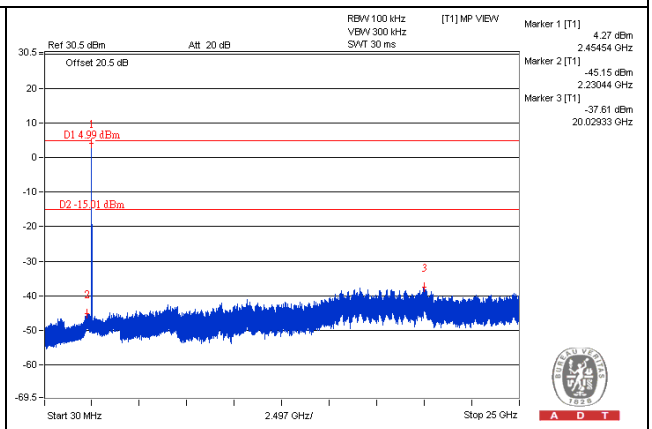
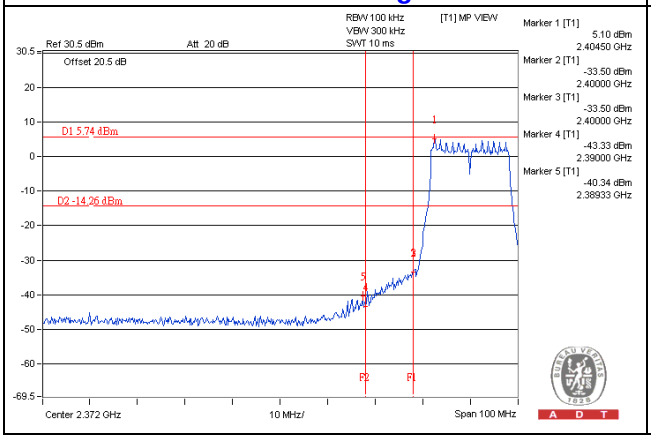




CH 1 Band edge



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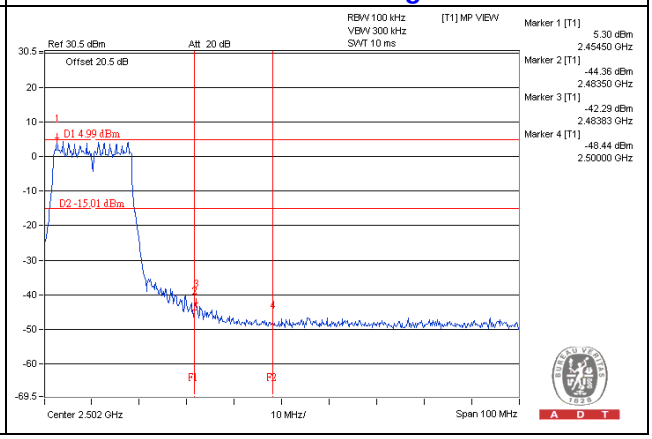
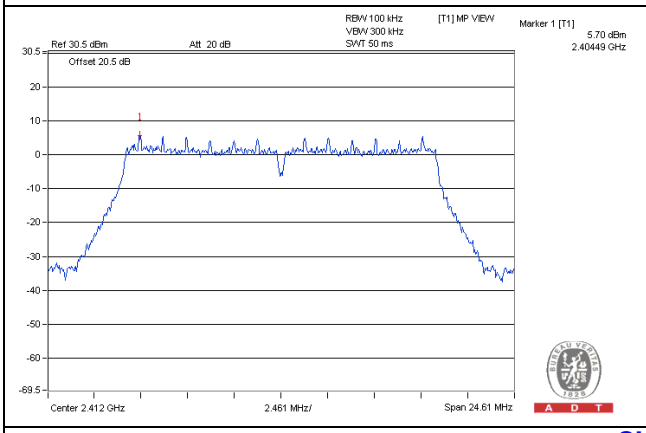
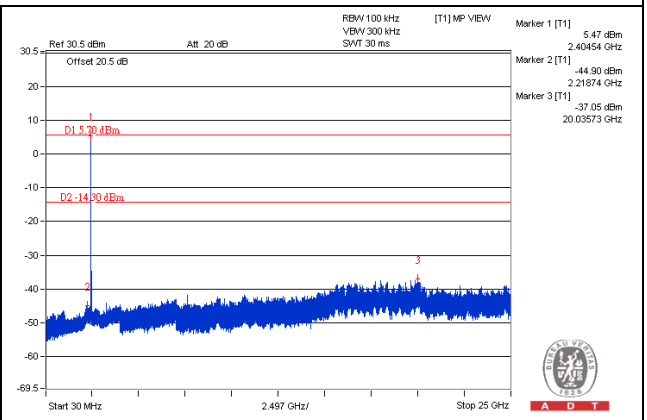


CHAIN 1

CH 1





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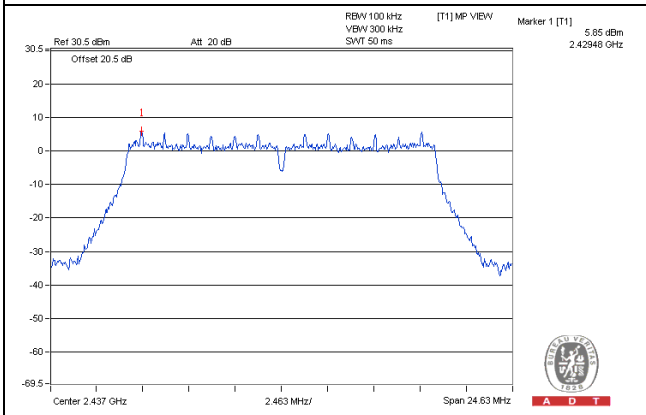

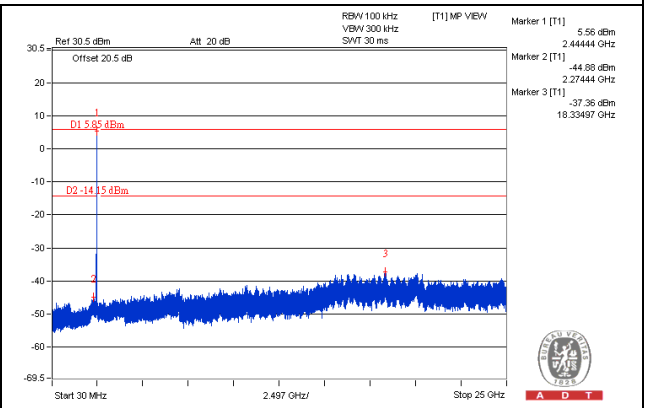

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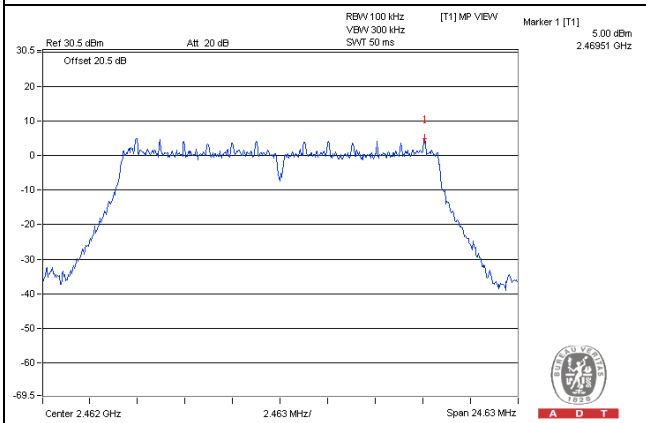
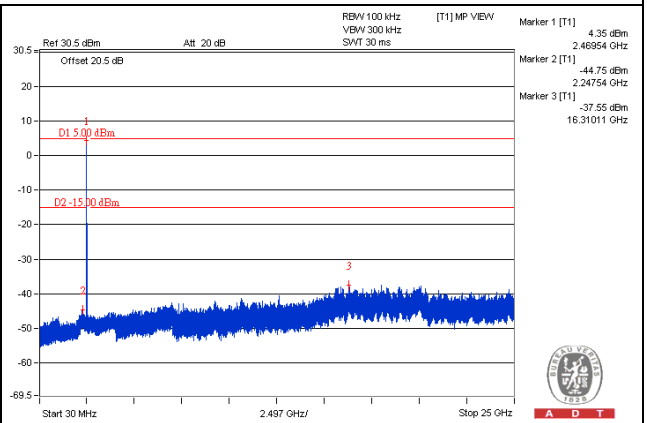
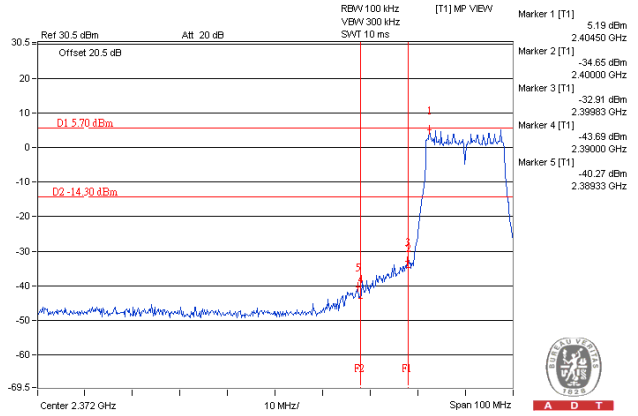
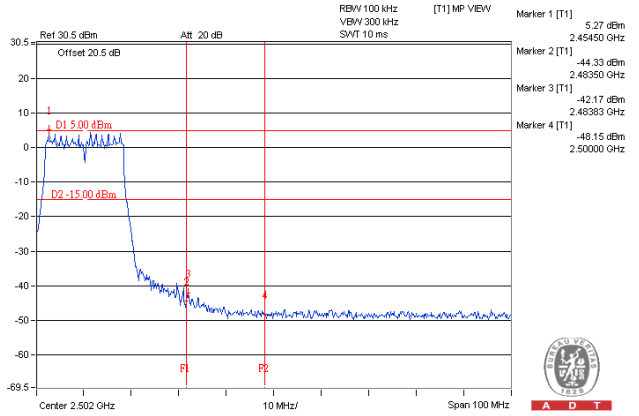




CH 1 Band edge

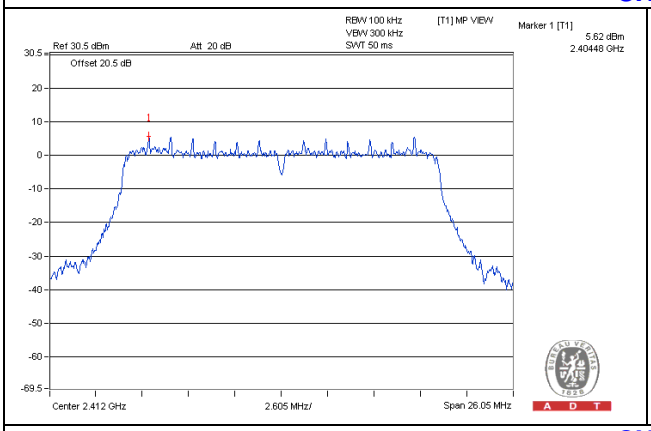


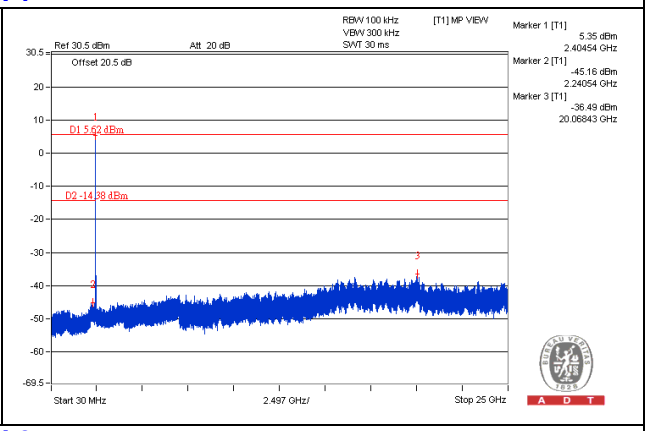
CH 11 Band edge



802.11n (HT20) CHAIN 0

CH 1





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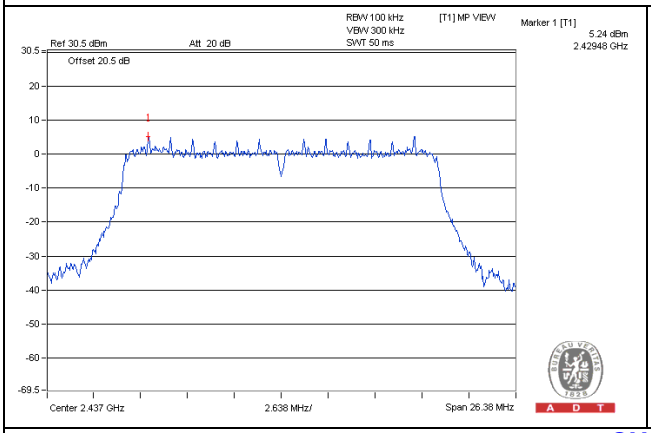

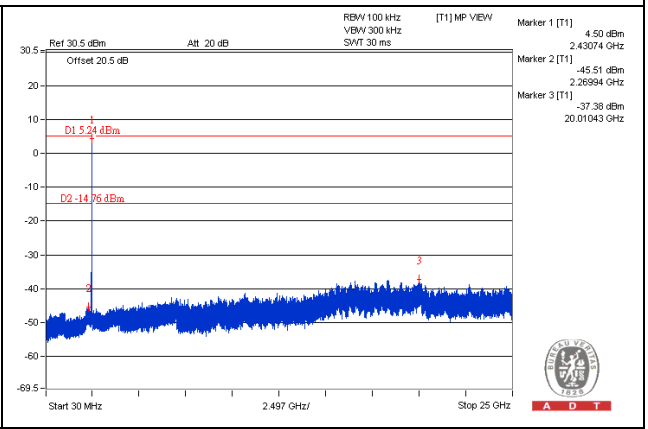

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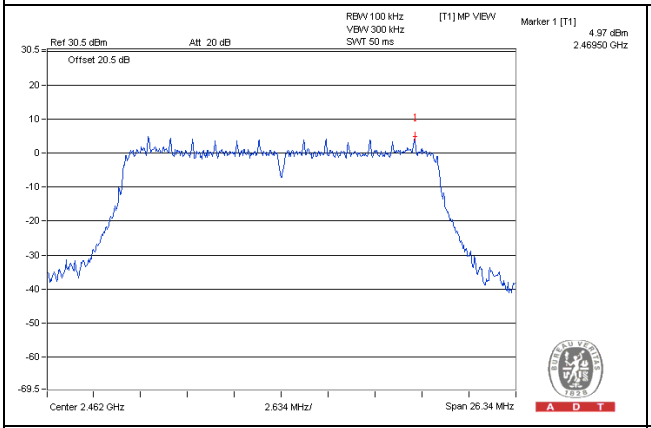
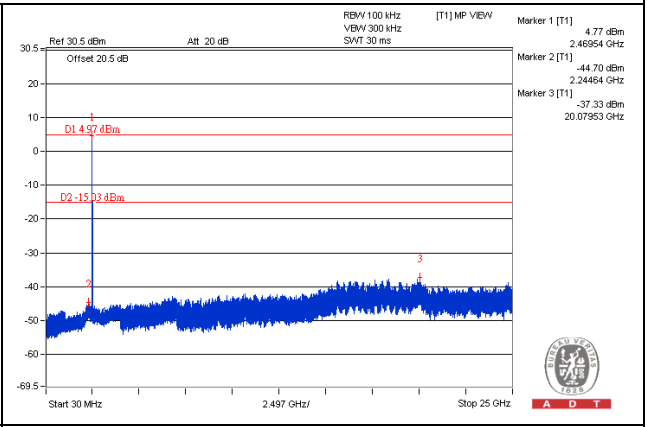
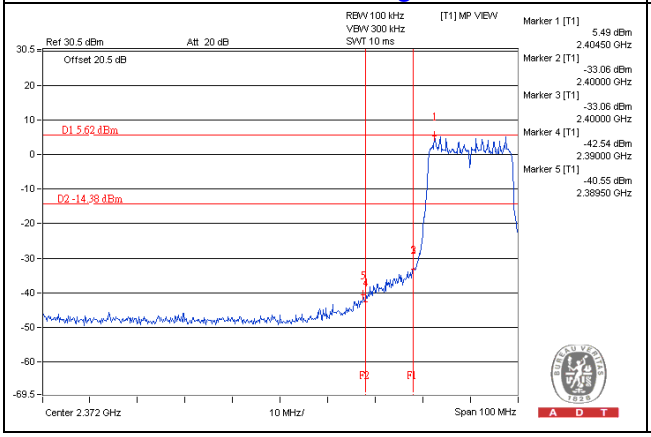
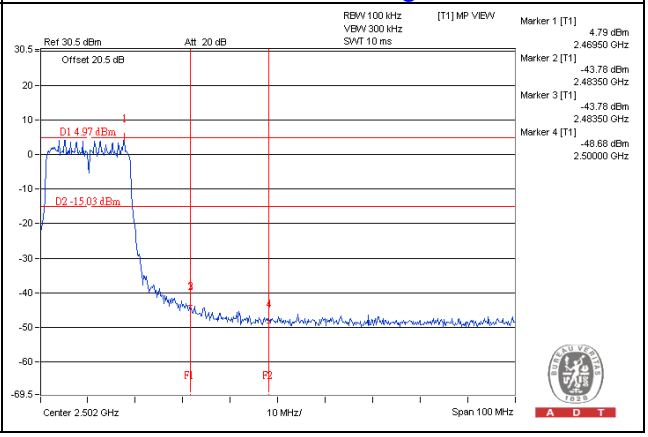




CH 1 Band edge

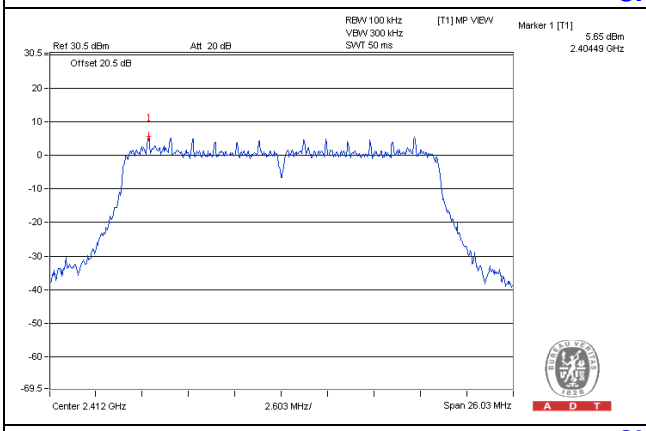


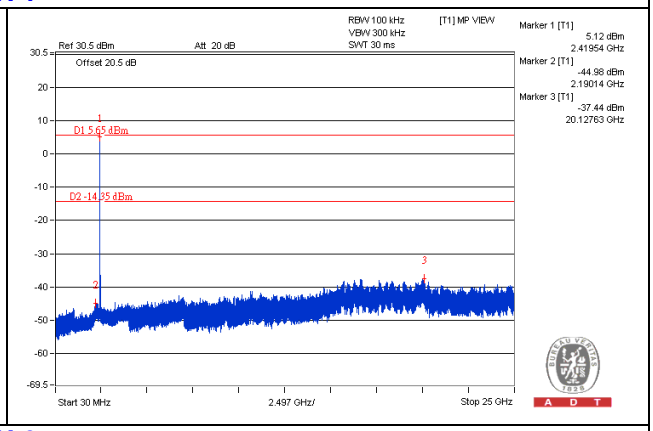
CH 11 Band edge



CHAIN 1

CH 1





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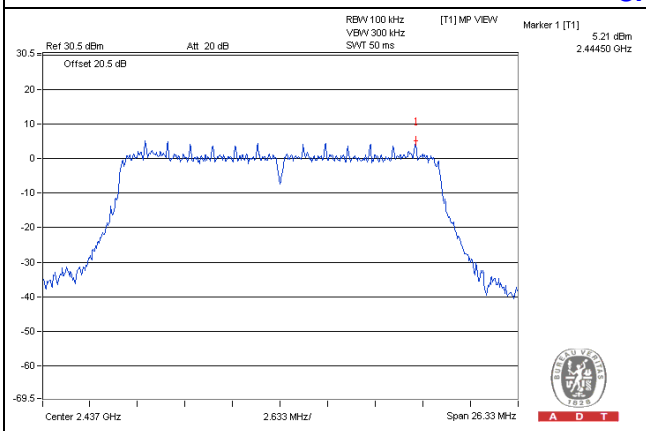
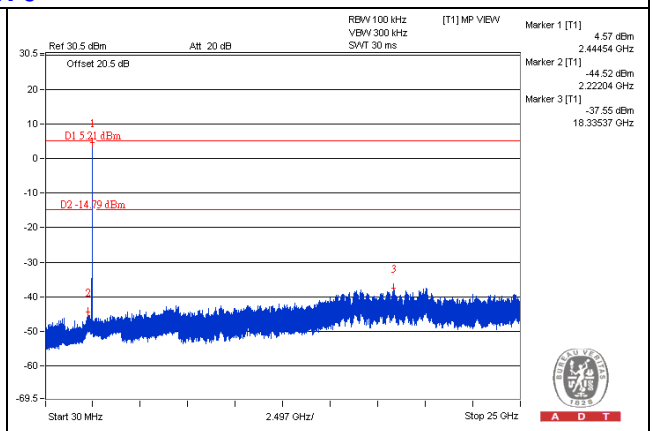
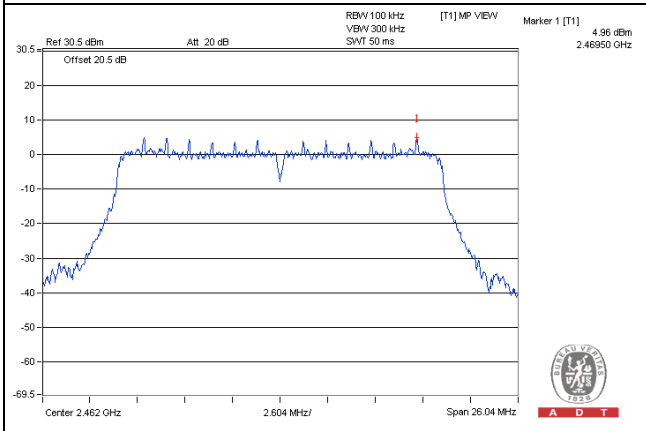
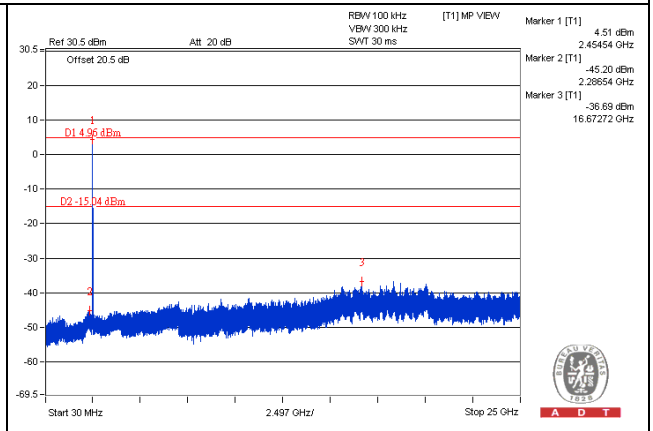


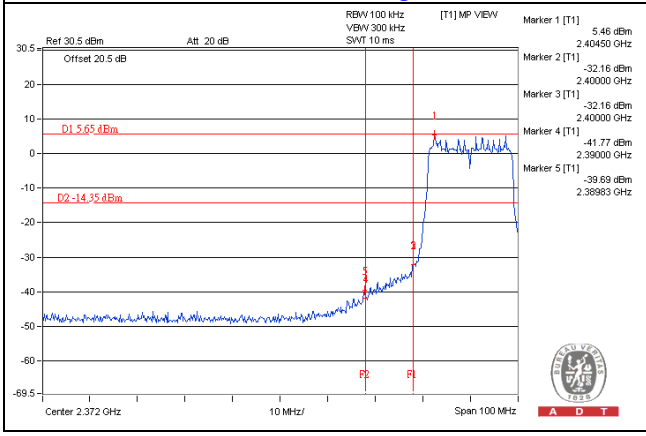


CH 11

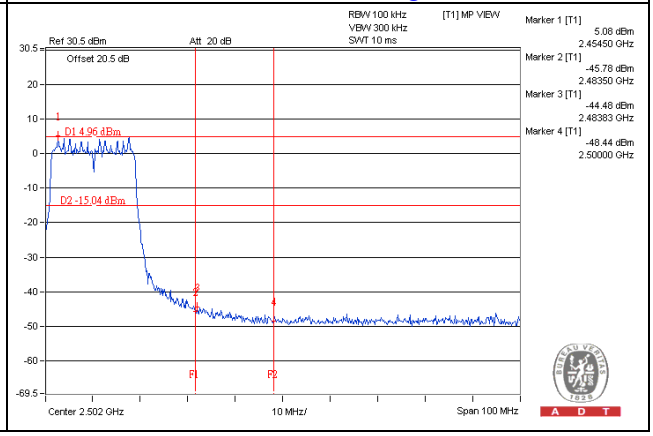




CH 1 Band edge

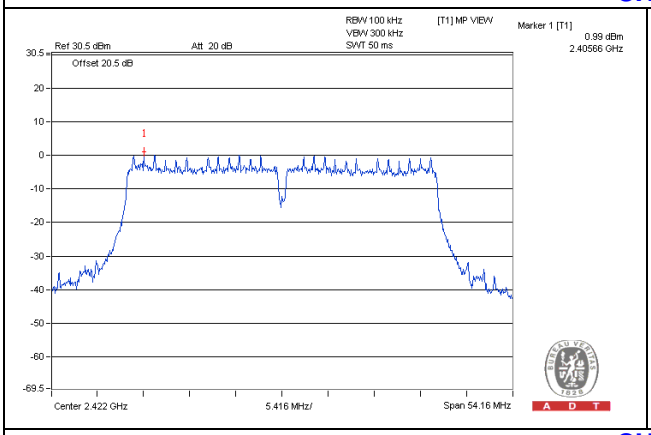


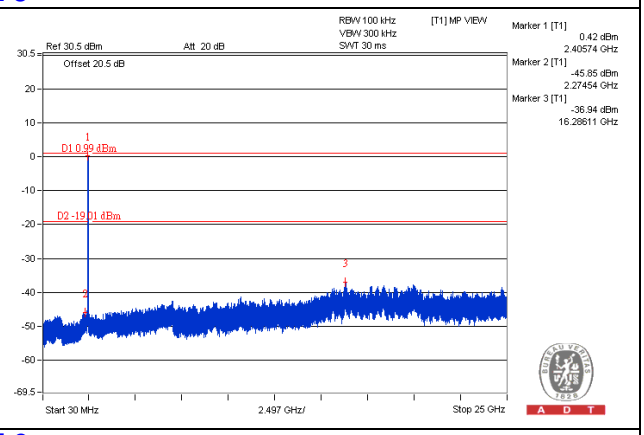
CH 11 Band edge



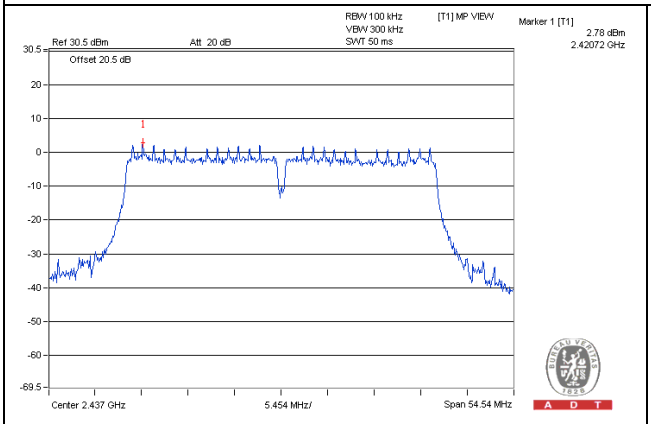
802.11n (HT40) CHAIN 0

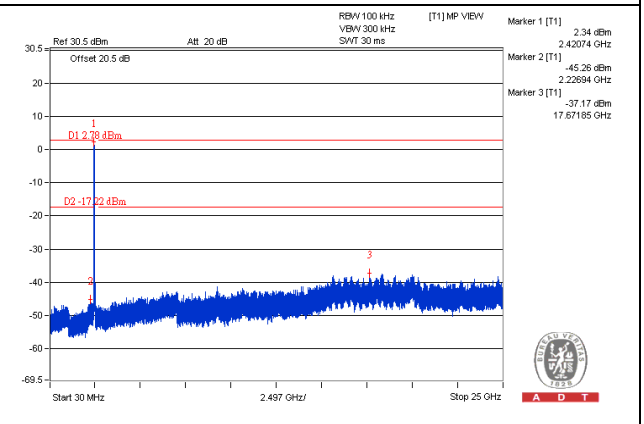
CH 3



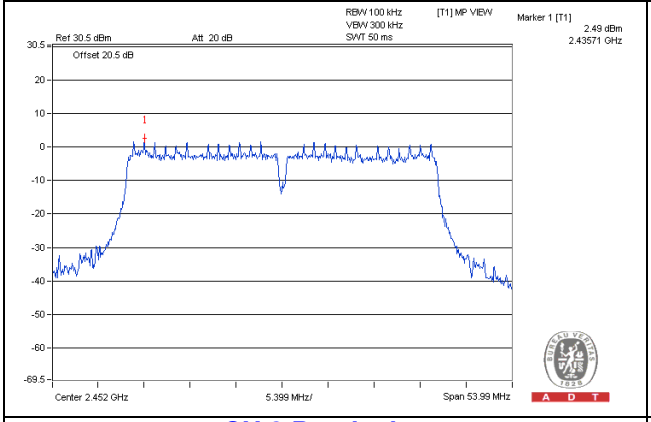


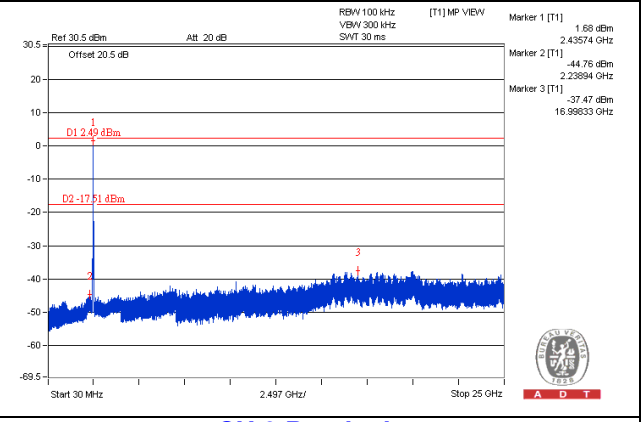
CH 6



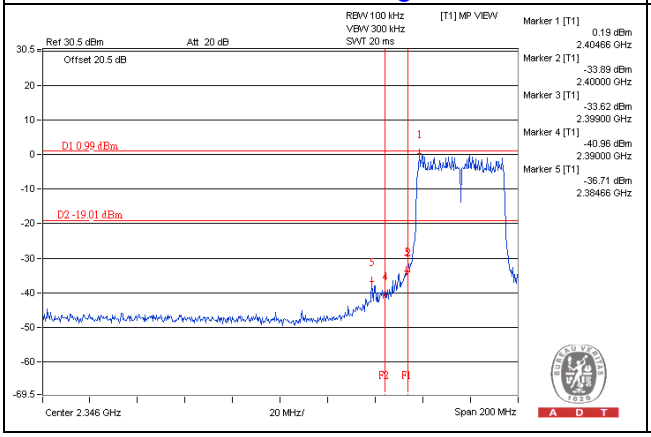


CH 9

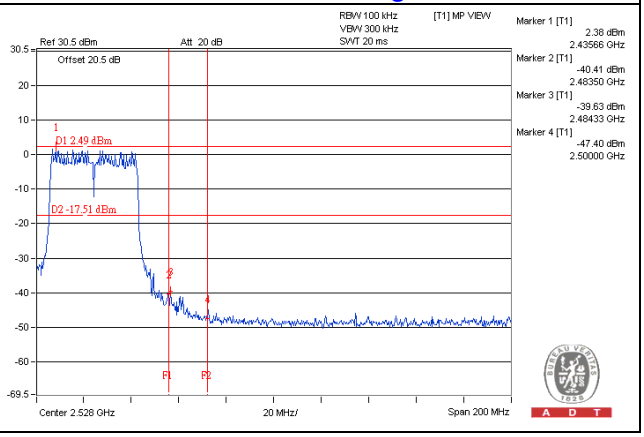




CH 3 Band edge

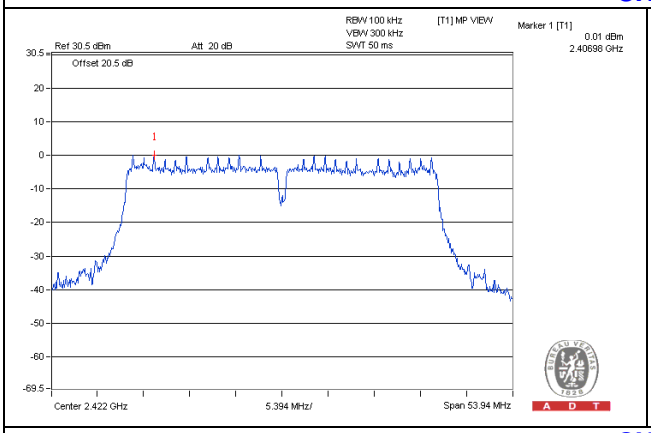


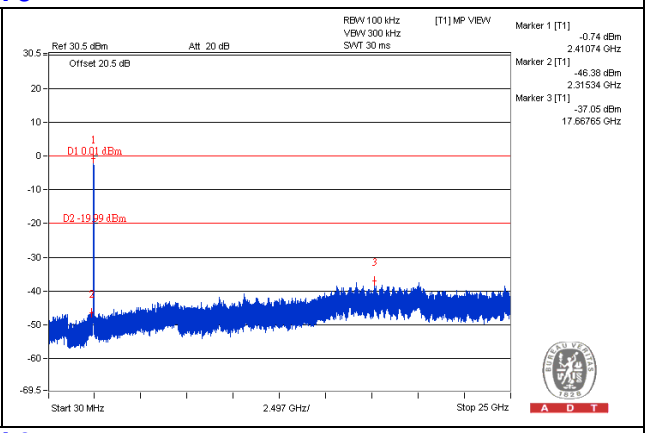
CH 9 Band edge



CHAIN 1

CH 3





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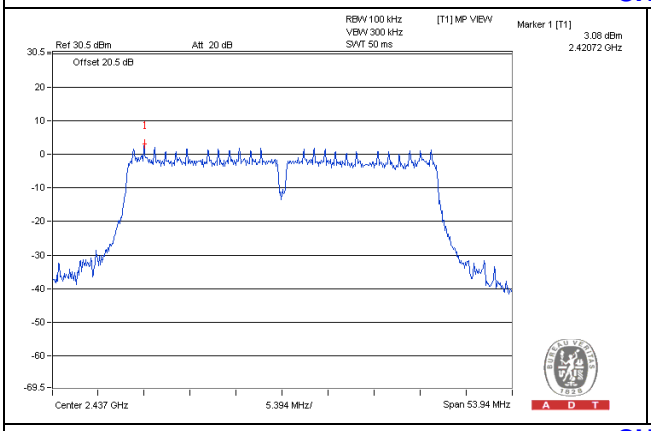
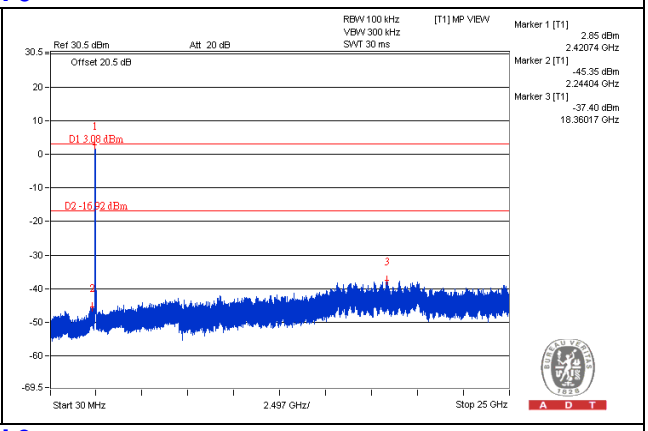
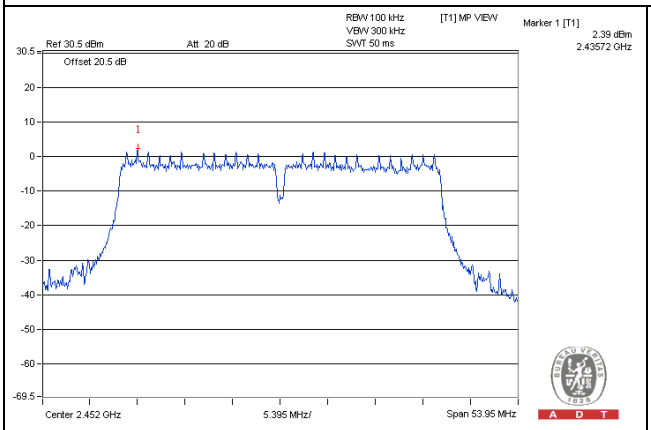
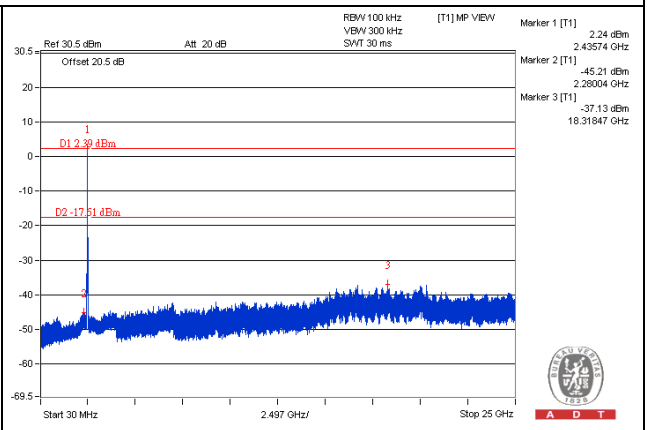


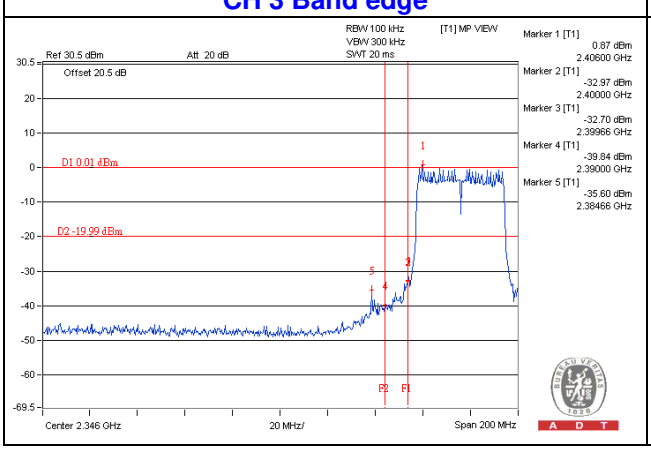


CH 9

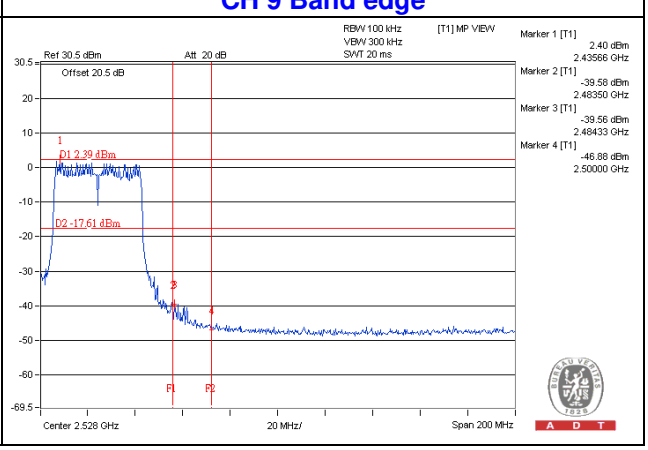




CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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Web Site: www.bureauveritas-adt.com

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

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