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FCC RADIO TEST REPORT

Applicant's company	**NETGEAR, Inc.**
Applicant Address	350 East Plumeria Drive, San Jose, California 95134, USA
FCC ID	**PY312200200**

Product Name	WiFi USB Adapter
Brand Name	NETGEAR
Model No.	A6200
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jun. 22, 2012
Final Test Date	Sep. 04, 2015
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a/ac of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01, KDB662911 D01 v02r01, KDB644545 D03 v01.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

TAF
Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR262930-05	Rev. 01	Initial issue of report	Sep. 16, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	WiFi USB Adapter
Brand Name	:	NETGEAR
Model No.	:	A6200
Applicant	:	NETGEAR, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jun. 22, 2012 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.2	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	14.17 dB
4.4	15.407(a)	Power Spectral Density	Complies	29.04 dB
4.5	15.407(b)	Radiated Emissions	Complies	10.22 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.22 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9 for 20MHz bandwidth ; 4 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	**For Non-beamforming Mode:** IEEE 802.11a: 16.41 MHz IEEE 802.11n MCS0 (HT20): 17.37 MHz IEEE 802.11n MCS0 (HT40): 37.05 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.37 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.05 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz
Maximum Conducted Output Power	**For Non-beamforming Mode:** IEEE 802.11a: 15.79 dBm IEEE 802.11n MCS0 (HT20): 15.69 dBm IEEE 802.11n MCS0 (HT40): 15.65 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 15.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 15.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 13.94 dBm **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT80): 13.94 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☒ With beamforming for 802.11ac VHT80 in 5GHz.	☐ Without beamforming
Operating Mode	☐ Outdoor access point	
	☐ Indoor access point	
	☐ Fixed point-to-point access points	
	☒ Mobile and portable client devices	

Note: The product has beamforming function for 802.11ac VHT80 in 5150-5250MHz and 5725-5850MHz.

Antenna and Band width

Antenna	Two (TX)		
Band width Mode	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
802.11ac (VHT20)	2	MCS 0-9/Nss1-2
802.11ac (VHT40)	2	MCS 0-9/Nss1-2
802.11ac (VHT80)	2	MCS 0-9/Nss1-2

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

Others
USB Cable * 1, Non-Shield 0.8m

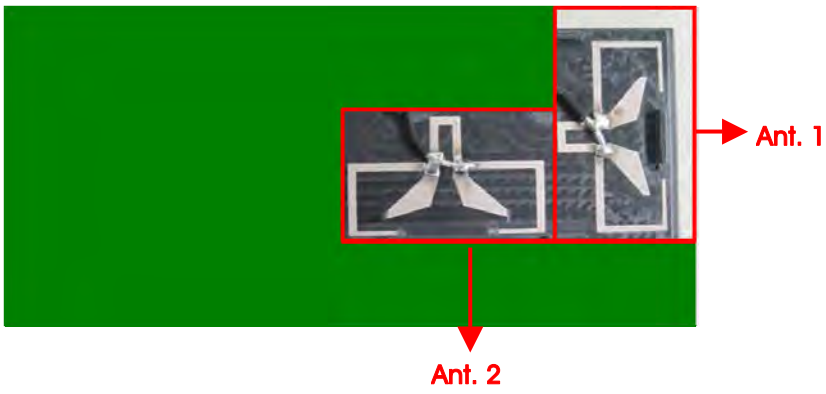
3.3. Table for Filed Antenna

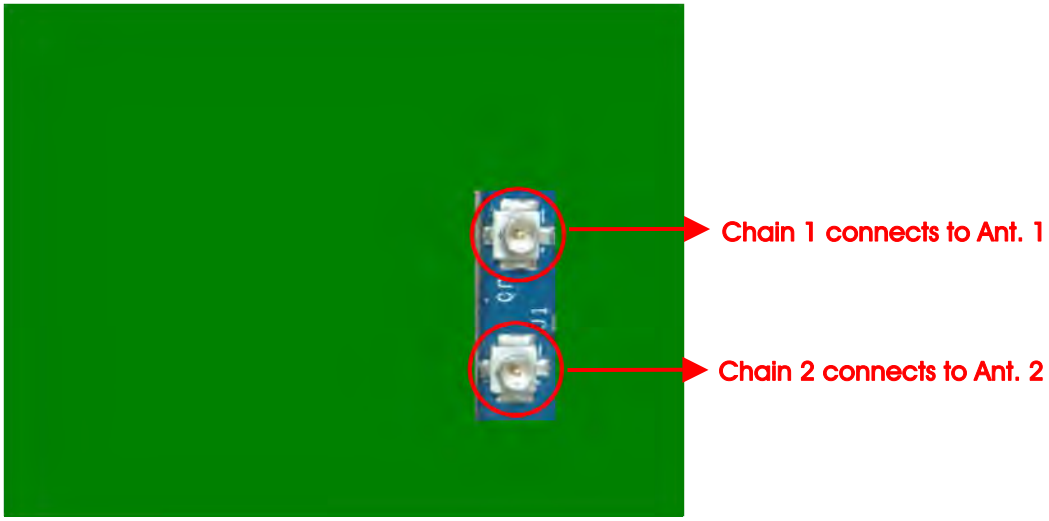
Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		
					2.4GHz	5GHz	
						Band 1	Band 4
1	WNC	-	LCD Antenna	I-PEX	4.30	4.75	4.30
2	WNC	-	LCD Antenna	I-PEX	4.30	4.75	4.30

Note: The EUT has two antennas

For IEEE 802.11a/n/ac mode (2TX/2RX):

Ant. 1 and Ant. 2 could transmit/receive simultaneously.





3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz	-	-
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Ant.
Max. Conducted Output Power	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
Power Spectral Density	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2

6dB Spectrum Bandwidth Measurement	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
Radiated Emission Above 1GHz	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
Band Edge Emission	**Non-beamforming Mode**				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2
	11n HT20	Band 4	MCS0	149/157/165	1+2
	11n HT40	Band 4	MCS0	151/159	1+2
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2
	Beamforming Mode				
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2

Note: There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11ac VHT80, Beamforming mode and non-beamforming mode has been test and record in this test report.

For original test report, the following test modes were performed for all tests:

Mode 1: EUT - Z axis + antenna 0°

Mode 2: EUT - Z axis + antenna 90°

Mode 3: EUT - Z axis + antenna 180°

Mode 3 has been evaluated to be the worst case, thus measurement will follow this same test mode.

Mode 4: EUT - Y axis + antenna 180°

Mode 5: EUT - X axis + antenna 180°

For Radiated Emissions (1GHz~10th Harmonic)

Mode 5 generated the worst case, so it was selected to perform test and its test result was written in the report.

For Band Edge Emissions

Mode 2 generated the worst case of original test, so it was selected to perform test and its test result was written in the report.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR262930AA, FR262930AB, FR262930-02AA and FR262930-02AB

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Changing 5GHz Band 1 to "New Rules" from "Old Rules".	After evaluating, it's not necessary to re-test all test items for 5GHz Band 1 updating to "New Rules" due to the same power as original filing.
2. Changing 5GHz Band 4 to "New Rules" from "Old Rules".	1. 26dB Spectrum Bandwidth and 99% Occupied Bandwidth 2. 6dB Spectrum Bandwidth 3. Maximum Conducted Output Power 4. Power Spectral Density 5. Radiated Emissions 6. Band Edge Emissions
Note: There is no change in hardware or in existing RF relevant portion.	

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB (Above 1GHz)

For Non-beamforming Mode:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For Test Site No: 03CH01-CB (Above 1GHz)

For Beamforming Mode:

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E4300	DoC
AP	Netgear	R7000	PY313200233

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Non-beamforming Mode:

Test Software Version	Mtool V1.0.0.10		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	46	46	46
802.11n MCS0 HT20	46	44	46
802.11ac MCS0/Nss1 VHT20	47	46	48
Mode	NCB: 40MHz		
	5755 MHz	5795 MHz	
802.11n MCS0 HT40	45	44	
802.11ac MCS0/Nss1 VHT40	45	45	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	38		

For Beamforming Mode:

Test Software Version	Mtool V1.0.0.10
Mode	Test Frequency (MHz)
	NCB: 80MHz
	5775 MHz
802.11ac MCS0/Nss1 VHT80	38

3.10. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN XP were executed.

The program was executed as follows:

1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by Wireless AP and transmit duty cycle no less 98%

3.11. Duty Cycle

For Non-beamforming Mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.055	2.092	98.23	0.08	0.01
802.11n MCS0 HT20	1.909	1.938	98.50	0.07	0.01
802.11n MCS0 HT40	0.945	0.970	97.39	0.11	1.06
802.11ac MCS0/Nss1 VHT20	1.922	1.947	98.72	0.06	0.01
802.11ac MCS0/Nss1 VHT40	0.950	0.976	97.34	0.12	1.05
802.11ac MCS0/Nss1 VHT80	0.460	0.759	60.66	2.17	2.17

For Beamforming Mode:

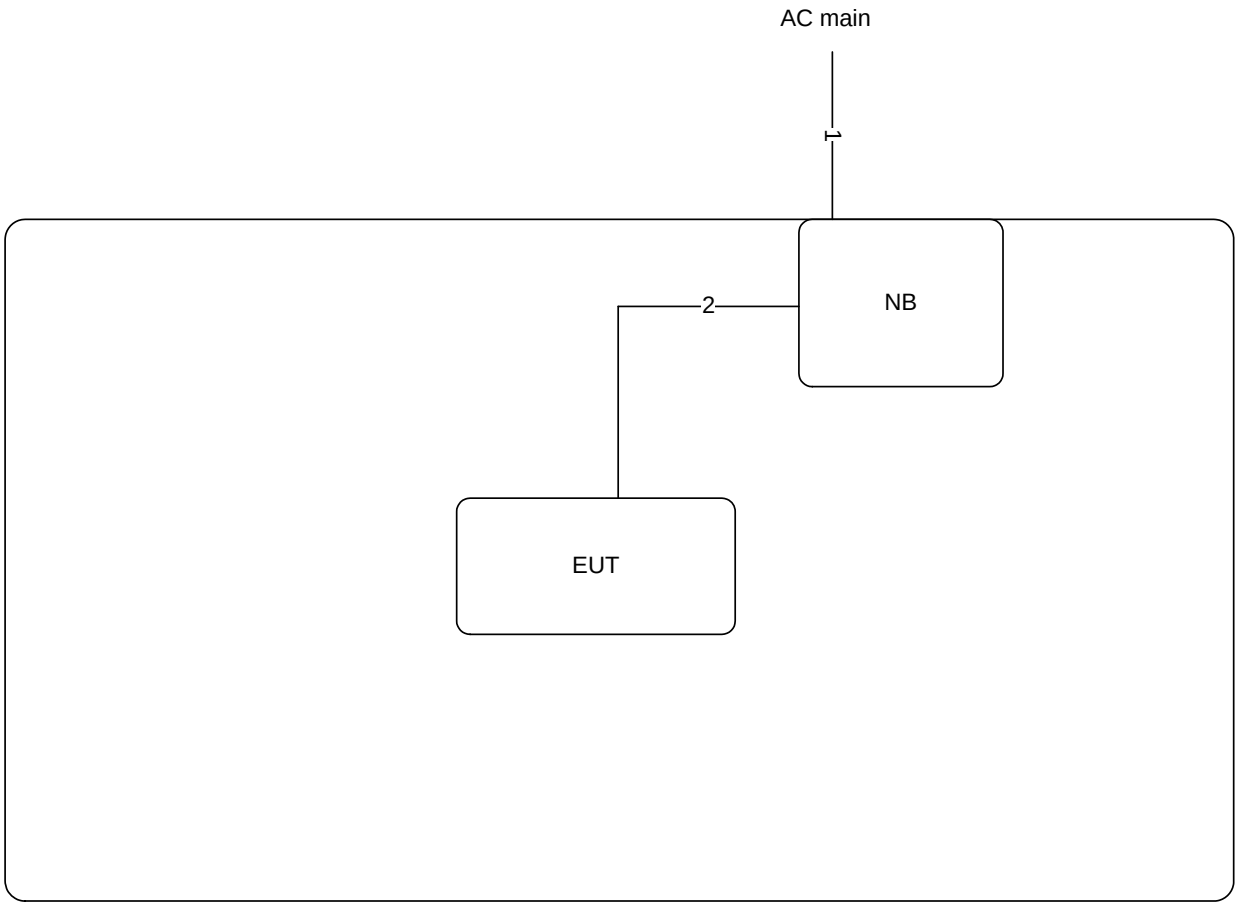
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT80	0.599	1.095	54.73	2.62	1.67

3.12. Test Configurations

3.12.1. Radiation Emissions Test Configuration

For Non-beamforming Mode:

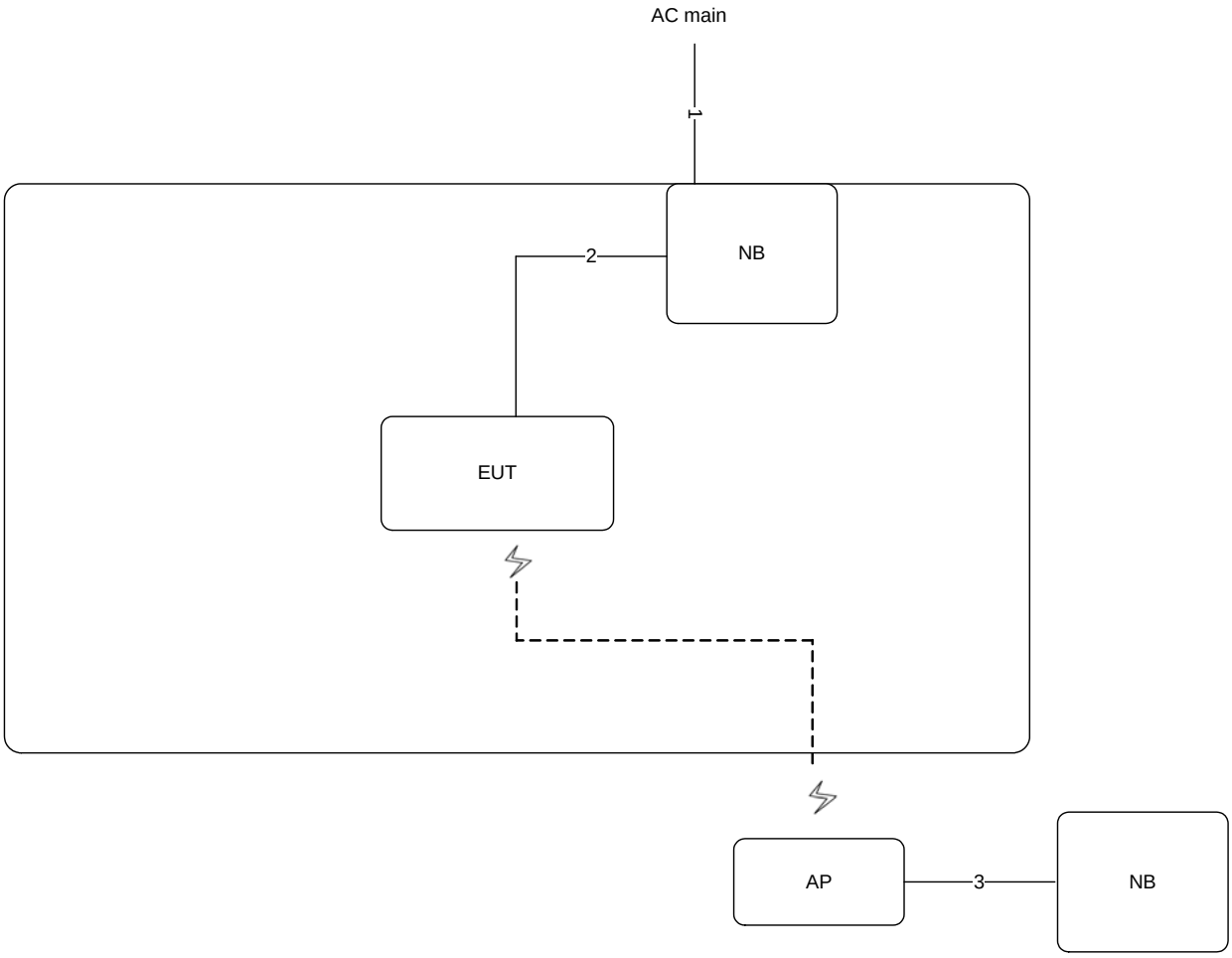
Test Configuration: above 1GHz



Item	Connection	Shielded	Length(m)
1	Power cable	No	2.6
2	USB cable	Yes	1

For Beamforming Mode:

Test Configuration: above 1GHz



Item	Connection	Shielded	Length(m)
1	Power cable	No	2.6
2	USB cable	Yes	1
3	RJ-45 cable	No	1

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

26dB Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	**Setting**
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

4.1.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.1.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

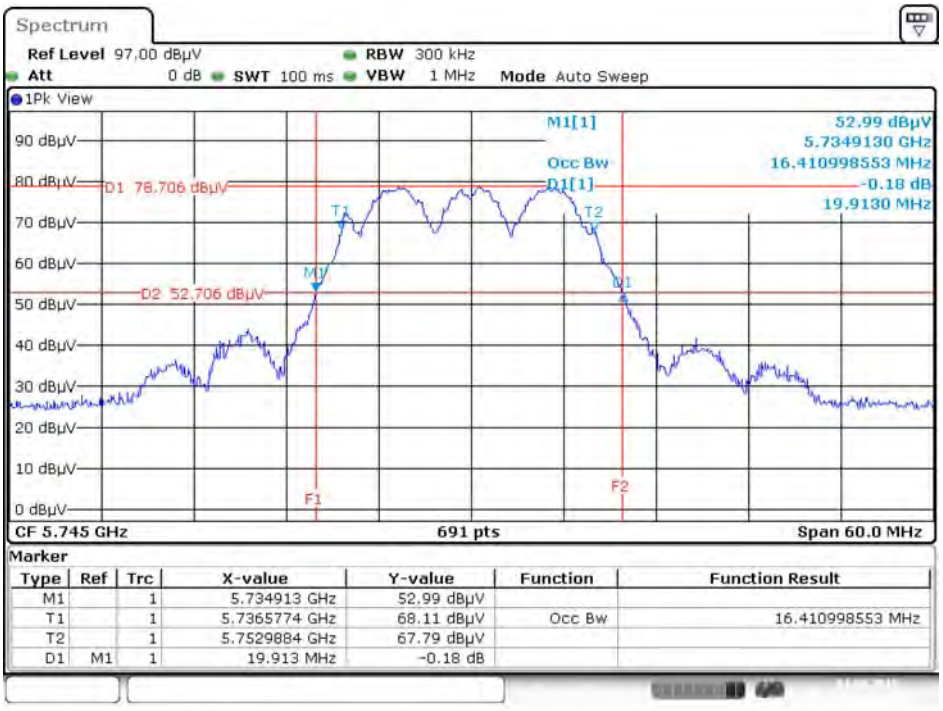
4.1.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

For Non-beamforming Mode:

Temperature	25℃	Humidity	45%
Test Engineer	Serway Li / Roki Liu		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	19.91	16.41
	5785 MHz	19.91	16.32
	5825 MHz	19.91	16.24
802.11n MCS0 HT20	5745 MHz	20.26	17.28
	5785 MHz	20.26	17.28
	5825 MHz	20.26	17.37
802.11n MCS0 HT40	5755 MHz	40.73	37.05
	5795 MHz	40.73	36.90
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.17	17.37
	5785 MHz	20.35	17.28
	5825 MHz	20.43	17.37
802.11ac MCS0/Nss1 VHT40	5755 MHz	40.87	37.05
	5795 MHz	40.73	36.90
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.32	76.12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5745 MHz



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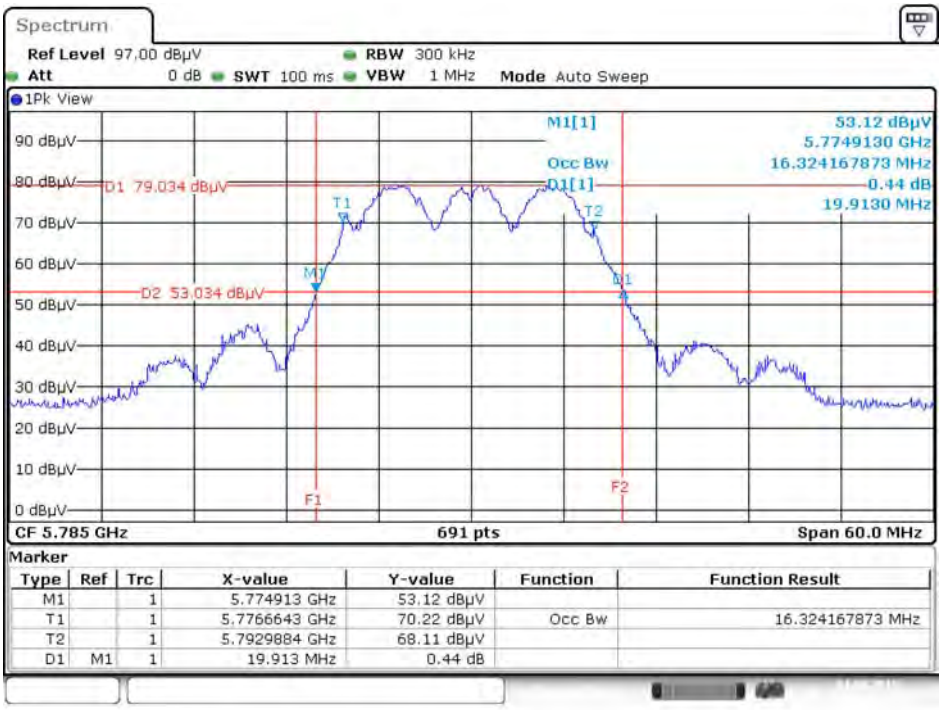
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5785 MHz



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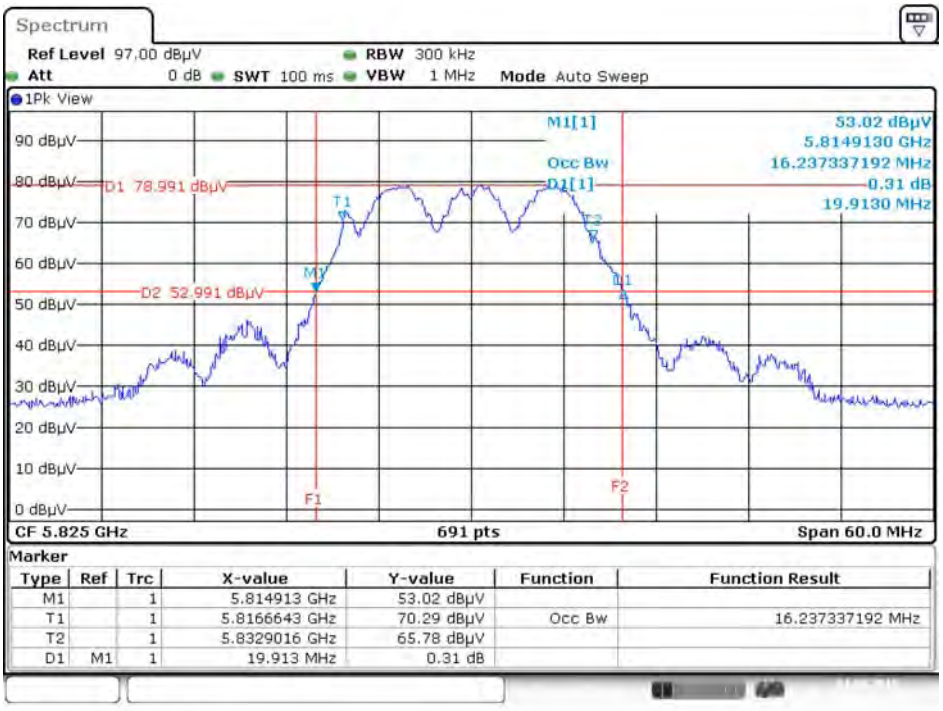

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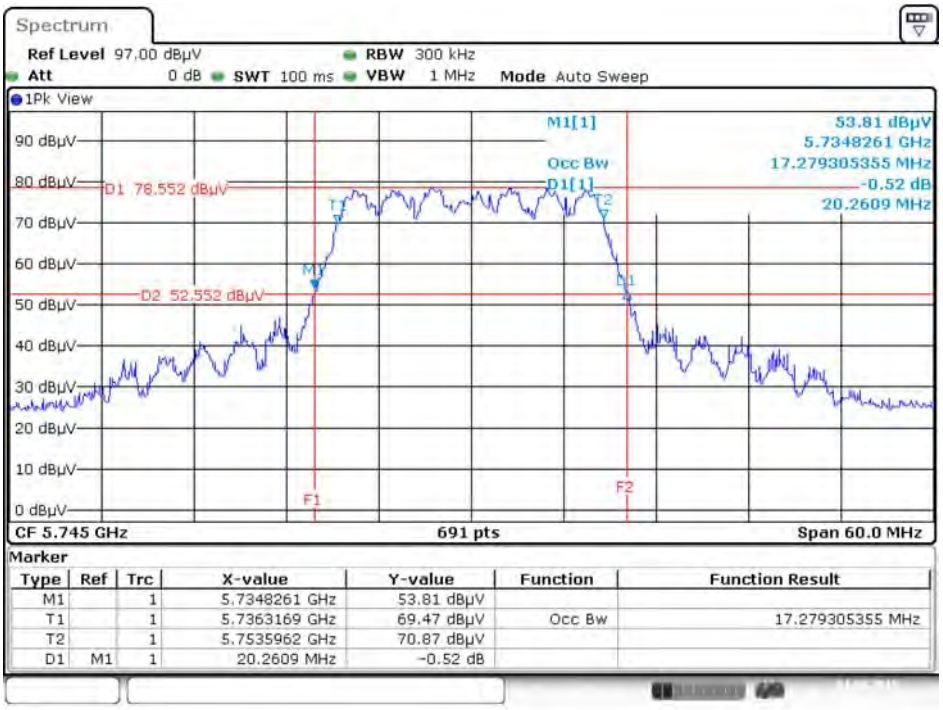
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 1 + Ant. 2 / 5745 MHz



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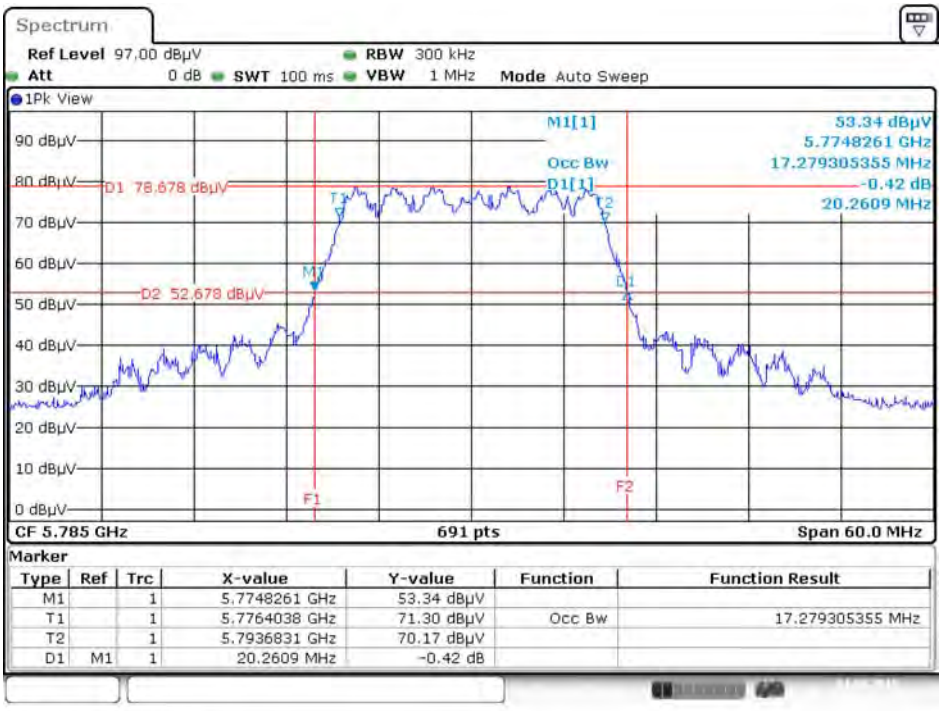

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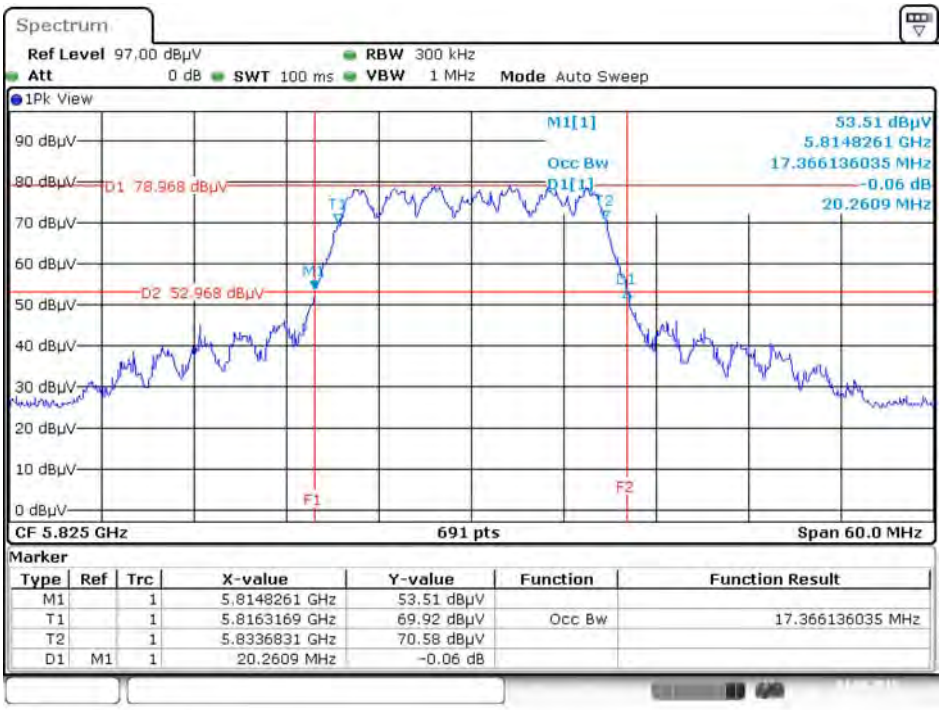
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 1 + Ant. 2 / 5825 MHz



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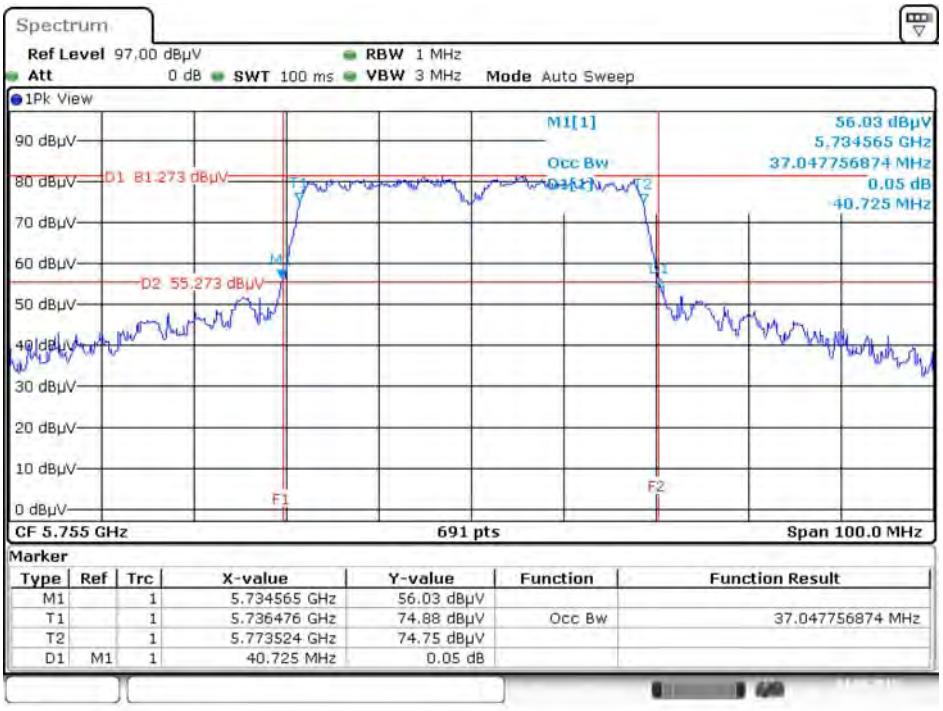
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2 / 5755 MHz



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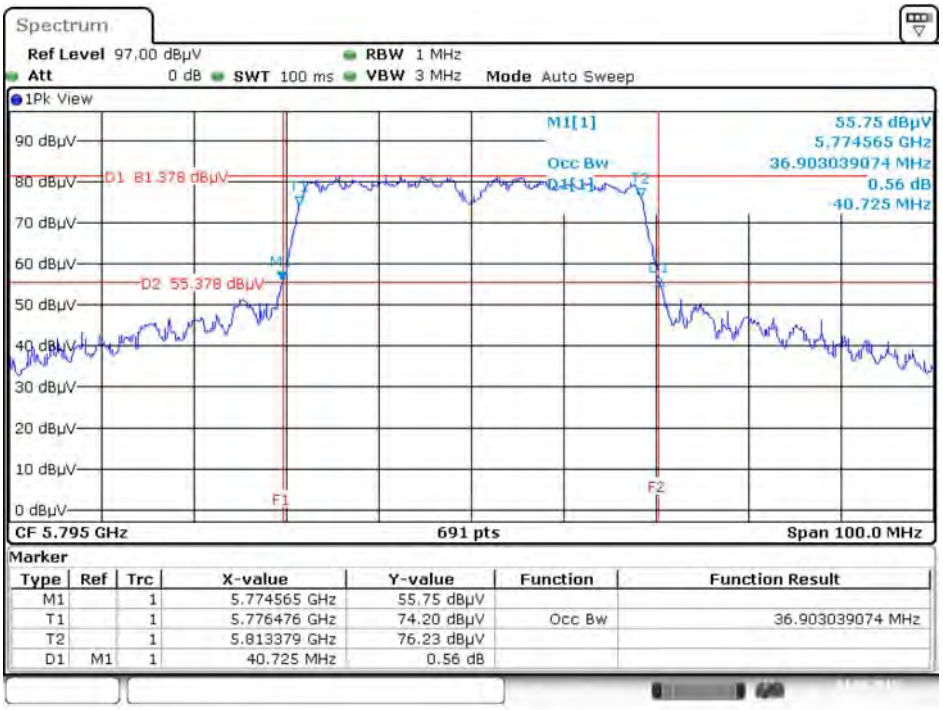
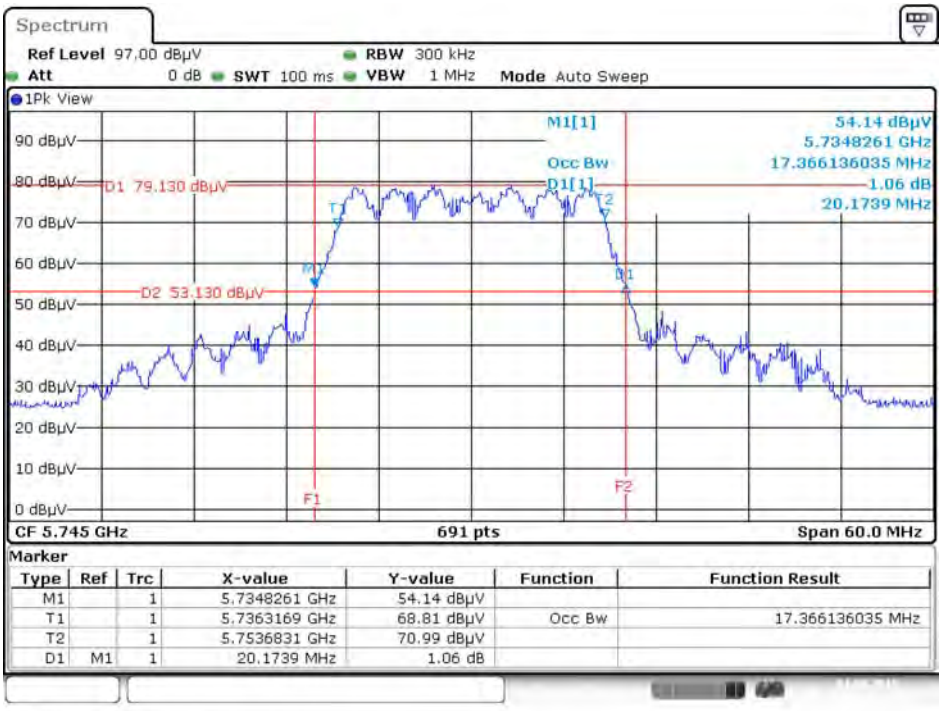
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2 / 5795 MHz



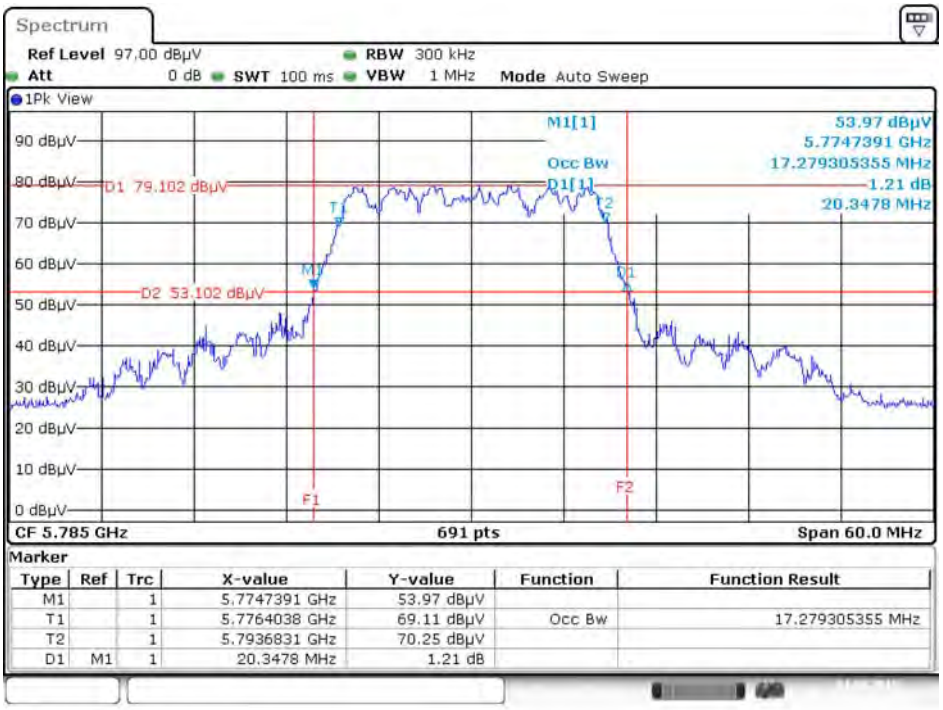
Date: 4.SEP.2015 11:20:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5745 MHz



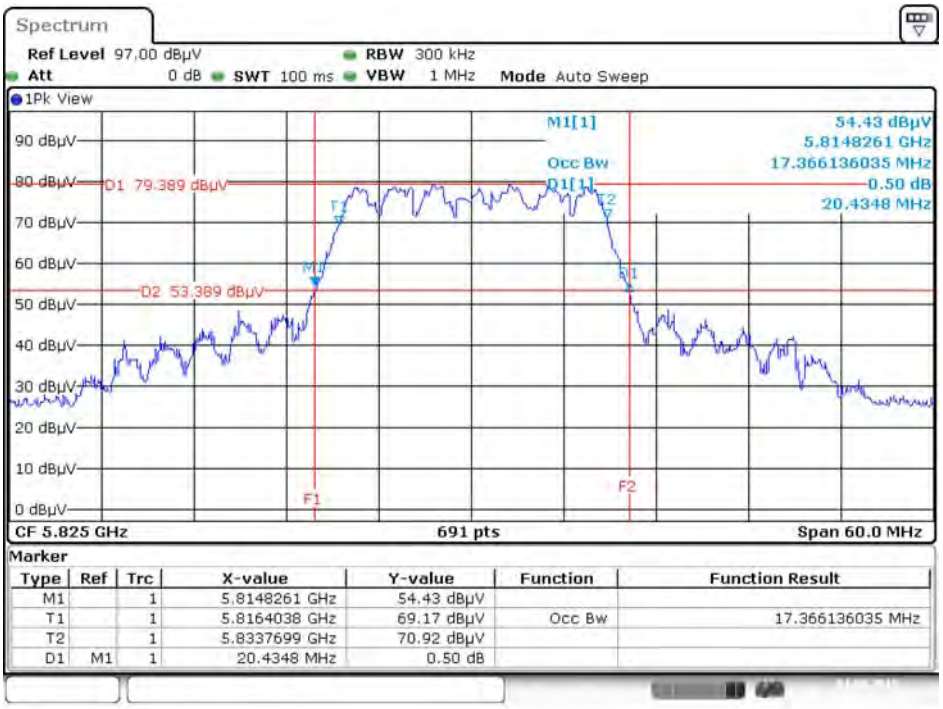
Date: 4.SEP.2015 11:14:53

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5785 MHz



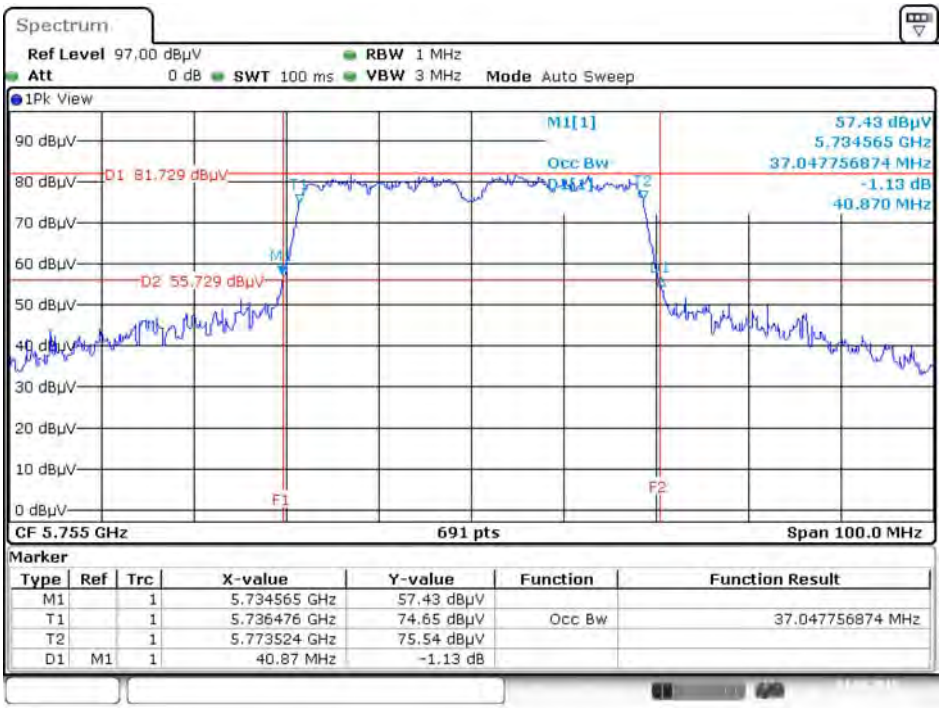
Date: 4.SEP.2015 11:15:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5825 MHz



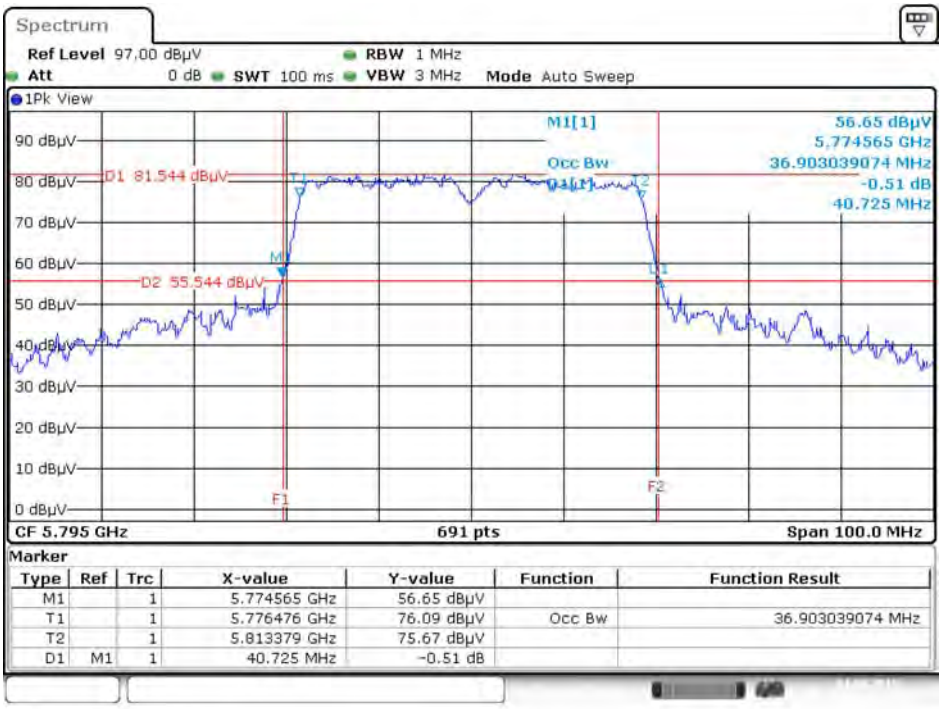
Date: 4.SEP.2015 11:18:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 / 5755 MHz



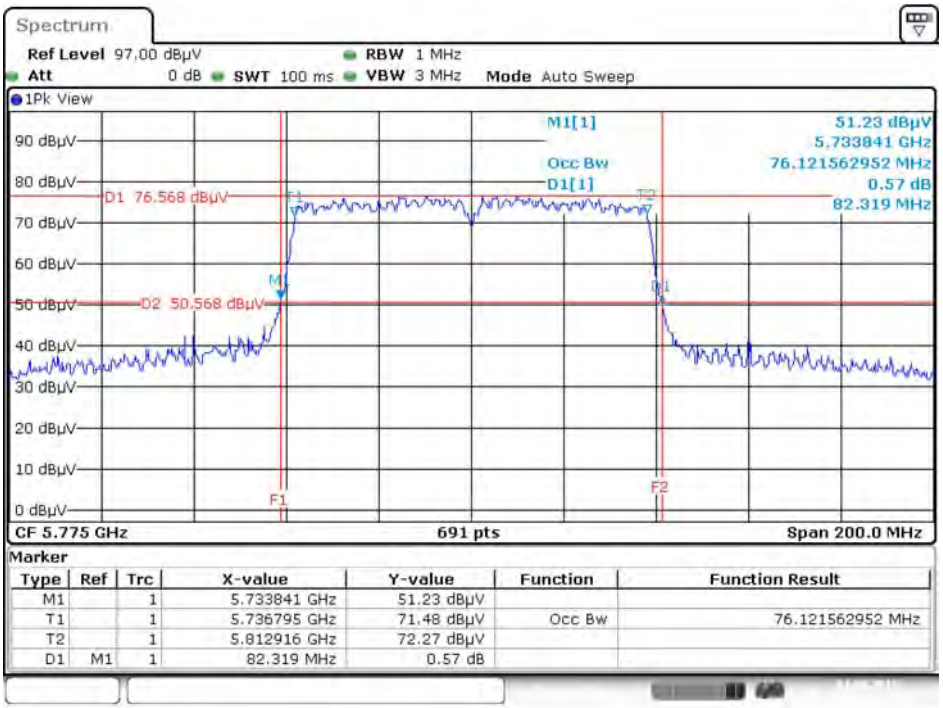
Date: 4.SEP.2015 11:21:14

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 / 5795 MHz



Date: 4.SEP.2015 11:21:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



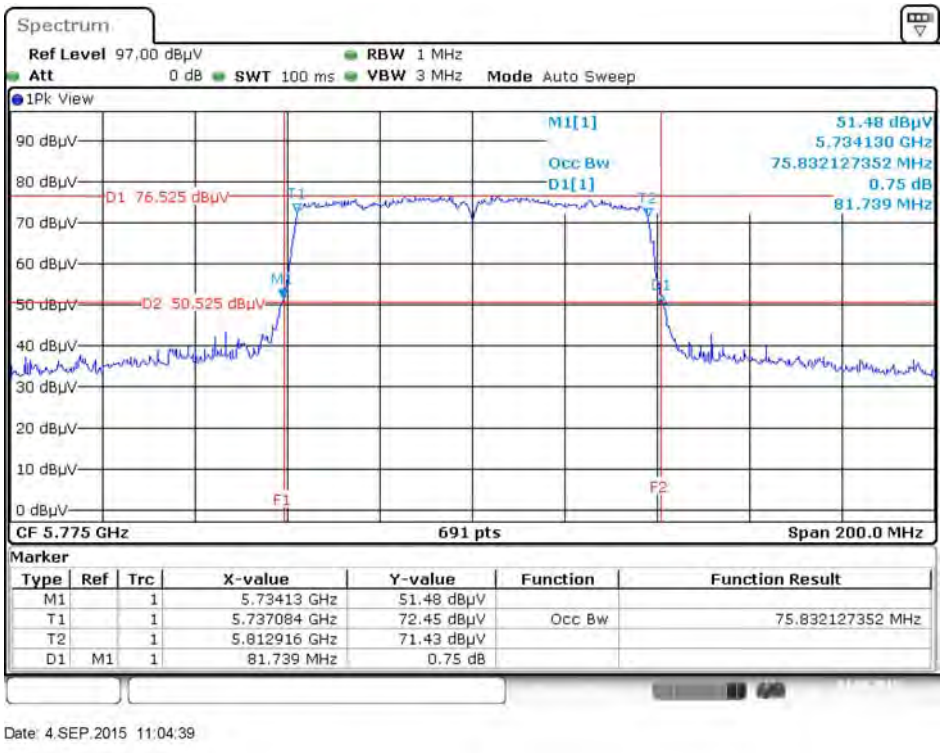
Date: 4.SEP.2015 11:22:49

For Beamforming Mode:

Temperature	25°C	Humidity	45%
Test Engineer	Serway Li		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT80	5775 MHz	81.74	75.83

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.2.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 6dB Spectrum Bandwidth

For Non-beamforming Mode:

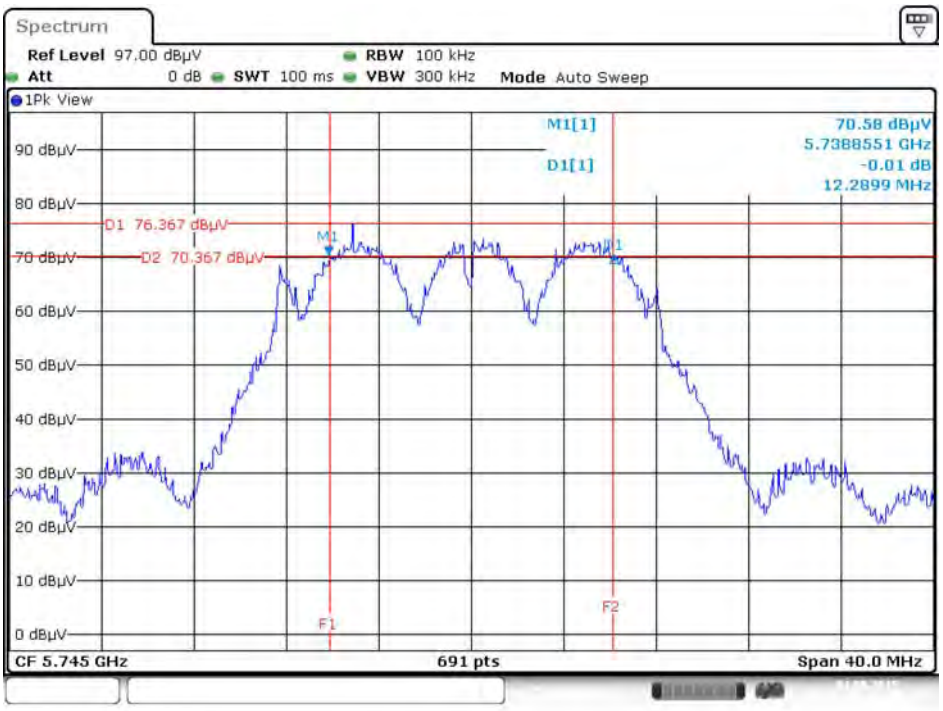
Temperature	25°C	Humidity	45%
Test Engineer	Serway Li / Roki Liu		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	12.29	500	Complies
	5785 MHz	12.93	500	Complies
	5825 MHz	12.93	500	Complies
802.11n MCS0/Nss1 HT20	5745 MHz	16.06	500	Complies
	5785 MHz	16.06	500	Complies
	5825 MHz	16.70	500	Complies
802.11n MCS0 HT40	5755 MHz	35.83	500	Complies
	5795 MHz	35.48	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.12	500	Complies
	5785 MHz	16.06	500	Complies
	5825 MHz	16.06	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.71	500	Complies
	5795 MHz	35.71	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	500	Complies

Note: All the test values were listed in the report.

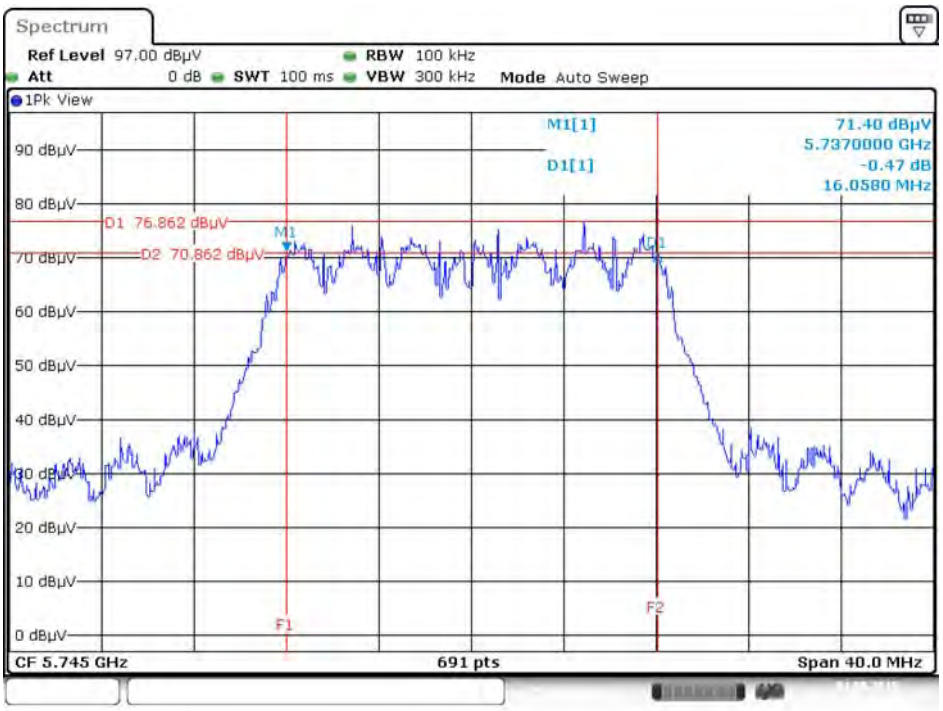
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5745 MHz



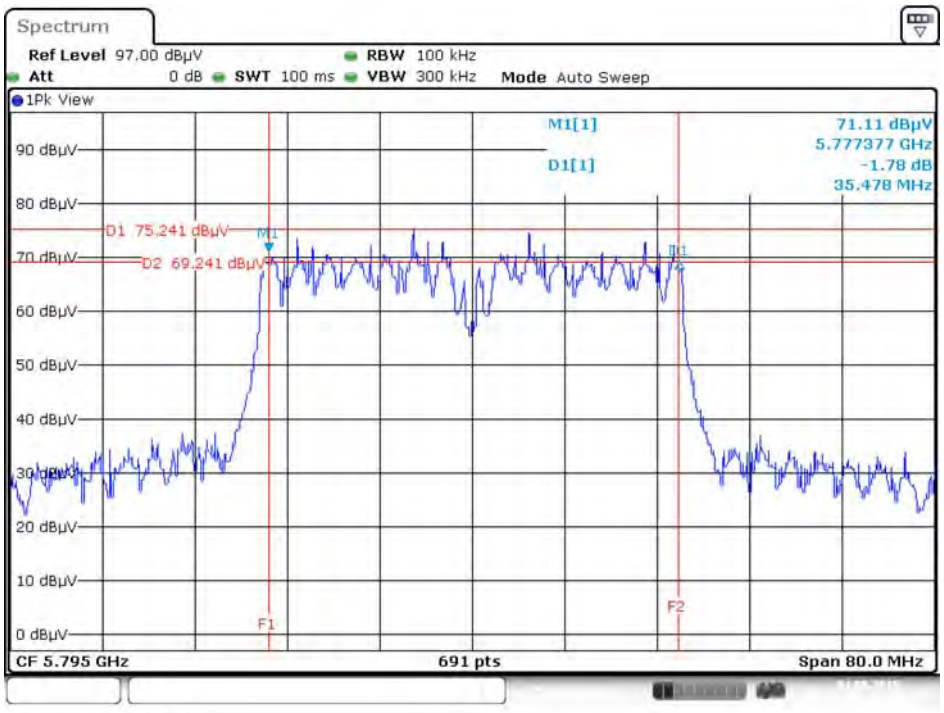
Date: 4.SEP.2015 10:35:05

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0/Nss1 HT20 / Ant. 1 + Ant. 2 / 5745 MHz



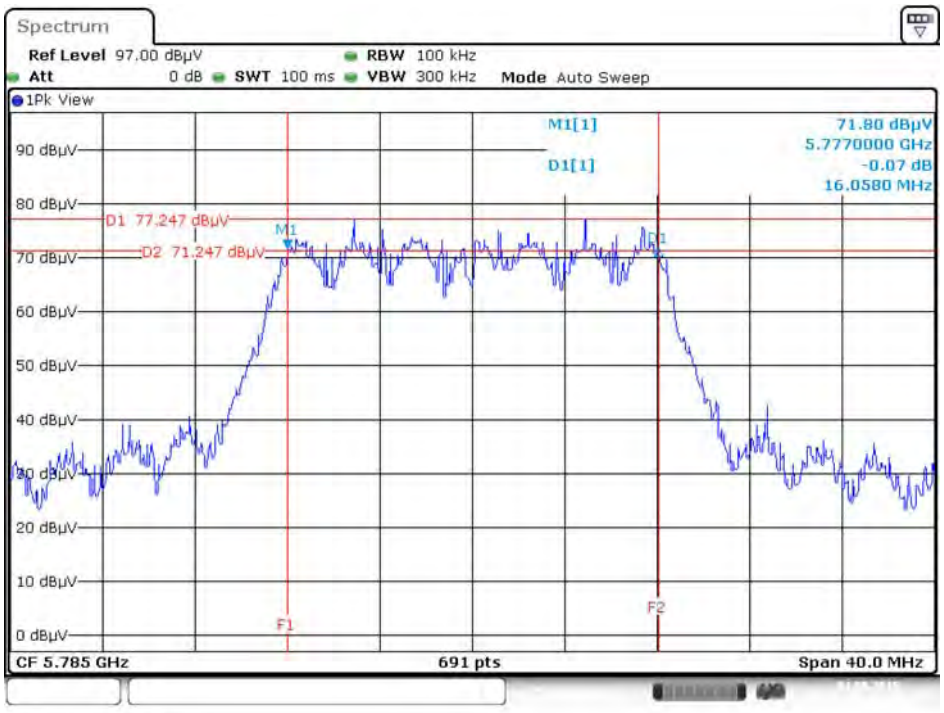
Date: 4.SEP.2015 10:38:40

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2 / 5795MHz



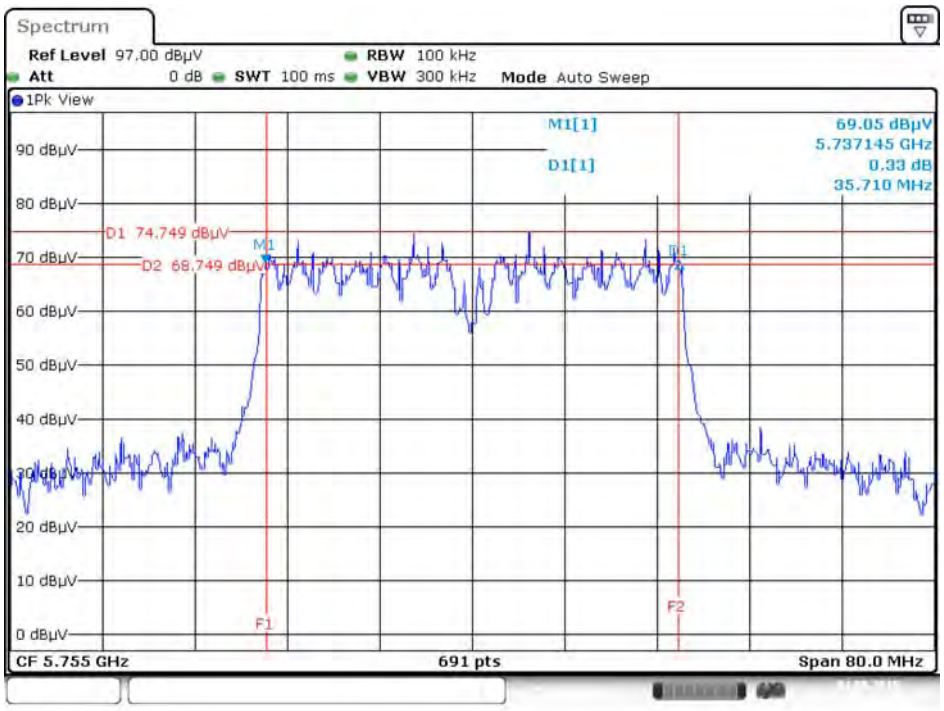
Date: 4.SEP.2015 10:43:20

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5785 MHz



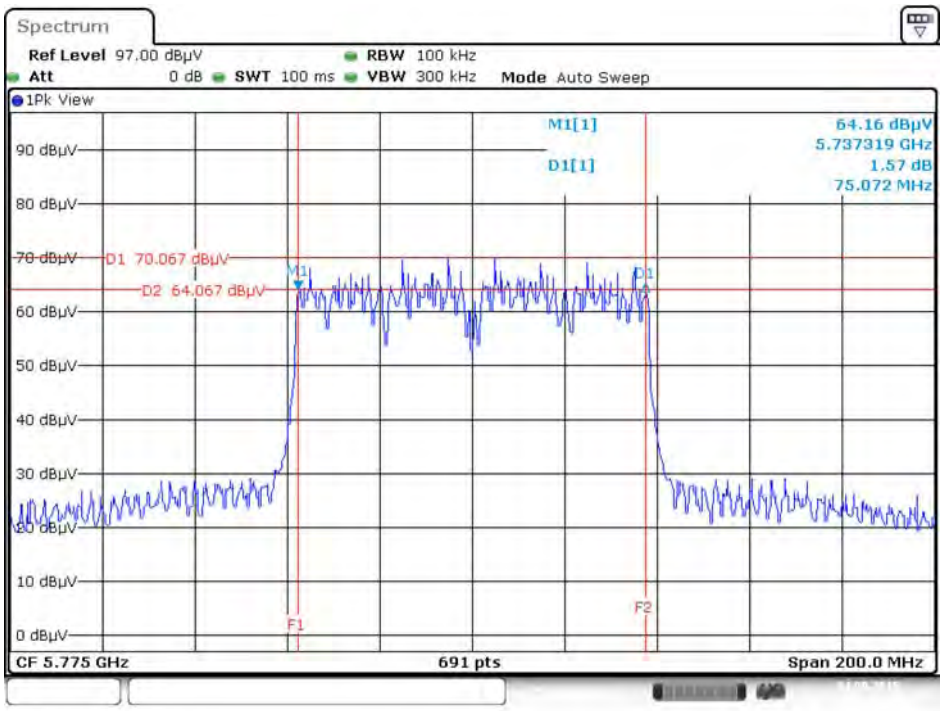
Date: 4.SEP.2015 10:41:14

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 / 5755MHz



Date: 4.SEP.2015 10:44:16

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



Date: 4.SEP.2015 10:46:01

For Beamforming Mode:

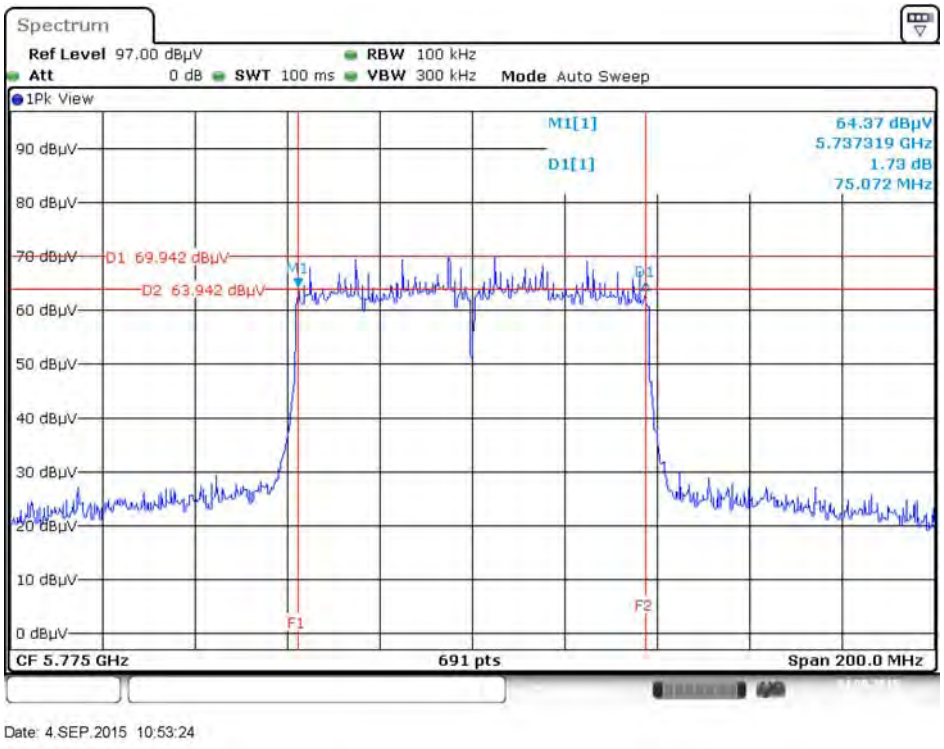
Temperature	25°C	Humidity	45%
Test Engineer	Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	500	Complies

Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☐	5.15~5.25 GHz	
	Operating Mode	
☐	Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
☐	Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
☐	Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
☐	Mobile and portable client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.3.2. Measuring Instruments and Setting

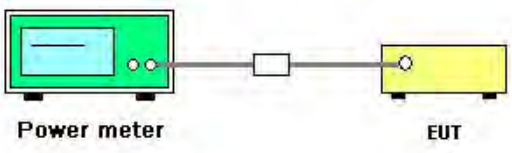
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

For Non-beamforming Mode:

Temperature	25°C	Humidity	45%
Test Engineer	Serway Li / Roki Liu	Test Date	Sep. 04, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
802.11a	5745 MHz	12.72	12.43	15.59	30.00	Complies
	5785 MHz	12.41	12.80	15.62	30.00	Complies
	5825 MHz	12.93	12.62	15.79	30.00	Complies
802.11n MCS0/Nss1 HT20	5745 MHz	12.68	12.55	15.63	30.00	Complies
	5785 MHz	12.74	12.61	15.69	30.00	Complies
	5825 MHz	12.68	12.43	15.57	30.00	Complies
802.11n MCS0 HT40	5755 MHz	12.70	12.58	15.65	30.00	Complies
	5795 MHz	12.68	12.53	15.62	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	12.52	12.91	15.73	30.00	Complies
	5785 MHz	12.69	12.51	15.61	30.00	Complies
	5825 MHz	12.73	12.91	15.83	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	12.72	12.58	15.66	30.00	Complies
	5795 MHz	12.84	12.80	15.83	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	10.74	11.11	13.94	30.00	Complies

For Beamforming Mode:

Temperature	25°C	Humidity	45%
Test Engineer	Serway Li	Test Date	Sep. 04, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
802.11ac MCS0/Nss1 VHT80	5775 MHz	10.74	11.11	13.94	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Band			Limit
☐	5.15~5.25 GHz		
	Operating Mode		
	☐	Outdoor access point	17 dBm/MHz
	☐	Indoor access point	17 dBm/MHz
	☐	Fixed point-to-point access points	17 dBm/MHz
	☐	Mobile and portable client devices	11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.4.2. Measuring Instruments and Setting

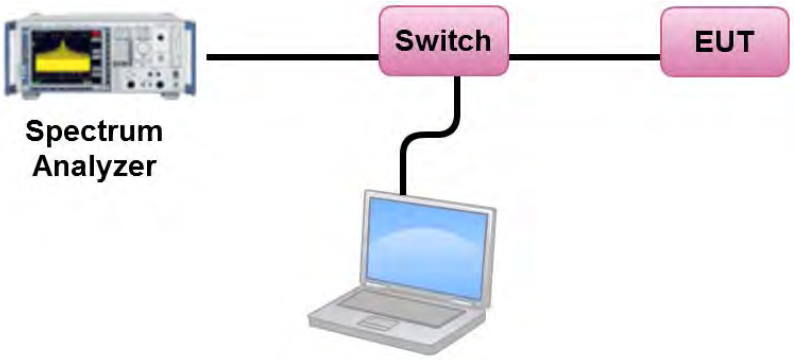
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

For Non-beamforming Mode:

Temperature	25°C	Humidity	45%
Test Engineer	Serway Li / Roki Liu		

Configuration IEEE 802.11a / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	2.39	-3.01	-0.62	28.69	Complies
157	5785 MHz	2.40	-3.01	-0.61	28.69	Complies
165	5825 MHz	2.66	-3.01	-0.35	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Configuration IEEE 802.11n MCS0/Nss1 HT20 / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	2.24	-3.01	-0.77	28.69	Complies
157	5785 MHz	2.20	-3.01	-0.81	28.69	Complies
165	5825 MHz	2.19	-3.01	-0.82	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	-0.48	-3.01	-3.49	28.69	Complies
159	5795 MHz	-0.45	-3.01	-3.46	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	2.25	-3.01	-0.76	28.69	Complies
157	5785 MHz	2.15	-3.01	-0.86	28.69	Complies
165	5825 MHz	2.41	-3.01	-0.60	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	-0.74	-3.01	-3.75	28.69	Complies
159	5795 MHz	-0.32	-3.01	-3.33	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2

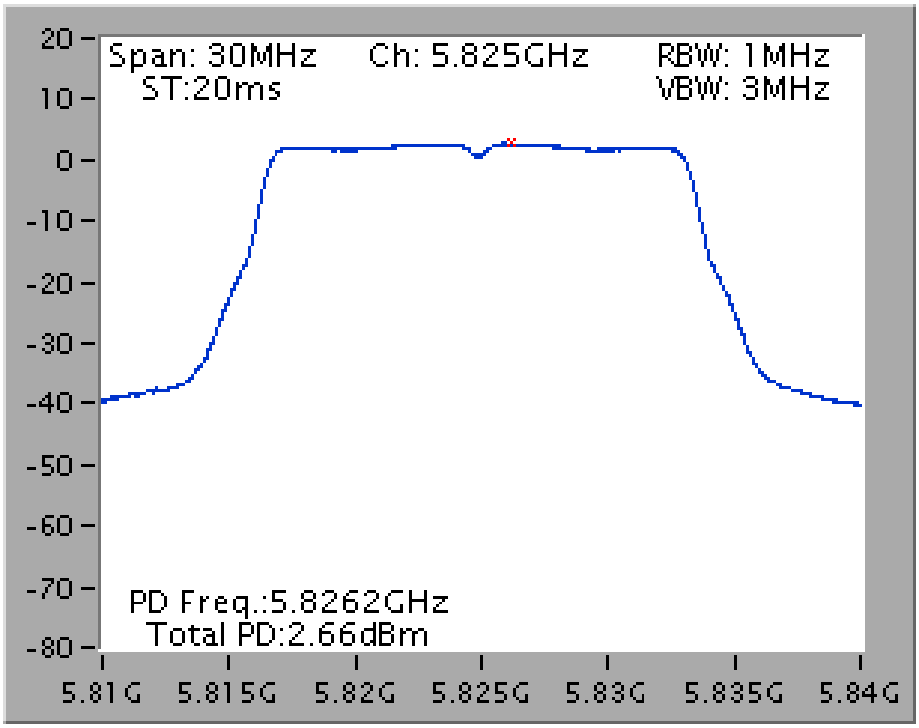
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-5.40	-3.01	-8.41	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

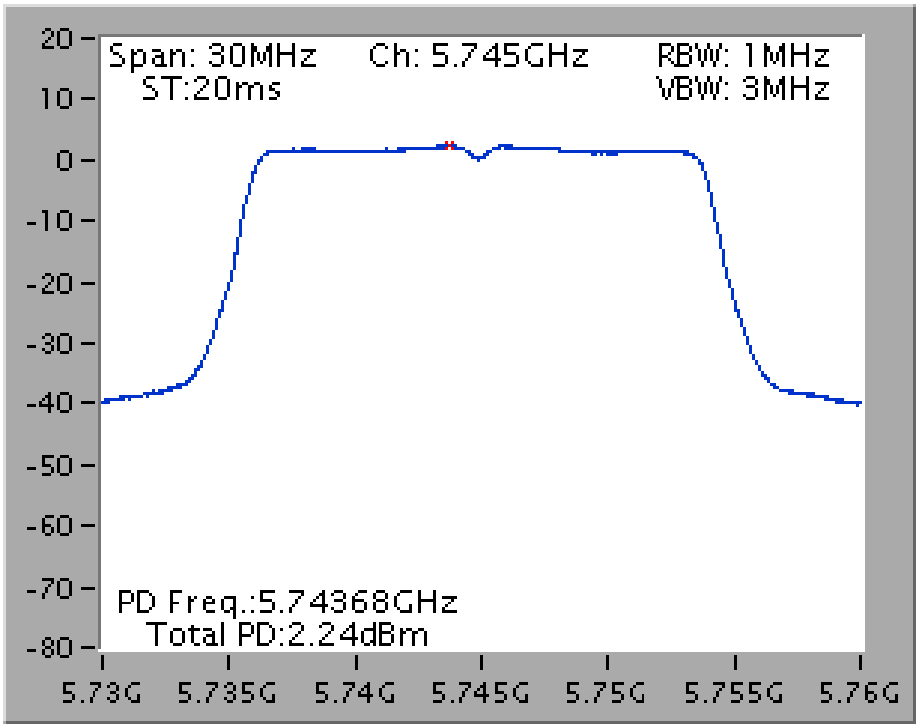
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

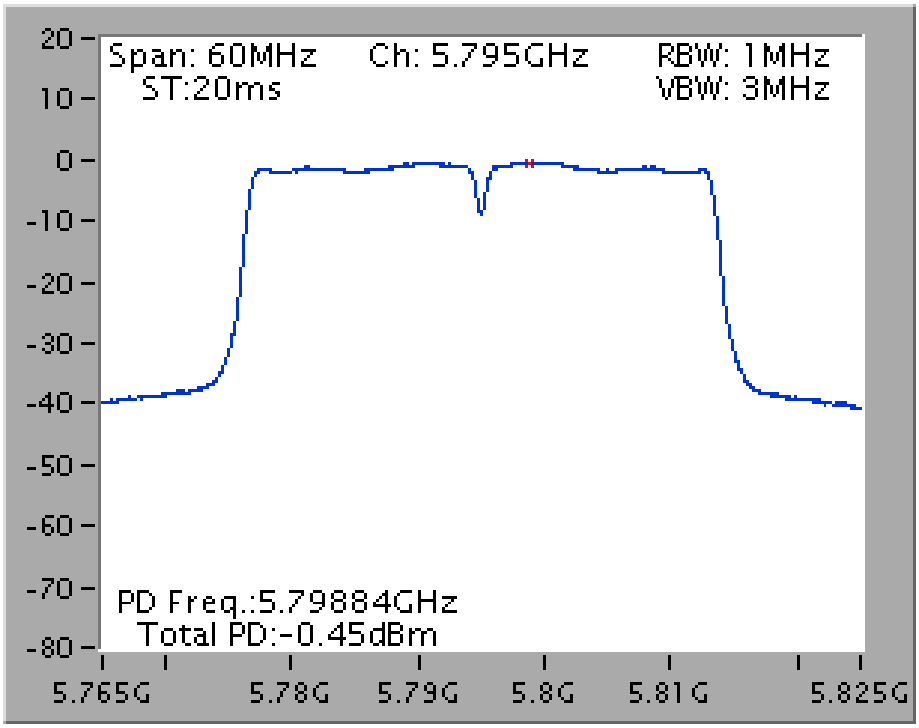
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5825 MHz



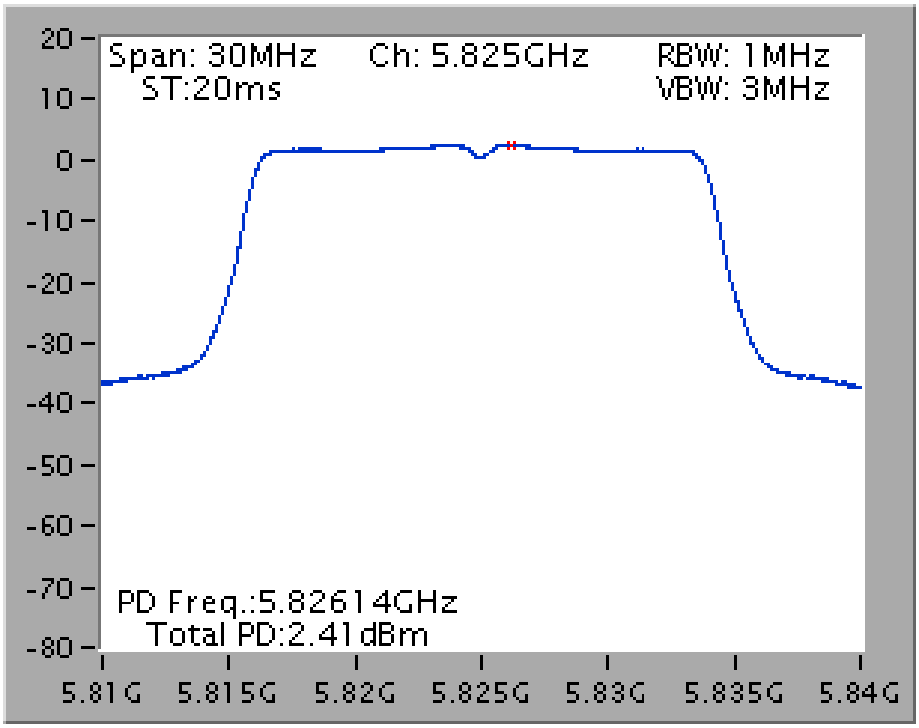
Power Density Plot on Configuration IEEE 802.11n MCS0/Nss1 HT20 / Ant. 1 + Ant. 2 / 5745 MHz



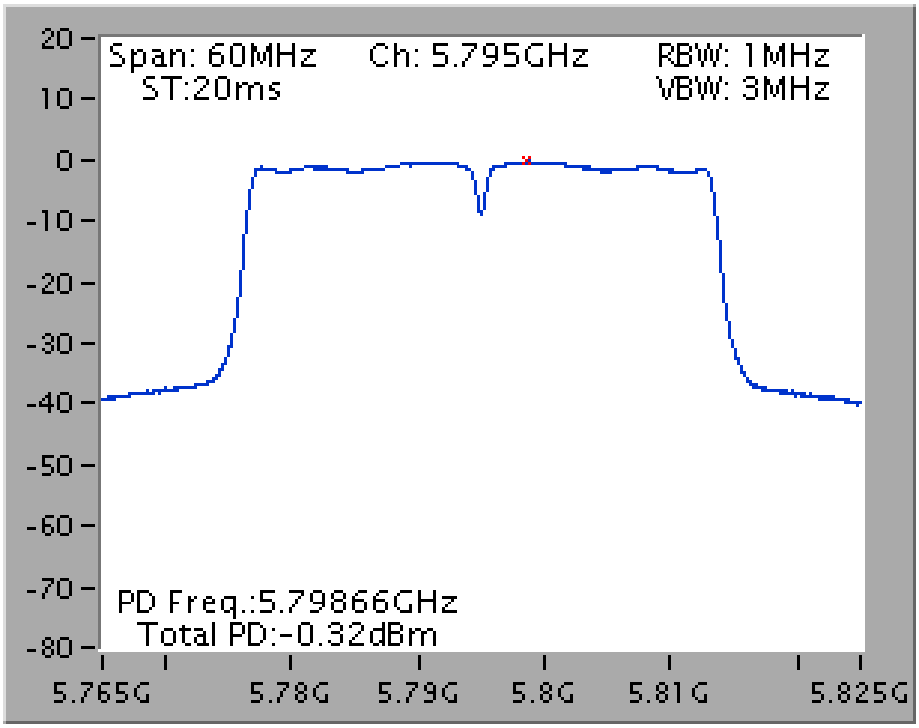
Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2 / 5795 MHz



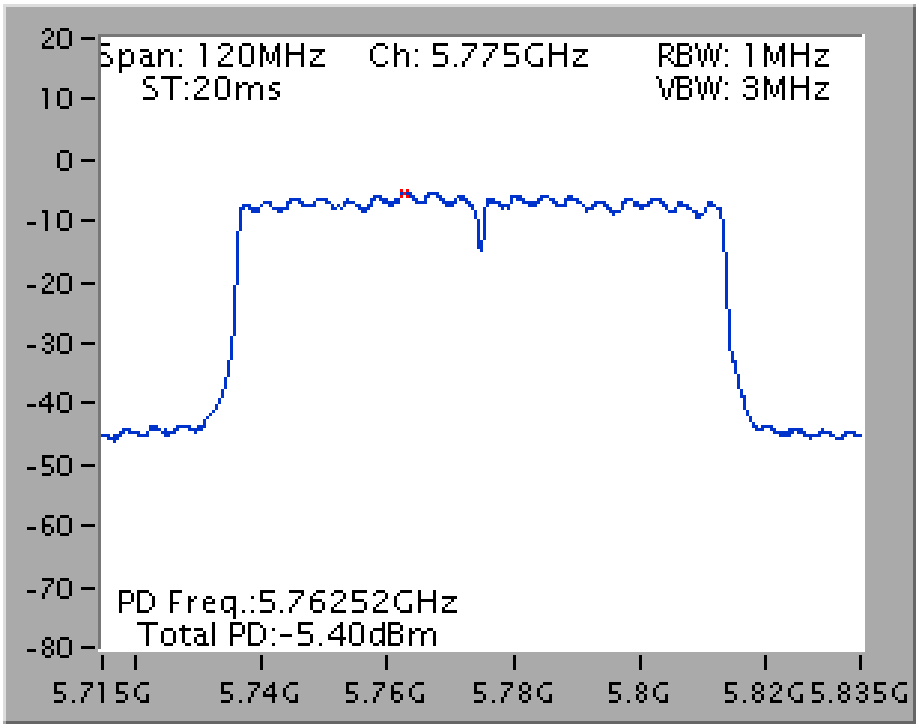
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5825 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



For Beamforming Mode:

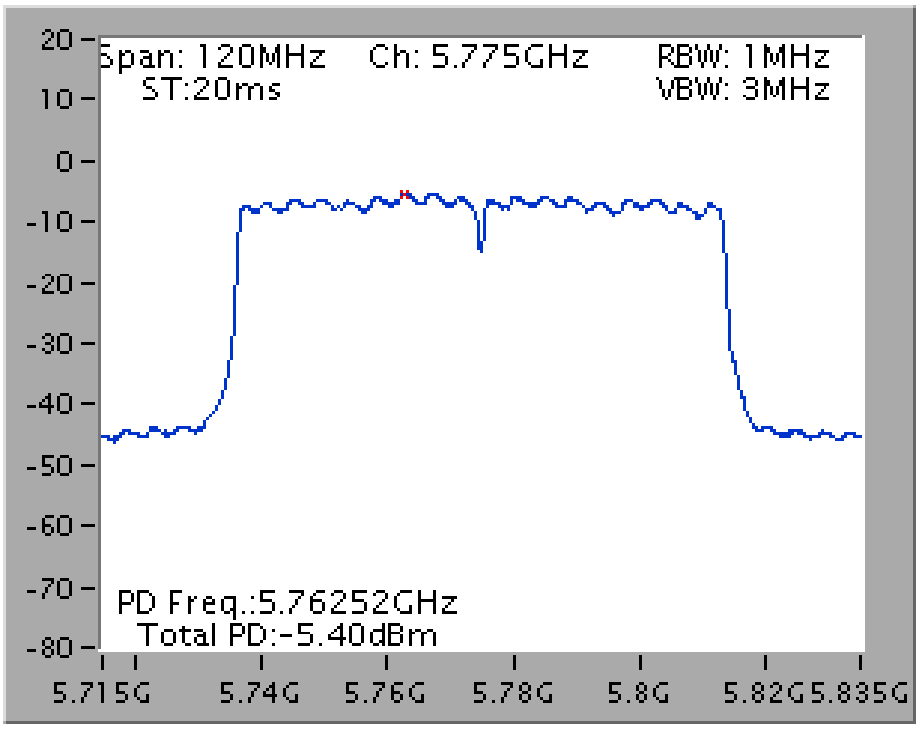
Temperature	25°C	Humidity	45%
Test Engineer	Serway Li		

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-5.40	-3.01	-8.41	28.69	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.31dBi, so limit=30-(7.31-6)=28.69dBm/MHz

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 / 5775 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

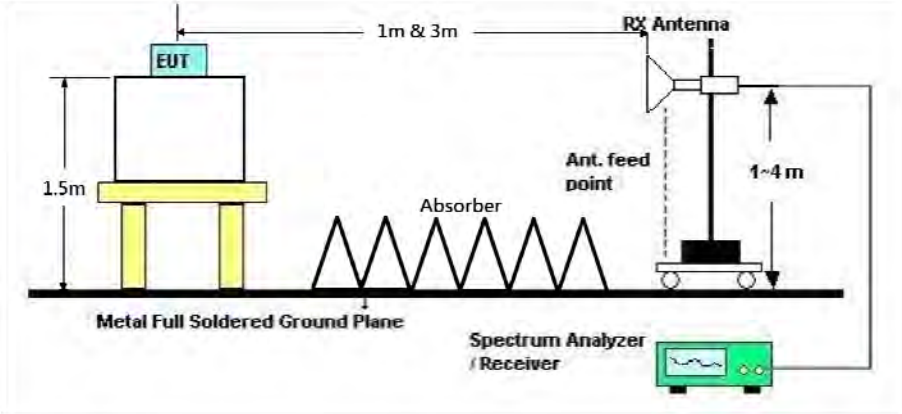
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.5.7. Results for Radiated Emissions (1GHz~40GHz)

For Non-beamforming Mode:

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11493.44	42.86	54.00	-11.14	29.26	8.73	39.20	34.33	178	130	HORIZONTAL	Average
2	11494.24	56.28	74.00	-17.72	42.68	8.73	39.20	34.33	178	130	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11492.08	42.97	54.00	-11.03	29.37	8.73	39.20	34.33	191	156	VERTICAL	Average
2	11492.45	56.20	74.00	-17.80	42.60	8.73	39.20	34.33	191	156	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11569.30	56.21	74.00	-17.79	42.63	8.78	39.17	34.37	164	178	HORIZONTAL	Peak
2	11571.17	43.19	54.00	-10.81	29.61	8.78	39.17	34.37	164	178	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11573.89	56.41	74.00	-17.59	42.83	8.78	39.17	34.37	169	126	VERTICAL	Peak
2	11574.67	43.45	54.00	-10.55	29.87	8.78	39.17	34.37	169	126	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11650.09	56.71	74.00	-17.29	43.15	8.82	39.15	34.41	167	221	HORIZONTAL	Peak
2	11651.85	43.63	54.00	-10.37	30.09	8.82	39.13	34.41	167	221	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11648.18	58.67	74.00	-15.33	45.11	8.82	39.15	34.41	138	294	VERTICAL	Peak
2	11652.16	43.49	54.00	-10.51	29.95	8.82	39.13	34.41	138	294	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0/Nss1 HT20 CH 149 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11487.15	56.06	74.00	-17.94	42.46	8.73	39.20	34.33	134	231	HORIZONTAL	Peak
2	11489.41	43.03	54.00	-10.97	29.43	8.73	39.20	34.33	134	231	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11487.84	43.10	54.00	-10.90	29.50	8.73	39.20	34.33	117	293	VERTICAL	Average
2	11492.84	56.33	74.00	-17.67	42.73	8.73	39.20	34.33	117	293	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0 HT20 CH 157 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11569.90	43.45	54.00	-10.55	29.87	8.78	39.17	34.37	162	295	HORIZONTAL	Average
2	11572.72	57.28	74.00	-16.72	43.70	8.78	39.17	34.37	162	295	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11566.70	56.39	74.00	-17.61	42.81	8.78	39.17	34.37	157	81	VERTICAL	Peak
2	11572.66	43.55	54.00	-10.45	29.97	8.78	39.17	34.37	157	81	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0 HT20 CH 165 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11648.42	57.45	74.00	-16.55	43.89	8.82	39.15	34.41	149	182	HORIZONTAL	Peak
2	11648.99	43.78	54.00	-10.22	30.22	8.82	39.15	34.41	149	182	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11651.11	43.75	54.00	-10.25	30.21	8.82	39.13	34.41	185	96	VERTICAL	Average
2	11652.79	57.23	74.00	-16.77	43.69	8.82	39.13	34.41	185	96	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0 HT40 CH 151 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11514.62	43.11	54.00	-10.89	29.53	8.73	39.20	34.35	146	192	HORIZONTAL	Average
2	11514.67	56.47	74.00	-17.53	42.89	8.73	39.20	34.35	146	192	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11505.54	42.90	54.00	-11.10	29.30	8.73	39.20	34.33	198	96	VERTICAL	Average
2	11513.60	56.65	74.00	-17.35	43.07	8.73	39.20	34.35	198	96	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0 HT40 CH 159 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11585.77	56.57	74.00	-17.43	43.02	8.78	39.16	34.39	132	260	HORIZONTAL	Peak
2	11594.60	43.30	54.00	-10.70	29.73	8.80	39.16	34.39	132	260	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11591.13	56.34	74.00	-17.66	42.79	8.78	39.16	34.39	188	310	VERTICAL	Peak
2	11592.71	42.98	54.00	-11.02	29.43	8.78	39.16	34.39	188	310	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11488.63	42.58	54.00	-11.42	28.98	8.73	39.20	34.33	120	217	HORIZONTAL	Average
2	11494.76	56.12	74.00	-17.88	42.52	8.73	39.20	34.33	120	217	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11485.17	42.32	54.00	-11.68	28.72	8.73	39.20	34.33	148	199	VERTICAL	Average
2	11494.56	55.82	74.00	-18.18	42.22	8.73	39.20	34.33	148	199	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11570.94	55.91	74.00	-18.09	42.33	8.78	39.17	34.37	170	167	HORIZONTAL	Peak
2	11571.25	43.07	54.00	-10.93	29.49	8.78	39.17	34.37	170	167	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11566.58	56.23	74.00	-17.77	42.65	8.78	39.17	34.37	157	126	VERTICAL	Peak
2	11572.20	42.69	54.00	-11.31	29.11	8.78	39.17	34.37	157	126	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11645.59	43.30	54.00	-10.70	29.74	8.82	39.15	34.41	171	206	HORIZONTAL	Average
2	11650.36	57.13	74.00	-16.87	43.57	8.82	39.15	34.41	171	206	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11646.96	42.92	54.00	-11.08	29.36	8.82	39.15	34.41	146	159	VERTICAL	Average
2	11650.48	56.43	74.00	-17.57	42.87	8.82	39.15	34.41	146	159	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11506.29	56.08	74.00	-17.92	42.48	8.73	39.20	34.33	138	166	HORIZONTAL	Peak
2	11507.95	43.01	54.00	-10.99	29.41	8.73	39.20	34.33	138	166	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11507.05	42.72	54.00	-11.28	29.12	8.73	39.20	34.33	116	212	VERTICAL	Average
2	11507.58	56.11	74.00	-17.89	42.51	8.73	39.20	34.33	116	212	VERTICAL	Peak

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11585.66	56.64	74.00	-17.36	43.09	8.78	39.16	34.39	125	140	HORIZONTAL	Peak
2	11588.41	43.08	54.00	-10.92	29.53	8.78	39.16	34.39	125	140	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11585.47	55.86	74.00	-18.14	42.31	8.78	39.16	34.39	166	217	VERTICAL	Peak
2	11591.16	42.68	54.00	-11.32	29.13	8.78	39.16	34.39	166	217	VERTICAL	Average

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11551.82	56.38	74.00	-17.62	42.83	8.75	39.17	34.37	172	238	HORIZONTAL	Peak
2	11554.63	43.24	54.00	-10.76	29.69	8.75	39.17	34.37	172	238	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11549.87	42.74	54.00	-11.26	29.17	8.75	39.19	34.37	204	274	VERTICAL	Average
2	11553.08	55.93	74.00	-18.07	42.38	8.75	39.17	34.37	204	274	VERTICAL	Peak

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Beamforming Mode:

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11550.00	38.20	54.00	-15.80	27.58	6.55	38.71	34.64	310	129	Average	HORIZONTAL
2	11552.20	52.87	74.00	-21.13	42.25	6.55	38.71	34.64	310	129	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11546.16	38.82	54.00	-15.18	28.21	6.54	38.71	34.64	281	186	Average	VERTICAL
2	11550.94	52.39	74.00	-21.61	41.77	6.55	38.71	34.64	281	186	Peak	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For Non-beamforming Mode:

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.70	60.48	68.20	-7.72	54.54	5.85	34.45	34.36	102	44	HORIZONTAL	Peak
2	5723.55	66.89	78.20	-11.31	60.90	5.85	34.50	34.36	102	44	HORIZONTAL	Peak
3	5746.74	98.77			92.71	5.88	34.55	34.37	102	44	HORIZONTAL	Average
4	5747.03	109.83			103.77	5.88	34.55	34.37	102	44	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5702.84	62.91	68.20	-5.29	57.03	5.83	34.40	34.35	101	43	HORIZONTAL	Peak
2	5722.11	60.60	78.20	-17.60	54.66	5.85	34.45	34.36	101	43	HORIZONTAL	Peak
3	5782.40	98.63			92.45	5.90	34.65	34.37	101	43	HORIZONTAL	Average
4	5787.03	109.66			103.47	5.92	34.65	34.38	101	43	HORIZONTAL	Peak
5	5850.87	60.63	78.20	-17.57	54.22	5.95	34.85	34.39	101	43	HORIZONTAL	Peak
6	5862.89	63.62	68.20	-4.58	57.14	5.97	34.90	34.39	101	43	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5827.03	99.58			93.22	5.94	34.80	34.38	101	43	HORIZONTAL	Average
2	5827.03	109.69			103.33	5.94	34.80	34.38	101	43	HORIZONTAL	Peak
3	5852.03	61.19	78.20	-17.01	54.78	5.95	34.85	34.39	101	43	HORIZONTAL	Peak
4	5860.00	60.75	68.20	-7.45	54.29	5.95	34.90	34.39	101	43	HORIZONTAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0/Nss1 HT20 CH 149, 157, 165 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5710.80	60.47	68.20	-7.73	54.53	5.85	34.45	34.36	102	44	HORIZONTAL	Peak
2	5723.70	72.07	78.20	-6.13	66.08	5.85	34.50	34.36	102	44	HORIZONTAL	Peak
3	5746.01	109.28			103.22	5.88	34.55	34.37	102	44	HORIZONTAL	Peak
4	5746.16	99.05			92.99	5.88	34.55	34.37	102	44	HORIZONTAL	Average

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5708.63	62.39	68.20	-5.81	56.45	5.85	34.45	34.36	101	40	HORIZONTAL	Peak
2	5724.13	60.36	78.20	-17.84	54.37	5.85	34.50	34.36	101	40	HORIZONTAL	Peak
3	5781.53	107.98			101.80	5.90	34.65	34.37	101	40	HORIZONTAL	Peak
4	5786.16	98.90			92.71	5.92	34.65	34.38	101	40	HORIZONTAL	Average
5	5852.32	60.47	78.20	-17.73	54.06	5.95	34.85	34.39	101	40	HORIZONTAL	Peak
6	5863.76	62.61	68.20	-5.59	56.13	5.97	34.90	34.39	101	40	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5827.03	99.06			92.70	5.94	34.80	34.38	285	45	VERTICAL	Peak
2	5831.95	88.65			82.29	5.94	34.80	34.38	285	45	VERTICAL	Average
3	5852.60	60.33	78.20	-17.87	53.92	5.95	34.85	34.39	285	45	VERTICAL	Peak
4	5866.08	61.69	68.20	-6.51	55.21	5.97	34.90	34.39	285	45	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11n MCS0 HT40 CH 151, 159 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.84	67.11	68.20	-1.09	61.17	5.85	34.45	34.36	102	43	HORIZONTAL	Peak
2	5723.84	71.60	78.20	-6.60	65.61	5.85	34.50	34.36	102	43	HORIZONTAL	Peak
3	5750.66	106.45			100.39	5.88	34.55	34.37	102	43	HORIZONTAL	Peak
4	5750.95	95.99			89.93	5.88	34.55	34.37	102	43	HORIZONTAL	Average

Item 3, 4 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5711.53	61.28	68.20	-6.92	55.34	5.85	34.45	34.36	101	42	HORIZONTAL	Peak
2	5723.70	60.85	78.20	-17.35	54.86	5.85	34.50	34.36	101	42	HORIZONTAL	Peak
3	5798.47	96.05			89.81	5.92	34.70	34.38	101	42	HORIZONTAL	Average
4	5798.47	106.20			99.96	5.92	34.70	34.38	101	42	HORIZONTAL	Peak
5	5852.17	61.20	78.20	-17.00	54.79	5.95	34.85	34.39	101	42	HORIZONTAL	Peak
6	5860.87	62.87	68.20	-5.33	56.39	5.97	34.90	34.39	101	42	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5795 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.84	61.04	68.20	-7.16	55.10	5.85	34.45	34.36	101	44	HORIZONTAL	Peak
2	5723.84	70.14	78.20	-8.06	64.15	5.85	34.50	34.36	101	44	HORIZONTAL	Peak
3	5746.16	99.10			93.04	5.88	34.55	34.37	101	44	HORIZONTAL	Average
4	5746.45	109.46			103.40	5.88	34.55	34.37	101	44	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5706.32	62.62	68.20	-5.58	56.69	5.83	34.45	34.35	100	42	HORIZONTAL	Peak
2	5721.82	60.26	78.20	-17.94	54.32	5.85	34.45	34.36	100	42	HORIZONTAL	Peak
3	5783.84	109.26			103.07	5.92	34.65	34.38	100	42	HORIZONTAL	Peak
4	5785.87	99.31			93.12	5.92	34.65	34.38	100	42	HORIZONTAL	Average
5	5850.29	61.92	78.20	-16.28	55.51	5.95	34.85	34.39	100	42	HORIZONTAL	Peak
6	5861.45	63.06	68.20	-5.14	56.58	5.97	34.90	34.39	100	42	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5826.16	99.68			93.32	5.94	34.80	34.38	101	43	HORIZONTAL	Average
2	5826.16	109.36			103.00	5.94	34.80	34.38	101	43	HORIZONTAL	Peak
3	5850.29	60.74	78.20	-17.46	54.33	5.95	34.85	34.39	101	43	HORIZONTAL	Peak
4	5860.87	61.28	68.20	-6.92	54.80	5.97	34.90	34.39	101	43	HORIZONTAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5712.68	67.77	68.20	-0.43	61.83	5.85	34.45	34.36	103	44	HORIZONTAL	Peak
2	5722.11	70.65	78.20	-7.55	64.71	5.85	34.45	34.36	103	44	HORIZONTAL	Peak
3	5751.24	96.20			90.14	5.88	34.55	34.37	103	44	HORIZONTAL	Average
4	5751.24	106.79			100.73	5.88	34.55	34.37	103	44	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.55	61.71	68.20	-6.49	55.77	5.85	34.45	34.36	100	44	HORIZONTAL	Peak
2	5720.95	62.08	78.20	-16.12	56.14	5.85	34.45	34.36	100	44	HORIZONTAL	Peak
3	5793.55	107.09			100.85	5.92	34.70	34.38	100	44	HORIZONTAL	Peak
4	5798.18	96.87			90.63	5.92	34.70	34.38	100	44	HORIZONTAL	Average
5	5850.00	60.70	78.20	-17.50	54.29	5.95	34.85	34.39	100	44	HORIZONTAL	Peak
6	5862.03	62.88	68.20	-5.32	56.40	5.97	34.90	34.39	100	44	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5795 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 155 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5712.83	65.69	68.20	-2.51	59.75	5.85	34.45	34.36	102	40	HORIZONTAL	Peak
2	5723.55	66.33	78.20	-11.87	60.34	5.85	34.50	34.36	102	40	HORIZONTAL	Peak
3	5763.42	93.95			87.84	5.88	34.60	34.37	102	40	HORIZONTAL	Average
4	5763.42	104.03			97.92	5.88	34.60	34.37	102	40	HORIZONTAL	Peak
5	5852.89	64.15	78.20	-14.05	57.74	5.95	34.85	34.39	102	40	HORIZONTAL	Peak
6	5862.17	63.95	68.20	-4.25	57.47	5.97	34.90	34.39	102	40	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 5775 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

For Beamforming Mode:

Temperature	24°C	Humidity	55%
Test Engineer	Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 155 / Ant. 1 + Ant. 2
Test Date	Jul. 22, 2015		

Channel 155

1	5712.11	67.84	68.20	-0.36	63.28	6.10	32.06	33.60	100	317	Peak	HORIZONTAL
2	5717.17	65.83	78.20	-12.37	61.27	6.10	32.06	33.60	100	317	Peak	HORIZONTAL
3	5780.07	104.99			100.33	6.12	32.14	33.60	100	317	Peak	HORIZONTAL
4	5787.30	95.11			90.45	6.12	32.14	33.60	100	317	Average	HORIZONTAL
5	5852.04	63.44	78.20	-14.76	58.68	6.15	32.22	33.61	100	317	Peak	HORIZONTAL
6	5866.51	67.98	68.20	-0.22	63.19	6.16	32.24	33.61	100	317	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5775 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.7. Antenna Requirements

4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%