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FCC RADIO TEST REPORT

Applicant's company	**MitraStar Technology Corporation**
Applicant Address	No. 6, Innovation Rd II, Science-Based Industrial, Hsin-Chu, Taiwan
FCC ID	**ZMYHGW-500BNA-QC**
Manufacturer's company (1)	**MitraStar Technology Corporation**
Manufacturer Address	No. 6, Innovation Rd II, Hsinchu Science Park, Hsinchu 30076, Taiwan
Manufacturer's company (2)	WuXi MitraStar Technology Co. Ltd
Manufacturer Address	60#-E, Minshan Road, Wuxi New district Jangsu, P.R.C.

Product Name	WiFi Gateway
Brand Name	Pace
Model No.	AW525
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Received Date	Apr. 20, 2015
Final Test Date	May 18, 2015
Submission Type	Original Equipment

Statement

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

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009**, **47 CFR FCC Part 15 Subpart E**, **KDB789033 D02 v01, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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

Note: Using 1.5m table as an alternative was permitted by the FCC per TCBC conference call of Dec. 2, 2014.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR550536AB	Rev. 01	Initial issue of report	Jun. 05, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	WiFi Gateway
Brand Name	:	Pace
Model No.	:	AW525
Applicant	:	MitraStar Technology 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 Apr. 20, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

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	15.207	AC Power Line Conducted Emissions	Complies	4.31 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	0.01 dB
4.5	15.407(a)	Power Spectral Density	Complies	0.01 dB
4.6	15.407(b)	Radiated Emissions	Complies	4.09 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.01 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Channel Number	25 for 20MHz bandwidth ; 12 for 40MHz bandwidth 6 for 80MHz bandwidth

Channel Band Width (99%)	For Non-Beamforming Mode
	Band 1: IEEE 802.11a: 16.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.60 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 72.80 MHz Band 2: IEEE 802.11a: 16.56 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.12 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.60 MHz Band 3: IEEE 802.11a: 17.16 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.76 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.60 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.00 MHz Band 4: IEEE 802.11a: 22.92 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.24 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 40.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 72.80 MHz

Channel Band Width (99%)	For Beamforming Mode
	Band 1: IEEE 802.11ac MCS0/Nss2 (VHT20): 18.48 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.20 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 76.00 MHz Band 2: IEEE 802.11ac MCS0/Nss2 (VHT20): 18.24 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.20 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.60 MHz Band 3: IEEE 802.11ac MCS0/Nss2 (VHT20): 18.12 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.00 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.60 MHz Band 4: IEEE 802.11ac MCS0/Nss2 (VHT20): 18.24 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.60 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 75.60 MHz

Maximum Conducted Output Power	For Non-Beamforming Mode
	Band 1: IEEE 802.11a: 27.07 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 26.97 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 27.27 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 23.58 dBm Band 2: IEEE 802.11a: 21.06 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 20.88 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.79 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 23.76 dBm Band 3: IEEE 802.11a: 20.79 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 21.07 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 23.48 dBm Band 4: IEEE 802.11a: 27.60 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 27.40 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 27.64 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 21.98 dBm

Maximum Conducted Output Power	For Beamforming Mode
	Band 1: IEEE 802.11ac MCS0/Nss2 (VHT20): 26.78 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 27.29 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 24.34 dBm Band 2: IEEE 802.11ac MCS0/Nss2 (VHT20): 23.54 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 23.81 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 23.64 dBm Band 3: IEEE 802.11ac MCS0/Nss2 (VHT20): 23.81 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 23.89 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 23.64 dBm Band 4: IEEE 802.11ac MCS0/Nss2 (VHT20): 27.38 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 26.69 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 22.66 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☒ With 5600~5650MHz	☐ Without 5600~5650MHz
Beamforming Function	☒ With beamforming for 802.11n/ac in 5GHz.	☐ Without beamforming
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

Antenna and Band width

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

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	4	MCS 0-31
802.11n (HT40)	4	MCS 0-31
802.11ac (VHT20)	4	MCS 0-9/Nss1-4
802.11ac (VHT40)	4	MCS 0-9/Nss1-4
802.11ac (VHT80)	4	MCS 0-9/Nss1-4

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

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

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

3.2. Accessories

Power	Brand	Model	Rating
Adapter	PI	AD2027310	Input: 120V ~ 50/60Hz 680mA Output: 12V, 1.5A
Others			
LAN Cable*1: 1.8 meter, non-shielded, w/o ferrite core Pedestal*1			

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector
1	-	-	Printed Antenna	N/A
2	CING XIN	A176-137LB-140IPCX016-1	PCB Antenna	I-PEX
3	-	-	Printed Antenna	N/A
4	-	-	Printed Antenna	N/A
5	-	-	Printed Antenna	N/A
6	-	-	Printed Antenna	N/A

2.4GHz Antenna Gain (dBi)		
Frequency	Ant. 1	Ant. 2
2412 MHz	2.40	6.15
2437 MHz	2.43	5.90
2462 MHz	2.01	5.48

5GHz Antenna Gain (dBi)				
Frequency	Ant. 3	Ant. 4	Ant. 5	Ant. 6
5180 MHz	2.84	3.94	2.78	2.16
5190 MHz	3.07	4.09	2.82	2.27
5200 MHz	2.67	4.07	2.73	2.4
5210 MHz	3.01	4.00	2.68	2.47
5230 MHz	3.03	4.02	2.81	2.87
5240 MHz	3.16	3.79	2.81	2.9
5260 MHz	3.23	3.67	3.00	3.08
5270 MHz	3.03	3.47	3.05	2.72
5290 MHz	3.12	3.26	2.94	2.83
5300 MHz	3.06	3.09	3.06	2.83
5310 MHz	2.97	2.99	3.04	2.90
5320 MHz	3.17	2.99	3.19	2.82
5500 MHz	2.46	3.47	2.94	3.14
5510 MHz	2.28	3.65	2.79	3.18
5530 MHz	2.48	3.74	2.90	3.38
5550 MHz	2.32	3.61	2.76	3.48
5580 MHz	2.19	3.26	2.5	3.31
5610 MHz	2.19	3.26	2.50	3.31
5670 MHz	2.78	2.98	3.41	3.28
5690 MHz	2.78	2.98	3.41	3.28
5700 MHz	2.66	3.15	3.49	3.26
5710MHz	2.71	3.02	3.54	3.34
5720 MHz	2.52	2.84	3.46	3.42
5745 MHz	2.71	3.17	3.52	3.46
5755 MHz	2.7	3.07	3.29	3.39
5775 MHz	2.59	2.93	3.19	3.35
5785 MHz	2.75	2.88	3.31	3.41
5795 MHz	2.66	2.93	3.2	3.58
5825 MHz	2.38	2.86	3.15	3.54

Note: The EUT has six antennas.

For 2.4GHz function:

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

Only Ant.1 can be used as transmitting/receiving antenna.

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

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

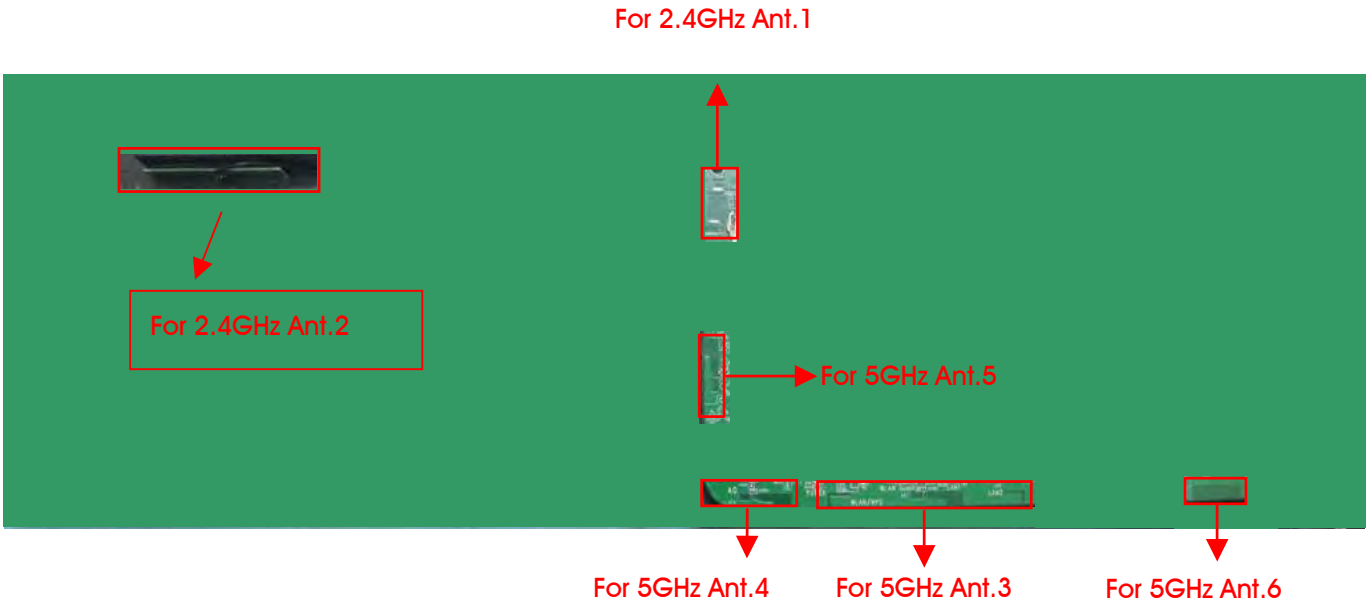
Ant.1 and Ant.2 could transmit/receive simultaneously.

For 5GHz function:

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

Ant.3, Ant.4, Ant.5 and Ant.6 can be used as transmitting/receiving antenna.

Ant.3, Ant.4, Ant.5 and Ant.6 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 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	Ant.
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	For Non-Beamforming Mode				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/144/149/157/165	3+4+5+6
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/144/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/142/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/122/138/155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/144/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/142/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/122/138/155	3+4+5+6

Power Spectral Density	For Non-Beamforming Mode				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/122/155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/122/155	3+4+5+6

26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	For Non-Beamforming Mode				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/122/155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/122/155	3+4+5+6
6dB Spectrum Bandwidth Measurement	For Non-Beamforming Mode				
	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 4	MCS0/Nss2	149/157/165	3+4+5+6
	11ac VHT40	Band 4	MCS0/Nss2	151/159	3+4+5+6
	11ac VHT80	Band 4	MCS0/Nss2	155	3+4+5+6
Radiated Emission Below 1GHz	Normal Link		-	-	-

Radiated Emission Above 1GHz	For Non-Beamforming Mode				
	11a/BPSK	Band 1～4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT20	Band 1～4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165/	3+4+5+6
	11ac VHT40	Band 1～4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1～4	MCS0/Nss1	42/58/106/122/155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 1～4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1～4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1～4	MCS0/Nss2	42/58/106/122/155	3+4+5+6

Band Edge Emission	For Non-Beamforming Mode				
	11a/BPSK	Band 1~4	6Mbps	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT20	Band 1~4	MCS0/Nss1	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss1	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss1	42/58/106/122/155	3+4+5+6
	For Beamforming Mode				
	11ac VHT20	Band 1~4	MCS0/Nss2	36/40/48/52/60/64/100/116/140/149/157/165	3+4+5+6
	11ac VHT40	Band 1~4	MCS0/Nss2	38/46/54/62/102/110/134/151/159	3+4+5+6
	11ac VHT80	Band 1~4	MCS0/Nss2	42/58/106/122/155	3+4+5+6
Frequency Stability	20 MHz	Band 1~4	-	40/60/116/157	3+4+5+6
	40 MHz	Band 1~4	-	38/62/110/151	3+4+5+6
	80 MHz	Band 1~4	-	42/58/106/155	3+4+5+6

Note 1: The EUT can only be used at standing position.

Note 2: 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.

Note 3: 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.

Note 4: All the specification of test configurations and test modes were based on customer's request.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link - AP Mode

Mode 2. Normal Link - STA Mode

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emission test (Below 1GHz):

Mode 1. Normal Link - AP Mode - Y axis

Mode 2. Normal Link - STA Mode - Y axis

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission test (Above 1GHz):

Mode 1. CTX

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

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to Appendix B) and Radiated Emission Co-location (please refer to Appendix C) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO02-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E4300	DoC
Notebook	Apple	Mac Book	DoC
Client Device	MitraStar	HGW-500BNA-QC	DoC

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

For Non-Beamforming Mode

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For Beamforming Mode

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E6430	DoC
Client Device	MitraStar	HGW-500BNA-QC	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6220	DoC
Notebook*2	DELL	E6430	DoC
AP Device	MitraStar	HGW-500BNA-QC	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.8. 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	DOS(V36.7.5.36)												
Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz	5720 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	21	21	21	14	14	14	14	13	13.5	14	18	22	22
802.11ac MCS0/Nss1 VHT20	21	21	21	14.5	14	14.5	13.5	14	14	14	21	21	21

Mode	NCB: 40MHz									
802.11ac MCS0/Nss1 VHT40	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz	5710 MHz	5755 MHz	5795 MHz
	18	21	17	17	17	16	16.5	17	21	21

Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz	5290 MHz	5530 MHz	5610 MHz	5690 MHz	5775 MHz
	17	17	16	16	17.5	15

For Beamforming Mode

Test Software Version	DOS(V36.7.5.36)												
Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz	5720 MHz	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss2 VHT20	21	21	21	17.5	17.5	17.5	17	17	17	17	18	21	22

Mode	NCB: 40MHz									
802.11ac MCS0/Nss2 VHT40	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz	5710 MHz	5755 MHz	5795 MHz
	17	21	17.5	17.5	17	17	17	16	16	20

Mode	NCB: 80MHz					
802.11ac MCS0/Nss2 VHT80	5210 MHz	5290 MHz	5530 MHz	5610 MHz	5690 MHz	5775 MHz
	18	17.5	16	16.5	17	16

3.9. 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 7 were executed.

The program was executed as follows:

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

3.10. Duty Cycle

For Non-Beamforming Mode

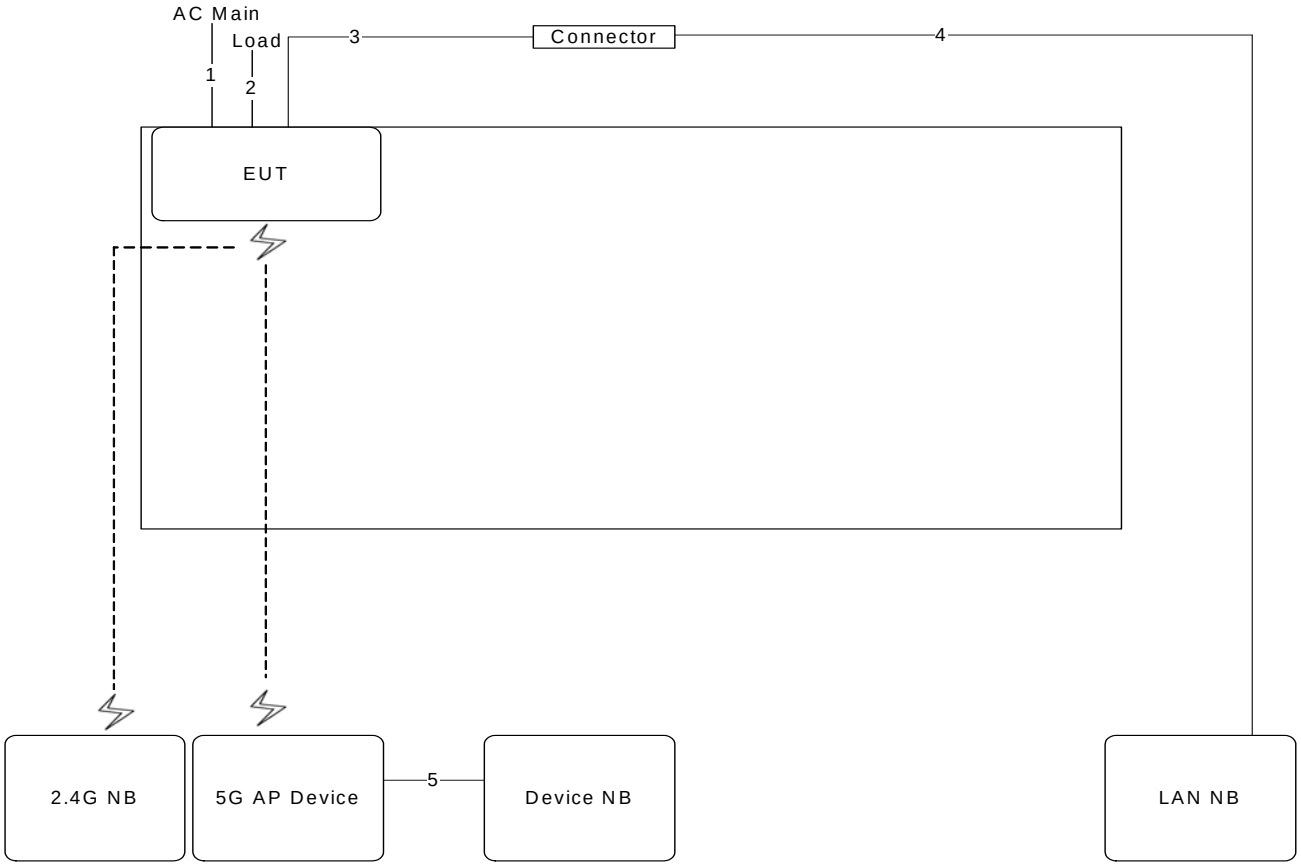
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	5.33	5.356	99.51%	0.02	0.01
802.11ac MCS0/Nss1 VHT20	4.966	5.018	98.96%	0.05	0.01
802.11ac MCS0/Nss1 VHT40	2.306	2.356	97.89%	0.09	0.43
802.11ac MCS0/Nss1 VHT80	1.109	1.152	96.25%	0.17	0.90

For Beamforming Mode

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss2 VHT20	1.720	1.88	91.49%	0.39	0.58
802.11ac MCS0/Nss2 VHT40	0.824	0.974	84.60%	0.73	1.21
802.11ac MCS0/Nss2 VHT80	2.330	2.43	95.88%	0.18	0.43

3.11. Test Configurations

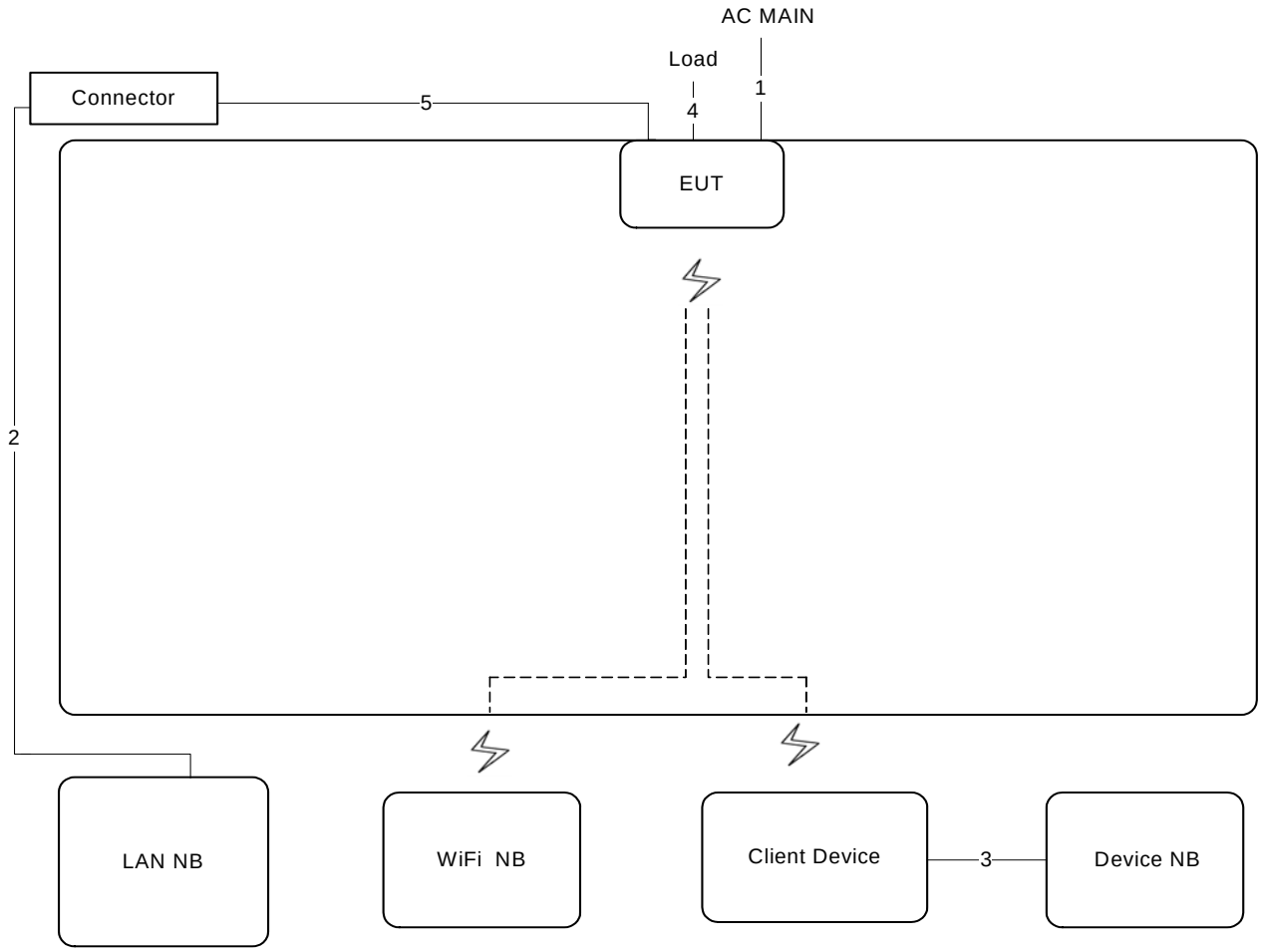
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length	Remark
1	Power cable	No	1.6m	-
2	RJ-45 cable	No	2m	Load
3	LAN cable	No	1.8m	-
4	RJ-45 cable	No	10m	-
5	RJ-45 cable	No	1m	-

3.11.2. Radiation Emissions Test Configuration

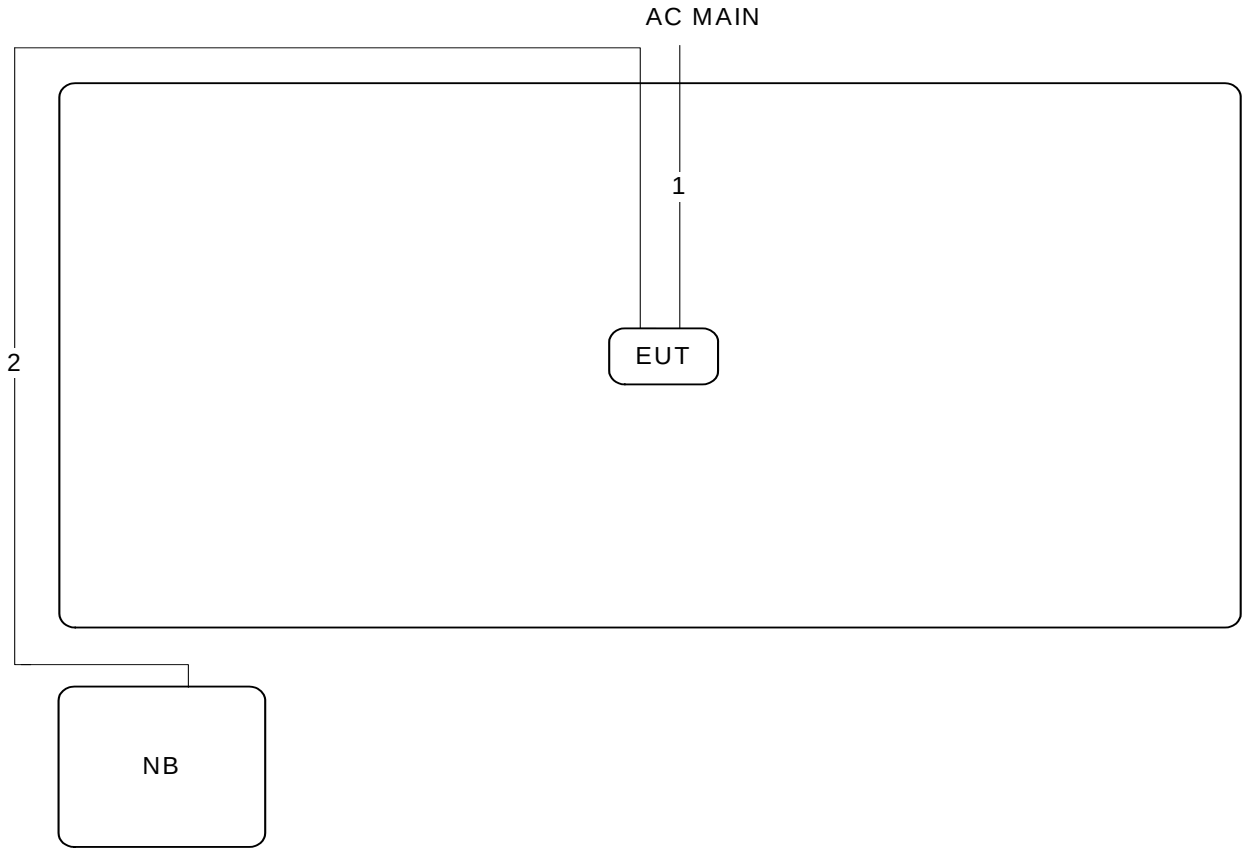
Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length	Remark
1	Power cable	No	1.6m	-
2	RJ-45 cable	No	10m	-
3	RJ-45 cable	No	1.5m	-
4	RJ-45 cable	No	1.5m	Load
5	LAN cable	No	1.8m	-

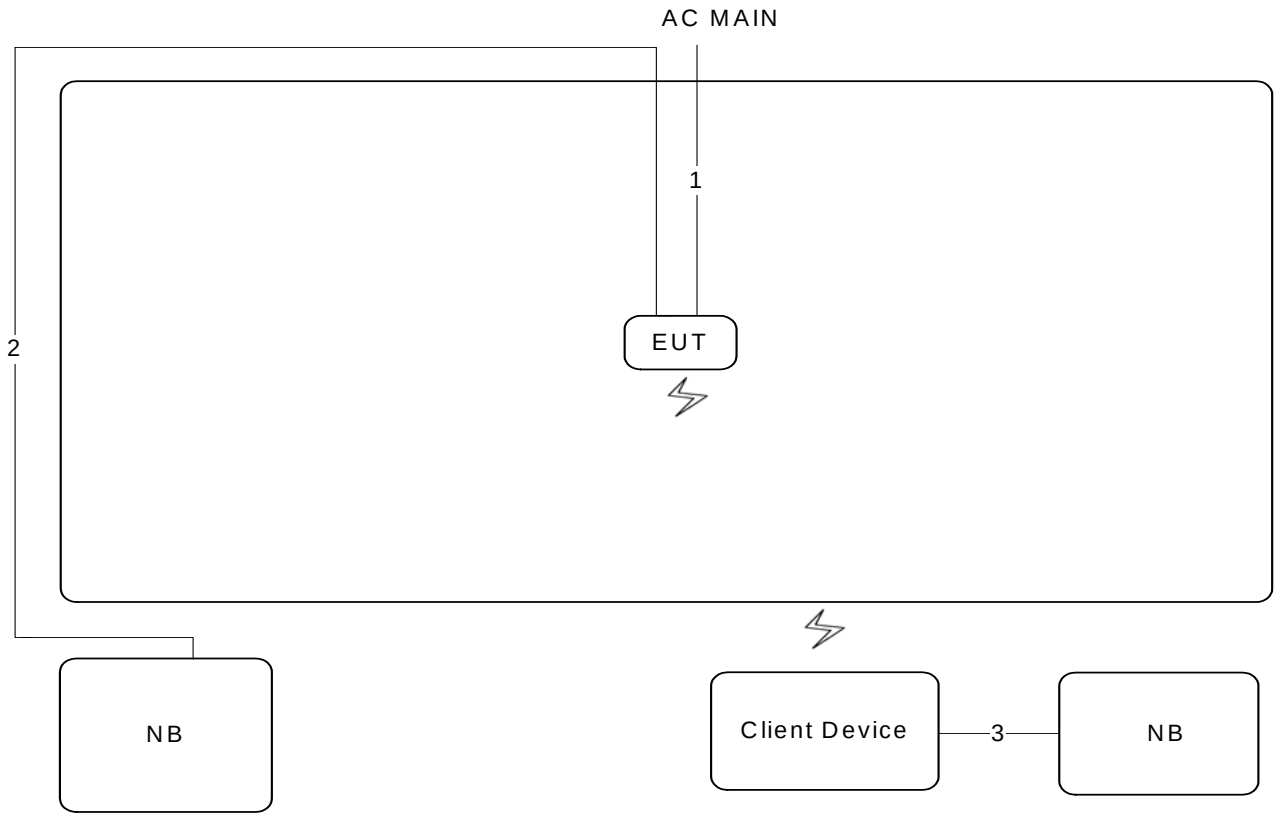
Test Configuration: above 1GHz

For Non-Beamforming Mode



Item	Connection	Shielded	Length
1	Power cable	No	1.6m
2	RJ-45 cable	No	10m

For Beamforming Mode



Item	Connection	Shielded	Length
1	Power cable	No	1.6m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

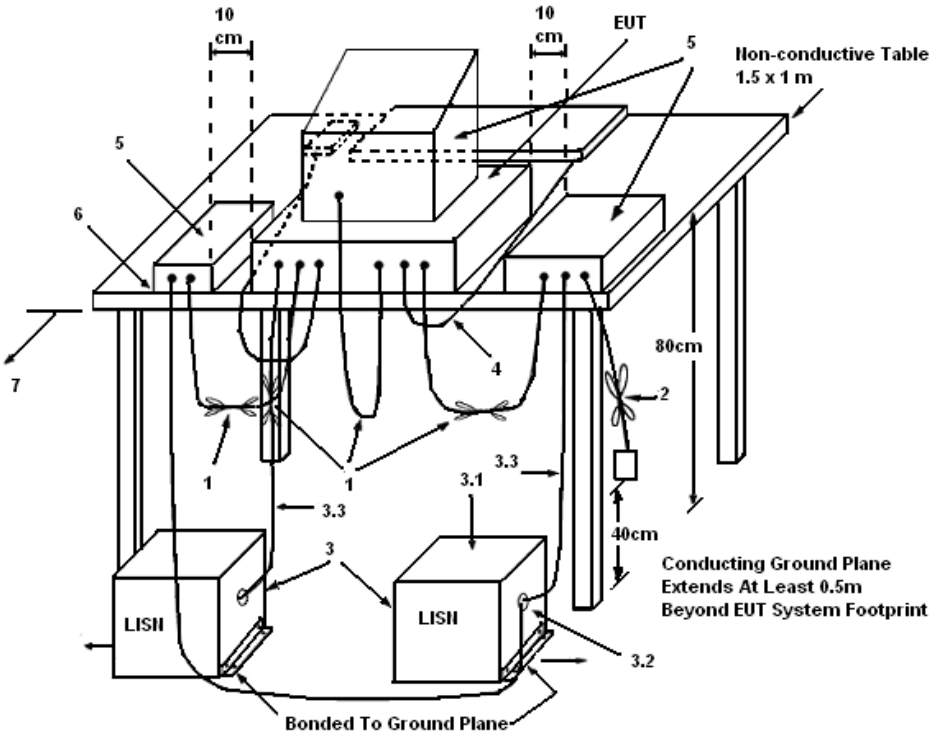
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

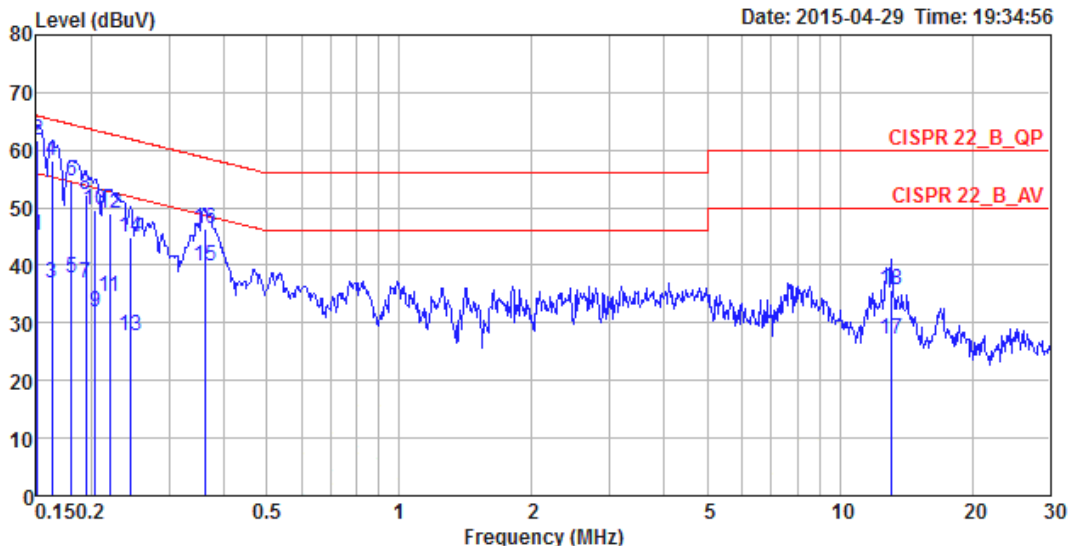
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

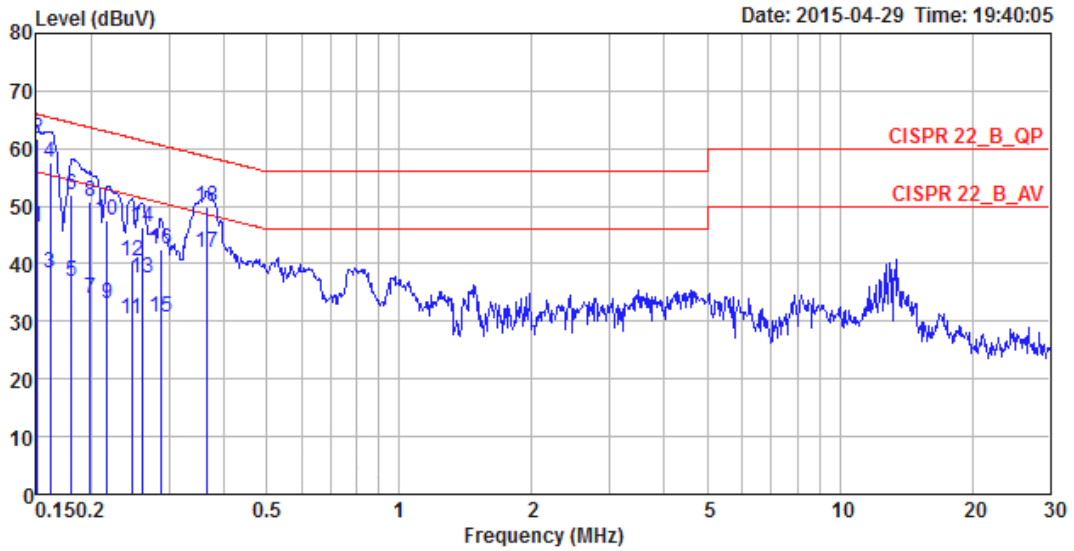
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link / Mode 2		



		Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
		MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1		0.1508	45.03	-10.93	55.96	10.00	34.86	0.17	LINE	Average
2	q	0.1508	61.65	-4.31	65.96	10.00	51.48	0.17	LINE	QP
3		0.1624	37.04	-18.30	55.34	10.00	26.87	0.17	LINE	Average
4		0.1624	58.03	-7.31	65.34	10.00	47.86	0.17	LINE	QP
5		0.1806	37.75	-16.71	54.46	10.01	27.55	0.19	LINE	Average
6		0.1806	54.57	-9.89	64.46	10.01	44.37	0.19	LINE	QP
7		0.1945	37.01	-16.83	53.84	10.01	26.81	0.19	LINE	Average
8		0.1945	52.31	-11.53	63.84	10.01	42.11	0.19	LINE	QP
9		0.2040	32.01	-21.44	53.45	10.01	21.81	0.19	LINE	Average
10		0.2040	49.68	-13.77	63.45	10.01	39.48	0.19	LINE	QP
11		0.2197	34.64	-18.19	52.83	10.01	24.44	0.19	LINE	Average
12		0.2197	48.98	-13.85	62.83	10.01	38.78	0.19	LINE	QP
13		0.2455	27.85	-24.06	51.91	10.01	17.65	0.19	LINE	Average
14		0.2455	44.81	-17.10	61.91	10.01	34.61	0.19	LINE	QP
15	a	0.3615	39.91	-8.56	48.47	10.01	29.70	0.20	LINE	Average
16		0.3615	46.27	-12.20	58.47	10.01	36.06	0.20	LINE	QP
17		13.1269	27.08	-22.92	50.00	10.29	16.38	0.41	LINE	Average
18		13.1269	35.82	-24.18	60.00	10.29	25.12	0.41	LINE	QP

Temperature	24°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 2		



		Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
		MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1		0.1508	46.32	-9.64	55.96	10.00	36.15	0.17	NEUTRAL	Average
2	q	0.1508	61.56	-4.40	65.96	10.00	51.39	0.17	NEUTRAL	QP
3		0.1616	38.27	-17.11	55.38	10.00	28.10	0.17	NEUTRAL	Average
4		0.1616	57.56	-7.82	65.38	10.00	47.39	0.17	NEUTRAL	QP
5		0.1806	36.80	-17.66	54.46	10.01	26.60	0.19	NEUTRAL	Average
6		0.1806	52.09	-12.37	64.46	10.01	41.89	0.19	NEUTRAL	QP
7		0.1986	33.87	-19.80	53.67	10.01	23.67	0.19	NEUTRAL	Average
8		0.1986	50.92	-12.75	63.67	10.01	40.72	0.19	NEUTRAL	QP
9		0.2174	33.13	-19.79	52.92	10.01	22.93	0.19	NEUTRAL	Average
10		0.2174	47.49	-15.43	62.92	10.01	37.29	0.19	NEUTRAL	QP
11		0.2468	30.34	-21.52	51.86	10.01	20.14	0.19	NEUTRAL	Average
12		0.2468	40.42	-21.44	61.86	10.01	30.22	0.19	NEUTRAL	QP
13		0.2603	37.40	-14.02	51.42	10.01	27.20	0.19	NEUTRAL	Average
14		0.2603	46.31	-15.11	61.42	10.01	36.11	0.19	NEUTRAL	QP
15		0.2878	30.69	-19.90	50.59	10.01	20.49	0.19	NEUTRAL	Average
16		0.2878	42.46	-18.13	60.59	10.01	32.26	0.19	NEUTRAL	QP
17	a	0.3653	41.83	-6.78	48.61	10.01	31.62	0.20	NEUTRAL	Average
18		0.3653	49.80	-8.81	58.61	10.01	39.59	0.20	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

For Non-Beamforming Mode

Temperature	23.2℃	Humidity	52%
Test Engineer	Lucas Huang		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	19.92	16.44
	5200 MHz	20.40	16.68
	5240 MHz	21.00	16.80
	5260 MHz	20.64	16.56
	5300 MHz	20.40	16.44
	5320 MHz	20.52	16.44
	5500 MHz	21.36	16.80
	5580 MHz	21.36	16.92
	5700 MHz	20.88	17.16
	5745 MHz	20.76	17.28
	5785 MHz	27.84	20.64
	5825 MHz	30.00	22.92
802.11ac MCS0/Nss1 VHT20	5180 MHz	23.28	18.60
	5200 MHz	23.16	18.48
	5240 MHz	22.32	18.36
	5260 MHz	21.96	18.12
	5300 MHz	21.12	18.00
	5320 MHz	20.28	17.64
	5500 MHz	20.4	17.76
	5580 MHz	20.04	17.04
	5700 MHz	20.28	17.28
	5745 MHz	25.92	17.64
	5785 MHz	27.48	18.00
	5825 MHz	26.52	18.24

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT40	5190 MHz	42.40	37.00
	5230 MHz	54.80	37.80
	5270 MHz	48.40	37.80
	5310 MHz	41.80	36.80
	5510 MHz	40.60	36.60
	5550 MHz	39.20	35.20
	5670 MHz	41.20	36.20
	5755 MHz	67.40	40.80
	5795 MHz	71.40	40.80
802.11ac MCS0/Nss1 VHT80	5210 MHz	84.40	72.80
	5290 MHz	80.00	75.60
	5530 MHz	82.00	76.00
	5610 MHz	83.20	73.20
	5775 MHz	78.80	72.80

Straddle Channel

Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 2C 26dB BW (MHz)	UNII 3 26dB BW (MHz)	UNII 2C 99% BW (MHz)	UNII 3 99% BW (MHz)
802.11a	5720 MHz	21.13	17.19	5708.61	5710.97	16.39	4.74	14.03	3.16
802.11ac MCS0/Nss1 VHT20	5720 MHz	19.39	16.93	5709.48	5711.32	15.52	3.87	13.68	3.25
802.11ac MCS0/Nss1 VHT40	5710 MHz	41.30	36.47	5689.71	5692.06	35.29	6.01	32.94	3.52
802.11ac MCS0/Nss1 VHT80	5690 MHz	82.03	75.54	5647.39	5652.08	77.61	4.42	72.92	2.63

For Beamforming Mode

Temperature	23.2℃	Humidity	52%
Test Engineer	Lucas Huang		

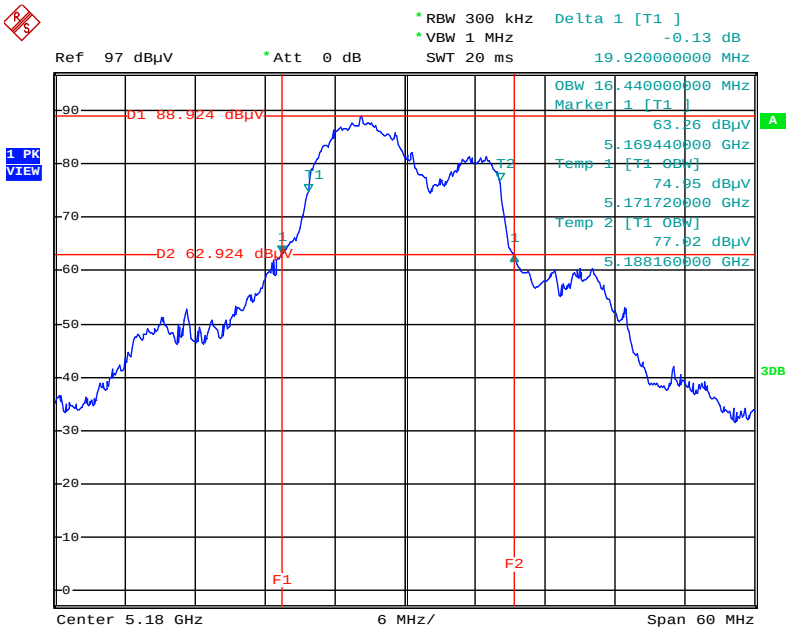
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss2 VHT20	5180 MHz	24.12	18.48
	5200 MHz	24.00	18.36
	5240 MHz	23.88	18.36
	5260 MHz	23.88	18.24
	5300 MHz	23.88	18.12
	5320 MHz	23.28	18.00
	5500 MHz	23.64	18.12
	5580 MHz	23.16	18.12
	5700 MHz	23.16	18.00
	5745 MHz	23.28	18.12
	5785 MHz	23.4	18.12
	5825 MHz	26.64	18.24
802.11ac MCS0/Nss2 VHT40	5190 MHz	42.20	36.80
	5230 MHz	42.80	37.20
	5270 MHz	42.40	37.20
	5310 MHz	42.40	37.20
	5510 MHz	42.20	37.00
	5550 MHz	42.20	37.00
	5670 MHz	42.80	37.00
	5755 MHz	43.00	37.00
	5795 MHz	62.60	37.60
802.11ac MCS0/Nss2 VHT80	5210 MHz	80.80	76.00
	5290 MHz	80.00	75.60
	5530 MHz	80.00	75.20
	5610 MHz	80.00	75.60
	5775 MHz	80.00	75.60

Straddle Channel

Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 2C 26dB BW (MHz)	UNII 3 26dB BW (MHz)	UNII 2C 99% BW (MHz)	UNII 3 99% BW (MHz)
802.11ac MCS0/Nss2 VHT20	5720 MHz	22.96	17.97	5708.26	5710.97	16.74	6.22	14.03	3.94
802.11ac MCS0/Nss2 VHT40	5710 MHz	43.33	36.90	5688.41	5691.48	36.59	6.74	33.52	3.38
802.11ac MCS0/Nss2 VHT80	5690 MHz	79.71	75.25	5650.00	5652.37	75.00	4.71	72.63	2.63

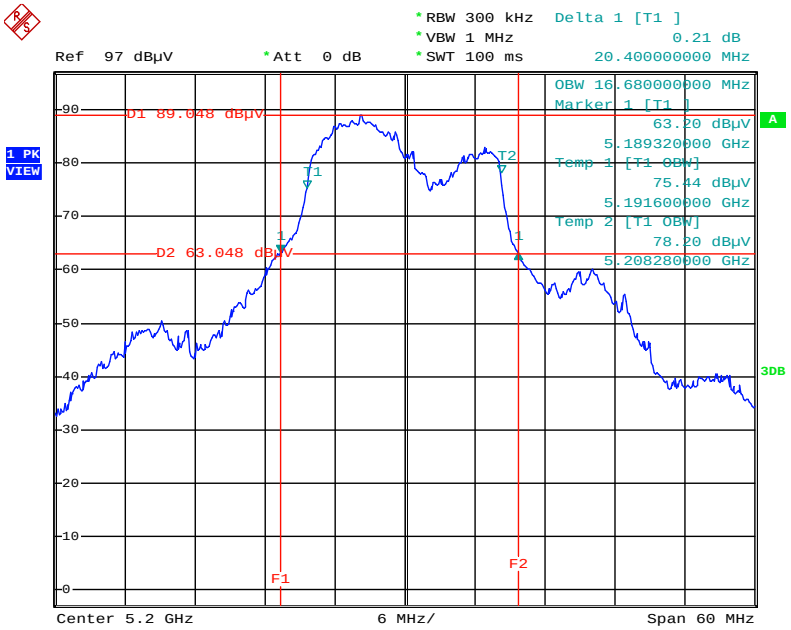
For Non-Beamforming Mode

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5180 MHz



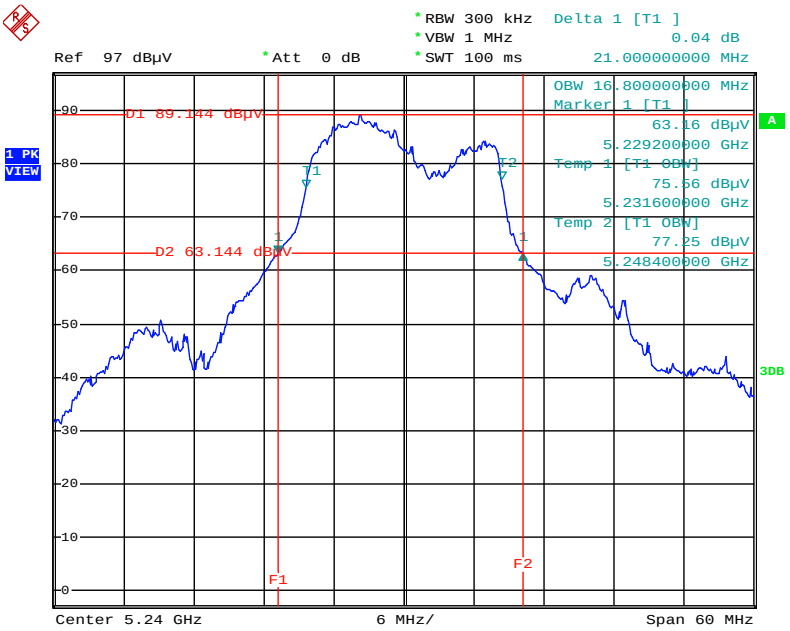
Date: 11.MAY.2015 12:49:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5200 MHz



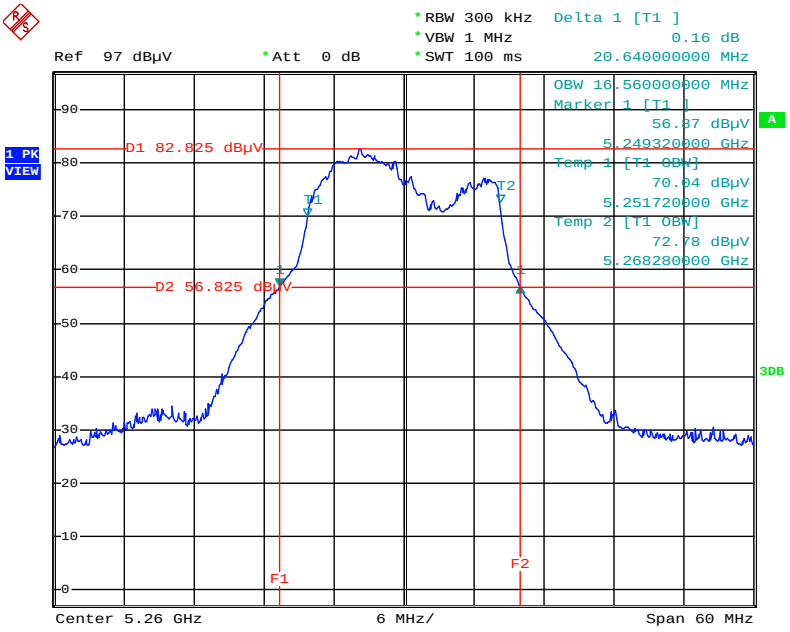
Date: 11.MAY.2015 12:54:49

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5240 MHz



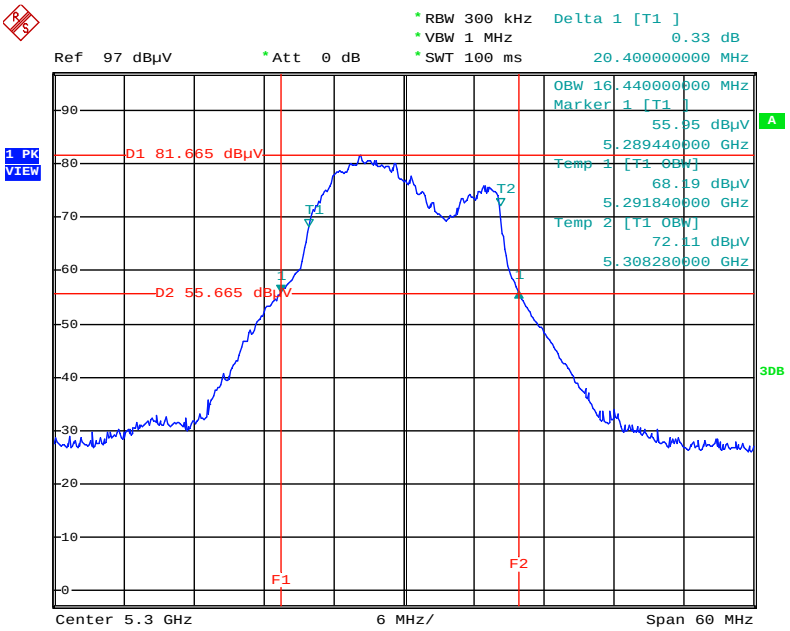
Date: 11.MAY.2015 12:56:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5260 MHz



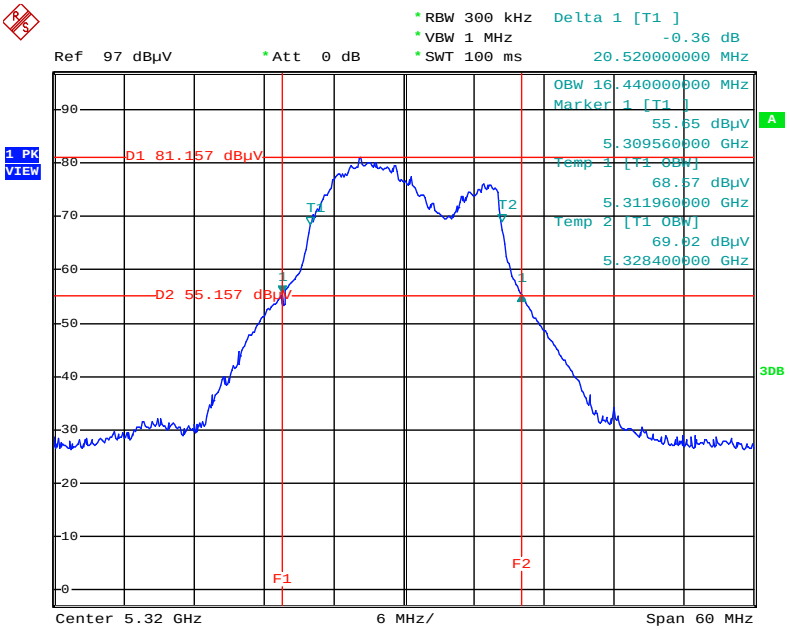
Date: 11.MAY.2015 12:57:14

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5300 MHz



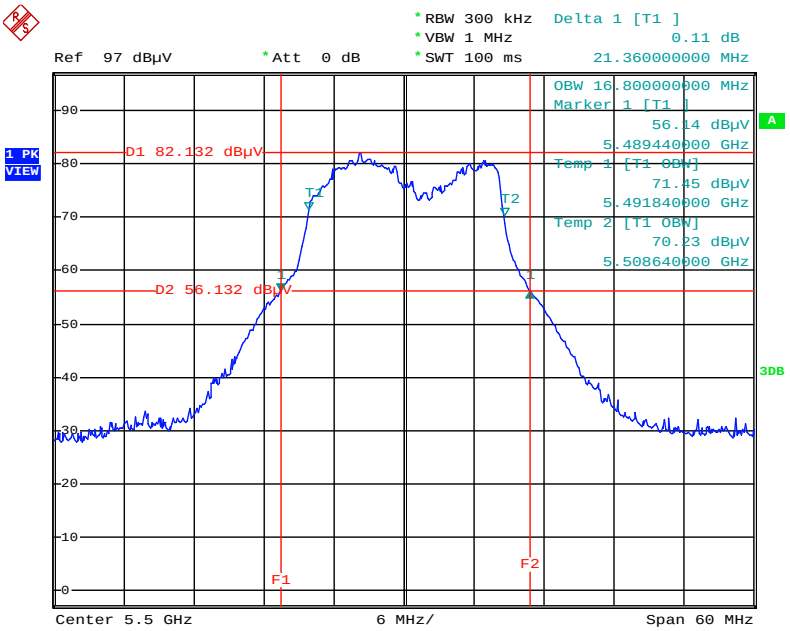
Date: 11.MAY.2015 12:57:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5320 MHz



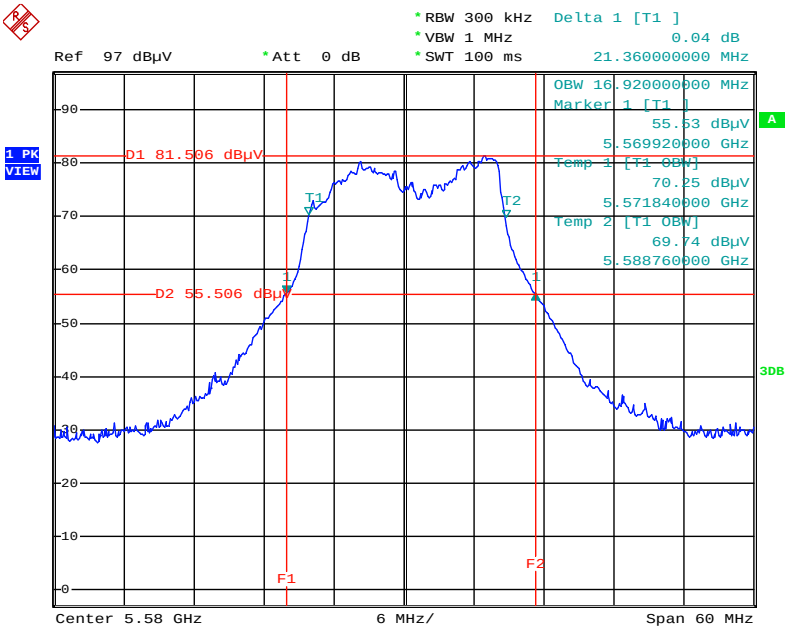
Date: 11.MAY.2015 12:58:29

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5500 MHz



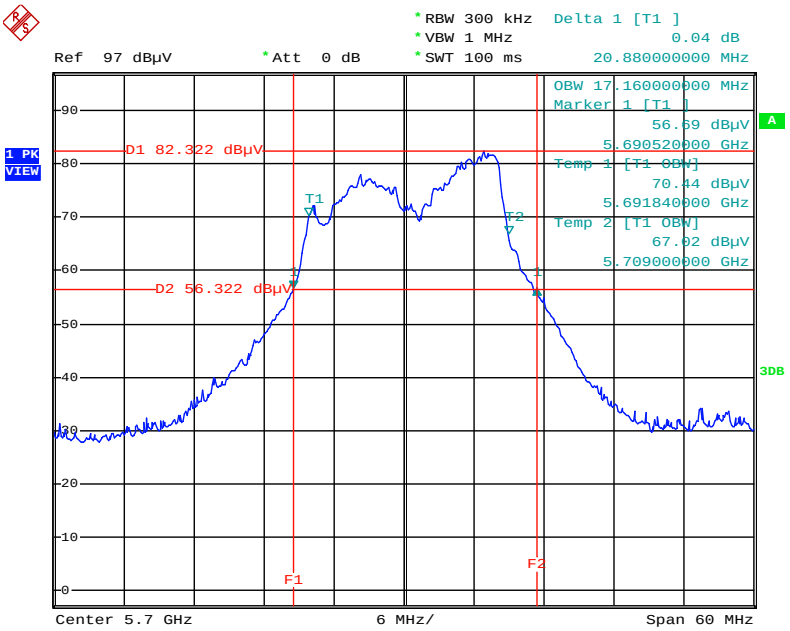
Date: 11.MAY.2015 13:00:48

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5580 MHz



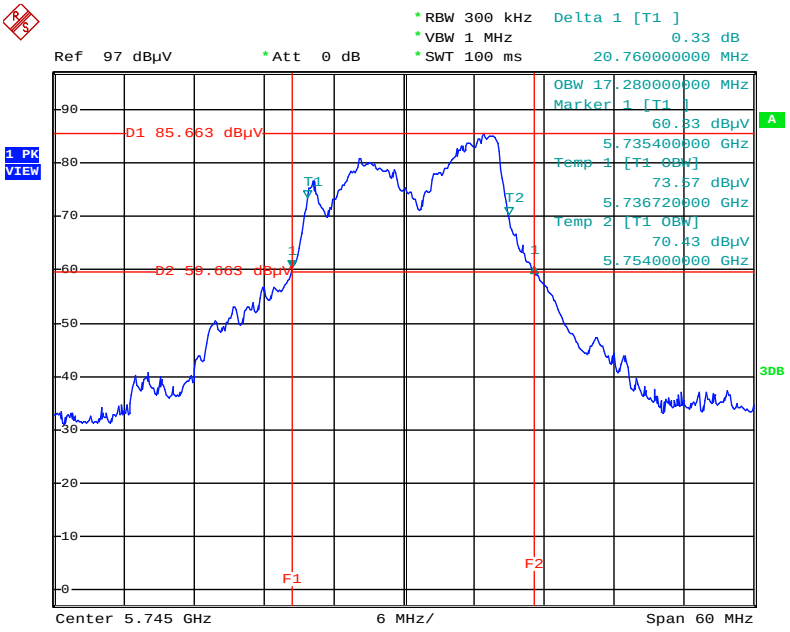
Date: 11.MAY.2015 13:01:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5700 MHz



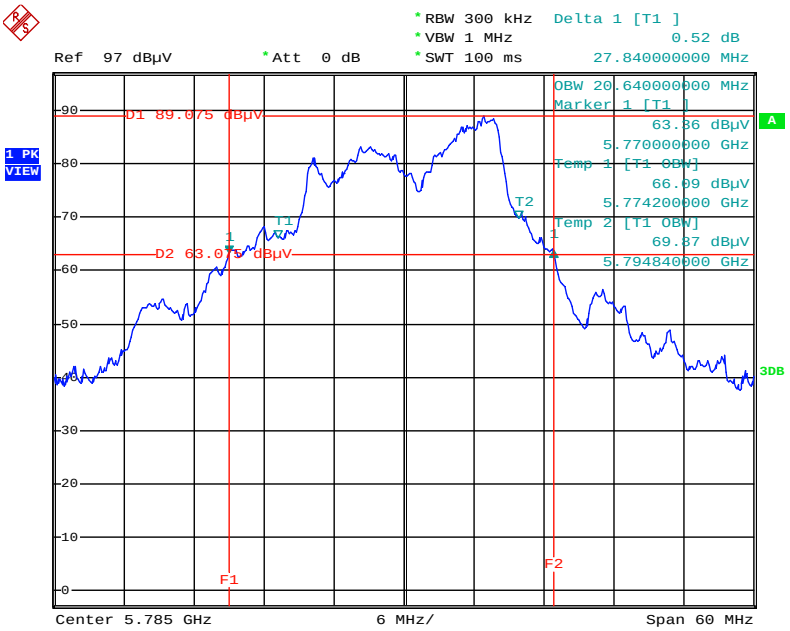
Date: 11.MAY.2015 13:03:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



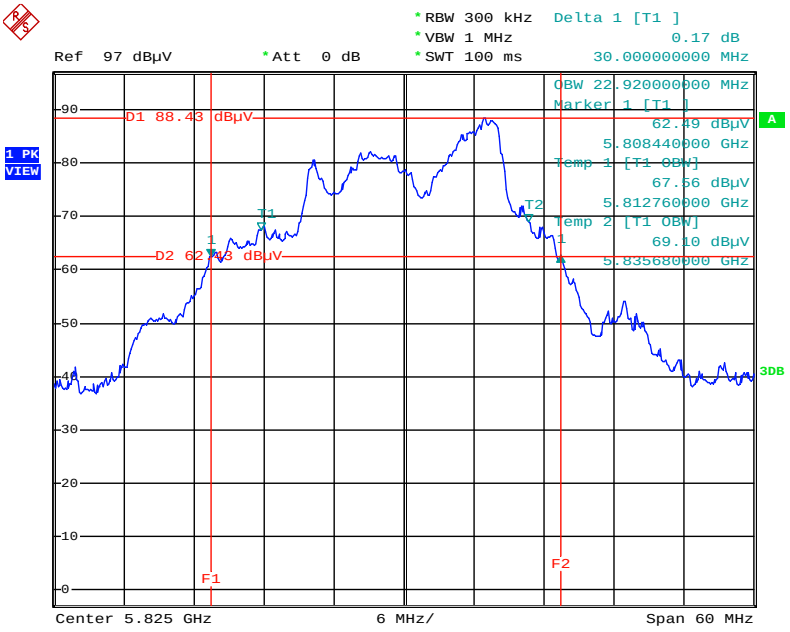
Date: 11.MAY.2015 13:04:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



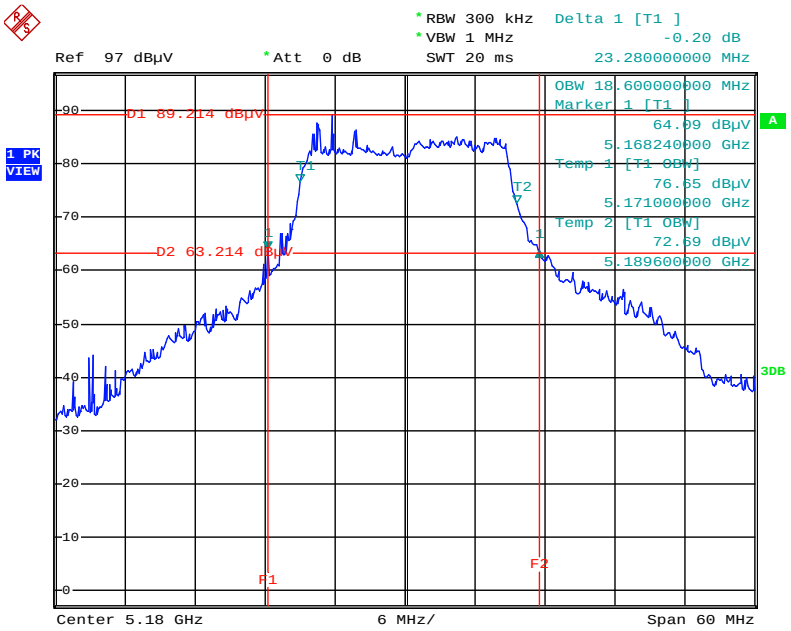
Date: 11.MAY.2015 13:05:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



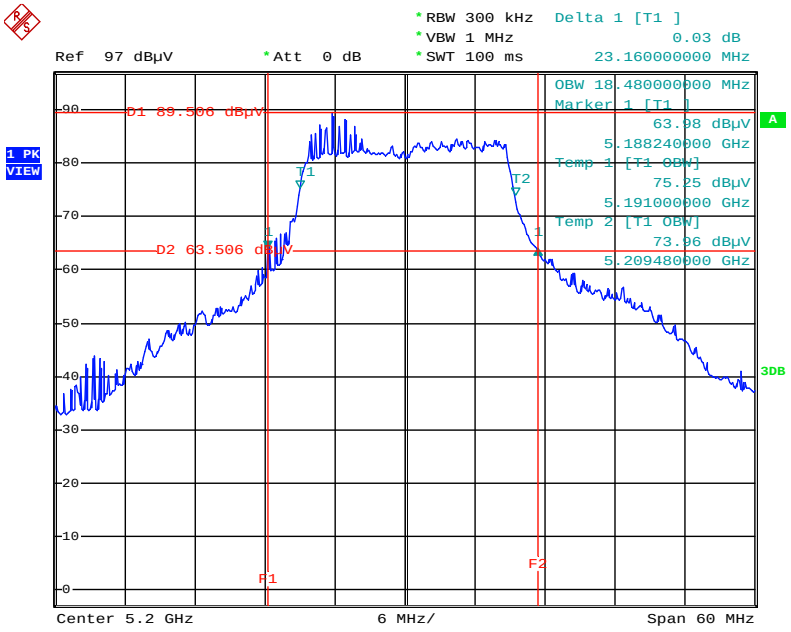
Date: 11.MAY.2015 13:05:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5180 MHz



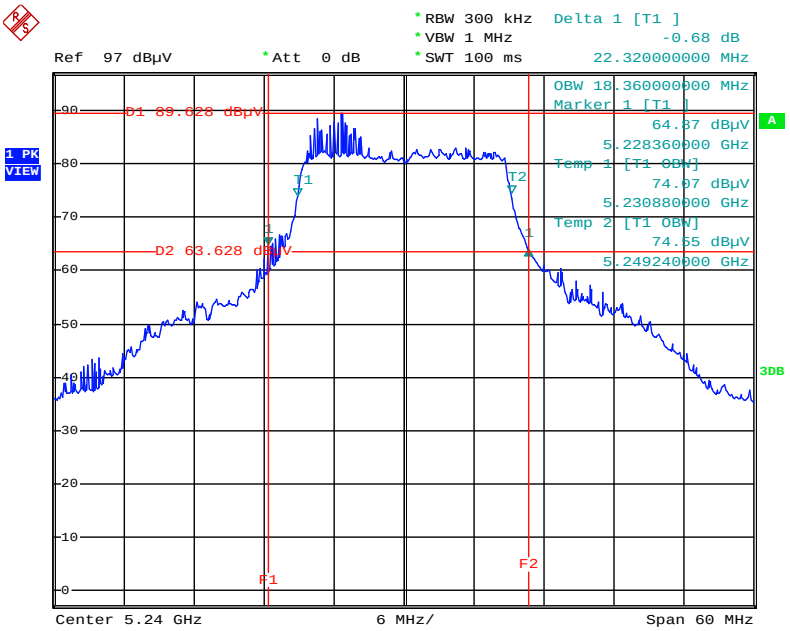
Date: 6.MAY.2015 16:36:02

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5200 MHz



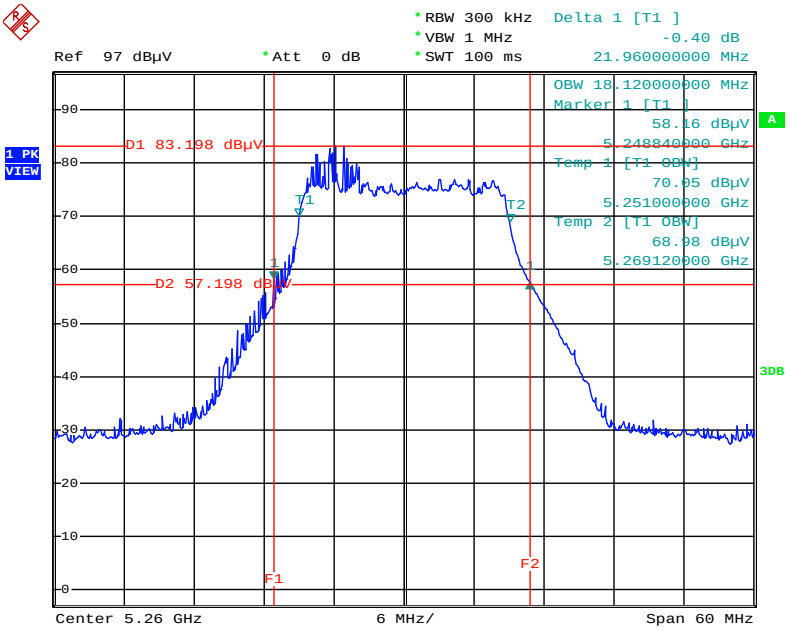
Date: 6.MAY.2015 16:36:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5240 MHz



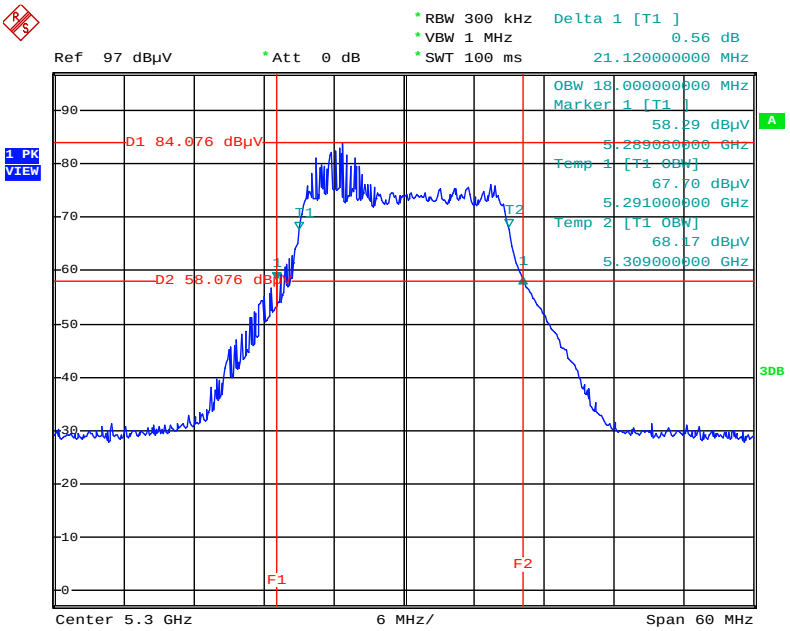
Date: 6.MAY.2015 16:37:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5260 MHz



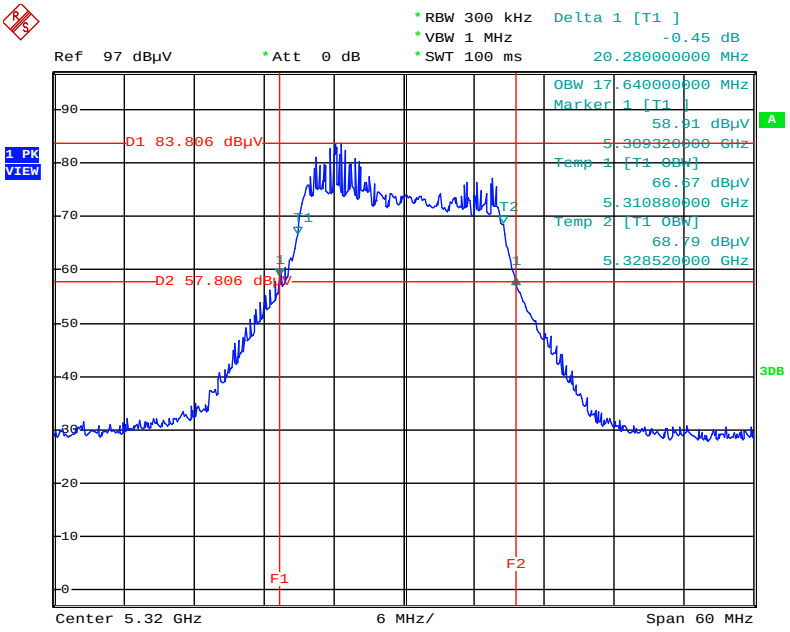
Date: 6.MAY.2015 16:38:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5300 MHz



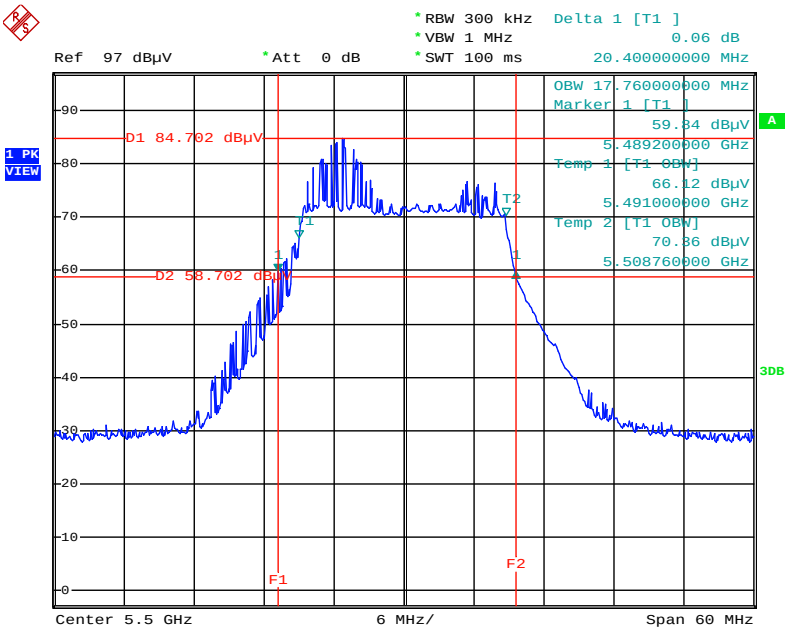
Date: 6.MAY.2015 16:39:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5320 MHz



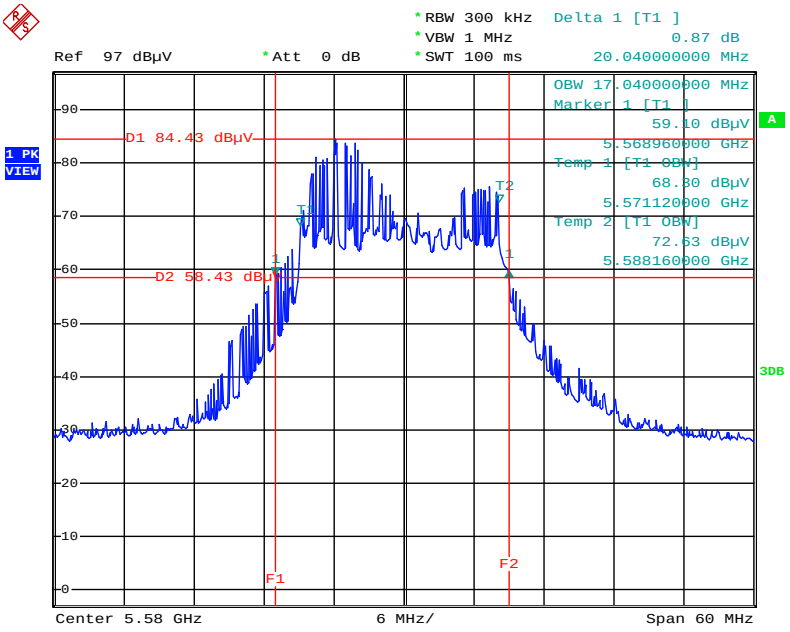
Date: 6.MAY.2015 16:39:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5500 MHz



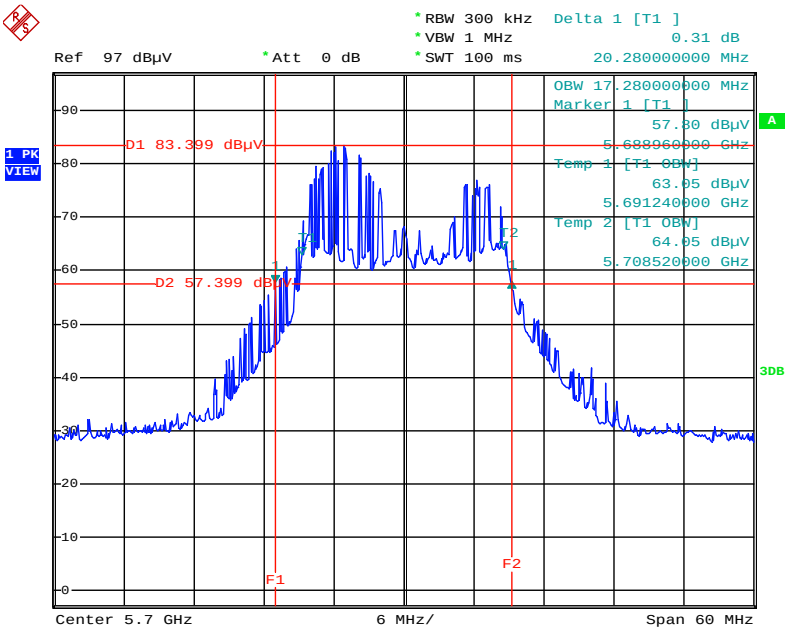
Date: 6.MAY.2015 16:40:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5580 MHz



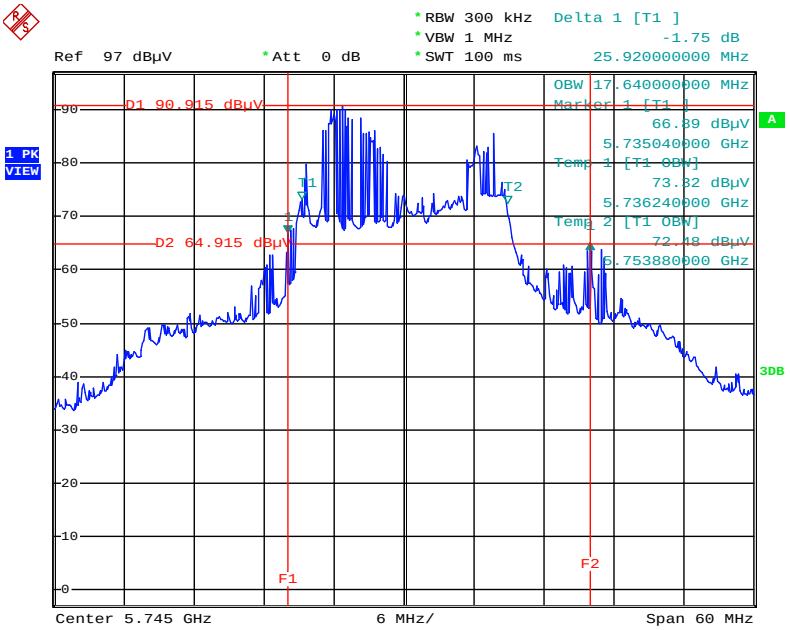
Date: 6.MAY.2015 16:41:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5700 MHz



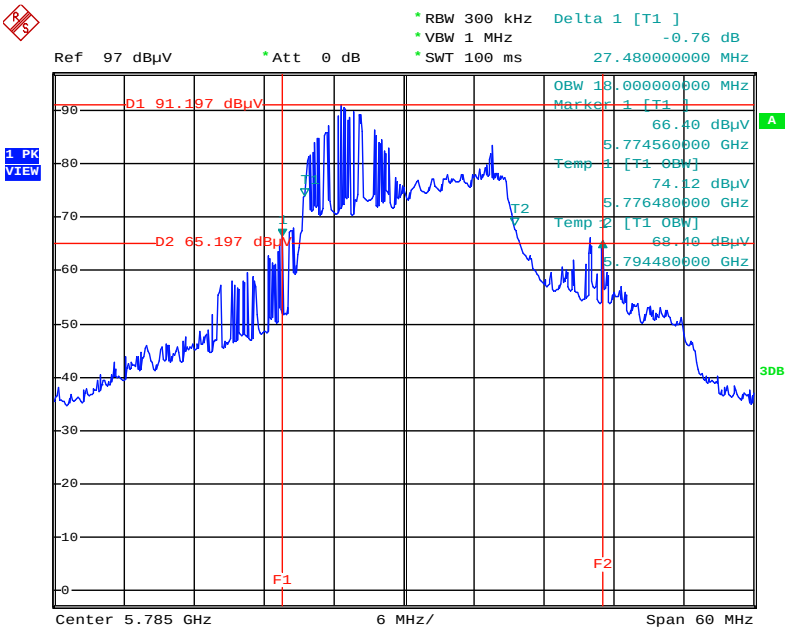
Date: 6.MAY.2015 16:41:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



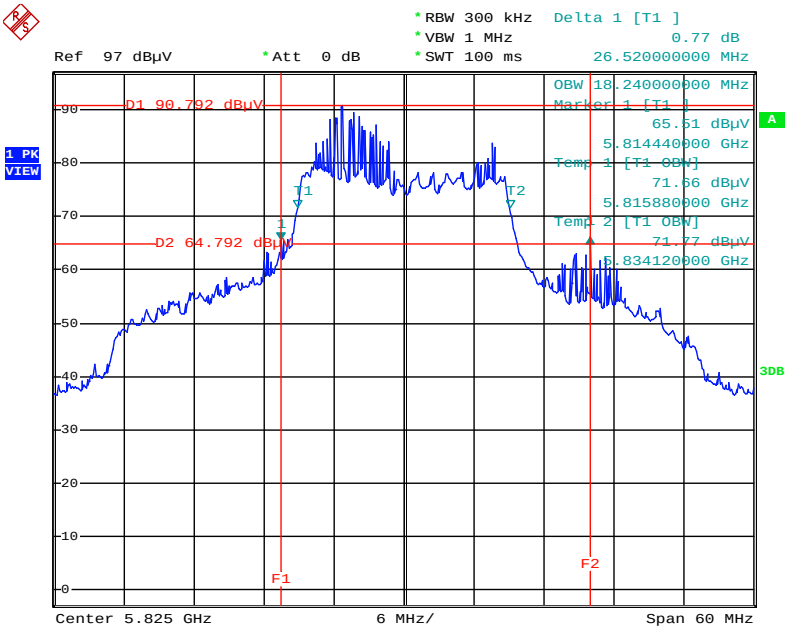
Date: 6.MAY.2015 16:42:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



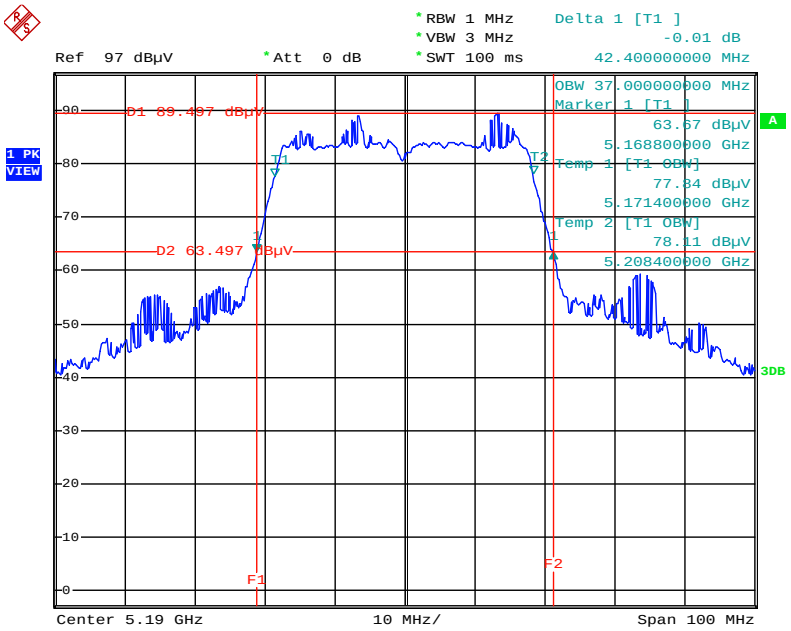
Date: 6.MAY.2015 16:43:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



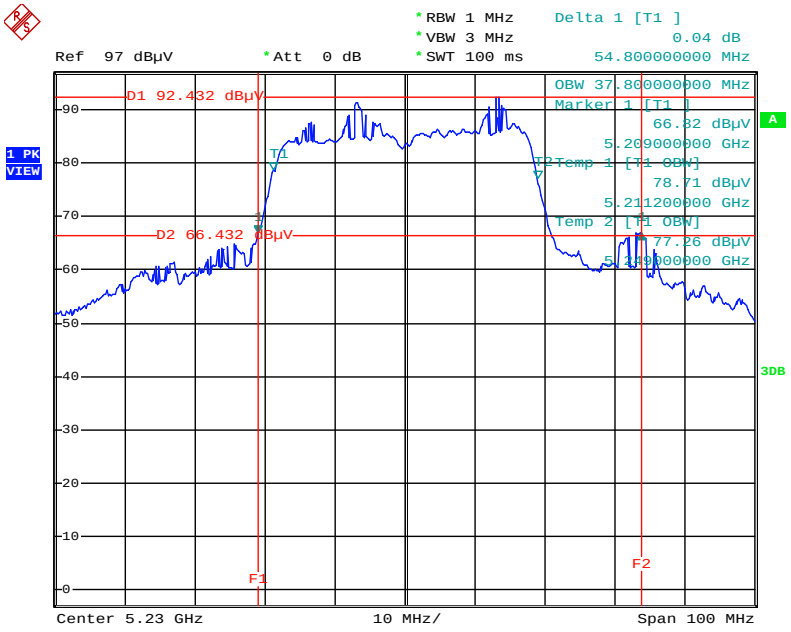
Date: 6.MAY.2015 16:44:22

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5190 MHz



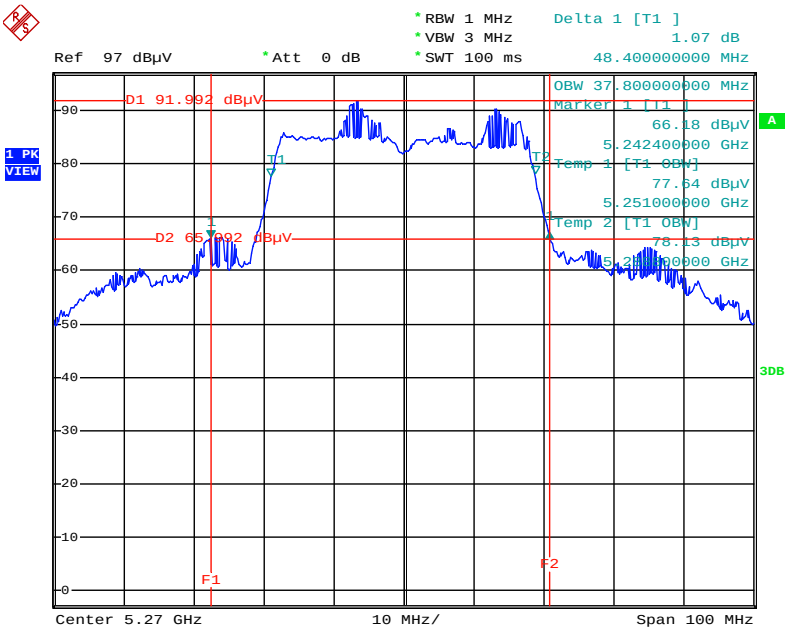
Date: 6.MAY.2015 16:48:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5230 MHz



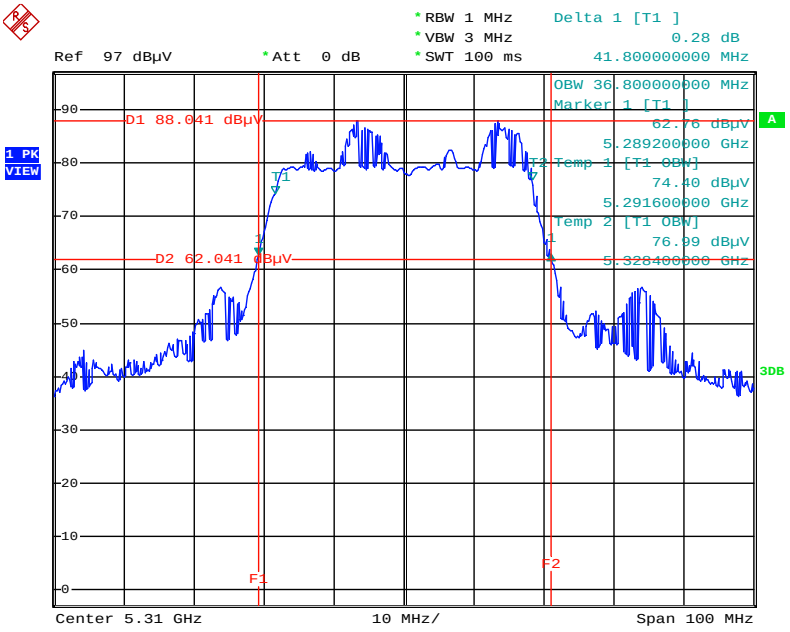
Date: 6.MAY.2015 16:49:06

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5270 MHz



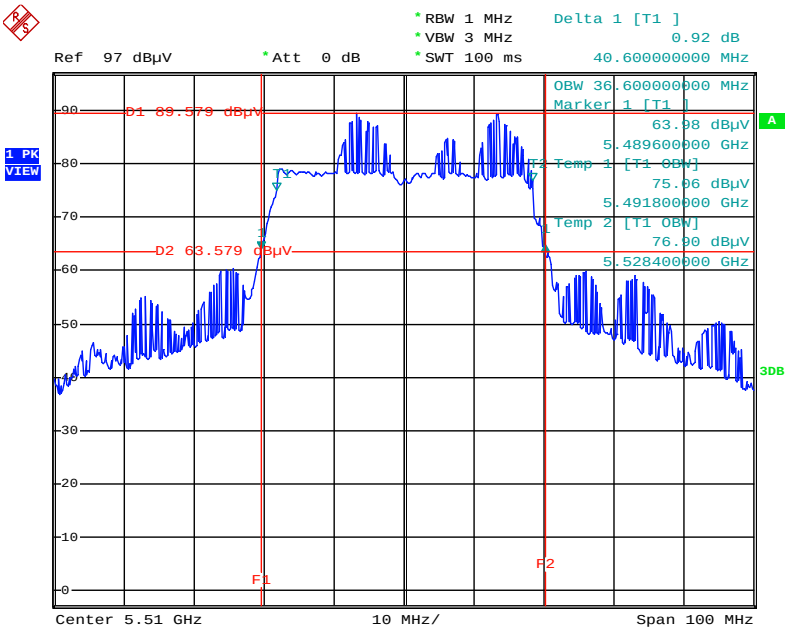
Date: 6.MAY.2015 16:49:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5310 MHz



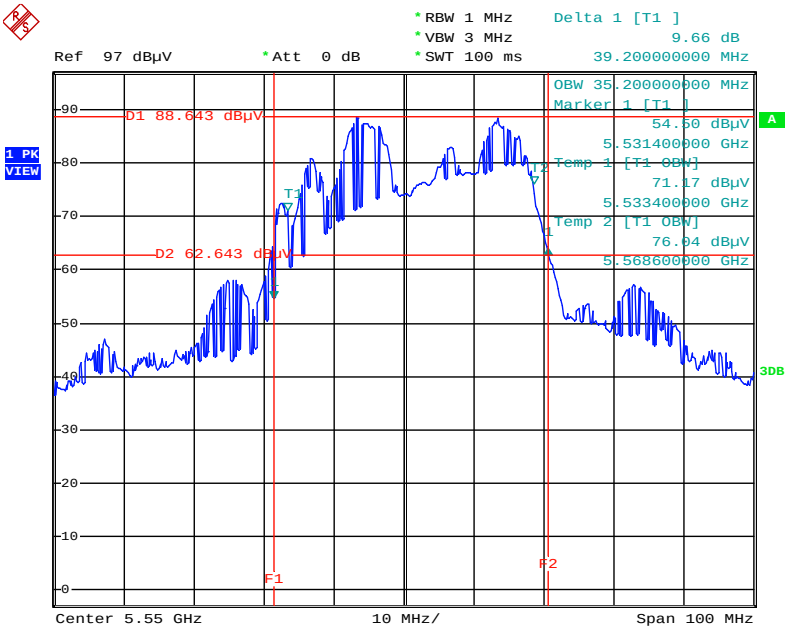
Date: 6.MAY.2015 16:50:30

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5510 MHz



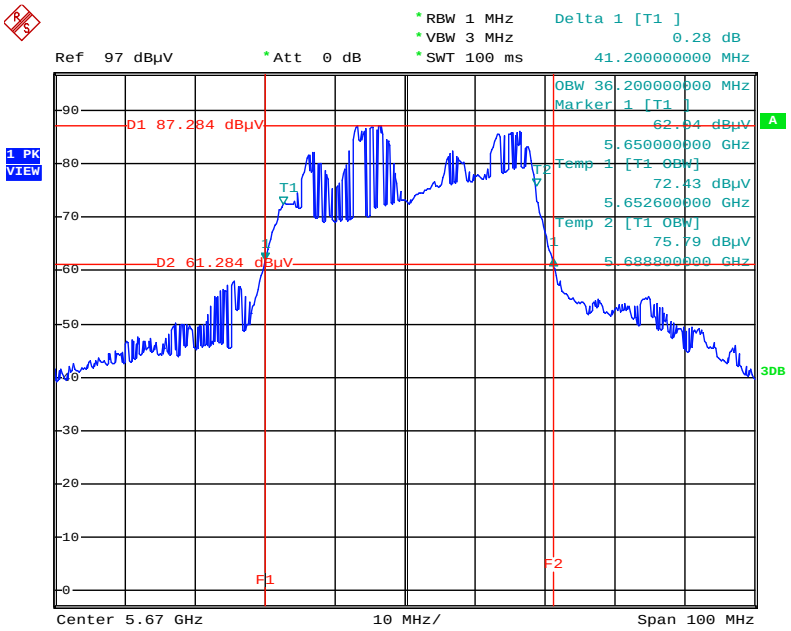
Date: 6.MAY.2015 16:51:14

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5550 MHz



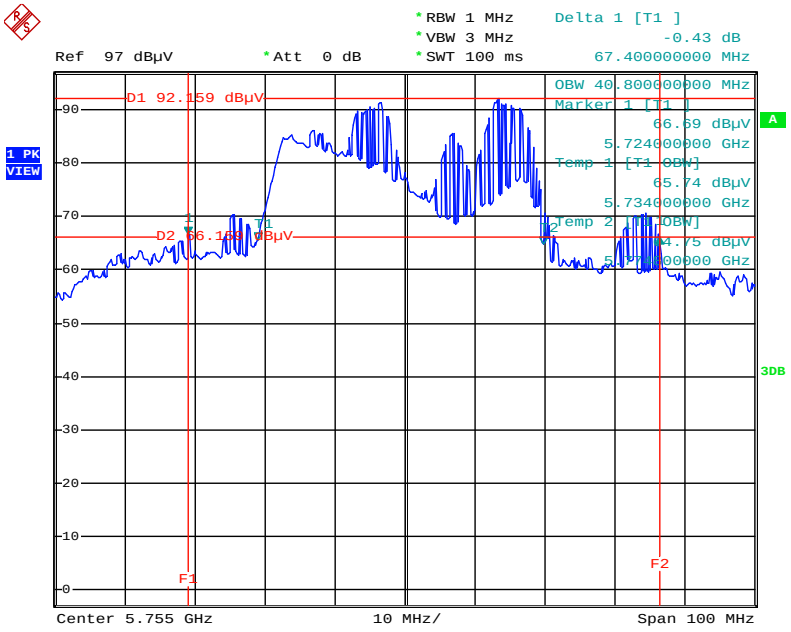
Date: 6.MAY.2015 16:52:06

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5670 MHz



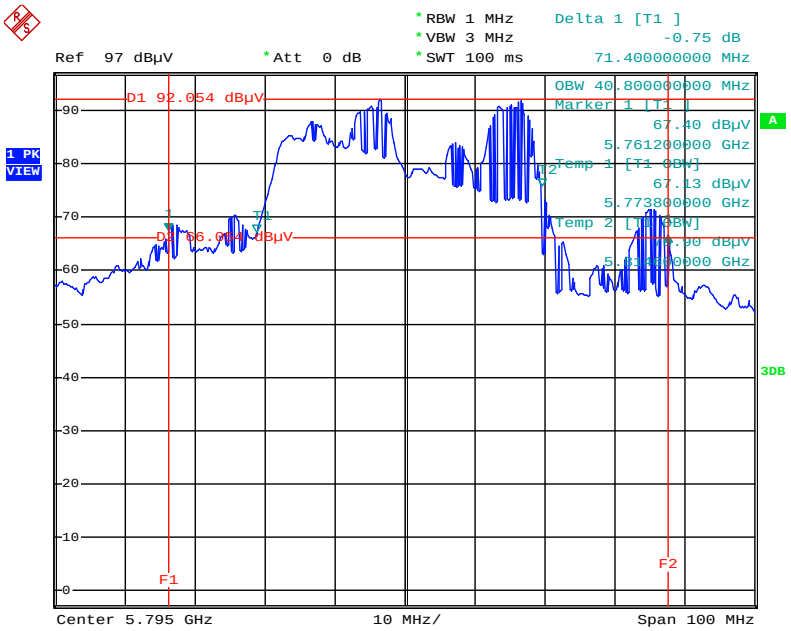
Date: 6.MAY.2015 16:52:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5755 MHz



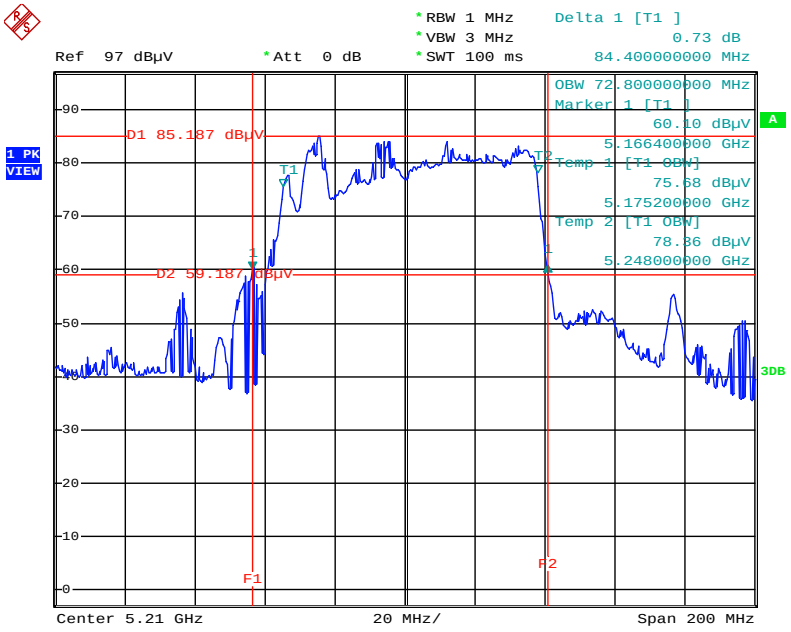
Date: 6.MAY.2015 16:53:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



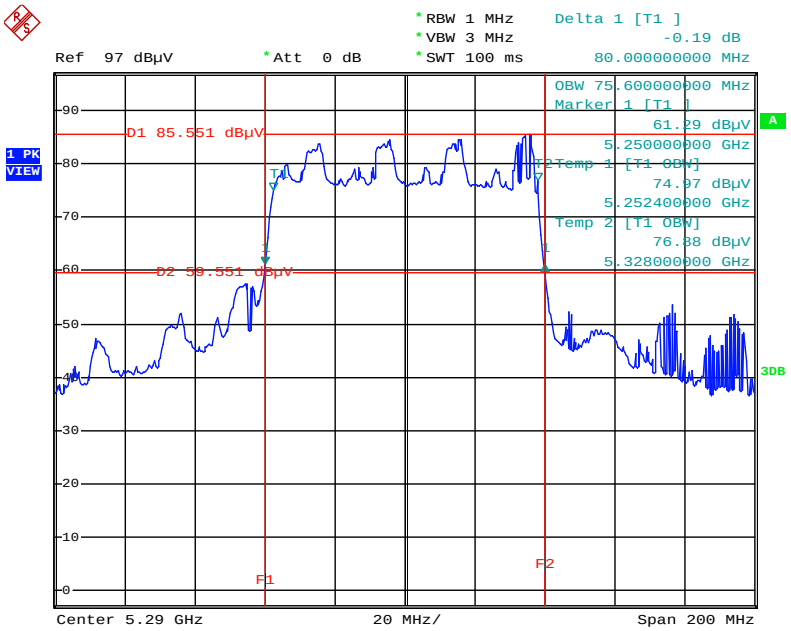
Date: 6.MAY.2015 16:54:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5210 MHz



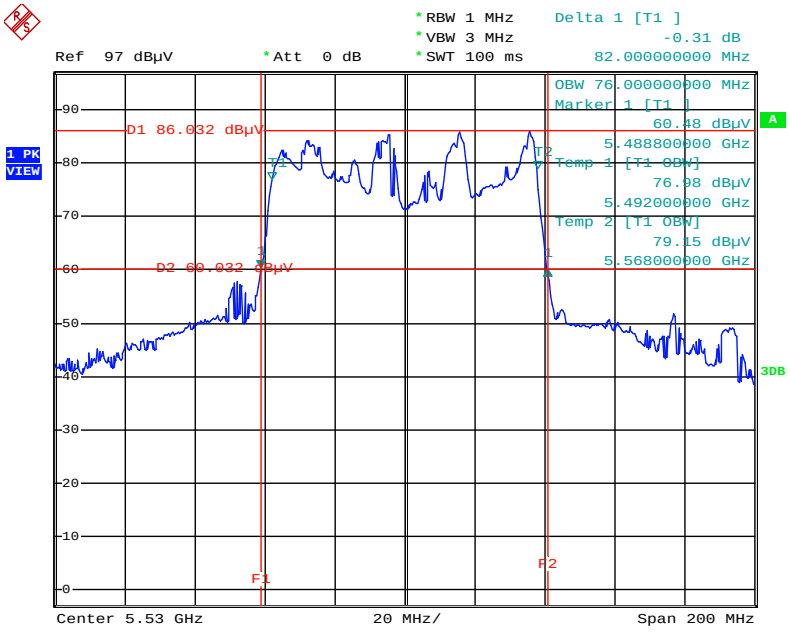
Date: 6.MAY.2015 16:55:53

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5290 MHz



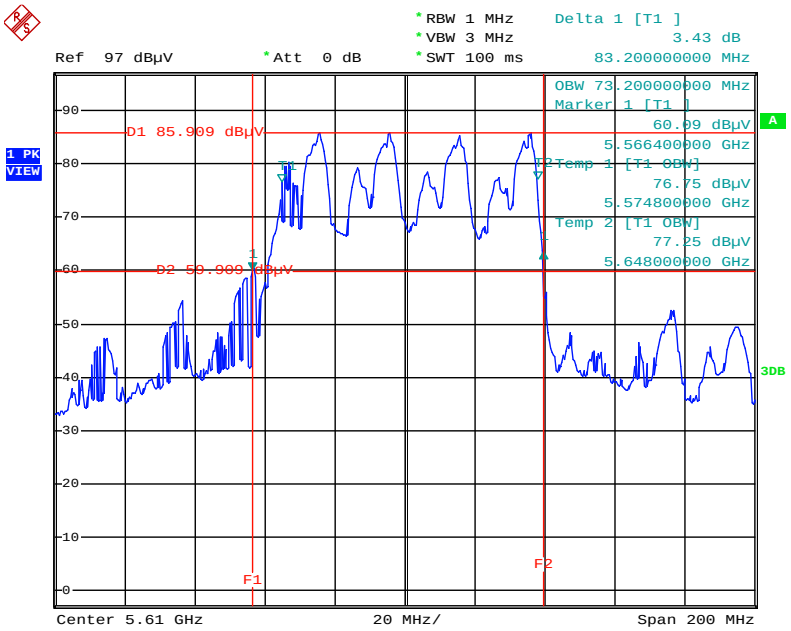
Date: 6.MAY.2015 16:56:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5530 MHz



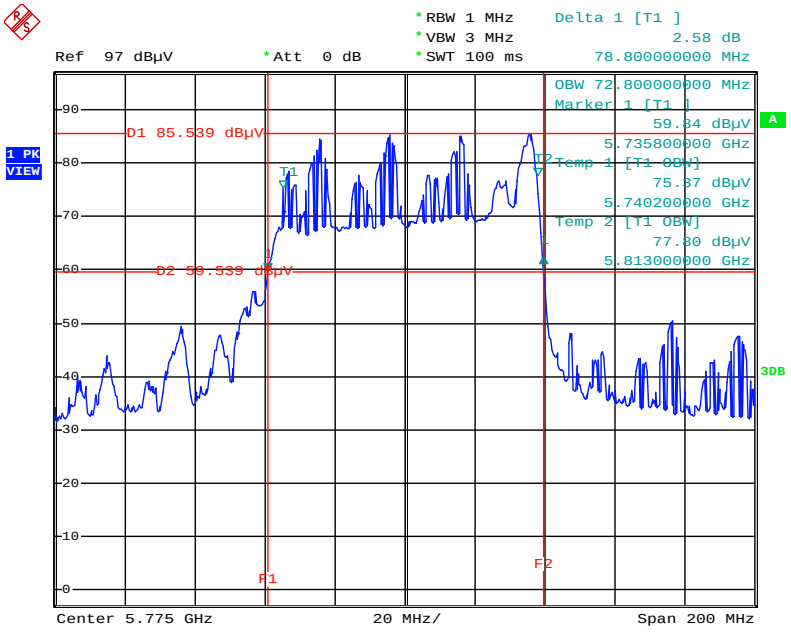
Date: 6.MAY.2015 16:57:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5610 MHz



Date: 6.MAY.2015 16:58:11

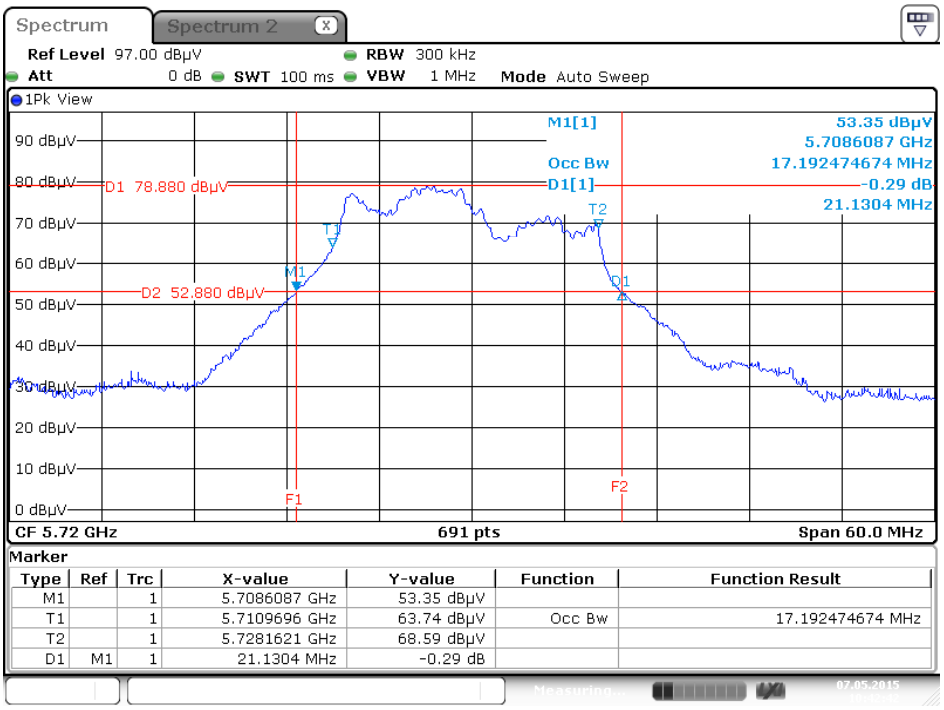
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 6.MAY.2015 16:59:02

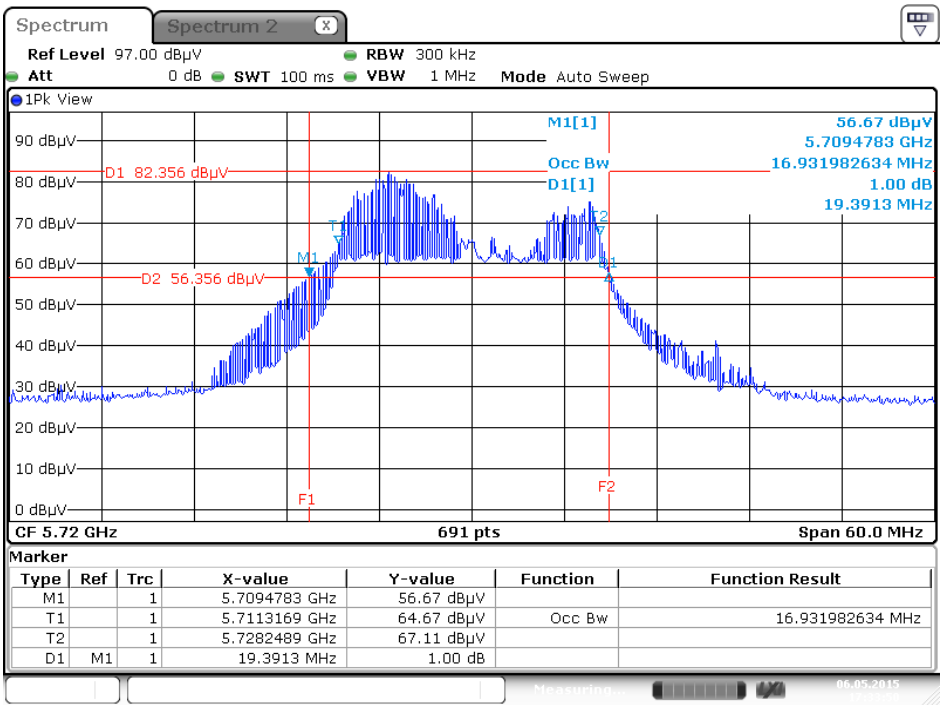
Straddle Channel

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz



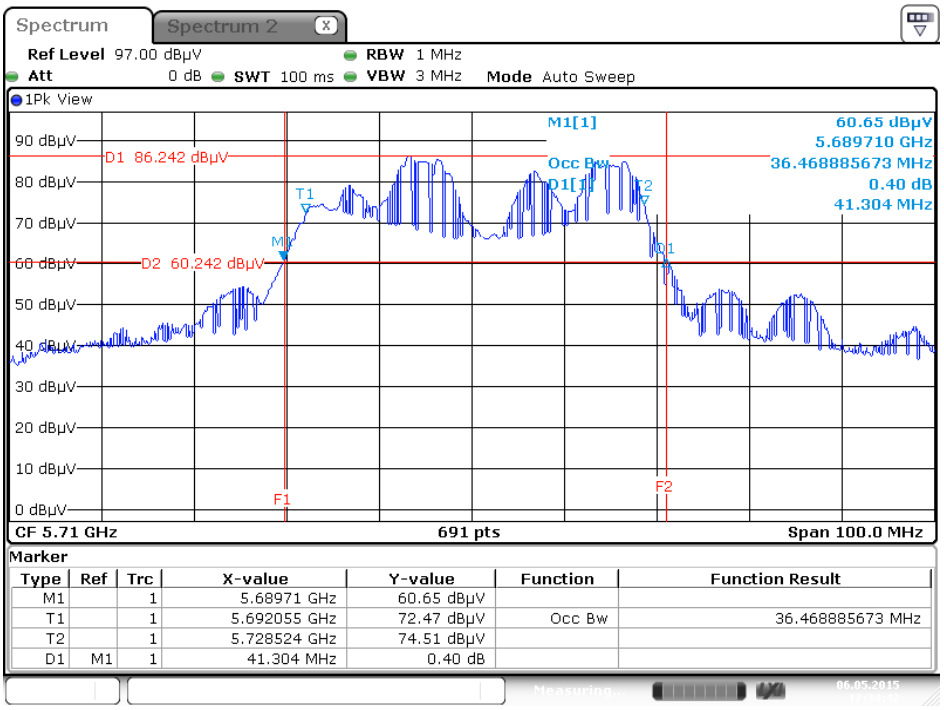
Date: 7 MAY 2015 10:42:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz



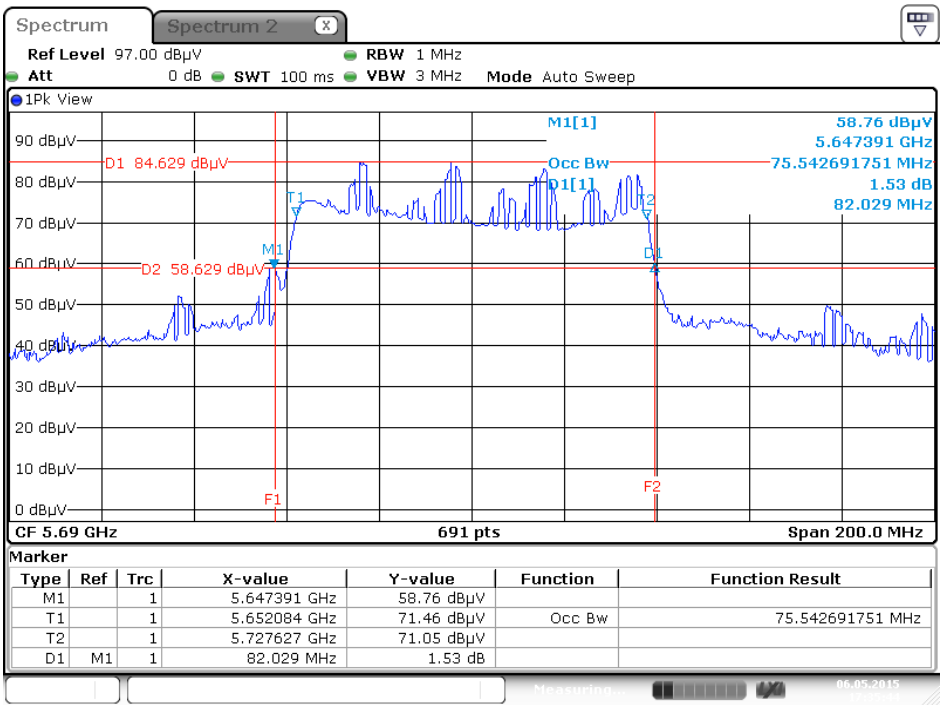
Date: 6 MAY 2015 17:33:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5710 MHz



Date: 6 MAY 2015 17:34:42

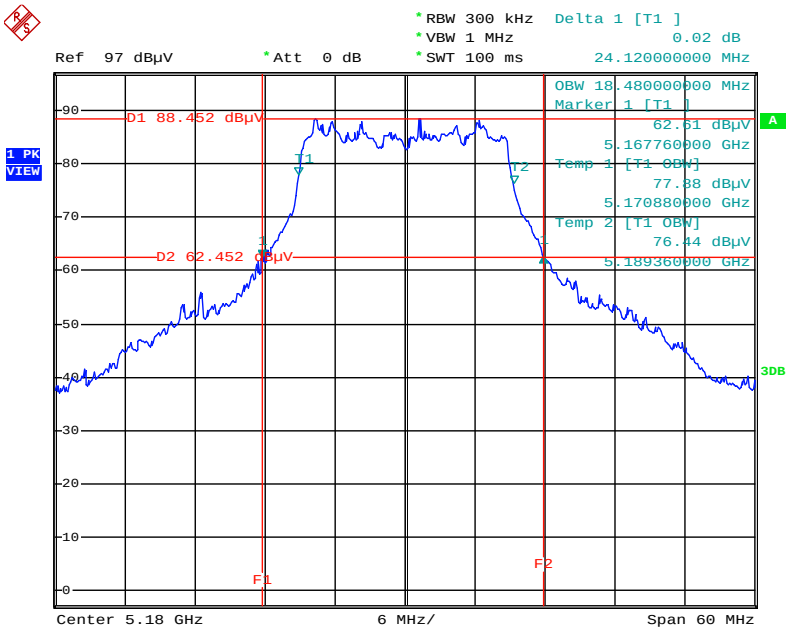
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5690 MHz



Date: 6 MAY 2015 17:35:44

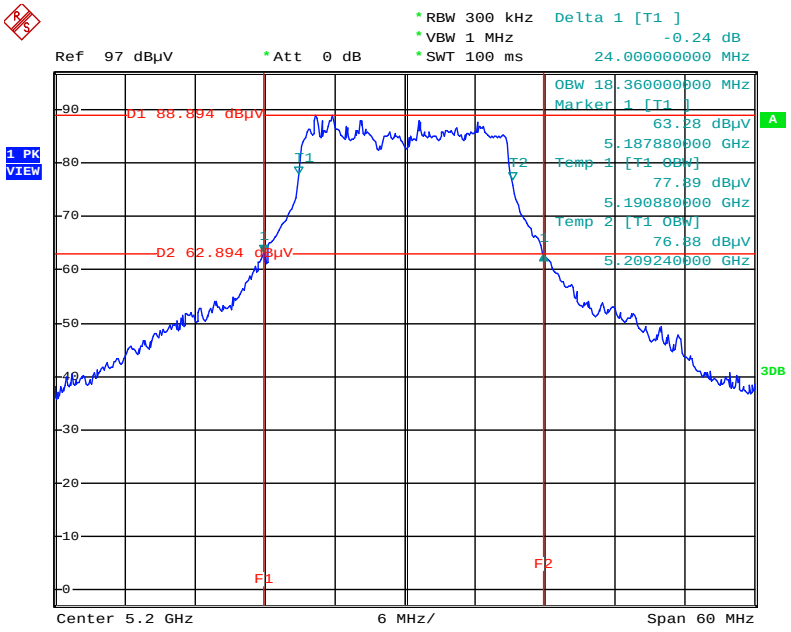
For Beamforming Mode

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5180 MHz



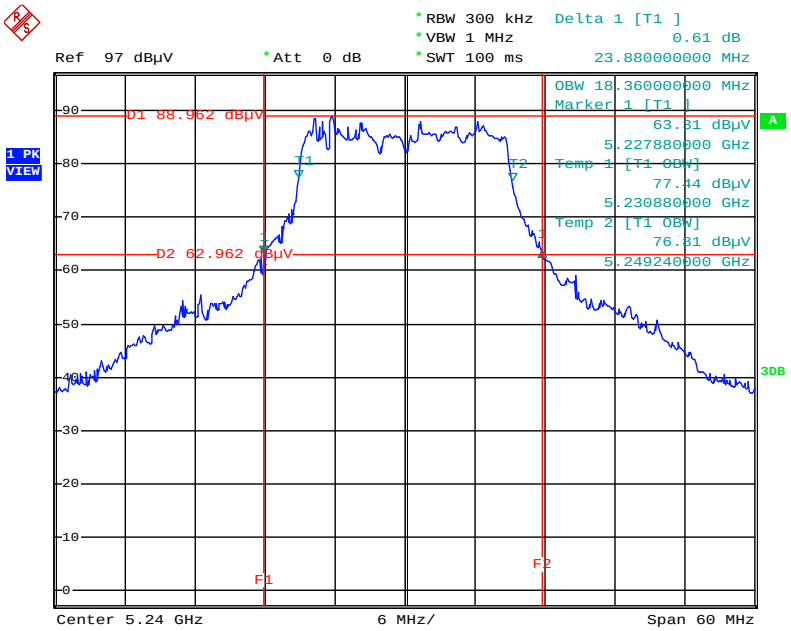
Date: 5.MAY.2015 17:50:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5200 MHz



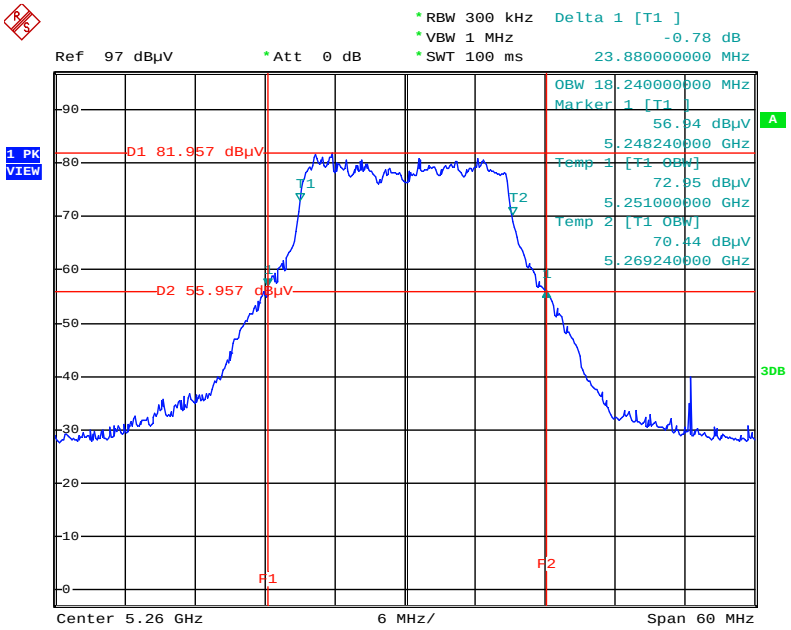
Date: 5.MAY.2015 17:50:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5240 MHz



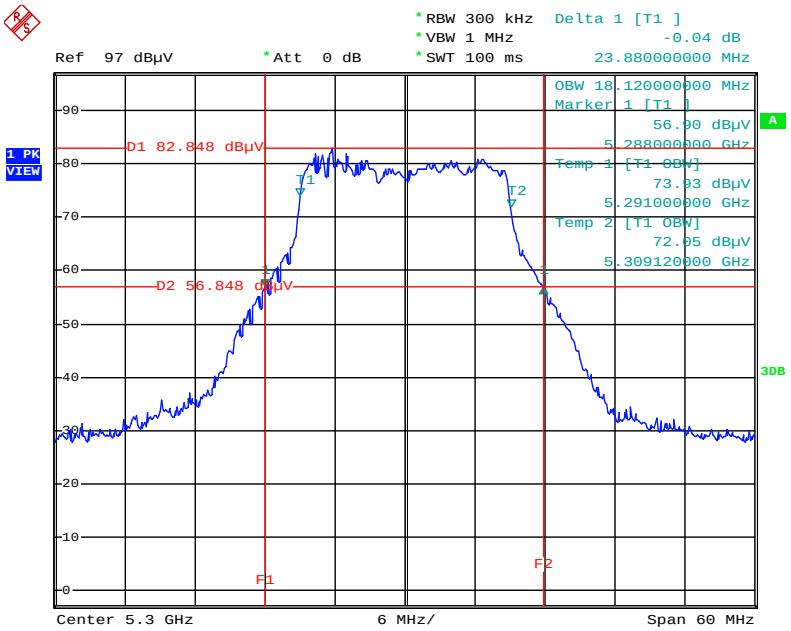
Date: 5.MAY.2015 17:51:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5260 MHz



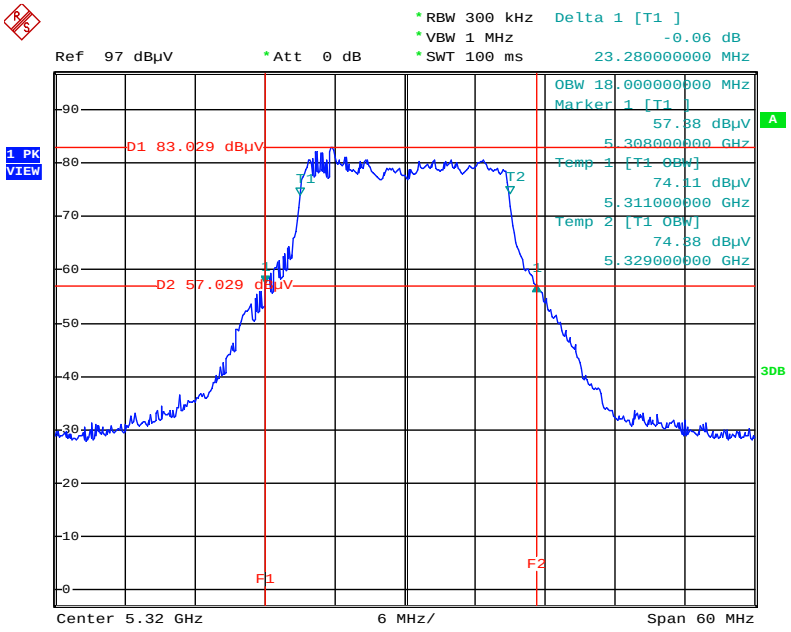
Date: 5.MAY.2015 17:53:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5300 MHz



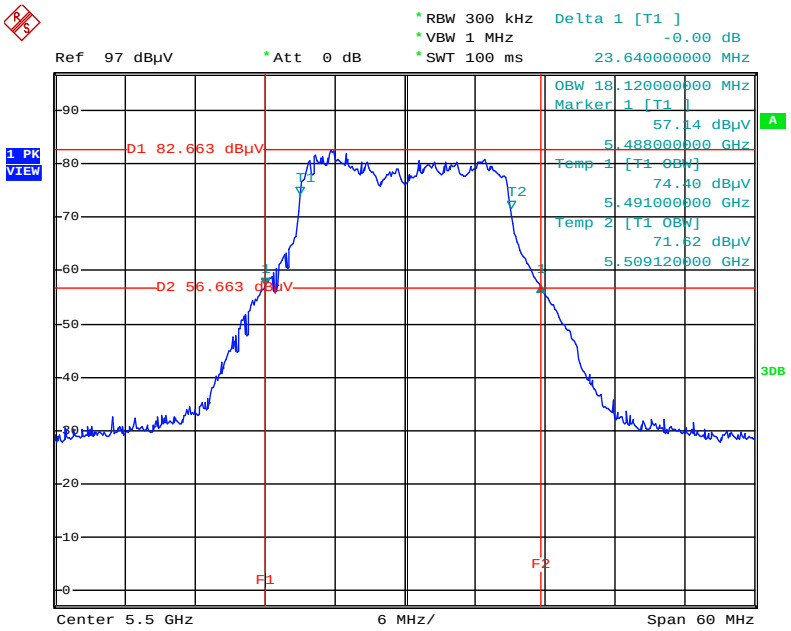
Date: 5.MAY.2015 17:53:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5320 MHz



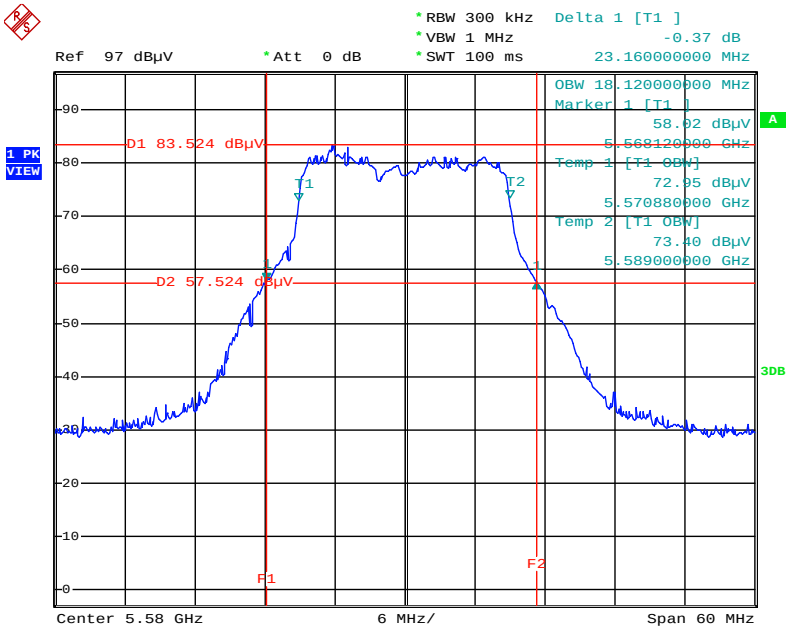
Date: 5.MAY.2015 17:54:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5500 MHz



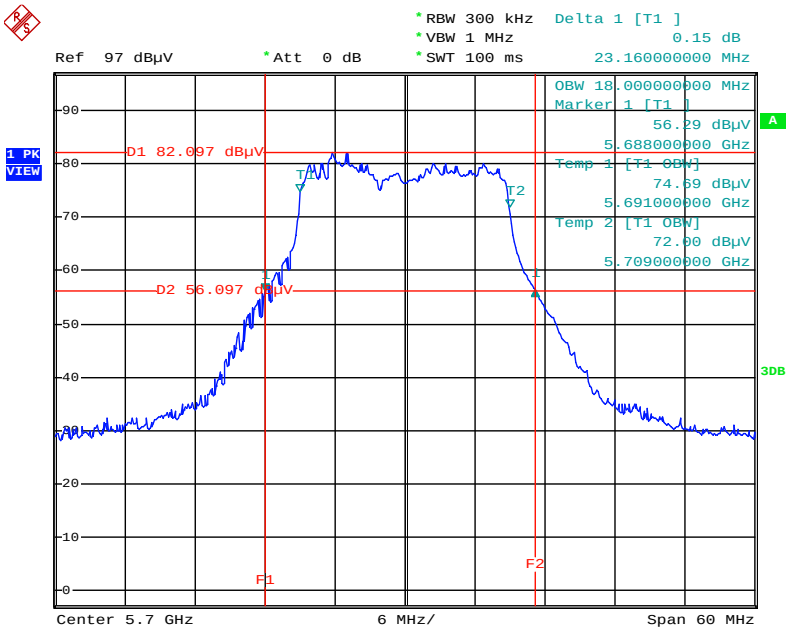
Date: 5.MAY.2015 17:55:37

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5580 MHz



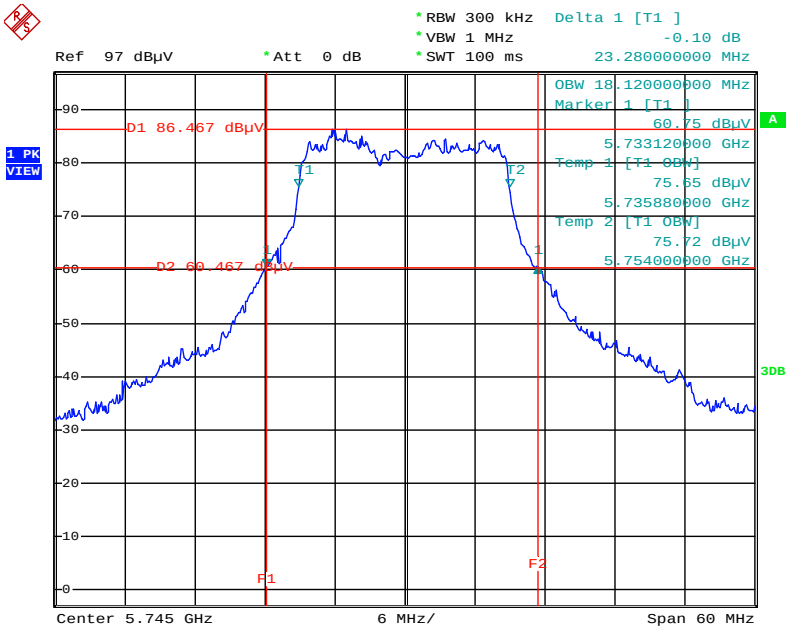
Date: 5.MAY.2015 17:56:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5700 MHz



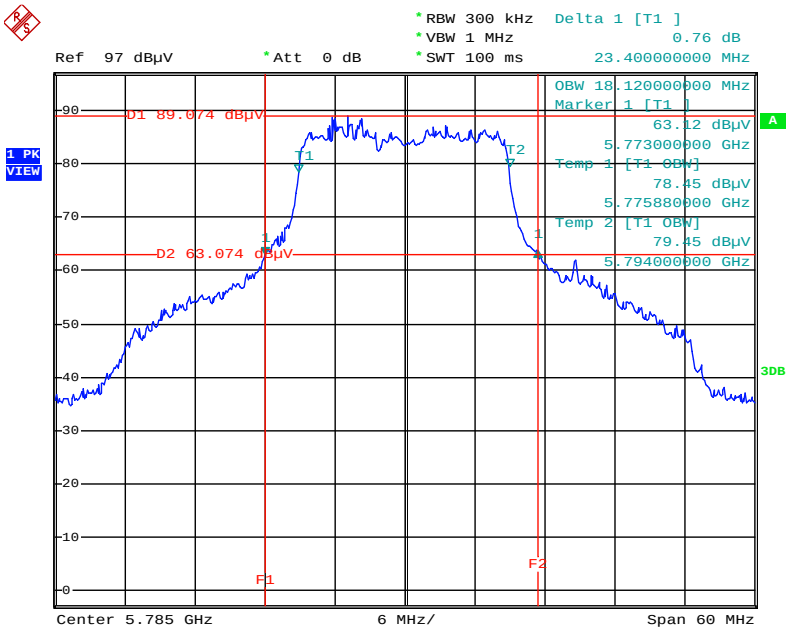
Date: 5.MAY.2015 17:56:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



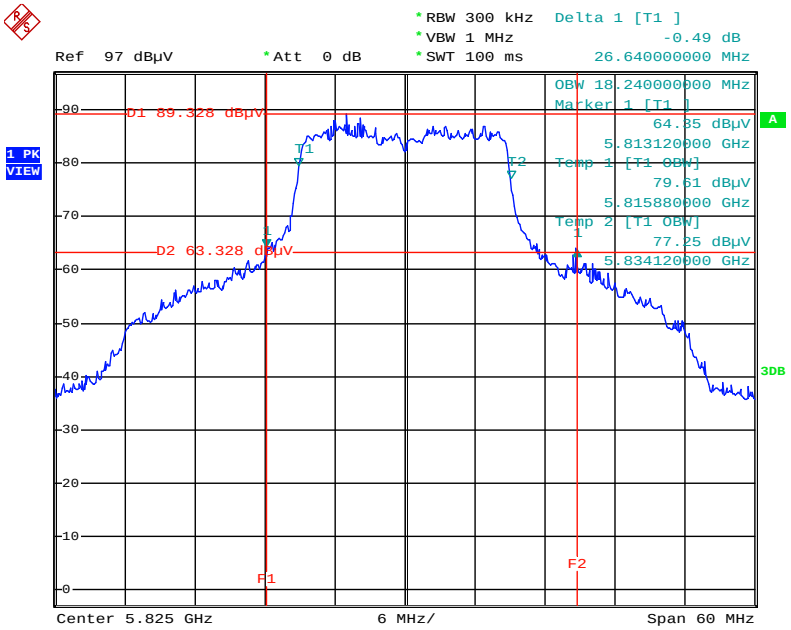
Date: 5.MAY.2015 17:57:38

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



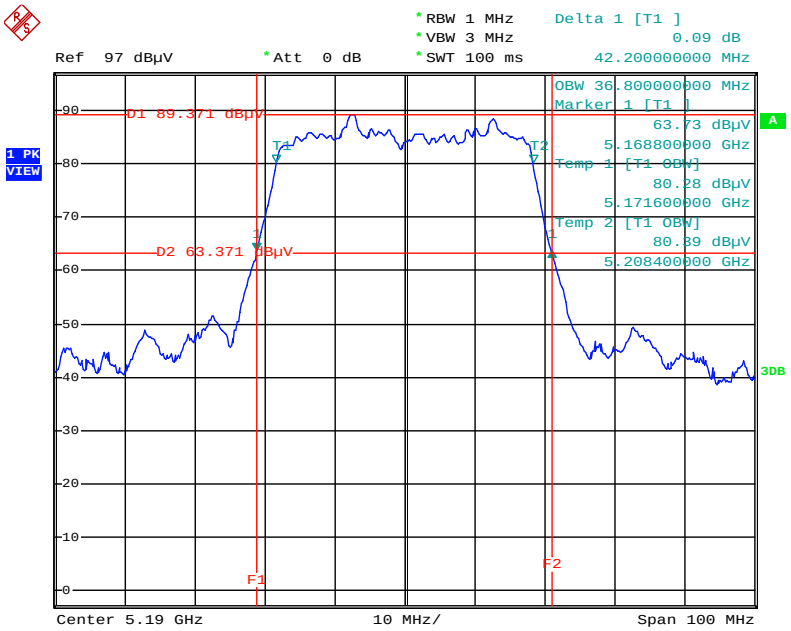
Date: 5.MAY.2015 17:58:15

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



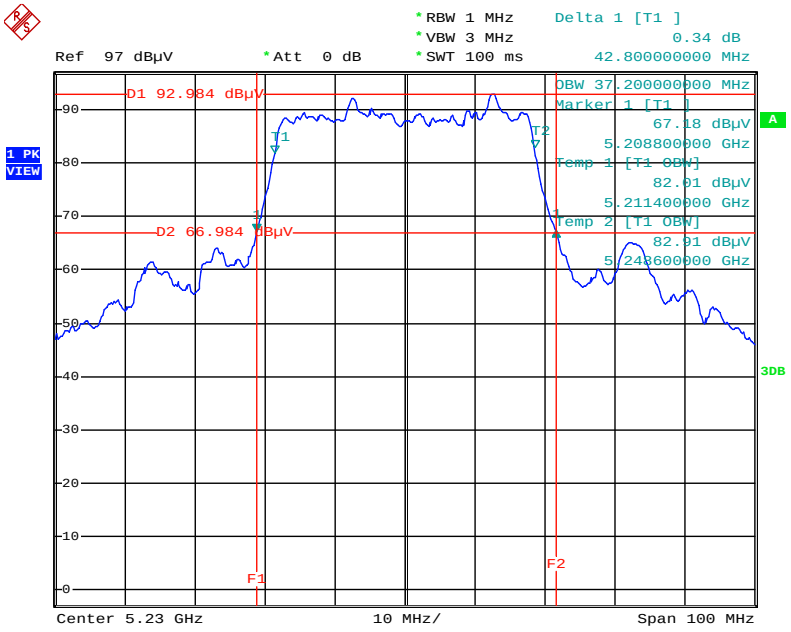
Date: 5.MAY.2015 17:58:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5190 MHz



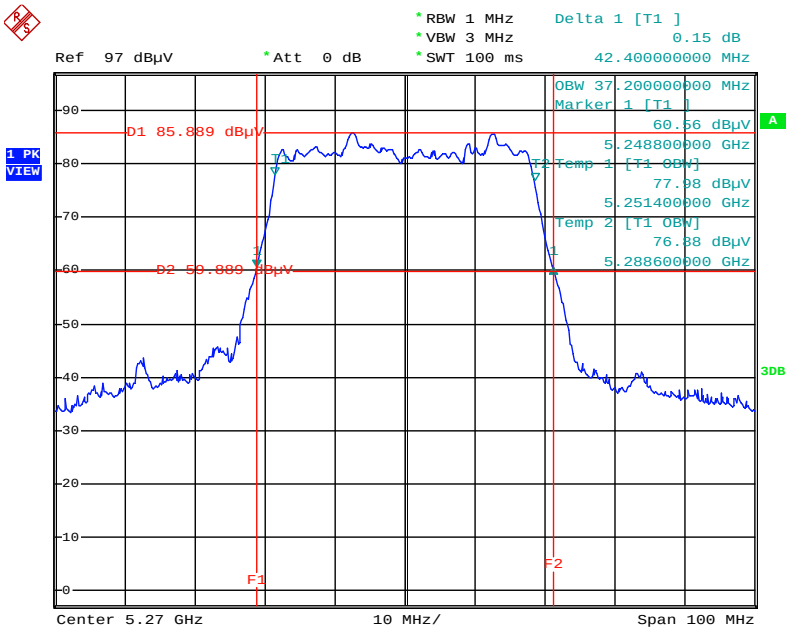
Date: 5.MAY.2015 18:05:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5230 MHz



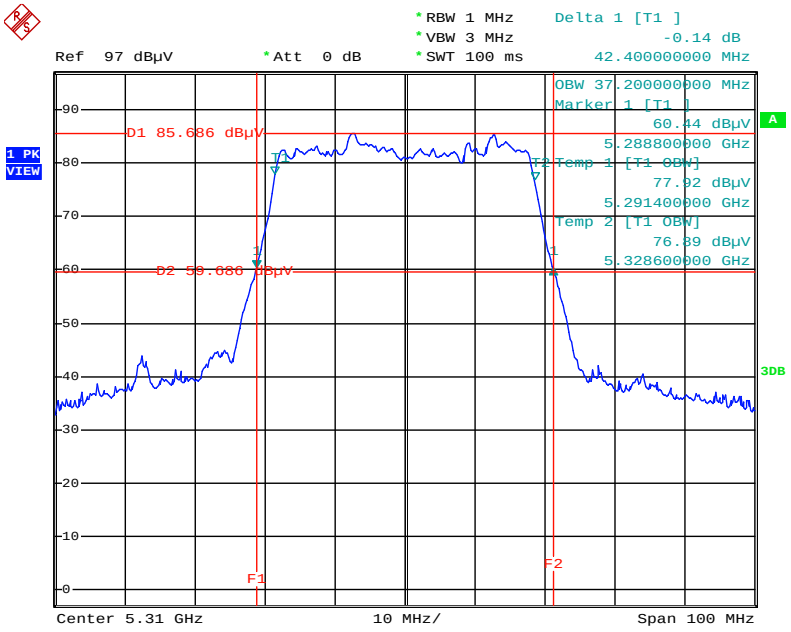
Date: 5.MAY.2015 18:06:30

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5270 MHz



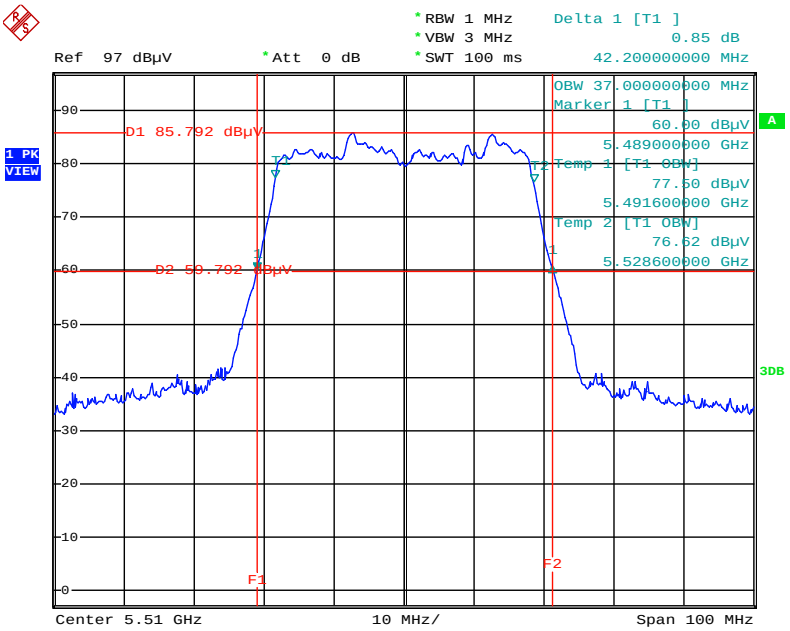
Date: 5.MAY.2015 18:07:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5310 MHz



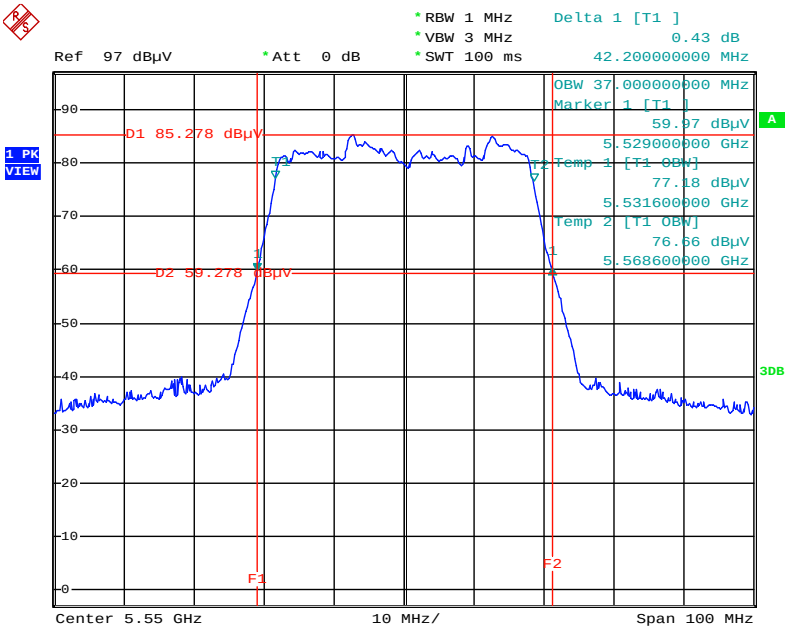
Date: 5.MAY.2015 18:08:08

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5510 MHz



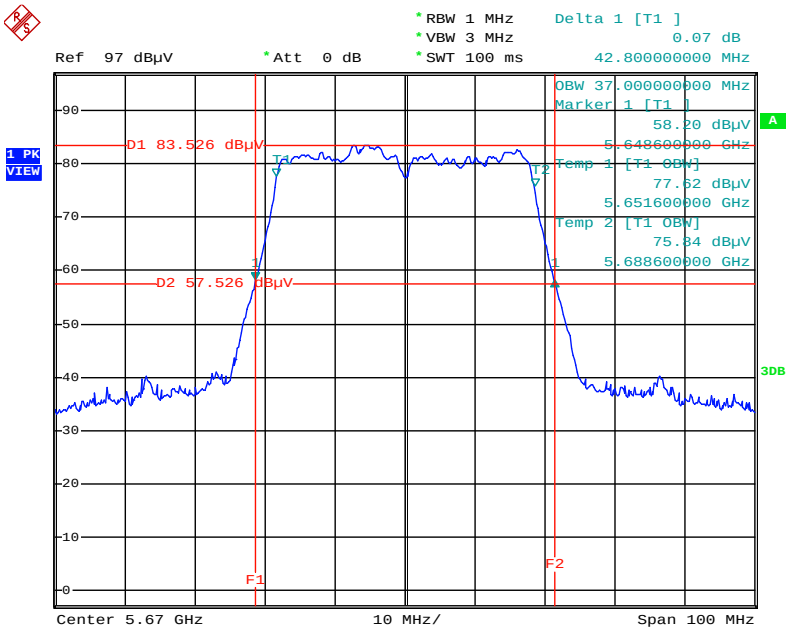
Date: 5.MAY.2015 18:13:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5550 MHz



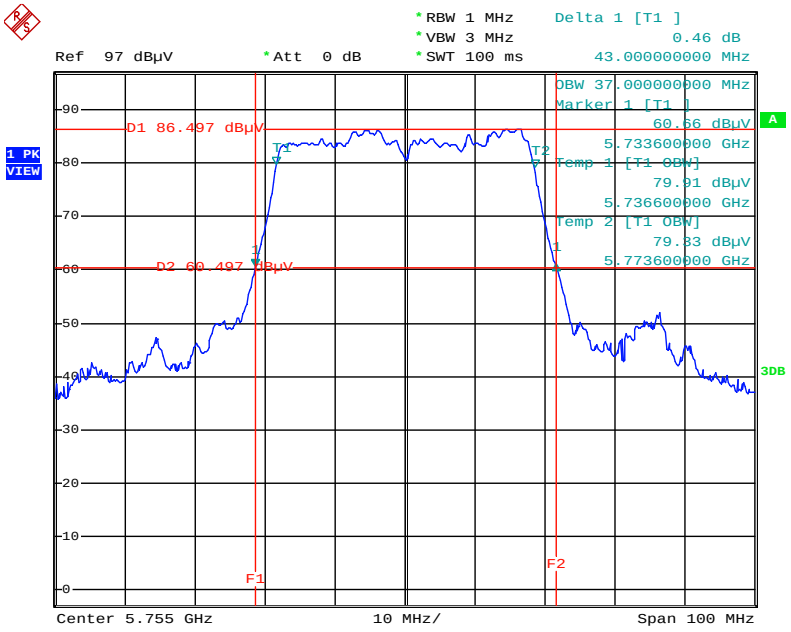
Date: 5.MAY.2015 18:08:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5670 MHz



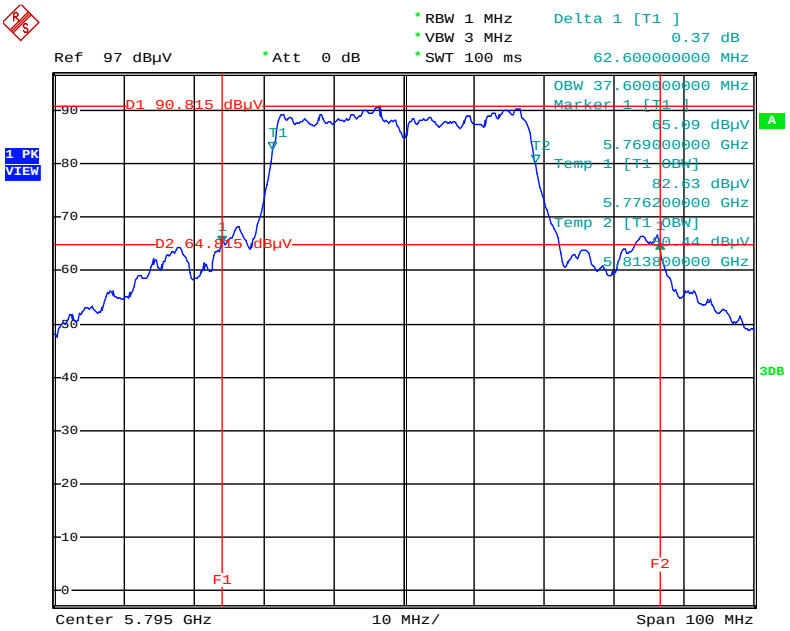
Date: 5.MAY.2015 18:15:02

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5755 MHz



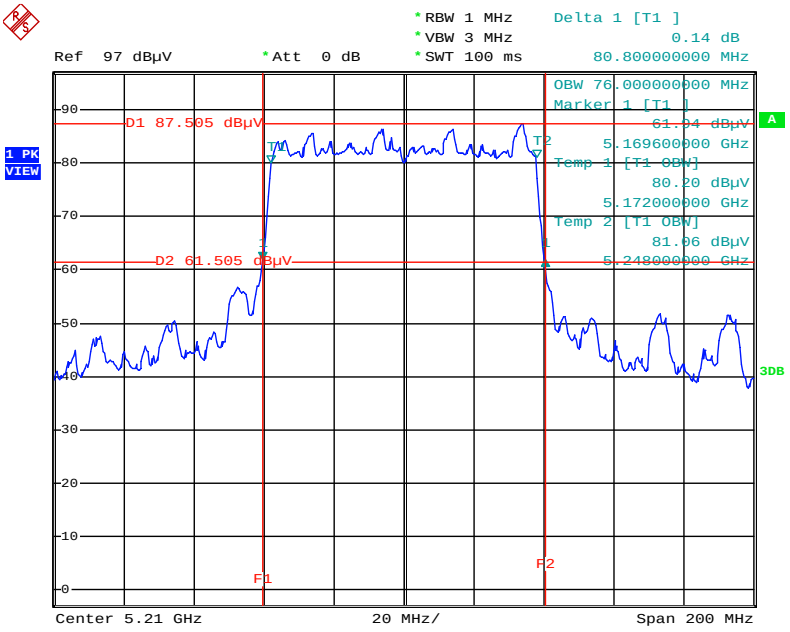
Date: 5.MAY.2015 18:09:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



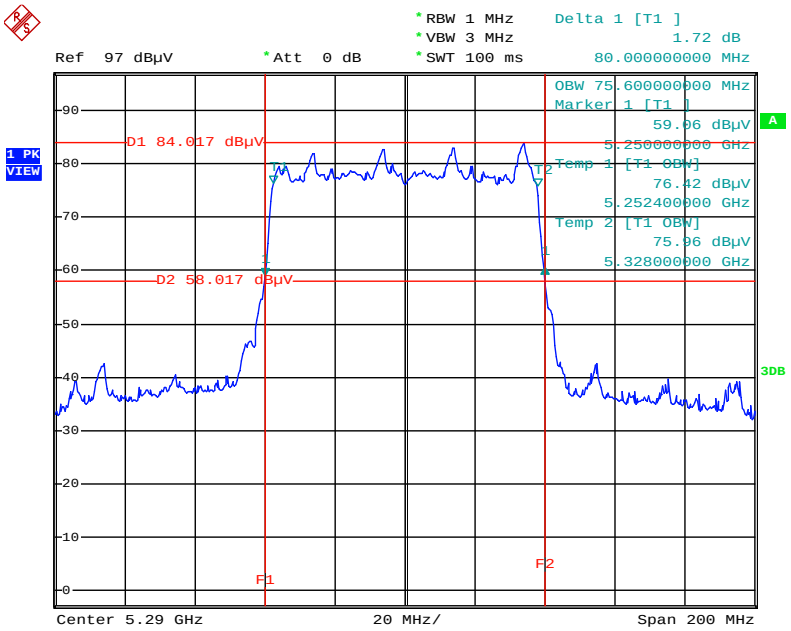
Date: 5.MAY.2015 18:10:37

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5210 MHz



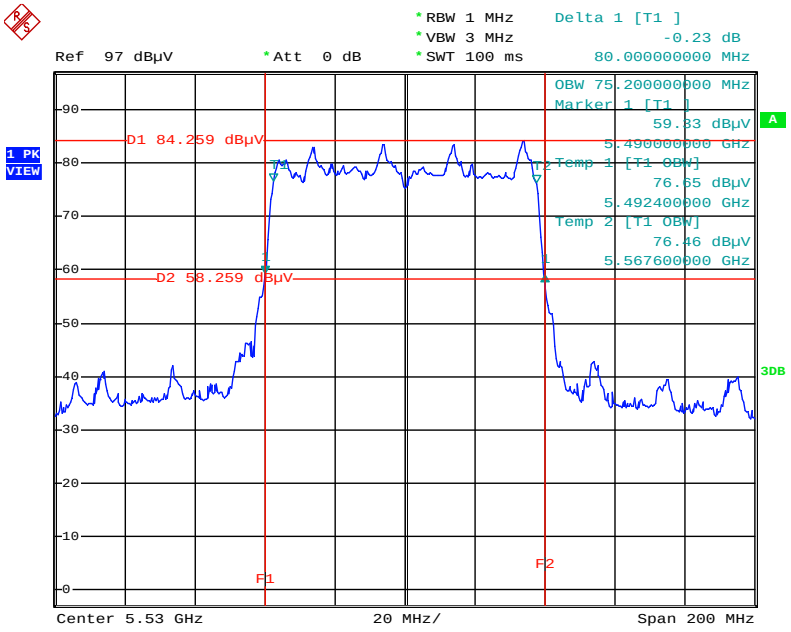
Date: 5.MAY.2015 18:18:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5290 MHz



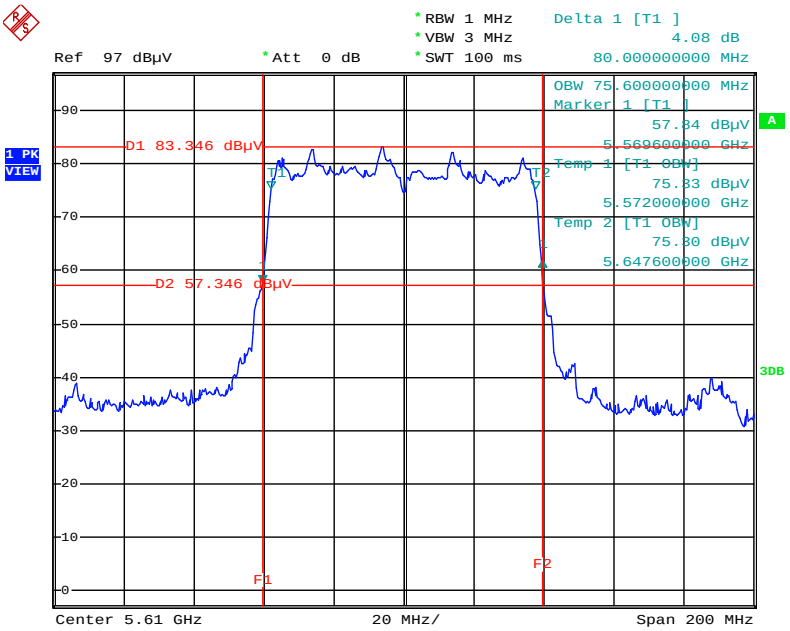
Date: 5.MAY.2015 18:19:16

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5530 MHz



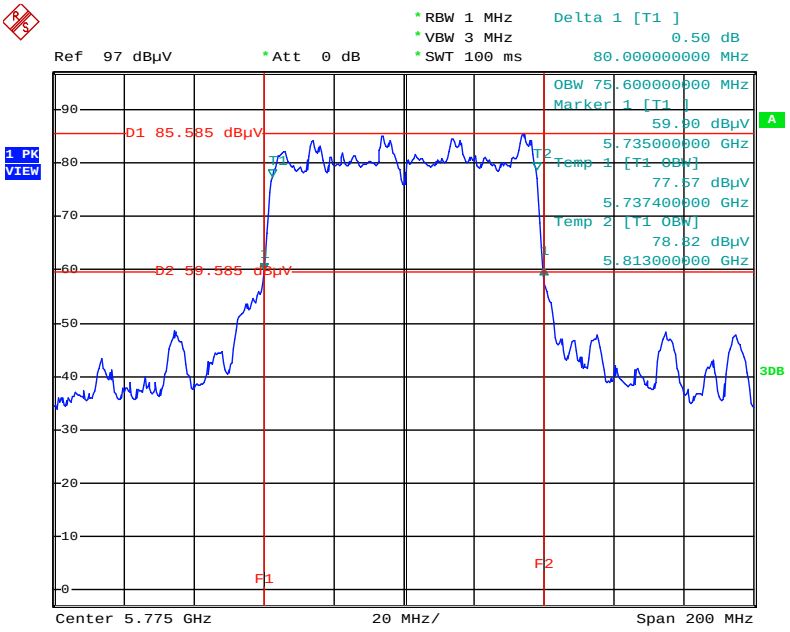
Date: 5.MAY.2015 18:19:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5610 MHz



Date: 5.MAY.2015 18:21:11

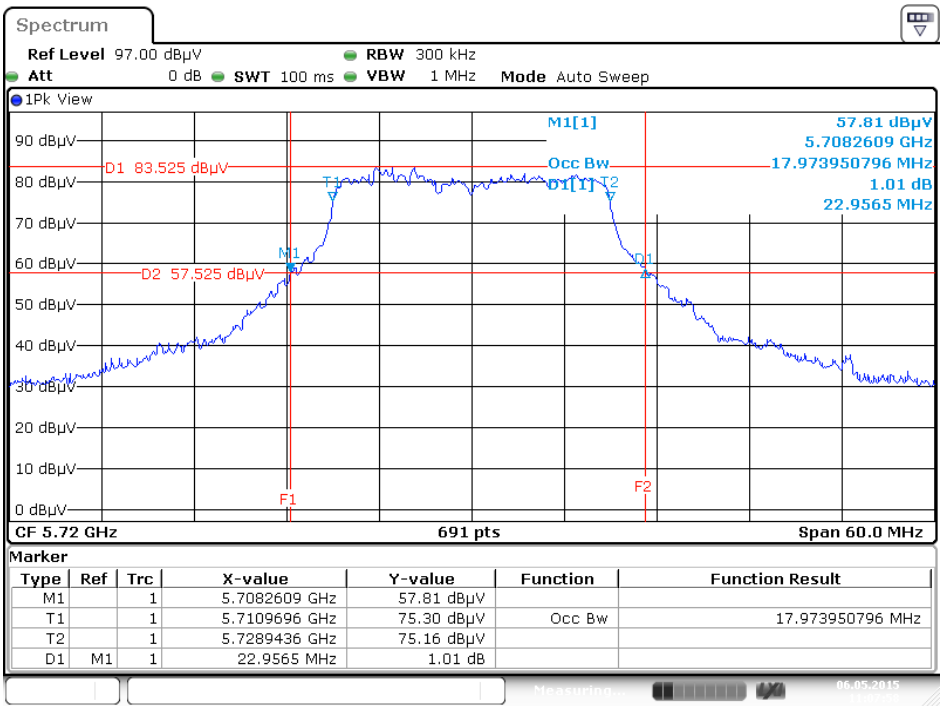
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 5.MAY.2015 18:21:53

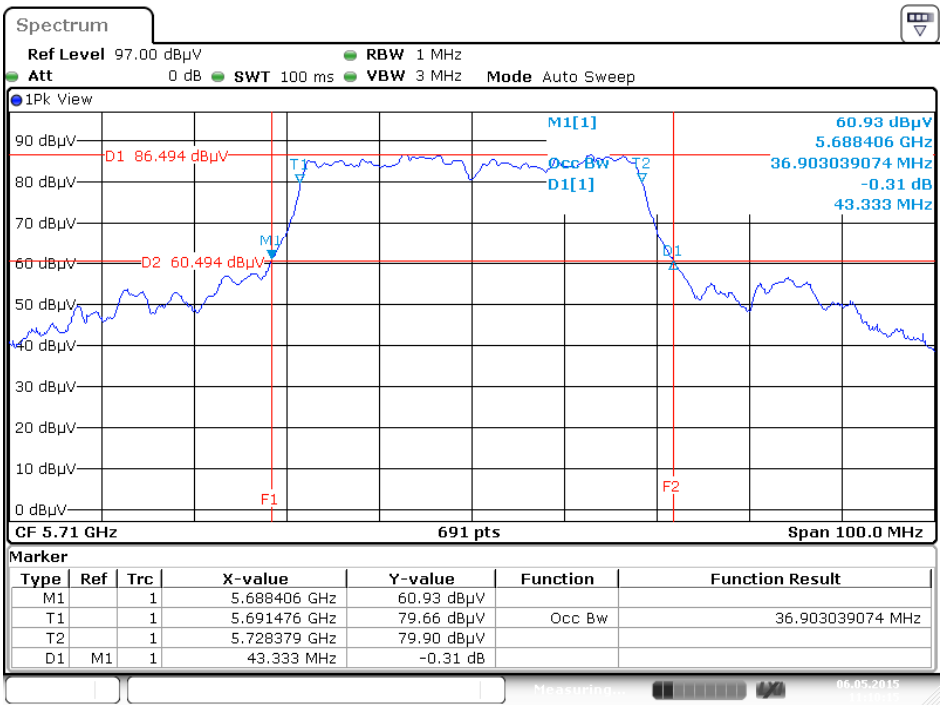
Straddle Channel

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz



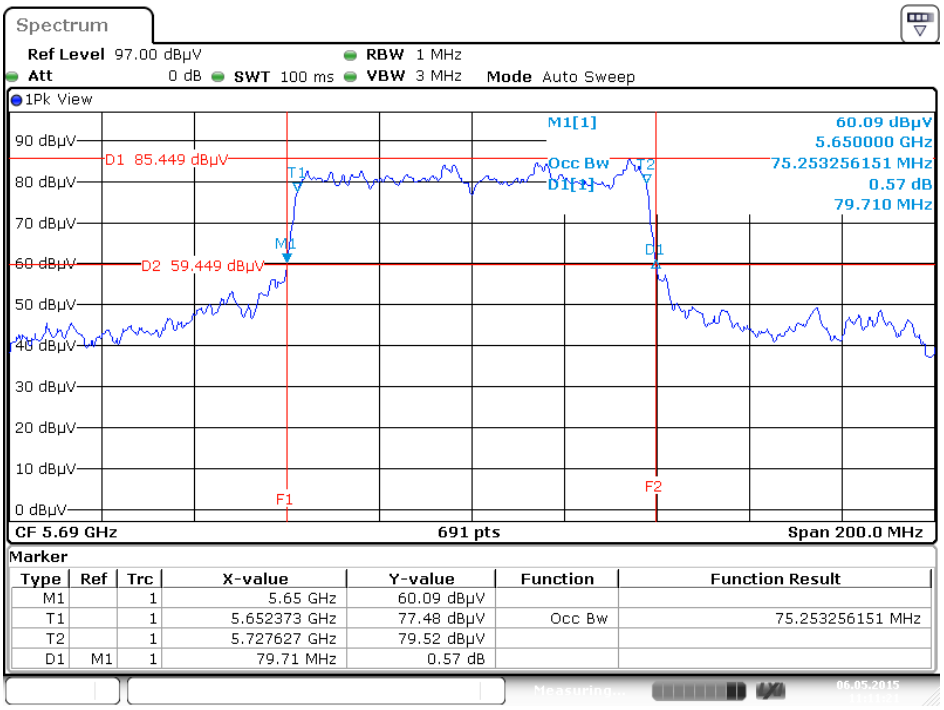
Date:6MAY.2015 11:07:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5710 MHz



Date:6MAY.2015 11:10:15

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5690 MHz



4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

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

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

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

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

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

For Non-Beamforming Mode

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	4.48	500	Complies
	5785 MHz	3.12	500	Complies
	5825 MHz	15.84	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	3.84	500	Complies
	5785 MHz	4.96	500	Complies
	5825 MHz	2.56	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	24.00	500	Complies
	5795 MHz	23.20	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	65.20	500	Complies

Straddle Channel

Mode	Frequency	6dB BW (MHz)	6dB BW F2 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
802.11a	5720 MHz	11.25	5726.83	1.83	500	Complies
802.11ac MCS0/Nss1 VHT20	5720 MHz	14.96	5727.40	2.40	500	Complies
802.11ac MCS0/Nss1 VHT40	5710 MHz	23.30	5726.35	1.35	500	Complies
802.11ac MCS0/Nss1 VHT80	5690 MHz	71.59	5727.63	2.63	500	Complies

For Beamforming Mode

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss2 VHT20	5745 MHz	10.40	500	Complies
	5785 MHz	3.84	500	Complies
	5825 MHz	4.96	500	Complies
802.11ac MCS0/Nss2 VHT40	5755 MHz	30.40	500	Complies
	5795 MHz	30.40	500	Complies
802.11ac MCS0/Nss2 VHT80	5775 MHz	72.40	500	Complies

Straddle Channel

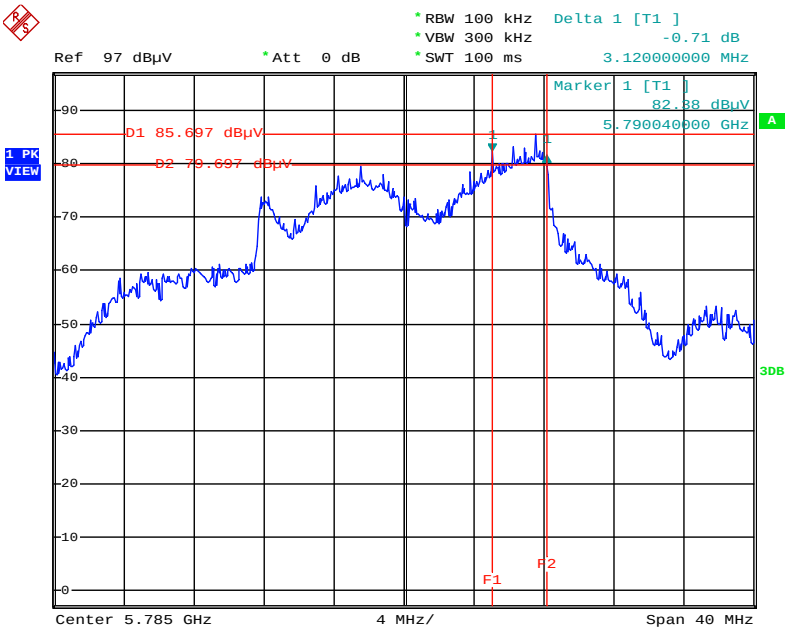
Mode	Frequency	6dB BW (MHz)	6dB BW F2 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss2 VHT20	5720 MHz	14.09	5726.48	1.48	500	Complies
802.11ac MCS0/Nss2 VHT40	5710 MHz	27.36	5727.53	2.53	500	Complies
802.11ac MCS0/Nss2 VHT80	5690 MHz	73.91	5727.53	2.53	500	Complies

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

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

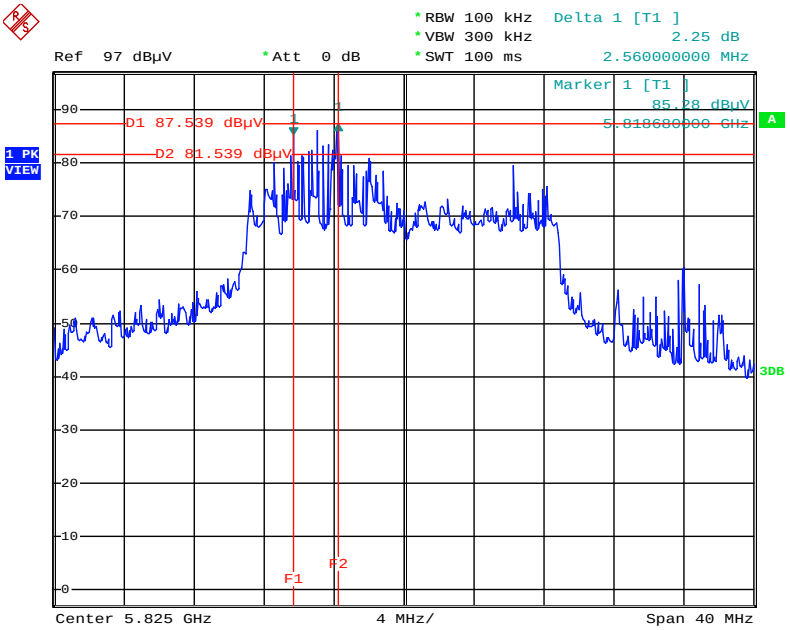
For Non-Beamforming Mode

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



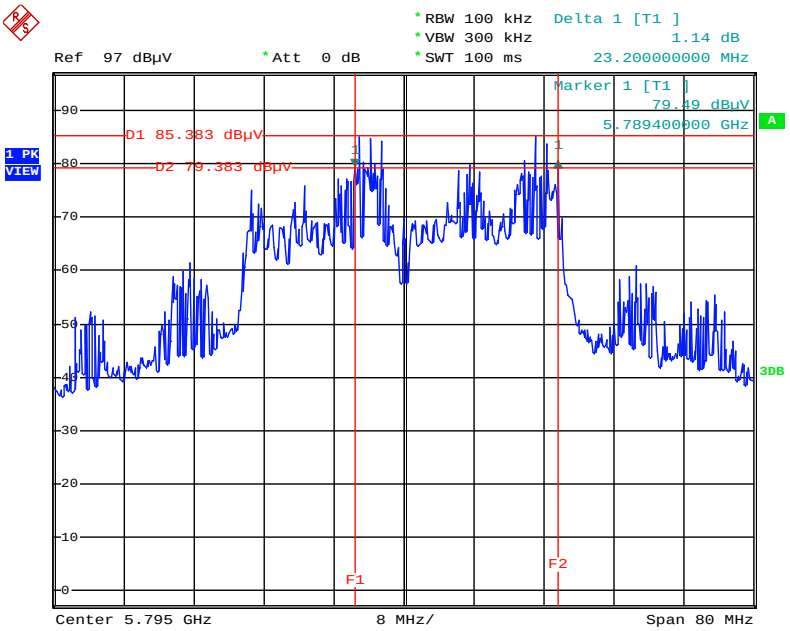
Date: 11.MAY.2015 13:07:32

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



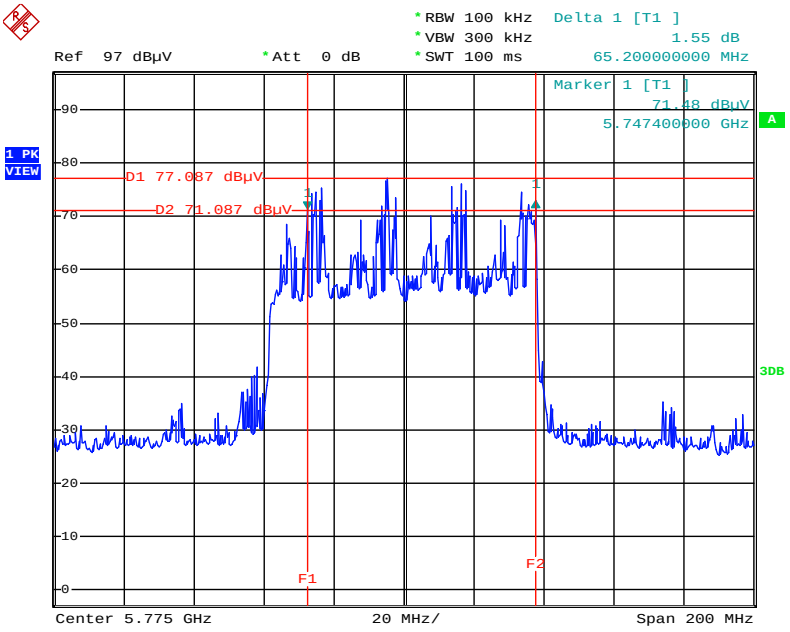
Date: 6.MAY.2015 16:46:24

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



Date: 6.MAY.2015 17:01:47

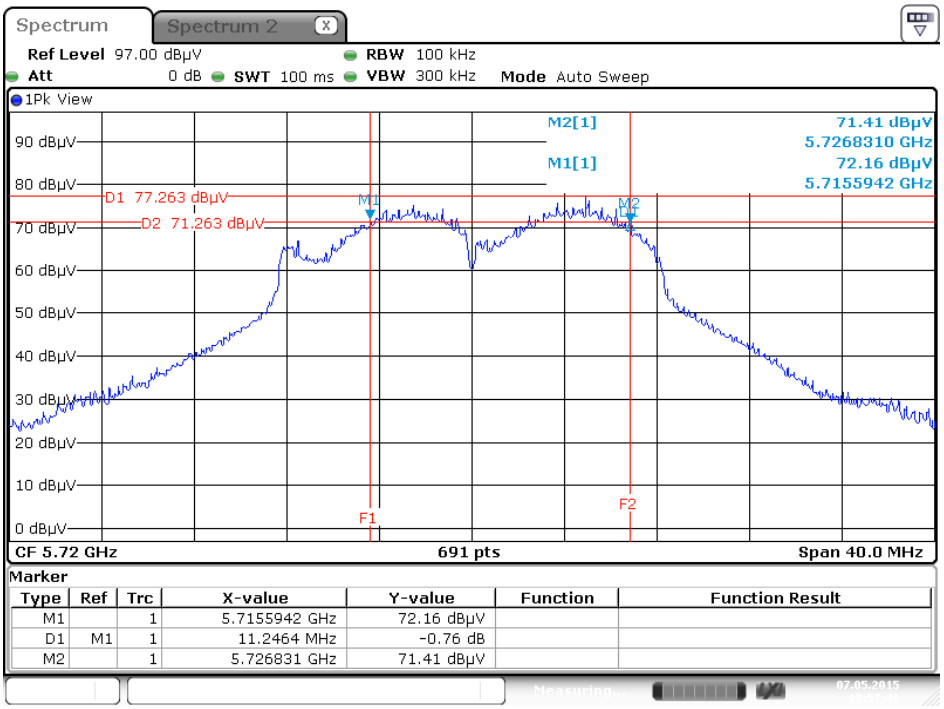
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 6.MAY.2015 17:00:10

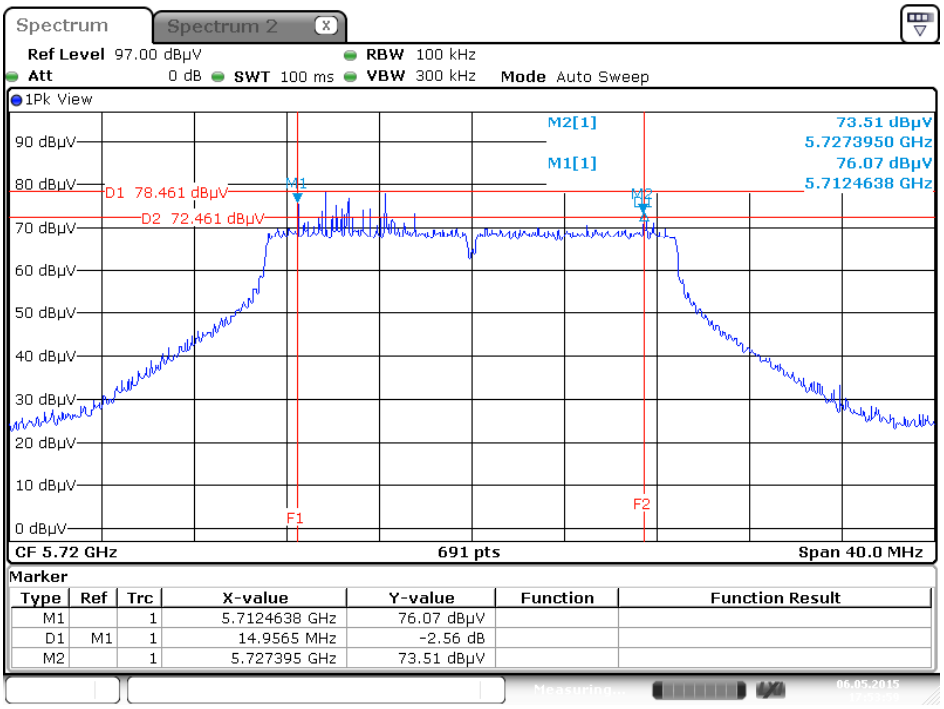
Straddle Channel

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz



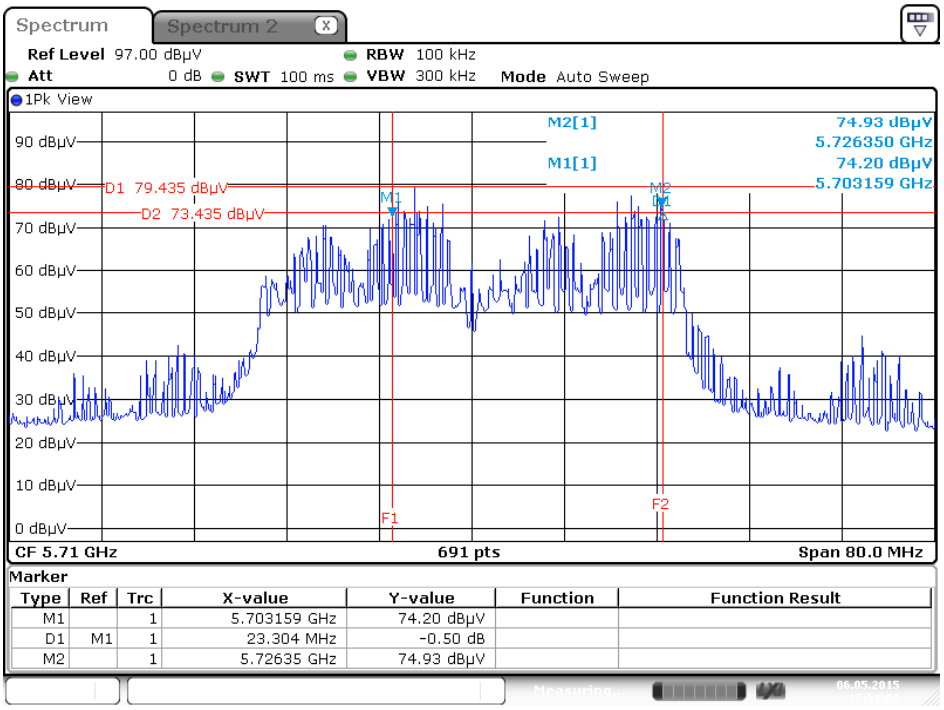
Date: 7 MAY 2015 10:57:47

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz

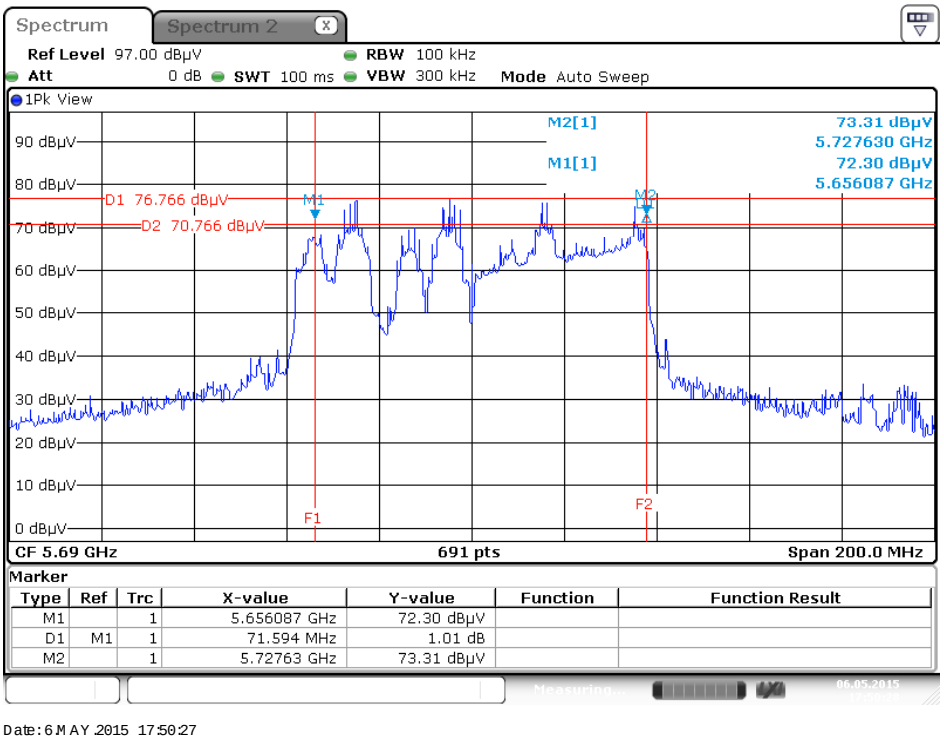


Date: 6 MAY 2015 17:53:59

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5710 MHz

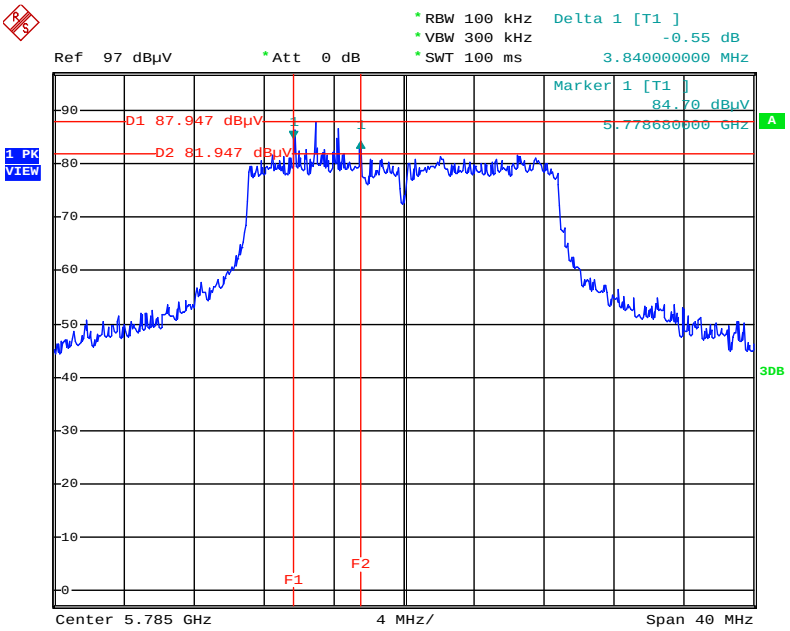


6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5690 MHz



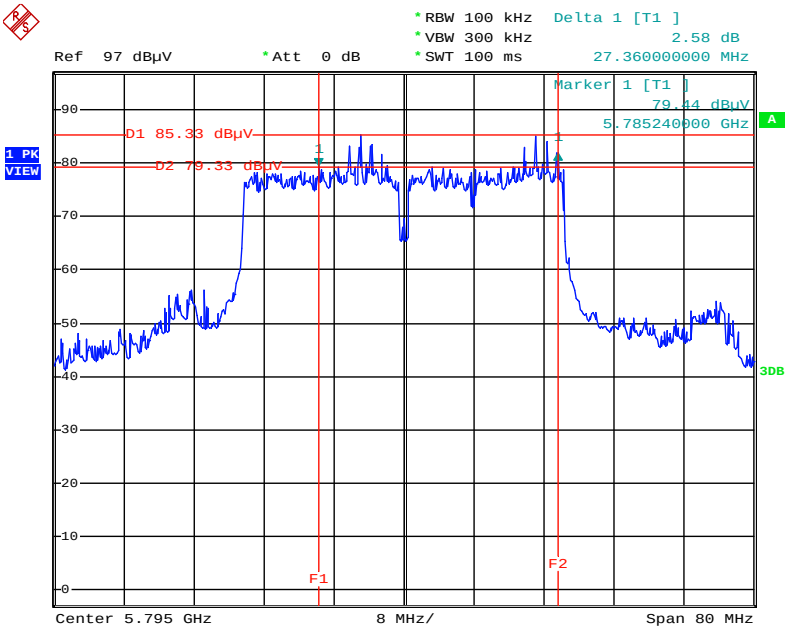
For Beamforming Mode

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



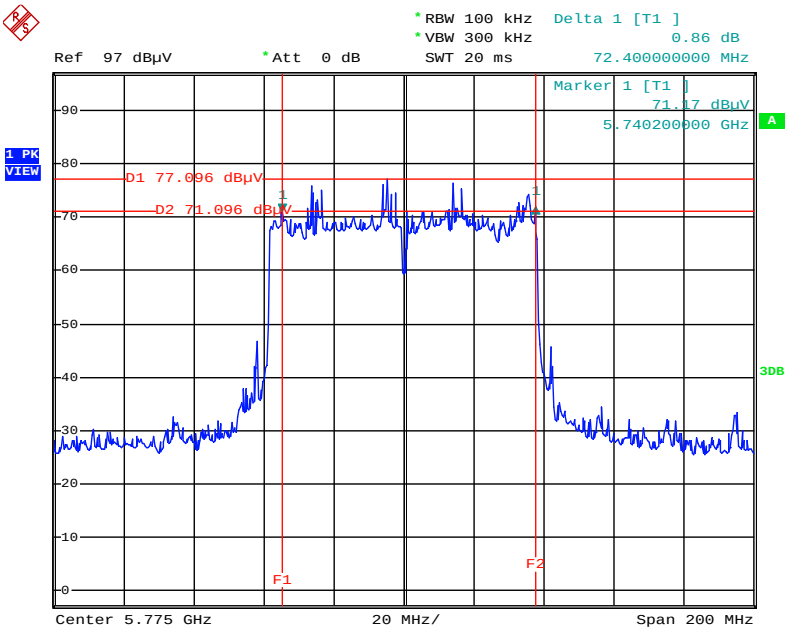
Date: 5.MAY.2015 18:02:16

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5795MHz



Date: 5.MAY.2015 18:17:19

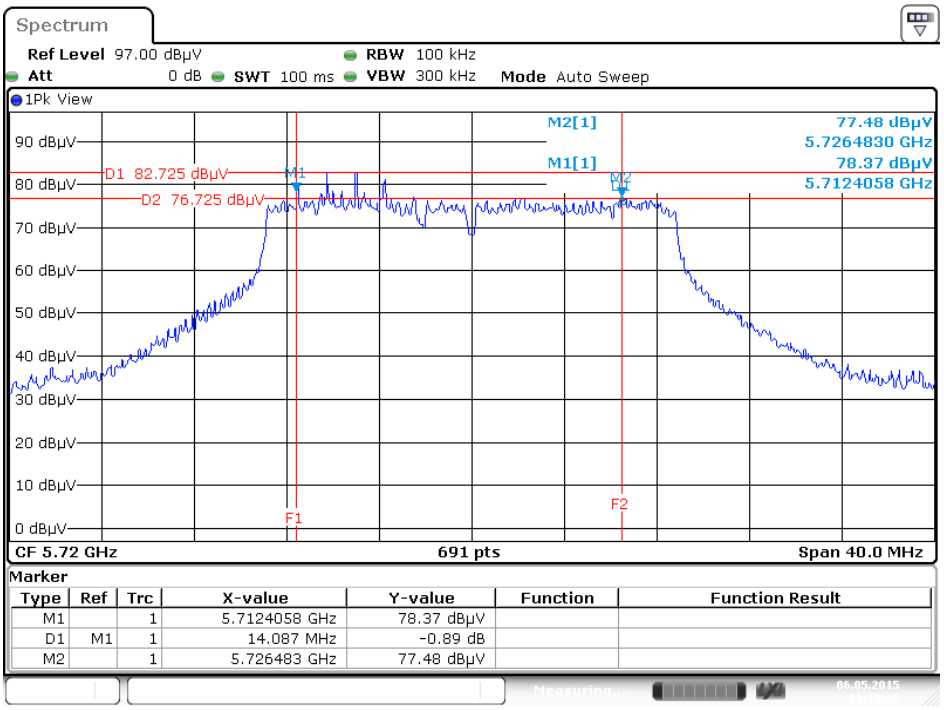
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 5.MAY.2015 18:22:26

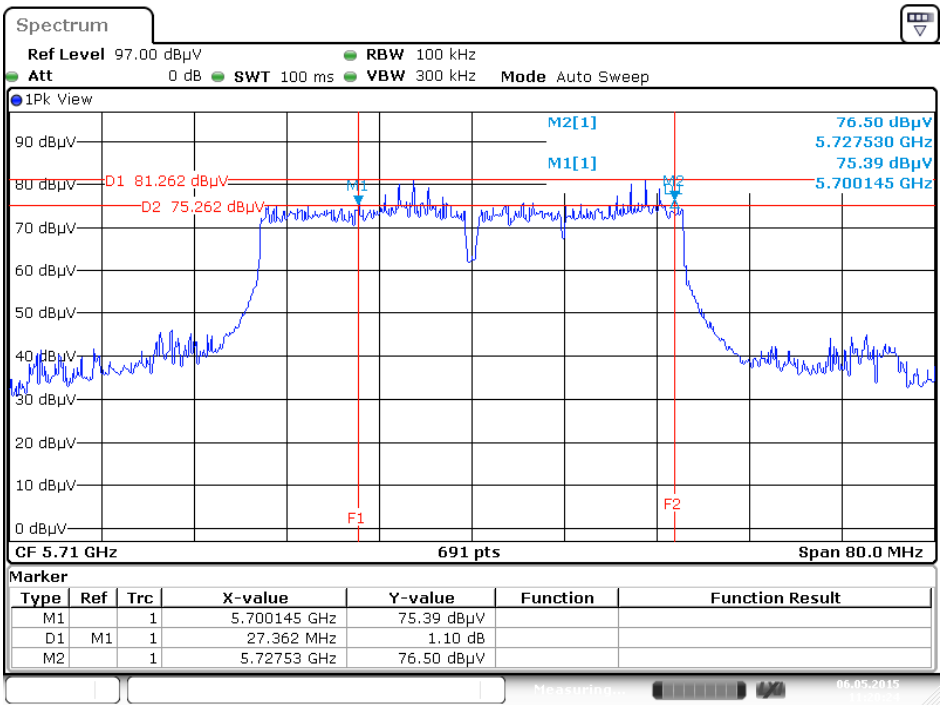
Straddle Channel

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz



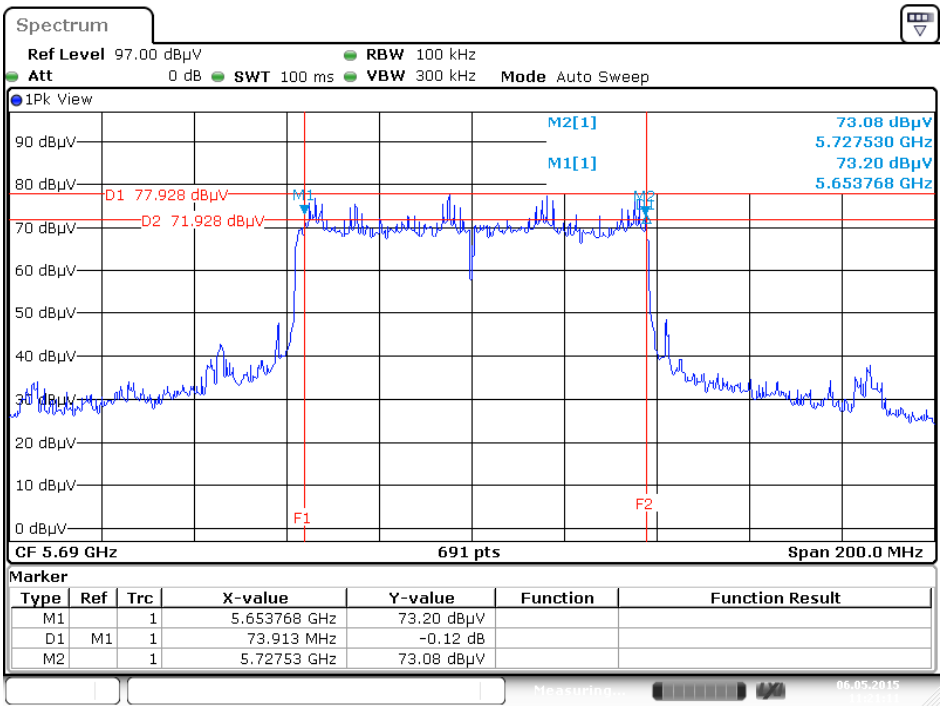
Date:6MAY.2015 11:19:26

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5710 MHz



Date:6MAY.2015 11:20:24

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5690 MHz



Date:6MAY.2015 11:21:11

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

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

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

4.4.2. Measuring Instruments and Setting

For other channel:

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

For straddle channel:

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 count 100
Sweep Time	Auto

4.4.3. Test Procedures

For other channel:

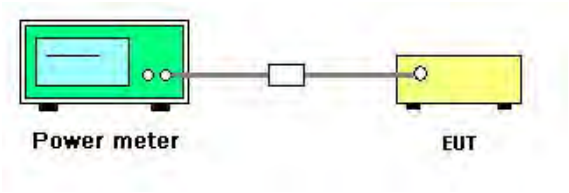
1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter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

For straddle channel:

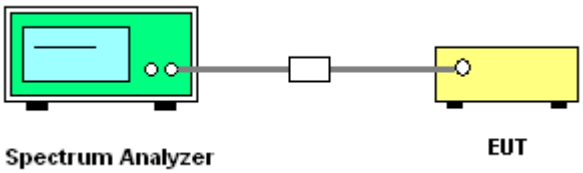
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with FCC Public Notice DA 02-2138, August 30, 2002.

4.4.4. Test Setup Layout

For other channel:



For straddle channel:



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

For Non-Beamforming Mode

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang	Test Date	May 05, 2015

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Ant. 6	Total		
802.11a	5180 MHz	21.05	21.54	21.01	20.56	27.07	30.00	Complies
	5200 MHz	21.05	21.12	20.87	21.11	27.06	30.00	Complies
	5240 MHz	20.87	21.32	20.66	20.71	26.92	30.00	Complies
	5260 MHz	15.17	15.37	14.03	14.91	20.92	24.00	Complies
	5300 MHz	15.23	15.44	14.56	14.88	21.06	24.00	Complies
	5320 MHz	14.89	15.35	13.97	14.49	20.73	24.00	Complies
	5500 MHz	14.66	14.87	14.12	14.68	20.61	24.00	Complies
	5580 MHz	14.28	14.45	14.26	14.47	20.39	24.00	Complies
	5700 MHz	14.55	14.92	14.76	14.85	20.79	24.00	Complies
	5745 MHz	18.96	18.77	18.88	18.76	24.86	30.00	Complies
	5785 MHz	21.54	22.24	21.56	20.89	27.60	30.00	Complies
	5825 MHz	21.49	21.75	22.18	20.76	27.60	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.71	20.66	21.29	20.78	26.89	30.00	Complies
	5200 MHz	20.89	20.54	21.06	20.80	26.85	30.00	Complies
	5240 MHz	20.63	20.87	21.25	21.01	26.97	30.00	Complies
	5260 MHz	14.56	14.28	15.36	15.05	20.85	24.00	Complies
	5300 MHz	14.61	13.63	14.96	14.71	20.53	24.00	Complies
	5320 MHz	14.46	14.26	15.53	15.06	20.88	24.00	Complies
	5500 MHz	14.99	14.53	14.98	14.58	20.80	24.00	Complies
	5580 MHz	15.12	14.88	15.47	14.68	21.07	24.00	Complies
	5700 MHz	15.19	14.74	14.99	14.71	20.93	24.00	Complies
	5745 MHz	21.54	21.31	21.29	21.37	27.40	30.00	Complies
	5785 MHz	21.45	20.97	21.29	21.15	27.24	30.00	Complies
	5825 MHz	21.20	20.92	21.26	20.96	27.11	30.00	Complies

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Ant. 6	Total		
802.11ac MCS0/Nss1 VHT40	5190 MHz	18.44	18.22	19.05	18.56	24.60	30.00	Complies
	5230 MHz	21.11	21.04	21.63	21.18	27.27	30.00	Complies
	5270 MHz	17.58	17.45	18.08	17.93	23.79	24.00	Complies
	5310 MHz	17.46	17.28	18.22	17.99	23.77	24.00	Complies
	5510 MHz	17.73	17.11	17.92	17.25	23.54	24.00	Complies
	5550 MHz	17.48	17.38	17.47	17.46	23.47	24.00	Complies
	5670 MHz	17.82	17.88	17.96	17.56	23.83	24.00	Complies
	5755 MHz	21.78	20.94	21.57	21.84	27.57	30.00	Complies
	5795 MHz	21.73	20.91	21.84	21.94	27.64	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	17.47	17.38	17.81	17.55	23.58	30.00	Complies
	5290 MHz	17.64	17.27	18.10	17.91	23.76	24.00	Complies
	5530 MHz	17.62	17.21	17.68	17.32	23.48	24.00	Complies
	5610 MHz	17.46	17.27	17.44	17.49	23.44	24.00	Complies
	5775 MHz	16.24	15.65	16.16	15.77	21.98	30.00	Complies

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang		

Straddle Channel

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Ant. 6	Total		
802.11a	5720 MHz (UNII 2C)	13.59	12.97	13.55	12.90	19.31	23.15	Complies
	5720 MHz (UNII 3)	7.54	6.80	7.50	6.95	13.25	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5720 MHz (UNII 2C)	12.89	12.21	12.69	12.50	18.65	22.91	Complies
	5720 MHz (UNII 3)	7.04	6.52	6.97	6.77	12.90	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5710 MHz (UNII 2C)	17.48	17.35	17.37	17.52	23.54	24.00	Complies
	5710 MHz (UNII 3)	7.27	7.20	6.76	7.21	13.23	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5690 MHz (UNII 2C)	17.62	16.97	17.70	17.15	23.56	24.00	Complies
	5690 MHz (UNII 3)	3.58	3.28	3.65	3.09	9.59	30.00	Complies

Note:

802.11a 5720 MHz (UNII 2C):

11+10log(B); 11+10log(16.39)=23.15dBm<24dBm, so power limit=23.15dBm

802.11ac MCS0/Nss1 VHT20 5720 MHz (UNII 2C):

11+10log(B); 11+10log(15.52)=22.91dBm<24dBm, so power limit=22.91dBm

For Beamforming Mode

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang	Test Date	May 05, 2015

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Ant. 6	Total		
802.11ac MCS0/Nss2 VHT20	5180 MHz	20.60	20.35	20.93	20.64	26.66	30.00	Complies
	5200 MHz	20.62	20.43	20.89	20.63	26.67	29.97	Complies
	5240 MHz	20.68	20.57	20.93	20.84	26.78	29.81	Complies
	5260 MHz	17.53	17.64	17.85	17.01	23.54	23.74	Complies
	5300 MHz	17.01	17.82	17.88	16.77	23.42	23.98	Complies
	5320 MHz	17.25	17.87	17.67	16.62	23.40	23.94	Complies
	5500 MHz	17.62	17.61	18.26	17.65	23.81	23.97	Complies
	5580 MHz	17.57	17.26	18.20	17.32	23.62	24.00	Complies
	5700 MHz	17.42	17.54	17.91	17.22	23.55	23.84	Complies
	5745 MHz	18.22	18.32	18.56	18.69	24.47	29.76	Complies
	5785 MHz	21.12	21.05	21.32	21.54	27.28	29.89	Complies
	5825 MHz	21.48	21.11	21.52	21.32	27.38	29.99	Complies
802.11ac MCS0/Nss2 VHT40	5190 MHz	17.01	17.02	17.64	17.34	23.28	29.88	Complies
	5230 MHz	21.34	20.95	21.32	21.44	27.29	29.78	Complies
	5270 MHz	17.53	18.02	18.15	17.09	23.74	23.91	Complies
	5310 MHz	17.75	18.23	18.35	16.61	23.81	24.00	Complies
	5510 MHz	17.44	17.04	17.74	17.24	23.39	23.99	Complies
	5550 MHz	18.13	17.66	18.20	17.44	23.89	23.92	Complies
	5670 MHz	17.42	17.83	18.32	17.56	23.82	23.87	Complies
	5755 MHz	16.87	17.03	17.03	16.94	22.99	29.87	Complies
	5795 MHz	20.49	20.57	20.87	20.73	26.69	29.88	Complies
802.11ac MCS0/Nss2 VHT80	5210 MHz	18.11	18.17	18.47	18.50	24.34	29.91	Complies
	5290 MHz	17.32	17.98	18.12	16.97	23.64	23.95	Complies
	5530 MHz	16.75	16.48	17.13	16.41	22.72	23.84	Complies
	5610 MHz	17.51	17.54	17.94	17.48	23.64	24.00	Complies
	5775 MHz	16.48	16.82	16.73	16.52	22.66	29.97	Complies

Note:

5200 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.03dBi >6dBi,So Band1 Limit =30-(6.03-6)=29.97dBm
5240 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.19dBi >6dBi,So Band1 Limit =30-(6.19-6)=29.97dBm
5260 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.26dBi >6dBi,So Band2 Limit =24-(6.26-6)=23.74dBm
5300 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.02dBi >6dBi,So Band2 Limit =24-(6.02-6)=23.98dBm
5320 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.06dBi >6dBi,So Band2 Limit =24-(6.06-6)=23.94dBm
5500 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.03dBi >6dBi,So Band3 Limit =24-(6.03-6)=23.97dBm
5700 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.16dBi >6dBi,So Band3 Limit=24-(6.16-6)=23.84dBm
5745 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.24dBi >6dBi,So Band4 Limit =30-(6.24-6)=29.76dBm
5785 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.11dBi >6dBi,So Band4 Limit =30-(6.11-6)=29.89dBm
5825 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.01dBi >6dBi,So Band4 Limit =30-(6.01-6)=29.99dBm
5190 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.12dBi >6dBi,So Band3 Limit =30-(6.12-6)=29.88dBm
5230 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.22dBi >6dBi,So Band3 Limit =30-(6.22-6)=29.78dBm
5270 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.09dBi >6dBi,So Band2 Limit =24-(6.09-6)=23.91dBm
5550 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.01dBi >6dBi,So Band3 Limit =24-(6.01-6)=23.99dBm
5510 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.08dBi >6dBi,So Band3 Limit =24-(6.08-6)=23.92dBm
5670 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.13dBi >6dBi,So Band3 Limit =24-(6.13-6)=23.87dBm
5755 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.13dBi >6dBi,So Band4 Limit =30-(6.13-6)=29.87dBm
5795 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.12dBi >6dBi,So Band4 Limit =30-(6.12-6)=29.88dBm
5210 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.09dBi >6dBi,So Band1 Limit =30-(6.09-6)=29.91dBm
5290 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.05dBi >6dBi,So Band2 Limit =24-(6.05-6)=23.95dBm
5530 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.16dBi >6dBi,So Band3 Limit =24-(6.16-6)=23.84dBm
5775 MHz	Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi	=6.03dBi >6dBi,So Band4 Limit =30-(6.03-6)=29.97dBm

Temperature	23.2℃	Humidity	52%
Test Engineer	Lucas Huang		

Straddle Channel

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Ant. 6	Total		
802.11ac MCS0/Nss2 VHT20	5720 MHz (UNII 2C)	16.95	16.73	16.80	15.80	23.00	23.15	Complies
	5720 MHz (UNII 3)	11.44	10.98	11.33	9.43	17.27	29.91	Complies
802.11ac MCS0/Nss2 VHT40	5710 MHz (UNII 2C)	16.86	16.59	17.04	16.50	23.50	23.83	Complies
	5710 MHz (UNII 3)	6.82	6.62	6.95	6.77	13.54	29.83	Complies
802.11ac MCS0/Nss2 VHT80	5690 MHz (UNII 2C)	17.81	17.40	18.10	17.26	23.86	23.87	Complies
	5690 MHz (UNII 3)	3.94	3.73	4.06	3.01	9.91	29.87	Complies

Note:

5720 MHz (UNII 2C) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.09dBi >6dBi,So Band3 Limit =23.24-(6.09-6)=23.15dBm

5720 MHz (UNII 3) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.09dBi >6dBi,So Band4 Limit =30-(6.09-6)=29.91dBm

5710 MHz (UNII 2C) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.17dBi >6dBi,So Band3 Limit =24-(6.17-6)=23.83dBm

5710 MHz (UNII 3) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.17dBi >6dBi,So Band4 Limit =30-(6.17-6)=29.83dBm

5690 MHz (UNII 2C) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.13dBi >6dBi,So Band3 Limit =24-(6.13-6)=23.87dBm

5690 MHz (UNII 3) Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.13dBi >6dBi,So Band4 Limit =30-(6.13-6)=29.87dBm

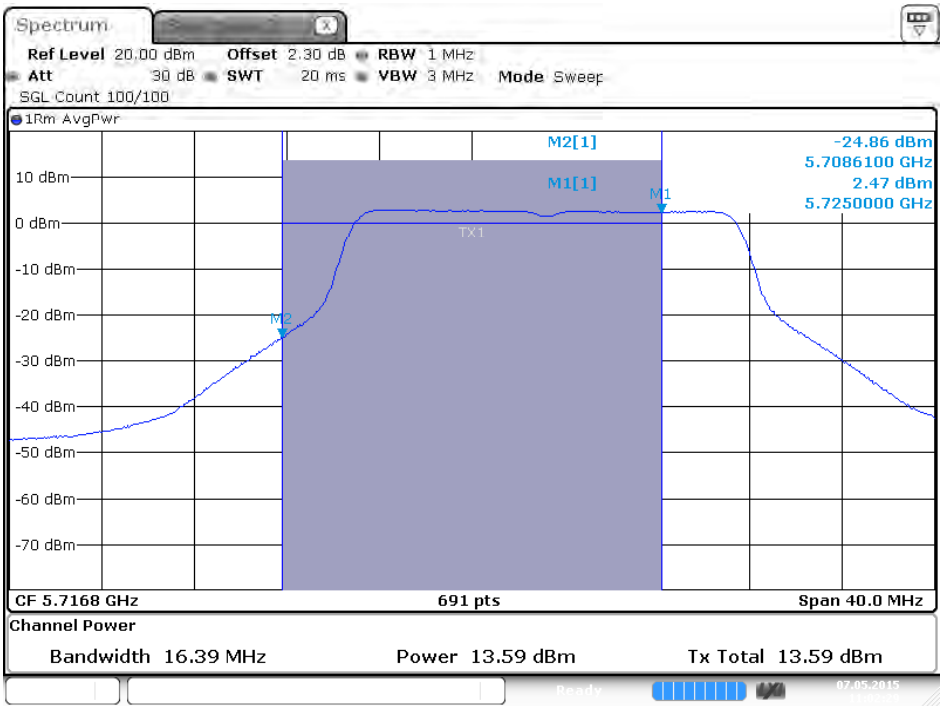
Note: All the test values were listed in the report.

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

Straddle Channel

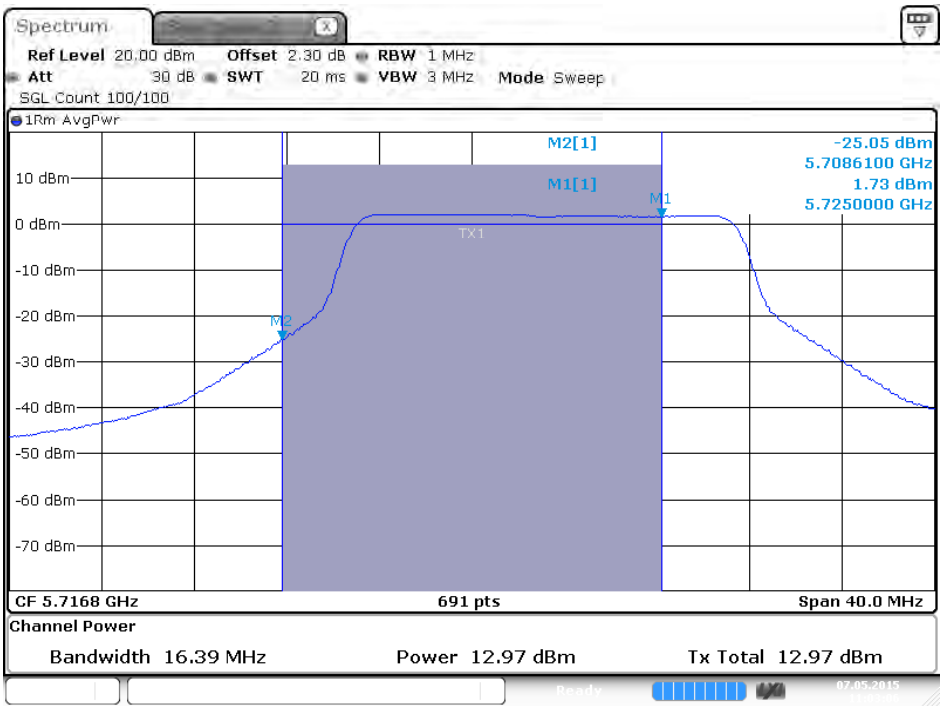
For Non-Beamforming Mode

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 3 / 5720 MHz (UNII 2C)



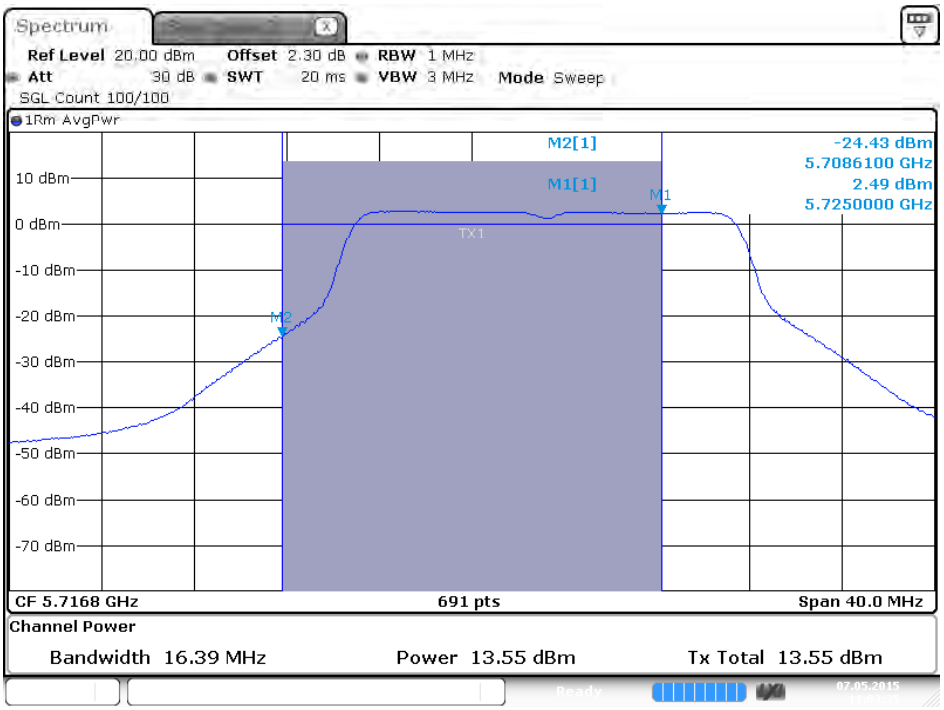
Date: 7 MAY 2015 11:02:29

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 4 / 5720 MHz (UNII 2C)



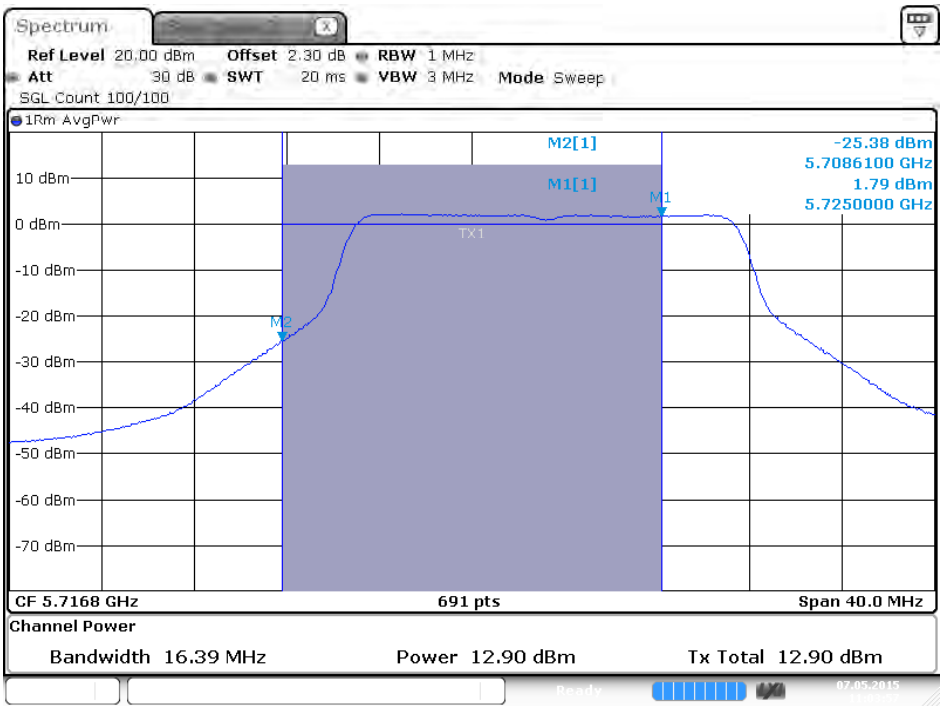
Date: 7 MAY 2015 11:03:06

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 5 / 5720 MHz (UNII 2C)



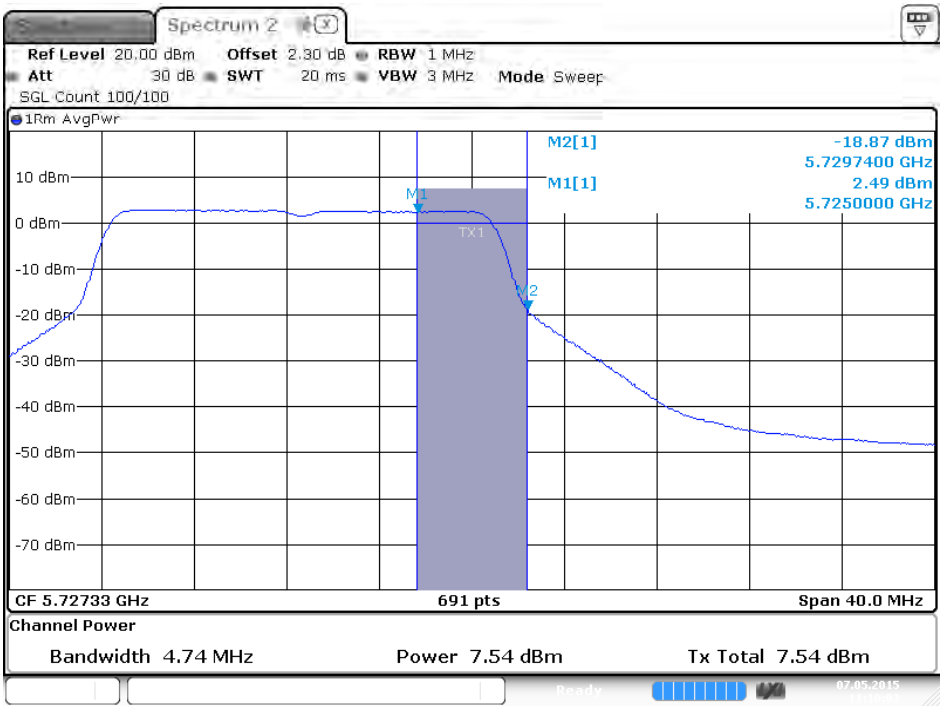
Date: 7 MAY 2015 11:03:35

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 6 / 5720 MHz (UNII 2C)



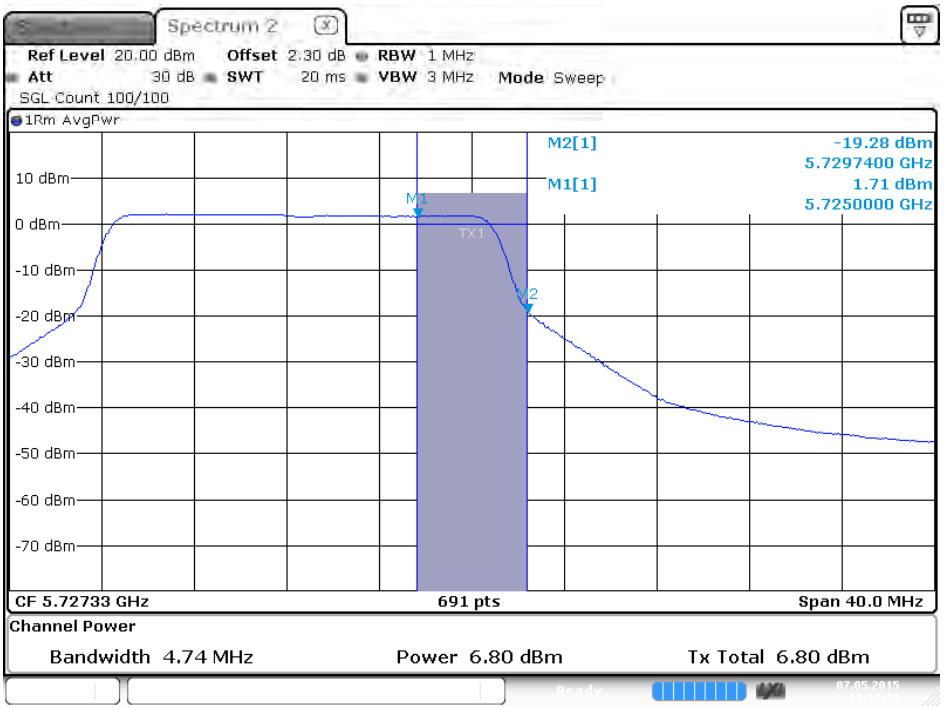
Date: 7 MAY 2015 11:03:57

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 3 / 5720 MHz (UNII 3)



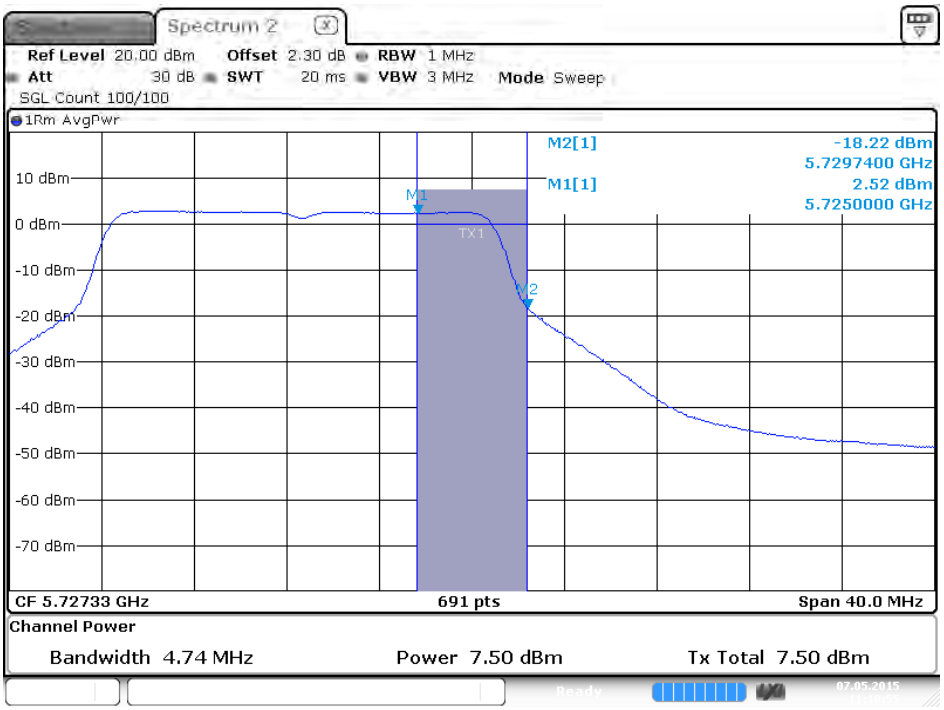
Date:7MAY.2015 11:10:03

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 4 / 5720 MHz (UNII 3)



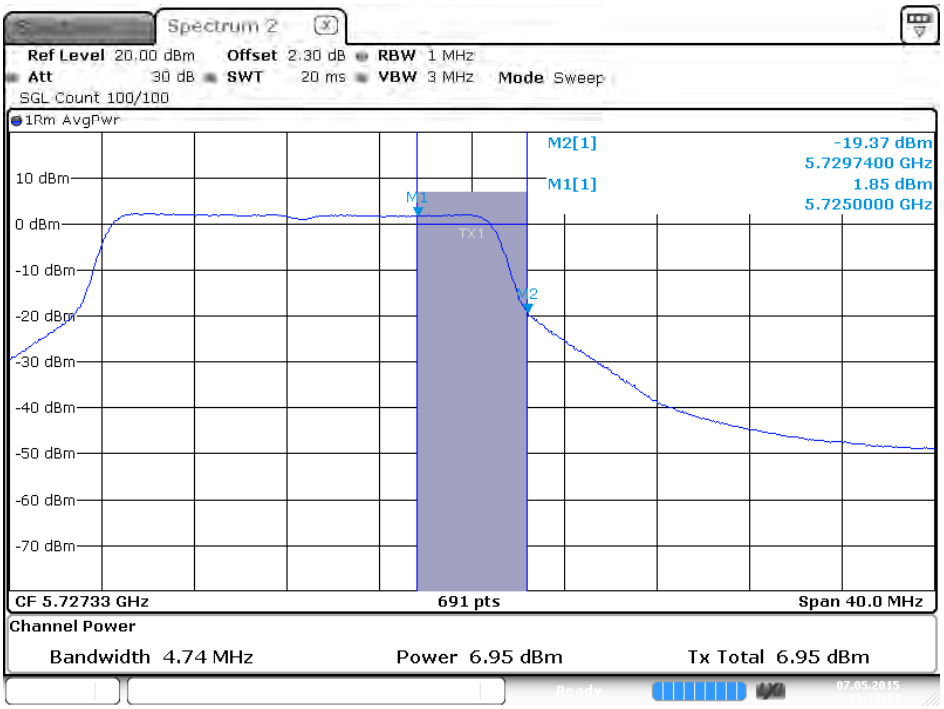
Date:7MAY.2015 11:10:30

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 5 / 5720 MHz (UNII 3)



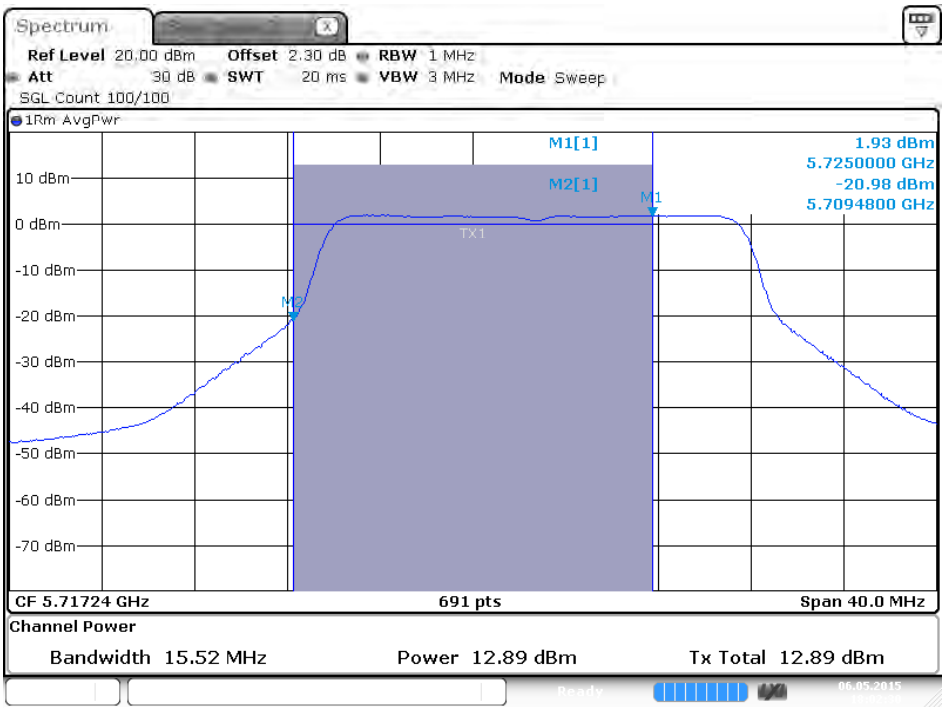
Date:7 MAY 2015 11:10:55

Conducted Output Power Plot on Configuration IEEE 802.11a / Ant. 6 / 5720 MHz (UNII 3)



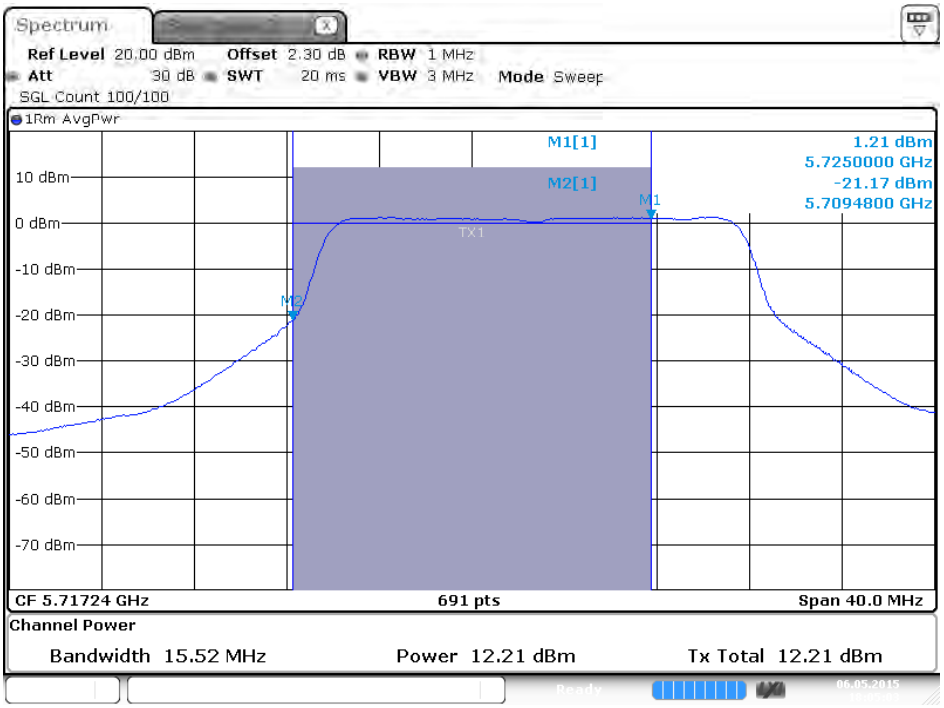
Date:7 MAY 2015 11:11:15

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 / 5720 MHz (UNII 2C)



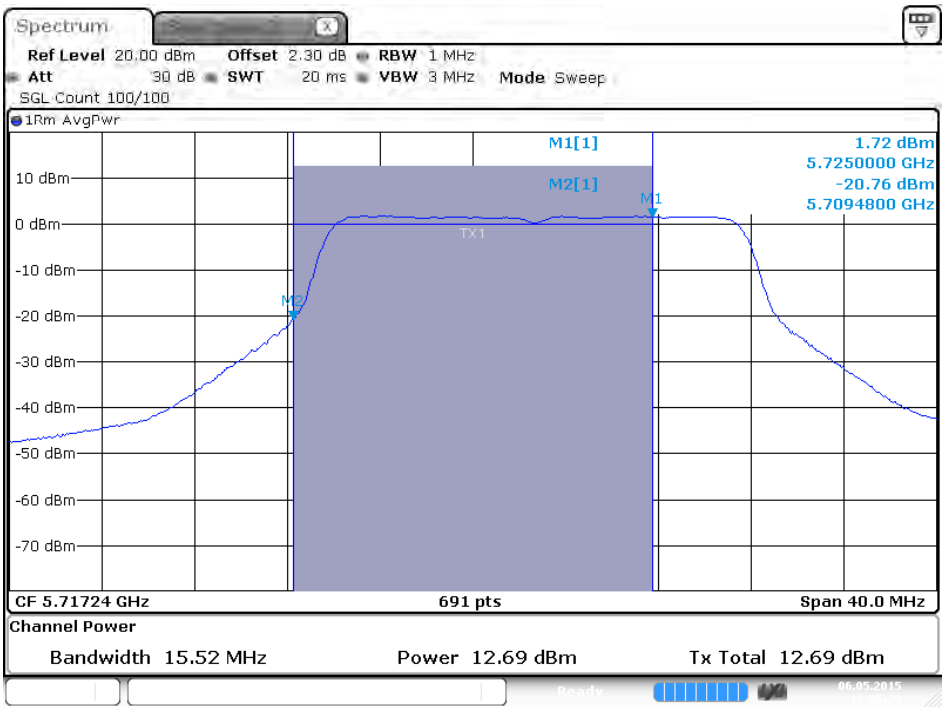
Date: 6 MAY 2015 18:02:30

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 / 5720 MHz (UNII 2C)



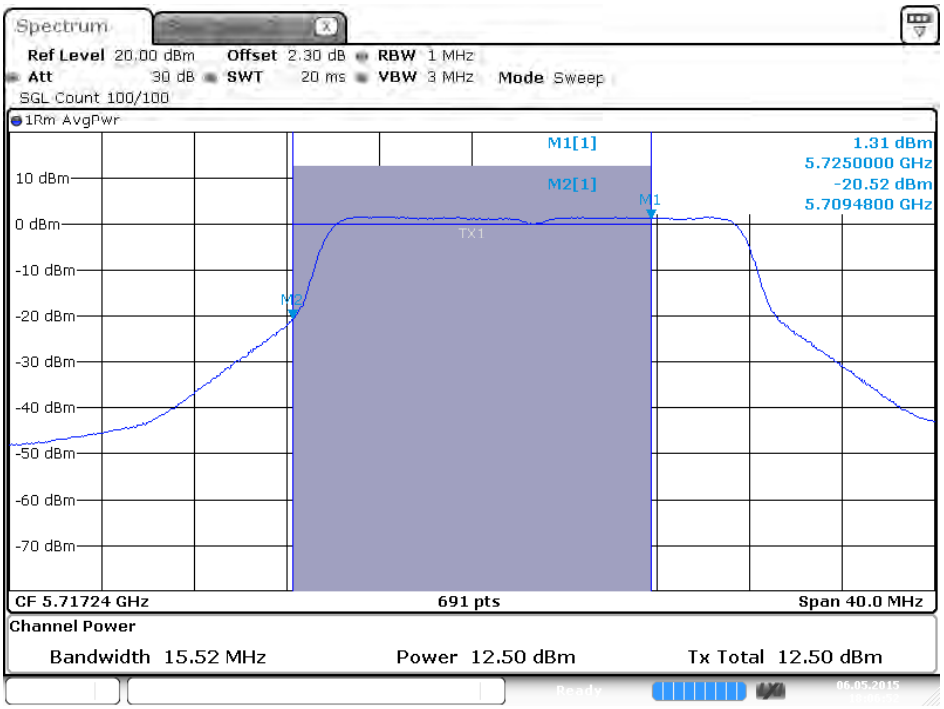
Date: 6 MAY 2015 18:05:03

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 5 / 5720 MHz (UNII 2C)



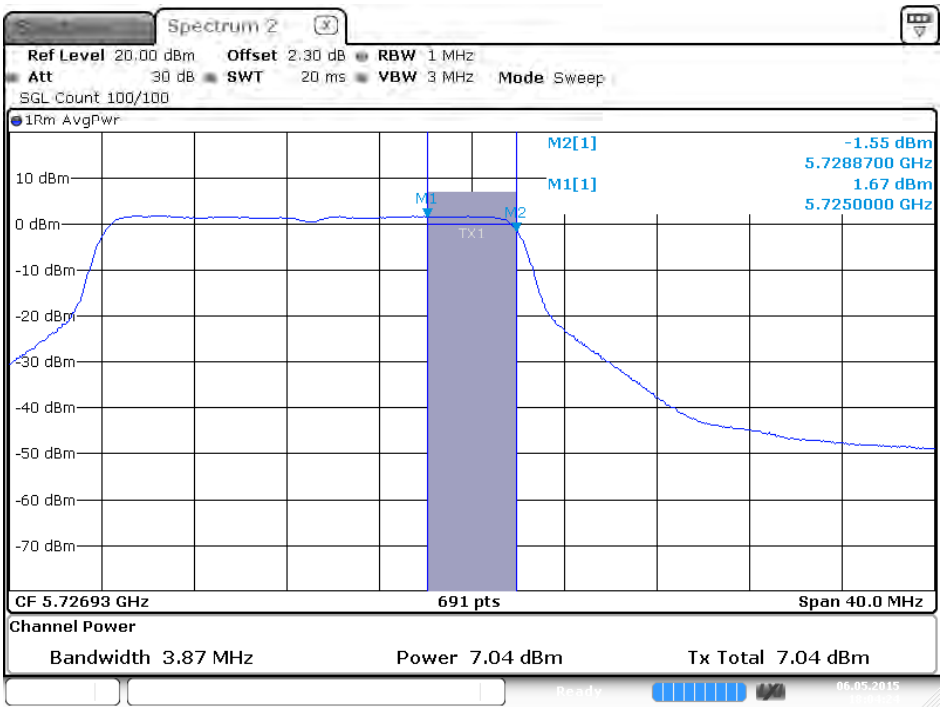
Date: 6 MAY 2015 18:05:30

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 6 / 5720 MHz (UNII 2C)



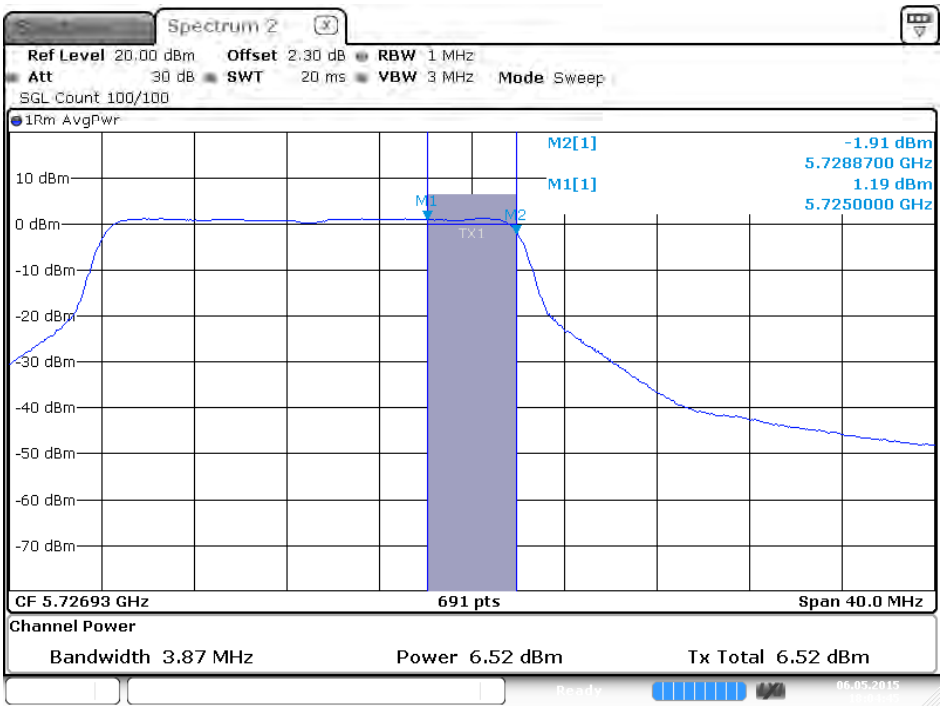
Date: 6 MAY 2015 18:06:53

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 / 5720 MHz (UNII 3)



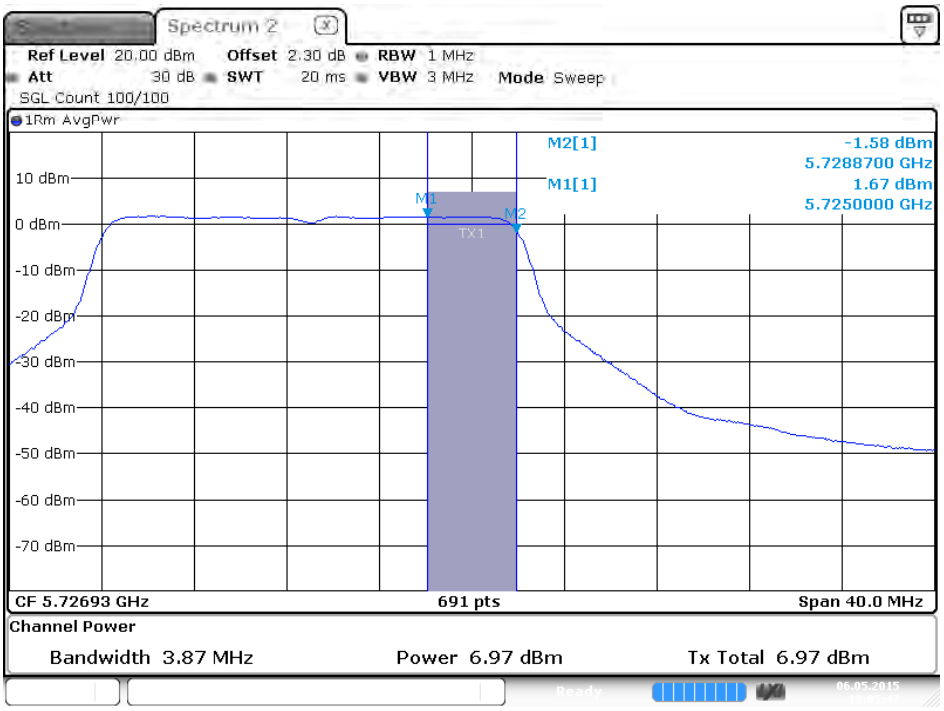
Date: 6 MAY 2015 18:04:24

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 / 5720 MHz (UNII 3)



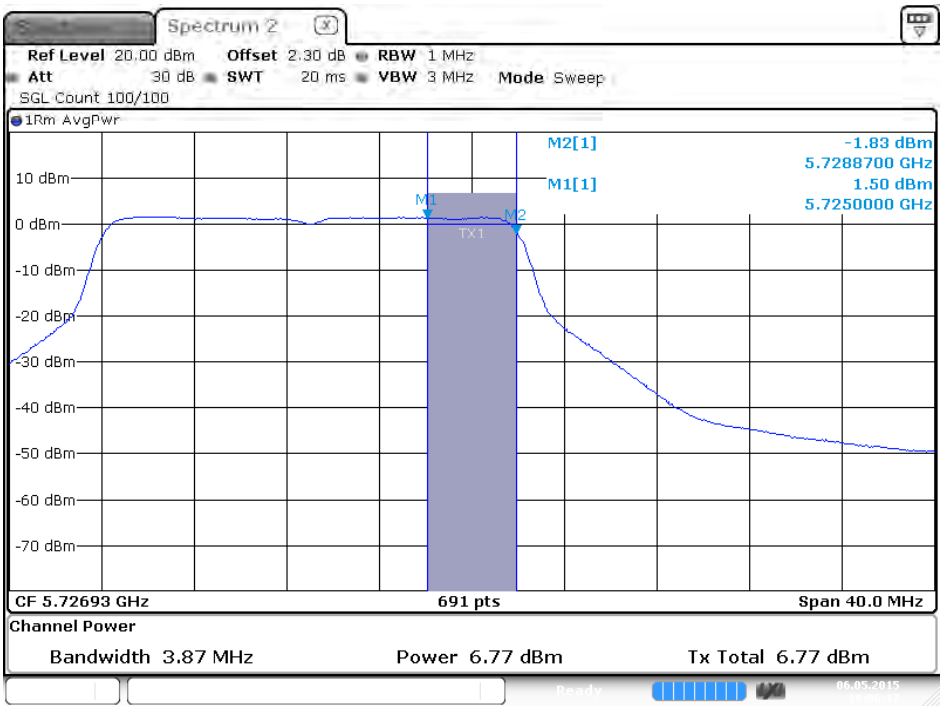
Date: 6 MAY 2015 18:04:45

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 5 / 5720 MHz (UNII 3)



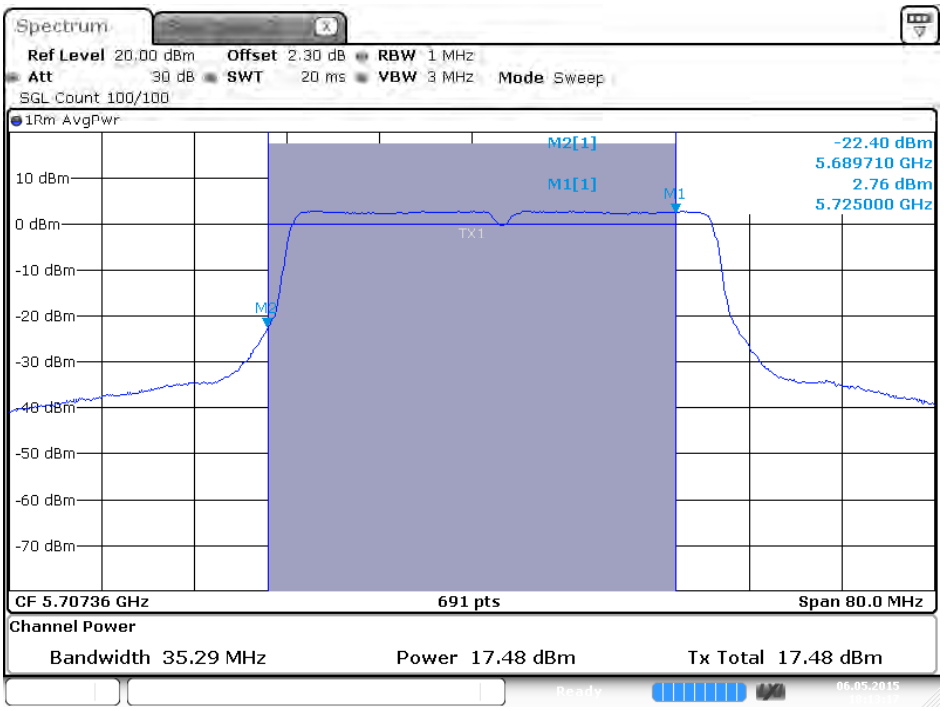
Date: 6 MAY 2015 18:05:48

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 6 / 5720 MHz (UNII 3)



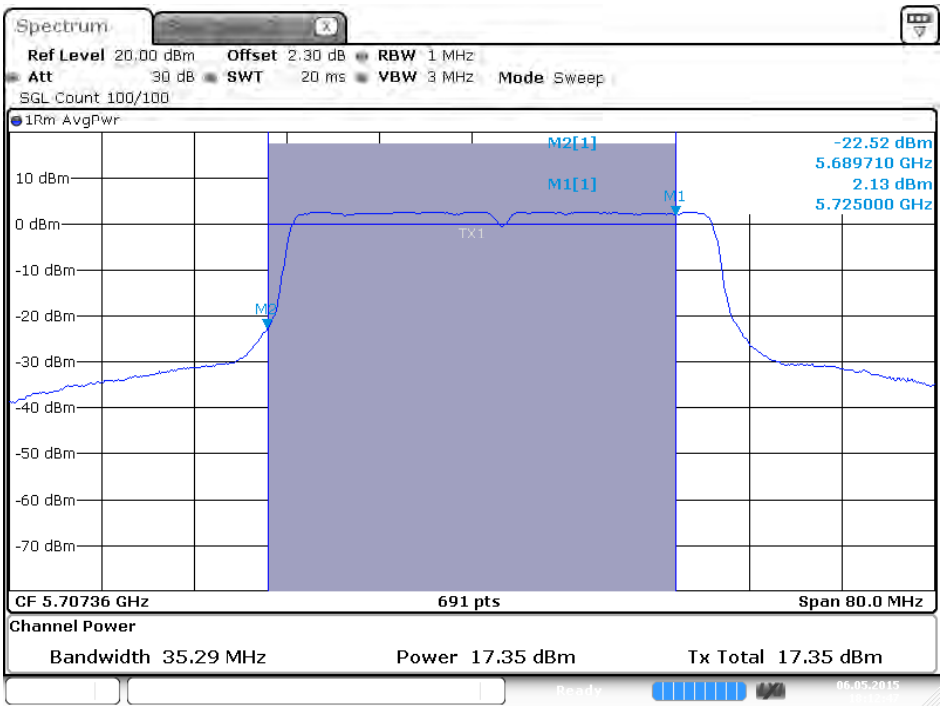
Date: 6 MAY 2015 18:06:17

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 / 5710 MHz (UNII 2C)



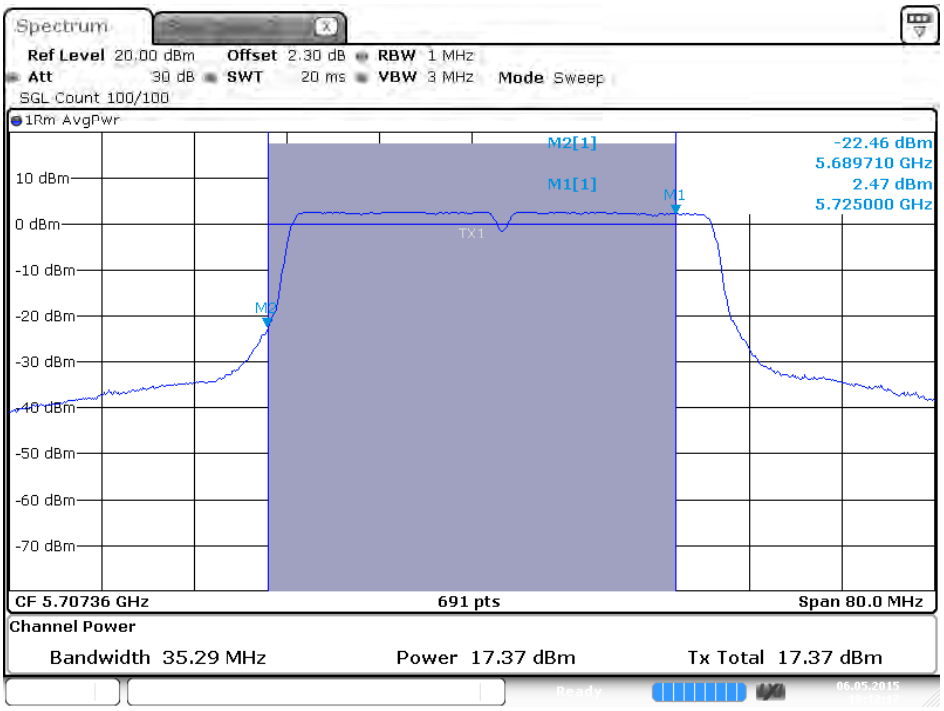
Date:6MAY.2015 18:13:17

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 / 5710 MHz (UNII 2C)



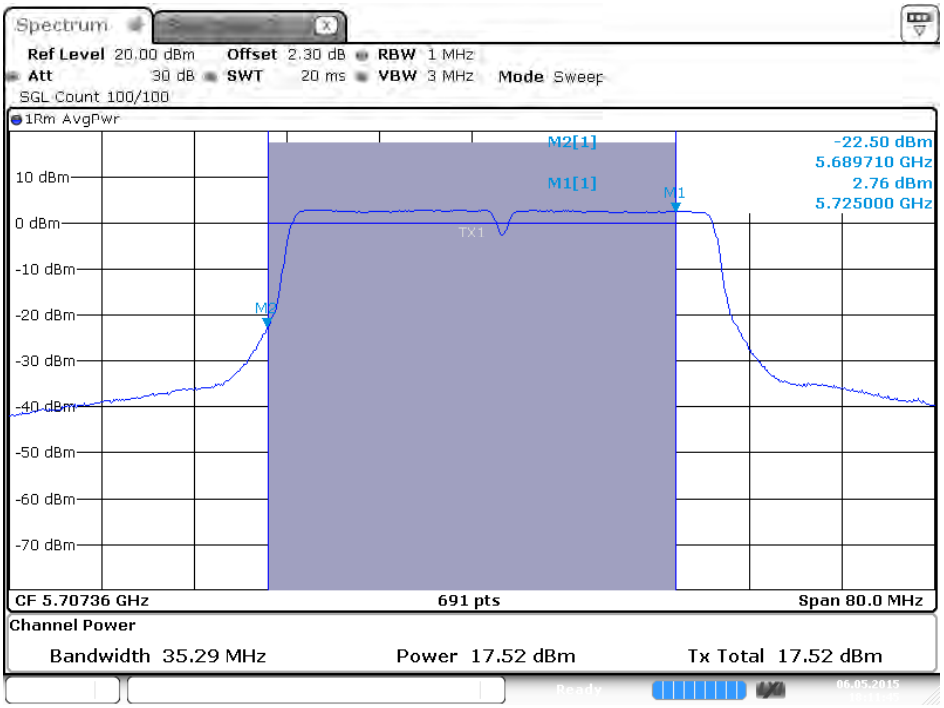
Date:6MAY.2015 18:12:48

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 5 / 5710 MHz (UNII 2C)



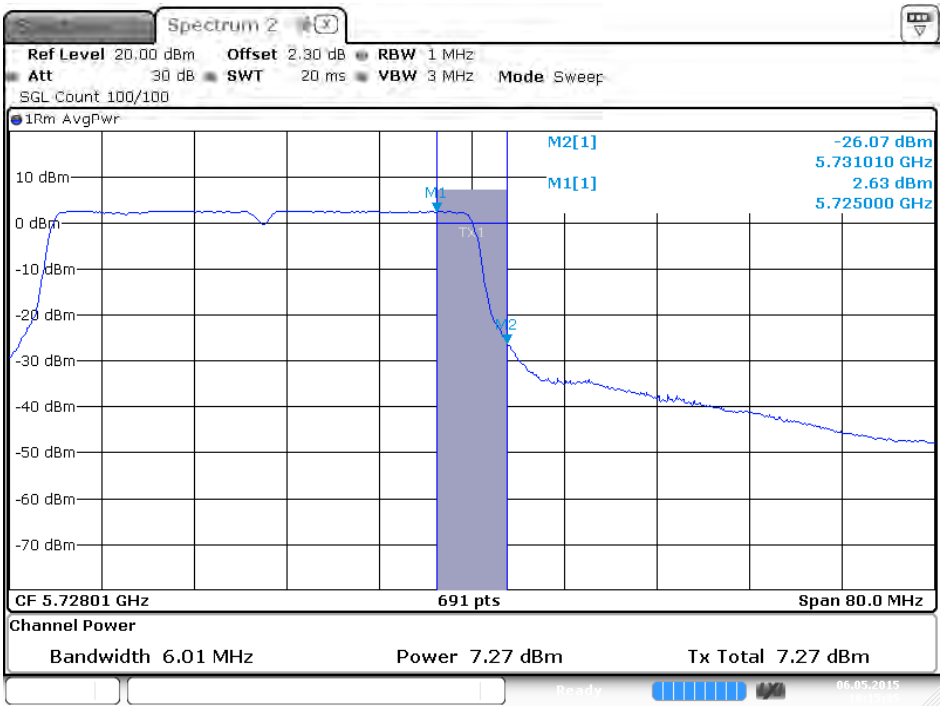
Date:6 MAY 2015 18:12:17

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 6 / 5710 MHz (UNII 2C)



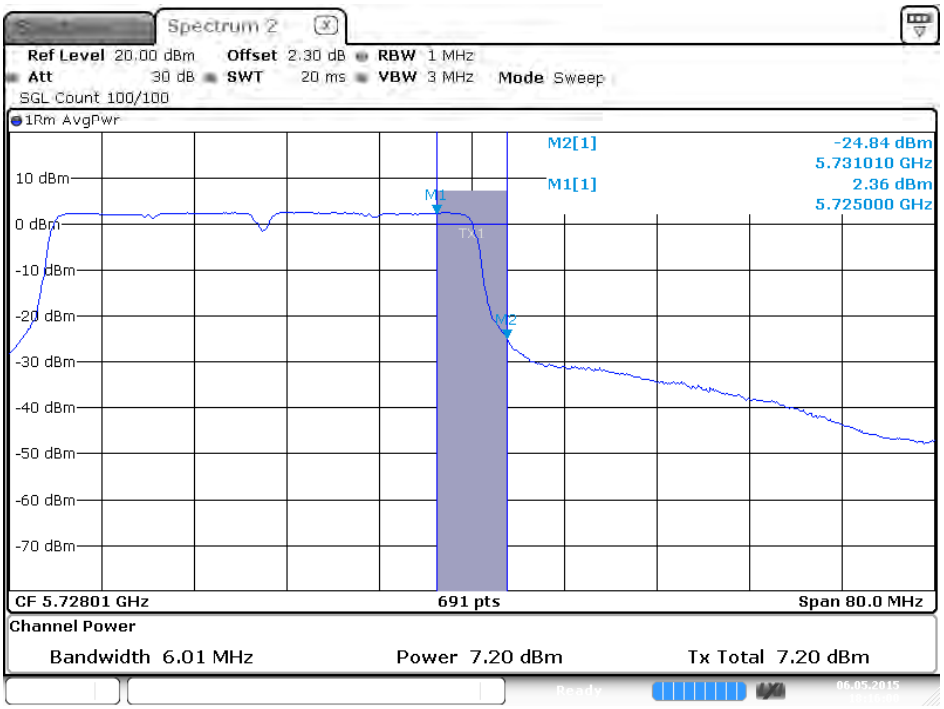
Date:6 MAY 2015 18:11:46

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 / 5710 MHz (UNII 3)



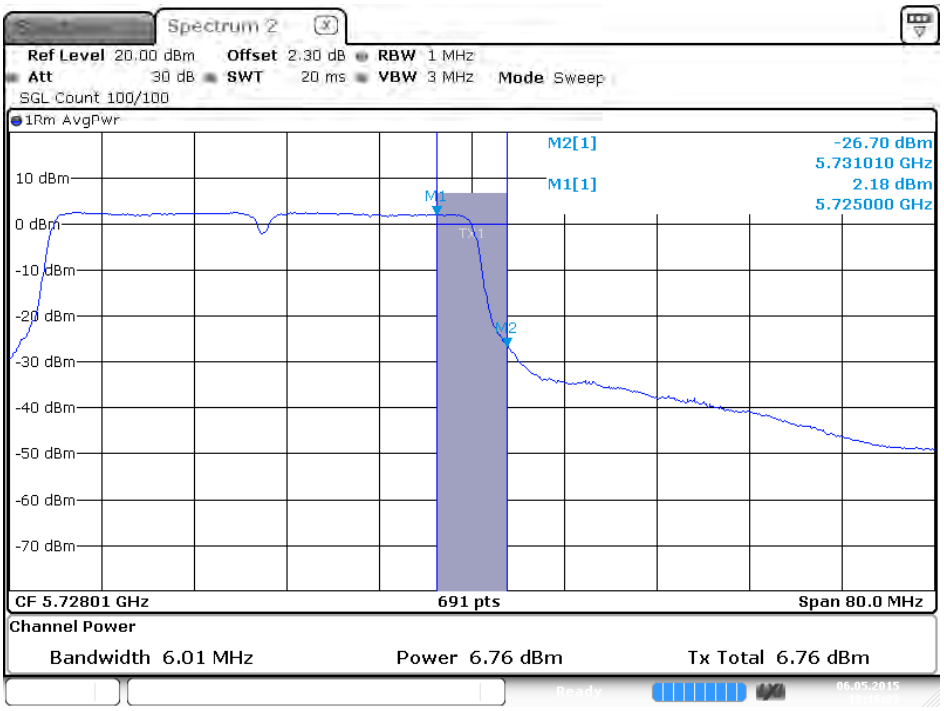
Date:6MAY.2015 18:15:34

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 / 5710 MHz (UNII 3)



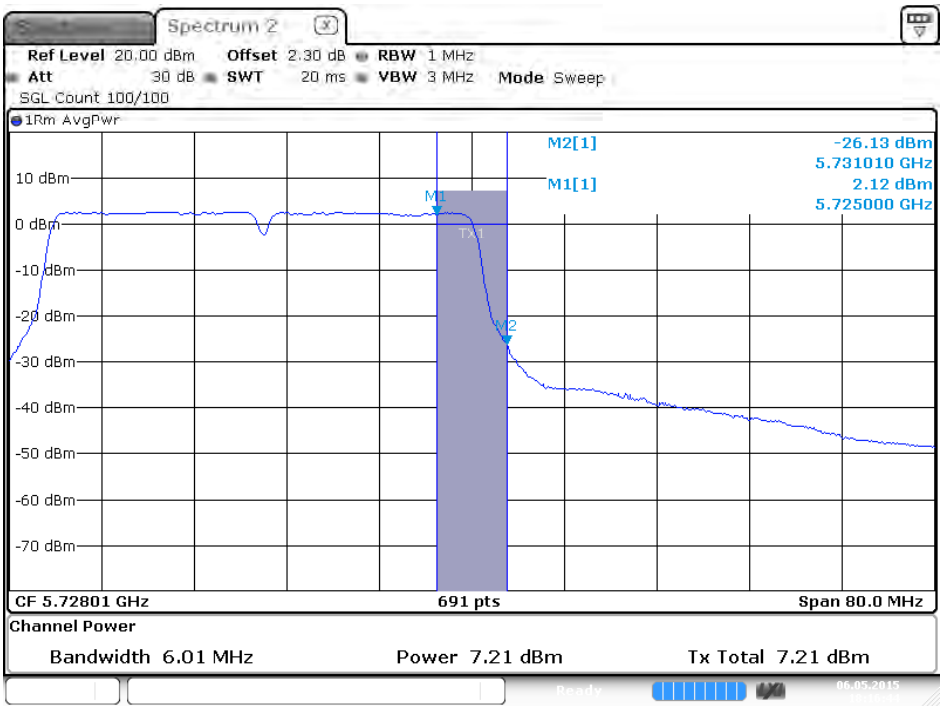
Date:6MAY.2015 18:16:00

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 5 / 5710 MHz (UNII 3)



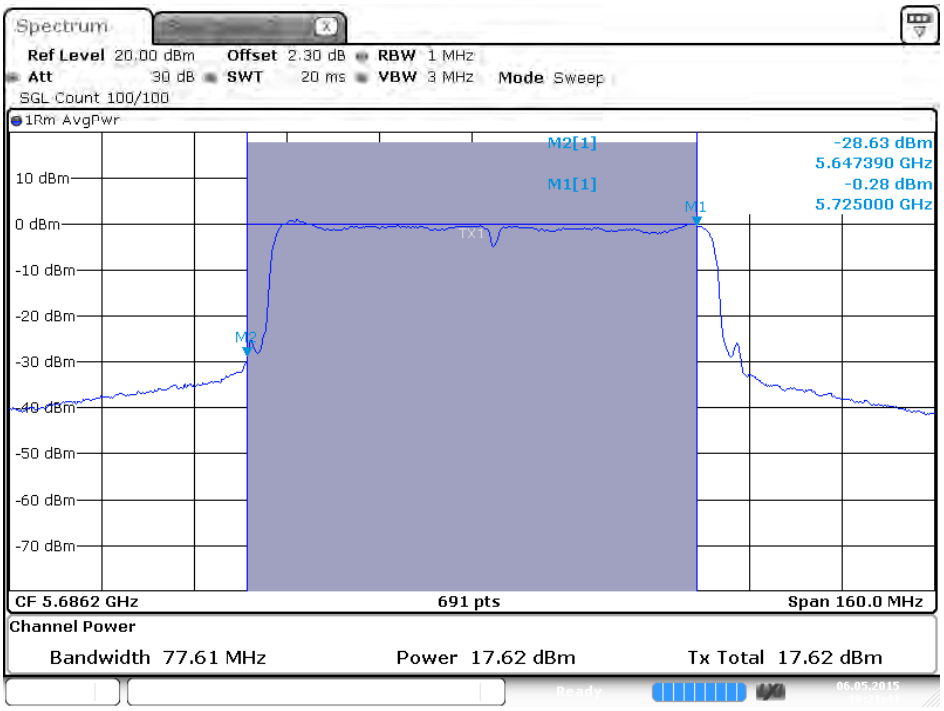
Date: 6 MAY 2015 18:16:24

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 6 / 5710 MHz (UNII 3)



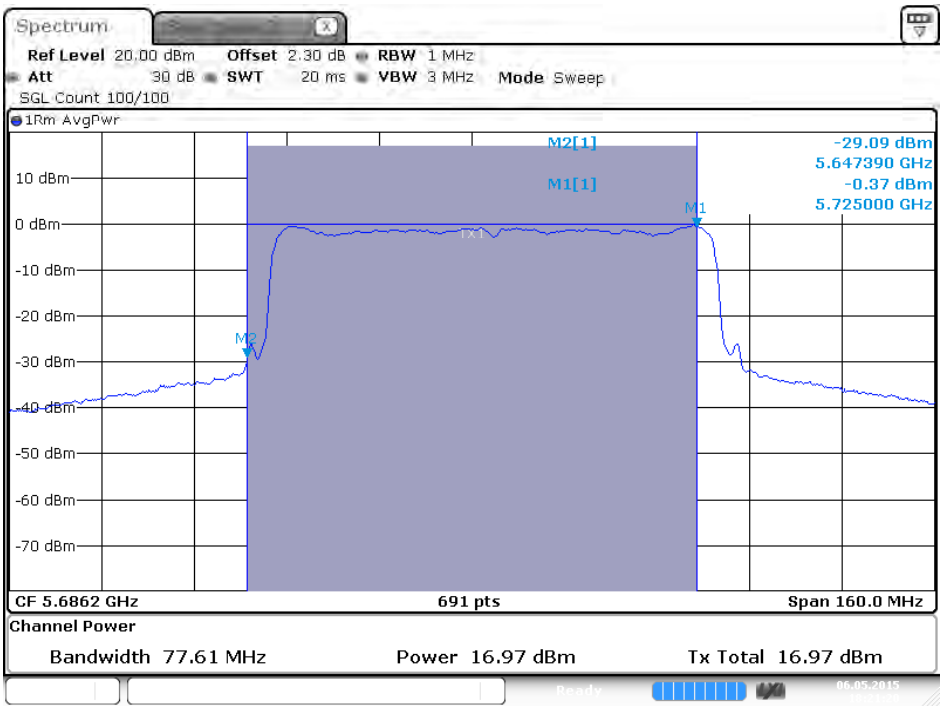
Date: 6 MAY 2015 18:16:44

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 / 5690 MHz (UNII 2C)



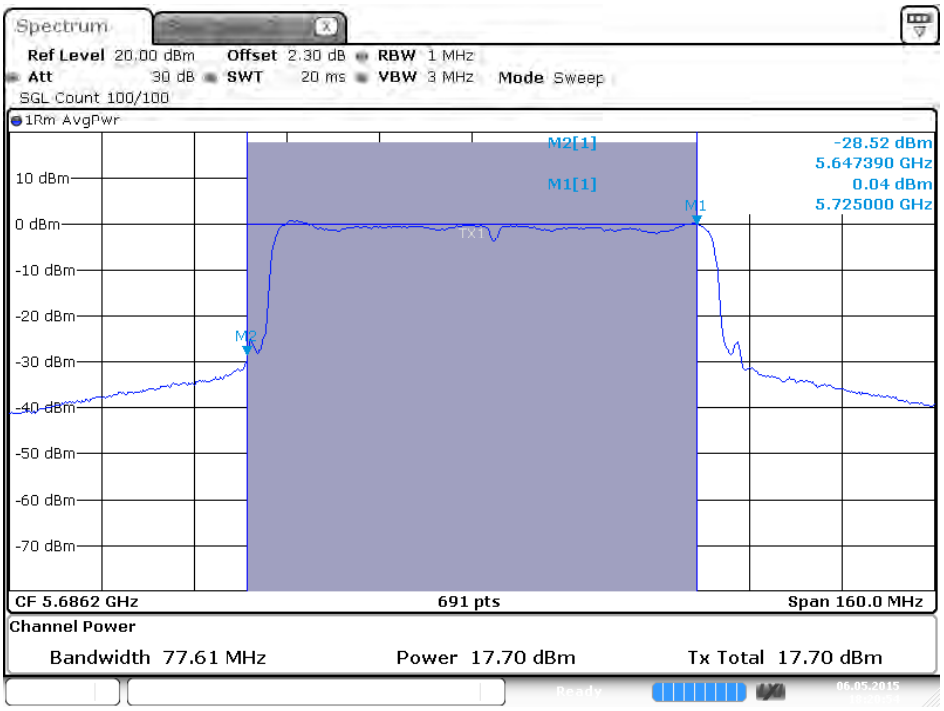
Date:6MAY.2015 18:21:42

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 / 5690 MHz (UNII 2C)



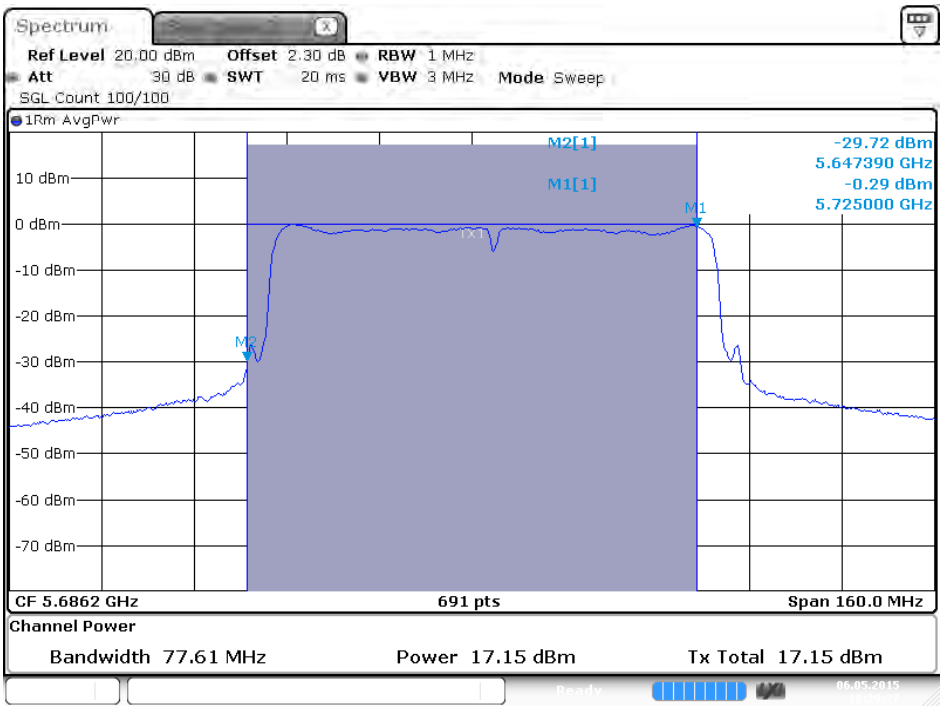
Date:6MAY.2015 18:21:21

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 5 / 5690 MHz (UNII 2C)



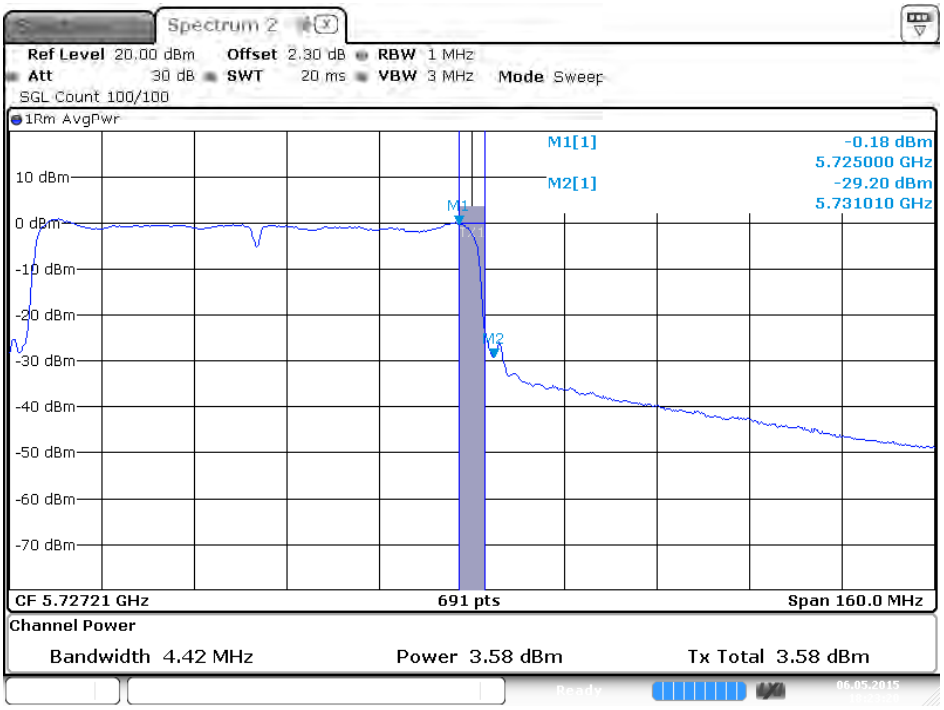
Date:6MAY.2015 18:20:54

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 6 / 5690 MHz (UNII 2C)



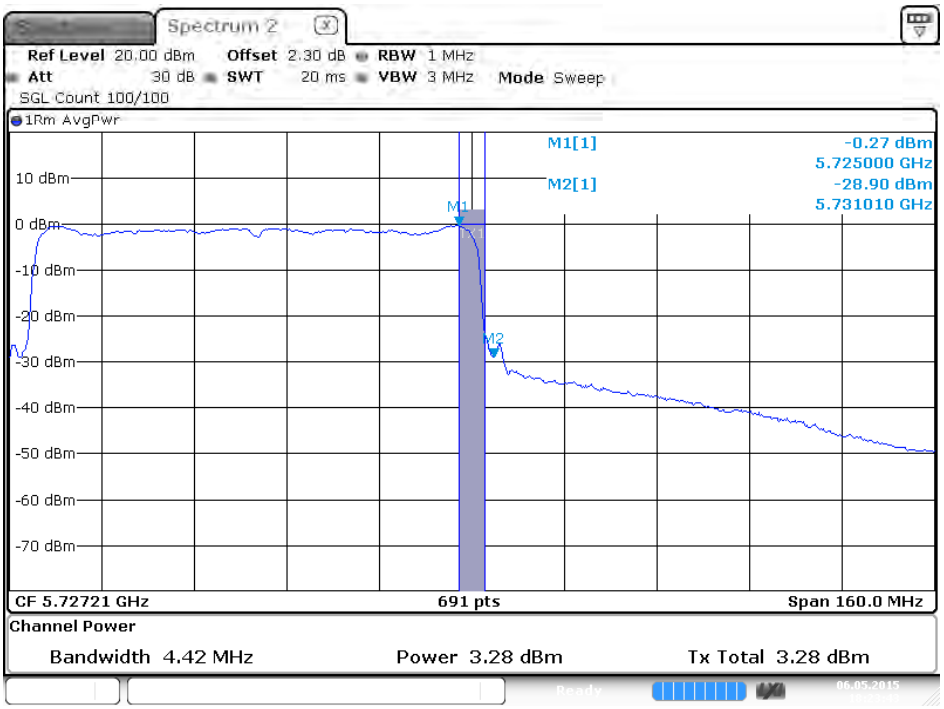
Date:6MAY.2015 18:20:27

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 / 5690 MHz (UNII 3)



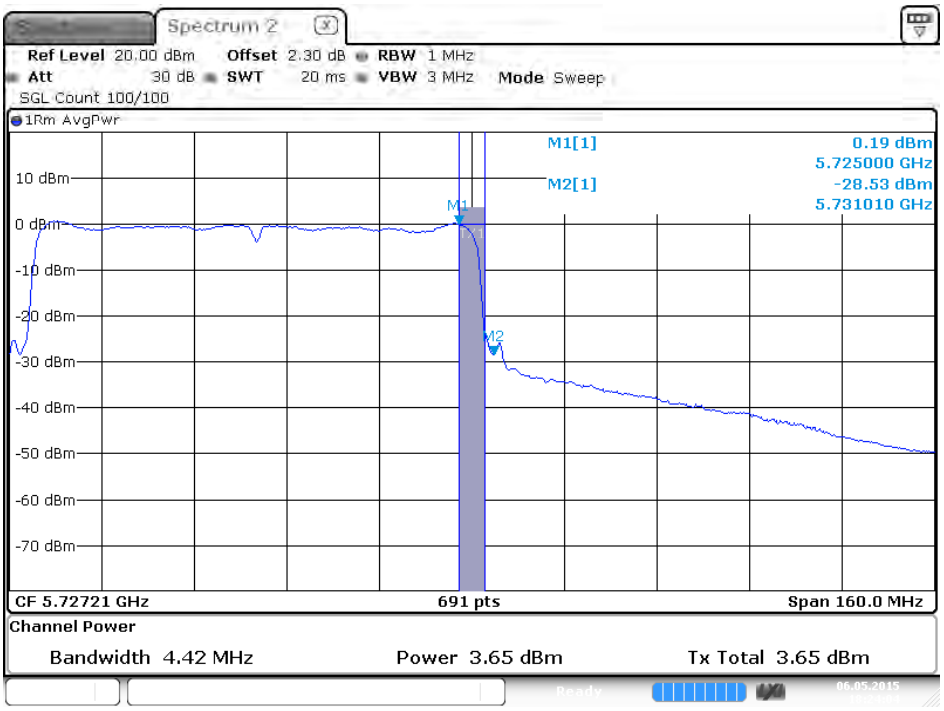
Date: 6 MAY 2015 18:23:20

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 / 5690 MHz (UNII 3)



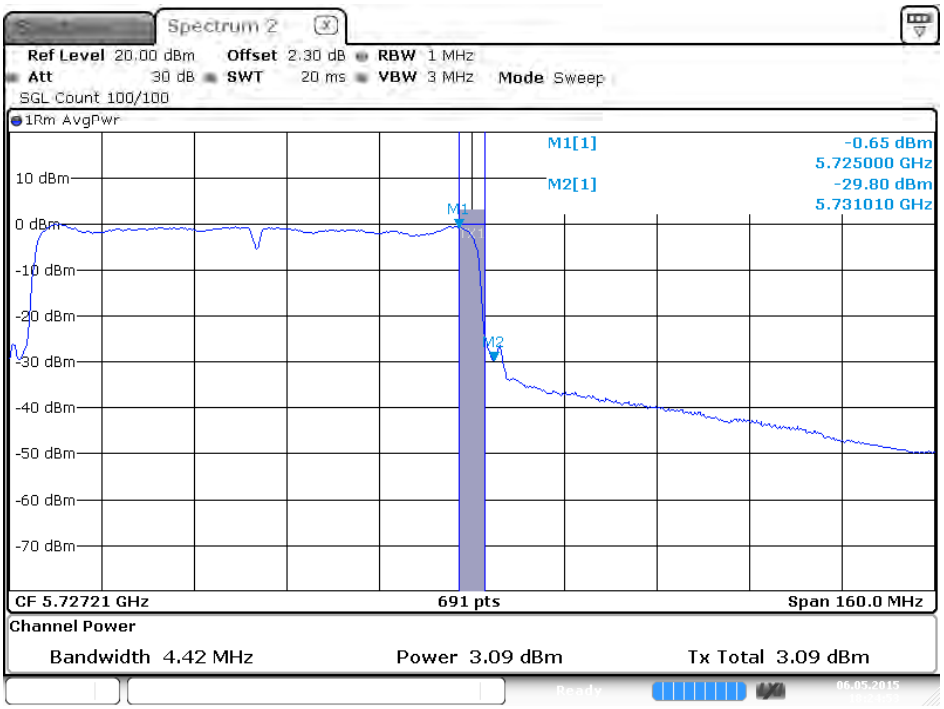
Date: 6 MAY 2015 18:23:43

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 5 / 5690 MHz (UNII 3)



Date: 6 MAY 2015 18:24:03

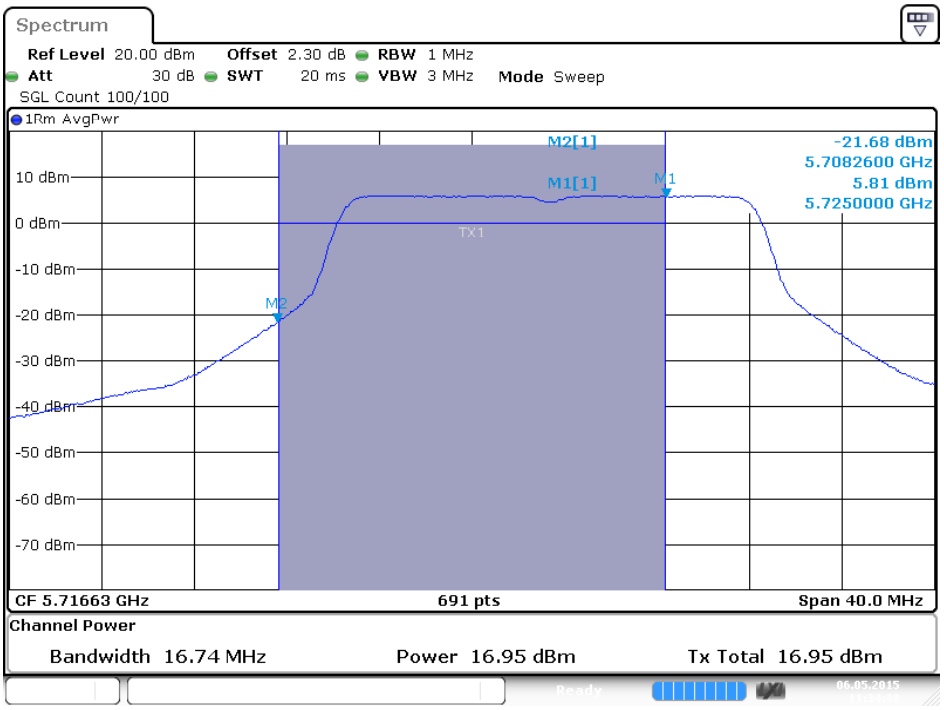
Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 6 / 5690 MHz (UNII 3)



Date: 6 MAY 2015 18:24:53

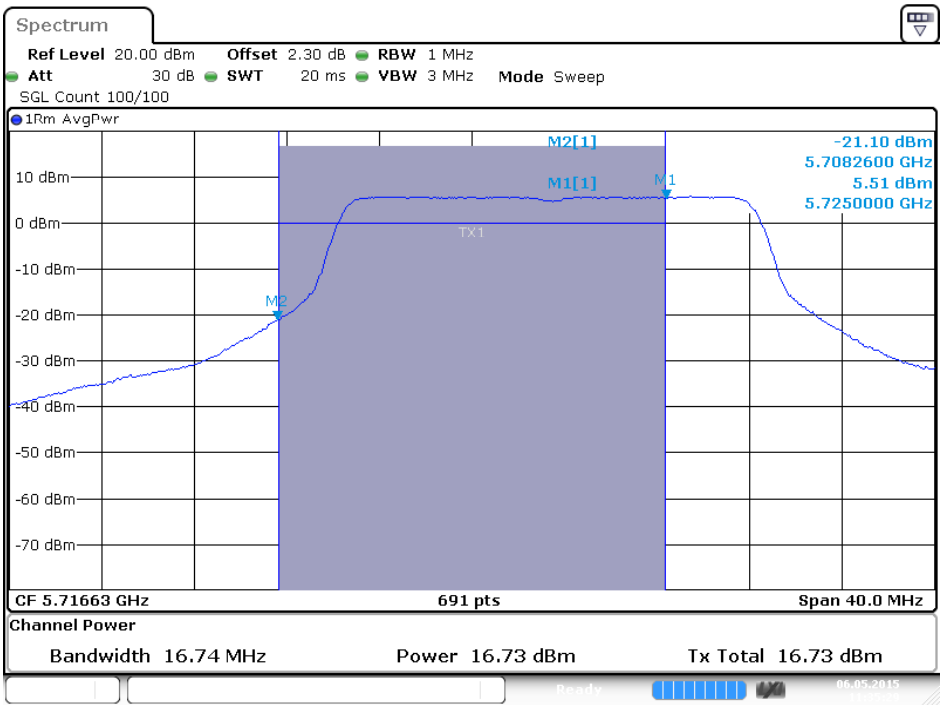
For Beamforming Mode

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 / 5720 MHz (UNII 2C)



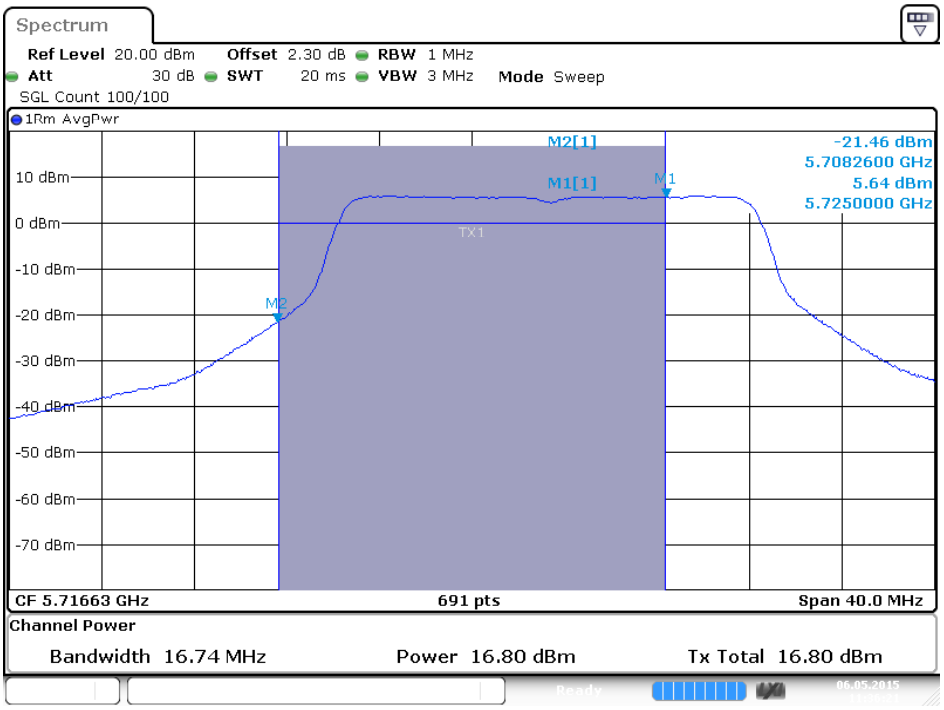
Date: 6 MAY 2015 11:34:38

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 4 / 5720 MHz (UNII 2C)



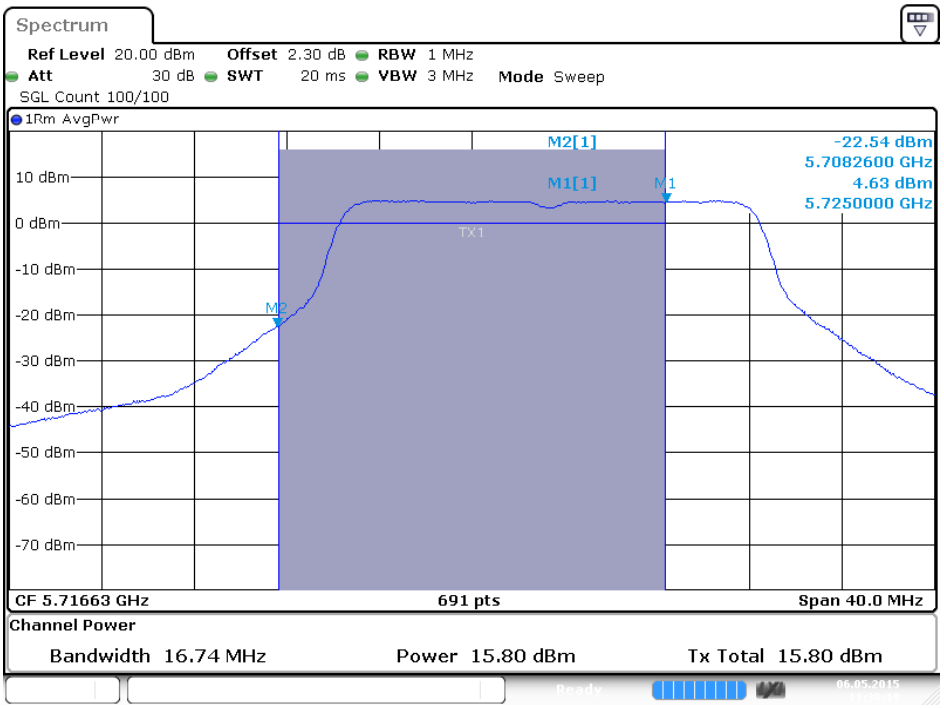
Date: 6 MAY 2015 11:35:29

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 5 / 5720 MHz (UNII 2C)



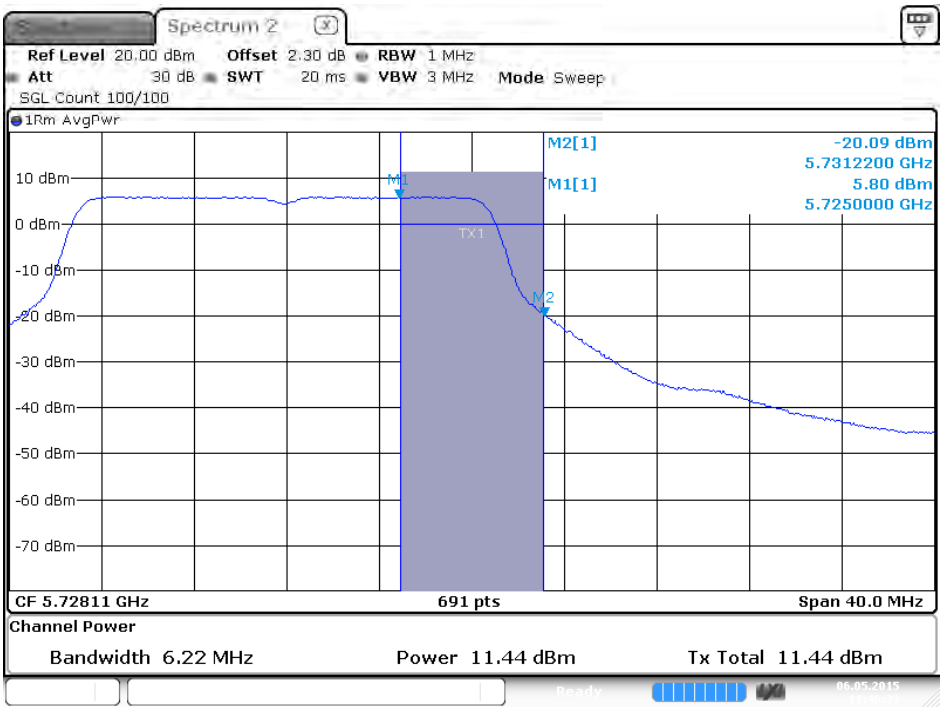
Date:6MAY.2015 11:36:21

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 6 / 5720 MHz (UNII 2C)



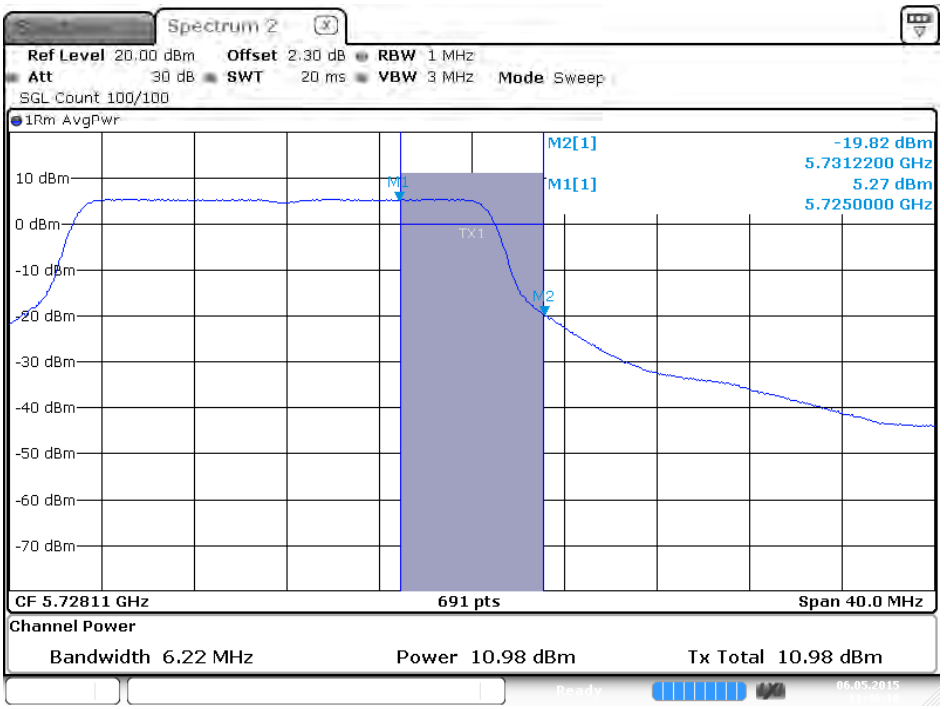
Date:6MAY.2015 11:38:19

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 / 5720 MHz (UNII 3)



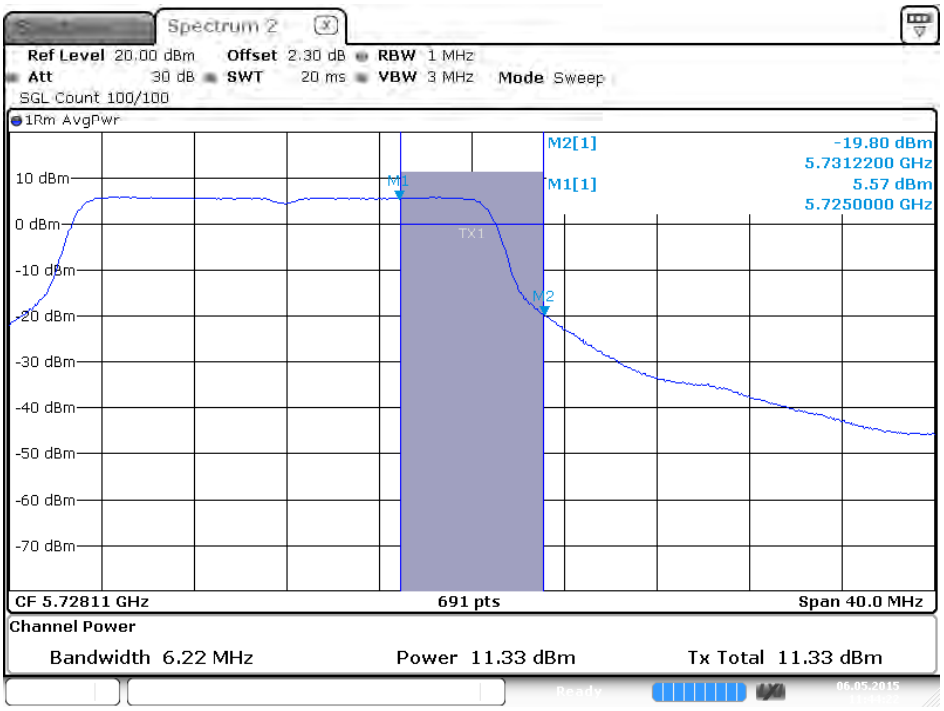
Date:6MAY.2015 11:46:33

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 4 / 5720 MHz (UNII 3)



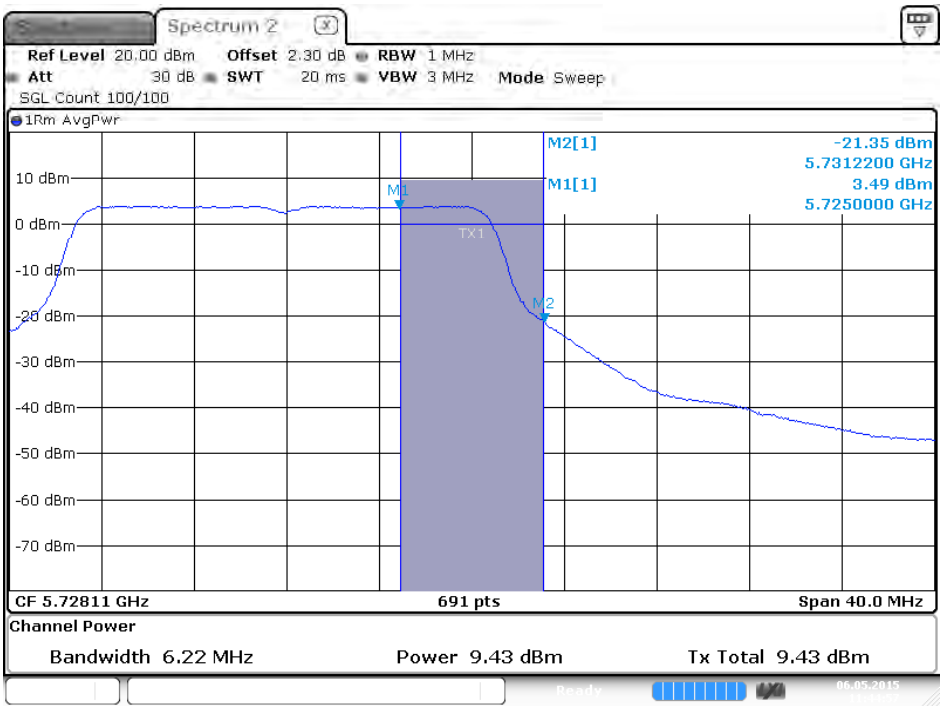
Date:6MAY.2015 11:46:10

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 5 / 5720 MHz (UNII 3)



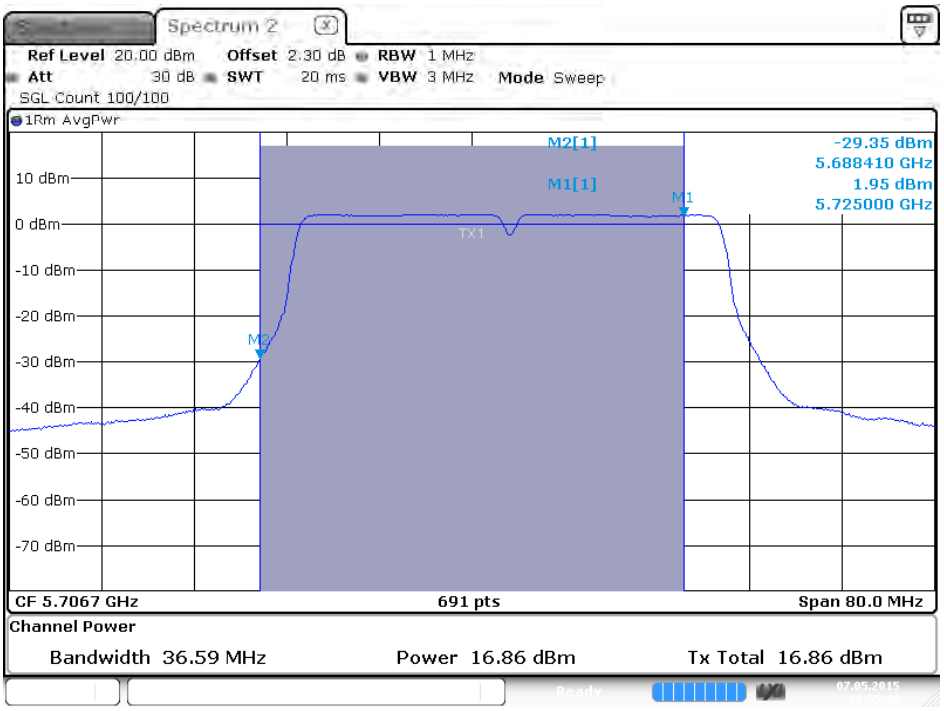
Date: 6 MAY 2015 11:44:23

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 6 / 5720 MHz (UNII 3)



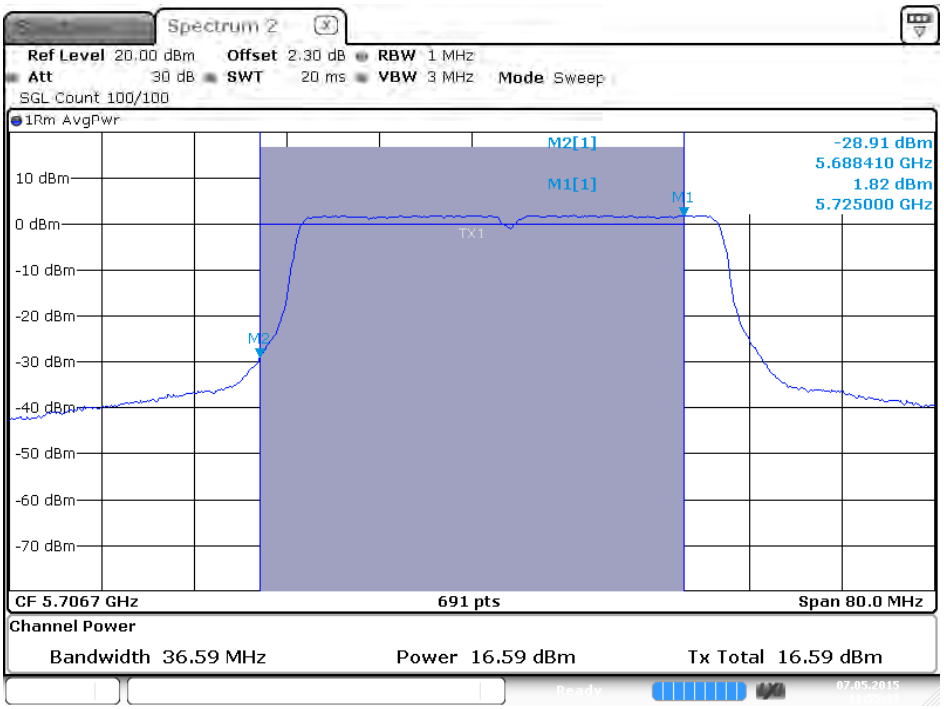
Date: 6 MAY 2015 11:44:56

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 / 5710 MHz (UNII 2C)



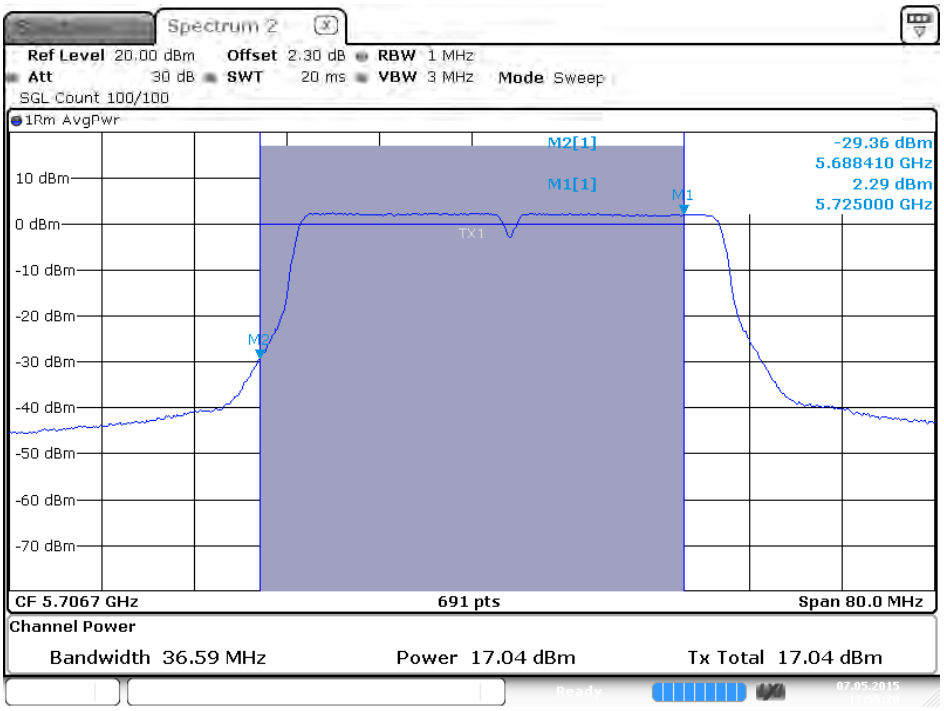
Date: 7 MAY 2015 11:55:46

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 4 / 5710 MHz (UNII 2C)



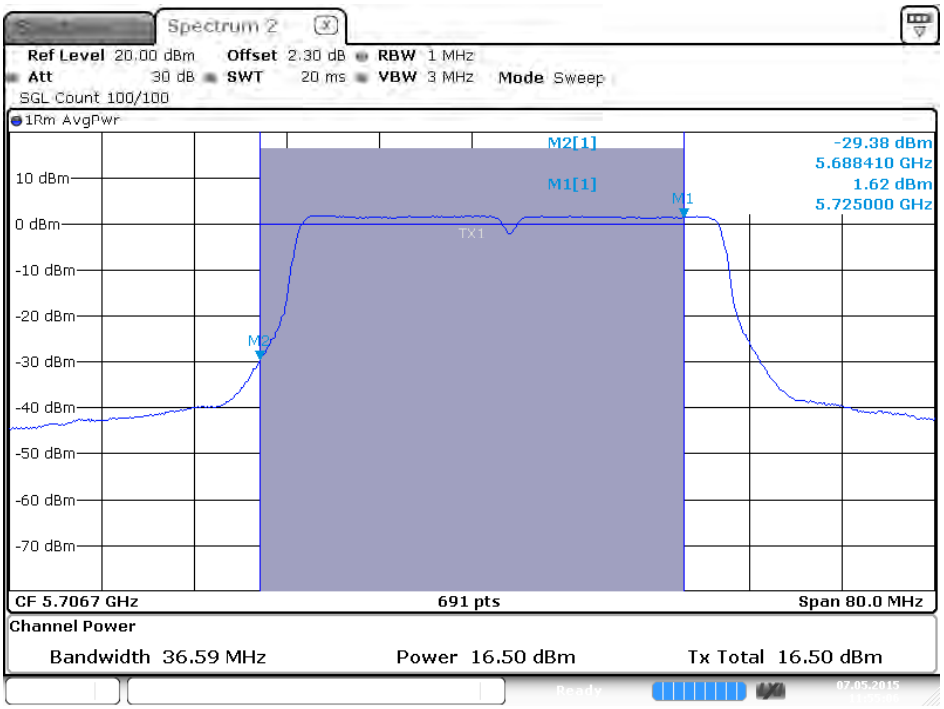
Date: 7 MAY 2015 11:55:34

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 5 / 5710 MHz (UNII 2C)



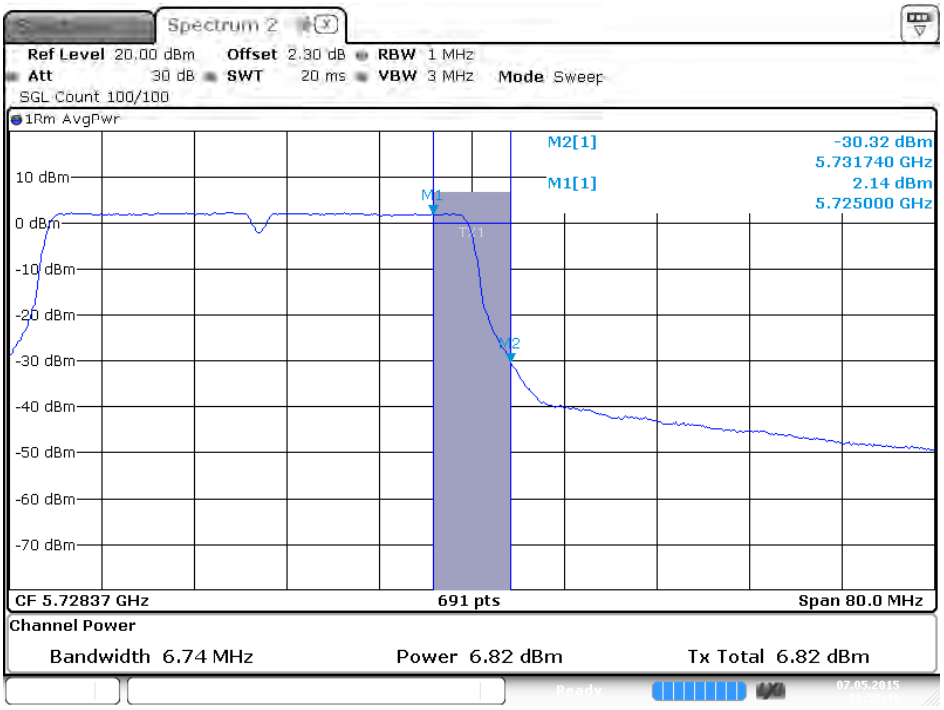
Date: 7 MAY 2015 11:55:20

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 6 / 5710 MHz (UNII 2C)



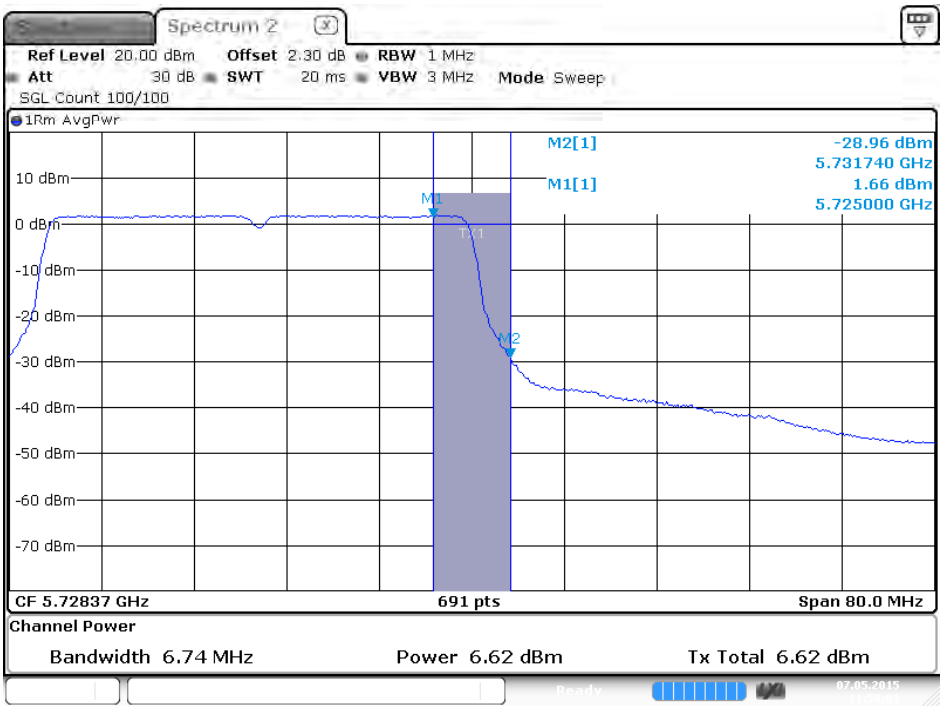
Date: 7 MAY 2015 11:55:06

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 / 5710 MHz (UNII 3)



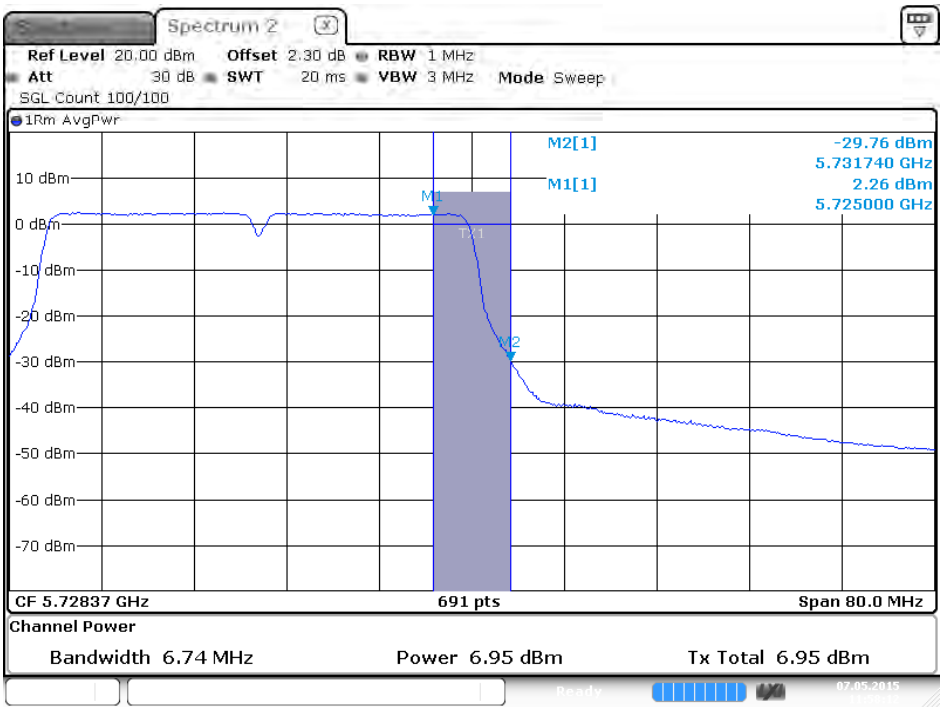
Date: 7 MAY 2015 11:57:49

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 4 / 5710 MHz (UNII 3)



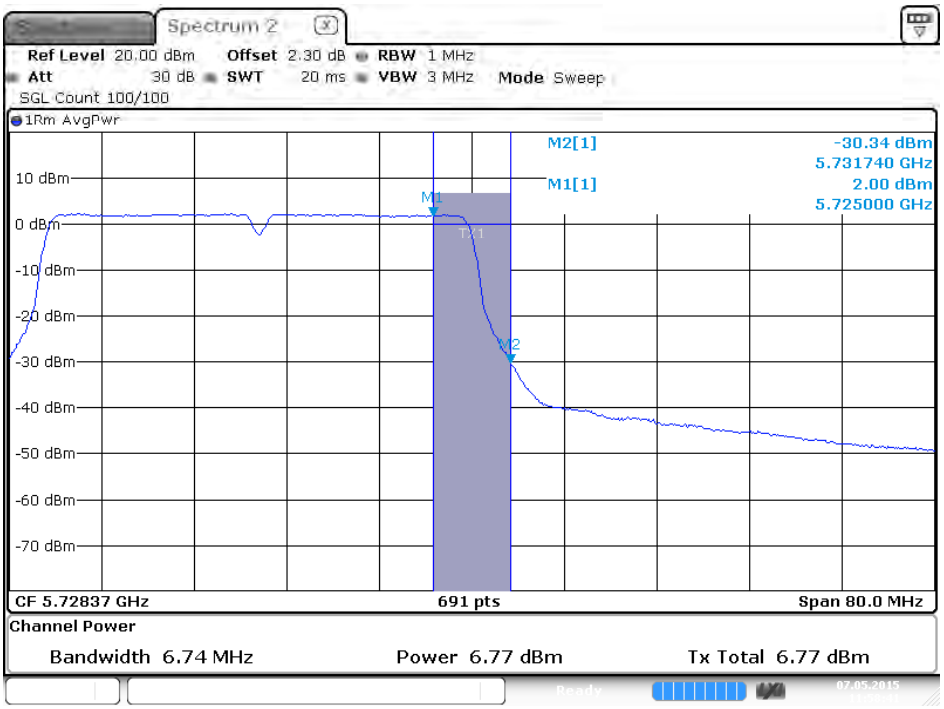
Date: 7 MAY 2015 11:58:02

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 5 / 5710 MHz (UNII 3)



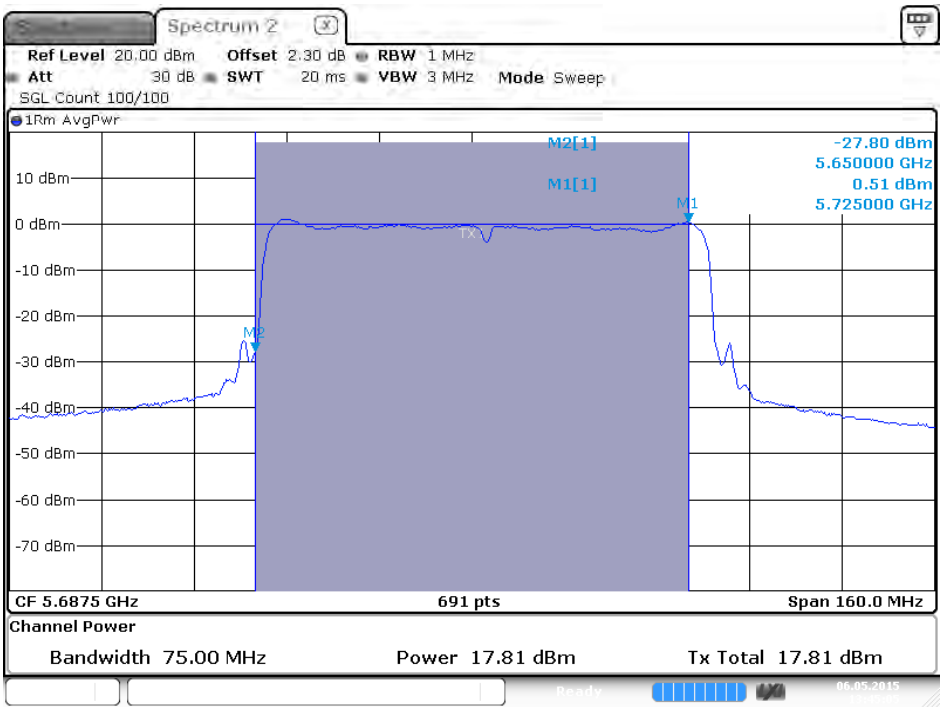
Date: 7 MAY 2015 11:58:13

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 6 / 5710 MHz (UNII 3)



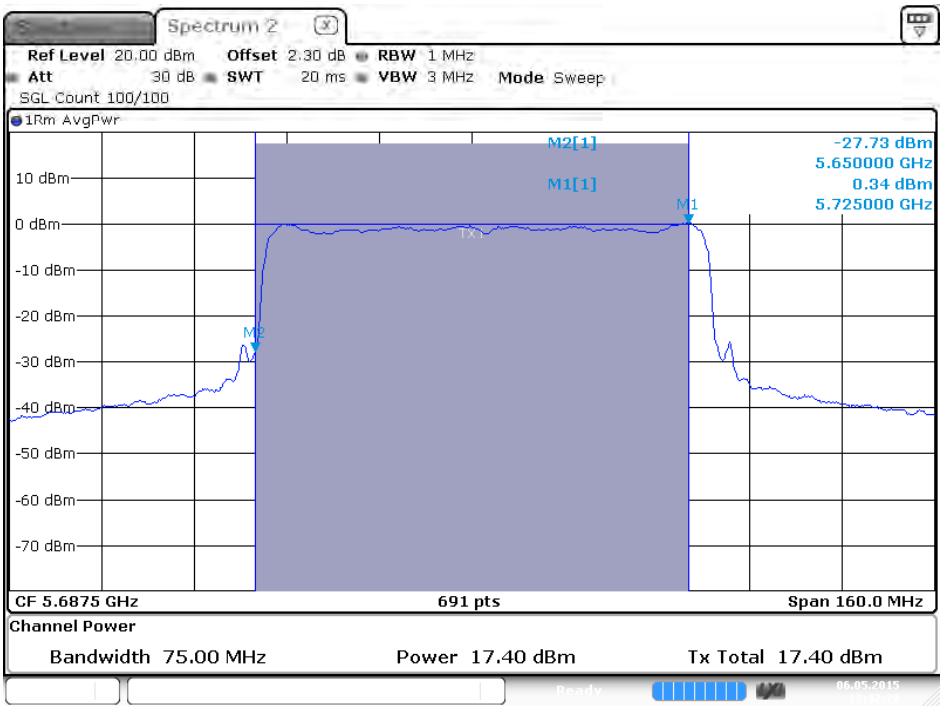
Date: 7 MAY 2015 11:58:41

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 / 5690 MHz (UNII 2C)



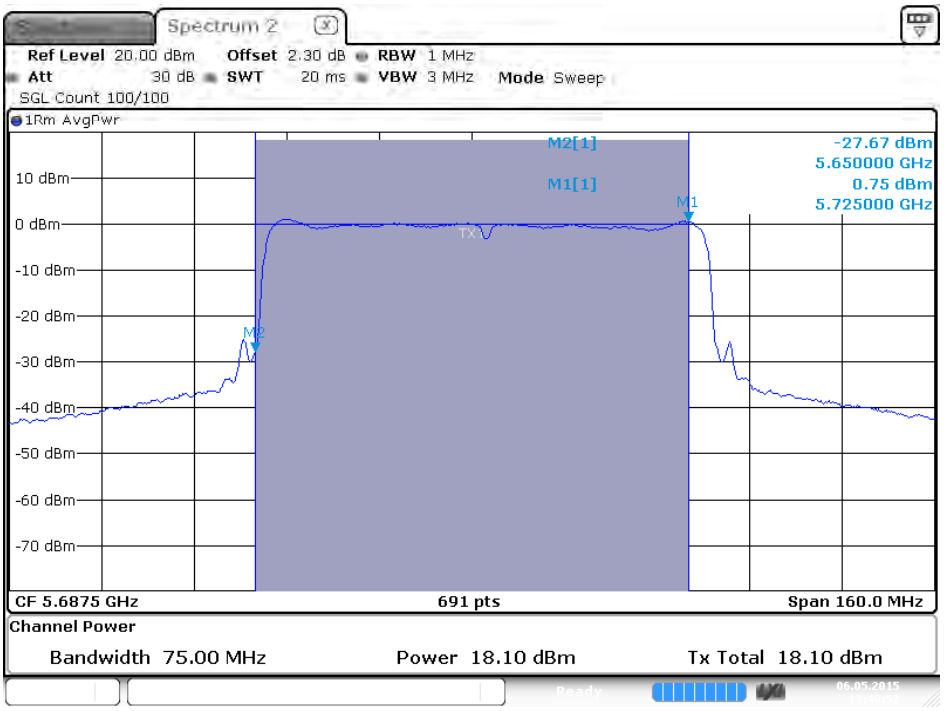
Date: 6 MAY 2015 13:45:05

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 4 / 5690 MHz (UNII 2C)



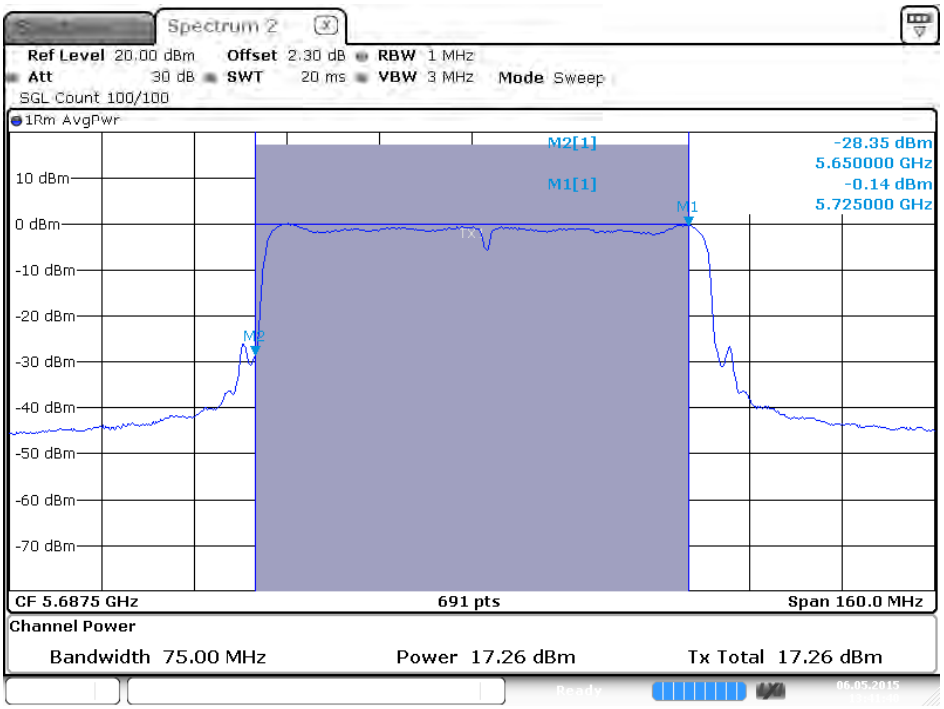
Date: 6 MAY 2015 13:42:29

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 5 / 5690 MHz (UNII 2C)



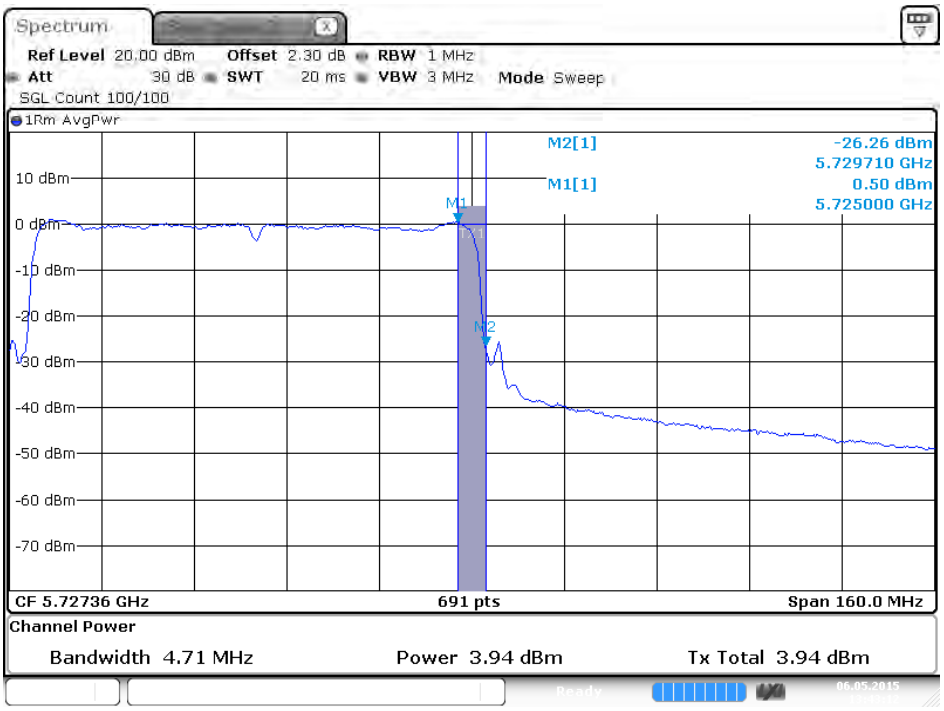
Date:6MAY.2015 13:40:52

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 6 / 5690 MHz (UNII 2C)



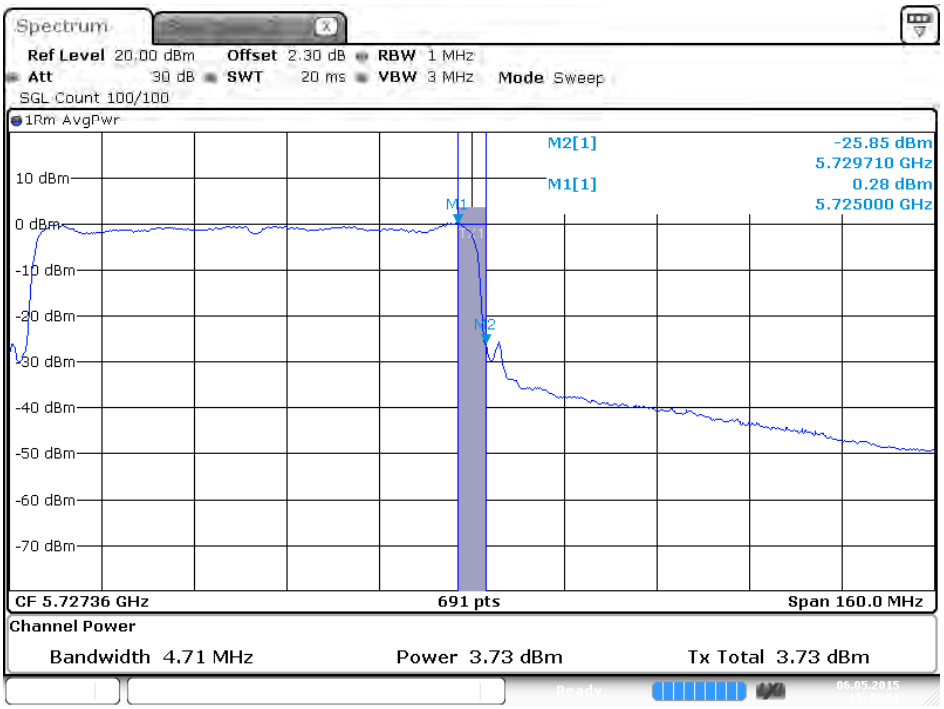
Date:6MAY.2015 13:41:40

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 / 5690 MHz (UNII 3)



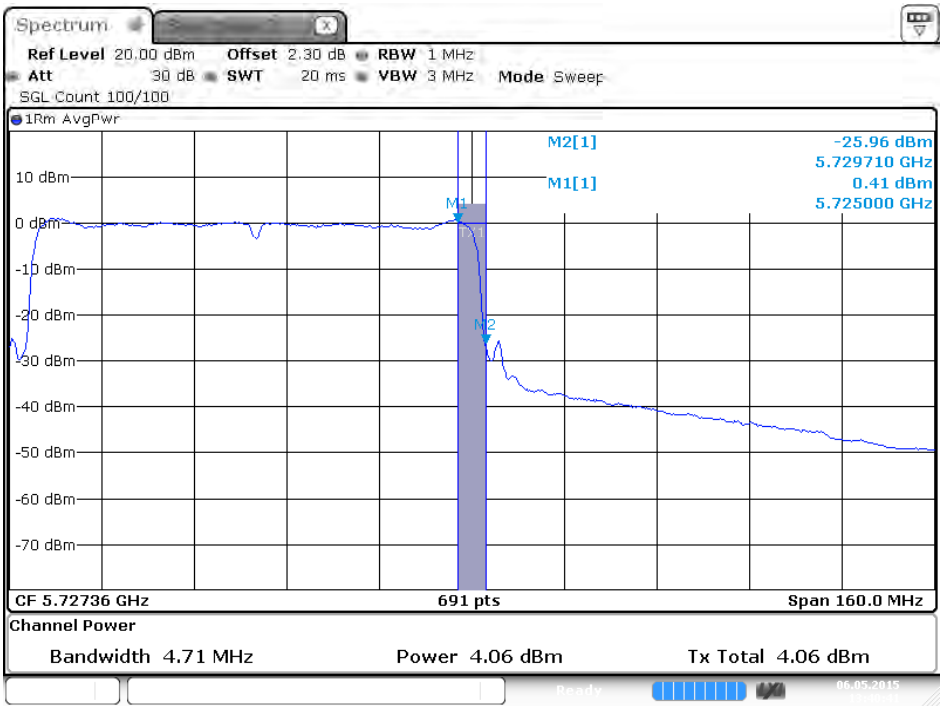
Date:6 MAY 2015 13:43:12

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 4 / 5690 MHz (UNII 3)



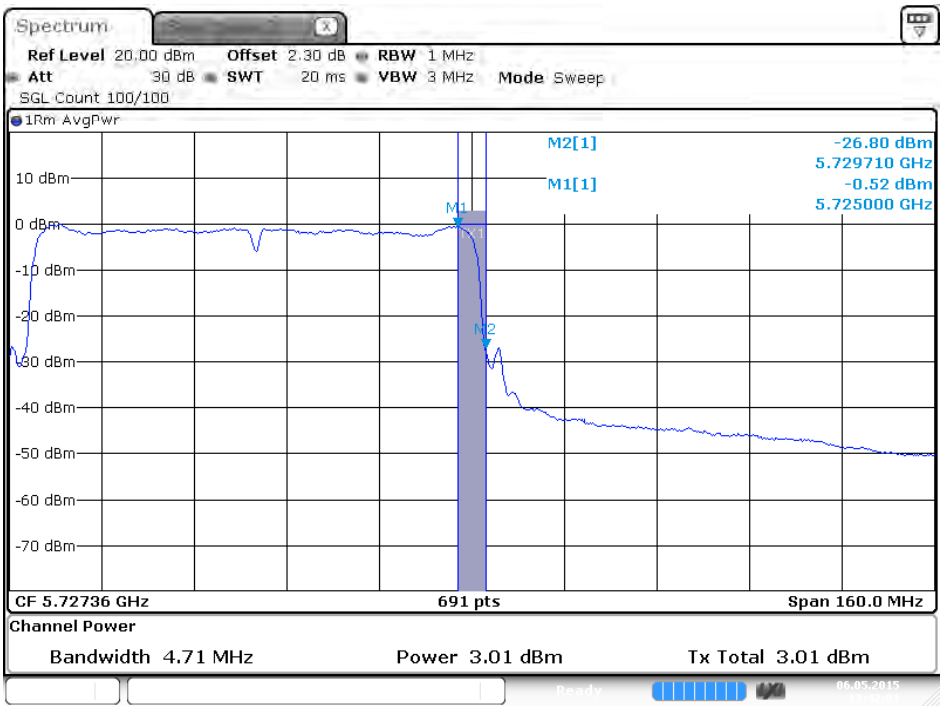
Date:6 MAY 2015 13:42:51

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 5 / 5690 MHz (UNII 3)



Date:6 MAY 2015 13:40:41

Conducted Output Power Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 6 / 5690 MHz (UNII 3)



Date:6 MAY 2015 13:42:01

4.5. Power Spectral Density Measurement

4.5.1. Limit

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

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☐	Outdoor access point	17 dBm/MHz
	☒	Indoor access point	17 dBm/MHz
	☐	Fixed point-to-point access points	17 dBm/MHz
	☐	Mobile and portable client devices	11 dBm/MHz
☒	5.25-5.35 GHz		11 dBm/MHz
☒	5.470-5.725 GHz		11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

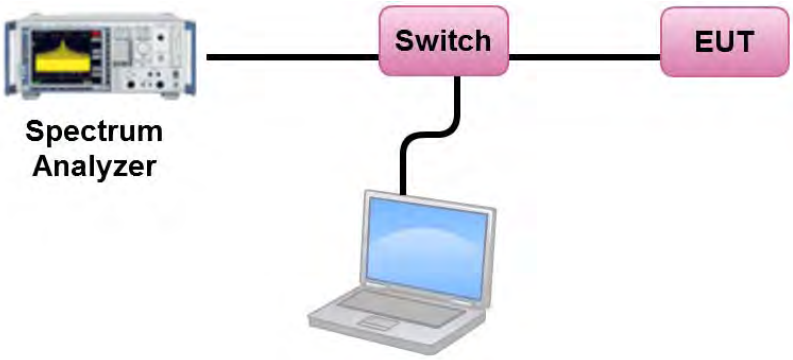
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.5.3. Test Procedures

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

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

For Non-Beamforming Mode

Temperature	23.2°C	Humidity	52%
Test Engineer	Lucas Huang		

Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	13.66	14.00	Complies
40	5200 MHz	13.67	13.96	Complies
48	5240 MHz	13.63	13.80	Complies
52	5260 MHz	7.68	7.73	Complies
60	5300 MHz	7.69	7.97	Complies
64	5320 MHz	7.72	7.93	Complies
100	5500 MHz	7.78	7.96	Complies
116	5580 MHz	7.68	8.14	Complies
140	5700 MHz	7.57	7.83	Complies

Note:

5180 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9dBi >6dBi,So Band1 Limit =17-(9-6)=14dBm/MHz

5200 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band1 Limit =17-(9.04-6)=13.96dBm/MHz

5240 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.20dBi >6dBi,So Band1 Limit =17-(9.20-6)=13.80dBm/MHz

5260 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.27dBi >6dBi,So Band2 Limit =11-(9.27-6)=7.73dBm/MHz

5300 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.03dBi >6dBi,So Band2 Limit =11-(9.03-6)=7.97dBm/MHz

5320 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.07dBi >6dBi,So Band2 Limit =11-(9.07-6)=7.93dBm/MHz

5500 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band3 Limit =11-(9.04-6)=7.96dBm/MHz

5580 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =8.86dBi >6dBi,So Band3 Limit =11-(8.86-6)=8.14dBm/MHz

5700 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.17dBi >6dBi,So Band3 Limit =11-(9.17-6)=7.83dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	11.60	-3.01	8.59	26.75	Complies
157	5785 MHz	14.71	-3.01	11.70	26.88	Complies
165	5825 MHz	14.37	-3.01	11.36	26.98	Complies

Note:

5745 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.25dBi >6dBi,So Band4 Limit =30-(9.25-6)=26.75dBm/500KHz

5785 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.12dBi >6dBi,So Band4 Limit =30-(9.12-6)=26.88dBm/500KHz

5825 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.02dBi >6dBi,So Band4 Limit =30-(9.02-6)=26.98dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	13.81	14.00	Complies
40	5200 MHz	13.94	13.96	Complies
48	5240 MHz	13.62	13.80	Complies
52	5260 MHz	7.72	7.73	Complies
60	5300 MHz	7.58	7.97	Complies
64	5320 MHz	7.88	7.93	Complies
100	5500 MHz	7.66	7.96	Complies
116	5580 MHz	8.03	8.14	Complies
140	5700 MHz	7.65	7.83	Complies

Note:

5180 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9dBi >6dBi,So Band1 Limit =17-(9-6)=14dBm/MHz

5200 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band1 Limit =17-(9.04-6)=13.96dBm/MHz

5240 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.20dBi >6dBi,So Band1 Limit =17-(9.20-6)=13.80dBm/MHz

5260 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.27dBi >6dBi,So Band2 Limit =11-(9.27-6)=7.73dBm/MHz

5300 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.03dBi >6dBi,So Band2 Limit =11-(9.03-6)=7.97dBm/MHz

5320 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.07dBi >6dBi,So Band2 Limit =11-(9.07-6)=7.93dBm/MHz

5500 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band3 Limit =11-(9.04-6)=7.96dBm/MHz

5580 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =8.86dBi >6dBi,So Band3 Limit =11-(8.86-6)=8.14dBm/MHz

5700 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.17dBi >6dBi,So Band3 Limit =11-(9.17-6)=7.83dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	14.44	-3.01	11.43	26.75	Complies
157	5785 MHz	14.37	-3.01	11.36	26.88	Complies
165	5825 MHz	14.07	-3.01	11.06	26.98	Complies

Note:

5745 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.25dBi >6dBi,So Band4 Limit =30-(9.25-6)=26.75dBm/500KHz

5785 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.12dBi >6dBi,So Band4 Limit =30-(9.12-6)=26.88dBm/500KHz

5825 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.02dBi >6dBi,So Band4 Limit =30-(9.02-6)=26.98dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	9.13	13.87	Complies
46	5230 MHz	11.54	13.77	Complies
54	5270 MHz	6.80	7.90	Complies
62	5310 MHz	7.87	8.00	Complies
102	5510 MHz	7.89	7.98	Complies
110	5550 MHz	6.85	7.91	Complies
134	5670 MHz	6.49	7.86	Complies

Note:

5190 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9 .13dBi >6dBi,So Band1 Limit =17-(9.13-6)=13.87dBm/MHz

5230 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.23dBi >6dBi,So Band1 Limit =17-(9.23-6)=13.77dBm/MHz

5270 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.10dBi >6dBi,So Band2 Limit =11-(9.10-6)=7.9dBm/MHz

5310 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9dBi >6dBi,So Band2 Limit =11-(9-6)=8dBm/MHz

5510 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.02dBi >6dBi,So Band3 Limit =11-(9.02-6)=7.98dBm/MHz

5550 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.09dBi >6dBi,So Band3 Limit =11-(9.09-6)=7.91dBm/MHz

5670 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.14dBi >6dBi,So Band3 Limit =11-(9.14-6)=7.86dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	10.98	-3.01	7.97	26.86	Complies
159	5795 MHz	11.02	-3.01	8.01	26.87	Complies

5755 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.14dBi >6dBi,So Band4 Limit =11-(9.14-6)=26.86dBm/500KHz

5795 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.13dBi >6dBi,So Band4 Limit =11-(9.13-6)=26.87dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	4.98	13.90	Complies
58	5290 MHz	4.93	7.94	Complies
106	5530 MHz	4.48	7.83	Complies
122	5610 MHz	4.29	8.14	Complies

Note:

5210 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9 .10dBi >6dBi,So Band1 Limit =17-(9.10-6)=13.9dBm/MHz

5290 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.06dBi >6dBi,So Band2 Limit =17-(9.06-6)=7.94dBm/MHz

5530 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.17dBi >6dBi,So Band3 Limit =11-(9.17-6)=7.83dBm/MHz

5610 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =8.86dBi >6dBi,So Band3 Limit =11-(8.86-6)=8.14dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	2.98	-3.01	-0.03	26.95	Complies

Note:

5775 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.05dBi >6dBi,So Band4 Limit =30-(9.05-6)=26.95dBm/500kHz

Straddle Channel

Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
144	5720 MHz (UNII 2C)	7.62	7.90	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.10dBi >6dBi,So Band3 Limit =11-(9.10-6)=7.9dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
144	5720 MHz (UNII 3)	7.39	-3.01	4.38	26.90	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.10dBi >6dBi,So Band4 Limit =30-(9.10-6)=26.90dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
144	5720 MHz (UNII 2C)	7.45	7.90	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.10dBi >6dBi,So Band3 Limit =11-(9.10-6)=7.9dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
144	5720 MHz (UNII 3)	7.39	-3.01	4.38	26.90	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.10dBi >6dBi,So Band4 Limit =30-(9.10-6)=26.90dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
142	5710 MHz (UNII 2C)	7.74	7.82	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.18dBi >6dBi,So Band3 Limit =11-(9.18-6)=7.82dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
142	5710 MHz (UNII 3)	7.66	-3.01	4.65	26.82	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.18dBi >6dBi,So Band4 Limit =30-(9.18-6)=26.82dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
138	5690 MHz (UNII 2C)	5.10	7.86	Complies

Note: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})$ dBi =9.14dBi >6dBi,So Band3 Limit =11-(9.14-6)=7.86dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
138	5690 MHz (UNII 3)	4.86	-3.01	1.85	26.86	Complies

Note: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})$ dBi =9.14dBi >6dBi,So Band4 Limit =30-(9.14-6)=26.86dBm/500KHz

For Beamforming Mode

Temperature	23.2℃	Humidity	52%
Test Engineer	Lucas Huang		

Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	13.27	17.00	Complies
40	5200 MHz	13.47	16.97	Complies
48	5240 MHz	13.58	16.81	Complies
52	5260 MHz	10.28	10.74	Complies
60	5300 MHz	10.31	10.98	Complies
64	5320 MHz	10.21	10.94	Complies
100	5500 MHz	10.77	10.97	Complies
116	5580 MHz	10.42	11.00	Complies
140	5700 MHz	9.63	10.84	Complies

Note:

5180 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =5.99dBi<6dBi, so the limit doesn't reduce.

5200 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band1 Limit =17-(9.04-6)=13.96dBm/MHz

5240 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.20dBi >6dBi,So Band1 Limit =17-(9.20-6)=13.80dBm/MHz

5260 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.27dBi >6dBi,So Band2 Limit =11-(9.27-6)=7.73dBm/MHz

5300 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.03dBi >6dBi,So Band2 Limit =11-(9.03-6)=7.97dBm/MHz

5320 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.07dBi >6dBi,So Band2 Limit =11-(9.07-6)=7.93dBm/MHz

5500 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.04dBi >6dBi,So Band3 Limit =11-(9.04-6)=7.96dBm/MHz

5580 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =8.86dBi >6dBi,So Band3 Limit =11-(8.86-6)=8.14dBm/MHz

5700 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =9.17dBi >6dBi,So Band3 Limit =11-(9.17-6)=7.83dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.63	-3.01	7.62	29.76	Complies
157	5785 MHz	13.36	-3.01	10.35	29.89	Complies
165	5825 MHz	13.12	-3.01	10.11	29.99	Complies

Note:

5745 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.24dBi >6dBi,So Band4 Limit =30-(6.24-6)=29.76dBm/500kHz

5785 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.11dBi >6dBi,So Band4 Limit =30-(6.11-6)=29.89dBm/500kHz

5825 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.01dBi >6dBi,So Band4 Limit =30-(6.01-6)=29.99dBm/500kHz

Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	7.07	16.88	Complies
46	5230 MHz	10.51	16.78	Complies
54	5270 MHz	7.26	10.91	Complies
62	5310 MHz	7.08	11.00	Complies
102	5510 MHz	7.79	10.99	Complies
110	5550 MHz	7.79	10.92	Complies
134	5670 MHz	6.76	10.87	Complies

Note:

5190 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.12dBi >6dBi,So Band3 Limit =17-(6.12-6)=16.88dBm/MHz

5230 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.22dBi >6dBi,So Band3 Limit =17-(6.22-6)=16.78dBm/MHz

5270 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.09dBi >6dBi,So Band2 Limit =11-(6.09-6)=10.91dBm/MHz

5310 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =5.99dBi<6dBi, so the limit doesn't reduce.

5510 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.01dBi >6dBi,So Band3 Limit =11-(6.01-6)=10.99dBm/MHz

5550 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.08dBi >6dBi,So Band3 Limit =11-(6.08-6)=10.92dBm/MHz

5670 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.13dBi >6dBi,So Band3 Limit =11-(6.13-6)=10.87dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	6.12	-3.01	3.11	29.87	Complies
159	5795 MHz	9.90	-3.01	6.89	29.88	Complies

Note:

5755 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.13dBi >6dBi,So Band4 Limit =11-(6.13-6)=29.87dBm/500KHz

5795 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.12dBi >6dBi,So Band4 Limit =11-(6.12-6)=29.88dBm/500KHz

Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	5.40	16.91	Complies
58	5290 MHz	4.59	10.95	Complies
106	5530 MHz	4.25	10.84	Complies
122	5610 MHz	8.25	11.00	Complies

Note:

5210 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.09dBi >6dBi,So Band1 Limit =17-(6.09-6)=16.91dBm/MHz

5290 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.05dBi >6dBi,So Band2 Limit =11-(6.05-6)=10.95dBm/MHz

5530 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.16dBi >6dBi,So Band3 Limit =11-(6.16-6)=10.84dBm/MHz

5610 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =5.85dBi<6dBi, so the limit doesn't reduce.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	3.47	-3.01	0.46	29.97	Complies

Note:

5775 MHz Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi=6.03dBi >6dBi,So Band4 Limit =30-(6.03-6)=29.97dBm/500KHz

Straddle Channel

Configuration IEEE 802.11ac MCS0/Nss2 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
144	5720 MHz (UNII 2C)	10.46	10.91	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.09dBi >6dBi,So Band3 Limit =11-(6.09-6)=10.91dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
144	5720 MHz (UNII 3)	10.50	-3.01	7.49	29.91	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.09dBi >6dBi,So Band4 Limit =30-(6.09-6)=29.91dBm/500MHz

Configuration IEEE 802.11ac MCS0/Nss2 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
142	5710 MHz (UNII 2C)	7.26	10.83	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.17dBi >6dBi,So Band3 Limit =11-(6.17-6)=10.83dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
142	5710 MHz (UNII 3)	7.21	-3.01	4.20	29.83	Complies

Note: Directional gain = G_{ANT} + 10 log(N_{ANT}/ N_{SS}) dBi =6.17dBi >6dBi,So Band4 Limit =30-(6.17-6)=29.83dBm/500MHz

Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
138	5690 MHz (UNII 2C)	4.94	10.87	Complies

Note: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi =6.13dBi >6dBi,So Band3 Limit =11-(6.13-6)=10.87dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
138	5690 MHz (UNII 3)	4.76	-3.01	1.75	29.87	Complies

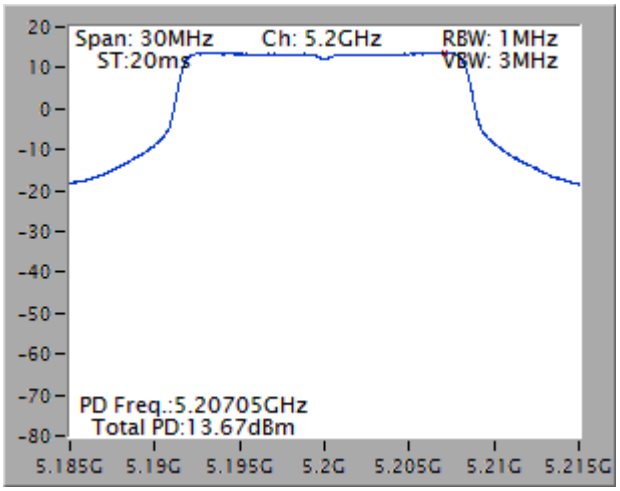
Note: Directional gain = $G_{ANT} + 10 \log(N_{ANT}/ N_{SS})$ dBi = 6.13dBi >6dBi,So Band4 Limit =30-(6.13-6)=29.87dBm/500MHz

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

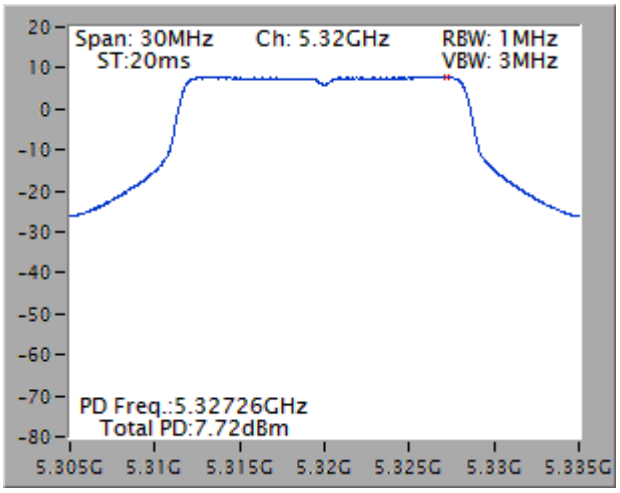
For plots, only the channel with worse result was shown.

For Non-Beamforming Mode

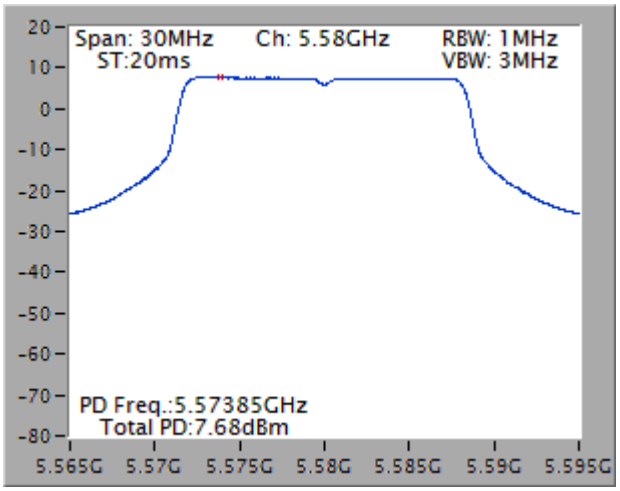
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5200 MHz



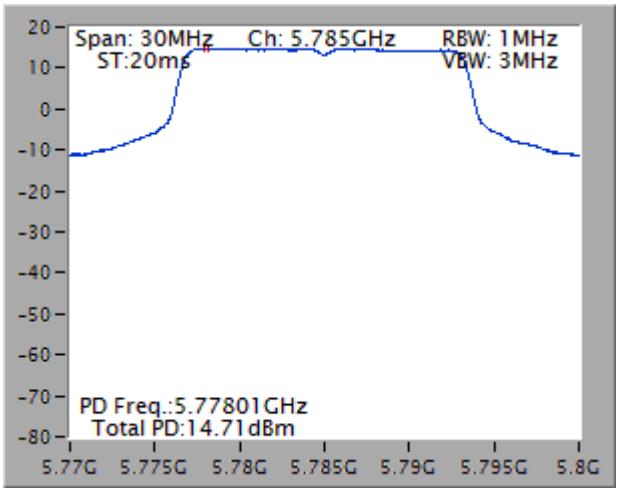
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5320 MHz



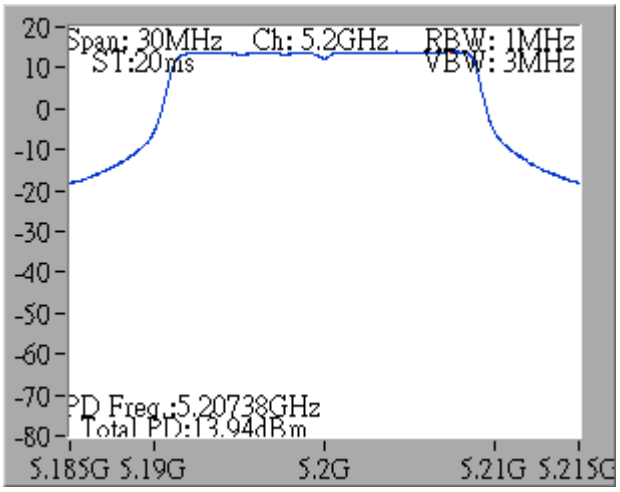
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5580 MHz



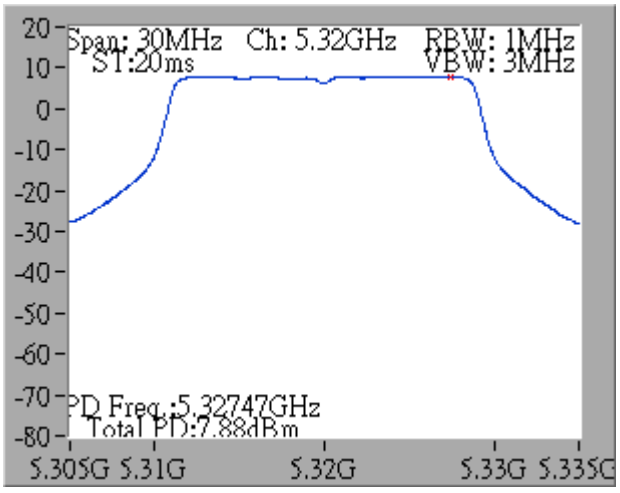
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



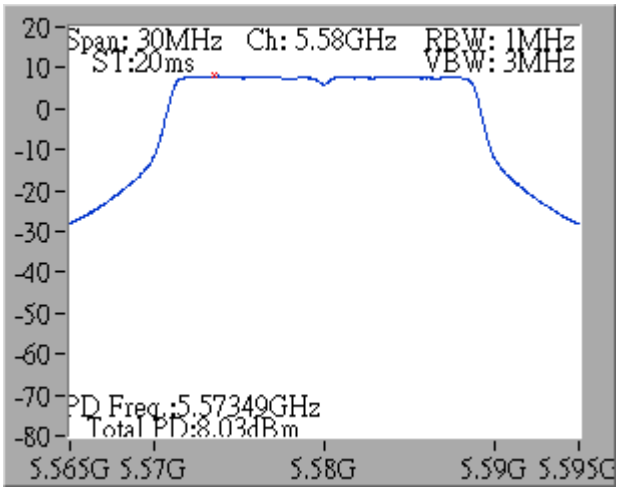
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5200 MHz



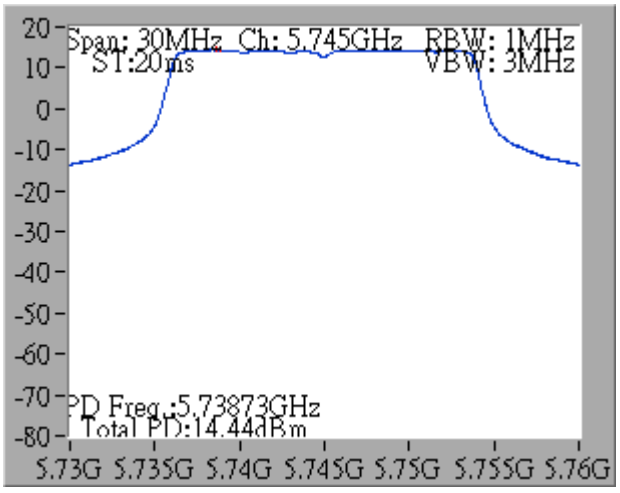
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5320 MHz



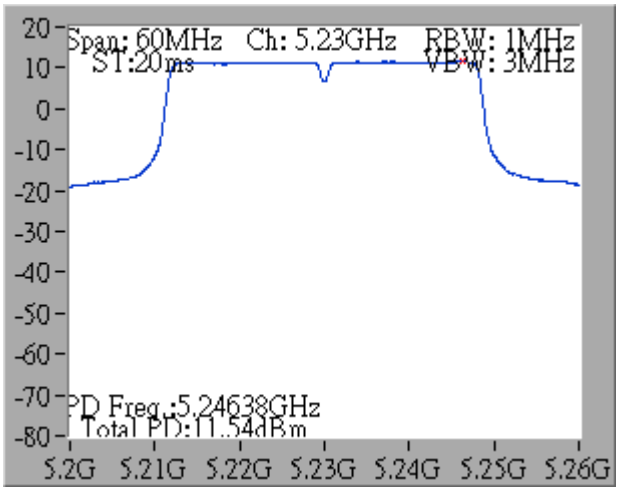
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5580 MHz



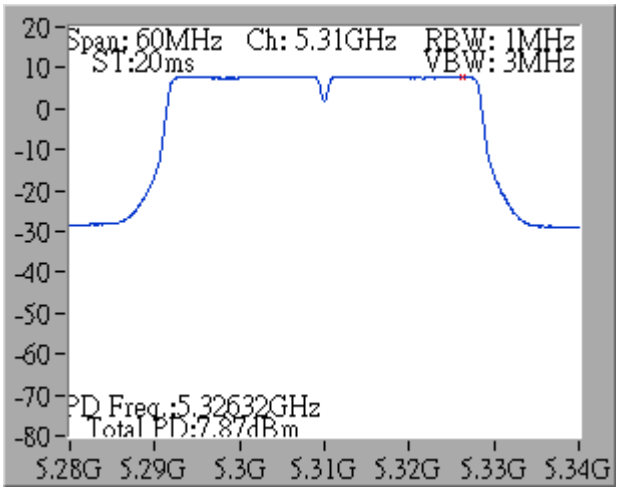
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



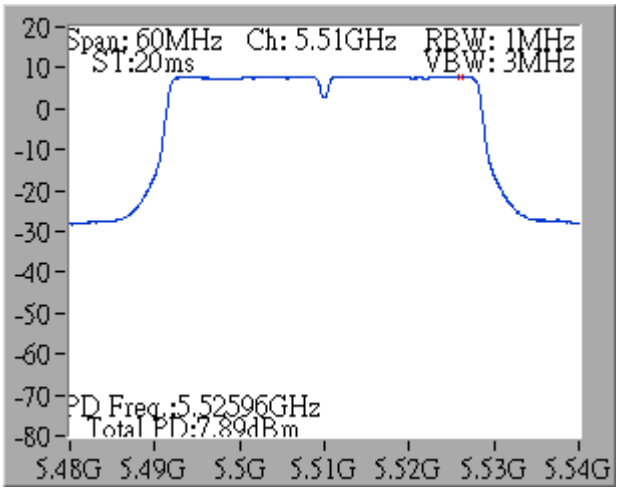
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5230 MHz



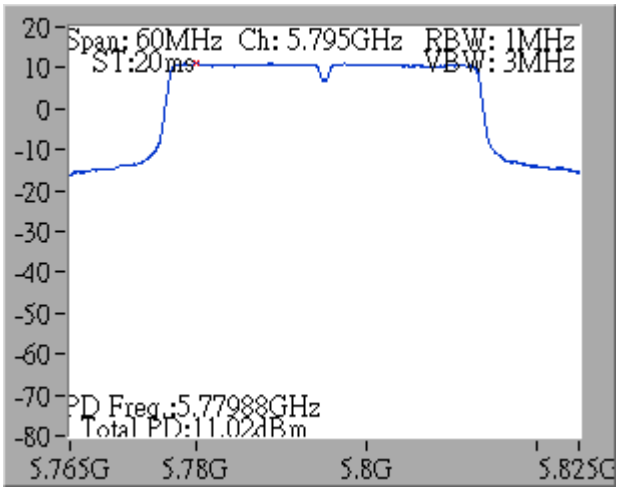
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5310 MHz



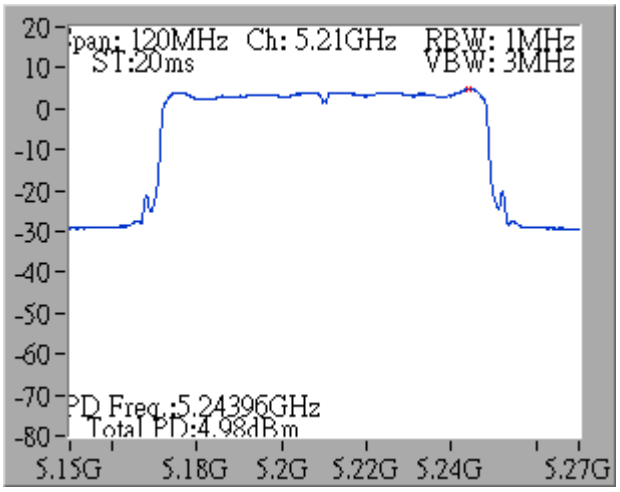
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5510 MHz



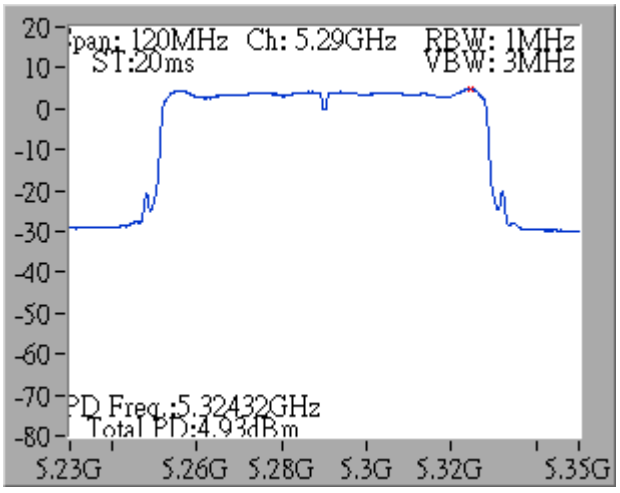
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



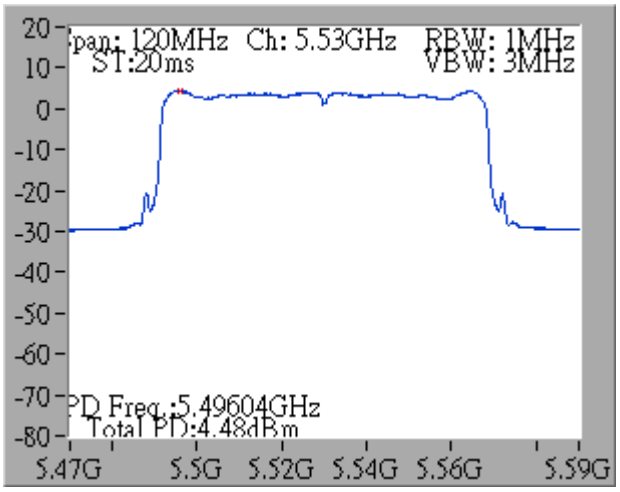
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5210 MHz



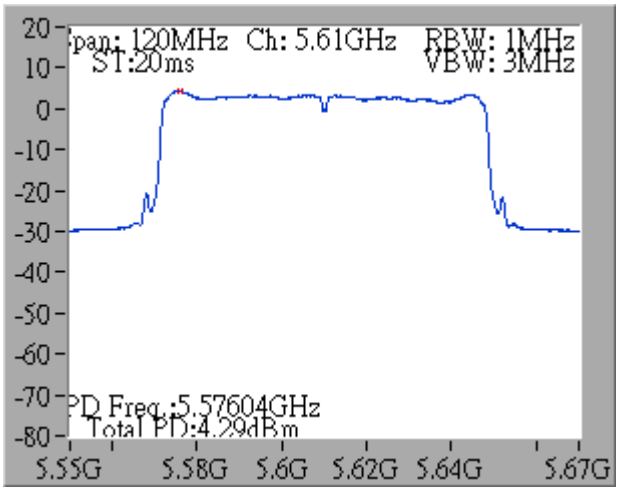
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5290 MHz



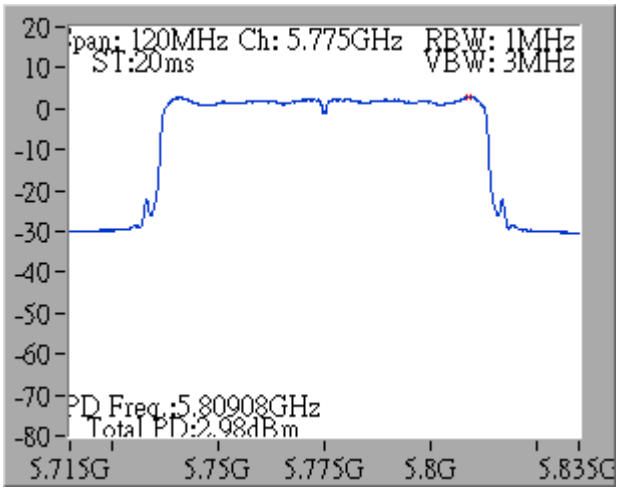
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5530 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5610 MHz

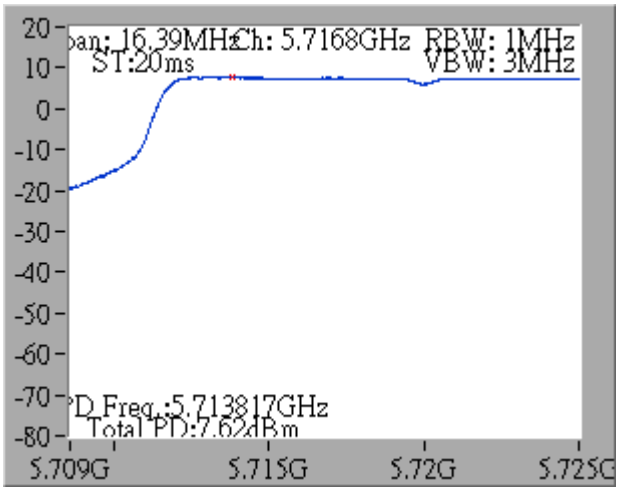


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz

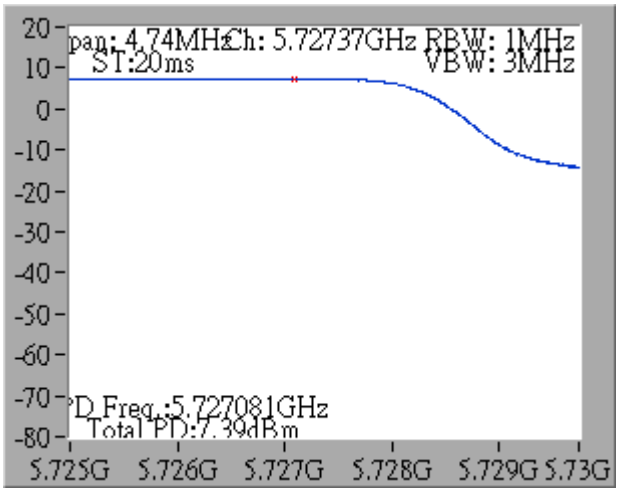


Straddle Channel

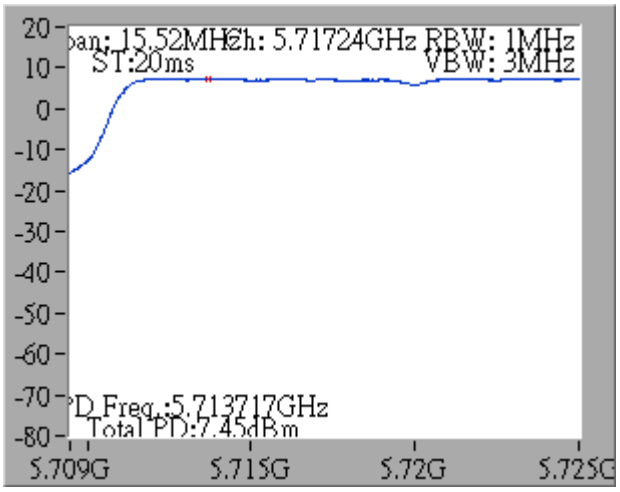
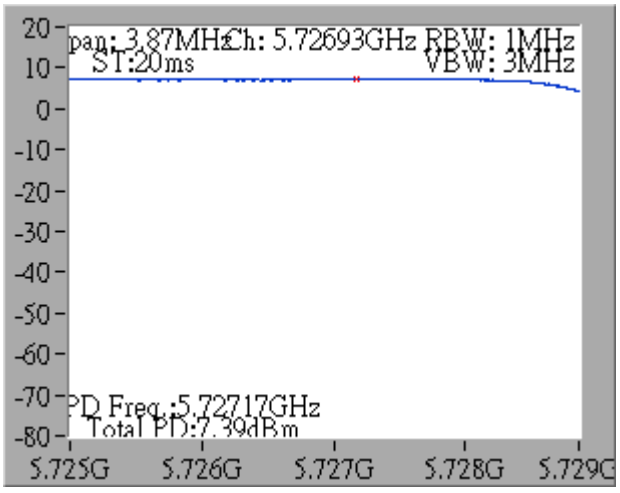
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz (UNII 2C)



Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz (UNII 3)



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz (UNII 2C)



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 + Ant. 6 / 5720 MHz (UNII 3)