

## FCC Test Report

**Report No.:** RF180628C20 R1

**FCC ID:** 2A07AARWM10

**Test Model:** 2856610100

**Received Date:** Jun. 28, 2018

**Test Date:** Jul. 03 ~ Sep. 10, 2018

**Issued Date:** Sep. 11, 2018

**Applicant:** Arcelik A.S. Dishwasher Plant

**Address:** Organize Sanayi Bolgesi Altinordu Cad. No:5 Sincan, Ankara, Turkey

**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. The report must 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.....	8
3.2.1 Test Mode Applicability and Tested Channel Detail.....	9
3.3 Duty Cycle of Test Signal.....	11
3.4 Description of Support Units.....	12
3.4.1 Configuration of System under Test.....	12
3.5 General Description of Applied Standards.....	12
<b>4 Test Types and Results</b> .....	<b>13</b>
4.1 Radiated Emission and Bandedge Measurement.....	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement.....	13
4.1.2 Test Instruments.....	14
4.1.3 Test Procedures.....	16
4.1.4 Deviation from Test Standard.....	17
4.1.5 Test Set Up.....	17
4.1.6 EUT Operating Conditions.....	18
4.1.7 Test Results.....	19
4.2 Conducted Emission Measurement.....	38
4.2.1 Limits of Conducted Emission Measurement.....	38
4.2.2 Test Instruments.....	38
4.2.3 Test Procedures.....	38
4.2.4 Deviation from Test Standard.....	39
4.2.5 Test Setup.....	39
4.2.6 EUT Operating Conditions.....	39
4.2.7 Test Results.....	40
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.....	47
4.5.6 EUT Operating Condition.....	47

4.5.7 Test Results .....	48
4.6 Conducted Out of Band Emission Measurement.....	50
4.6.1 Limits of Conducted Out of Band Emission Measurement .....	50
4.6.2 Test Setup.....	50
4.6.3 Test Instruments .....	50
4.6.4 Test Procedure .....	50
4.6.5 Deviation from Test Standard .....	50
4.6.6 EUT Operating Condition .....	50
4.6.7 Test Results .....	50
<b>5 Pictures of Test Arrangements.....</b>	<b>55</b>
<b>Appendix – Information on the Testing Laboratories .....</b>	<b>56</b>



### Release Control Record

Issue No.	Description	Date Issued
RF180628C20	Original release.	Jul. 19, 2018
RF180628C20 R1	Revising Applicant information.	Sep. 11, 2018

## 1 Certificate of Conformity

**Product:** Recon WiFi Module

**Brand:** Arcelik

**Test Model:** 2856610100

**Sample Status:** Engineering sample

**Applicant:** Arcelik A.S. Dishwasher Plant

**Test Date:** Jul. 03 ~ Sep. 10, 2018

**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 :** Alice Ho , **Date:** Sep. 11, 2018  
Alice Ho / Specialist

**Approved by :** Bruce Chen , **Date:** Sep. 11, 2018  
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 -28.89dB at 25.30950MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0 dB at 23900.00MHz, 2483.50MHz & 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	Antenna connector is Murata.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 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	Recon WiFi Module
Brand	Arcelik
Test Model	2856610100
Status of EUT	Engineering sample
Power Supply Rating	3.3Vdc (Host equipment)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for 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	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	161.065mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	NA

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 1 completed transmitter and 2 receivers.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

- The following antennas were provided to the EUT.

Ant. Type	Monopole	Connector Type	None (like solder)
RF Chain No.	Chain 0		Chain 1
Spec.	Support TX/RX		RX diversity
Antenna Gain (dBi)	6.25		6.32

### 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	
-	√	√	√	√	-

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

#### Radiated Emission Test (Above 1GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

#### Radiated Emission Test (Below 1GHz):

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

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

**6dB Bandwidth, Power Spectral Density and Conducted Out of Band Emission Measurement:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

**Conducted Output Power Measurement:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

**Test Condition:**

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE $\geq$ 1G	25 deg. C, 70% RH	120Vac, 60Hz	Noah Chang, Luis Lee
RE $<$ 1G	25 deg. C, 70% RH	120Vac, 60Hz	Noah Chang
PLC	22 deg. C, 62% RH	120Vac, 60Hz	Noah Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Chris Lin

### 3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required

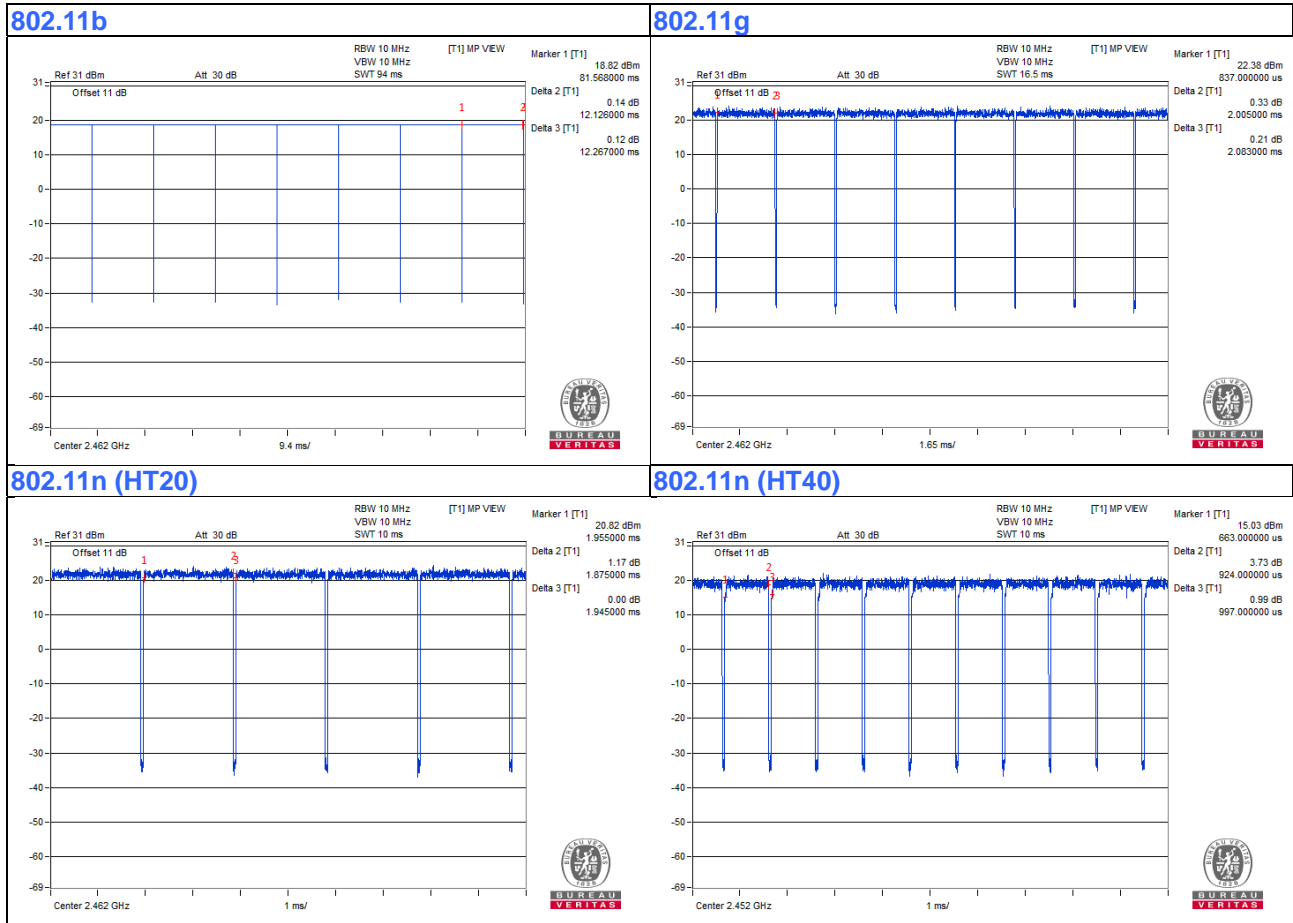
**802.11b:** Duty cycle =  $12.126/12.267 = 0.989$

Duty cycle of test signal is < 98 %, duty factor is required

**802.11g:** Duty cycle =  $2.005/2.083 = 0.963$ , Duty factor =  $10 * \log(1/0.963) = 0.16$

**802.11n (HT20):** Duty cycle =  $1.875/1.945 = 0.964$ , Duty factor =  $10 * \log(1/0.964) = 0.17$

**802.11n (HT40):** Duty cycle =  $0.924/0.997 = 0.927$ , Duty factor =  $10 * \log(1/0.927) = 0.36$



### 3.4 Description of Support Units

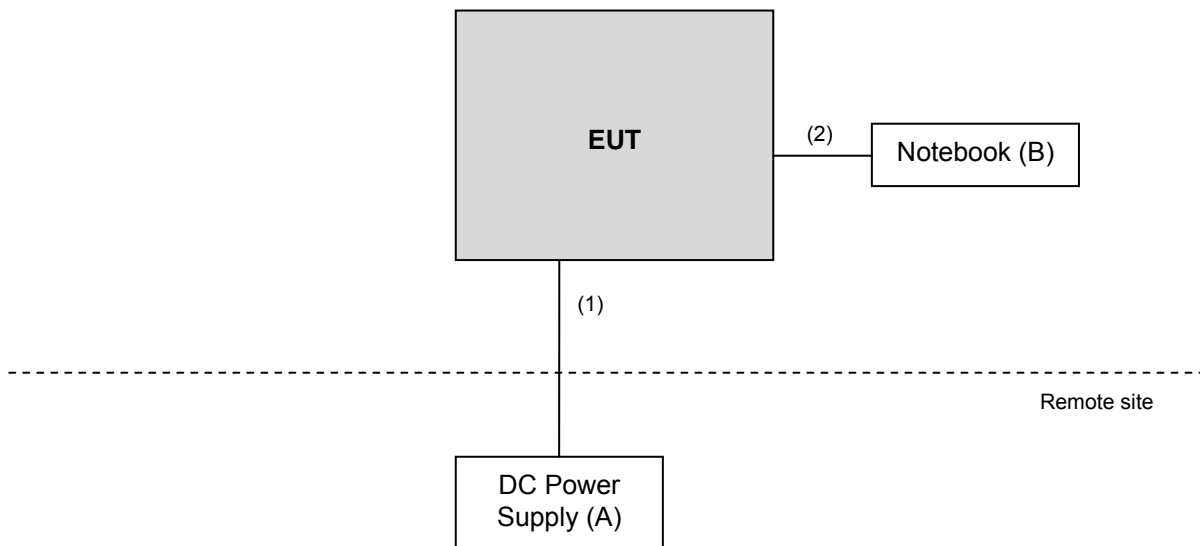
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DC Power Supply	Keysight	U8002A	MY56330015	NA	-
B.	Notebook	DELL	E5520	8Y4DMQ1	FCC DoC Approved	

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	1	N	0	-
2.	USB cable	1	0.4	-	0	-

#### 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**  
**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

Tested date: Jul. 03 ~ Jul. 09, 2018

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 18, 2017	Aug. 17, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2017	Aug. 07, 2018
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jul. 02, 2018	Jul. 01, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2017	Aug. 07, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018

- 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 4.
  3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
  4. The IC Site Registration No. is IC 7450F-4.

Tested date: Sep.10, 2018

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2018	Aug. 07, 2019
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jul. 02, 2018	Jul. 01, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2018	Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2018	Aug. 07, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 Chamber 4.  
 3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.  
 4. The IC Site Registration No. is IC 7450F-4.

#### 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 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10 Hz (Duty cycle  $\geq 98\%$ ) for Peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

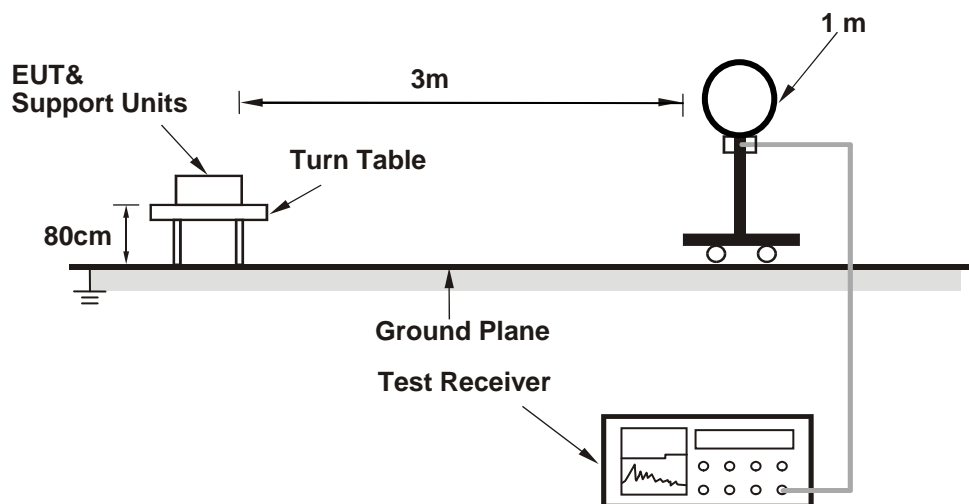


4.1.4 Deviation from Test Standard

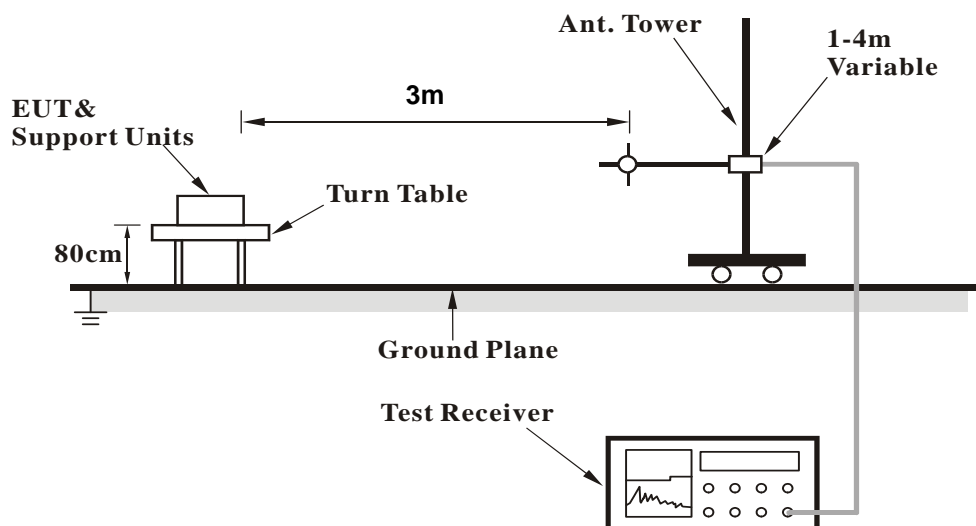
No deviation.

4.1.5 Test Set Up

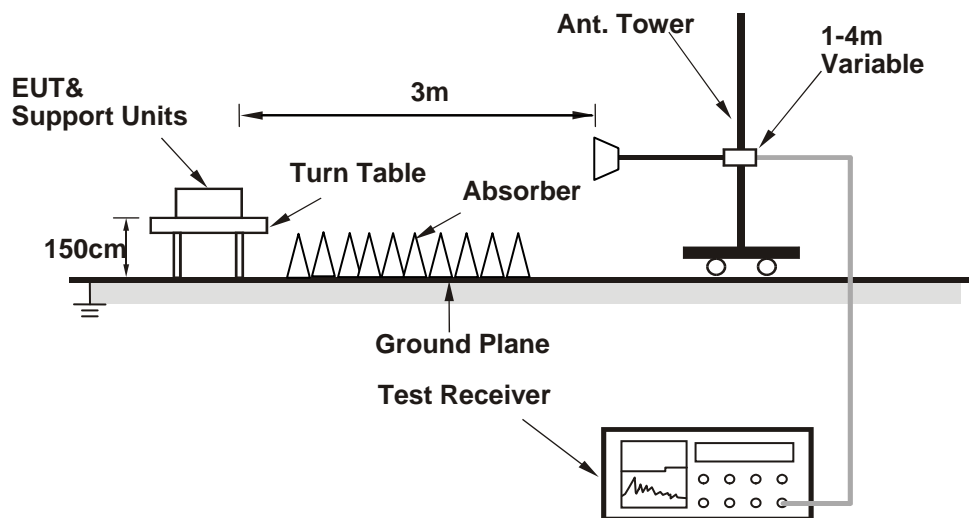
**For Radiated emission below 30MHz**



**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. 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	57.1 PK	74.0	-16.9	1.05 H	239	23.7	33.4
2	2390.00	46.2 AV	54.0	-7.8	1.05 H	239	12.8	33.4
3	*2412.00	100.7 PK			1.03 H	222	67.3	33.4
4	*2412.00	97.0 AV			1.03 H	222	63.6	33.4
5	4824.00	56.0 PK	74.0	-18.0	2.20 H	197	52.4	3.6
<b>6</b>	<b>4824.00</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>2.20 H</b>	<b>197</b>	<b>49.4</b>	<b>3.6</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	2390.00	57.2 PK	74.0	-16.8	1.02 V	192	23.8	33.4
2	2390.00	45.8 AV	54.0	-8.2	1.02 V	192	12.4	33.4
3	*2412.00	98.0 PK			1.00 V	188	64.6	33.4
4	*2412.00	94.5 AV			1.00 V	188	61.1	33.4
5	4824.00	52.7 PK	74.0	-21.3	1.00 V	170	49.1	3.6
6	4824.00	48.9 AV	54.0	-5.1	1.00 V	170	45.3	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.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.8 PK			1.21 H	149	68.4	33.4
2	*2437.00	98.0 AV			1.21 H	149	64.6	33.4
3	4874.00	55.5 PK	74.0	-18.5	2.14 H	195	52.2	3.3
4	4874.00	52.5 AV	54.0	-1.5	2.14 H	195	49.2	3.3

**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	98.2 PK			1.00 V	186	64.8	33.4
2	*2437.00	94.4 AV			1.00 V	186	61.0	33.4
3	4874.00	53.1 PK	74.0	-20.9	1.13 V	166	49.8	3.3
4	4874.00	47.9 AV	54.0	-6.1	1.13 V	166	44.6	3.3

**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	101.7 PK			1.06 H	194	68.2	33.5
2	*2462.00	98.0 AV			1.06 H	194	64.5	33.5
3	2483.50	58.3 PK	74.0	-15.7	1.05 H	206	24.8	33.5
4	2483.50	46.6 AV	54.0	-7.4	1.05 H	206	13.1	33.5
5	4924.00	54.9 PK	74.0	-19.1	1.84 H	192	51.6	3.3
6	4924.00	52.5 AV	54.0	-1.5	1.84 H	192	49.2	3.3

**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	100.0 PK			1.22 V	191	66.5	33.5
2	*2462.00	96.2 AV			1.22 V	191	62.7	33.5
3	2483.50	58.4 PK	74.0	-15.6	1.25 V	206	24.9	33.5
4	2483.50	46.0 AV	54.0	-8.0	1.25 V	206	12.5	33.5
5	4924.00	54.7 PK	74.0	-19.3	1.06 V	172	51.4	3.3
6	4924.00	51.0 AV	54.0	-3.0	1.06 V	172	47.7	3.3

**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	64.1 PK	74.0	-9.9	1.33 H	128	30.7	33.4
2	2390.00	52.5 AV	54.0	-1.5	1.33 H	128	19.1	33.4
3	*2412.00	106.8 PK			1.28 H	148	73.4	33.4
4	*2412.00	95.9 AV			1.28 H	148	62.5	33.4
5	4824.00	57.5 PK	74.0	-16.5	1.32 H	212	53.9	3.6
6	4824.00	43.4 AV	54.0	-10.6	1.32 H	212	39.8	3.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.3 PK	74.0	-11.7	1.02 V	192	28.9	33.4
2	2390.00	49.9 AV	54.0	-4.1	1.02 V	192	16.5	33.4
3	*2412.00	102.5 PK			1.00 V	190	69.1	33.4
4	*2412.00	92.1 AV			1.00 V	190	58.7	33.4
5	4824.00	50.8 PK	74.0	-23.2	2.56 V	222	47.2	3.6
6	4824.00	39.2 AV	54.0	-14.8	2.56 V	222	35.6	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.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.

CHANNEL	TX Channel 2	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	66.3 PK	74.0	-7.7	1.25 H	166	33.00	33.30
<b>2</b>	<b>2390.00</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.25 H</b>	<b>166</b>	<b>19.70</b>	<b>33.30</b>
3	*2417.00	110.2 PK			1.42 H	170	76.80	33.40
4	*2417.00	100.5 AV			1.42 H	170	67.10	33.40
5	4834.00	50.5 PK	74.0	-23.5	2.50 H	310	37.90	12.60
6	4834.00	38.4 AV	54.0	-15.6	2.50 H	310	25.80	12.60

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.3 PK	74.0	-11.7	1.08 V	200	29.00	33.30
2	2390.00	49.4 AV	54.0	-4.6	1.08 V	200	16.10	33.30
3	*2417.00	106.3 PK			1.00 V	196	72.90	33.40
4	*2417.00	95.7 AV			1.00 V	196	62.30	33.40
5	4834.00	49.9 PK	74.0	-24.1	1.40 V	162	37.30	12.60
6	4834.00	37.8 AV	54.0	-16.2	1.40 V	162	25.20	12.60

**REMARKS:**

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

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.1 PK			1.31 H	150	77.7	33.4
2	*2437.00	101.4 AV			1.31 H	150	68.0	33.4
3	4874.00	55.5 PK	74.0	-18.5	1.32 H	211	52.2	3.3
4	4874.00	43.9 AV	54.0	-10.1	1.32 H	211	40.6	3.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.1 PK			1.00 V	186	73.7	33.4
2	*2437.00	97.2 AV			1.00 V	186	63.8	33.4
3	4874.00	50.5 PK	74.0	-23.5	2.56 V	252	47.2	3.3
4	4874.00	38.8 AV	54.0	-15.2	2.56 V	252	35.5	3.3

**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 10	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	*2457.00	111.6 PK			1.46 H	163	78.20	33.40
2	*2457.00	101.3 AV			1.46 H	163	67.90	33.40
3	2483.50	66.6 PK	74.0	-7.4	1.38 H	165	33.10	33.50
4	2483.50	52.8 AV	54.0	-1.2	1.38 H	165	19.30	33.50
5	4914.00	50.1 PK	74.0	-23.9	2.79 H	280	37.70	12.40
6	4914.00	38.0 AV	54.0	-16.0	2.79 H	280	25.60	12.40

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	106.8 PK			1.00 V	201	73.40	33.40
2	*2457.00	96.7 AV			1.00 V	201	63.30	33.40
3	2483.50	62.1 PK	74.0	-11.9	1.17 V	215	28.60	33.50
4	2483.50	49.0 AV	54.0	-5.0	1.17 V	215	15.50	33.50
5	4914.00	49.4 PK	74.0	-24.6	1.76 V	127	37.00	12.40
6	4914.00	37.7 AV	54.0	-16.3	1.76 V	127	25.30	12.40

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)– 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	108.4 PK			1.18 H	150	74.9	33.5
2	*2462.00	98.0 AV			1.18 H	150	64.5	33.5
3	2483.50	66.6 PK	74.0	-7.4	1.20 H	163	33.1	33.5
4	2483.50	52.5 AV	54.0	-1.5	1.20 H	163	19.0	33.5
5	4924.00	57.6 PK	74.0	-16.4	1.35 H	226	54.3	3.3
6	4924.00	43.6 AV	54.0	-10.4	1.35 H	226	40.3	3.3

**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	104.2 PK			1.23 V	190	70.7	33.5
2	*2462.00	93.3 AV			1.23 V	190	59.8	33.5
3	2483.50	59.7 PK	74.0	-14.3	1.29 V	188	26.2	33.5
4	2483.50	47.8 AV	54.0	-6.2	1.29 V	188	14.3	33.5
5	4924.00	50.6 PK	74.0	-23.4	2.56 V	320	47.3	3.3
6	4924.00	38.5 AV	54.0	-15.5	2.56 V	320	35.2	3.3

**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 (HT20)

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	65.1 PK	74.0	-8.9	1.26 H	138	31.7	33.4
2	2390.00	52.5 AV	54.0	-1.5	1.26 H	138	19.1	33.4
3	*2412.00	105.0 PK			1.25 H	148	71.6	33.4
4	*2412.00	94.2 AV			1.25 H	148	60.8	33.4
5	4824.00	54.3 PK	74.0	-19.7	1.69 H	212	50.7	3.6
6	4824.00	41.8 AV	54.0	-12.2	1.69 H	212	38.2	3.6

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	63.4 PK	74.0	-10.6	1.15 V	124	30.0	33.4
2	2390.00	49.6 AV	54.0	-4.4	1.15 V	124	16.2	33.4
3	*2412.00	100.5 PK			1.26 V	189	67.1	33.4
4	*2412.00	90.8 AV			1.26 V	189	57.4	33.4
5	4824.00	48.8 PK	74.0	-25.2	1.99 V	336	45.2	3.6
6	4824.00	36.8 AV	54.0	-17.2	1.99 V	336	33.2	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.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.

CHANNEL	TX Channel 2	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	65.7 PK	74.0	-8.3	1.28 H	170	32.40	33.30
2	2390.00	52.7 AV	54.0	-1.3	1.28 H	170	19.40	33.30
3	*2417.00	109.8 PK			1.36 H	169	76.40	33.40
4	*2417.00	99.5 AV			1.36 H	169	66.10	33.40
5	4834.00	50.4 PK	74.0	-23.6	2.47 H	296	37.80	12.60
6	4834.00	38.5 AV	54.0	-15.5	2.47 H	296	25.90	12.60

**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	61.4 PK	74.0	-12.6	1.14 V	195	28.10	33.30
2	2390.00	49.3 AV	54.0	-4.7	1.14 V	195	16.00	33.30
3	*2417.00	106.1 PK			1.02 V	198	72.70	33.40
4	*2417.00	95.5 AV			1.02 V	198	62.10	33.40
5	4834.00	49.5 PK	74.0	-24.5	1.68 V	144	36.90	12.60
6	4834.00	38.0 AV	54.0	-16.0	1.68 V	144	25.40	12.60

**REMARKS:**

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

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.2 PK			1.20 H	145	77.8	33.4
2	*2437.00	101.1 AV			1.20 H	145	67.7	33.4
3	4874.00	54.3 PK	74.0	-19.7	1.77 H	223	51.0	3.3
4	4874.00	42.6 AV	54.0	-11.4	1.77 H	223	39.3	3.3

**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	108.1 PK			1.16 V	190	74.7	33.4
2	*2437.00	97.8 AV			1.16 V	190	64.4	33.4
3	4874.00	48.9 PK	74.0	-25.1	2.59 V	226	45.6	3.3
4	4874.00	36.5 AV	54.0	-17.5	2.59 V	226	33.2	3.3

**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 10	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	*2457.00	111.0 PK			1.48 H	164	77.60	33.40
2	*2457.00	100.5 AV			1.48 H	164	67.10	33.40
3	2483.50	65.9 PK	74.0	-8.1	1.37 H	167	32.40	33.50
<b>4</b>	<b>2483.50</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.37 H</b>	<b>167</b>	<b>19.50</b>	<b>33.50</b>
5	4914.00	50.2 PK	74.0	-23.8	2.55 H	318	37.80	12.40
6	4914.00	38.3 AV	54.0	-15.7	2.55 H	318	25.90	12.40

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	106.7 PK			1.10 V	204	73.30	33.40
2	*2457.00	95.7 AV			1.10 V	204	62.30	33.40
3	2483.50	61.2 PK	74.0	-12.8	1.02 V	227	27.70	33.50
4	2483.50	48.5 AV	54.0	-5.5	1.02 V	227	15.00	33.50
5	4914.00	49.6 PK	74.0	-24.4	1.69 V	147	37.20	12.40
6	4914.00	37.5 AV	54.0	-16.5	1.69 V	147	25.10	12.40

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)– 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	107.9 PK			1.17 H	147	74.4	33.5
2	*2462.00	98.0 AV			1.17 H	147	64.5	33.5
3	2483.50	66.1 PK	74.0	-7.9	1.22 H	149	32.6	33.5
<b>4</b>	<b>2483.50</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.22 H</b>	<b>149</b>	<b>19.5</b>	<b>33.5</b>
5	4924.00	53.9 PK	74.0	-20.1	1.85 H	222	50.6	3.3
6	4924.00	41.6 AV	54.0	-12.4	1.85 H	222	38.3	3.3

**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	103.8 PK			1.21 V	189	70.3	33.5
2	*2462.00	94.0 AV			1.21 V	189	60.5	33.5
3	2483.50	61.1 PK	74.0	-12.9	1.29 V	201	27.6	33.5
4	2483.50	49.6 AV	54.0	-4.4	1.29 V	201	16.1	33.5
5	4924.00	48.5 PK	74.0	-25.5	2.59 V	356	45.2	3.3
6	4924.00	36.5 AV	54.0	-17.5	2.59 V	356	33.2	3.3

**REMARKS:**

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.3 PK	74.0	-8.7	1.30 H	148	31.9	33.4
2	2390.00	52.5 AV	54.0	-1.5	1.30 H	148	19.1	33.4
3	*2422.00	101.7 PK			1.28 H	150	68.3	33.4
4	*2422.00	91.1 AV			1.28 H	150	57.7	33.4
5	2483.50	57.6 PK	74.0	-16.4	1.33 H	147	24.1	33.5
6	2483.50	46.3 AV	54.0	-7.7	1.33 H	147	12.8	33.5
7	4844.00	52.1 PK	74.0	-21.9	1.29 H	149	48.6	3.5
8	4844.00	38.5 AV	54.0	-15.5	1.29 H	149	35.0	3.5

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	60.4 PK	74.0	-13.6	1.20 V	201	27.0	33.4
2	2390.00	48.5 AV	54.0	-5.5	1.20 V	201	15.1	33.4
3	*2422.00	98.6 PK			1.18 V	191	65.2	33.4
4	*2422.00	88.4 AV			1.18 V	191	55.0	33.4
5	2483.50	57.8 PK	74.0	-16.2	1.32 V	211	24.3	33.5
6	2483.50	45.5 AV	54.0	-8.5	1.32 V	211	12.0	33.5
7	4844.00	48.7 PK	74.0	-25.3	2.15 V	266	45.2	3.5
8	4844.00	35.5 AV	54.0	-18.5	2.15 V	266	32.0	3.5

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 4	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	66.5 PK	74.0	-7.5	1.27 H	167	33.20	33.30
2	2390.00	52.8 AV	54.0	-1.2	1.27 H	167	19.50	33.30
3	*2427.00	104.1 PK			1.23 H	171	70.70	33.40
4	*2427.00	93.9 AV			1.23 H	171	60.50	33.40
5	4854.00	49.8 PK	74.0	-24.2	2.54 H	299	37.40	12.40
6	4854.00	37.7 AV	54.0	-16.3	2.54 H	299	25.30	12.40

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.2 PK	74.0	-11.8	1.01 V	203	28.90	33.30
2	2390.00	49.2 AV	54.0	-4.8	1.01 V	203	15.90	33.30
3	*2427.00	99.0 PK			1.06 V	211	65.60	33.40
4	*2427.00	88.8 AV			1.06 V	211	55.40	33.40
5	4854.00	49.2 PK	74.0	-24.8	1.93 V	134	36.80	12.40
6	4854.00	37.3 AV	54.0	-16.7	1.93 V	134	24.90	12.40

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)– 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	65.7 PK	74.0	-8.3	1.32 H	149	32.3	33.4
2	2390.00	52.8 AV	54.0	-1.2	1.32 H	149	19.4	33.4
3	*2437.00	109.6 PK			1.33 H	147	76.2	33.4
4	*2437.00	99.2 AV			1.33 H	147	65.8	33.4
5	4874.00	51.8 PK	74.0	-22.2	1.33 H	165	48.5	3.3
6	4874.00	38.2 AV	54.0	-15.8	1.33 H	165	34.9	3.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.8 PK	74.0	-13.2	1.25 V	203	27.4	33.4
2	2390.00	49.0 AV	54.0	-5.0	1.25 V	203	15.6	33.4
3	*2437.00	100.8 PK			1.17 V	191	67.4	33.4
4	*2437.00	91.1 AV			1.17 V	191	57.7	33.4
5	4874.00	48.6 PK	74.0	-25.4	2.59 V	325	45.3	3.3
6	4874.00	35.4 AV	54.0	-18.6	2.59 V	325	32.1	3.3

**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 8	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	*2447.00	107.5 PK			1.36 H	166	74.10	33.40
2	*2447.00	97.1 AV			1.36 H	166	63.70	33.40
3	2483.50	64.8 PK	74.0	-9.2	1.07 H	168	31.30	33.50
4	2483.50	52.8 AV	54.0	-1.2	1.07 H	168	19.30	33.50
5	4894.00	50.4 PK	74.0	-23.6	2.88 H	302	37.90	12.50
6	4894.00	37.9 AV	54.0	-16.1	2.88 H	302	25.40	12.50

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2447.00	103.1 PK			1.00 V	207	69.70	33.40
2	*2447.00	92.0 AV			1.00 V	207	58.60	33.40
3	2483.50	61.0 PK	74.0	-13.0	1.09 V	198	27.50	33.50
4	2483.50	48.3 AV	54.0	-5.7	1.09 V	198	14.80	33.50
5	4894.00	49.6 PK	74.0	-24.4	1.88 V	119	37.10	12.50
6	4894.00	37.3 AV	54.0	-16.7	1.88 V	119	24.80	12.50

**REMARKS:**

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
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	57.5 PK	74.0	-16.5	1.15 H	152	24.1	33.4
2	2390.00	46.5 AV	54.0	-7.5	1.15 H	152	13.1	33.4
3	*2452.00	104.7 PK			1.12 H	148	71.2	33.5
4	*2452.00	94.3 AV			1.12 H	148	60.8	33.5
5	2483.50	65.5 PK	74.0	-8.5	1.12 H	148	32.0	33.5
6	2483.50	52.7 AV	54.0	-1.3	1.12 H	148	19.2	33.5
7	4904.00	51.6 PK	74.0	-22.4	1.29 H	156	48.3	3.3
8	4904.00	38.1 AV	54.0	-15.9	1.29 H	156	34.8	3.3

**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	57.0 PK	74.0	-17.0	1.23 V	199	23.6	33.4
2	2390.00	45.7 AV	54.0	-8.3	1.23 V	199	12.3	33.4
3	*2452.00	100.5 PK			1.22 V	192	67.0	33.5
4	*2452.00	90.9 AV			1.22 V	192	57.4	33.5
5	2483.50	61.3 PK	74.0	-12.7	1.22 V	192	27.8	33.5
6	2483.50	48.6 AV	54.0	-5.4	1.22 V	192	15.1	33.5
7	4904.00	48.5 PK	74.0	-25.5	2.56 V	325	45.2	3.3
8	4904.00	35.9 AV	54.0	-18.1	2.56 V	325	32.6	3.3

**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 Data: 802.11b

CHANNEL	TX Channel 11	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	57.07	26.1 QP	40.0	-13.9	1.00 H	259	35.3	-9.2
2	113.34	31.1 QP	43.5	-12.4	1.51 H	70	42.8	-11.7
3	134.68	33.8 QP	43.5	-9.7	1.00 H	247	43.5	-9.7
4	379.17	29.7 QP	46.0	-16.3	1.00 H	321	35.3	-5.6
5	520.82	29.3 QP	46.0	-16.7	1.51 H	195	32.3	-3.0
6	747.85	35.6 QP	46.0	-10.4	1.51 H	7	33.2	2.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.07	34.9 QP	40.0	-5.1	1.49 V	13	44.1	-9.2
2	113.34	30.6 QP	43.5	-12.9	1.00 V	220	42.3	-11.7
3	132.74	35.8 QP	43.5	-7.7	1.49 V	53	45.8	-10.0
4	367.53	28.7 QP	46.0	-17.3	2.00 V	340	34.4	-5.7
5	480.07	30.2 QP	46.0	-15.8	1.00 V	112	33.9	-3.7
6	912.78	35.7 QP	46.0	-10.3	2.00 V	99	30.4	5.3

REMARKS:

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

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

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

### 4.2.2 Test Instruments

Tested date: Jul. 09, 2018

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 06, 2018	Mar. 05, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 31, 2017	Jul. 30, 2018
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-2040.

### 4.2.3 Test Procedures

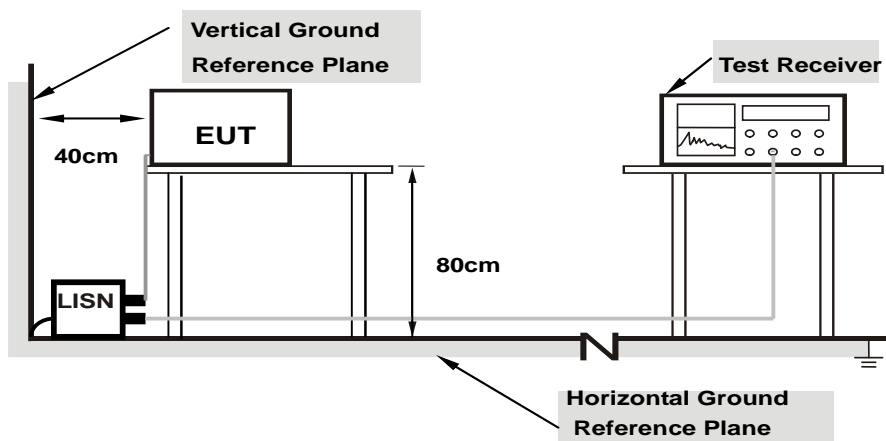
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

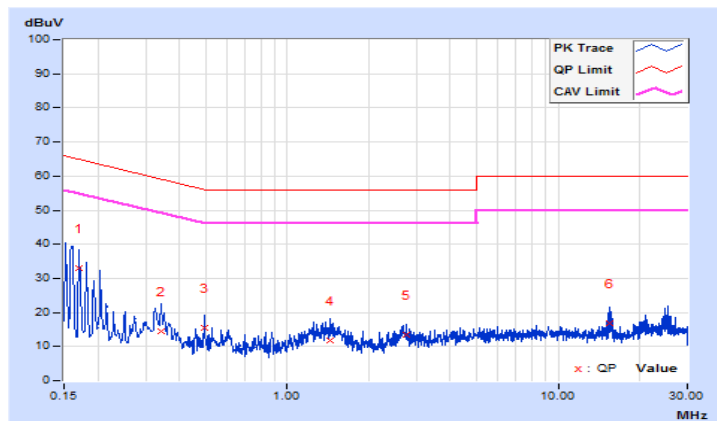
Worst-case data: 802.11g

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

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	0.17025	9.67	23.23	1.85	32.90	11.52	64.95
2	0.34244	9.66	4.67	1.35	14.33	11.01	59.14	49.14	-44.81	-38.13
3	0.49428	9.66	5.68	2.33	15.34	11.99	56.10	46.10	-40.76	-34.11
4	1.44825	9.66	2.00	0.21	11.66	9.87	56.00	46.00	-44.34	-36.13
5	2.73750	9.70	3.79	1.22	13.49	10.92	56.00	46.00	-42.51	-35.08
6	15.55575	9.89	6.87	5.26	16.76	15.15	60.00	50.00	-43.24	-34.85

#### REMARKS:

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



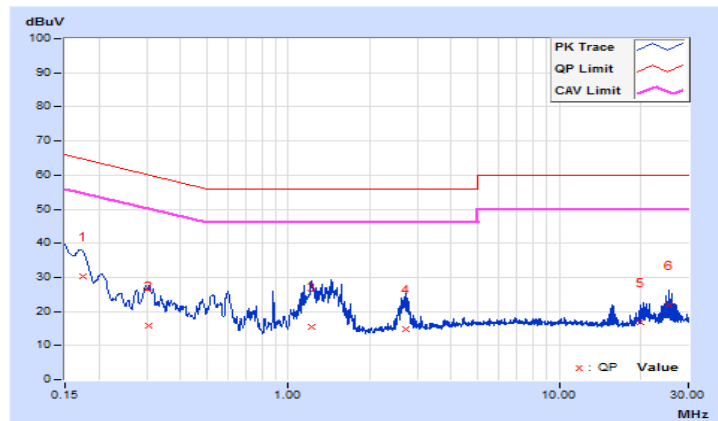


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	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	0.17475	9.68	20.78	0.70	30.46	10.38	64.73
2	0.30731	9.67	6.18	1.76	15.85	11.43	60.04	50.04	-44.19	-38.61
3	1.22550	9.66	5.81	0.44	15.47	10.10	56.00	46.00	-40.53	-35.90
4	2.71950	9.70	5.11	0.65	14.81	10.35	56.00	46.00	-41.19	-35.65
5	19.95000	10.01	6.93	1.69	16.94	11.70	60.00	50.00	-43.06	-38.30
<b>6</b>	<b>25.30950</b>	<b>10.03</b>	<b>11.82</b>	<b>11.08</b>	<b>21.85</b>	<b>21.11</b>	<b>60.00</b>	<b>50.00</b>	<b>-38.15</b>	<b>-28.89</b>

**REMARKS:**

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

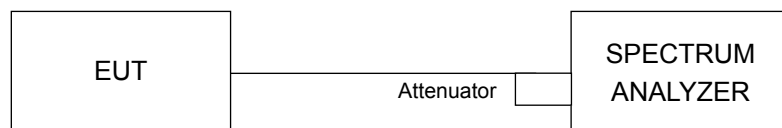


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

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

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

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

#### 4.3.7 Test Result

##### 802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
		Chain 0		
1	2412	9.03	0.5	Pass
6	2437	8.58	0.5	Pass
11	2462	8.11	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
		Chain 0		
1	2412	16.38	0.5	Pass
6	2437	16.40	0.5	Pass
11	2462	16.38	0.5	Pass

##### 802.11n (HT20)

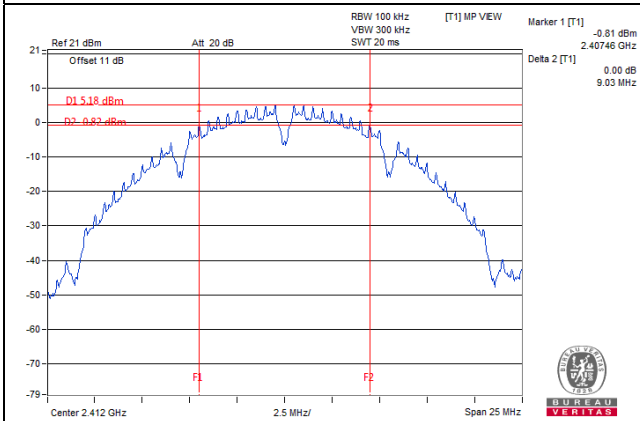
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
		Chain 0		
1	2412	17.59	0.5	Pass
6	2437	17.57	0.5	Pass
11	2462	17.10	0.5	Pass

##### 802.11n (HT40)

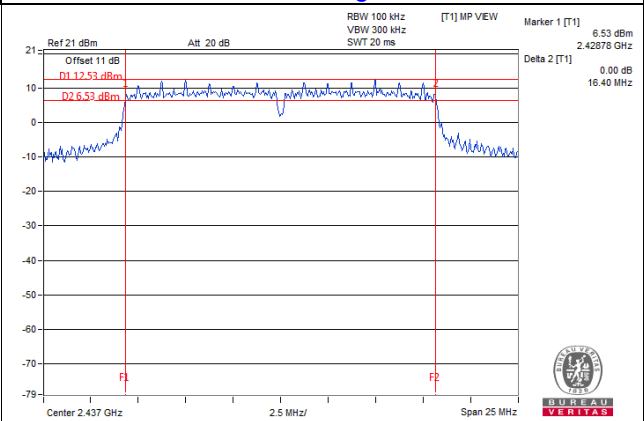
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
		Chain 0		
3	2422	35.22	0.5	Pass
6	2437	35.20	0.5	Pass
9	2452	35.16	0.5	Pass

### Spectrum Plot of Worst Value

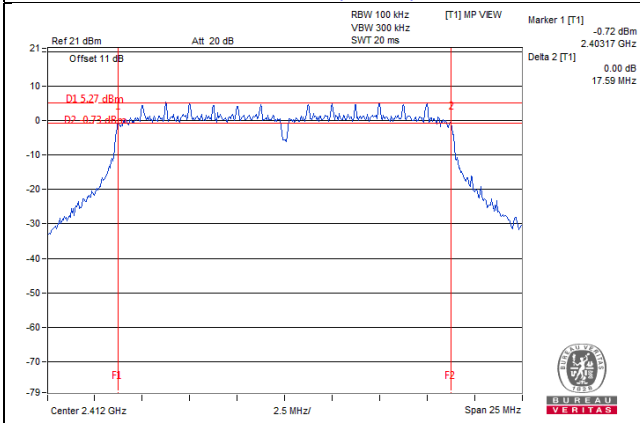
#### 802.11b



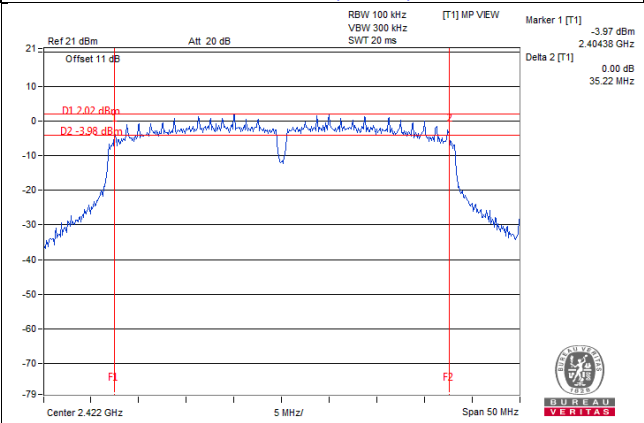
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

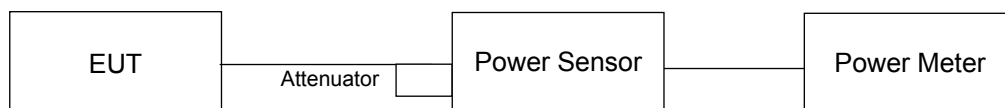


## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

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

### 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 (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	20.941	13.21	29.75	Pass
6	2437	26.002	14.15	29.75	Pass
11	2462	34.834	15.42	29.75	Pass

##### 802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	45.604	16.59	29.75	Pass
2	2417	65.917	18.19	29.75	Pass
6	2437	153.815	21.87	29.75	Pass
10	2457	83.176	19.20	29.75	Pass
11	2462	62.230	17.94	29.75	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	34.914	15.43	29.75	Pass
2	2417	56.754	17.54	29.75	Pass
6	2437	<b>161.065</b>	22.07	29.75	Pass
10	2457	70.795	18.50	29.75	Pass
11	2462	67.143	18.27	29.75	Pass

##### 802.11n (HT40)

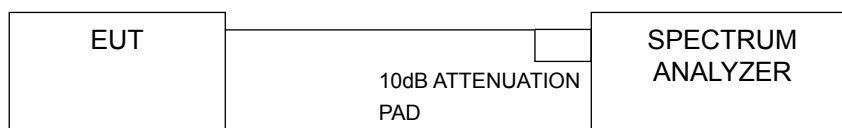
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	28.119	14.49	29.75	Pass
4	2427	28.314	14.52	29.75	Pass
6	2437	64.714	18.11	29.75	Pass
8	2447	66.374	18.22	29.75	Pass
9	2452	60.674	17.83	29.75	Pass

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

### 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 duty cycle  $\geq 98\%$

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

For duty cycle  $< 98\%$

- a. Measure the duty cycle (x).
- b. Set instrument center frequency to DTS channel center frequency.
- c. Set span to at least 1.5 times the OBW.
- d. Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- e. Set VBW  $\geq 3 \times \text{RBW}$ .
- f. Detector = power averaging (RMS) or sample detector (when RMS not available).
- g. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$ .
- h. Sweep time = auto couple.
- i. Don't use sweep triggering. Allow sweep to "free run".
- j. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- k. Use the peak marker function to determine the maximum amplitude level.
- l. 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

Channel	Freq. (MHz)	PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-14.17	7.75	Pass
6	2437	-12.04	7.75	Pass
11	2462	-11.36	7.75	Pass

##### 802.11g

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/10kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-13.52	0.16	-13.35	7.75	Pass
6	2437	-7.70	0.16	-7.53	7.75	Pass
11	2462	-12.08	0.16	-11.91	7.75	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/10kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-15.23	0.17	-15.07	7.75	Pass
6	2437	-8.74	0.17	-8.58	7.75	Pass
11	2462	-12.01	0.17	-11.85	7.75	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11n (HT40)

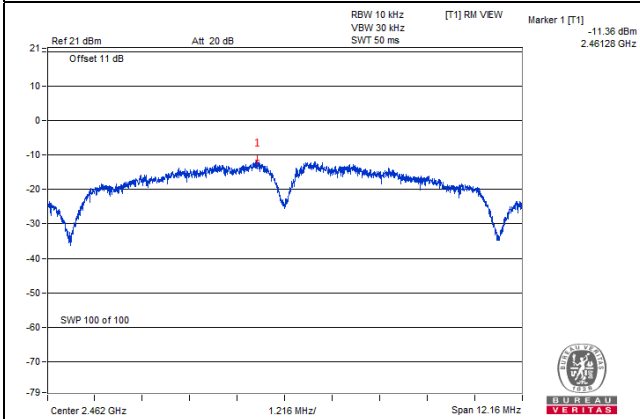
Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/10kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
3	2422	-17.77	0.36	-17.44	7.75	Pass
6	2437	-13.69	0.36	-13.36	7.75	Pass
9	2452	-14.85	0.36	-14.52	7.75	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

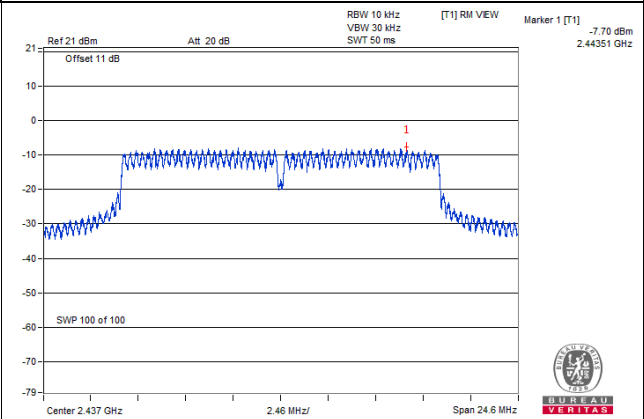


### Spectrum Plot of Worst Value

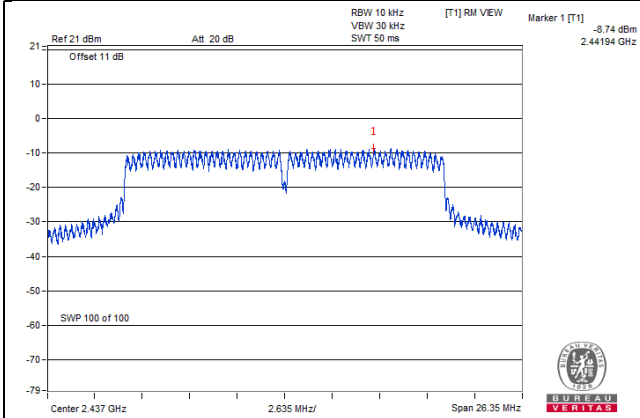
#### 802.11b



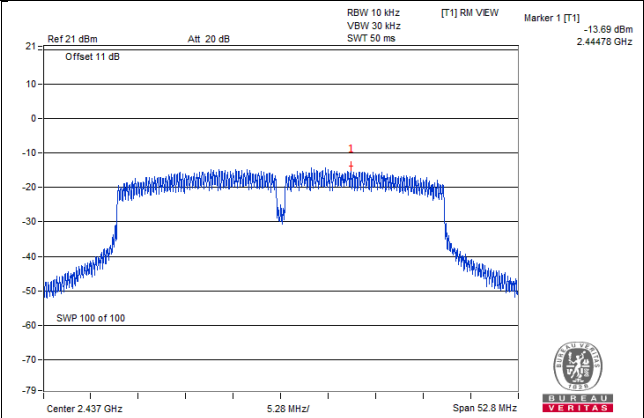
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

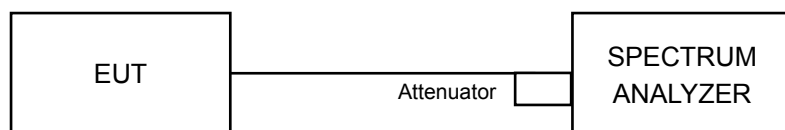


## 4.6 Conducted Out of Band Emission Measurement

### 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 = average.
- 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.
- Ensure that the number of measurement points  $\geq$  span/RBW
- According to measurement points to set differ measurement span.
- Detector = average.
- Trace Mode = max hold.
- Sweep = auto couple.

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

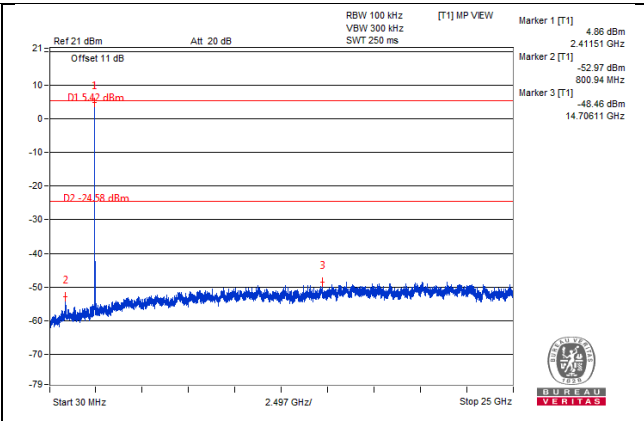
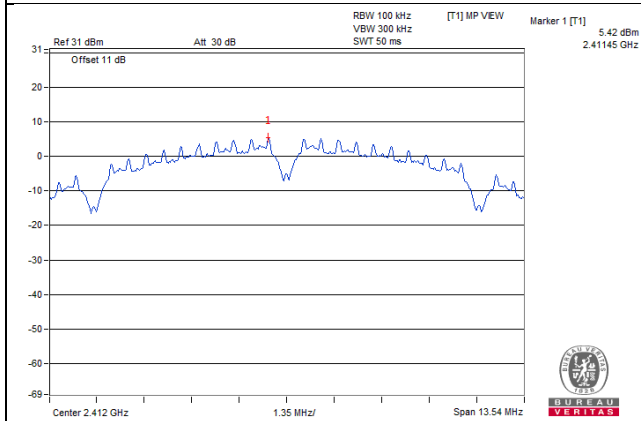
Same as Item 4.3.6

### 4.6.7 Test Results

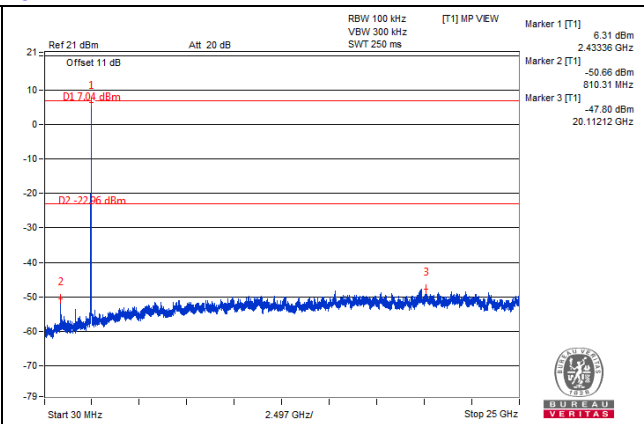
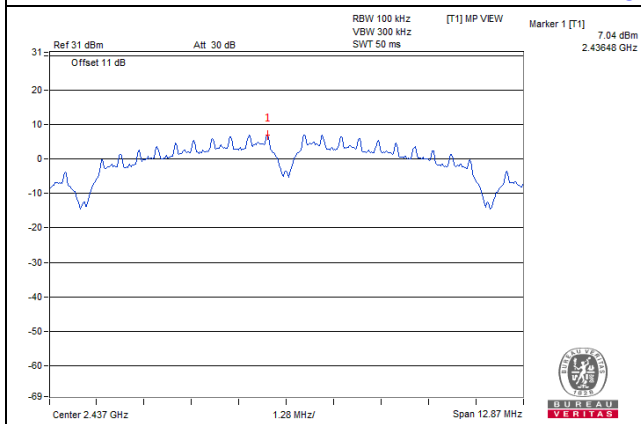
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

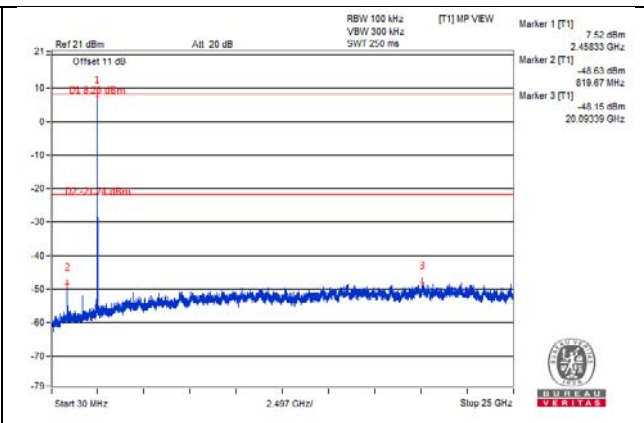
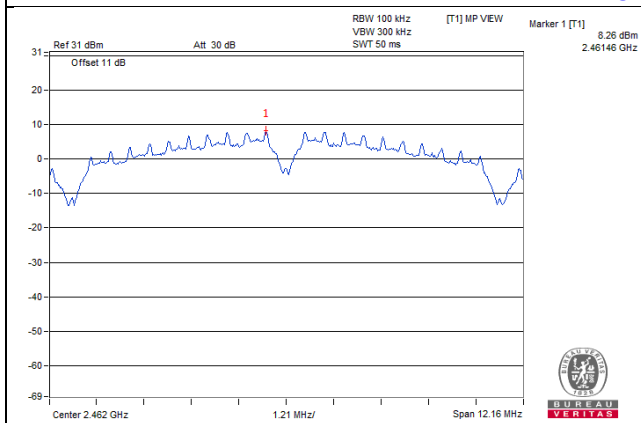
CH 1



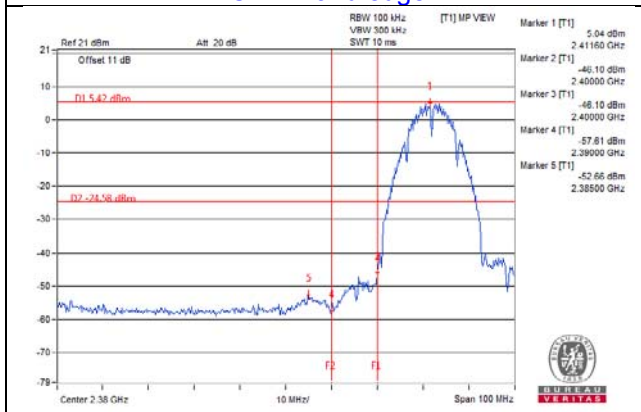
CH 6



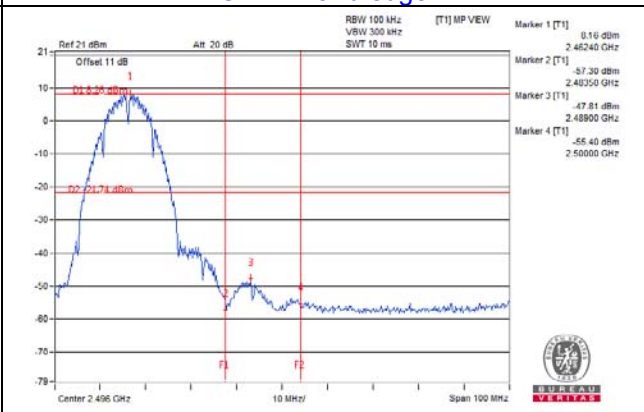
CH 11



CH 1 Band edge

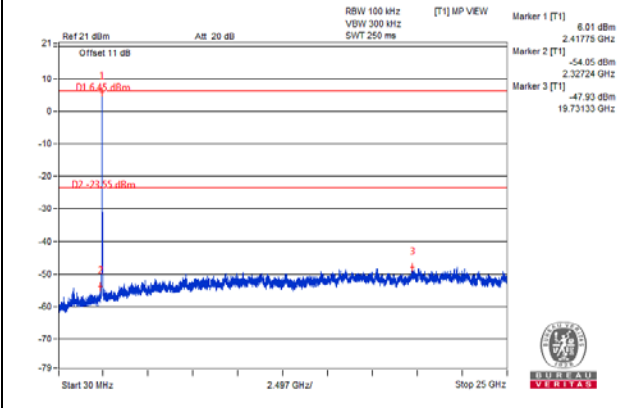
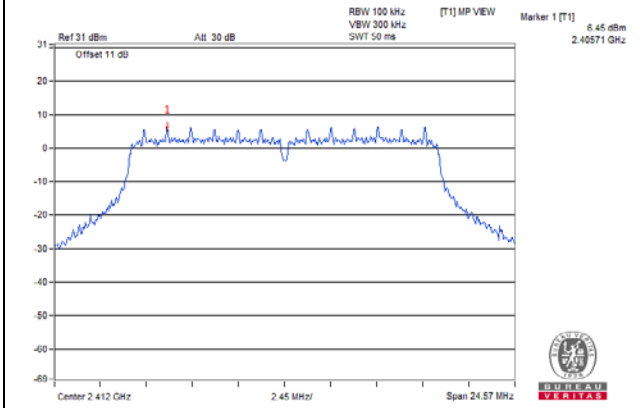


CH 11 Band edge

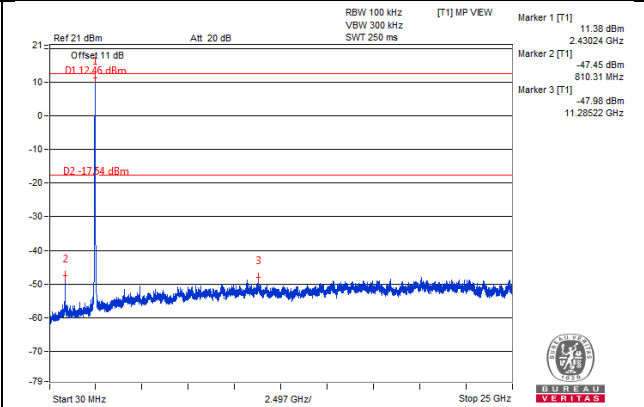
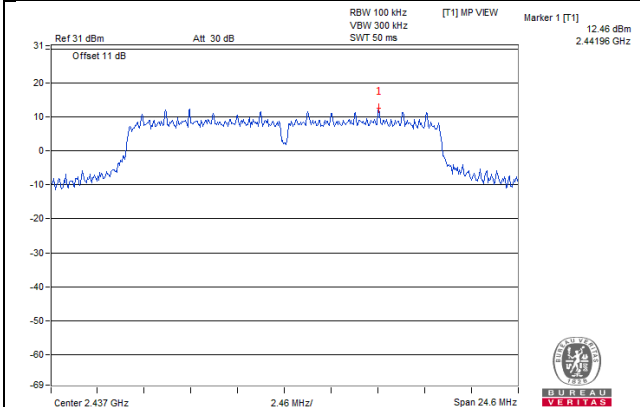


802.11g

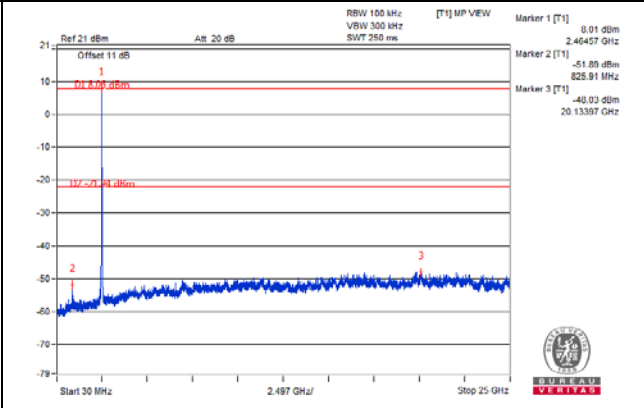
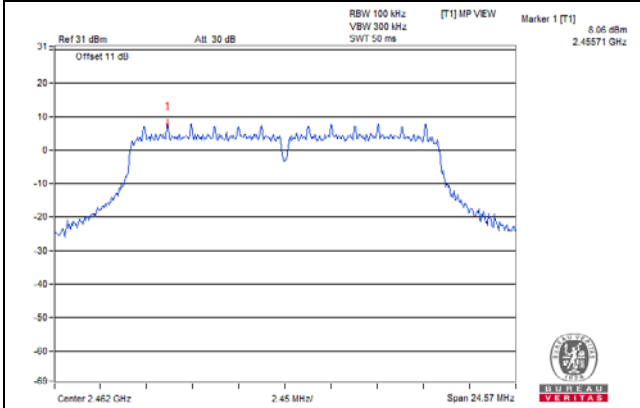
CH 1



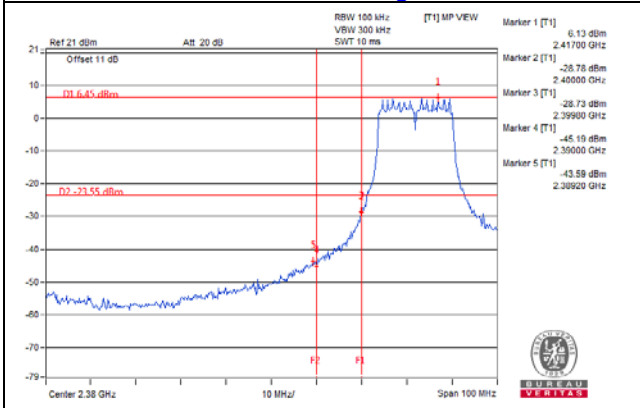
CH 6



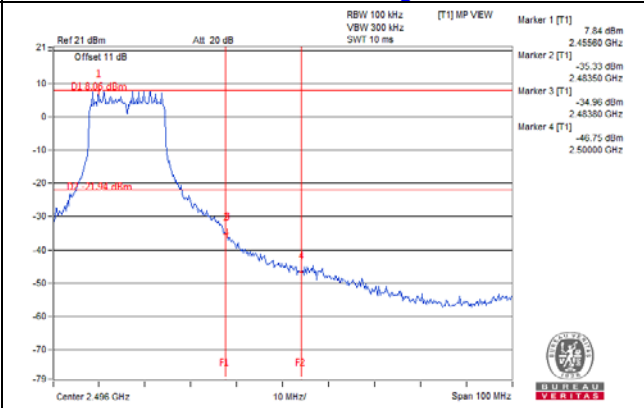
CH 11



CH 1 Band edge

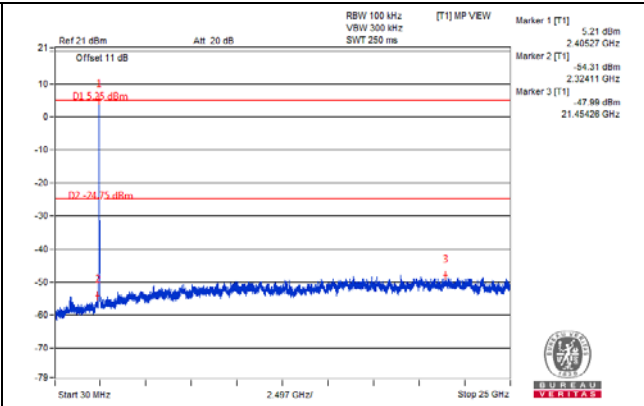
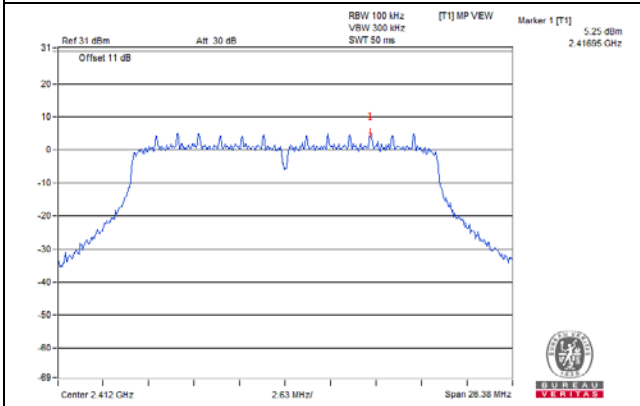


CH 11 Band edge

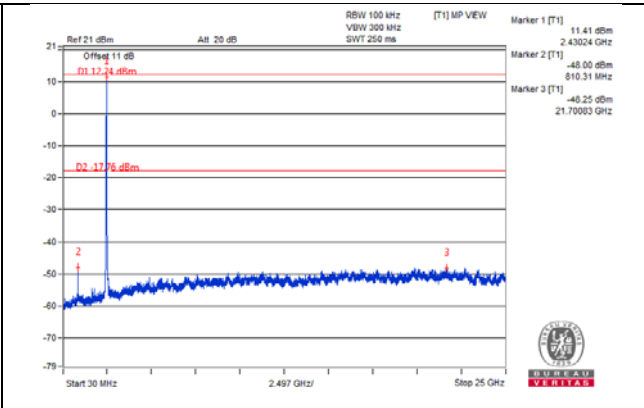
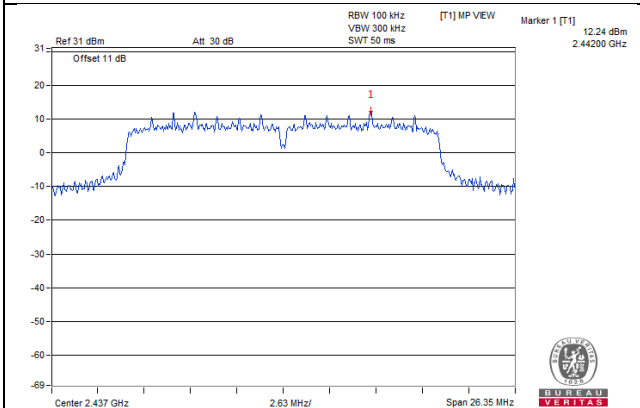


802.11n (HT20)

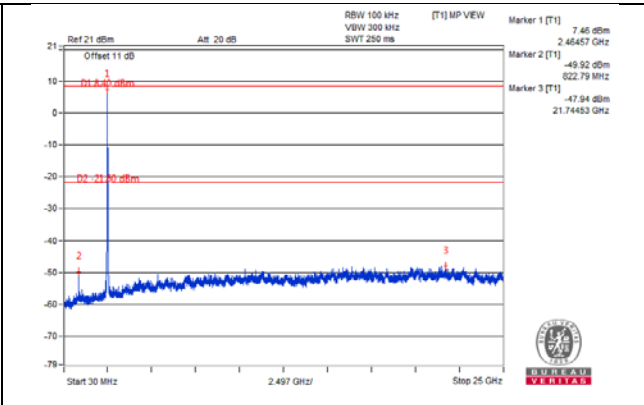
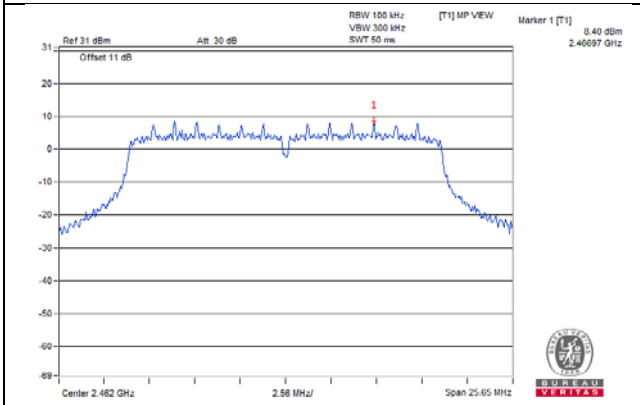
CH 1



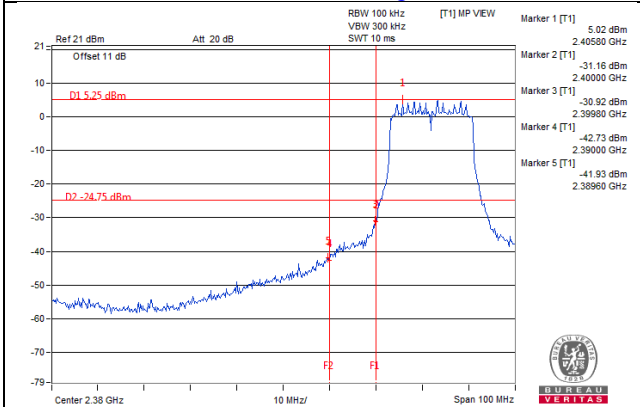
CH 6



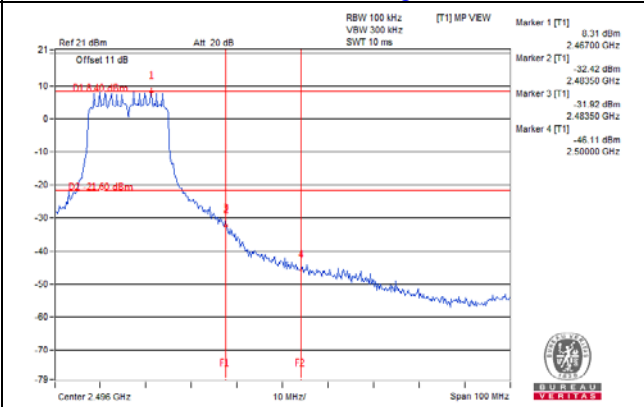
CH 11



CH 1 Band edge

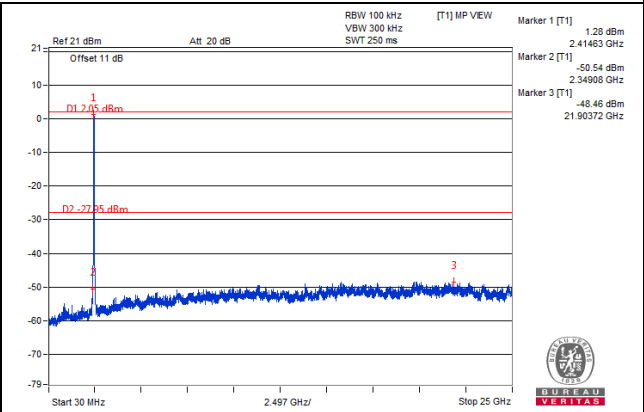
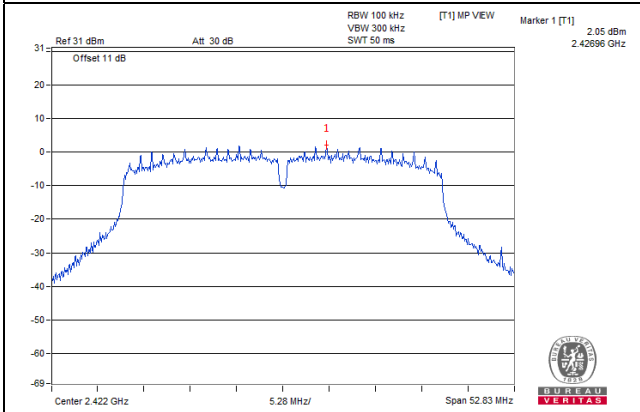


CH 11 Band edge

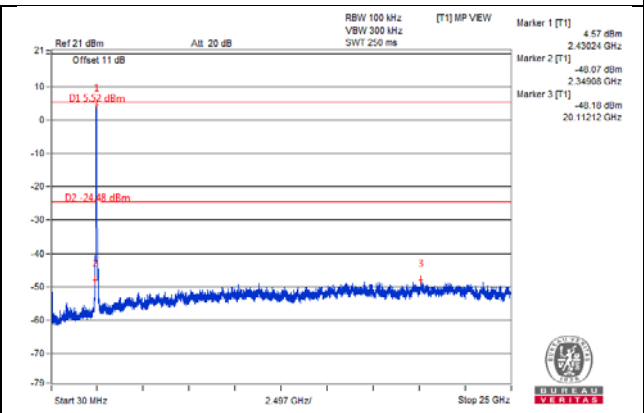
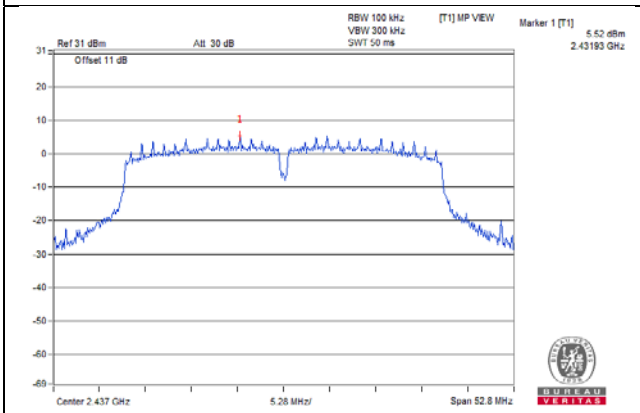


802.11n (HT40)

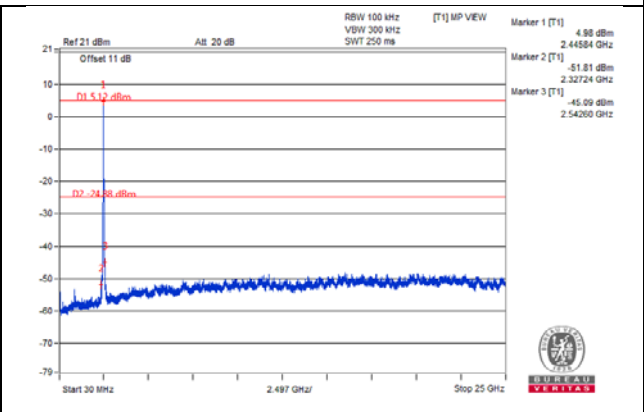
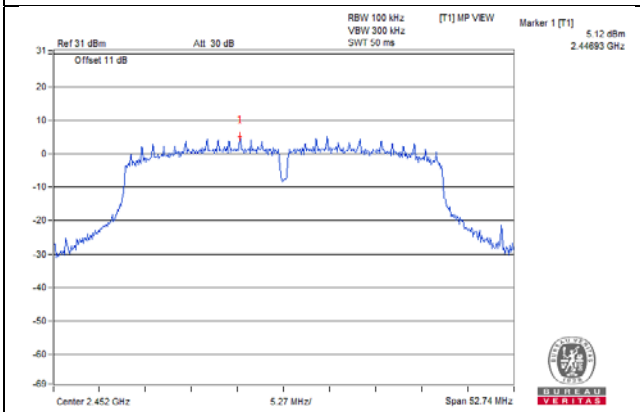
CH 3



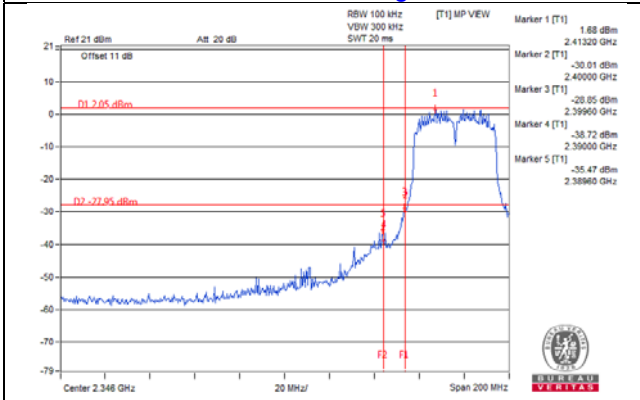
CH 6



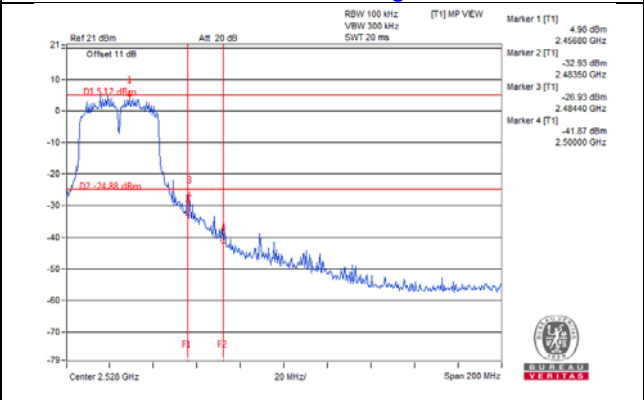
CH 9



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 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:

**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](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 ---