

## FCC Test Report

**Report No.:** RF190514C12-3

**FCC ID:** 2ARXKVHE10

**Test Model:** VHE10

**Series Model:** VHE10XXX (X=A-Z, 0-9, blank or "-")

**Received Date:** May 14, 2019

**Test Date:** Jun. 13 ~ Jul. 20, 2019

**Issued Date:** Jul. 26, 2019

**Applicant:** Veea Inc

**Address:** 164 E 83rd Street, New York NY, 10028, USA

**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.)

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /  
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty.....	6
2.2 Modification Record.....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT.....	7
3.2 Description of Test Modes.....	9
3.2.1 Test Mode Applicability and Tested Channel Detail.....	10
3.3 Duty Cycle of Test Signal.....	12
3.4 Description of Support Units.....	13
3.4.1 Configuration of System under Test.....	13
3.5 General Description of Applied Standards.....	14
<b>4 Test Types and Results</b> .....	<b>15</b>
4.1 Radiated Emission and Bandedge Measurement.....	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement.....	15
4.1.2 Test Instruments.....	16
4.1.3 Test Procedures.....	17
4.1.4 Deviation from Test Standard.....	17
4.1.5 Test Setup.....	18
4.1.6 EUT Operating Conditions.....	19
4.1.7 Test Results.....	20
4.2 Conducted Emission Measurement.....	36
4.2.1 Limits of Conducted Emission Measurement.....	36
4.2.2 Test Instruments.....	36
4.2.3 Test Procedures.....	37
4.2.4 Deviation from Test Standard.....	37
4.2.5 Test Setup.....	37
4.2.6 EUT Operating Conditions.....	37
4.2.7 Test Results.....	38
4.3 6dB Bandwidth Measurement.....	42
4.3.1 Limits of 6dB Bandwidth Measurement.....	42
4.3.2 Test Setup.....	42
4.3.3 Test Instruments.....	42
4.3.4 Test Procedure.....	42
4.3.5 Deviation from Test Standard.....	42
4.3.6 EUT Operating Conditions.....	42
4.3.7 Test Result.....	43
4.4 Conducted Output Power Measurement.....	45
4.4.1 Limits of Conducted Output Power Measurement.....	45
4.4.2 Test Setup.....	45
4.4.3 Test Instruments.....	45
4.4.4 Test Procedures.....	45
4.4.5 Deviation from Test Standard.....	45
4.4.6 EUT Operating Conditions.....	45
4.4.7 Test Results.....	46
4.5 Power Spectral Density Measurement.....	47
4.5.1 Limits of Power Spectral Density Measurement.....	47
4.5.2 Test Setup.....	47
4.5.3 Test Instruments.....	47
4.5.4 Test Procedure.....	47
4.5.5 Deviation from Test Standard.....	48
4.5.6 EUT Operating Condition.....	48

4.5.7 Test Results .....	49
4.6 Conducted Out of Band Emission Measurement.....	52
4.6.1 Limits of Conducted Out of Band Emission Measurement .....	52
4.6.2 Test Setup.....	52
4.6.3 Test Instruments .....	52
4.6.4 Test Procedure .....	52
4.6.5 Deviation from Test Standard .....	52
4.6.6 EUT Operating Condition .....	52
4.6.7 Test Results .....	52
<b>5 Pictures of Test Arrangements.....</b>	<b>61</b>
<b>Appendix – Information on the Testing Laboratories .....</b>	<b>62</b>

### Release Control Record

Issue No.	Description	Date Issued
RF190514C12-3	Original release	Jul. 26, 2019

## 1 Certificate of Conformity

**Product:** veeaHub

**Brand:** 

**Test Model:** VHE10

**Series Model:** VHE10XXX (X=A-Z, 0-9, blank or "-")

**Sample Status:** Engineering sample

**Applicant:** Veea Inc

**Test Date:** Jun. 13 ~ Jul. 20, 2019

**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 RF characteristics under the conditions specified in this report.

**Prepared by :** Celine Chou , **Date:** Jul. 26, 2019  
Celine Chou / Senior Specialist

**Approved by :** Bruce Chen , **Date:** Jul. 26, 2019  
Bruce Chen / Project Engineer

## 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 -0.55dB at 0.48295MHz.
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 4824.00MHz.
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	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	veeaHub
Brand	
Test Model	VHE10
Series Model	VHE10XXX (X=A-Z, 0-9, blank or "-")
Model Difference	Marketing purposes
Sample Status	Engineering sample
Power Supply Rating	48Vdc (Adapter and POE)
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	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	503.967mW
Antenna Type	Chip antenna with 3.2dBi gain
Antenna Connector	NA
Accessory Device	Adapter
Cable Supplied	NA

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

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

- The EUT has two sale types.

Type	Description
A	Without LTE function, BT internal ant.
B	With LTE function, BT external ant.

- The following RF Modules are for the EUT.

RF Module	Band
Module 1	5180 ~ 5240MHz
Module 2	5745 ~ 5825MHz
Module 3	2412 ~ 2462MHz

4. The EUT uses following adapter and POE.

Adapter	
Brand	EDACPOWER ELEC.
Model	EA1062SGR-480
Input Power	100-240Vac, 50-60Hz, 2.5A
Output Power	48Vdc, 1.35A
Power Line	1.2m DC cable with one core

POE (Support unit)	
Model	APOE02-WM
Output Power	48Vdc

5. WLAN, zigbee and Bluetooth technology can transmit at same time.



### 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 $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from POE

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. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

#### **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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	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)
A, B	802.11g	1 to 11	6	OFDM	BPSK	6.0

#### **Power Line Conducted Emission Test:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11g	1 to 11	6	OFDM	BPSK	6.0

**Antenna Port Conducted Measurement:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

**Test Condition:**

Applicable to	Environmental Conditions	Input Power	Tested by
RE <sub>≥</sub> 1G	25 deg. C, 68% RH	120Vac, 60Hz	Willy Cheng
RE <sub>&lt;</sub> 1G	25 deg. C, 68% RH	120Vac, 60Hz 48Vdc	Willy Cheng
PLC	21 deg. C, 61% RH	120Vac, 60Hz 48Vdc	Willy Cheng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

### 3.3 Duty Cycle of Test Signal

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

802.11n (HT20): Duty cycle of test signal  $\geq 98\%$ , duty factor is not required.

802.11g, 802.11n (HT40): Duty cycle of test signal is  $< 98\%$ , duty factor is required.

802.11g: Duty cycle =  $2.060/2.145 = 0.960$ , Duty factor =  $10 * \log(1/0.960) = 0.18$

802.11n (HT20): Duty cycle =  $4.980/5.075 = 0.981$

802.11n (HT40): Duty cycle =  $2.427/2.507 = 0.968$ , Duty factor =  $10 * \log(1/0.968) = 0.14$



### 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	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	USB Flash	HP	v250W	03	NA	-
D.	USB Flash	HP	v250W	05	NA	-
E.	USB Flash	HP	v250W	09	NA	-
F.	POE	NA	APOE02-WM	NA	NA	Provided by manufacturer

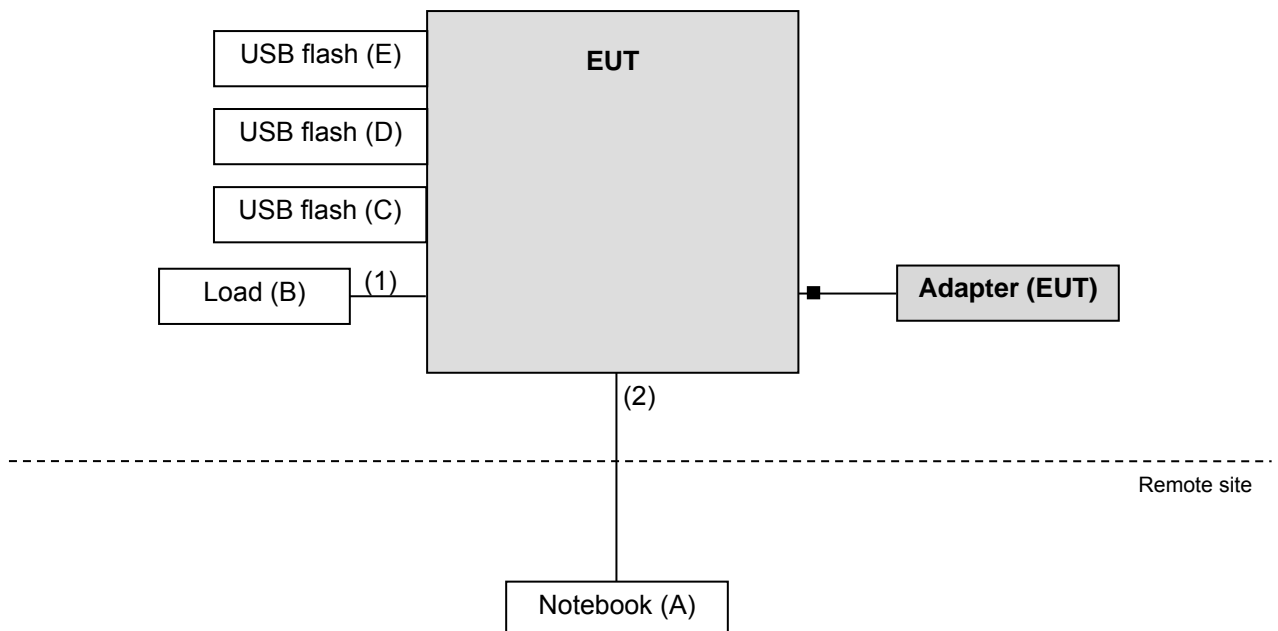
Note:

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

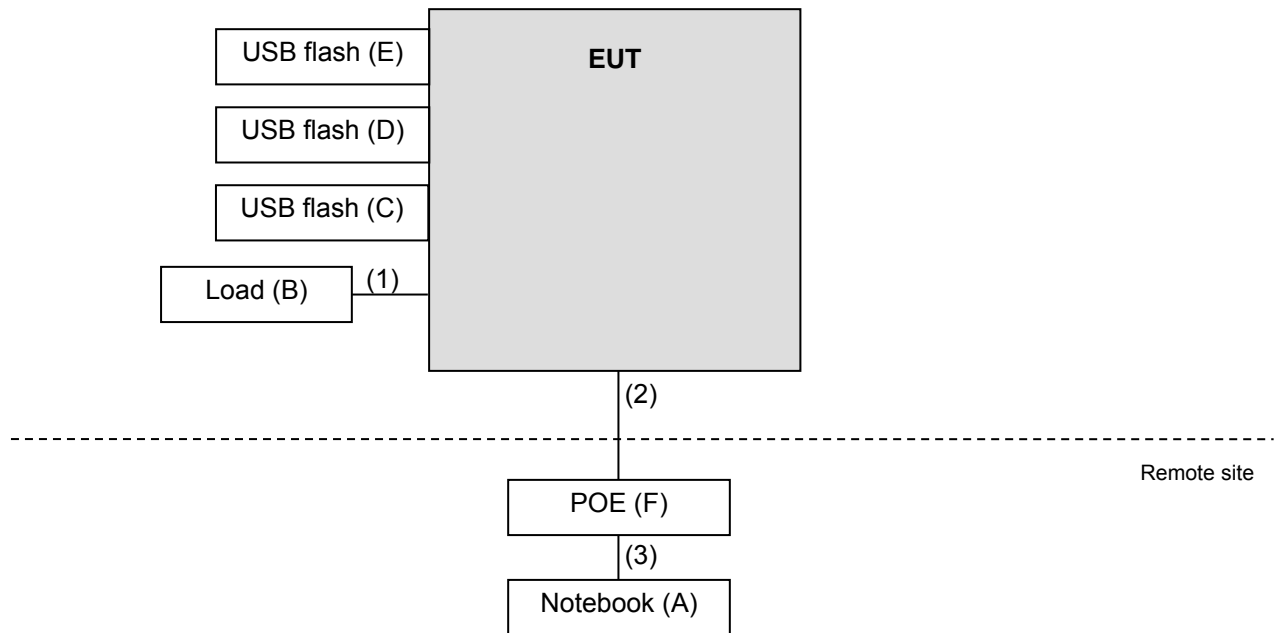
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	1.5	N	0	Cat5e
2.	RJ45 cable	1	5	N	0	Cat5e
3.	RJ45 cable	1	1.5	N	0	Cat5e

#### 3.4.1 Configuration of System under Test

Test Mode A



Test Mode B



**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 15.247 Meas Guidance v05r02**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

**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 30dB below the highest level of the desired power:

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

**Note:**

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

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 30, 2019	May 29, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 22, 2018	Nov. 21, 2019
HORN Antenna SCHWARZBECK	9120D	209	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Loop Antenna EMCI	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 27, 2019	Mar. 26, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable WOKEN	8D-FB	Cable-CH3-01	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519	Jul. 17, 2018	Jul. 16, 2019
		0004/MY55190007/MY 55210005	Jul. 15, 2019	Jul. 14, 2020

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 3.



### 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. Parallel, perpendicular, and ground-parallel orientations 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:

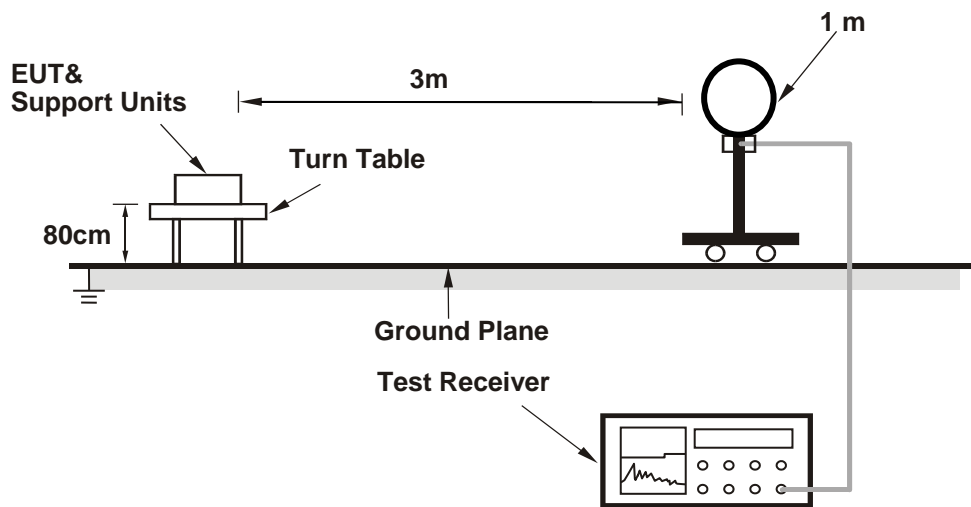
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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. (802.11b: RBW = 1MHz, VBW = 10Hz; 802.11g: RBW = 1MHz, VBW = 1kHz; 802.11n (HT20): RBW = 1MHz, VBW = 10Hz; 802.11n (HT40): RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

### 4.1.4 Deviation from Test Standard

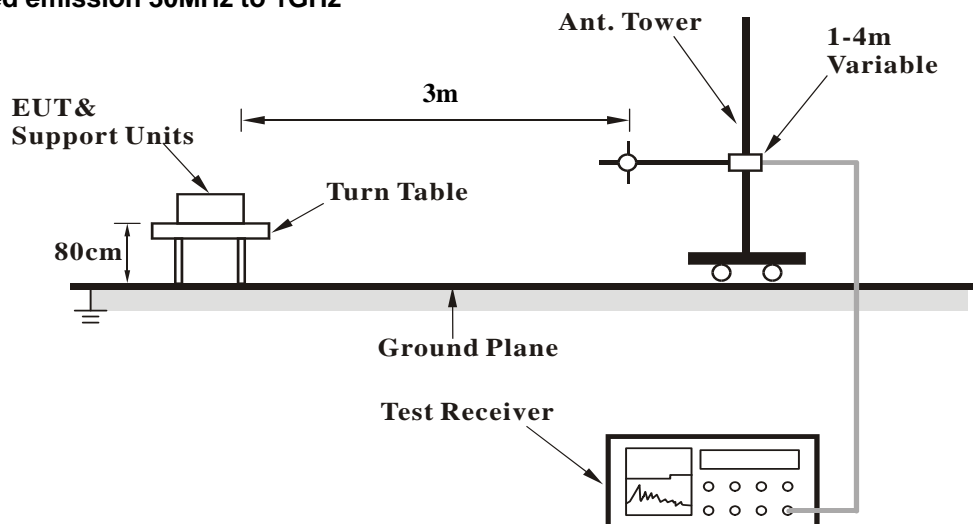
No deviation.

#### 4.1.5 Test Setup

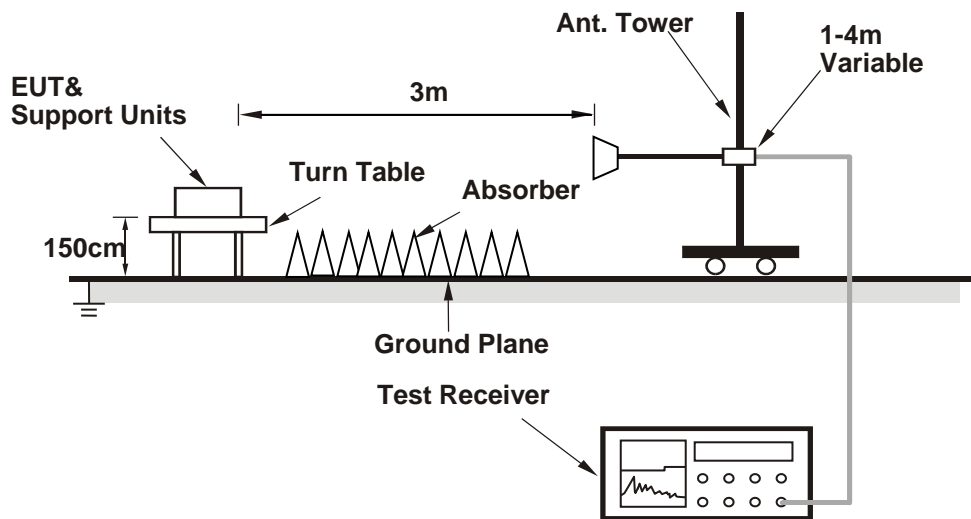
##### For Radiated emission below 30MHz



##### 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

- a. Placed the EUT on the testing table.
- b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (QRCT V3.0.264.0) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The necessary accessories enable the system in full functions.

#### 4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.2 PK	74.0	-14.8	1.73 H	68	26.3	32.9
2	2390.00	47.3 AV	54.0	-6.7	1.73 H	68	14.4	32.9
3	*2412.00	107.6 PK			1.63 H	49	74.7	32.9
4	*2412.00	105.8 AV			1.63 H	49	72.9	32.9
5	4824.00	54.7 PK	74.0	-19.3	1.74 H	53	51.0	3.7
6	4824.00	51.5 AV	54.0	-2.5	1.74 H	53	47.8	3.7
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	59.6 PK	74.0	-14.4	1.54 V	327	26.7	32.9
2	2390.00	47.2 AV	54.0	-6.8	1.54 V	327	14.3	32.9
3	*2412.00	107.2 PK			1.75 V	341	74.3	32.9
4	*2412.00	105.3 AV			1.75 V	341	72.4	32.9
5	4824.00	55.9 PK	74.0	-18.1	1.52 V	338	52.2	3.7
<b>6</b>	<b>4824.00</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.52 V</b>	<b>338</b>	<b>49.3</b>	<b>3.7</b>

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.7 PK			1.57 H	46	77.8	32.9
2	*2437.00	108.8 AV			1.57 H	46	75.9	32.9
3	4874.00	55.8 PK	74.0	-18.2	1.71 H	53	51.8	4.0
4	4874.00	52.9 AV	54.0	-1.1	1.71 H	53	48.9	4.0

**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			1.22 V	31	75.8	32.9
2	*2437.00	106.7 AV			1.22 V	31	73.8	32.9
3	4874.00	55.8 PK	74.0	-18.2	1.44 V	337	51.8	4.0
4	4874.00	52.7 AV	54.0	-1.3	1.44 V	337	48.7	4.0

**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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.1 PK			1.67 H	48	76.2	32.9
2	*2462.00	106.4 AV			1.67 H	48	73.5	32.9
3	2483.50	59.6 PK	74.0	-14.4	1.69 H	77	26.6	33.0
4	2483.50	47.5 AV	54.0	-6.5	1.69 H	77	14.5	33.0
5	4924.00	56.3 PK	74.0	-17.7	1.68 H	54	52.3	4.0
6	4924.00	52.9 AV	54.0	-1.1	1.68 H	54	48.9	4.0

**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	107.5 PK			1.17 V	32	74.6	32.9
2	*2462.00	105.0 AV			1.17 V	32	72.1	32.9
3	2483.50	59.6 PK	74.0	-14.4	1.17 V	32	26.6	33.0
4	2483.50	47.5 AV	54.0	-6.5	1.17 V	32	14.5	33.0
5	4924.00	56.2 PK	74.0	-17.8	1.51 V	339	52.2	4.0
6	4924.00	52.7 AV	54.0	-1.3	1.51 V	339	48.7	4.0

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.4 PK	74.0	-9.6	2.69 H	40	31.5	32.9
2	2390.00	52.1 AV	54.0	-1.9	2.69 H	40	19.2	32.9
3	*2412.00	114.1 PK			2.22 H	40	81.2	32.9
4	*2412.00	103.3 AV			2.22 H	40	70.4	32.9
5	4824.00	56.5 PK	74.0	-17.5	1.95 H	291	52.8	3.7
6	4824.00	43.4 AV	54.0	-10.6	1.95 H	291	39.7	3.7

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	63.5 PK	74.0	-10.5	1.18 V	317	30.6	32.9
2	2390.00	52.4 AV	54.0	-1.6	1.18 V	317	19.5	32.9
3	*2412.00	114.3 PK			2.30 V	18	81.4	32.9
4	*2412.00	103.2 AV			2.30 V	18	70.3	32.9
5	4824.00	56.5 PK	74.0	-17.5	2.17 V	291	52.8	3.7
6	4824.00	43.1 AV	54.0	-10.9	2.17 V	291	39.4	3.7

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	116.8 PK			2.47 H	36	83.9	32.9
2	*2437.00	106.4 AV			2.47 H	36	73.5	32.9
3	4874.00	63.0 PK	74.0	-11.0	1.71 H	22	59.0	4.0
4	4874.00	50.0 AV	54.0	-4.0	1.71 H	22	46.0	4.0
5	12185.00	66.2 PK	74.0	-7.8	2.46 H	32	50.3	15.9
6	12185.00	50.9 AV	54.0	-3.1	2.46 H	32	35.0	15.9

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	115.4 PK			1.58 V	351	82.5	32.9
2	*2437.00	104.8 AV			1.58 V	351	71.9	32.9
3	4874.00	61.6 PK	74.0	-12.4	3.97 V	351	57.6	4.0
4	4874.00	48.7 AV	54.0	-5.3	3.97 V	351	44.7	4.0
5	12185.00	67.2 PK	74.0	-6.8	3.47 V	344	51.3	15.9
6	12185.00	52.3 AV	54.0	-1.7	3.47 V	344	36.4	15.9

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.



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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.6 PK			2.11 H	44	80.7	32.9
2	*2462.00	102.2 AV			2.11 H	44	69.3	32.9
3	2483.50	63.2 PK	74.0	-10.8	2.61 H	50	30.2	33.0
4	2483.50	50.5 AV	54.0	-3.5	2.61 H	50	17.5	33.0
5	4924.00	57.3 PK	74.0	-16.7	2.18 H	55	53.3	4.0
6	4924.00	44.5 AV	54.0	-9.5	2.18 H	55	40.5	4.0

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.1 PK			1.65 V	351	80.2	32.9
2	*2462.00	102.4 AV			1.65 V	351	69.5	32.9
3	2483.50	65.6 PK	74.0	-8.4	1.76 V	323	32.6	33.0
4	2483.50	52.5 AV	54.0	-1.5	1.76 V	323	19.5	33.0
5	4924.00	59.0 PK	74.0	-15.0	1.62 V	352	55.0	4.0
6	4924.00	46.0 AV	54.0	-8.0	1.62 V	352	42.0	4.0

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.3 PK	74.0	-12.7	2.61 H	293	28.4	32.9
2	2390.00	49.2 AV	54.0	-4.8	2.61 H	293	16.3	32.9
3	*2412.00	111.8 PK			1.97 H	47	78.9	32.9
4	*2412.00	101.2 AV			1.97 H	47	68.3	32.9
5	4824.00	56.6 PK	74.0	-17.4	1.97 H	290	52.9	3.7
6	4824.00	42.5 AV	54.0	-11.5	1.97 H	290	38.8	3.7

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	66.1 PK	74.0	-7.9	2.11 V	21	33.2	32.9
2	2390.00	52.3 AV	54.0	-1.7	2.11 V	21	19.4	32.9
3	*2412.00	112.9 PK			2.27 V	21	80.0	32.9
4	*2412.00	102.5 AV			2.27 V	21	69.6	32.9
5	4824.00	59.7 PK	74.0	-14.3	2.03 V	37	56.0	3.7
6	4824.00	44.4 AV	54.0	-9.6	2.03 V	37	40.7	3.7

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	116.5 PK			2.95 H	42	83.6	32.9
2	*2437.00	105.2 AV			2.95 H	42	72.3	32.9
3	4874.00	61.2 PK	74.0	-12.8	2.38 H	282	57.2	4.0
4	4874.00	45.6 AV	54.0	-8.4	2.13 H	282	41.6	4.0
5	12185.00	69.5 PK	74.0	-4.5	2.17 H	12	53.6	15.9
6	12185.00	51.6 AV	54.0	-2.4	2.17 H	12	35.7	15.9

**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	116.0 PK			1.61 V	345	83.1	32.9
2	*2437.00	105.1 AV			1.61 V	345	72.2	32.9
3	4874.00	63.2 PK	74.0	-10.8	3.92 V	352	59.2	4.0
4	4874.00	50.3 AV	54.0	-3.7	3.92 V	352	46.3	4.0
5	12185.00	69.4 PK	74.0	-4.6	3.59 V	343	53.5	15.9
6	12185.00	52.9 AV	54.0	-1.1	3.59 V	343	37.0	15.9

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.4 PK			2.25 H	297	75.5	32.9
2	*2462.00	97.5 AV			2.25 H	297	64.6	32.9
3	2483.50	60.7 PK	74.0	-13.3	2.21 H	286	27.7	33.0
4	2483.50	48.5 AV	54.0	-5.5	2.21 H	286	15.5	33.0
5	4924.00	57.2 PK	74.0	-16.8	1.91 H	29	53.2	4.0
6	4924.00	41.7 AV	54.0	-12.3	1.91 H	29	37.7	4.0

**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	111.2 PK			1.70 V	350	78.3	32.9
2	*2462.00	100.2 AV			1.70 V	350	67.3	32.9
3	2483.50	66.3 PK	74.0	-7.7	1.98 V	314	33.3	33.0
4	2483.50	52.5 AV	54.0	-1.5	1.98 V	314	19.5	33.0
5	4924.00	57.5 PK	74.0	-16.5	1.54 V	343	53.5	4.0
6	4924.00	42.3 AV	54.0	-11.7	1.54 V	343	38.3	4.0

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.1 PK	74.0	-10.9	2.17 H	33	30.2	32.9
2	2390.00	51.1 AV	54.0	-2.9	2.17 H	33	18.2	32.9
3	*2422.00	109.6 PK			2.46 H	41	76.8	32.8
4	*2422.00	99.0 AV			2.46 H	41	66.2	32.8
5	4844.00	53.5 PK	74.0	-20.5	1.91 H	19	49.6	3.9
6	4844.00	39.8 AV	54.0	-14.2	1.91 H	19	35.9	3.9

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	66.4 PK	74.0	-7.6	1.39 V	325	33.5	32.9
2	2390.00	52.5 AV	54.0	-1.5	1.39 V	325	19.6	32.9
3	*2422.00	109.1 PK			1.66 V	347	76.3	32.8
4	*2422.00	99.0 AV			1.66 V	347	66.2	32.8
5	4844.00	51.9 PK	74.0	-22.1	1.93 V	12	48.0	3.9
6	4844.00	39.4 AV	54.0	-14.6	1.93 V	12	35.5	3.9

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	2.43 H	71	26.5	32.9
2	2390.00	47.9 AV	54.0	-6.1	2.43 H	71	15.0	32.9
3	*2437.00	110.3 PK			2.67 H	45	77.4	32.9
4	*2437.00	100.3 AV			2.67 H	45	67.4	32.9
5	2483.50	64.4 PK	74.0	-9.6	3.07 H	48	31.4	33.0
6	2483.50	50.5 AV	54.0	-3.5	3.07 H	48	17.5	33.0
7	4874.00	53.8 PK	74.0	-20.2	1.56 H	51	49.8	4.0
8	4874.00	40.2 AV	54.0	-13.8	1.56 H	51	36.2	4.0

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.3 PK	74.0	-13.7	1.75 V	19	27.4	32.9
2	2390.00	48.9 AV	54.0	-5.1	1.75 V	19	16.0	32.9
3	*2437.00	110.0 PK			1.61 V	345	77.1	32.9
4	*2437.00	100.2 AV			1.61 V	345	67.3	32.9
5	2483.50	65.8 PK	74.0	-8.2	1.81 V	344	32.8	33.0
6	2483.50	52.3 AV	54.0	-1.7	1.81 V	344	19.3	33.0
7	4874.00	54.6 PK	74.0	-19.4	1.55 V	344	50.6	4.0
8	4874.00	41.7 AV	54.0	-12.3	1.55 V	344	37.7	4.0

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	107.9 PK			1.96 H	45	75.0	32.9
2	*2452.00	97.6 AV			1.96 H	45	64.7	32.9
3	2483.50	60.9 PK	74.0	-13.1	2.53 H	50	27.9	33.0
4	2483.50	48.8 AV	54.0	-5.2	2.53 H	50	15.8	33.0
5	4904.00	52.7 PK	74.0	-21.3	1.61 H	57	48.7	4.0
6	4904.00	39.2 AV	54.0	-14.8	1.61 H	57	35.2	4.0

**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	107.3 PK			2.07 V	21	74.4	32.9
2	*2452.00	97.1 AV			2.07 V	21	64.2	32.9
3	2483.50	65.9 PK	74.0	-8.1	2.27 V	314	32.9	33.0
4	2483.50	52.7 AV	54.0	-1.3	2.27 V	314	19.7	33.0
5	4904.00	50.8 PK	74.0	-23.2	1.82 V	312	46.8	4.0
6	4904.00	38.1 AV	54.0	-15.9	1.82 V	312	34.1	4.0

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. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

Below 1GHz worst-case data:

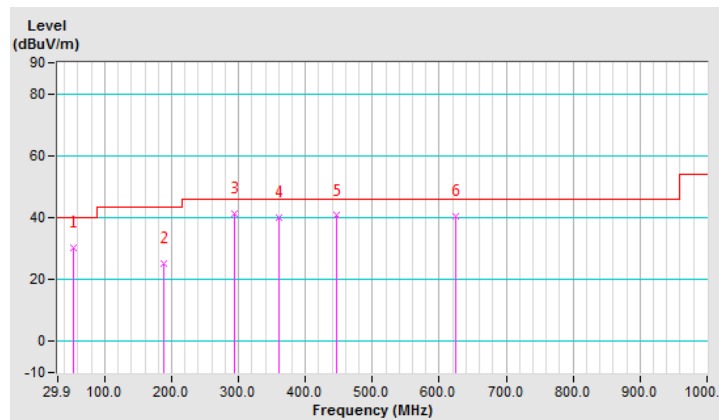
802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	53.23	30.3 QP	40.0	-9.7	1.99 H	87	40.1	-9.8
2	187.39	25.1 QP	43.5	-18.4	1.50 H	270	36.0	-10.9
3	294.32	41.2 QP	46.0	-4.8	1.50 H	16	48.8	-7.6
4	360.43	40.2 QP	46.0	-5.8	1.99 H	19	46.6	-6.4
5	445.98	40.6 QP	46.0	-5.4	1.99 H	5	45.0	-4.4
6	624.85	40.3 QP	46.0	-5.7	1.00 H	25	41.0	-0.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



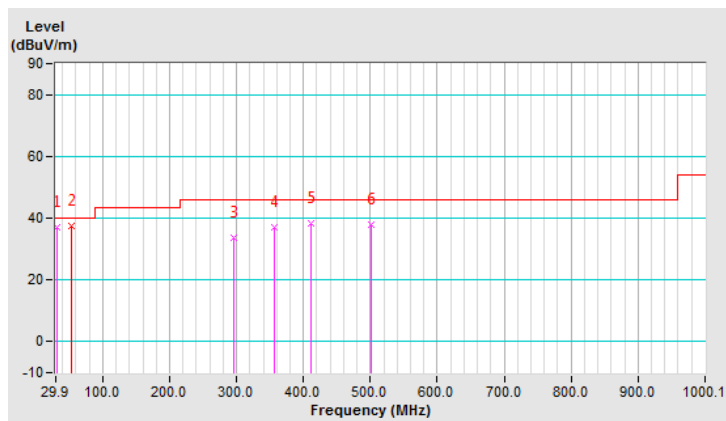


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	A		

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	31.84	37.1 QP	40.0	-2.9	1.00 V	276	48.6	-11.5
2	53.86	37.3 QP	40.0	-2.7	1.00 V	9	47.2	-9.9
3	296.27	33.7 QP	46.0	-12.3	1.99 V	4	41.3	-7.6
4	356.54	37.2 QP	46.0	-8.8	1.99 V	75	43.7	-6.5
5	410.98	38.3 QP	46.0	-7.7	1.00 V	81	43.7	-5.4
6	500.42	37.9 QP	46.0	-8.1	1.00 V	334	41.5	-3.6

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

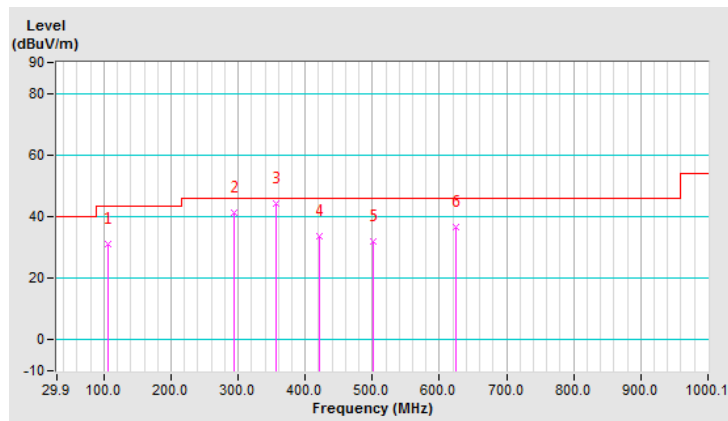


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	105.73	31.0 QP	43.5	-12.5	1.50 H	114	43.9	-12.9
2	294.32	41.3 QP	46.0	-4.7	1.00 H	350	48.9	-7.6
3	356.54	44.1 QP	46.0	-1.9	1.50 H	13	50.6	-6.5
4	420.70	33.8 QP	46.0	-12.2	1.00 H	10	38.7	-4.9
5	500.42	32.0 QP	46.0	-14.0	2.00 H	10	35.6	-3.6
6	624.85	36.4 QP	46.0	-9.6	1.00 H	10	37.1	-0.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

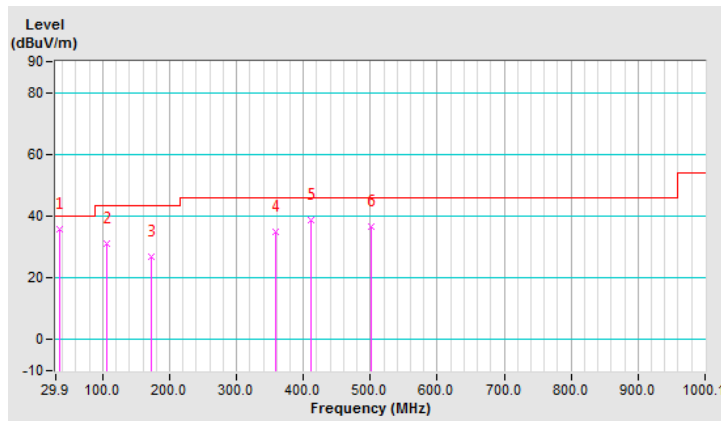


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.73	35.8 QP	40.0	-4.2	1.50 V	213	46.9	-11.1
2	105.73	31.1 QP	43.5	-12.4	1.00 V	119	44.0	-12.9
3	171.83	26.9 QP	43.5	-16.6	1.00 V	61	36.4	-9.5
4	358.48	35.0 QP	46.0	-11.0	2.00 V	153	41.4	-6.4
5	410.98	38.6 QP	46.0	-7.4	1.50 V	357	44.0	-5.4
6	500.42	36.4 QP	46.0	-9.6	1.00 V	336	40.0	-3.6

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 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
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 1.  
 3. The VCCI Site Registration No. is C-12040.

#### 4.2.3 Test Procedures

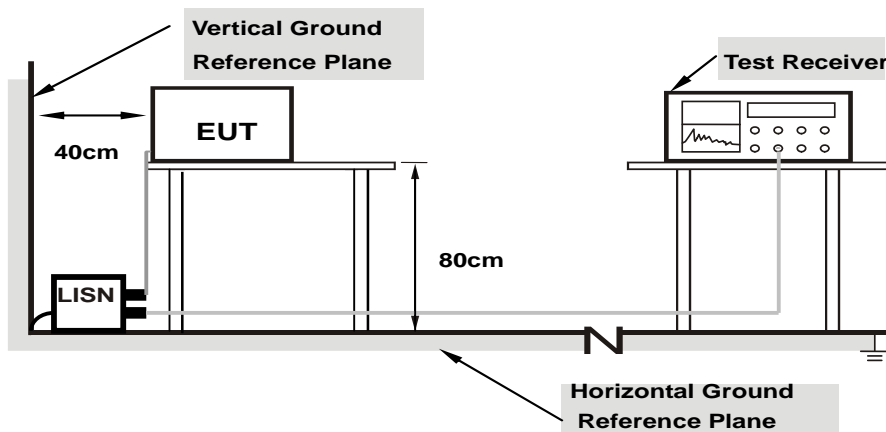
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: 1.Support units were connected to second LISN.

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

#### 4.2.7 Test Results

Worst-case data:

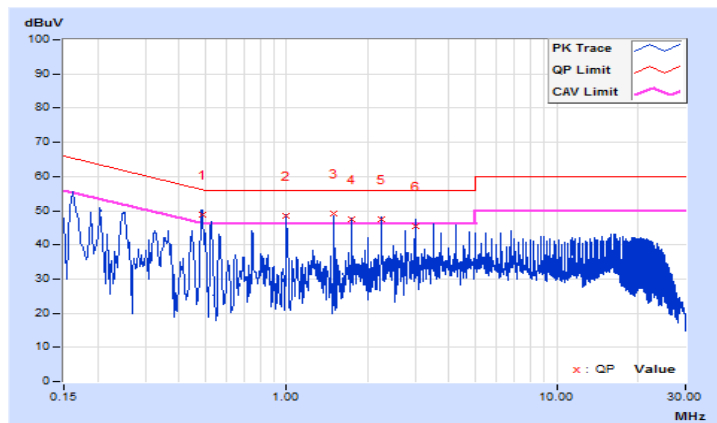
802.11g

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.48678	9.89	38.93	35.52	48.82	45.41	56.22	46.22	-7.40	-0.81
2	0.99847	9.92	38.70	35.06	48.62	44.98	56.00	46.00	-7.38	-1.02
3	1.49954	9.93	39.08	35.32	49.01	45.25	56.00	46.00	-6.99	-0.75
4	1.74919	9.94	37.50	35.28	47.44	45.22	56.00	46.00	-8.56	-0.78
5	2.24967	9.96	37.66	34.97	47.62	44.93	56.00	46.00	-8.38	-1.07
6	2.99648	9.98	35.63	34.97	45.61	44.95	56.00	46.00	-10.39	-1.05

Remarks:

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

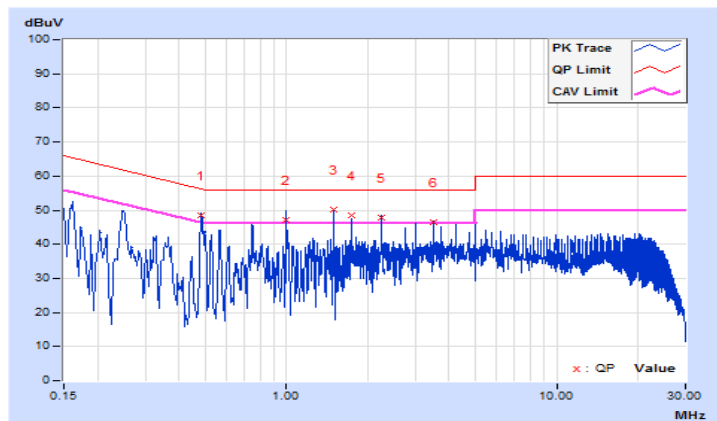


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.48295	9.87	38.72	35.63	48.59	45.50	56.29
2	1.00202	9.88	37.26	35.19	47.14	45.07	56.00	46.00	-8.86	-0.93
3	1.49895	9.90	40.23	35.48	50.13	45.38	56.00	46.00	-5.87	-0.62
4	1.74919	9.92	38.69	35.21	48.61	45.13	56.00	46.00	-7.39	-0.87
5	2.25001	9.94	37.91	34.91	47.85	44.85	56.00	46.00	-8.15	-1.15
6	3.49696	9.98	36.63	35.03	46.61	45.01	56.00	46.00	-9.39	-0.99

Remarks:

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

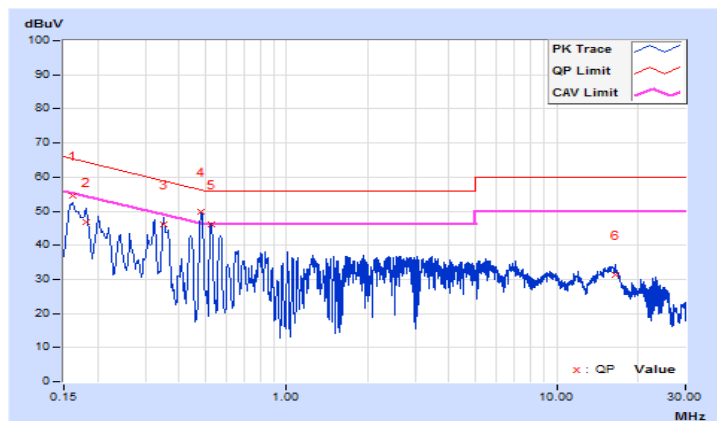


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.16096	9.84	44.58	33.46	54.42	43.30	65.41
2	0.18122	9.85	36.92	27.11	46.77	36.96	64.43	54.43	-17.66	-17.47
3	0.35018	9.87	36.20	27.53	46.07	37.40	58.96	48.96	-12.89	-11.56
<b>4</b>	<b>0.48295</b>	<b>9.89</b>	<b>39.88</b>	<b>35.85</b>	<b>49.77</b>	<b>45.74</b>	<b>56.29</b>	<b>46.29</b>	<b>-6.52</b>	<b>-0.55</b>
5	0.52544	9.89	36.37	35.45	46.26	45.34	56.00	46.00	-9.74	-0.66
6	16.48207	10.22	21.15	13.67	31.37	23.89	60.00	50.00	-28.63	-26.11

Remarks:

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



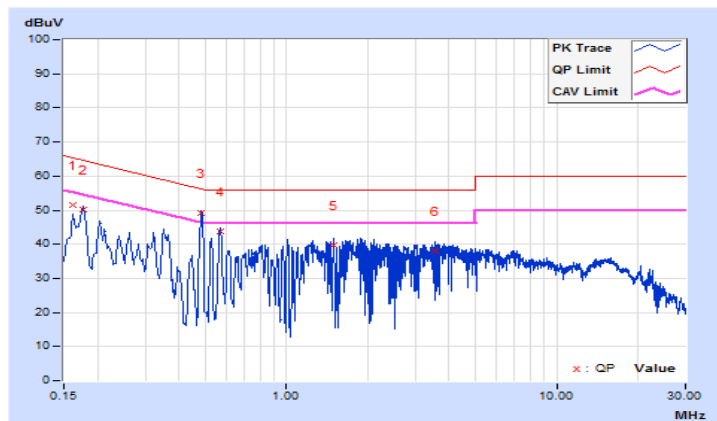


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.16181	9.82	41.70	33.29	51.52	43.11	65.37
2	0.17744	9.83	40.36	34.29	50.19	44.12	64.60	54.60	-14.41	-10.48
3	0.48295	9.87	39.18	35.77	49.05	45.64	56.29	46.29	-7.24	-0.65
4	0.56866	9.87	33.76	32.58	43.63	42.45	56.00	46.00	-12.37	-3.55
5	1.50286	9.91	29.73	20.83	39.64	30.74	56.00	46.00	-16.36	-15.26
6	3.52824	9.98	28.14	16.62	38.12	26.60	56.00	46.00	-17.88	-19.40

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.

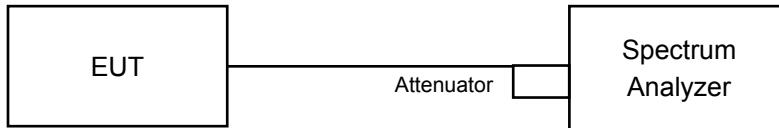


### 4.3 6dB Bandwidth Measurement

#### 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	9.06	8.12	0.5	Pass
6	2437	9.13	7.13	0.5	Pass
11	2462	8.14	7.13	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.95	15.80	0.5	Pass
6	2437	15.77	15.40	0.5	Pass
11	2462	16.36	15.81	0.5	Pass

##### 802.11n (HT20)

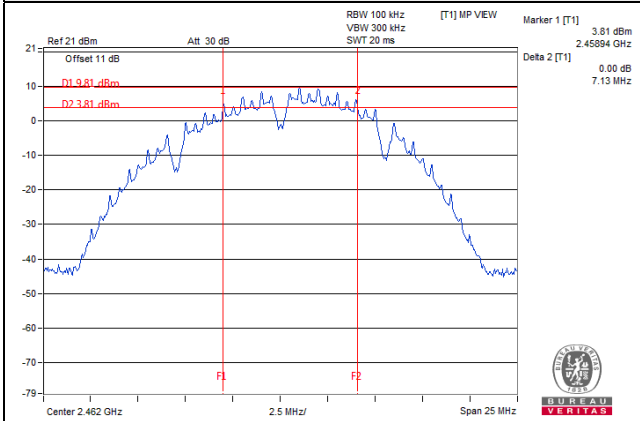
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.42	15.49	0.5	Pass
6	2437	16.03	16.25	0.5	Pass
11	2462	17.22	16.34	0.5	Pass

##### 802.11n (HT40)

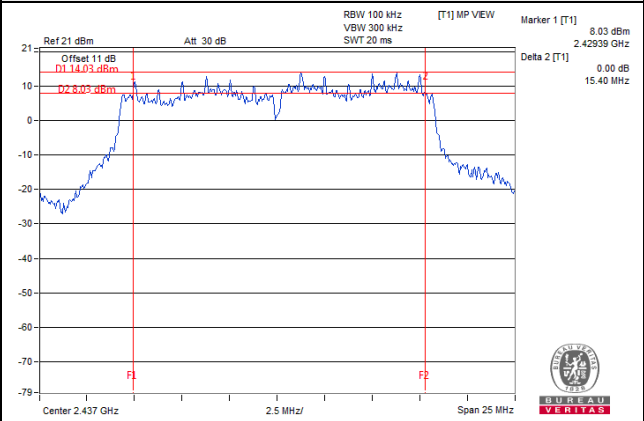
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.32	35.32	0.5	Pass
6	2437	35.24	32.80	0.5	Pass
9	2452	35.27	32.78	0.5	Pass

### Spectrum Plot of Worst Value

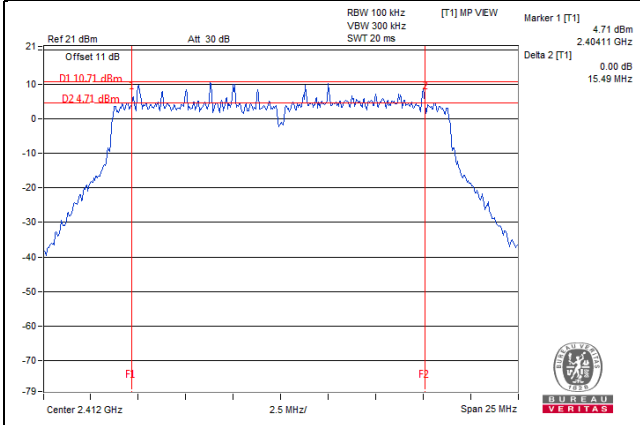
#### 802.11b



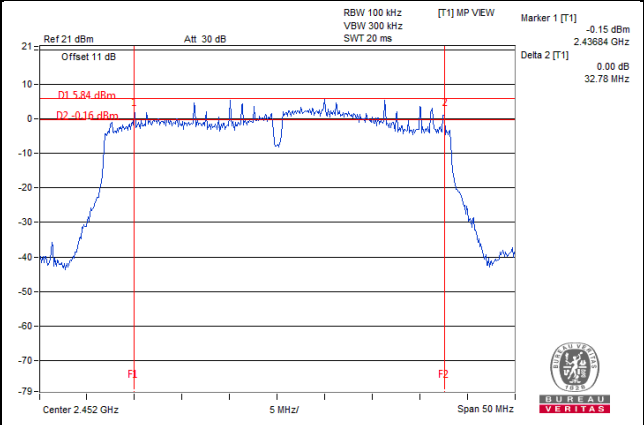
#### 802.11g



#### 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,

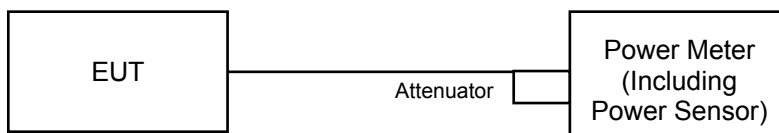
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  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

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

### 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

##### 802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.33	16.71	132.585	21.22	30.00	Pass
6	2437	20.20	17.66	163.058	22.12	30.00	Pass
11	2462	19.24	16.45	128.103	21.08	30.00	Pass

##### 802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.87	19.61	245.226	23.90	30.00	Pass
6	2437	25.05	22.65	<b>503.967</b>	27.02	30.00	Pass
11	2462	21.45	19.44	227.539	23.57	30.00	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.87	18.71	228.117	23.58	30.00	Pass
6	2437	24.31	22.37	442.358	26.46	30.00	Pass
11	2462	19.98	18.02	162.928	22.12	30.00	Pass

##### 802.11n (HT40)

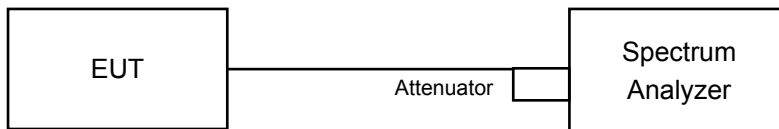
Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.73	18.31	186.068	22.70	30.00	Pass
6	2437	21.84	19.13	234.603	23.70	30.00	Pass
9	2452	20.06	17.19	153.751	21.87	30.00	Pass

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm per 3kHz.

### 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

For Average Power (Duty cycle  $\geq 98\%$ )

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set VBW  $\geq 3 \times \text{RBW}$ .
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$ .
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For Average Power (Duty cycle  $< 98\%$ )

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set VBW  $\geq 3 \times \text{RBW}$ .
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$ .
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add  $10 \log (1/x)$ , where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

#### **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	Frequency (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-7.80	3.01	-4.79	7.79	Pass
	6	2437	-6.63	3.01	-3.62	7.79	Pass
	11	2462	-7.51	3.01	-4.50	7.79	Pass
1	1	2412	-10.30	3.01	-7.29	7.79	Pass
	6	2437	-8.76	3.01	-5.75	7.79	Pass
	11	2462	-8.94	3.01	-5.93	7.79	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N<sub>ANT</sub>) dB.
- Directional Gain = 3.2dBi + 10log(2) = 6.21dBi > 6dBi, so the limit shall be reduced to 8-(6.21-6) = 7.79dBm.

##### 802.11g

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-6.97	3.01	0.18	-3.78	7.79	Pass
	6	2437	-3.36	3.01	0.18	-0.17	7.79	Pass
	11	2462	-7.19	3.01	0.18	-4.00	7.79	Pass
1	1	2412	-8.83	3.01	0.18	-5.64	7.79	Pass
	6	2437	-5.98	3.01	0.18	-2.79	7.79	Pass
	11	2462	-8.91	3.01	0.18	-5.72	7.79	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N<sub>ANT</sub>) dB.
- Directional Gain = 3.2dBi + 10log(2) = 6.21dBi > 6dBi, so the limit shall be reduced to 8-(6.21-6) = 7.79dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

### 802.11n (HT20)

TX chain	Channel	Frequency (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-6.55	3.01	-3.54	7.79	Pass
	6	2437	-4.09	3.01	-1.08	7.79	Pass
	11	2462	-8.65	3.01	-5.64	7.79	Pass
1	1	2412	-9.64	3.01	-6.63	7.79	Pass
	6	2437	-4.71	3.01	-1.70	7.79	Pass
	11	2462	-9.91	3.01	-6.90	7.79	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add  $10 \log (N_{ANT})$  dB.
- Directional Gain =  $3.2\text{dBi} + 10\log(2) = 6.21\text{dBi} > 6\text{dBi}$ , so the limit shall be reduced to  $8-(6.21-6) = 7.79\text{dBm}$ .

### 802.11n (HT40)

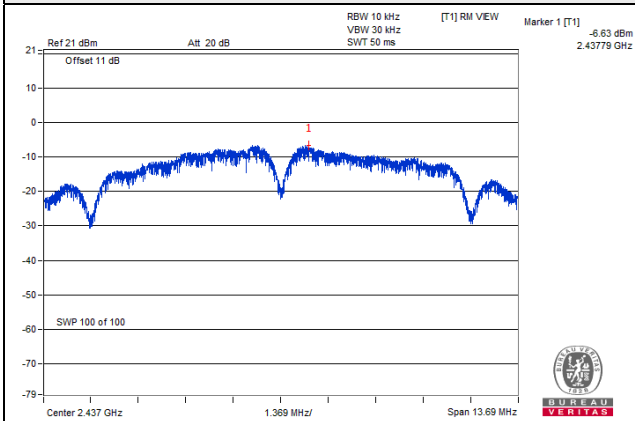
TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-10.87	3.01	0.14	-7.72	7.79	Pass
	6	2437	-9.34	3.01	0.14	-6.19	7.79	Pass
	9	2452	-11.46	3.01	0.14	-8.31	7.79	Pass
1	3	2422	-12.23	3.01	0.14	-9.08	7.79	Pass
	6	2437	-11.59	3.01	0.14	-8.44	7.79	Pass
	9	2452	-12.97	3.01	0.14	-9.82	7.79	Pass

Note:

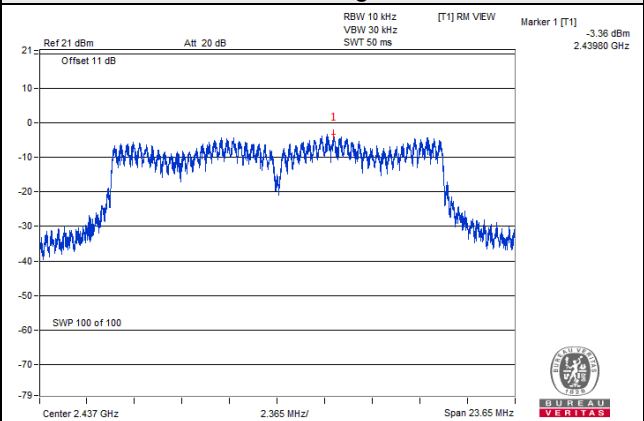
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add  $10 \log (N_{ANT})$  dB.
- Directional Gain =  $3.2\text{dBi} + 10\log(2) = 6.21\text{dBi} > 6\text{dBi}$ , so the limit shall be reduced to  $8-(6.21-6) = 7.79\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

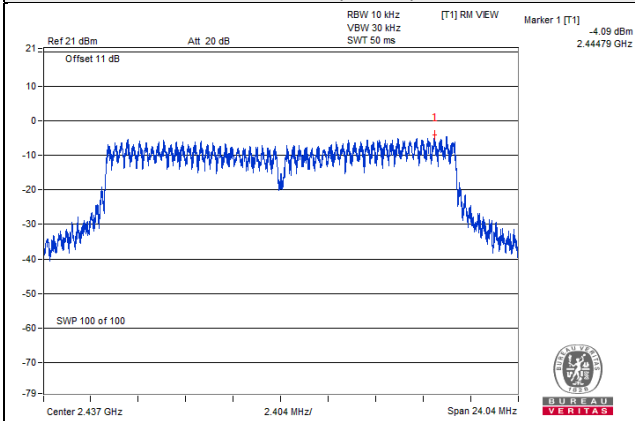
#### 802.11b



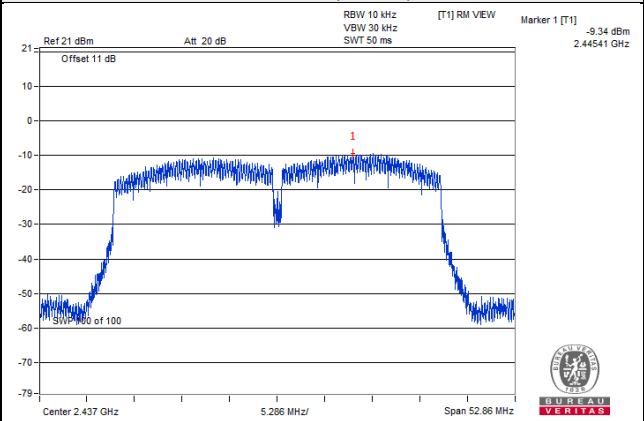
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

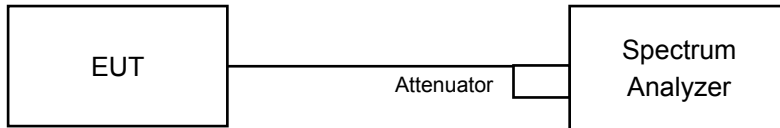


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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

#### MEASUREMENT PROCEDURE OOB

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

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

Same as item 4.3.6

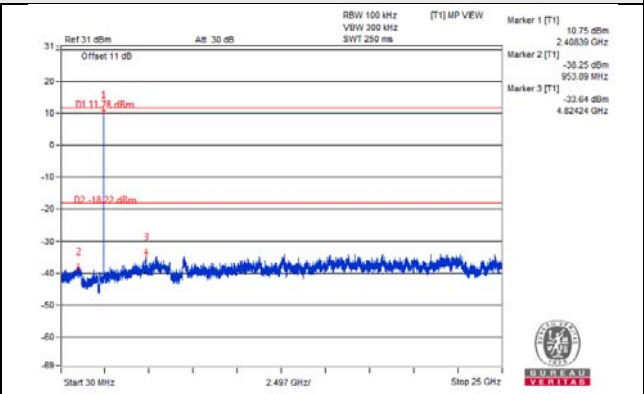
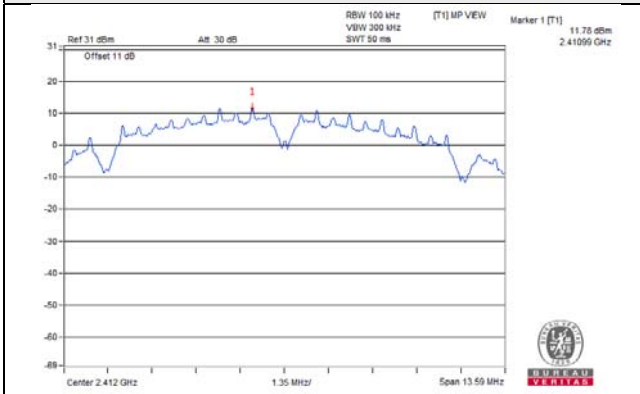
### 4.6.7 Test Results

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

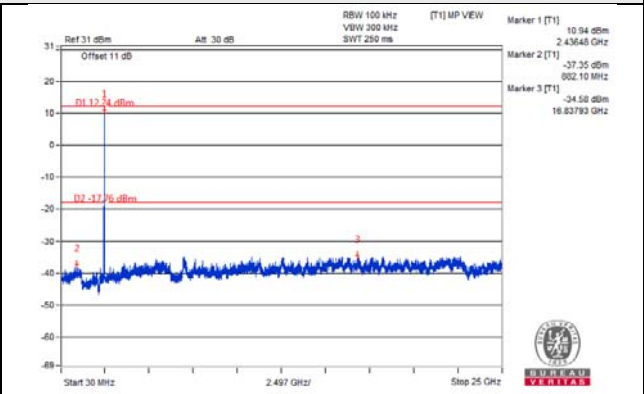
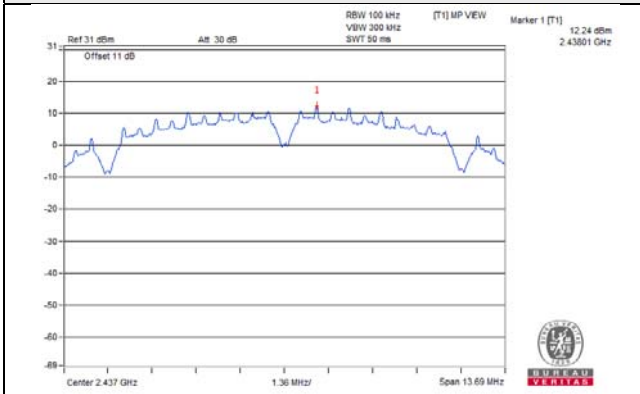
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b\_Chain 0

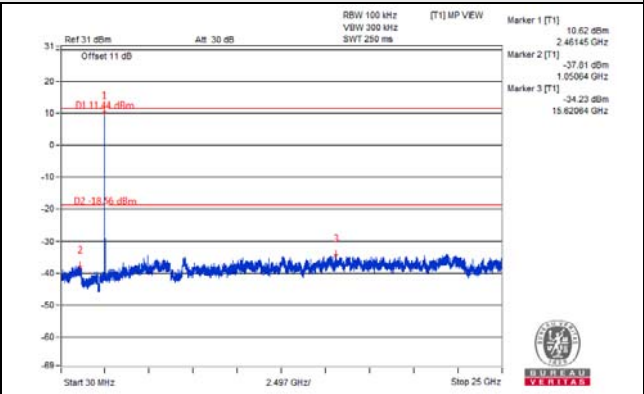
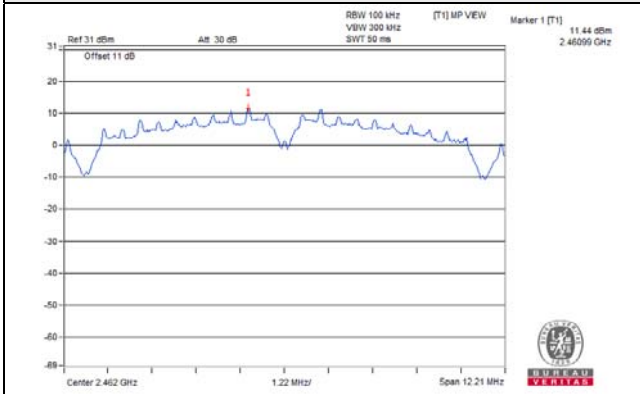
CH 1



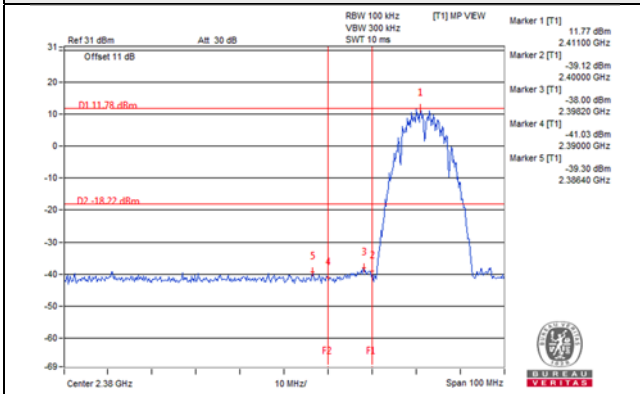
CH 6



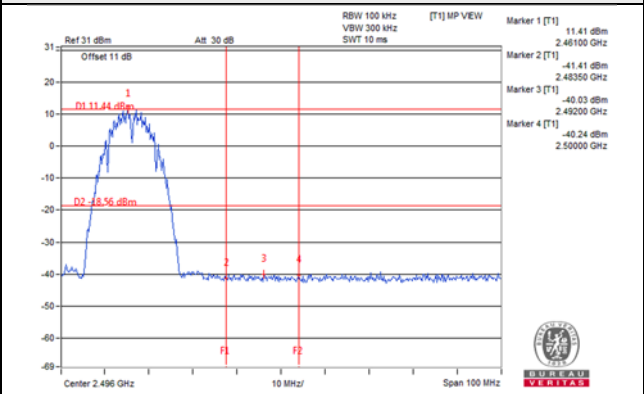
CH 11



CH 1 Band edge

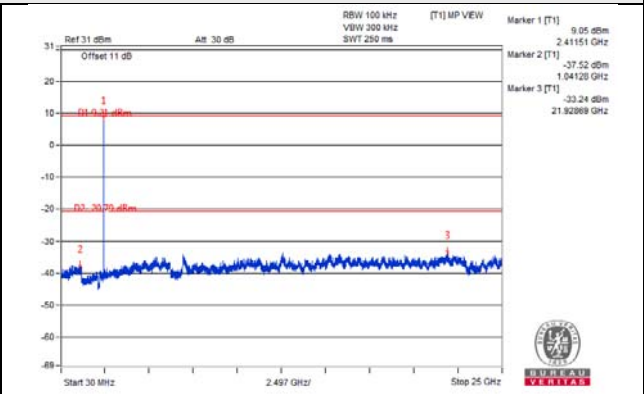
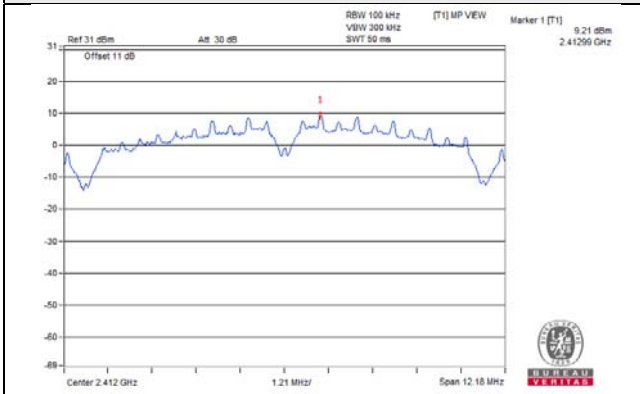


CH 11 Band edge

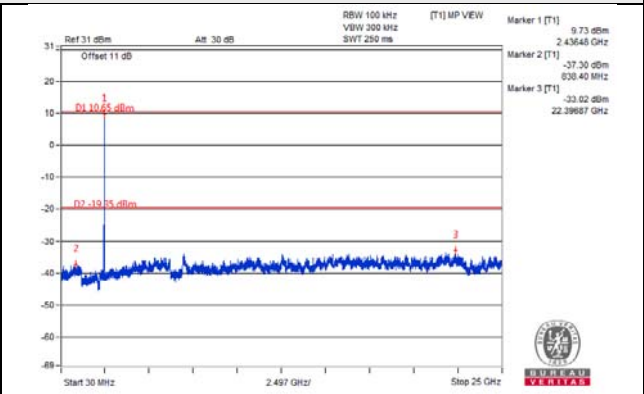
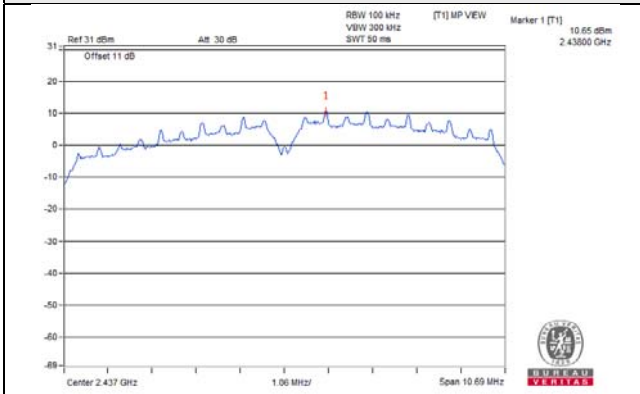


802.11b\_Chain 1

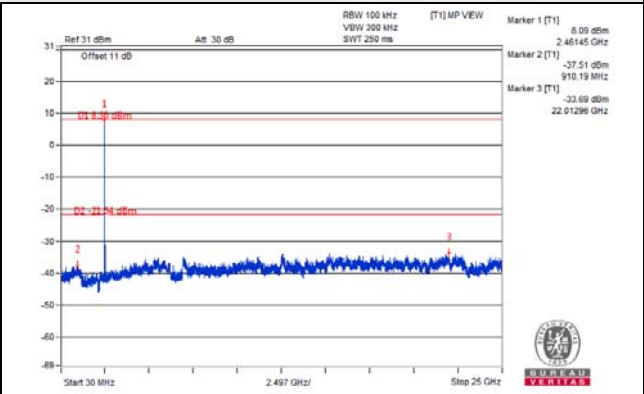
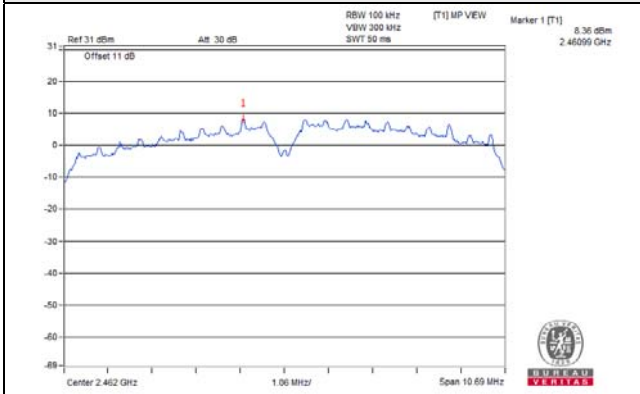
CH 1



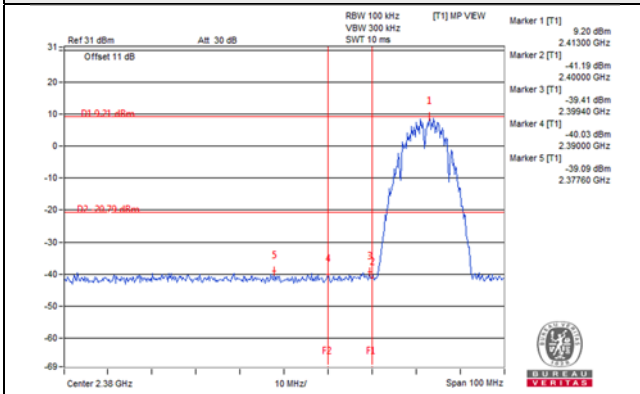
CH 6



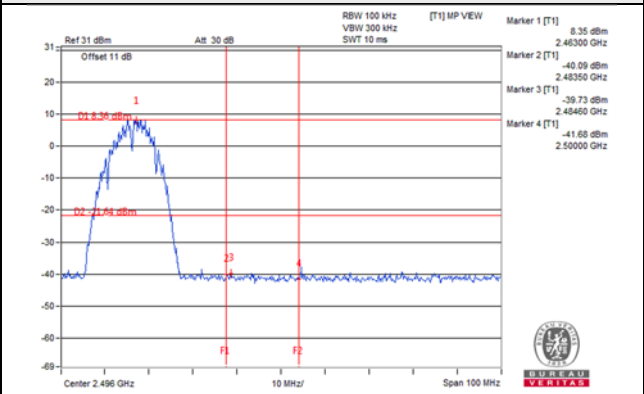
CH 11



CH 1 Band edge

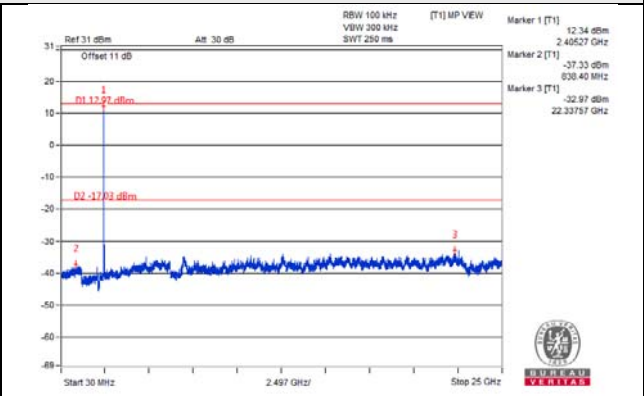
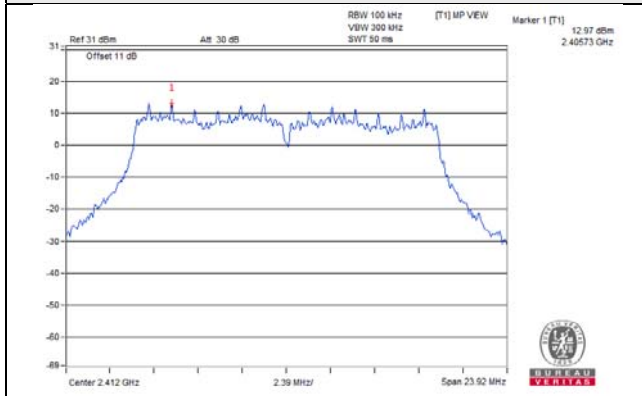


CH 11 Band edge

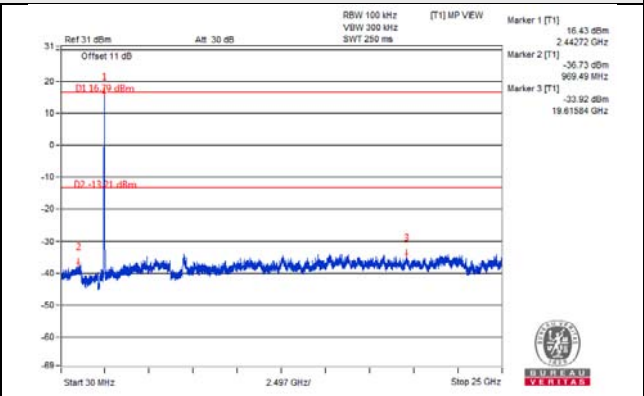
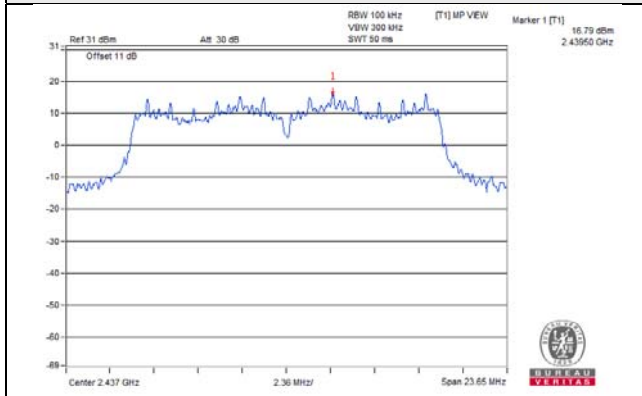


802.11g\_Chain 0

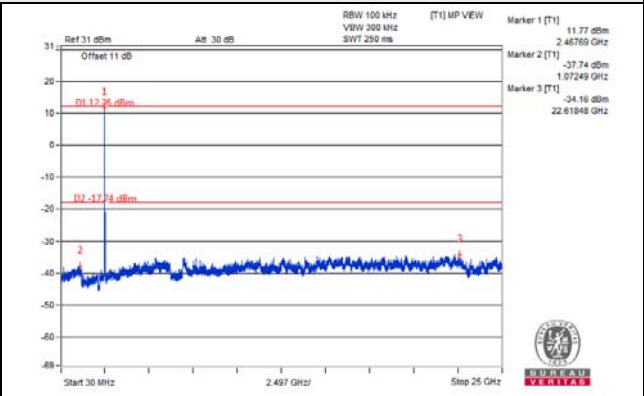
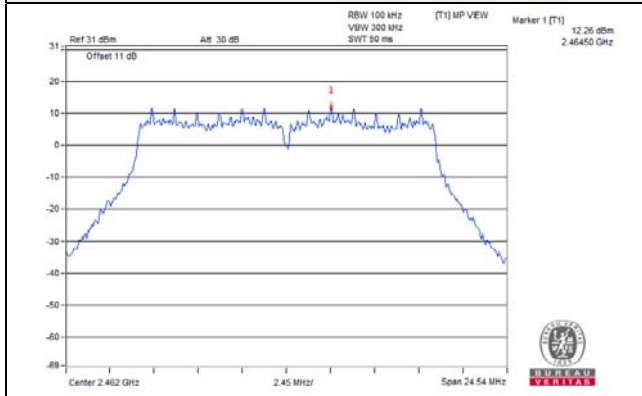
CH 1



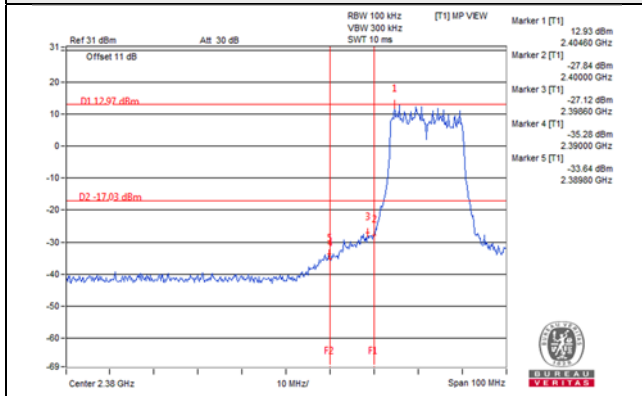
CH 6



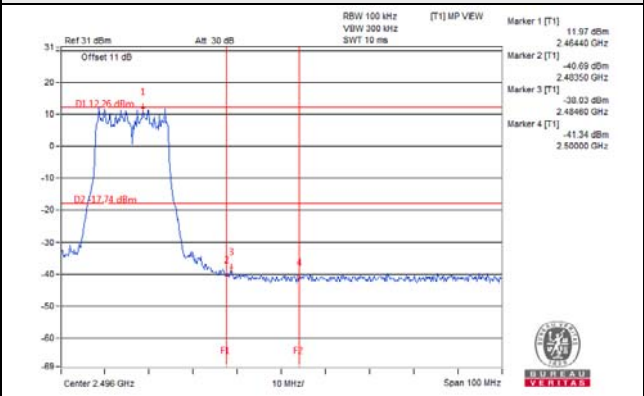
CH 11



CH 1 Band edge

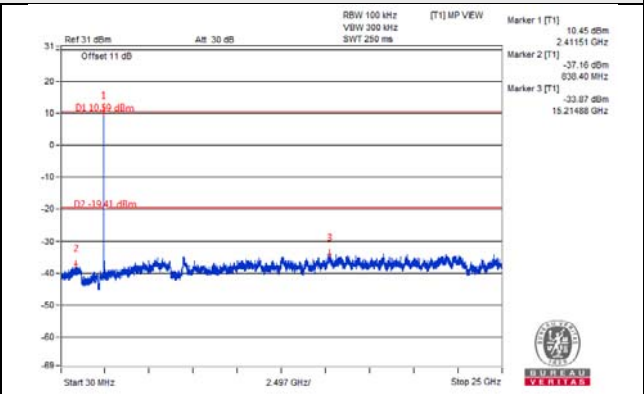
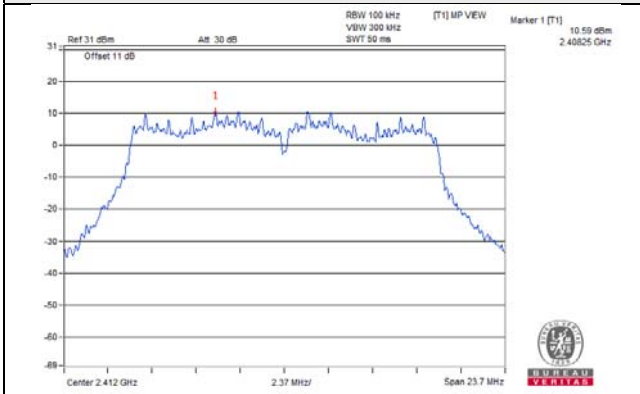


CH 11 Band edge

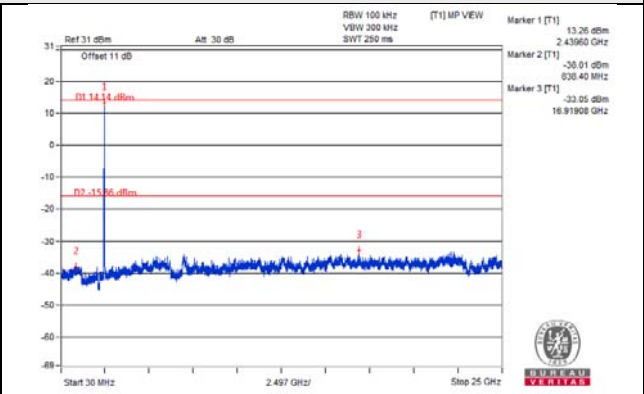
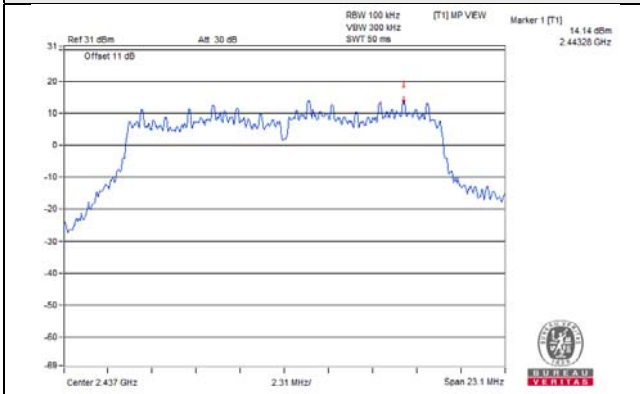


802.11g\_Chain 1

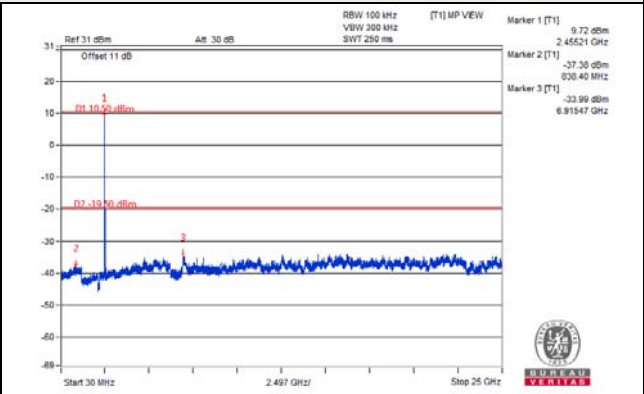
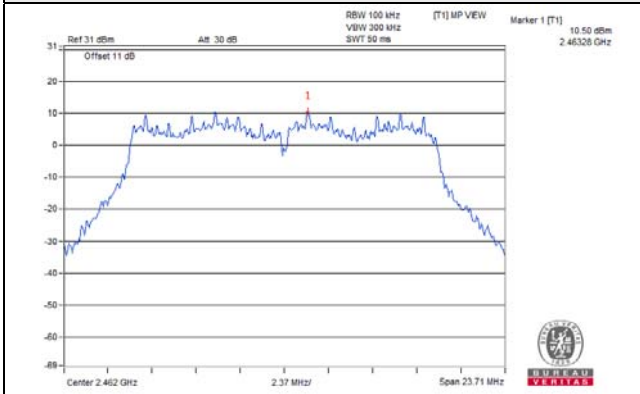
CH 1



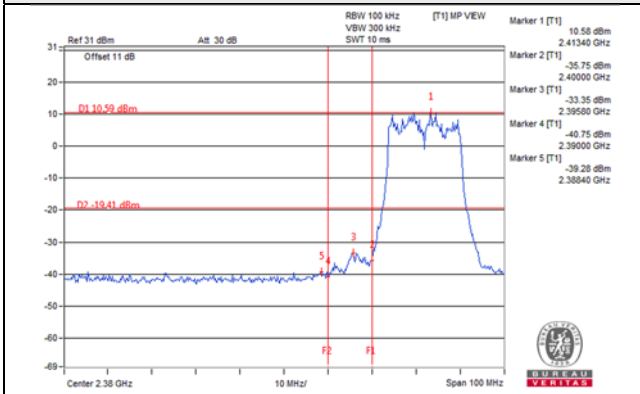
CH 6



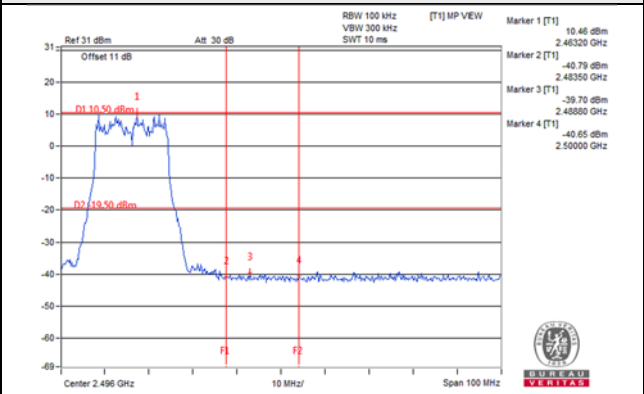
CH 11



CH 1 Band edge



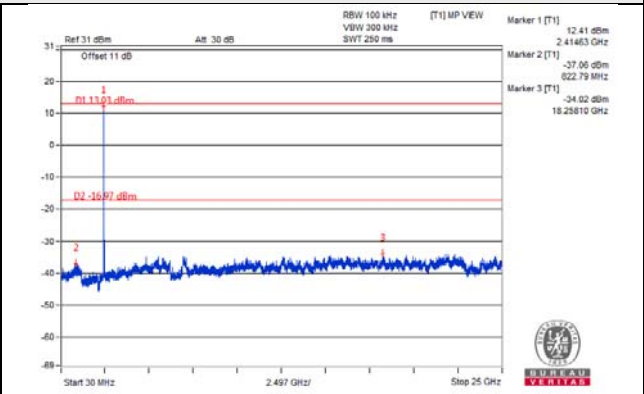
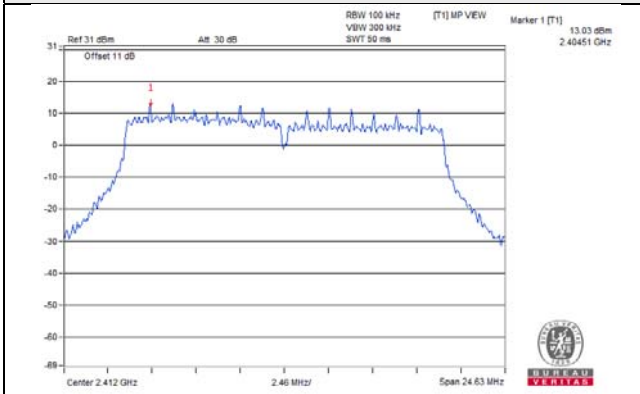
CH 11 Band edge



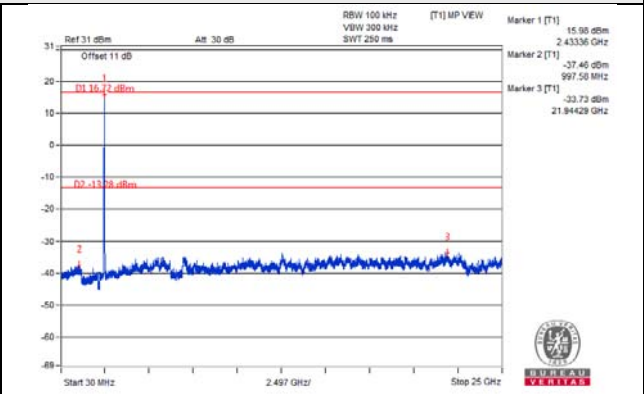
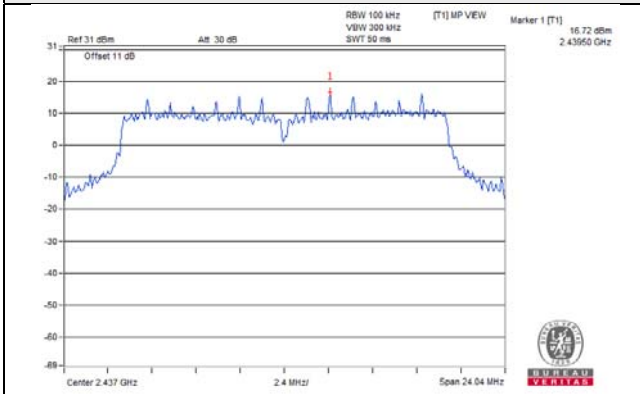


802.11n (HT20)\_Chain 0

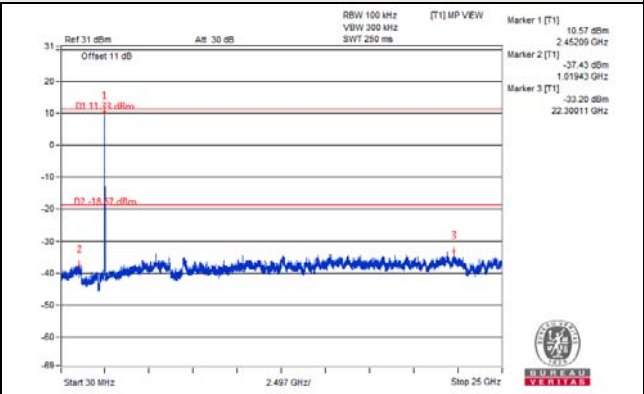
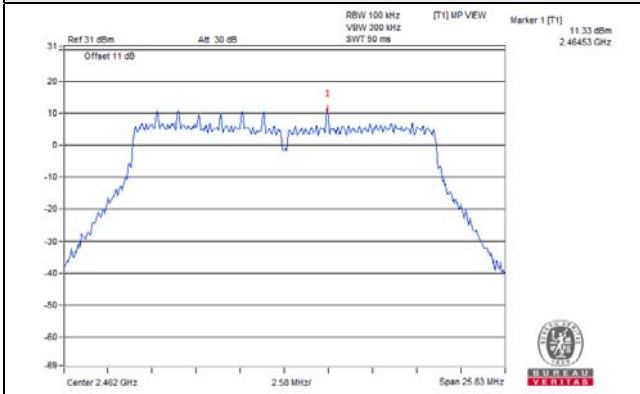
CH 1



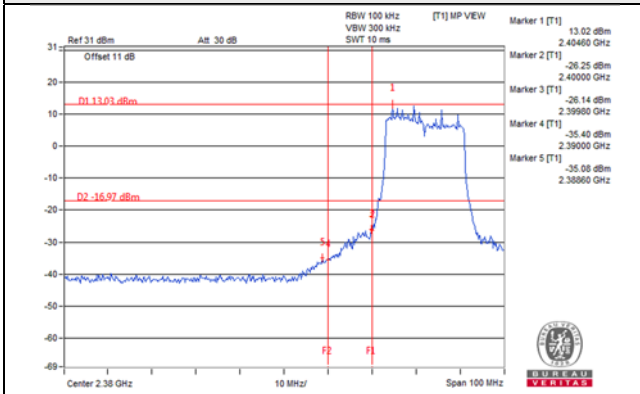
CH 6



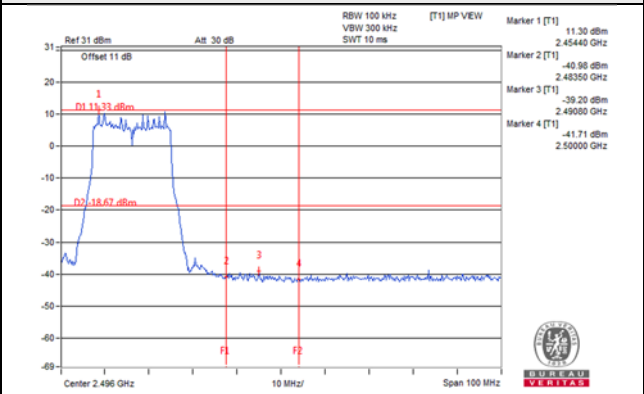
CH 11



CH 11 Band edge

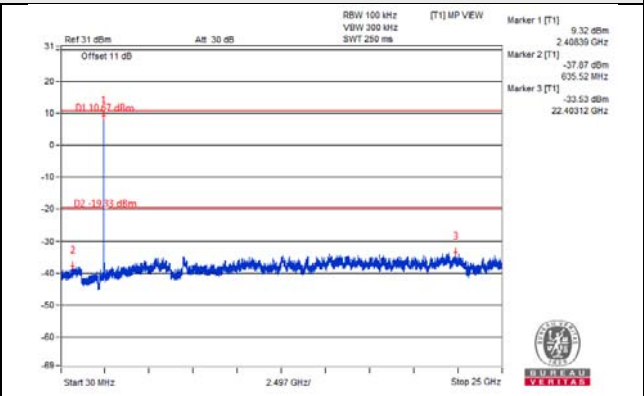
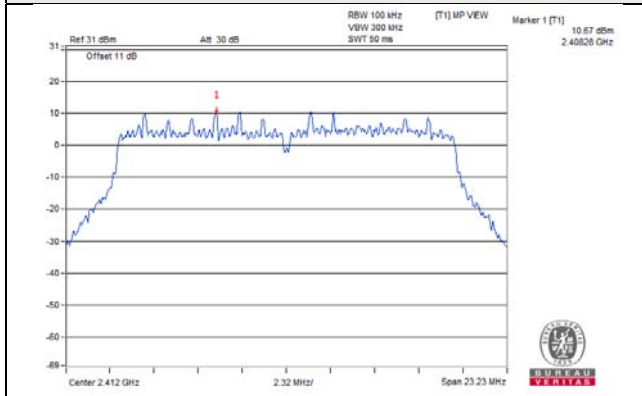


CH 11 Band edge

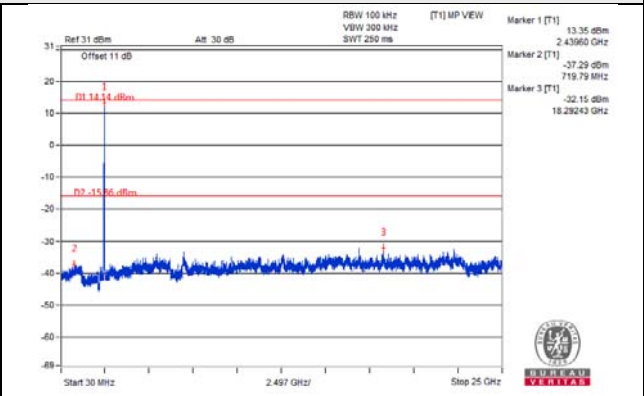
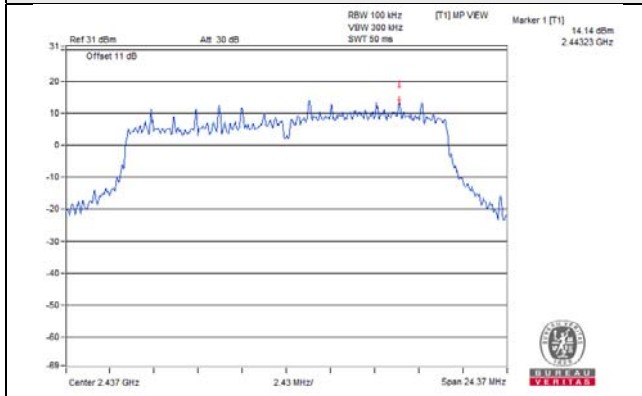


802.11n (HT20)\_Chain 1

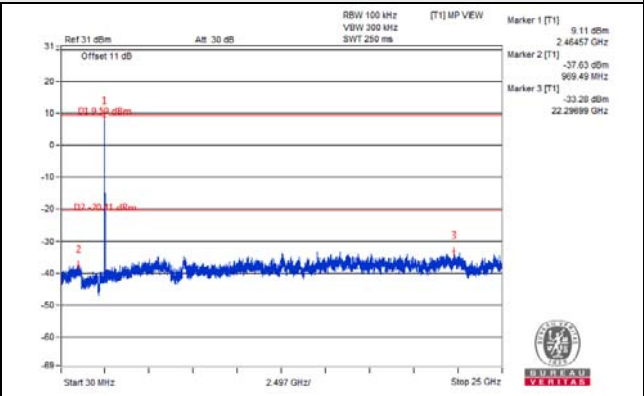
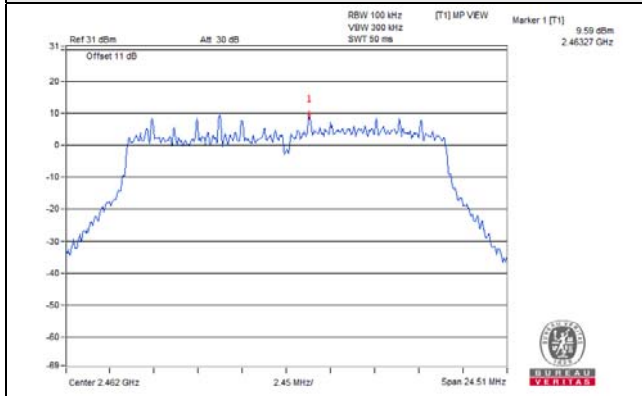
CH 1



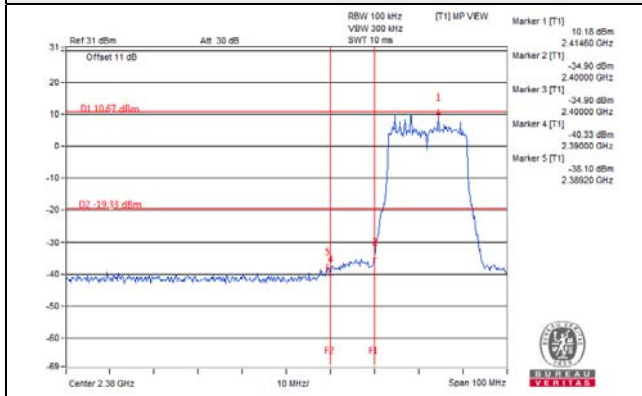
CH 6



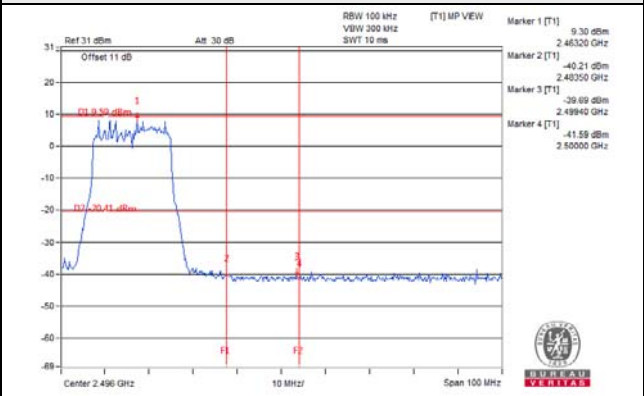
CH 11



CH 1 Band edge

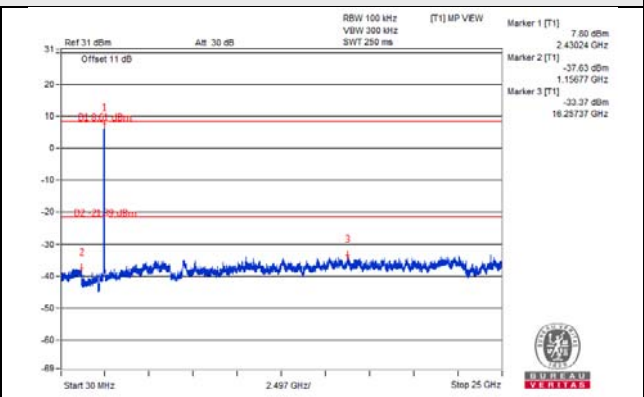
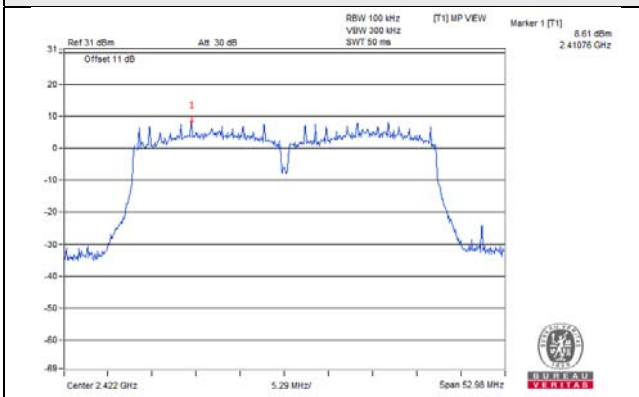


CH 11 Band edge

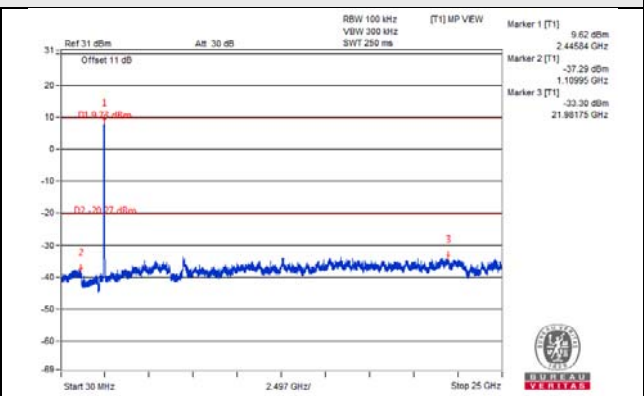
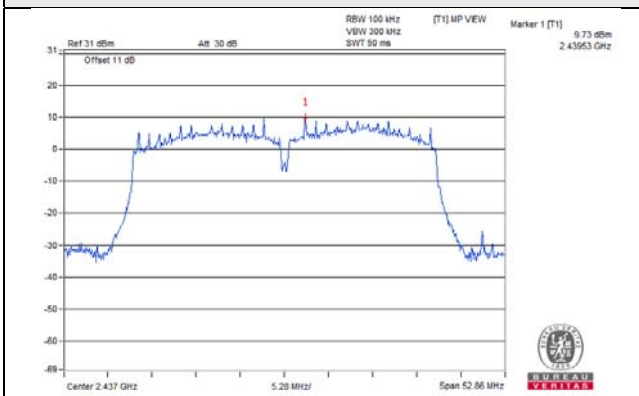


802.11n (HT40)\_Chain 0

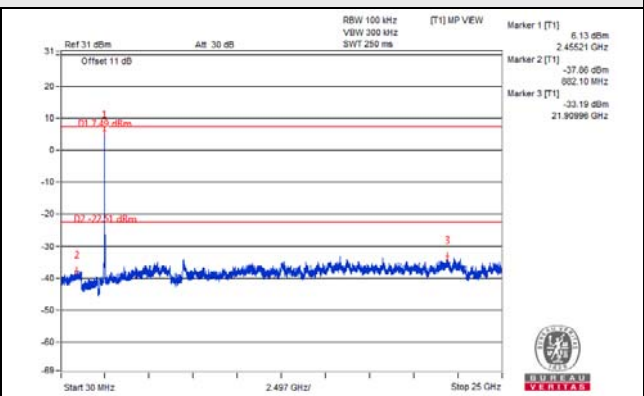
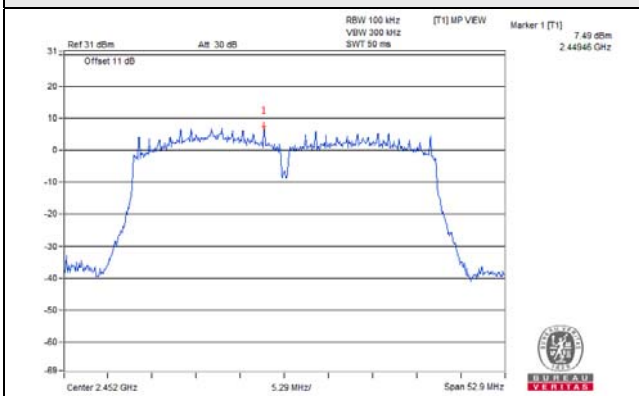
CH 3



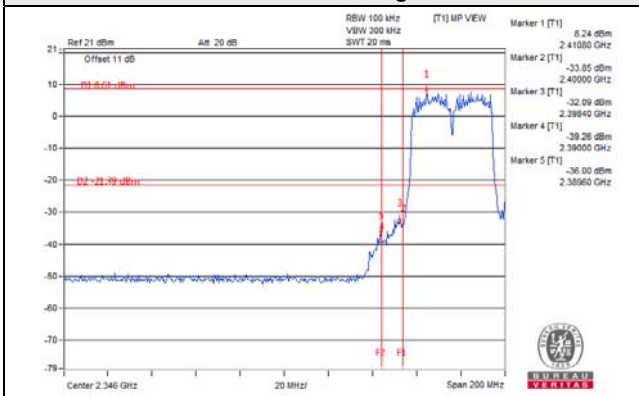
CH 6



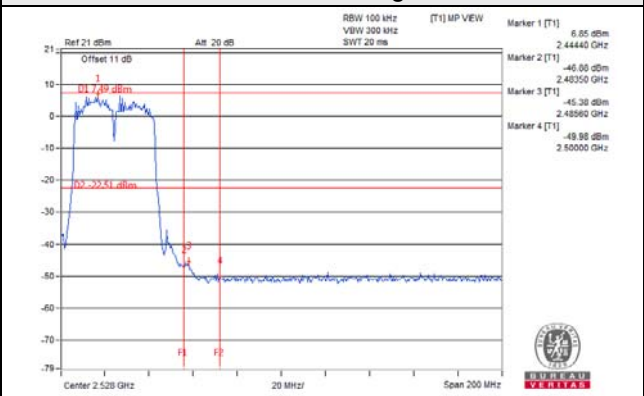
CH 9



CH 3 Band edge

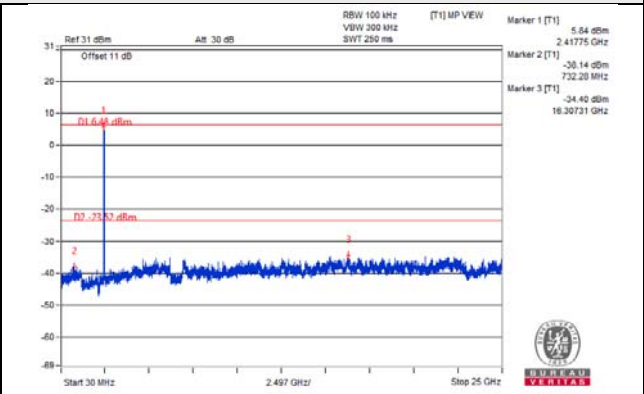
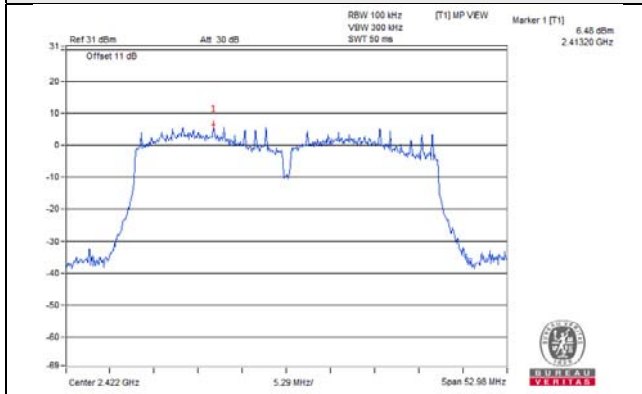


CH 9 Band edge

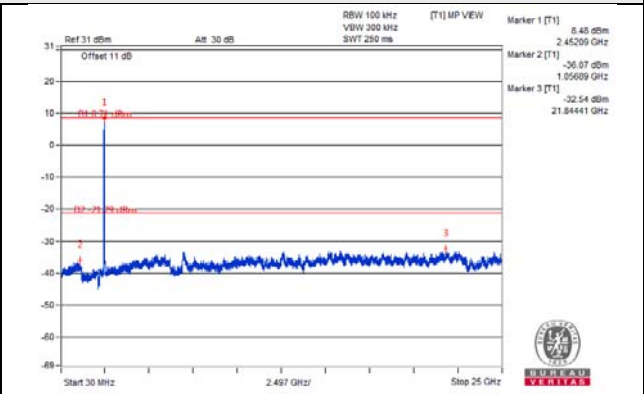
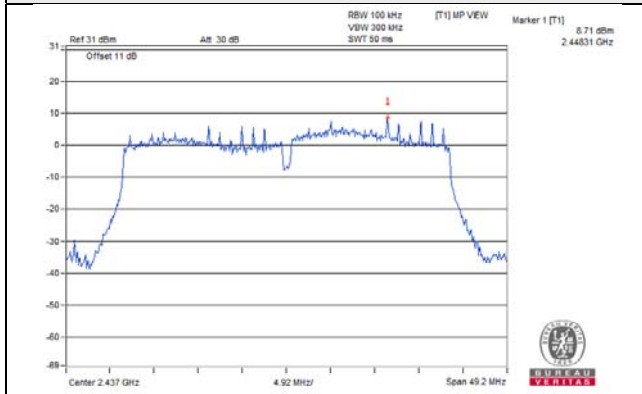


802.11n (HT40)\_Chain 1

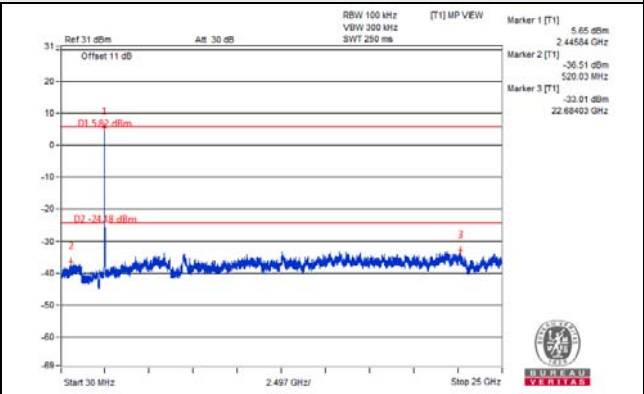
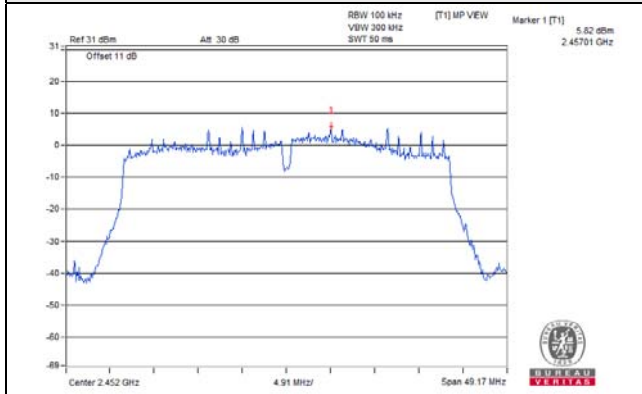
CH 3



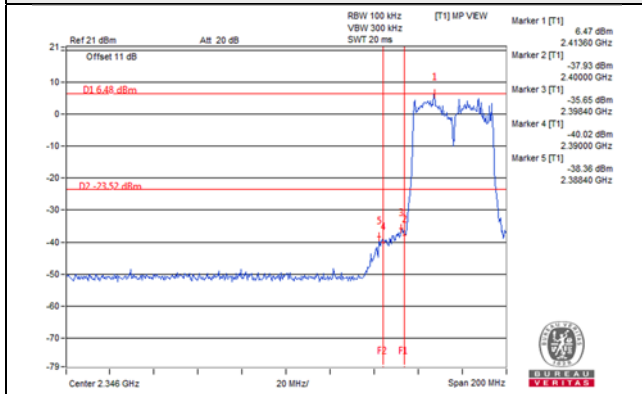
CH 6



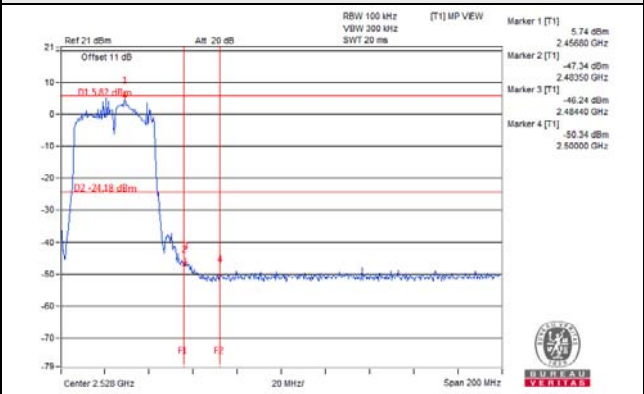
CH 9



CH 3 Band edge



CH 9 Band edge



## 5 Pictures of Test Arrangements

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

## Appendix – Information of 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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

### Lin Kou 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](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---