

## FCC Test Report

**Report No.:** RF150615E13

**FCC ID:** MCLJ20H090

**Test Model:** J20H090

**Received Date:** June 12, 2015

**Test Date:** June 12 to 25, 2015

**Issued Date:** July 16, 2015

**Applicant:** HON HAI PRECISION IND.CO.,LTD

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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## 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.....	13
<b>4 Test Types and Results</b> .....	<b>14</b>
4.1 Radiated Emission and Bandedge Measurement.....	14
4.1.1 Limits of Radiated Emission and Bandedge Measurement.....	14
4.1.2 Test Instruments.....	15
4.1.3 Test Procedures.....	16
4.1.4 Deviation from Test Standard.....	16
4.1.5 Test Setup.....	17
4.1.6 EUT Operating Conditions.....	17
4.1.7 Test Results.....	18
4.2 Conducted Emission Measurement.....	28
4.2.1 Limits of Conducted Emission Measurement.....	28
4.2.2 Test Instruments'.....	28
4.2.3 Test Procedures.....	29
4.2.4 Deviation from Test Standard.....	29
4.2.5 Test Setup.....	29
4.2.6 EUT Operating Conditions.....	29
4.2.7 Test Results.....	30
4.3 6dB Bandwidth Measurement.....	32
4.3.1 Limits of 6dB Bandwidth Measurement.....	32
4.3.2 Test Setup.....	32
4.3.3 Test Instruments.....	32
4.3.4 Test Procedure.....	32
4.3.5 Deviation from Test Standard.....	32
4.3.6 EUT Operating Conditions.....	32
4.3.7 Test Result.....	33
4.4 Conducted Output Power Measurement.....	35
4.4.1 Limits of Conducted Output Power Measurement.....	35
4.4.2 Test Setup.....	35
4.4.3 Test Instruments.....	35
4.4.4 Test Procedures.....	35
4.4.5 Deviation from Test Standard.....	35
4.4.6 EUT Operating Conditions.....	35
4.4.7 Test Results.....	36
4.5 Power Spectral Density Measurement.....	38
4.5.1 Limits of Power Spectral Density Measurement.....	38
4.5.2 Test Setup.....	38
4.5.3 Test Instruments.....	38
4.5.4 Test Procedure.....	38
4.5.5 Deviation from Test Standard.....	38
4.5.6 EUT Operating Condition.....	38



4.5.7 Test Results .....	39
4.6 Conducted Out of Band Emission Measurement.....	41
4.6.1 Limits of Conducted Out of Band Emission Measurement .....	41
4.6.2 Test Setup.....	41
4.6.3 Test Instruments .....	41
4.6.4 Test Procedure .....	41
4.6.5 Deviation from Test Standard .....	41
4.6.6 EUT Operating Condition .....	42
4.6.7 Test Results .....	42
<b>5 Pictures of Test Arrangements.....</b>	<b>46</b>
<b>Appendix – Information on the Testing Laboratories .....</b>	<b>47</b>



### Release Control Record

Issue No.	Description	Date Issued
RF150615E13	Original release.	July 16, 2015



## 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 -16.89dB at 1.91406MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz & 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.37 dB
	200MHz ~ 1000MHz	3.65 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	WLAN module
Brand	FOXCONN
Test Model	J20H090
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 72.2Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11
Output Power	396.278mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand	Model	Ant. Gain(dBi)	Frequency range	Antenna Type	Connector Type
Chain (0)	Foxconn WiFi	J20H090	2.54	2412MHz	PCB printing Ant.	NA
			2.98	2442MHz		
			2.64	2484MHz		
Chain (1)	Foxconn WiFi	J20H090	3.08	2412MHz	PCB printing Ant.	NA
			3.15	2442MHz		
			2.57	2484MHz		

2. The EUT incorporates a SISO function.

Modulation mode	Data Rate (MCS)	TX & RX configuration	
802.11b	1 ~ 11Mbps	1TX (Fixed Chan 0)	1RX (Diversity)
802.11g	6 ~ 54Mbps	1TX (Fixed Chan 0)	1RX (Diversity)
802.11n (HT20)	MCS 0~7	1TX (Fixed Chan 0)	1RX (Diversity)

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

### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

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



### 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

#### **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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

#### **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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

**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.

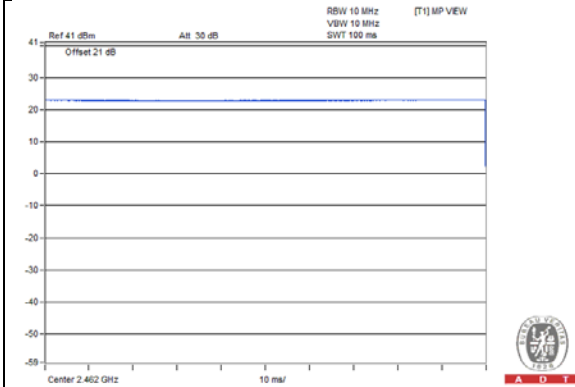
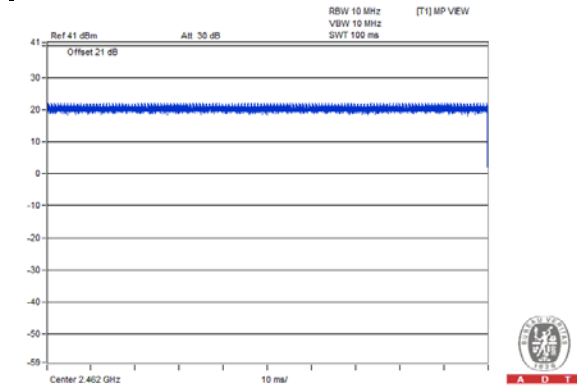
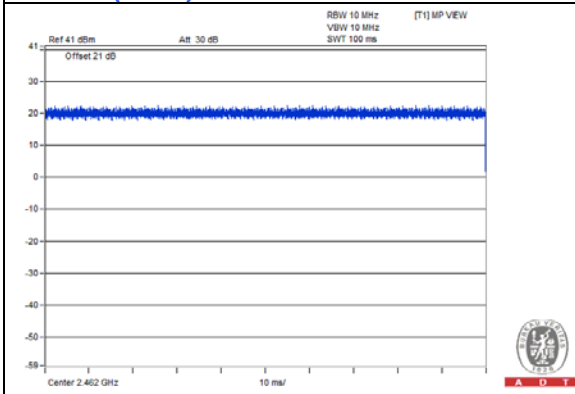
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

**Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	27deg. C, 65%RH	120Vac, 60Hz (System)	Weiwei Lo
RE<1G	22deg. C, 69%RH	120Vac, 60Hz (System)	Weiwei Lo
PLC	25deg. C, 68%RH	120Vac, 60Hz (System)	JyunChun.Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz (System)	Gary Cheng

### 3.3 Duty Cycle of Test Signal

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

**802.11b****802.11g****802.11n (HT20)**

### 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.

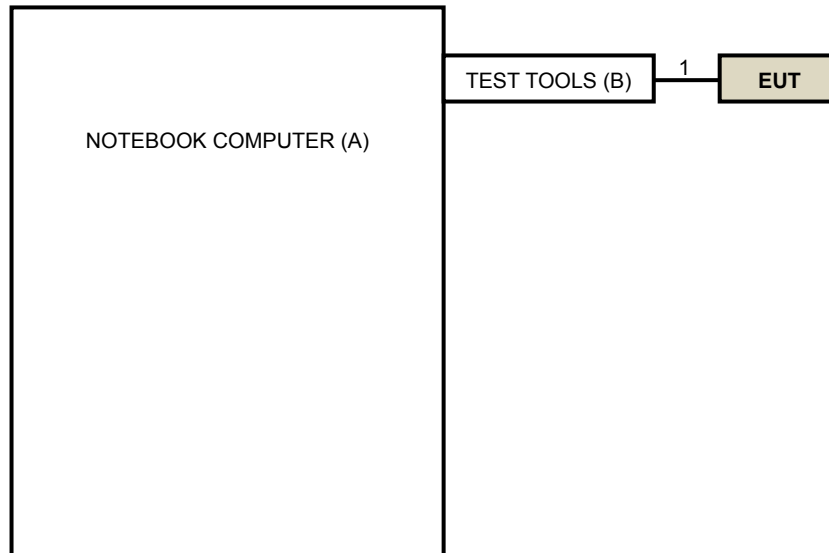
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E6440	67LYQ32	FCC DoC	Provided by Lab
B	TEST TOOLS	FOXCONN	NA	NA	NA	Supplied by Client

**NOTE:**

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	USB	1	0.1	No	0	Supplied by Client

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.247)**  
**558074 D01 DTS Meas Guidance v03r02**  
ANSI C63.10-2013 2009

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

**NOTE:**

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



4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 21,2014	July 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISl	AIH.8018	0000320091110	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKka-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: June 12 to 23, 2015

#### 4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

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

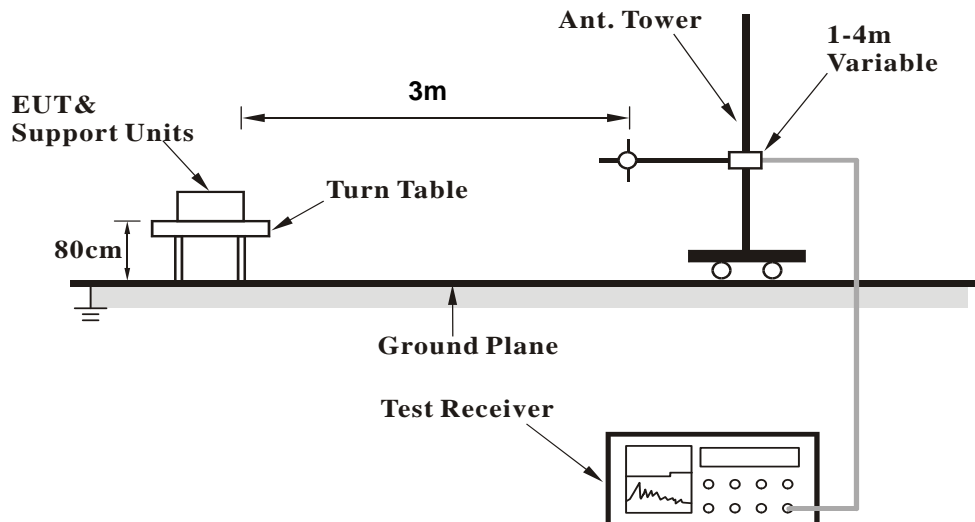
#### 4.1.4 Deviation from Test Standard

No deviation.

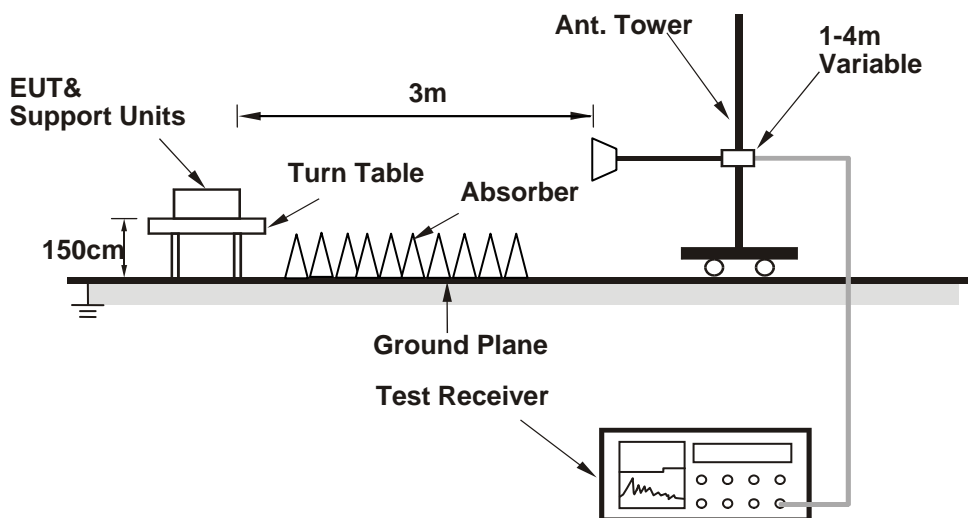


#### 4.1.5 Test Setup

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.1.6 EUT Operating Conditions

- a. Plugged the EUT into notebook via external board and placed them on the testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data :

802.11b

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	60.0 PK	74.0	-14.0	1.32 H	10	61.43	-1.43
2	2390.00	53.5 AV	54.0	-0.5	1.32 H	10	54.93	-1.43
3	*2412.00	109.8 PK			1.32 H	10	111.18	-1.38
4	*2412.00	107.5 AV			1.32 H	10	108.88	-1.38
5	4824.00	52.3 PK	74.0	-21.7	1.00 H	113	45.21	7.09
6	4824.00	41.7 AV	54.0	-12.3	1.00 H	113	34.61	7.09

**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	54.8 PK	74.0	-19.2	2.22 V	265	56.23	-1.43
2	2390.00	48.4 AV	54.0	-5.6	2.22 V	265	49.83	-1.43
3	*2412.00	105.2 PK			2.22 V	265	106.58	-1.38
4	*2412.00	102.3 AV			2.22 V	265	103.68	-1.38
5	4824.00	49.5 PK	74.0	-24.5	1.00 V	139	42.41	7.09
6	4824.00	39.7 AV	54.0	-14.3	1.00 V	139	32.61	7.09

**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.

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	57.6 PK	74.0	-16.4	1.46 H	7	59.03	-1.43
2	2390.00	49.3 AV	54.0	-4.7	1.46 H	7	50.73	-1.43
3	*2437.00	113.5 PK			1.46 H	7	114.82	-1.32
4	*2437.00	110.9 AV			1.46 H	7	112.22	-1.32
5	2483.50	57.2 PK	74.0	-16.8	1.46 H	7	58.41	-1.21
6	2483.50	47.6 AV	54.0	-6.4	1.46 H	7	48.81	-1.21
7	4874.00	50.8 PK	74.0	-23.2	1.13 H	360	43.55	7.25
8	4874.00	43.5 AV	54.0	-10.5	1.13 H	360	36.25	7.25
9	7311.00	58.1 PK	74.0	-15.9	1.13 H	360	43.65	14.45
10	7311.00	46.5 AV	54.0	-7.5	1.13 H	360	32.05	14.45

**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	52.4 PK	74.0	-21.6	2.16 V	264	53.83	-1.43
2	2390.00	44.2 AV	54.0	-9.8	2.16 V	264	45.63	-1.43
3	*2437.00	108.4 PK			2.16 V	264	109.72	-1.32
4	*2437.00	105.4 AV			2.16 V	264	106.72	-1.32
5	2483.50	51.6 PK	74.0	-22.4	2.16 V	264	52.81	-1.21
6	2483.50	40.3 AV	54.0	-13.7	2.16 V	264	41.51	-1.21
7	4874.00	50.3 PK	74.0	-23.7	1.00 V	200	43.05	7.25
8	4874.00	40.8 AV	54.0	-13.2	1.00 V	200	33.55	7.25
9	7311.00	56.8 PK	74.0	-17.2	1.00 V	200	42.35	14.45
10	7311.00	44.3 AV	54.0	-9.7	1.00 V	200	29.85	14.45

**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.

<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	110.0 PK			1.61 H	9	111.26	-1.26
2	*2462.00	107.7 AV			1.61 H	9	108.96	-1.26
3	2483.50	60.8 PK	74.0	-13.2	1.61 H	9	62.01	-1.21
4	2483.50	53.8 AV	54.0	-0.2	1.61 H	9	55.01	-1.21
5	4924.00	50.5 PK	74.0	-23.5	1.11 H	354	43.05	7.45
6	4924.00	43.1 AV	54.0	-10.9	1.11 H	354	35.65	7.45
7	7386.00	57.6 PK	74.0	-16.4	1.17 H	352	43.08	14.52
8	7386.00	46.3 AV	54.0	-7.7	1.17 H	352	31.78	14.52

**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	104.4 PK			2.01 V	263	105.66	-1.26
2	*2462.00	102.4 AV			2.01 V	263	103.66	-1.26
3	2483.50	54.7 PK	74.0	-19.3	2.01 V	263	55.91	-1.21
4	2483.50	48.6 AV	54.0	-5.4	2.01 V	263	49.81	-1.21
5	4924.00	50.1 PK	74.0	-23.9	1.04 V	197	42.65	7.45
6	4924.00	40.6 AV	54.0	-13.4	1.04 V	197	33.15	7.45
7	7386.00	57.3 PK	74.0	-16.7	1.01 V	210	42.78	14.52
8	7386.00	44.6 AV	54.0	-9.4	1.01 V	210	30.08	14.52

**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

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.0 PK	74.0	-2.0	1.32 H	10	73.43	-1.43
2	2390.00	53.5 AV	54.0	-0.5	1.32 H	10	54.93	-1.43
3	*2412.00	109.0 PK			1.32 H	10	110.38	-1.38
4	*2412.00	99.5 AV			1.32 H	10	100.88	-1.38
5	4824.00	49.9 PK	74.0	-24.1	1.04 H	345	42.81	7.09
6	4824.00	42.8 AV	54.0	-11.2	1.04 H	345	35.71	7.09

**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	67.1 PK	74.0	-6.9	1.97 V	271	68.53	-1.43
2	2390.00	48.9 AV	54.0	-5.1	1.97 V	271	50.33	-1.43
3	*2412.00	104.4 PK			1.97 V	271	105.78	-1.38
4	*2412.00	94.3 AV			1.97 V	271	95.68	-1.38
5	4824.00	49.4 PK	74.0	-24.6	1.04 V	199	42.31	7.09
6	4824.00	38.9 AV	54.0	-15.1	1.04 V	199	31.81	7.09

**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.

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.0 PK	74.0	-6.0	1.77 H	6	69.43	-1.43
2	2390.00	53.0 AV	54.0	-1.0	1.77 H	6	54.43	-1.43
3	*2437.00	113.0 PK			1.77 H	6	114.32	-1.32
4	*2437.00	105.9 AV			1.77 H	6	107.22	-1.32
5	2483.50	66.0 PK	74.0	-8.0	1.77 H	6	67.21	-1.21
6	2483.50	48.4 AV	54.0	-5.6	1.77 H	6	49.61	-1.21
7	4874.00	49.6 PK	74.0	-24.4	1.07 H	355	42.35	7.25
8	4874.00	42.6 AV	54.0	-11.4	1.07 H	355	35.35	7.25
9	7311.00	57.3 PK	74.0	-16.7	1.12 H	358	42.85	14.45
10	7311.00	45.4 AV	54.0	-8.6	1.12 H	358	30.95	14.45

**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	62.4 PK	74.0	-11.6	1.96 V	277	63.83	-1.43
2	2390.00	47.6 AV	54.0	-6.4	1.96 V	277	49.03	-1.43
3	*2437.00	108.2 PK			1.96 V	277	109.52	-1.32
4	*2437.00	100.4 AV			1.96 V	277	101.72	-1.32
5	2483.50	64.3 PK	74.0	-9.7	1.96 V	277	65.51	-1.21
6	2483.50	45.4 AV	54.0	-8.6	1.96 V	277	46.61	-1.21
7	4874.00	49.6 PK	74.0	-24.4	1.02 V	205	42.35	7.25
8	4874.00	39.4 AV	54.0	-14.6	1.02 V	205	32.15	7.25
9	7311.00	56.4 PK	74.0	-17.6	1.01 V	218	41.95	14.45
10	7311.00	43.2 AV	54.0	-10.8	1.01 V	218	28.75	14.45

**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.

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.2 PK			1.67 H	7	110.46	-1.26
2	*2462.00	100.6 AV			1.67 H	7	101.86	-1.26
3	2483.50	72.3 PK	74.0	-1.7	1.67 H	7	73.51	-1.21
4	<b>2483.50</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.67 H</b>	<b>7</b>	<b>55.11</b>	<b>-1.21</b>
5	4924.00	49.0 PK	74.0	-25.0	1.12 H	351	41.55	7.45
6	4924.00	42.3 AV	54.0	-11.7	1.12 H	351	34.85	7.45
7	7386.00	57.8 PK	74.0	-16.2	1.07 H	360	43.28	14.52
8	7386.00	45.8 AV	54.0	-8.2	1.07 H	360	31.28	14.52

**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	105.3 PK			1.92 V	276	106.56	-1.26
2	*2462.00	95.6 AV			1.92 V	276	96.86	-1.26
3	2483.50	66.9 PK	74.0	-7.1	1.92 V	276	68.11	-1.21
4	2483.50	49.6 AV	54.0	-4.4	1.92 V	276	50.81	-1.21
5	4924.00	49.2 PK	74.0	-24.8	1.00 V	221	41.75	7.45
6	4924.00	39.0 AV	54.0	-15.0	1.00 V	221	31.55	7.45
7	7386.00	56.6 PK	74.0	-17.4	1.02 V	211	42.08	14.52
8	7386.00	43.3 AV	54.0	-10.7	1.02 V	211	28.78	14.52

**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)

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.0 PK	74.0	-2.0	1.52 H	7	73.43	-1.43
2	<b>2390.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.52 H</b>	<b>7</b>	<b>55.33</b>	<b>-1.43</b>
3	*2412.00	108.3 PK			1.52 H	7	109.68	-1.38
4	*2412.00	98.8 AV			1.52 H	7	100.18	-1.38
5	4824.00	49.7 PK	74.0	-24.3	1.02 H	338	42.61	7.09
6	4824.00	42.4 AV	54.0	-11.6	1.02 H	338	35.31	7.09

**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	66.9 PK	74.0	-7.1	1.94 V	273	68.33	-1.43
2	2390.00	48.6 AV	54.0	-5.4	1.94 V	273	50.03	-1.43
3	*2412.00	104.4 PK			1.94 V	273	105.78	-1.38
4	*2412.00	93.3 AV			1.94 V	273	94.68	-1.38
5	4824.00	49.3 PK	74.0	-24.7	1.05 V	192	42.21	7.09
6	4824.00	38.7 AV	54.0	-15.3	1.05 V	192	31.61	7.09

**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.



<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	69.0 PK	74.0	-5.0	1.76 H	6	70.43	-1.43
2	2390.00	53.5 AV	54.0	-0.5	1.76 H	6	54.93	-1.43
3	*2437.00	113.4 PK			1.76 H	6	114.72	-1.32
4	*2437.00	104.0 AV			1.76 H	6	105.32	-1.32
5	2483.50	66.6 PK	74.0	-7.4	1.76 H	6	67.81	-1.21
6	2483.50	48.7 AV	54.0	-5.3	1.76 H	6	49.91	-1.21
7	4874.00	49.9 PK	74.0	-24.1	1.06 H	358	42.65	7.25
8	4874.00	43.1 AV	54.0	-10.9	1.06 H	358	35.85	7.25
9	7311.00	57.6 PK	74.0	-16.4	1.09 H	351	43.15	14.45
10	7311.00	45.7 AV	54.0	-8.3	1.09 H	351	31.25	14.45

**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	64.5 PK	74.0	-9.5	1.98 V	291	65.93	-1.43
2	2390.00	48.3 AV	54.0	-5.7	1.98 V	291	49.73	-1.43
3	*2437.00	108.1 PK			1.98 V	291	109.42	-1.32
4	*2437.00	100.5 AV			1.98 V	291	101.82	-1.32
5	2483.50	64.8 PK	74.0	-9.2	1.98 V	291	66.01	-1.21
6	2483.50	45.7 AV	54.0	-8.3	1.98 V	291	46.91	-1.21
7	4874.00	49.7 PK	74.0	-24.3	1.00 V	197	42.45	7.25
8	4874.00	39.6 AV	54.0	-14.4	1.00 V	197	32.35	7.25
9	7311.00	56.6 PK	74.0	-17.4	1.03 V	211	42.15	14.45
10	7311.00	43.6 AV	54.0	-10.4	1.03 V	211	29.15	14.45

**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.

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.3 PK			1.40 H	7	110.56	-1.26
2	*2462.00	99.3 AV			1.40 H	7	100.56	-1.26
3	2483.50	73.5 PK	74.0	-0.5	1.40 H	7	74.71	-1.21
4	2483.50	53.1 AV	54.0	-0.9	1.40 H	7	54.31	-1.21
5	4924.00	48.8 PK	74.0	-25.2	1.12 H	342	41.35	7.45
6	4924.00	42.3 AV	54.0	-11.7	1.12 H	342	34.85	7.45
7	7386.00	57.7 PK	74.0	-16.3	1.13 H	360	43.18	14.52
8	7386.00	45.9 AV	54.0	-8.1	1.13 H	360	31.38	14.52

**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	105.9 PK			1.87 V	287	107.16	-1.26
2	*2462.00	95.2 AV			1.87 V	287	96.46	-1.26
3	2483.50	68.9 PK	74.0	-5.1	1.87 V	287	70.11	-1.21
4	2483.50	48.5 AV	54.0	-5.5	1.87 V	287	49.71	-1.21
5	4924.00	48.9 PK	74.0	-25.1	1.02 V	224	41.45	7.45
6	4924.00	38.5 AV	54.0	-15.5	1.02 V	224	31.05	7.45
7	7386.00	56.1 PK	74.0	-17.9	1.03 V	218	41.58	14.52
8	7386.00	43.0 AV	54.0	-11.0	1.03 V	218	28.48	14.52

**REMARKS:**

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

**BELOW 1GHz WORST-CASE DATA**
**802.11b**

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.60	27.8 QP	43.5	-15.7	2.00 H	308	45.39	-17.57
2	166.58	28.4 QP	43.5	-15.1	1.50 H	275	41.74	-13.34
3	210.86	37.7 QP	43.5	-5.8	1.50 H	75	53.73	-16.02
4	232.39	33.3 QP	46.0	-12.7	1.00 H	283	48.54	-15.23
5	279.97	31.9 QP	46.0	-14.1	1.00 H	255	44.52	-12.63
6	799.11	31.7 QP	46.0	-14.3	1.00 H	138	32.32	-0.62

**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	42.56	20.5 QP	40.0	-19.5	1.00 V	360	33.79	-13.31
2	99.60	27.8 QP	43.5	-15.7	1.00 V	270	45.38	-17.57
3	209.98	34.6 QP	43.5	-8.9	1.00 V	198	50.61	-16.02
4	232.39	29.6 QP	46.0	-16.4	1.00 V	144	44.85	-15.23
5	279.92	32.2 QP	46.0	-13.8	1.50 V	180	44.85	-12.63
6	499.82	26.1 QP	46.0	-19.9	1.00 V	237	32.89	-6.83

**REMARKS:**

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

## 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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

#### Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: June 25, 2015

#### 4.2.3 Test Procedures

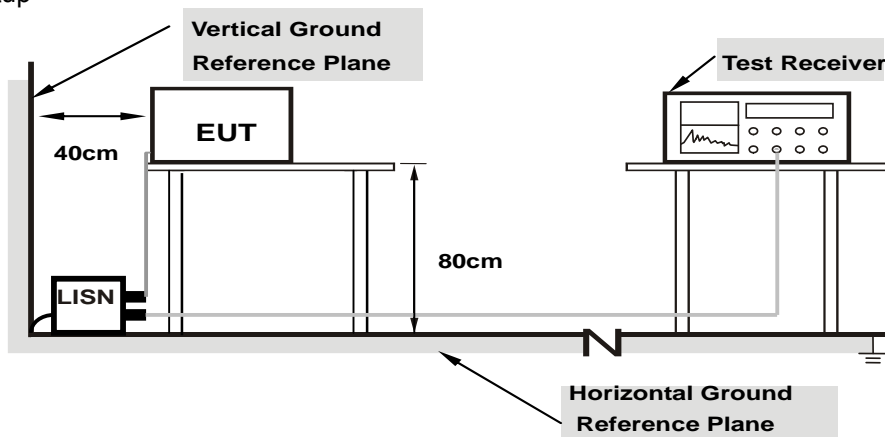
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

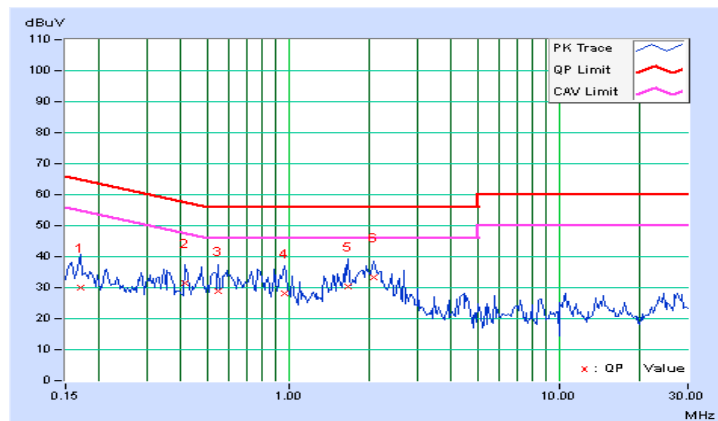
4.2.7 Test Results

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

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.
1	0.16953	0.08	29.92	23.52	30.00	23.60	64.98	54.98	-34.98	-31.38
2	0.41172	0.10	31.50	20.37	31.60	20.47	57.61	47.61	-26.01	-27.14
3	0.55234	0.11	28.70	22.11	28.81	22.22	56.00	46.00	-27.19	-23.78
4	0.96250	0.13	27.98	22.09	28.11	22.22	56.00	46.00	-27.89	-23.78
5	1.65625	0.16	30.39	25.04	30.55	25.20	56.00	46.00	-25.45	-20.80
6	2.06641	0.17	33.06	28.25	33.23	28.42	56.00	46.00	-22.77	-17.58

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.

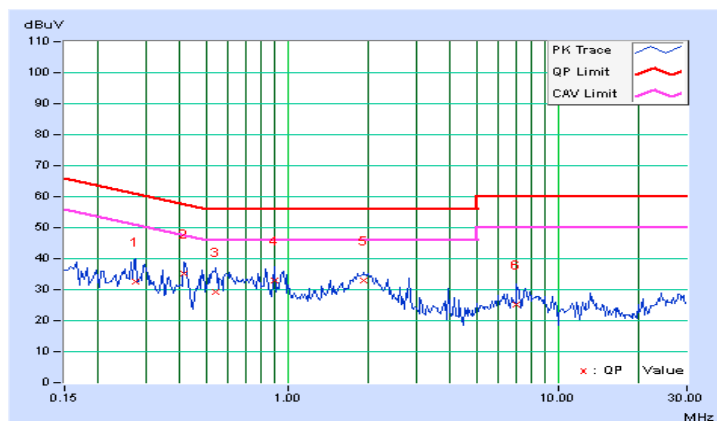


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.27500	0.09	32.33	25.63	32.42	25.72	60.97	50.97	-28.55	-25.25
2	0.41563	0.10	35.16	25.23	35.26	25.33	57.54	47.54	-22.27	-22.20
3	0.54453	0.11	29.03	21.88	29.14	21.99	56.00	46.00	-26.86	-24.01
4	0.89219	0.12	32.86	17.83	32.98	17.95	56.00	46.00	-23.02	-28.05
<b>5</b>	<b>1.91406</b>	<b>0.17</b>	<b>32.89</b>	<b>28.94</b>	<b>33.06</b>	<b>29.11</b>	<b>56.00</b>	<b>46.00</b>	<b>-22.94</b>	<b>-16.89</b>
6	7.03516	0.35	24.85	18.32	25.20	18.67	60.00	50.00	-34.80	-31.33

**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.

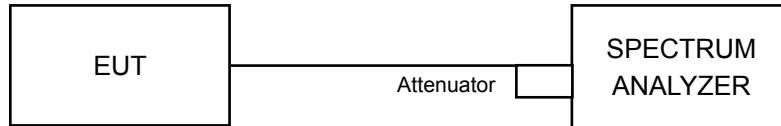


**4.3 6dB Bandwidth Measurement**

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

- NOTE:**
1. The test was performed in Oven room B.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: June 23, 2015

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
1	2412	10.12	0.5	PASS
6	2437	10.11	0.5	PASS
11	2462	10.11	0.5	PASS

## 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.65	0.5	PASS
6	2437	16.65	0.5	PASS
11	2462	16.64	0.5	PASS

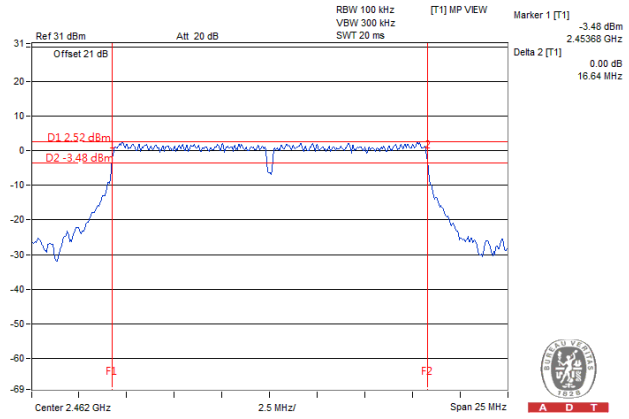
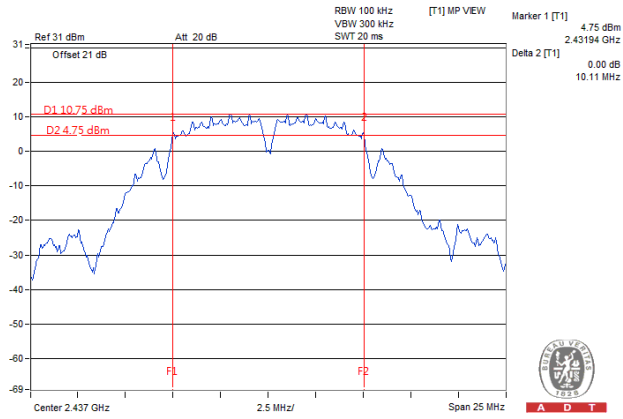
## 802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.76	0.5	Pass
6	2437	17.81	0.5	Pass
11	2462	17.81	0.5	Pass

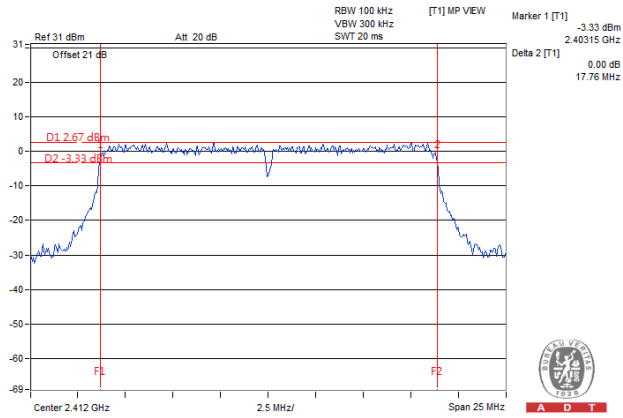
Spectrum Plot of Worst Value

802.11b / CH6

802.11g / CH 11



802.11n (HT20) / CH 1

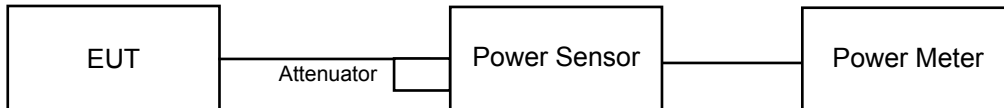


#### 4.4 Conducted Output Power Measurement

##### 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016

- NOTE:**
1. The test was performed in Oven room B.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: June 23, 2015

##### 4.4.4 Test Procedures

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

##### 4.4.5 Deviation from Test Standard

No deviation.

##### 4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

#### 4.4.7 Test Results

#### FOR PEAK POWER

##### 802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	279.254	24.46	30	Pass
6	2437	390.841	25.92	30	Pass
11	2462	325.837	25.13	30	Pass

##### 802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	296.483	24.72	30	Pass
6	2437	396.278	25.98	30	Pass
11	2462	325.087	25.12	30	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	299.226	24.76	30	Pass
6	2437	396.278	25.98	30	Pass
11	2462	324.34	25.11	30	Pass

**FOR AVERAGE POWER****802.11b**

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	151.705	21.81
6	2437	289.734	24.62
11	2462	189.234	22.77

**802.11g**

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	72.778	18.62
6	2437	250.611	23.99
11	2462	89.743	19.53

**802.11n (HT20)**

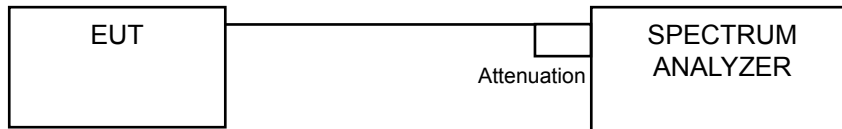
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	68.707	18.37
6	2437	243.220	23.86
11	2462	78.886	18.97

**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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

- NOTE:**
1. The test was performed in Oven room B.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: June 23, 2015

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

## 4.5.7 Test Results

## 802.11b

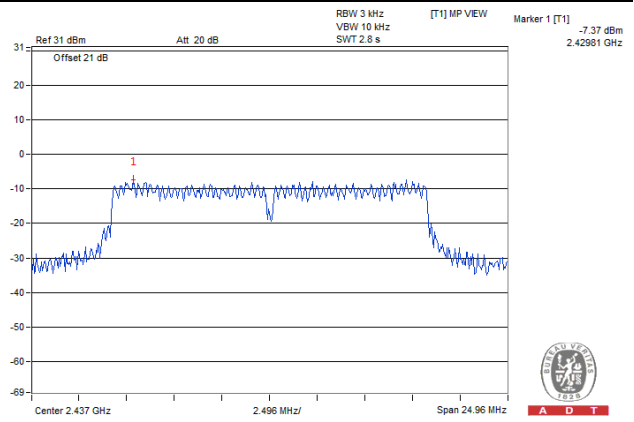
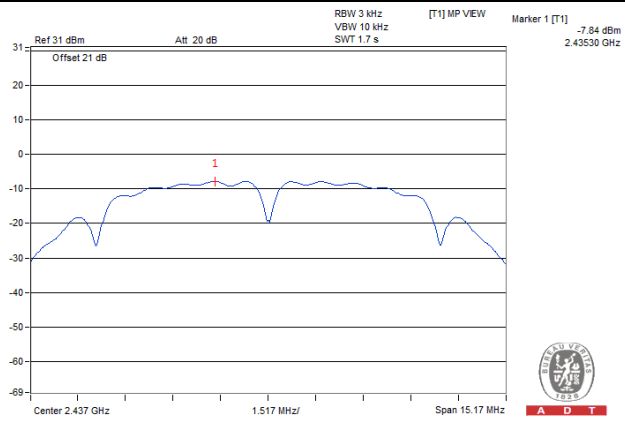
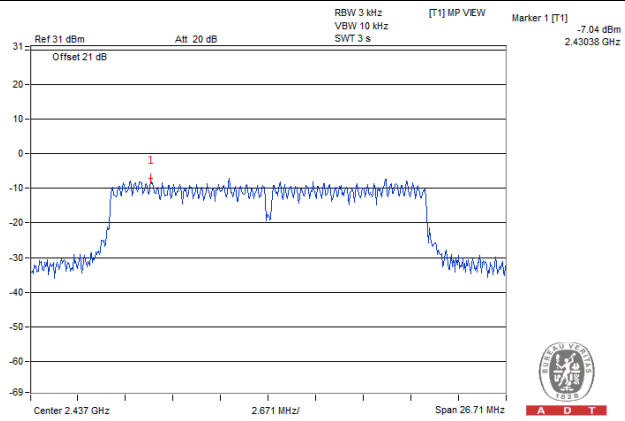
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-10.60	8	Pass
6	2437	-7.84	8	Pass
11	2462	-9.33	8	Pass

## 802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-12.41	8	Pass
6	2437	-7.37	8	Pass
11	2462	-11.17	8	Pass

## 802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-10.99	8	Pass
6	2437	-7.04	8	Pass
11	2462	-12.02	8	Pass

**Spectrum Plot of Worst Value****802.11b / CH6****802.11g / CH6****802.11n (HT20) / CH6**

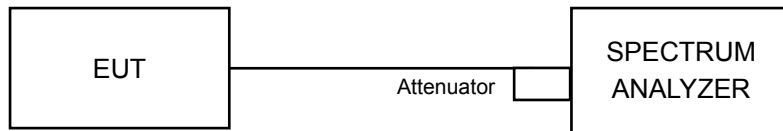


**4.6 Conducted Out of Band Emission Measurement**

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

- NOTE:**
1. The test was performed in Oven room B.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: June 23, 2015

4.6.4 Test Procedure

**MEASUREMENT PROCEDURE REF**

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

**MEASUREMENT PROCEDURE OOBE**

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

4.6.5 Deviation from Test Standard

No deviation.

#### 4.6.6 EUT Operating Condition

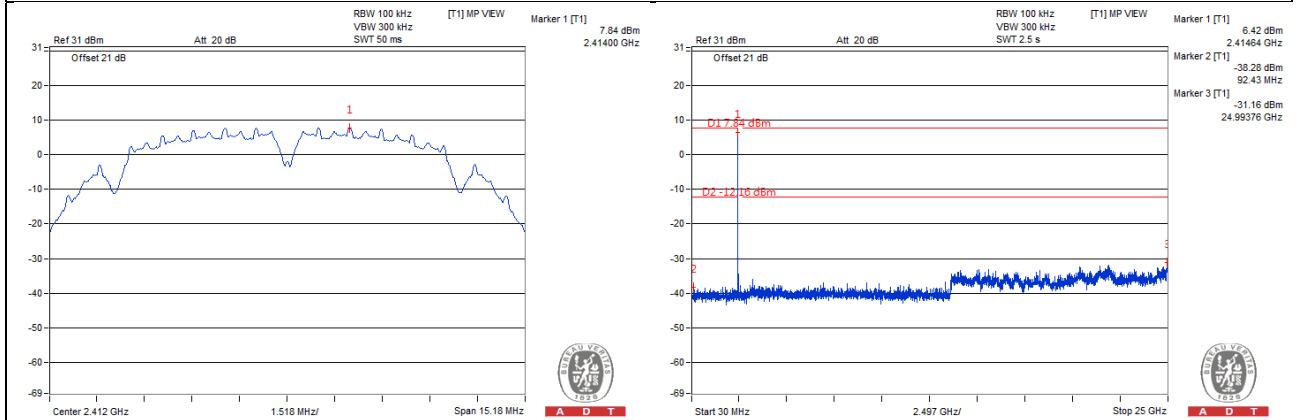
Same as Item 4.3.6

#### 4.6.7 Test Results

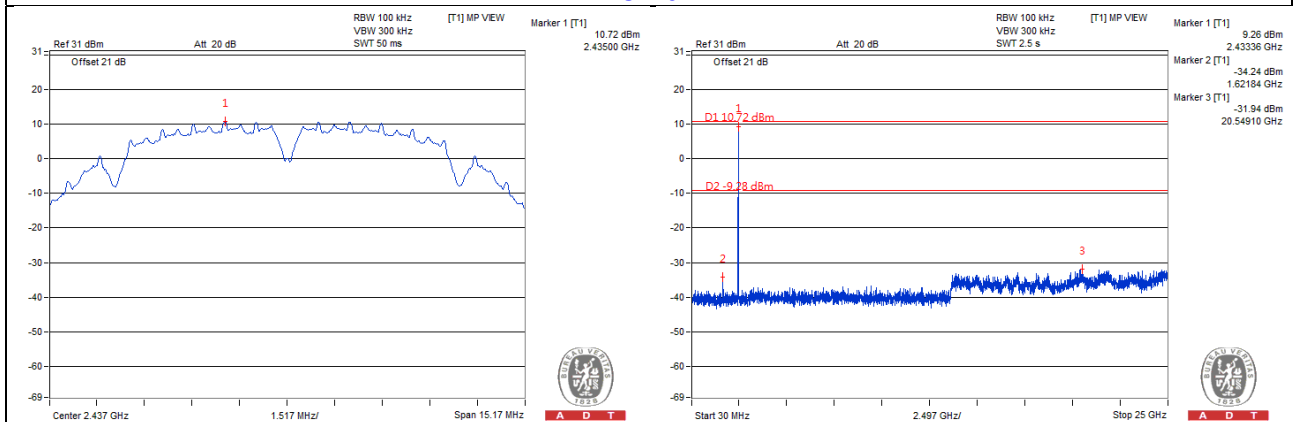
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

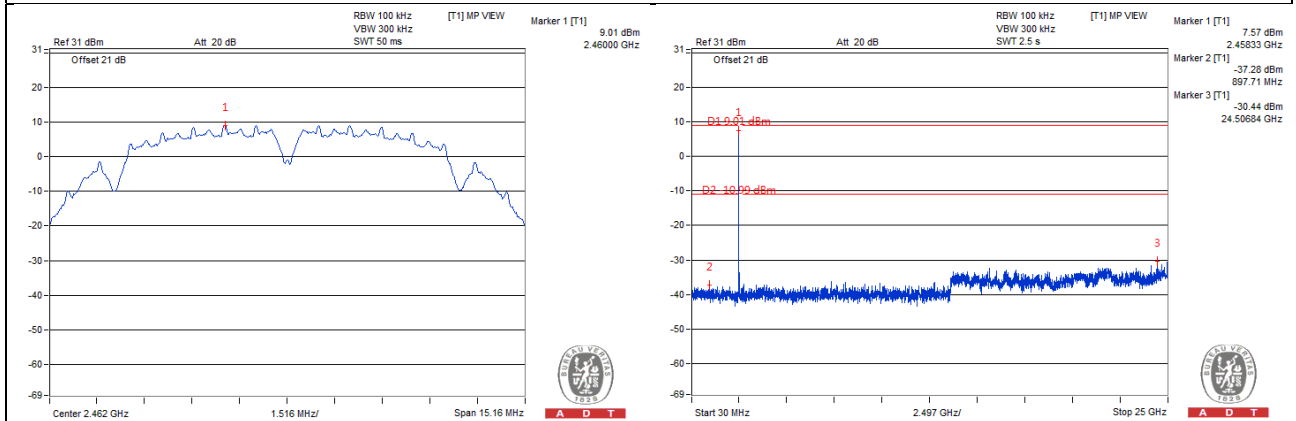
CH 1



CH 6

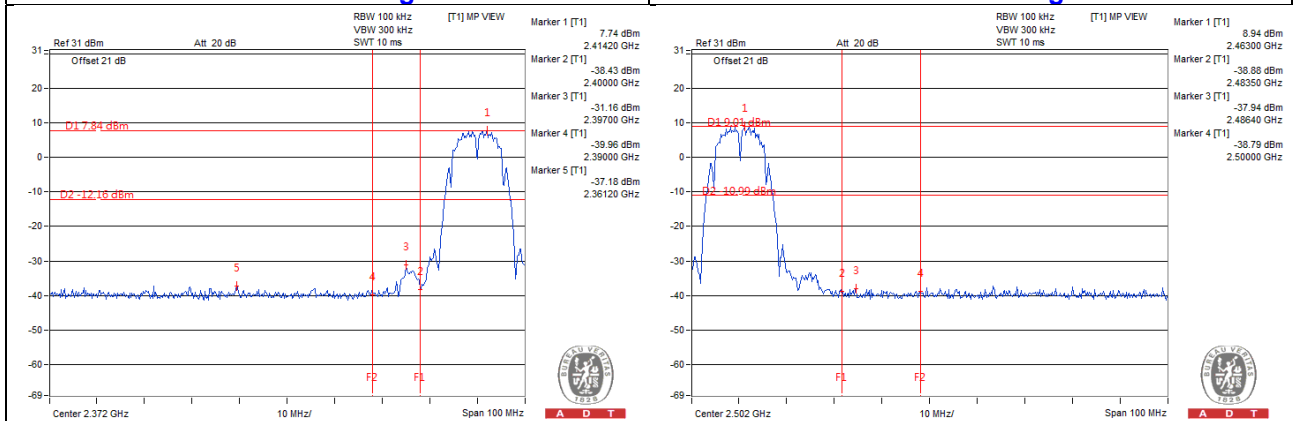


CH 11



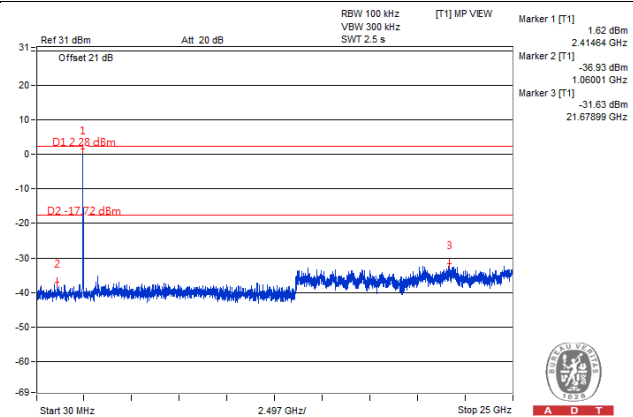
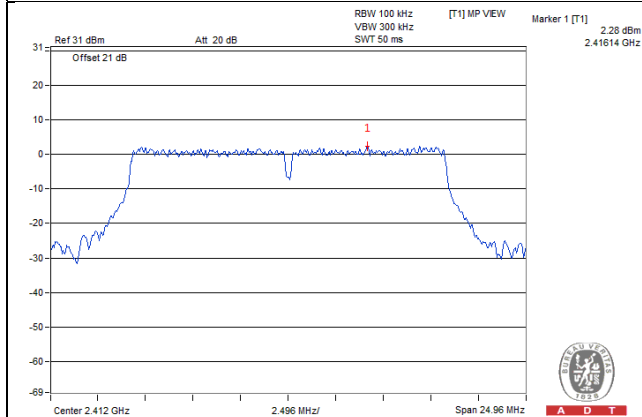
CH 1 Band edge

CH 11 Band edge

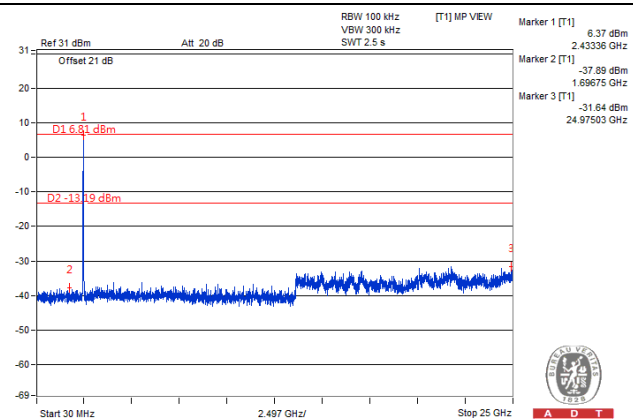
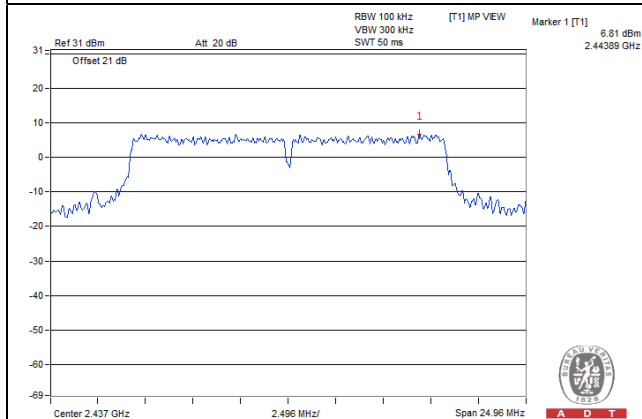


### 802.11g

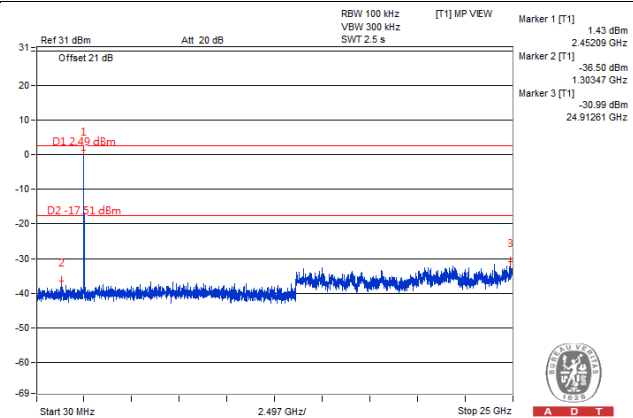
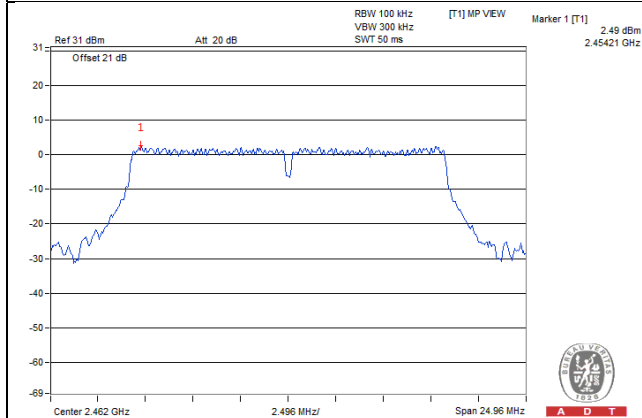
#### CH 1



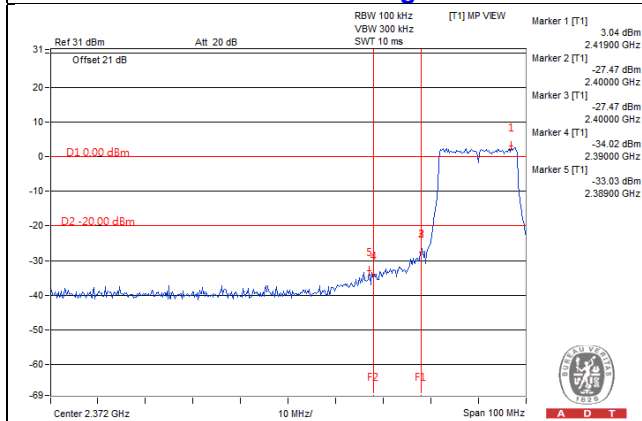
#### CH 6



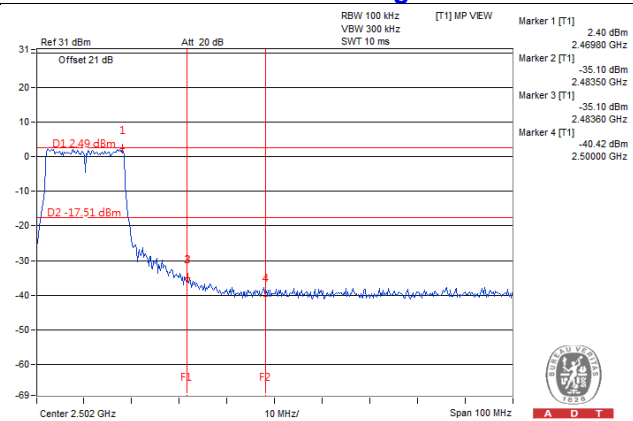
#### CH 11



#### CH 1 Band edge

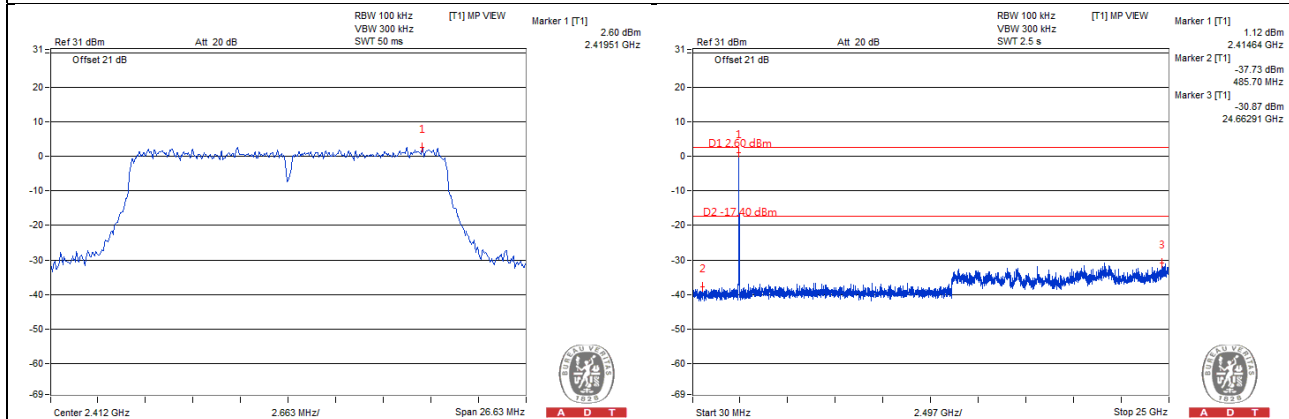


#### CH 11 Band edge

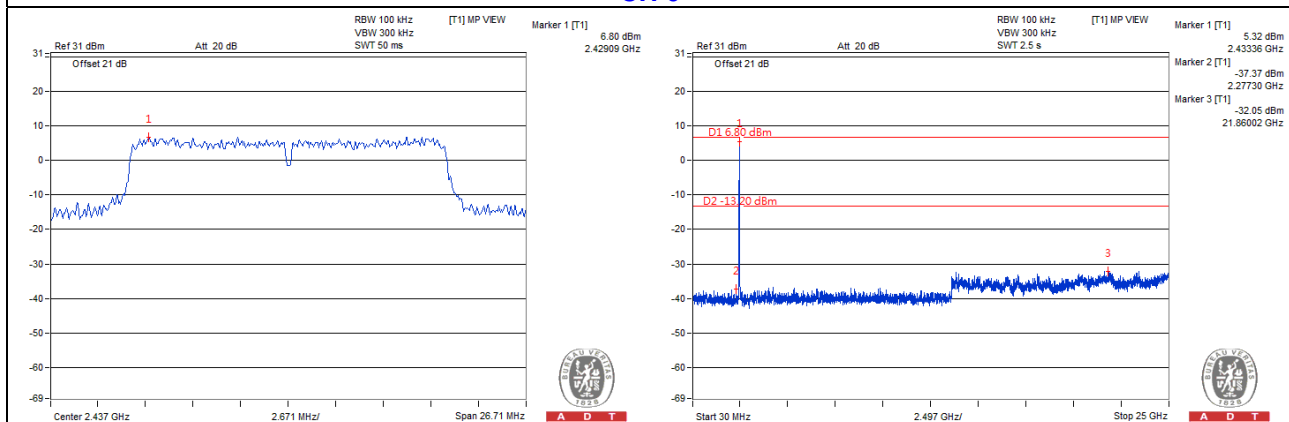


### 802.11n (HT20)

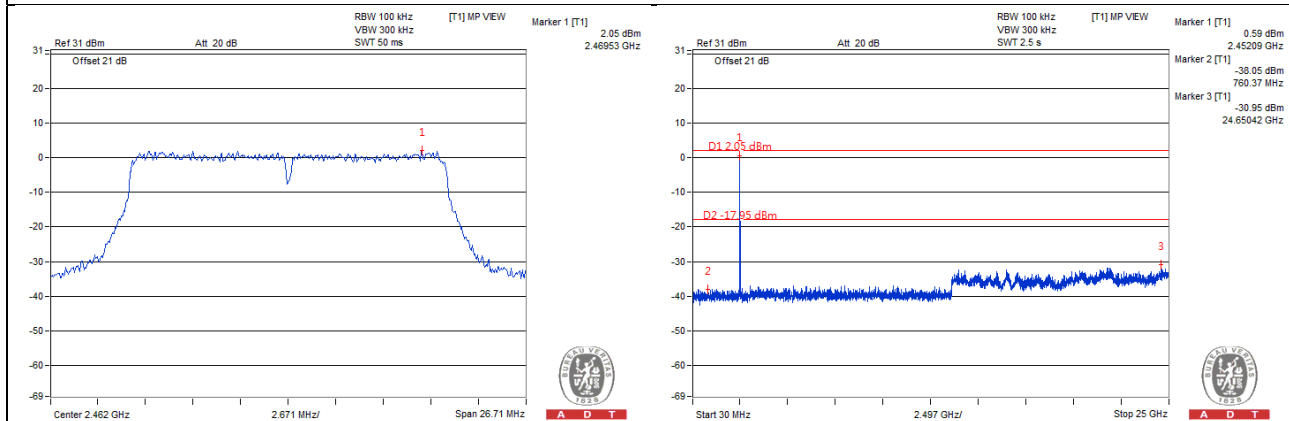
#### CH 1



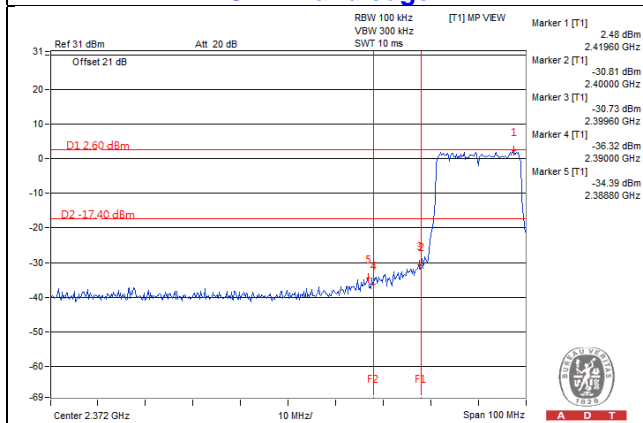
#### CH 6



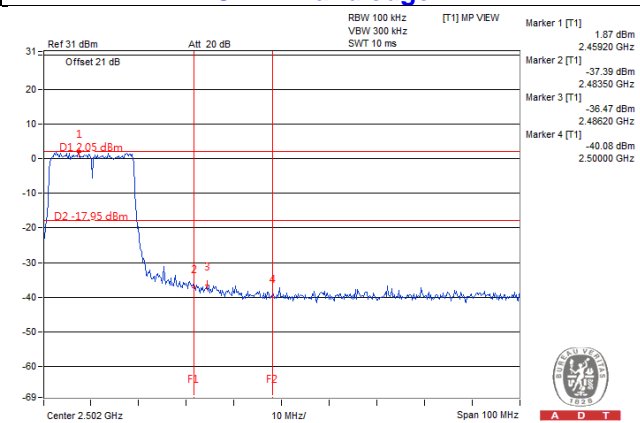
#### CH 11



#### CH 1 Band edge



#### CH 11 Band edge



## 5 Pictures of Test Arrangements

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



## Appendix – Information on the Testing Laboratories

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

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

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Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

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**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 ---