

## FCC Test Report

**Report No.:** RF150910D02

**FCC ID:** 2ACCJB029

**Test Model:** P17AA

**Received Date:** Sep. 10, 2015

**Test Date:** Sep. 24 ~ Oct. 19, 2015

**Issued Date:** Oct. 20, 2015

**Applicant:** TCL communication Ltd

**Address:** 5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong  
Shanghai China

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
(R.O.C.)



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### Release Control Record

Issue No.	Description	Date Issued
RF150910D02	Original release.	Oct. 20, 2015

## 1 Certificate of Conformity

**Product:** BigPad

**Brand:** TCL, ALCATEL onetouch

**Test Model:** P17AA

**Sample Status:** Engineering sample

**Applicant:** TCL communication Ltd

**Test Date:** Sep. 24 ~ Oct. 19, 2015

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**



**Date:** Oct. 20, 2015

Jessica Cheng / Senior Specialist

**Approved by :**



**Date:** Oct. 20, 2015

Rex Lai / Assistant Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.81dB at 24.02344MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -6.4dB at 165.95MHz & 860.65MHz.
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	Expended Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.43 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	Above 1GHz	3.36 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	BigPad
Brand	TCL, ALCATEL onetouch
Test Model	P17AA
Status of EUT	Engineering sample
Power Supply Rating	19Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11/ 5.5/ 2/ 1Mbps 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n: up to 150.0Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	223.357mW
Antenna Type	PIFA antenna with -3.76dBi gain
Antenna Connector	N/A
Accessory Device	Touch Pen
Data Cable Supplied	N/A

Note:

- The EUT provides 1 completed transmitter and 1 receiver.

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

- The EUT uses following adapter.

Brand	NA
Model	S048DO1900250
AC Input Power	100-240V, 50/60Hz, 1500mA
DC Output Power	19Vdc, 2500mA
Power Cable	AC Nonshielded (1.0m) DC Shielded (1.0m) with one Core

- 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 <sup>≥</sup> 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE<sup>≥</sup>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 X,Z axis. The worst case was found when positioned on **Z-plane**.

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	1 to 11	1	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	1 to 11	1	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	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 <sup>3</sup> 1G	28deg. C, 73%RH	120Vac, 60Hz	Aaron You
RE<1G	27deg. C, 65%RH	120Vac, 60Hz	Aaron You
PLC	27deg. C, 50%RH	120Vac, 60Hz	Hermes Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

### 3.3 Duty Cycle of Test Signal

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

**802.11g:** Duty cycle =  $1.362/1.528 = 0.891$ , Duty factor =  $10 * \log(1/0.891) = 0.501$

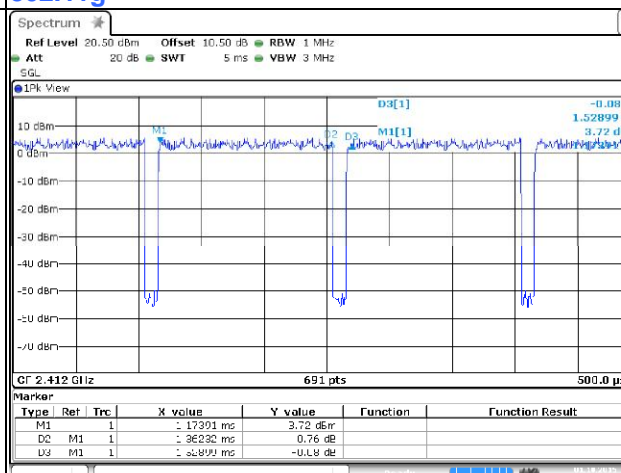
**802.11n (HT20):** Duty cycle =  $1.268/1.413 = 0.897$ , Duty factor =  $10 * \log(1/0.897) = 0.472$

**802.11n (HT40):** Duty cycle =  $0.61/0.752 = 0.811$ , Duty factor =  $10 * \log(1/0.811) = 0.910$

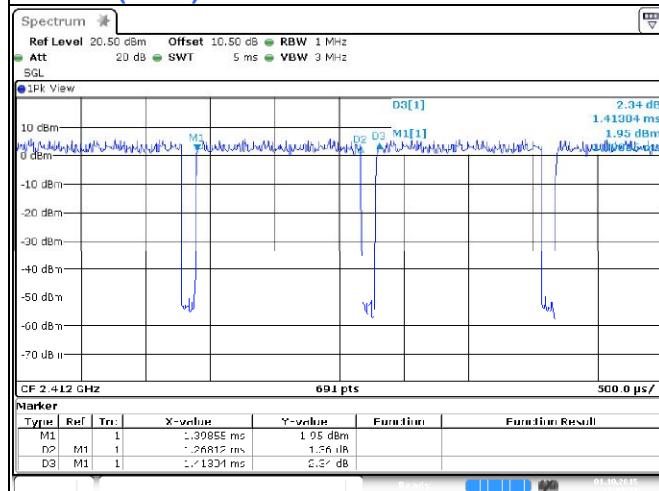
#### 802.11b



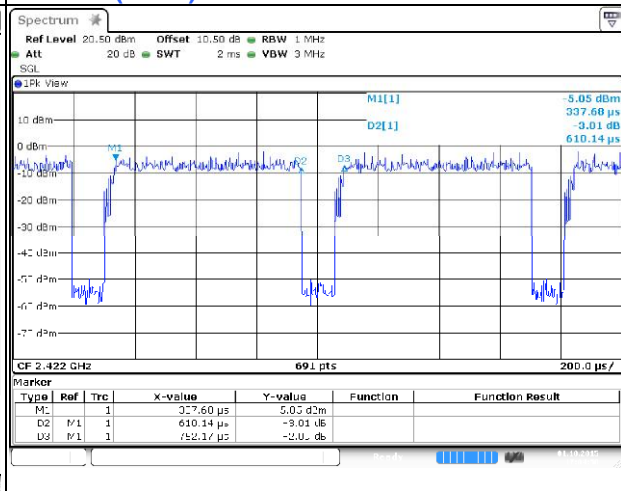
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)



### 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.	USB Mouse	Microsoft	1113	9170515897415	FCC DOC Approved	Provided by Lab
B.	USB 3.0 Hard Disk	WD	WDBACY5000ABL-PE SN	WX81E81VMH07	FCC DOC Approved	Provided by Lab
C.	EARPHONE / MIC	RONALD	MOE143	N/A	N/A	Provided by Lab
D.	Micro SD	Transcend	8G	N/A	N/A	Provided by Lab
E.	Touch Pen	ALCATEL onetouch	ASCJXUI6003010584 2A0101	N/A	N/A	Supplied by client
F.	Notebook PC	DELL	P41G	HT4W952	N/A	Provided by Lab
G.	Wireless Broadband Router	D-LINK	DIR-815	PVK21B1000238	KA2IR815A1	Provided by Lab

Note:

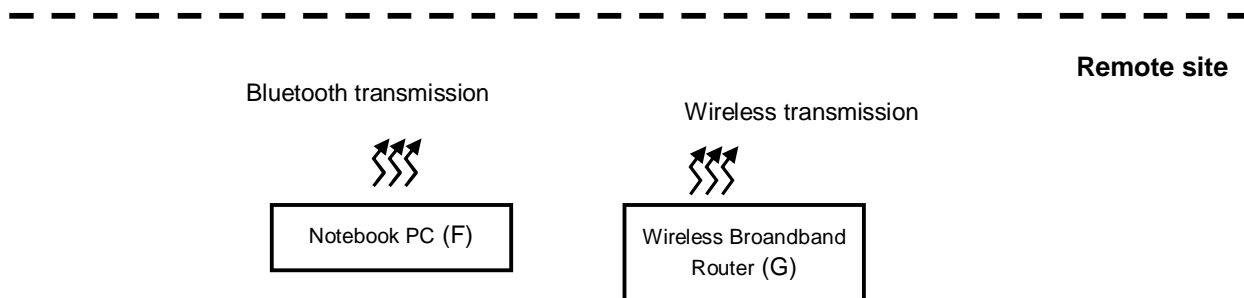
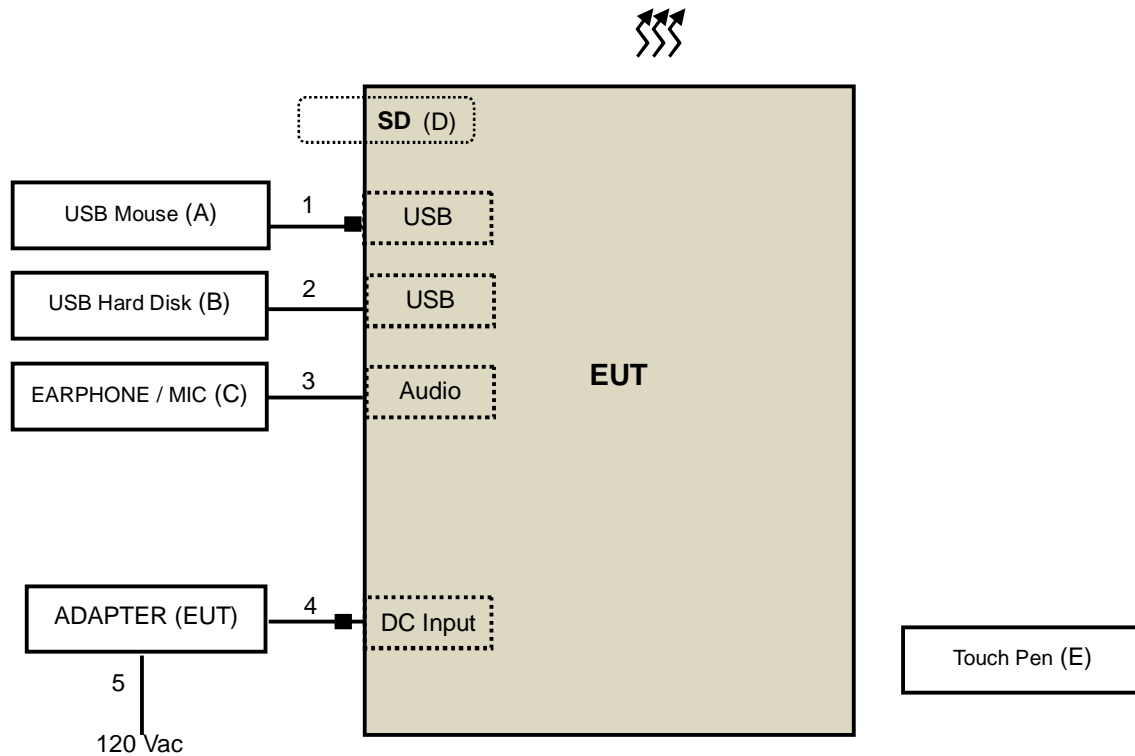
1. All power cords of the above support units are non-shielded (1.8m).
2. Items F~G acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.8	Y	1	Provided by Lab
2.	USB cable	1	0.5	Y	0	Provided by Lab
3.	Audio cable	1	1.2	N	0	Provided by Lab
4.	DC power cable	1	1.0	Y	1	Supplied by client
5.	AC power cord	1	1.0	N	0	Supplied by client

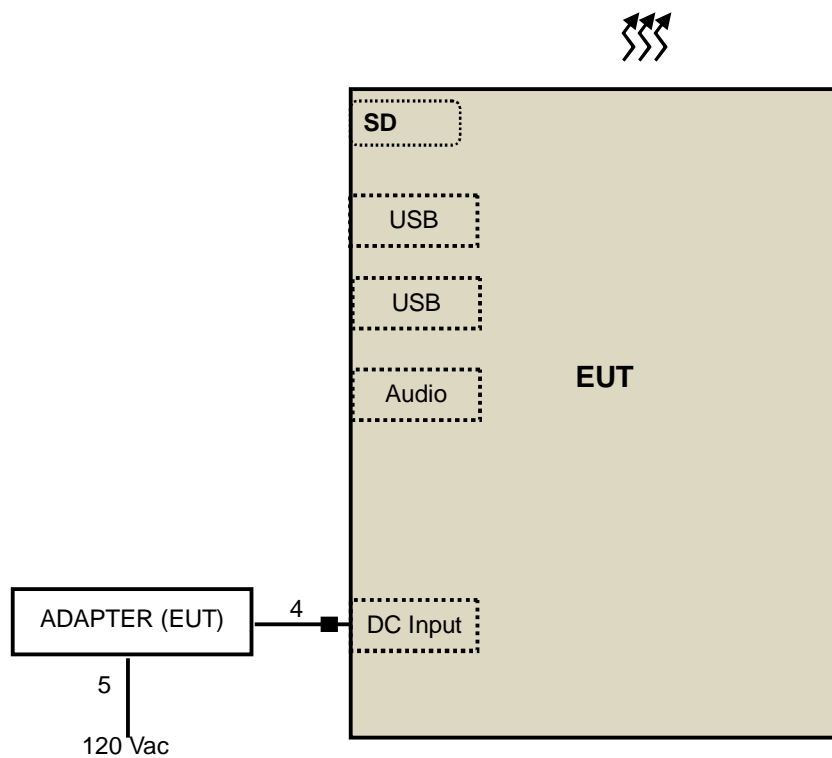
Note: The core(s) is(are) originally attached to the cable(s).

### 3.4.1 Configuration of System under Test

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



# Radiated Emission Test (Above 1GHz):



### 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 v03r03**

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 20dB below the highest level of the desired power:

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

#### NOTE:

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



#### 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2015	Feb. 25, 2016
HP Preamplifier	8449B	3008A01201	Feb. 26, 2015	Feb. 25, 2016
MITEQ Preamplifier	AMF-6F-260400-3 3-8P	892164	Mar. 01, 2015	Feb. 28, 2016
Agilent Spectrum	E4446A	MY51100050	Oct. 24, 2014	Oct. 23, 2015
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 04, 2015	Feb. 03, 2016
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Feb. 09, 2015	Feb. 08, 2016
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Feb. 10, 2015	Feb. 09, 2016
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15. 9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
EMCO Horn Antenna	3115	00028257	Feb. 05, 2015	Feb. 04, 2016
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2015	Apr. 20, 2016
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2015	Apr. 20, 2016

- NOTE:**
1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
  2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  3. The test was performed in Chamber No. 6.
  4. The Industry Canada Reference No. IC 7450E-6.
  5. The FCC Site Registration No. is 447212.

#### 4.1.3 Test Procedures

- 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:**

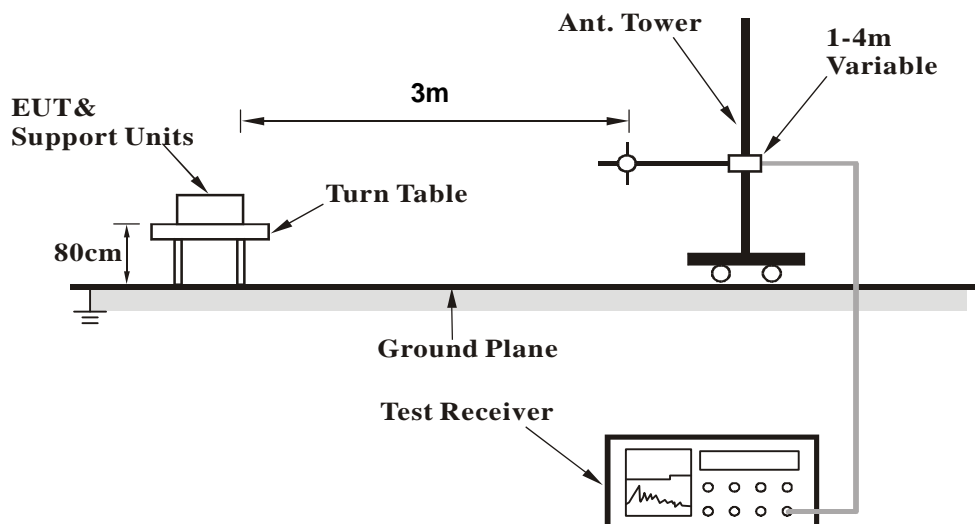
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

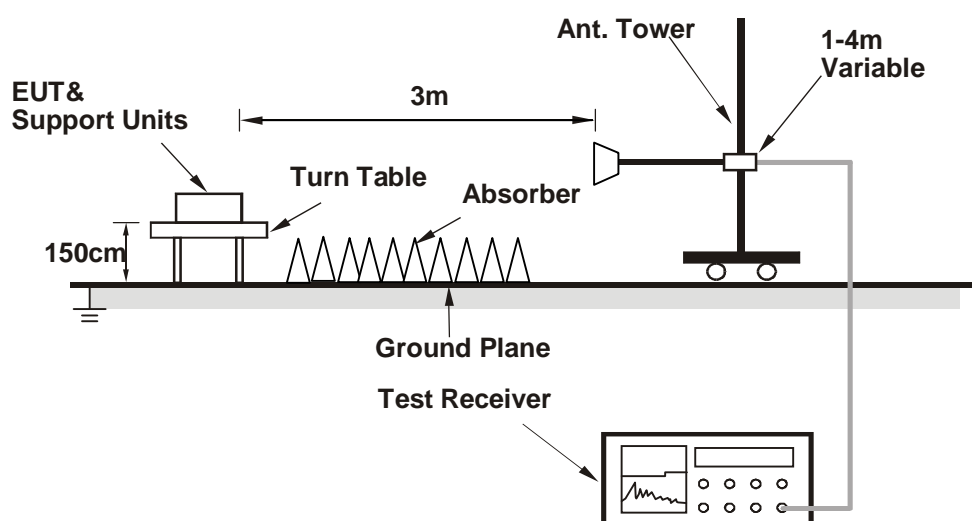
No deviation.

#### 4.1.5 Test Set Up

##### <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

Set the EUT under transmission condition continuously at specific channel frequency.

#### 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	55.2 PK	74.0	-18.9	1.37 H	230	54.63	0.52
2	2390.00	41.4 AV	54.0	-12.6	1.37 H	230	40.91	0.52
3	*2412.00	100.3 PK			1.37 H	230	99.64	0.65
4	*2412.00	97.2 AV			1.37 H	230	96.54	0.65
5	4824.00	49.5 PK	74.0	-24.5	1.17 H	89	41.66	7.83
6	4824.00	38.0 AV	54.0	-16.0	1.17 H	89	30.17	7.83
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	53.6 PK	74.0	-20.4	2.16 V	252	53.11	0.52
2	2390.00	41.2 AV	54.0	-12.9	2.16 V	252	40.63	0.52
3	*2412.00	99.1 PK			2.16 V	252	98.49	0.65
4	*2412.00	95.8 AV			2.16 V	252	95.19	0.65
5	4824.00	48.2 PK	74.0	-25.8	1.08 V	265	40.37	7.83
6	4824.00	37.7 AV	54.0	-16.3	1.08 V	265	29.88	7.83

#### 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
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	103.7 PK			1.06 H	230	102.89	0.76
2	*2437.00	100.6 AV			1.06 H	230	99.82	0.76
3	4874.00	50.6 PK	74.0	-23.4	1.20 H	100	42.68	7.93
4	4874.00	39.7 AV	54.0	-14.3	1.20 H	100	31.77	7.93
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	100.4 PK			1.72 V	339	99.61	0.76
2	*2437.00	97.2 AV			1.72 V	339	96.48	0.76
3	4874.00	49.8 PK	74.0	-24.2	1.17 V	243	41.88	7.93
4	4874.00	38.2 AV	54.0	-15.8	1.17 V	243	30.26	7.93

**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	100.1 PK			1.33 H	229	99.21	0.88
2	*2462.00	97.0 AV			1.33 H	229	96.10	0.88
3	2483.50	56.6 PK	74.0	-17.4	1.33 H	229	55.63	0.98
4	2483.50	42.7 AV	54.0	-11.3	1.33 H	229	41.71	0.98
5	4924.00	49.2 PK	74.0	-24.8	1.15 H	93	41.13	8.08
6	4924.00	38.9 AV	54.0	-15.1	1.15 H	93	30.82	8.08
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	97.7 PK			1.54 V	334	96.82	0.88
2	*2462.00	94.7 AV			1.54 V	334	93.81	0.88
3	2483.50	55.2 PK	74.0	-18.9	1.54 V	334	54.17	0.98
4	2483.50	41.6 AV	54.0	-12.4	1.54 V	334	40.61	0.98
5	4924.00	48.2 PK	74.0	-25.8	1.00 V	227	40.15	8.08
6	4924.00	37.9 AV	54.0	-16.1	1.00 V	227	29.80	8.08

#### 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.

## 802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.2 PK	74.0	-16.8	1.36 H	232	56.64	0.52
2	2390.00	43.4 AV	54.0	-10.6	1.36 H	232	42.91	0.52
3	*2412.00	98.7 PK			1.36 H	232	98.00	0.65
4	*2412.00	89.0 AV			1.36 H	232	88.34	0.65
5	4824.00	49.1 PK	74.0	-24.9	1.12 H	86	41.27	7.83
6	4824.00	38.1 AV	54.0	-15.9	1.12 H	86	30.26	7.83
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	53.4 PK	74.0	-20.6	2.22 V	248	52.88	0.52
2	2390.00	41.6 AV	54.0	-12.5	2.22 V	248	41.03	0.52
3	*2412.00	98.2 PK			2.22 V	248	97.52	0.65
4	*2412.00	88.5 AV			2.22 V	248	87.88	0.65
5	4824.00	48.1 PK	74.0	-25.9	1.03 V	255	40.31	7.83
6	4824.00	37.5 AV	54.0	-16.5	1.03 V	255	29.71	7.83

## 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 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	103.5 PK			1.37 H	230	102.71	0.76
2	*2437.00	94.1 AV			1.37 H	230	93.36	0.76
3	4874.00	49.6 PK	74.0	-24.4	1.10 H	88	41.63	7.93
4	4874.00	38.5 AV	54.0	-15.5	1.10 H	88	30.54	7.93
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	100.1 PK			1.41 V	339	99.35	0.76
2	*2437.00	91.2 AV			1.41 V	339	90.48	0.76
3	4874.00	48.2 PK	74.0	-25.8	1.00 V	261	40.28	7.93
4	4874.00	37.8 AV	54.0	-16.2	1.00 V	261	29.86	7.93

**REMARKS:**

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	99.7 PK			1.34 H	230	98.77	0.88
2	*2462.00	89.8 AV			1.34 H	230	88.95	0.88
3	2483.50	58.7 PK	74.0	-15.3	1.34 H	230	57.71	0.98
4	2483.50	43.6 AV	54.0	-10.4	1.34 H	230	42.65	0.98
5	4924.00	50.1 PK	74.0	-23.9	1.26 H	68	42.03	8.08
6	4924.00	39.9 AV	54.0	-14.2	1.26 H	68	31.77	8.08
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	97.9 PK			1.26 V	335	97.01	0.88
2	*2462.00	87.9 AV			1.26 V	335	86.98	0.88
3	2483.50	55.3 PK	74.0	-18.7	1.26 V	335	54.29	0.98
4	2483.50	41.7 AV	54.0	-12.3	1.26 V	335	40.75	0.98
5	4924.00	49.1 PK	74.0	-24.9	1.05 V	227	41.03	8.08
6	4924.00	38.2 AV	54.0	-15.8	1.05 V	227	30.11	8.08

#### REMARKS:

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

## 802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.1 PK	74.0	-15.9	1.22 H	231	57.55	0.52
2	2390.00	43.3 AV	54.0	-10.7	1.22 H	231	42.81	0.52
3	*2412.00	99.7 PK			1.22 H	231	99.05	0.65
4	*2412.00	89.1 AV			1.22 H	231	88.49	0.65
5	4824.00	49.1 PK	74.0	-24.9	1.29 H	113	41.23	7.83
6	4824.00	38.1 AV	54.0	-15.9	1.29 H	113	30.28	7.83
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	54.7 PK	74.0	-19.4	2.41 V	250	54.13	0.52
2	2390.00	41.5 AV	54.0	-12.5	2.41 V	250	40.99	0.52
3	*2412.00	99.4 PK			2.41 V	250	98.76	0.65
4	*2412.00	88.7 AV			2.41 V	250	88.09	0.65
5	4824.00	48.2 PK	74.0	-25.8	1.73 V	206	40.33	7.83
6	4824.00	37.5 AV	54.0	-16.5	1.73 V	206	29.71	7.83

## 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 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	104.7 PK			1.22 H	230	103.94	0.76
2	*2437.00	94.1 AV			1.22 H	230	93.32	0.76
3	4924.00	49.9 PK	74.0	-24.1	1.30 H	119	41.86	8.08
4	4924.00	38.7 AV	54.0	-15.3	1.30 H	119	30.66	8.08
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	101.6 PK			1.73 V	337	100.85	0.76
2	*2437.00	90.9 AV			1.73 V	337	90.11	0.76
3	4924.00	48.4 PK	74.0	-25.7	1.68 V	211	40.27	8.08
4	4924.00	37.9 AV	54.0	-16.1	1.68 V	211	29.83	8.08

**REMARKS:**

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	99.0 PK			1.32 H	228	98.07	0.88
2	*2462.00	88.9 AV			1.32 H	228	88.06	0.88
3	2483.50	57.3 PK	74.0	-16.8	1.32 H	228	56.27	0.98
4	2483.50	43.0 AV	54.0	-11.0	1.32 H	228	42.03	0.98
5	4924.00	49.9 PK	74.0	-24.2	1.25 H	124	41.77	8.08
6	4924.00	38.9 AV	54.0	-15.1	1.25 H	124	30.85	8.08
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	97.6 PK			1.54 V	336	96.68	0.88
2	*2462.00	87.3 AV			1.54 V	336	86.45	0.88
3	2483.50	55.8 PK	74.0	-18.3	1.54 V	336	54.77	0.98
4	2483.50	42.8 AV	54.0	-11.2	1.54 V	336	41.83	0.98
5	4924.00	48.4 PK	74.0	-25.6	1.77 V	223	40.33	8.08
6	4924.00	37.3 AV	54.0	-16.7	1.77 V	223	29.25	8.08

#### REMARKS:

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

## 802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.0 PK	74.0	-15.0	1.38 H	229	58.51	0.52
2	2390.00	43.1 AV	54.0	-10.9	1.38 H	229	42.62	0.52
3	*2422.00	96.4 PK			1.38 H	229	95.66	0.69
4	*2422.00	87.1 AV			1.38 H	229	86.43	0.69
5	4844.00	49.2 PK	74.0	-24.8	1.31 H	110	41.32	7.87
6	4844.00	38.1 AV	54.0	-15.9	1.31 H	110	30.25	7.87
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	55.5 PK	74.0	-18.5	1.57 V	337	54.99	0.52
2	2390.00	41.8 AV	54.0	-12.2	1.57 V	337	41.27	0.52
3	*2422.00	94.3 PK			1.57 V	337	93.58	0.69
4	*2422.00	83.9 AV			1.57 V	337	83.18	0.69
5	4844.00	48.1 PK	74.0	-25.9	1.52 V	248	40.27	7.87
6	4844.00	37.7 AV	54.0	-16.3	1.52 V	248	29.80	7.87

## 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 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	100.5 PK			1.64 H	230	99.71	0.76
2	*2437.00	91.4 AV			1.64 H	230	90.68	0.76
3	4874.00	49.4 PK	74.0	-24.6	1.28 H	113	41.51	7.93
4	4874.00	38.4 AV	54.0	-15.6	1.28 H	113	30.46	7.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.8 PK			1.42 V	340	98.06	0.76
2	*2437.00	88.8 AV			1.42 V	340	88.04	0.76
3	4874.00	48.1 PK	74.0	-25.9	1.47 V	239	40.20	7.93
4	4874.00	37.8 AV	54.0	-16.2	1.47 V	239	29.84	7.93

**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 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	97.4 PK			1.36 H	229	96.61	0.83
2	*2452.00	87.9 AV			1.36 H	229	87.10	0.83
3	2483.50	60.1 PK	74.0	-13.9	1.36 H	229	59.15	0.98
4	2483.50	45.8 AV	54.0	-8.2	1.36 H	229	44.83	0.98
5	4904.00	50.0 PK	74.0	-24.0	1.23 H	117	41.99	8.00
6	4904.00	38.7 AV	54.0	-15.4	1.23 H	117	30.65	8.00
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	94.4 PK			1.56 V	333	93.58	0.83
2	*2452.00	85.6 AV			1.56 V	333	84.72	0.83
3	2483.50	57.7 PK	74.0	-16.4	1.56 V	333	56.67	0.98
4	2483.50	42.2 AV	54.0	-11.8	1.56 V	333	41.21	0.98
5	4904.00	48.1 PK	74.0	-25.9	1.50 V	243	40.06	8.00
6	4904.00	37.8 AV	54.0	-16.3	1.50 V	243	29.75	8.00

#### 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)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	68.22	29.9 QP	40.0	-10.1	4.00 H	166	40.34	-10.41
2	165.95	37.2 QP	43.5	-6.4	4.00 H	147	45.68	-8.53
3	199.93	36.7 QP	43.5	-6.9	2.84 H	143	47.64	-10.99
4	240.01	37.9 QP	46.0	-8.1	2.26 H	147	47.45	-9.53
5	521.55	37.4 QP	46.0	-8.6	1.65 H	46	39.61	-2.19
6	920.85	37.9 QP	46.0	-8.1	1.00 H	224	33.06	4.87
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	60.65	33.7 QP	40.0	-6.4	1.47 V	166	42.90	-9.25
2	82.33	33.5 QP	40.0	-6.5	1.12 V	210	47.11	-13.58
3	166.62	35.3 QP	43.5	-8.2	1.00 V	240	43.80	-8.50
4	422.56	32.0 QP	46.0	-14.1	1.65 V	224	36.26	-4.31
5	767.83	34.7 QP	46.0	-11.3	2.37 V	26	32.46	2.25
6	951.65	36.2 QP	46.0	-9.8	1.93 V	98	30.69	5.53

### 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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100290	Dec. 27, 2014	Dec. 26, 2015
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 04, 2014	Dec. 03, 2015
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 04, 2014	Dec. 03, 2015
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 06, 2015	May 05, 2016
Software	Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C09.01	Feb. 24, 2015	Feb. 23, 2016
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 19, 2015	May 18, 2016
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 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 Shielded Room No. 9.

3. The VCCI Site Registration No. C-1312.

#### 4.2.3 Test Procedures

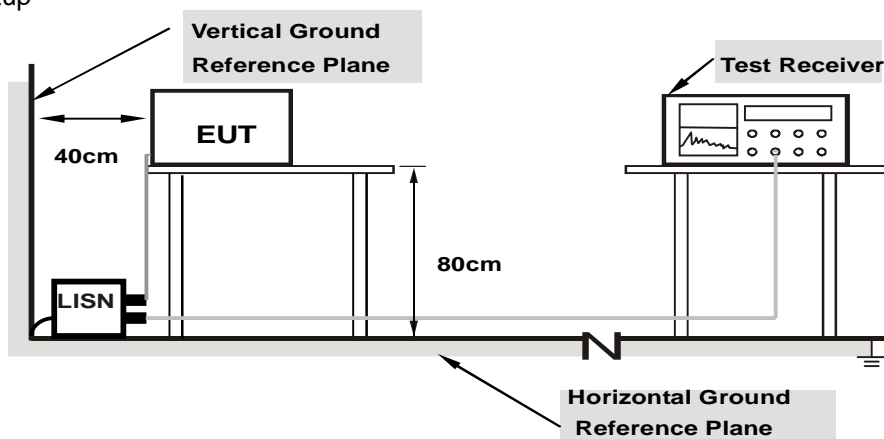
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

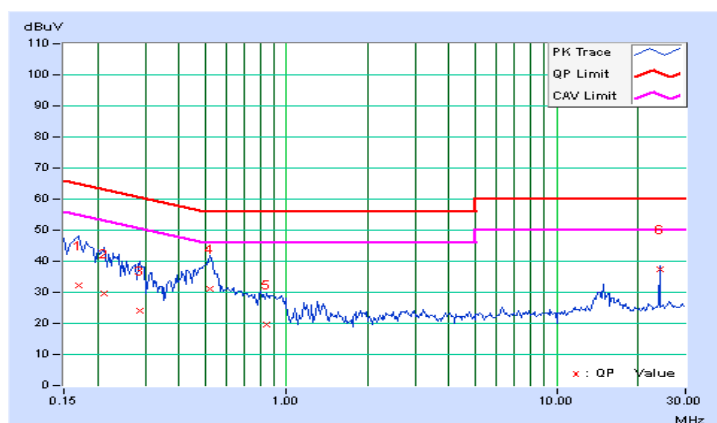
##### 802.11n (HT20)

Phase	Line (L)	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	0.16953	10.23	22.09	2.94	32.32	13.17	64.98	54.98	-32.66	-41.81
2	0.21250	10.24	19.35	3.82	29.59	14.06	63.11	53.11	-33.51	-39.04
3	0.28672	10.26	13.90	6.69	24.16	16.95	60.62	50.62	-36.46	-33.67
4	0.52109	10.30	20.79	6.39	31.09	16.69	56.00	46.00	-24.91	-29.31
5	0.84141	10.35	9.43	3.70	19.78	14.05	56.00	46.00	-36.22	-31.95
6	24.02344	11.01	26.42	26.18	37.43	37.19	60.00	50.00	-22.57	-12.81

#### 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.

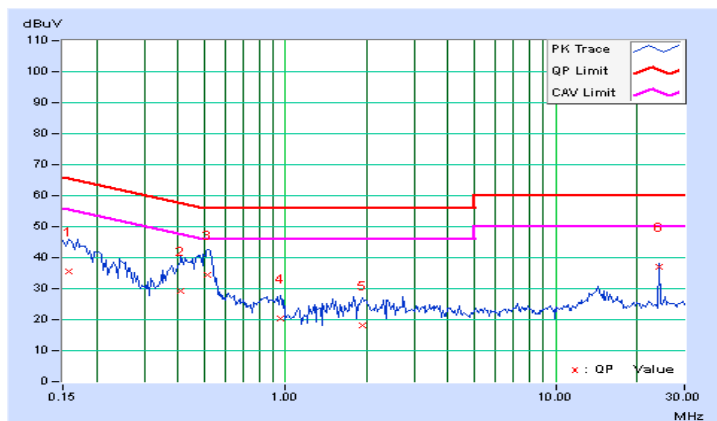


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.15781	10.23	25.43	10.66	35.66	20.89	65.58	55.58	-29.92	-34.69
2	0.41172	10.29	19.14	8.25	29.43	18.54	57.61	47.61	-28.18	-29.07
3	0.51719	10.31	24.13	5.29	34.44	15.60	56.00	46.00	-21.56	-30.40
4	0.96250	10.38	9.99	4.20	20.37	14.58	56.00	46.00	-35.63	-31.42
5	1.92188	10.50	7.54	3.94	18.04	14.44	56.00	46.00	-37.96	-31.56
6	24.02344	10.67	26.20	25.96	36.87	36.63	60.00	50.00	-23.13	-13.37

#### REMARKS:

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

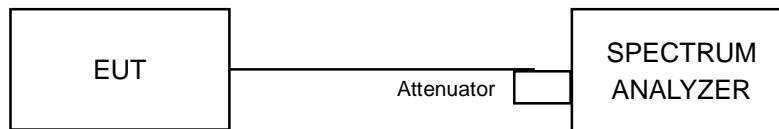


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

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

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

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

#### 4.3.7 Test Result

##### 802.11b

Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.09	0.5	PASS
6	2437	8.60	0.5	PASS
11	2462	9.09	0.5	PASS

##### 802.11g

Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.74	0.5	PASS
6	2437	15.53	0.5	PASS
11	2462	15.41	0.5	PASS

##### 802.11n (HT20)

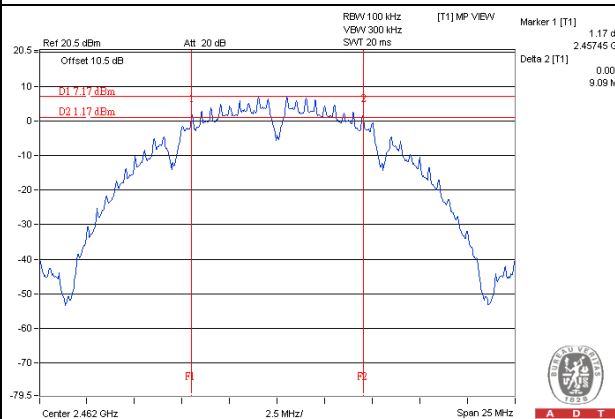
Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.11	0.5	Pass
6	2437	16.03	0.5	Pass
11	2462	16.02	0.5	Pass

##### 802.11n (HT40)

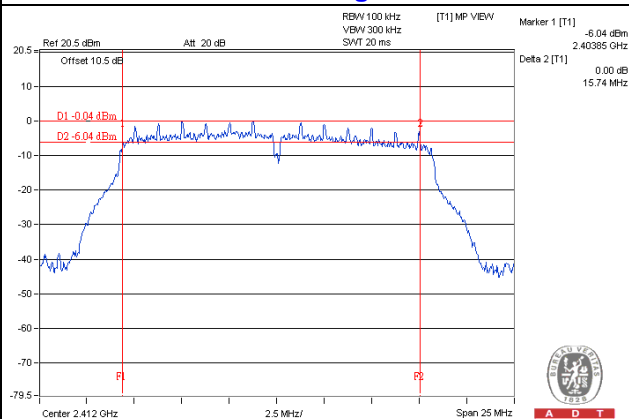
Channel	Frequency (MHz)	6db Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.54	0.5	Pass
6	2437	35.25	0.5	Pass
9	2452	35.23	0.5	Pass

# Spectrum Plot of Worst Value

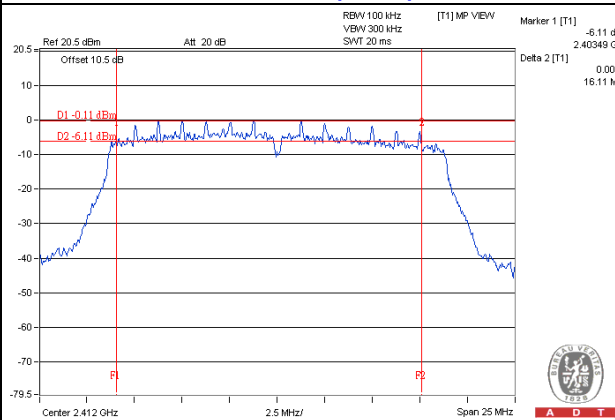
## 802.11b



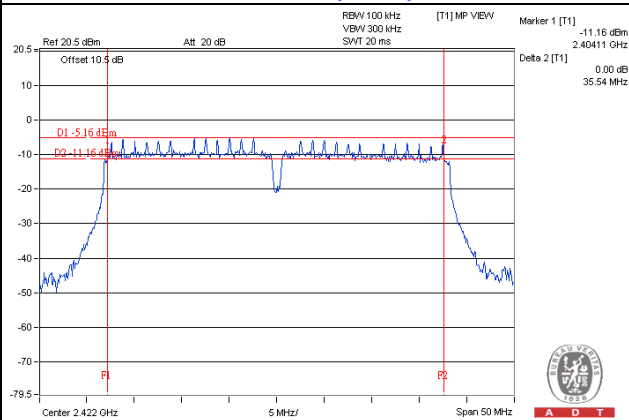
## 802.11g



## 802.11n (HT20)



## 802.11n (HT40)

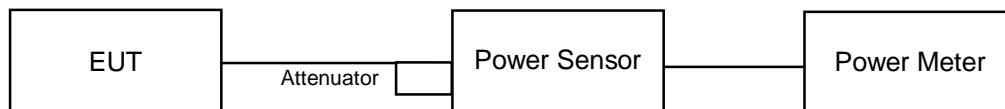


#### 4.4 Conducted Output Power Measurement

##### 4.4.1 Limits of Conducted Output Power Measurement

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

##### 4.4.2 Test Setup



##### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

##### 4.4.4 Test Procedures

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	51.761	17.14	30	Pass
6	2437	113.240	20.54	30	Pass
11	2462	57.280	17.58	30	Pass

###### 802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	107.399	20.31	30	Pass
6	2437	205.589	23.13	30	Pass
11	2462	118.304	20.73	30	Pass

###### 802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	96.161	19.83	30	Pass
6	2437	<b>223.357</b>	23.49	30	Pass
11	2462	110.408	20.43	30	Pass

###### 802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	63.533	18.03	30	Pass
6	2437	172.982	22.38	30	Pass
9	2452	65.766	18.18	30	Pass

## FOR AVERAGE POWER

### 802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	31.550	14.99
6	2437	69.343	18.41
11	2462	34.435	15.37

### 802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	14.588	11.64
6	2437	39.902	16.01
11	2462	16.520	12.18

### 802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	13.964	11.45
6	2437	39.719	15.99
11	2462	15.885	12.01

### 802.11n (HT40)

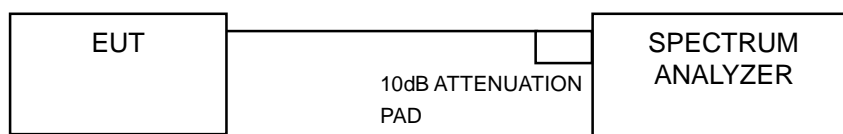
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	8.260	9.17
6	2437	33.420	15.24
9	2452	9.078	9.58

## 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

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

### 4.5.5 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	-10.03	8	Pass
6	2437	-6.97	8	Pass
11	2462	-9.97	8	Pass

##### 802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-16.32	8	Pass
6	2437	-10.59	8	Pass
11	2462	-14.15	8	Pass

##### 802.11n (HT20)

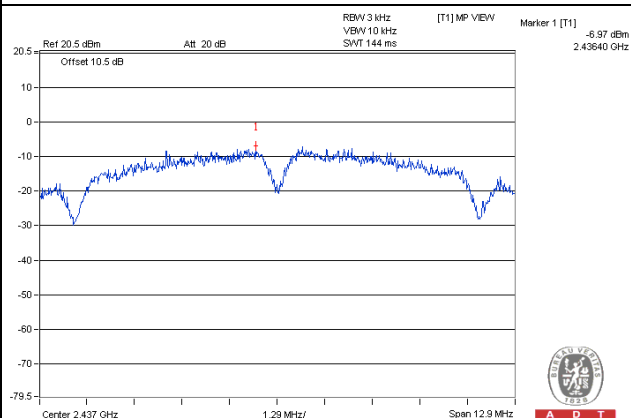
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-15.89	8	Pass
6	2437	-10.03	8	Pass
11	2462	-15.94	8	Pass

##### 802.11n (HT40)

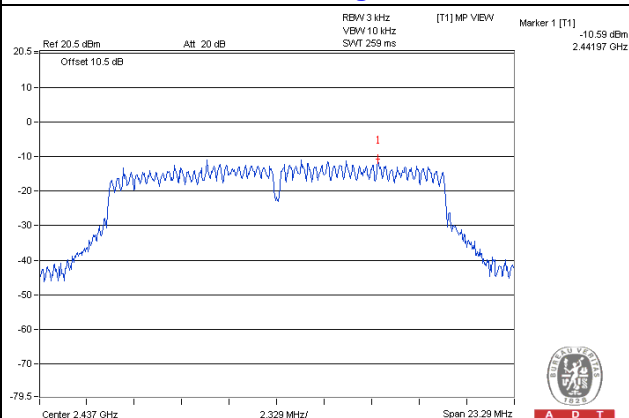
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
3	2422	-20.58	8	PASS
6	2437	-13.89	8	PASS
9	2452	-19.90	8	PASS

# Spectrum Plot of Worst Value

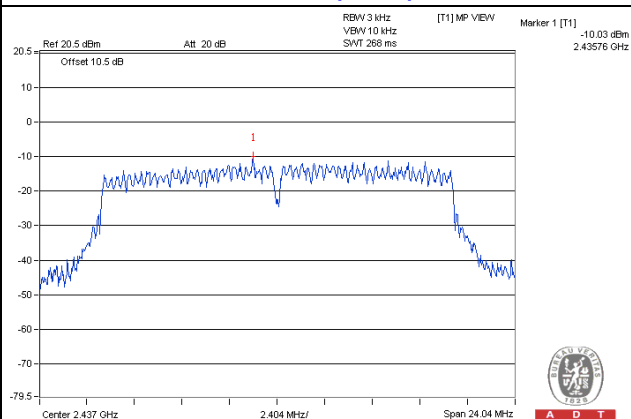
## 802.11b



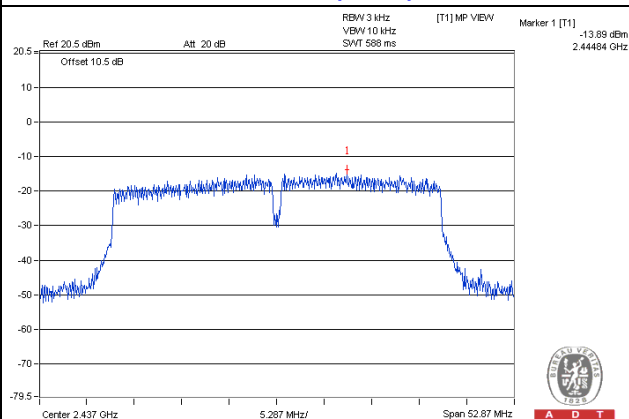
## 802.11g



## 802.11n (HT20)



## 802.11n (HT40)

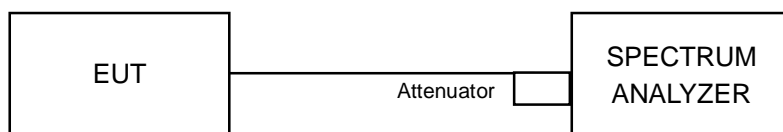


## 4.6 Conducted Out of Band Emission Measurement

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

Below 20dB 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

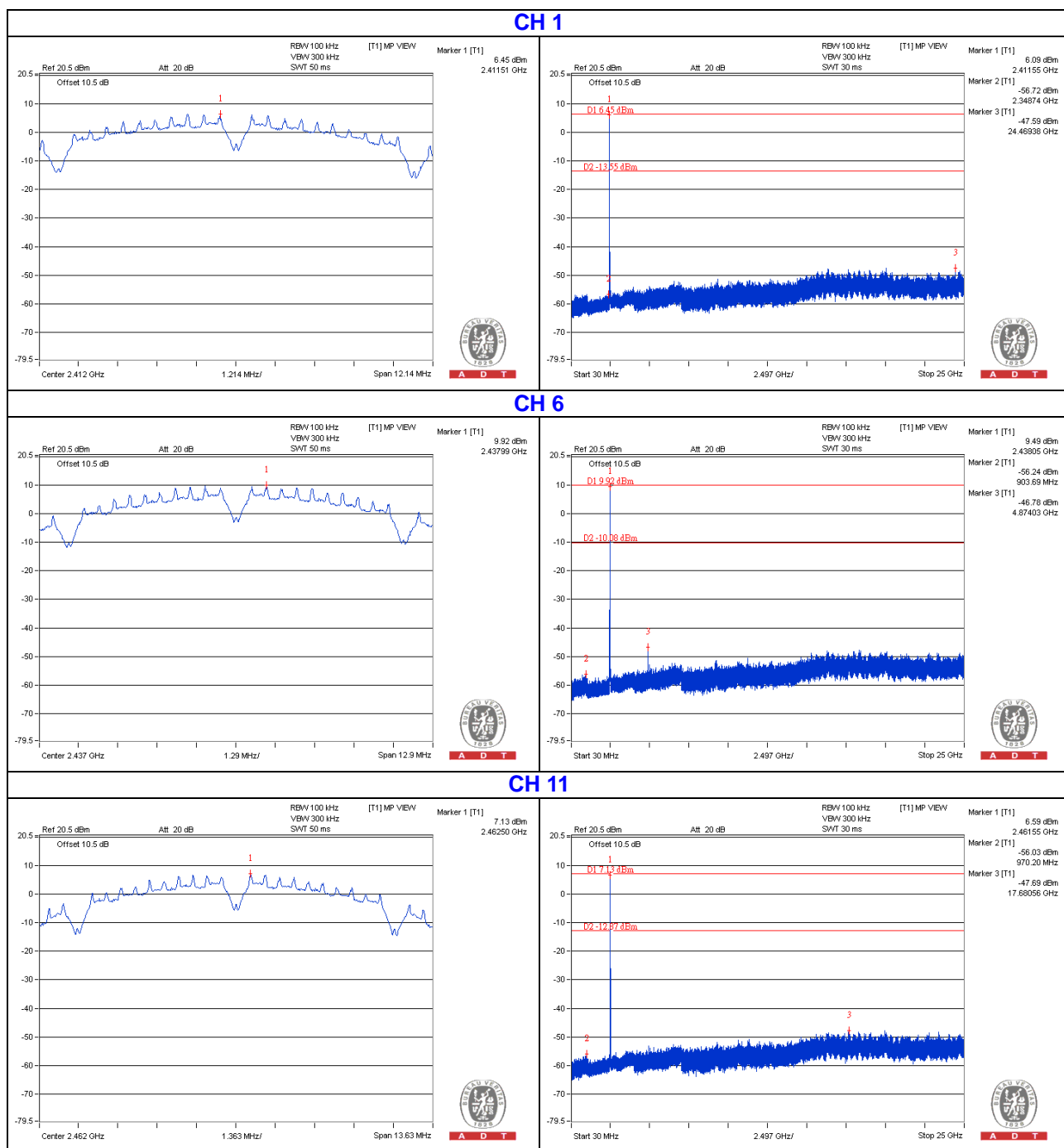
Same as Item 4.3.6

## 4.6.7 Test Results

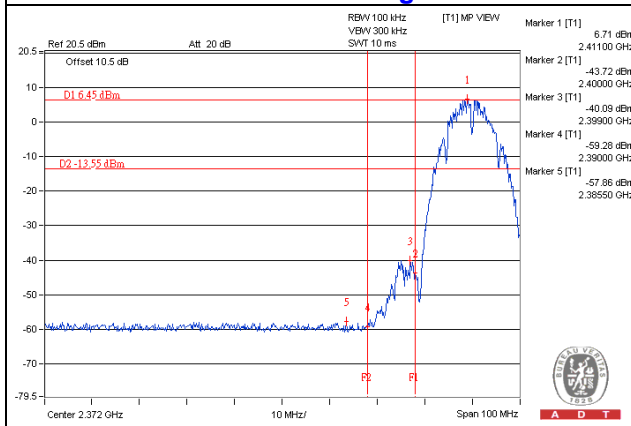
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

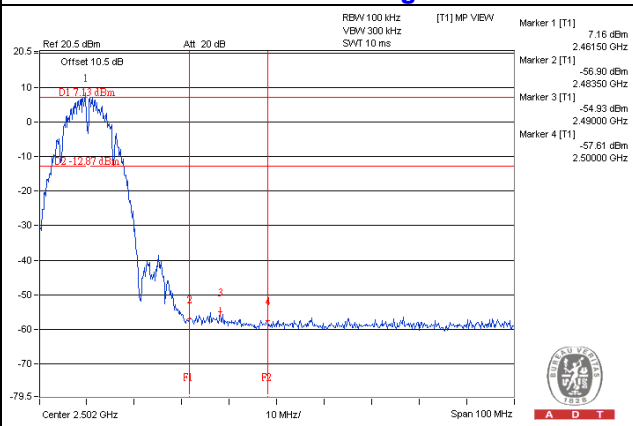
1TX



## CH 1 Band edge



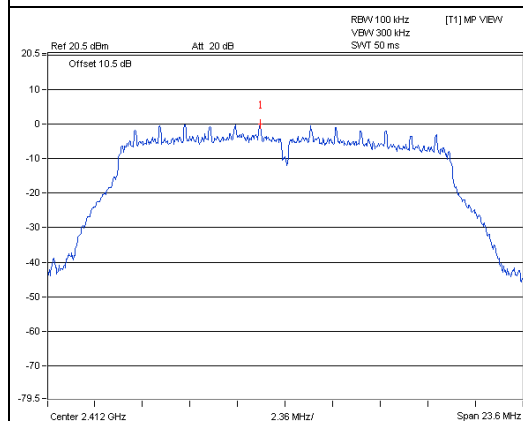
## CH 11 Band edge



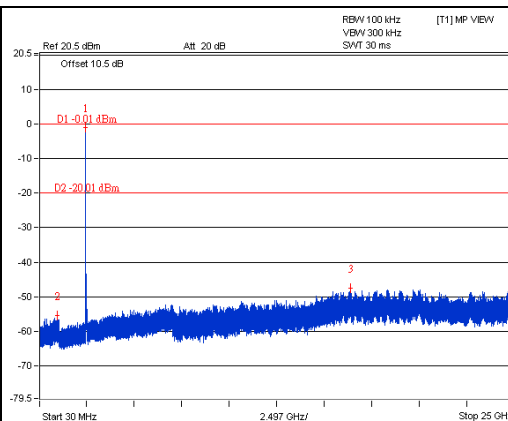


802.11g

### CH 1

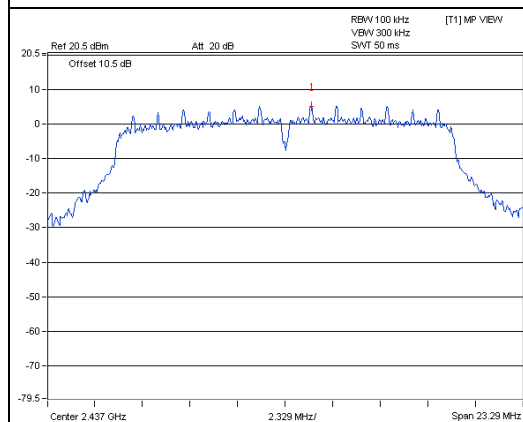


A D T

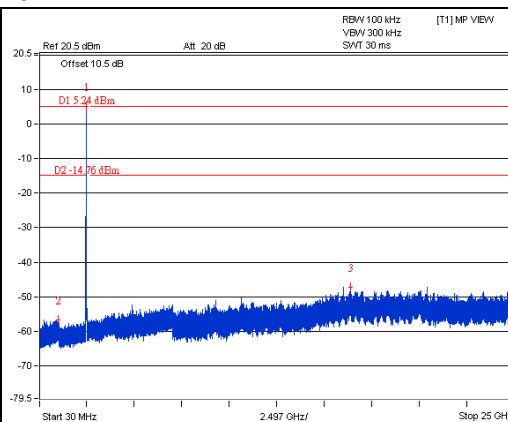


A D T

### CH 6

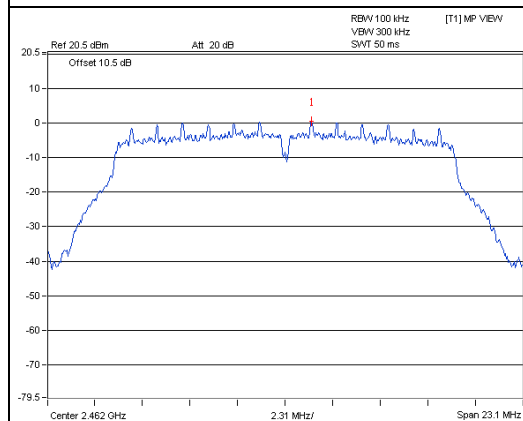


A D T

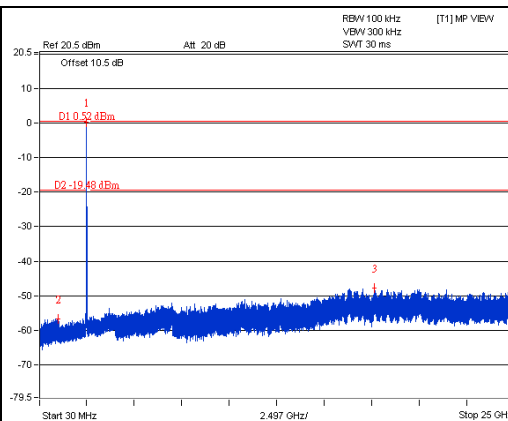


A D T

### CH 11

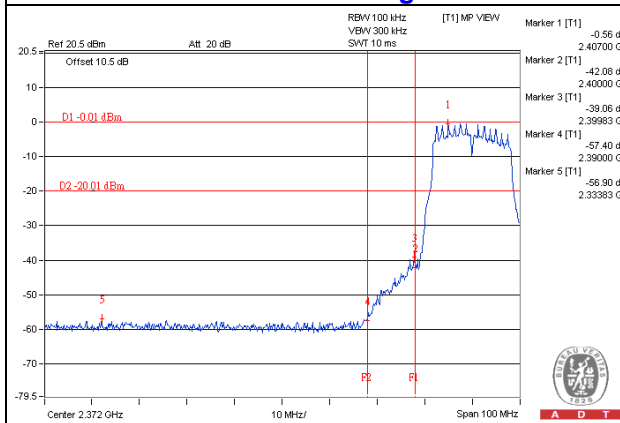


A D T

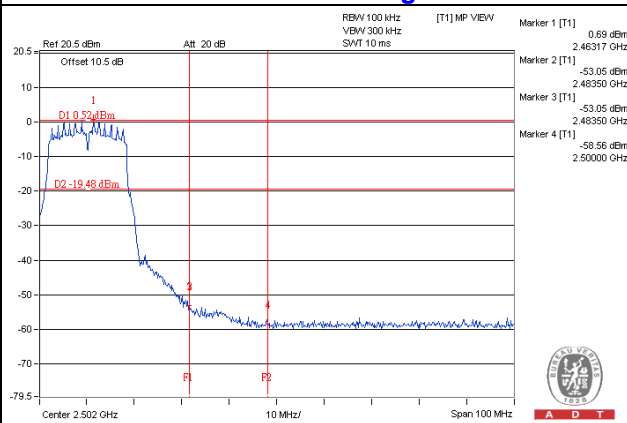


A D T

### CH 1 Band edge

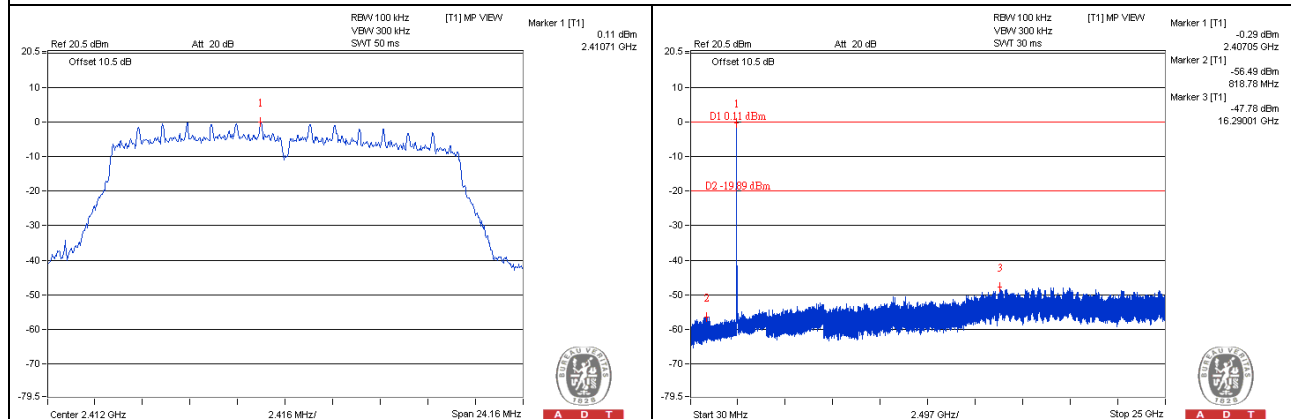


### CH 11 Band edge

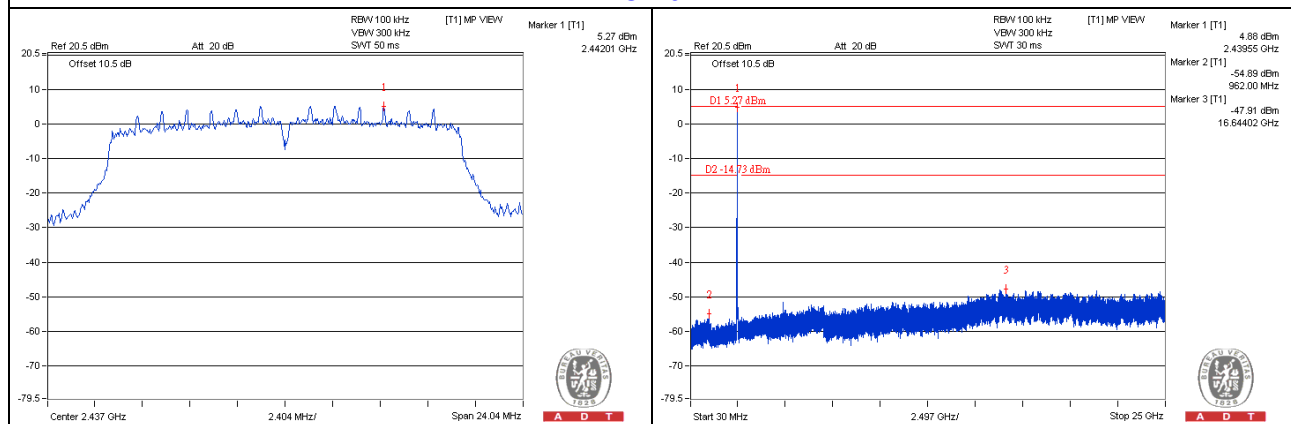


# 802.11n (HT20)

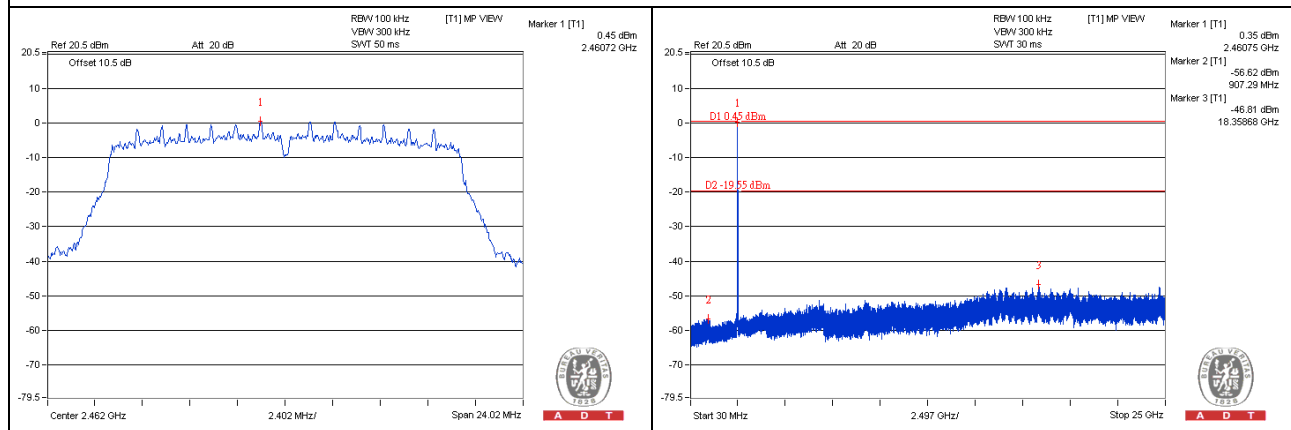
## CH 1



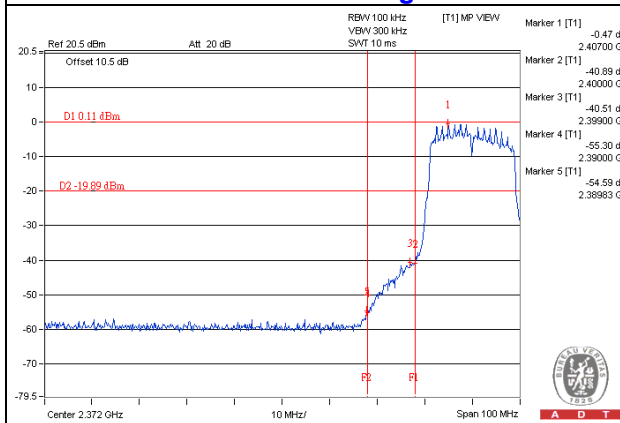
## CH 6



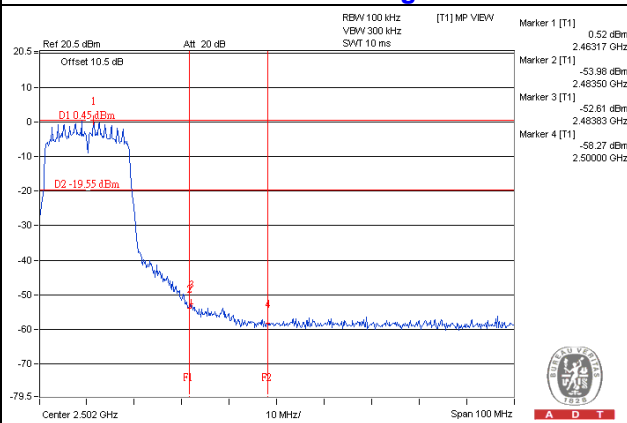
## CH 11



### CH 1 Band edge

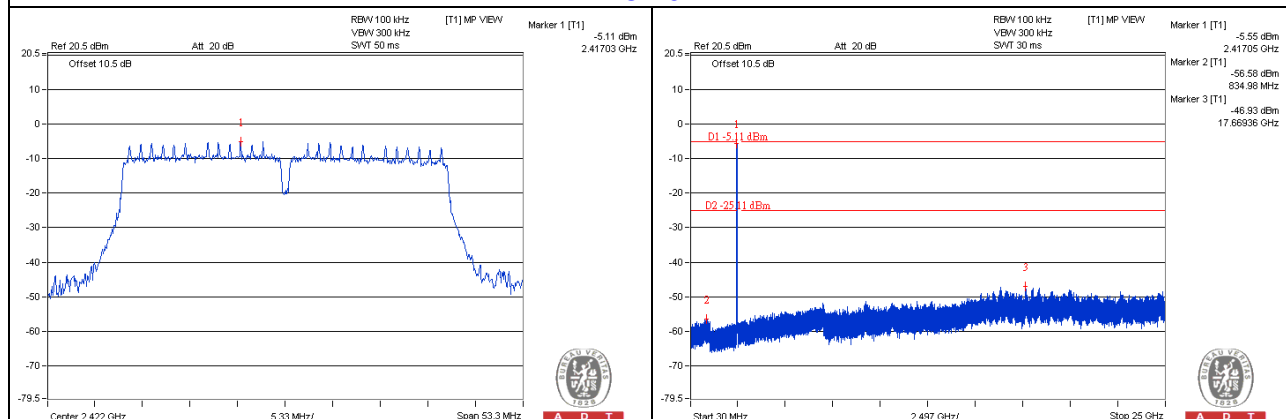


### CH 11 Band edge

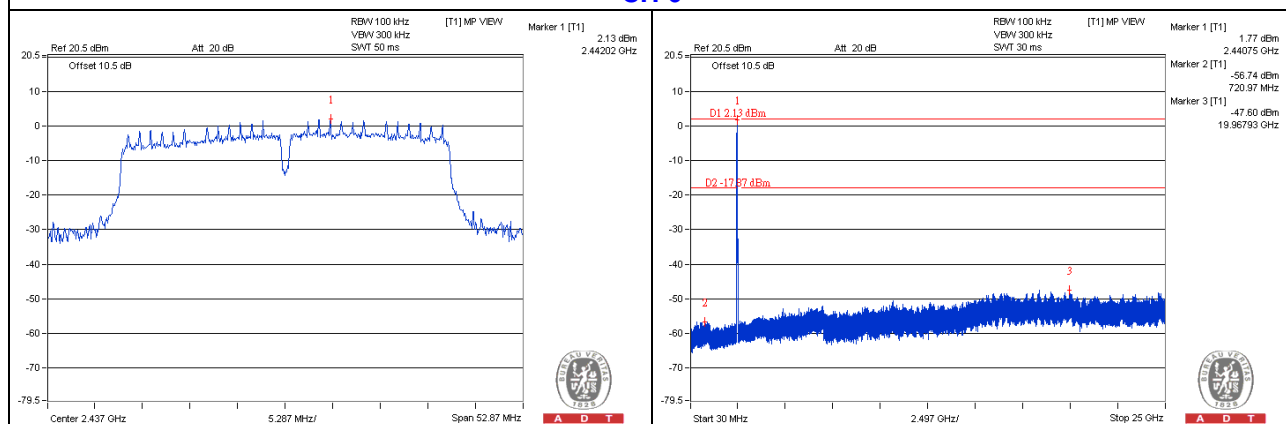


# 802.11n (HT40)

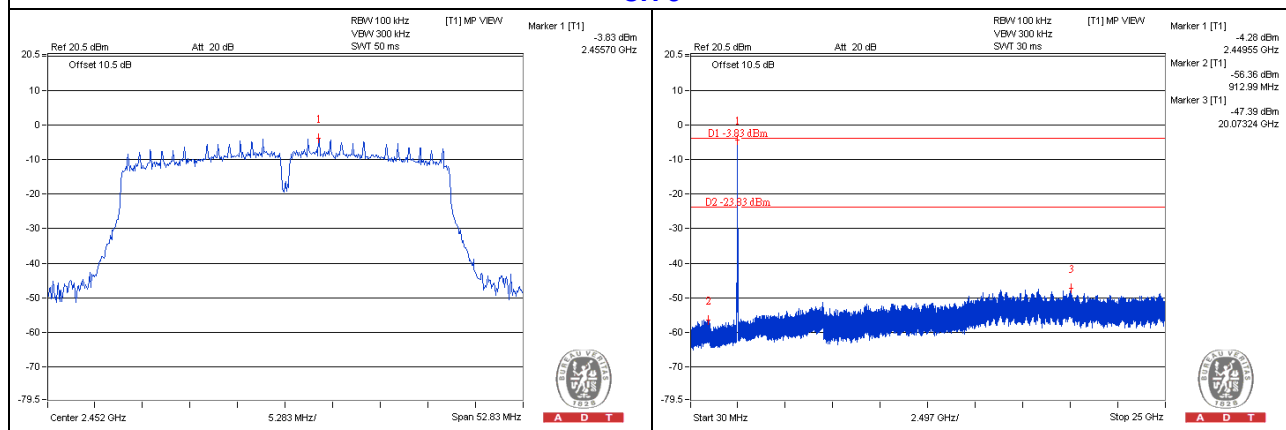
## CH 3



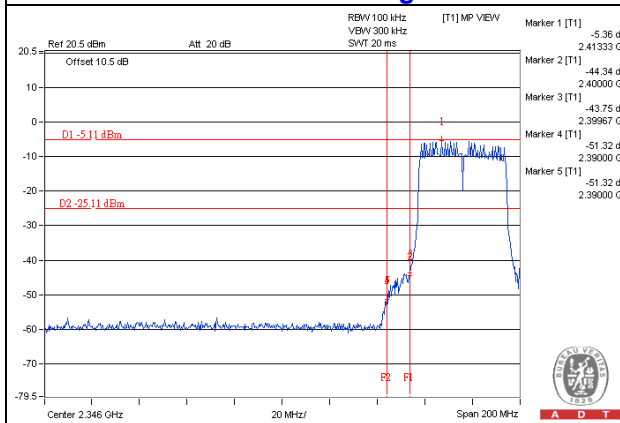
## CH 6



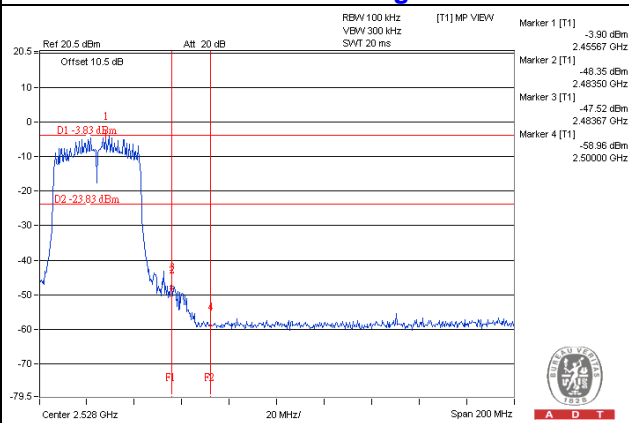
## CH 9



### CH 3 Band edge



### CH 9 Band edge



## 5 Pictures of Test Arrangements

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

## Appendix – Information on the Testing Laboratories

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

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

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

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

Tel: 886-3-5935343

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**Hwa Ya EMC/RF/Safety Lab**

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**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

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

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

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