

## FCC Test Report

**Report No.:** RF161202C05-1

**FCC ID:** 2AKLWLUCIDCAM

**Test Model:** LUCIDCAM V1

**Received Date:** Dec. 02, 2016

**Test Date:** Dec. 22, 2016 ~ Jan. 13, 2017

**Issued Date:** Jan. 20, 2017

**Applicant:** Lucid VR, Inc.

**Address:** 4500 Great America Pkwy., 2nd floor, CA 95054, Santa Clara.

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

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

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



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### Release Control Record

Issue No.	Description	Date Issued
RF161202C05-1	Original release.	Jan. 20, 2017

## 1 Certificate of Conformity

**Product:** LUCIDCAM 3D Camera

**Brand:** LUCID

**Test Model:** LUCIDCAM V1

**Sample Status:** Engineering sample


**Applicant:** Lucid VR, Inc.

**Test Date:** Dec. 22, 2016 ~ Jan. 13, 2017

**Standards:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
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 :**



Polly Chien / Specialist

**Date:**

Jan. 20, 2017

**Approved by :**



Ken Liu / Senior Manager

**Date:**

Jan. 20, 2017

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -12.67dB at 0.26719MHz.
15.407(b)(1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 11570.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is IPEX not a standard connector.

\*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	LUCIDCAM 3D Camera
Brand	LUCID
Test Model	LUCIDCAM V1
Status of EUT	Engineering sample
Power Supply Rating	5Vdc (host equipment) 3.6Vdc (battery)
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 72.2Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180MHz ~ 5240MHz 802.11a, 802.11n (HT20): 4 802.11n (HT40): 2 5745MHz ~ 5825MHz: 802.11a, 802.11n (HT20): 5 802.11n (HT40): 2
Output Power	5180MHz ~ 5240MHz: 20.324mW 5745MHz ~ 5825MHz: 15.849mW
Antenna Type	PIFA antenna with 1.49dBi gain
Antenna Connector	IPEX
Accessory Device	NA
Data Cable Supplied	1.15m non-shielded USB cable without core

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

2. The EUT uses following battery.

Model	LucidCam
Rating	3.6Vdc, 2100mAh, 7.56Wh

3. 2.4GHz and 5GHz can not transmit simultaneously.
4. The Lucidcam will assign an IP address to the connected device same as an AP device, therefore an additional test item of the EIRP has been evaluated under Outdoor Access Point condition, other test items were evaluated under Mobile and Portable client device conditions.

### 3.2 Description of Test Modes

For 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz



### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	Model: K175

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	6.0

#### Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	6.0

#### Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5

#### Test Condition:

Applicable to	Environmental Conditions	Input Power (system)	Tested by
RE $\geq$ 1G	21deg. C, 66%RH	120Vac, 60Hz	Jones Chang
RE<1G	20deg. C, 66%RH	120Vac, 60Hz	James Yang
PLC	25deg. C, 66%RH	120Vac, 60Hz	James Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

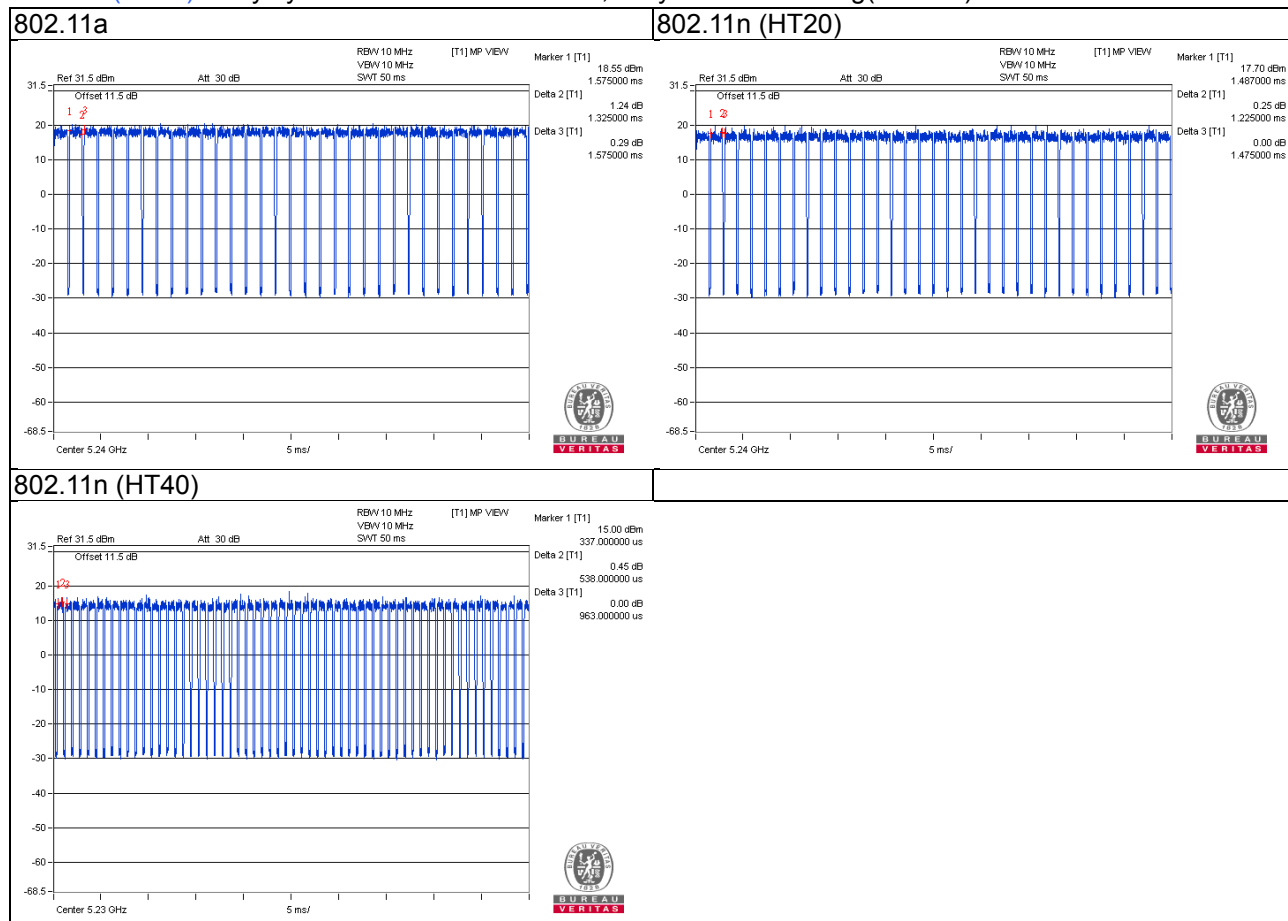
### 3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11a: Duty cycle =  $1.325/1.575 = 0.841$ , Duty factor =  $10 * \log(1/0.841) = 0.75$

802.11n (HT20): Duty cycle =  $1.225/1.475 = 0.831$ , Duty factor =  $10 * \log(1/0.831) = 0.81$

802.11n (HT40): Duty cycle =  $0.538/0.963 = 0.559$ , Duty factor =  $10 * \log(1/0.559) = 2.53$



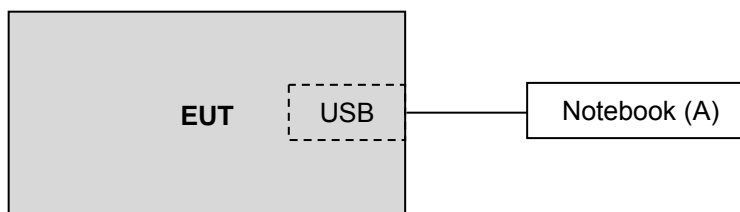
### 3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	SONY	SVS151A12P	275548477000805	FCC DoC Approved	-

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

#### 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 E (15.407)**

**KDB 789033 D02 General UNII Test Procedures New Rules v01r03**

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.

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.

Limits of unwanted emission out of the restricted bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v01r02			Field Strength at 3m	
			PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	<input checked="" type="checkbox"/>	15.407(b)(4)(i)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:10 (dBm/MHz) <sup>*2</sup> PK:15.6 (dBm/MHz) <sup>*3</sup> PK:27 (dBm/MHz) <sup>*4</sup>	PK: 68.2(dBµV/m) <sup>*1</sup> PK:105.2 (dBµV/m) <sup>*2</sup> PK: 110.8(dBµV/m) <sup>*3</sup> PK:122.2 (dBµV/m) <sup>*4</sup>
	<input type="checkbox"/>	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
<sup>*1</sup> beyond 75 MHz or more above of the band edge.			<sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
<sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.			<sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

**Note:** The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Apr. 18, 2016	Apr. 17, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 16, 2016	Nov. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 13, 2016	Dec. 12, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1170	Dec. 15, 2016	Dec. 14, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8447D	2944A10738	Aug. 22, 2016	Aug. 21, 2017
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2016	Aug. 21, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2016	Aug. 21, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2016	Aug. 21, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2016	Jun. 07, 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 test was performed in HwaYa Chamber 9.  
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.  
4. The FCC Site Registration No. is 215374.  
5. The IC Site Registration No. is IC 7450F-9.

#### 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:

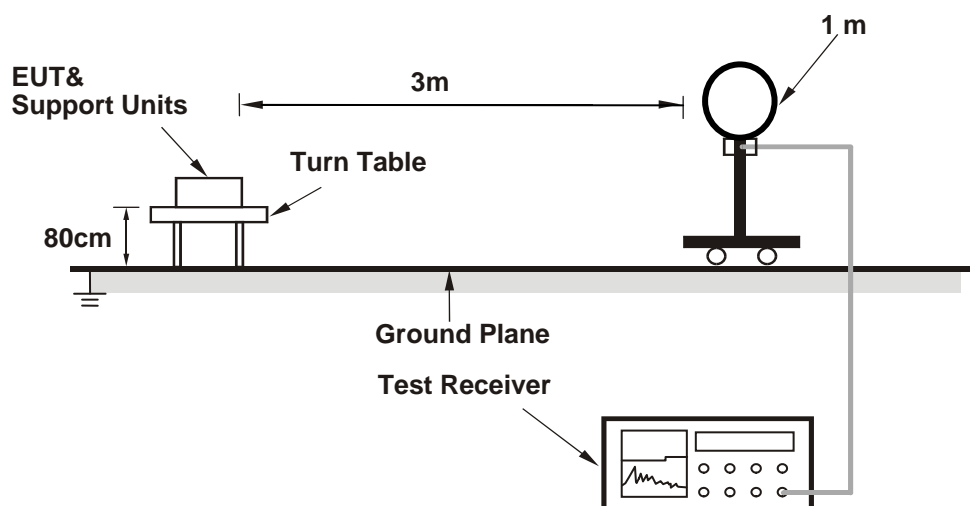
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

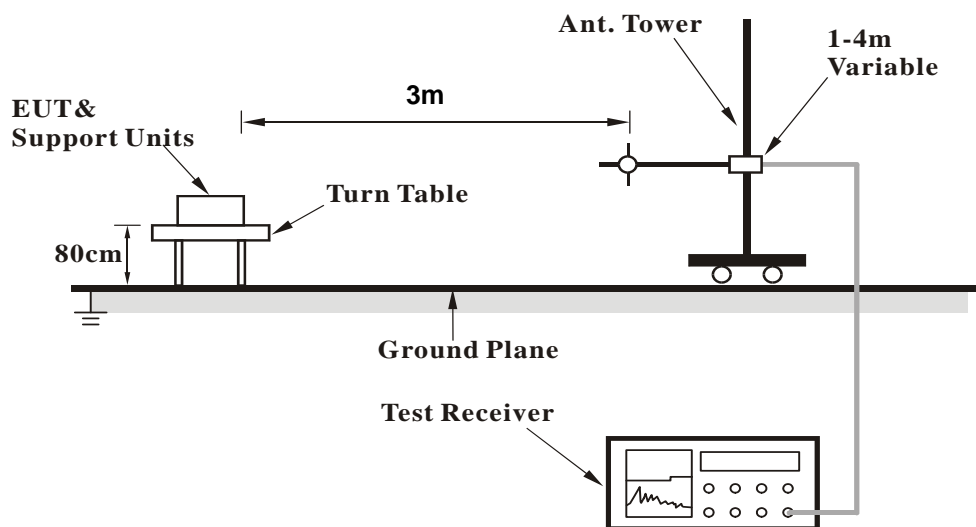
No deviation.

#### 4.1.5 Test Setup

##### For Radiated emission below 30MHz

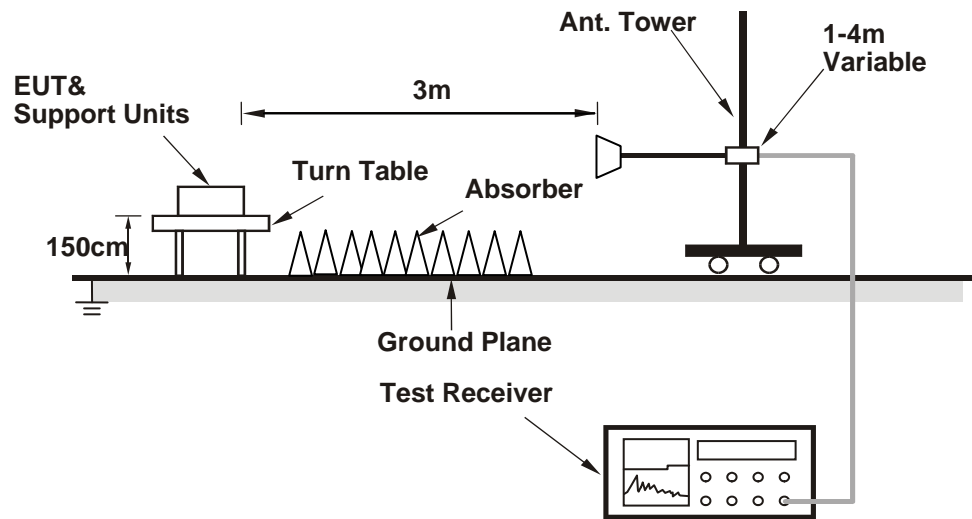


##### For Radiated emission 30MHz to 1GHz





## For Radiated emission above 1GHz



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

### 4.1.6 EUT Operating Conditions

- a. Connected the EUT with the notebook and placed them on the testing table.
- a. Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

Above 1GHz Worst-Case Data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5150.00	57.1 PK	74.0	-16.9	2.02 H	305	52.30	4.80
2	5150.00	45.1 AV	54.0	-8.9	2.02 H	305	40.30	4.80
3	*5180.00	101.2 PK			2.02 H	306	62.50	38.70
4	*5180.00	91.1 AV			2.02 H	306	52.40	38.70
5	#10360.00	65.9 PK	68.2	-2.3	2.12 H	359	48.30	17.60
6	#10360.00	51.3 AV	54.0	-2.7	1.24 H	141	33.7	17.6
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	5150.00	56.7 PK	74.0	-17.3	1.61 V	20	51.90	4.80
2	5150.00	44.8 AV	54.0	-9.2	1.61 V	20	40.00	4.80
3	*5180.00	103.7 PK			1.66 V	41	65.00	38.70
4	*5180.00	93.2 AV			1.66 V	41	54.50	38.70
5	#10360.00	65.5 PK	68.2	-2.7	2.78 V	163	47.90	17.60

Remarks:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5200.00	102.4 PK			1.48 H	294	63.70	38.70
2	*5200.00	91.6 AV			1.48 H	294	52.90	38.70
3	#10400.00	66.6 PK	68.2	-1.6	2.23 H	11	49.00	17.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	103.6 PK			1.70 V	19	64.90	38.70
2	*5200.00	92.9 AV			1.70 V	19	54.20	38.70
3	#10400.00	64.2 PK	68.2	-4.0	1.82 V	326	46.60	17.60

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5240.00	103.6 PK			1.13 H	290	64.70	38.90
2	*5240.00	93.4 AV			1.13 H	290	54.50	38.90
3	5350.00	59.0 PK	74.0	-15.0	1.42 H	220	53.50	5.50
4	5350.00	46.8 AV	54.0	-7.2	1.42 H	220	41.30	5.50
5	#10480.00	66.8 PK	68.2	-1.4	2.22 H	0	48.40	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	104.9 PK			1.80 V	37	66.00	38.90
2	*5240.00	93.7 AV			1.80 V	37	54.80	38.90
3	5350.00	56.1 PK	74.0	-17.9	1.81 V	40	50.60	5.50
4	5350.00	45.1 AV	54.0	-8.9	1.81 V	40	39.60	5.50
5	#10480.00	64.4 PK	68.2	-3.8	1.92 V	330	46.00	18.40

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5649.60	57.3 PK	68.2	-10.9	2.22 H	299	51.20	6.10
2	*5745.00	104.9 PK			2.22 H	299	64.90	40.00
3	*5745.00	94.0 AV			2.22 H	299	54.00	40.00
4	#5934.40	58.8 PK	68.2	-9.4	2.22 H	299	52.20	6.60
5	11490.00	64.6 PK	74.0	-9.4	1.81 H	0	45.30	19.30
6	11490.00	53.0 AV	54.0	-1.0	1.81 H	0	33.70	19.30
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	#5641.60	58.5 PK	68.2	-9.7	1.99 V	323	52.60	5.90
2	*5745.00	104.5 PK			1.99 V	323	64.60	39.90
3	*5745.00	93.7 AV			1.99 V	323	53.80	39.90
4	#5976.00	59.1 PK	68.2	-9.1	1.99 V	323	52.20	6.90
5	11490.00	61.8 PK	74.0	-12.2	1.70 V	64	42.70	19.10
6	11490.00	50.6 AV	54.0	-3.4	1.70 V	64	31.50	19.10

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5620.00	58.0 PK	68.2	-10.2	2.05 H	296	51.90	6.10
2	*5785.00	106.0 PK			2.05 H	296	65.90	40.10
3	*5785.00	94.4 AV			2.05 H	296	54.30	40.10
4	#5939.20	59.3 PK	68.2	-8.9	2.05 H	296	52.70	6.60
5	11570.00	65.4 PK	74.0	-8.6	1.61 H	316	46.20	19.20
6	11570.00	52.9 AV	54.0	-1.1	1.61 H	316	33.70	19.20
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	#5643.20	57.5 PK	68.2	-10.7	1.97 V	321	51.60	5.90
2	*5785.00	105.4 PK			1.97 V	321	65.30	40.10
3	*5785.00	94.4 AV			1.97 V	321	54.30	40.10
4	#5979.20	59.0 PK	68.2	-9.2	1.97 V	321	52.10	6.90
5	11570.00	62.6 PK	74.0	-11.4	1.68 V	63	43.60	19.00
6	11570.00	51.2 AV	54.0	-2.8	1.68 V	63	32.20	19.00

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5636.00	58.1 PK	68.2	-10.1	2.11 H	297	52.00	6.10
2	*5825.00	104.9 PK			2.11 H	297	64.80	40.10
3	*5825.00	94.1 AV			2.11 H	297	54.00	40.10
4	#5956.80	59.2 PK	68.2	-9.0	2.11 H	297	52.60	6.60
5	11650.00	62.5 PK	74.0	-11.5	1.55 H	10	43.20	19.30
6	11650.00	53.0 AV	54.0	-1.0	1.55 H	10	33.70	19.30
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	#5612.00	58.2 PK	68.2	-10.0	1.89 V	330	52.30	5.90
2	*5825.00	106.4 PK			1.89 V	330	66.20	40.20
3	*5825.00	96.0 AV			1.89 V	330	55.80	40.20
4	#5984.00	59.7 PK	68.2	-8.5	1.89 V	330	52.80	6.90
5	11650.00	63.4 PK	74.0	-10.6	1.55 V	2	44.30	19.10
6	11650.00	51.8 AV	54.0	-2.2	1.55 V	2	32.70	19.10

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.
6. " # ": The radiated frequency is out of the restricted band.

# 802.11n (HT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5150.00	56.6 PK	74.0	-17.4	2.10 H	300	51.70	4.90
2	5150.00	45.6 AV	54.0	-8.4	2.10 H	300	40.70	4.90
3	*5180.00	98.5 PK			2.12 H	313	59.80	38.70
4	*5180.00	87.4 AV			2.12 H	313	48.70	38.70
5	#10360.00	64.9 PK	68.2	-3.3	2.77 H	344	47.80	17.10
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	5150.00	55.8 PK	74.0	-18.2	1.23 V	23	50.90	4.90
2	5150.00	44.8 AV	54.0	-9.2	1.23 V	23	39.90	4.90
3	*5180.00	100.1 PK			1.10 V	30	61.40	38.70
4	*5180.00	88.6 AV			1.10 V	30	49.90	38.70
5	#10360.00	64.4 PK	68.2	-3.8	2.77 V	355	47.30	17.10

## 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.
6. " # ": The radiated frequency is out of the restricted band.



CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5200.00	99.3 PK			2.11 H	313	60.60	38.70
2	*5200.00	88.4 AV			2.11 H	313	49.70	38.70
3	#10400.00	64.8 PK	68.2	-3.4	2.74 H	358	47.60	17.20
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	*5200.00	98.7 PK			1.35 V	34	60.00	38.70
2	*5200.00	88.4 AV			1.35 V	34	49.70	38.70
3	#10400.00	64.3 PK	68.2	-3.9	2.80 V	359	47.10	17.20

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5240.00	100.1 PK			2.68 H	309	61.30	38.80
2	*5240.00	89.1 AV			2.68 H	309	50.30	38.80
3	5350.00	59.8 PK	74.0	-14.2	2.60 H	311	54.50	5.30
4	5350.00	47.7 AV	54.0	-6.3	2.60 H	311	42.40	5.30
5	#10480.00	64.9 PK	68.2	-3.3	2.82 H	358	47.00	17.90
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	*5240.00	99.7 PK			1.19 V	32	60.90	38.80
2	*5240.00	89.4 AV			1.19 V	32	50.60	38.80
3	5350.00	57.7 PK	74.0	-16.3	1.18 V	26	52.40	5.30
4	5350.00	46.1 AV	54.0	-7.9	1.18 V	26	40.80	5.30
5	#10480.00	63.2 PK	68.2	-5.0	1.70 V	1	45.30	17.90

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5632.80	57.9 PK	68.2	-10.3	2.00 H	292	52.00	5.90
2	*5745.00	104.0 PK			2.00 H	292	64.10	39.90
3	*5745.00	93.5 AV			2.00 H	292	53.60	39.90
4	#5956.00	59.2 PK	68.2	-9.0	2.00 H	292	52.40	6.80
5	11490.00	62.4 PK	74.0	-11.6	1.98 H	14	43.30	19.10
6	11490.00	50.6 AV	54.0	-3.4	1.98 H	14	31.50	19.10
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	#5616.80	58.0 PK	68.2	-10.2	1.88 V	327	52.10	5.90
2	*5745.00	103.6 PK			1.88 V	327	63.70	39.90
3	*5745.00	93.1 AV			1.88 V	327	53.20	39.90
4	#5943.20	58.6 PK	68.2	-9.6	1.88 V	327	51.80	6.80
5	11490.00	62.6 PK	74.0	-11.4	1.70 V	64	43.50	19.10
6	11490.00	50.4 AV	54.0	-3.6	1.70 V	64	31.30	19.10

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5619.20	58.1 PK	68.2	-10.1	1.89 H	280	52.00	6.10
2	*5785.00	100.3 PK			1.89 H	290	60.20	40.10
3	*5785.00	89.3 AV			1.89 H	290	49.20	40.10
4	#5983.20	58.6 PK	68.2	-9.6	1.89 H	280	51.90	6.70
5	11570.00	63.3 PK	74.0	-10.7	1.69 H	1	44.10	19.20
6	11570.00	53.9 AV	54.0	-0.1	1.69 H	1	34.70	19.20
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	#5609.60	58.6 PK	68.2	-9.6	2.14 V	325	52.70	5.90
2	*5785.00	105.4 PK			2.14 V	325	65.30	40.10
3	*5785.00	94.2 AV			2.14 V	325	54.10	40.10
4	#5940.00	59.8 PK	68.2	-8.4	2.14 V	325	53.00	6.80
5	11570.00	62.8 PK	74.0	-11.2	1.63 V	326	43.80	19.00
6	11570.00	51.8 AV	54.0	-2.2	1.63 V	326	32.80	19.00

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5641.60	57.5 PK	68.2	-10.7	1.85 H	291	51.60	5.90
2	*5825.00	103.3 PK			1.85 H	291	63.10	40.20
3	*5825.00	93.0 AV			1.85 H	291	52.80	40.20
4	#5969.60	58.7 PK	68.2	-9.5	1.85 H	291	51.80	6.90
5	11650.00	62.7 PK	74.0	-11.3	1.91 H	358	43.60	19.10
6	11650.00	52.6 AV	54.0	-1.4	1.91 H	358	33.50	19.10
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	#5607.20	58.7 PK	68.2	-9.5	1.85 V	291	52.80	5.90
2	*5825.00	105.1 PK			1.88 V	322	64.90	40.20
3	*5825.00	94.6 AV			1.88 V	322	54.40	40.20
4	#5938.40	59.2 PK	68.2	-9.0	1.85 V	291	52.40	6.80
5	11650.00	61.4 PK	74.0	-12.6	1.96 V	18	42.30	19.10
6	11650.00	49.6 AV	54.0	-4.4	1.96 V	18	30.50	19.10

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.
6. " # ": The radiated frequency is out of the restricted band.

# 802.11n (HT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5150.00	56.4 PK	74.0	-17.6	1.20 H	305	51.50	4.90
2	5150.00	43.8 AV	54.0	-10.2	1.20 H	305	38.90	4.90
3	*5190.00	96.5 PK			1.16 H	303	57.80	38.70
4	*5190.00	84.8 AV			1.16 H	303	46.10	38.70
5	#10380.00	61.1 PK	68.2	-7.1	1.54 H	321	43.90	17.20
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	5150.00	45.8 PK	74.0	-28.2	1.55 V	13	40.90	4.90
2	5150.00	44.0 AV	54.0	-10.0	1.55 V	13	39.10	4.90
3	*5190.00	98.8 PK			1.50 V	16	60.10	38.70
4	*5190.00	87.7 AV			1.50 V	16	49.00	38.70
5	#10380.00	63.0 PK	68.2	-5.2	1.27 V	330	45.80	17.20

## 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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5230.00	96.8 PK			1.36 H	305	58.00	38.80
2	*5230.00	85.6 AV			1.36 H	305	46.80	38.80
3	5380.00	56.4 PK	74.0	-17.6	1.33 H	311	51.10	5.30
4	5380.00	44.0 AV	54.0	-10.0	1.33 H	311	38.70	5.30
5	#10460.00	61.7 PK	68.2	-6.5	1.54 H	322	44.00	17.70
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	*5230.00	97.6 PK			1.42 V	25	58.80	38.80
2	*5230.00	87.3 AV			1.42 V	25	48.50	38.80
3	5350.00	56.4 PK	74.0	-17.6	1.44 V	23	51.10	5.30
4	5350.00	44.2 AV	54.0	-9.8	1.44 V	23	38.90	5.30
5	#10460.00	63.6 PK	68.2	-4.6	1.17 V	351	45.90	17.70

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5636.80	57.6 PK	68.2	-10.6	1.97 H	290	51.70	5.90
2	*5755.00	100.9 PK			1.97 H	290	61.00	39.90
3	*5755.00	89.8 AV			1.97 H	290	49.90	39.90
4	#5959.20	59.2 PK	68.2	-9.0	1.97 H	290	52.40	6.80
5	11510.00	63.2 PK	74.0	-10.8	1.98 H	15	44.10	19.10
6	11510.00	53.1 AV	54.0	-0.9	1.98 H	15	34.00	19.10
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	#5640.80	57.2 PK	68.2	-11.0	2.03 V	324	51.30	5.90
2	*5755.00	102.7 PK			2.03 V	324	62.80	39.90
3	*5755.00	91.4 AV			2.03 V	324	51.50	39.90
4	#5948.00	57.5 PK	68.2	-10.7	2.03 V	324	50.70	6.80
5	11510.00	61.4 PK	74.0	-12.6	1.80 V	64	42.30	19.10
6	11510.00	49.4 AV	54.0	-4.6	1.80 V	64	30.30	19.10

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.
6. " # ": The radiated frequency is out of the restricted band.



CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5625.60	57.4 PK	68.2	-10.8	2.04 H	291	51.50	5.90
2	*5795.00	101.3 PK			2.04 H	291	61.20	40.10
3	*5795.00	90.4 AV			2.04 H	291	50.30	40.10
4	#5940.80	58.8 PK	68.2	-9.4	2.04 H	291	52.00	6.80
5	11590.00	64.5 PK	74.0	-9.5	1.91 H	358	45.50	19.00
6	11590.00	53.2 AV	54.0	-0.8	1.91 H	358	34.20	19.00
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	#5628.80	56.8 PK	68.2	-11.4	2.00 V	325	50.90	5.90
2	*5795.00	102.8 PK			2.00 V	325	62.70	40.10
3	*5795.00	92.2 AV			2.00 V	325	52.10	40.10
4	#5932.00	58.2 PK	68.2	-10.0	2.00 V	325	51.40	6.80
5	11590.00	62.2 PK	74.0	-11.8	1.68 V	64	43.20	19.00
6	11590.00	50.6 AV	54.0	-3.4	1.68 V	64	31.60	19.00

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.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	66.84	32.7 QP	40.0	-7.3	1.50 H	157	48.30	-15.60
2	167.94	35.9 QP	43.5	-7.6	1.50 H	259	49.70	-13.80
3	311.82	38.3 QP	46.0	-7.7	1.00 H	236	50.00	-11.70
4	399.31	39.1 QP	46.0	-6.9	2.00 H	263	49.10	-10.00
5	482.92	38.2 QP	46.0	-7.8	2.00 H	26	46.30	-8.10
6	599.58	37.5 QP	46.0	-8.5	1.50 H	139	42.80	-5.30
7	745.40	33.2 QP	46.0	-12.8	1.00 H	126	35.60	-2.40
8	963.16	36.8 QP	54.0	-17.2	1.50 H	91	35.00	1.80
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	119.34	34.7 QP	43.5	-8.8	1.00 V	117	50.90	-16.20
2	311.82	31.3 QP	46.0	-14.7	1.50 V	284	43.00	-11.70
3	399.31	38.2 QP	46.0	-7.8	1.50 V	344	48.20	-10.00
4	482.92	36.2 QP	46.0	-9.8	1.50 V	164	44.30	-8.10
5	700.68	37.1 QP	46.0	-8.9	1.50 V	213	40.70	-3.60
6	978.71	42.9 QP	54.0	-11.1	1.00 V	311	41.00	1.90

Remarks:

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

**Note:** 1. The lower limit shall apply at the transition frequencies.  
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

Tested date: Dec. 23, 2016

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS 30	100288	Aug. 18, 2016	Aug. 17, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Jan. 18, 2016	Jan. 17, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 26, 2016	Jul. 25, 2017
Software ADT	BV ADT_Conc_ V7.3.7.3	NA	NA	NA

**Note:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Shielded Room 2.  
3. The VCCI Site Registration No. is C-2047.

### 4.2.3 Test Procedures

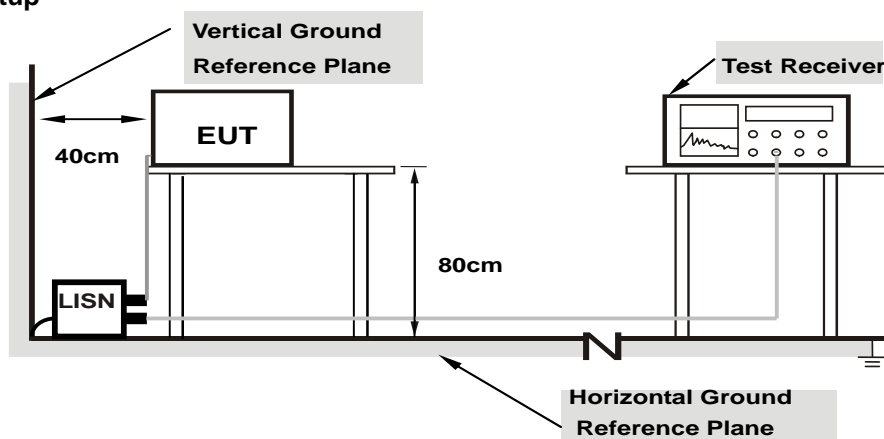
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

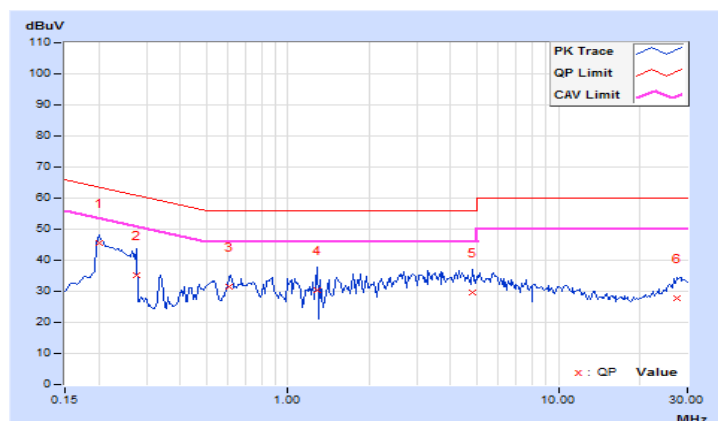
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20078	10.21	35.43	29.42	45.64	39.63	63.58	53.58	-17.94	-13.95
2	0.27500	10.22	24.87	23.28	35.09	33.50	60.97	50.97	-25.88	-17.47
3	0.60703	10.26	21.17	16.75	31.43	27.01	56.00	46.00	-24.57	-18.99
4	1.28125	10.33	20.22	14.72	30.55	25.05	56.00	46.00	-25.45	-20.95
5	4.80859	10.43	19.32	7.21	29.75	17.64	56.00	46.00	-26.25	-28.36
6	27.54297	10.53	17.30	12.04	27.83	22.57	60.00	50.00	-32.17	-27.43

#### 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.

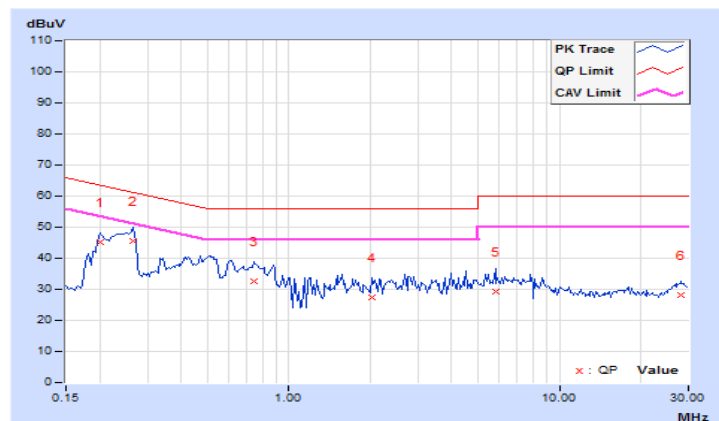


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20078	10.20	34.96	30.09	45.16	40.29	63.58	53.58	-18.42	-13.29
<b>2</b>	<b>0.26719</b>	<b>10.23</b>	<b>35.47</b>	<b>28.30</b>	<b>45.70</b>	<b>38.53</b>	<b>61.20</b>	<b>51.20</b>	<b>-15.50</b>	<b>-12.67</b>
3	0.74375	10.29	22.40	15.28	32.69	25.57	56.00	46.00	-23.31	-20.43
4	2.02344	10.41	17.12	7.43	27.53	17.84	56.00	46.00	-28.47	-28.16
5	5.80469	10.57	18.56	11.51	29.13	22.08	60.00	50.00	-30.87	-27.92
6	28.02344	10.69	17.36	14.05	28.05	24.74	60.00	50.00	-31.95	-25.26

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 Transmit Power Measurement

#### 4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1	√ <sub>Note</sub>	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≤ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

**Note:** Device will assign an IP address to the connected device same as an AP device, therefore the EIRP shall not exceed 125mW as Outdoor Access Point condition.

\*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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

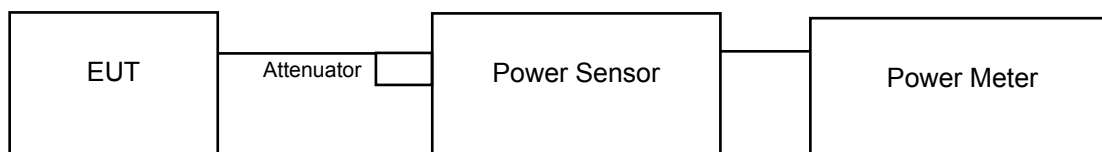
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

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

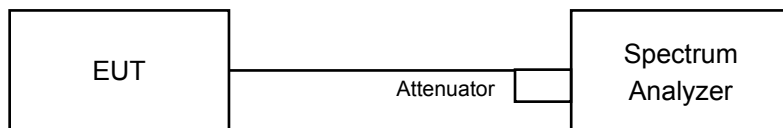
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup

For Power Output Measurement



For 26dB Bandwidth



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

#### For Average Power Measurement

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

#### For 26dB Bandwidth

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 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

Power Output:  
For U-NII-1 Band  
802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
36	5180	<b>20.324</b>	13.08	24.00	1.49	14.57	21.00	Pass
40	5200	20.137	13.04	24.00	1.49	14.53	21.00	Pass
48	5240	20.230	13.06	24.00	1.49	14.55	21.00	Pass

#### 802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
36	5180	15.241	11.83	24.00	1.49	13.32	21.00	Pass
40	5200	15.382	11.87	24.00	1.49	13.36	21.00	Pass
48	5240	15.524	11.91	24.00	1.49	13.40	21.00	Pass

#### 802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
38	5190	15.453	11.89	24.00	1.49	13.38	21.00	Pass
46	5230	15.631	11.94	24.00	1.49	13.43	21.00	Pass

For U-NII-3 Band  
802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	13.646	11.35	30.00	Pass
157	5785	14.322	11.56	30.00	Pass
165	5825	14.191	11.52	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	15.136	11.80	30.00	Pass
157	5785	<b>15.849</b>	12.00	30.00	Pass
165	5825	14.791	11.70	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
151	5755	14.825	11.71	30.00	Pass
159	5795	14.322	11.56	30.00	Pass

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)
36	5180	22.44
40	5200	22.45
48	5240	22.59

802.11n (HT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)
36	5180	22.75
40	5200	23.00
48	5240	22.77

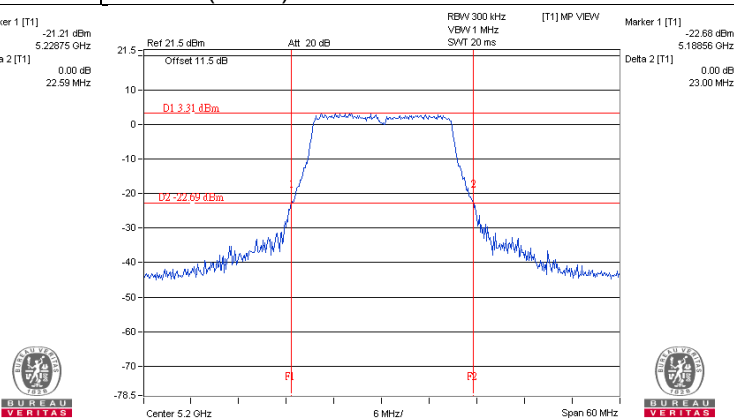
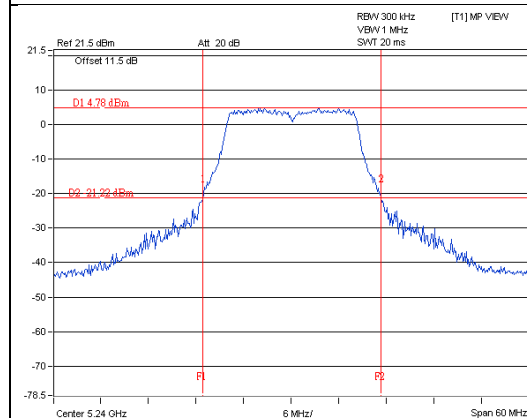
802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)
38	5190	45.27
46	5230	45.53

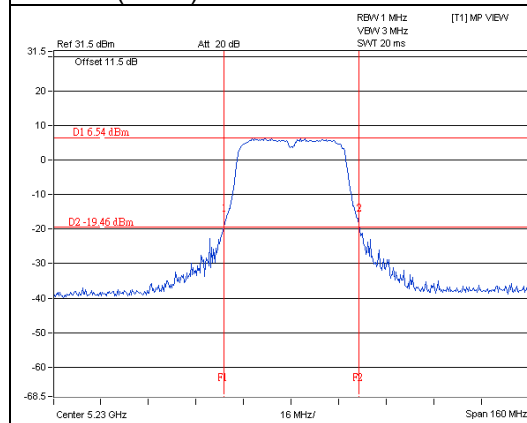
### Spectrum Plot of Worst Value

802.11a

802.11n (HT20)

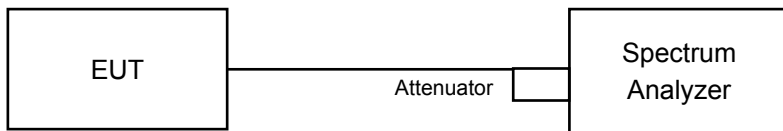


802.11n (HT40)



## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup



### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

#### 4.4.4 Test Result

##### 802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	17.04
40	5200	17.04
48	5240	17.16
149	5745	17.21
157	5785	17.28
165	5825	17.16

##### 802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	18.12
40	5200	18.12
48	5240	18.12
149	5745	18.12
157	5785	18.24
165	5825	18.12

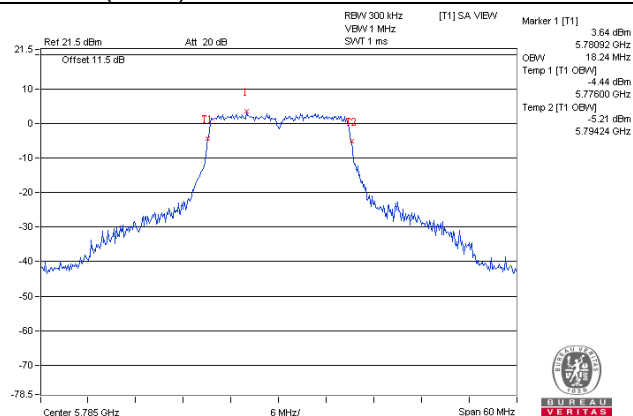
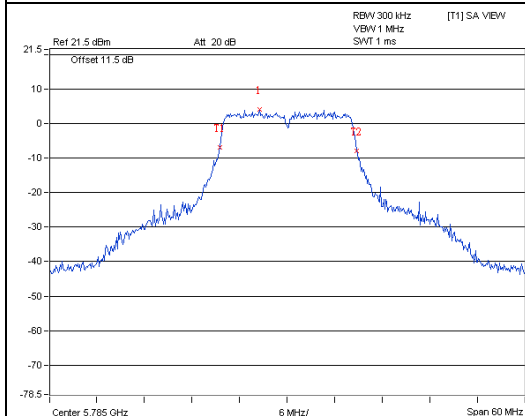
##### 802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
38	5190	36.60
46	5230	36.60
151	5755	36.84
159	5795	36.72

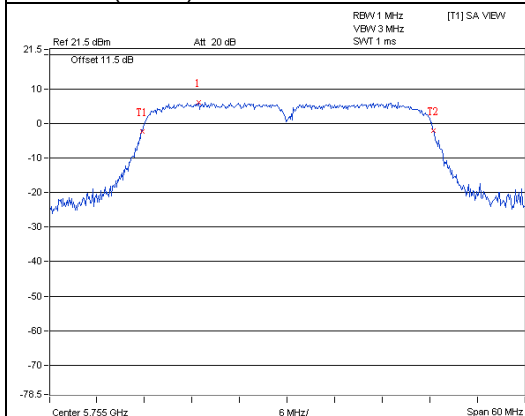
# Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



802.11n (HT40)

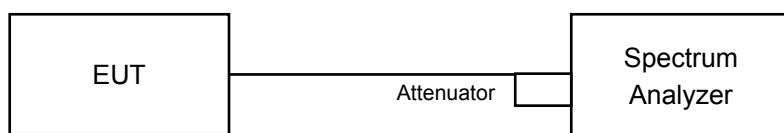


## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

### 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 Procedures

#### For U-NII-1 band:

Using method SA-2, Duty cycle <98%

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

#### For U-NII-3 band:

Duty cycle <98%

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

#### **4.5.5 Deviation from Test Standard**

No deviation.

#### **4.5.6 EUT Operating Conditions**

Same as Item 4.3.6.



#### 4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	-0.65	0.75	0.10	11.00	Pass
40	5200	-0.64	0.75	0.11	11.00	Pass
48	5240	-0.50	0.75	0.25	11.00	Pass

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

802.11n (HT20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	-1.90	0.81	-1.10	11.00	Pass
40	5200	-1.89	0.81	-1.09	11.00	Pass
48	5240	-1.88	0.81	-1.08	11.00	Pass

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

802.11n (HT40)

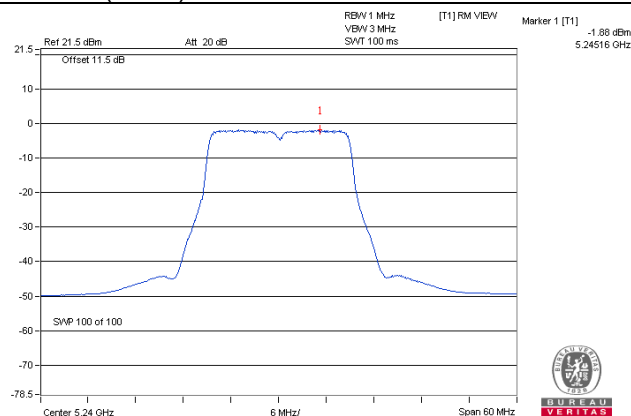
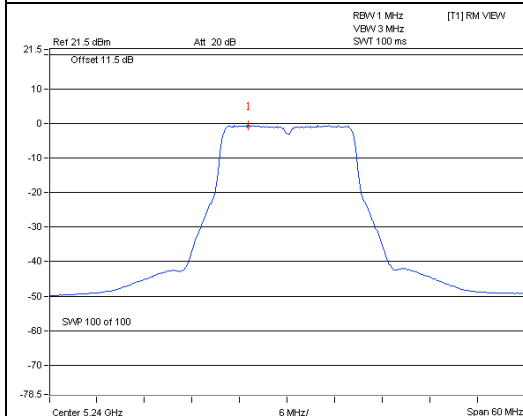
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
38	5190	-5.17	2.53	-2.64	11.00	Pass
46	5230	-5.42	2.53	-2.89	11.00	Pass

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

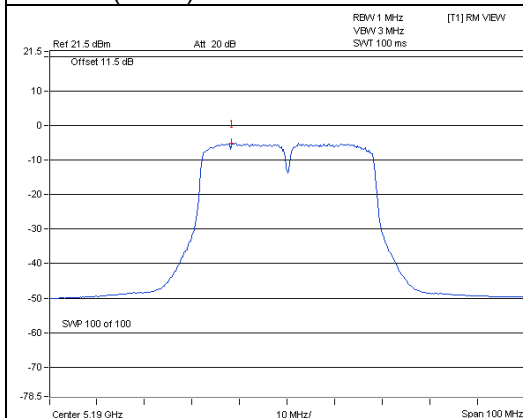
# Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



802.11n (HT40)



# For U-NII-3 Band

## 802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		(dBm/300kHz)	(dBm/500kHz)				
149	5745	-9.27	-7.05	0.75	-6.30	30.00	Pass
157	5785	-9.54	-7.32	0.75	-6.57	30.00	Pass
165	5825	-9.27	-7.05	0.75	-6.30	30.00	Pass

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

## 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		(dBm/300kHz)	(dBm/500kHz)				
149	5745	-10.33	-8.11	0.81	-7.30	30.00	Pass
157	5785	-9.73	-7.51	0.81	-6.70	30.00	Pass
165	5825	-10.52	-8.30	0.81	-7.49	30.00	Pass

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

## 802.11n (HT40)

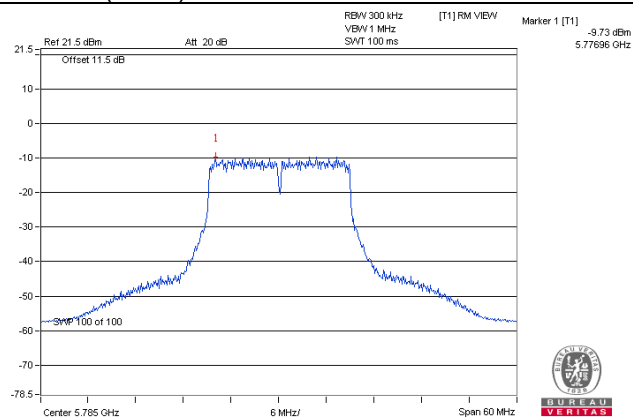
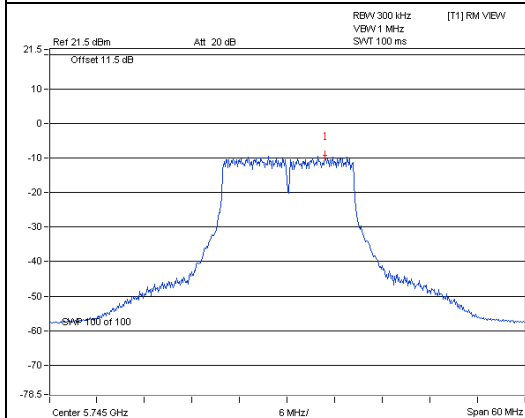
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		(dBm/300kHz)	(dBm/500kHz)				
151	5755	-13.77	-11.55	2.53	-9.02	30.00	Pass
159	5795	-13.69	-11.47	2.53	-8.94	30.00	Pass

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

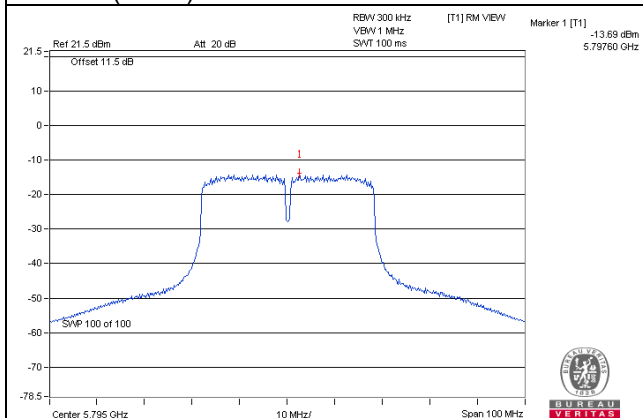
## Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



802.11n (HT40)

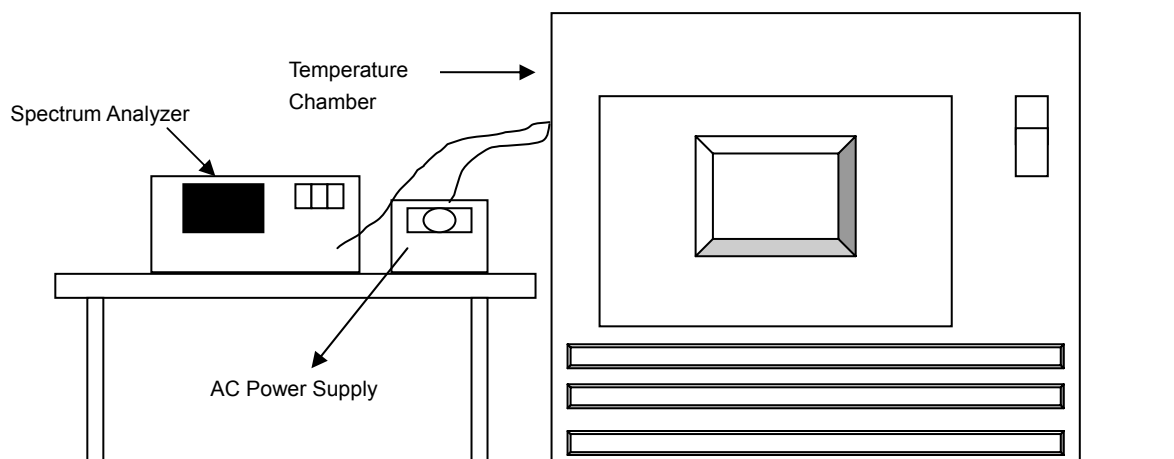


## 4.6 Frequency Stability

### 4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

### 4.6.2 Test Setup



### 4.6.3 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.6.4 Deviation from Test Standard

No deviation.

### 4.6.5 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

#### 4.6.6 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5240MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)
50	120	5239.9959	-0.00008	5239.9985	-0.00003	5239.9953	-0.00009	5239.9997	-0.00001
40	120	5240.0018	0.00003	5239.9998	0.00000	5240.0012	0.00002	5240.0002	0.00000
30	120	5239.9927	-0.00014	5239.9931	-0.00013	5239.9964	-0.00007	5239.9952	-0.00009
20	120	5240.0143	0.00027	5240.0137	0.00026	5240.0143	0.00027	5240.0135	0.00026
10	120	5239.9967	-0.00006	5239.9975	-0.00005	5239.9975	-0.00005	5239.9938	-0.00012
0	120	5239.9916	-0.00016	5239.996	-0.00008	5239.996	-0.00008	5239.9929	-0.00014
-10	120	5239.977	-0.00044	5239.9737	-0.00050	5239.9743	-0.00049	5239.9749	-0.00048
-20	120	5239.9849	-0.00029	5239.9836	-0.00031	5239.9845	-0.00030	5239.9825	-0.00033
-30	120	5240.0268	0.00051	5240.0226	0.00043	5240.0269	0.00051	5240.0267	0.00051

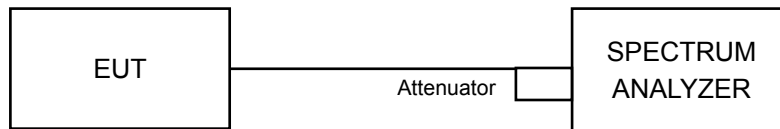
Frequency Stability Versus Voltage									
Operating Frequency: 5240MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)	Measured Frequency( MHz)	Frequency Drift (%)
20	138	5240.0146	0.00028	5240.0144	0.00027	5240.0138	0.00026	5240.0141	0.00027
	120	5240.0143	0.00027	5240.0137	0.00026	5240.0143	0.00027	5240.0135	0.00026
	102	5240.0152	0.00029	5240.0138	0.00026	5240.0152	0.00029	5240.0129	0.00025

## 4.7 6dB Bandwidth Measurement

### 4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.7.2 Test Setup



### 4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.7.4 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

### 4.7.5 Deviation from Test Standard

No deviation.

### 4.7.6 EUT Operating Condition

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

#### 4.7.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.40	0.5	Pass
157	5785	16.43	0.5	Pass
165	5825	16.41	0.5	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.64	0.5	Pass
157	5785	17.65	0.5	Pass
165	5825	17.63	0.5	Pass

##### 802.11n (HT40)

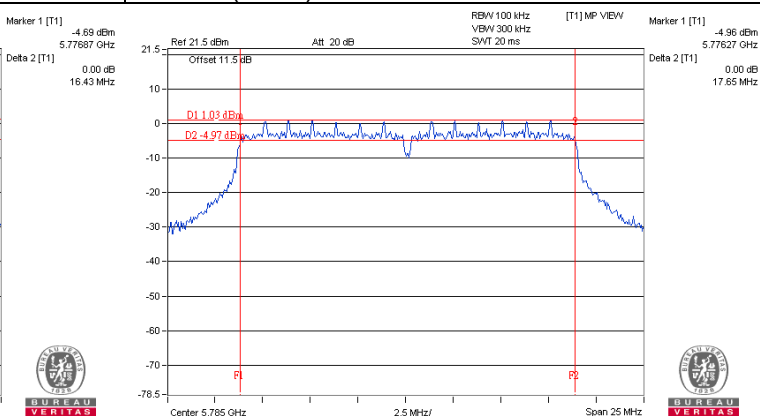
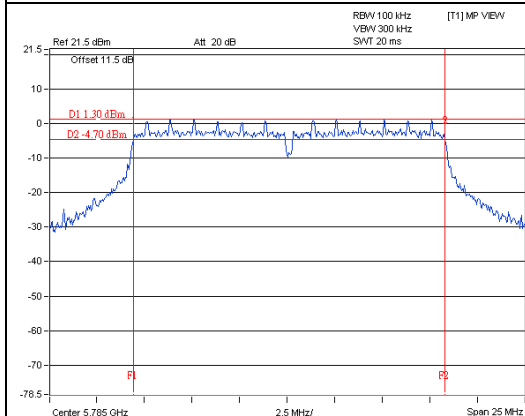
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.33	0.5	Pass
159	5795	35.48	0.5	Pass



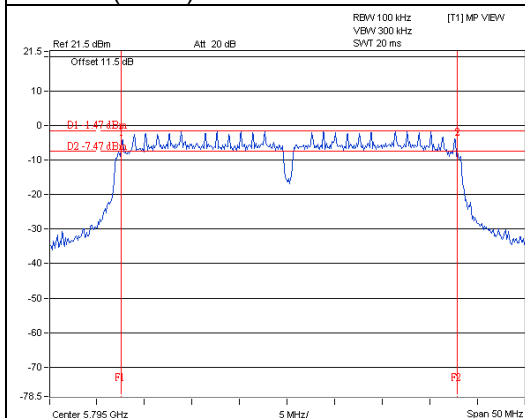
## Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



802.11n (HT40)

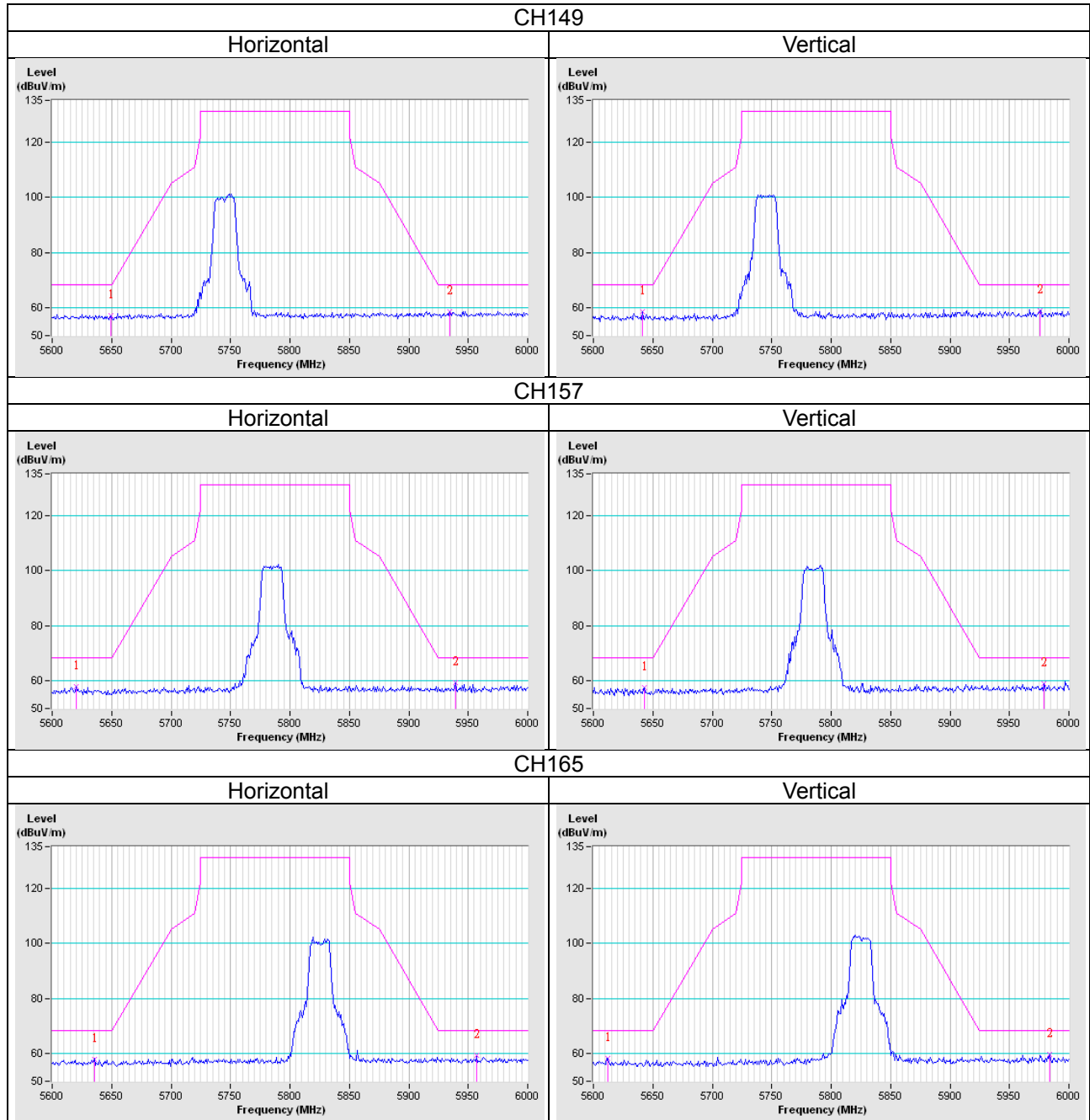


## 5 Pictures of Test Arrangements

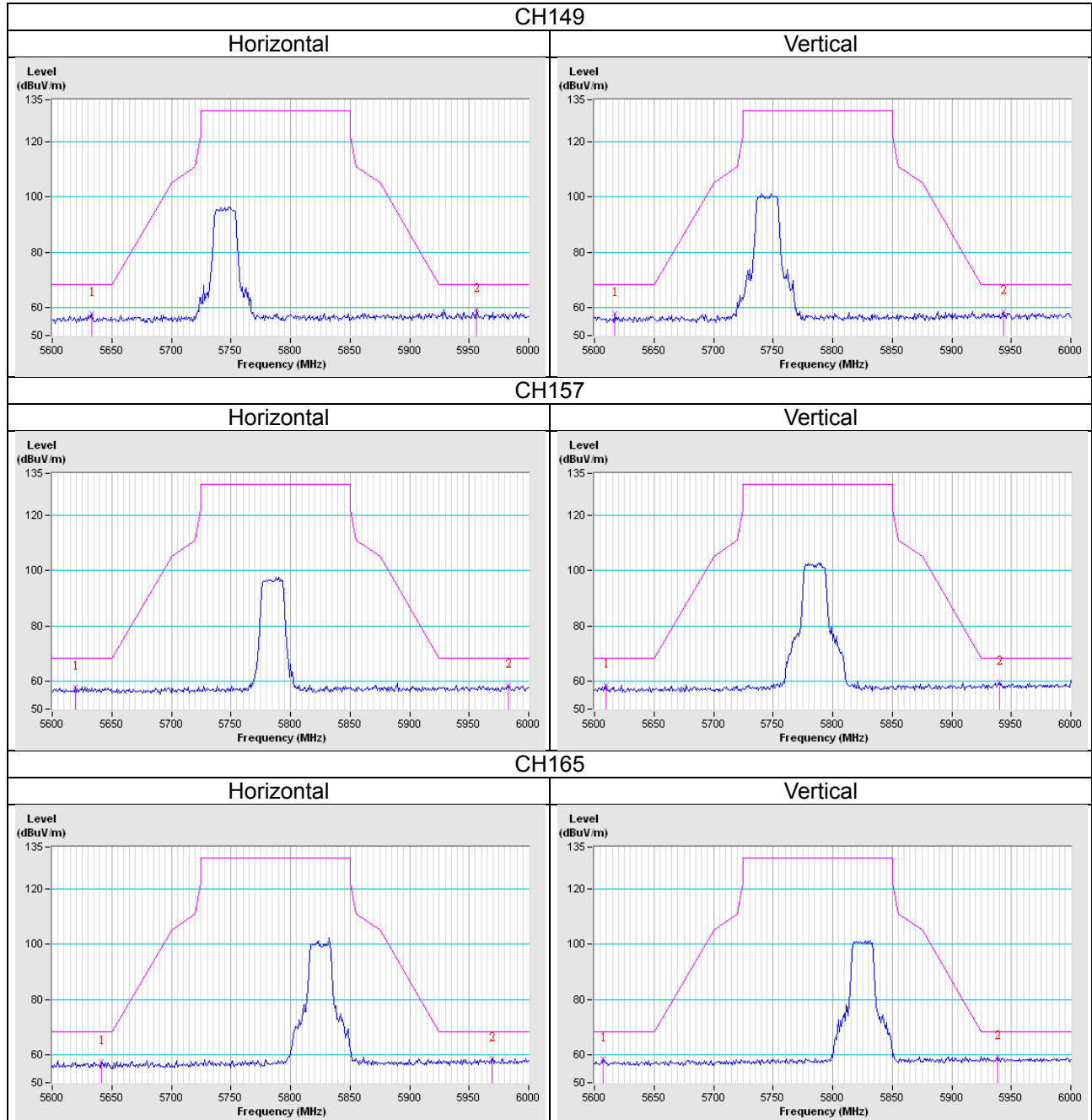
Please refer to the attached file (Test Setup Photo).

## Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a



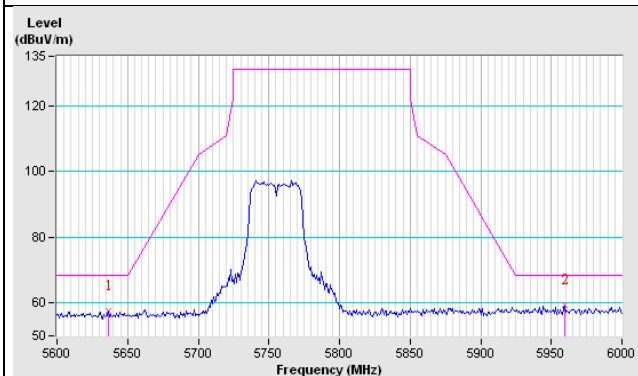
# 802.11n (HT20)



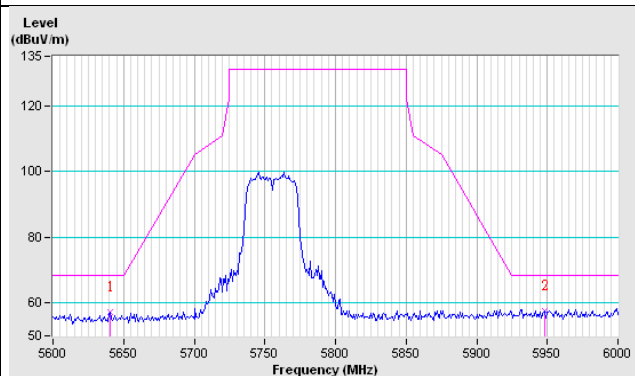
802.11n (HT40)

CH151

Horizontal

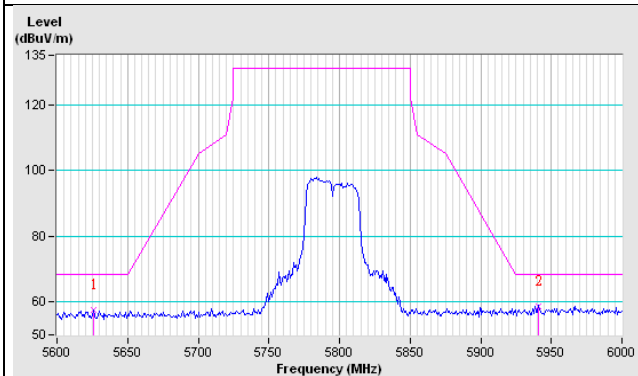


Vertical

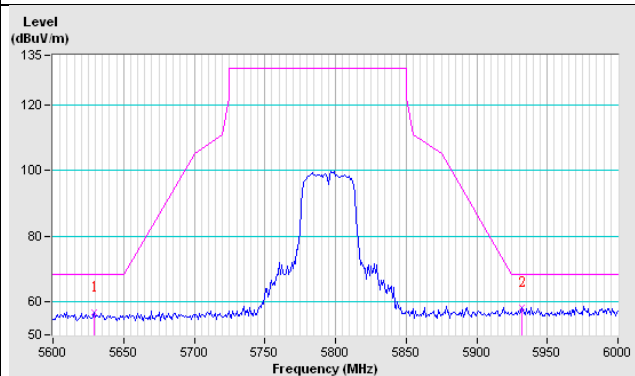


CH159

Horizontal



Vertical



## Appendix – Information on the Testing Laboratories

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

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

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**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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