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FCC RADIO TEST REPORT

Applicant's company	Fortinet Inc.
Applicant Address	899 Kifer Road Sunnyvale, CA 94086, USA
FCC ID	TVE-28166022
Manufacturer's company	Fortinet Inc.
Manufacturer Address	899 Kifer Road Sunnyvale, CA 94086, USA

Product Name	Secured Wireless Access Point
Brand Name	FORTINET
Model No.	FORTIAP-S421Exxxxxx, FortiAP S421Exxxxxx, FAP-S421Exxxxxx, FORTIAP-S423Exxxxxx, FortiAP S423Exxxxxx, FAP-S423Exxxxxx (Please refer to section 3.7 for more detail information)
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jan. 25, 2016
Final Test Date	Jul. 22, 2016
Submission Type	Original Equipment

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 v01r02, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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



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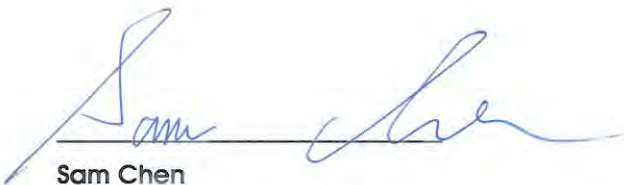
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5N2028AB	Rev. 01	Initial issue of report	Jul. 26, 2016
FR5N2028AB	Rev. 02	- Adding PoE mode for AC Power Line Conducted Emissions Measurement. - Adding a note at page 107, 123 and 190. - Revising the equation of directional gain. - Revising the Calibration Date of EMI Receiver.	Aug. 15, 2016

1. VERIFICATION OF COMPLIANCE

Product Name : Secured Wireless Access Point
Brand Name : FORTINET
Model No. : FORTIAP-S421Exxxxxx, FortiAP S421Exxxxxx, FAP-S421Exxxxxx,
FORTIAP-S423Exxxxxx, FortiAP S423Exxxxxx, FAP-S423Exxxxxx
(Please refer to section 3.7 for more detail information)
Applicant : Fortinet 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 Jan. 25, 2016 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
4.1	15.207	AC Power Line Conducted Emissions	Complies
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies
4.4	15.407(a)	Maximum Conducted Output Power	Complies
4.5	15.407(a)	Power Spectral Density	Complies
4.6	15.407(b)	Radiated Emissions	Complies
4.7	15.407(b)	Band Edge Emissions	Complies
4.8	15.407(g)	Frequency Stability	Complies
4.9	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From adapter or PoE
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%)	<u>For non-beamforming function:</u> Band 1: IEEE 802.11a: 16.59 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.47 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz Band 4: IEEE 802.11a: 20.84 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 19.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.04 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz <u>For beamforming function:</u> Band 1: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.32 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz Band 4: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.04 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz

Maximum Conducted Output Power	<u>For non-beamforming function:</u> Band 1: IEEE 802.11a: 25.16 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 24.80 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.85 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 17.79 dBm Band 4: IEEE 802.11a: 28.03 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 27.93 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.82 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.24 dBm <u>For beamforming function:</u> Band 1: IEEE 802.11ac MCS0/Nss1 (VHT20): 23.71 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.56 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 16.27 dBm Band 4: IEEE 802.11ac MCS0/Nss1 (VHT20): 23.87 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 22.99 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 17.35 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
	The product has beamforming function for 802.11n/ac.	
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Band width

Antenna	Four (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)	4	MCS 0-31
802.11n (HT40)	4	MCS 0-31
802.11ac (VHT20)	4	MCS 0-9/Nss1-4
802.11ac (VHT40)	4	MCS 0-9/Nss1-4
802.11ac (VHT80)	4	MCS 0-9/Nss1-4

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 No.	Rating
Adapter (Removable plug)	APD	WA-36A12R	Input: 100-240Vac, 50-60Hz, 0.9A Max. Output: 12Vdc, 3A
Other			
Plug*1			

3.3. Table for Filed Antenna

Internal antenna EUT:

Ant.	Brand	Part Number	Type	Connector	Gain (dBi)		
					2.4GHz	5GHz band1	5GHz band4
1	Senao	5718A0167300	PIFA	I-PEX	3.98	-	-
2	Senao	5718A0168300	PIFA	I-PEX	3.98	-	-
3	Senao	5718A0115300	PIFA	I-PEX	3.98	-	-
4	Senao	5718A0116300	PIFA	I-PEX	3.98	-	-
5	Senao	5718A0146300	PIFA	I-PEX	-	4.78	5.84
6	Senao	5718A0118300	PIFA	I-PEX	-	4.78	5.84
7	Senao	5718A0169300	PIFA	I-PEX	-	4.78	5.84
8	Senao	5718A0120300	PIFA	I-PEX	-	4.78	5.84

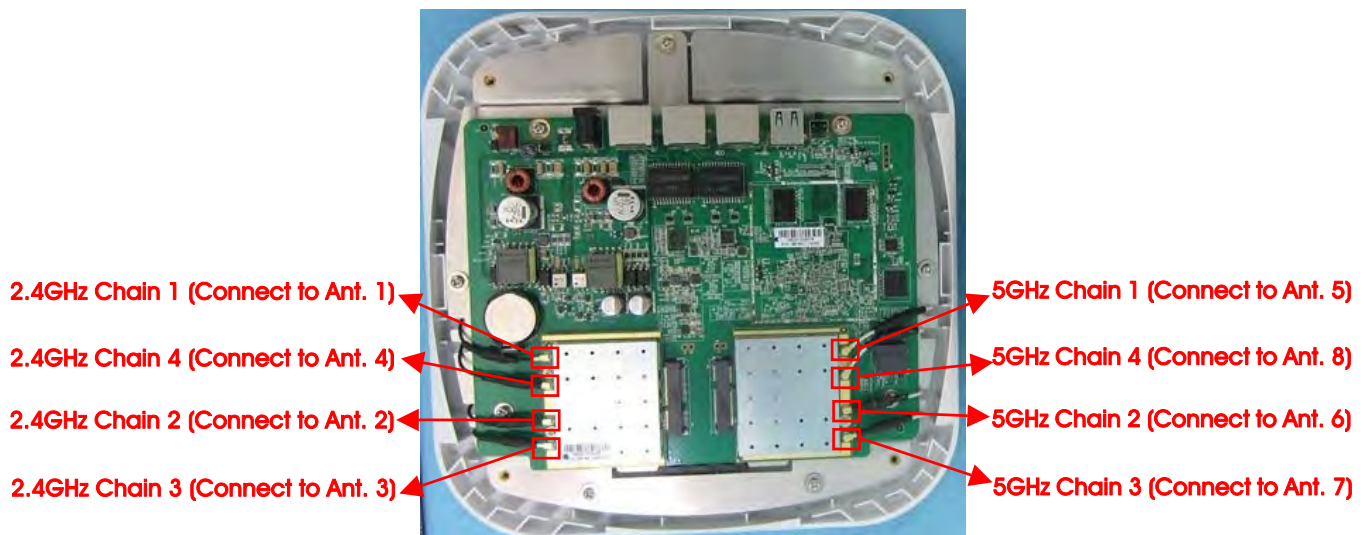
Note: The EUT has eight antennas.

For 2.4GHz WLAN function (4TX/4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

For 5GHz WLAN function (4TX/4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.



External antenna EUT:

Ant.	Brand	Model No.	Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	MASTER WAVE TECHNOLOGY	98152MRSX010	Dipole	Reversed-SMA	4.42	-
2	MASTER WAVE TECHNOLOGY	98152MRSX010	Dipole	Reversed-SMA	4.42	-
3	MASTER WAVE TECHNOLOGY	98152MRSX010	Dipole	Reversed-SMA	4.42	-
4	MASTER WAVE TECHNOLOGY	98152MRSX010	Dipole	Reversed-SMA	4.42	-
5	MASTER WAVE TECHNOLOGY	98152URSX005	Dipole	Reversed-SMA	-	3.18
6	MASTER WAVE TECHNOLOGY	98152URSX005	Dipole	Reversed-SMA	-	3.18
7	MASTER WAVE TECHNOLOGY	98152URSX005	Dipole	Reversed-SMA	-	3.18
8	MASTER WAVE TECHNOLOGY	98152URSX005	Dipole	Reversed-SMA	-	3.18

Note: The EUT has eight antennas.

For 2.4GHz WLAN function (4TX/4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

For 5GHz WLAN function (4TX/4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 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	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	For non-beamforming function:				
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157 /165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
	For beamforming function:				
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
Power Spectral Density	For non-beamforming function:				
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157 /165	1+2+3+4

	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
	<u>For beamforming function:</u>				
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4

26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	For non-beamforming function:				
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157 /165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
	For beamforming function:				
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
6dB Spectrum Bandwidth Measurement	For non-beamforming function:				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3+4
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3+4
	For beamforming function:				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3+4
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	For non-beamforming function:				
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157 /165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
	For beamforming function:				
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4

Band Edge Emission	For non-beamforming function:				
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157 /165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
	For beamforming function:				
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157 /165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
Frequency Stability	20 MHz	Band 1&4	-	40/157	1
	40 MHz	Band 1&4	-	38/151	1
	80 MHz	Band 1&4	-	42/155	1

Note: 1. The console port can not be used by end user. It is generally used for updating FW.

- All the specification of test configurations and test modes were based on customer's request.
- VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.
- There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for 802.11n/ac. All test results were recorded in this report.
- The PoE is for measurement only, would not be marketed and its information as below:

Support Unit	Brand	Model	FCC ID
PoE	EnGenius	EPA5006GAT	DoC

- For Normal Link mode:

The External antenna EUT (Model No.: FortiAP S423E) and Internal antenna EUT (Model No.: FortiAP S421E) were selected to perform the test and recorded in this report.

- For CTX mode:

For Conducted measurement:

For 2.4GHz Band:

Only the External antenna EUT (Model No.: FortiAP S423E) was selected to perform the test and recorded in this report, it matched with the highest gain antenna.

For 5GHz Band:

Only the Internal antenna EUT (Model No.: FortiAP S421E) was selected to perform the test and recorded in this report, it matched with the highest gain antenna.

For Radiated measurement:

The External antenna EUT (Model No.: FortiAP S423E) and Internal antenna EUT (Model No.: FortiAP S421E) were selected to perform the test and recorded in this report.

The following test modes were performed for all tests:

AC Power Line Conducted Emissions test	
Test Mode	Description
1	External antenna EUT (Model No.: FortiAP S423E) + Adapter
2	External antenna EUT (Model No.: FortiAP S423E) + PoE
3	Internal antenna EUT (Model No.: FortiAP S421E) + Adapter
4	Internal antenna EUT (Model No.: FortiAP S421E) + PoE
Mode 3 generated the worst test result, so it was recorded in this report.	

Radiated Emission Below 1GHz test	
There are four modes as below:	
1. External antenna EUT (Model No.: FortiAP S423E) in Y axis	
2. External antenna EUT (Model No.: FortiAP S423E) in Z axis	
3. Internal antenna EUT (Model No.: FortiAP S421E) in Y axis	
4. Internal antenna EUT (Model No.: FortiAP S421E) in Z axis	
After evaluating, "External antenna EUT (Model No.: FortiAP S423E) in Z axis" and "Internal antenna EUT (Model No.: FortiAP S421E) in Z axis" has been evaluated to be the worst case, so the measurement will follow this same test configuration.	
Test Mode	Description
1	External antenna EUT (Model No.: FortiAP S423E) in Z axis + Adapter
2	External antenna EUT (Model No.: FortiAP S423E) in Z axis + PoE
3	Internal antenna EUT (Model No.: FortiAP S421E) in Z axis + Adapter
4	Internal antenna EUT (Model No.: FortiAP S421E) in Z axis + PoE
Mode 2 generated the worst test result, so it was recorded in this report.	

Radiated Emission Above 1GHz test	
The EUT can be placed in Y axis and Z axis. After evaluating, Y axis was the worst case, so it's recorded in this report.	
Test Mode	Description
1	External antenna EUT (Model No.: FortiAP S423E) in Y axis
2	Internal antenna EUT (Model No.: FortiAP S421E) in Y axis

Radiated Emission Co-location test	
Test Mode	Description
1	External antenna EUT (Model No.: FortiAP S423E) in Y axis
2	External antenna EUT (Model No.: FortiAP S423E) in Z axis
3	Internal antenna EUT (Model No.: FortiAP S421E) in Y axis
4	Internal antenna EUT (Model No.: FortiAP S421E) in Z axis

Radiated Emission Co-location test
Mode 1 and Mode 4 generated the worst test result, so it was recorded in this report.

Co-location MPE and Radiated Emission Co-location test
The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA5N2028) and Radiated Emission Co-location (please refer to Appendix B) tests are 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 Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Multiple Listing

The EUT has six model numbers which are identical to each other in all aspects except for the following table:

Model No.	Description	Remark
FORTIAP-S421Exxxxxx	Where "x" can be used as "A-Z", or "-0-9", or "-", or blank for software changes or marketing purposes only.	Internal antenna EUT
FortiAP S421Exxxxxx		
FAP-S421Exxxxxx		
FORTIAP-S423Exxxxxx	Where "x" can be used as "A-Z", or "-0-9", or "-", or blank for software changes or marketing purposes only.	External antenna EUT
FortiAP S423Exxxxxx		
FAP-S423Exxxxxx		

Note: 1. For Normal Link mode:

The External antenna EUT (Model No.: FortiAP S423E) and Internal antenna EUT (Model No.: FortiAP S421E) were selected to perform the test and recorded in this report.

2. For CTX mode:

For Conducted measurement:

For 2.4GHz Band:

Only the External antenna EUT (Model No.: FortiAP S423E) was selected to perform the test and recorded in this report, it matched with the highest gain antenna.

For 5GHz Band:

Only the Internal antenna EUT (Model No.: FortiAP S421E) was selected to perform the test and recorded in this report, it matched with the highest gain antenna.

For Radiated measurement:

The External antenna EUT (Model No.: FortiAP S423E) and Internal antenna EUT (Model No.: FortiAP S421E) were selected to perform the test and recorded in this report.

3.8. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E6430	DoC
Flash disk	Silicon	I-Series	DoC
PoE	EnGenius	EPA5006GAT	DoC

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

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
PoE	EnGenius	EPA5006GAT	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E6430	DoC
PoE	EnGenius	EPA5006GAT	DoC
RX device	Boardcom	BCM943162ZP	QDS-BRCM1075

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E4300	DoC
Flash disk	Silicon	I-Series	DoC
PoE	EnGenius	EPA5006GAT	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
PoE	EnGenius	EPA5006GAT	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	QCAR Version 3.0.144.0

Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	18.5	18.5	18.5	17	21.5	17.5
802.11ac MCS0/Nss1 VHT20	17.5	18.5	18.5	17	21.5	17.5
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	
	15.5		18		15	
802.11ac MCS0/Nss1 VHT40	17.5		17.5		17.5	
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz			5775 MHz		
	10.5			11.5		

Test Function	Beamforming function					
Test Software Version	QCAR Version 3.0.144.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	22.5	23.5	23.5	21	23.5	22.5
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	
	18		23.5		20	
22.5						
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz			5775 MHz		
	16			17		

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 7 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 telnet.
3. Executed "Lantest.exe" to link with the remote workstation to receive and transmit packet by RX device and transmit duty cycle no less 98%.

3.11. Duty Cycle

External antenna EUT (Model No.: FortiAP S423E)

For non-beamforming function:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.060	2.130	96.71	0.15	0.49
802.11ac MCS0/Nss1 VHT20	5.012	5.068	98.90	0.05	0.01
802.11ac MCS0/Nss1 VHT40	2.394	2.492	96.07	0.17	0.42
802.11ac MCS0/Nss1 VHT80	1.134	1.204	94.19	0.26	0.88

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	1.750	1.920	91.15	0.40	0.57
802.11ac MCS0/Nss1 VHT40	1.640	1.840	89.13	0.50	0.61
802.11ac MCS0/Nss1 VHT80	1.910	2.100	90.95	0.41	0.52

Internal antenna EUT (Model No.: FortiAP S421E)

For non-beamforming function:

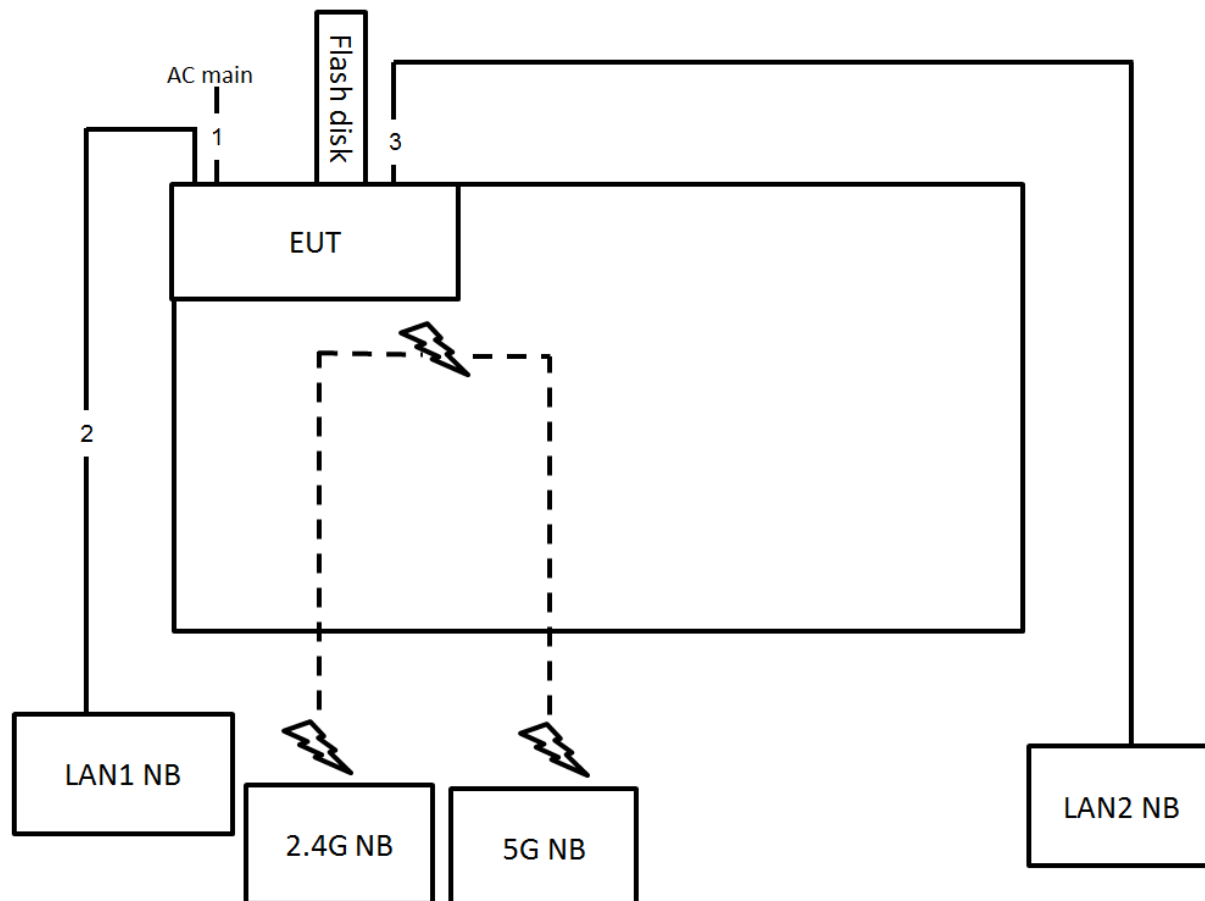
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.060	2.130	96.71	0.15	0.49
802.11ac MCS0/Nss1 VHT20	5.005	5.080	98.52	0.06	0.01
802.11ac MCS0/Nss1 VHT40	2.415	2.490	96.99	0.13	0.41
802.11ac MCS0/Nss1 VHT80	1.110	1.210	91.74	0.37	0.90

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	1.780	1.936	91.94	0.36	0.56
802.11ac MCS0/Nss1 VHT40	1.660	1.860	89.25	0.49	0.60
802.11ac MCS0/Nss1 VHT80	1.920	2.110	91.00	0.41	0.52

3.12. Test Configurations

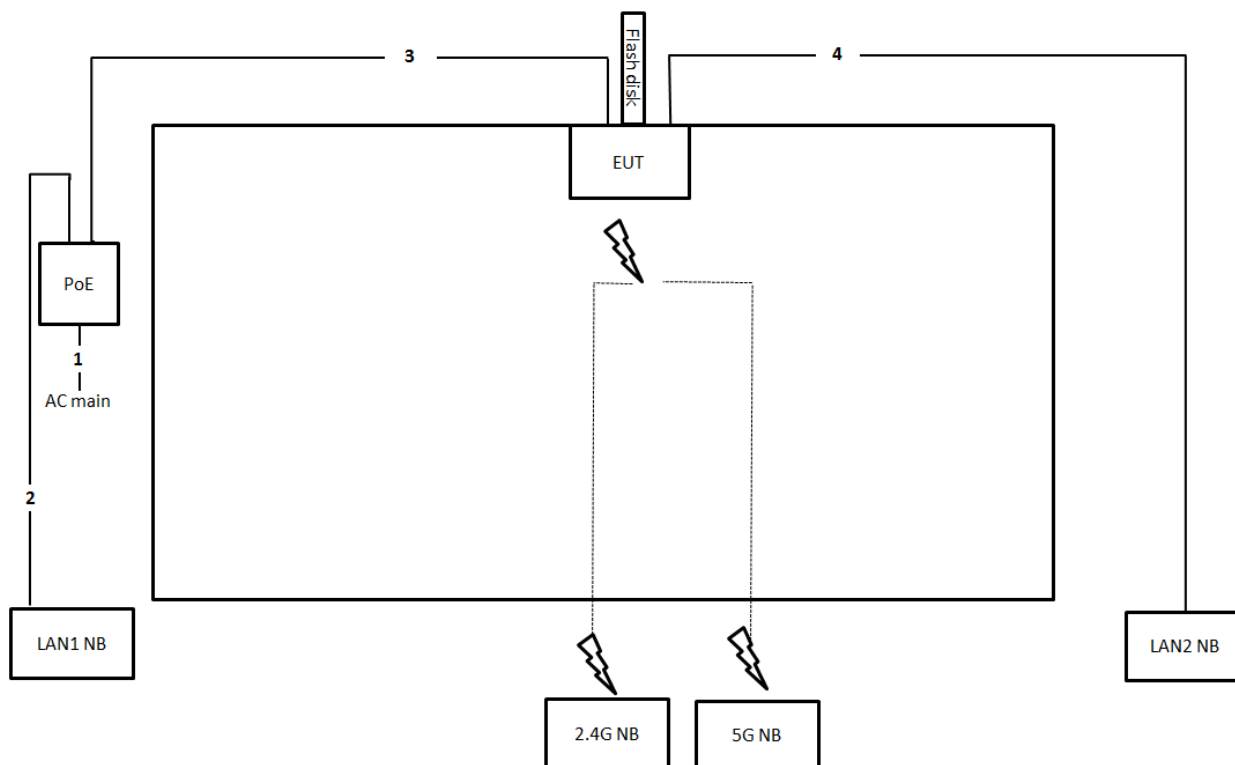
3.12.1. AC Power Line Conduction Emissions Test Configuration



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

3.12.2. Radiation Emissions Test Configuration

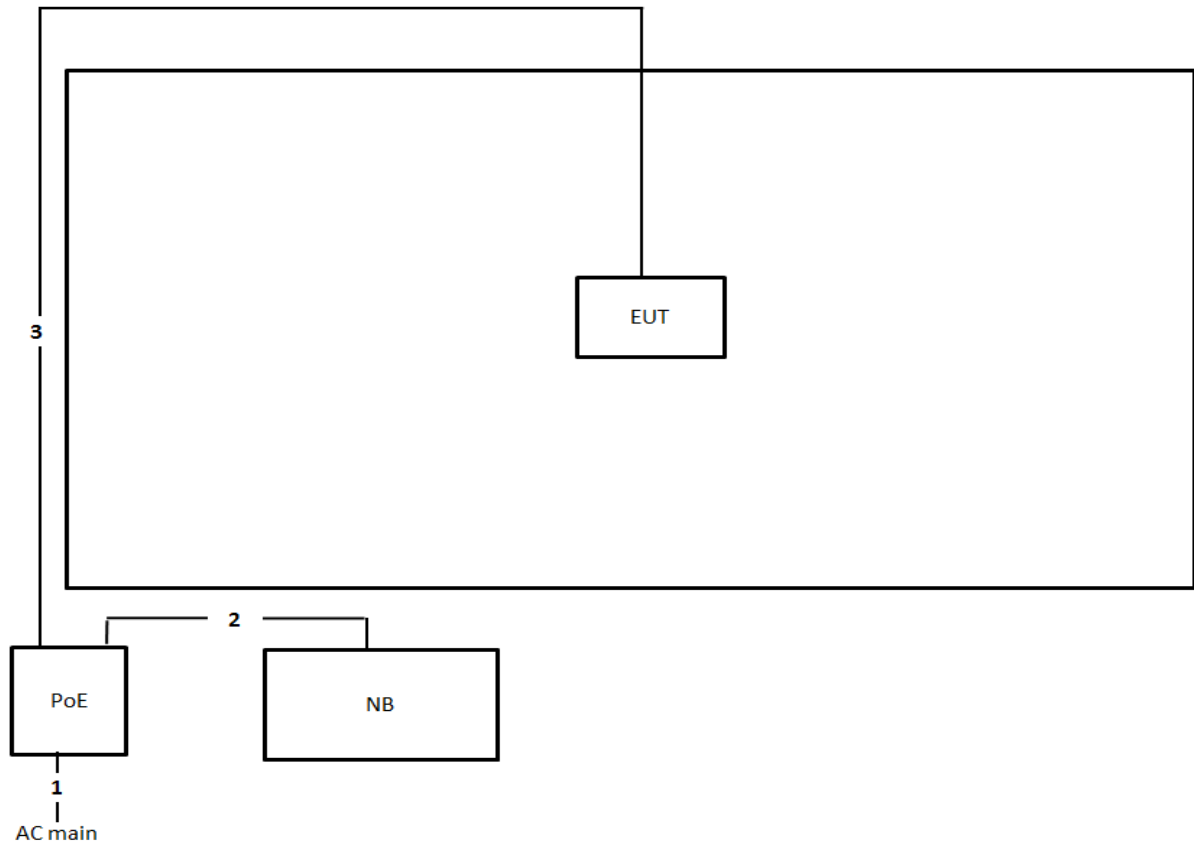
Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	1m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m

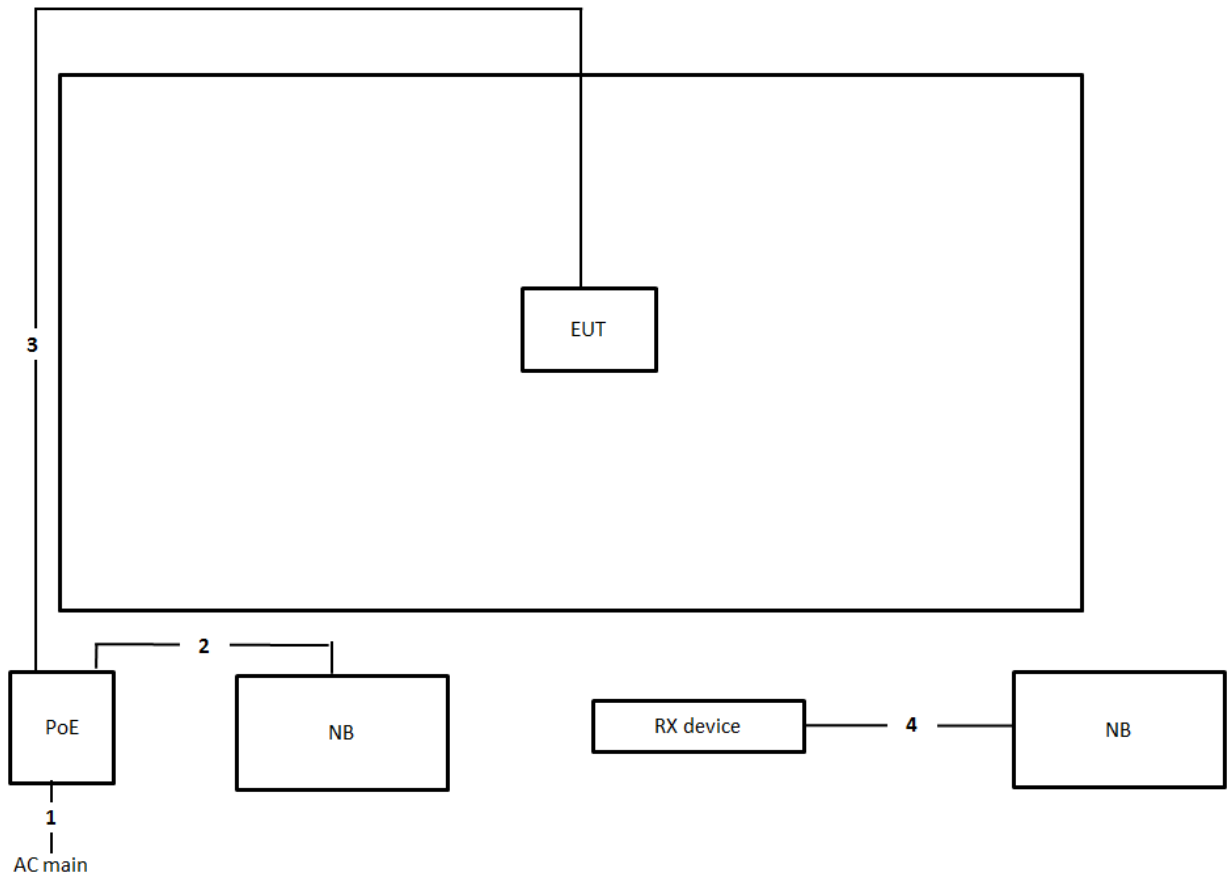
Test Configuration: above 1GHz

For non-beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	1m
3	RJ-45 cable	No	10m

For beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	1m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

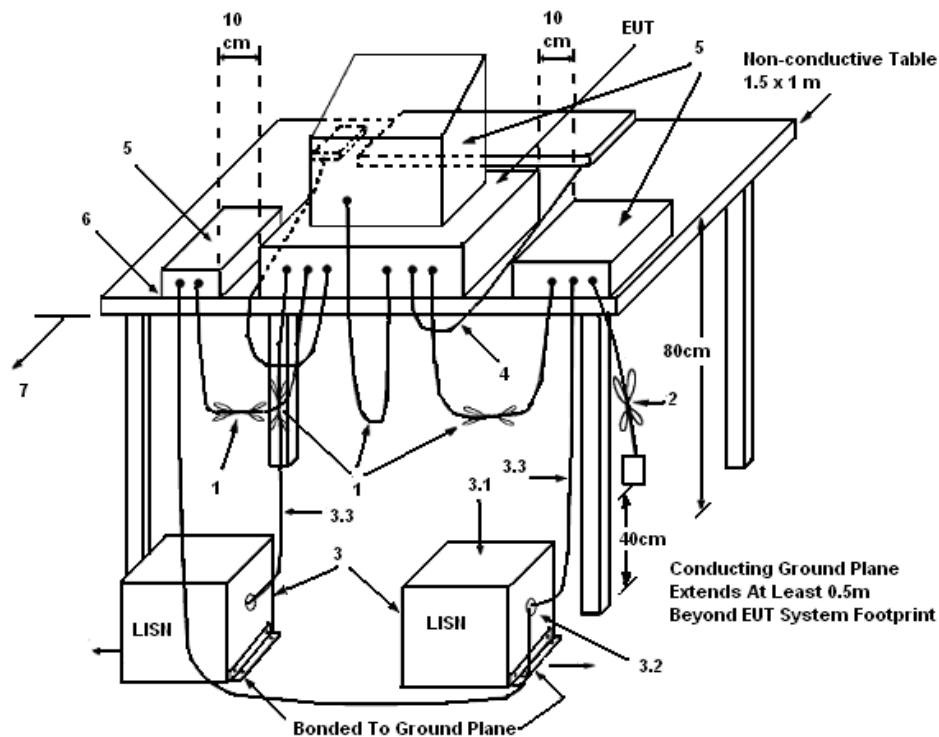
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

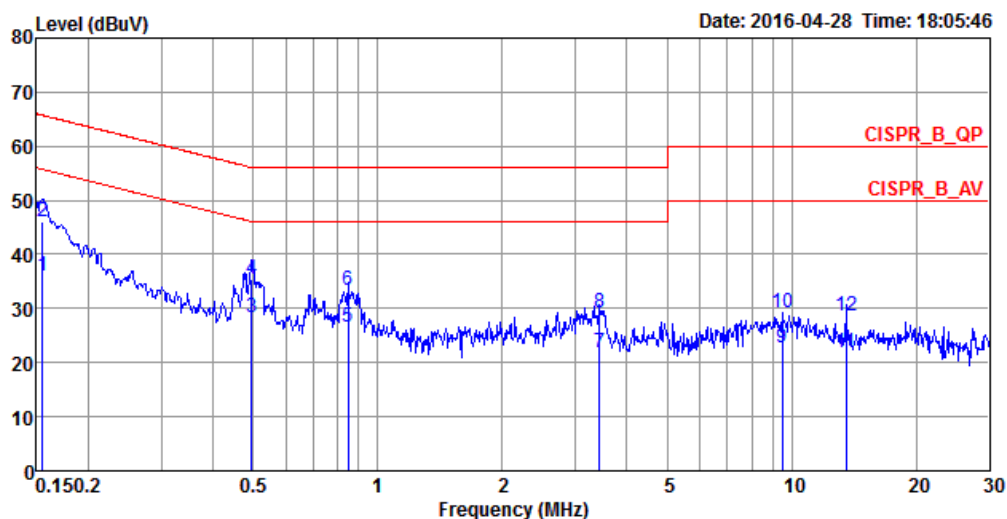
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

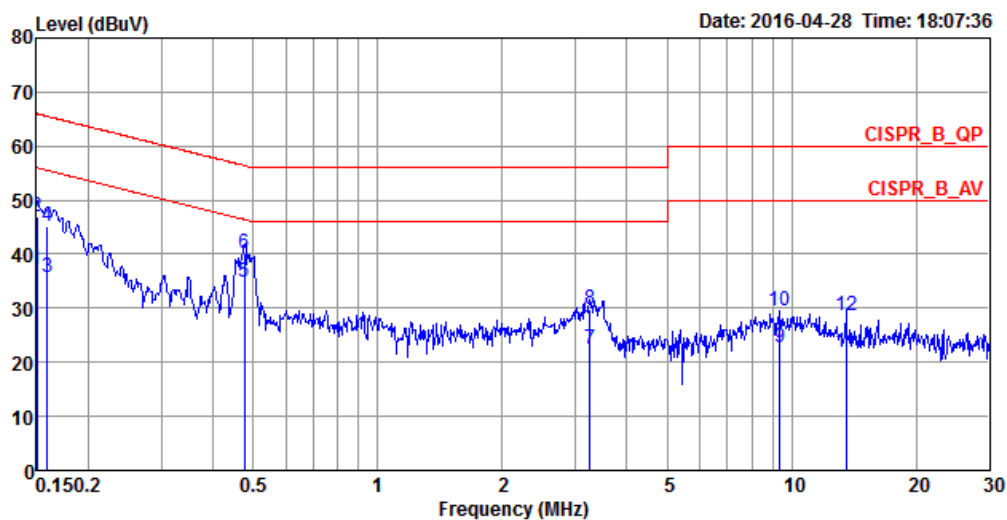
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	58%
Test Engineer	Deven Huang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1548	36.01	-19.73	55.74	25.97	10.02	0.02	LINE	Average
2	0.1548	46.10	-19.64	65.74	36.06	10.02	0.02	LINE	QP
3	0.4967	28.43	-17.62	46.05	18.47	9.92	0.04	LINE	Average
4	0.4967	35.31	-20.74	56.05	25.35	9.92	0.04	LINE	QP
5	0.8483	26.58	-19.42	46.00	16.61	9.93	0.04	LINE	Average
6	0.8483	33.45	-22.55	56.00	23.48	9.93	0.04	LINE	QP
7	3.4356	21.73	-24.27	46.00	11.69	9.98	0.06	LINE	Average
8	3.4356	29.27	-26.73	56.00	19.23	9.98	0.06	LINE	QP
9	9.5016	22.67	-27.33	50.00	12.30	10.14	0.23	LINE	Average
10	9.5016	29.32	-30.68	60.00	18.95	10.14	0.23	LINE	QP
11	13.5509	21.84	-28.16	50.00	11.38	10.21	0.25	LINE	Average
12	13.5509	28.60	-31.40	60.00	18.14	10.21	0.25	LINE	QP

Temperature	23°C	Humidity	58%
Test Engineer	Deven Huang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over	Limit	Read	LISN	Cable		
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Pol/Phase	Remark
			dB	dBuV	dBuV	dB	dB		
1	0.1500	37.22	-18.78	56.00	27.18	10.02	0.02	NEUTRAL	Average
2	0.1500	47.00	-19.00	66.00	36.96	10.02	0.02	NEUTRAL	QP
3	0.1590	35.78	-19.74	55.52	25.74	10.02	0.02	NEUTRAL	Average
4	0.1590	45.04	-20.48	65.52	35.00	10.02	0.02	NEUTRAL	QP
5	0.4761	34.91	-11.50	46.41	24.95	9.92	0.04	NEUTRAL	Average
6	0.4761	40.04	-16.37	56.41	30.08	9.92	0.04	NEUTRAL	QP
7	3.2583	22.39	-23.61	46.00	12.35	9.98	0.06	NEUTRAL	Average
8	3.2583	29.84	-26.16	56.00	19.80	9.98	0.06	NEUTRAL	QP
9	9.3518	22.70	-27.30	50.00	12.34	10.13	0.23	NEUTRAL	Average
10	9.3518	29.55	-30.45	60.00	19.19	10.13	0.23	NEUTRAL	QP
11	13.5509	21.96	-28.04	50.00	11.50	10.21	0.25	NEUTRAL	Average
12	13.5509	28.70	-31.30	60.00	18.24	10.21	0.25	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

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 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	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold

4.2.3. Test Procedures

1. The transmitter was conducted 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.
3. 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. Measurement perform conducted of each port.

4.2.4. Test Setup Layout

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 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Function	Non-beamforming function

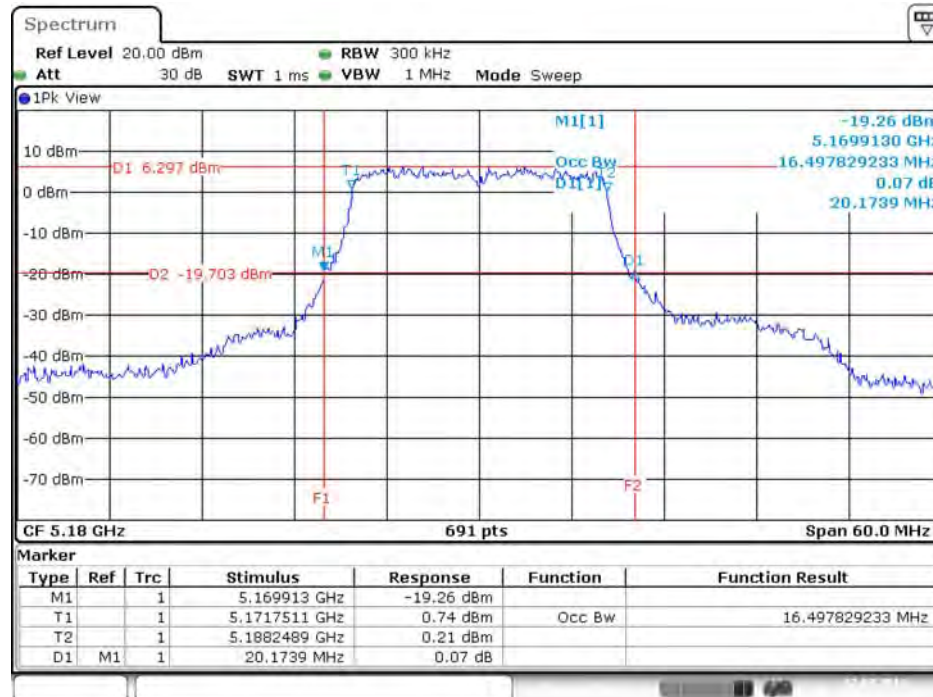
Mode	Frequency	26dB Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		Chain 1	Chain 2	Chain 3	Chain 4	Chain 1	Chain 2	Chain 3	Chain 4
802.11a	5180 MHz	20.17	20.00	20.96	19.39	16.50	16.50	16.59	16.50
	5200 MHz	20.26	20.09	21.30	19.39	16.50	16.50	16.59	16.50
	5240 MHz	20.26	20.52	20.96	19.91	16.50	16.50	16.59	16.50
	5745 MHz	20.35	19.39	19.13	19.83	16.50	16.50	16.50	16.50
	5785 MHz	32.00	36.78	36.35	32.35	18.67	20.06	20.84	17.28
	5825 MHz	19.57	20.35	19.91	19.48	16.50	16.50	16.50	16.50
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.70	20.52	20.61	20.26	17.71	17.71	17.71	17.71
	5200 MHz	20.78	20.52	21.83	20.26	17.71	17.71	17.71	17.63
	5240 MHz	20.96	20.96	23.13	20.26	17.63	17.71	17.80	17.63
	5745 MHz	20.70	20.26	20.44	20.35	17.63	17.71	17.63	17.63
	5785 MHz	31.83	35.48	36.78	29.65	18.93	19.71	19.54	18.06
	5825 MHz	20.70	20.35	20.35	20.26	17.63	17.63	17.71	17.63
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.44	40.44	40.29	40.15	36.04	36.04	36.04	36.04
	5230 MHz	40.44	40.29	56.38	40.44	36.04	36.04	36.47	36.04
	5755 MHz	40.29	40.29	40.29	40.15	36.04	36.04	36.04	36.04
	5795 MHz	40.29	40.44	40.44	40.15	36.04	36.04	36.04	36.04
802.11ac MCS0/Nss1 VHT80	5210 MHz	84.64	84.35	84.93	85.51	76.12	75.83	76.12	75.83
	5775 MHz	84.93	84.06	84.35	85.22	76.12	75.83	76.12	75.54

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Function	Beamforming function

Mode	Frequency	26dB Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		Chain 1	Chain 2	Chain 3	Chain 4	Chain 1	Chain 2	Chain 3	Chain 4
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.44	20.61	20.52	20.26	17.71	17.71	17.71	17.71
	5200 MHz	20.52	20.61	20.52	20.26	17.71	17.71	17.71	17.71
	5240 MHz	20.61	20.35	20.78	20.52	17.71	17.71	17.71	17.63
	5745 MHz	20.17	20.44	20.35	20.17	17.63	17.63	17.63	17.63
	5785 MHz	20.43	20.43	20.43	20.26	17.63	17.71	17.63	17.71
	5825 MHz	20.26	20.35	20.17	20.17	17.63	17.63	17.63	17.63
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.58	39.86	40.15	40.00	36.04	35.89	36.04	36.04
	5230 MHz	40.44	40.29	53.19	40.15	36.04	36.04	36.32	36.04
	5755 MHz	40.29	40.00	40.29	40.00	36.04	36.04	36.04	36.04
	5795 MHz	40.58	40.58	40.29	40.29	36.04	36.04	36.04	36.04
802.11ac MCS0/Nss1 VHT80	5210 MHz	84.06	84.35	84.93	85.51	76.12	75.83	76.12	75.83
	5775 MHz	84.64	84.93	85.51	84.93	75.83	75.83	76.12	75.83

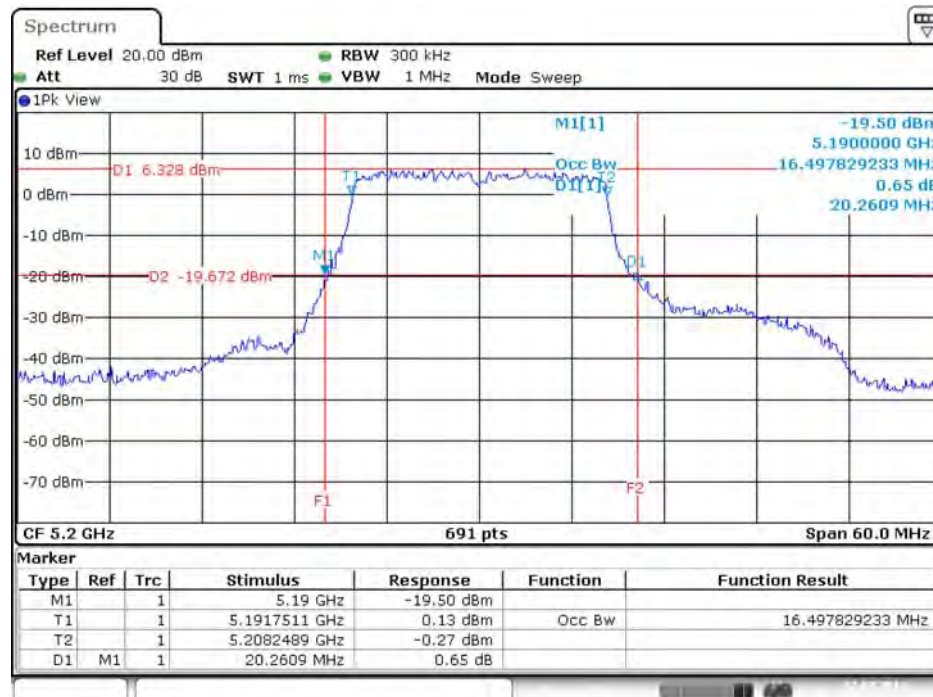
For non-beamforming function:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5180 MHz



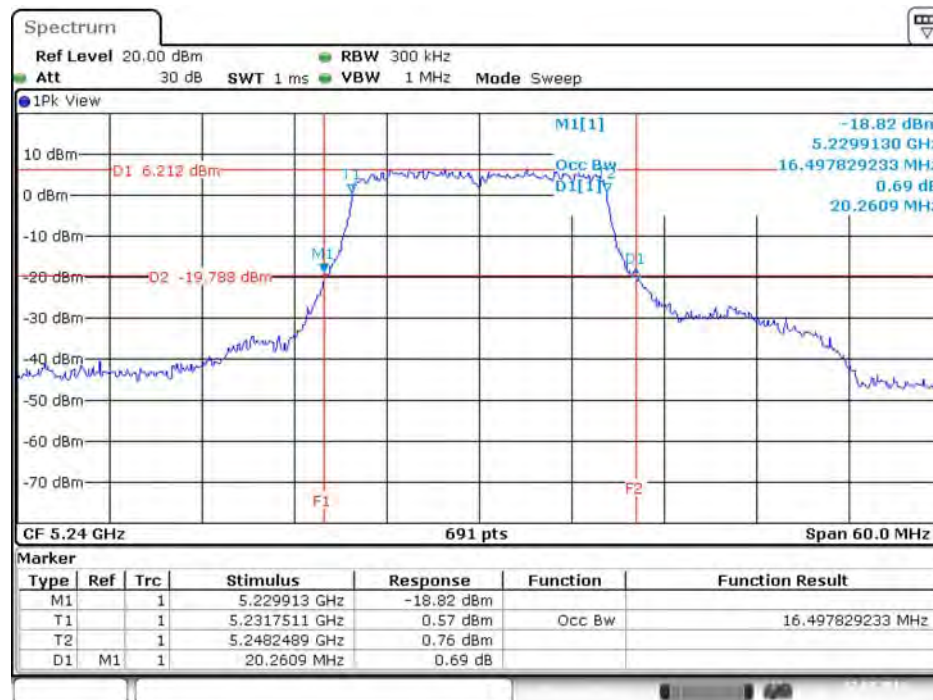
Date: 22.JUL.2016 15:15:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz



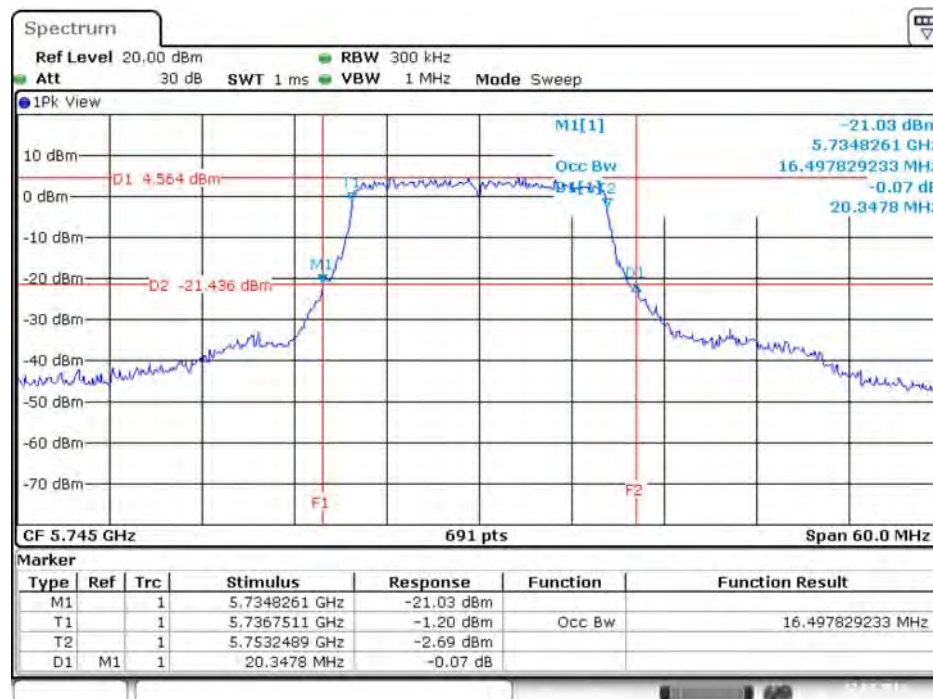
Date: 22.JUL.2016 15:23:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz



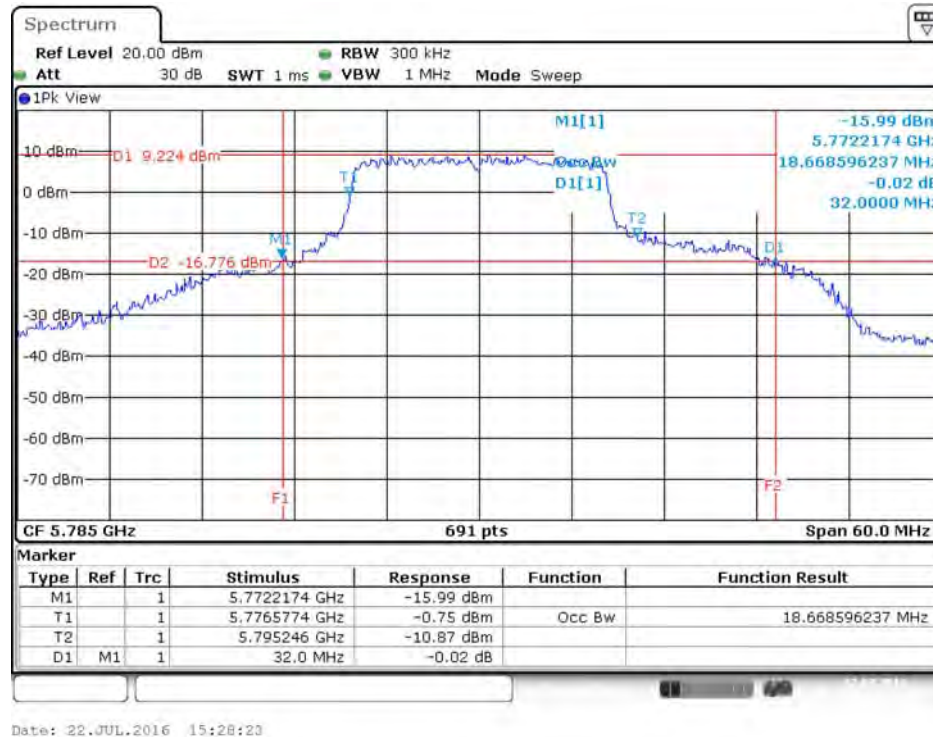
Date: 22.JUL.2016 15:23:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5745 MHz

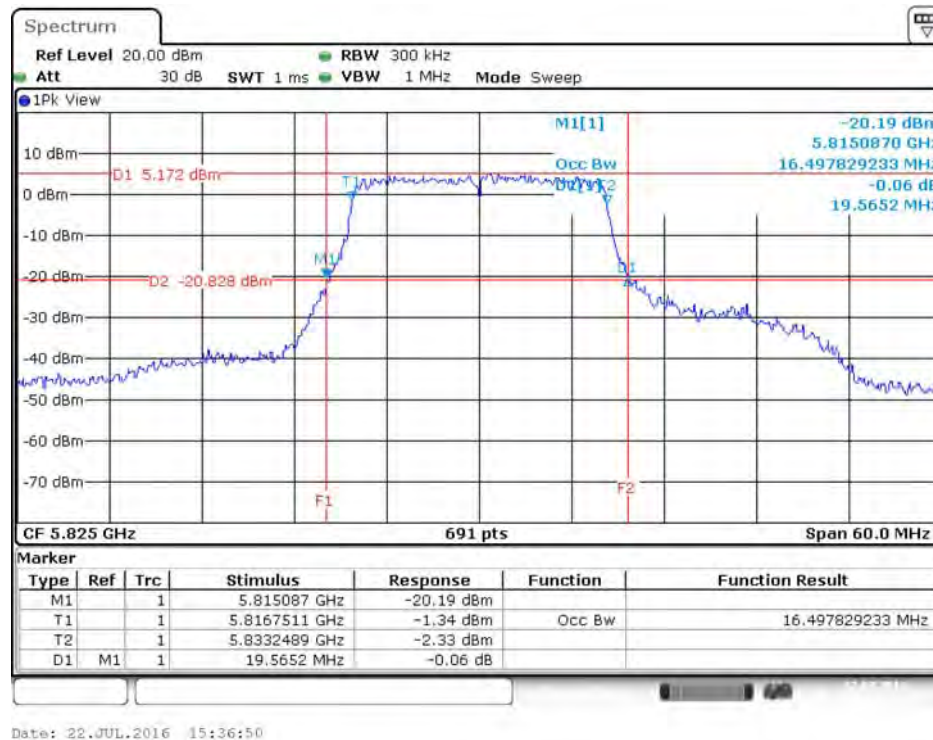


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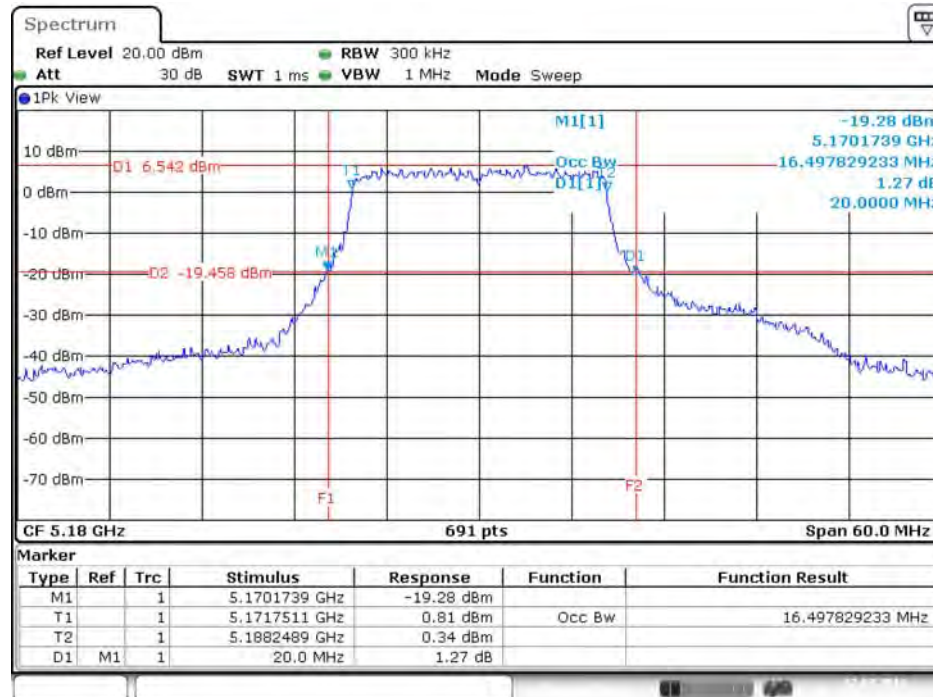
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5785 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5825 MHz

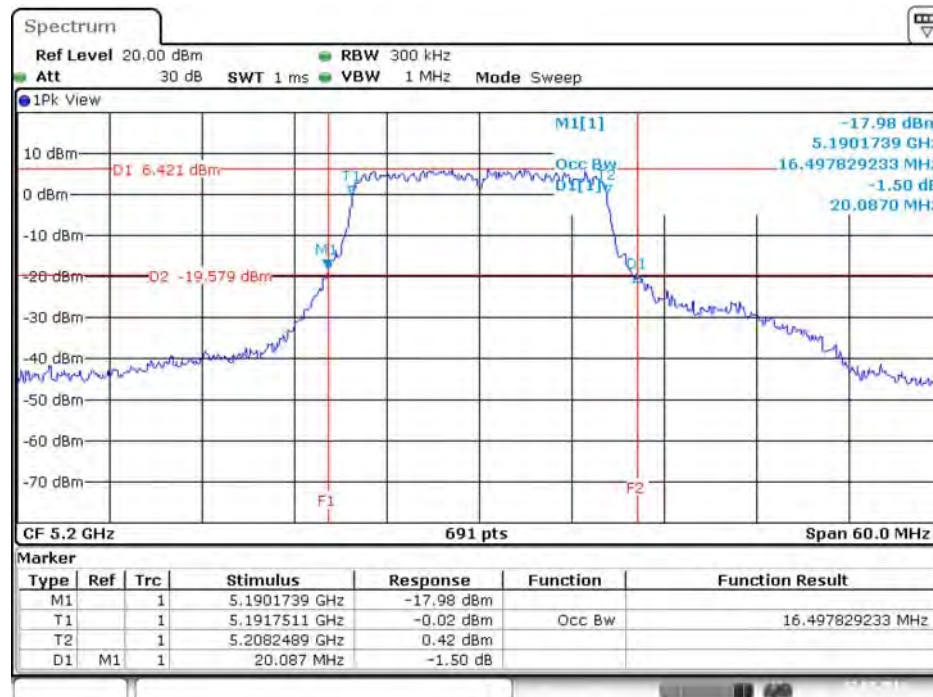


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5180 MHz



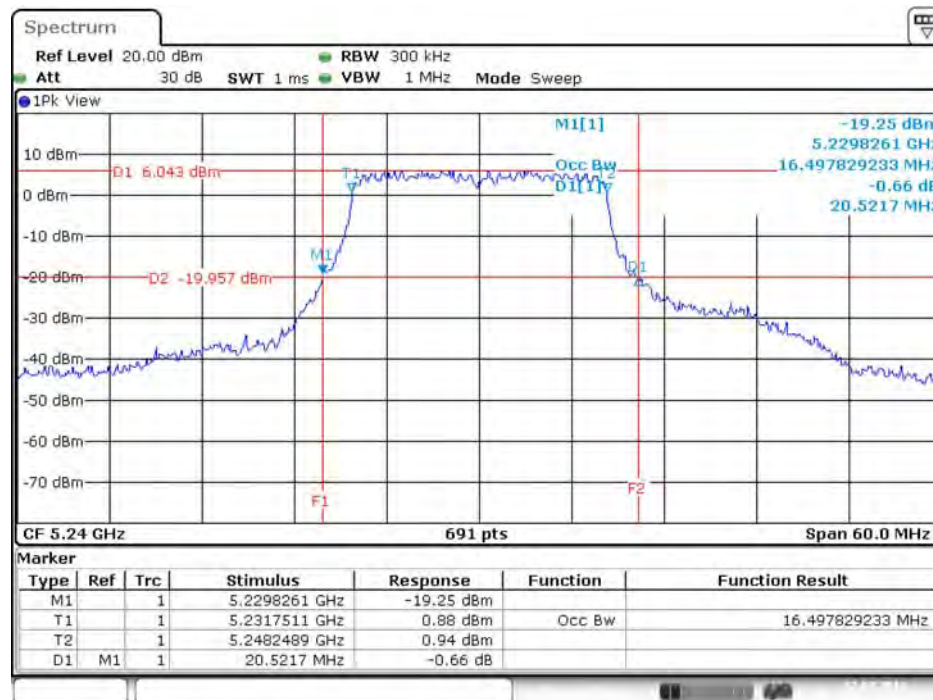
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5200 MHz



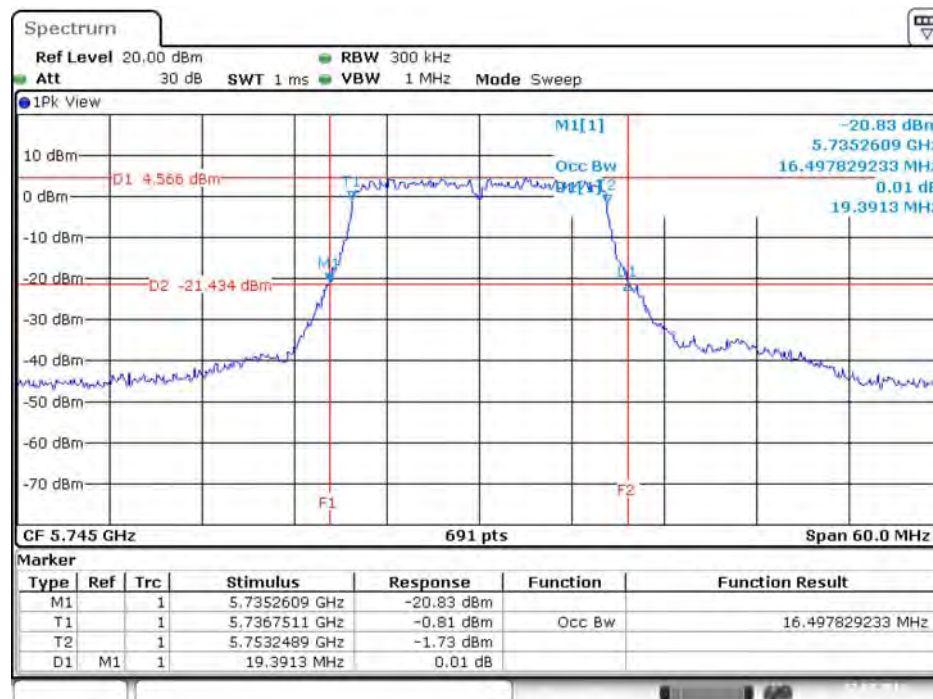
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5240 MHz



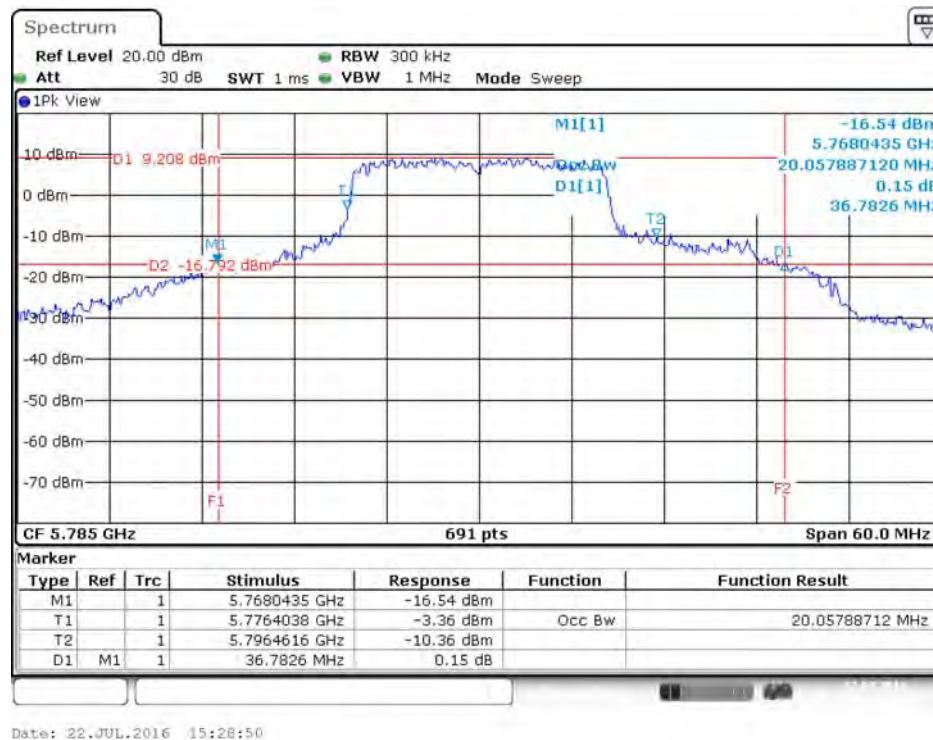
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5745 MHz

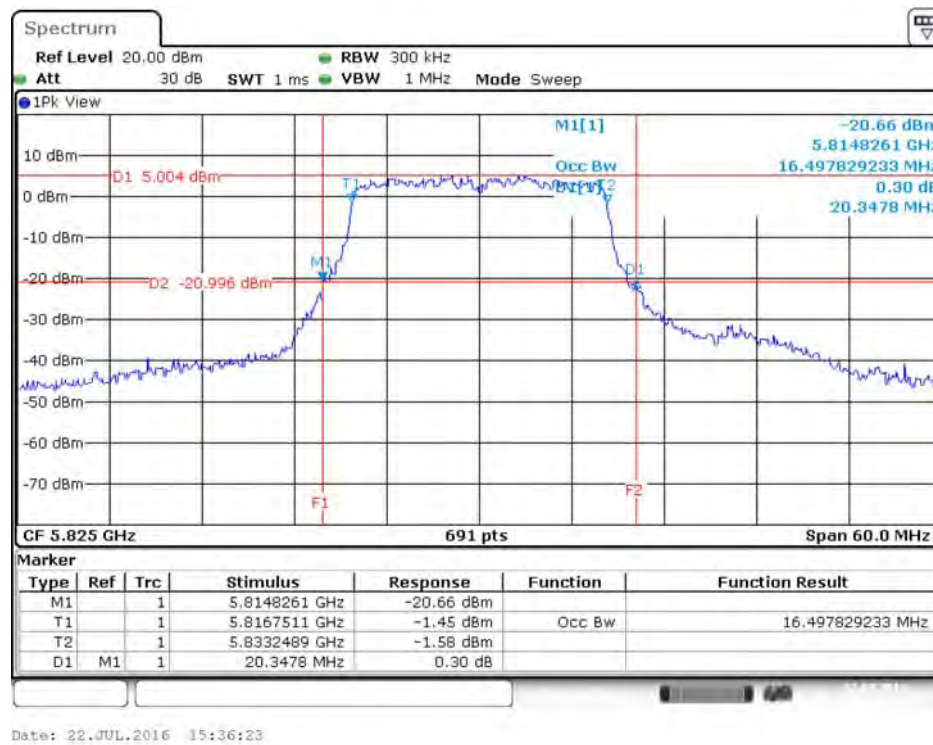


Date: 22.JUL.2016 15:26:53

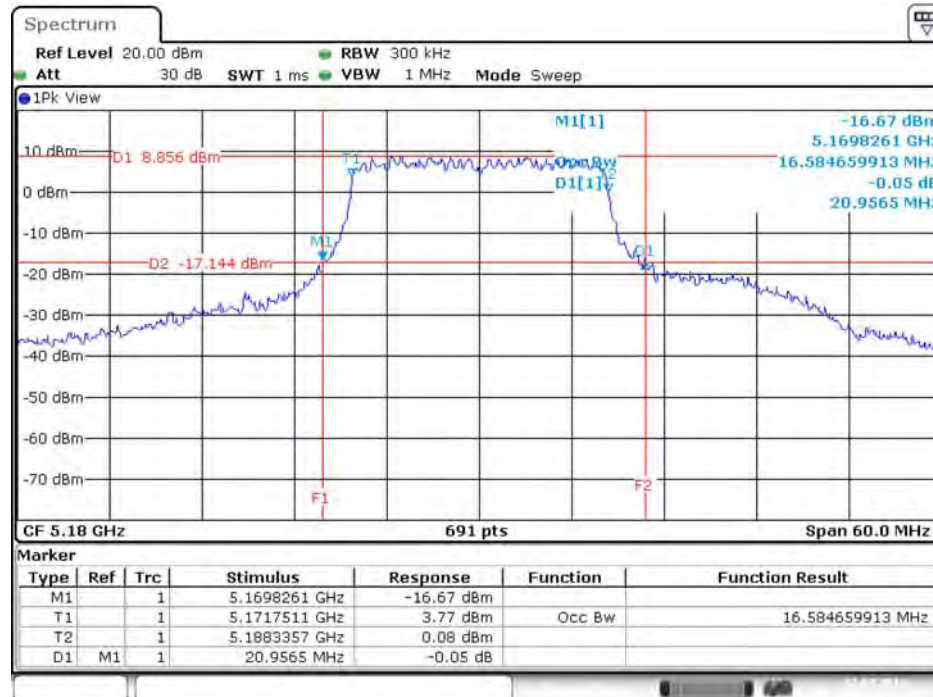
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5785 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5825 MHz

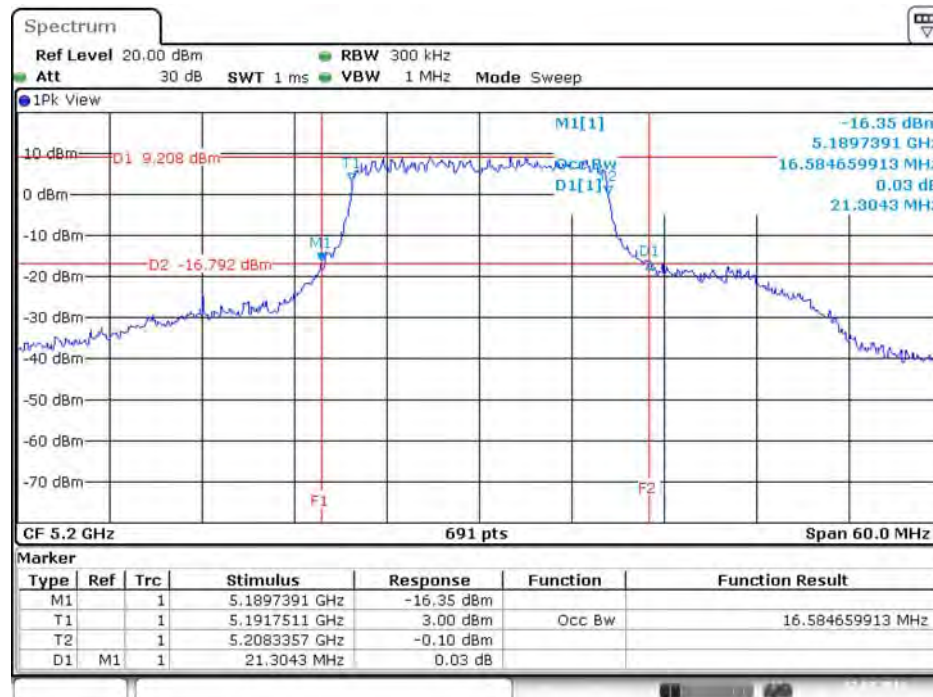


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5180 MHz



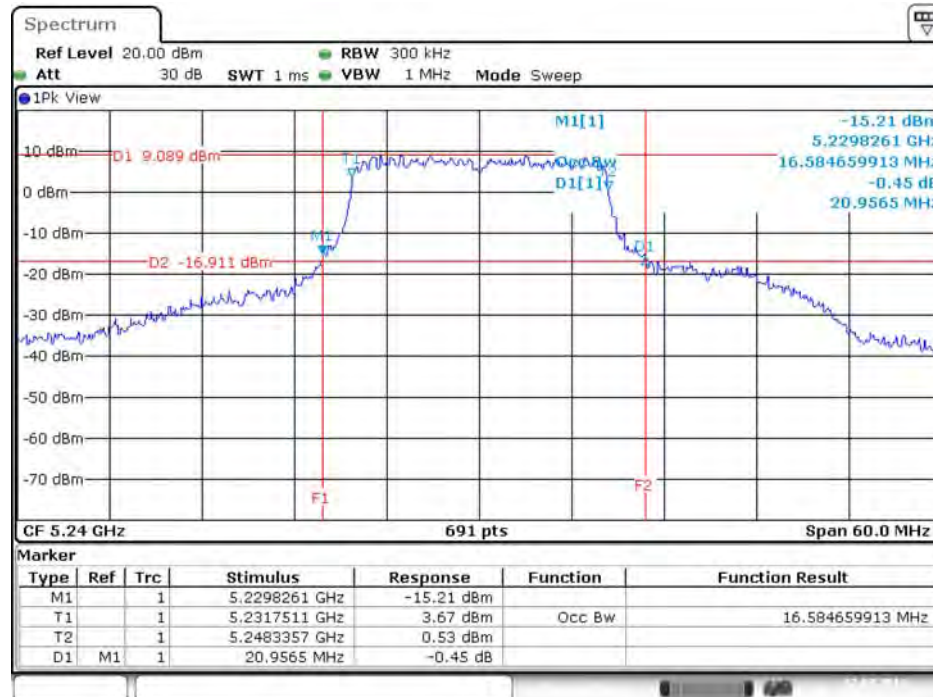
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5200 MHz



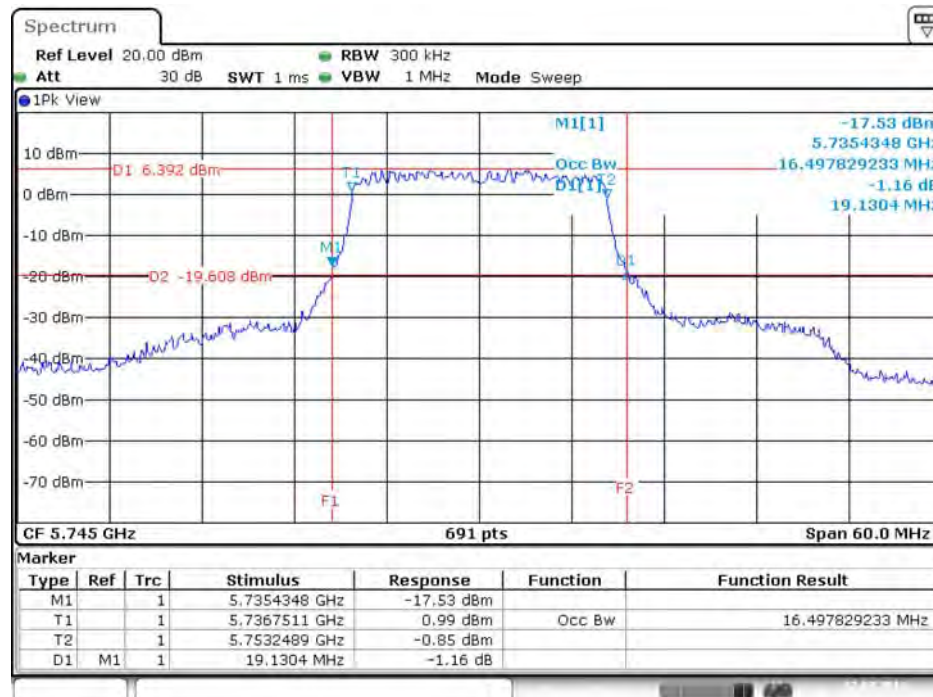
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5240 MHz



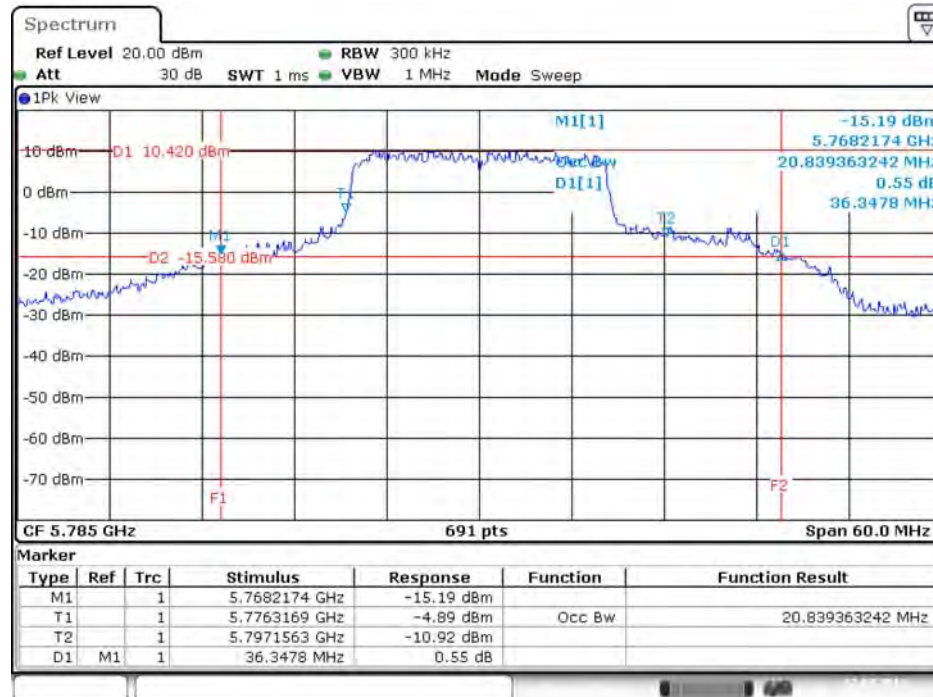
Date: 22.JUL.2016 15:24:35

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



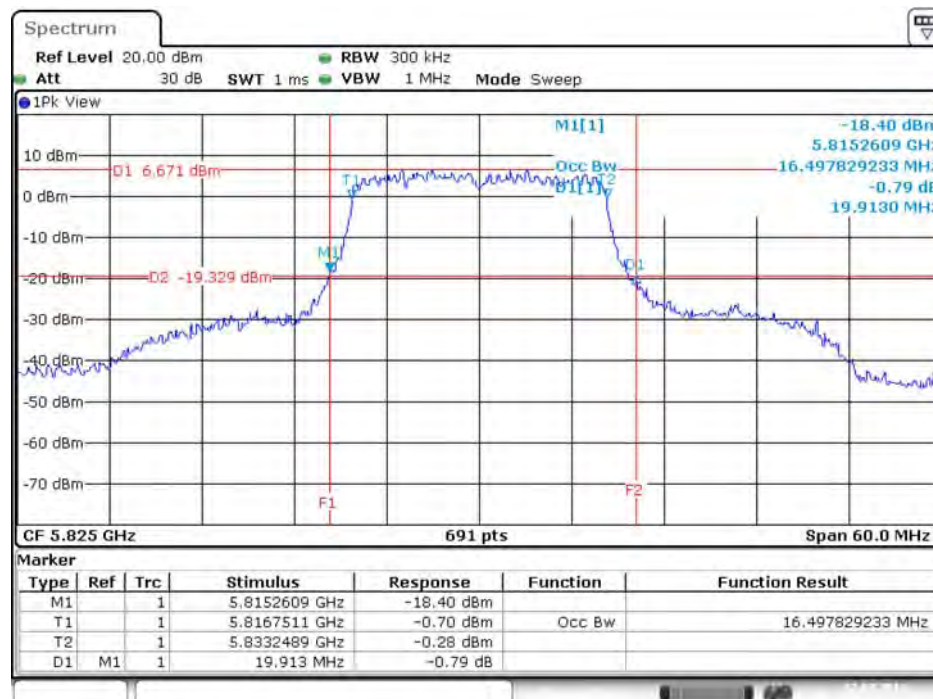
Date: 22.JUL.2016 15:26:22

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



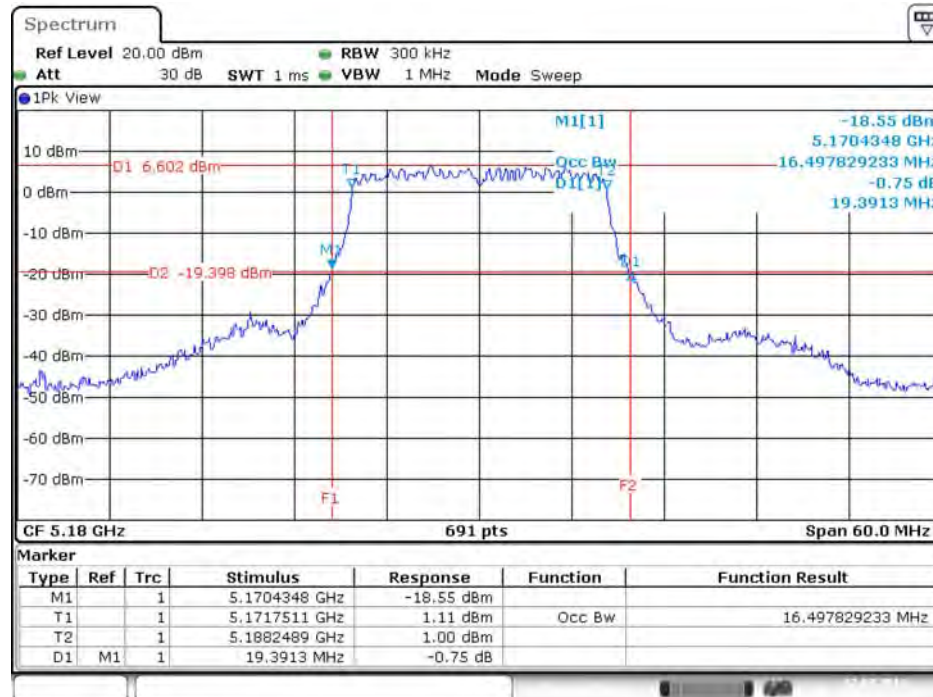
Date: 22.JUL.2016 15:29:13

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



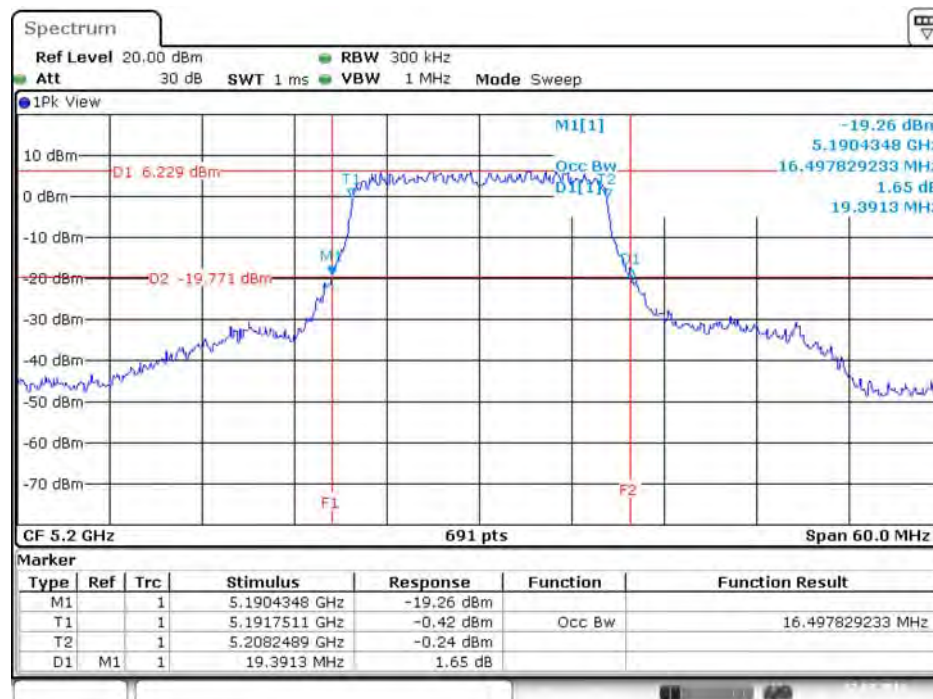
Date: 22.JUL.2016 15:36:04

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5180 MHz



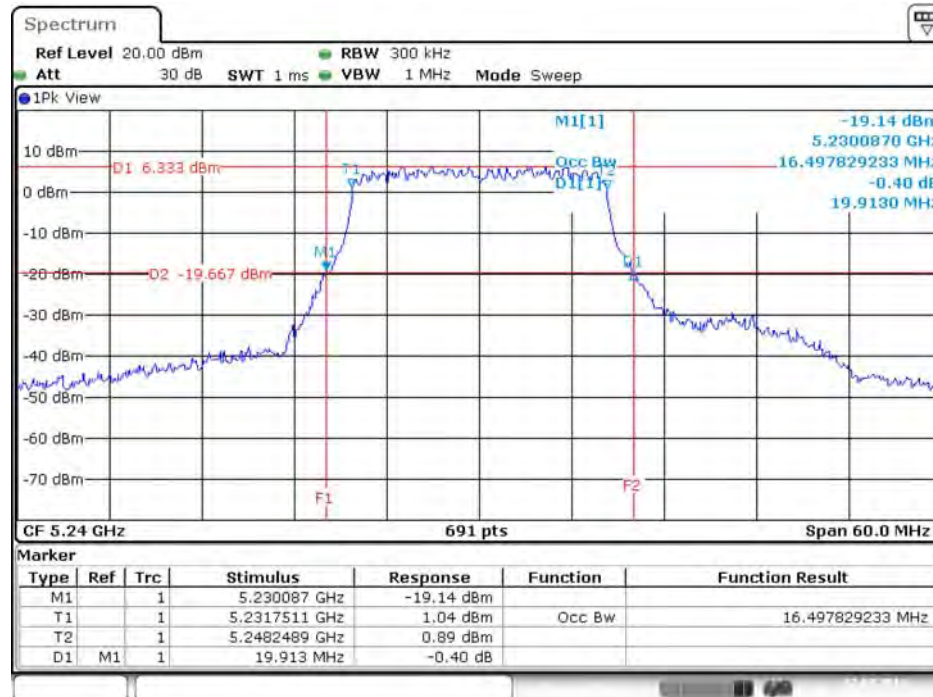
Date: 22.JUL.2016 15:21:04

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5200 MHz



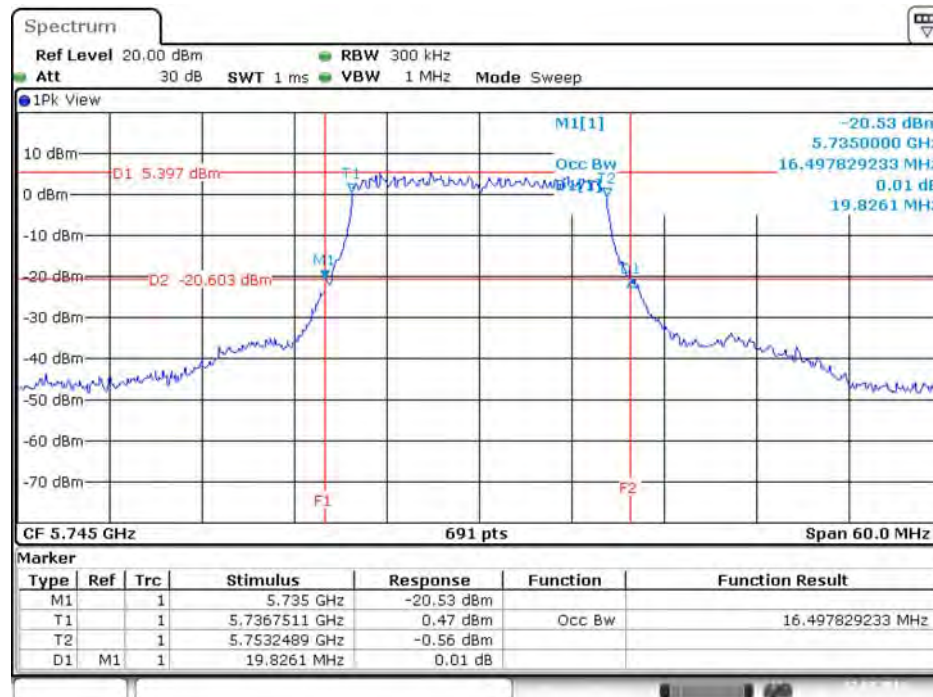
Date: 22.JUL.2016 15:21:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5240 MHz



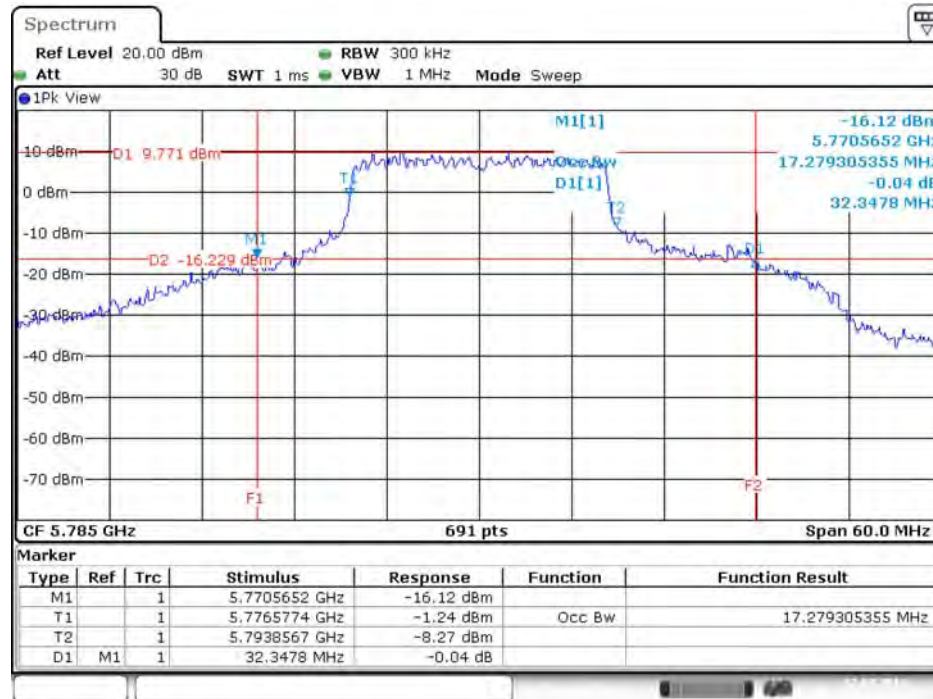
Date: 22.JUL.2016 15:24:52

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

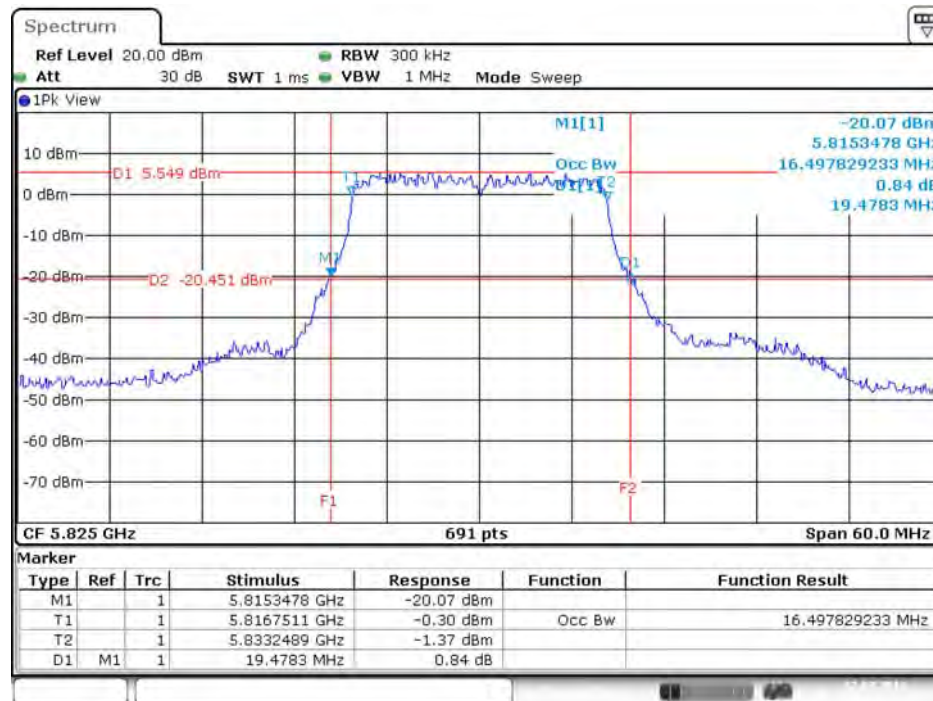


Date: 22.JUL.2016 15:25:42

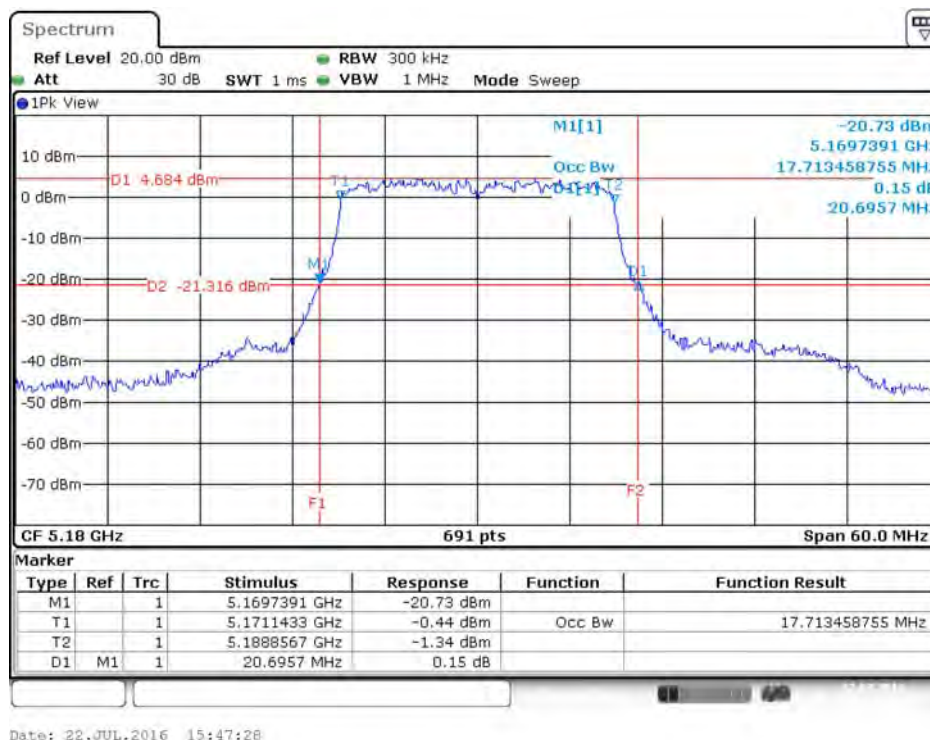
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5785 MHz



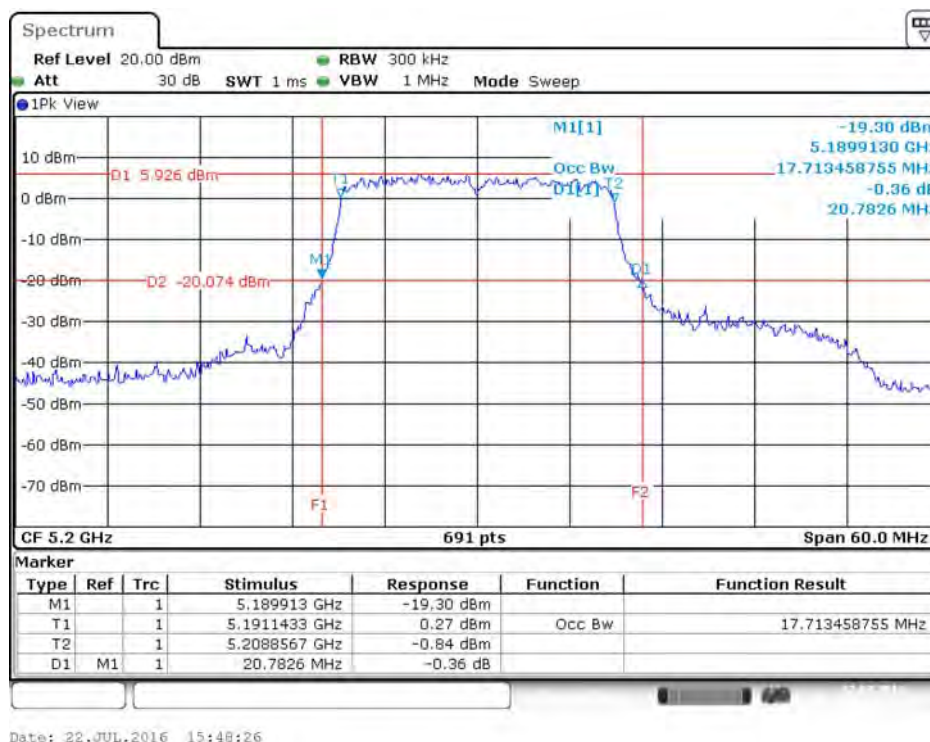
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5825 MHz



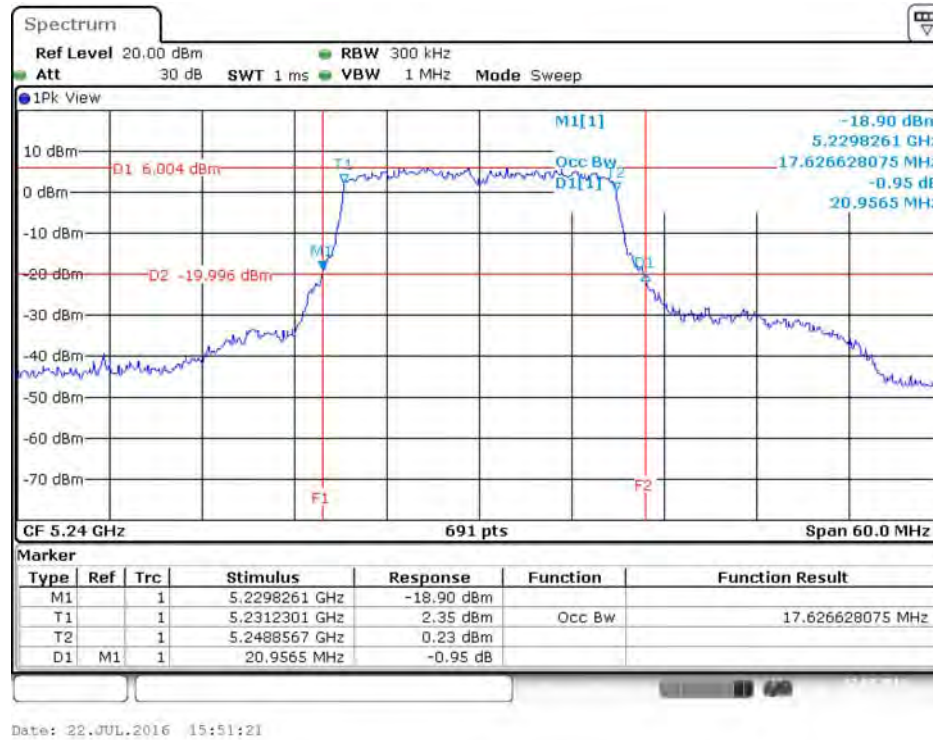
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5180 MHz



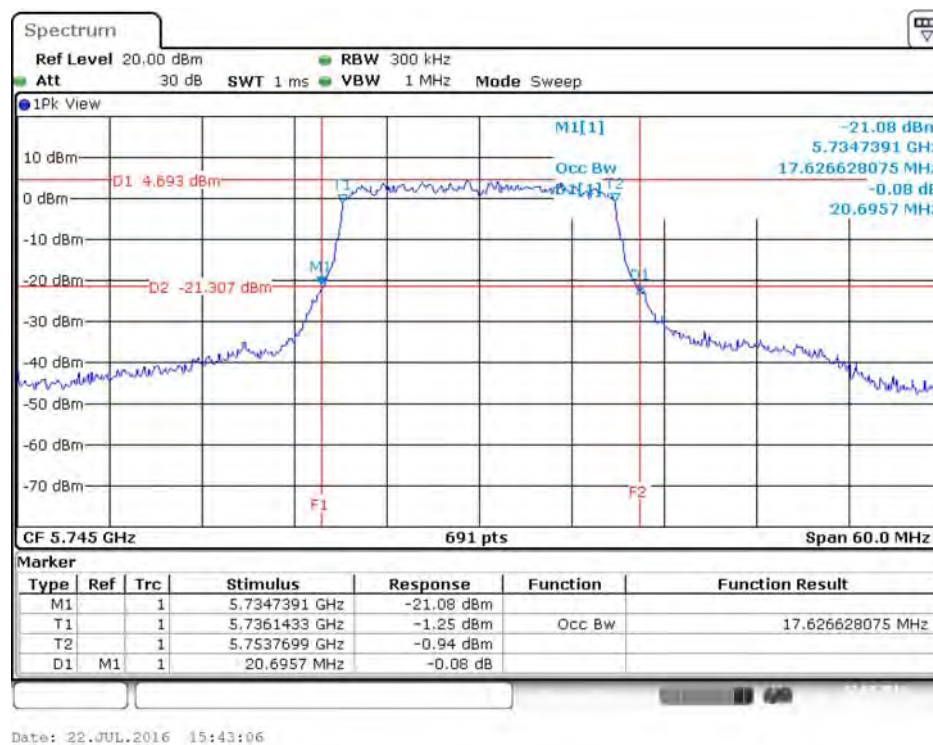
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5200 MHz



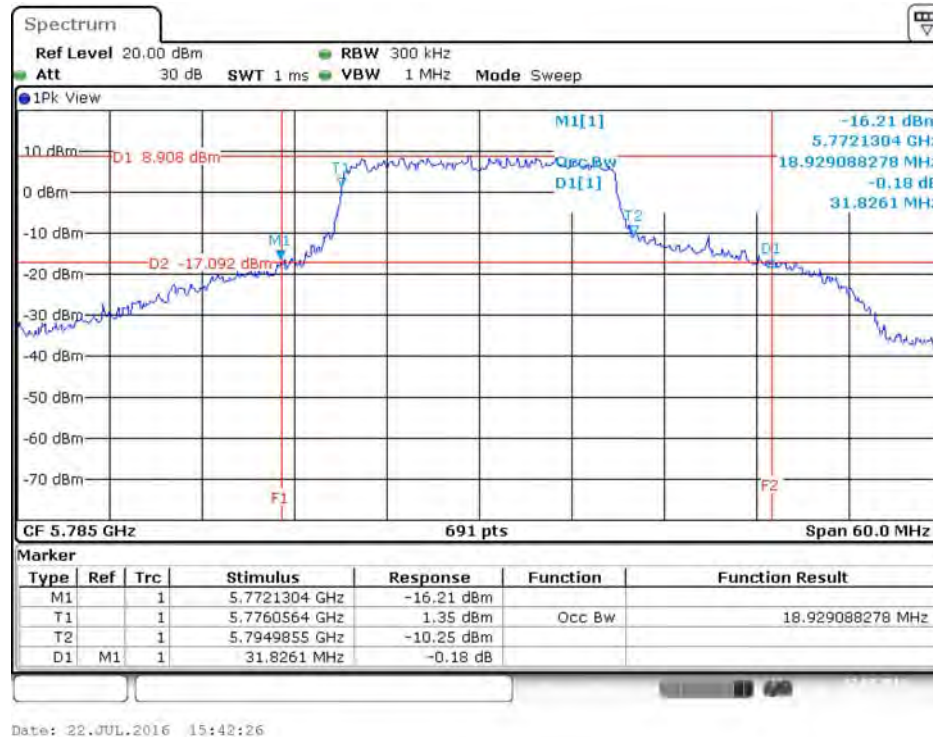
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5240 MHz



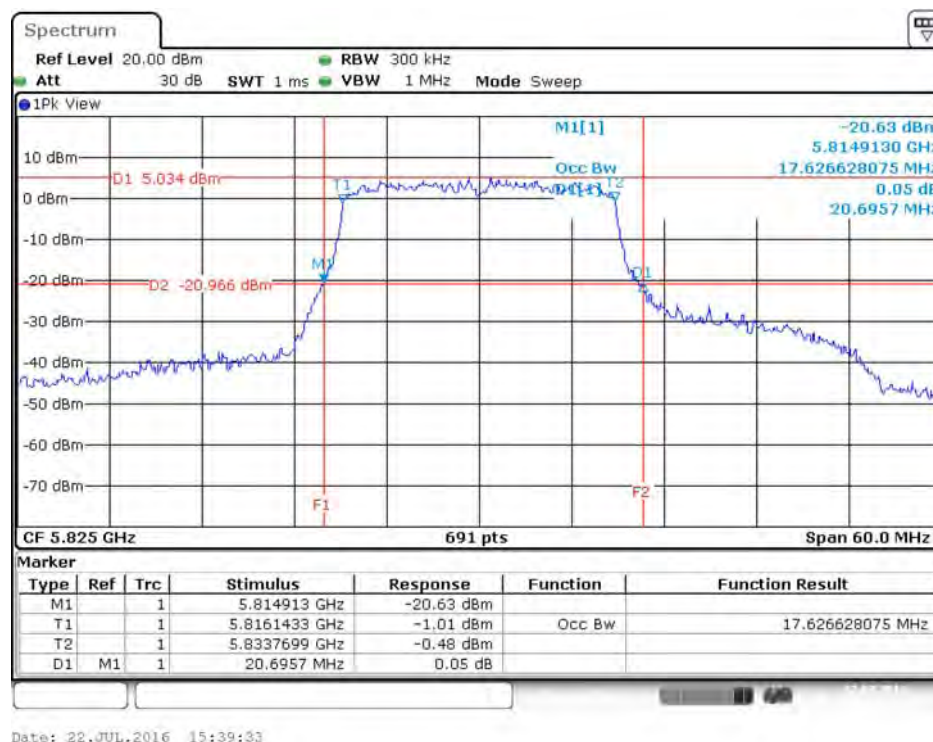
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5745 MHz



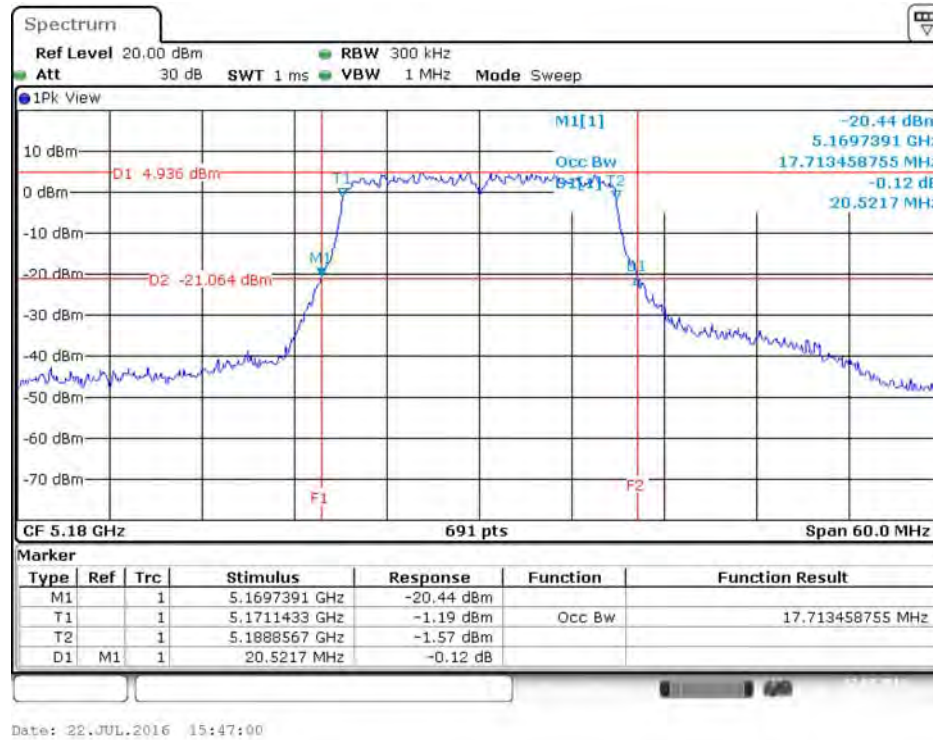
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5785 MHz



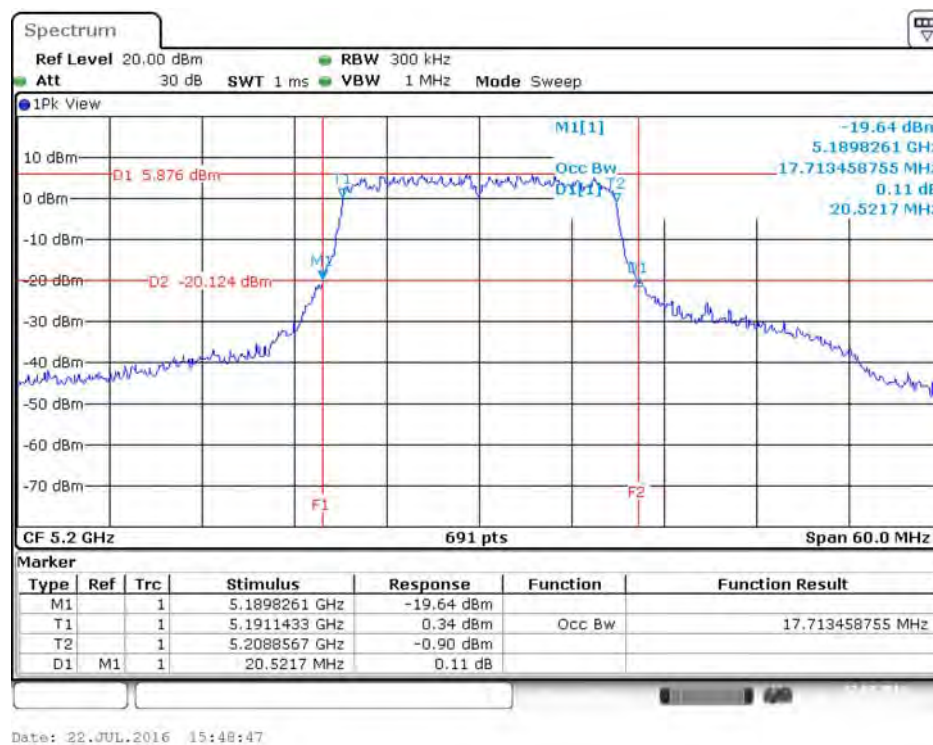
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5825 MHz



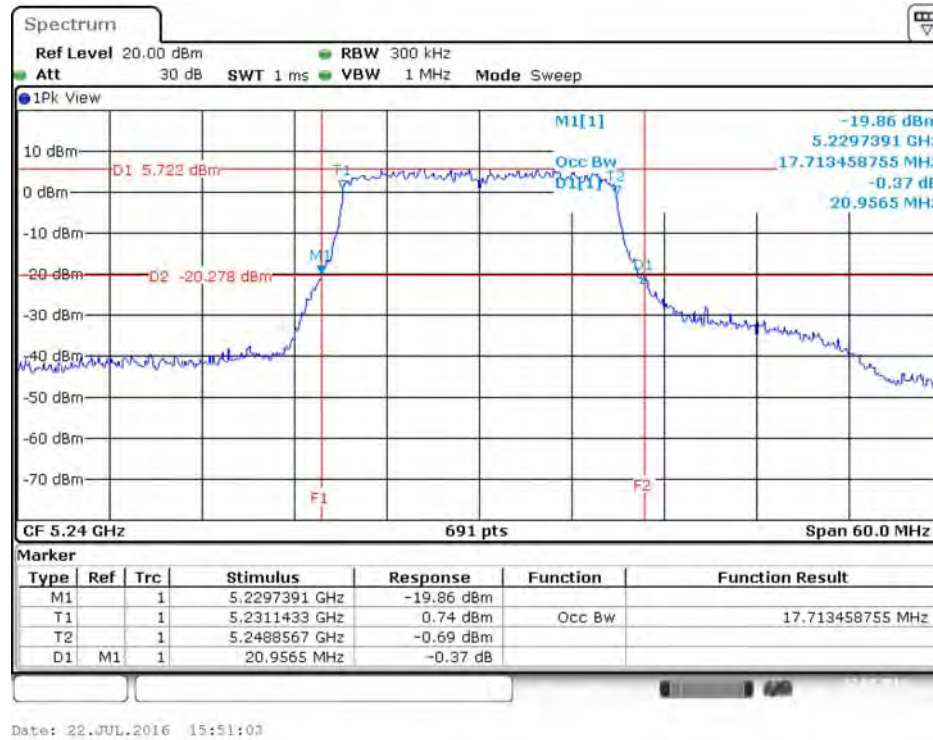
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5180 MHz



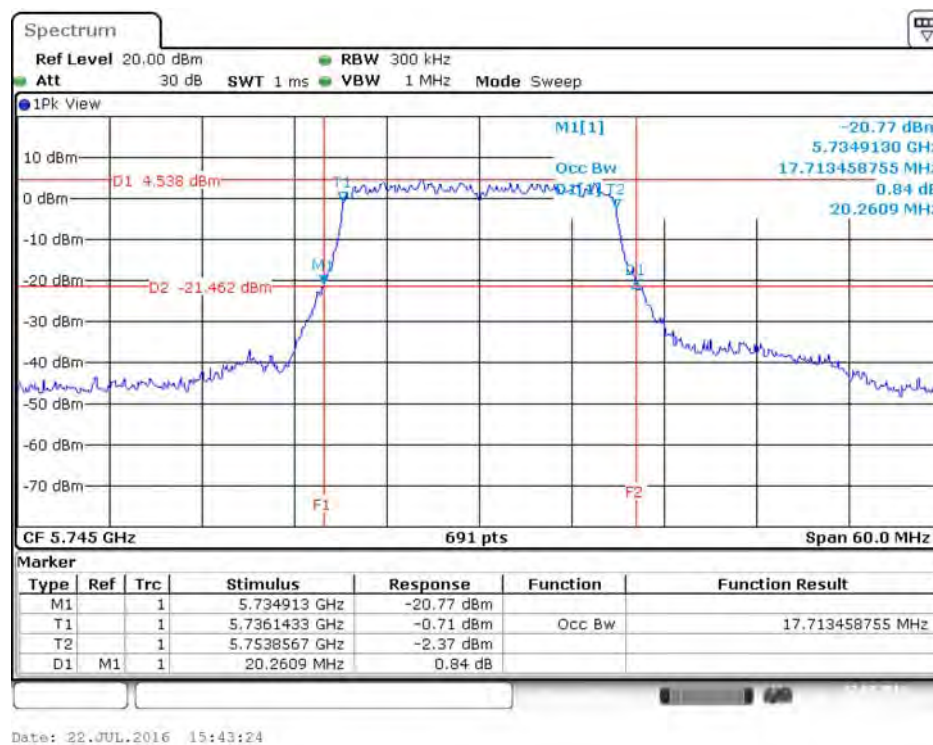
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5200 MHz



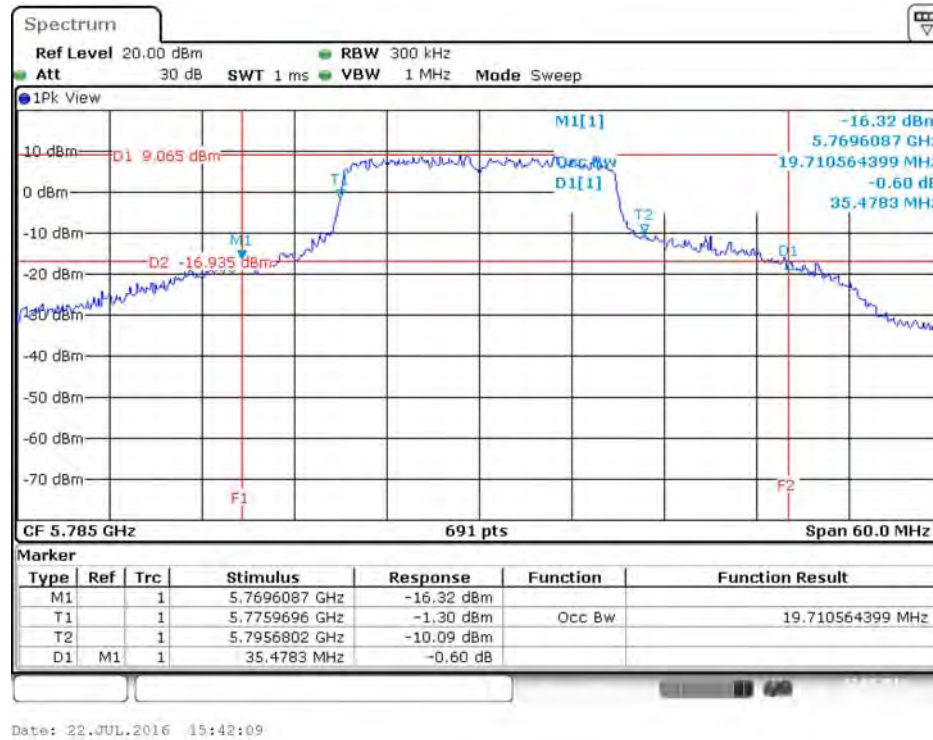
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5240 MHz



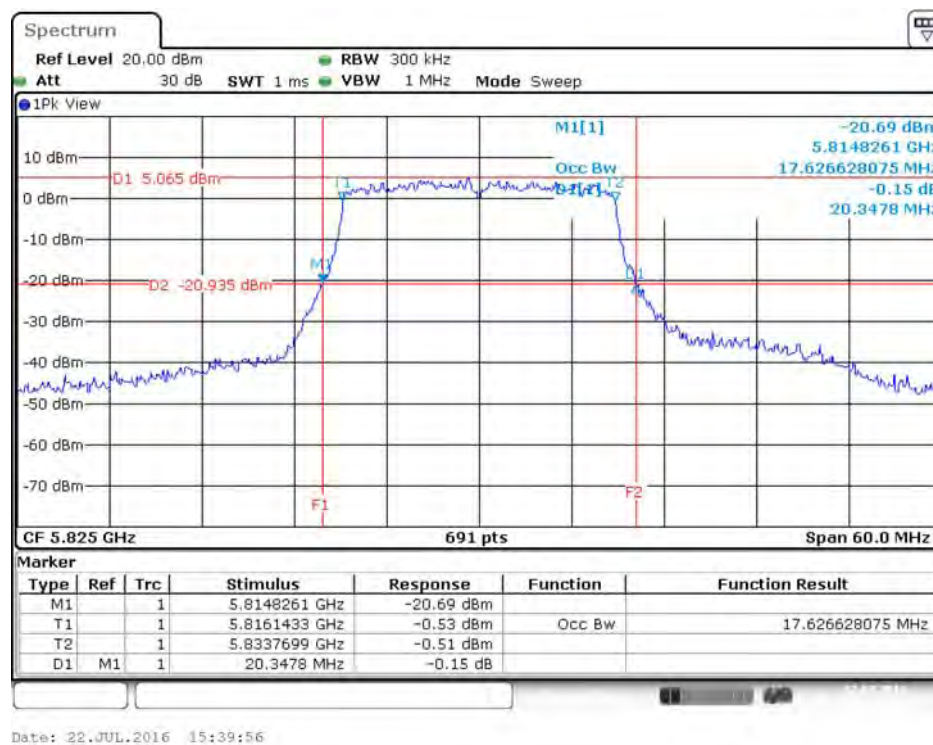
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5745 MHz



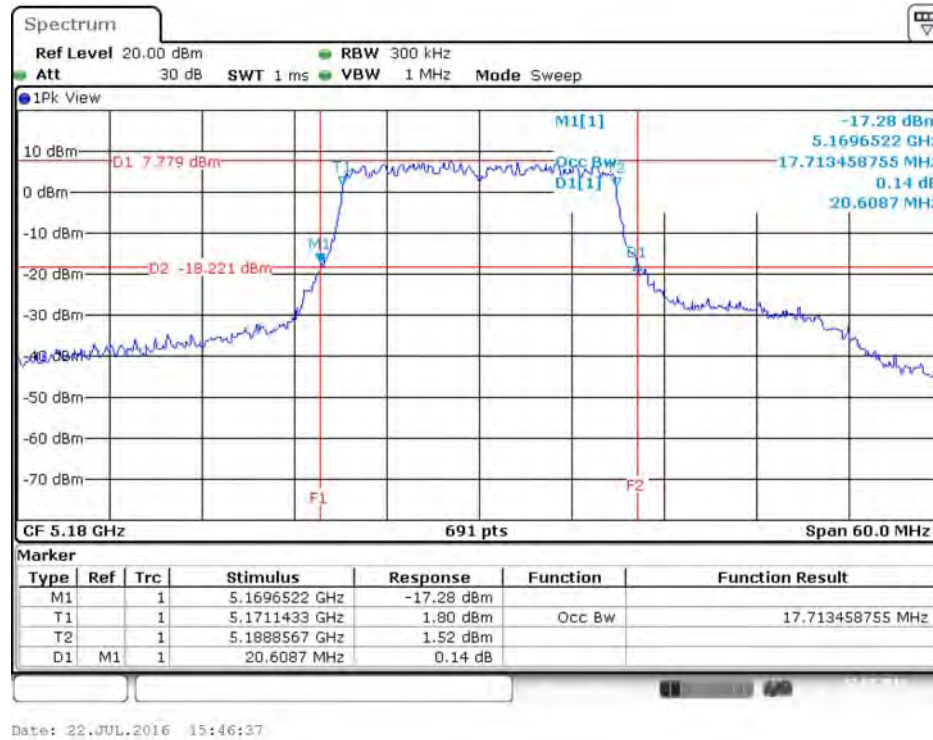
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5785 MHz



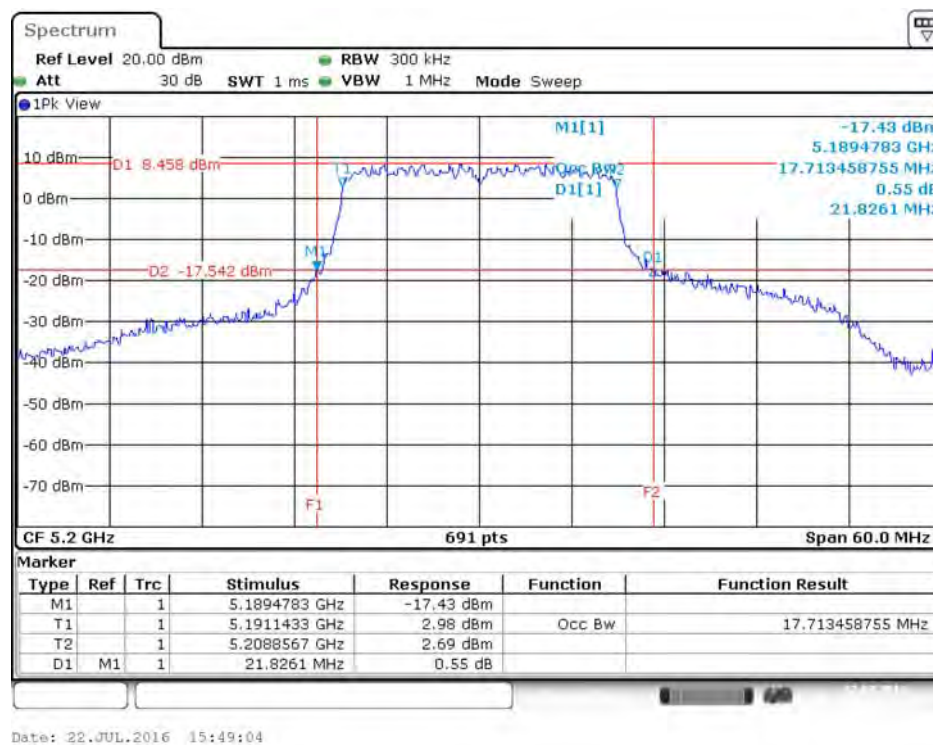
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



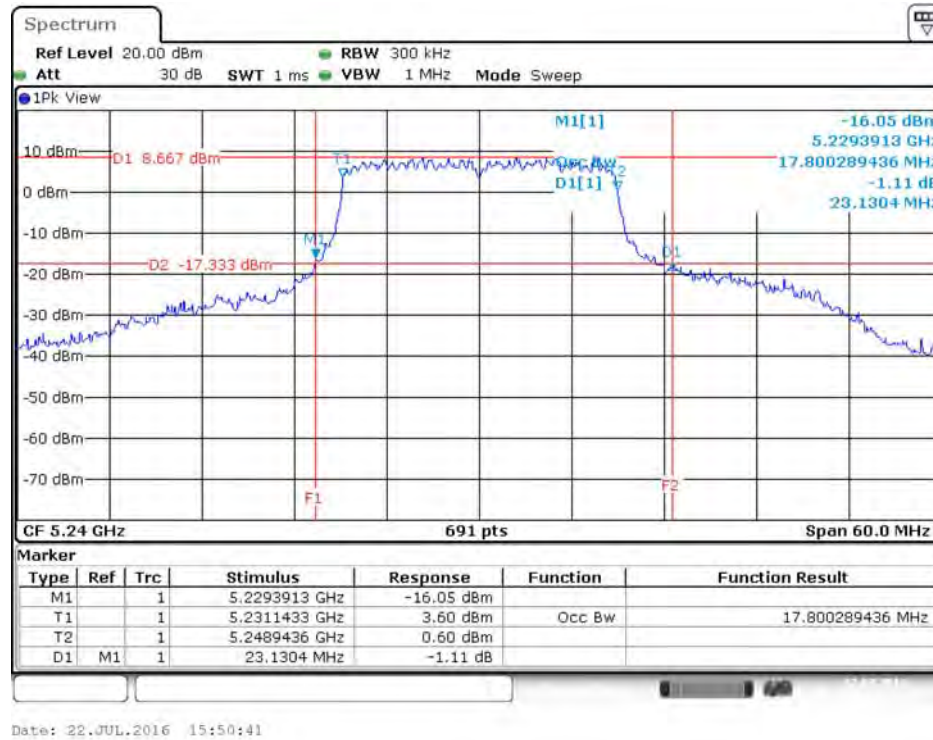
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5180 MHz



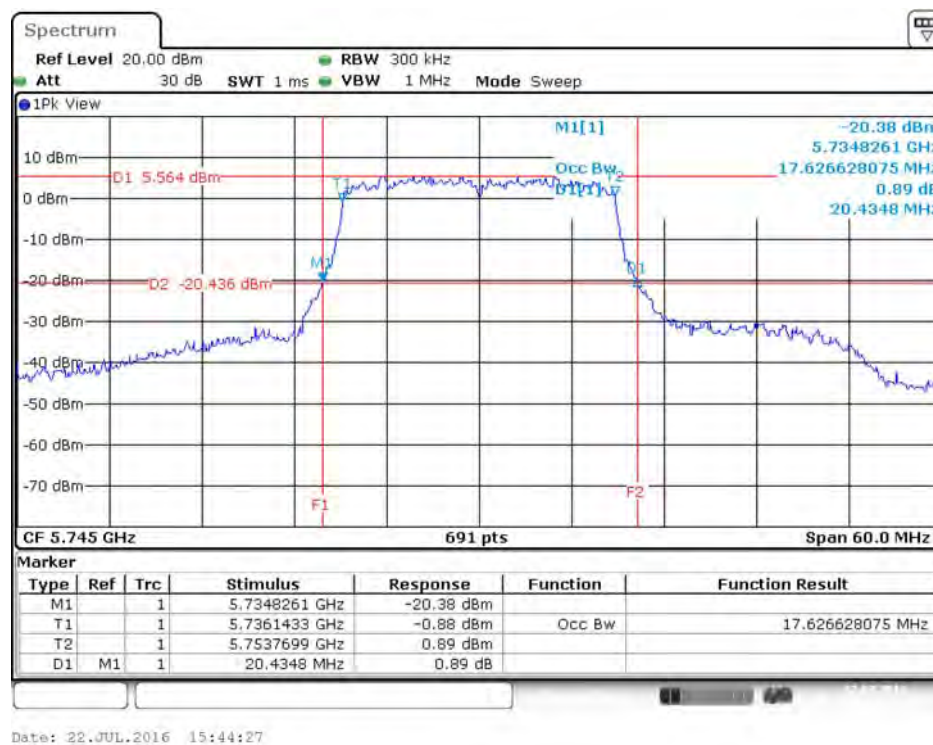
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5200 MHz



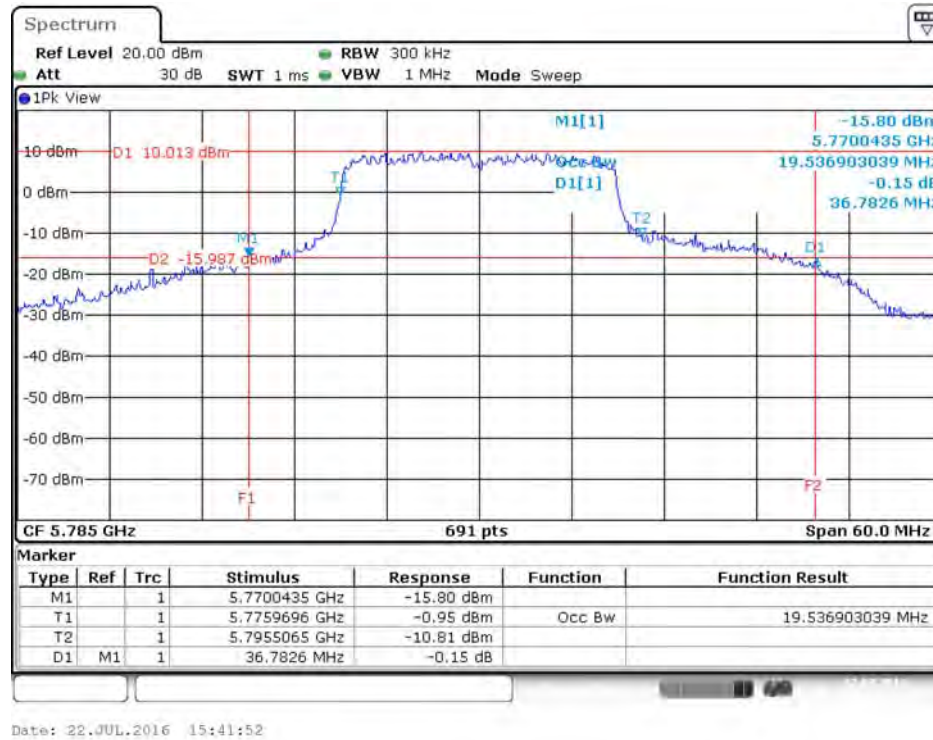
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5240 MHz



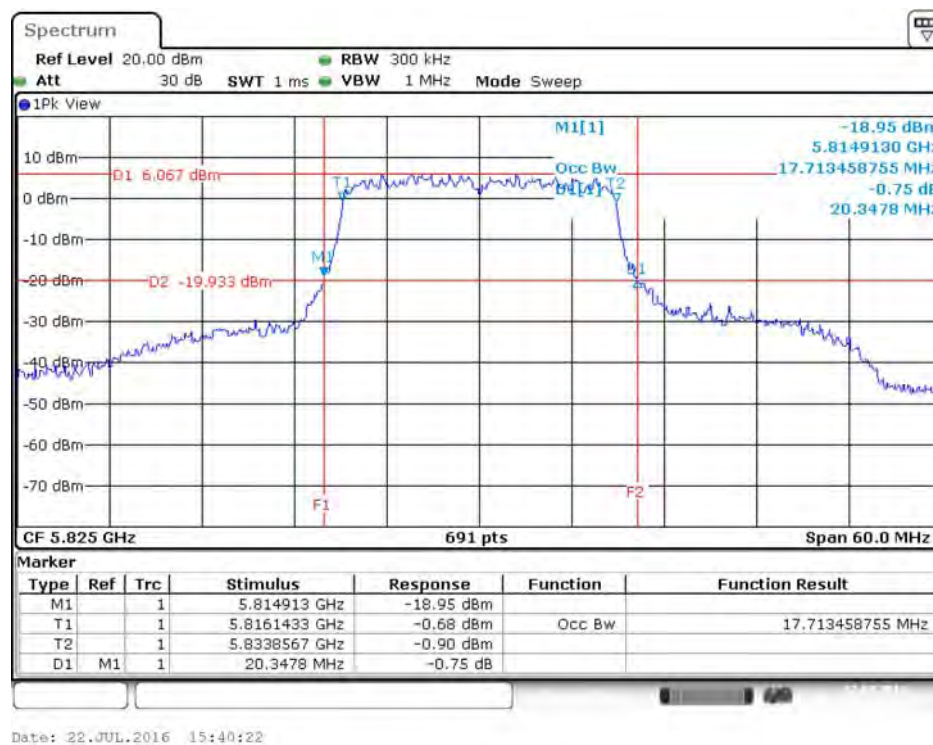
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5745 MHz



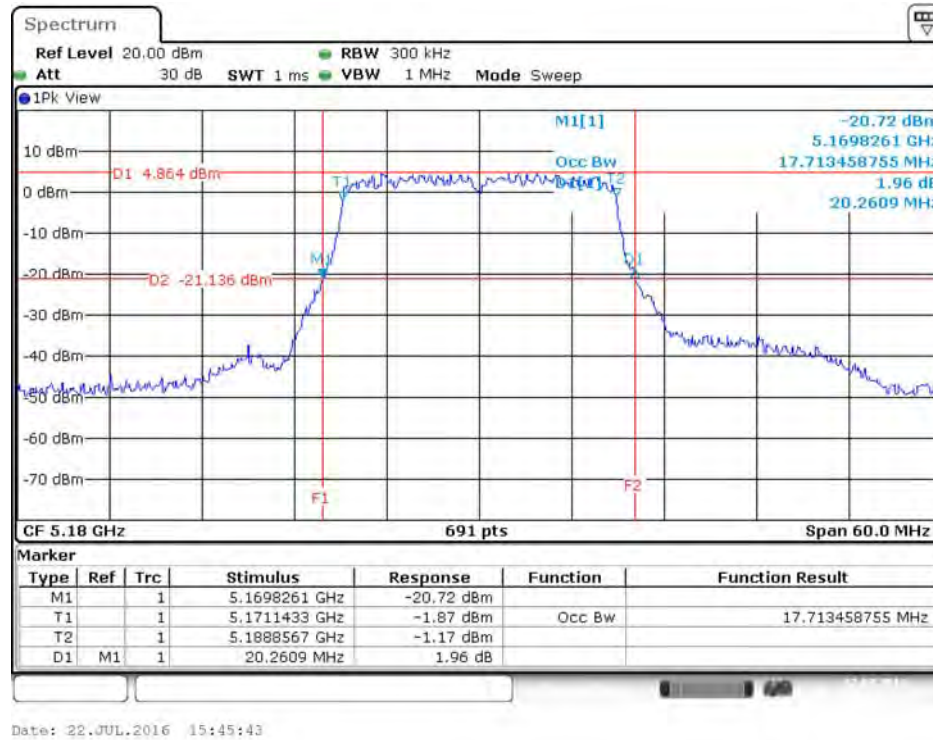
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5785 MHz



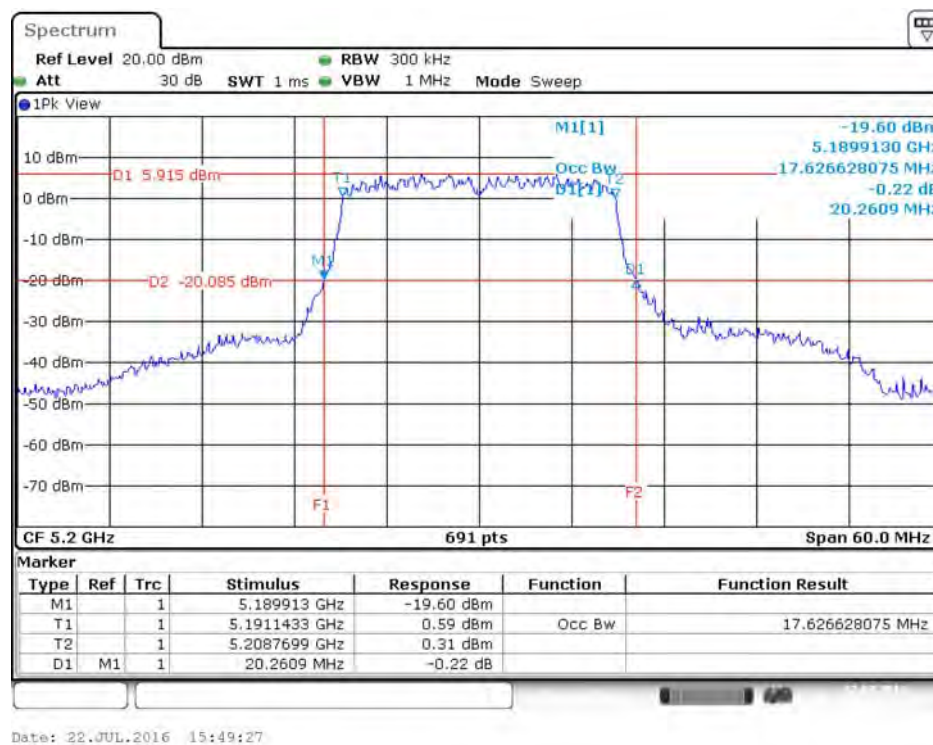
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5825 MHz



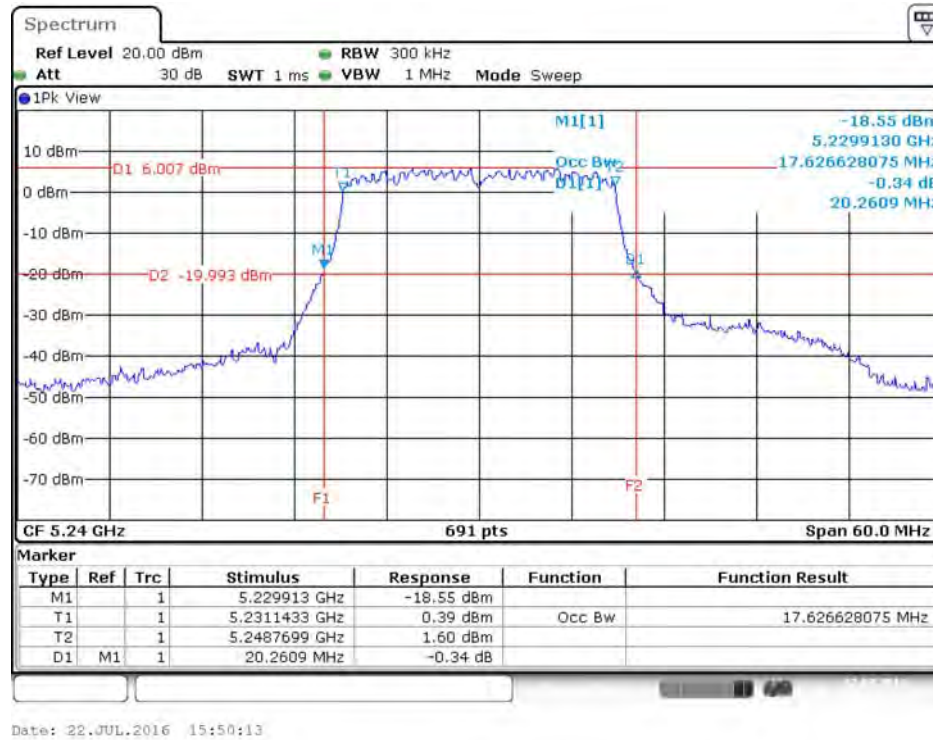
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5180 MHz



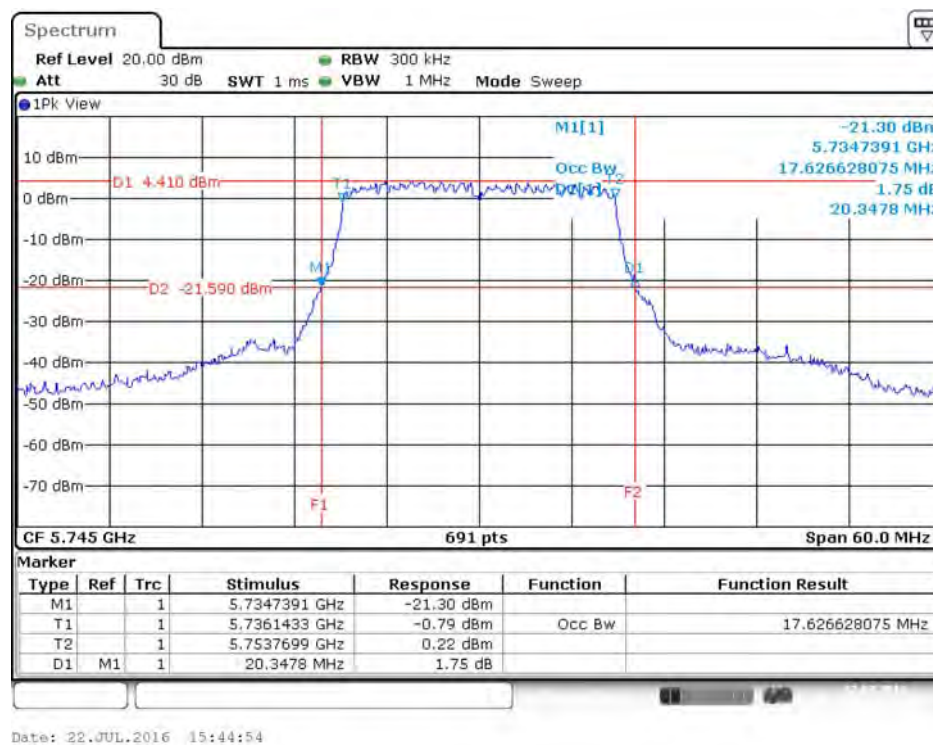
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5200 MHz



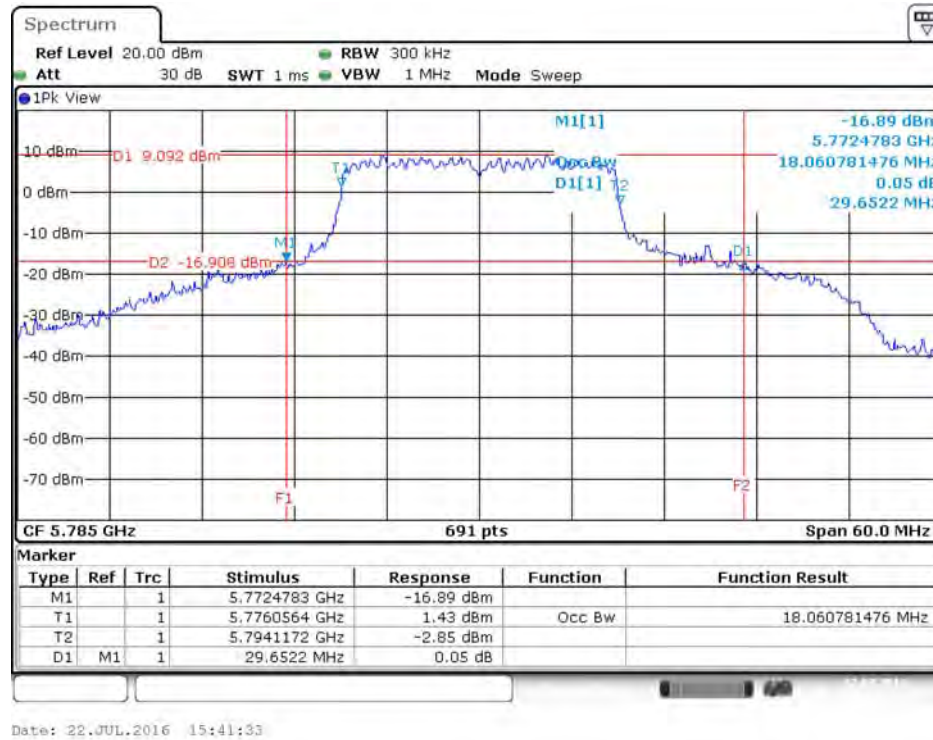
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5240 MHz



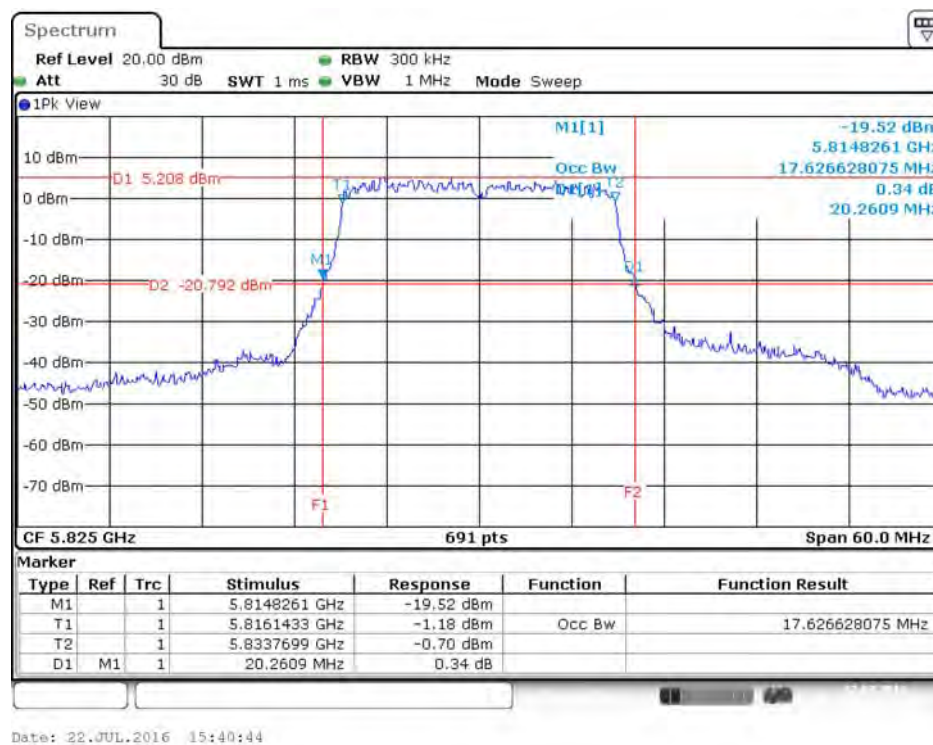
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5745 MHz



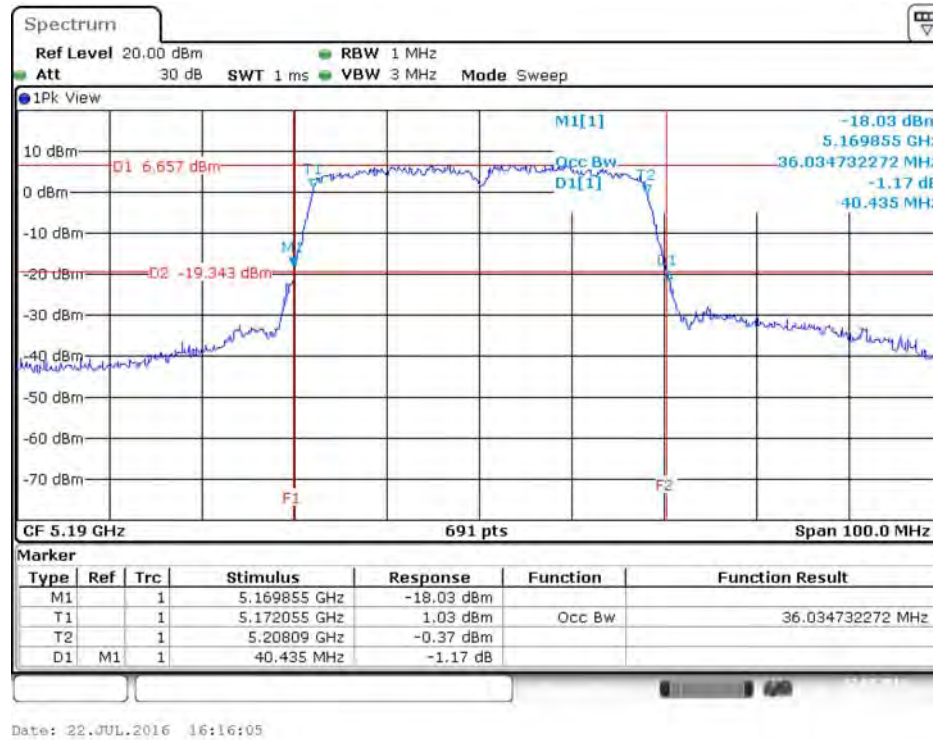
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5785 MHz



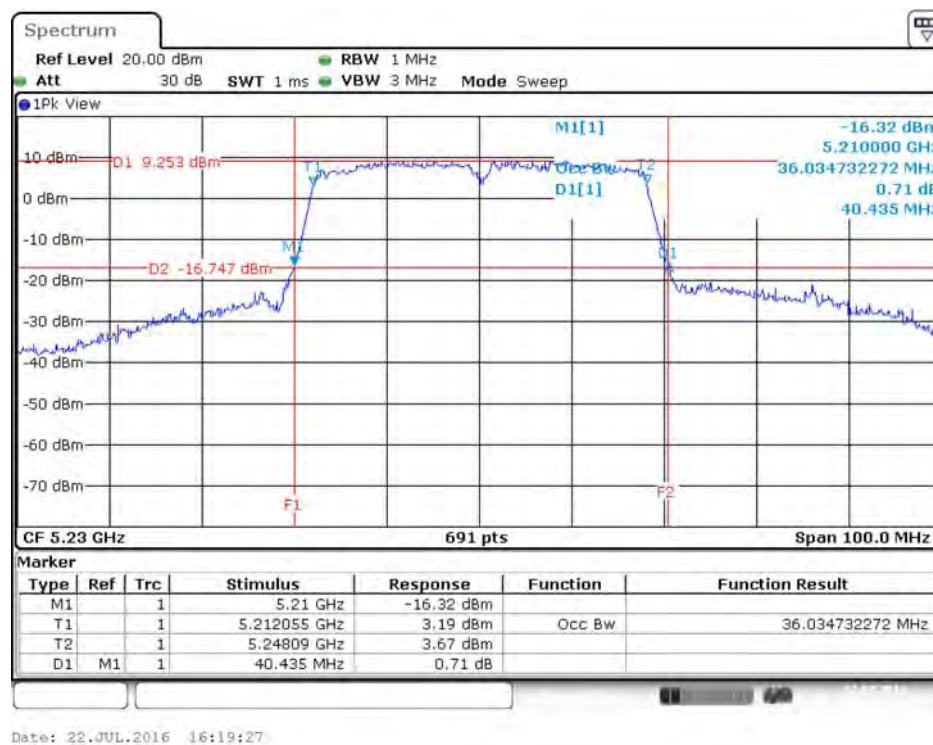
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5825 MHz



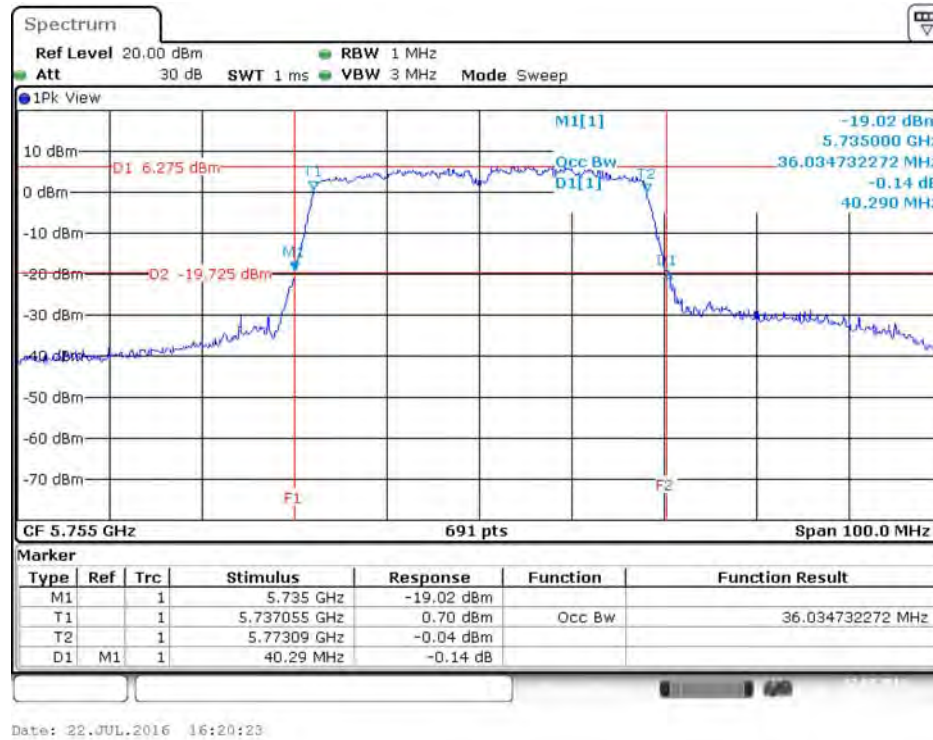
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5190 MHz



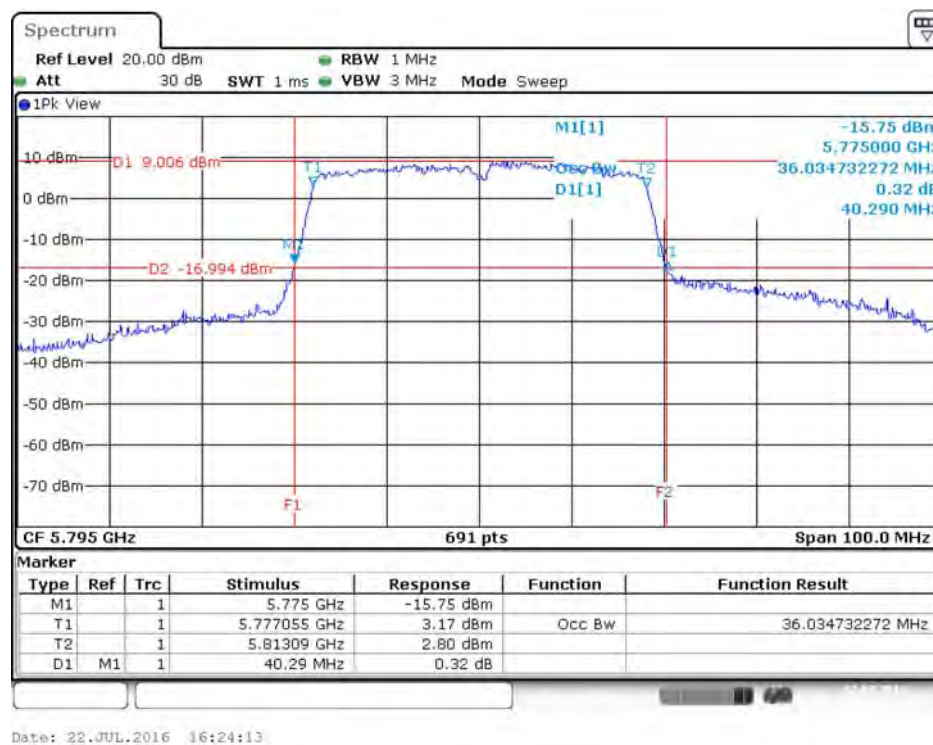
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5230 MHz



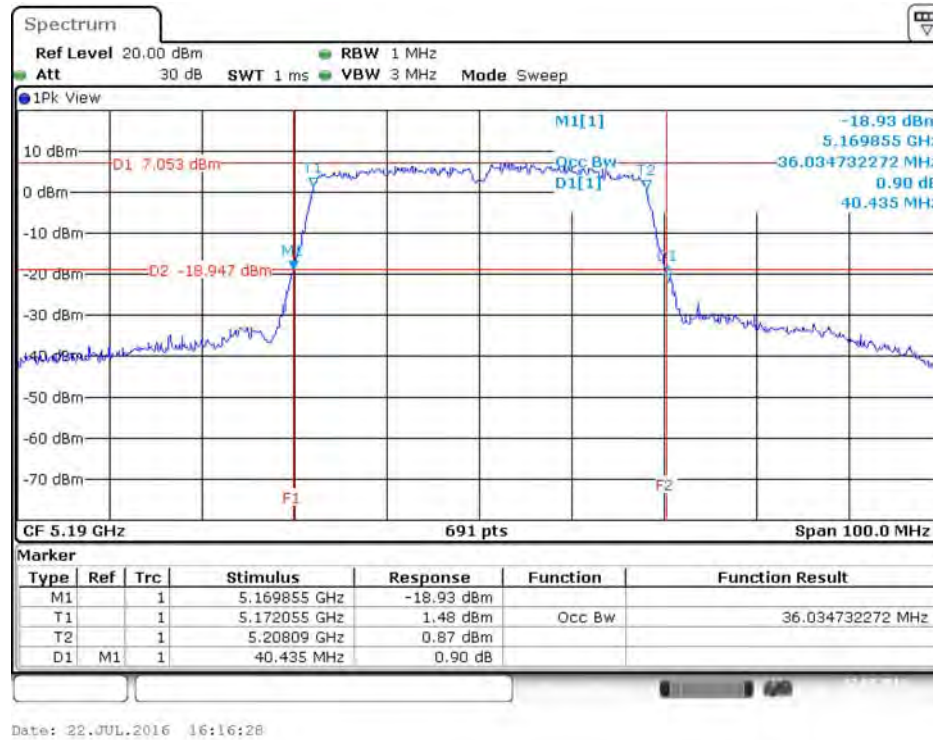
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5755 MHz



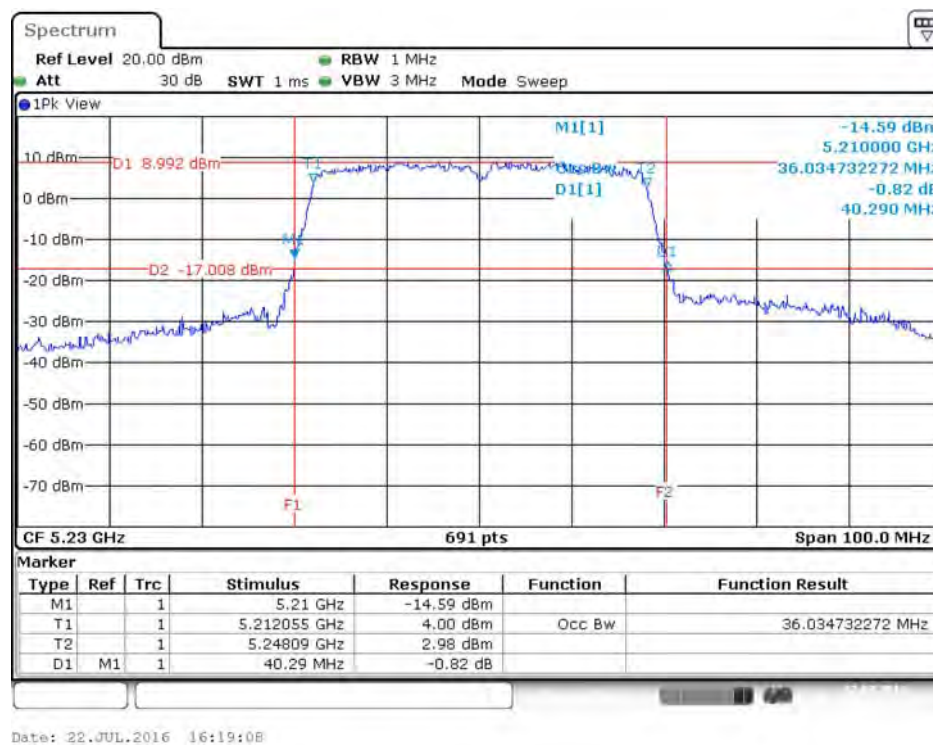
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5795 MHz



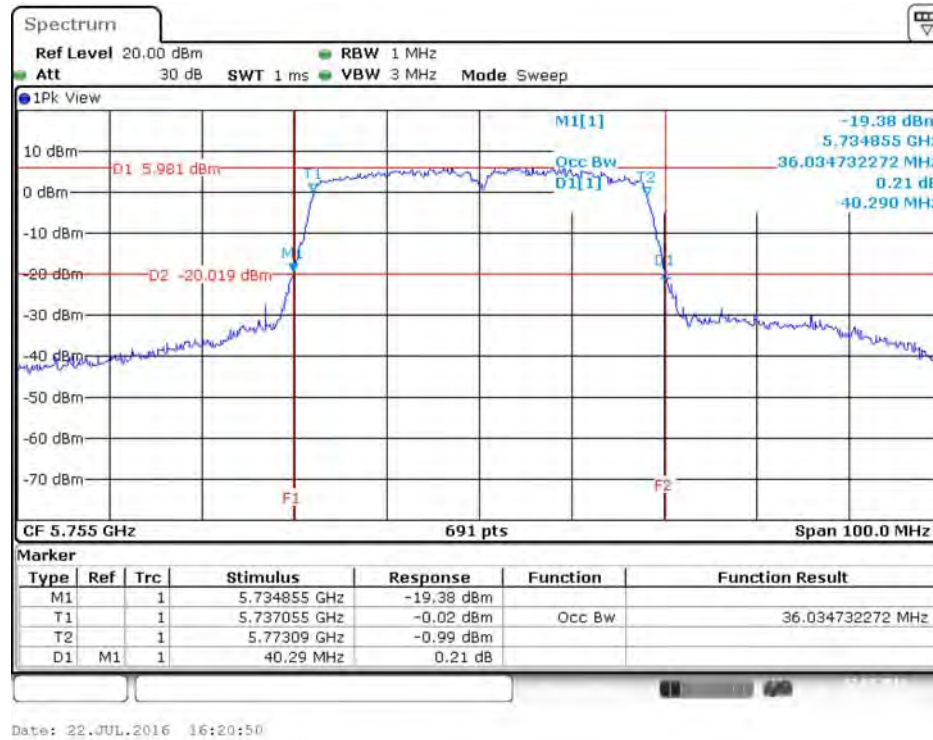
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5190 MHz



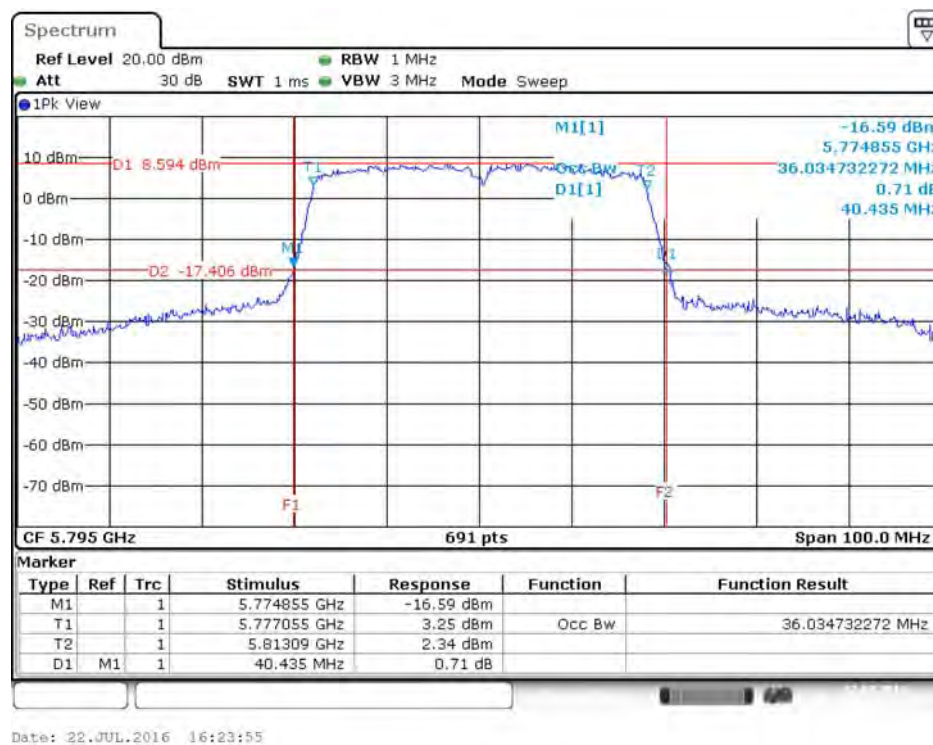
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5230 MHz



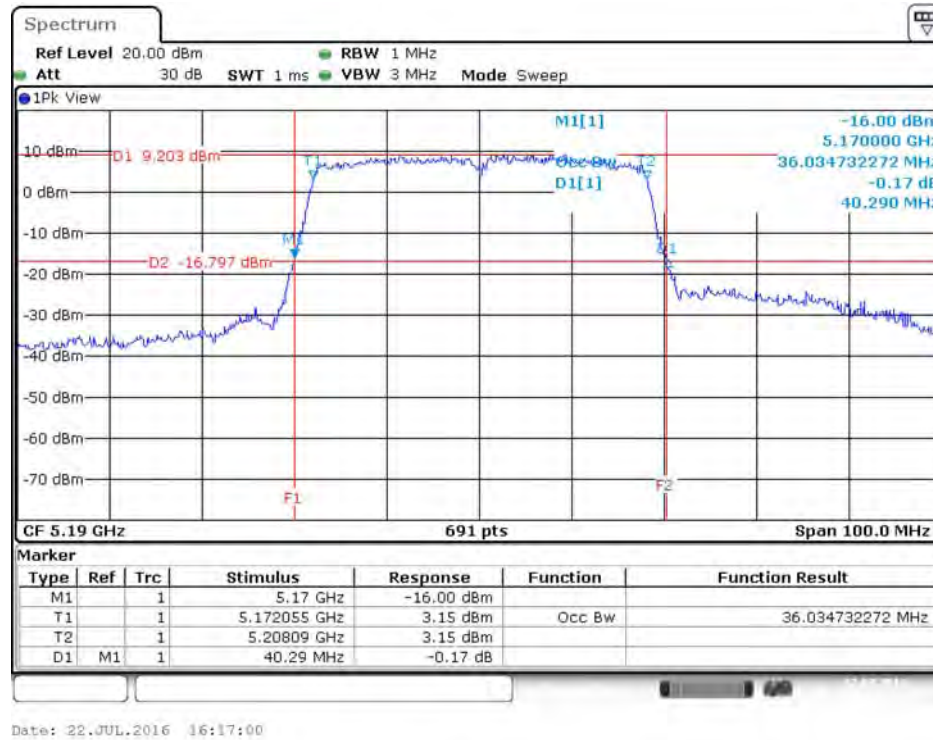
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5755 MHz



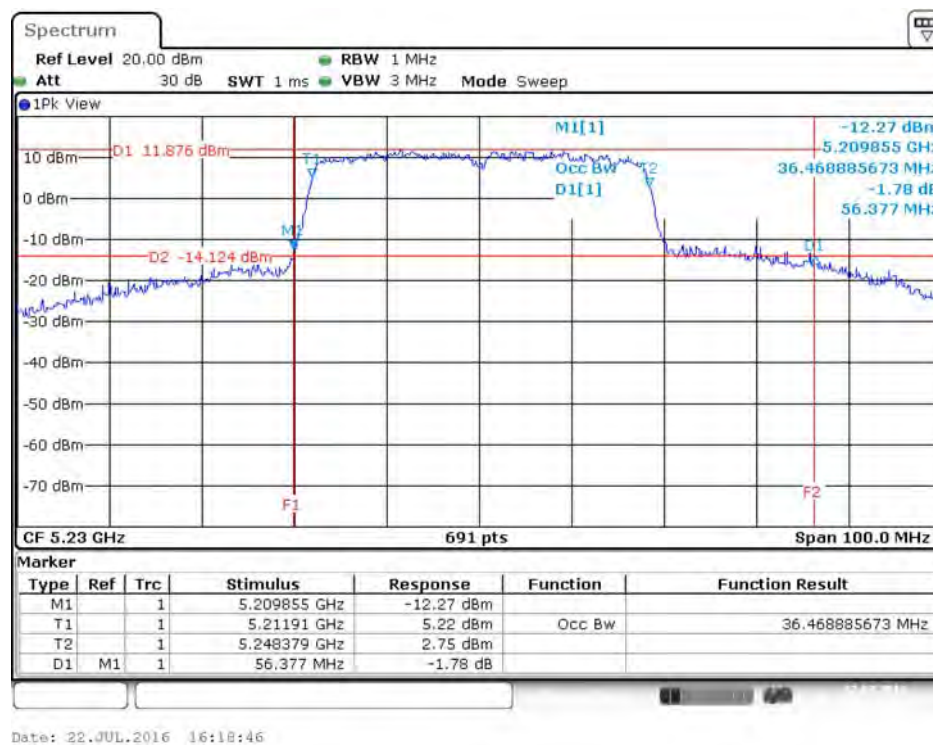
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5795 MHz



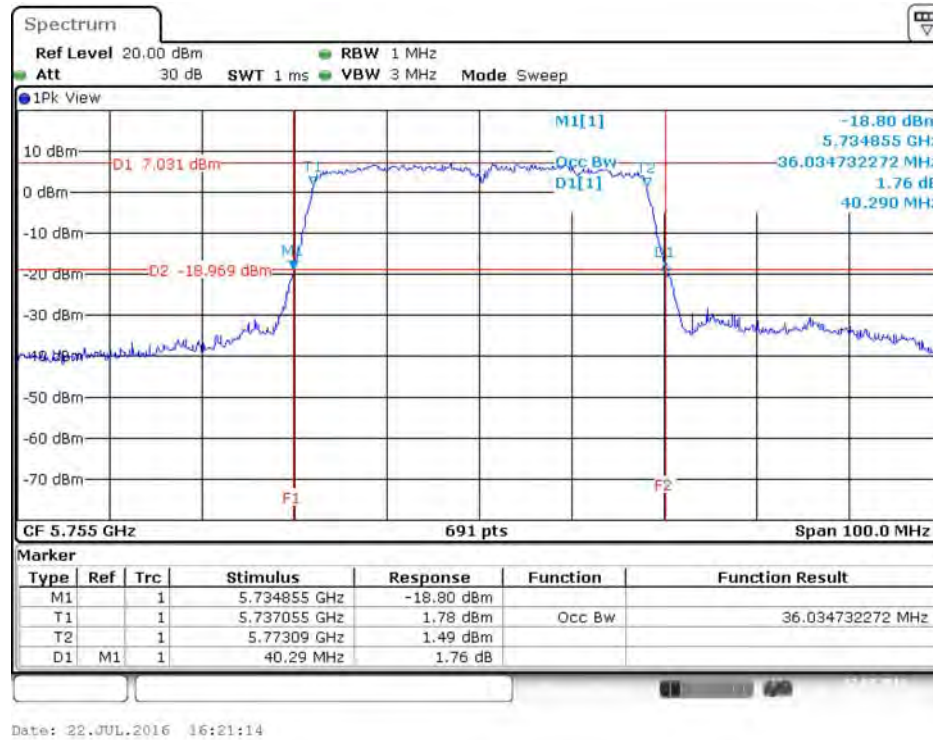
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5190 MHz



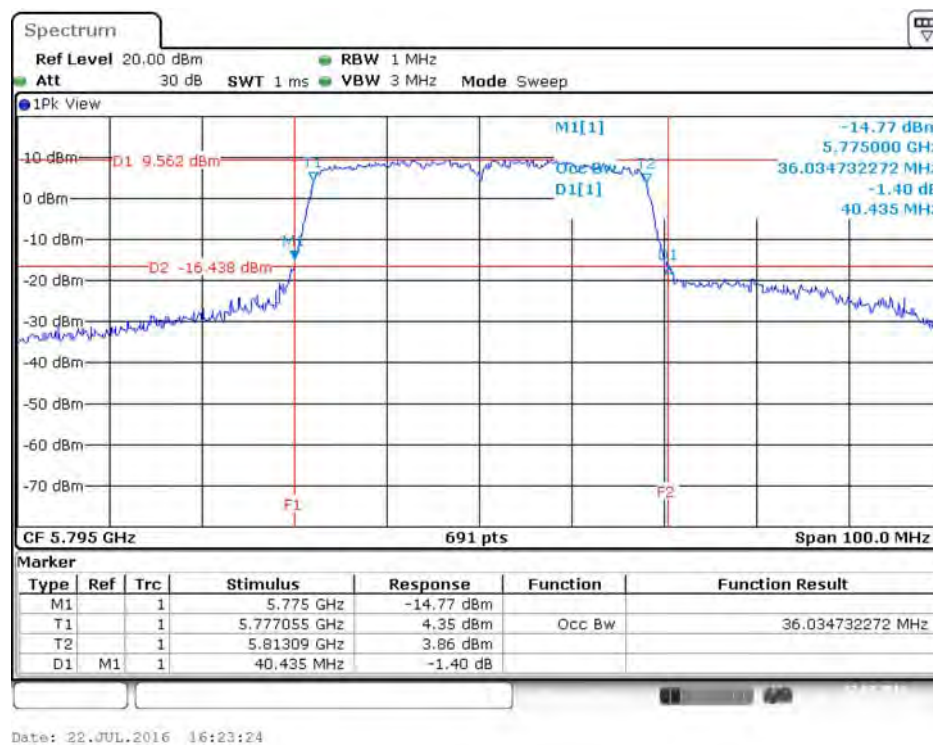
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5230 MHz



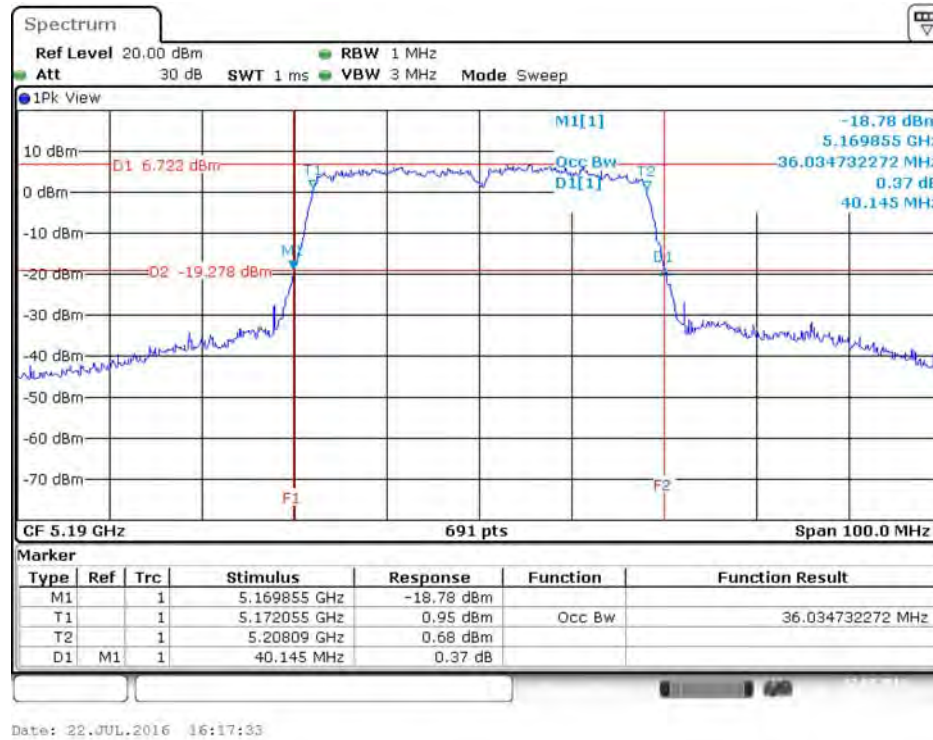
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5755 MHz



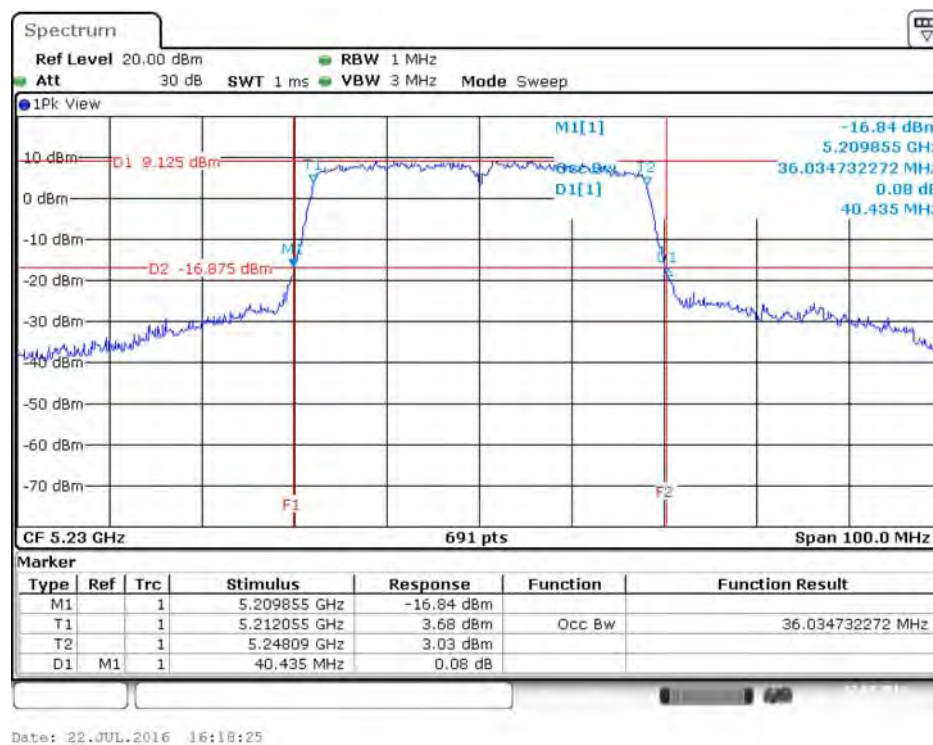
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5795 MHz



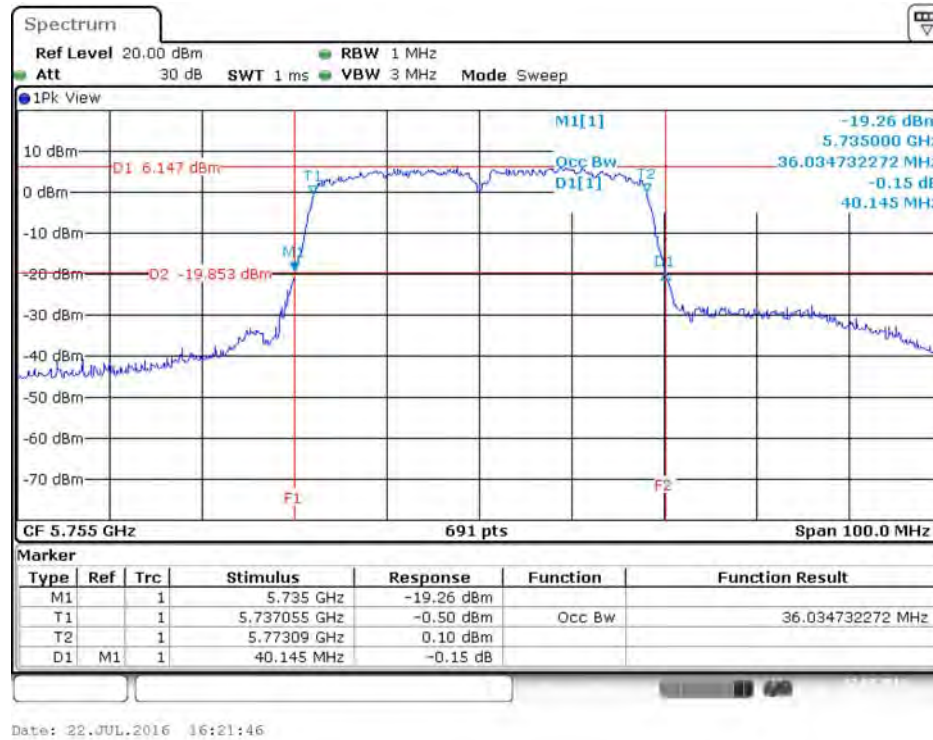
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5190 MHz



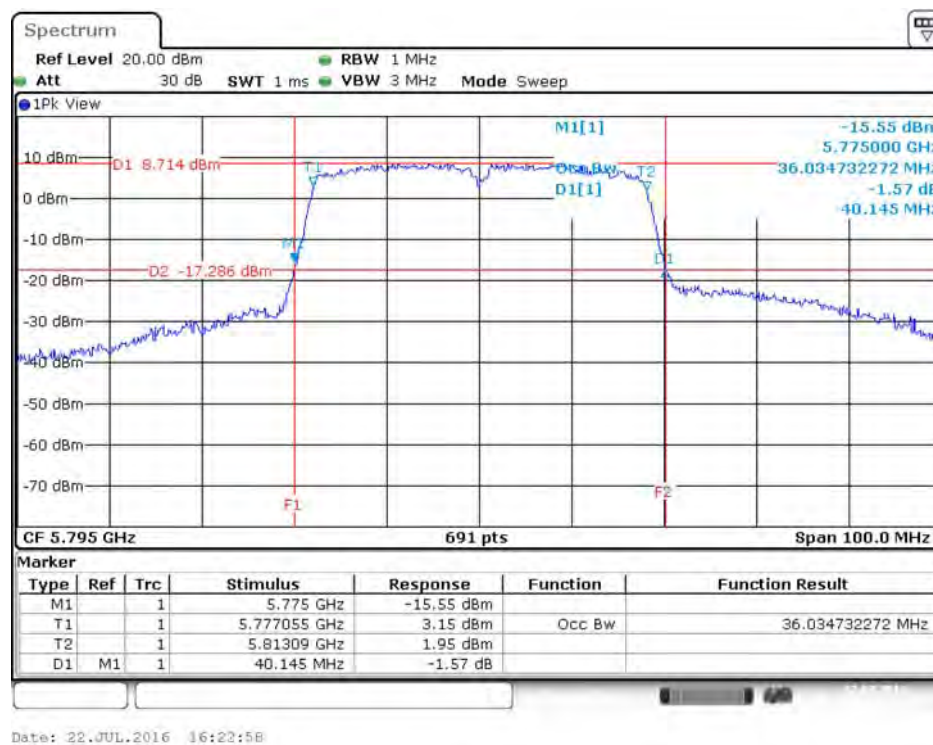
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5230 MHz



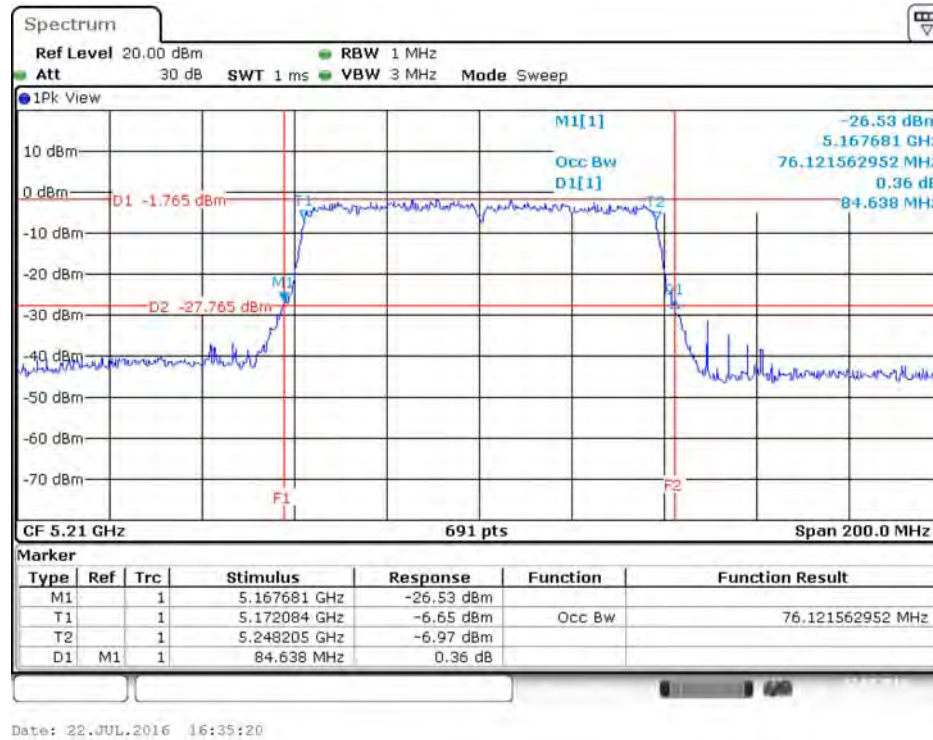
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5755 MHz



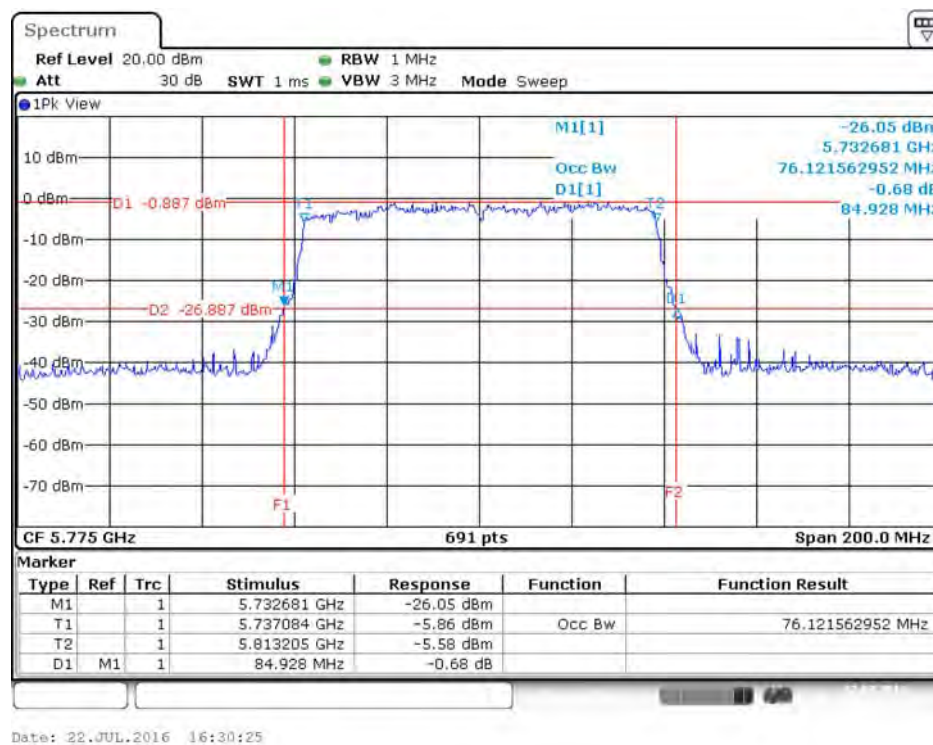
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5795 MHz



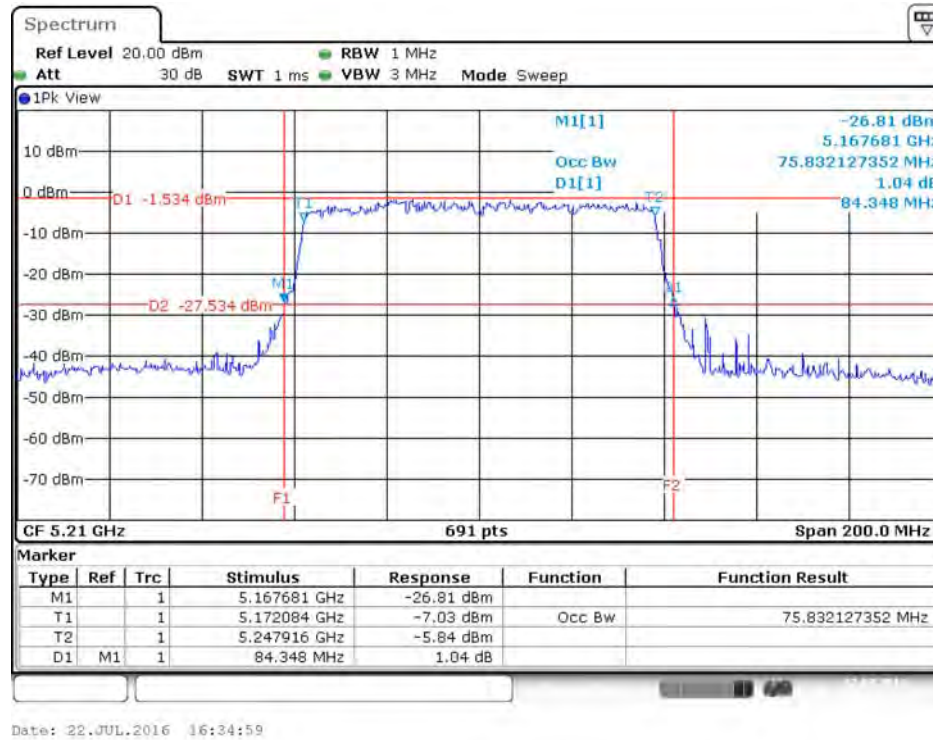
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5210 MHz



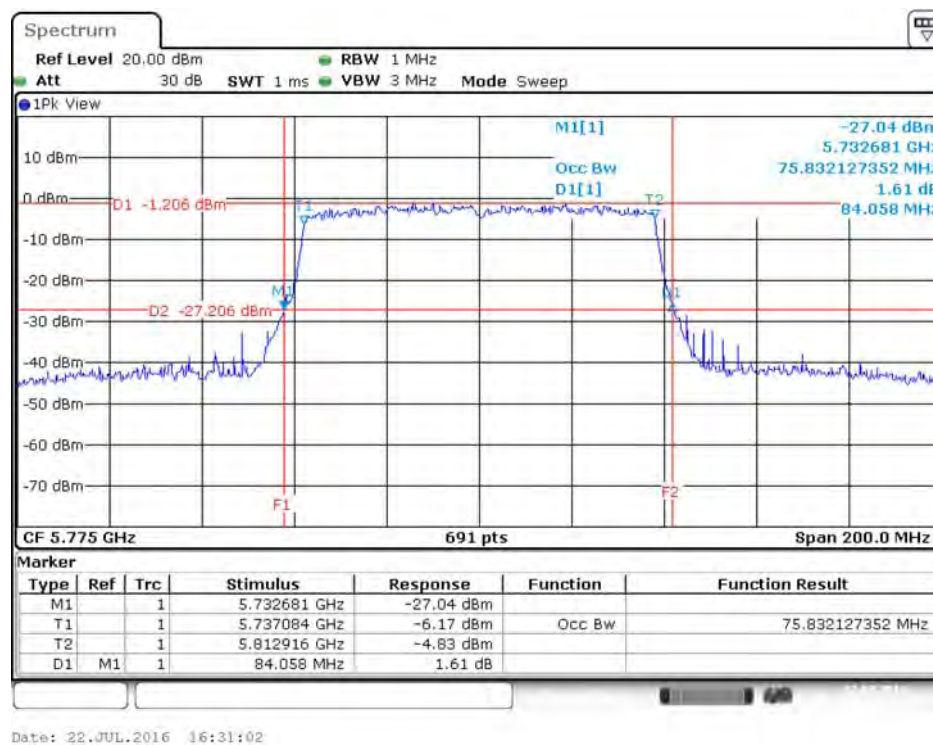
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



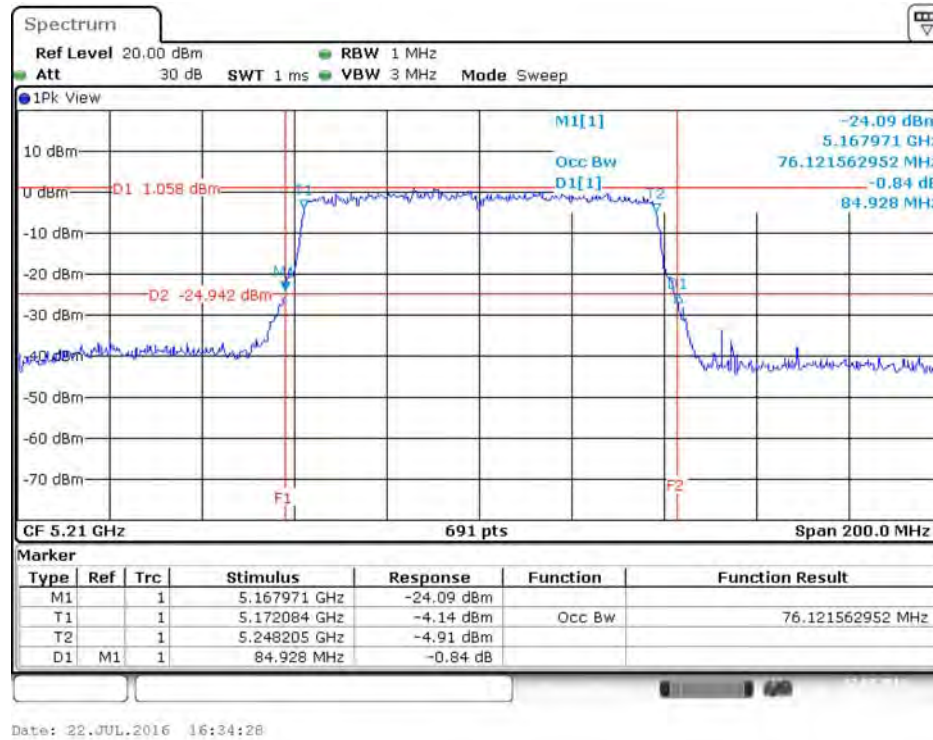
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5210 MHz



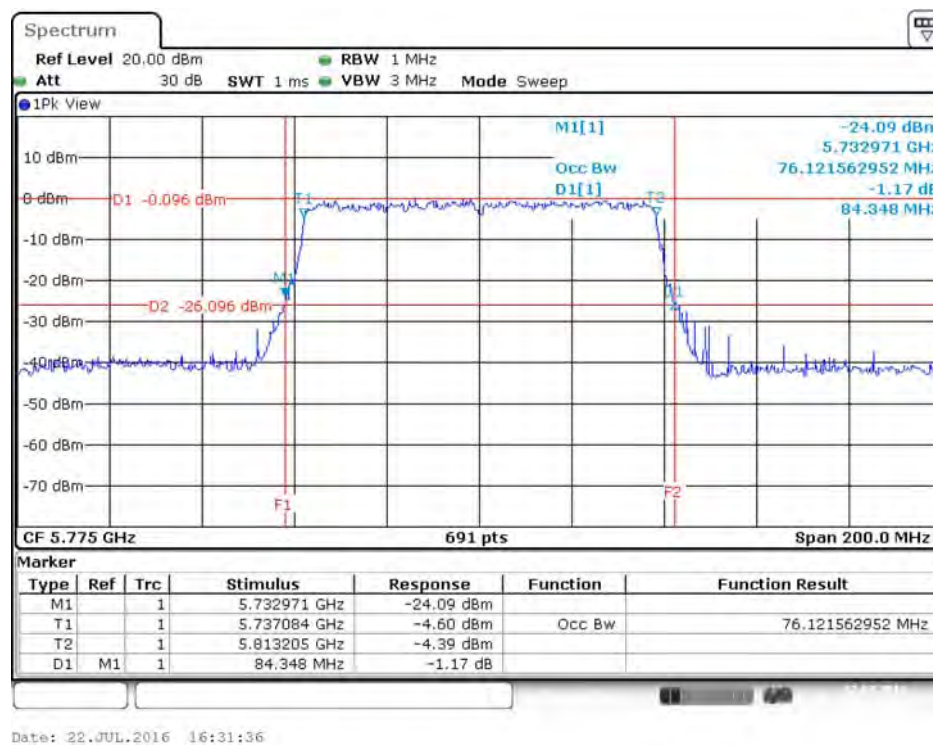
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5775 MHz



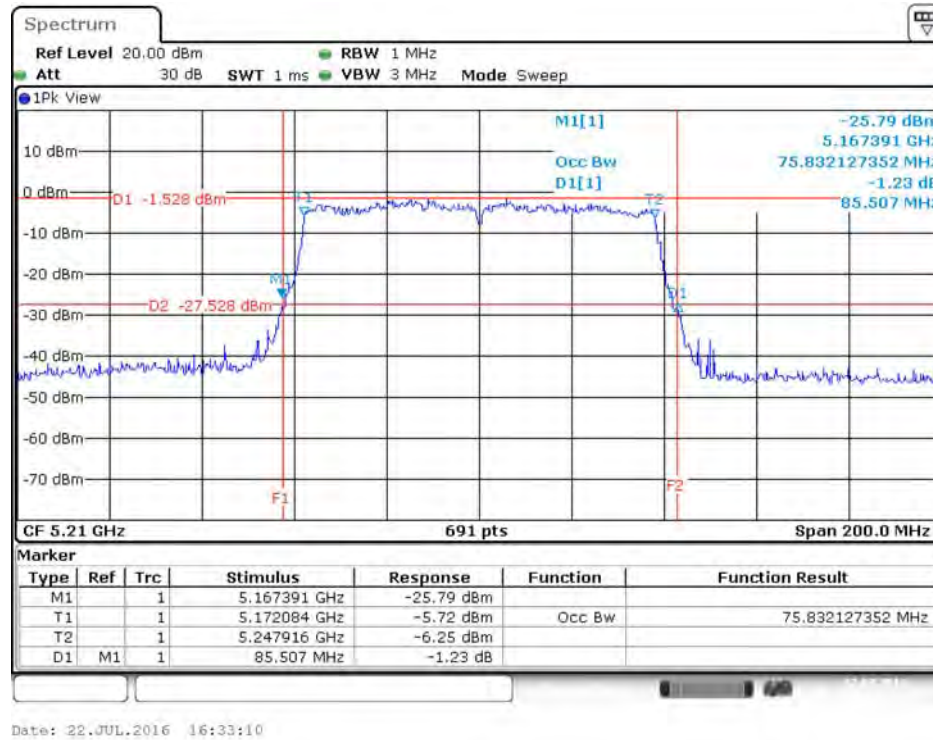
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5210 MHz



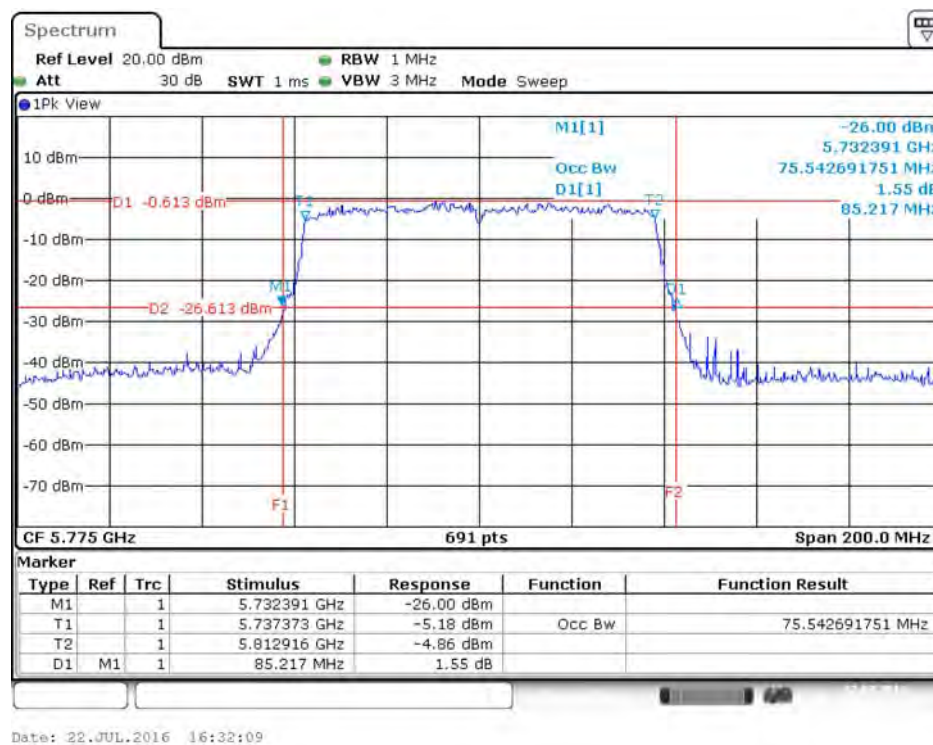
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5775 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 / 5210 MHz

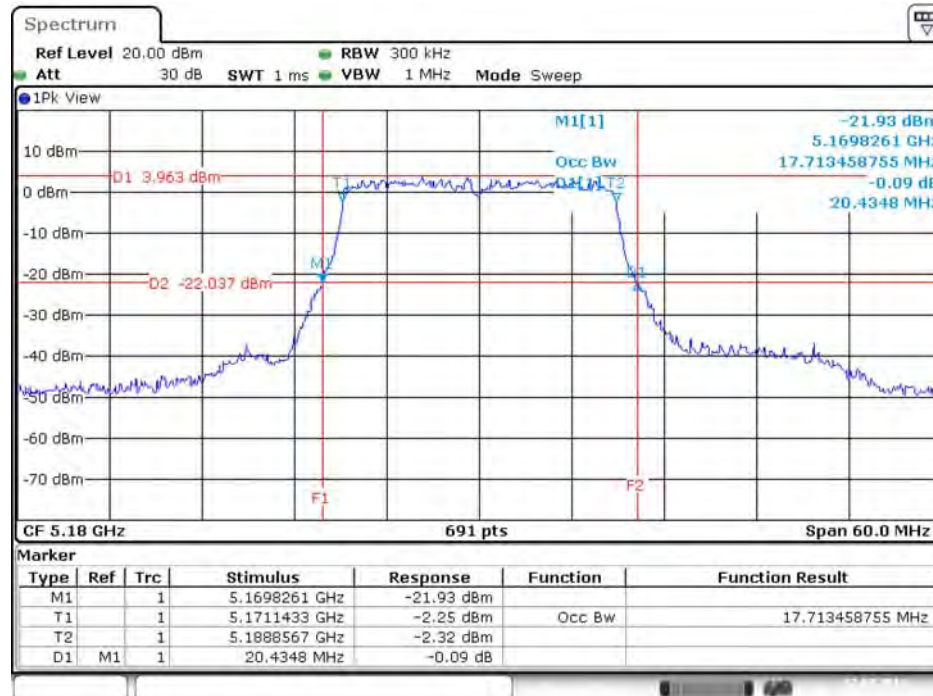


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 / 5775 MHz



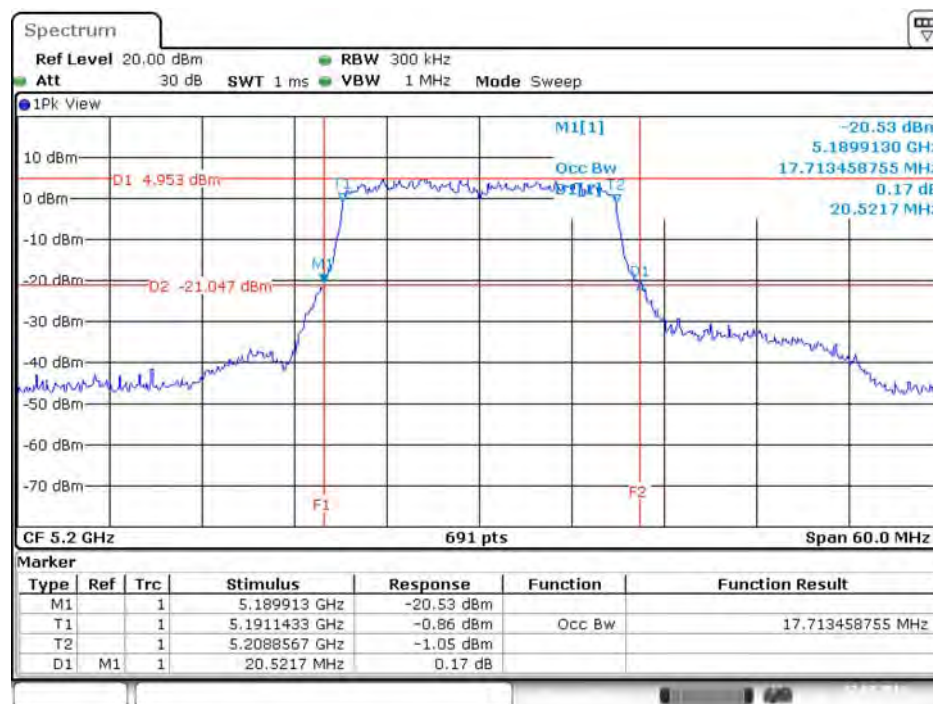
For beamforming function:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5180 MHz



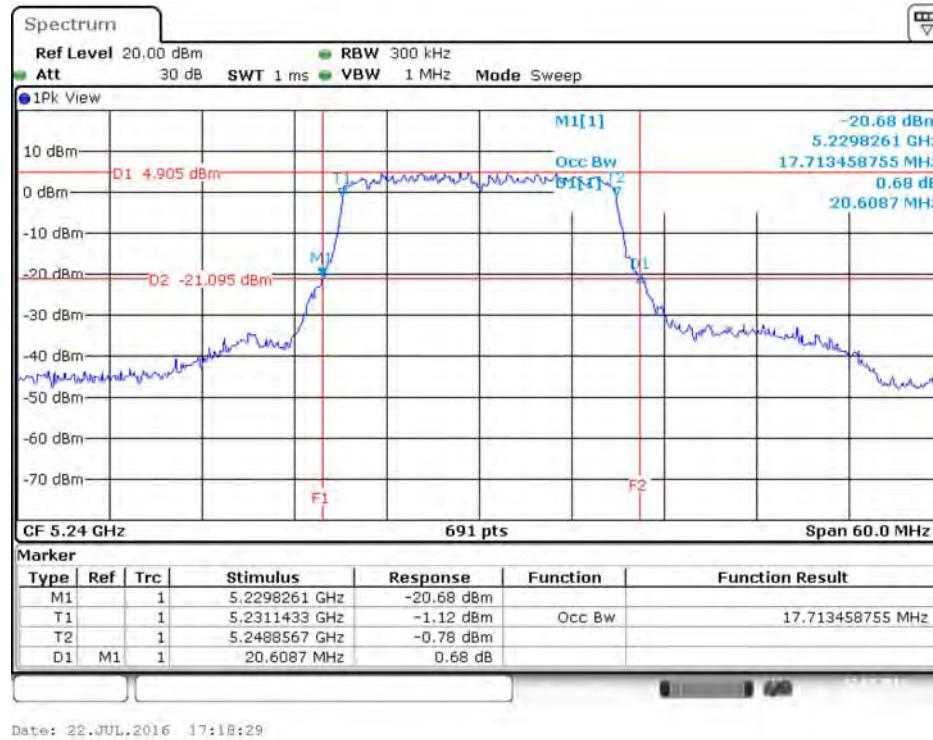
Date: 22.JUL.2016 17:13:24

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5200 MHz

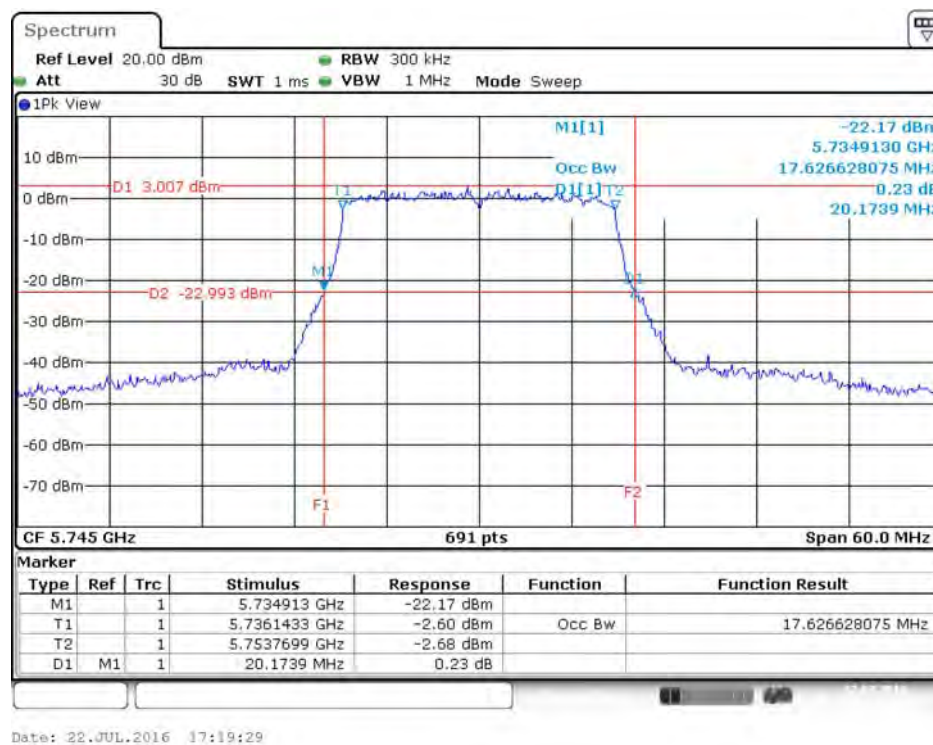


Date: 22.JUL.2016 17:14:06

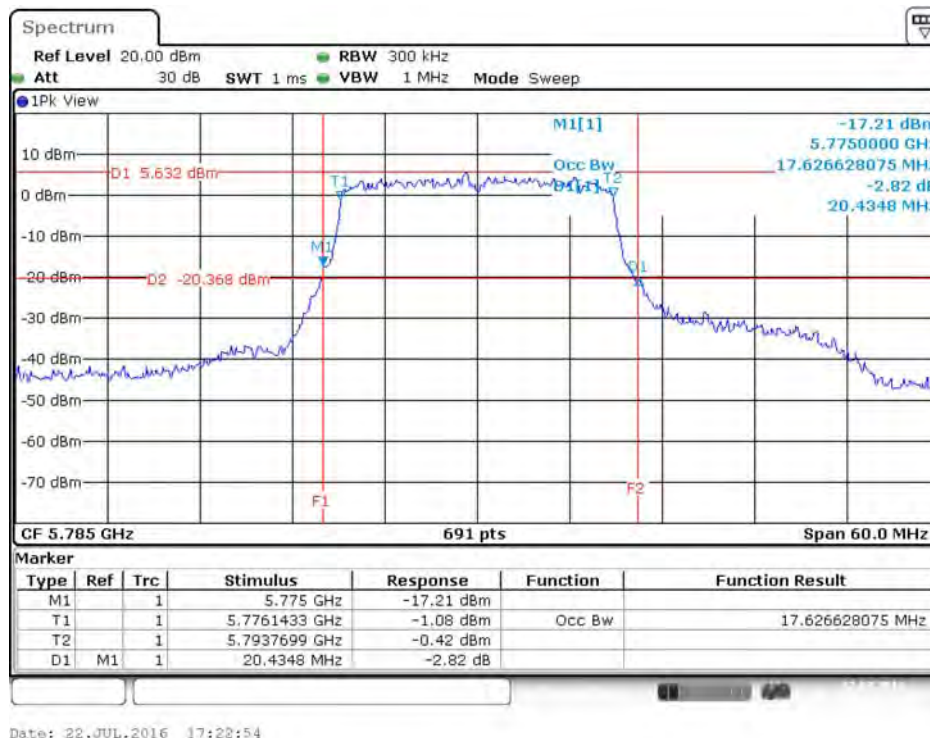
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5240 MHz



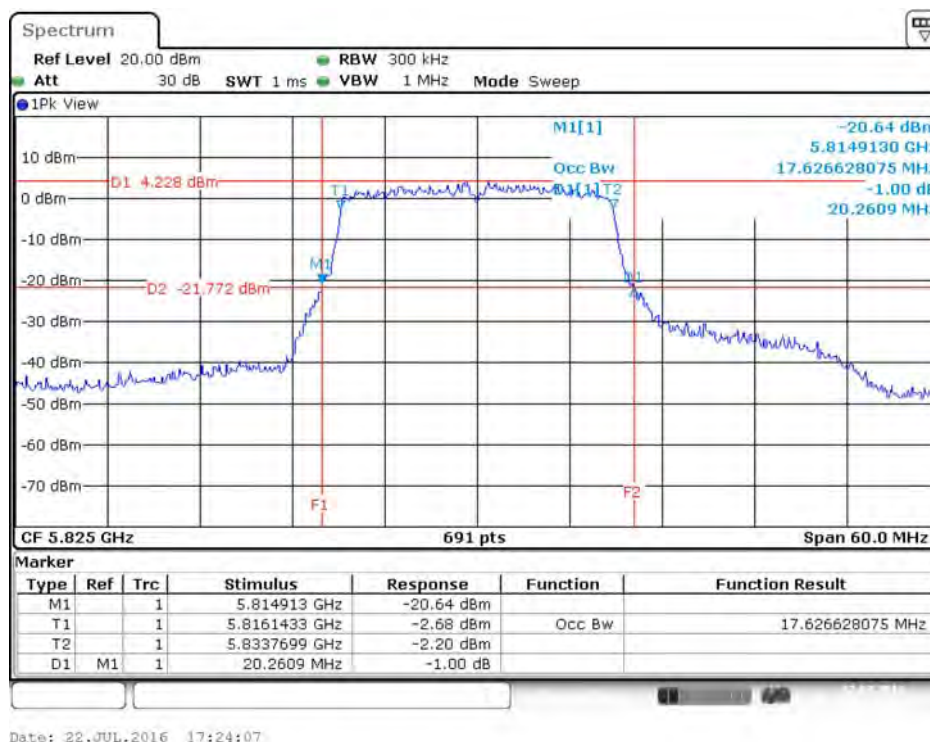
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5745 MHz



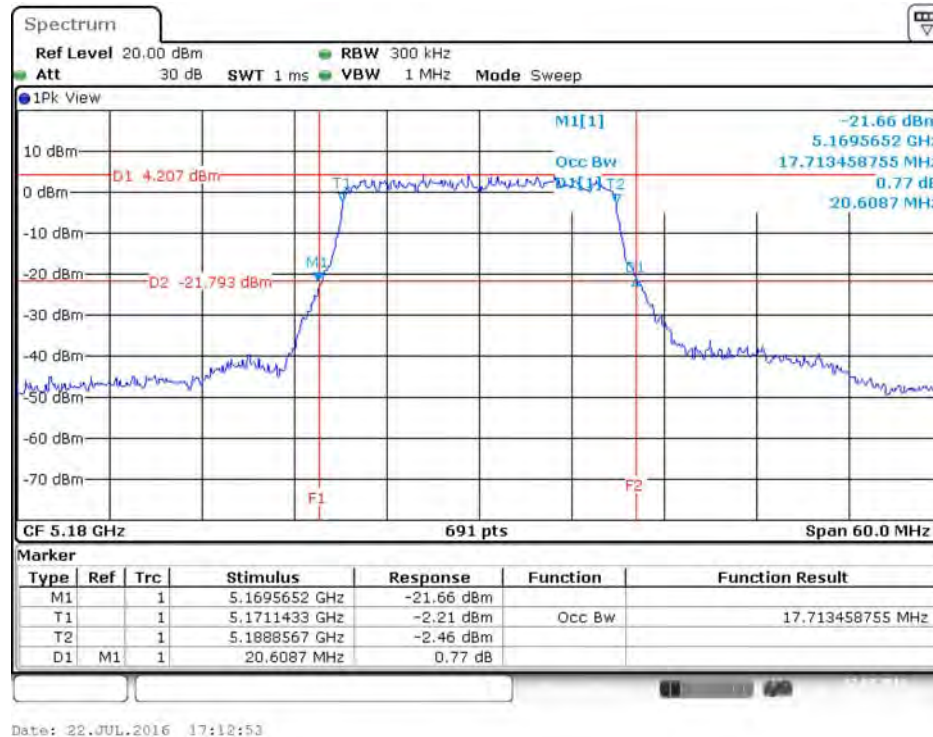
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5785 MHz



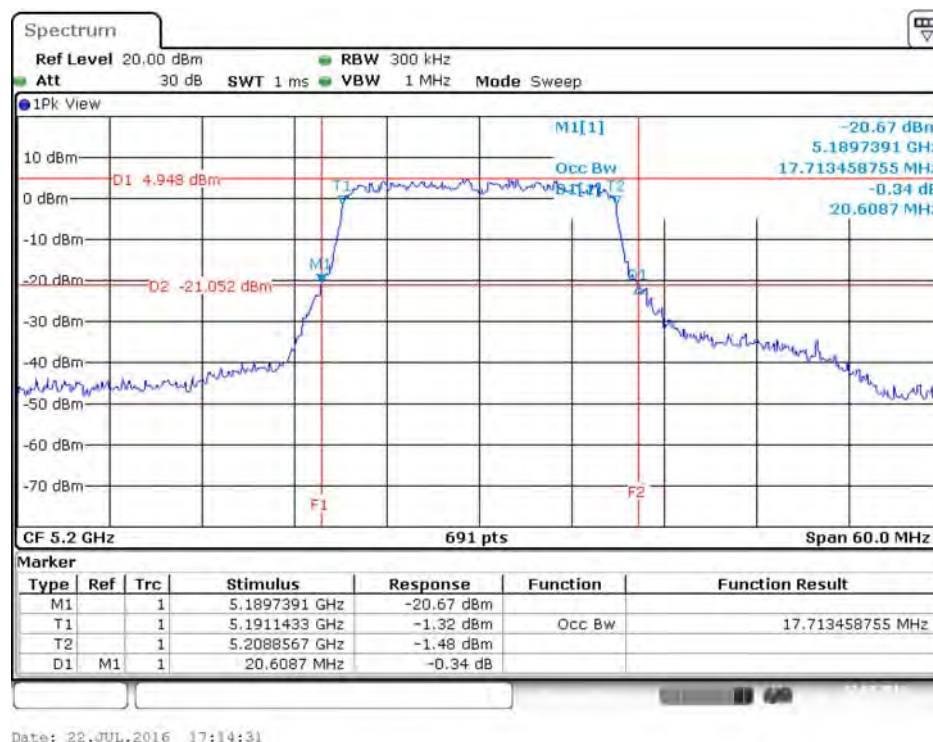
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5825 MHz



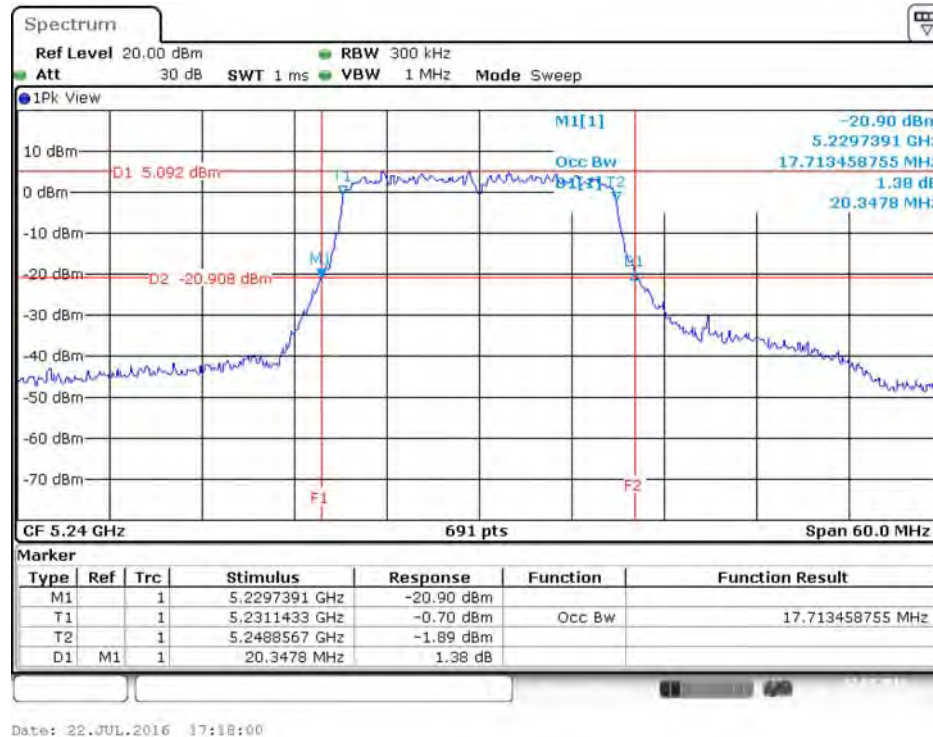
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5180 MHz



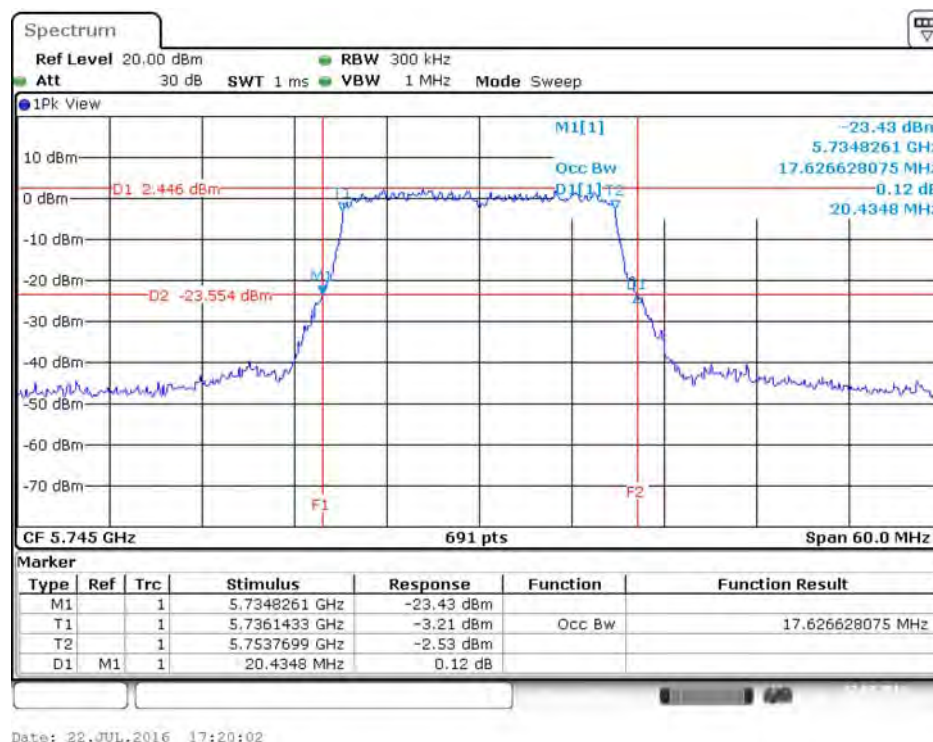
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5200 MHz



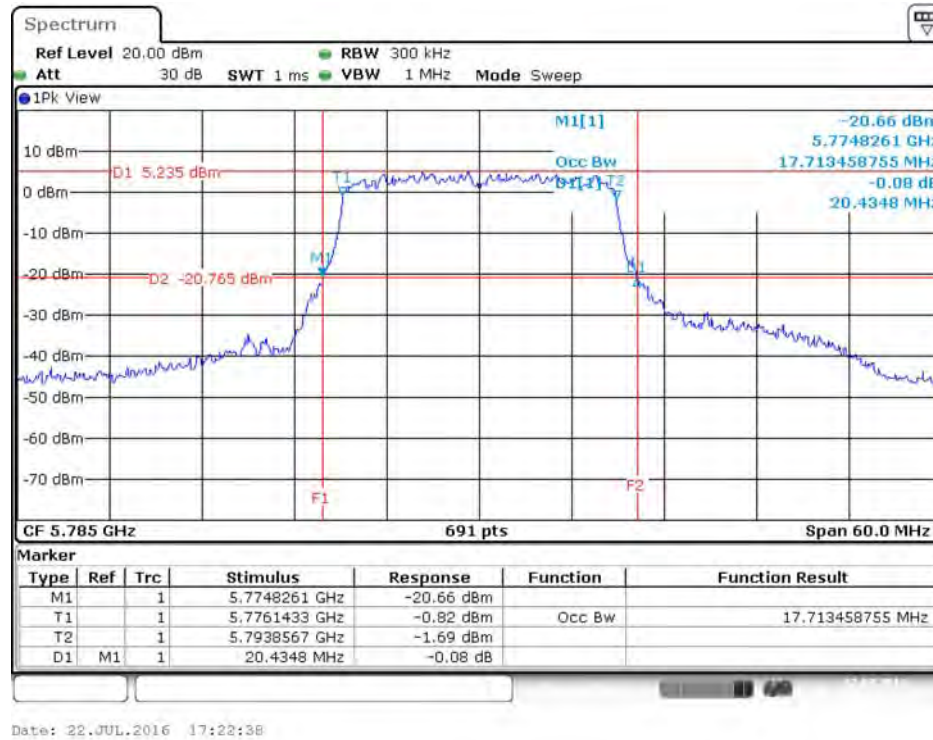
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5240 MHz



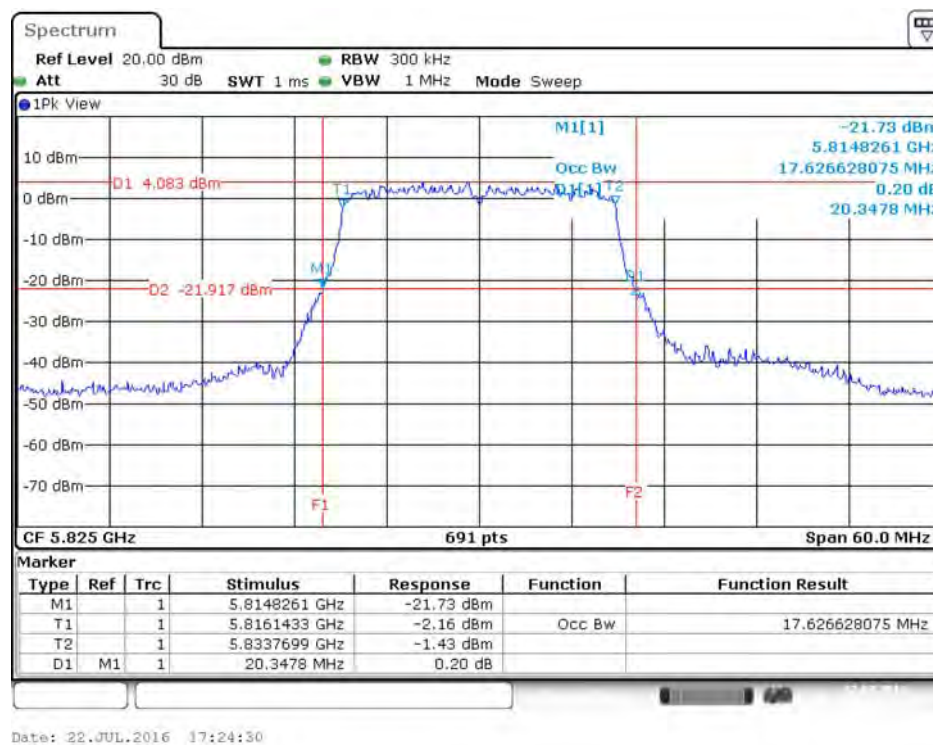
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5745 MHz



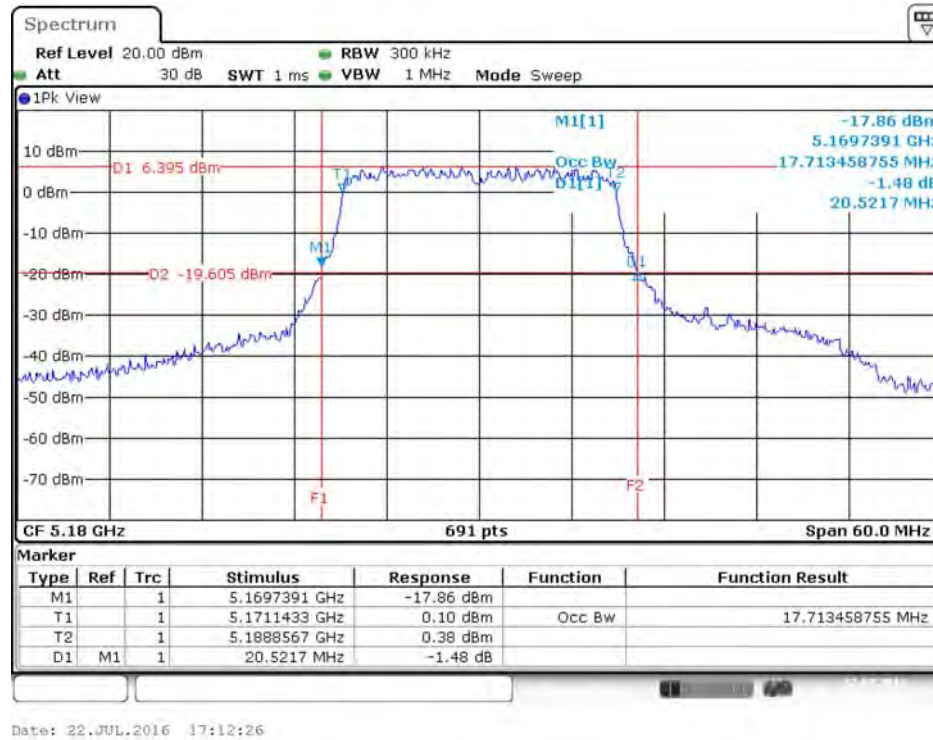
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5785 MHz



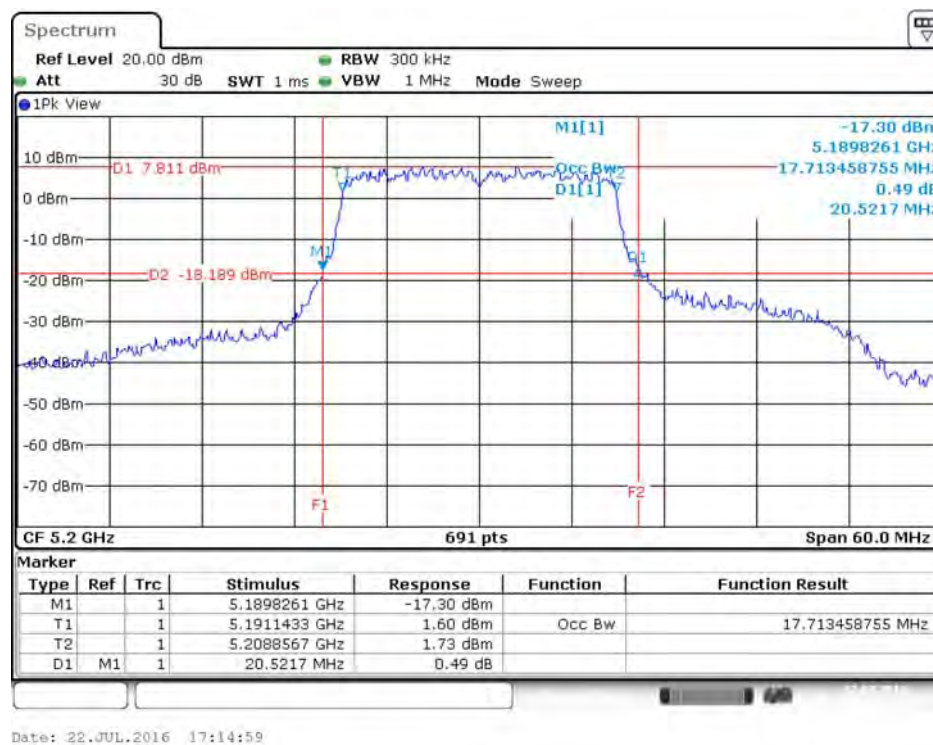
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



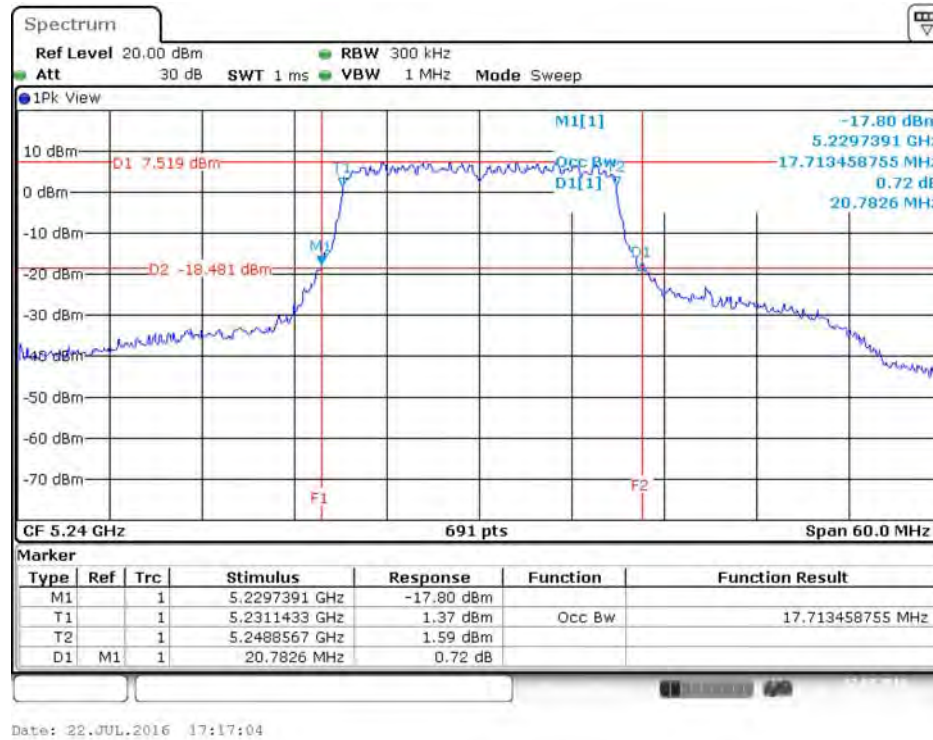
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5180 MHz



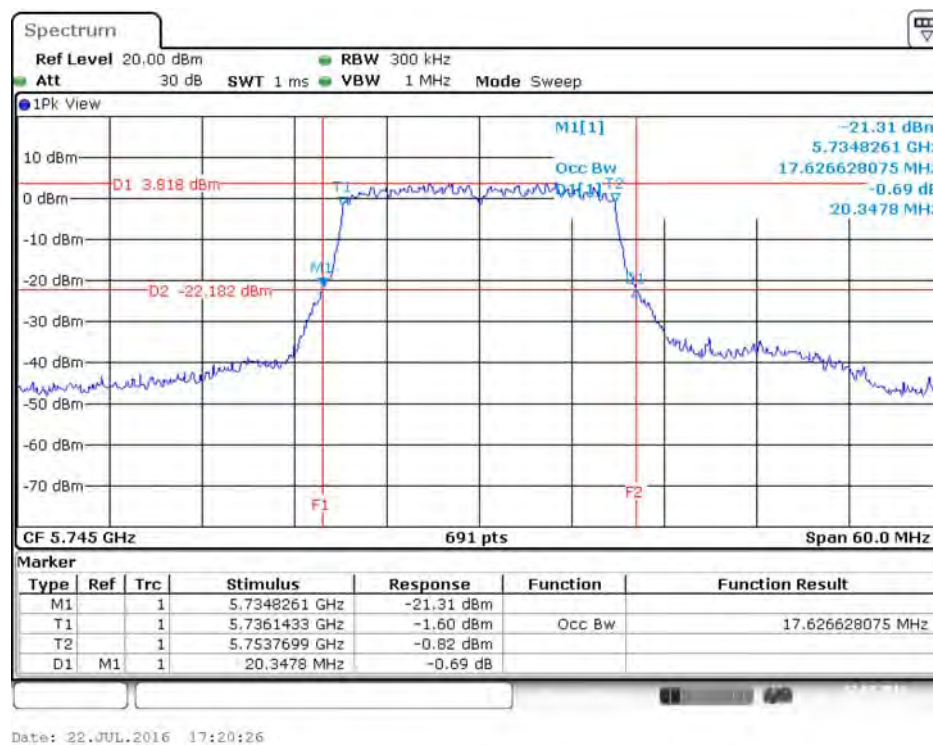
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5200 MHz



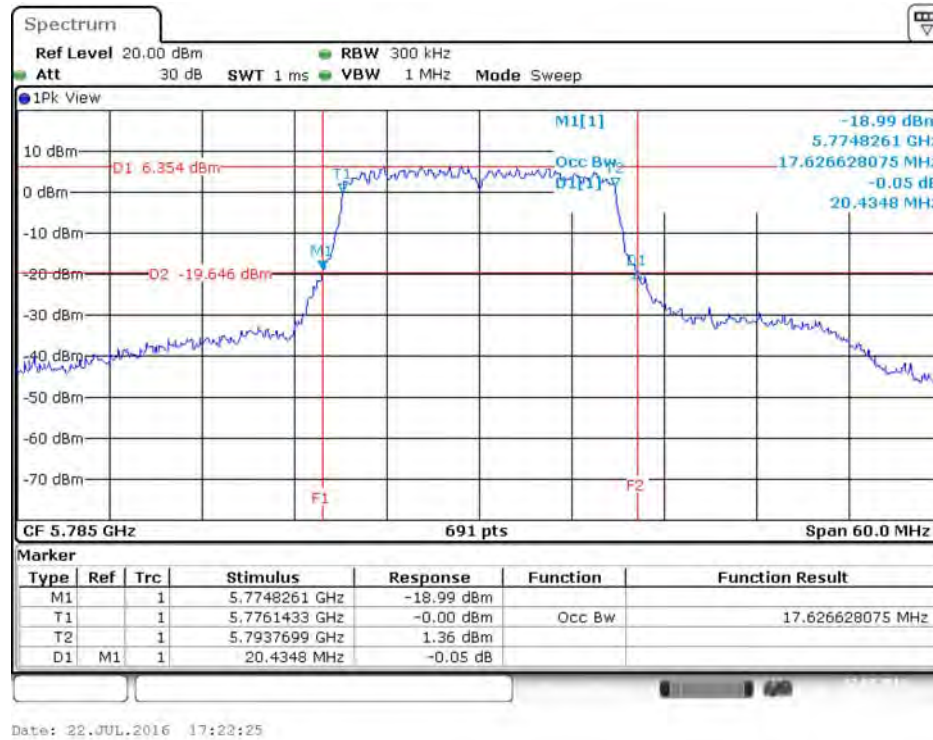
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5240 MHz



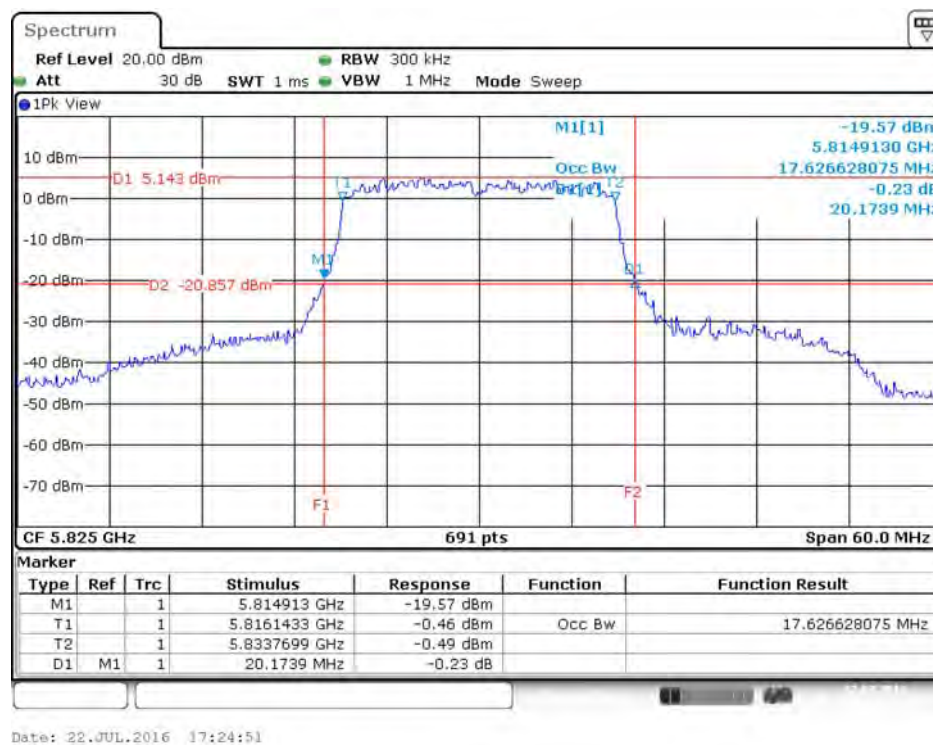
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5745 MHz



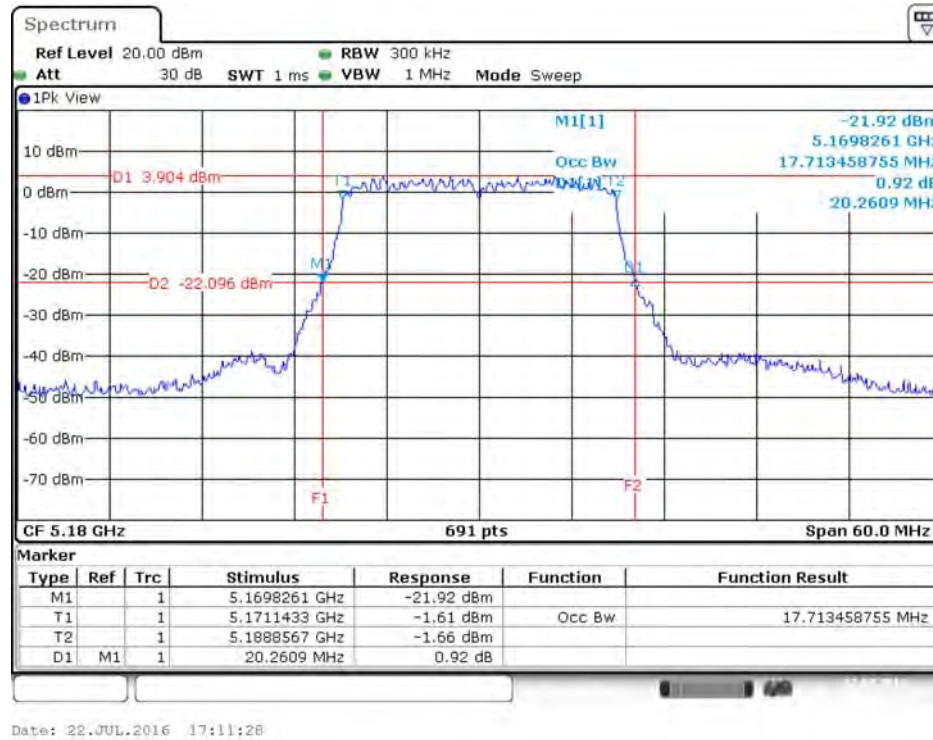
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5785 MHz



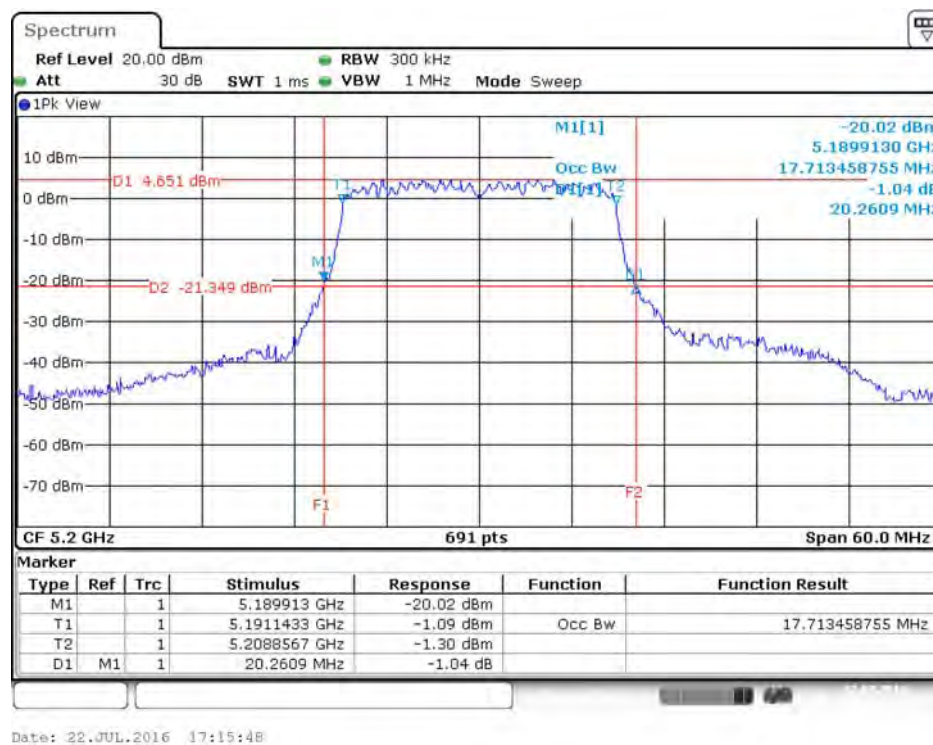
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5825 MHz



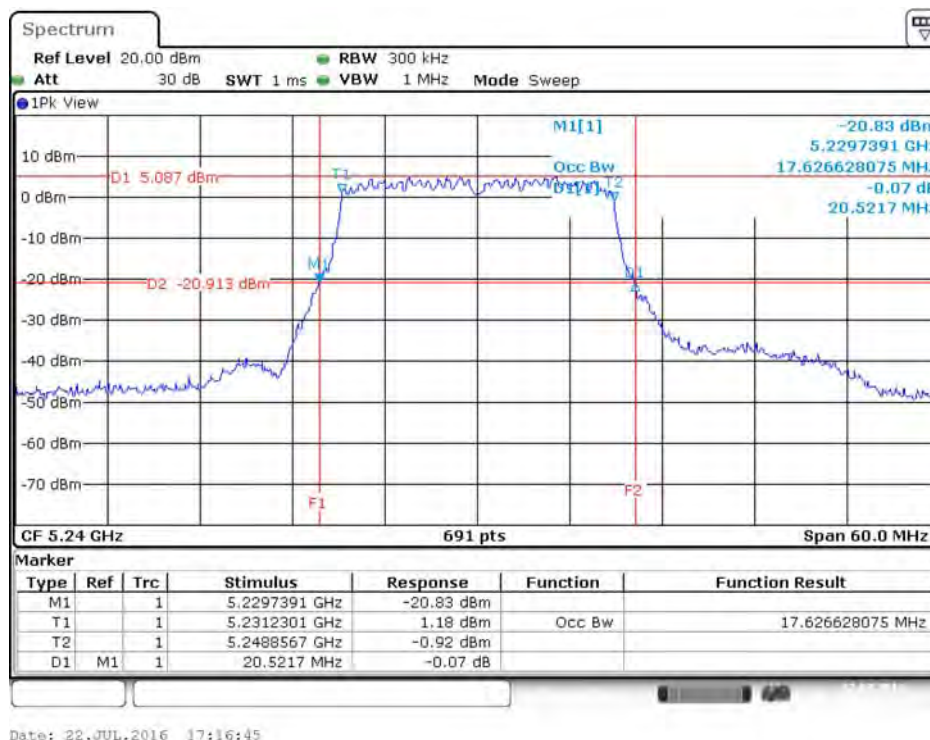
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5180 MHz



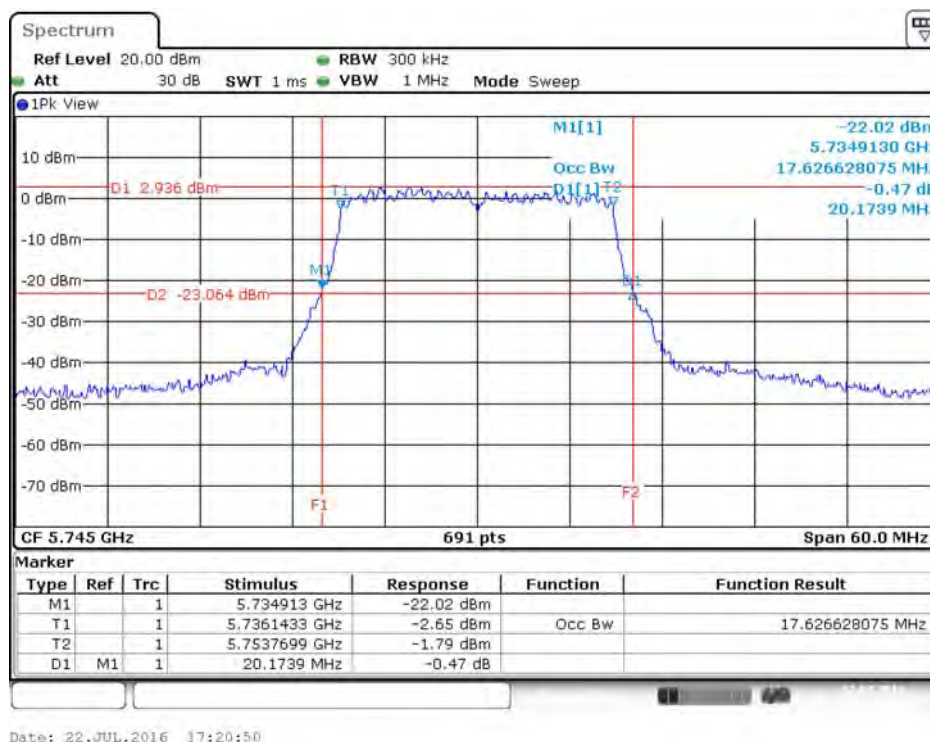
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5200 MHz



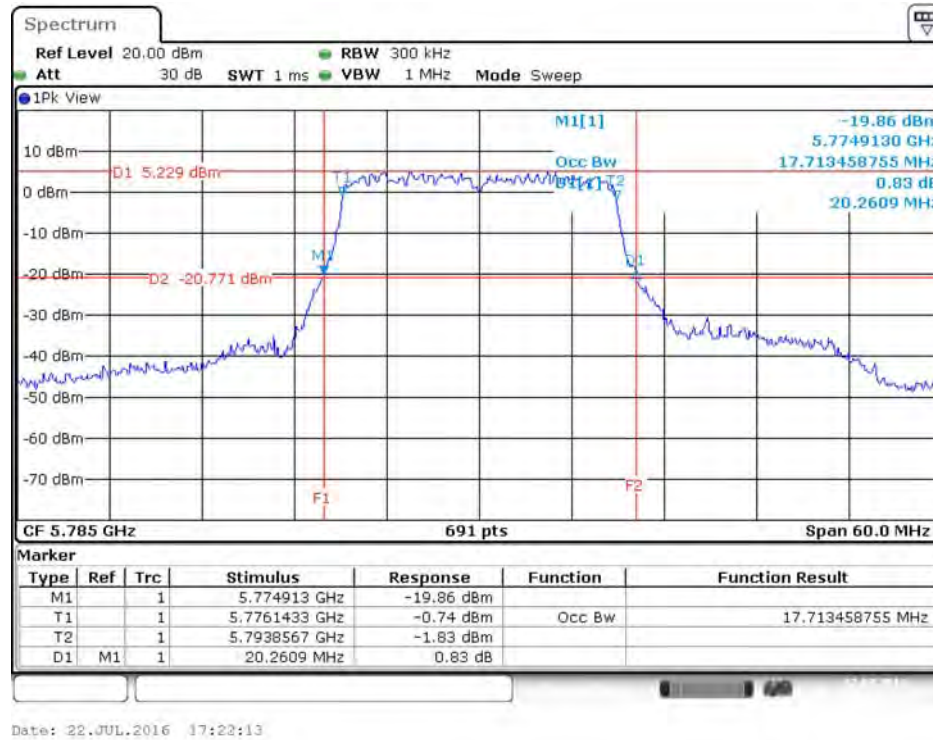
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5240 MHz



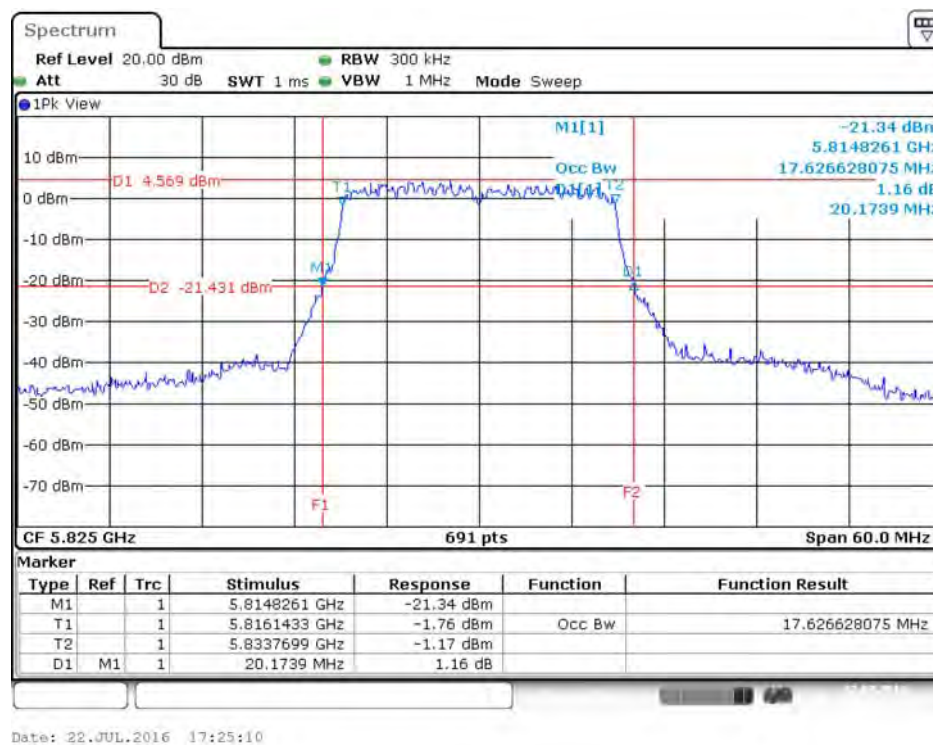
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5745 MHz



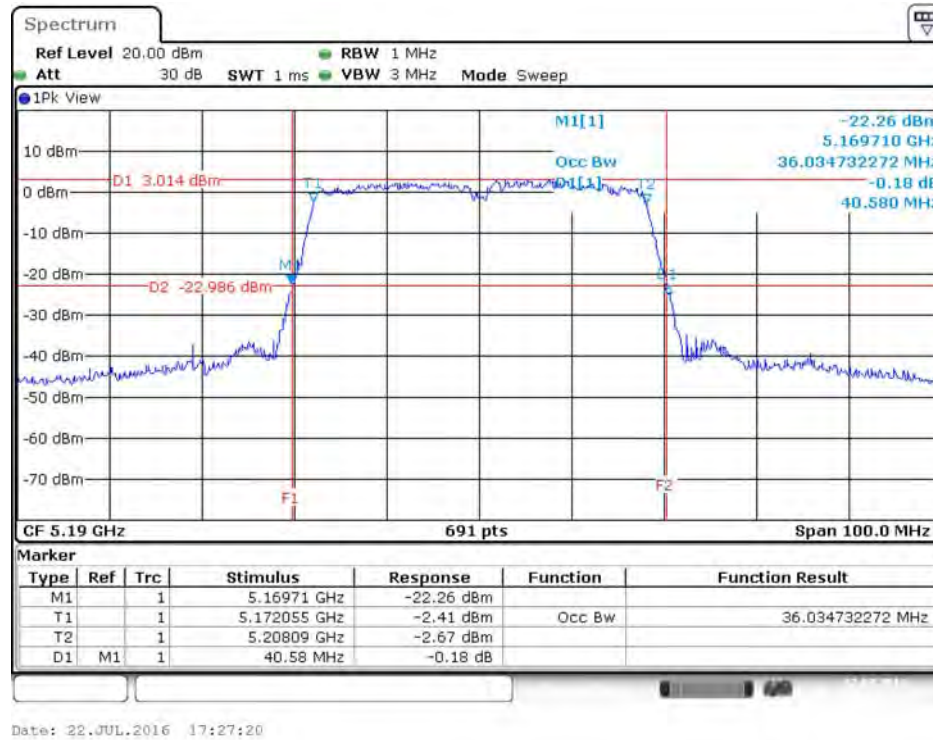
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5785 MHz



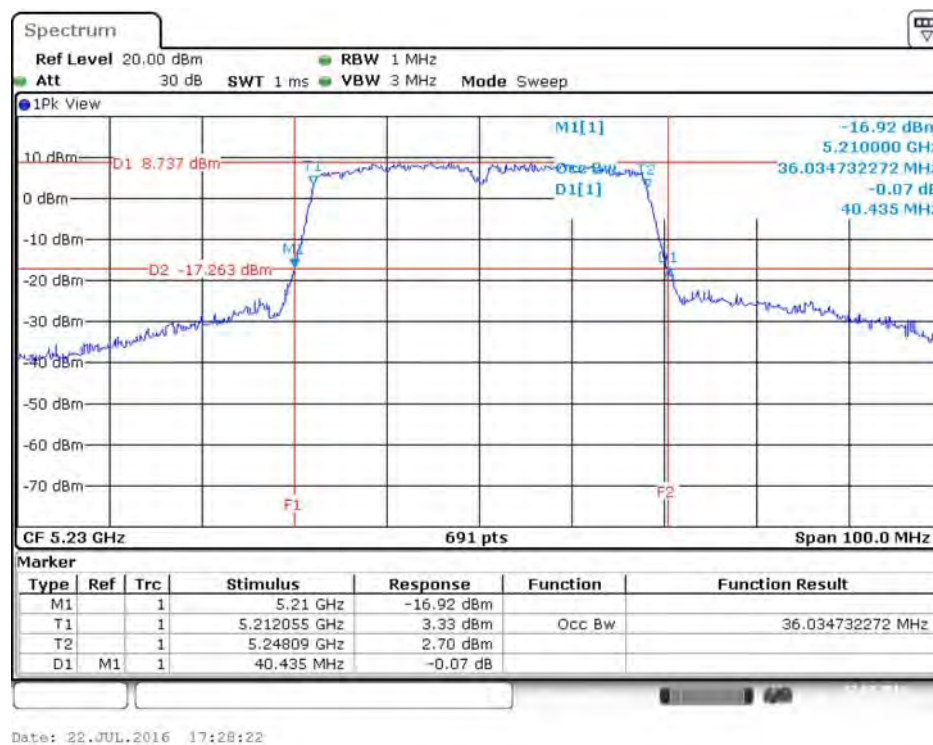
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5825 MHz



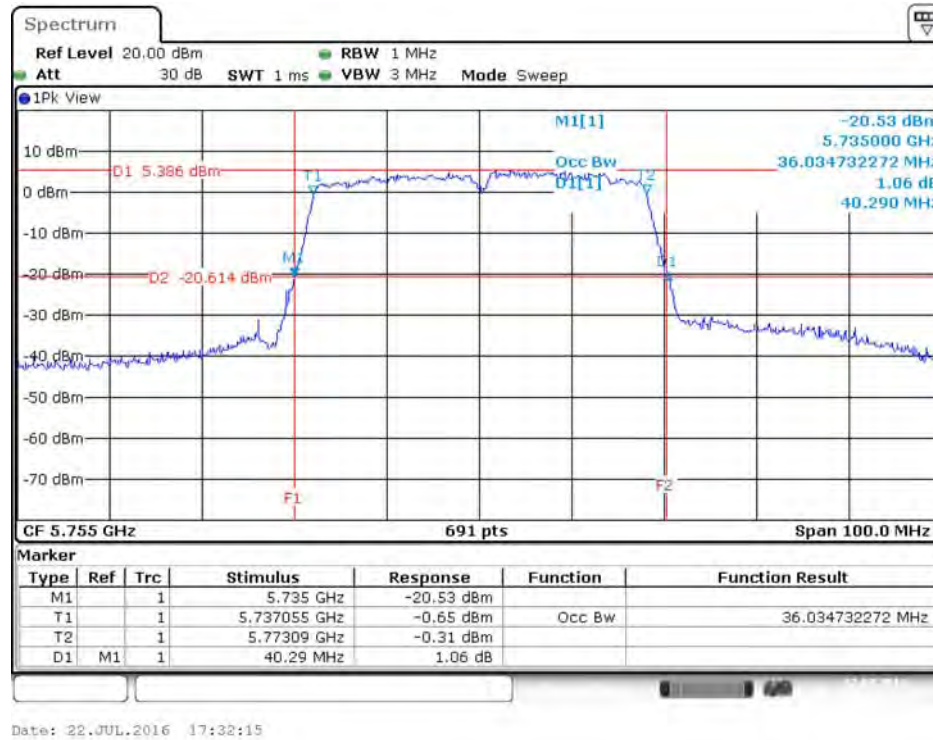
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5190 MHz



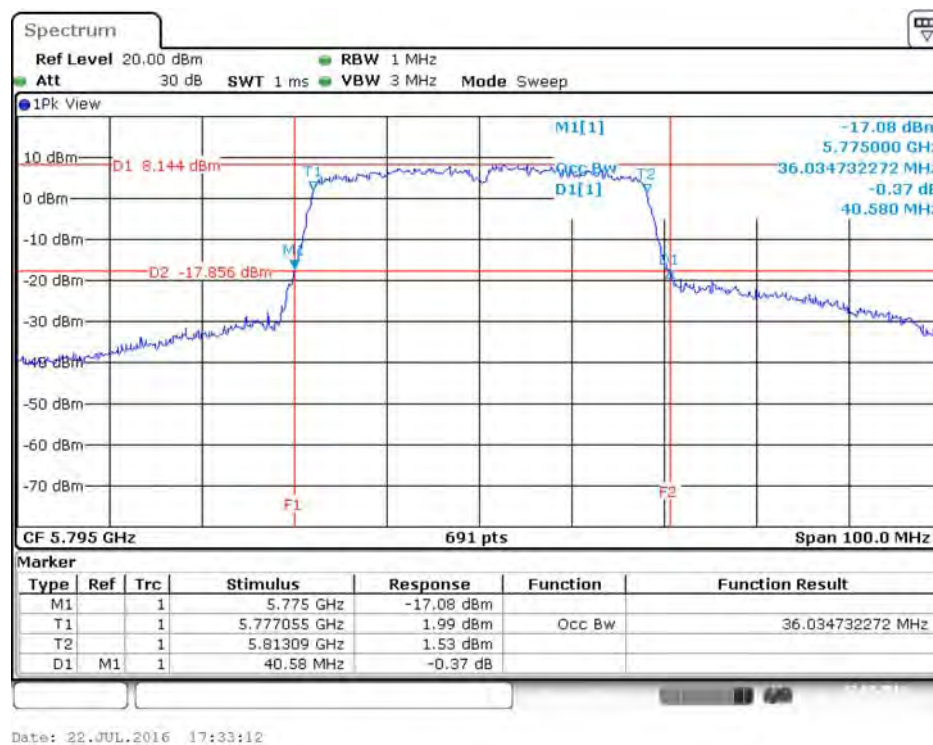
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5230 MHz



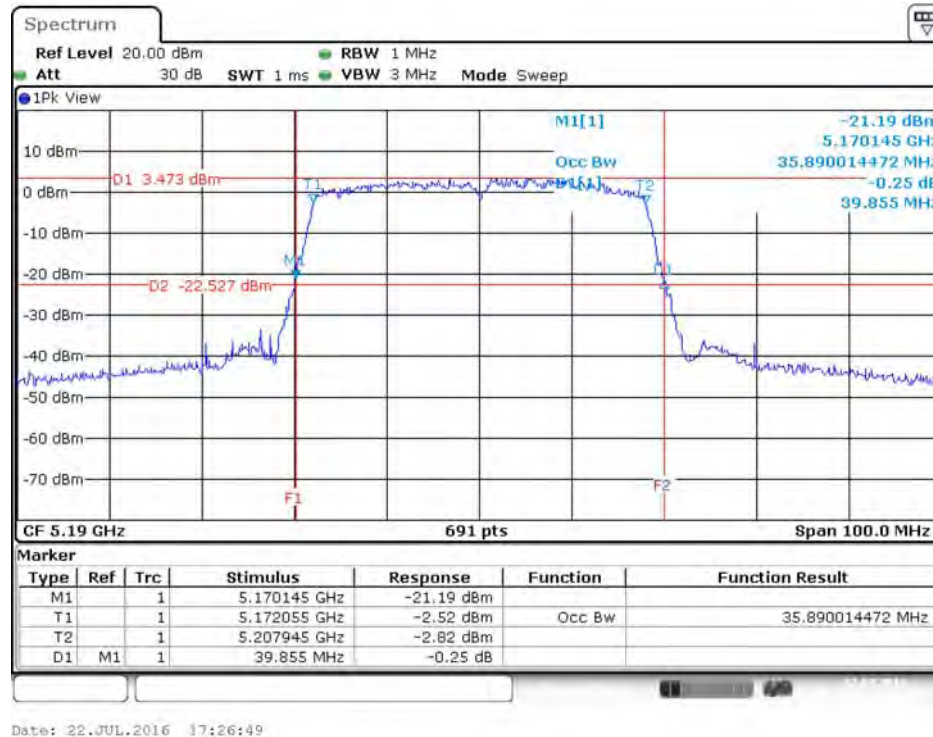
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5755 MHz



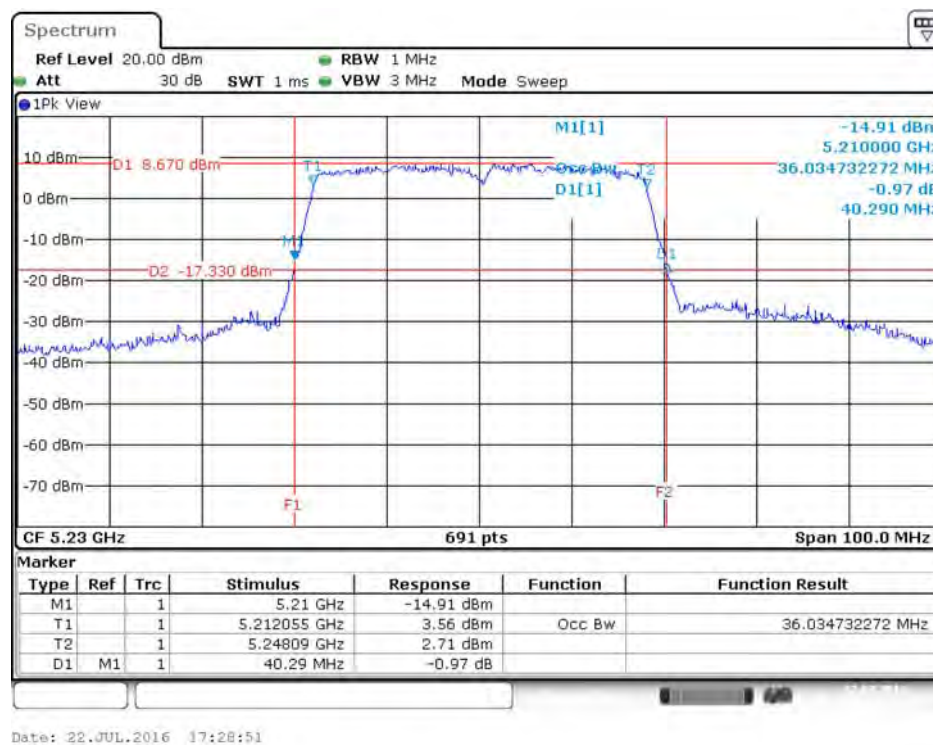
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5795 MHz



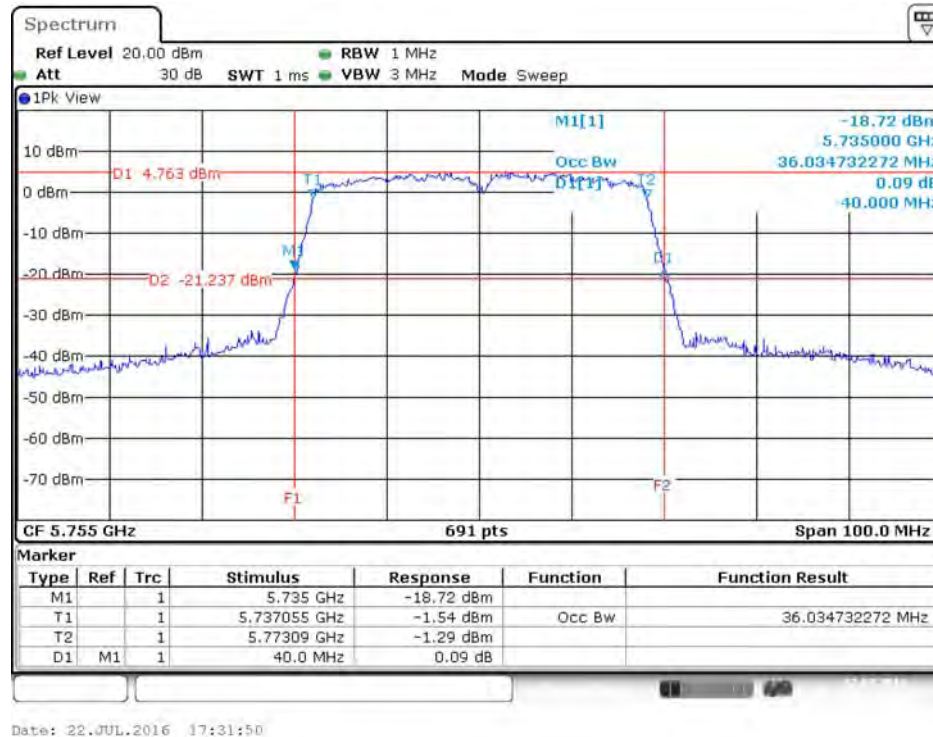
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5190 MHz



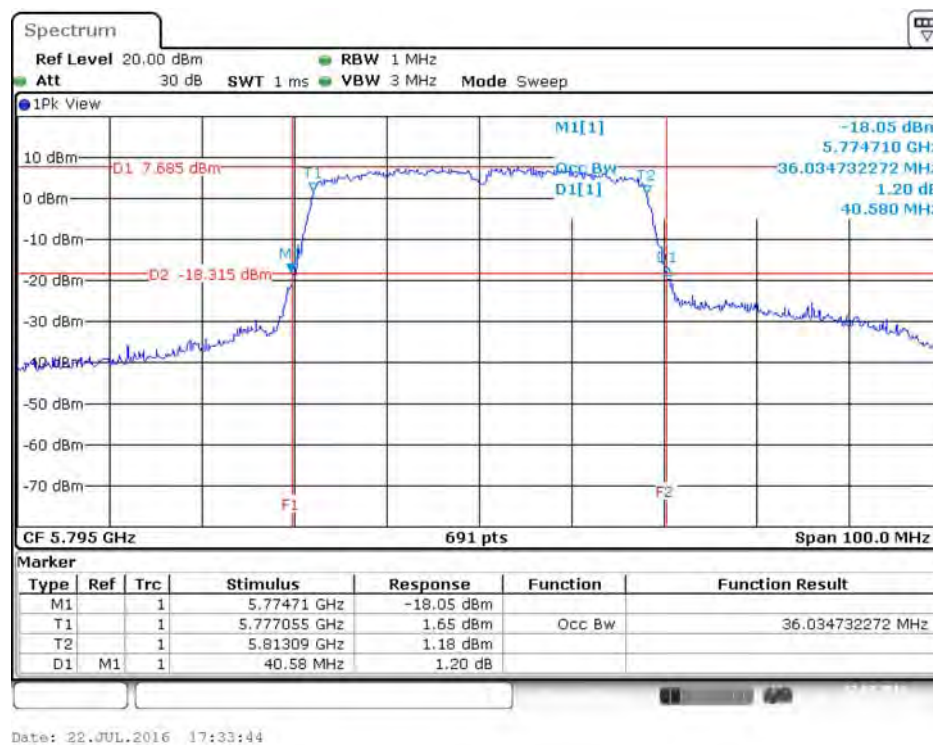
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5230 MHz



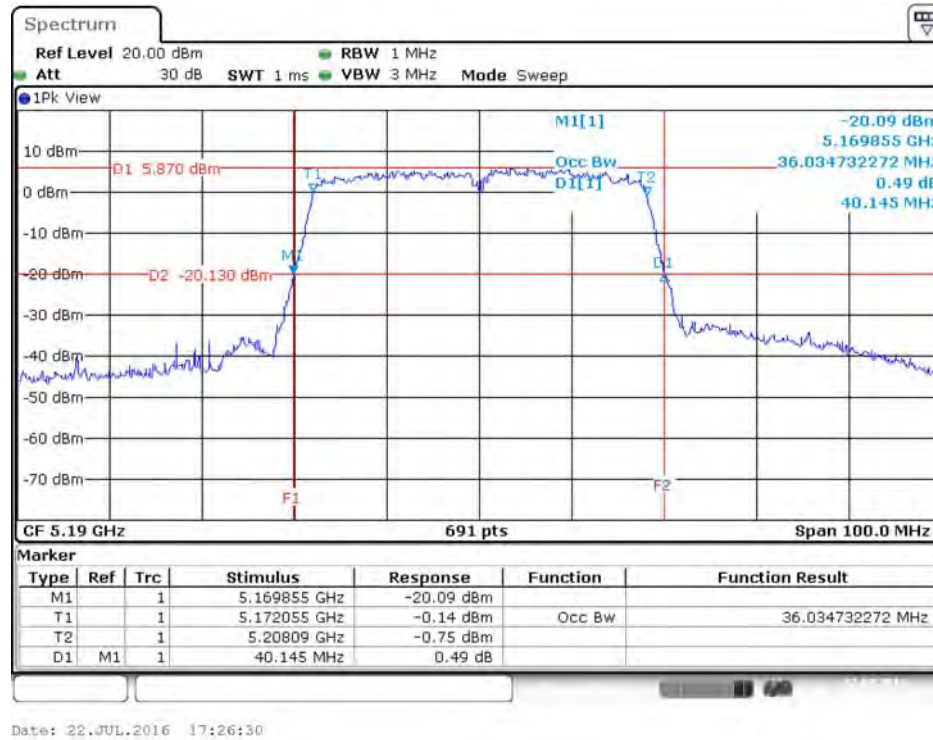
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5755 MHz



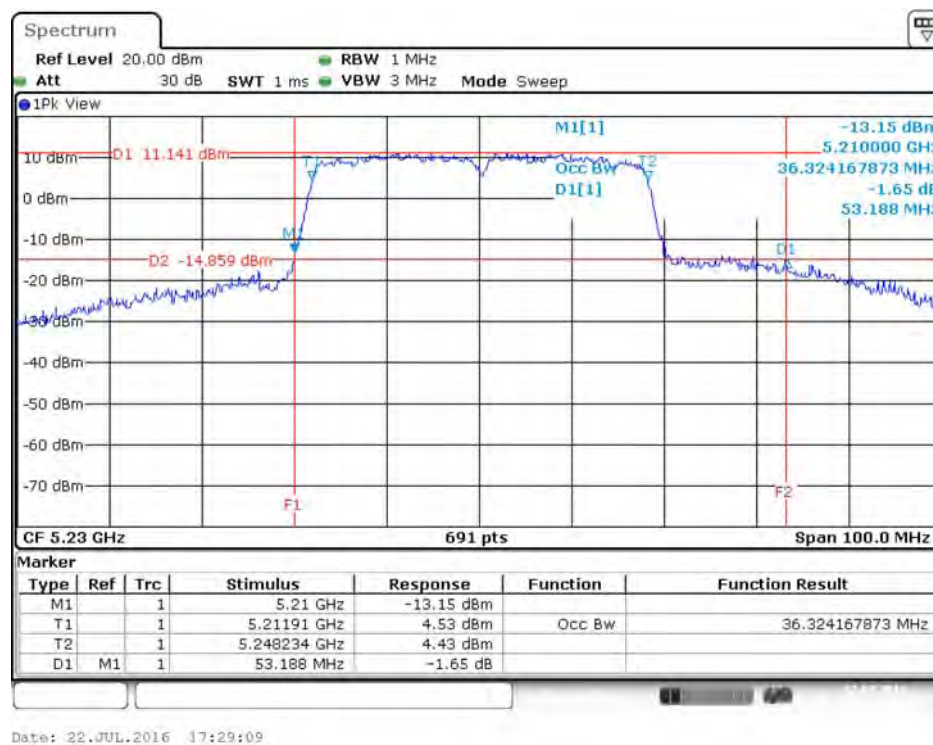
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5795 MHz



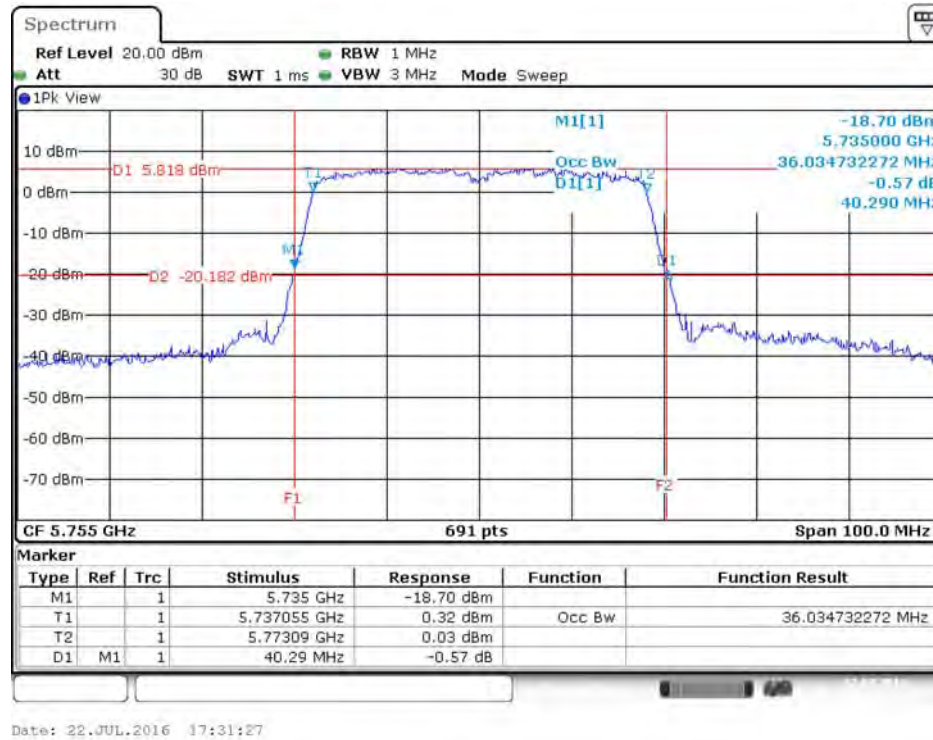
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5190 MHz



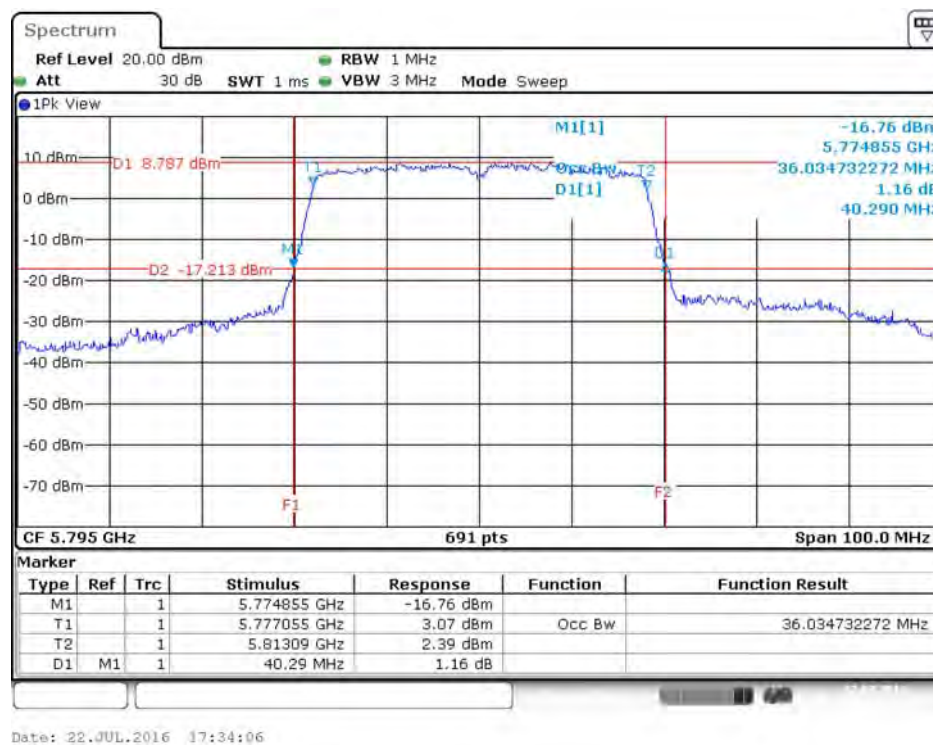
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5230 MHz



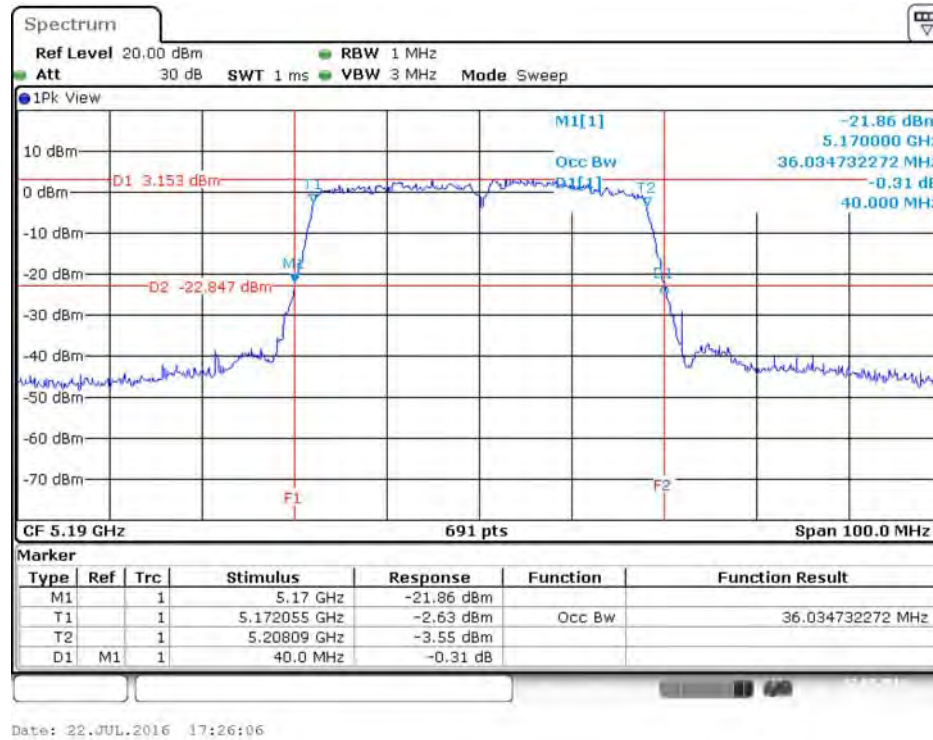
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5755 MHz



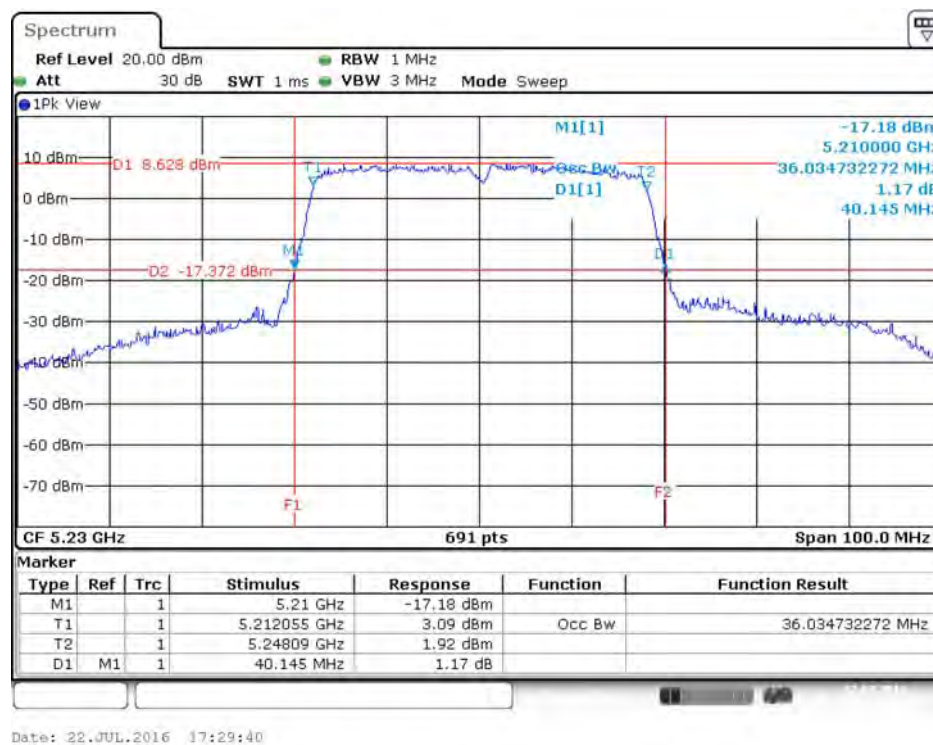
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5795 MHz



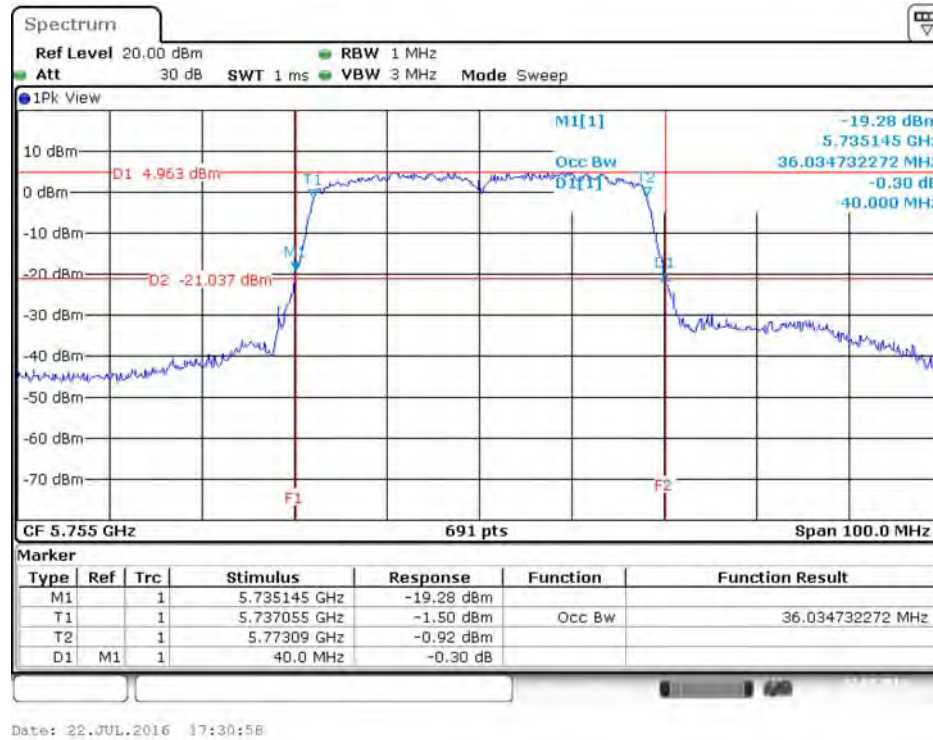
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5190 MHz



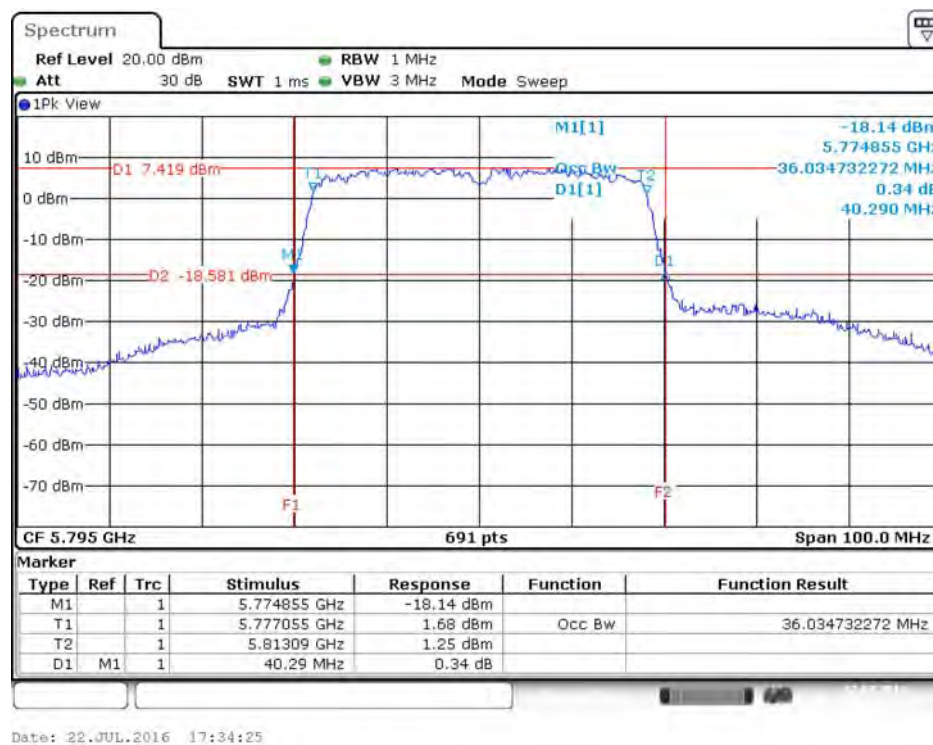
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5230 MHz



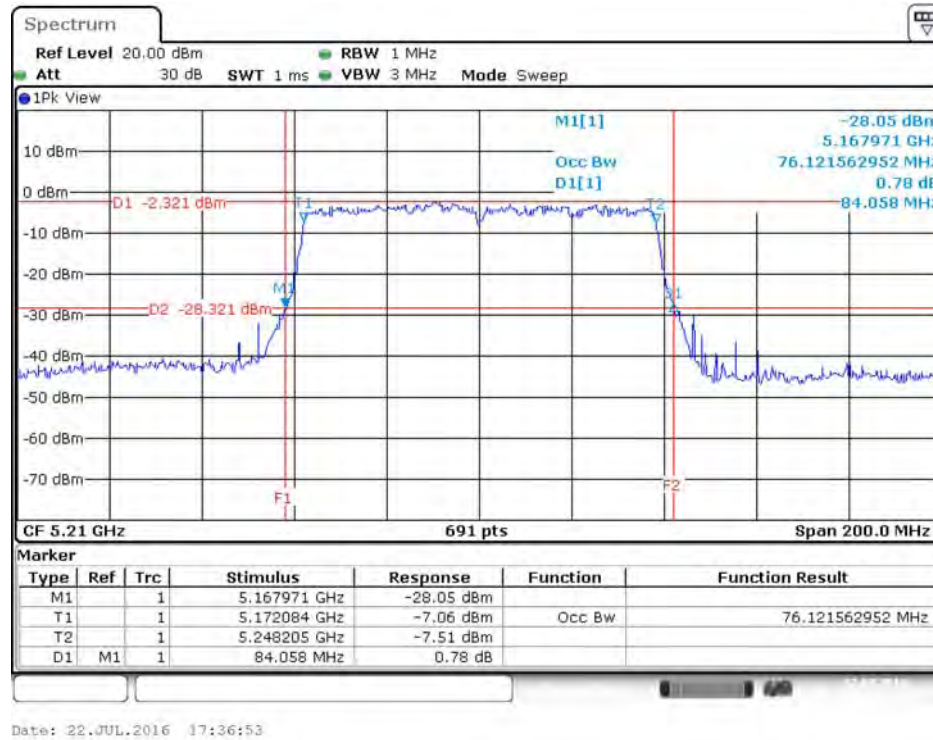
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5755 MHz



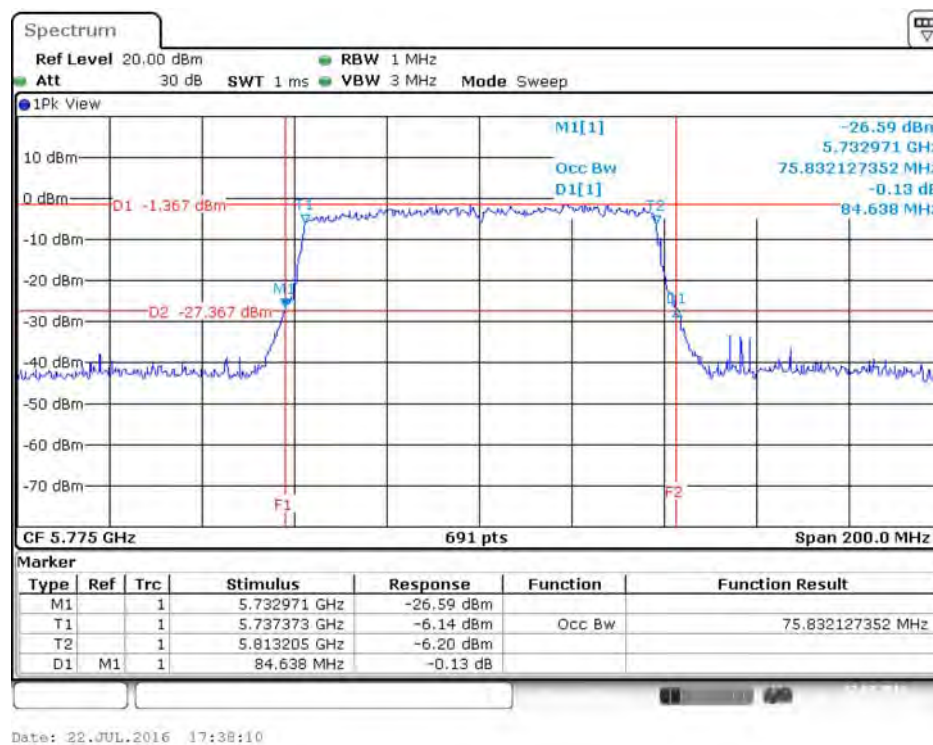
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5795 MHz



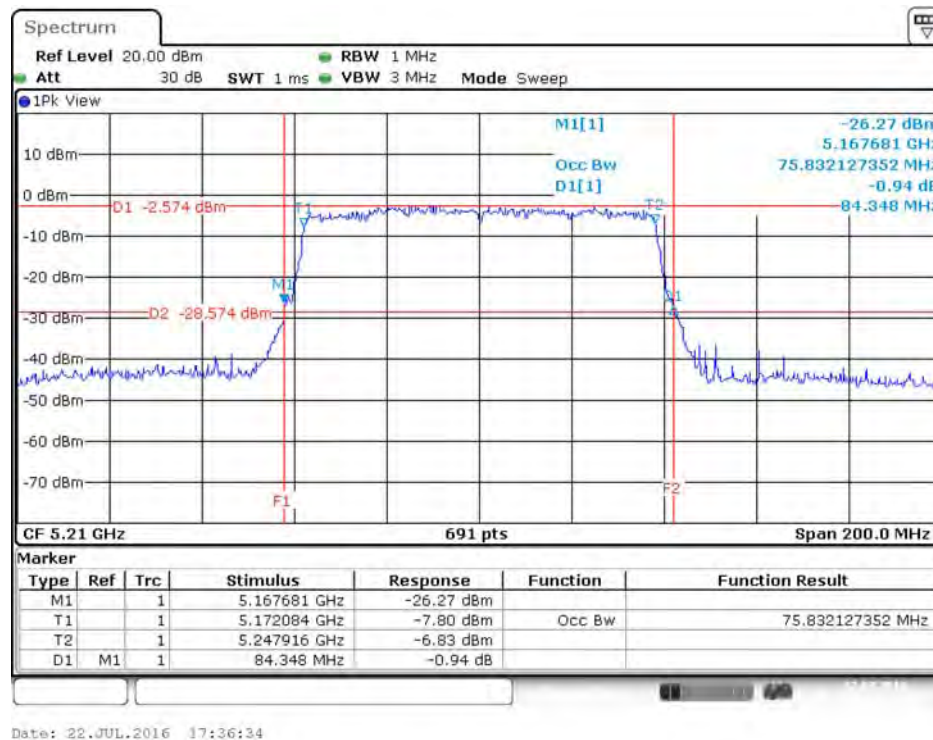
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5210 MHz



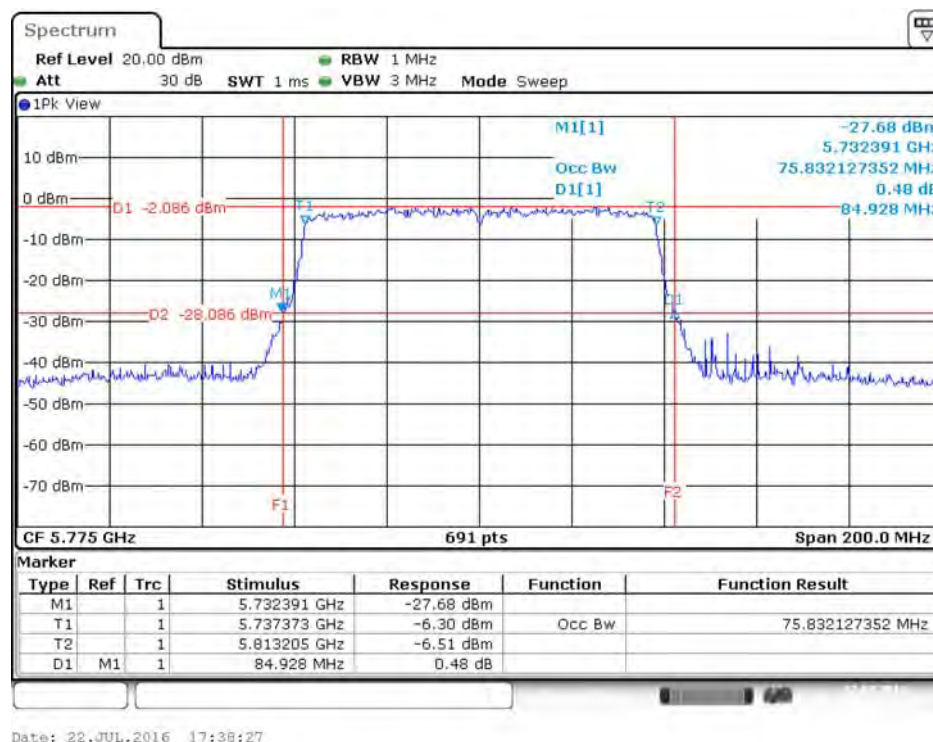
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



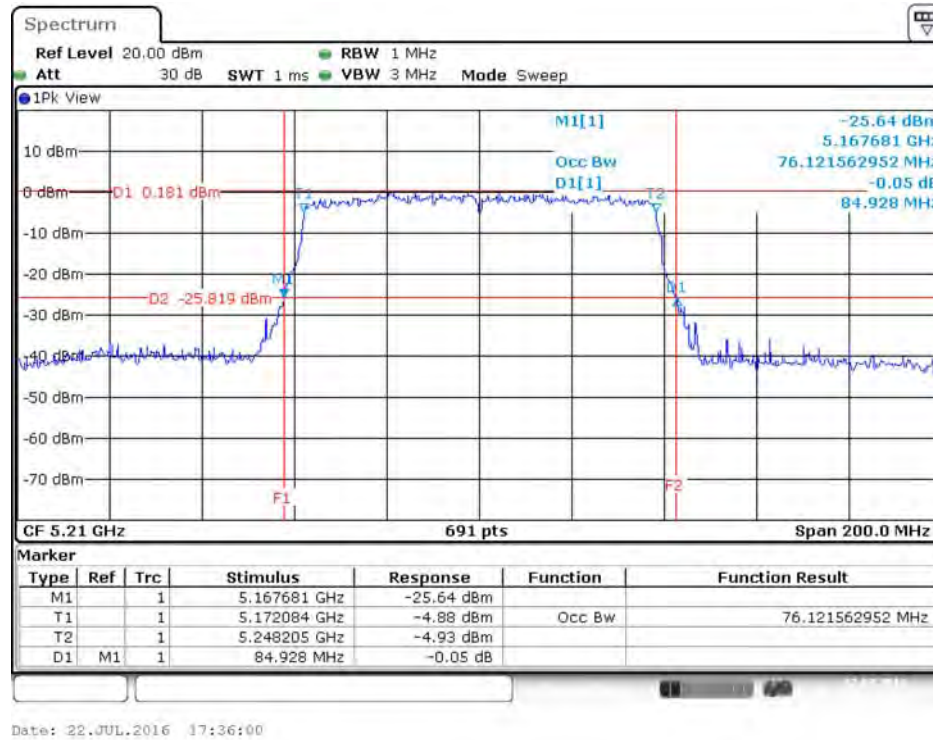
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5210 MHz



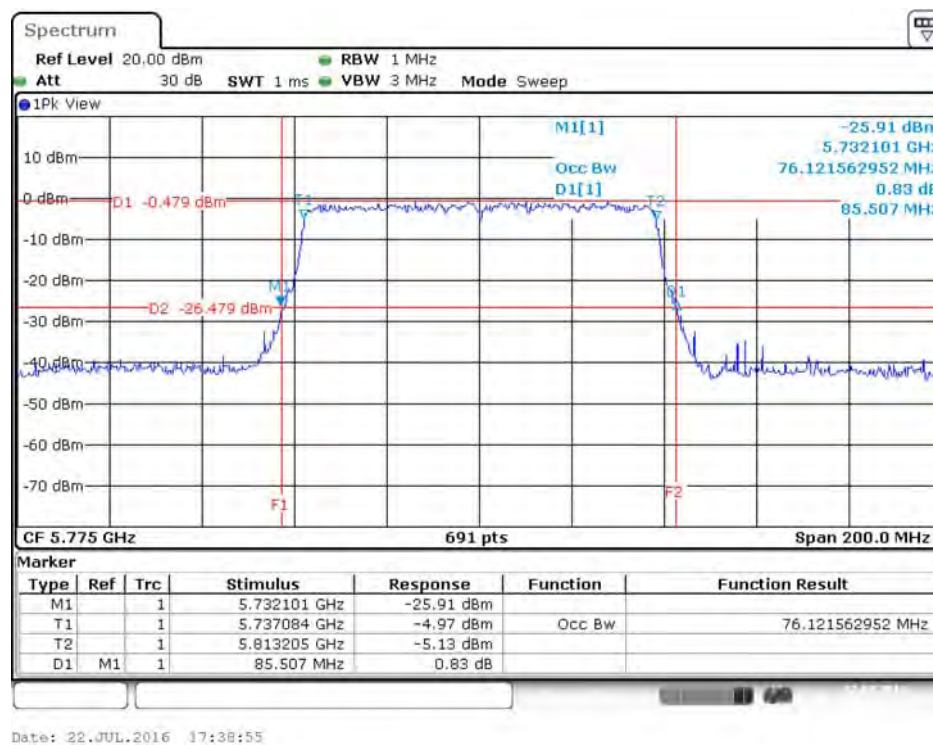
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5775 MHz



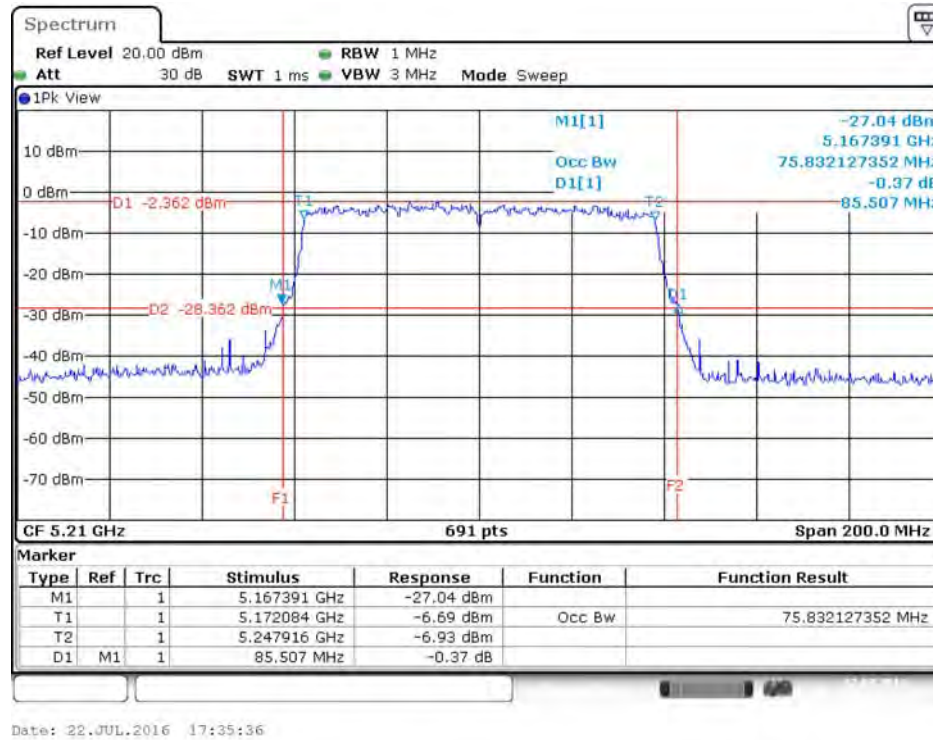
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5210 MHz



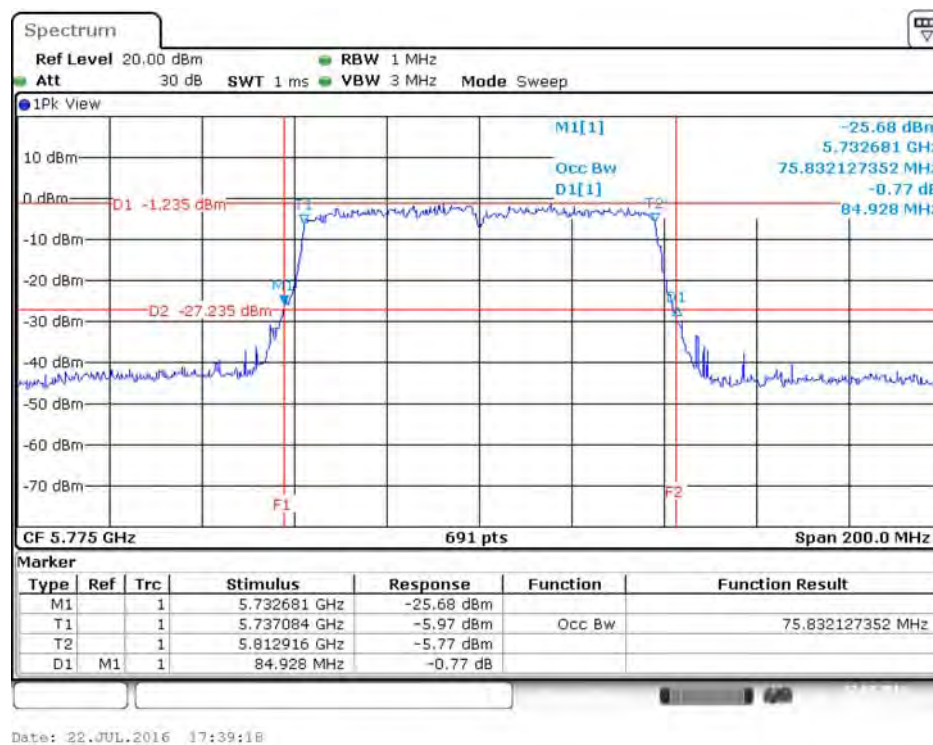
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5775 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 / 5210 MHz



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



4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

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 spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

1. The transmitter was conducted to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r02 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. Measurement perform conducted of each port.
5. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

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

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 6dB Spectrum Bandwidth

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Function	Non-beamforming function

Mode	Frequency	6dB Bandwidth (MHz)				Min. Limit (kHz)	Test Result
		Chain 1	Chain 2	Chain 3	Chain 4		
802.11a	5745 MHz	16.29	16.29	16.35	16.35	500	Complies
	5785 MHz	16.29	15.77	15.42	16.29	500	Complies
	5825 MHz	16.29	16.00	16.29	16.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.62	17.22	16.17	17.62	500	Complies
	5785 MHz	17.57	17.57	17.57	17.57	500	Complies
	5825 MHz	16.81	17.16	16.52	17.16	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	33.86	35.13	35.13	31.88	500	Complies
	5795 MHz	35.13	30.38	35.36	32.58	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	74.20	72.46	75.36	75.36	500	Complies

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Function	Beamforming function

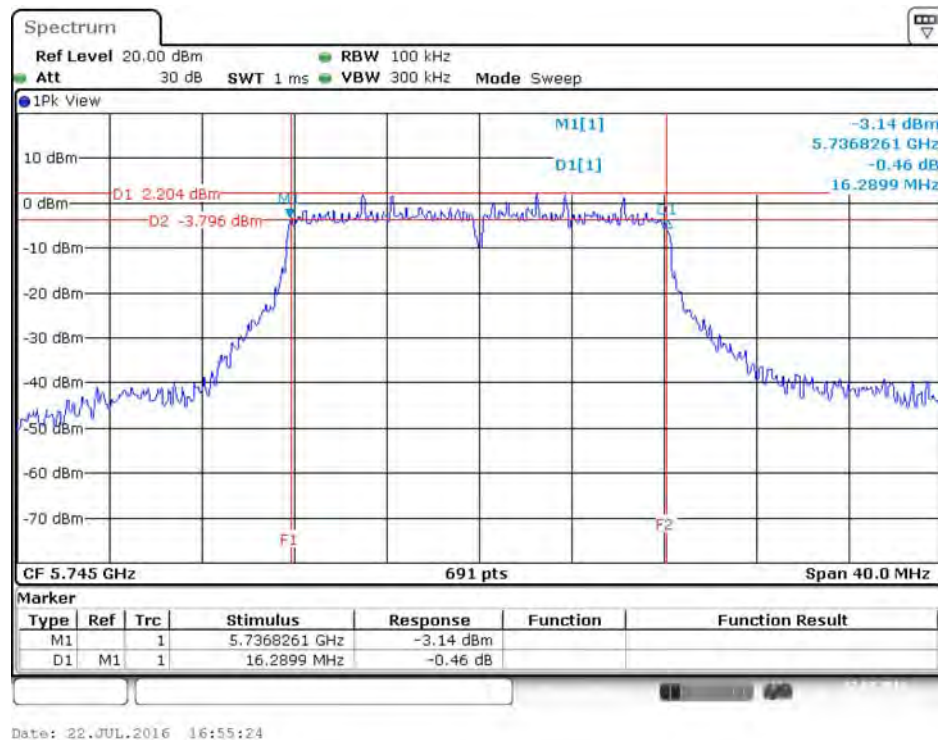
Mode	Frequency	6dB Bandwidth (MHz)				Min. Limit (kHz)	Test Result
		Chain 1	Chain 2	Chain 3	Chain 4		
802.11ac	5745 MHz	17.57	16.93	17.57	16.93	500	Complies
MCS0/Nss1	5785 MHz	17.57	17.57	17.68	17.68	500	Complies
VHT20	5825 MHz	16.81	17.57	16.81	17.57	500	Complies
802.11ac	5755 MHz	32.81	31.42	35.13	33.74	500	Complies
MCS0/Nss1	5795 MHz	31.88	34.09	32.81	35.01	500	Complies
VHT40							
802.11ac	5775 MHz	74.20	73.91	74.20	73.91	500	Complies
MCS0/Nss1							
VHT80							

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

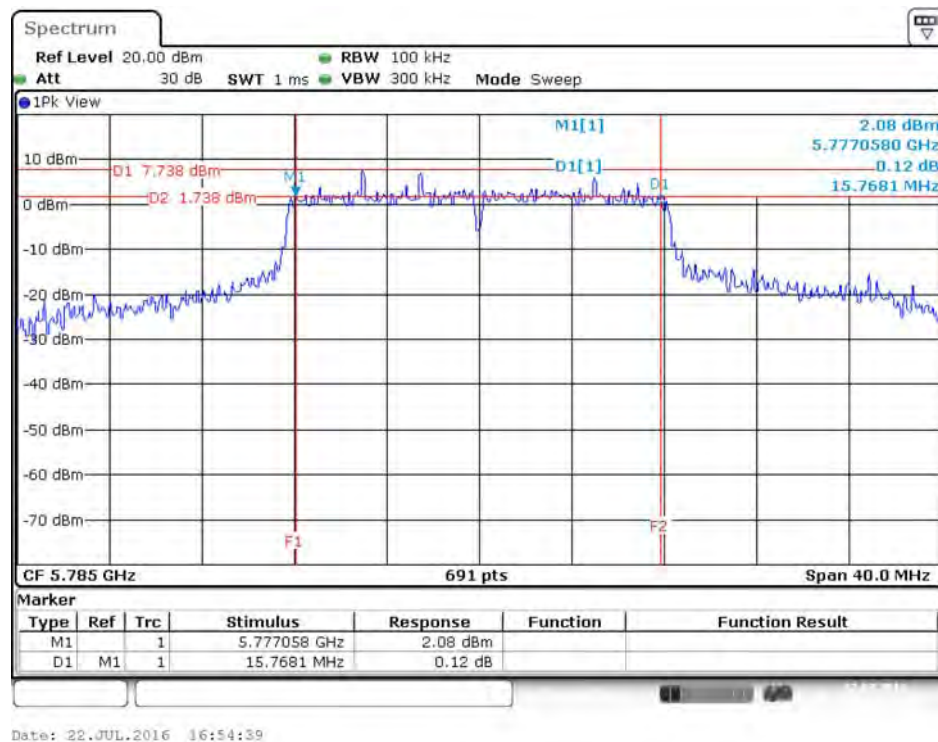
For plots, only the channel with worse result was shown.

For non-beamforming function:

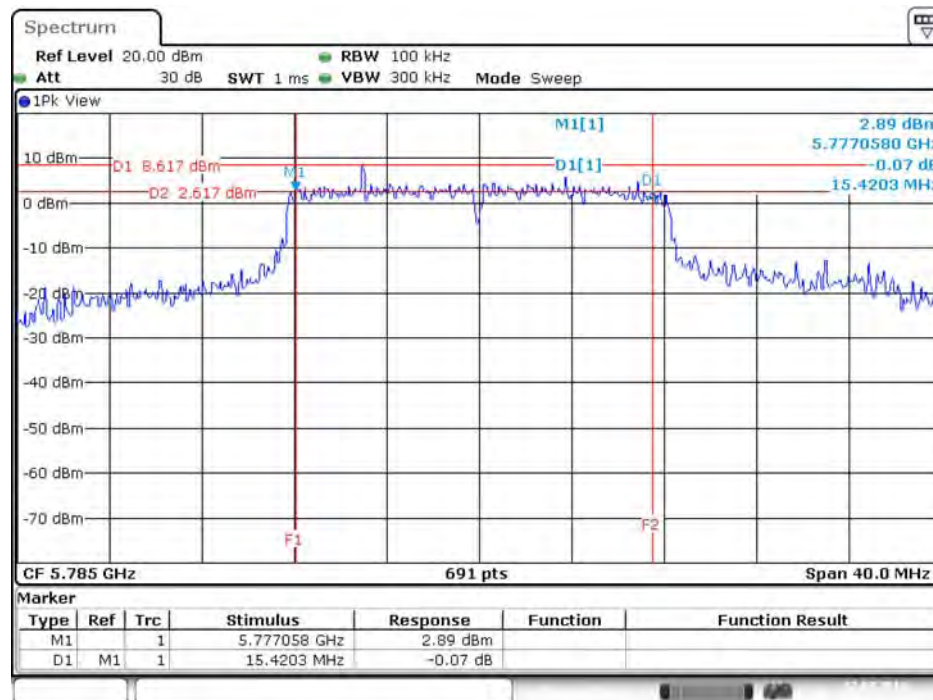
6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5745 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5785 MHz

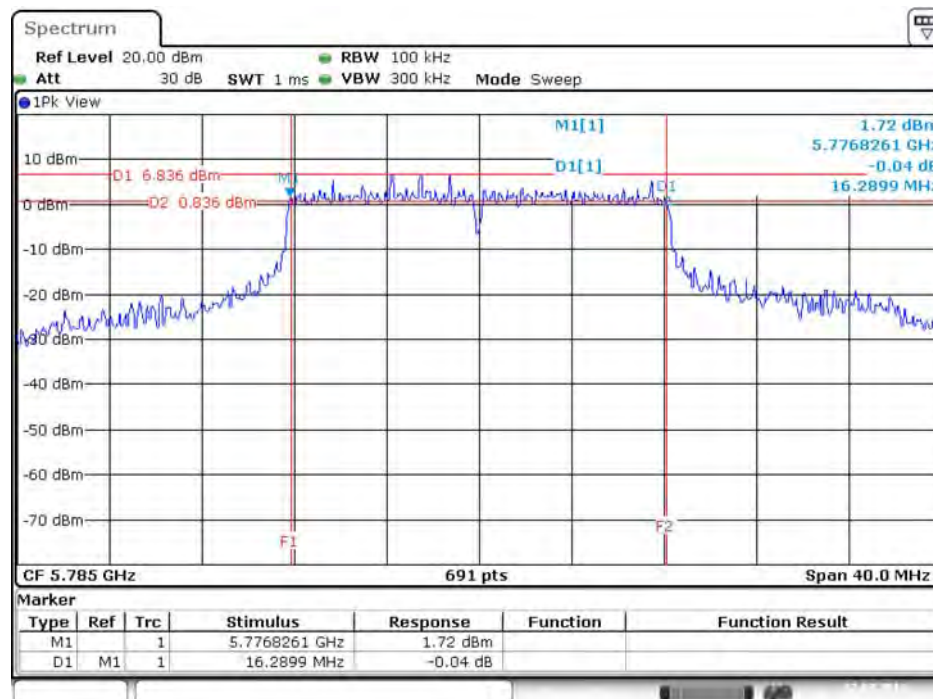


6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5785 MHz



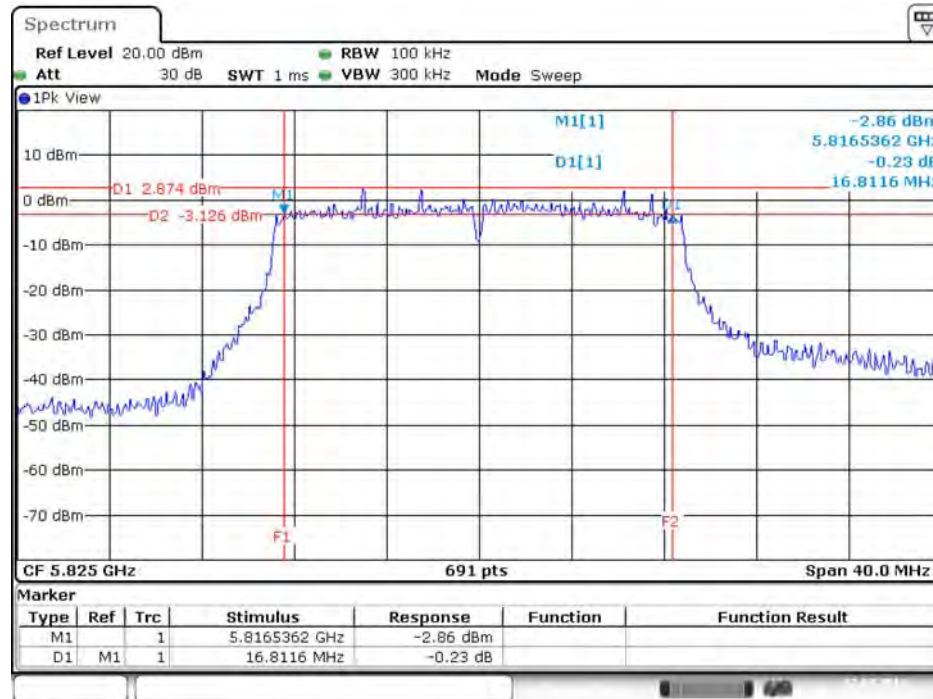
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5785 MHz

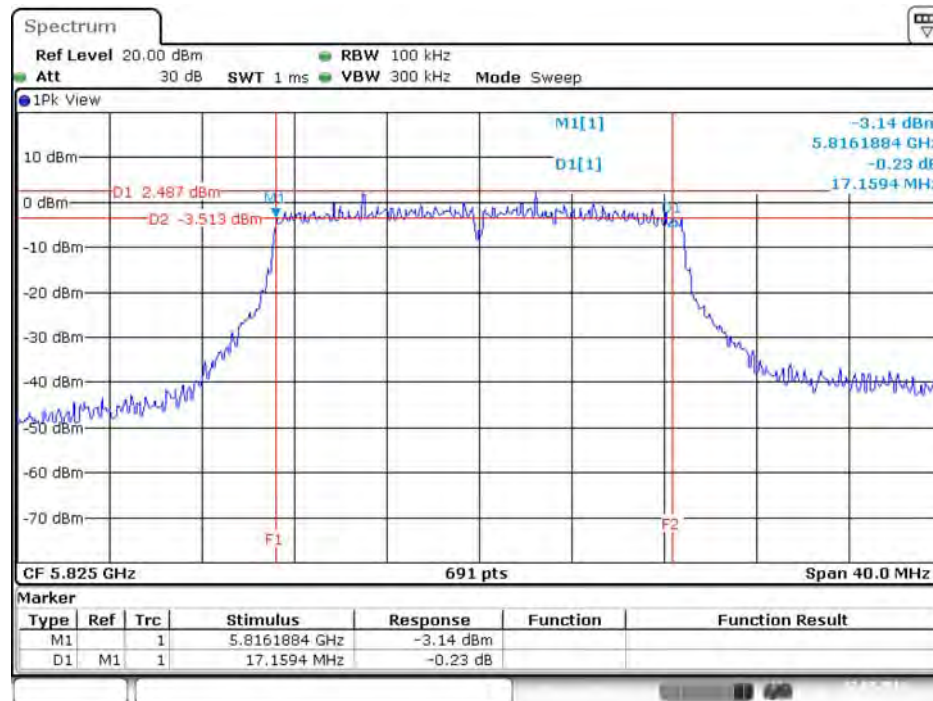


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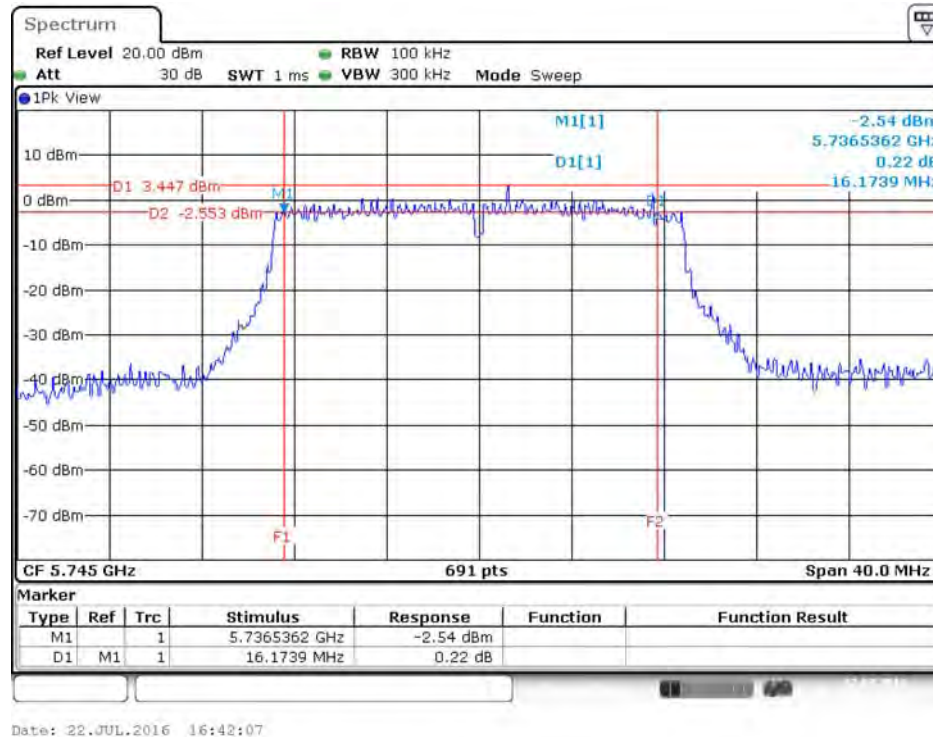
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5825 MHz



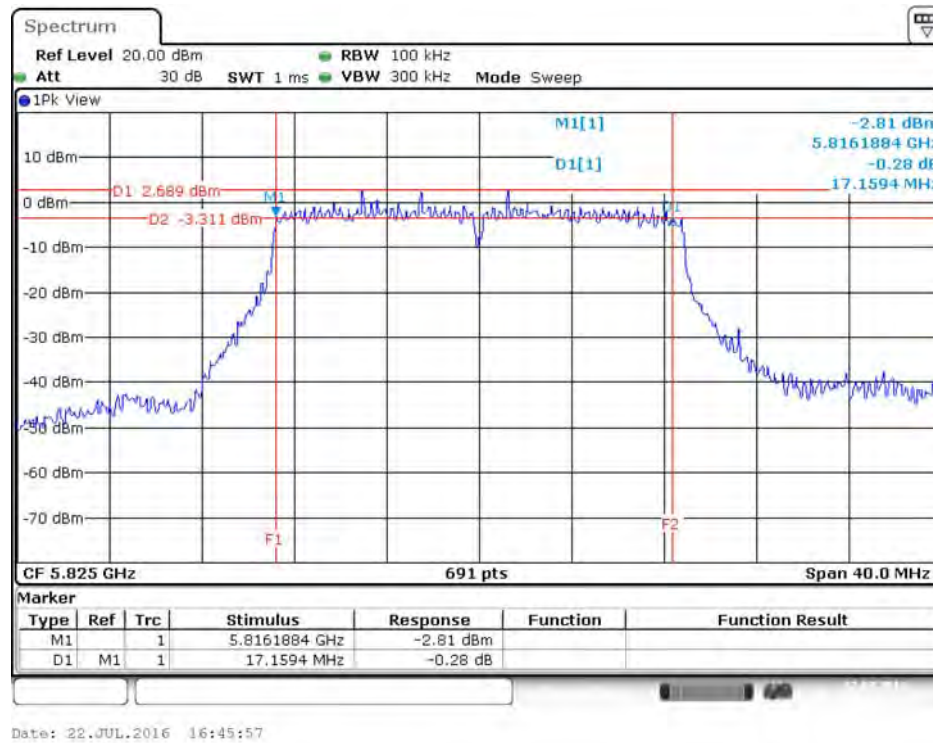
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



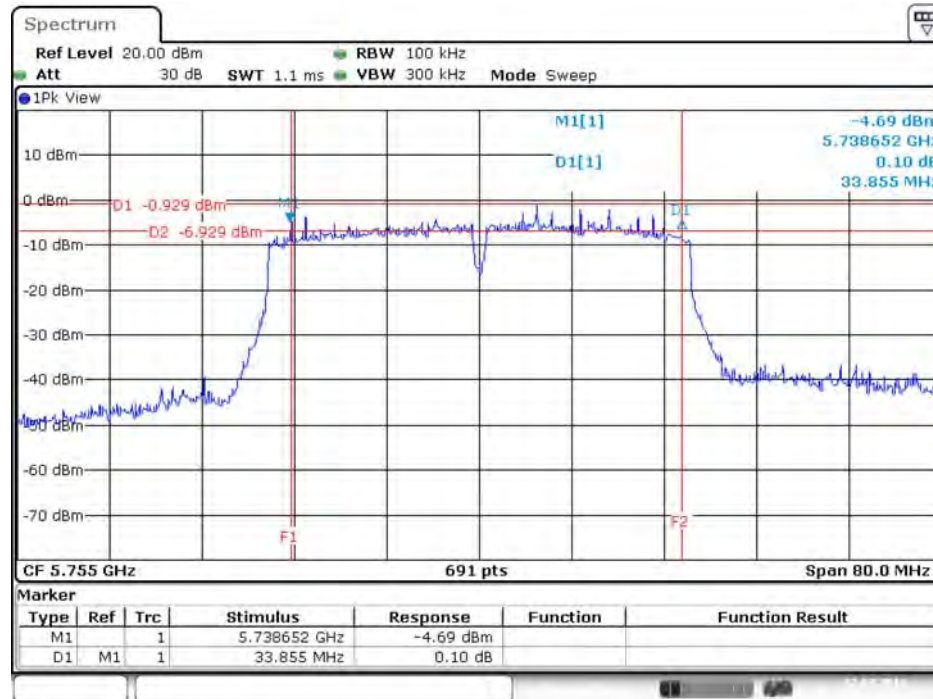
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5745 MHz



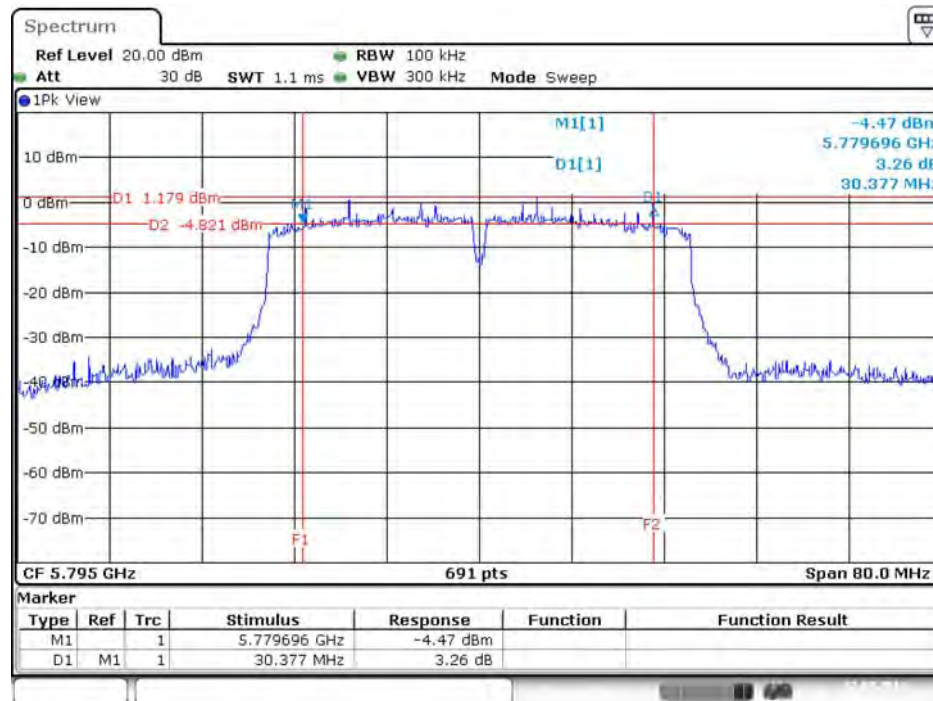
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5825 MHz



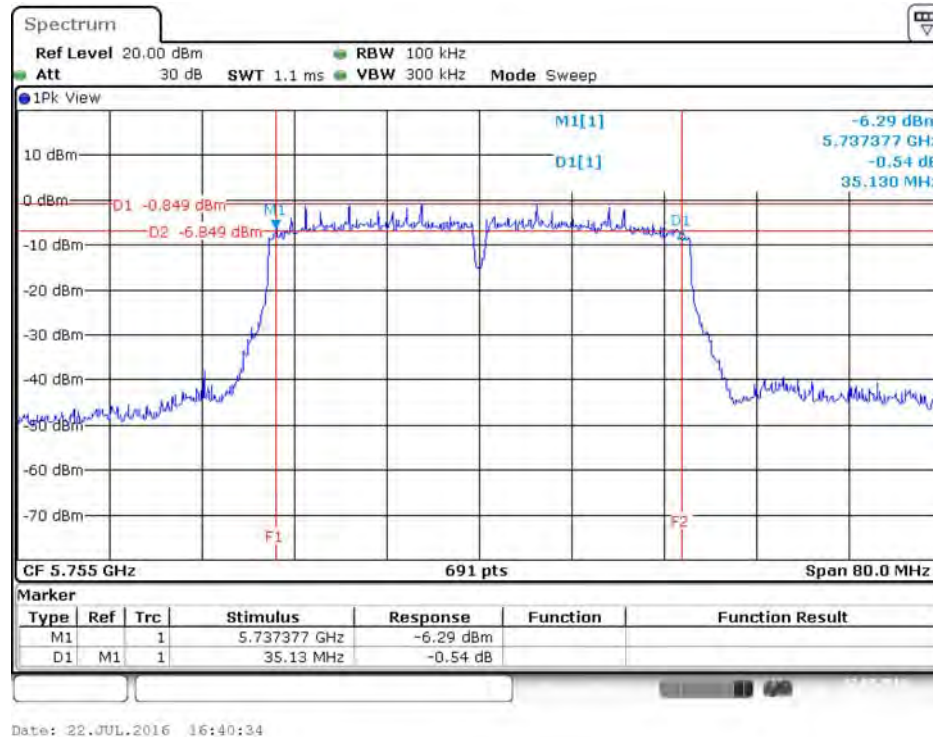
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5755 MHz



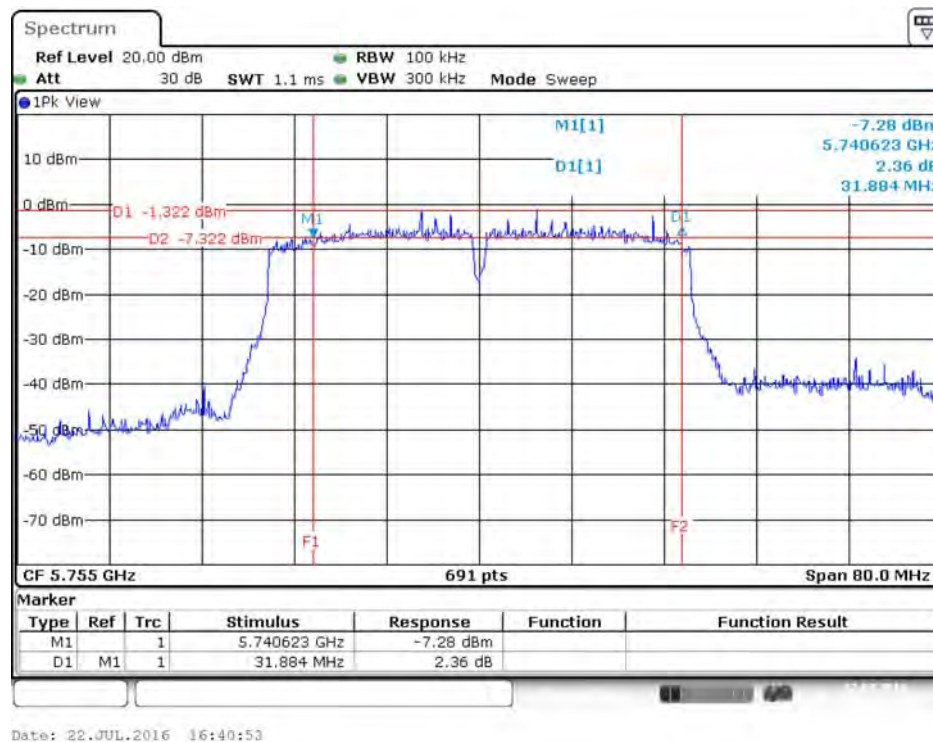
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5795 MHz



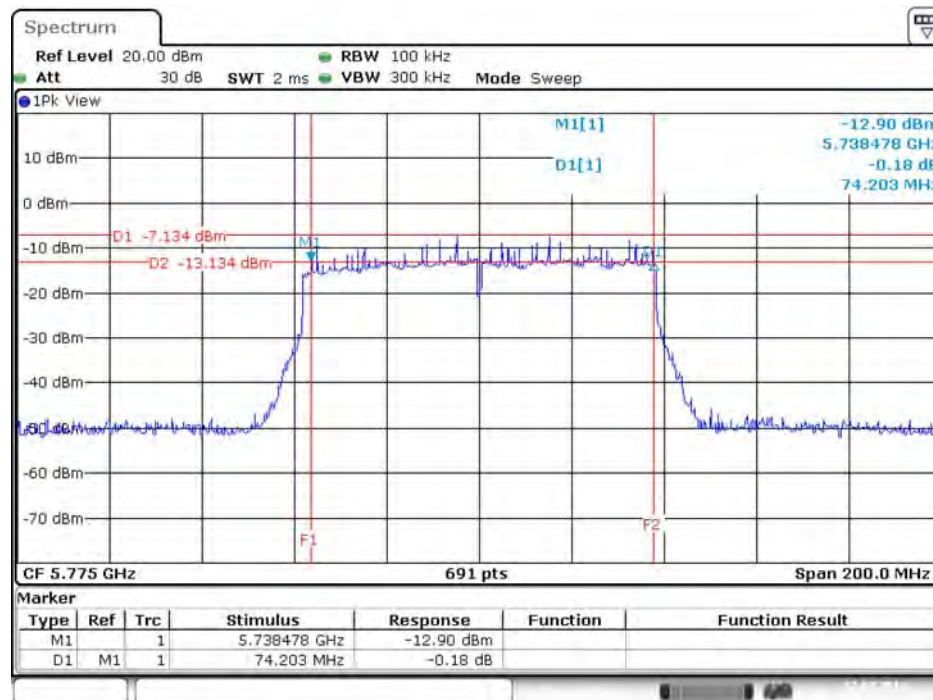
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5755 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5755 MHz

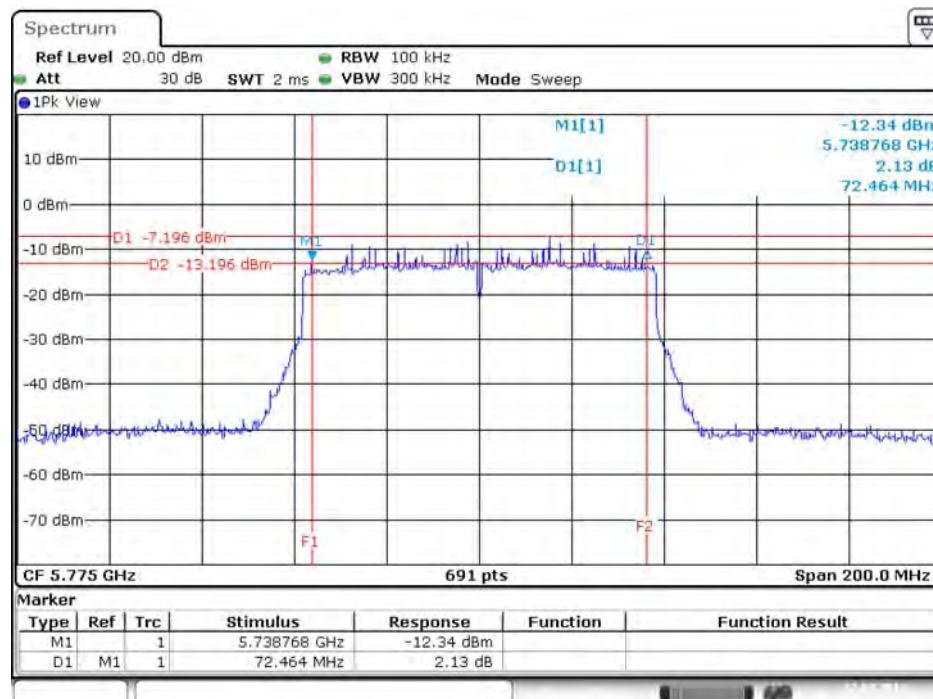


6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



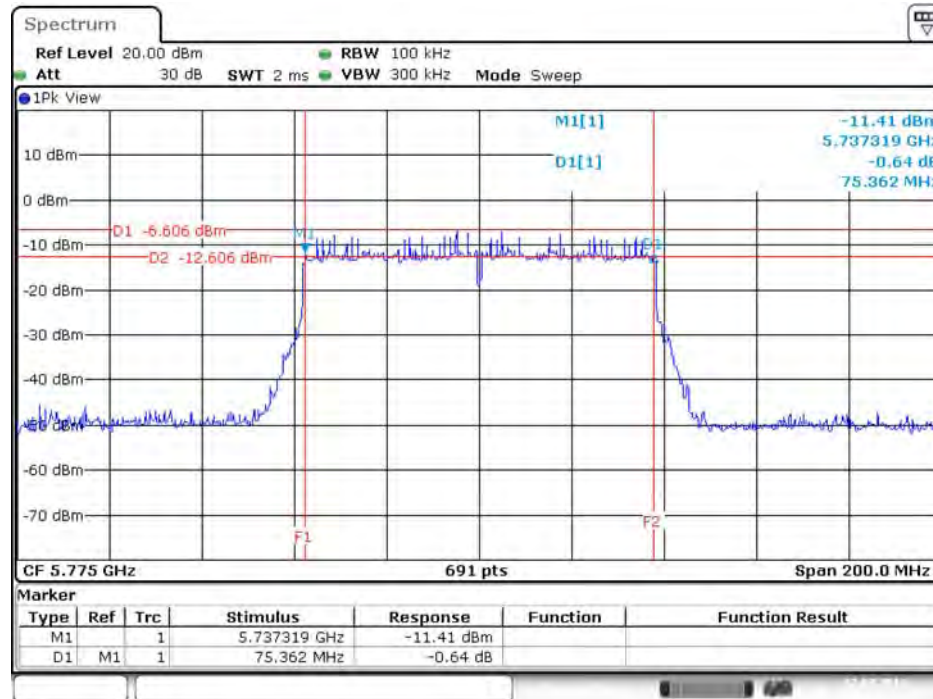
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5775 MHz



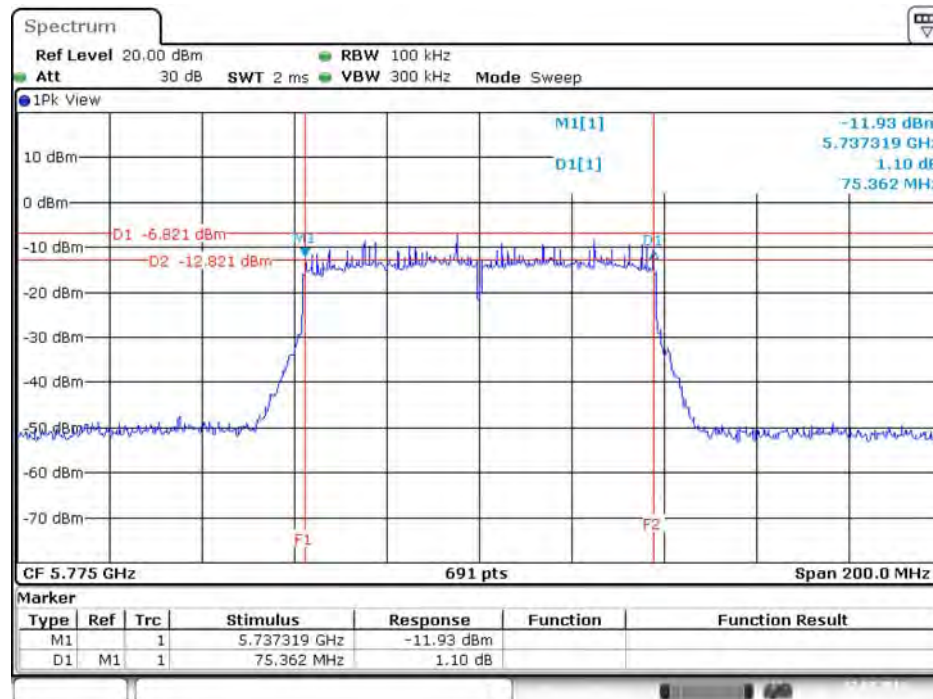
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5775 MHz



Date: 22.JUL.2016 16:37:19

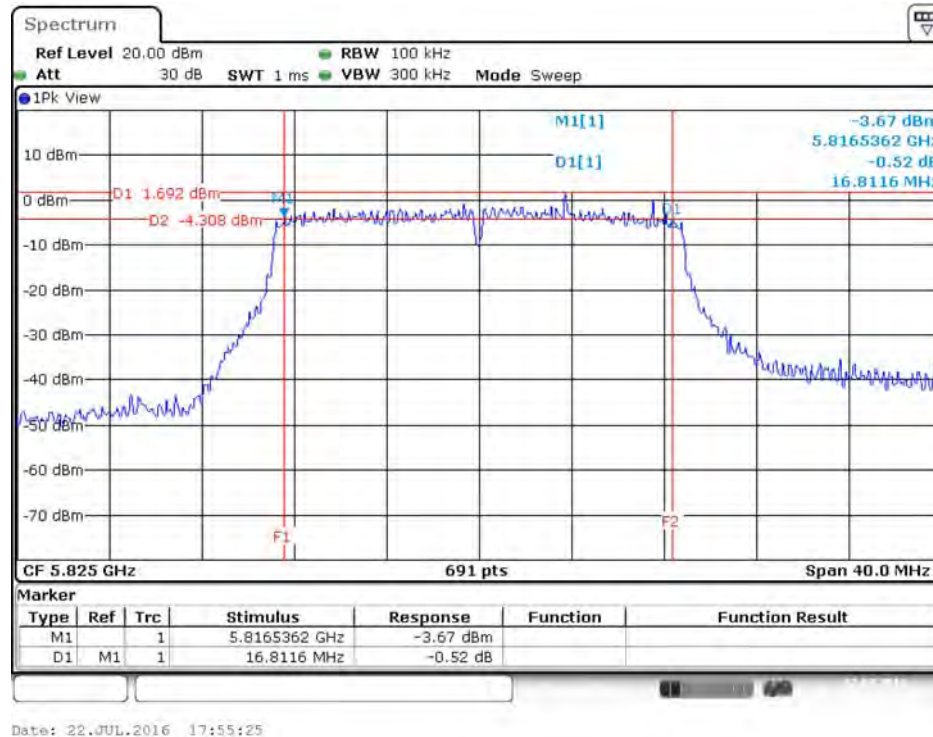
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 / 5775 MHz



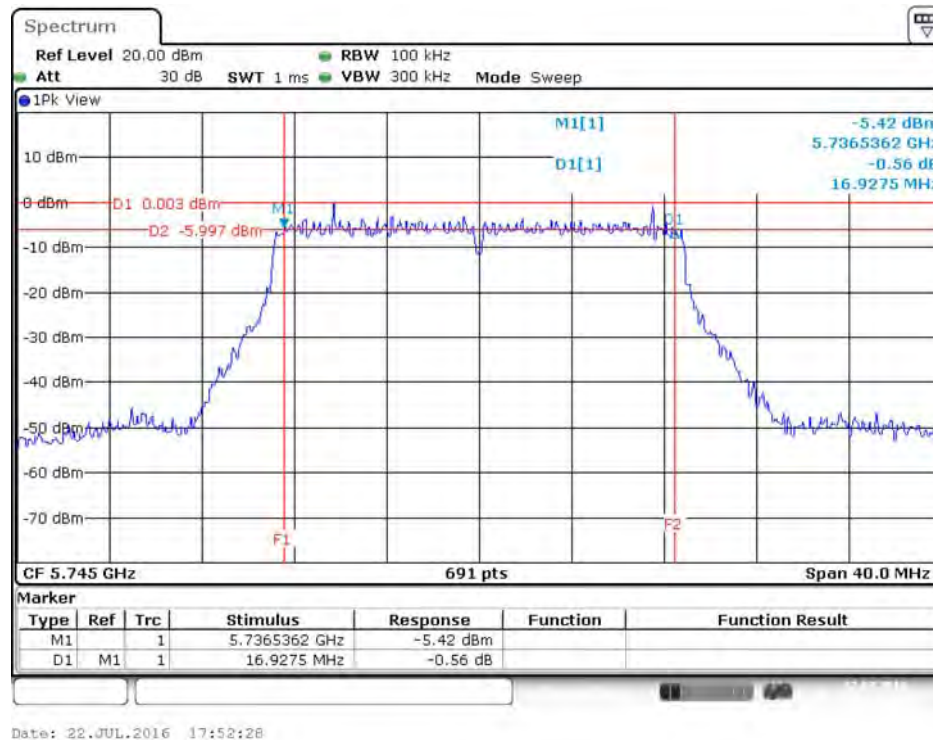
Date: 22.JUL.2016 16:37:34

For beamforming function:

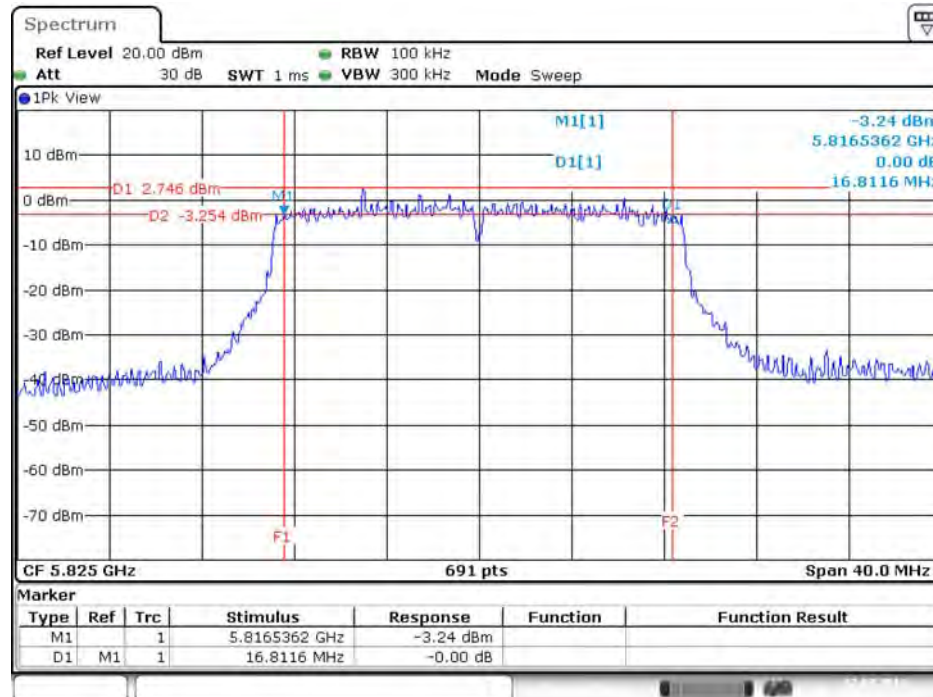
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5825 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5745 MHz

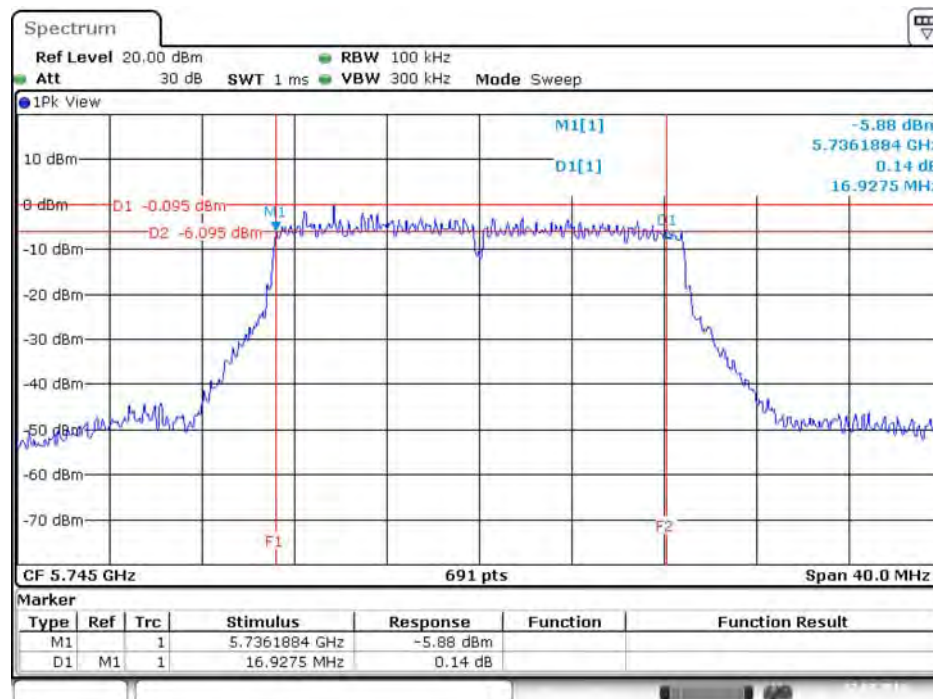


6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5825 MHz



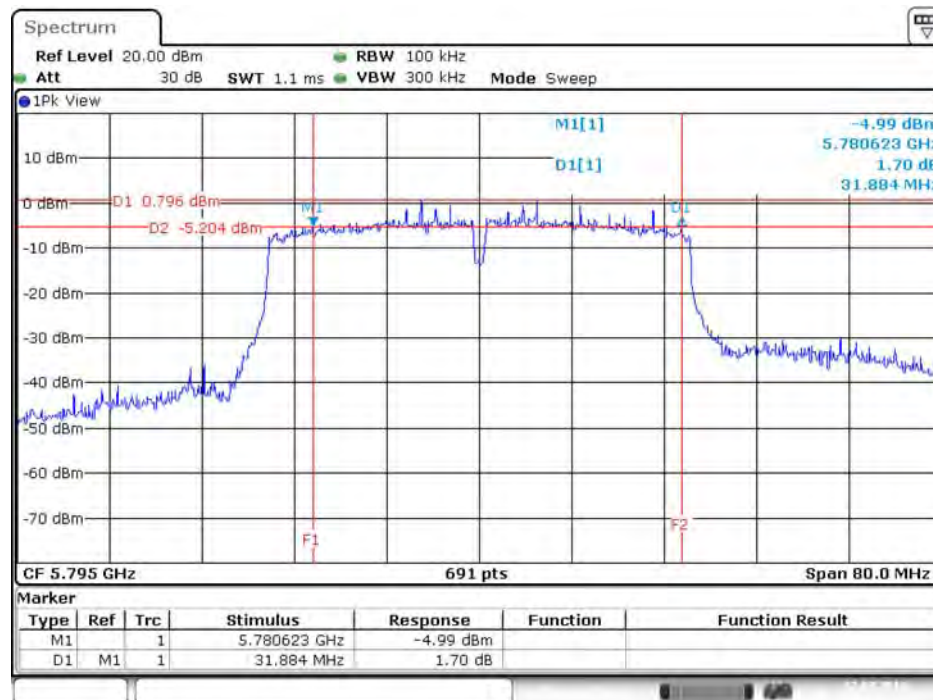
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 / 5745 MHz



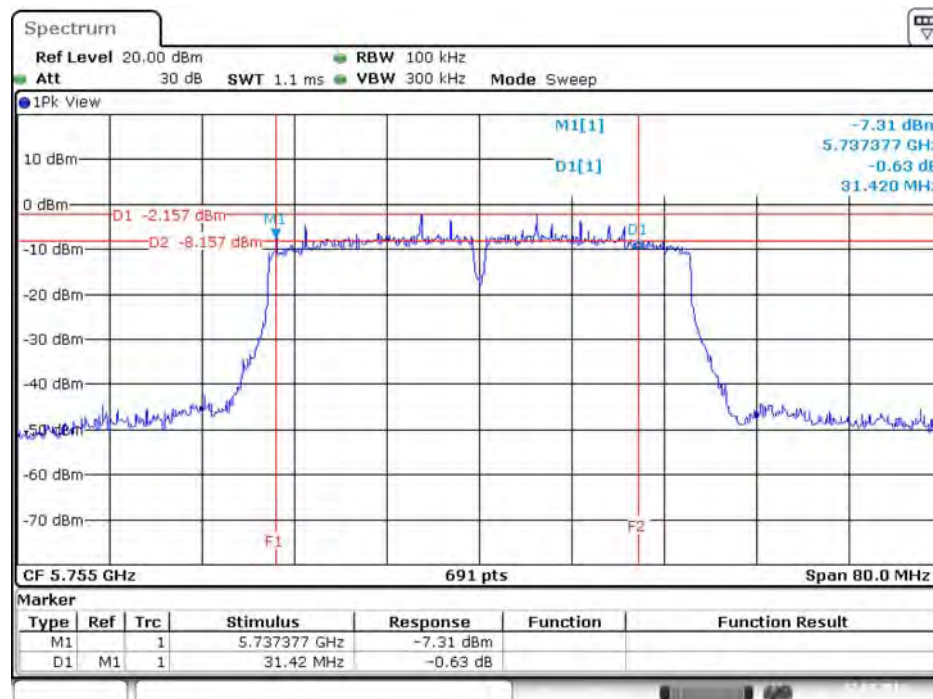
Date: 22.JUL.2016 17:53:01

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5795 MHz



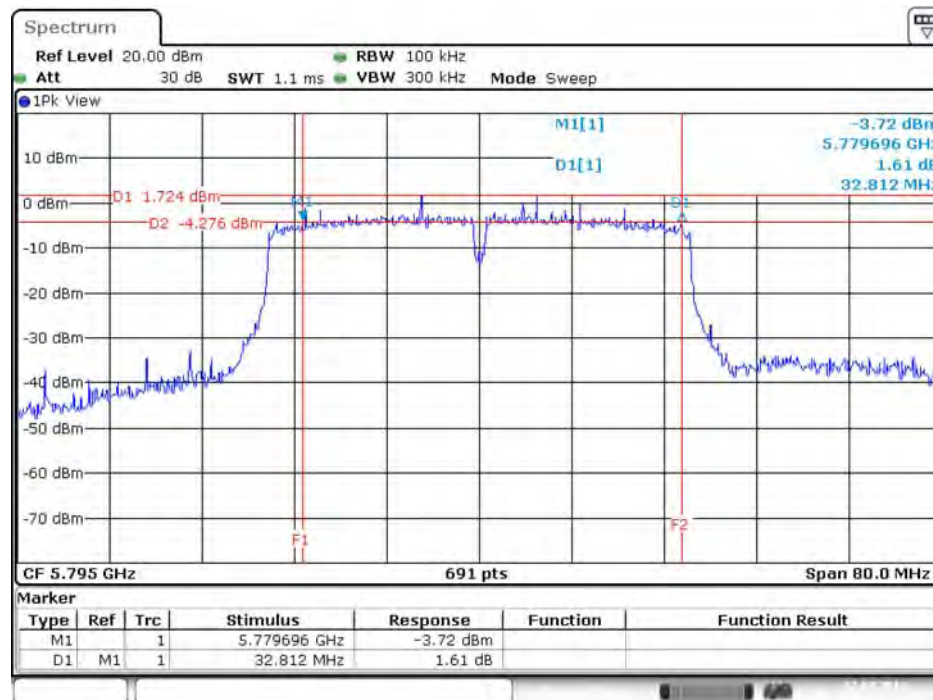
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5755 MHz



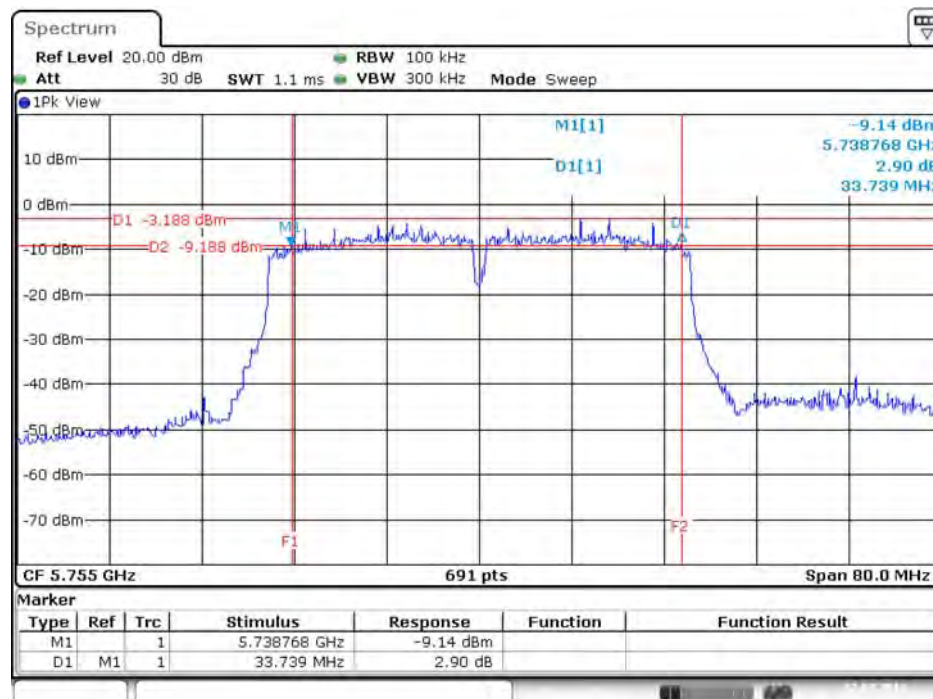
Date: 22.JUL.2016 17:47:47

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



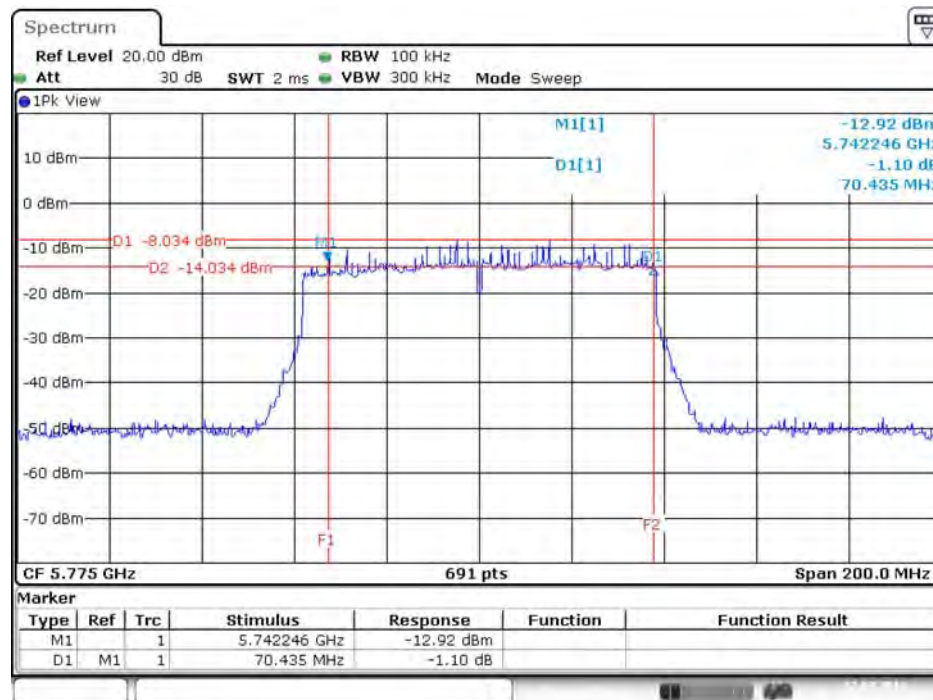
Date: 22.JUL.2016 17:49:19

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 / 5755 MHz



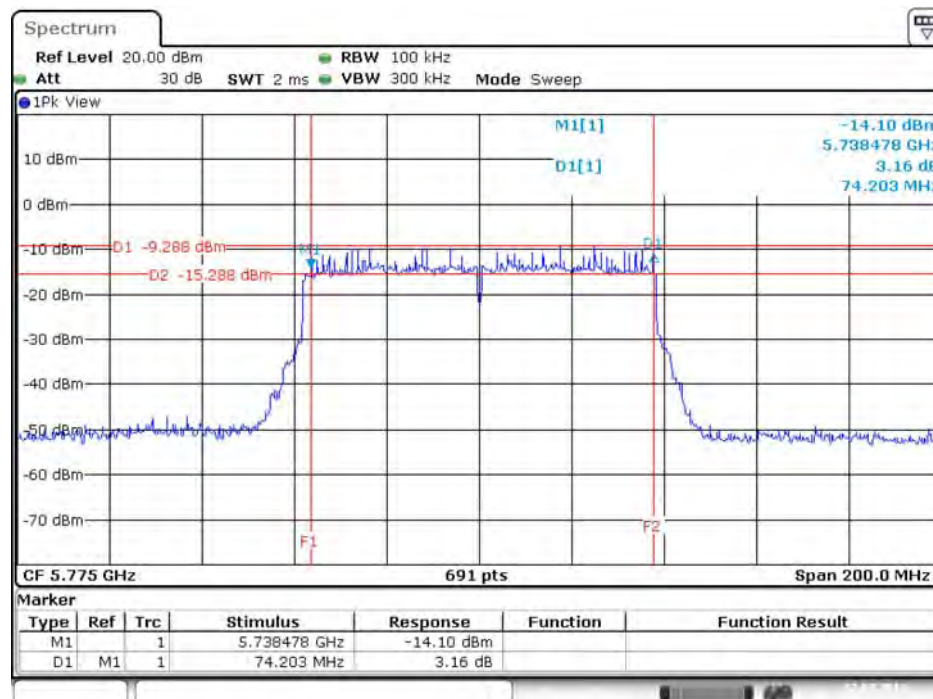
Date: 22.JUL.2016 17:46:56

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



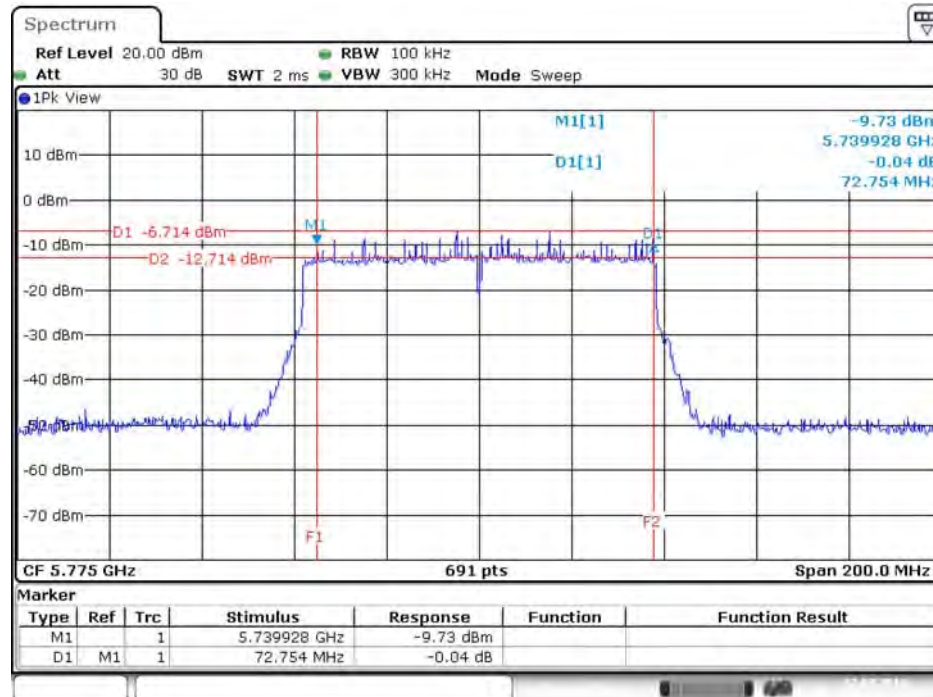
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5775 MHz



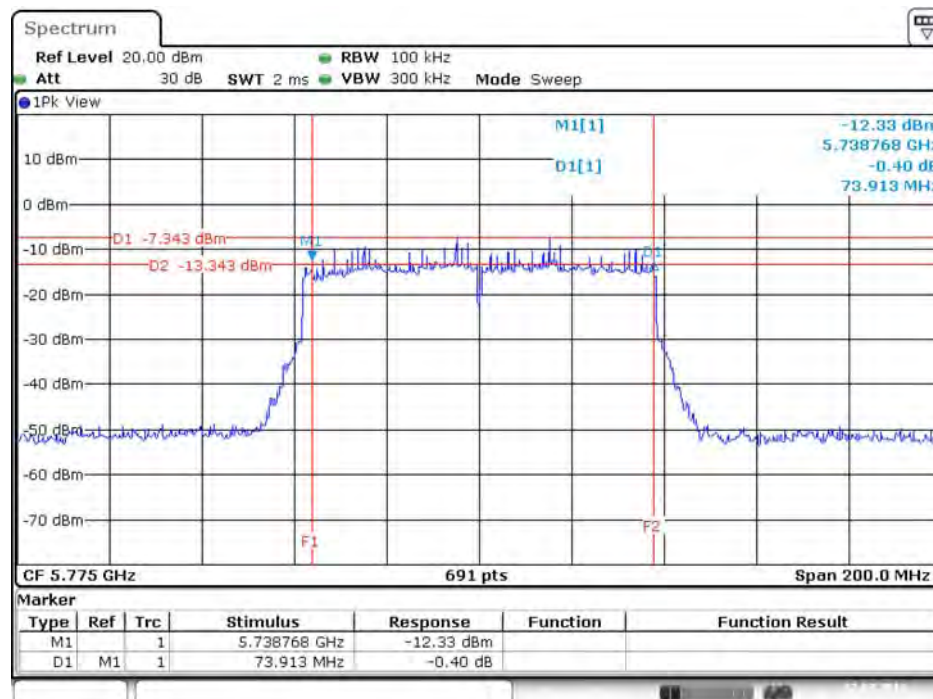
Date: 22.JUL.2016 17:51:07

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



Date: 22.JUL.2016 17:50:53

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



Date: 22.JUL.2016 17:50:39

4.4. Maximum Conducted Output Power Measurement

4.4.1. 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.
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4.4.2. Measuring Instruments and Setting

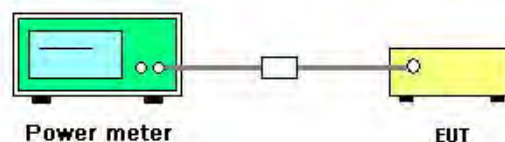
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 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.

4.4.4. 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 Maximum Conducted Output Power

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Date	Apr. 22, 2016~Apr. 23, 2016
Test Function	Non-beamforming function		

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5180 MHz	18.83	19.10	19.42	19.18	25.16	30.00	Complies
	5200 MHz	19.25	18.94	19.02	19.16	25.11	30.00	Complies
	5240 MHz	19.28	18.95	18.99	19.14	25.11	30.00	Complies
	5745 MHz	17.37	17.06	18.37	17.23	23.56	30.00	Complies
	5785 MHz	21.85	21.80	22.69	21.60	28.03	30.00	Complies
	5825 MHz	18.07	17.85	18.82	17.84	24.18	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	17.90	17.65	20.00	17.62	24.44	30.00	Complies
	5200 MHz	19.15	18.67	18.76	18.52	24.80	30.00	Complies
	5240 MHz	18.71	18.58	18.72	18.51	24.65	30.00	Complies
	5745 MHz	17.40	17.15	18.26	17.12	23.53	30.00	Complies
	5785 MHz	21.96	21.51	22.29	21.84	27.93	30.00	Complies
	5825 MHz	17.87	17.7	18.42	17.64	23.94	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	16.34	16.58	16.66	16.14	22.46	30.00	Complies
	5230 MHz	19.53	18.81	21.50	18.91	25.85	30.00	Complies
	5755 MHz	15.71	15.79	17.19	15.27	22.07	30.00	Complies
	5795 MHz	19.10	18.31	19.3	18.42	24.82	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	11.12	11.08	13.43	10.93	17.79	30.00	Complies
	5775 MHz	12.22	12.11	12.52	11.99	18.24	30.00	Complies

Note: For CDD mode, in-band power directional gain = antenna gain + array gain, array gain = 0 (when Nant ≤ 4)

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Date	Apr. 22, 2016~Apr. 23, 2016
Test Function	Beamforming function		

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	16.56	16.47	16.40	16.33	22.46	25.20	Complies
	5200 MHz	17.44	17.53	17.60	17.67	23.58	25.20	Complies
	5240 MHz	17.60	17.65	17.73	17.78	23.71	25.20	Complies
	5745 MHz	15.72	15.46	15.68	15.69	21.66	24.14	Complies
	5785 MHz	17.75	17.89	17.82	17.95	23.87	24.14	Complies
	5825 MHz	16.50	16.68	16.88	16.83	22.75	24.14	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	11.88	12.12	12.10	12.17	18.09	25.20	Complies
	5230 MHz	17.42	17.51	17.58	17.65	23.56	25.20	Complies
	5755 MHz	13.24	13.50	14.28	14.27	19.87	24.14	Complies
	5795 MHz	17.07	16.80	17.03	16.99	22.99	24.14	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	10.25	10.19	10.31	10.23	16.27	25.20	Complies
	5775 MHz	11.63	11.39	11.19	11.07	17.35	24.14	Complies

Note: Directional Gain=GANT+ 10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=30 – (10.80 – 6)=25.20dBm.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm.

4.5. Power Spectral Density Measurement

4.5.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.4.1.

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

4.5.2. Measuring Instruments and Setting

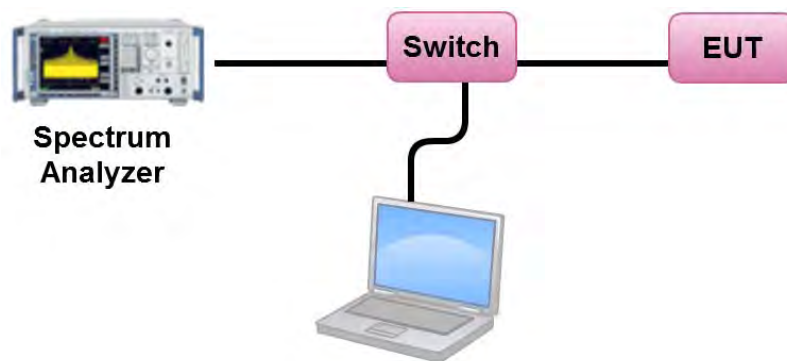
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.5.3. 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 v01r02 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 and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add $10\log(500\text{kHz}/\text{RBW})$ and the final result should $\leq 30 \text{ dBm}$.

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

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Date	Apr. 22, 2016~Apr. 23, 2016
Test Function	Non-beamforming function		

Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
36	5180 MHz	11.78		12.20		Complies
40	5200 MHz	12.00		12.20		Complies
48	5240 MHz	12.19		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.24	-3.01	7.23	24.14	Complies
157	5785 MHz	14.65	-3.01	11.64	24.14	Complies
165	5825 MHz	10.75	-3.01	7.74	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
36	5180 MHz	11.05		12.20		Complies
40	5200 MHz	11.88		12.20		Complies
48	5240 MHz	11.92		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.22	-3.01	7.21	24.14	Complies
157	5785 MHz	14.60	-3.01	11.59	24.14	Complies
165	5825 MHz	10.54	-3.01	7.53	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
38	5190 MHz	6.25		12.20		Complies
46	5230 MHz	9.61		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	5.74	-3.01	2.73	24.14	Complies
159	5795 MHz	8.73	-3.01	5.72	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
42	5210 MHz	-1.27		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-0.91	-3.01	-3.92	24.14	Complies

Note: Directional Gain=GANT+ 10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Temperature	24°C	Humidity	60%
Test Engineer	Eddie Weng / Clemens Fang	Test Date	Apr. 22, 2016~Apr. 23, 2016
Test Function	Beamforming function		

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
36	5180 MHz	9.14		12.20		Complies
40	5200 MHz	10.22		12.20		Complies
48	5240 MHz	10.27		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	8.33	-3.01	5.32	24.14	Complies
157	5785 MHz	10.34	-3.01	7.33	24.14	Complies
165	5825 MHz	9.32	-3.01	6.31	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
38	5190 MHz	2.00		12.20		Complies
46	5230 MHz	7.51		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	3.60	-3.01	0.59	24.14	Complies
159	5795 MHz	6.82	-3.01	3.81	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
42	5210 MHz	-2.90		12.20		Complies
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-1.90	-3.01	-4.91	24.14	Complies

Note: Directional Gain=GANT+10 log(NANT)

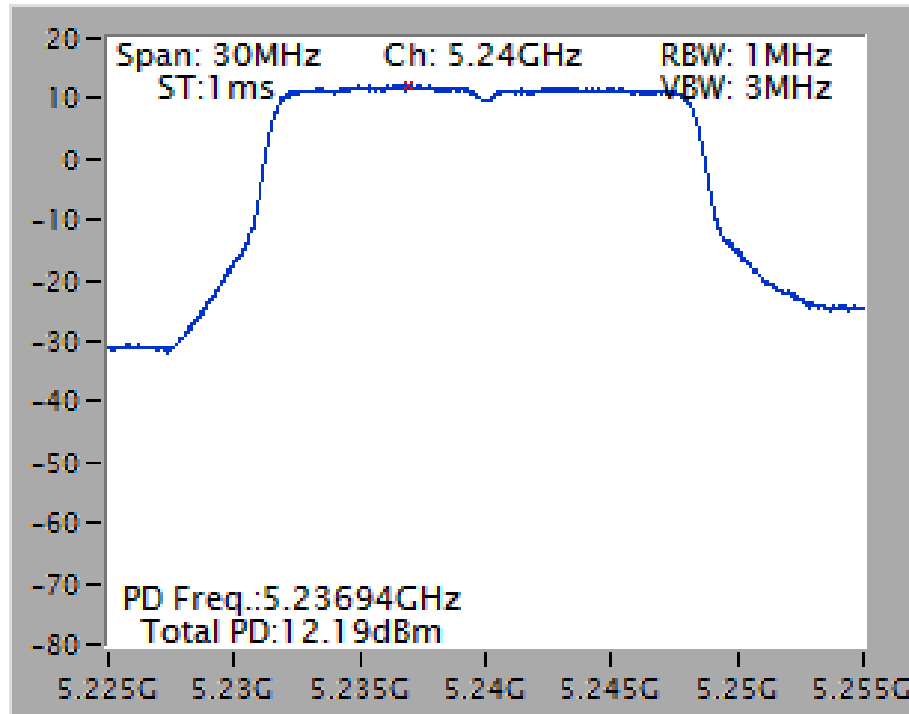
1. 5GHz band 1 direction gain=10.80dBi >6dBi, so limit=17 – (10.80 – 6)=12.20dBm/MHz.
2. 5GHz band 4 direction gain=11.86dBi >6dBi, so limit=30 – (11.86 – 6)=24.14dBm/500kHz.

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

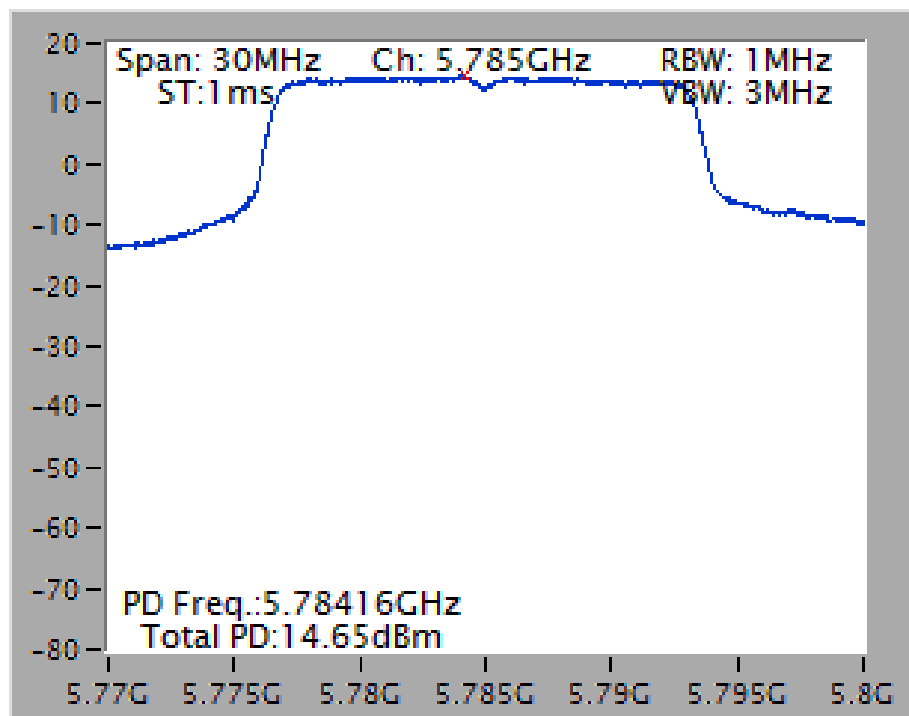
For plots, only the channel with worse result was shown.

For non-beamforming function:

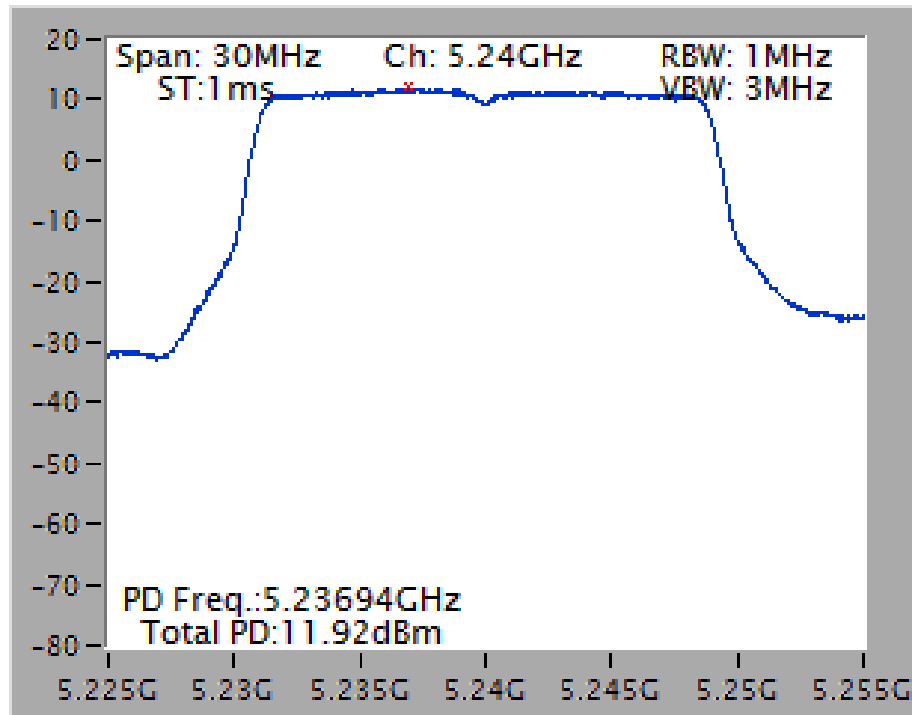
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



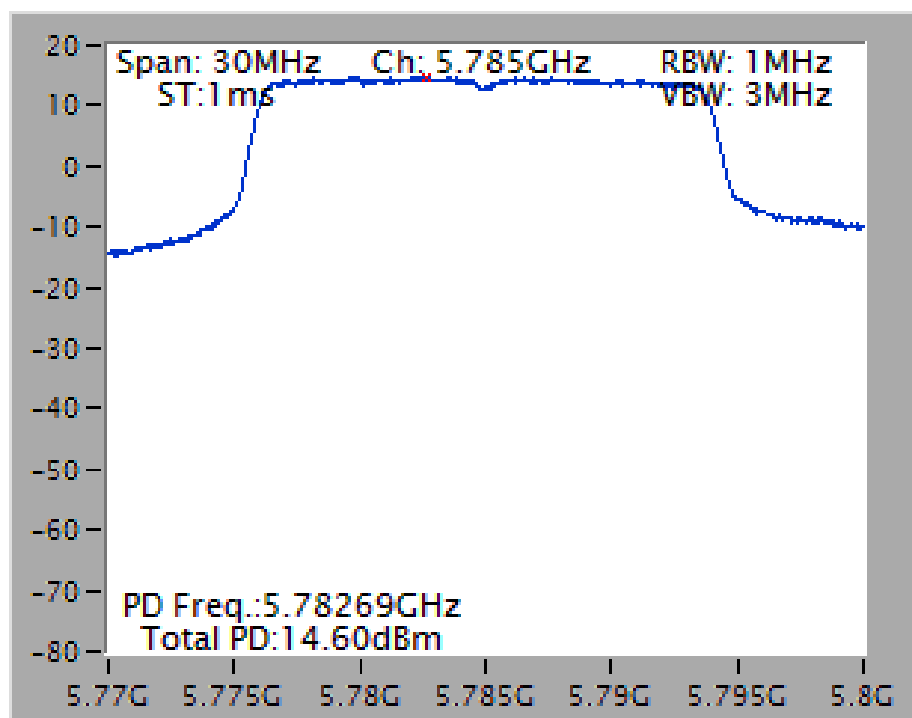
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



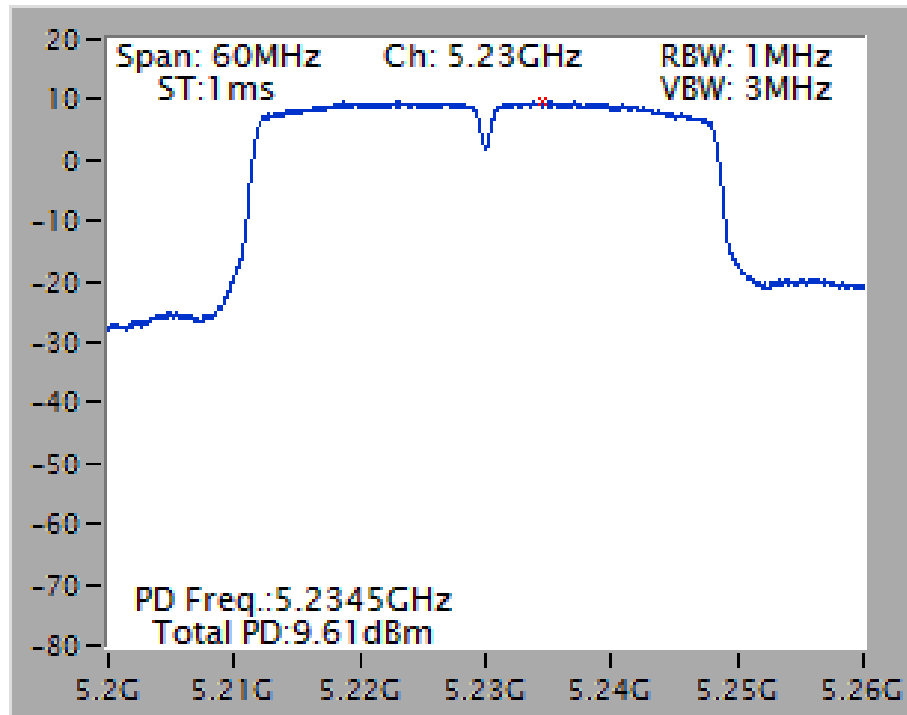
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



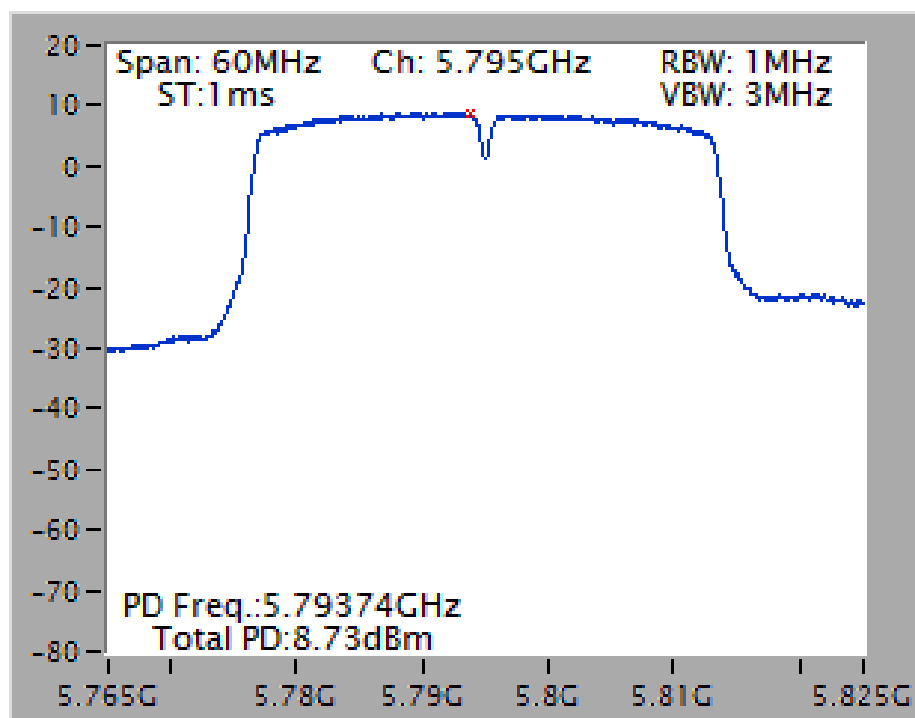
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



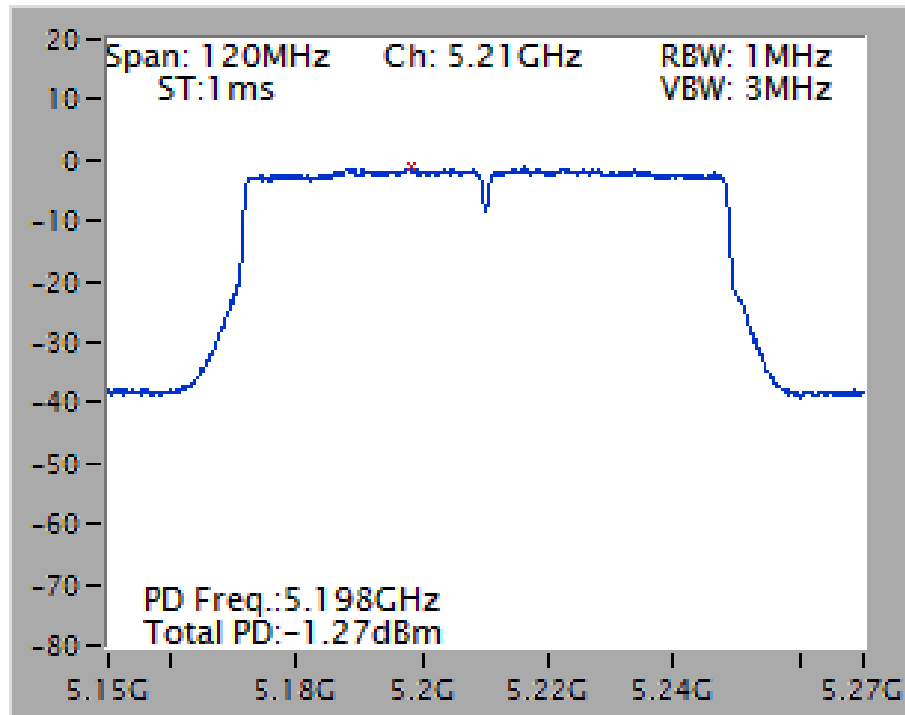
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz



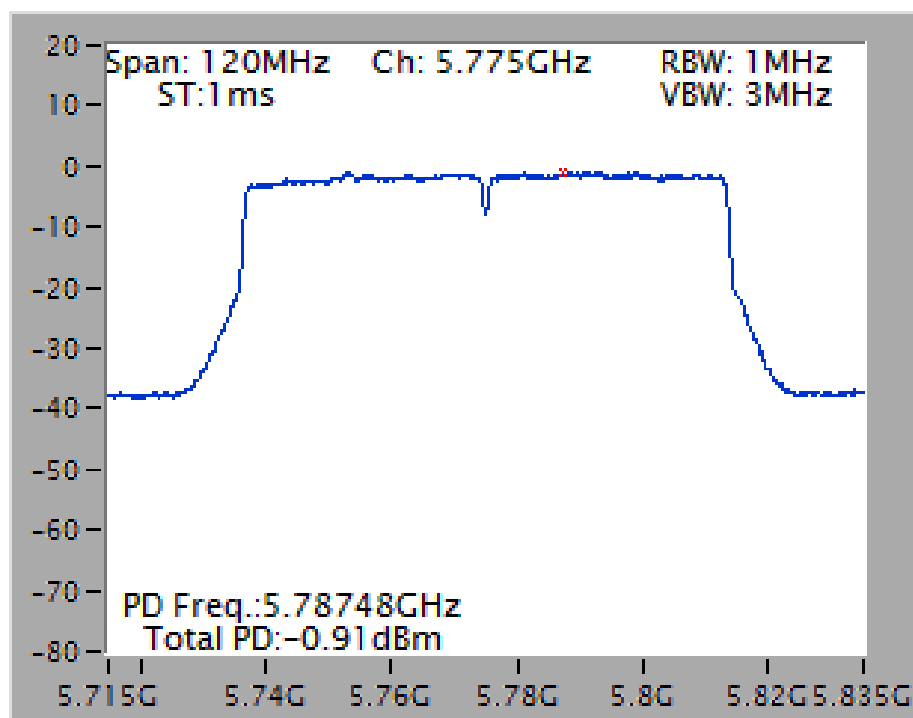
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz

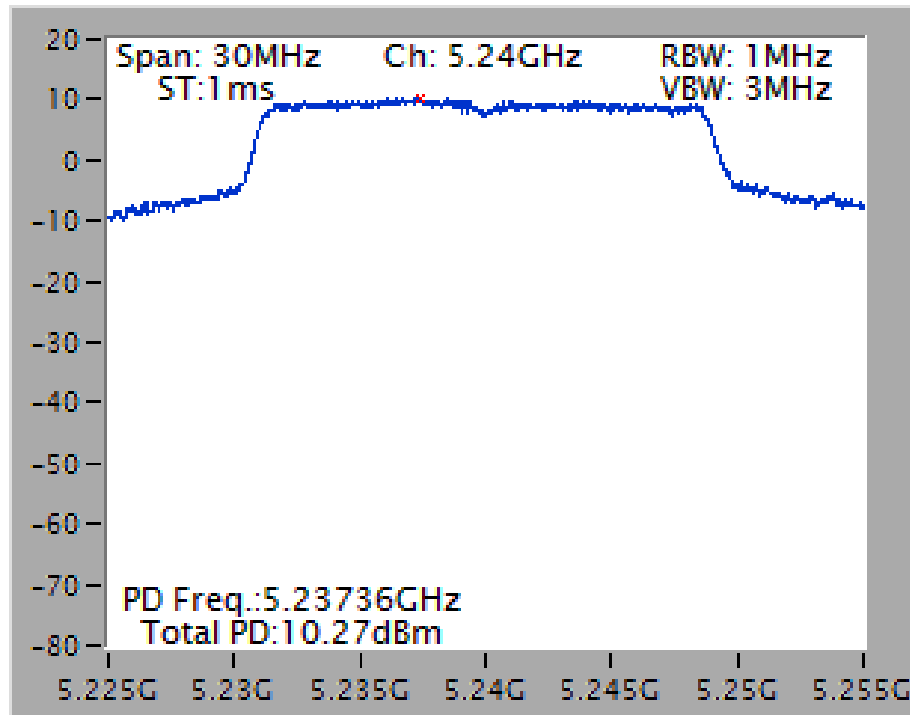


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz

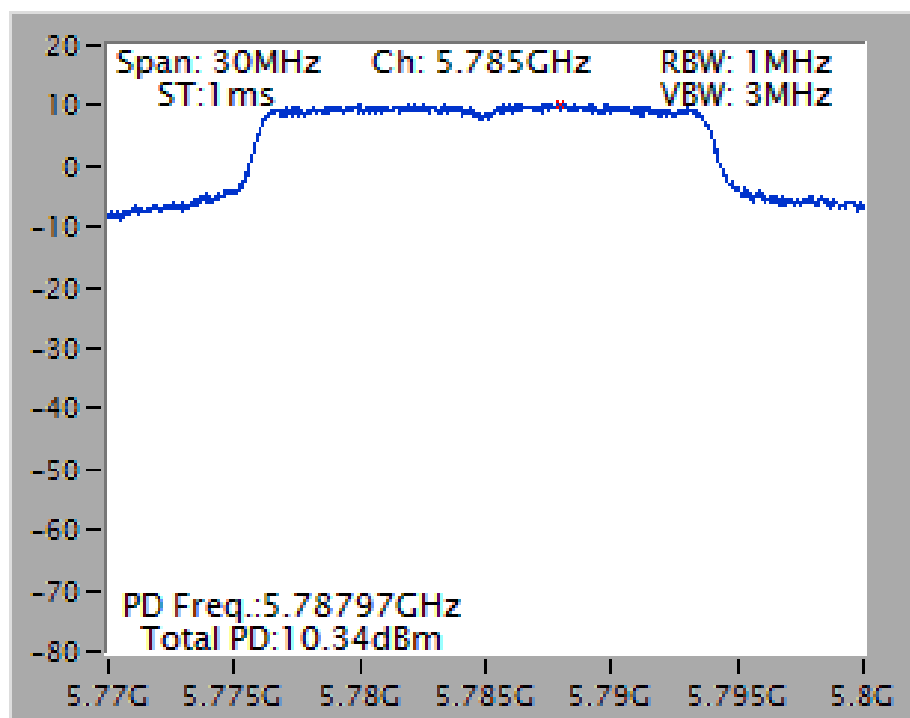


For beamforming function:

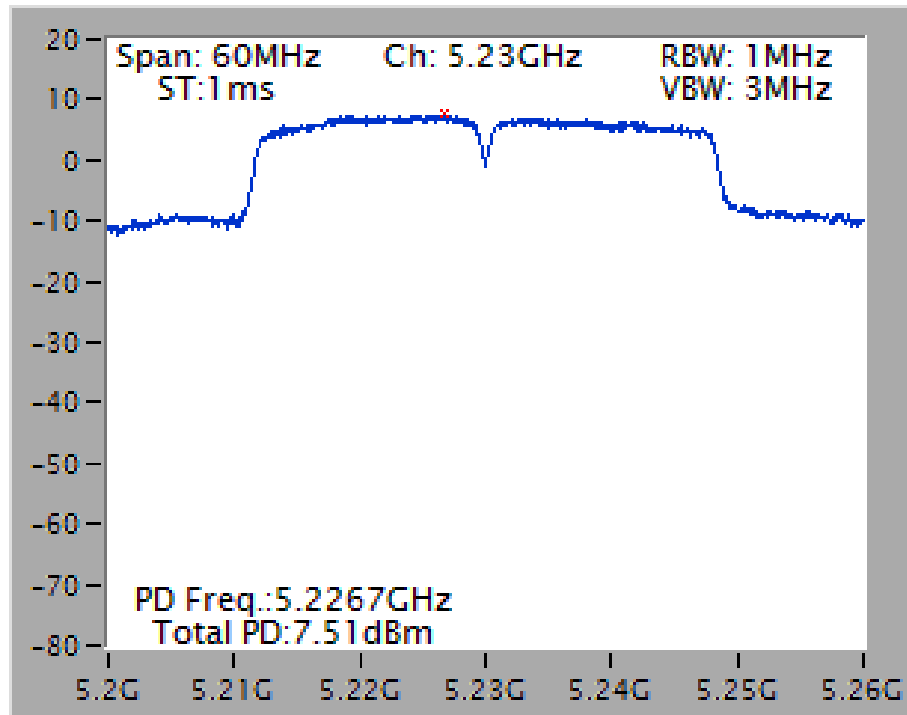
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



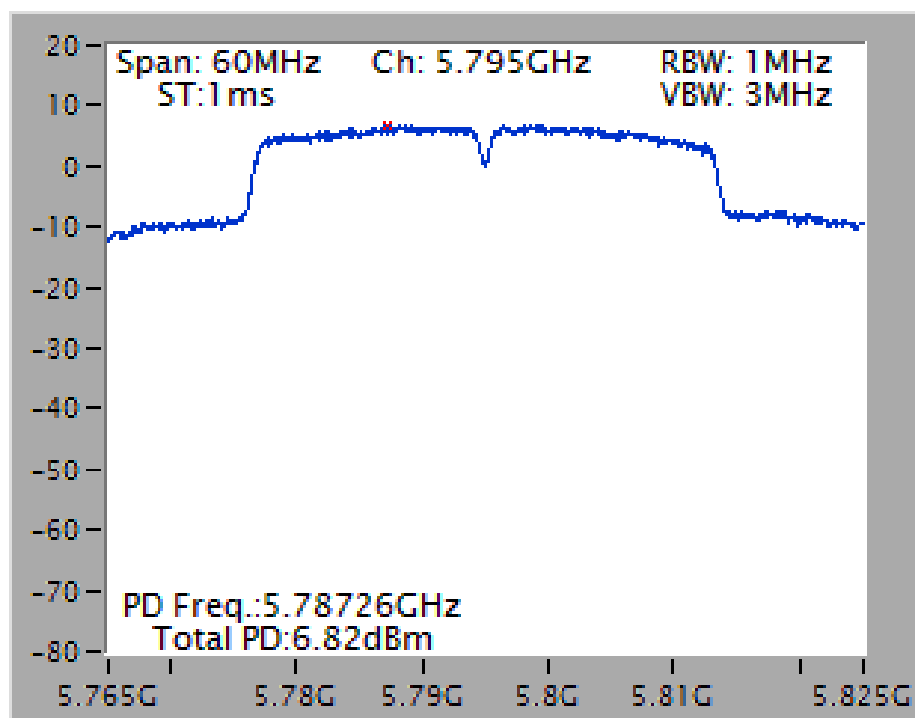
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



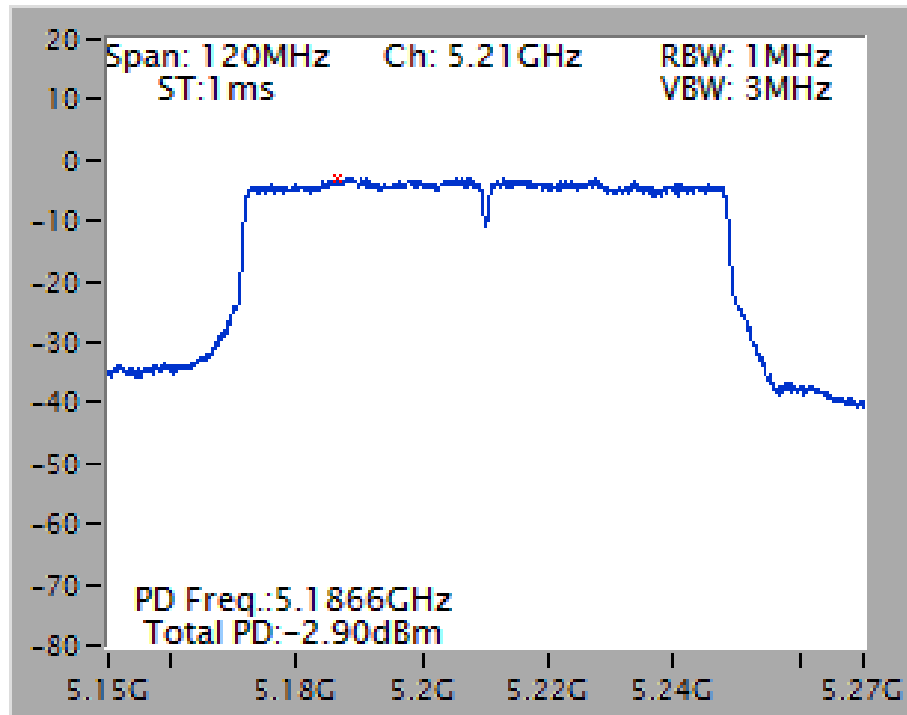
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz



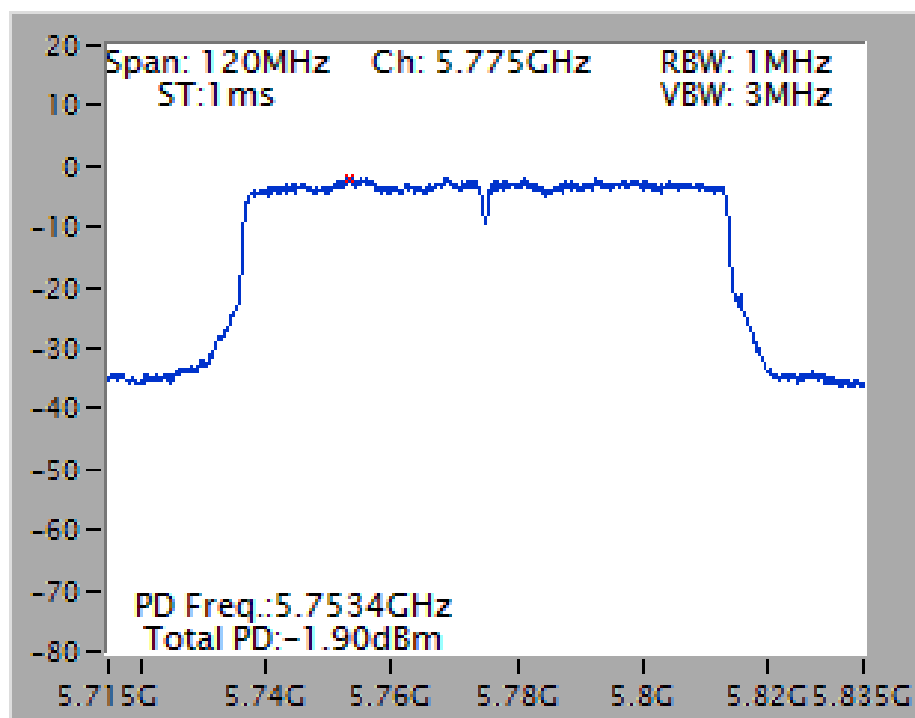
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

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

Note: -17 and -27 dBm/MHz limits are lower than the current 15.407 (b) (4) (i) requirement.

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 spectrum analyzer and receiver.

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

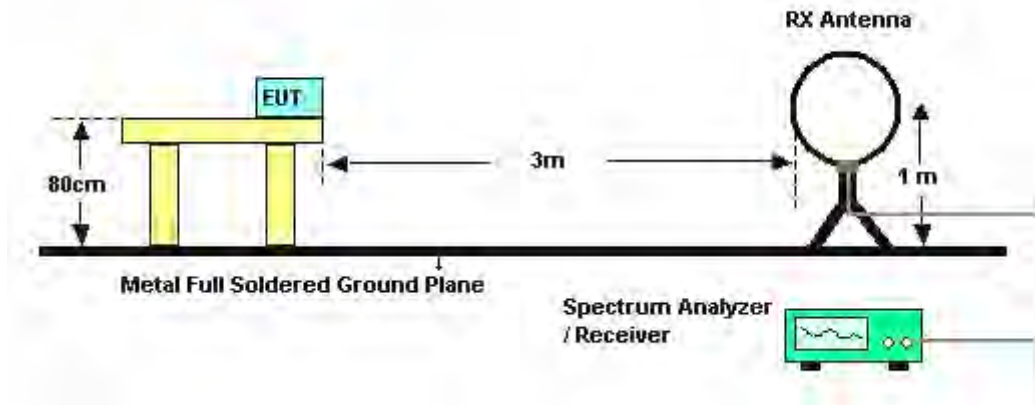
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

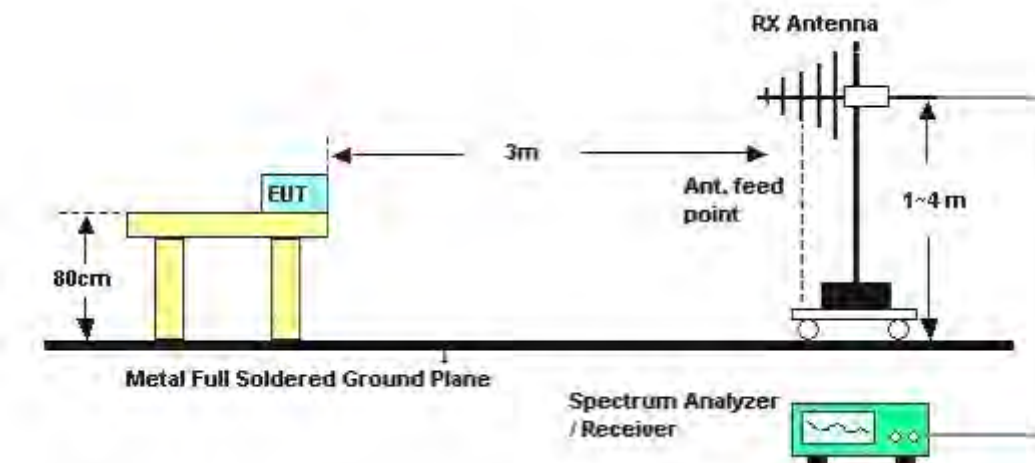
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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.
10. The measurement distance for 1 to 18GHz is 3m, and above 18GHz is 1m.

4.6.4. Test Setup Layout

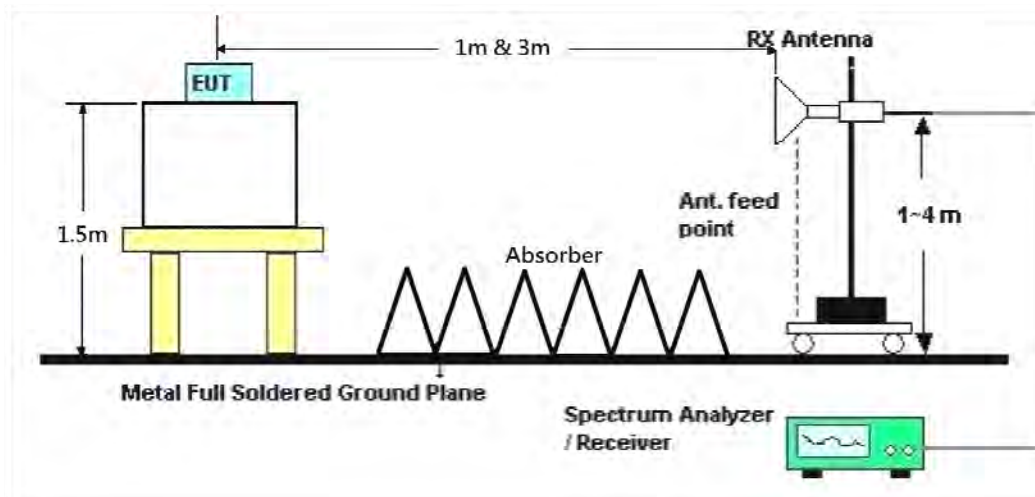
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



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. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	Normal Link
Test Date	May 06, 2016	Test Mode	Mode 2

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

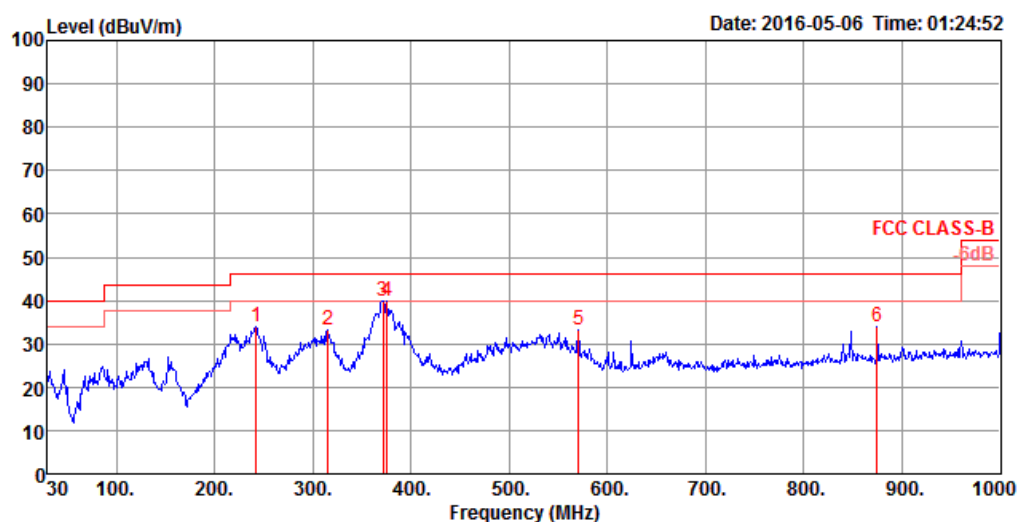
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.6.8. Results of Radiated Emissions (30MHz~1GHz)

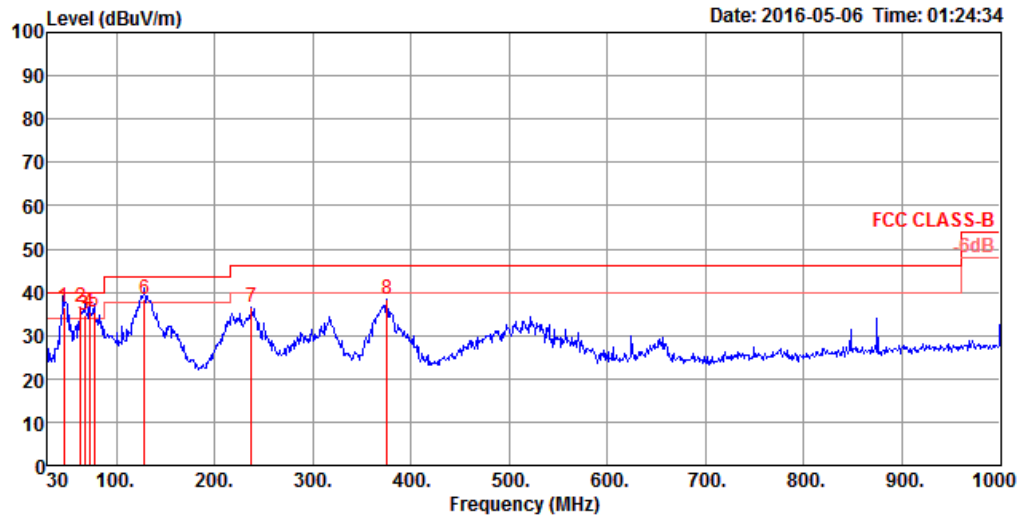
Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	Normal Link
Test Mode	Mode 2		

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	242.43	34.02	46.00	-11.98	46.43	1.32	18.58	32.31	125	271 Peak	HORIZONTAL
2	315.18	33.32	46.00	-12.68	43.64	1.52	20.45	32.29	100	84 Peak	HORIZONTAL
3	371.44	39.94	46.00	-6.06	48.62	1.66	21.98	32.32	100	166 Peak	HORIZONTAL
4	375.32	39.95	46.00	-6.05	48.52	1.67	22.08	32.32	100	193 Peak	HORIZONTAL
5	570.29	33.28	46.00	-12.72	38.55	2.07	25.05	32.39	200	306 Peak	HORIZONTAL
6	874.87	33.91	46.00	-12.09	35.67	2.55	27.55	31.86	125	48 Peak	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	46.49	36.43	40.00	-3.57	51.80	0.60	16.44	32.41	125	132 QP	VERTICAL
2	63.95	36.53	40.00	-3.47	54.86	0.70	13.37	32.40	100	360 Peak	VERTICAL
3	67.83	34.57	40.00	-5.43	53.20	0.71	13.06	32.40	150	299 QP	VERTICAL
4	72.68	35.52	40.00	-4.48	54.10	0.74	13.08	32.40	150	212 QP	VERTICAL
5	77.53	35.30	40.00	-4.70	53.50	0.77	13.43	32.40	150	206 QP	VERTICAL
6	128.94	38.54	43.50	-4.96	51.10	0.98	18.83	32.37	200	159 QP	VERTICAL
7	237.58	36.38	46.00	-9.62	49.21	1.31	18.17	32.31	100	2 Peak	VERTICAL
8	375.32	38.24	46.00	-7.76	46.81	1.67	22.08	32.32	150	105 Peak	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

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

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos		
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	Remark
1	15532.40	60.28	74.00	-13.72	37.34	18.54	38.13	33.73	150	95	Peak
2	15539.28	47.31	54.00	-6.69	24.37	18.54	38.13	33.73	150	95	Average

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos		
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	Remark
1	15530.12	59.75	74.00	-14.25	36.81	18.54	38.13	33.73	150	233	Peak
2	15536.80	47.30	54.00	-6.70	24.36	18.54	38.13	33.73	150	233	Average

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15594.60	60.64	74.00	-13.36	37.79	18.57	38.05	33.77	150	79 Peak	HORIZONTAL
2	15606.80	47.05	54.00	-6.95	24.24	18.60	37.98	33.77	150	79 Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15601.16	59.84	74.00	-14.16	37.03	18.60	37.98	33.77	150	243 Peak	VERTICAL
2	15602.68	47.22	54.00	-6.78	24.41	18.60	37.98	33.77	150	243 Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	15719.08	59.50	74.00	-14.50	36.92	18.66	37.84	33.92	150	58	Peak	HORIZONTAL
2	15721.64	46.53	54.00	-7.47	23.95	18.66	37.84	33.92	150	58	Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	15710.08	59.37	74.00	-14.63	36.74	18.66	37.84	33.87	150	235	Peak	VERTICAL
2	15712.12	46.80	54.00	-7.20	24.17	18.66	37.84	33.87	150	235	Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11489.88	44.23	54.00	-9.77	23.58	14.82	39.20	33.37	150	23	Average
2	11496.96	57.26	74.00	-16.74	36.61	14.82	39.20	33.37	150	23	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11493.48	56.79	74.00	-17.21	36.14	14.82	39.20	33.37	150	272	Peak	VERTICAL
2	11493.96	44.35	54.00	-9.65	23.70	14.82	39.20	33.37	150	272	Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11573.48	44.53	54.00	-9.47	23.83	14.89	39.20	33.39	150	37 Average	HORIZONTAL
2	11576.60	57.06	74.00	-16.94	36.36	14.89	39.20	33.39	150	37 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11575.00	57.90	74.00	-16.10	37.20	14.89	39.20	33.39	150	221 Peak	VERTICAL
2	11578.08	44.69	54.00	-9.31	23.99	14.89	39.20	33.39	150	221 Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	11647.48	44.51	54.00	-9.49	23.77	14.95	39.20	33.41	150	83	Average	HORIZONTAL
2	11655.08	57.67	74.00	-16.33	36.90	14.98	39.20	33.41	150	83	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	11640.40	56.67	74.00	-17.33	35.93	14.95	39.20	33.41	150	259	Peak	VERTICAL
2	11647.68	44.57	54.00	-9.43	23.83	14.95	39.20	33.41	150	259	Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15532.44	59.42	74.00	-14.58	36.48	18.54	38.13	33.73	150	38 Peak	HORIZONTAL
2	15539.12	46.90	54.00	-7.10	23.96	18.54	38.13	33.73	150	38 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15543.24	46.93	54.00	-7.07	23.99	18.54	38.13	33.73	150	265 Average	VERTICAL
2	15547.68	60.37	74.00	-13.63	37.43	18.54	38.13	33.73	150	265 Peak	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15602.72	59.56	74.00	-14.44	36.75	18.60	37.98	33.77	150	74	Peak	HORIZONTAL
2	15607.36	46.59	54.00	-7.41	23.78	18.60	37.98	33.77	150	74	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15598.68	59.60	74.00	-14.40	36.75	18.57	38.05	33.77	150	297	Peak	VERTICAL
2	15608.72	46.62	54.00	-7.38	23.81	18.60	37.98	33.77	150	297	Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15715.88	58.74	74.00	-15.26	36.16	18.66	37.84	33.92	150	75	Peak	HORIZONTAL
2	15725.20	46.26	54.00	-7.74	23.68	18.66	37.84	33.92	150	75	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15717.64	46.18	54.00	-7.82	23.60	18.66	37.84	33.92	150	245	Average	VERTICAL
2	15725.20	59.06	74.00	-14.94	36.48	18.66	37.84	33.92	150	245	Peak	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11481.48	44.08	54.00	-9.92	23.51	14.79	39.15	33.37	150	47	Average
2	11483.60	58.36	74.00	-15.64	37.71	14.82	39.20	33.37	150	47	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11485.72	56.95	74.00	-17.05	36.30	14.82	39.20	33.37	150	261	Peak	VERTICAL
2	11489.24	44.21	54.00	-9.79	23.56	14.82	39.20	33.37	150	261	Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11571.72	56.85	74.00	-17.15	36.15	14.89	39.20	33.39	150	57 Peak	HORIZONTAL
2	11577.08	44.69	54.00	-9.31	23.99	14.89	39.20	33.39	150	57 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11562.80	44.77	54.00	-9.23	24.07	14.89	39.20	33.39	150	232 Average	VERTICAL
2	11576.76	58.34	74.00	-15.66	37.64	14.89	39.20	33.39	150	232 Peak	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11647.28	56.90	74.00	-17.10	36.16	14.95	39.20	33.41	150	39 Peak	HORIZONTAL
2	11656.52	44.43	54.00	-9.57	23.66	14.98	39.20	33.41	150	39 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11641.48	44.47	54.00	-9.53	23.73	14.95	39.20	33.41	150	251 Average	VERTICAL
2	11658.16	57.36	74.00	-16.64	36.59	14.98	39.20	33.41	150	251 Peak	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15565.00	60.39	74.00	-13.61	37.54	18.57	38.05	33.77	150	32	Peak
2	15578.36	46.66	54.00	-7.34	23.81	18.57	38.05	33.77	150	32	Average

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15568.76	46.99	54.00	-7.01	24.14	18.57	38.05	33.77	150	244	Average
2	15570.60	59.73	74.00	-14.27	36.88	18.57	38.05	33.77	150	244	Peak

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor			
						dB	dB/m	dB	cm	deg	
1	15690.36	59.15	74.00	-14.85	36.48	18.63	37.91	33.87	150	28	Peak
2	15696.16	46.51	54.00	-7.49	23.88	18.66	37.84	33.87	150	28	Average

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor			
						dB	dB/m	dB	cm	deg	
1	15682.32	46.47	54.00	-7.53	23.80	18.63	37.91	33.87	150	297	Average
2	15698.96	59.59	74.00	-14.41	36.96	18.66	37.84	33.87	150	297	Peak

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11516.80	57.30	74.00	-16.70	36.66	14.82	39.20	33.38	150	27 Peak	HORIZONTAL
2	11519.88	44.15	54.00	-9.85	23.48	14.85	39.20	33.38	150	27 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11513.52	56.62	74.00	-17.38	35.98	14.82	39.20	33.38	150	218 Peak	VERTICAL
2	11517.36	44.19	54.00	-9.81	23.52	14.85	39.20	33.38	150	218 Average	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11584.12	57.57	74.00	-16.43	36.84	14.92	39.20	33.39	150	58 Peak	HORIZONTAL
2	11585.80	44.63	54.00	-9.37	23.91	14.92	39.20	33.40	150	58 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11590.12	44.57	54.00	-9.43	23.85	14.92	39.20	33.40	150	264 Average	VERTICAL
2	11596.80	57.35	74.00	-16.65	36.63	14.92	39.20	33.40	150	264 Peak	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15629.36	59.74	74.00	-14.26	36.98	18.60	37.98	33.82	150	53	Peak
2	15632.00	46.64	54.00	-7.36	23.88	18.60	37.98	33.82	150	53	Average

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15624.00	46.73	54.00	-7.27	23.97	18.60	37.98	33.82	150	282	Average
2	15631.40	59.48	74.00	-14.52	36.72	18.60	37.98	33.82	150	282	Peak

Temperature	25°C	Humidity	62%
Test Engineer	Andy Tsai, Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Apr. 07, 2016	Test Mode	Mode 1
Test Function	Non-beamforming function		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11543.72	56.97	74.00	-17.03	36.30	14.85	39.20	33.38	150	71	Peak	HORIZONTAL
2	11557.80	44.02	54.00	-9.98	23.32	14.89	39.20	33.39	150	71	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11545.48	56.43	74.00	-17.57	35.76	14.85	39.20	33.38	150	257	Peak	VERTICAL
2	11556.08	44.35	54.00	-9.65	23.65	14.89	39.20	33.39	150	257	Average	VERTICAL