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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	**PY312400219**

Product Name	R6250 Smart WiFi Router
Brand Name	NETGEAR
Model No.	R6250
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jul. 16, 2015
Final Test Date	Sep. 17, 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.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR322315-05	Rev. 01	Initial issue of report	Sep. 30, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	R6250 Smart WiFi Router
Brand Name	:	NETGEAR
Model No.	:	R6250
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 Jul. 16, 2015 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	7.87 dB
4.4	15.407(a)	Power Spectral Density	Complies	24.45 dB
4.5	15.407(b)	Radiated Emissions	Complies	1.09 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.12 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
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 function: IEEE 802.11a: 17.02 MHz IEEE 802.11n MCS0 (HT20): 17.80 MHz IEEE 802.11n MCS0 (HT40): 37.34 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.34 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.70 MHz For beamforming function: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.89 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.05 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	For non-beamforming function: IEEE 802.11a: 20.36 dBm IEEE 802.11n MCS0 (HT20): 20.88 dBm IEEE 802.11n MCS0 (HT40): 22.13 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 21.67 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.36 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.46 dBm For beamforming function: IEEE 802.11ac MCS0/Nss1 (VHT20): 21.42 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.61 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 17.68 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	☐ 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.

Antenna and Band width

Antenna	Three (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)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

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

Power	Brand	Model	P/N	Rating
Adapter 1	NETGEAR	MU30-5120250-A1	332-10234-01	Input:100-240Vac, 50/60Hz, 0.8A Output:12Vdc, 2.5A
Adapter 2	NETGEAR	P030WF120B 11200-6LF	332-10200-02	Input:100-240Vac, 50/60Hz, 1.0A Output:12Vdc, 2.5A
Others				
RJ-45 Cable*1: Shielded, 1.3m				

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	NETGEAR	-	PCB Antenna	I-PEX	1.5	-
2	NETGEAR	-	PCB Antenna	I-PEX	1.3	-
3	NETGEAR	-	PCB Antenna	I-PEX	-	2.5
4	NETGEAR	-	PCB Antenna	I-PEX	-	2.1
5	NETGEAR	-	PCB Antenna	I-PEX	-	3.0

Note: The EUT has five antennas.

For 2.4GHz Band:

For IEEE 802.11b mode (1TX/2RX):

Only Ant. 2 can be used as transmitting, but Ant. 1 and Ant. 2 could receive simultaneously.

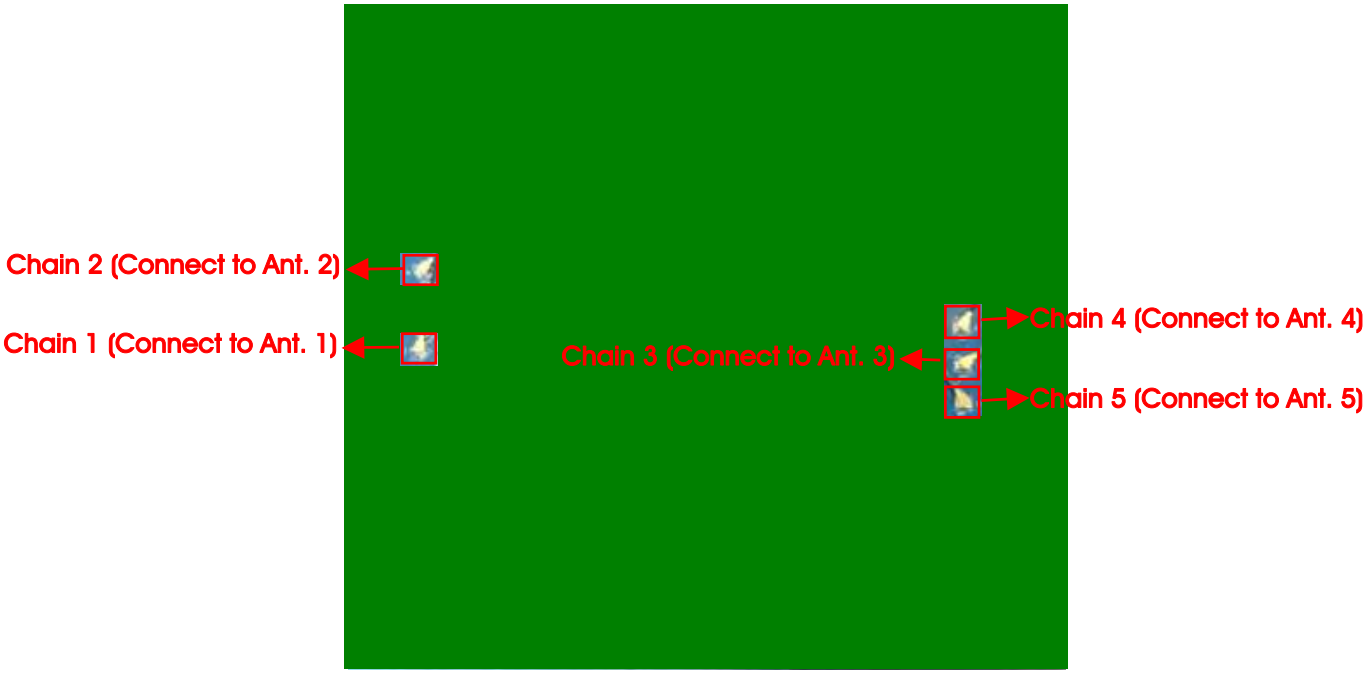
For IEEE 802.11g/n mode (2TX/2RX):

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

For 5GHz Band (3TX/3RX):

Ant. 3, Ant. 4 and Ant. 5 could transmit/receive simultaneously.

According to the above antennas, there are three antennas will transit simultaneously (one is Horizontal and the others are Vertical)



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	Chain
Max. Conducted Output Power	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Power Spectral Density	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5

6dB Spectrum Bandwidth Measurement	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Radiated Emission Above 1GHz	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Band Edge Emission	Non-beamforming function				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11n HT20	Band 4	MCS0	149/157/165	3+4+5
	11n HT40	Band 4	MCS0	151/159	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
	Beamforming function				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Frequency Stability	20 MHz	Band 4	-	157	4
	40 MHz	Band 4	-	151	4
	80 MHz	Band 4	-	155	5

Note: 1. There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for for 802.11ac. All test results were recorded in the report.

2. The EUT can only be used at Y axis position.

The following test modes were performed for all tests:

For Co-location MPE test:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA322315-05) test is added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

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: FR322315

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. Max. Conducted Output Power. 2. Power Spectral Density. 3. 26dB Spectrum Bandwidth. 4. 6dB Spectrum Bandwidth 5. 99% Occupied Bandwidth Measurement. 6. Radiated Emission Above 1GHz. 7. Band Edge Emission. 8. Frequency Stability.

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Notebook	DELL	E4300	DoC
WLAN ac Dongle	Netgear	A6200	PY31220200

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.

Test Function	Non-beamforming function		
Test Software Version	Mtool V1.0.0.10		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	60	58	60
802.11n MCS0 HT20	62	63	62
802.11ac MCS0/Nss1 VHT20	62	62	64
Mode	NCB: 40MHz		
	5755 MHz	5795 MHz	
802.11n MCS0 HT40	60	68	
802.11ac MCS0/Nss1 VHT40	60	66	
Mode	NCB: 80MHz		
	5775 MHz		
802.11ac MCS0/Nss1 VHT80	57		

Test Function	Beamforming function		
Test Software Version	Mtool V1.0.0.10		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	65	63	58
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	60	66	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	52		

3.10. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

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 WLAN ac Dongle and transmit duty cycle no less 98%

3.11. Duty Cycle

For non-beamforming function:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.045	2.086	98.03	0.09	0.01
802.11n MCS0 HT20	1.920	1.940	98.97	0.05	0.01
802.11n MCS0 HT40	0.950	0.968	98.14	0.08	0.01
802.11ac MCS0/Nss1 VHT20	1.922	1.955	98.31	0.07	0.01
802.11ac MCS0/Nss1 VHT40	0.922	0.991	93.04	0.31	1.08
802.11ac MCS0/Nss1 VHT80	0.426	0.487	87.47	0.58	2.35

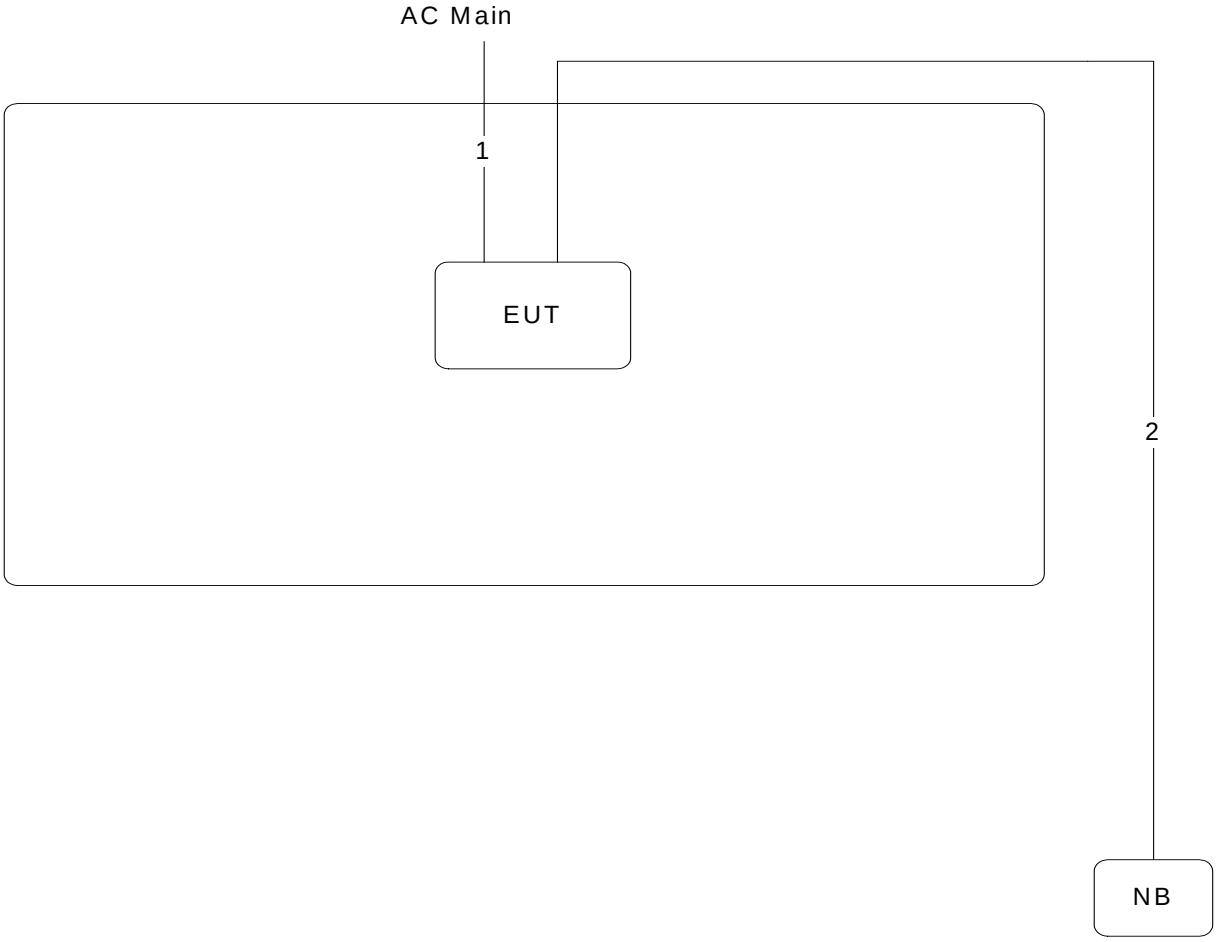
For beamforming function:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.841	3.942	97.44	0.11	0.26
802.11ac MCS0/Nss1 VHT40	5.975	6.774	88.20	0.55	0.17
802.11ac MCS0/Nss1 VHT80	5.768	6.638	86.90	0.61	0.17

3.12. Test Configurations

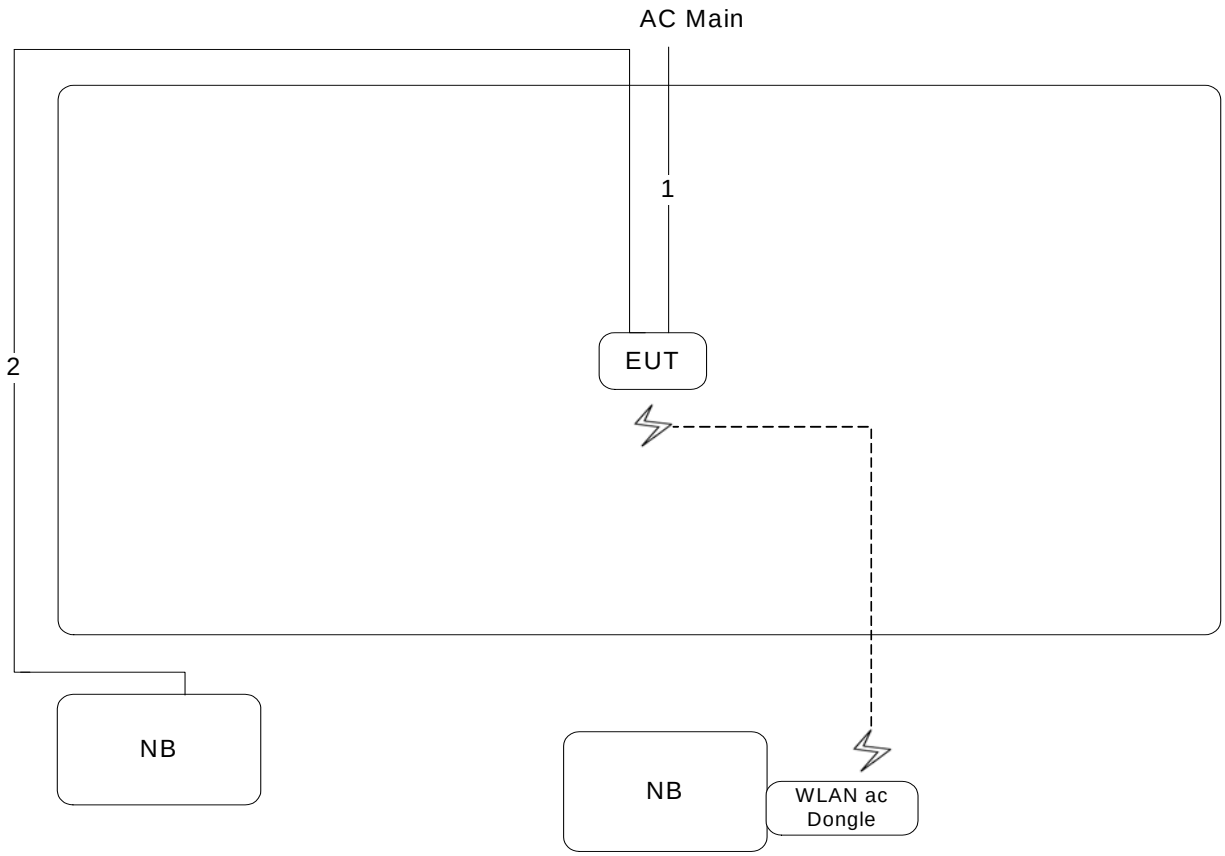
3.12.1. Radiation Emissions Test Configuration

For non-beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

For beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

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

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Non-beamforming function

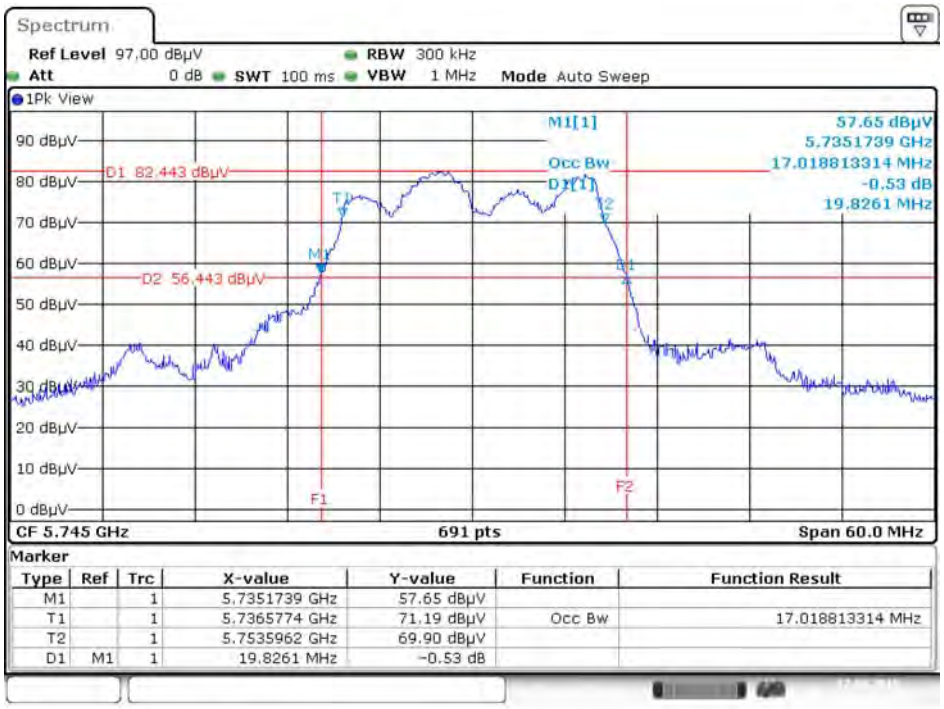
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	19.83	17.02
	5785 MHz	19.83	17.02
	5825 MHz	19.74	16.93
802.11n MCS0 HT20	5745 MHz	20.17	17.71
	5785 MHz	20.43	17.80
	5825 MHz	20.35	17.71
802.11n MCS0 HT40	5755 MHz	40.58	37.19
	5795 MHz	47.83	37.34
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.26	17.71
	5785 MHz	20.35	17.71
	5825 MHz	20.43	17.80
802.11ac MCS0/Nss1 VHT40	5755 MHz	40.58	37.19
	5795 MHz	44.93	37.34
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.03	76.70

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Beamforming function

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.35	17.80
	5785 MHz	20.35	17.89
	5825 MHz	20.17	17.80
802.11ac MCS0/Nss1 VHT40	5755 MHz	42.75	36.90
	5795 MHz	51.59	37.05
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.61	76.12

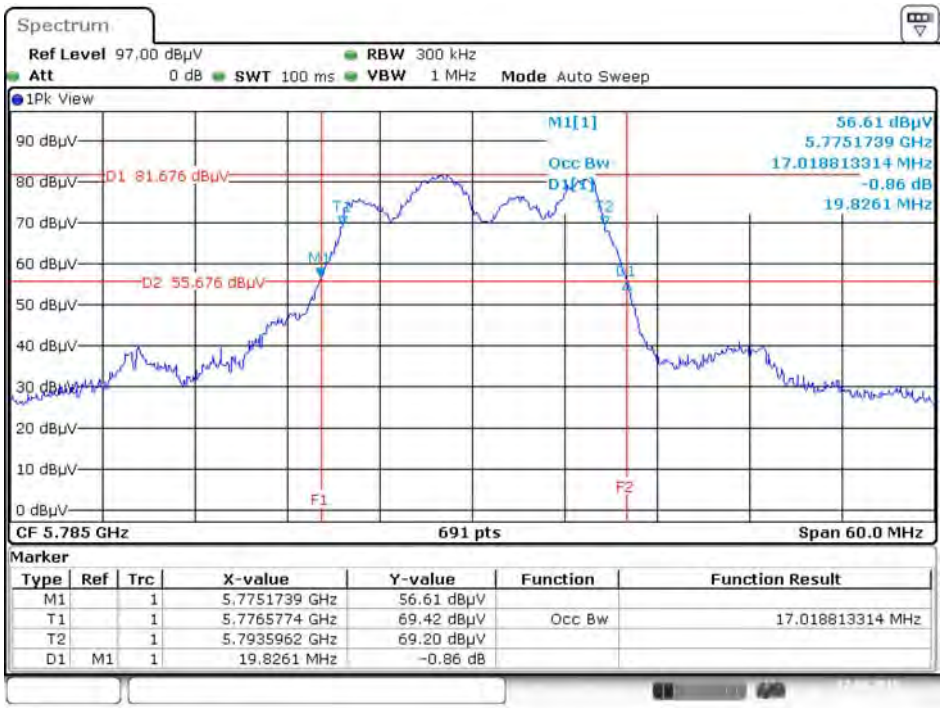
For non-beamforming function:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



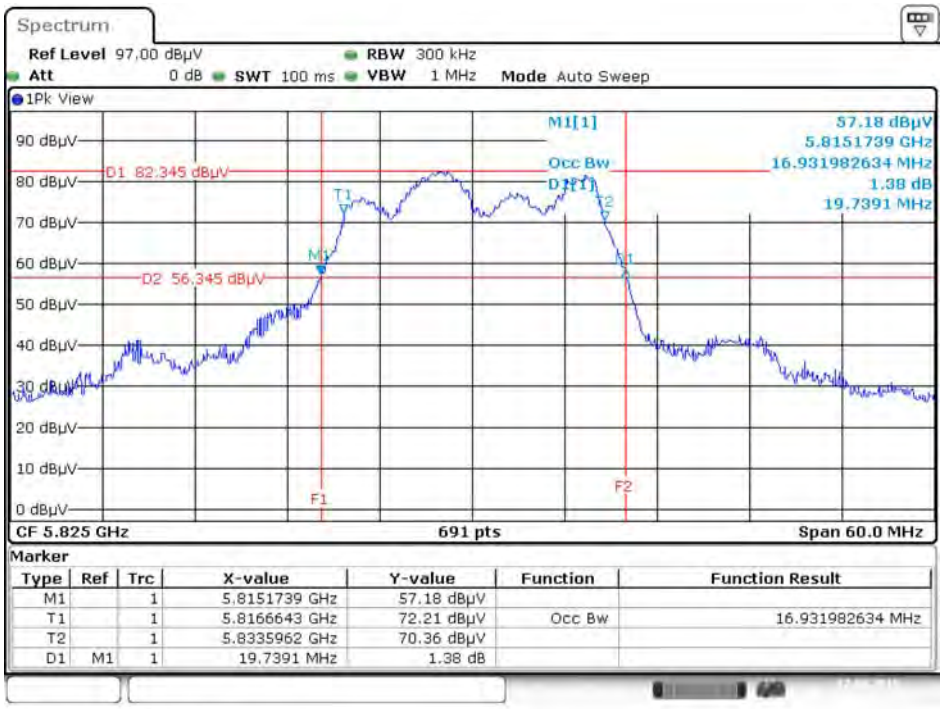
Date: 17.SEP.2015 02:25:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5 / 5785 MHz



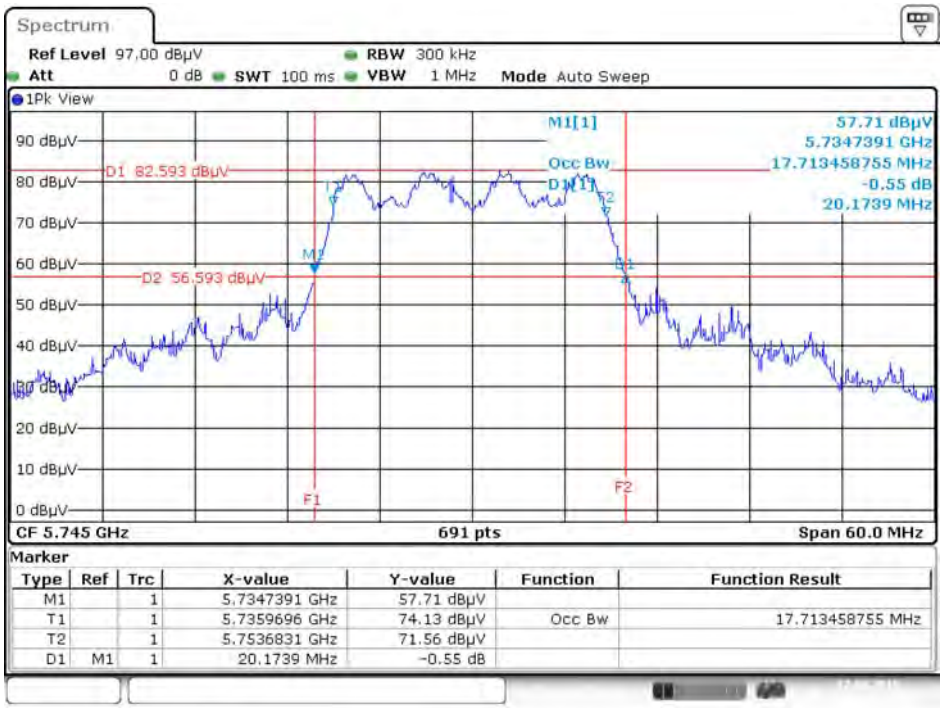
Date: 17.SEP.2015 02:26:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



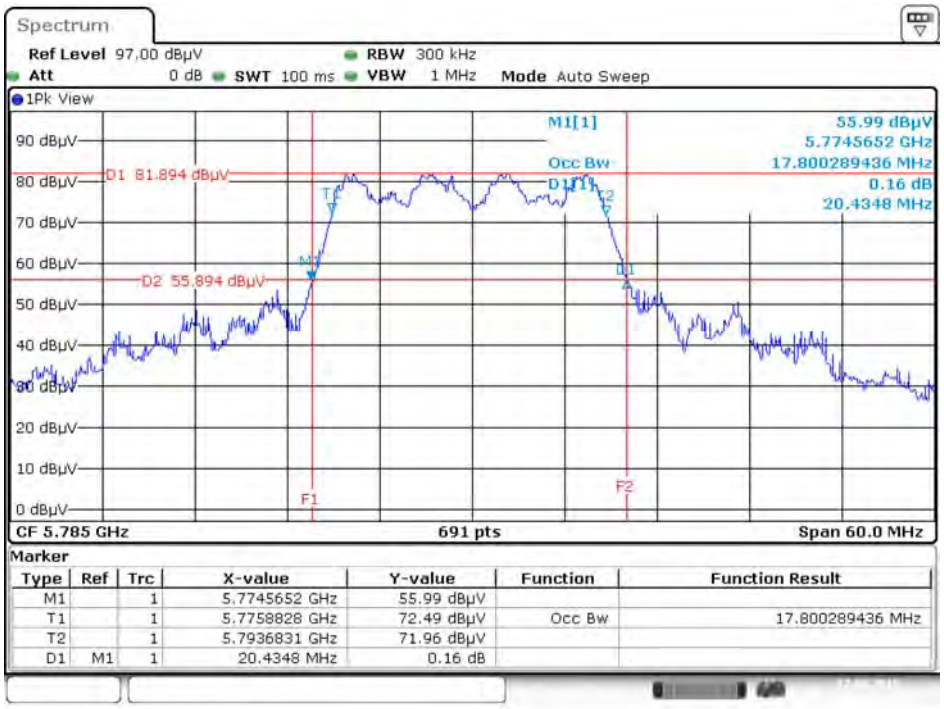
Date: 17.SEP.2015 02:28:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



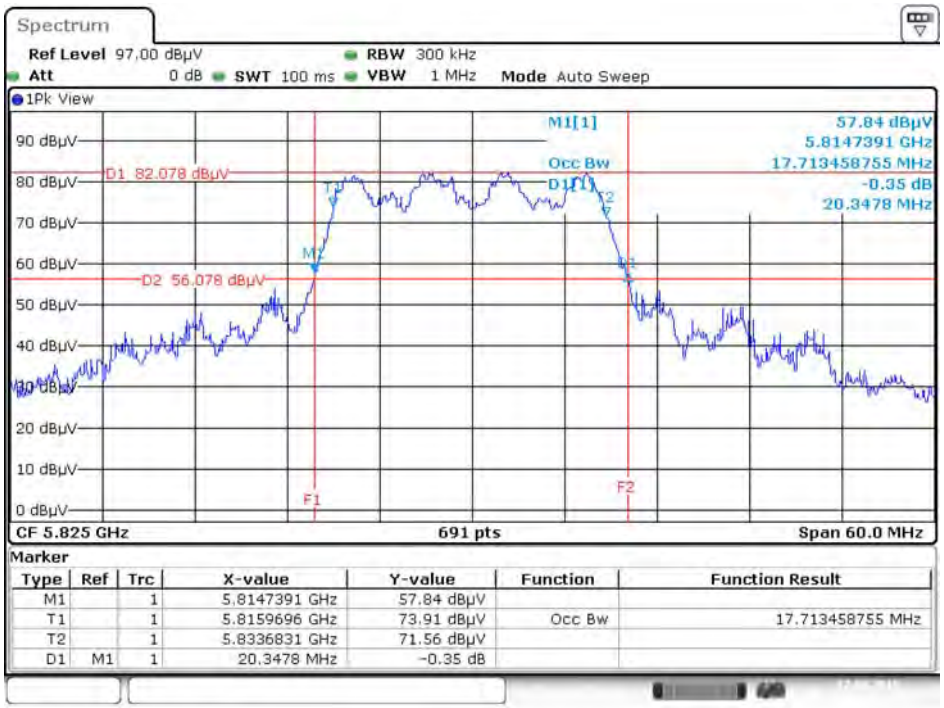
Date: 17.SEP.2015 02:30:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5 / 5785 MHz



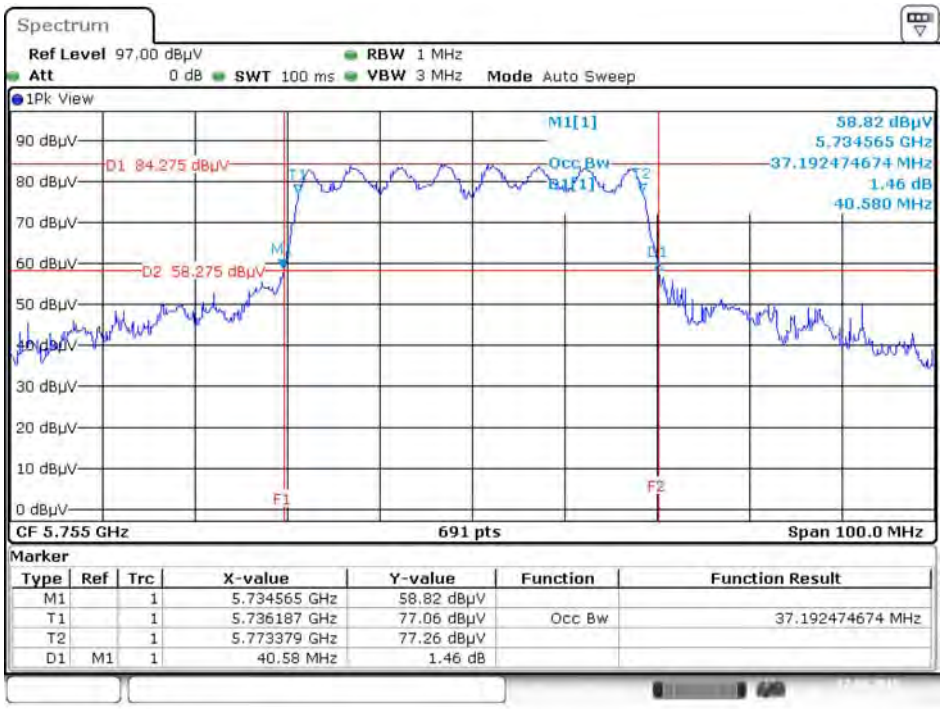
Date: 17.SEP.2015 02:31:28

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



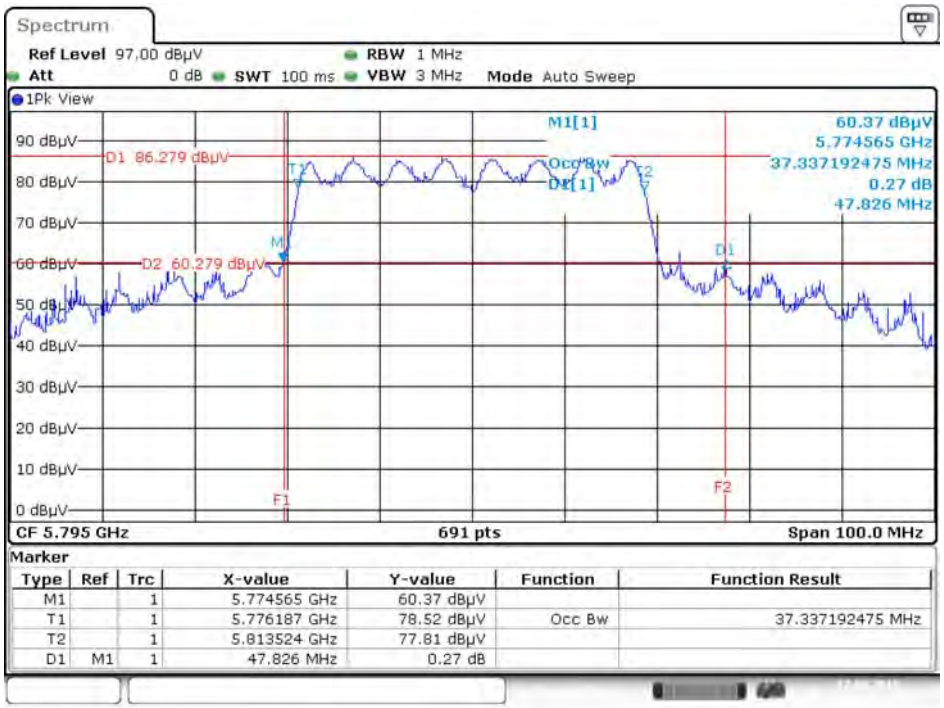
Date: 17.SEP.2015 02:32:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 3 + Chain 4 + Chain 5 / 5755 MHz



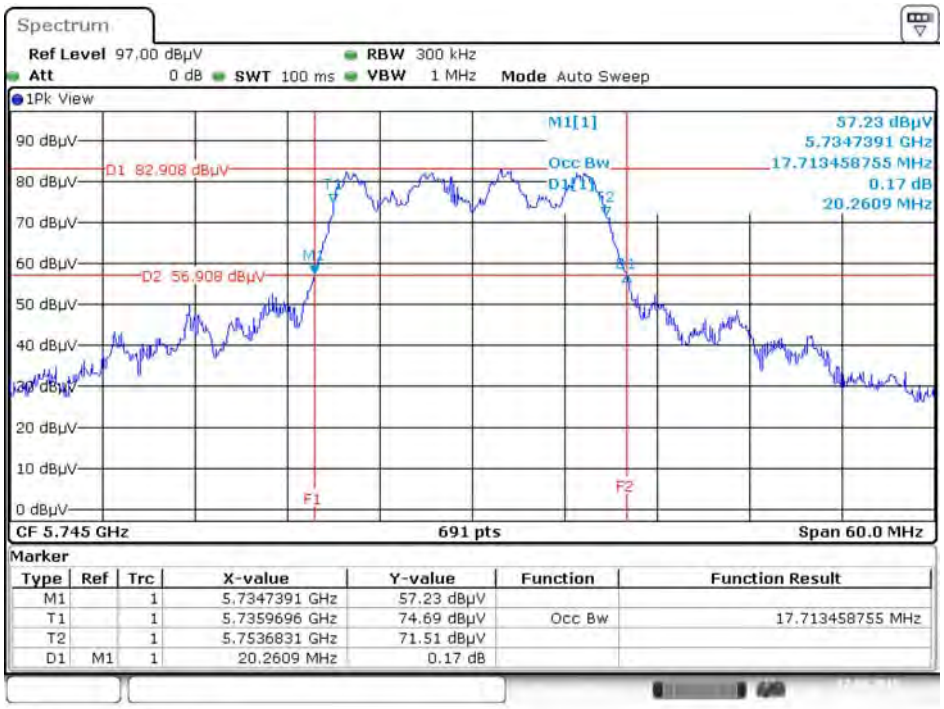
Date: 17.SEP.2015 02:40:13

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



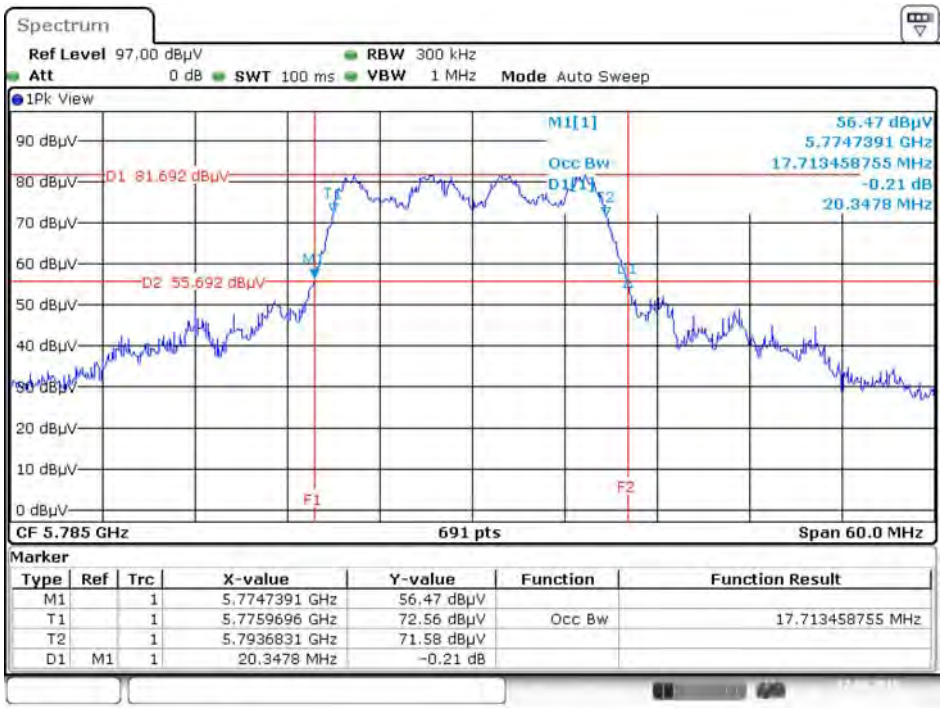
Date: 17.SEP.2015 02:41:44

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



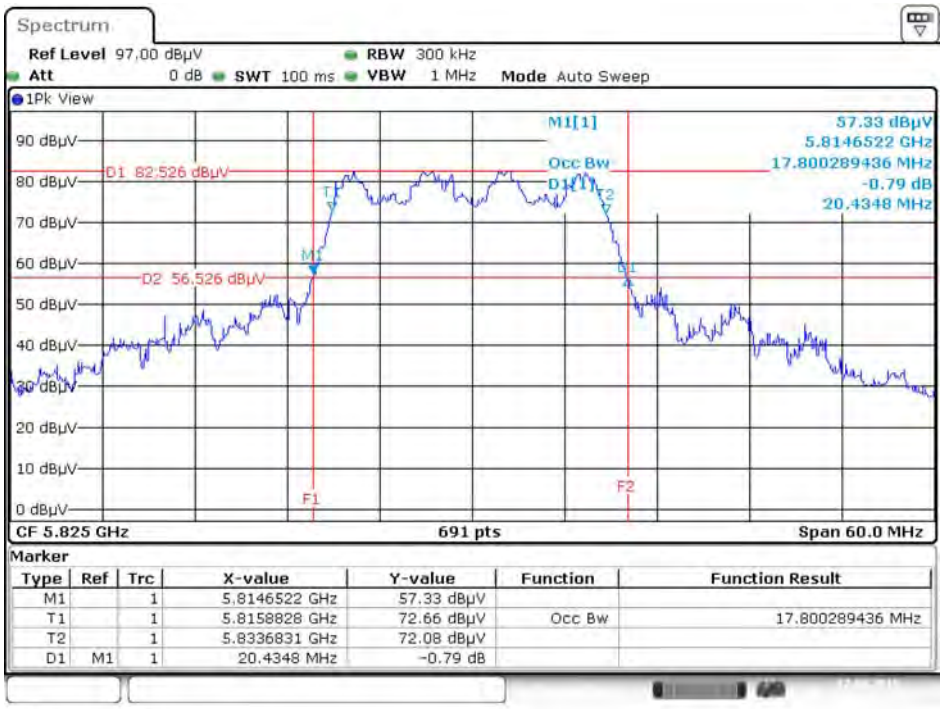
Date: 17.SEP.2015 02:34:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5785 MHz



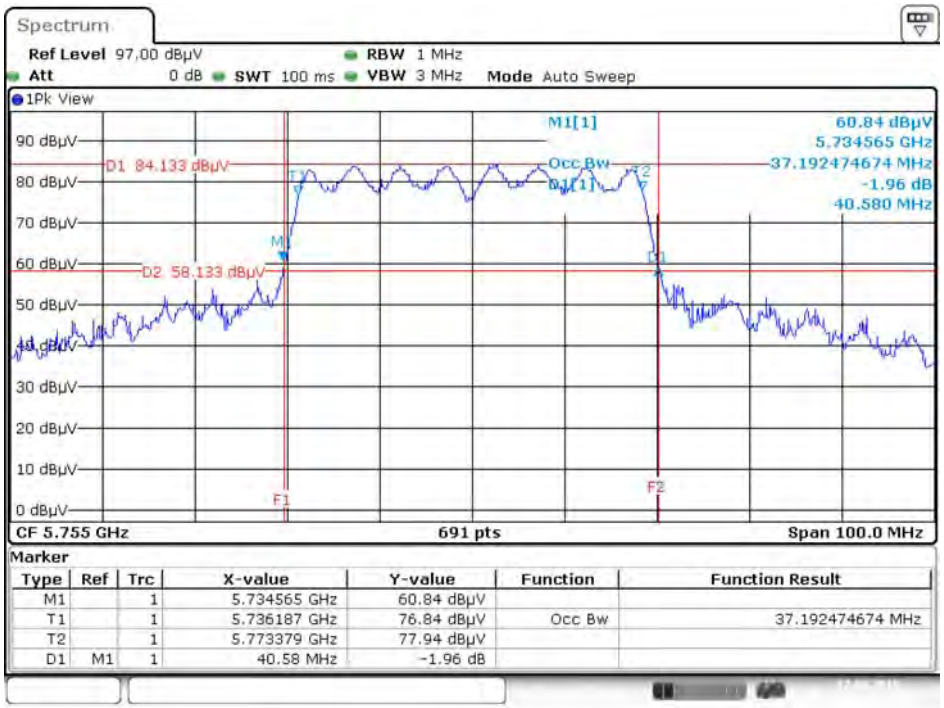
Date: 17.SEP.2015 02:35:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



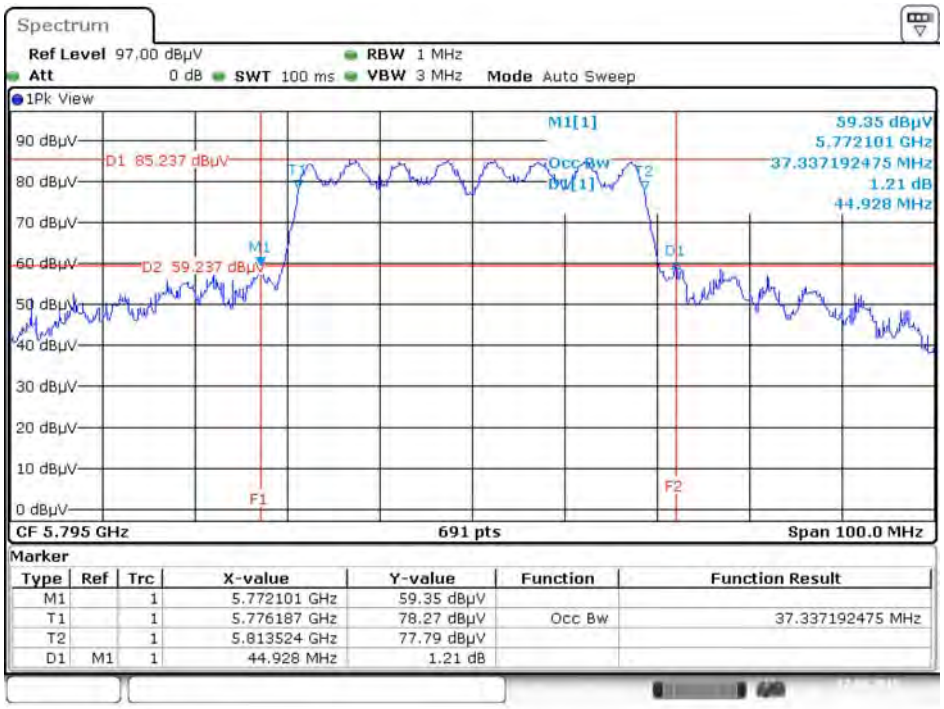
Date: 17.SEP.2015 02:36:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5755 MHz



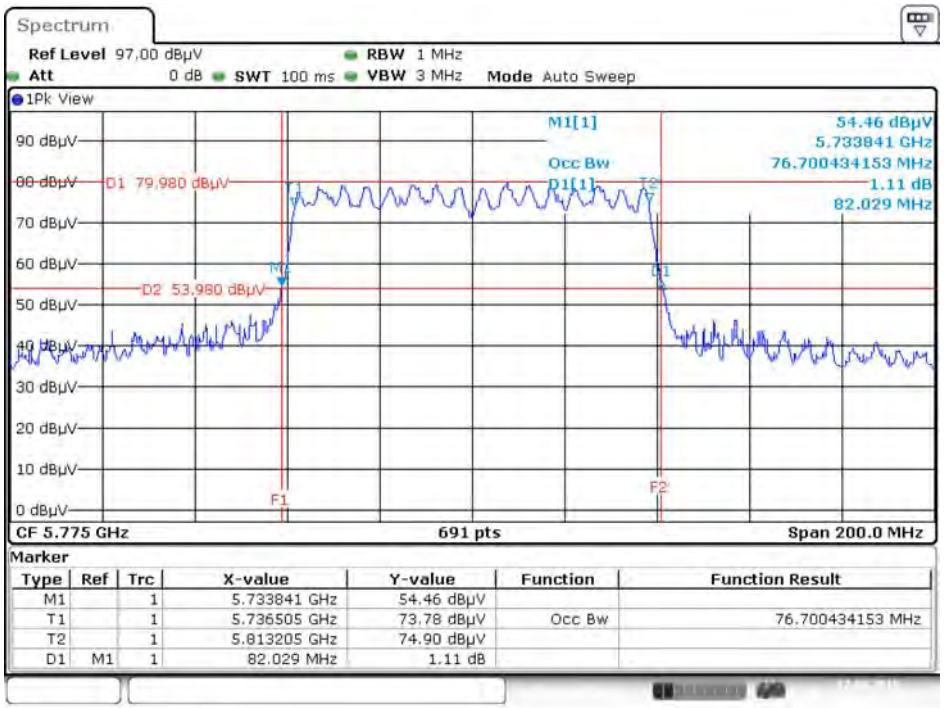
Date: 17.SEP.2015 02:44:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



Date: 17.SEP.2015 02:43:44

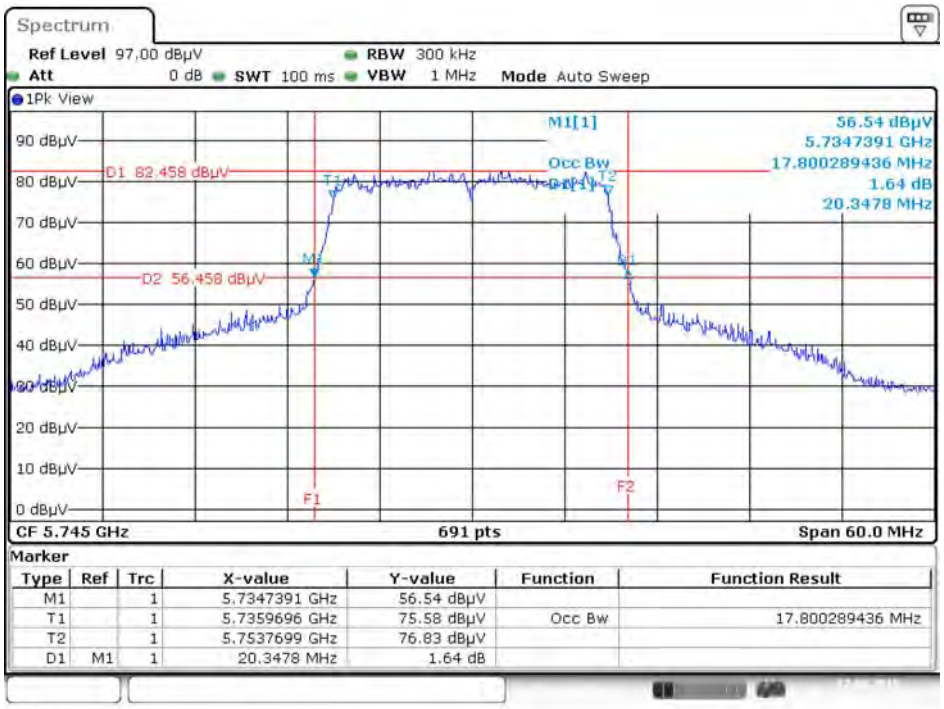
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 5775 MHz



Date: 17.SEP.2015 02:46:30

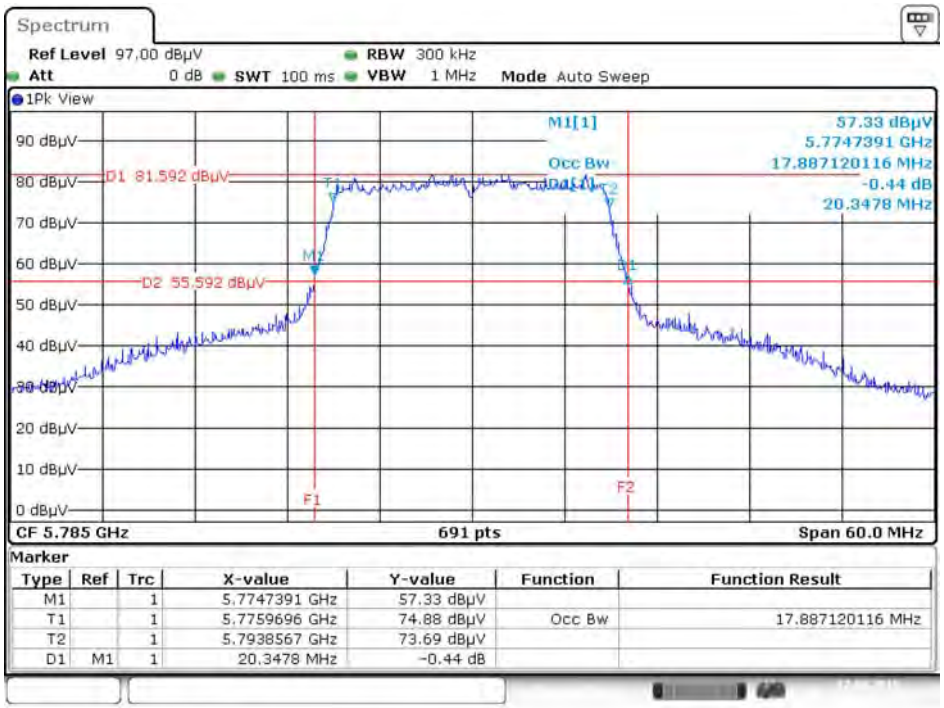
For beamforming function:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



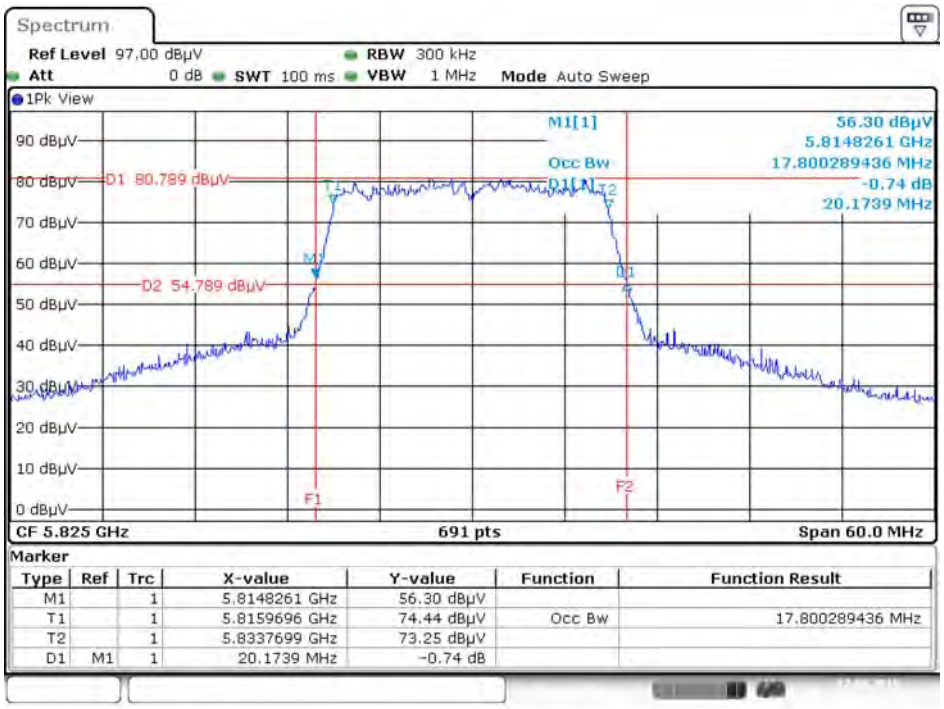
Date: 17.SEP.2015 02:54:16

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5785 MHz



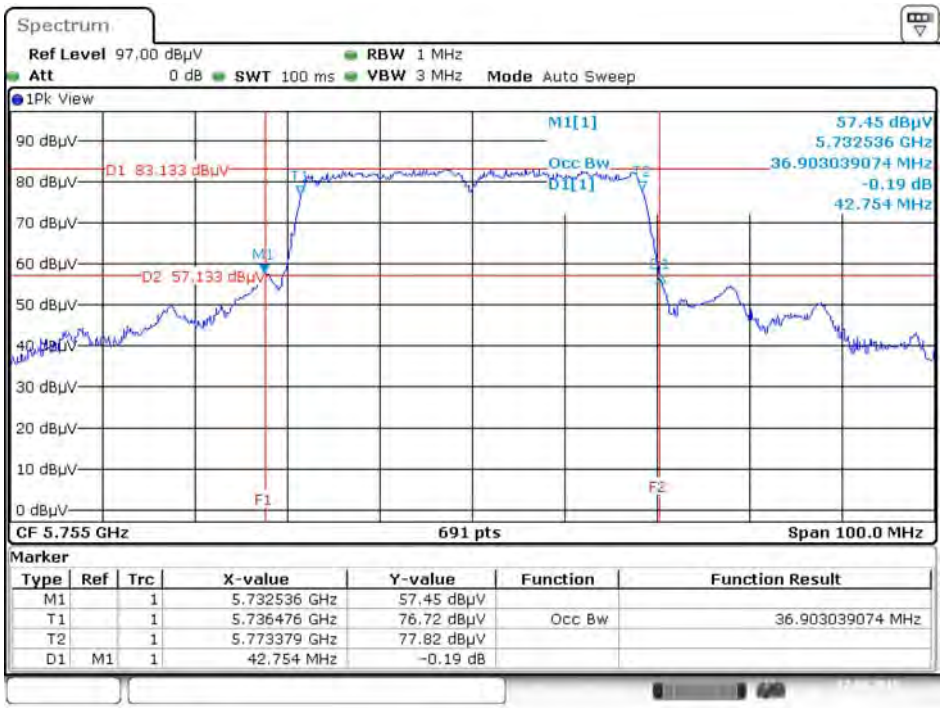
Date: 17.SEP.2015 02:55:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



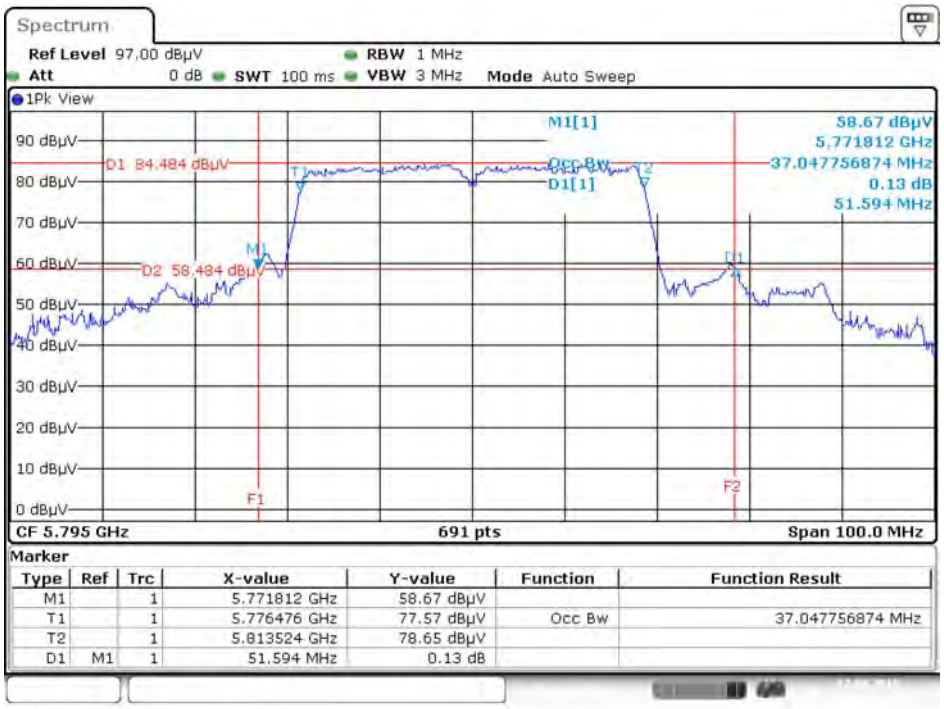
Date: 17.SEP.2015 02:57:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5755 MHz



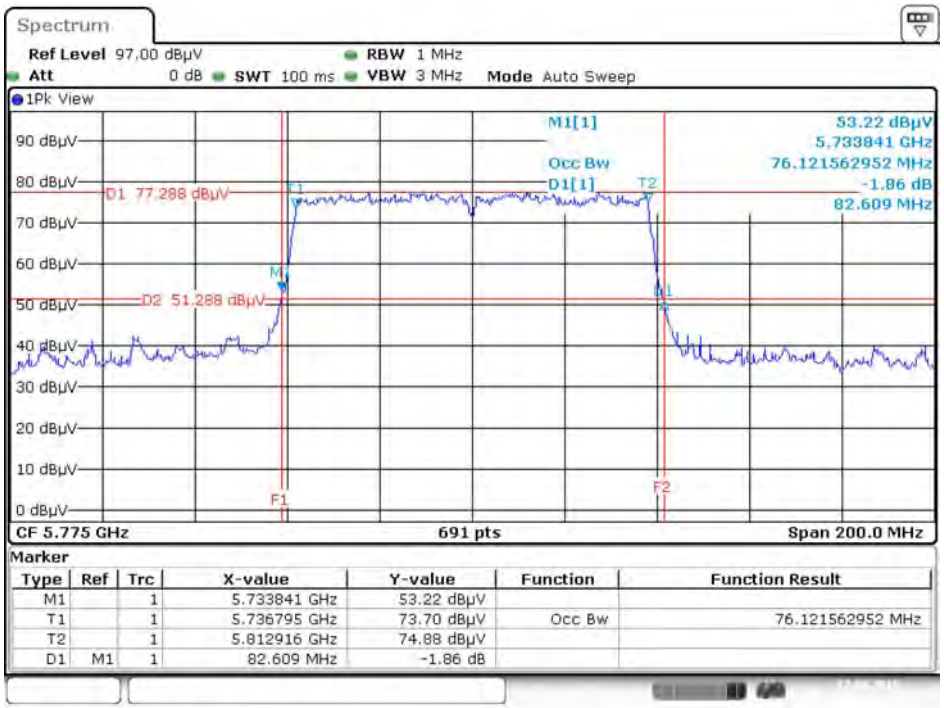
Date: 17.SEP.2015 02:50:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



Date: 17.SEP.2015 02:52:19

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 5775 MHz



Date: 17.SEP.2015 02:48:47

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

Temperature	25°C	Humidity	60%
Test Engineer	Serway Li	Test Function	Non-beamforming function

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	15.65	500	Complies
	5785 MHz	15.71	500	Complies
	5825 MHz	15.71	500	Complies
802.11n MCS0 HT20	5745 MHz	16.06	500	Complies
	5785 MHz	16.06	500	Complies
	5825 MHz	16.46	500	Complies
802.11n MCS0 HT40	5755 MHz	36.17	500	Complies
	5795 MHz	36.06	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.35	500	Complies
	5785 MHz	16.58	500	Complies
	5825 MHz	16.29	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.29	500	Complies
	5795 MHz	36.06	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.65	500	Complies

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Beamforming function

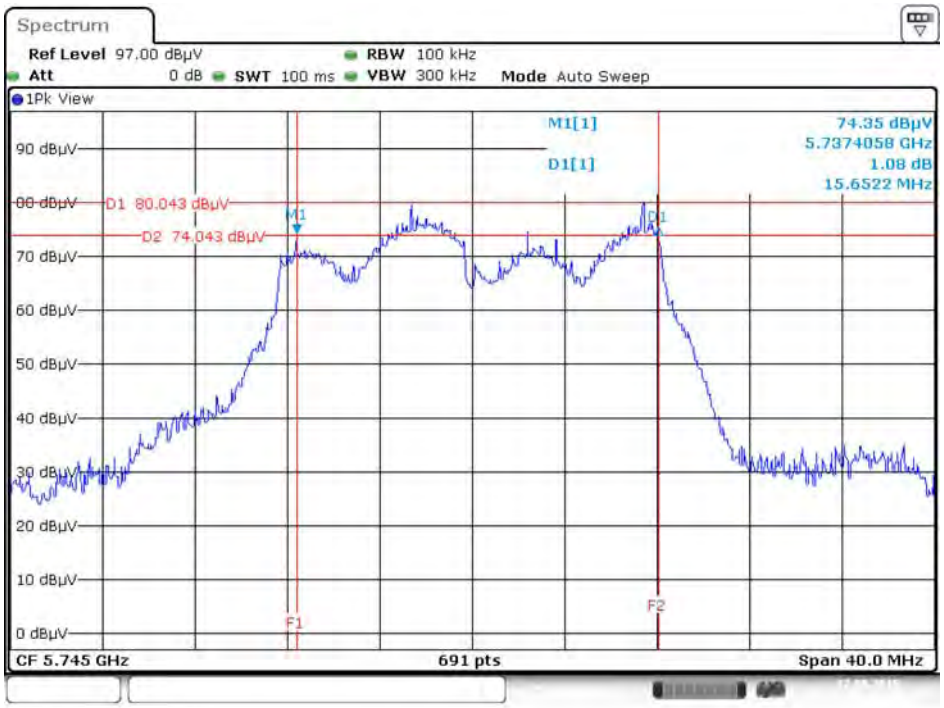
Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.93	500	Complies
	5785 MHz	16.87	500	Complies
	5825 MHz	16.70	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.59	500	Complies
	5795 MHz	35.48	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	500	Complies

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

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

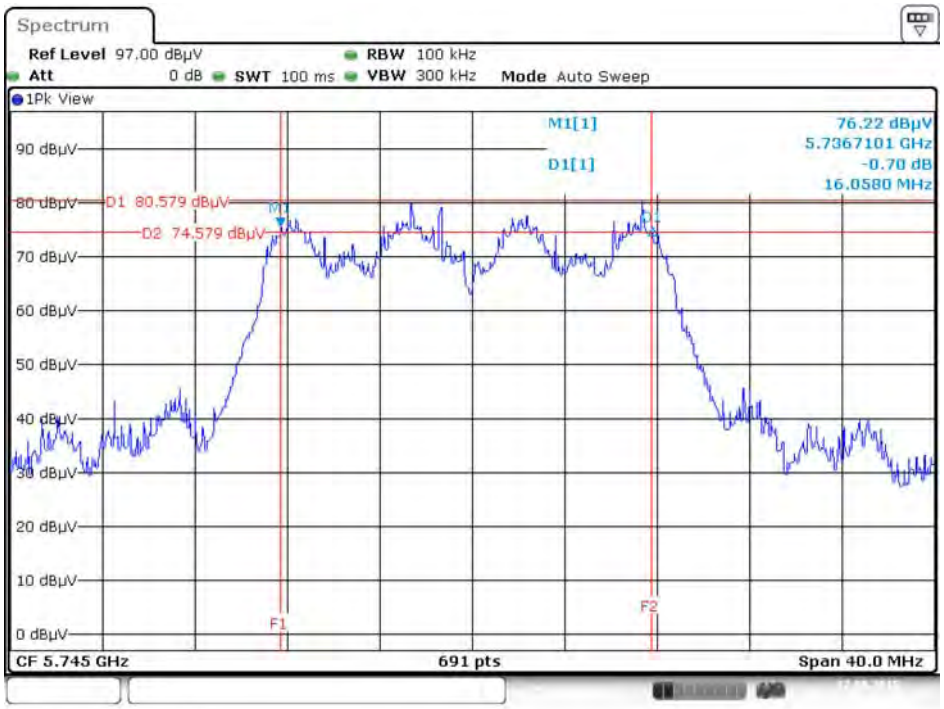
For non-beamforming function:

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



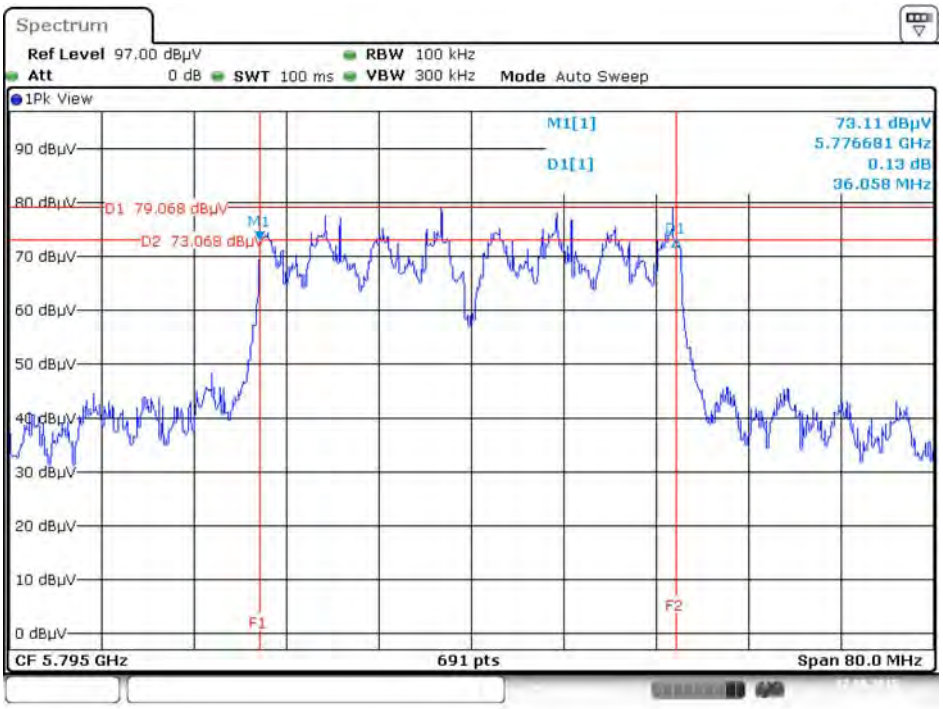
Date: 17.SEP.2015 03:24:28

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



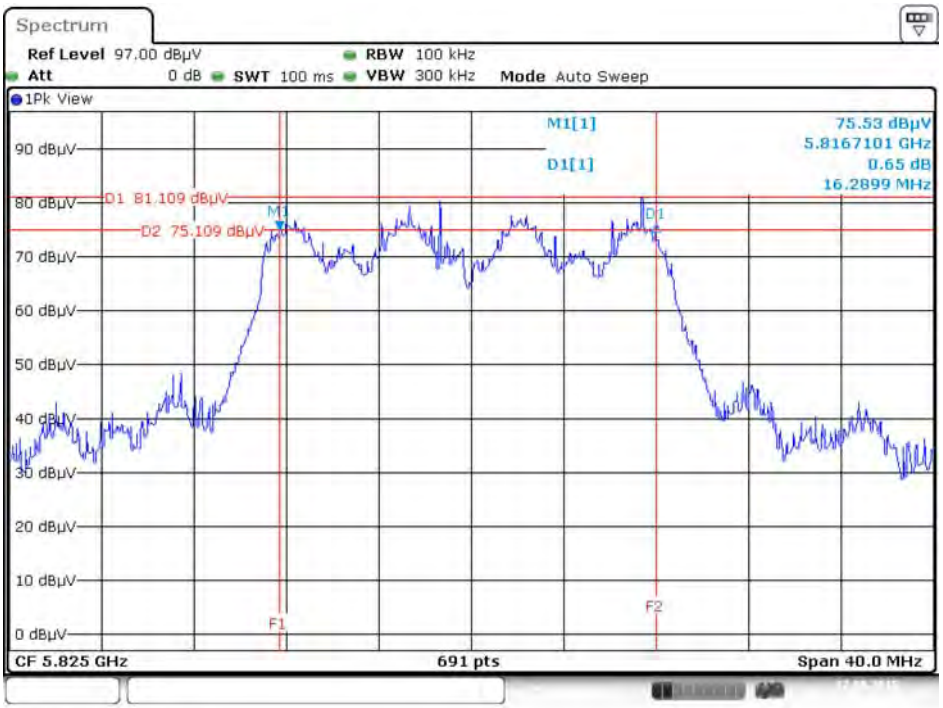
Date: 17.SEP.2015 03:20:45

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



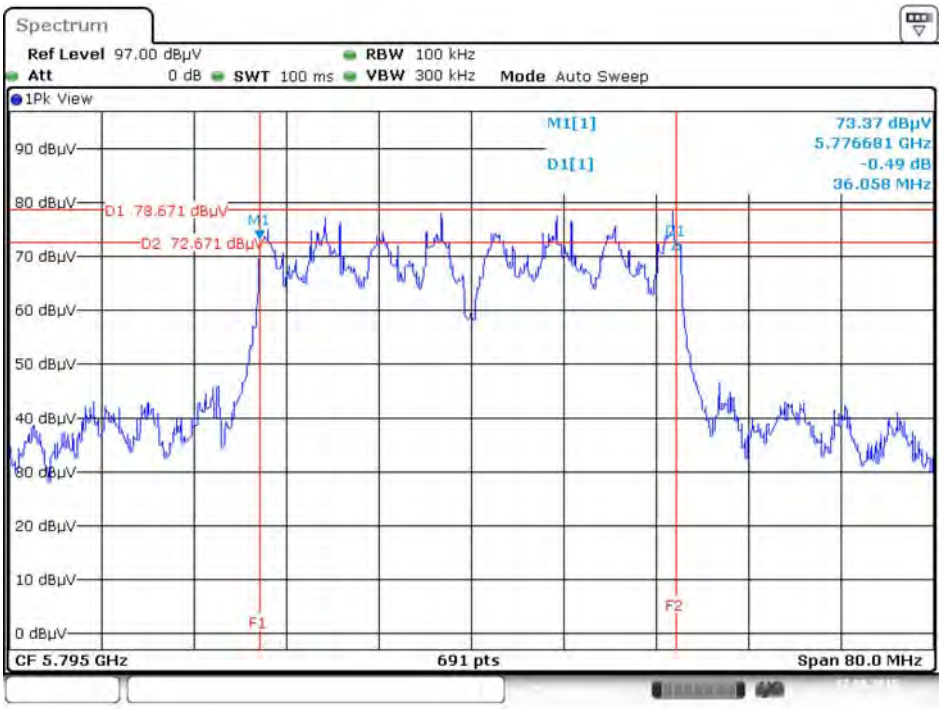
Date: 17.SEP.2015 03:15:04

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



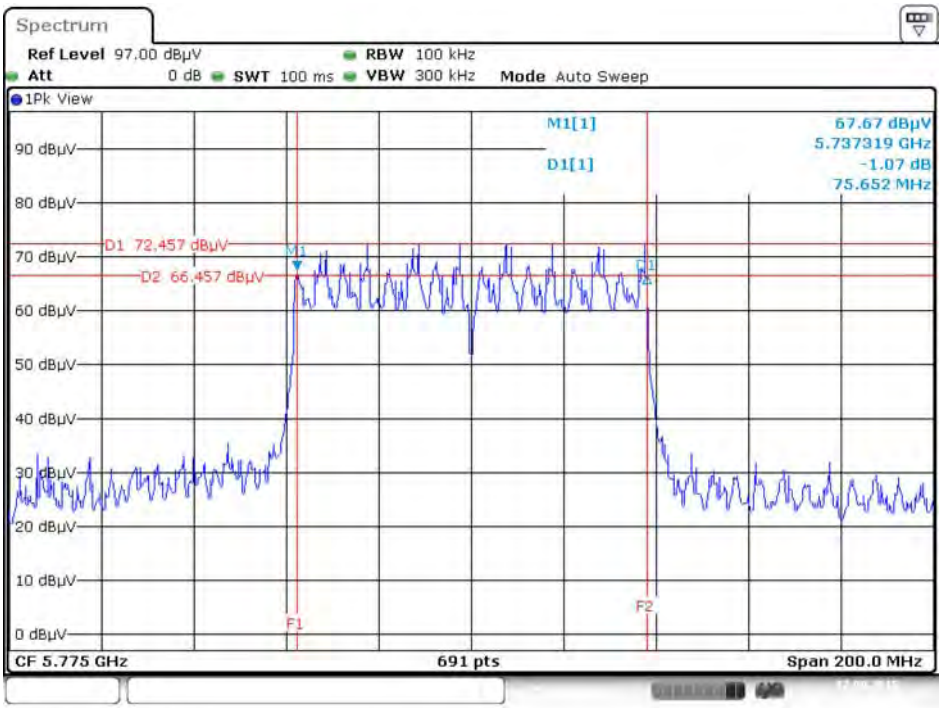
Date: 17.SEP.2015 03:19:22

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



Date: 17.SEP.2015 03:11:37

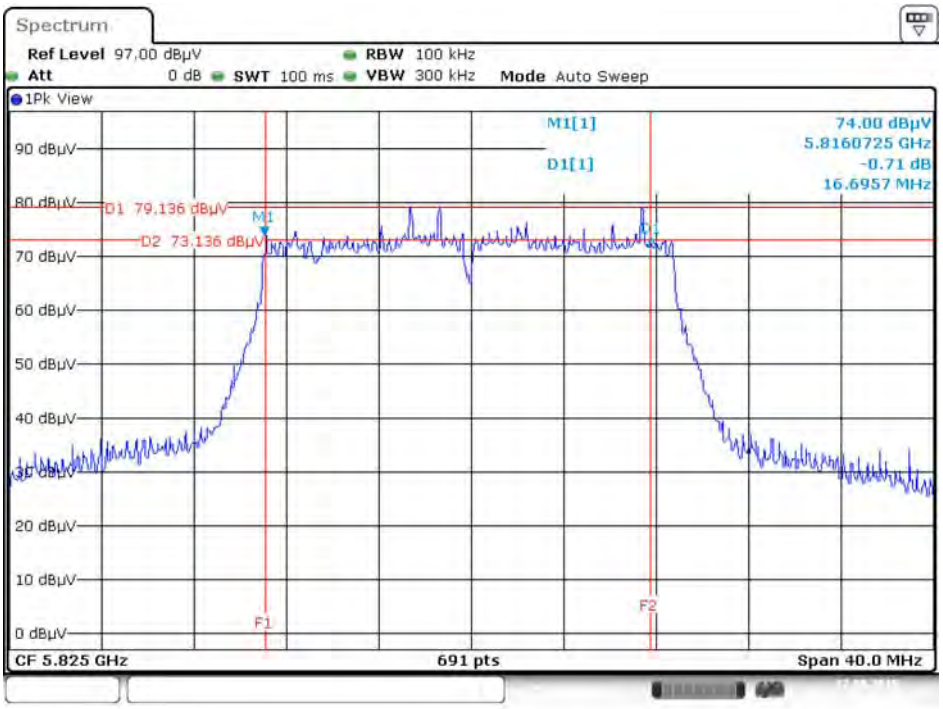
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 5775 MHz



Date: 17.SEP.2015 03:08:58

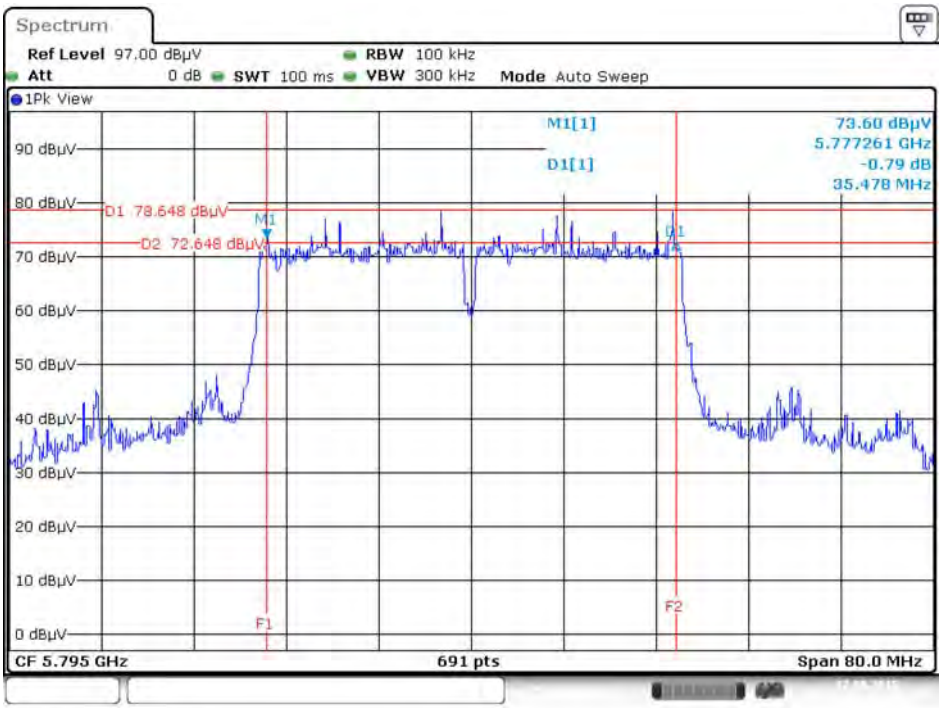
For beamforming function:

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



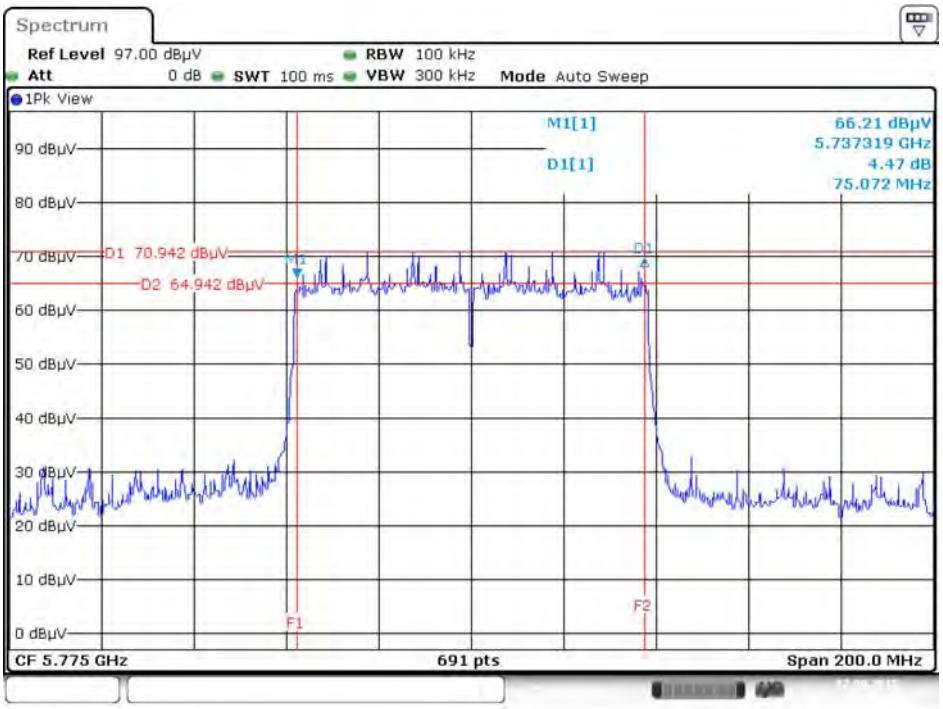
Date: 17.SEP.2015 03:02:27

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



Date: 17.SEP.2015 03:04:46

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 5775 MHz



Date: 17.SEP.2015 03:06:30

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	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

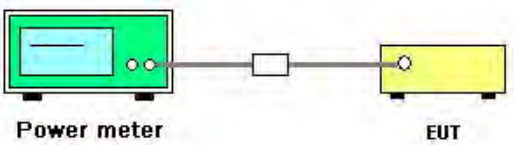
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Non-beamforming function
Test Date	Sep. 16, 2015		

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 3	Chain 4	Chain 5	Total		
802.11a	5745 MHz	15.49	15.94	15.31	20.36	30.00	Complies
	5785 MHz	14.95	15.47	14.75	19.84	30.00	Complies
	5825 MHz	15.17	15.76	15.16	20.14	30.00	Complies
802.11n MS0 HT20	5745 MHz	15.68	16.32	15.59	20.65	30.00	Complies
	5785 MHz	15.82	16.60	15.86	20.88	30.00	Complies
	5825 MHz	15.62	16.24	15.54	20.58	30.00	Complies
802.11n MS0 HT40	5755 MHz	15.13	15.69	15.24	20.13	30.00	Complies
	5795 MHz	17.03	17.15	17.86	22.13	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	15.62	16.28	15.64	20.63	30.00	Complies
	5785 MHz	15.79	16.23	15.67	20.67	30.00	Complies
	5825 MHz	16.96	17.14	16.58	21.67	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	15.14	15.37	15.13	19.99	30.00	Complies
	5795 MHz	16.62	16.71	16.43	21.36	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	13.68	13.63	13.77	18.46	30.00	Complies

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Beamforming function
Test Date	Sep. 16, 2015		

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 3	Chain 4	Chain 5	Total		
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.44	16.96	16.53	21.42	30.00	Complies
	5785 MHz	16.04	16.54	15.92	20.95	30.00	Complies
	5825 MHz	15.37	15.67	15.13	20.17	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	15.31	15.74	15.21	20.20	30.00	Complies
	5795 MHz	16.75	17.15	16.59	21.61	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	12.67	13.28	12.74	17.68	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

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
☒	5.725~5.85 GHz	30 dBm/500kHz

4.4.2. Measuring Instruments and Setting

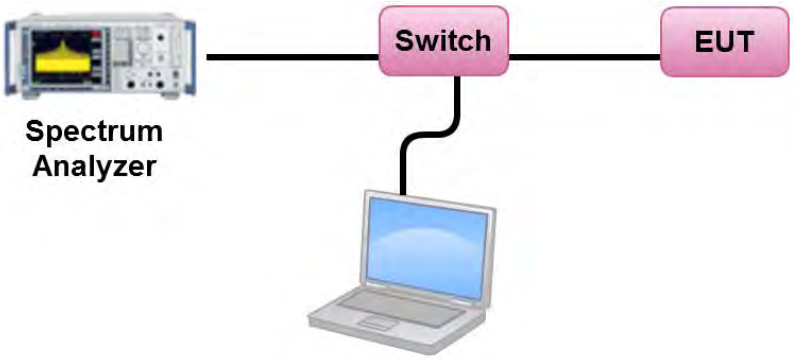
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Non-beamforming function
Test Date	Sep. 16, 2015		

Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.19	-3.01	4.18	30.00	Complies
157	5785 MHz	6.63	-3.01	3.62	30.00	Complies
165	5825 MHz	6.96	-3.01	3.95	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.47	-3.01	4.46	30.00	Complies
157	5785 MHz	7.63	-3.01	4.62	30.00	Complies
165	5825 MHz	7.31	-3.01	4.30	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11n MCS0 HT40 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	4.03	-3.01	1.02	30.00	Complies
159	5795 MHz	6.01	-3.01	3.00	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.49	-3.01	4.48	30.00	Complies
157	5785 MHz	7.57	-3.01	4.56	30.00	Complies
165	5825 MHz	8.56	-3.01	5.55	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	3.85	-3.01	0.84	30.00	Complies
159	5795 MHz	5.23	-3.01	2.22	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-0.66	-3.01	-3.67	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Temperature	25℃	Humidity	60%
Test Engineer	Serway Li	Test Function	Beamforming function
Test Date	Sep. 16, 2015		

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	8.29	-3.01	5.28	30.00	Complies
157	5785 MHz	7.85	-3.01	4.84	30.00	Complies
165	5825 MHz	7.03	-3.01	4.02	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	3.94	-3.01	0.93	30.00	Complies
159	5795 MHz	5.38	-3.01	2.37	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-1.46	-3.01	-4.47	30.00	Complies

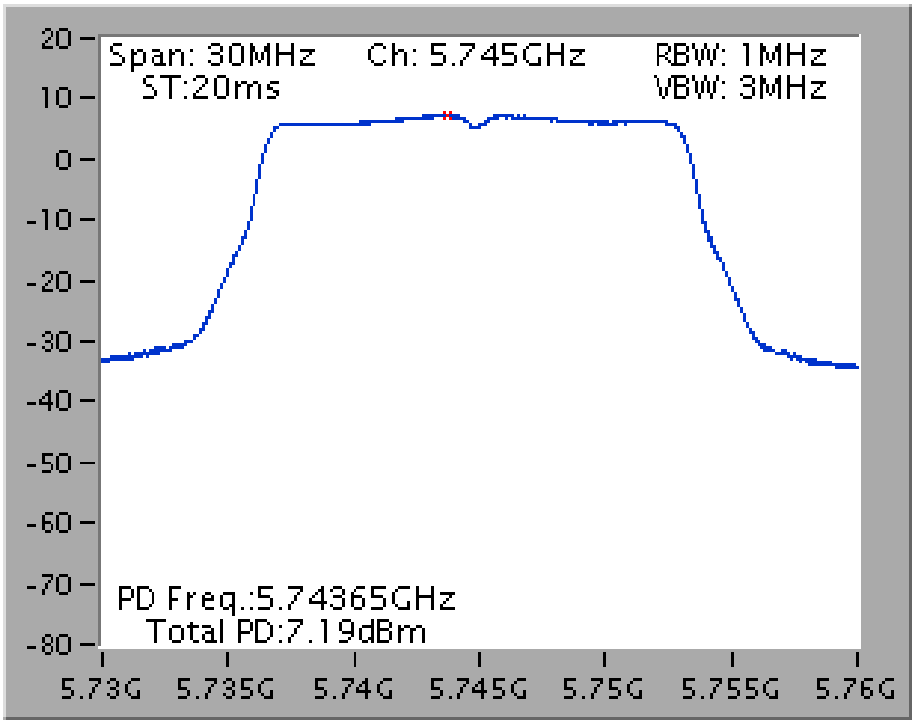
Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.56dBi <6dBi, so the limit doesn't reduce.

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

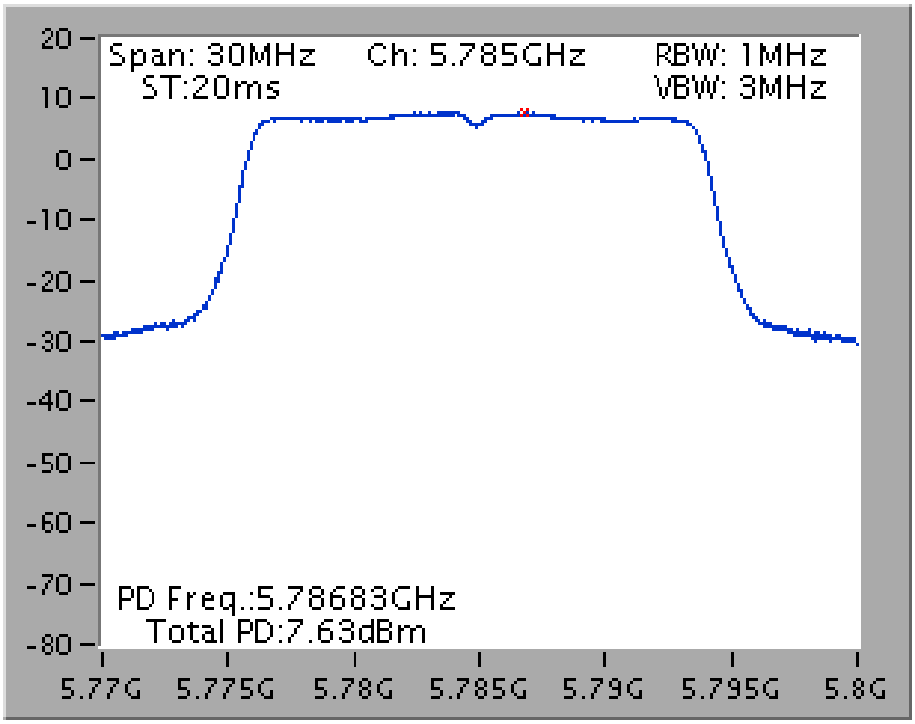
For plots, only the channel with worse result was shown.

For non-beamforming function:

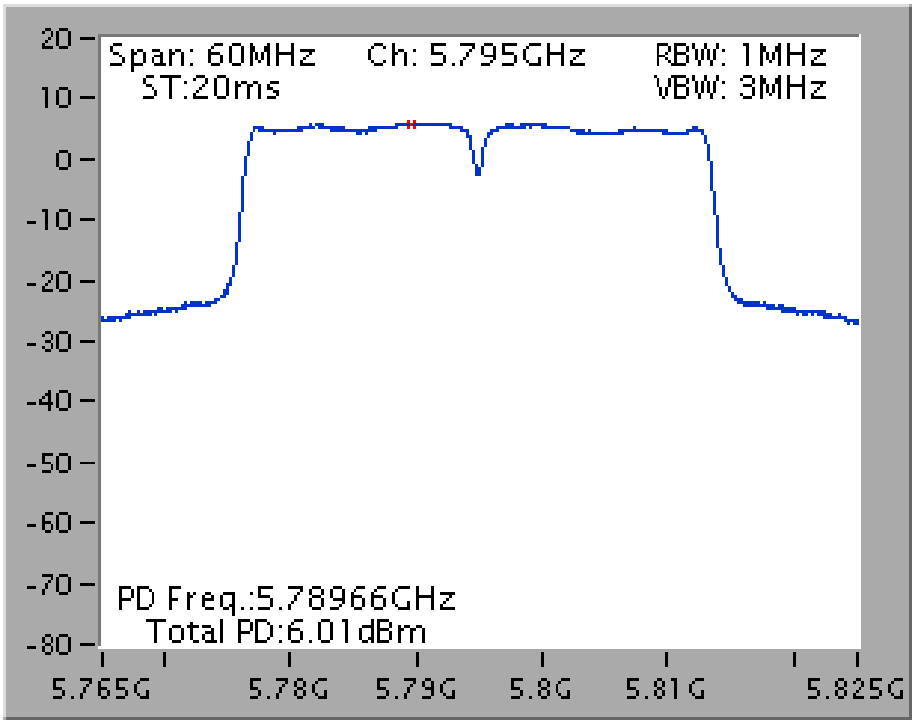
Power Density Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



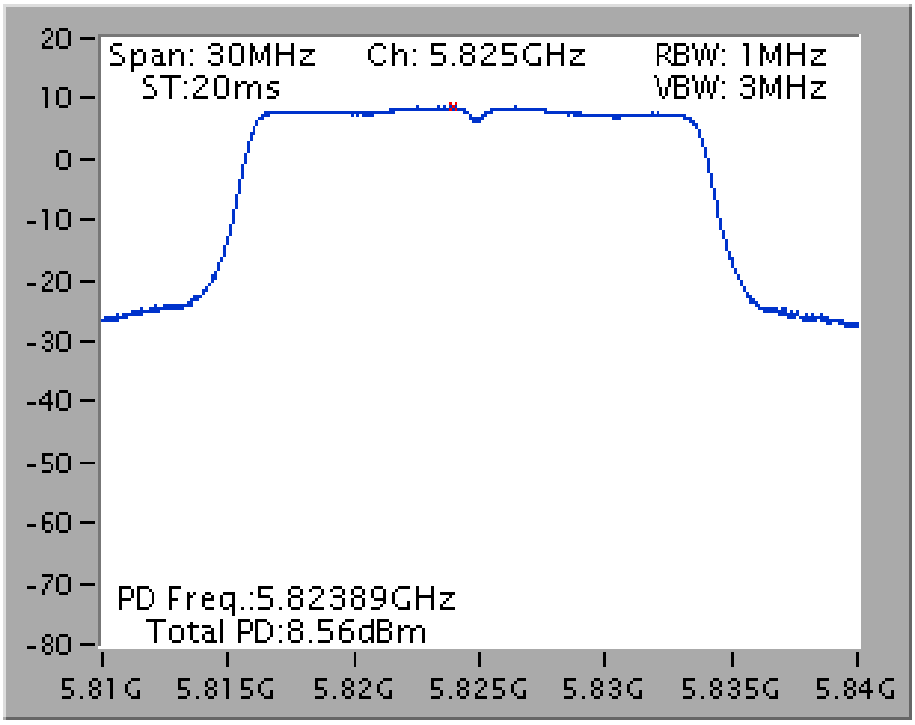
Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 + Chain 4 + Chain 5 / 5785 MHz



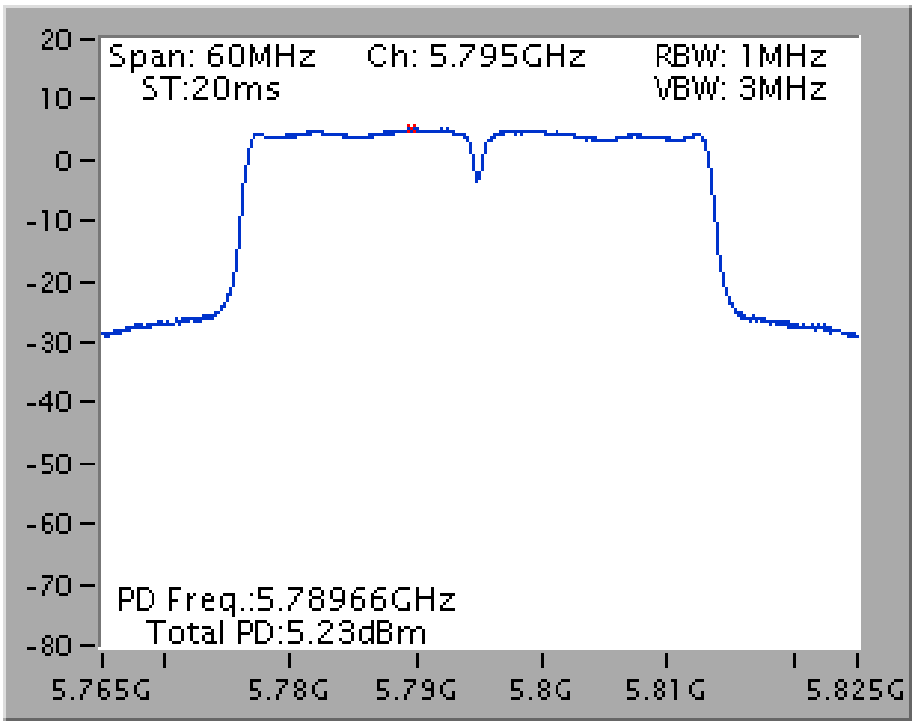
Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



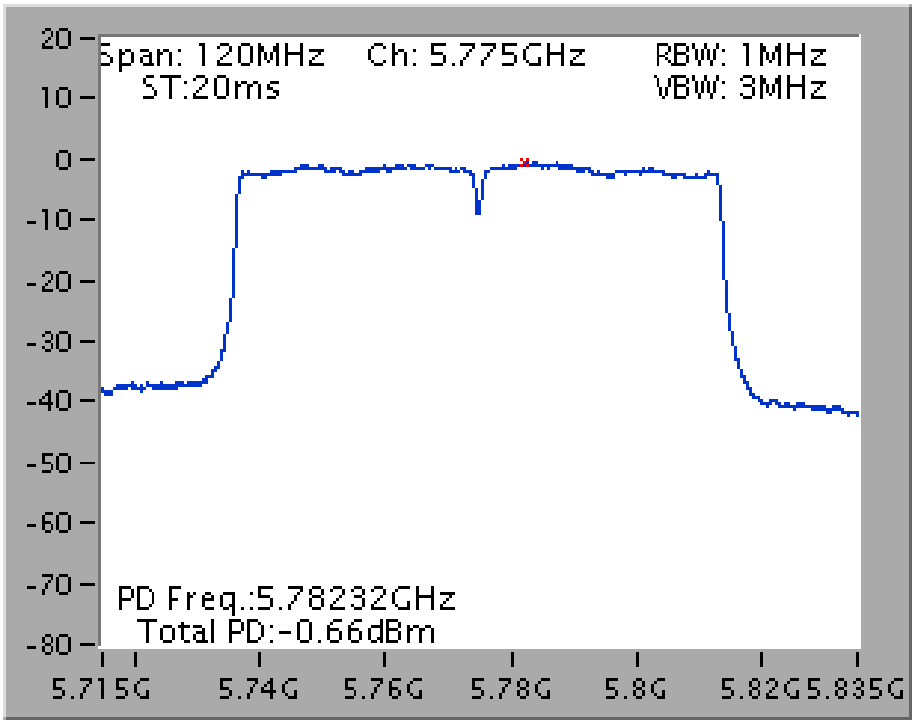
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5825 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz

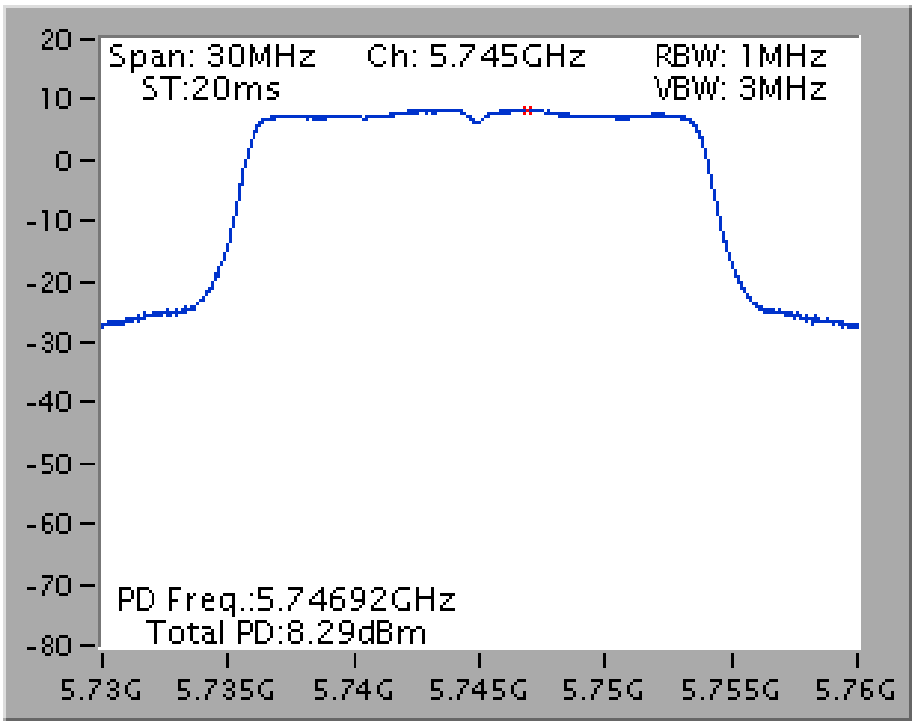


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 5775 MHz

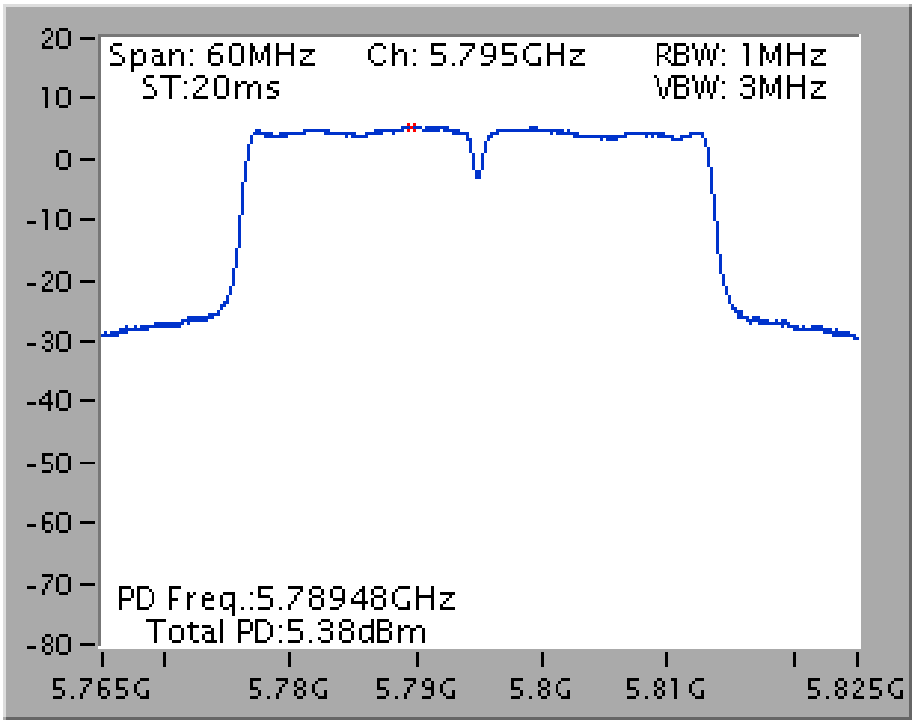


For beamforming function:

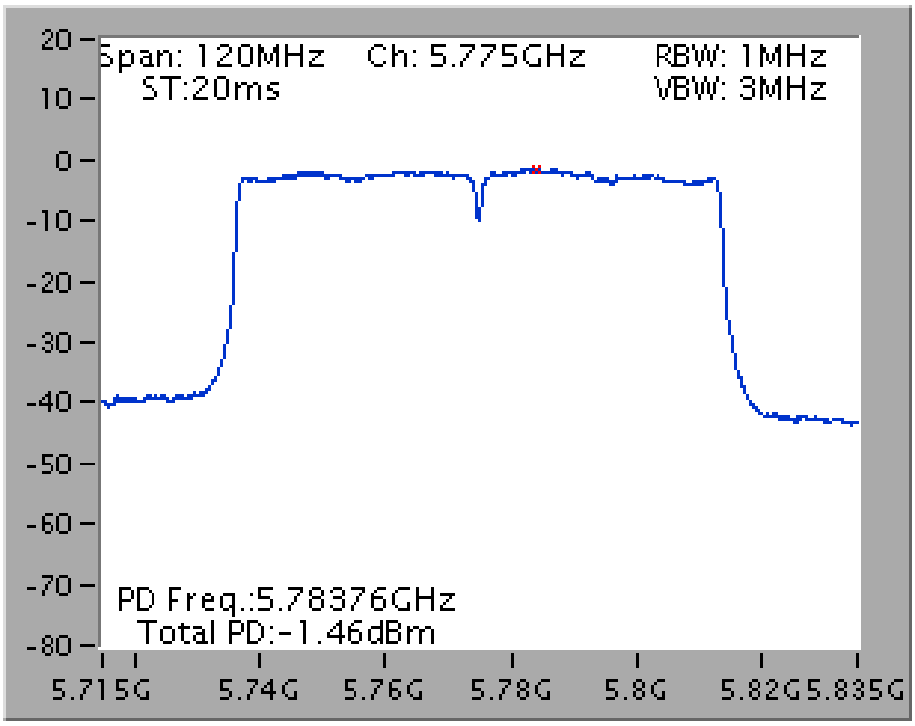
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 + Chain 5 / 5745 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 + Chain 5 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 + Chain 5 / 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.

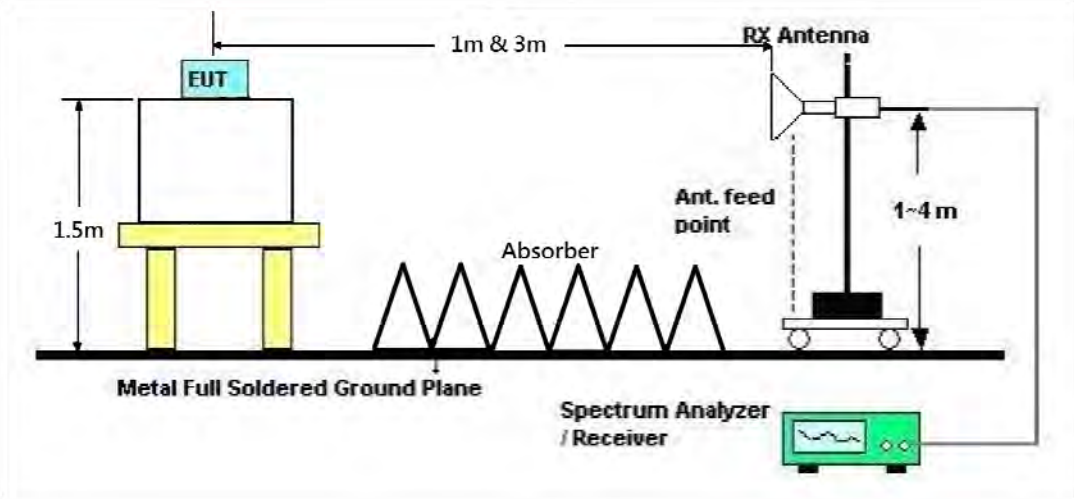
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

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



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11a CH 149 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11487.69	51.35	54.00	-2.65	35.65	39.90	11.03	35.23	175	233	HORIZONTAL	Average
2	11489.03	64.76	74.00	-9.24	49.06	39.90	11.03	35.23	175	233	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11488.24	47.40	54.00	-6.60	31.70	39.90	11.03	35.23	175	158	VERTICAL	Average
2	11489.25	60.97	74.00	-13.03	45.27	39.90	11.03	35.23	175	158	VERTICAL	Peak

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11a CH 157 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11567.51	51.13	54.00	-2.87	35.52	39.77	11.07	35.23	167	220	HORIZONTAL	Average
2	11568.33	64.81	74.00	-9.19	49.20	39.77	11.07	35.23	167	220	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11568.31	60.58	74.00	-13.42	44.97	39.77	11.07	35.23	175	127	VERTICAL	Peak
2	11568.62	47.18	54.00	-6.82	31.57	39.77	11.07	35.23	175	127	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11a CH 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11647.62	64.32	74.00	-9.68	48.81	39.63	11.10	35.22	163	234	HORIZONTAL	Peak
2	11647.63	50.56	54.00	-3.44	35.05	39.63	11.10	35.22	163	234	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11650.49	61.29	74.00	-12.71	45.78	39.63	11.10	35.22	175	140	VERTICAL	Peak
2	11650.59	47.14	54.00	-6.86	31.63	39.63	11.10	35.22	175	140	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT20 CH 149 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.10	45.58	54.00	-8.42	32.06	9.24	39.08	34.80	Average	179	290	HORIZONTAL
2	11502.80	57.77	74.00	-16.23	44.22	9.25	39.10	34.80	Peak	179	290	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.90	58.43	74.00	-15.57	44.91	9.24	39.08	34.80	Peak	175	176	VERTICAL
2	11491.40	45.75	54.00	-8.25	32.23	9.24	39.08	34.80	Average	175	176	VERTICAL

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT20 CH 157 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11558.10	57.70	74.00	-16.30	44.12	9.26	39.13	34.81	Peak	162	259	HORIZONTAL
2	11587.20	44.52	54.00	-9.48	30.92	9.27	39.15	34.82	Average	162	259	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.30	56.02	74.00	-17.98	42.42	9.27	39.15	34.82	Peak	150	148	VERTICAL
2	11590.50	45.35	54.00	-8.65	31.75	9.27	39.15	34.82	Average	150	148	VERTICAL

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT20 CH 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11654.50	45.19	54.00	-8.81	31.56	9.28	39.19	34.84	Average	158	269	HORIZONTAL
2	11672.10	54.83	74.00	-19.17	41.20	9.28	39.20	34.85	Peak	158	269	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11628.10	44.15	54.00	-9.85	30.54	9.27	39.17	34.83	Average	165	251	VERTICAL
2	11666.00	55.89	74.00	-18.11	42.26	9.28	39.19	34.84	Peak	165	251	VERTICAL

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT40 CH 151 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11520.40	55.74	74.00	-18.26	42.19	9.25	39.11	34.81	Peak	158	196	HORIZONTAL
2	11533.90	44.74	54.00	-9.26	31.17	9.26	39.12	34.81	Average	158	196	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11515.60	56.70	74.00	-17.30	43.14	9.25	39.11	34.80	Peak	158	248	VERTICAL
2	11527.80	44.75	54.00	-9.25	31.20	9.25	39.11	34.81	Average	158	248	VERTICAL

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT40 CH 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11586.40	58.42	74.00	-15.58	44.82	9.27	39.15	34.82	Peak	232	215	HORIZONTAL
2	11590.80	45.57	54.00	-8.43	31.97	9.27	39.15	34.82	Average	232	215	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.20	56.54	74.00	-17.46	42.94	9.27	39.15	34.82	Peak	133	171	VERTICAL
2	11589.30	44.93	54.00	-9.07	31.33	9.27	39.15	34.82	Average	133	171	VERTICAL

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11490.85	52.17	54.00	-1.83	36.47	39.90	11.03	35.23	162	223	HORIZONTAL	Average
2	11490.92	67.27	74.00	-6.73	51.57	39.90	11.03	35.23	162	223	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11488.21	60.73	74.00	-13.27	45.03	39.90	11.03	35.23	175	145	VERTICAL	Peak
2	11491.38	47.51	54.00	-6.49	31.81	39.90	11.03	35.23	175	145	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11570.26	65.25	74.00	-8.75	49.64	39.77	11.07	35.23	165	221	HORIZONTAL	Peak
2	11571.04	50.48	54.00	-3.52	34.87	39.77	11.07	35.23	165	221	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11568.64	47.16	54.00	-6.84	31.55	39.77	11.07	35.23	175	136	VERTICAL	Average
2	11572.25	60.84	74.00	-13.16	45.23	39.77	11.07	35.23	175	136	VERTICAL	Peak

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11650.90	64.35	74.00	-9.65	48.90	39.57	11.10	35.22	166	220	HORIZONTAL	Peak
2	11651.04	50.59	54.00	-3.41	35.14	39.57	11.10	35.22	166	220	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11650.43	60.97	74.00	-13.03	45.46	39.63	11.10	35.22	175	171	VERTICAL	Peak
2	11651.05	47.27	54.00	-6.73	31.82	39.57	11.10	35.22	175	171	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11510.79	50.67	54.00	-3.33	34.96	39.90	11.04	35.23	167	220	HORIZONTAL	Average
2	11511.31	64.11	74.00	-9.89	48.40	39.90	11.04	35.23	167	220	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11508.08	47.27	54.00	-6.73	31.56	39.90	11.04	35.23	175	129	VERTICAL	Average
2	11510.71	61.68	74.00	-12.32	45.97	39.90	11.04	35.23	175	129	VERTICAL	Peak

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11591.00	49.63	54.00	-4.37	34.07	39.70	11.08	35.22	166	221	HORIZONTAL	Average
2	11591.29	63.46	74.00	-10.54	47.90	39.70	11.08	35.22	166	221	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11591.07	60.33	74.00	-13.67	44.77	39.70	11.08	35.22	175	152	VERTICAL	Peak
2	11591.36	47.10	54.00	-6.90	31.54	39.70	11.08	35.22	175	152	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11550.57	62.52	74.00	-11.48	46.92	39.77	11.06	35.23	161	223	HORIZONTAL	Peak
2	11551.11	48.20	54.00	-5.80	32.60	39.77	11.06	35.23	161	223	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11548.73	47.08	54.00	-6.92	31.42	39.83	11.06	35.23	175	164	VERTICAL	Average
2	11550.77	60.96	74.00	-13.04	45.36	39.77	11.06	35.23	175	164	VERTICAL	Peak

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11490.24	66.58	74.00	-7.42	50.88	39.90	11.03	35.23	192	232	HORIZONTAL	Peak
2	11490.59	52.91	54.00	-1.09	37.21	39.90	11.03	35.23	192	232	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11488.92	60.20	74.00	-13.80	44.50	39.90	11.03	35.23	175	126	VERTICAL	Peak
2	11490.07	47.02	54.00	-6.98	31.32	39.90	11.03	35.23	175	126	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11567.57	63.85	74.00	-10.15	48.24	39.77	11.07	35.23	184	232	HORIZONTAL	Peak
2	11571.00	51.17	54.00	-2.83	35.56	39.77	11.07	35.23	184	232	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11568.78	46.72	54.00	-7.28	31.11	39.77	11.07	35.23	175	60	VERTICAL	Average
2	11570.17	60.64	74.00	-13.36	45.03	39.77	11.07	35.23	175	60	VERTICAL	Peak

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11651.11	66.27	74.00	-7.73	50.82	39.57	11.10	35.22	185	235	HORIZONTAL	Peak
2	11652.40	51.20	54.00	-2.80	35.75	39.57	11.10	35.22	185	235	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11648.68	60.49	74.00	-13.51	44.98	39.63	11.10	35.22	175	24	VERTICAL	Peak
2	11652.04	47.38	54.00	-6.62	31.93	39.57	11.10	35.22	175	24	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11509.50	50.97	54.00	-3.03	35.26	39.90	11.04	35.23	186	233	HORIZONTAL	Average
2	11509.69	66.80	74.00	-7.20	51.09	39.90	11.04	35.23	186	233	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11507.70	59.86	74.00	-14.14	44.15	39.90	11.04	35.23	175	42	VERTICAL	Peak
2	11509.90	46.36	54.00	-7.64	30.65	39.90	11.04	35.23	175	42	VERTICAL	Average

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11588.34	49.80	54.00	-4.20	34.24	39.70	11.08	35.22	188	230	HORIZONTAL	Average
2	11589.78	66.35	74.00	-7.65	50.79	39.70	11.08	35.22	188	230	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11587.60	46.26	54.00	-7.74	30.70	39.70	11.08	35.22	175	46	VERTICAL	Average
2	11588.18	59.41	74.00	-14.59	43.85	39.70	11.08	35.22	175	46	VERTICAL	Peak

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11549.30	60.93	74.00	-13.07	45.27	39.83	11.06	35.23	187	229	HORIZONTAL	Peak
2	11550.95	47.53	54.00	-6.47	31.93	39.77	11.06	35.23	187	229	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11549.78	59.50	74.00	-14.50	43.84	39.83	11.06	35.23	175	60	VERTICAL	Peak
2	11550.64	46.01	54.00	-7.99	30.41	39.77	11.06	35.23	175	60	VERTICAL	Average

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 function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5668.01	68.00	68.20	-0.20	61.22	32.00	7.76	32.98	174	136	VERTICAL	Peak
2	5725.00	70.72	78.20	-7.48	63.85	32.08	7.79	33.00	174	136	VERTICAL	Peak
3	5746.45	102.29			95.40	32.10	7.81	33.02	174	136	VERTICAL	Average
4	5746.74	112.47			105.58	32.10	7.81	33.02	174	136	VERTICAL	Peak

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5706.85	67.72	68.20	-0.48	60.88	32.06	7.78	33.00	129	166	VERTICAL	Peak
2	5720.08	62.24	78.20	-15.96	55.39	32.06	7.79	33.00	129	166	VERTICAL	Peak
3	5786.74	112.11			105.17	32.14	7.83	33.03	129	166	VERTICAL	Peak
4	5787.03	101.84			94.90	32.14	7.83	33.03	129	166	VERTICAL	Average
5	5857.53	65.56	78.20	-12.64	58.50	32.24	7.87	33.05	129	166	VERTICAL	Peak
6	5866.95	67.28	68.20	-0.92	60.22	32.24	7.88	33.06	129	166	VERTICAL	Peak

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5827.60	111.95			104.95	32.20	7.85	33.05	167	81	VERTICAL	Peak
2	5827.60	101.58			94.58	32.20	7.85	33.05	167	81	VERTICAL	Average
3	5858.39	63.49	78.20	-14.71	56.43	32.24	7.87	33.05	167	81	VERTICAL	Peak
4	5897.94	68.07	68.20	-0.13	60.97	32.28	7.89	33.07	167	81	VERTICAL	Peak

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

Temperature	23.7°C	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT20 CH 149, 157, 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5667.40	67.86	68.20	-0.34	61.83	6.43	34.63	35.03	Peak	173	130	VERTICAL
2	5722.60	75.86	78.20	-2.34	69.80	6.45	34.64	35.03	Peak	173	130	VERTICAL
3	5747.40	100.22			94.16	6.45	34.65	35.04	Average	173	130	VERTICAL
4	5747.40	109.97			103.91	6.45	34.65	35.04	Peak	173	130	VERTICAL
5	5858.80	61.64	78.20	-16.56	55.54	6.50	34.67	35.07	Peak	173	130	VERTICAL
6	5908.20	65.54	68.20	-2.66	59.41	6.52	34.68	35.07	Peak	173	130	VERTICAL

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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5697.00	66.26	68.20	-1.94	60.22	6.43	34.64	35.03	Peak	175	116	VERTICAL
2	5722.60	57.94	78.20	-20.26	51.88	6.45	34.64	35.03	Peak	175	116	VERTICAL
3	5786.60	99.57			93.49	6.47	34.66	35.05	Average	175	116	VERTICAL
4	5787.40	109.52			103.44	6.47	34.66	35.05	Peak	175	116	VERTICAL
5	5857.20	65.74	78.20	-12.46	59.63	6.50	34.67	35.06	Peak	175	116	VERTICAL
6	5864.20	67.92	68.20	-0.28	61.82	6.50	34.67	35.07	Peak	175	116	VERTICAL

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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5663.40	62.81	68.20	-5.39	56.79	6.42	34.63	35.03	Peak	175	80	VERTICAL
2	5723.40	60.27	78.20	-17.93	54.21	6.45	34.64	35.03	Peak	175	80	VERTICAL
3	5828.20	100.37			94.28	6.48	34.67	35.06	Average	175	80	VERTICAL
4	5828.20	110.87			104.78	6.48	34.67	35.06	Peak	175	80	VERTICAL
5	5850.00	66.16	78.20	-12.04	60.06	6.49	34.67	35.06	Peak	175	80	VERTICAL
6	5908.20	68.08	68.20	-0.12	61.95	6.52	34.68	35.07	Peak	175	80	VERTICAL

Item 3, 4 are the fundamental frequency at 5825 MHz.

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11n MCS0 HT40 CH 151, 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 24, 2015	Test Function	Non-beamforming function

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5713.00	67.94	68.20	-0.26	61.89	6.44	34.64	35.03	Peak	174	81	VERTICAL
2	5718.60	72.60	78.20	-5.60	66.54	6.45	34.64	35.03	Peak	174	81	VERTICAL
3	5753.40	96.73			90.66	6.46	34.65	35.04	Average	174	81	VERTICAL
4	5753.40	106.98			100.91	6.46	34.65	35.04	Peak	174	81	VERTICAL

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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5712.60	66.85	68.20	-1.35	60.80	6.44	34.64	35.03	Peak	180	154	VERTICAL
2	5721.80	67.43	78.20	-10.77	61.37	6.45	34.64	35.03	Peak	180	154	VERTICAL
3	5802.20	98.78			92.70	6.47	34.66	35.05	Average	180	154	VERTICAL
4	5802.20	107.87			101.79	6.47	34.66	35.05	Peak	180	154	VERTICAL
5	5857.20	68.73	78.20	-9.47	62.62	6.50	34.67	35.06	Peak	180	154	VERTICAL
6	5862.20	67.82	68.20	-0.38	61.72	6.50	34.67	35.07	Peak	180	154	VERTICAL

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015 / Jul. 23, 2015	Test Function	Non-beamforming function

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5668.01	68.00	68.20	-0.20	61.22	32.00	7.76	32.98	159	132	VERTICAL	Peak
2	5725.00	72.59	78.20	-5.61	65.72	32.08	7.79	33.00	159	132	VERTICAL	Peak
3	5742.68	111.87			104.98	32.10	7.80	33.01	159	132	VERTICAL	Peak
4	5742.68	102.21			95.32	32.10	7.80	33.01	159	132	VERTICAL	Average

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5707.14	67.69	68.20	-0.51	60.85	32.06	7.78	33.00	174	161	VERTICAL	Peak
2	5718.05	61.87	78.20	-16.33	55.02	32.06	7.79	33.00	174	161	VERTICAL	Peak
3	5782.11	99.58			92.64	32.14	7.83	33.03	174	161	VERTICAL	Average
4	5787.03	110.38			103.44	32.14	7.83	33.03	174	161	VERTICAL	Peak
5	5857.24	67.26	78.20	-10.94	60.20	32.24	7.87	33.05	174	161	VERTICAL	Peak
6	5863.47	67.21	68.20	-0.99	60.16	32.24	7.87	33.06	174	161	VERTICAL	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5827.00	100.14			94.05	6.48	34.67	35.06	Average	175	124	VERTICAL
2	5827.40	110.33			104.24	6.48	34.67	35.06	Peak	175	124	VERTICAL
3	5850.00	65.87	78.20	-12.33	59.77	6.49	34.67	35.06	Peak	175	124	VERTICAL
4	5911.40	67.55	68.20	-0.65	61.43	6.52	34.68	35.08	Peak	175	124	VERTICAL

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5713.32	67.82	68.20	-0.38	60.97	32.06	7.79	33.00	166	135	VERTICAL	Peak
2	5725.00	73.94	78.20	-4.26	67.07	32.08	7.79	33.00	166	135	VERTICAL	Peak
3	5750.37	108.64			101.75	32.10	7.81	33.02	166	135	VERTICAL	Peak
4	5752.68	98.73			91.84	32.10	7.81	33.02	166	135	VERTICAL	Average

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5712.11	67.19	68.20	-1.01	60.34	32.06	7.79	33.00	162	162	VERTICAL	Peak
2	5722.68	66.81	78.20	-11.39	59.94	32.08	7.79	33.00	162	162	VERTICAL	Peak
3	5781.98	99.43			92.49	32.14	7.83	33.03	162	162	VERTICAL	Average
4	5782.55	109.85			102.91	32.14	7.83	33.03	162	162	VERTICAL	Peak
5	5857.53	66.81	78.20	-11.39	59.75	32.24	7.87	33.05	162	162	VERTICAL	Peak
6	5871.99	67.68	68.20	-0.52	60.62	32.24	7.88	33.06	162	162	VERTICAL	Peak

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 22, 2015	Test Function	Non-beamforming function

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5712.11	68.06	68.20	-0.14	61.21	32.06	7.79	33.00	167	134	VERTICAL	Peak
2	5717.11	69.79	78.20	-8.41	62.94	32.06	7.79	33.00	167	134	VERTICAL	Peak
3	5767.04	94.67			87.76	32.12	7.82	33.03	167	134	VERTICAL	Average
4	5768.49	105.48			98.57	32.12	7.82	33.03	167	134	VERTICAL	Peak
5	5850.00	64.51	78.20	-13.69	57.47	32.22	7.87	33.05	167	134	VERTICAL	Peak
6	5862.89	64.31	68.20	-3.89	57.26	32.24	7.87	33.06	167	134	VERTICAL	Peak

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015 / Jul. 23, 2015	Test Function	Beamforming function

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5713.31	65.70	68.20	-2.50	58.85	32.06	7.79	33.00	174	125	VERTICAL	Peak
2	5724.59	77.87	78.20	-0.33	71.00	32.08	7.79	33.00	174	125	VERTICAL	Peak
3	5742.83	102.13			95.24	32.10	7.80	33.01	174	125	VERTICAL	Average
4	5743.55	113.00			106.11	32.10	7.80	33.01	174	125	VERTICAL	Peak

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5704.00	67.24	68.20	-0.96	60.42	32.04	7.78	33.00	177	118	VERTICAL	Peak
2	5718.05	61.11	78.20	-17.09	54.26	32.06	7.79	33.00	177	118	VERTICAL	Peak
3	5782.11	112.21			105.27	32.14	7.83	33.03	177	118	VERTICAL	Peak
4	5782.97	101.64			94.70	32.14	7.83	33.03	177	118	VERTICAL	Average
5	5851.16	61.59	78.20	-16.61	54.55	32.22	7.87	33.05	177	118	VERTICAL	Peak
6	5867.20	67.82	68.20	-0.38	60.76	32.24	7.88	33.06	177	118	VERTICAL	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5826.60	101.08			94.99	6.48	34.67	35.06	Average	171	132	VERTICAL
2	5826.60	111.05			104.96	6.48	34.67	35.06	Peak	171	132	VERTICAL
3	5851.20	62.61	78.20	-15.59	56.51	6.49	34.67	35.06	Peak	171	132	VERTICAL
4	5906.60	67.88	68.20	-0.32	61.75	6.52	34.68	35.07	Peak	171	132	VERTICAL

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5714.77	67.61	68.20	-0.59	60.76	32.06	7.79	33.00	164	130	VERTICAL	Peak
2	5724.61	74.55	78.20	-3.65	67.68	32.08	7.79	33.00	164	130	VERTICAL	Peak
3	5759.34	109.72			102.81	32.12	7.81	33.02	164	130	VERTICAL	Peak
4	5768.02	98.59			91.68	32.12	7.82	33.03	164	130	VERTICAL	Average

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5710.37	65.86	68.20	-2.34	59.01	32.06	7.79	33.00	175	136	VERTICAL	Peak
2	5722.97	66.51	78.20	-11.69	59.64	32.08	7.79	33.00	175	136	VERTICAL	Peak
3	5786.32	111.41			104.47	32.14	7.83	33.03	175	136	VERTICAL	Peak
4	5801.08	99.97			93.00	32.16	7.84	33.03	175	136	VERTICAL	Average
5	5857.81	66.10	78.20	-12.10	59.04	32.24	7.87	33.05	175	136	VERTICAL	Peak
6	5860.41	67.76	68.20	-0.44	60.71	32.24	7.87	33.06	175	136	VERTICAL	Peak

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

Temperature	23.7℃	Humidity	68%
Test Engineer	Eason Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 3 + Chain 4 + Chain 5
Test Date	Jul. 21, 2015	Test Function	Beamforming function

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5705.54	67.90	68.20	-0.30	61.08	32.04	7.78	33.00	166	129	VERTICAL	Peak
2	5723.26	71.92	78.20	-6.28	65.05	32.08	7.79	33.00	166	129	VERTICAL	Peak
3	5742.58	106.53			99.64	32.10	7.80	33.01	166	129	VERTICAL	Peak
4	5764.58	94.53			87.62	32.12	7.82	33.03	166	129	VERTICAL	Average
5	5852.89	69.20	78.20	-9.00	62.16	32.22	7.87	33.05	166	129	VERTICAL	Peak
6	5861.16	65.45	68.20	-2.75	58.40	32.24	7.87	33.06	166	129	VERTICAL	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

4.7. Frequency Stability Measurement

4.7.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.7.2. Measuring Instruments and Setting

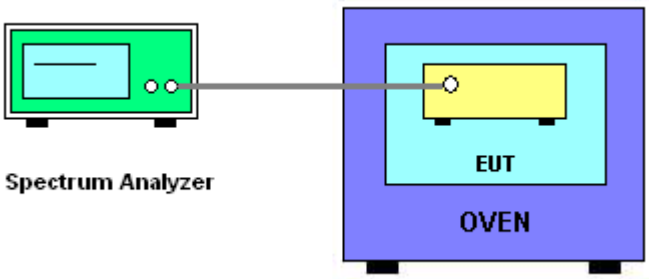
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10 kHz
Sweep Time	Auto

4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. 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.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is -20°C～50°C.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.7.7. Test Result of Frequency Stability

Temperature	25°C	Humidity	60%
Test Engineer	Serway Li	Test Date	Sep. 16, 2015

Mode: 20 MHz / Chain 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9110	5784.9100	5784.9078	5784.9074
110.00	5784.9100	5784.9088	5784.9062	5784.9060
93.50	5784.9062	5784.9058	5784.9054	5784.9052
Max. Deviation (MHz)	0.0938	0.0942	0.0946	0.0948
Max. Deviation (ppm)	16.21	16.28	16.35	16.39
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5784.9144	5784.9142	5784.9149	5784.9152
-10	5784.9138	5784.9132	5784.9140	5784.9136
0	5784.9126	5784.9110	5784.9084	5784.9076
10	5784.9108	5784.9096	5784.9070	5784.9068
20	5784.9100	5784.9088	5784.9062	5784.9060
30	5784.9084	5784.9072	5784.9054	5784.9052
40	5784.9066	5784.9064	5784.9044	5784.9038
50	5784.9023	5784.9027	5784.9029	5784.9023
Max. Deviation (MHz)	0.0977	0.0973	0.0971	0.0977
Max. Deviation (ppm)	16.88	16.81	16.78	16.88
Result	Complies			

Mode: 40 MHz / Chain 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5795.0012	5794.9998	5794.9994	5794.9990
110.00	5795.0000	5794.9994	5794.9990	5794.9986
93.50	5794.9982	5794.9984	5794.9982	5794.9980
Max. Deviation (MHz)	0.0018	0.0016	0.0018	0.0020
Max. Deviation (ppm)	0.31	0.28	0.31	0.35
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5795.0146	5795.0138	5795.0144	5795.0140
-10	5795.0121	5795.0124	5795.0118	5795.0126
0	5795.0010	5795.0008	5795.0000	5794.9998
10	5795.0000	5795.0004	5794.9994	5794.9992
20	5795.0000	5794.9994	5794.9990	5794.9986
30	5794.9984	5794.9984	5794.9982	5794.9980
40	5794.9978	5794.9978	5794.9976	5794.9974
50	5794.9964	5794.9968	5794.9962	5794.9966
Max. Deviation (MHz)	0.0146	0.0138	0.0144	0.0140
Max. Deviation (ppm)	2.52	2.38	2.48	2.42
Result	Complies			

Mode: 80 MHz / Chain 5

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5775.0008	5774.9998	5774.9996	5774.9986
110.00	5775.0000	5774.9994	5774.9988	5774.9982
93.50	5774.9990	5774.9988	5774.9982	5774.9974
Max. Deviation (MHz)	0.0010	0.0012	0.0018	0.0026
Max. Deviation (ppm)	0.17	0.21	0.31	0.45
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5775.0110	5775.0114	5775.0110	5775.0113
-10	5775.0082	5775.0078	5775.0084	5775.0085
0	5775.0020	5775.0004	5775.0004	5774.9998
10	5775.0014	5774.9998	5774.9992	5774.9986
20	5775.0000	5774.9994	5774.9988	5774.9982
30	5774.9994	5774.9986	5774.9980	5774.9974
40	5774.9988	5774.9978	5774.9972	5774.9962
50	5774.9876	5774.9874	5774.9872	5774.9874
Max. Deviation (MHz)	0.0124	0.0126	0.0128	0.0126
Max. Deviation (ppm)	2.15	2.18	2.22	2.18
Result	Complies			

4.8. Antenna Requirements

4.8.1. 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.

4.8.2. 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	Aug. 22, 2014	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)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	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%