

FCC Test Report

Report No.: RF151112D02

FCC ID: P27RP151

Test Model: RP151

Series Model: RP151xxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "- " , for marking purpose)

Received Date: Nov. 12, 2015

Test Date: Nov. 18 ~ 27, 2015

Issued Date: Dec. 3, 2015

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.)



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A D T

Release Control Record

Issue No.	Description	Date Issued
RF151112D02	Original release.	Dec. 3, 2015

1 Certificate of Conformity

Product: Selectable Dual Band WiFi Adapter

Brand: Sercomm

Test Model: RP151

Series Model: RP151xxxxxxxx (The "x" in model name can be 0 to 9, A to Z, blank or "-", for marking purpose)

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Nov. 18 ~ 27, 2015

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 :



Date:

Dec. 3, 2015

Celia Chen / Supervisor

Approved by :



Date:

Dec. 3, 2015

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 -5.84dB at 0.47422MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 7311.00MHz & 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX 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	Expanded Uncertainty (k=2) ($\pm$)
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	Selectable Dual Band WiFi Adapter
Brand	Sercomm
Test Model	RP151
Series Model	RP151xxxxxxx (The “x” in model name can be 0 to 9, A to Z, blank or “- “ , for marking purpose)
Model Difference	For marking purpose
Status of EUT	Engineering sample
Power Supply Rating	AC I/P: 100-240Vac, 200mA, 50/60Hz DC O/P: 12Vdc, 350mA
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	747.237mW
Antenna Type	PCB antenna with 4.63dBi gain
Antenna Connector	I-PEX connector
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 ³ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE³1G: 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	6.5
-	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)
-	802.11g	1 to 11	6	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	6	OFDM	BPSK	6.5

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	6.5
-	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 ³ 1G	23deg. C, 65%RH	120Vac, 60Hz	Aaron You
RE<1G	23deg. C, 65%RH	120Vac, 60Hz	Aaron You
PLC	21deg. C, 70%RH	120Vac, 60Hz	Aaron You
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is 100 %, duty factor is not required.

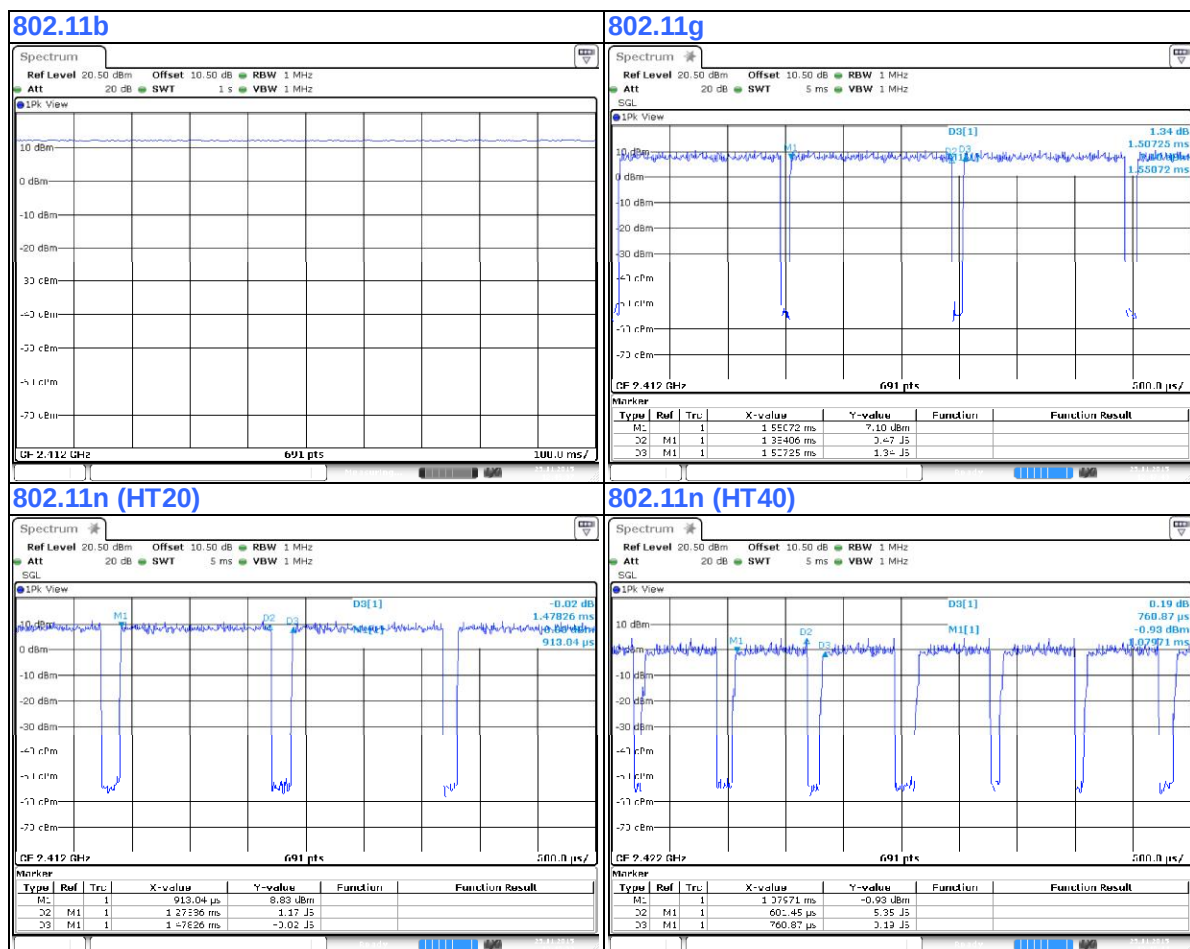
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle of test signal is 100 %.

802.11g: Duty cycle = $1.384/1.507 = 0.918$, Duty factor = $10 * \log(1/0.918) = 0.4$

802.11n (HT20): Duty cycle = $1.275/1.478 = 0.863$, Duty factor = $10 * \log(1/0.863) = 0.6$

802.11n (HT40): Duty cycle = $0.601/0.760 = 0.791$, Duty factor = $10 * \log(1/0.791) = 1$



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	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab

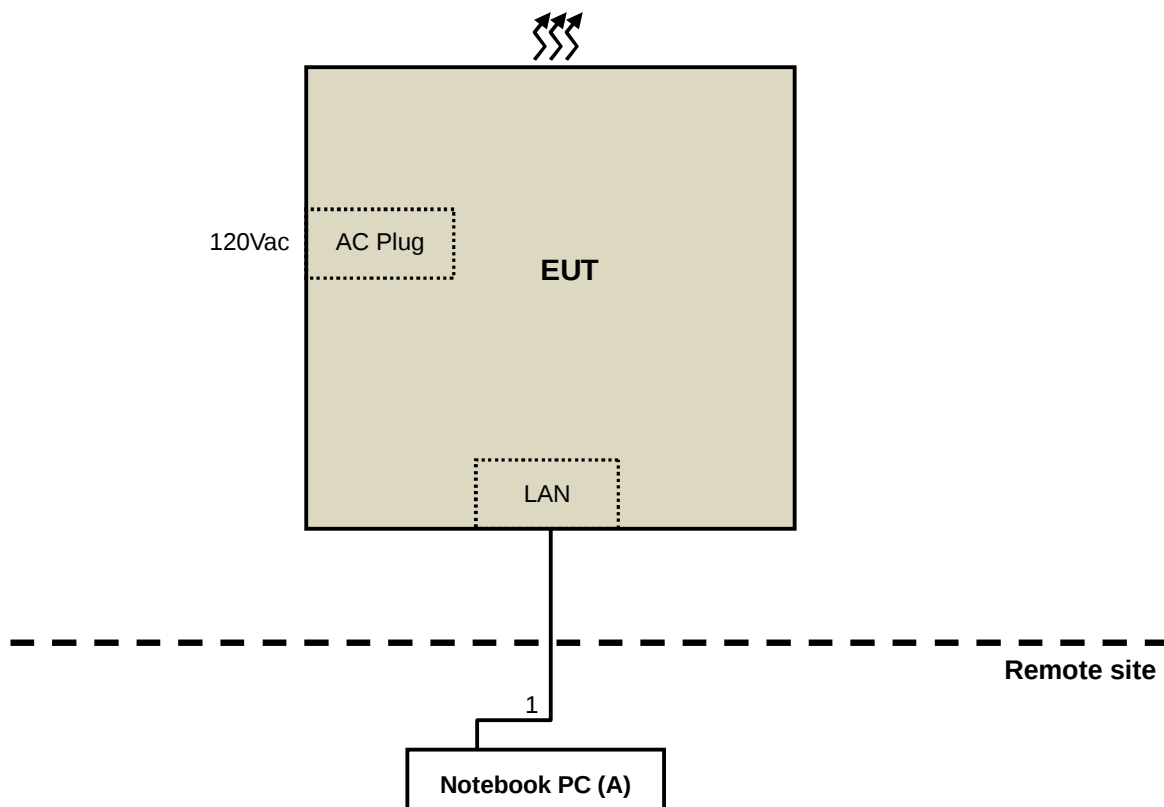
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 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)

558074 D01 DTS Meas Guidance v03r03

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, 2015	Feb. 25, 2016
HP Preamplifier	8449B	3008A01201	Feb. 26, 2015	Feb. 25, 2016
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2015	Feb. 28, 2016
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 04, 2015	Feb. 03, 2016
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Feb. 09, 2015	Feb. 08, 2016
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Feb. 10, 2015	Feb. 09, 2016
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
EMCO Horn Antenna	3115	00028257	Feb. 05, 2015	Feb. 04, 2016
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. 21, 2015	Apr. 20, 2016
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2015	Apr. 20, 2016

- 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:

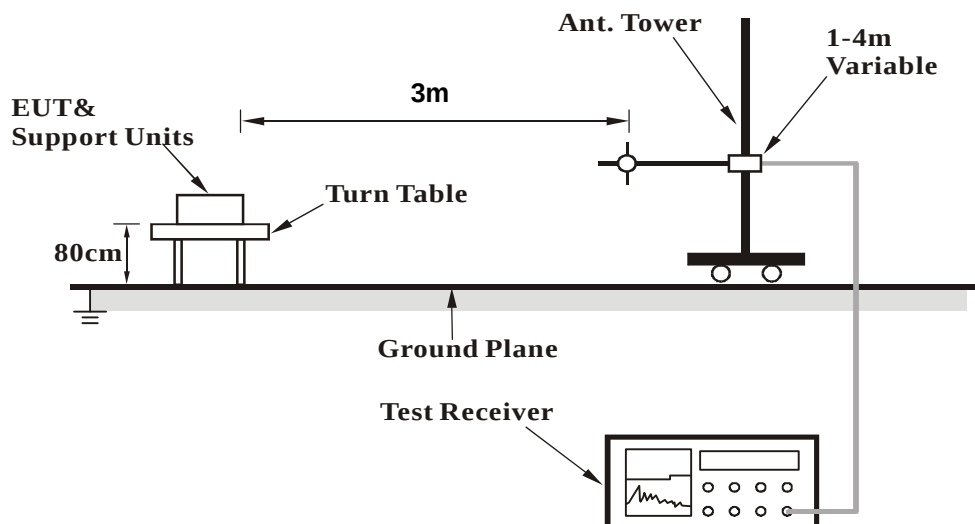
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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 ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) 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

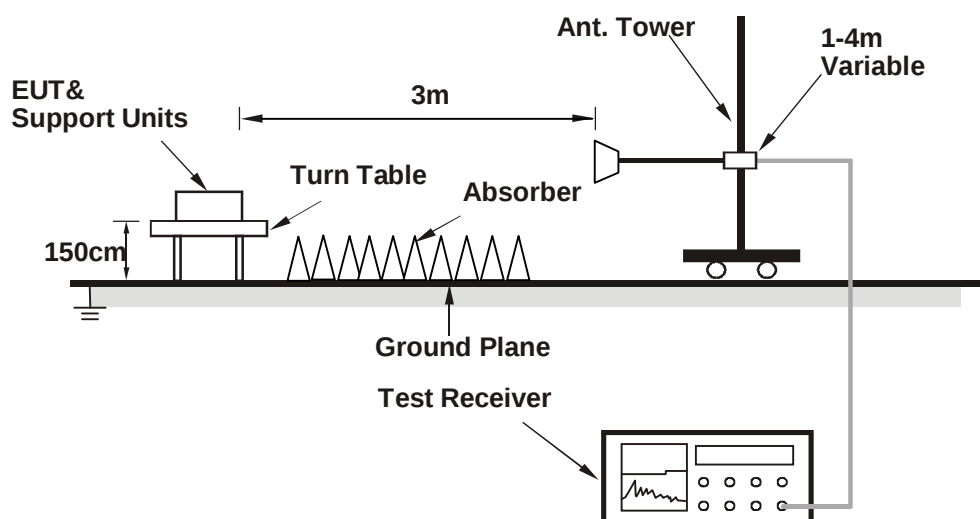
No deviation.

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

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- 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.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Below 1GHz Worst-Case Data:

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	81.22	22.7 QP	40.0	-17.3	4.00 H	239	41.05	-18.37
2	108.86	23.9 QP	43.5	-19.6	3.99 H	246	41.14	-17.20
3	143.39	28.1 QP	43.5	-15.4	3.21 H	87	42.03	-13.90
4	320.03	19.9 QP	46.0	-26.1	2.24 H	216	31.27	-11.33
5	795.48	27.7 QP	46.0	-18.3	1.28 H	244	30.09	-2.41
6	914.01	28.7 QP	46.0	-17.3	1.00 H	211	29.11	-0.40
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	45.33	34.8 QP	40.0	-5.2	1.28 V	50	48.80	-14.03
2	81.17	31.5 QP	40.0	-8.5	1.13 V	246	49.84	-18.36
3	108.86	30.5 QP	43.5	-13.0	1.00 V	166	47.69	-17.20
4	172.83	23.4 QP	43.5	-20.1	1.00 V	360	37.27	-13.88
5	625.07	25.0 QP	46.0	-21.0	2.38 V	225	29.95	-4.99
6	939.96	30.3 QP	46.0	-15.7	1.93 V	187	30.24	0.04

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

Above 1GHz Data :

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.5 PK	74.0	-15.5	2.30 H	105	57.96	0.52
2	2390.00	45.0 AV	54.0	-9.1	2.30 H	105	44.43	0.52
3	*2412.00	111.6 PK			2.30 H	105	110.94	0.65
4	*2412.00	108.1 AV			2.30 H	105	107.44	0.65
5	4824.00	49.3 PK	74.0	-24.8	3.72 H	11	41.42	7.83
6	4824.00	39.8 AV	54.0	-14.2	3.72 H	11	31.96	7.83
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	56.0 PK	74.0	-18.0	2.03 V	218	55.45	0.52
2	2390.00	42.8 AV	54.0	-11.2	2.03 V	218	42.32	0.52
3	*2412.00	107.8 PK			2.03 V	218	107.14	0.65
4	*2412.00	103.8 AV			2.03 V	218	103.11	0.65
5	4824.00	47.5 PK	74.0	-26.5	3.73 V	293	39.65	7.83
6	4824.00	36.6 AV	54.0	-17.4	3.73 V	293	28.77	7.83

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.5 PK			2.28 H	104	110.72	0.76
2	*2437.00	108.0 AV			2.28 H	104	107.21	0.76
3	4873.00	49.9 PK	74.0	-24.2	3.76 H	2	41.92	7.93
4	4873.00	39.7 AV	54.0	-14.3	3.76 H	2	31.77	7.93
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	108.7 PK			2.22 V	217	107.98	0.76
2	*2437.00	104.9 AV			2.22 V	217	104.11	0.76
3	4874.00	47.4 PK	74.0	-26.6	2.98 V	296	39.45	7.93
4	4874.00	37.0 AV	54.0	-17.1	2.98 V	296	29.02	7.93

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.9 PK			1.85 H	109	111.03	0.88
2	*2462.00	108.6 AV			1.85 H	109	107.75	0.88
3	2483.50	61.6 PK	74.0	-12.4	1.85 H	109	60.58	0.98
4	2483.50	46.3 AV	54.0	-7.7	1.85 H	109	45.32	0.98
5	4924.00	52.6 PK	74.0	-21.4	3.71 H	148	44.54	8.08
6	4924.00	47.4 AV	54.0	-6.6	3.71 H	148	39.35	8.08
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	108.2 PK			1.98 V	218	107.35	0.88
2	*2462.00	104.5 AV			1.98 V	218	103.58	0.88
3	2483.50	56.0 PK	74.0	-18.0	1.98 V	218	55.02	0.98
4	2483.50	44.1 AV	54.0	-9.9	1.98 V	218	43.13	0.98
5	4924.00	48.3 PK	74.0	-25.7	1.03 V	166	40.20	8.08
6	4924.00	37.1 AV	54.0	-16.9	1.03 V	166	28.99	8.08

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.9 PK	74.0	-1.1	3.05 H	105	72.36	0.52
2	2390.00	51.0 AV	54.0	-3.0	3.05 H	105	50.51	0.52
3	*2412.00	113.9 PK			3.05 H	105	113.24	0.65
4	*2412.00	104.4 AV			3.05 H	105	103.72	0.65
5	4824.00	48.0 PK	74.0	-26.0	3.72 H	148	40.18	7.83
6	4824.00	37.2 AV	54.0	-16.8	3.72 H	148	29.35	7.83
7	#7236.00	56.9 PK	93.9	-37.0	2.26 H	155	42.18	14.70
8	#7236.00	43.8 AV	84.4	-40.5	2.26 H	155	29.13	14.70
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	2390.00	66.0 PK	74.0	-8.0	2.02 V	223	65.45	0.52
2	2390.00	46.5 AV	54.0	-7.5	2.02 V	223	45.95	0.52
3	*2412.00	108.2 PK			2.02 V	223	107.59	0.65
4	*2412.00	98.9 AV			2.02 V	223	98.22	0.65
5	4824.00	47.1 PK	74.0	-26.9	2.01 V	285	39.25	7.83
6	4824.00	36.5 AV	54.0	-17.5	2.01 V	285	28.71	7.83
7	#7236.00	61.9 PK	88.2	-26.3	2.62 V	315	47.23	14.70
8	#7236.00	46.4 AV	78.9	-32.5	2.62 V	315	31.72	14.70

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	115.5 PK			3.03 H	103	114.76	0.76
2	*2437.00	106.2 AV			3.03 H	103	105.39	0.76
3	2483.50	70.3 PK	74.0	-3.7	3.03 H	103	69.32	0.98
4	2483.50	51.6 AV	54.0	-2.4	3.03 H	103	50.62	0.98
5	4874.00	50.6 PK	74.0	-23.4	2.85 H	146	42.71	7.93
6	4874.00	37.9 AV	54.0	-16.2	2.85 H	146	29.92	7.93
7	7311.00	59.2 PK	74.0	-14.8	1.93 H	126	44.27	14.95
8	7311.00	46.0 AV	54.0	-8.0	1.93 H	126	31.06	14.95
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	106.3 PK			1.46 V	218	105.50	0.76
2	*2437.00	96.8 AV			1.46 V	218	96.08	0.76
3	2483.50	67.1 PK	74.0	-6.9	1.46 V	218	66.10	0.98
4	2483.50	49.1 AV	54.0	-4.9	1.46 V	218	48.08	0.98
5	4874.00	50.1 PK	74.0	-23.9	1.71 V	174	42.19	7.93
6	4874.00	37.3 AV	54.0	-16.7	1.71 V	174	29.39	7.93
7	7311.00	66.5 PK	74.0	-7.5	2.60 V	326	51.52	14.95
8	7311.00	53.0 AV	54.0	-1.0	2.60 V	326	38.02	14.95

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.2 PK			2.99 H	107	112.36	0.88
2	*2462.00	103.0 AV			2.99 H	107	102.14	0.88
3	2483.50	72.8 PK	74.0	-1.2	2.99 H	107	71.78	0.98
4	2483.50	49.6 AV	54.0	-4.4	2.99 H	107	48.63	0.98
5	4924.00	49.4 PK	74.0	-24.6	2.93 H	146	41.28	8.08
6	4924.00	37.6 AV	54.0	-16.4	2.93 H	146	29.51	8.08
7	7386.00	57.0 PK	74.0	-17.0	2.30 H	162	42.10	14.89
8	7386.00	44.0 AV	54.0	-10.0	2.30 H	162	29.08	14.89
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.5 PK			2.01 V	218	108.66	0.88
2	*2462.00	100.3 AV			2.01 V	218	99.44	0.88
3	2483.50	68.2 PK	74.0	-5.8	2.01 V	218	67.18	0.98
4	2483.50	47.6 AV	54.0	-6.4	2.01 V	218	46.60	0.98
5	4924.00	47.8 PK	74.0	-26.2	2.00 V	290	39.75	8.08
6	4924.00	36.6 AV	54.0	-17.4	2.00 V	290	28.53	8.08
7	7386.00	61.5 PK	74.0	-12.5	2.61 V	311	46.58	14.89
8	7386.00	45.8 AV	54.0	-8.2	2.61 V	311	30.92	14.89

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.8 PK	74.0	-1.2	3.03 H	111	72.32	0.52
2	2390.00	52.9 AV	54.0	-1.1	3.03 H	111	52.34	0.52
3	*2412.00	113.1 PK			3.03 H	111	112.49	0.65
4	*2412.00	103.7 AV			3.03 H	111	103.07	0.65
5	4824.00	48.9 PK	74.0	-25.2	3.58 H	153	41.02	7.83
6	4824.00	37.6 AV	54.0	-16.5	3.58 H	153	29.72	7.83
7	#7236.00	56.0 PK	93.1	-37.1	1.96 H	156	41.32	14.70
8	#7236.00	42.8 AV	83.7	-40.9	1.96 H	156	28.11	14.70
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	2390.00	68.1 PK	74.0	-5.9	2.03 V	219	67.56	0.52
2	2390.00	47.8 AV	54.0	-6.2	2.03 V	219	47.24	0.52
3	*2412.00	102.7 PK			2.03 V	219	102.03	0.65
4	*2412.00	93.3 AV			2.03 V	219	92.61	0.65
5	4824.00	47.7 PK	74.0	-26.3	2.05 V	283	39.85	7.83
6	4824.00	35.5 AV	54.0	-18.5	2.05 V	283	27.63	7.83
7	#7236.00	57.5 PK	82.7	-25.2	2.59 V	318	42.83	14.70
8	#7236.00	44.0 AV	73.3	-29.2	2.59 V	318	29.32	14.70

REMARKS:

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

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	114.2 PK			1.21 H	100	113.40	0.76
2	*2437.00	104.2 AV			1.21 H	100	103.44	0.76
3	2483.50	71.8 PK	74.0	-2.2	1.21 H	100	70.85	0.98
4	2483.50	52.7 AV	54.0	-1.3	1.21 H	100	51.74	0.98
5	4874.00	51.4 PK	74.0	-22.7	3.07 H	146	43.42	7.93
6	4874.00	36.5 AV	54.0	-17.5	3.07 H	146	28.57	7.93
7	7311.00	55.9 PK	74.0	-18.1	1.99 H	148	40.93	14.95
8	7311.00	43.0 AV	54.0	-11.0	1.99 H	148	28.05	14.95
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	104.3 PK			1.47 V	217	103.49	0.76
2	*2437.00	94.9 AV			1.47 V	217	94.17	0.76
3	2483.50	61.9 PK	74.0	-12.1	1.47 V	217	60.88	0.98
4	2483.50	44.7 AV	54.0	-9.3	1.47 V	217	43.75	0.98
5	4874.00	48.1 PK	74.0	-26.0	2.01 V	288	40.12	7.93
6	4874.00	35.4 AV	54.0	-18.6	2.01 V	288	27.50	7.93
7	7311.00	62.2 PK	74.0	-11.8	3.26 V	324	47.27	14.95
8	7311.00	48.2 AV	54.0	-5.8	3.26 V	324	33.24	14.95

REMARKS:

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

CHANNEL	TX Channel 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	109.2 PK			1.20 H	101	108.27	0.88
2	*2462.00	99.4 AV			1.20 H	101	98.55	0.88
3	2483.50	72.9 PK	74.0	-1.2	1.20 H	101	71.87	0.98
4	2483.50	51.8 AV	54.0	-2.2	1.20 H	101	50.79	0.98
5	4924.00	50.7 PK	74.0	-23.3	3.10 H	144	42.58	8.08
6	4924.00	36.4 AV	54.0	-17.6	3.10 H	144	28.29	8.08
7	7386.00	55.2 PK	74.0	-18.8	2.03 H	138	40.28	14.89
8	7386.00	42.9 AV	54.0	-11.2	2.03 H	138	27.96	14.89
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	99.9 PK			1.99 V	218	98.97	0.88
2	*2462.00	90.2 AV			1.99 V	218	89.31	0.88
3	2483.50	63.7 PK	74.0	-10.3	1.99 V	218	62.76	0.98
4	2483.50	44.8 AV	54.0	-9.2	1.99 V	218	43.81	0.98
5	4924.00	48.1 PK	74.0	-25.9	2.01 V	279	40.01	8.08
6	4924.00	35.2 AV	54.0	-18.8	2.01 V	279	27.10	8.08
7	7386.00	55.8 PK	74.0	-18.2	3.20 V	327	40.95	14.89
8	7386.00	43.7 AV	54.0	-10.3	3.20 V	327	28.77	14.89

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 (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.9 PK	74.0	-1.1	3.07 H	113	72.41	0.52
2	2390.00	49.5 AV	54.0	-4.5	3.07 H	113	48.95	0.52
3	*2422.00	108.7 PK			3.07 H	113	108.05	0.69
4	*2422.00	98.6 AV			3.07 H	113	97.91	0.69
5	4844.00	48.2 PK	74.0	-25.9	3.62 H	158	40.28	7.87
6	4844.00	37.0 AV	54.0	-17.0	3.62 H	158	29.11	7.87
7	7266.00	55.7 PK	74.0	-18.3	1.99 H	151	40.83	14.83
8	7266.00	42.9 AV	54.0	-11.2	1.99 H	151	28.02	14.83
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	68.3 PK	74.0	-5.7	2.07 V	219	67.75	0.52
2	2390.00	48.0 AV	54.0	-6.1	2.07 V	219	47.43	0.52
3	*2422.00	104.1 PK			2.07 V	219	103.45	0.69
4	*2422.00	94.6 AV			2.07 V	219	93.91	0.69
5	4844.00	47.7 PK	74.0	-26.3	2.63 V	311	39.82	7.87
6	4844.00	36.6 AV	54.0	-17.4	2.63 V	311	28.75	7.87
7	7266.00	57.4 PK	74.0	-16.7	2.49 V	317	42.52	14.83
8	7266.00	43.9 AV	54.0	-10.1	2.49 V	317	29.11	14.83

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.5 PK			3.03 H	112	111.75	0.76
2	*2437.00	101.7 AV			3.03 H	112	100.97	0.76
3	2483.50	72.9 PK	74.0	-1.1	3.03 H	112	71.88	0.98
4	2483.50	48.7 AV	54.0	-5.3	3.03 H	112	47.75	0.98
5	4874.00	50.8 PK	74.0	-23.2	3.05 H	158	42.89	7.93
6	4874.00	36.4 AV	54.0	-17.6	3.05 H	158	28.44	7.93
7	7311.00	55.8 PK	74.0	-18.2	2.03 H	145	40.89	14.95
8	7311.00	43.0 AV	54.0	-11.0	2.03 H	145	28.01	14.95
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	107.8 PK			2.21 V	217	107.02	0.76
2	*2437.00	97.1 AV			2.21 V	217	96.38	0.76
3	2483.50	71.9 PK	74.0	-2.1	2.21 V	217	70.88	0.98
4	2483.50	47.8 AV	54.0	-6.2	2.21 V	217	46.86	0.98
5	4874.00	47.8 PK	74.0	-26.2	2.55 V	310	39.85	7.93
6	4874.00	35.9 AV	54.0	-18.1	2.55 V	310	27.99	7.93
7	7311.00	57.6 PK	74.0	-16.4	2.96 V	320	42.64	14.95
8	7311.00	45.2 AV	54.0	-8.8	2.96 V	320	30.23	14.95

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)
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	108.0 PK			3.29 H	104	107.17	0.83
2	*2452.00	98.2 AV			3.29 H	104	97.37	0.83
3	2483.50	73.0 PK	74.0	-1.0	3.29 H	104	71.98	0.98
4	2483.50	51.8 AV	54.0	-2.2	3.29 H	104	50.81	0.98
5	4904.00	49.1 PK	74.0	-24.9	3.70 H	162	41.08	8.00
6	4904.00	37.6 AV	54.0	-16.4	3.70 H	162	29.57	8.00
7	7356.00	55.8 PK	74.0	-18.2	2.05 H	148	40.93	14.91
8	7356.00	43.1 AV	54.0	-10.9	2.05 H	148	28.15	14.91
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	105.4 PK			2.03 V	217	104.53	0.83
2	*2452.00	95.0 AV			2.03 V	217	94.20	0.83
3	2483.50	66.7 PK	74.0	-7.3	2.03 V	217	65.76	0.98
4	2483.50	48.3 AV	54.0	-5.7	2.03 V	217	47.31	0.98
5	4904.00	48.0 PK	74.0	-26.0	2.17 V	278	40.00	8.00
6	4904.00	36.0 AV	54.0	-18.0	2.17 V	278	28.02	8.00
7	7356.00	57.9 PK	74.0	-16.1	2.58 V	322	43.01	14.91
8	7356.00	44.5 AV	54.0	-9.5	2.58 V	322	29.58	14.91

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.

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. 01, 2015	Mar. 31, 2016
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101197	Apr. 27, 2015	Apr. 26, 2016
LISN With Adapter (for EUT)	AD10	C10Ada-002	Apr. 27, 2015	Apr. 26, 2016
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. 17, 2015	Feb. 16, 2016
SUHNTER 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. Tested Date: Nov. 27, 2015.

4.2.3 Test Procedures

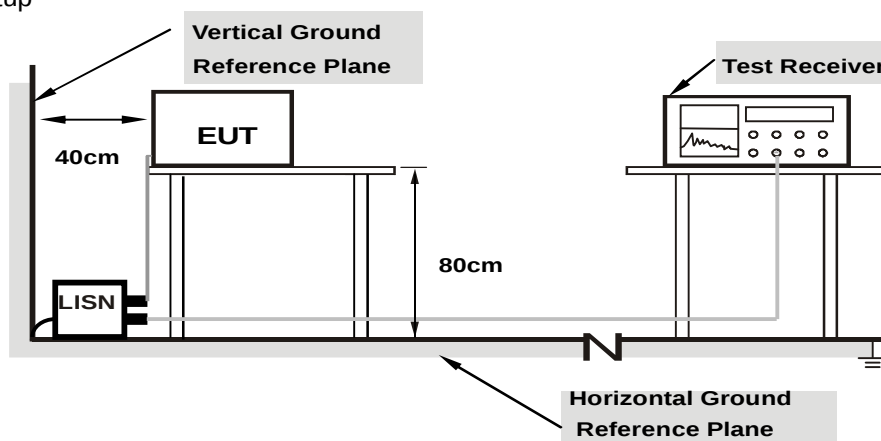
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

NOTE: 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: 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 item 4.1.6.

4.2.7 Test Results

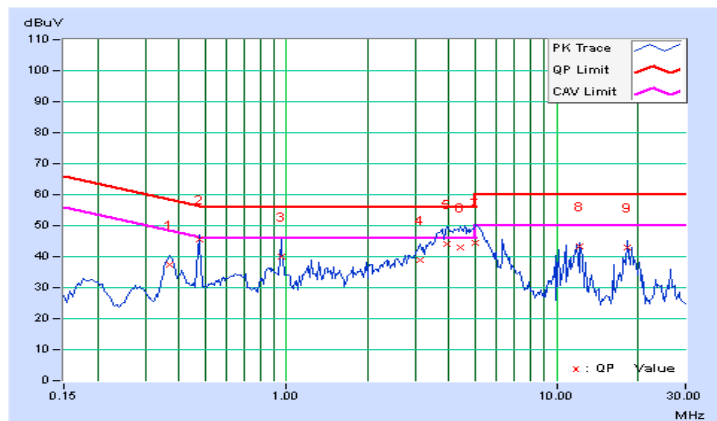
802.11g: CH 6

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
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Phase Of Power : Line (L)										
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	0.36875	9.69	27.85	21.78	37.54	31.47	58.53	48.53	-20.99	-17.06
2	0.47422	9.70	35.93	30.90	45.63	40.60	56.44	46.44	-10.81	-5.84
3	0.95469	9.76	30.24	24.29	40.00	34.05	56.00	46.00	-16.00	-11.95
4	3.11328	9.91	28.96	19.67	38.87	29.58	56.00	46.00	-17.13	-16.42
5	3.95313	9.95	34.20	25.40	44.15	35.35	56.00	46.00	-11.85	-10.65
6	4.41406	9.96	33.14	24.23	43.10	34.19	56.00	46.00	-12.90	-11.81
7	4.99999	9.97	34.60	23.29	44.57	33.26	56.00	46.00	-11.43	-12.74
8	12.19922	10.09	33.22	25.78	43.31	35.87	60.00	50.00	-16.69	-14.13
9	18.24609	10.15	32.69	24.95	42.84	35.10	60.00	50.00	-17.16	-14.90

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

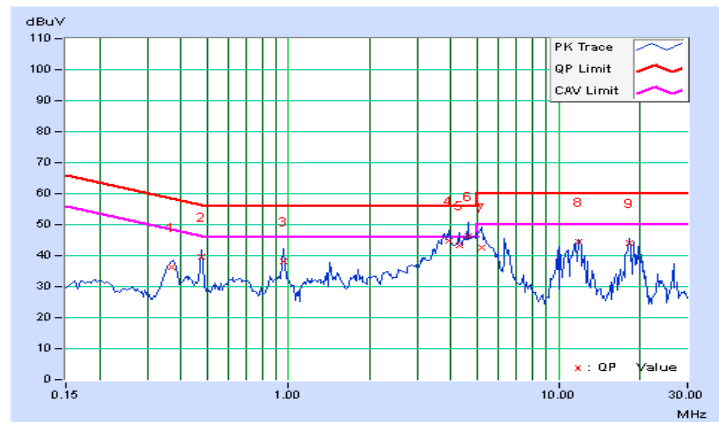


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.36875	9.74	26.40	21.54	36.14	31.28	58.53	48.53	-22.39	-17.25
2	0.47422	9.75	30.06	21.63	39.81	31.38	56.44	46.44	-16.63	-15.06
3	0.95469	9.79	28.26	20.57	38.05	30.36	56.00	46.00	-17.95	-15.64
4	3.92188	9.98	34.69	24.67	44.67	34.65	56.00	46.00	-11.33	-11.35
5	4.26953	9.99	33.36	22.18	43.35	32.17	56.00	46.00	-12.65	-13.83
6	4.60938	9.99	36.36	26.20	46.35	36.19	56.00	46.00	-9.65	-9.81
7	5.18359	10.01	32.54	20.42	42.55	30.43	60.00	50.00	-17.45	-19.57
8	11.89453	10.14	34.30	26.47	44.44	36.61	60.00	50.00	-15.56	-13.39
9	18.24219	10.24	33.77	25.96	44.01	36.20	60.00	50.00	-15.99	-13.80

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

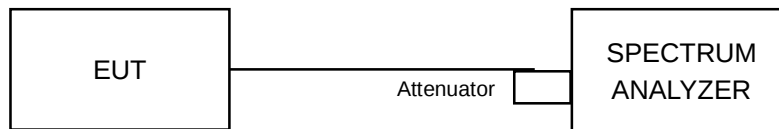


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	10.10	10.11	0.5	PASS
6	2437	10.11	10.11	0.5	PASS
11	2462	10.12	10.12	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	16.38	16.38	0.5	PASS
6	2437	16.36	16.35	0.5	PASS
11	2462	16.37	16.36	0.5	PASS

802.11n (HT20)

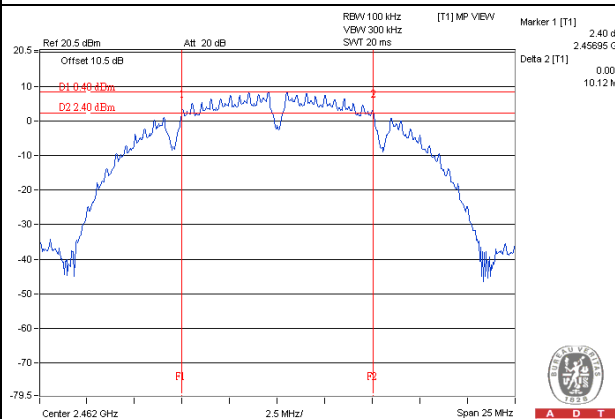
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	17.55	17.56	0.5	Pass
6	2437	17.37	17.37	0.5	Pass
11	2462	17.33	17.31	0.5	Pass

802.11n (HT40)

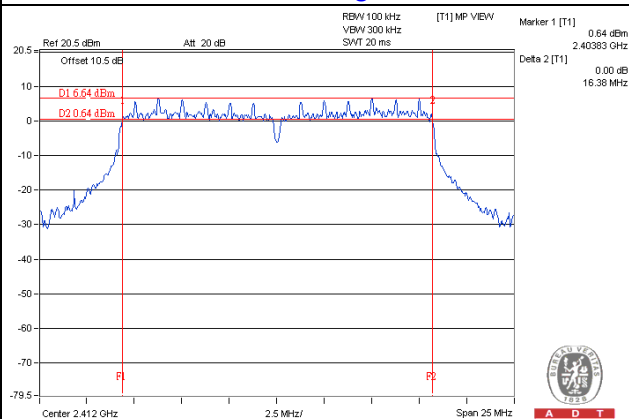
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
3	2422	35.97	36.00	0.5	Pass
6	2437	36.02	36.01	0.5	Pass
9	2452	36.35	36.35	0.5	Pass

Spectrum Plot of Worst Value

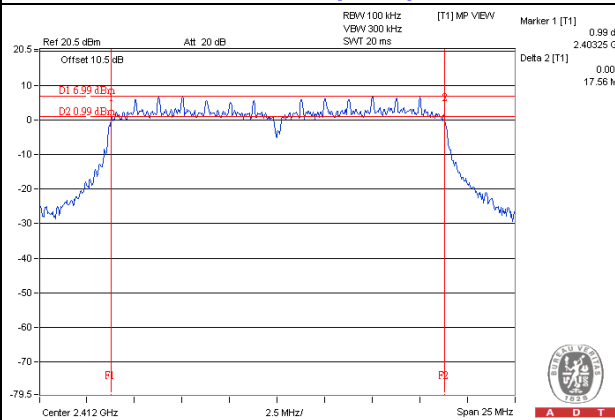
802.11b



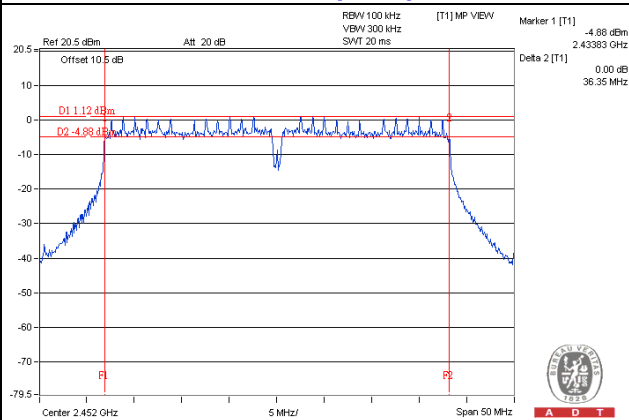
802.11g



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,

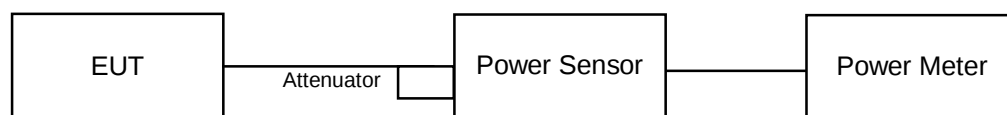
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ 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	20.58	20.38	223.432	23.49	30	Pass
6	2437	20.56	20.41	223.664	23.50	30	Pass
11	2462	20.71	20.60	232.576	23.67	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	24.89	23.96	557.205	27.46	30	Pass
6	2437	26.27	25.10	747.237	28.73	30	Pass
11	2462	24.98	23.80	554.658	27.44	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	25.34	24.79	643.280	28.08	30	Pass
6	2437	25.84	24.98	698.482	28.44	30	Pass
11	2462	24.07	22.87	448.912	26.52	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	24.84	24.10	561.829	27.50	30	Pass
6	2437	25.98	24.97	710.329	28.51	30	Pass
9	2452	24.91	24.13	568.563	27.55	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	18.16	18.02	128.851	21.10
6	2437	18.18	18.06	129.739	21.13
11	2462	18.29	18.12	132.316	21.22

802.11g

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.14	16.28	94.223	19.74
6	2437	22.06	21.45	300.331	24.78
11	2462	17.06	16.04	90.995	19.59

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.77	17.25	112.929	20.53
6	2437	19.57	19.47	179.085	22.53
11	2462	15.09	13.89	56.776	17.54

802.11n (HT40)

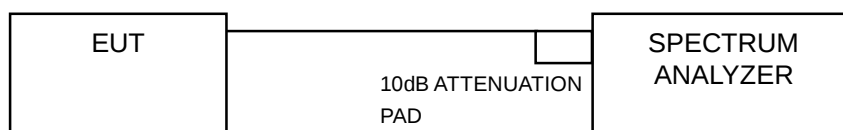
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	15.12	14.68	61.885	17.92
6	2437	18.41	17.63	127.286	21.05
9	2452	15.21	15.04	65.104	18.14

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- 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	2.75	3.01	5.76	6.36	Pass
	6	2437	2.99	3.01	6.00	6.36	Pass
	11	2462	2.92	3.01	5.93	6.36	Pass
1	1	2412	2.65	3.01	5.66	6.36	Pass
	6	2437	3.03	3.01	6.04	6.36	Pass
	11	2462	2.91	3.01	5.92	6.36	Pass

NOTE: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced to 8-(7.64-6) = 6.36dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-9.87	3.01	-6.86	6.36	Pass
	6	2437	-6.11	3.01	-3.10	6.36	Pass
	11	2462	-10.87	3.01	-7.86	6.36	Pass
1	1	2412	-10.11	3.01	-7.10	6.36	Pass
	6	2437	-6.55	3.01	-3.54	6.36	Pass
	11	2462	-10.29	3.01	-7.28	6.36	Pass

NOTE: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced to 8-(7.64-6) = 6.36dBm.

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	-8.66	3.01	-5.65	6.36	Pass
	6	2437	-6.64	3.01	-3.63	6.36	Pass
	11	2462	-11.38	3.01	-8.37	6.36	Pass
1	1	2412	-8.82	3.01	-5.81	6.36	Pass
	6	2437	-6.53	3.01	-3.52	6.36	Pass
	11	2462	-11.49	3.01	-8.48	6.36	Pass

NOTE: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced to 8-(7.64-6) = 6.36dBm.

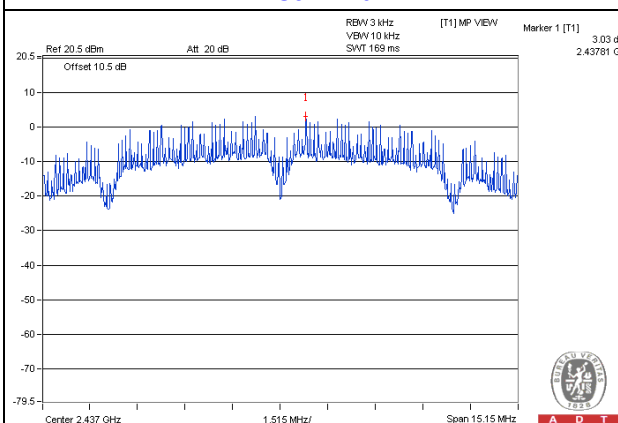
802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	3	2422	-13.81	3.01	-10.80	6.36	Pass
	6	2437	-10.44	3.01	-7.43	6.36	Pass
	9	2452	-12.16	3.01	-9.15	6.36	Pass
1	3	2422	-13.94	3.01	-10.93	6.36	Pass
	6	2437	-10.62	3.01	-7.61	6.36	Pass
	9	2452	-12.10	3.01	-9.09	6.36	Pass

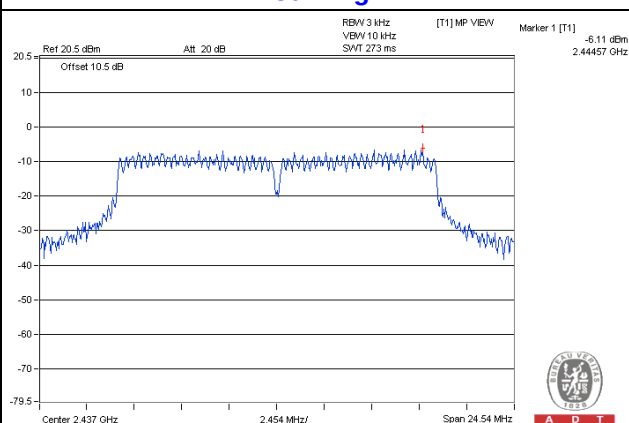
NOTE: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced to 8-(7.64-6) = 6.36dBm.

Spectrum Plot of Worst Value

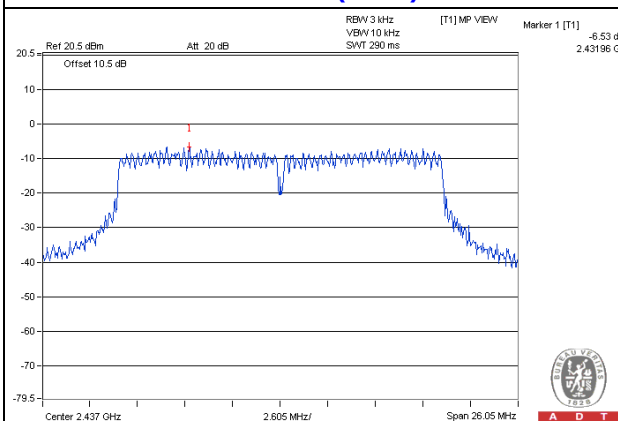
802.11b



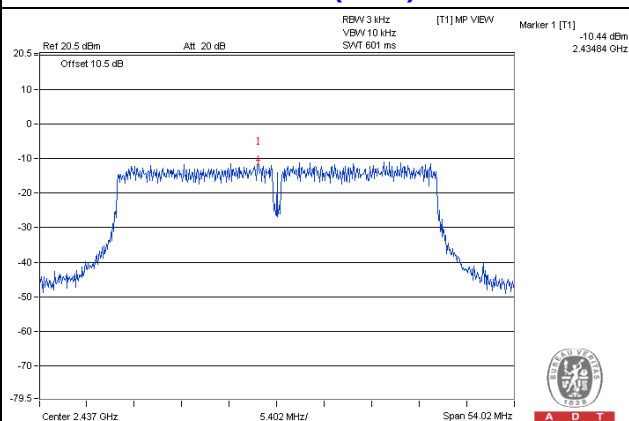
802.11g



802.11n (HT20)



802.11n (HT40)

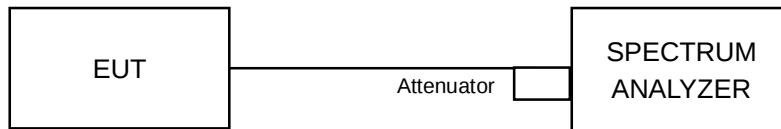


4.6 Conducted Out of Band Emission Measurement

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

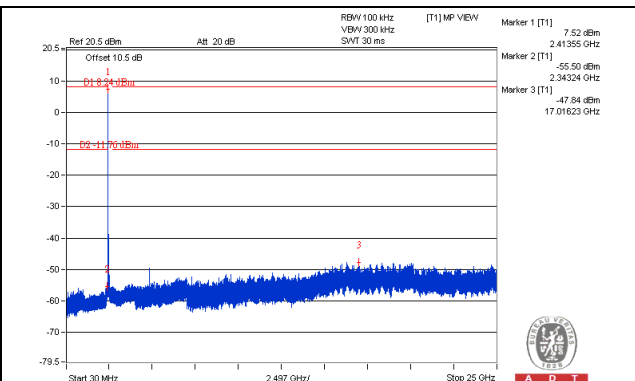
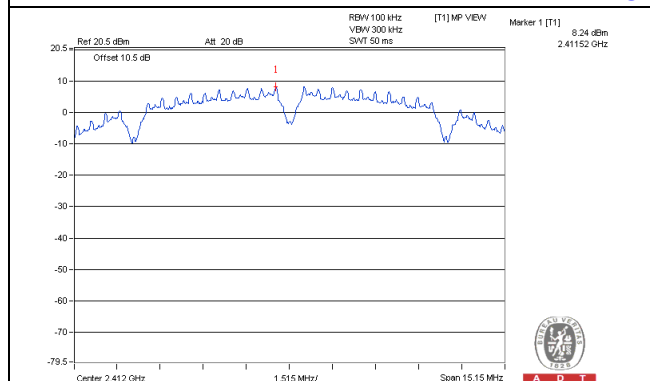
4.6.7 Test Results

The 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.

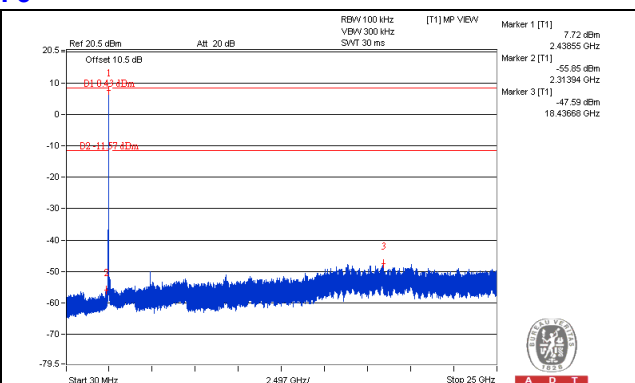
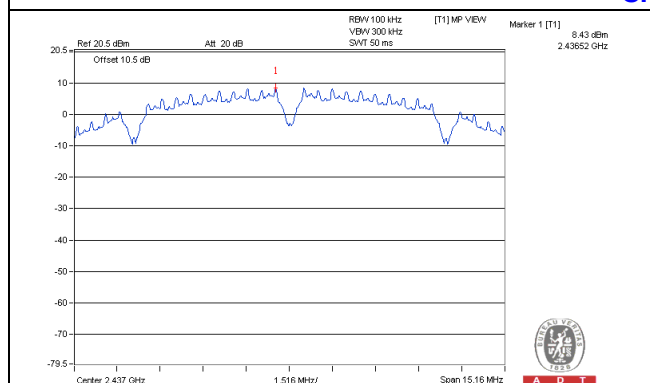
802.11b

CHAIN 0

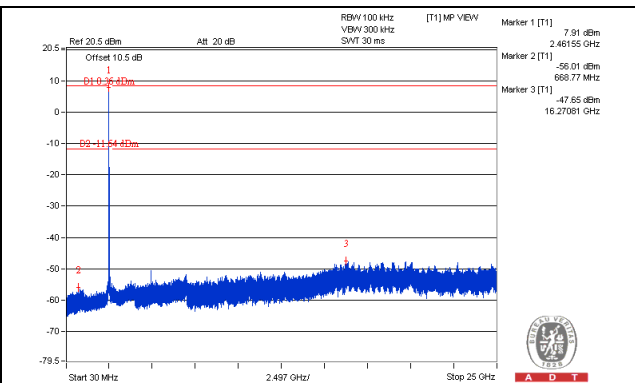
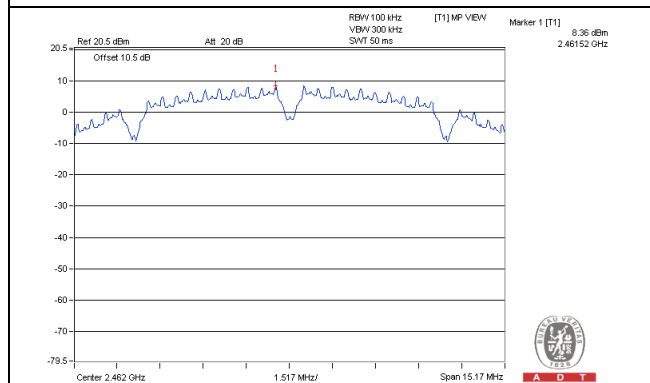
CH 1



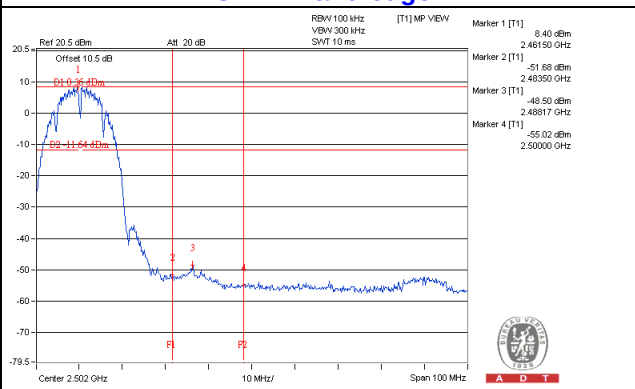
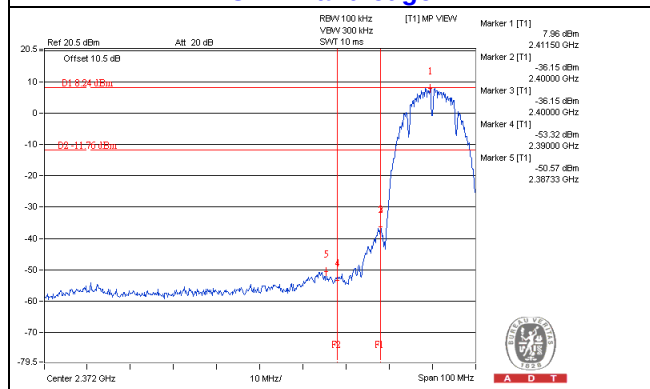
CH 6



CH 11

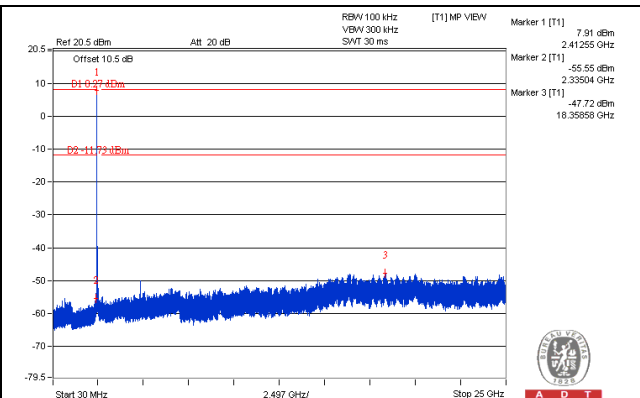
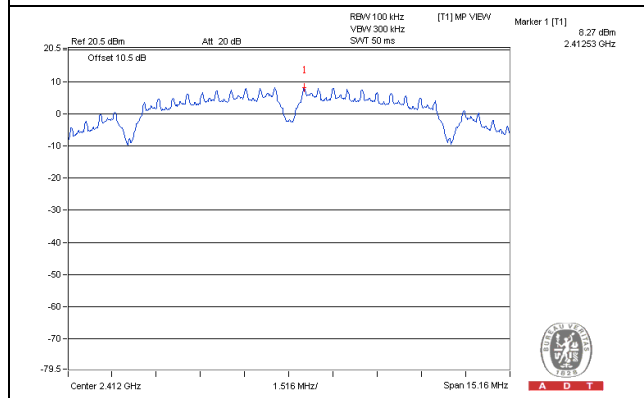


CH 1 Band edge

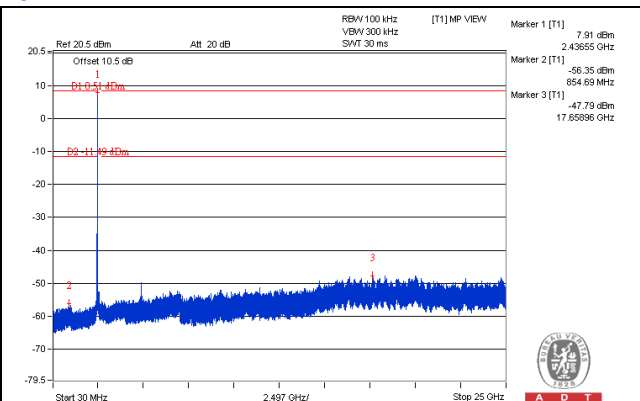
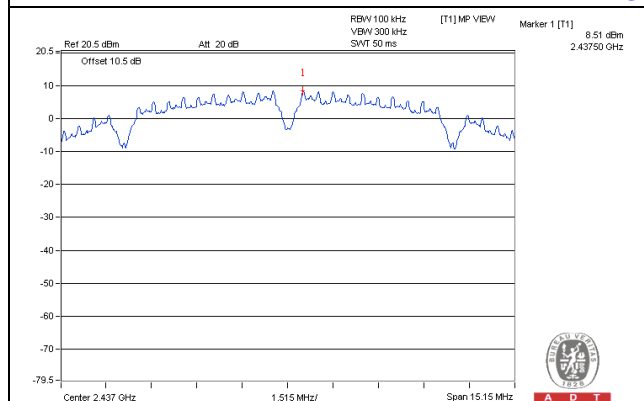


CHAIN 1

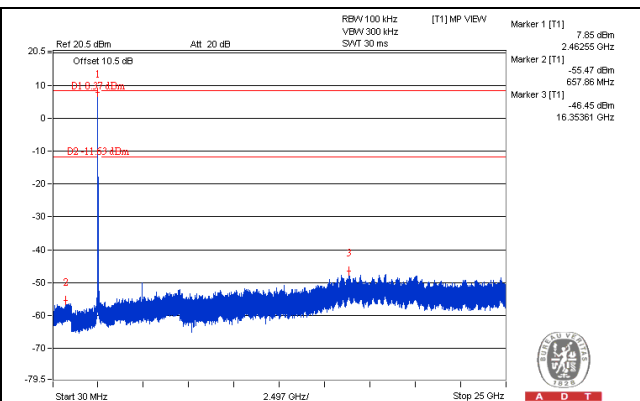
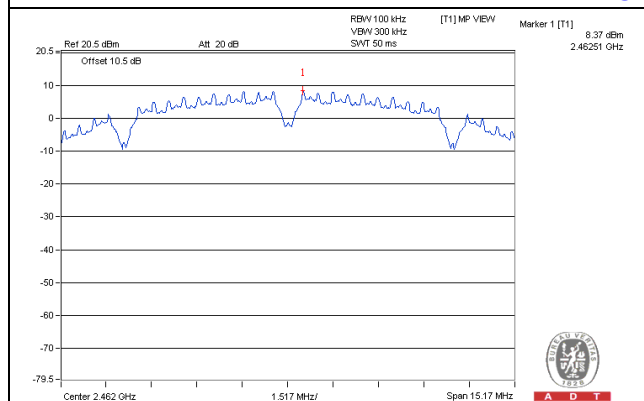
CH 1



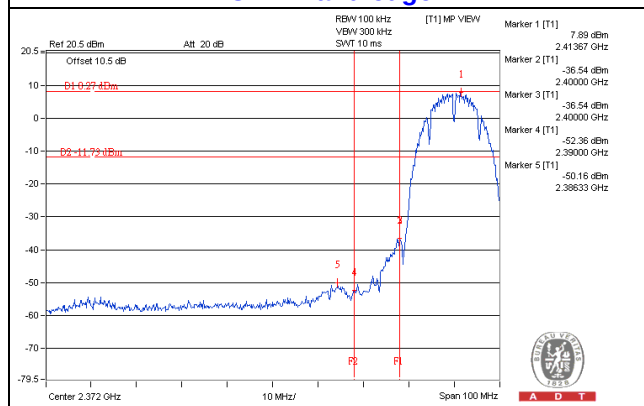
CH 6



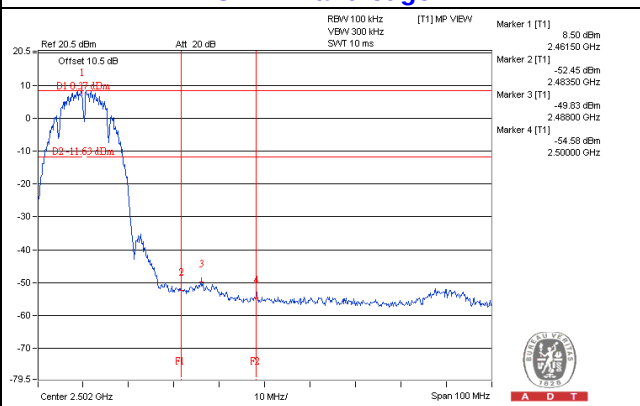
CH 11



CH 1 Band edge

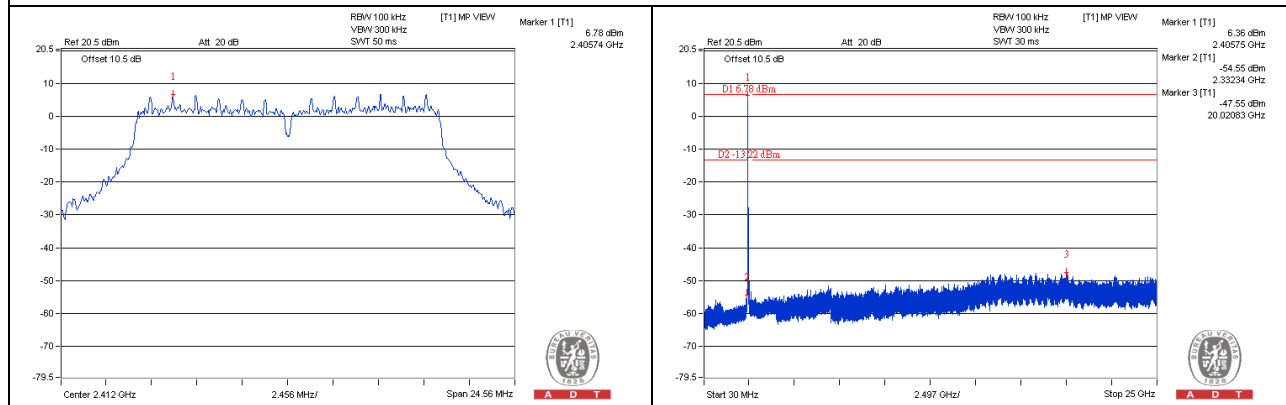


CH 11 Band edge

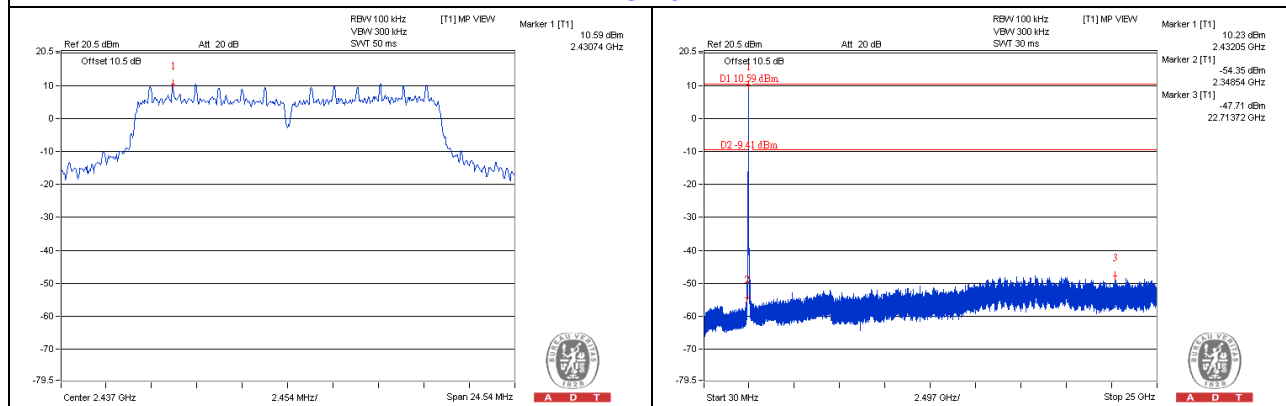


802.11g CHAIN 0

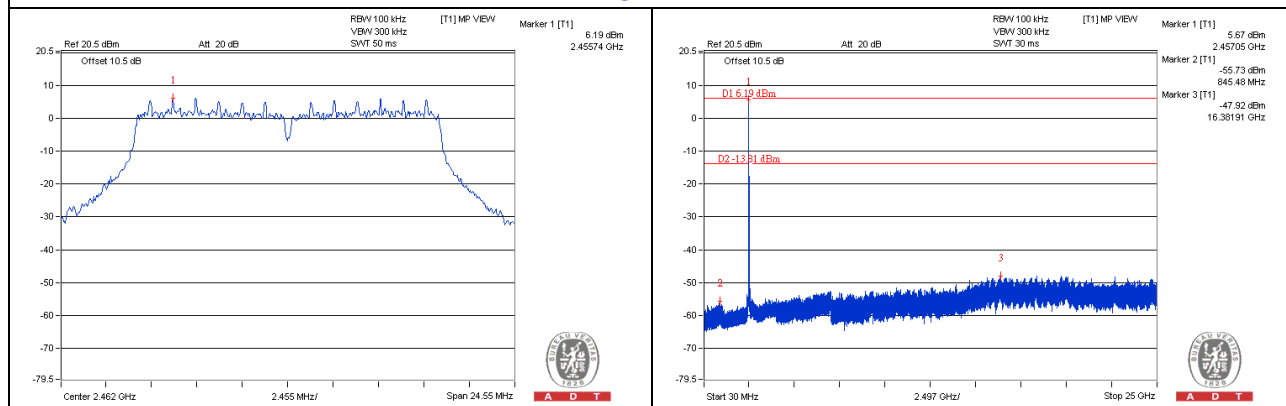
CH 1



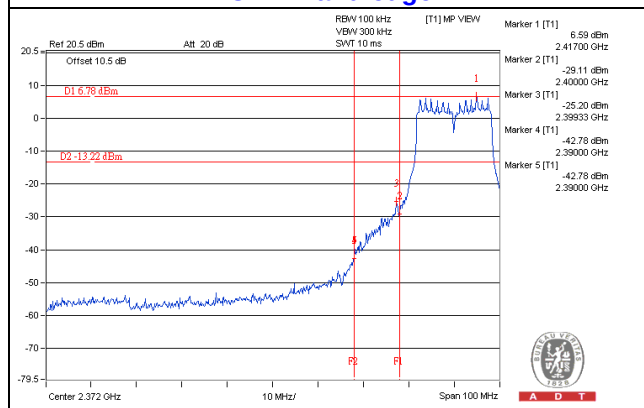
CH 6



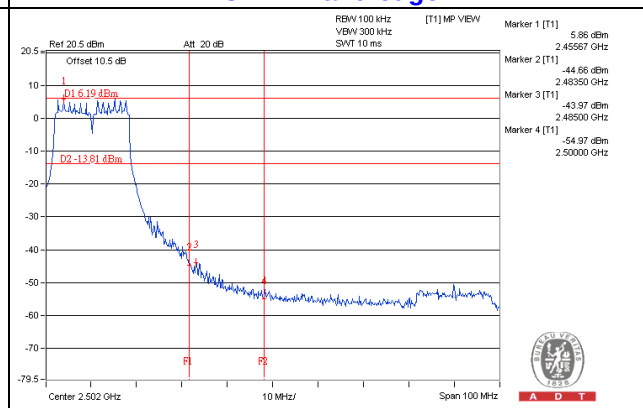
CH 11



CH 1 Band edge

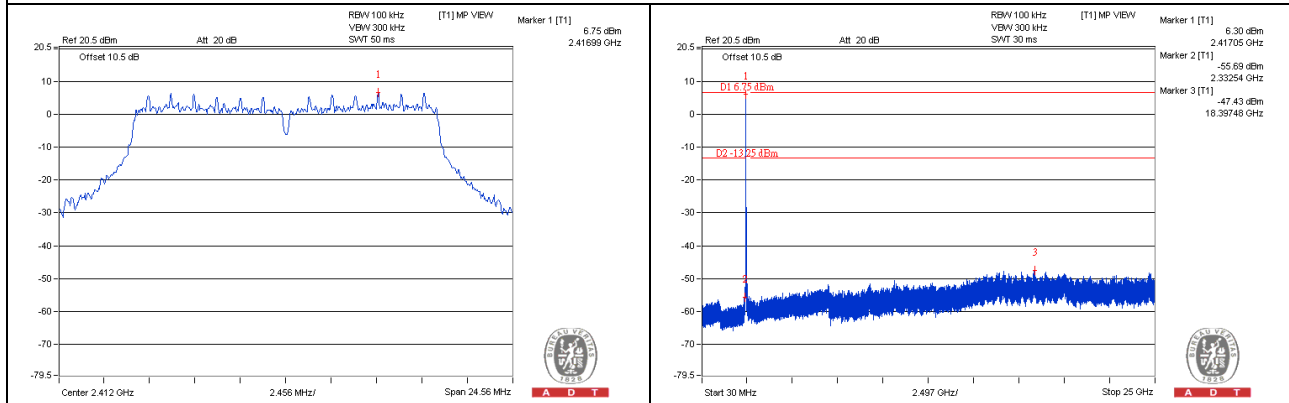


CH 11 Band edge

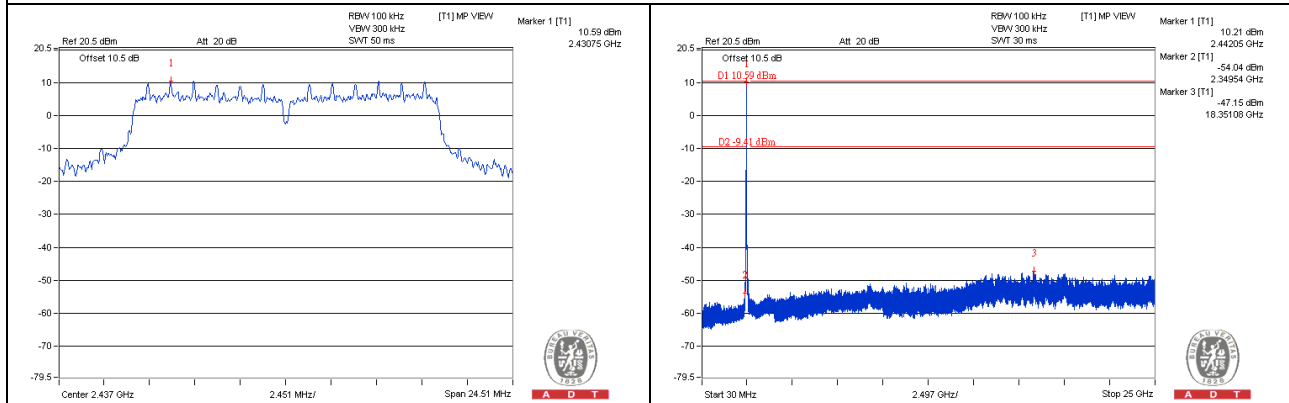


CHAIN 1

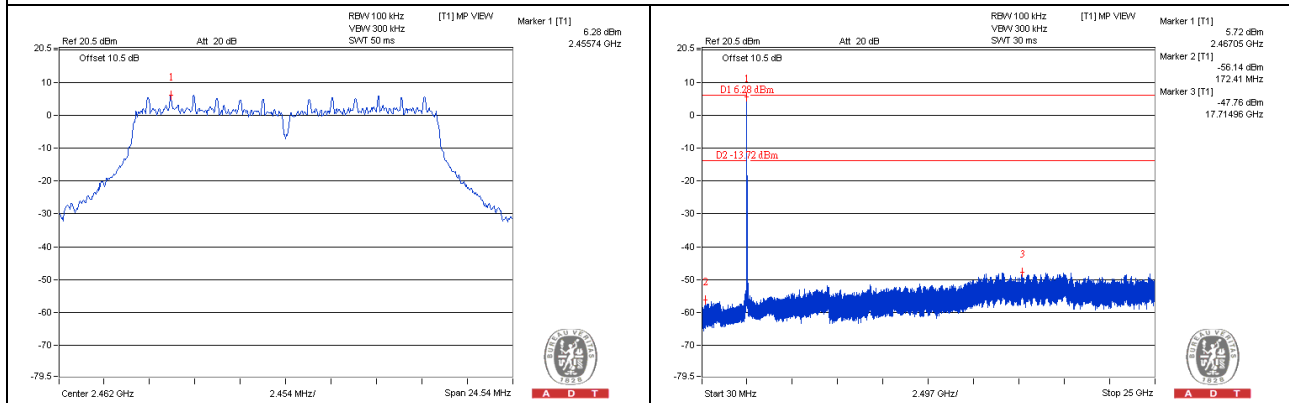
CH 1



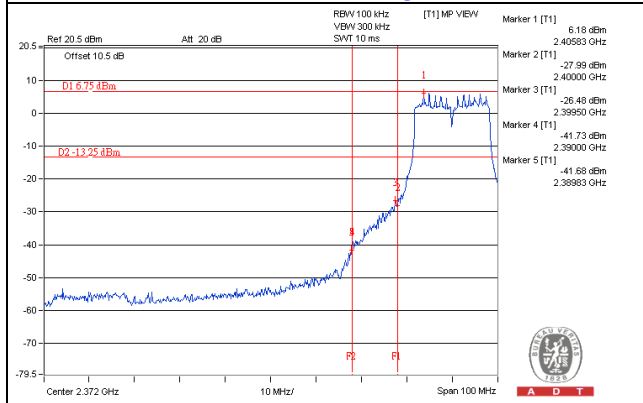
CH 6



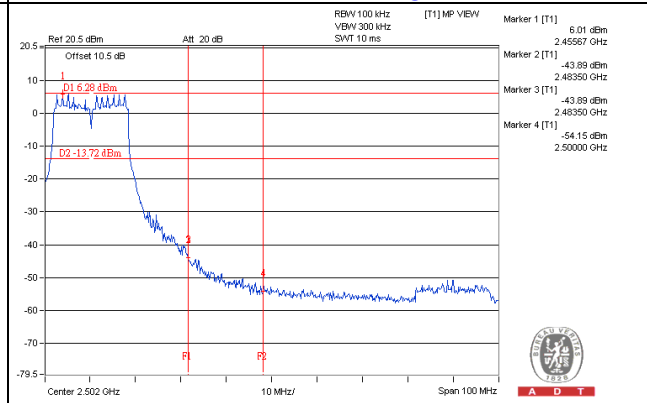
CH 11



CH 1 Band edge

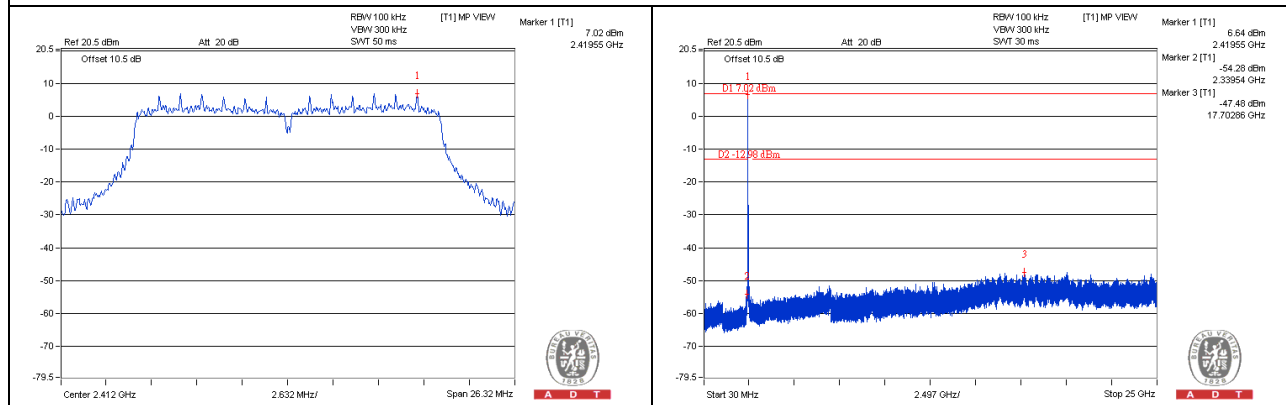


CH 11 Band edge

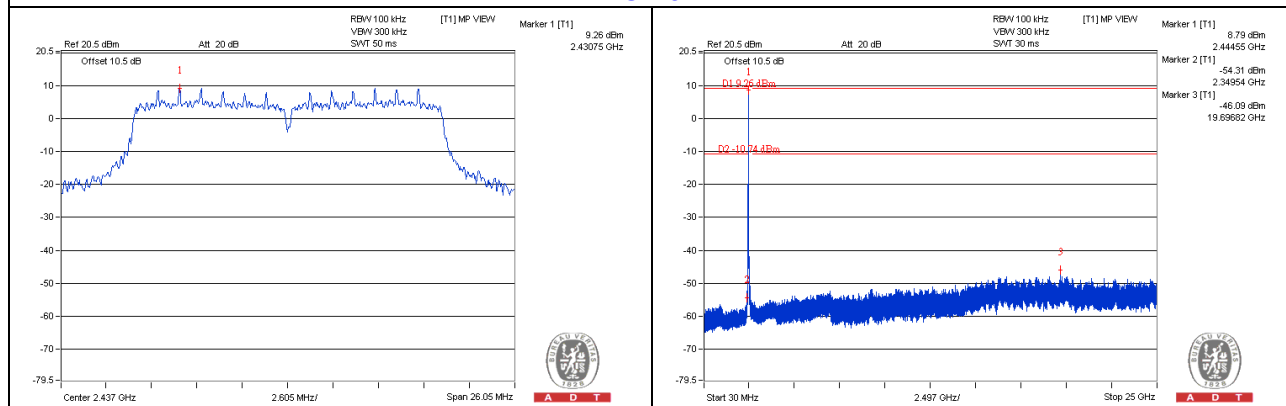


802.11n (HT20) CHAIN 0

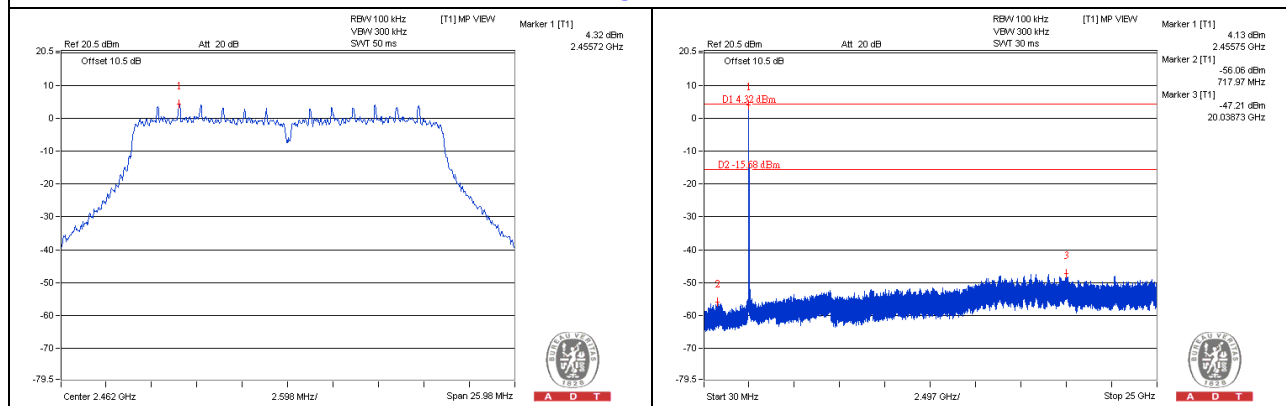
CH 1



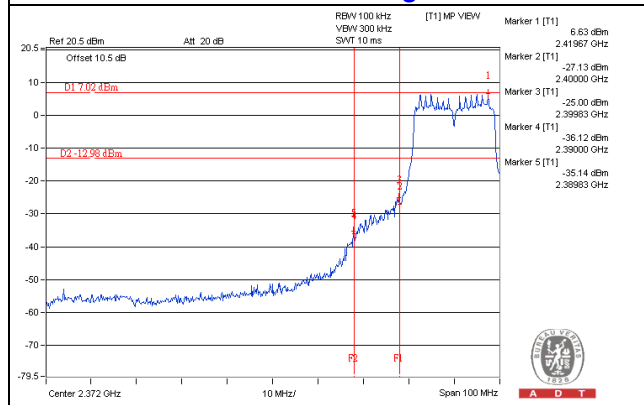
CH 6



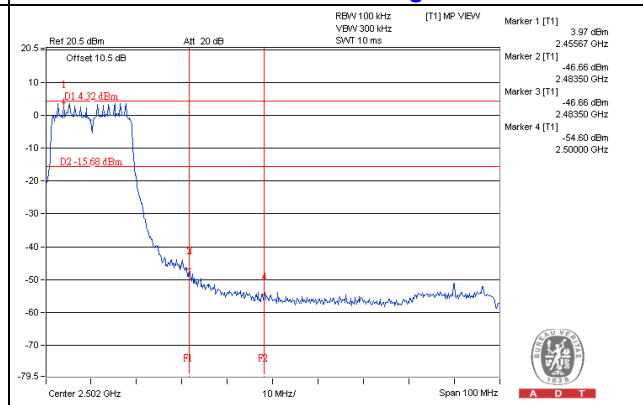
CH 11



CH 1 Band edge

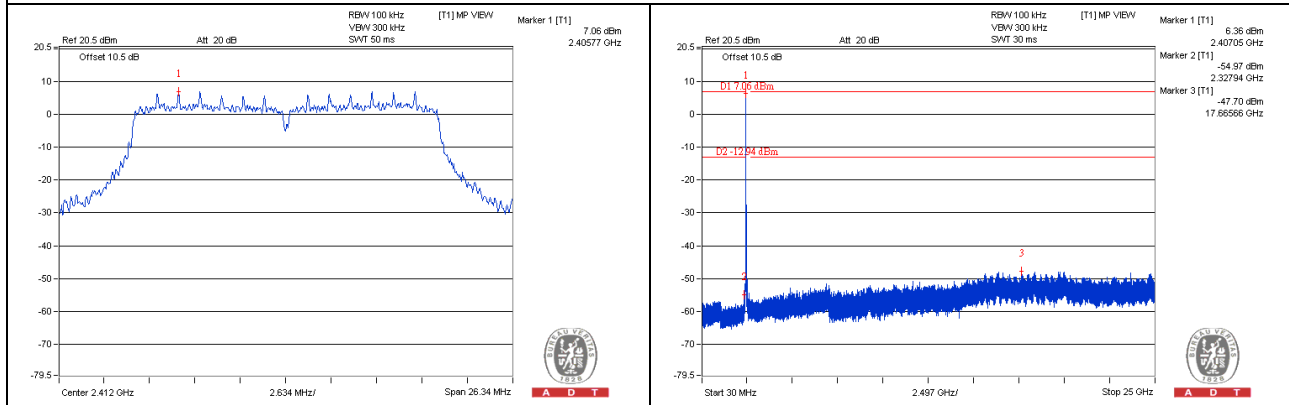


CH 11 Band edge

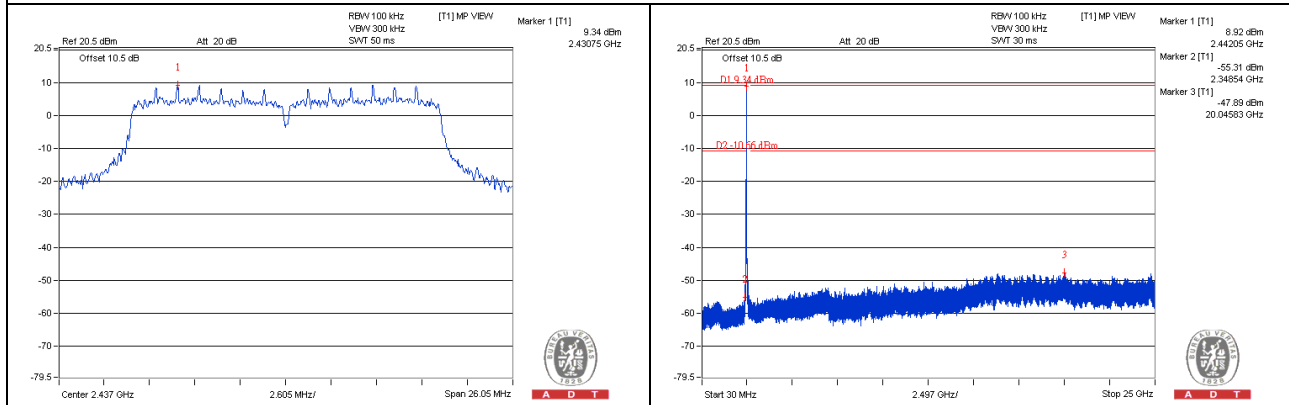


CHAIN 1

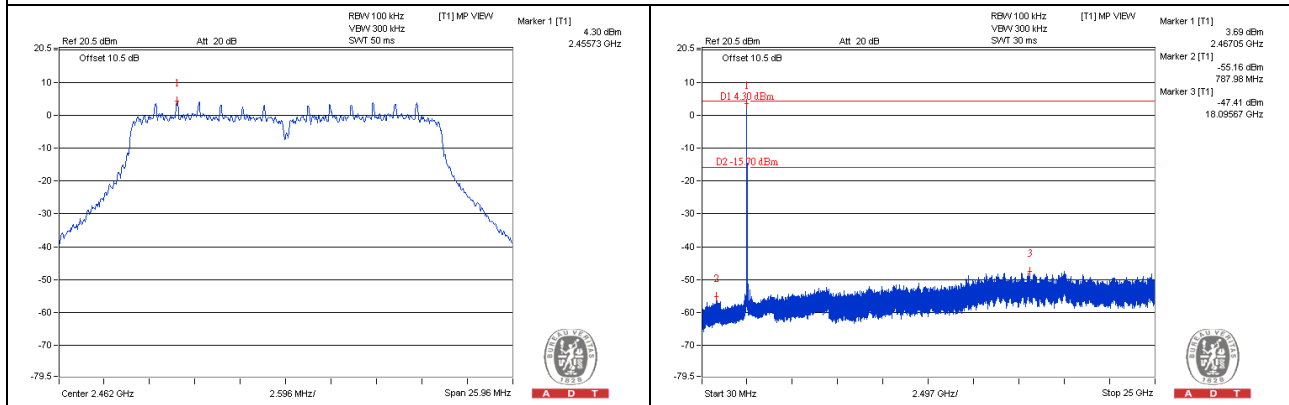
CH 1



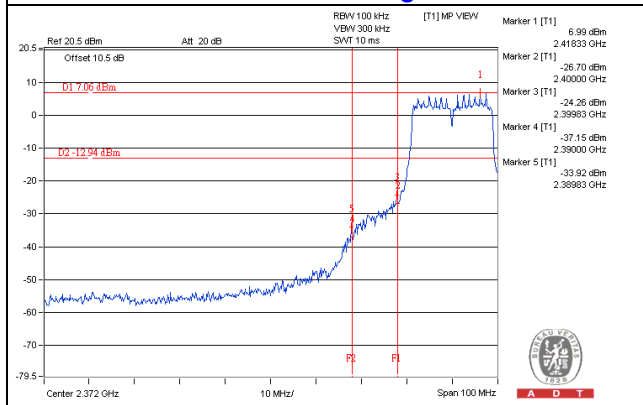
CH 6



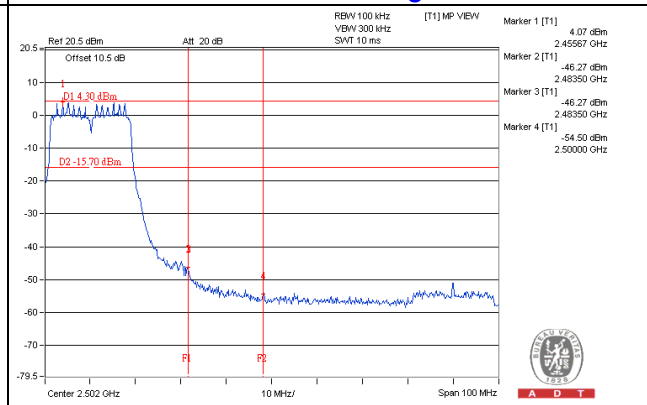
CH 11



CH 1 Band edge

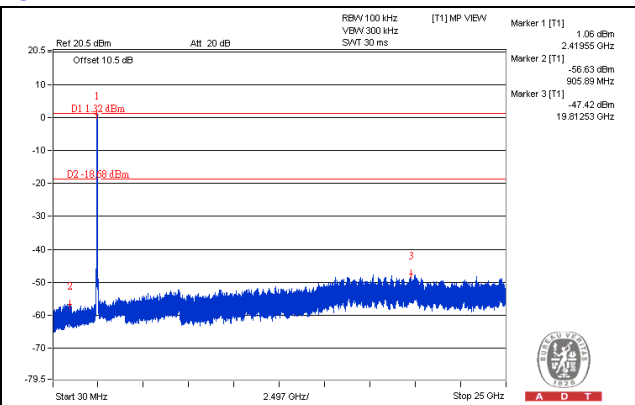
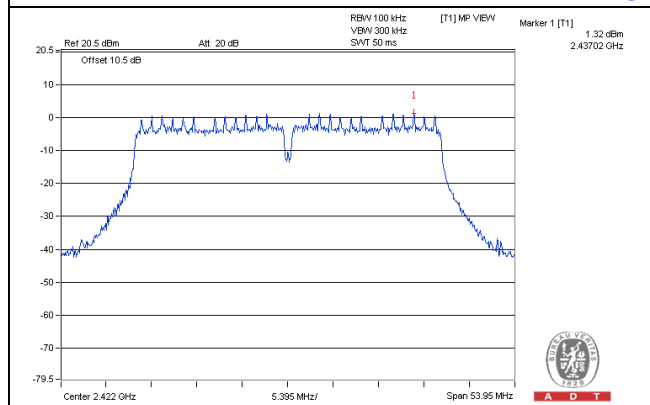


CH 11 Band edge

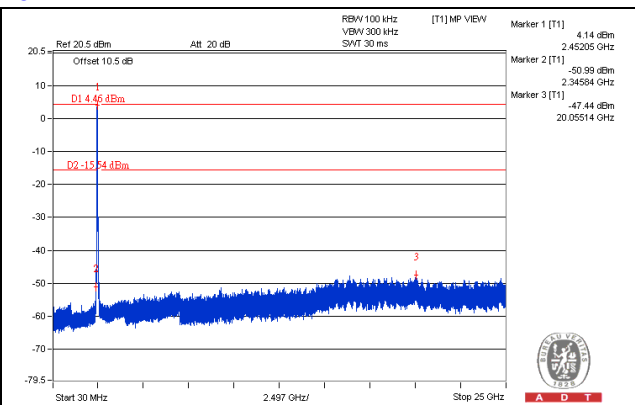
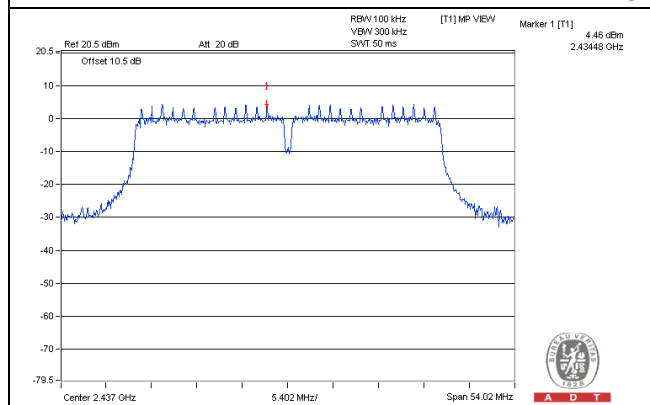


802.11n (HT40) CHAIN 0

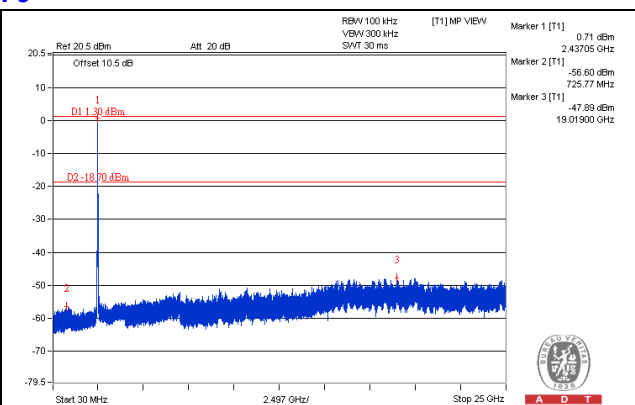
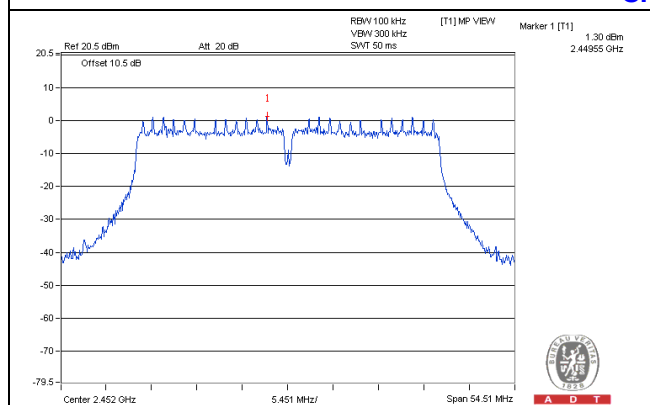
CH 3



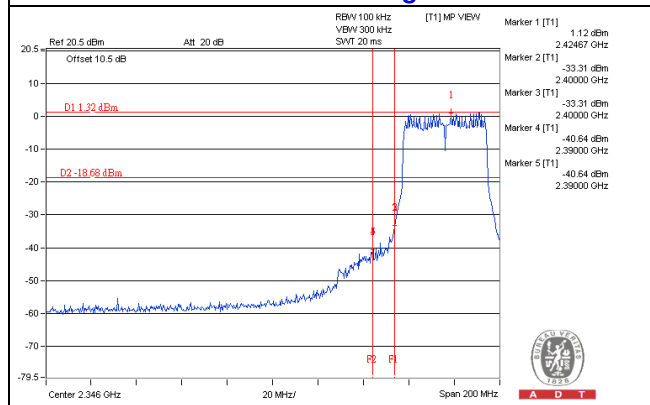
CH 6



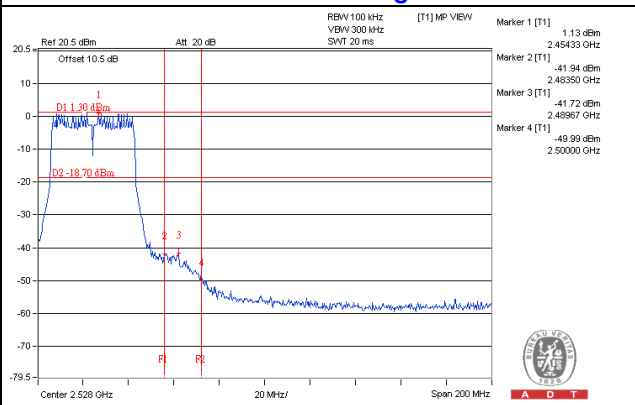
CH 9



CH 3 Band edge

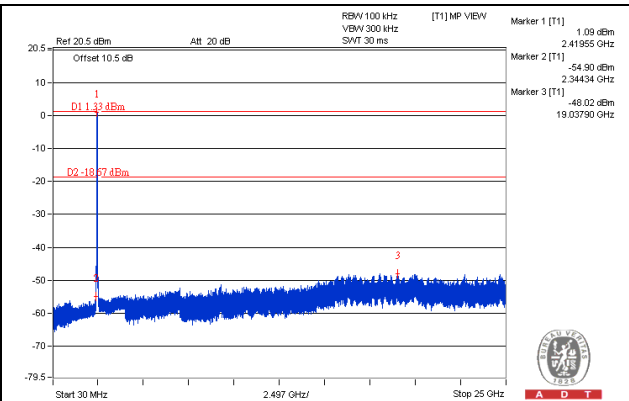
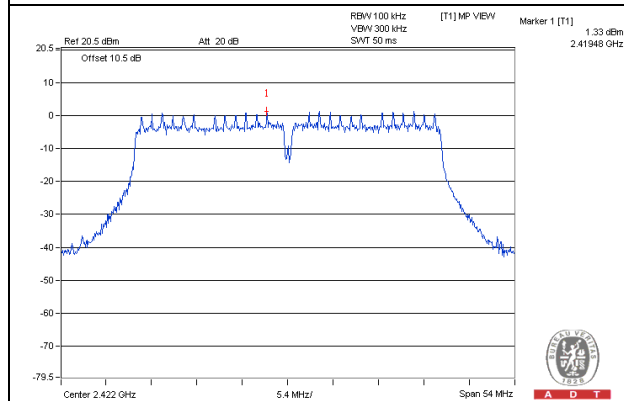


CH 9 Band edge

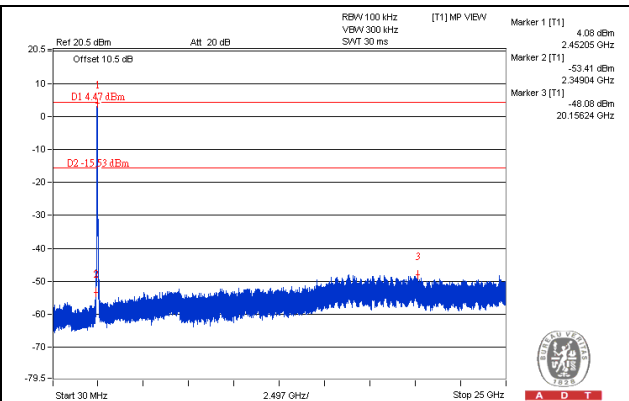
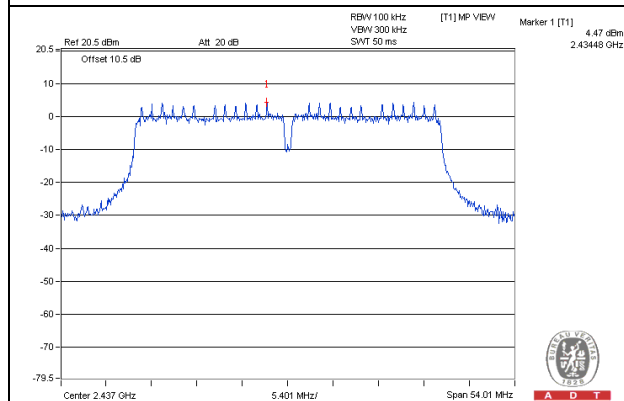


CHAIN 1

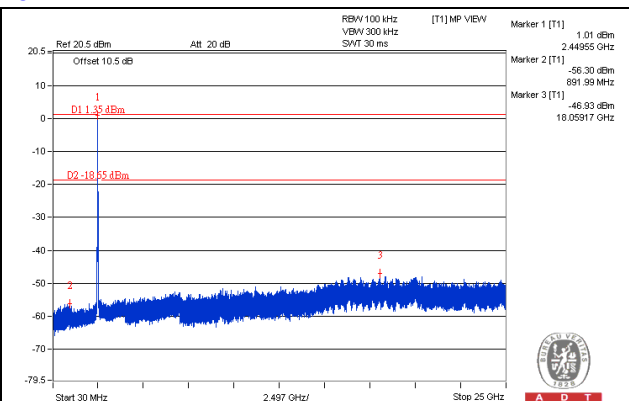
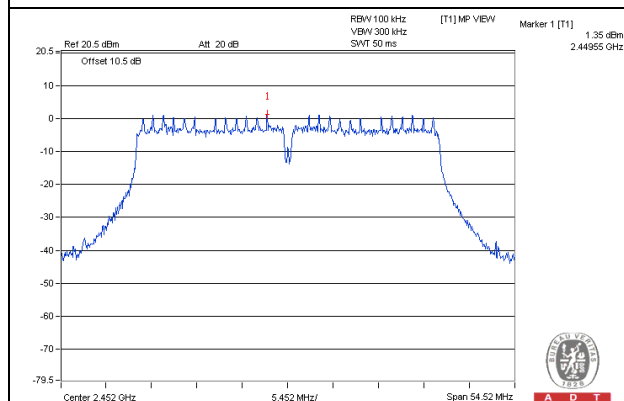
CH 3



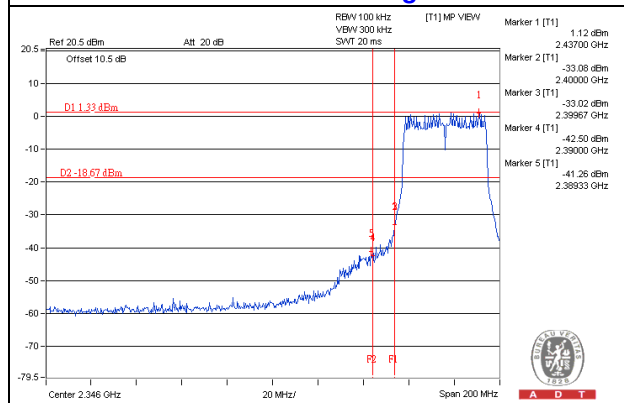
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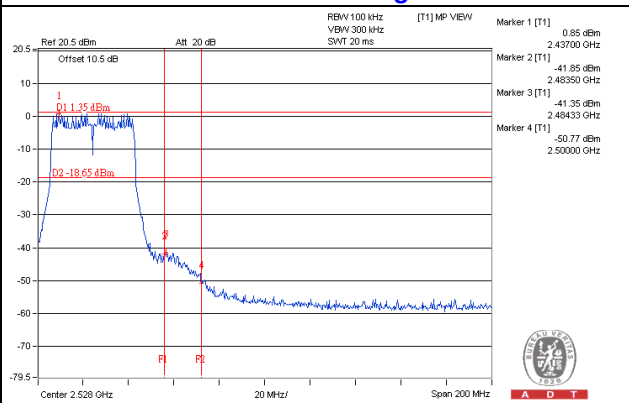
CH 9



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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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.

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