Certificate of Test

NCT Co., Ltd. 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, 18511, Korea (Tel: +82-31-323-6070 / Fax: +82-31-323-6071)	Report No.: NW2004-F003 Page (1) / (221)	Your business' success starts with NCT

1. **Client**
   - ○ Name : T&F Global Co., Ltd.
   - ○ Address : 604, 303DONG, 397, SEOKCHEON-RO OJEONG-GU, GYEONGGI-DO, KOREA (303-604, BUCHEON TECHNO PARK SSANGYONG 3CHA, 397, Seokcheon-ro, Bucheon-si, Gyeonggi-do, Korea)
   - ○ Date of Receipt : 2020-03-27

2. **Use of Report :** FCC & IC Approval

3. **Test Sample**
   - ○ Description / Model Name : Rear Seat Entertainment / RSE
   - ○ FCC ID : 2AT7Y-RSE / IC : 26002-RSE

4. **Date of Test :** 2020-03-27 ~ 2020-04-07

5. **Test method used :** FCC Part 15 Subpart E 15.407
   RSS-247 Issue 2(2017-02), RSS-GEN Issue 5(2019-03)

6. **Testing Environment :**
   - ○ Temperature: (25 ± 5) °C, Humidity: Less than 75 % R.H.
   - * Unless specified otherwise in the individual methods, the tests were conducted on ambient conditions.

7. **Test Results :** Refer to the test results

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This Test Report cannot be reproduced, except in full
This test report is prepared according to the requirements of ISO / IEC 17025.

Affirmation	**Tested by** Jong-Myoung, Shin (signature)	**Technical Manager** Kyung-Taek, Lee (signature)

April 20, 2020

NCT CO., LTD. (seal)

Table of contents

1. General Information's

1.1 Test Performed

Laboratory	:	NCT Co., Ltd.
Address	:	211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, 18511, Korea
Telephone	:	+82-31-323-6070
Facsimile	:	+82-31-323-6071
FCC Designation No.	:	KR0166
FCC Registration Number	:	409631
IC Site Registration No.	:	25897

2. Information's about Test Item

2.1 Applicant Information

Company name	:	T&F Global Co., Ltd.
Address	:	604, 303DONG, 397, SEOKCHEON-RO OJEONG-GU, GYEONGGI-DO, KOREA (303-604, BUCHEON TECHNO PARK SSANGYONG 3CHA, 397, Seokcheon-ro, Bucheon-si, Gyeonggi-do, Korea)
Telephone / Facsimile	:	+82-2-855-0501 / +82-2-855-0580

2.2 Equipment Under Test (EUT) description

Test item particulars	:	Rear Seat Entertainment
Model and/or type reference	:	RSE
Additional model name	:	-
Serial number	:	Identification
Antenna type and gain	:	Chip Antenna with Max gain : 3.60 dBi
Date (s) of performance of tests:	:	2020-03-27 ~ 2020-04-07
Date of receipt of test item	:	2020-03-27
EUT condition	:	Pre-production, not damaged
EUT Power Source	:	DC 12 V
Type of Modulation	:	OFDM
Firmware version	:	RSE_US_K101_1.0.0 for FCC RSE_CA_K101_1.0.0 for IC
Hardware version	:	1.0
Test software name(version)	:	TeraTerm(4.105)

2.3 Tested Frequency

5㎓ Band	802.11a/n_HT20 /ac_VHT20		802.11n_HT40 /ac_VHT40		Remark
	Channel	Frequency (㎒)	Channel	Frequency (㎒)	
U-NII 1	36	5 180	38	5 190	
	44	5 220			
	48	5 240	46	5 230	
U-NII 2A	52	5 260	54	5 270	
	60	5 300			
	64	5 320	62	5 310	
U-NII 2C	100	5 500	102	5 510	Not supported in IC
	120	5 600	118	5 590	
	140	5 700	134	5 670	
U-NII 3	149	5 745	151	5 755	
	157	5 785			
	165	5 825	159	5 795	

2.4 Transmitting Configuration of EUT

Test Mode	Data rate
802.11a	6 ~ 54 Mbps
802.11n_HT20	MCS 0 ~ 7
802.11n_HT40	MCS 0 ~ 7
802.11ac_VHT20	MCS 0 ~ 8
802.11ac_VHT40	MCS 0 ~ 9

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3. Test Report

3.1 Test Summary

Applied	FCC	IC	Test Items	Limit	Test Condition	Result
☒	15.203	-	Antenna Requirement	FCC 15.203	Conducted	C
☒	15.407(a)	-	Emission Bandwidth (26 ㏈ Bandwidth)	N/A		C
☒	15.407(e)	RSS-247(6.2.4)	Minimum Emission Bandwidth (6 ㏈ Bandwidth)	> 500 ㎑ in 5725 ~ 5850 ㎒		C
☒	-	RSS-GEN(6.7)	Occupied Bandwidth (99%)	N/A		C
☒	15.407(a)	RSS-247(6.2)	Maximum Conducted Output Power	5150 ~ 5250 ㎒ : < 23.97 ㏈m 5250 ~ 5350 & 5470 ~ 5725 ㎒ : < 250 ㎽ or < 11 + 10 log10(B) ㏈m, whichever power is less. (B is the 26㏈ BW.) 5725 ~ 5850 ㎒ : < 30 ㏈m		C
☒	15.407(a)	RSS-247(6.2)	Peak Power Spectral Density	5150 ~ 5250 ㎒ : 11 ㏈m/㎒ 5250 ~ 5350 ㎒ : 11 ㏈m/㎒ 5470 ~ 5725 ㎒ : 11 ㏈m/㎒ 5725 ~ 5850 ㎒ : 30 ㏈m/500㎑		C
☒	15.407(h)	RSS-GEN(6.3)	Dynamic Frequency Selection	FCC 15.407(h)		C note2
☒	15.407(b)	RSS-247(6.2) RSS-GEN(8.9) RSS-GEN(8.10)	Undesirable Emissions	5150 ~ 5725 ㎒: < -27 ㏈m/㎒ EIRP 5725 ~ 5850 ㎒: < -27 ㏈m/㎒ or < 10 ㏈m/㎒ or 15.6 ㏈m/㎒ < 27㏈m/㎒ EIRP	Radiated	C note3
☒	15.205 15.209 15.407(b)	RSS-247(6.2) RSS-GEN(8.9) RSS-GEN(8.10)	General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		C note3
☐	15.207	RSS-GEN(8.8)	Conducted Emissions	FCC 15.207	AC Line Conducted	NA note4

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: Refer to the DFS Test Report.

Note 3: This test item was performed in each axis and the worst case data was reported.

Note 4: This product is only using DC power. So, AC conducted emission test has not been performed.

Note 5: This product will not operate U-NII 2C band in Canada(IC).

The sample was tested according to the following specification: ANSI C63.10:2013, KDB789033 D02 V01, KDB644545 D03

Compliance was determined by specification limits of the applicable standard according to customer requirements.

3.2 Test Report Version

Test Report No.	Date	Description
NW2004-F003	2020-04-20	Initial issue

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3.3 Transmitter Requirements

3.3.1 Antenna Requirement

Accoding to §15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

3.3.1.1 Result

Complies
(The transmitter has a Chip Antenna. The directional peak gain of the antenna is 3.60 dBi.)

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3.3.2 26 dB Bandwidth & Occupied Bandwidth

3.3.2.1 Test Setup

Refer to the APPENDIX I.

3.3.2.2 Limit

N/A
(The 26 dB bandwidth is used to determine the conducted output power limit.)

3.3.2.3 Test Procedure

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the EUT's antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max Hold.
5. Sweep = Auto
6. Allow the trace to stabilize.
7. 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%.

3.3.2.4 Test Result

Test Mode	Band	Test Channel	26 dB Bandwidth (㎒)	Occupied Bandwidth (㎒)
802.11a	U-NII 1	36	21.31	16.75
		44	21.23	16.67
		48	21.15	16.67
	U-NII 2A	52	21.39	16.67
		60	21.39	16.67
		64	21.39	16.67
	U-NII 2C	100	21.63	16.75
		120	21.88	16.75
		140	21.96	16.75
802.11n _HT20	U-NII 1	36	21.71	17.95
		44	21.63	17.95
		48	21.55	17.95
	U-NII 2A	52	21.55	17.95
		60	21.55	17.87
		64	21.88	18.03
	U-NII 2C	100	21.79	18.03
		120	21.88	18.03
		140	22.36	18.03
802.11n _HT40	U-NII 1	38	40.54	36.54
		46	40.38	36.54
	U-NII 2A	54	40.71	36.54
		62	40.38	36.54
	U-NII 2C	102	41.03	36.70
		118	41.35	36.86
		134	41.35	36.70

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Test Mode	Band	Test Channel	26 dB Bandwidth (㎒)	Occupied Bandwidth (㎒)
802.11ac _VHT20	U-NII 1	36	21.31	16.67
		44	21.31	16.67
		48	21.23	16.67
	U-NII 2A	52	21.23	16.67
		60	21.15	16.67
		64	21.23	16.67
	U-NII 2C	100	21.39	16.75
		120	21.79	16.75
		140	21.96	16.75
802.11ac _VHT40	U-NII 1	38	40.38	36.54
		46	40.38	36.54
	U-NII 2A	54	40.38	36.54
		62	40.71	36.54
	U-NII 2C	102	40.87	36.70
		118	40.87	36.54
		134	41.03	36.70

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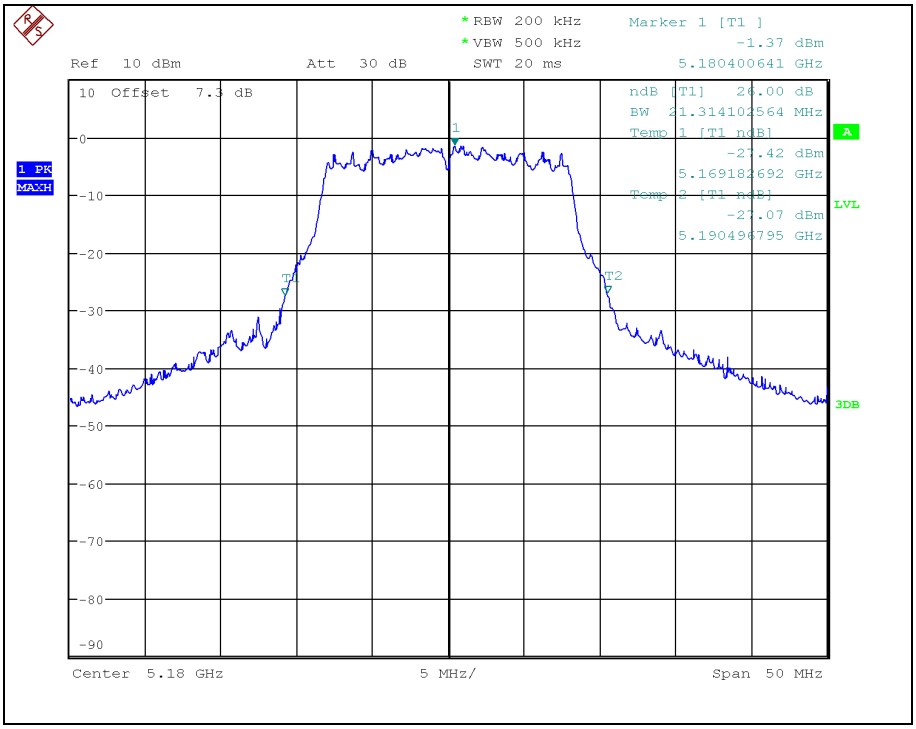
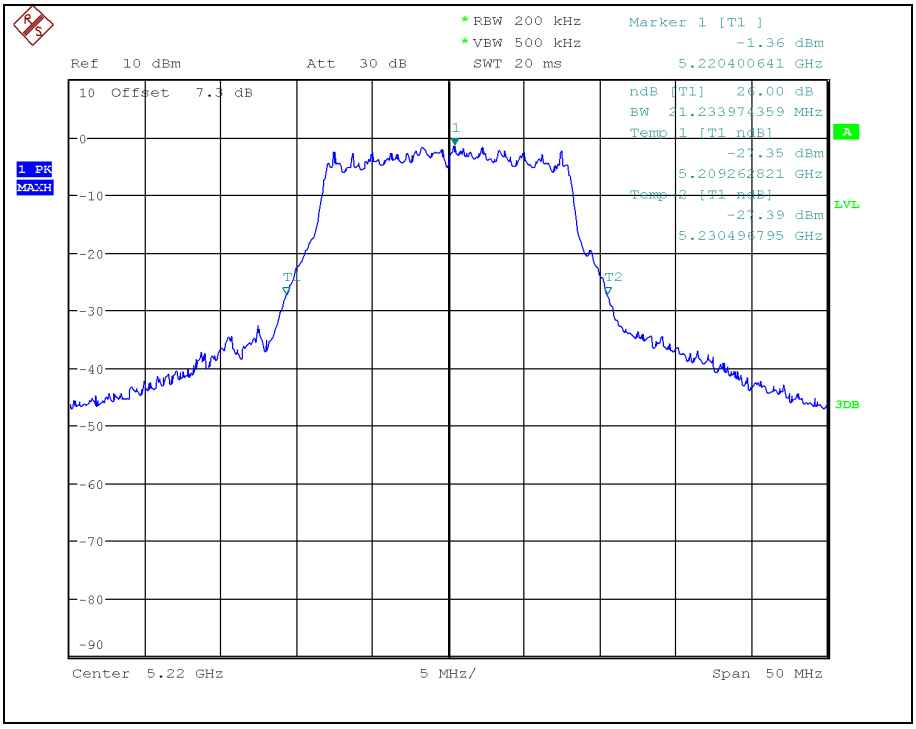
3.3.2.5 Test Plot

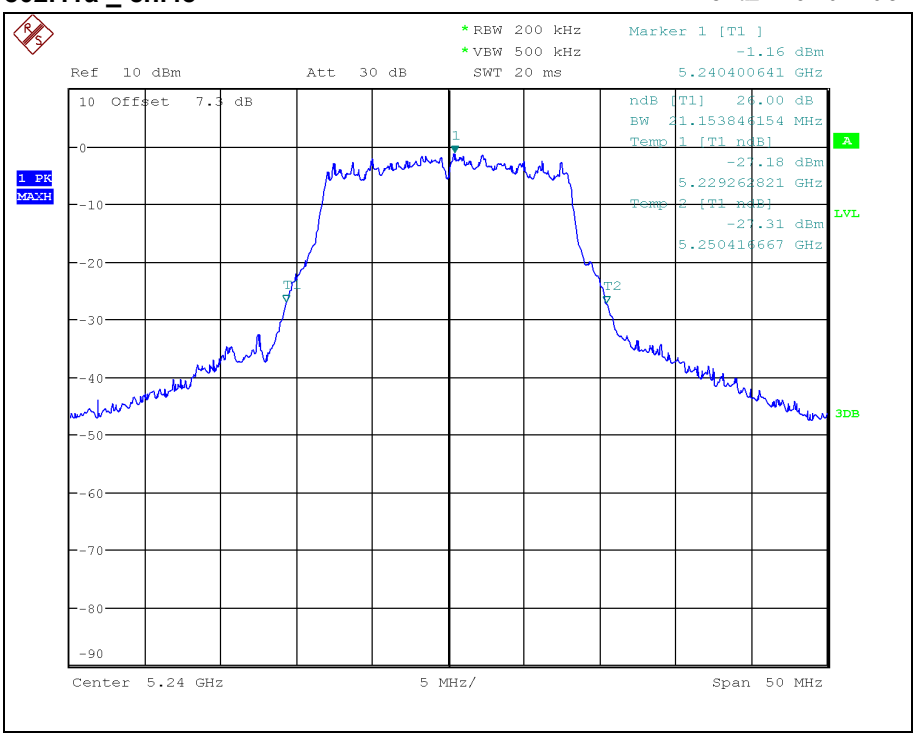
802.11a _ ch.36 **26 dB Bandwidth**



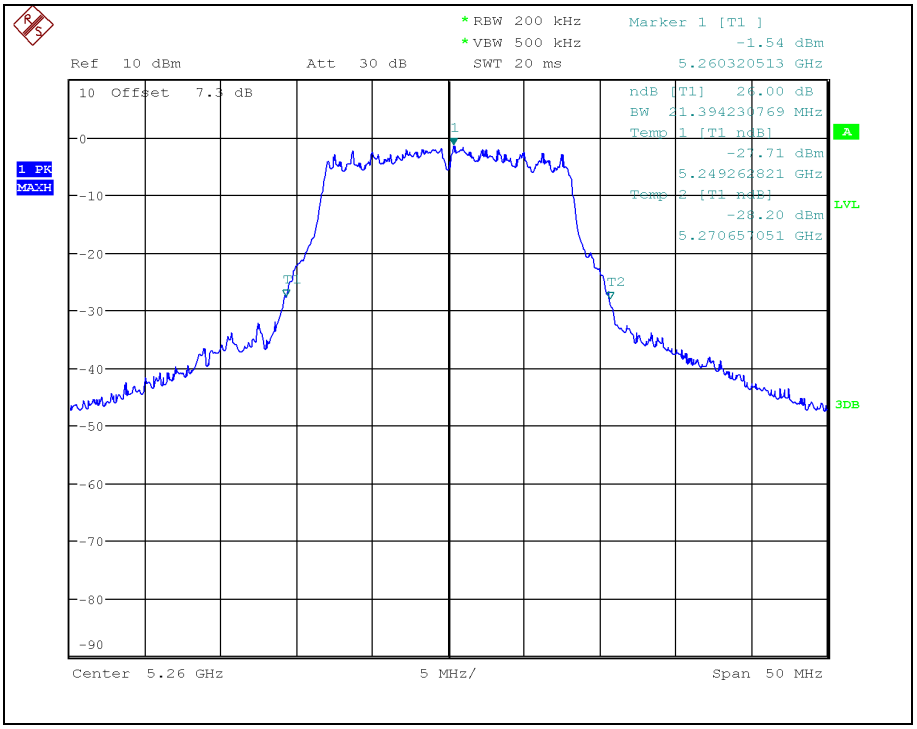
802.11a _ ch.44 **26 dB Bandwidth**



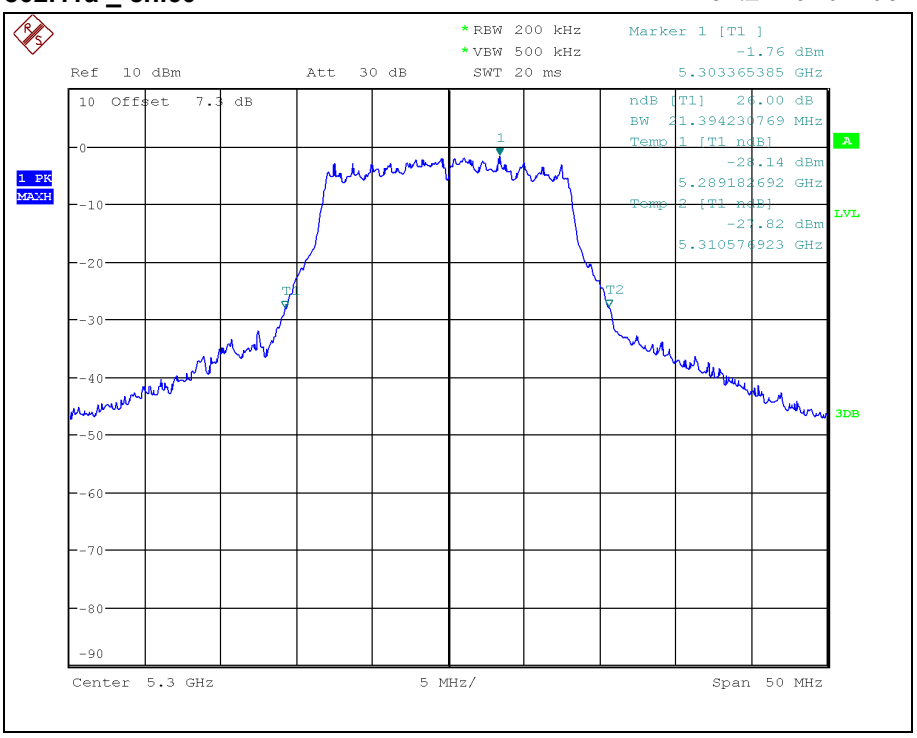
802.11a _ ch.48 **26 dB Bandwidth**



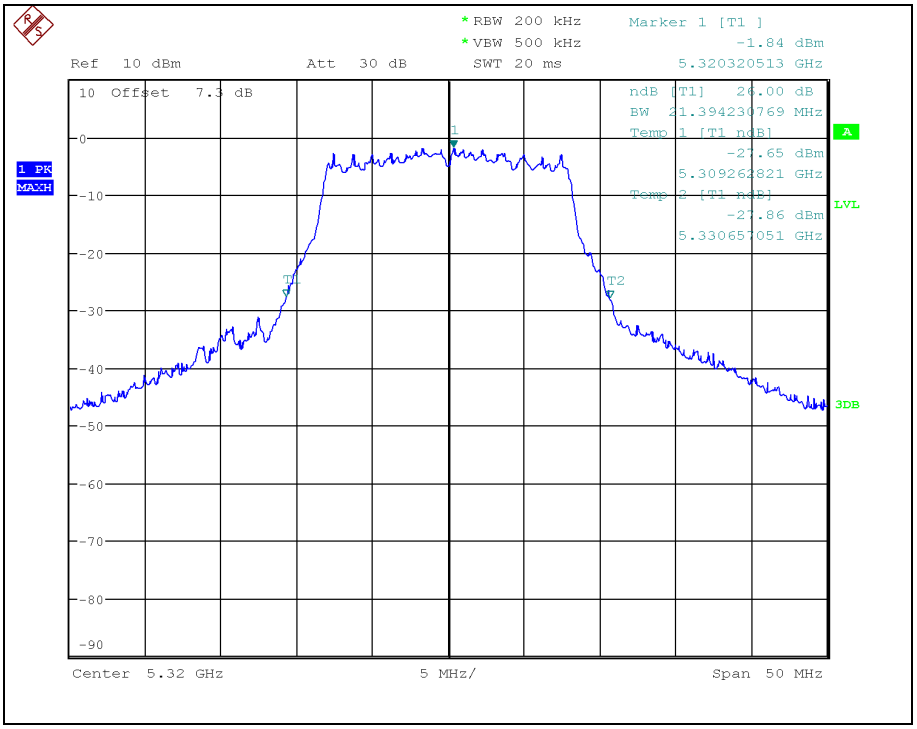
802.11a _ ch.52 **26 dB Bandwidth**



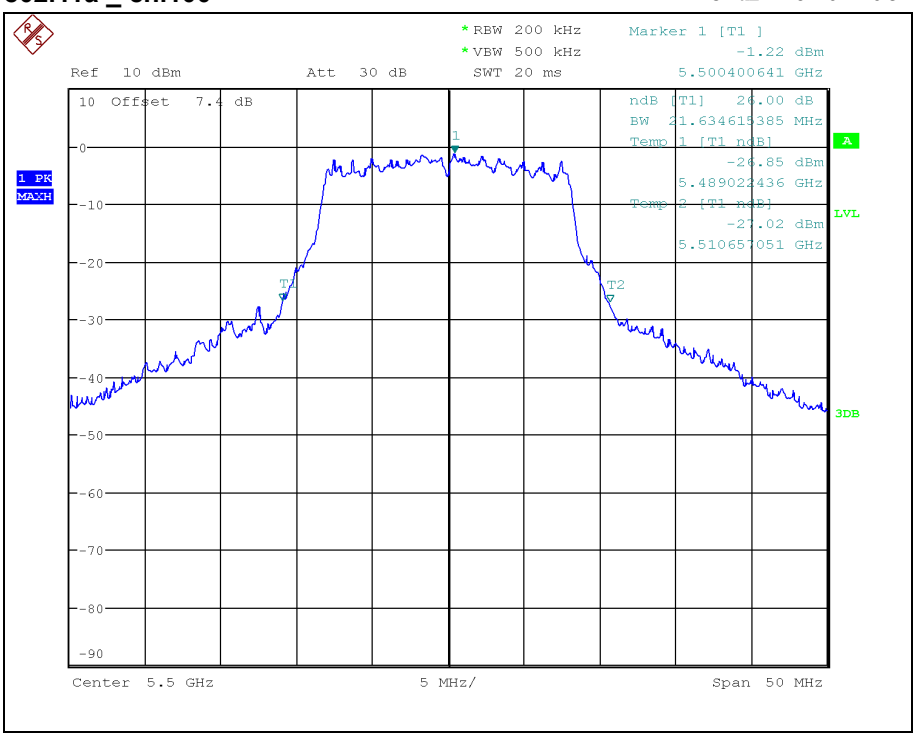
802.11a _ ch.60 **26 dB Bandwidth**



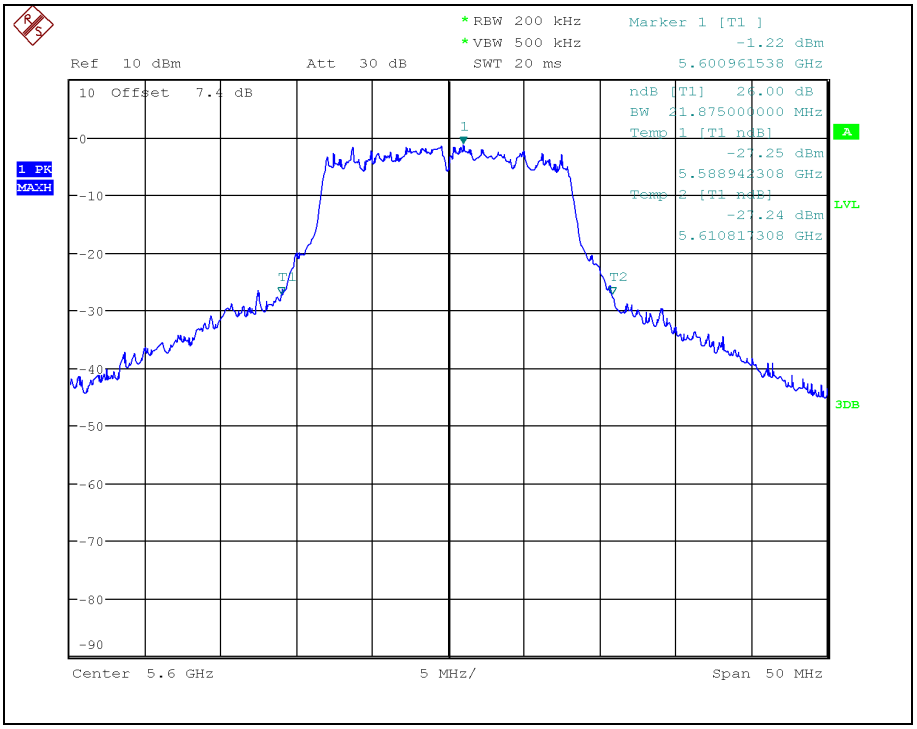
802.11a _ ch.64 **26 dB Bandwidth**



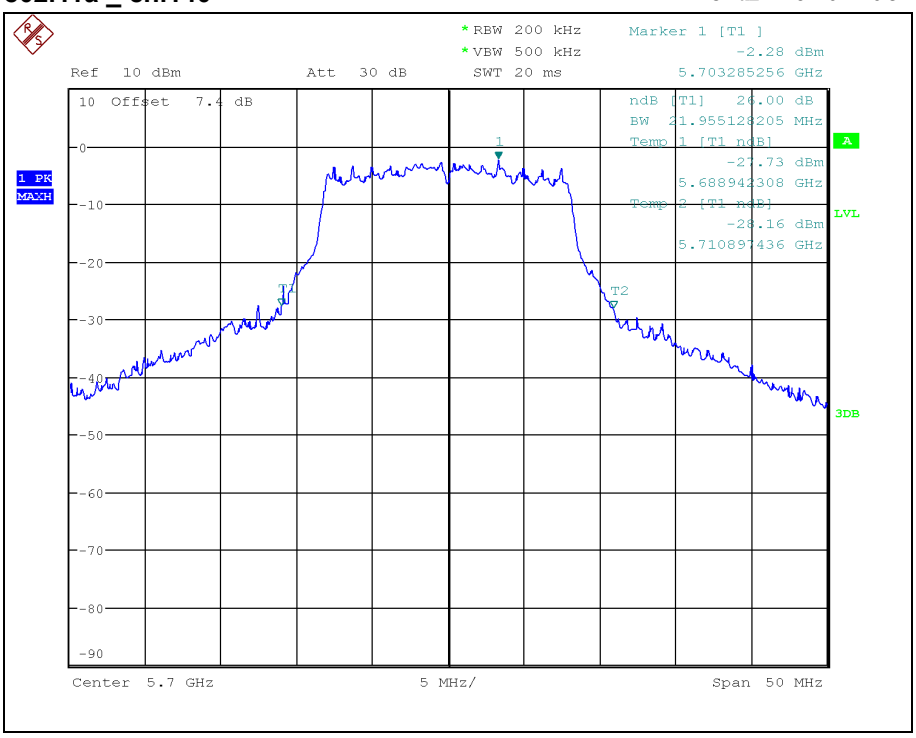
802.11a _ ch.100 **26 dB Bandwidth**



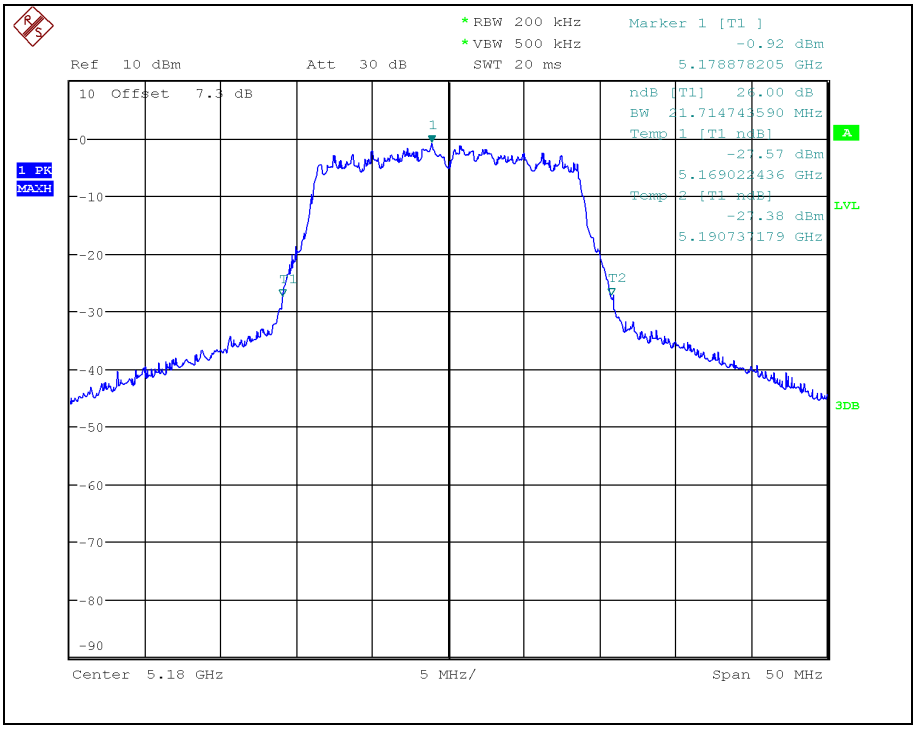
802.11a _ ch.120 **26 dB Bandwidth**



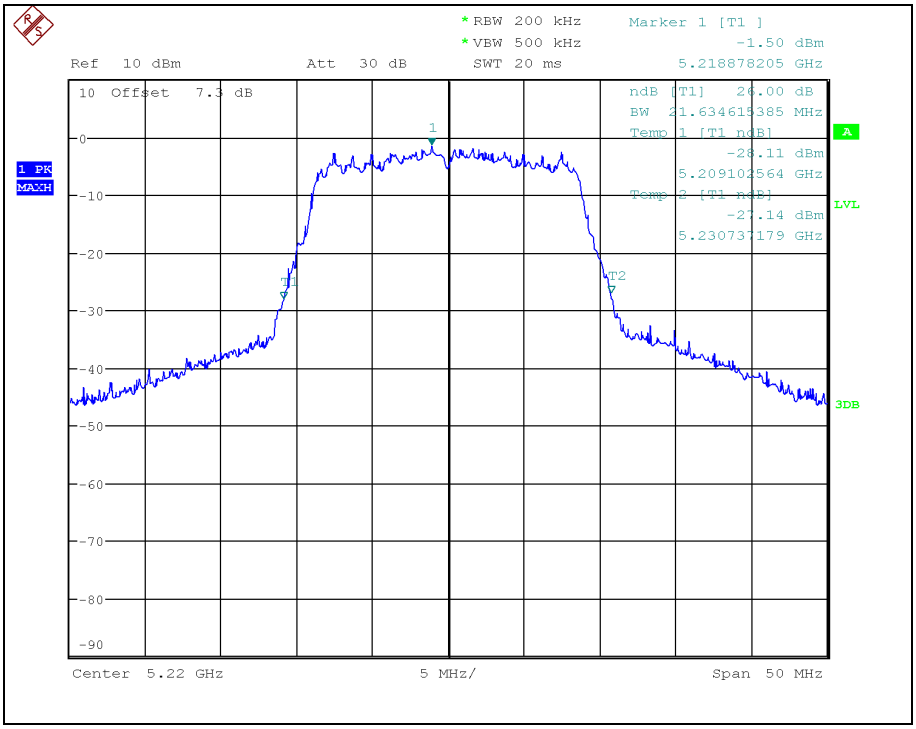
802.11a _ ch.140 **26 dB Bandwidth**



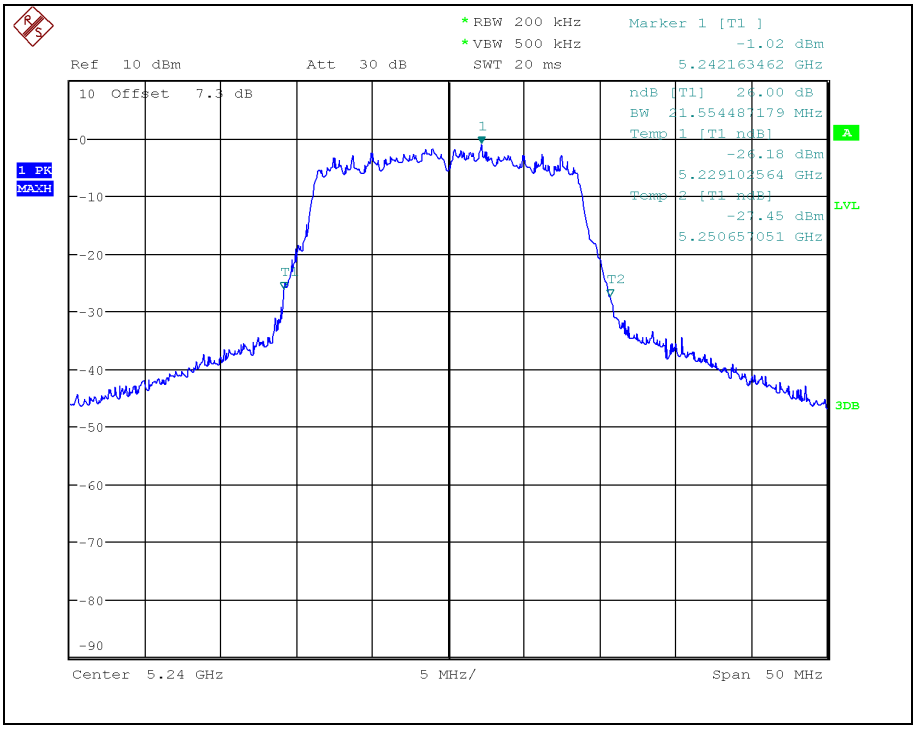
802.11n_HT20 _ ch.36 **26 dB Bandwidth**



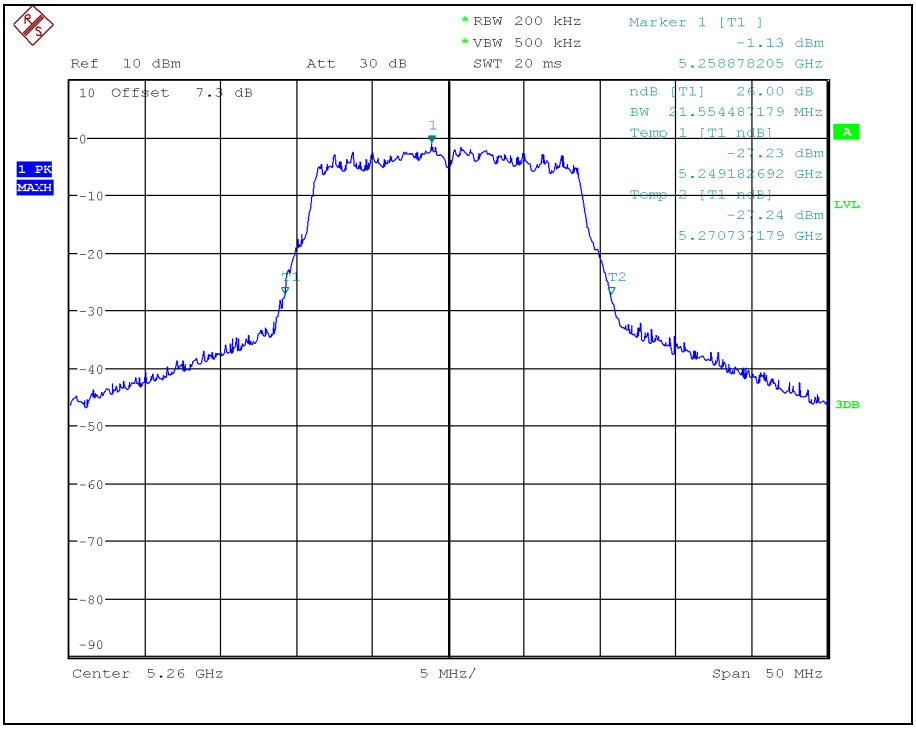
802.11n_HT20 _ ch.44 **26 dB Bandwidth**



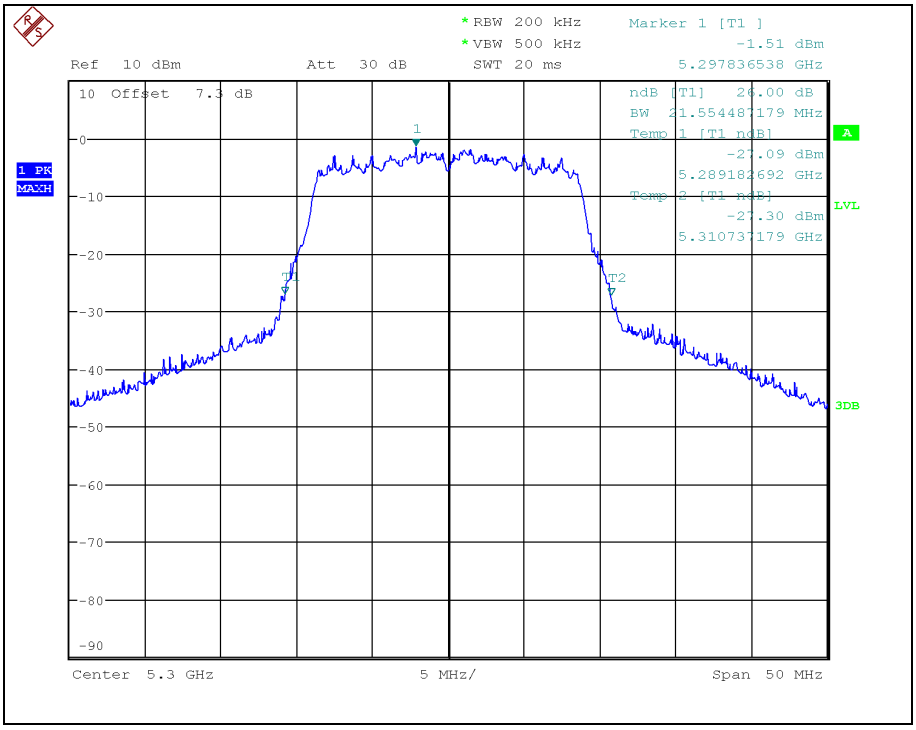
802.11n_HT20 _ ch.48 **26 dB Bandwidth**



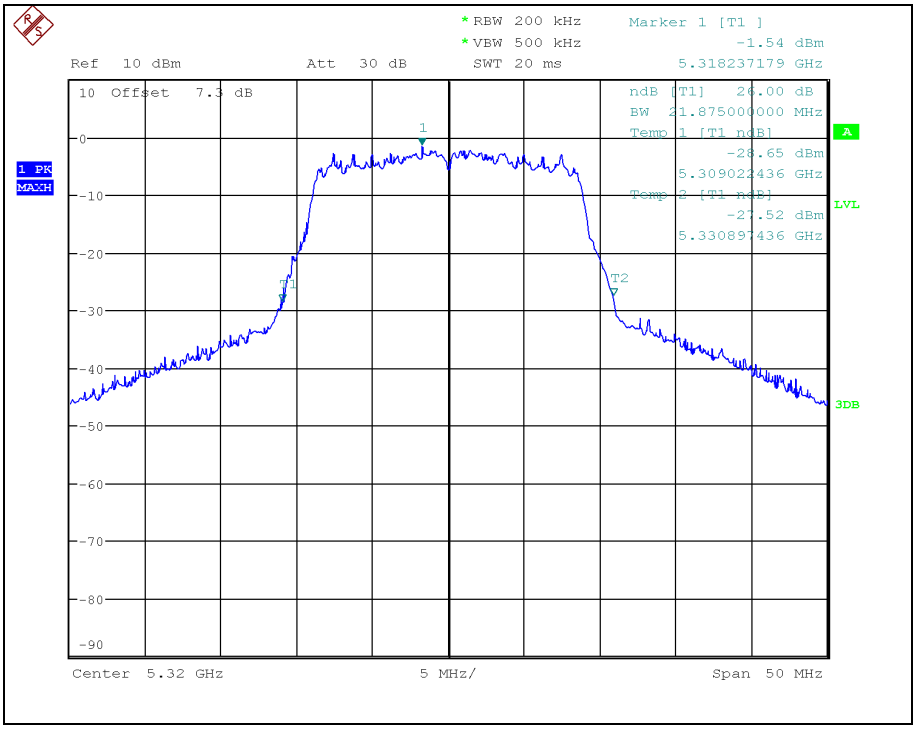
802.11n_HT20 _ ch.52 **26 dB Bandwidth**



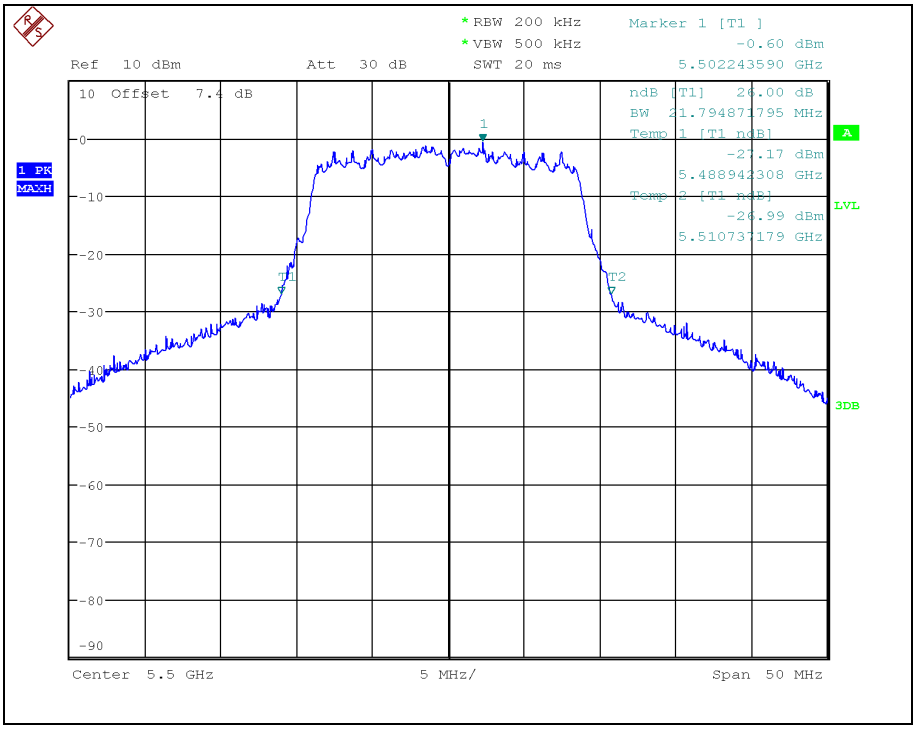
802.11n_HT20 _ ch.60 **26 dB Bandwidth**



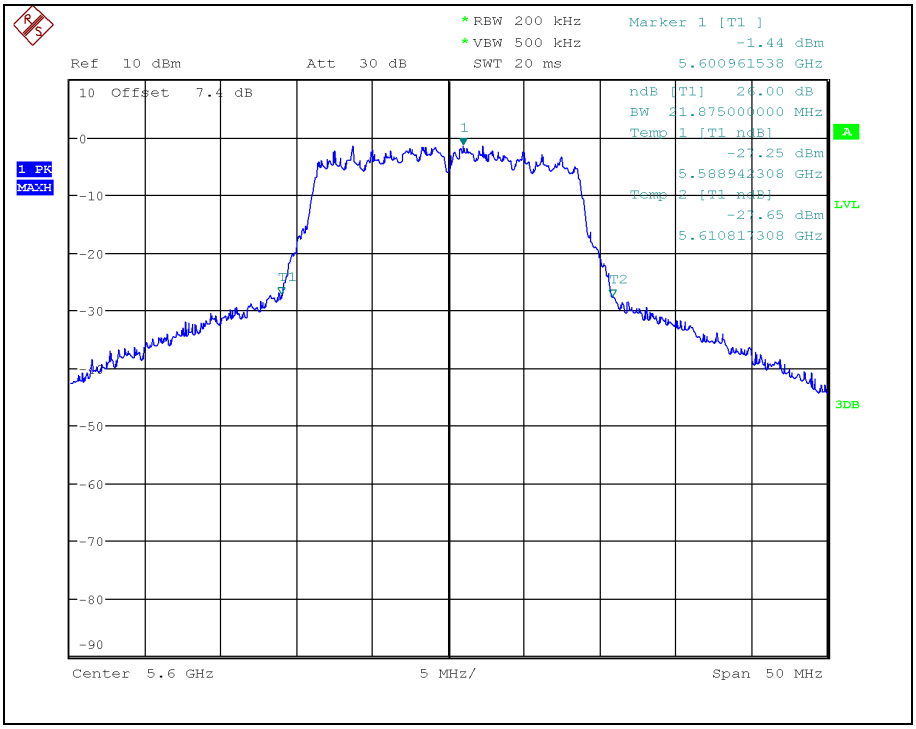
802.11n_HT20 _ ch.64 **26 dB Bandwidth**



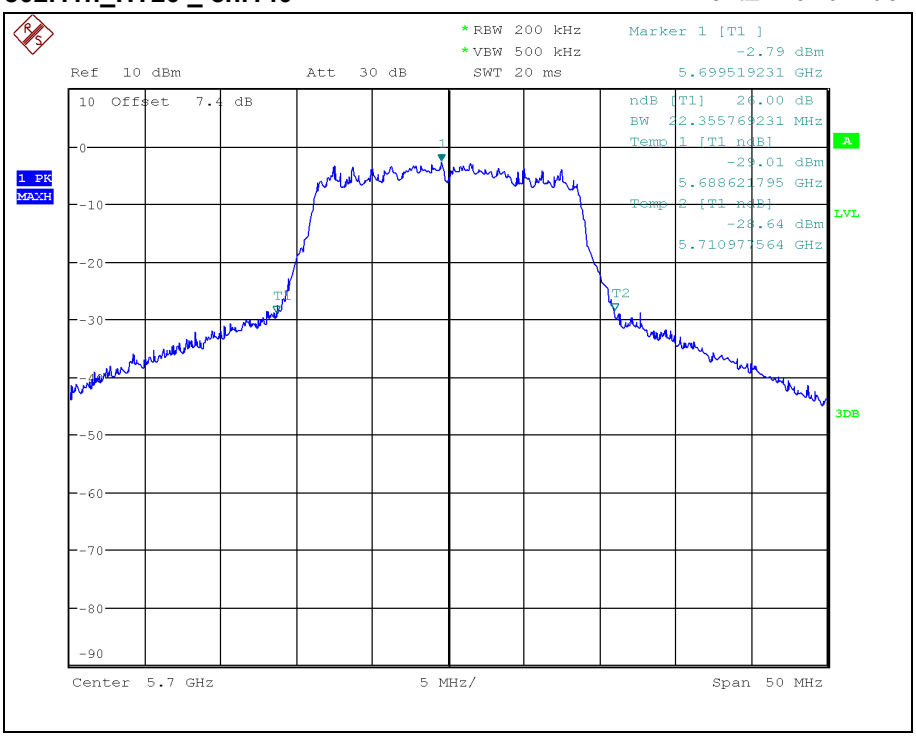
802.11n_HT20 _ ch.100 **26 dB Bandwidth**



802.11n_HT20 _ ch.120 **26 dB Bandwidth**



802.11n_HT20 _ ch.140 **26 dB Bandwidth**



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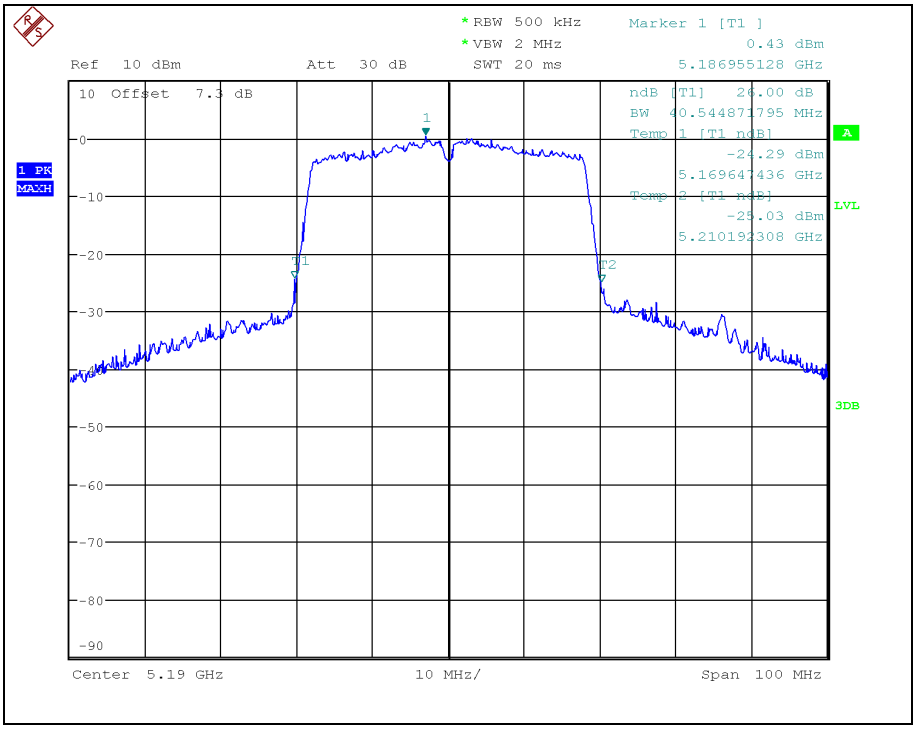
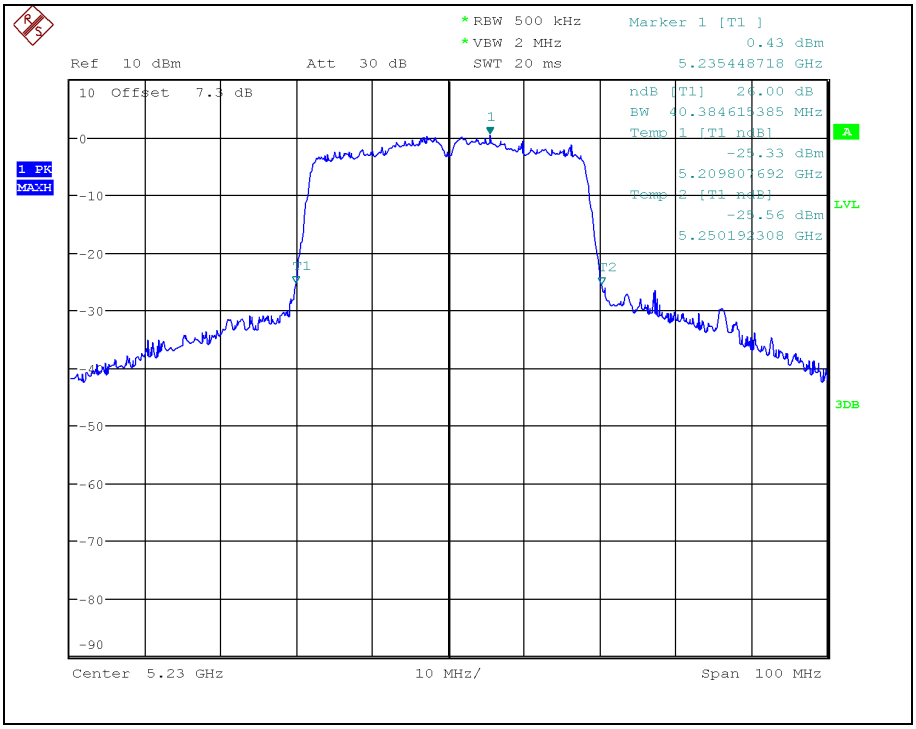
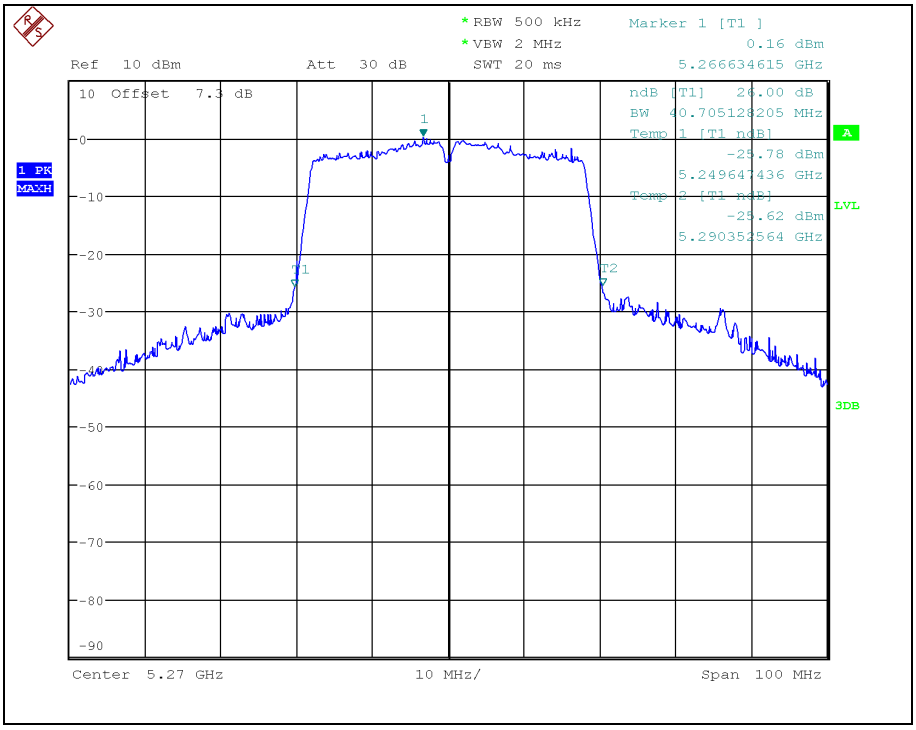
802.11n_HT40 _ ch.38 **26 dB Bandwidth**



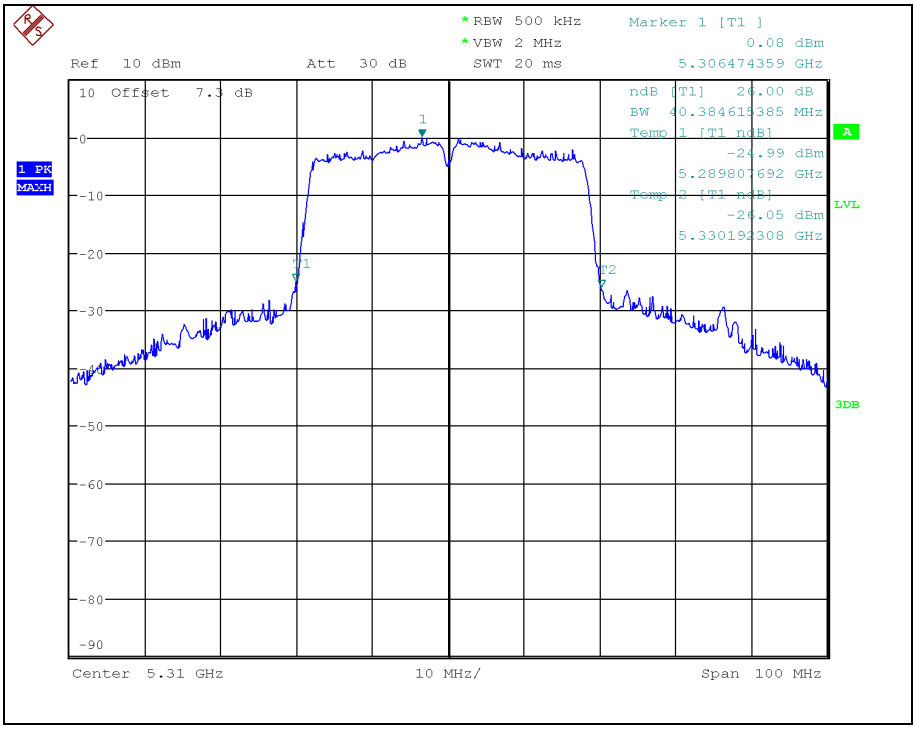
802.11n_HT40 _ ch.46 **26 dB Bandwidth**



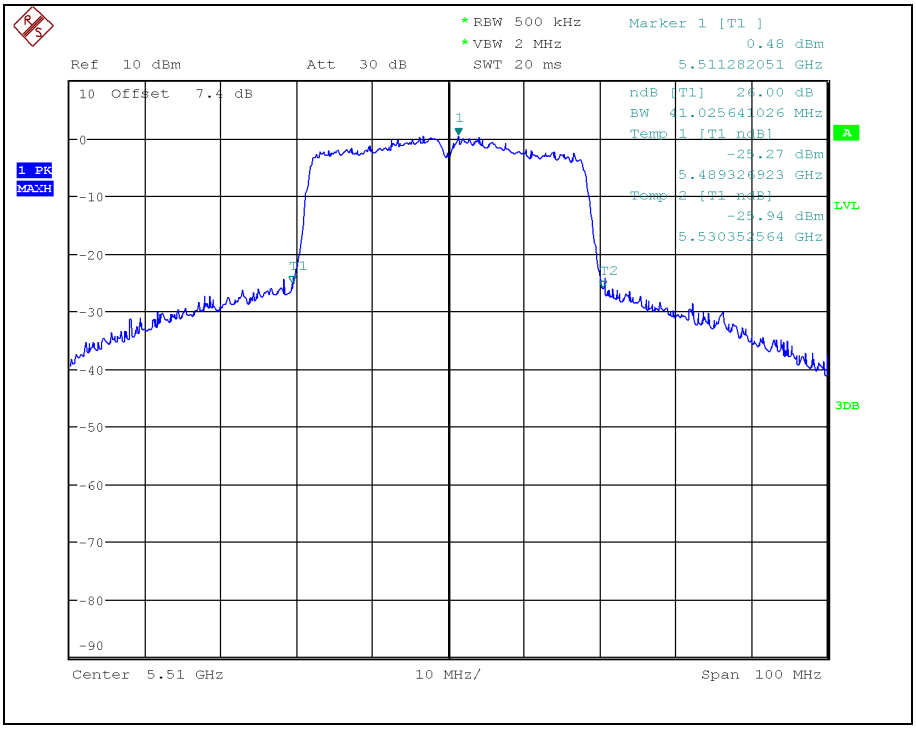
802.11n_HT40 _ ch.54 **26 dB Bandwidth**



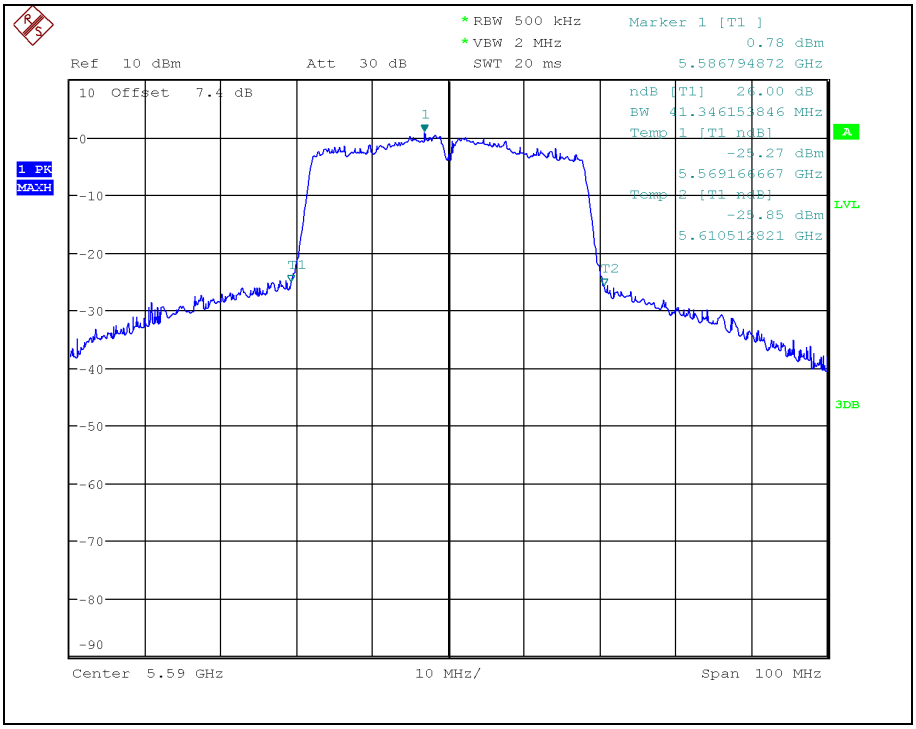
802.11n_HT40 _ ch.62 **26 dB Bandwidth**



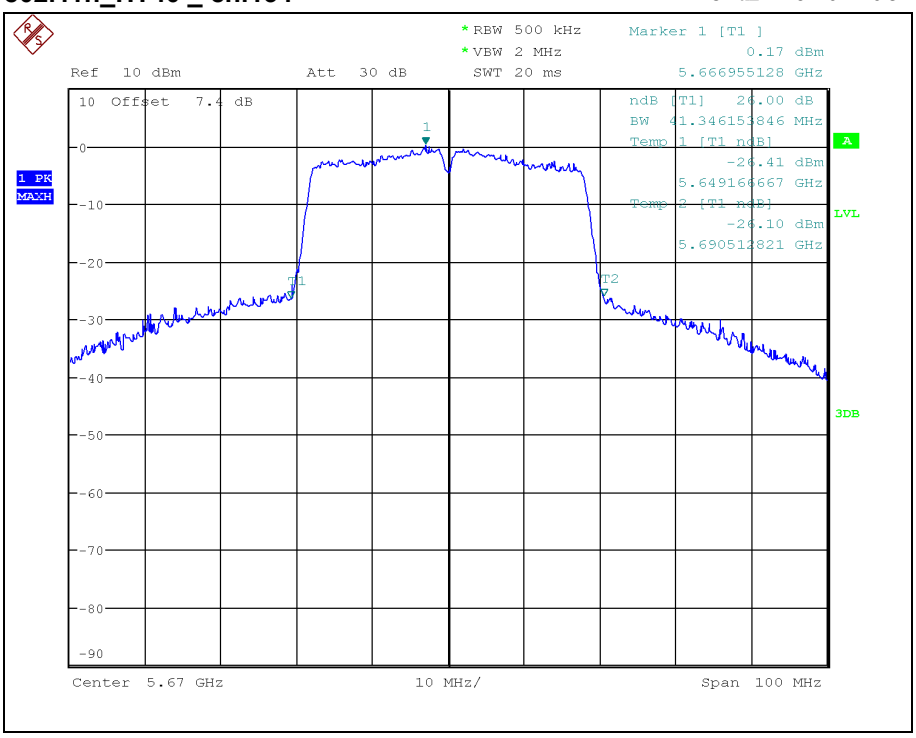
802.11n_HT40 _ ch.102 **26 dB Bandwidth**



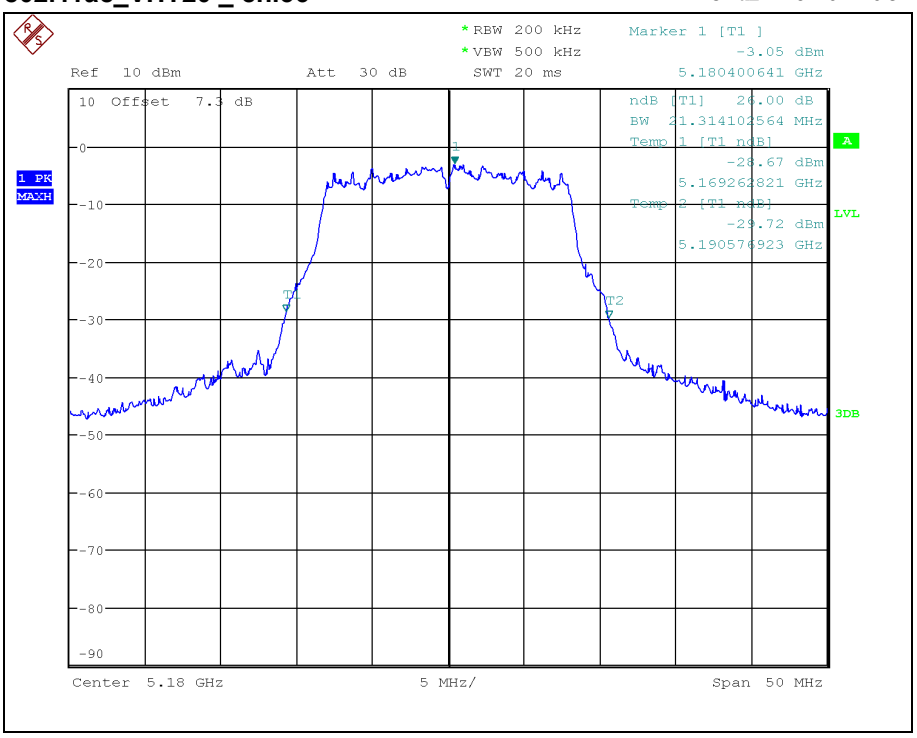
802.11n_HT40 _ ch.118 **26 dB Bandwidth**



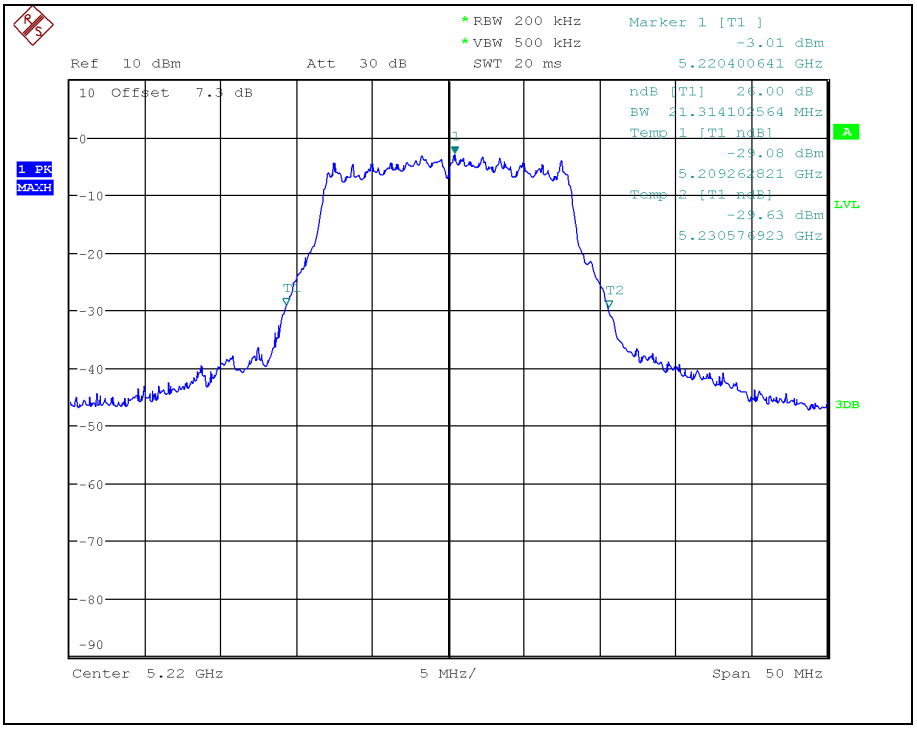
802.11n_HT40 _ ch.134 **26 dB Bandwidth**



802.11ac_VHT20 _ ch.36 **26 dB Bandwidth**



802.11ac_VHT20 _ ch.44 **26 dB Bandwidth**



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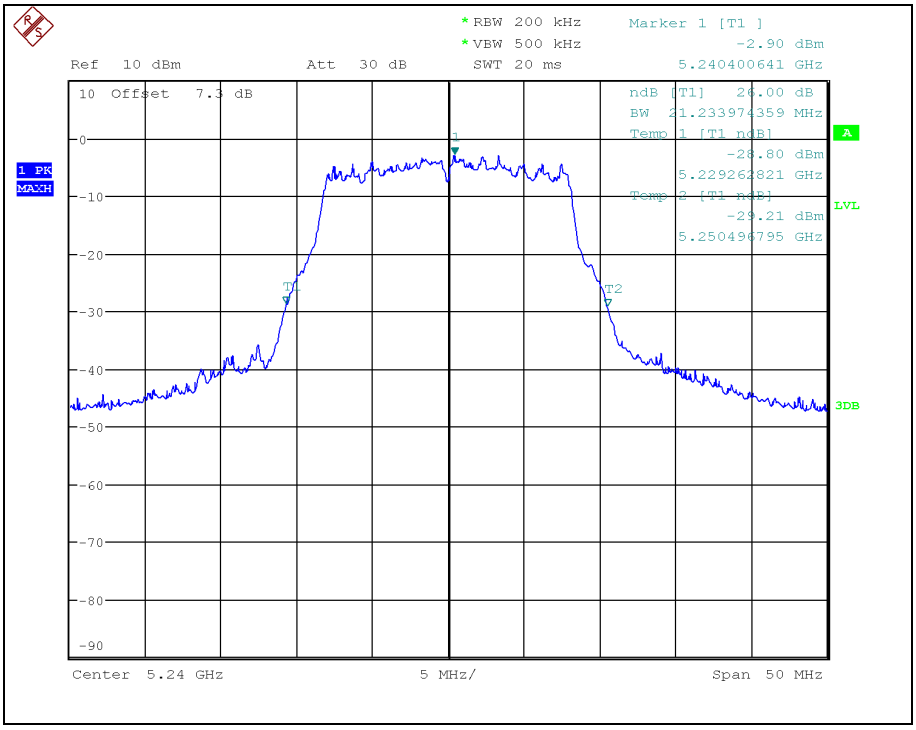
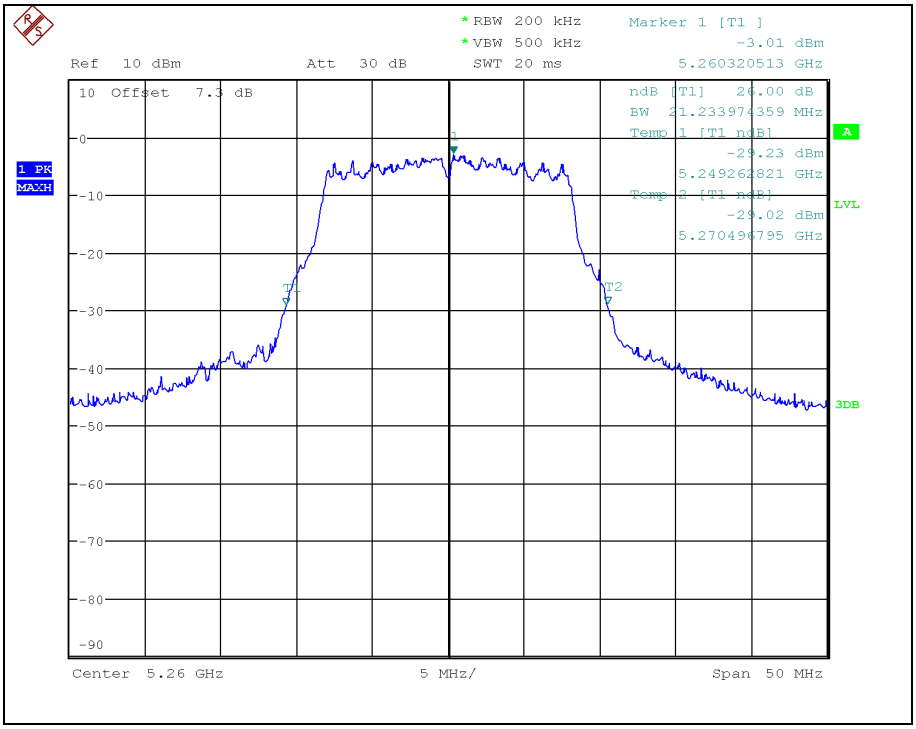
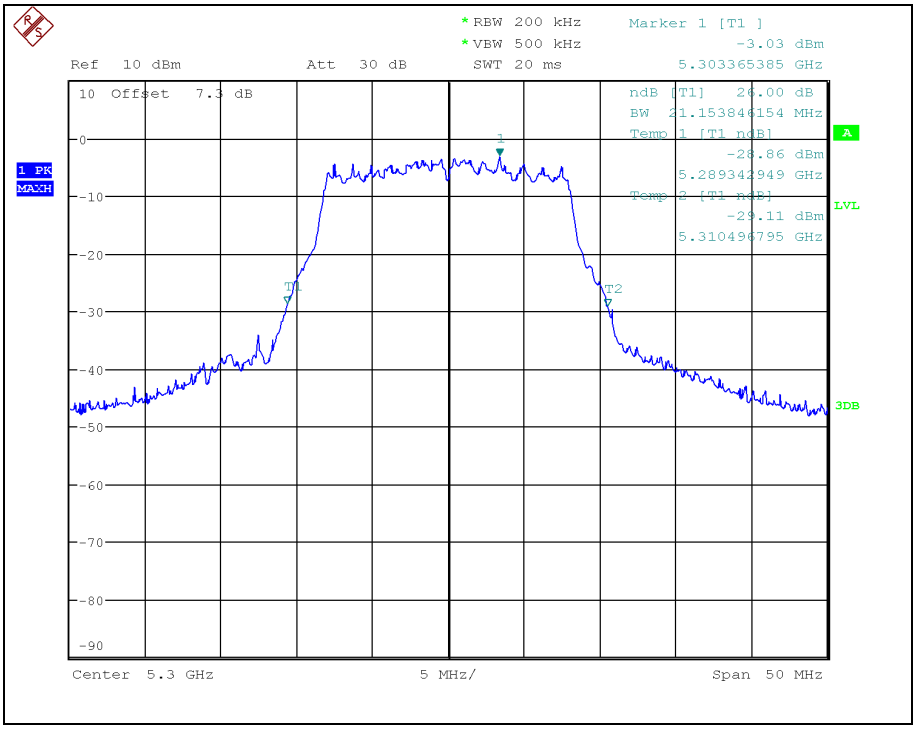
802.11ac_VHT20 _ ch.48 **26 dB Bandwidth**



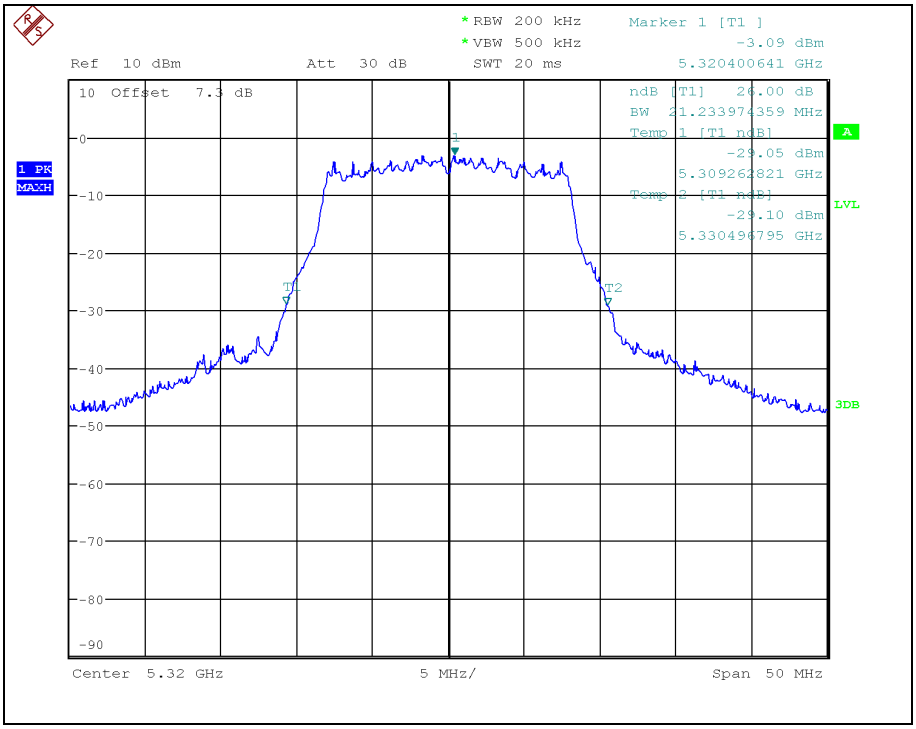
802.11ac_VHT20 _ ch.52 **26 dB Bandwidth**



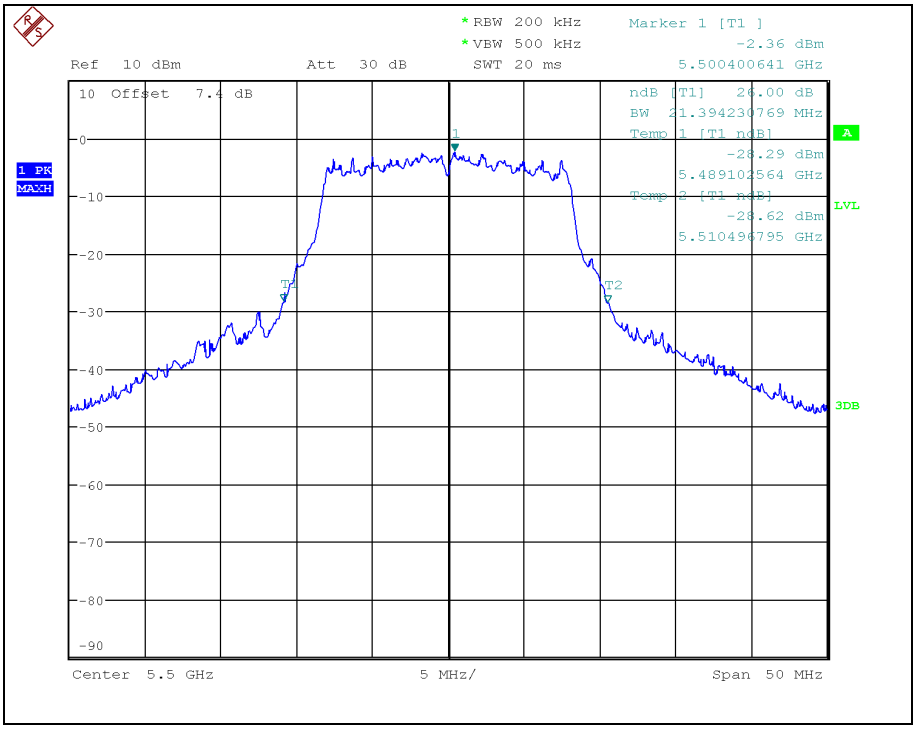
802.11ac_VHT20 _ ch.60 **26 dB Bandwidth**



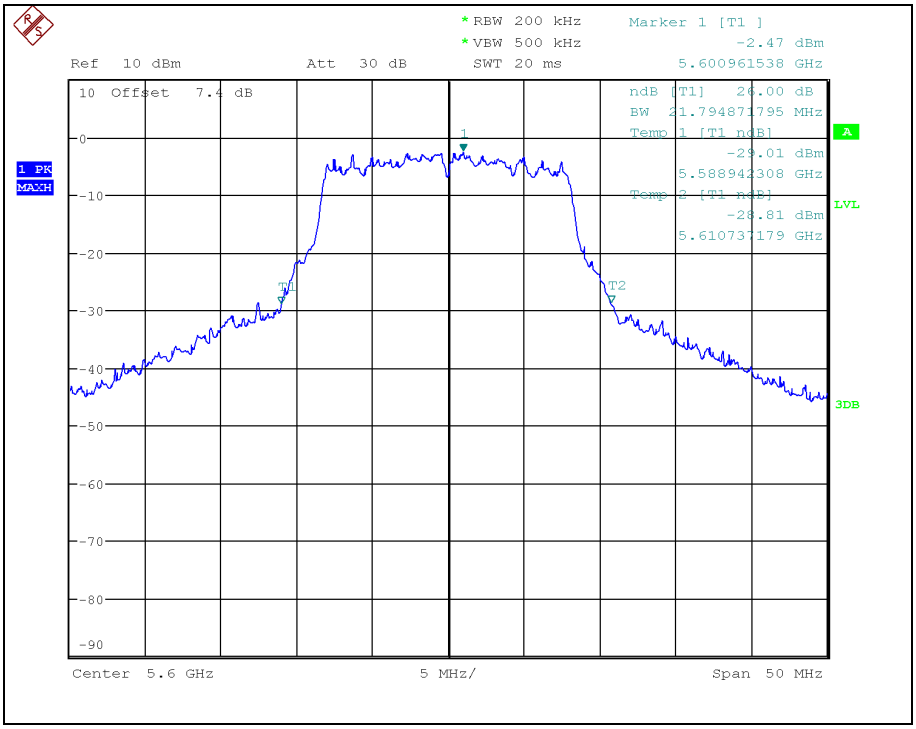
802.11ac_VHT20 _ ch.64 **26 dB Bandwidth**



802.11ac_VHT20 _ ch.100 **26 dB Bandwidth**



802.11ac_VHT20 _ ch.120 **26 dB Bandwidth**



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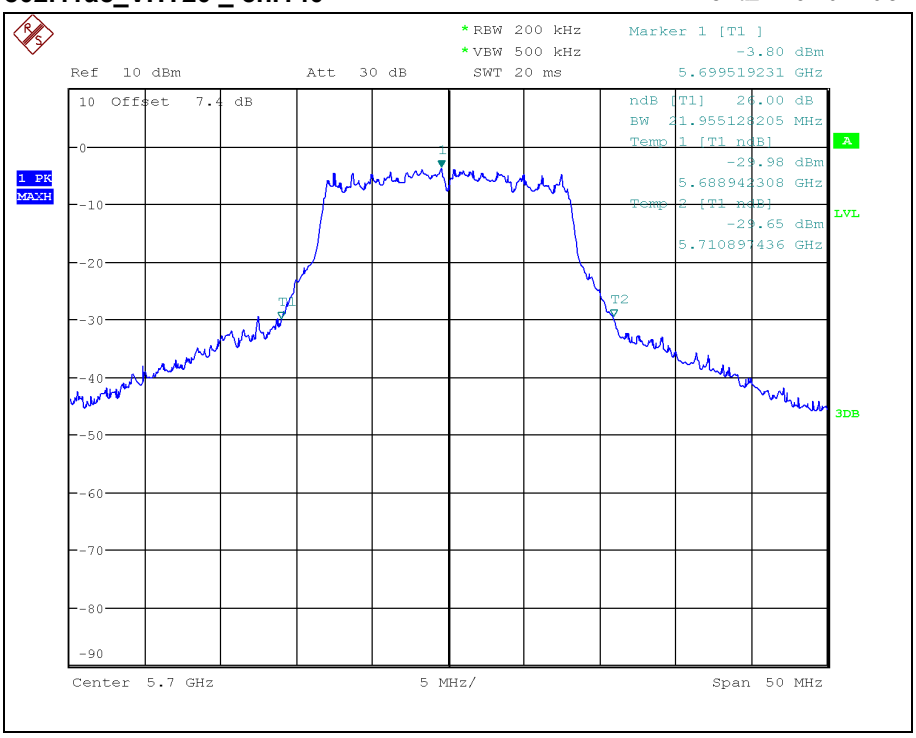
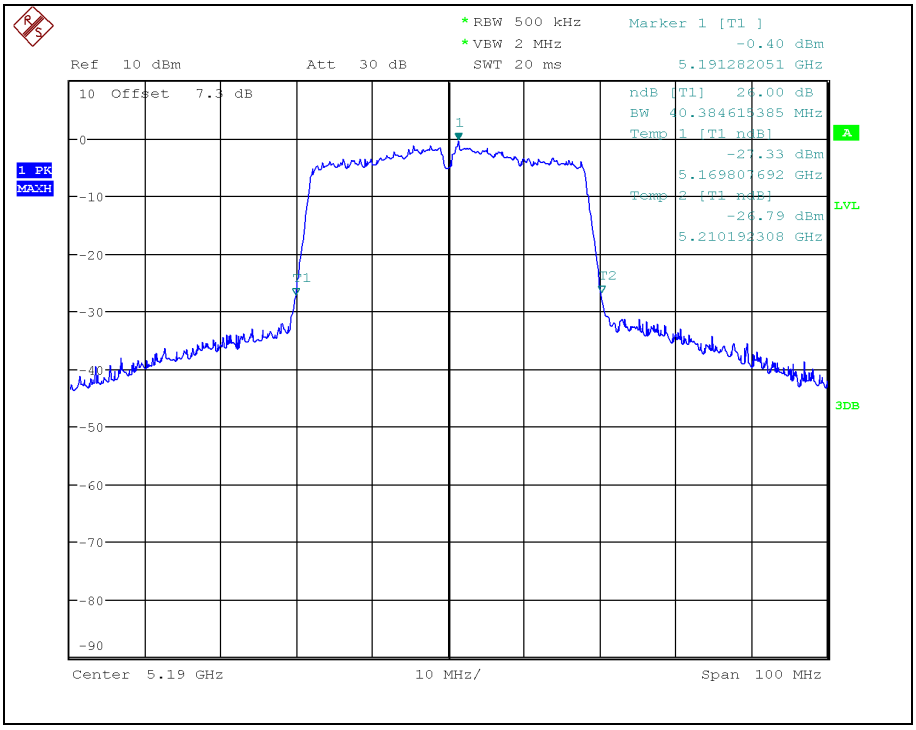
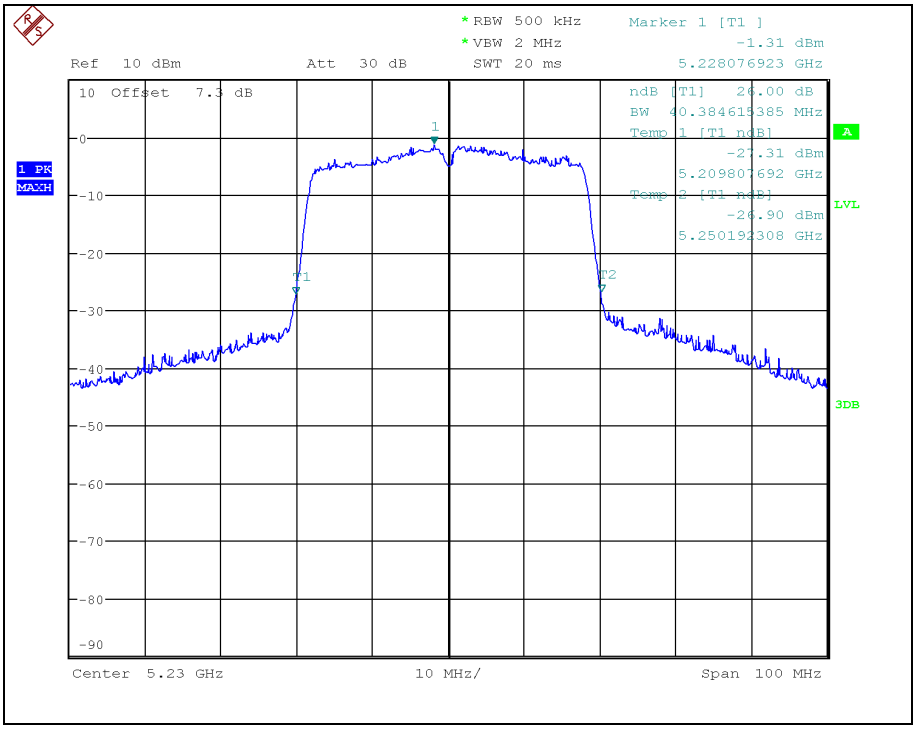
802.11ac_VHT20 _ ch.140 **26 dB Bandwidth**



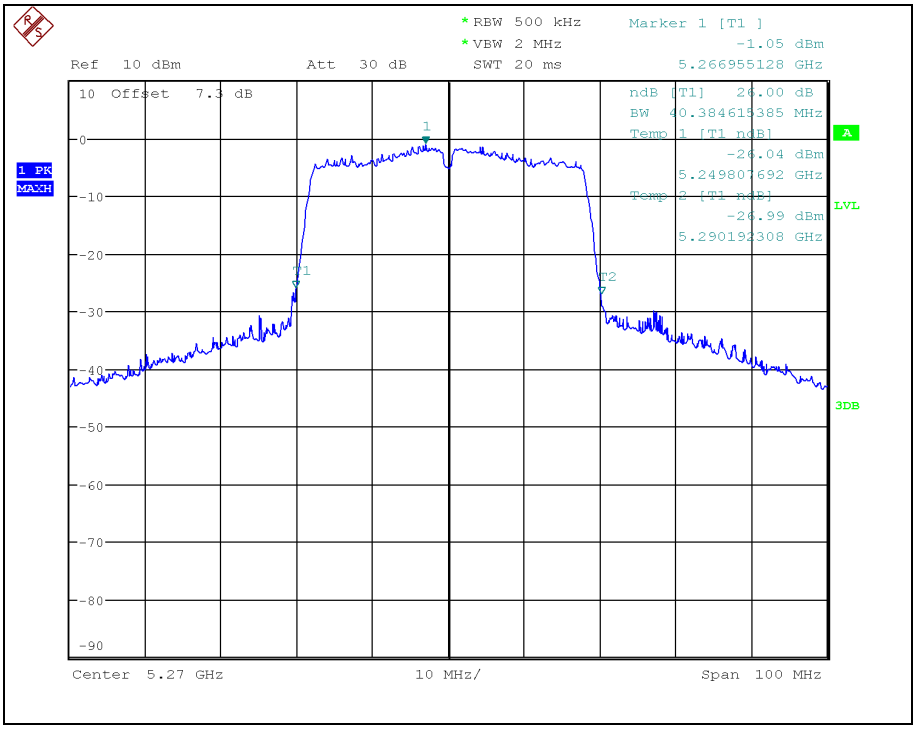
802.11ac_VHT40 _ ch.38 **26 dB Bandwidth**



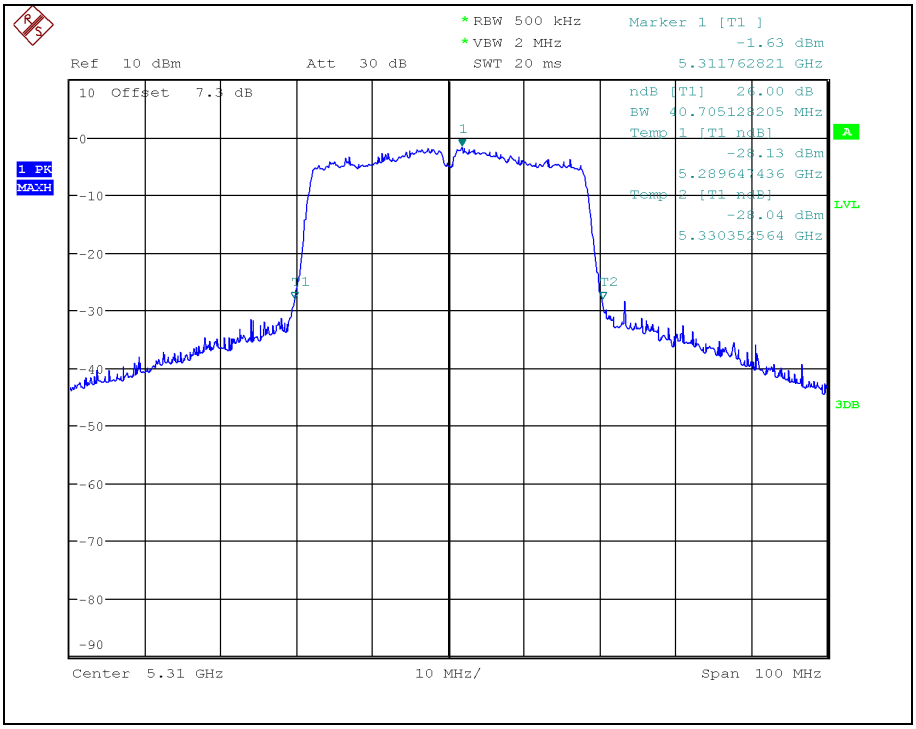
802.11ac_VHT40 _ ch.46 **26 dB Bandwidth**



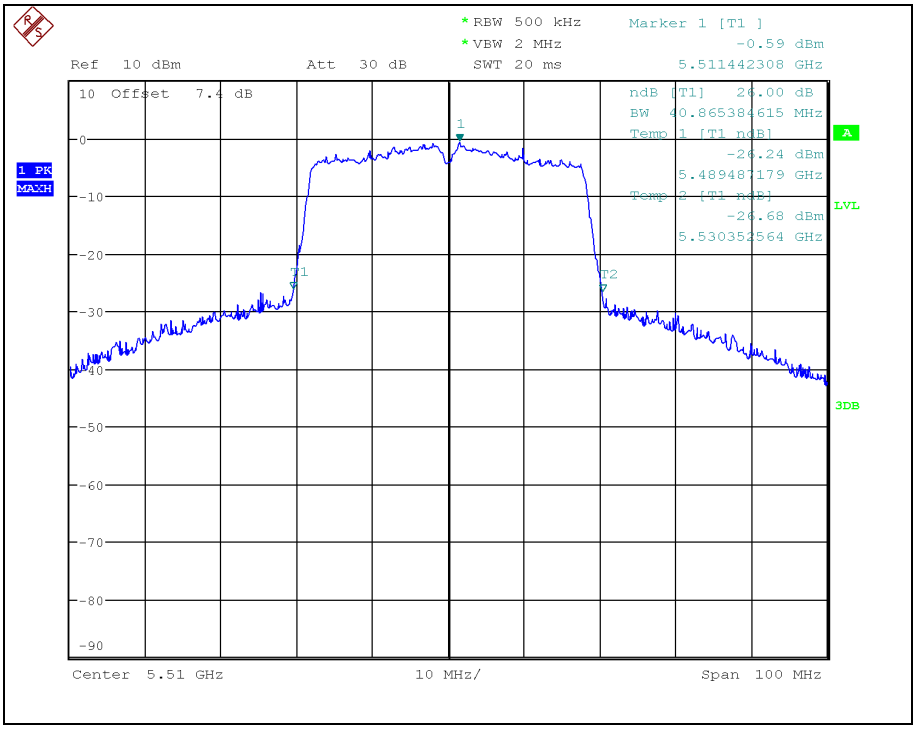
802.11ac_VHT40 _ ch.54 **26 dB Bandwidth**



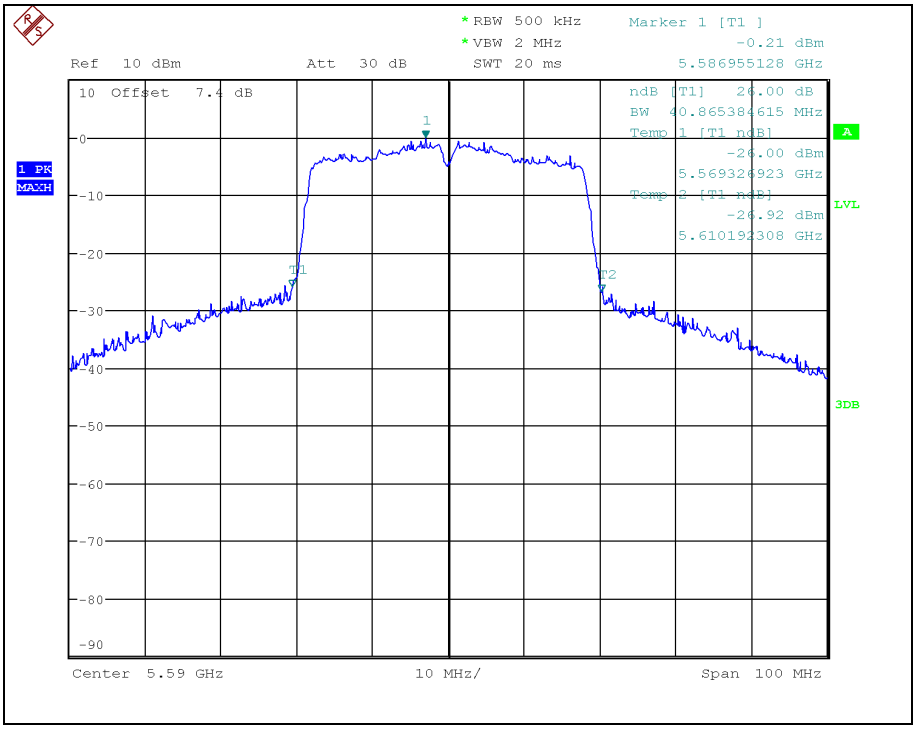
802.11ac_VHT40 _ ch.62 **26 dB Bandwidth**



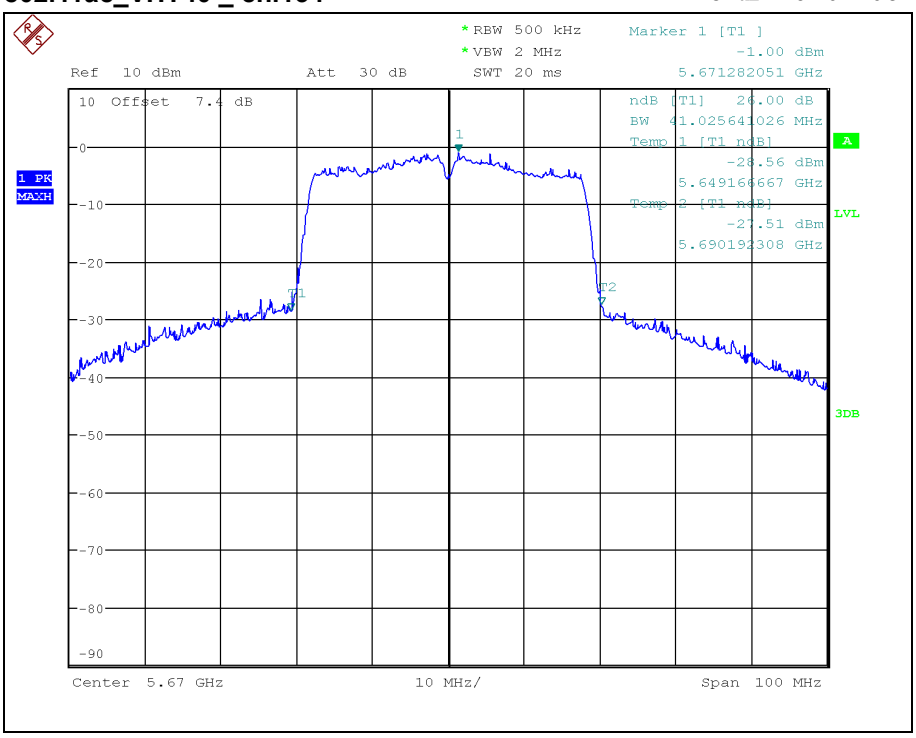
802.11ac_VHT40 _ ch.102 **26 dB Bandwidth**



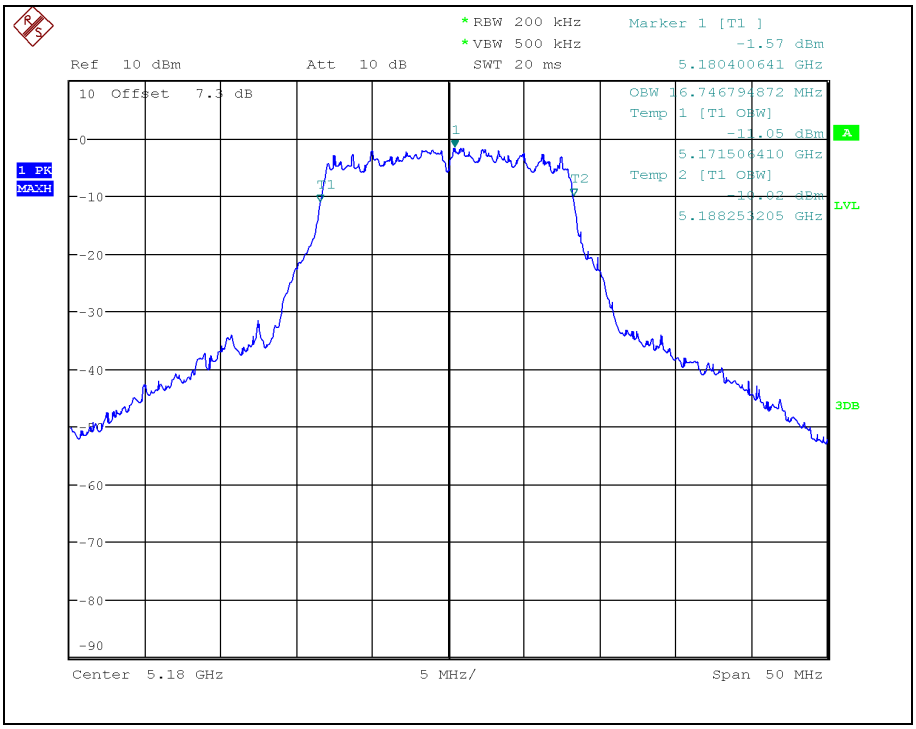
802.11ac_VHT40 _ ch.118 **26 dB Bandwidth**



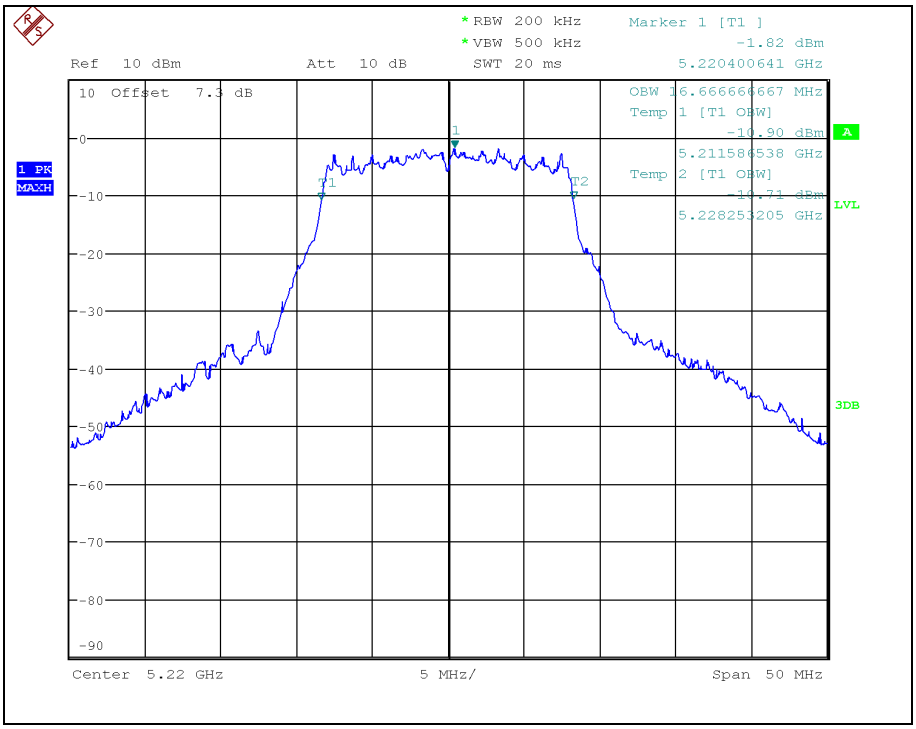
802.11ac_VHT40 _ ch.134 **26 dB Bandwidth**



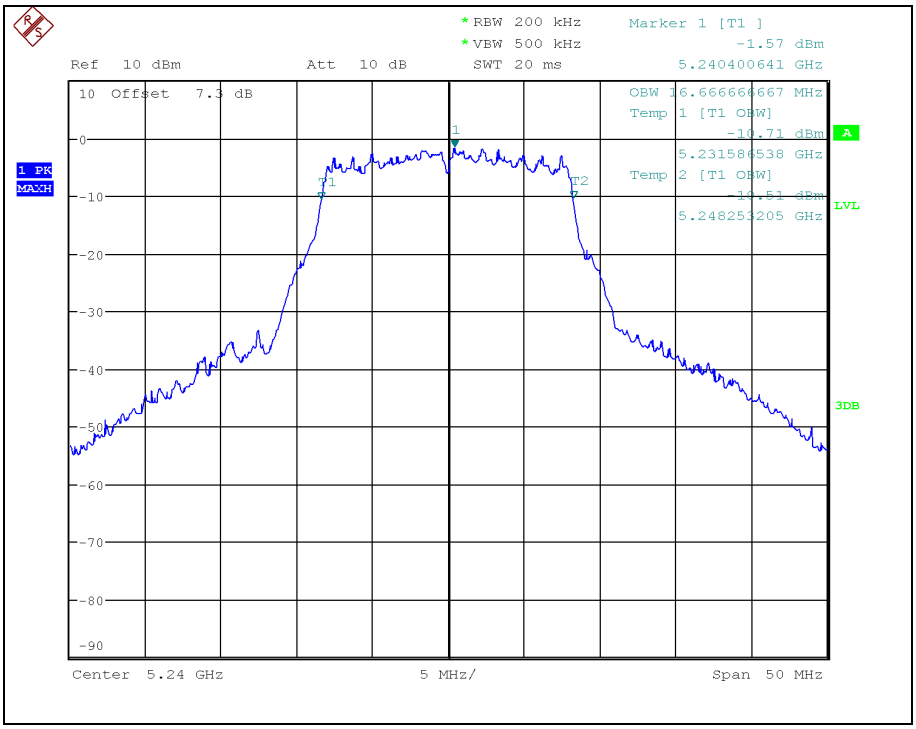
802.11a _ ch.36 **Occupied Bandwidth**



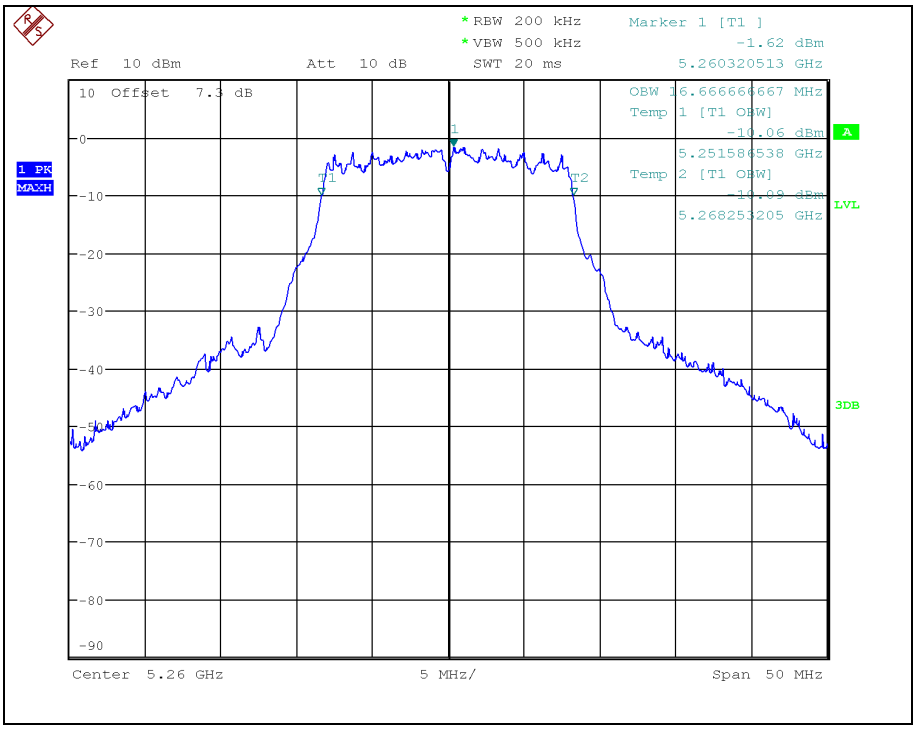
802.11a _ ch.44 **Occupied Bandwidth**



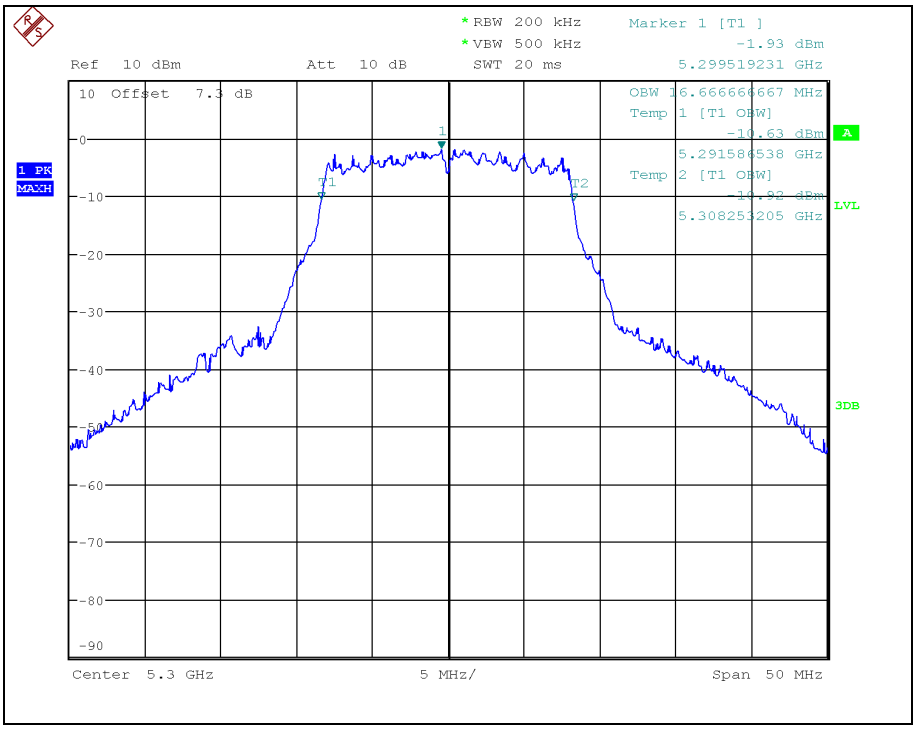
802.11a _ ch.48 **Occupied Bandwidth**



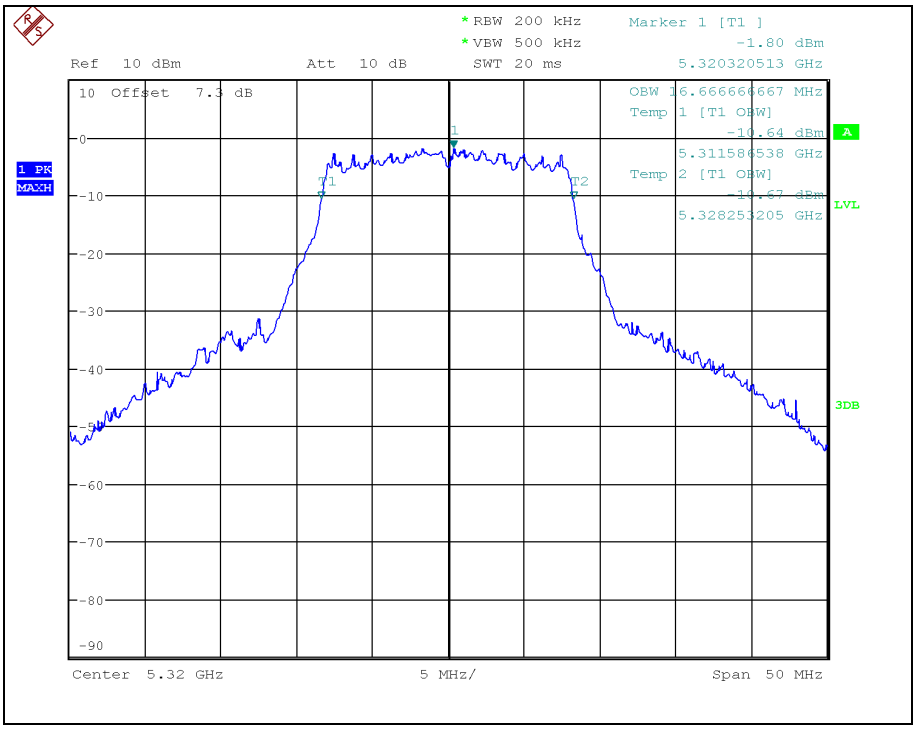
802.11a _ ch.52 **Occupied Bandwidth**



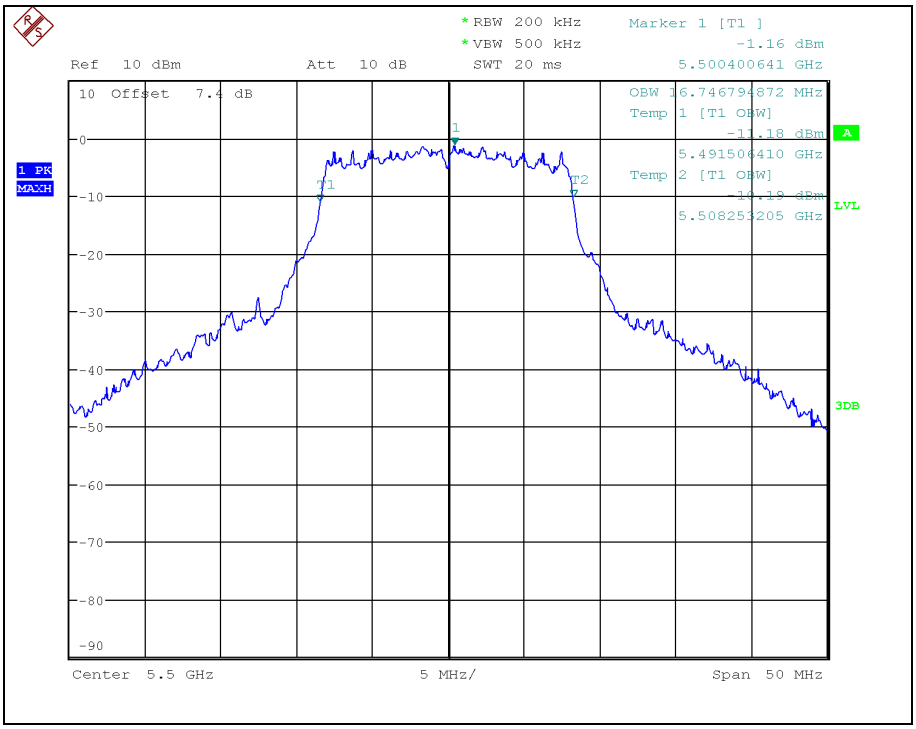
802.11a _ ch.60 **Occupied Bandwidth**



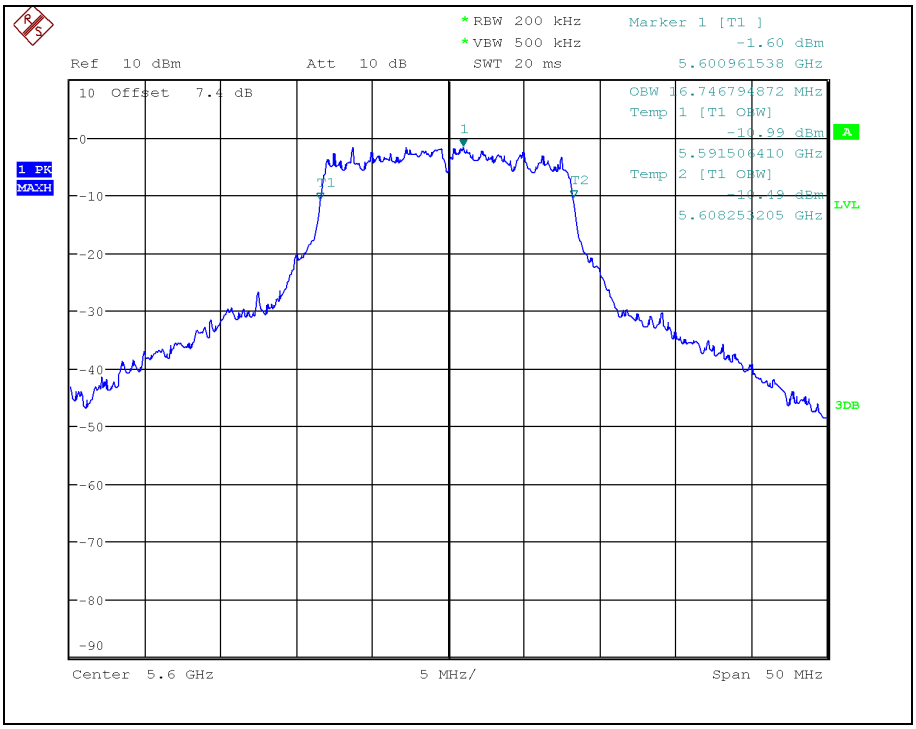
802.11a _ ch.64 **Occupied Bandwidth**



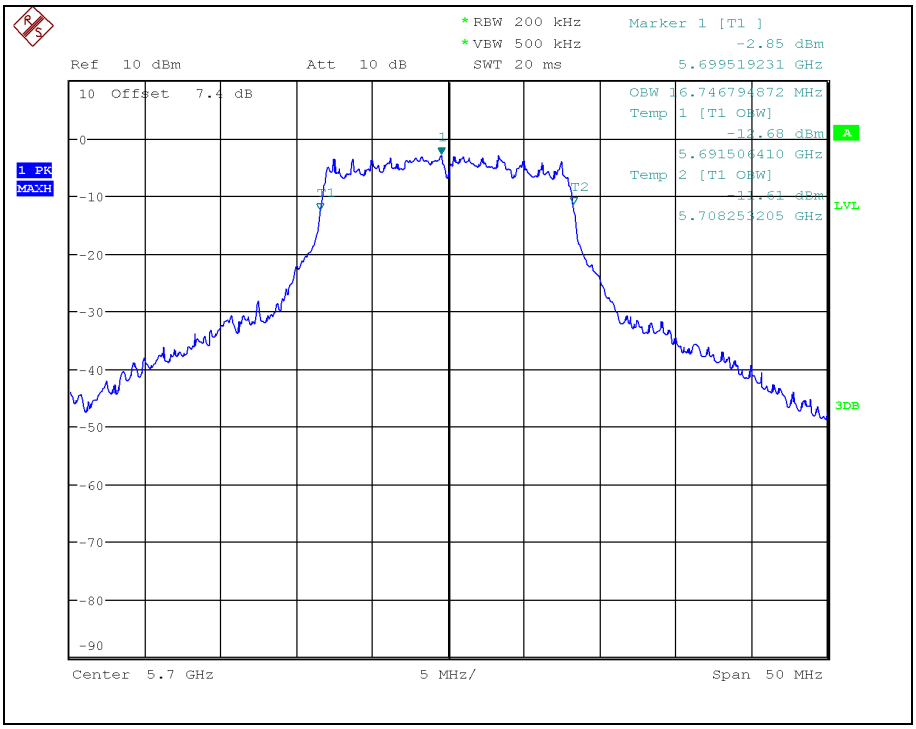
802.11a _ ch.100 **Occupied Bandwidth**



802.11a _ ch.120 **Occupied Bandwidth**



802.11a _ ch.140 **Occupied Bandwidth**



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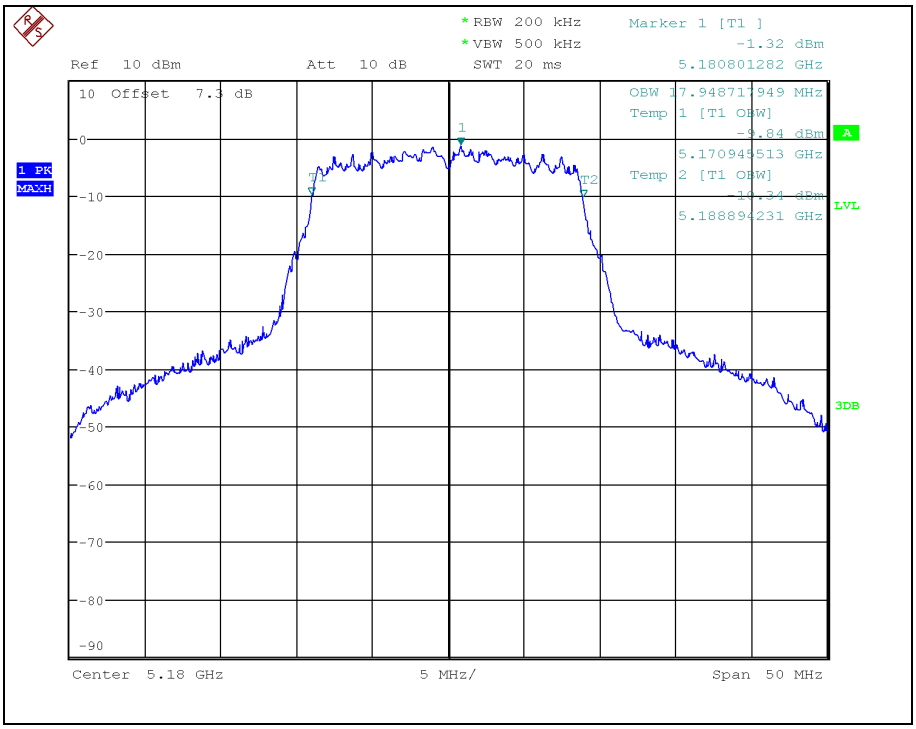
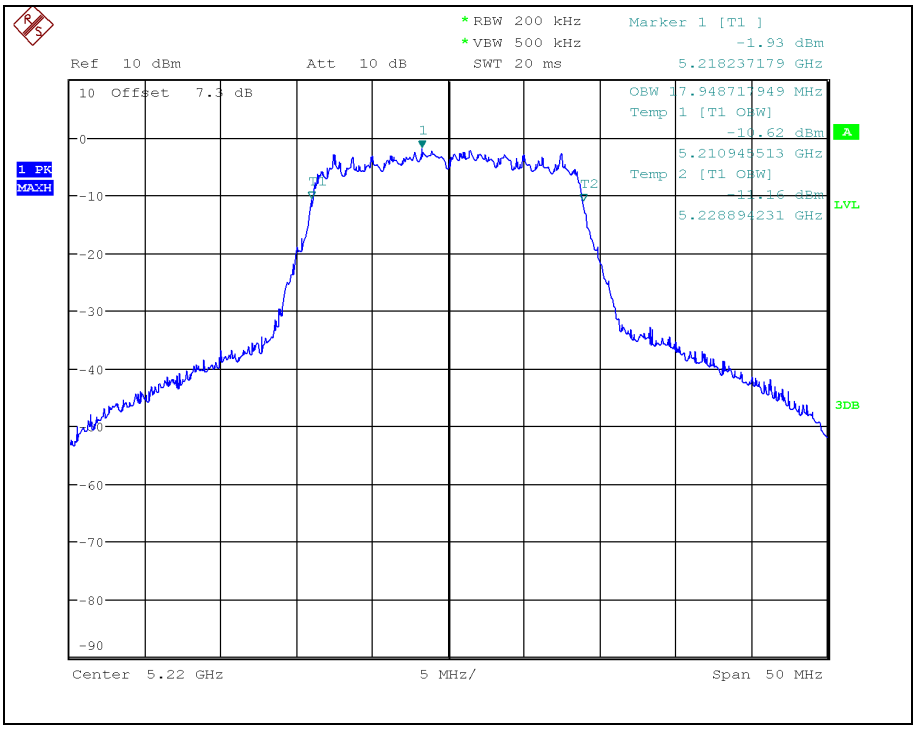
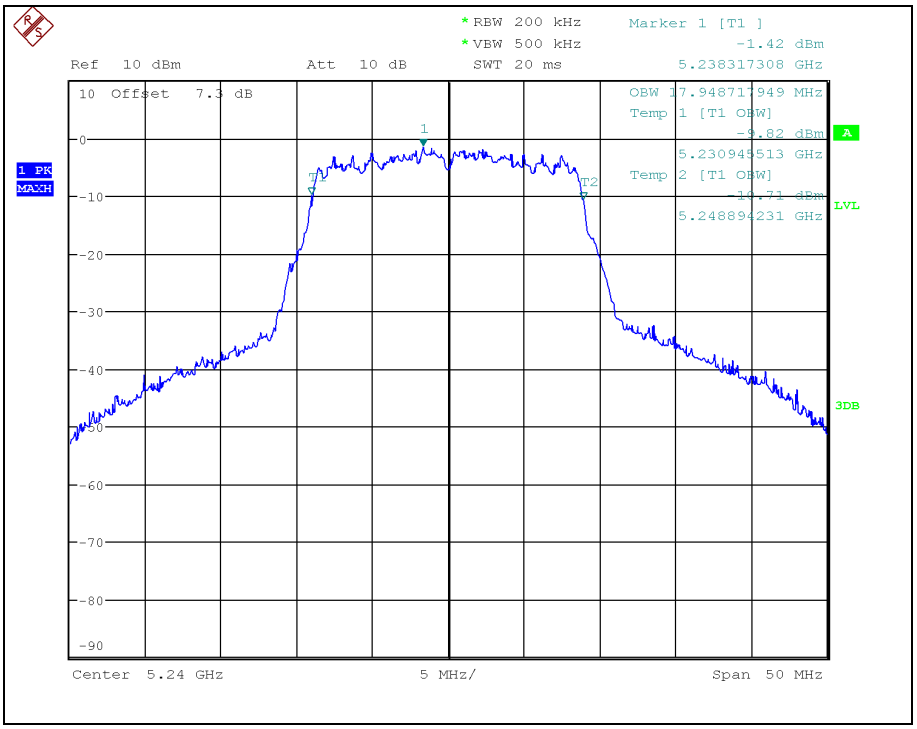
802.11n_HT20 _ ch.36 **Occupied Bandwidth**



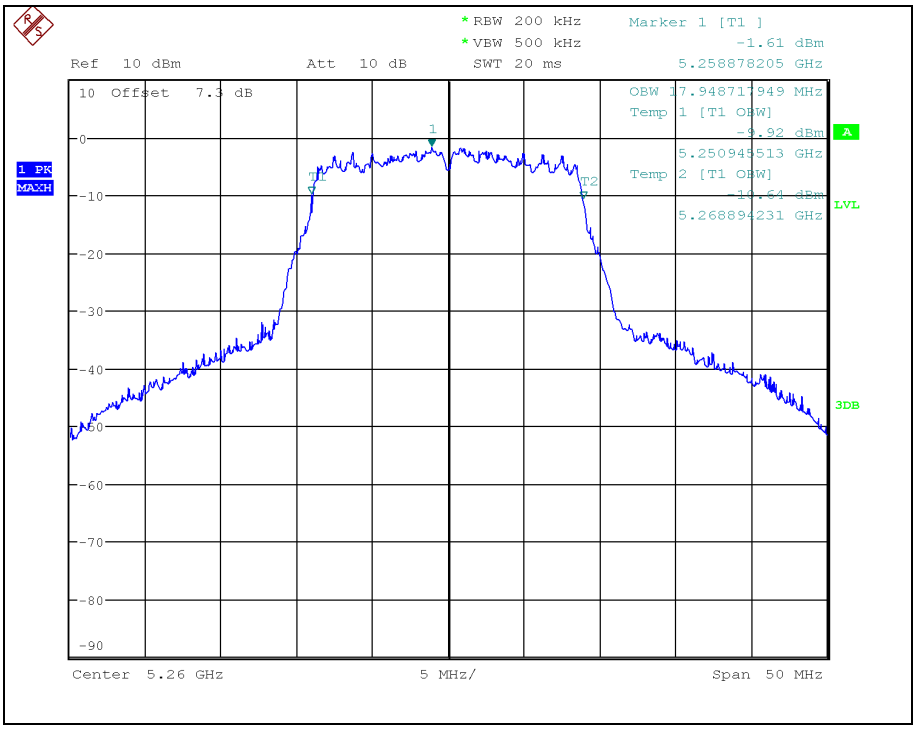
802.11n_HT20 _ ch.44 **Occupied Bandwidth**



802.11n_HT20 _ ch.48 **Occupied Bandwidth**



802.11n_HT20 _ ch.52 **Occupied Bandwidth**



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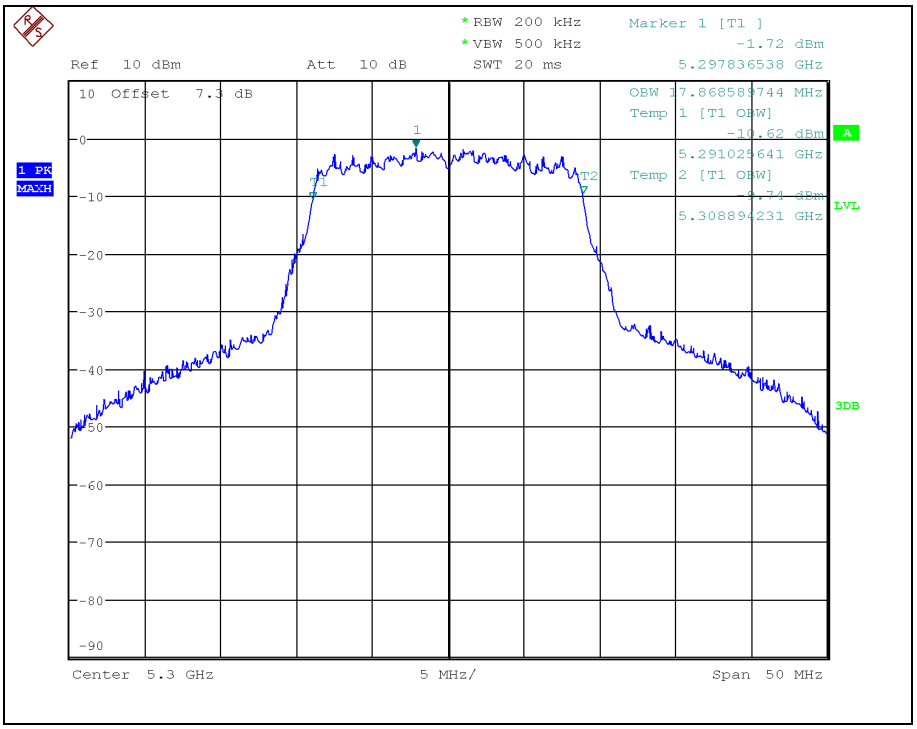
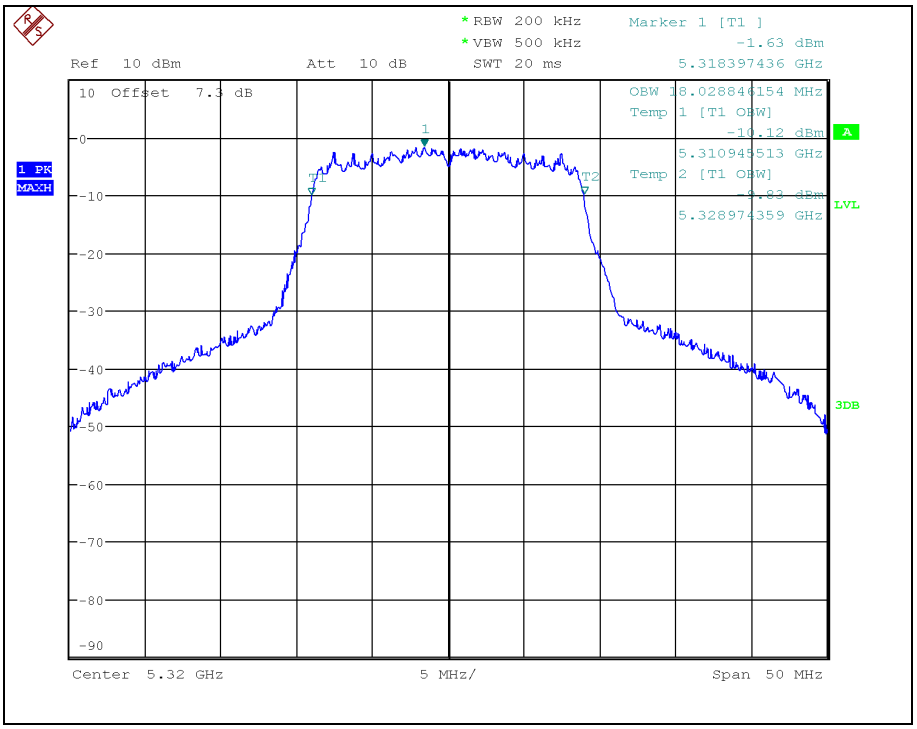
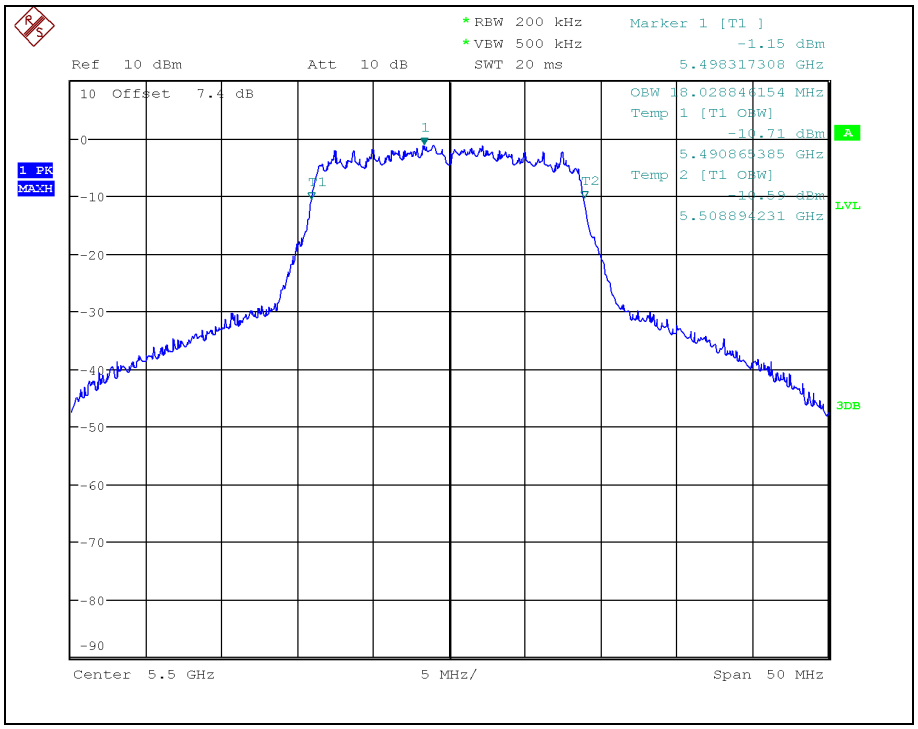
802.11n_HT20 _ ch.60 **Occupied Bandwidth**



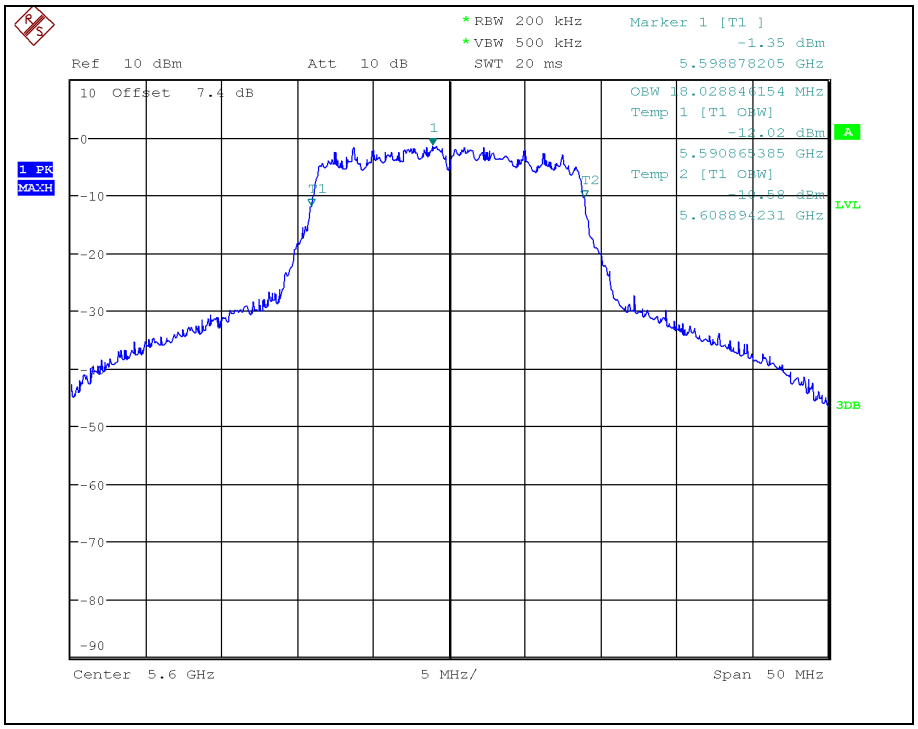
802.11n_HT20 _ ch.64 **Occupied Bandwidth**



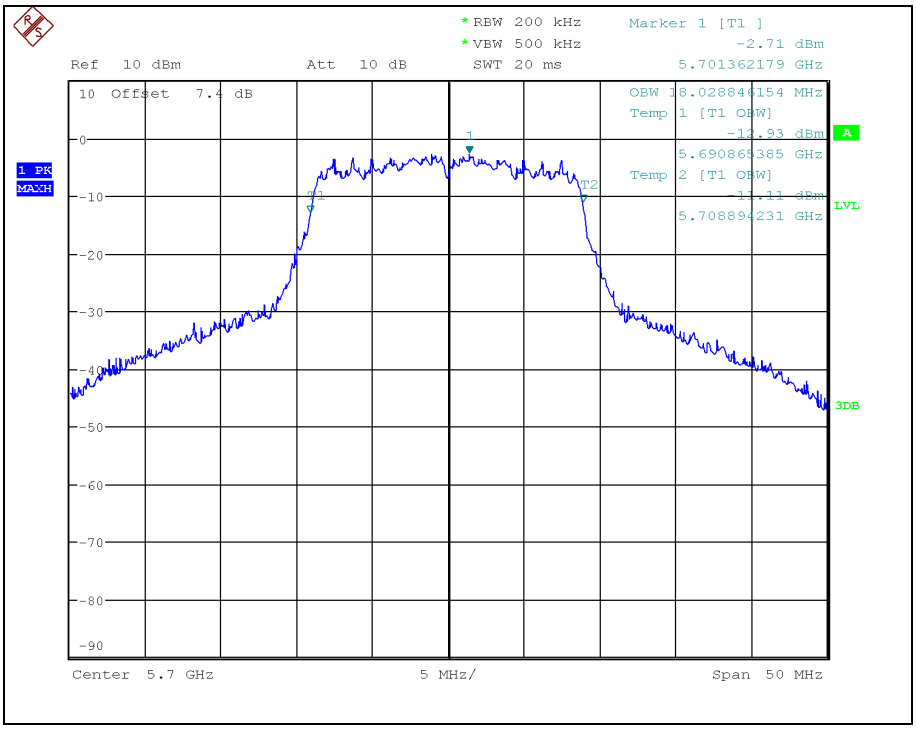
802.11n_HT20 _ ch.100 **Occupied Bandwidth**



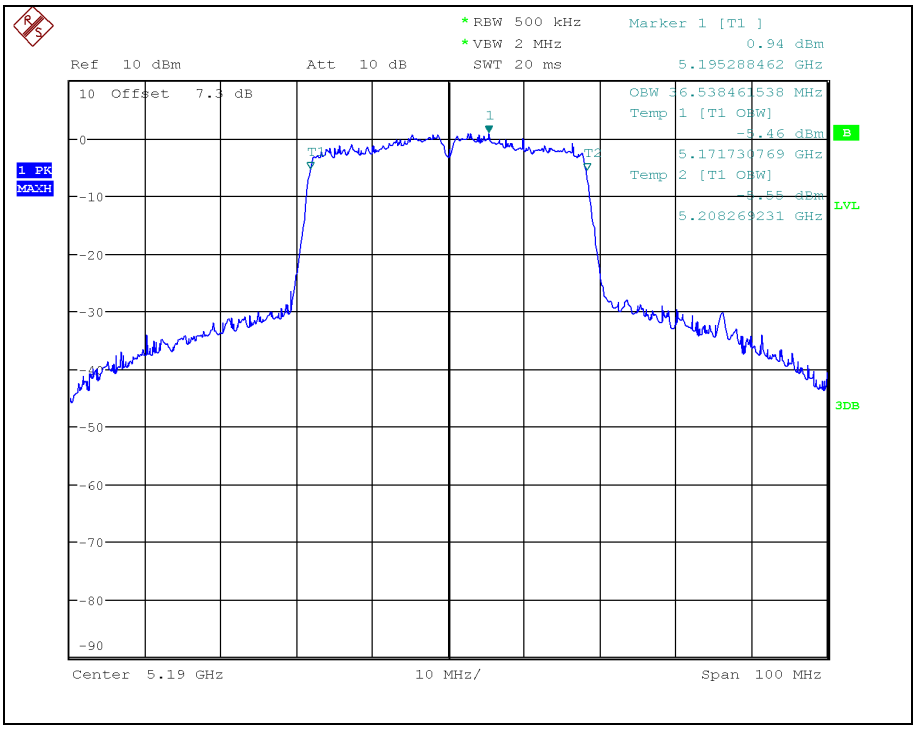
802.11n_HT20 _ ch.120 **Occupied Bandwidth**



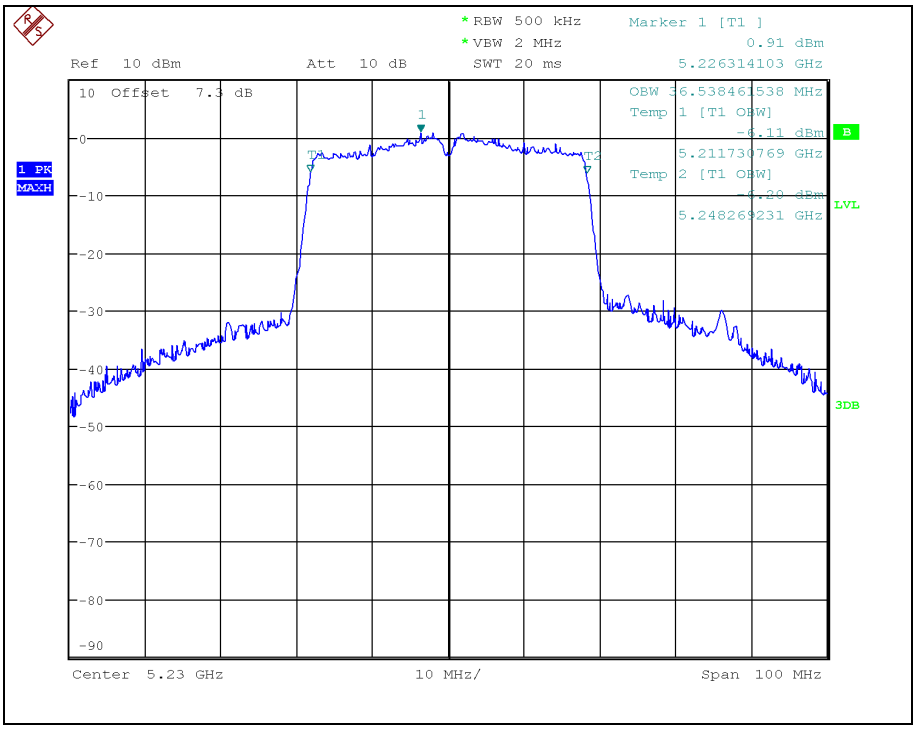
802.11n_HT20 _ ch.140 **Occupied Bandwidth**



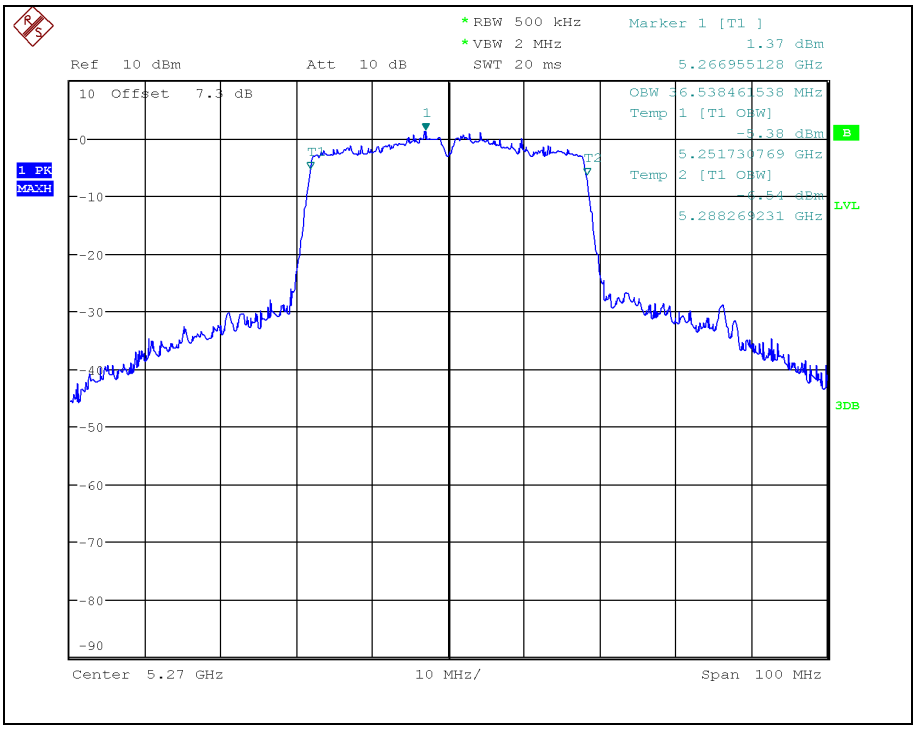
802.11n_HT40 _ ch.38 **Occupied Bandwidth**



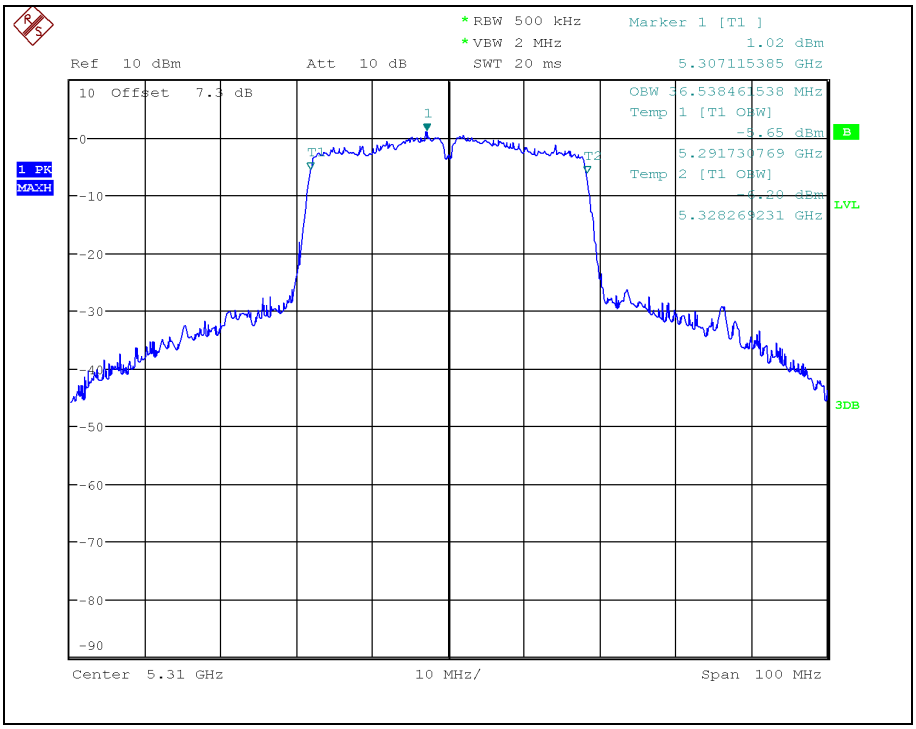
802.11n_HT40 _ ch.46 **Occupied Bandwidth**



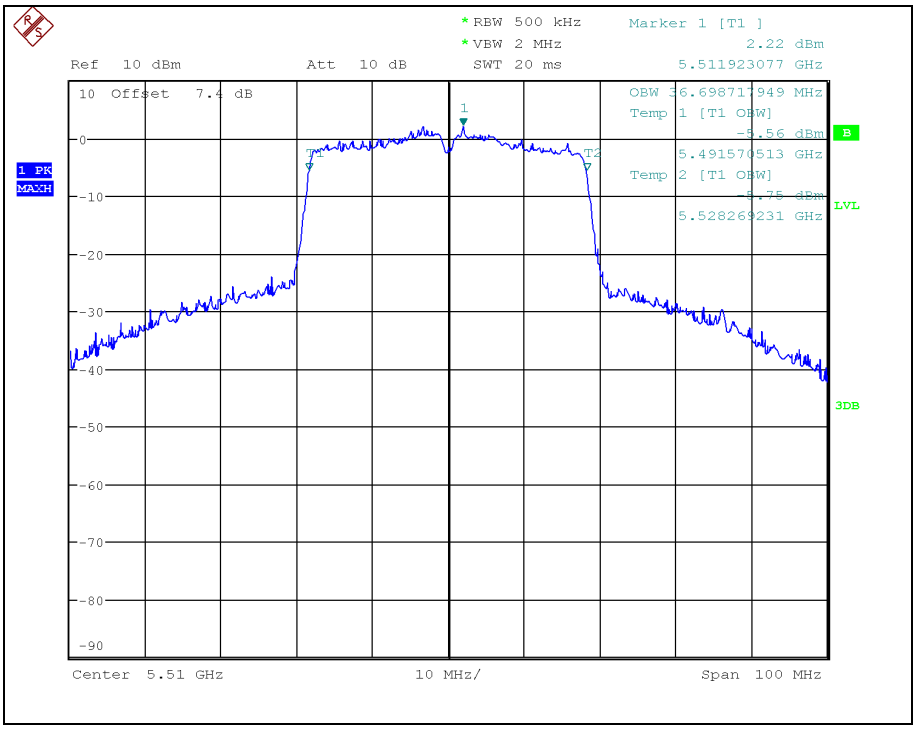
802.11n_HT40 _ ch.54 **Occupied Bandwidth**



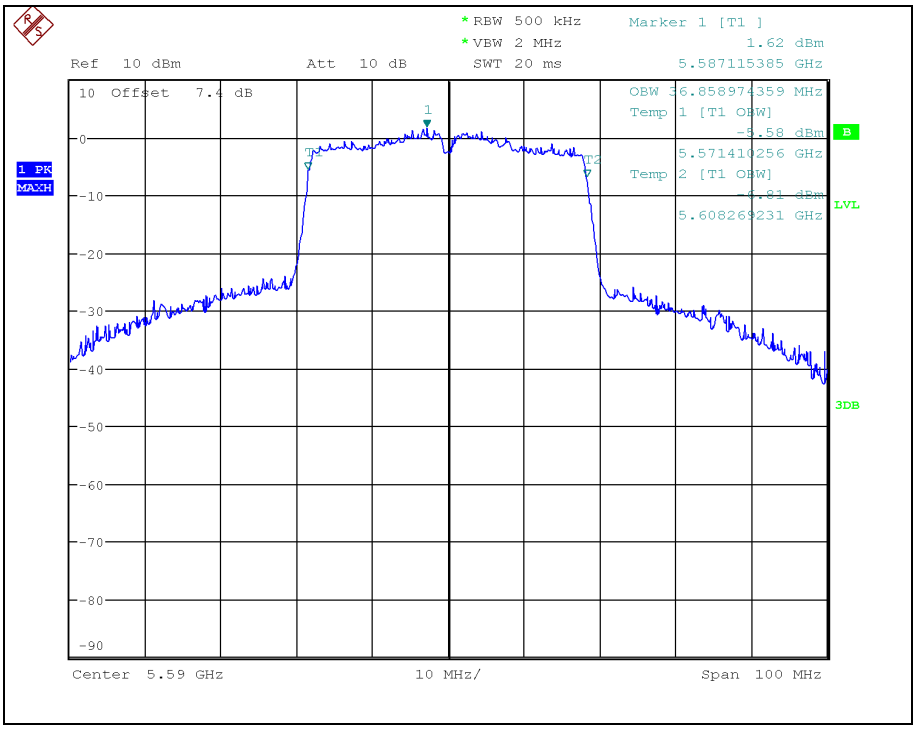
802.11n_HT40 _ ch.62 **Occupied Bandwidth**



802.11n_HT40 _ ch.102 **Occupied Bandwidth**



802.11n_HT40 _ ch.118 **Occupied Bandwidth**



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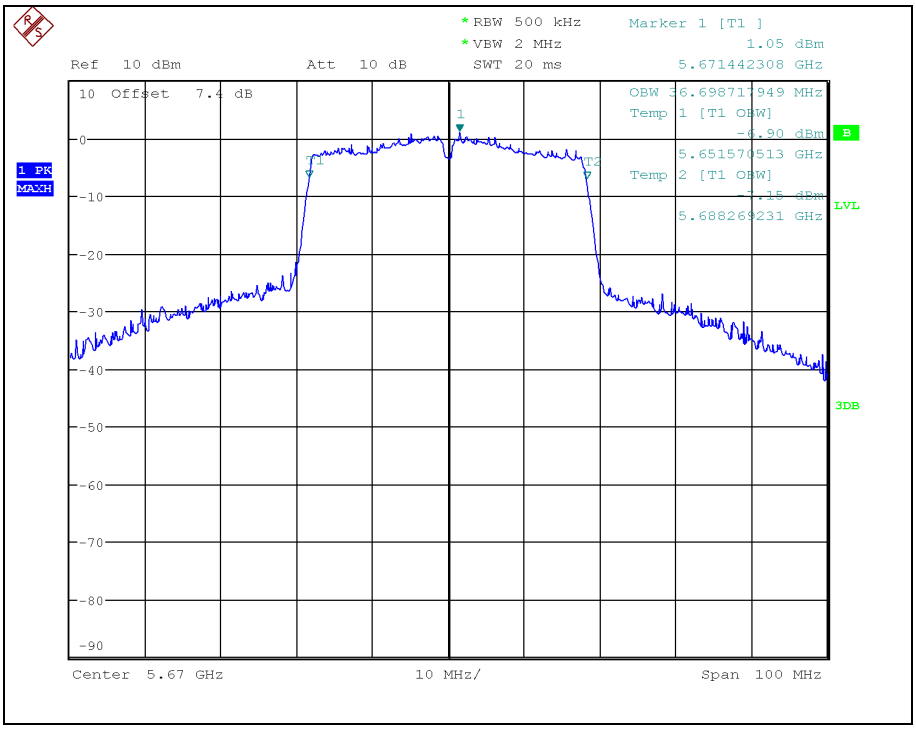
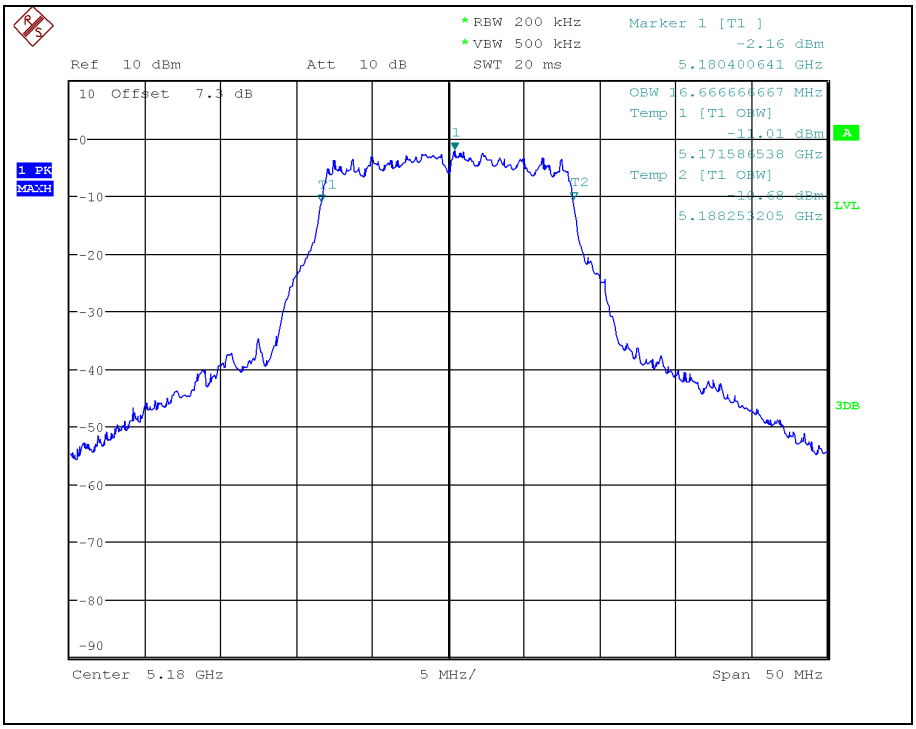
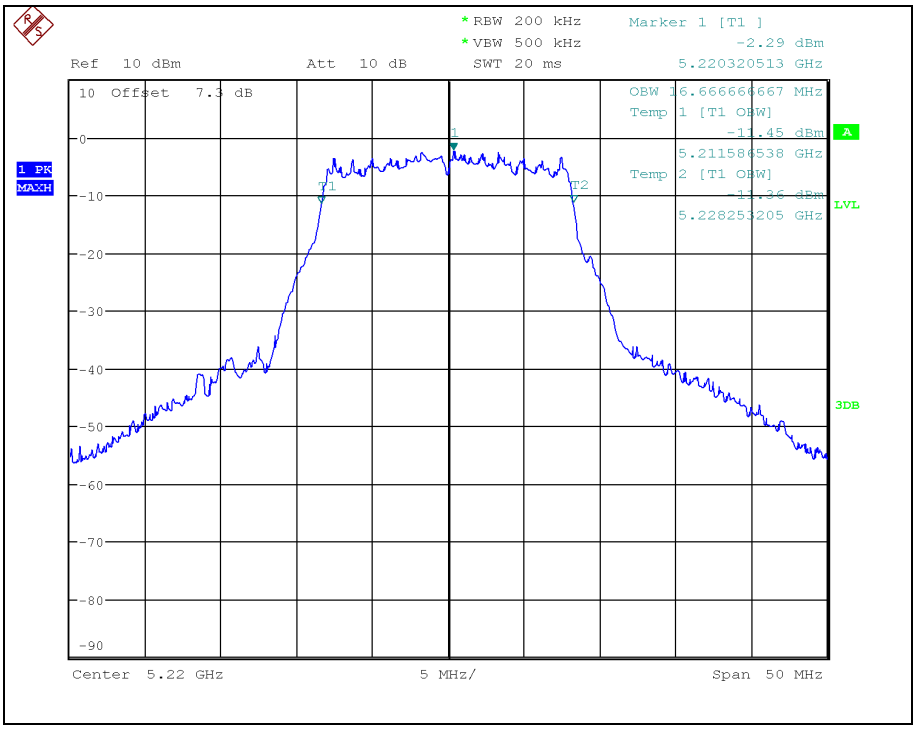
802.11n_HT40 _ ch.134 **Occupied Bandwidth**



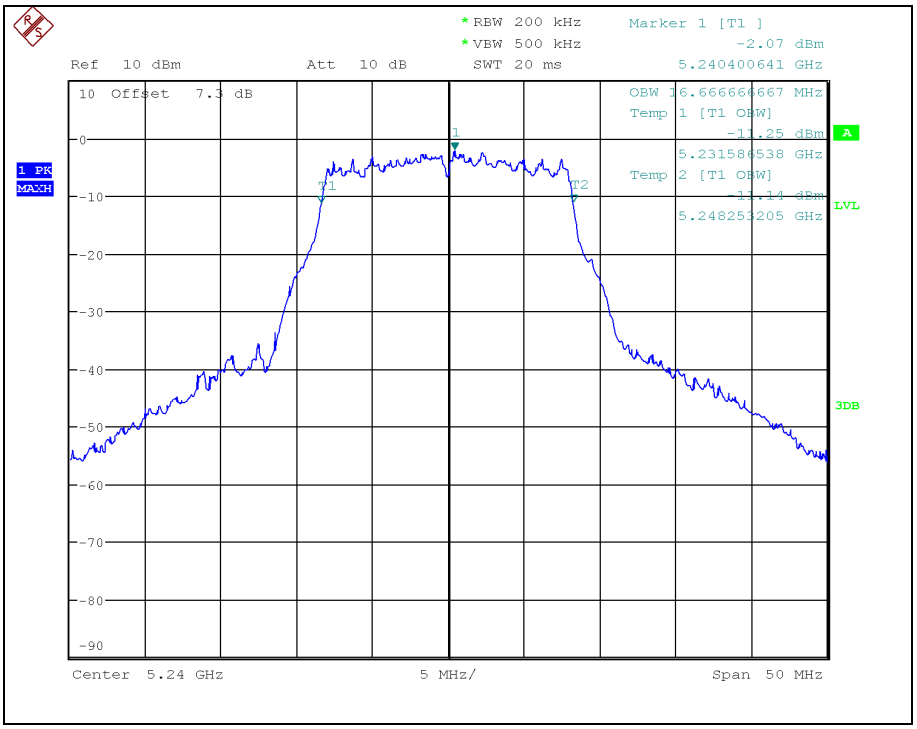
802.11ac_VHT20 _ ch.36 **Occupied Bandwidth**



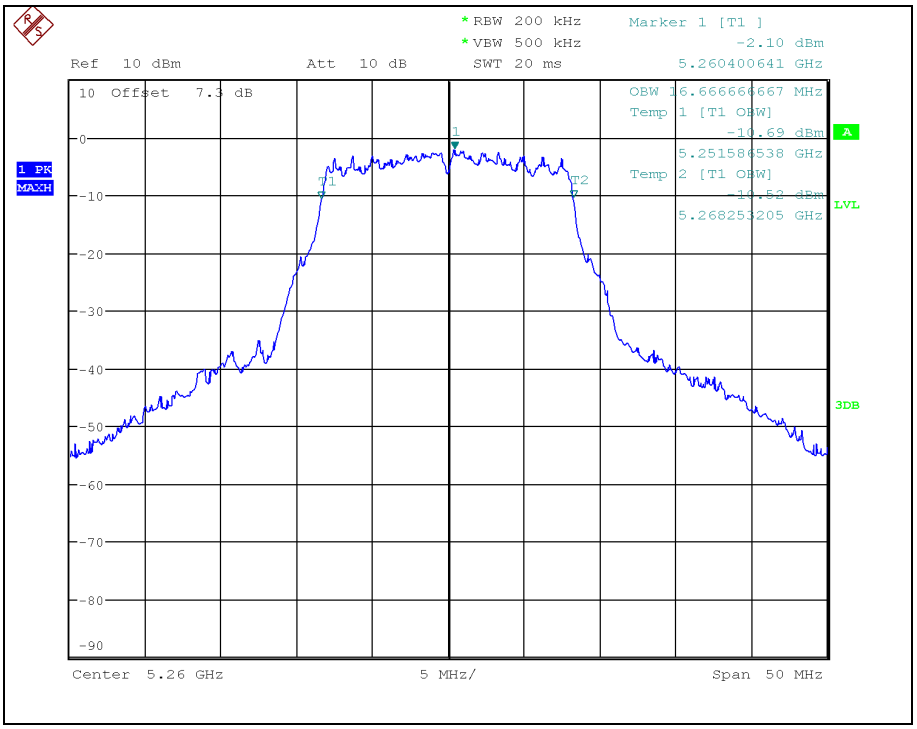
802.11ac_VHT20 _ ch.44 **Occupied Bandwidth**



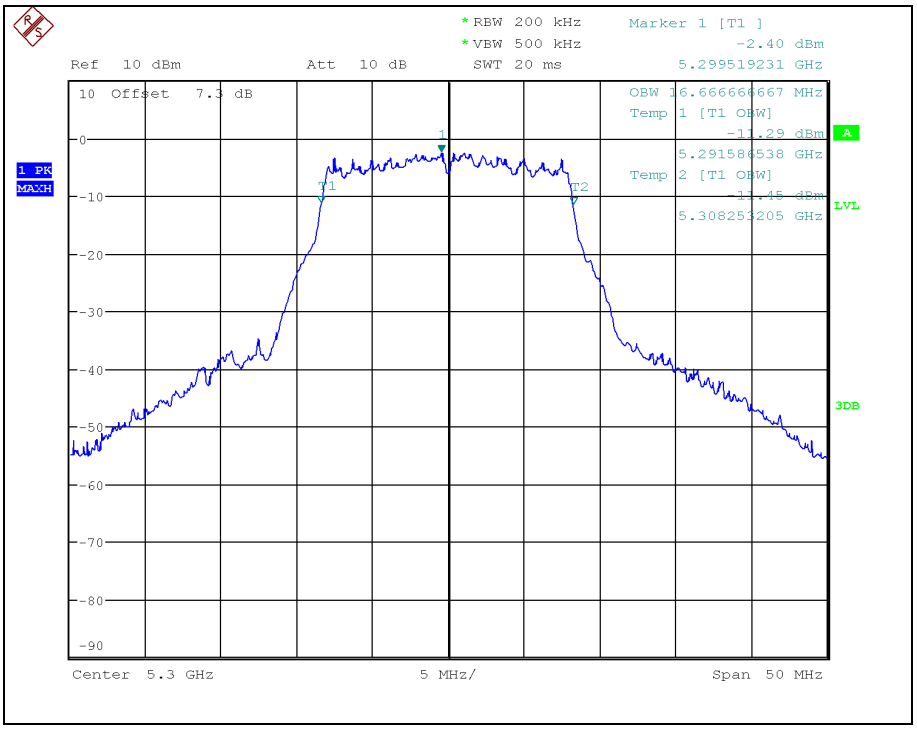
802.11ac_VHT20 _ ch.48 **Occupied Bandwidth**



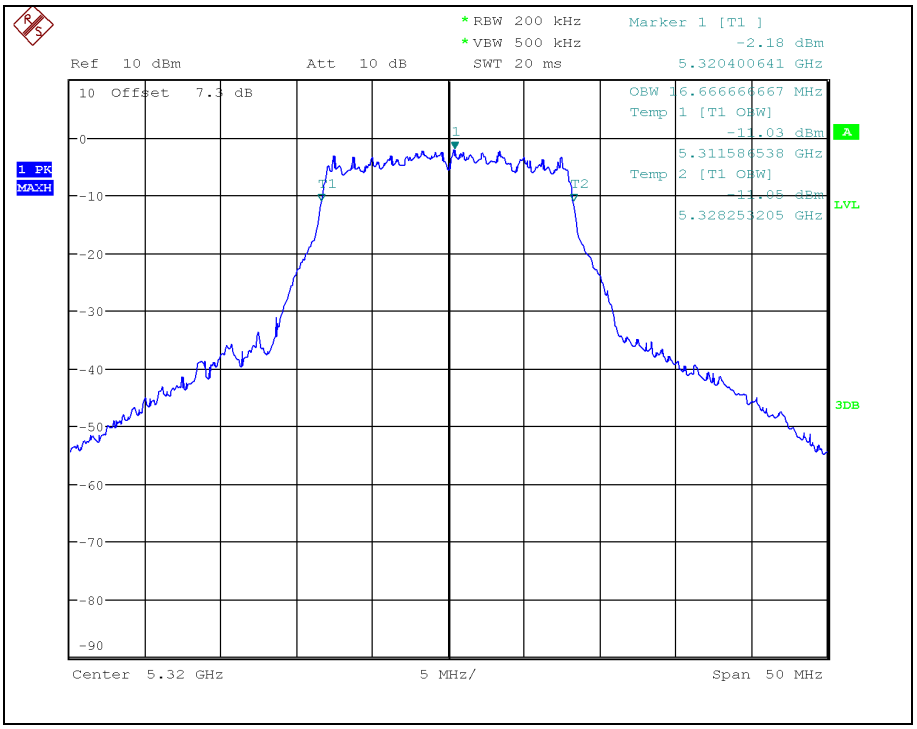
802.11ac_VHT20 _ ch.52 **Occupied Bandwidth**



802.11ac_VHT20 _ ch.60 **Occupied Bandwidth**



802.11ac_VHT20 _ ch.64 **Occupied Bandwidth**



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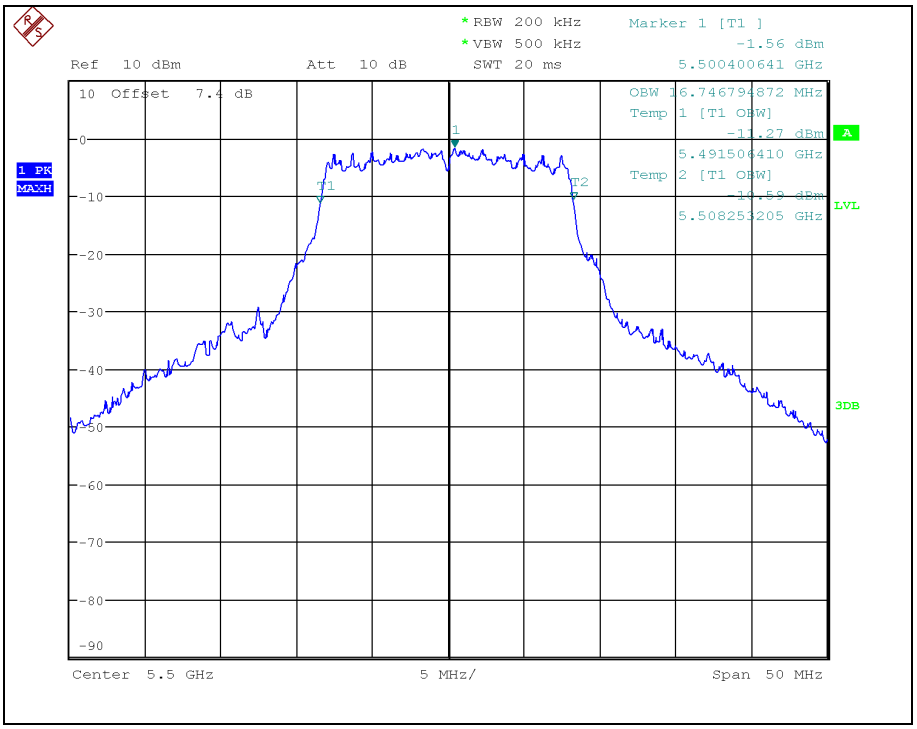
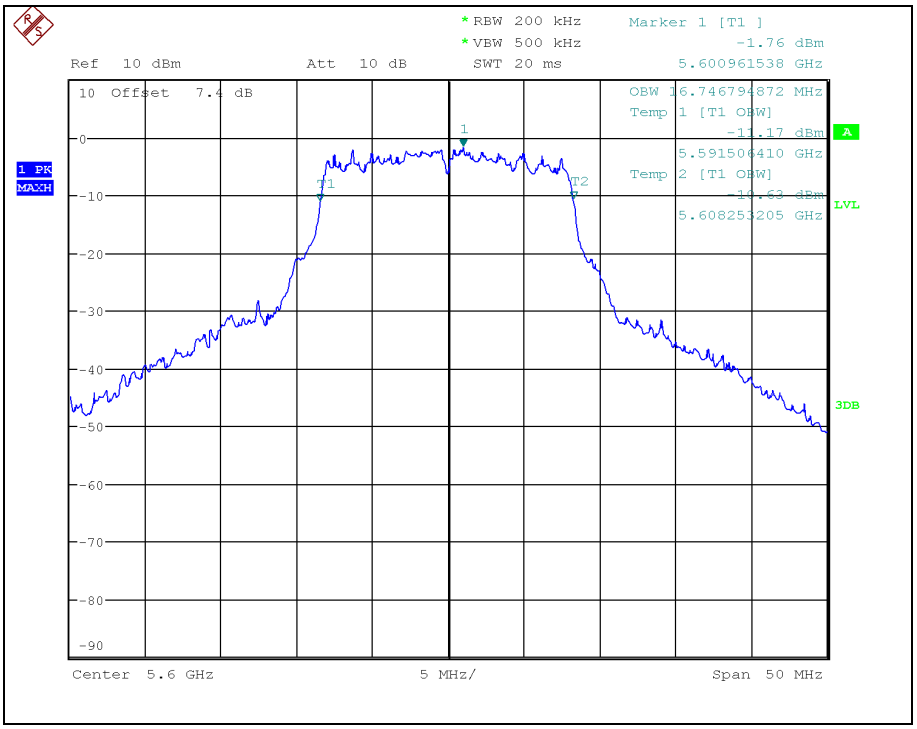
802.11ac_VHT20 _ ch.100 **Occupied Bandwidth**



802.11ac_VHT20 _ ch.120 **Occupied Bandwidth**



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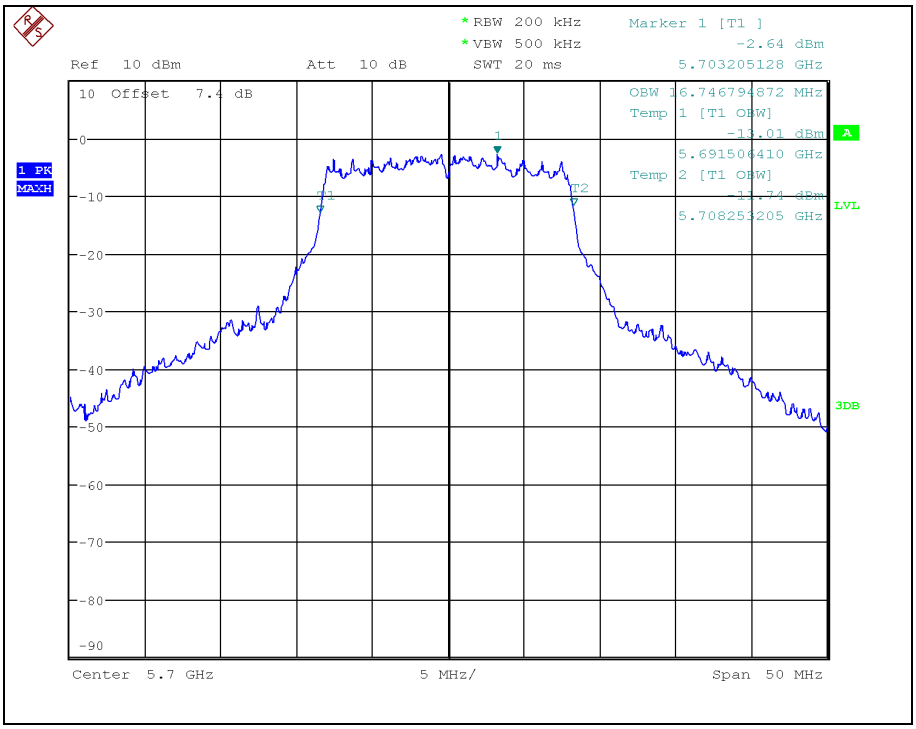
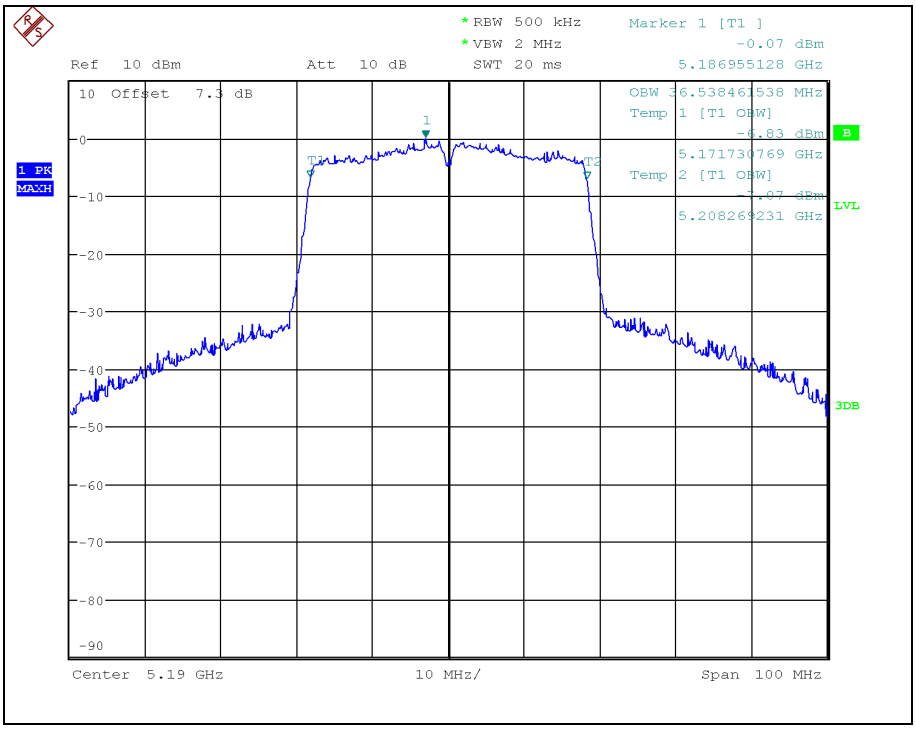
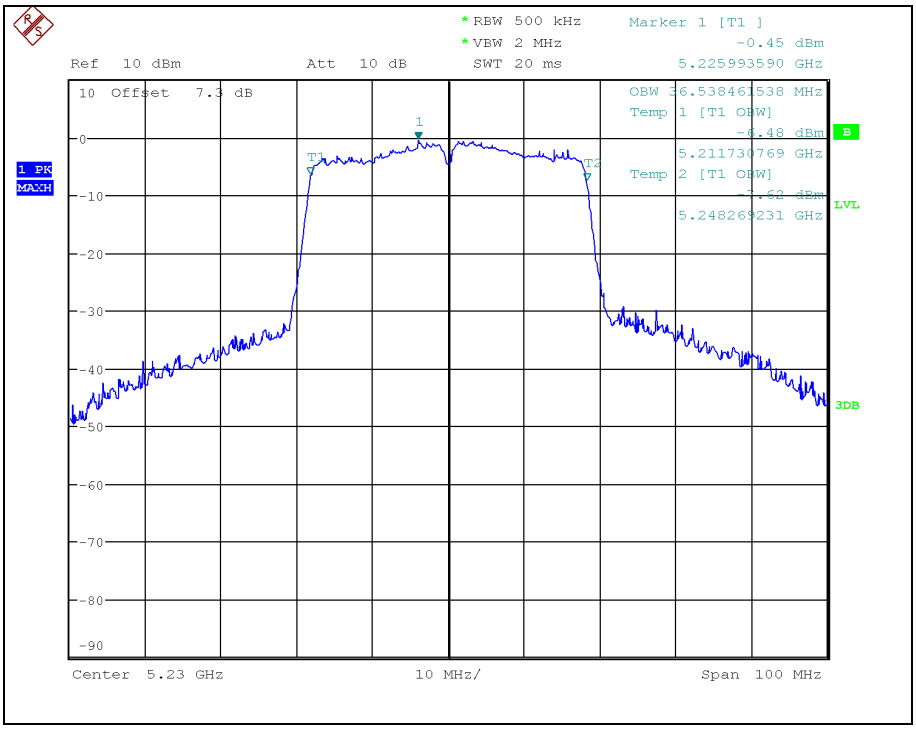
802.11ac_VHT20 _ ch.140 **Occupied Bandwidth**



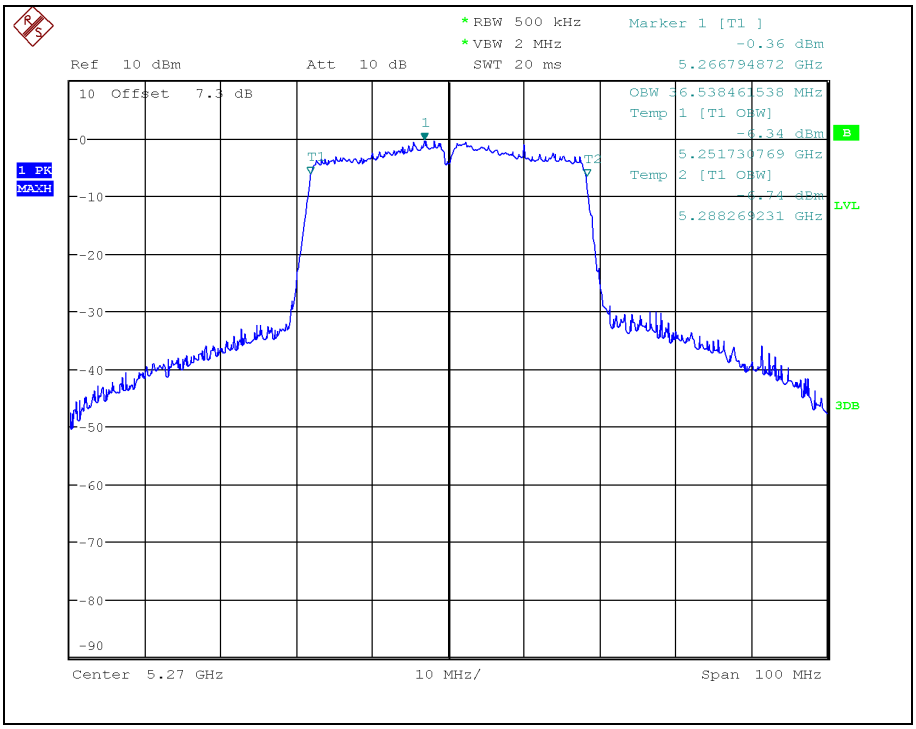
802.11ac_VHT40 _ ch.38 **Occupied Bandwidth**



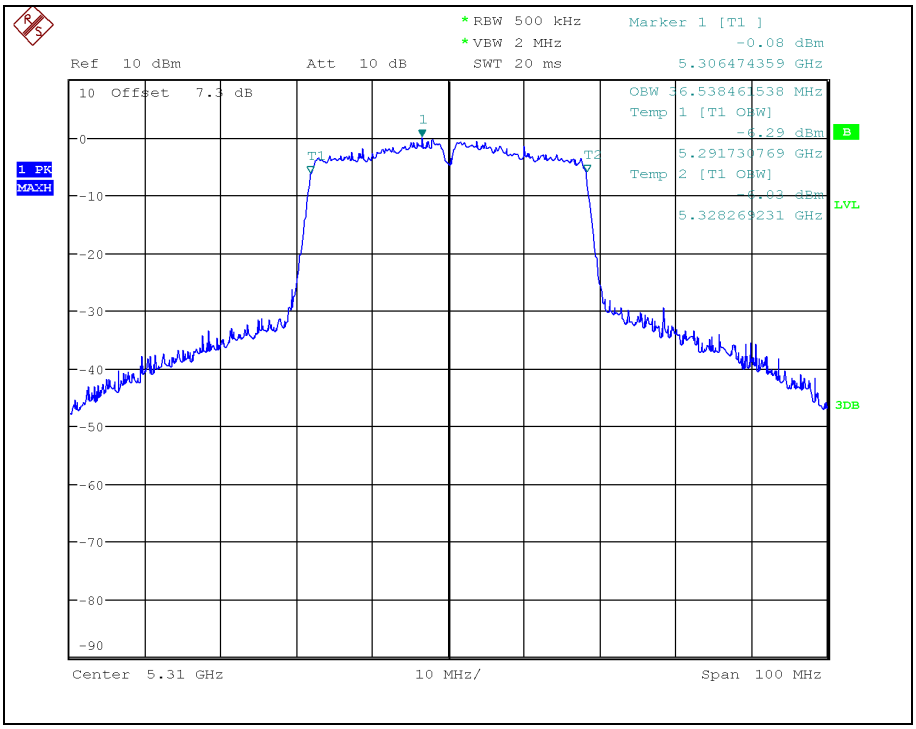
802.11ac_VHT40 _ ch.46 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.54 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.62 **Occupied Bandwidth**



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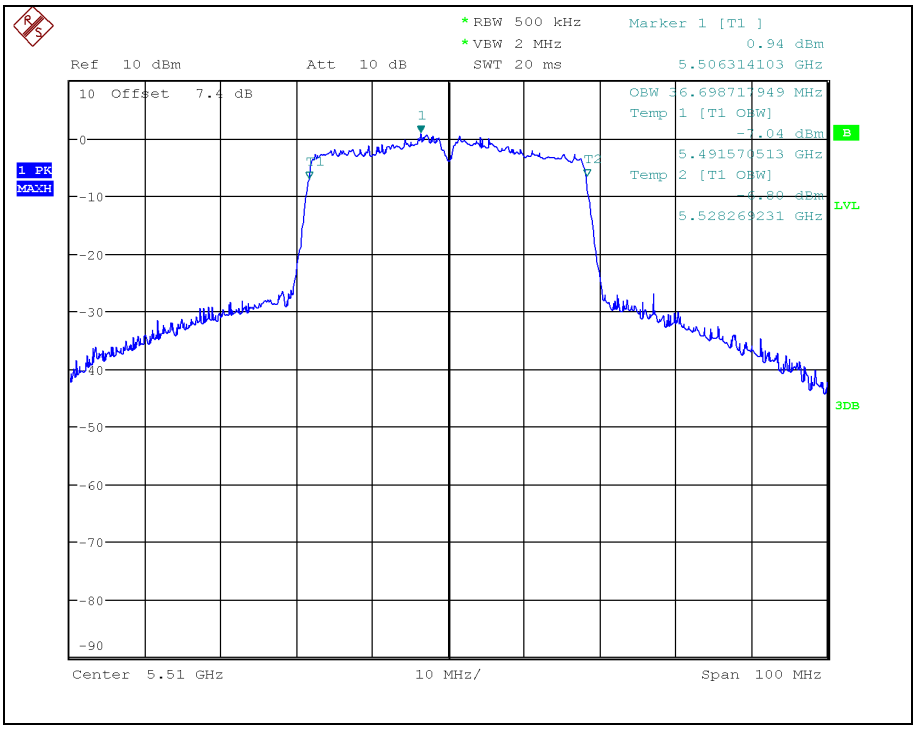
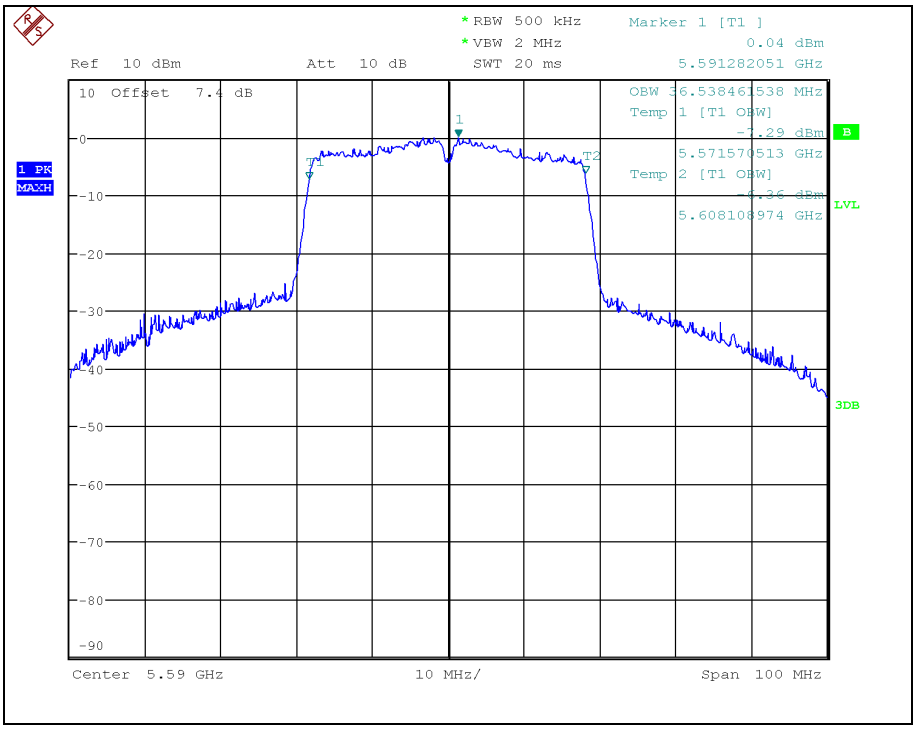
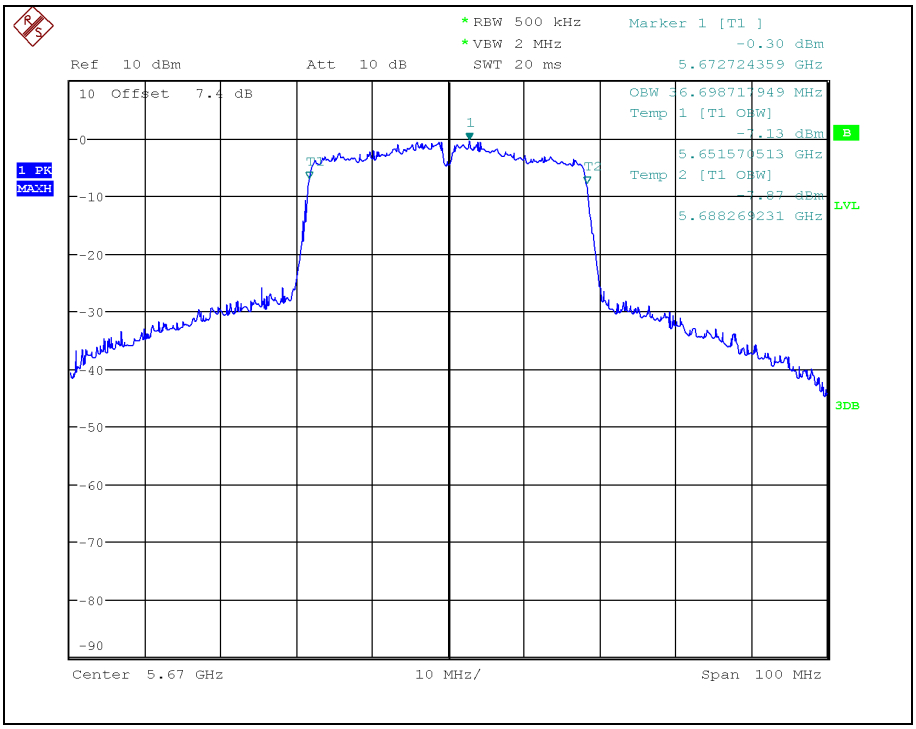
802.11ac_VHT40 _ ch.102 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.118 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.134 **Occupied Bandwidth**



3.3.3 6 ㏈ Bandwidth & Occupied Bandwidth

3.3.3.1 Test Setup

Refer to the APPENDIX I.

3.3.3.2 Limit

Within the 5.725-5.85 ㎓ band, the minimum permissible 6 ㏈ bandwidth is 500 ㎑.

3.3.3.3 Test Procedure

The bandwidth at 6 ㏈ down from the highest in-band spectral density is measured with a spectrum analyzer connected to the EUT's antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

1. Set resolution bandwidth (RBW) = 100 ㎑
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max Hold.
5. Sweep = Auto
6. Allow the trace to stabilize.
7. Option 1 - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission.

   Option 2 - The automatic bandwidth measurement capability of an instrument may be employed using the X ㏈ bandwidth mode with X set to 6 ㏈, if the functionality described above (i.e., RBW = 100 ㎑, VBW ≥ 3 x RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 ㏈.

3.3.3.4 Test Result

Test Mode	Band	Test Channel	6 dB Bandwidth (㎒)	Occupied Bandwidth (㎒)
802.11a	U-NII 3	149	16.46	16.75
		157	16.35	16.75
		165	16.41	16.67
802.11n _HT20	U-NII 3	149	17.55	18.11
		157	17.57	18.11
		165	17.57	18.03
802.11n _HT40	U-NII 3	151	36.04	36.70
		159	36.20	36.70
802.11ac _VHT20	U-NII 3	149	17.55	16.83
		157	17.57	16.75
		165	17.57	16.67
802.11ac _VHT40	U-NII 3	151	35.82	36.70
		159	36.35	36.70

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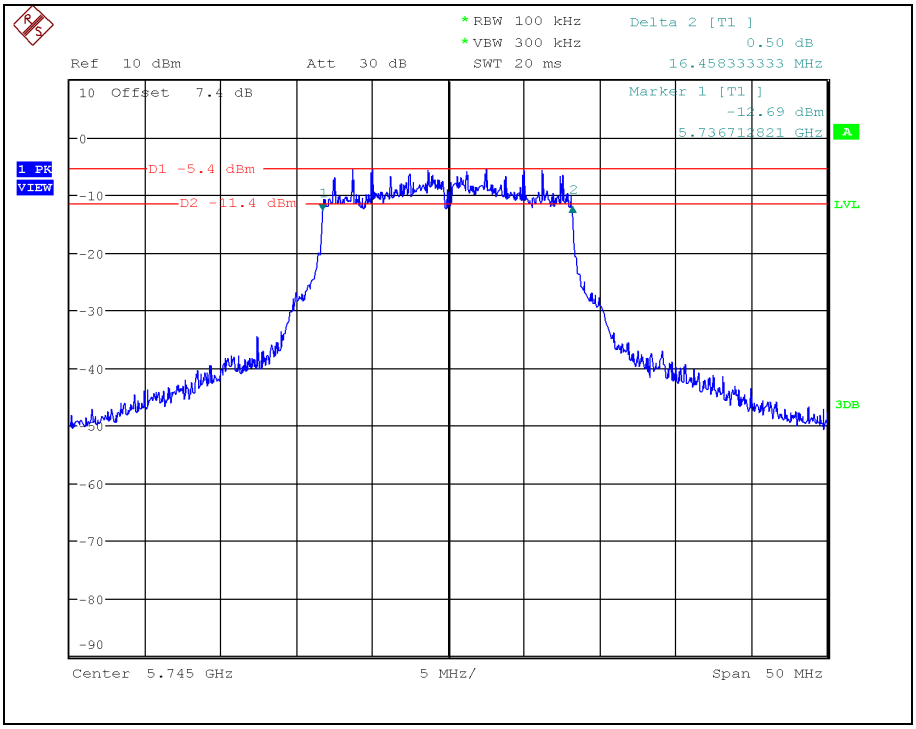
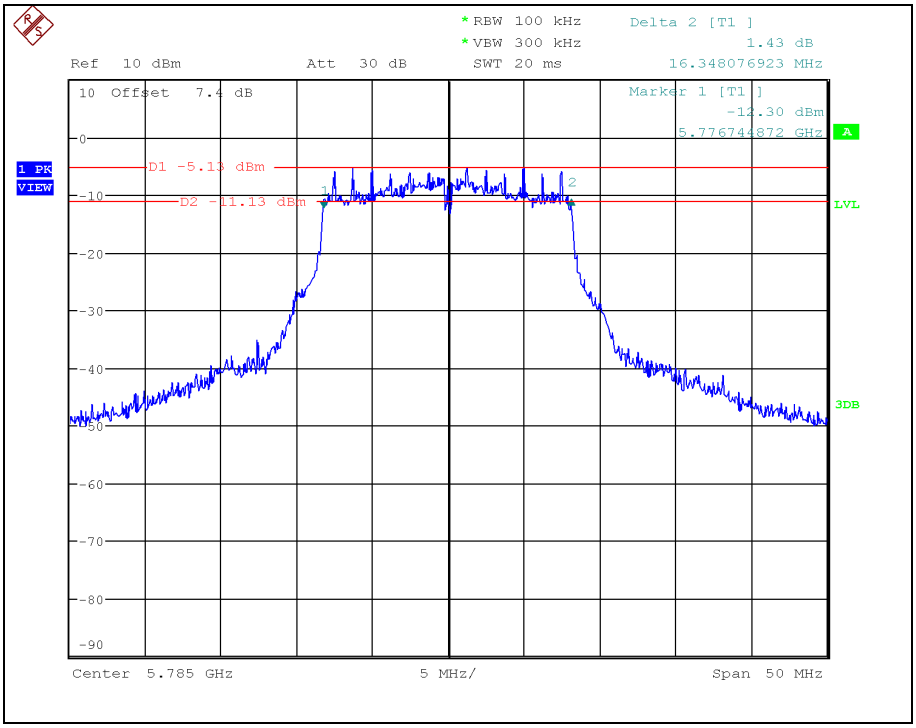
3.3.3.5 Test Plot

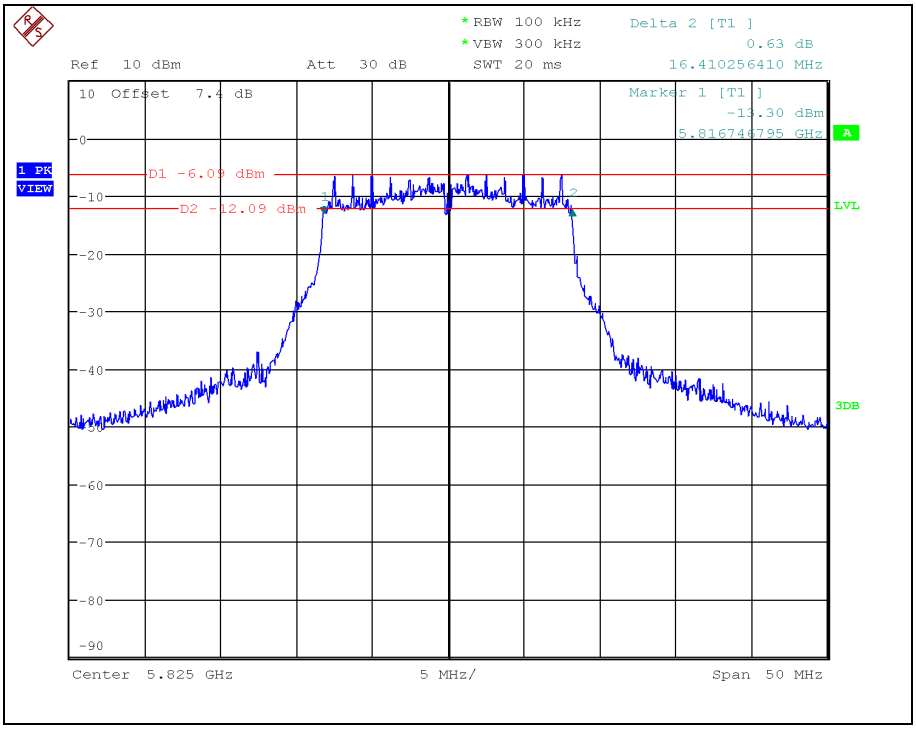
802.11a _ ch.149 **6 dB Bandwidth**



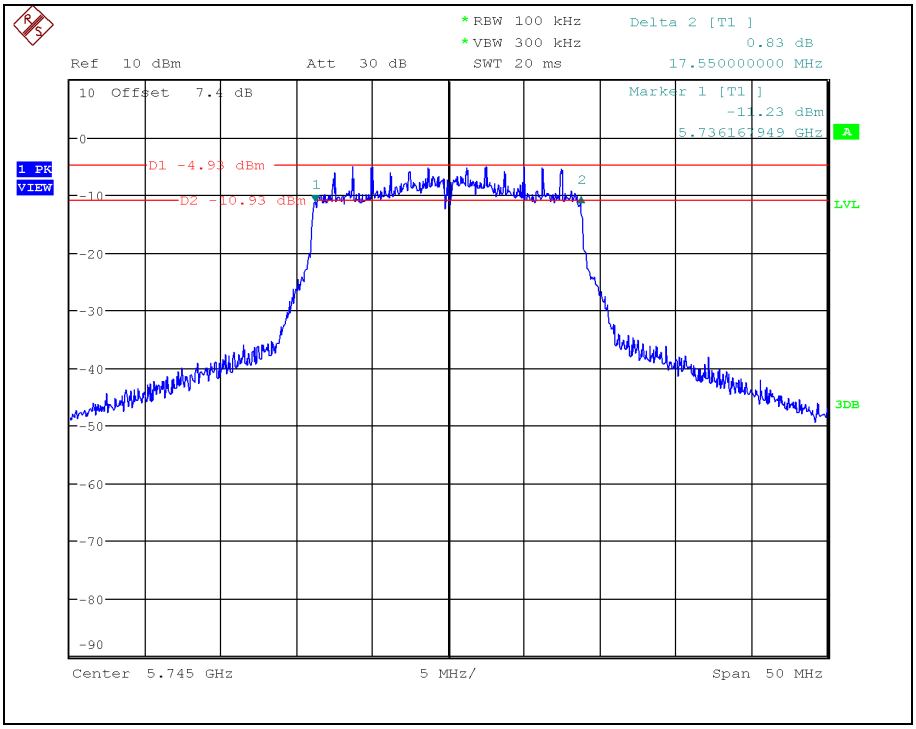
802.11a _ ch.157 **6 dB Bandwidth**



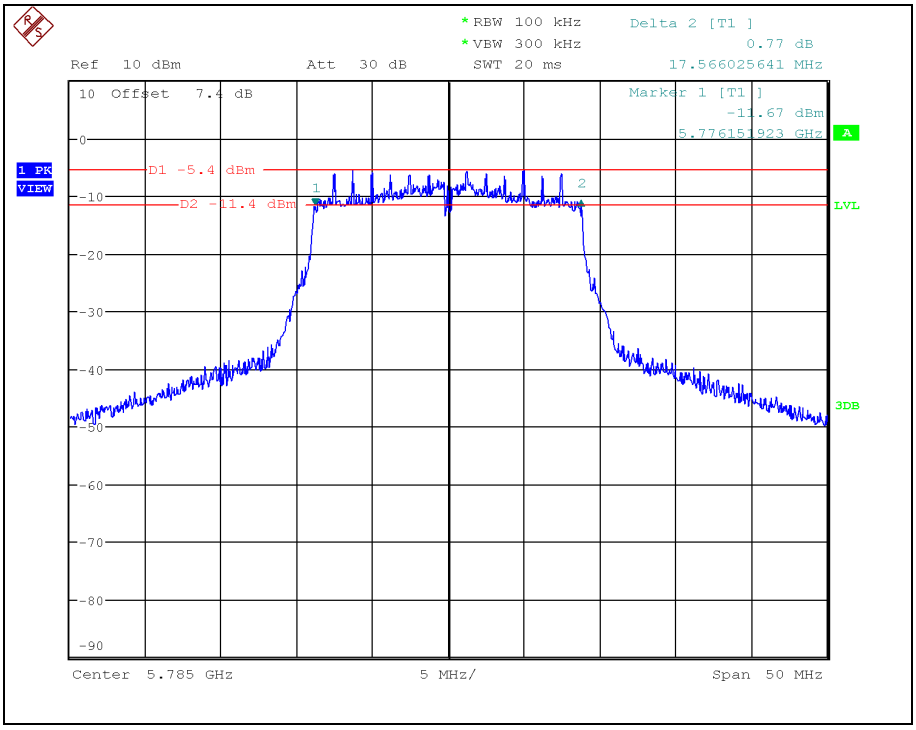
802.11a _ ch.165 **6 dB Bandwidth**



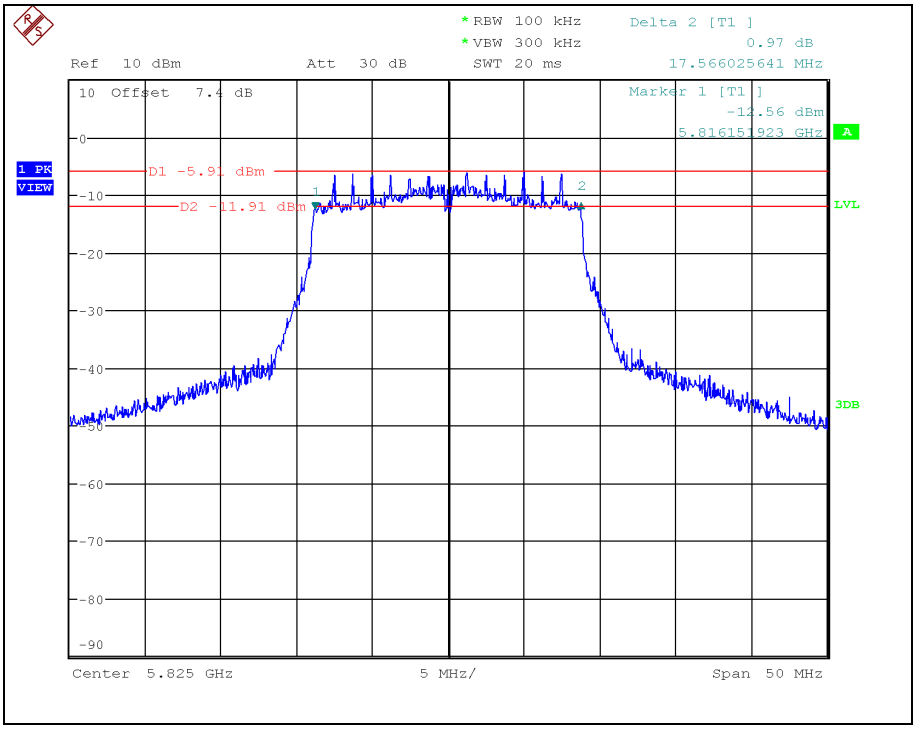
802.11n_HT20 _ ch.149 **6 dB Bandwidth**



802.11n_HT20 _ ch.157 **6 dB Bandwidth**



802.11n_HT20 _ ch.165 **6 dB Bandwidth**



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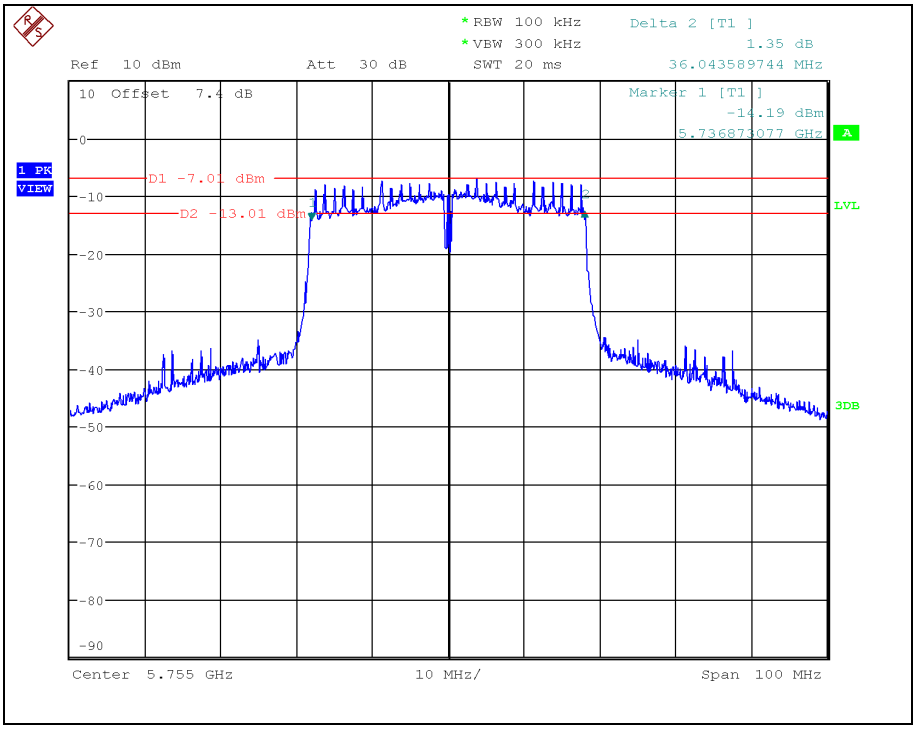
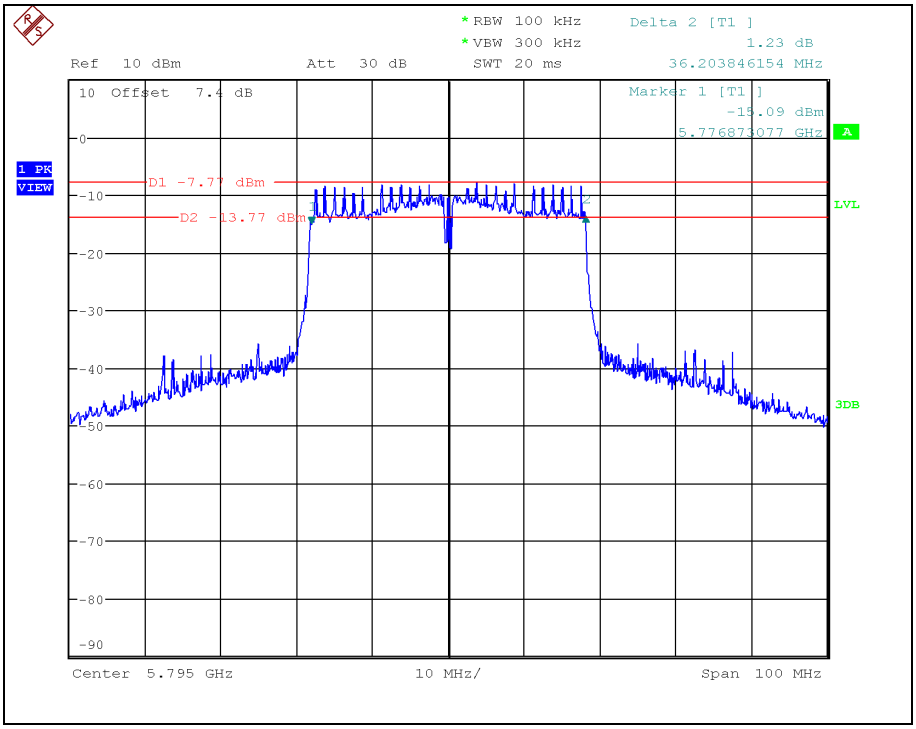
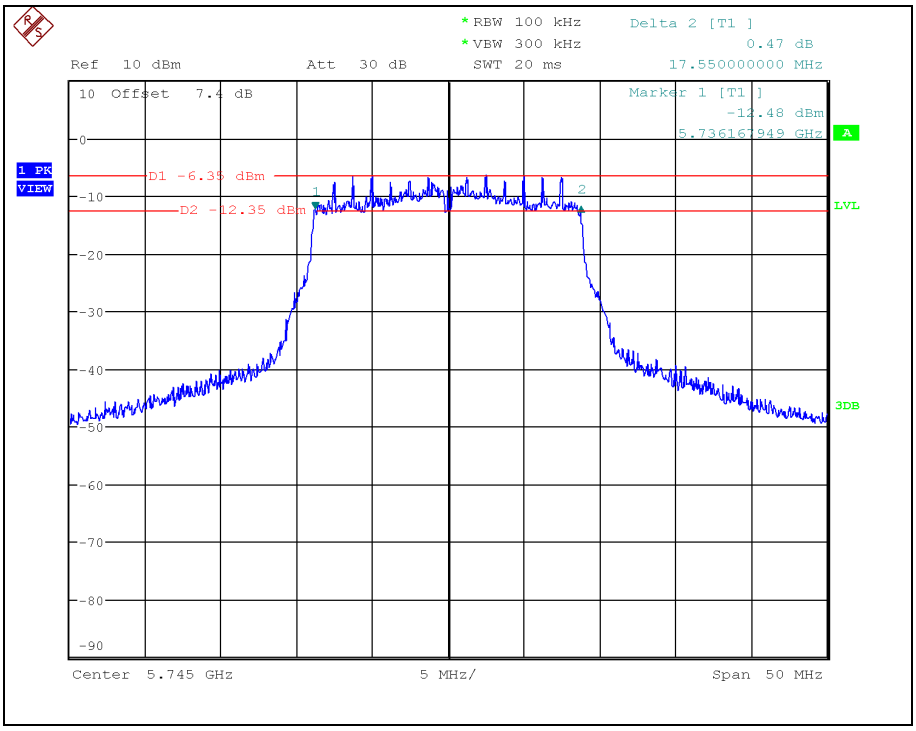
802.11n_HT40 _ ch.151 **6 dB Bandwidth**



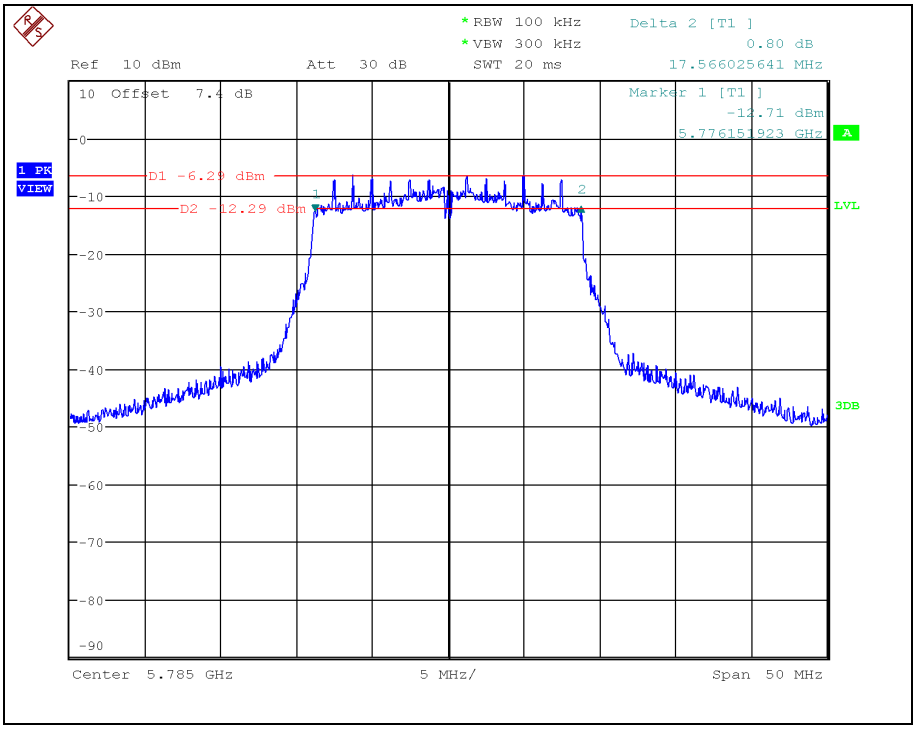
802.11n_HT40 _ ch.159 **6 dB Bandwidth**



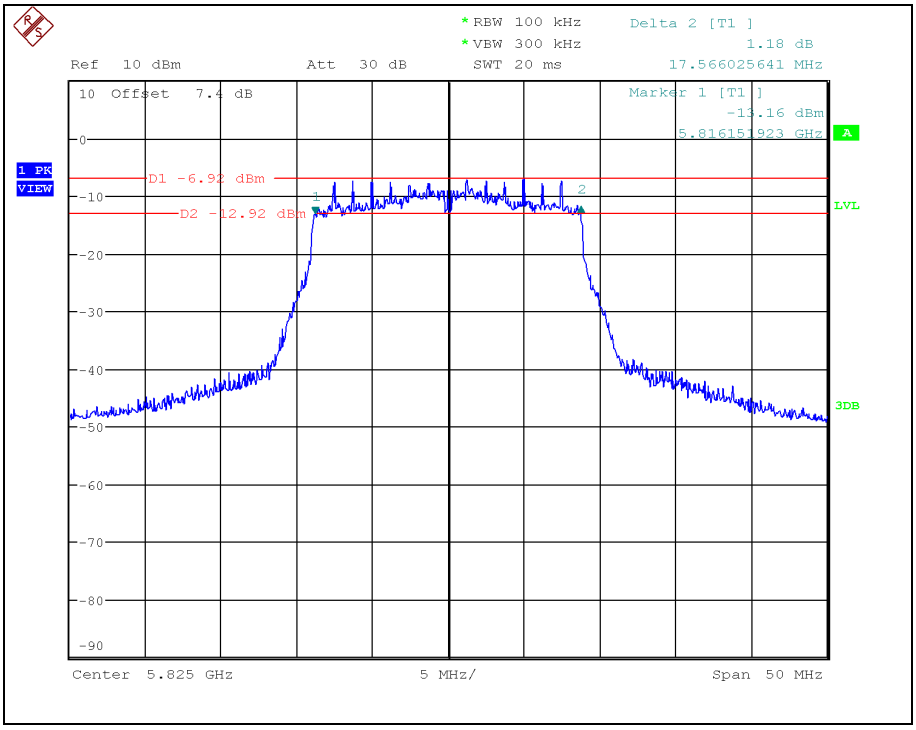
802.11ac_VHT20 _ ch.149 **6 dB Bandwidth**



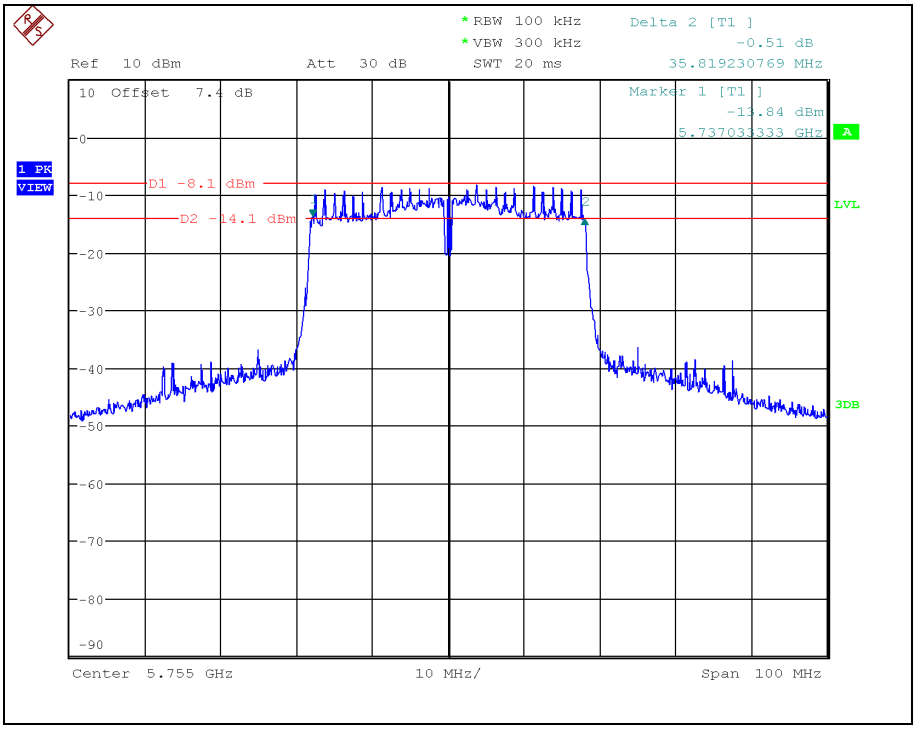
802.11ac_VHT20 _ ch.157 **6 dB Bandwidth**



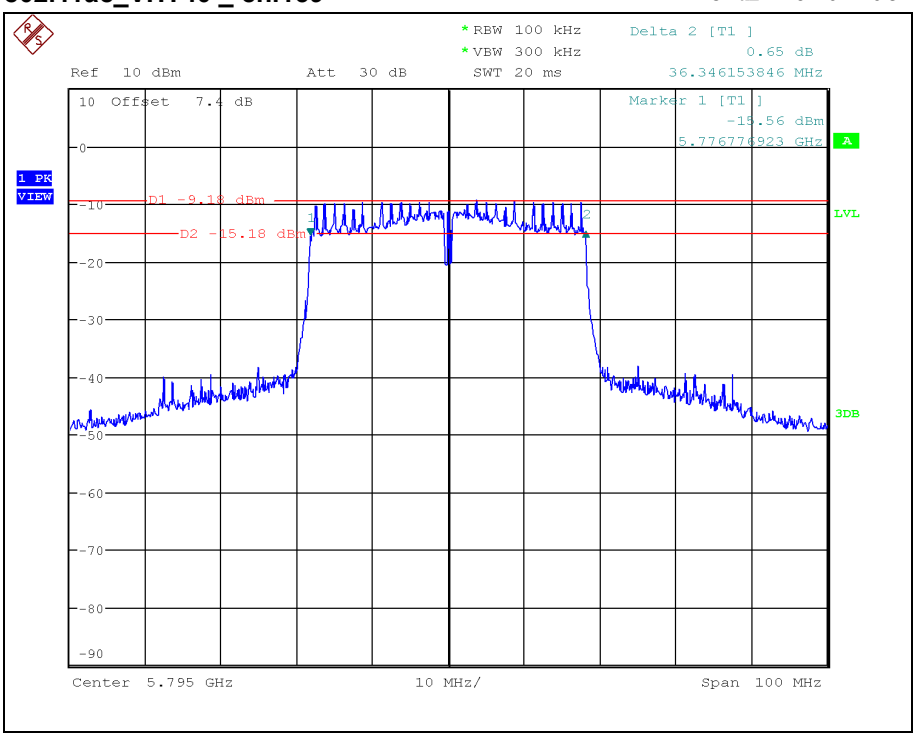
802.11ac_VHT20 _ ch.165 **6 dB Bandwidth**



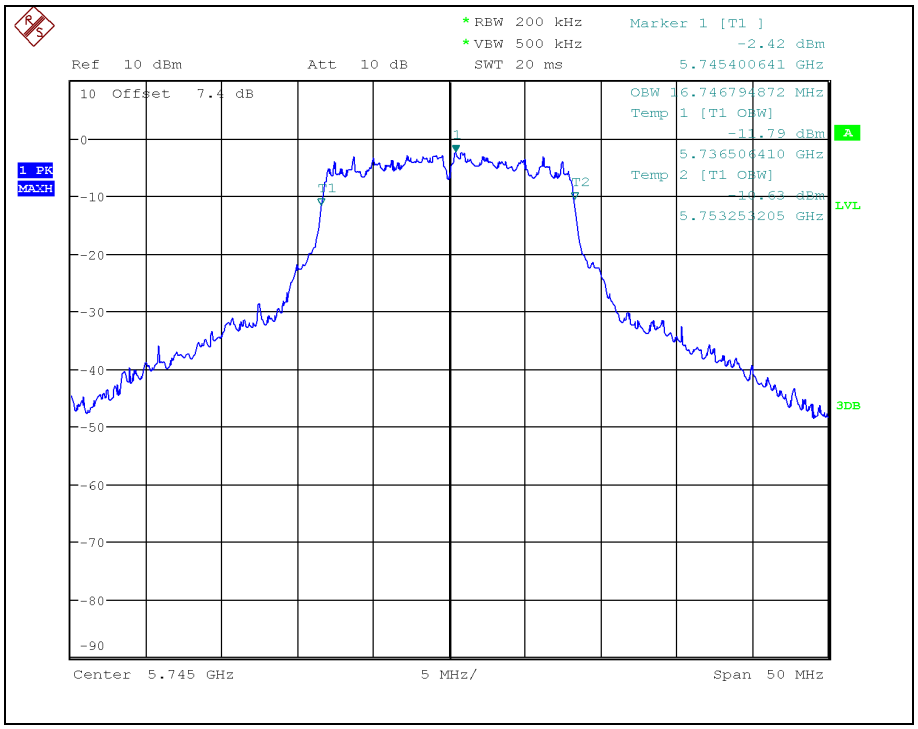
802.11ac_VHT40 _ ch.151 **6 dB Bandwidth**



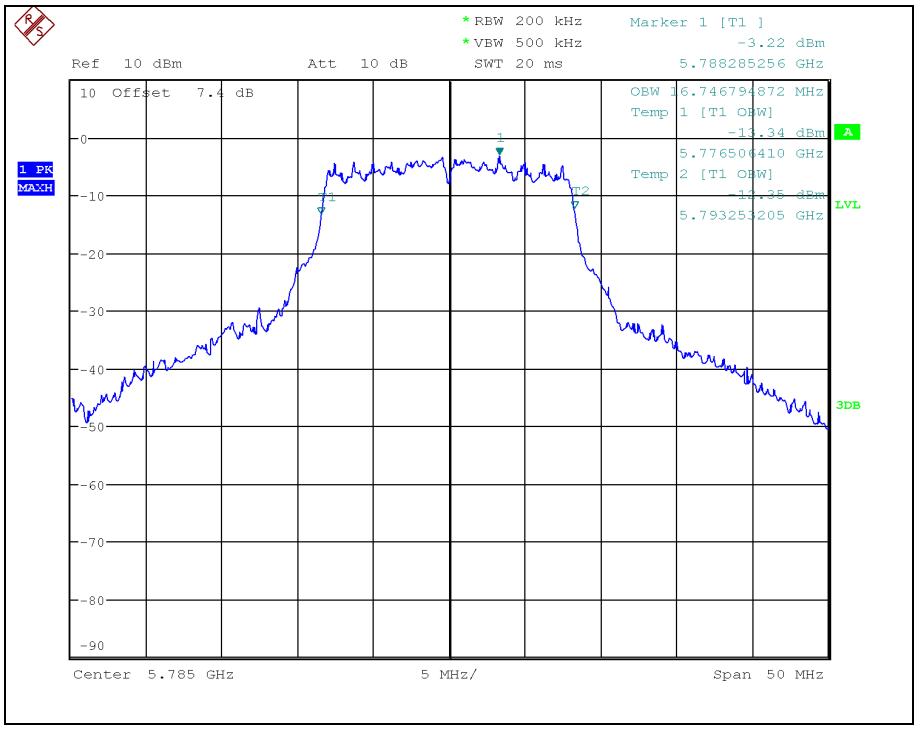
802.11ac_VHT40 _ ch.159 **6 dB Bandwidth**



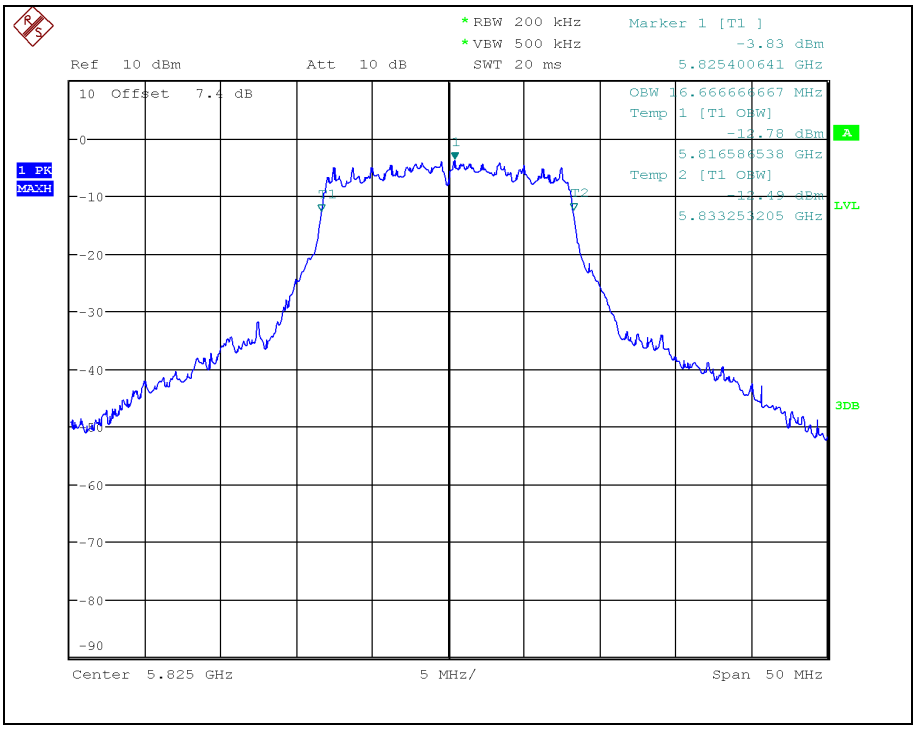
802.11a _ ch.149 **Occupied Bandwidth**



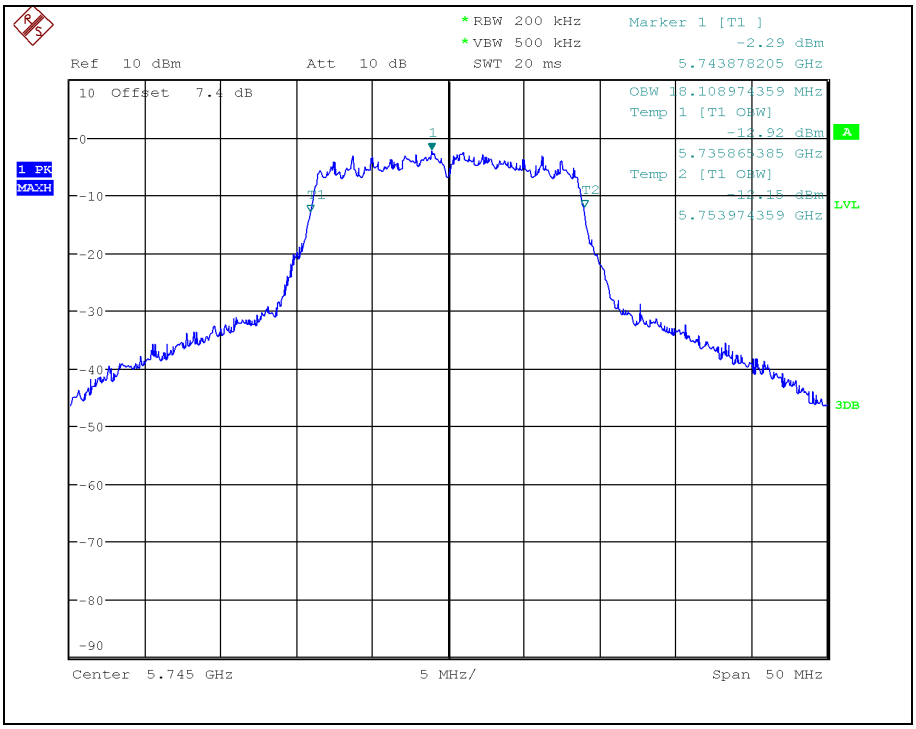
802.11a _ ch.157 **Occupied Bandwidth**



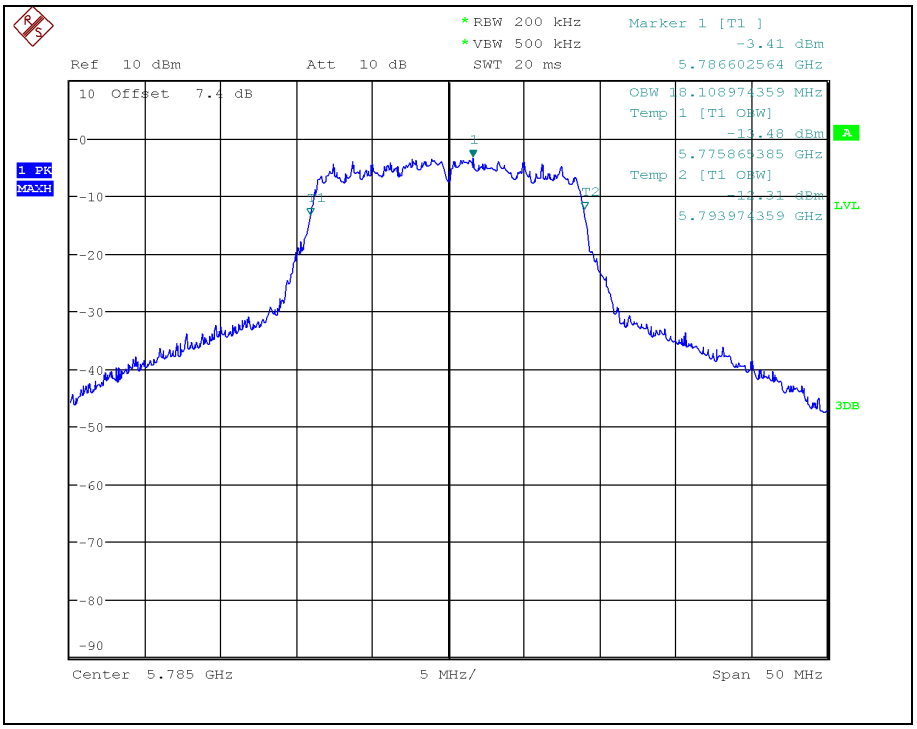
802.11a _ ch.165 **Occupied Bandwidth**



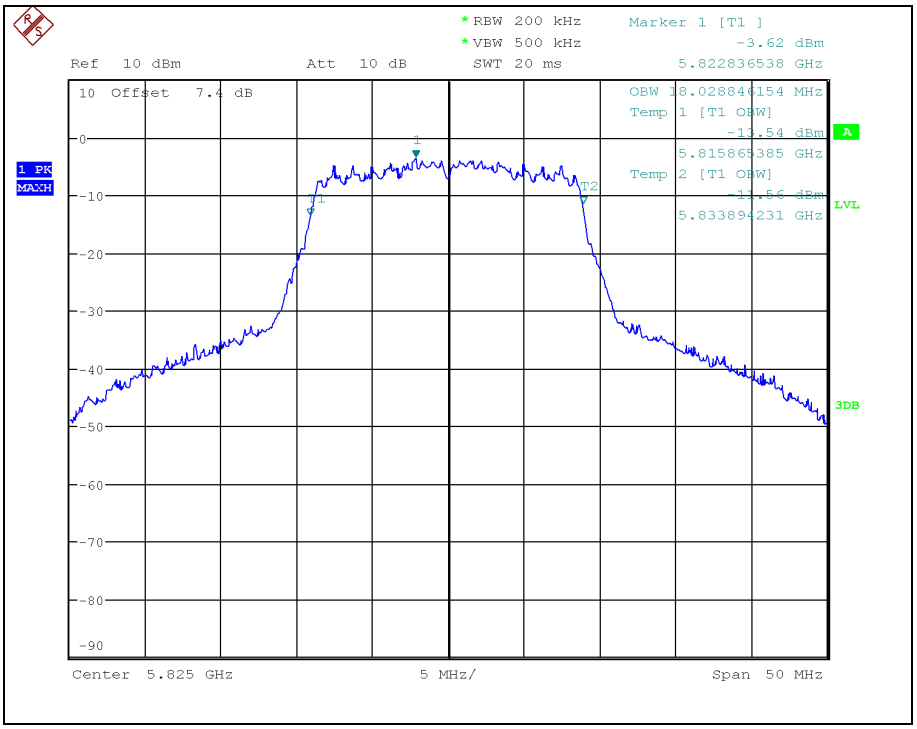
802.11n_HT20 _ ch.149 **Occupied Bandwidth**



802.11n_HT20 _ ch.157 **Occupied Bandwidth**



802.11n_HT20 _ ch.165 **Occupied Bandwidth**



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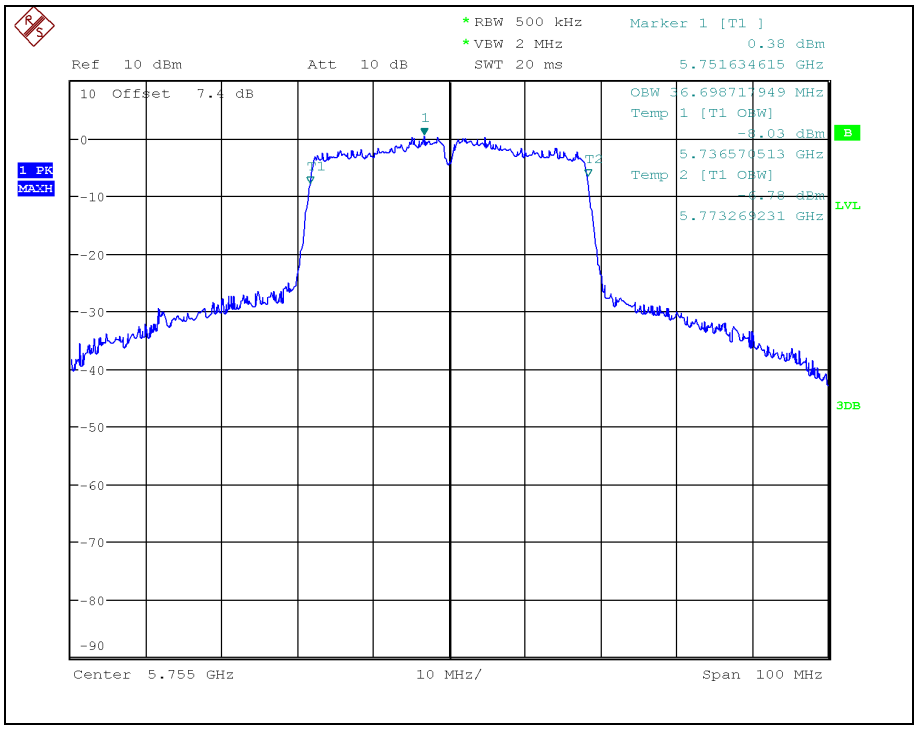
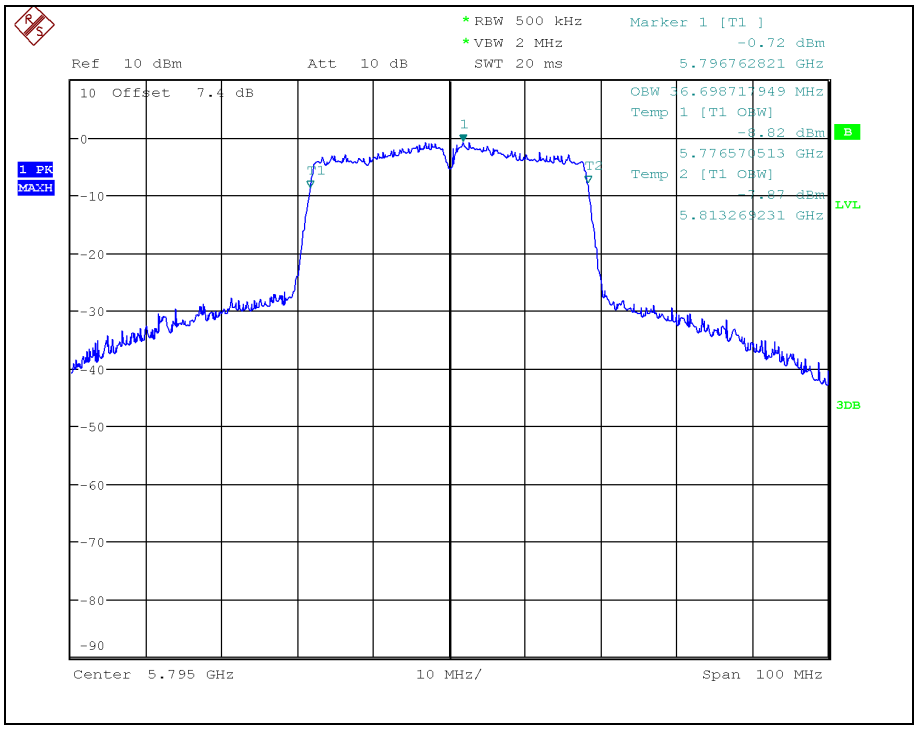
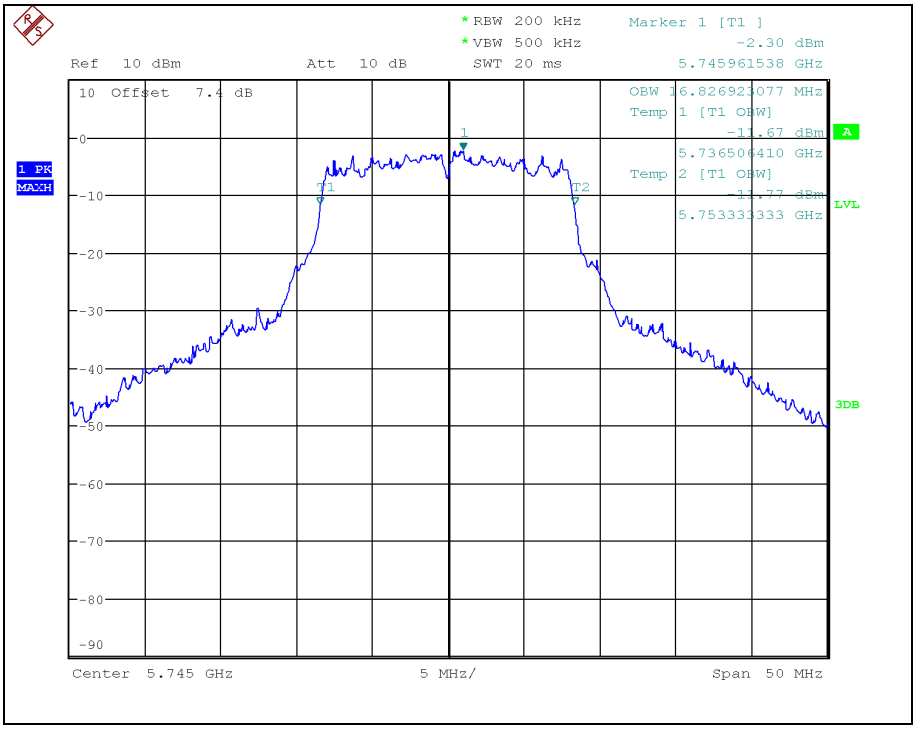
802.11n_HT40 _ ch.151 **Occupied Bandwidth**



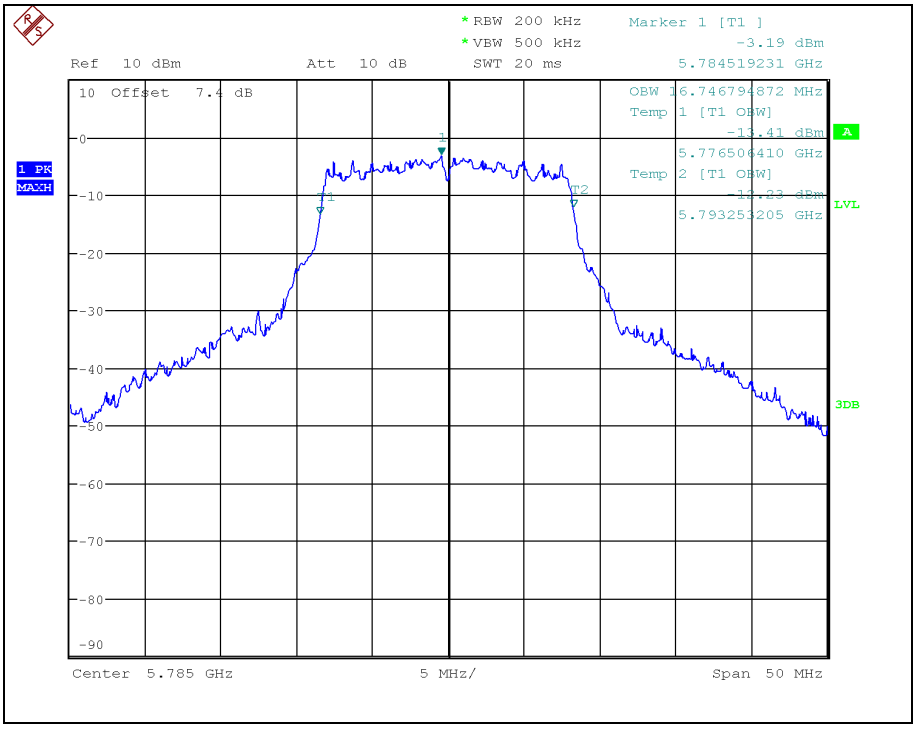
802.11n_HT40 _ ch.159 **Occupied Bandwidth**



802.11ac_VHT20 _ ch.149 **Occupied Bandwidth**



802.11ac_VHT20 _ ch.157 **Occupied Bandwidth**



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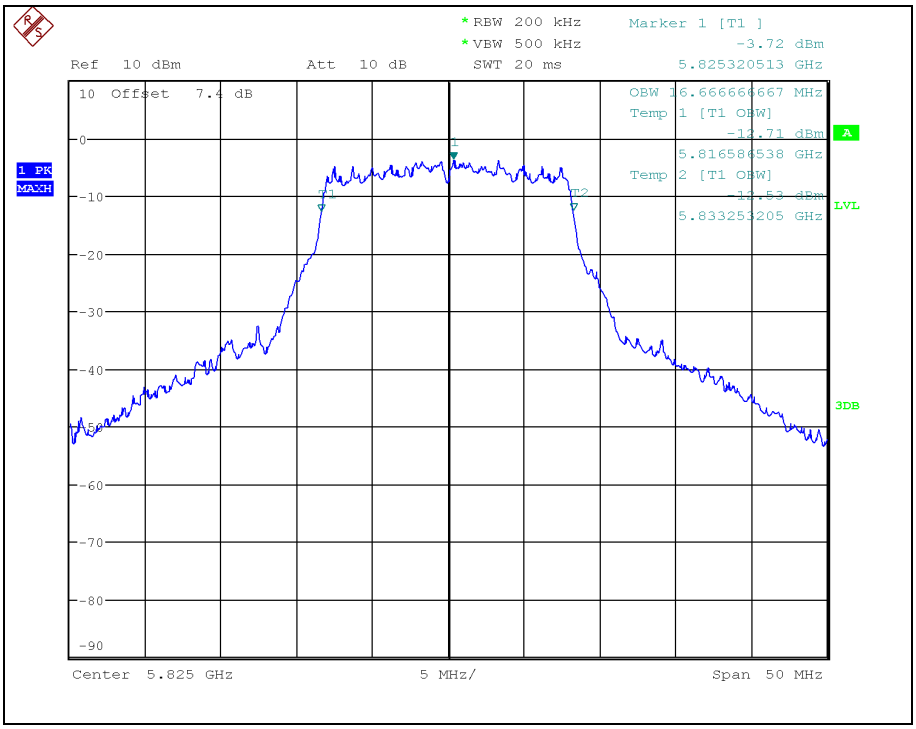
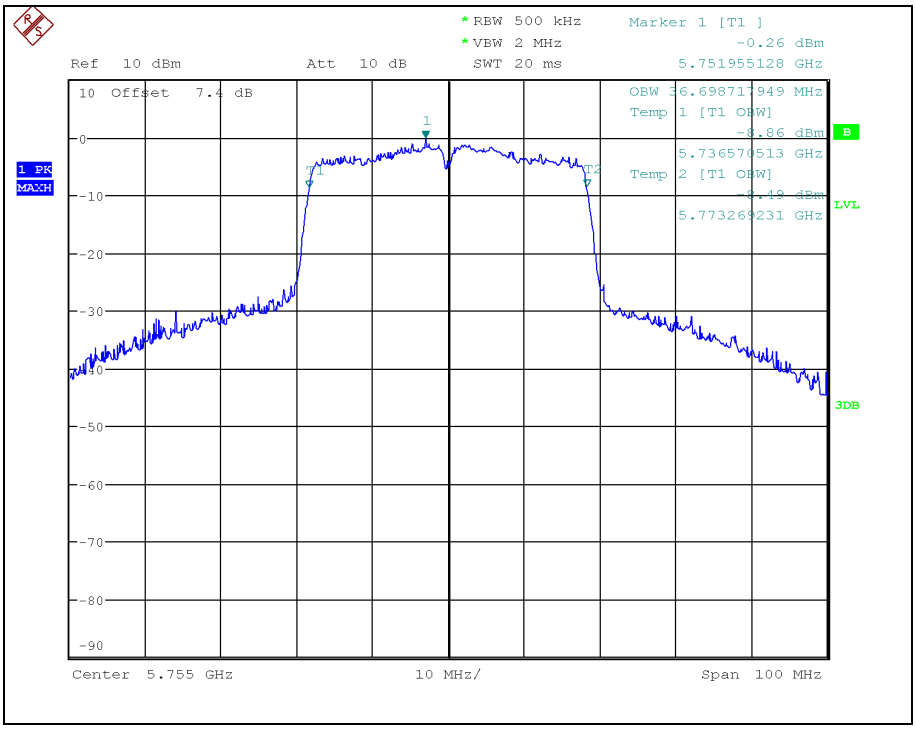
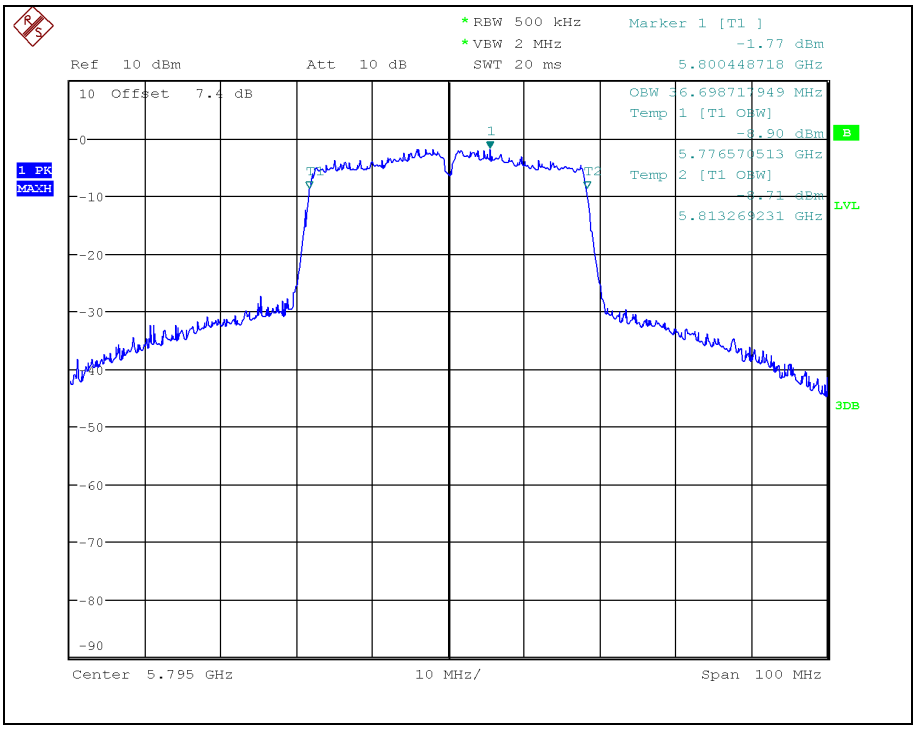
802.11ac_VHT20 _ ch.165 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.151 **Occupied Bandwidth**



802.11ac_VHT40 _ ch.159 **Occupied Bandwidth**



3.3.4 Maximum Conducted Output Power

3.3.4.1 Test Setup

Refer to the APPENDIX I.

3.3.4.2 Limit

Part. 15.407(a)

(1) For the band 5.15 - 5.25 ㎓.

(i) For an outdoor access point operating in the band 5.15 - 5.25 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 ㏈i. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 ㎽ (21 ㏈m).

(ii) For an indoor access point operating in the band 5.15 - 5.25 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 ㏈i. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 ㏈i 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 ㏈i, a 1 ㏈ reduction in maximum conducted output power and maximum power spectral density is required for each 1 ㏈ of antenna gain in excess of 23 ㏈i. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15 - 5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈i. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

(2) For the 5.25 - 5.35 ㎓ and 5.47 - 5.725 ㎓ bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 ㎽ or 11 ㏈m + 10 log B, where B is the 26 ㏈ emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

(3) For the band 5.725 - 5.85 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than

6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Band	Power Limit (㎽)	Calculated Limit (㏈m)	Antenna Gain (Worst case) (㏈i)	Determined Limit (㏈m)
U-NII 1	250	23.97	3.60	23.97

Band	Power Limit (㎽) Least 26 ㏈c BW (㒒)	Calculated Limit (㏈m)	Antenna Gain (Worst case) (㏈i)	Determined Limit (㏈m)
U-NII 2A	250	23.97	3.60	23.97
	21.15	24.25		
U-NII 2C	250	23.97	3.60	23.97
	21.39	24.30		

Band	Power Limit (㎽)	Calculated Limit (㏈m)	Antenna Gain (Worst case) (㏈i)	Determined Limit (㏈m)
U-NII 3	1000	30.00	3.60	30.00

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(1) For the band 5.15 - 5.25 ㎓.

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 log10B, ㏈m, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For other devices, the maximum e.i.r.p. shall not exceed 200 ㎽ or 10 + 10 log10B, ㏈m, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 ㏈m in any 1.0 㒒 band.

(2) For the band 5.25 - 5.35 ㎓.

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 log10B, ㏈m, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

Devices, other than devices installed in vehicles, shall comply with the following:

- The maximum conducted output power shall not exceed 250 ㎽ or 11 + 10 log10B, ㏈m, whichever is less. The power spectral density shall not exceed 11 ㏈m in any 1.0 ㎒ band;
- The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, ㏈m, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 ㎽ shall implement TPC in order to have the capability to operate at least 6 ㏈ below the maximum permitted e.i.r.p. of 1 W.

(3) For the band 5.47 - 5.60 ㎓ and 5.65 - 5.725 ㎓.

The maximum conducted output power shall not exceed 250 ㎽ or 11 + 10 log10B, ㏈m, whichever is less. The power spectral density shall not exceed 11 ㏈m in any 1.0 ㎒ band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, ㏈m, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 ㎽ shall implement TPC in order to have the capability to operate at least 6 ㏈ below the maximum permitted e.i.r.p. of 1 W.

(4) For the band 5.725 - 5.85 ㎓.

For equipment operating in the band 5725-5850 ㎒, the minimum 6 ㏈ bandwidth shall be at least 500 ㎑.

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 ㏈m in any 500 ㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipointFootnote3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

3.3.4.3 Test Procedure

A transmitter antenna terminal of EUT is connected to the input of a spectrum analyzer.
Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

1. Measure the duty cycle D of the transmitter output signal
2. Set span to encompass the entire 26 dB EBW or 99% OBW of the signal
3. Set RBW = 1 MHz
4. Set VBW ≥ 3 MHz
5. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = RMS (power averaging)
8. Do not use sweep triggering. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
10. Compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.
11. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1 / 0.25)] = 6 dB if the duty cycle is 25%.

3.3.4.4 Test Result

Test Mode	Band	Test Channel	Maximum Conducted Output Power			
			Reading	C.F	Test Result	
			(dBm)	(dB)	(dBm)	(mW)
802.11a	U-NII 1	36	8.14	0.39	8.53	7.13
		44	7.82	0.39	8.21	6.62
		48	8.04	0.39	8.43	6.97
	U-NII 2A	52	8.09	0.39	8.48	7.05
		60	7.66	0.39	8.05	6.38
		64	8.02	0.39	8.41	6.94
	U-NII 2C	100	8.41	0.39	8.80	7.59
		120	8.49	0.39	8.88	7.73
		140	7.64	0.39	8.03	6.35
	U-NII 3	149	7.70	0.39	8.09	6.44
		157	7.04	0.39	7.43	5.53
		165	6.32	0.39	6.71	4.69

Note 1: C.F(Correction Factor)
Correction Factor = DCCF
For DCCF(Duty Cycle Correction Factor) please refer to appendix III.
Note 2: Sample Calculation.
Test Result = Reading + C.F

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Test Mode	Band	Test Channel	Maximum Conducted Output Power			
			Reading	C.F	Test Result	
			(dBm)	(dB)	(dBm)	(mW)
802.11n _HT20	U-NII 1	36	7.90	0.40	8.30	6.76
		44	7.67	0.40	8.07	6.41
		48	7.79	0.40	8.19	6.59
	U-NII 2A	52	7.68	0.40	8.08	6.43
		60	7.55	0.40	7.95	6.24
		64	7.78	0.40	8.18	6.58
	U-NII 2C	100	7.93	0.40	8.33	6.81
		120	8.18	0.40	8.58	7.21
		140	7.01	0.40	7.41	5.51
	U-NII 3	149	7.08	0.40	7.48	5.60
		157	6.63	0.40	7.03	5.05
		165	5.93	0.40	6.33	4.29
802.11n _HT40	U-NII 1	38	8.27	0.40	8.67	7.37
		46	8.21	0.40	8.61	7.27
	U-NII 2A	54	8.10	0.40	8.50	7.09
		62	7.96	0.40	8.36	6.86
	U-NII 2C	102	8.45	0.40	8.85	7.68
		118	8.73	0.40	9.13	8.19
		134	8.07	0.40	8.47	7.04
	U-NII 3	151	7.58	0.40	7.98	6.29
		159	6.76	0.40	7.16	5.21

Note 1: C.F(Correction Factor)
Correction Factor = DCCF
For DCCF(Duty Cycle Correction Factor) please refer to appendix III.
Note 2: Sample Calculation.
Test Result = Reading + C.F

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Test Mode	Band	Test Channel	Maximum Conducted Output Power			
			Reading	C.F	Test Result	
			(dBm)	(dB)	(dBm)	(mW)
802.11ac _VHT20	U-NII 1	36	6.30	0.38	6.68	4.66
		44	6.03	0.38	6.41	4.38
		48	6.15	0.38	6.53	4.50
	U-NII 2A	52	6.28	0.38	6.66	4.64
		60	5.80	0.38	6.18	4.15
		64	5.91	0.38	6.29	4.26
	U-NII 2C	100	6.90	0.38	7.28	5.35
		120	6.78	0.38	7.16	5.20
		140	5.78	0.38	6.16	4.13
	U-NII 3	149	5.96	0.38	6.34	4.31
		157	5.23	0.38	5.61	3.64
		165	4.81	0.38	5.19	3.30
802.11ac _VHT40	U-NII 1	38	7.17	0.41	7.58	5.72
		46	6.94	0.41	7.35	5.43
	U-NII 2A	54	6.65	0.41	7.06	5.08
		62	6.75	0.41	7.16	5.19
	U-NII 2C	102	7.38	0.41	7.79	6.00
		118	7.58	0.41	7.99	6.29
		134	6.98	0.41	7.39	5.48
	U-NII 3	151	6.51	0.41	6.92	4.91
		159	5.71	0.41	6.12	4.09

Note 1: C.F(Correction Factor)
Correction Factor = DCCF
For DCCF(Duty Cycle Correction Factor) please refer to appendix III.
Note 2: Sample Calculation.
Test Result = Reading + C.F

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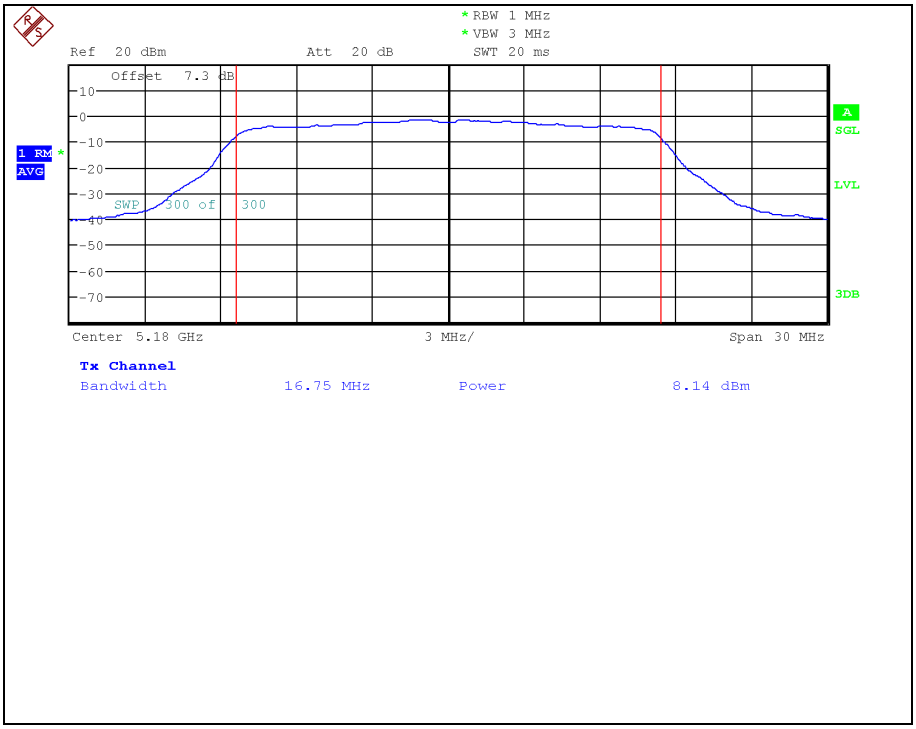
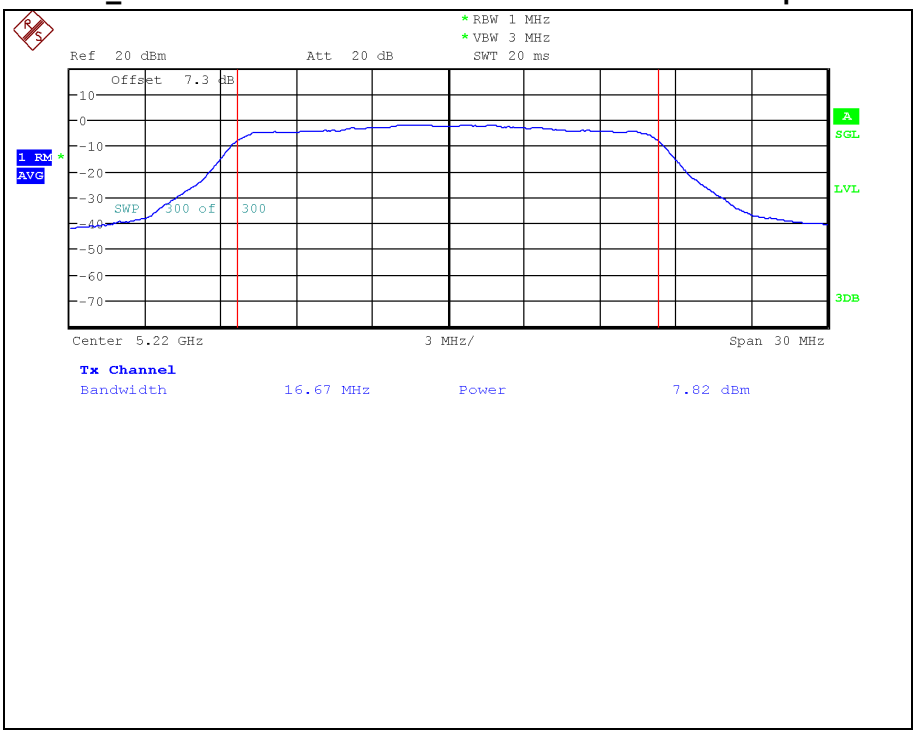
3.3.4.5 Test Plot

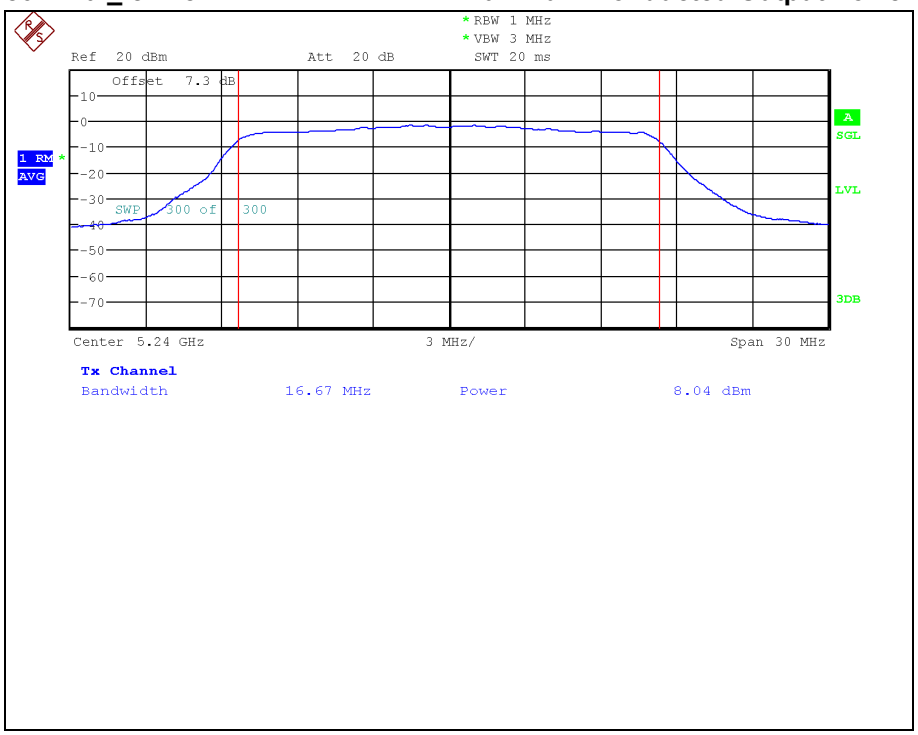
802.11a _ ch.36 **Maximum Conducted Output Power**



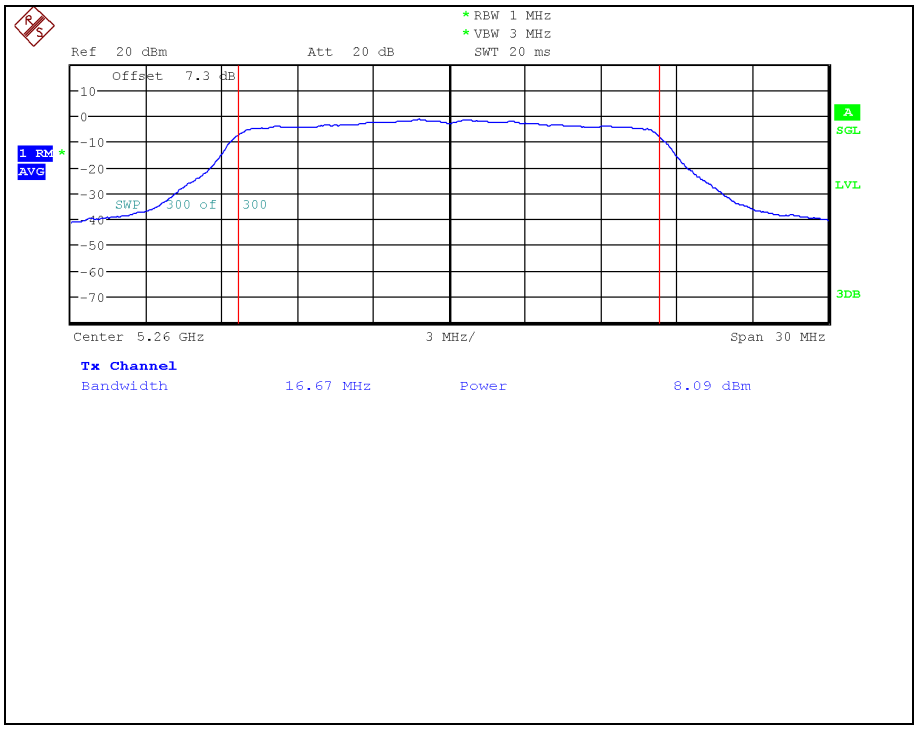
802.11a _ ch.44 **Maximum Conducted Output Power**



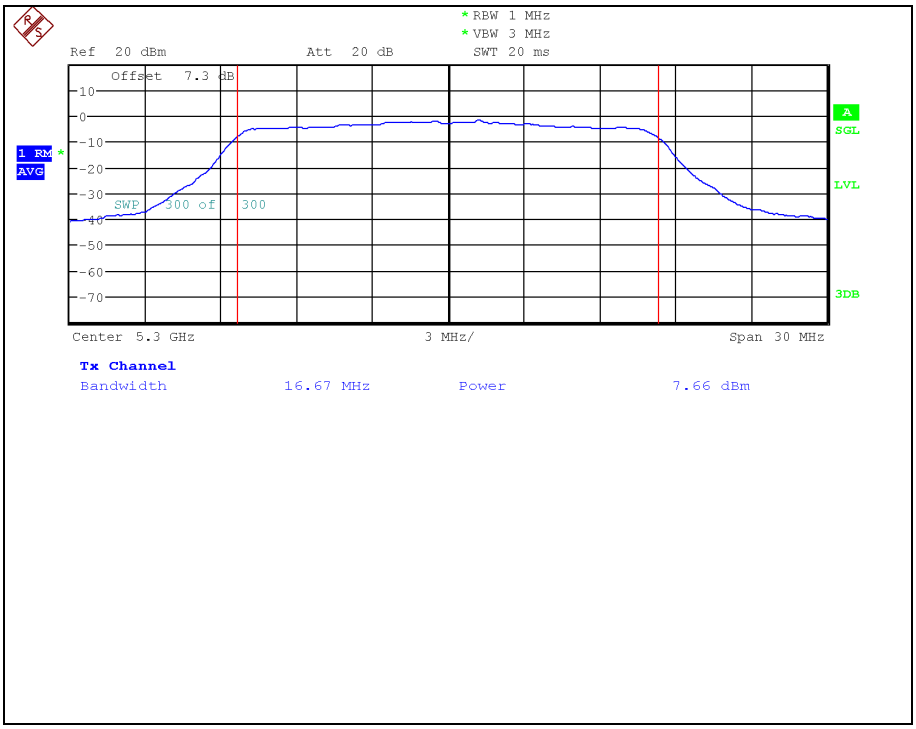
802.11a _ ch.48 **Maximum Conducted Output Power**



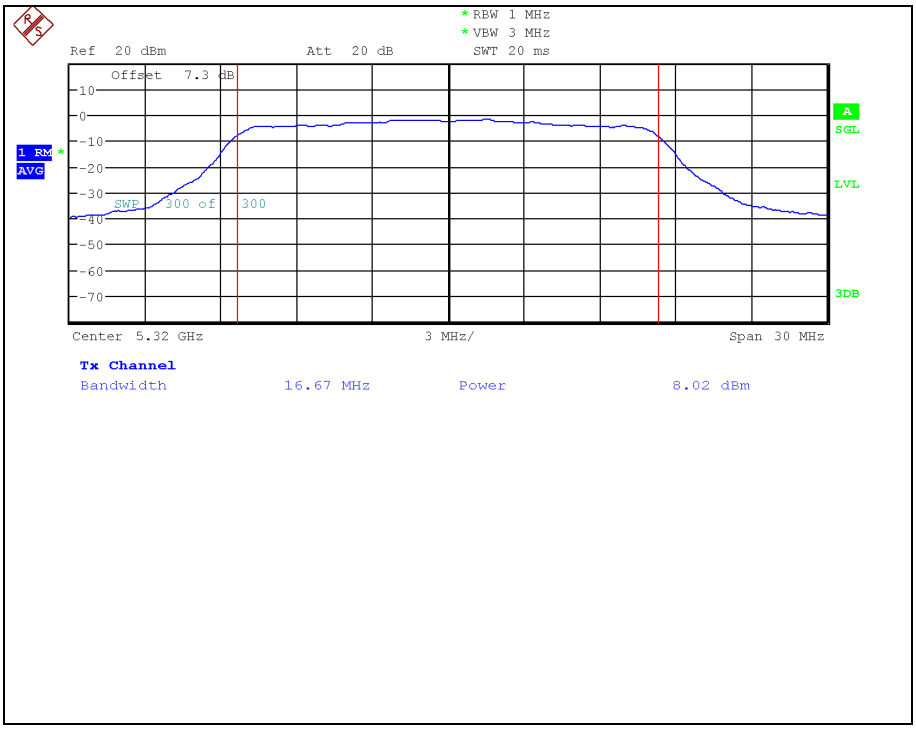
802.11a _ ch.52 **Maximum Conducted Output Power**



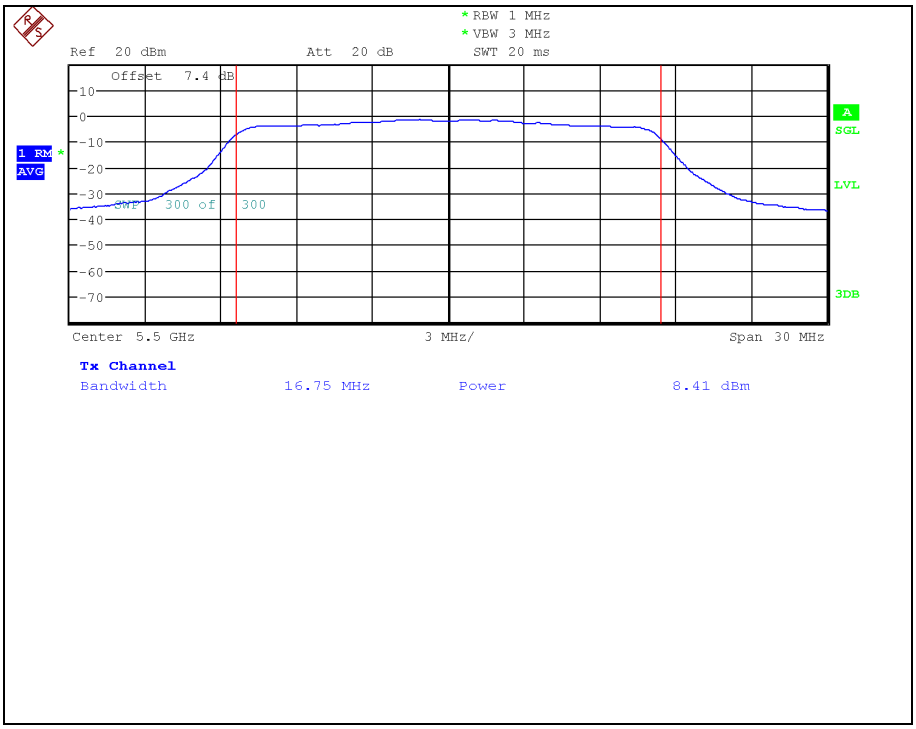
802.11a _ ch.60 **Maximum Conducted Output Power**



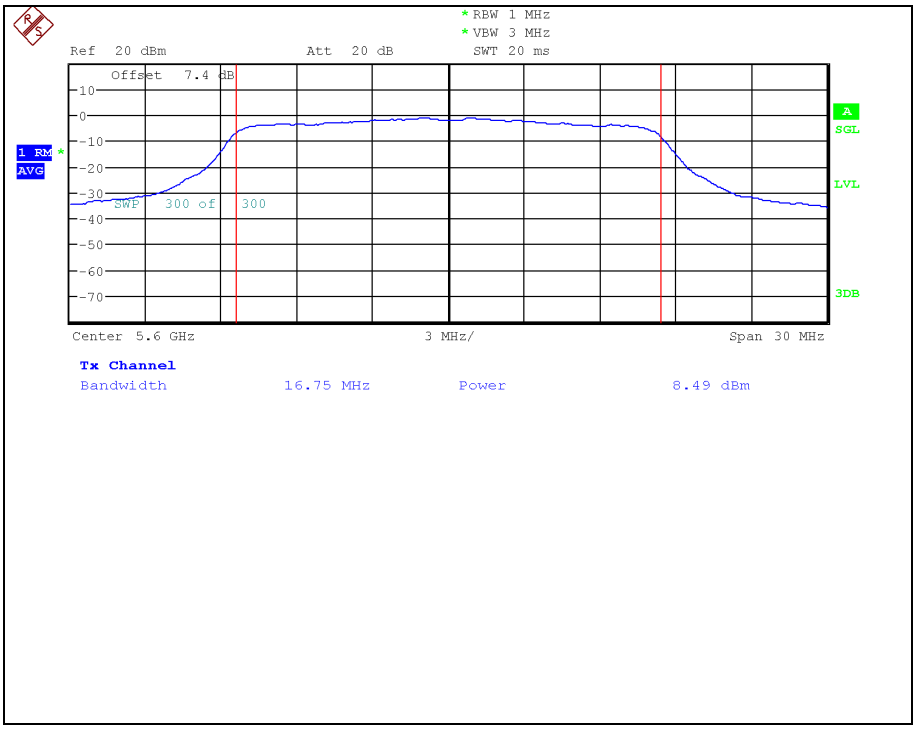
802.11a _ ch.64 **Maximum Conducted Output Power**



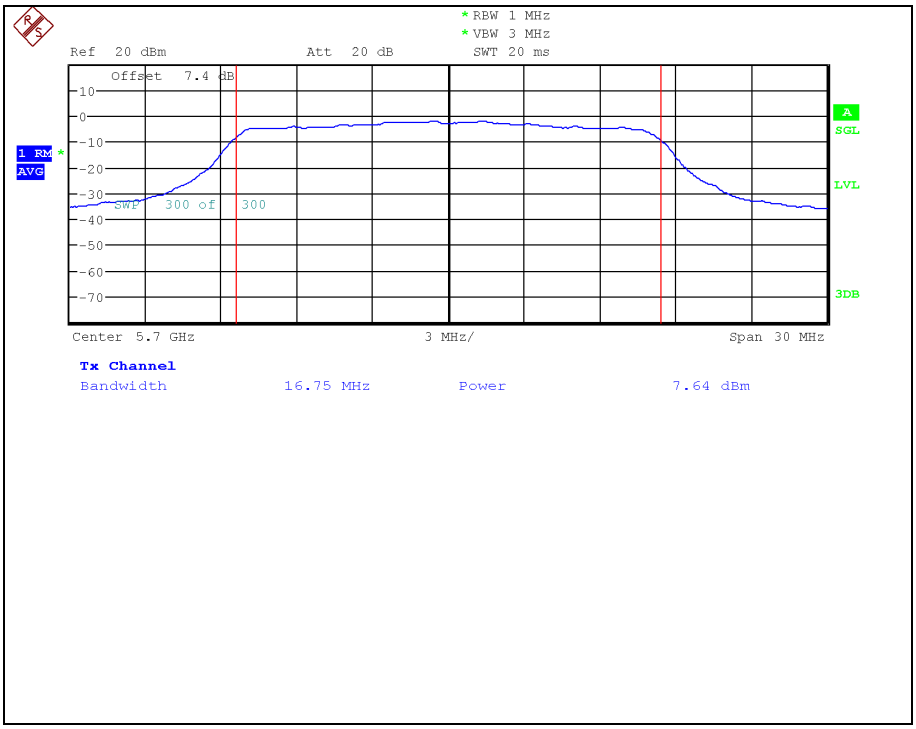
802.11a _ ch.100 **Maximum Conducted Output Power**



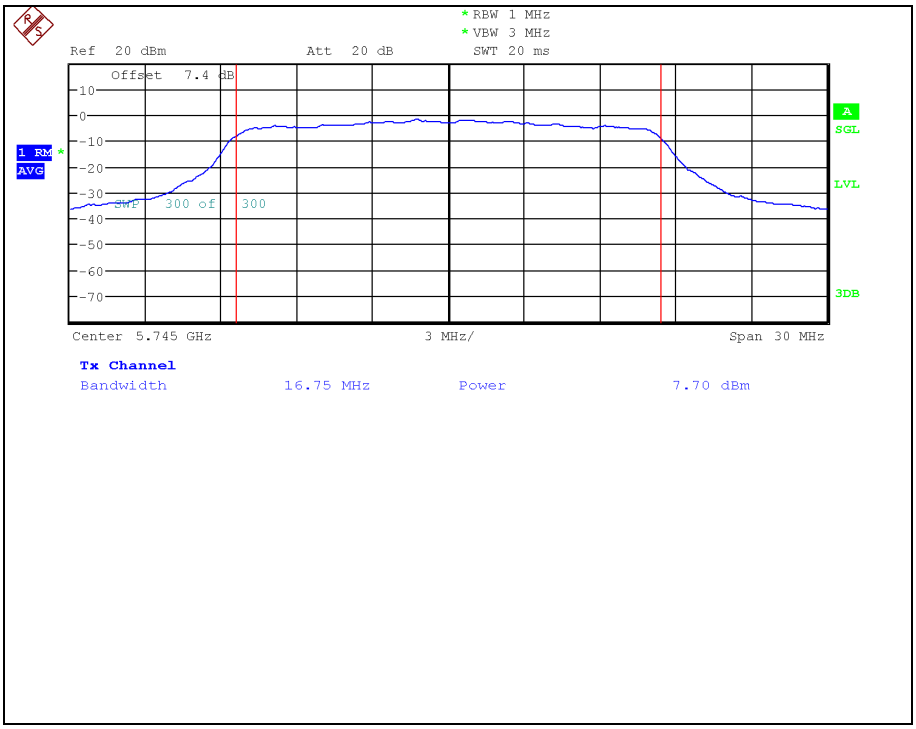
802.11a _ ch.120 **Maximum Conducted Output Power**



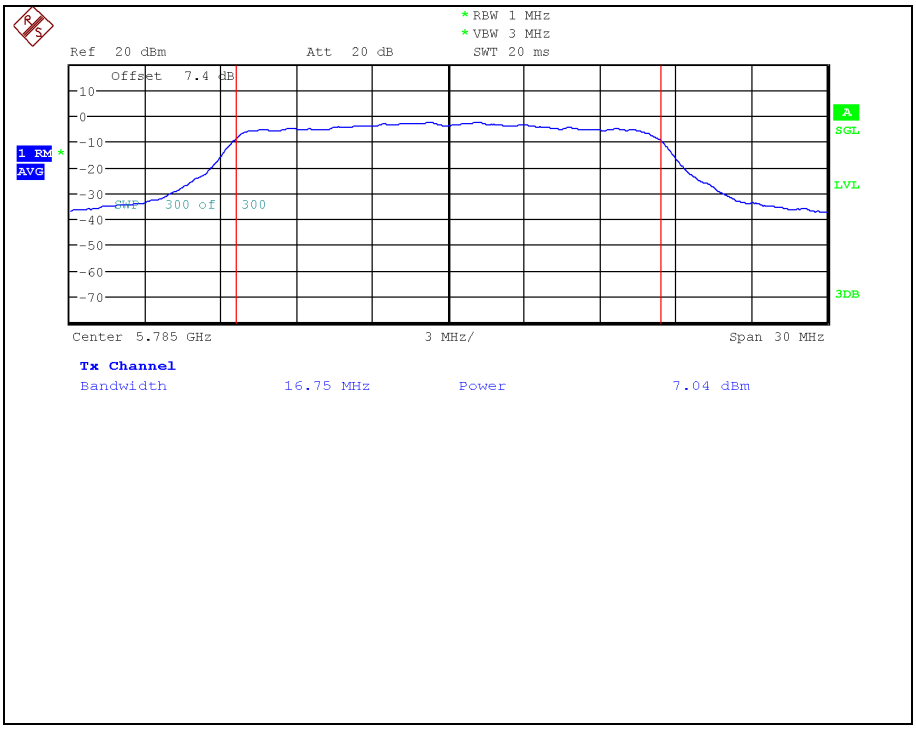
802.11a _ ch.140 **Maximum Conducted Output Power**



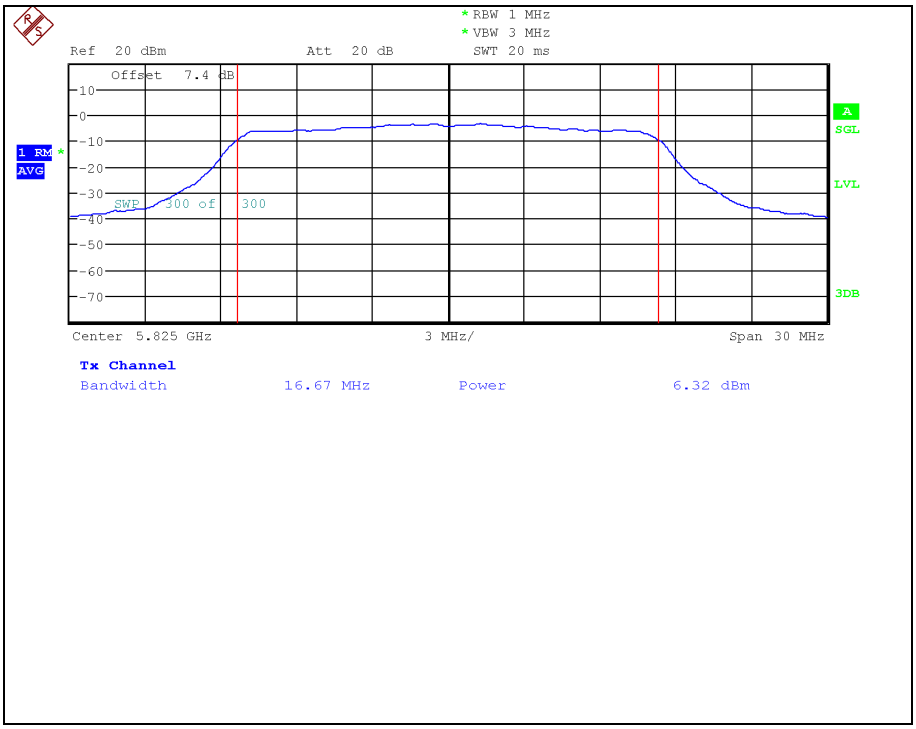
802.11a _ ch.149 **Maximum Conducted Output Power**



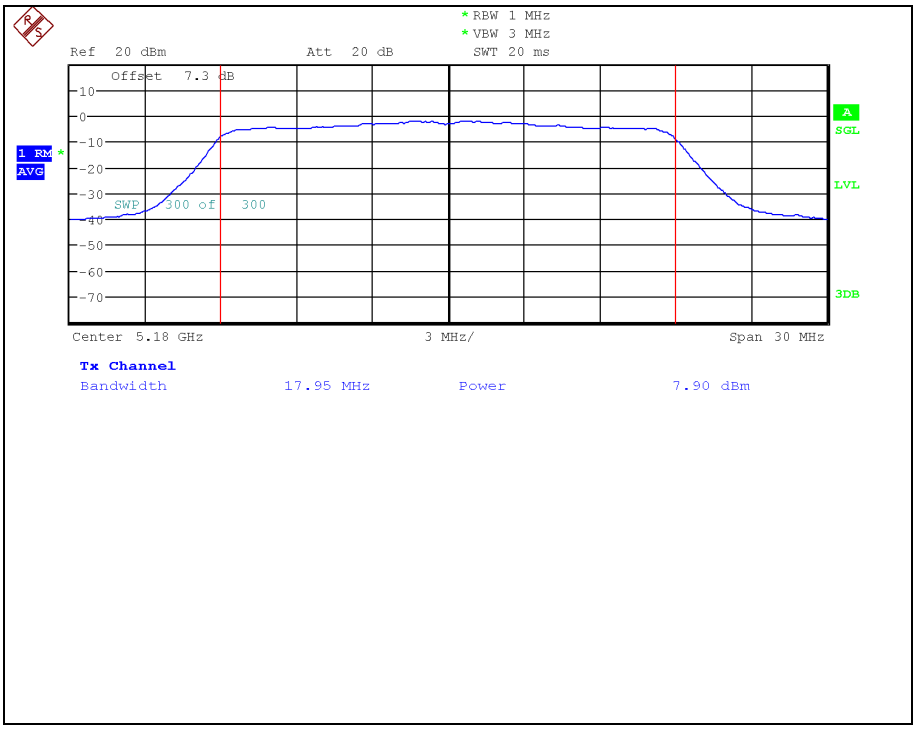
802.11a _ ch.157 **Maximum Conducted Output Power**



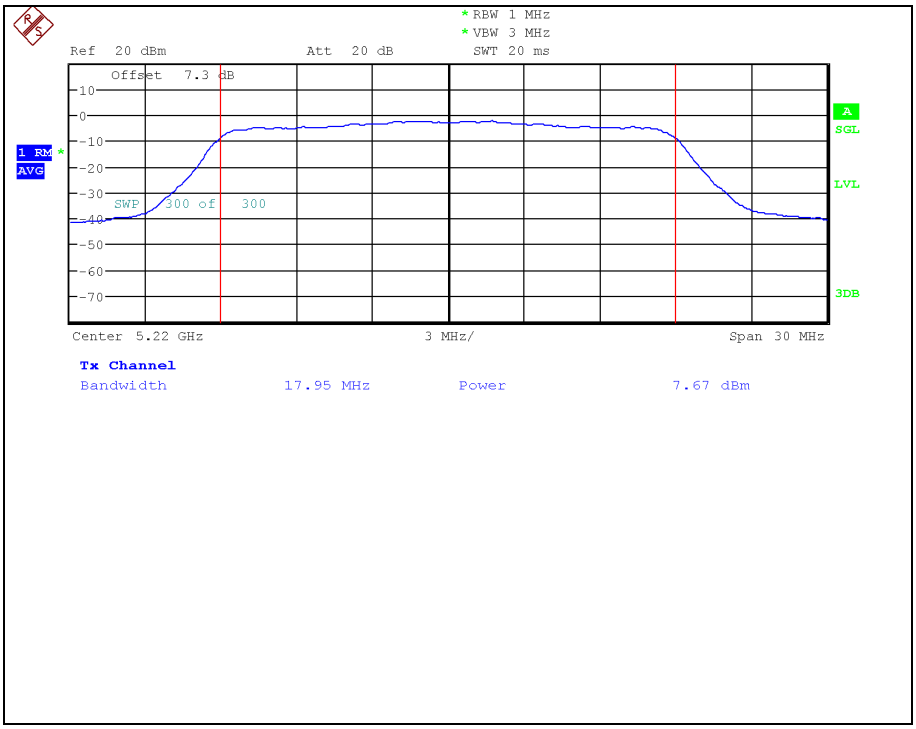
802.11a _ ch.165 **Maximum Conducted Output Power**



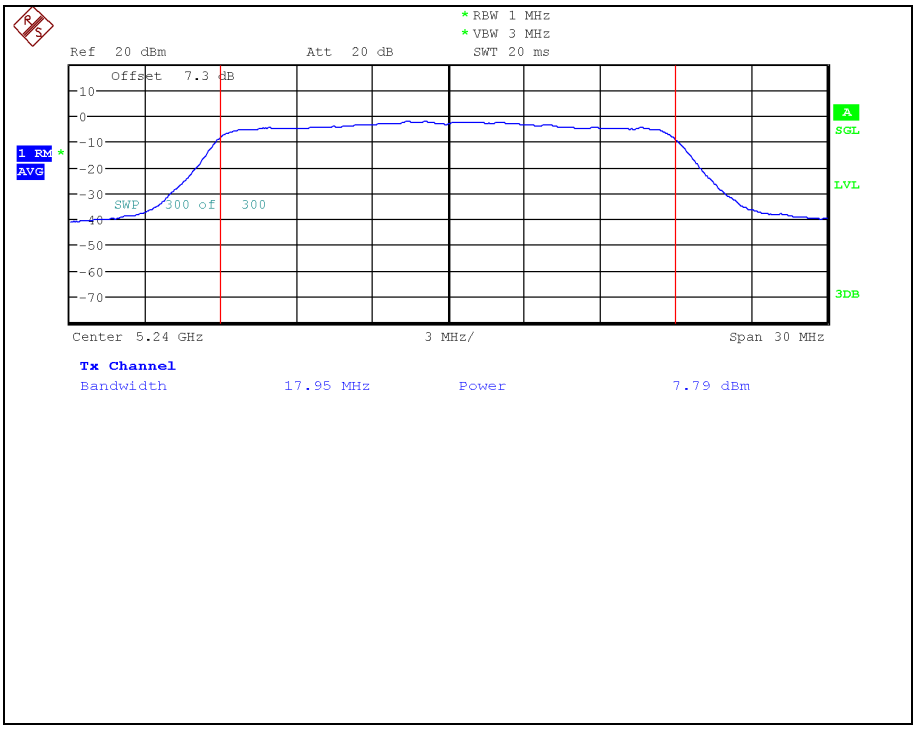
802.11n_HT20 _ ch.36 **Maximum Conducted Output Power**



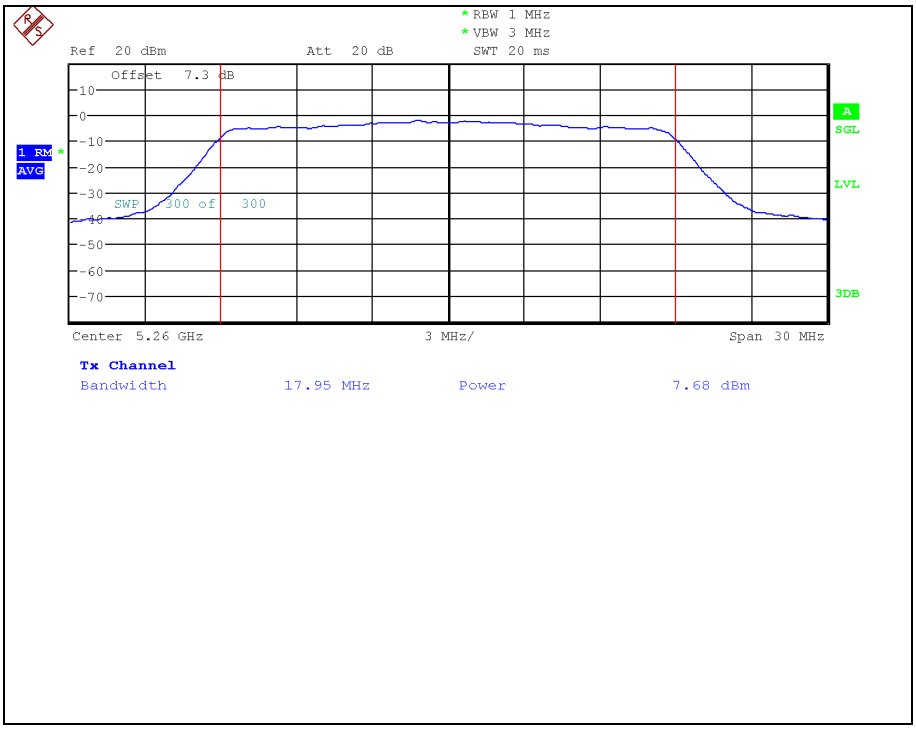
802.11n_HT20 _ ch.44 **Maximum Conducted Output Power**



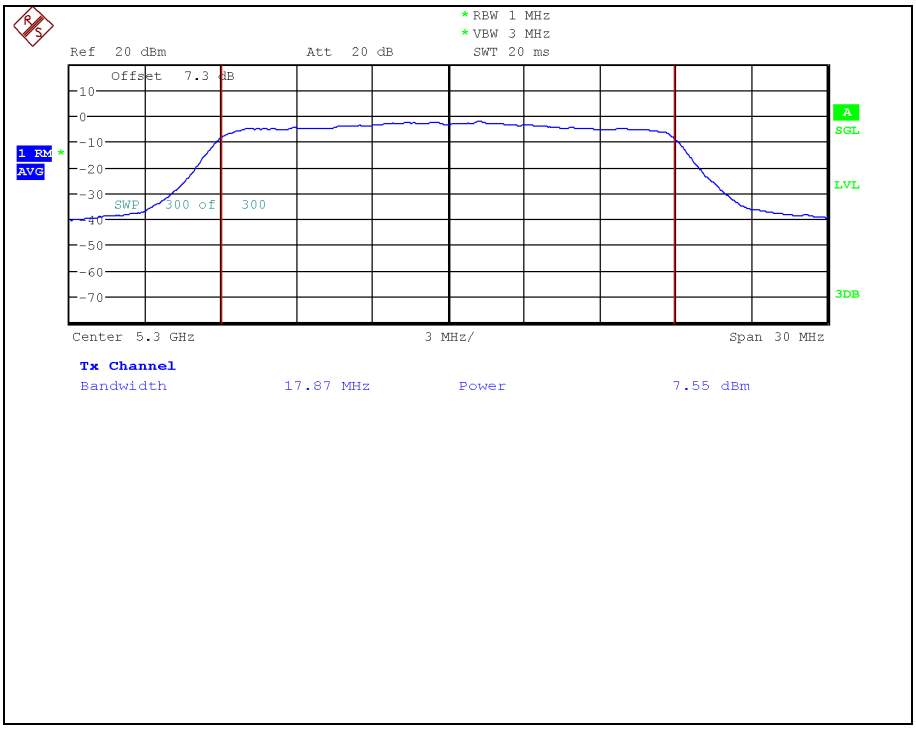
802.11n_HT20 _ ch.48 **Maximum Conducted Output Power**



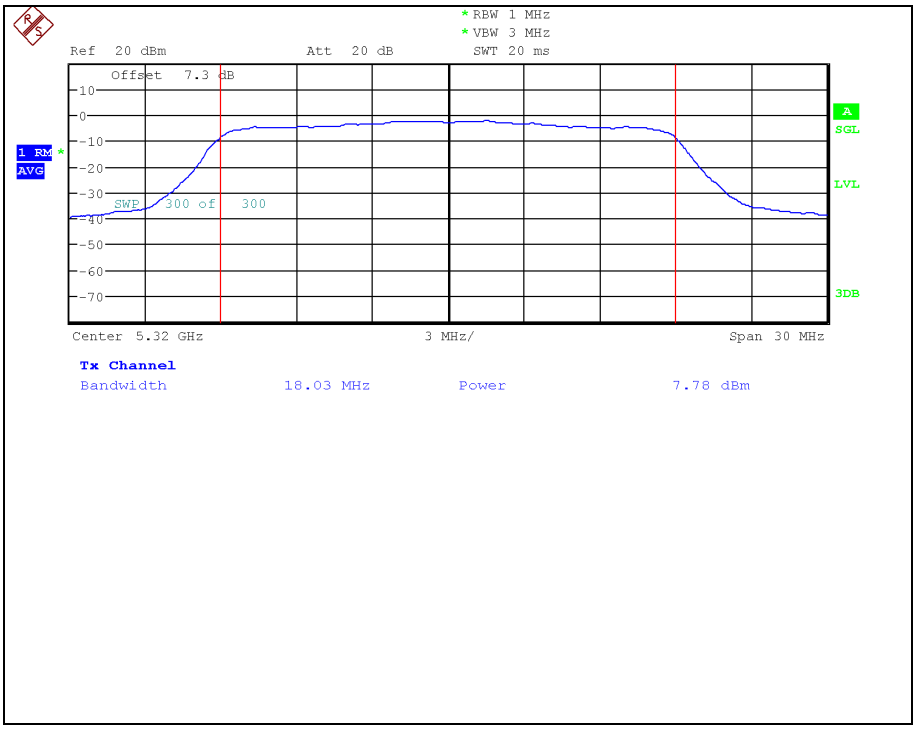
802.11n_HT20 _ ch.52 **Maximum Conducted Output Power**



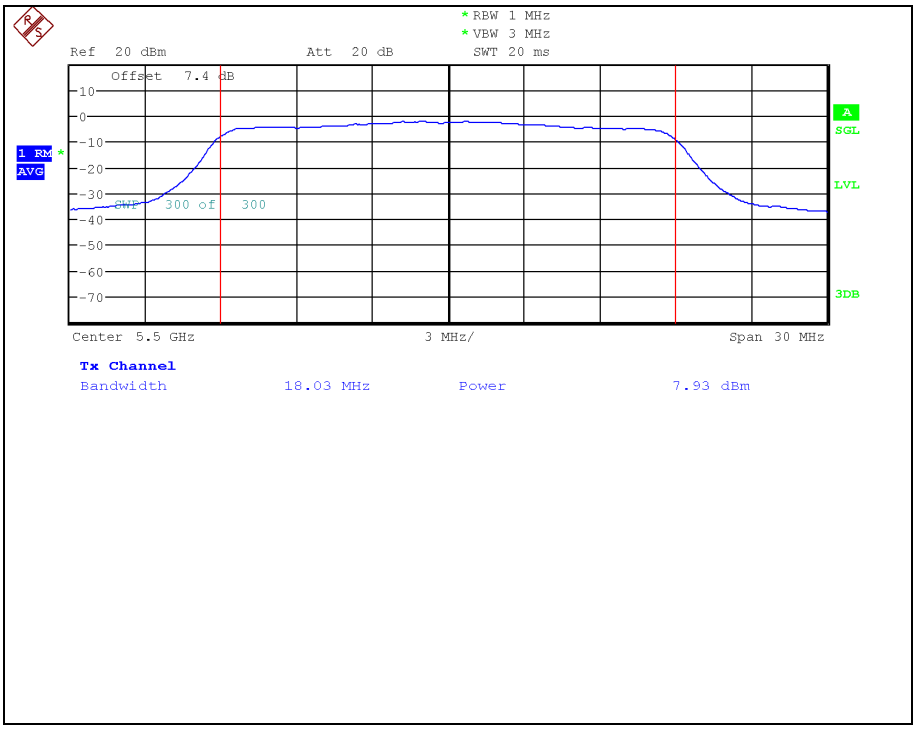
802.11n_HT20 _ ch.60 **Maximum Conducted Output Power**



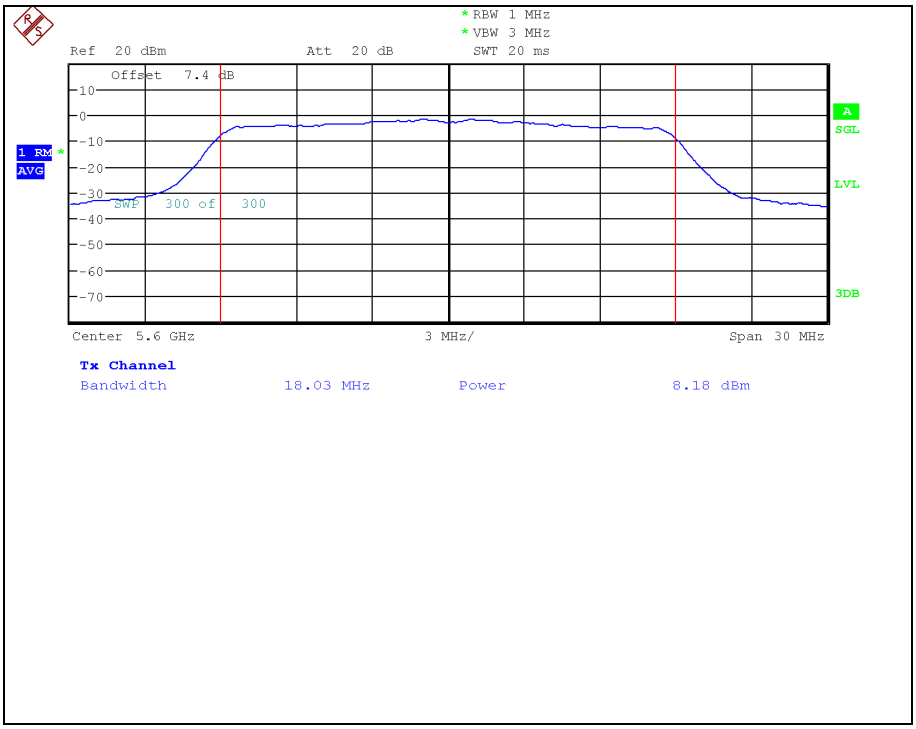
802.11n_HT20 _ ch.64 **Maximum Conducted Output Power**



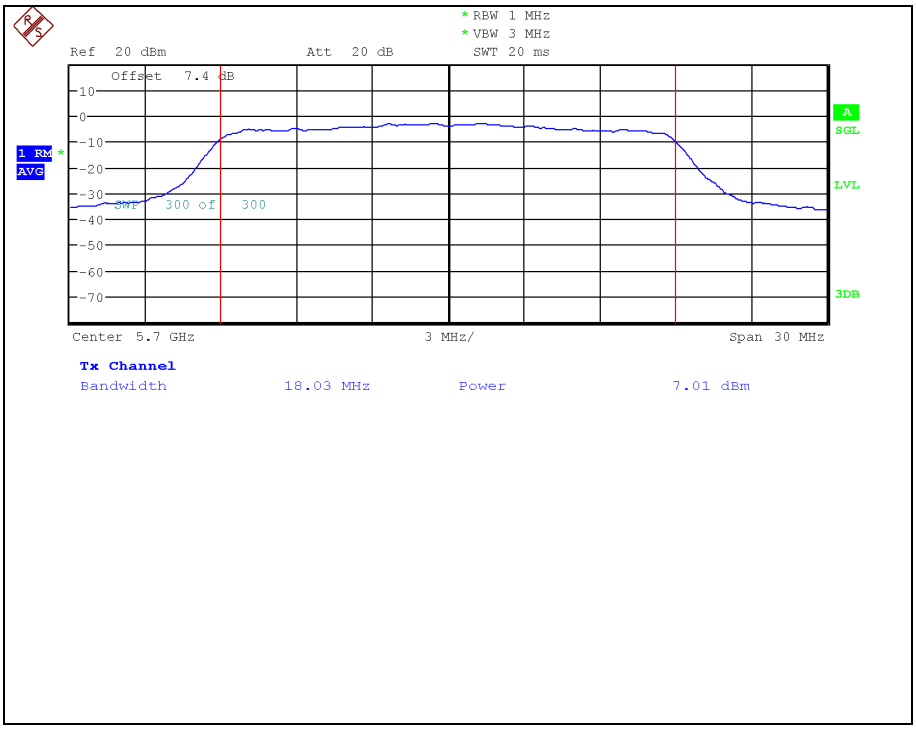
802.11n_HT20 _ ch.100 **Maximum Conducted Output Power**



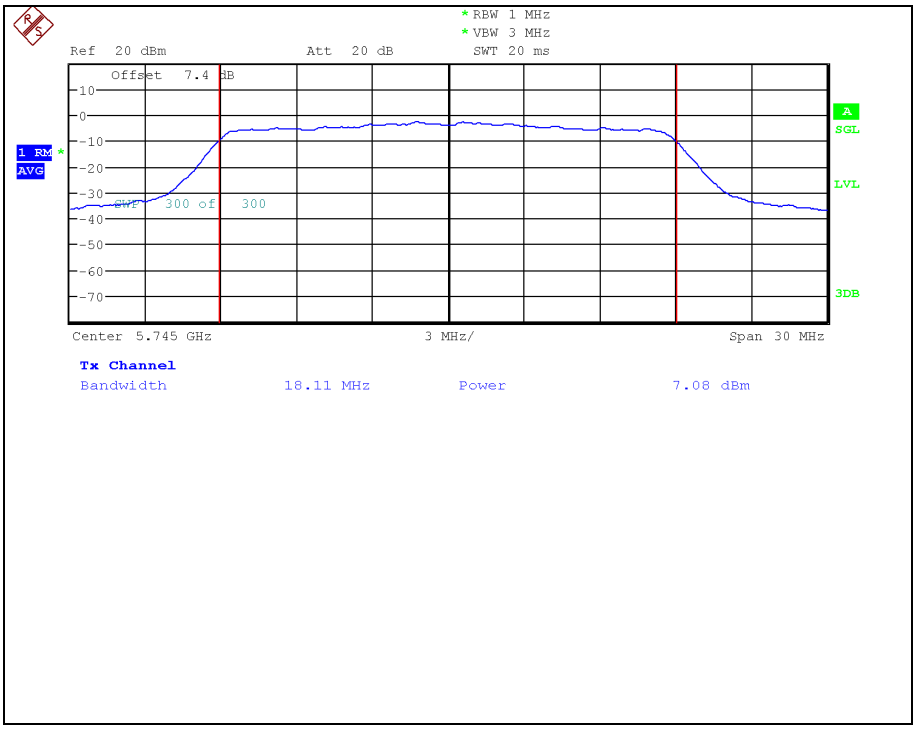
802.11n_HT20 _ ch.120 **Maximum Conducted Output Power**



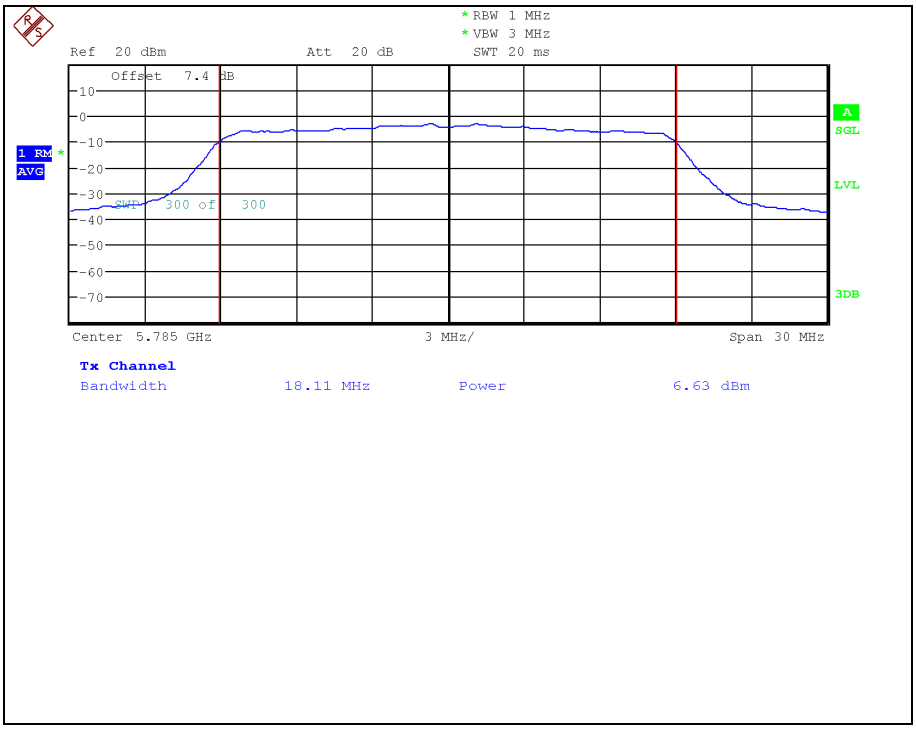
802.11n_HT20 _ ch.140 **Maximum Conducted Output Power**



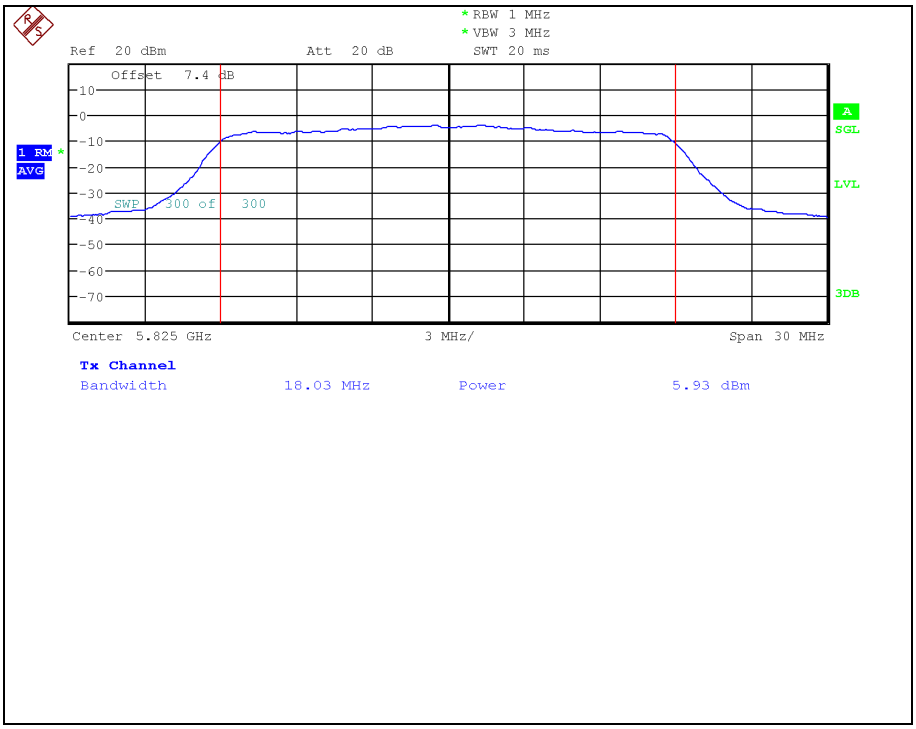
802.11n_HT20 _ ch.149 **Maximum Conducted Output Power**



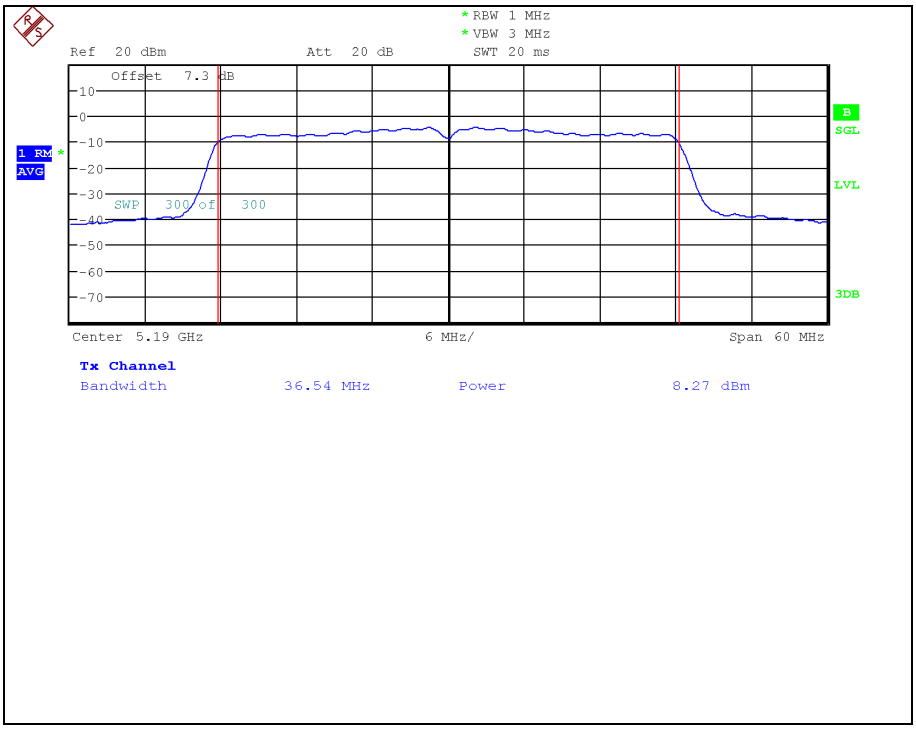
802.11n_HT20 _ ch.157 **Maximum Conducted Output Power**



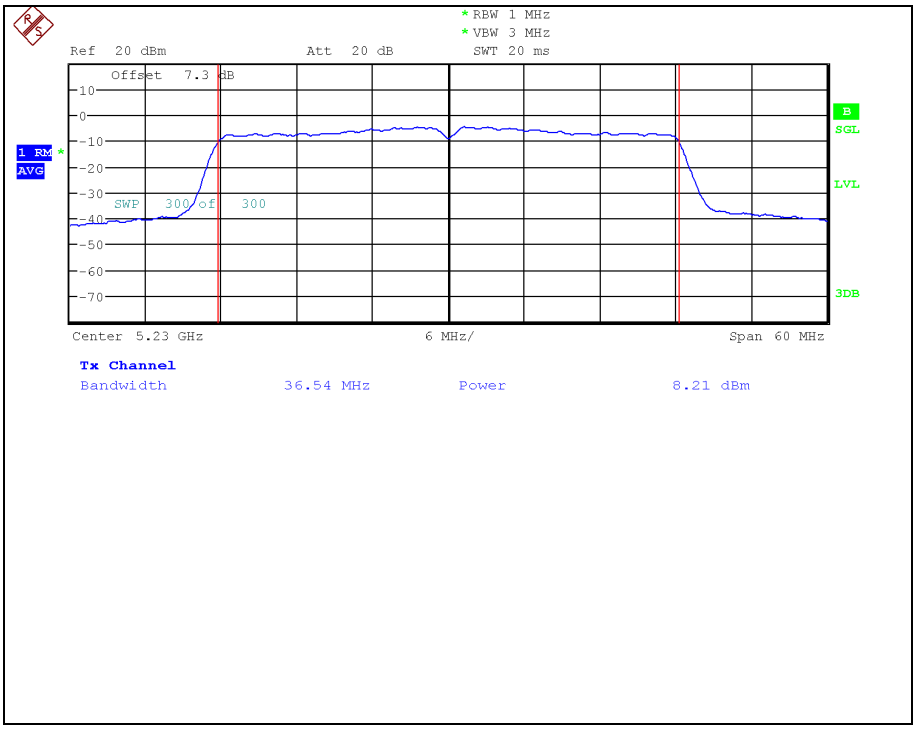
802.11n_HT20 _ ch.165 **Maximum Conducted Output Power**



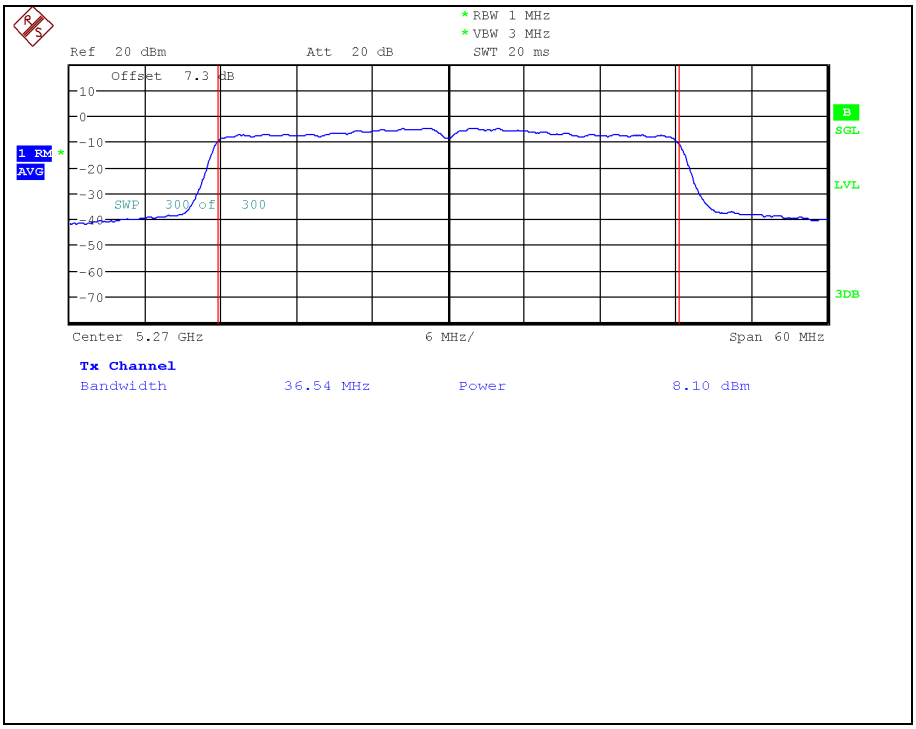
802.11n_HT40 _ ch.38 **Maximum Conducted Output Power**



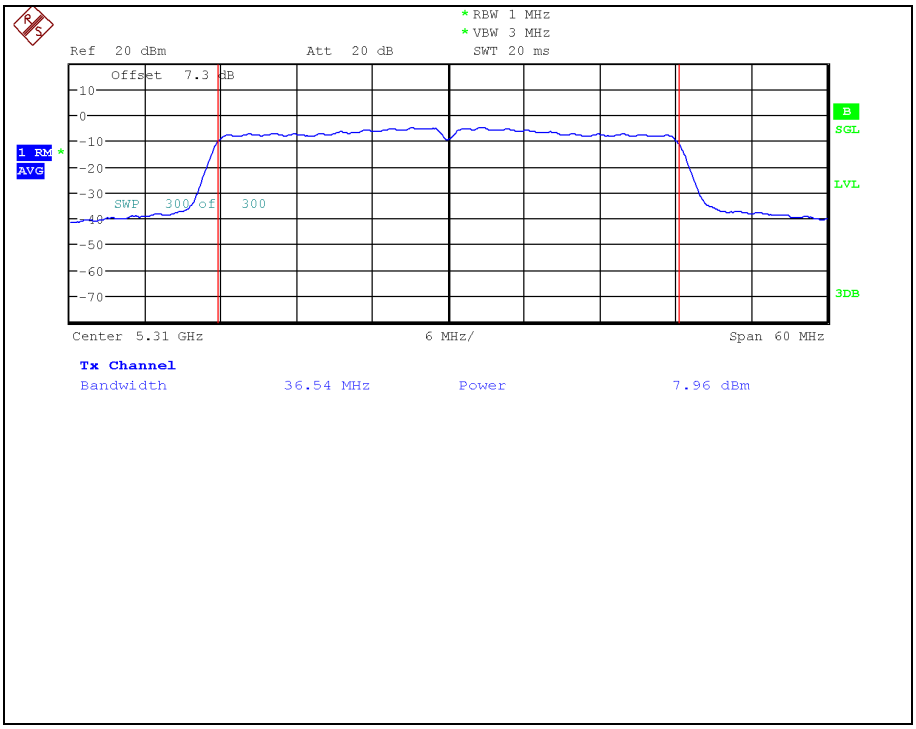
802.11n_HT40 _ ch.46 **Maximum Conducted Output Power**



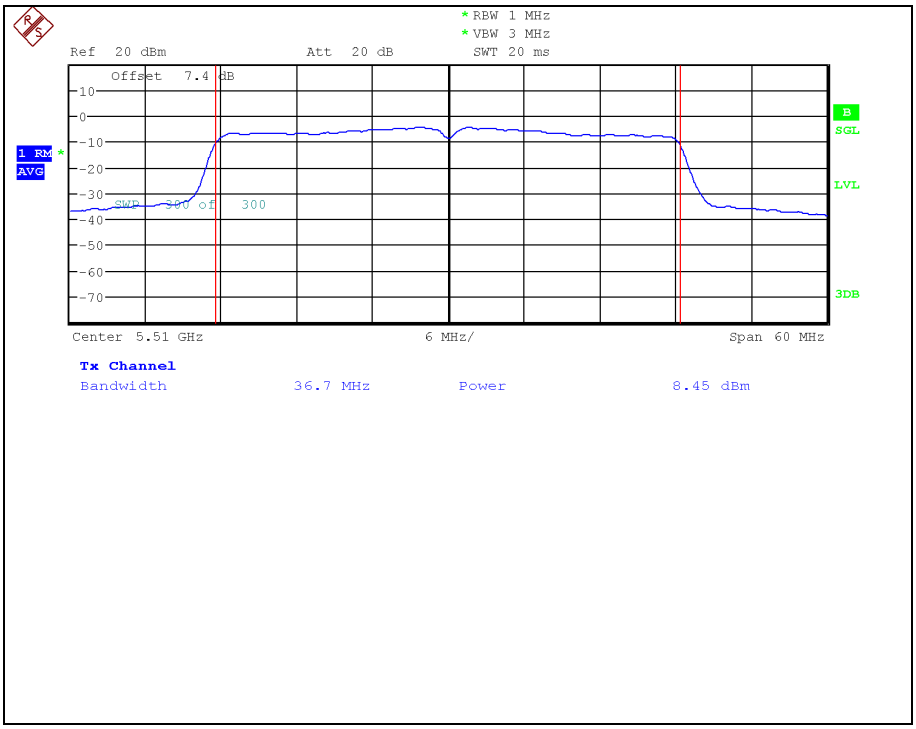
802.11n_HT40 _ ch.54 **Maximum Conducted Output Power**



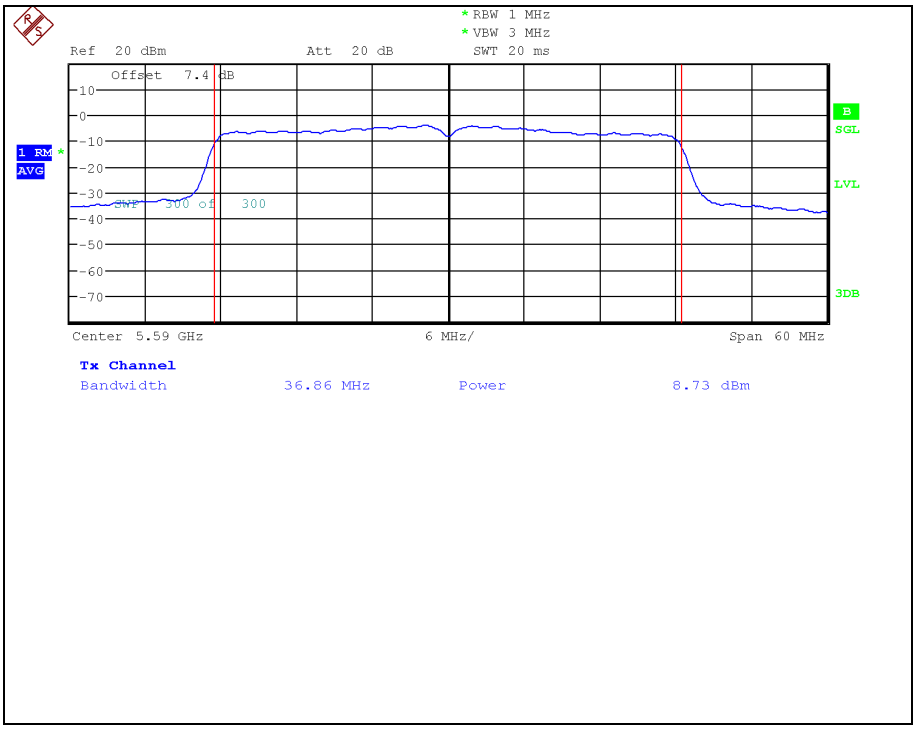
802.11n_HT40 _ ch.62 **Maximum Conducted Output Power**



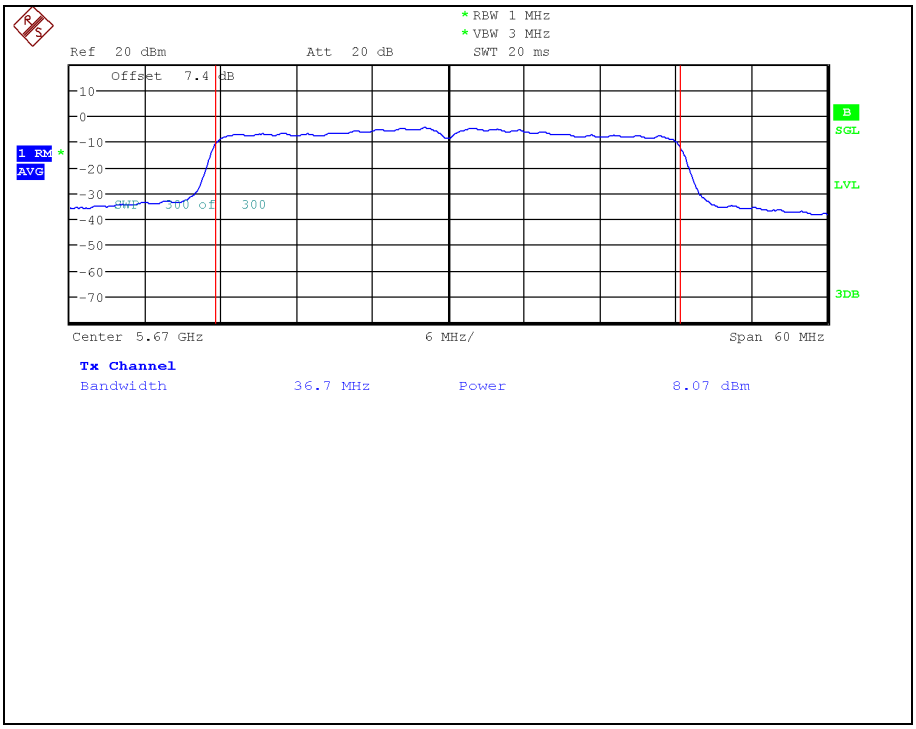
802.11n_HT40 _ ch.102 **Maximum Conducted Output Power**



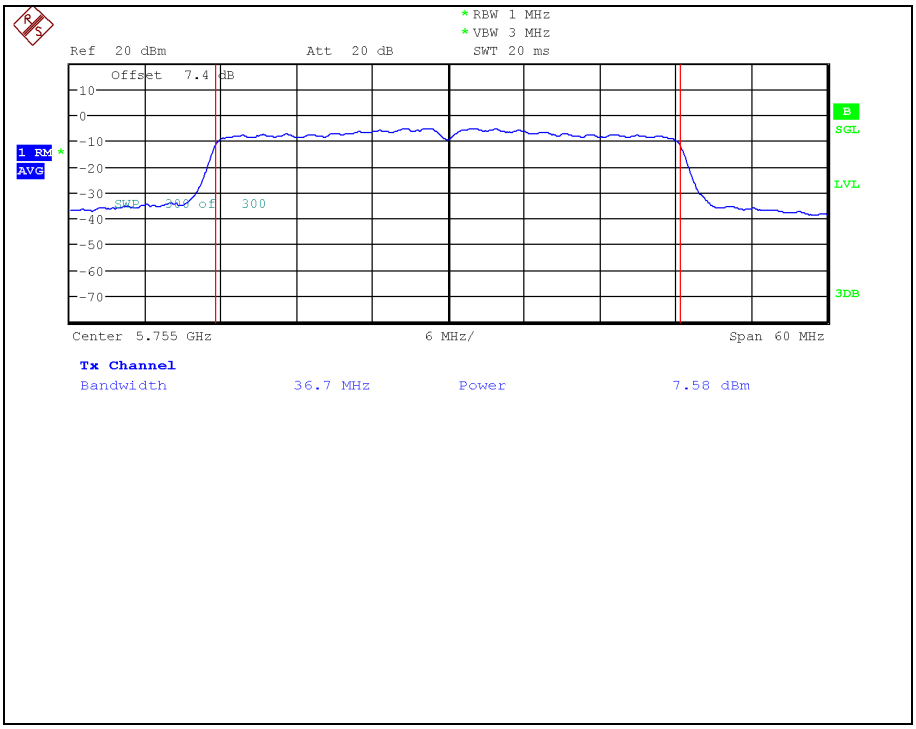
802.11n_HT40 _ ch.118 **Maximum Conducted Output Power**



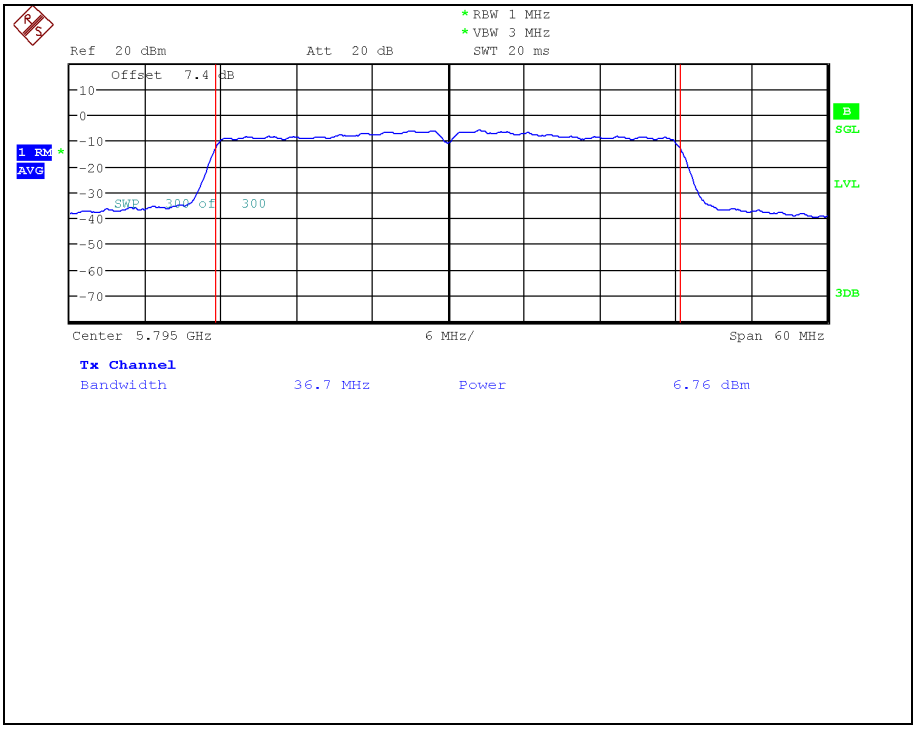
802.11n_HT40 _ ch.134 **Maximum Conducted Output Power**



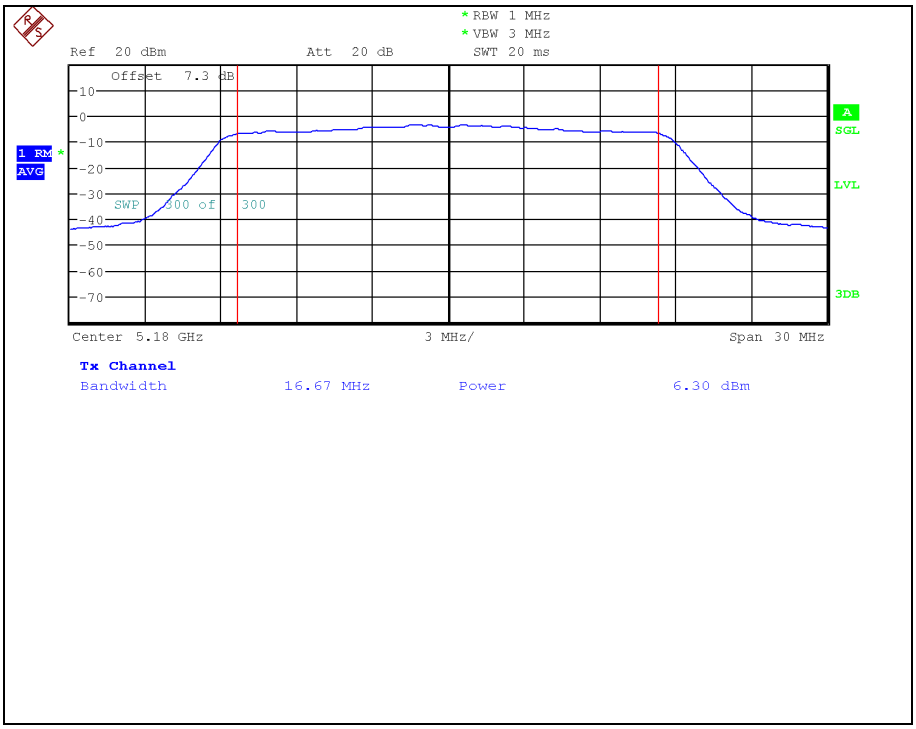
802.11n_HT40 _ ch.151 **Maximum Conducted Output Power**



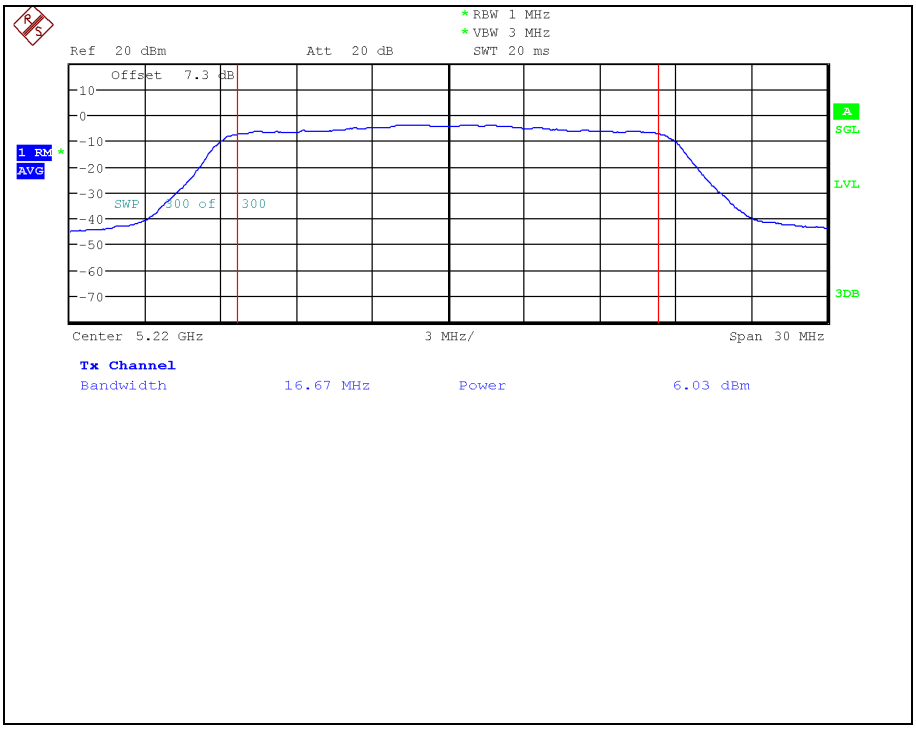
802.11n_HT40 _ ch.159 **Maximum Conducted Output Power**



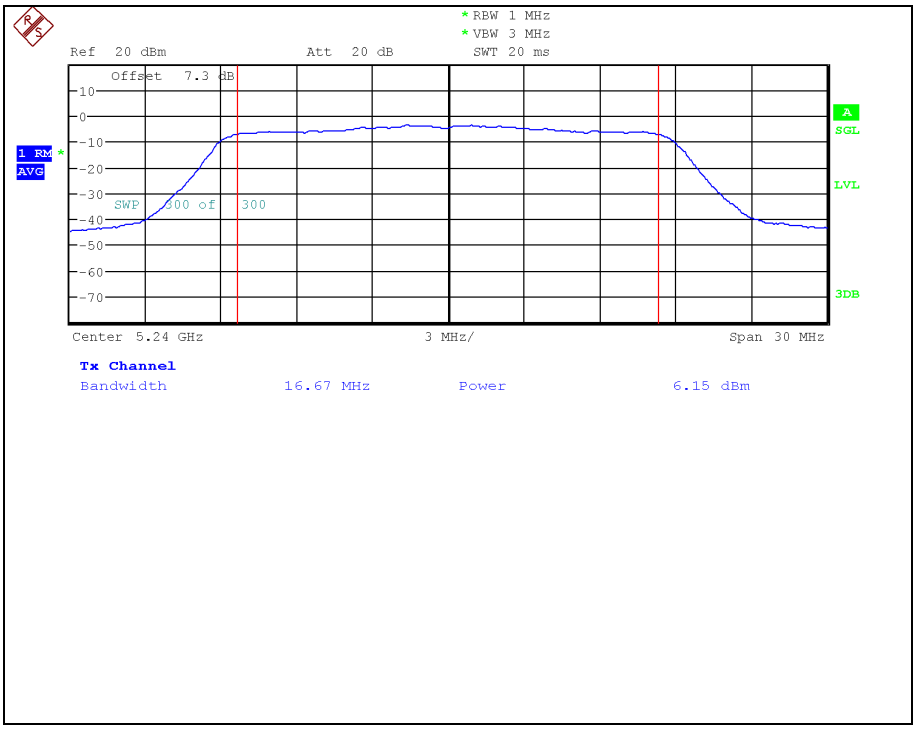
802.11ac_VHT20 _ ch.36 **Maximum Conducted Output Power**



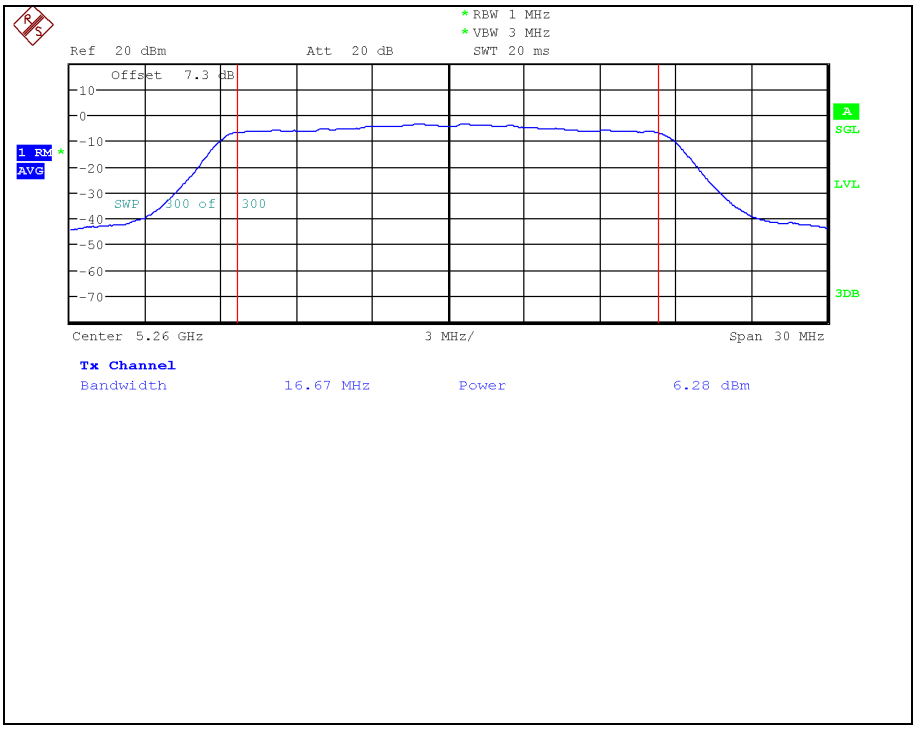
802.11ac_VHT20 _ ch.44 **Maximum Conducted Output Power**



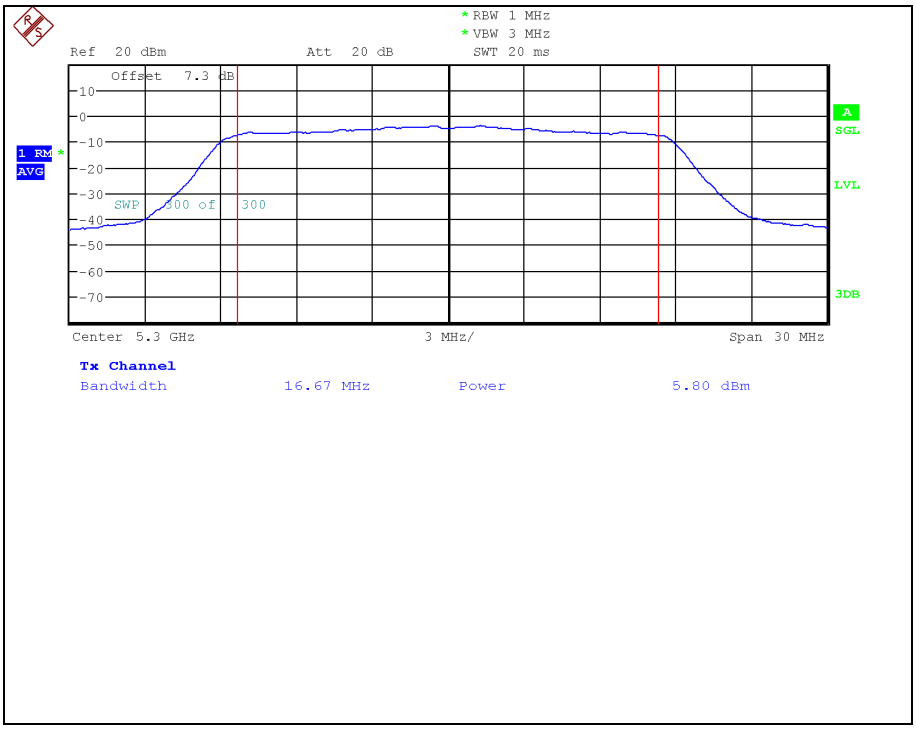
802.11ac_VHT20 _ ch.48 **Maximum Conducted Output Power**



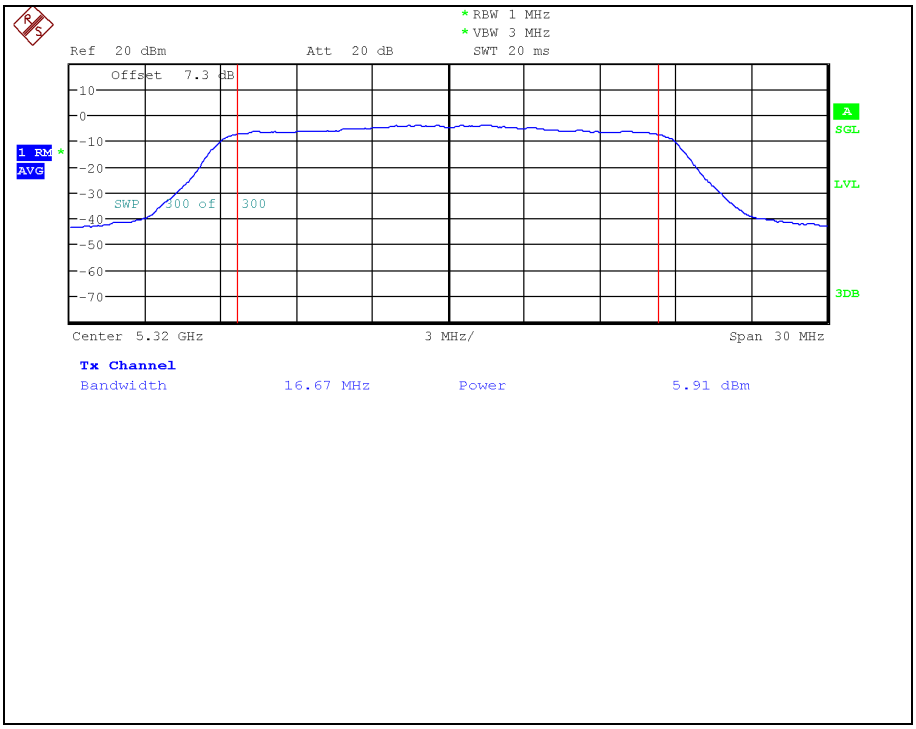
802.11ac_VHT20 _ ch.52 **Maximum Conducted Output Power**



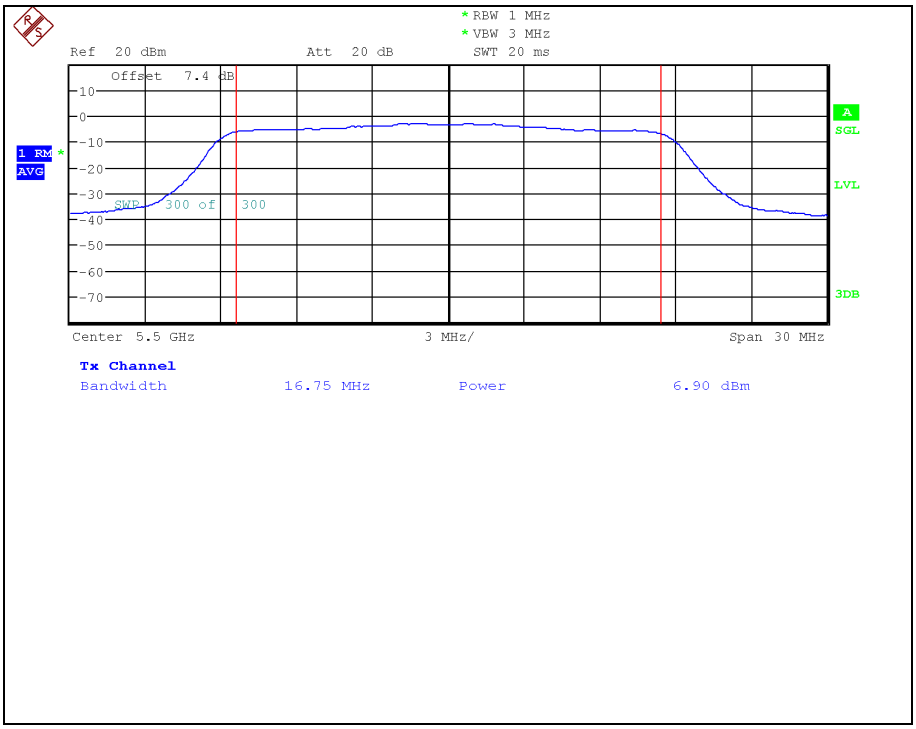
802.11ac_VHT20 _ ch.60 **Maximum Conducted Output Power**



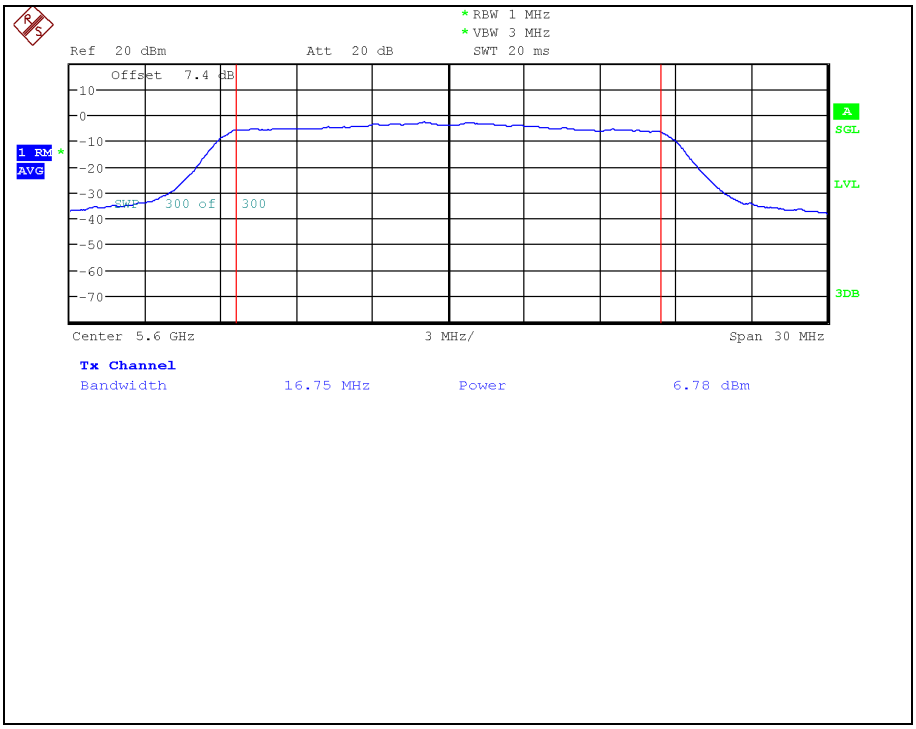
802.11ac_VHT20 _ ch.64 **Maximum Conducted Output Power**



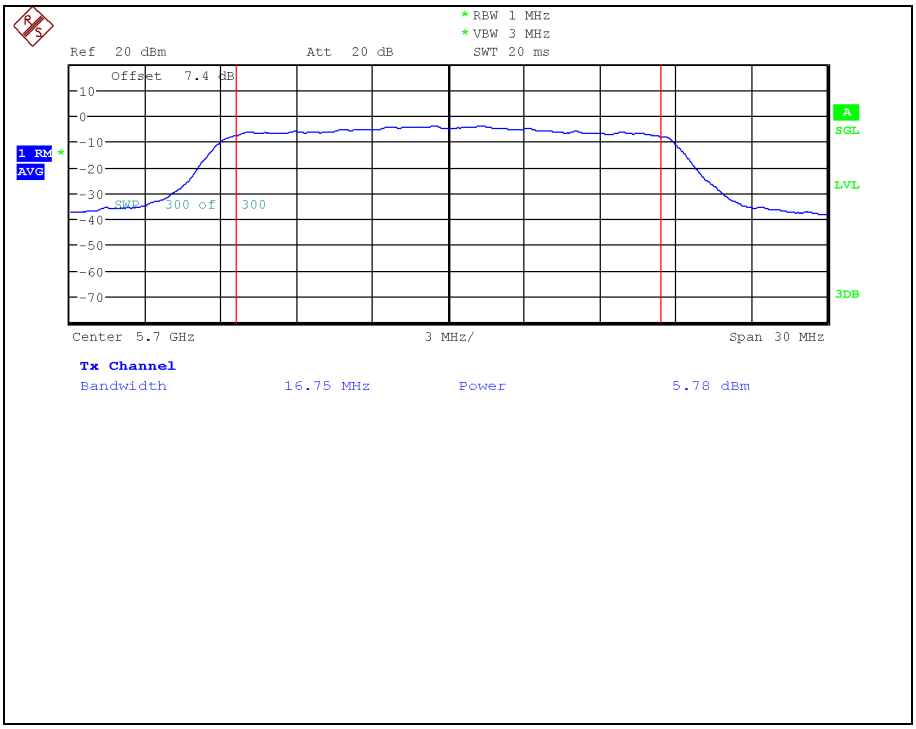
802.11ac_VHT20 _ ch.100 **Maximum Conducted Output Power**



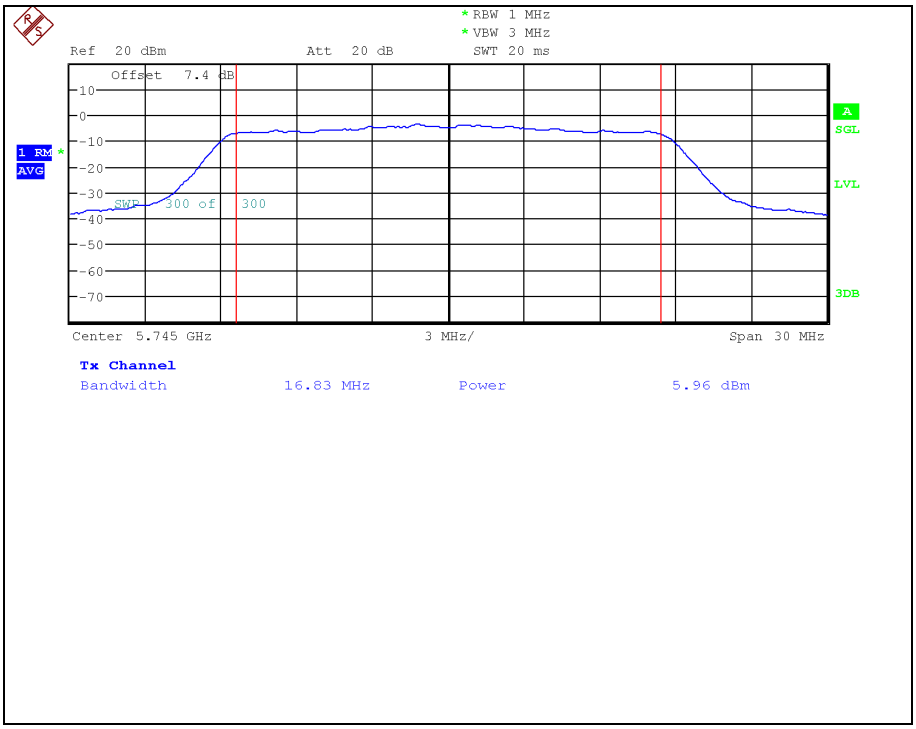
802.11ac_VHT20 _ ch.120 **Maximum Conducted Output Power**



802.11ac_VHT20 _ ch.140 **Maximum Conducted Output Power**



802.11ac_VHT20 _ ch.149 **Maximum Conducted Output Power**



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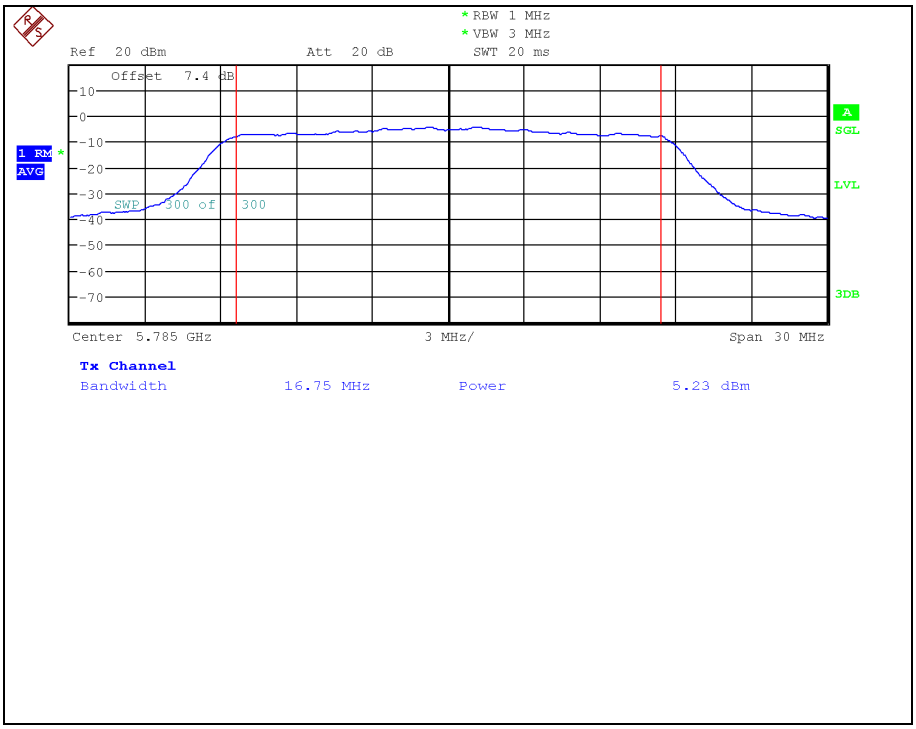
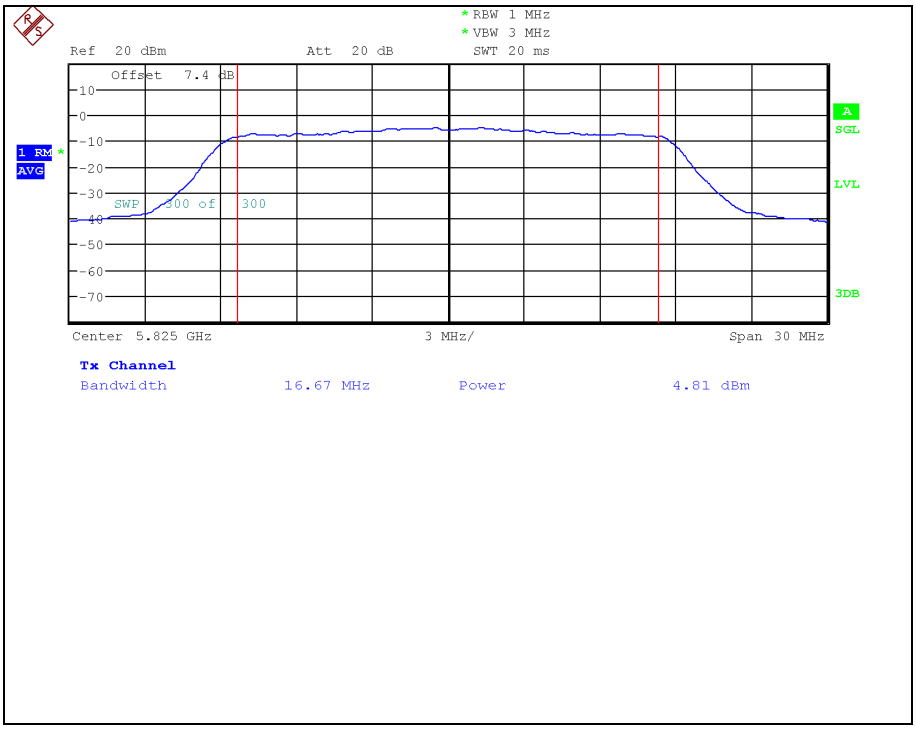
802.11ac_VHT20 _ ch.157 **Maximum Conducted Output Power**



802.11ac_VHT20 _ ch.165 **Maximum Conducted Output Power**



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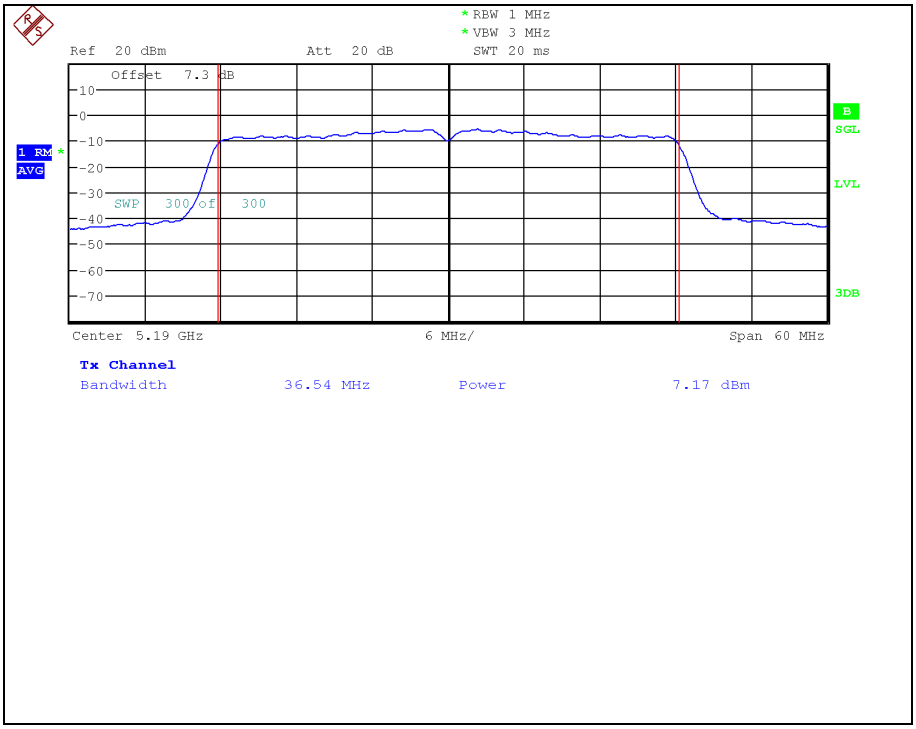
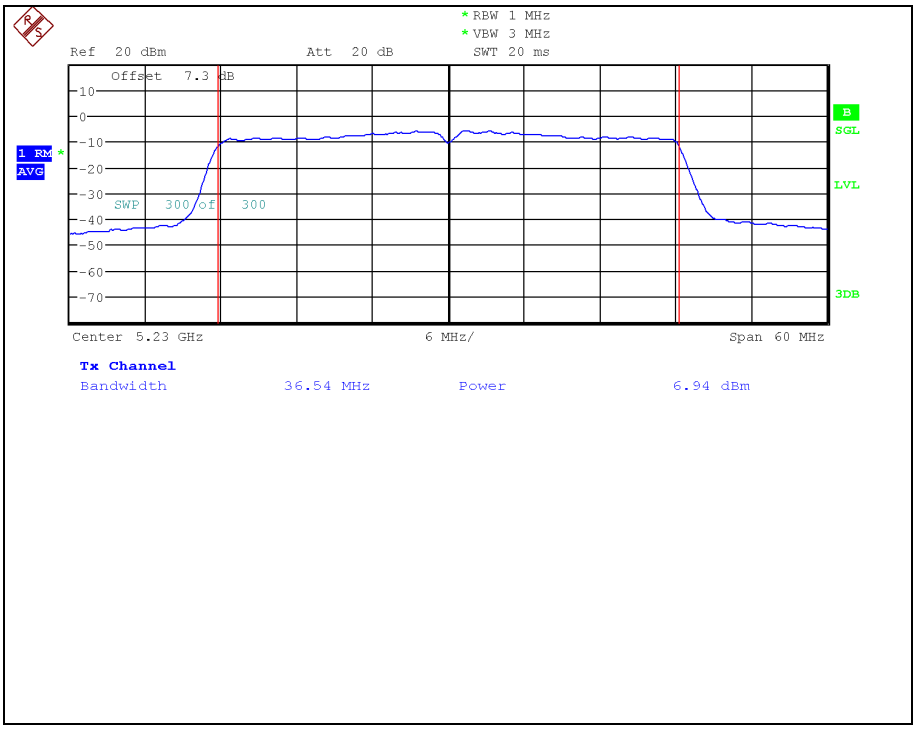
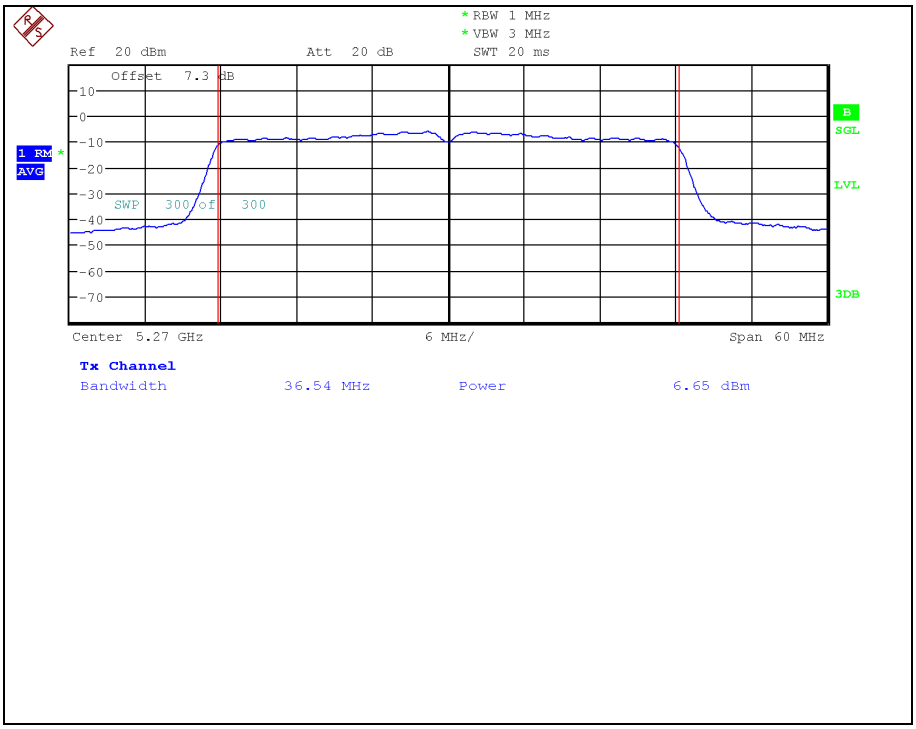
802.11ac_VHT40 _ ch.38 **Maximum Conducted Output Power**



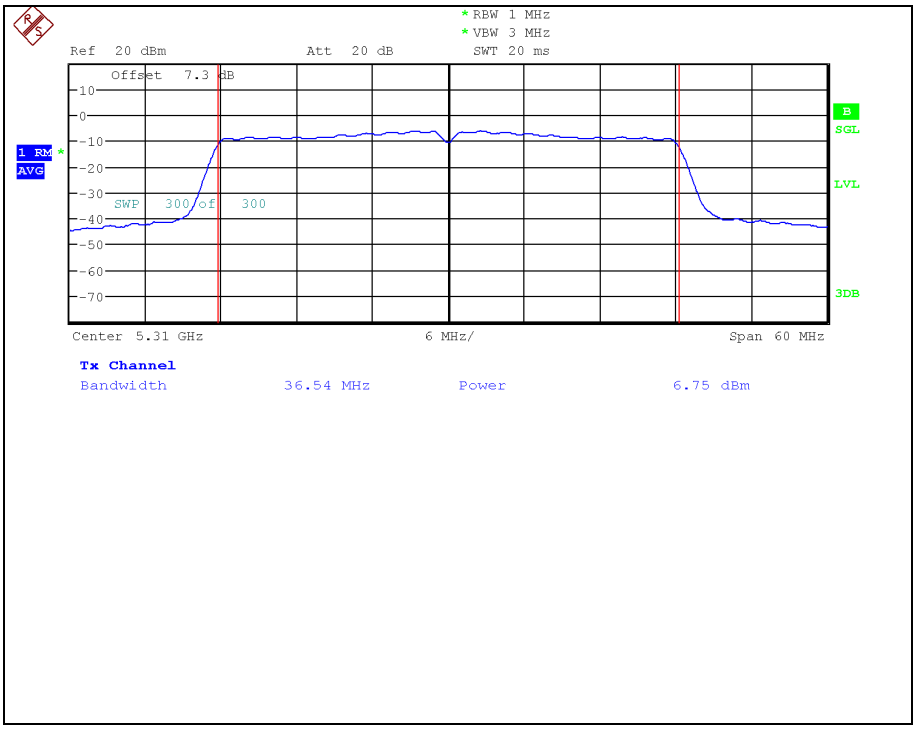
802.11ac_VHT40 _ ch.46 **Maximum Conducted Output Power**



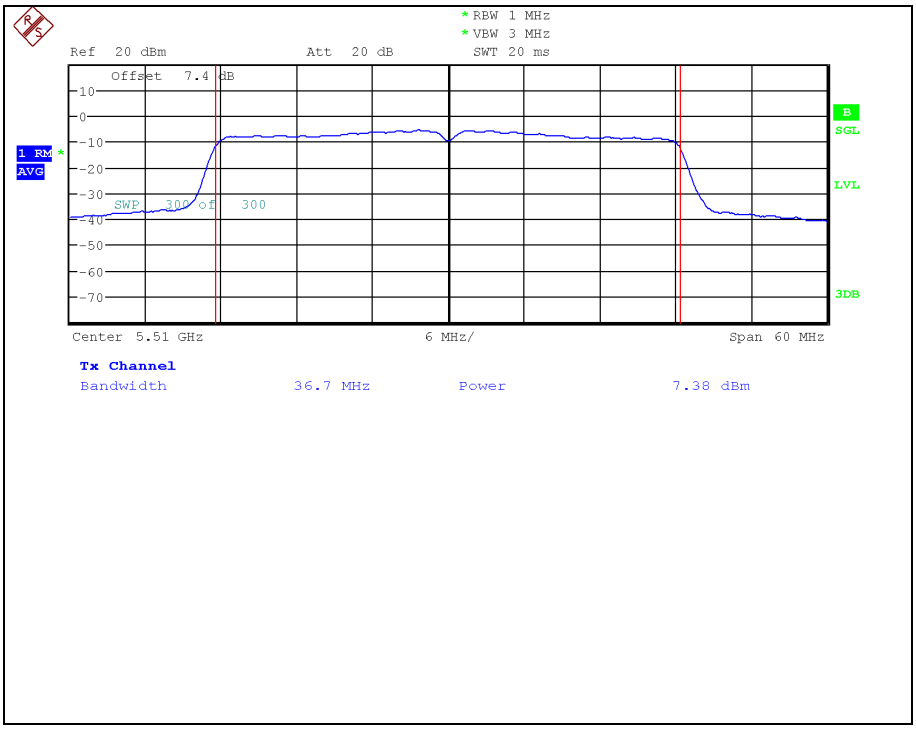
802.11ac_VHT40 _ ch.54 **Maximum Conducted Output Power**



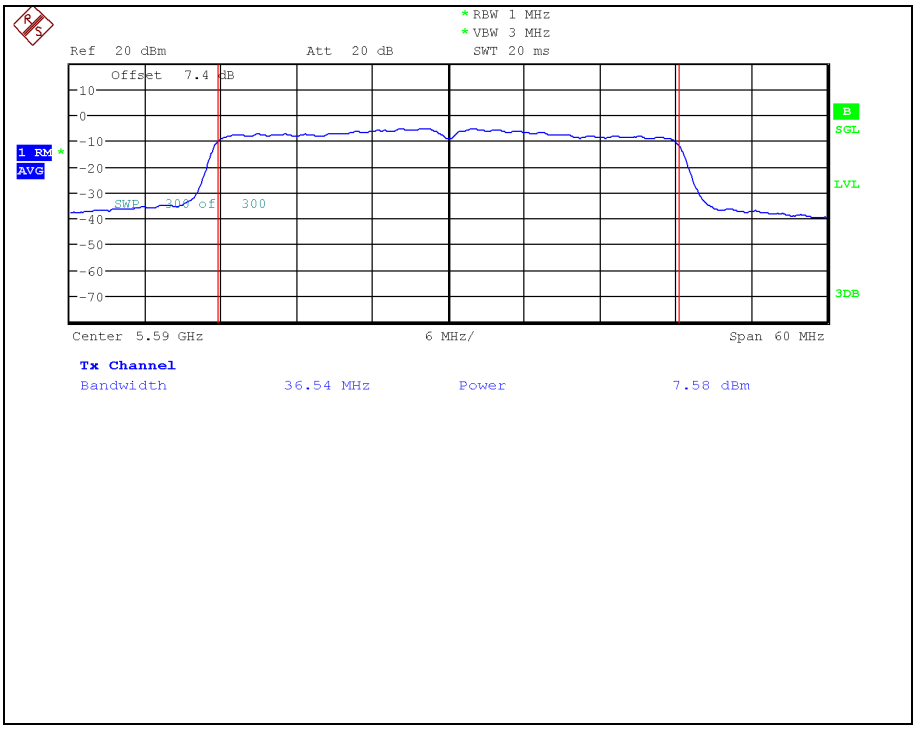
802.11ac_VHT40 _ ch.62 **Maximum Conducted Output Power**



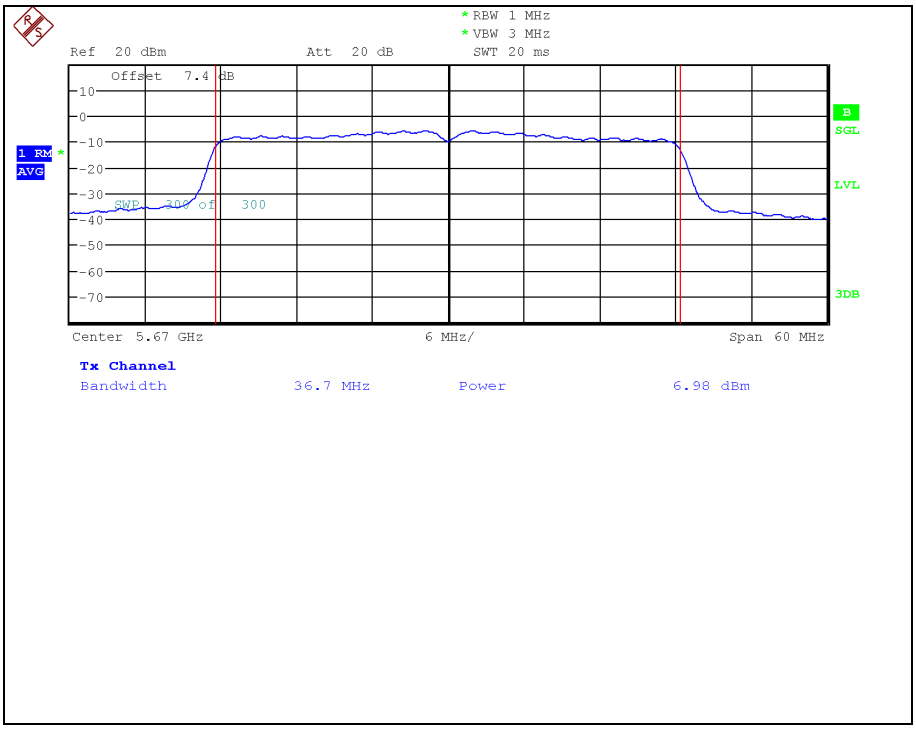
802.11ac_VHT40 _ ch.102 **Maximum Conducted Output Power**



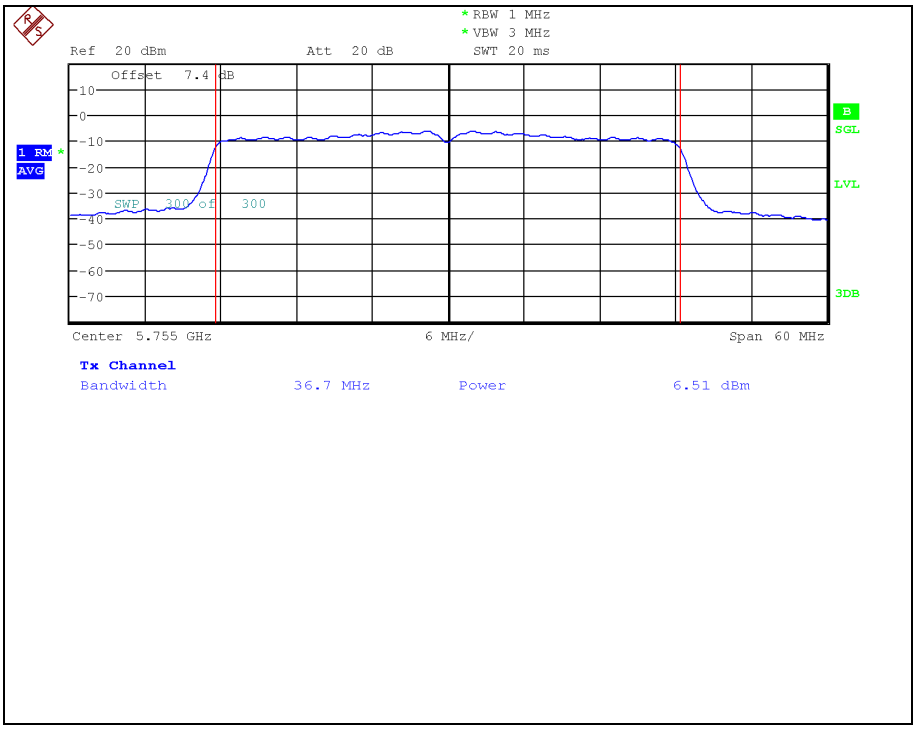
802.11ac_VHT40 _ ch.118 **Maximum Conducted Output Power**



802.11ac_VHT40 _ ch.134 **Maximum Conducted Output Power**



802.11ac_VHT40 _ ch.151 **Maximum Conducted Output Power**



802.11ac_VHT40 _ ch.159 **Maximum Conducted Output Power**