

FCC Test Report

Report No.: RF170302D10

FCC ID: PD5-VCB5001LNW

Test Model: VCB-5001LN-W

Received Date: Mar. 27, 2016

Test Date: Apr. 17 ~ 25, 2017

Issued Date: Apr. 28, 2017

Applicant: Delta Networks, Inc.

Address: No.252, Shan Ying Rd., Kuei San District, Taoyuan City 33341, Taiwan

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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Release Control Record

Issue No.	Description	Date Issued
RF170302D10	Original release.	Apr. 28, 2017

1 Certificate of Conformity

Product: 2.4G WiFi Module
Brand: Delta, VidaGrid
Test Model: VCB-5001LN-W
Sample Status: Engineering sample
Applicant: Delta Networks, Inc.
Test Date: Apr. 17 ~ 25, 2017
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 : Annie Chang , **Date:** Apr. 28, 2017
Annie Chang / Senior Specialist

Approved by : Rex Lai , **Date:** Apr. 28, 2017
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	N/A	Without AC power port of the EUT
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.01dB at 2390.00MHz.
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 R-SMA 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) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.54 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.77 dB
	6GHz ~ 18GHz	5.48 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2.4G WiFi Module
Brand	Delta, VidaGrid
Test Model	VCB-5001LN-W
Status of EUT	Engineering sample
Power Supply Rating	5Vdc From DC Power supply
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
Output Power	282.488mW (Peak Power)
Antenna Type	Dipole antenna with 4.2dBi gain
Antenna Connector	R-SMA connector
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

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 (20MHz):

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

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

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

NOTE: 1. No need to concern of Conducted Emission due to the EUT is powered by host equipment.
 2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	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

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
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	20deg. C, 71%RH	5Vdc	Ian Chang
RE<1G	20deg. C, 71%RH	5Vdc	Ian Chang
APCM	25deg. C, 75%RH	5Vdc	Saxon Lee

3.3 Duty Cycle of Test Signal

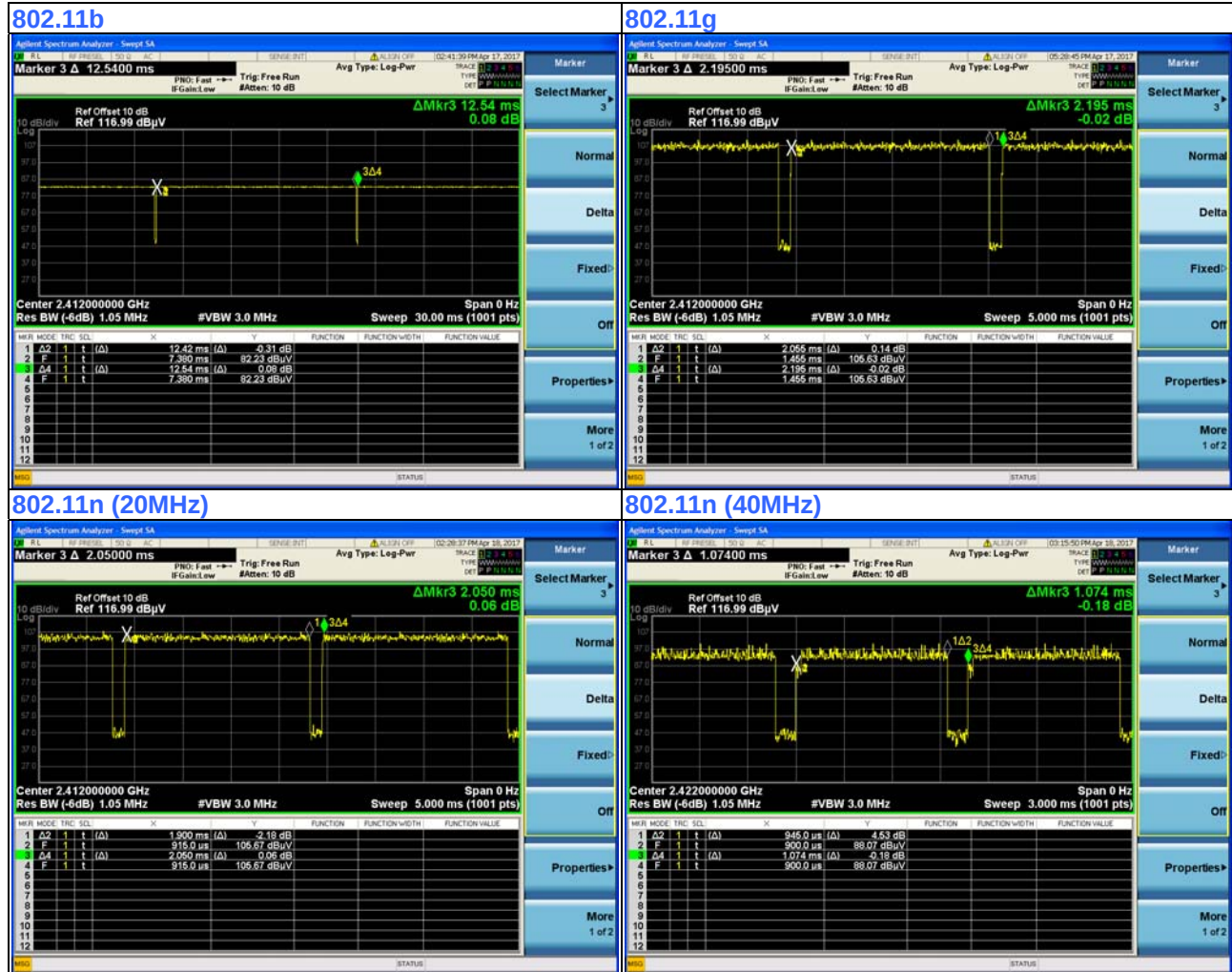
Duty cycle of test signal is > 98 %, duty factor is not required.
 Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle of test signal is 99 %.

802.11g: $2.055 \text{ ms} / 2.195 \text{ ms} = 0.936$, Duty factor = $10 * \log(1/0.936) = 0.29$

802.11n (20MHz): $1.90 \text{ ms} / 2.05 \text{ ms} = 0.927$, Duty factor = $10 * \log(1/0.927) = 0.33$

802.11n (40MHz): $0.945 \text{ ms} / 1.074 \text{ ms} = 0.880$, Duty factor = $10 * \log(1/0.880) = 0.56$



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.

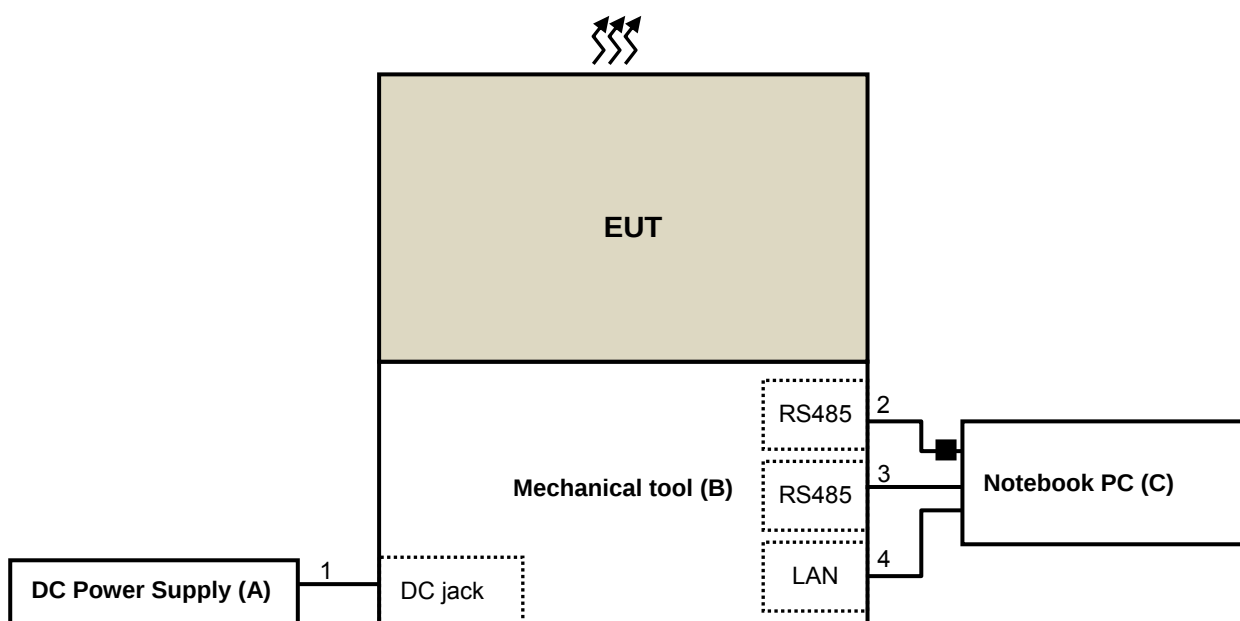
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DC Power Supply	Topward	6303D	795551	N/A	Provided by Lab
B.	Mechanical tool	NA	NA	NA	NA	Supplied by client
C.	Notebook PC	ASUS	PU401L	ECNXBC012528528	FCC DoC Approved	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	0.5	N	0	Provided by Lab
2.	USB to RS485 cable	1	1.5	Y	1	Supplied by client
3.	USB to RS485 cable	1	1.2	Y	0	Supplied by client
4.	LAN cable	1	1.5	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 v04

ANSI C63.10-2013

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

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. 21, 2017	Feb. 20, 2018
HP Preamplifier	8449B	3008A01201	Feb. 22, 2017	Feb. 21, 2018
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2017	Feb. 20, 2018
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 08, 2017	Feb. 07, 2018
Schwarzbeck Antenna	VULB 9168	139	Dec. 13, 2016	Dec. 12, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 30, 2016	Dec. 29, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Dec. 27, 2016	Dec. 26, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2016	Aug. 14, 2017
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2016	Aug. 14, 2017
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 25, 2016	May 24, 2017
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 26, 2016	Jul. 25, 2017
Loop Antenna EMCI	LPA600	270	Aug. 20, 2015	Aug. 19, 2017
EMCO Horn Antenna	3115	00028257	Dec. 15, 2016	Dec. 14, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 30, 2016	Sep. 29, 2017
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2017	Apr. 23, 2018
Anritsu Power Meter	ML2495A	0842014	Apr. 24, 2017	Apr. 23, 2018

- 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

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

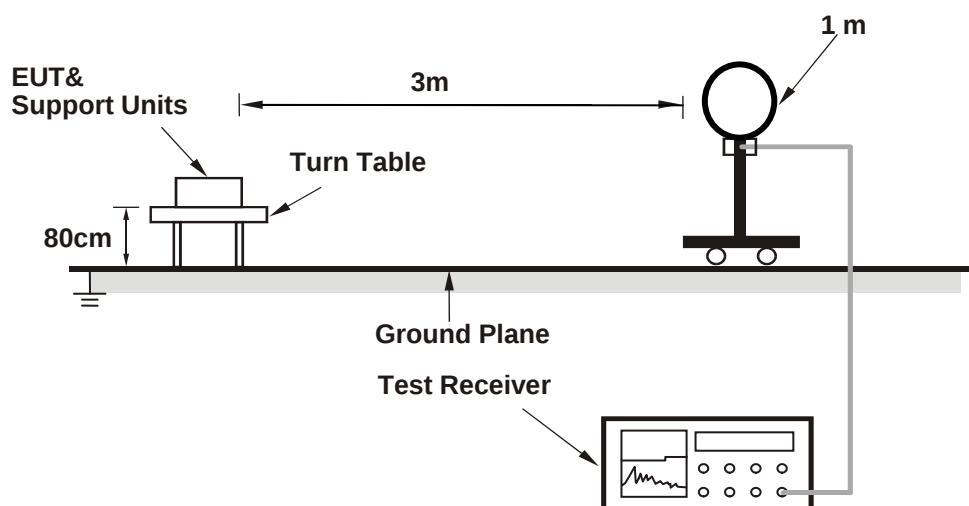
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

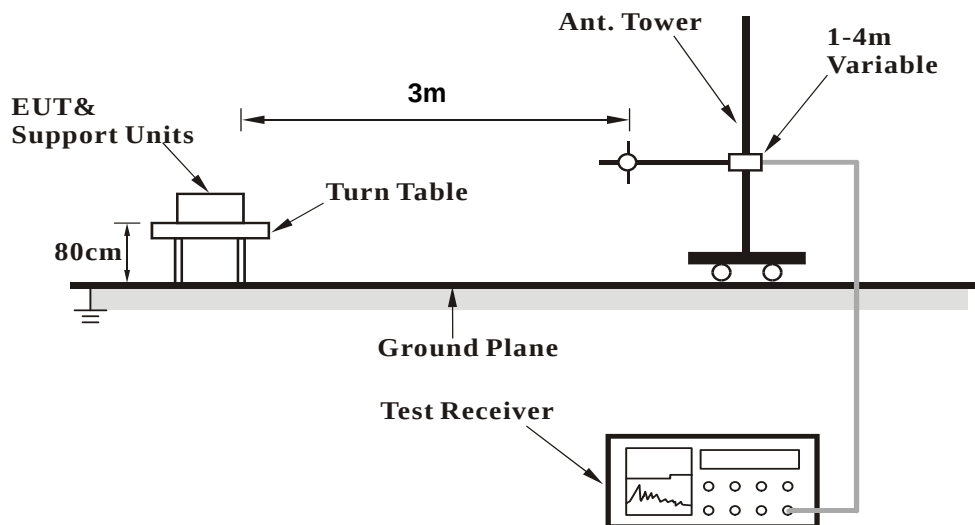
No deviation.

4.1.5 Test Setup

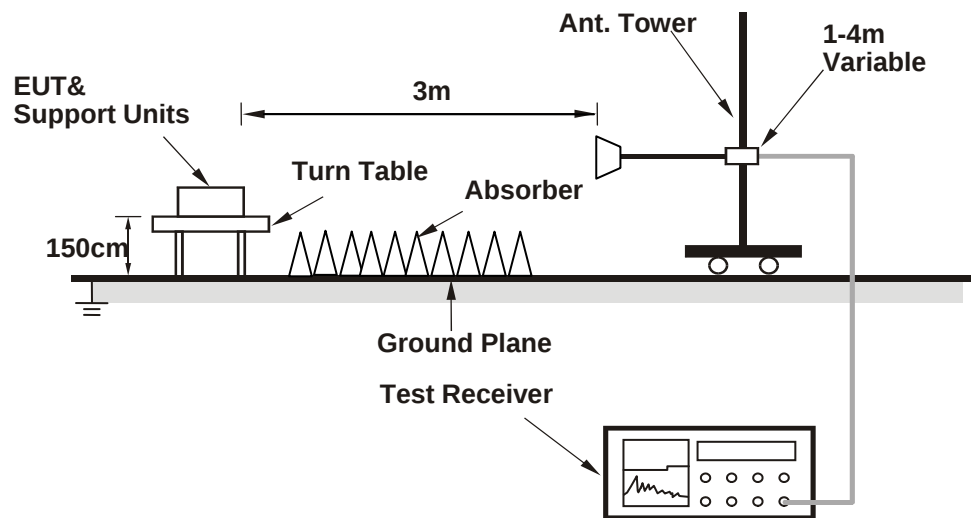
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission 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.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.43 PK	74.00	-17.57	2.01 H	323	57.02	-0.59
2	2390.00	45.38 AV	54.00	-8.62	2.01 H	323	45.97	-0.59
3	*2412.00	103.18 PK			2.01 H	323	103.63	-0.45
4	*2412.00	100.00 AV			2.01 H	323	100.45	-0.45
5	4824.00	45.82 PK	74.00	-28.18	1.51 H	67	38.90	6.92
6	4824.00	35.52 AV	54.00	-18.48	1.51 H	67	28.60	6.92
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.49 PK	74.00	-8.51	1.19 V	329	66.08	-0.59
2	2390.00	52.97 AV	54.00	-1.03	1.19 V	329	53.56	-0.59
3	*2412.00	111.41 PK			1.19 V	329	111.86	-0.45
4	*2412.00	108.08 AV			1.19 V	329	108.53	-0.45
5	4824.00	47.74 PK	74.00	-26.26	1.50 V	33	40.82	6.92
6	4824.00	38.80 AV	54.00	-15.20	1.50 V	33	31.88	6.92

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	105.58 PK			2.06 H	331	105.87	-0.29
2	*2437.00	102.30 AV			2.06 H	331	102.59	-0.29
3	4874.00	46.90 PK	74.00	-27.10	1.42 H	78	39.89	7.01
4	4874.00	36.68 AV	54.00	-17.32	1.42 H	78	29.67	7.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.89 PK			1.17 V	339	113.18	-0.29
2	*2437.00	108.69 AV			1.17 V	339	108.98	-0.29
3	4874.00	48.58 PK	74.00	-25.42	1.59 V	354	41.57	7.01
4	4874.00	41.31 AV	54.00	-12.69	1.59 V	354	34.30	7.01

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	102.33 PK			1.96 H	319	102.47	-0.14
2	*2462.00	99.55 AV			1.96 H	319	99.69	-0.14
3	2483.50	58.67 PK	74.00	-15.33	1.96 H	319	58.67	0.00
4	2483.50	50.16 AV	54.00	-3.84	1.96 H	319	50.16	0.00
5	4924.00	45.82 PK	74.00	-28.18	1.42 H	53	38.69	7.13
6	4924.00	37.30 AV	54.00	-16.70	1.42 H	53	30.17	7.13
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	110.13 PK			1.00 V	19	110.27	-0.14
2	*2462.00	106.72 AV			1.00 V	19	106.86	-0.14
3	2483.50	60.33 PK	74.00	-13.67	1.00 V	19	60.33	0.00
4	2483.50	52.87 AV	54.00	-1.13	1.00 V	19	52.87	0.00
5	4924.00	47.76 PK	74.00	-26.24	1.26 V	355	40.63	7.13
6	4924.00	39.66 AV	54.00	-14.34	1.26 V	355	32.53	7.13

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.00 PK	74.00	-8.00	1.81 H	323	66.59	-0.59
2	2390.00	47.35 AV	54.00	-6.65	1.81 H	323	47.94	-0.59
3	*2412.00	102.02 PK			1.81 H	323	102.47	-0.45
4	*2412.00	92.51 AV			1.81 H	323	92.96	-0.45
5	4824.00	46.54 PK	74.00	-27.46	1.77 H	167	39.62	6.92
6	4824.00	32.06 AV	54.00	-21.94	1.77 H	167	25.14	6.92
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	72.19 PK	74.00	-1.81	1.51 V	343	72.78	-0.59
2	2390.00	52.96 AV	54.00	-1.04	1.51 V	343	53.55	-0.59
3	*2412.00	108.29 PK			1.51 V	343	108.74	-0.45
4	*2412.00	98.84 AV			1.51 V	343	99.29	-0.45
5	4824.00	47.08 PK	74.00	-26.92	1.68 V	201	40.16	6.92
6	4824.00	33.30 AV	54.00	-20.70	1.68 V	201	26.38	6.92

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	107.20 PK			1.78 H	315	107.49	-0.29
2	*2437.00	98.60 AV			1.78 H	315	98.89	-0.29
3	4874.00	47.16 PK	74.00	-26.84	1.66 H	233	40.15	7.01
4	4874.00	33.35 AV	54.00	-20.65	1.66 H	233	26.34	7.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	113.37 PK			1.33 V	342	113.66	-0.29
2	*2437.00	103.75 AV			1.33 V	342	104.04	-0.29
3	4874.00	49.17 PK	74.00	-24.83	1.84 V	269	42.16	7.01
4	4874.00	35.70 AV	54.00	-18.30	1.84 V	269	28.69	7.01

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	104.39 PK			1.81 H	336	104.53	-0.14
2	*2462.00	95.75 AV			1.81 H	336	95.89	-0.14
3	2483.50	70.15 PK	74.00	-3.85	1.81 H	336	70.15	0.00
4	2483.50	50.26 AV	54.00	-3.74	1.81 H	336	50.26	0.00
5	4924.00	46.49 PK	74.00	-27.51	1.18 H	261	39.36	7.13
6	4924.00	32.41 AV	54.00	-21.59	1.18 H	261	25.28	7.13
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	110.16 PK			1.31 V	339	110.30	-0.14
2	*2462.00	100.32 AV			1.31 V	339	100.46	-0.14
3	2483.50	71.77 PK	74.00	-2.23	1.31 V	339	71.77	0.00
4	2483.50	52.68 AV	54.00	-1.32	1.31 V	339	52.68	0.00
5	4924.00	47.31 PK	74.00	-26.69	1.78 V	154	40.18	7.13
6	4924.00	33.87 AV	54.00	-20.13	1.78 V	154	26.74	7.13

REMARKS:

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

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.90 PK	74.00	-9.10	1.30 H	340	65.49	-0.59
2	2390.00	44.12 AV	54.00	-9.88	1.30 H	340	44.71	-0.59
3	*2412.00	100.36 PK			1.30 H	340	100.81	-0.45
4	*2412.00	90.18 AV			1.30 H	340	90.63	-0.45
5	4824.00	46.60 PK	74.00	-27.40	1.78 H	141	39.68	6.92
6	4824.00	33.44 AV	54.00	-20.56	1.78 H	141	26.52	6.92
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	72.72 PK	74.00	-1.28	1.36 V	9	73.31	-0.59
2	2390.00	50.13 AV	54.00	-3.87	1.36 V	9	50.72	-0.59
3	*2412.00	107.04 PK			1.36 V	9	107.49	-0.45
4	*2412.00	97.22 AV			1.36 V	9	97.67	-0.45
5	4824.00	47.77 PK	74.00	-26.23	1.68 V	185	40.85	6.92
6	4824.00	34.61 AV	54.00	-19.39	1.68 V	185	27.69	6.92

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	105.55 PK			1.39 H	336	105.84	-0.29
2	*2437.00	95.39 AV			1.39 H	336	95.68	-0.29
3	4874.00	46.43 PK	74.00	-27.57	1.17 H	49	39.42	7.01
4	4874.00	33.65 AV	54.00	-20.35	1.17 H	49	26.64	7.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.19 PK			1.33 V	13	112.48	-0.29
2	*2437.00	102.62 AV			1.33 V	13	102.91	-0.29
3	4874.00	47.70 PK	74.00	-26.30	1.54 V	20	40.69	7.01
4	4874.00	34.89 AV	54.00	-19.11	1.54 V	20	27.88	7.01

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	101.40 PK			1.34 H	346	101.54	-0.14
2	*2462.00	91.49 AV			1.34 H	346	91.63	-0.14
3	2483.50	68.64 PK	74.00	-5.36	1.34 H	346	68.64	0.00
4	2483.50	43.63 AV	54.00	-10.37	1.34 H	346	43.63	0.00
5	4924.00	46.28 PK	74.00	-27.72	1.87 H	142	39.15	7.13
6	4924.00	33.77 AV	54.00	-20.23	1.87 H	142	26.64	7.13
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	108.79 PK			1.47 V	16	108.93	-0.14
2	*2462.00	98.33 AV			1.47 V	16	98.47	-0.14
3	2483.50	72.79 PK	74.00	-1.21	1.47 V	16	72.79	0.00
4	2483.50	47.85 AV	54.00	-6.15	1.47 V	16	47.85	0.00
5	4924.00	47.97 PK	74.00	-26.03	1.55 V	228	40.84	7.13
6	4924.00	34.99 AV	54.00	-19.01	1.55 V	228	27.86	7.13

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.44 PK	74.00	-8.56	1.48 H	340	66.03	-0.59
2	2390.00	45.13 AV	54.00	-8.87	1.48 H	340	45.72	-0.59
3	*2422.00	96.81 PK			1.48 H	340	97.20	-0.39
4	*2422.00	86.78 AV			1.48 H	340	87.17	-0.39
5	4844.00	46.22 PK	74.00	-27.78	1.39 H	228	39.26	6.96
6	4844.00	32.80 AV	54.00	-21.20	1.39 H	228	25.84	6.96
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	72.99 PK	74.00	-1.01	1.18 V	314	73.58	-0.59
2	2390.00	51.71 AV	54.00	-2.29	1.18 V	314	52.30	-0.59
3	*2422.00	104.66 PK			1.18 V	314	105.05	-0.39
4	*2422.00	94.73 AV			1.18 V	314	95.12	-0.39
5	4844.00	47.54 PK	74.00	-26.46	2.19 V	341	40.58	6.96
6	4844.00	33.85 AV	54.00	-20.15	2.19 V	341	26.89	6.96

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.37 PK	74.00	-5.63	1.41 H	346	68.96	-0.59
2	2390.00	49.74 AV	54.00	-4.26	1.41 H	346	50.33	-0.59
3	*2437.00	99.55 PK			1.41 H	346	99.84	-0.29
4	*2437.00	89.19 AV			1.41 H	346	89.48	-0.29
5	2483.50	63.63 PK	74.00	-10.37	1.41 H	346	63.63	0.00
6	2483.50	43.28 AV	54.00	-10.72	1.41 H	346	43.28	0.00
7	4874.00	46.24 PK	74.00	-27.76	1.18 H	14	39.23	7.01
8	4874.00	32.35 AV	54.00	-21.65	1.18 H	14	25.34	7.01
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	72.50 PK	74.00	-1.50	1.35 V	10	73.09	-0.59
2	2390.00	52.84 AV	54.00	-1.16	1.35 V	10	53.43	-0.59
3	*2437.00	106.93 PK			1.35 V	10	107.22	-0.29
4	*2437.00	97.32 AV			1.35 V	10	97.61	-0.29
5	2483.50	67.45 PK	74.00	-6.55	1.35 V	10	67.45	0.00
6	2483.50	47.73 AV	54.00	-6.27	1.35 V	10	47.73	0.00
7	4874.00	47.85 PK	74.00	-26.15	1.64 V	206	40.84	7.01
8	4874.00	33.97 AV	54.00	-20.03	1.64 V	206	26.96	7.01

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	99.70 PK			1.36 H	346	99.89	-0.19
2	*2452.00	89.57 AV			1.36 H	346	89.76	-0.19
3	2483.50	68.46 PK	74.00	-5.54	1.36 H	346	68.46	0.00
4	2483.50	47.88 AV	54.00	-6.12	1.36 H	346	47.88	0.00
5	4904.00	46.53 PK	74.00	-27.47	1.53 H	220	39.46	7.07
6	4904.00	32.20 AV	54.00	-21.80	1.53 H	220	25.13	7.07
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	106.07 PK			1.33 V	338	106.26	-0.19
2	*2452.00	96.46 AV			1.33 V	338	96.65	-0.19
3	2483.50	72.45 PK	74.00	-1.55	1.33 V	338	72.45	0.00
4	2483.50	52.68 AV	54.00	-1.32	1.33 V	338	52.68	0.00
5	4904.00	47.76 PK	74.00	-26.24	1.64 V	200	40.69	7.07
6	4904.00	34.03 AV	54.00	-19.97	1.64 V	200	26.96	7.07

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: 802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	81.07	23.30 QP	40.00	-16.70	2.34 H	272	37.55	-14.25
2	125.45	31.98 QP	43.50	-11.52	2.10 H	172	43.30	-11.32
3	216.00	33.69 QP	43.50	-9.81	1.19 H	121	44.83	-11.14
4	264.01	31.09 QP	46.00	-14.91	1.87 H	115	39.67	-8.58
5	391.13	32.77 QP	46.00	-13.23	1.66 H	360	38.30	-5.53
6	443.90	30.84 QP	46.00	-15.16	1.88 H	159	34.98	-4.14
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	37.13	33.81 QP	40.00	-6.19	1.64 V	209	44.18	-10.37
2	68.31	29.39 QP	40.00	-10.61	1.78 V	136	40.41	-11.02
3	113.37	30.81 QP	43.50	-12.69	2.03 V	176	43.19	-12.38
4	170.26	31.29 QP	43.50	-12.21	2.17 V	0	40.80	-9.51
5	300.00	27.44 QP	46.00	-18.56	1.66 V	261	34.76	-7.32
6	516.60	27.61 QP	46.00	-18.39	2.56 V	0	30.27	-2.66

REMARKS:

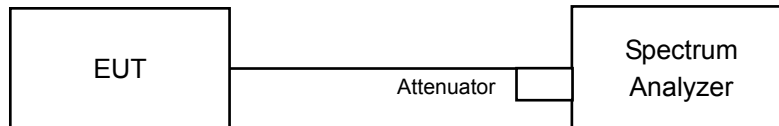
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 6dB Bandwidth Measurement

4.2.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.08	0.5	PASS
6	2437	9.08	0.5	PASS
11	2462	9.09	0.5	PASS

802.11g

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

802.11n (20MHz)

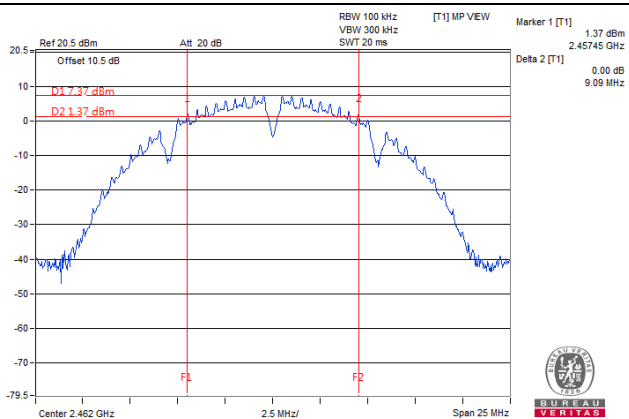
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.37	0.5	Pass
6	2437	17.37	0.5	Pass
11	2462	17.39	0.5	Pass

802.11n (40MHz)

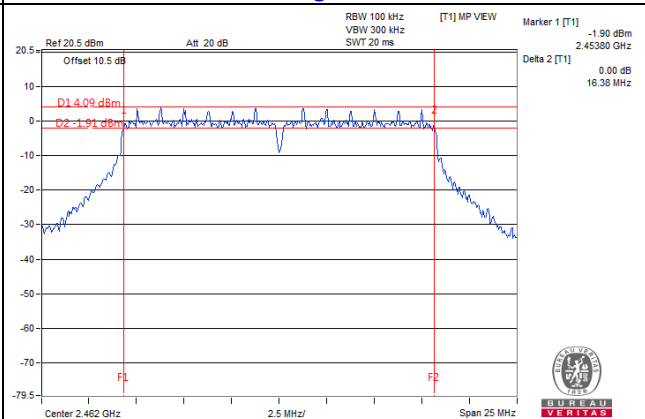
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.84	0.5	Pass
6	2437	35.83	0.5	Pass
9	2452	35.94	0.5	Pass

Spectrum Plot of Worst Value

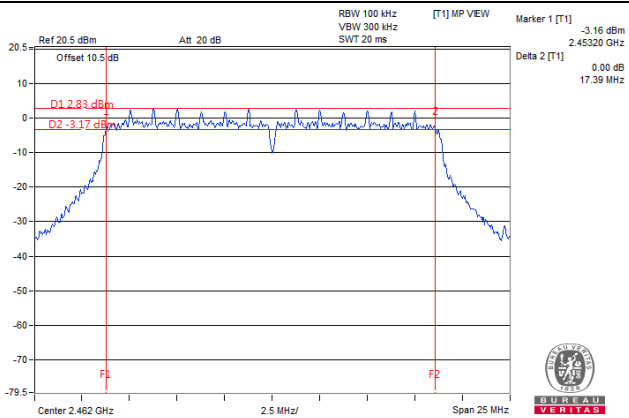
802.11b / CH11



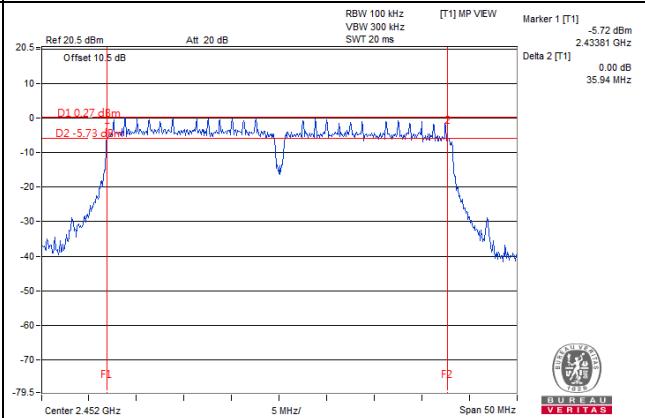
802.11g / CH11



802.11n (20MHz) / CH11



802.11n (40MHz) / CH9

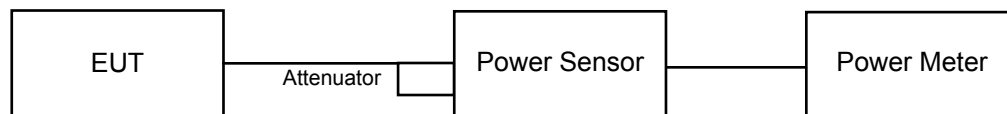


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.2.6.

4.3.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	96.605	19.85	30	Pass
6	2437	95.499	19.80	30	Pass
11	2462	95.940	19.82	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	282.488	24.51	30	Pass
6	2437	277.971	24.44	30	Pass
11	2462	279.254	24.46	30	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	184.502	22.66	30	Pass
6	2437	180.717	22.57	30	Pass
11	2462	182.810	22.62	30	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	229.087	23.60	30	Pass
6	2437	224.905	23.52	30	Pass
9	2452	225.944	23.54	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	51.880	17.15
6	2437	51.404	17.11
11	2462	51.761	17.14

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	32.434	15.11
6	2437	32.063	15.06
11	2462	32.285	15.09

802.11n (20MHz)

Chan.	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	26.182	14.18
6	2437	25.763	14.11
11	2462	26.002	14.15

802.11n (40MHz)

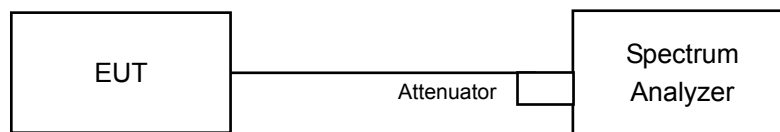
Chan.	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	25.645	14.09
6	2437	25.351	14.04
9	2452	25.527	14.07

4.4 Power Spectral Density Measurement

4.4.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

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 Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 10 \text{ kHz}$.
- 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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.2.6

4.4.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.45	8	Pass
6	2437	-9.27	8	Pass
11	2462	-9.02	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.52	8	Pass
6	2437	-12.20	8	Pass
11	2462	-11.78	8	Pass

802.11n (20MHz)

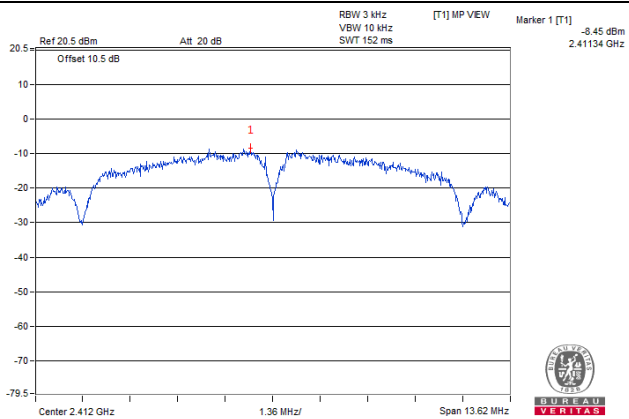
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-13.22	8	Pass
6	2437	-12.86	8	Pass
11	2462	-13.17	8	Pass

802.11n (40MHz)

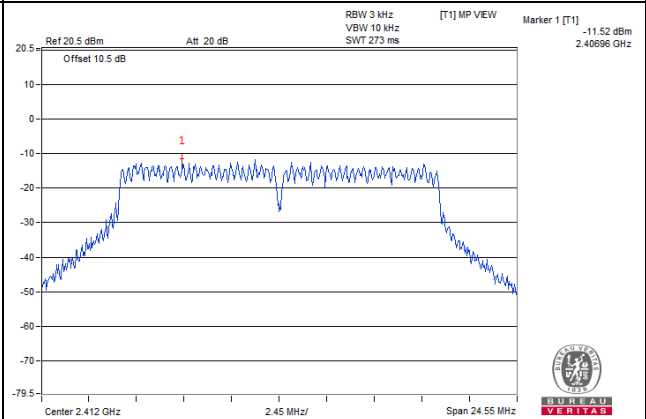
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-15.13	8	Pass
6	2437	-15.56	8	Pass
9	2452	-16.28	8	Pass

Spectrum Plot of Worst Value

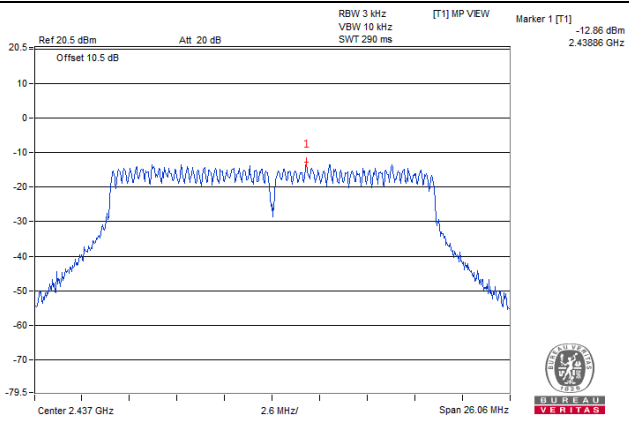
802.11b / CH1



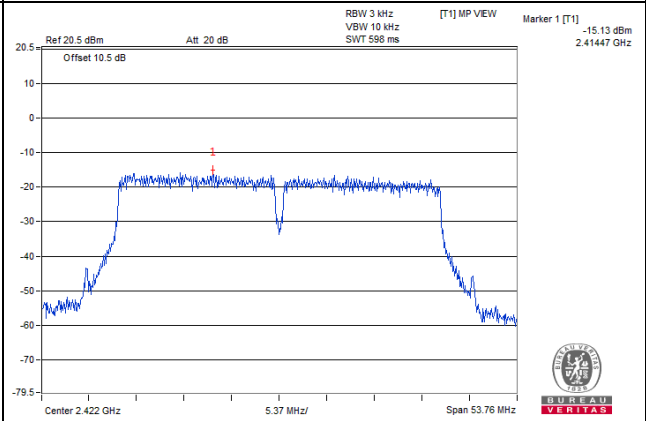
802.11g / CH1



802.11n (20MHz) / CH6



802.11n (40MHz) / CH3

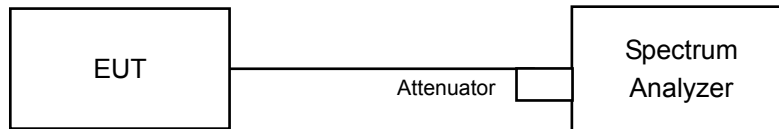


4.5 Conducted Out of Band Emission Measurement

4.5.1 Limits of Conducted Out of Band Emission Measurement

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

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

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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

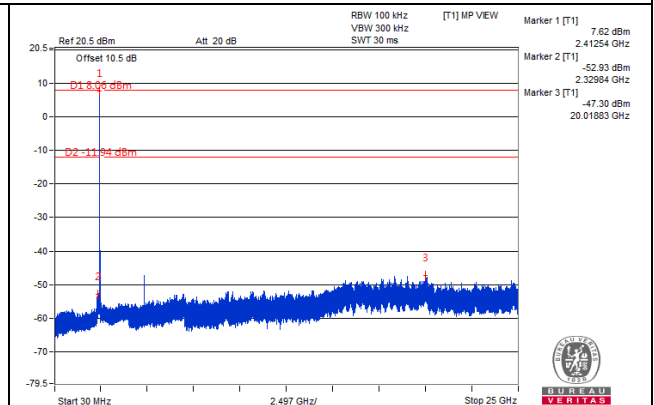
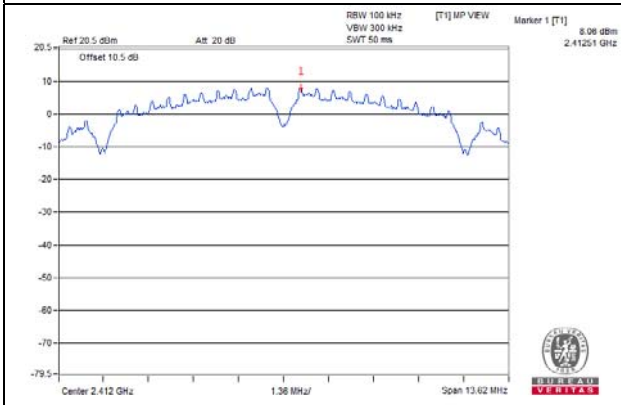
Same as Item 4.2.6

4.5.7 Test Results

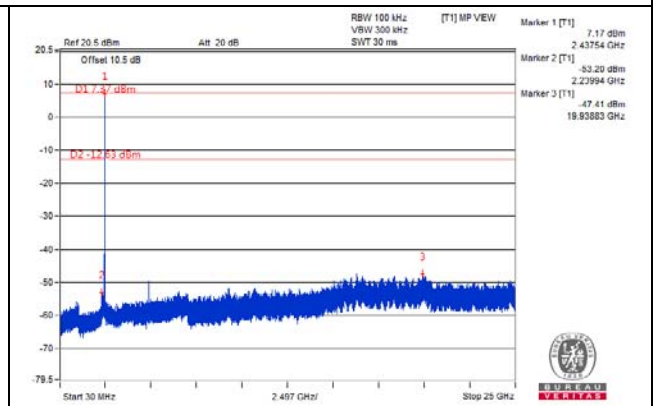
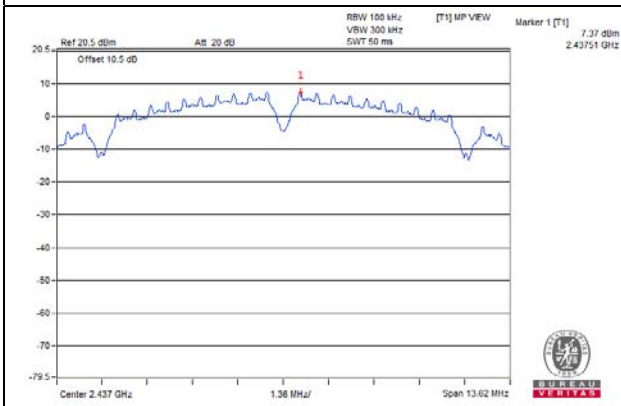
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

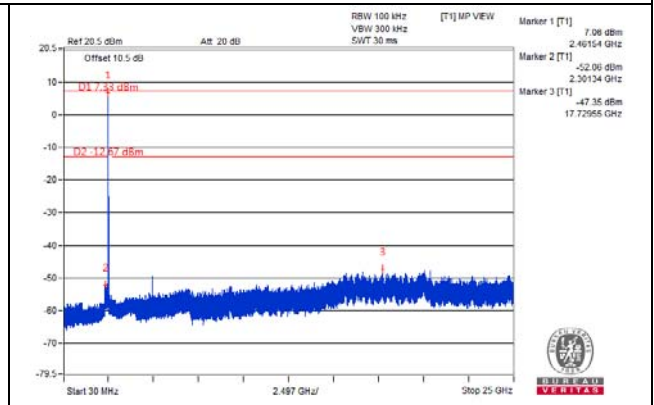
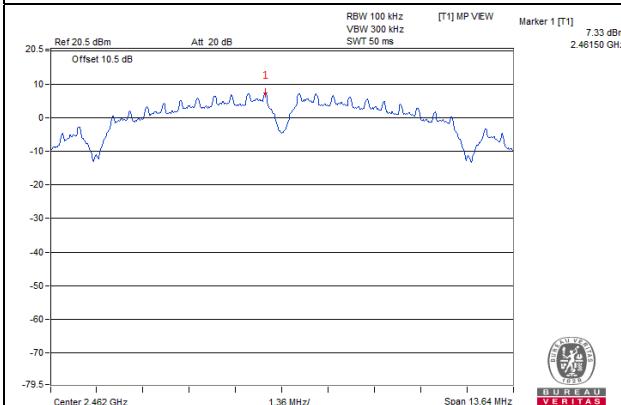
CH 1



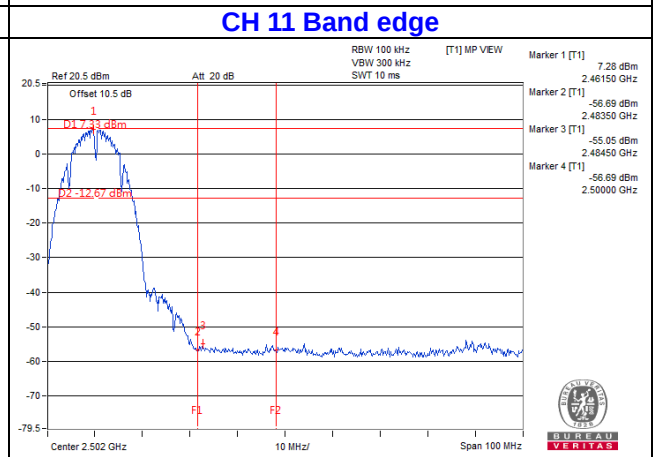
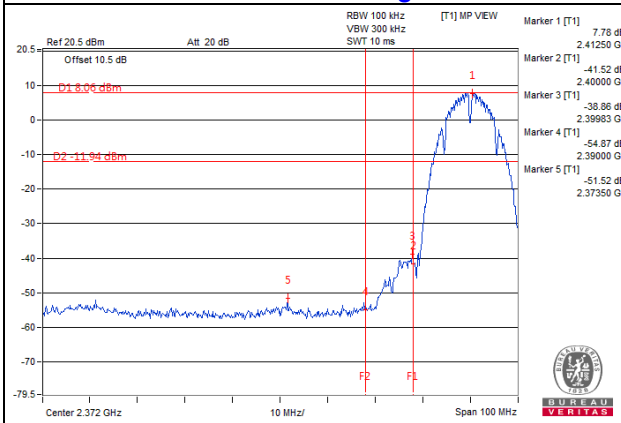
CH 6



CH 11

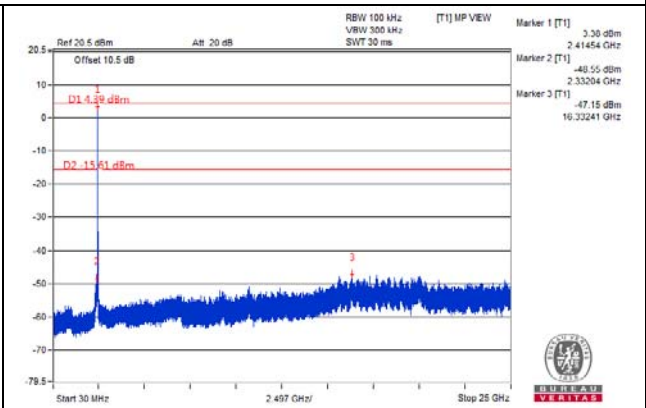
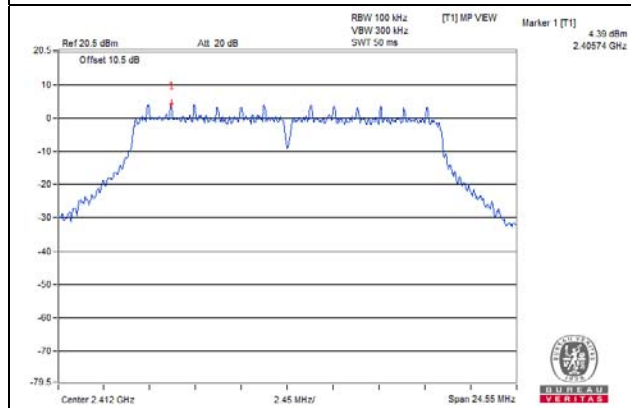


CH 1 Band edge

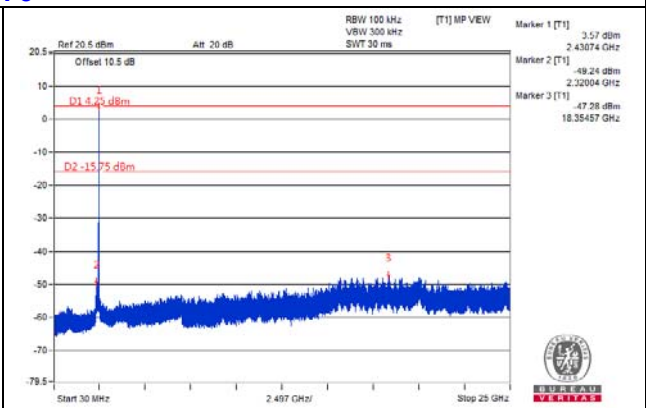
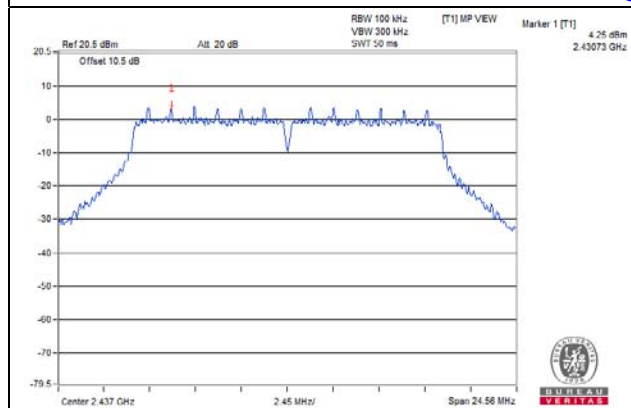


802.11g

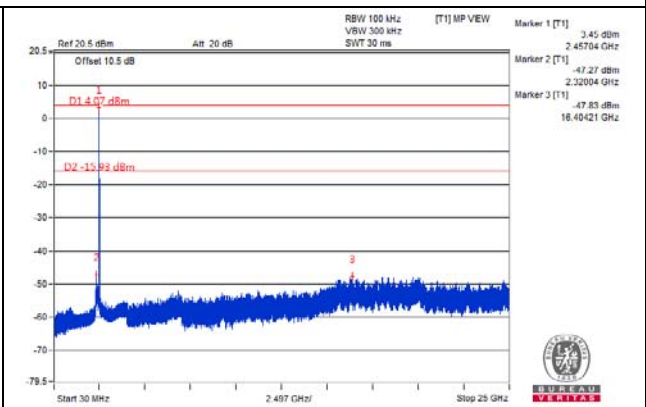
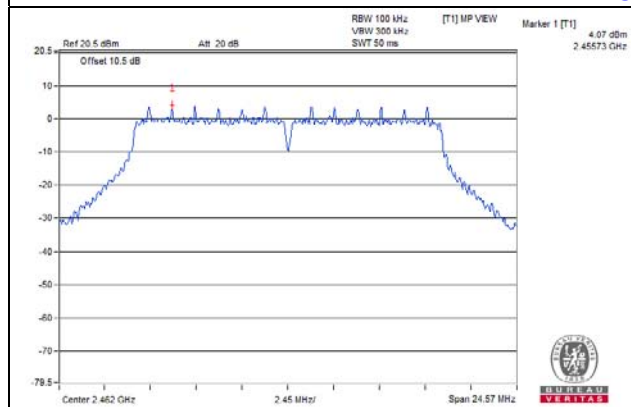
CH 1



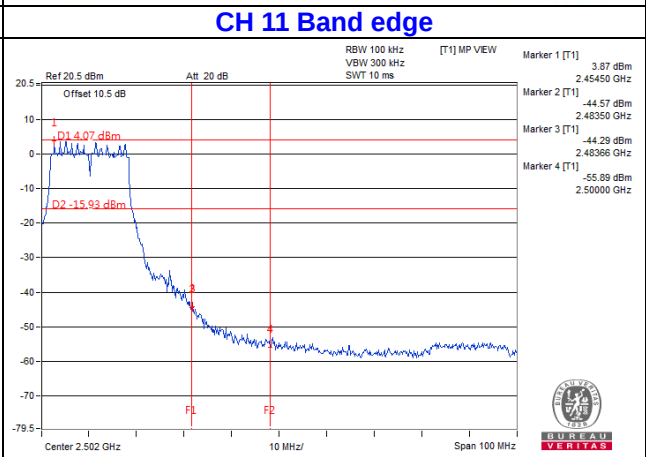
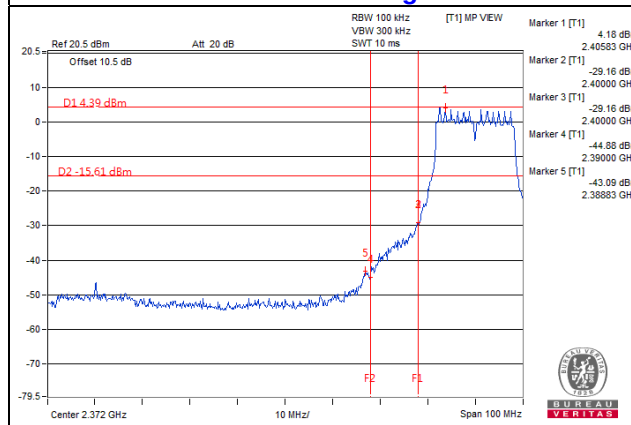
CH 6



CH 11

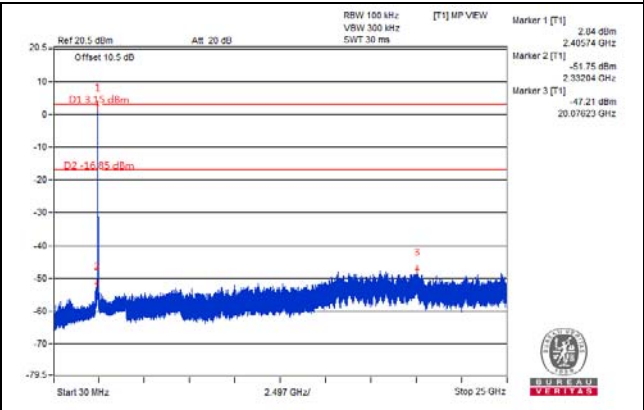
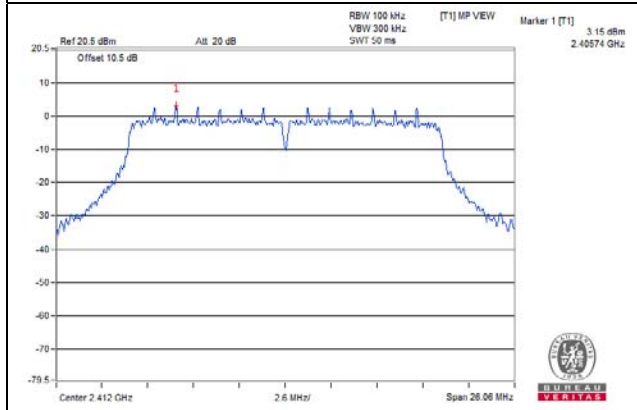


CH 1 Band edge

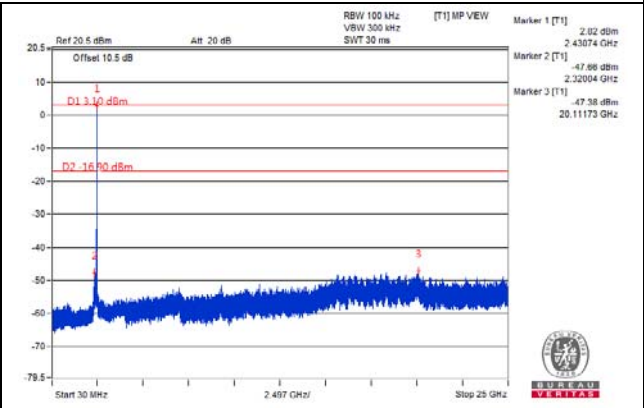
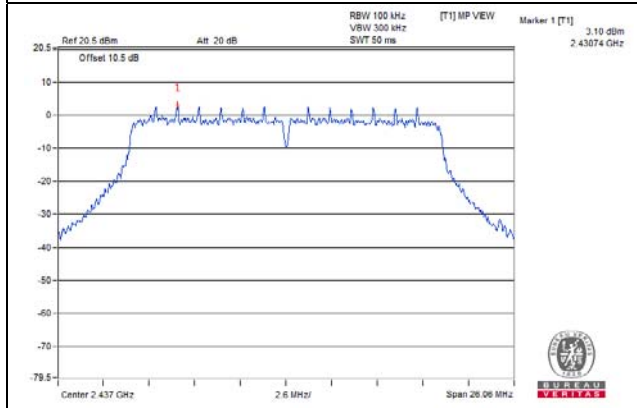


802.11n (20MHz):

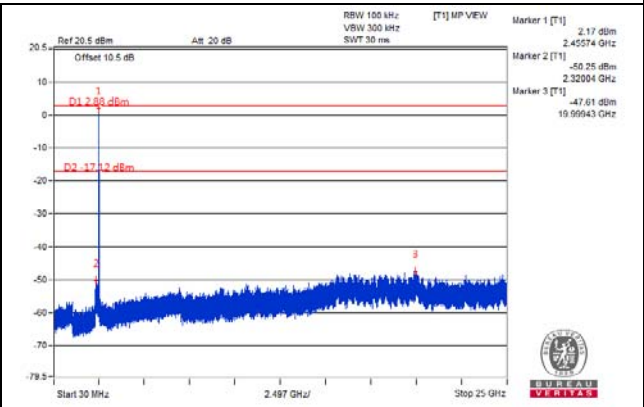
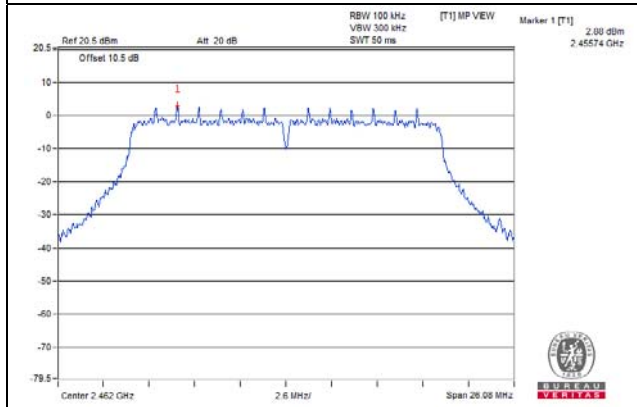
CH 1



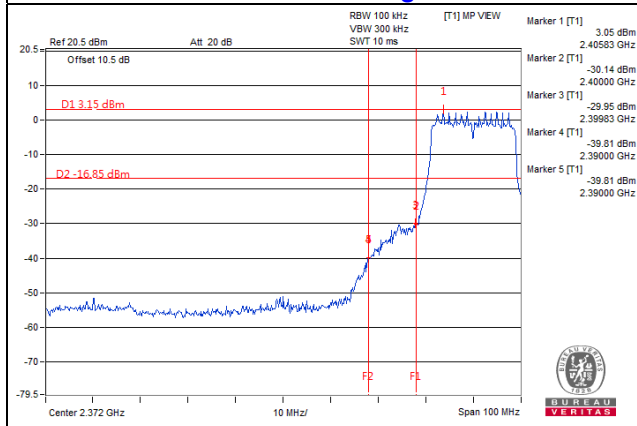
CH 6



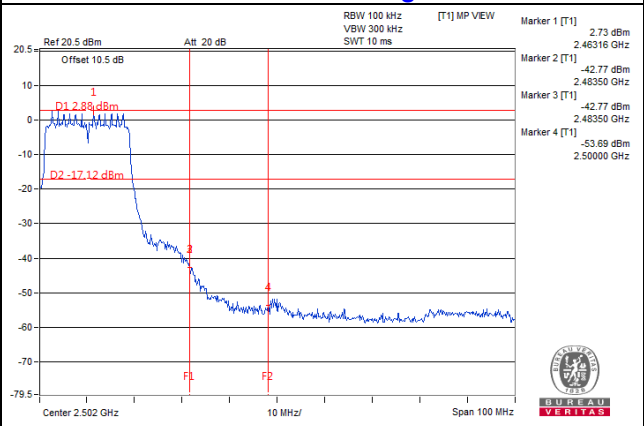
CH 11



CH 1 Band edge

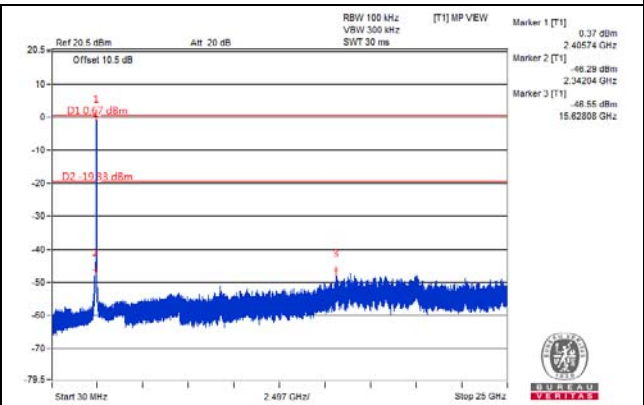
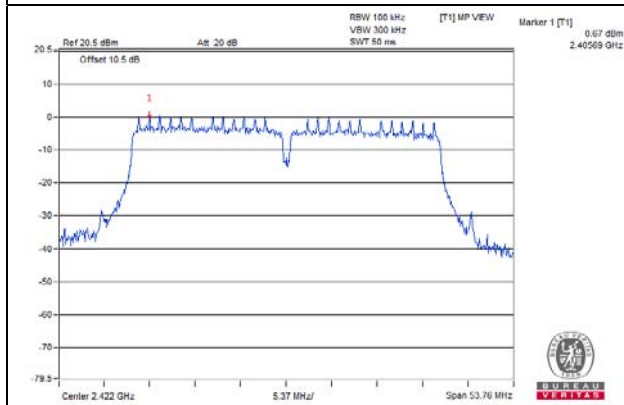


CH 11 Band edge

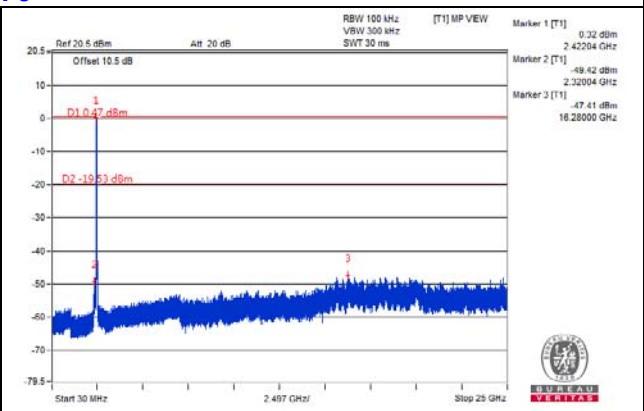
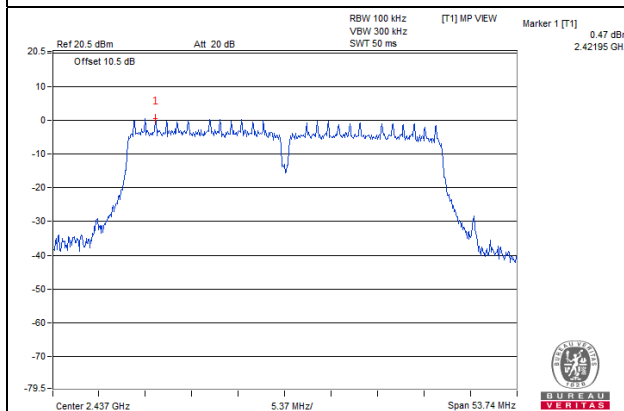


802.11n (40MHz)

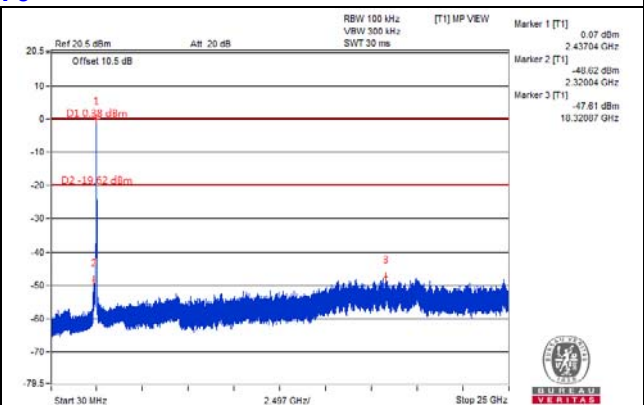
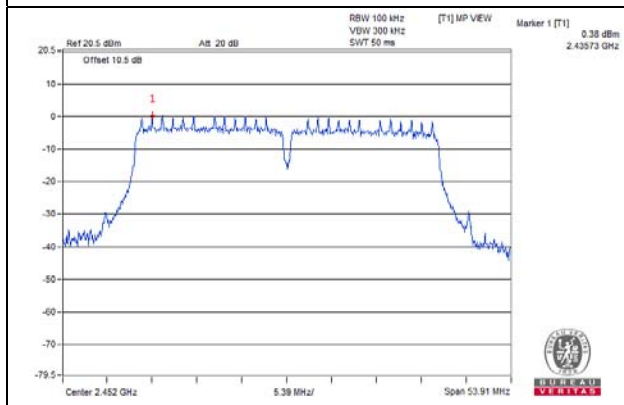
CH 3



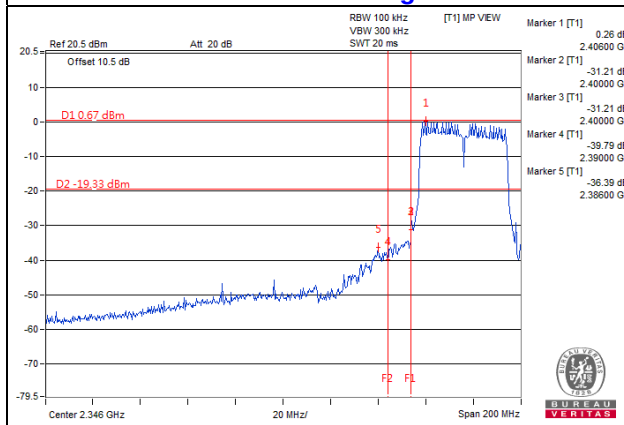
CH 6



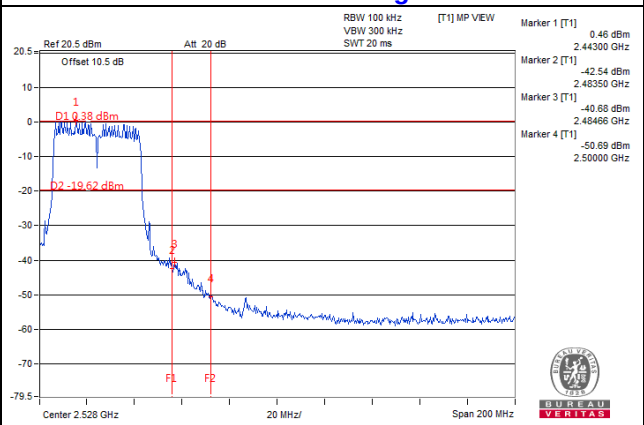
CH 9



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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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