

RF TEST REPORT

Test item : Mobile Phone
Model No. : 201K
Order No. : DEMC1210-02137
Date of receipt : 2012-10-10
Test duration : 2012-11-08 ~ 2012-11-23
Date of issue : 2012-11-30
Use of report : FCC Original Grant

Applicant : KYOCERA Corporation
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Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification : FCC Part 15.407 Subpart E
ANSI C63.10-2009, KDB 789033

Test environment : See appended test report

Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of Digital EMC Co., Ltd.

Tested by:

A blue ink signature, appearing to be "Jae-Jin, Lee", written in a cursive style.

Engineer
Jae-Jin, Lee

Witnessed by:

N/A

Reviewed by:

A blue ink signature, appearing to be "Harvey Sung", written in a cursive style.

Technical Director
Harvey Sung

Test Report Version

Test Report No.	Date	Description
DRTFCC1211-0835	Nov. 30, 2012	Final version for approval

CONTENTS

1. EUT information.....	4
1.1 EUT description.....	4
1.2 Ancillary equipment	4
2. Information about test items.....	5
2.1 Test mode / Channel Information.....	5
2.2 Tested Channel Information.....	5
2.3 Auxiliary equipment	5
2.4 Tested environment	6
2.5 EMI Suppression Device(s)/Modifications	6
3. Test Report.....	7
3.1 Summary of tests	7
3.2 Transmitter requirements.....	8
3.2.1 26 dB Bandwidth	8
3.2.2 Output Power	25
3.2.3 Peak Power Spectral Density	43
3.2.4 Peak Excursion Ratio.....	61
3.2.5 Frequency Stability.....	78
3.2.6 Radiated Spurious Emission Measurements.....	81
3.2.7 AC Conducted Emissions.....	93
3.2.8 Antenna Requirements.....	100
3.2.9 Occupied Bandwidth	101
4. LIST OF TEST EQUIPMENT.....	102
APPENDIX I	103
APPENDIX II	104

1. EUT information

1.1 EUT description

FCC Equipment Class	Unlicensed National Information Infrastructure (UNII)
Product	Mobile Phone
Model Name	201K
Add Model Name	N/A
Equipment serial no.	Identical prototype
Frequency Range	802.11a/n(20MHz) : Band I: 5180 ~ 5240MHz Band II: 5260 ~ 5320MHz Band III: 5500 ~ 5700MHz
	802.11n(40MHz) : Band I: 5190 ~ 5230MHz Band II: 5270 ~ 5310MHz Band III: 5510 ~ 5670MHz
Channels	802.11a/n(20MHz): 4 (Band I) / 4 (Band II) / 8 (Band III) 802.11n(40MHz): 2 (Band I) / 2 (Band II) / 3 (Band III)
Modulation type	802.11a/n : OFDM
Data rate	802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n(20MHz): 6.5, 7.2, 13, 14.4, 19.5, 21.7, 26, 28.9, 39, 43.3, 52, 57.8, 58.5, 65, 72.2 Mbps 802.11n(40MHz): 13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150 Mbps
Antenna Specification	Internal Antenna (1TX / 1RX) / Max. peak gain: 0 dBi
Power Supply	DC 3.8 V

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2. Information about test items

2.1 Test mode / Channel Information

5GHz Band	Mode	Data Rate
Band I	802.11a	6Mbps
	802.11n(20MHz)	MCS0
	802.11n(40MHz)	MCS0
Band II	802.11a	6Mbps
	802.11n(20MHz)	MCS0
	802.11n(40MHz)	MCS0
Band III	802.11a	6Mbps
	802.11n(20MHz)	MCS0
	802.11n(40MHz)	MCS0

For all test items, the low, middle and high channels of the modes were tested with above worst case data rate.

2.2 Tested Channel Information

5GHz Band	802.11a/n(20MHz)		802.11n(40MHz)	
	Channel	Frequency [MHz]	Channel	Frequency [MHz]
Band I	36	5180	38	5190
	40	5200	-	-
	48	5240	46	5230
Band II	52	5260	54	5270
	60	5300	-	-
	64	5320	62	5310
Band III	100	5500	102	5510
	116	5580	110	5550
	140	5700	134	5670

2.3 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2.4 Tested environment

Temperature	: 20 ~ 25 °C
Relative humidity content	: 40 ~ 54 % R.H.
Details of power supply	: DC 3.8 V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter Mode (TX)					
15.407(a)	N/A	26 dB Bandwidth for FCC	N/A	Conducted	C
15.407(a)	RSS-210 [A9.2]	Maximum Conducted Output Power	$< 4 + 10\log_{10}(B)$ dBm (5150-5250) $< 11 + 10\log_{10}(B)$ dBm (5250-5350) $< 11 + 10\log_{10}(B)$ dBm (5470-5725)		C
15.407(a)	RSS-210 [A9.2]	Peak Power Spectral Density	< 4 dBm/MHz (5150-5250) < 11 dBm/MHz (5250-5350) < 11 dBm/MHz (5470-5725)		C
15.407(a)	N/A	Peak Excursion	< 13 dB/MHz maximum difference		C
15.407(g)	N/A	Frequency Stability	N/A		C
-	RSS Gen [4.6.1]	Occupied Bandwidth (99%)	N/A		NA
15.407(b)	RSS-210 [A9.2]	Undesirable Emissions	< -27 dBm/MHz EIRP (5150-5725)	Radiated	C
15.205 15.209 15.407(b)	RSS-Gen [7.2.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		C
15.407(h)	RSS-210 [A9.3]	Dynamic Frequency Selection	See DFS Test Report		C Note3
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	FCC 15.207	AC Line Conducted	C
15.203	RSS-Gen [7.1.2]	Antenna Requirements	FCC 15.203	-	C
Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable Note 2: These test items were performed in each axis and the worst case data was reported. Note 3: Refer to the DFS Test Report.					

3.2 Transmitter requirements

3.2.1 26 dB Bandwidth

Test Requirements

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

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of **KDB789033**.

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**.

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%.

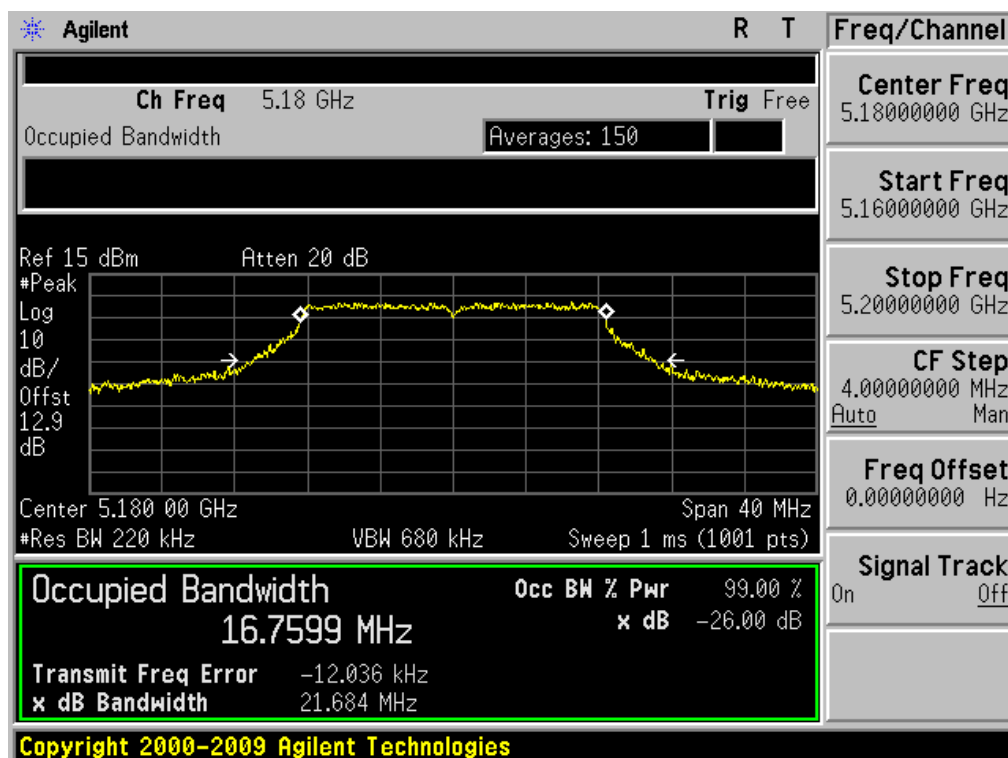
■ TEST RESULTS: **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	Band I	36	5180	21.684
		40	5200	21.913
		48	5240	21.812
	Band II	52	5260	21.665
		60	5300	21.598
		64	5320	21.673
	Band III	100	5500	21.776
		116	5580	21.677
		140	5700	21.478
802.11n (20MHz)	Band I	36	5180	21.966
		40	5200	21.995
		48	5240	21.984
	Band II	52	5260	21.877
		60	5300	21.942
		64	5320	21.823
	Band III	100	5500	21.981
		116	5580	21.943
		140	5700	21.866
802.11n (40MHz)	Band I	38	5190	42.944
		46	5230	42.643
	Band II	54	5270	42.179
		62	5310	42.616
	Band III	102	5510	42.920
		110	5550	42.967
		134	5670	42.404

RESULT PLOTS

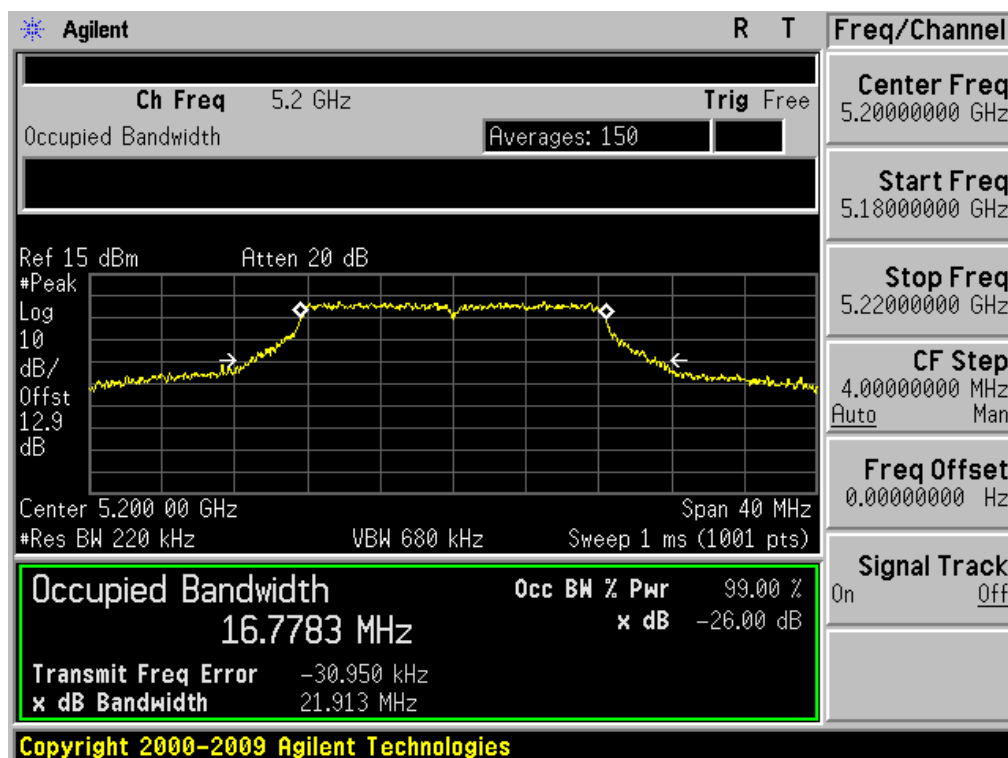
26 dB Bandwidth

Test Mode: 802.11a & Ch.36



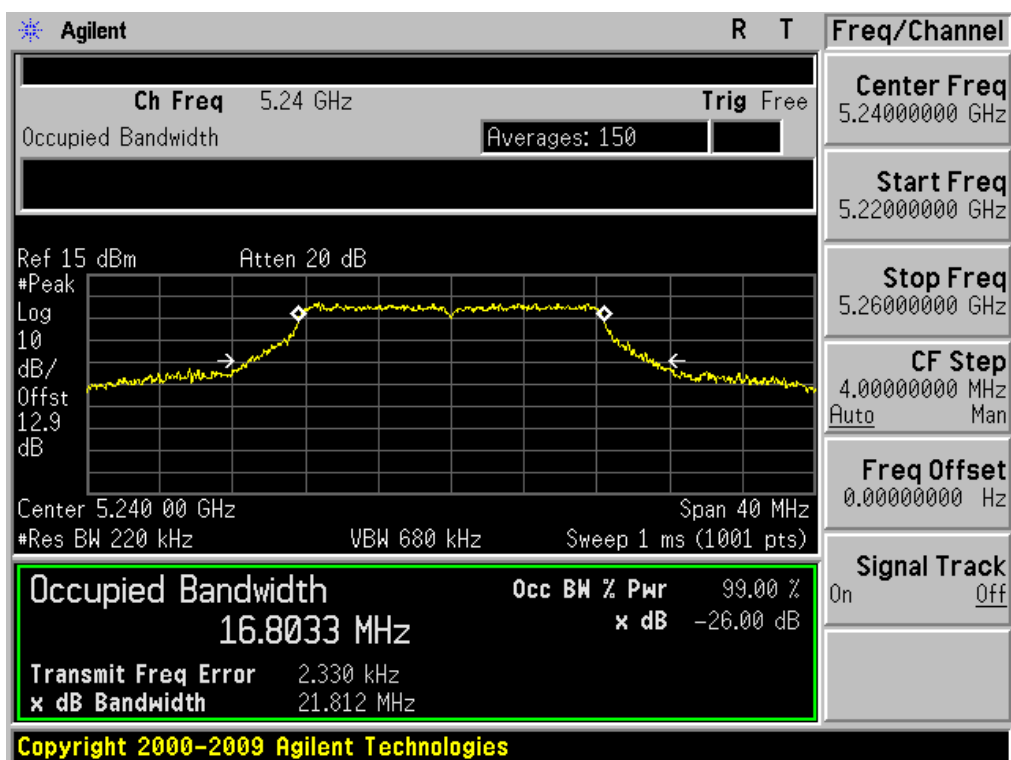
26 dB Bandwidth

Test Mode: 802.11a & Ch.40



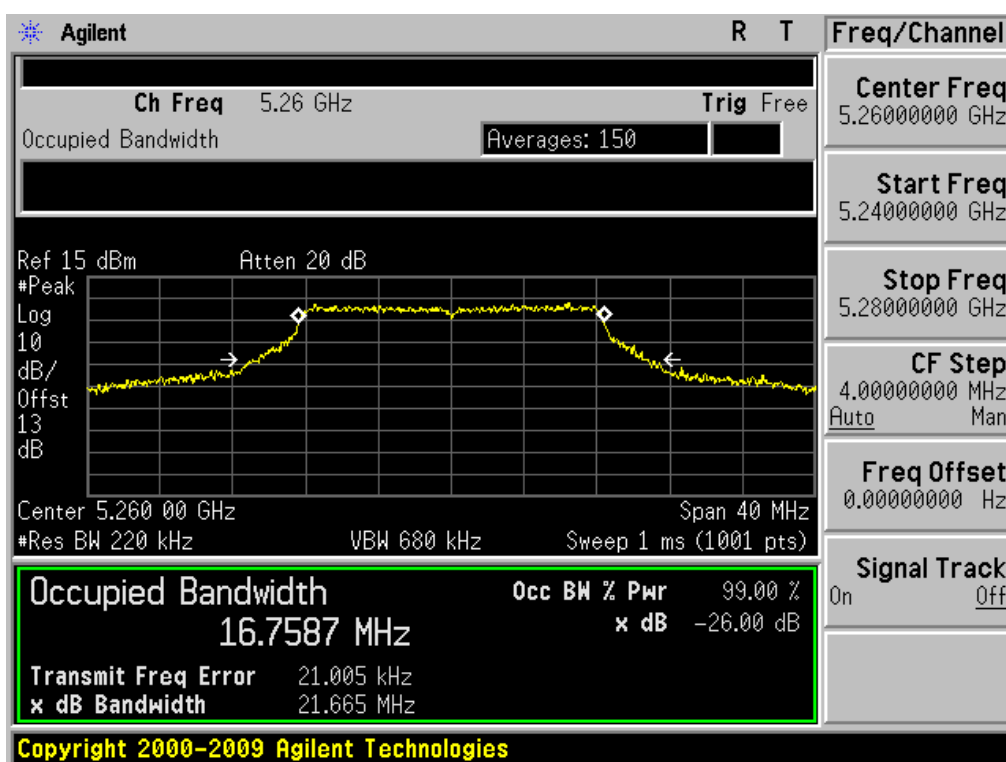
26 dB Bandwidth

Test Mode: 802.11a & Ch.48



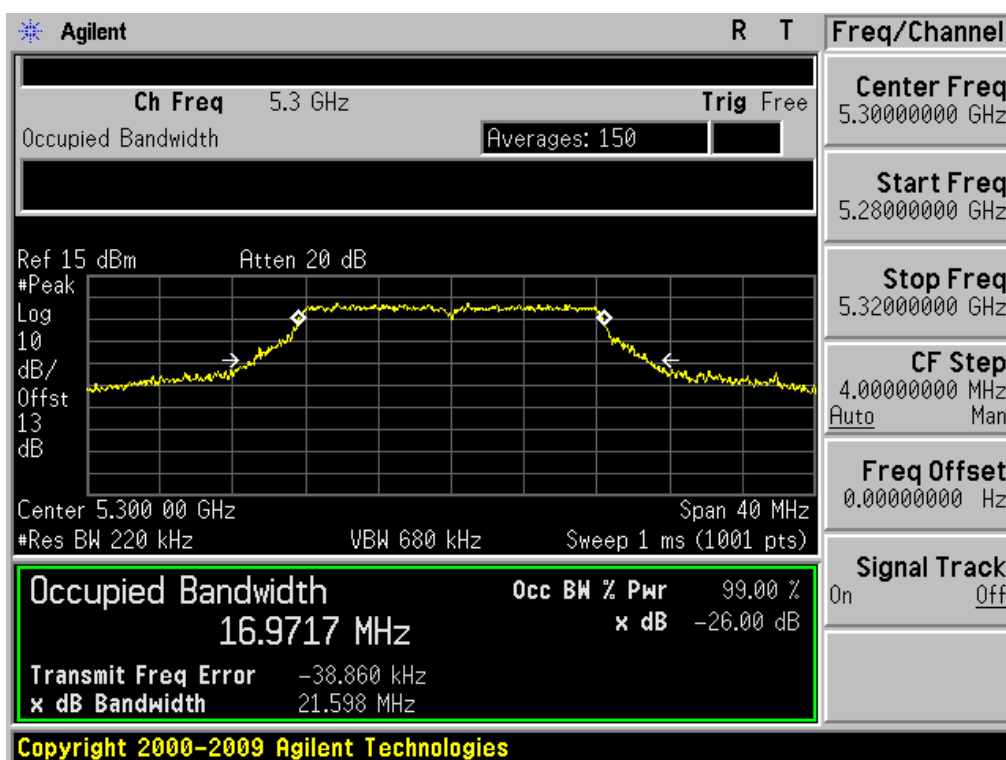
26 dB Bandwidth

Test Mode: 802.11a & Ch.52



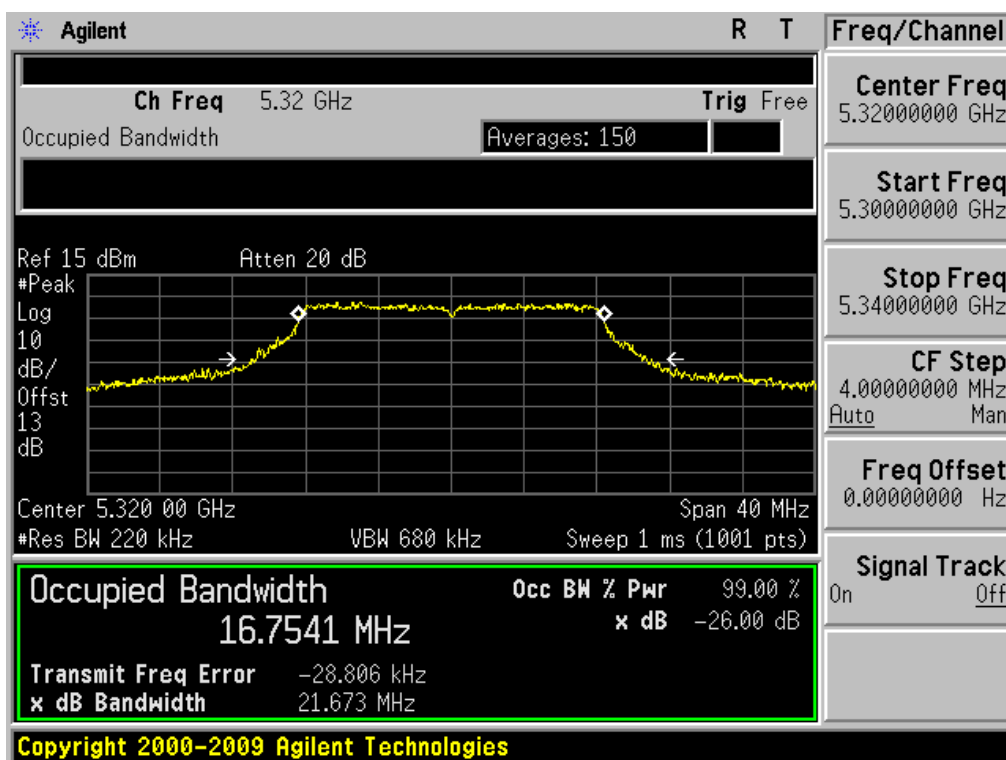
26 dB Bandwidth

Test Mode: 802.11a & Ch.60



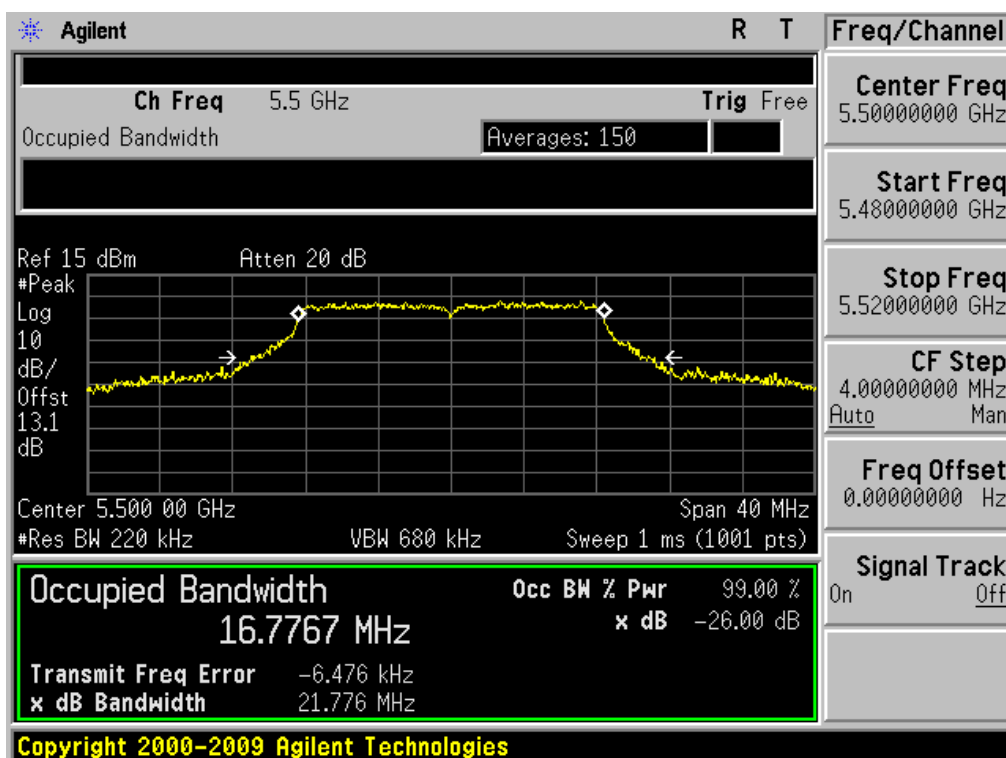
26 dB Bandwidth

Test Mode: 802.11a & Ch.64



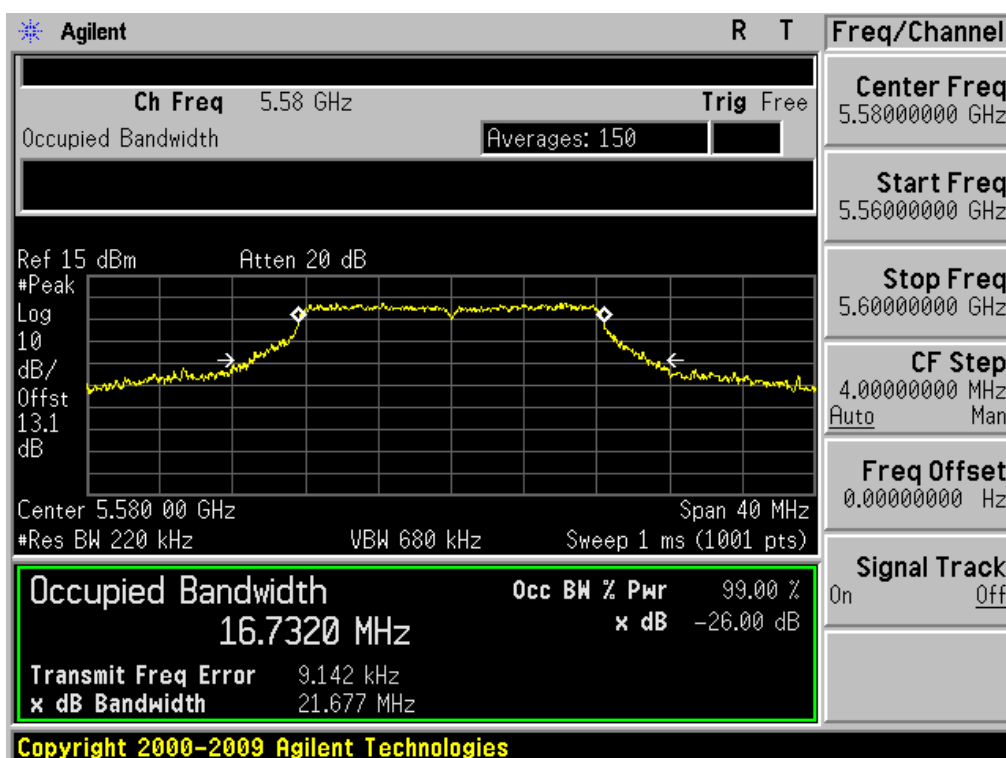
26 dB Bandwidth

Test Mode: 802.11a & Ch.100



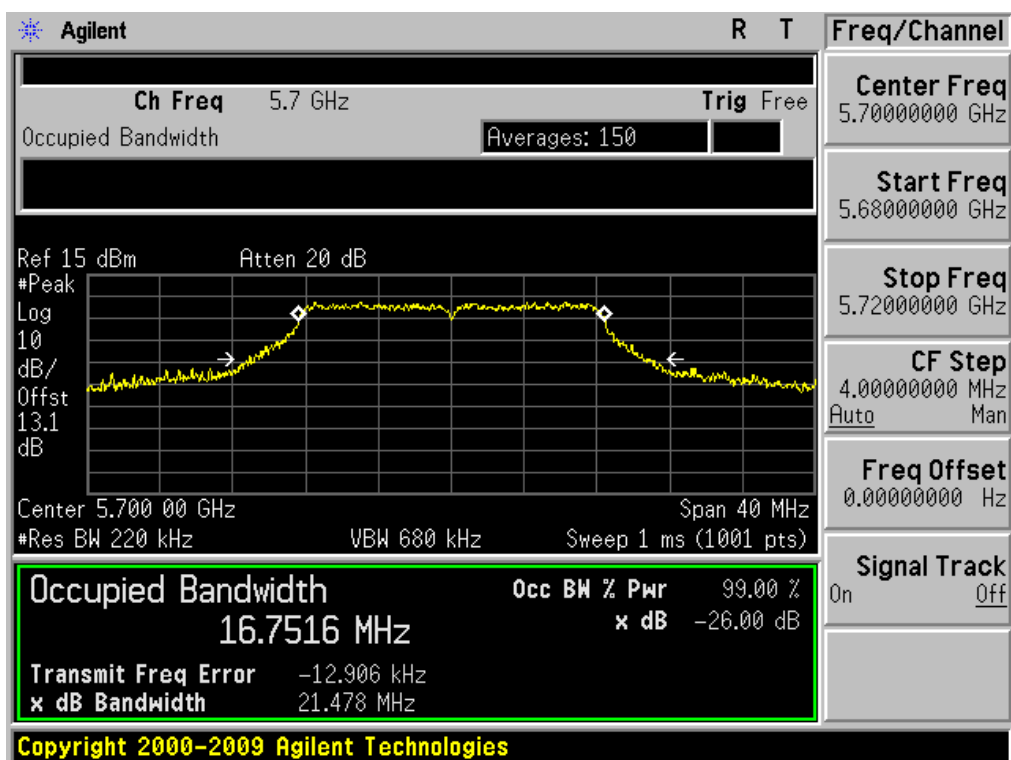
26 dB Bandwidth

Test Mode: 802.11a & Ch.116



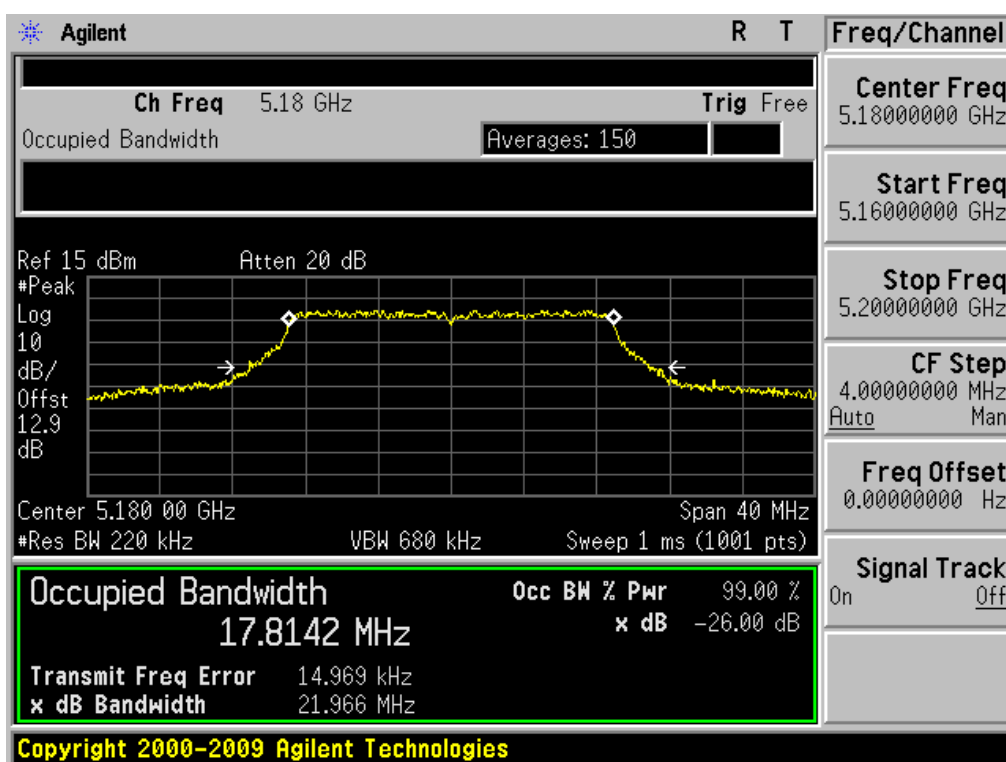
26 dB Bandwidth

Test Mode: 802.11a & Ch.140



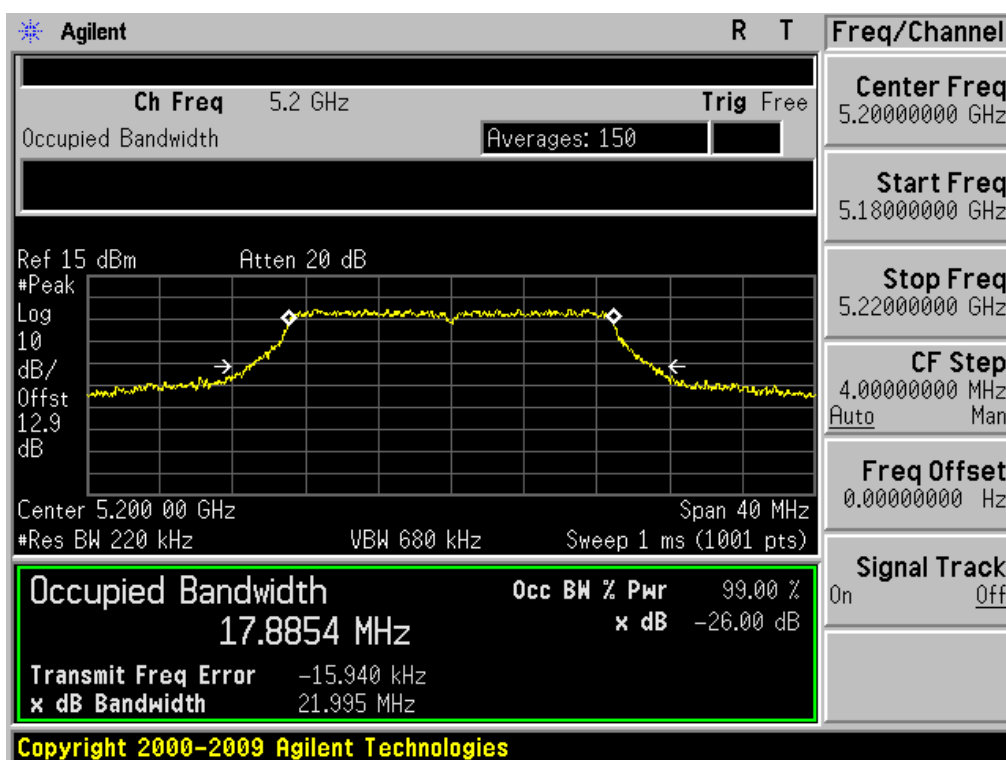
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.36



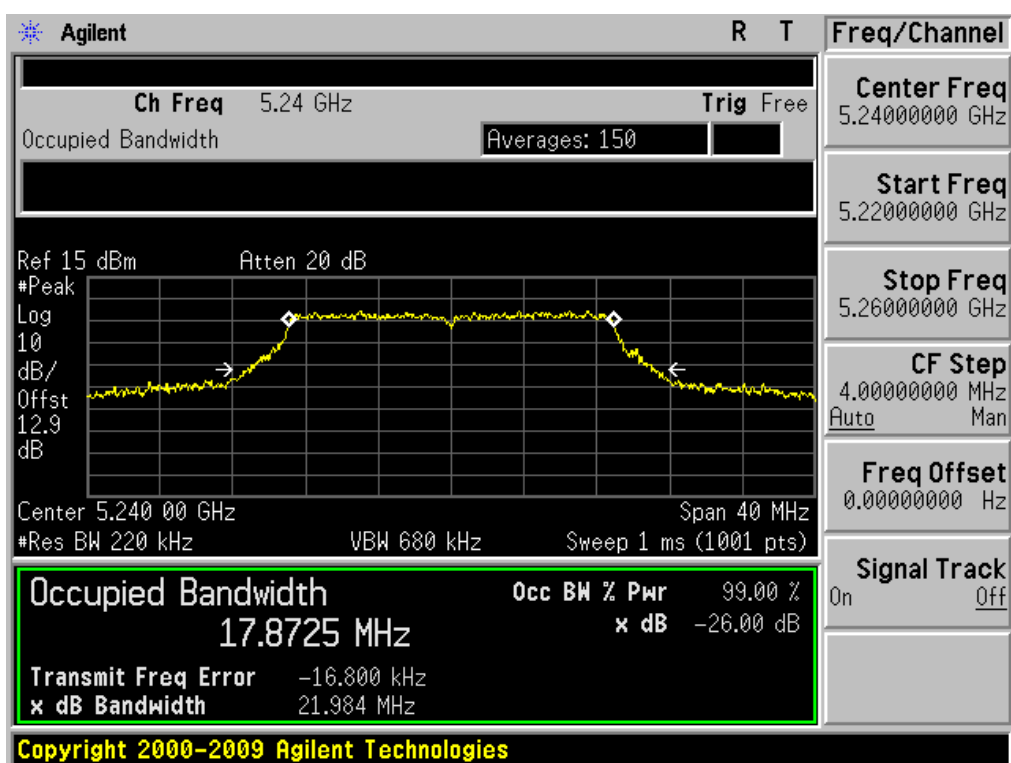
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.40



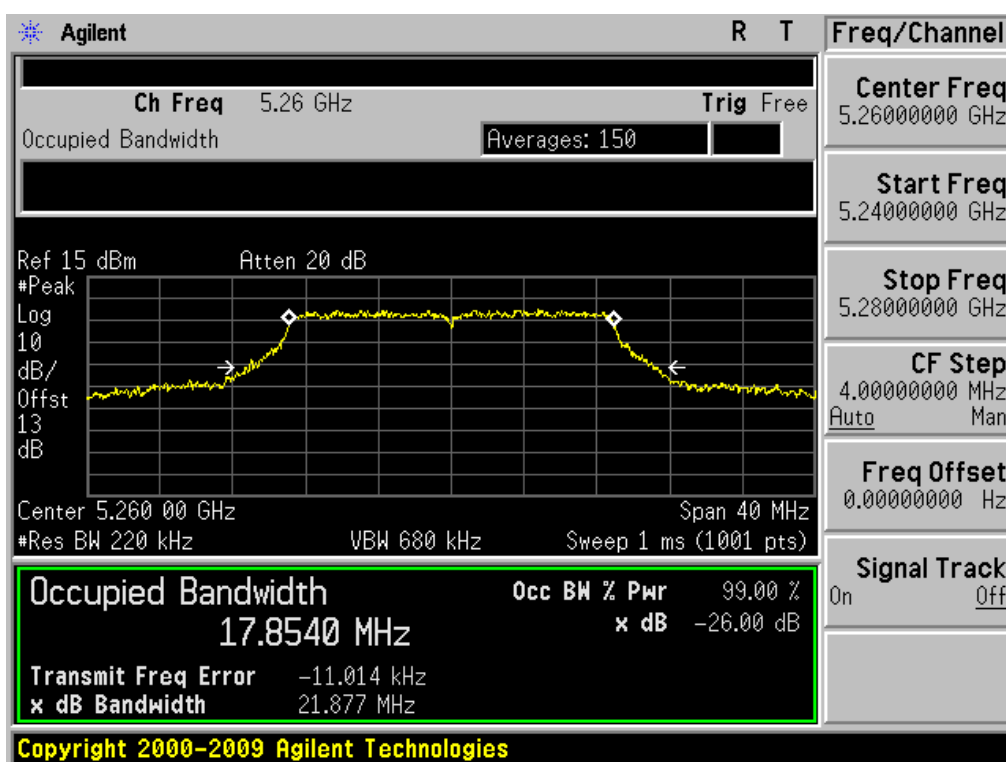
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.48



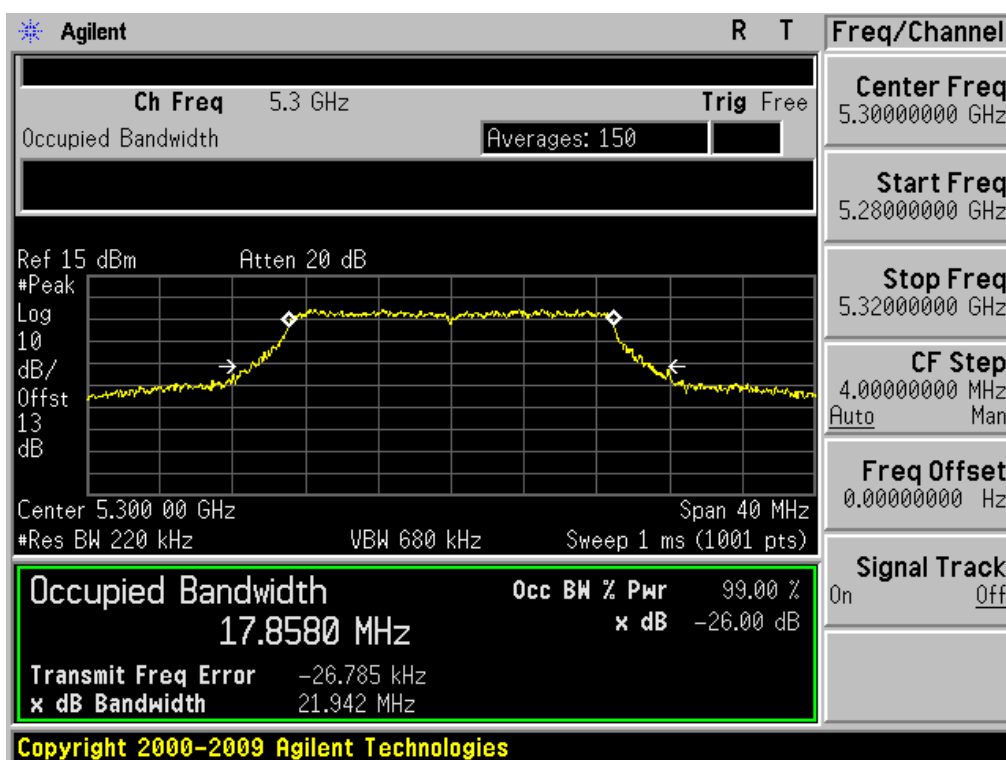
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.52



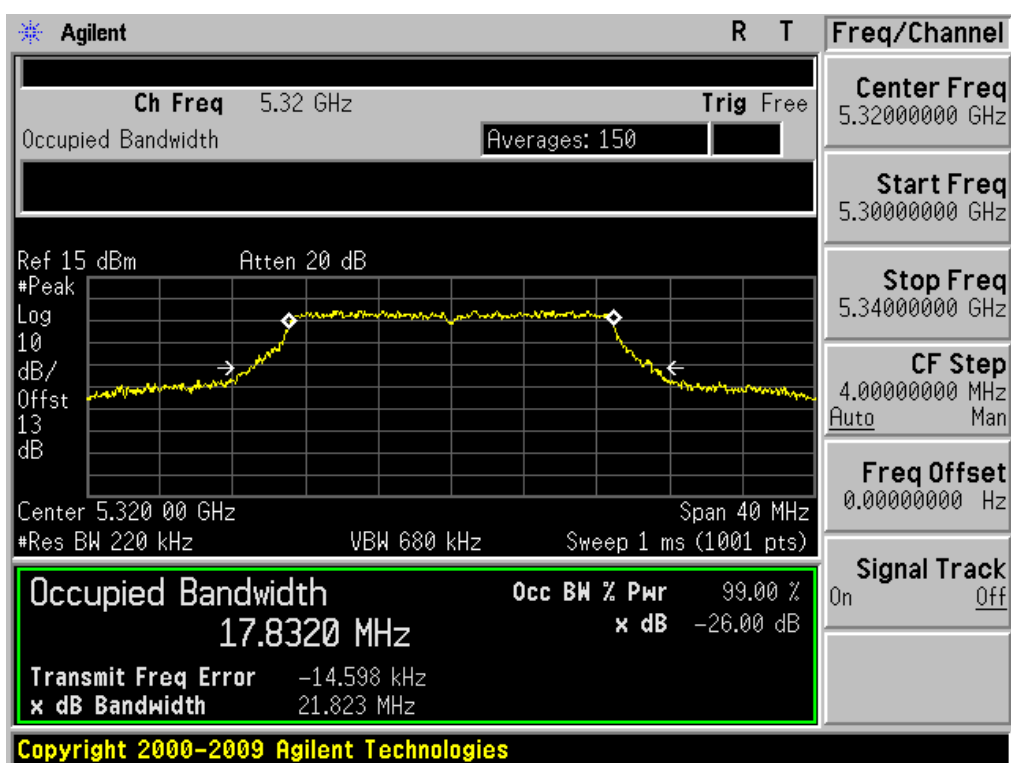
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.60



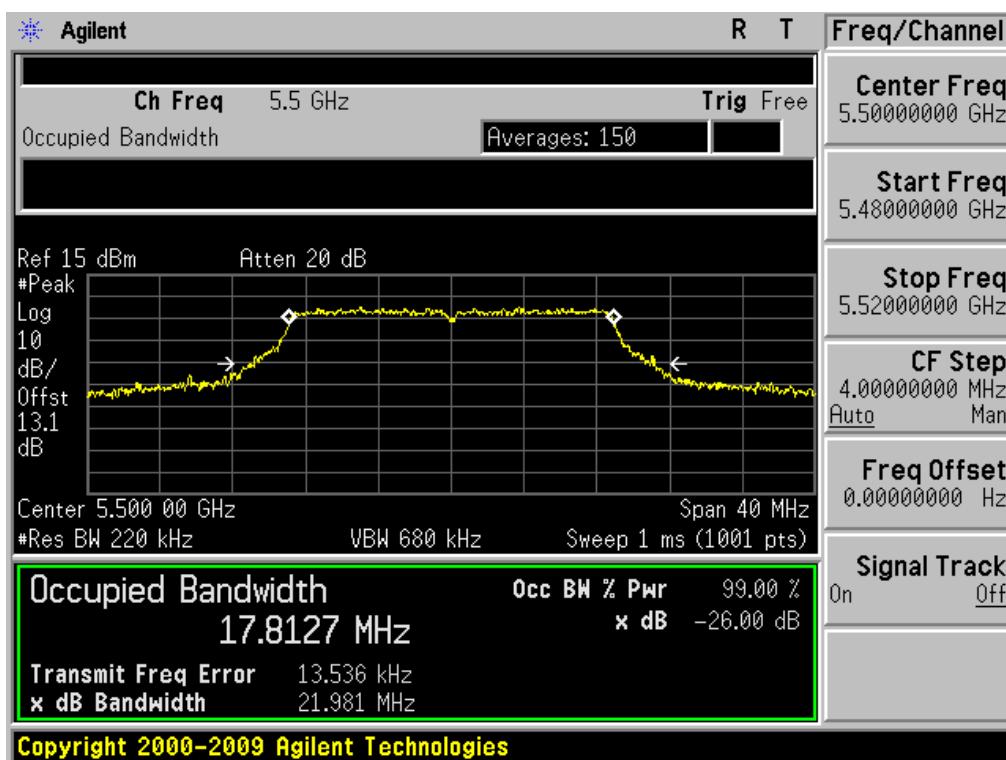
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.64



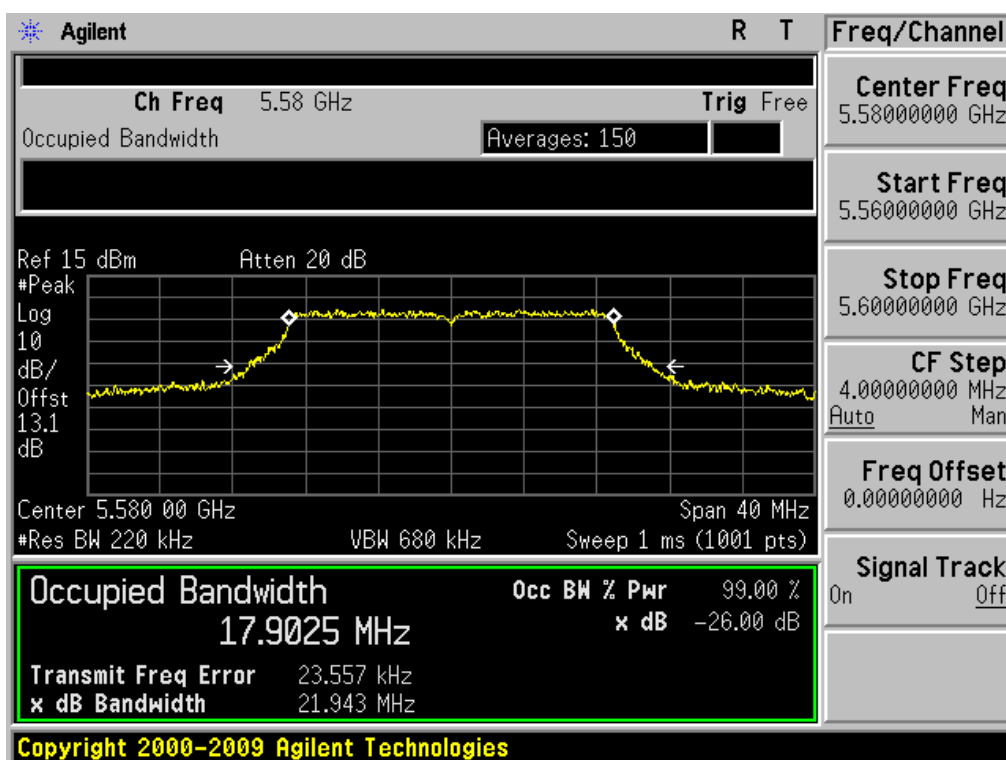
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.100



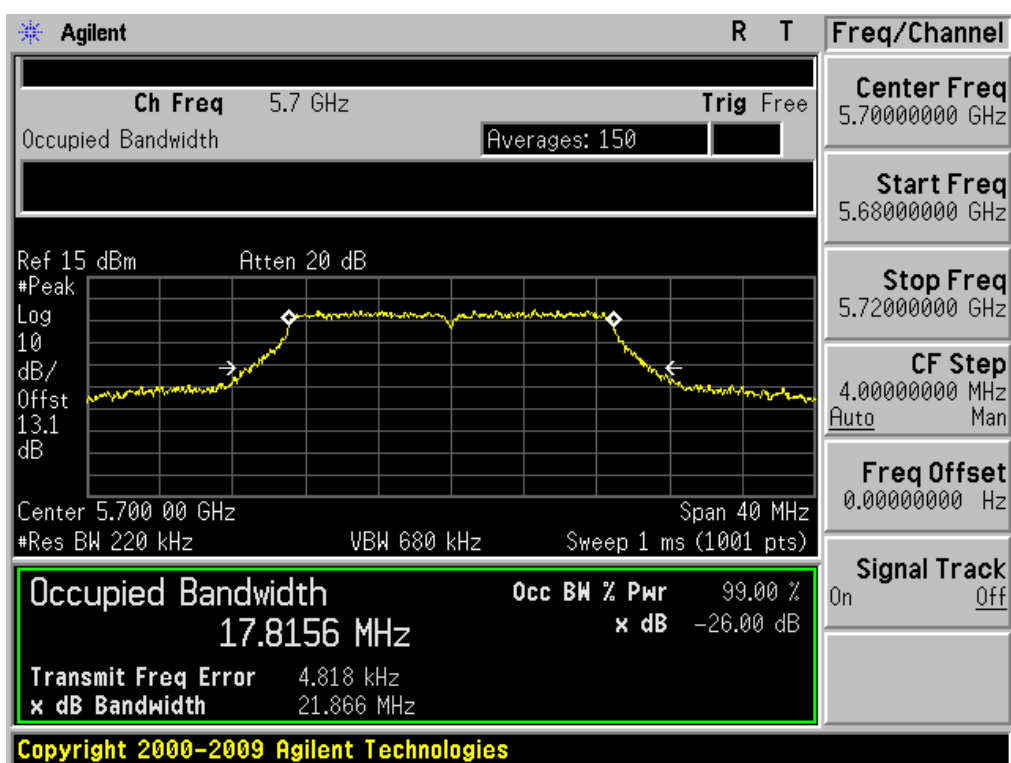
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.116



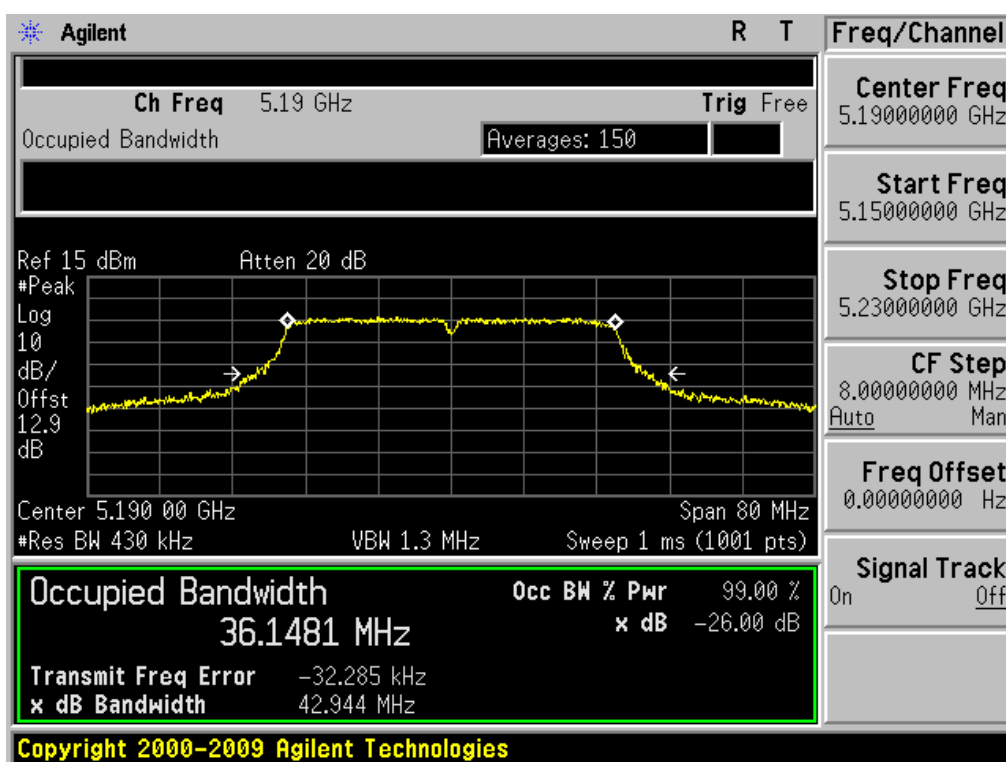
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.140



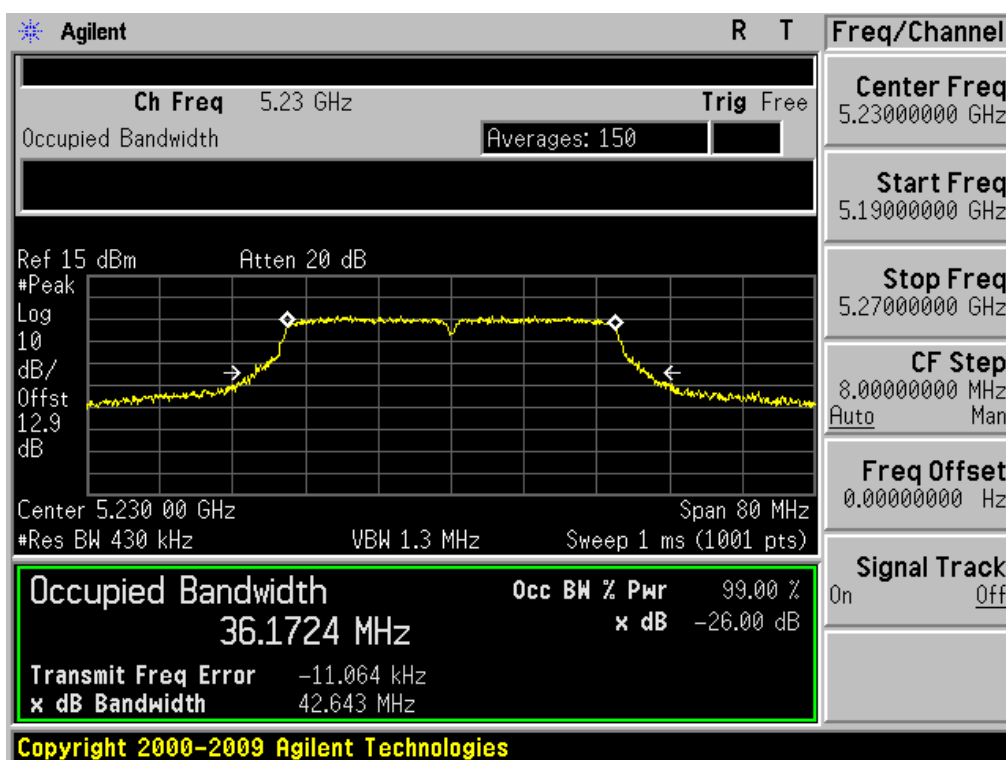
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.38



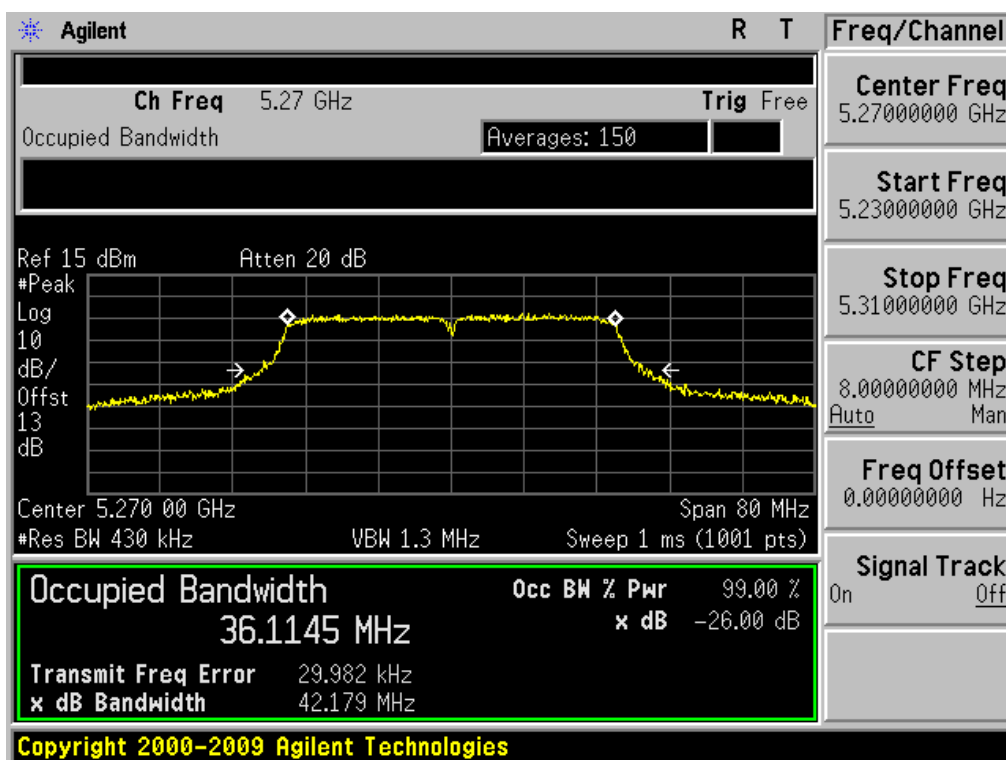
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.46



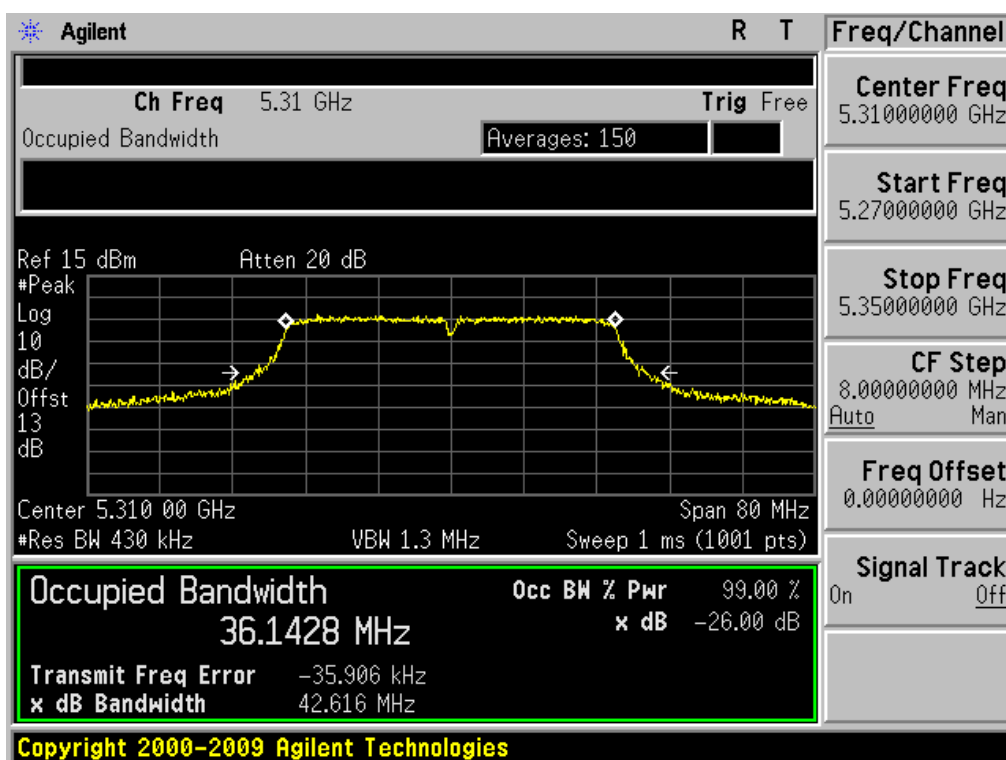
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.54



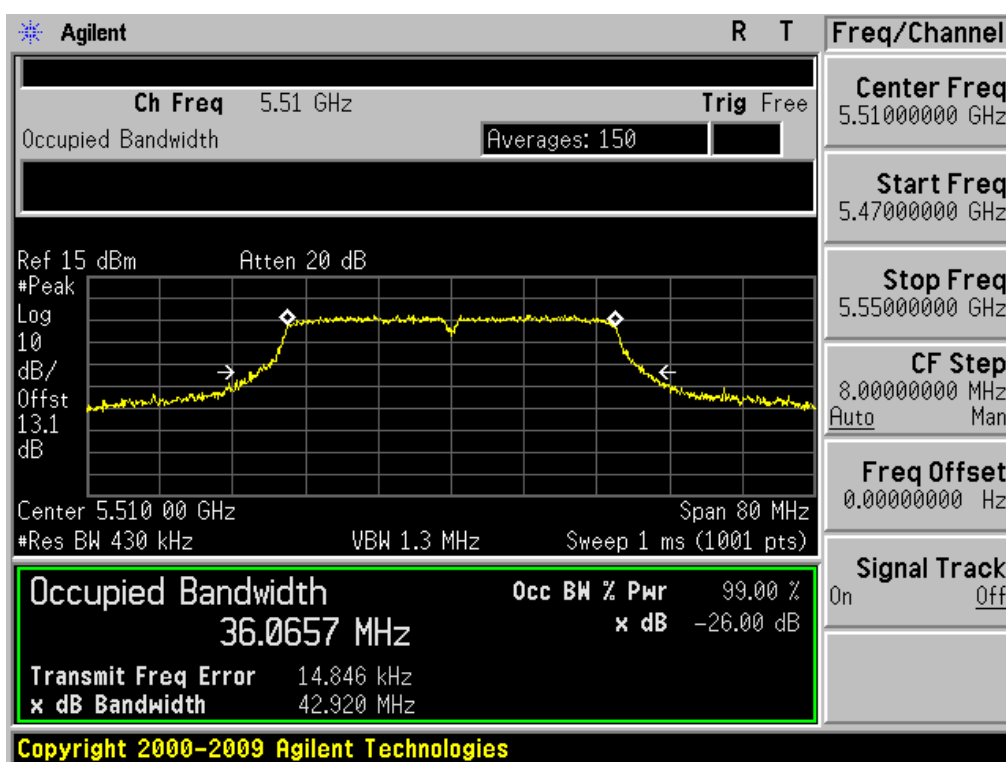
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.62



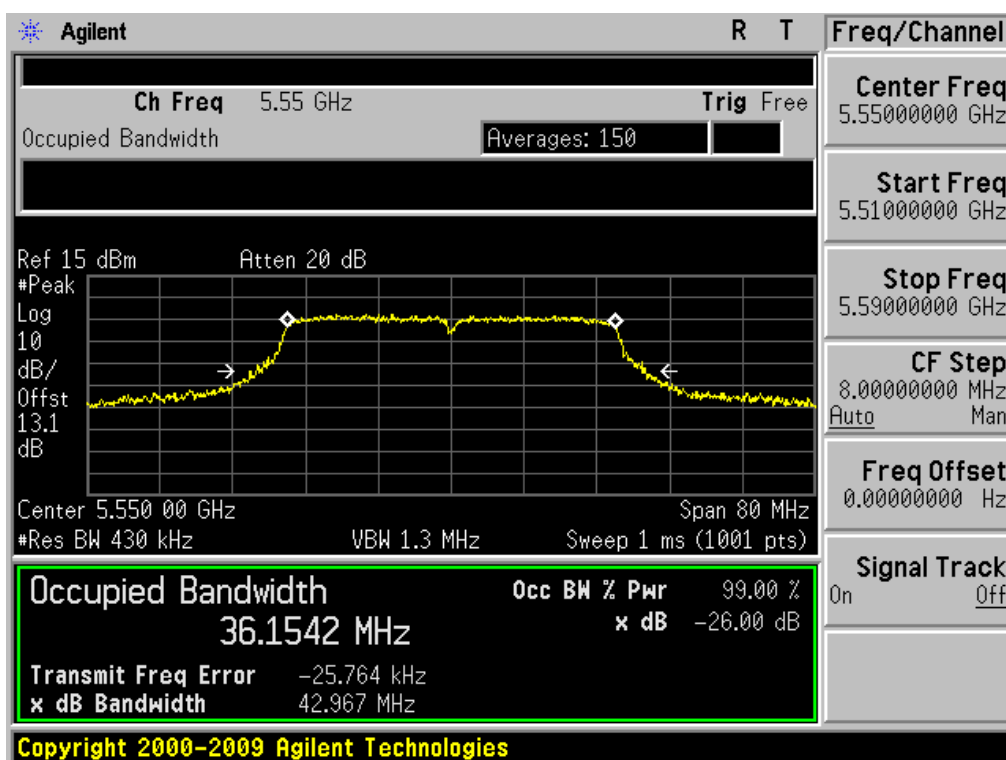
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.102



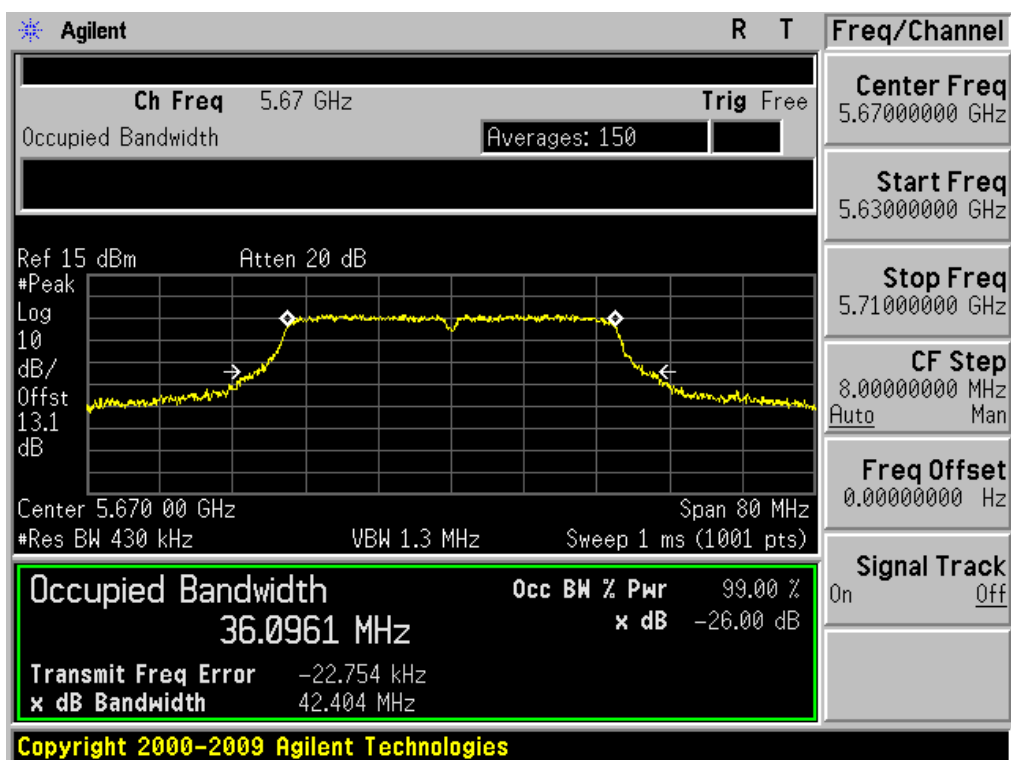
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.110



26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.134



3.2.2 Output Power

Test Requirements

- (1) For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26 dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, 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 peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- Output power Limit Calculation

Bands	Mode	Power Limit [mW]	Calculated Limit [dBm]	ANT Gain	Determined Limit [dBm]
		Least 26dBC BW [MHz]			
Band I	802.11a	50	16.98	0	16.98
		21.684	17.36		
	802.11n HT20	50	16.98		16.98
		21.966	17.41		
	802.11n HT40	50	16.98		16.98
		42.643	20.29		

Bands	Mode	Power Limit [mW]	Calculation Limit [dBm]	ANT Gain	Determined Limit [dBm]
		Least 26dBC BW [MHz]			
Band II	802.11a	250	23.97	0	23.97
		21.598	24.34		
	802.11n HT20	250	23.97		23.97
		21.823	24.38		
	802.11n HT40	250	23.97		23.97
		42.179	27.25		
Band III	802.11a	250	23.97	0	23.97
		21.478	24.31		
	802.11n HT20	250	23.97		23.97
		21.866	24.39		
	802.11n HT40	250	23.97		23.97
		42.404	27.27		

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE:

Maximum Conducted Output Power is measured using Measurement Procedure **Method SA-2 of KDB789033**

1. Set the **RBW = 1 MHz**.
2. Set the **VBW ≥ 3 MHz**.
3. Set **SPAN to encompass the entire EBW** of signal.
4. Detector = **RMS (power averaging)**
5. Sweep time = **auto couple**.
6. **Trace average at least 100 traces in power averaging.**
7. **Compute power by integrating the spectrum across the 26 dB EBW** of the signal using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges.
8. **Add $10 \log(1/x)$, where x is the duty cycle**, to the measured power in order 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)

■ TEST RESULTS : **Comply**

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Test Result [dBm]
				On Time[ms]	On+Off Time[ms]	X		
802.11a	36	5180	11.95	1.360	1.470	0.92	0.37	12.32
	40	5200	12.00					12.37
	48	5240	11.65					12.02
	52	5260	11.95	1.360	1.470	0.92	0.37	12.32
	60	5300	11.88					12.25
	64	5320	11.93					12.30
	100	5500	12.40	1.360	1.470	0.92	0.37	12.77
	116	5580	11.94					12.31
	140	5700	11.99					12.36

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Result
				On Time[ms]	On+Off Time[ms]	X		
802.11n (20MHz)	36	5180	9.64	1.270	1.380	0.92	0.37	10.01
	40	5200	9.58					9.95
	48	5240	9.28					9.65
	52	5260	9.63	1.270	1.380	0.92	0.37	10.00
	60	5300	9.60					9.97
	64	5320	9.60					9.97
	100	5500	10.06	1.270	1.380	0.92	0.37	10.43
	116	5580	9.57					9.94
	140	5700	9.58					9.95
802.11n (40MHz)	38	5190	6.84	0.634	0.686	0.92	0.37	7.21
	46	5230	6.65					7.02
	54	5270	6.98	0.634	0.686	0.92	0.37	7.35
	62	5310	6.85					7.22
	102	5510	7.21	0.634	0.686	0.92	0.37	7.58
	110	5550	7.00					7.37
	134	5670	7.01					7.38

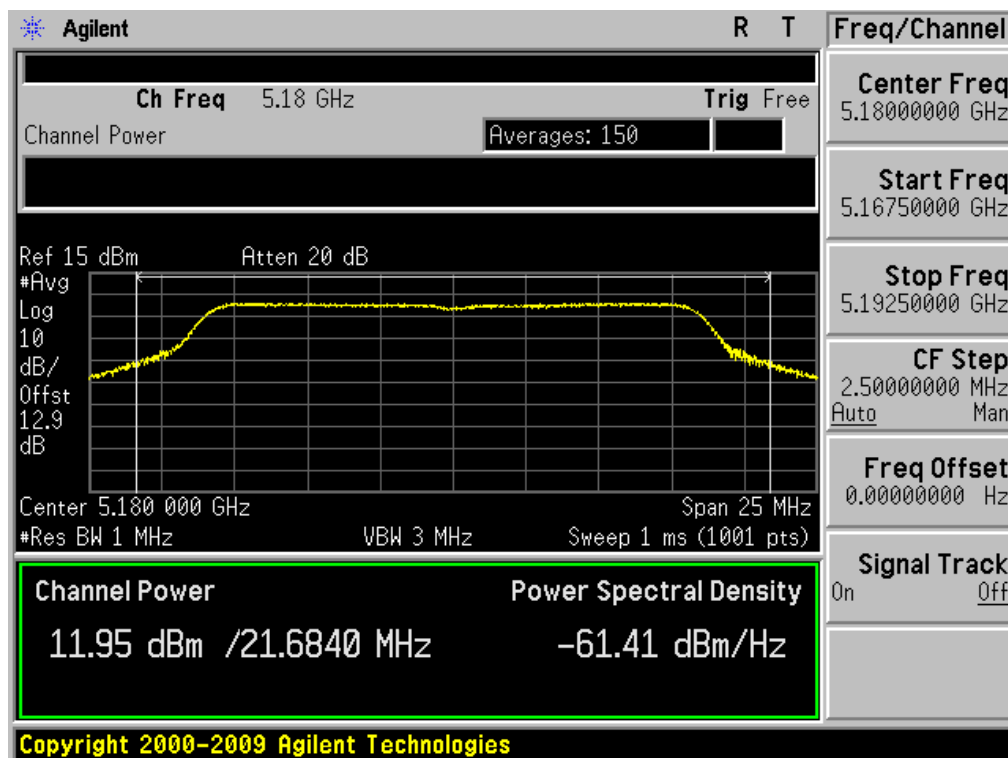
Note 1 : $DCF = 10 \log(1/X)$, $X = \text{On Time} / (\text{On} + \text{Off time})$

Note 2 : Test Result = Measurement Data + DCF

■ Measurement Data PLOTS

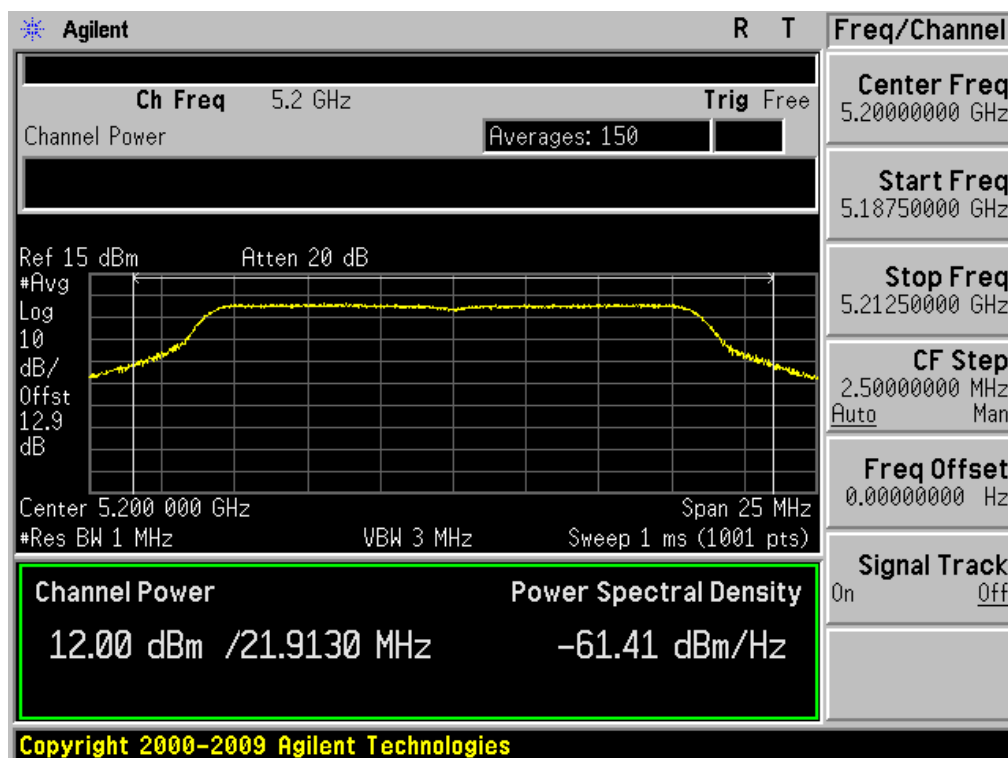
Output Power

Test Mode: 802.11a & Ch.36



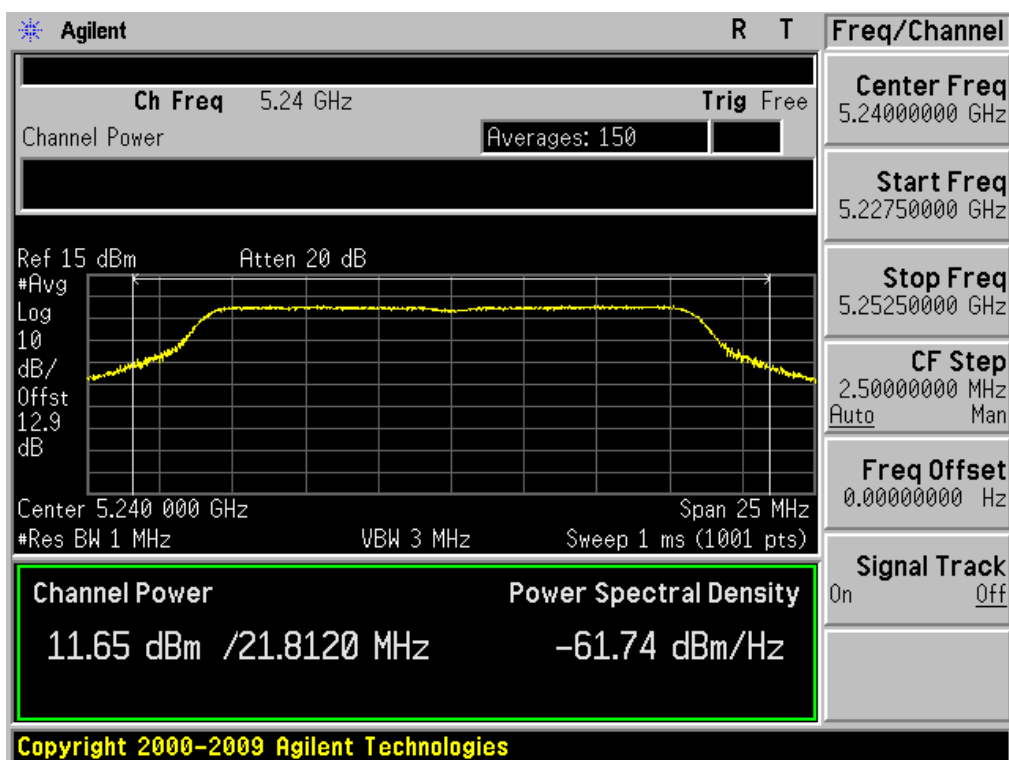
Output Power

Test Mode: 802.11a & Ch.40



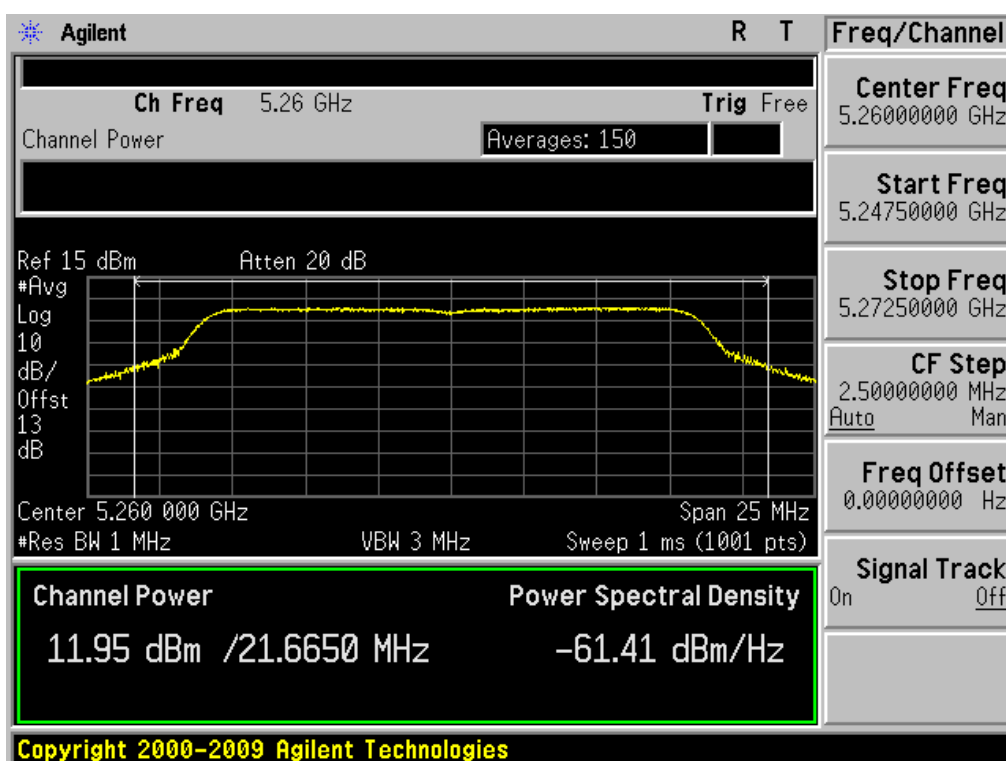
Output Power

Test Mode: 802.11a & Ch.48



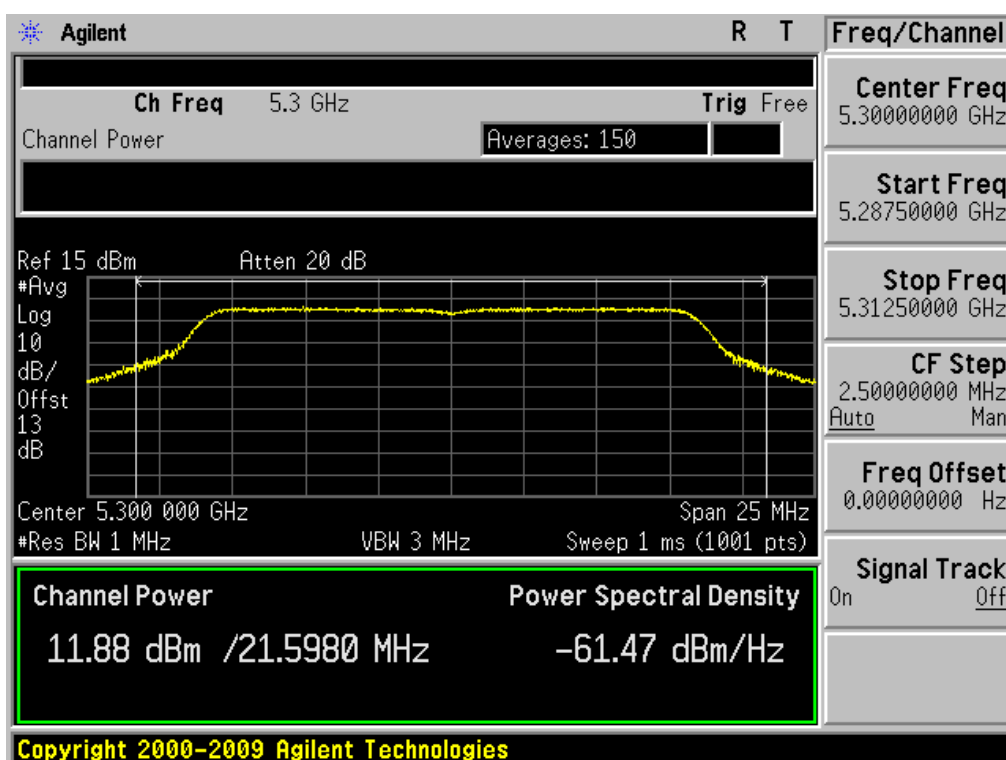
Output Power

Test Mode: 802.11a & Ch.52



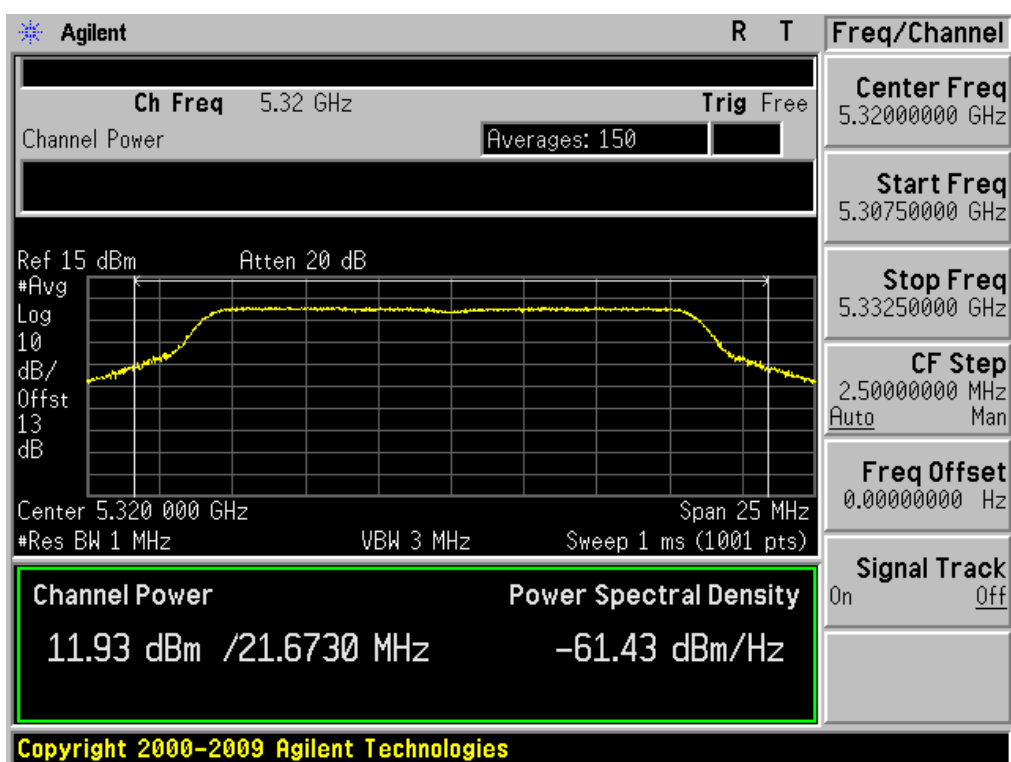
Output Power

Test Mode: 802.11a & Ch.60



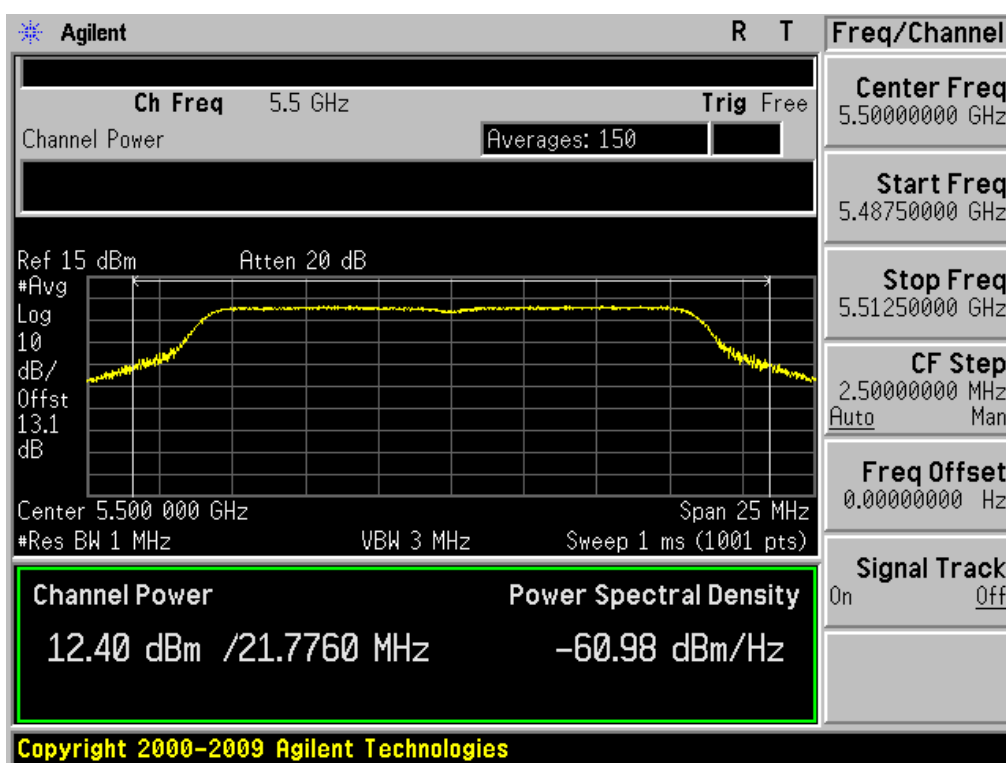
Output Power

Test Mode: 802.11a & Ch.64



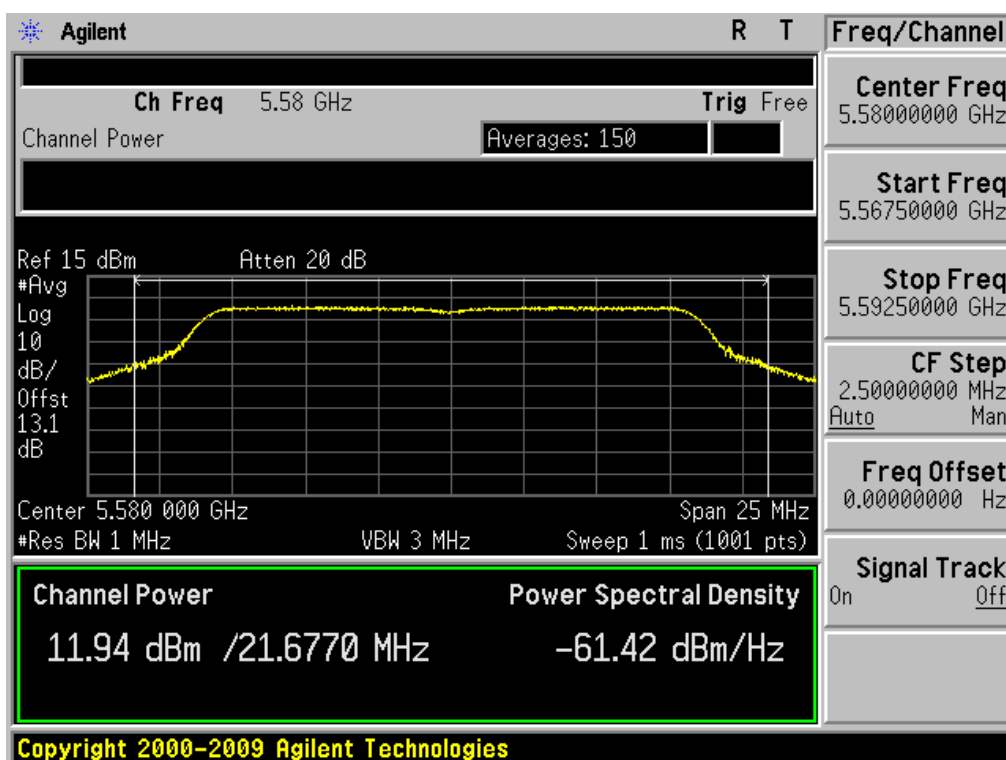
Output Power

Test Mode: 802.11a & Ch.100



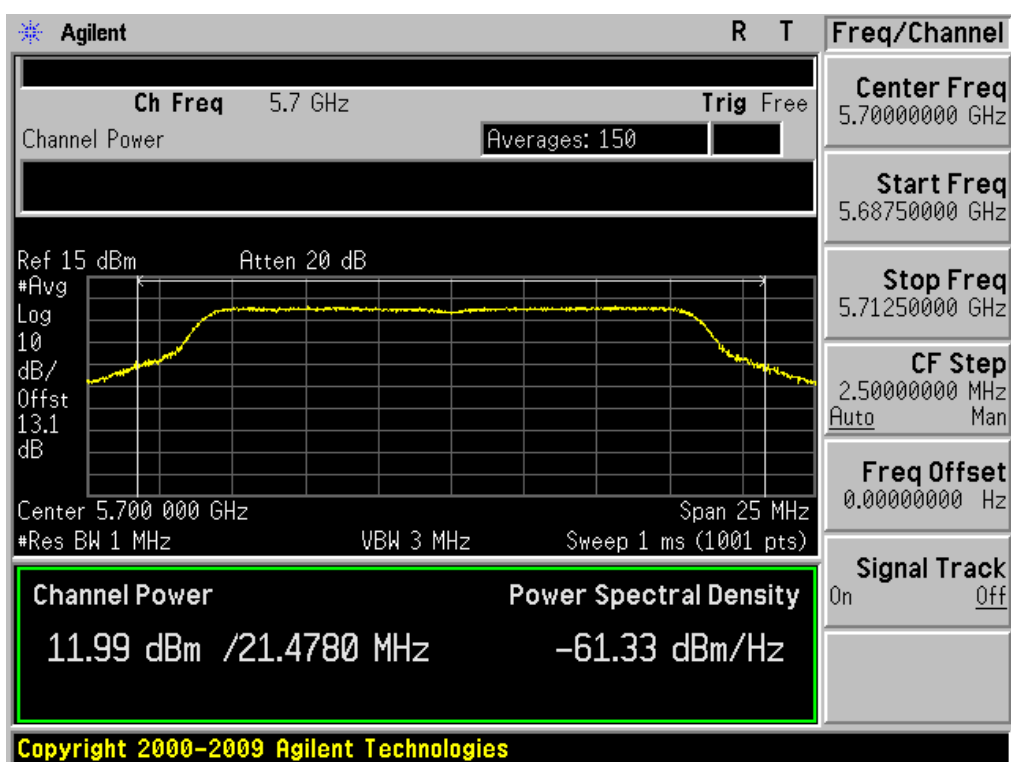
Output Power

Test Mode: 802.11a & Ch.116



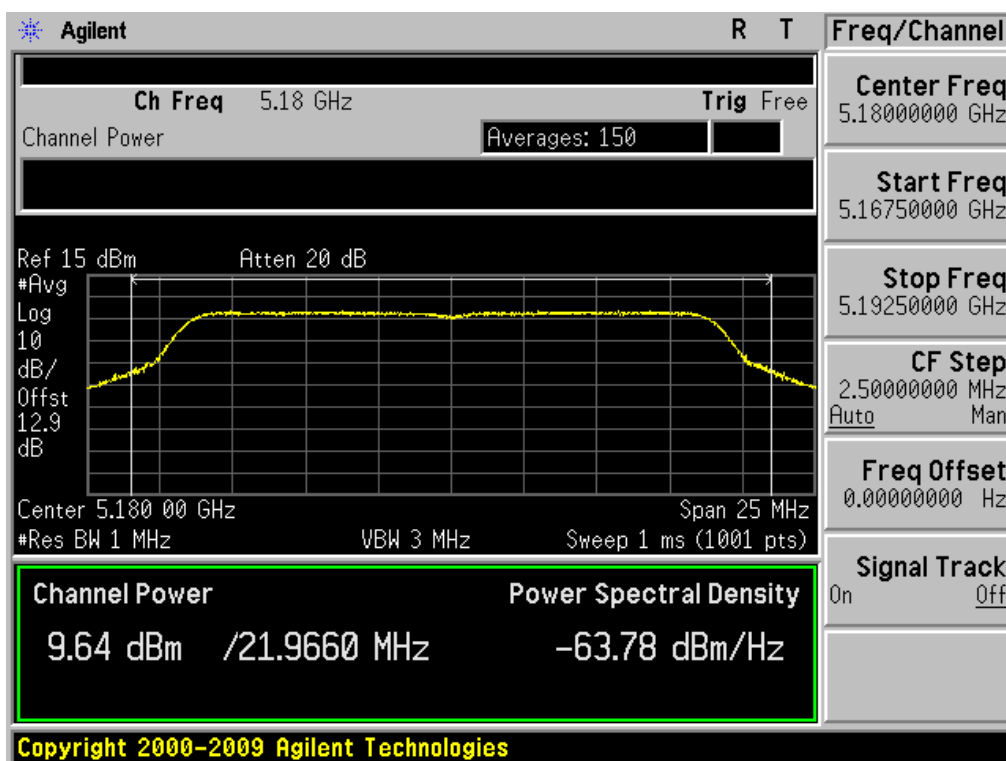
Output Power

Test Mode: 802.11a & Ch.140



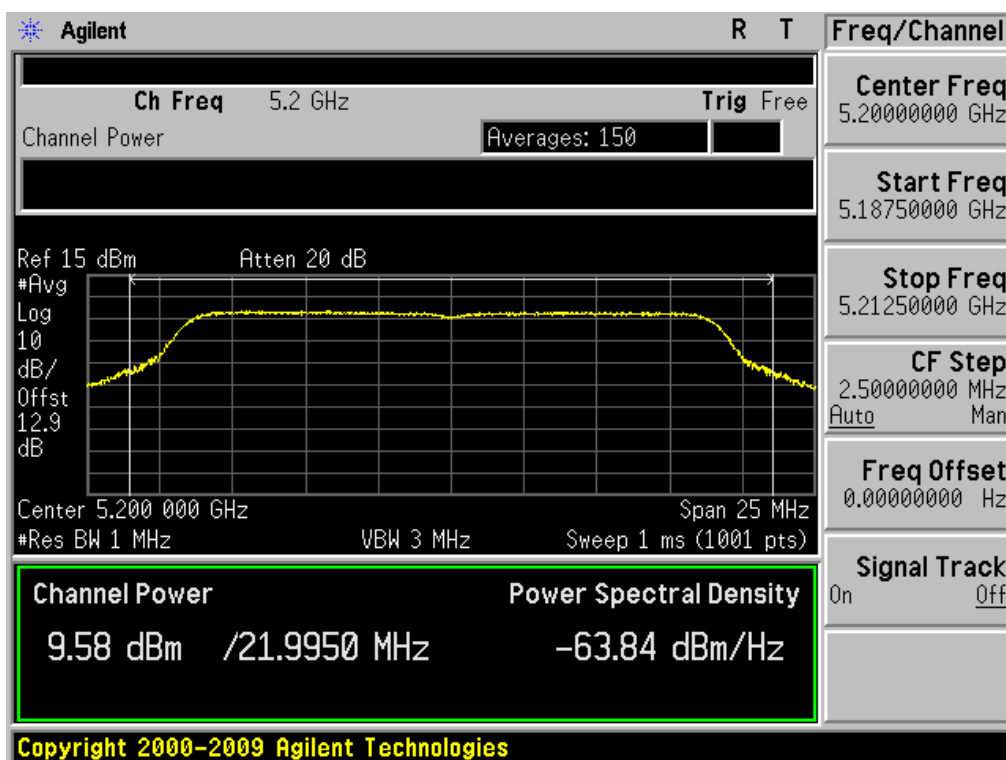
Output Power

Test Mode: 802.11n HT20 & Ch.36



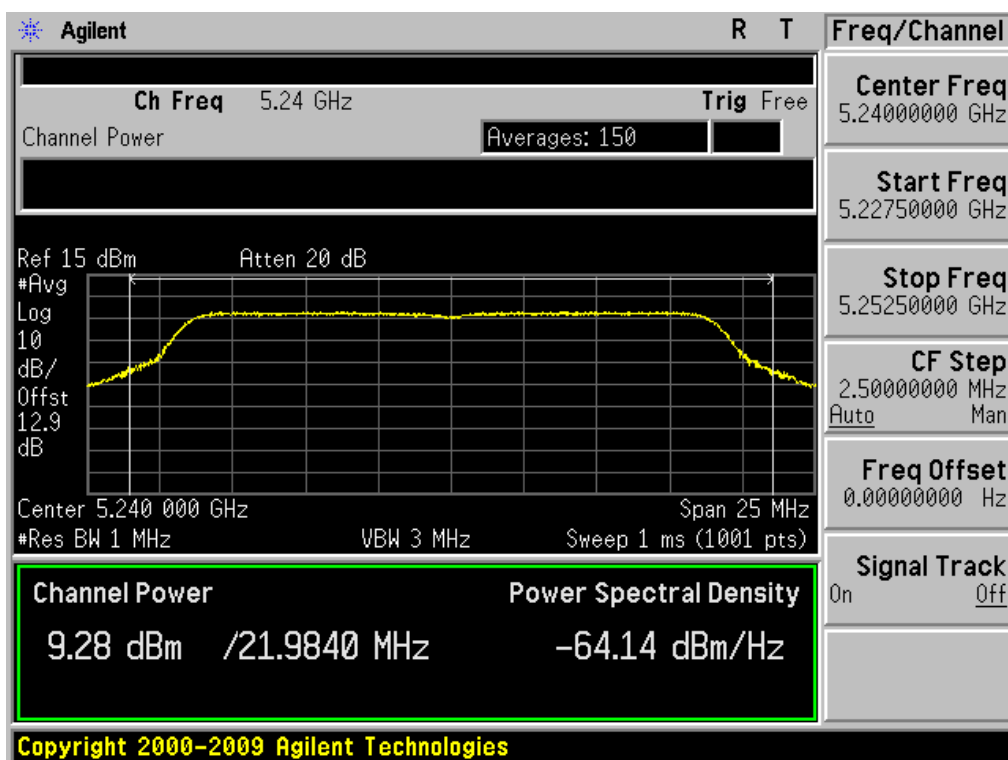
Output Power

Test Mode: 802.11n HT20 & Ch.40



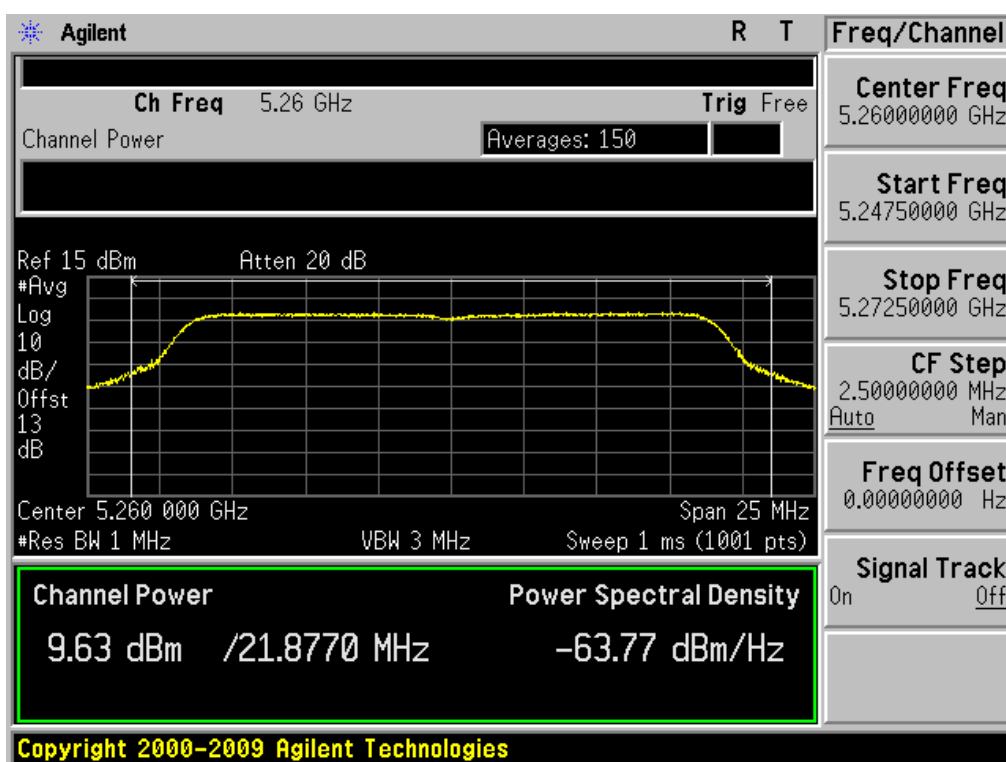
Output Power

Test Mode: 802.11n HT20 & Ch.48



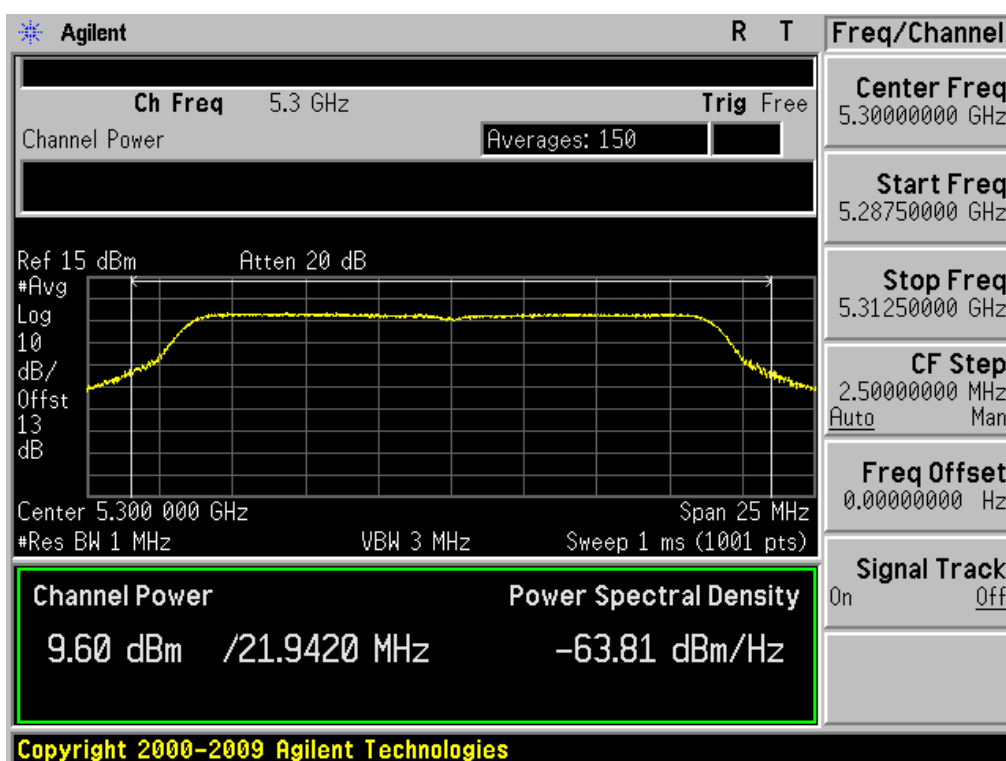
Output Power

Test Mode: 802.11n HT20 & Ch.52



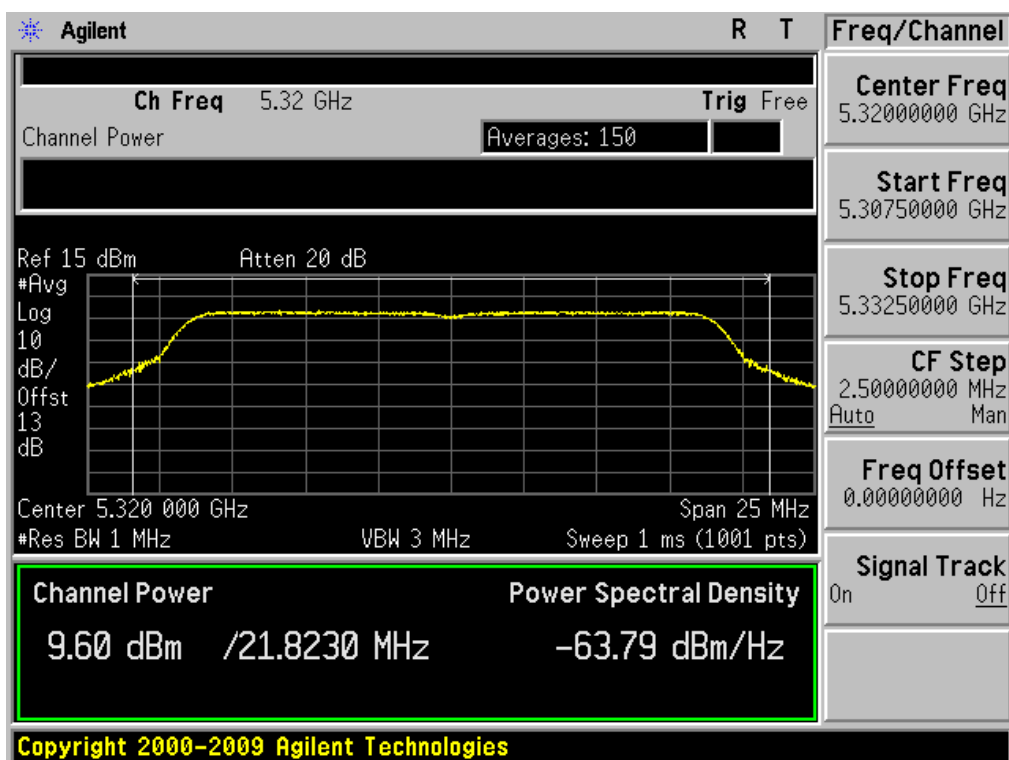
Output Power

Test Mode: 802.11n HT20 & Ch.60



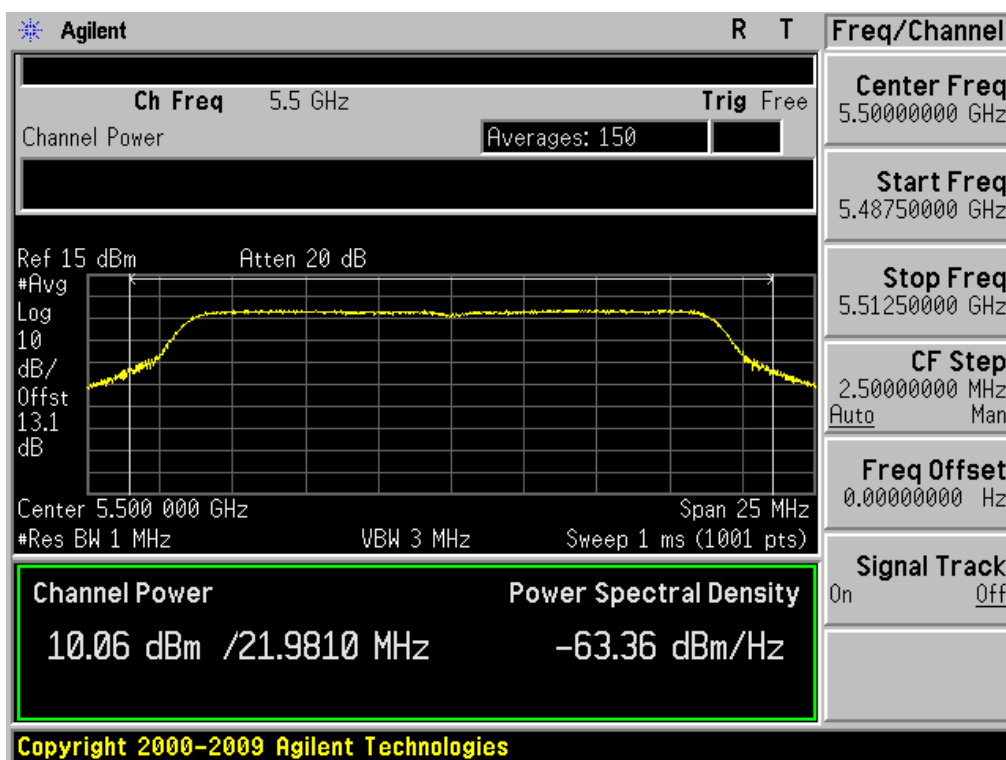
Output Power

Test Mode: 802.11n HT20 & Ch.64



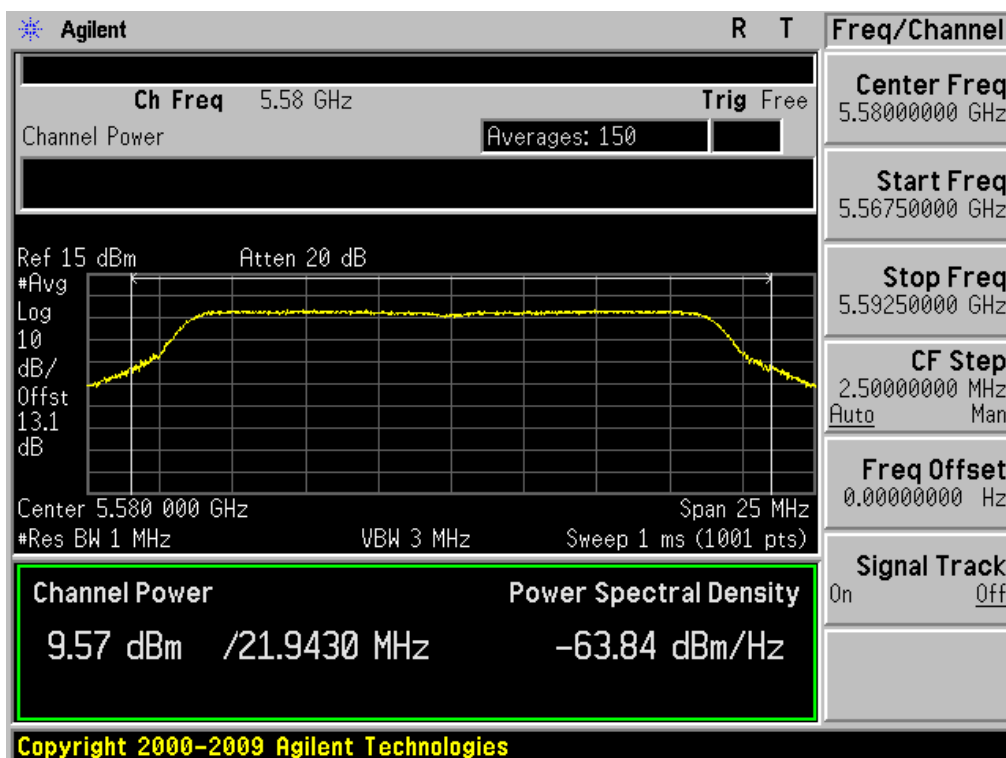
Output Power

Test Mode: 802.11n HT20 & Ch.100



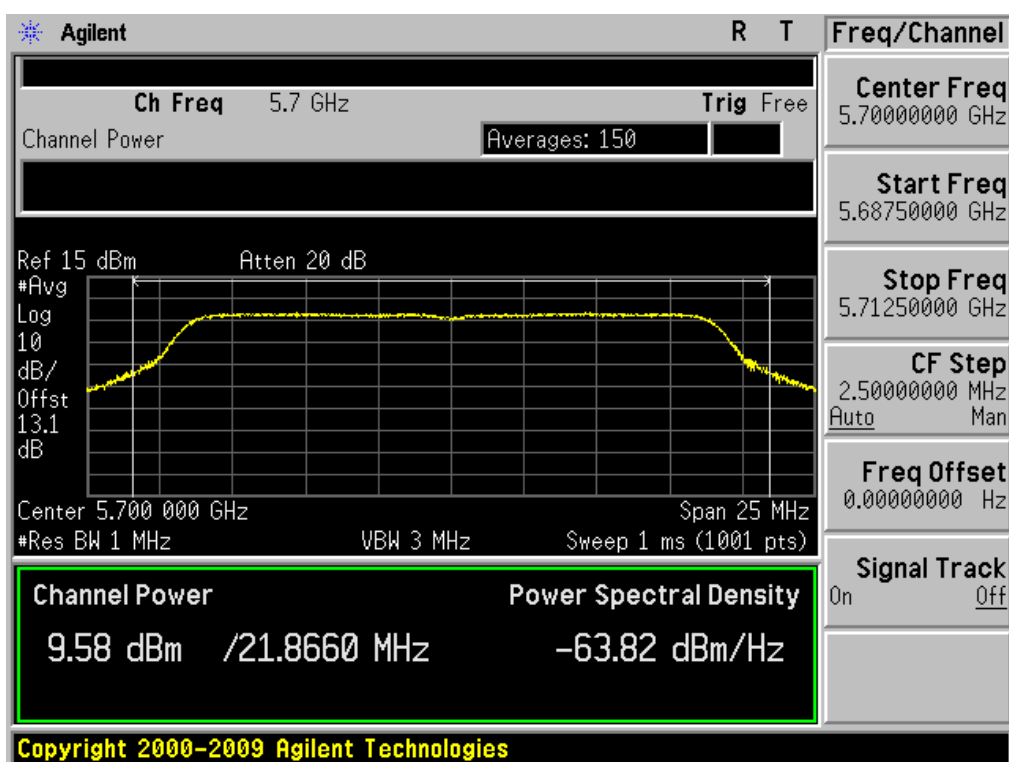
Output Power

Test Mode: 802.11n HT20 & Ch.116



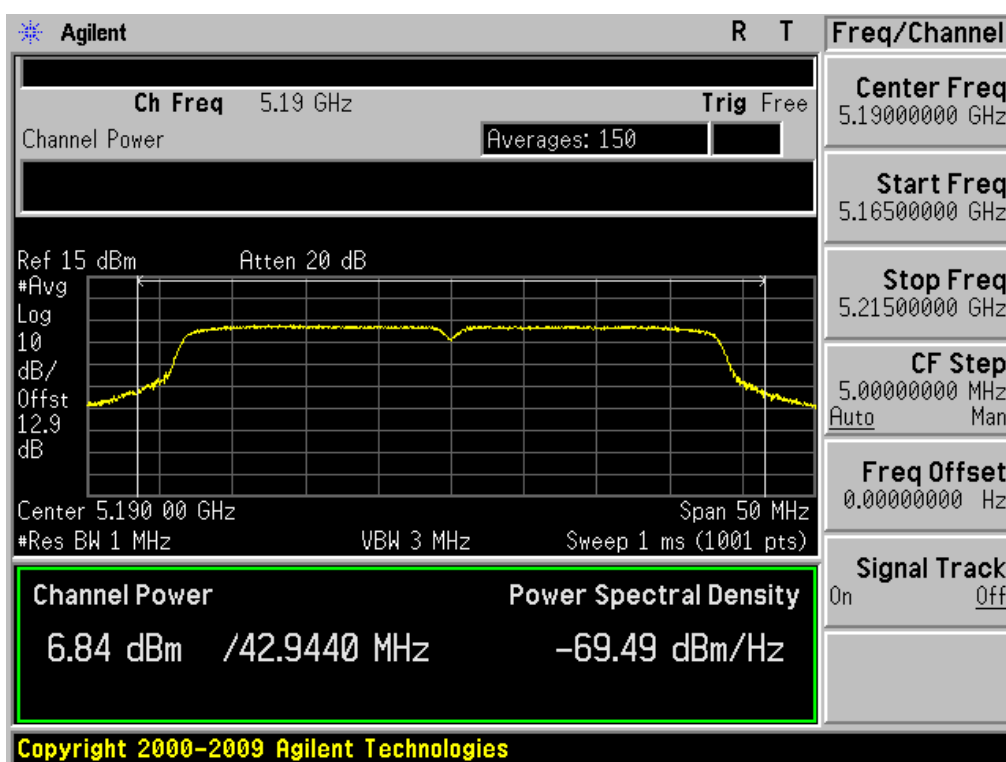
Output Power

Test Mode: 802.11n HT20 & Ch.140



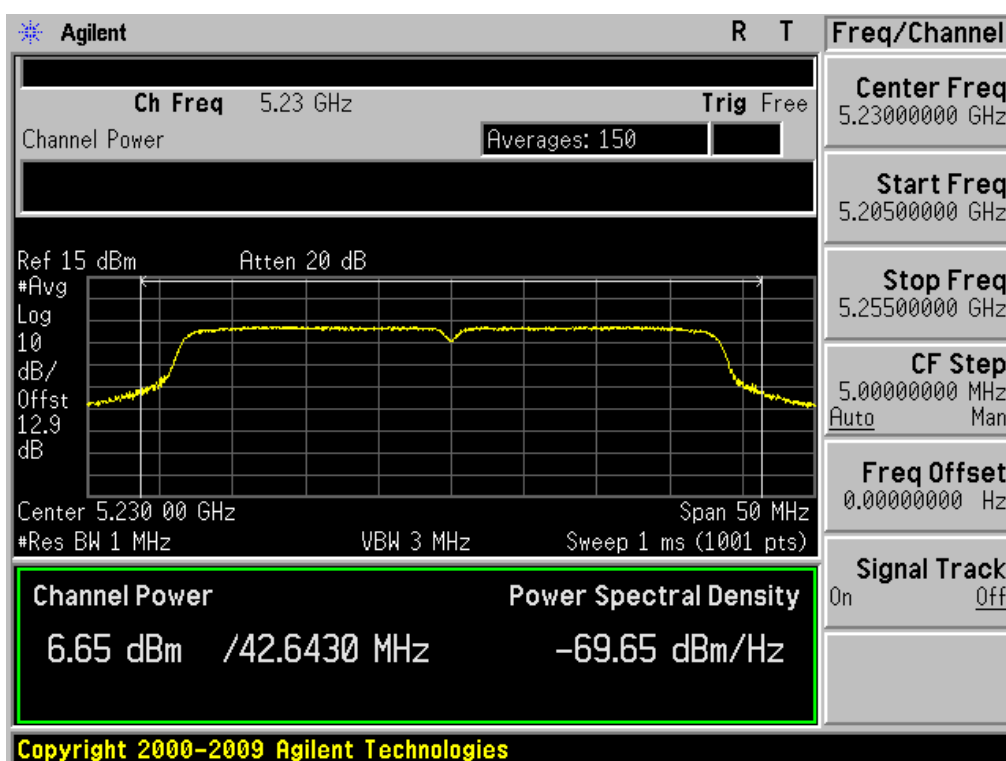
Output Power

Test Mode: 802.11n HT40 & Ch.38



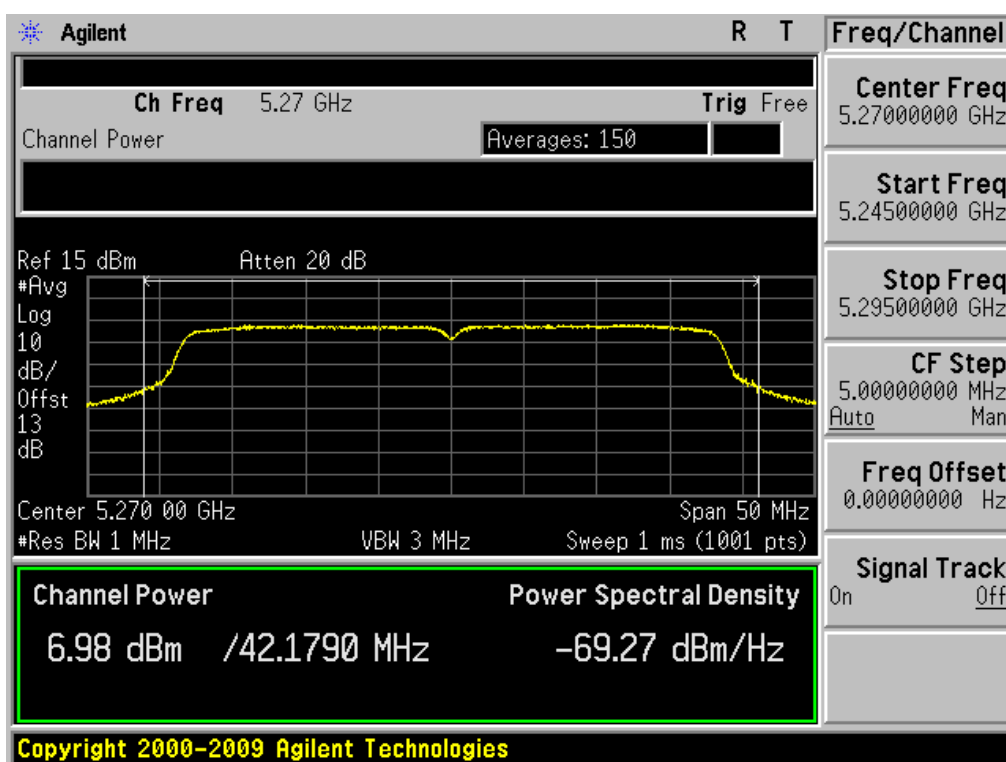
Output Power

Test Mode: 802.11n HT40 & Ch.46



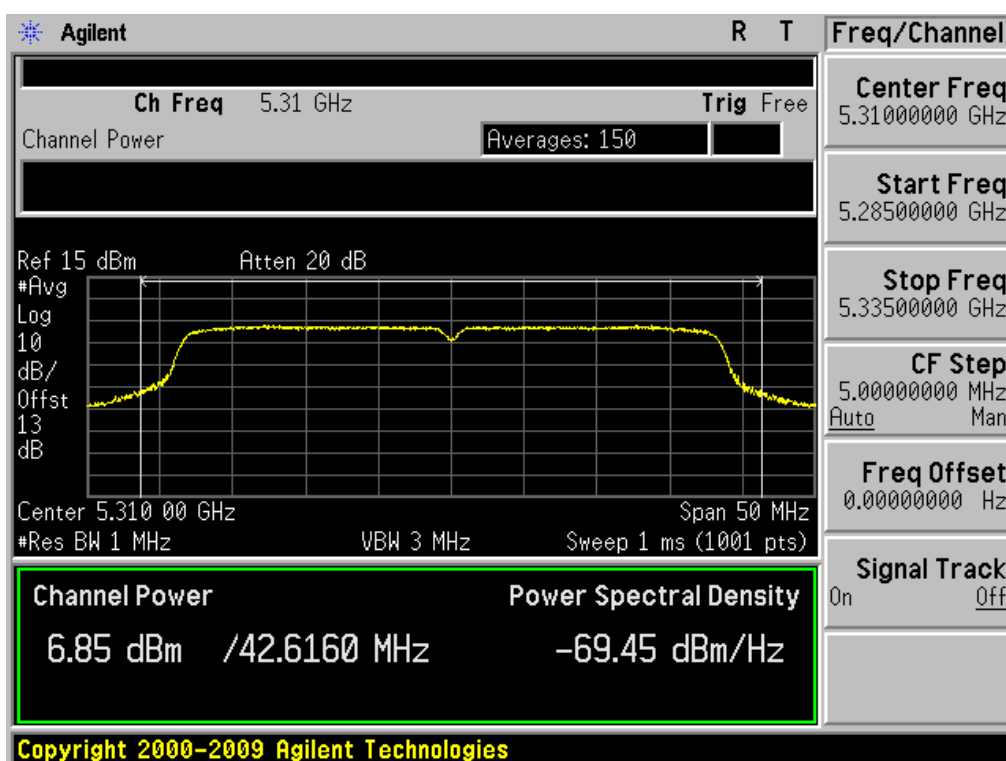
Output Power

Test Mode: 802.11n HT40 & Ch.54



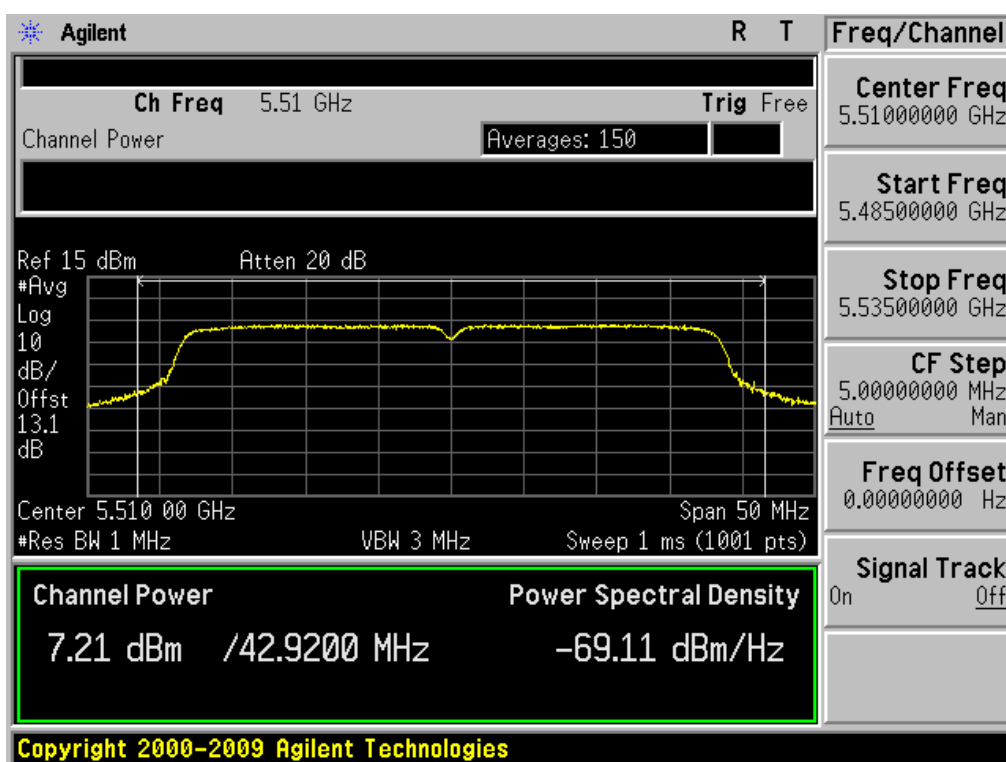
Output Power

Test Mode: 802.11n HT40 & Ch.62



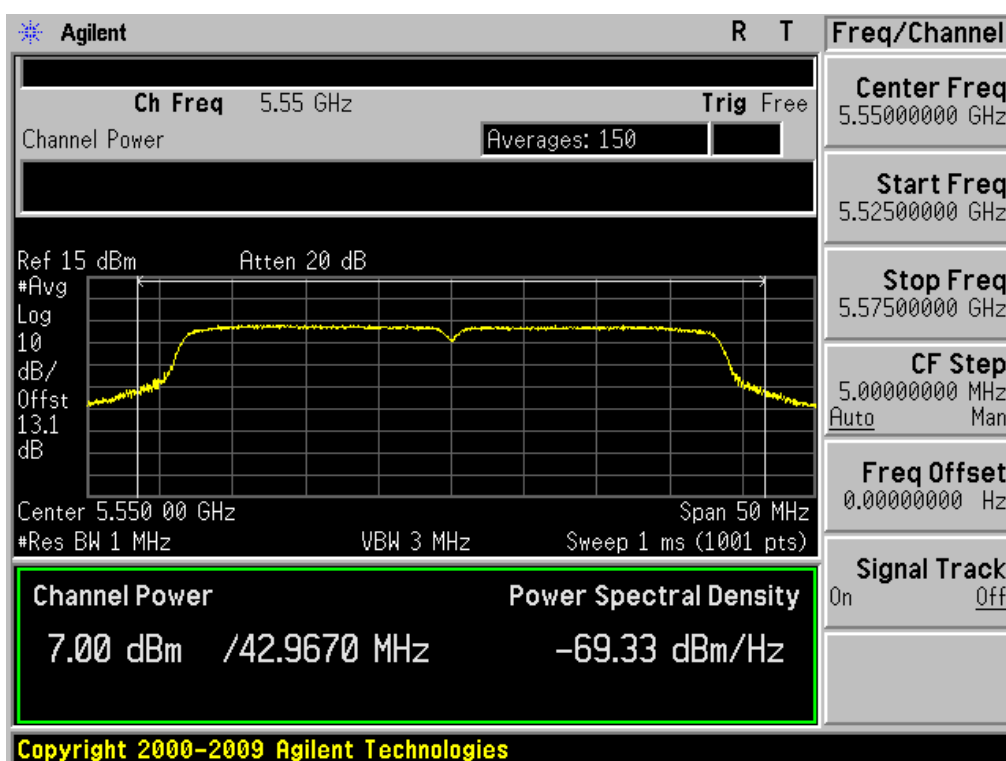
Output Power

Test Mode: 802.11n HT40 & Ch.102



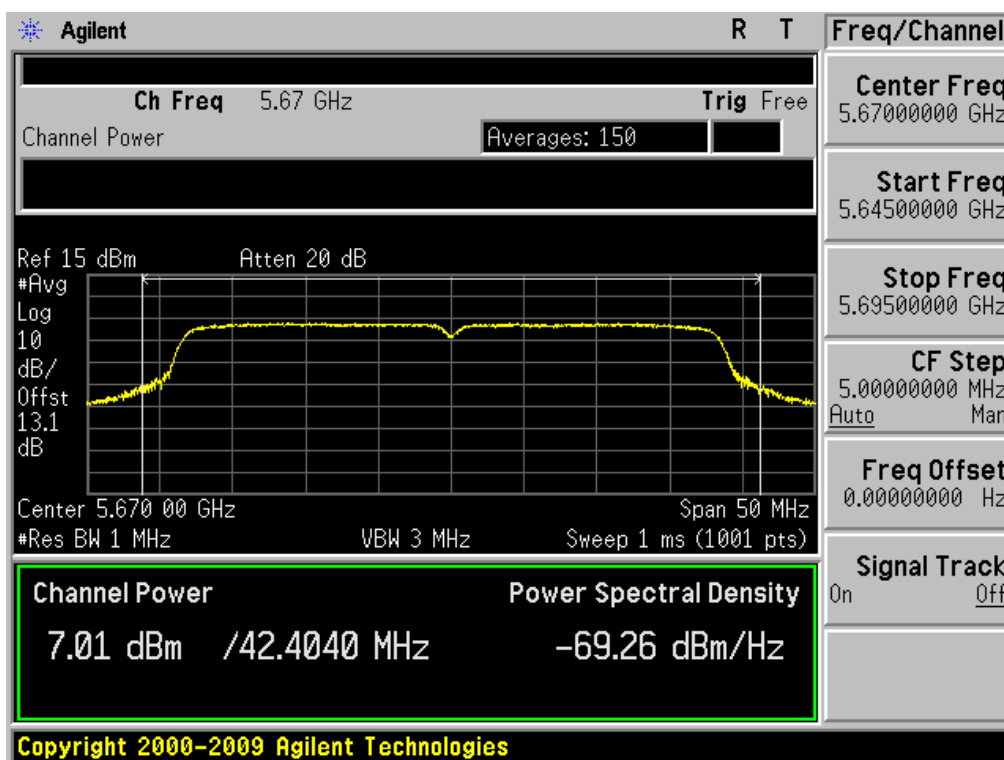
Output Power

Test Mode: 802.11n HT40 & Ch.110



Output Power

Test Mode: 802.11n HT40 & Ch.134



3.2.3 Peak Power Spectral Density

Test requirements

- (1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1MHz band.
- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- Peak Power Spectral Density Limit Calculation

Band	Limit [dBm]	ANT Gain [dBi]	Determined Limit [dBm]
Band I	4	0	4
Band II	11	0	11
Band III	11	0	11

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE

Peak Power Spectral Density is measured using Measurement Procedure of **KDB789033**

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section C)3) for measuring maximum conducted output power using a spectrum analyzer: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
- 2) Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
- 3) Make the following adjustments to the peak value of the spectrum, if applicable:
 - a) If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.
 - b) If Method SA-3 Alternative was used and the linear mode was used in step C)3)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
- 4) The result is the PPSD.

■ TEST RESULT : **Comply**

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Test Result [dBm]
				On Time[ms]	On+Off Time[ms]	X		
802.11a	36	5180	0.918	1.360	1.470	0.92	0.37	1.288
	40	5200	1.003					1.373
	48	5240	0.847					1.217
	52	5260	0.876	1.360	1.470	0.92	0.37	1.246
	60	5300	1.040					1.410
	64	5320	1.061					1.431
	100	5500	1.768	1.360	1.470	0.92	0.37	2.138
	116	5580	1.075					1.445
	140	5700	1.180					1.550

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Test Result [dBm]
				On Time[ms]	On+Off Time[ms]	X		
802.11n (20MHz)	36	5180	-1.403	1.270	1.380	0.92	0.37	-1.033
	40	5200	-1.464					-1.094
	48	5240	-1.845					-1.475
	52	5260	-1.433	1.270	1.380	0.92	0.37	-1.063
	60	5300	-1.581					-1.211
	64	5320	-1.669					-1.299
	100	5500	-0.636	1.270	1.380	0.92	0.37	-0.266
	116	5580	-1.413					-1.043
	140	5700	-1.769					-1.399
802.11n (40MHz)	38	5190	-7.078	0.634	0.686	0.92	0.37	-6.708
	46	5230	-6.993					-6.623
	54	5270	-7.141	0.634	0.686	0.92	0.37	-6.771
	62	5310	-7.198					-6.828
	102	5510	-6.726	0.634	0.686	0.92	0.37	-6.356
	110	5550	-6.813					-6.443
	134	5670	-7.069					-6.699

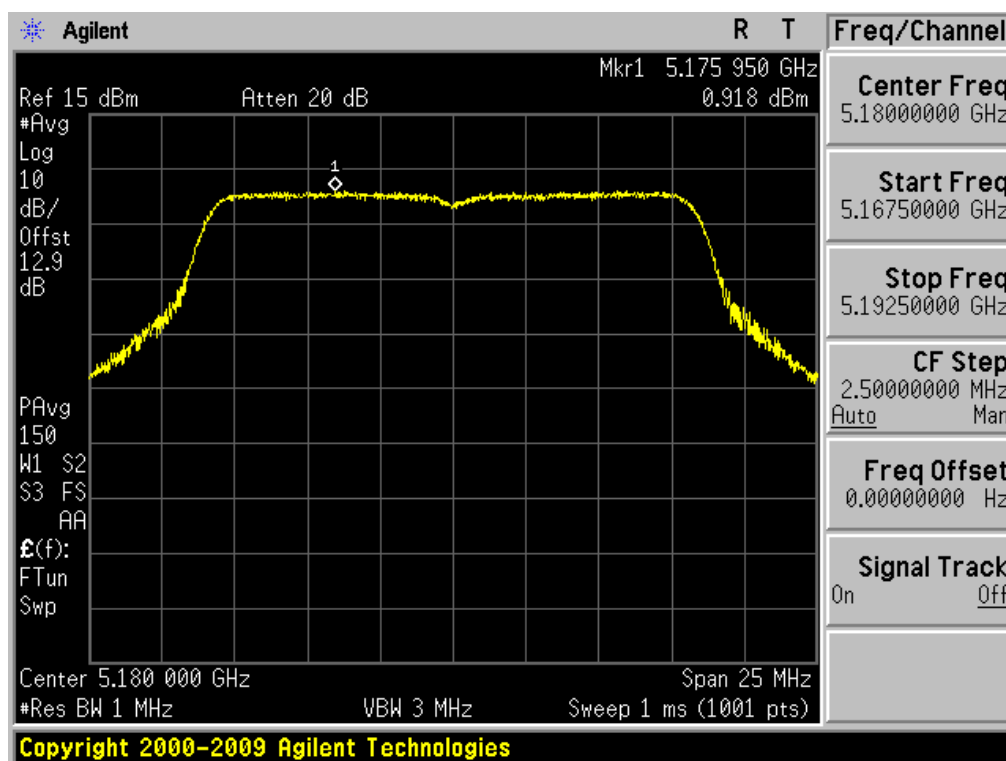
Note 1 : DCF = $10\log(1/X)$, $X = \text{On Time} / (\text{On} + \text{Off time})$

Note 2 : Test Result = Measurement Data + DCF

■ Measurement Data PLOTS

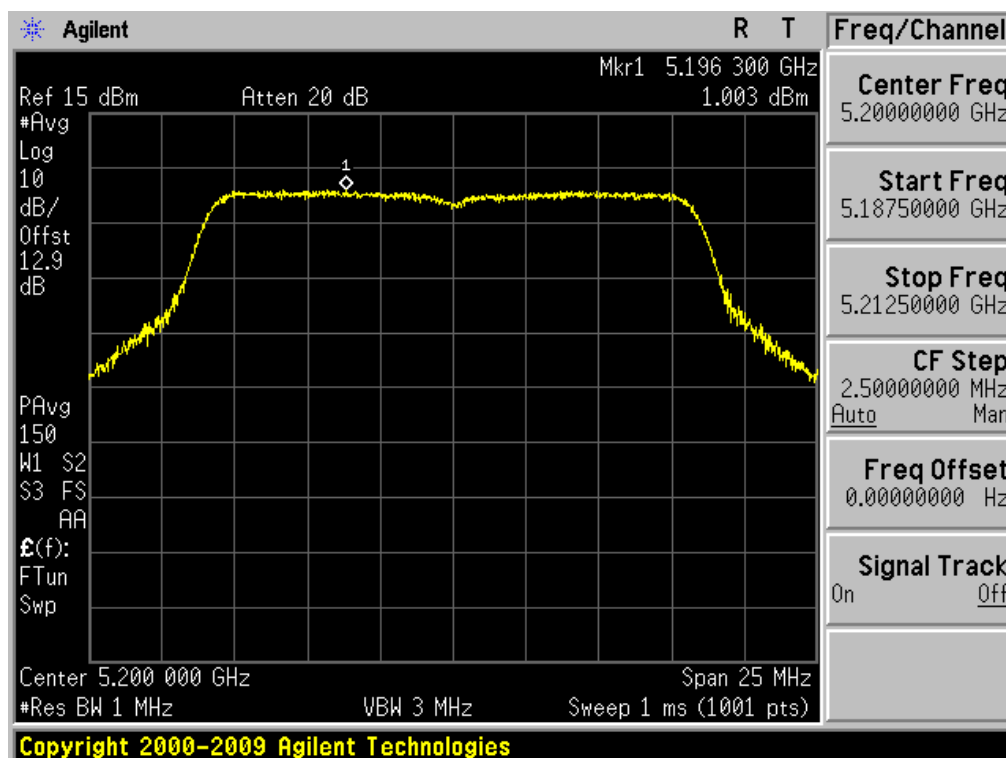
Peak Power Spectral Density

Test Mode: 802.11a & Ch.36



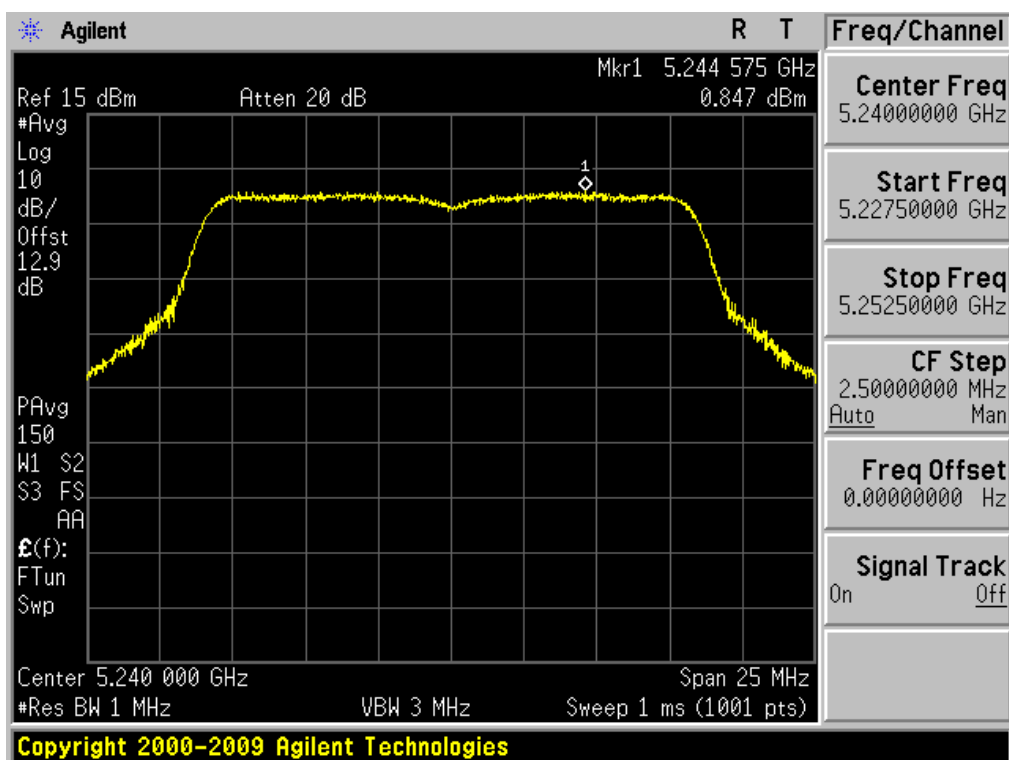
Peak Power Spectral Density

Test Mode: 802.11a & Ch.40



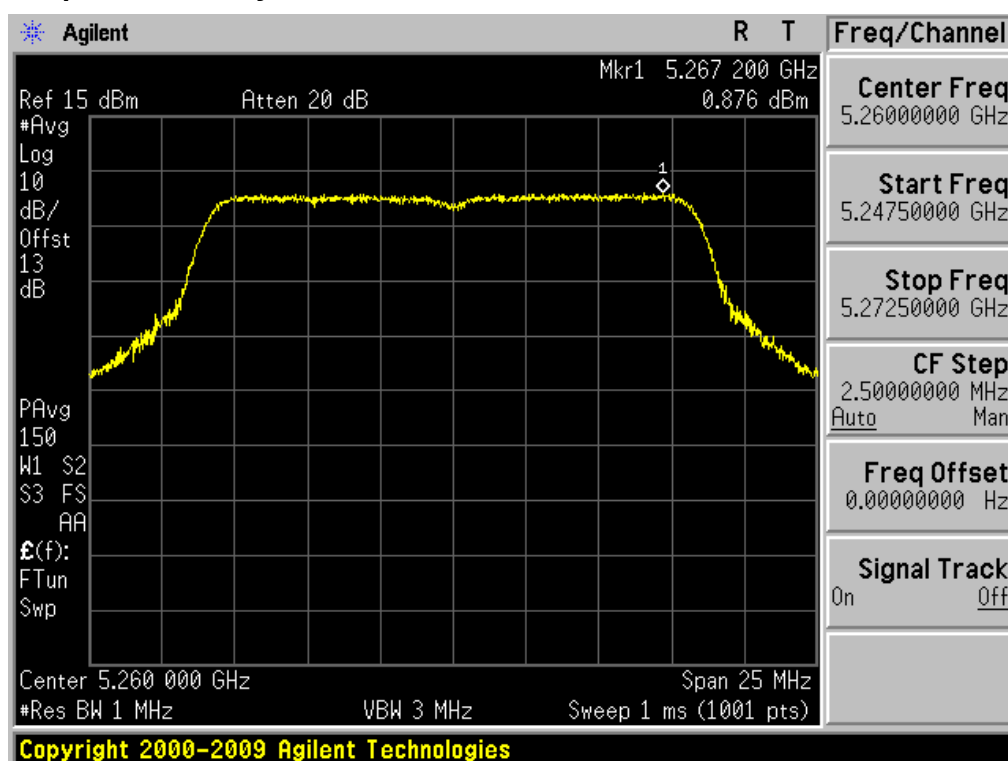
Peak Power Spectral Density

Test Mode: 802.11a & Ch.48



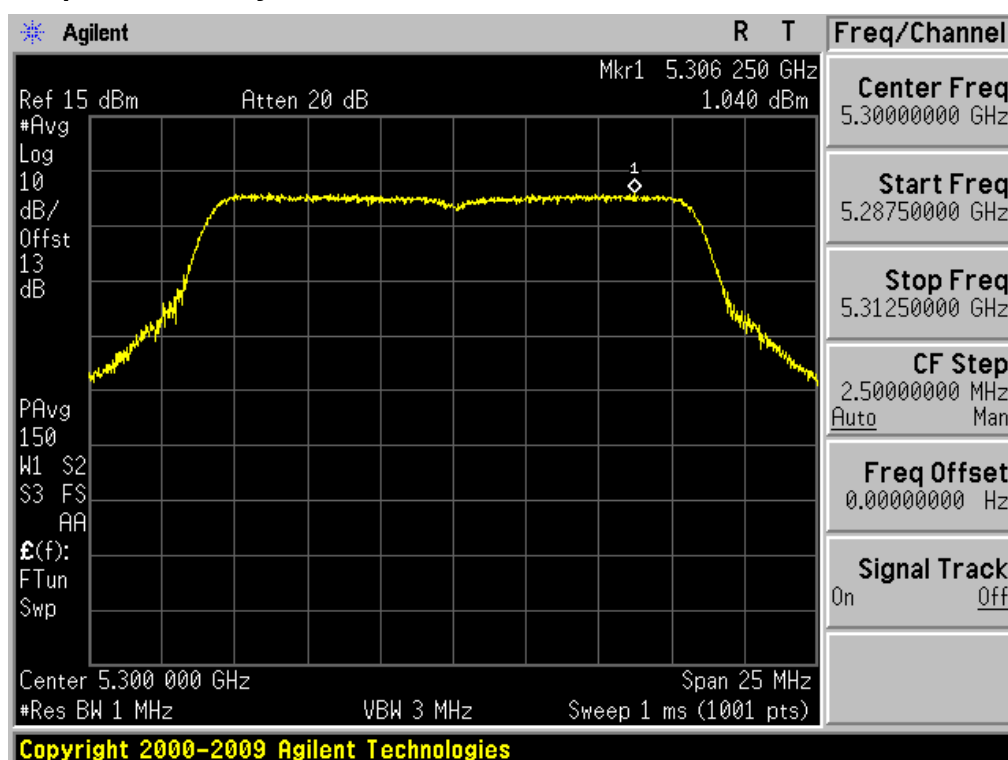
Peak Power Spectral Density

Test Mode: 802.11a & Ch.52



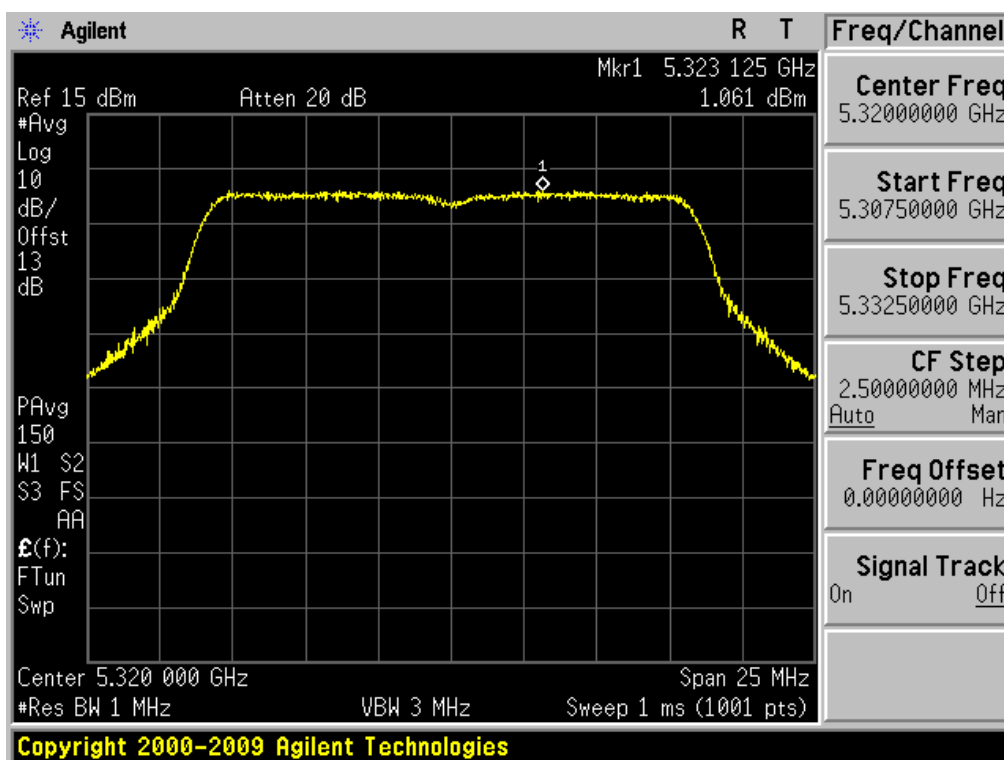
Peak Power Spectral Density

Test Mode: 802.11a & Ch.60



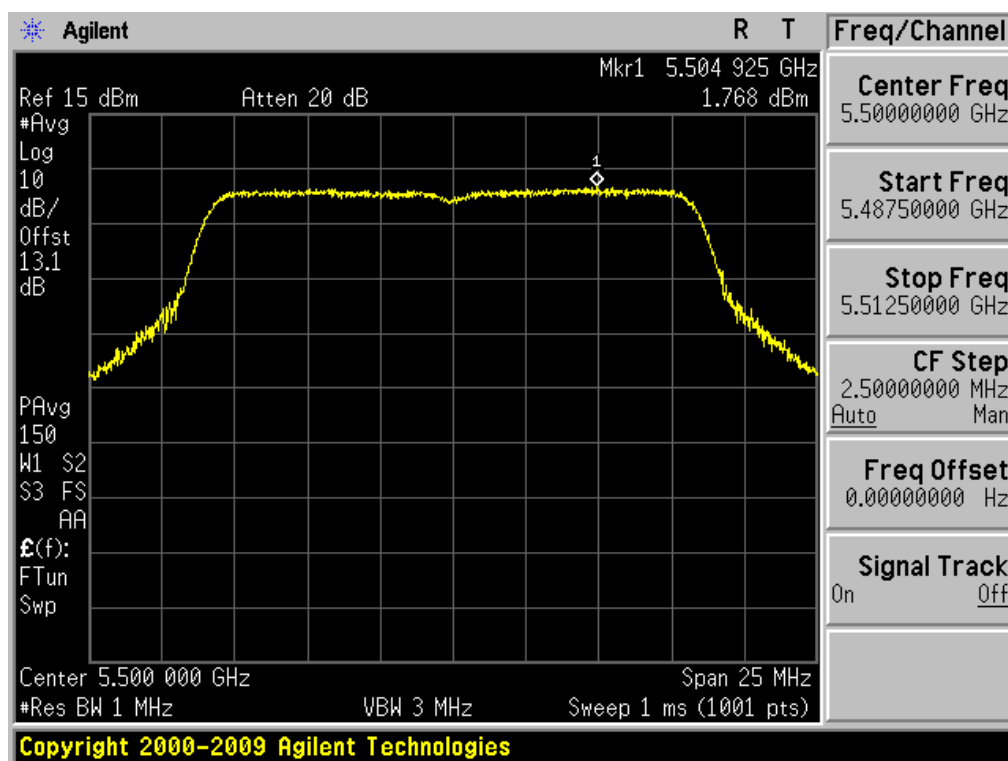
Peak Power Spectral Density

Test Mode: 802.11a & Ch.64



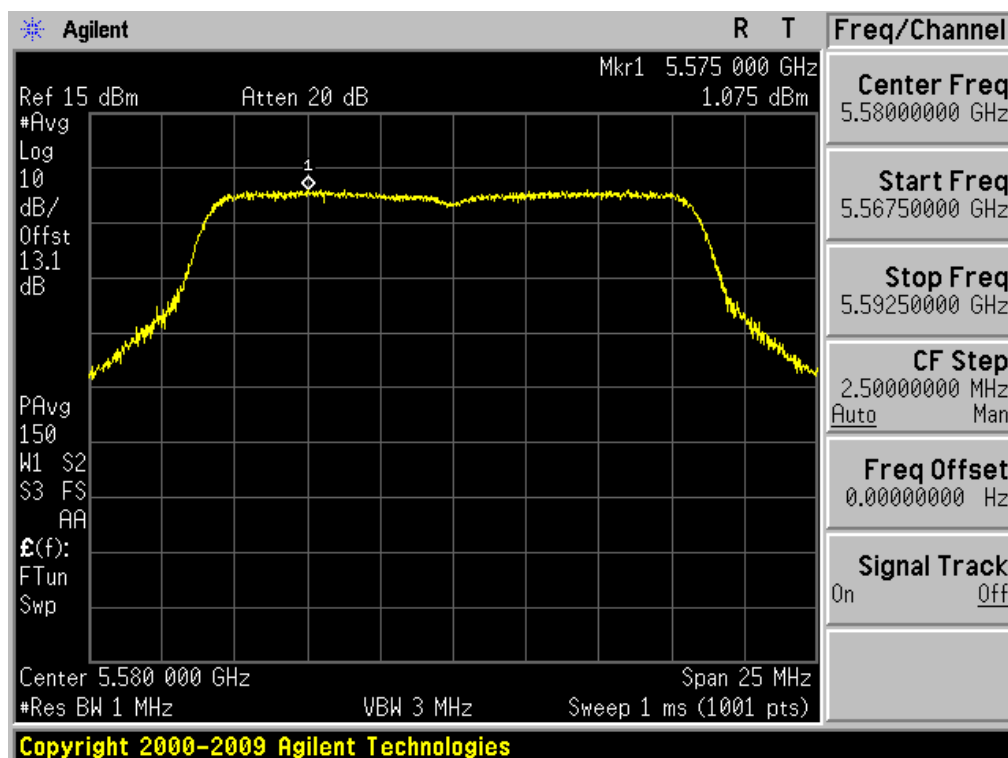
Peak Power Spectral Density

Test Mode: 802.11a & Ch.100



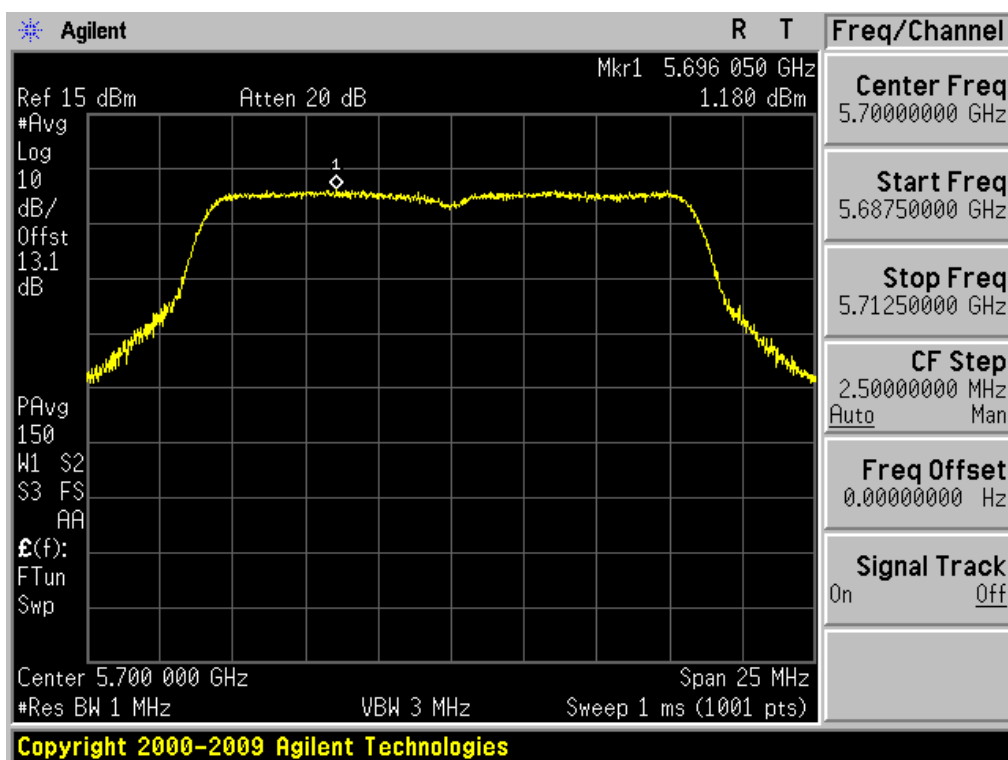
Peak Power Spectral Density

Test Mode: 802.11a & Ch.116



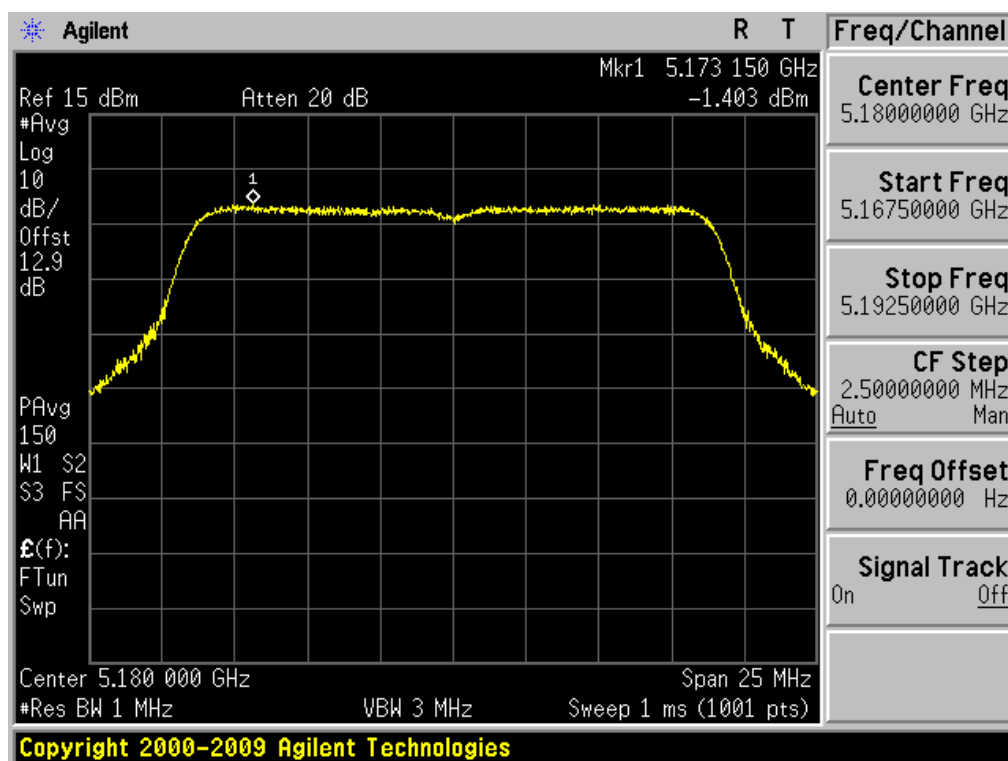
Peak Power Spectral Density

Test Mode: 802.11a & Ch.140



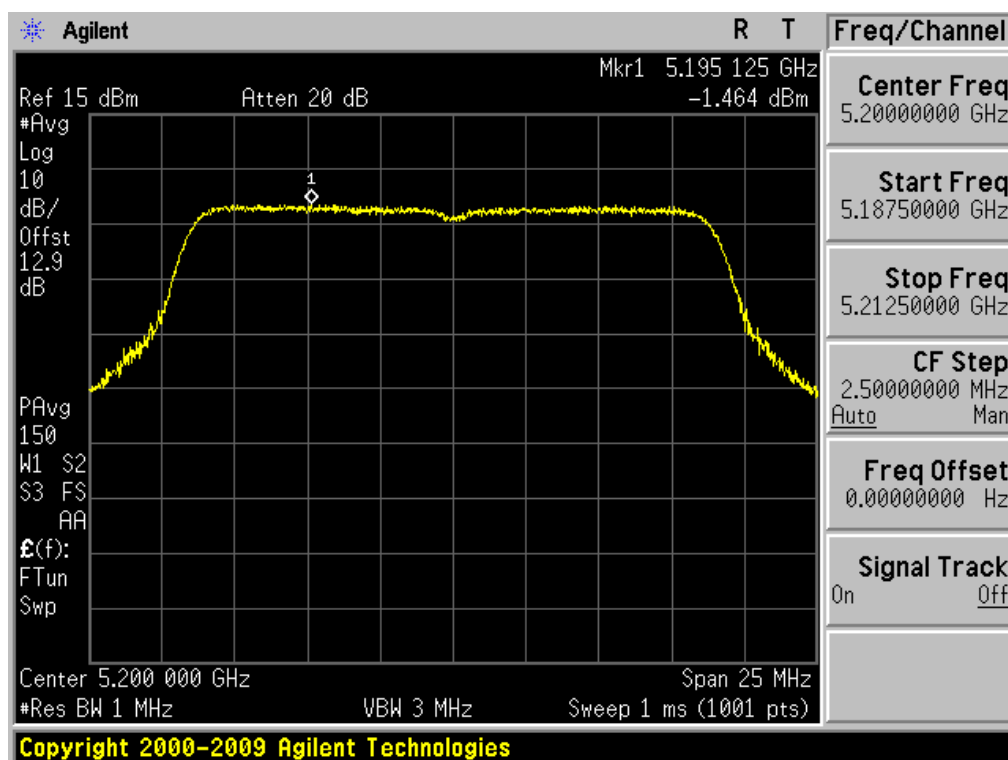
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.36



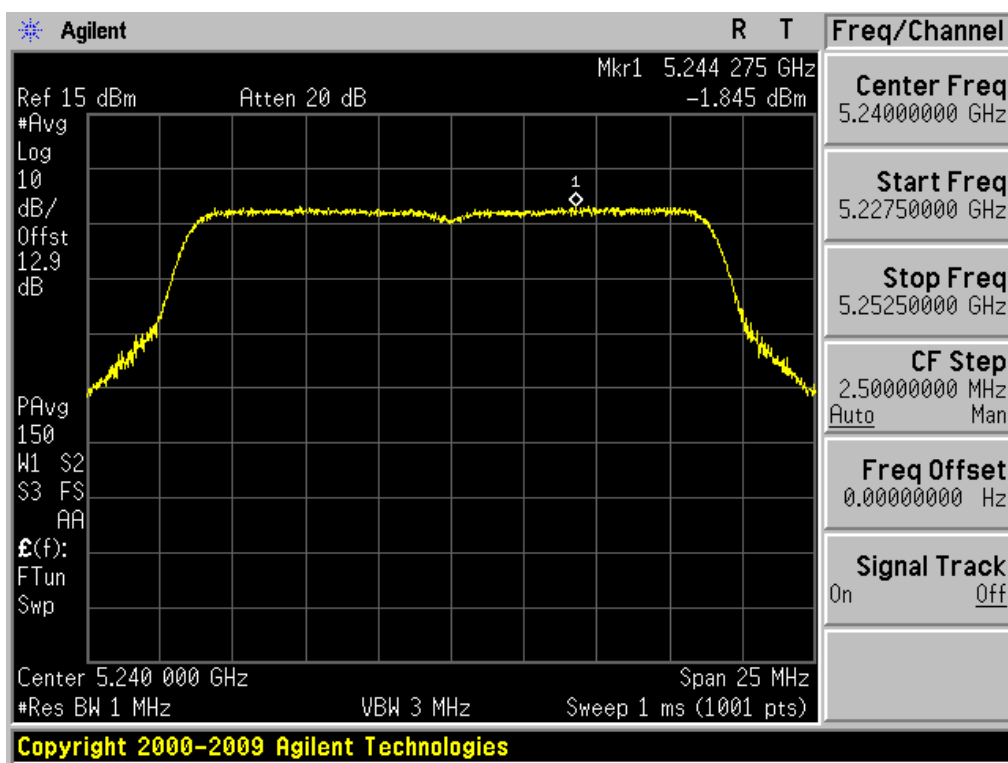
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.40



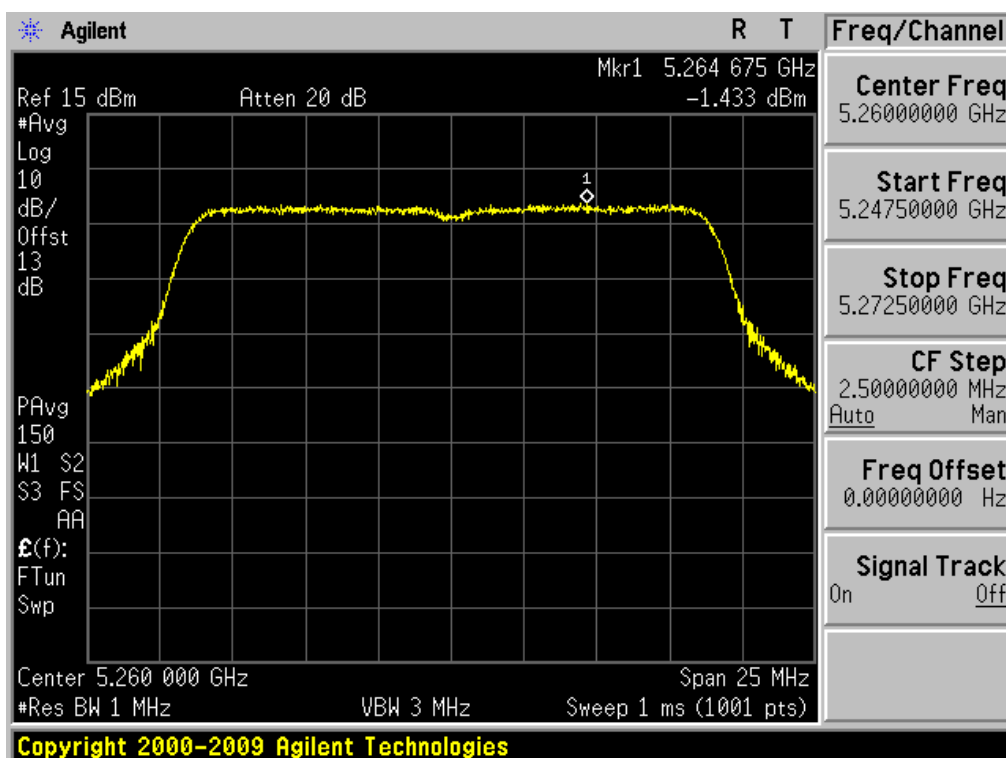
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.48



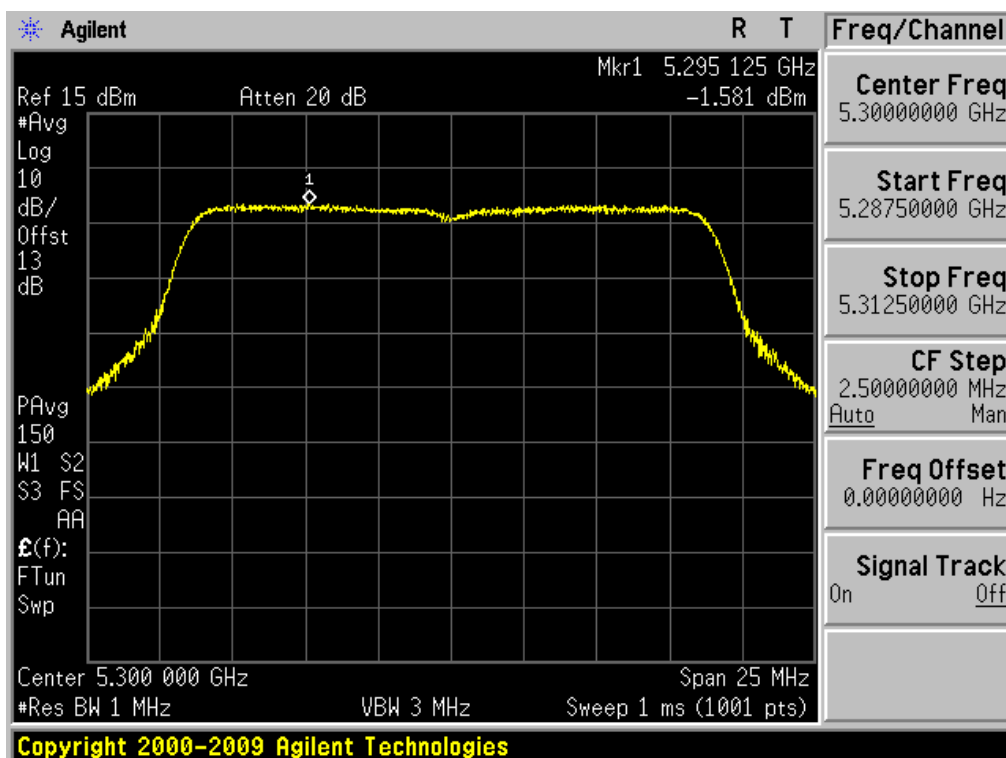
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.52



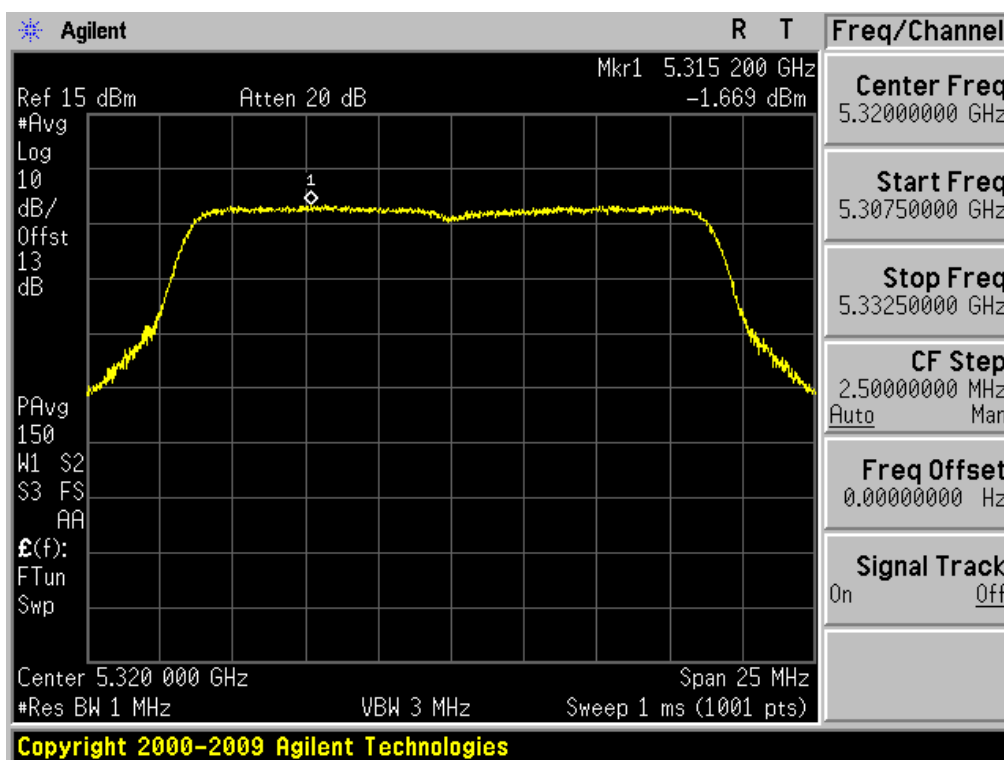
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.60



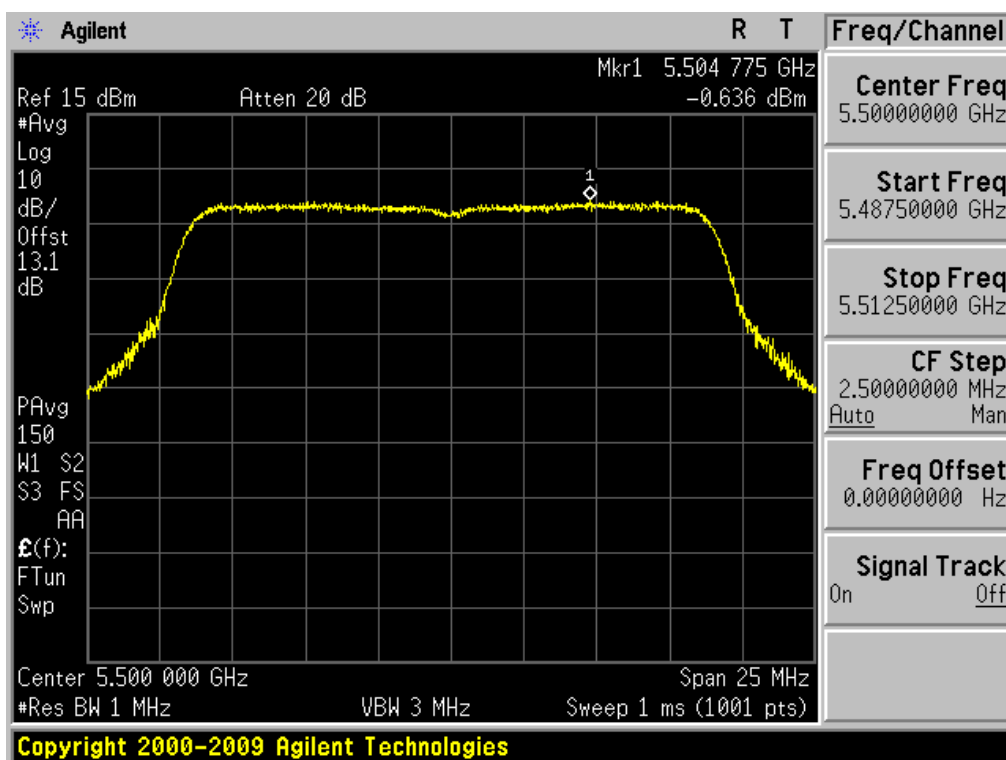
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.64



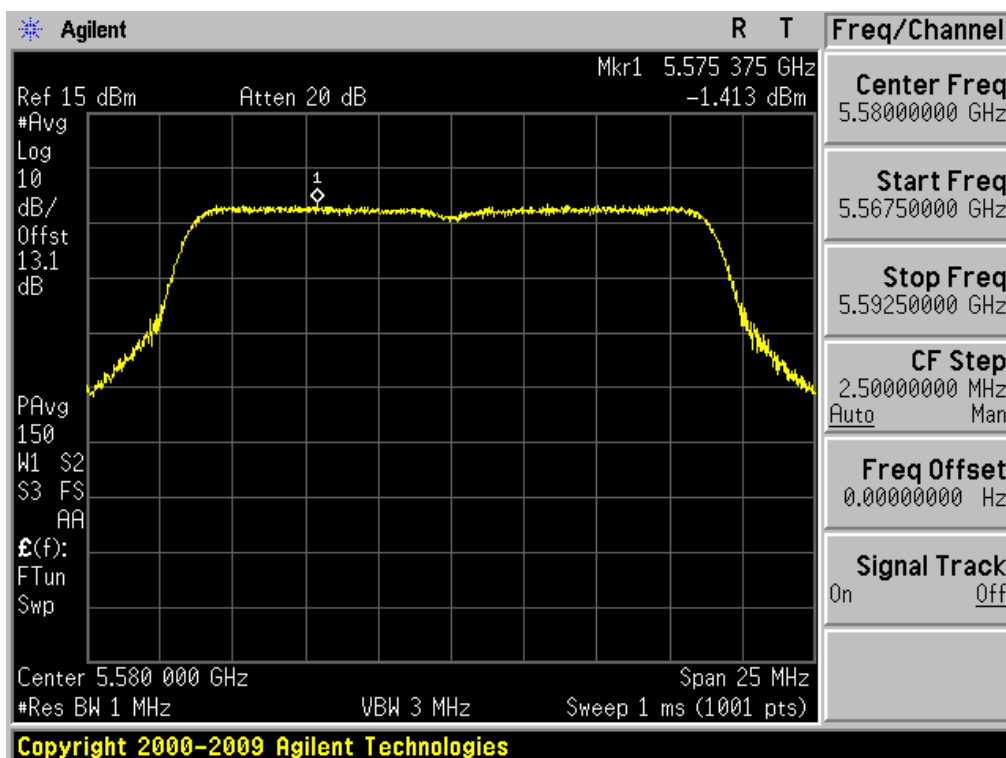
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.100



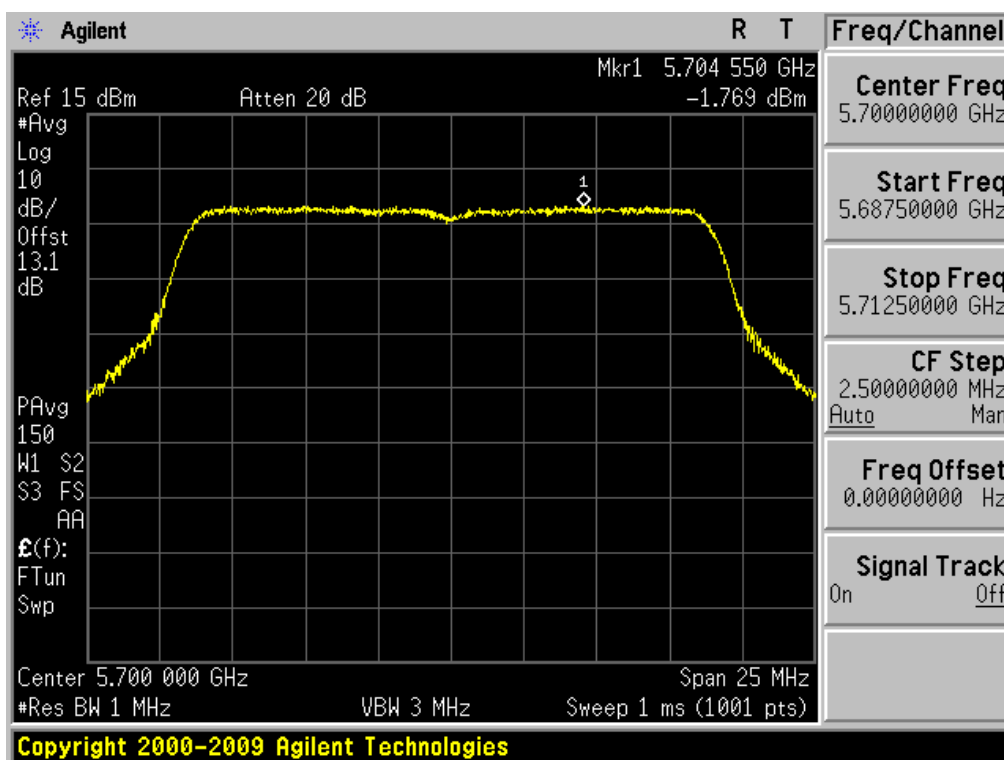
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.116



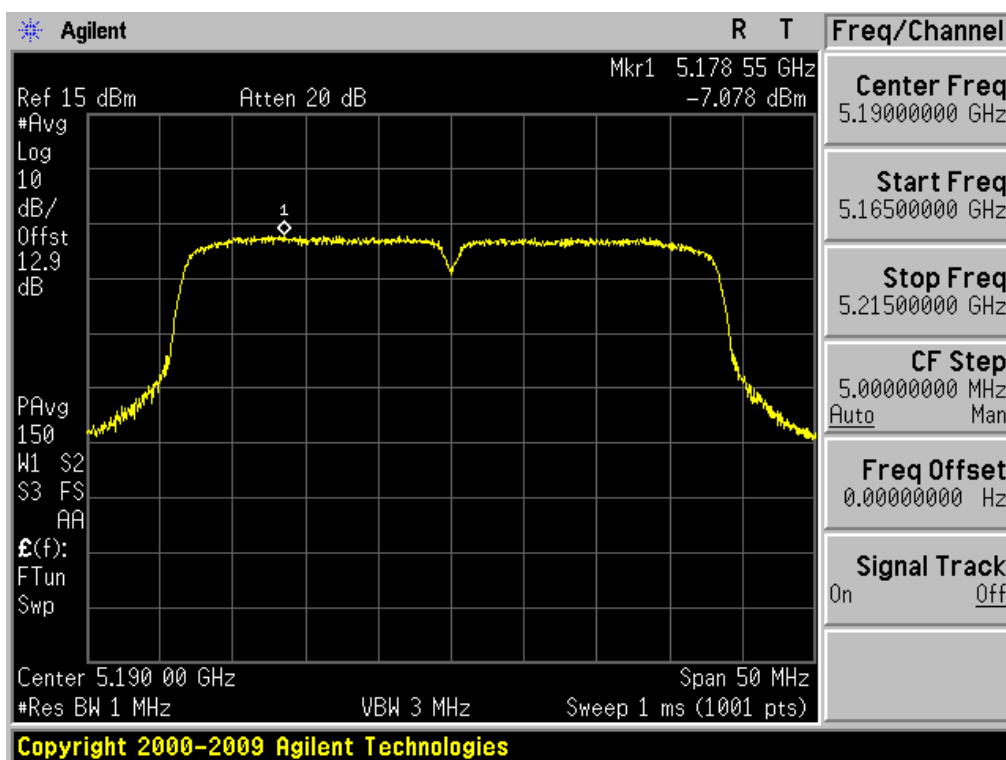
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.140



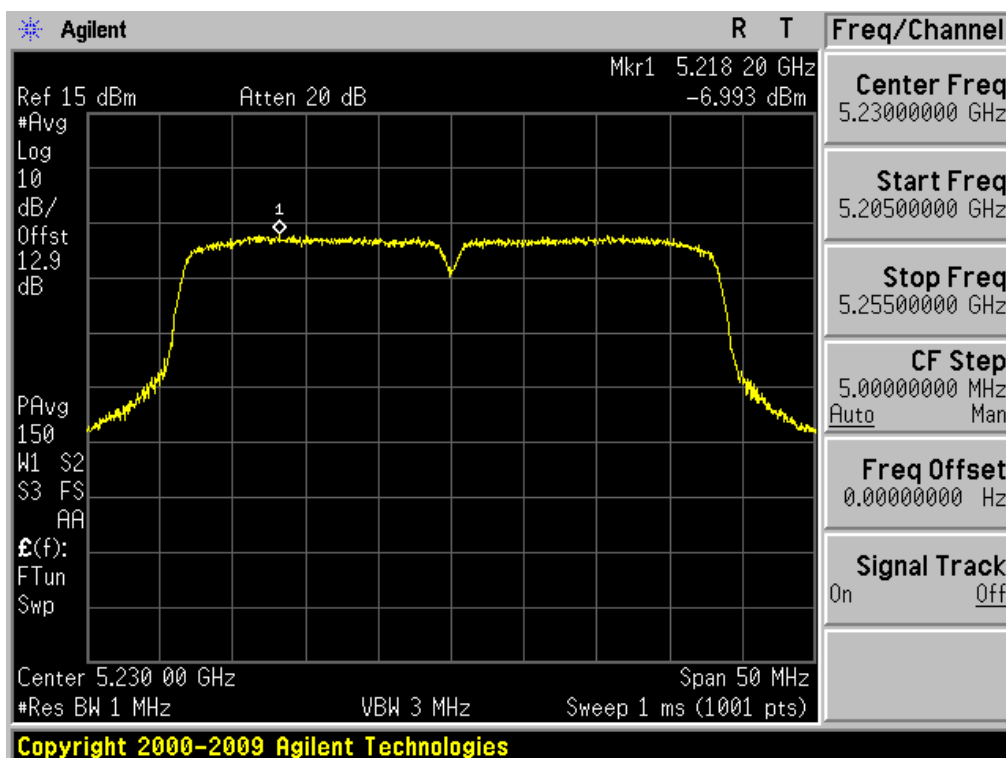
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.38



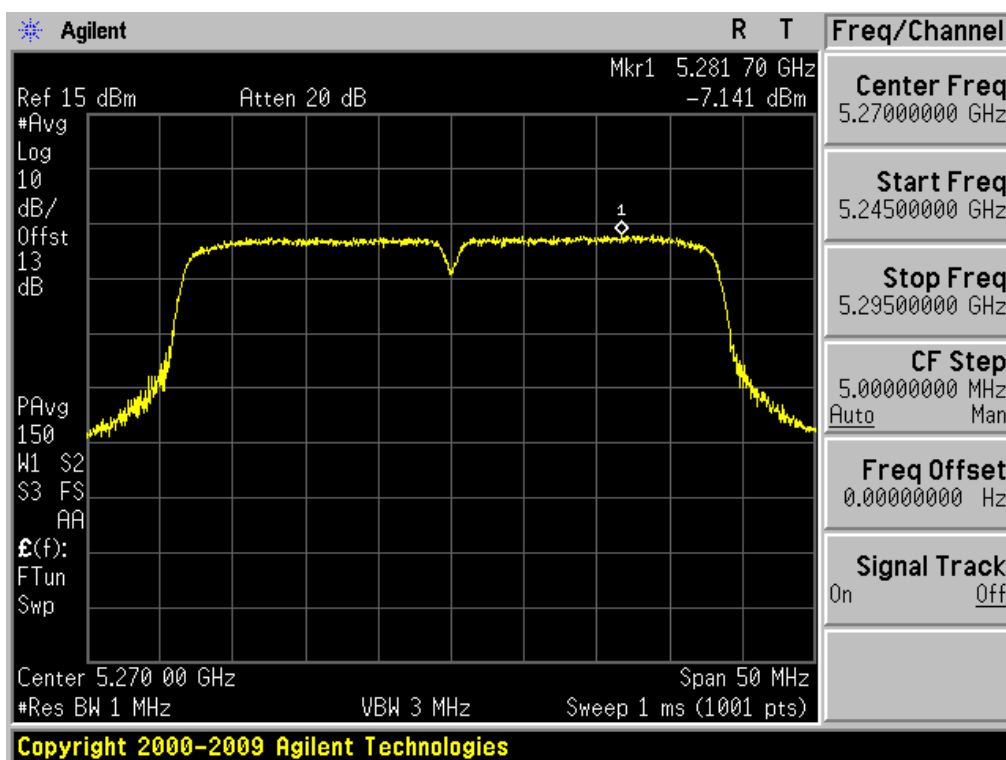
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.46



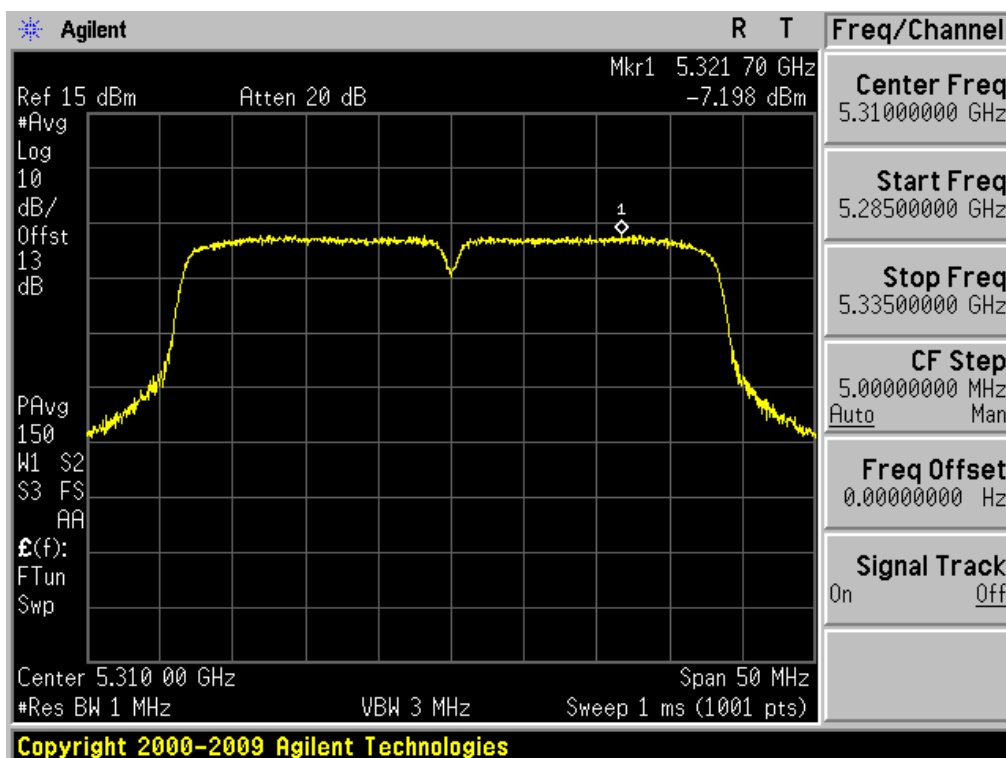
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.54



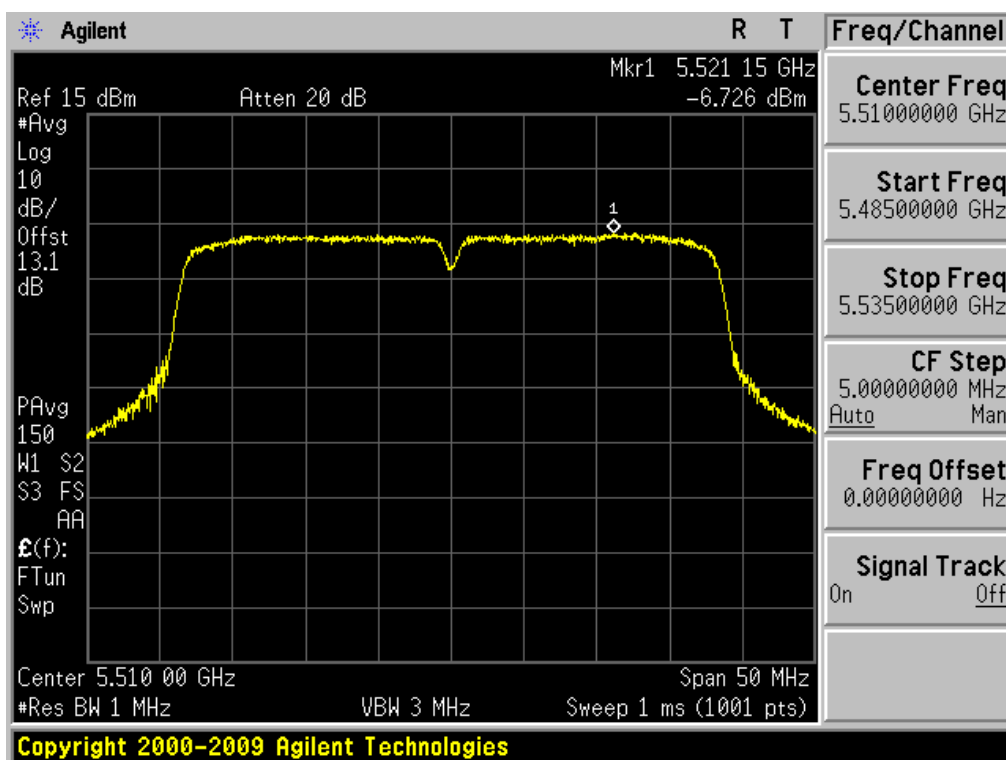
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.62



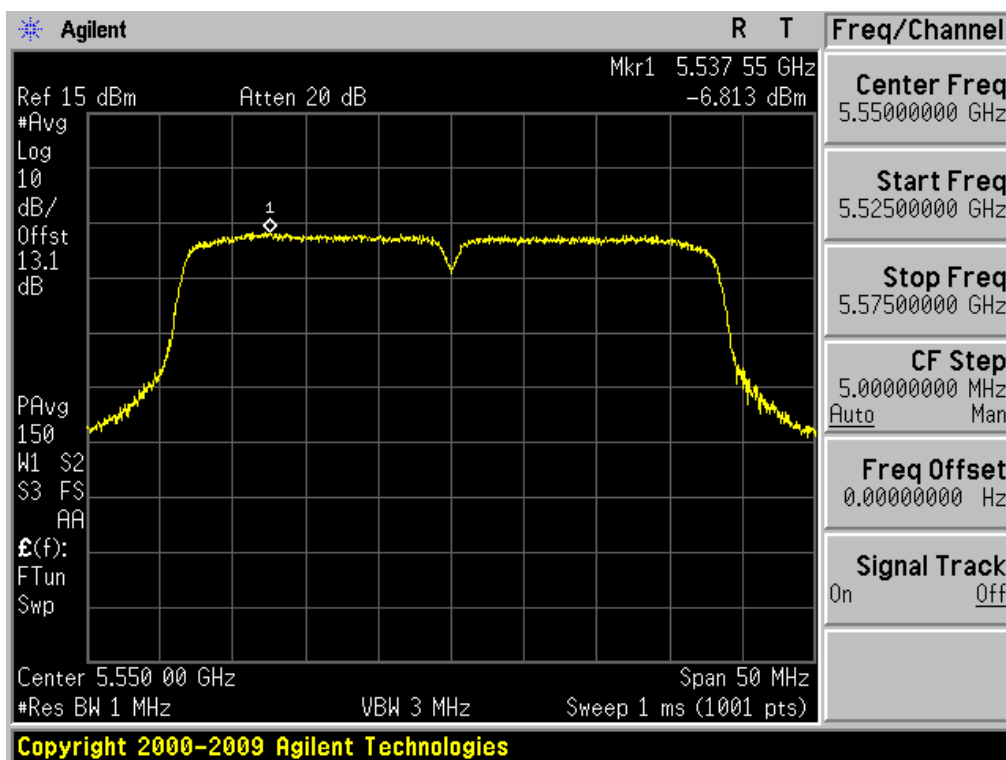
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.102



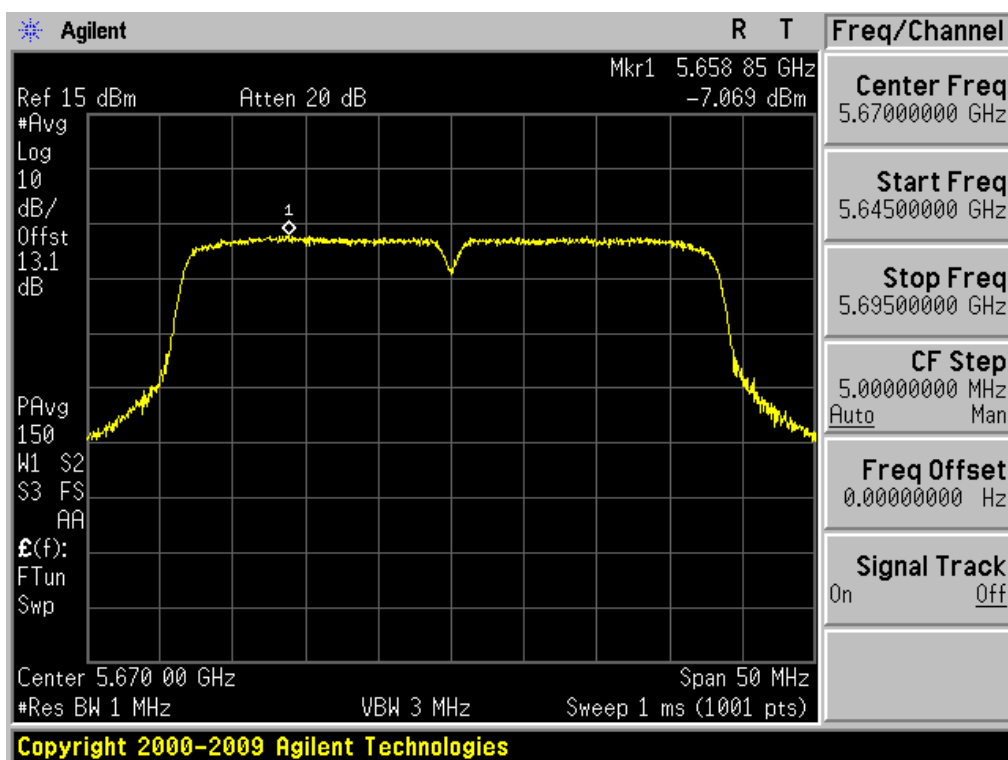
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.110



Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.134



3.2.4 Peak Excursion Ratio

Test requirements

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed **13 dB/MHz**.

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE

Peak Excursion Ratio is measured using Measurement Procedure **of KDB789033**

- 1) Compliance with the peak excursion requirement of Section 15.407(a)(6) shall be demonstrated by confirming that the ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.)
- 2) Set the spectrum analyzer span to view the entire emission bandwidth.
- 3) Find the maximum of the peak-max-hold spectrum.
 - a) Set **RBW = 1 MHz**.
 - b) **VBW ≥ 3 MHz**.
 - c) **Detector = peak**.
 - d) **Trace mode = max-hold**.
 - e) Allow the sweeps to continue until the trace stabilizes.
 - f) Use the peak search function to find the peak of the spectrum.
- 4) **Use the procedure found under E) to measure the PPSD.**
- 5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

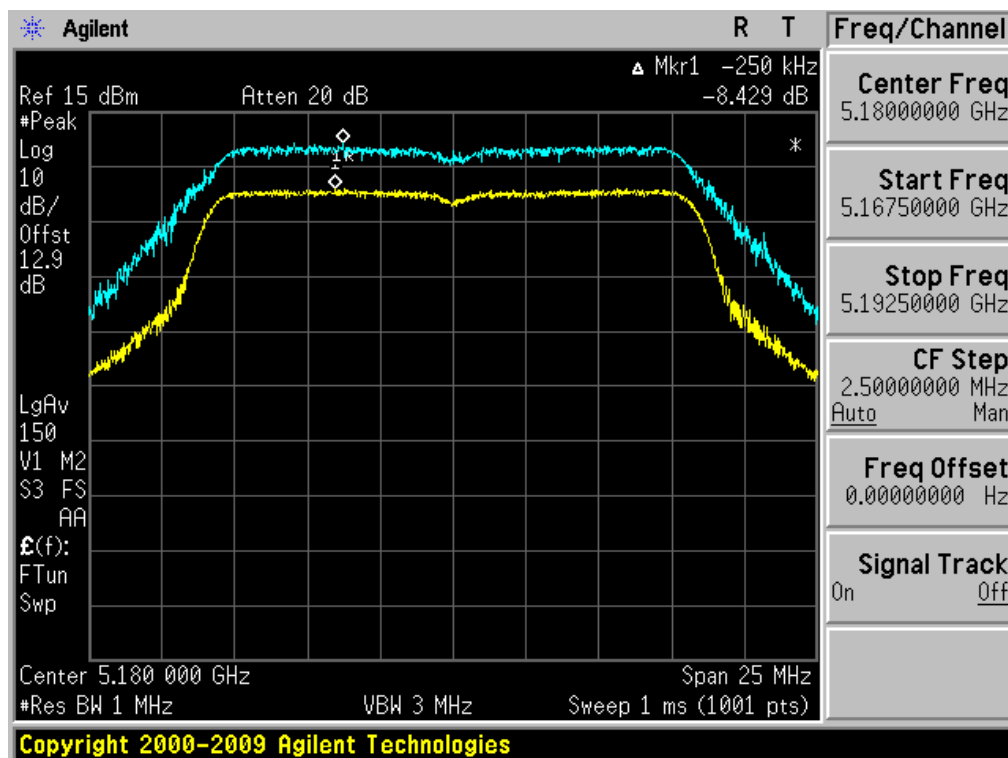
■ TEST RESULT : **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [dB/MHz]	Limit [dB/MHz]
802.11a	Band I	36	5180	8.429	13.000
		40	5200	8.775	
		48	5240	7.681	
	Band II	52	5260	8.223	
		60	5300	8.245	
		64	5320	8.472	
	Band III	100	5500	7.896	
		116	5580	8.140	
		140	5700	8.420	
802.11n (20MHz)	Band I	36	5180	8.655	
		40	5200	8.195	
		48	5240	7.848	
	Band II	52	5260	7.976	
		60	5300	8.666	
		64	5320	9.418	
	Band III	100	5500	8.130	
		116	5580	8.927	
		140	5700	9.027	
802.11n (40MHz)	Band I	38	5190	8.323	
		46	5230	8.019	
	Band II	54	5270	8.294	
		62	5310	9.155	
	Band III	102	5510	8.389	
		110	5550	8.112	
		134	5670	8.885	

■ Measurement Data PLOTS

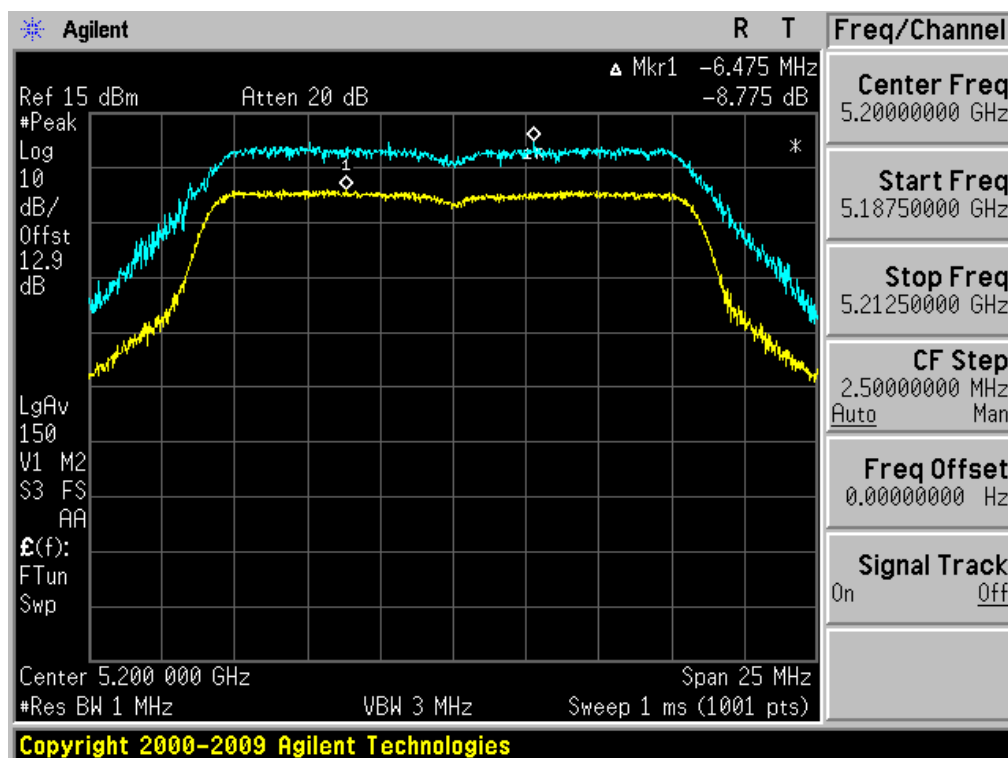
Peak Excursion Ratio

Test Mode: 802.11a & Ch.36



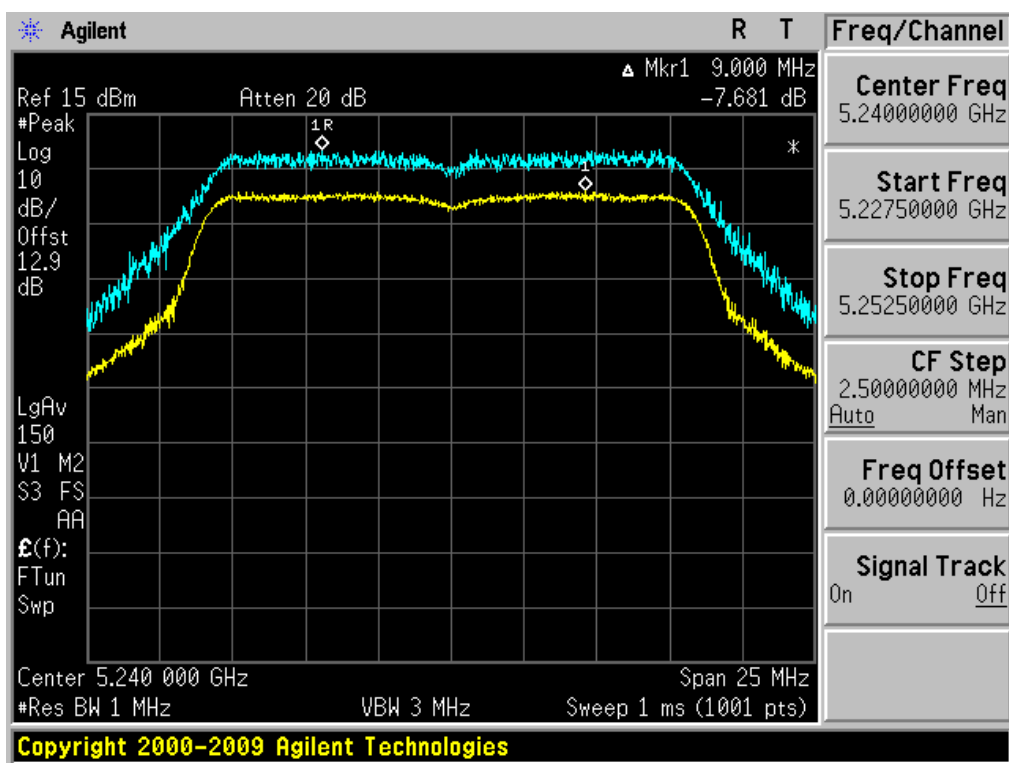
Peak Excursion Ratio

Test Mode: 802.11a & Ch.40



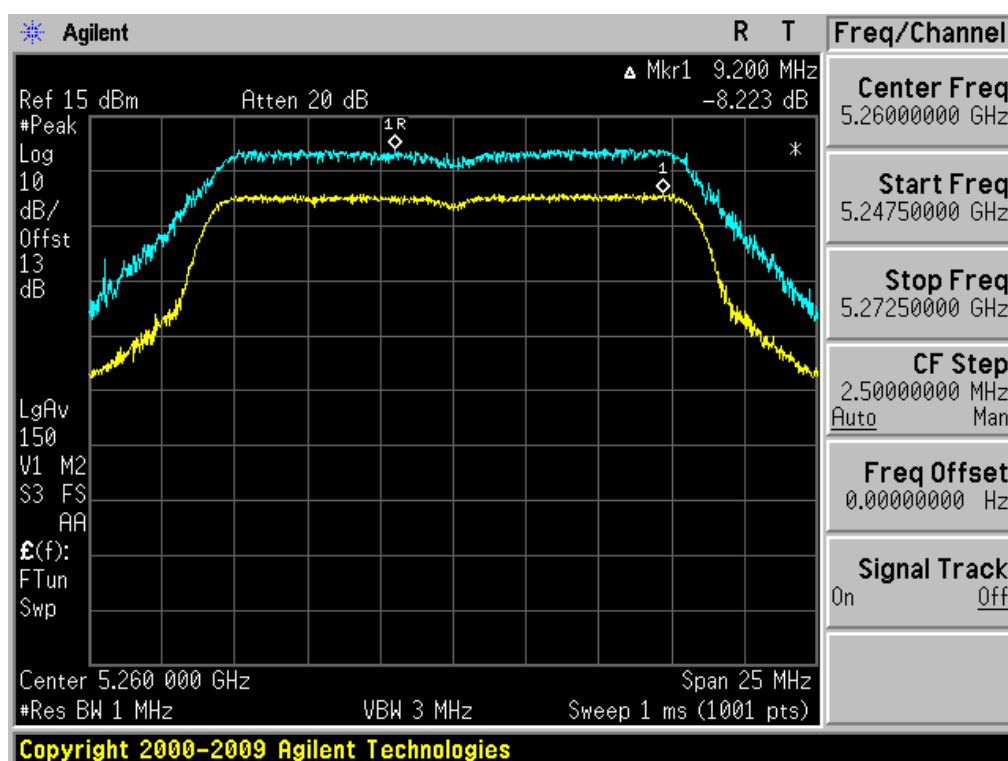
Peak Excursion Ratio

Test Mode: 802.11a & Ch.48



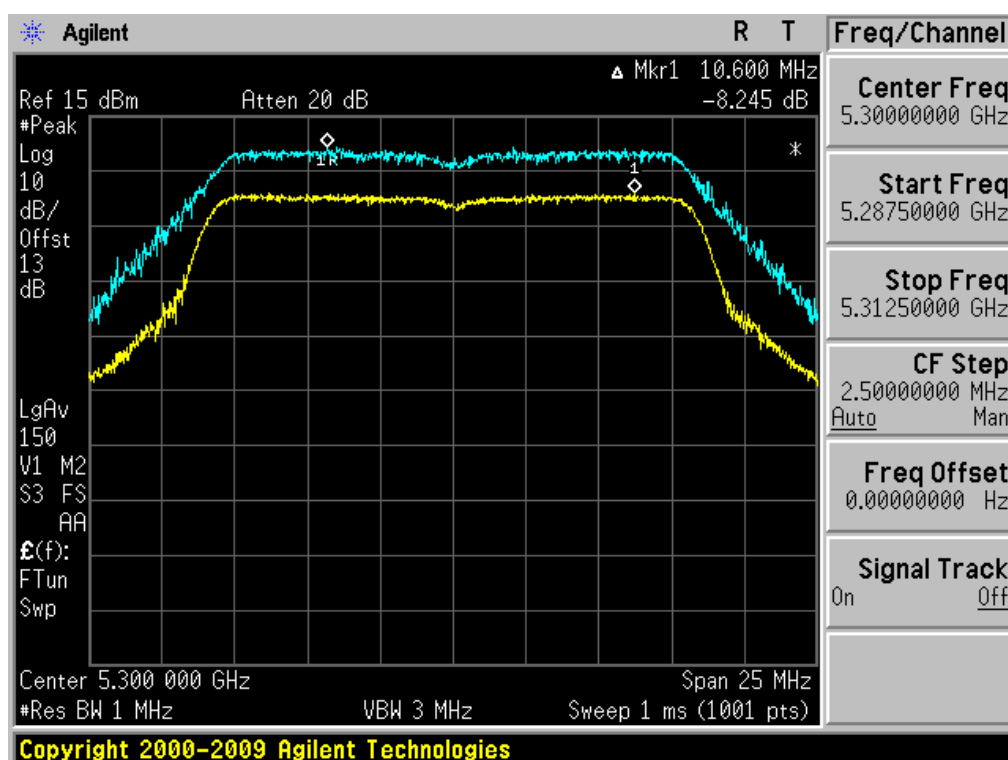
Peak Excursion Ratio

Test Mode: 802.11a & Ch.52



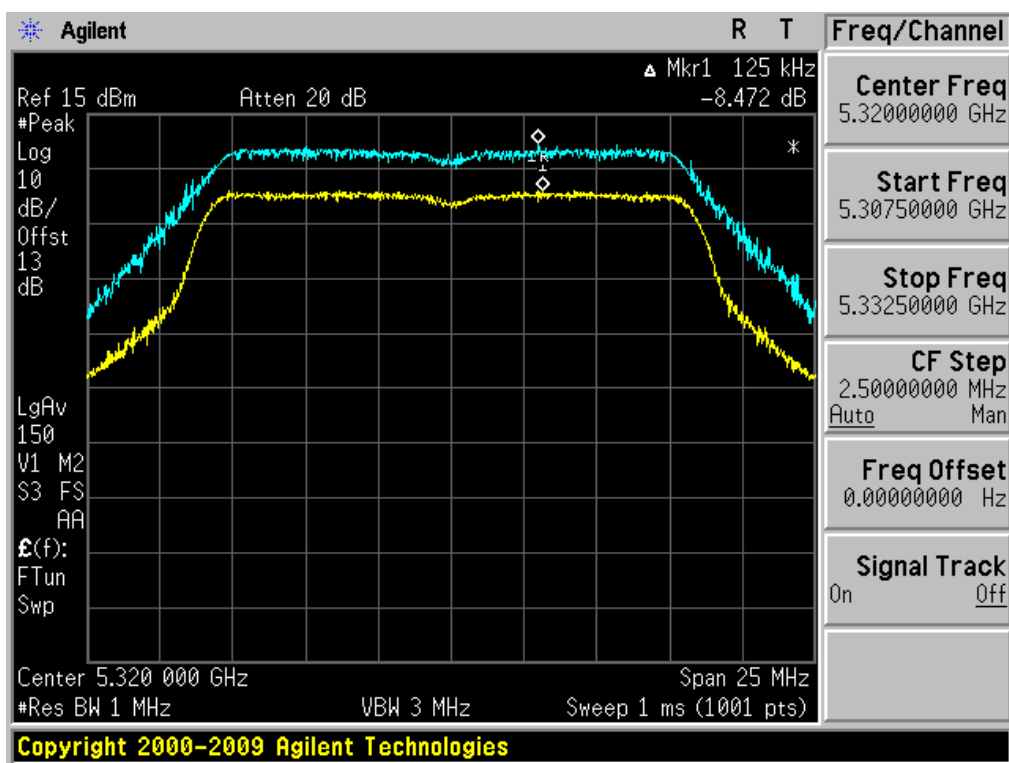
Peak Excursion Ratio

Test Mode: 802.11a & Ch.60



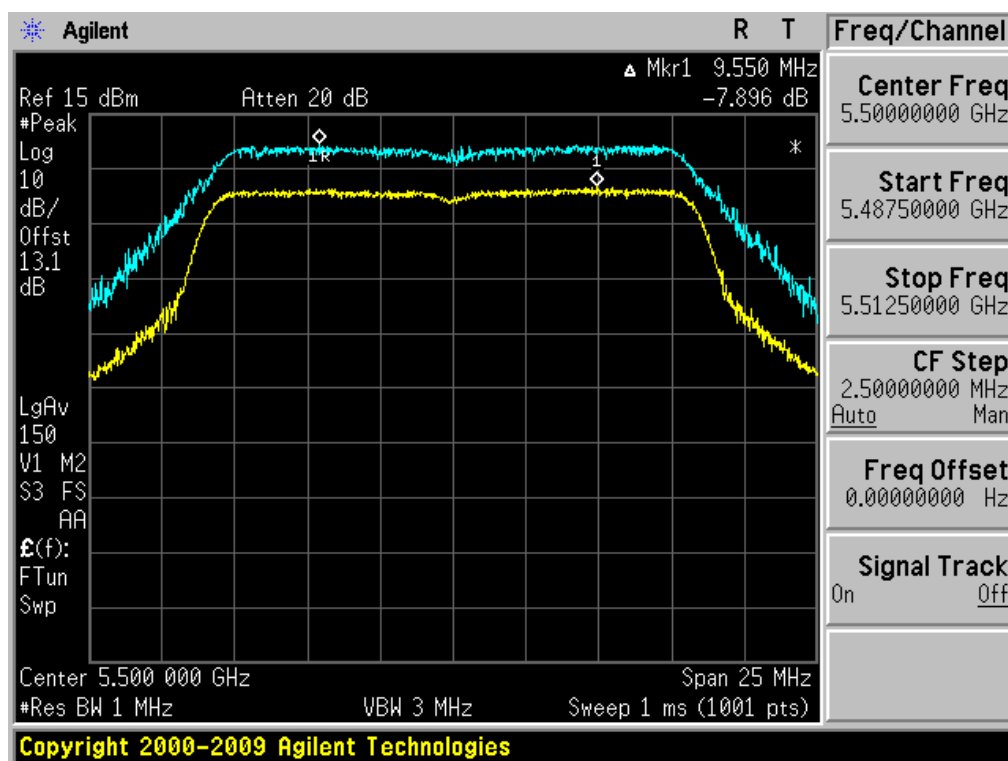
Peak Excursion Ratio

Test Mode: 802.11a & Ch.64



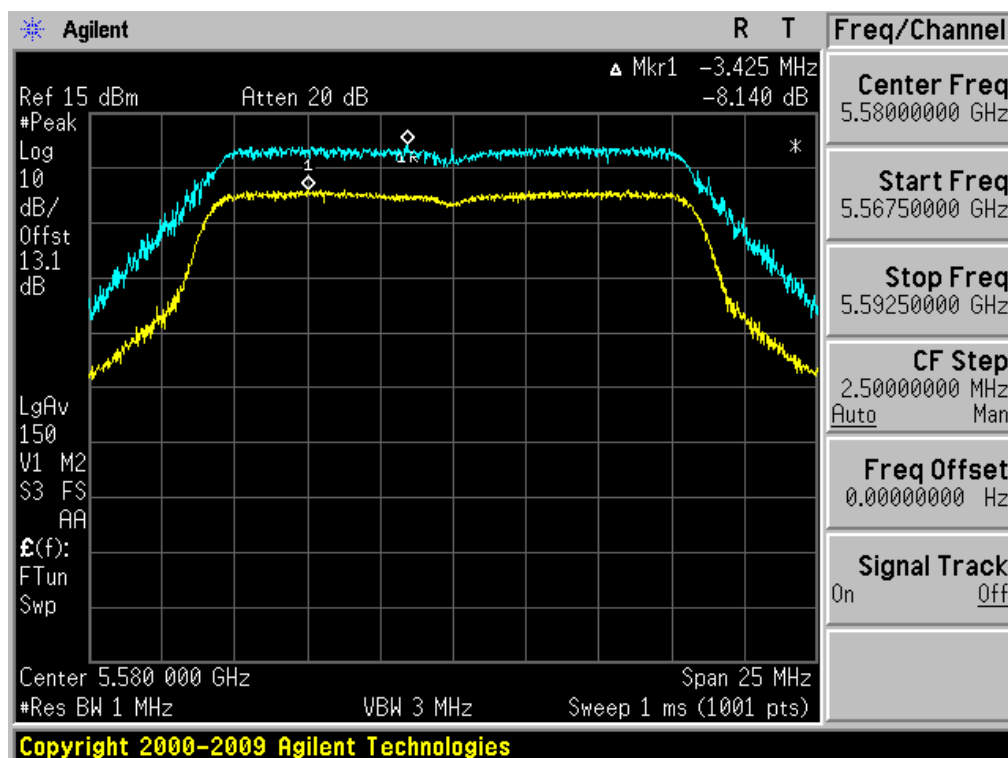
Peak Excursion Ratio

Test Mode: 802.11a & Ch.100



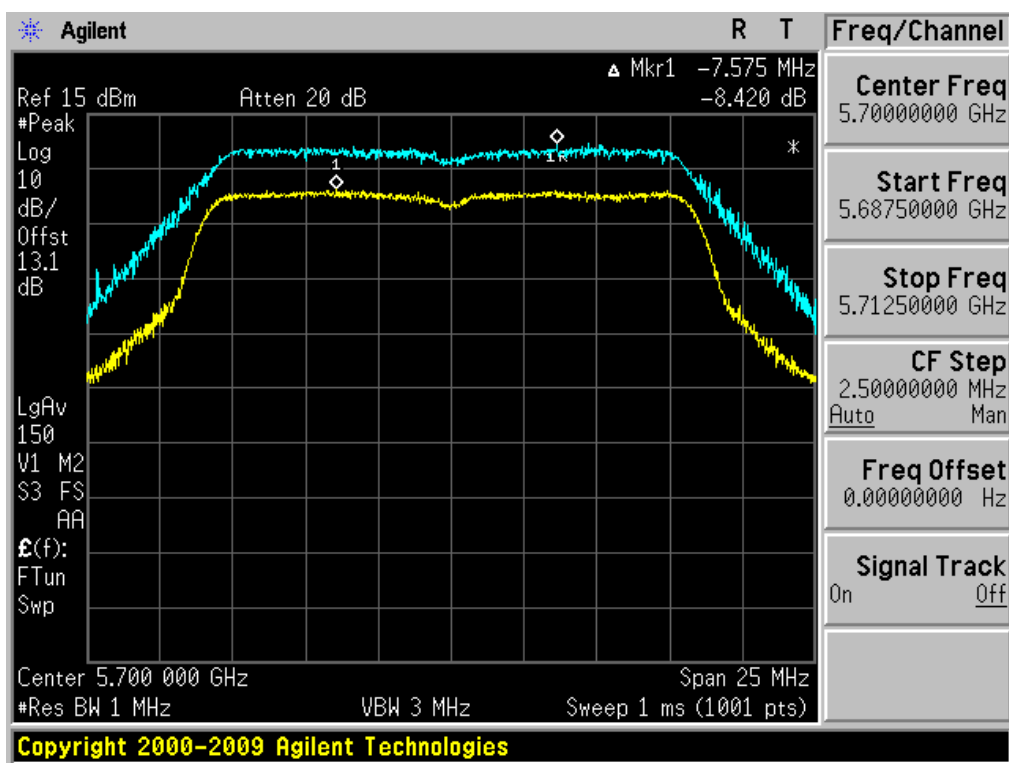
Peak Excursion Ratio

Test Mode: 802.11a & Ch.116



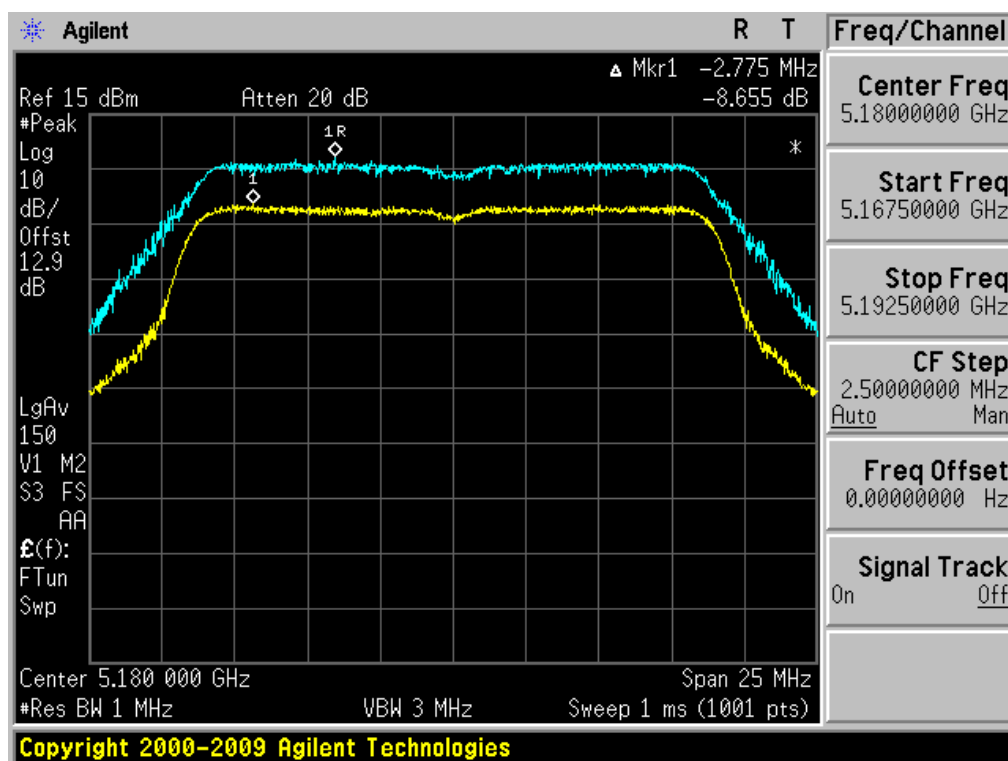
Peak Excursion Ratio

Test Mode: 802.11a & Ch.140



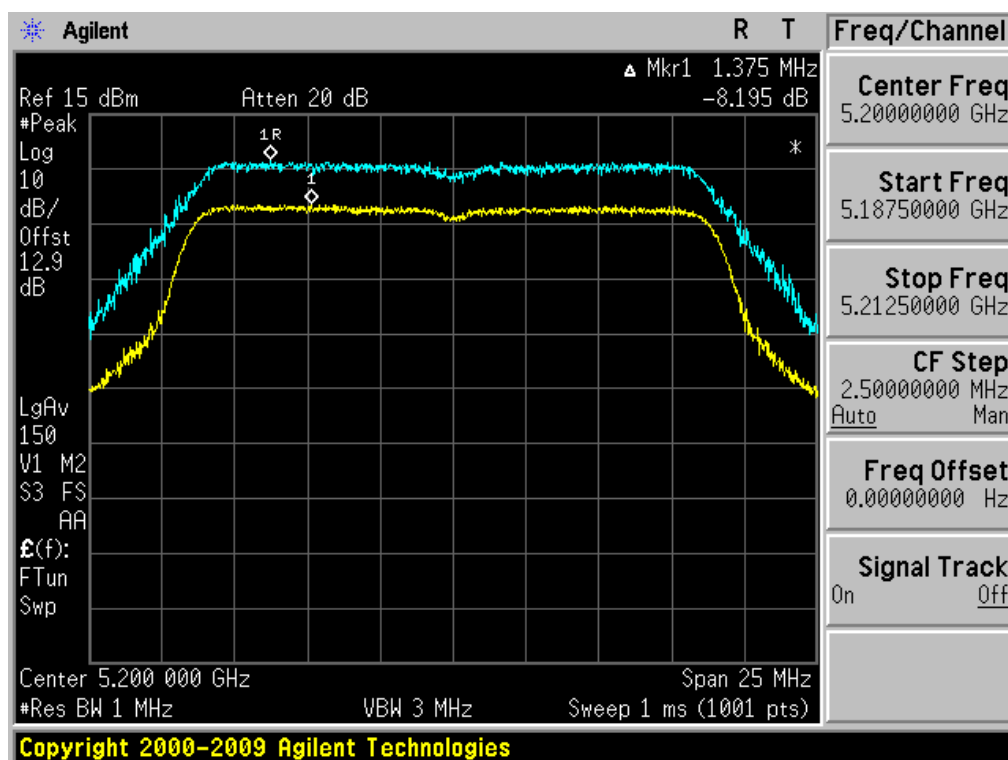
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.36



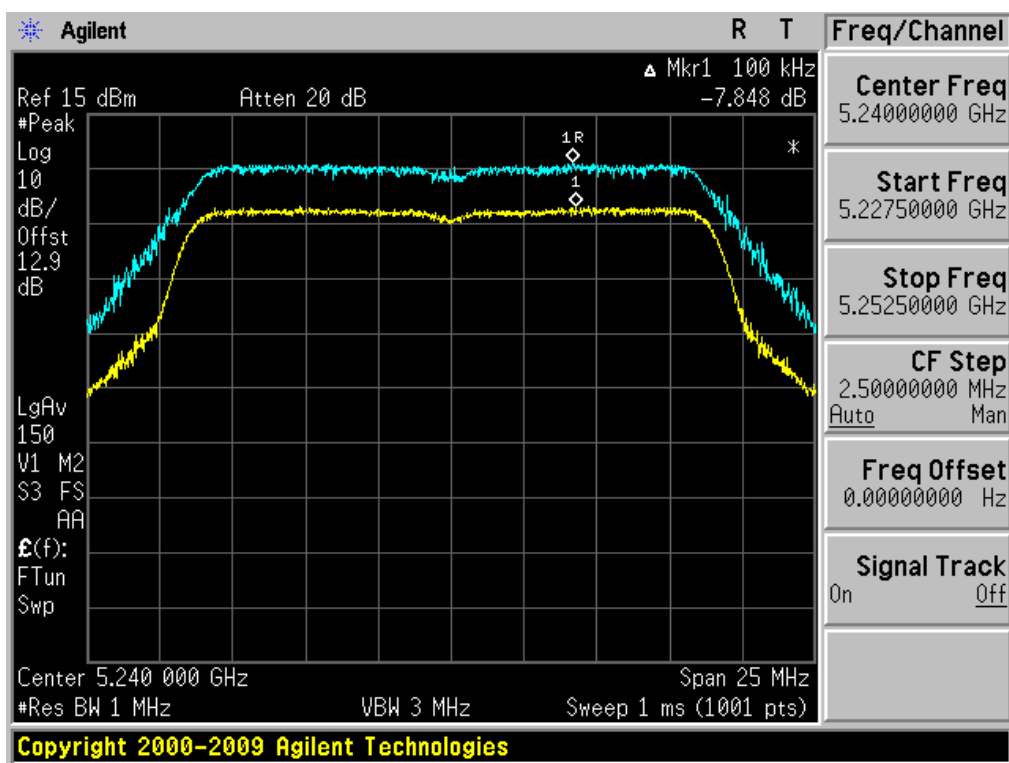
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.40



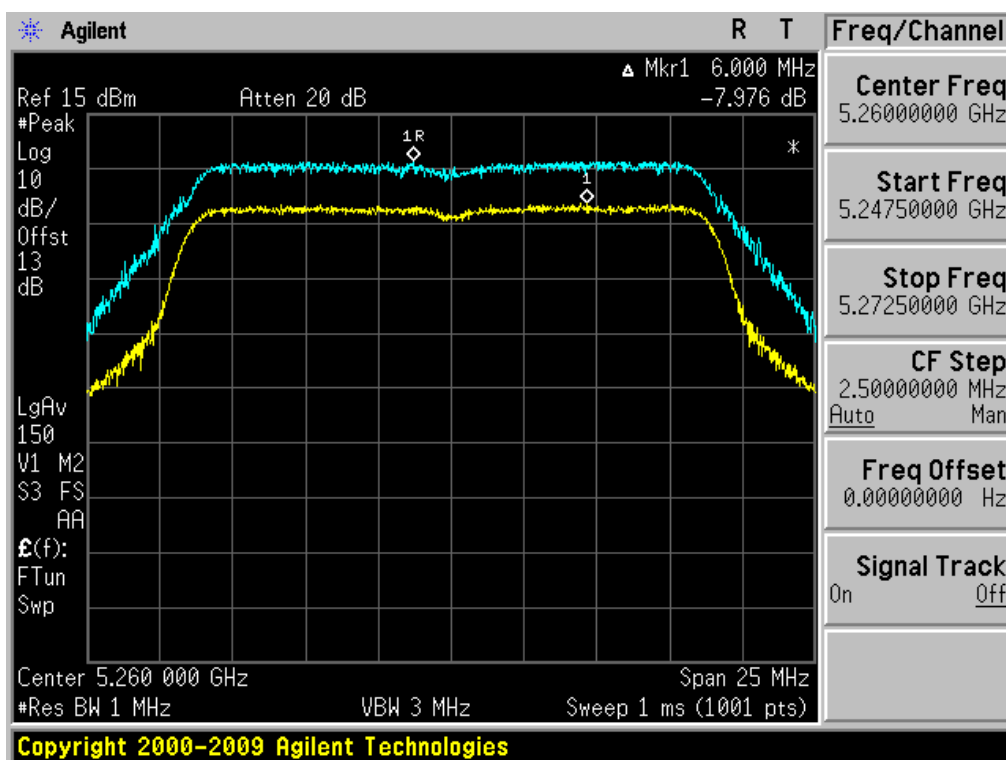
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.48



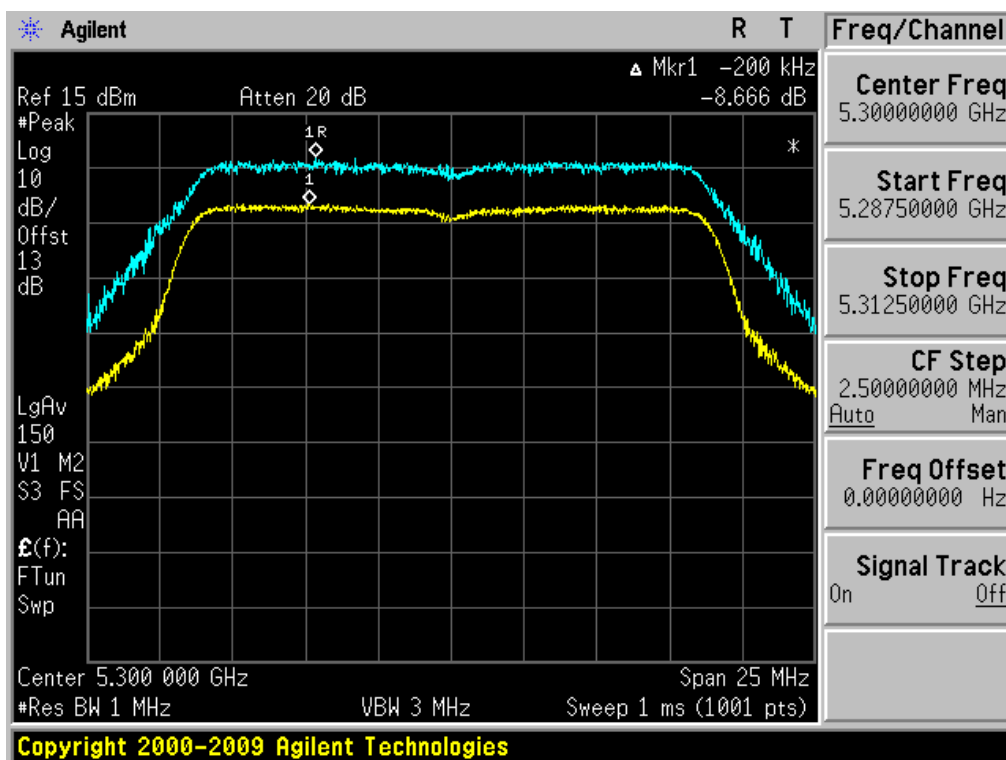
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.52



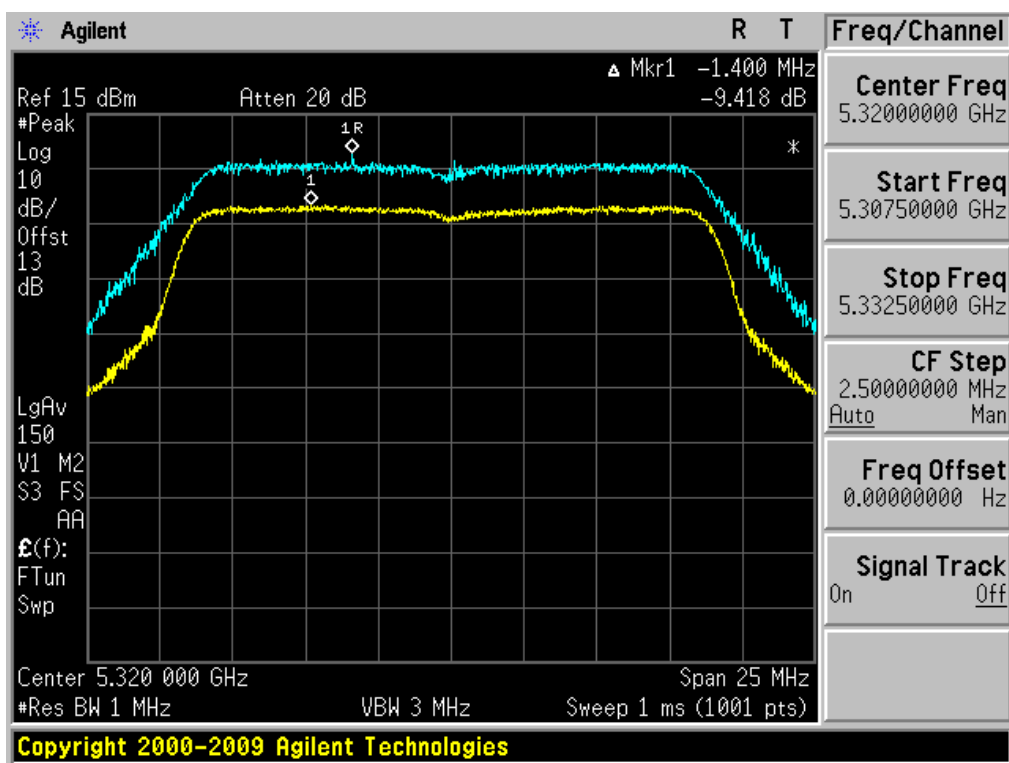
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.60



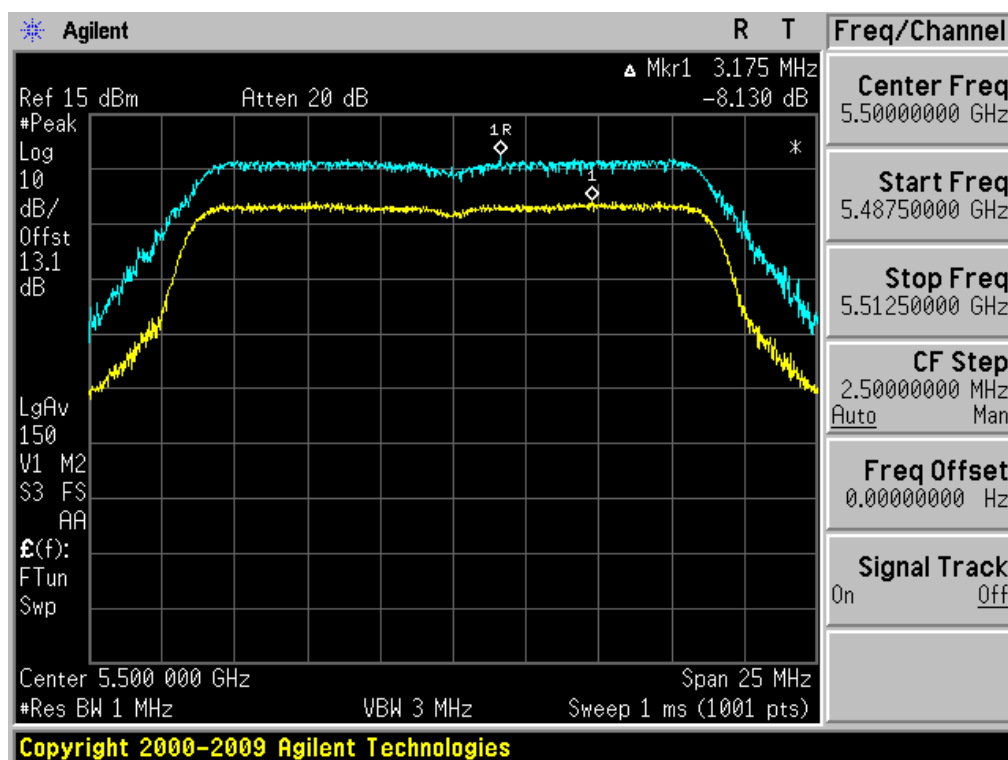
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.64



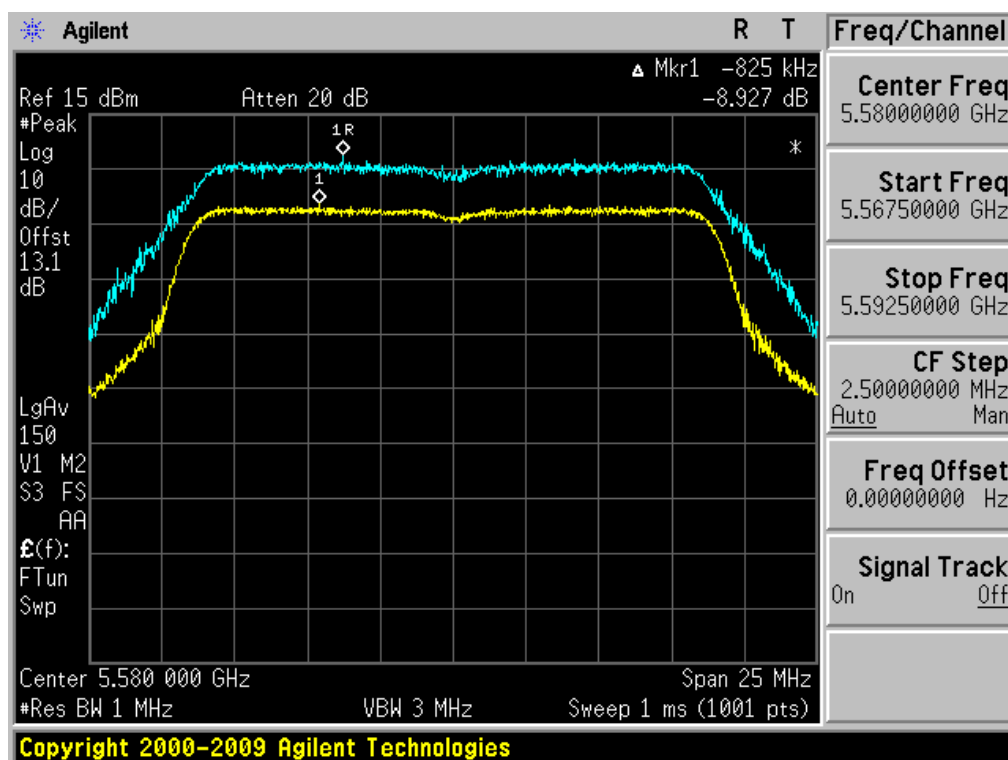
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.100



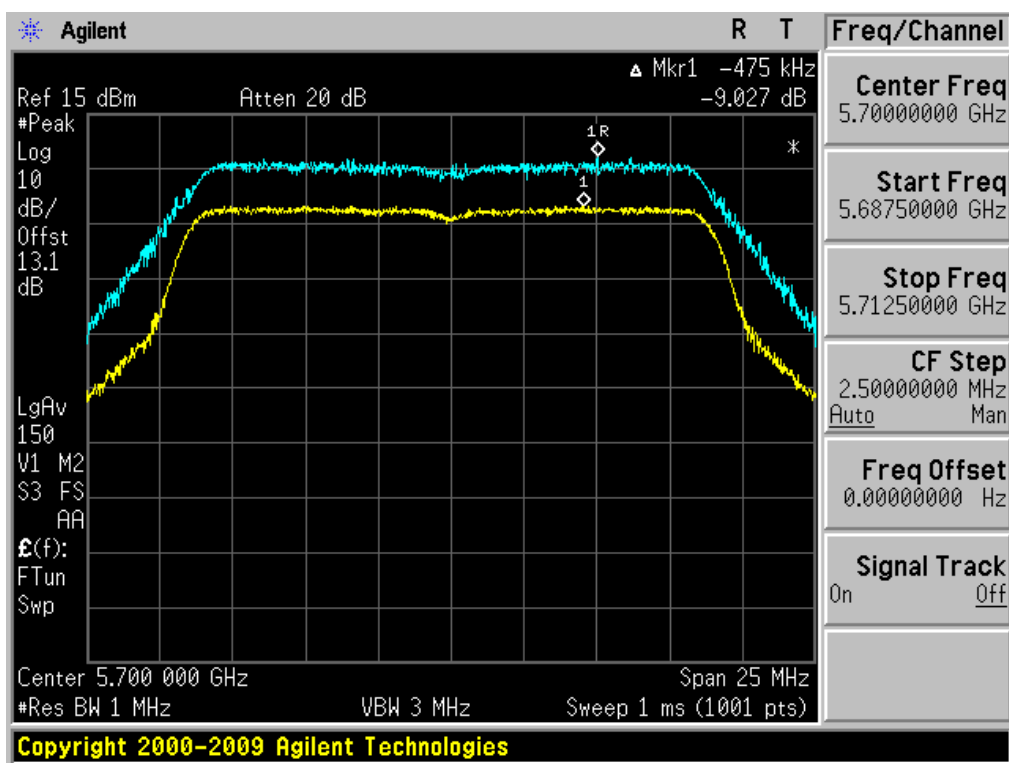
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.116



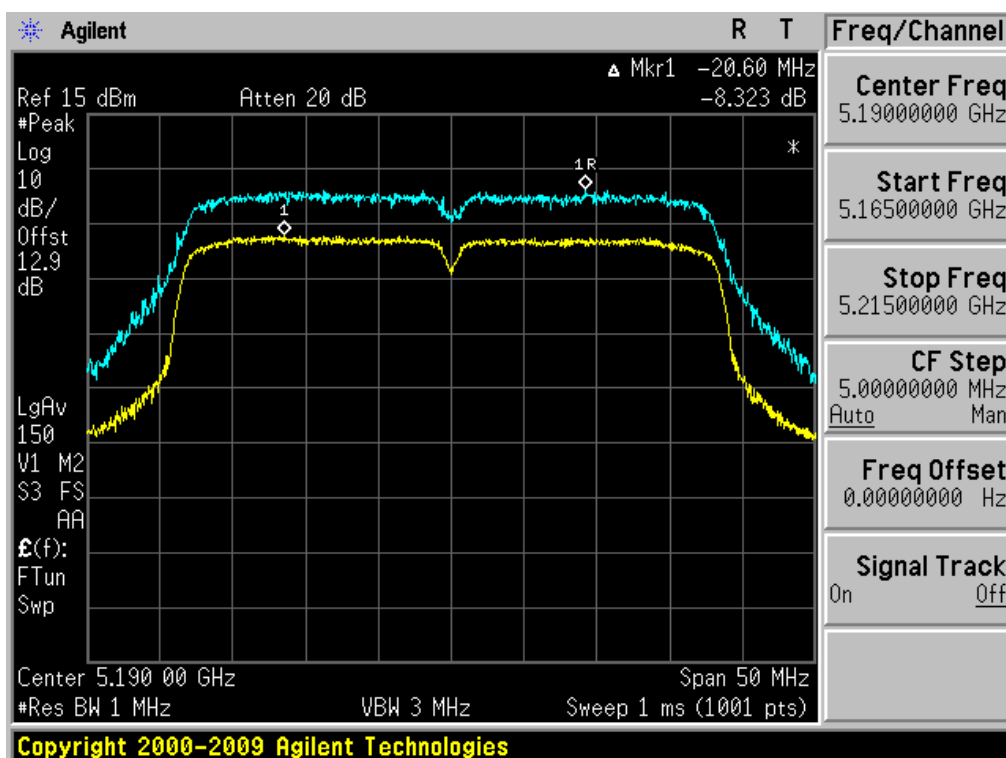
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.140



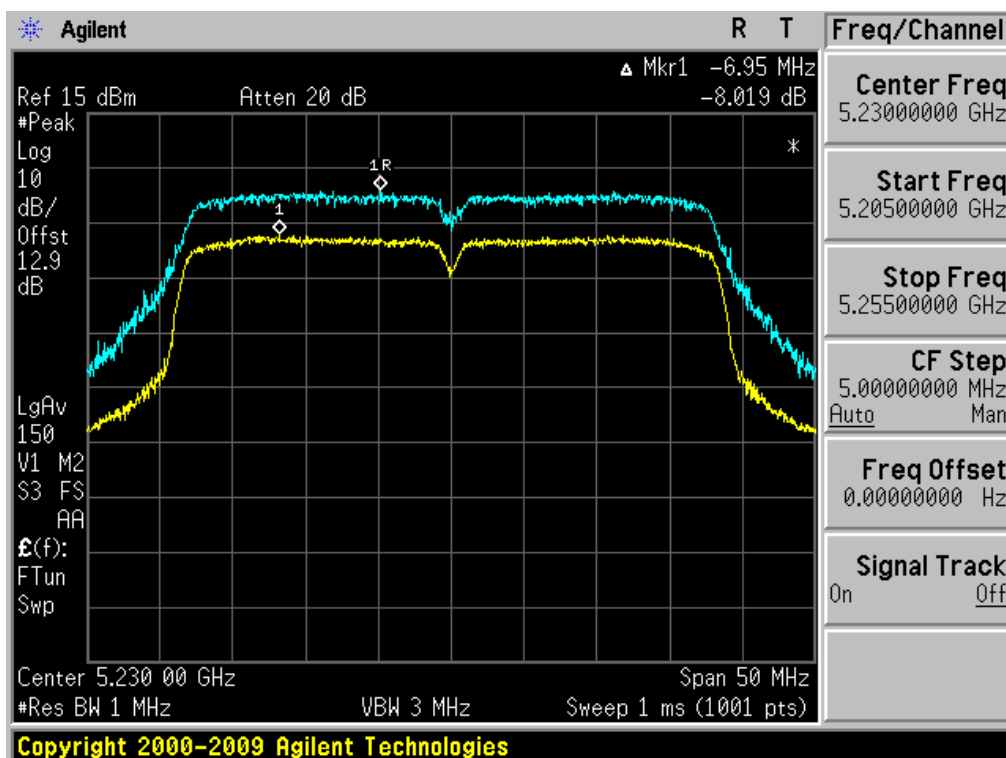
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.38



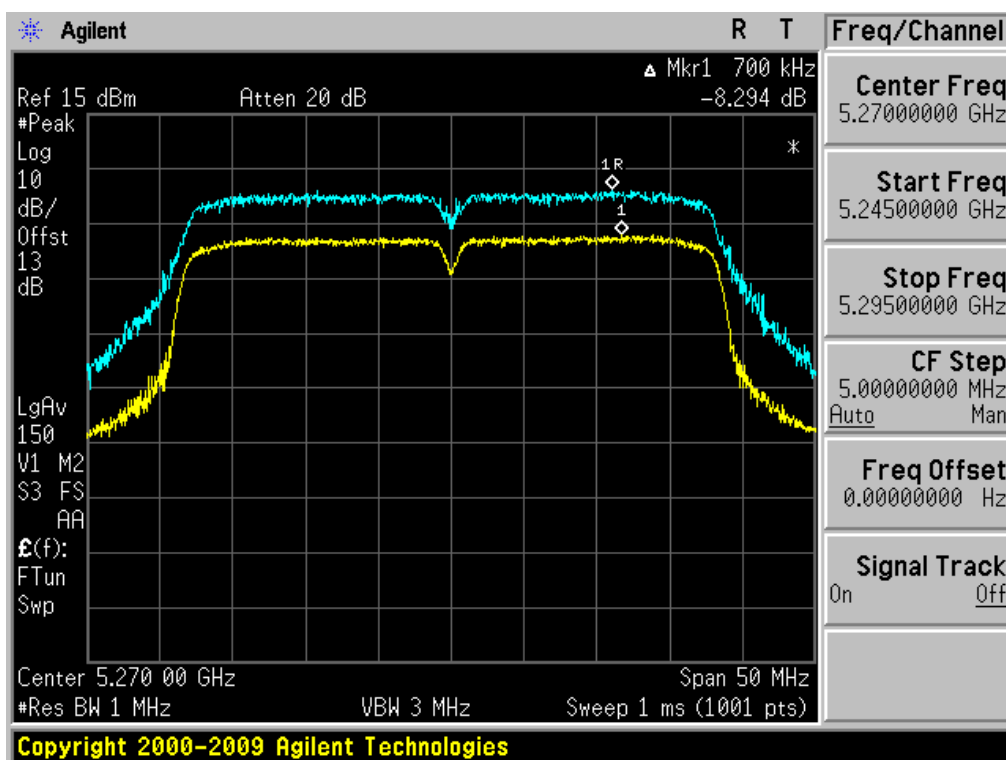
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.46



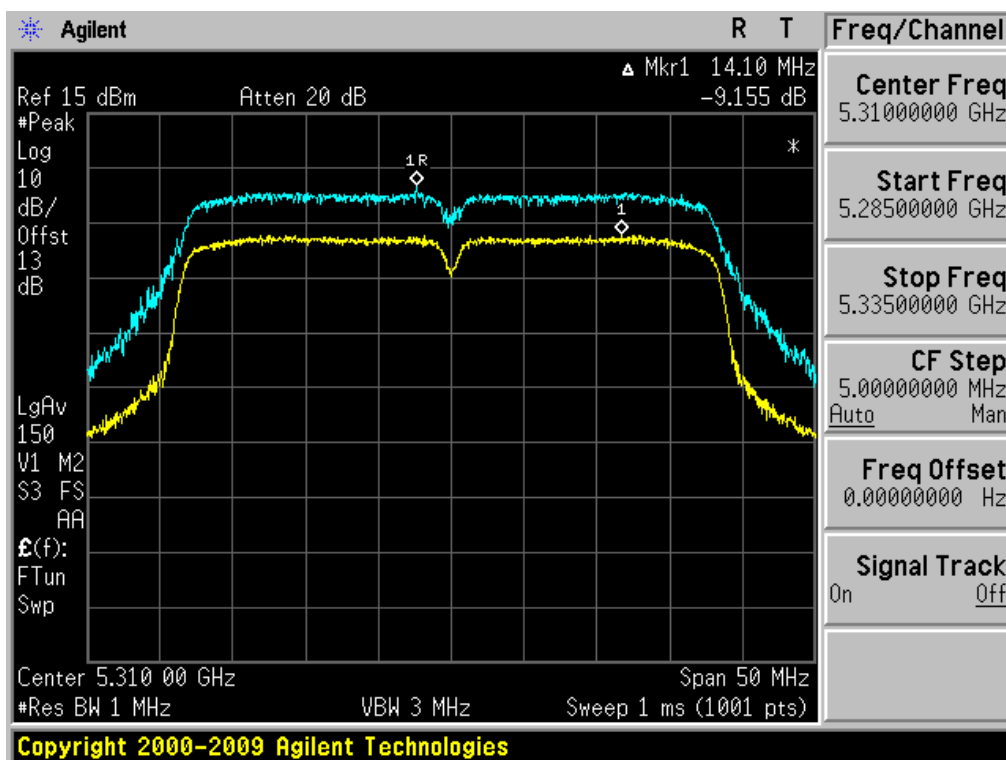
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.54



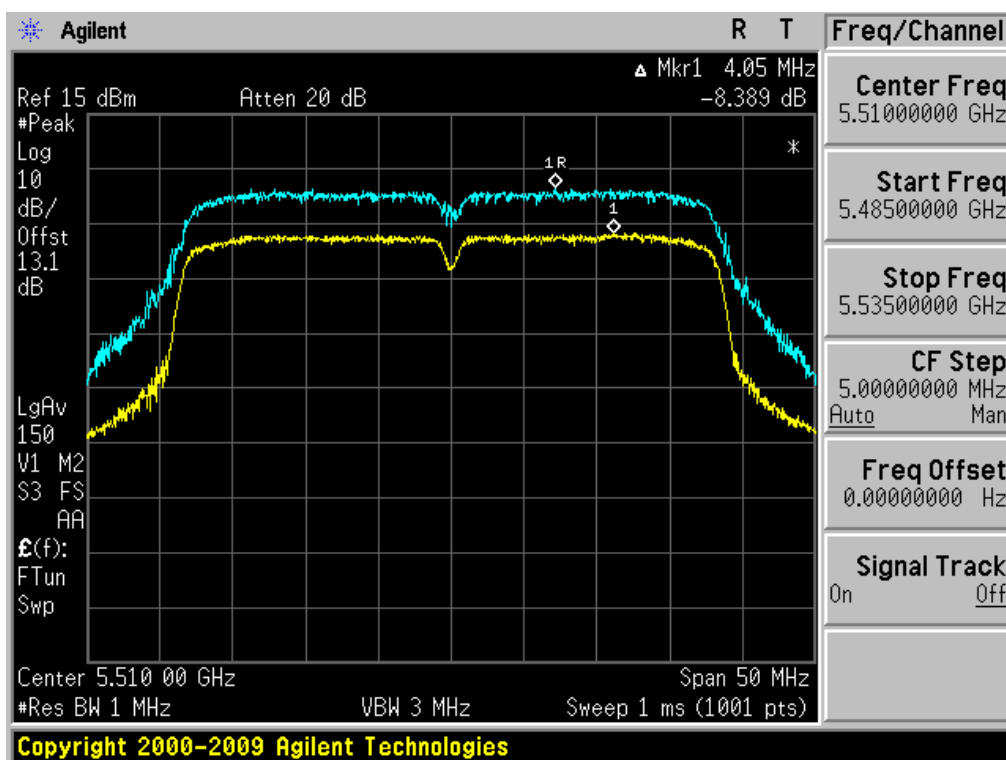
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.62



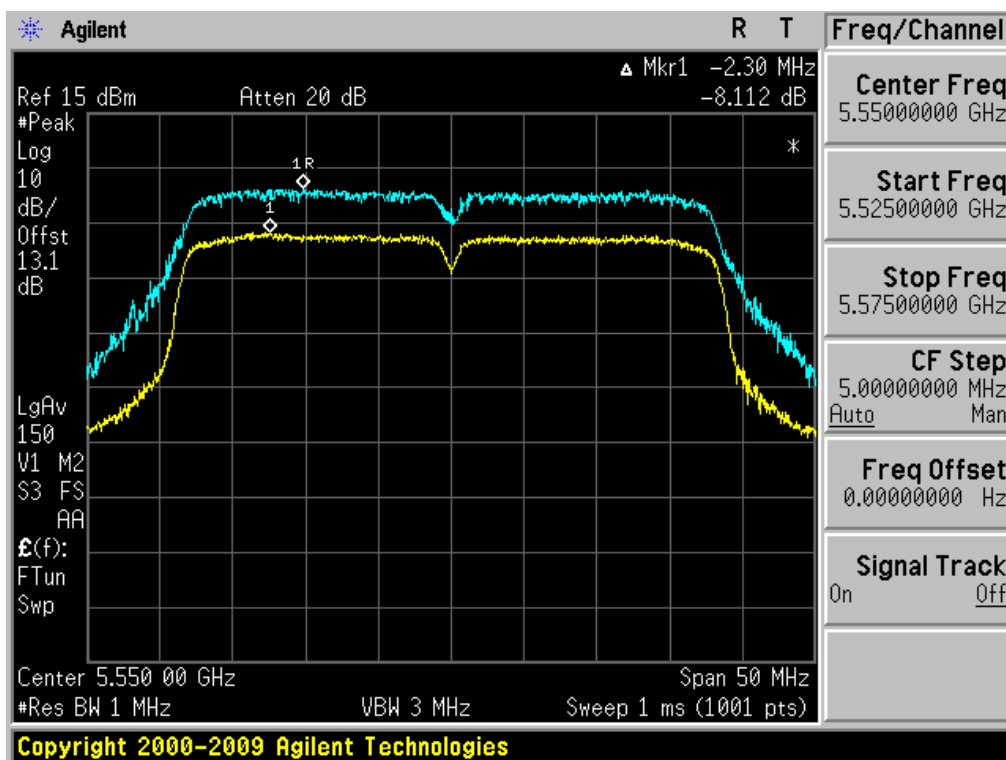
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.102



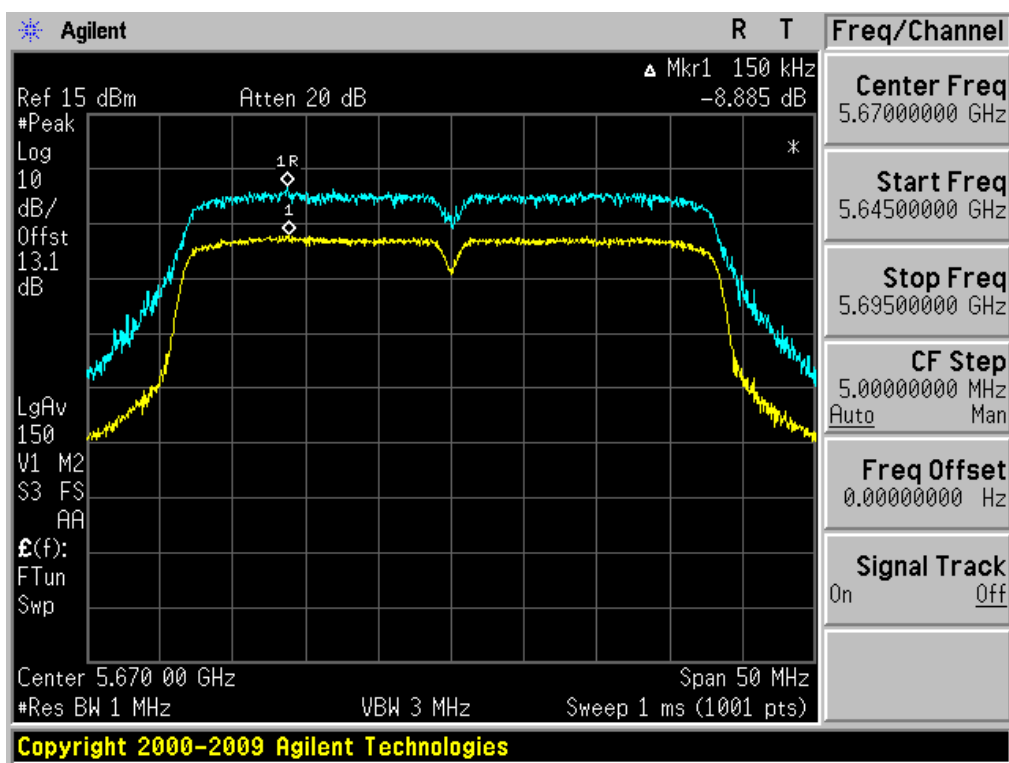
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.110



Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.134



3.2.5 Frequency Stability

Test requirements

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

■ TEST PROCEDURE

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10°C intervals and the unit was allowed to stabilize at each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

■ TEST RESULT : **Comply**

- Measurement Data:

OPERATING FREQUENCY : 5,200,000,000 Hz
CHANNEL : 40
REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,200,010,384	0.000200
100%		-30	5,199,964,868	-0.000676
100%		-20	5,200,024,851	0.000478
100%		-10	5,200,018,335	0.000353
100%		0	5,200,020,557	0.000395
100%		+10	5,200,009,480	0.000182
100%		+20	5,199,958,675	-0.000795
100%		+30	5,200,036,054	0.000693
100%		+40	5,200,028,472	0.000548
100%		+50	5,199,961,790	-0.000735
100%		+60	5,199,989,333	-0.000205
85%	3.230	+25	5,200,020,876	0.000401
115%	4.370	+25	5,199,953,502	-0.000894
BATT.ENDPOINT	3.200	+25	5,200,036,594	0.000704

- Minimum Standard: The emission is maintained within the band of the operation.

- Measurement Data:

OPERATING FREQUENCY : 5,300,000,000 Hz

CHANNEL : 60

REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,299,967,510	-0.000613
100%		-30	5,300,023,315	0.000440
100%		-20	5,299,969,399	-0.000577
100%		-10	5,299,990,335	-0.000182
100%		0	5,300,008,434	0.000159
100%		+10	5,300,018,460	0.000348
100%		+20	5,299,951,510	-0.000915
100%		+30	5,300,036,058	0.000680
100%		+40	5,300,043,482	0.000820
100%		+50	5,299,944,776	-0.001042
100%		+60	5,300,036,188	0.000683
85%	3.230	+25	5,299,975,110	-0.000470
115%	4.370	+25	5,300,032,974	0.000622
BATT.ENDPOINT	3.200	+25	5,300,008,776	0.000166

- Minimum Standard: The emission is maintained within the band of the operation.

- Measurement Data:

OPERATING FREQUENCY : 5,580,000,000 Hz
 CHANNEL : 116
 REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,580,061,231	0.001097
100%		-30	5,579,992,546	-0.000134
100%		-20	5,579,961,275	-0.000694
100%		-10	5,579,972,649	-0.000490
100%		0	5,580,036,654	0.000657
100%		+10	5,580,018,879	0.000338
100%		+20	5,579,964,398	-0.000638
100%		+30	5,580,023,482	0.000421
100%		+40	5,580,004,348	0.000078
100%		+50	5,579,963,515	-0.000654
100%		+60	5,579,956,431	-0.000781
85%	3.230	+25	5,580,012,384	0.000222
115%	4.370	+25	5,579,976,395	-0.000423
BATT.ENDPOINT	3.200	+25	5,580,051,347	0.000920

- Minimum Standard: The emission is maintained within the band of the operation.

3.2.6 Radiated Spurious Emission Measurements

■ TEST PROCEDURE

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in semi anechoic chamber. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine the worst-case orientation for maximum emissions.

Radiated spurious emission measured using following Measurement Procedure of KDB789033

● Measurements Below 1000MHz

- a) Follow the requirements in section G)3), "General Requirements for Unwanted Emissions Measurements"
- b) Compliance shall be demonstrated using **CISPR quasi-peak detection**; however, **peak detection** is permitted as an alternative to quasi-peak detection.

G)3), General Requirements for Unwanted Emissions Measurements. The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

a) EUT Duty Cycle

- (1) The EUT shall be configured or modified to **transmit continuously** except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (**to no lower than 98 percent**) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
- (2) If **continuous transmission (or at least 98 percent duty cycle) cannot be achieved** due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:
 - The EUT shall be configured to operate at the maximum achievable duty cycle.
 - Measure the duty cycle, x, of the transmitter output signal.
 - Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
 - The test report shall include the following additional information:
 - The reason for the duty cycle limitation.
 - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
 - The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.
- (3) **Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.**

● Measurements Above 1000MHz (Peak)

- a) Follow the requirements in section G)3), "General Requirements for Unwanted Emissions Measurements".
- b) Peak emission levels are measured by setting the analyzer as follows:
 - (1) **RBW = 1 MHz.**
 - (2) **VBW ≥ 3 MHz.**
 - (3) **Detector = Peak.**
 - (4) Sweep time = auto.
 - (5) Trace mode = max hold.
 - (6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

● Measurements Above 1000MHz (Method AD)

- (1) **RBW = 1 MHz.**
- (2) **VBW ≥ 3 MHz.**
- (3) **Detector = RMS**, if $\text{span}/(\# \text{ of points in sweep}) \leq \text{RBW}/2$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
- (4) Averaging type = power (i.e., RMS)
 - As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- (5) Sweep time = auto.
- (6) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of $1/x$, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged.
- (7) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - If power averaging (RMS) mode was used in step (iv) above, the correction factor is $10 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
 - **If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log(1/x)$, where x is the duty cycle.** For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.

■ **Minimum Standard:**

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240			
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

▪ **FCC Part 15.407 (b):** Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the **5.15-5.25 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (2) For transmitters operating in the **5.25-5.35 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
- (3) For transmitters operating in the **5.47-5.725 GHz band**: all emissions outside of the **5.47-5.725 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (4) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.
- (5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions **below 1 GHz** must comply with the general field strength limits set forth in **Section 15.209**. Further, any U-NII devices using an **AC power line** are required to comply also with the conducted limits set forth in **Section 15.207**.

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5180MHz(Ch. 36)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5148.75	H	Z	PK	55.51	6.95	-	-	62.46	74.00	11.54
5149.55	H	Z	AV	41.83	6.95	0.74	-	49.52	54.00	4.48
10359.90	H	Y	PK	49.83	11.39	-	-9.54	51.68	68.20	16.52
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5200MHz(Ch. 40)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10400.20	H	Y	PK	49.53	11.98	-	-9.54	51.97	68.20	16.23
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5240MHz(Ch. 48)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10479.96	H	Y	PK	49.56	12.36	-	-9.54	52.38	68.20	15.82
-	-	-	-	-	-	-	-	-	-	-

Note.

- This test item was performed in each axis and the worst case data were reported.
- Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
- Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5260MHz(Ch. 52)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10519.93	V	X	PK	49.51	12.08	-	-9.54	52.05	68.20	16.15
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5300MHz(Ch. 60)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10600.05	V	X	PK	51.02	12.21	-	-9.54	53.69	74.00	20.31
10600.10	V	X	AV	47.21	12.21	0.74	-9.54	50.62	54.00	3.38

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5320MHz(Ch. 64)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5351.30	H	Z	PK	55.94	7.43	-	-	63.37	74.00	10.63
5350.15	H	Z	AV	40.85	7.43	0.74	-	49.02	54.00	4.98
10639.77	V	X	PK	49.47	12.53	-	-9.54	52.46	74.00	21.54
10639.96	V	X	AV	45.98	12.53	0.74	-9.54	49.71	54.00	4.29
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5500MHz(Ch. 100)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5468.88	H	Z	PK	52.27	7.62	-	-	59.89	68.20	8.31
11000.00	V	X	PK	49.35	12.92	-	-9.54	52.73	74.00	21.27
10999.97	V	X	AV	45.41	12.92	0.74	-9.54	49.53	54.00	4.47
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5580MHz(Ch. 116)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11159.95	V	X	PK	49.59	14.65	-	-9.54	54.70	74.00	19.30
11159.89	V	X	AV	46.07	14.65	0.74	-9.54	51.92	54.00	2.08

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5700MHz(Ch. 140)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5725.36	H	Z	PK	53.96	7.98	-	-	61.94	68.20	6.26
11400.00	V	X	PK	48.30	14.65	-	-9.54	53.41	74.00	20.59
11399.88	V	X	AV	44.33	14.65	0.74	-9.54	50.18	54.00	3.82

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5180MHz(Ch. 36)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5149.85	H	Z	PK	53.85	6.95	-	-	60.80	74.00	13.20
5149.75	H	Z	AV	39.2	6.95	0.74	-	46.89	54.00	7.11
10359.89	H	Y	PK	49.72	11.39	-	-9.54	51.57	68.20	16.63
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5200MHz(Ch. 40)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10400.13	H	Y	PK	49.99	11.98	-	-9.54	52.43	68.20	15.77
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5240MHz(Ch. 48)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10479.80	H	Y	PK	49.57	12.36	-	-9.54	52.39	68.20	15.81
-	-	-	-	-	-	-	-	-	-	-

Note.

- This test item was performed in each axis and the worst case data were reported.
- Sample Calculation.
 Margin = Limit – Result
 Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
 T.F = AF + CL – AG
 DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
- Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5260MHz(Ch. 52)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10520.06	V	X	PK	49.27	12.08	-	-9.54	51.81	68.20	16.39
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5300MHz(Ch. 60)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10600.07	V	X	PK	50.45	12.21	-	-9.54	53.12	74.00	20.88
10600.34	V	X	AV	47.10	12.21	0.74	-9.54	50.51	54.00	3.49

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5320MHz(Ch. 64)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5350.40	H	Z	PK	51.97	7.43	-	-	59.40	74.00	14.60
5351.00	H	Z	AV	38.90	7.43	0.74	-	47.07	54.00	6.93
10639.78	V	X	PK	49.61	12.53	-	-9.54	52.60	74.00	21.40
10640.03	V	X	AV	45.92	12.53	0.74	-9.54	49.65	54.00	4.35
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5500MHz(Ch. 100)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5469.16	H	Z	PK	50.12	7.62	-	-	57.74	68.20	10.46
10999.94	V	X	PK	48.95	12.92	-	-9.54	52.33	74.00	21.67
10999.96	V	X	AV	45.3	12.92	0.74	-9.54	49.42	54.00	4.58
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5580MHz(Ch. 116)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11159.90	V	X	PK	49.8	14.65	-	-9.54	54.91	74.00	19.09
11159.88	V	X	AV	46.15	14.65	0.74	-9.54	52.00	54.00	2.00

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5700MHz(Ch. 140)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5725.04	H	Z	PK	50.58	7.98	-	-	58.56	68.20	9.64
11400.05	V	X	PK	47.86	14.65	-	-9.54	52.97	74.00	21.03
11400.01	V	X	AV	44.12	14.65	0.74	-9.54	49.97	54.00	4.03

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$
 $\text{Result} = \text{Reading} + \text{T.F} + \text{DUTY Correction Factor} + \text{Distance Correction Factor}$
 $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 $\text{DUTY Correction Factor} : 0.74 \text{ dB} = 20 \cdot \log(1/0.92) \text{ for Method AD.}$
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : $-9.54 \text{ dB} = 20 \cdot \log(1\text{m}/3\text{m})$

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5190MHz(Ch. 38)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5149.35	H	Z	PK	52.78	6.95	-	-	59.73	74.00	14.27
5149.95	H	Z	AV	39.54	6.95	0.74	-	47.23	54.00	6.77
10380.05	H	Y	PK	50.2	11.39	-	-9.54	52.05	68.20	16.15

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5230MHz(Ch. 46)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10460.01	H	Y	PK	50.08	12.36	-	-9.54	52.90	68.20	15.30
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5270MHz(Ch. 54)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10540.04	V	X	PK	50.7	12.08	-	-9.54	53.24	68.20	14.96
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5310MHz(Ch. 62)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5350.00	H	Z	PK	52.5	7.43	-	-	59.93	74.00	14.07
5350.45	H	Z	AV	40.17	7.43	0.74	-	48.34	54.00	5.66
10620.05	V	X	PK	49.69	12.53	-	-9.54	52.68	74.00	21.32
10620.00	V	X	AV	46.72	12.53	0.74	-9.54	50.45	54.00	3.55

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
Margin = Limit – Result
Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
T.F = AF + CL – AG
DUTY Correction Factor : 0.74 dB = 20*log(1/0.92) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : -9.54dB = 20*log(1m/3m)

■ Measurement Data:

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5510MHz(Ch. 102)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5467.69	H	Z	PK	51.90	7.62	-	-	59.52	68.20	8.68
11019.86	V	X	PK	49.18	12.92	-	-9.54	52.56	74.00	21.44
11019.92	V	X	AV	45.58	12.92	0.74	-9.54	49.70	54.00	4.30
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5550MHz(Ch. 110)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11099.85	V	X	PK	49.07	14.65	-	-9.54	54.18	74.00	19.82
11100.00	V	X	AV	45.65	14.65	0.74	-9.54	51.50	54.00	2.50

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT40 & 5670MHz(Ch. 134)

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5725.90	H	Z	PK	45.47	7.98	-	-	53.45	68.20	14.75
11340.03	V	X	PK	49.44	14.65	-	-9.54	54.55	74.00	19.45
11339.98	V	X	AV	46.20	14.65	0.74	-9.54	52.05	54.00	1.95

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$
 $\text{Result} = \text{Reading} + \text{T.F} + \text{DUTY Correction Factor} + \text{Distance Correction Factor}$
 $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 $\text{DUTY Correction Factor} : 0.74 \text{ dB} = 20 \cdot \log(1/0.92) \text{ for Method AD.}$
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor : $-9.54 \text{ dB} = 20 \cdot \log(1\text{m}/3\text{m})$

3.2.7 AC Conducted Emissions

■ **TEST PROCEDURE :**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

■ **Measurement Data: Comply**

Note 1: See next pages for actual measured spectrum plots and data.

■ **Minimum Standard: FCC Part 15.207(a)/EN 55022**

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions (Graph)

Test Mode: 802.11a_5.1G



Results of Conducted Emission

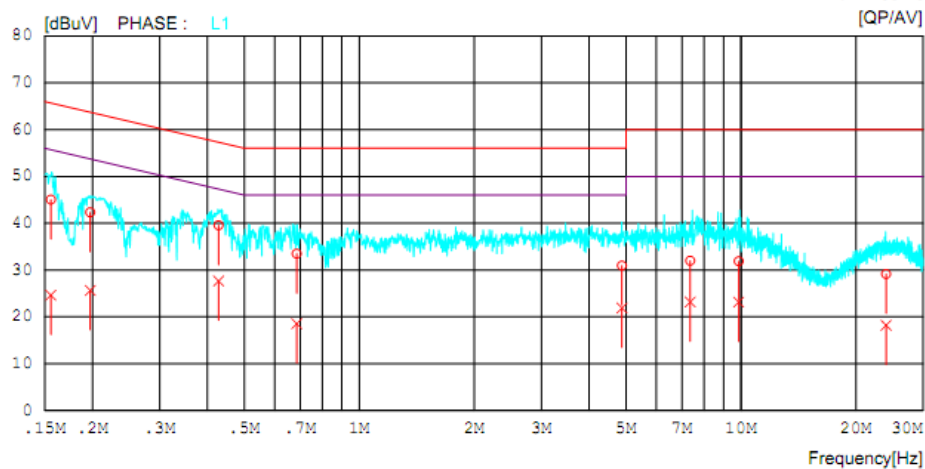
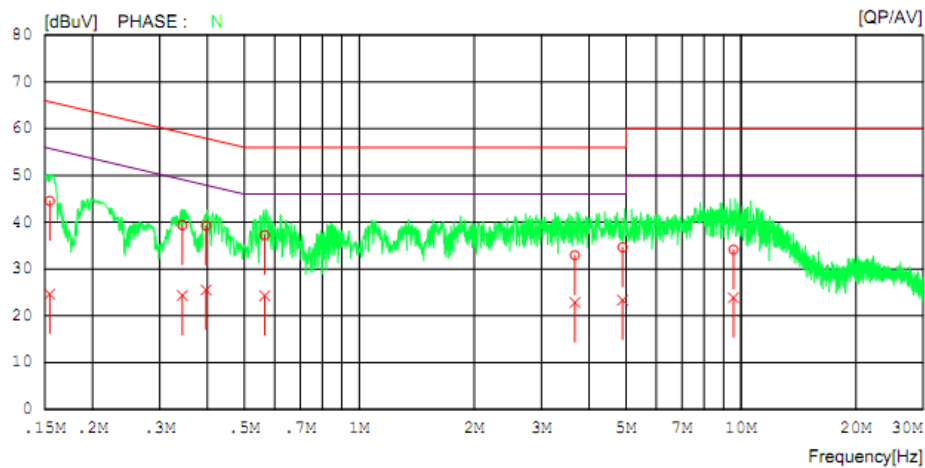
Digital EMC
Date : 2012-11-08

Model No. : 201K
Type :
Serial No. : Identical prototype
Test Condition : WLAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 25 °C 40% R.H.
Operator : J.J.LEE

Memo : 5.1GHz

LIMIT : CISPR22_B QP
CISPR22_B AV



AC Line Conducted Emissions (Data List)

Test Mode: 802.11a_5.1G

Results of Conducted Emission

Digital EMC
Date : 2012-11-08

Model No.	: 201K	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 25°C 40% R.H.
Test Condition	: WLAN	Operator	: J.J.LEE
Memo	: 5.1GHz		

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15458	44.4	24.4	0.2	44.6	24.6	65.8	55.8	21.2	31.2	N
2	0.34383	39.2	24.2	0.2	39.4	24.4	59.1	49.1	19.7	24.7	N
3	0.39673	39.1	25.3	0.2	39.3	25.5	57.9	47.9	18.6	22.4	N
4	0.56498	37.1	24.1	0.2	37.3	24.3	56.0	46.0	18.7	21.7	N
5	3.67250	32.6	22.6	0.3	32.9	22.9	56.0	46.0	23.1	23.1	N
6	4.89450	34.2	23.0	0.4	34.6	23.4	56.0	46.0	21.4	22.6	N
7	9.55350	33.5	23.2	0.7	34.2	23.9	60.0	50.0	25.8	26.1	N
8	0.15560	44.8	24.5	0.2	45.0	24.7	65.7	55.7	20.7	31.0	L1
9	0.19739	42.1	25.4	0.2	42.3	25.6	63.7	53.7	21.4	28.1	L1
10	0.42798	39.3	27.5	0.2	39.5	27.7	57.3	47.3	17.8	19.6	L1
11	0.68556	33.3	18.3	0.2	33.5	18.5	56.0	46.0	22.5	27.5	L1
12	4.87400	30.6	21.5	0.4	31.0	21.9	56.0	46.0	25.0	24.1	L1
13	7.35900	31.5	22.7	0.5	32.0	23.2	60.0	50.0	28.0	26.8	L1
14	9.86250	31.2	22.5	0.7	31.9	23.2	60.0	50.0	28.1	26.8	L1
15	23.98400	28.2	17.2	1.0	29.2	18.2	60.0	50.0	30.8	31.8	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11a_5.3G



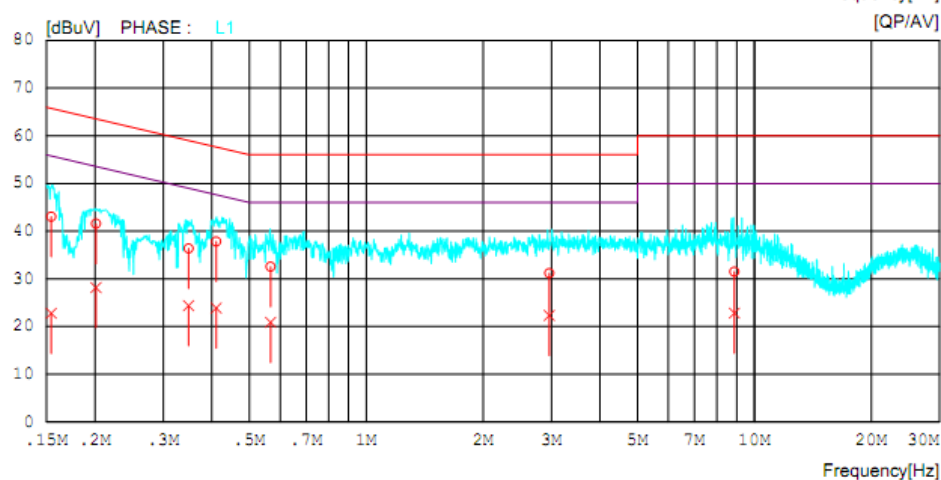
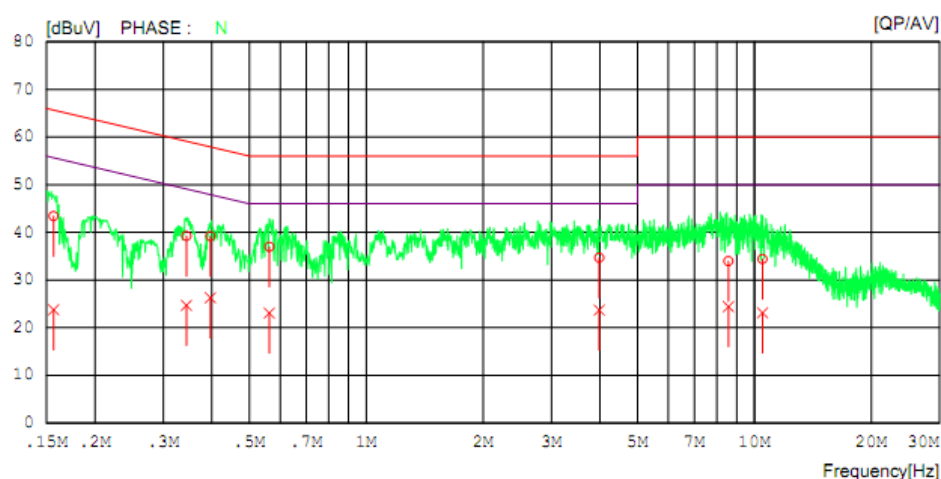
Results of Conducted Emission

Digital EMC
Date : 2012-11-08

Model No. : 201K
Type :
Serial No. : Identical prototype
Test Condition : WLAN
Memo : 5.3GHz

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 25 °C 40% R.H.
Operator : J.J.LEE

LIMIT : CISPR22_B QP
CISPR22_B AV



AC Line Conducted Emissions (Data List)

Test Mode: 802.11a_5.3G

Results of Conducted Emission

Digital EMC
Date : 2012-11-08

Model No. : 201K
Type :
Serial No. : Identical prototype
Test Condition : WLAN
Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 25 °C 40% R.H.
Operator : J.J.LEE
Memo : 5.3GHz

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15650	43.2	23.6	0.2	43.4	23.8	65.6	55.6	22.2	31.8	N
2	0.34405	39.0	24.5	0.2	39.2	24.7	59.1	49.1	19.9	24.4	N
3	0.39661	39.0	26.1	0.2	39.2	26.3	57.9	47.9	18.7	21.6	N
4	0.56283	36.8	22.9	0.2	37.0	23.1	56.0	46.0	19.0	22.9	N
5	3.98150	34.4	23.4	0.3	34.7	23.7	56.0	46.0	21.3	22.3	N
6	8.56850	33.3	23.7	0.7	34.0	24.4	60.0	50.0	26.0	25.6	N
7	10.49050	33.7	22.4	0.7	34.4	23.1	60.0	50.0	25.6	26.9	N
8	0.15431	42.9	22.6	0.2	43.1	22.8	65.8	55.8	22.7	33.0	L1
9	0.20128	41.4	28.0	0.2	41.6	28.2	63.6	53.6	22.0	25.4	L1
10	0.34850	36.2	24.2	0.2	36.4	24.4	59.0	49.0	22.6	24.6	L1
11	0.41054	37.6	23.7	0.2	37.8	23.9	57.6	47.6	19.8	23.7	L1
12	0.56675	32.4	20.7	0.2	32.6	20.9	56.0	46.0	23.4	25.1	L1
13	2.96050	30.9	22.0	0.3	31.2	22.3	56.0	46.0	24.8	23.7	L1
14	8.87450	30.8	22.1	0.7	31.5	22.8	60.0	50.0	28.5	27.2	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11a_5.5G



Results of Conducted Emission

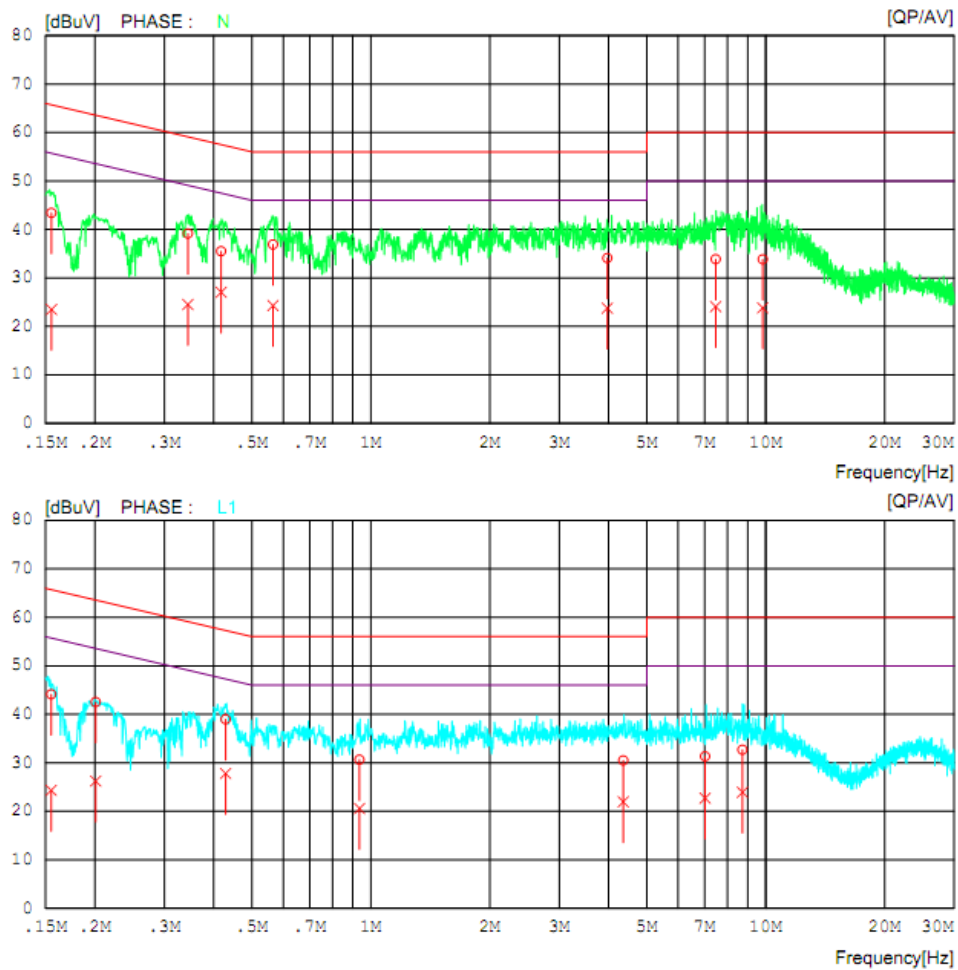
Digital EMC
Date : 2012-11-08

Model No. : 201K
Type :
Serial No. : Identical prototype
Test Condition : WLAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 25 °C 40% R.H.
Operator : J.J.LEE

Memo : 5.5GHz

LIMIT : CISPR22_B QP
CISPR22_B AV



AC Line Conducted Emissions (Data List)

Test Mode: 802.11a_5.5G

Results of Conducted Emission

Digital EMC
Date : 2012-11-08

Model No.	: 201K	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 25°C 40% R.H.
Test Condition	: WLAN	Operator	: J.J.LEE
Memo	: 5.5GHz		

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15540	43.2	23.3	0.2	43.4	23.5	65.7	55.7	22.3	32.2	N
2	0.34399	39.0	24.3	0.2	39.2	24.5	59.1	49.1	19.9	24.6	N
3	0.41760	35.3	26.9	0.2	35.5	27.1	57.5	47.5	22.0	20.4	N
4	0.56504	36.7	24.1	0.2	36.9	24.3	56.0	46.0	19.1	21.7	N
5	3.97050	33.8	23.5	0.3	34.1	23.8	56.0	46.0	21.9	22.2	N
6	7.46700	33.4	23.6	0.5	33.9	24.1	60.0	50.0	26.1	25.9	N
7	9.82250	33.2	23.1	0.7	33.9	23.8	60.0	50.0	26.1	26.2	N
8	0.15504	43.9	24.1	0.2	44.1	24.3	65.7	55.7	21.6	31.4	L1
9	0.20104	42.3	26.0	0.2	42.5	26.2	63.6	53.6	21.1	27.4	L1
10	0.42885	38.8	27.6	0.2	39.0	27.8	57.3	47.3	18.3	19.5	L1
11	0.93585	30.5	20.4	0.2	30.7	20.6	56.0	46.0	25.3	25.4	L1
12	4.35450	30.2	21.7	0.3	30.5	22.0	56.0	46.0	25.5	24.0	L1
13	7.01900	30.8	22.2	0.5	31.3	22.7	60.0	50.0	28.7	27.3	L1
14	8.72800	32.0	23.2	0.7	32.7	23.9	60.0	50.0	27.3	26.1	L1

3.2.8 Antenna Requirements

■ **Procedure:**

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

■ **Conclusion: Comply**

The internal antenna is attached on the main PCB using the special spring tension. (Refer to Internal Photo file.)

■ **Minimum Standard:**

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.

3.2.9 Occupied Bandwidth

■ **TEST Requirements**

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured

■ **TEST CONFIGURATION**

■ **TEST PROCEDURE :**

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual

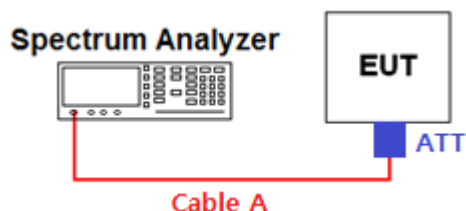
■ **TEST RESULT : N/A**

Minimum Standard : N/A

■ **RESULT PLOT : N/A**

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	E4440A	12/09/18	13/09/18	MY45304199
Spectrum Analyzer	Agilent	E4440A	12/10/22	13/10/22	US45303022
Spectrum Analyzer	Rohde Schwarz	FSQ26	12/01/09	13/01/09	200445
Harmonic Mixer	OML	M28HWD	12/02/06	13/02/06	Ka100224-1
Digital Multimeter	H.P	34401A	12/03/05	13/03/05	3146A13475
Signal Generator	Rohde Schwarz	SMR20	12/03/05	13/03/05	101251
Vector Signal Generator	Rohde Schwarz	SMJ100A	12/01/09	13/01/09	100148
Attenuator (10dB)	WEINSCHL	23-10-34	12/09/17	13/09/17	BP4386
Thermo hygrometer	BODYCOM	BJ5478	12/01/13	13/01/13	090205-2
DC Power Supply	HP	6622A	12/03/05	13/03/05	3448A03760
High-Pass Filter	Wainwright	WHKX8.5	12/09/17	13/09/17	1
BILOG ANTENNA	SCHAFFNER	CBL6112D	10/12/21	12/12/21	2737
HORN ANT	ETS	3115	12/02/20	14/02/20	6419
HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	154
Amplifier (22dB)	H.P	8447E	12/01/09	13/01/09	2945A02865
Amplifier (30dB)	Agilent	8449B	12/03/05	13/03/05	3008A00370
EMI TEST RECEIVER	R&S	ESU	12/01/09	13/01/09	100014
EMI TEST RECEIVER	R&S	ESCI	12/03/06	13/03/06	100364
CVCF	KIKUSUI	PCR1000L	12/09/15	13/09/15	14110610
LISN	R&S	ESH2-Z5	12/09/18	13/09/18	828739/006
RFI/Field intensity Meter	KYORITSU	KNM-2402	12/07/02	13/07/02	4N-170-3
TEMP & HUMIDITY Chamber	SJ SCIENCE	TEMI850-10	12/03/06	13/03/06	S7400LE267 1226

APPENDIX I**Conducted Test set up Diagram & Path loss Information**▪ **Conducted Measurement****Path loss value information**

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
5180	12.89	5260	12.85	5500	12.91
5190	12.86	5270	12.91	5510	12.95
5200	12.87	5300	12.98	5550	13.04
5230	12.91	5310	12.97	5580	13.12
5240	12.92	5320	12.94	5670	13.09
				5700	12.85

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.

Path loss (=S/A's offset value) = Cable A + ATT (Attenuator, Applied only when it was used externally)

Note. 2: The worst case path loss was used as below.

BAND1 : 12.92dB, BAND2 : 12.98dB, Band3 : 13.12dB

APPENDIX II

Duty cycle plots

■ TEST PROCEDURE

Duty Cycle [$X = \text{On Time} / (\text{On} + \text{Off time})$] is measured using Measurement Procedure of KDB789033

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW $\geq$ RBW.
4. Set detector = peak.
5. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are $> 50/T$** , where T is defined in section B)1)a), and **the number of sweep points across duration T exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

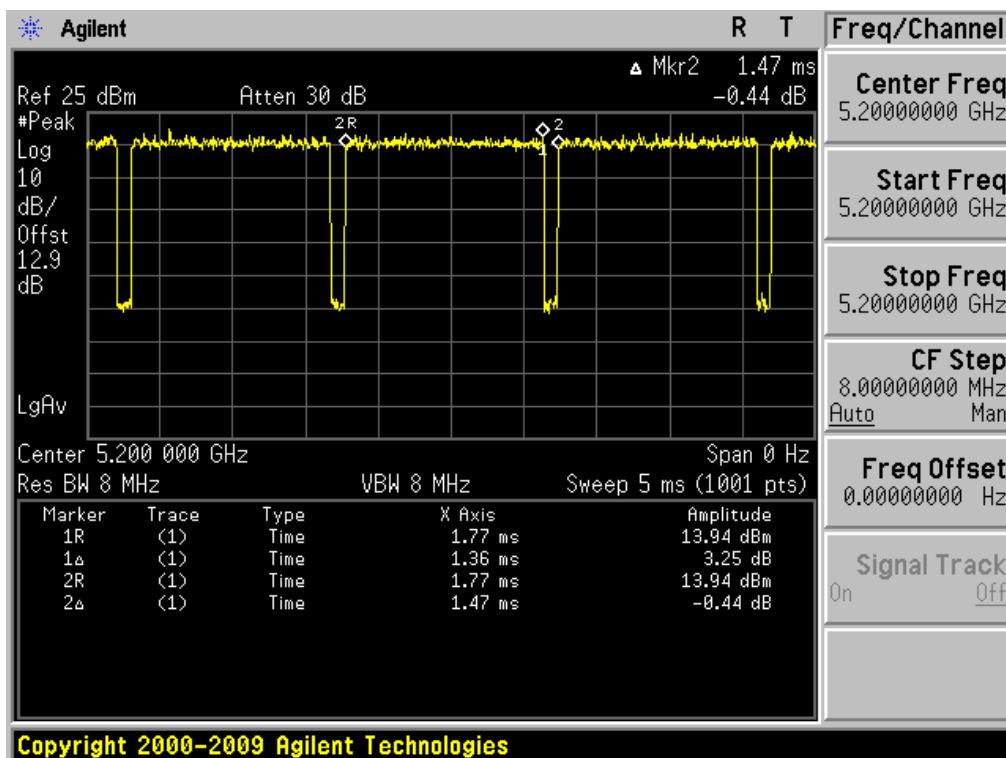
- Summary of Duty Cycle Calculation Table

Mode	Channel	Frequency [MHz]	Maximum Achievable Duty Cycle ($x = \text{On} / (\text{On} + \text{Off})$)		
			On Time [ms]	(On+Off) Time [ms]	x
802.11a	36	5180	1.360	1.470	0.92
	40	5200			
	48	5240			
	52	5260	1.360	1.470	0.92
	60	5300			
	64	5320			
	100	5500	1.360	1.470	0.92
	116	5580			
802.11n (20MHz)	140	5700	1.270	1.380	0.92
	36	5180			
	40	5200			
	48	5240	1.270	1.380	0.92
	52	5260			
	60	5300			
	64	5320	1.270	1.380	0.92
	100	5500			
802.11n (40MHz)	116	5580	0.634	0.686	0.92
	140	5700			
	38	5190			
	46	5230	0.634	0.686	0.92
	54	5270			
	62	5310			
	102	5510	0.634	0.686	0.92
	110	5550			
	134	5670			

- Description for duty cycle plot data on next pages : **$1\Delta = \text{On Time}$, $2\Delta = (\text{On} + \text{Off}) \text{ Time}$ So $\text{Off Time} = 2\Delta - 1\Delta$**
- T : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
($T = \text{On time}$ of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)
For Duty Cycle with zero span method, both RBW/VBW $> 50/T$
(For example, this case **$\text{RBW/VBW (8 MHz)} > 50/0.000634 = 78.9 \text{ KHz}$**)
- The reason for the Duty Cycle Limitation : The test S/W provided by the applicant supports transmission with above maximum fixed duty cycle.
- The number of sweeps were increased by factor of $1/x$ until the trace stabilizes for Peak Measurement
The number of average traces were increased by factor of $1/x$ for Method AD

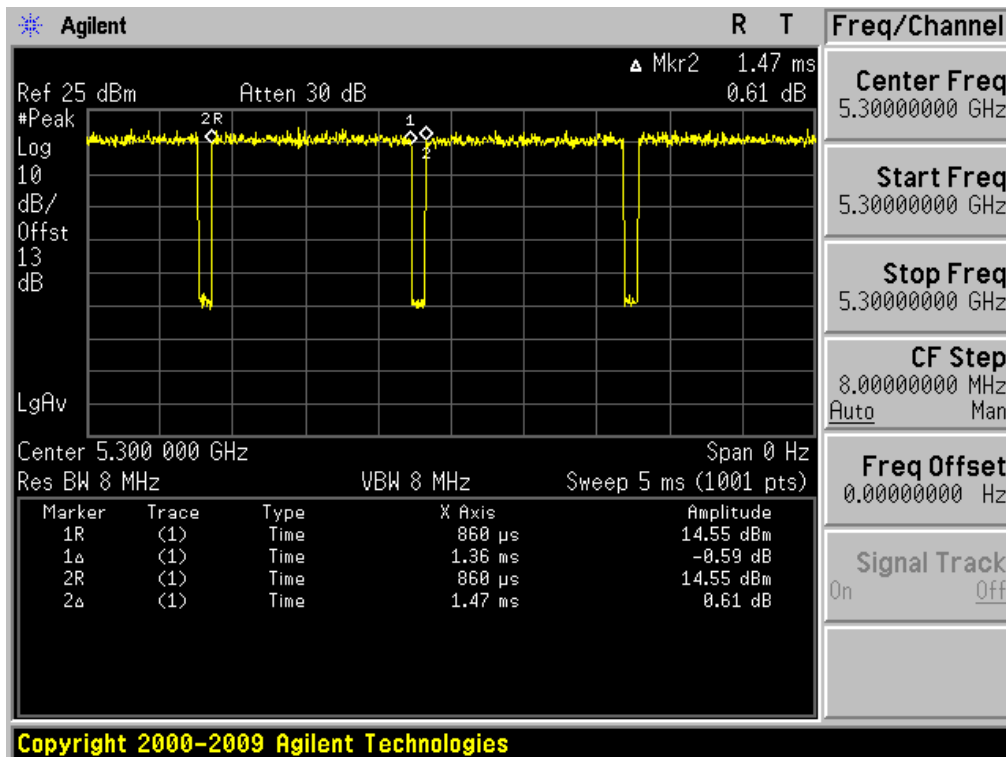
Duty Cycle

Test Mode: 802.11a & Ch.40



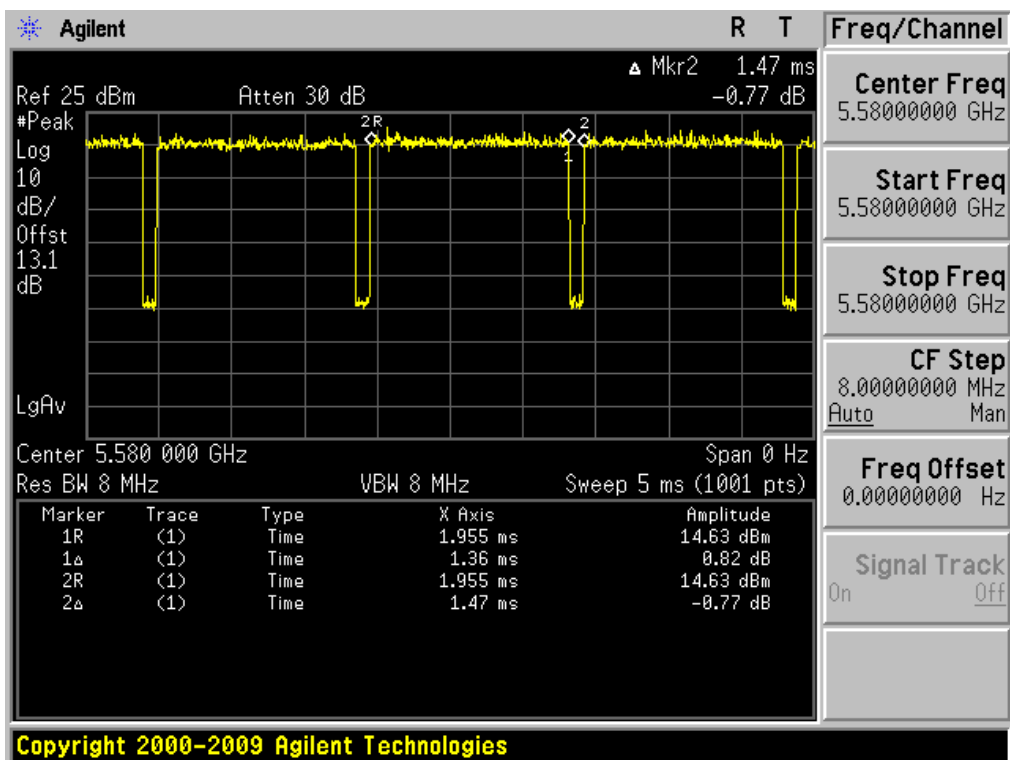
Duty Cycle

Test Mode: 802.11a & Ch.60



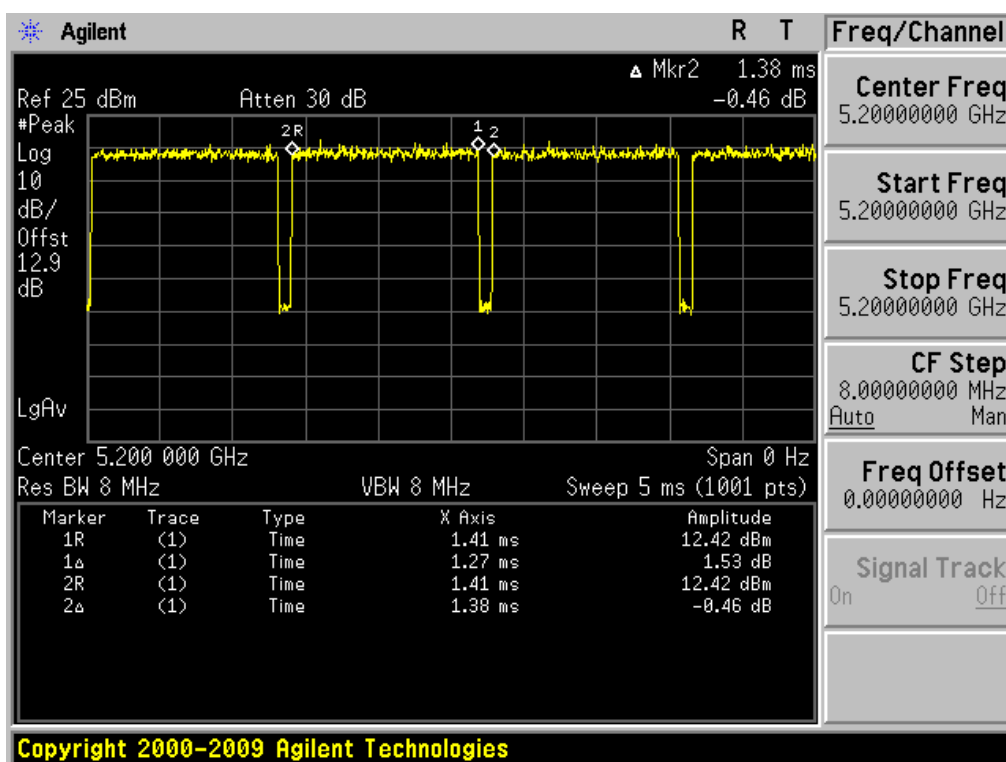
Duty Cycle

Test Mode: 802.11a & Ch.116



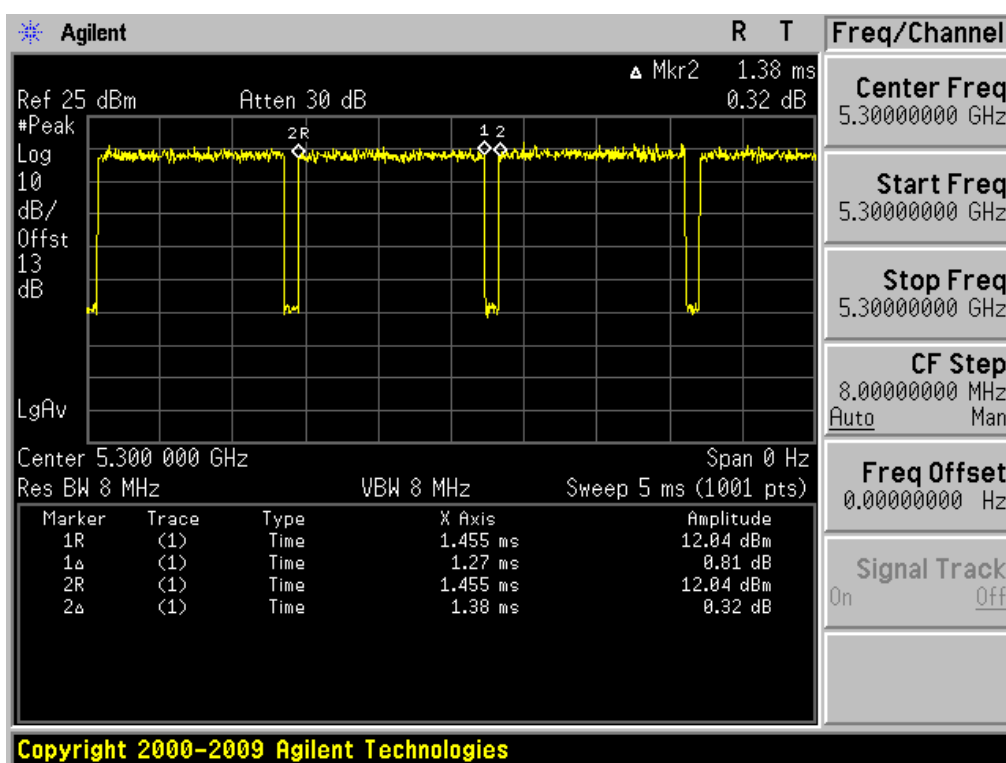
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.40



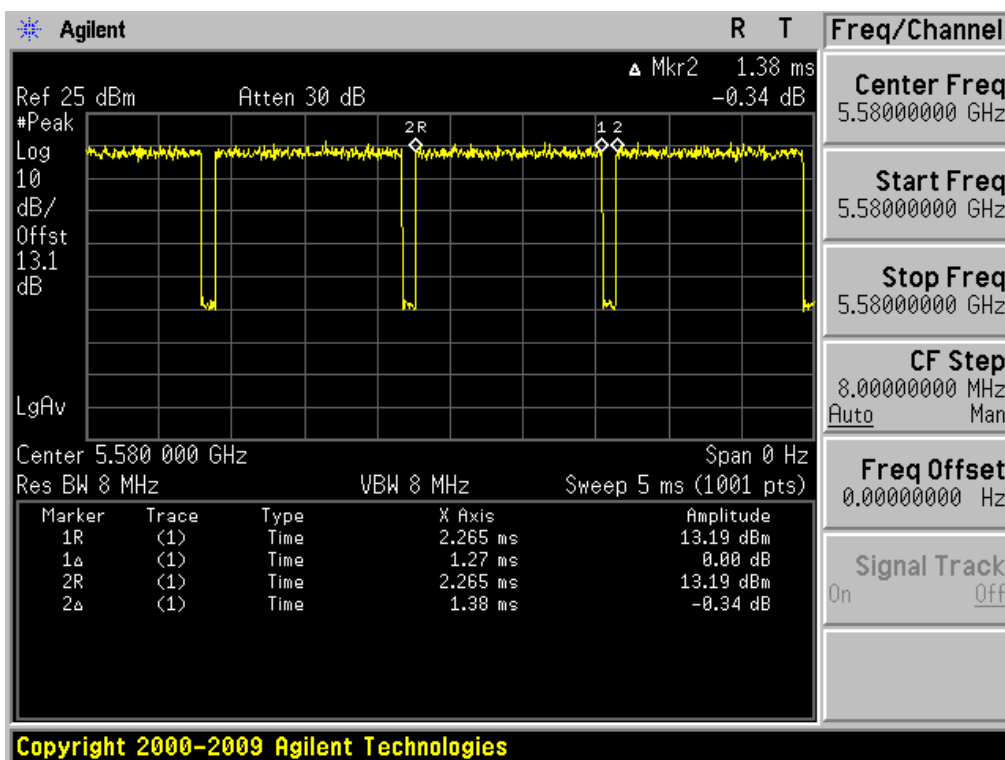
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.60



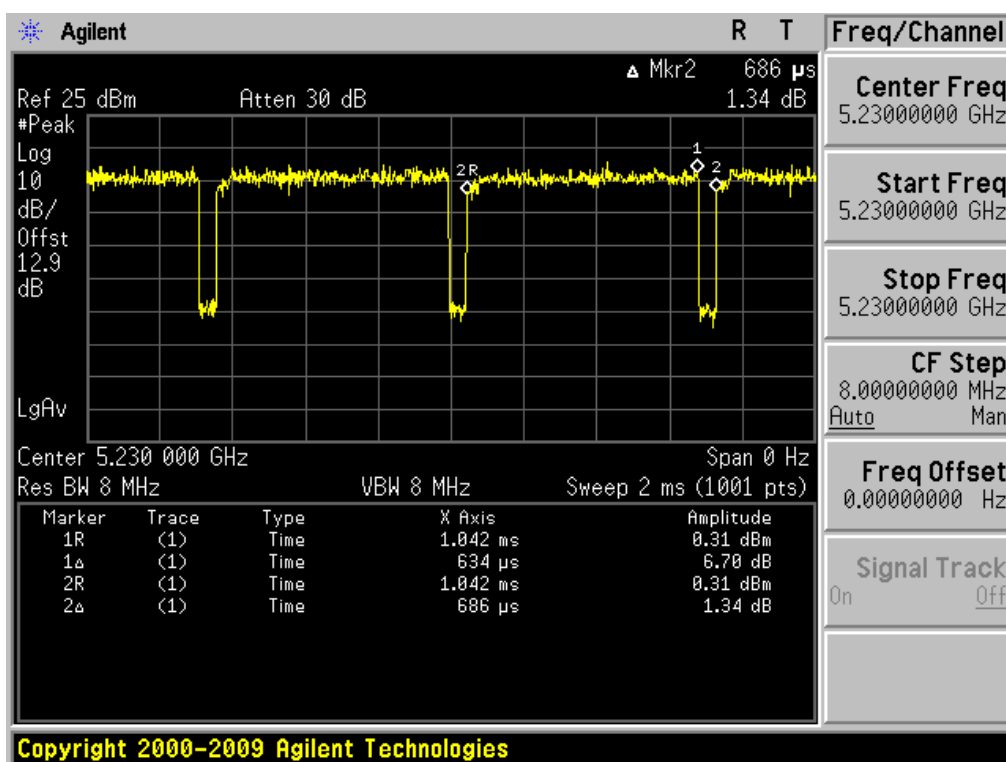
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.116



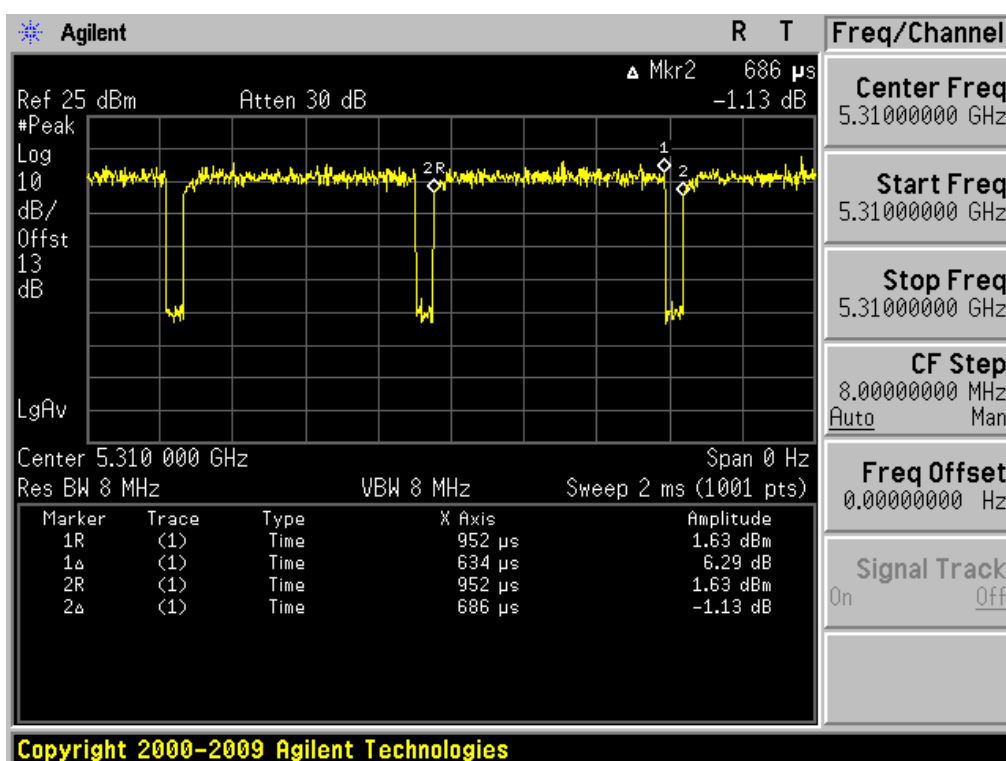
Duty Cycle

Test Mode: 802.11n(HT40) & Ch.46



Duty Cycle

Test Mode: 802.11n(HT40) & Ch.62



Duty Cycle

Test Mode: 802.11n(HT40) & Ch.110

