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FCC RADIO TEST REPORT

Applicant's company	Broadcom Corporation
Applicant Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.
FCC ID	QDS-BRCM1082
Manufacturer's company	Broadcom Corporation
Manufacturer Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.

Product Name	802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card
Brand Name	Broadcom
Model No.	BCM94360HMB
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350 MHz / 5470 ~ 5725 MHz / 5725 ~ 5850 MHz
Received Date	Mar. 12, 2014
Final Test Date	Jan. 21, 2016
Submission Type	Class II Change

Statement

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

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

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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 v01r01, KDB662911 D01 v02r01.**

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



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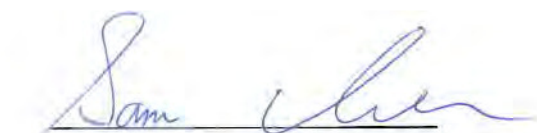
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR431 243-04	Rev. 01	Initial issue of report	Feb. 02, 2016

1. VERIFICATION OF COMPLIANCE

Product Name : 802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card
Brand Name : Broadcom
Model No. : BCM94360HMB
Applicant : Broadcom Corporation
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 Mar. 12, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.2	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	1.3 dB
4.4	15.407(a)	Power Spectral Density	Complies	16.4 dB
4.5	15.407(b)	Radiated Emissions	Complies	7.98 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.02 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5350 MHz / 5470 ~ 5725 MHz / 5725 ~ 5850 MHz
Channel Number	25 for 20MHz bandwidth ; 12 for 40MHz bandwidth 6 for 80MHz bandwidth
Channel Band Width (99%)	Band 4 <For Non-Beamforming Mode> IEEE 802.11a: 28.65 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 30.22 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 57.02 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz <For Beamforming Mode> IEEE 802.11ac MCS0/Nss1 (VHT20): 28.48 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 46.60 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	Band 4 <For Non-Beamforming Mode> IEEE 802.11a: 25.31 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 25.44 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 22.99 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 17.23 dBm <For Beamforming Mode> IEEE 802.11ac MCS0/Nss1 (VHT20): 24.13 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.74 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 16.14 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Note: The MIMO transmission mode is correlated.

Items	Description	
Communication Mode	<input checked="" type="checkbox"/> IP Based (Load Based)	<input type="checkbox"/> Frame Based
TPC Function	<input checked="" type="checkbox"/> With TPC	<input type="checkbox"/> Without TPC
Weather Band (5600~5650MHz)	<input checked="" type="checkbox"/> With 5600~5650MHz	<input type="checkbox"/> Without 5600~5650MHz
Beamforming Function	<input checked="" type="checkbox"/> With beamforming for 802.11n/ac in 5GHz.	<input type="checkbox"/> Without beamforming
Operate Condition	<input checked="" type="checkbox"/> Indoor	<input type="checkbox"/> Outdoor

Antenna and Band width

Antenna	Three (TX)		
	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

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

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

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

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Set	Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)				
						2.4G	5G B1	5G B2	5G B3	5G B4
1	1	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8
	2	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8
	3	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8

Note: There are three antennas for this set.

<For 2.4GHz Band>

For IEEE 802.11b/g/n mode (3TX/3RX)

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

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

<For 5GHz Band>

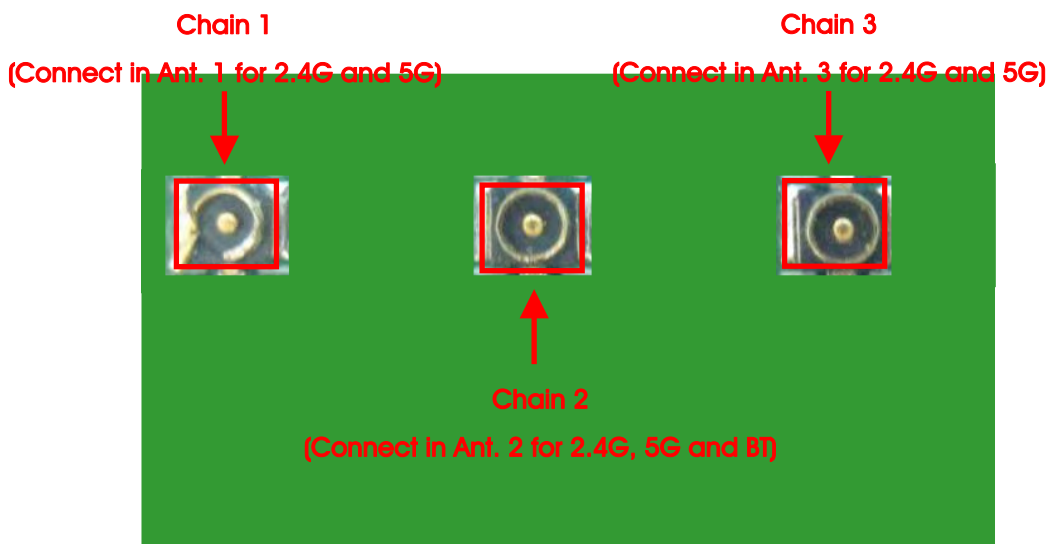
For IEEE 802.11a/n/ac mode (3TX/3RX)

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

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

For Bluetooth mode (1TX/1RX)

Only Chain 2 can be used as transmitting/receiving antenna.



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, 120, 124, 128, 132, 136, 140, 144, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 118, 126, 134, 142, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 58, 106, 122, 138, 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	124	5620 MHz
	102	5510 MHz	126	5630 MHz
	104	5520 MHz	128	5640 MHz
	106	5530 MHz	132	5660 MHz
	108	5540 MHz	134	5670 MHz
	110	5550 MHz	136	5680 MHz
	112	5560 MHz	138	5690 MHz
	116	5580 MHz	140	5700 MHz
	118	5590 MHz	142	5710 MHz
	120	5600 MHz	144	5720 MHz
	122	5610 MHz	-	-
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

3.5. Table for Test Modes

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

Test Items	Mode	Data Rate	Channel	Chain	
Max. Conducted Output Power	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	Power Spectral Density	<For Non-Beamforming Mode>			
11a/BPSK		Band 4	6Mbps	149/157/165	1+2+3
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+3
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+3
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+3
<For Beamforming Mode>					
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+3
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+3
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+3
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement		<For Non-Beamforming Mode>			
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3

6dB Spectrum Bandwidth Measurement	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	Radiated Emission Above 1GHz	<For Non-Beamforming Mode>			
11a/BPSK		Band 4	6Mbps	149/157/165	1+2+3
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+3
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+3
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+3
<For Beamforming Mode>					
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+3
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+3
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+3
Band Edge Emission		<For Non-Beamforming Mode>			
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
	Frequency Stability	20 MHz	Band 4	-	40/157
40 MHz		Band 4	-	38/151	2
80 MHz		Band 4	-	42/155	2

Note 1. 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.

2. There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11n/ac. All test results were recorded in the report.

The following test modes were performed for all tests:

For Radiated Emission Above 1GHz test:

The EUT was performed at X axis, Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

Mode 1. CTX-EUT Z axis

For Co-location MPE:

The EUT could be applied 2.4GHz / 5GHz with WLAN function and Bluetooth function; therefore Co-location Maximum Permissible Exposure (please refer to FA432143-04) test is added for simultaneously transmit between 2.4GHz / 5GHz WLAN function and Bluetooth function.

3.6. Table for Testing Locations

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

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR431243AA and AB
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Changing 5GHz Band 1 to "New Rules" from "Old Rules".	After evaluating, it's not necessary to re-test all test items for 5GHz Band 1 updating to "New Rules" due to the same power as original filing.
2. Changing 5GHz Band 2 and Band 3 to "New Rules" from "Old Rules".	It is not necessary to re-test all test items.
3. Changing 5GHz Band 4 to "New Rules" from "Old Rules".	1. 26dB Bandwidth and 99% Occupied Bandwidth 2. 6dB Spectrum Bandwidth 3. Maximum Conducted Output Power 4. Power Spectral Density 5. Radiated Emissions (Above 1GHz) 6. Band Edge Emissions 7. Frequency Stability

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB (Beamforming Mode)

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E4300	DoC
AP	Netgear	R7000	PY313200233
Fixture	Broadcom	BCM9MC2EC	N/A

For Test Site No: TH01-CB and 03CH01-CB (Non-Beamforming Mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Fixture	Broadcom	BCM9MC2EC	N/A

3.9. Table for Parameters of Test Software Setting

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

<For Non-Beamforming Mode>

Test Software Version	Mtool_2.0.1.6		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	66	100	85
802.11ac MCS0/Nss1 VHT20	63	100	71
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz		5795 MHz
	56	75	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	51		

<For Beamforming Mode>

Test Software Version	Mtool_2.0.1.6		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	55	80	71
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz		5795 MHz
	49	70	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	47		

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 AP and transmit duty cycle no less 98%

3.11. Duty Cycle

For non-beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.051	2.083	98.46%	0.07	0.01
802.11ac MCS0/Nss1 VHT20	1.899	1.955	97.14%	0.13	0.53
802.11ac MCS0/Nss1 VHT40	0.950	0.975	97.44%	0.11	1.05
802.11ac MCS0/Nss1 VHT80	0.453	0.487	93.02%	0.31	2.21

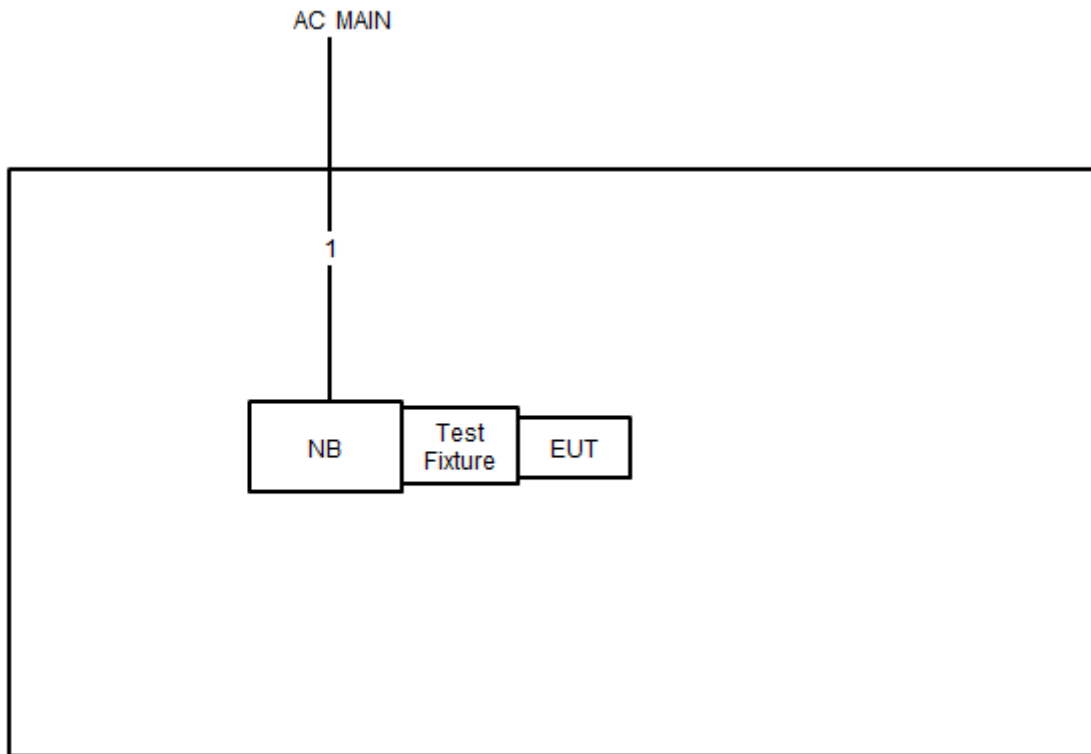
For beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.753	4.409	85.12%	0.70	0.27
802.11ac MCS0/Nss1 VHT40	3.571	4.311	82.83%	0.82	0.28
802.11ac MCS0/Nss1 VHT80	1.667	2.365	70.50%	1.52	0.60

Test Configurations

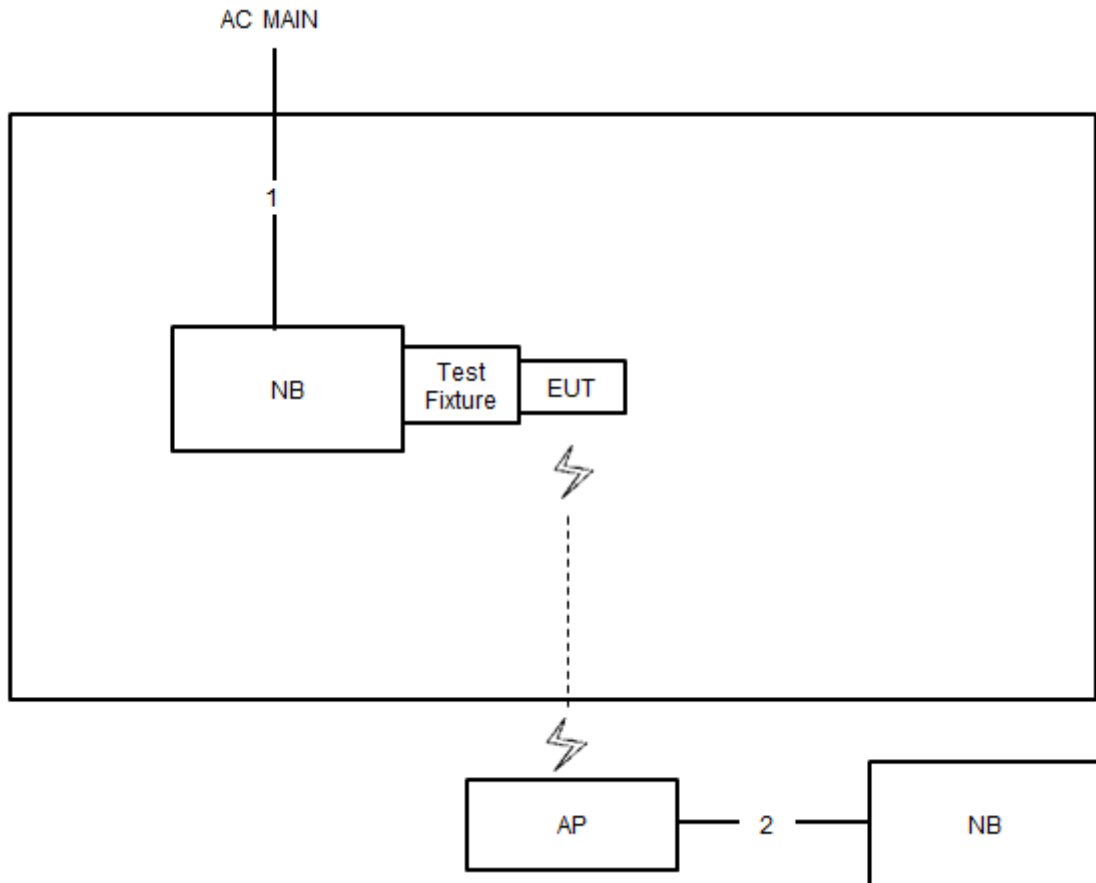
3.11.1. Radiation Emissions Test Configuration

<For Non-Beamforming Mode>



Item	Connection	Shielded	Length (m)
1	Power cable	No	1.8

<For Beamforming Mode>



Item	Connection	Shielded	Length (m)
1	Power cable	No	1.8
2	RJ-45 cable	No	1.5

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

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

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.4.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24°C	Humidity	59%
Test Engineer	Jan. 14, 2016		

<For Non-Beamforming Mode>

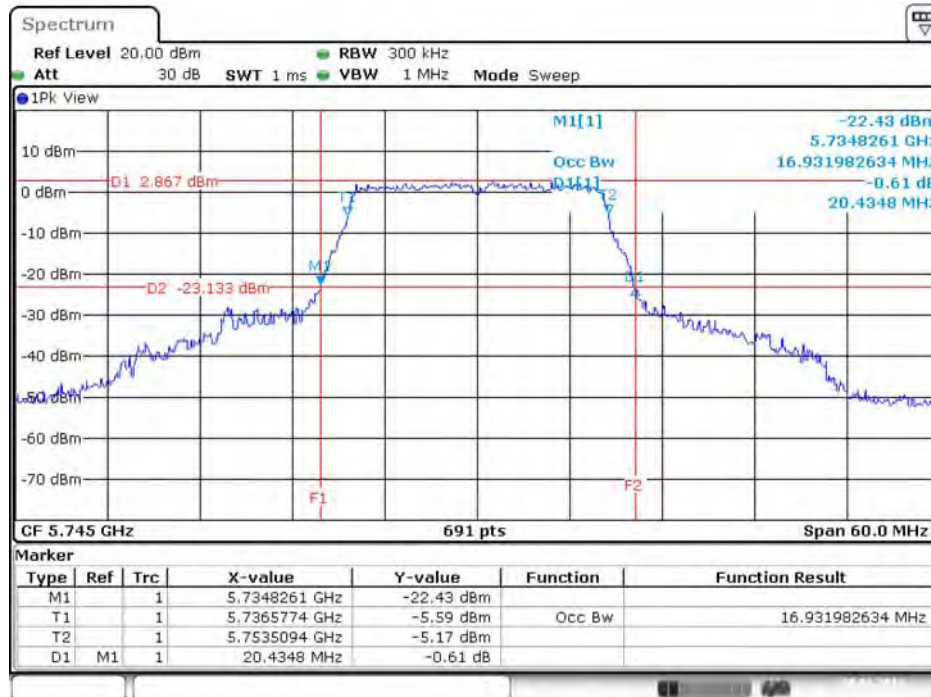
Mode	Frequency	26dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3	Chain 1	Chain 2	Chain 3
802.11a	5745 MHz	20.43	31.30	20.35	16.93	17.45	16.85
	5785 MHz	43.83	41.13	41.30	28.65	26.66	28.05
	5825 MHz	36.96	40.87	34.87	20.23	26.31	19.10
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.61	29.91	20.52	17.97	18.15	17.89
	5785 MHz	47.13	44.78	46.00	30.22	28.22	29.44
	5825 MHz	26.09	41.57	24.52	18.06	23.10	17.97
802.11ac MCS0/Nss1 VHT40	5755 MHz	41.01	58.12	40.29	36.76	36.90	36.76
	5795 MHz	73.04	97.97	61.45	37.34	57.02	37.05
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.61	83.48	81.74	75.83	75.83	75.83

<For Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3	Chain 1	Chain 2	Chain 3
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.70	23.04	20.43	17.97	17.80	17.80
	5785 MHz	36.96	43.39	32.26	18.58	28.48	18.32
	5825 MHz	22.26	37.91	22.17	17.97	22.84	17.89
802.11ac MCS0/Nss1 VHT40	5755 MHz	41.01	44.64	40.15	36.76	36.76	36.76
	5795 MHz	56.67	93.33	52.32	37.05	46.60	37.05
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.61	82.32	81.45	75.83	75.54	76.12

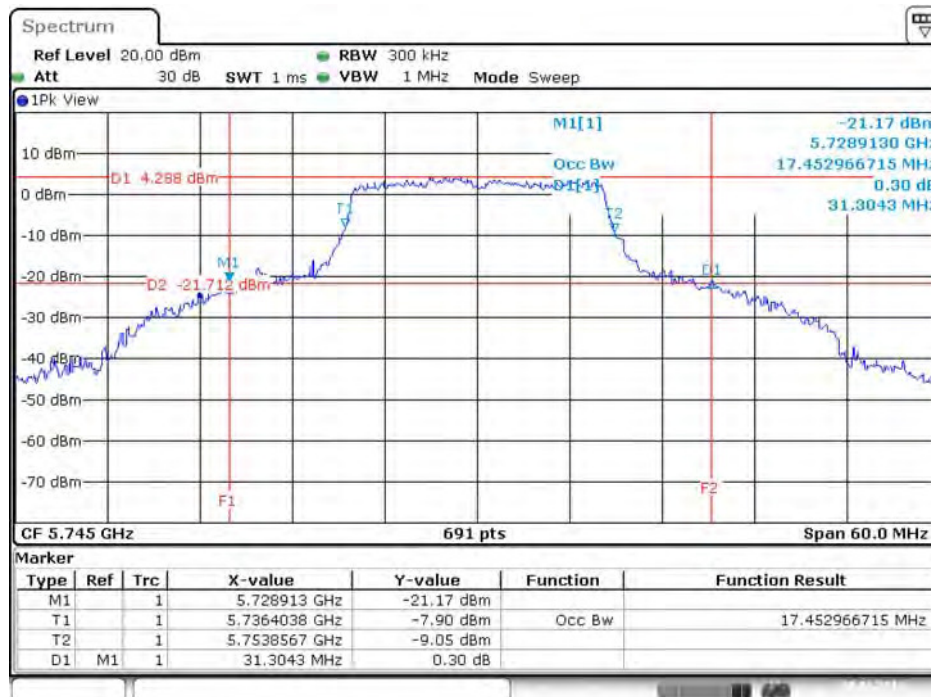
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5745 MHz



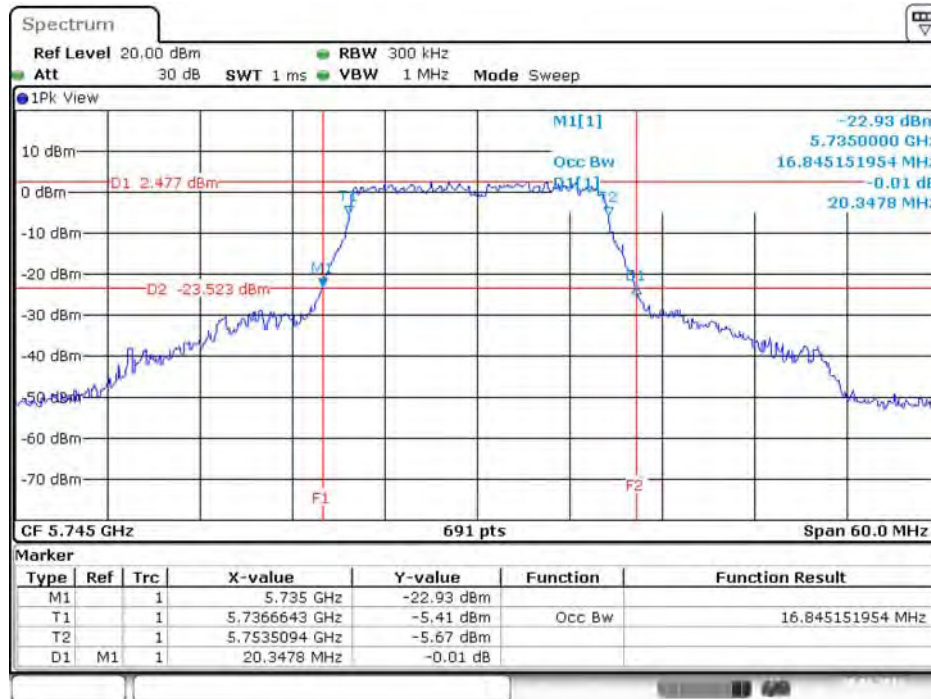
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5745 MHz



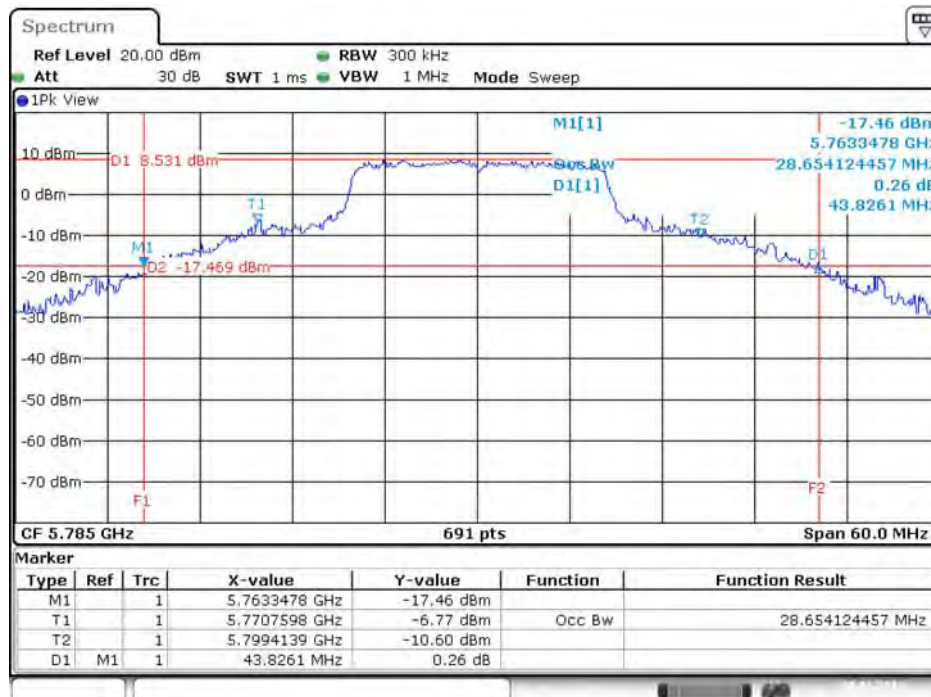
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5745 MHz



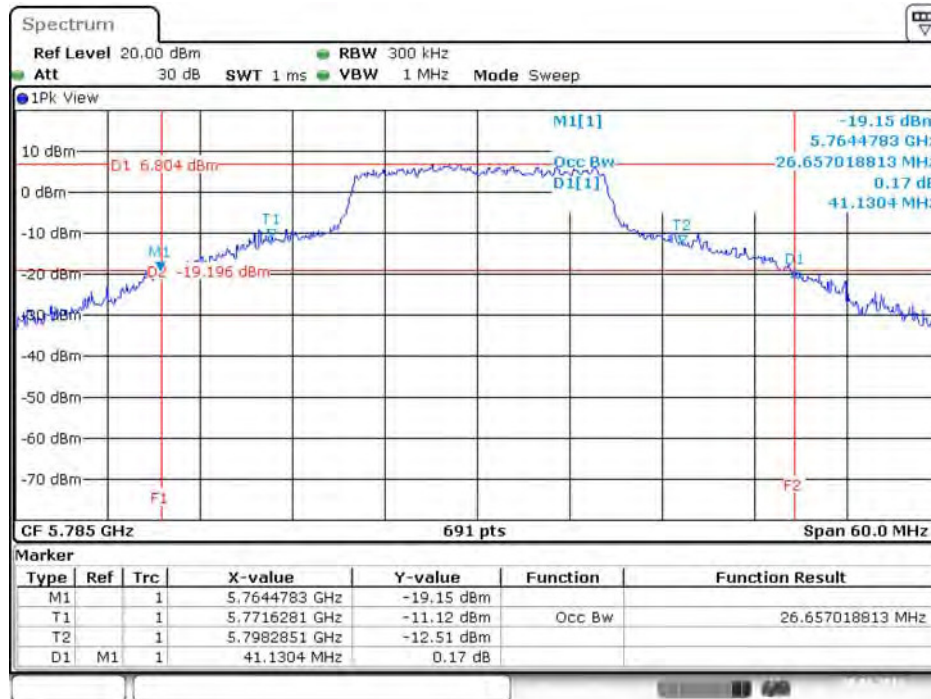
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5785 MHz



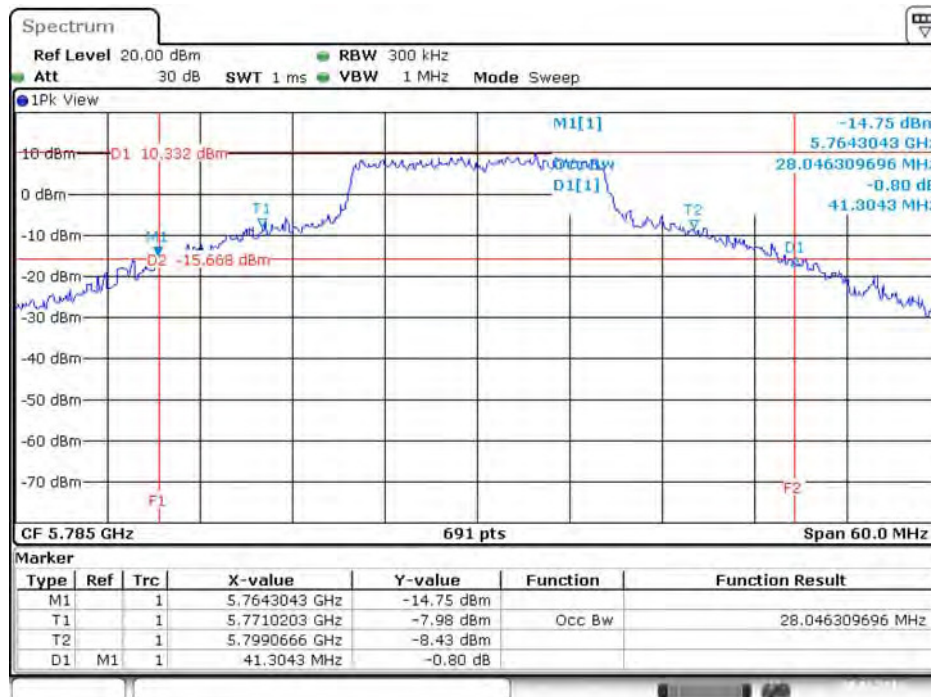
Date: 20.JAN.2016 23:04:31

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



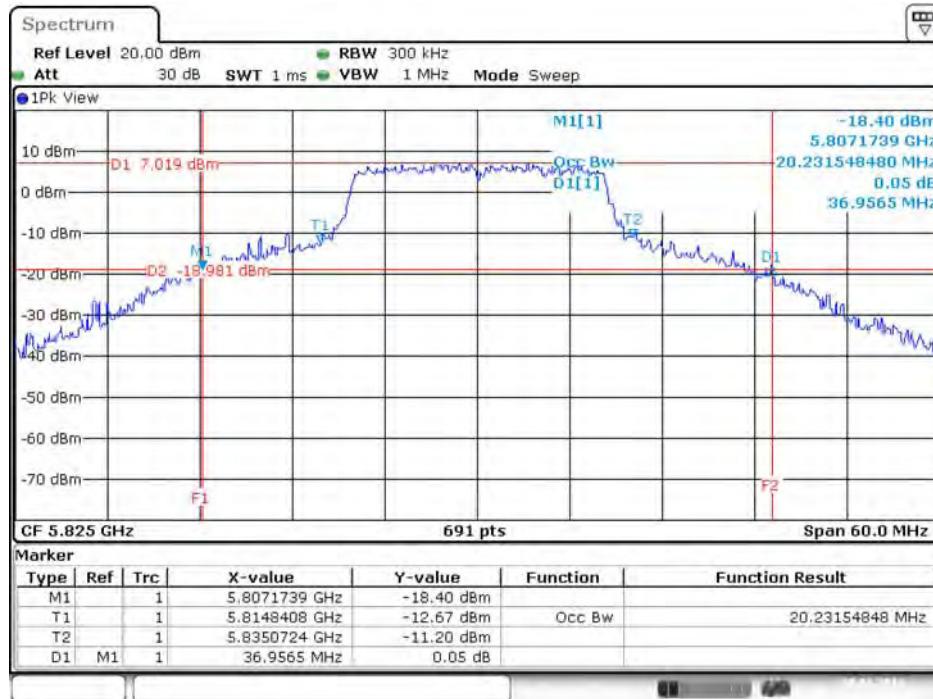
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 / 5785 MHz



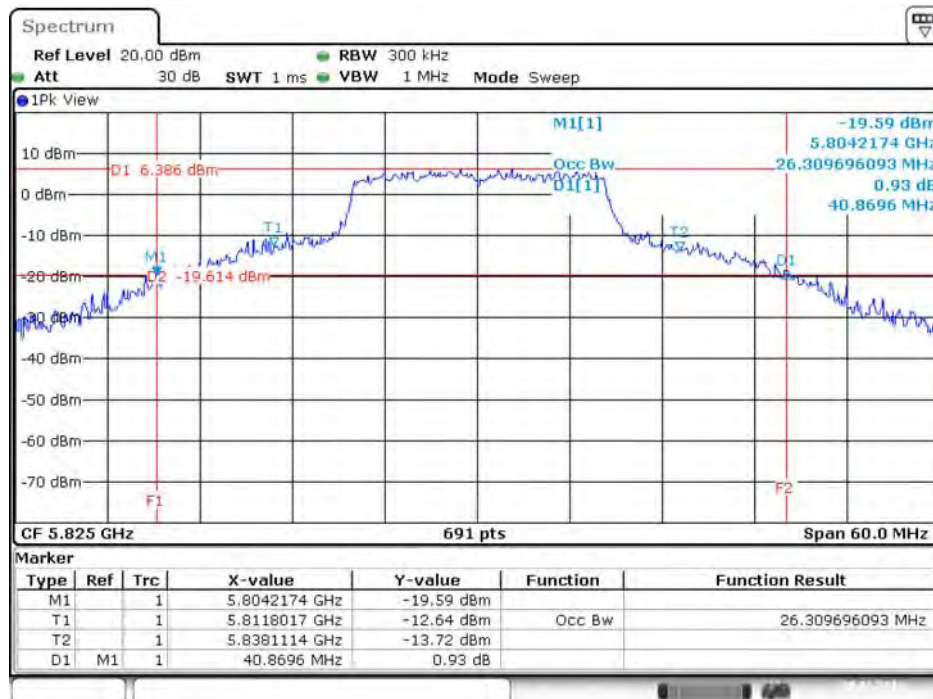
Date: 20.JAN.2016 23:03:48

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



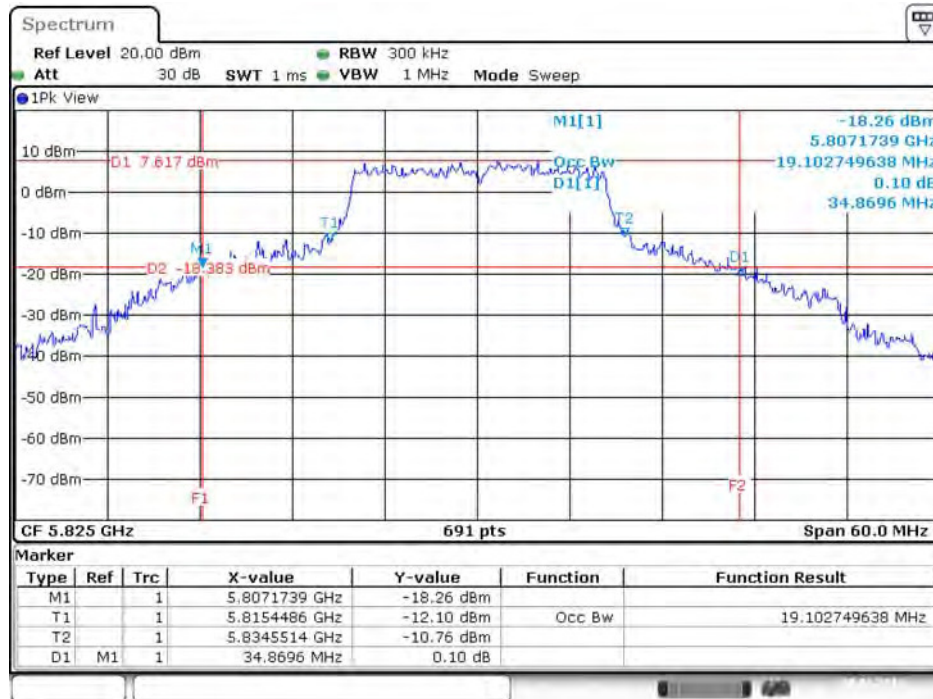
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5825 MHz



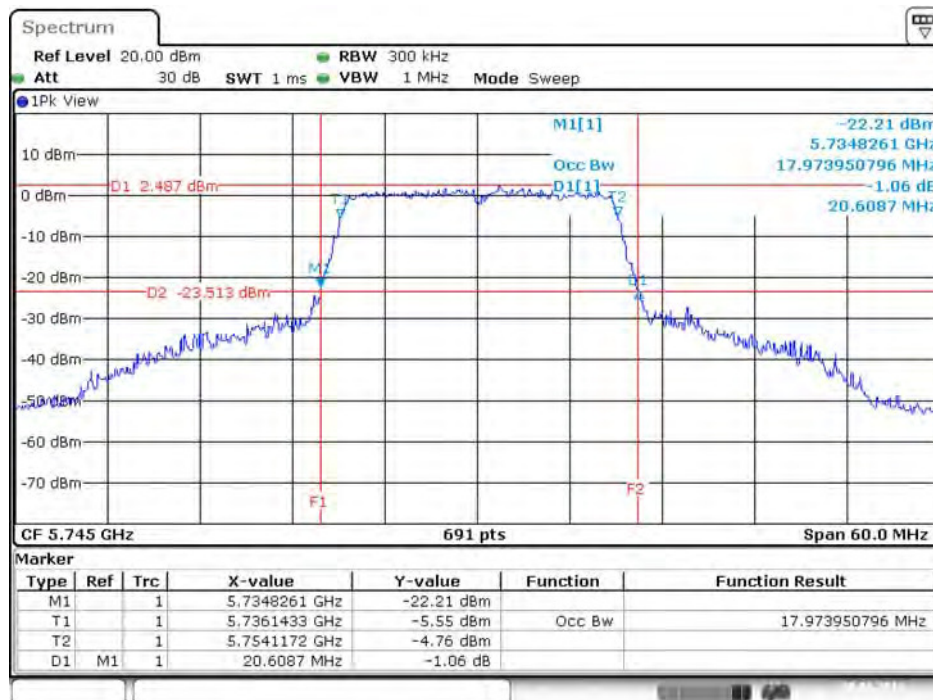
Date: 20.JAN.2016 23:05:12

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



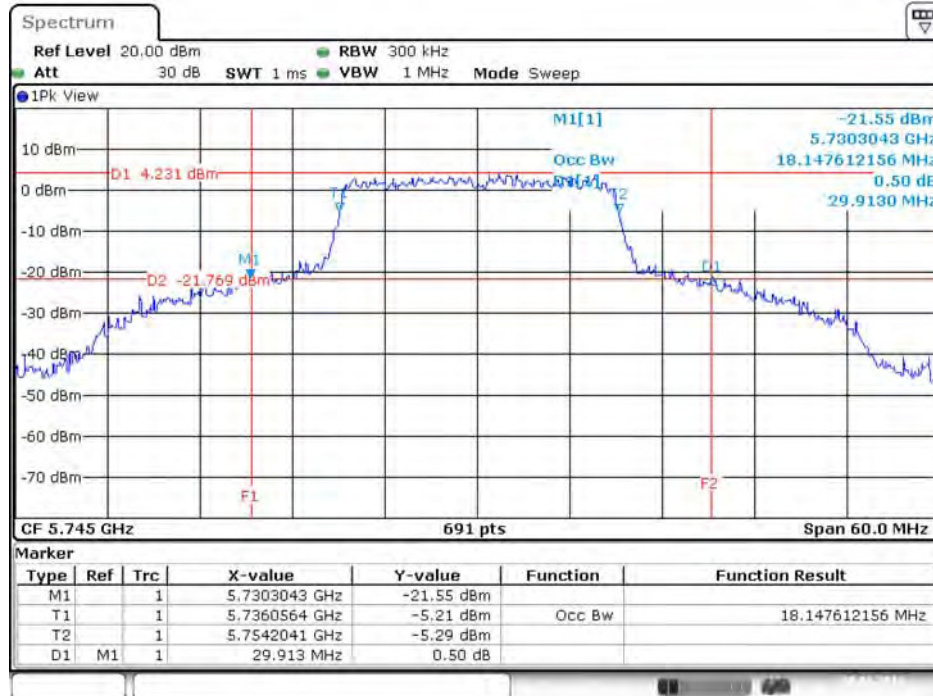
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5745 MHz



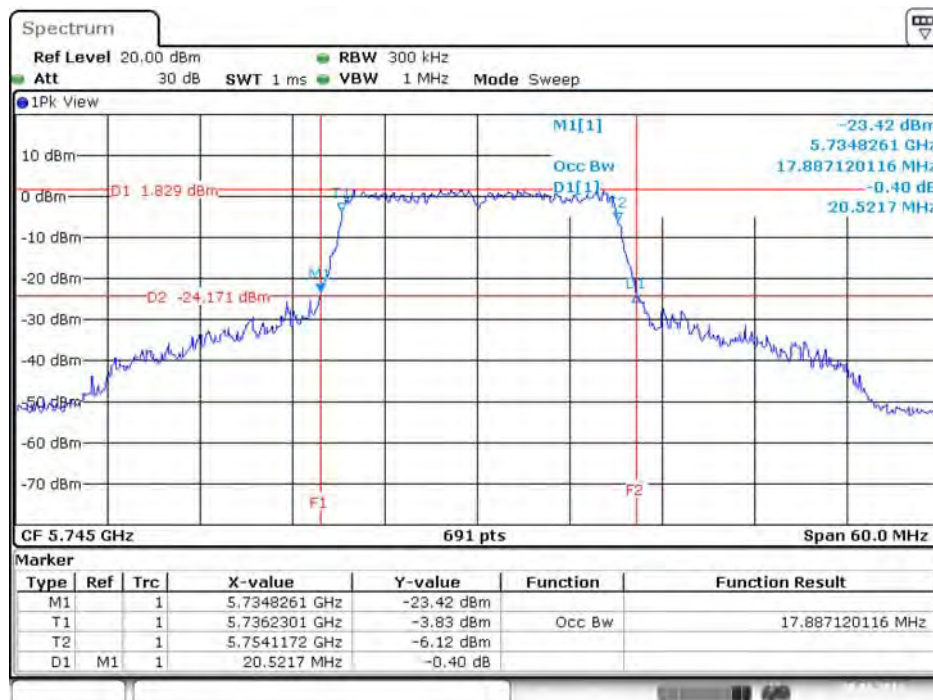
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5745 MHz



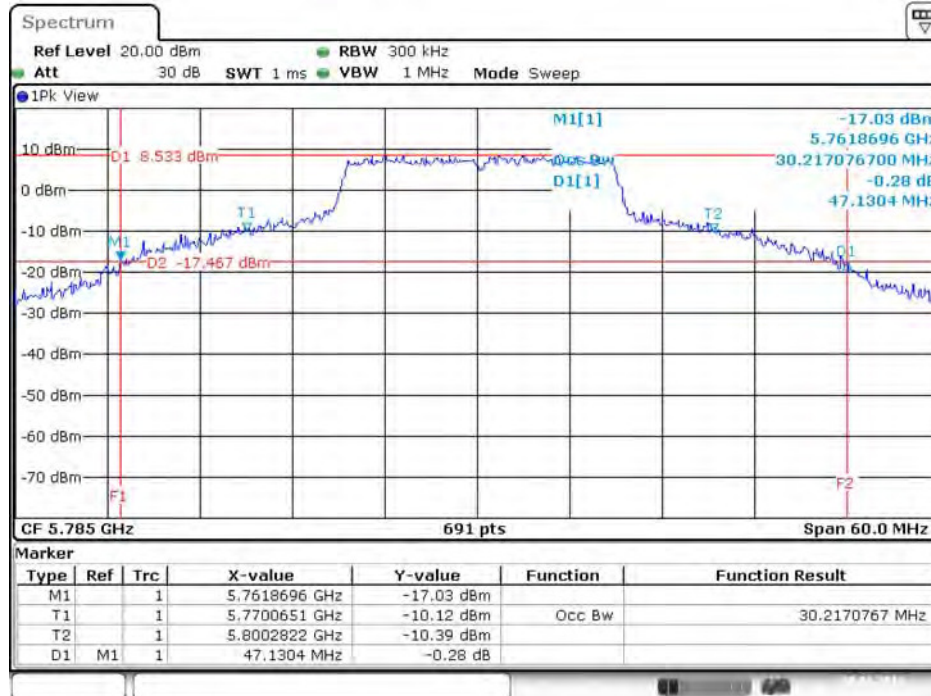
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5745 MHz



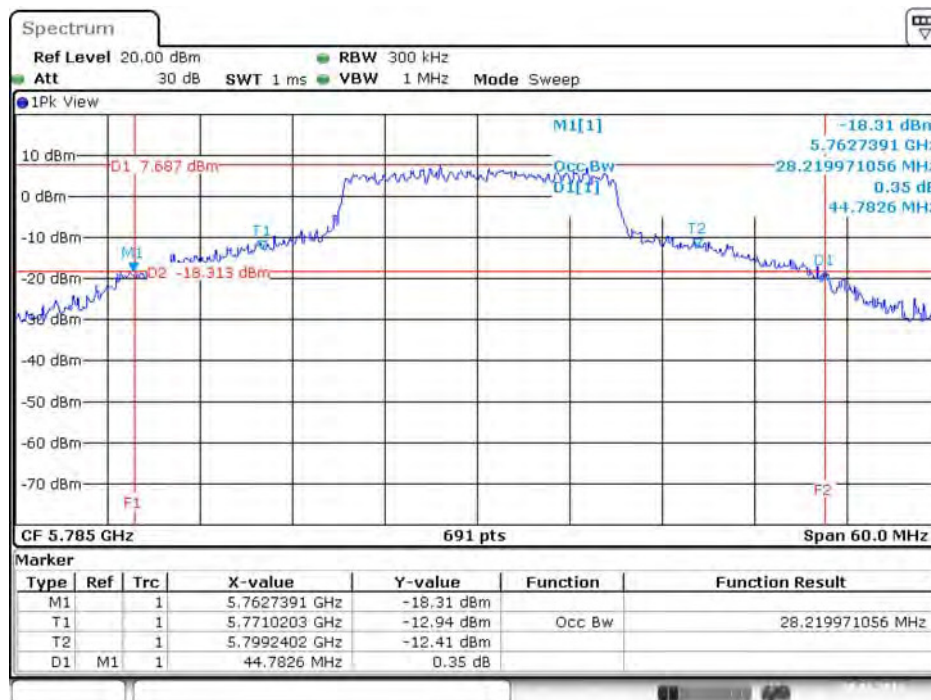
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5785 MHz



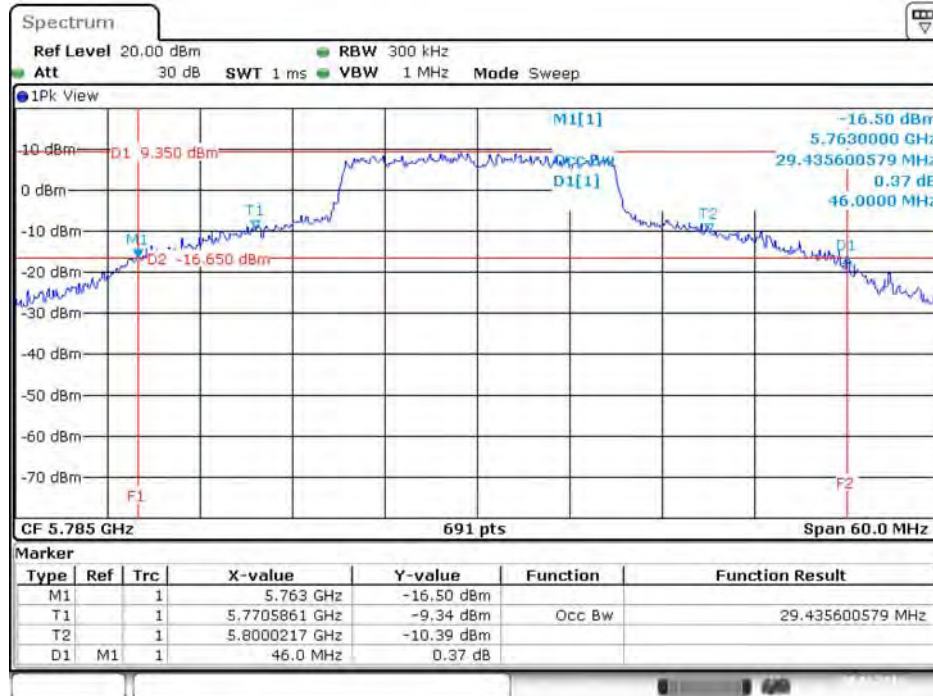
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5785 MHz



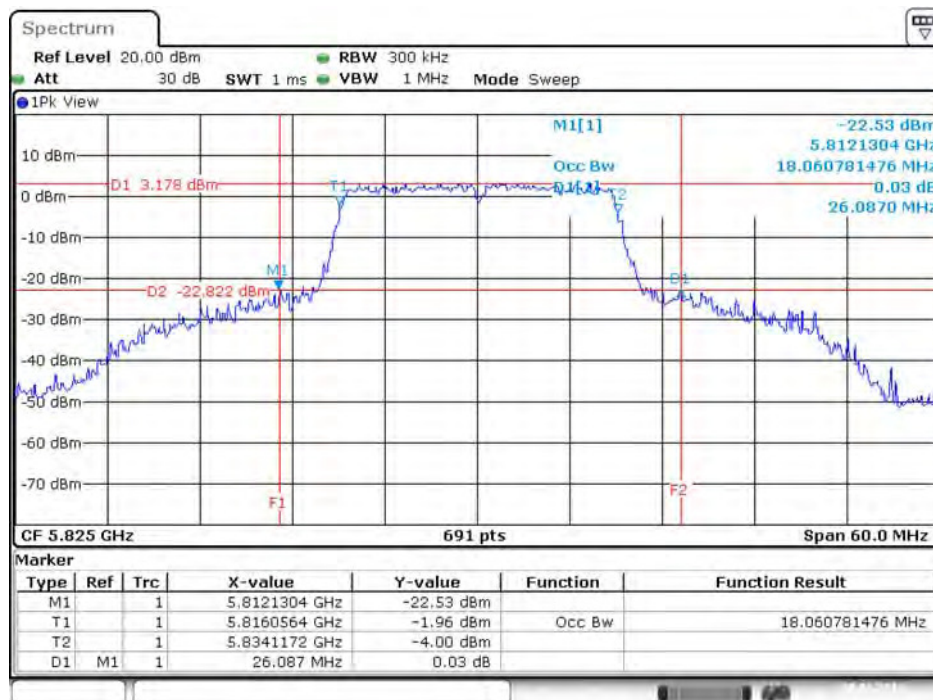
Date: 20.JAN.2016 23:09:48

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



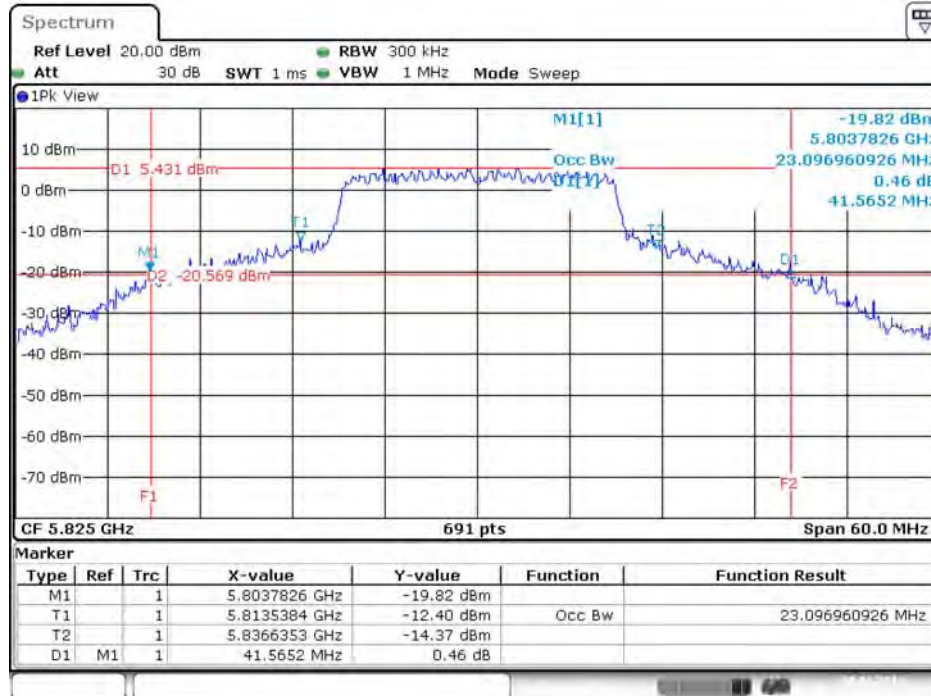
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5825 MHz



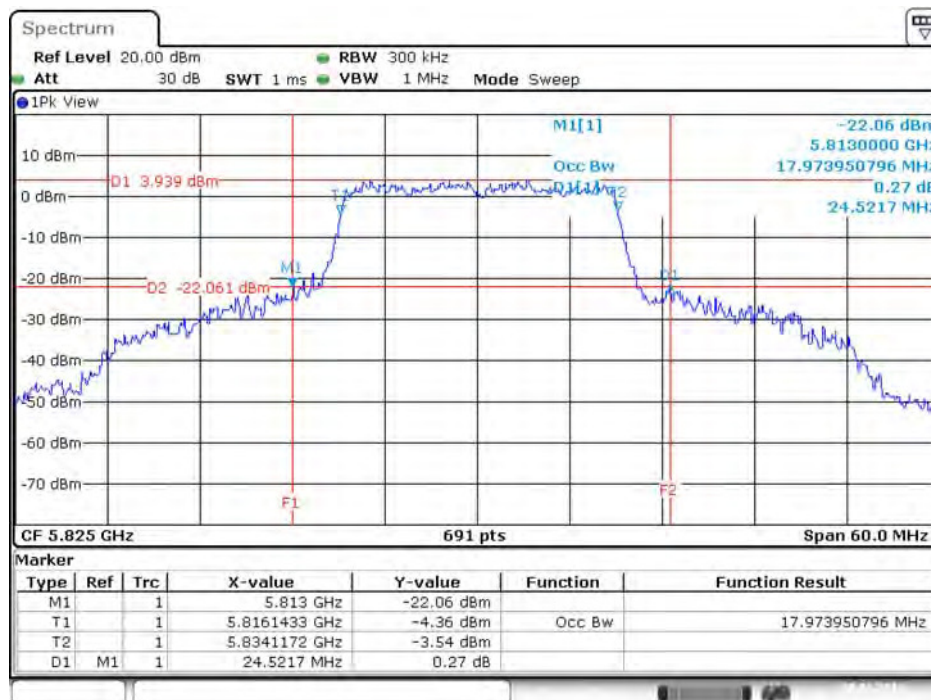
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



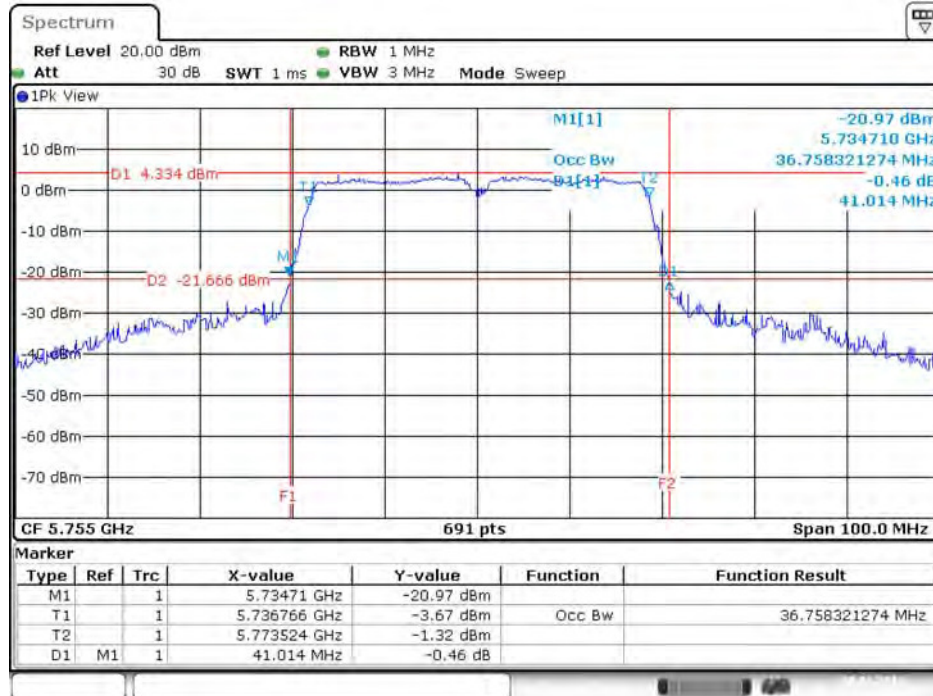
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5825 MHz



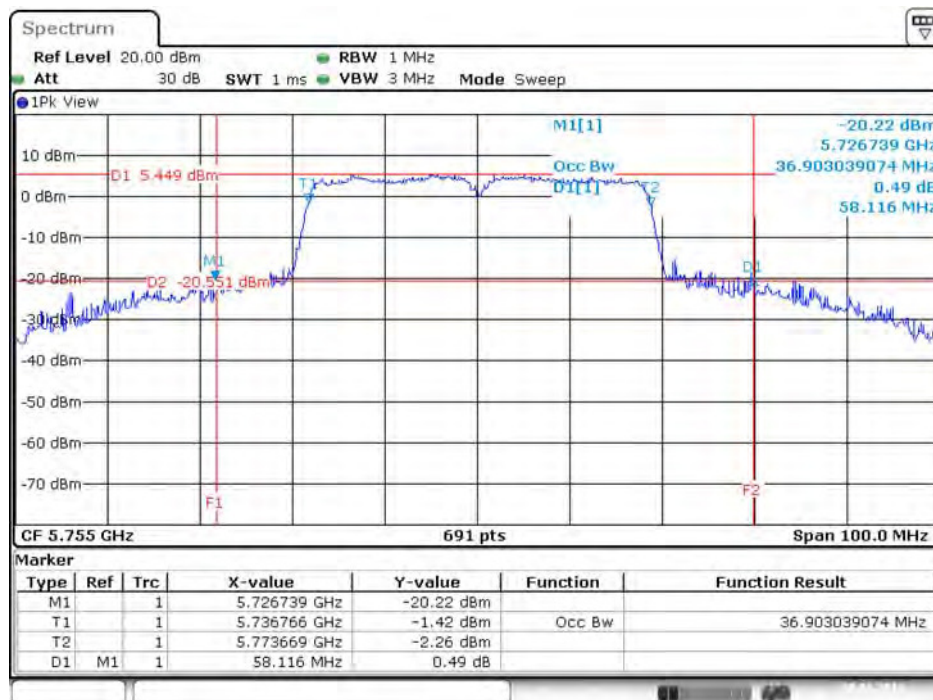
Date: 20.JAN.2016 23:08:53

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



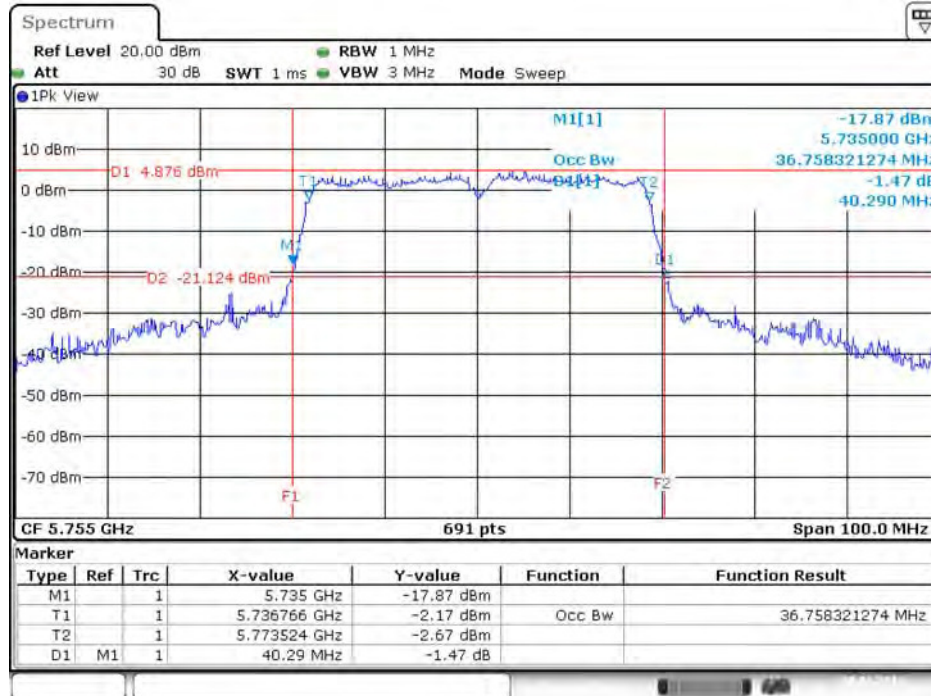
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5755 MHz



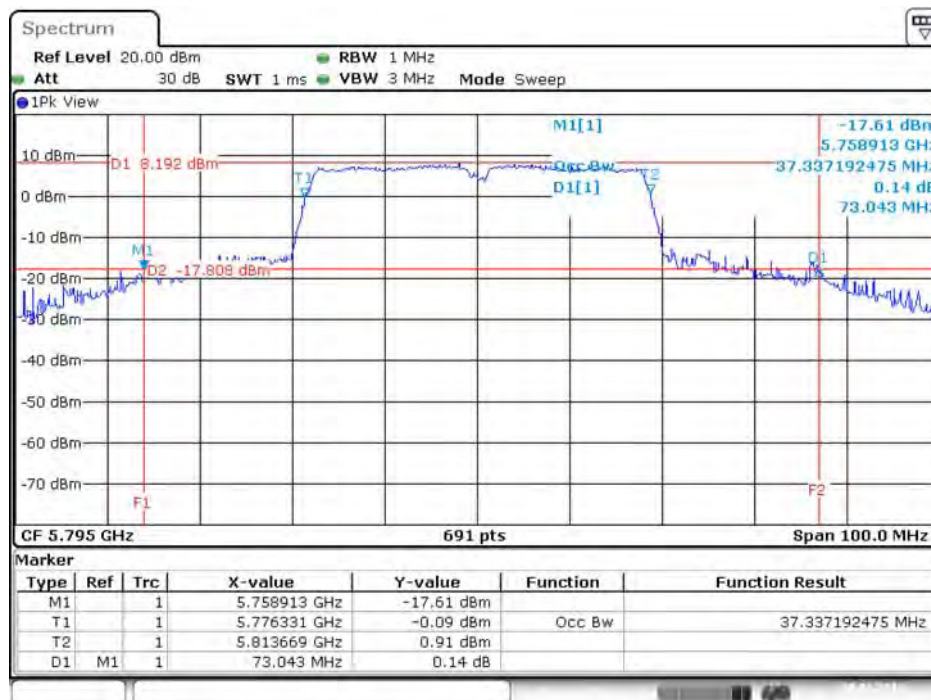
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5755 MHz



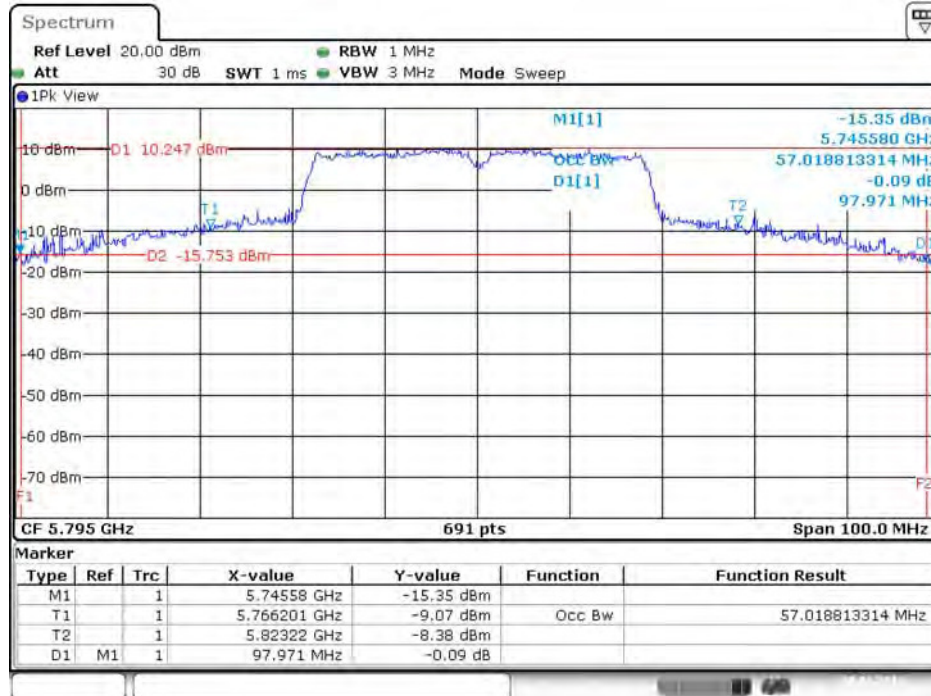
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5795 MHz



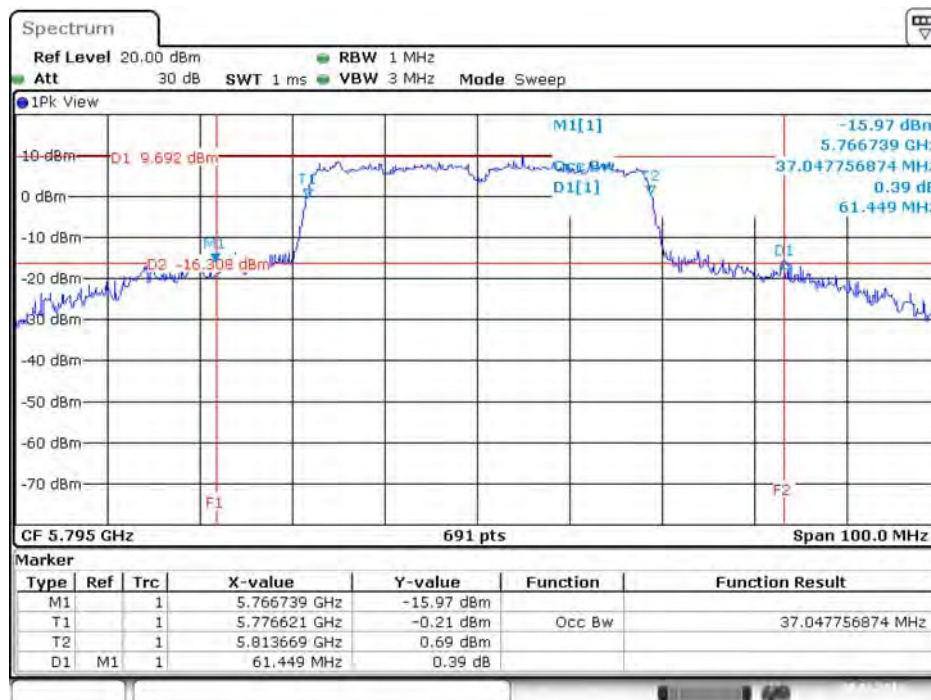
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5795 MHz



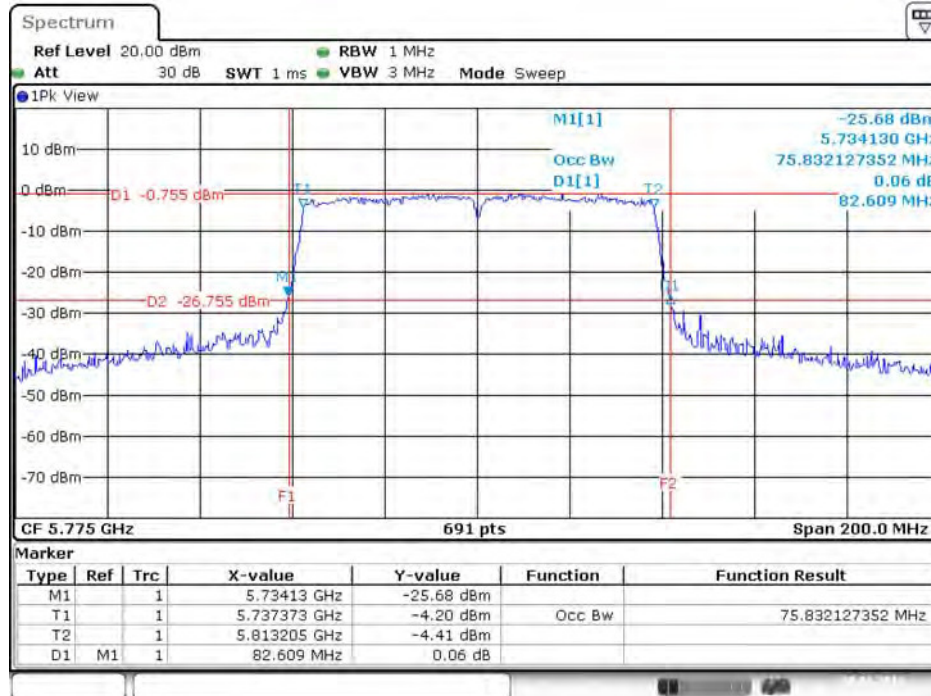
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5795 MHz



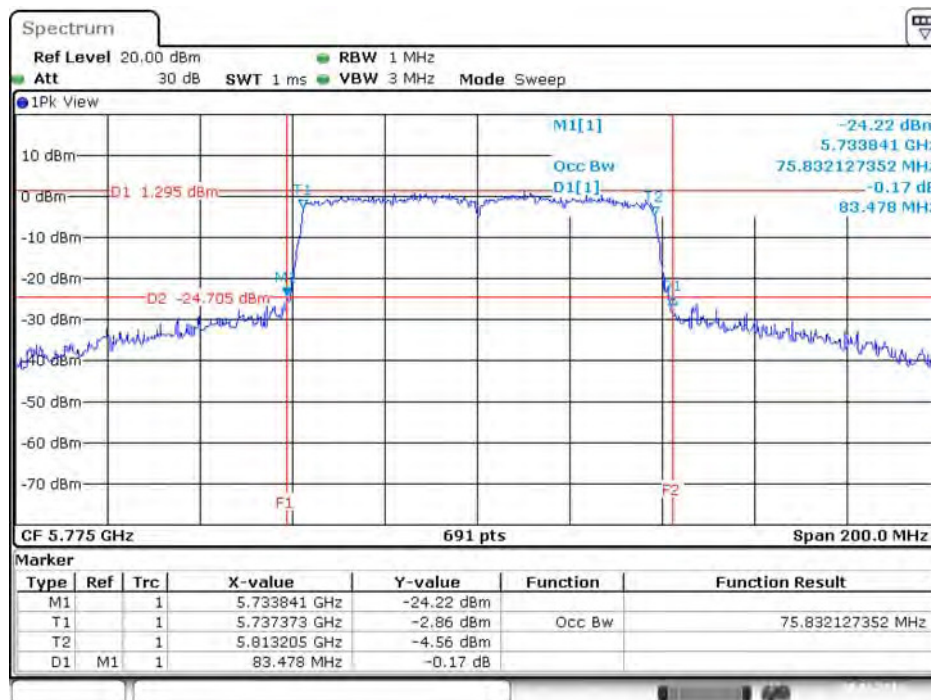
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



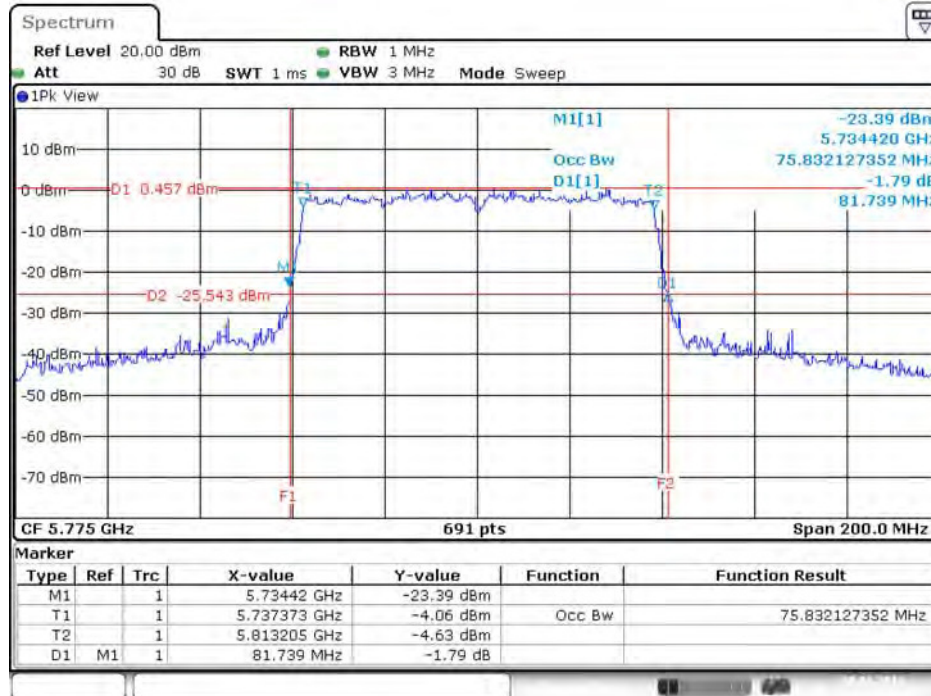
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 2 / 5775 MHz



Date: 20.JAN.2016 23:18:15

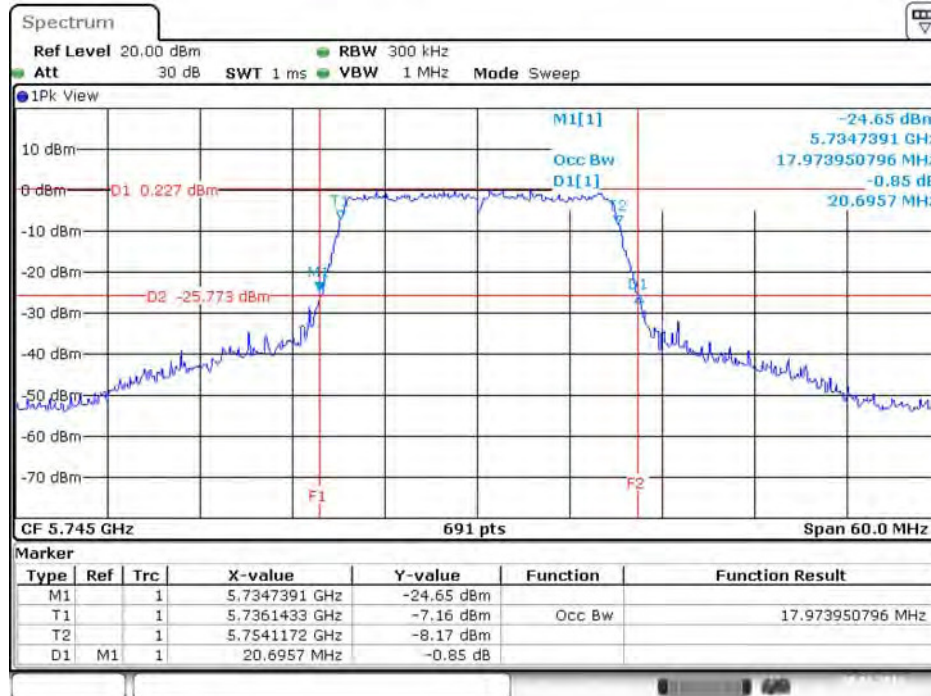
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5775 MHz



Date: 20.JAN.2016 23:17:58

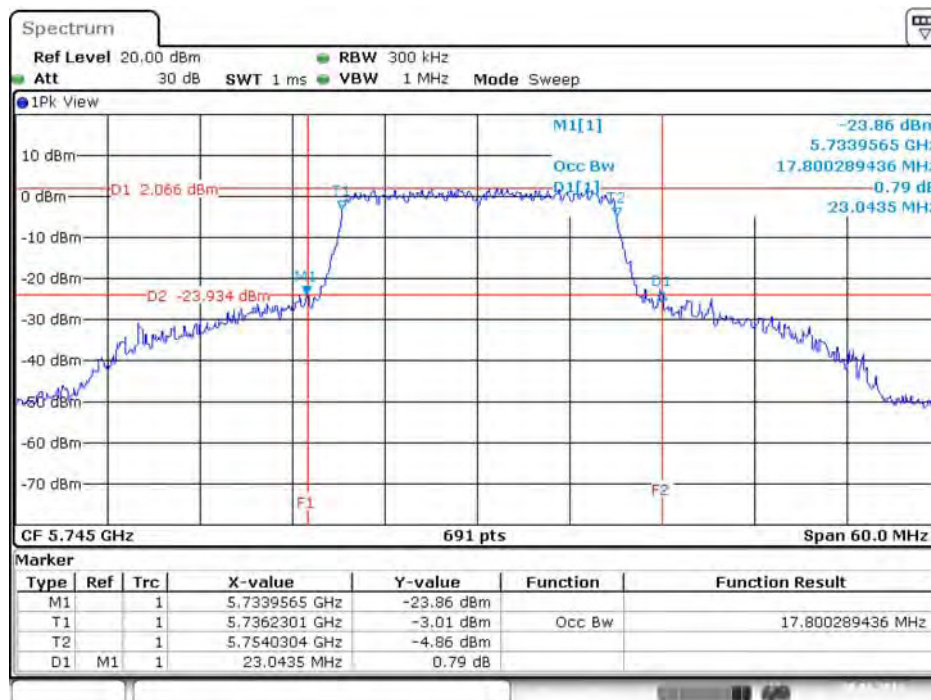
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5745 MHz



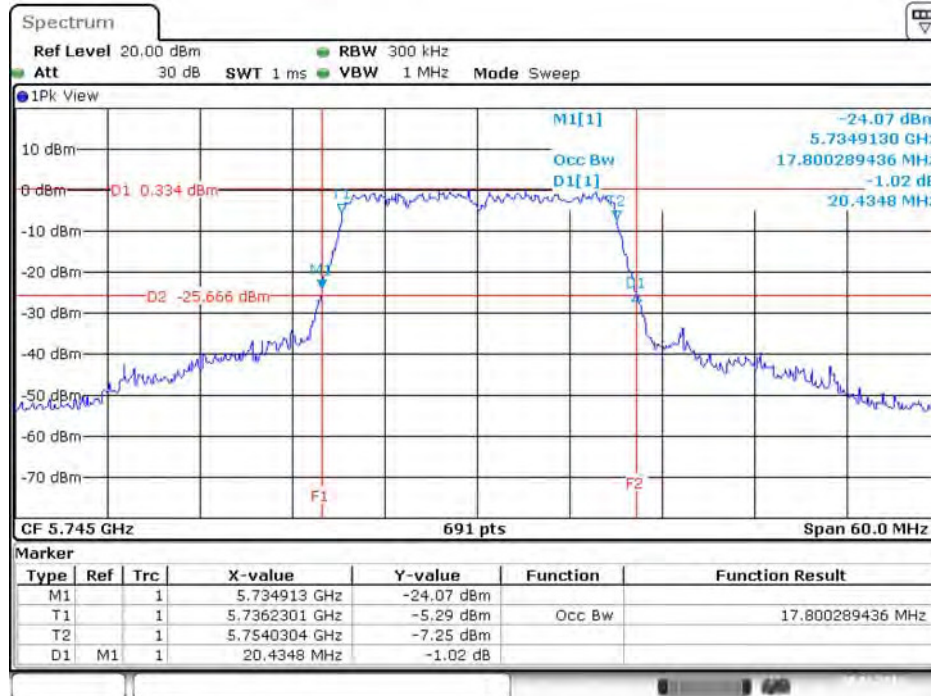
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5745 MHz



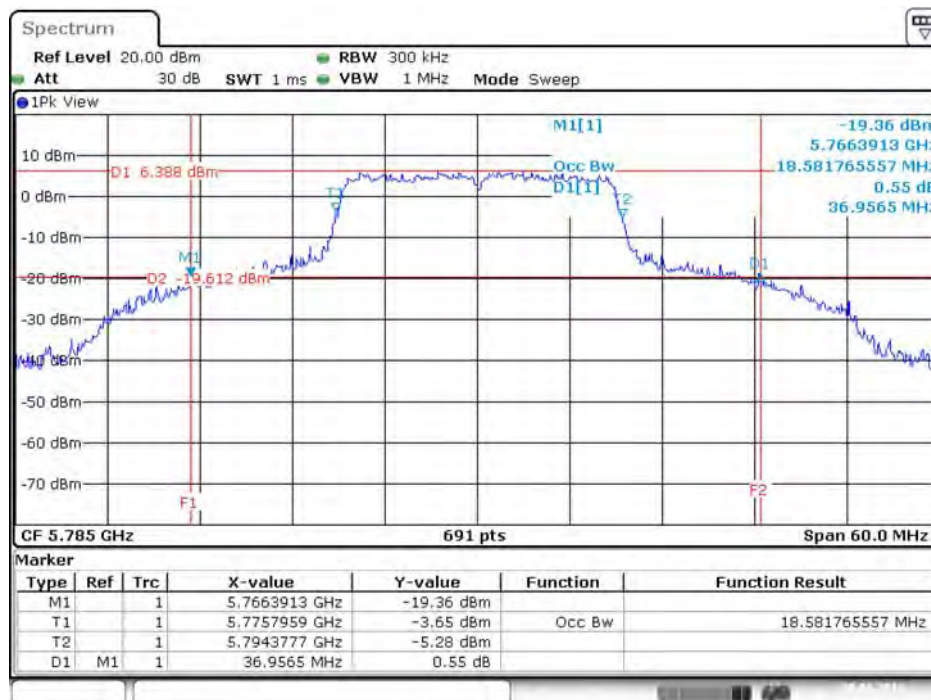
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5745 MHz



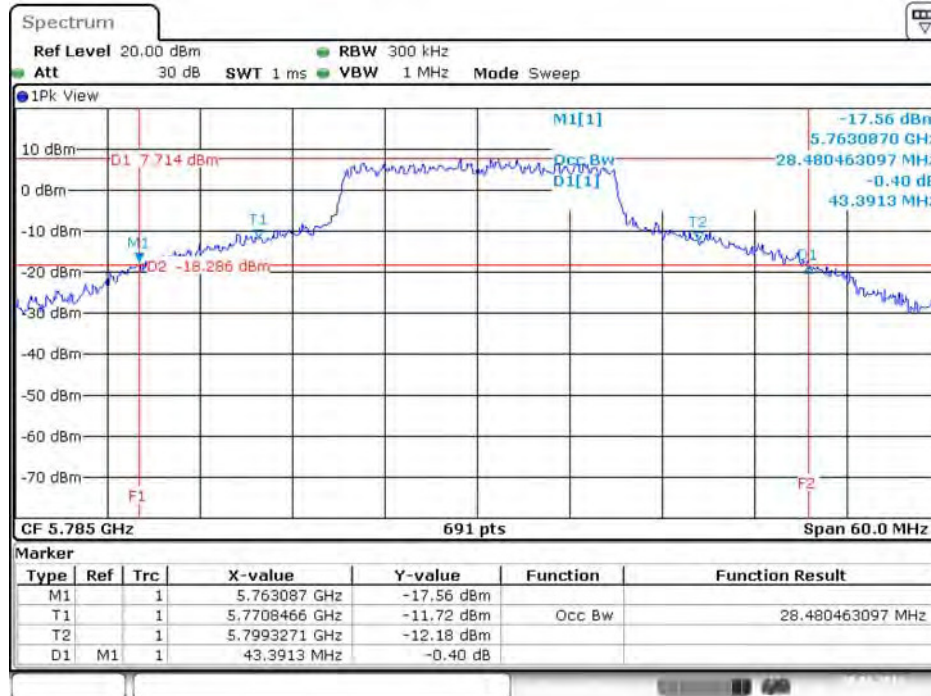
Date: 20.JAN.2016 23:26:31

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



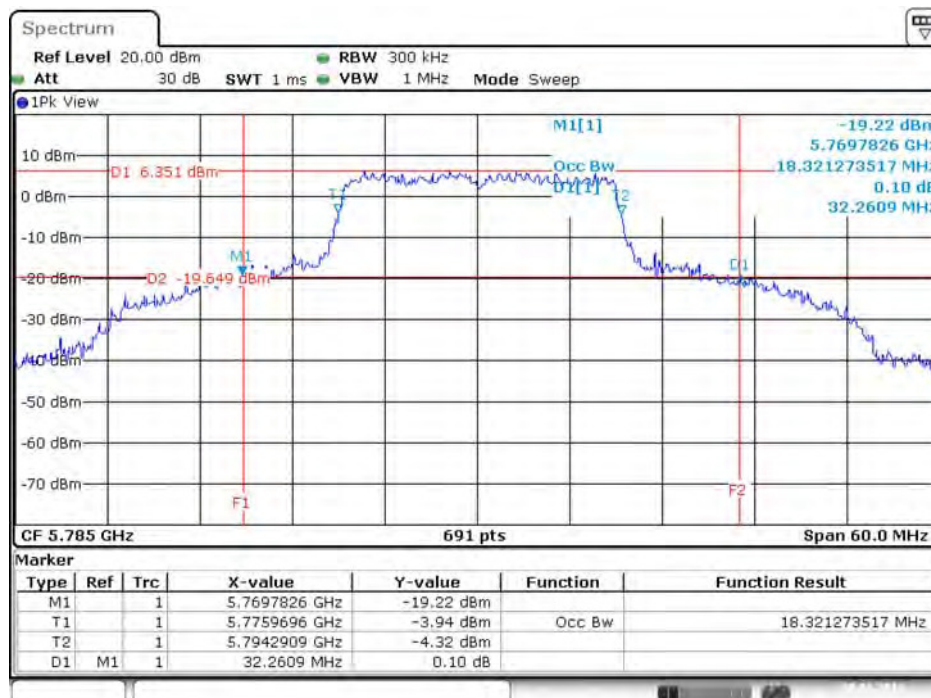
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5785 MHz



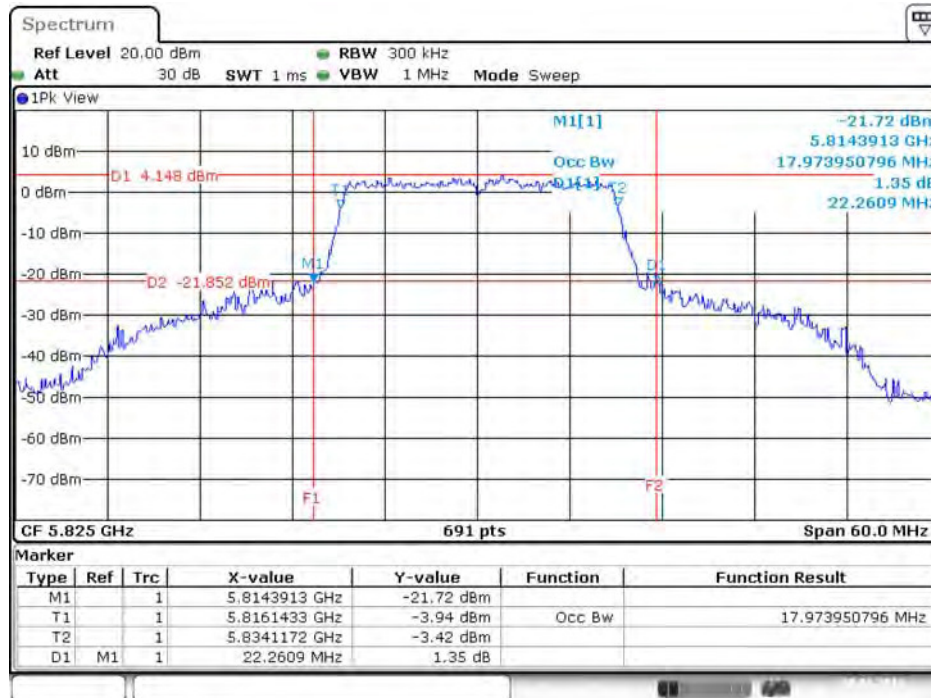
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 / 5785 MHz



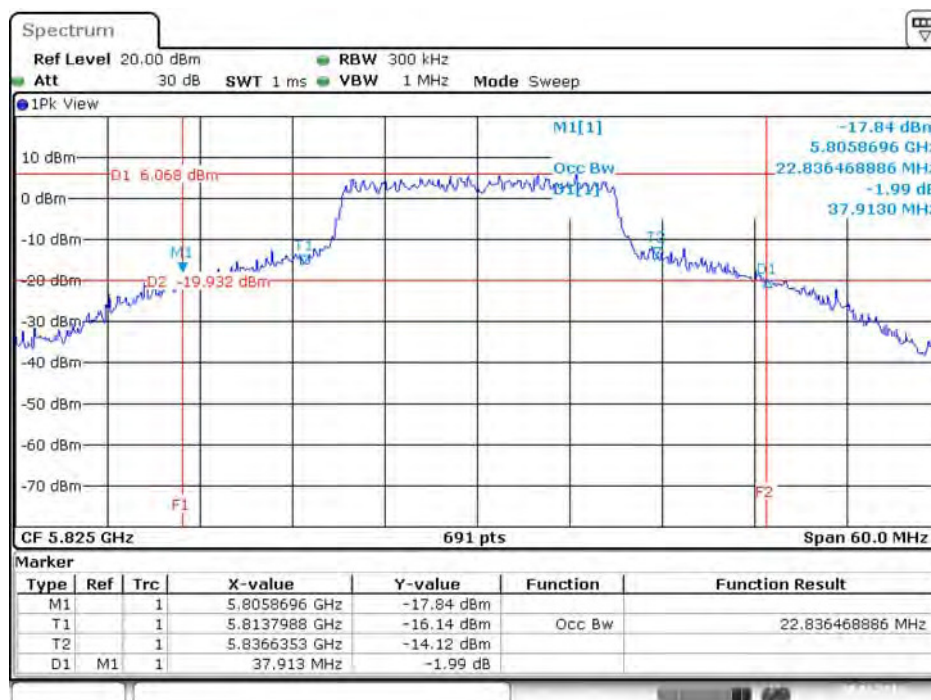
Date: 20.JAN.2016 23:28:02

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



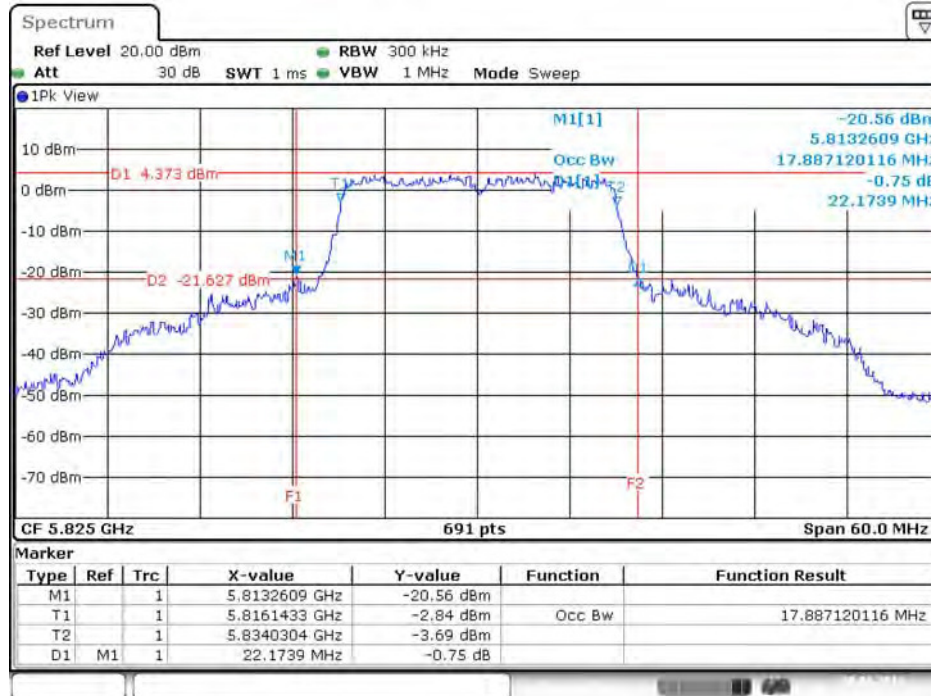
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



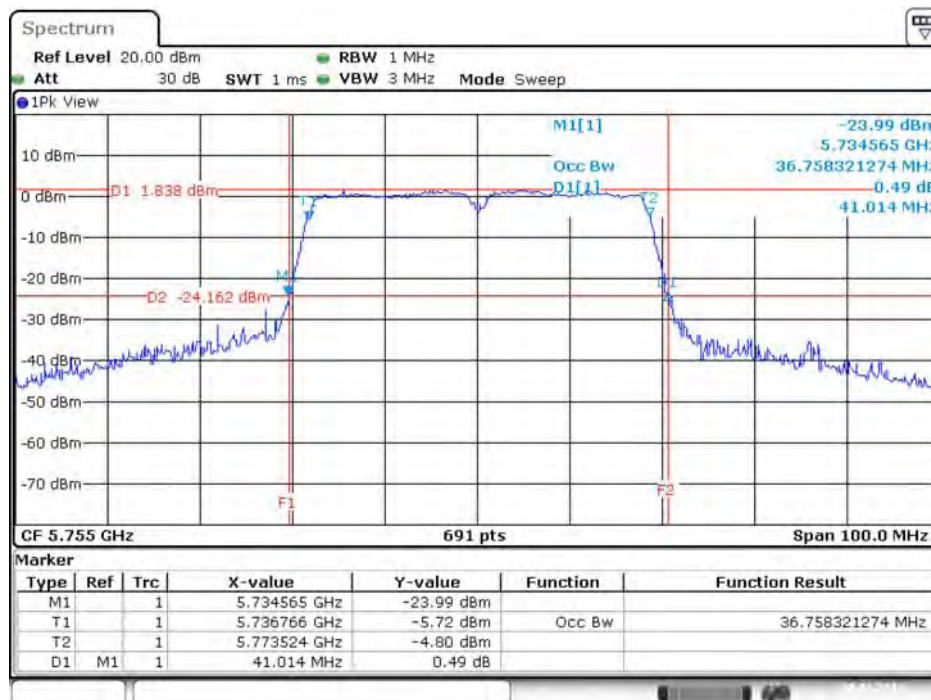
Date: 20.JAN.2016 23:28:48

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



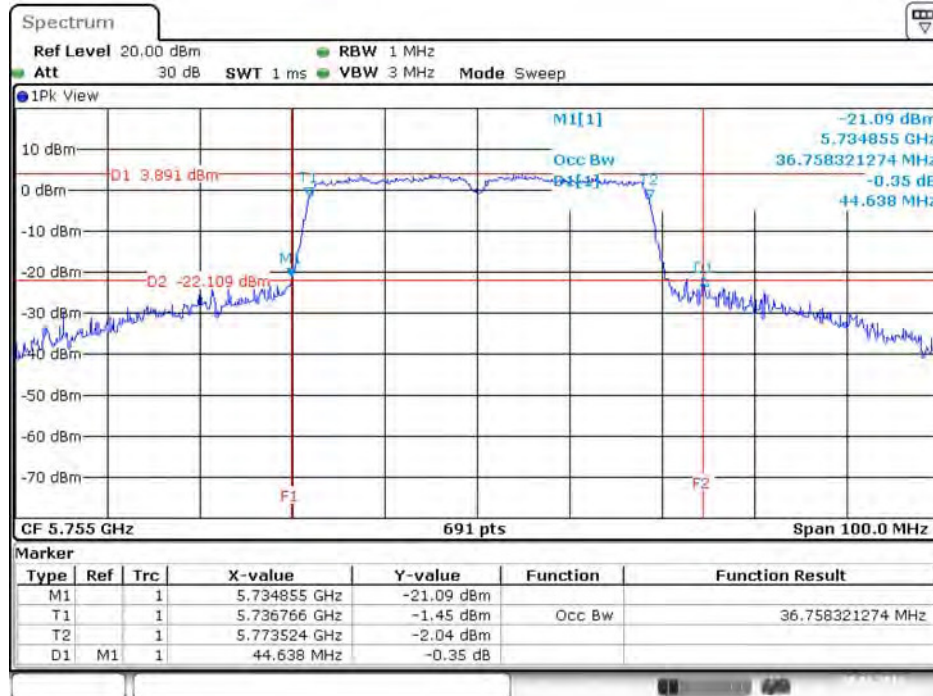
Date: 20.JAN.2016 23:28:34

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



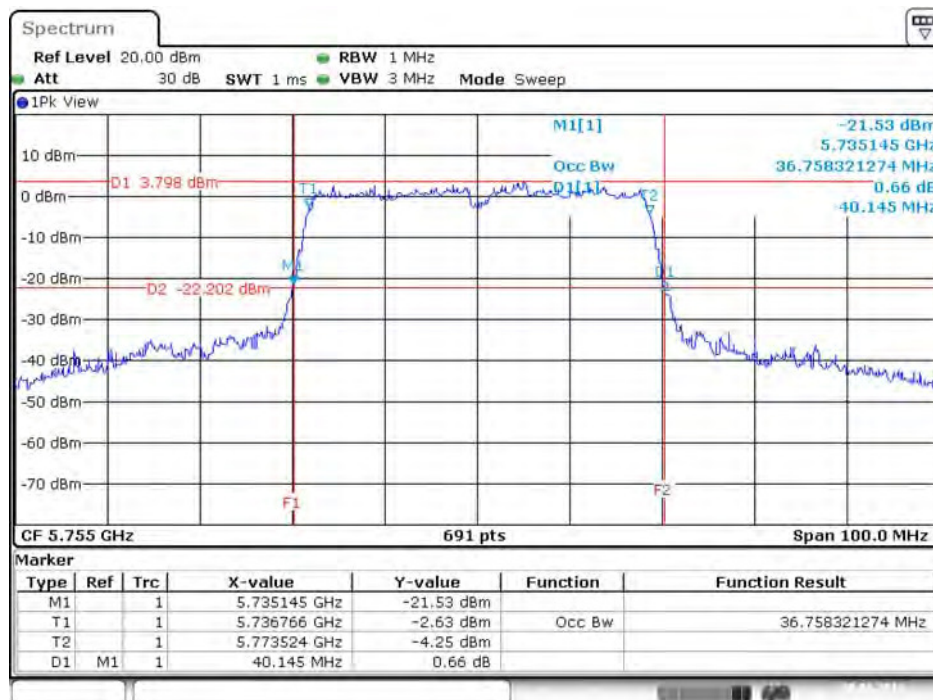
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5755 MHz



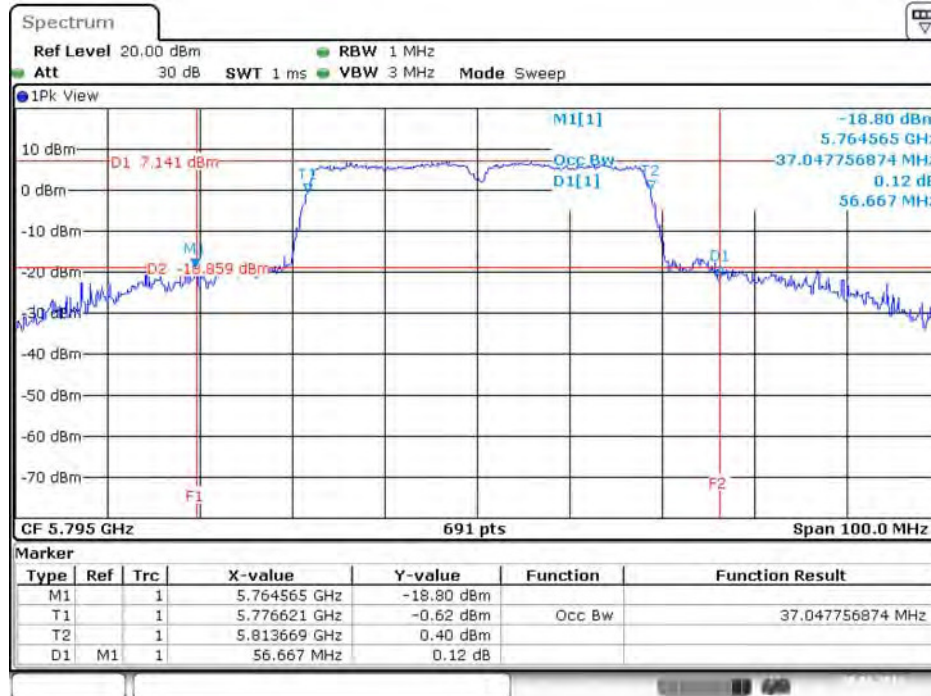
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5755 MHz



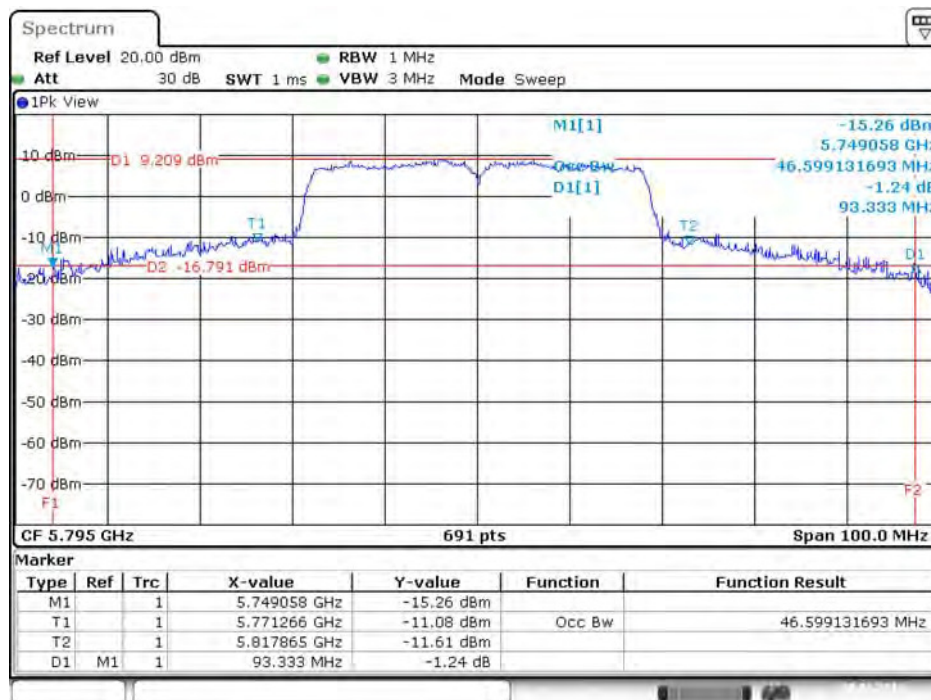
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 / 5795 MHz



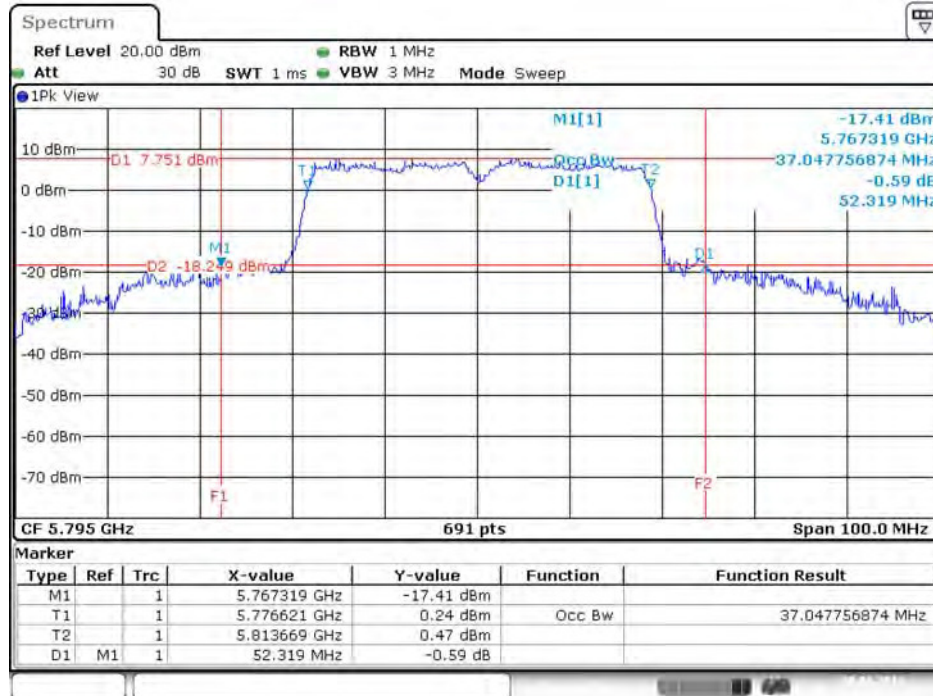
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 2 / 5795 MHz



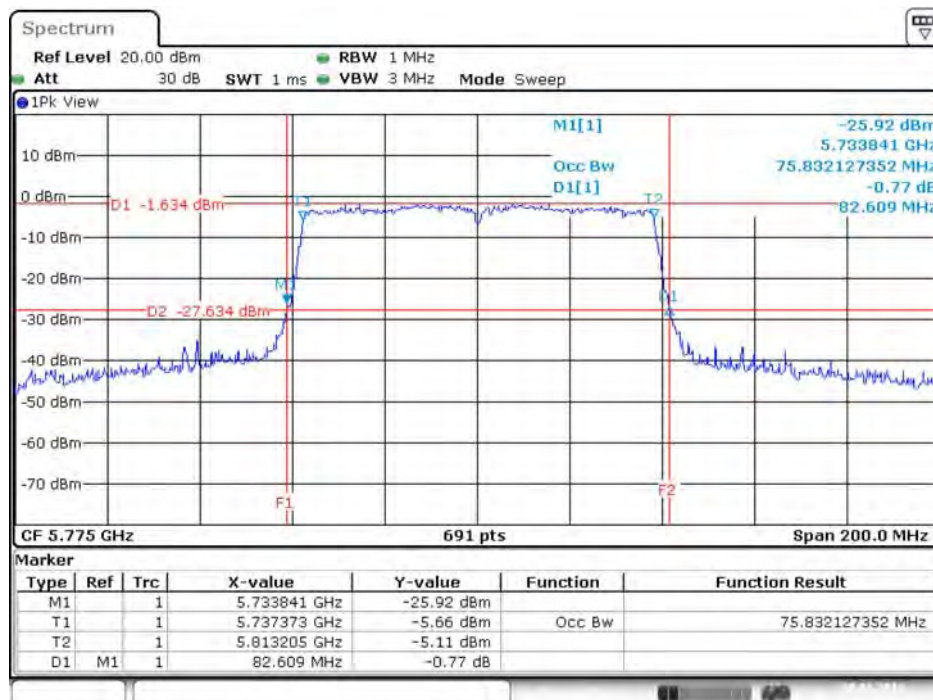
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 / 5795 MHz



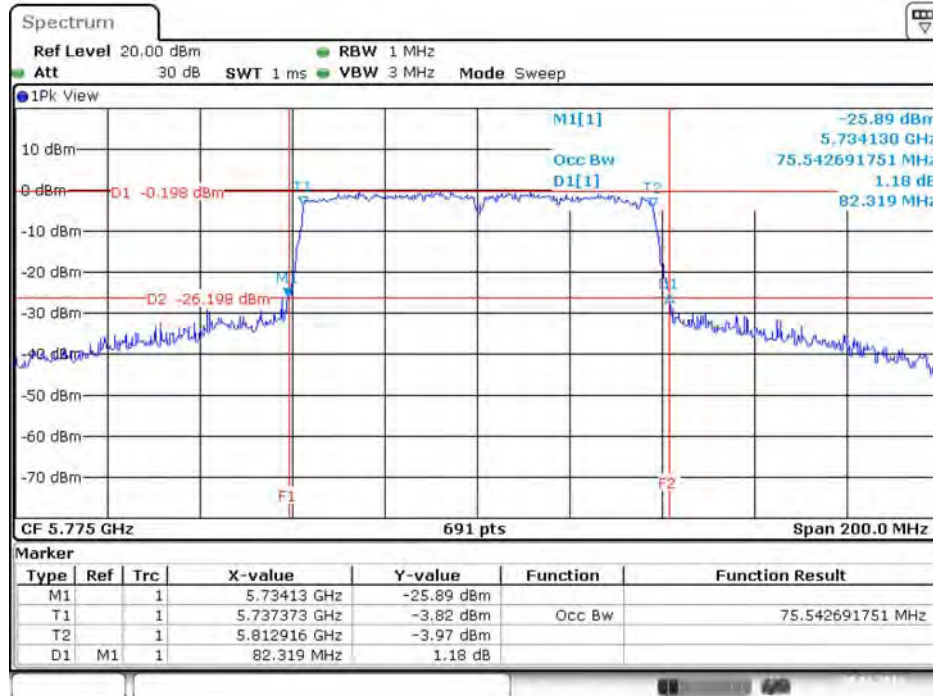
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 / 5775 MHz



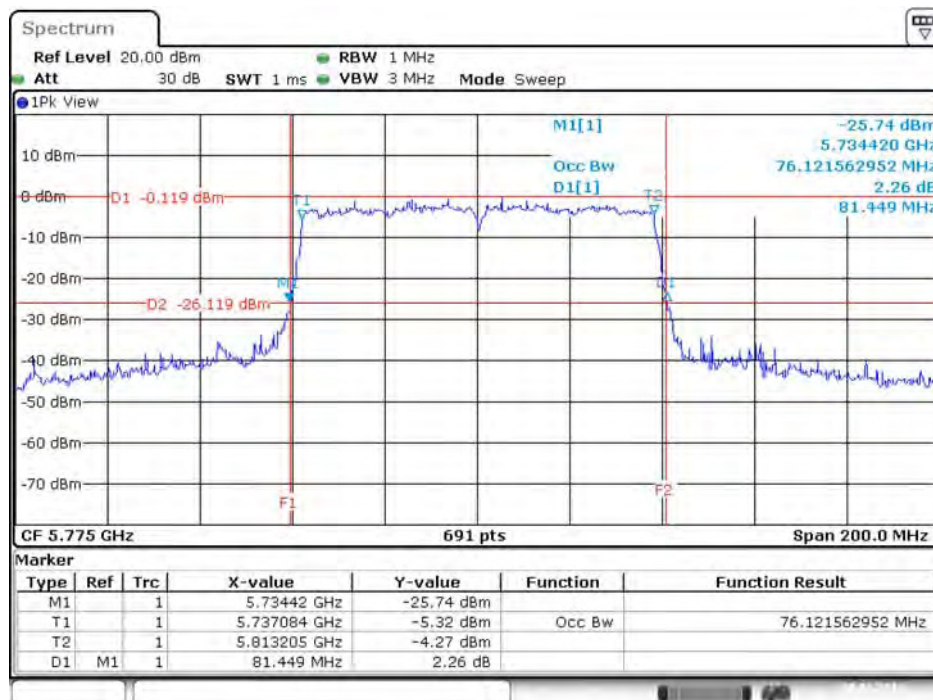
Date: 20.JAN.2016 23:21:07

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



Date: 20.JAN.2016 23:21:21

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



Date: 20.JAN.2016 23:21:32

4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

4.2.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.4.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 6dB Spectrum Bandwidth

Temperature	24°C	Humidity	59%
Test Engineer	Peter Wu		

<For Non-Beamforming Mode>

Mode	Frequency	6dB Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Chain 1	Chain 2	Chain 3		
802.11a	5745 MHz	16.46	16.35	16.35	500	Complies
	5785 MHz	16.29	15.88	16.29	500	Complies
	5825 MHz	16.29	15.94	16.29	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.62	17.62	17.57	500	Complies
	5785 MHz	17.68	17.57	17.74	500	Complies
	5825 MHz	17.57	17.62	17.62	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.83	36.41	36.29	500	Complies
	5795 MHz	36.41	36.41	36.29	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	75.36	75.65	500	Complies

<For Beamforming Mode>

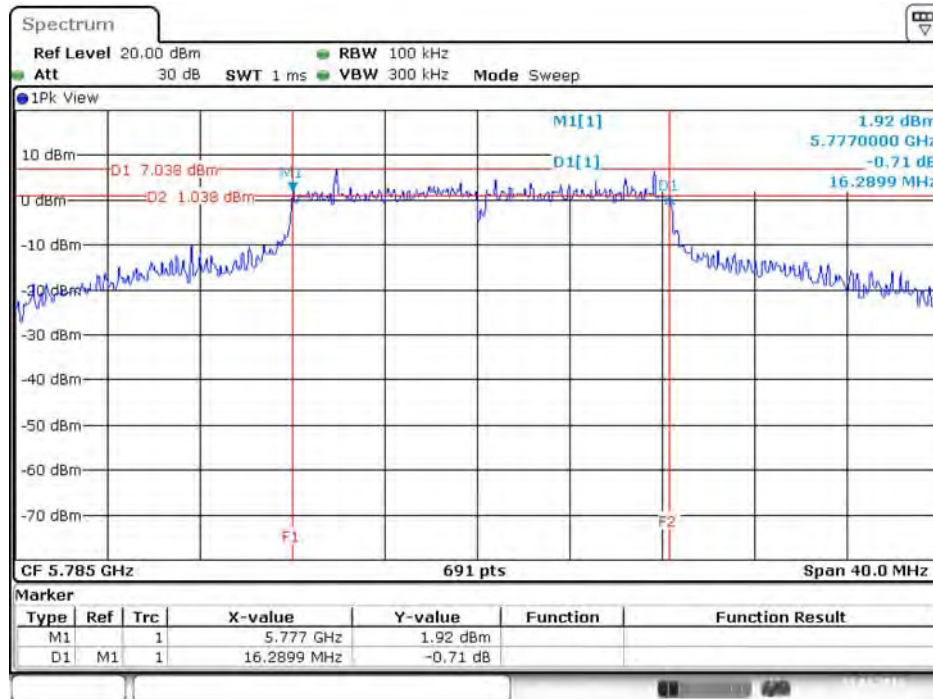
Mode	Frequency	6dB Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Chain 1	Chain 2	Chain 3		
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.80	17.62	17.62	500	Complies
	5785 MHz	17.22	17.57	17.62	500	Complies
	5825 MHz	17.62	17.62	17.57	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.29	36.41	36.41	500	Complies
	5795 MHz	36.29	36.41	36.29	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	75.36	75.94	500	Complies

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

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

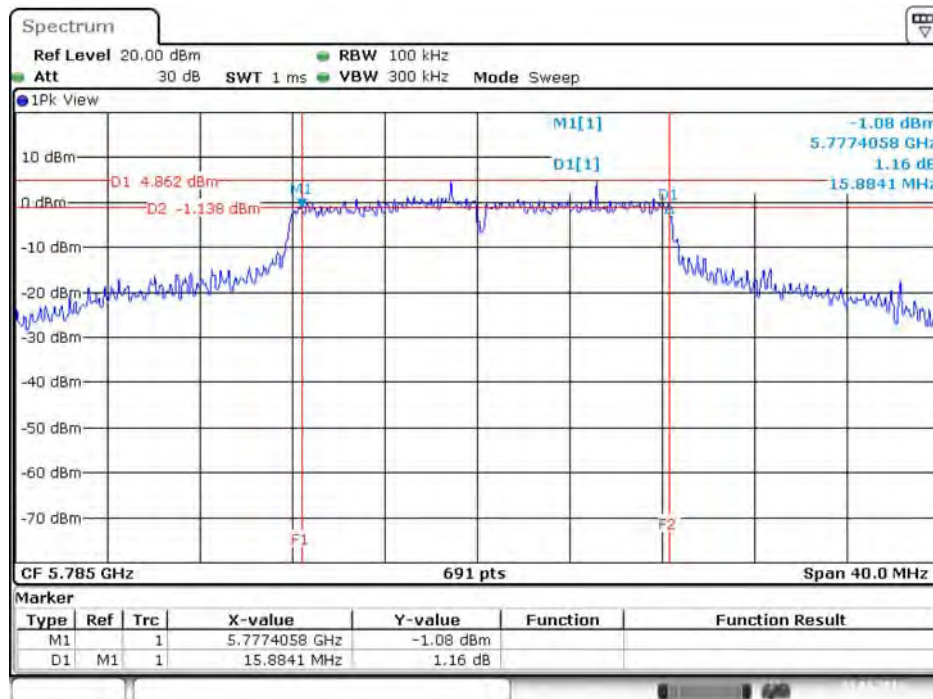
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5785 MHz



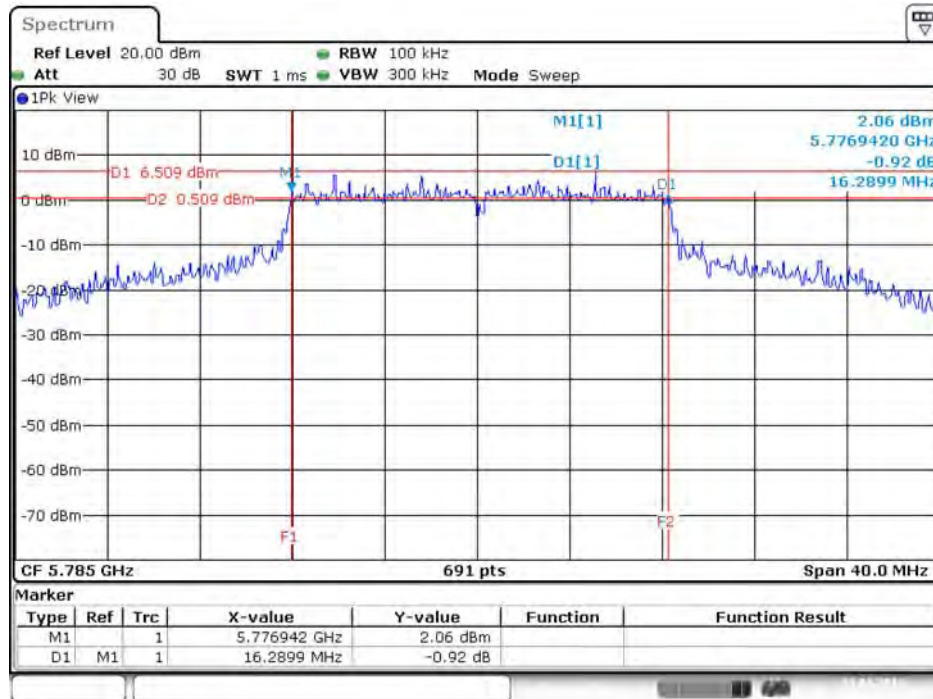
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 2 / 5785 MHz



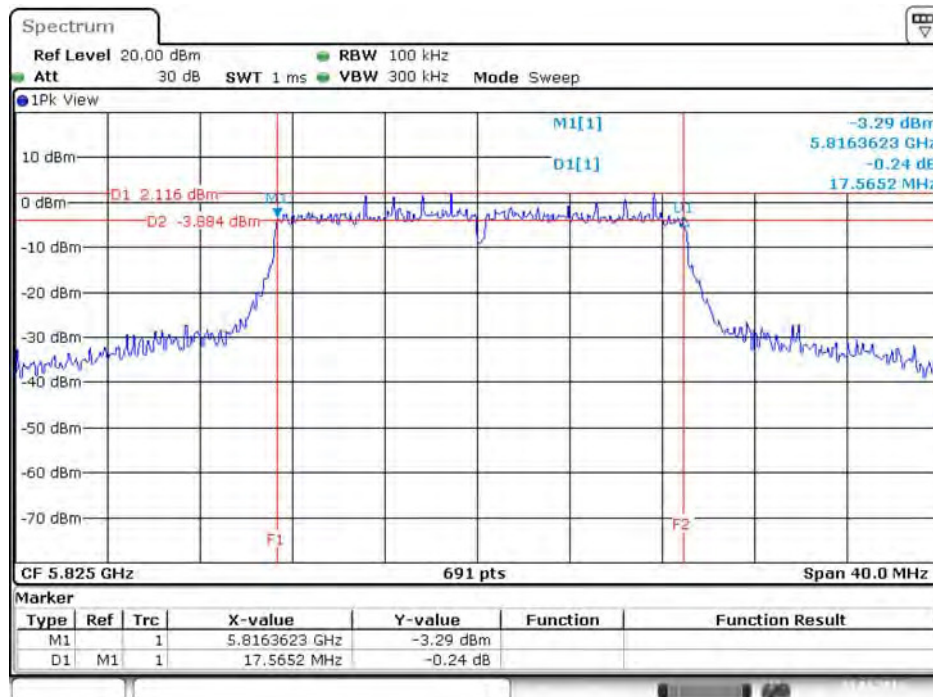
Date: 21.JAN.2016 00:56:25

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



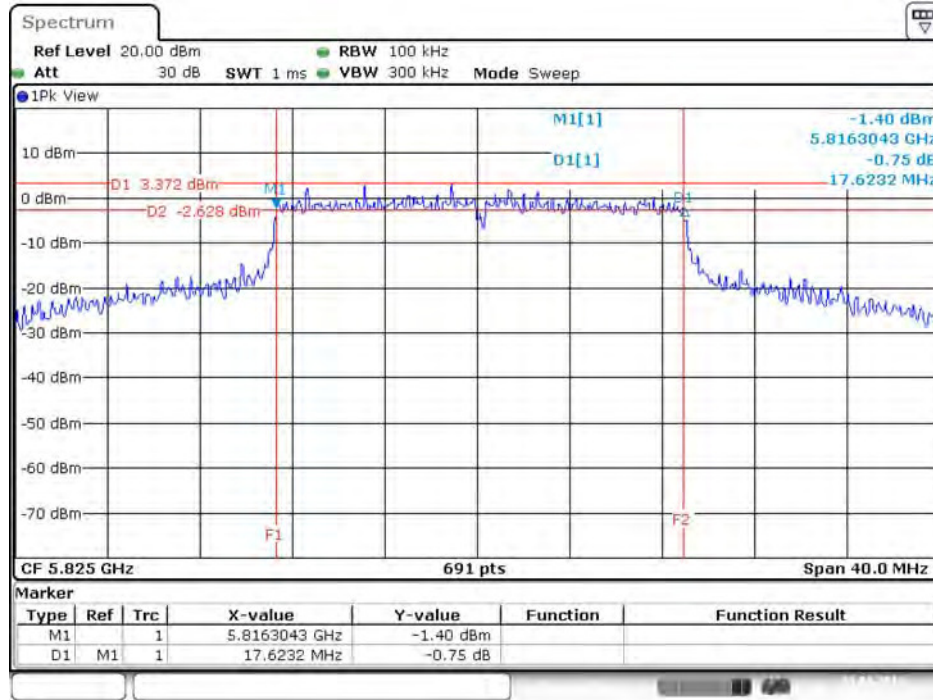
Date: 21.JAN.2016 00:56:12

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



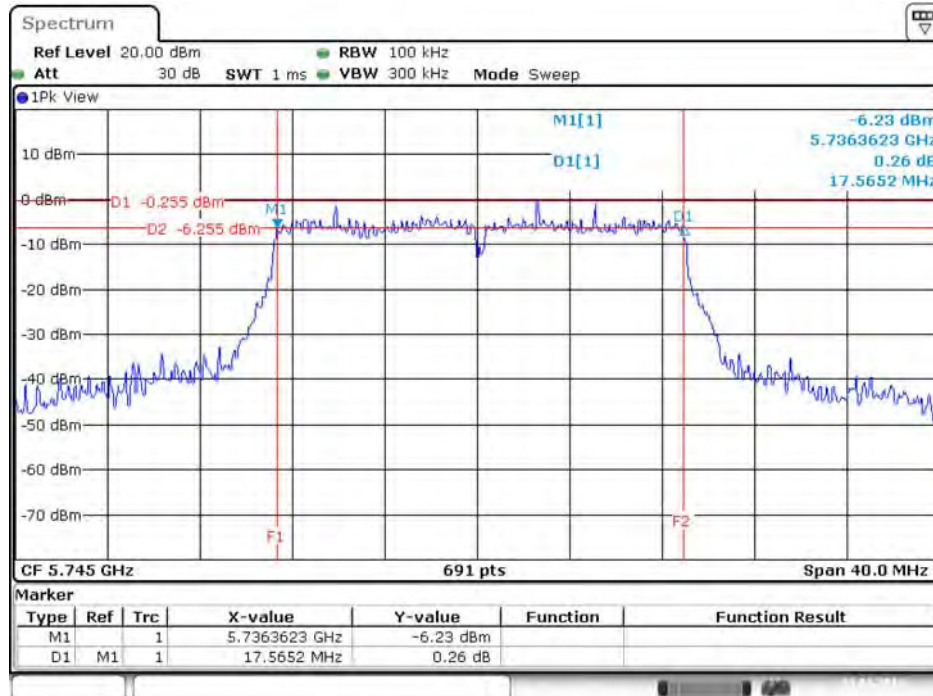
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5825 MHz



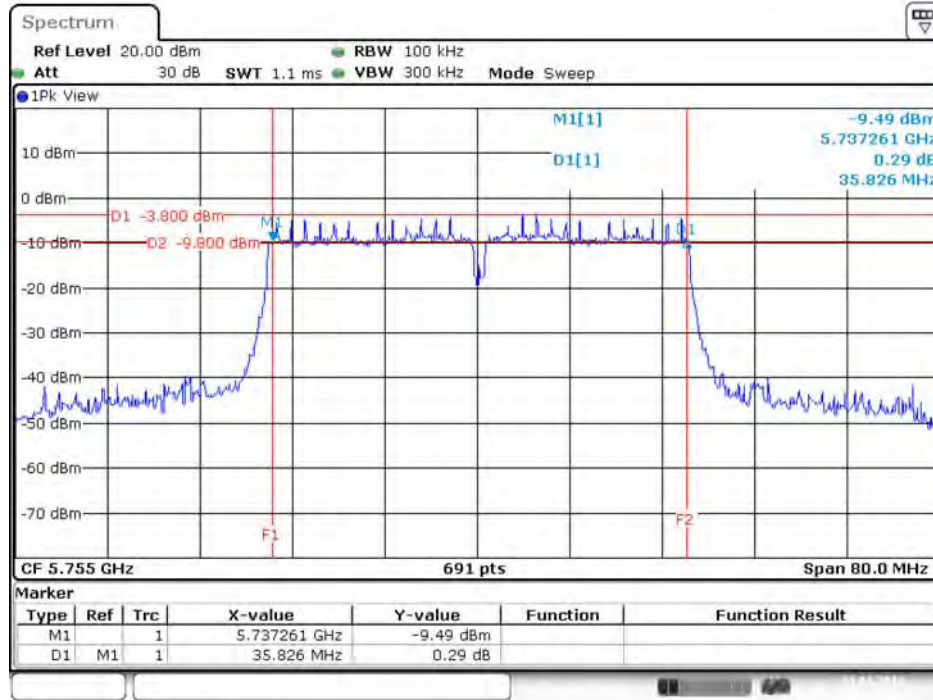
Date: 21.JAN.2016 00:42:58

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



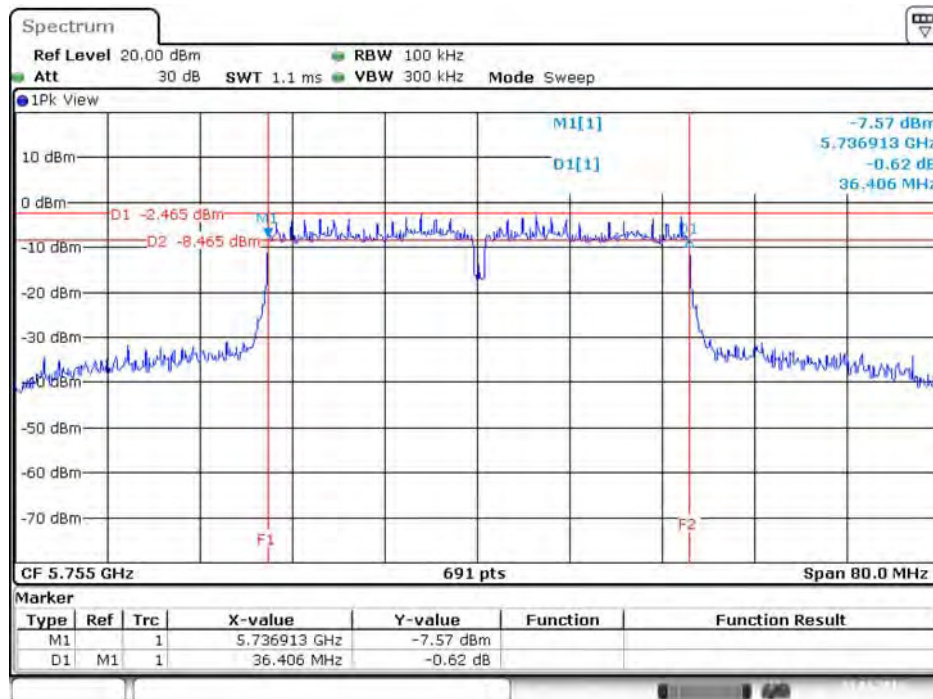
Date: 21.JAN.2016 00:40:26

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



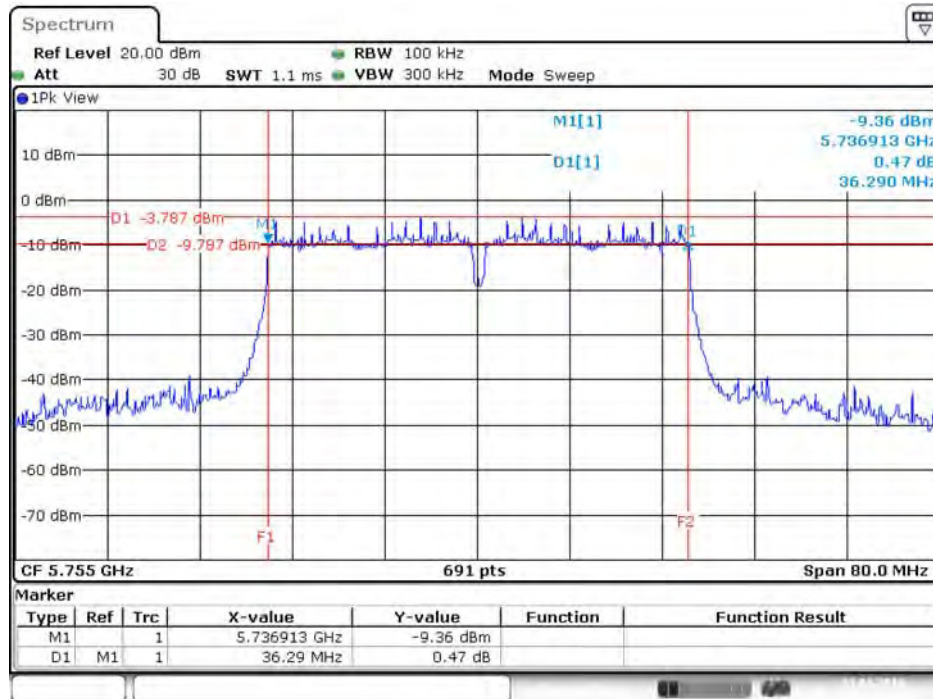
Date: 21.JAN.2016 00:37:47

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



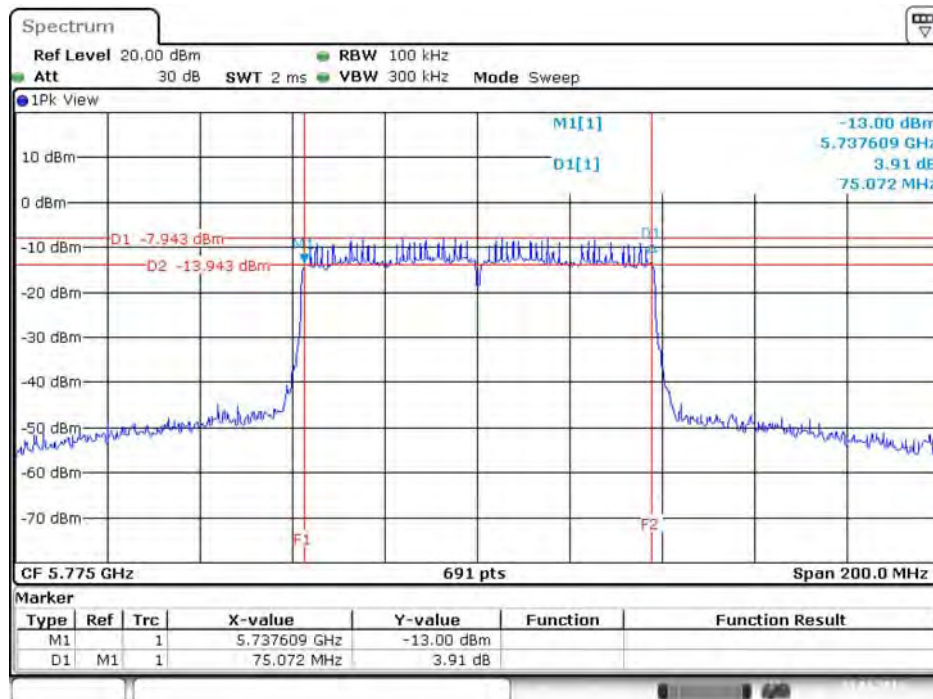
Date: 21.JAN.2016 00:37:30

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



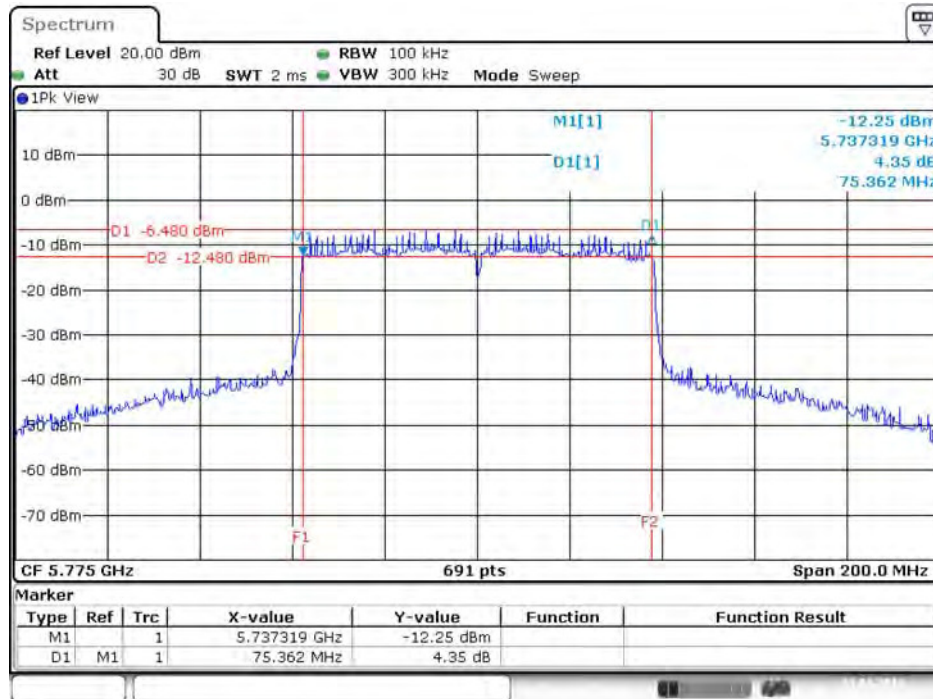
Date: 21.JAN.2016 00:36:49

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



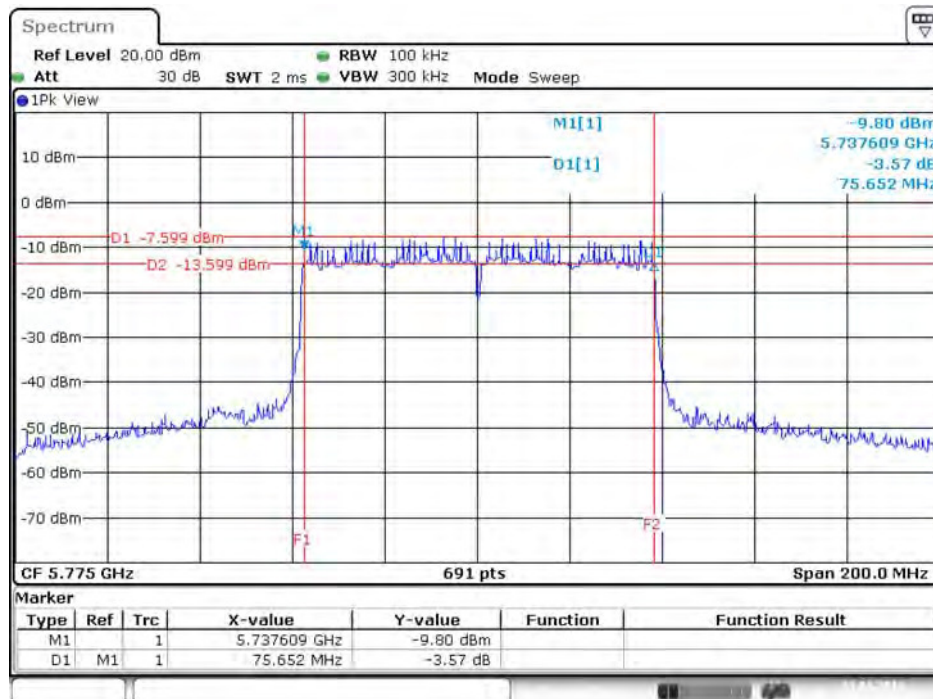
Date: 21.JAN.2016 00:34:51

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



Date: 21.JAN.2016 00:35:06

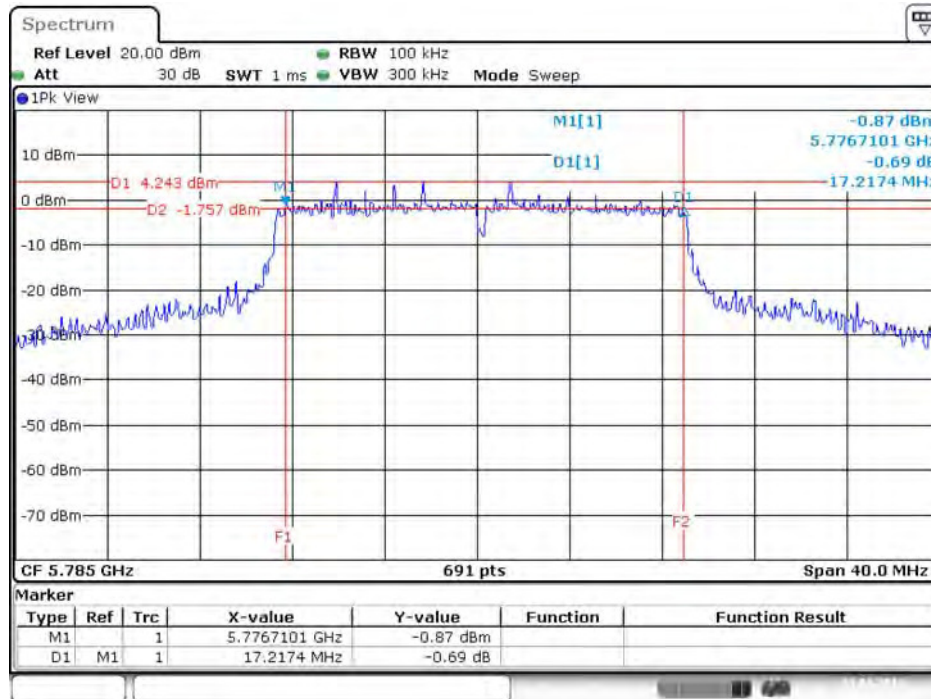
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 / 5775 MHz



Date: 21.JAN.2016 00:35:20

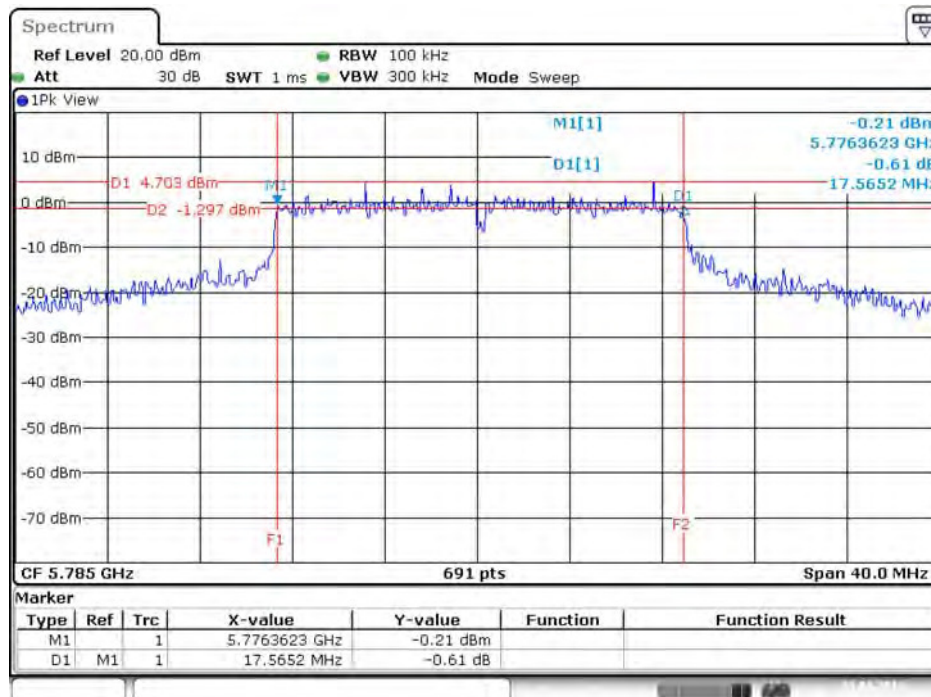
<For Beamforming Mode>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 / 5785 MHz



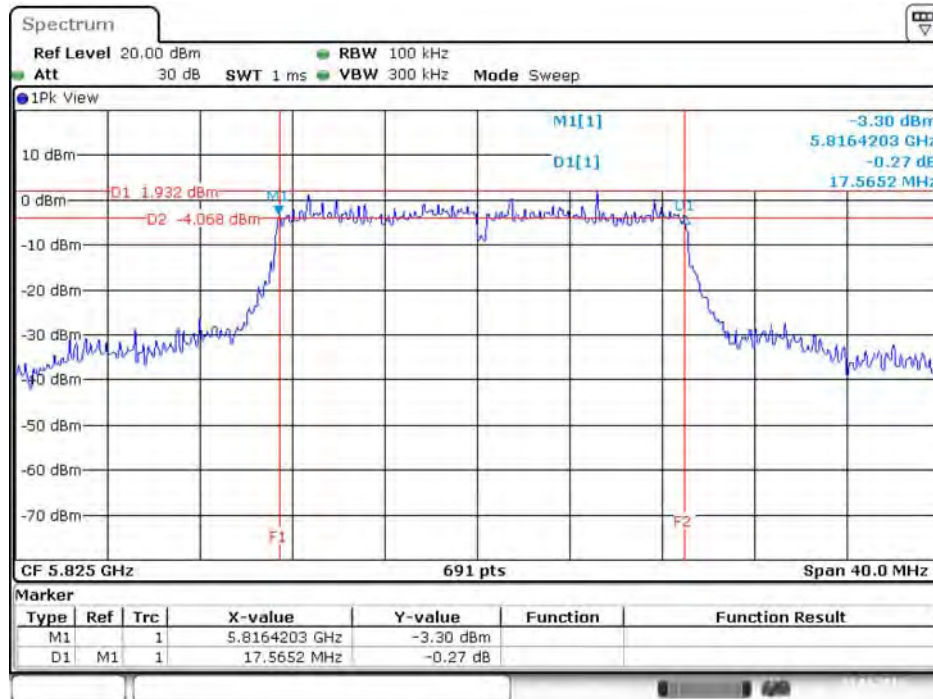
Date: 21.JAN.2016 00:24:47

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 2 / 5785 MHz



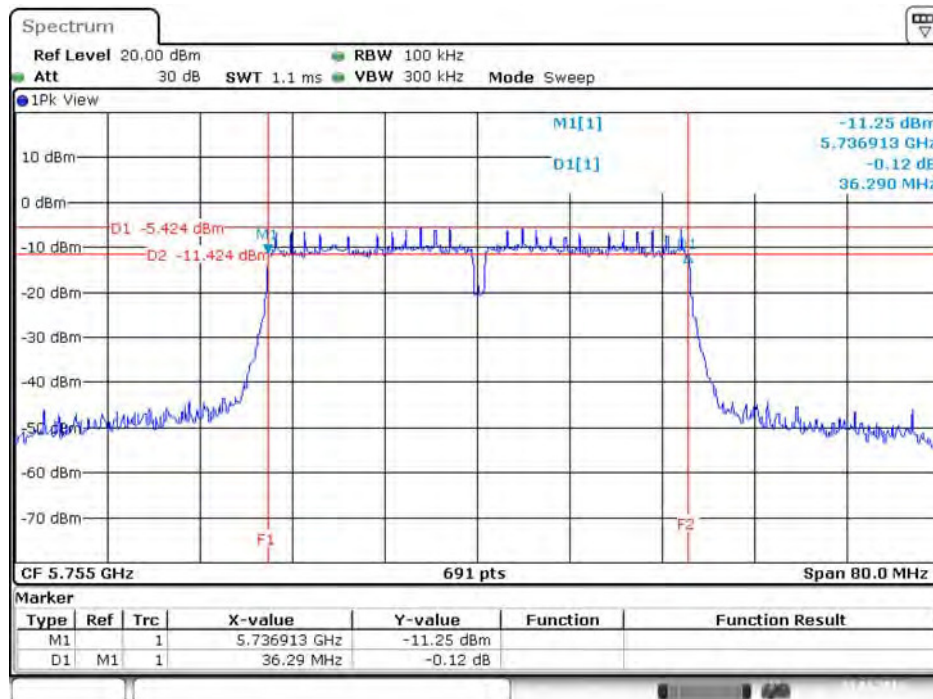
Date: 21.JAN.2016 00:24:32

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



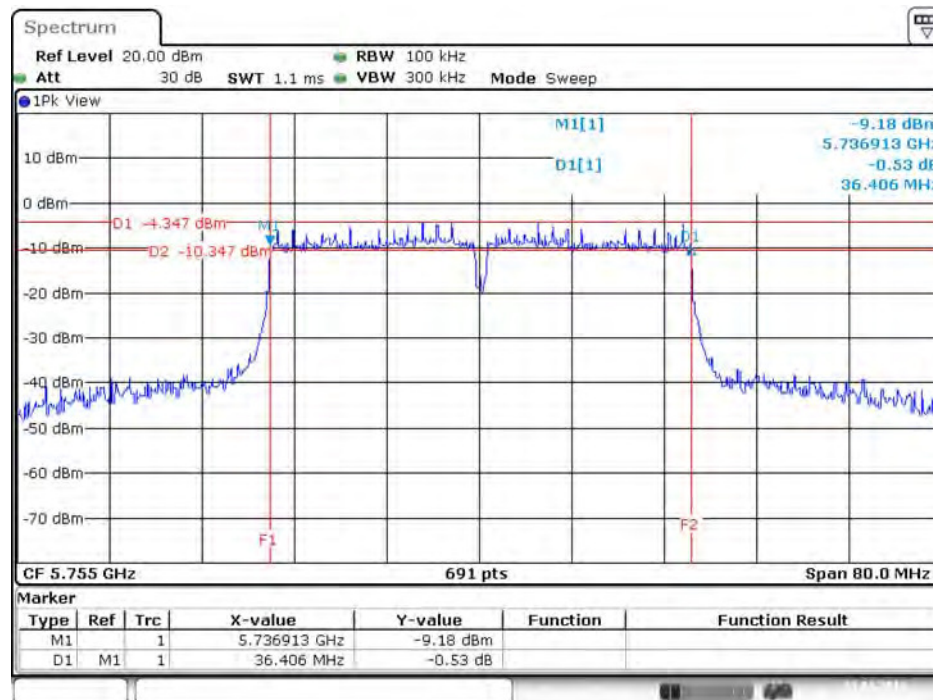
Date: 21.JAN.2016 00:23:40

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



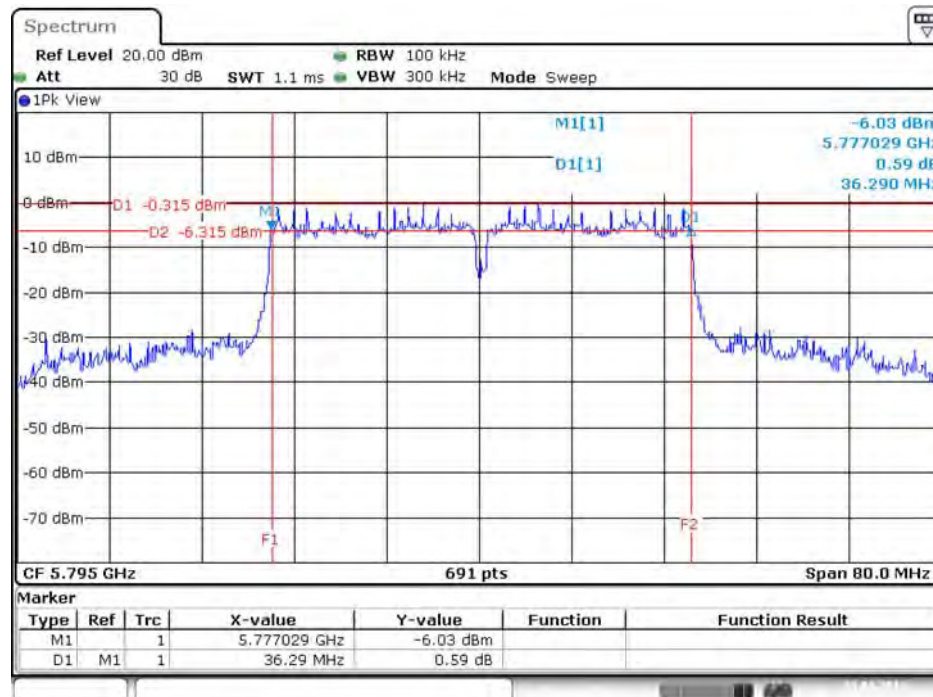
Date: 21.JAN.2016 00:29:01

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



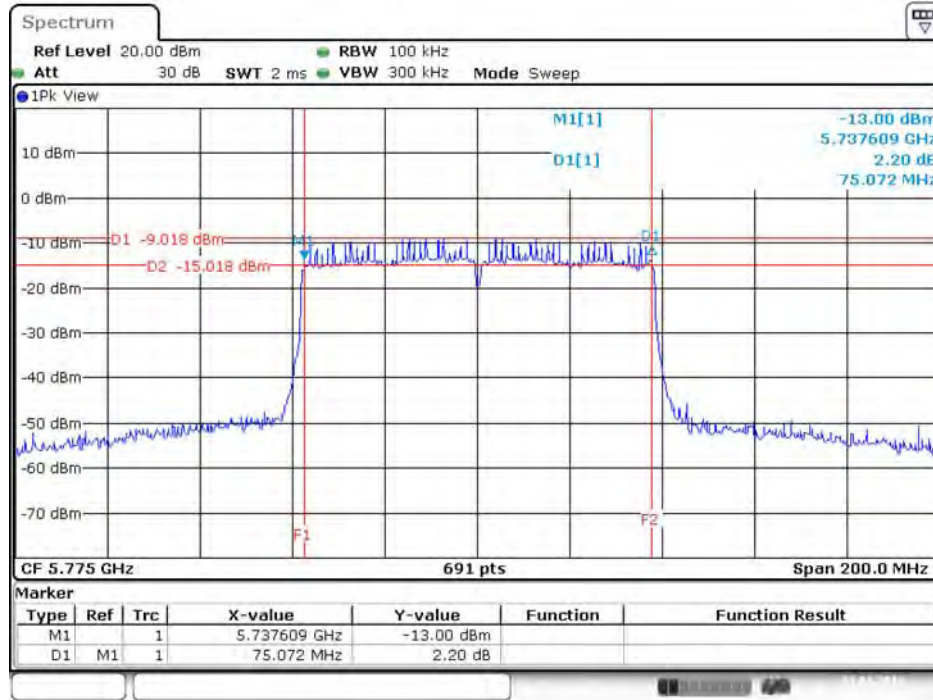
Date: 21.JAN.2016 00:28:49

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



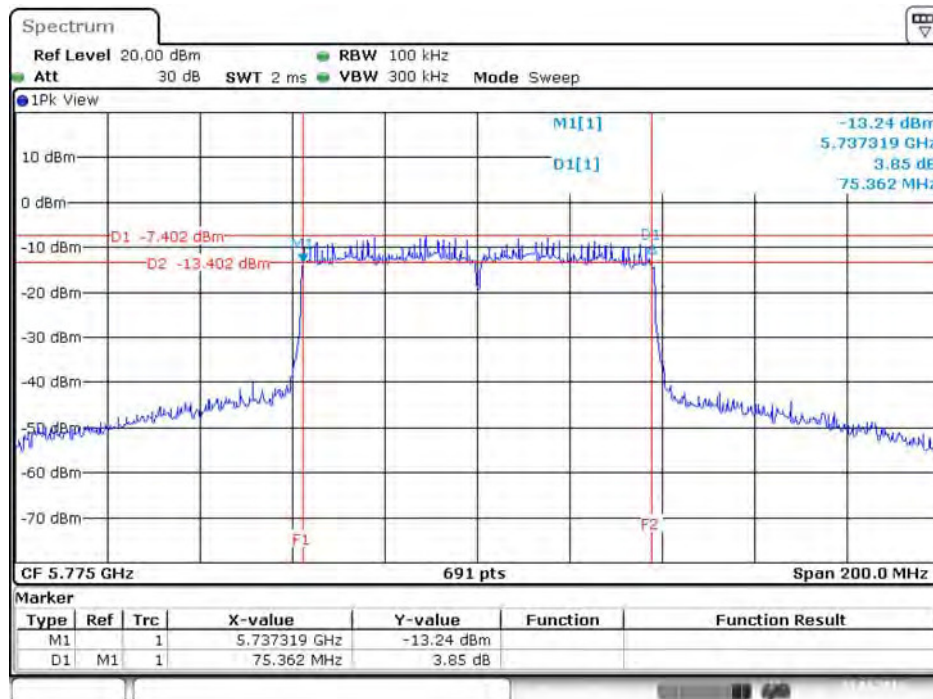
Date: 21.JAN.2016 00:30:07

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



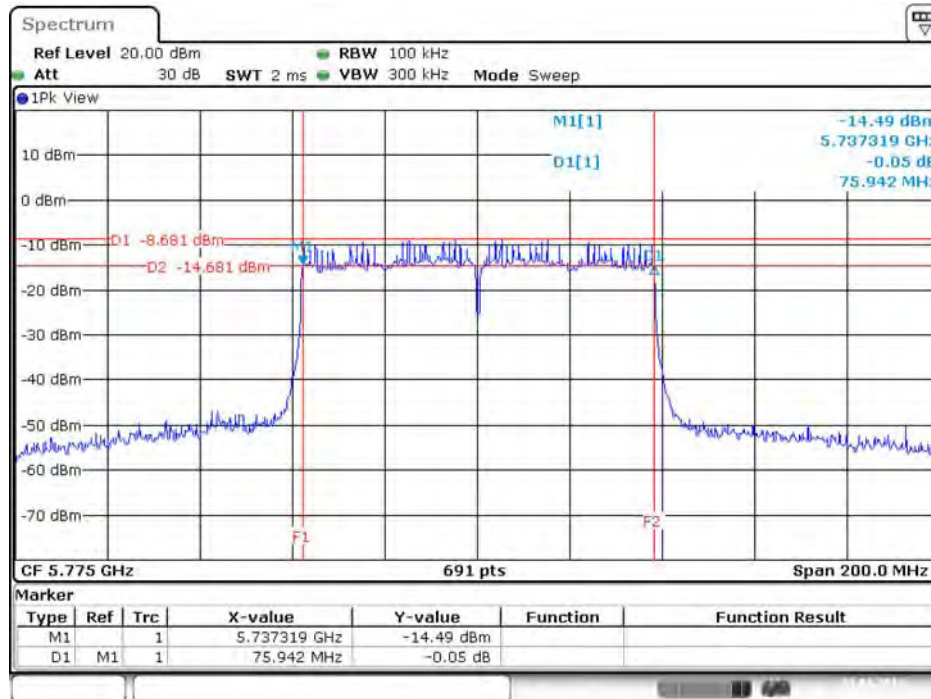
Date: 21.JAN.2016 00:32:22

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



Date: 21.JAN.2016 00:32:09

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



Date: 21.JAN.2016 00:31:55

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

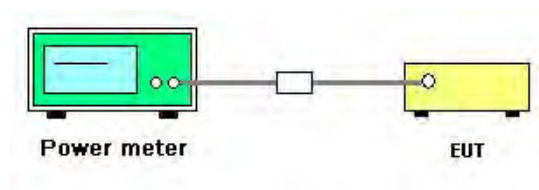
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	24°C	Humidity	59%
Test Engineer	Peter Wu	Test Date	Jan. 14, 2016 ~ Jan. 21, 2016

<For Non-Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11a	5745 MHz	15.09	16.62	14.81	20.35	30.00	Complies
	5785 MHz	21.29	19.88	20.32	25.31	30.00	Complies
	5825 MHz	19.87	19.65	19.34	24.40	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	14.59	15.97	14.42	19.82	30.00	Complies
	5785 MHz	21.04	20.62	20.32	25.44	30.00	Complies
	5825 MHz	16.75	17.81	16.55	21.84	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	13.60	14.02	12.84	18.28	30.00	Complies
	5795 MHz	17.86	19.09	17.54	22.99	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	12.38	12.81	12.17	17.23	30.00	Complies

<For Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT20	5745 MHz	12.68	14.03	12.29	17.84	25.43	Complies
	5785 MHz	19.08	20.35	18.43	24.13	25.43	Complies
	5825 MHz	16.75	17.81	16.55	21.84	25.43	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	11.67	12.51	11.14	16.58	25.43	Complies
	5795 MHz	16.71	17.76	16.29	21.74	25.43	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	11.21	11.91	10.92	16.14	25.43	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57\text{dBi}$, so limit = $30 - (10.57 - 6) = 25.43$ dBm.

4.4. Power Spectral Density Measurement

4.4.1. Limit

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

	Frequency Band	Limit
<input checked="" type="checkbox"/>	5.725~5.85 GHz	30 dBm/500kHz

4.4.2. Measuring Instruments and Setting

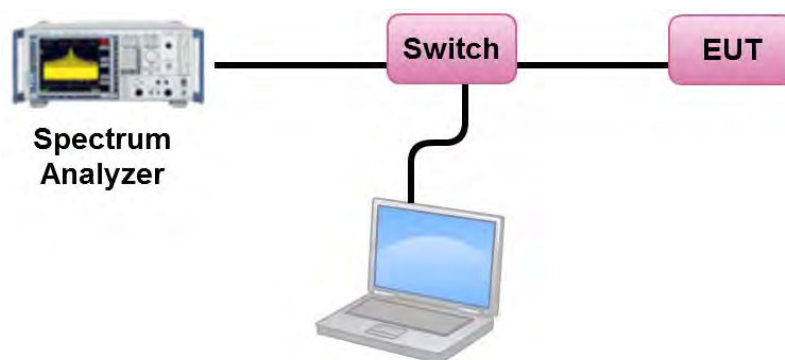
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add $10\log(500\text{kHz}/\text{RBW})$ and the final result should ≤ 30 dBm.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	24°C	Humidity	59%
Test Engineer	Peter Wu		

<For Non-Beamforming Mode>

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.02	-3.01	4.01	25.43	Complies
157	5785 MHz	11.74	-3.01	8.73	25.43	Complies
165	5825 MHz	11.09	-3.01	8.08	25.43	Complies

$$\text{Note: } \textit{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{dBi, so limit} = 30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz.}$$

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	6.48	-3.01	3.47	25.43	Complies
157	5785 MHz	12.04	-3.01	9.03	25.43	Complies
165	5825 MHz	8.48	-3.01	5.47	25.43	Complies

$$\text{Note: } \textit{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{dBi, so limit} = 30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz.}$$

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	2.07	-3.01	-0.94	25.43	Complies
159	5795 MHz	6.85	-3.01	3.84	25.43	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{dBi}$, so limit = $30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz}$.

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-1.85	-3.01	-4.86	25.43	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{dBi}$, so limit = $30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz}$.

<For Beamforming Mode>

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	4.52	-3.01	1.51	25.43	Complies
157	5785 MHz	10.78	-3.01	7.77	25.43	Complies
165	5825 MHz	8.46	-3.01	5.45	25.43	Complies

$$\text{Note: } \textit{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{ dBi, so limit} = 30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz.}$$

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	0.45	-3.01	-2.56	25.43	Complies
159	5795 MHz	5.56	-3.01	2.55	25.43	Complies

$$\text{Note: } \textit{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{ dBi, so limit} = 30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz.}$$

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-2.92	-3.01	-5.93	25.43	Complies

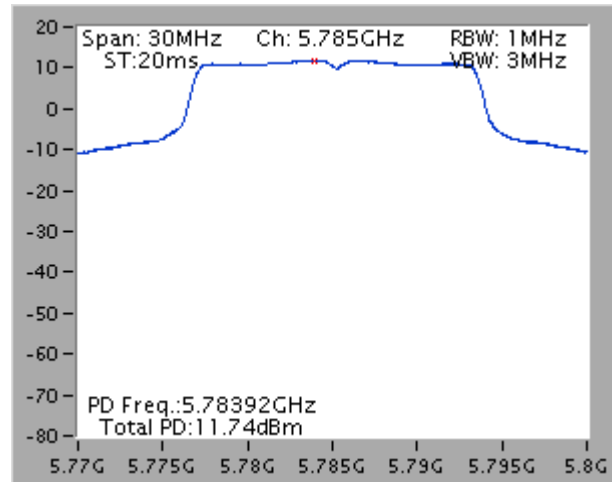
$$\text{Note: } \textit{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 10.57 \text{ dBi, so limit} = 30 - (10.57 - 6) = 25.43 \text{ dBm/500kHz.}$$

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

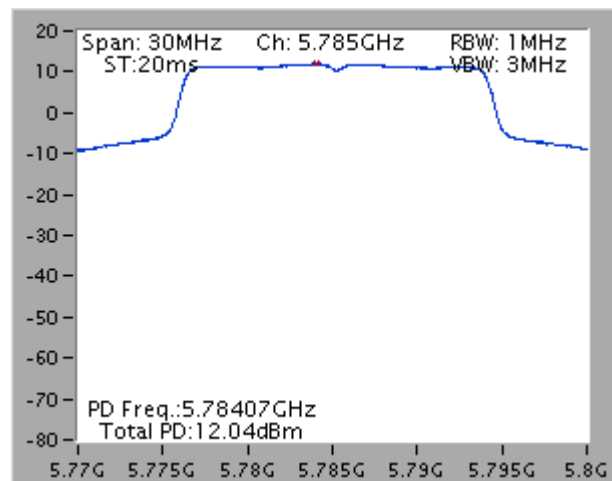
For plots, only the channel with worse result was shown.

<For Non-Beamforming Mode>

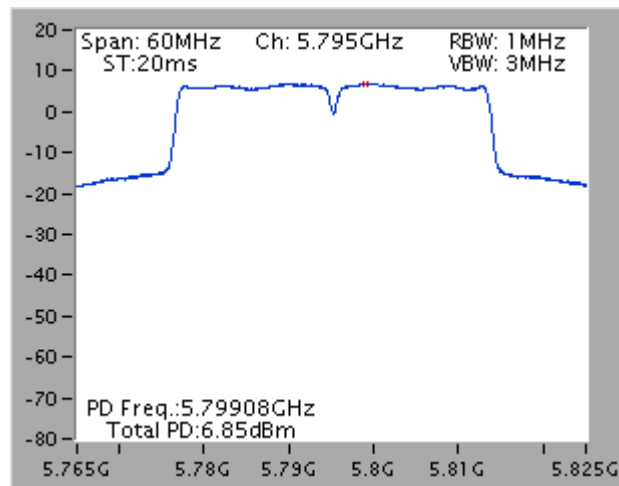
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 / 5785 MHz



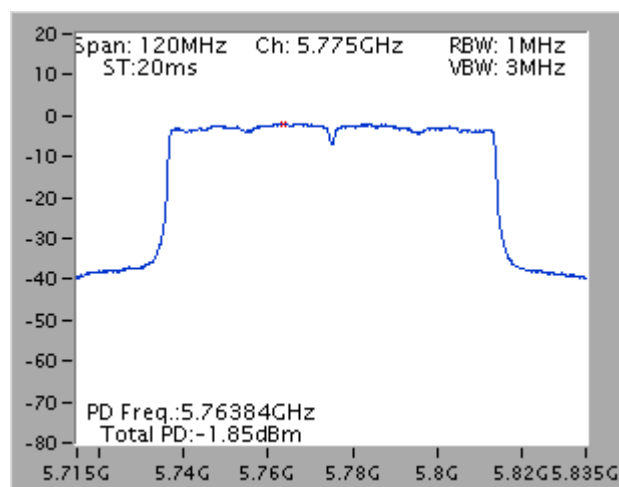
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5785 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5755 MHz

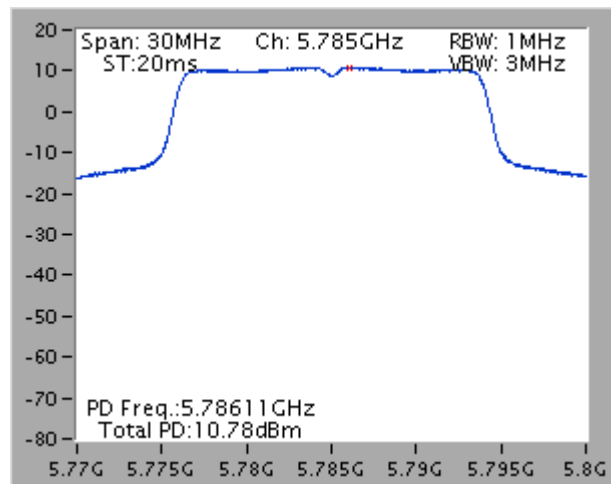


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 5775 MHz

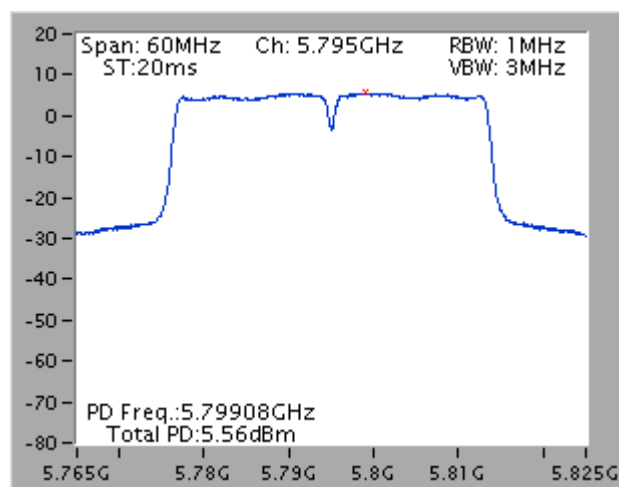


<For Beamforming Mode>

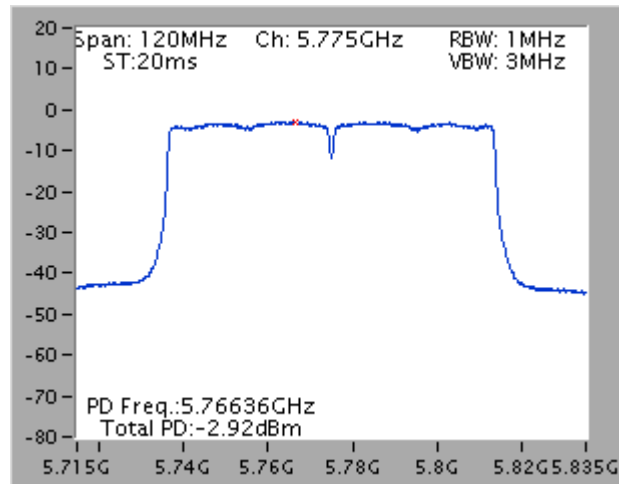
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 /
5785 MHz



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



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



4.5. Radiated Emissions Measurement

4.5.1. Limit

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

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

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

4.5.2. Measuring Instruments and Setting

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

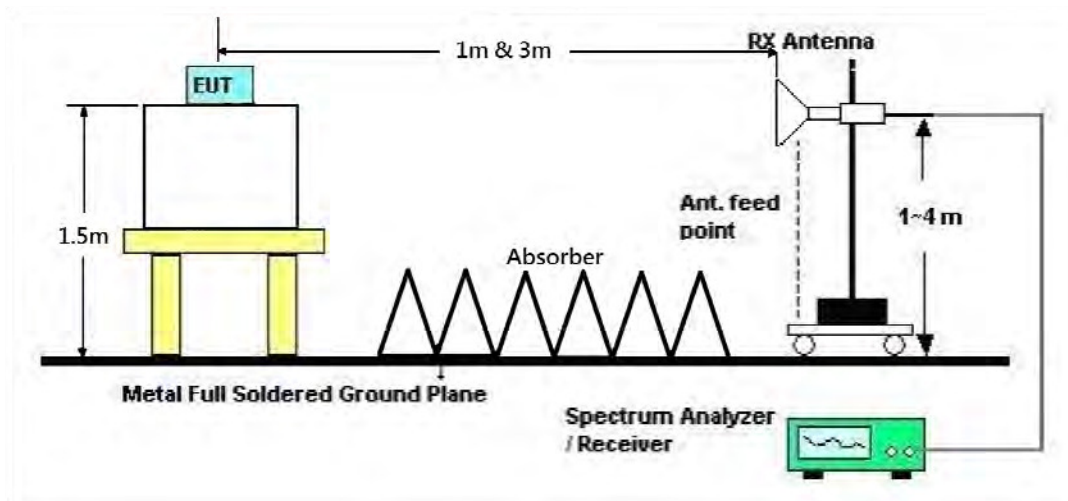
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for peak

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

4.5.3. Test Procedures

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

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

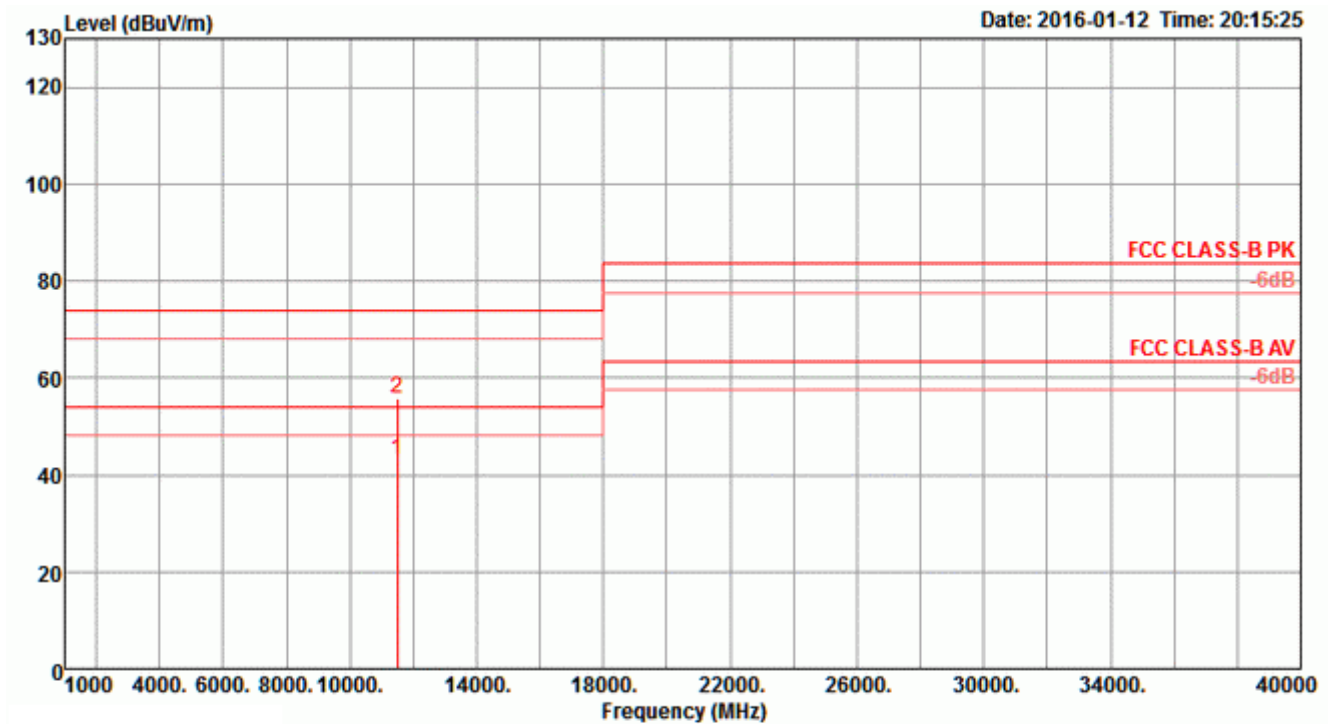
The EUT was programmed to be in beamforming transmitting mode.

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

<For Non-Beamforming Mode>

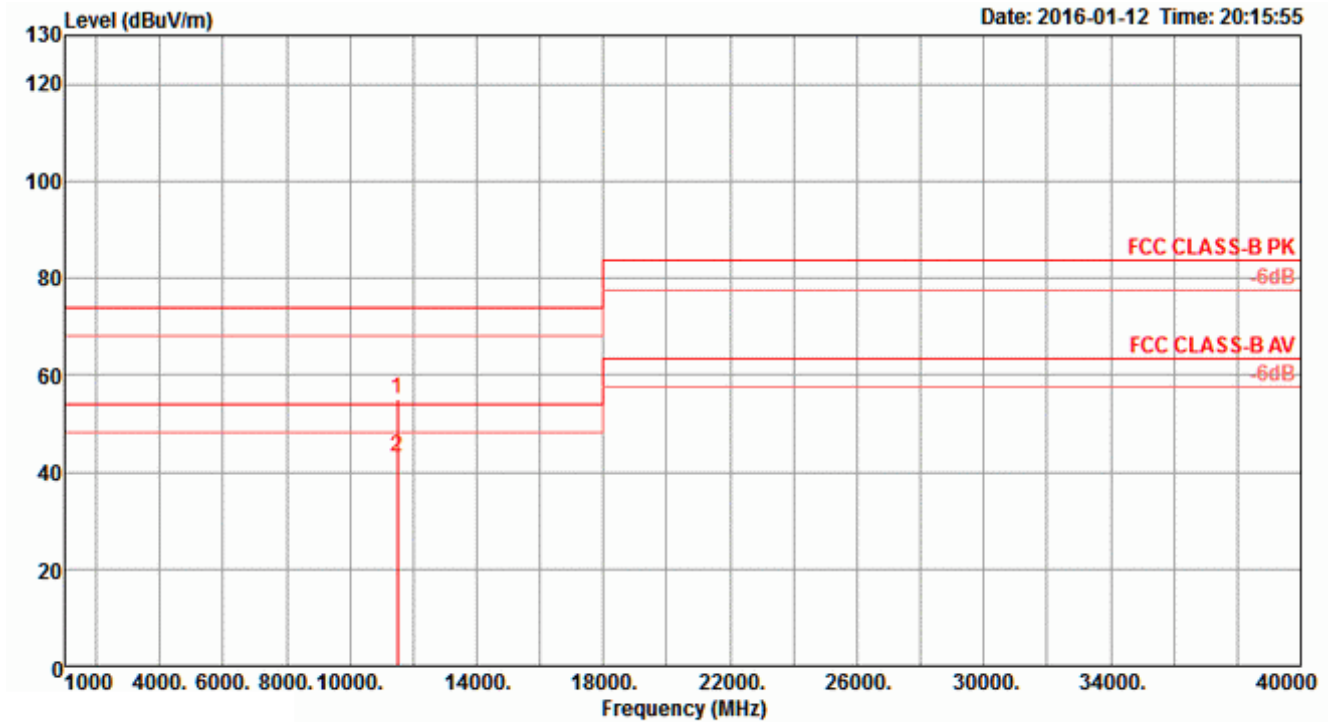
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11483.56	43.27	54.00	-10.73	29.73	9.66	38.50	34.62	126	188	Average	HORIZONTAL
2	11491.76	55.77	74.00	-18.23	42.22	9.67	38.50	34.62	126	188	Peak	HORIZONTAL

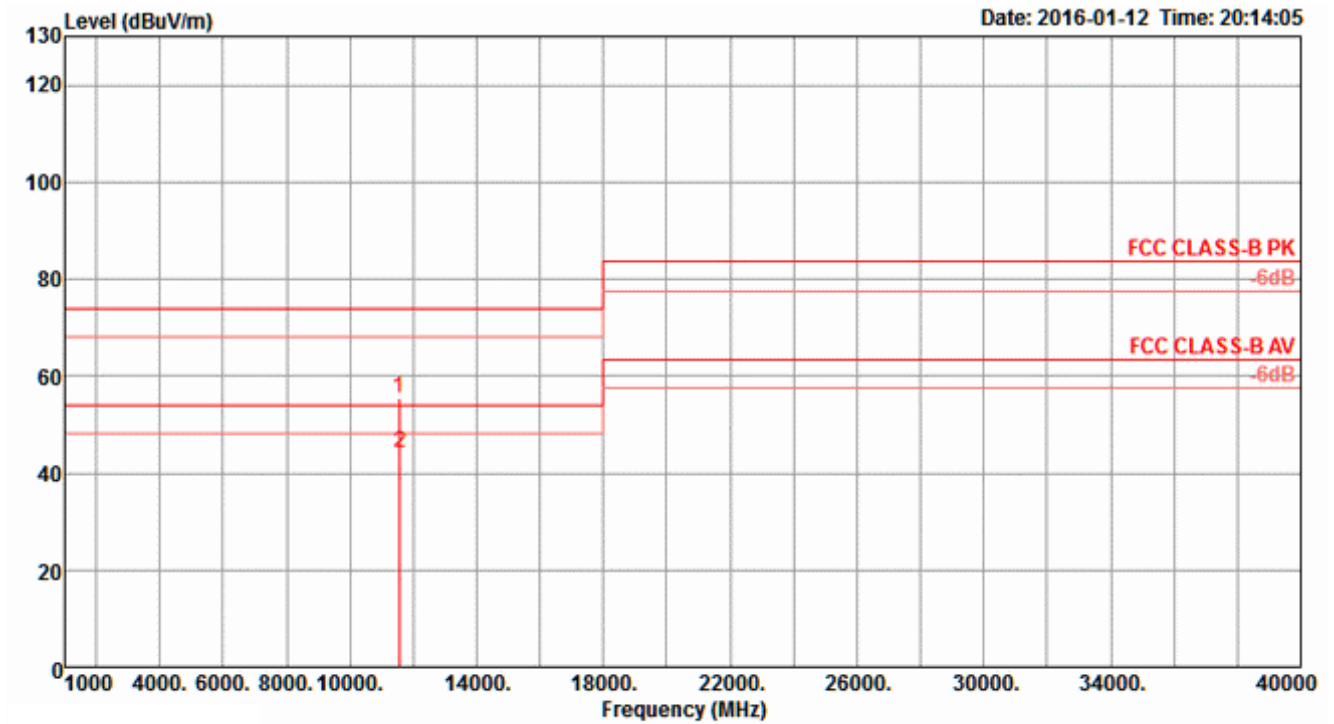
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11483.11	54.94	74.00	-19.06	41.40	9.66	38.50	34.62	147	166	Peak	VERTICAL
2	11490.93	43.14	54.00	-10.86	29.59	9.67	38.50	34.62	147	166	Average	VERTICAL

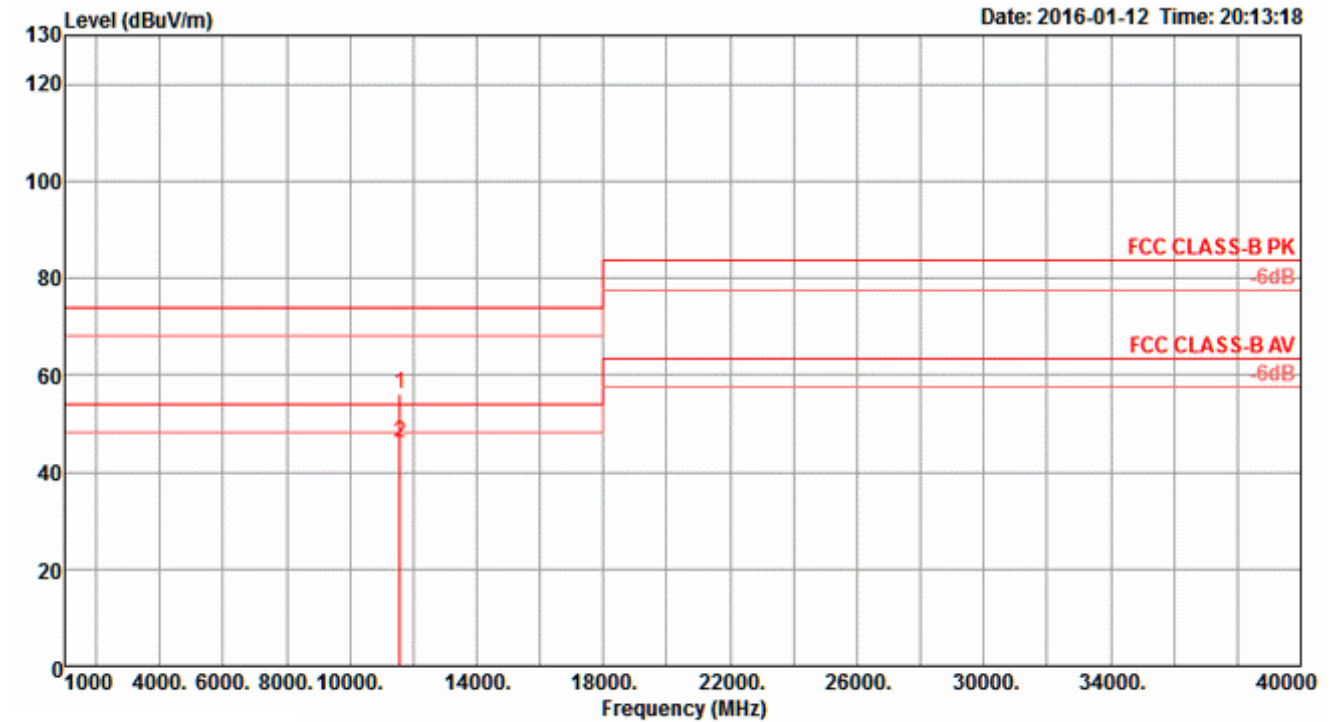
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11560.19	55.36	74.00	-18.64	41.77	9.71	38.53	34.65	104	178 Peak	HORIZONTAL
2	11570.00	44.08	54.00	-9.92	30.49	9.71	38.53	34.65	104	178 Average	HORIZONTAL

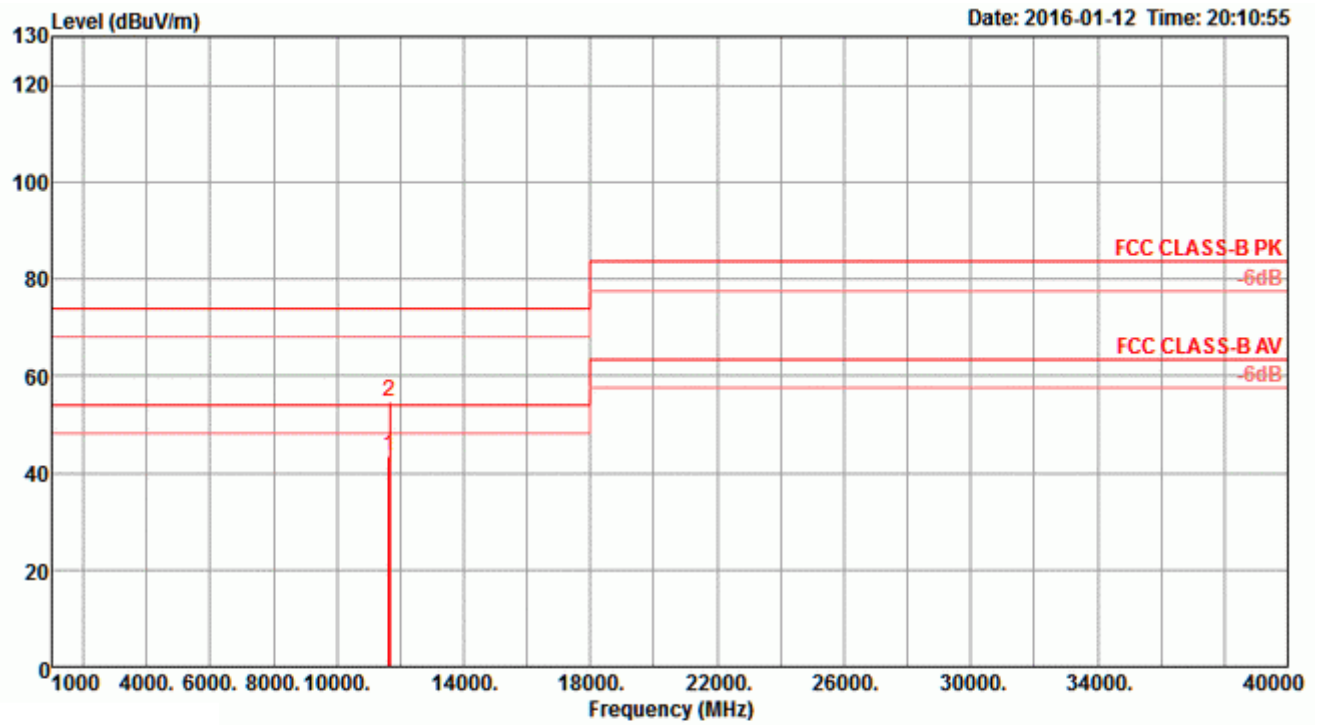
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11566.12	56.29	74.00	-17.71	42.70	9.71	38.53	34.65	12	193	Peak	VERTICAL
2	11571.54	46.02	54.00	-7.98	32.43	9.71	38.53	34.65	12	193	Average	VERTICAL

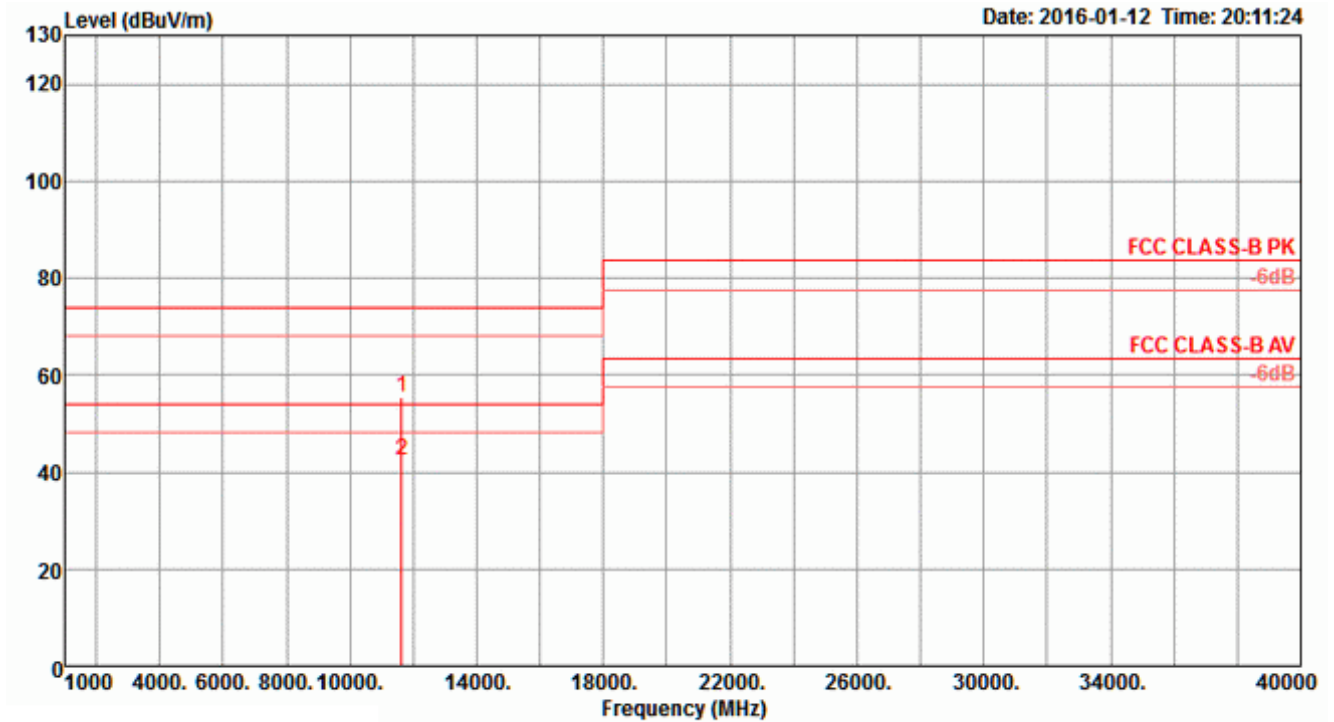
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11645.51	43.45	54.00	-10.55	29.83	9.75	38.55	34.68	241	187 Average	HORIZONTAL
2	11659.78	54.85	74.00	-19.15	41.19	9.77	38.57	34.68	241	187 Peak	HORIZONTAL

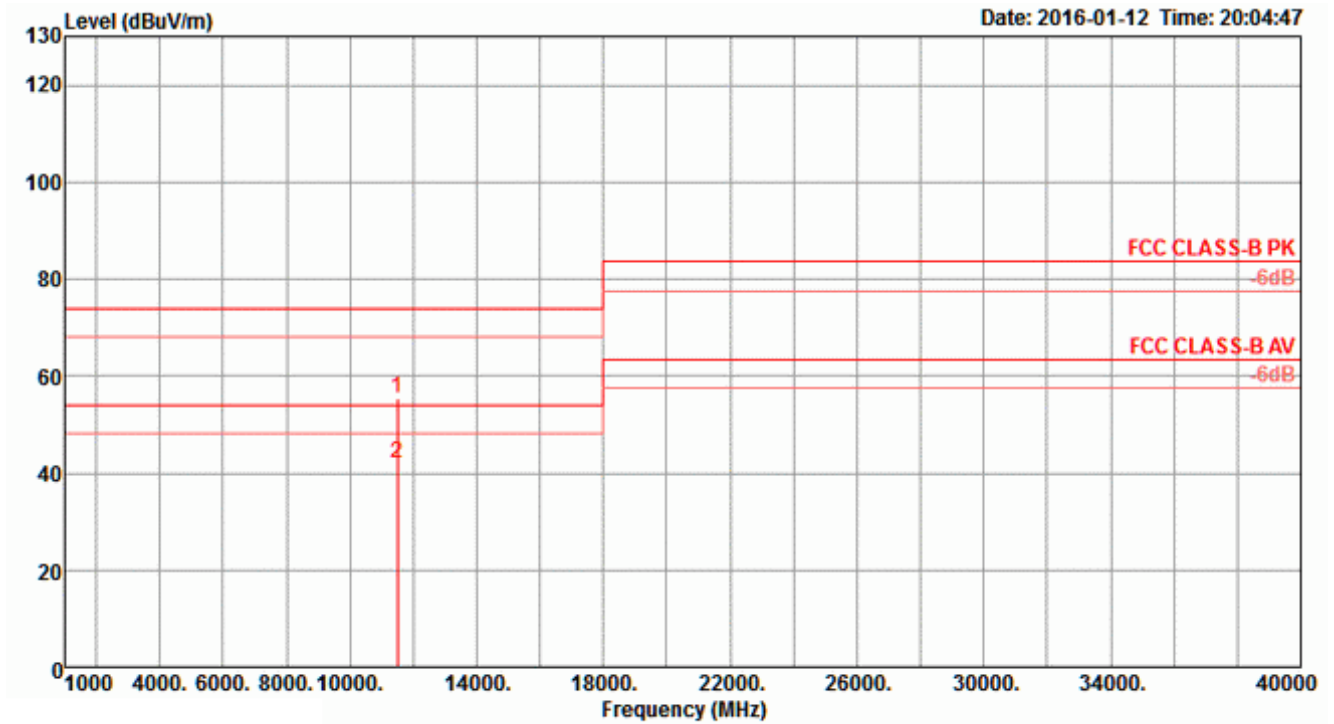
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11643.69	55.30	74.00	-18.70	41.68	9.75	38.55	34.68	230	193	Peak	VERTICAL
2	11647.72	42.33	54.00	-11.67	28.71	9.75	38.55	34.68	230	193	Average	VERTICAL

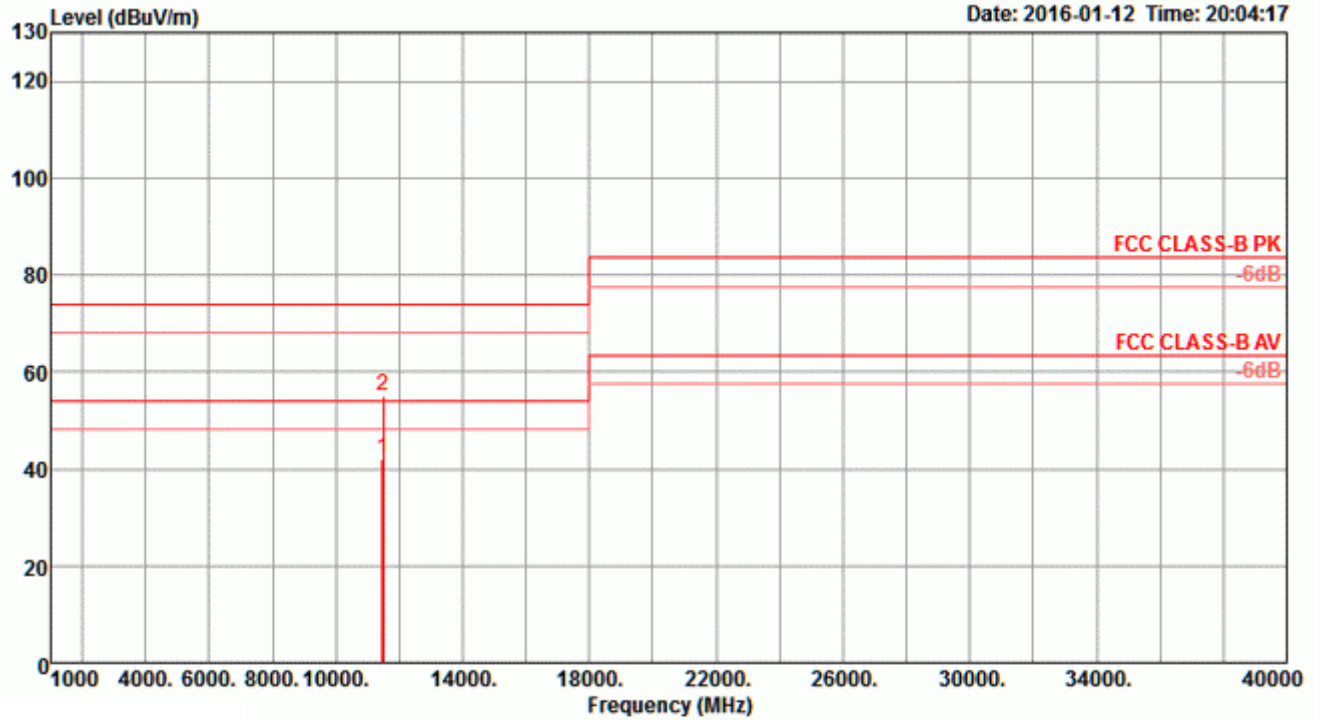
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	11483.81	55.41	74.00	-18.59	41.86	9.67	38.50	34.62	232	131	Peak	HORIZONTAL
2	11485.51	42.17	54.00	-11.83	28.62	9.67	38.50	34.62	232	131	Average	HORIZONTAL

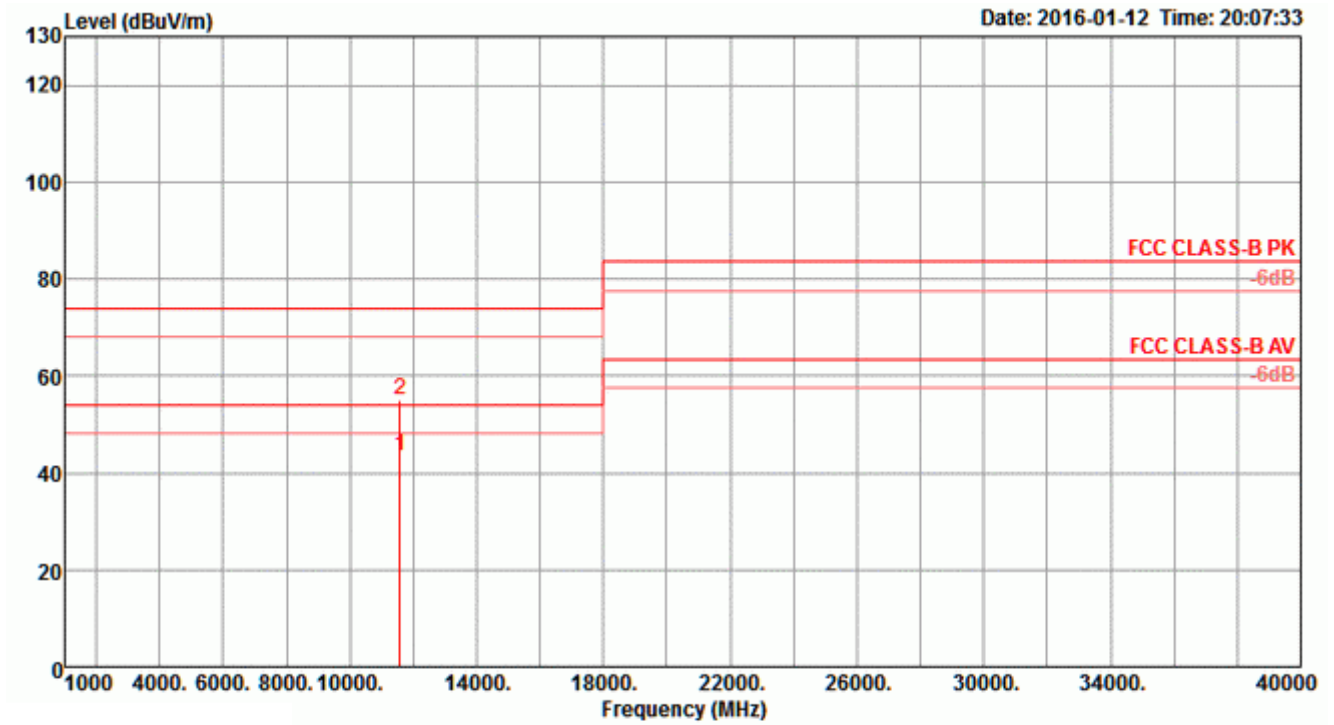
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	11481.15	42.12	54.00	-11.88	28.58	9.66	38.50	34.62	267	129	Average	VERTICAL
2	11486.79	54.90	74.00	-19.10	41.35	9.67	38.50	34.62	267	129	Peak	VERTICAL

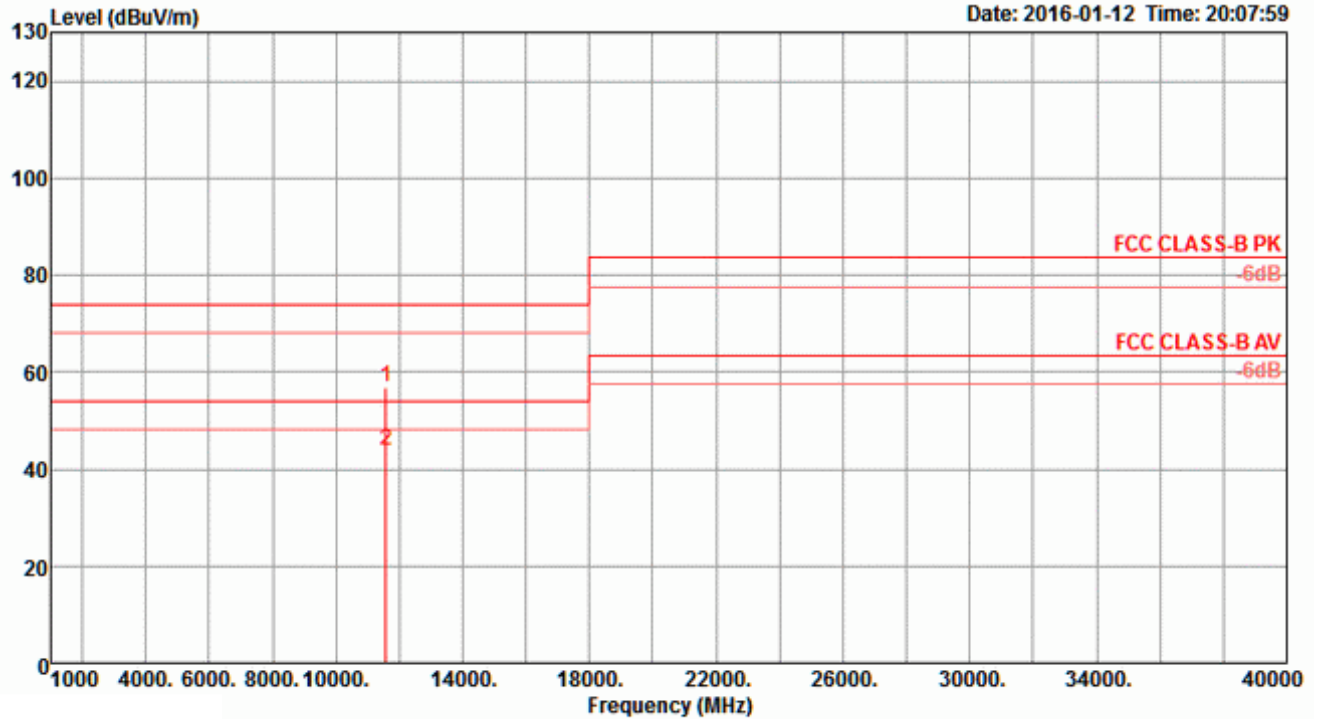
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11568.04	43.38	54.00	-10.62	29.79	9.71	38.53	34.65	334	158 Average	HORIZONTAL
2	11570.83	55.10	74.00	-18.90	41.51	9.71	38.53	34.65	334	158 Peak	HORIZONTAL

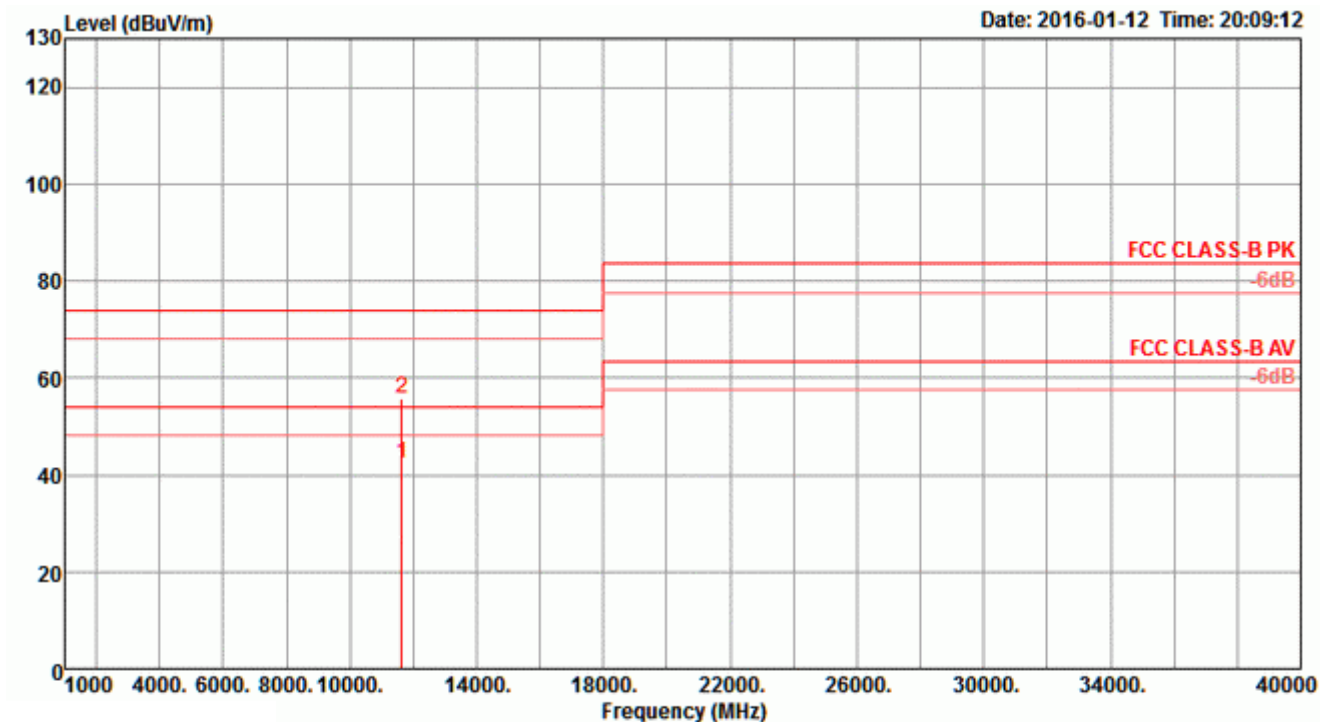
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11566.86	56.97	74.00	-17.03	43.38	9.71	38.53	34.65	278	205	Peak	VERTICAL
2	11570.83	43.90	54.00	-10.10	30.31	9.71	38.53	34.65	278	205	Average	VERTICAL

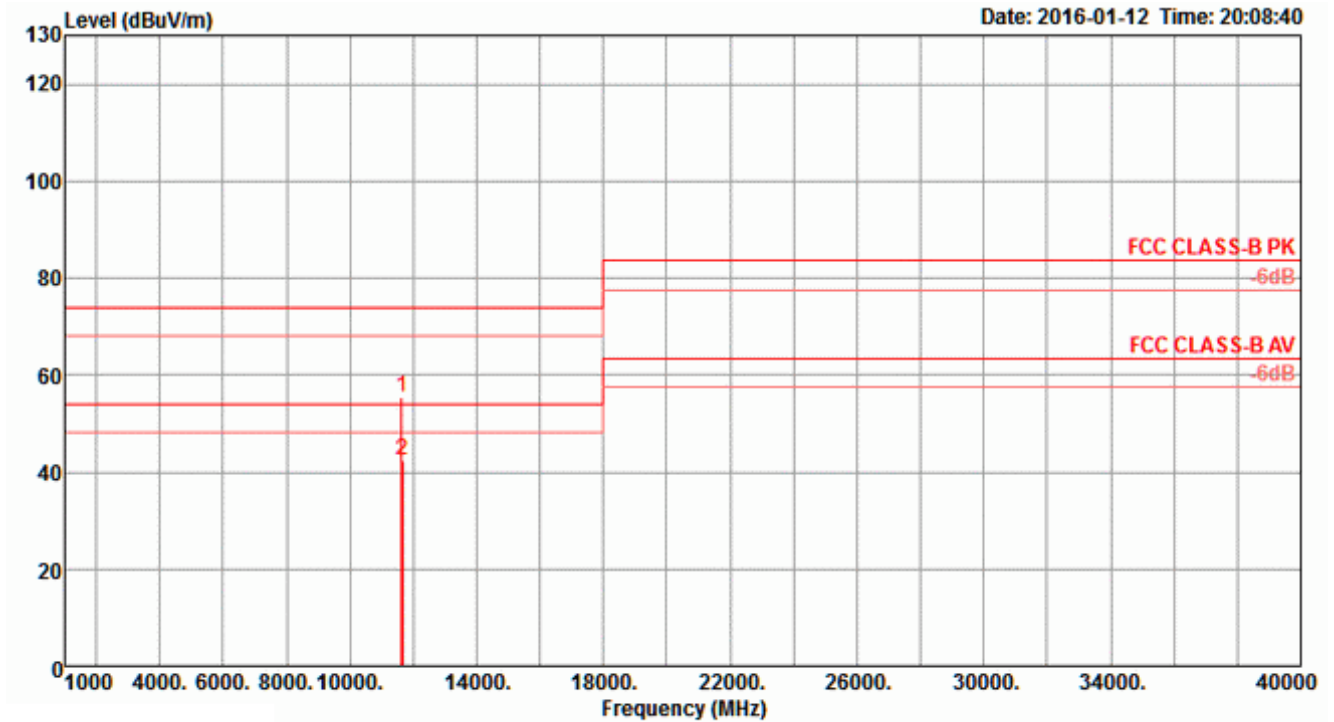
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11642.66	42.50	54.00	-11.50	28.88	9.75	38.55	34.68	250	186 Average	HORIZONTAL
2	11643.04	55.80	74.00	-18.20	42.18	9.75	38.55	34.68	250	186 Peak	HORIZONTAL

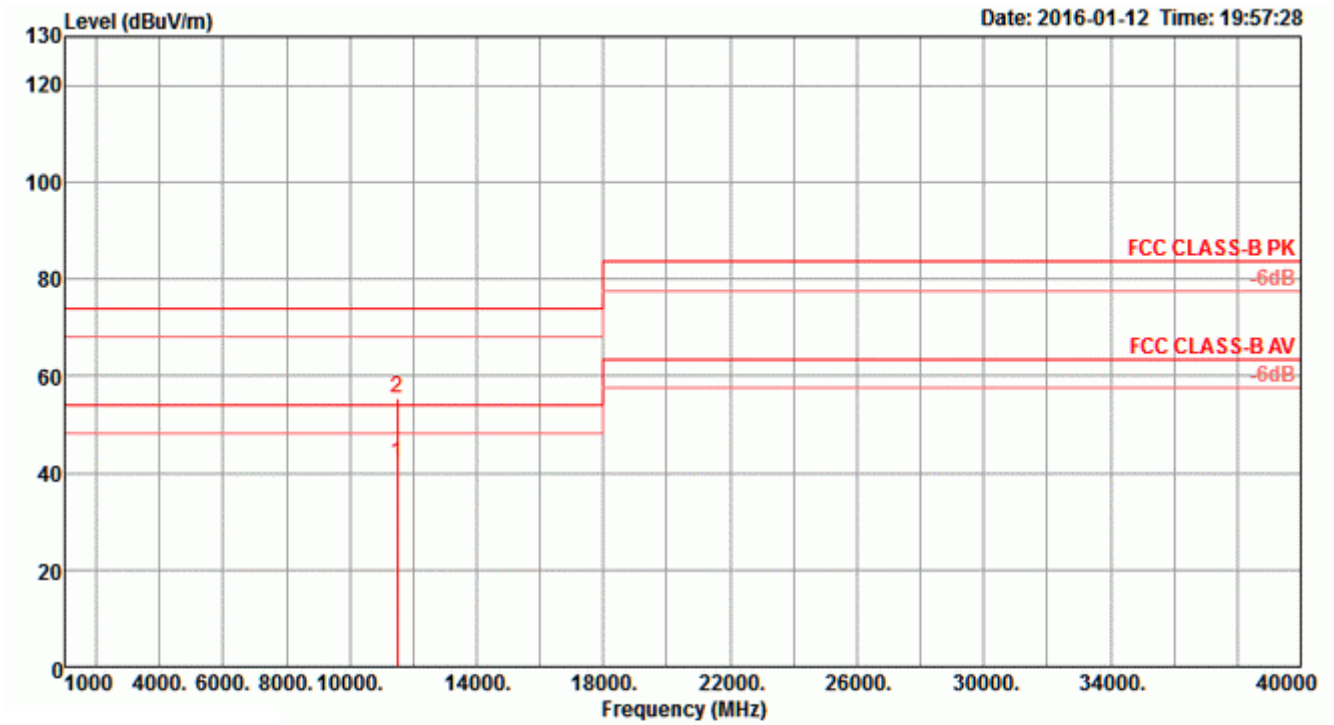
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11644.10	55.52	74.00	-18.48	41.90	9.75	38.55	34.68	259	195	Peak	VERTICAL
2	11651.96	42.40	54.00	-11.60	28.74	9.77	38.57	34.68	259	195	Average	VERTICAL

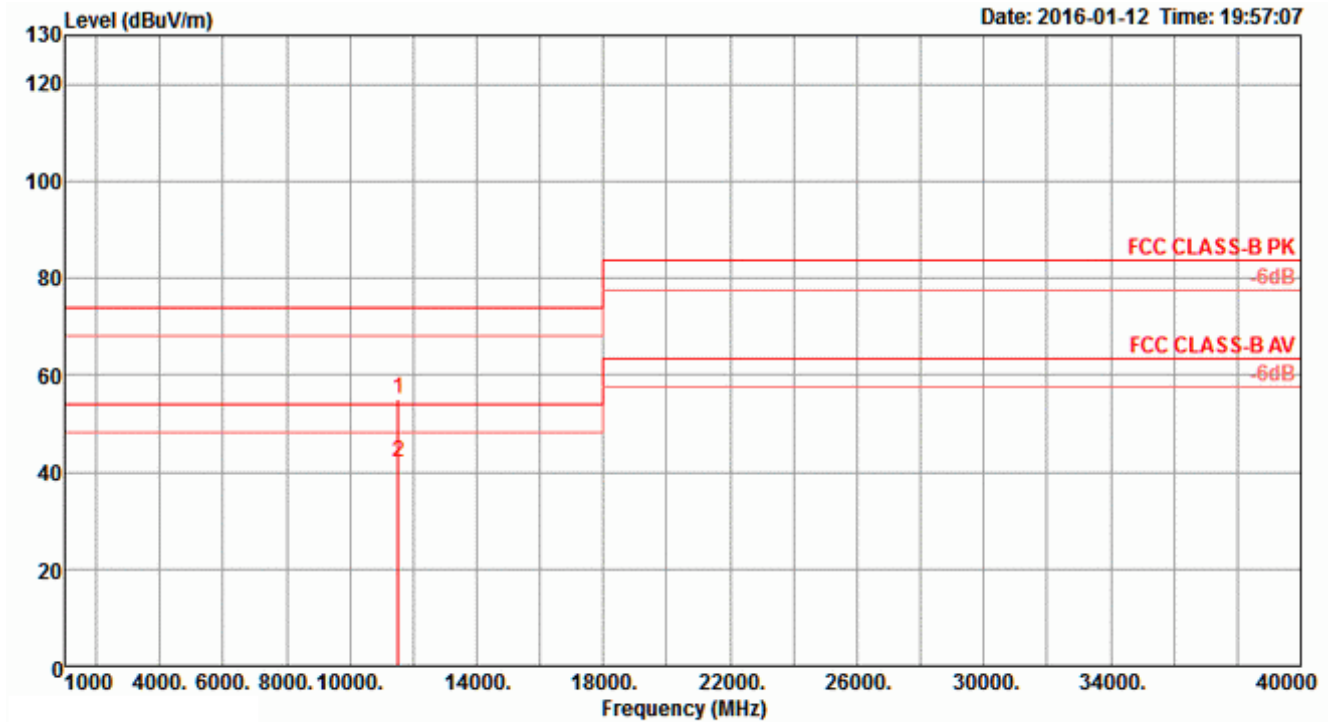
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	11501.73	42.02	54.00	-11.98	28.47	9.67	38.50	34.62	109	218	Average	HORIZONTAL
2	11506.54	55.47	74.00	-18.53	41.92	9.67	38.50	34.62	109	218	Peak	HORIZONTAL

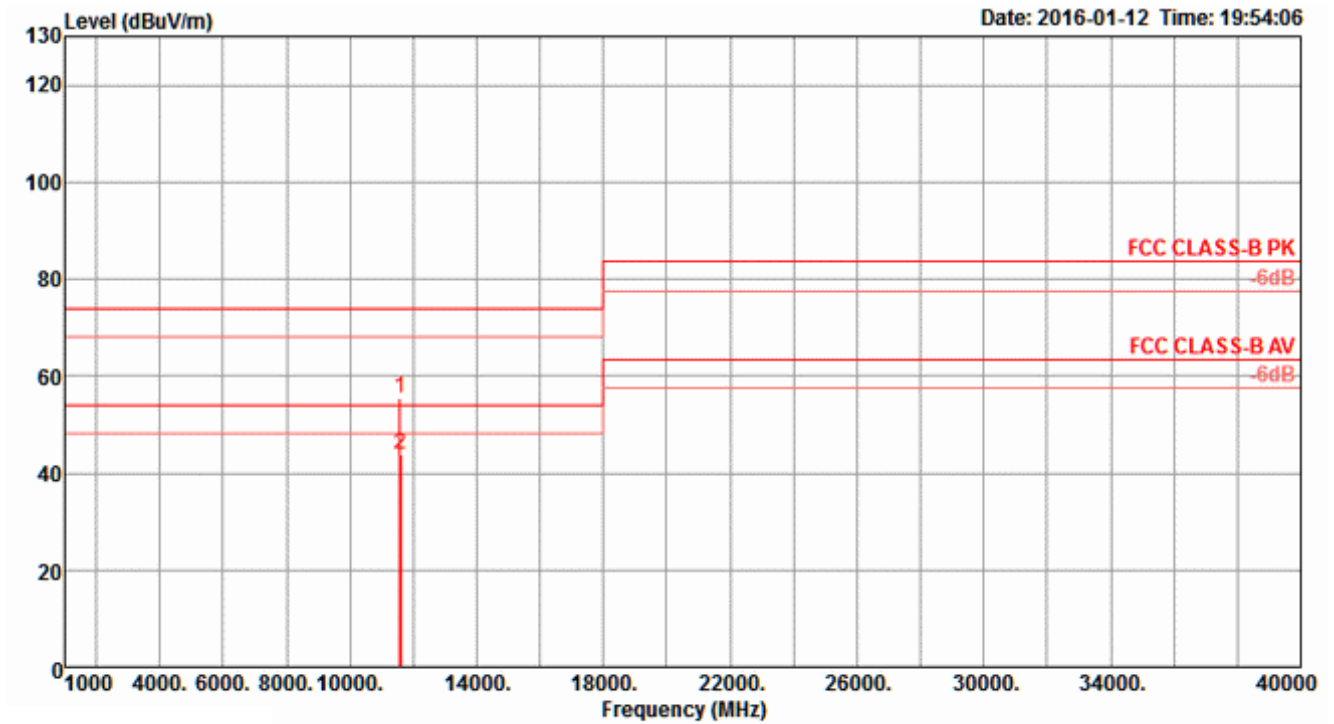
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11513.30	55.06	74.00	-18.94	41.52	9.67	38.50	34.63	101	213	Peak	VERTICAL
2	11516.03	42.05	54.00	-11.95	28.51	9.67	38.50	34.63	101	213	Average	VERTICAL

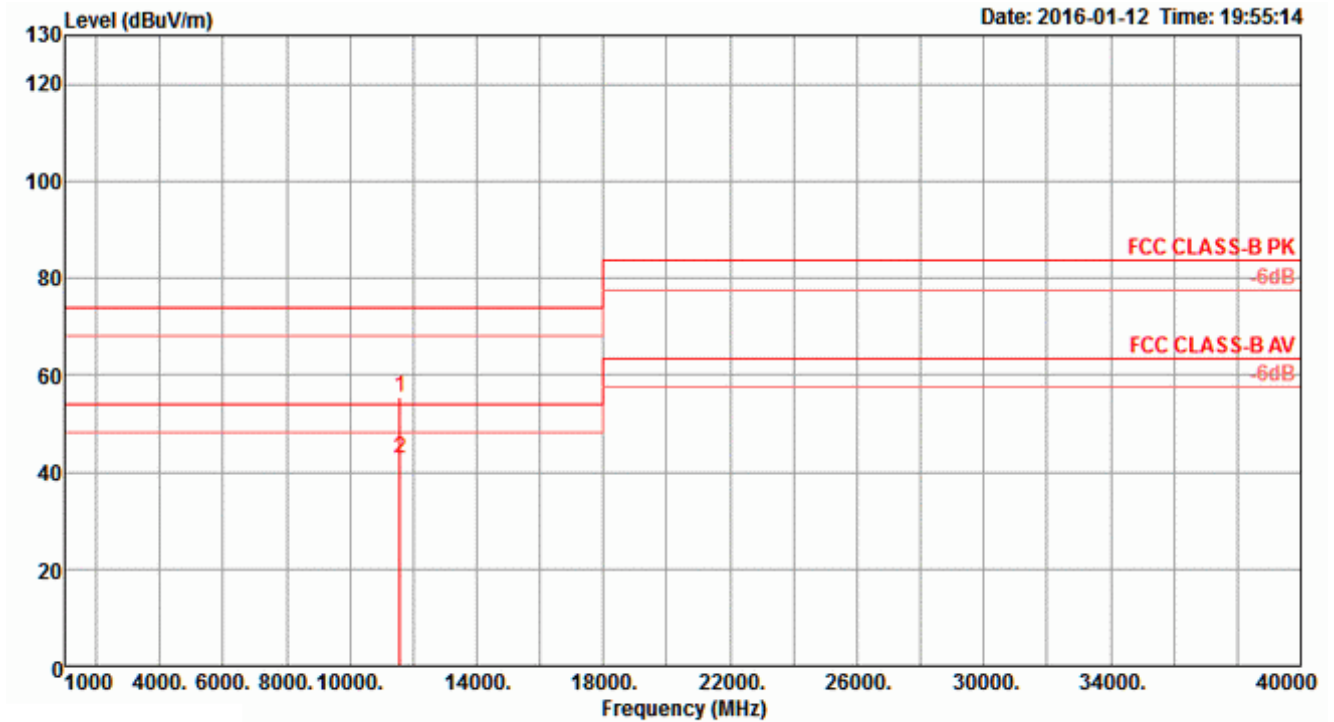
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	11582.72	55.51	74.00	-18.49	41.92	9.71	38.53	34.65	74	254	Peak	HORIZONTAL
2	11598.43	43.67	54.00	-10.33	30.06	9.73	38.54	34.66	74	254	Average	HORIZONTAL

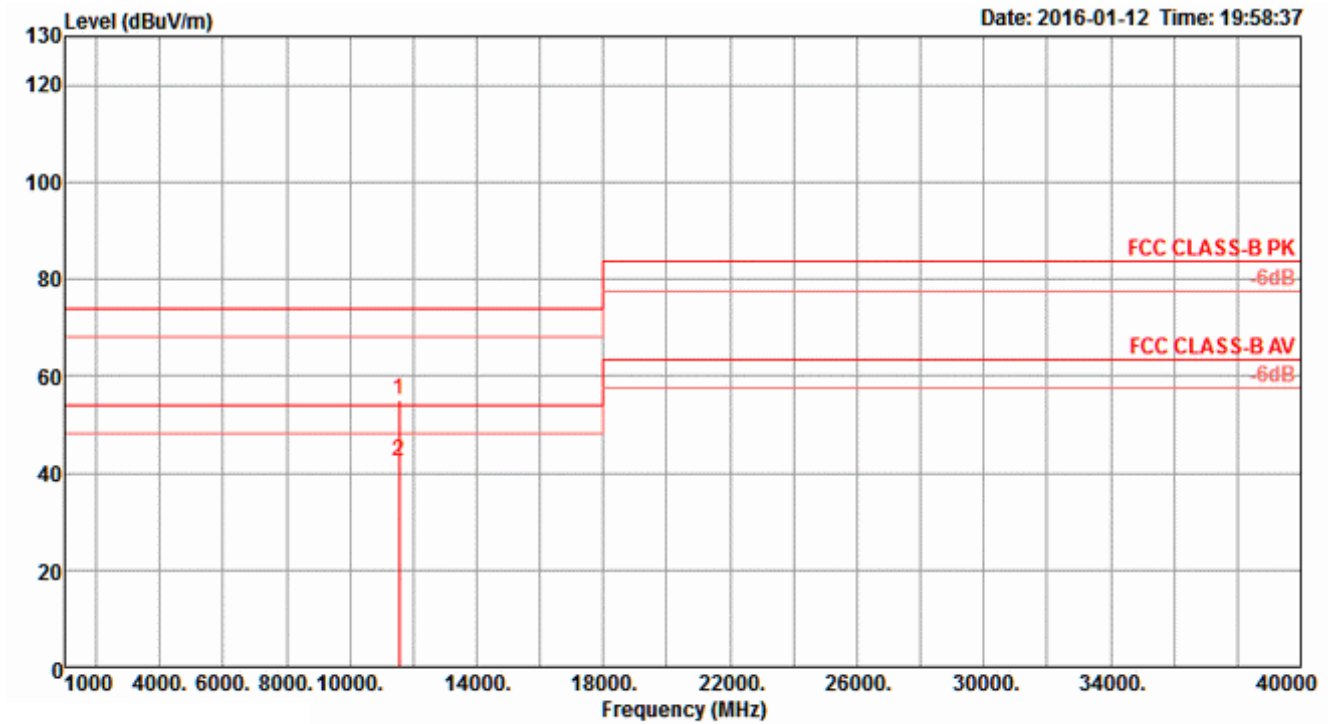
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11586.57	55.50	74.00	-18.50	41.89	9.73	38.54	34.66	97	224	Peak	VERTICAL
2	11588.56	42.83	54.00	-11.17	29.22	9.73	38.54	34.66	97	224	Average	VERTICAL

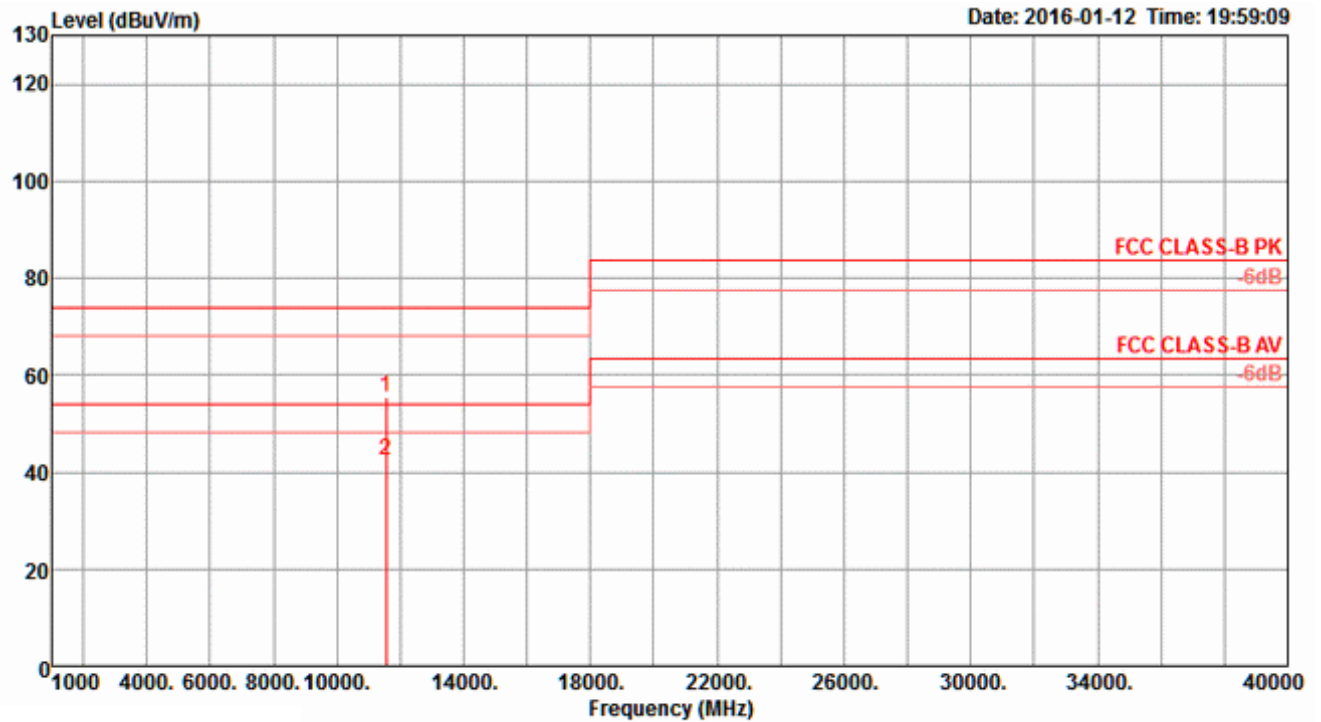
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	11547.15	55.09	74.00	-18.91	41.54	9.69	38.51	34.65	99	225	Peak	HORIZONTAL
2	11556.47	42.45	54.00	-11.55	28.86	9.71	38.53	34.65	99	225	Average	HORIZONTAL

Vertical

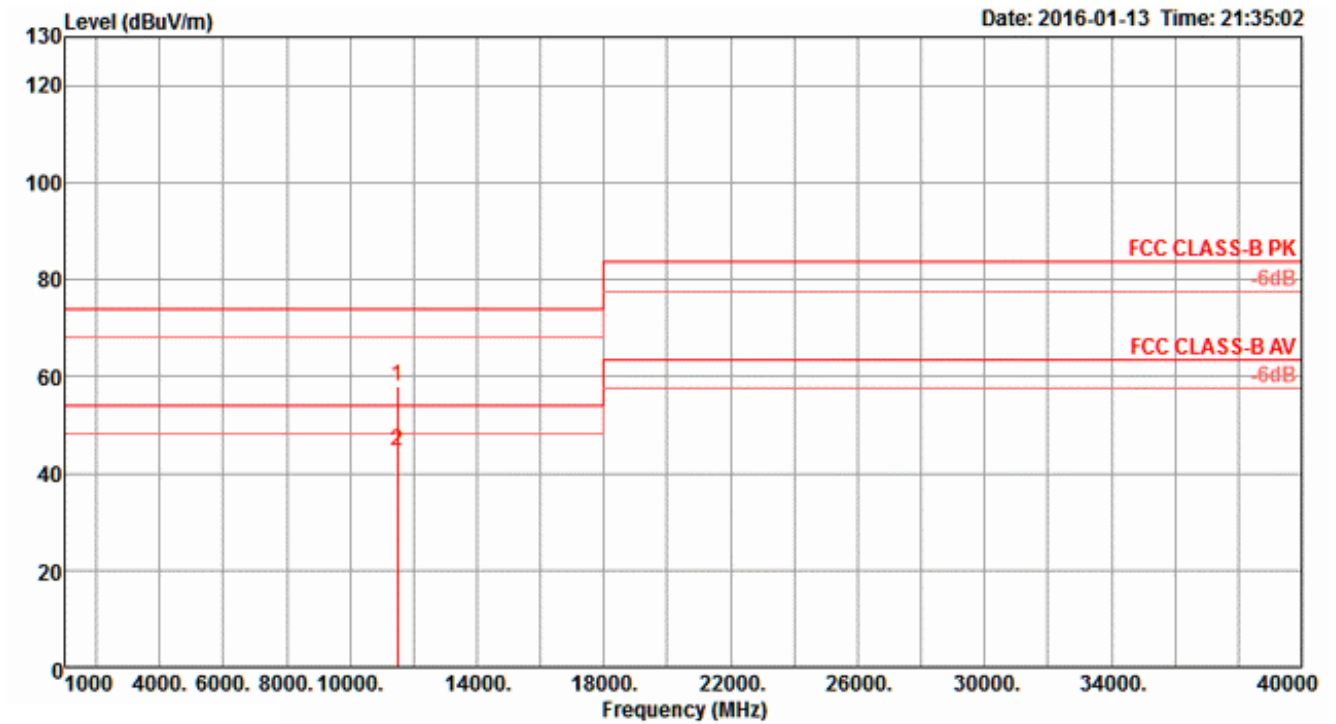


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11549.65	55.25	74.00	-18.75	41.70	9.69	38.51	34.65	87	217	Peak	VERTICAL
2	11553.01	42.27	54.00	-11.73	28.68	9.71	38.53	34.65	87	217	Average	VERTICAL

<For Beamforming Mode>

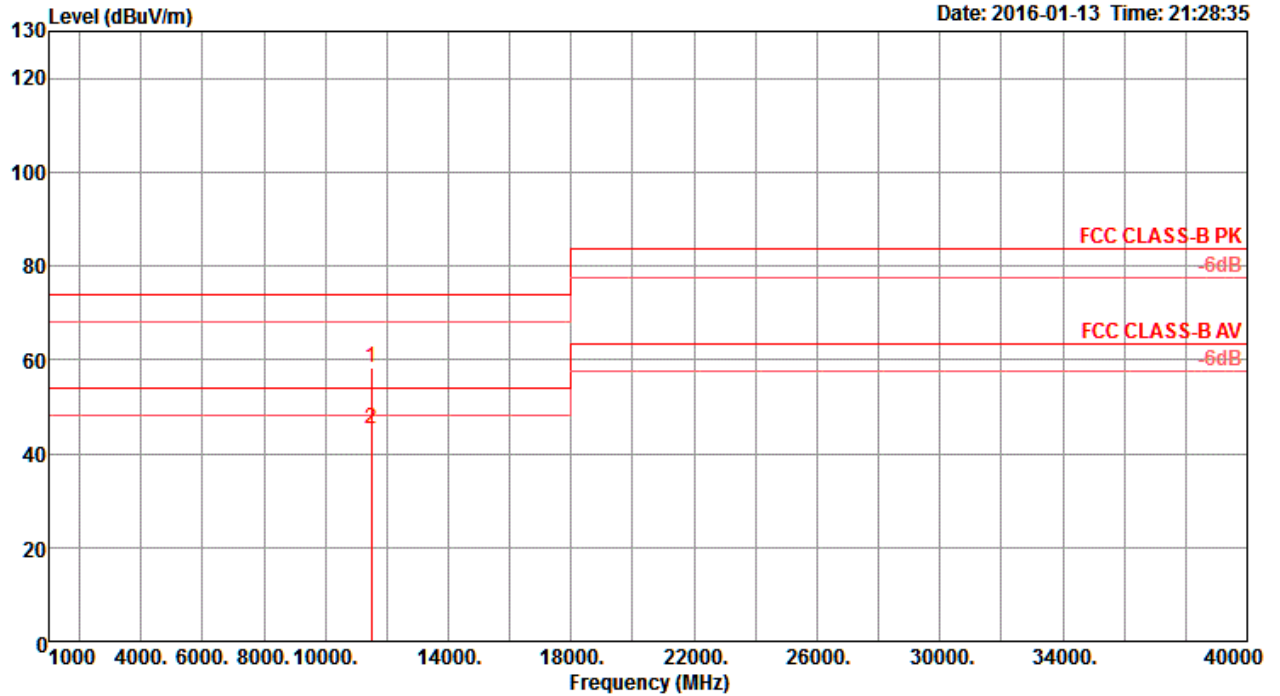
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11493.14	57.88	74.00	-16.12	44.33	9.67	38.50	34.62	244	137	Peak	HORIZONTAL
2	11493.59	44.55	54.00	-9.45	31.00	9.67	38.50	34.62	244	137	Average	HORIZONTAL

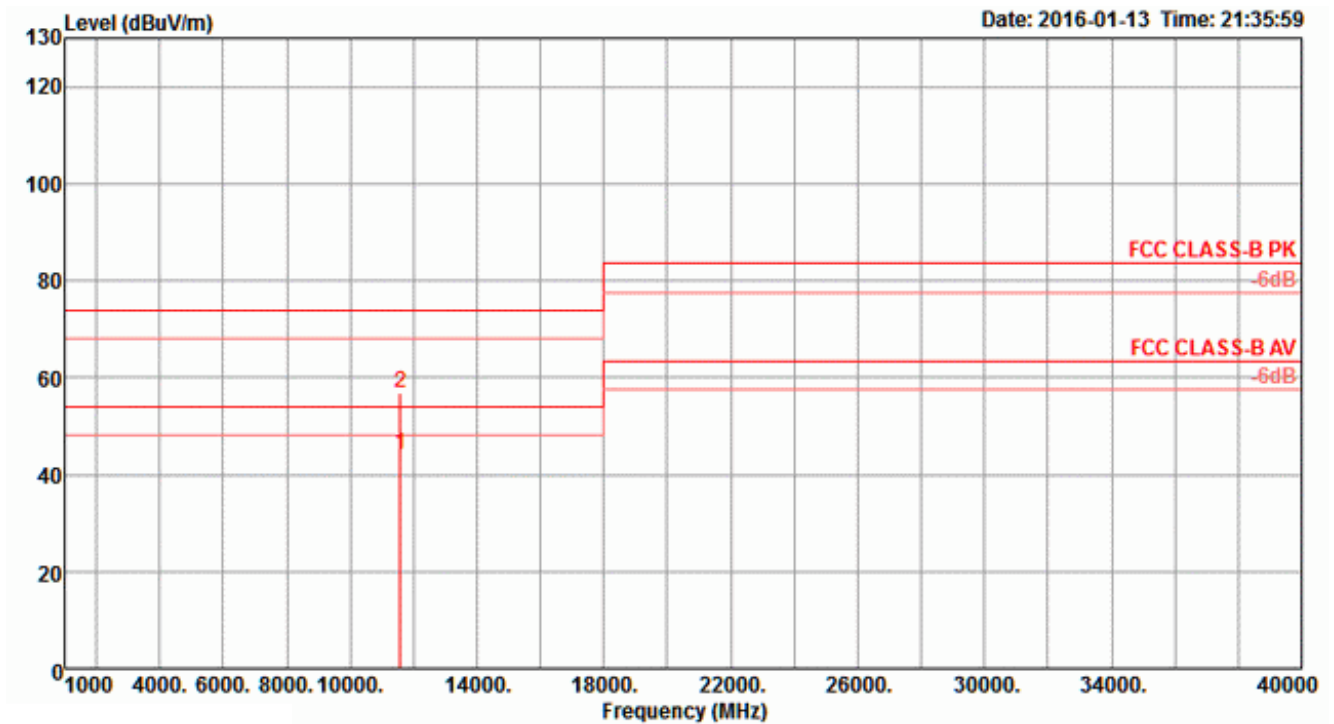
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11487.56	58.25	74.00	-15.75	44.70	9.67	38.50	34.62	114	145	Peak	VERTICAL
2	11488.33	45.29	54.00	-8.71	31.74	9.67	38.50	34.62	114	145	Average	VERTICAL

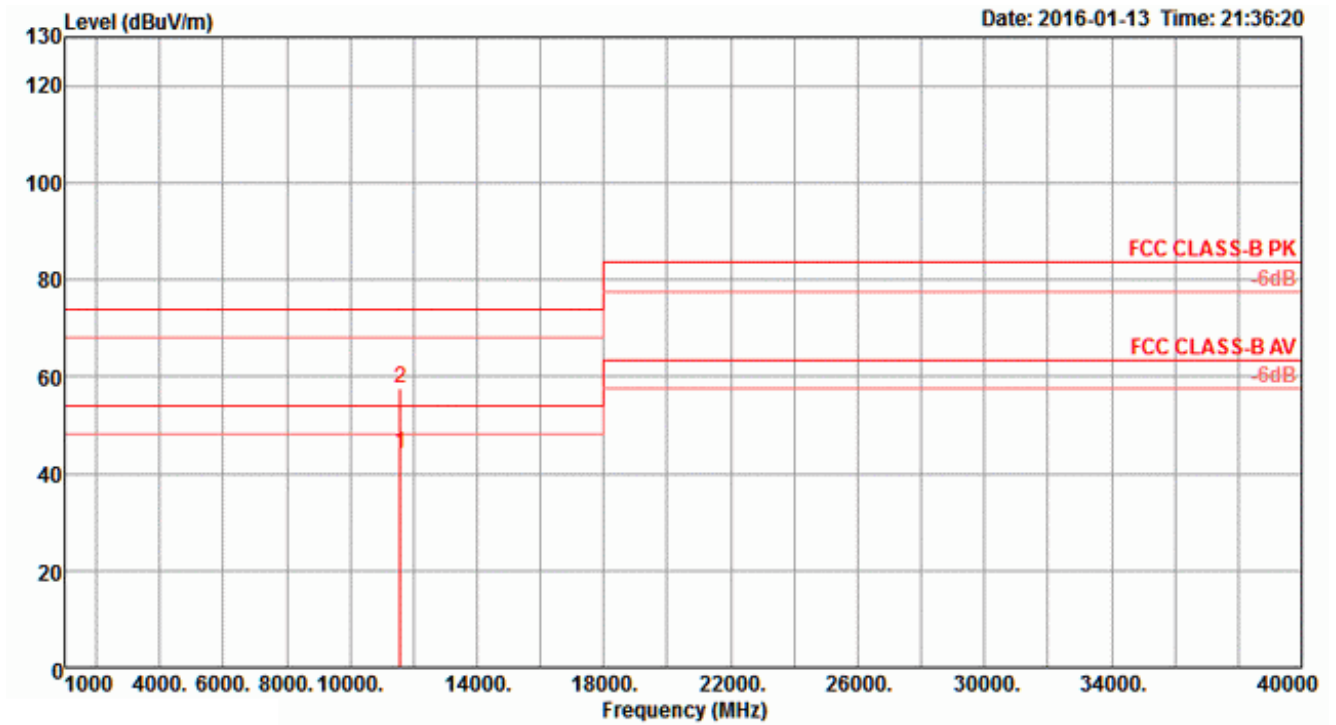
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11571.75	44.15	54.00	-9.85	30.56	9.71	38.53	34.65	225	166	Average	HORIZONTAL
2	11573.73	56.86	74.00	-17.14	43.27	9.71	38.53	34.65	225	166	Peak	HORIZONTAL

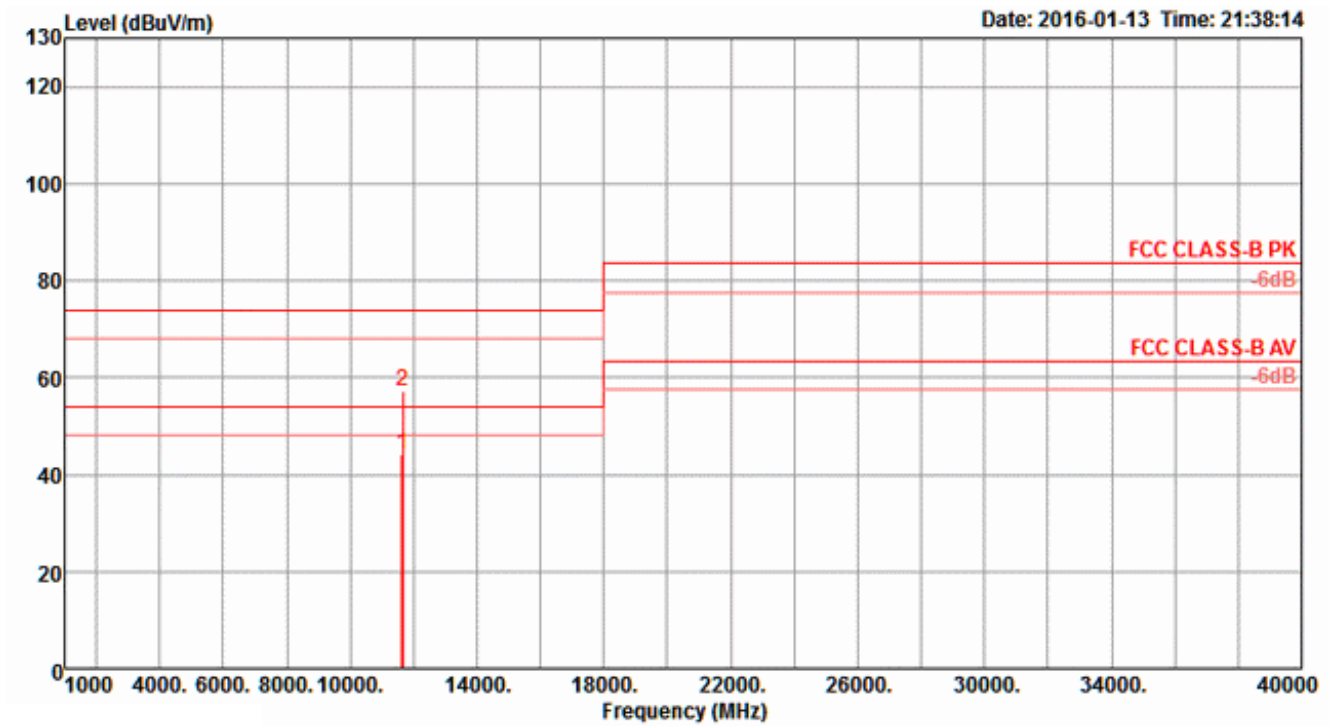
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBUV/m	dBUV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11567.64	44.11	54.00	-9.89	30.52	9.71	38.53	34.65	213	145	Average	VERTICAL
2	11574.76	57.48	74.00	-16.52	43.89	9.71	38.53	34.65	213	145	Peak	VERTICAL

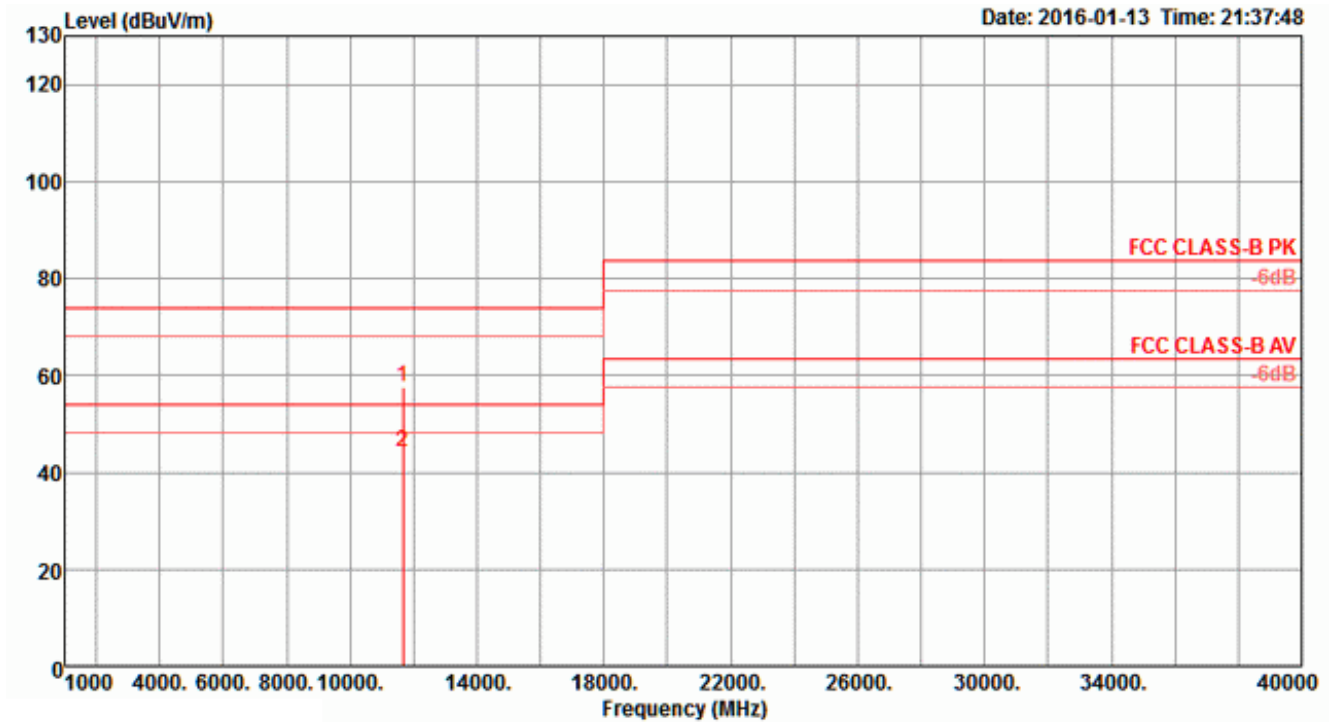
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11646.68	44.34	54.00	-9.66	30.72	9.75	38.55	34.68	219	193	Average	HORIZONTAL
2	11653.01	57.19	74.00	-16.81	43.53	9.77	38.57	34.68	219	193	Peak	HORIZONTAL

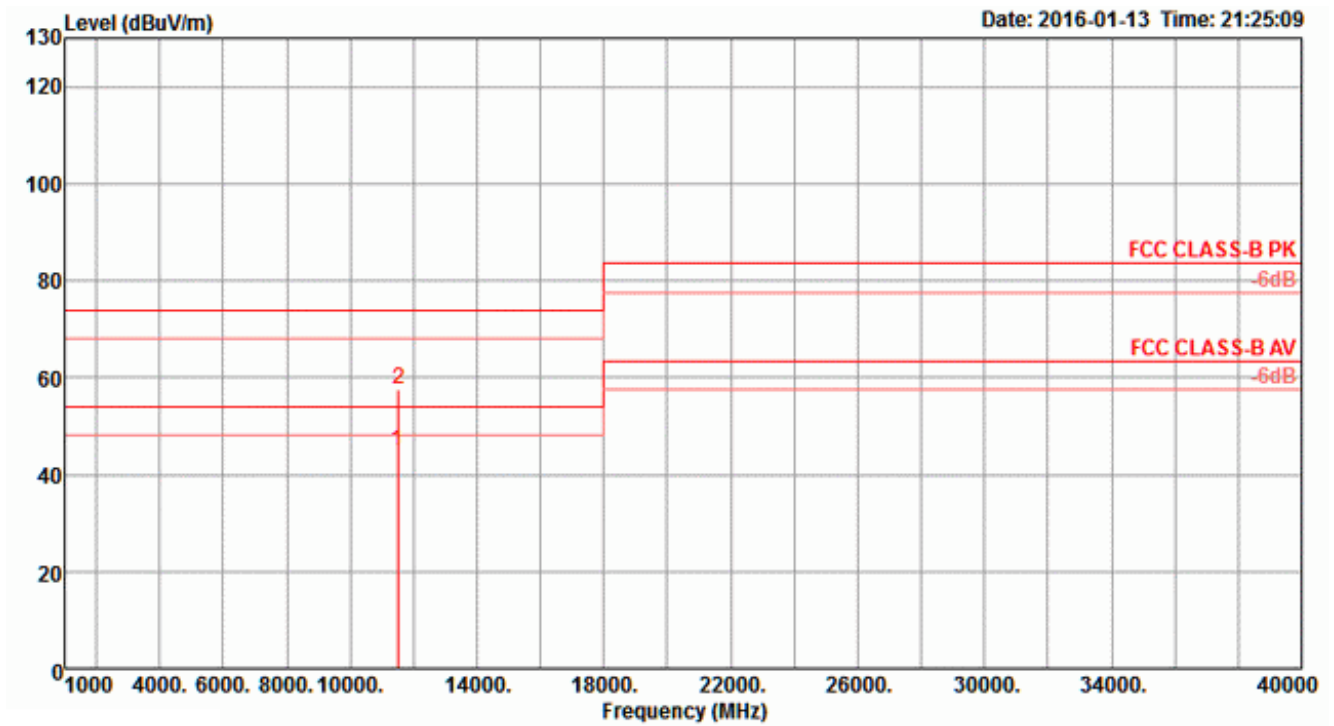
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11650.43	57.55	74.00	-16.45	43.93	9.75	38.55	34.68	231	172	Peak	VERTICAL
2	11654.38	44.33	54.00	-9.67	30.67	9.77	38.57	34.68	231	172	Average	VERTICAL

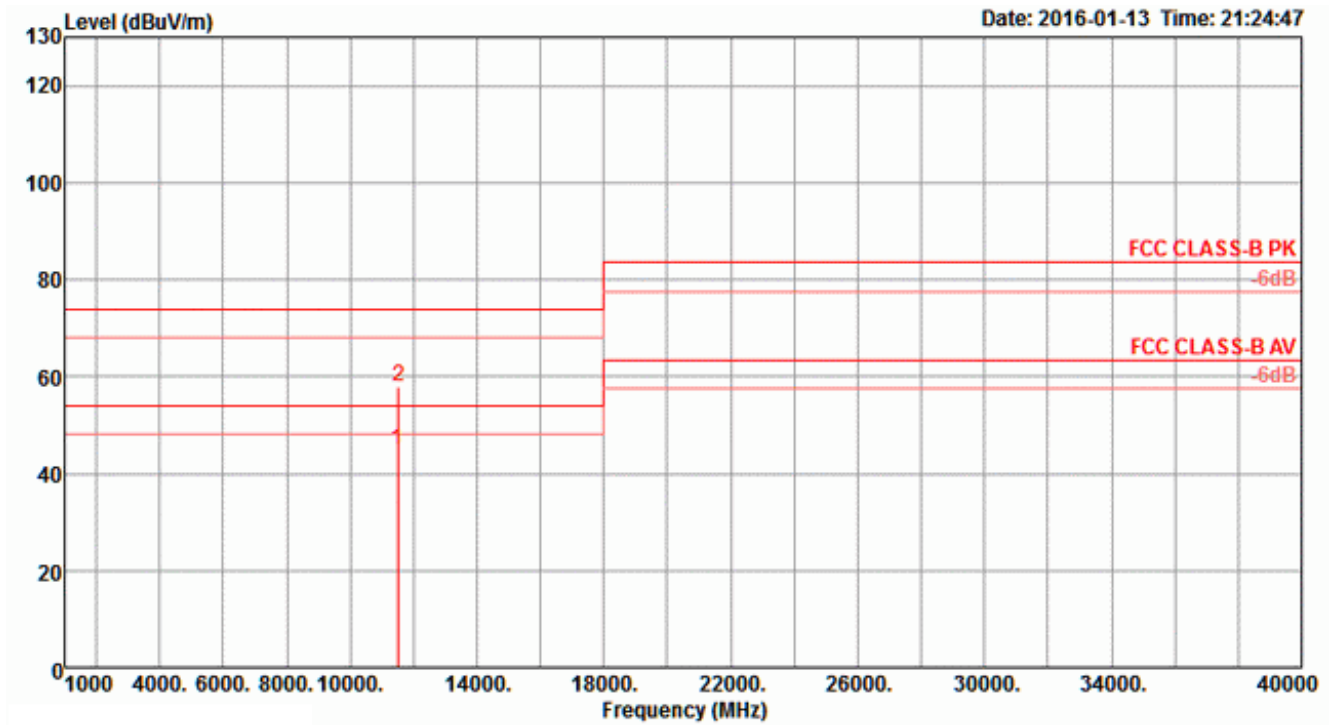
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBUV/m	dBUV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11507.24	44.81	54.00	-9.19	31.26	9.67	38.50	34.62	102	158	Average	HORIZONTAL
2	11510.95	57.48	74.00	-16.52	43.94	9.67	38.50	34.63	102	158	Peak	HORIZONTAL

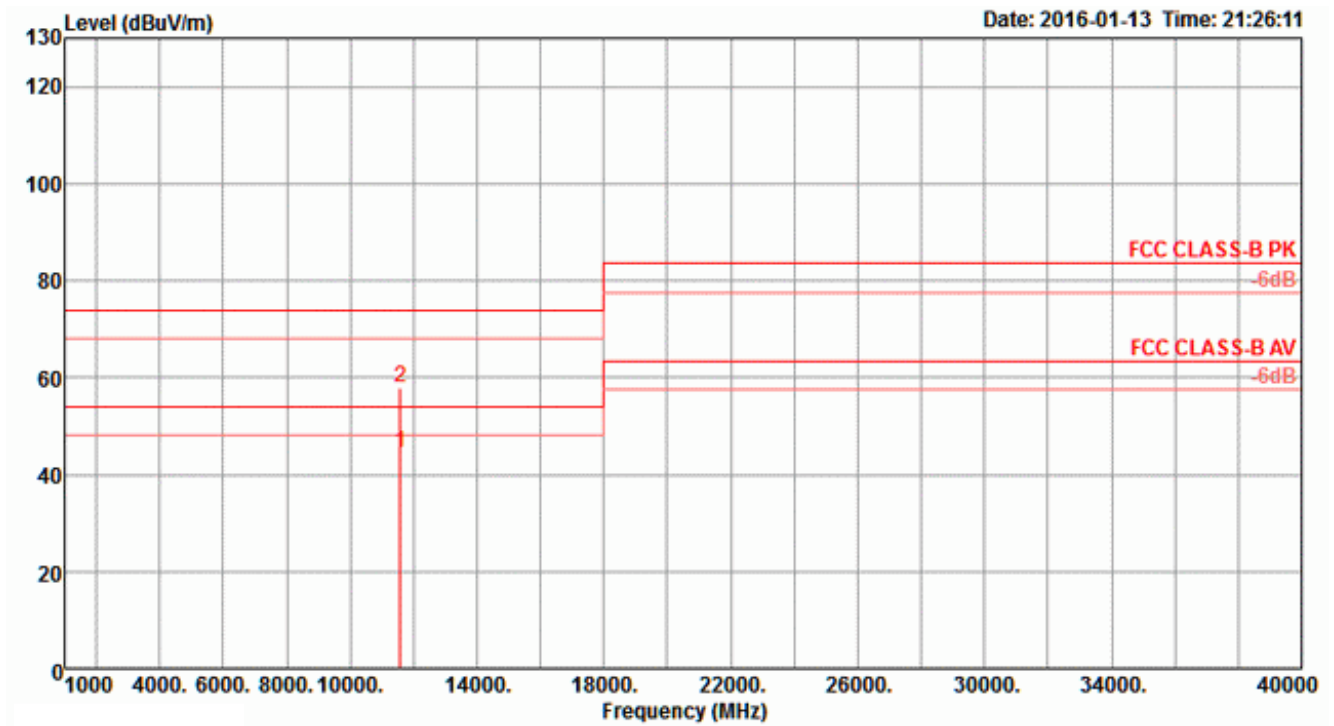
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBUV/m	dBUV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11508.75	44.80	54.00	-9.20	31.25	9.67	38.50	34.62	123	200	Average	VERTICAL
2	11514.01	58.04	74.00	-15.96	44.50	9.67	38.50	34.63	123	200	Peak	VERTICAL

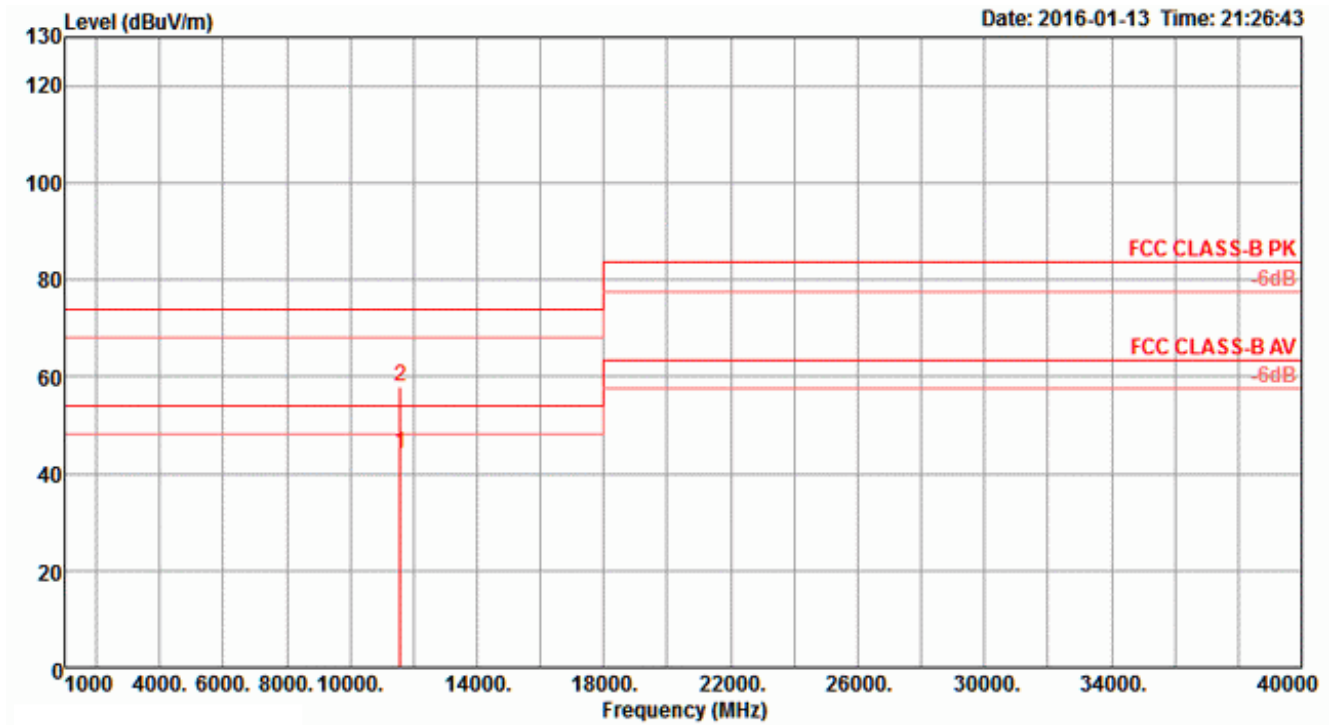
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBUV/m	dBUV/m	dB	dBUV	dB	dB/m	dB	deg	cm		
1	11585.56	44.69	54.00	-9.31	31.08	9.73	38.54	34.66	87	175	Average	HORIZONTAL
2	11591.94	57.84	74.00	-16.16	44.23	9.73	38.54	34.66	87	175	Peak	HORIZONTAL

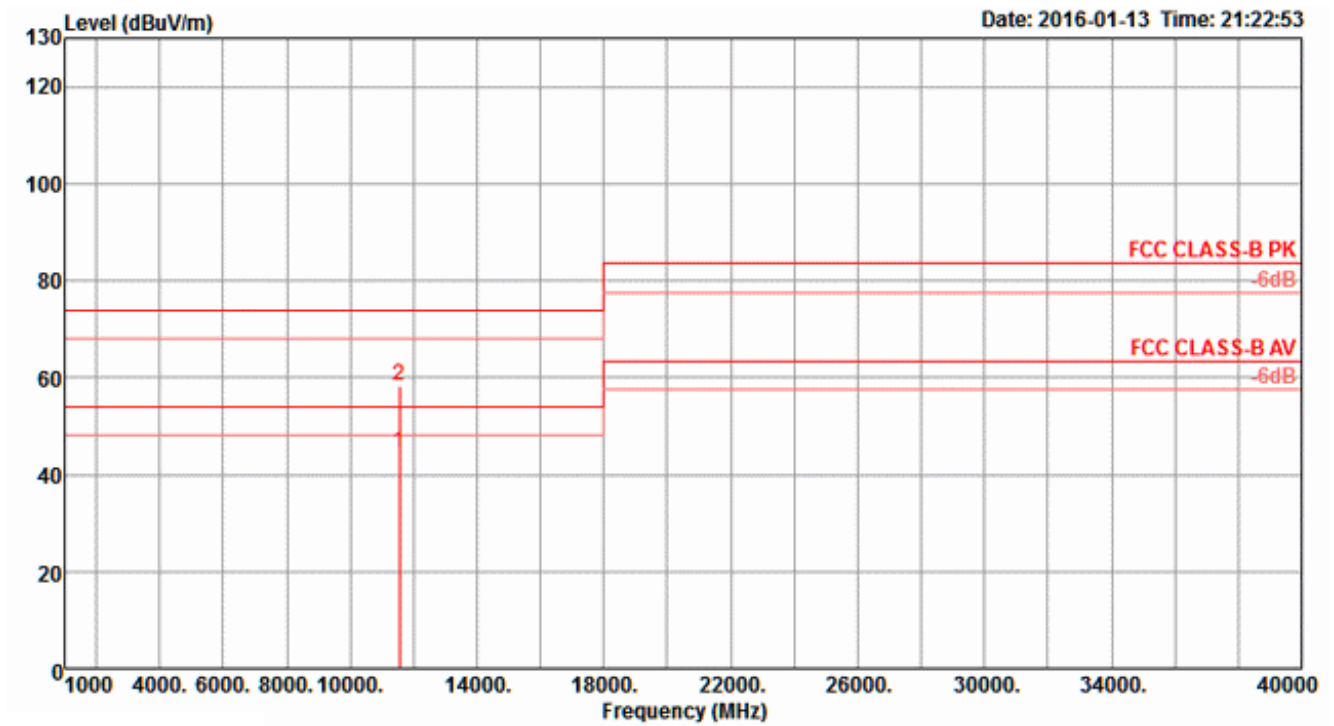
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBUV/m	dBUV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	11592.93	44.32	54.00	-9.68	30.71	9.73	38.54	34.66	64	160	Average	VERTICAL
2	11593.43	58.00	74.00	-16.00	44.39	9.73	38.54	34.66	64	160	Peak	VERTICAL

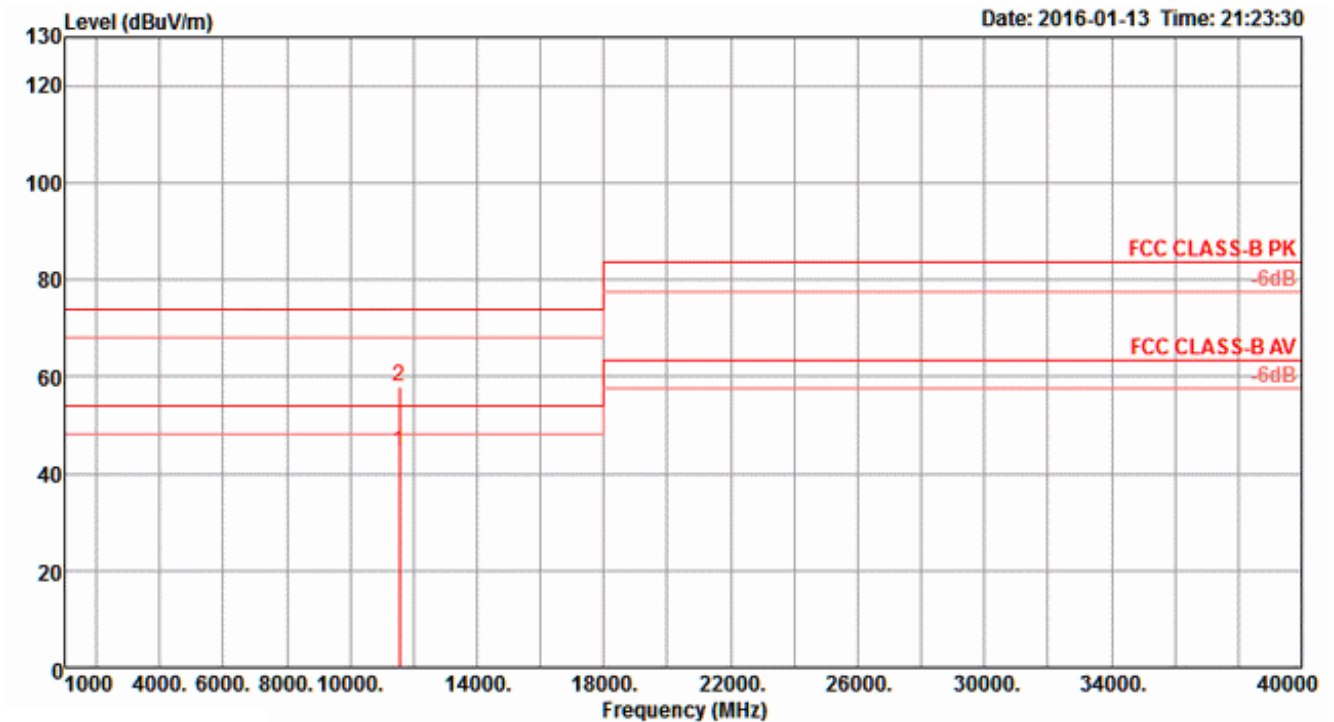
Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11549.97	44.70	54.00	-9.30	31.15	9.69	38.51	34.65	177	206	Average	HORIZONTAL
2	11550.69	58.19	74.00	-15.81	44.60	9.71	38.53	34.65	177	206	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11550.51	44.67	54.00	-9.33	31.08	9.71	38.53	34.65	130	204	Average	VERTICAL
2	11553.80	57.99	74.00	-16.01	44.40	9.71	38.53	34.65	130	204	Peak	VERTICAL

Note:

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

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

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

4.6. Band Edge Emissions Measurement

4.6.1. Limit

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

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

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

4.6.4. Test Setup Layout

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

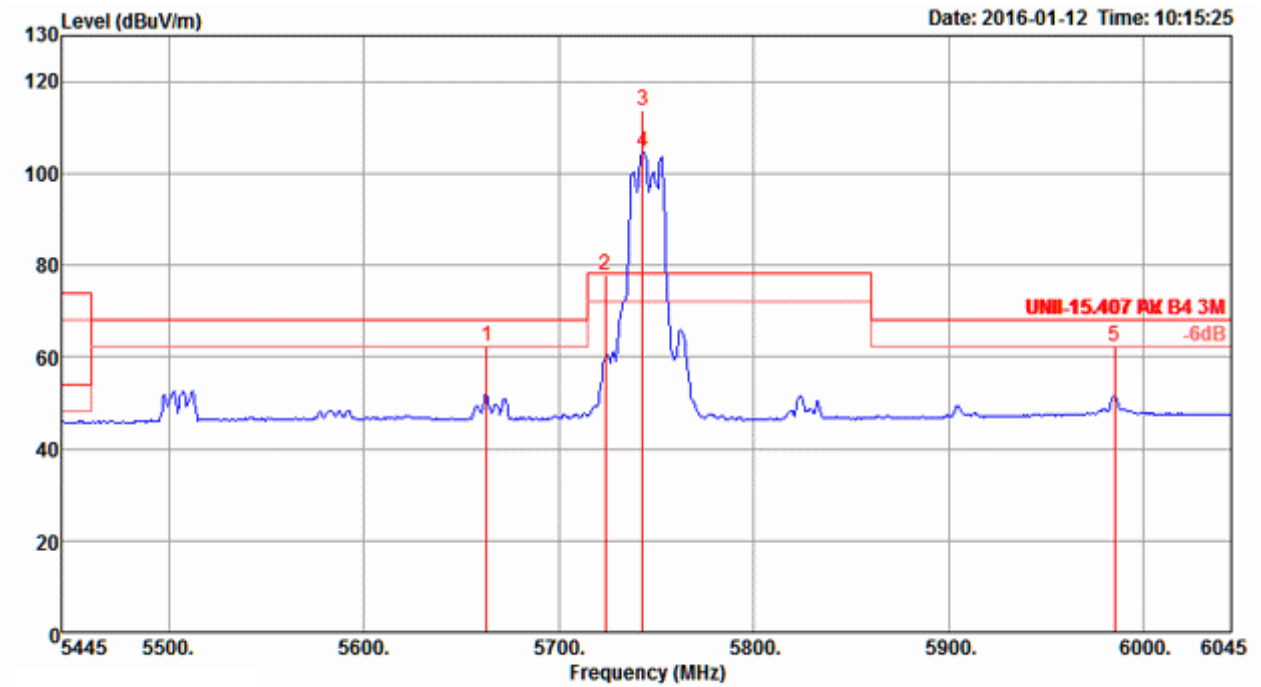
For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3

Channel 149

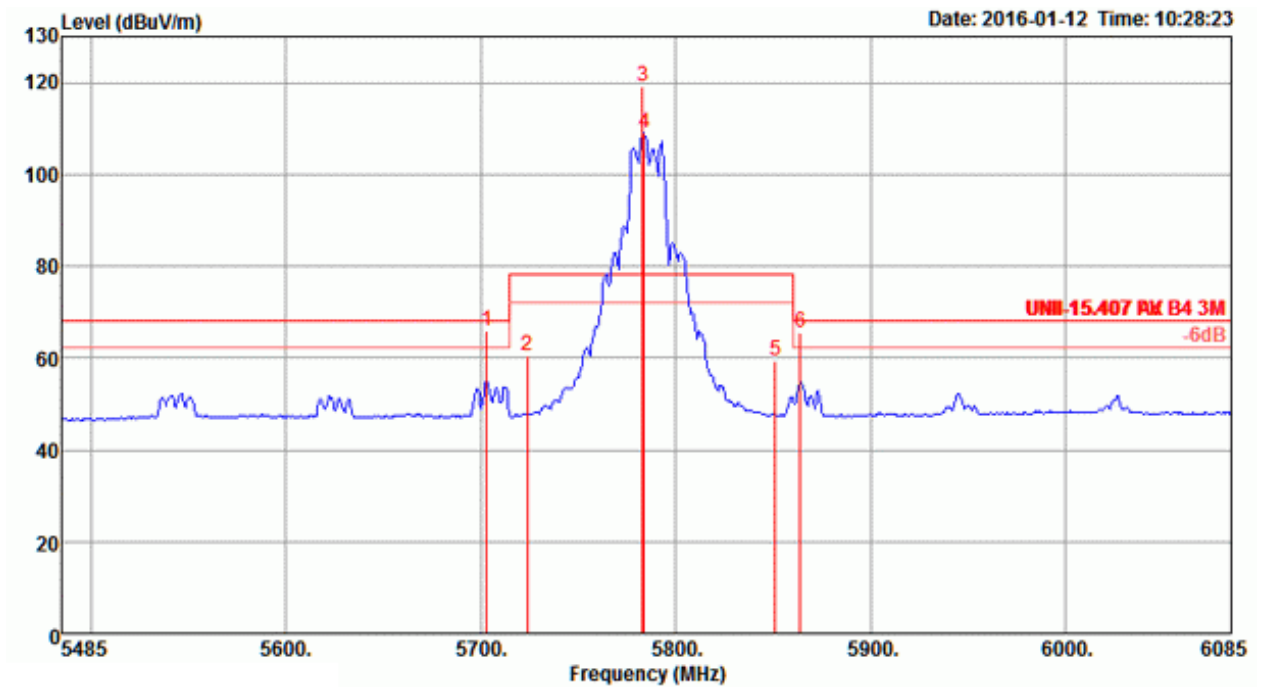


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5663.27	62.38	68.20	-5.82	55.86	6.72	34.30	34.50	177	200	Peak	VERTICAL
2	5723.85	77.68	78.20	-0.52	71.26	6.43	34.50	34.51	177	200	Peak	VERTICAL
3	5743.08	113.84			107.45	6.36	34.55	34.52	177	200	Peak	VERTICAL
4	5743.08	104.75			98.36	6.36	34.55	34.52	177	200	Average	VERTICAL
5	5985.39	62.12	68.20	-6.08	54.41	7.03	35.25	34.57	177	200	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 157

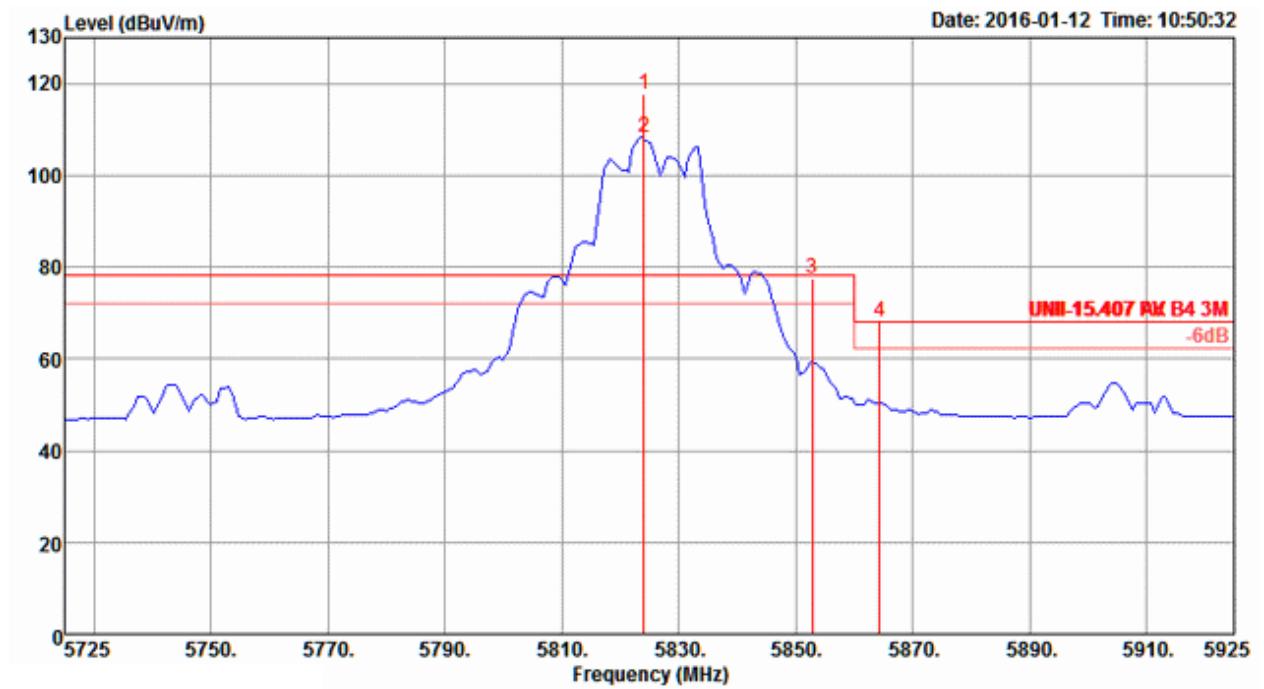


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5703.27	65.83	68.20	-2.37	59.37	6.57	34.40	34.51	177	199	Peak	VERTICAL
2	5724.04	60.37	78.20	-17.83	53.95	6.43	34.50	34.51	177	199	Peak	VERTICAL
3	5783.08	119.05			112.71	6.22	34.65	34.53	177	199	Peak	VERTICAL
4	5784.04	108.99			102.65	6.22	34.65	34.53	177	199	Average	VERTICAL
5	5850.96	59.37	78.20	-18.83	52.67	6.39	34.85	34.54	177	199	Peak	VERTICAL
6	5863.85	65.59	68.20	-2.61	58.76	6.47	34.90	34.54	177	199	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 165



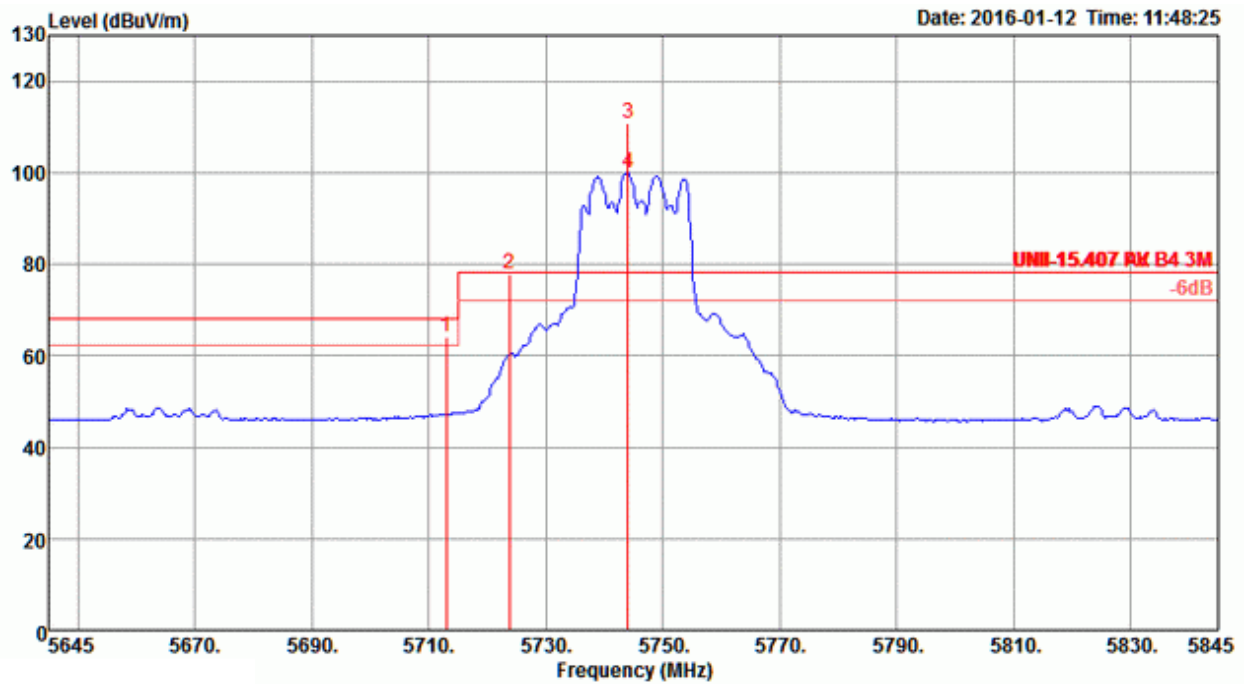
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5824.04	117.66			111.09	6.31	34.80	34.54	176	194	Peak	VERTICAL
2	5824.04	108.11			101.54	6.31	34.80	34.54	176	194	Average	VERTICAL
3	5852.89	77.42	78.20	-0.78	70.72	6.39	34.85	34.54	176	194	Peak	VERTICAL
4	5864.42	67.91	68.20	-0.29	61.08	6.47	34.90	34.54	176	194	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3

Channel 149

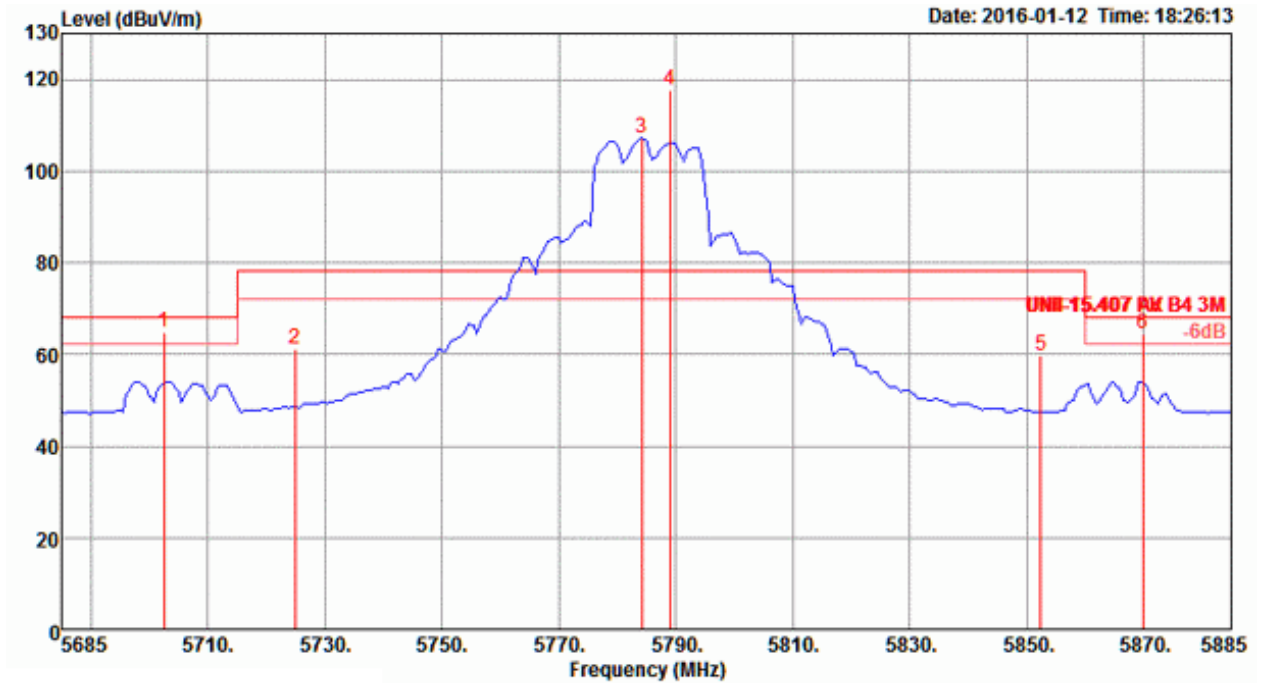


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5712.95	64.12	68.20	-4.08	57.68	6.50	34.45	34.51	91	182	Peak	HORIZONTAL
2	5723.85	78.00	78.20	-0.20	71.58	6.43	34.50	34.51	91	182	Peak	HORIZONTAL
3	5744.04	110.80			104.41	6.36	34.55	34.52	91	182	Peak	HORIZONTAL
4	5744.04	99.85			93.46	6.36	34.55	34.52	91	182	Average	HORIZONTAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 157

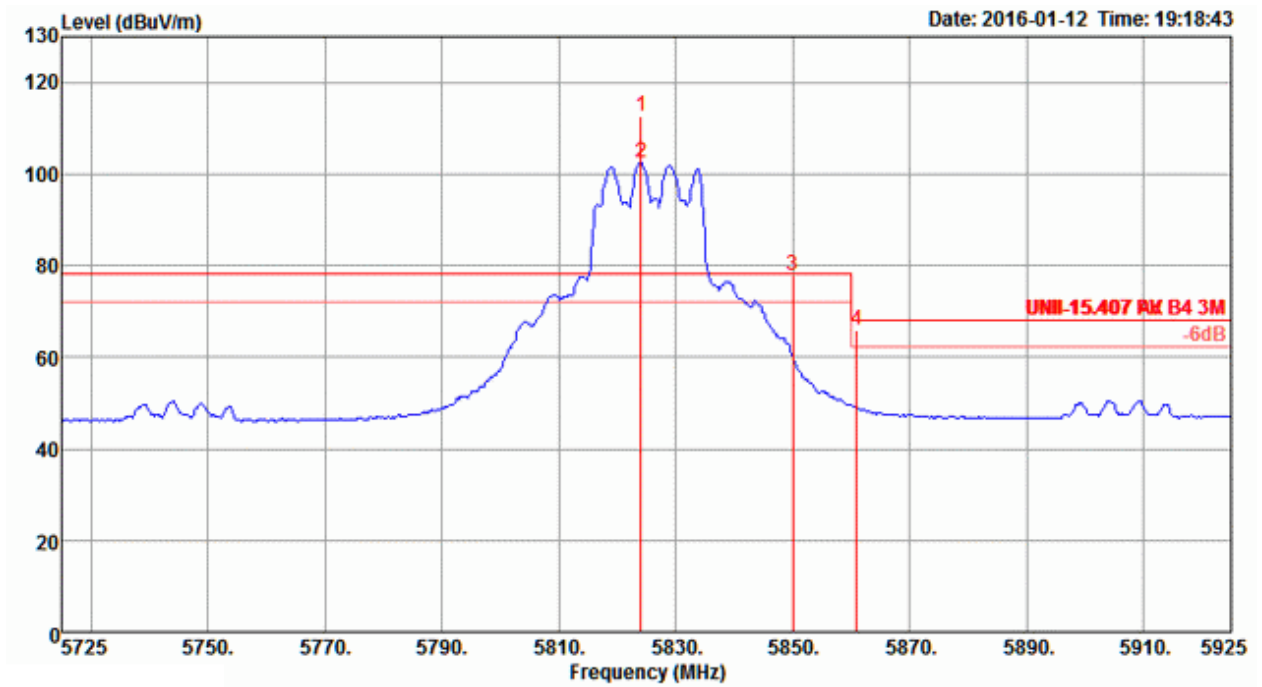


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5702.47	64.85	68.20	-3.35	58.39	6.57	34.40	34.51	179	200	Peak	VERTICAL
2	5725.00	61.33	78.20	-16.87	54.91	6.43	34.50	34.51	179	200	Peak	VERTICAL
3	5784.20	107.24			100.90	6.22	34.65	34.53	179	200	Average	VERTICAL
4	5789.01	117.56			111.24	6.15	34.70	34.53	179	200	Peak	VERTICAL
5	5852.40	59.61	78.20	-18.59	52.91	6.39	34.85	34.54	179	200	Peak	VERTICAL
6	5869.94	64.43	68.20	-3.77	57.60	6.47	34.90	34.54	179	200	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 165

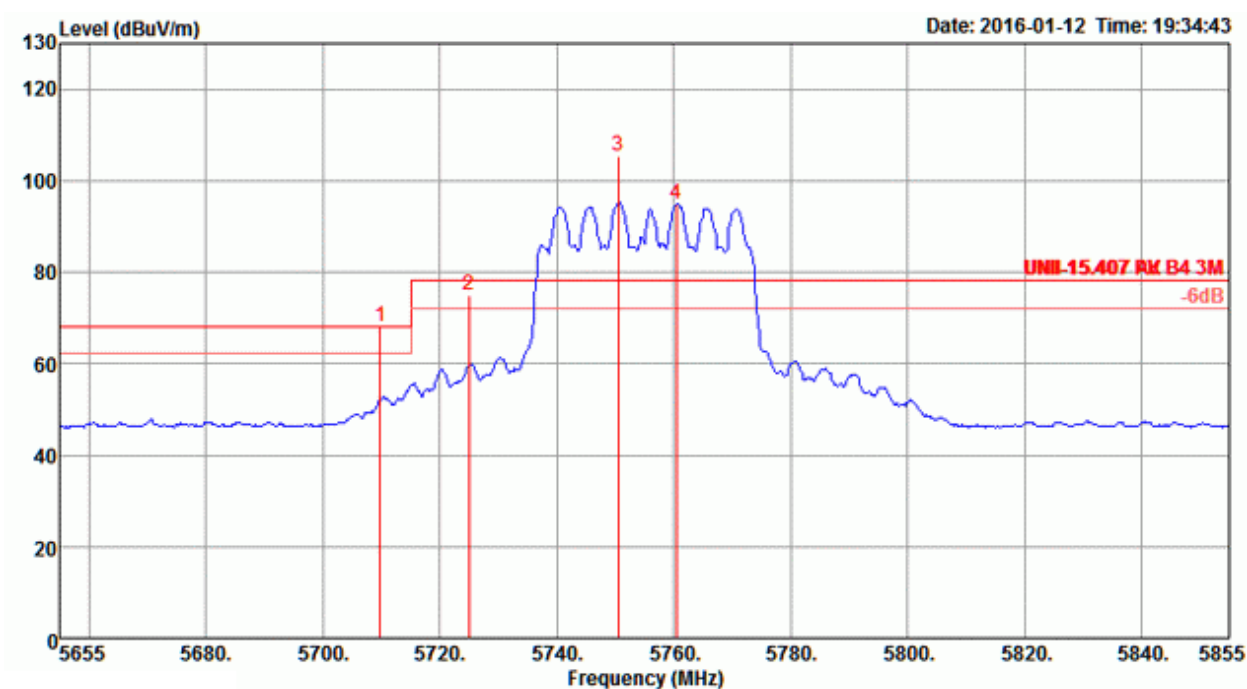


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5824.04	112.49			105.92	6.31	34.80	34.54	91	175	Peak	HORIZONTAL
2	5824.04	102.58			96.01	6.31	34.80	34.54	91	175	Average	HORIZONTAL
3	5850.00	77.93	78.20	-0.27	71.23	6.39	34.85	34.54	91	175	Peak	HORIZONTAL
4	5860.90	65.97	68.20	-2.23	59.14	6.47	34.90	34.54	91	175	Peak	HORIZONTAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3

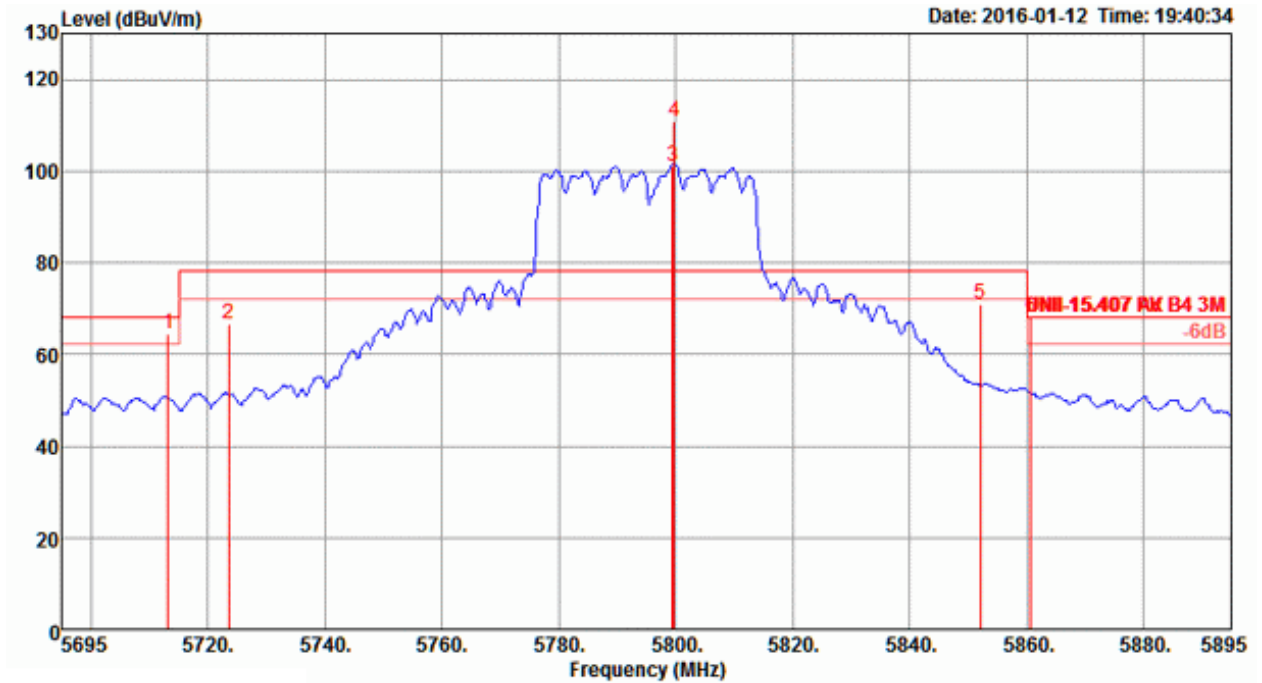
Channel 151


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5709.81	68.15	68.20	-0.05	61.71	6.50	34.45	34.51	84	182	Peak	HORIZONTAL
2	5725.00	75.00	78.20	-3.20	68.58	6.43	34.50	34.51	84	182	Peak	HORIZONTAL
3	5750.51	105.23			98.84	6.36	34.55	34.52	84	182	Peak	HORIZONTAL
4	5760.45	95.01			88.64	6.29	34.60	34.52	84	182	Average	HORIZONTAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 159



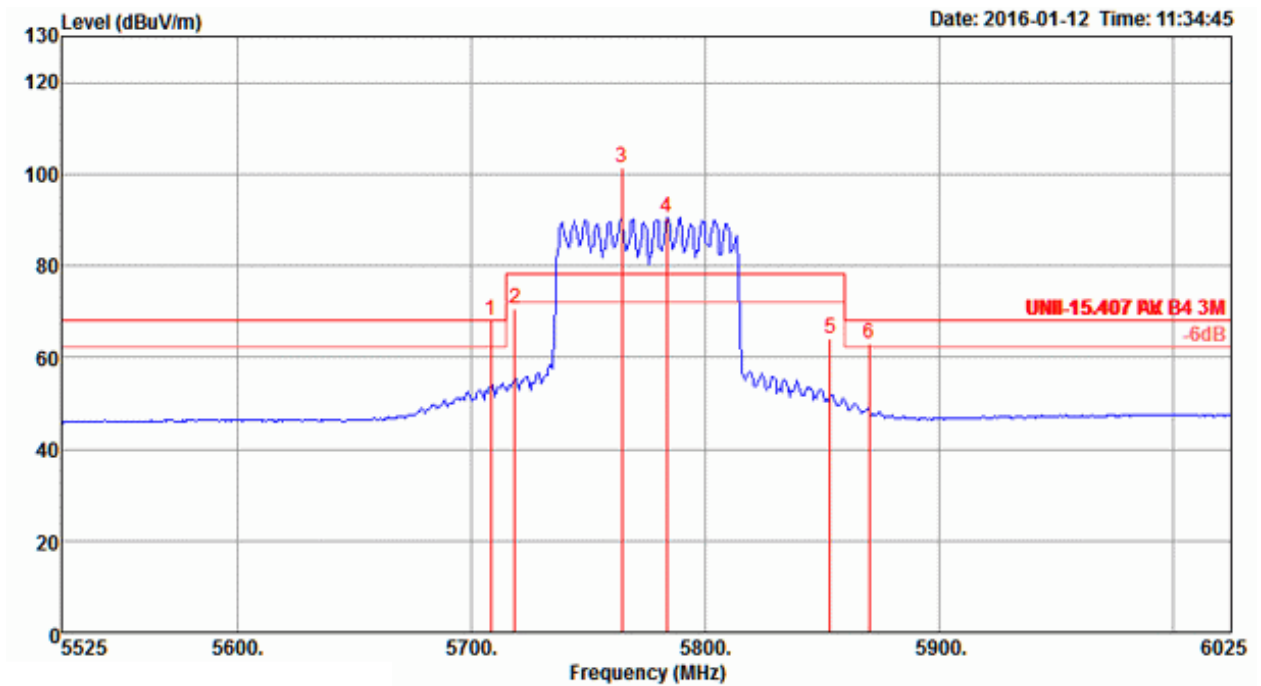
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	5713.27	64.30	68.20	-3.90	57.86	6.50	34.45	34.51	178	190 Peak	VERTICAL
2	5723.53	66.69	78.20	-11.51	60.27	6.43	34.50	34.51	178	190 Peak	VERTICAL
3	5799.49	101.03			94.71	6.15	34.70	34.53	178	190 Average	VERTICAL
4	5799.81	110.94			104.62	6.15	34.70	34.53	178	190 Peak	VERTICAL
5	5852.05	70.94	78.20	-7.26	64.24	6.39	34.85	34.54	178	190 Peak	VERTICAL
6	5860.71	67.99	68.20	-0.21	61.16	6.47	34.90	34.54	178	190 Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3

Channel 155



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5708.49	68.18	68.20	-0.02	61.74	6.50	34.45	34.51	93	187	Peak	HORIZONTAL
2	5718.91	70.59	78.20	-7.61	64.15	6.50	34.45	34.51	93	187	Peak	HORIZONTAL
3	5764.58	101.54	78.20	-7.61	95.18	6.29	34.60	34.53	93	187	Peak	HORIZONTAL
4	5783.81	90.40	78.20	-14.09	84.06	6.22	34.65	34.53	93	187	Average	HORIZONTAL
5	5853.53	64.11	78.20	-14.09	57.41	6.39	34.85	34.54	93	187	Peak	HORIZONTAL
6	5870.35	63.16	68.20	-5.04	56.33	6.47	34.90	34.54	93	187	Peak	HORIZONTAL

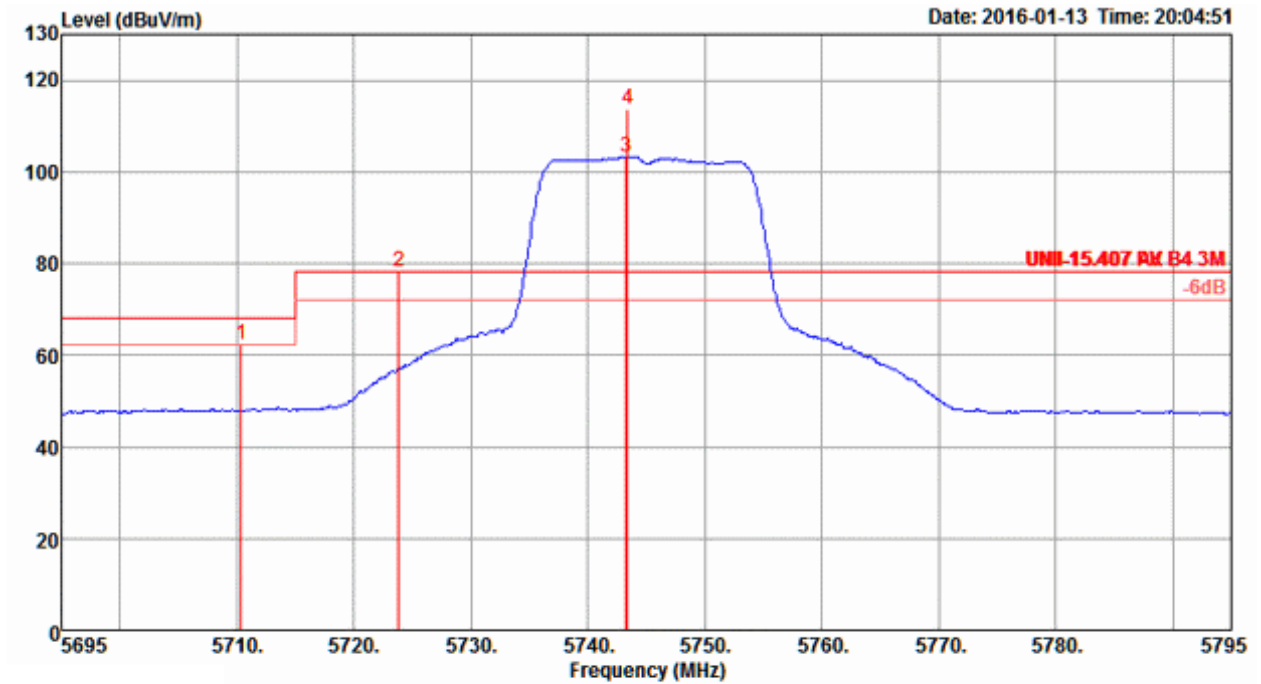
Item 3, 4 are the fundamental frequency at 5775 MHz.

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

<For Beamforming Mode>

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3

Channel 149

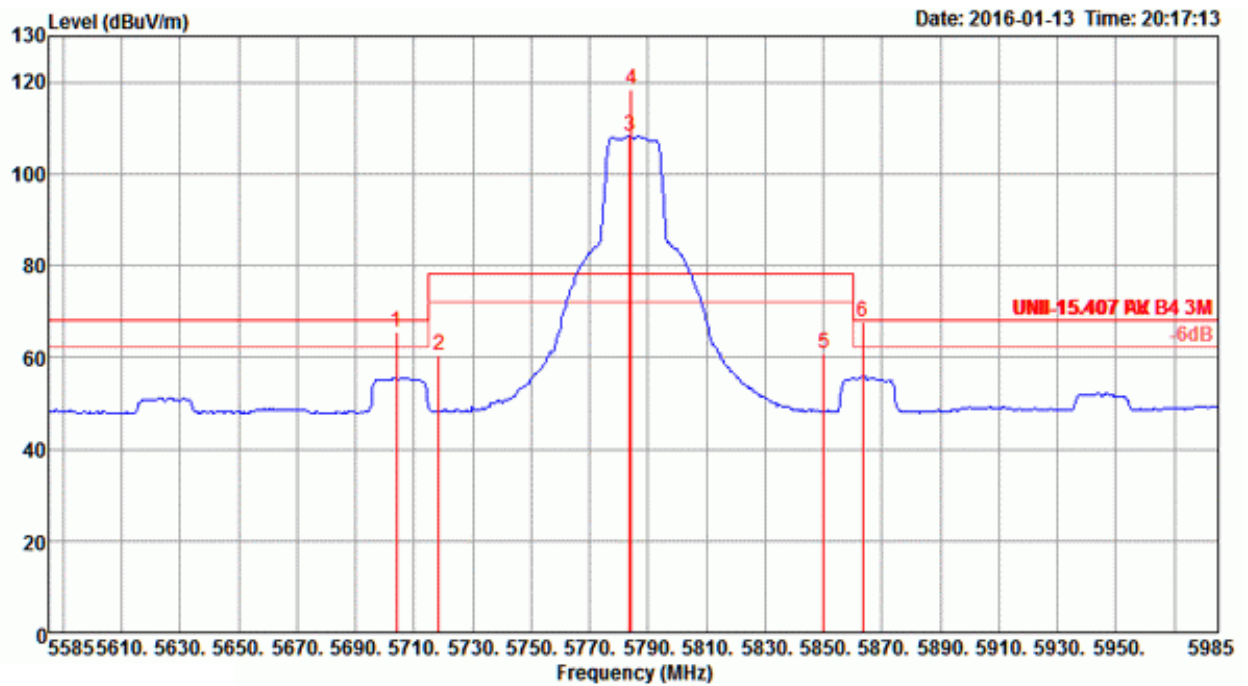


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5710.39	62.43	68.20	-5.77	55.99	6.50	34.45	34.51	179	204	Peak	VERTICAL
2	5723.85	78.05	78.20	-0.15	71.63	6.43	34.50	34.51	179	204	Peak	VERTICAL
3	5743.24	103.12			96.73	6.36	34.55	34.52	179	204	Average	VERTICAL
4	5743.40	113.57			107.18	6.36	34.55	34.52	179	204	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 157

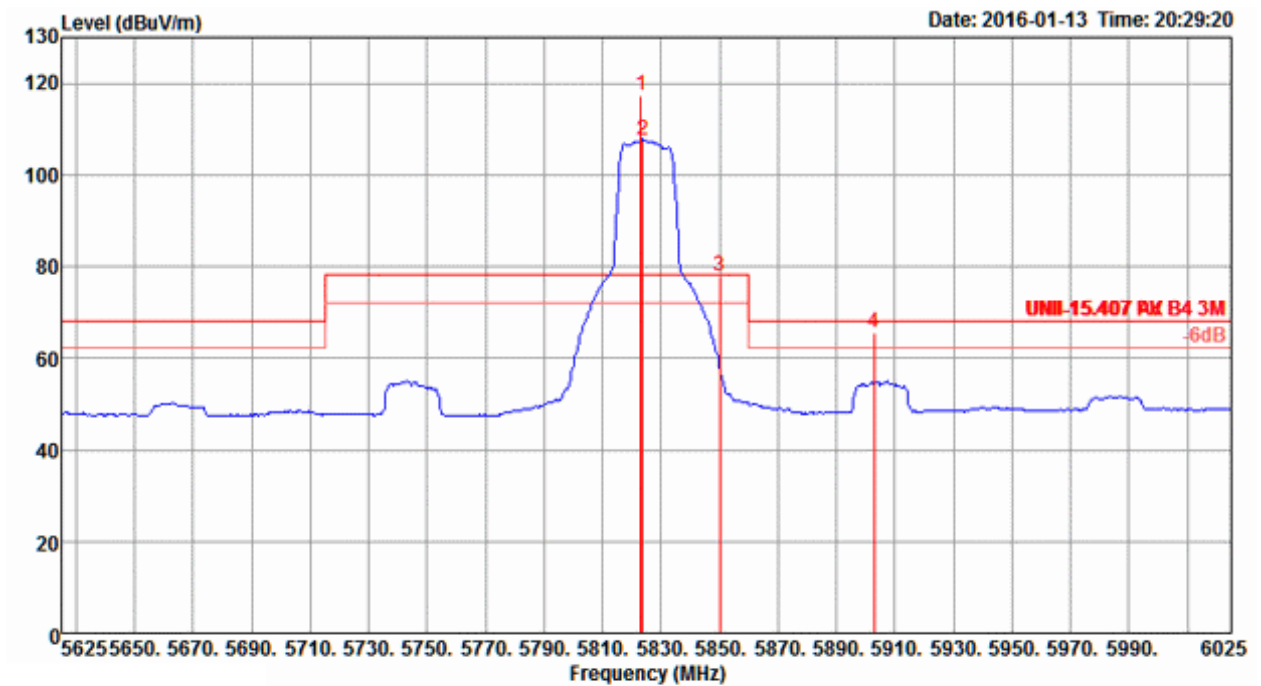


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	5704.07	65.68	68.20	-2.52	59.22	6.57	34.40	34.51	179	209 Peak	VERTICAL
2	5718.59	60.63	78.20	-17.57	54.19	6.50	34.45	34.51	179	209 Peak	VERTICAL
3	5783.72	108.39			102.05	6.22	34.65	34.53	179	209 Average	VERTICAL
4	5784.20	118.35			112.01	6.22	34.65	34.53	179	209 Peak	VERTICAL
5	5850.00	60.72	78.20	-17.48	54.02	6.39	34.85	34.54	179	209 Peak	VERTICAL
6	5863.53	67.76	68.20	-0.44	60.93	6.47	34.90	34.54	179	209 Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 165



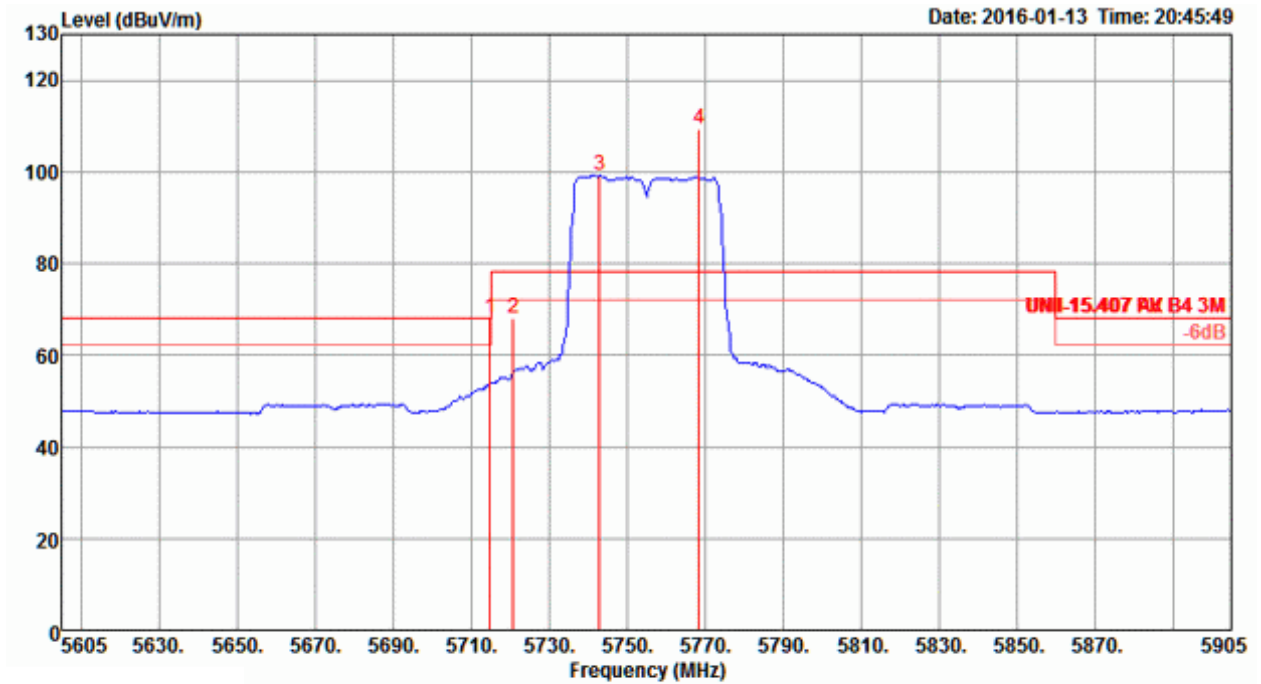
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	5823.08	117.37			110.80	6.31	34.80	34.54	176	209 Peak	VERTICAL
2	5823.72	107.56			100.99	6.31	34.80	34.54	176	209 Average	VERTICAL
3	5850.00	77.86	78.20	-0.34	71.16	6.39	34.85	34.54	176	209 Peak	VERTICAL
4	5902.89	65.57	68.20	-2.63	58.49	6.63	35.00	34.55	176	209 Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3

Channel 151

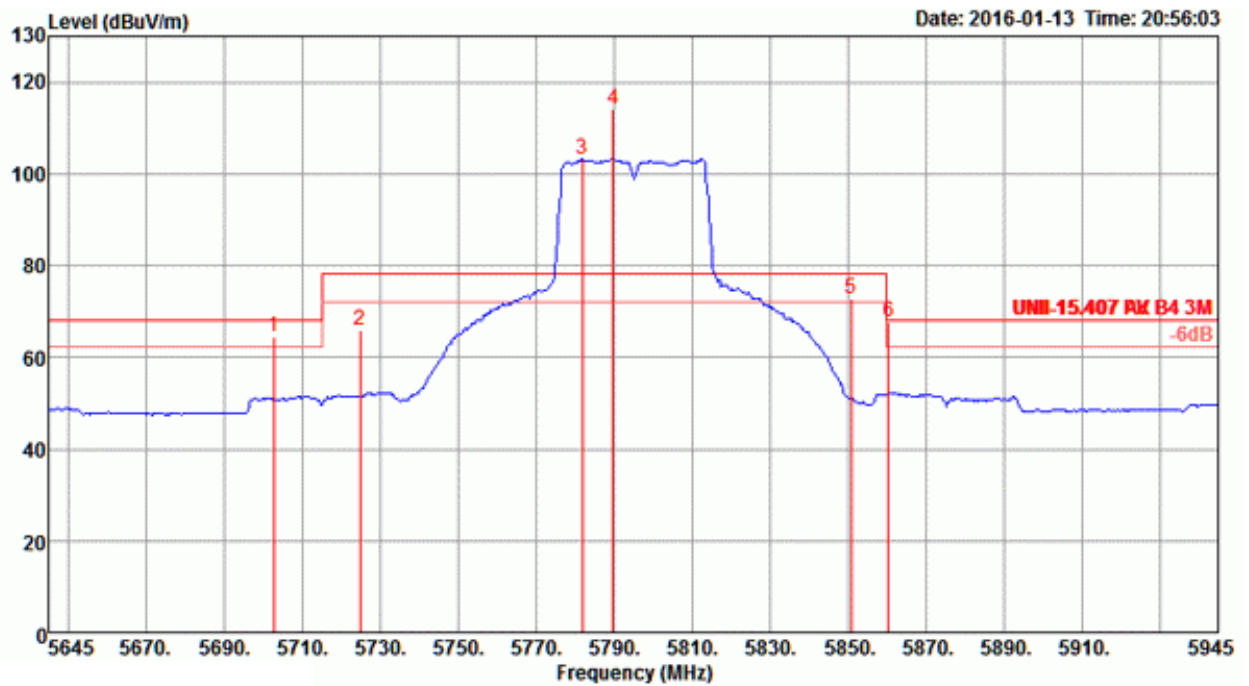


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	deg	cm		
1	5715.00	68.17	68.20	-0.03	61.73	6.50	34.45	34.51	179	198	Peak	VERTICAL
2	5720.87	68.21	78.20	-9.99	61.77	6.50	34.45	34.51	179	198	Peak	VERTICAL
3	5742.98	99.20			92.81	6.36	34.55	34.52	179	198	Average	VERTICAL
4	5768.46	109.35			102.99	6.29	34.60	34.53	179	198	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Channel 159



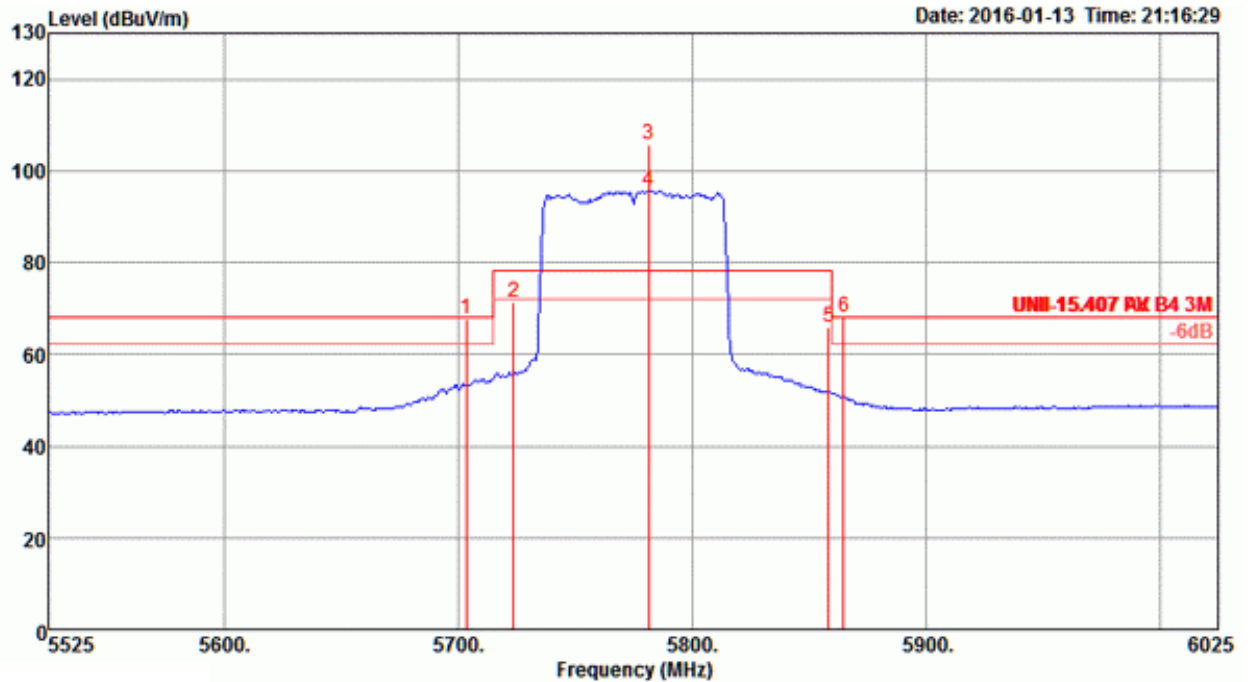
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5702.69	64.52	68.20	-3.68	58.06	6.57	34.40	34.51	181	210	Peak	VERTICAL
2	5725.00	66.02	78.20	-12.18	59.60	6.43	34.50	34.51	181	210	Peak	VERTICAL
3	5782.02	103.13			96.79	6.22	34.65	34.53	181	210	Average	VERTICAL
4	5789.71	114.20			107.88	6.15	34.70	34.53	181	210	Peak	VERTICAL
5	5850.77	72.94	78.20	-5.26	66.24	6.39	34.85	34.54	181	210	Peak	VERTICAL
6	5860.39	67.73	68.20	-0.47	60.90	6.47	34.90	34.54	181	210	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Temperature	22°C	Humidity	55%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3

Channel 155



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5703.69	67.84	68.20	-0.36	61.38	6.57	34.40	34.51	179	185	Peak	VERTICAL
2	5723.72	71.36	78.20	-6.84	64.94	6.43	34.50	34.51	179	185	Peak	VERTICAL
3	5781.41	105.56			99.22	6.22	34.65	34.53	179	185	Peak	VERTICAL
4	5781.41	95.63			89.29	6.22	34.65	34.53	179	185	Average	VERTICAL
5	5858.33	65.93	78.20	-12.27	59.10	6.47	34.90	34.54	179	185	Peak	VERTICAL
6	5864.74	67.98	68.20	-0.22	61.15	6.47	34.90	34.54	179	185	Peak	VERTICAL

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

Note: Both antenna polarizations have been tested and only the worst case was recorded in test report.

Note:

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

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

4.7. Frequency Stability Measurement

4.7.1. Limit

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

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

4.7.2. Measuring Instruments and Setting

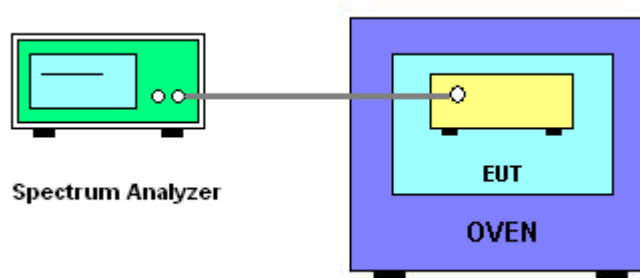
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is $0^\circ\text{C} \sim 70^\circ\text{C}$.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

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

4.7.7. Test Result of Frequency Stability

Temperature	24°C	Humidity	59%
Test Engineer	Peter Wu	Test Date	Jan. 14, 2016

Mode: 20 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)			
	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5785.0541	5785.0534	5785.0527	5785.0519
110.00	5785.0532	5785.0525	5785.0518	5785.0516
93.50	5785.0523	5785.0516	5785.0510	5785.0501
Max. Deviation (MHz)	0.0541	0.0534	0.0527	0.0519
Max. Deviation (ppm)	9.35	9.23	9.11	8.97
Result	Complies			

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)			
	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5785.0635	5785.0622	5785.0605	5785.0581
10	5785.0620	5785.0608	5785.0592	5785.0573
20	5785.0606	5785.0594	5785.0575	5785.0553
30	5785.0593	5785.0580	5785.0565	5785.0547
40	5785.0581	5785.0568	5785.0552	5785.0533
50	5785.0567	5785.0556	5785.0542	5785.0526
60	5785.0551	5785.0536	5785.0520	5785.0500
70	5785.0534	5785.0522	5785.0507	5785.0480
Max. Deviation (MHz)	0.0635	0.0622	0.0605	0.0581
Max. Deviation (ppm)	10.98	10.75	10.46	10.04
Result	Complies			

Mode: 40 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5755.0168	5755.0165	5755.0159	5755.0154
110.00	5755.0163	5755.0161	5755.0153	5755.0148
93.50	5755.0159	5755.0152	5755.0151	5755.0141
Max. Deviation (MHz)	0.0168	0.0165	0.0159	0.0154
Max. Deviation (ppm)	2.92	2.86	2.76	2.67
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5755.0223	5755.0210	5755.0193	5755.0169
10	5755.0208	5755.0196	5755.0180	5755.0161
20	5755.0194	5755.0182	5755.0163	5755.0141
30	5755.0181	5755.0168	5755.0153	5755.0135
40	5755.0169	5755.0156	5755.0140	5755.0121
50	5755.0155	5755.0144	5755.0130	5755.0114
60	5755.0139	5755.0124	5755.0108	5755.0088
70	5755.0122	5755.0110	5755.0095	5755.0068
Max. Deviation (MHz)	0.0223	0.0210	0.0193	0.0169
Max. Deviation (ppm)	3.87	3.65	3.35	2.93
Result	Complies			

Mode: 80 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5775.0101	5775.0099	5775.0095	5775.0092
110.00	5775.0099	5775.0091	5775.0084	5775.0080
93.50	5775.0097	5775.0089	5775.0082	5775.0077
Max. Deviation (MHz)	0.0101	0.0099	0.0095	0.0092
Max. Deviation (ppm)	1.75	1.71	1.64	1.59
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5775.0153	5775.0140	5775.0123	5775.0099
10	5775.0138	5775.0126	5775.0110	5775.0091
20	5775.0124	5775.0112	5775.0093	5775.0071
30	5775.0111	5775.0098	5775.0083	5775.0065
40	5775.0099	5775.0086	5775.0070	5775.0051
50	5775.0085	5775.0074	5775.0060	5775.0044
60	5775.0069	5775.0054	5775.0038	5775.0018
70	5775.0052	5775.0040	5775.0025	5774.9998
Max. Deviation (MHz)	0.0153	0.0140	0.0123	0.0099
Max. Deviation (ppm)	2.65	2.42	2.13	1.71
Result	Complies			

4.8. Antenna Requirements

4.8.1. Limit

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

4.8.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02099	1GHz ~ 26.5GHz	Dec. 07, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Feb.10, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-10-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

6. MEASUREMENT UNCERTAINTY

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