

## FCC Test Report

**Report No.:** RF111005C22D

**FCC ID:** TVE-0120201

**Test Model:** EMP7618

**Series Model:** EMP7618-FT (refer to item 3.1 for more details)

**Received Date:** Mar. 07, 2013

**Test Date:** Mar. 14, 2013 (Conducted emission test for test mode A)

Mar. 22 ~ Apr. 19, 2016 (For all test, except conducted emission test for test mode A)

**Issued Date:** Apr. 19, 2016

**Applicant:** Fortinet, Inc.

**Address:** 899 Kifer Road Sunnyvale, CA 94086 USA

**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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A D T

### Release Control Record

Issue No.	Description	Date Issued
RF111005C22D	Original release	Apr. 19, 2016



# 1 Certificate of Conformity

**Product:** 802.11 abgn RF Module Card  
**Brand:** Fortinet Inc.  
**Test Model:** EMP7618  
**Series Model:** EMP7618-FT (refer to item 3.1 for more details)  
**Sample Status:** Engineering sample  
**Applicant:** Fortinet, Inc.  
**Test Date:** Mar. 14, 2013 (Conducted emission test for test mode A)  
Mar. 22 ~ Apr. 19, 2016 (For all test, except conducted emission test for test mode A)  
**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 , **Date:** Apr. 19, 2016  
Polly Chien / Specialist

**Approved by :** Ken Liu , **Date:** Apr. 19, 2016  
Ken Liu / Senior Manager

## 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 -6.96dB at 0.49584MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5722.00MHz, 11650.00MHz, 11570.00MHz and 5714.90MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
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	For Dipole antenna: Antenna connector is RSMA not a standard connector. For PIFA antenna: Antenna connector is IPEX not a standard connector.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports0	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	802.11 abgn RF Module Card
Brand	Fortinet Inc.
Test Model	EMP7618
Series Model	EMP7618-FT
Status of EUT	Engineering sample
Power Supply Rating	3.3Vdc (host equipment)
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20): 4 802.11n (HT40): 2 5745 ~ 5825MHz: 802.11a, 802.11n (HT20): 5 802.11n (HT40): 2
Output Power	5180 ~ 5240MHz: 46.086mW 5745 ~ 5825MHz: 21.346mW
Antenna Type	Refer to note as below
Antenna Connector	Refer to note as below
Accessory Device	NA
Data Cable Supplied	NA

**Note:**

1. This report is issued as a supplementary report of original report no.: RF111005C22A-1.
2. This report is prepared for FCC class II permissive change. The differences compared to the original design are adding PIFA antennas and updating standard to new rule version for U-NII-1 & U-NII-3 band. U-NII-1 band output power unchanged. Therefore, radiated emissions test items on U-NII-1 band for test mode B. and U-NII-3 band for test mode A & B, conducted emission test items on U-NII-3 band for test mode A had been re-tested.
3. The following models are electrically identical, different model names are for marketing purpose.

Brand	Model
Fortinet Inc.	EMP7618
Fortinet Inc.	EMP7618-FT

\* The model of the EMP7618 was chosen for final test.

4. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

5. The following antennas are used in this EUT.

**Original antennas**

SET	TRANSMITTER CIRCUIT	TYPE	CONNECTOR	GAIN (dBi)	
				2.4GHz	5 GHz
1	Chain (0)	Dipole	RSMA	2	4.5
	Chain (1)			2	4.5
2	Chain (0)	Dipole	RSMA	2	1
	Chain (1)			2	1
3	Chain (0)	Dipole	RSMA	2	2
	Chain (1)			2	2

SET	TRANSMITTER CIRCUIT	TYPE	CONNECTOR	GAIN (dBi)	
				2.4GHz	5 GHz
4	<b>Chain (0)</b>	<b>Dipole</b>	RSMA	<b>3</b>	<b>6</b>
	<b>Chain (1)</b>			<b>3</b>	<b>6</b>
5	Chain (0)	Dipole	RSMA	2	1
	Chain (1)			2	1
6	Chain (0)	Dipole	RSMA	2	3
	Chain (1)			2	3

\* For this test report, the set 4 was chosen for final test.

**New antennas**

SET	TRANSMITTER CIRCUIT	TYPE	CONNECTOR	GAIN (dBi)	
				2.4GHz	5 GHz
1	<b>Chain (0)</b>	<b>PIFA</b>	<b>IPEX</b>	<b>3</b>	<b>4</b>
	<b>Chain (1)</b>			<b>3</b>	<b>4</b>
2	Chain (0)	PIFA	IPEX	2	2
	Chain (1)			2	2

\* For this test report, the set 1 was chosen for final test.



### 3.2 Description of Test Modes

#### 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

#### 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	
A	√	√	√	√	EUT with Dipole antenna
B	√	√	√	-	EUT with PIFA antenna

Where RE $\geq$ 1G: Radiated Emission above 1GHz RE<1G: Radiated Emission below 1GHz  
 PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane.
2. "-" means no effect.

#### 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	Modulation Type	Date Rate (Mbps)
B	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
B	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
B	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A, B	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A, B	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A, B	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date Rate (Mbps)
A, B	802.11n (HT40)	5180-5240	38 to 46	46	OFDM	BPSK	15.0
	802.11n (HT40)	5745-5825	149 to 165		OFDM	BPSK	15.0

#### 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	Modulation Type	Date Rate (Mbps)
A, B	802.11n (HT40)	5180-5240	38 to 46	46	OFDM	BPSK	15.0
	802.11n (HT40)	5745-5825	149 to 165		OFDM	BPSK	15.0

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	Modulation Type	Date Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	22deg. C, 68%RH	120Vac, 60Hz	Jones Chang
RE<1G	16deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Brad Wu
	24deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

### 3.3 Duty Cycle of Test Signal

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

802.11a: Duty cycle = 1.355/1.402 = 0.966, Duty factor =  $10 * \log(1/0.966) = 0.15$

802.11n (HT20): Duty cycle = 1.270/1.335 = 0.951, Duty factor =  $10 * \log(1/0.951) = 0.22$

802.11n (HT40): Duty cycle = 0.629/0.682 = 0.922, Duty factor =  $10 * \log(1/0.922) = 0.35$



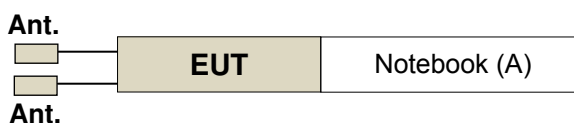
### 3.4 Description of Support Units

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	DELL	E5420	33MLMQ1	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)**  
**789033 D02 General UNII Test Procedures New Rules v01r02**  
**662911 D01 Multiple Transmitter Output v02r01**  
 ANSI C63.10:2013

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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 Procedures New Rules v01r02	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2 (dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2 (dBuV/m) <sup>*1</sup> PK:78.2 (dBuV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge    <sup>\*2</sup> within 10 MHz of band edge

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	ESCI	100424	Oct. 12, 2015	Oct. 11, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Sep. 02, 2015	Sep. 01, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	9120D	209	Jan. 20, 2016	Jan. 19, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2015	Oct. 17, 2016
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2015	Aug. 21, 2016
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
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016

- 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 3.  
 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 988962.  
 5. The IC Site Registration No. is IC 7450F-3.

#### 4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters 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. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. 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.
4. 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 ( $10 \log(1/\text{duty cycle})$ ).
5. 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.
6. All modes of operation were investigated and the worst-case emissions are reported.

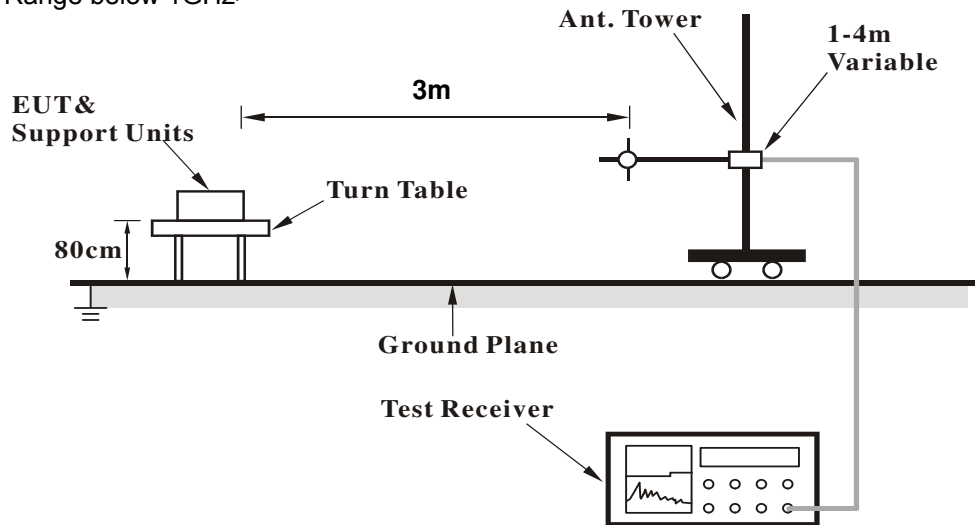
#### 4.1.4 Deviation from Test Standard

No deviation.

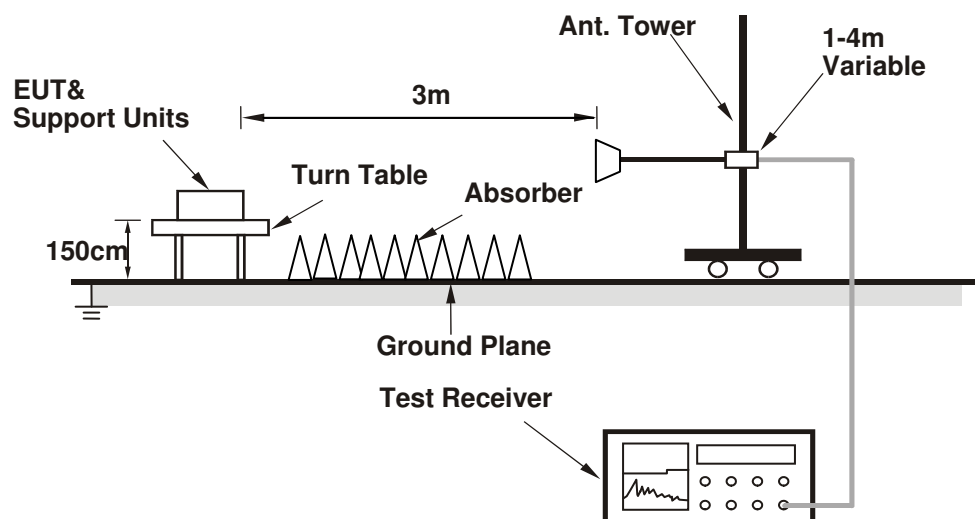


#### 4.1.5 Test Set Up

<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

- a. Plugged the EUT into notebook and placed them on the testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

Above 1GHz Data

Test mode A

802.11a

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	#5714.90	57.9 PK	74.0	-16.1	1.70 H	300	50.50	7.40
2	#5714.90	46.9 AV	54.0	-7.1	1.70 H	300	39.50	7.40
3	#5722.00	65.3 PK	78.2	-12.9	1.66 H	327	57.90	7.40
4	#5725.00	53.3 PK	78.2	-24.9	1.66 H	327	45.90	7.40
5	*5745.00	97.3 PK			1.42 H	60	56.80	40.50
6	*5745.00	87.9 AV			1.42 H	60	47.40	40.50
7	11490.00	60.2 PK	74.0	-13.8	1.86 H	70	41.50	18.70
8	11490.00	47.3 AV	54.0	-6.7	1.86 H	70	28.60	18.70
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	#5714.00	59.5 PK	74.0	-14.5	1.86 V	218	52.10	7.40
2	#5714.00	47.9 AV	54.0	-6.1	1.86 V	218	40.50	7.40
3	#5722.30	76.4 PK	78.2	-1.8	2.18 V	30	69.00	7.40
4	#5725.00	63.9 PK	78.2	-14.3	2.18 V	230	56.50	7.40
5	*5745.00	106.7 PK			2.38 V	123	66.20	40.50
6	*5745.00	97.3 AV			2.38 V	123	56.80	40.50
7	11490.00	69.1 PK	74.0	-4.9	2.37 V	223	50.40	18.70
8	11490.00	52.4 AV	54.0	-1.6	2.37 V	223	33.70	18.70

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 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	*5785.00	93.7 PK			2.02 H	241	53.10	40.60
2	*5785.00	83.9 AV			2.02 H	241	43.30	40.60
3	11570.00	60.9 PK	74.0	-13.1	2.30 H	199	42.20	18.70
4	11570.00	48.4 AV	54.0	-5.6	2.30 H	199	29.70	18.70

**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	*5785.00	104.9 PK			2.06 V	39	64.30	40.60
2	*5785.00	95.3 AV			2.06 V	39	54.70	40.60
3	11570.00	69.0 PK	74.0	-5.0	2.36 V	223	50.30	18.70
4	11570.00	52.7 AV	54.0	-1.3	2.36 V	223	34.00	18.70

**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.

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	*5825.00	96.3 PK			2.42 H	203	55.70	40.60
2	*5825.00	86.5 AV			2.42 H	203	45.90	40.60
3	#5850.00	59.5 PK	78.2	-18.7	2.22 H	234	51.90	7.60
4	#5853.00	50.2 PK	78.2	-28.0	2.22 H	234	42.50	7.70
5	#5861.00	57.3 PK	74.0	-16.7	2.29 H	221	49.60	7.70
6	#5861.00	46.6 AV	54.0	-7.4	2.29 H	221	38.90	7.70
7	11650.00	61.1 PK	74.0	-12.9	1.99 H	277	41.90	19.20
8	11650.00	47.9 AV	54.0	-6.1	1.99 H	277	28.70	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	*5825.00	104.9 PK			1.89 V	39	64.30	40.60
2	*5825.00	95.2 AV			1.89 V	39	54.60	40.60
3	#5850.00	56.6 PK	78.2	-21.6	2.00 V	255	49.00	7.60
4	#5853.00	59.2 PK	78.2	-19.0	2.00 V	255	51.50	7.70
5	#5861.00	58.0 PK	74.0	-16.0	1.88 V	233	50.30	7.70
6	#5861.00	46.8 AV	54.0	-7.2	1.88 V	233	39.10	7.70
7	11650.00	68.1 PK	74.0	-5.9	2.35 V	223	48.90	19.20
8	11650.00	52.6 AV	54.0	-1.4	2.35 V	223	33.40	19.20

**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.

**802.11n (HT20)**

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	#5714.90	58.9 PK	74.0	-15.1	2.00 H	101	51.50	7.40
2	#5714.90	47.4 AV	54.0	-6.6	2.00 H	101	40.00	7.40
3	#5722.00	58.2 PK	78.2	-20.0	1.89 H	212	50.80	7.40
4	#5725.00	49.5 PK	78.2	-28.7	1.89 H	212	42.10	7.40
5	*5745.00	92.4 PK			2.54 H	94	51.90	40.50
6	*5745.00	82.0 AV			2.54 H	94	41.50	40.50
7	11490.00	60.5 PK	74.0	-13.5	3.01 H	302	41.80	18.70
8	11490.00	47.7 AV	54.0	-6.3	3.01 H	302	29.00	18.70
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	#5714.00	57.7 PK	74.0	-16.3	1.76 V	239	50.30	7.40
2	#5714.00	46.8 AV	54.0	-7.2	1.76 V	239	39.40	7.40
<b>3</b>	<b>#5722.00</b>	<b>77.2 PK</b>	<b>78.2</b>	<b>-1.0</b>	<b>1.86 V</b>	<b>289</b>	<b>69.80</b>	<b>7.40</b>
4	#5725.00	62.8 PK	78.2	-15.4	1.86 V	225	55.40	7.40
5	*5745.00	108.9 PK			1.75 V	248	68.40	40.50
6	*5745.00	98.8 AV			1.75 V	248	58.30	40.50
7	11490.00	61.2 PK	74.0	-12.8	2.82 V	272	42.50	18.70
8	11490.00	48.2 AV	54.0	-5.8	2.82 V	272	29.50	18.70

**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 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	*5785.00	94.4 PK			2.49 H	94	53.80	40.60
2	*5785.00	84.9 AV			2.49 H	94	44.30	40.60
3	11570.00	63.3 PK	74.0	-10.7	3.63 H	327	44.60	18.70
4	11570.00	51.1 AV	54.0	-2.9	3.63 H	327	32.40	18.70

**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	*5785.00	108.7 PK			1.83 V	247	68.10	40.60
2	*5785.00	98.7 AV			1.83 V	247	58.10	40.60
3	11570.00	67.2 PK	74.0	-6.8	2.96 V	239	48.50	18.70
4	11570.00	52.5 AV	54.0	-1.5	2.96 V	239	33.80	18.70

**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 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	*5825.00	93.6 PK			2.45 H	95	53.00	40.60
2	*5825.00	83.9 AV			2.45 H	95	43.30	40.60
3	#5850.00	49.0 PK	78.2	-29.2	2.40 H	248	41.40	7.60
4	#5853.00	59.0 PK	78.2	-19.2	2.40 H	248	51.30	7.70
5	#5861.00	58.2 PK	74.0	-15.8	2.33 H	100	50.50	7.70
6	#5861.00	47.6 AV	54.0	-6.4	2.33 H	100	39.90	7.70
7	11650.00	61.3 PK	74.0	-12.7	2.96 H	337	42.10	19.20
8	11650.00	48.4 AV	54.0	-5.6	2.96 H	337	29.20	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	*5825.00	107.4 PK			1.86 V	309	66.80	40.60
2	*5825.00	97.2 AV			1.86 V	309	56.60	40.60
3	#5850.00	59.2 PK	78.2	-19.0	1.89 V	301	51.60	7.60
4	#5853.00	51.2 PK	78.2	-27.0	1.89 V	301	43.50	7.70
5	#5861.00	60.7 PK	74.0	-13.3	1.98 V	220	53.00	7.70
6	#5861.00	47.6 AV	54.0	-6.4	1.98 V	220	39.90	7.70
7	11650.00	66.9 PK	74.0	-7.1	3.28 V	241	47.70	19.20
<b>8</b>	<b>11650.00</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>3.28 V</b>	<b>241</b>	<b>33.80</b>	<b>19.20</b>

**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 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	#5714.90	56.9 PK	74.0	-17.1	1.60 H	96	49.50	7.40
2	#5714.90	45.7 AV	54.0	-8.3	1.60 H	96	38.30	7.40
3	#5722.00	60.4 PK	78.2	-17.8	1.77 H	111	53.00	7.40
4	#5725.00	51.5 PK	78.2	-26.7	1.77 H	111	44.10	7.40
5	*5755.00	88.3 PK			1.46 H	80	47.70	40.60
6	*5755.00	80.2 AV			1.46 H	80	39.60	40.60
7	11510.00	60.2 PK	74.0	-13.8	2.12 H	256	41.50	18.70
8	11510.00	47.0 AV	54.0	-7.0	2.12 H	256	28.30	18.70

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	#5714.90	69.2 PK	74.0	-4.8	2.33 V	286	61.80	7.40
2	#5714.90	52.9 AV	54.0	-1.1	2.33 V	286	45.50	7.40
3	#5722.00	72.9 PK	78.2	-5.3	2.39 V	271	65.50	7.40
4	#5725.00	62.7 PK	78.2	-15.5	2.39 V	271	55.30	7.40
5	*5755.00	102.8 PK			2.18 V	244	62.20	40.60
6	*5755.00	93.5 AV			2.18 V	244	52.90	40.60
7	11510.00	61.0 PK	74.0	-13.0	3.11 V	270	42.30	18.70
8	11510.00	48.1 AV	54.0	-5.9	3.11 V	270	29.40	18.70

**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 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	*5795.00	89.7 PK			1.51 H	76	49.10	40.60
2	*5795.00	80.6 AV			1.51 H	76	40.00	40.60
3	#5850.00	50.4 PK	78.2	-27.8	1.64 H	233	42.80	7.60
4	#5853.00	57.5 PK	78.2	-20.7	1.64 H	233	49.80	7.70
5	#5861.00	56.8 PK	74.0	-17.2	1.44 H	121	49.10	7.70
6	#5861.00	45.9 AV	54.0	-8.1	1.44 H	121	38.20	7.70
7	11590.00	60.8 PK	74.0	-13.2	3.10 H	315	42.00	18.80
8	11590.00	48.1 AV	54.0	-5.9	3.10 H	315	29.30	18.80

**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	*5795.00	102.3 PK			2.36 V	258	61.70	40.60
2	*5795.00	92.9 AV			2.36 V	258	52.30	40.60
3	#5850.00	56.1 PK	78.2	-22.1	2.42 V	251	48.50	7.60
4	#5853.00	68.1 PK	78.2	-10.1	2.42 V	251	60.40	7.70
5	#5861.00	58.6 PK	74.0	-15.4	2.33 V	275	50.90	7.70
6	#5861.00	47.5 AV	54.0	-6.5	2.33 V	275	39.80	7.70
7	11590.00	63.9 PK	74.0	-10.1	3.03 V	234	45.10	18.80
8	11590.00	52.2 AV	54.0	-1.8	3.03 V	234	33.40	18.80

**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.

Test mode B

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	55.5 PK	74.0	-18.5	1.22 H	210	49.50	6.00
2	5150.00	42.1 AV	54.0	-11.9	1.22 H	210	36.10	6.00
3	*5180.00	103.7 PK			1.00 H	193	64.30	39.40
4	*5180.00	94.0 AV			1.00 H	193	54.60	39.40
5	#10360.00	58.5 PK	74.0	-15.5	1.20 H	79	40.70	17.80
6	#10360.00	46.1 AV	54.0	-7.9	1.20 H	79	28.30	17.80
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	5150.00	57.3 PK	74.0	-16.7	1.16 V	240	51.30	6.00
2	5150.00	43.8 AV	54.0	-10.2	1.16 V	240	37.80	6.00
3	*5180.00	101.9 PK			1.00 V	225	62.50	39.40
4	*5180.00	92.4 AV			1.00 V	225	53.00	39.40
5	#10360.00	60.6 PK	74.0	-13.4	1.00 V	247	42.80	17.80
6	#10360.00	47.9 AV	54.0	-6.1	1.00 V	247	30.10	17.80

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	104.1 PK			1.24 H	163	64.60	39.50
2	*5200.00	94.7 AV			1.24 H	163	55.20	39.50
3	#10400.00	59.0 PK	74.0	-15.0	1.25 H	182	41.30	17.70
4	#10400.00	46.7 AV	54.0	-7.3	1.25 H	182	29.00	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	*5200.00	102.2 PK			1.00 V	50	62.70	39.50
2	*5200.00	92.5 AV			1.00 V	50	53.00	39.50
3	#10400.00	59.5 PK	74.0	-14.5	1.15 V	102	41.80	17.70
4	#10400.00	46.9 AV	54.0	-7.1	1.15 V	102	29.20	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 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	104.8 PK			1.06 H	168	65.20	39.60
2	*5240.00	94.7 AV			1.06 H	168	55.10	39.60
3	5400.00	58.0 PK	74.0	-16.0	1.22 H	169	51.30	6.70
4	5400.00	47.1 AV	54.0	-6.9	1.22 H	169	40.40	6.70
5	#10480.00	59.5 PK	74.0	-14.5	1.24 H	243	40.80	18.70
6	#10480.00	46.2 AV	54.0	-7.8	1.24 H	243	27.50	18.70

**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	*5240.00	104.4 PK			1.08 V	79	64.80	39.60
2	*5240.00	94.5 AV			1.08 V	79	54.90	39.60
3	5400.00	58.0 PK	74.0	-16.0	1.48 V	206	51.30	6.70
4	5400.00	46.8 AV	54.0	-7.2	1.48 V	206	40.10	6.70
5	#10480.00	58.3 PK	74.0	-15.7	1.13 V	79	39.60	18.70
6	#10480.00	46.0 AV	54.0	-8.0	1.13 V	79	27.30	18.70

**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 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	#5714.90	58.8 PK	74.0	-15.2	2.02 H	190	51.40	7.40
2	#5714.90	48.0 AV	54.0	-6.0	2.02 H	190	40.60	7.40
3	#5722.00	73.4 PK	78.2	-4.8	2.11 H	169	66.00	7.40
4	#5725.00	66.1 PK	78.2	-12.1	2.11 H	169	58.70	7.40
5	*5745.00	105.2 PK			1.85 H	143	64.70	40.50
6	*5745.00	95.6 AV			1.85 H	143	55.10	40.50
7	11490.00	61.8 PK	74.0	-12.2	2.22 H	229	43.10	18.70
8	11490.00	48.7 AV	54.0	-5.3	2.22 H	229	30.00	18.70

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	#5714.90	57.7 PK	74.0	-16.3	1.70 V	210	50.30	7.40
2	#5714.90	46.9 AV	54.0	-7.1	1.70 V	210	39.50	7.40
3	#5722.00	71.3 PK	78.2	-6.9	1.87 V	265	63.90	7.40
4	#5725.00	64.0 PK	78.2	-14.2	1.87 V	265	56.60	7.40
5	*5745.00	104.0 PK			1.72 V	206	63.50	40.50
6	*5745.00	94.0 AV			1.72 V	206	53.50	40.50
7	11490.00	64.8 PK	74.0	-9.2	1.86 V	194	46.10	18.70
8	11490.00	52.5 AV	54.0	-1.5	1.86 V	194	33.80	18.70

**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 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	*5785.00	105.9 PK			1.86 H	143	65.30	40.60
2	*5785.00	96.0 AV			1.86 H	143	55.40	40.60
3	11570.00	61.8 PK	74.0	-12.2	2.29 H	211	43.10	18.70
4	11570.00	48.6 AV	54.0	-5.4	2.29 H	211	29.90	18.70

**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	*5785.00	103.0 PK			1.99 V	260	62.40	40.60
2	*5785.00	93.5 AV			1.99 V	260	52.90	40.60
3	11570.00	68.0 PK	74.0	-6.0	2.72 V	229	49.30	18.70
<b>4</b>	<b>11570.00</b>	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>2.72 V</b>	<b>229</b>	<b>34.30</b>	<b>18.70</b>

**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 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	*5825.00	102.0 PK			1.88 H	166	61.40	40.60
2	*5825.00	93.0 AV			1.88 H	166	52.40	40.60
3	#5850.00	49.6 PK	78.2	-28.6	1.99 H	182	42.00	7.60
4	#5853.00	59.6 PK	78.2	-18.6	1.99 H	182	51.90	7.70
5	#5861.00	57.8 PK	74.0	-16.2	2.10 H	192	50.10	7.70
6	#5861.00	46.9 AV	54.0	-7.1	2.10 H	192	39.20	7.70
7	11650.00	62.7 PK	74.0	-11.3	2.29 H	230	43.50	19.20
8	11650.00	49.3 AV	54.0	-4.7	2.29 H	230	30.10	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	*5825.00	101.2 PK			1.69 V	261	60.60	40.60
2	*5825.00	91.9 AV			1.69 V	261	51.30	40.60
3	#5850.00	50.2 PK	78.2	-28.0	1.70 V	198	42.60	7.60
4	#5853.00	59.2 PK	78.2	-19.0	1.70 V	198	51.50	7.70
5	#5861.00	58.3 PK	74.0	-15.7	1.82 V	162	50.60	7.70
6	#5861.00	47.2 AV	54.0	-6.8	1.82 V	162	39.50	7.70
7	11650.00	67.2 PK	74.0	-6.8	2.78 V	229	48.00	19.20
8	11650.00	52.9 AV	54.0	-1.1	2.78 V	229	33.70	19.20

**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.

**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	56.1 PK	74.0	-17.9	1.11 H	171	50.10	6.00
2	5150.00	43.4 AV	54.0	-10.6	1.11 H	171	37.40	6.00
3	*5180.00	104.5 PK			1.01 H	193	65.10	39.40
4	*5180.00	94.6 AV			1.01 H	193	55.20	39.40
5	#10360.00	59.4 PK	74.0	-14.6	1.09 H	240	41.60	17.80
6	#10360.00	47.1 AV	54.0	-6.9	1.09 H	240	29.30	17.80
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	5150.00	56.4 PK	74.0	-17.6	1.18 V	83	50.40	6.00
2	5150.00	43.7 AV	54.0	-10.3	1.18 V	83	37.70	6.00
3	*5180.00	104.3 PK			1.00 V	78	64.90	39.40
4	*5180.00	94.1 AV			1.00 V	78	54.70	39.40
5	#10360.00	60.9 PK	74.0	-13.1	1.00 V	248	43.10	17.80
6	#10360.00	47.3 AV	54.0	-6.7	1.00 V	248	29.50	17.80

**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	104.7 PK			1.23 H	172	65.20	39.50
2	*5200.00	95.2 AV			1.23 H	172	55.70	39.50
3	#10400.00	59.4 PK	74.0	-14.6	1.63 H	177	41.70	17.70
4	#10400.00	46.4 AV	54.0	-7.6	1.63 H	177	28.70	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	*5200.00	104.3 PK			1.02 V	78	64.80	39.50
2	*5200.00	94.1 AV			1.02 V	78	54.60	39.50
3	#10400.00	59.2 PK	74.0	-14.8	1.16 V	244	41.50	17.70
4	#10400.00	47.3 AV	54.0	-6.7	1.16 V	244	29.60	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 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	106.2 PK			1.00 H	170	66.60	39.60
2	*5240.00	96.6 AV			1.00 H	170	57.00	39.60
3	5350.00	57.2 PK	74.0	-16.8	1.13 H	160	50.70	6.50
4	5350.00	46.4 AV	54.0	-7.6	1.13 H	160	39.90	6.50
5	#10480.00	58.4 PK	74.0	-15.6	1.55 H	209	39.70	18.70
6	#10480.00	45.9 AV	54.0	-8.1	1.55 H	209	27.20	18.70

**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	*5240.00	105.2 PK			1.92 V	214	65.60	39.60
2	*5240.00	94.7 AV			1.92 V	214	55.10	39.60
3	5350.00	56.6 PK	74.0	-17.4	1.59 V	127	50.10	6.50
4	5350.00	44.5 AV	54.0	-9.5	1.59 V	127	38.00	6.50
5	#10480.00	57.9 PK	74.0	-16.1	1.24 V	92	39.20	18.70
6	#10480.00	45.8 AV	54.0	-8.2	1.24 V	92	27.10	18.70

**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 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	#5714.90	59.9 PK	74.0	-14.1	2.05 H	165	52.50	7.40
2	#5714.90	49.0 AV	54.0	-5.0	2.05 H	165	41.60	7.40
3	#5722.90	76.3 PK	78.2	-1.9	2.15 H	165	68.90	7.40
4	#5725.00	65.3 PK	78.2	-12.9	2.15 H	165	57.90	7.40
5	*5745.00	105.9 PK			1.81 H	147	65.40	40.50
6	*5745.00	95.9 AV			1.81 H	147	55.40	40.50
7	11490.00	62.2 PK	74.0	-11.8	2.45 H	236	43.50	18.70
8	11490.00	49.0 AV	54.0	-5.0	2.45 H	236	30.30	18.70

**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	#5714.90	58.6 PK	74.0	-15.4	1.61 V	205	51.20	7.40
2	#5714.90	47.4 AV	54.0	-6.6	1.61 V	205	40.00	7.40
3	#5722.00	75.4 PK	78.2	-2.8	1.61 V	205	68.00	7.40
4	#5725.00	63.5 PK	78.2	-14.7	1.61 V	205	56.10	7.40
5	*5745.00	103.5 PK			1.70 V	205	63.00	40.50
6	*5745.00	93.5 AV			1.70 V	205	53.00	40.50
7	11490.00	64.8 PK	74.0	-9.2	2.98 V	228	46.10	18.70
8	11490.00	52.1 AV	54.0	-1.9	2.98 V	228	33.40	18.70

**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 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	*5785.00	105.1 PK			1.88 H	142	64.50	40.60
2	*5785.00	94.9 AV			1.88 H	142	54.30	40.60
3	11570.00	61.3 PK	74.0	-12.7	2.20 H	250	42.60	18.70
4	11570.00	48.0 AV	54.0	-6.0	2.20 H	250	29.30	18.70

**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	*5785.00	102.2 PK			1.99 V	258	61.60	40.60
2	*5785.00	92.8 AV			1.99 V	258	52.20	40.60
3	11570.00	66.5 PK	74.0	-7.5	2.79 V	243	47.80	18.70
4	11570.00	52.7 AV	54.0	-1.3	2.79 V	243	34.00	18.70

**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 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	*5825.00	103.6 PK			1.76 H	166	63.00	40.60
2	*5825.00	92.2 AV			1.76 H	166	51.60	40.60
3	#5850.00	51.0 PK	78.2	-27.2	1.90 H	212	43.40	7.60
4	#5853.00	58.7 PK	78.2	-19.5	1.90 H	212	51.00	7.70
5	#5861.00	57.9 PK	74.0	-16.1	1.69 H	200	50.20	7.70
6	#5861.00	47.0 AV	54.0	-7.0	1.69 H	200	39.30	7.70
7	11650.00	61.6 PK	74.0	-12.4	2.30 H	234	42.40	19.20
8	11650.00	48.8 AV	54.0	-5.2	2.30 H	234	29.60	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	*5825.00	100.7 PK			1.75 V	243	60.10	40.60
2	*5825.00	90.7 AV			1.75 V	243	50.10	40.60
3	#5850.00	49.1 PK	78.2	-29.1	1.90 V	255	41.50	7.60
4	#5853.00	60.0 PK	78.2	-18.2	1.90 V	255	52.30	7.70
5	#5861.00	58.3 PK	74.0	-15.7	1.85 V	262	50.60	7.70
6	#5861.00	47.1 AV	54.0	-6.9	1.85 V	262	39.40	7.70
7	11650.00	66.7 PK	74.0	-7.3	2.82 V	227	47.50	19.20
8	11650.00	52.7 AV	54.0	-1.3	2.82 V	227	33.50	19.20

**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.

**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	55.6 PK	74.0	-18.4	1.20 H	195	49.60	6.00
2	5150.00	44.4 AV	54.0	-9.6	1.20 H	195	38.40	6.00
3	*5190.00	97.6 PK			1.00 H	165	58.20	39.40
4	*5190.00	88.7 AV			1.00 H	165	49.30	39.40
5	5400.00	57.8 PK	74.0	-16.2	1.00 H	160	51.10	6.70
6	5400.00	48.3 AV	54.0	-5.7	1.00 H	160	41.60	6.70
7	#10380.00	58.1 PK	74.0	-15.9	1.15 H	80	40.40	17.70
8	#10380.00	45.9 AV	54.0	-8.1	1.15 H	80	28.20	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	5150.00	56.0 PK	74.0	-18.0	2.25 V	211	50.00	6.00
2	5150.00	44.5 AV	54.0	-9.5	2.25 V	211	38.50	6.00
3	*5190.00	96.3 PK			2.13 V	213	56.90	39.40
4	*5190.00	86.5 AV			2.13 V	213	47.10	39.40
5	5400.00	57.5 PK	74.0	-16.5	2.22 V	230	50.80	6.70
6	5400.00	47.1 AV	54.0	-6.9	2.22 V	230	40.40	6.70
7	#10380.00	58.0 PK	74.0	-16.0	1.29 V	122	40.30	17.70
8	#10380.00	46.4 AV	54.0	-7.6	1.29 V	122	28.70	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 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	105.1 PK			1.00 H	162	65.50	39.60
2	*5230.00	95.5 AV			1.00 H	162	55.90	39.60
3	5400.00	58.3 PK	74.0	-15.7	1.00 H	159	51.60	6.70
4	5400.00	47.3 AV	54.0	-6.7	1.00 H	159	40.60	6.70
5	#10460.00	58.0 PK	74.0	-16.0	1.21 H	279	39.50	18.50
6	#10460.00	46.9 AV	54.0	-7.1	1.21 H	279	28.40	18.50

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	104.6 PK			2.21 V	213	65.00	39.60
2	*5230.00	94.8 AV			2.21 V	213	55.20	39.60
3	5400.00	57.5 PK	74.0	-16.5	1.80 V	158	50.80	6.70
4	5400.00	46.2 AV	54.0	-7.8	1.80 V	158	39.50	6.70
5	#10460.00	58.9 PK	74.0	-15.1	1.15 V	246	40.40	18.50
6	#10460.00	47.1 AV	54.0	-6.9	1.15 V	246	28.60	18.50

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)  
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
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	#5714.90	68.9 PK	74.0	-5.1	1.96 H	339	61.50	7.40
2	#5714.90	<b>53.0 AV</b>	<b>54.0</b>	<b>-1.0</b>	<b>1.96 H</b>	<b>339</b>	<b>45.60</b>	<b>7.40</b>
3	#5722.90	72.3 PK	78.2	-5.9	1.56 H	168	64.90	7.40
4	#5725.00	61.9 PK	78.2	-16.3	1.56 H	168	54.50	7.40
5	*5755.00	101.4 PK			1.82 H	165	60.80	40.60
6	*5755.00	91.7 AV			1.82 H	165	51.10	40.60
7	11490.00	60.7 PK	74.0	-13.3	2.12 H	232	42.00	18.70
8	11490.00	47.6 AV	54.0	-6.4	2.12 H	232	28.90	18.70

**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	#5714.90	67.3 PK	74.0	-6.7	2.05 V	242	59.90	7.40
2	#5714.90	51.6 AV	54.0	-2.4	2.05 V	242	44.20	7.40
3	#5722.90	71.5 PK	78.2	-6.7	1.82 V	273	64.10	7.40
4	#5725.00	58.0 PK	78.2	-20.2	1.82 V	273	50.60	7.40
5	*5755.00	99.7 PK			1.75 V	207	59.10	40.60
6	*5755.00	90.4 AV			1.75 V	207	49.80	40.60
7	11510.00	62.6 PK	74.0	-11.4	2.41 V	196	43.90	18.70
8	11510.00	49.4 AV	54.0	-4.6	2.41 V	196	30.70	18.70

**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 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	*5795.00	101.2 PK			1.80 H	162	60.60	40.60
2	*5795.00	91.8 AV			1.80 H	162	51.20	40.60
3	#5850.00	48.6 PK	78.2	-29.6	1.56 H	212	41.00	7.60
4	#5853.00	57.9 PK	78.2	-20.3	1.56 H	212	50.20	7.70
5	#5861.00	57.7 PK	74.0	-16.3	1.60 H	148	50.00	7.70
6	#5861.00	46.6 AV	54.0	-7.4	1.60 H	148	38.90	7.70
7	11590.00	60.6 PK	74.0	-13.4	2.30 H	313	41.80	18.80
8	11590.00	47.8 AV	54.0	-6.2	2.30 H	313	29.00	18.80

**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	*5795.00	99.7 PK			1.81 V	259	59.10	40.60
2	*5795.00	90.2 AV			1.81 V	259	49.60	40.60
3	#5850.00	53.2 PK	78.2	-25.0	2.00 V	235	45.60	7.60
4	#5853.00	64.1 PK	78.2	-14.1	2.00 V	235	56.40	7.70
5	#5861.00	57.9 PK	74.0	-16.1	2.04 V	248	50.20	7.70
6	#5861.00	46.7 AV	54.0	-7.3	2.04 V	248	39.00	7.70
7	11590.00	64.8 PK	74.0	-9.2	2.98 V	243	46.00	18.80
8	11590.00	52.3 AV	54.0	-1.7	2.98 V	243	33.50	18.80

**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 Data

802.11n (HT40)

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.89	37.0 QP	43.5	-6.5	2.00 H	108	55.60	-18.60
2	166.00	37.0 QP	43.5	-6.5	1.50 H	198	50.90	-13.90
3	191.28	34.7 QP	43.5	-8.8	1.50 H	176	51.00	-16.30
4	300.16	42.2 QP	46.0	-3.8	1.00 H	160	54.30	-12.10
5	500.42	44.8 QP	46.0	-1.2	1.50 H	67	52.80	-8.00
6	599.58	37.1 QP	46.0	-8.9	1.50 H	354	42.80	-5.70

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	99.89	33.5 QP	43.5	-10.0	1.50 V	9	52.10	-18.60
2	183.50	30.1 QP	43.5	-13.4	1.00 V	143	45.60	-15.50
3	199.05	31.7 QP	43.5	-11.8	1.00 V	350	48.20	-16.50
4	298.21	37.5 QP	46.0	-8.5	1.50 V	133	49.70	-12.20
5	372.09	31.0 QP	46.0	-15.0	1.50 V	172	41.60	-10.60
6	498.47	43.7 QP	46.0	-2.3	1.00 V	175	51.70	-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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	B		

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.89	37.1 QP	43.5	-6.4	2.00 H	109	55.70	-18.60
2	199.05	40.0 QP	43.5	-3.5	1.00 H	16	56.50	-16.50
3	300.16	43.5 QP	46.0	-2.5	1.00 H	175	55.60	-12.10
4	399.31	35.4 QP	46.0	-10.6	2.00 H	22	45.50	-10.10
5	497.96	44.0 QP	46.0	-2.0	1.41 H	50	52.00	-8.00
6	527.64	35.2 QP	46.0	-10.8	1.50 H	70	42.80	-7.60

**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	99.89	33.6 QP	43.5	-9.9	1.50 V	16	52.20	-18.60
2	191.28	35.8 QP	43.5	-7.7	1.50 V	16	52.10	-16.30
3	300.16	34.7 QP	46.0	-11.3	1.50 V	161	46.80	-12.10
4	399.31	30.9 QP	46.0	-15.1	1.00 V	132	41.00	-10.10
5	498.47	42.4 QP	46.0	-3.6	1.99 V	94	50.40	-8.00
6	665.68	27.5 QP	46.0	-18.5	1.00 V	98	32.10	-4.60

**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

## 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: Mar. 14, 2013**

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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 HwaYa Shielded Room 1.  
3. The VCCI Site Registration No. is C-2040.

**Tested date: Apr. 19, 2016**

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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 HwaYa Shielded Room 1.  
3. The VCCI Site Registration No. is C-2040.

### 4.2.3 Test Procedures

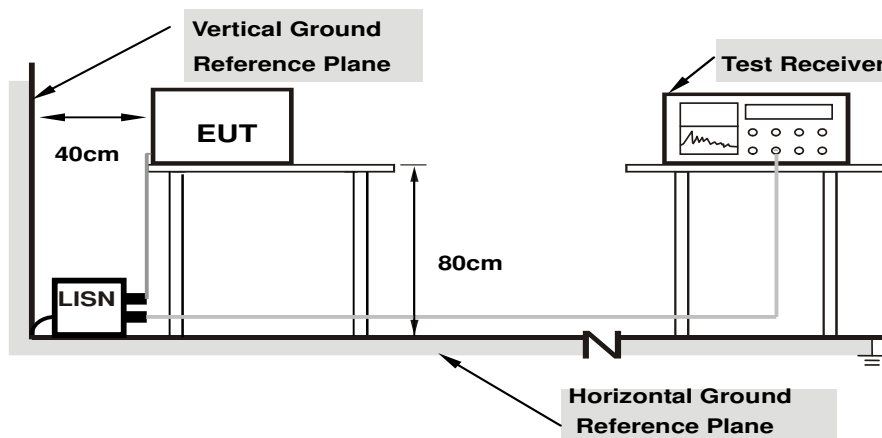
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

### 4.2.4 Deviation from Test Standard

No deviation.

### 4.2.5 Test Setup



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

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

### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

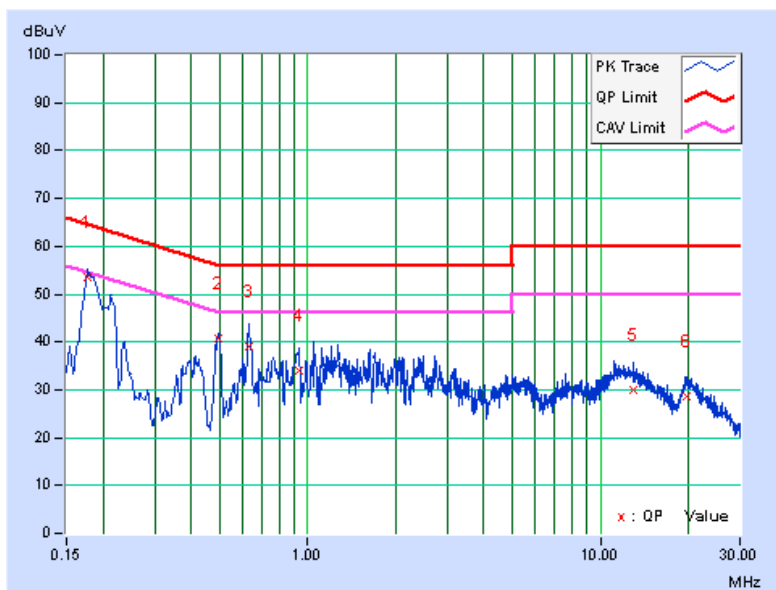
### 4.2.7 Test Results

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

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	0.17605	0.19	53.37	40.43	53.56	40.62	64.67
<b>2</b>	<b>0.49584</b>	<b>0.21</b>	<b>40.43</b>	<b>38.90</b>	<b>40.64</b>	<b>39.11</b>	<b>56.07</b>	<b>46.07</b>	<b>-15.43</b>	<b>-6.96</b>
3	0.63020	0.21	38.69	32.02	38.90	32.23	56.00	46.00	-17.10	-13.77
4	0.93076	0.22	33.78	27.82	34.00	28.04	56.00	46.00	-22.00	-17.96
5	12.88878	0.68	29.26	23.92	29.94	24.60	60.00	50.00	-30.06	-25.40
6	19.66481	0.91	27.65	22.47	28.56	23.38	60.00	50.00	-31.44	-26.62

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.

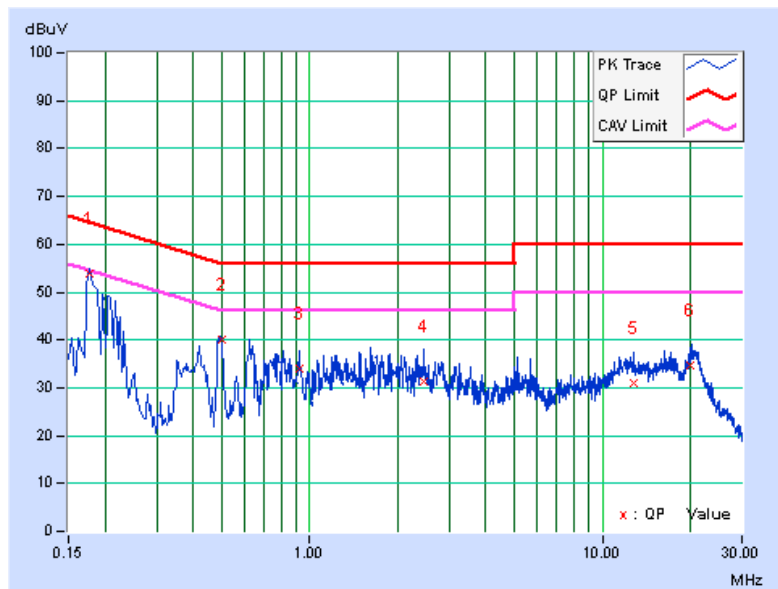


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.17605	0.28	53.49	40.72	53.77	41.00	64.67
2	0.49846	0.30	39.67	36.35	39.97	36.65	56.03	46.03	-16.05	-9.37
3	0.91858	0.31	33.54	27.86	33.85	28.17	56.00	46.00	-22.15	-17.83
4	2.44126	0.38	30.84	24.63	31.22	25.01	56.00	46.00	-24.78	-20.99
5	12.73238	0.76	30.09	24.63	30.85	25.39	60.00	50.00	-29.15	-24.61
6	19.86813	1.02	33.80	28.44	34.82	29.46	60.00	50.00	-25.18	-20.54

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.

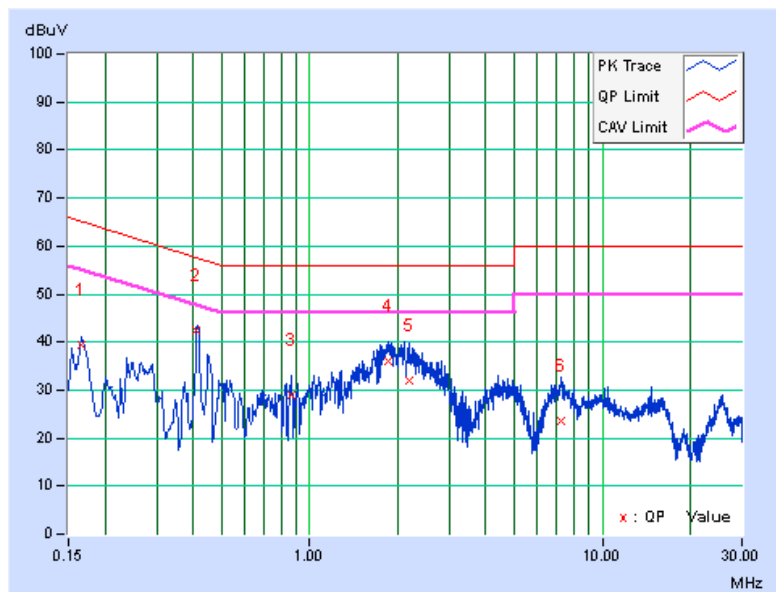


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16600	10.02	29.35	21.78	39.37	31.80	65.16
2	0.41035	10.12	32.32	30.42	42.44	40.54	57.64	47.64	-15.20	-7.10
3	0.87000	10.18	18.73	8.80	28.91	18.98	56.00	46.00	-27.09	-27.02
4	1.85000	10.26	25.68	21.90	35.94	32.16	56.00	46.00	-20.06	-13.84
5	2.19800	10.28	21.68	16.60	31.96	26.88	56.00	46.00	-24.04	-19.12
6	7.20200	10.58	13.04	4.93	23.62	15.51	60.00	50.00	-36.38	-34.49

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.



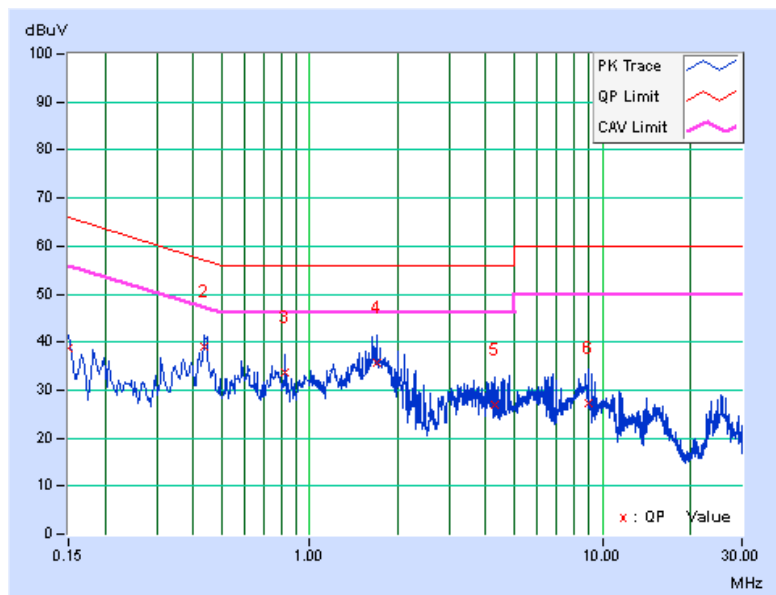


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15000	10.03	28.81	22.91	38.84	32.94	66.00
2	0.43829	10.14	29.01	24.62	39.15	34.76	57.09	47.09	-17.95	-12.34
3	0.82600	10.19	23.43	13.96	33.62	24.15	56.00	46.00	-22.38	-21.85
4	1.69400	10.26	25.29	18.03	35.55	28.29	56.00	46.00	-20.45	-17.71
5	4.31400	10.45	16.62	7.90	27.07	18.35	56.00	46.00	-28.93	-27.65
6	8.95800	10.74	16.52	9.37	27.26	20.11	60.00	50.00	-32.74	-29.89

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		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 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)

\*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  $N_{ANT} \leq 4$ ;

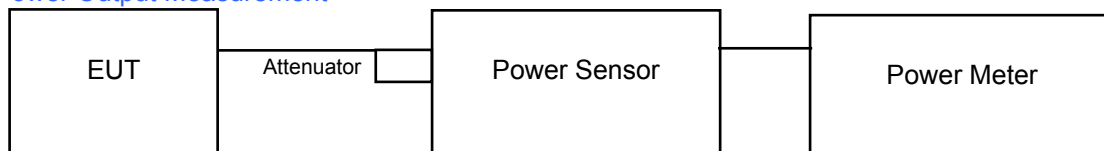
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

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

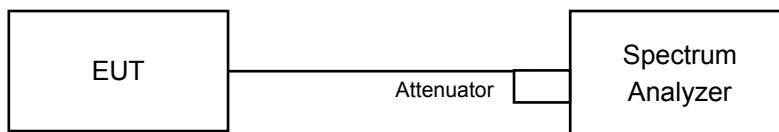
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup

For Power Output Measurement



For 26dB and Occupied 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 Occupied Bandwidth

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 AVERAGE. 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.

### 4.3.5 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:

##### 802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	10.78	9.36	20.597	13.14	30	Pass
40	5200	11.01	9.65	21.844	13.39	30	Pass
48	5240	11.11	9.41	21.642	13.35	30	Pass
149	5745	10.44	10.12	<b>21.346</b>	13.29	30	Pass
157	5785	9.52	9.13	17.139	12.34	30	Pass
165	5825	8.52	8.19	13.704	11.37	30	Pass

##### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	12.78	10.91	31.298	14.96	30	Pass
40	5200	12.37	11.07	30.052	14.78	30	Pass
48	5240	12.48	10.72	29.504	14.70	30	Pass
149	5745	7.88	7.84	12.219	10.87	30	Pass
157	5785	9.26	8.91	16.213	12.10	30	Pass
165	5825	8.04	7.71	12.270	10.89	30	Pass

##### 802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	7.12	5.86	9.007	9.55	30	Pass
46	5230	14.58	12.40	<b>46.086</b>	16.64	30	Pass
151	5755	7.82	8.21	12.675	11.03	30	Pass
159	5795	9.01	8.84	15.618	11.94	30	Pass

**26dB Bandwidth:**
**802.11a**

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	24.48	24.76	Pass
40	5200	24.24	25.16	Pass
48	5240	24.36	25.17	Pass

**802.11n (HT20)**

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	25.58	25.71	Pass
40	5200	25.72	25.49	Pass
48	5240	25.97	27.09	Pass

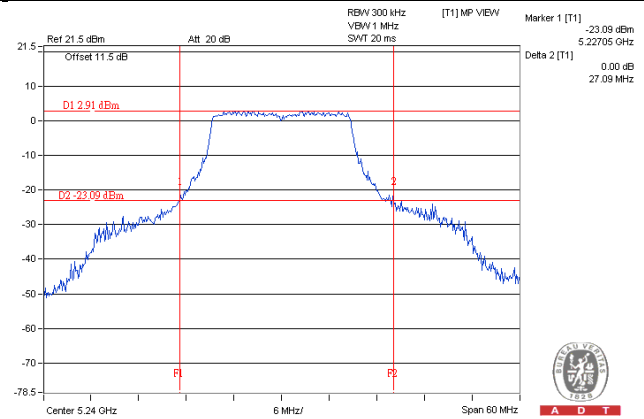
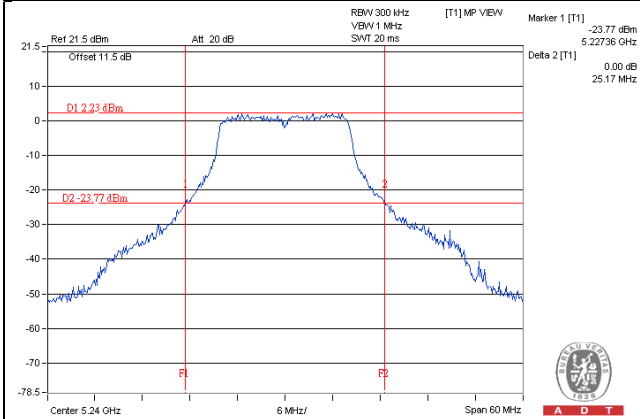
**802.11n (HT40)**

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	52.99	53.83	Pass
46	5230	54.46	83.05	Pass

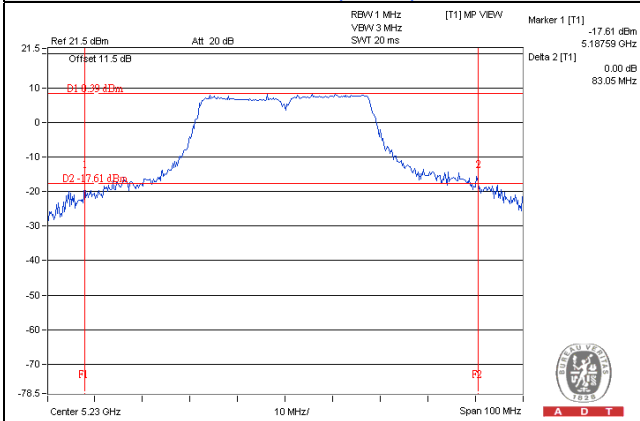
### Spectrum Plot of Worst Value

#### 802.11a

#### 802.11n (HT20)



#### 802.11n (HT40)



**Occupied Bandwidth:**
**802.11a**

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.92	17.28
40	5200	16.92	17.16
48	5240	17.04	17.28
149	5745	17.39	17.13
157	5785	17.40	17.04
165	5825	17.16	17.04

**802.11n (HT20)**

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.36	18.36
40	5200	18.24	18.36
48	5240	18.36	18.36
149	5745	18.36	18.24
157	5785	18.36	18.24
165	5825	18.24	18.24

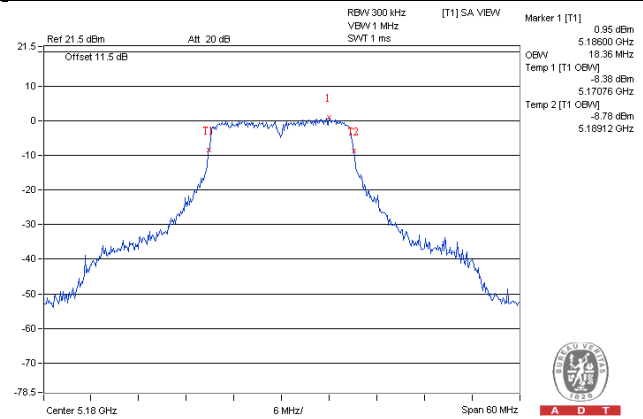
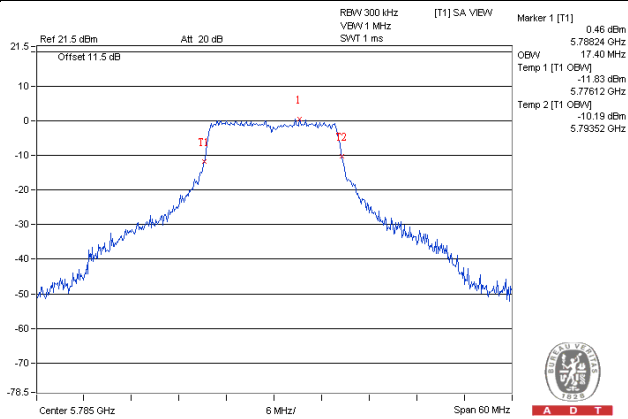
**802.11n (HT40)**

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.80	38.16
46	5230	38.28	38.64
151	5755	38.40	38.04
159	5795	38.40	38.04

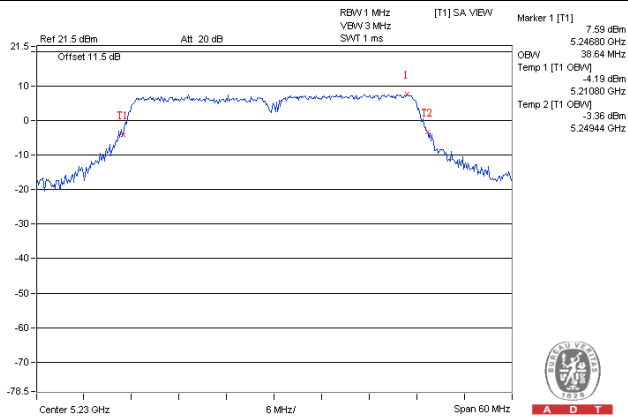
### Spectrum Plot of Worst Value

#### 802.11a

#### 802.11n (HT20)



#### 802.11n (HT40)



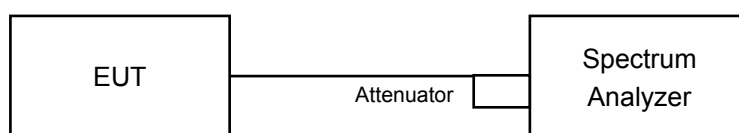


## 4.4 Peak Power Spectral Density Measurement

### 4.4.1 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

### 4.4.2 Test Setup



### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 Test Procedures

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

Using method SA-2

- 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:

- 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)

#### 4.4.5 Deviation from Test Standard

No deviation.

#### 4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

#### 4.4.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	-3.72	-2.16	0.14	0.15	0.29	13.99	Pass
40	5200	-3.49	-2.22	0.20	0.15	0.35	13.99	Pass
48	5240	-4.02	-2.42	-0.14	0.15	0.01	13.99	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain =  $6\text{dBi} + 10\log(2) = 9.01\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(9.01-6) = 13.99\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	-3.27	-1.41	0.77	0.22	0.99	13.99	Pass
40	5200	-3.02	-1.45	0.84	0.22	1.06	13.99	Pass
48	5240	-3.24	-1.38	0.80	0.22	1.02	13.99	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain =  $6\text{dBi} + 10\log(2) = 9.01\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(9.01-6) = 13.99\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

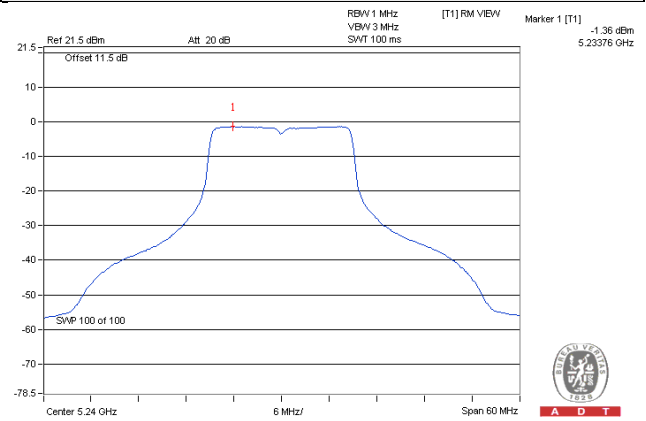
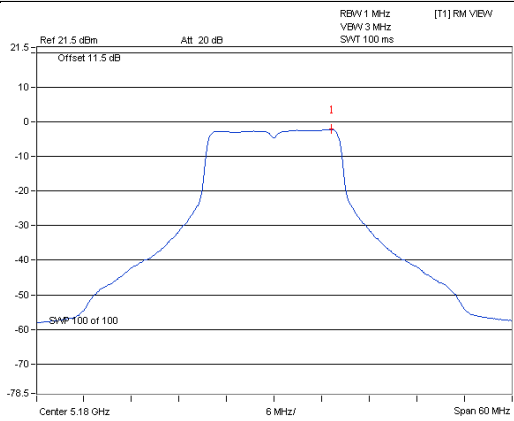
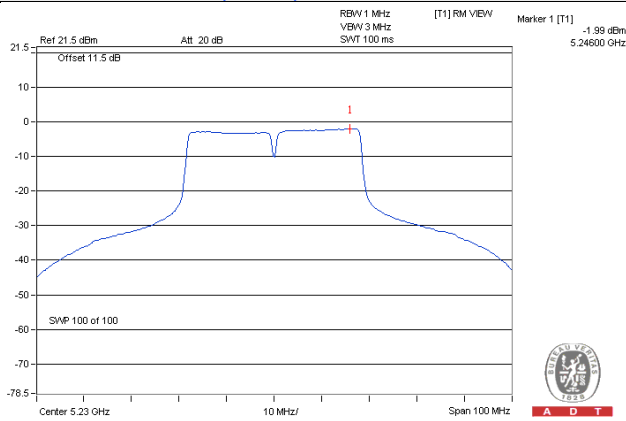
802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	-10.83	-9.20	-6.93	0.35	-6.58	13.99	Pass
46	5230	-4.55	-1.99	-0.07	0.35	0.28	13.99	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain =  $6\text{dBi} + 10\log(2) = 9.01\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(9.01-6) = 13.99\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

**802.11a / Chain 1 / CH 36****802.11n (HT20) / Chain 1 / CH 48****802.11n (HT40) / Chain 1 / CH 46**

**For U-NII-3 Band**
**802.11a**

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	-11.84	-9.62	3.01	0.15	-6.46	26.99	Pass
	157	5785	-12.28	-10.06	3.01	0.15	-6.90	26.99	Pass
	165	5825	-13.23	-11.01	3.01	0.15	-7.85	26.99	Pass
1	149	5745	-12.18	-9.96	3.01	0.15	-6.80	26.99	Pass
	157	5785	-12.97	-10.75	3.01	0.15	-7.59	26.99	Pass
	165	5825	-13.93	-11.71	3.01	0.15	-8.55	26.99	Pass

**Note:**

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = 6dBi + 10log(2) = 9.01dBi > 6dBi , so the power density limit shall be reduced to 30-(9.01-6) = 26.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

**802.11n (HT20)**

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	-14.29	-12.07	3.01	0.22	-8.84	26.99	Pass
	157	5785	-12.75	-10.53	3.01	0.22	-7.30	26.99	Pass
	165	5825	-13.56	-11.34	3.01	0.22	-8.11	26.99	Pass
1	149	5745	-14.32	-12.10	3.01	0.22	-8.87	26.99	Pass
	157	5785	-13.21	-10.99	3.01	0.22	-7.76	26.99	Pass
	165	5825	-13.80	-11.58	3.01	0.22	-8.35	26.99	Pass

**Note:**

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = 6dBi + 10log(2) = 9.01dBi > 6dBi , so the power density limit shall be reduced to 30-(9.01-6) = 26.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

**802.11n (HT40)**

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-17.59	-15.37	3.01	0.35	-12.01	26.99	Pass
	159	5795	-16.30	-14.08	3.01	0.35	-10.72	26.99	Pass
1	151	5755	-17.73	-15.51	3.01	0.35	-12.15	26.99	Pass
	159	5795	-16.45	-14.23	3.01	0.35	-10.87	26.99	Pass

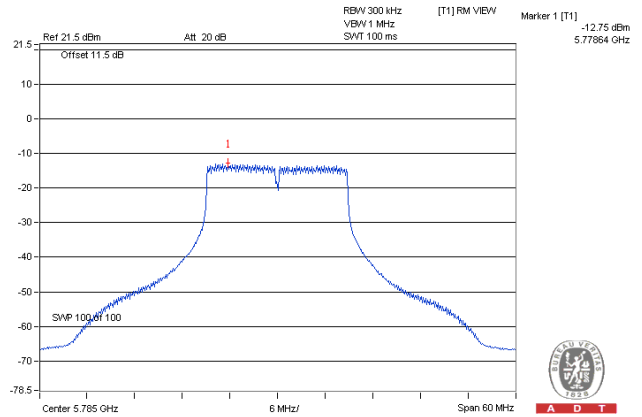
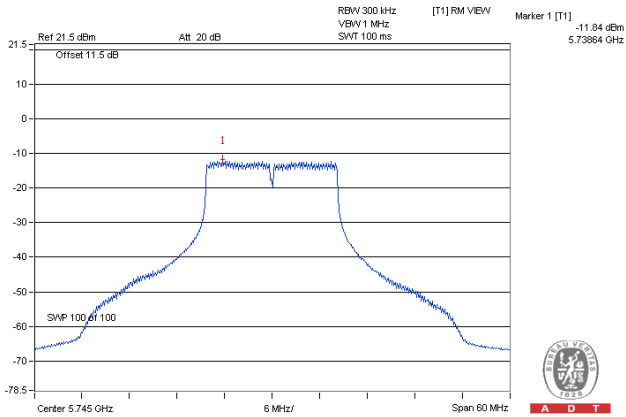
**Note:**

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = 6dBi + 10log(2) = 9.01dBi > 6dBi , so the power density limit shall be reduced to 30-(9.01-6) = 26.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

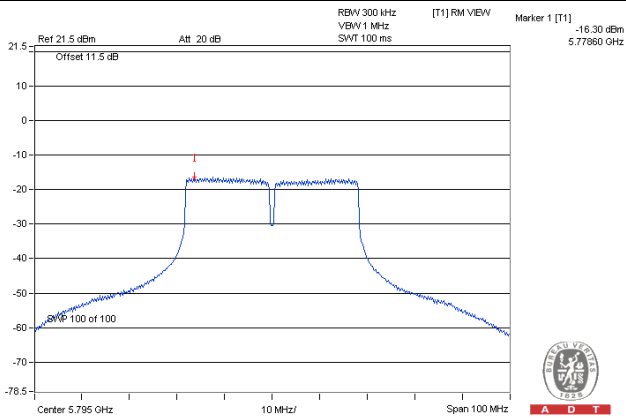
### Spectrum Plot of Worst Value

#### 802.11a

#### 802.11n (HT20)



#### 802.11n (HT40)

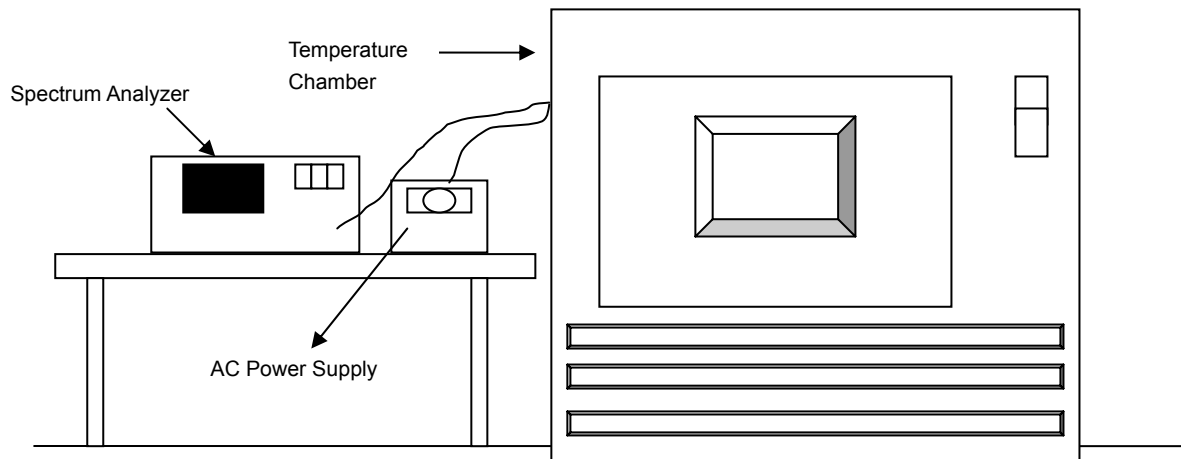


## 4.5 Frequency Stability

### 4.5.1 Limits of Frequency Stability Measurement

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

### 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

- 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.

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

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

**4.5.7 Test Results**

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
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	5180.0026	0.00005	5180.0056	0.00011	5180.0028	0.00005	5180.0061	0.00012
40	120	5180.0186	0.00036	5180.0202	0.00039	5180.0215	0.00042	5180.0197	0.00038
30	120	5180.0016	0.00003	5179.9995	-0.00001	5180.0040	0.00008	5180.0020	0.00004
20	120	5179.9967	-0.00006	5179.9957	-0.00008	5179.9953	-0.00009	5179.9989	-0.00002
10	120	5180.0207	0.00040	5180.0229	0.00044	5180.0202	0.00039	5180.0197	0.00038
0	120	5179.9938	-0.00012	5179.9932	-0.00013	5179.9929	-0.00014	5179.9951	-0.00009
-10	120	5180.0240	0.00046	5180.0253	0.00049	5180.0219	0.00042	5180.0268	0.00052
-20	120	5180.0019	0.00004	5180.0058	0.00011	5180.0046	0.00009	5180.0053	0.00010
-30	120	5180.0056	0.00011	5180.0018	0.00003	5180.0016	0.00003	5180.0045	0.00009

Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
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	5179.9969	-0.00006	5179.995	-0.00010	5179.9957	-0.00008	5179.9987	-0.00003
	120	5179.9967	-0.00006	5179.9957	-0.00008	5179.9953	-0.00009	5179.9989	-0.00002
	102	5179.9964	-0.00007	5179.995	-0.00010	5179.9952	-0.00009	5179.9993	-0.00001

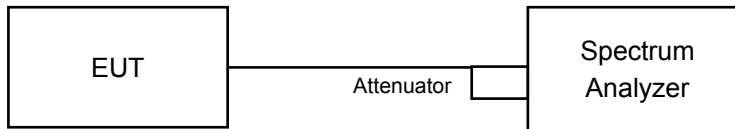


## 4.6 6dB Bandwidth Measurement

### 4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

- Set 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

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

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

#### 4.6.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.37	16.38	0.5	Pass
157	5785	16.38	16.41	0.5	Pass
165	5825	16.39	16.43	0.5	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.63	17.63	0.5	Pass
157	5785	17.62	17.64	0.5	Pass
165	5825	17.62	17.63	0.5	Pass

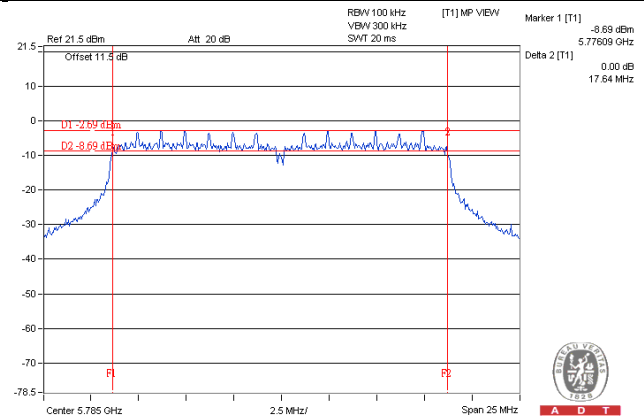
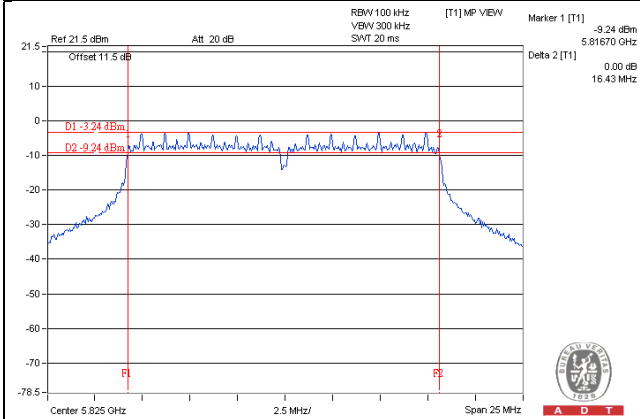
##### 802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.47	36.47	0.5	Pass
159	5795	36.42	36.46	0.5	Pass

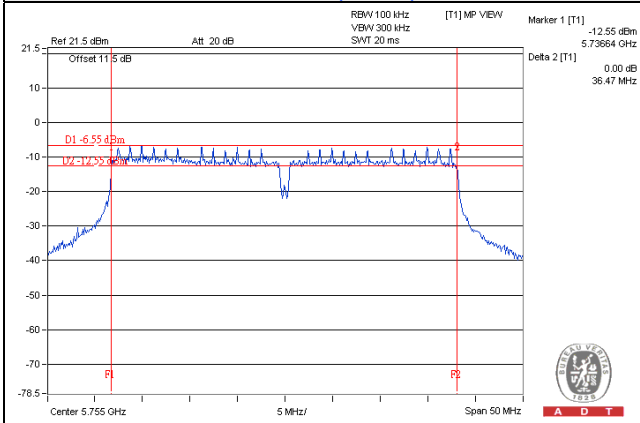
### Spectrum Plot of Worst Value

#### 802.11a

#### 802.11n (HT20)



#### 802.11n (HT40)





## 5 Pictures of Test Arrangements

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



## Appendix – Information on the Testing Laboratories

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

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

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