

## FCC Test Report

**Report No.:** RF160825E02

**FCC ID:** NKR-JAW301

**Test Model:** WFB100S

**Received Date:** Aug. 25, 2016

**Test Date:** Sep. 07 to 22, 2016

**Issued Date:** Oct. 05, 2016

**Applicant:** Wistron NeWeb Corp.

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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### Release Control Record

Issue No.	Description	Date Issued
RF160825E02	Original release.	Oct. 05, 2016



## 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 -15.21dB at 0.25938 MHz.
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 4874.00 dB 2390.00MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is Murata, i-pex(MHF) not a standard connector.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 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	WiFi PSE adaptor
Brand	AT&T
Test Model	WFB100S
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	120Vac, 500mA, 60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	767.471mW
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:

Ant. No.	Transmitter Circuit	Brand	Model	Antenna Net Gain(dBi)	Frequency range (MHz to MHz)	Antenna Type	Connector Type	Cable Length
1	Chain (0)	NA	NA	3.49	2.4~2.4835	Loop	Murata	NA
2	Chain (1)	NA	NA	3.96	2.4~2.4835	Dipole	i-pex(MHF)	38mm

2. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1~11Mbps	2TX diversity	2RX diversity
802.11g	6~54Mbps	2TX diversity	2RX diversity
802.11n (HT20)	MCS 0~7 MCS 8~15	2TX diversity	2RX diversity
802.11n (HT40)	MCS 0~7 MCS 8~15	2TX diversity	2RX 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		

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:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane (below 1GHz) & Z-plane (above 1GHz)**.

#### **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	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

### Antenna Port Conducted Measurement:

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

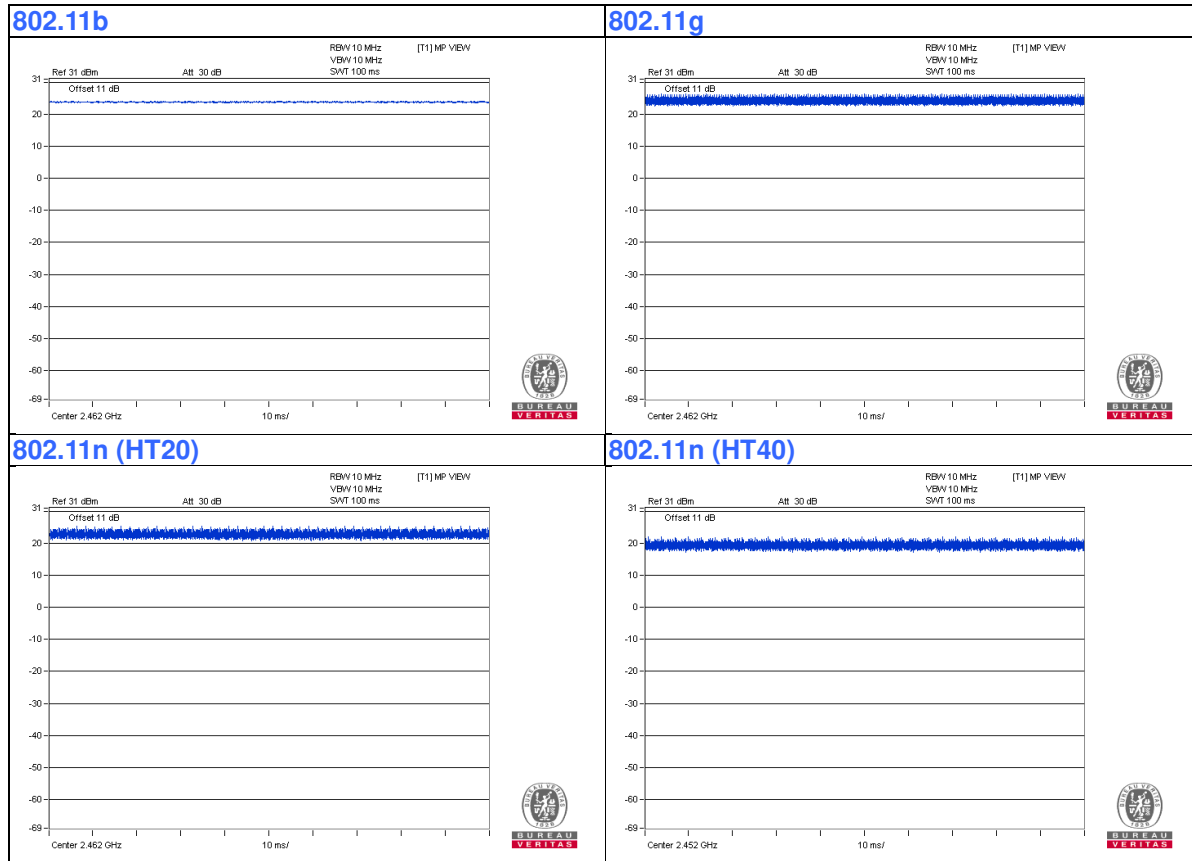
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

### Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 70%RH	120Vac, 60Hz	Andy Ho
RE $<$ 1G	25deg. C, 70%RH	120Vac, 60Hz	Andy Ho
PLC	26deg. C, 64%RH	120Vac, 60Hz	Eagle Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho

### 3.3 Duty Cycle of Test Signal

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



### 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.

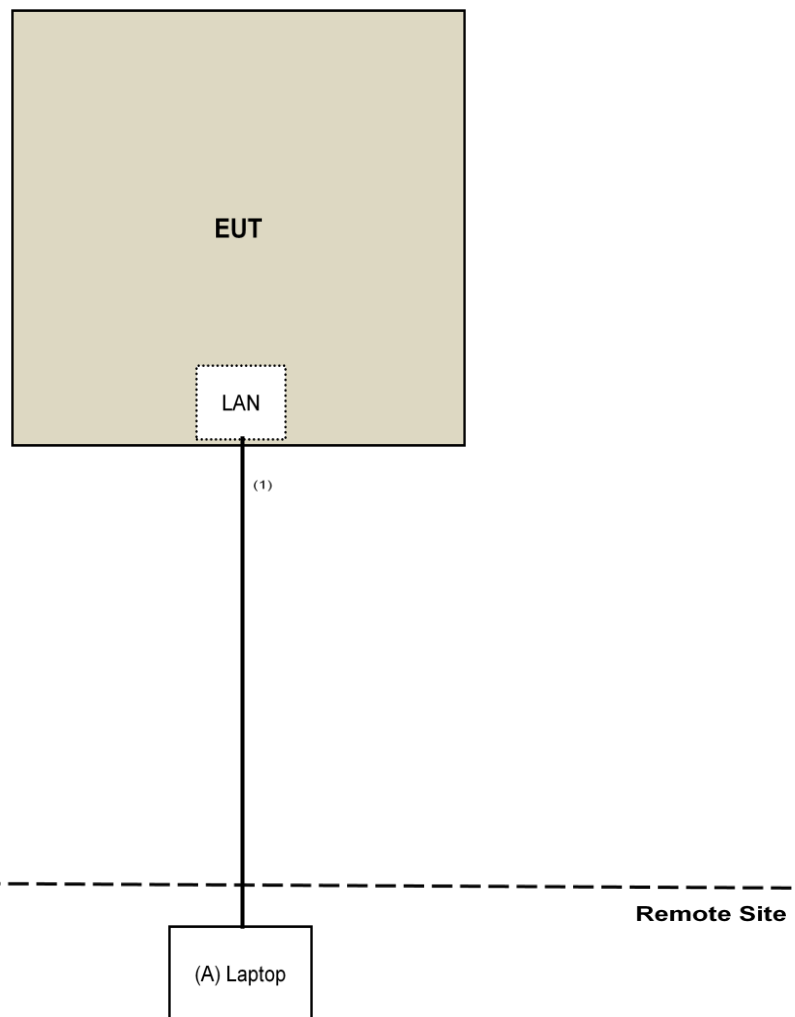
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab

Note:

1. 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.	RJ-45 Cable	1	10	No	0	Provided by Lab

### 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 v03r05**  
**KDB 662911 D01 Multiple Transmitter Output v02r01**  
**ANSI C63.10-2013**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

#### NOTE:

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

## 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 06, 2016	July 05, 2017
Pre-Amplifier <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Horn_Antenna FT-RF	HA-07M18G-NF	0000320091110	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A02578	June 22, 2016	June 21, 2017
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 15, 2016	Jan. 14, 2017
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 25, 2015	Nov. 24, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 11, 2015	Dec. 10, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Jan. 18, 2016	Jan. 17, 2017
RF Cable	SUCOFLEX 102	36442/2 36434/2	Dec. 10, 2015	Dec.09, 2016
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table CT	CM100	NA	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-WD01	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017



**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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Loop antenna was used for all emissions below 30 MHz.
8. Tested Date: Sep. 07 to 22, 2016

#### 4.1.3 Test Procedures

##### **For Radiated emission below 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### **NOTE:**

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

##### **For Radiated emission above 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

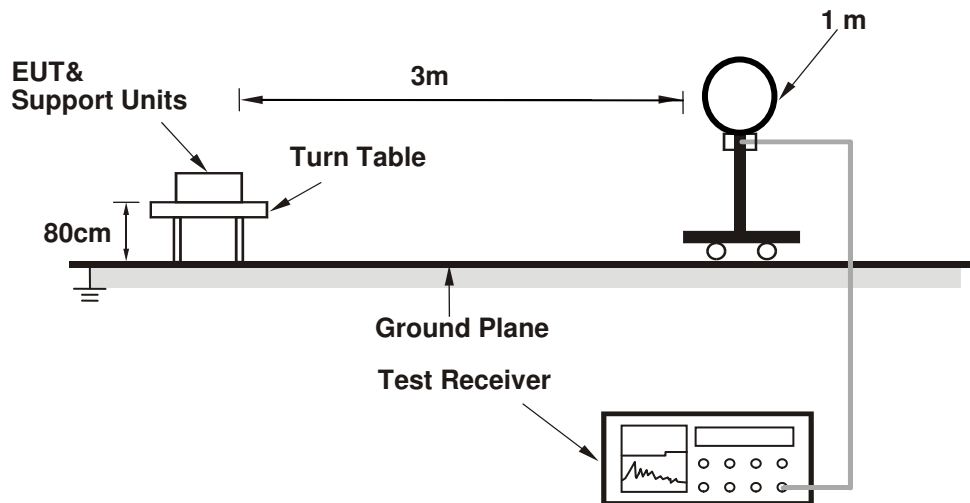
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
  2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

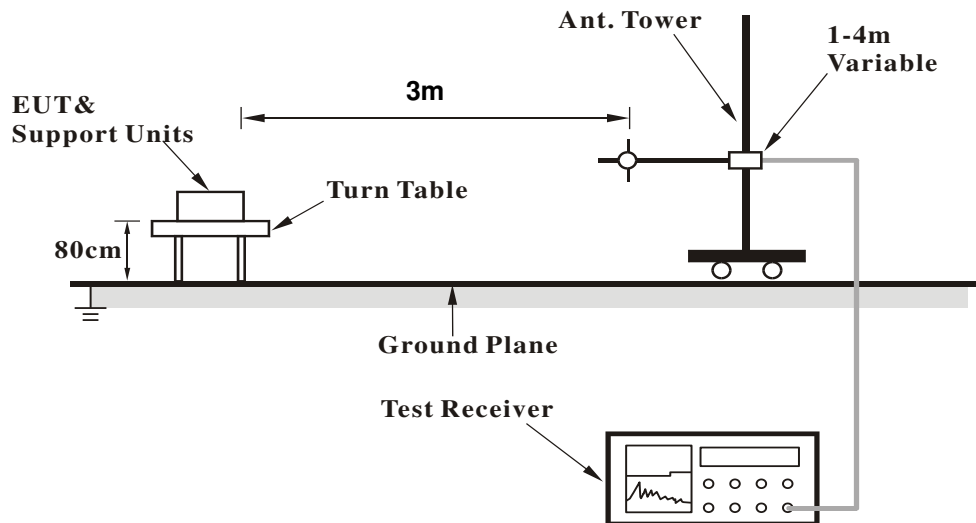
No deviation.

#### 4.1.5 Test Setup

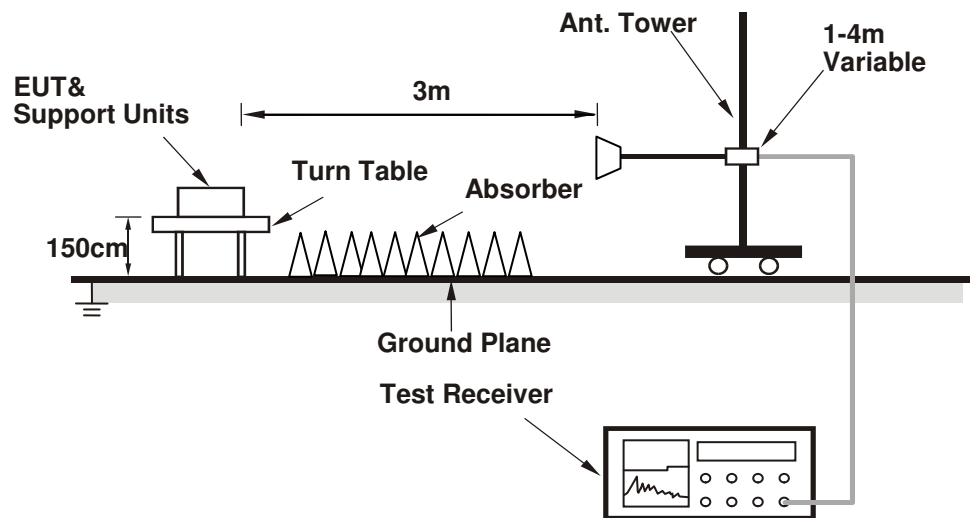
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (Mp TEST.exe) has been activated to set the EUT on specific status.

## 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	54.3 PK	74.0	-19.7	1.32 H	167	59.9	-5.6
2	2390.00	41.6 AV	54.0	-12.4	1.32 H	167	47.2	-5.6
3	*2412.00	104.2 PK			1.32 H	167	109.7	-5.5
4	*2412.00	102.1 AV			1.32 H	167	107.6	-5.5
5	4824.00	52.2 PK	74.0	-21.8	2.58 H	7	51.3	0.9
6	4824.00	50.6 AV	54.0	-3.4	2.58 H	7	49.7	0.9

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.1 PK	74.0	-19.9	3.84 V	342	59.7	-5.6
2	2390.00	42.0 AV	54.0	-12.0	3.84 V	342	47.6	-5.6
3	*2412.00	105.1 PK			3.84 V	342	110.6	-5.5
4	*2412.00	103.0 AV			3.84 V	342	108.5	-5.5
5	4824.00	55.6 PK	74.0	-18.4	1.04 V	360	54.7	0.9
6	4824.00	53.7 AV	54.0	-0.3	1.04 V	360	52.8	0.9

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	*2437.00	104.0 PK			1.30 H	155	109.4	-5.4
2	*2437.00	101.7 AV			1.30 H	155	107.1	-5.4
3	4874.00	52.8 PK	74.0	-21.2	2.60 H	3	51.8	1.0
4	4874.00	51.1 AV	54.0	-2.9	2.60 H	3	50.1	1.0
5	7311.00	50.2 PK	74.0	-23.8	1.61 H	356	42.6	7.6
6	7311.00	42.8 AV	54.0	-11.2	1.61 H	356	35.2	7.6

**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	*2437.00	105.6 PK			3.75 V	111	111.0	-5.4
2	*2437.00	103.7 AV			3.75 V	111	109.1	-5.4
3	4874.00	55.4 PK	74.0	-18.6	1.14 V	360	54.4	1.0
4	4874.00	53.8 AV	54.0	-0.2	1.14 V	360	52.8	1.0
5	7311.00	51.0 PK	74.0	-23.0	1.10 V	35	43.4	7.6
6	7311.00	41.5 AV	54.0	-12.5	1.10 V	35	33.9	7.6

**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.

<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	104.0 PK			1.33 H	170	109.3	-5.3
2	*2462.00	101.6 AV			1.33 H	170	106.9	-5.3
3	2483.50	53.0 PK	74.0	-21.0	1.33 H	170	58.3	-5.3
4	2483.50	40.2 AV	54.0	-13.8	1.33 H	170	45.5	-5.3
5	4924.00	52.7 PK	74.0	-21.3	2.58 H	0	51.4	1.3
6	4924.00	51.0 AV	54.0	-3.0	2.58 H	0	49.7	1.3
7	7386.00	50.7 PK	74.0	-23.3	1.62 H	359	43.0	7.7
8	7386.00	43.1 AV	54.0	-10.9	1.62 H	359	35.4	7.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.6 PK			3.73 V	111	110.9	-5.3
2	*2462.00	103.5 AV			3.73 V	111	108.8	-5.3
3	2483.50	53.4 PK	74.0	-20.6	3.73 V	111	58.7	-5.3
4	2483.50	40.6 AV	54.0	-13.4	3.73 V	111	45.9	-5.3
5	4924.00	54.4 PK	74.0	-19.6	1.19 V	360	53.1	1.3
6	4924.00	53.4 AV	54.0	-0.6	1.19 V	360	52.1	1.3
7	7386.00	50.7 PK	74.0	-23.3	1.07 V	46	43.0	7.7
8	7386.00	41.5 AV	54.0	-12.5	1.07 V	46	33.8	7.7

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	67.4 PK	74.0	-6.6	1.32 H	142	73.0	-5.6
2	2390.00	51.7 AV	54.0	-2.3	1.32 H	142	57.3	-5.6
3	*2412.00	108.7 PK			1.32 H	142	114.2	-5.5
4	*2412.00	99.3 AV			1.32 H	142	104.8	-5.5
5	4824.00	55.7 PK	74.0	-18.3	2.68 H	307	54.8	0.9
6	4824.00	43.4 AV	54.0	-10.6	2.68 H	307	42.5	0.9

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.2 PK	74.0	-4.8	3.93 V	112	74.8	-5.6
2	2390.00	53.7 AV	54.0	-0.3	3.93 V	112	59.3	-5.6
3	*2412.00	110.5 PK			3.93 V	112	116.0	-5.5
4	*2412.00	101.3 AV			3.93 V	112	106.8	-5.5
5	4824.00	62.6 PK	74.0	-11.4	1.10 V	2	61.7	0.9
6	4824.00	50.3 AV	54.0	-3.7	1.10 V	2	49.4	0.9

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	60.3 PK	74.0	-13.7	1.31 H	135	65.9	-5.6
2	2390.00	45.0 AV	54.0	-9.0	1.31 H	135	50.6	-5.6
3	*2437.00	112.0 PK			1.31 H	135	117.4	-5.4
4	*2437.00	102.9 AV			1.31 H	135	108.3	-5.4
5	2483.50	58.9 PK	74.0	-15.1	1.31 H	135	64.2	-5.3
6	2483.50	42.8 AV	54.0	-11.2	1.31 H	135	48.1	-5.3
7	4874.00	59.8 PK	74.0	-14.2	2.71 H	314	58.8	1.0
8	4874.00	47.0 AV	54.0	-7.0	2.71 H	314	46.0	1.0
9	7311.00	65.2 PK	74.0	-8.8	2.24 H	358	57.6	7.6
10	7311.00	51.3 AV	54.0	-2.7	2.24 H	358	43.7	7.6

**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	62.1 PK	74.0	-11.9	2.59 V	360	67.7	-5.6
2	2390.00	47.0 AV	54.0	-7.0	2.59 V	360	52.6	-5.6
3	*2437.00	113.8 PK			2.59 V	360	119.2	-5.4
4	*2437.00	104.9 AV			2.59 V	360	110.3	-5.4
5	2483.50	60.7 PK	74.0	-13.3	2.59 V	360	66.0	-5.3
6	2483.50	44.8 AV	54.0	-9.2	2.59 V	360	50.1	-5.3
7	4874.00	66.2 PK	74.0	-7.8	1.00 V	13	65.2	1.0
8	<b>4874.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.00 V</b>	<b>13</b>	<b>52.9</b>	<b>1.0</b>
9	7311.00	63.1 PK	74.0	-10.9	1.00 V	45	55.5	7.6
10	7311.00	50.1 AV	54.0	-3.9	1.00 V	45	42.5	7.6

**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.

<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	109.9 PK			1.32 H	129	115.2	-5.3
2	*2462.00	100.5 AV			1.32 H	129	105.8	-5.3
3	2483.50	68.6 PK	74.0	-5.4	1.32 H	129	73.9	-5.3
4	2483.50	51.4 AV	54.0	-2.6	1.32 H	129	56.7	-5.3
5	4924.00	56.9 PK	74.0	-17.1	2.68 H	314	55.6	1.3
6	4924.00	44.6 AV	54.0	-9.4	2.68 H	314	43.3	1.3
7	7386.00	53.8 PK	74.0	-20.2	2.68 H	314	46.1	7.7
8	7386.00	40.8 AV	54.0	-13.2	2.68 H	314	33.1	7.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.7 PK			3.75 V	110	117.0	-5.3
2	*2462.00	102.5 AV			3.75 V	110	107.8	-5.3
3	2483.50	70.4 PK	74.0	-3.6	3.75 V	110	75.7	-5.3
4	2483.50	53.4 AV	54.0	-0.6	3.75 V	110	58.7	-5.3
5	4924.00	63.8 PK	74.0	-10.2	1.04 V	1	62.5	1.3
6	4924.00	51.5 AV	54.0	-2.5	1.04 V	1	50.2	1.3
7	7386.00	60.7 PK	74.0	-13.3	1.03 V	49	53.0	7.7
8	7386.00	47.7 AV	54.0	-6.3	1.03 V	49	40.0	7.7

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	71.5 PK	74.0	-2.5	1.34 H	123	77.1	-5.6
2	2390.00	51.8 AV	54.0	-2.2	1.34 H	123	57.4	-5.6
3	*2412.00	107.8 PK			1.34 H	123	113.3	-5.5
4	*2412.00	98.5 AV			1.34 H	123	104.0	-5.5
5	4824.00	56.4 PK	74.0	-17.6	2.67 H	341	55.5	0.9
6	4824.00	43.4 AV	54.0	-10.6	2.67 H	341	42.5	0.9

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.3 PK	74.0	-0.7	3.93 V	114	78.9	-5.6
2	2390.00	53.8 AV	54.0	-0.2	3.93 V	114	59.4	-5.6
3	*2412.00	109.6 PK			3.93 V	114	115.1	-5.5
4	*2412.00	100.5 AV			3.93 V	114	106.0	-5.5
5	4824.00	64.4 PK	74.0	-9.6	1.02 V	0	63.5	0.9
6	4824.00	49.7 AV	54.0	-4.3	1.02 V	0	48.8	0.9

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	62.8 PK	74.0	-11.2	1.26 H	124	68.4	-5.6
2	2390.00	46.0 AV	54.0	-8.0	1.26 H	124	51.6	-5.6
3	*2437.00	112.4 PK			1.26 H	124	117.8	-5.4
4	*2437.00	102.7 AV			1.26 H	124	108.1	-5.4
5	2483.50	61.8 PK	74.0	-12.2	1.26 H	124	67.1	-5.3
6	2483.50	44.9 AV	54.0	-9.1	1.26 H	124	50.2	-5.3
7	4874.00	60.2 PK	74.0	-13.8	2.73 H	320	59.2	1.0
8	4874.00	47.2 AV	54.0	-6.8	2.73 H	320	46.2	1.0
9	7311.00	65.3 PK	74.0	-8.7	2.19 H	354	57.7	7.6
10	7311.00	51.2 AV	54.0	-2.8	2.19 H	354	43.6	7.6

**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	64.6 PK	74.0	-9.4	2.56 V	357	70.2	-5.6
2	2390.00	48.0 AV	54.0	-6.0	2.56 V	357	53.6	-5.6
3	*2437.00	114.2 PK			2.56 V	357	119.6	-5.4
4	*2437.00	104.7 AV			2.56 V	357	110.1	-5.4
5	2483.50	63.6 PK	74.0	-10.4	2.56 V	357	68.9	-5.3
6	2483.50	46.9 AV	54.0	-7.1	2.56 V	357	52.2	-5.3
7	4874.00	68.1 PK	74.0	-5.9	1.02 V	2	67.1	1.0
8	4874.00	53.3 AV	54.0	-0.7	1.02 V	2	52.3	1.0
9	7311.00	63.8 PK	74.0	-10.2	1.03 V	59	56.2	7.6
10	7311.00	50.5 AV	54.0	-3.5	1.03 V	59	42.9	7.6

**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.

<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	108.4 PK			1.27 H	111	113.7	-5.3
2	*2462.00	98.1 AV			1.27 H	111	103.4	-5.3
3	2483.50	71.5 PK	74.0	-2.5	1.27 H	111	76.8	-5.3
4	2483.50	51.7 AV	54.0	-2.3	1.27 H	111	57.0	-5.3
5	4924.00	56.2 PK	74.0	-17.8	2.69 H	336	54.9	1.3
6	4924.00	43.2 AV	54.0	-10.8	2.69 H	336	41.9	1.3
7	7386.00	61.3 PK	74.0	-12.7	2.18 H	360	53.6	7.7
8	7386.00	47.2 AV	54.0	-6.8	2.18 H	360	39.5	7.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.2 PK			3.65 V	108	115.5	-5.3
2	*2462.00	100.1 AV			3.65 V	108	105.4	-5.3
3	2483.50	73.3 PK	74.0	-0.7	3.65 V	108	78.6	-5.3
4	2483.50	53.7 AV	54.0	-0.3	3.65 V	108	59.0	-5.3
5	4924.00	64.1 PK	74.0	-9.9	1.00 V	6	62.8	1.3
6	4924.00	49.3 AV	54.0	-4.7	1.00 V	6	48.0	1.3
7	7386.00	59.8 PK	74.0	-14.2	1.00 V	47	52.1	7.7
8	7386.00	46.5 AV	54.0	-7.5	1.00 V	47	38.8	7.7

**REMARKS:**

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

**802.11n (HT40)**

<b>CHANNEL</b>	TX Channel 3	<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	69.9 PK	74.0	-4.1	1.29 H	116	75.5	-5.6
2	2390.00	51.6 AV	54.0	-2.4	1.29 H	116	57.2	-5.6
3	*2422.00	103.3 PK			1.29 H	116	108.7	-5.4
4	*2422.00	93.1 AV			1.29 H	116	98.5	-5.4
5	4844.00	52.1 PK	74.0	-21.9	2.63 H	322	51.2	0.9
6	4844.00	39.1 AV	54.0	-14.9	2.63 H	322	38.2	0.9
7	7266.00	55.8 PK	74.0	-18.2	2.24 H	358	48.1	7.7
8	7266.00	41.7 AV	54.0	-12.3	2.24 H	358	34.0	7.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.7 PK	74.0	-2.3	3.78 V	114	77.3	-5.6
2	2390.00	53.6 AV	54.0	-0.4	3.78 V	114	59.2	-5.6
3	*2422.00	105.1 PK			3.78 V	114	110.5	-5.4
4	*2422.00	95.2 AV			3.78 V	114	100.6	-5.4
5	4844.00	58.6 PK	74.0	-15.4	1.02 V	21	57.7	0.9
6	4844.00	43.8 AV	54.0	-10.2	1.02 V	21	42.9	0.9
7	7266.00	54.4 PK	74.0	-19.6	1.00 V	53	46.7	7.7
8	7266.00	40.4 AV	54.0	-13.6	1.00 V	53	32.7	7.7

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	65.8 PK	74.0	-8.2	1.29 H	130	71.4	-5.6
2	2390.00	51.9 AV	54.0	-2.1	1.29 H	130	57.5	-5.6
3	*2437.00	106.0 PK			1.29 H	130	111.4	-5.4
4	*2437.00	95.6 AV			1.29 H	130	101.0	-5.4
5	2483.50	65.1 PK	74.0	-8.9	1.29 H	130	70.4	-5.3
6	2483.50	49.1 AV	54.0	-4.9	1.29 H	130	54.4	-5.3
7	4874.00	53.1 PK	74.0	-20.9	2.66 H	331	52.1	1.0
8	4874.00	40.1 AV	54.0	-13.9	2.66 H	331	39.1	1.0
9	7311.00	58.2 PK	74.0	-15.8	2.20 H	360	50.6	7.6
10	7311.00	44.1 AV	54.0	-9.9	2.20 H	360	36.5	7.6

**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	67.6 PK	74.0	-6.4	3.76 V	114	73.2	-5.6
2	2390.00	53.9 AV	54.0	-0.1	3.76 V	114	59.5	-5.6
3	*2437.00	107.8 PK			3.76 V	114	113.2	-5.4
4	*2437.00	97.6 AV			3.76 V	114	103.0	-5.4
5	2483.50	66.9 PK	74.0	-7.1	3.76 V	114	72.2	-5.3
6	2483.50	51.1 AV	54.0	-2.9	3.76 V	114	56.4	-5.3
7	4874.00	61.0 PK	74.0	-13.0	1.05 V	6	60.0	1.0
8	4874.00	46.2 AV	54.0	-7.8	1.05 V	6	45.2	1.0
9	7311.00	56.8 PK	74.0	-17.2	1.04 V	67	49.2	7.6
10	7311.00	42.8 AV	54.0	-11.2	1.04 V	67	35.2	7.6

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 9	<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	*2452.00	105.8 PK			1.23 H	146	111.2	-5.4
2	*2452.00	95.7 AV			1.23 H	146	101.1	-5.4
3	2483.50	71.3 PK	74.0	-2.7	1.23 H	146	76.6	-5.3
4	2483.50	51.6 AV	54.0	-2.4	1.23 H	146	56.9	-5.3
5	4904.00	52.5 PK	74.0	-21.5	2.61 H	325	51.3	1.2
6	4904.00	39.8 AV	54.0	-14.2	2.61 H	325	38.6	1.2
7	7356.00	58.1 PK	74.0	-15.9	2.19 H	355	50.4	7.7
8	7356.00	43.7 AV	54.0	-10.3	2.19 H	355	36.0	7.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	107.6 PK			3.84 V	111	113.0	-5.4
2	*2452.00	97.7 AV			3.84 V	111	103.1	-5.4
3	2483.50	73.1 PK	74.0	-0.9	3.84 V	111	78.4	-5.3
4	2483.50	53.6 AV	54.0	-0.4	3.84 V	111	58.9	-5.3
5	4904.00	61.2 PK	74.0	-12.8	1.03 V	12	60.0	1.2
6	4904.00	46.7 AV	54.0	-7.3	1.03 V	12	45.5	1.2
7	7356.00	57.0 PK	74.0	-17.0	1.09 V	55	49.3	7.7
8	7356.00	43.1 AV	54.0	-10.9	1.09 V	55	35.4	7.7

**REMARKS:**

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



**Below 1GHz Data:**

**802.11n (HT20)**

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	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	54.13	25.1 QP	40.0	-14.9	1.50 H	38	33.8	-8.7
2	146.72	28.3 QP	43.5	-15.2	1.50 H	276	36.9	-8.6
3	226.69	25.8 QP	46.0	-20.2	1.05 H	281	37.8	-12.0
4	500.04	30.5 QP	46.0	-15.5	1.50 H	334	33.2	-2.7
5	625.02	29.2 QP	46.0	-16.8	1.05 H	36	29.2	0.0
6	959.19	29.8 QP	46.0	-16.2	1.05 H	324	25.2	4.6

**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	34.63	32.5 QP	40.0	-7.5	1.05 V	272	42.1	-9.6
2	69.02	31.8 QP	40.0	-8.2	1.05 V	69	42.5	-10.7
3	101.93	25.8 QP	43.5	-17.7	1.05 V	236	38.4	-12.6
4	226.69	25.1 QP	46.0	-20.9	1.05 V	21	37.1	-12.0
5	500.01	28.0 QP	46.0	-18.0	1.05 V	63	30.7	-2.7
6	625.00	30.9 QP	46.0	-15.1	1.05 V	360	30.9	0.0

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral ) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 14, 2015	Sep. 13, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.4	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: Sep. 07, 2016

#### 4.2.3 Test Procedures

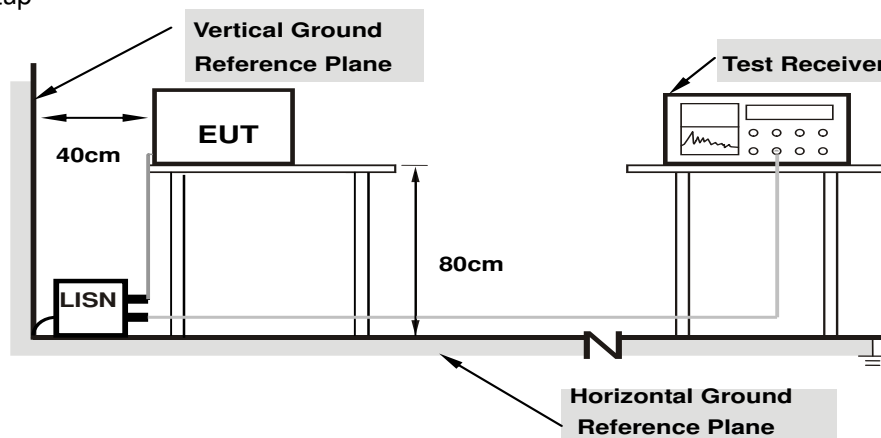
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

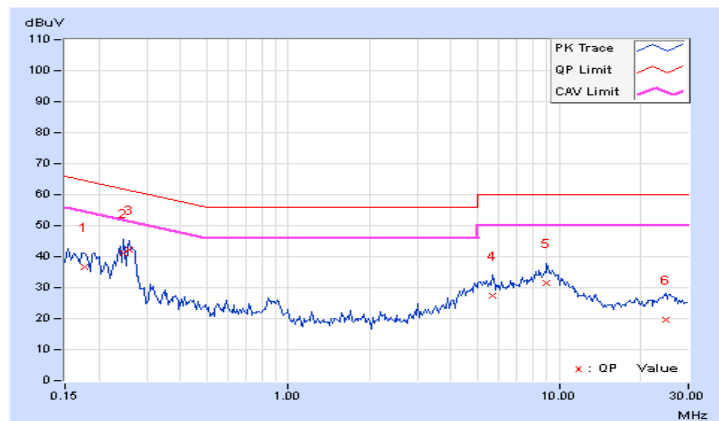
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	10.38	26.19	15.29	36.57	25.67	64.61	54.61	-28.04	-28.94
2	0.24766	10.37	30.88	21.98	41.25	32.35	61.84	51.84	-20.59	-19.49
<b>3</b>	<b>0.25938</b>	<b>10.38</b>	<b>31.96</b>	<b>25.86</b>	<b>42.34</b>	<b>36.24</b>	<b>61.45</b>	<b>51.45</b>	<b>-19.11</b>	<b>-15.21</b>
4	5.68359	10.71	16.55	11.68	27.26	22.39	60.00	50.00	-32.74	-27.61
5	9.02344	10.86	20.77	16.26	31.63	27.12	60.00	50.00	-28.37	-22.88
6	24.73438	11.66	7.88	2.35	19.54	14.01	60.00	50.00	-40.46	-35.99

#### REMARKS:

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

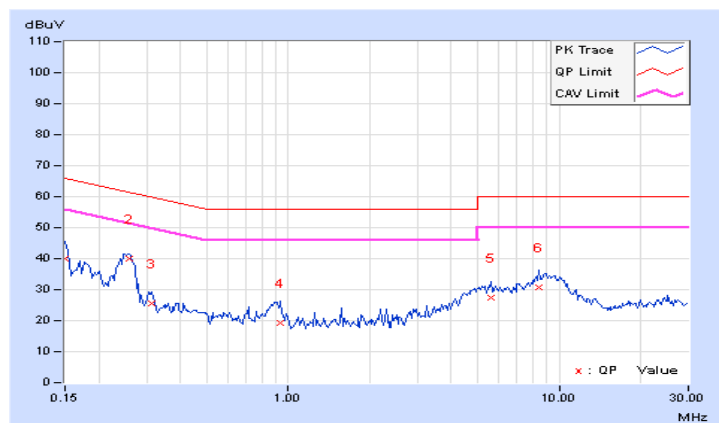


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.35	29.69	17.23	40.04	27.58	66.00	56.00	-25.96	-28.42
2	0.25938	10.39	29.75	23.66	40.14	34.05	61.45	51.45	-21.31	-17.40
3	0.31406	10.42	14.99	9.88	25.41	20.30	59.86	49.86	-34.45	-29.56
4	0.93906	10.40	8.86	5.89	19.26	16.29	56.00	46.00	-36.74	-29.71
5	5.61328	10.78	16.55	11.33	27.33	22.11	60.00	50.00	-32.67	-27.89
6	8.38672	10.88	19.96	14.68	30.84	25.56	60.00	50.00	-29.16	-24.44

#### 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.

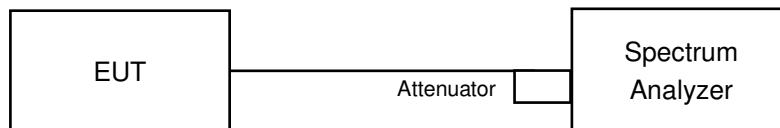


### 4.3 6dB Bandwidth Measurement

#### 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	Chain 1		
1	2412	10.15	10.15	0.5	Pass
6	2437	10.09	10.04	0.5	Pass
11	2462	10.12	9.59	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.65	16.65	0.5	Pass
6	2437	16.60	16.57	0.5	Pass
11	2462	16.65	16.63	0.5	Pass

##### 802.11n (HT20)

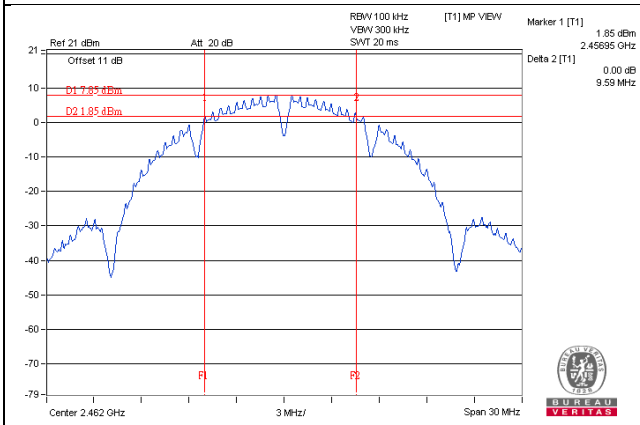
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.89	17.87	0.5	Pass
6	2437	17.93	17.90	0.5	Pass
11	2462	17.86	17.87	0.5	Pass

##### 802.11n (HT40)

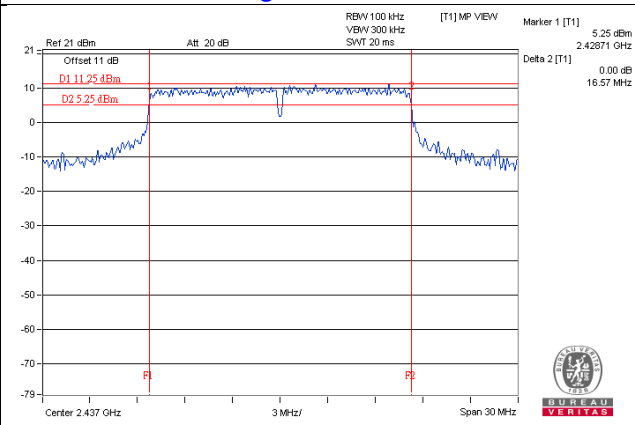
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.60	36.61	0.5	Pass
6	2437	36.60	36.61	0.5	Pass
9	2452	36.58	36.59	0.5	Pass

### Spectrum Plot of Worst Value

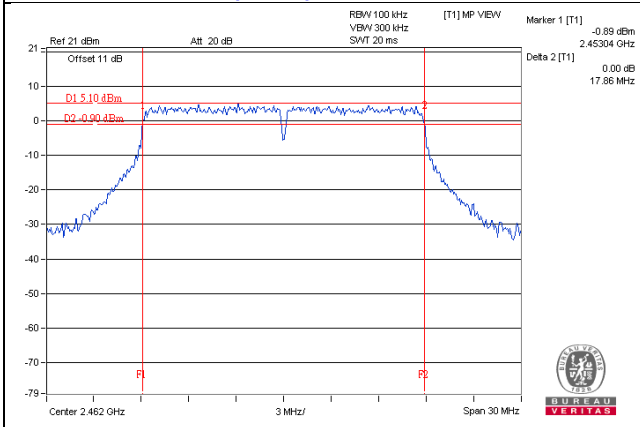
**802.11b / Chain 1: CH11**



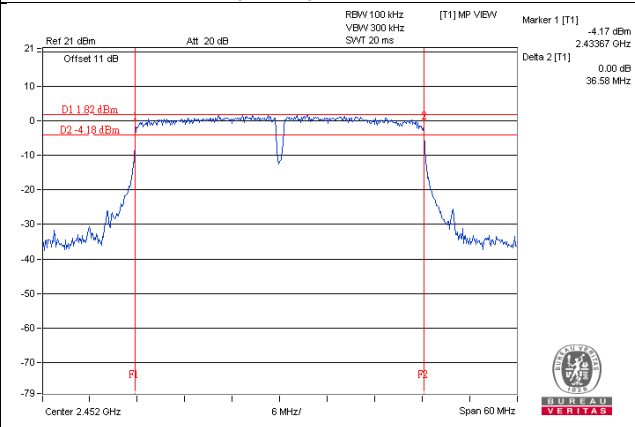
**802.11g / Chain 1: CH6**



**802.11n (HT20) / Chain 0 : CH11**



**802.11n (HT20) / Chain 0 : CH9**





## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

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

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

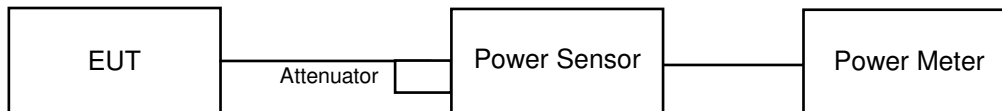
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

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

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

For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

### 4.4.2 Test Setup



### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 Test Procedures

An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the 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

##### 802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.37	17.86	129.801	21.13	30	Pass
6	2437	18.44	17.77	129.664	21.13	30	Pass
11	2462	19.50	17.55	146.01	21.64	30	Pass

##### 802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.50	19.22	172.685	22.37	30	Pass
6	2437	25.98	25.20	727.409	28.62	30	Pass
11	2462	20.25	20.58	220.213	23.43	30	Pass

##### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.43	19.22	171.26	22.34	30	Pass
6	2437	26.19	25.46	767.471	28.85	30	Pass
11	2462	19.06	18.30	148.146	21.71	30	Pass

##### 802.11n (HT40)

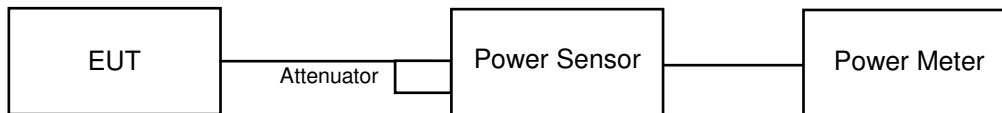
Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.30	19.04	165.282	22.18	30	Pass
6	2437	21.38	21.21	269.534	24.31	30	Pass
9	2452	18.84	18.41	145.903	21.64	30	Pass

## 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

- 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.

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

Same as Item 4.3.6

#### 4.5.7 Test Results

##### 802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.86	3.01	-10.85	7.26	Pass
	6	2437	-13.56	3.01	-10.55	7.26	Pass
	11	2462	-10.32	3.01	-7.31	7.26	Pass
1	1	2412	-13.83	3.01	-10.82	7.26	Pass
	6	2437	-12.51	3.01	-9.50	7.26	Pass
	11	2462	-13.84	3.01	-10.83	7.26	Pass

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.74dBi > 6dBi , so the power density limit shall be reduced to  $8-(6.74-6) = 7.26$ dBm.

##### 802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.28	3.01	-10.27	7.26	Pass
	6	2437	-6.39	3.01	-3.38	7.26	Pass
	11	2462	-11.86	3.01	-8.85	7.26	Pass
1	1	2412	-12.75	3.01	-9.74	7.26	Pass
	6	2437	-7.72	3.01	-4.71	7.26	Pass
	11	2462	-11.06	3.01	-8.05	7.26	Pass

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.74dBi > 6dBi , so the power density limit shall be reduced to  $8-(6.74-6) = 7.26$ dBm.

### 802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.45	3.01	-10.44	7.26	Pass
	6	2437	-6.56	3.01	-3.55	7.26	Pass
	11	2462	-13.81	3.01	-10.80	7.26	Pass
1	1	2412	-13.55	3.01	-10.54	7.26	Pass
	6	2437	-8.08	3.01	-5.07	7.26	Pass
	11	2462	-14.21	3.01	-11.20	7.26	Pass

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.74dBi > 6dBi , so the power density limit shall be reduced to  $8-(6.74-6) = 7.26$ dBm.

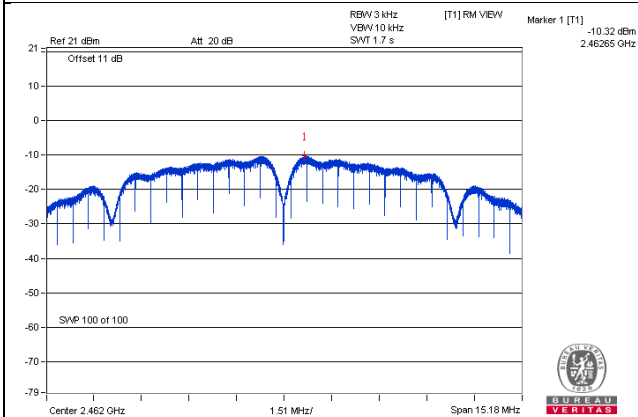
### 802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-14.01	3.01	-11.00	7.26	Pass
	6	2437	-14.03	3.01	-11.02	7.26	Pass
	9	2452	-15.77	3.01	-12.76	7.26	Pass
1	3	2422	-15.76	3.01	-12.75	7.26	Pass
	6	2437	-14.28	3.01	-11.27	7.26	Pass
	9	2452	-17.23	3.01	-14.22	7.26	Pass

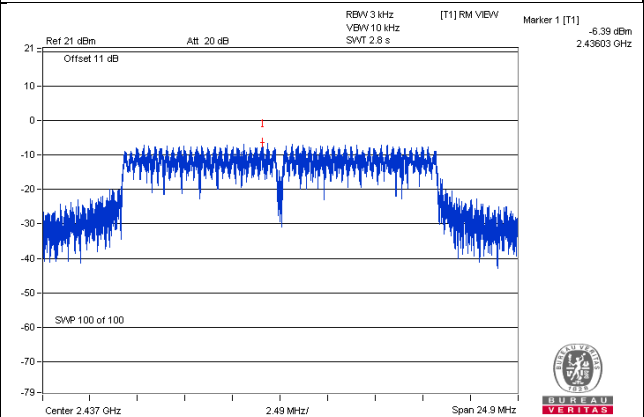
**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.74dBi > 6dBi , so the power density limit shall be reduced to  $8-(6.74-6) = 7.26$ dBm.

### Spectrum Plot of Worst Value

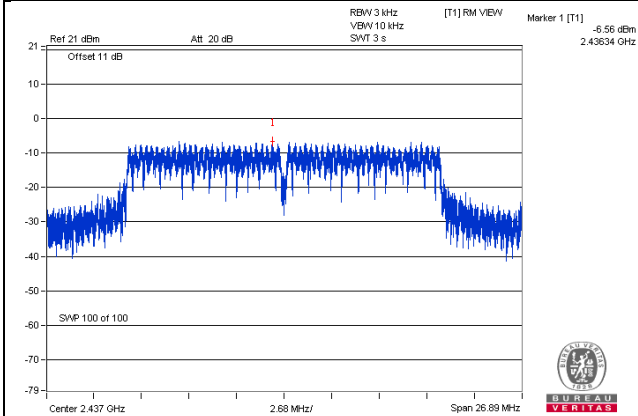
**802.11b / Chain 0: CH11**



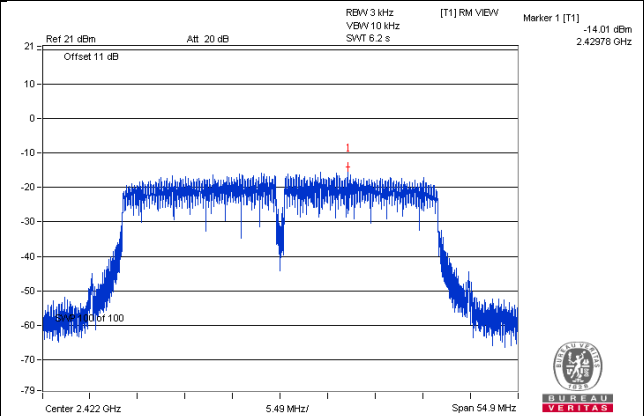
**802.11g / Chain 0: CH6**



**802.11n (HT20) / Chain 0: CH6**



**802.11n (HT40) / Chain 0: CH1**

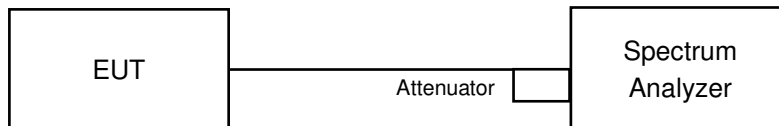


## 4.6 Conducted Out of Band Emission Measurement

### 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

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

#### MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard  
No deviation.

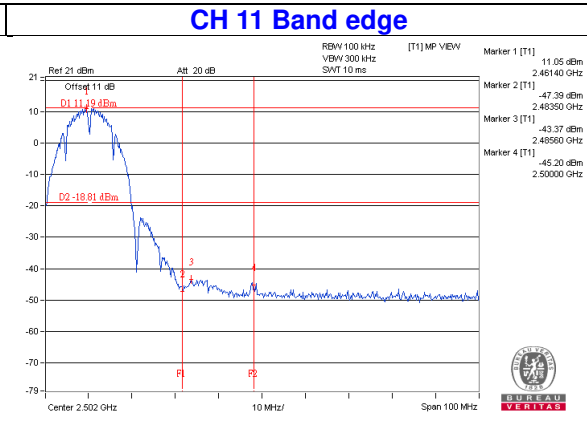
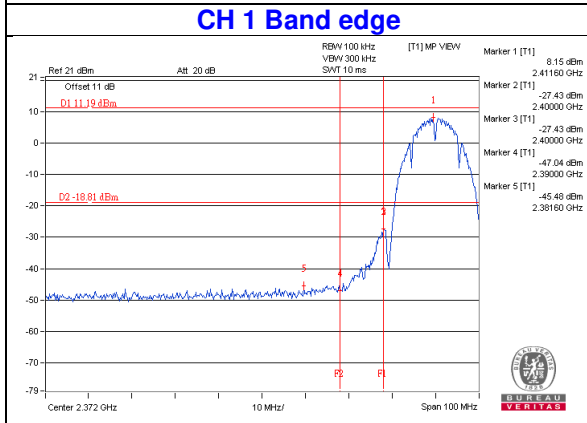
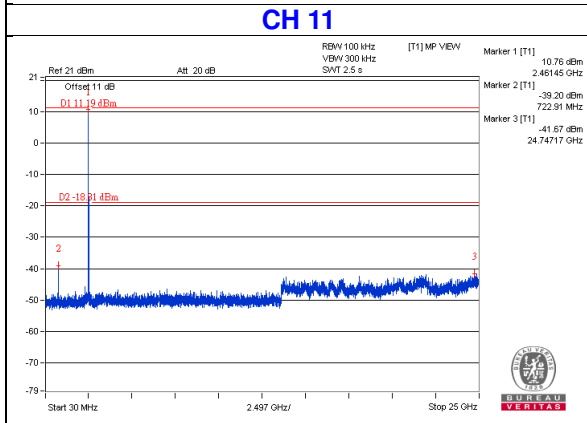
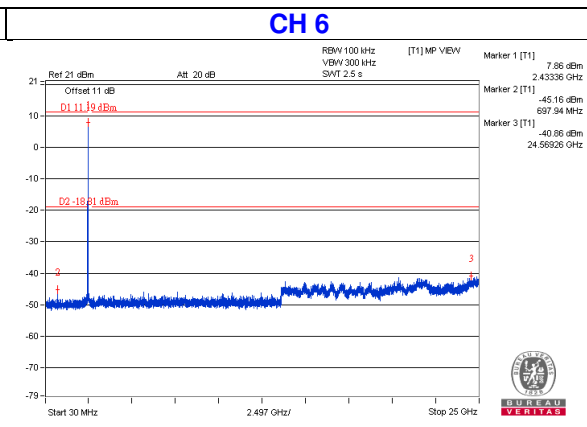
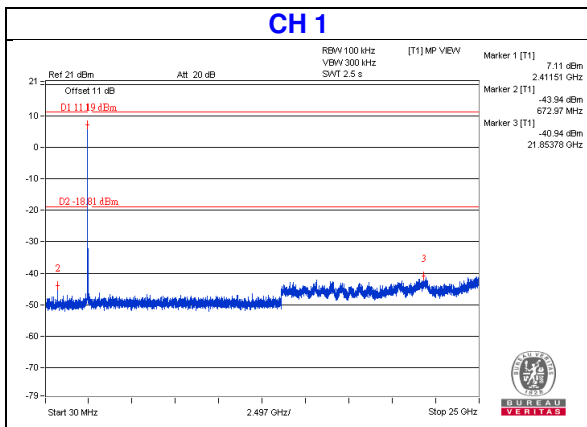
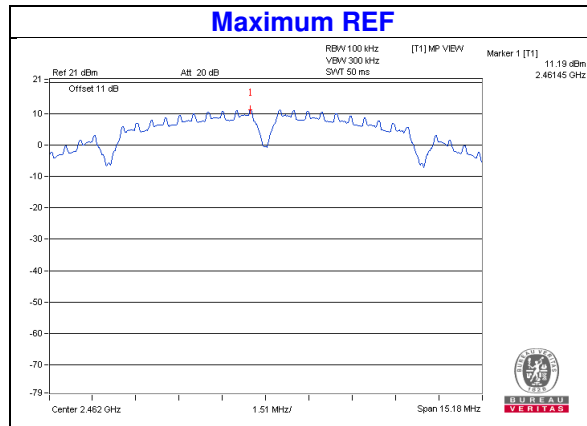
### 4.6.6 EUT Operating Condition

Same as Item 4.3.6

### 4.6.7 Test Results

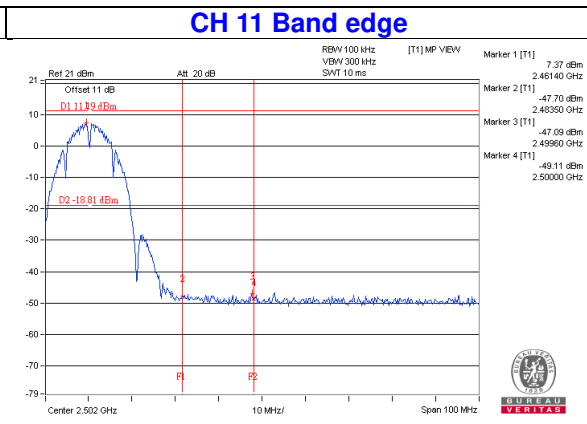
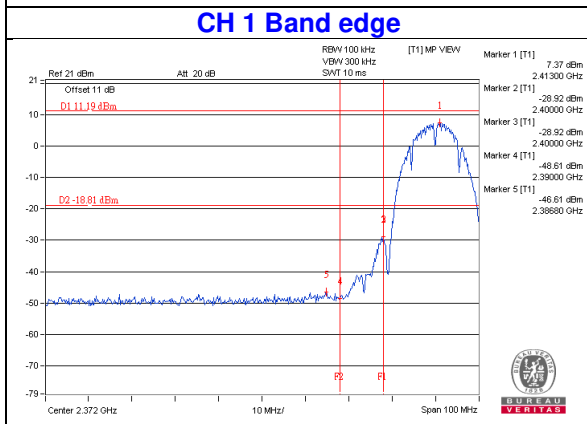
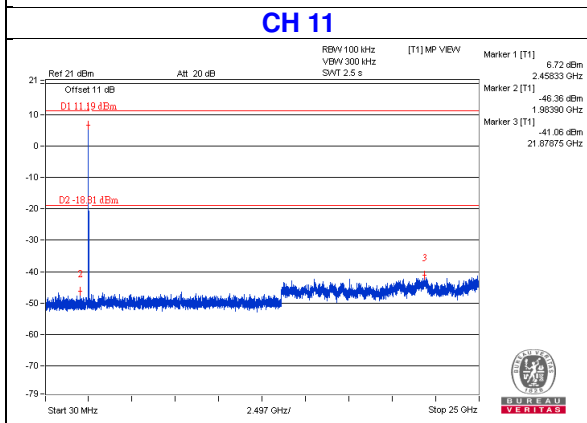
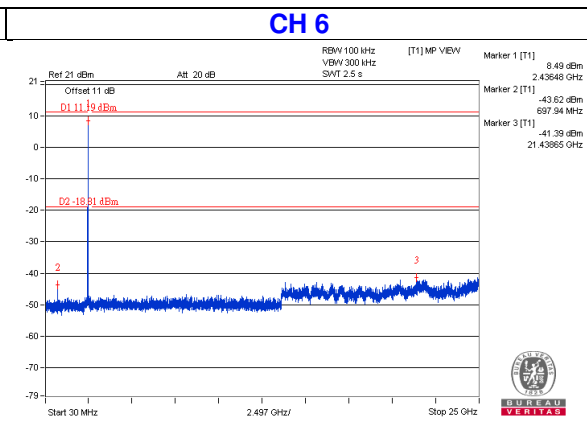
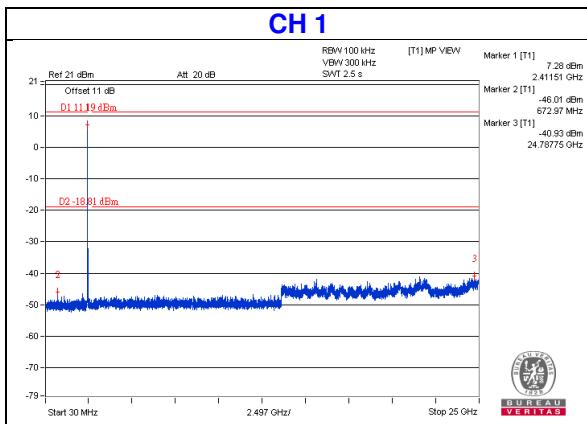
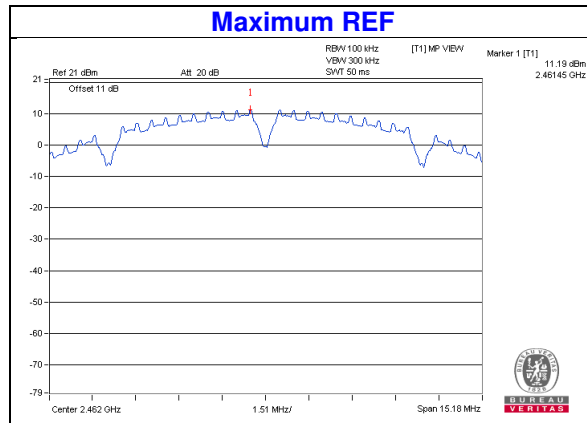
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b  
CHAIN 0

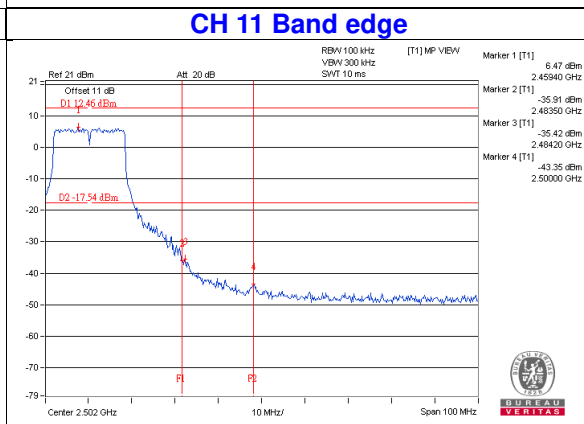
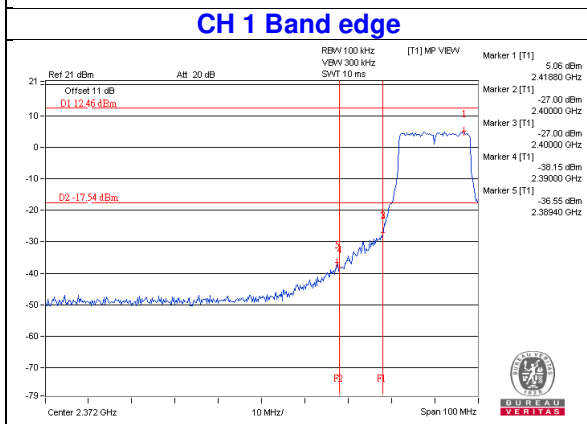
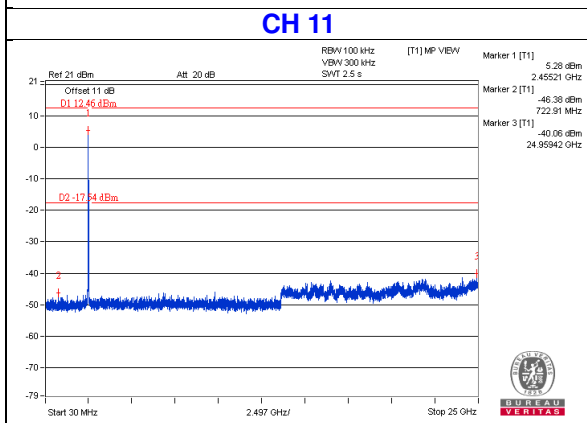
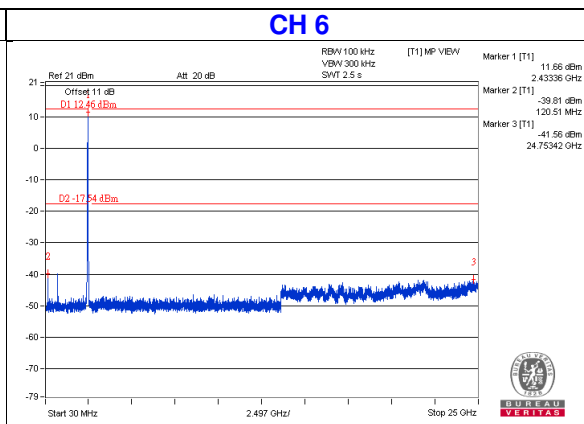
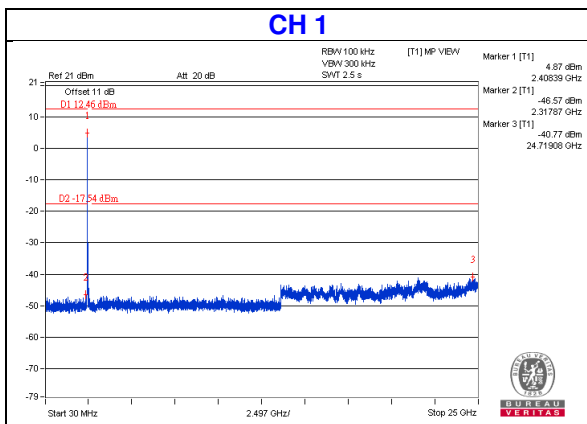
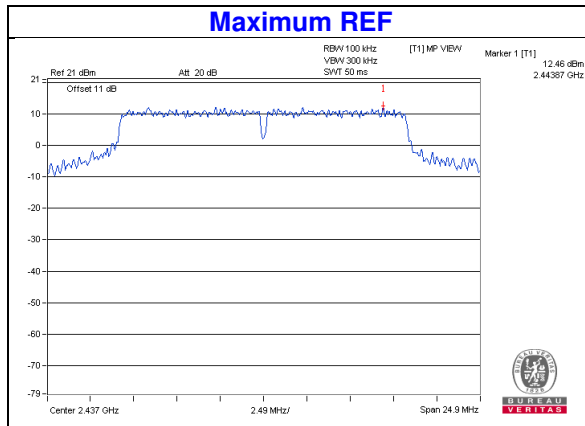




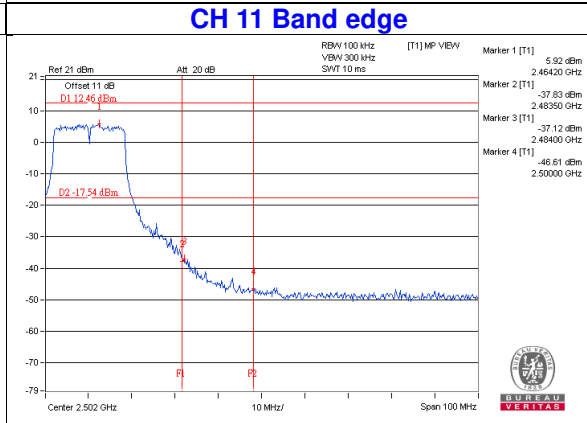
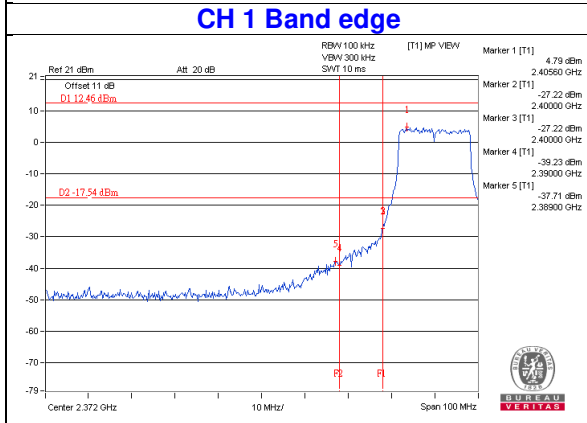
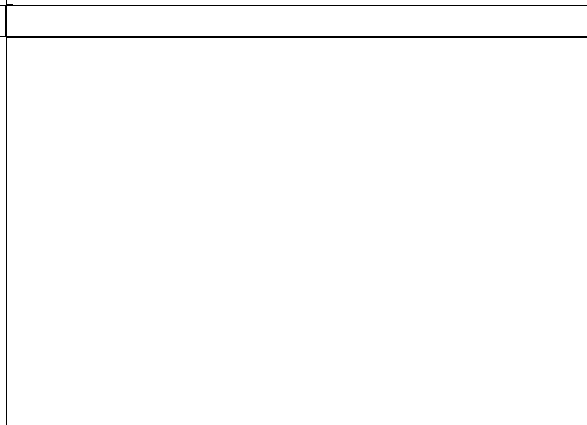
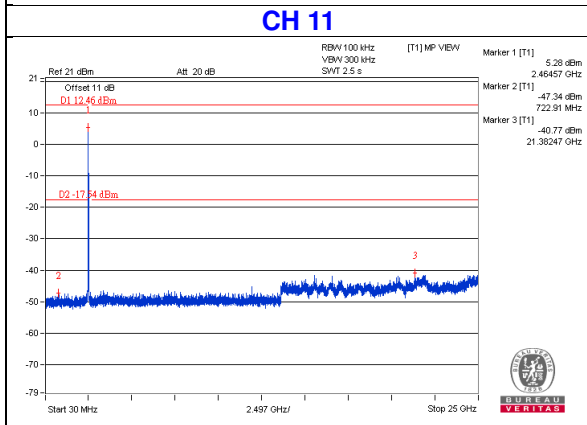
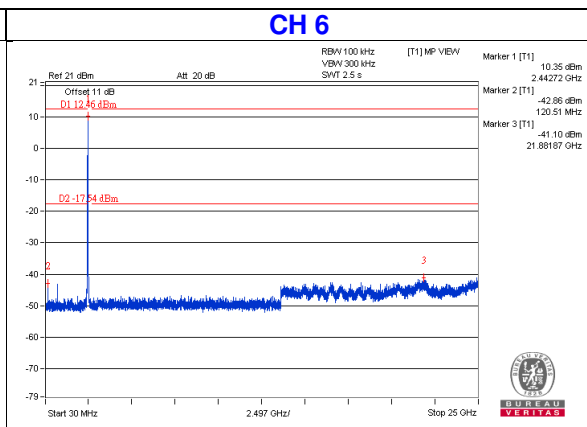
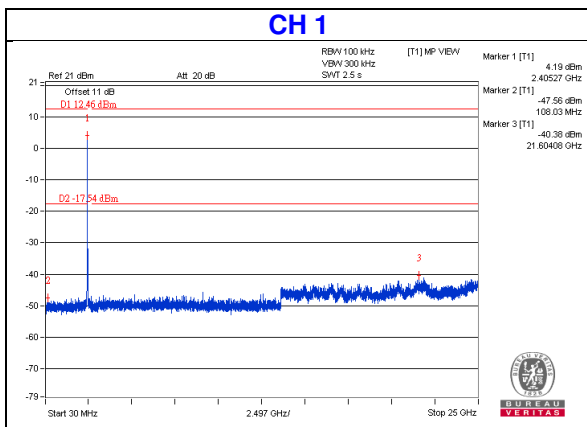
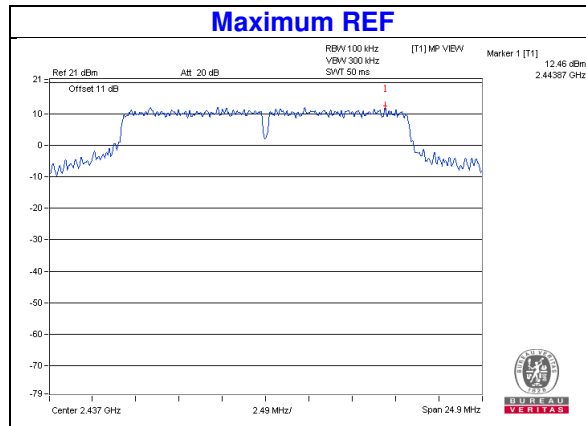
### CHAIN 1



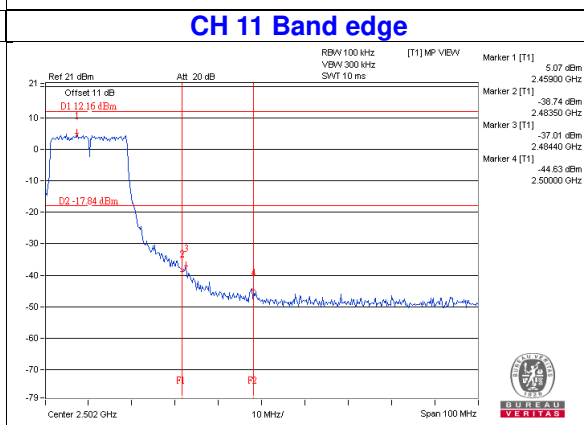
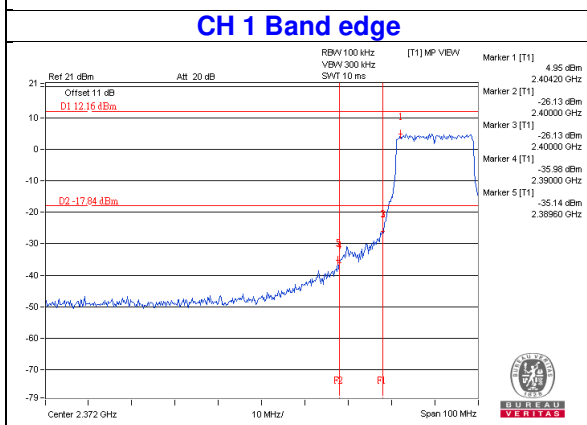
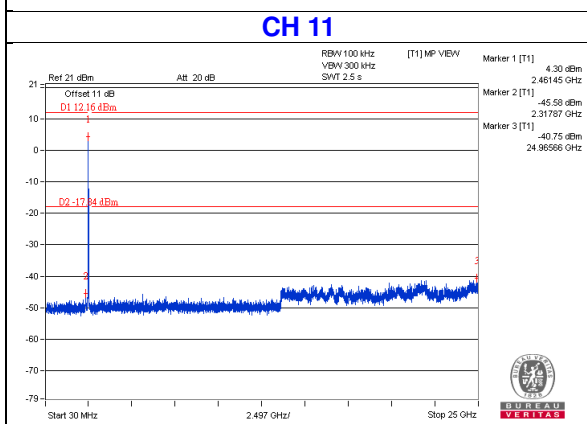
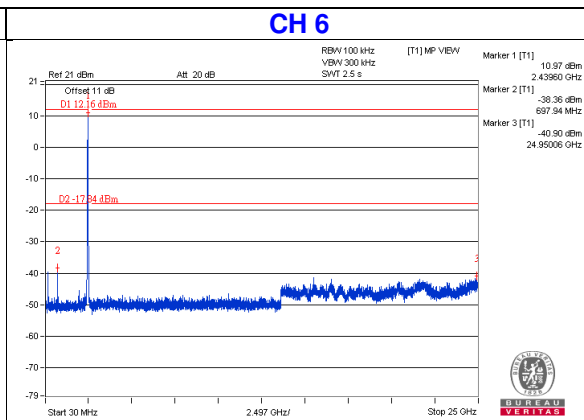
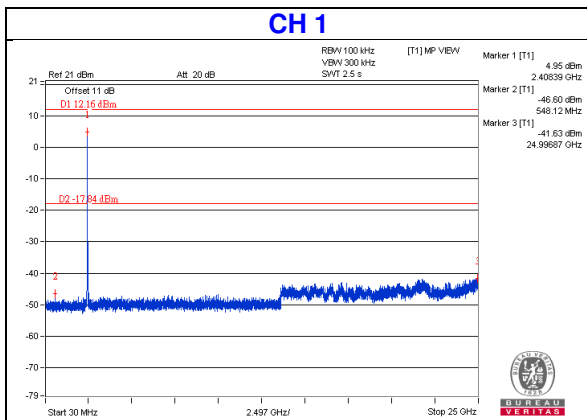
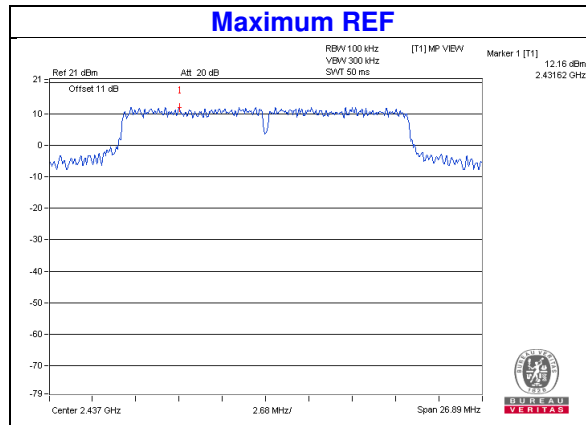
802.11g  
CHAIN 0



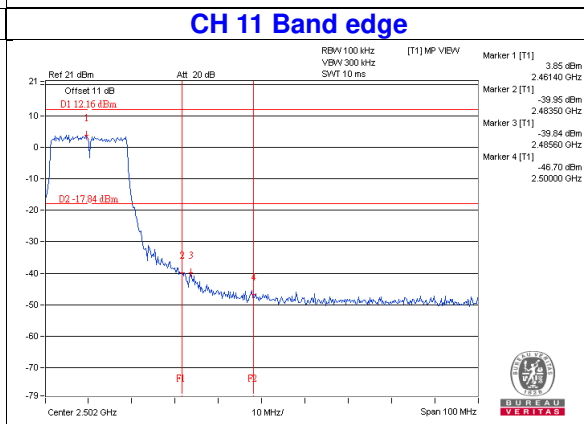
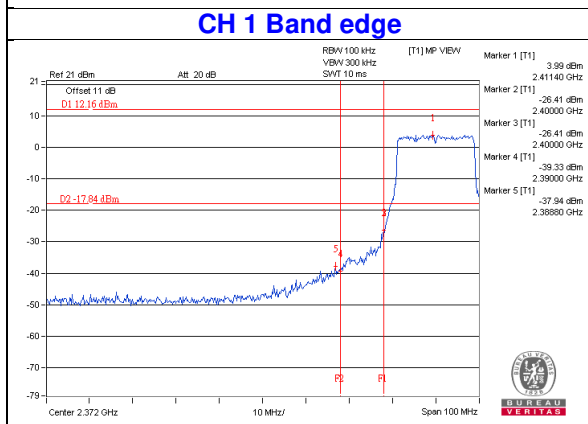
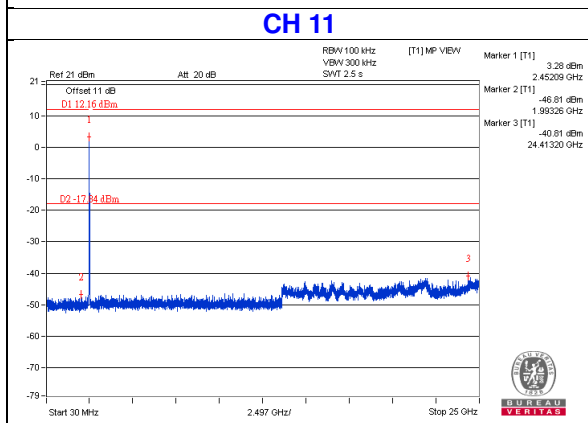
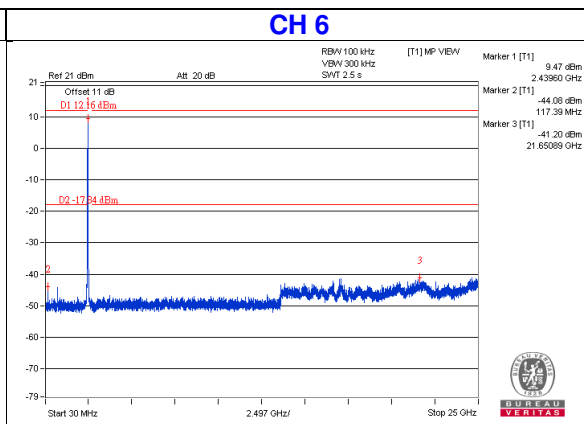
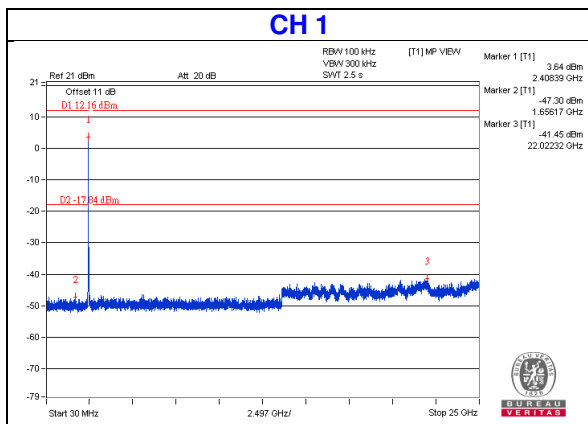
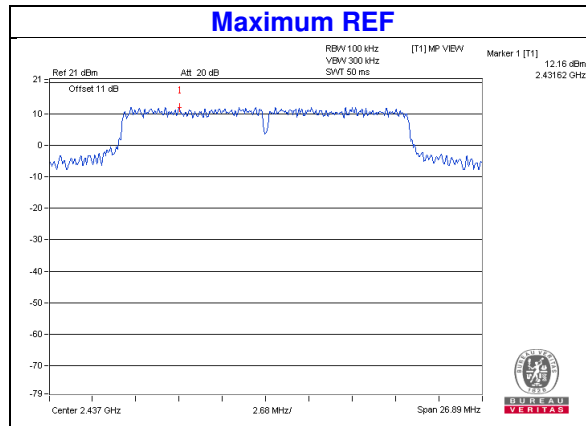
# CHAIN 1



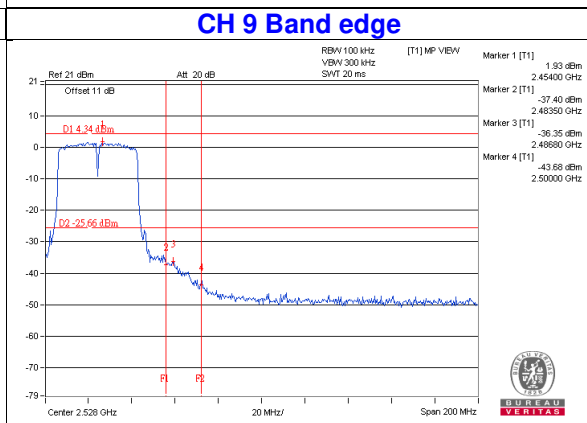
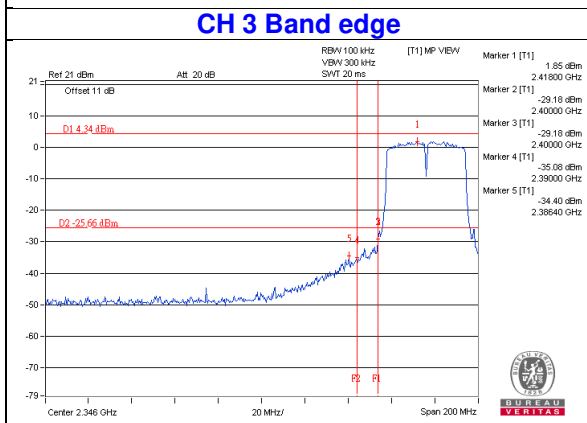
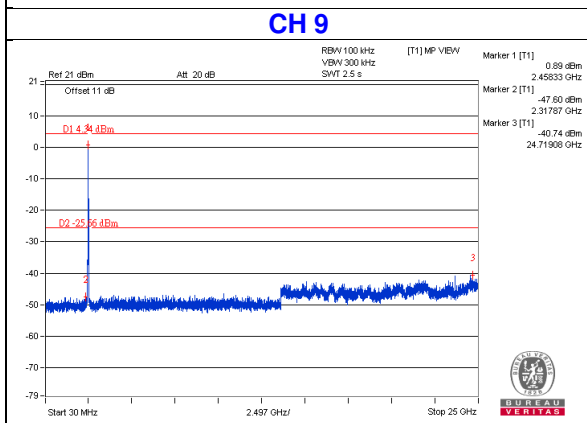
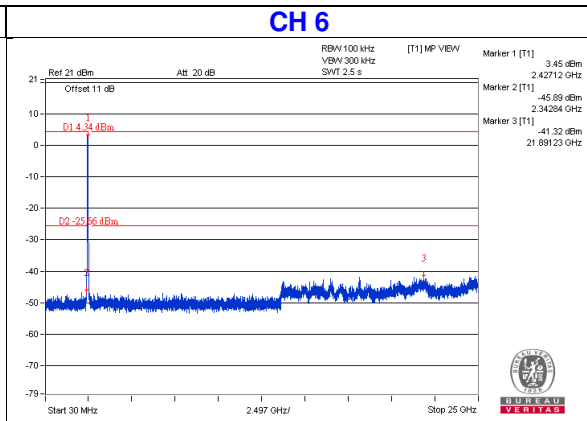
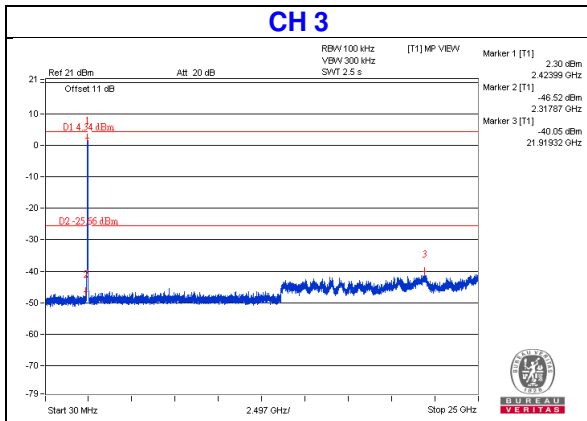
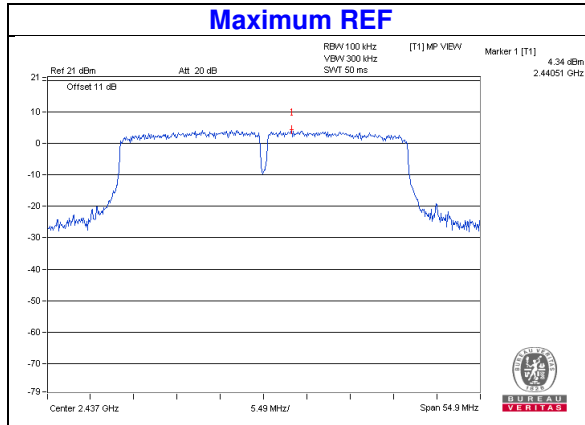
802.11n (HT20)  
CHAIN 0



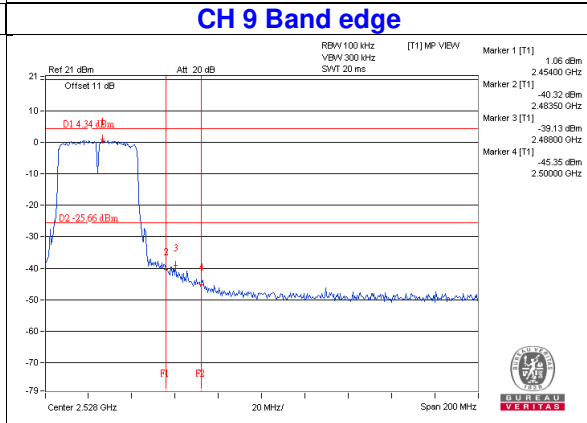
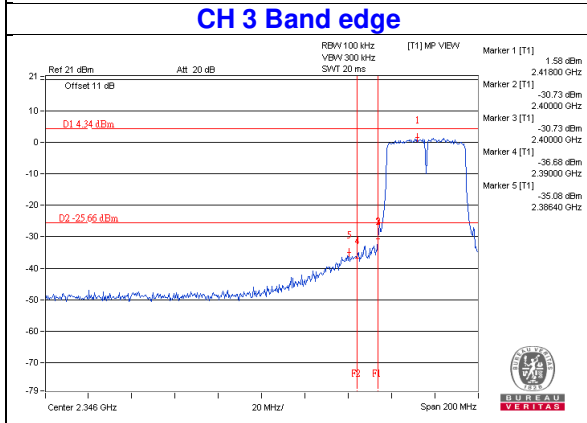
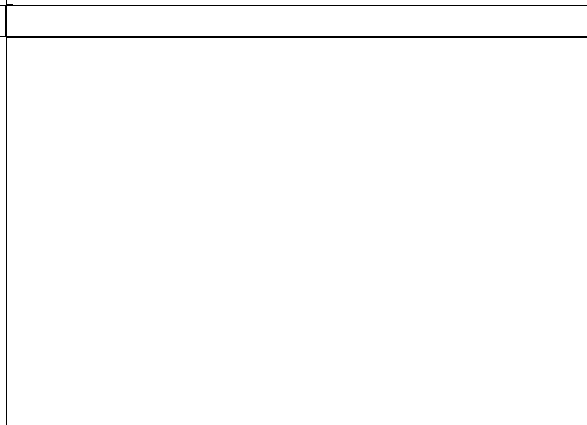
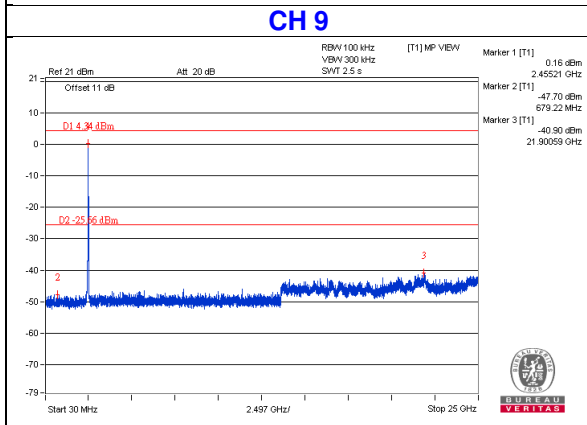
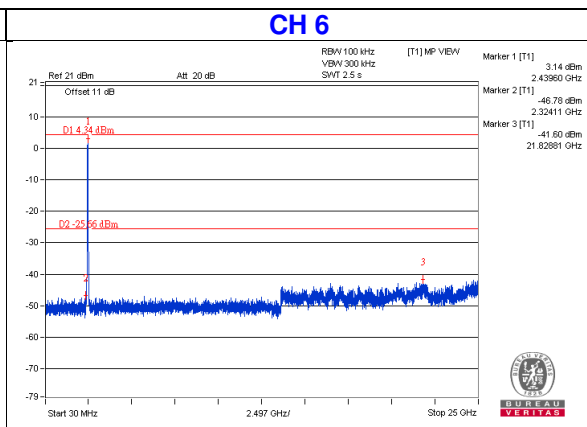
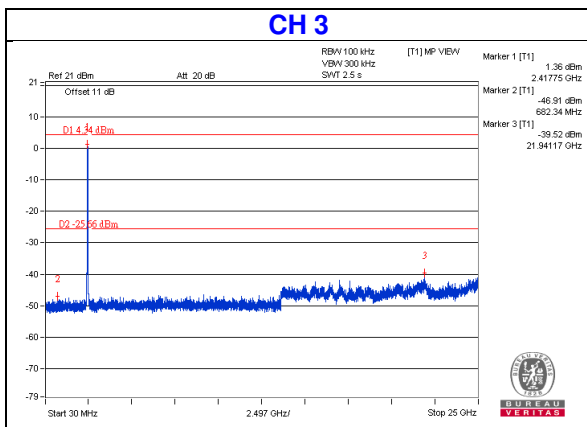
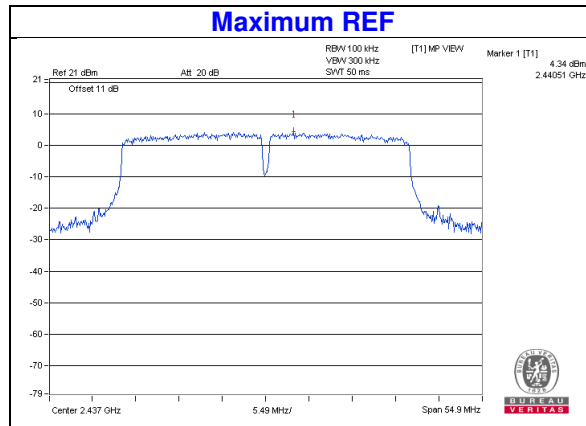
# CHAIN 1



802.11n (HT40)  
CHAIN 0



# CHAIN 1



## 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.

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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 ---