FCC Test Report

Report No.:	RF140707C54I-2
FCC ID:	M82-UTX-3115
Test Model:	UTX-3115
Series Model:	UTX-3115XXXXXXXXXXXXXXX, UTX3115XXXXXXXXXXXXXXX (“X” can be 0-9 or A-Z or blank or any alphanumeric character), HPE Edgeline EL10
Received Date:	Jun. 18, 2014
Test Date:	Mar. 24, 2016 (For antenna port Conducted measurement test) Aug. 15 ~ Oct. 03, 2016 (For radiated emission and power line conducted emission tests)
Issued Date:	Oct. 03, 2016
Applicant:	ADVANTECH CO., LTD
Address:	No. 1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei, Taiwan 114
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.)

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF140707C54I-2	Original release	Oct. 03, 2016

1 Certificate of Conformity

Product:	COMPUTER
Brand:	Advantech, Hewlett Packard Enterprise
Test Model:	UTX-3115
Series Model:	UTX-3115XXXXXXXXXXXXXXX, UTX3115XXXXXXXXXXXXXXX (“X” can be 0-9 or A-Z or blank or any alphanumeric character), HPE Edgeline EL10
Sample Status:	Engineering sample
Applicant:	ADVANTECH CO., LTD
Test Date:	Mar. 24, 2016 (For antenna port Conducted measurement test) Aug. 15 ~ Oct. 03, 2016 (For radiated emission and power line conducted emission tests)
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 : Celine Chou , **Date:** Oct. 03, 2016

Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Oct. 03, 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 -16.01dB at 0.15000MHz.
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 -2.2dB at 30.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is SMA (M) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports0	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 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	COMPUTER
Brand	Advantech, Hewlett Packard Enterprise
Test Model	UTX-3115
Series Model	UTX-3115XXXXXXXXXXXXXXX, UTX3115XXXXXXXXXXXXXXXX (“X” can be 0-9 or A-Z or blank or any alphanumeric character), HPE Edgeline EL10
Model Difference	Refer to Note
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5745 ~ 5825MHz
Number of Channel	5 for 802.11a, 802.11n (20MHz) , 802.11ac (20MHz) 2 for 802.11n (40MHz) , 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	89.743mW
Antenna Type	Dipole antenna with 1.4dBi gain
Antenna Connector	SMA (M)
Accessory Device	Refer to note
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change
2. This report is issued as a supplementary report to the original BV ADT report no.: RF140707C54D. The differences compared with original report are adding components and updating U-NII-3 Band to new rules, All test data had been re-tested.
3. All models are listed as below.

Brand	Model	Difference
Advantech	UTX-3115XXXXXXXXXXXXXXX (“X” can be 0-9 or A-Z or blank or any alphanumeric character)	For marketing purpose.
	UTX3115XXXXXXXXXXXXXXX (“X” can be 0-9 or A-Z or blank or any alphanumeric character)	
Hewlett Packard Enterprise	HPE Edgeline EL10	

* Model UTX-3115 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	1TX
802.11n (20MHz)	1TX / 2TX
802.11n (40MHz)	1TX / 2TX
802.11ac (20MHz)	1TX / 2TX
802.11ac (40MHz)	1TX / 2TX
802.11ac (80MHz)	1TX / 2TX

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The EUT uses the following components. (New components are marked in boldface.)

Part	Specification	Vendor	Model
Main board	-	Advantech	AIMB-115
Memory	DDR3L 4GB	Apacer	PC3-1066 CL9
SSD	32GB	Plextor	PX-32G5Le-72
	64GB	**Plextor**	**PX-64G5Le-72**
	64GB	**Liteon**	**PZ8-CC064**
	64GB	**Advantech**	**SQF-S25M4-64G-S9E**
	64GB	**Transcend**	**96FD25-S064-TR7**
CPU	1.4GHz	Intel	ATOM E3826
3G Module	-	Telit	HE910
Wi-Fi Module	-	Intel	7260HMW
Adapter 1	I/P: 100-240Vac, 50-60Hz, 1.5A O/P: 12Vdc, 3A DC: 1.5m cable with one core attached on adapter AC: 1.8m shielded cable without core	FSP	FSP036-RAB
Adapter 2	**I/P: 100-240Vac, 50-60Hz, 1.2A** **O/P: 12Vdc, 3A** **DC: 1.45m cable with one core attached on adapter** **AC: 1.8m shielded cable without core**	**FSP**	**FSP036-RBBN2**

3.2 Description of Test Modes

5 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter 1 + Plextor SSD (32GB)
B	-	√	√	-	Powered by adapter 2 + Liteon SSD (64GB)

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 **X-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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (80MHz)		155	155	OFDM	BPSK	65.0

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5745-5825	149 to 165	149	OFDM	BPSK	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5745-5825	149 to 165	149	OFDM	BPSK	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)		155	155	OFDM	BPSK	65.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Tank Wu
RE<1G	20deg. C, 69%RH 25deg. C, 69%RH	120Vac, 60Hz	Bond Tseng
PLC	25deg. C, 75%RH 20deg. C, 69%RH	120Vac, 60Hz	Chris Lin Bayu Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

Chain A

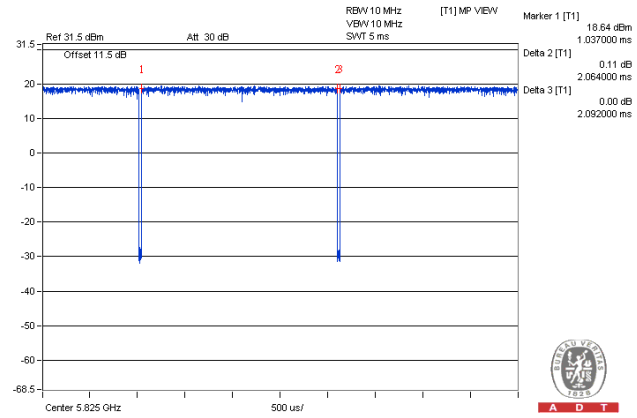
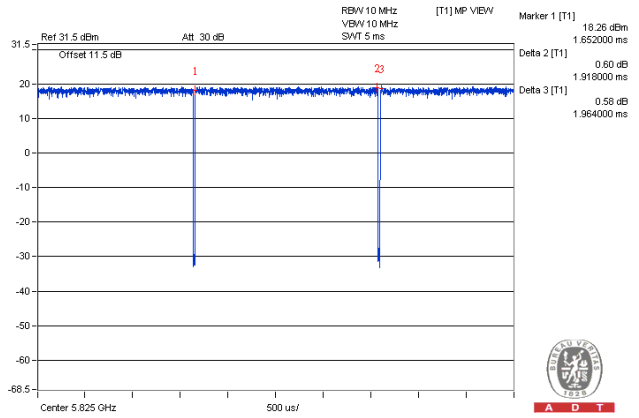
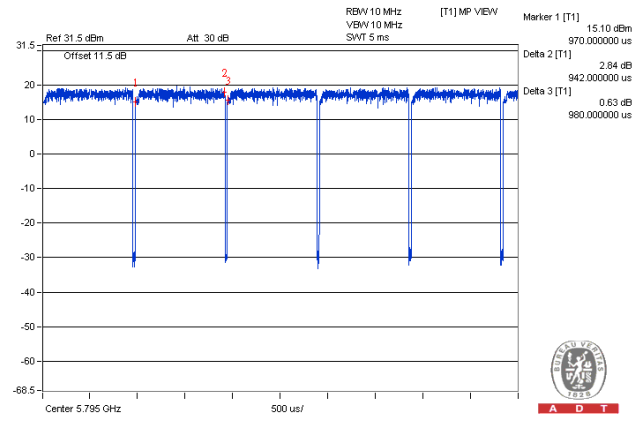
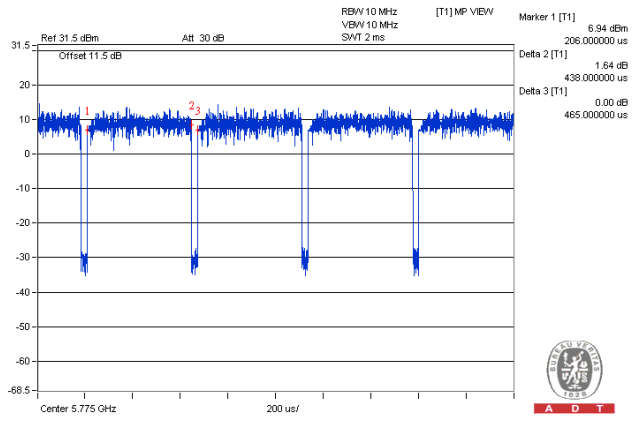
802.11a: Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (20MHz), 802.11n (40MHz), 802.11ac (80MHz): Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11n (20MHz): Duty cycle = 1.918/1.964 = 0.977, Duty factor = 10 * log(1/0.977) = 0.10

802.11n (40MHz): Duty cycle = 0.942/0.980 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17

802.11ac (80MHz): Duty cycle = 0.438/0.465 = 0.942, Duty factor = 10 * log(1/0.942) = 0.26

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

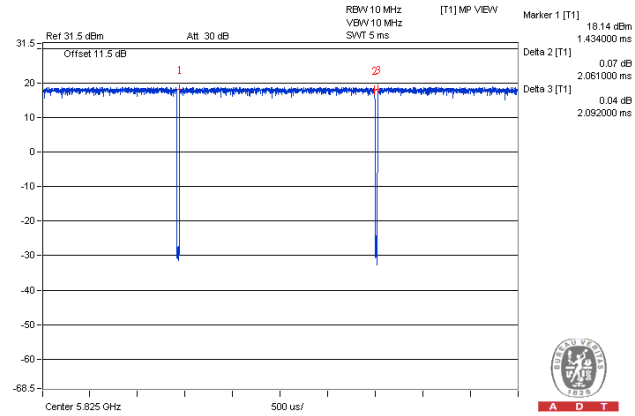
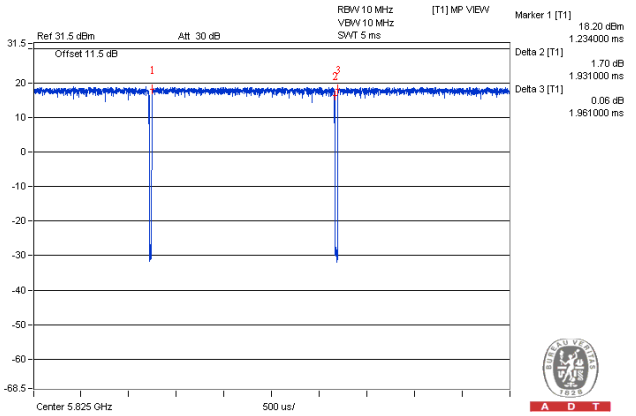
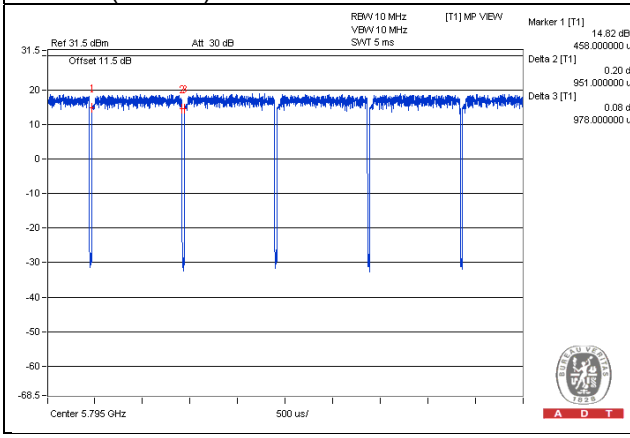
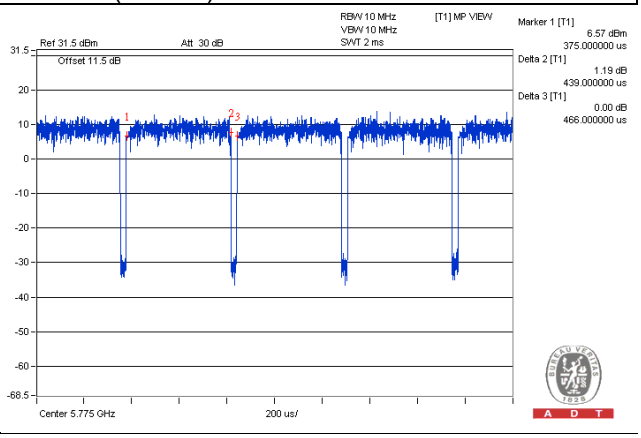
Chain B

802.11a, 802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (40MHz), 802.11ac (80MHz): Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11n (40MHz): Duty cycle = 0.951/0.978 = 0.972, Duty factor = 10 * log(1/0.972) = 0.12

802.11ac (80MHz): Duty cycle = 0.439/0.466 = 0.942, Duty factor = 10 * log(1/0.942) = 0.26

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain A + B

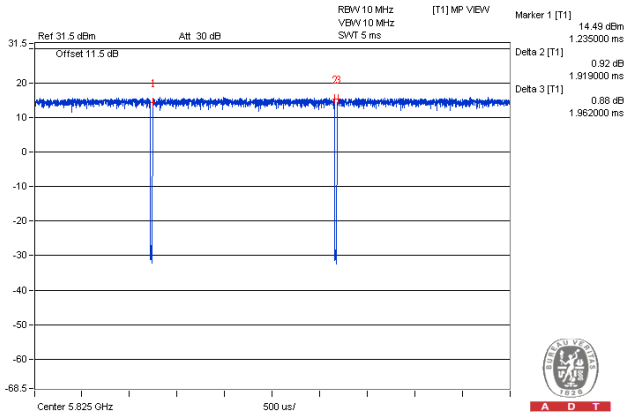
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11n (20MHz): Duty cycle = 1.919/1.962 = 0.978, Duty factor = 10 * log(1/0.978) = 0.10

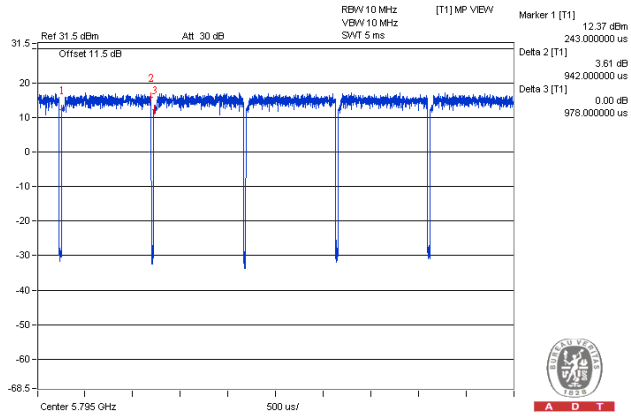
802.11n (40MHz): Duty cycle = 0.942/0.987 = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

802.11ac (80MHz): Duty cycle = 0.253/0.290 = 0.872, Duty factor = 10 * log(1/0.872) = 0.59

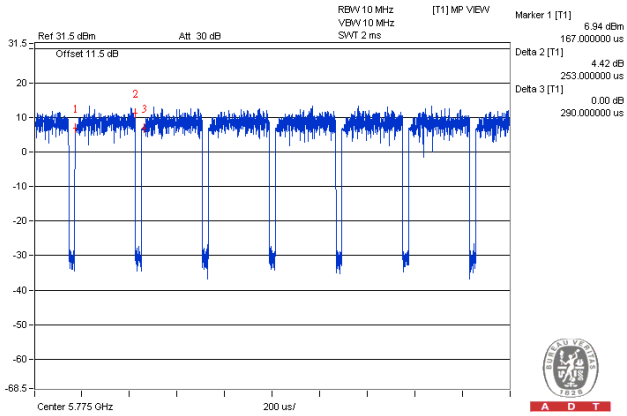
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



3.4 Description of Support Units

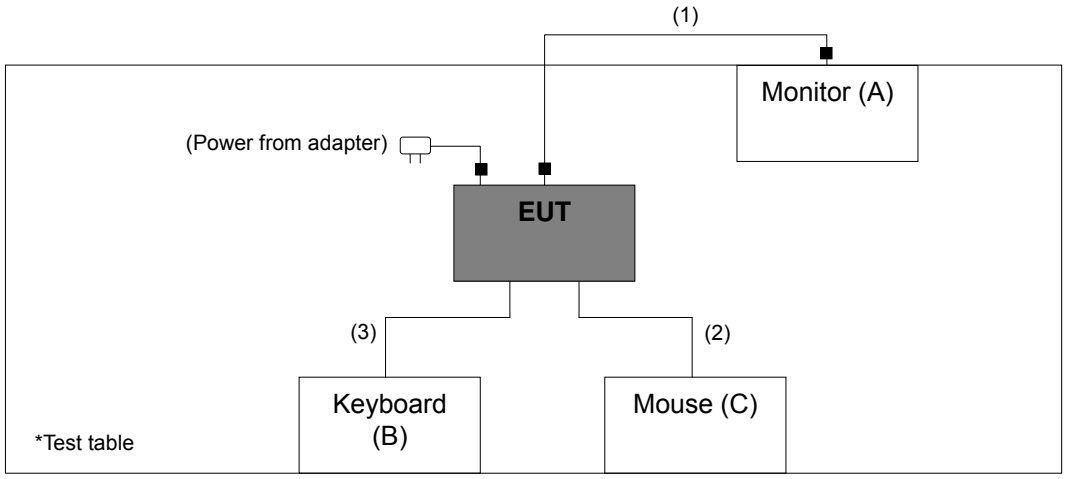
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Monitor	Samsung	173v	N/A	FCC DoC Approved	-
B.	Mouse	DELL	MS-111T	CN-0KW2YH-71616-28H-0L30	N/A	-
C.	Keyboard	WINTEK	WM700	20110700000	N/A	-

Note: 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.	D-Sub	1	1.8	Y	2	-
2.	USB	1	1.8	Y	0	-
3.	USB	1	1.8	Y	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedures New Rules v01r03
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2015	Apr. 18, 2016
			Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 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, 2015	Aug. 10, 2016
			Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(309222 +248780)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(274092)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	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
			Jul. 09, 2016	Jul. 08, 2017
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016
			Jul. 09, 2016	Jul. 08, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2015	Jun. 07, 2016
			Jun. 08, 2016	Jun. 07, 2017

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

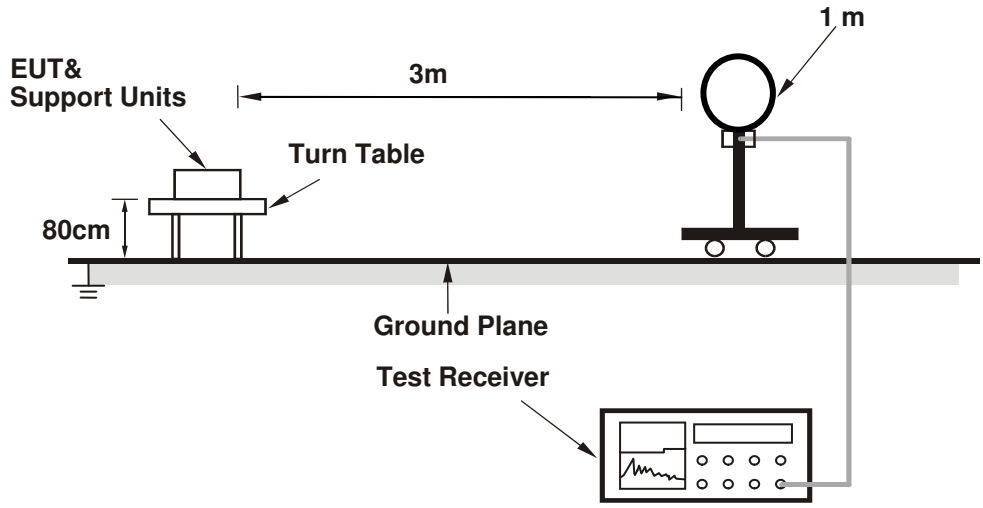
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

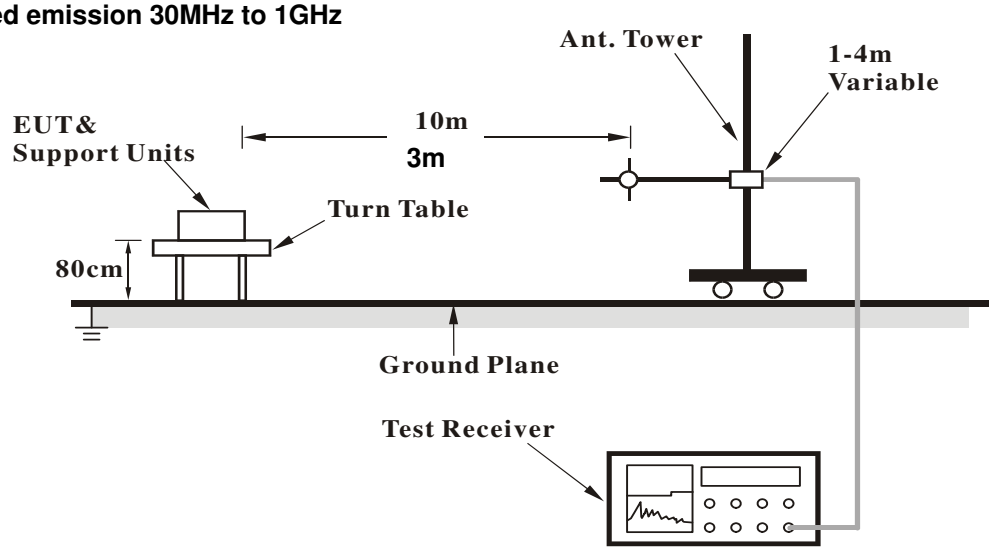
No deviation.

4.1.5 Test Set Up

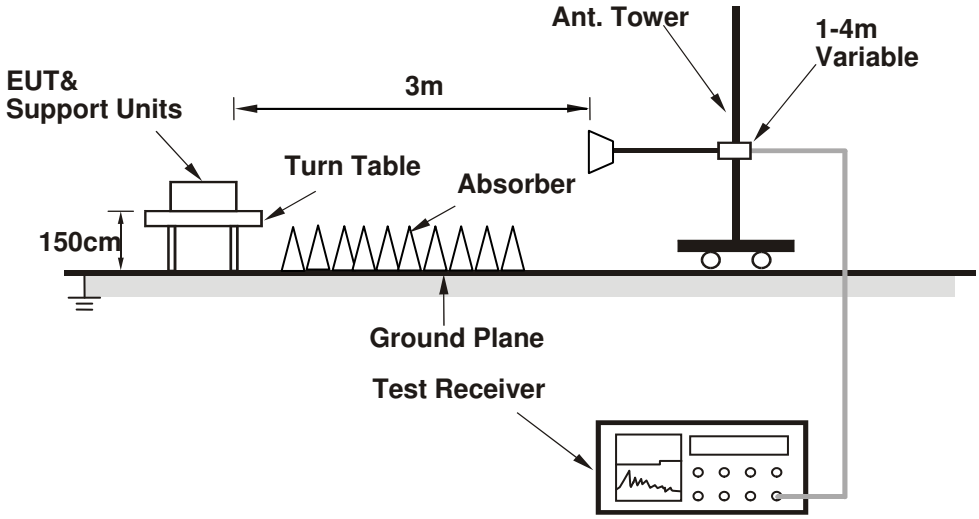
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. The EUT ran a test program (provided by manufacturer) to enable itself under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

Chain A

802.11a

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	#5618.40	58.0 PK	68.2	-10.2	3.39 H	310	52.9	5.1
2	*5745.00	101.1 PK			3.39 H	310	57.5	43.6
3	*5745.00	90.5 AV			3.39 H	310	46.9	43.6
4	#5971.20	58.7 PK	68.2	-9.5	3.39 H	310	53.4	5.3
5	11490.00	61.0 PK	74.0	-13.0	1.77 H	198	44.9	16.1
6	11490.00	46.3 AV	54.0	-7.7	1.77 H	198	30.2	16.1
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	#5625.60	58.8 PK	68.2	-9.4	2.22 V	239	53.7	5.1
2	*5745.00	106.9 PK			2.22 V	239	63.3	43.6
3	*5745.00	96.2 AV			2.22 V	239	52.6	43.6
4	#5979.20	59.3 PK	68.2	-8.9	2.22 V	239	53.9	5.4
5	11490.00	61.2 PK	74.0	-12.8	1.65 V	282	45.1	16.1
6	11490.00	46.8 AV	54.0	-7.2	1.65 V	282	30.7	16.1

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)
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	#5641.60	58.5 PK	68.2	-9.7	3.99 H	297	53.4	5.1
2	*5785.00	99.8 PK			3.99 H	297	56.2	43.6
3	*5785.00	89.7 AV			3.99 H	297	46.1	43.6
4	#5950.40	58.5 PK	68.2	-9.7	3.99 H	297	53.2	5.3
5	11570.00	61.1 PK	74.0	-12.9	1.77 H	199	45.0	16.1
6	11570.00	46.4 AV	54.0	-7.6	1.77 H	199	30.3	16.1
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	#5627.20	57.8 PK	68.2	-10.4	2.77 V	209	52.7	5.1
2	*5785.00	104.2 PK			2.76 V	209	60.6	43.6
3	*5785.00	93.2 AV			2.76 V	209	49.6	43.6
4	#5997.60	58.1 PK	68.2	-10.1	2.77 V	209	52.8	5.3
5	11570.00	61.4 PK	74.0	-12.6	1.58 V	283	45.3	16.1
6	11570.00	47.1 AV	54.0	-6.9	1.58 V	283	31.0	16.1

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)
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) 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	58.4 PK	68.2	-9.8	4.00 H	297	53.3	5.1
2	*5825.00	96.9 PK			4.00 H	297	53.3	43.6
3	*5825.00	86.3 AV			4.00 H	297	42.7	43.6
4	#5929.60	59.6 PK	68.2	-8.6	4.00 H	297	54.3	5.3
5	11650.00	61.4 PK	74.0	-12.6	1.79 H	187	45.1	16.3
6	11650.00	46.5 AV	54.0	-7.5	1.79 H	187	30.2	16.3
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	#5647.20	59.0 PK	68.2	-9.2	2.56 V	209	53.9	5.1
2	*5825.00	102.9 PK			2.56 V	209	59.3	43.6
3	*5825.00	93.1 AV			2.56 V	209	49.5	43.6
4	#5931.20	58.7 PK	68.2	-9.5	2.56 V	209	53.4	5.3
5	11650.00	61.9 PK	74.0	-12.1	1.60 V	281	45.6	16.3
6	11650.00	47.8 AV	54.0	-6.2	1.60 V	281	31.5	16.3

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)
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 (20MHz)

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	#5625.60	57.7 PK	68.2	-10.5	3.90 H	299	52.6	5.1
2	*5745.00	100.8 PK			3.90 H	299	57.2	43.6
3	*5745.00	89.7 AV			3.90 H	299	46.1	43.6
4	#5940.00	59.1 PK	68.2	-9.1	3.90 H	299	53.8	5.3
5	11490.00	61.1 PK	74.0	-12.9	1.77 H	289	45.0	16.1
6	11490.00	46.8 AV	54.0	-7.2	1.77 H	289	30.7	16.1
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	#5602.40	58.0 PK	68.2	-10.2	2.72 V	207	53.0	5.0
2	*5745.00	104.3 PK			2.72 V	207	60.7	43.6
3	*5745.00	93.8 AV			2.72 V	207	50.2	43.6
4	#5936.80	59.2 PK	68.2	-9.0	2.72 V	207	53.9	5.3
5	11490.00	61.3 PK	74.0	-12.7	1.59 V	198	45.2	16.1
6	11490.00	47.1 AV	54.0	-6.9	1.59 V	198	31.0	16.1

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)
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	#5643.48	59.4 PK	68.2	-8.8	3.35 H	302	54.3	5.1
2	*5785.00	102.5 PK			3.35 H	302	58.9	43.6
3	*5785.00	91.9 AV			3.35 H	302	48.3	43.6
4	#5937.39	59.6 PK	68.2	-8.6	3.35 H	302	54.3	5.3
5	11570.00	61.1 PK	74.0	-12.9	1.77 H	268	45.0	16.1
6	11570.00	47.0 AV	54.0	-7.0	1.77 H	268	30.9	16.1
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	#5625.60	58.3 PK	68.2	-9.9	2.26 V	192	53.2	5.1
2	*5785.00	105.9 PK			2.26 V	192	62.3	43.6
3	*5785.00	95.7 AV			2.26 V	192	52.1	43.6
4	#5976.00	58.1 PK	68.2	-10.1	2.26 V	192	52.7	5.4
5	11570.00	61.4 PK	74.0	-12.6	1.60 V	199	45.3	16.1
6	11570.00	47.3 AV	54.0	-6.7	1.60 V	199	31.2	16.1

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)
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) 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	#5622.40	58.9 PK	68.2	-9.3	3.96 H	298	53.8	5.1
2	*5825.00	98.2 PK			3.96 H	298	54.6	43.6
3	*5825.00	87.2 AV			3.96 H	298	43.6	43.6
4	#5972.00	59.1 PK	68.2	-9.1	3.96 H	298	53.7	5.4
5	11650.00	61.2 PK	74.0	-12.8	1.79 H	283	44.9	16.3
6	11650.00	47.4 AV	54.0	-6.6	1.79 H	283	31.1	16.3
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	#5612.00	60.3 PK	68.2	-7.9	3.22 V	156	55.3	5.0
2	*5825.00	102.6 PK			3.22 V	156	59.0	43.6
3	*5825.00	92.7 AV			3.22 V	156	49.1	43.6
4	#5993.60	60.2 PK	68.2	-8.0	3.22 V	156	54.9	5.3
5	11650.00	61.6 PK	74.0	-12.4	1.56 V	179	45.3	16.3
6	11650.00	47.8 AV	54.0	-6.2	1.56 V	179	31.5	16.3

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)
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 (40MHz)

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	#5629.60	59.1 PK	68.2	-9.1	3.55 H	293	54.0	5.1
2	*5755.00	96.6 PK			3.55 H	293	53.0	43.6
3	*5755.00	86.2 AV			3.55 H	293	42.6	43.6
4	#5971.20	58.8 PK	68.2	-9.4	3.55 H	293	53.5	5.3
5	11510.00	60.9 PK	74.0	-13.1	1.89 H	199	45.0	15.9
6	11510.00	47.1 AV	54.0	-6.9	1.89 H	199	31.2	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5620.80	58.3 PK	68.2	-9.9	2.85 V	209	53.2	5.1
2	*5755.00	101.2 PK			2.85 V	209	57.6	43.6
3	*5755.00	90.4 AV			2.85 V	209	46.8	43.6
4	#5944.00	59.0 PK	68.2	-9.2	2.85 V	209	53.7	5.3
5	11510.00	61.2 PK	74.0	-12.8	1.57 V	272	45.3	15.9
6	11510.00	47.4 AV	54.0	-6.6	1.57 V	272	31.5	15.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5619.20	58.9 PK	68.2	-9.3	3.44 H	310	53.8	5.1
2	*5795.00	94.9 PK			3.44 H	310	51.3	43.6
3	*5795.00	84.3 AV			3.44 H	310	40.7	43.6
4	#5972.00	59.5 PK	68.2	-8.7	3.44 H	310	54.1	5.4
5	11590.00	61.1 PK	74.0	-12.9	1.82 H	198	45.0	16.1
6	11590.00	47.3 AV	54.0	-6.7	1.82 H	198	31.2	16.1
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	#5620.80	61.0 PK	68.2	-7.2	2.61 V	184	55.9	5.1
2	*5795.00	101.9 PK			2.61 V	184	58.3	43.6
3	*5795.00	91.2 AV			2.61 V	184	47.6	43.6
4	#5976.80	62.1 PK	68.2	-6.1	2.61 V	184	56.7	5.4
5	11590.00	61.4 PK	74.0	-12.6	1.55 V	297	45.3	16.1
6	11590.00	47.6 AV	54.0	-6.4	1.55 V	297	31.5	16.1

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)
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.

802.11ac (80MHz)

CHANNEL	TX Channel 155	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	#5633.60	58.4 PK	68.2	-9.8	3.54 H	293	53.3	5.1
2	*5775.00	93.3 PK			3.54 H	293	49.7	43.6
3	*5775.00	82.5 AV			3.54 H	293	38.9	43.6
4	#5985.60	59.0 PK	68.2	-9.2	3.54 H	293	53.7	5.3
5	11550.00	60.8 PK	74.0	-13.2	1.79 H	188	44.8	16.0
6	11550.00	47.0 AV	54.0	-7.0	1.79 H	188	31.0	16.0
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	#5621.60	58.7 PK	68.2	-9.5	2.88 V	155	53.6	5.1
2	*5775.00	97.2 PK			2.88 V	155	53.6	43.6
3	*5775.00	87.1 AV			2.88 V	155	43.5	43.6
4	#5945.60	59.0 PK	68.2	-9.2	2.88 V	155	53.7	5.3
5	11550.00	61.2 PK	74.0	-12.8	1.53 V	291	45.2	16.0
6	11550.00	47.5 AV	54.0	-6.5	1.53 V	291	31.5	16.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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.

Chain B

802.11a

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	#5626.40	58.3 PK	68.2	-9.9	1.57 H	74	53.2	5.1
2	*5745.00	100.4 PK			1.57 H	74	56.8	43.6
3	*5745.00	89.8 AV			1.57 H	74	46.2	43.6
4	#5965.60	58.6 PK	68.2	-9.6	1.57 H	74	53.3	5.3
5	11490.00	61.2 PK	74.0	-12.8	1.67 H	311	45.1	16.1
6	11490.00	47.9 AV	54.0	-6.1	1.67 H	311	31.8	16.1
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	#5648.80	57.9 PK	68.2	-10.3	2.03 V	20	52.8	5.1
2	*5745.00	105.4 PK			2.03 V	20	61.8	43.6
3	*5745.00	95.5 AV			2.03 V	20	51.9	43.6
4	#5928.00	58.8 PK	68.2	-9.4	2.03 V	20	53.5	5.3
5	11490.00	61.9 PK	74.0	-12.1	1.42 V	129	45.8	16.1
6	11490.00	48.7 AV	54.0	-5.3	1.42 V	129	32.6	16.1

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)
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	#5642.40	58.5 PK	68.2	-9.7	1.51 H	74	53.4	5.1
2	*5785.00	101.2 PK			1.51 H	74	57.6	43.6
3	*5785.00	90.5 AV			1.51 H	74	46.9	43.6
4	#5951.20	59.5 PK	68.2	-8.7	1.51 H	74	54.2	5.3
5	11570.00	61.3 PK	74.0	-12.7	1.56 H	302	45.2	16.1
6	11570.00	47.8 AV	54.0	-6.2	1.56 H	302	31.7	16.1
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	#5620.00	58.1 PK	68.2	-10.1	1.84 V	21	53.0	5.1
2	*5785.00	106.1 PK			1.84 V	21	62.5	43.6
3	*5785.00	95.7 AV			1.84 V	21	52.1	43.6
4	#5960.80	58.8 PK	68.2	-9.4	1.84 V	21	53.5	5.3
5	11570.00	62.0 PK	74.0	-12.0	1.28 V	126	45.9	16.1
6	11570.00	49.0 AV	54.0	-5.0	1.28 V	126	32.9	16.1

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)
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) 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	#5600.00	57.9 PK	68.2	-10.3	1.69 H	60	52.9	5.0
2	*5825.00	99.2 PK			1.69 H	60	55.6	43.6
3	*5825.00	88.1 AV			1.69 H	60	44.5	43.6
4	#5956.80	58.0 PK	68.2	-10.2	1.69 H	60	52.7	5.3
5	11650.00	61.5 PK	74.0	-12.5	1.71 H	311	45.2	16.3
6	11650.00	48.0 AV	54.0	-6.0	1.71 H	311	31.7	16.3
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	58.1 PK	68.2	-10.1	1.79 V	20	53.0	5.1
2	*5825.00	105.0 PK			1.79 V	20	61.4	43.6
3	*5825.00	94.8 AV			1.79 V	20	51.2	43.6
4	#5970.40	59.0 PK	68.2	-9.2	1.70 V	20	53.7	5.3
5	11650.00	61.8 PK	74.0	-12.2	1.22 V	108	45.5	16.3
6	11650.00	49.0 AV	54.0	-5.0	1.22 V	108	32.7	16.3

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)
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 (20MHz)

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	#5621.60	60.1 PK	68.2	-8.1	1.51 H	221	55.0	5.1
2	*5745.00	100.4 PK			1.51 H	221	56.8	43.6
3	*5745.00	89.7 AV			1.51 H	221	46.1	43.6
4	#5986.40	60.0 PK	68.2	-8.2	1.51 H	221	54.7	5.3
5	11490.00	61.4 PK	74.0	-12.6	1.54 H	322	45.3	16.1
6	11490.00	47.6 AV	54.0	-6.4	1.54 H	322	31.5	16.1
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	#5606.40	61.2 PK	68.2	-7.0	1.41 V	204	56.2	5.0
2	*5745.00	108.1 PK			1.41 V	204	64.5	43.6
3	*5745.00	97.5 AV			1.41 V	204	53.9	43.6
4	#5956.80	61.4 PK	68.2	-6.8	1.41 V	204	56.1	5.3
5	11490.00	61.7 PK	74.0	-12.3	1.52 V	124	45.6	16.1
6	11490.00	48.2 AV	54.0	-5.8	1.52 V	124	32.1	16.1

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)
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	#5629.60	57.5 PK	68.2	-10.7	1.29 H	77	52.4	5.1
2	*5785.00	100.8 PK			1.29 H	77	57.2	43.6
3	*5785.00	89.8 AV			1.29 H	77	46.2	43.6
4	#5957.60	58.5 PK	68.2	-9.7	1.29 H	77	53.2	5.3
5	11570.00	61.4 PK	74.0	-12.6	1.59 H	311	45.3	16.1
6	11570.00	48.1 AV	54.0	-5.9	1.59 H	311	32.0	16.1
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	#5648.80	58.7 PK	68.2	-9.5	1.53 V	208	53.6	5.1
2	*5785.00	105.2 PK			1.53 V	208	61.6	43.6
3	*5785.00	94.5 AV			1.53 V	208	50.9	43.6
4	#5981.60	59.2 PK	68.2	-9.0	1.53 V	208	53.9	5.3
5	11570.00	61.9 PK	74.0	-12.1	1.55 V	126	45.8	16.1
6	11570.00	48.6 AV	54.0	-5.4	1.55 V	126	32.5	16.1

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)
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) 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	#5644.80	59.1 PK	68.2	-9.1	1.53 H	75	54.0	5.1
2	*5825.00	98.7 PK			1.53 H	75	55.1	43.6
3	*5825.00	88.5 AV			1.53 H	75	44.9	43.6
4	#5967.20	59.5 PK	68.2	-8.7	1.53 H	75	54.2	5.3
5	11650.00	61.3 PK	74.0	-12.7	1.60 H	301	45.0	16.3
6	11650.00	47.9 AV	54.0	-6.1	1.60 H	301	31.6	16.3
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	#5632.00	58.4 PK	68.2	-9.8	1.99 V	23	53.3	5.1
2	*5825.00	105.2 PK			1.99 V	23	61.6	43.6
3	*5825.00	104.1 AV			1.99 V	23	60.5	43.6
4	#5969.60	59.3 PK	68.2	-8.9	1.99 V	23	54.0	5.3
5	11650.00	62.1 PK	74.0	-11.9	1.43 V	118	45.8	16.3
6	11650.00	48.9 AV	54.0	-5.1	1.43 V	118	32.6	16.3

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)
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 (40MHz)

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	#5629.60	58.2 PK	68.2	-10.0	1.49 H	74	53.1	5.1
2	*5755.00	98.1 PK			1.49 H	74	54.5	43.6
3	*5755.00	88.0 AV			1.49 H	74	44.4	43.6
4	#5997.60	58.9 PK	68.2	-9.3	1.49 H	74	53.6	5.3
5	11510.00	60.7 PK	74.0	-13.3	1.69 H	221	44.8	15.9
6	11510.00	46.9 AV	54.0	-7.1	1.69 H	221	31.0	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5636.80	59.5 PK	68.2	-8.7	1.92 V	202	54.4	5.1
2	*5755.00	101.2 PK			1.92 V	202	57.6	43.6
3	*5755.00	91.2 AV			1.92 V	202	47.6	43.6
4	#5994.40	58.6 PK	68.2	-9.6	1.92 V	202	53.3	5.3
5	11510.00	61.3 PK	74.0	-12.7	1.48 V	266	45.4	15.9
6	11510.00	47.3 AV	54.0	-6.7	1.48 V	266	31.4	15.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5602.40	58.7 PK	68.2	-9.5	1.54 H	78	53.7	5.0
2	*5795.00	99.9 PK			1.54 H	79	56.3	43.6
3	*5795.00	89.0 AV			1.54 H	79	45.4	43.6
4	#5940.00	59.2 PK	68.2	-9.0	1.54 H	78	53.9	5.3
5	11590.00	60.9 PK	74.0	-13.1	1.71 H	209	44.8	16.1
6	11590.00	47.0 AV	54.0	-7.0	1.71 H	209	30.9	16.1
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	#5633.60	58.2 PK	68.2	-10.0	2.28 V	215	53.1	5.1
2	*5795.00	105.2 PK			2.28 V	215	61.6	43.6
3	*5795.00	94.7 AV			2.28 V	215	51.1	43.6
4	#5952.80	58.8 PK	68.2	-9.4	2.28 V	215	53.5	5.3
5	11590.00	61.4 PK	74.0	-12.6	1.44 V	232	45.3	16.1
6	11590.00	47.6 AV	54.0	-6.4	1.44 V	232	31.5	16.1

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)
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.

802.11ac (80MHz)

CHANNEL	TX Channel 155	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	#5604.00	58.9 PK	68.2	-9.3	1.49 H	78	53.9	5.0
2	*5775.00	91.6 PK			1.49 H	78	48.0	43.6
3	*5775.00	81.4 AV			1.49 H	78	37.8	43.6
4	#5943.20	58.3 PK	68.2	-9.9	1.49 H	78	53.0	5.3
5	11550.00	60.9 PK	74.0	-13.1	1.68 H	216	44.9	16.0
6	11550.00	46.8 AV	54.0	-7.2	1.68 H	216	30.8	16.0
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	#5619.20	58.0 PK	68.2	-10.2	2.19 V	216	52.9	5.1
2	*5775.00	97.0 PK			2.19 V	216	53.4	43.6
3	*5775.00	86.2 AV			2.19 V	216	42.6	43.6
4	#5928.00	58.9 PK	68.2	-9.3	2.19 V	216	53.6	5.3
5	11550.00	61.2 PK	74.0	-12.8	1.49 V	255	45.2	16.0
6	11550.00	47.0 AV	54.0	-7.0	1.49 V	255	31.0	16.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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.

Chain A + B

802.11n (20MHz)

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	#5634.40	60.2 PK	68.2	-8.0	1.49 H	226	55.1	5.1
2	*5745.00	95.3 PK			1.49 H	226	51.7	43.6
3	*5745.00	85.0 AV			1.49 H	226	41.4	43.6
4	#5965.60	59.7 PK	68.2	-8.5	1.49 H	226	54.4	5.3
5	11490.00	58.5 PK	74.0	-15.5	1.52 H	248	42.4	16.1
6	11490.00	46.1 AV	54.0	-7.9	1.52 H	248	30.0	16.1
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	#5618.40	60.2 PK	68.2	-8.0	1.51 V	2	55.1	5.1
2	*5745.00	102.1 PK			1.51 V	2	58.5	43.6
3	*5745.00	91.7 AV			1.51 V	2	48.1	43.6
4	#5962.40	59.9 PK	68.2	-8.3	1.51 V	2	54.6	5.3
5	11490.00	59.0 PK	74.0	-15.0	1.50 V	122	42.9	16.1
6	11490.00	46.2 AV	54.0	-7.8	1.50 V	122	30.1	16.1

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)
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	#5608.80	60.1 PK	68.2	-8.1	1.58 H	358	55.1	5.0
2	*5785.00	100.2 PK			1.58 H	358	56.6	43.6
3	*5785.00	88.0 AV			1.58 H	358	44.4	43.6
4	#5943.20	60.8 PK	68.2	-7.4	1.58 H	358	55.5	5.3
5	11570.00	59.6 PK	74.0	-14.4	1.44 H	34	43.5	16.1
6	11570.00	46.9 AV	54.0	-7.1	1.44 H	34	30.8	16.1
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	#5625.60	58.6 PK	68.2	-9.6	1.49 V	18	53.5	5.1
2	*5785.00	104.9 PK			1.49 V	18	61.3	43.6
3	*5785.00	95.1 AV			1.49 V	18	51.5	43.6
4	#5928.00	58.6 PK	68.2	-9.6	1.49 V	18	53.3	5.3
5	11570.00	60.4 PK	74.0	-13.6	1.52 V	88	44.3	16.1
6	11570.00	47.5 AV	54.0	-6.5	1.52 V	88	31.4	16.1

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)
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) 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	#5628.80	59.6 PK	68.2	-8.6	1.52 H	74	54.5	5.1
2	*5825.00	100.1 PK			1.52 H	74	56.5	43.6
3	*5825.00	89.5 AV			1.52 H	74	45.9	43.6
4	#5961.60	59.9 PK	68.2	-8.3	1.52 H	74	54.6	5.3
5	11650.00	61.1 PK	74.0	-12.9	1.59 H	127	44.8	16.3
6	11650.00	47.5 AV	54.0	-6.5	1.59 H	127	31.2	16.3
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	#5630.40	59.4 PK	68.2	-8.8	1.51 V	16	54.3	5.1
2	*5825.00	105.1 PK			1.51 V	16	61.5	43.6
3	*5825.00	94.6 AV			1.51 V	16	51.0	43.6
4	#5948.80	58.9 PK	68.2	-9.3	1.51 V	16	53.6	5.3
5	11650.00	61.6 PK	74.0	-12.4	1.53 V	144	45.3	16.3
6	11650.00	47.9 AV	54.0	-6.1	1.53 V	144	31.6	16.3

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)
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 (40MHz)

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	#5618.40	58.3 PK	68.2	-9.9	1.54 H	66	53.2	5.1
2	*5755.00	91.1 PK			1.54 H	66	47.5	43.6
3	*5755.00	81.0 AV			1.54 H	66	37.4	43.6
4	#5971.20	58.8 PK	68.2	-9.4	1.54 H	66	53.5	5.3
5	11570.00	59.2 PK	74.0	-14.8	1.50 H	122	43.1	16.1
6	11570.00	47.0 AV	54.0	-7.0	1.50 H	122	30.9	16.1
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	#5620.80	59.3 PK	68.2	-8.9	1.52 V	15	54.2	5.1
2	*5755.00	99.8 PK			1.52 V	15	56.2	43.6
3	*5755.00	89.3 AV			1.52 V	15	45.7	43.6
4	#5958.40	59.6 PK	68.2	-8.6	1.52 V	15	54.3	5.3
5	11510.00	59.8 PK	74.0	-14.2	1.50 V	122	43.9	15.9
6	11510.00	47.3 AV	54.0	-6.7	1.50 V	122	31.4	15.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5620.00	59.9 PK	68.2	-8.3	1.51 H	310	54.8	5.1
2	*5795.00	92.7 PK			1.51 H	310	49.1	43.6
3	*5795.00	82.8 AV			1.51 H	310	39.2	43.6
4	#5984.00	60.4 PK	68.2	-7.8	1.51 H	310	55.1	5.3
5	11590.00	60.4 PK	74.0	-13.6	1.88 H	344	44.3	16.1
6	11590.00	47.5 AV	54.0	-6.5	1.88 H	344	31.4	16.1
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	#5620.80	60.2 PK	68.2	-8.0	2.74 V	349	55.1	5.1
2	*5795.00	101.8 PK			2.74 V	349	58.2	43.6
3	*5795.00	91.2 AV			2.74 V	349	47.6	43.6
4	#5957.60	59.8 PK	68.2	-8.4	2.74 V	349	54.5	5.3
5	11590.00	61.9 PK	74.0	-12.1	2.23 V	322	45.8	16.1
6	11590.00	48.2 AV	54.0	-5.8	2.23 V	322	32.1	16.1

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)
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.

802.11ac (80MHz)

CHANNEL	TX Channel 155	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	60.1 PK	68.2	-8.1	2.51 H	293	55.0	5.1
2	*5775.00	87.7 PK			2.51 H	293	44.1	43.6
3	*5775.00	76.4 AV			2.51 H	293	32.8	43.6
4	#5948.80	60.2 PK	68.2	-8.0	2.51 H	293	54.9	5.3
5	11550.00	61.4 PK	74.0	-12.6	1.83 H	286	45.4	16.0
6	11550.00	47.3 AV	54.0	-6.7	1.83 H	286	31.3	16.0
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	#5608.00	59.7 PK	68.2	-8.5	2.64 V	12	54.7	5.0
2	*5775.00	95.2 PK			2.64 V	12	51.6	43.6
3	*5775.00	83.7 AV			2.64 V	12	40.1	43.6
4	#5980.80	59.6 PK	68.2	-8.6	2.64 V	12	54.3	5.3
5	11550.00	61.9 PK	74.0	-12.1	1.25 V	235	45.9	16.0
6	11550.00	47.7 AV	54.0	-6.3	1.25 V	235	31.7	16.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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

Chain A

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	95.96	33.2 QP	43.5	-10.3	2.00 H	115	52.1	-18.9
2	206.54	31.4 QP	43.5	-12.1	1.01 H	279	47.4	-16.0
3	239.52	33.2 QP	46.0	-12.8	1.50 H	7	47.2	-14.0
4	288.02	30.6 QP	46.0	-15.4	1.01 H	246	42.1	-11.5
5	431.58	30.2 QP	46.0	-15.8	1.01 H	137	38.2	-8.0
6	534.40	32.3 QP	46.0	-13.7	1.25 H	157	38.1	-5.8
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	35.82	34.6 QP	40.0	-5.4	2.00 V	309	50.0	-15.4
2	53.28	25.6 QP	40.0	-14.4	1.00 V	4	39.5	-13.9
3	95.96	30.2 QP	43.5	-13.3	1.24 V	192	49.1	-18.9
4	144.46	24.5 QP	43.5	-19.0	1.00 V	31	38.2	-13.7
5	173.56	29.1 QP	43.5	-14.4	1.00 V	302	42.8	-13.7
6	534.40	27.8 QP	46.0	-18.2	1.24 V	78	33.6	-5.8

Remark:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	30.00	29.7 QP	40.0	-10.3	2.00 H	229	45.3	-15.6
2	72.68	25.4 QP	40.0	-14.6	1.26 H	296	41.7	-16.3
3	158.04	25.1 QP	43.5	-18.4	1.01 H	94	38.4	-13.3
4	206.54	25.9 QP	43.5	-17.6	1.26 H	304	41.9	-16.0
5	249.22	25.7 QP	46.0	-20.3	1.01 H	149	39.1	-13.4
6	835.10	40.7 QP	46.0	-5.3	1.26 H	178	39.3	1.4
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	**30.00**	**37.8 QP**	**40.0**	**-2.2**	**1.01 V**	**333**	**53.4**	**-15.6**
2	64.92	31.3 QP	40.0	-8.7	1.01 V	269	46.4	-15.1
3	94.02	24.1 QP	43.5	-19.4	1.26 V	261	43.3	-19.2
4	258.92	26.2 QP	46.0	-19.8	1.01 V	308	39.2	-13.0
5	499.48	29.7 QP	46.0	-16.3	1.01 V	180	36.2	-6.5
6	827.34	37.7 QP	46.0	-8.3	1.01 V	279	36.4	1.3

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable 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	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/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
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 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.

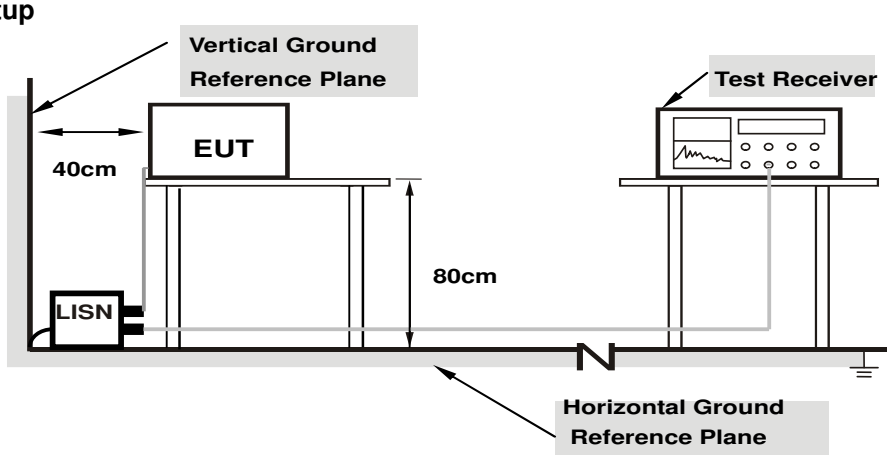
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

Chain A

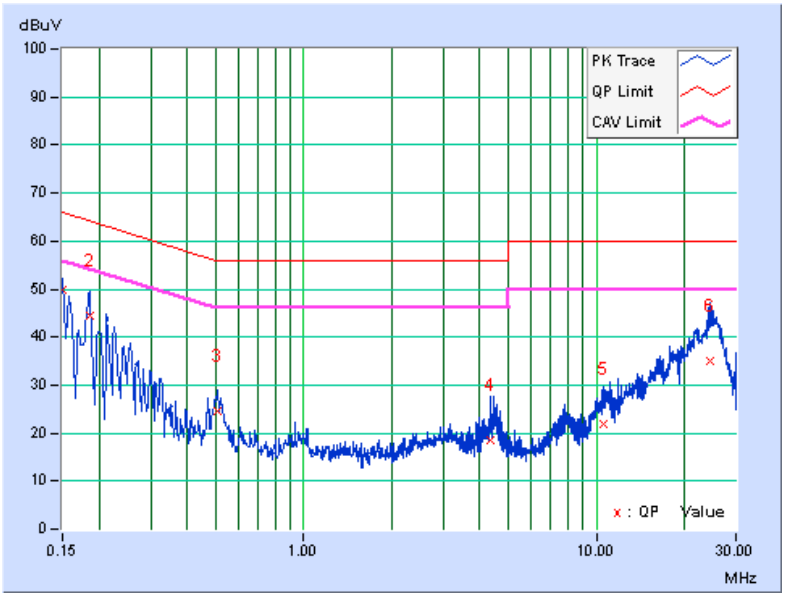
802.11a

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

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	**0.15000**	**10.01**	**39.98**	**23.69**	**49.99**	**33.70**	**66.00**	**56.00**	**-16.01**	**-22.30**
2	0.18508	10.03	34.56	19.17	44.59	29.20	64.25	54.25	-19.66	-25.05
3	0.50581	10.13	14.48	8.64	24.61	18.77	56.00	46.00	-31.39	-27.23
4	4.37280	10.43	8.02	-0.88	18.45	9.55	56.00	46.00	-37.55	-36.45
5	10.64053	10.77	11.13	4.22	21.90	14.99	60.00	50.00	-38.10	-35.01
6	24.57186	11.64	23.30	13.49	34.94	25.13	60.00	50.00	-25.06	-24.87

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.

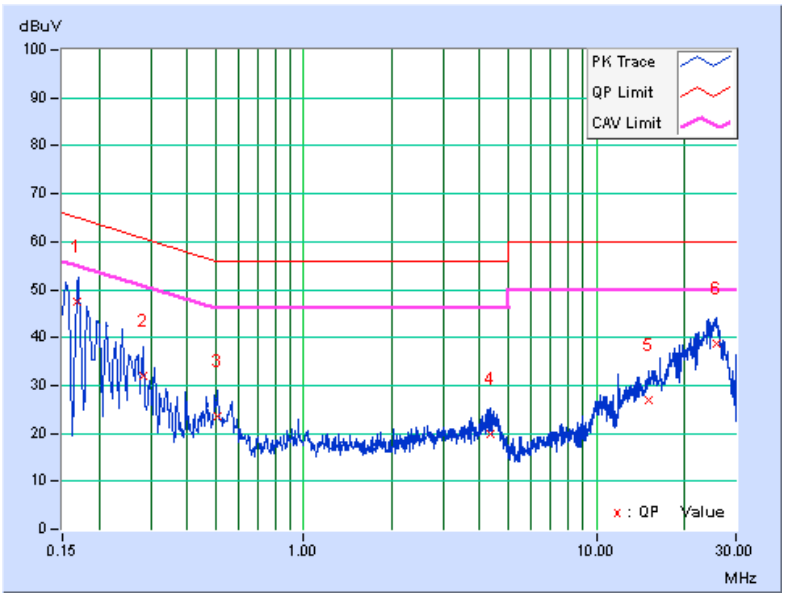


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	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	0.16922	10.03	37.39	19.01	47.42	29.04	65.00	55.00	-17.58	-25.96
2	0.28288	10.08	21.79	8.88	31.87	18.96	60.73	50.73	-28.86	-31.77
3	0.50641	10.14	13.48	6.81	23.62	16.95	56.00	46.00	-32.38	-29.05
4	4.35325	10.45	9.44	0.19	19.89	10.64	56.00	46.00	-36.11	-35.36
5	15.16831	11.12	15.69	9.20	26.81	20.32	60.00	50.00	-33.19	-29.68
6	25.76832	11.88	26.94	18.14	38.82	30.02	60.00	50.00	-21.18	-19.98

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.

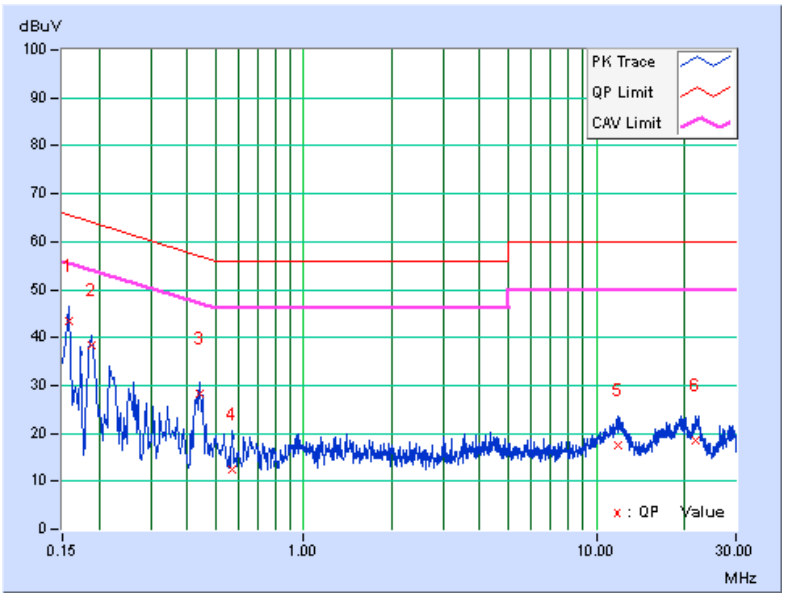


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	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	0.15782	10.02	33.43	16.96	43.45	26.98	65.58	55.58	-22.13	-28.60
2	0.18910	10.03	28.52	14.59	38.55	24.62	64.08	54.08	-25.53	-29.46
3	0.43934	10.13	18.24	10.85	28.37	20.98	57.07	47.07	-28.70	-26.09
4	0.57228	10.14	2.43	-2.45	12.57	7.69	56.00	46.00	-43.43	-38.31
5	11.92692	10.84	6.82	1.89	17.66	12.73	60.00	50.00	-42.34	-37.27
6	21.87787	11.48	6.88	2.03	18.36	13.51	60.00	50.00	-41.64	-36.49

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.

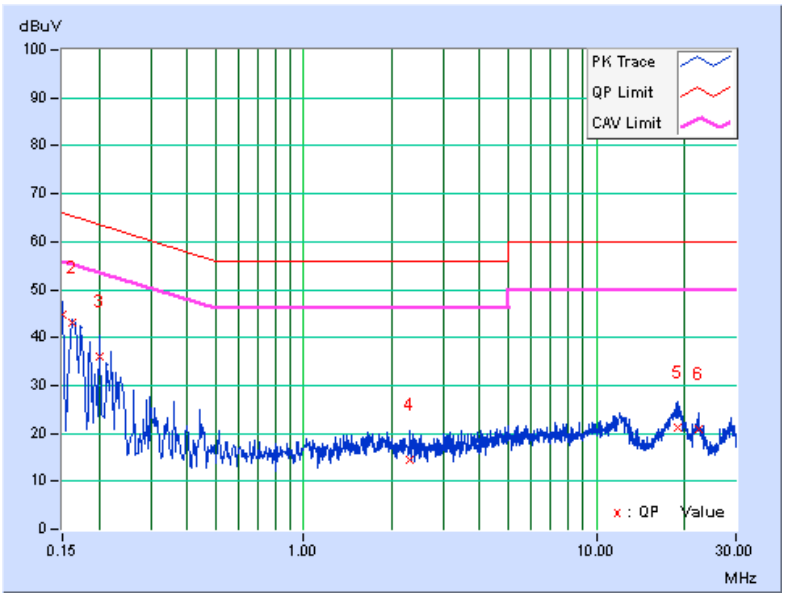


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	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	0.15000	10.03	34.74	17.33	44.77	27.36	66.00	56.00	-21.23	-28.64
2	0.16181	10.03	32.95	16.20	42.98	26.23	65.37	55.37	-22.39	-29.14
3	0.20084	10.04	26.06	9.08	36.10	19.12	63.58	53.58	-27.48	-34.46
4	2.31223	10.30	4.24	-1.72	14.54	8.58	56.00	46.00	-41.46	-37.42
5	18.88281	11.40	9.80	4.10	21.20	15.50	60.00	50.00	-38.80	-34.50
6	22.33143	11.64	9.35	2.41	20.99	14.05	60.00	50.00	-39.01	-35.95

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 Measurment

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)

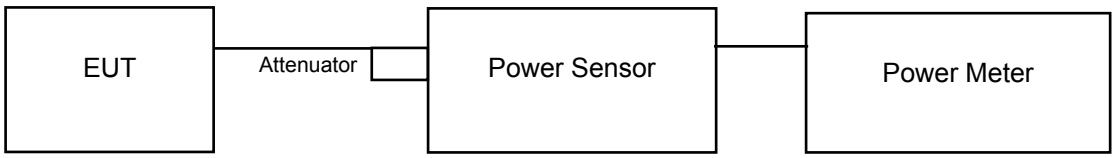
*B is the 26 dB emission bandwidth in megahertz

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 $N_{ANT} \geq 5$.

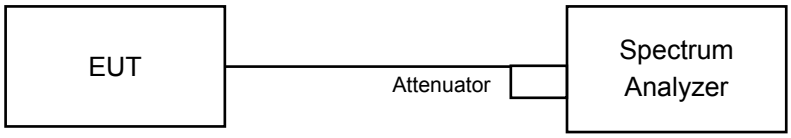
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

For 802.11a, 802.11n (HT20), 802.11n (HT40)



For 802.11ac (VHT80)



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

For 802.11a, 802.11n (HT20), 802.11n (HT40)
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 802.11ac (VHT80)

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

b. Set sweep trigger to “free run”.

c. Set RBW = 1 MHz.

d. Set VBW ≥ 3 MHz

e. Number of points in sweep ≥ 2 Span / RBW.

f. Sweep time ≤ (number of points in sweep) * T

g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.

h. Detector = RMS.

i. Trace mode = max hold.

j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’ s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

4.3.5 Deviation fromTest 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:

Chain A

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	75.683	18.79	30	Pass
157	5785	58.210	17.65	30	Pass
165	5825	45.082	16.54	30	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	60.814	17.84	30	Pass
157	5785	60.395	17.81	30	Pass
165	5825	45.290	16.56	30	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	45.499	16.58	30	Pass
157	5785	55.847	17.47	30	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
155	5775	45.499	16.58	30	Pass

Chain B

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	82.035	19.14	30	Pass
157	5785	**89.743**	19.53	30	Pass
165	5825	74.302	18.71	30	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	72.778	18.62	30	Pass
157	5785	83.753	19.23	30	Pass
165	5825	73.114	18.64	30	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
149	5745	46.774	16.70	30	Pass
157	5785	85.310	19.31	30	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
155	5775	21.038	13.23	30	Pass

Chain A + B

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	14.12	14.01	51.000	17.08	30	Pass
157	5785	14.90	15.10	63.262	18.01	30	Pass
165	5825	15.30	15.43	68.798	18.38	30	Pass

802.11n (40MHz)

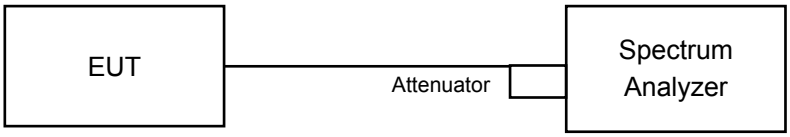
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	12.72	12.00	34.556	15.39	30	Pass
159	5795	13.40	13.60	44.787	16.51	30	Pass

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	9.83	9.10	17.744	12.49	30	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

Chain A

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
149	5745	26.00
157	5785	28.08
165	5825	29.16

802.11n (20MHz)

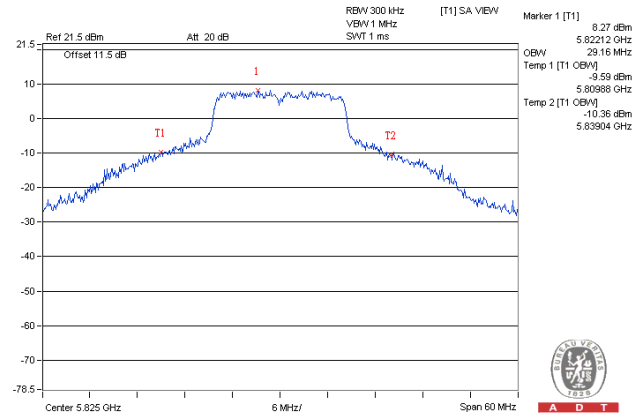
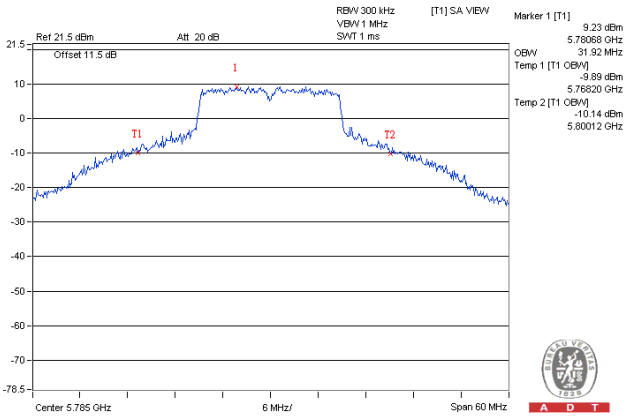
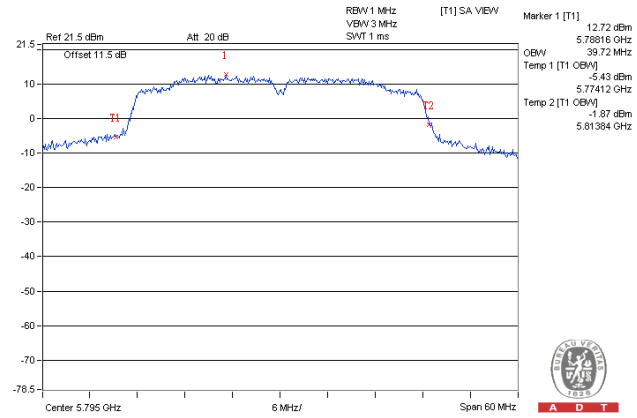
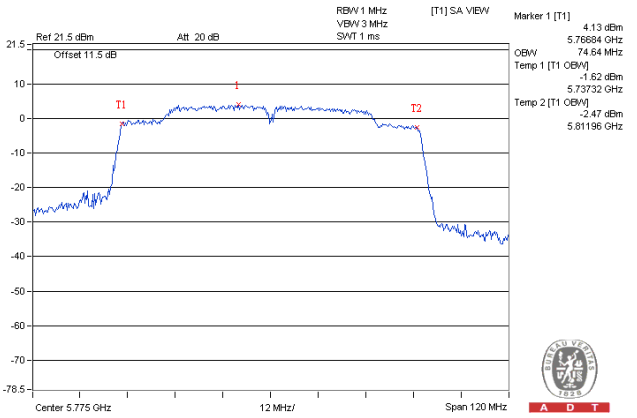
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
149	5745	18.72
157	5785	31.92
165	5825	28.32

802.11n (40MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
151	5755	36.48
159	5795	39.72

802.11ac (80MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
155	5775	74.64

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain B

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
149	5745	20.88
157	5785	29.40
165	5825	28.20

802.11n (20MHz)

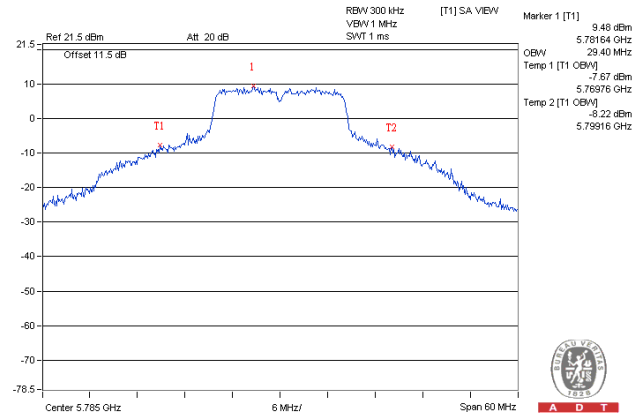
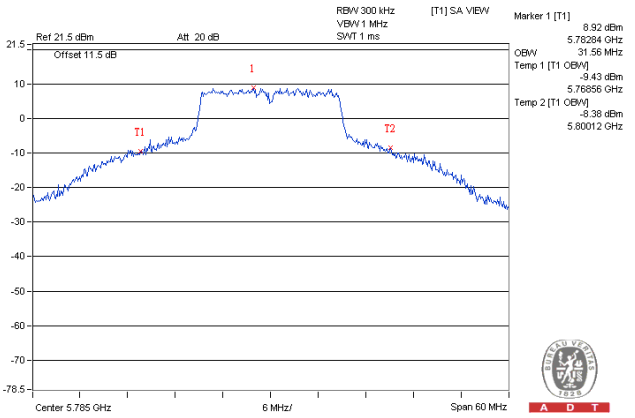
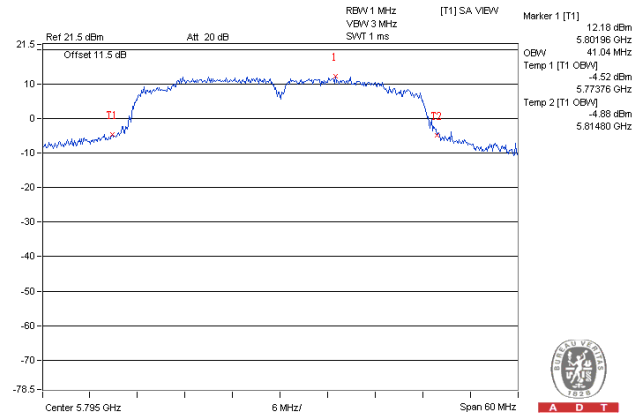
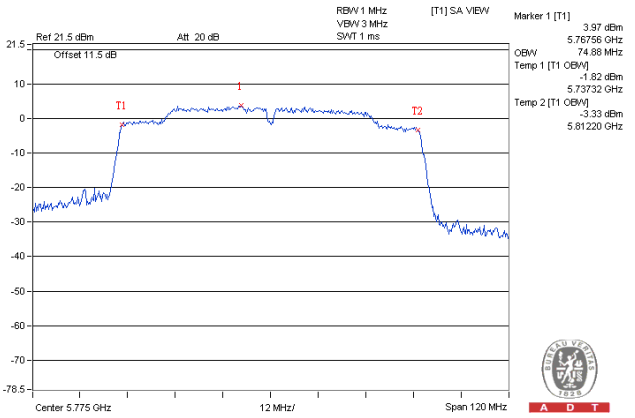
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
149	5745	22.70
157	5785	31.56
165	5825	30.12

802.11n (40MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
151	5755	36.48
159	5795	41.04

802.11ac (80MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
155	5775	74.88

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain A + B

802.11n (20MHz)

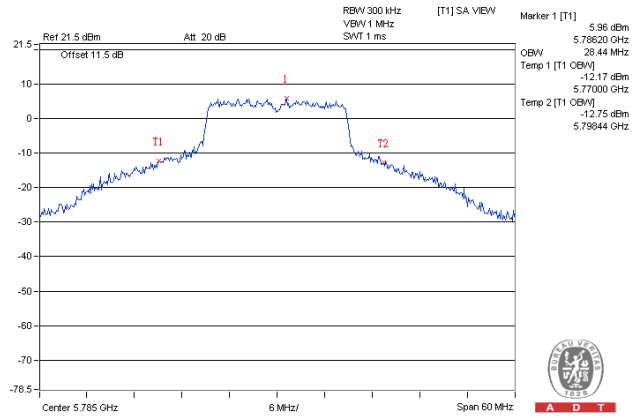
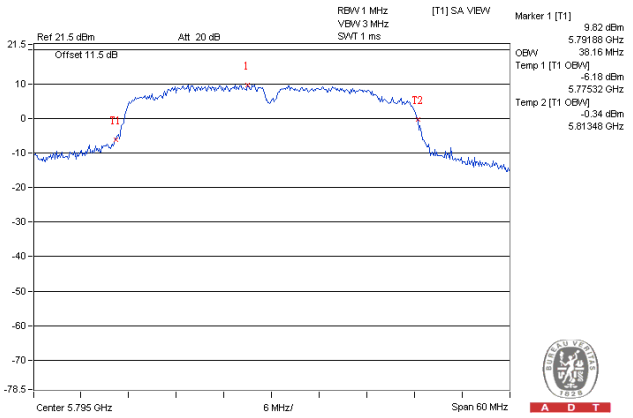
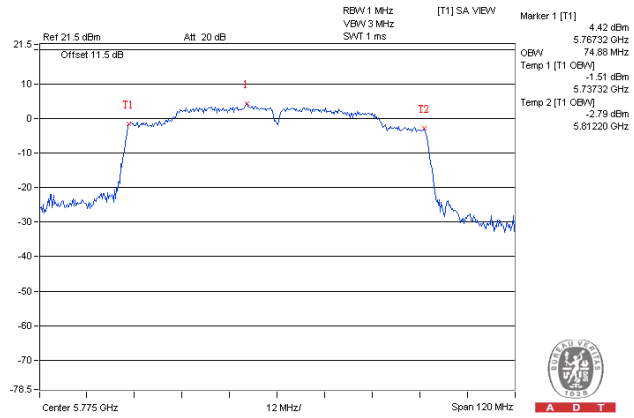
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
149	5745	18.52	19.04
157	5785	28.44	18.24
165	5825	26.88	18.12

802.11n (40MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
151	5755	36.48	36.12
159	5795	38.16	36.12

802.11ac (80MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
155	5775	74.88	74.88

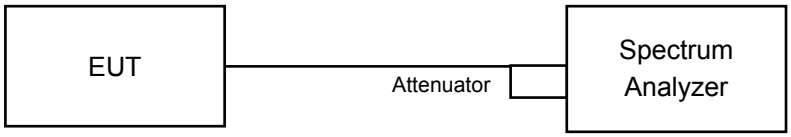
Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as Item 4.3.6.

4.5.7 Test Results

Chain A

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
149	5745	-3.42	-1.20	30.00	Pass
157	5785	-3.35	-1.13	30.00	Pass
165	5825	-4.26	-2.04	30.00	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
149	5745	-4.81	-2.59	0.10	-2.49	30.00	Pass
157	5785	-3.41	-1.19	0.10	-1.09	30.00	Pass
165	5825	-5.01	-2.79	0.10	-2.69	30.00	Pass

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

802.11n (40MHz)

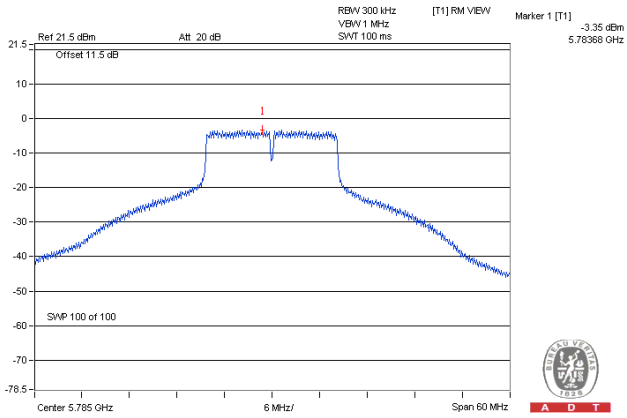
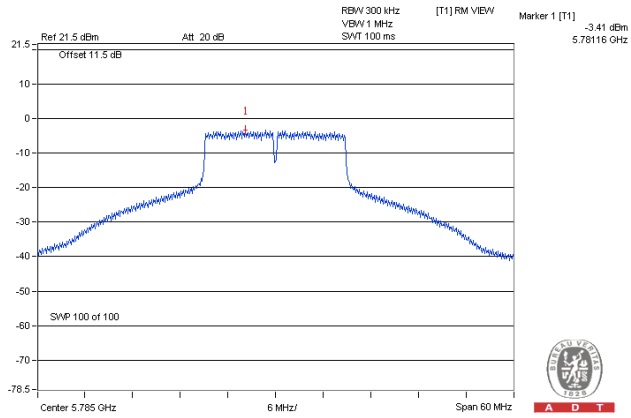
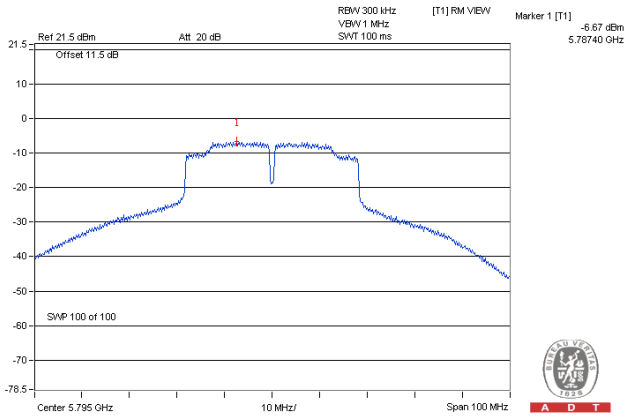
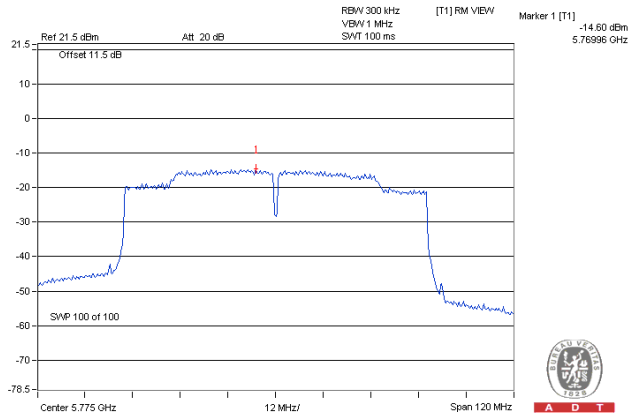
Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
151	5755	-8.27	-6.05	0.17	-5.88	30.00	Pass
159	5795	-6.67	-4.45	0.17	-4.28	30.00	Pass

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

802.11ac (80MHz)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
155	5775	-14.60	-12.38	0.26	-12.12	30.00	Pass

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

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain B

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
149	5745	-3.78	-1.56	30.00	Pass
157	5785	-3.74	-1.52	30.00	Pass
165	5825	-4.87	-2.65	30.00	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
149	5745	-3.96	-1.74	30.00	Pass
157	5785	-4.12	-1.90	30.00	Pass
165	5825	-5.15	-2.93	30.00	Pass

802.11n (40MHz)

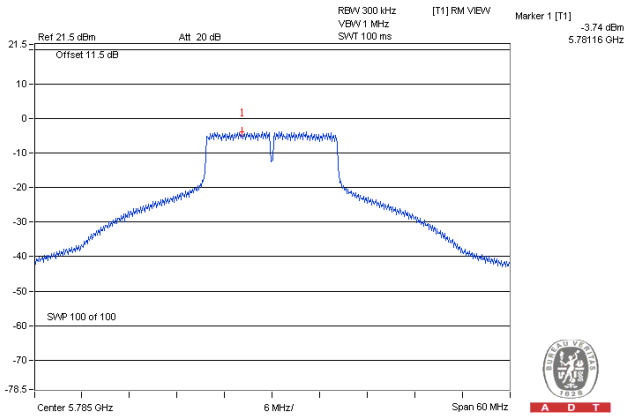
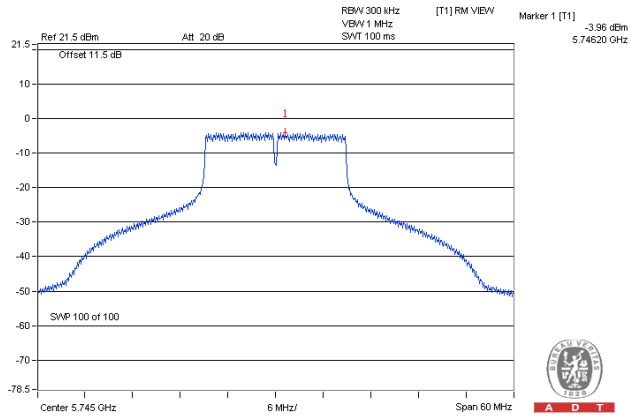
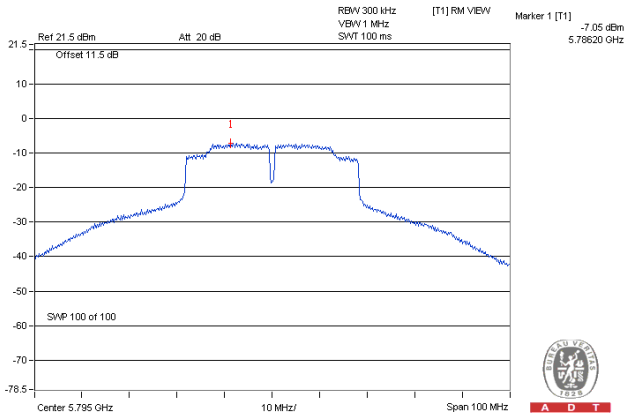
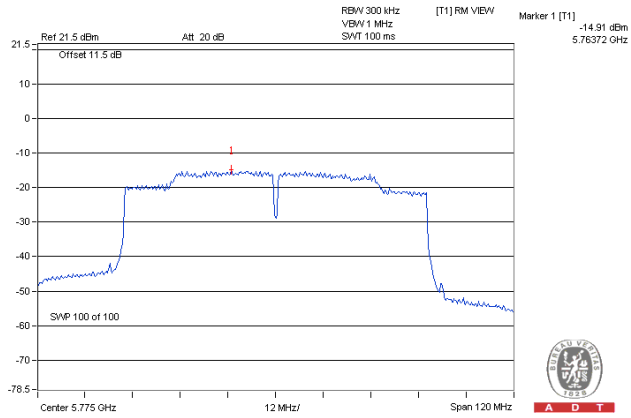
Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
151	5755	-9.25	-7.03	0.12	-6.91	30.00	Pass
159	5795	-7.05	-4.83	0.12	-4.71	30.00	Pass

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

802.11ac (80MHz)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
155	5775	-14.91	-12.69	0.26	-12.43	30.00	Pass

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

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain A + B

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	149	5745	-7.10	-4.88	3.01	0.10	-1.77	30.00	Pass
	157	5785	-6.92	-4.70	3.01	0.10	-1.59	30.00	Pass
	165	5825	-7.85	-5.63	3.01	0.10	-2.52	30.00	Pass
1	149	5745	-6.26	-4.04	3.01	0.10	-0.93	30.00	Pass
	157	5785	-10.12	-7.90	3.01	0.10	-4.79	30.00	Pass
	165	5825	-10.25	-8.03	3.01	0.10	-4.92	30.00	Pass

Note:
1. Directional gain = 1.4dBi + 10log(2) = 4.41 < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

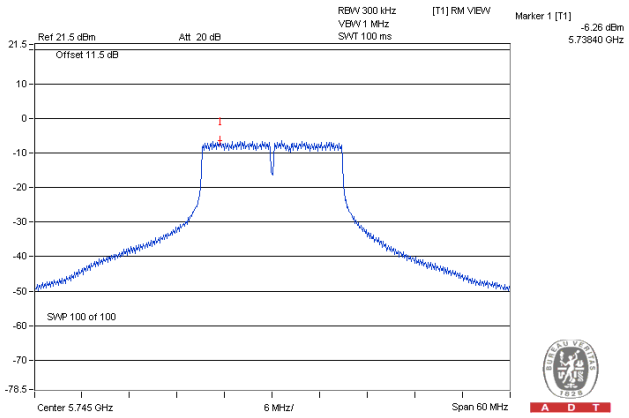
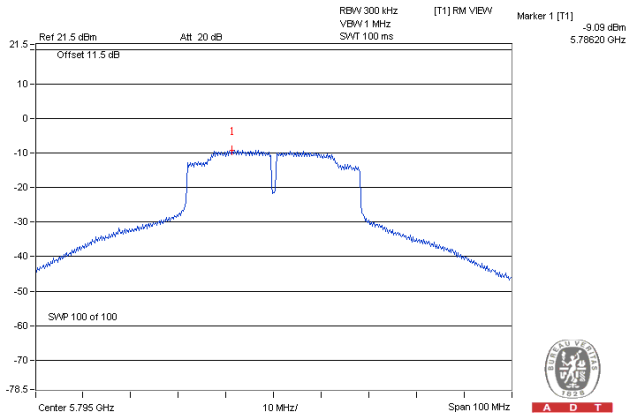
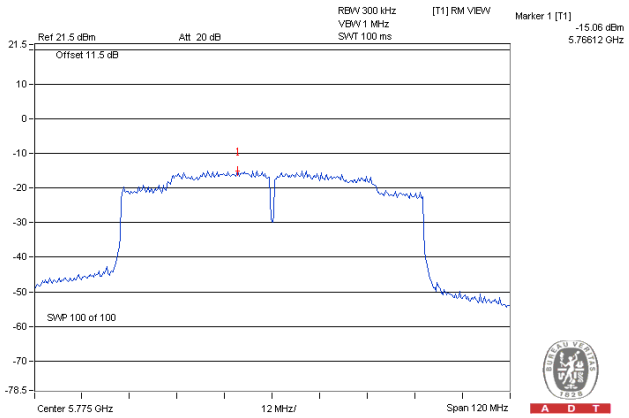
TX chain	Chan.	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	151	5755	-11.32	-9.10	3.01	0.16	-5.93	30.00	Pass
	159	5795	-9.09	-6.87	3.01	0.16	-3.70	30.00	Pass
1	151	5755	-11.51	-9.29	3.01	0.16	-6.12	30.00	Pass
	159	5795	-14.09	-11.87	3.01	0.16	-8.70	30.00	Pass

Note:
1. Directional gain = 1.4dBi + 10log(2) = 4.41 < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	155	5775	-15.06	-12.84	3.01	0.59	-9.24	30.00	Pass
1	155	5775	-18.78	-16.56	3.01	0.59	-12.96	30.00	Pass

Note:
1. Directional gain = 1.4dBi + 10log(2) = 4.41 < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

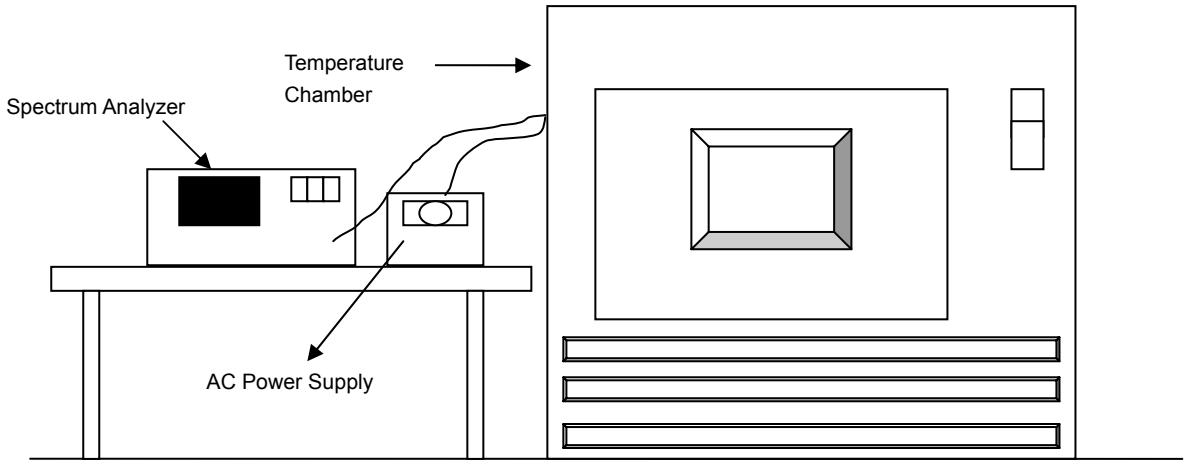
Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Procedure

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.

4.6.4 Deviation from Test Standard

No deviation.

4.6.5 EUT Operating Condition

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

4.6.6 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
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	5745.0076	0.00013	5745.0102	0.00018	5745.0107	0.00019	5745.0068	0.00012
40	120	5745.0017	0.00003	5745.0014	0.00002	5745.0043	0.00007	5745.0019	0.00003
30	120	5745.0019	0.00003	5744.999	-0.00002	5744.9992	-0.00001	5744.9981	-0.00003
20	120	5745.0111	0.00019	5745.0142	0.00025	5745.0121	0.00021	5745.012	0.00021
10	120	5744.997	-0.00005	5744.9984	-0.00003	5744.9995	-0.00001	5744.9973	-0.00005
0	120	5745.0198	0.00034	5745.019	0.00033	5745.0188	0.00033	5745.0219	0.00038
-10	120	5744.9776	-0.00039	5744.9785	-0.00037	5744.9745	-0.00044	5744.9762	-0.00041
-20	120	5745.0123	0.00021	5745.0127	0.00022	5745.0091	0.00016	5745.0086	0.00015
-30	120	5744.9816	-0.00032	5744.979	-0.00037	5744.9802	-0.00034	5744.9787	-0.00037

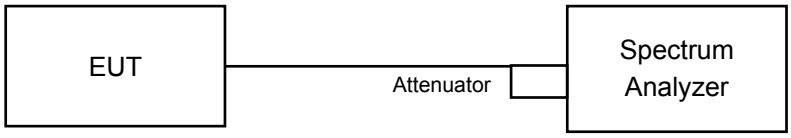
Frequency Stability Versus Voltage									
Operating Frequency: 5745MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)
20	138	5745.0107	0.00019	5745.015	0.00026	5745.0115	0.00020	5745.0122	0.00021
	120	5745.0111	0.00019	5745.0142	0.00025	5745.0121	0.00021	5745.012	0.00021
	102	5745.0116	0.00020	5745.0144	0.00025	5745.0112	0.00019	5745.0131	0.00023

4.7 6dB Bandwidth Measurment

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

MEASUREMENT PROCEDURE REF

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

Chain A

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.37	0.5	Pass
157	5785	16.41	0.5	Pass
165	5825	16.40	0.5	Pass

802.11n (20MHz)

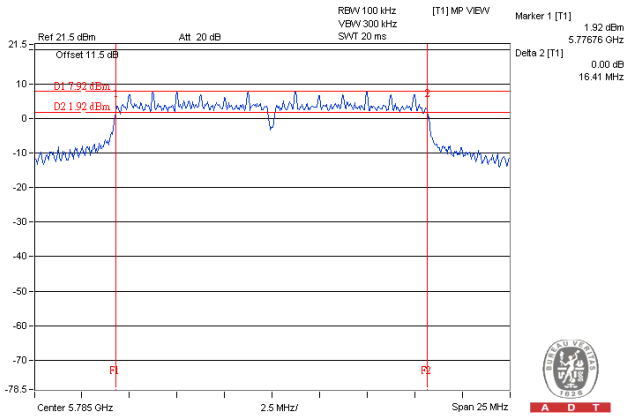
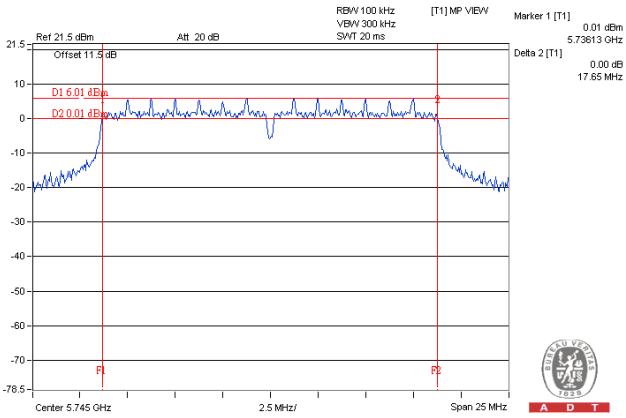
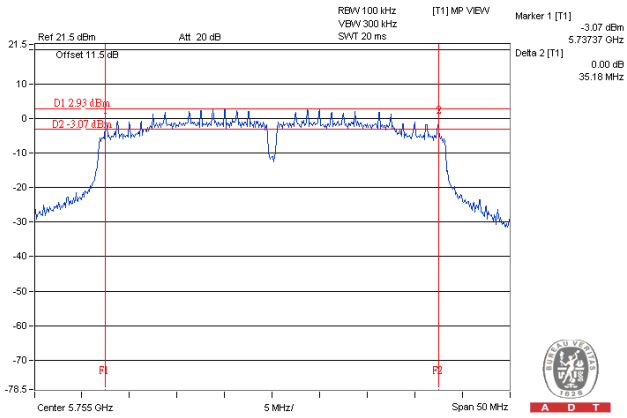
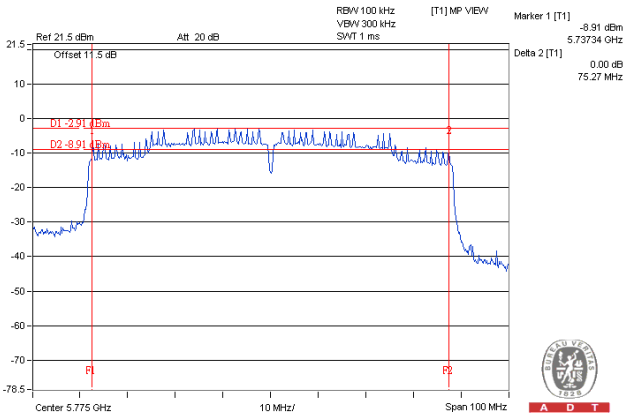
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.65	0.5	Pass
157	5785	17.64	0.5	Pass
165	5825	17.65	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.18	0.5	Pass
159	5795	33.82	0.5	Pass

802.11ac (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	75.27	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain B

802.11a

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

802.11n (20MHz)

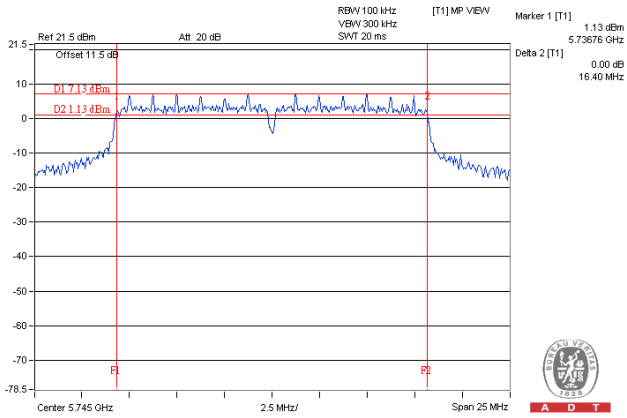
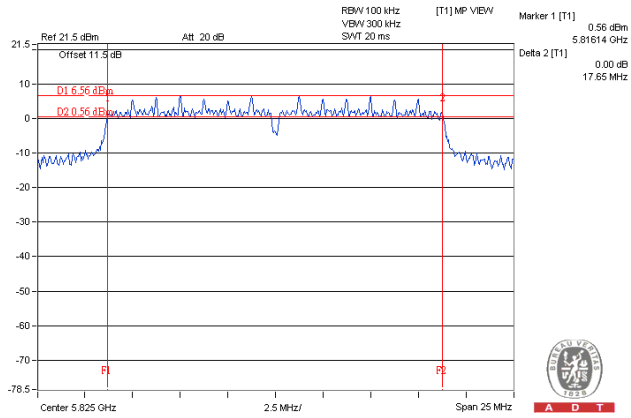
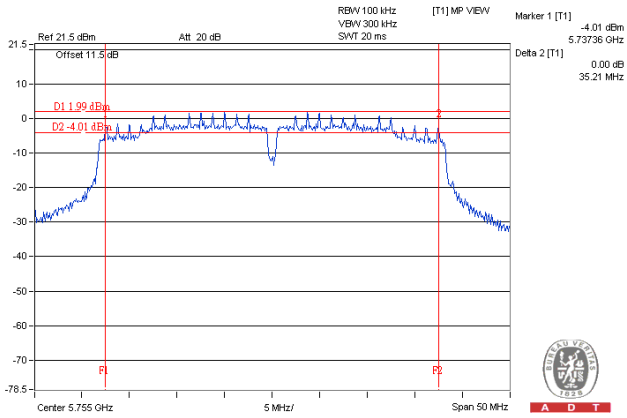
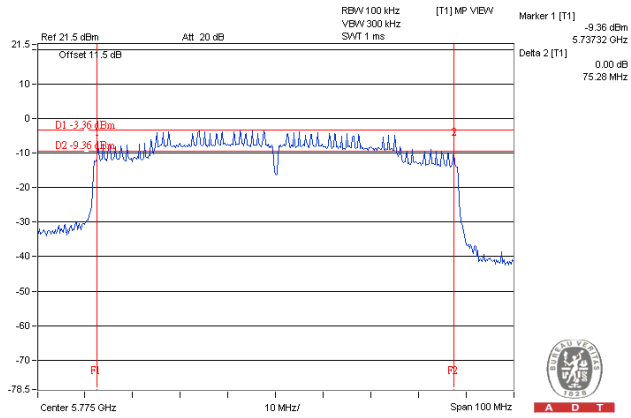
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.62	0.5	Pass
157	5785	17.64	0.5	Pass
165	5825	17.65	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.21	0.5	Pass
159	5795	32.66	0.5	Pass

802.11ac (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	75.28	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Chain A + B

802.11n (20MHz)

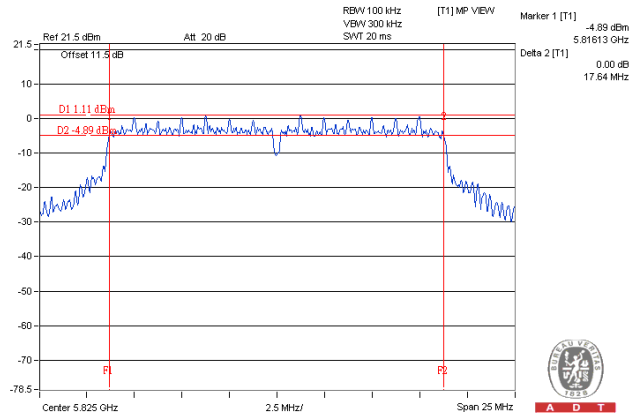
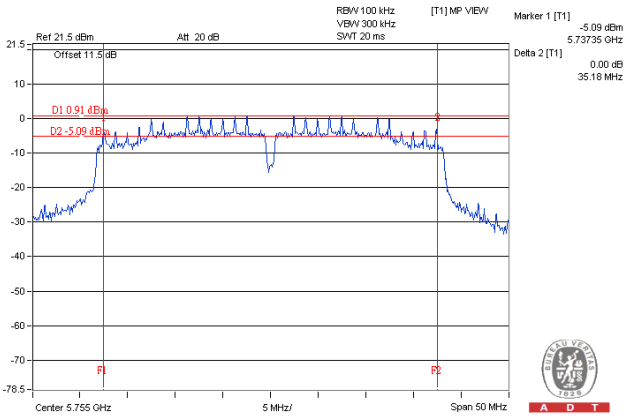
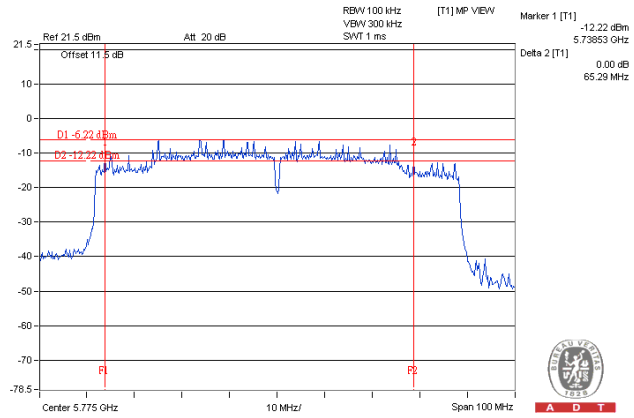
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.62	17.63	0.5	Pass
157	5785	17.63	17.62	0.5	Pass
165	5825	17.63	17.64	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.18	33.92	0.5	Pass
159	5795	32.75	35.12	0.5	Pass

802.11ac (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	63.89	65.29	0.5	Pass

Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

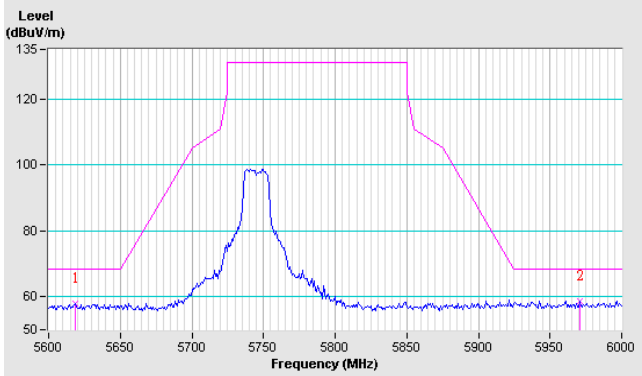
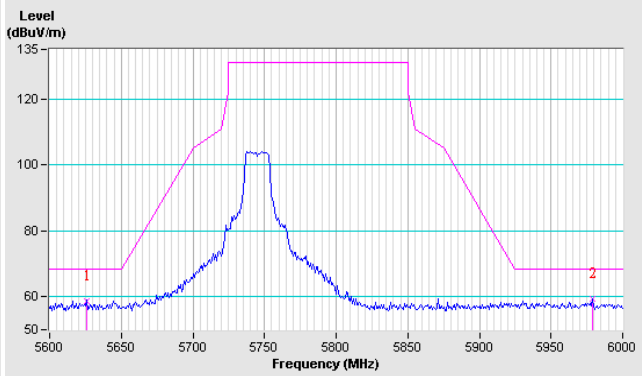
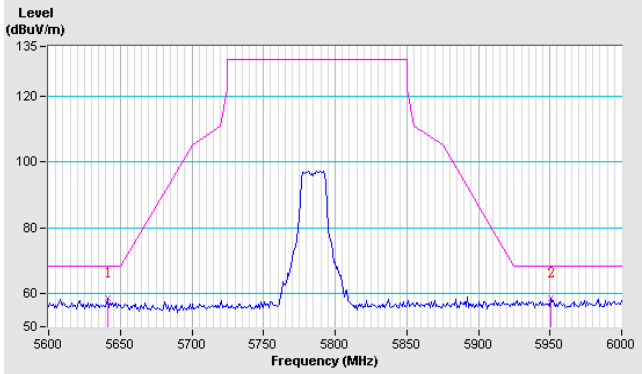
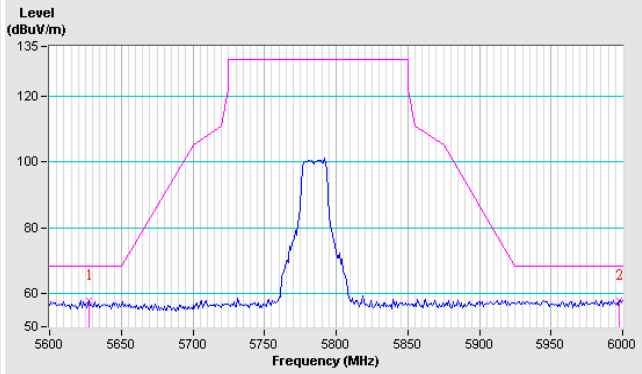
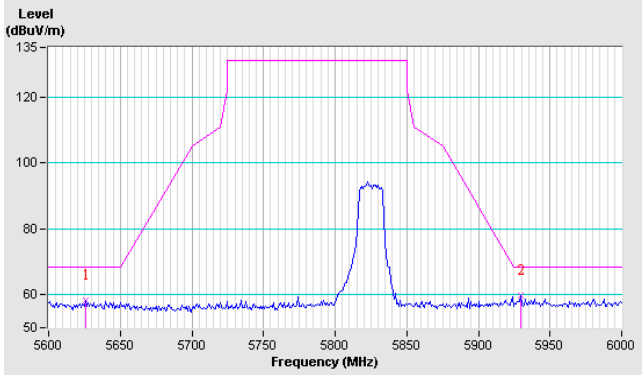
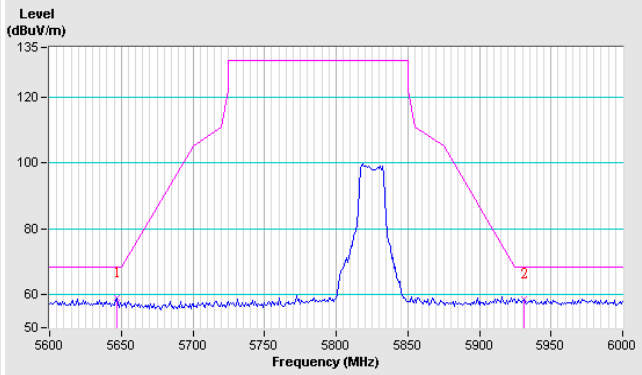
5 Pictures of Test Arrangements

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

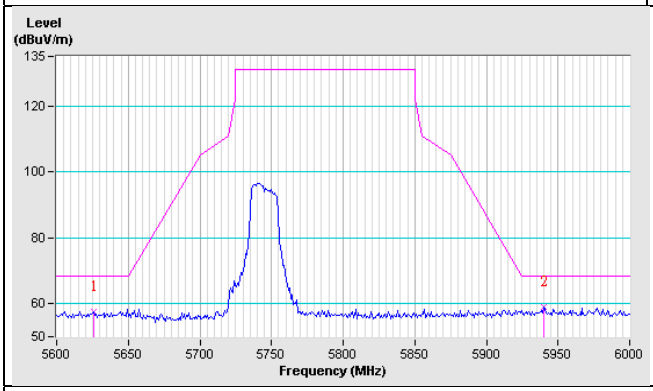
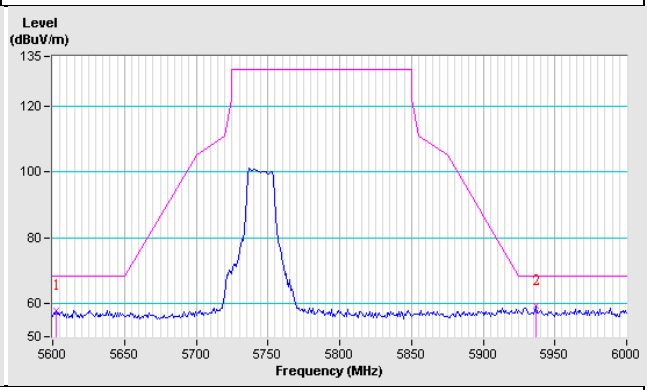
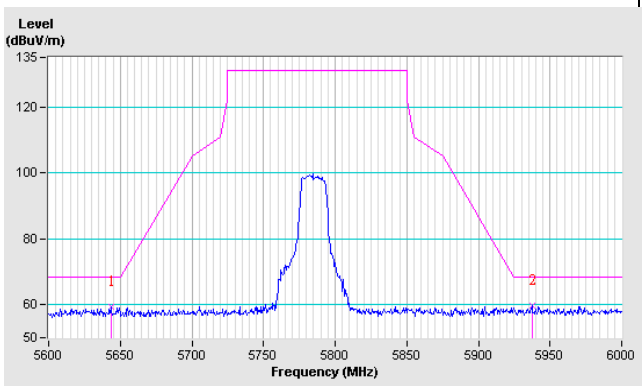
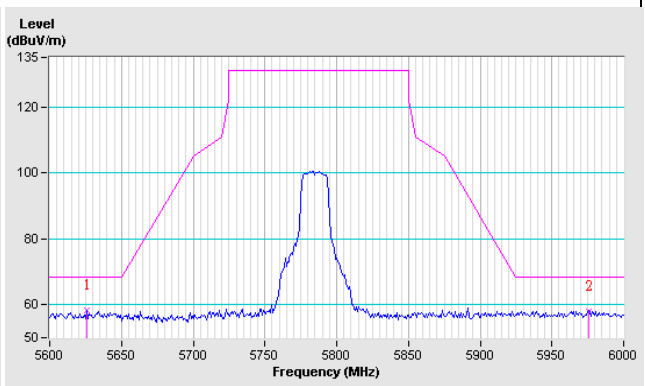
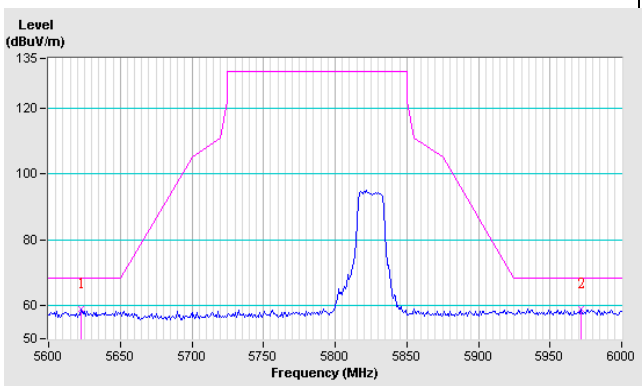
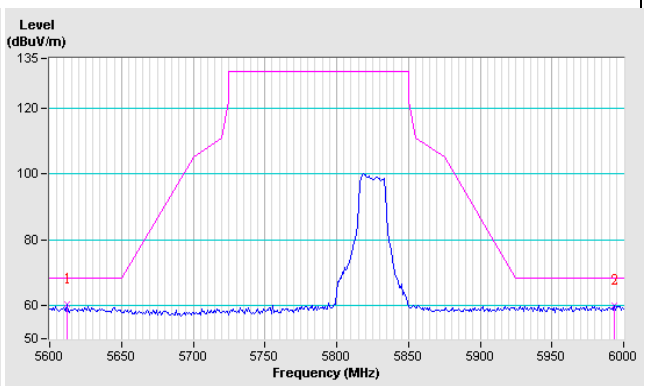
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

Chain A

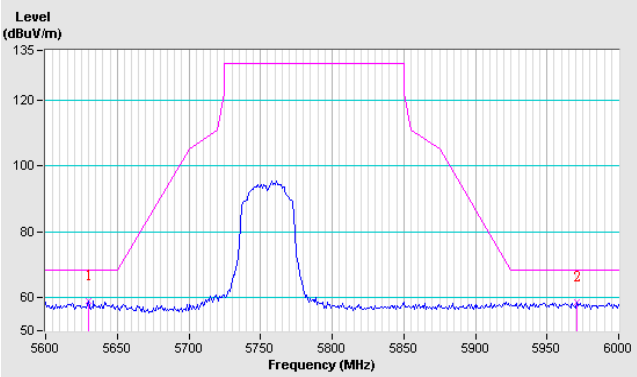
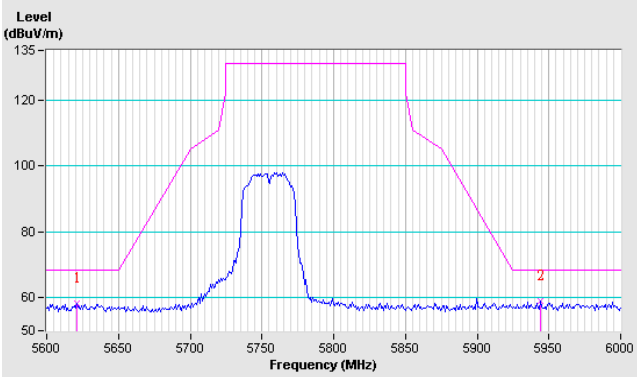
802.11a

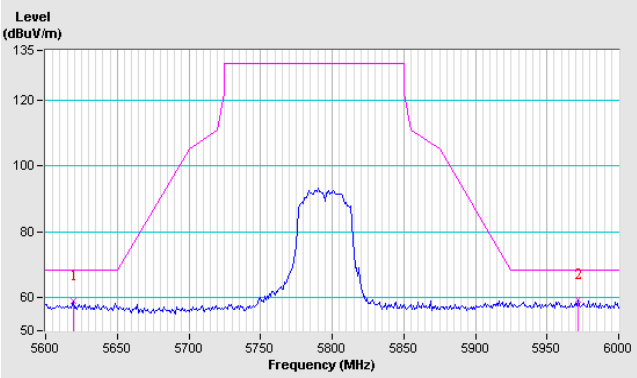
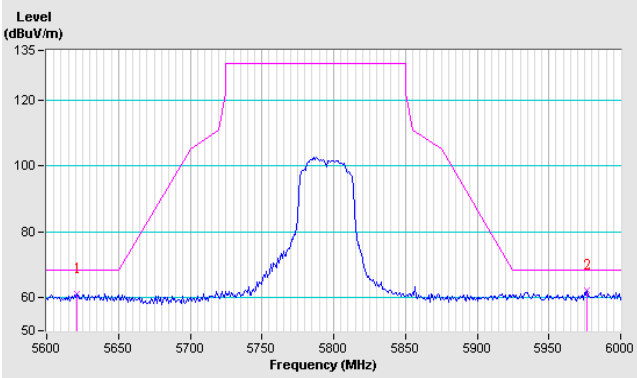
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (20MHz)

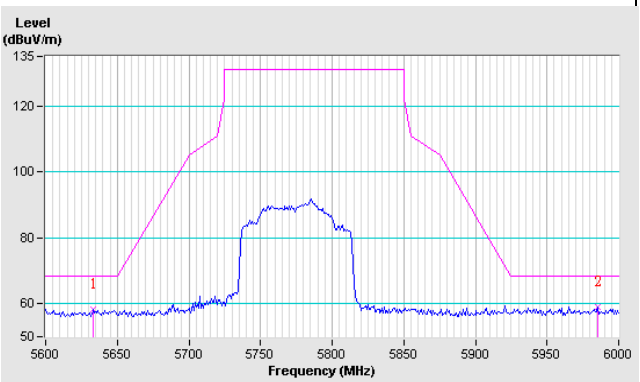
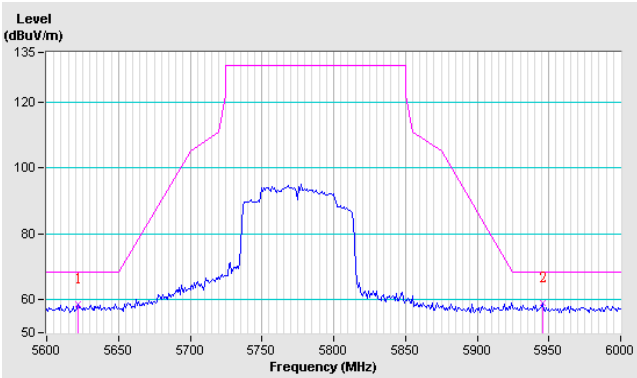
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (40MHz)

CH151	
Horizontal	Vertical
	

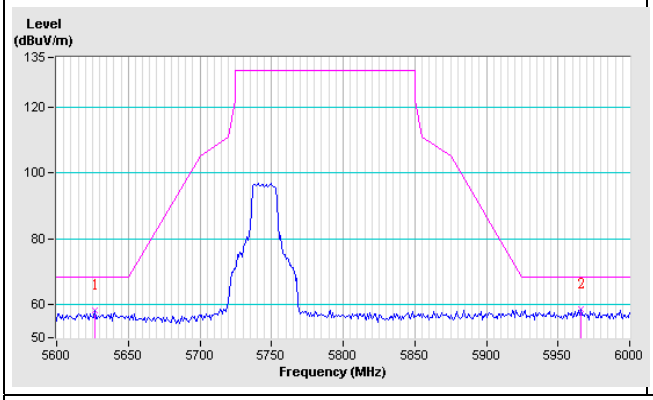
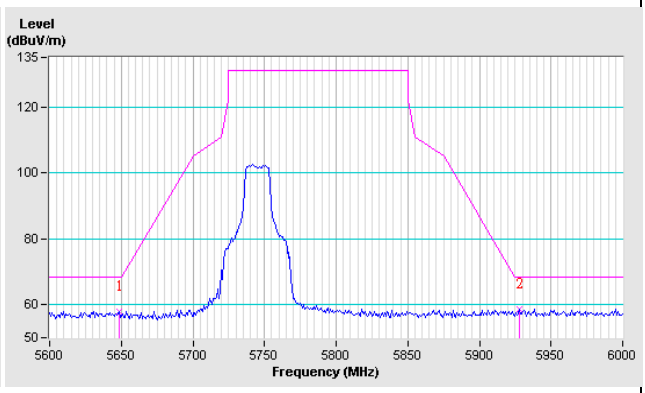
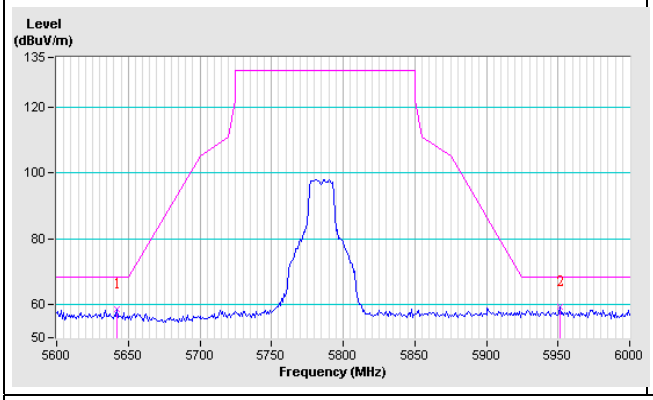
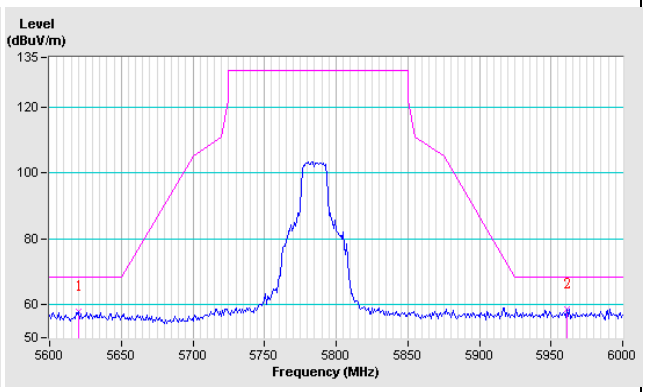
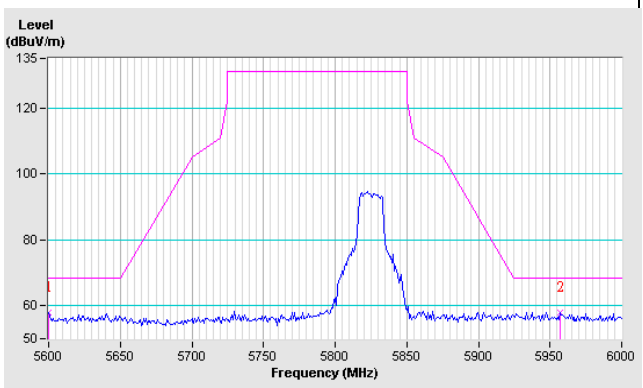
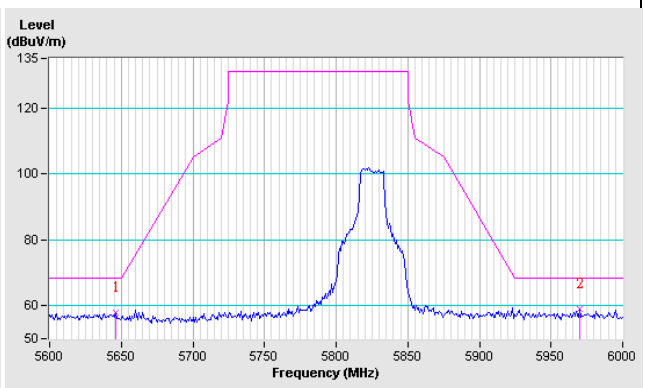
CH159	
Horizontal	Vertical
	

802.11ac (80MHz)

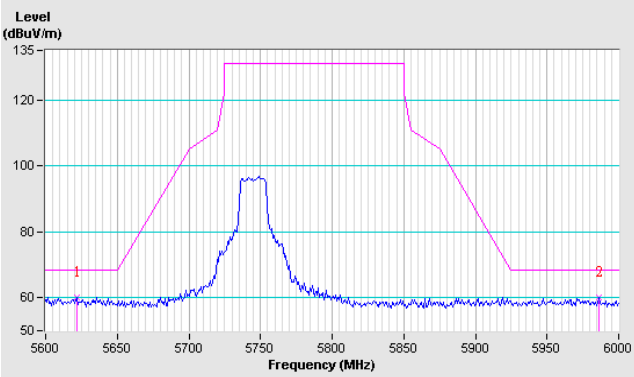
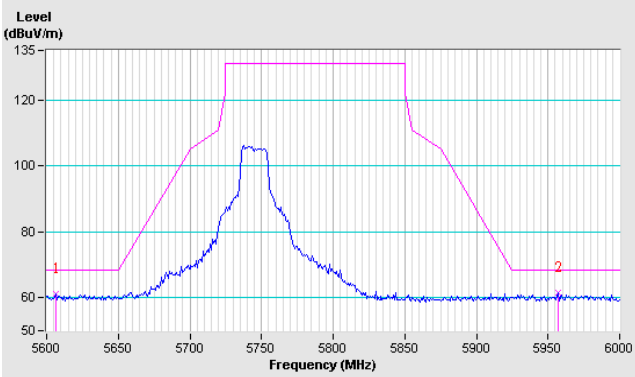
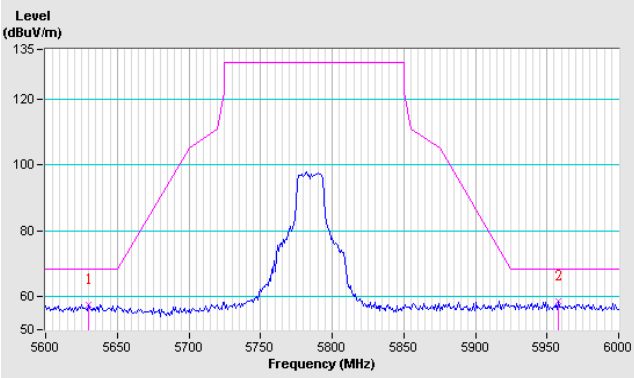
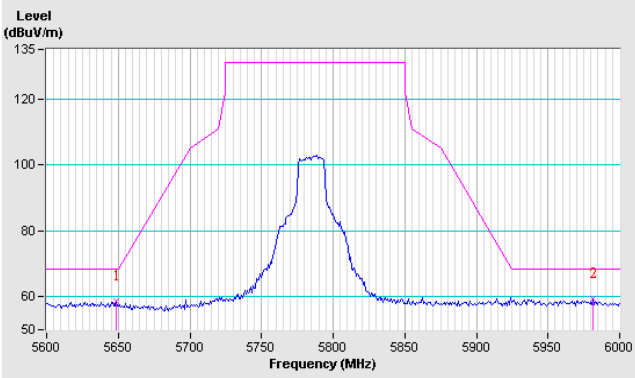
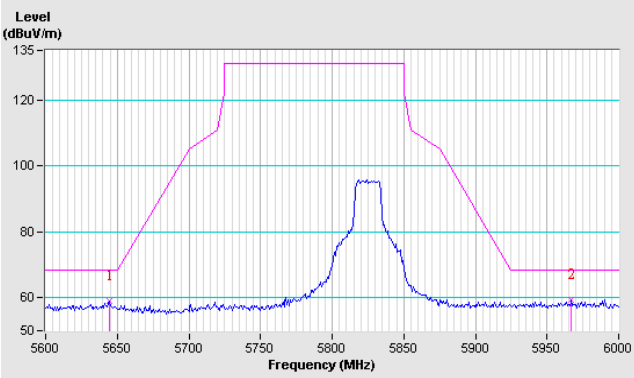
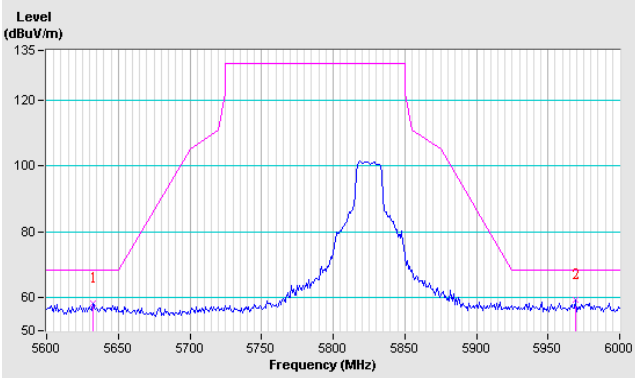
CH155	
Horizontal	Vertical
	

Chain B

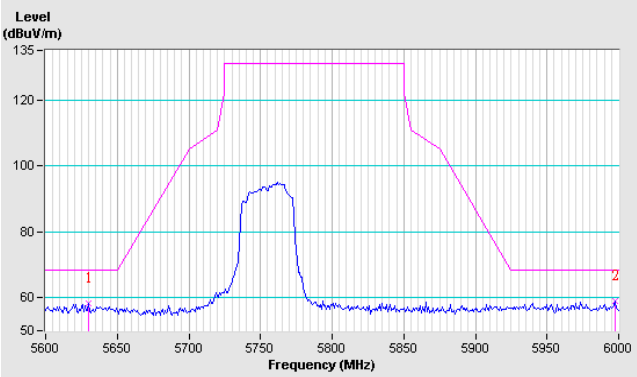
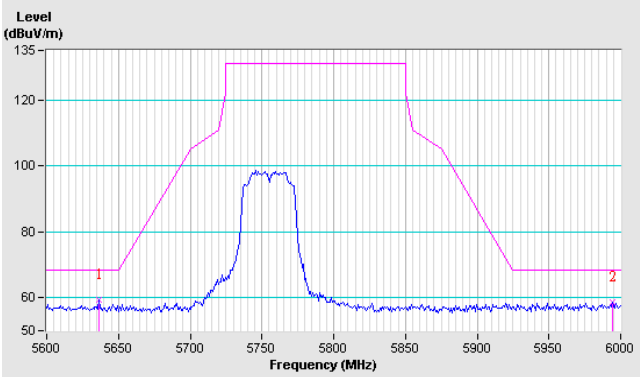
802.11a

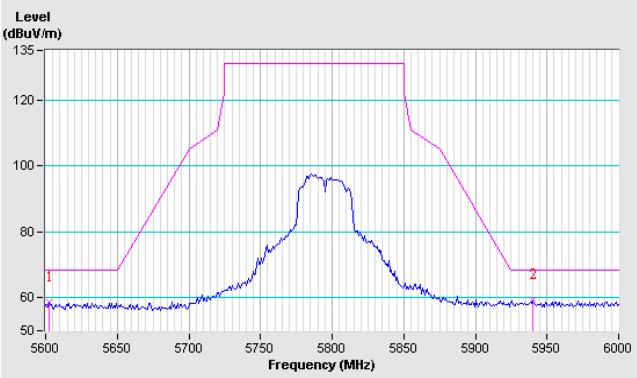
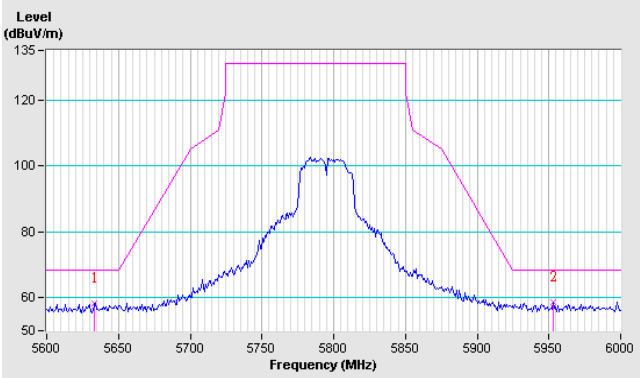
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (20MHz)

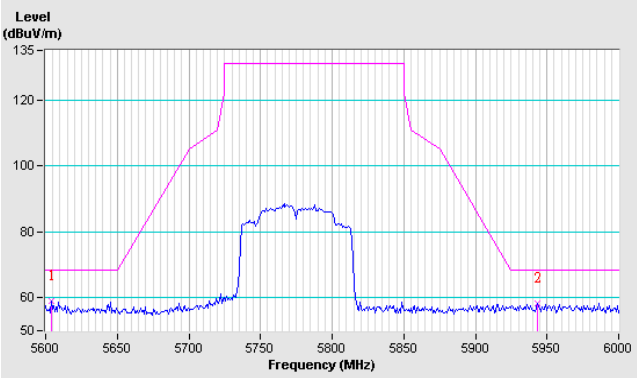
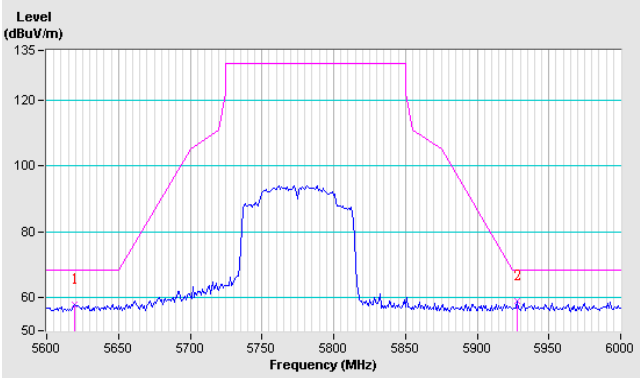
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (40MHz)

CH151	
Horizontal	Vertical
	

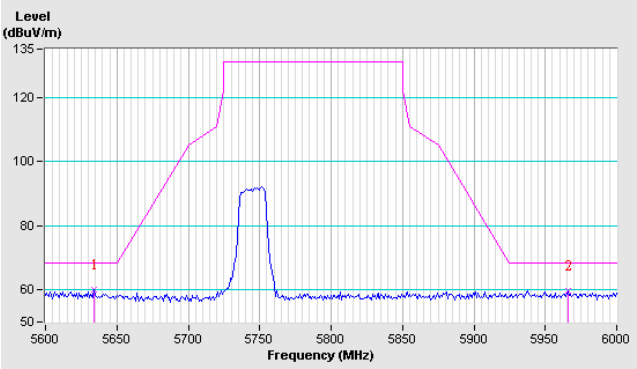
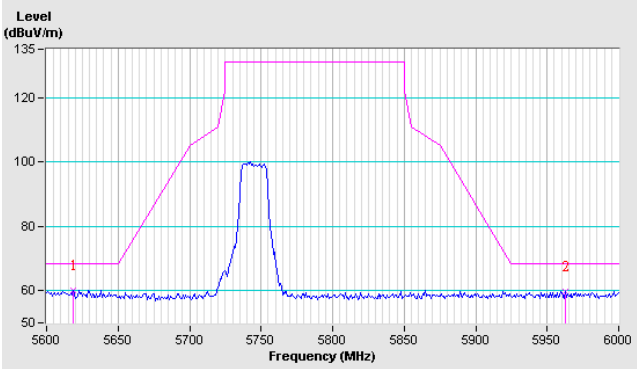
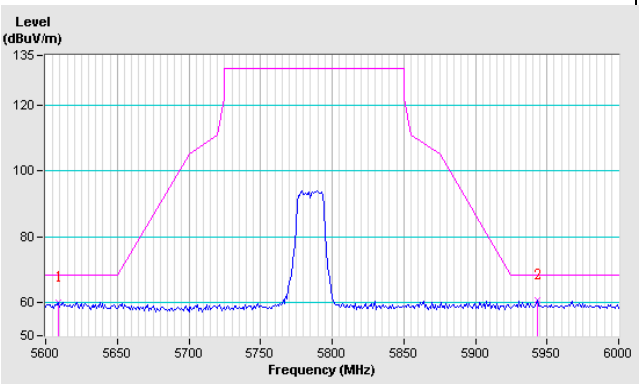
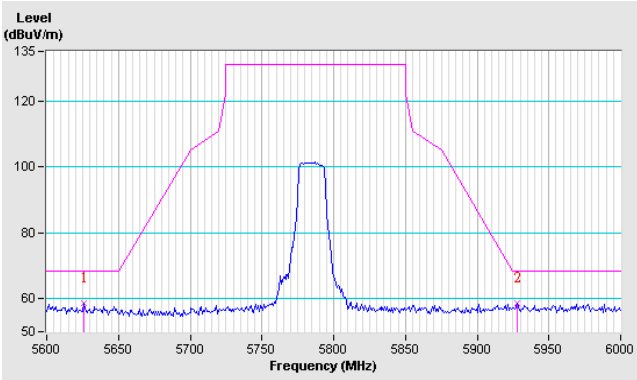
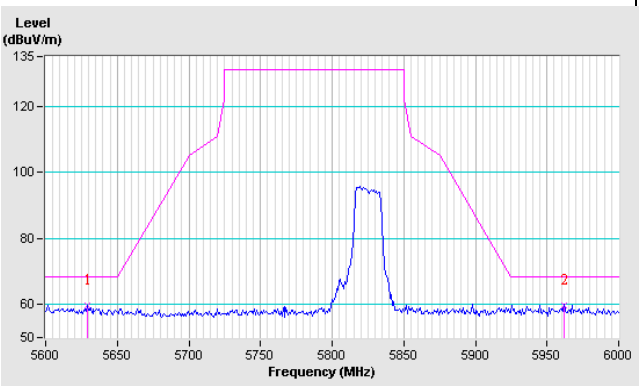
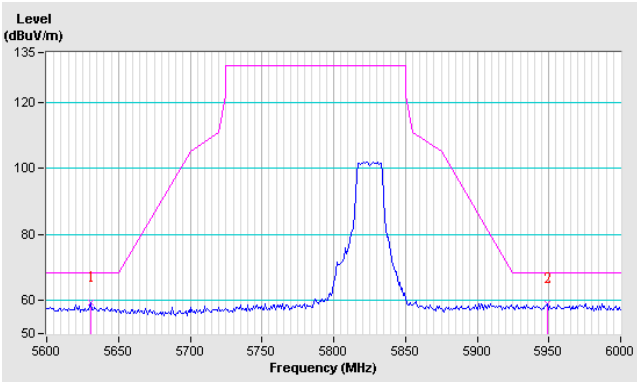
CH159	
Horizontal	Vertical
	

802.11ac (80MHz)

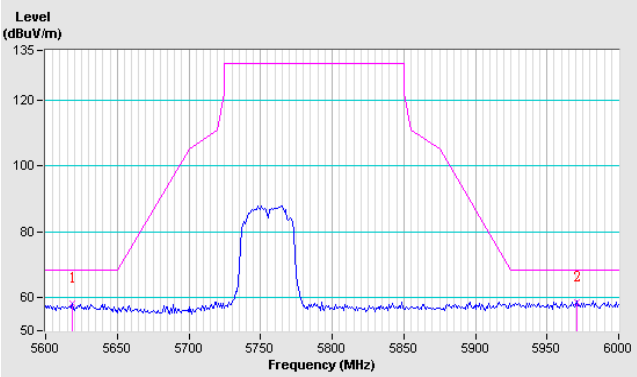
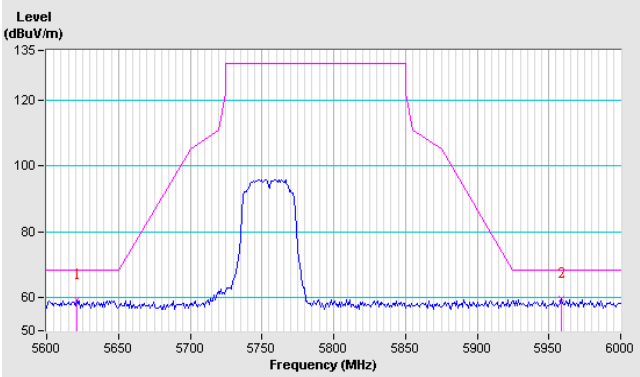
CH155	
Horizontal	Vertical
	

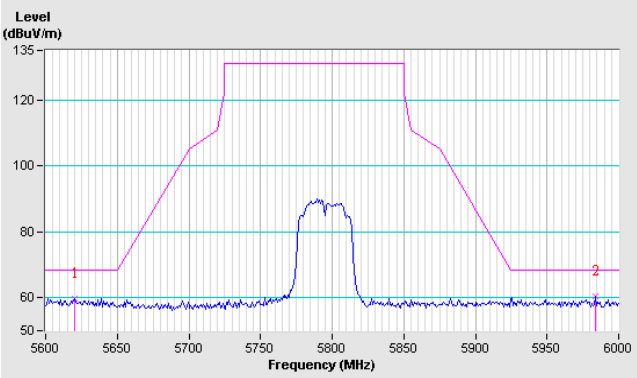
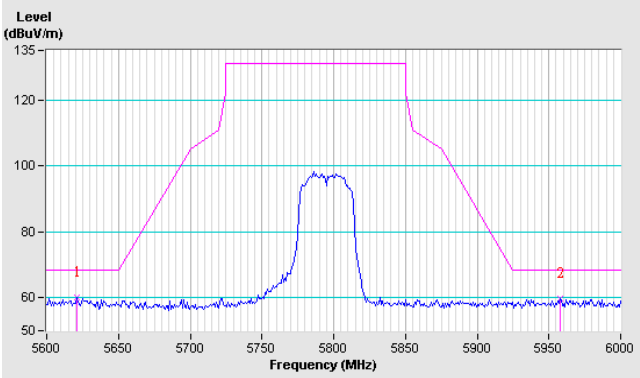
Chain A + B

802.11n (20MHz)

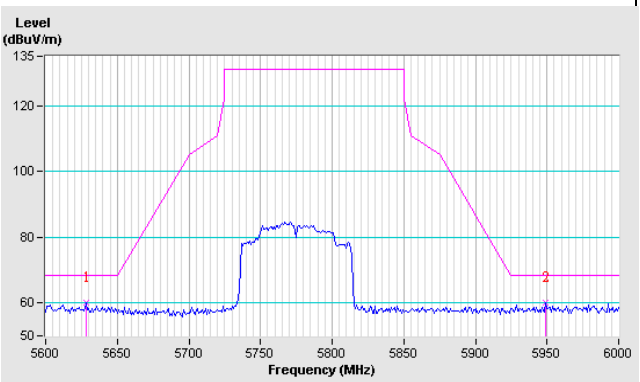
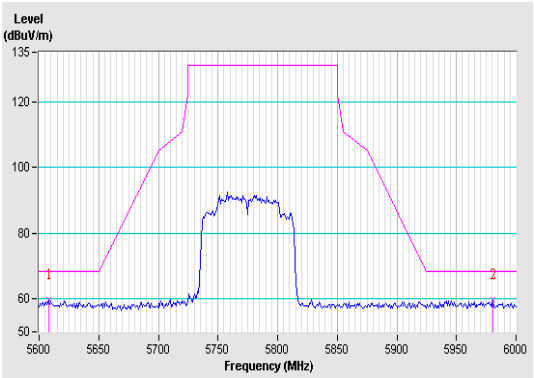
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (40MHz)

CH151	
Horizontal	Vertical
	

CH159	
Horizontal	Vertical
	

802.11ac (80MHz)

CH155	
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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
Fax: 886-3-3270892

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.

--- END ---