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FCC RADIO TEST REPORT

Applicant's company	**CyberTAN Technology, Inc.**
Applicant Address	No. 99, Park Avenue III, Science-based Industrial Park, Hsinchu, 308 Taiwan
FCC ID	**N89-UIW8001**
Manufacturer's company	**CyberTAN Technology, Inc.**
Manufacturer Address	No. 99, Park Avenue III, Science-based Industrial Park, Hsinchu, 308 Taiwan

Product Name	Wireless IP STB
Brand Name	technicolor
Model No.	UIW8001, UIW4001
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Received Date	Jun. 28, 2016
Final Test Date	Sep. 09, 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 v01r03, KDB662911 D01 v02r01, KDB644545 D03 v01, ET Docket No. 13–49; FCC 16–24.**

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR680237AC	Rev. 01	Initial issue of report	Oct. 26, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless IP STB
Brand Name	:	technicolor
Model No.	:	UIW8001, UIW4001
Applicant	:	CyberTAN Technology, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jun. 28, 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 power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Channel Number	21 for 20MHz bandwidth ; 9 for 40MHz bandwidth 4 for 80MHz bandwidth
Channel Bandwidth (99%)	**<For Non-Beamforming Mode>** Band 1: IEEE 802.11a: 17.19 MHz Band 2: IEEE 802.11a: 17.19 MHz Band 3: IEEE 802.11a: 16.85 MHz Band 4: IEEE 802.11a: 16.32 MHz **<For Beamforming Mode>** Band 1: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.15 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.05 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.54 MHz Band 2: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 18.06 MHz

	IEEE 802.11ac MCS0/Nss2 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.54 MHz Band 3: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 74.96 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.83 MHz Band 4: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.23 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.34 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.54 MHz
Maximum Conducted Output Power	<For Non-Beamforming Mode> Band 1: IEEE 802.11a: 20.02 dBm Band 2: IEEE 802.11a: 19.94 dBm Band 3: IEEE 802.11a: 19.99 dBm Band 4: IEEE 802.11a: 27.72 dBm <For Beamforming Mode> Band 1: IEEE 802.11ac MCS0/Nss1 (VHT20): 19.40 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 19.67 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.35 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 22.09 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 22.04 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 21.42 dBm Band 2: IEEE 802.11ac MCS0/Nss1 (VHT20): 19.46 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 19.74 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.64 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 22.09 dBm

	IEEE 802.11ac MCS0/Nss2 (VHT40): 22.07 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 22.09 dBm Band 3: IEEE 802.11ac MCS0/Nss1 (VHT20): 19.57 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 19.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.78 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 22.08 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 22.07 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 20.78 dBm Band 4: IEEE 802.11ac MCS0/Nss1 (VHT20): 26.00 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.47 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 24.45 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 26.91 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 27.34 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 26.25 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
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☐ With 5600~5650MHz	☒ Without 5600~5650MHz
Beamforming Function	☒ With beamforming for 802.11n/ac in 5GHz.	☐ Without beamforming
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Bandwidth

Antenna	Four (TX)		
Bandwidth 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	Rating
Adapter	AcBel	WAE029	INPUT: 100-240V, 50/60Hz 0.6A OUTPUT: 12V, 2.08A 25W

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	
					5GHz	Bluetooth
1	Airgain	N5X20B	PCB Antenna	I-PEX	2.97	-
2	Airgain	N2420DG	PCB Antenna	I-PEX	4.43	-
3	Airgain	N5X20B	PCB Antenna	I-PEX	4.1	-
4	Airgain	N2410DR2	PCB Antenna	I-PEX	4.3	3.7

Note: The EUT has four antennas

For Bluetooth function (1TX/1RX)

Only Ant. 4 can be use as transmit and receive antenna.

For 5GHz function:

For IEEE 802.11a/n/ac mode (4TX/4RX)

Ant. 1, Ant. 2, Ant. 3 and Ant. 4 can be used as transmitting/receiving antenna.

Ant. 1, Ant. 2, Ant. 3 and Ant. 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, 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 134, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 58, 106, 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	-	-
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
	58	5290 MHz	-	-
5470~5725 MHz Band 3	100	5500 MHz	112	5560 MHz
	102	5510 MHz	116	5580 MHz
	104	5520 MHz	132	5660 MHz
	106	5530 MHz	134	5670 MHz
	108	5540 MHz	136	5680 MHz
	110	5550 MHz	140	5700 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	Antenna
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	<For Beamforming Mode>				
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2 MCS0/Nss1	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106//155	1+2+3+4
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106//155	1+2+3+4

Power Spectral Density	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	<For Beamforming Mode>				
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/155	1+2+3+4
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/155	1+2+3+4
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	<For Beamforming Mode>				
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/155	1+2+3+4
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/155	1+2+3+4

6dB Spectrum Bandwidth Measurement	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3+4
	<For Beamforming Mode>				
	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
	11ac VHT20	Band 4	MCS0/Nss2	149/157/165	1+2+3+4
	11ac VHT40	Band 4	MCS0/Nss2	151/159	1+2+3+4
	11ac VHT80	Band 4	MCS0/Nss2	155	1+2+3+4
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	<For Beamforming Mode>				
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165/	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106//155	1+2+3+4
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/155	1+2+3+4

Band Edge Emission	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	<For Beamforming Mode>				
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106//155	1+2+3+4
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	1+2+3+4
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	1+2+3+4
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/155	1+2+3+4
Frequency Stability	20 MHz	Band 1~4	-	40/60/116/157	1
	40 MHz	Band 1~4	-	38/62/110/151	1
	80 MHz	Band 1~4	-	42/58/106/155	1

Note1: The EUT can only be used at Z axis position.

Note2: All the specification of test configurations and test modes were based on customer's request.

Note3: 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.

Note4: There are two modes of EUT in 802.11n/ac, one is beamforming mode and the other is non-beamforming mode for 802.11n/ac. After evaluating, beamforming mode had been evaluated to be the worst case, so it was selected to record in this test report.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT + Adapter (Bluetooth Speaker mode)

For Radiated Emission test (below 1GHz):

Mode 1. EUT + Adapter (Bluetooth Speaker mode)

For Radiated Emission test (above 1GHz):

Mode 1. CTX

For Co-location MPE and Radiated Emission Co-location Test:

The EUT could be applied with Blutetooth function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA680237) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between Blutetooth 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 brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	HDD
technicolor	UIW8001	V
	UIW4001	X

From the above models, model: UIW8001 was selected as representative model for the test and its data was recorded in this report.

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
AP	CyberTan	VEN501	DoC
Bluetooth Speaker	Hawk	HBS707	DoC
Flash disk3.0	Transcend	JetFlash-700	DoC
LG TV	LG	42U8B82OT-DH	DoC
SONY TV	SONY	KLV-32U300A	DoC
Optical Speaker	PLANK	CA-T522-204824	DoC

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

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
AP	CyberTan	VEN501	DoC
Bluetooth Speaker	Hawk	HBS707	DoC
Flash disk3.0	Transcend	JetFlash-700	DoC
LG TV	LG	42U8B82OT-DH	DoC
SONY TV	SONY	KLV-32U300A	DoC
Optical Speaker	PLANK	CA-T522-204824	DoC

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

<For Non-Beamforming Mode>

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

<For Beamforming Mode>

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E4300	DoC
RX Device	CISCO	VEN501	N89-VEN501

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

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

<For Non-Beamforming Mode>

Test Software Version	Telnet											
Mode	Test Frequency (MHz)											
	NCB: 20MHz											
	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	13	13	13	13	13	13	13	13	13	20	21	20

<For Beamforming Mode>

Test Software Version	Telnet											
Mode	Test Frequency (MHz)											
	NCB: 20MHz											
	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	13	13	13	13	13	13	13	13	13	20	20	20
802.11ac MCS0/Nss2 VHT20	16	16	16	16	16	16	16	16	16	21	21	21
Mode	NCB: 40MHz											
	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz	5755 MHz	5795 MHz			
802.11ac MCS0/Nss1 VHT40	13	13	13	13	13	13	13	19	19			
802.11ac MCS0/Nss2 VHT40	16	16	16	16	15	16	16	21	21			
Mode	NCB: 80MHz											
	5210 MHz		5290 MHz		5530 MHz		5775 MHz					
802.11ac MCS0/Nss1 VHT80	13		13		13		18					
802.11ac MCS0/Nss2 VHT80	15		16		14		20					

3.10. EUT Operation during Test

<For Non-Beamforming Mode>

The EUT was programmed to be in continuously transmitting mode.

<For Beamforming Mode>

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

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

The program was executed as follows:

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

3.11. Duty Cycle

<For Non-Beamforming Mode>

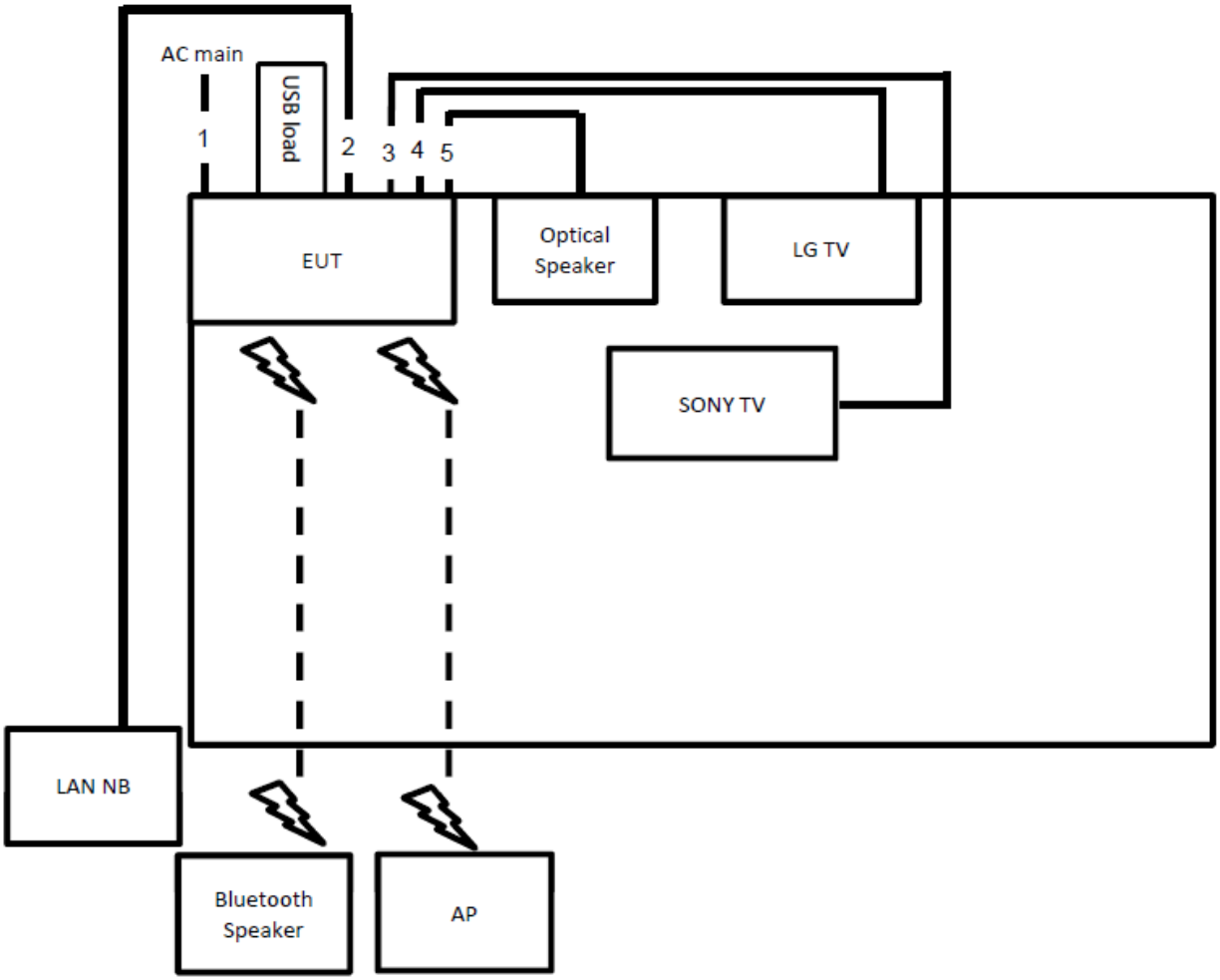
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	0.550	0.590	93.22%	0.30	1.82

<For Beamforming Mode>

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	1.730	2.000	86.50%	0.63	0.58
802.11ac MCS0/Nss1 VHT40	1.650	1.812	91.06%	0.41	0.61
802.11ac MCS0/Nss1 VHT80	3.847	3.980	96.66%	0.15	0.26
802.11ac MCS0/Nss2 VHT20	2.580	2.880	89.58%	0.48	0.39
802.11ac MCS0/Nss2 VHT40	2.080	2.230	93.27%	0.30	0.48
802.11ac MCS0/Nss2 VHT80	4.460	4.660	95.71%	0.19	0.22

3.12. Test Configurations

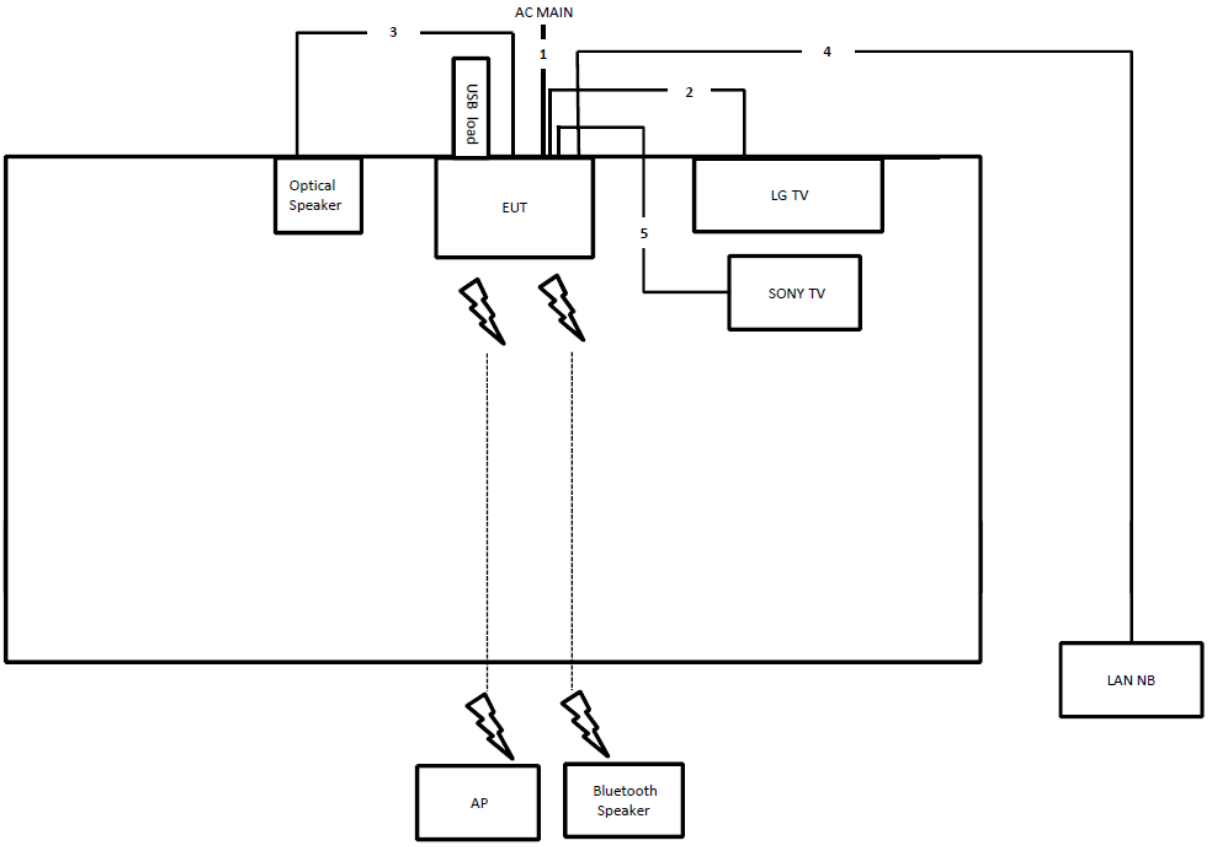
3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	S-Video cable	No	1.6m
4	HDMI cable	No	2m
5	Optical cable	No	1.5m

3.12.2. Radiation Emissions Test Configuration

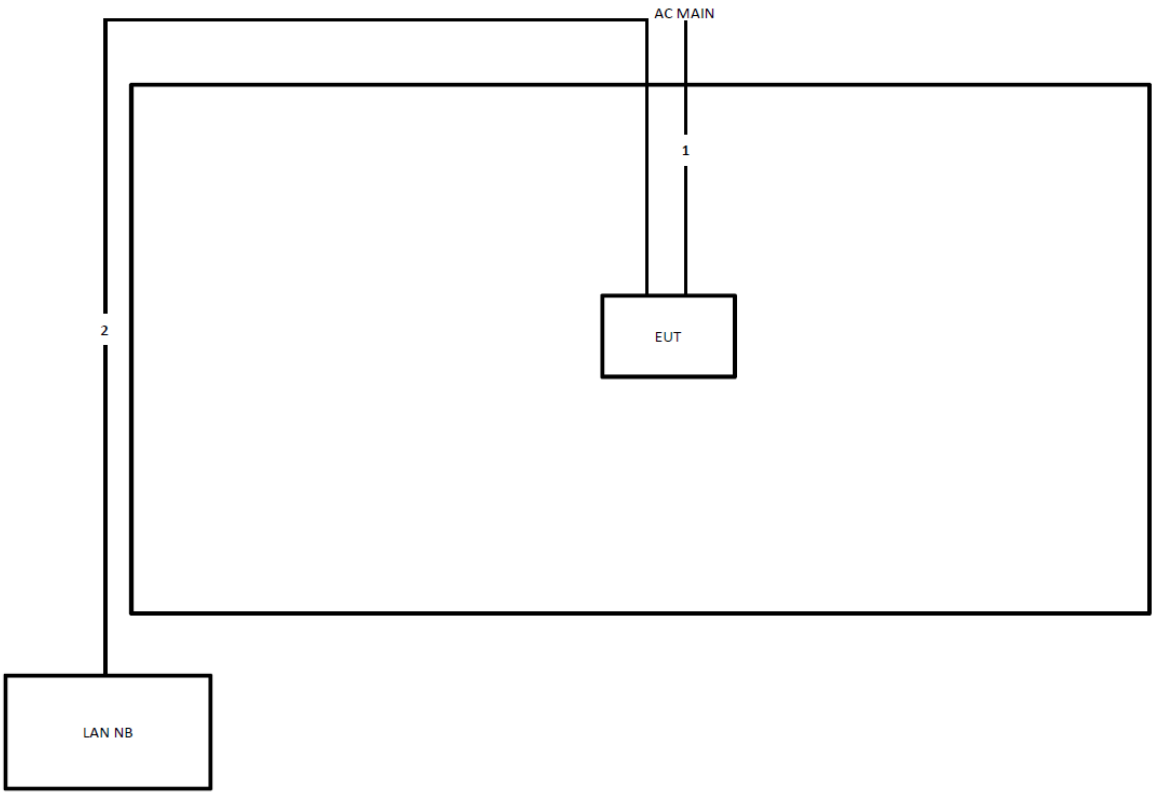
Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	HDMI cable	No	2m
3	Optical cable	No	1.5m
4	RJ-45 cable	No	10m
5	S-Video cable	No	1.6m

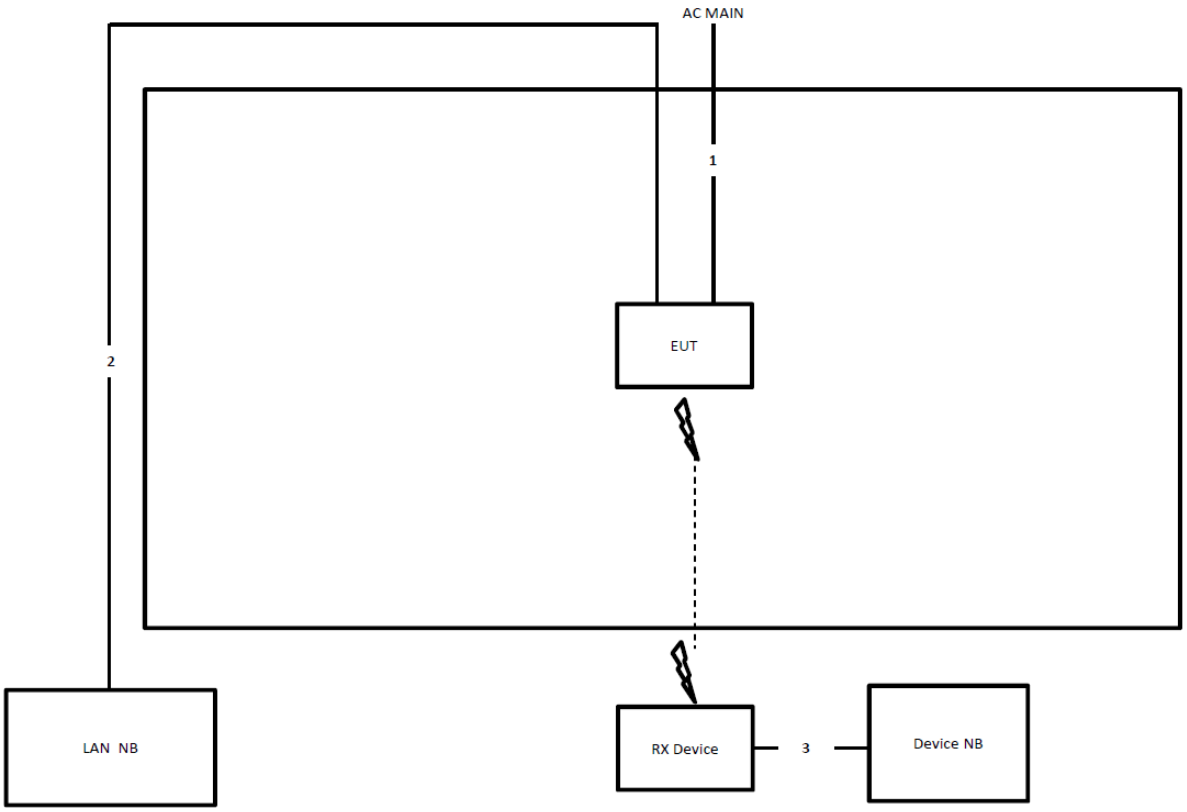
Test Configuration: above 1GHz

<For Non-Beamforming Mode>



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

<For Beamforming Mode>



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	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

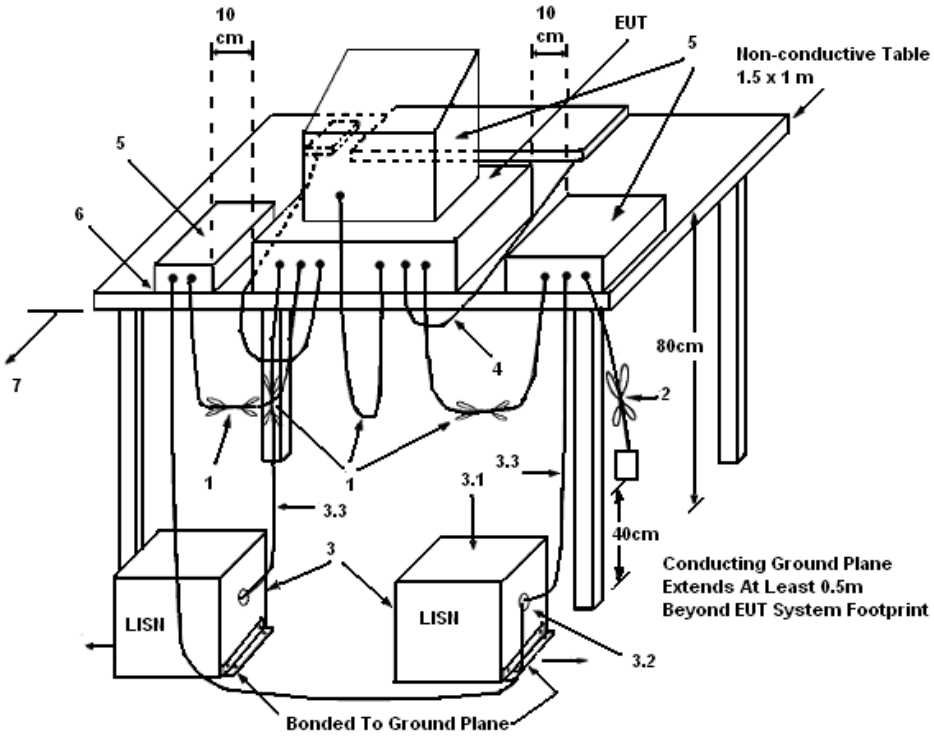
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

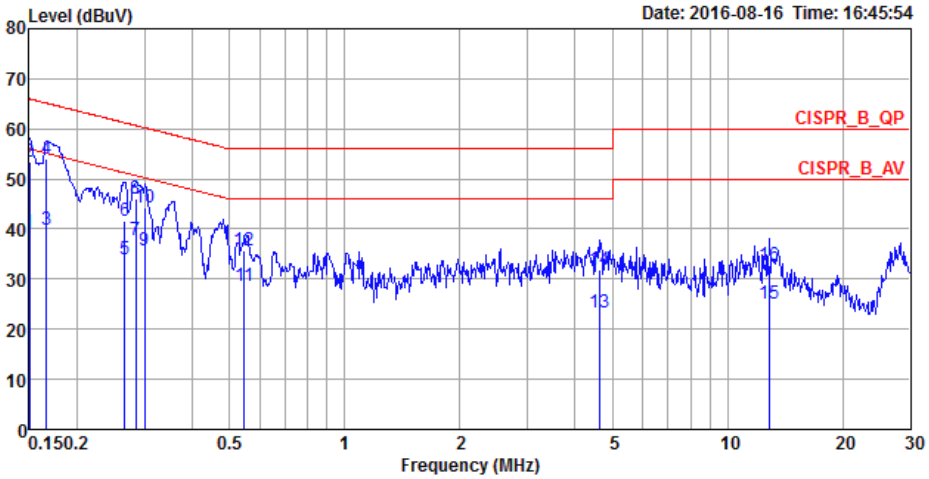
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

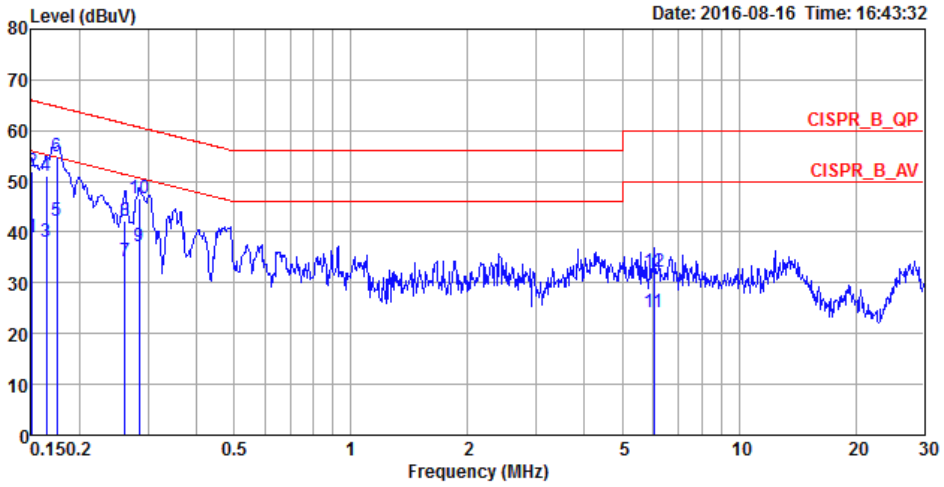
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	57%
Test Engineer	GN Hou	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	39.25	-16.75	56.00	29.07	10.02	0.16	LINE	Average
2	0.1500	53.44	-12.56	66.00	43.26	10.02	0.16	LINE	QP
3	0.1666	39.85	-15.28	55.13	29.66	10.02	0.17	LINE	Average
4	0.1666	54.15	-10.98	65.13	43.96	10.02	0.17	LINE	QP
5	0.2658	34.02	-17.23	51.25	23.98	9.92	0.12	LINE	Average
6	0.2658	41.54	-19.71	61.25	31.50	9.92	0.12	LINE	QP
7	0.2848	37.85	-12.83	50.68	27.83	9.92	0.10	LINE	Average
8	0.2848	46.18	-14.50	60.68	36.16	9.92	0.10	LINE	QP
9	0.3003	35.71	-14.53	50.24	25.70	9.92	0.09	LINE	Average
10	0.3003	44.41	-15.83	60.24	34.40	9.92	0.09	LINE	QP
11	0.5464	28.68	-17.32	46.00	18.49	9.93	0.26	LINE	Average
12	0.5464	35.75	-20.25	56.00	25.56	9.93	0.26	LINE	QP
13	4.6469	23.40	-22.60	46.00	13.29	10.01	0.10	LINE	Average
14	4.6469	31.91	-24.09	56.00	21.80	10.01	0.10	LINE	QP
15	12.8516	25.16	-24.84	50.00	14.77	10.20	0.19	LINE	Average
16	12.8516	32.85	-27.15	60.00	22.46	10.20	0.19	LINE	QP

Temperature	22°C	Humidity	57%
Test Engineer	GN Hou	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	39.08	-16.88	55.96	28.90	10.02	0.16	NEUTRAL	Average
2	0.1508	51.81	-14.15	65.96	41.63	10.02	0.16	NEUTRAL	QP
3	0.1641	38.04	-17.21	55.25	27.85	10.02	0.17	NEUTRAL	Average
4	0.1641	51.12	-14.13	65.25	40.93	10.02	0.17	NEUTRAL	QP
5	0.1749	42.30	-12.42	54.72	32.20	9.92	0.18	NEUTRAL	Average
6	0.1749	54.77	-9.95	64.72	44.67	9.92	0.18	NEUTRAL	QP
7	0.2616	34.20	-17.18	51.38	24.16	9.92	0.12	NEUTRAL	Average
8	0.2616	42.23	-19.15	61.38	32.19	9.92	0.12	NEUTRAL	QP
9	0.2848	37.29	-13.39	50.68	27.27	9.92	0.10	NEUTRAL	Average
10	0.2848	46.56	-14.12	60.68	36.54	9.92	0.10	NEUTRAL	QP
11	6.0243	24.15	-25.85	50.00	13.99	10.04	0.12	NEUTRAL	Average
12	6.0243	32.10	-27.90	60.00	21.94	10.04	0.12	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	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

This test setup layout is the same as that shown in section 4.6.4.

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	20°C	Humidity	50%
Test Engineer	Eddie Weng		

<For Non-Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	21.91	17.19
	5200 MHz	20.17	16.85
	5240 MHz	21.04	17.02
	5260 MHz	22.26	17.02
	5300 MHz	22.52	17.19
	5320 MHz	22.35	17.11
	5500 MHz	21.22	16.85
	5580 MHz	21.04	16.67
	5700 MHz	20.52	16.58
	5745 MHz	18.70	16.32
	5785 MHz	18.00	16.06
	5825 MHz	18.44	16.15

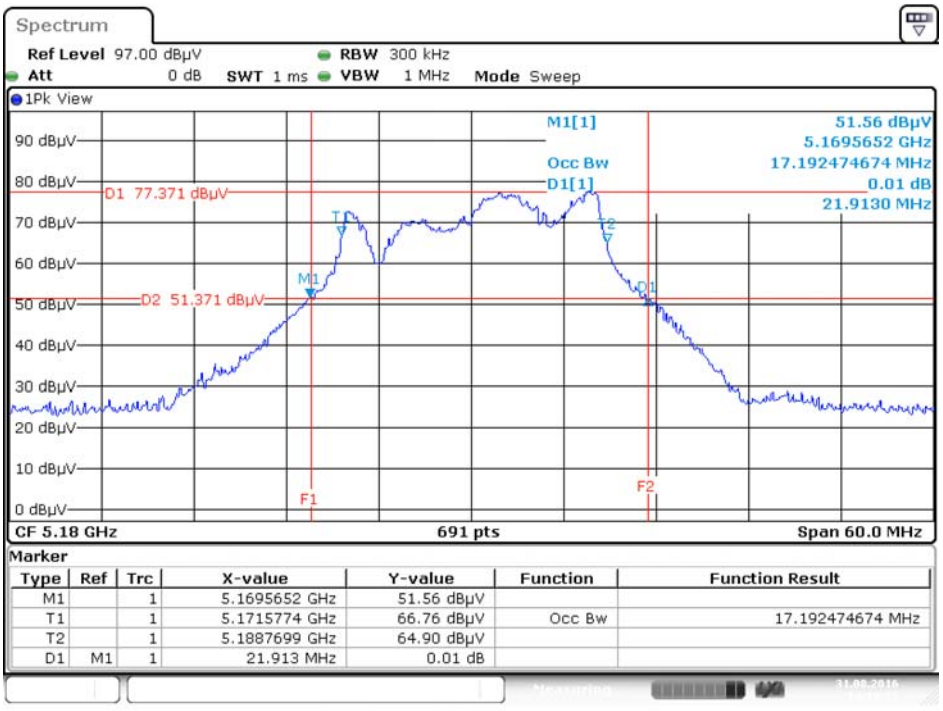
<For Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5180 MHz	23.39	18.15
	5200 MHz	24.00	18.15
	5240 MHz	24.09	18.15
	5260 MHz	22.78	18.06
	5300 MHz	23.22	18.06
	5320 MHz	23.22	18.06
	5500 MHz	23.13	17.97
	5580 MHz	22.52	18.06
	5700 MHz	21.65	17.89
	5745 MHz	24.35	18.15
	5785 MHz	24.00	18.06
	5825 MHz	24.26	18.23
802.11ac MCS0/Nss1 VHT40	5190 MHz	43.77	37.05
	5230 MHz	44.35	37.05
	5270 MHz	43.04	36.90
	5310 MHz	42.46	36.90
	5510 MHz	42.17	36.47
	5550 MHz	42.17	36.61
	5670 MHz	42.17	36.76
	5755 MHz	45.80	37.19
	5795 MHz	46.09	37.34
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.03	75.54
	5290 MHz	81.45	75.54
	5530 MHz	81.74	74.96
	5775 MHz	83.77	75.54

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss2 VHT20	5180 MHz	23.13	18.06
	5200 MHz	23.30	18.06
	5240 MHz	23.04	18.06
	5260 MHz	23.91	18.06
	5300 MHz	23.74	18.06
	5320 MHz	23.39	17.97
	5500 MHz	24.09	18.06
	5580 MHz	23.74	18.06
	5700 MHz	22.17	17.97
	5745 MHz	21.57	17.97
	5785 MHz	24.00	18.06
	5825 MHz	20.78	17.89
802.11ac MCS0/Nss2 VHT40	5190 MHz	42.61	36.76
	5230 MHz	42.90	36.61
	5270 MHz	42.61	36.76
	5310 MHz	43.04	36.76
	5510 MHz	42.46	36.90
	5550 MHz	42.61	36.90
	5670 MHz	42.46	36.76
	5755 MHz	41.74	36.76
	5795 MHz	41.45	36.61
802.11ac MCS0/Nss2 VHT80	5210 MHz	80.87	75.54
	5290 MHz	81.16	75.54
	5530 MHz	82.03	75.83
	5775 MHz	82.32	75.54

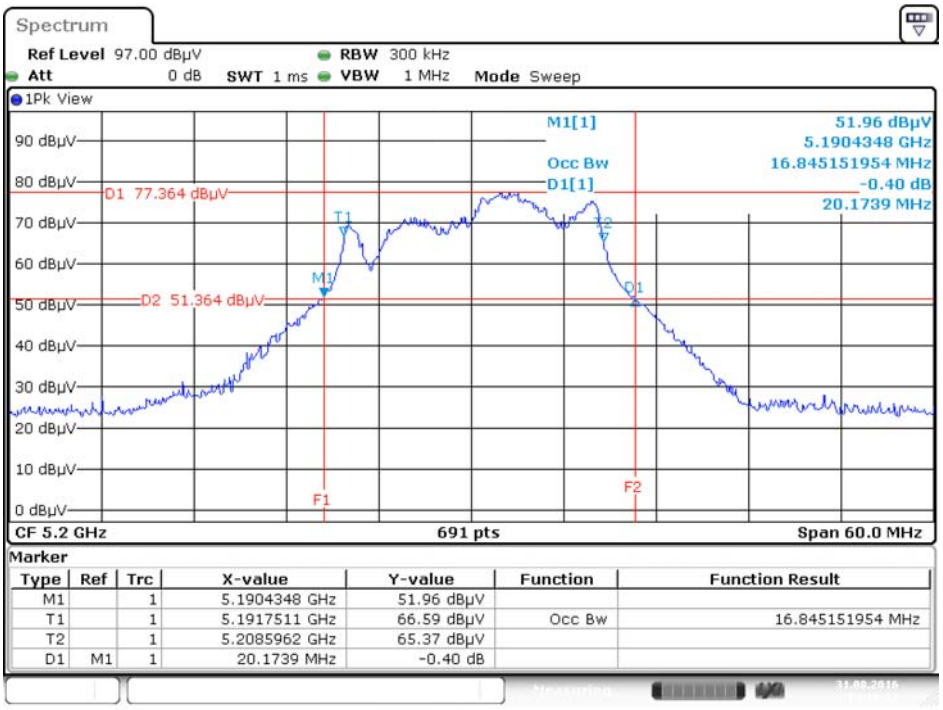
<For Non-Beamforming Mode>

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5180 MHz



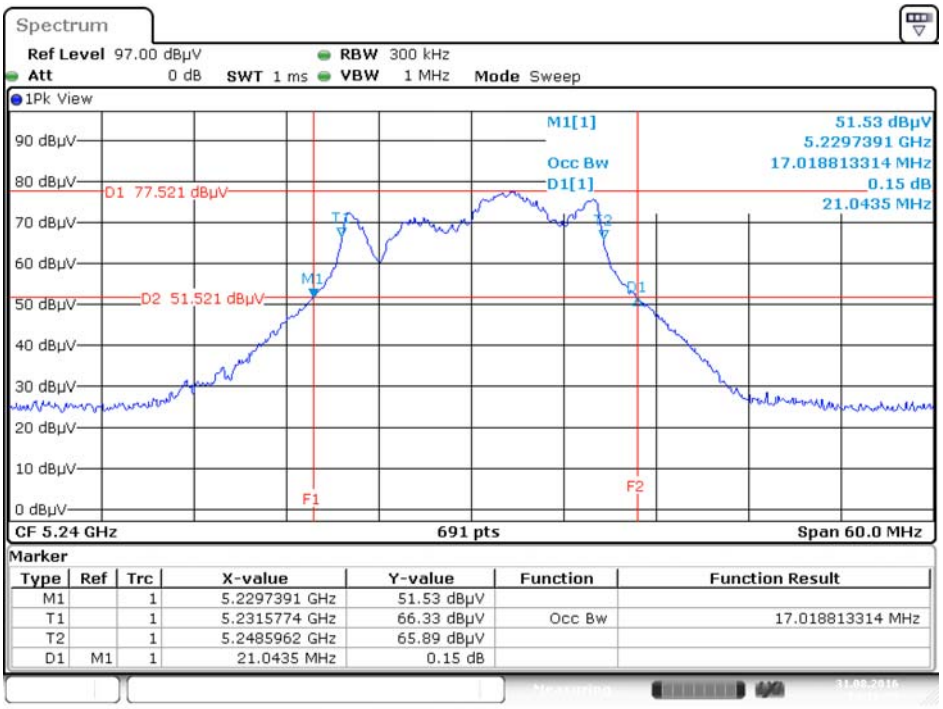
Date: 31.AUG.2016 14:15:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5200 MHz



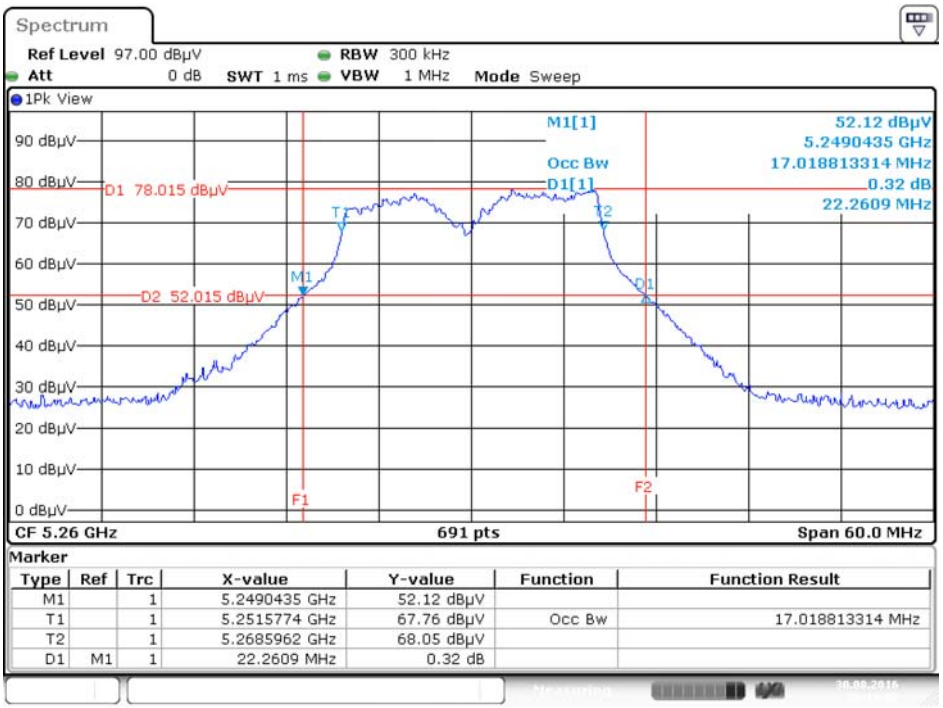
Date: 31.AUG.2016 14:16:17

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5240 MHz



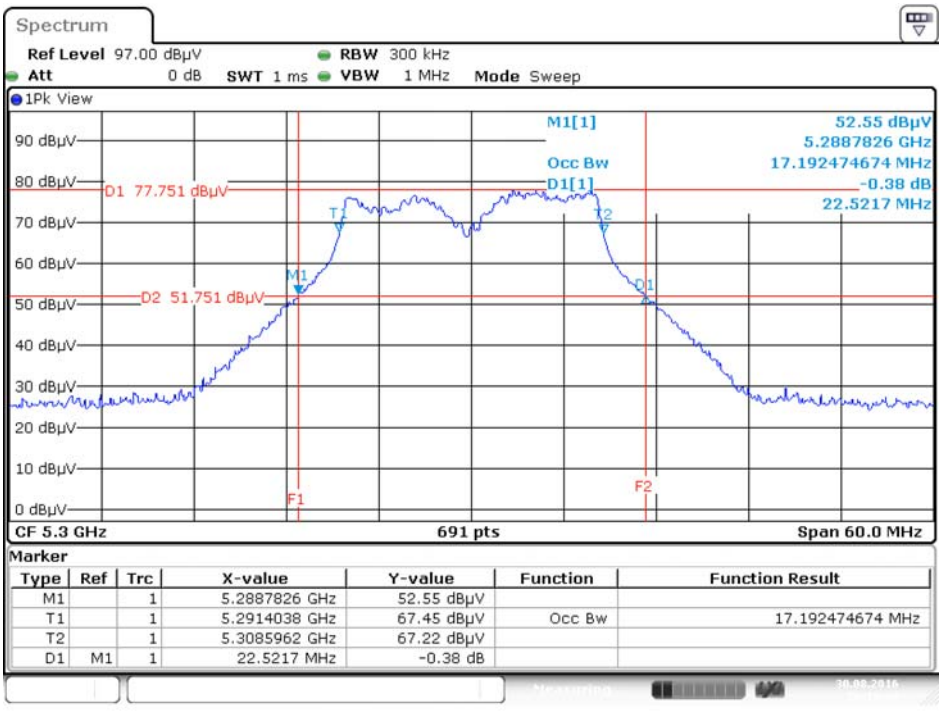
Date: 31.AUG.2016 14:16:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5260 MHz



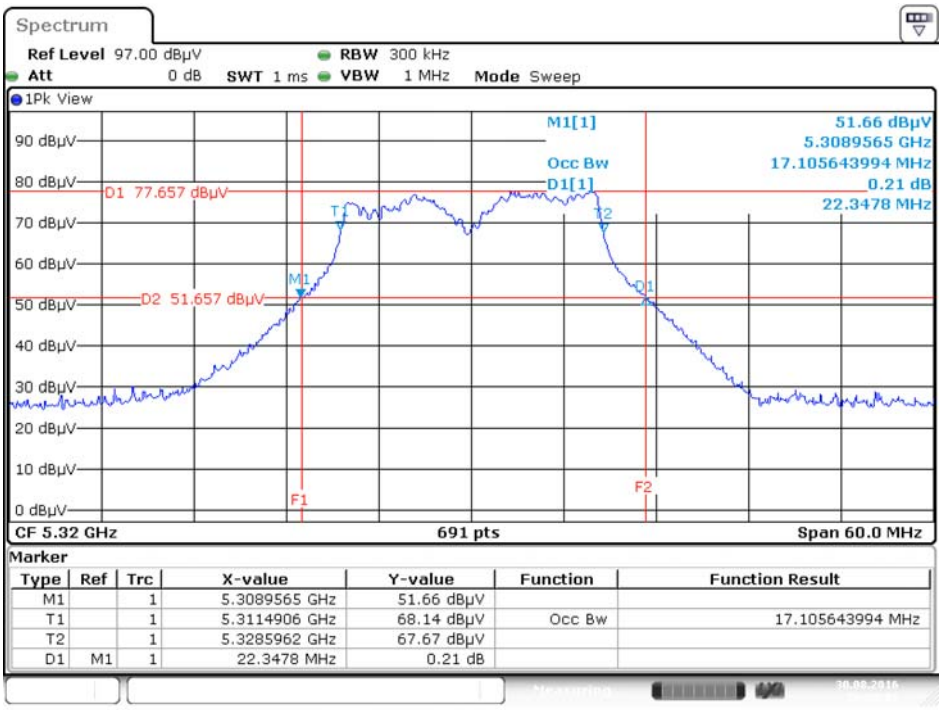
Date: 30.AUG.2016 20:19:02

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5300 MHz



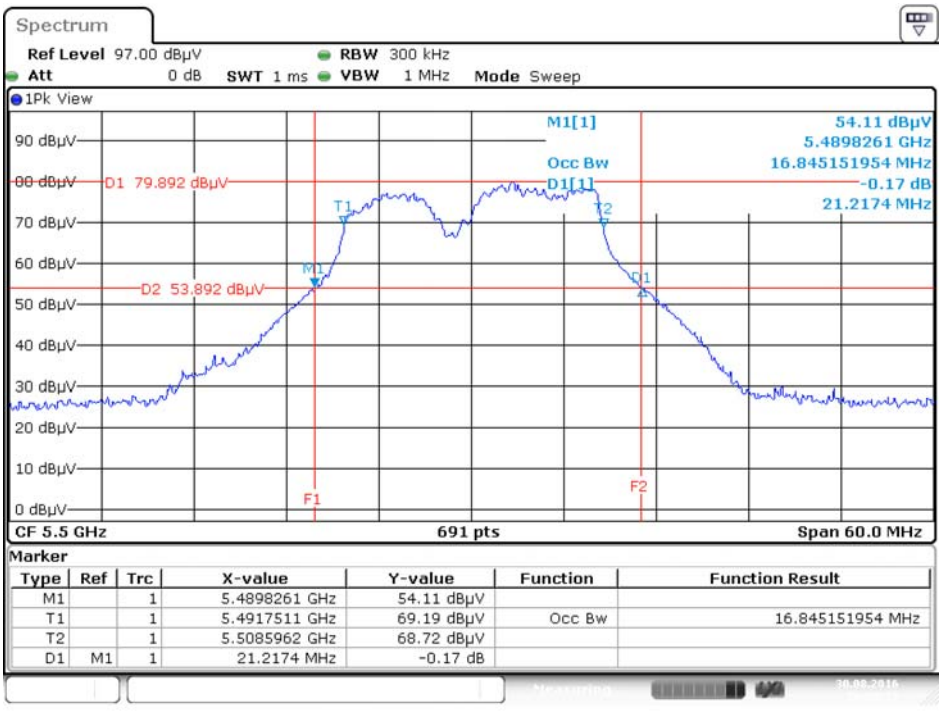
Date: 30.AUG.2016 20:19:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5320 MHz



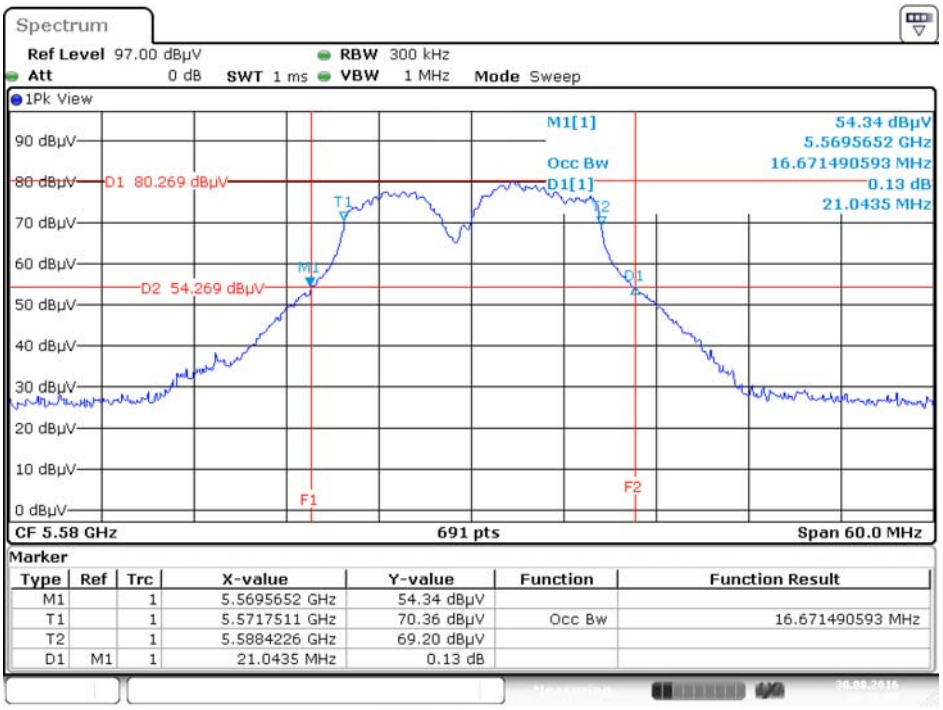
Date: 30.AUG.2016 20:20:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5500 MHz



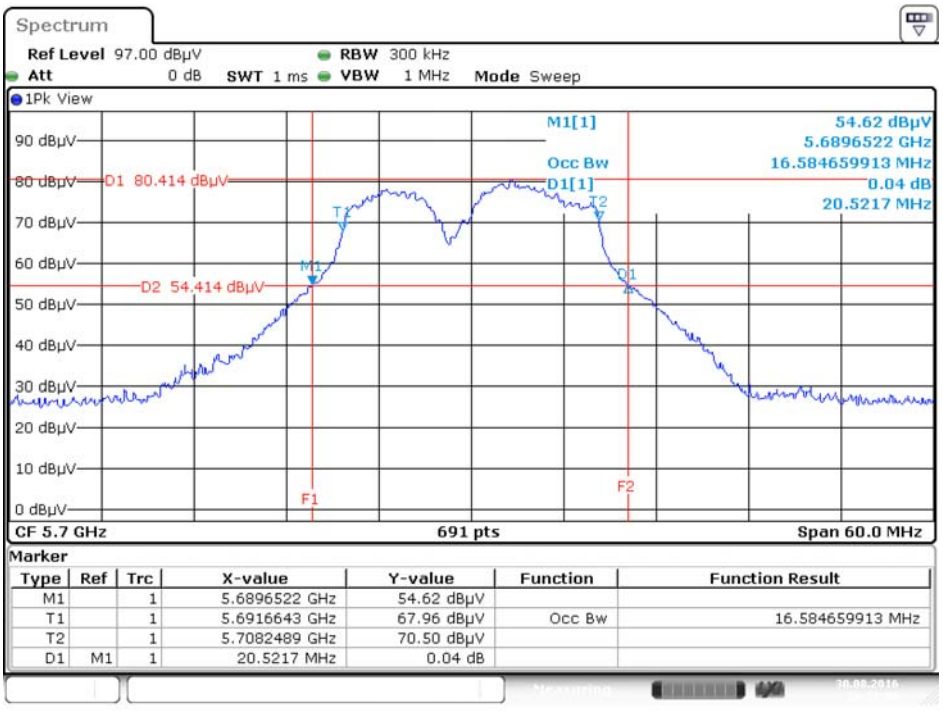
Date: 30.AUG.2016 20:20:27

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5580 MHz



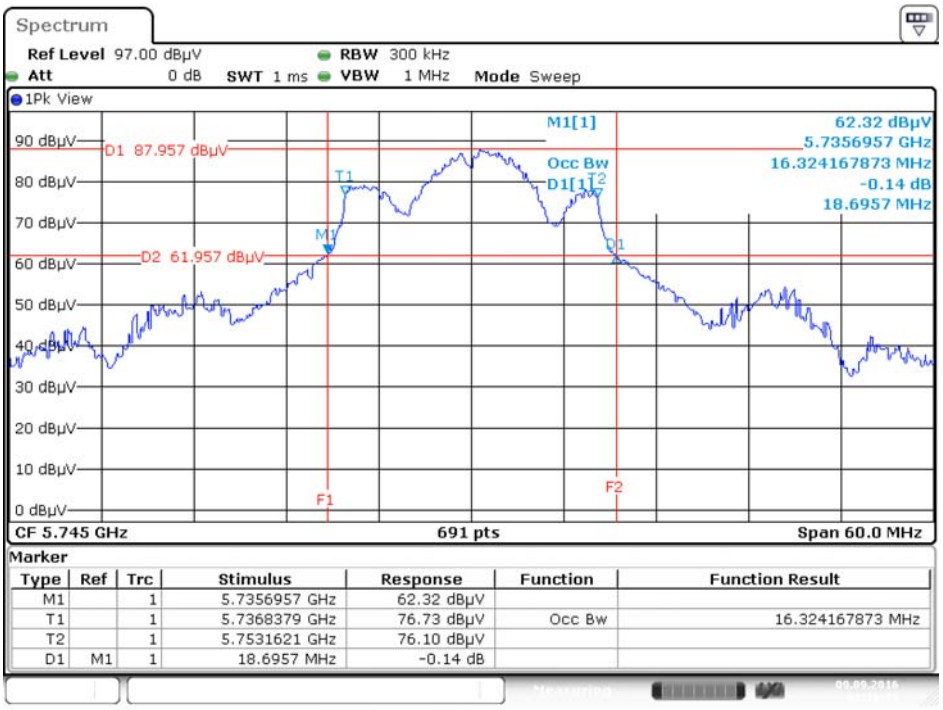
Date: 30.AUG.2016 20:21:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5700 MHz



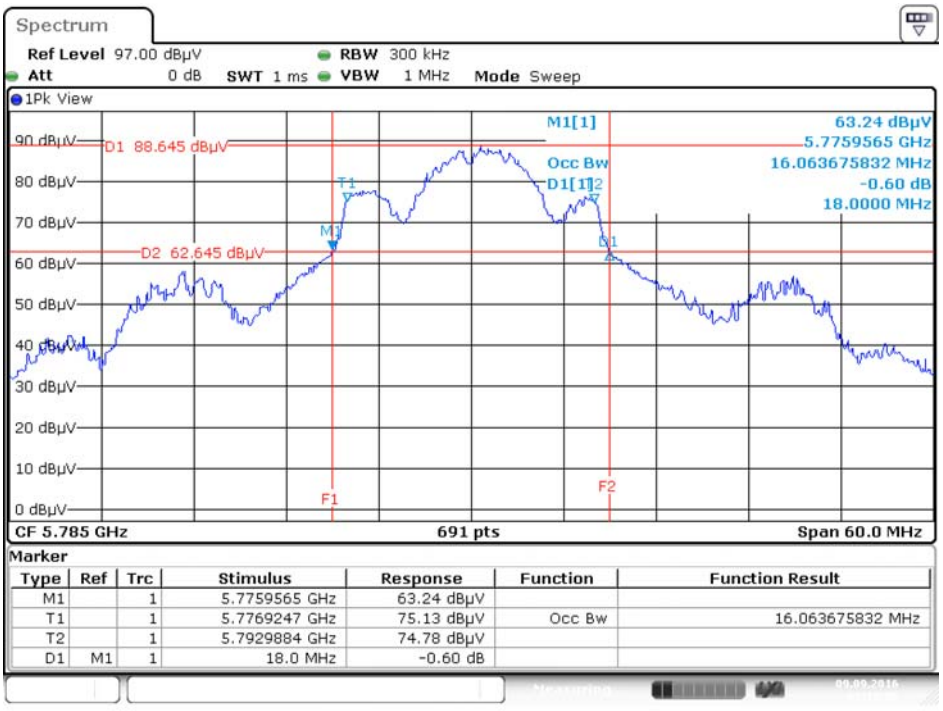
Date: 30.AUG.2016 20:21:30

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5745 MHz



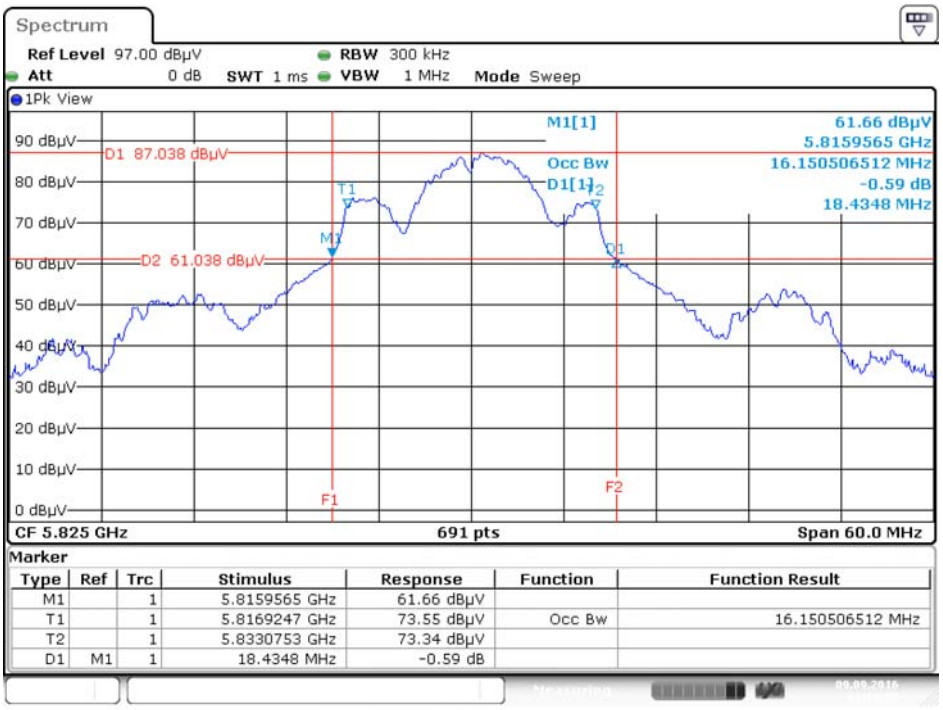
Date: 9.SEP.2016 01:16:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz



Date: 9.SEP.2016 01:15:36

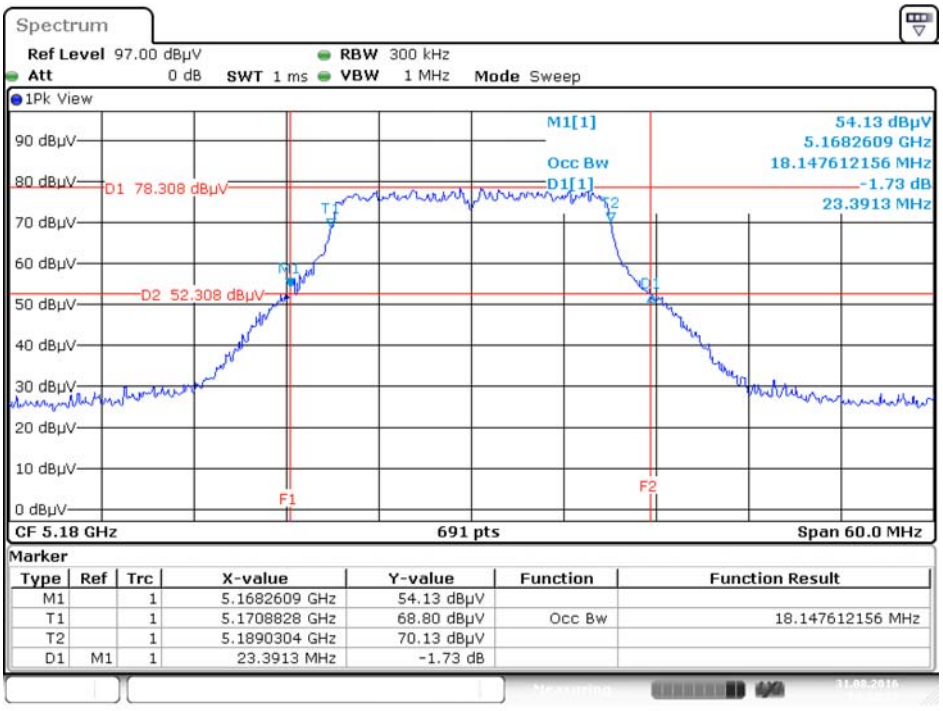
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



Date: 9.SEP.2016 01:13:59

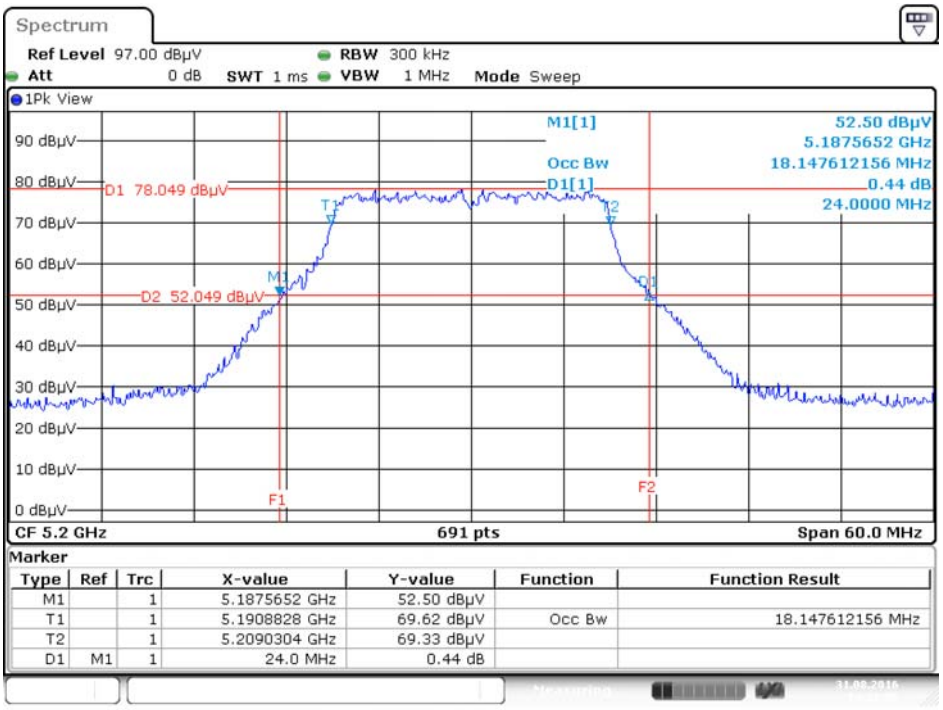
<For Beamforming Mode>

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5180 MHz



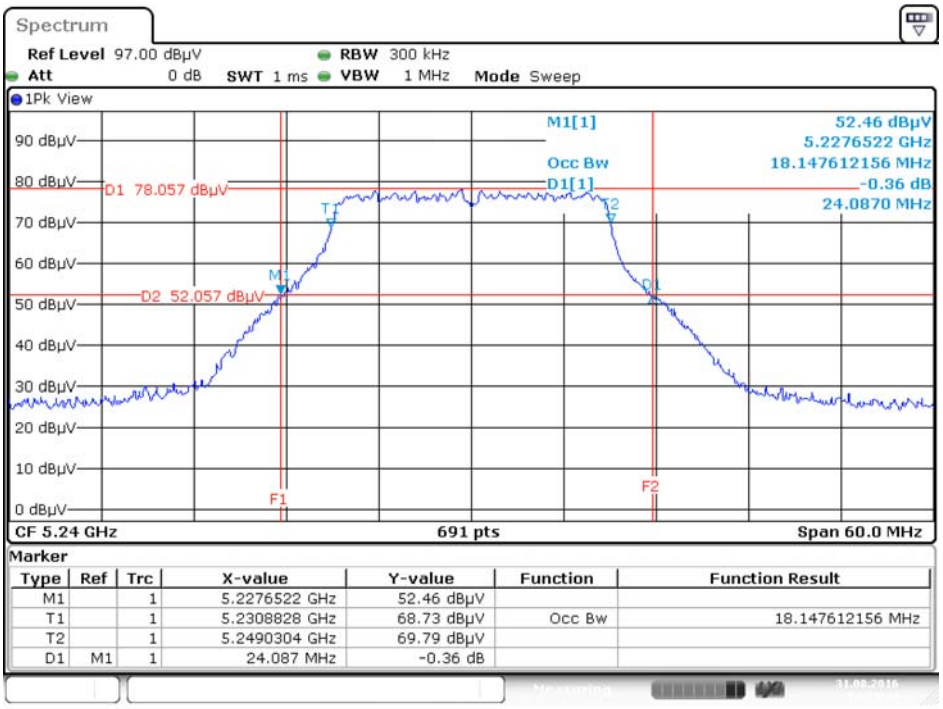
Date: 31.AUG.2016 14:22:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5200 MHz



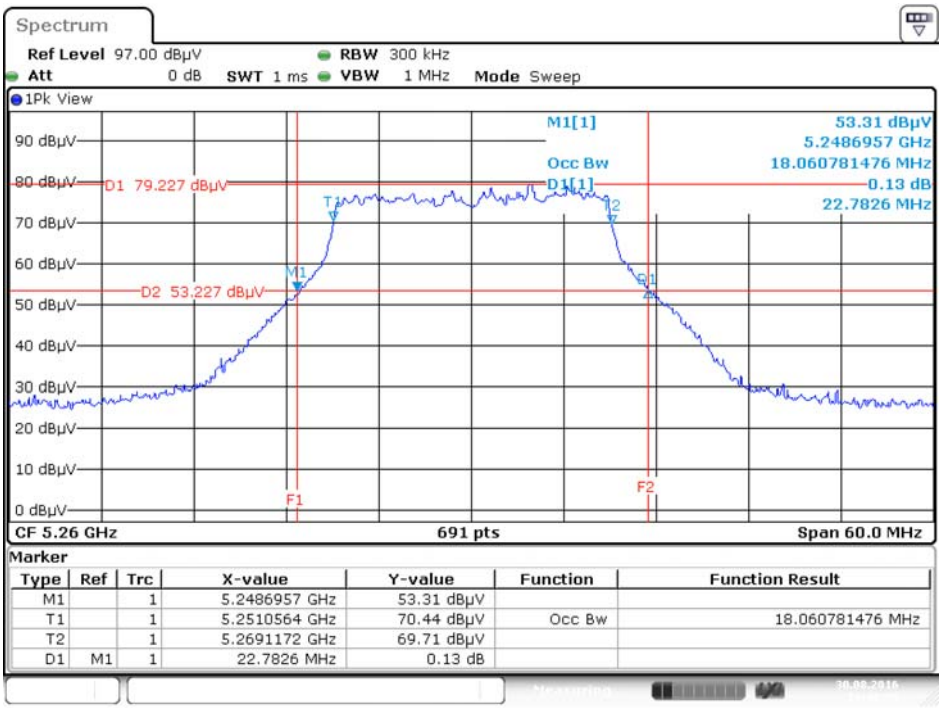
Date: 31.AUG.2016 14:22:56

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5240 MHz



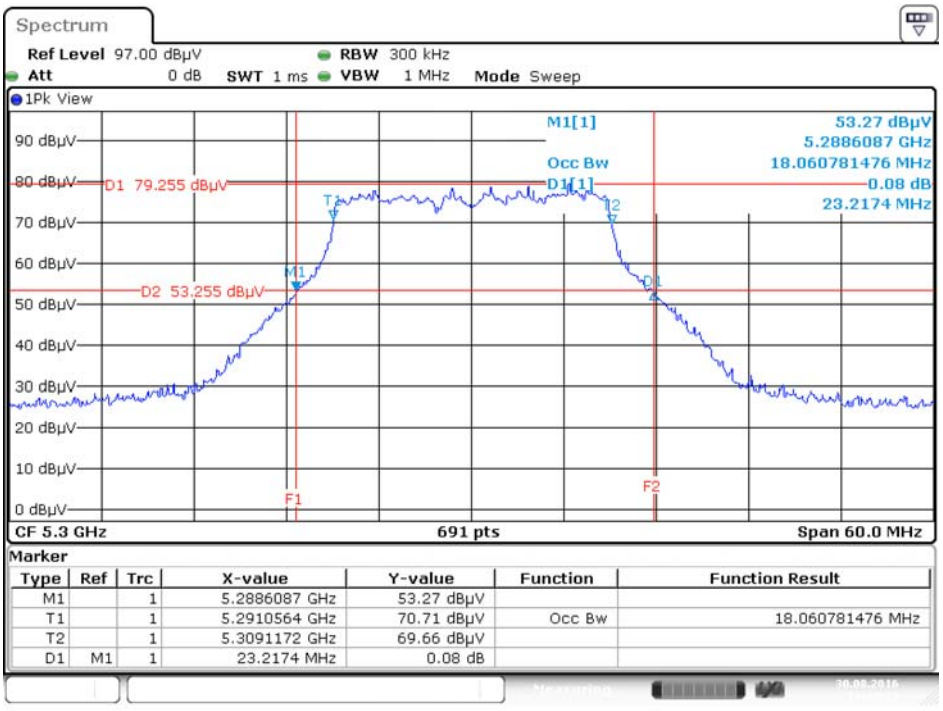
Date: 31.AUG.2016 14:23:44

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5260 MHz



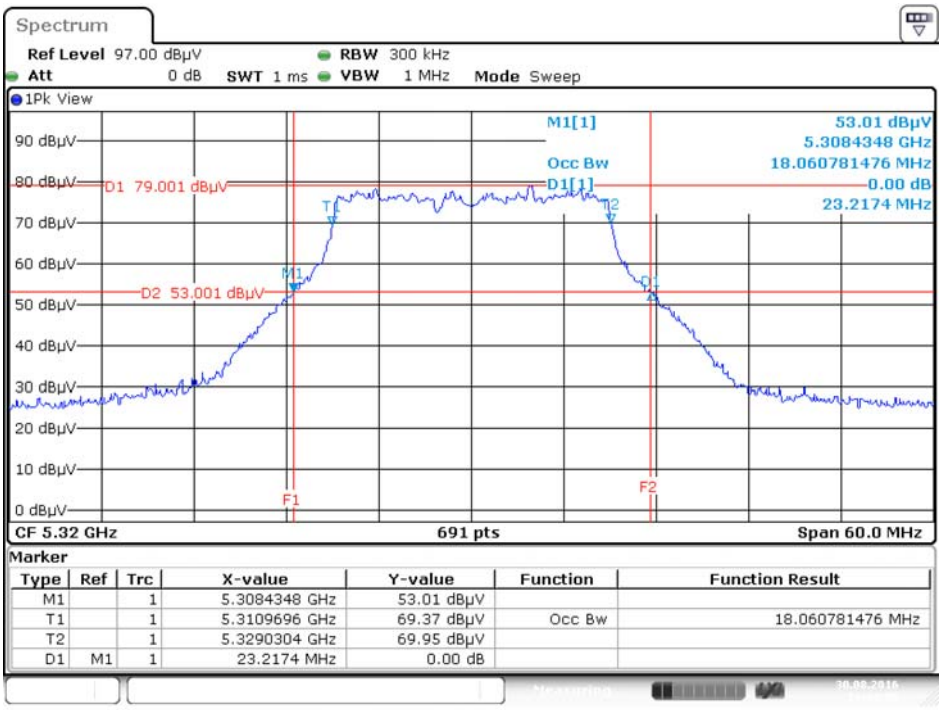
Date: 30.AUG.2016 19:42:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5300 MHz



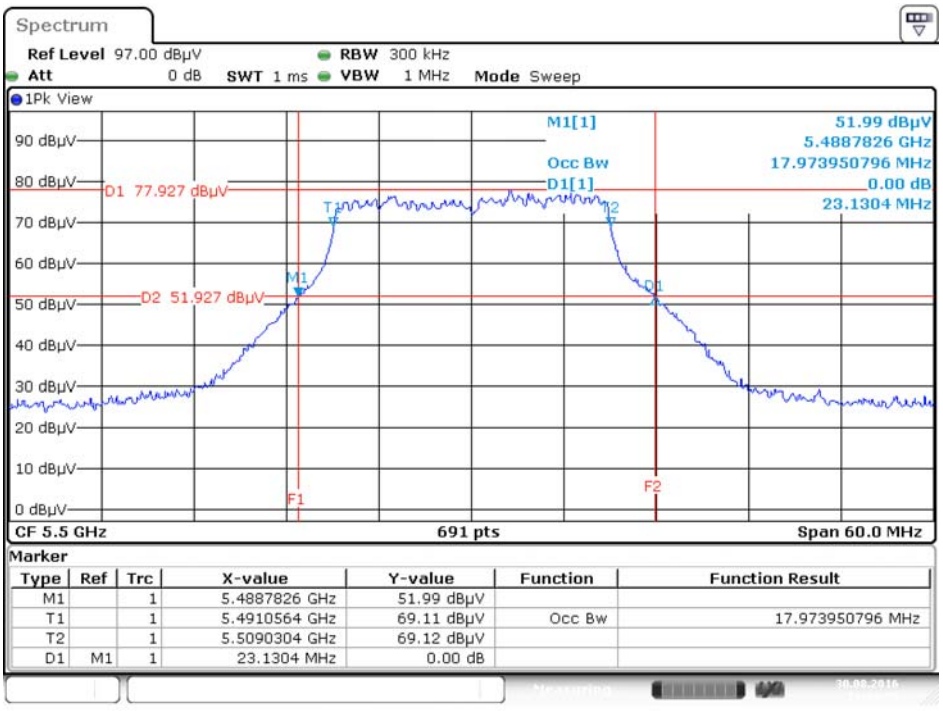
Date: 30.AUG.2016 19:43:17

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5320 MHz



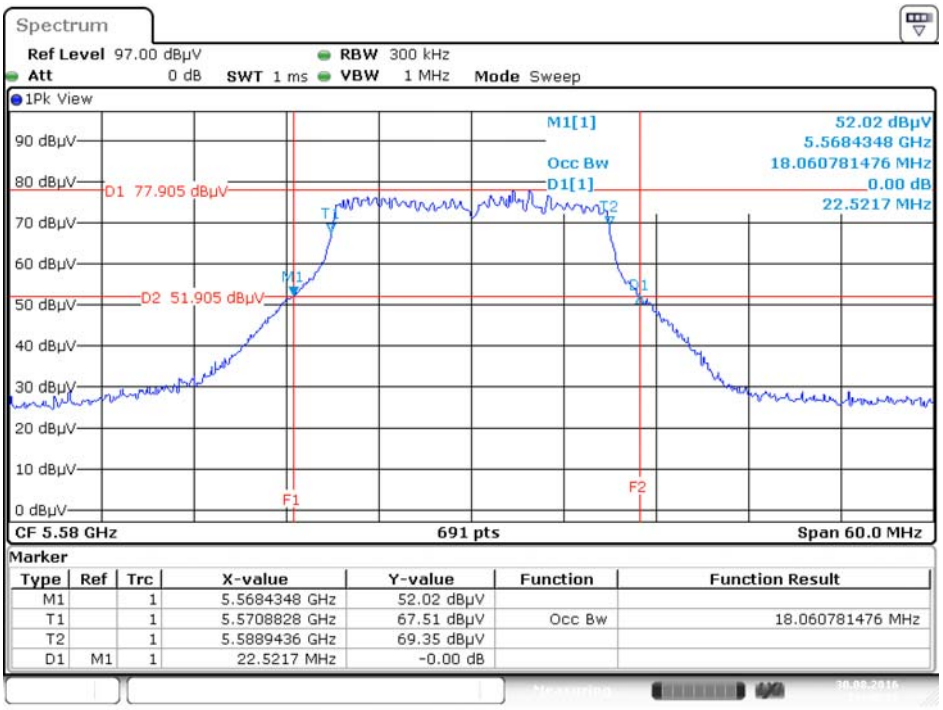
Date: 30.AUG.2016 19:43:55

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5500 MHz



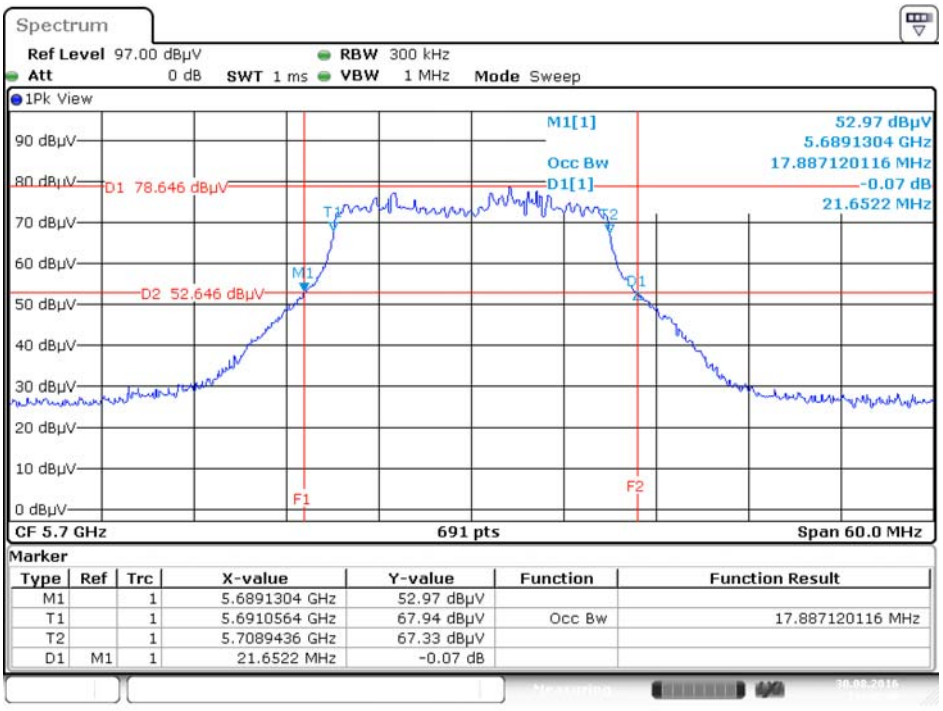
Date: 30.AUG.2016 19:44:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5580 MHz



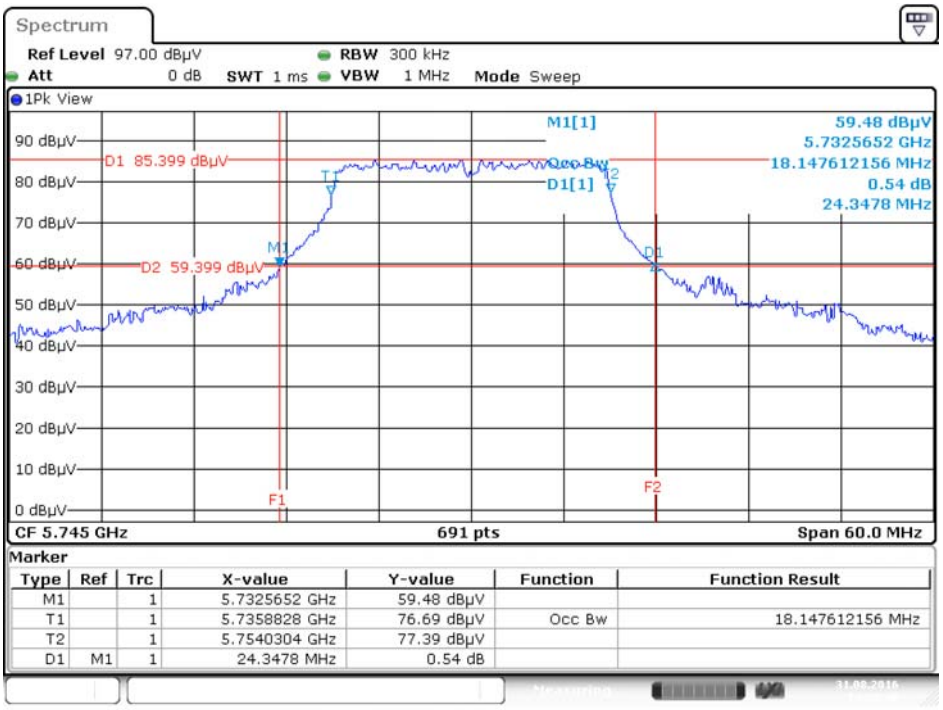
Date: 30.AUG.2016 19:45:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5700 MHz



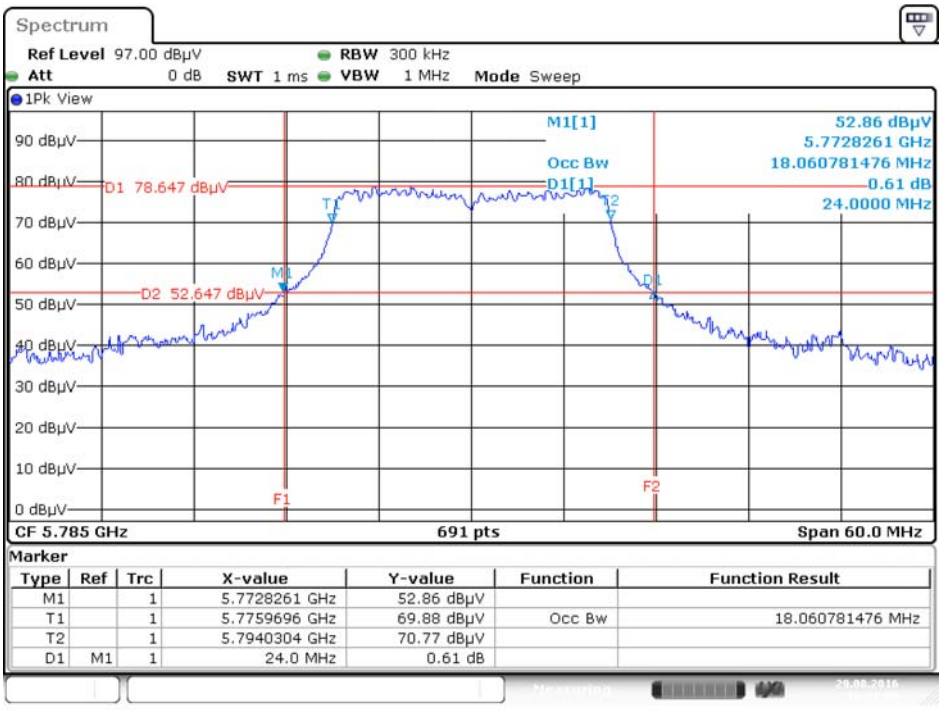
Date: 30.AUG.2016 19:45:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5745 MHz



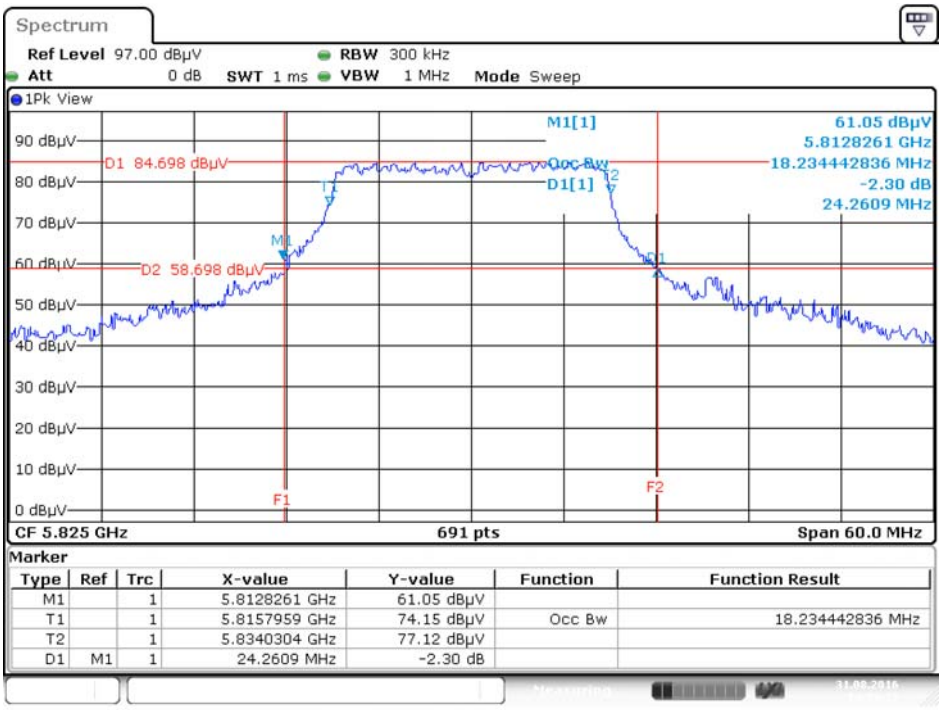
Date: 31.AUG.2016 14:50:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz



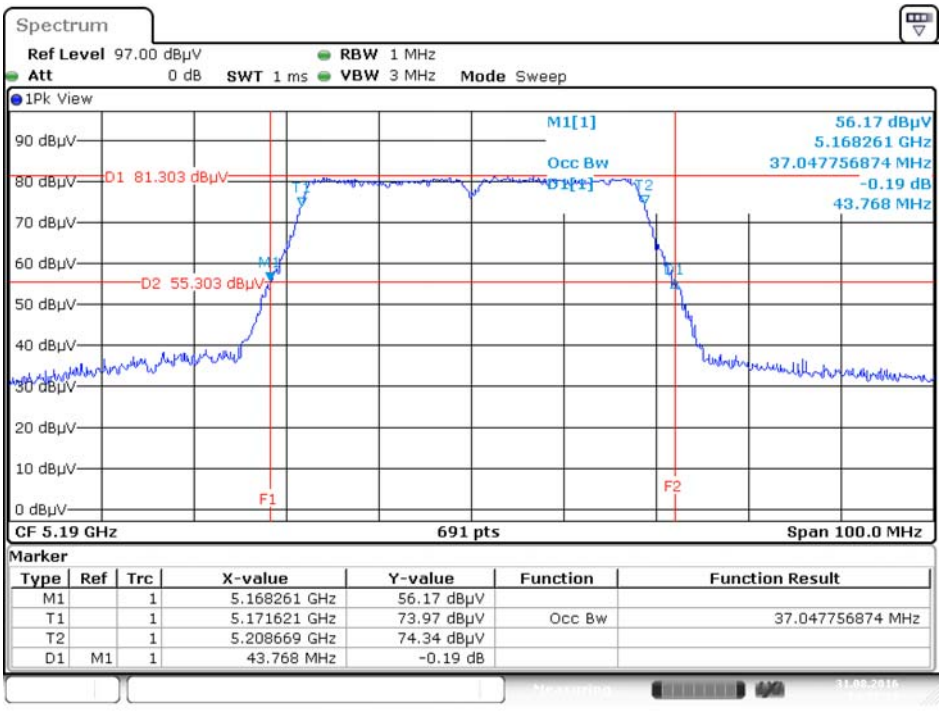
Date: 29.AUG.2016 10:32:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



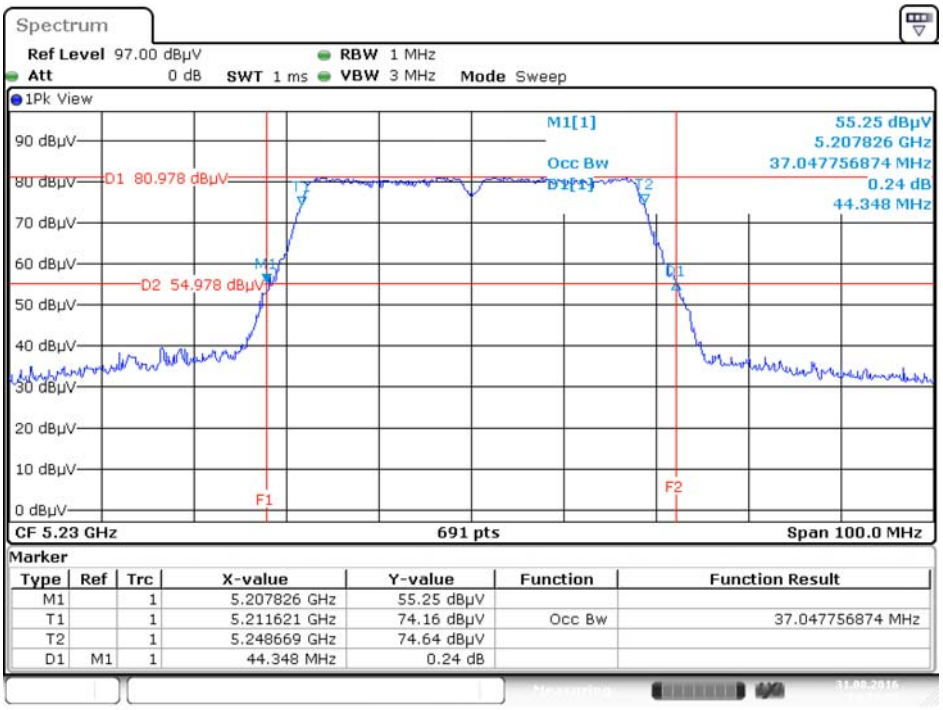
Date: 31.AUG.2016 14:54:27

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5190 MHz



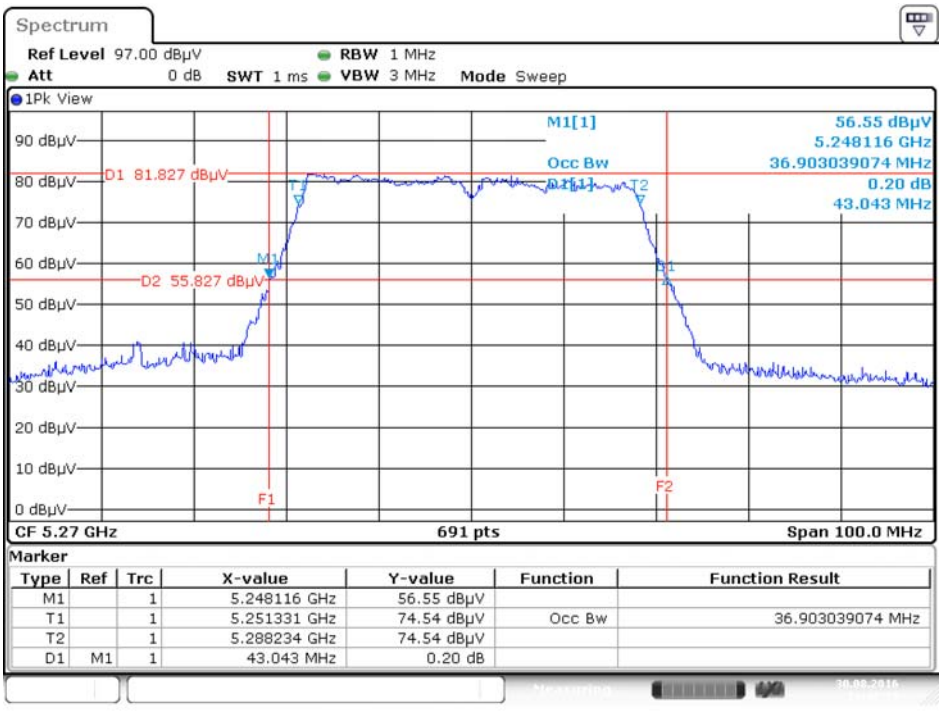
Date: 31.AUG.2016 14:57:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5230 MHz



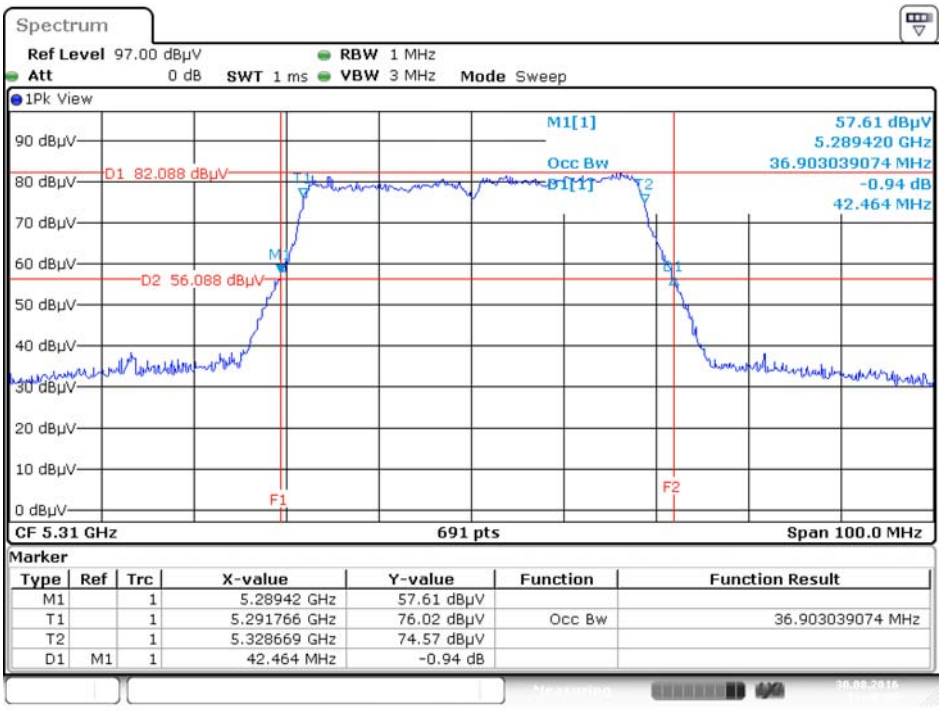
Date: 31.AUG.2016 14:59:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5270 MHz



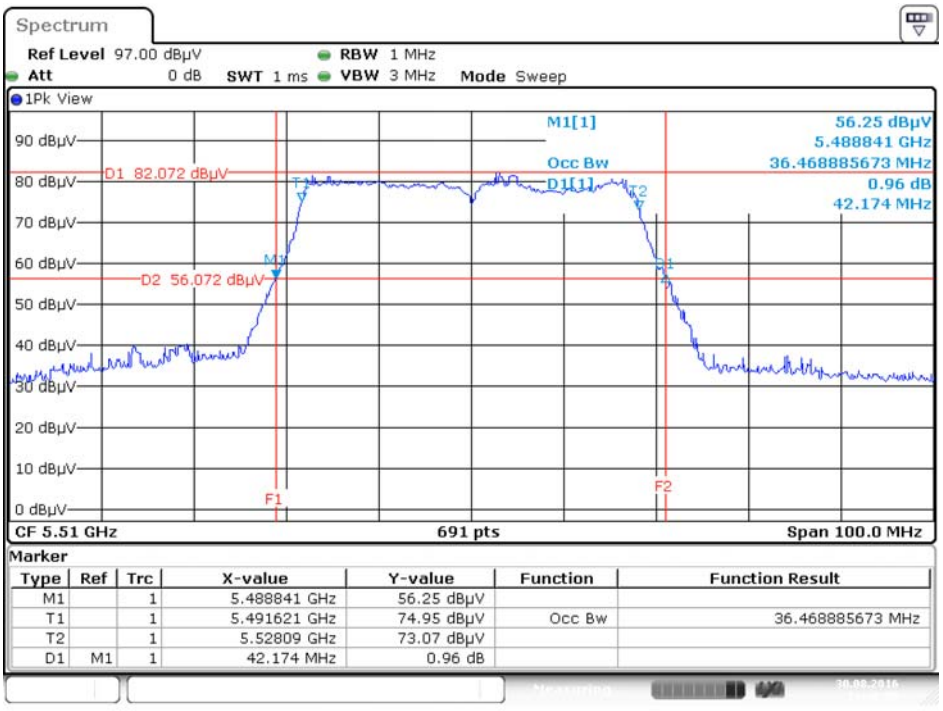
Date: 30.AUG.2016 19:47:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5310 MHz



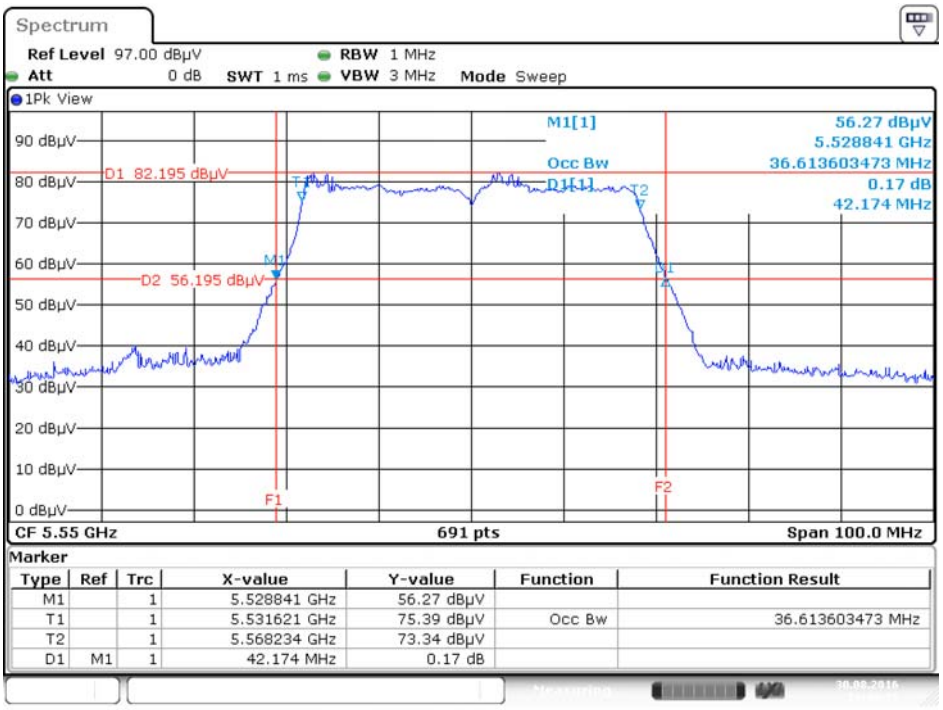
Date: 30.AUG.2016 19:48:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5510 MHz



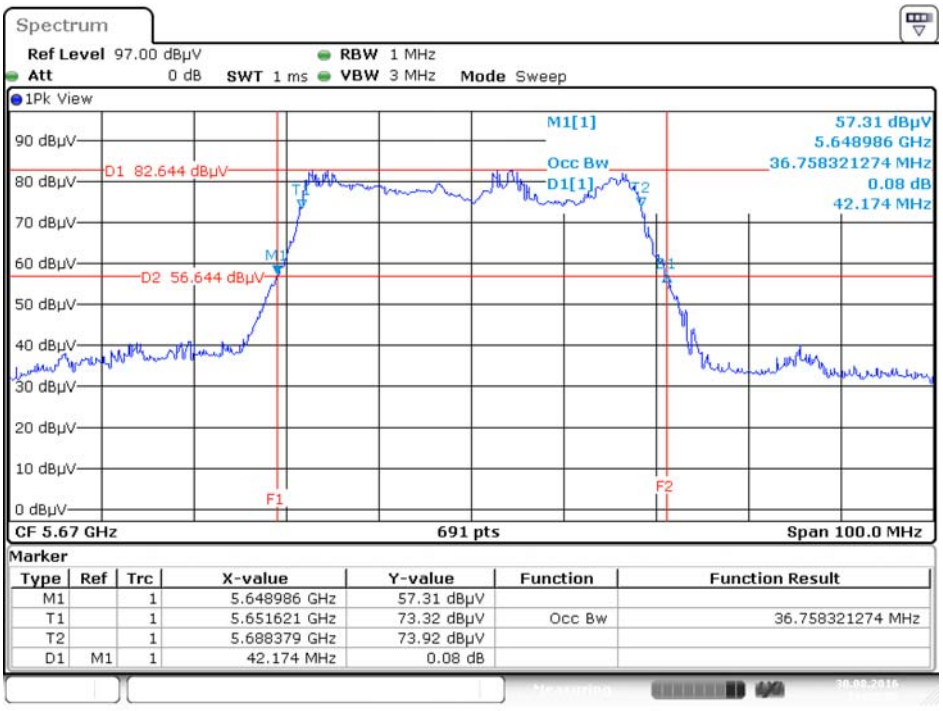
Date: 30.AUG.2016 19:48:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5550 MHz



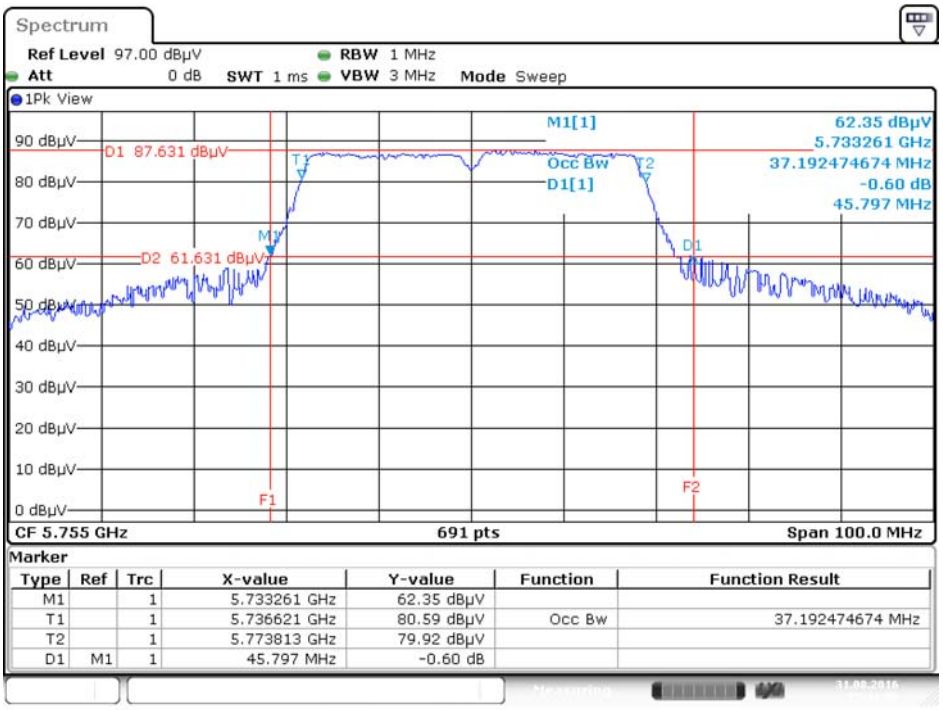
Date: 30.AUG.2016 19:49:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5670 MHz



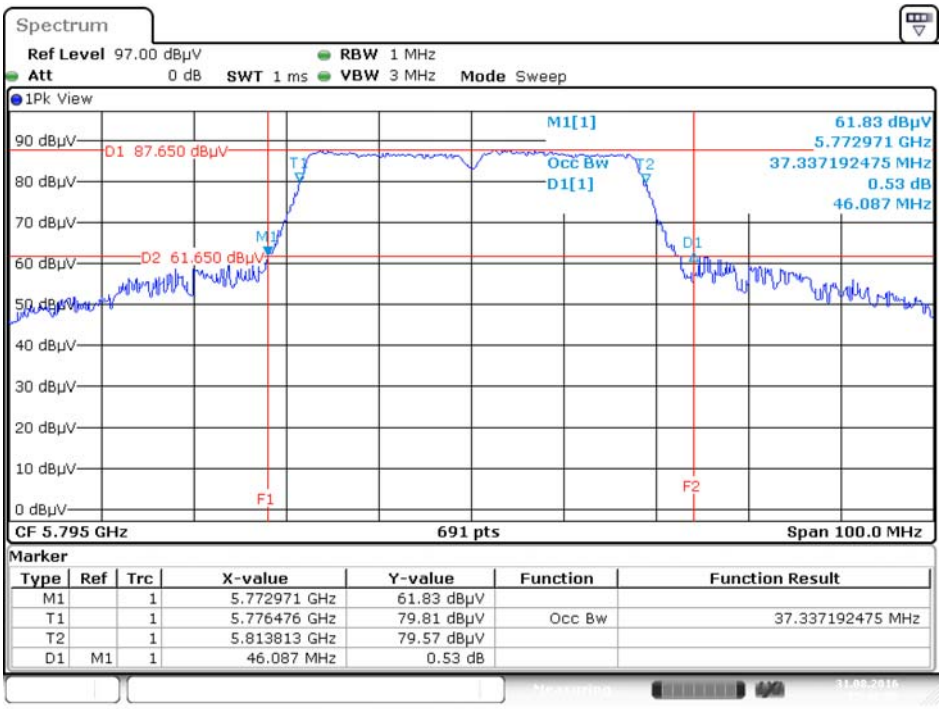
Date: 30.AUG.2016 19:50:06

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5755 MHz



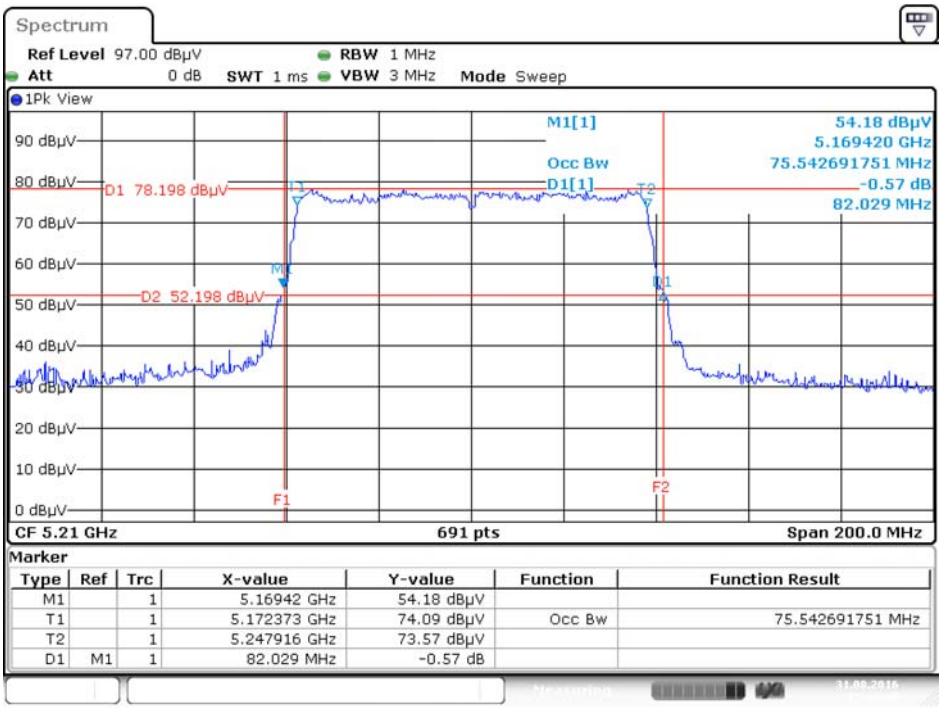
Date: 31.AUG.2016 15:41:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5795 MHz



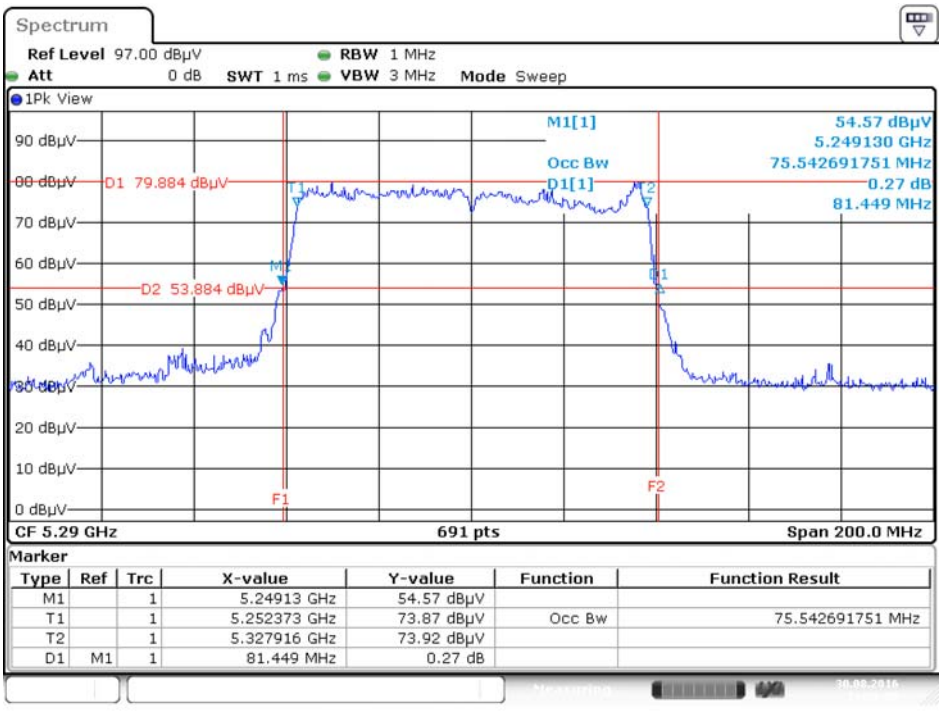
Date: 31.AUG.2016 15:42:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5210 MHz



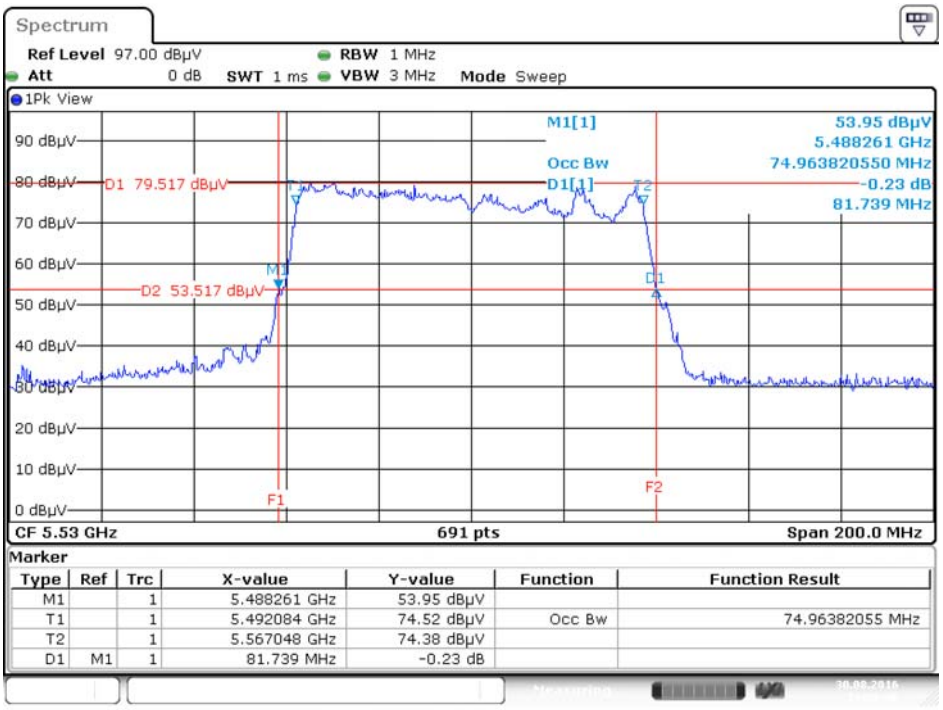
Date: 31.AUG.2016 15:44:41

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5290 MHz



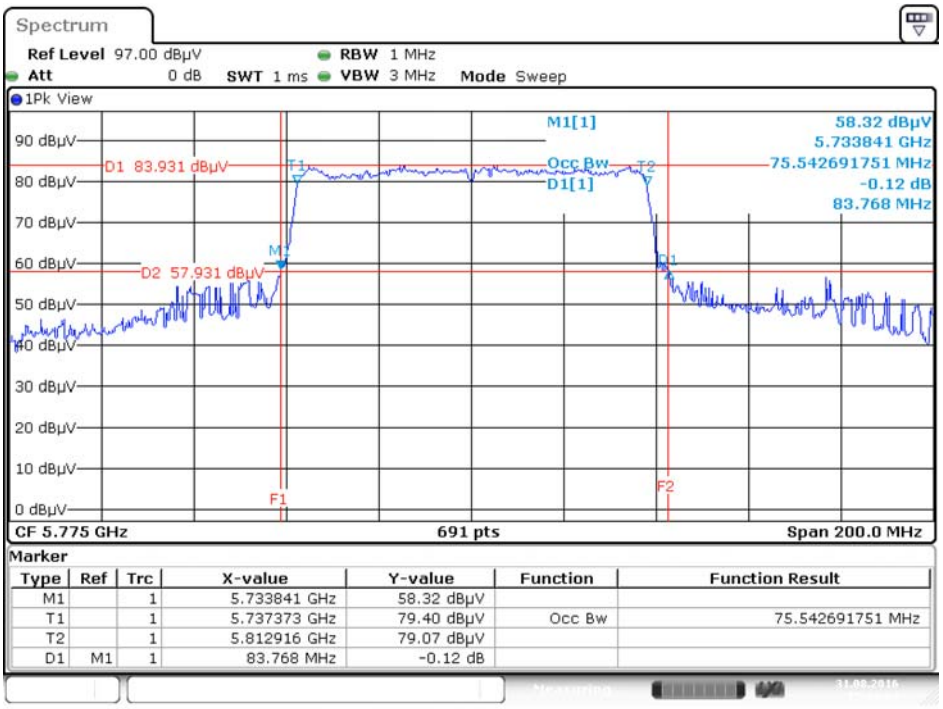
Date: 30.AUG.2016 19:56:08

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5530 MHz

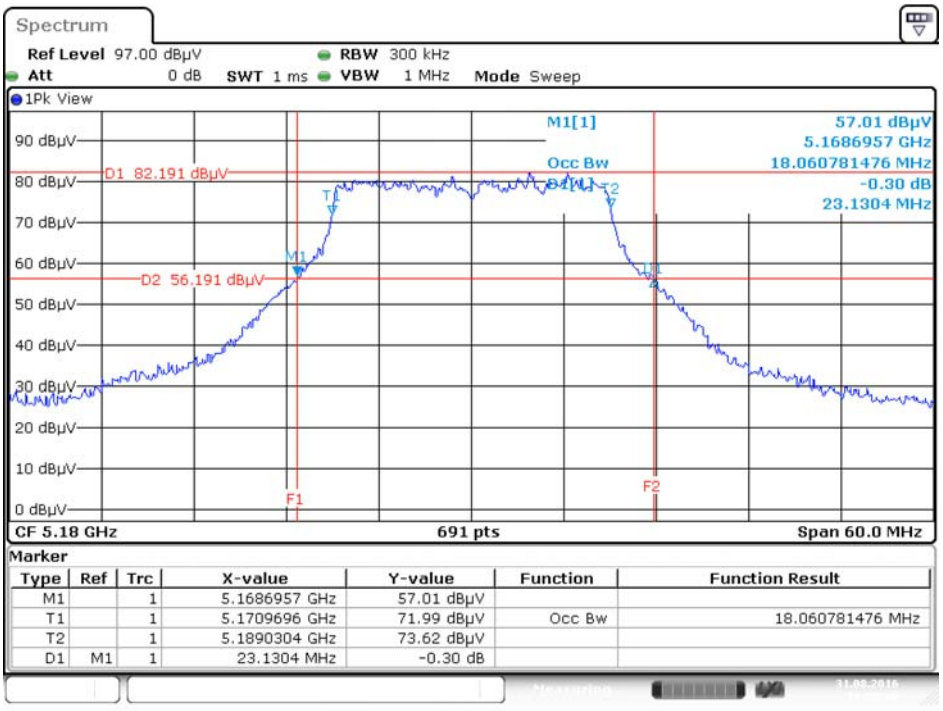


Date: 30.AUG.2016 19:56:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz

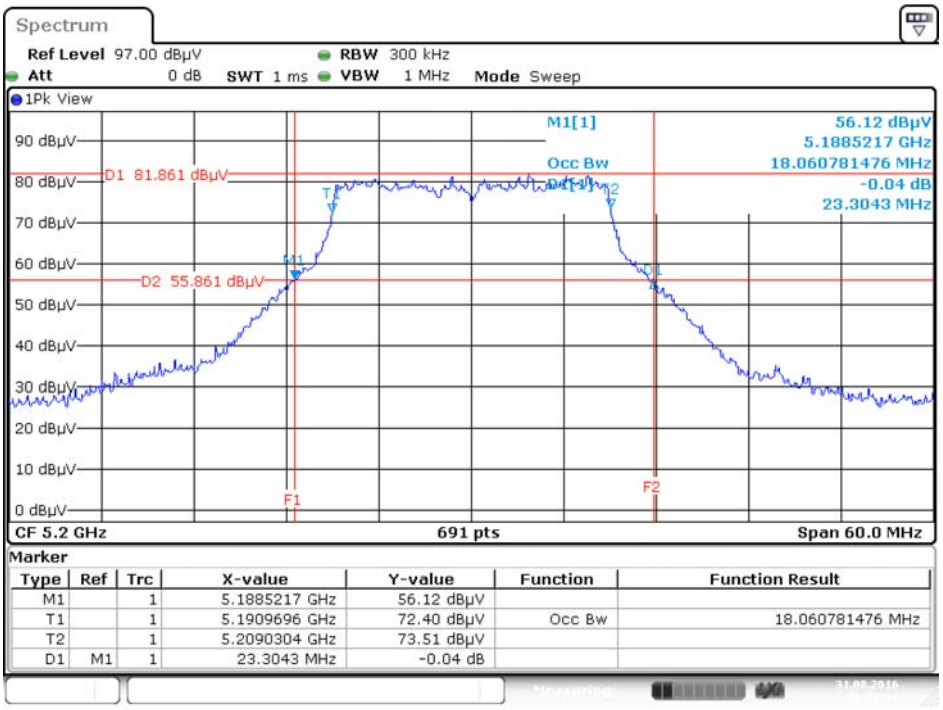


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5180 MHz



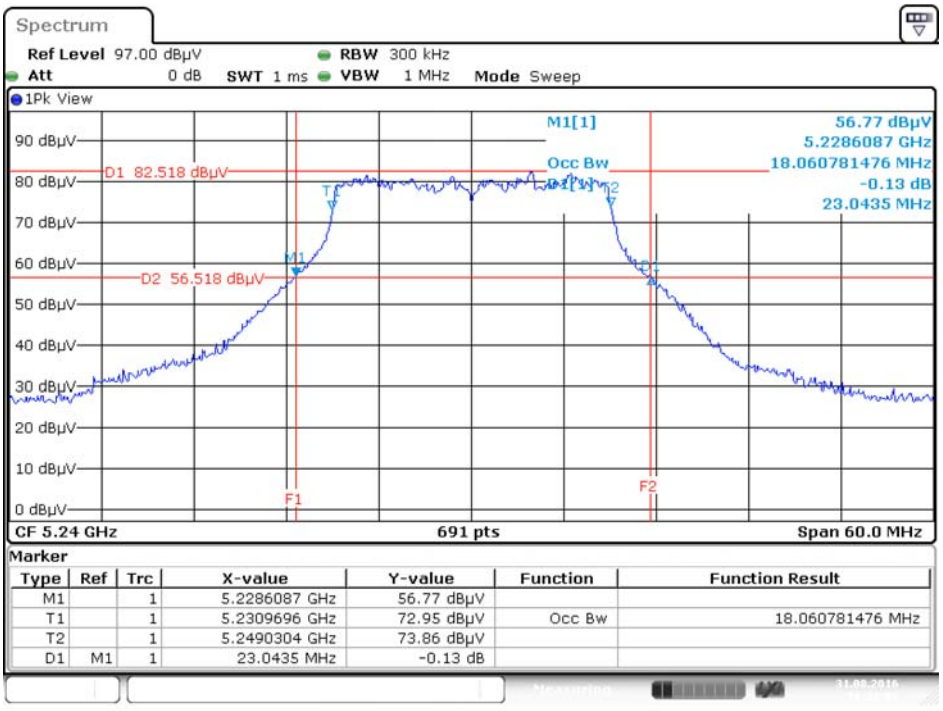
Date: 31.AUG.2016 16:20:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5200 MHz



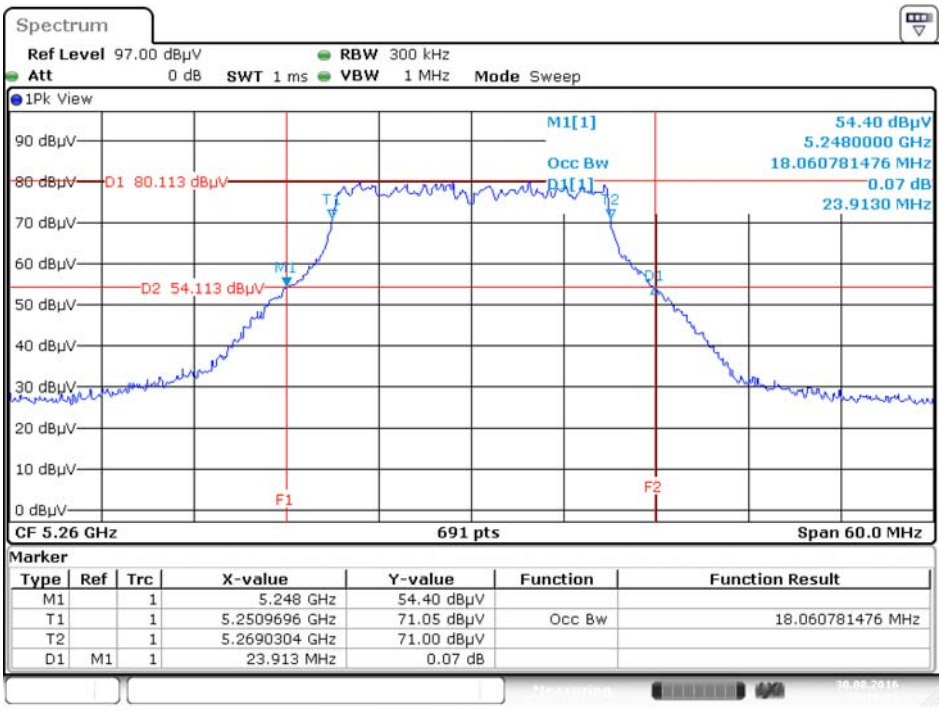
Date: 31.AUG.2016 16:21:14

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5240 MHz



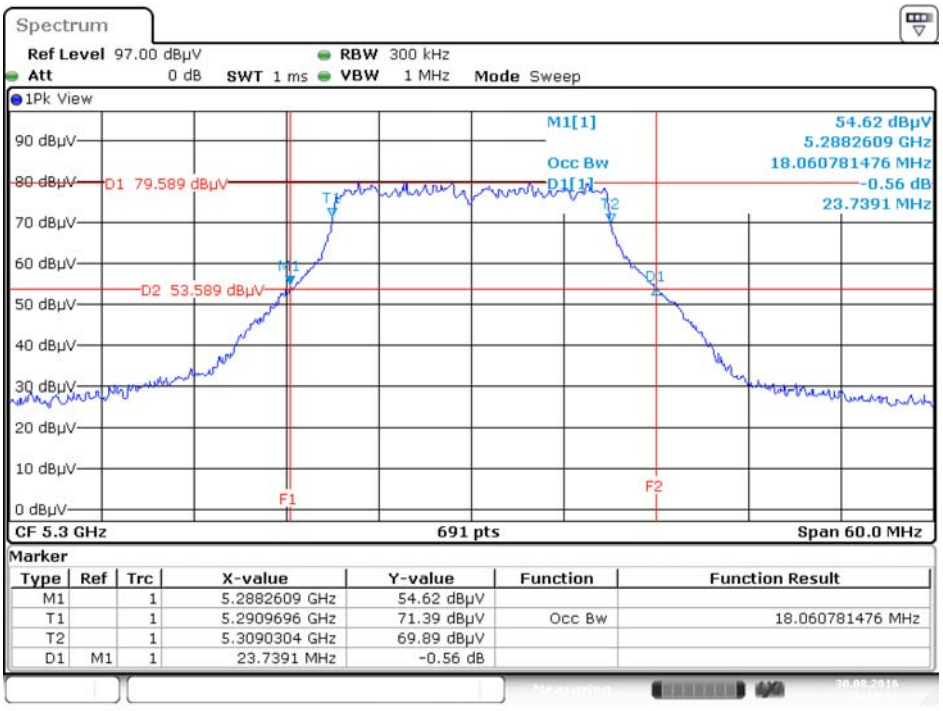
Date: 31.AUG.2016 16:22:01

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5260 MHz



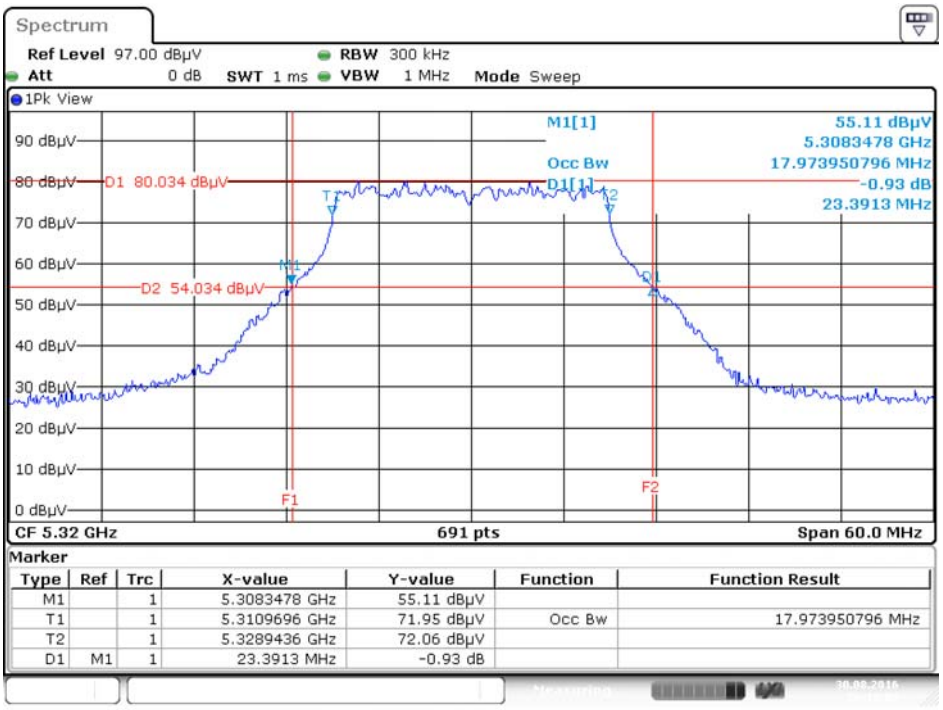
Date: 30.AUG.2016 20:16:15

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5300 MHz



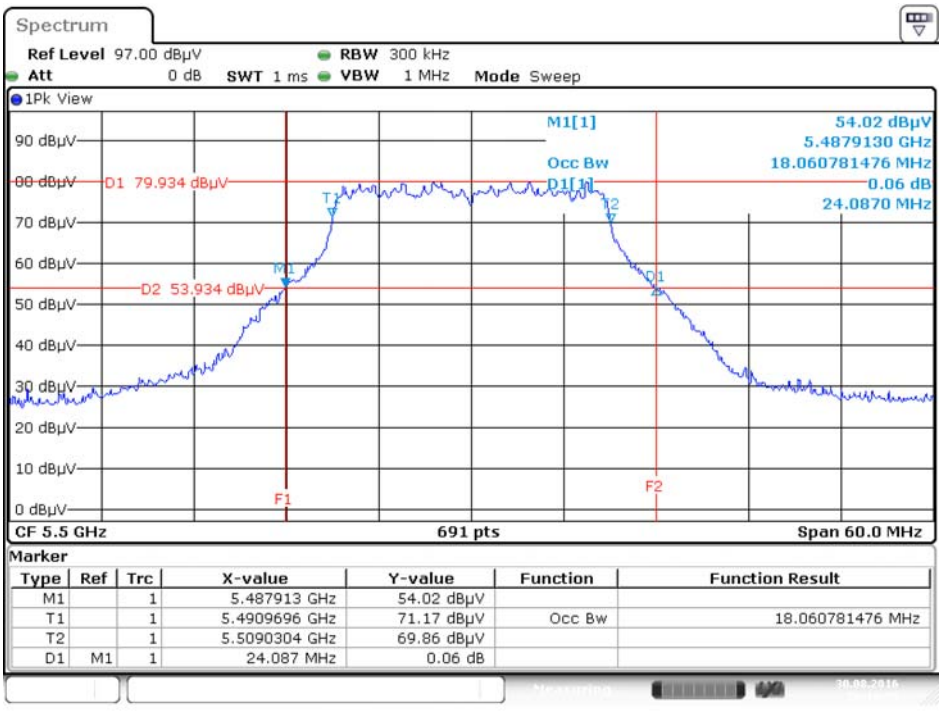
Date: 30.AUG.2016 20:15:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5320 MHz



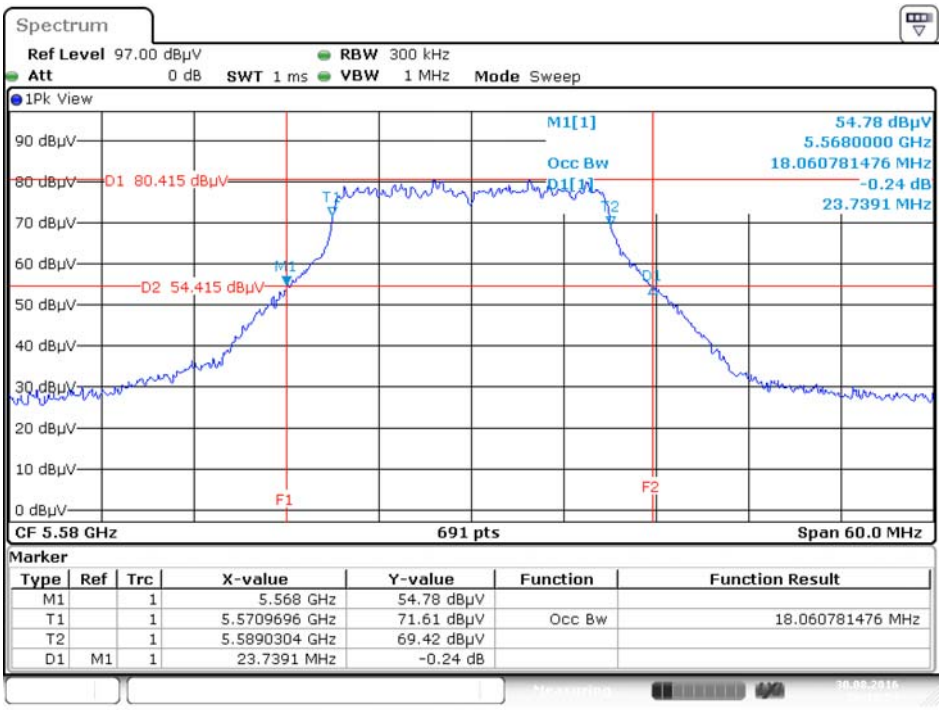
Date: 30.AUG.2016 20:15:03

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5500 MHz



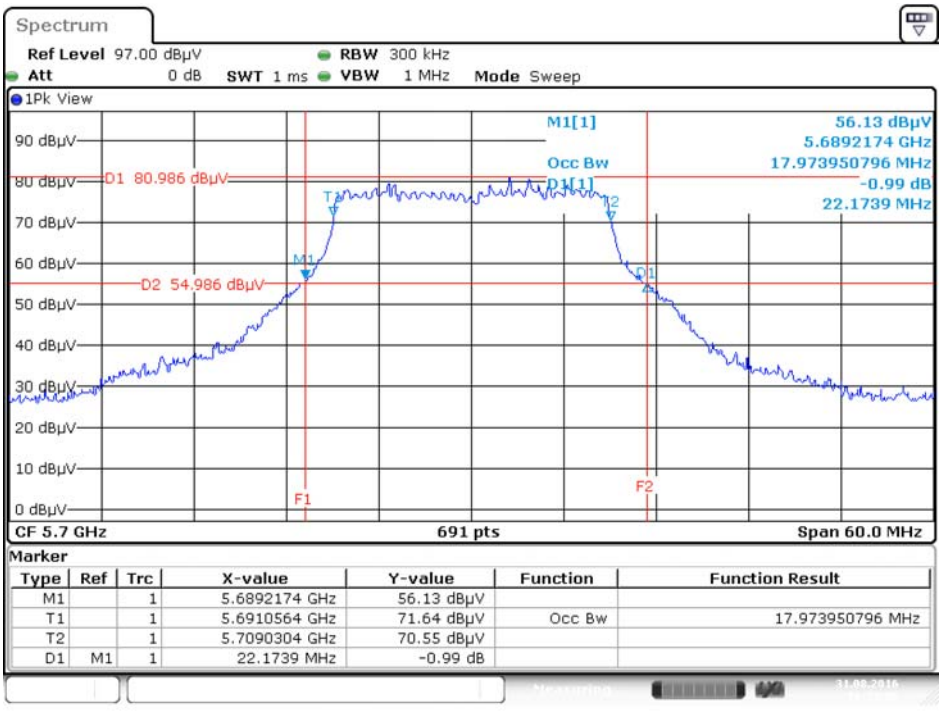
Date: 30.AUG.2016 20:14:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5580 MHz



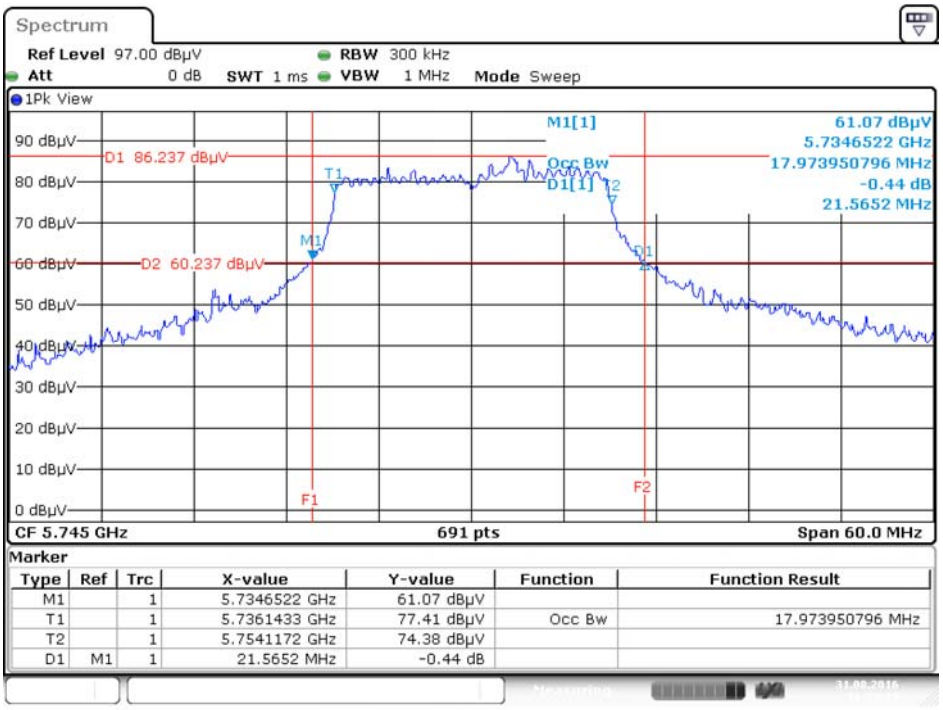
Date: 30.AUG.2016 20:13:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5700 MHz



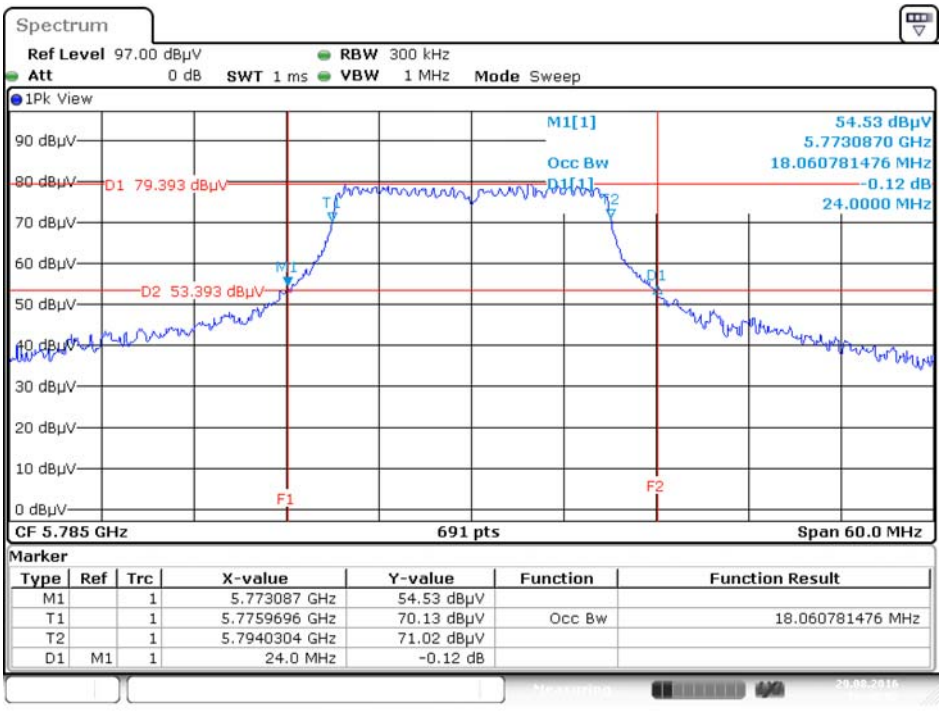
Date: 31.AUG.2016 16:23:06

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5745 MHz



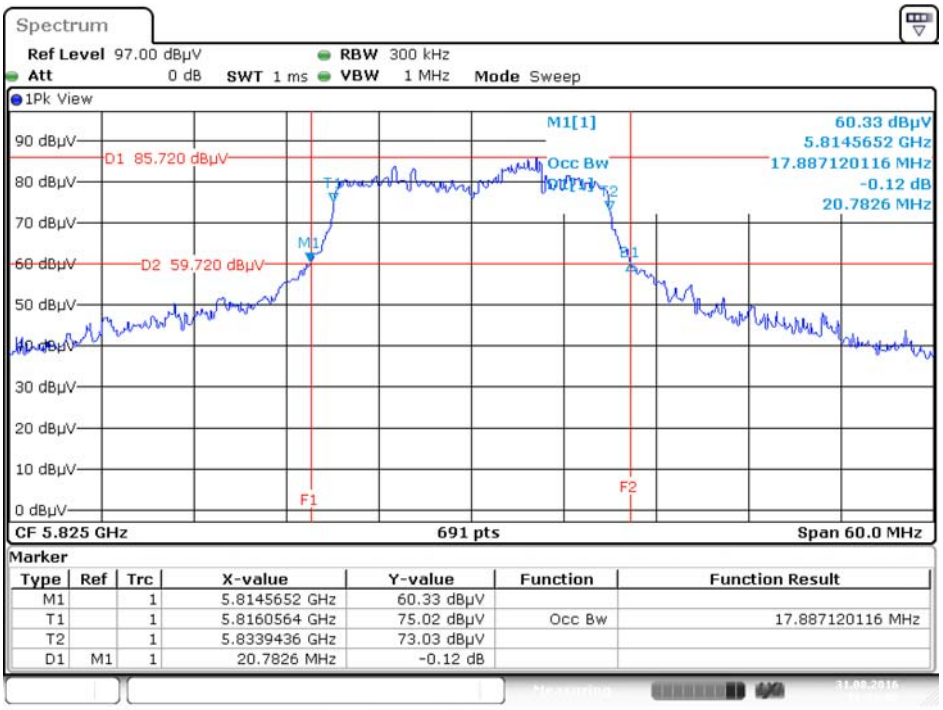
Date: 31.AUG.2016 16:23:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz



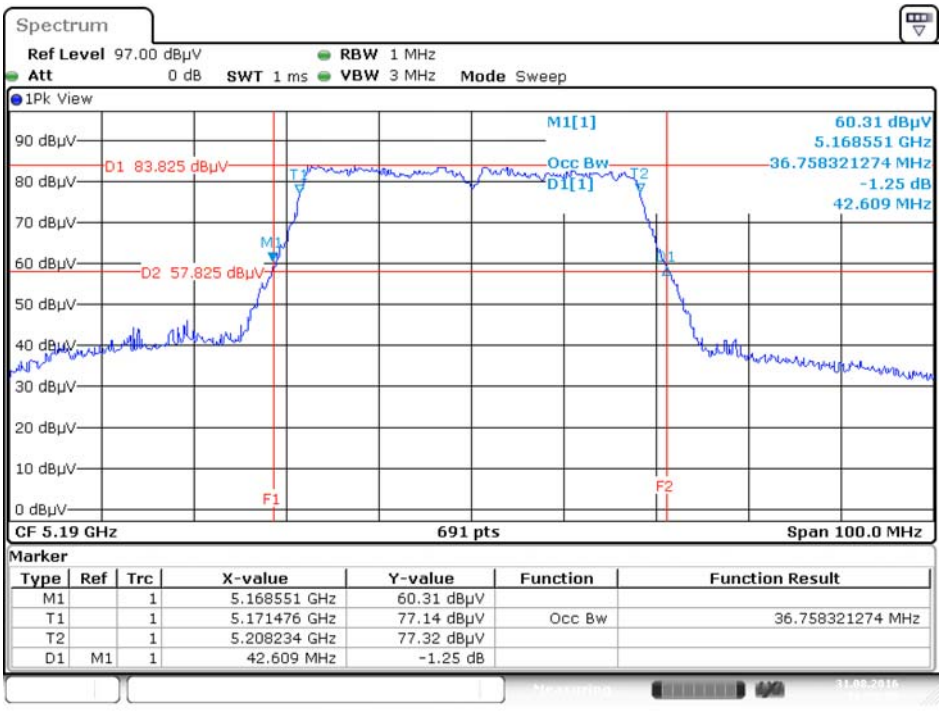
Date: 29.AUG.2016 10:40:03

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



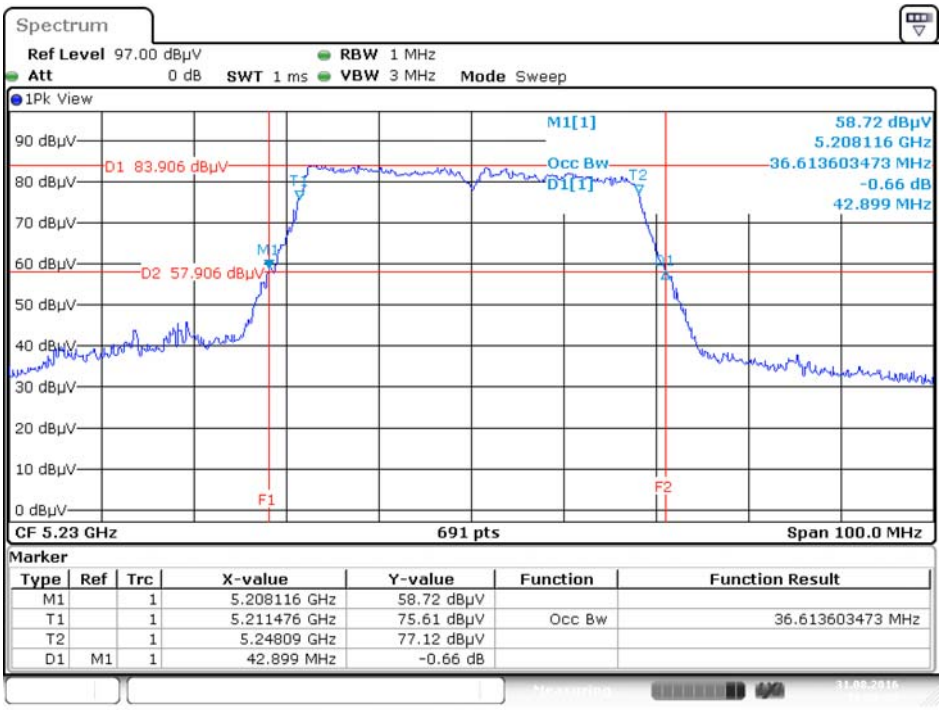
Date: 31.AUG.2016 16:24:03

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5190 MHz



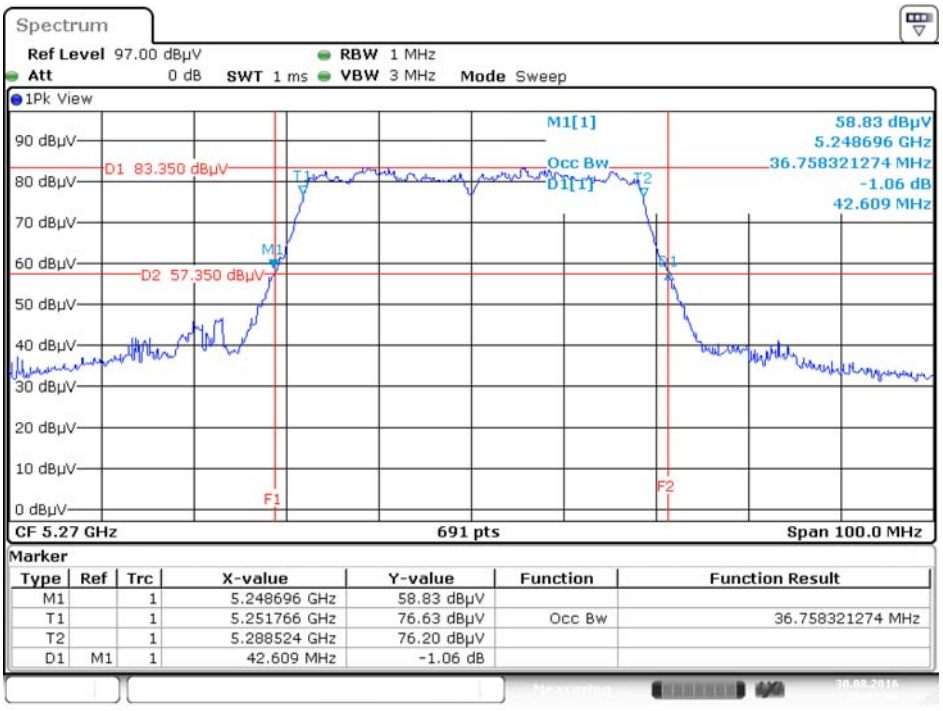
Date: 31.AUG.2016 16:25:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5230 MHz



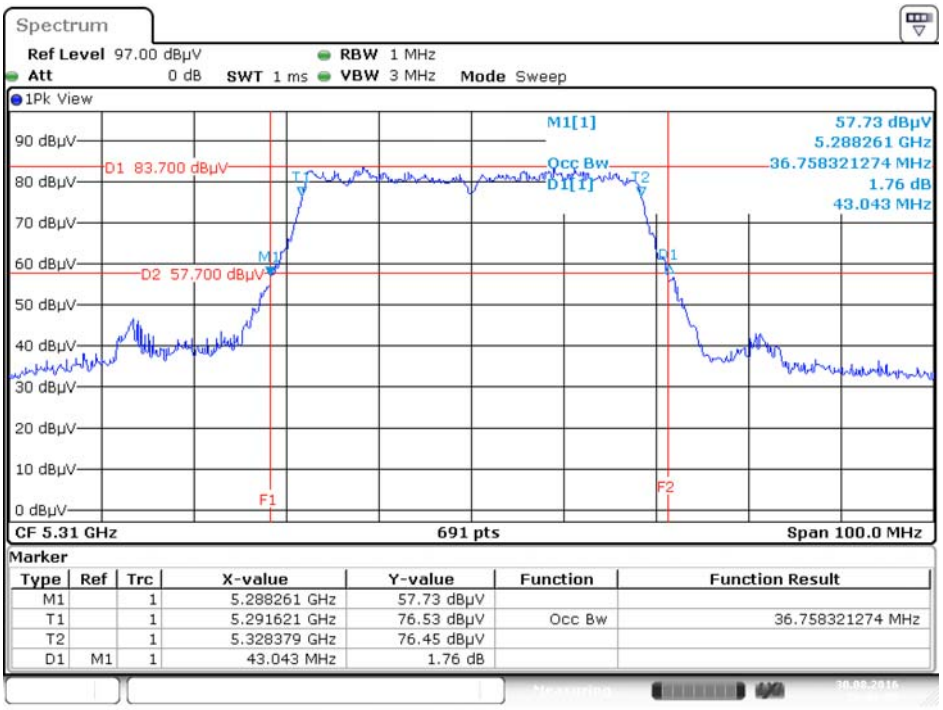
Date: 31.AUG.2016 16:26:24

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5270 MHz



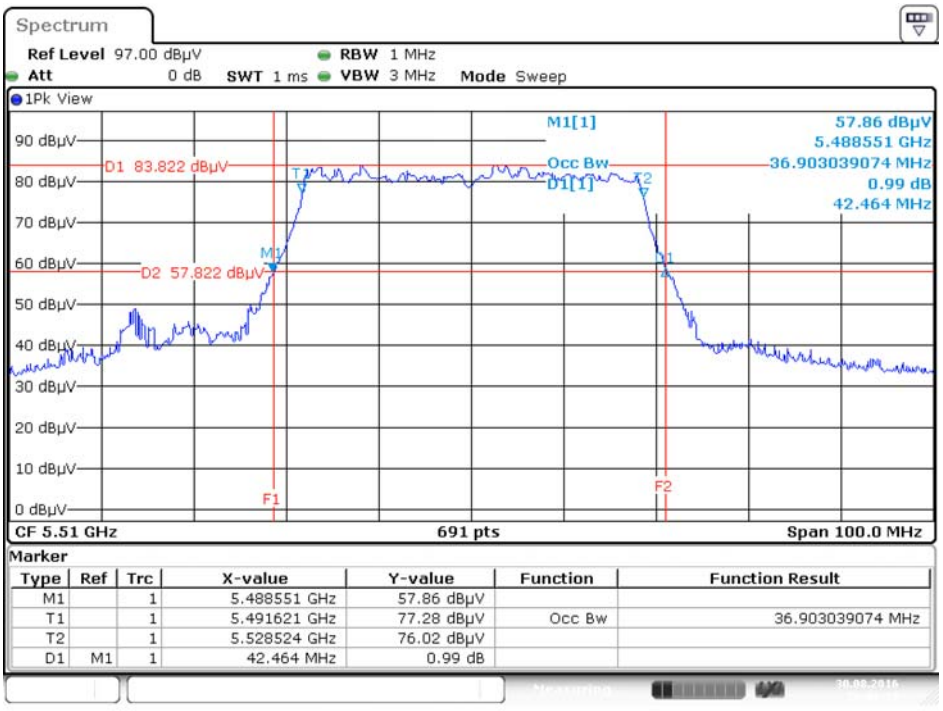
Date: 30.AUG.2016 20:07:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5310 MHz



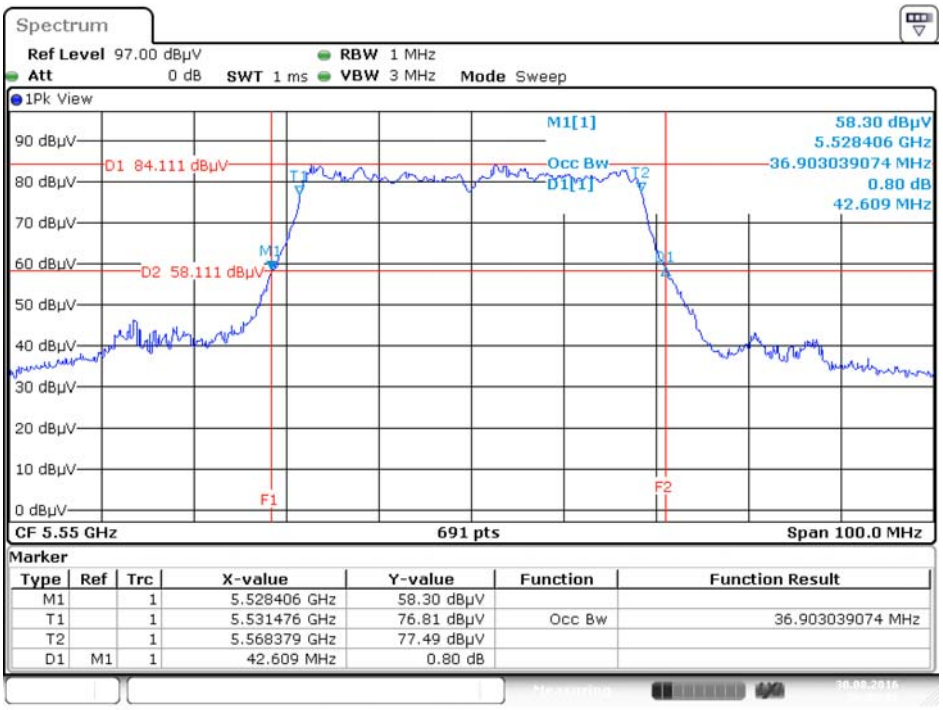
Date: 30.AUG.2016 20:06:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5510 MHz



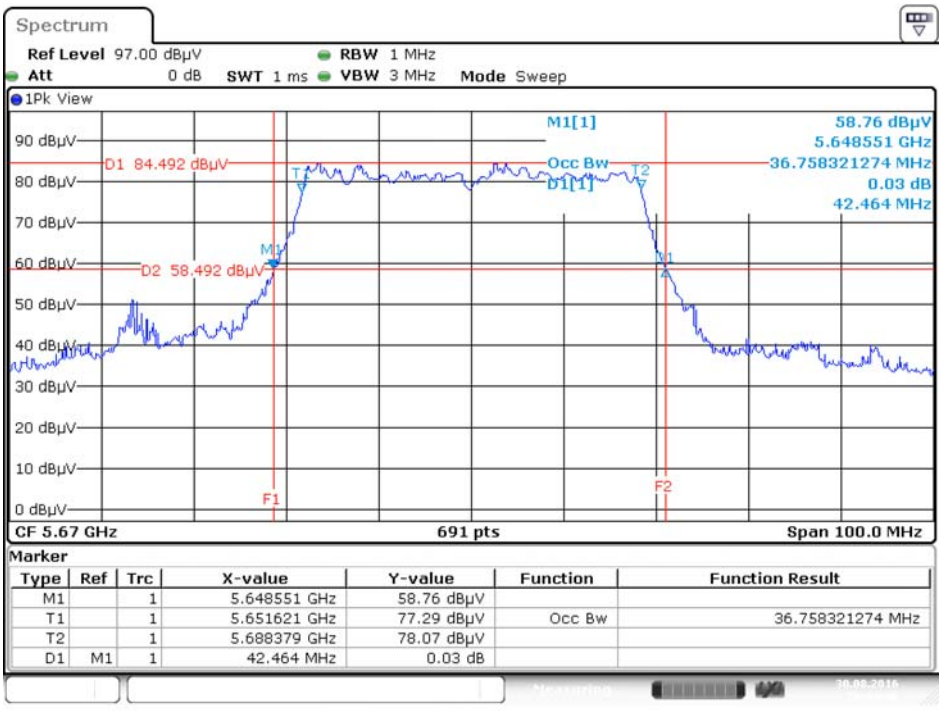
Date: 30.AUG.2016 20:06:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5550 MHz



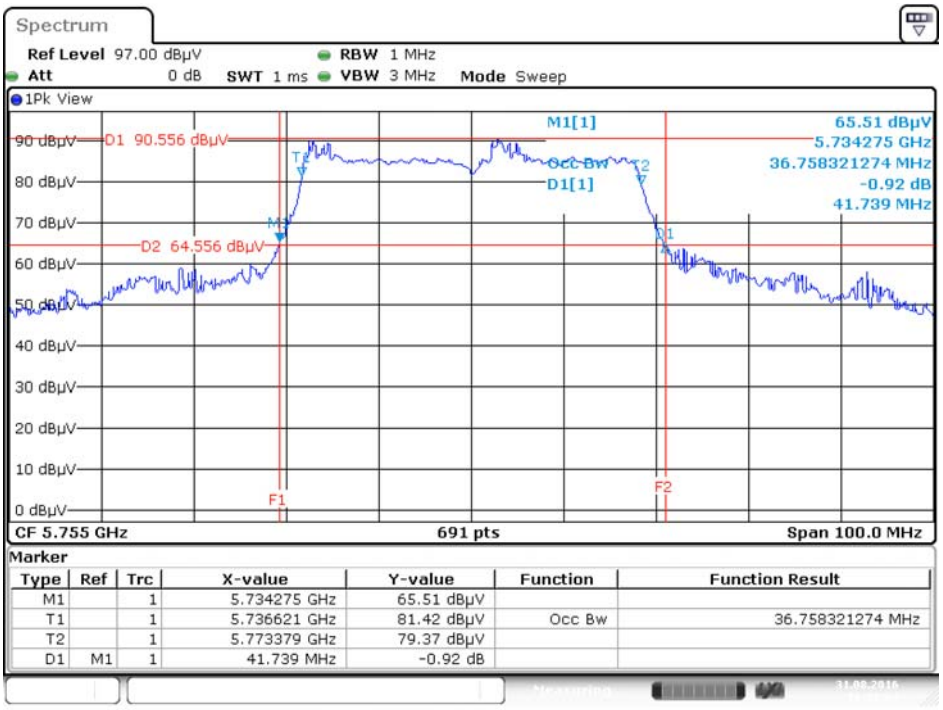
Date: 30.AUG.2016 20:05:17

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5670 MHz



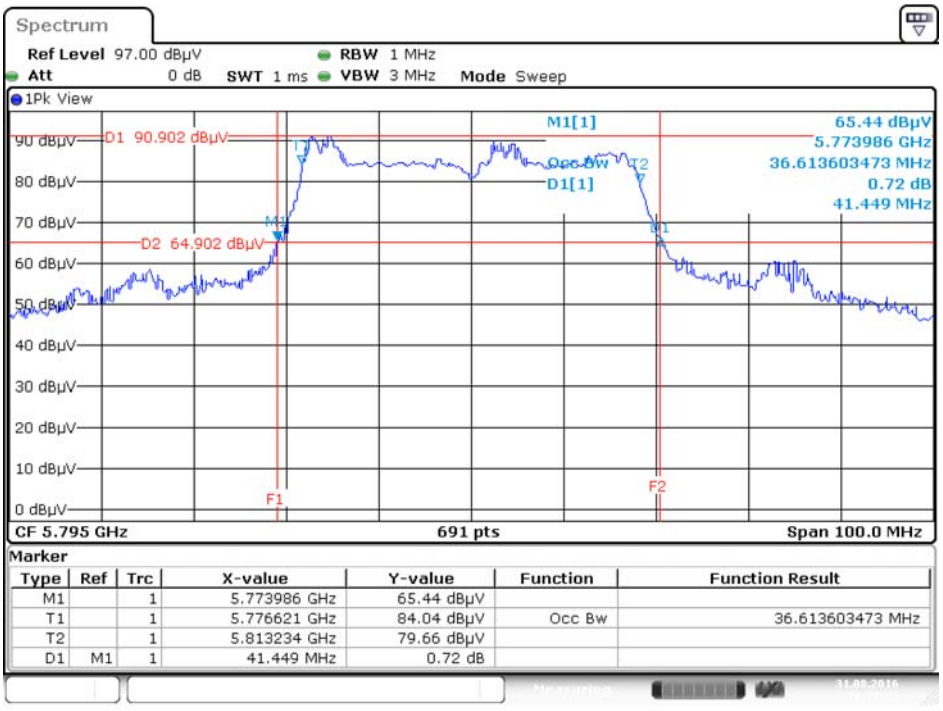
Date: 30.AUG.2016 20:04:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5755 MHz



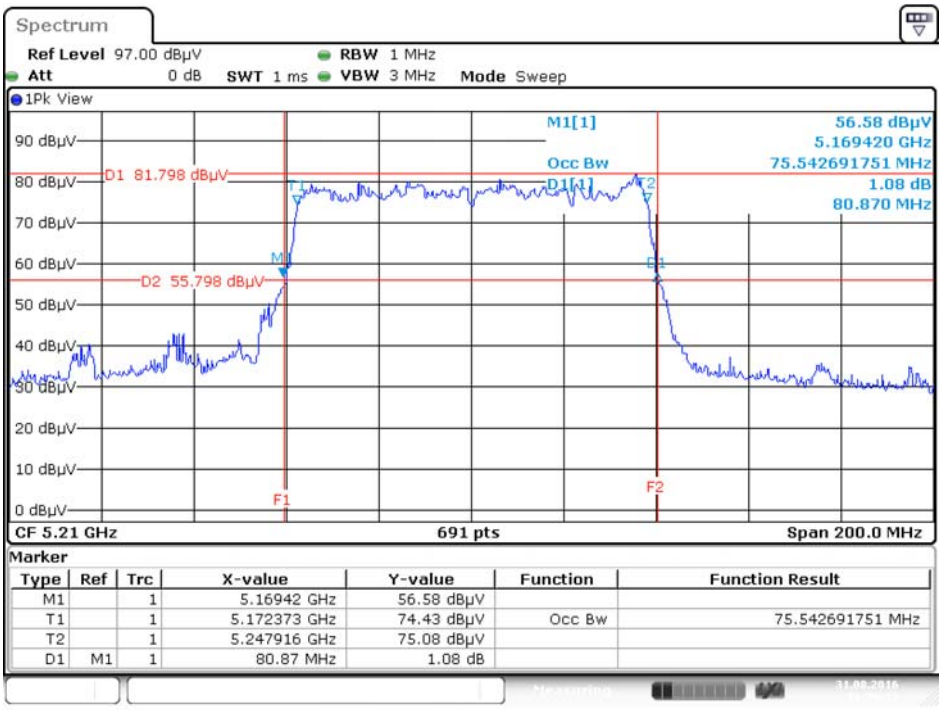
Date: 31.AUG.2016 16:32:04

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5795 MHz



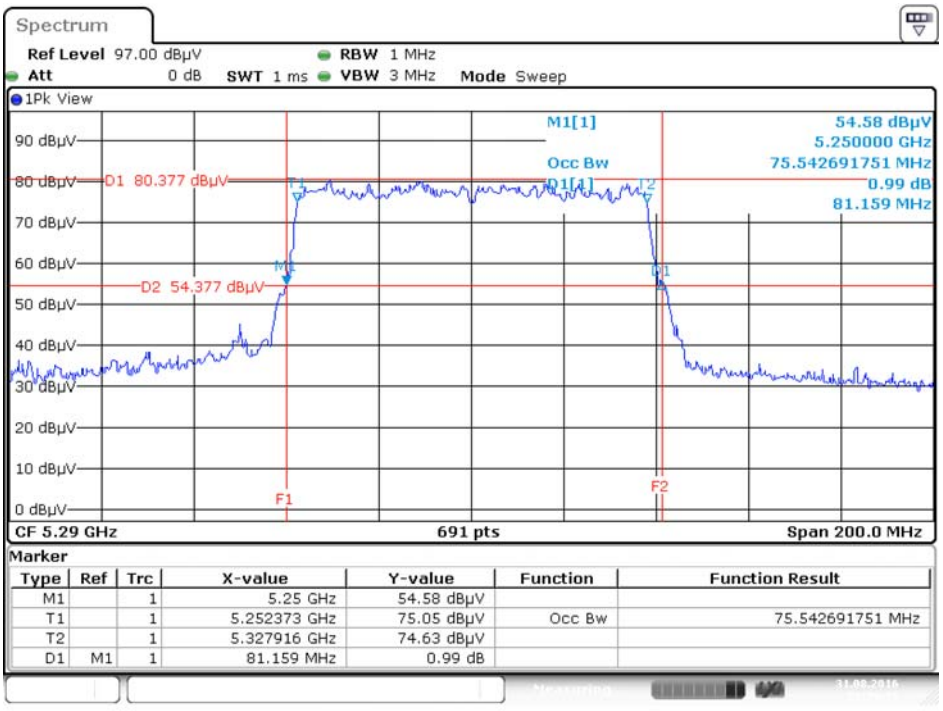
Date: 31.AUG.2016 16:27:23

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5210 MHz



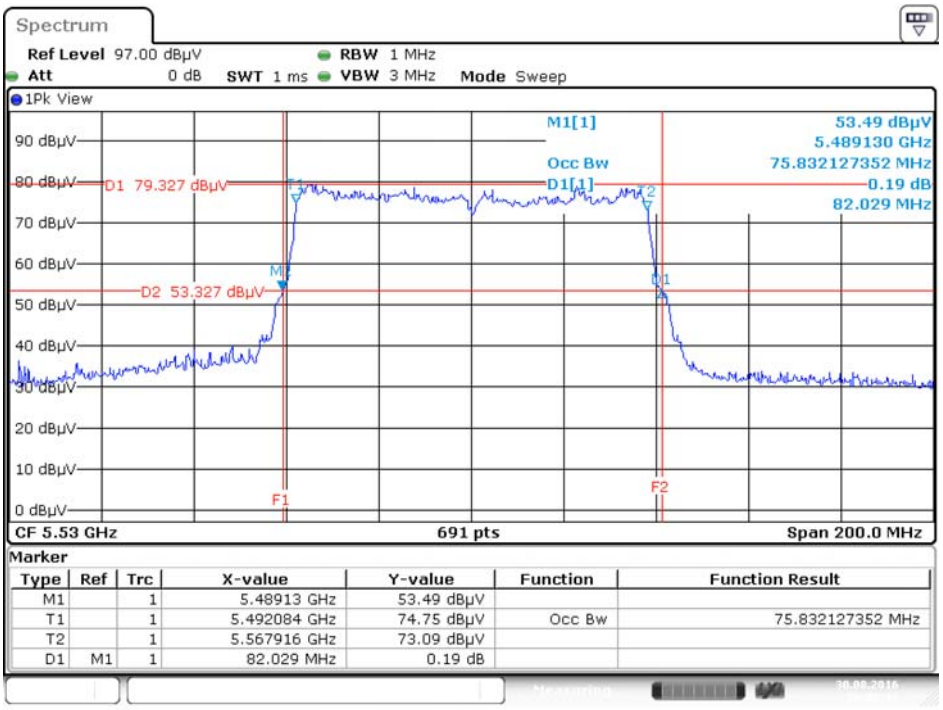
Date: 31.AUG.2016 16:29:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5290 MHz



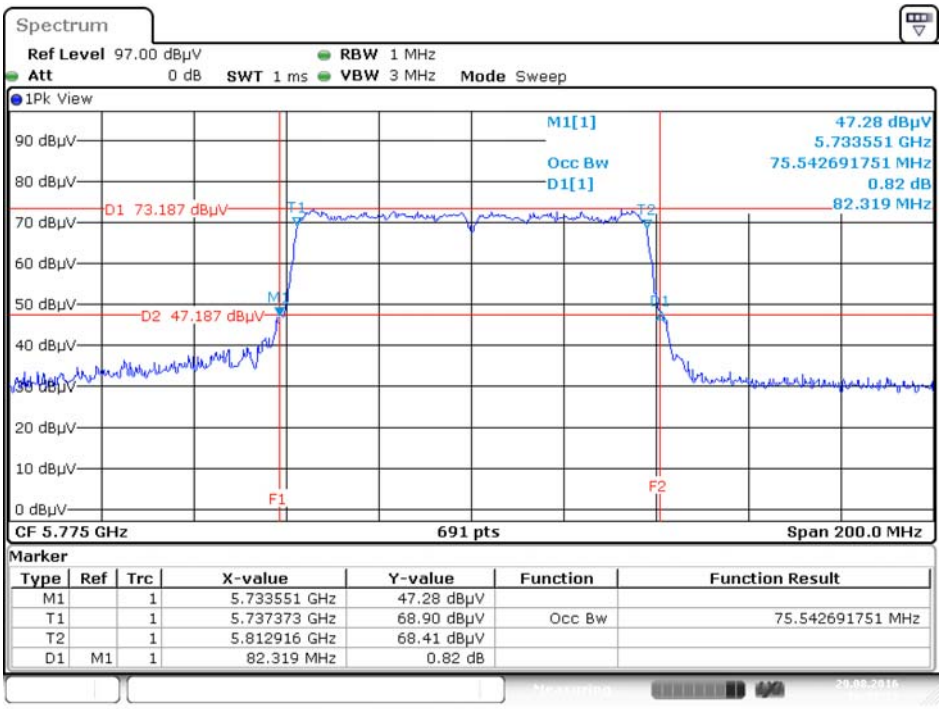
Date: 31.AUG.2016 21:29:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5530 MHz



Date: 30.AUG.2016 20:02:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz



Date: 29.AUG.2016 10:37:27

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	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r03 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

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	20°C	Humidity	50%
Test Engineer	Eddie Weng		

<For Non-Beamforming Mode>

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	5.39	500	Complies
	5785 MHz	5.22	500	Complies
	5825 MHz	5.10	500	Complies

<For Beamforming Mode>

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.80	500	Complies
	5785 MHz	17.62	500	Complies
	5825 MHz	17.62	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.41	500	Complies
	5795 MHz	36.41	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.36	500	Complies

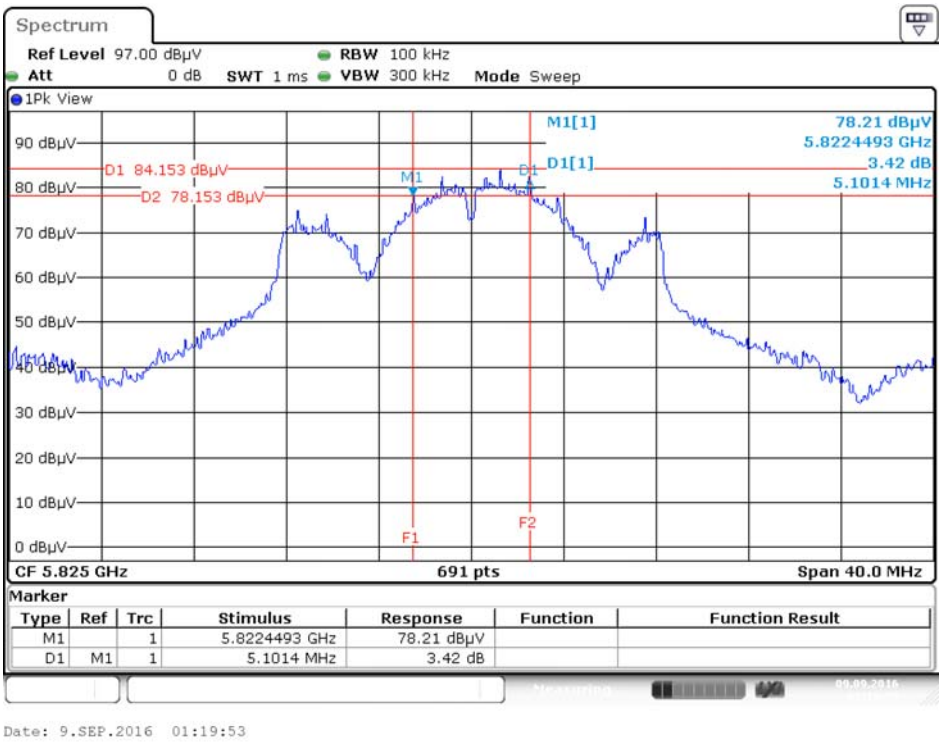
Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss2 VHT20	5745 MHz	16.29	500	Complies
	5785 MHz	17.62	500	Complies
	5825 MHz	12.58	500	Complies
802.11ac MCS0/Nss2 VHT40	5755 MHz	34.09	500	Complies
	5795 MHz	33.97	500	Complies
802.11ac MCS0/Nss2 VHT80	5775 MHz	71.59	500	Complies

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

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

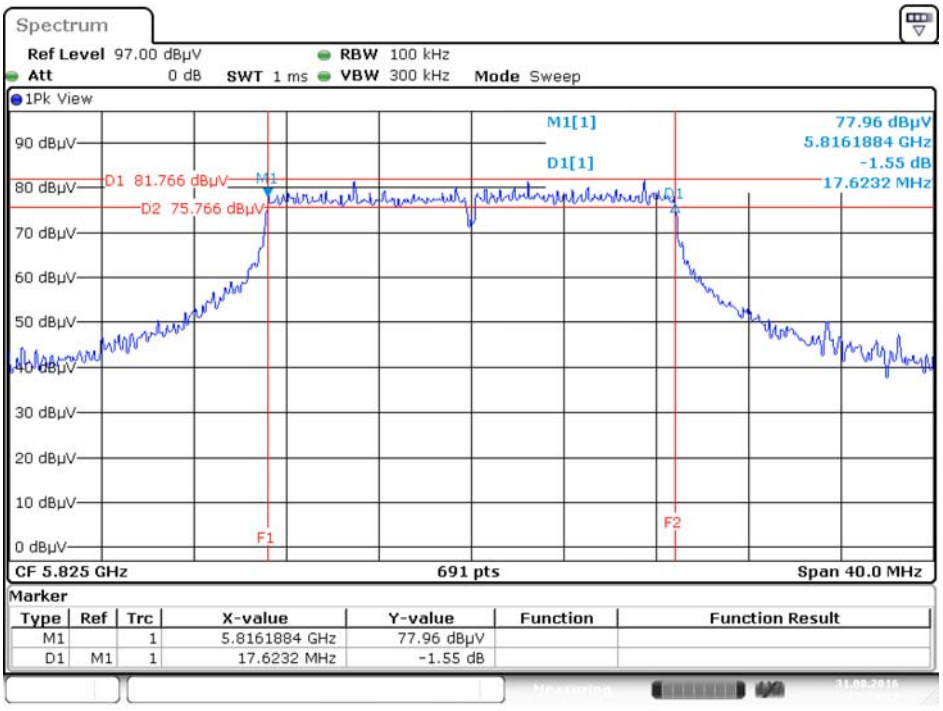
<For Non-Beamforming Mode>

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



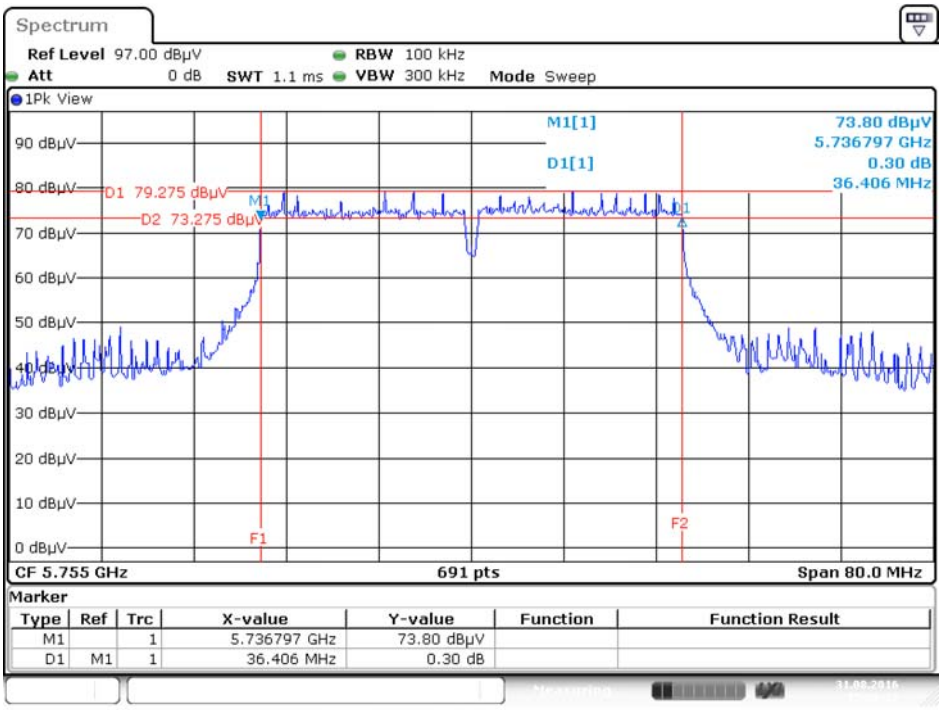
<For Beamforming Mode>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



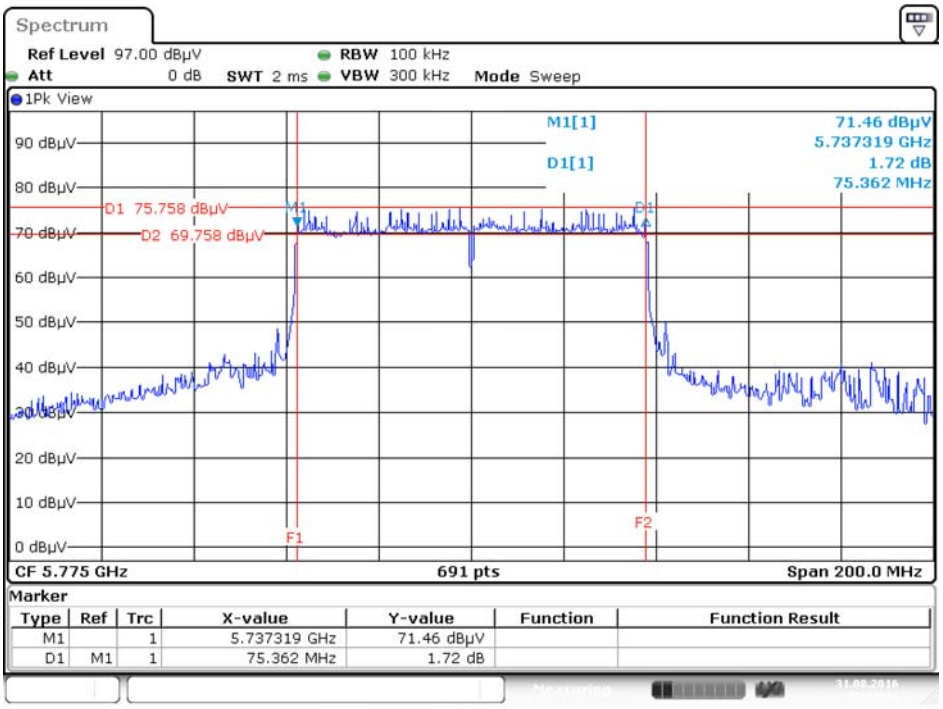
Date: 31.AUG.2016 15:54:18

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5755MHz



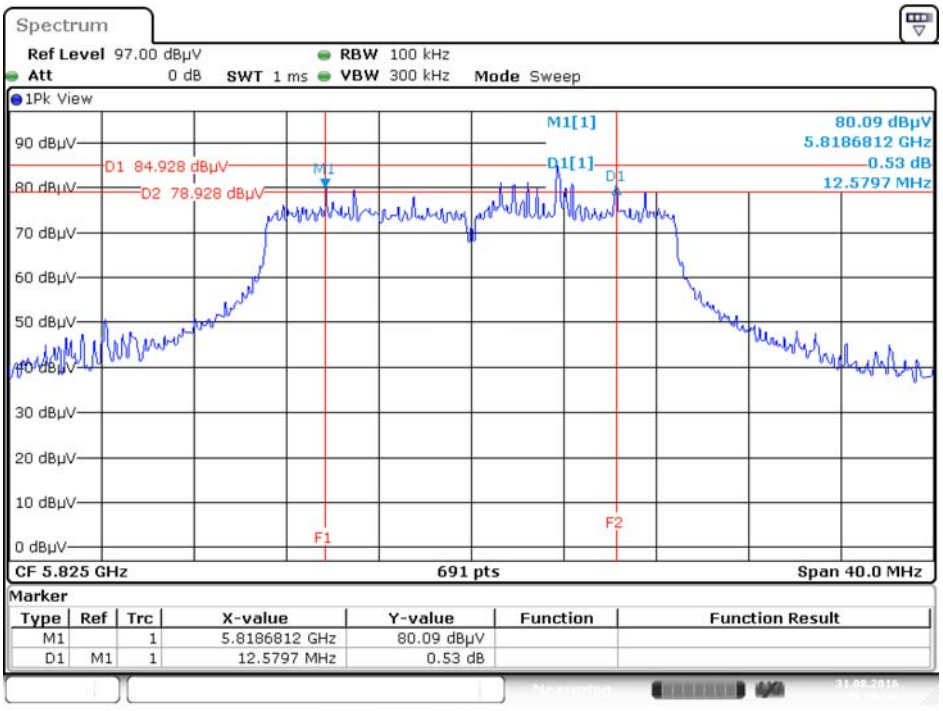
Date: 31.AUG.2016 15:56:32

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz



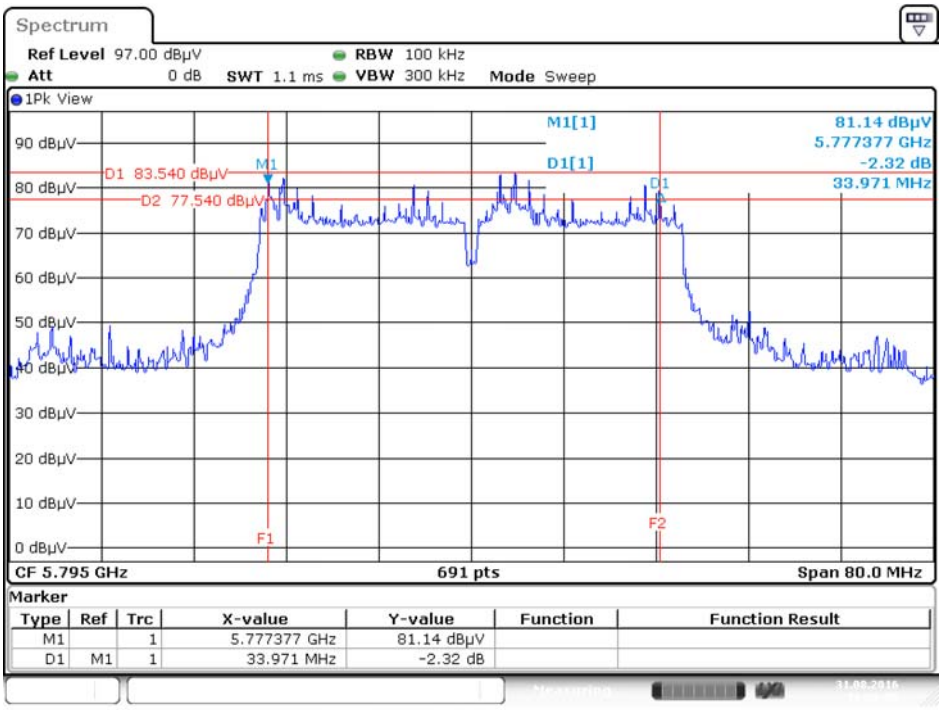
Date: 31.AUG.2016 15:57:42

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5825 MHz



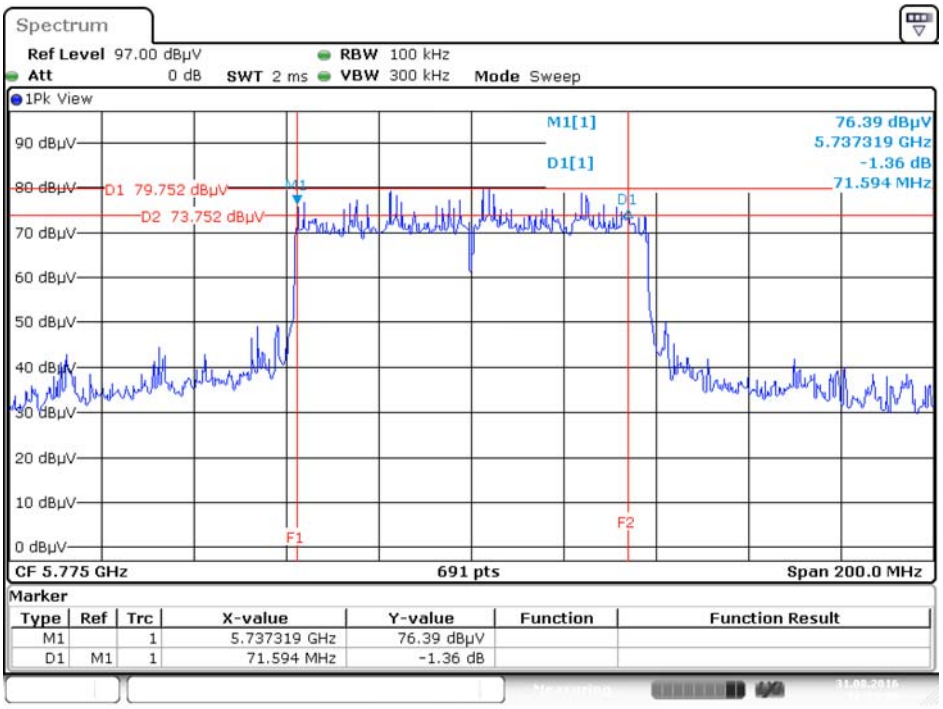
Date: 31.AUG.2016 16:36:34

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5795MHz



Date: 31.AUG.2016 16:36:06

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz



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.
☒	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.

☒	5.25-5.35 GHz	The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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.
☒	5.470-5.725 GHz	
☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.4.2. Measuring Instruments and Setting

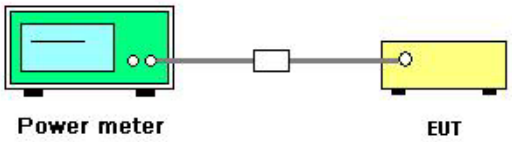
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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 v01r03 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	20°C	Humidity	50%
Test Engineer	Eddie Weng	Test Date	Aug. 30, 2016 ~ Sep. 09, 2016

<For Non-Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11a	5180 MHz	13.88	13.92	13.95	13.82	19.91	23.98	Complies
	5200 MHz	14.21	13.88	13.96	13.92	20.02	23.98	Complies
	5240 MHz	14.21	13.86	13.78	13.89	19.96	23.98	Complies
	5260 MHz	14.36	13.89	13.75	13.58	19.93	23.98	Complies
	5300 MHz	14.14	13.78	13.82	13.93	19.94	23.98	Complies
	5320 MHz	14.12	13.84	13.97	13.72	19.94	23.98	Complies
	5500 MHz	14.15	14.34	13.88	13.47	19.99	23.98	Complies
	5580 MHz	13.97	13.95	13.94	13.86	19.95	23.98	Complies
	5700 MHz	14.27	13.52	13.68	13.65	19.81	23.98	Complies
	5745 MHz	21.33	20.66	20.83	21.03	26.99	30.00	Complies
	5785 MHz	22.05	21.42	21.79	21.52	27.72	30.00	Complies
	5825 MHz	21.14	20.69	20.78	20.97	26.92	30.00	Complies

<For Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	13.28	13.34	13.46	13.35	19.38	19.99	Complies
	5200 MHz	13.48	13.36	13.23	13.44	19.40	19.99	Complies
	5240 MHz	13.26	13.49	13.22	13.32	19.34	19.99	Complies
	5260 MHz	13.57	13.35	13.05	13.43	19.37	19.99	Complies
	5300 MHz	13.79	13.03	13.32	13.58	19.46	19.99	Complies
	5320 MHz	13.57	13.18	13.43	13.33	19.40	19.99	Complies
	5500 MHz	14.06	13.19	13.36	13.47	19.55	19.99	Complies
	5580 MHz	13.92	13.21	13.37	13.65	19.57	19.99	Complies
	5700 MHz	13.79	13.03	13.15	13.12	19.30	19.99	Complies
	5745 MHz	20.39	19.45	20.26	19.69	25.99	26.01	Complies
	5785 MHz	20.69	19.43	19.85	19.81	25.99	26.01	Complies
	5825 MHz	20.64	19.47	19.97	19.77	26.00	26.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=23.98-(9.99-6)=19.99dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=30-(9.99-6)=26.01dBm.

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss1 VHT40	5190 MHz	14.02	13.34	13.77	13.43	19.67	19.99	Complies
	5230 MHz	13.59	13.77	13.45	13.29	19.55	19.99	Complies
	5270 MHz	13.83	13.73	13.41	13.89	19.74	19.99	Complies
	5310 MHz	13.98	13.67	13.39	13.53	19.67	19.99	Complies
	5510 MHz	13.96	13.71	13.69	13.84	19.82	19.99	Complies
	5550 MHz	13.87	13.78	13.47	13.54	19.69	19.99	Complies
	5670 MHz	14.03	13.55	13.82	13.81	19.83	19.99	Complies
	5755 MHz	19.86	19.15	19.57	19.17	25.47	26.01	Complies
	5795 MHz	19.92	19.09	19.35	19.27	25.44	26.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=23.98-(9.99-6)=19.99dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=30-(9.99-6)=26.01dBm.

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss1 VHT80	5210 MHz	13.28	13.27	13.52	13.25	19.35	19.99	Complies
	5290 MHz	13.85	13.52	13.26	13.83	19.64	19.99	Complies
	5530 MHz	14.03	13.71	13.54	13.76	19.78	19.99	Complies
	5775 MHz	18.69	18.29	18.54	18.17	24.45	26.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=23.98-(9.99-6)=19.99dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=30-(9.99-6)=26.01dBm.

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss2 VHT20	5180 MHz	16.15	16.09	16.18	15.85	22.09	22.10	Complies
	5200 MHz	16.08	16.01	15.86	16.06	22.02	22.10	Complies
	5240 MHz	16.02	16.01	16.03	16.05	22.05	22.10	Complies
	5260 MHz	16.06	15.82	15.77	16.07	21.95	22.10	Complies
	5300 MHz	16.16	16.07	15.85	16.06	22.06	22.10	Complies
	5320 MHz	16.11	15.91	16.19	16.08	22.09	22.10	Complies
	5500 MHz	16.09	15.81	15.82	16.15	21.99	22.10	Complies
	5580 MHz	16.22	15.84	16.02	16.03	22.05	22.10	Complies
	5700 MHz	16.42	15.72	16.05	16.02	22.08	22.10	Complies
	5745 MHz	21.42	20.13	21.08	20.84	26.91	28.12	Complies
	5785 MHz	21.58	20.08	21.06	20.49	26.86	28.12	Complies
	5825 MHz	21.33	20.19	20.69	20.48	26.71	28.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=23.98-(7.88-6)=22.10dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=30-(7.88-6)=28.12dBm.

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss2 VHT40	5190 MHz	16.12	16.02	16.08	15.85	22.04	22.10	Complies
	5230 MHz	16.05	15.82	16.14	15.88	21.99	22.10	Complies
	5270 MHz	16.13	15.79	15.87	16.39	22.07	22.10	Complies
	5310 MHz	16.58	15.65	15.87	15.89	22.03	22.10	Complies
	5510 MHz	16.26	15.97	15.51	15.54	21.85	22.10	Complies
	5550 MHz	16.19	15.95	15.89	16.16	22.07	22.10	Complies
	5670 MHz	16.25	15.74	16.02	15.98	22.02	22.10	Complies
	5755 MHz	21.76	20.61	21.23	20.99	27.19	28.12	Complies
	5795 MHz	22.01	20.75	21.27	21.16	27.34	28.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=23.98-(7.88-6)=22.10dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=30-(7.88-6)=28.12dBm.

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 3	Antenna 4	Total		
802.11ac MCS0/Nss2 VHT80	5210 MHz	15.65	15.36	15.17	15.42	21.42	22.10	Complies
	5290 MHz	16.39	15.98	15.65	16.24	22.09	22.10	Complies
	5530 MHz	14.89	15.02	14.48	14.64	20.78	22.10	Complies
	5775 MHz	20.97	19.96	20.21	19.66	26.25	28.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=23.98-(7.88-6)=22.10dBm.

For 5GB4:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=30-(7.88-6)=28.12dBm.

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
	☒	Client devices	11 dBm/MHz
☒	5.25-5.35 GHz		11 dBm/MHz
☒	5.470-5.725 GHz		11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

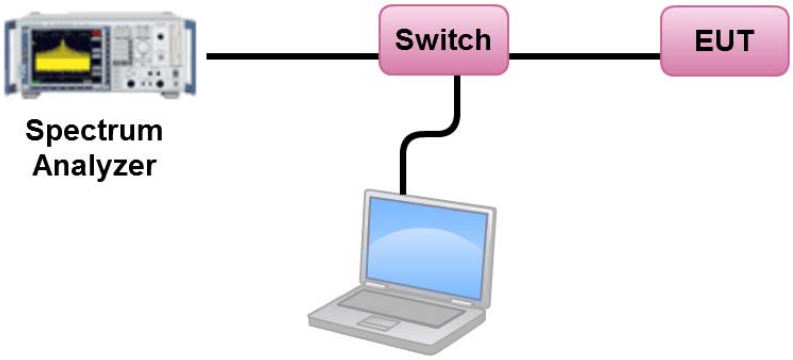
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 10log(500kHz/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 v01r03 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 10log(500kHz/RBW) and the final result should ≤ 30 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	20°C	Humidity	50%
Test Engineer	Eddie Weng	Test Date	Aug. 30, 2016 ~ Sep. 09, 2016

<For Non-Beamforming Mode>

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	6.71	7.01	Complies
40	5200 MHz	6.95	7.01	Complies
48	5240 MHz	6.85	7.01	Complies
52	5260 MHz	6.92	7.01	Complies
60	5300 MHz	6.88	7.01	Complies
64	5320 MHz	6.87	7.01	Complies
100	5500 MHz	6.75	7.01	Complies
116	5580 MHz	6.78	7.01	Complies
140	5700 MHz	6.68	7.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=11-(9.99-6)=7.01dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	13.97	-3.01	10.96	26.01	Complies
157	5785 MHz	14.63	-3.01	11.62	26.01	Complies
165	5825 MHz	13.80	-3.01	10.79	26.01	Complies

Note:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi>6dBi, so Limit=30-(9.99-6)=26.01dBm/500kHz.

<For Beamforming Mode>

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	6.41	7.01	Complies
40	5200 MHz	6.30	7.01	Complies
48	5240 MHz	6.37	7.01	Complies
52	5260 MHz	6.14	7.01	Complies
60	5300 MHz	6.15	7.01	Complies
64	5320 MHz	6.08	7.01	Complies
100	5500 MHz	6.55	7.01	Complies
116	5580 MHz	6.42	7.01	Complies
140	5700 MHz	6.00	7.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=11-(9.99-6)=7.01dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	12.30	-3.01	9.29	26.01	Complies
157	5785 MHz	12.88	-3.01	9.87	26.01	Complies
165	5825 MHz	12.13	-3.01	9.12	26.01	Complies

Note:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi>6dBi, so Limit=30-(9.99-6)=26.01dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	3.16	7.01	Complies
46	5230 MHz	3.27	7.01	Complies
54	5270 MHz	3.34	7.01	Complies
62	5310 MHz	3.34	7.01	Complies
102	5510 MHz	3.70	7.01	Complies
110	5550 MHz	3.57	7.01	Complies
134	5670 MHz	3.63	7.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=11-(9.99-6)=7.01dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	8.76	-3.01	5.75	26.01	Complies
159	5795 MHz	8.77	-3.01	5.76	26.01	Complies

Note:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi>6dBi, so Limit=30-(9.99-6)=26.01dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	0.06	7.01	Complies
58	5290 MHz	0.59	7.01	Complies
106	5530 MHz	0.72	7.01	Complies

Note:

For 5GB1/B2/B3:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi >6dBi, so Limit=11-(9.99-6)=7.01dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	5.69	-3.01	2.68	26.01	Complies

Note:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =9.99dBi>6dBi, so Limit=30-(9.99-6)=26.01dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	8.87	9.12	Complies
40	5200 MHz	8.85	9.12	Complies
48	5240 MHz	9.04	9.12	Complies
52	5260 MHz	8.09	9.12	Complies
60	5300 MHz	8.11	9.12	Complies
64	5320 MHz	8.24	9.12	Complies
100	5500 MHz	8.04	9.12	Complies
116	5580 MHz	7.98	9.12	Complies
140	5700 MHz	8.69	9.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=11-(7.88-6)=9.12dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	13.60	-3.01	10.59	28.12	Complies
157	5785 MHz	13.79	-3.01	10.78	28.12	Complies
165	5825 MHz	13.68	-3.01	10.67	28.12	Complies

Note:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi>6dBi, so Limit=30-(7.88-6)=28.12dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	5.24	9.12	Complies
46	5230 MHz	5.43	9.12	Complies
54	5270 MHz	5.55	9.12	Complies
62	5310 MHz	5.46	9.12	Complies
102	5510 MHz	5.38	9.12	Complies
110	5550 MHz	5.57	9.12	Complies
134	5670 MHz	5.41	9.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=11-(7.88-6)=9.12dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	10.86	-3.01	7.85	28.12	Complies
159	5795 MHz	11.21	-3.01	8.20	28.12	Complies

Note:

$$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi>6dBi, so Limit=30-(7.88-6)=28.12dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	2.23	9.12	Complies
58	5290 MHz	2.39	9.12	Complies
106	5530 MHz	1.72	9.12	Complies

Note:

For 5GB1/B2/B3:

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi >6dBi, so Limit=11-(7.88-6)=9.12dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	7.05	-3.01	4.04	28.12	Complies

Note:

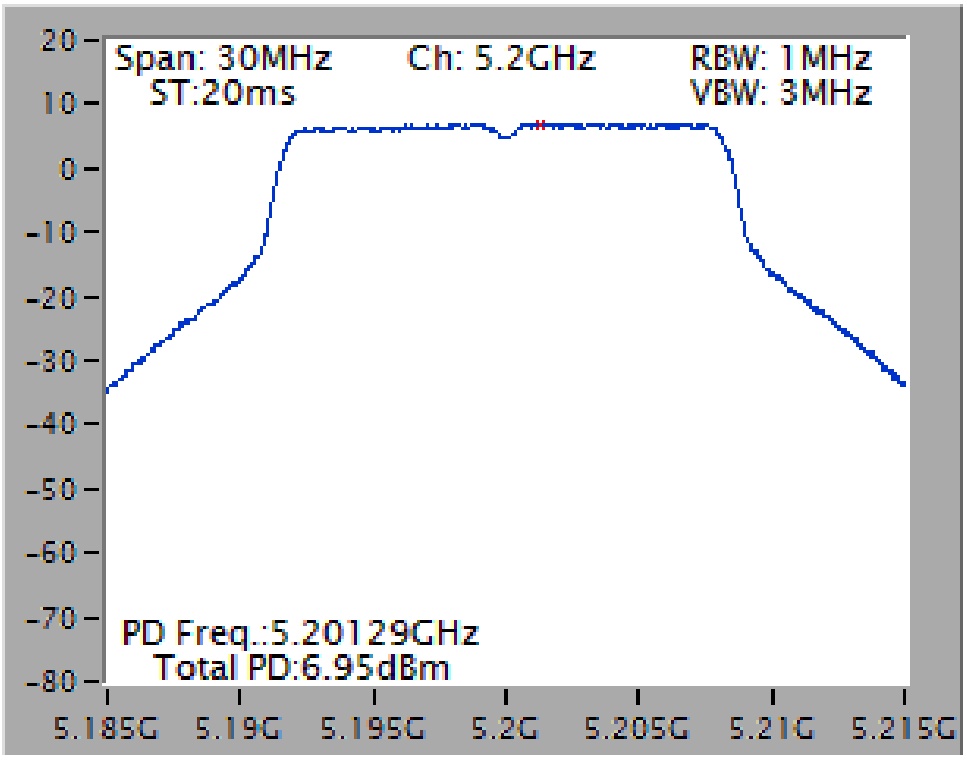
$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.88dBi>6dBi, so Limit=30-(7.88-6)=28.12dBm/500kHz.

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

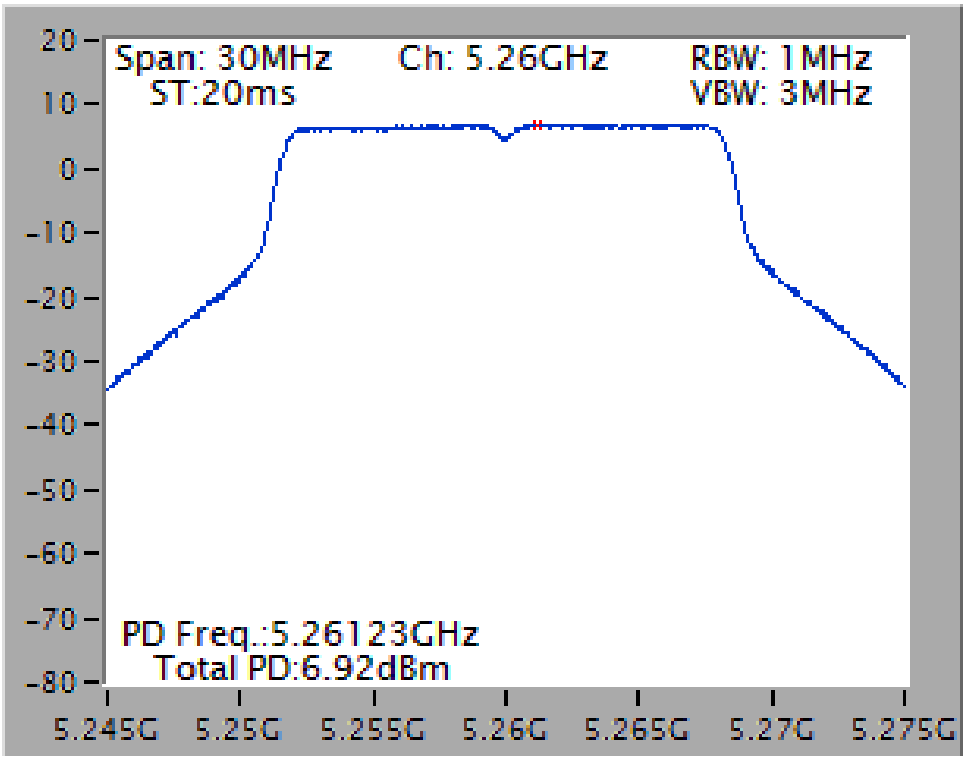
For plots, only the channel with worse result was shown.

<For Non-Beamforming Mode>

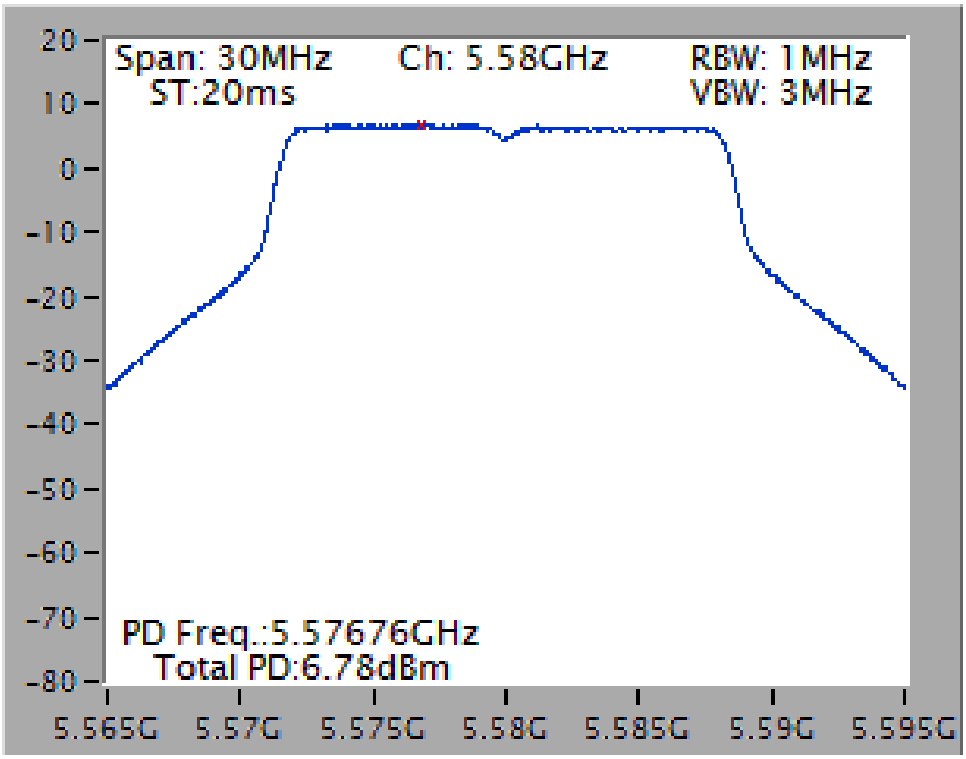
Power Density Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5200 MHz



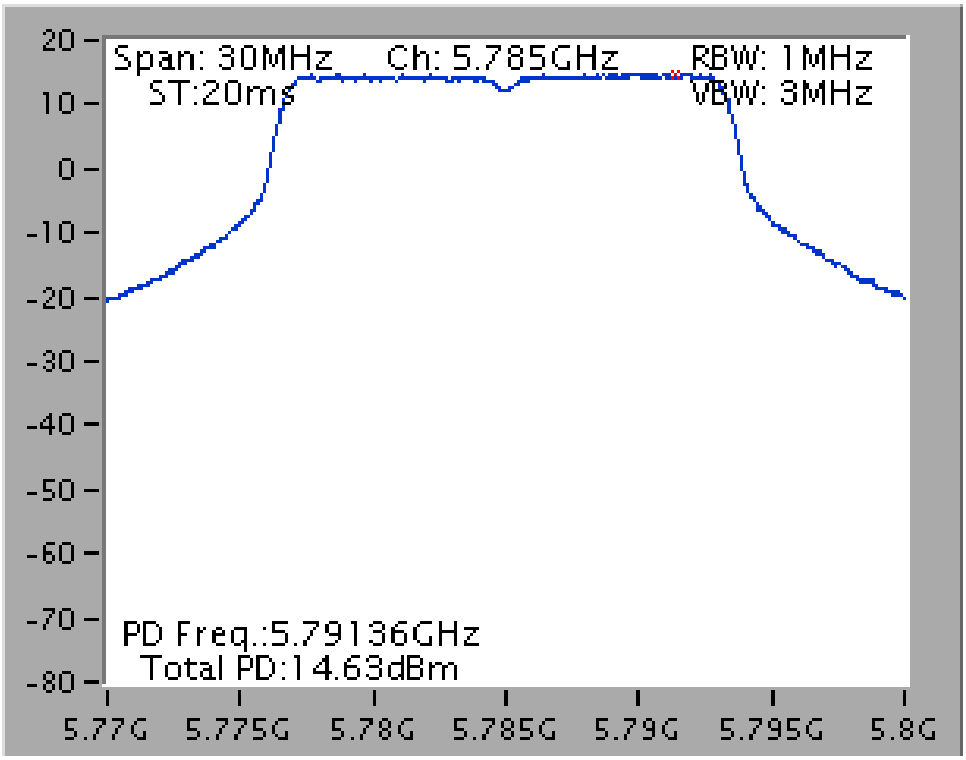
Power Density Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5260 MHz



Power Density Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5580 MHz

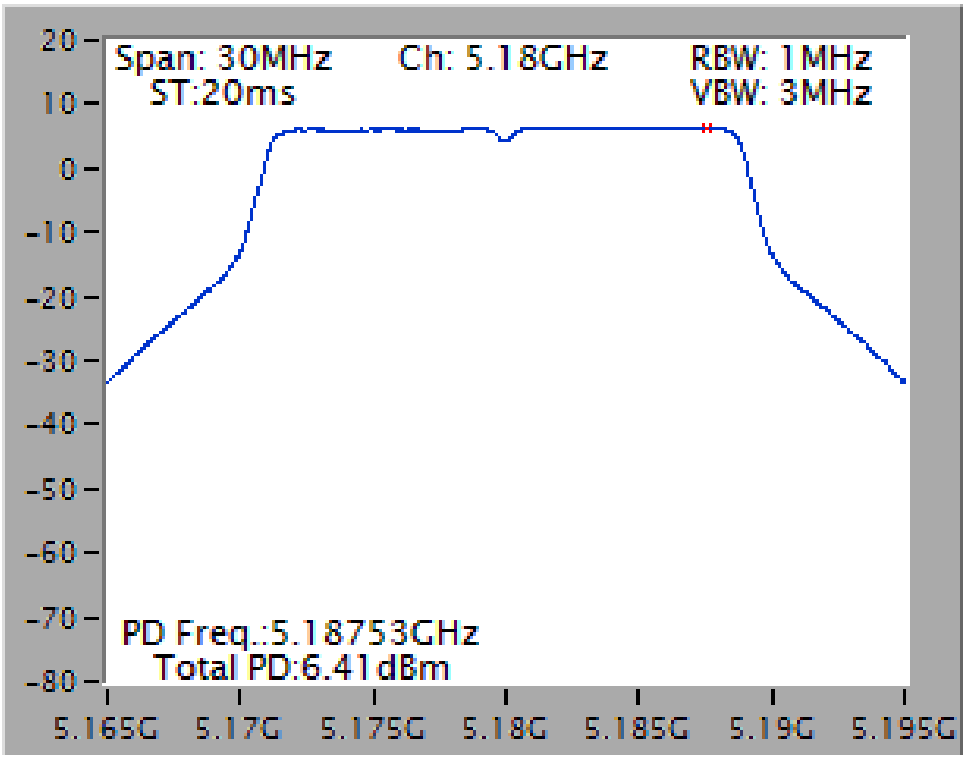


Power Density Plot on Configuration IEEE 802.11a / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz

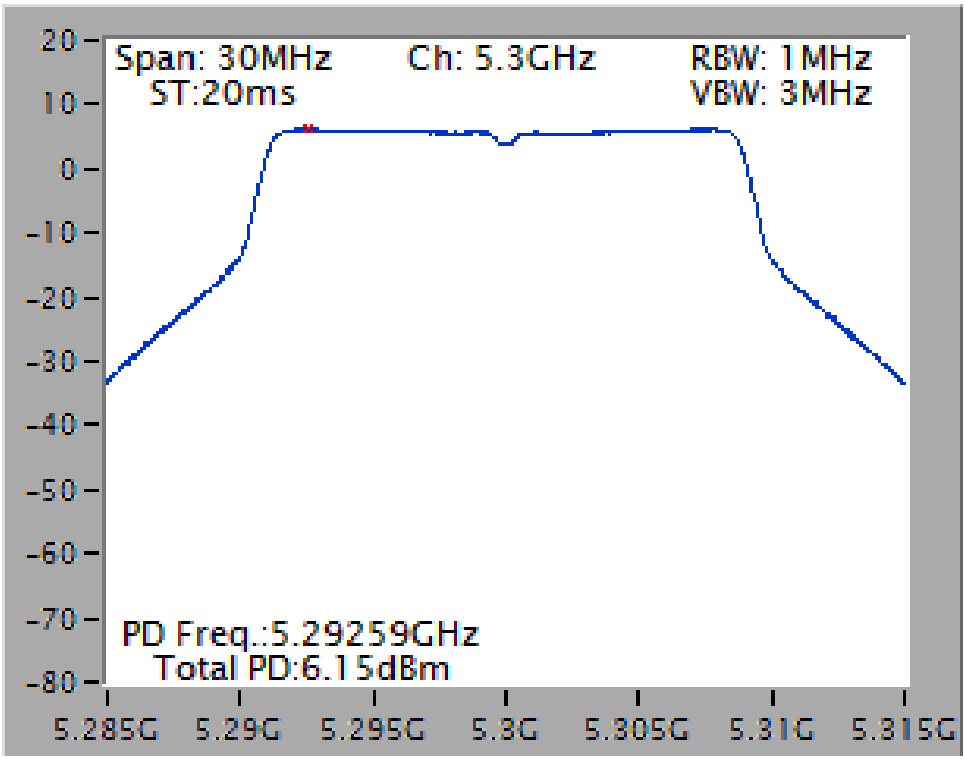


<For Beamforming Mode>

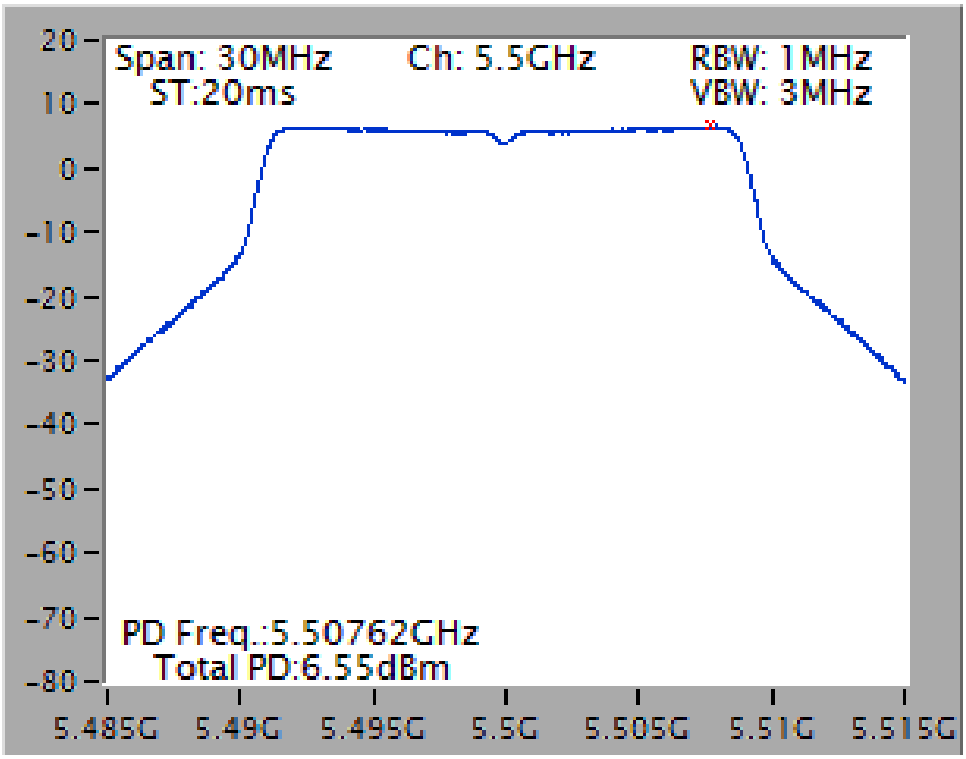
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5180 MHz



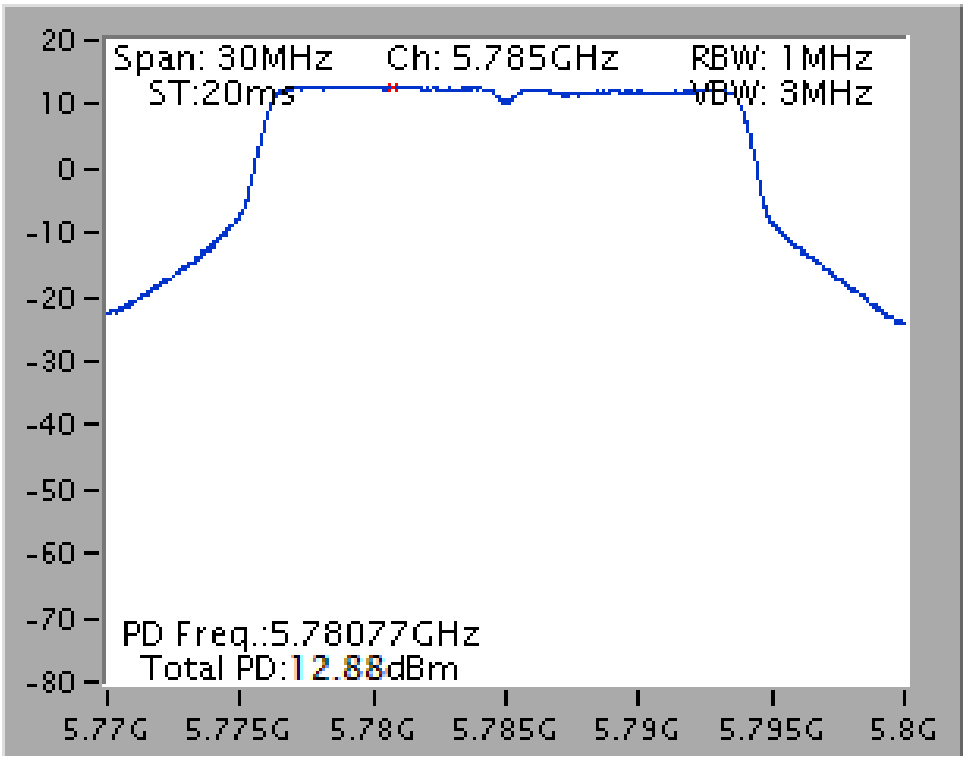
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5300 MHz



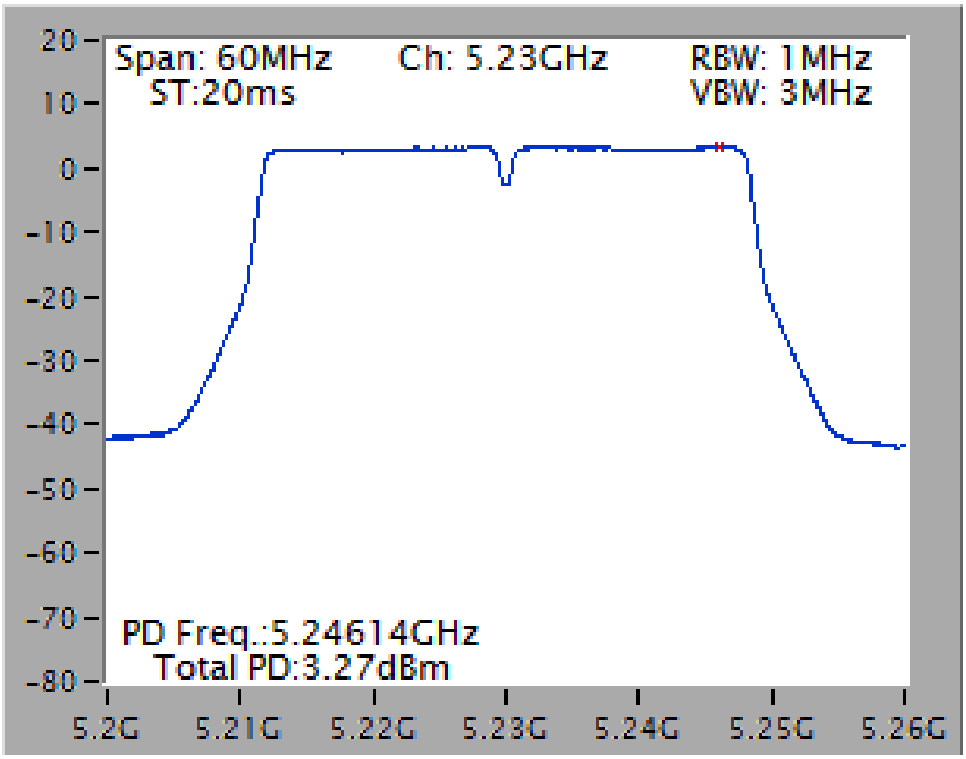
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5500 MHz



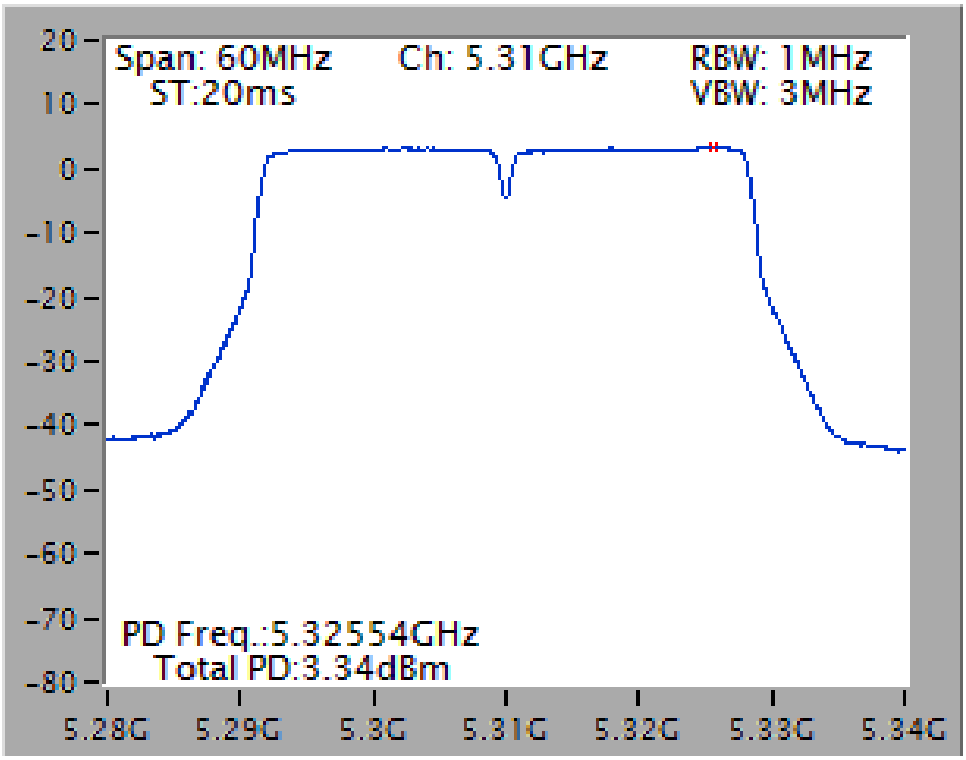
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz



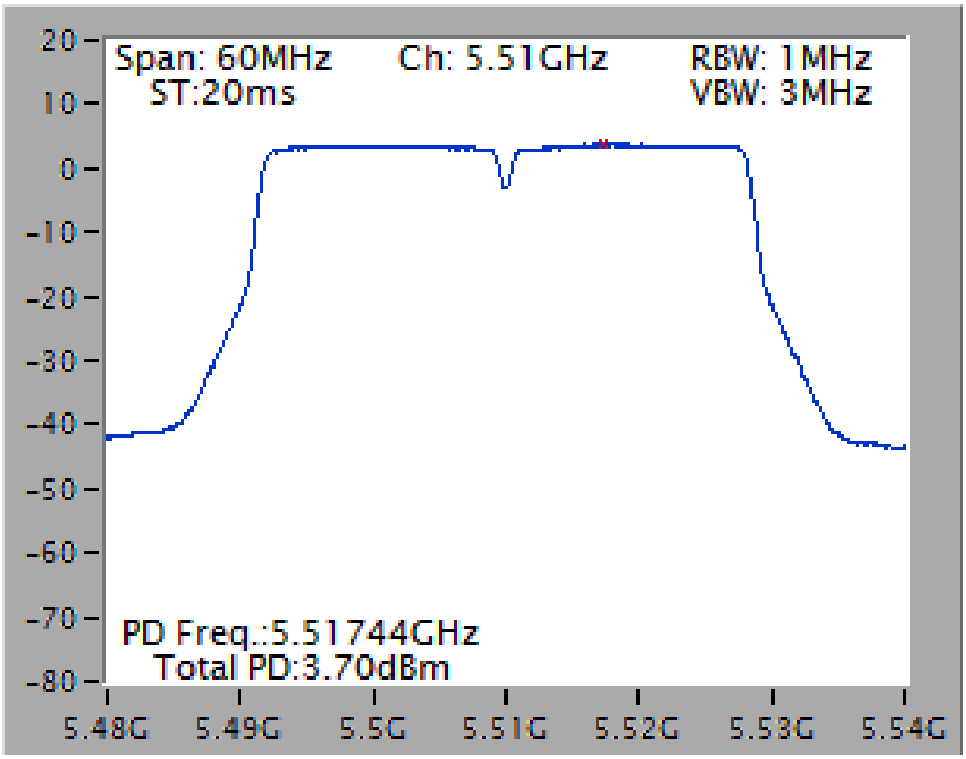
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5230 MHz



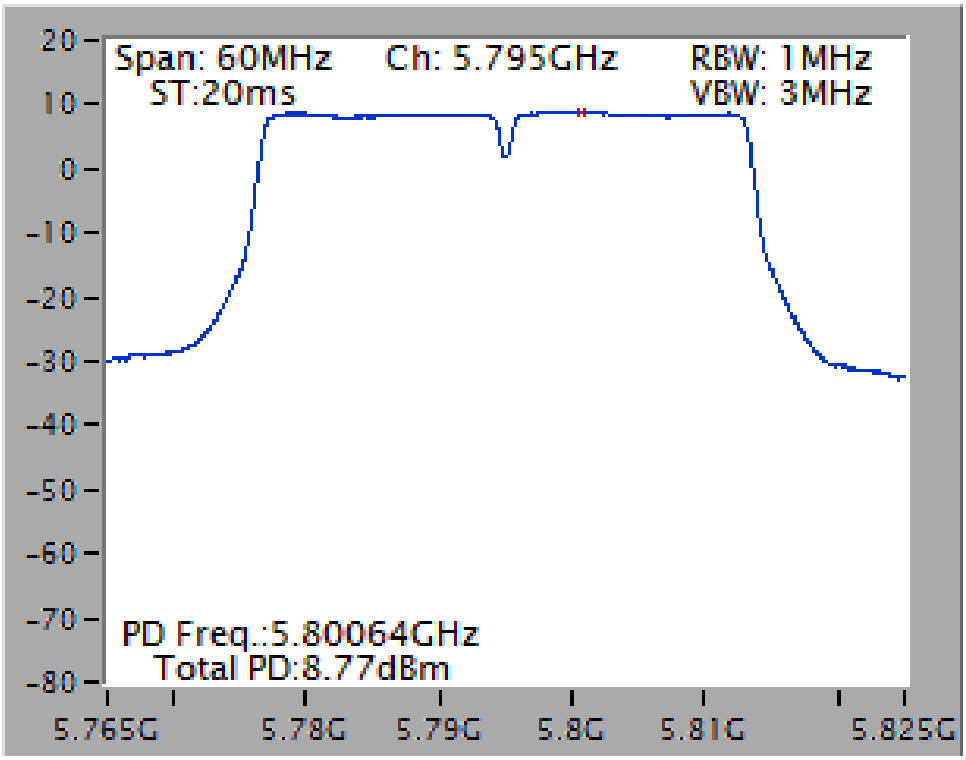
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5310 MHz



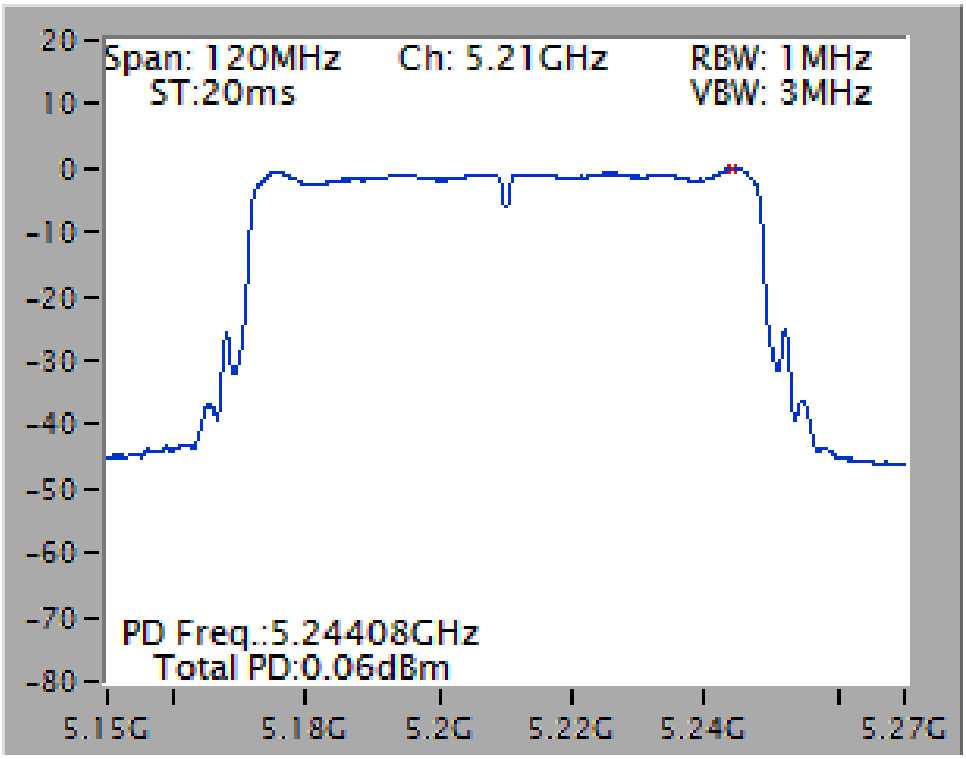
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5510 MHz



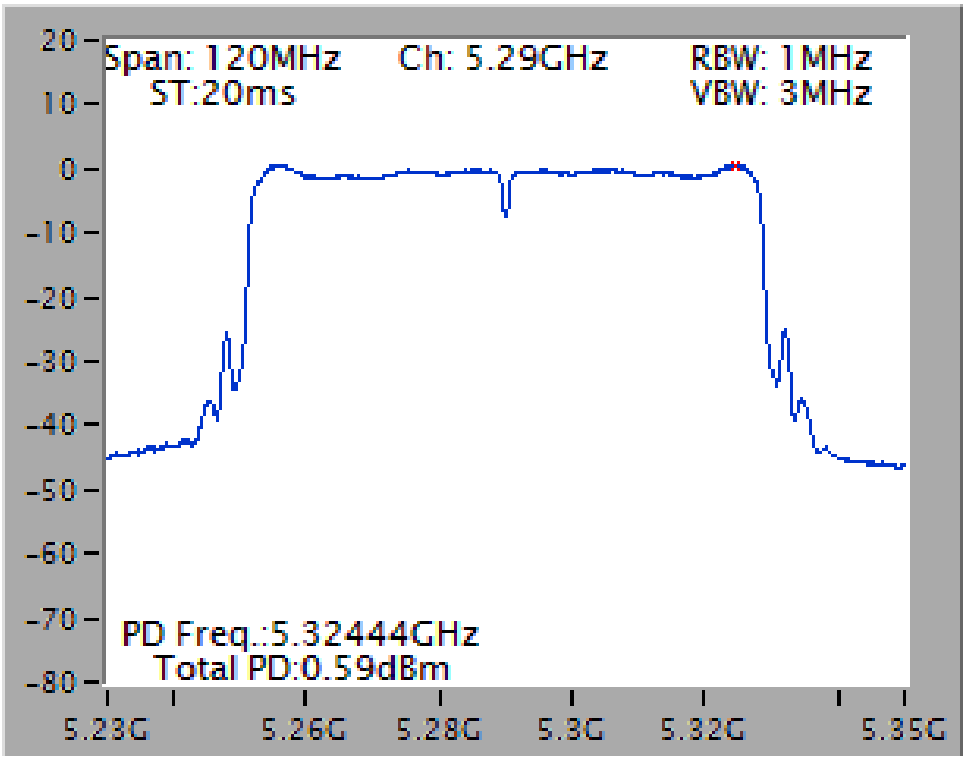
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5795 MHz



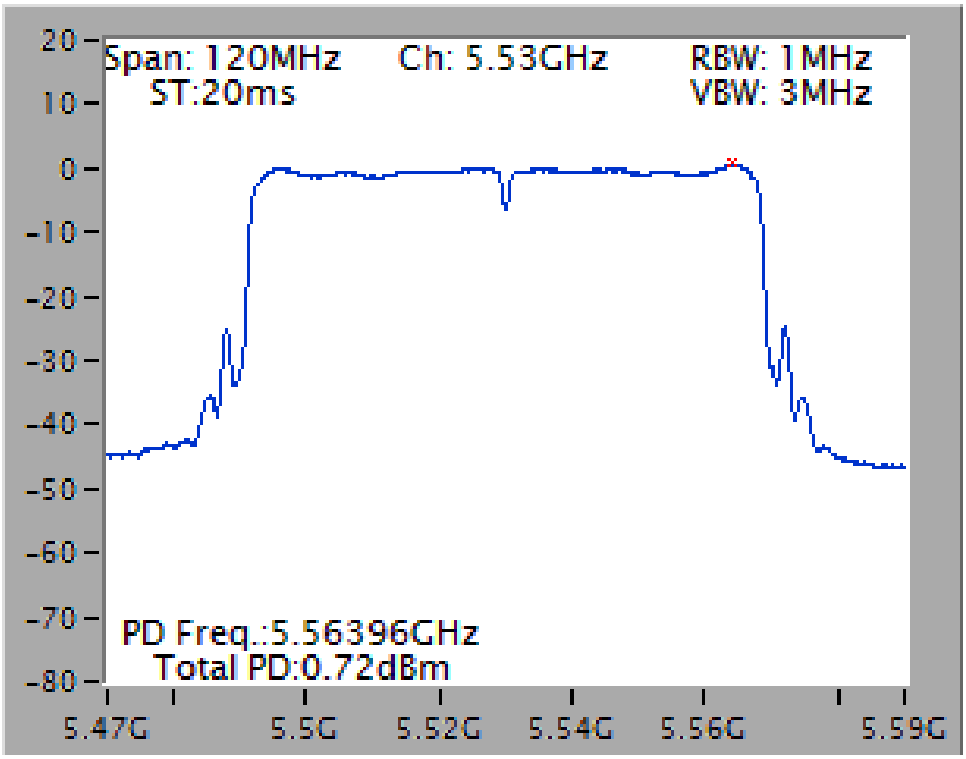
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5210 MHz



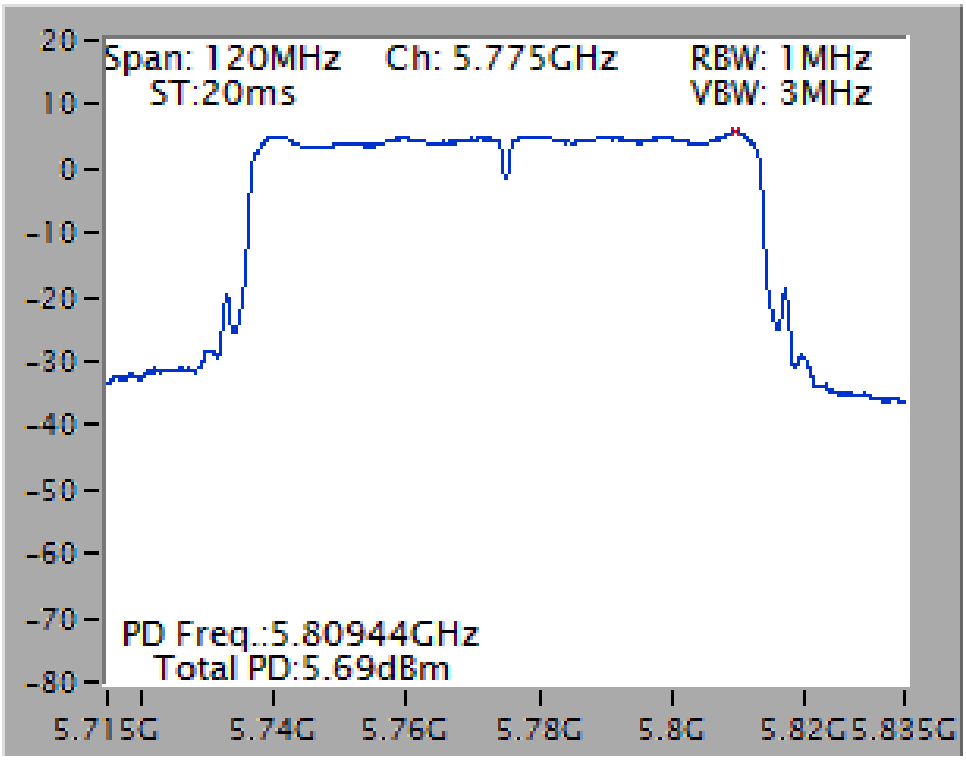
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5290 MHz



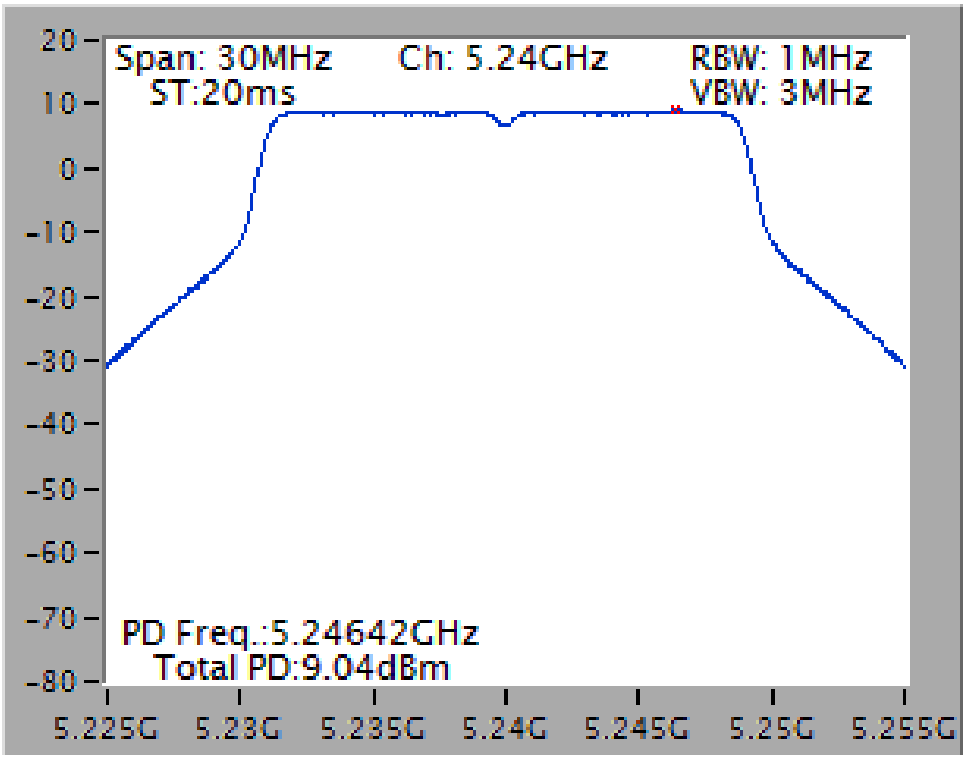
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5530 MHz



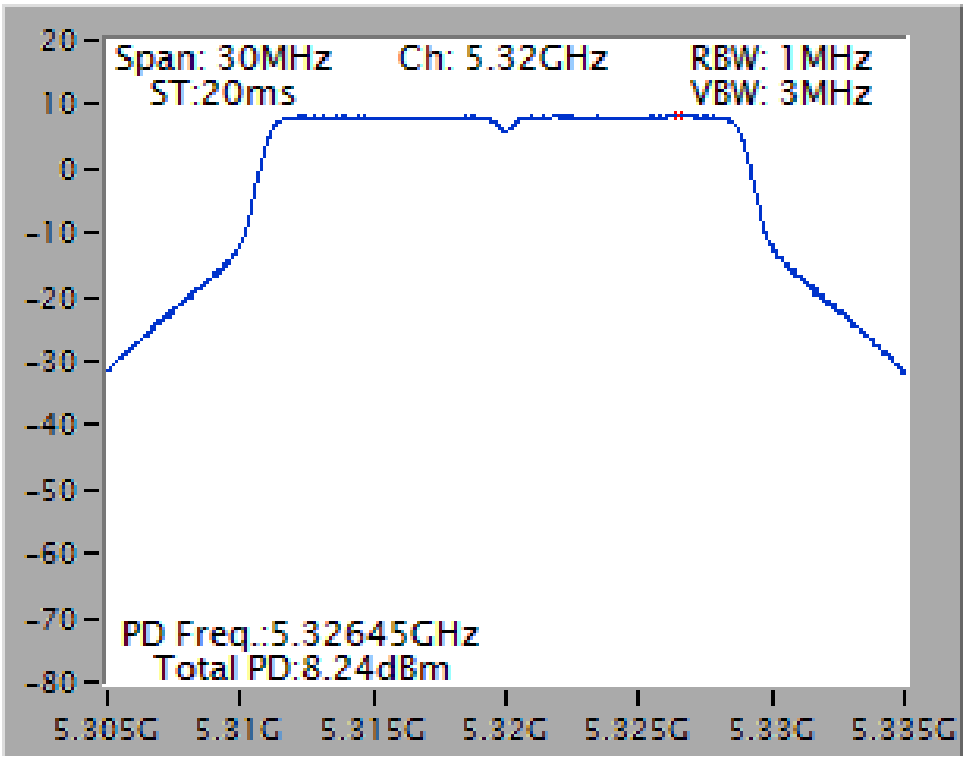
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz



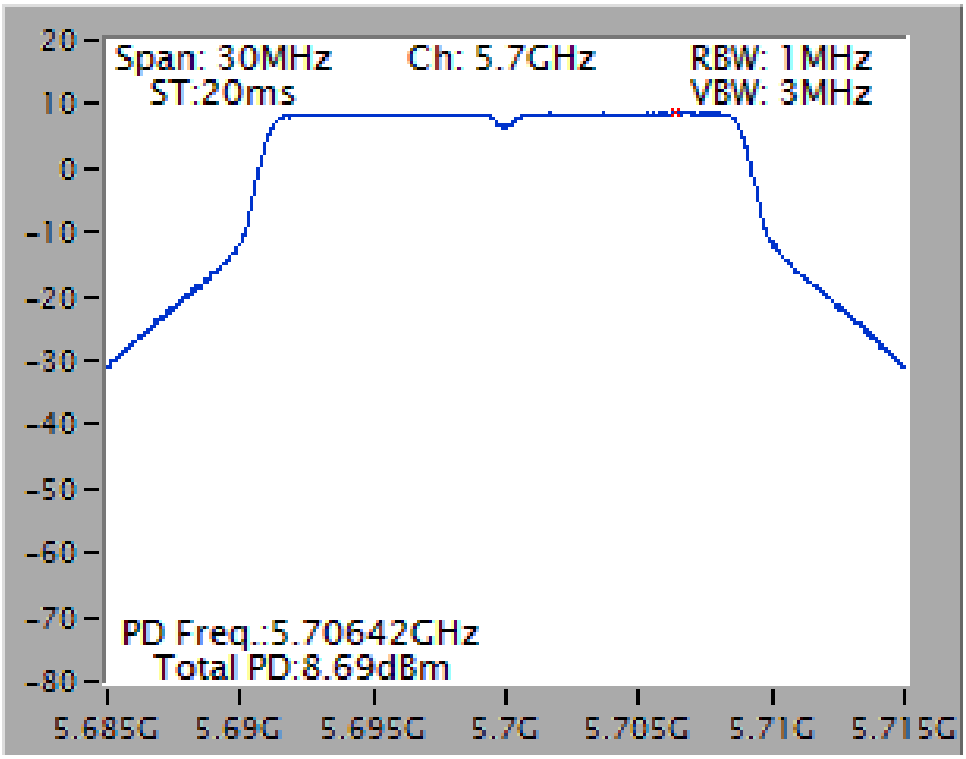
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5240 MHz



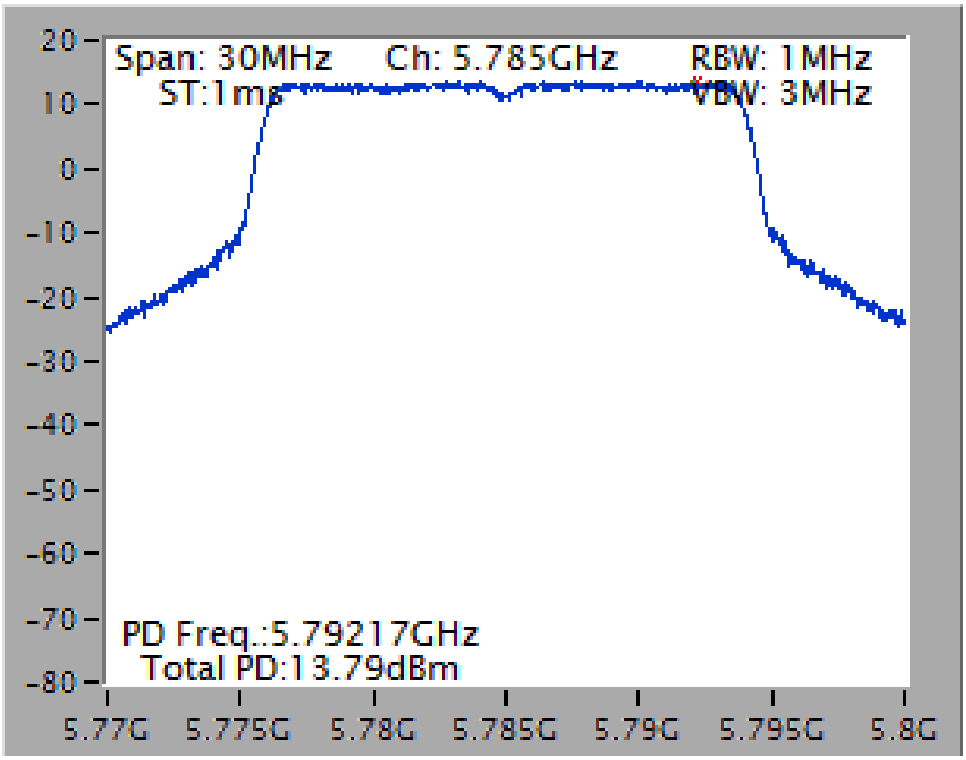
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5320 MHz



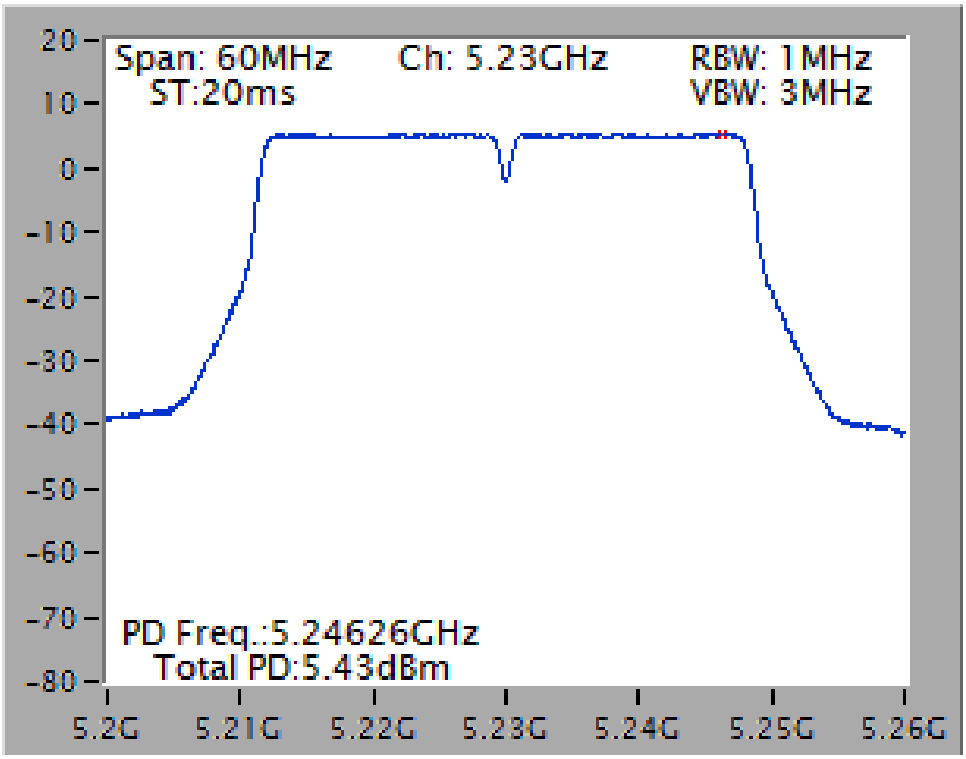
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5700 MHz



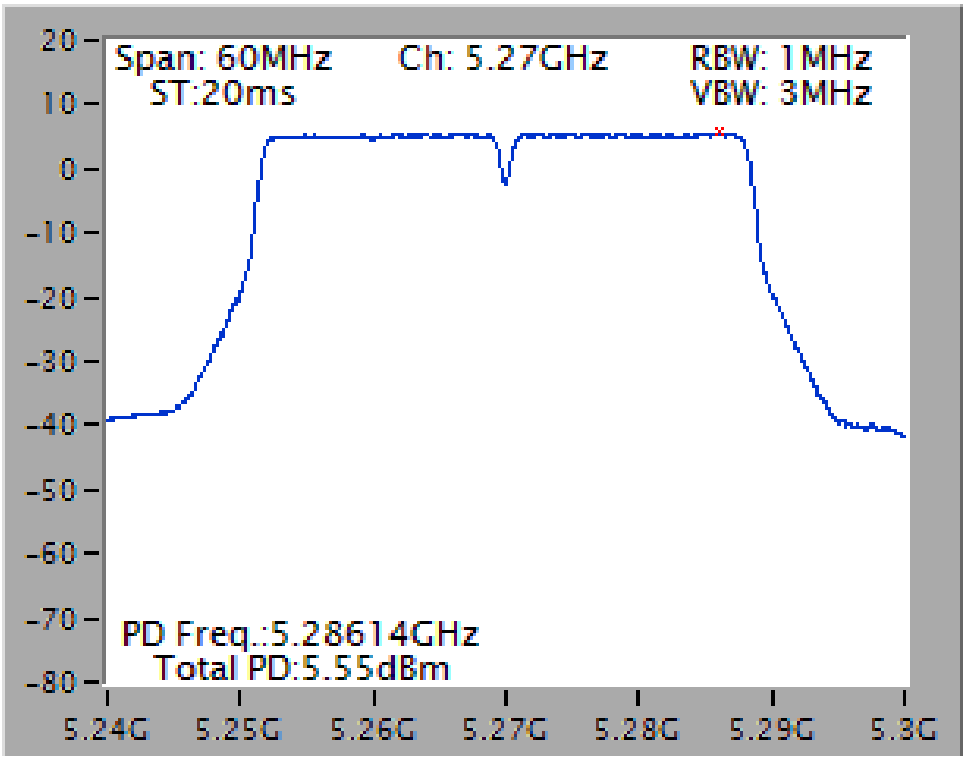
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5785 MHz



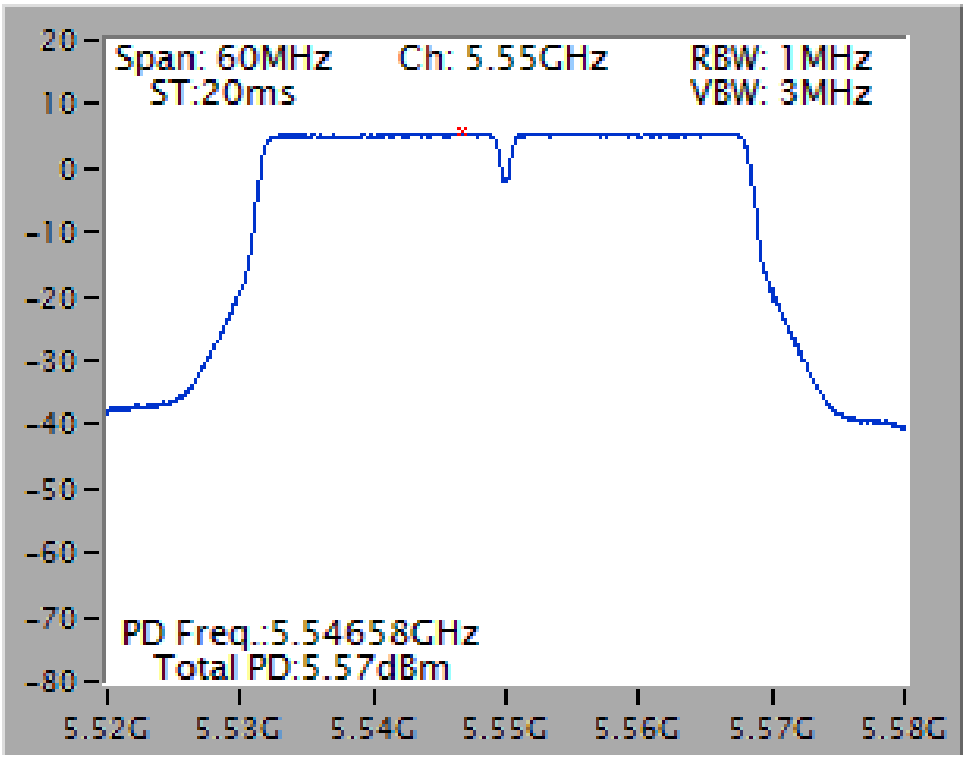
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5230 MHz



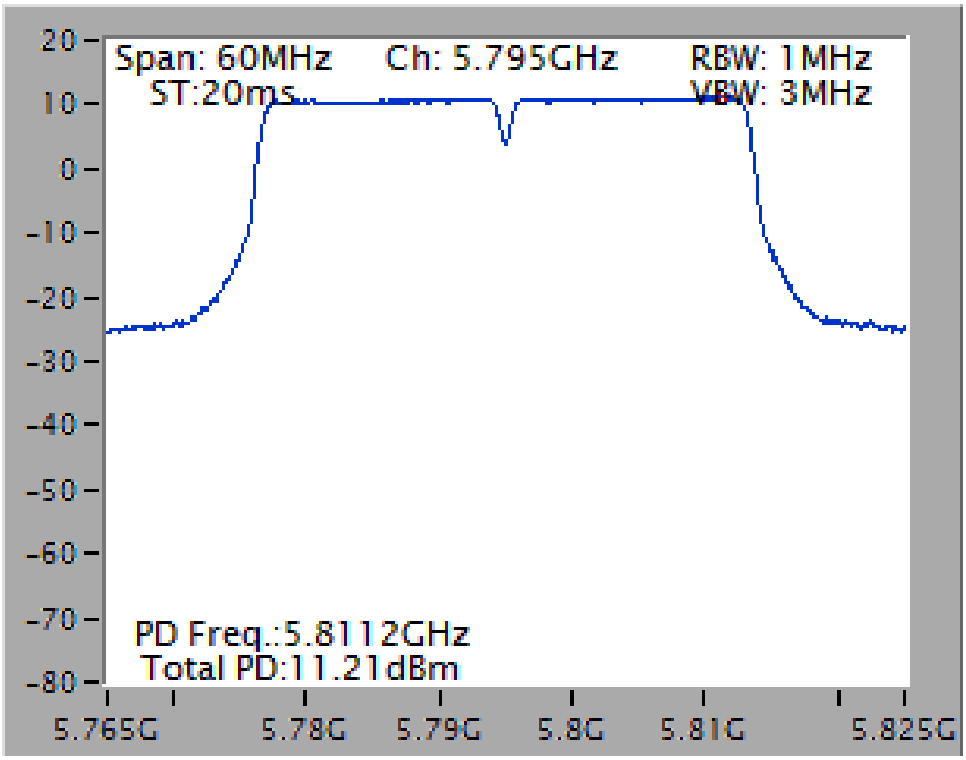
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5270 MHz



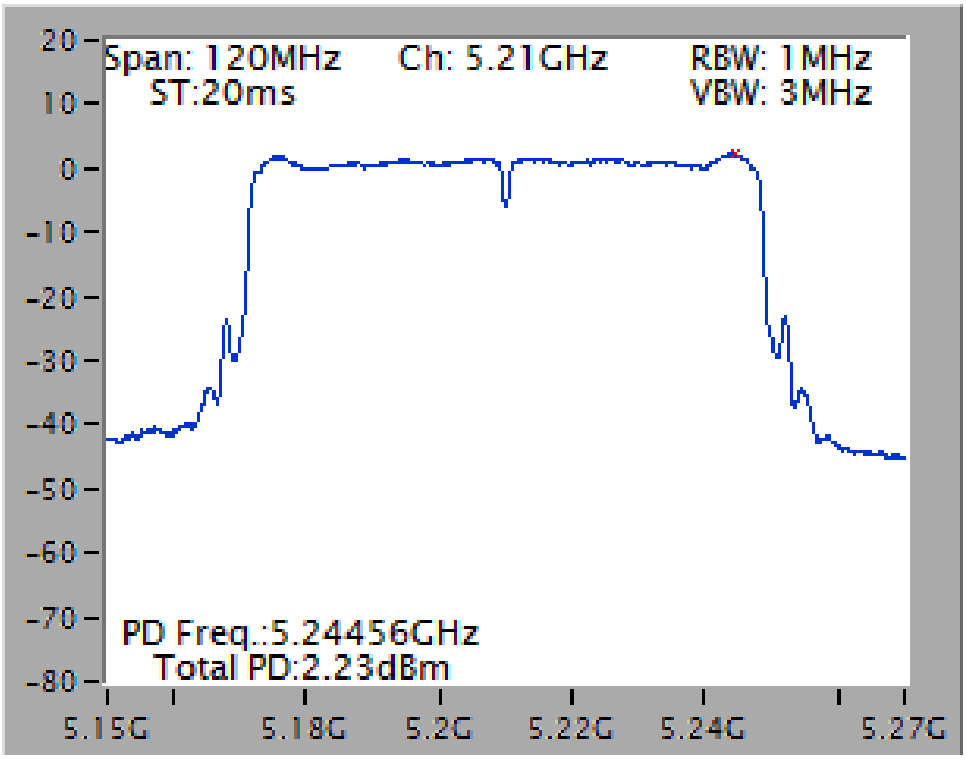
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5550 MHz



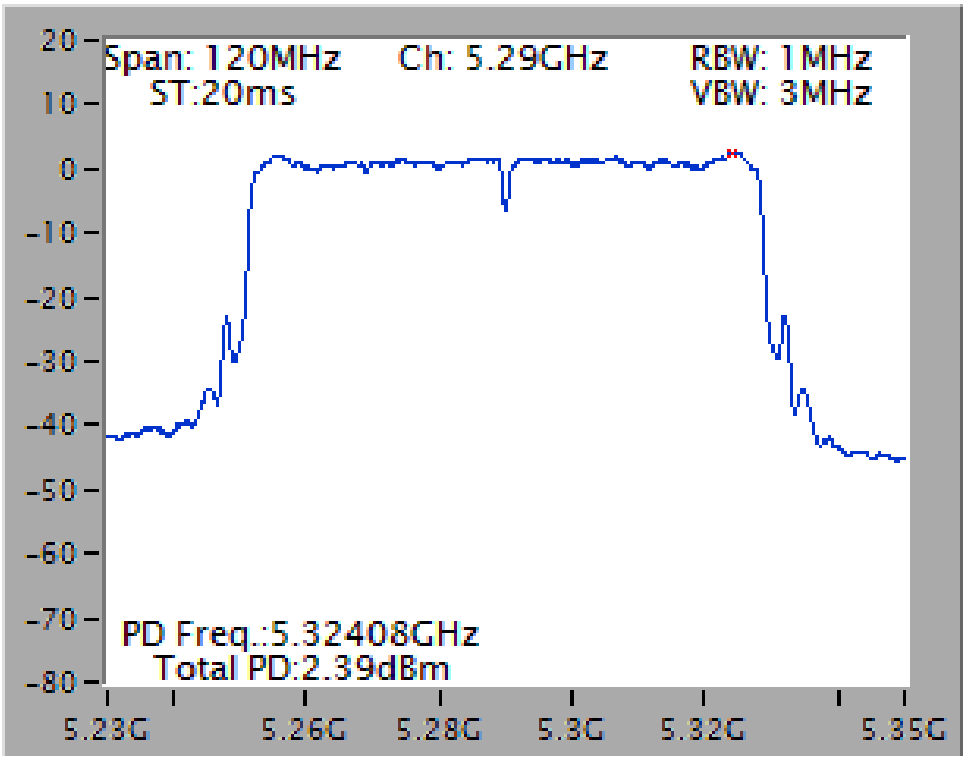
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5795 MHz



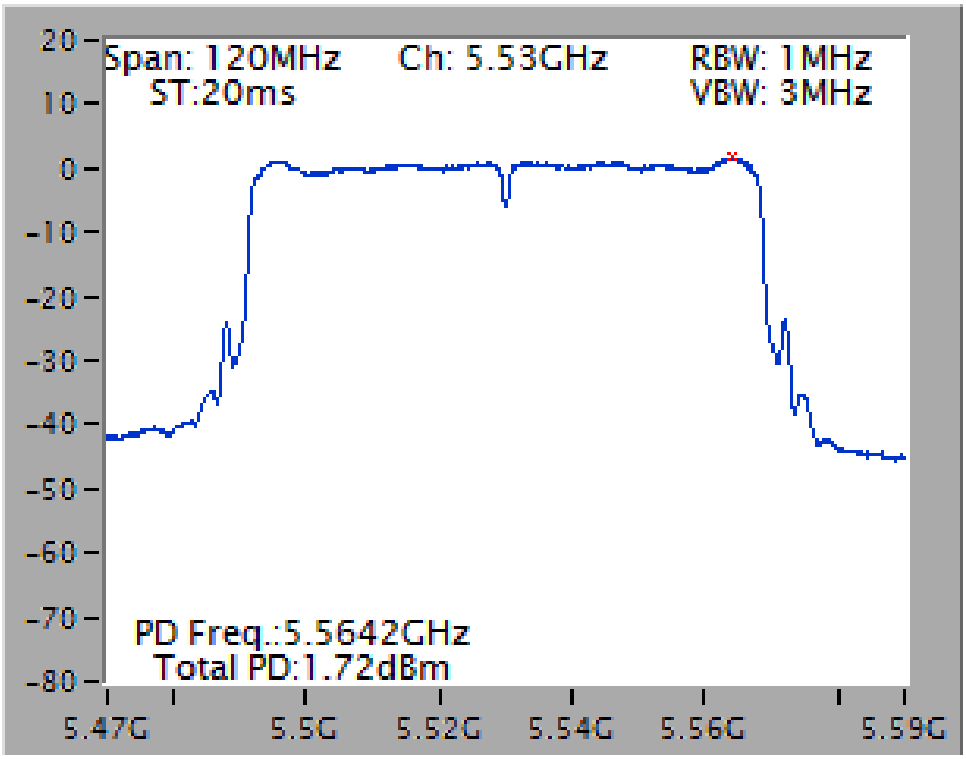
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5210 MHz



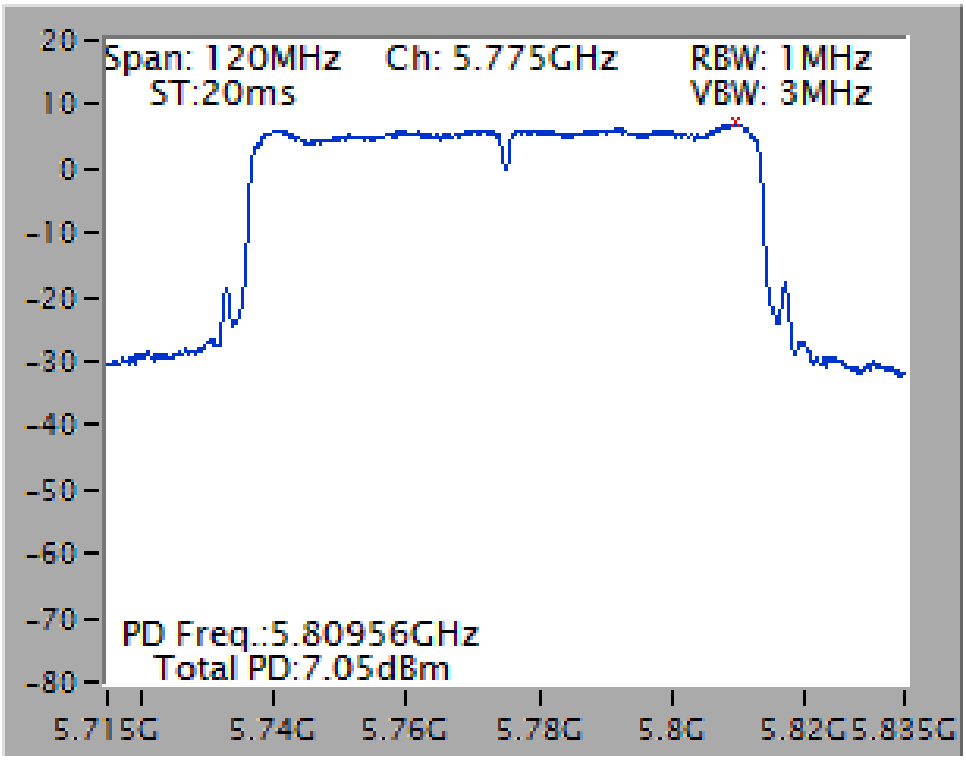
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5290 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5530 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.35 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 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.6.2. Measuring Instruments and Setting

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

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

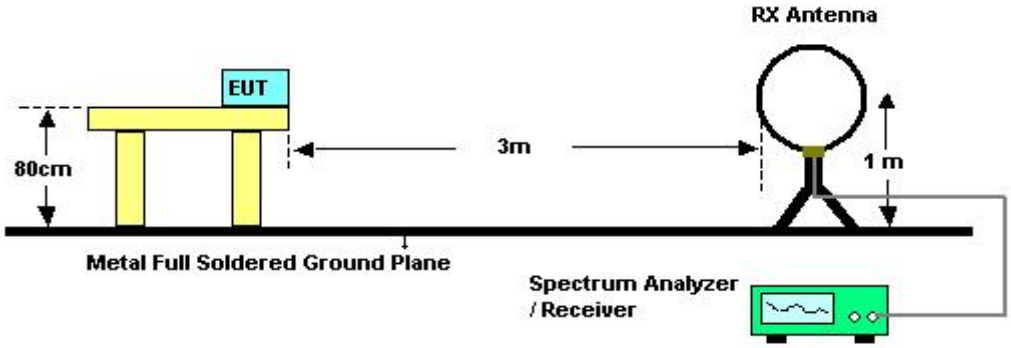
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

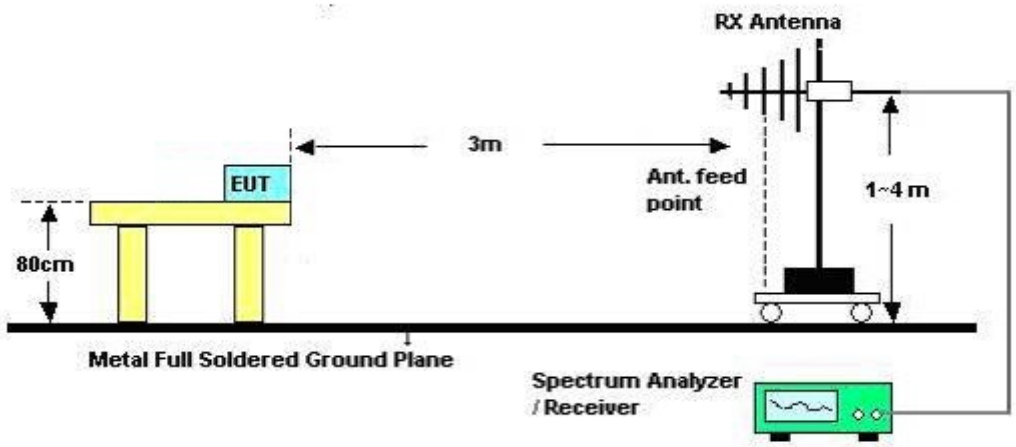
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.6.4. Test Setup Layout

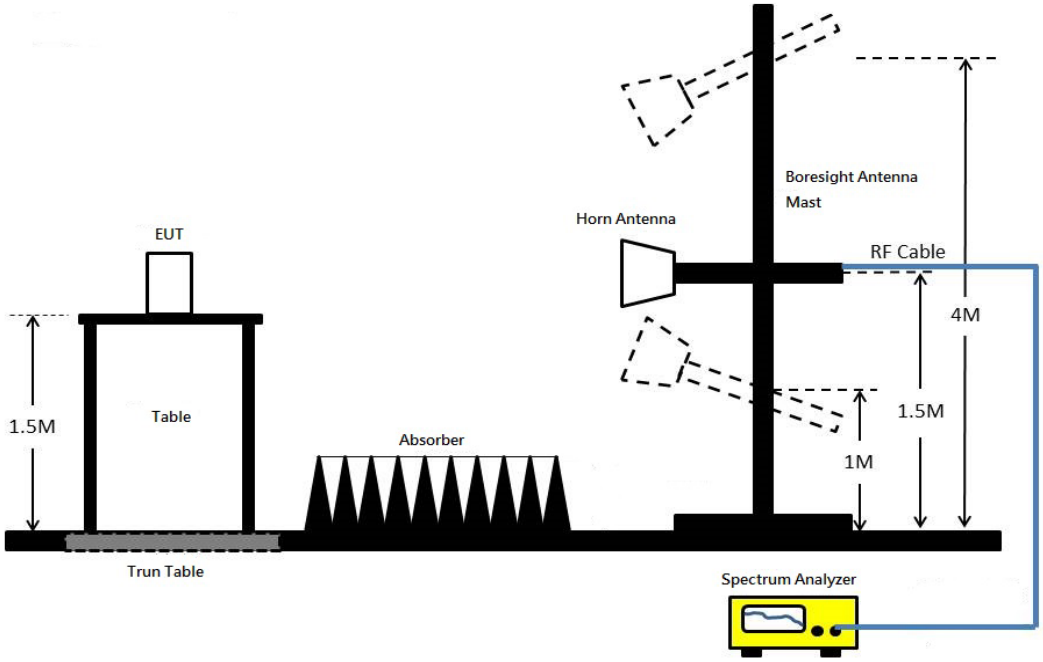
For Radiated Emissions: 9kHz ~30MHz



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 Mode>

The EUT was programmed to be in continuously transmitting mode.

<For Beamforming Mode>

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	22°C	Humidity	54%
Test Engineer	Kenneth Huang	Test Date	Jul. 22, 2016
Configurations	Normal Link		

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.

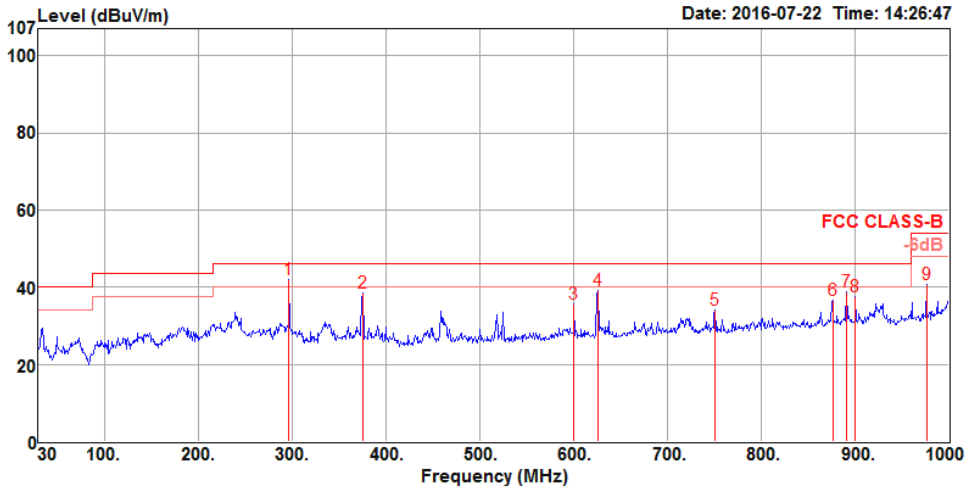
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

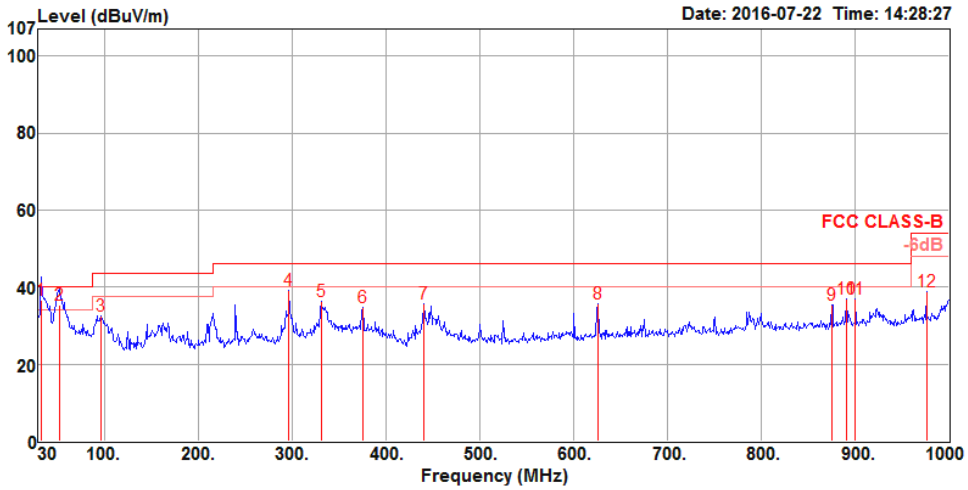
Temperature	22°C	Humidity	54%
Test Engineer	Kenneth Huang	Configurations	Normal Link

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	296.75	42.02	46.00	-3.98	53.31	1.69	19.54	32.52	150	295	Peak	HORIZONTAL
2	375.32	38.53	46.00	-7.47	47.54	1.90	21.63	32.54	150	360	Peak	HORIZONTAL
3	600.36	35.81	46.00	-10.19	41.32	2.38	24.80	32.69	200	6	Peak	HORIZONTAL
4	625.58	39.07	46.00	-6.93	44.24	2.44	25.06	32.67	150	187	Peak	HORIZONTAL
5	750.71	34.05	46.00	-11.95	37.75	2.69	26.10	32.49	125	56	Peak	HORIZONTAL
6	875.84	36.52	46.00	-9.48	38.32	2.89	27.30	31.99	200	227	Peak	HORIZONTAL
7	890.39	38.97	46.00	-7.03	40.53	2.92	27.42	31.90	200	241	Peak	HORIZONTAL
8	900.09	37.71	46.00	-8.29	39.13	2.94	27.50	31.86	100	134	Peak	HORIZONTAL
9	975.75	40.76	54.00	-13.24	40.84	3.13	27.96	31.17	300	67	Peak	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	32.91	36.77	40.00	-3.23	45.15	0.57	23.69	32.64	100	201	QP	VERTICAL
2	52.31	35.51	40.00	-4.49	53.54	0.72	13.88	32.63	125	50	QP	VERTICAL
3	95.96	32.53	43.50	-10.97	48.13	0.97	16.00	32.57	150	79	Peak	VERTICAL
4	296.75	39.16	46.00	-6.84	50.45	1.69	19.54	32.52	150	254	Peak	VERTICAL
5	330.70	36.45	46.00	-9.55	46.73	1.79	20.46	32.53	150	262	Peak	VERTICAL
6	375.32	34.88	46.00	-11.12	43.89	1.90	21.63	32.54	150	227	Peak	VERTICAL
7	440.31	35.65	46.00	-10.35	43.32	2.05	22.85	32.57	150	17	Peak	VERTICAL
8	625.58	35.60	46.00	-10.40	40.77	2.44	25.06	32.67	100	164	Peak	VERTICAL
9	874.87	35.41	46.00	-10.59	37.21	2.89	27.30	31.99	100	358	Peak	VERTICAL
10	890.39	37.09	46.00	-8.91	38.65	2.92	27.42	31.90	125	339	Peak	VERTICAL
11	900.09	37.05	46.00	-8.95	38.47	2.94	27.50	31.86	150	204	Peak	VERTICAL
12	975.75	38.94	54.00	-15.06	39.02	3.13	27.96	31.17	125	233	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)

<For Non-Beamforming Mode>

Temperature	22℃	Humidity	54%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 36 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4
Test Date	Aug. 30, 2016		

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	15530.00	59.27	74.00	-14.73	43.37	13.56	38.39	36.05	170	153	Peak	HORIZONTAL
2	15546.28	47.97	54.00	-6.03	32.07	13.56	38.39	36.05	170	153	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	15544.96	59.38	74.00	-14.62	43.48	13.56	38.39	36.05	145	270	Peak	VERTICAL
2	15548.64	47.94	54.00	-6.06	32.04	13.56	38.39	36.05	145	270	Average	VERTICAL

Temperature	22℃	Humidity	54%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 40 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4
Test Date	Aug. 30, 2016		

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	15595.08	47.46	54.00	-6.54	31.55	13.57	38.38	36.04	136	282	Average	HORIZONTAL
2	15600.08	59.72	74.00	-14.28	43.81	13.57	38.38	36.04	136	282	Peak	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	15599.48	58.86	74.00	-15.14	42.95	13.57	38.38	36.04	159	155	Peak	VERTICAL
2	15599.96	48.10	54.00	-5.90	32.19	13.57	38.38	36.04	159	155	Average	VERTICAL

Temperature	22℃	Humidity	54%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 48 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4
Test Date	Aug. 30, 2016		

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	15728.00	47.19	54.00	-6.81	31.22	13.62	38.35	36.00	123	41	Average	HORIZONTAL
2	15728.40	58.63	74.00	-15.37	42.66	13.62	38.35	36.00	123	41	Peak	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	15720.72	58.77	74.00	-15.23	42.80	13.62	38.35	36.00	166	256	Peak	VERTICAL
2	15724.24	47.48	54.00	-6.52	31.51	13.62	38.35	36.00	166	256	Average	VERTICAL

Temperature	22℃	Humidity	54%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 52 / Antenna 1 + Antenna 2 + Antenna 3 + Antenna 4
Test Date	Aug. 30, 2016		

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	15784.68	47.26	54.00	-6.74	31.27	13.64	38.34	35.99	200	144	Average	HORIZONTAL
2	15786.76	58.15	74.00	-15.85	42.16	13.64	38.34	35.99	200	144	Peak	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	15777.68	58.80	74.00	-15.20	42.81	13.63	38.35	35.99	106	252	Peak	VERTICAL
2	15782.24	47.12	54.00	-6.88	31.13	13.64	38.34	35.99	106	252	Average	VERTICAL