FCC Test Report

Report No.:	RF161114C05-1
FCC ID:	TYM-BRIO
Test Model:	K175
Series Model:	K165
Received Date:	Nov. 14 , 2016
Test Date:	Dec. 01 ~ Dec. 29, 2016
Issued Date:	Jan. 04, 2017
Applicant:	AVAYA
Address:	250 Sidney Street, Belleville, Ontario , K8P 3Z3 ,Canada
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
RF161114C05-1	Original release	Jan. 04, 2017

1 Certificate of Conformity

Product:	IP Phone
Brand:	AVAYA
Test Model:	K175
Series Model:	K165
Sample Status:	Engineering sample
Applicant:	AVAYA
Test Date:	Dec. 01 ~ Dec. 29, 2016
Standard:	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 : _____ , **Date:** Jan. 04, 2017

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Jan. 04, 2017

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 -5.67dB at 0.40391MHz.
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 -0.9dB at 15600.00MHz.
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	Antenna connector is i-pex(MHF) not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
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	IP Phone
Brand	AVAYA
Test Model	K175
Series Model	K165
Model Difference	K175: With camera K165: Without camera
Sample Status	Engineering sample
Power Supply Rating	48Vdc (adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 400Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20)/802.11ac (VHT20) 2 for 802.11n (HT40)/802.11ac (VHT40) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20)/802.11ac (VHT20) 2 for 802.11n (HT40)/802.11ac (VHT40)
Output Power	5180 ~ 5240MHz: 161.137mW 5745 ~ 5825MHz: 134.312mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

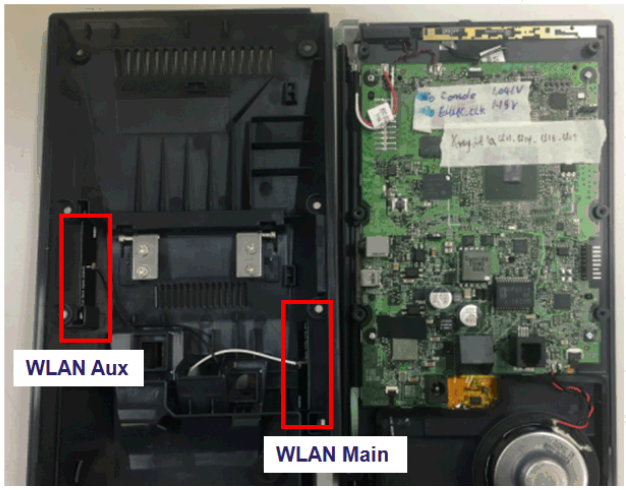
1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11a	2TX
802.11n (HT20)/802.11ac (VHT20)	2TX
802.11n (HT40)/802.11ac (VHT40)	2TX

2. The EUT uses the following Adapter.

Adapter	
Brand	DELTA Electronics, INC.
Model	ADP-30HR B
Input Power	100-240ac~1A 50-60Hz
Output Power	48Vdc / 0.66A
Power Line	1.45m power cable with one core attached on adapter

3. The following antennas were provided to the EUT.



Antenna Type		PCB			Connecter Type		i-pex(MHF)		
Frequency (MHz)		2400	2450	2500	5150	5350	5470	5725	5850
Gain (dBi)	Main (Chain 0)	2.55	2.96	2.78	4.81	4.09	3.90	2.85	2.84
	AUX (Chain 1)	2.87	2.83	2.50	3.93	3.90	3.18	3.44	4.11

4. WLAN and BT technologies cannot transmit at same time.
   WLAN and NFC technologies can transmit at same time.
   Bluetooth and NFC technologies can transmit at same time.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥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 **Z-plane**.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	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	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	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	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	149	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	149	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	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0

Test Condition:

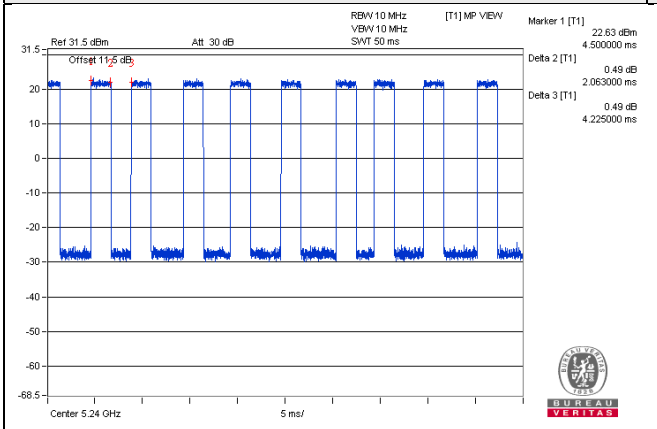
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	21 deg. C, 66% RH	120Vac, 60Hz	James Yang
RE<1G	20 deg. C, 65% RH	120Vac, 60Hz	James Yang
PLC	25 deg. C, 60% RH	120Vac, 60Hz	James Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Tank Wu

3.3 Duty Cycle of Test Signal

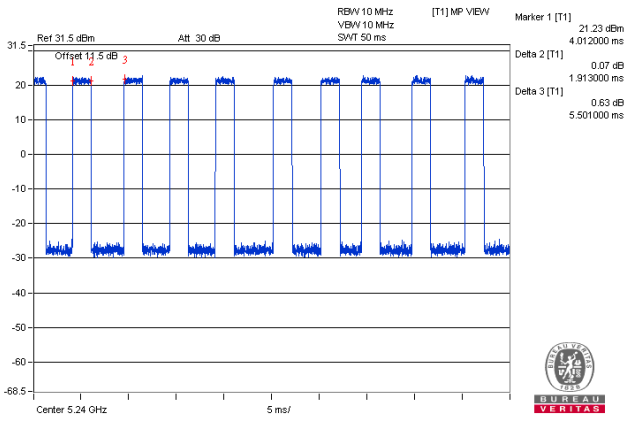
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.063/4.225 = 0.488, Duty factor = 10 * log(1/0.488) = 3.11
802.11n (HT20): Duty cycle = 1.913/5.501 = 0.348, Duty factor = 10 * log(1/0.348) = 4.59
802.11n (HT40): Duty cycle = 0.913/5.3 = 0.172, Duty factor = 10 * log(1/0.172) = 7.64

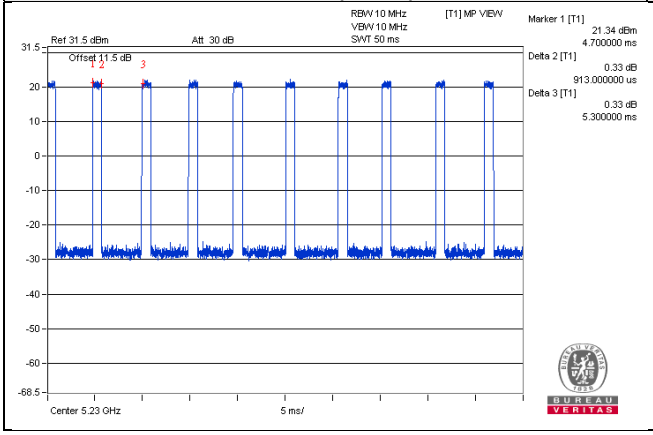
802.11a



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

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

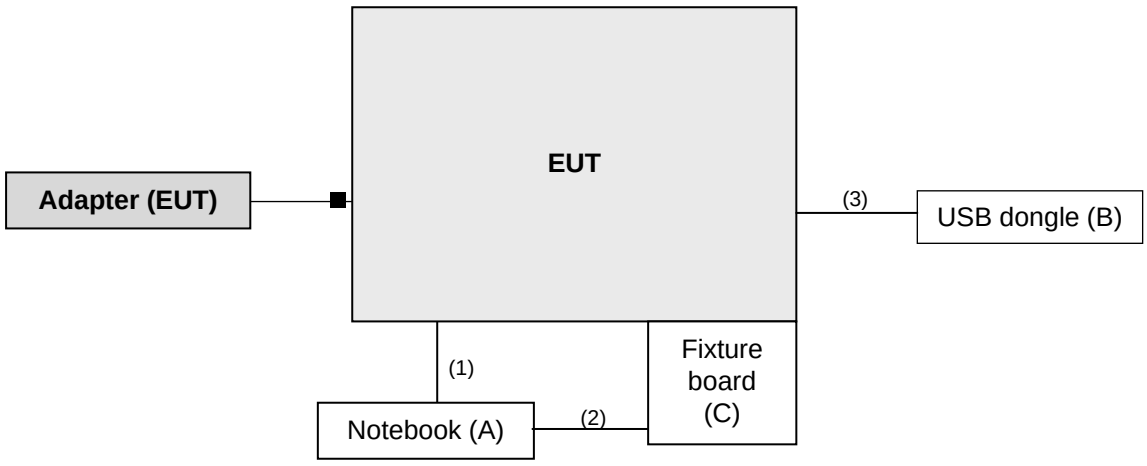
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	NA	NA	FCC DoC Approved	Provided by client
B.	USB dongle	NA	NA	NA	NA	Provided by client
C.	Fixture board	NA	NA	NA	NA	Provided by client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	2.0	N	0	Provided by client
2.	USB cable	1	0.92	N	0	Provided by client
3.	USB cable	1	0.2	N	0	Provided by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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 v01r03
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r03</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK:105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK:122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

$$E = \frac{1000000\sqrt{30P}}{3}$$ µV/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	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 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
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 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 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 Procedure

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:

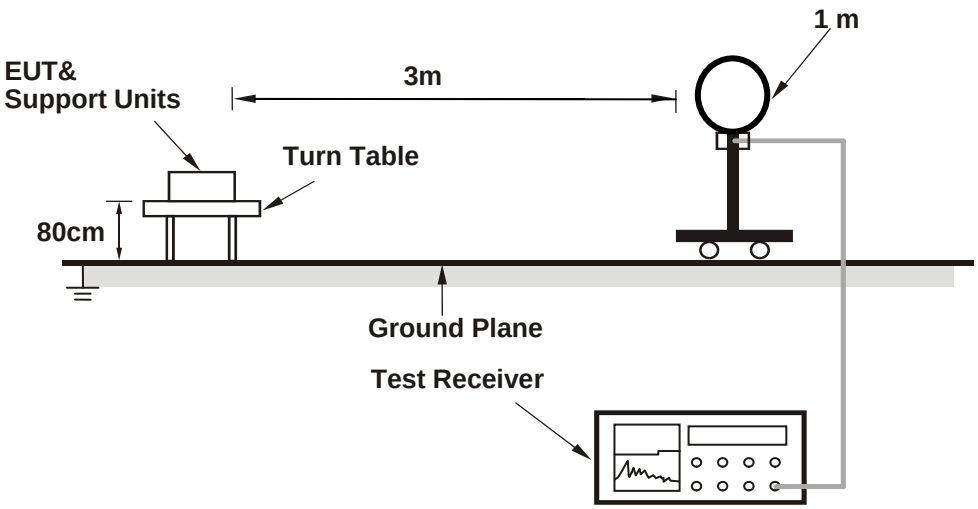
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 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

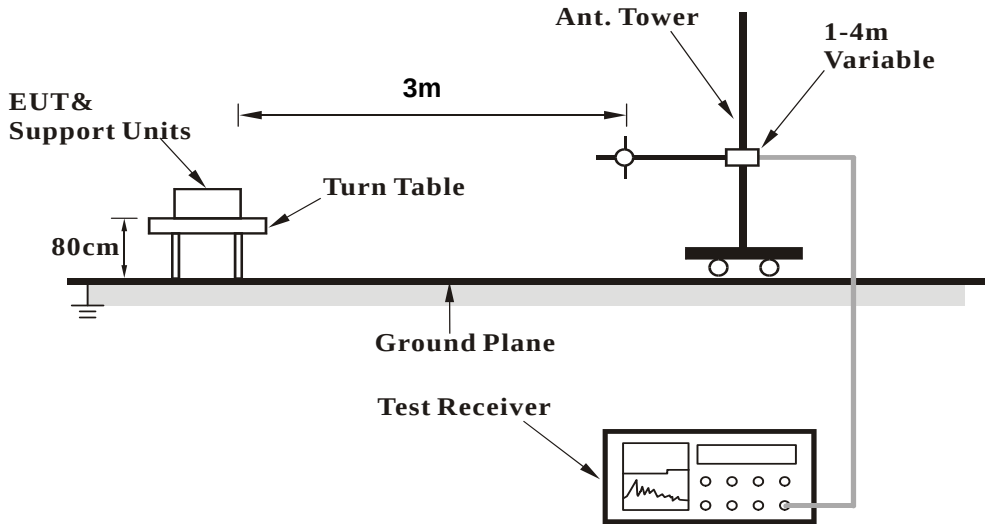
No deviation.

4.1.5 Test Setup

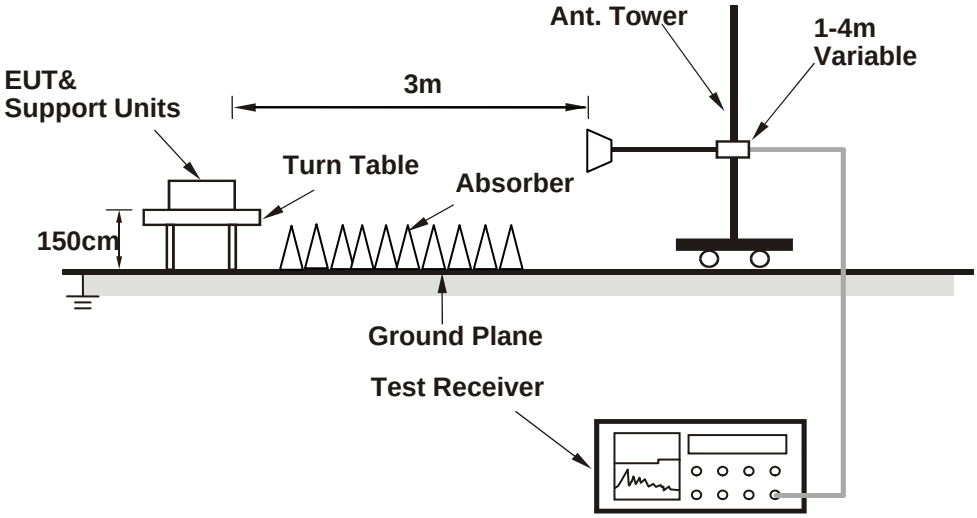
For Radiated emission below 30MHz



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.
b. Set the EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Worst-case Data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	58.8 PK	74.0	-15.2	1.32 H	193	54.0	4.8
2	5150.00	44.0 AV	54.0	-10.0	1.32 H	193	39.2	4.8
3	*5180.00	105.3 PK			1.75 H	186	66.6	38.7
4	*5180.00	95.7 AV			1.75 H	186	57.0	38.7
5	#10360.00	62.1 PK	74.0	-11.9	1.24 H	141	44.5	17.6
6	#10360.00	51.3 AV	54.0	-2.7	1.24 H	141	33.7	17.6
7	15540.00	65.0 PK	74.0	-9.0	1.53 H	146	45.7	19.3
8	15540.00	51.9 AV	54.0	-2.1	1.53 H	146	32.6	19.3
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	66.3 PK	74.0	-7.7	1.72 V	199	61.5	4.8
2	5150.00	52.6 AV	54.0	-1.4	1.72 V	199	47.8	4.8
3	*5180.00	111.6 PK			1.35 V	141	72.9	38.7
4	*5180.00	101.3 AV			1.35 V	141	62.6	38.7
5	#10360.00	59.6 PK	74.0	-14.4	1.87 V	280	42.0	17.6
6	#10360.00	46.7 AV	54.0	-7.3	1.87 V	280	29.1	17.6
7	15540.00	60.6 PK	74.0	-13.4	1.47 V	15	41.3	19.3
8	15540.00	50.1 AV	54.0	-3.9	1.47 V	15	30.8	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	105.0 PK			1.54 H	159	66.3	38.7
2	*5200.00	95.1 AV			1.54 H	159	56.4	38.7
3	#10400.00	61.8 PK	74.0	-12.2	1.55 H	142	44.2	17.6
4	#10400.00	50.9 AV	54.0	-3.1	1.55 H	142	33.3	17.6
5	15600.00	67.0 PK	74.0	-7.0	1.42 H	146	47.7	19.3
6	15600.00	52.7 AV	54.0	-1.3	1.42 H	146	33.4	19.3
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	110.2 PK			1.36 V	201	71.5	38.7
2	*5200.00	100.4 AV			1.36 V	201	61.7	38.7
3	#10400.00	58.8 PK	74.0	-15.2	2.85 V	177	41.2	17.6
4	#10400.00	46.1 AV	54.0	-7.9	2.85 V	177	28.5	17.6
5	15600.00	64.6 PK	74.0	-9.4	1.57 V	21	45.3	19.3
6	15600.00	51.1 AV	54.0	-2.9	1.57 V	21	31.8	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	105.4 PK			1.54 H	196	66.5	38.9
2	*5240.00	95.6 AV			1.54 H	196	56.7	38.9
3	5350.00	56.1 PK	74.0	-17.9	1.55 H	188	50.6	5.5
4	5350.00	42.9 AV	54.0	-11.1	1.55 H	188	37.4	5.5
5	#10480.00	62.3 PK	74.0	-11.7	1.53 H	142	43.9	18.4
6	#10480.00	51.5 AV	54.0	-2.5	1.53 H	142	33.1	18.4
7	15720.00	65.9 PK	74.0	-8.1	1.43 H	136	47.2	18.7
8	15720.00	52.9 AV	54.0	-1.1	1.43 H	136	34.2	18.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.0 PK			1.49 V	198	75.1	38.9
2	*5240.00	104.1 AV			1.49 V	198	65.2	38.9
3	5350.00	58.8 PK	74.0	-15.2	1.52 V	195	53.3	5.5
4	5350.00	44.4 AV	54.0	-9.6	1.52 V	195	38.9	5.5
5	#10480.00	62.5 PK	74.0	-11.5	1.53 V	125	44.1	18.4
6	#10480.00	48.8 AV	54.0	-5.2	1.53 V	125	30.4	18.4
7	15720.00	64.5 PK	74.0	-9.5	1.50 V	18	45.8	18.7
8	15720.00	51.3 AV	54.0	-2.7	1.50 V	18	32.6	18.7

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5615.20	57.1 PK	68.2	-11.1	1.50 H	208	51.0	6.1
2	*5745.00	105.9 PK			1.50 H	208	65.9	40.0
3	*5745.00	96.5 AV			1.50 H	208	56.5	40.0
4	#5970.40	58.2 PK	68.2	-10.0	1.50 H	208	51.5	6.7
5	11490.00	61.3 PK	74.0	-12.7	1.73 H	136	42.0	19.3
6	11490.00	48.8 AV	54.0	-5.2	1.73 H	136	29.5	19.3
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	#5646.40	58.3 PK	68.2	-9.9	1.68 V	146	52.2	6.1
2	*5745.00	113.2 PK			1.68 V	146	73.2	40.0
3	*5745.00	103.0 AV			1.68 V	146	63.0	40.0
4	#5957.60	58.9 PK	68.2	-9.3	1.68 V	146	52.3	6.6
5	11490.00	60.4 PK	74.0	-13.6	1.68 V	225	41.1	19.3
6	11490.00	47.8 AV	54.0	-6.2	1.68 V	225	28.5	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5624.80	57.7 PK	68.2	-10.5	1.66 H	205	51.6	6.1
2	*5785.00	108.1 PK			1.66 H	205	68.0	40.1
3	*5785.00	98.1 AV			1.66 H	205	58.0	40.1
4	#5994.40	58.1 PK	68.2	-10.1	1.66 H	205	51.4	6.7
5	11570.00	62.3 PK	74.0	-11.7	1.61 H	136	43.1	19.2
6	11570.00	49.9 AV	54.0	-4.1	1.61 H	136	30.7	19.2
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	#5636.00	58.8 PK	68.2	-9.4	1.22 V	133	52.7	6.1
2	*5785.00	116.4 PK			1.22 V	133	76.3	40.1
3	*5785.00	106.3 AV			1.22 V	133	66.2	40.1
4	#5941.60	58.9 PK	68.2	-9.3	1.22 V	133	52.3	6.6
5	11570.00	60.4 PK	74.0	-13.6	1.66 V	182	41.2	19.2
6	11570.00	47.6 AV	54.0	-6.4	1.66 V	182	28.4	19.2

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5617.60	57.4 PK	68.2	-10.8	1.67 H	207	51.3	6.1
2	*5825.00	106.9 PK			1.67 H	207	66.8	40.1
3	*5825.00	97.1 AV			1.67 H	207	57.0	40.1
4	#5964.80	58.4 PK	68.2	-9.8	1.67 H	207	51.7	6.7
5	11650.00	60.8 PK	74.0	-13.2	1.68 H	138	41.5	19.3
6	11650.00	48.7 AV	54.0	-5.3	1.68 H	138	29.4	19.3
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	#5639.20	57.6 PK	68.2	-10.6	1.44 V	132	51.5	6.1
2	*5825.00	114.8 PK			1.44 V	132	74.7	40.1
3	*5825.00	104.5 AV			1.44 V	132	64.4	40.1
4	#5961.60	58.5 PK	68.2	-9.7	1.44 V	132	51.8	6.7
5	11650.00	60.2 PK	74.0	-13.8	1.68 V	166	40.9	19.3
6	11650.00	47.3 AV	54.0	-6.7	1.68 V	166	28.0	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	62.1 PK	74.0	-11.9	1.31 H	155	57.3	4.8
2	5150.00	44.9 AV	54.0	-9.1	1.31 H	155	40.1	4.8
3	*5180.00	105.6 PK			1.31 H	157	66.9	38.7
4	*5180.00	95.7 AV			1.31 H	157	57.0	38.7
5	#10360.00	61.9 PK	74.0	-12.1	1.48 H	144	44.3	17.6
6	#10360.00	51.2 AV	54.0	-2.8	1.48 H	144	33.6	17.6
7	15540.00	65.7 PK	74.0	-8.3	1.51 H	142	46.4	19.3
8	15540.00	51.6 AV	54.0	-2.4	1.51 H	142	32.3	19.3
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	66.3 PK	74.0	-7.7	1.37 V	198	61.5	4.8
2	5150.00	52.7 AV	54.0	-1.3	1.37 V	198	47.9	4.8
3	*5180.00	111.5 PK			1.14 V	141	72.8	38.7
4	*5180.00	100.4 AV			1.14 V	141	61.7	38.7
5	#10360.00	59.8 PK	74.0	-14.2	1.39 V	172	42.2	17.6
6	#10360.00	46.5 AV	54.0	-7.5	1.39 V	172	28.9	17.6
7	15540.00	62.0 PK	74.0	-12.0	1.52 V	17	42.7	19.3
8	15540.00	50.7 AV	54.0	-3.3	1.52 V	17	31.4	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	105.4 PK			1.54 H	197	66.7	38.7
2	*5200.00	95.8 AV			1.54 H	197	57.1	38.7
3	#10400.00	64.4 PK	74.0	-9.6	1.55 H	142	46.8	17.6
4	#10400.00	51.8 AV	54.0	-2.2	1.55 H	142	34.2	17.6
5	15600.00	67.3 PK	74.0	-6.7	1.47 H	135	48.0	19.3
6	**15600.00**	**53.1 AV**	**54.0**	**-0.9**	**1.47 H**	**135**	**33.8**	**19.3**
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	113.2 PK			1.02 V	185	74.5	38.7
2	*5200.00	103.3 AV			1.02 V	185	64.6	38.7
3	#10400.00	58.8 PK	74.0	-15.2	1.13 V	115	41.2	17.6
4	#10400.00	45.9 AV	54.0	-8.1	1.13 V	115	28.3	17.6
5	15600.00	63.9 PK	74.0	-10.1	1.55 V	19	44.6	19.3
6	15600.00	51.1 AV	54.0	-2.9	1.55 V	19	31.8	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	107.7 PK			1.55 H	197	68.8	38.9
2	*5240.00	97.5 AV			1.55 H	197	58.6	38.9
3	5350.00	56.1 PK	74.0	-17.9	1.58 H	187	50.6	5.5
4	5350.00	43.3 AV	54.0	-10.7	1.58 H	187	37.8	5.5
5	#10480.00	66.2 PK	74.0	-7.8	1.54 H	140	47.8	18.4
6	#10480.00	52.8 AV	54.0	-1.2	1.54 H	140	34.4	18.4
7	15720.00	66.4 PK	74.0	-7.6	1.49 H	136	47.7	18.7
8	15720.00	52.8 AV	54.0	-1.2	1.49 H	136	34.1	18.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.9 PK			1.32 V	143	75.0	38.9
2	*5240.00	103.0 AV			1.32 V	143	64.1	38.9
3	5350.00	62.1 PK	74.0	-11.9	1.28 V	126	56.6	5.5
4	5350.00	44.3 AV	54.0	-9.7	1.28 V	126	38.8	5.5
5	#10480.00	61.1 PK	74.0	-12.9	1.34 V	138	42.7	18.4
6	#10480.00	48.3 AV	54.0	-5.7	1.34 V	138	29.9	18.4
7	15720.00	63.9 PK	74.0	-10.1	1.49 V	19	45.2	18.7
8	15720.00	51.2 AV	54.0	-2.8	1.49 V	19	32.5	18.7

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5616.00	57.6 PK	68.2	-10.6	1.72 H	207	51.5	6.1
2	*5745.00	106.0 PK			1.72 H	207	66.0	40.0
3	*5745.00	96.3 AV			1.72 H	207	56.3	40.0
4	#5981.60	58.9 PK	68.2	-9.3	1.72 H	207	52.2	6.7
5	11490.00	60.3 PK	74.0	-13.7	1.37 H	132	41.0	19.3
6	11490.00	48.5 AV	54.0	-5.5	1.37 H	132	29.2	19.3
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	#5612.80	57.1 PK	68.2	-11.1	1.81 V	147	51.0	6.1
2	*5745.00	112.7 PK			1.81 V	147	72.7	40.0
3	*5745.00	102.5 AV			1.81 V	147	62.5	40.0
4	#5935.20	58.2 PK	68.2	-10.0	1.81 V	147	51.6	6.6
5	11490.00	60.5 PK	74.0	-13.5	1.68 V	122	41.2	19.3
6	11490.00	47.8 AV	54.0	-6.2	1.68 V	122	28.5	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5614.40	57.6 PK	68.2	-10.6	1.65 H	205	51.5	6.1
2	*5785.00	107.8 PK			1.65 H	205	67.7	40.1
3	*5785.00	97.8 AV			1.65 H	205	57.7	40.1
4	#5995.20	59.0 PK	68.2	-9.2	1.65 H	205	52.3	6.7
5	11570.00	61.3 PK	74.0	-12.7	1.61 H	134	42.1	19.2
6	11570.00	49.0 AV	54.0	-5.0	1.61 H	134	29.8	19.2
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	#5611.20	58.1 PK	68.2	-10.1	1.62 V	146	52.0	6.1
2	*5785.00	115.5 PK			1.62 V	146	75.4	40.1
3	*5785.00	104.8 AV			1.62 V	146	64.7	40.1
4	#5944.00	58.3 PK	68.2	-9.9	1.62 V	146	51.7	6.6
5	11570.00	60.7 PK	74.0	-13.3	2.05 V	143	41.5	19.2
6	11570.00	47.1 AV	54.0	-6.9	2.05 V	143	27.9	19.2

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5628.00	57.9 PK	68.2	-10.3	1.60 H	206	51.8	6.1
2	*5825.00	106.9 PK			1.60 H	206	66.8	40.1
3	*5825.00	96.1 AV			1.60 H	206	56.0	40.1
4	#5927.20	58.4 PK	68.2	-9.8	1.60 H	206	51.8	6.6
5	11650.00	60.4 PK	74.0	-13.6	1.63 H	135	41.1	19.3
6	11650.00	48.5 AV	54.0	-5.5	1.63 H	135	29.2	19.3
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	#5628.00	57.4 PK	68.2	-10.8	1.72 V	147	51.3	6.1
2	*5825.00	112.6 PK			1.72 V	147	72.5	40.1
3	*5825.00	102.6 AV			1.72 V	147	62.5	40.1
4	#5955.20	58.2 PK	68.2	-10.0	1.72 V	147	51.6	6.6
5	11650.00	60.2 PK	74.0	-13.8	2.41 V	87	40.9	19.3
6	11650.00	47.2 AV	54.0	-6.8	2.41 V	87	27.9	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	62.2 PK	74.0	-11.8	1.60 H	198	57.4	4.8
2	5150.00	47.2 AV	54.0	-6.8	1.60 H	198	42.4	4.8
3	*5190.00	98.8 PK			1.54 H	160	60.1	38.7
4	*5190.00	89.1 AV			1.54 H	160	50.4	38.7
5	#10380.00	60.2 PK	74.0	-13.8	1.60 H	139	42.6	17.6
6	#10380.00	50.9 AV	54.0	-3.1	1.60 H	139	33.3	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	66.4 PK	74.0	-7.6	1.26 V	142	61.6	4.8
2	5150.00	52.6 AV	54.0	-1.4	1.26 V	142	47.8	4.8
3	*5190.00	105.1 PK			1.13 V	141	66.4	38.7
4	*5190.00	94.7 AV			1.13 V	141	56.0	38.7
5	#10380.00	59.3 PK	74.0	-14.7	1.64 V	124	41.7	17.6
6	#10380.00	46.2 AV	54.0	-7.8	1.64 V	124	28.6	17.6

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	62.4 PK	74.0	-11.6	1.47 H	185	57.6	4.8
2	5150.00	47.7 AV	54.0	-6.3	1.47 H	185	42.9	4.8
3	*5230.00	103.9 PK			1.46 H	190	65.0	38.9
4	*5230.00	94.7 AV			1.46 H	190	55.8	38.9
5	5350.00	55.6 PK	74.0	-18.4	1.41 H	120	50.1	5.5
6	5350.00	43.5 AV	54.0	-10.5	1.41 H	120	38.0	5.5
7	#10460.00	62.8 PK	74.0	-11.2	1.50 H	142	44.6	18.2
8	#10460.00	52.2 AV	54.0	-1.8	1.50 H	142	34.0	18.2
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	67.5 PK	74.0	-6.5	1.49 V	118	62.7	4.8
2	5150.00	52.5 AV	54.0	-1.5	1.49 V	118	47.7	4.8
3	*5230.00	111.1 PK			1.17 V	143	72.2	38.9
4	*5230.00	100.6 AV			1.17 V	143	61.7	38.9
5	5350.00	59.5 PK	74.0	-14.5	1.24 V	143	54.0	5.5
6	5350.00	44.1 AV	54.0	-9.9	1.24 V	143	38.6	5.5
7	#10460.00	60.0 PK	74.0	-14.0	1.98 V	256	41.8	18.2
8	#10460.00	46.8 AV	54.0	-7.2	1.98 V	256	28.6	18.2

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	#5605.60	57.1 PK	68.2	-11.1	1.70 H	207	51.0	6.1
2	*5755.00	100.0 PK			1.70 H	207	60.0	40.0
3	*5755.00	89.6 AV			1.70 H	207	49.6	40.0
4	#5962.40	58.5 PK	68.2	-9.7	1.70 H	207	51.8	6.7
5	11510.00	60.3 PK	74.0	-13.7	1.60 H	145	41.0	19.3
6	11510.00	48.3 AV	54.0	-5.7	1.60 H	145	29.0	19.3
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	#5628.00	57.4 PK	68.2	-10.8	1.63 V	147	51.3	6.1
2	*5755.00	105.9 PK			1.63 V	147	65.9	40.0
3	*5755.00	95.7 AV			1.63 V	147	55.7	40.0
4	#5944.80	58.9 PK	68.2	-9.3	1.63 V	147	52.3	6.6
5	11510.00	61.3 PK	74.0	-12.7	1.63 V	312	42.0	19.3
6	11510.00	47.2 AV	54.0	-6.8	1.63 V	312	27.9	19.3

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	57.7 PK	68.2	-10.5	1.73 H	205	51.6	6.1
2	*5795.00	102.6 PK			1.73 H	205	62.5	40.1
3	*5795.00	92.7 AV			1.73 H	205	52.6	40.1
4	#5964.80	57.8 PK	68.2	-10.4	1.73 H	205	51.1	6.7
5	11590.00	61.9 PK	74.0	-12.1	1.59 H	138	42.7	19.2
6	11590.00	48.4 AV	54.0	-5.6	1.59 H	138	29.2	19.2
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	#5638.40	57.6 PK	68.2	-10.6	1.37 V	134	51.5	6.1
2	*5795.00	110.1 PK			1.37 V	134	70.0	40.1
3	*5795.00	99.5 AV			1.37 V	134	59.4	40.1
4	#5990.40	58.1 PK	68.2	-10.1	1.37 V	134	51.4	6.7
5	11590.00	60.5 PK	74.0	-13.5	1.64 V	25	41.3	19.2
6	11590.00	47.3 AV	54.0	-6.7	1.64 V	25	28.1	19.2

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 149	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	125.17	37.8 QP	43.5	-5.7	1.50 H	103	53.9	-16.1
2	249.60	42.6 QP	46.0	-3.4	1.00 H	279	56.6	-14.0
3	374.04	38.0 QP	46.0	-8.0	1.00 H	114	48.5	-10.5
4	500.42	38.5 QP	46.0	-7.5	1.50 H	180	46.4	-7.9
5	624.85	42.2 QP	46.0	-3.8	1.00 H	285	46.9	-4.7
6	751.23	41.1 QP	46.0	-4.9	1.50 H	6	43.3	-2.2
7	875.67	41.1 QP	46.0	-4.9	1.00 H	145	41.2	-0.1
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	37.68	34.1 QP	40.0	-5.9	1.00 V	260	49.4	-15.3
2	249.60	35.2 QP	46.0	-10.8	1.50 V	145	49.2	-14.0
3	374.04	39.1 QP	46.0	-6.9	1.50 V	188	49.6	-10.5
4	500.42	38.6 QP	46.0	-7.4	1.00 V	167	46.5	-7.9
5	624.85	42.6 QP	46.0	-3.4	1.00 V	179	47.3	-4.7
6	875.67	37.7 QP	46.0	-8.3	1.00 V	264	37.8	-0.1

Remarks:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2016	Oct. 23, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 11, 2016	Jan. 10, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 26, 2016	Jul. 25, 2017
Software ADT	BV ADT_Cond_ 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 Procedure

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.

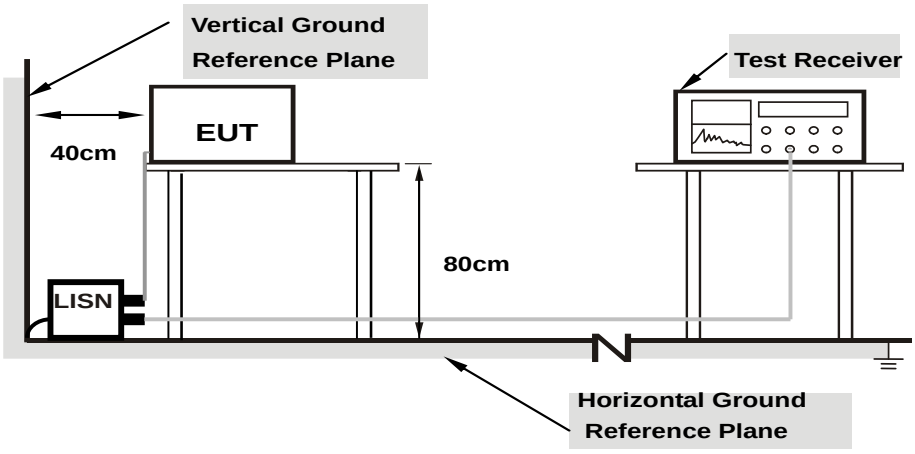
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

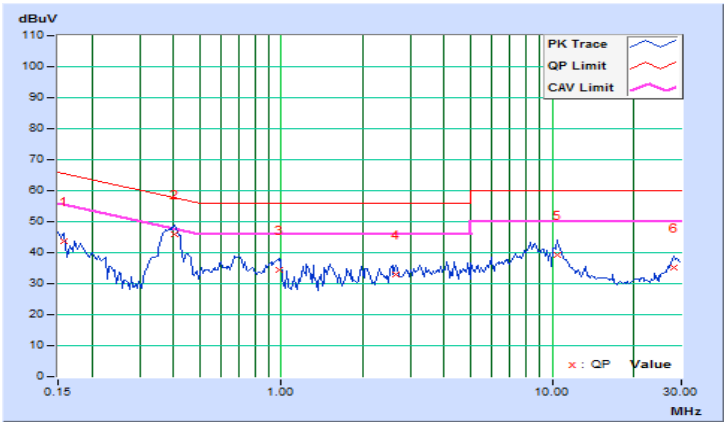
Worst-Case Data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.18	33.38	26.63	43.56	36.81	65.58	55.58	-22.02	-18.77
2	0.40391	10.24	35.81	31.01	46.05	41.25	57.77	47.77	-11.72	-6.52
3	0.97813	10.31	24.14	19.70	34.45	30.01	56.00	46.00	-21.55	-15.99
4	2.63281	10.39	22.56	17.33	32.95	27.72	56.00	46.00	-23.05	-18.28
5	10.41797	10.53	28.84	22.81	39.37	33.34	60.00	50.00	-20.63	-16.66
6	28.15625	10.52	24.72	21.46	35.24	31.98	60.00	50.00	-24.76	-18.02

Remarks:

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

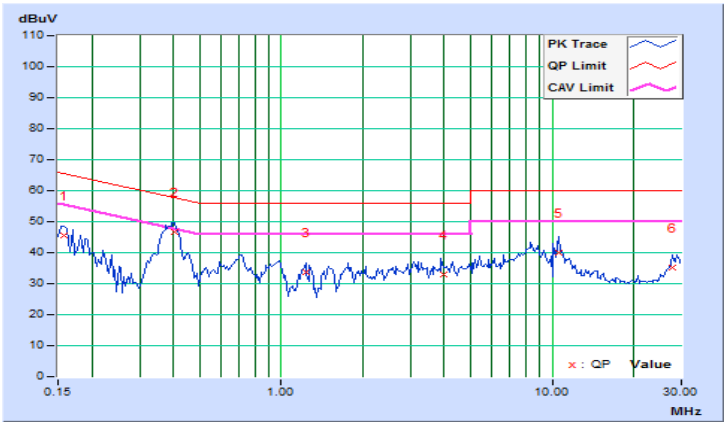


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.19	35.45	27.15	45.64	37.34	65.58	55.58	-19.94	-18.24
2	**0.40391**	**10.30**	**36.48**	**31.80**	**46.78**	**42.10**	**57.77**	**47.77**	**-10.99**	**-5.67**
3	1.23047	10.32	23.43	18.66	33.75	28.98	56.00	46.00	-22.25	-17.02
4	3.99219	10.55	22.31	16.70	32.86	27.25	56.00	46.00	-23.14	-18.75
5	10.55078	10.62	29.24	23.07	39.86	33.69	60.00	50.00	-20.14	-16.31
6	27.77344	10.69	24.39	19.79	35.08	30.48	60.00	50.00	-24.92	-19.52

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 ≦ 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)

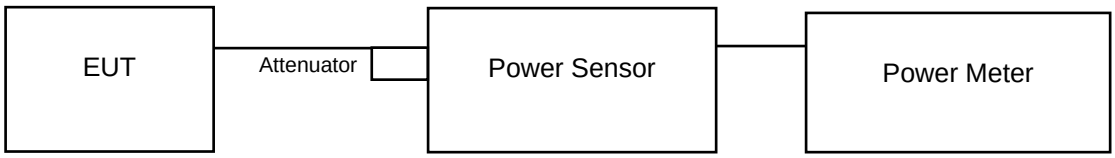
*B is the 26 dB emission bandwidth in megahertz

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 ≥ 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 $N_{ANT} \geq 5$.

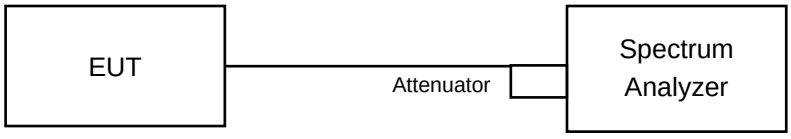
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

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

Average Power:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	15.68	15.82	75.177	18.76	24	Pass
40	5200	16.20	16.09	82.331	19.16	24	Pass
48	5240	17.16	16.78	99.643	19.98	24	Pass
149	5745	14.76	14.93	61.040	17.86	30	Pass
157	5785	18.49	18.04	**134.312**	21.28	30	Pass
165	5825	16.47	16.22	86.240	19.36	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	15.80	15.89	76.834	18.86	24	Pass
40	5200	16.73	16.96	96.757	19.86	24	Pass
48	5240	16.97	17.06	100.590	20.03	24	Pass
149	5745	14.98	15.05	63.466	18.03	30	Pass
157	5785	17.26	17.01	103.445	20.15	30	Pass
165	5825	15.10	15.25	65.856	18.19	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	13.32	13.12	41.990	16.23	24	Pass
46	5230	19.18	18.94	**161.137**	22.07	24	Pass
151	5755	11.45	11.31	27.485	14.39	30	Pass
159	5795	16.04	15.91	79.173	18.99	30	Pass

26dB Bandwidth:

802.11a

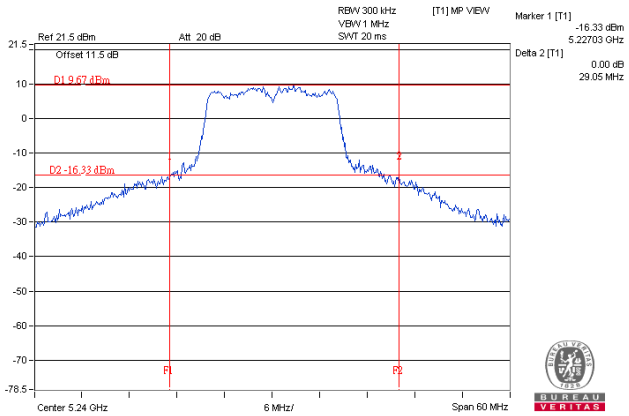
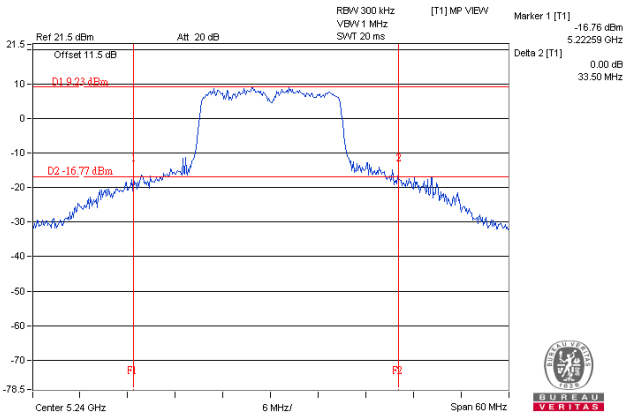
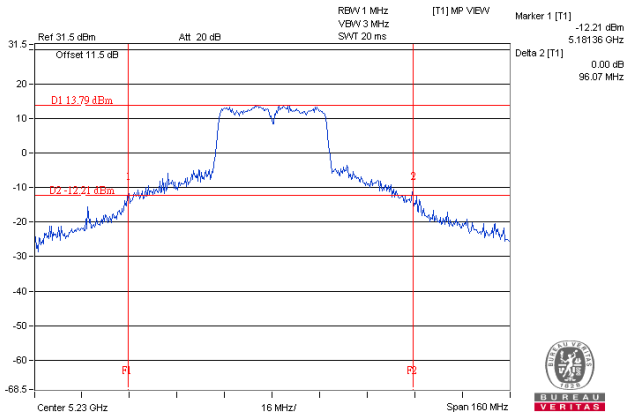
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	23.21	21.49
40	5200	24.03	21.34
48	5240	29.05	24.40

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	25.37	27.39
40	5200	30.89	29.45
48	5240	33.50	27.17

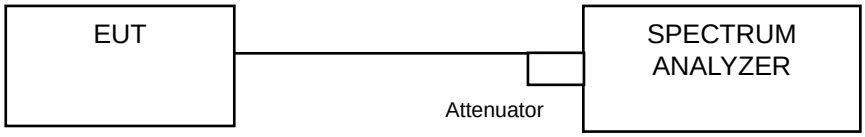
802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.52	41.07
46	5230	96.07	94.17

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 Results

802.11a

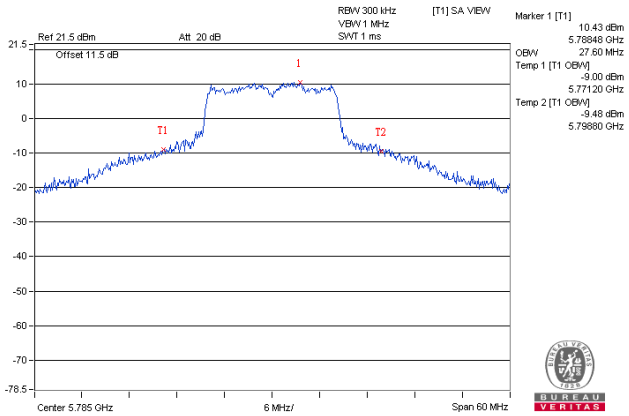
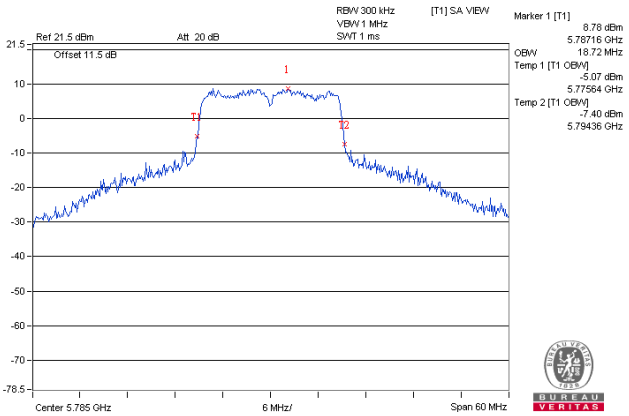
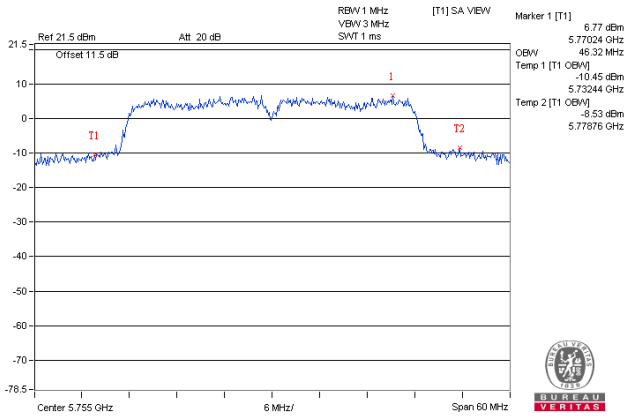
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.80	16.68
40	5200	16.80	16.68
48	5240	17.04	16.80
149	5745	16.78	16.69
157	5785	27.60	26.52
165	5825	16.92	16.80

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.76	17.76
40	5200	18.00	17.88
48	5240	18.00	17.76
149	5745	17.76	17.76
157	5785	18.72	18.24
165	5825	17.76	17.76

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.36	36.36
46	5230	37.44	37.08
151	5755	46.32	36.36
159	5795	36.48	36.60

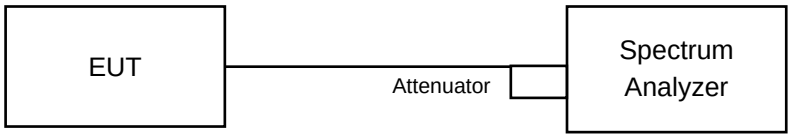
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

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 Procedure

For U-NII-1 band:

Using method SA-2, Duty cycle <98%

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

For U-NII-3 band:

Duty cycle <98%

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
d. 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 = 10log(500 kHz/300kHz)
e. Sweep time = auto, trigger set to “free run”.
f. Trace average at least 100 traces in power averaging mode.
g. 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 Condition

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-14.64	-13.39	3.11	-7.84	9.52	Pass
40	5200	-22.92	-23.44	3.11	-17.06	9.52	Pass
48	5240	-18.39	-26.47	3.11	-14.63	9.52	Pass

Note:
1. 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.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] =7.48dBi > 6dBi, so the limit shall be reduced to 11-(7.48-6) = 9.52dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

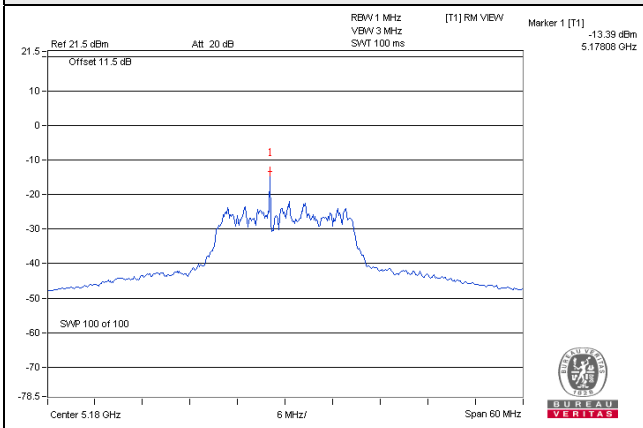
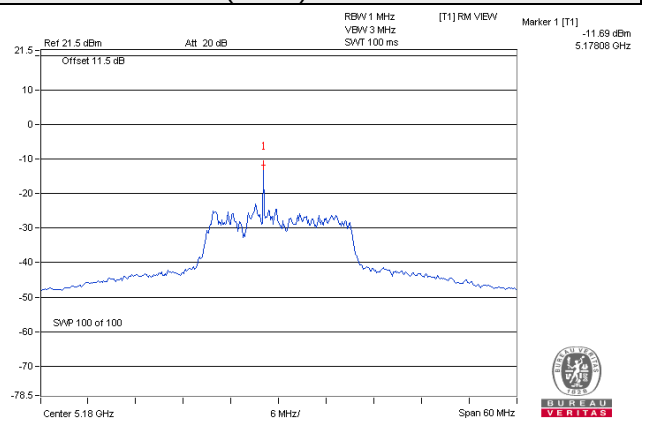
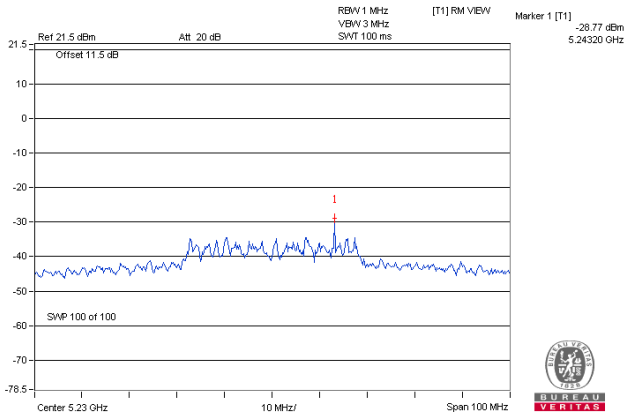
Chan.	Freq. (MHz)	PSD (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-15.00	-11.69	4.59	-5.44	9.52	Pass
40	5200	-27.55	-21.55	4.59	-15.97	9.52	Pass
48	5240	-24.24	-23.07	4.59	-16.02	9.52	Pass

Note:
1. 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.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] =7.48dBi > 6dBi, so the limit shall be reduced to 11-(7.48-6) = 9.52dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-34.19	-33.69	7.64	-23.28	9.52	Pass
46	5230	-28.77	-29.29	7.64	-18.39	9.52	Pass

Note:
1. 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.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] =7.48dBi > 6dBi, so the limit shall be reduced to 11-(7.48-6) = 9.52dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Ch 36 / Chain 1	802.11n (HT20) / Ch 36 / Chain 1
	
802.11n (HT40) / Ch 46 / Chain 0	
	

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	-31.73	-29.51	3.01	3.11	-23.39	28.52	Pass
	157	5785	-29.76	-27.54	3.01	3.11	-21.42	28.52	Pass
	165	5825	-11.30	-9.08	3.01	3.11	-2.96	28.52	Pass
1	149	5745	-32.37	-30.15	3.01	3.11	-24.03	28.52	Pass
	157	5785	-30.09	-27.87	3.01	3.11	-21.75	28.52	Pass
	165	5825	-15.08	-12.86	3.01	3.11	-6.74	28.52	Pass

Note:
1. 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.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] =7.48dBi > 6dBi, so the limit shall be reduced to 30-(7.48-6) = 28.52dBm.
3. 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	-32.94	-30.72	3.01	4.59	-23.12	28.52	Pass
	157	5785	-31.36	-29.14	3.01	4.59	-21.54	28.52	Pass
	165	5825	-15.65	-13.43	3.01	4.59	-5.83	28.52	Pass
1	149	5745	-33.99	-31.77	3.01	4.59	-24.17	28.52	Pass
	157	5785	-31.70	-29.48	3.01	4.59	-21.88	28.52	Pass
	165	5825	-18.14	-15.92	3.01	4.59	-8.32	28.52	Pass

Note:
1. 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.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] =7.48dBi > 6dBi, so the limit shall be reduced to 30-(7.48-6) = 28.52dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

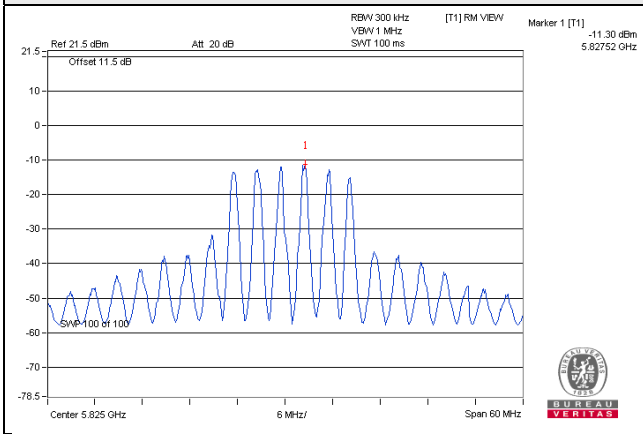
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-45.68	-43.46	3.01	7.64	-32.81	28.52	Pass
	159	5795	-43.93	-41.71	3.01	7.64	-31.06	28.52	Pass
1	151	5755	-45.22	-43.00	3.01	7.64	-32.35	28.52	Pass
	159	5795	-43.91	-41.69	3.01	7.64	-31.04	28.52	Pass

Note:

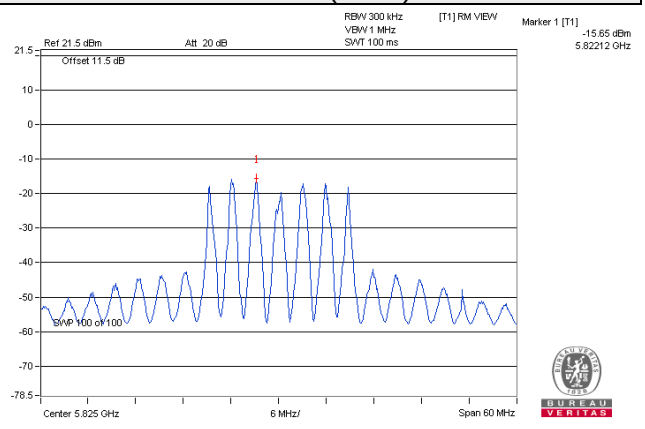
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/N] =7.48dBi > 6dBi, so the limit shall be reduced to 30-(7.48-6) = 28.52dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

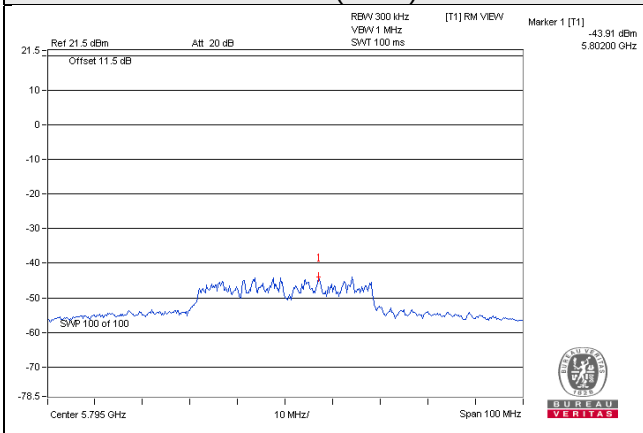
802.11a



802.11n (HT20)



802.11n (HT40)

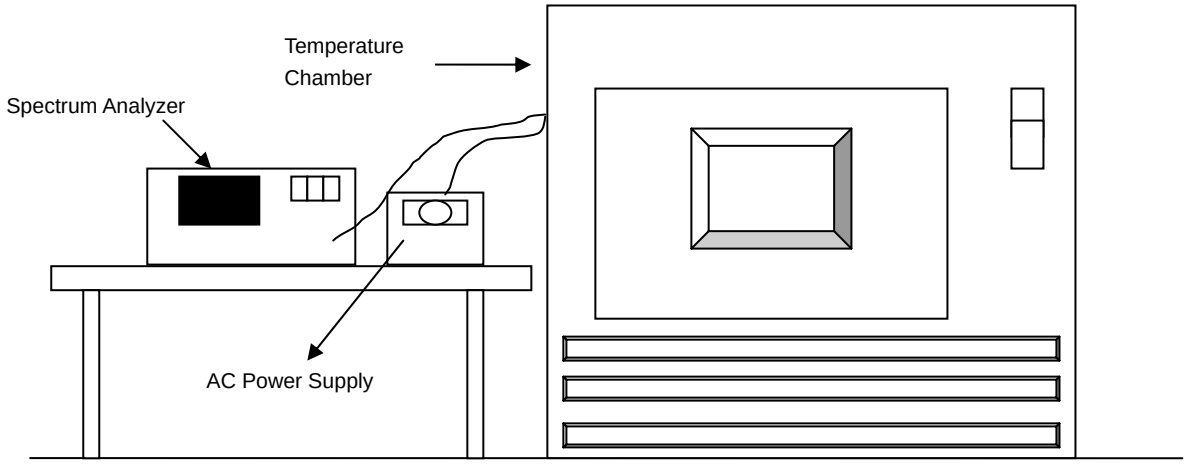


4.6 Frequency Stability

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 Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. 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.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	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	5180.0113	0.00022	5180.0101	0.00019	5180.0106	0.00020	5180.0113	0.00022
40	120	5180.0136	0.00026	5180.0139	0.00027	5180.0110	0.00021	5180.0100	0.00019
30	120	5179.9943	-0.00011	5179.9968	-0.00006	5179.9963	-0.00007	5179.9934	-0.00013
20	120	5180.0085	0.00016	5180.005	0.00010	5180.0066	0.00013	5180.0050	0.00010
10	120	5180.0177	0.00034	5180.0192	0.00037	5180.0143	0.00028	5180.0178	0.00034
0	120	5179.9821	-0.00035	5179.9819	-0.00035	5179.9826	-0.00034	5179.9854	-0.00028
-10	120	5180.0157	0.00030	5180.0138	0.00027	5180.0132	0.00025	5180.0148	0.00029
-20	120	5179.9822	-0.00034	5179.9824	-0.00034	5179.9814	-0.00036	5179.9826	-0.00034
-30	120	5180.0167	0.00032	5180.0200	0.00039	5180.0150	0.00029	5180.0192	0.00037

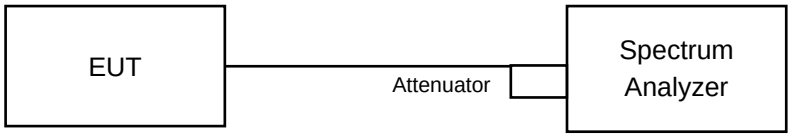
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0088	0.00017	5180.0042	0.00008	5180.0058	0.00011	5180.0057	0.00011
	120	5180.0085	0.00016	5180.0050	0.00010	5180.0066	0.00013	5180.0050	0.00010
	102	5180.0086	0.00017	5180.0045	0.00009	5180.0075	0.00014	5180.0054	0.00010

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

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

4.7.5 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

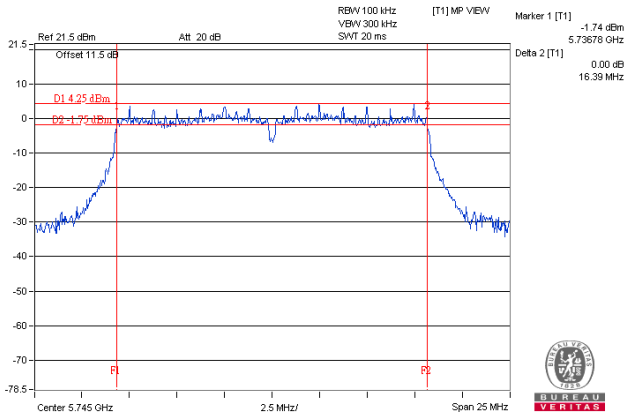
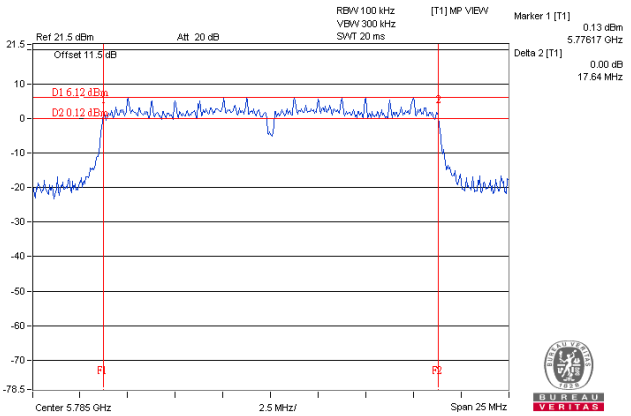
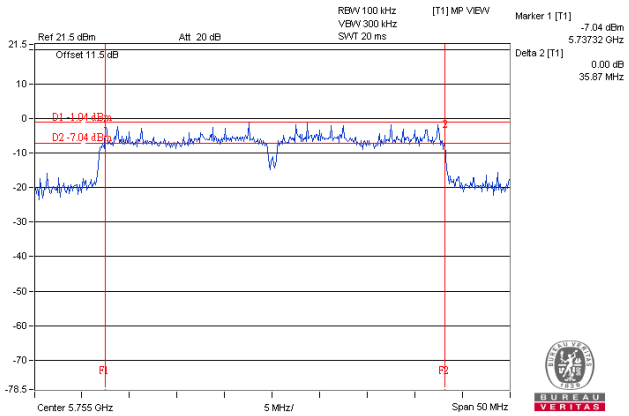
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.35	16.39	0.5	Pass
157	5785	16.37	16.37	0.5	Pass
165	5825	16.34	16.39	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.36	17.57	0.5	Pass
157	5785	16.96	17.64	0.5	Pass
165	5825	17.58	17.60	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.87	35.28	0.5	Pass
159	5795	35.22	35.31	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

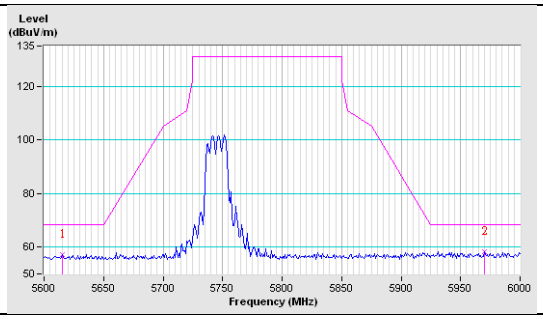
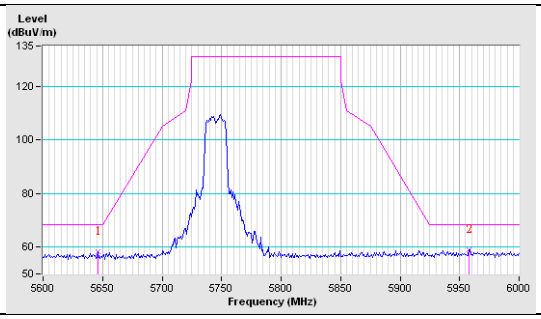
5 Pictures of Test Arrangements

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

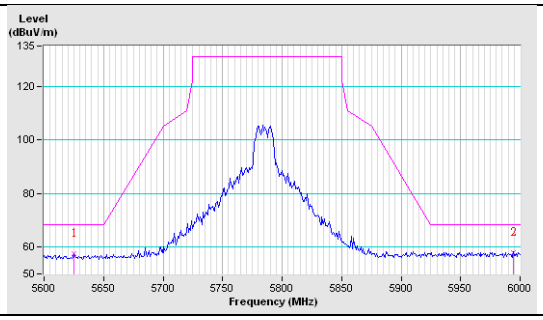
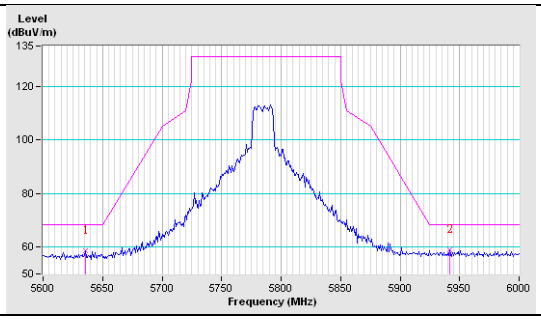
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

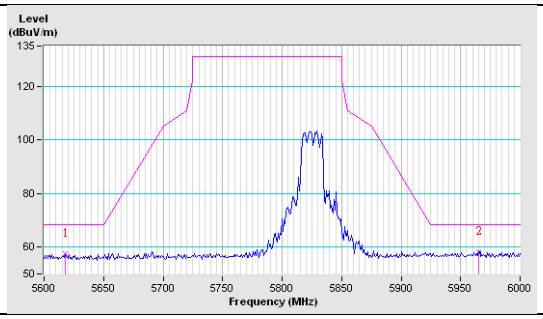
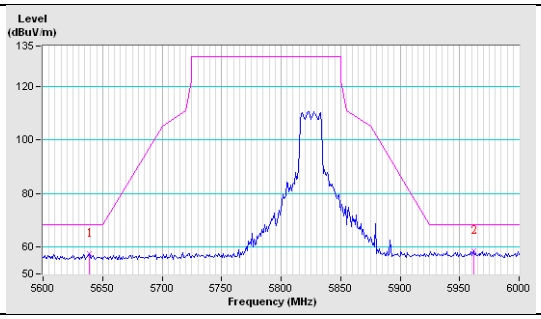
CH149

Horizontal	Vertical
	

CH157

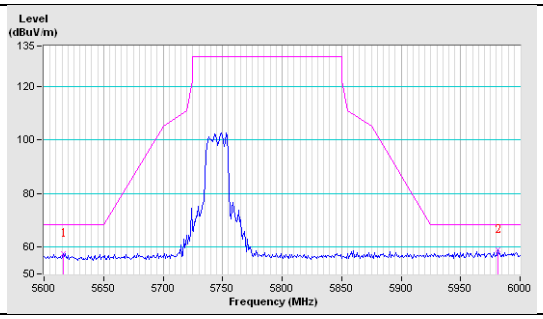
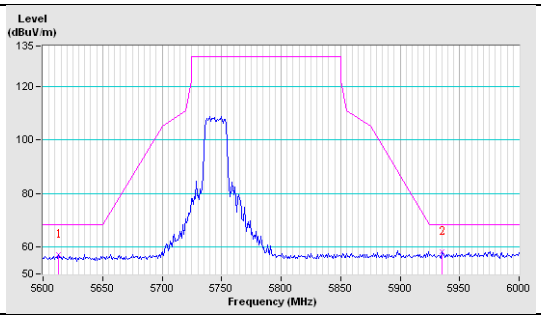
Horizontal	Vertical
	

CH165

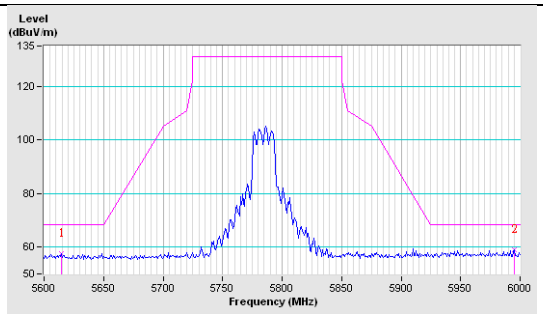
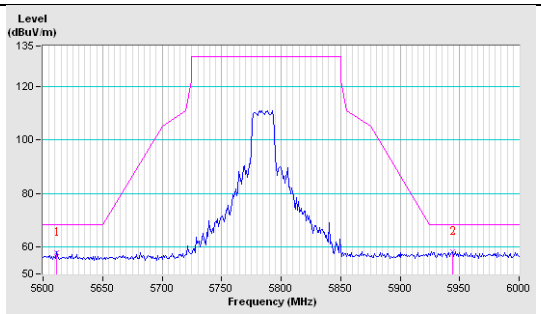
Horizontal	Vertical
	

802.11n (HT20)

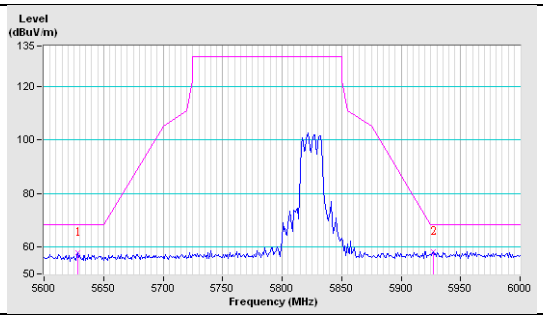
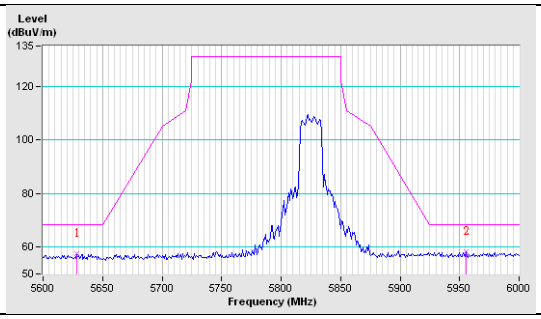
CH149

Horizontal	Vertical
	

CH157

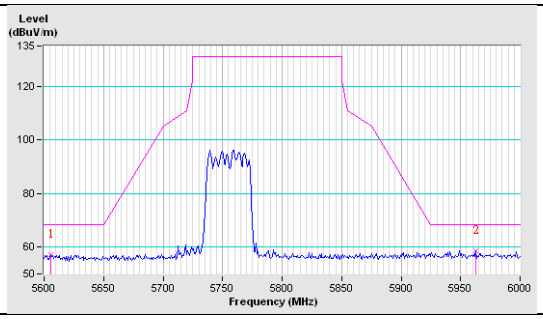
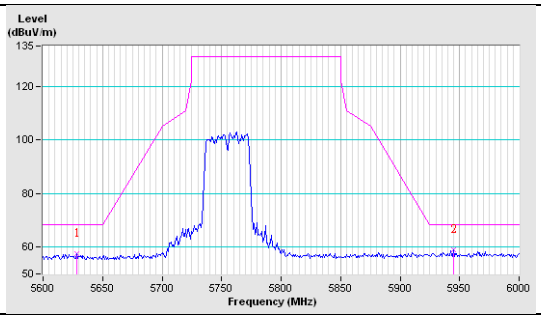
Horizontal	Vertical
	

CH165

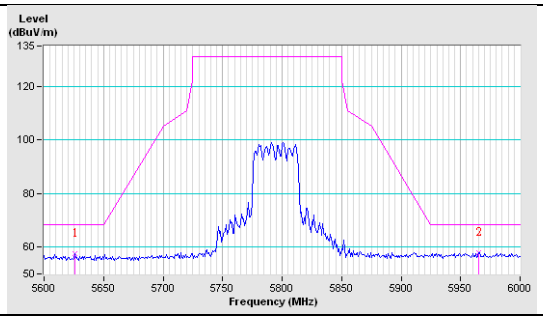
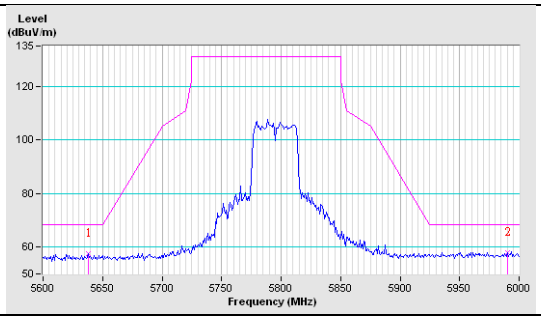
Horizontal	Vertical
	

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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Email: service.adt@tw.bureauveritas.com
Web Site: 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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