

RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS Cellular WCDMA/HSDPA
Cellular CDMA Phone with Bluetooth, WLAN and NFC
Model No. : KYL21
Order No. : DEMC1208-01410
Date of receipt : 2012-08-08
Test duration : 2012-09-03 ~ 2012-09-22
Date of issue : 2012-09-24
Use of report : Original Grant

Applicant : KYOCERA Corporation
2-1-1 Kagahara, Tsuzuki-ku, Yokohama-Shi, Kanagawa 224-8502, Japan

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 C63.4-2003, 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:

Witnessed by:

Reviewed by:



Engineer
H.S.Son

N/A



Technical Director
Harvey sung

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1. EUT information

1.1 EUT description

FCC Equipment Class	Unlicensed National Information Infrastructure (UNII)
Product	Cellular/PCS GSM/GPRS Cellular WCDMA/HSDPA Cellular CDMA Phone with Bluetooth, WLAN and NFC
Model Name	KYL21
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, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps 802.11n(40MHz): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps
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
	56	5280	-	-
	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	:	22 ~ 25 °C
Relative humidity content	:	34 ~ 56 % 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 + 10log ₁₀ (B) dBm (5150-5250) < 11 + 10log ₁₀ (B) dBm (5250-5350) < 11 + 10log 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
<p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> <p>Note 2: These test items were performed in each axis and the worst case data was reported.</p> <p>Note 3: Refer to the DFS Test Report.</p>					

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%.

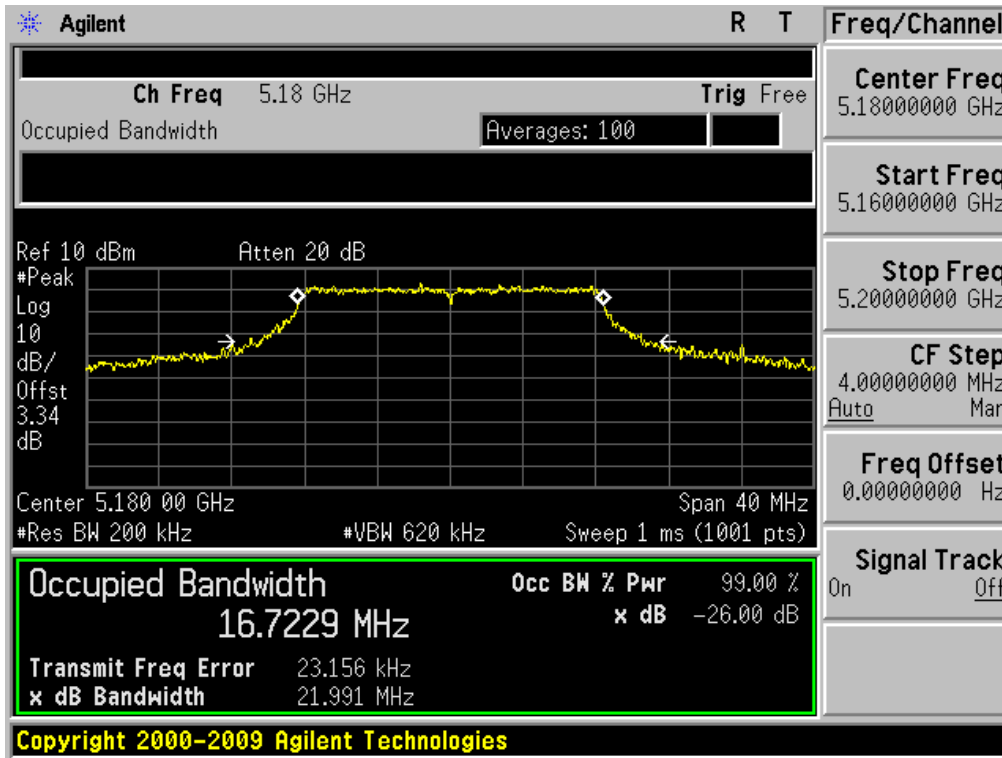
■ TEST RESULTS: **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	Band I	36	5180	21.991
		40	5200	21.449
		48	5240	21.788
	Band II	52	5260	21.339
		56	5280	21.340
		64	5320	21.475
	Band III	100	5500	21.038
		116	5580	21.309
		140	5700	21.038
802.11n (20MHz)	Band I	36	5180	21.568
		40	5200	21.751
		48	5240	21.701
	Band II	52	5260	21.687
		56	5280	21.496
		64	5320	21.475
	Band III	100	5500	21.743
		116	5580	21.936
		140	5700	21.651
802.11n (40MHz)	Band I	38	5190	42.280
		46	5230	42.378
	Band II	54	5270	42.716
		62	5310	41.857
	Band III	102	5510	41.385
		110	5550	42.458
		134	5670	42.546

RESULT PLOTS

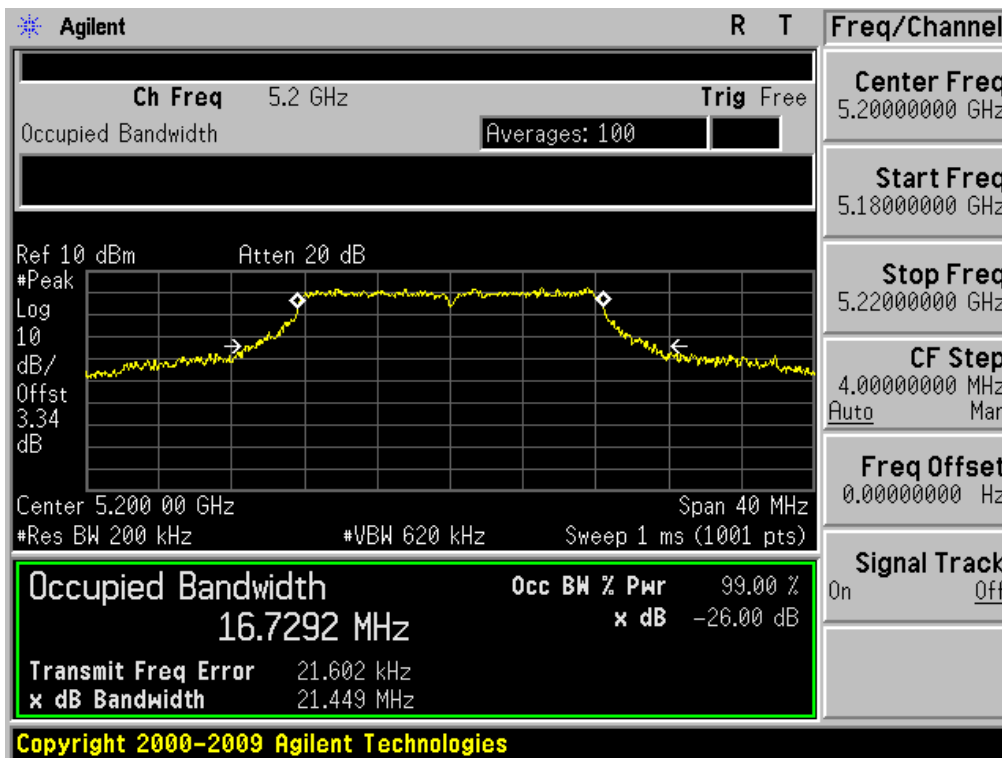
26 dB Bandwidth

Test Mode: 802.11a & Ch.36



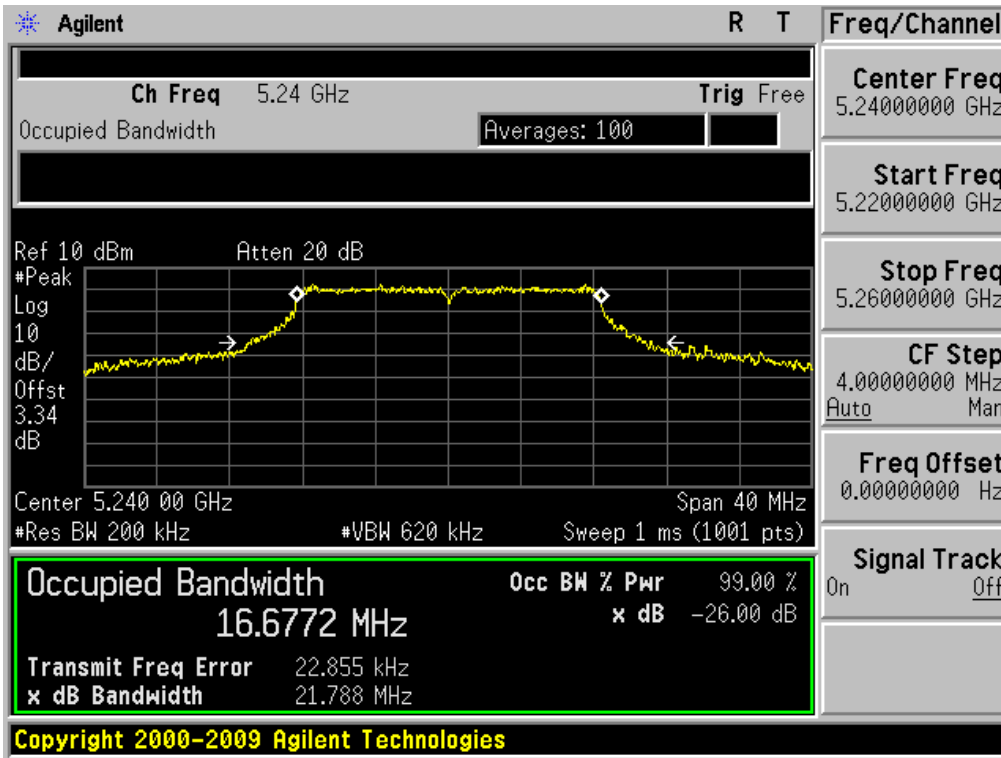
26 dB Bandwidth

Test Mode: 802.11a & Ch.40



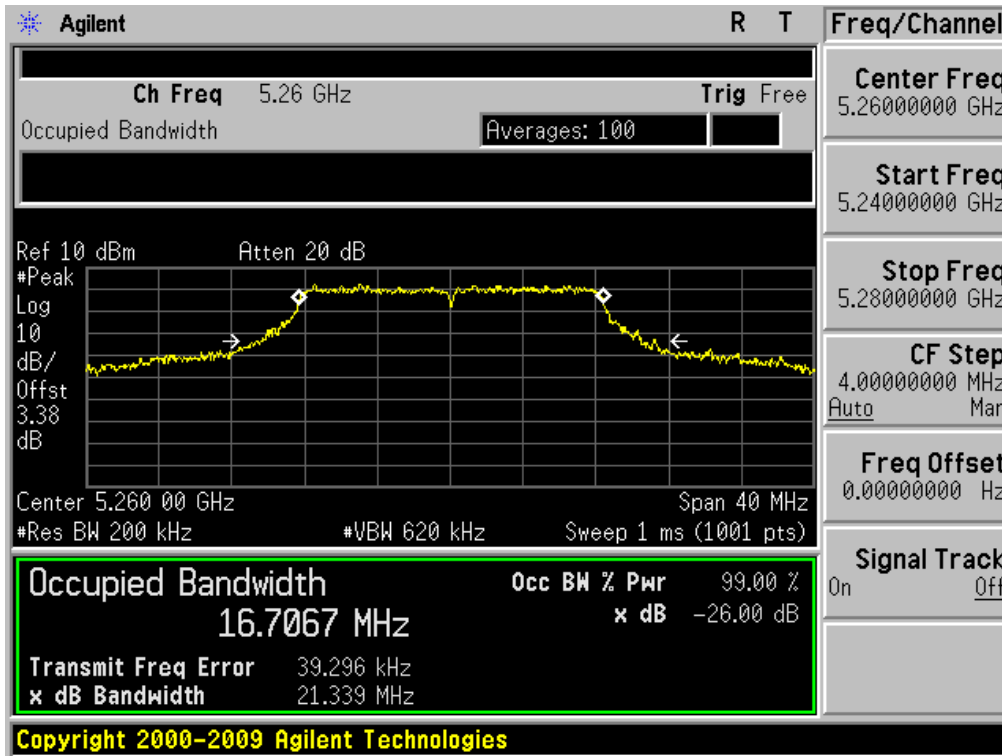
26 dB Bandwidth

Test Mode: 802.11a & Ch.48



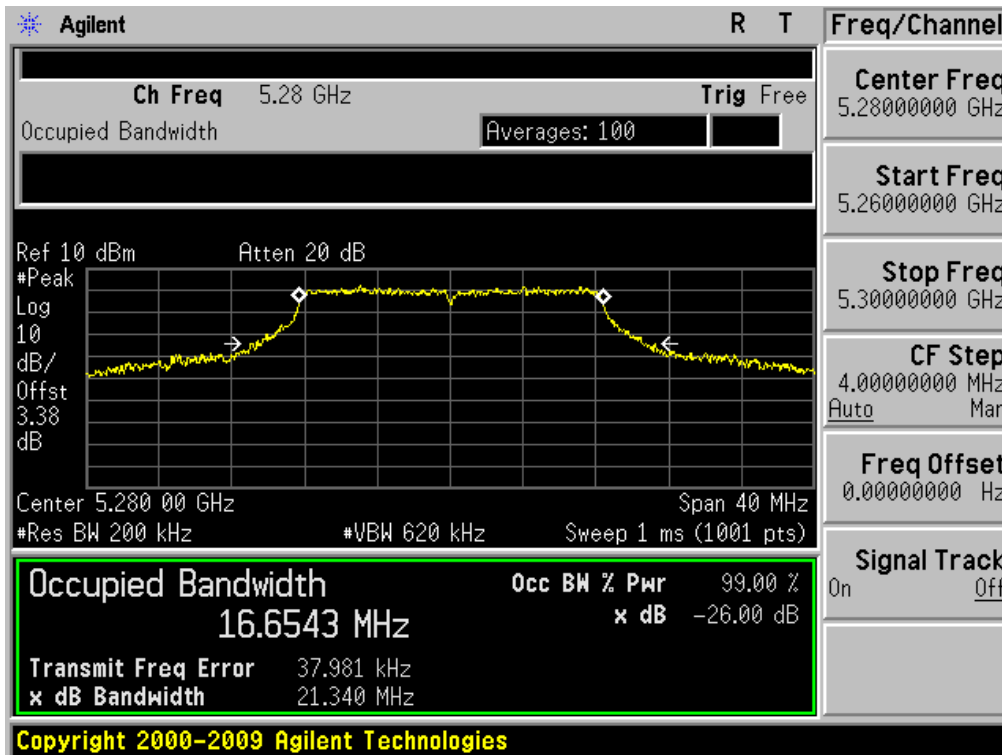
26 dB Bandwidth

Test Mode: 802.11a & Ch.52



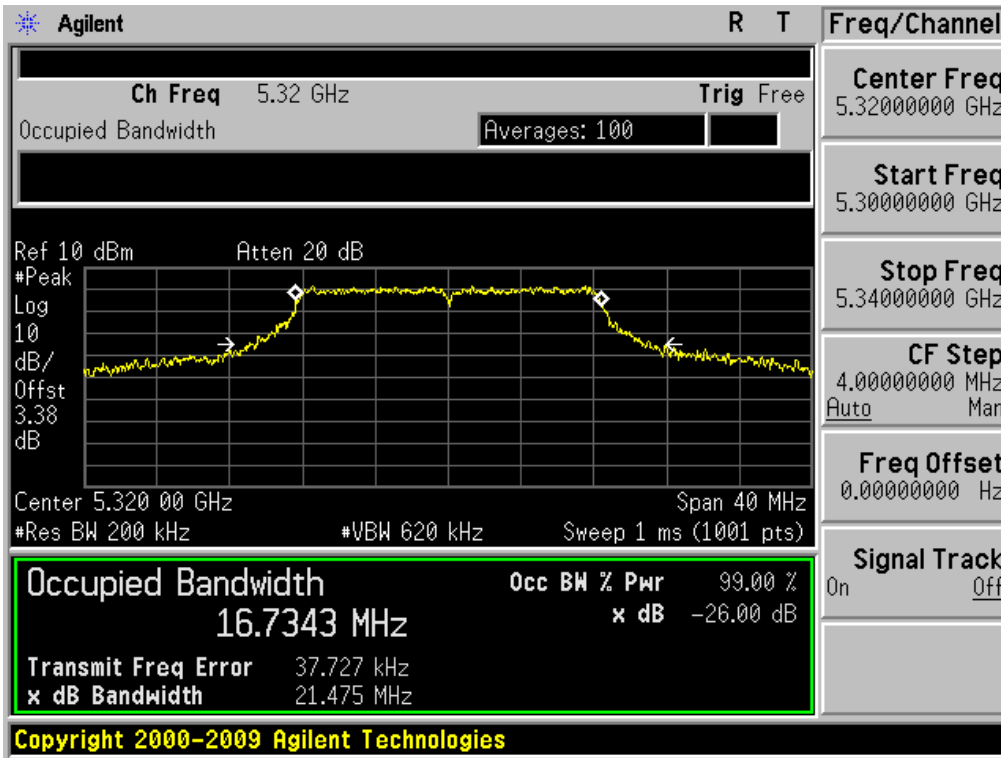
26 dB Bandwidth

Test Mode: 802.11a & Ch.56



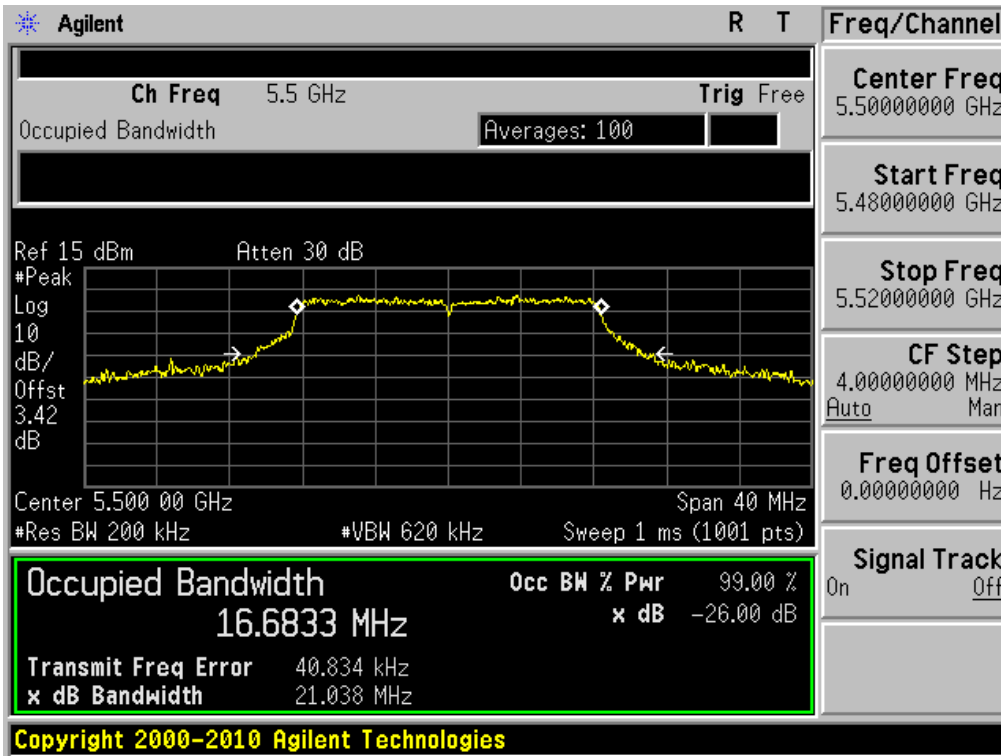
26 dB Bandwidth

Test Mode: 802.11a & Ch.64



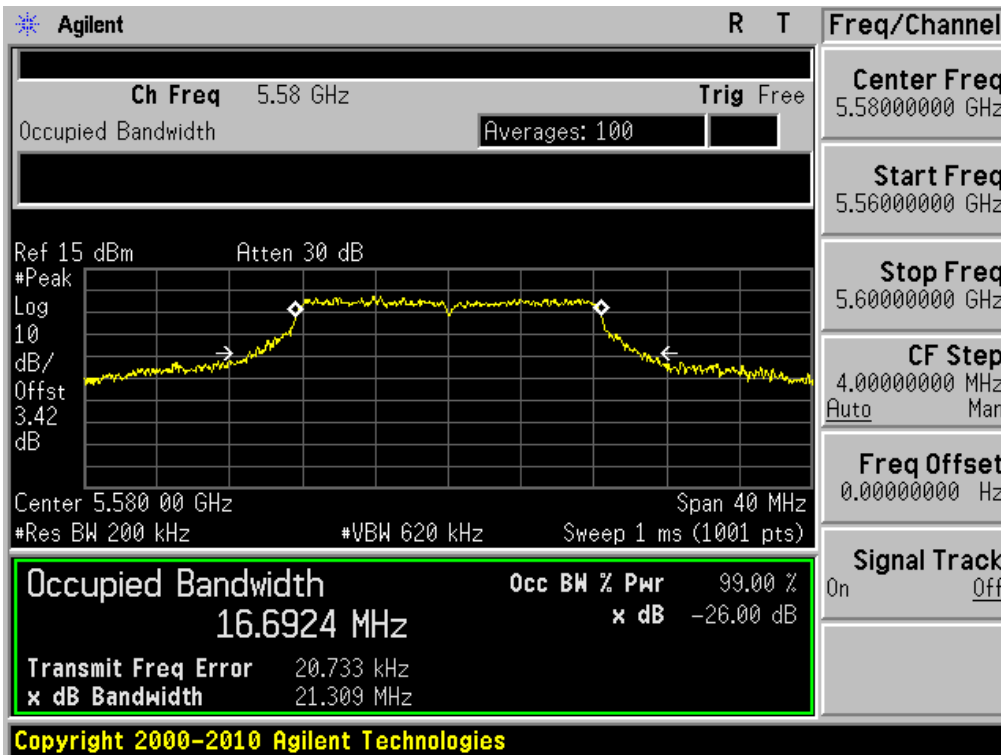
26 dB Bandwidth

Test Mode: 802.11a & Ch.100



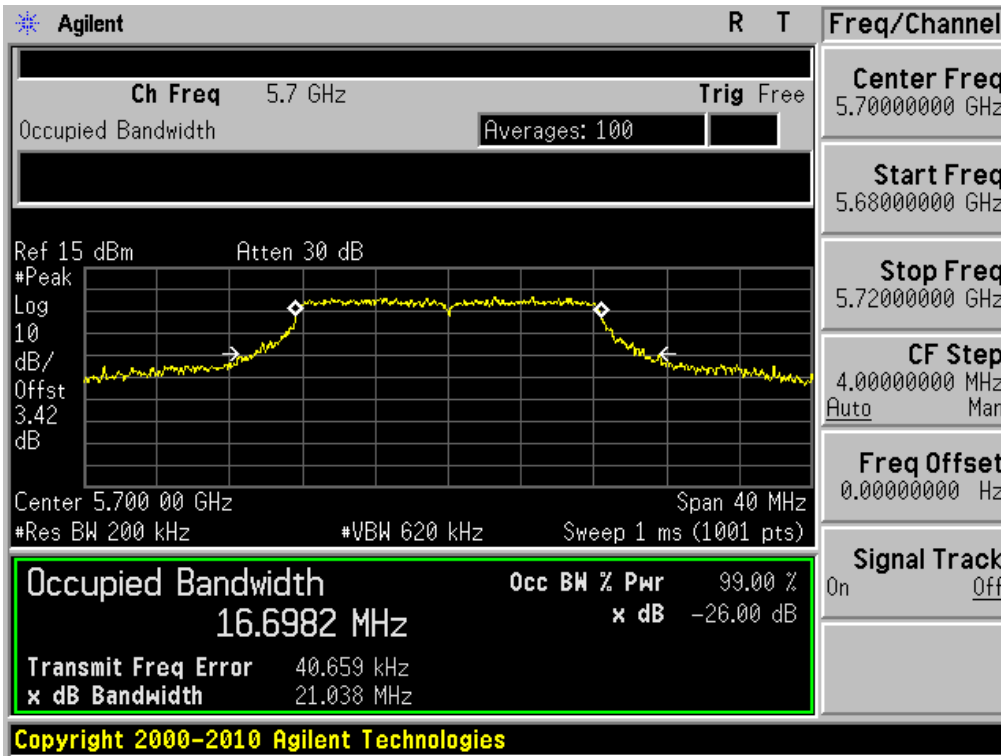
26 dB Bandwidth

Test Mode: 802.11a & Ch.116



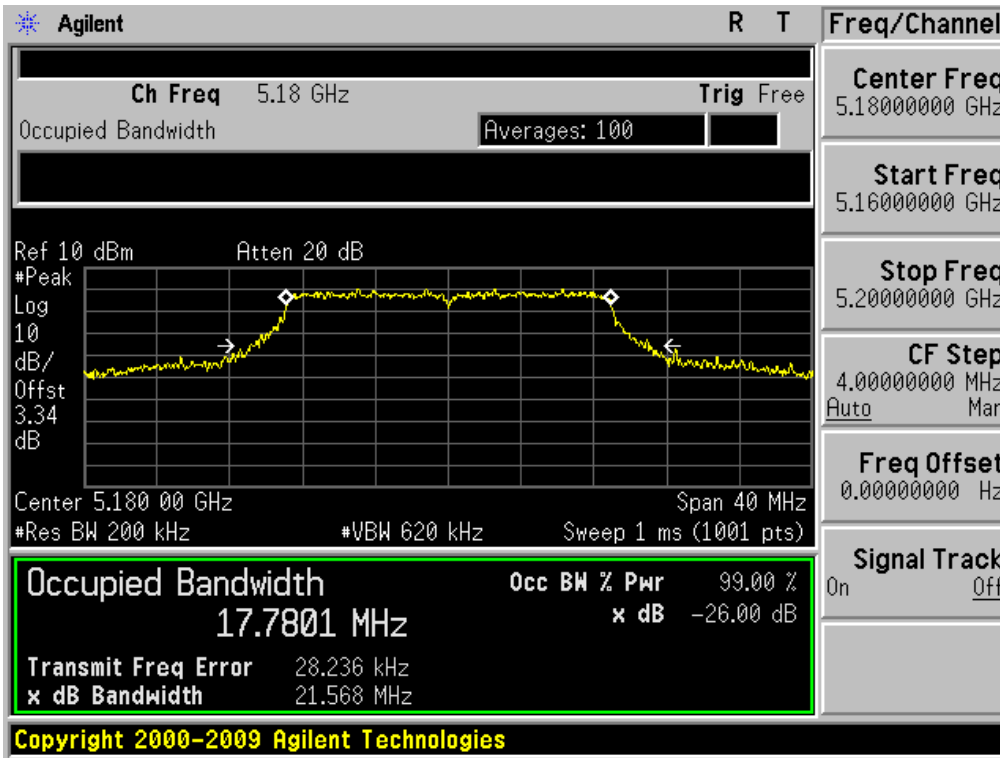
26 dB Bandwidth

Test Mode: 802.11a & Ch.140



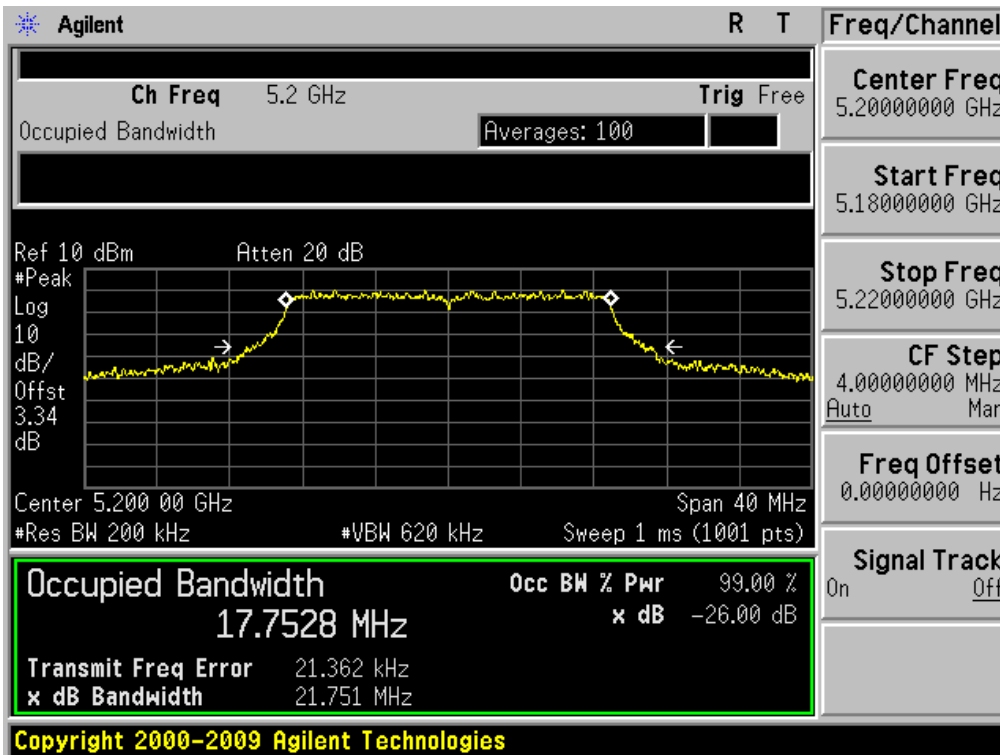
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.36



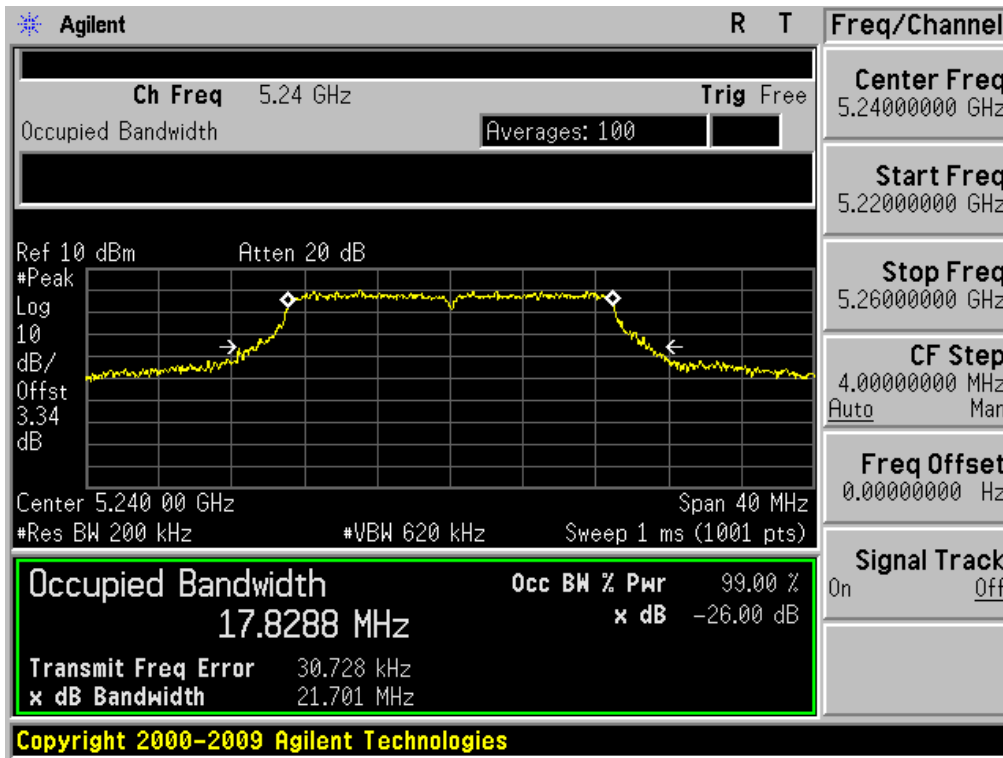
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.40



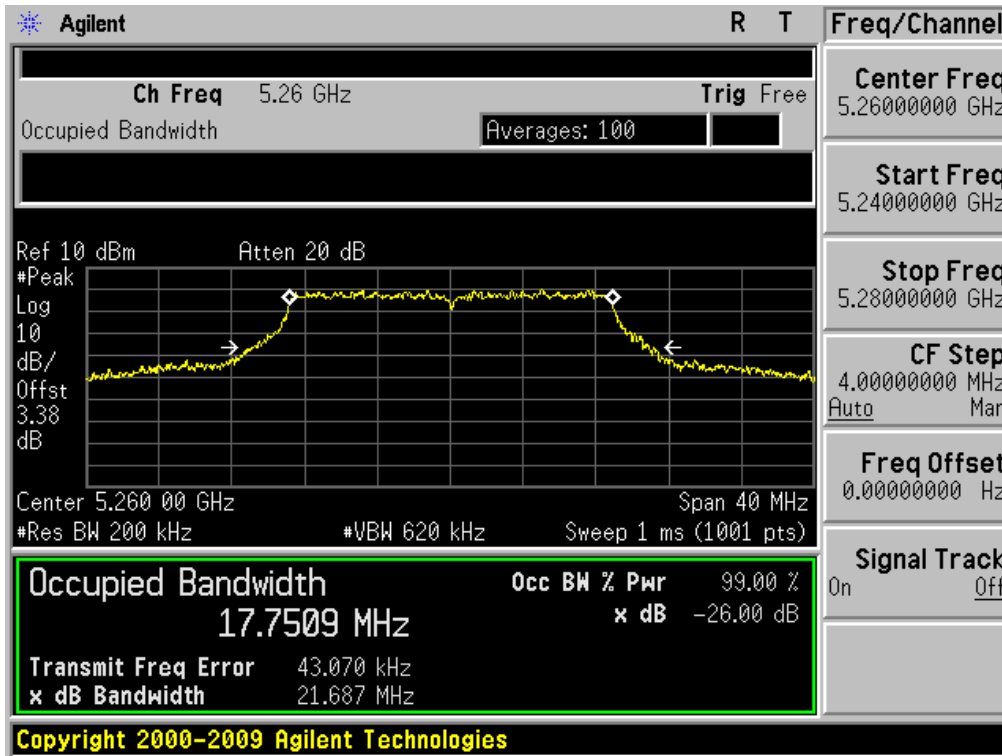
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.48



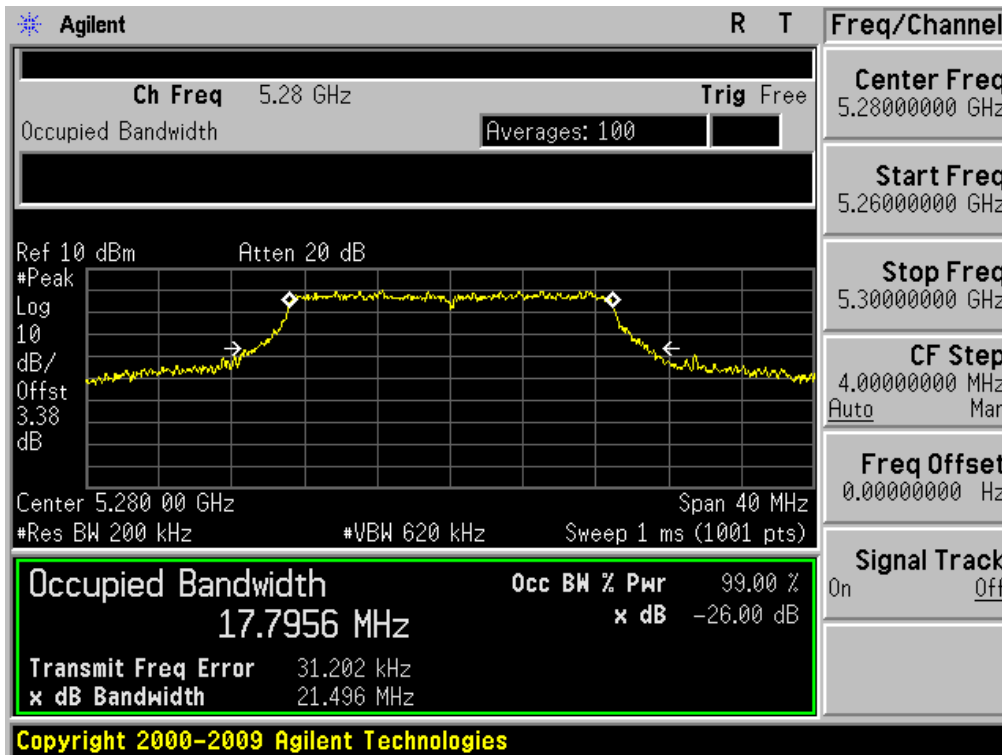
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.52



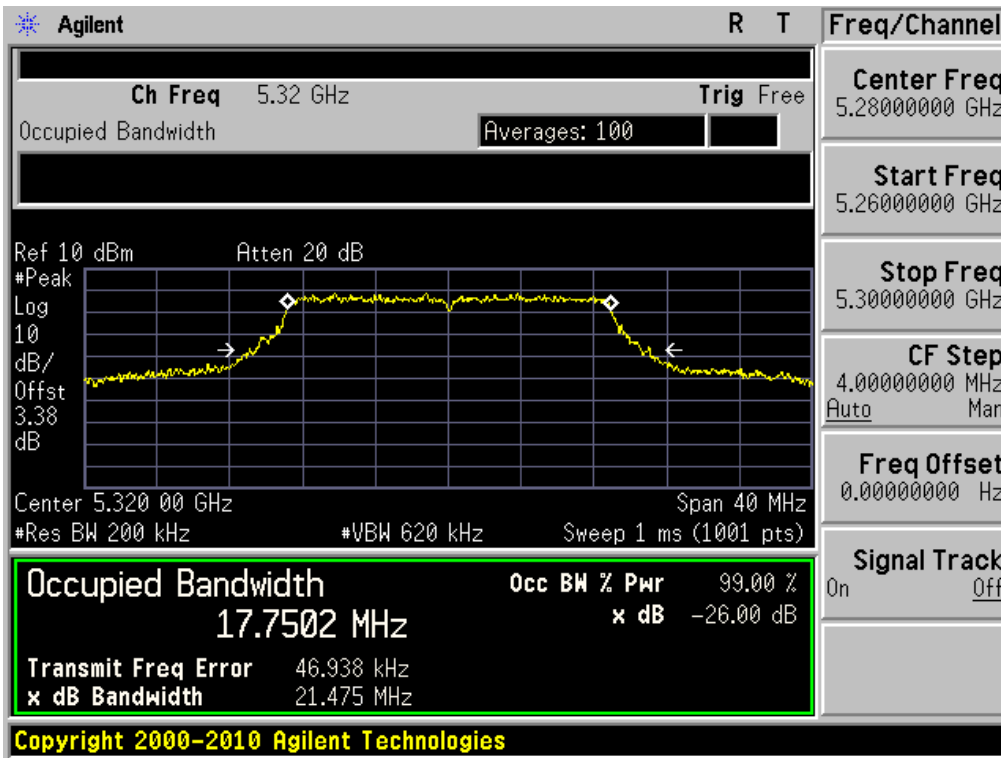
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.56



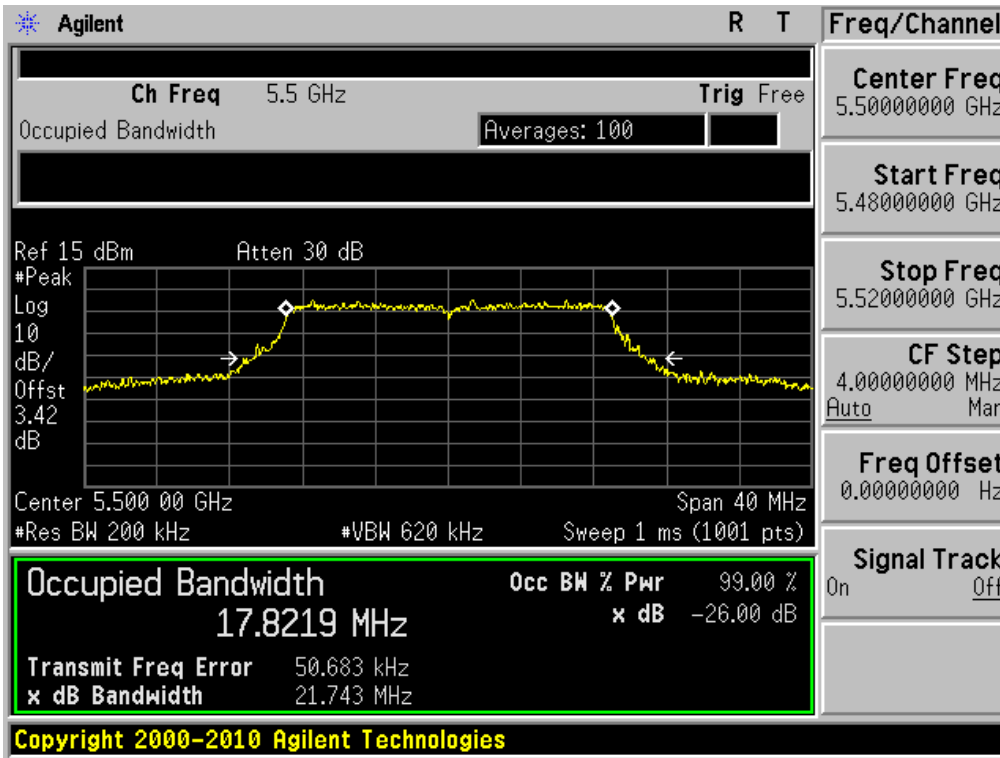
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.64



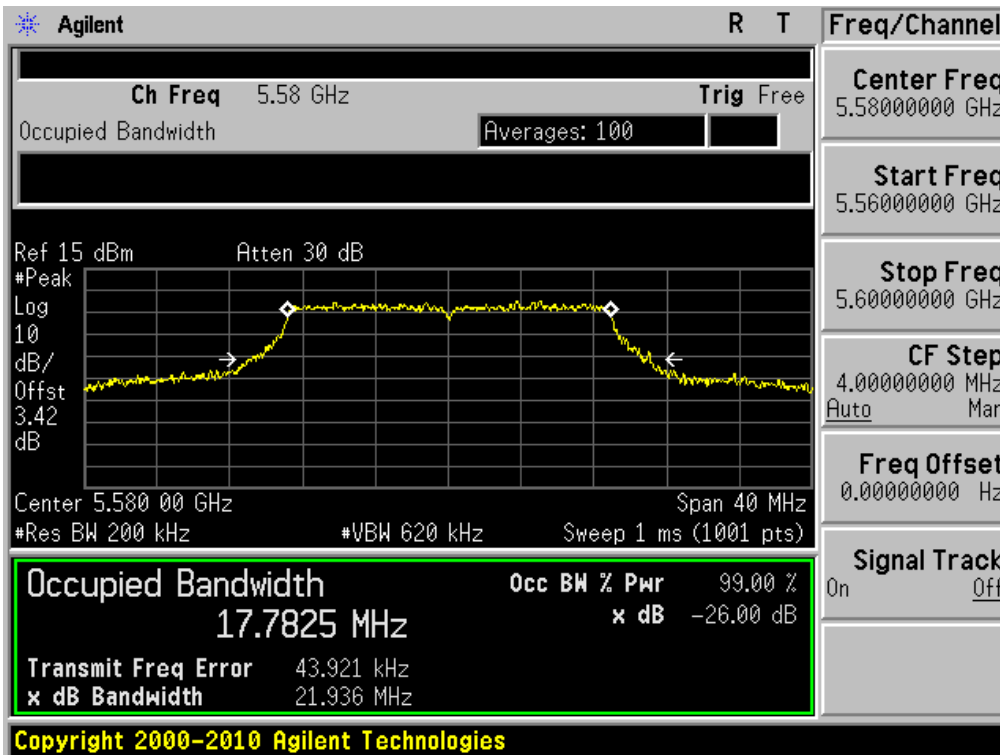
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.100



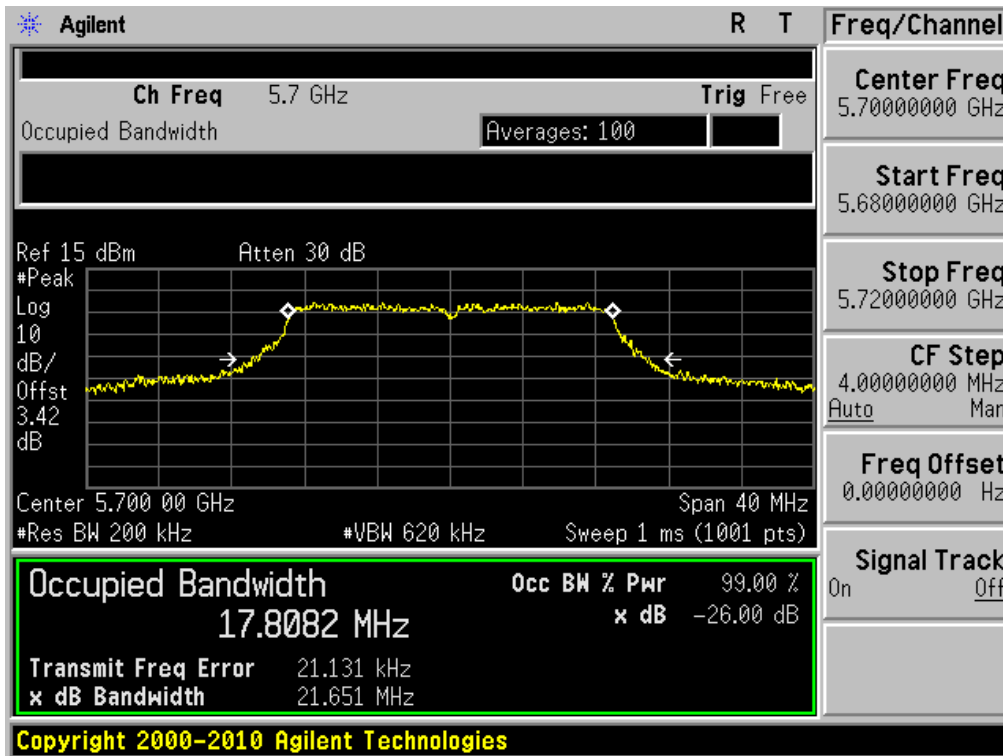
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.116



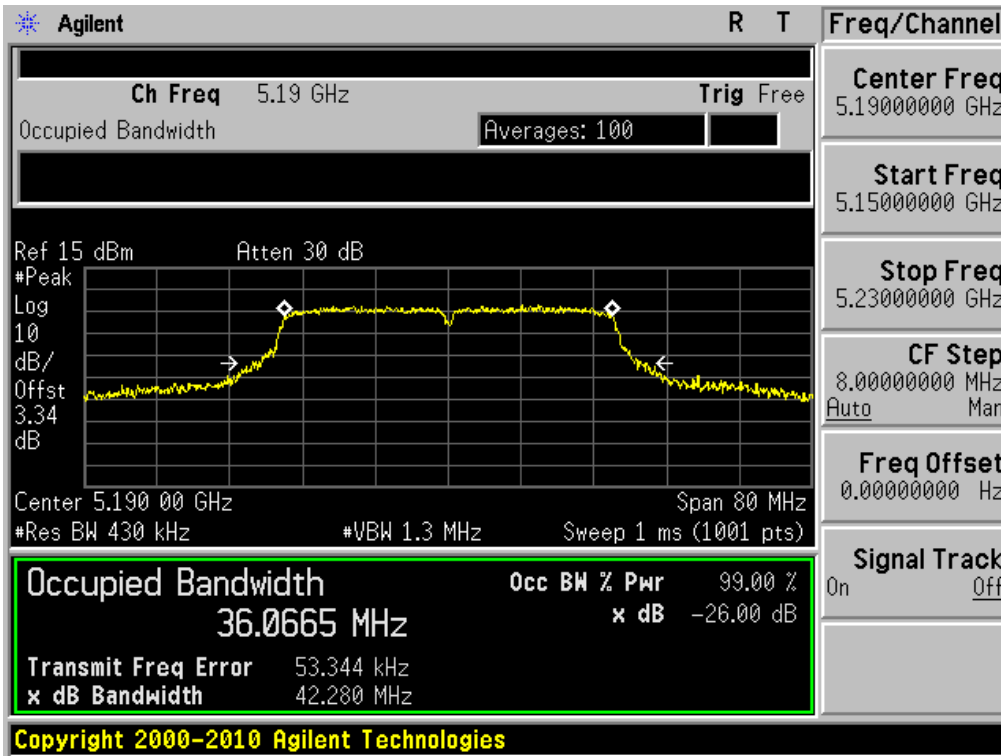
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.140



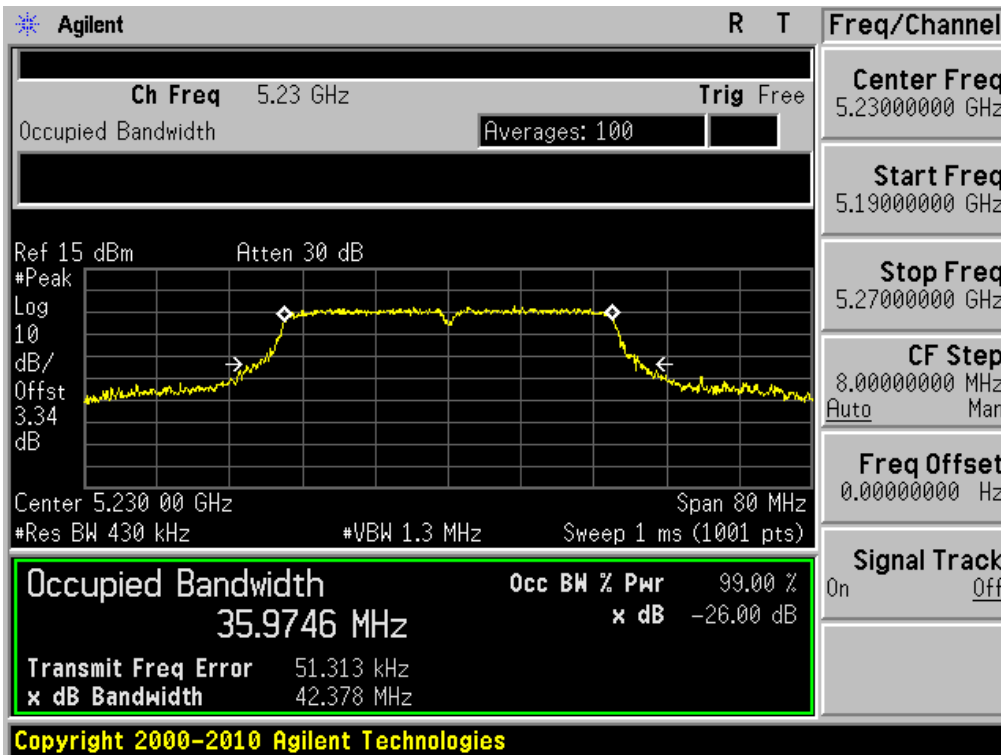
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.38



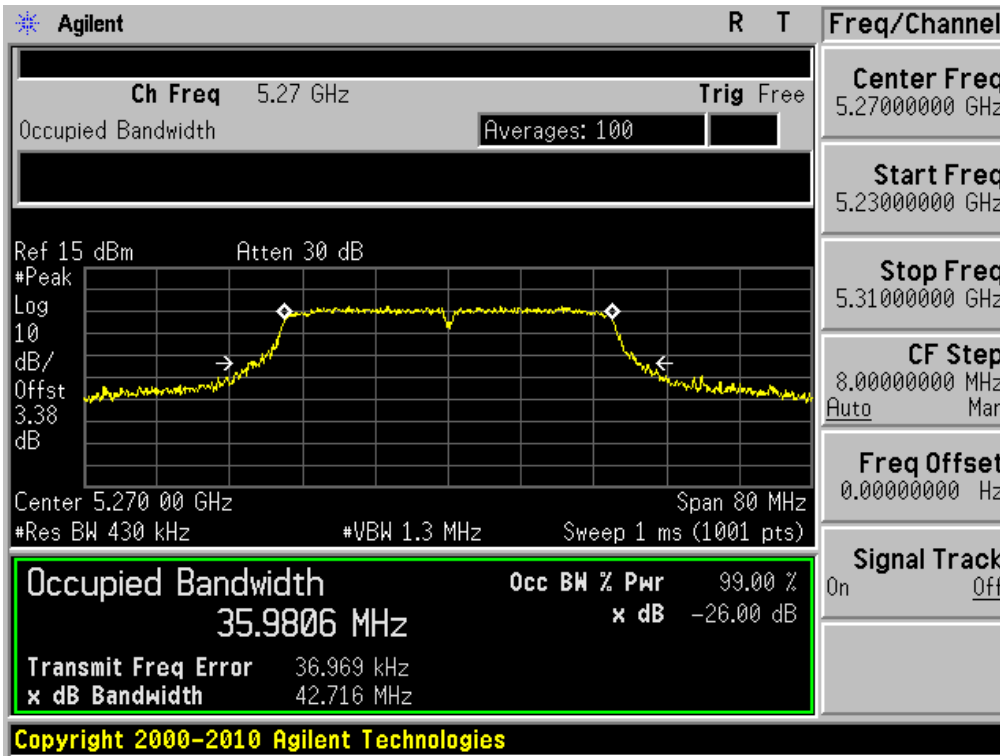
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.46



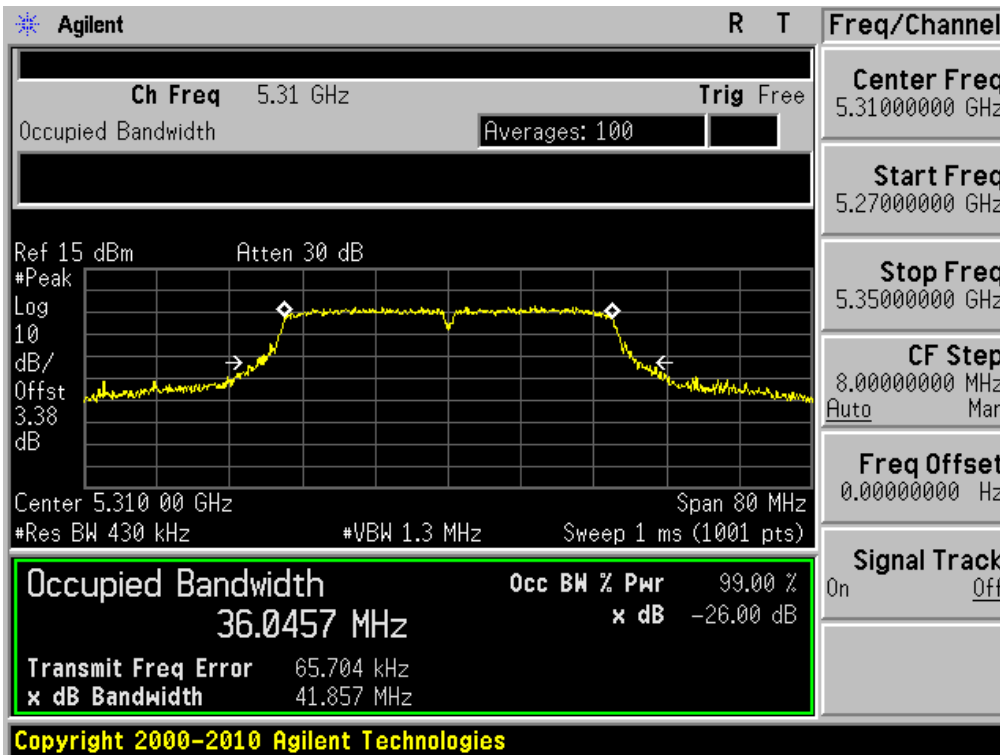
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.54



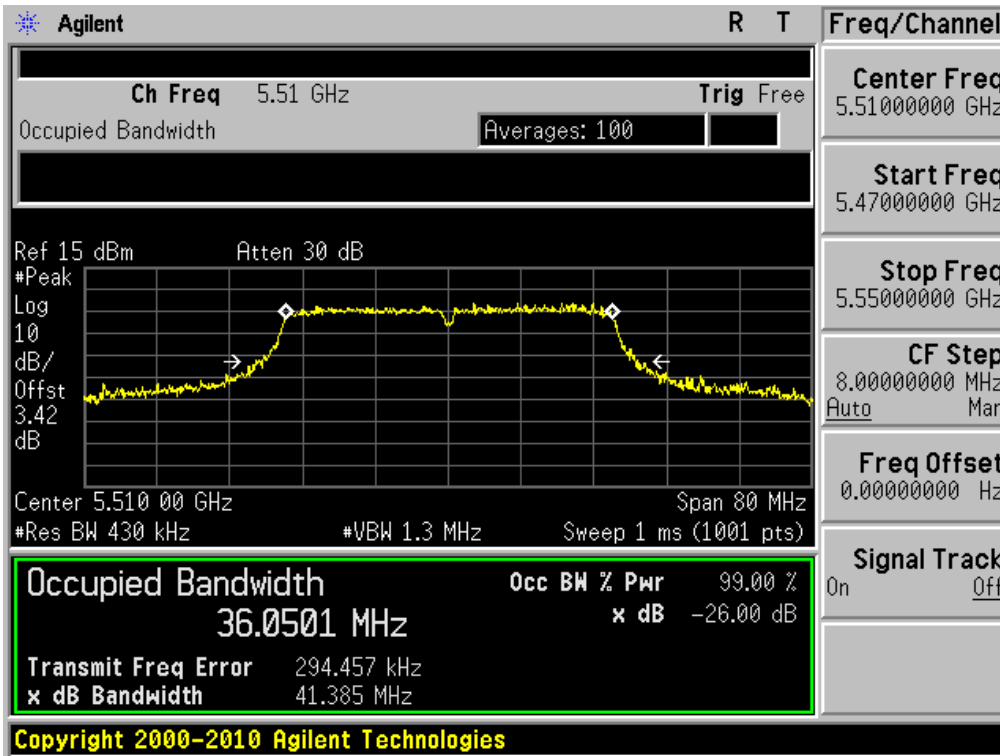
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.62



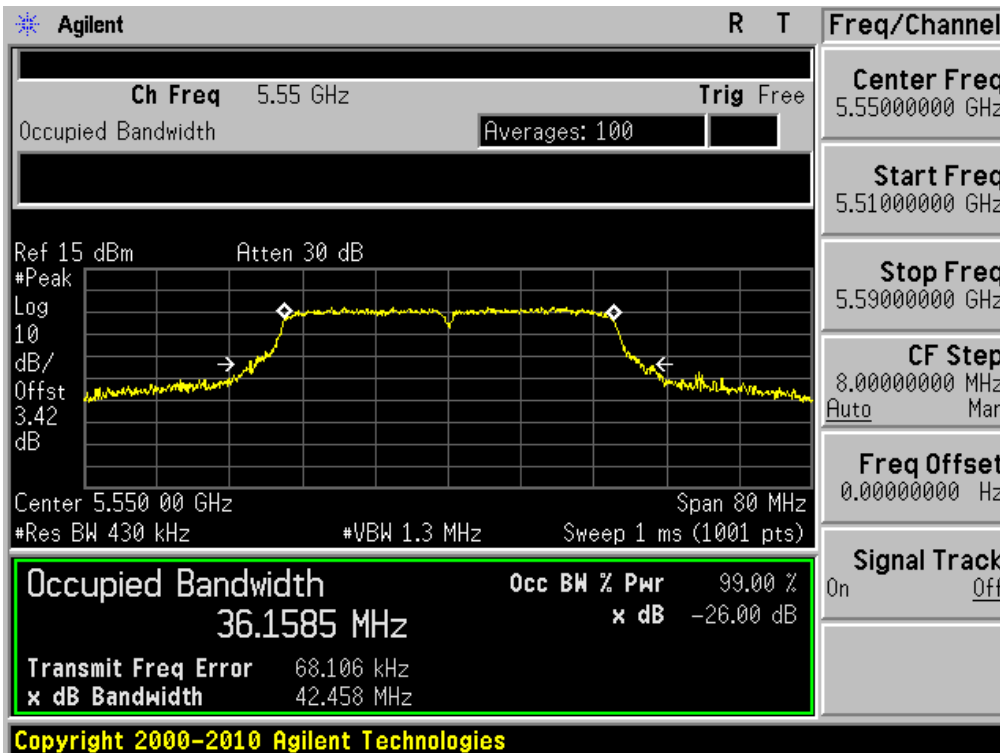
26 dB Bandwidth

Test Mode: 802.11n-HT40 & Ch.102



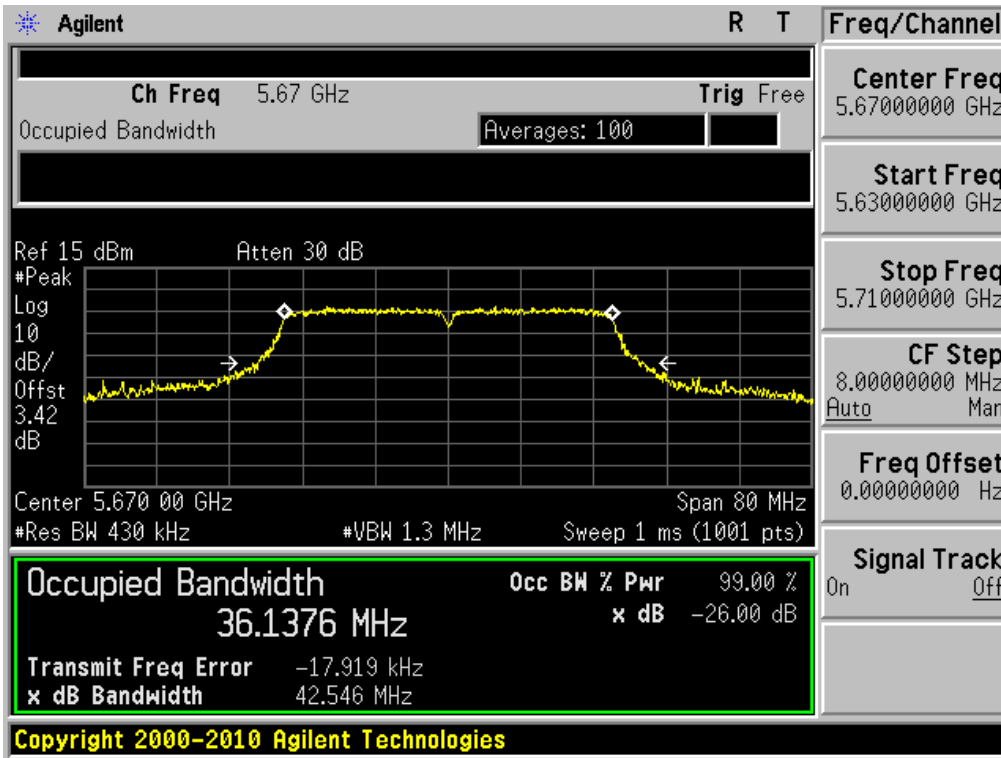
26 dB Bandwidth

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
		21.449	17.31		
	802.11n HT20	50	16.98		16.98
		21.568	17.33		
	802.11n HT40	50	16.98		16.98
		42.280	20.26		

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
		21.339	24.29		
	802.11n HT20	250	23.97		23.97
		21.475	24.31		
	802.11n HT40	250	23.97		23.97
		41.857	27.21		
Band III	802.11a	250	23.97	0	23.97
		21.038	24.23		
	802.11n HT20	250	23.97		23.97
		21.651	24.35		
	802.11n HT40	250	23.97		23.97
		41.385	27.16		

■ 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	12.220	1.360	1.480	0.91	0.41	12.630
	40	5200	12.140					12.550
	48	5240	12.130					12.540
	52	5260	12.220	1.360	1.480	0.91	0.41	12.630
	56	5280	11.870					12.280
	64	5320	11.960					12.370
	100	5500	12.190	1.360	1.480	0.91	0.41	12.600
	116	5580	12.080					12.490
140	5700	11.830	12.240					

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Result
				On Time[ms]	On+Off Time[ms]	X		
802.11n (20MHz)	36	5180	10.170	1.270	1.380	0.92	0.37	10.540
	40	5200	9.990					10.360
	48	5240	10.000					10.370
	52	5260	9.990	1.270	1.380	0.92	0.37	10.360
	56	5280	9.870					10.240
	64	5320	9.770					10.140
	100	5500	10.130	1.270	1.380	0.92	0.37	10.500
	116	5580	9.910					10.280
140	5700	9.810	10.180					
802.11n (40MHz)	38	5190	8.050	0.633	0.684	0.92	0.37	8.420
	46	5230	7.830					8.200
	54	5270	7.630	0.633	0.684	0.92	0.37	8.000
	62	5310	7.830					8.200
	102	5510	7.700	0.633	0.684	0.92	0.37	8.070
	110	5550	7.760					8.130
134	5670	7.320	7.690					

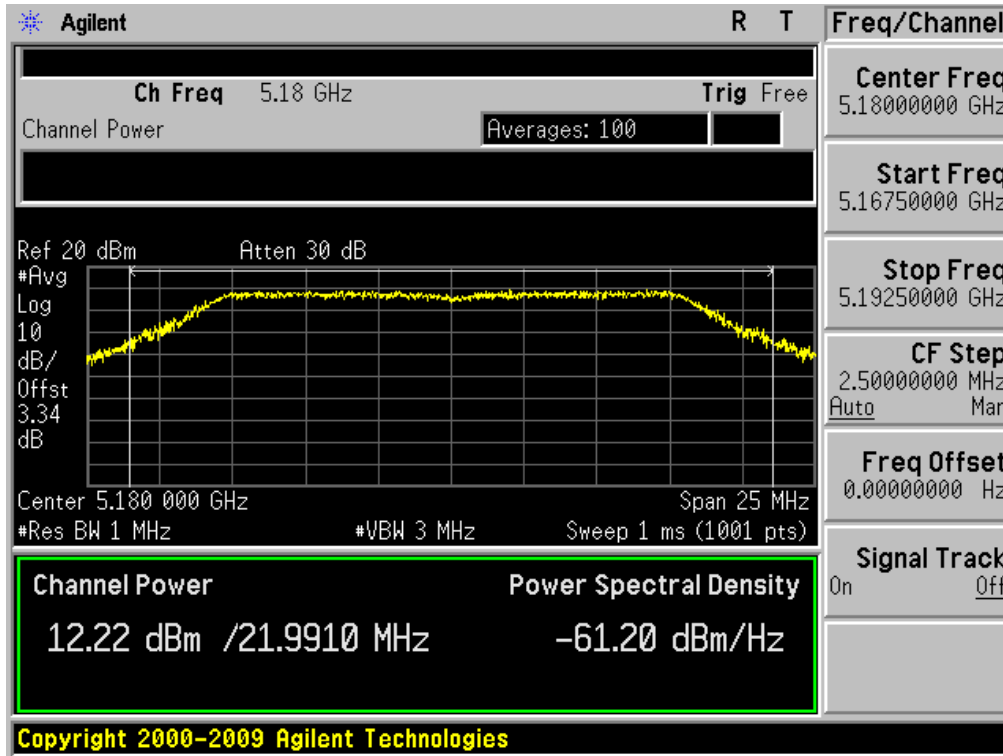
Note 1 : DCF = 10log(1 / X), X = On Time / (On+Off time)

Note 2 : Test Result = Measurement Data + DCF

Measurement Data PLOTS

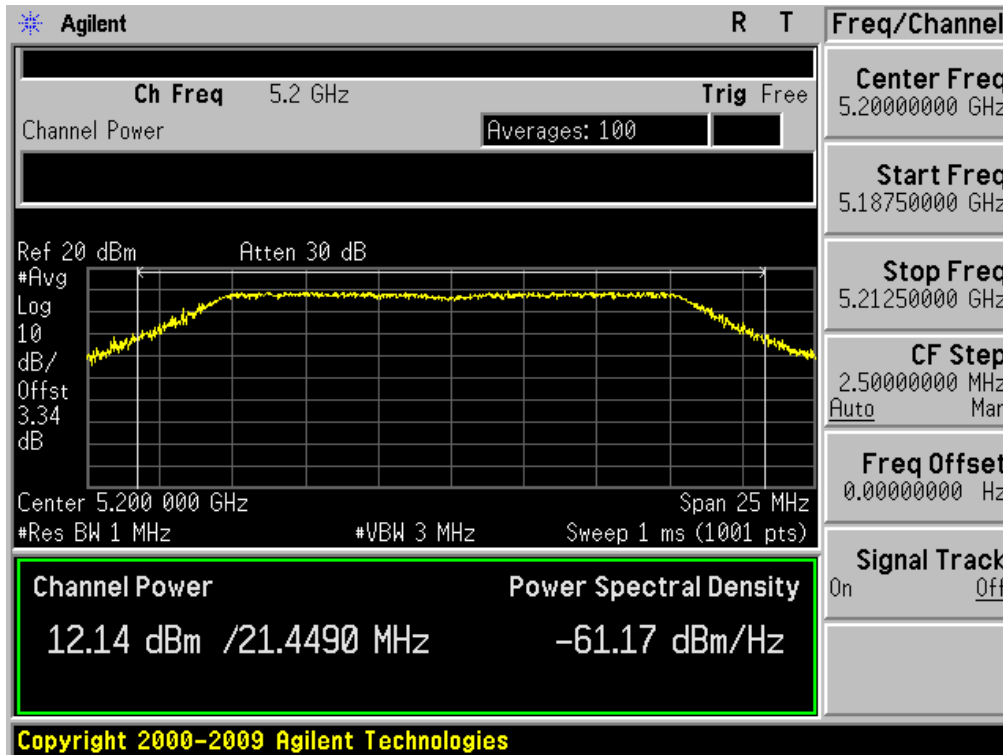
Output Power

Test Mode: 802.11a & Ch.36



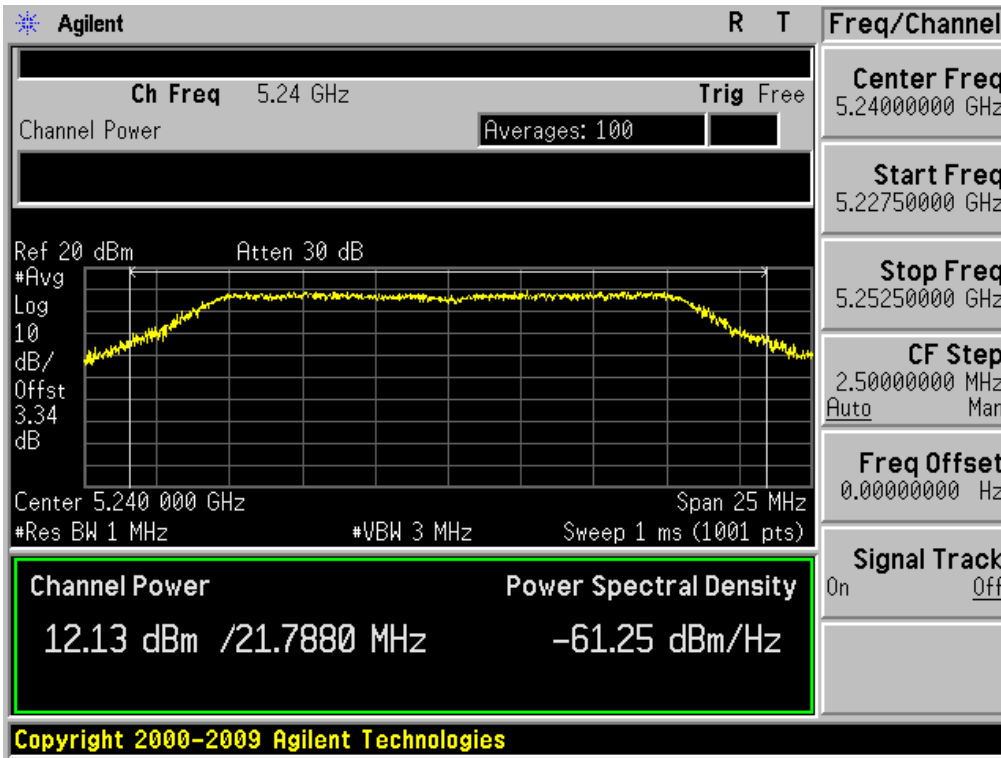
Output Power

Test Mode: 802.11a & Ch.40



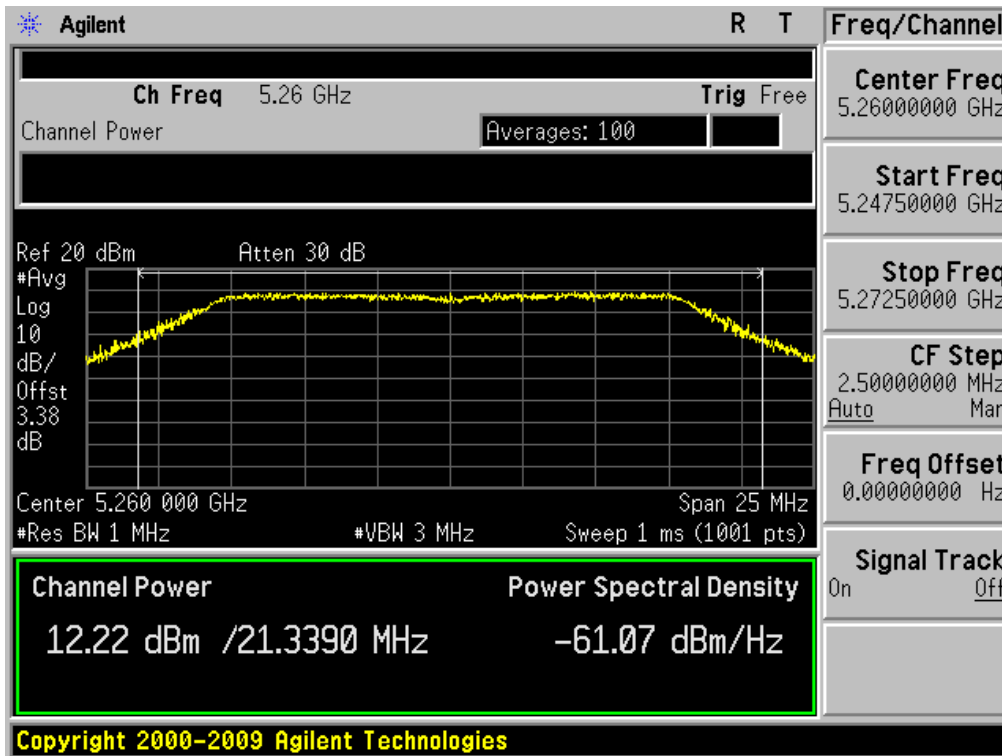
Output Power

Test Mode: 802.11a & Ch.48



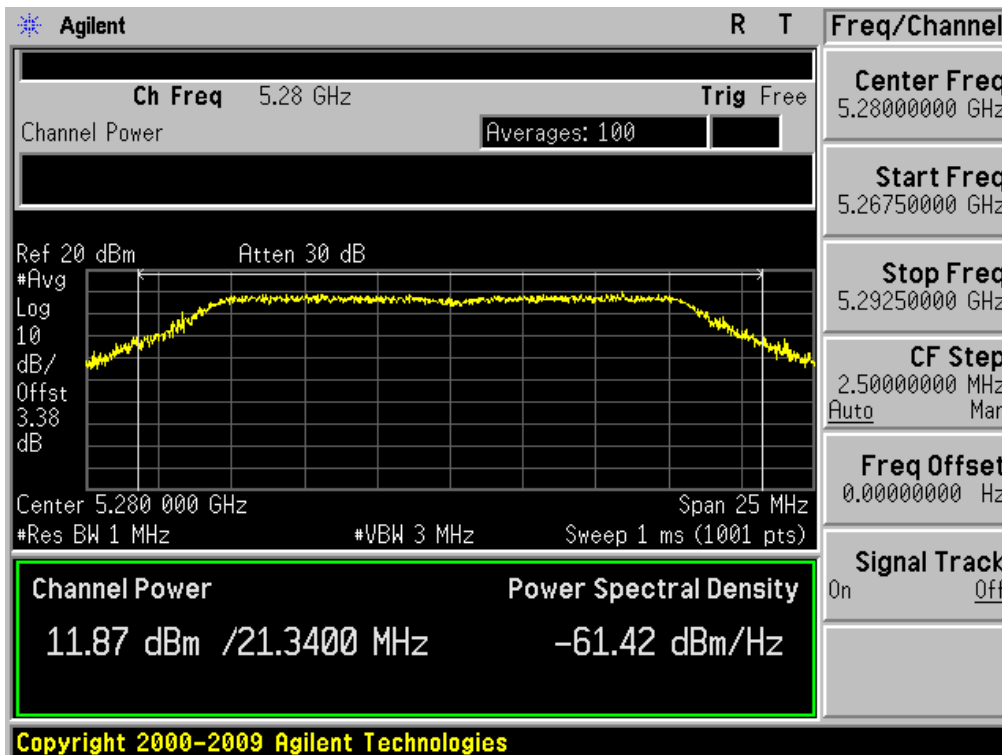
Output Power

Test Mode: 802.11a & Ch.52



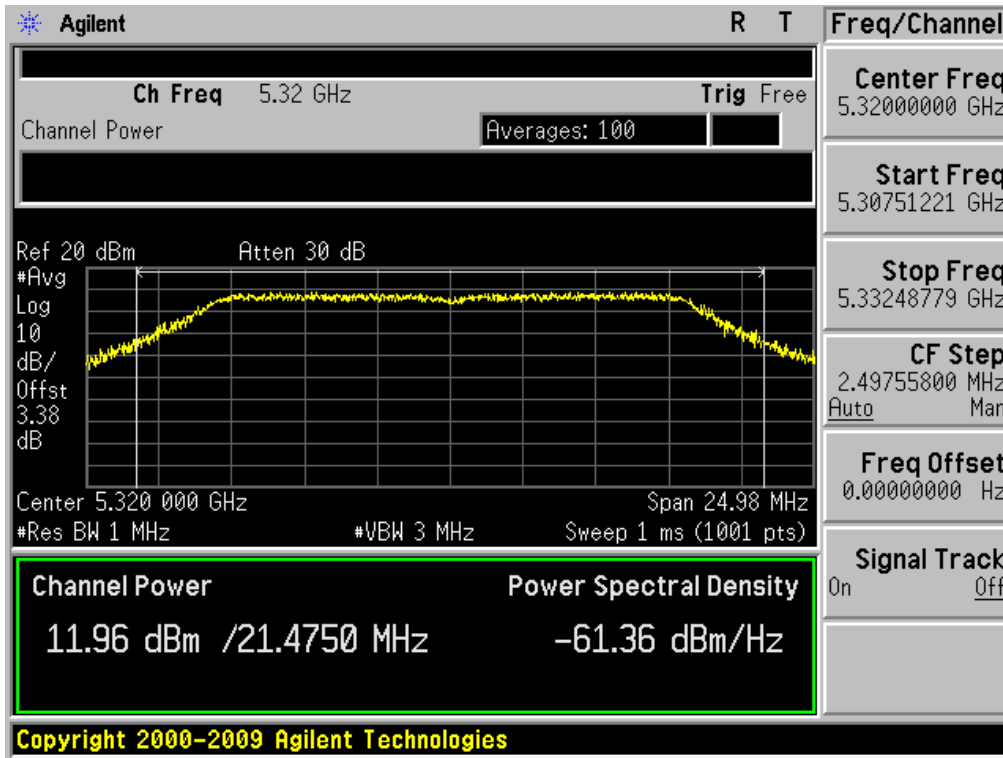
Output Power

Test Mode: 802.11a & Ch.56



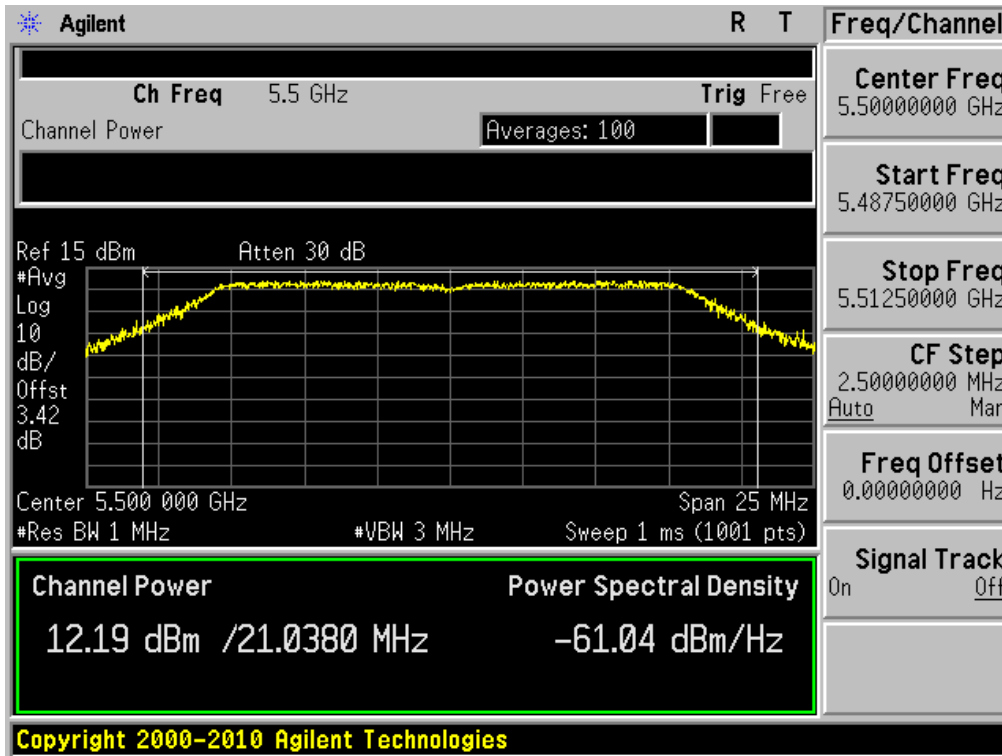
Output Power

Test Mode: 802.11a & Ch.64



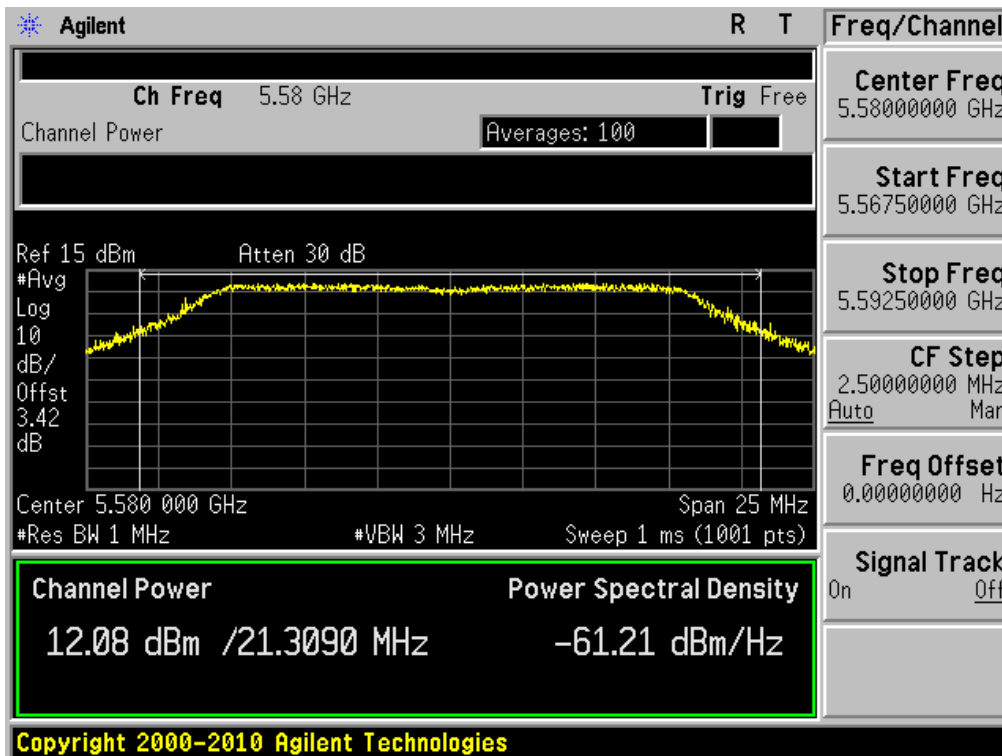
Output Power

Test Mode: 802.11a & Ch.100



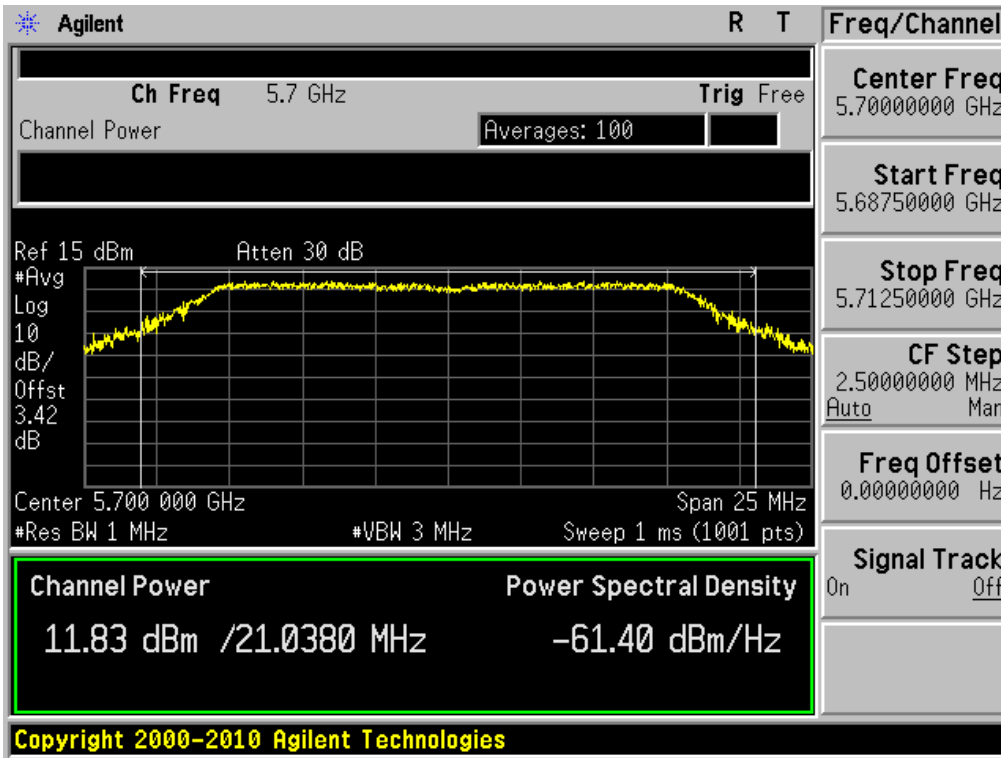
Output Power

Test Mode: 802.11a & Ch.116



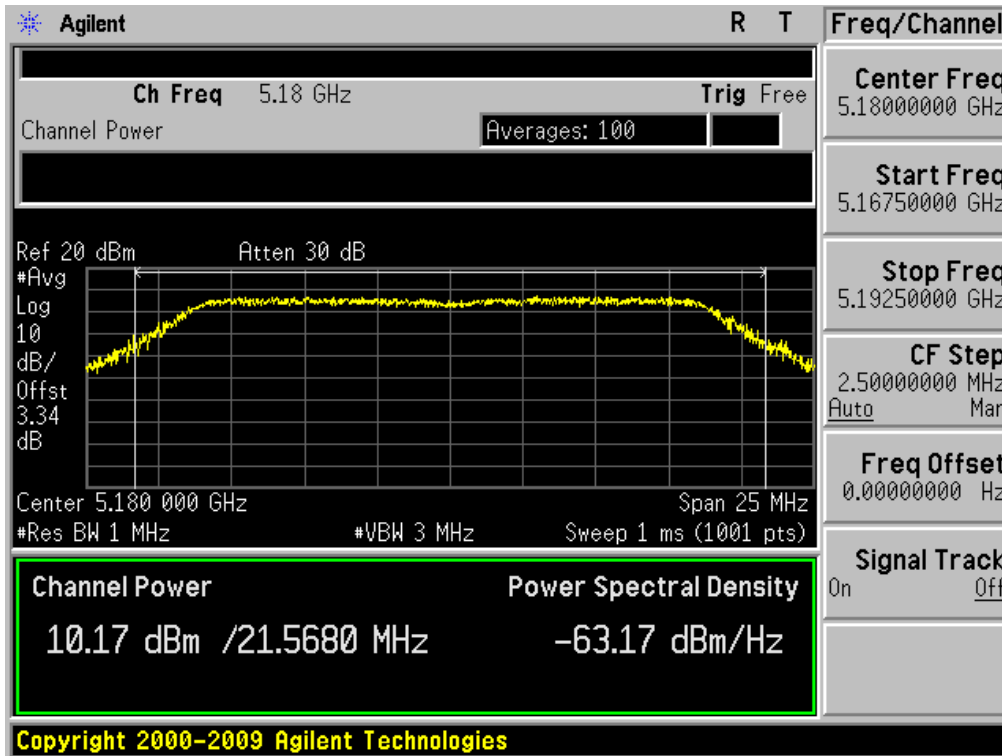
Output Power

Test Mode: 802.11a & Ch.140



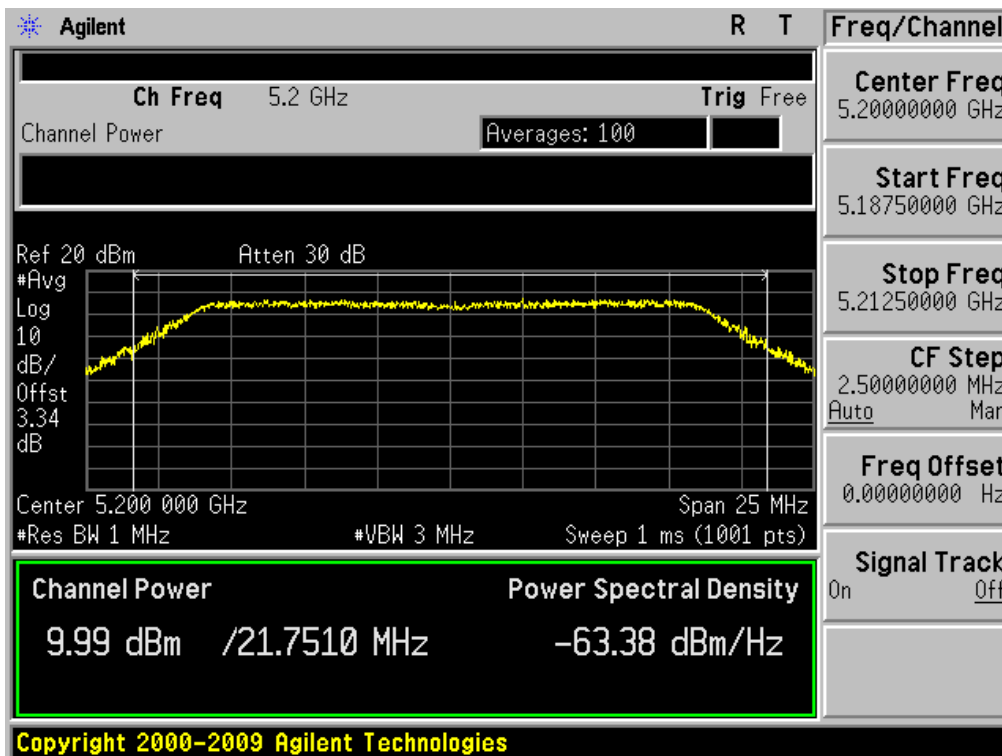
Output Power

Test Mode: 802.11n HT20 & Ch.36



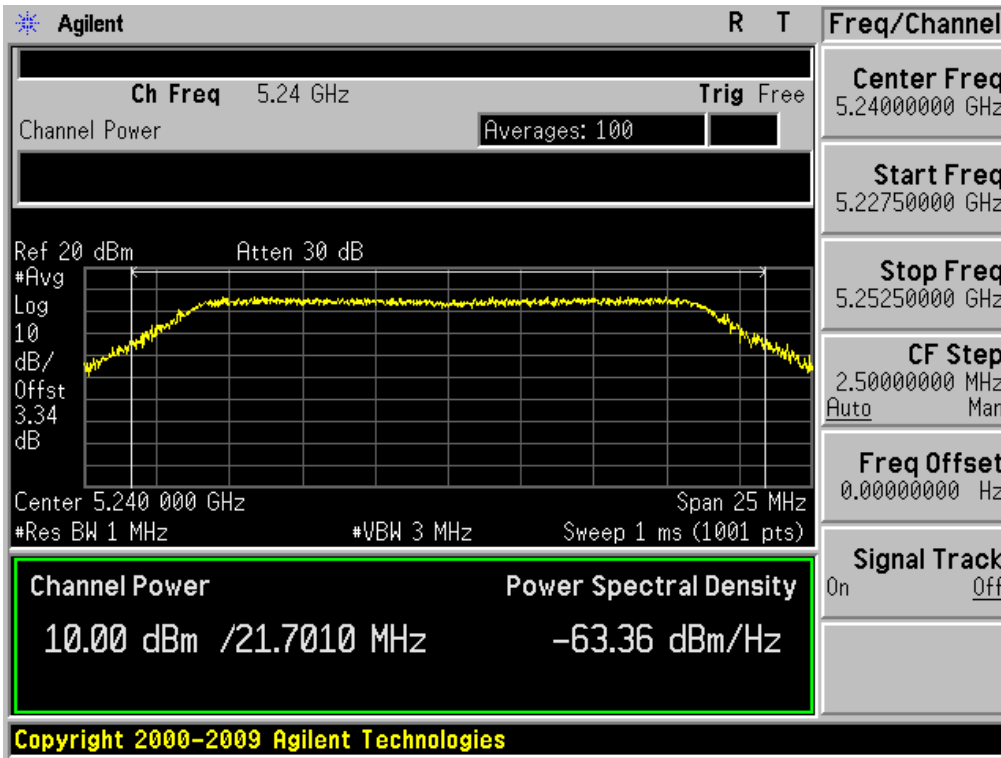
Output Power

Test Mode: 802.11n HT20 & Ch.40



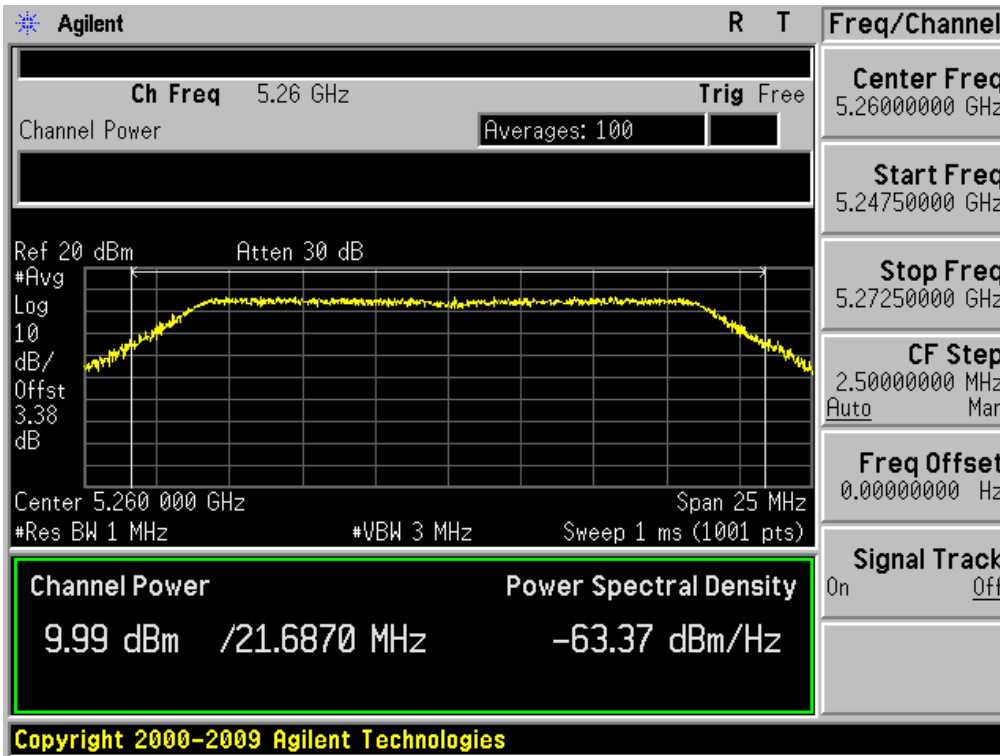
Output Power

Test Mode: 802.11n HT20 & Ch.48



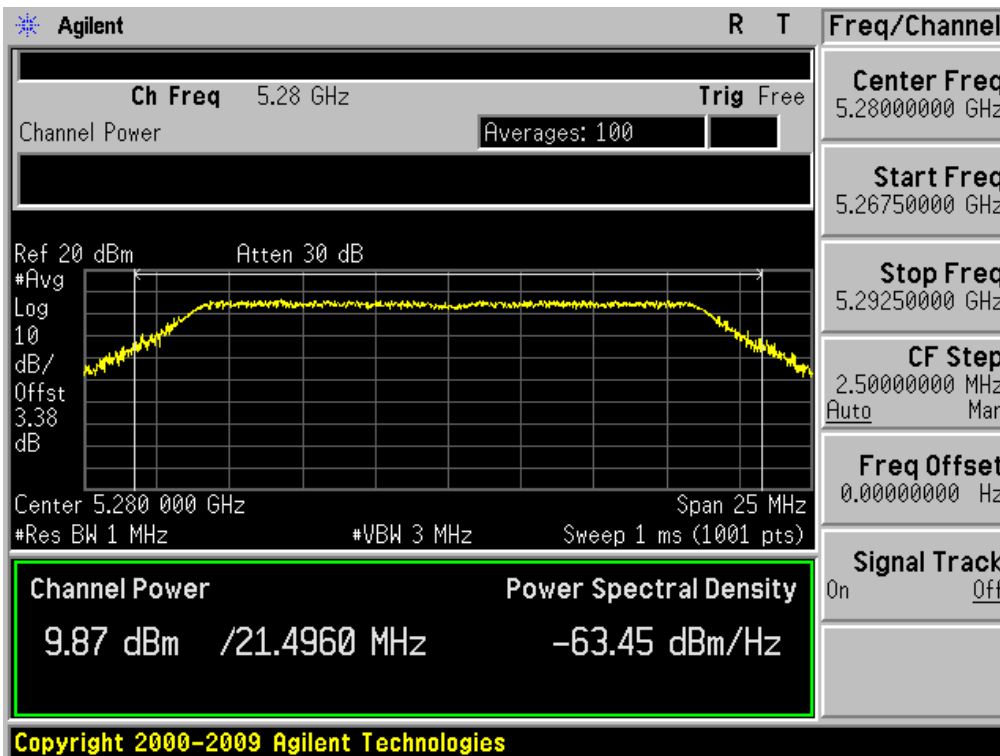
Output Power

Test Mode: 802.11n HT20 & Ch.52



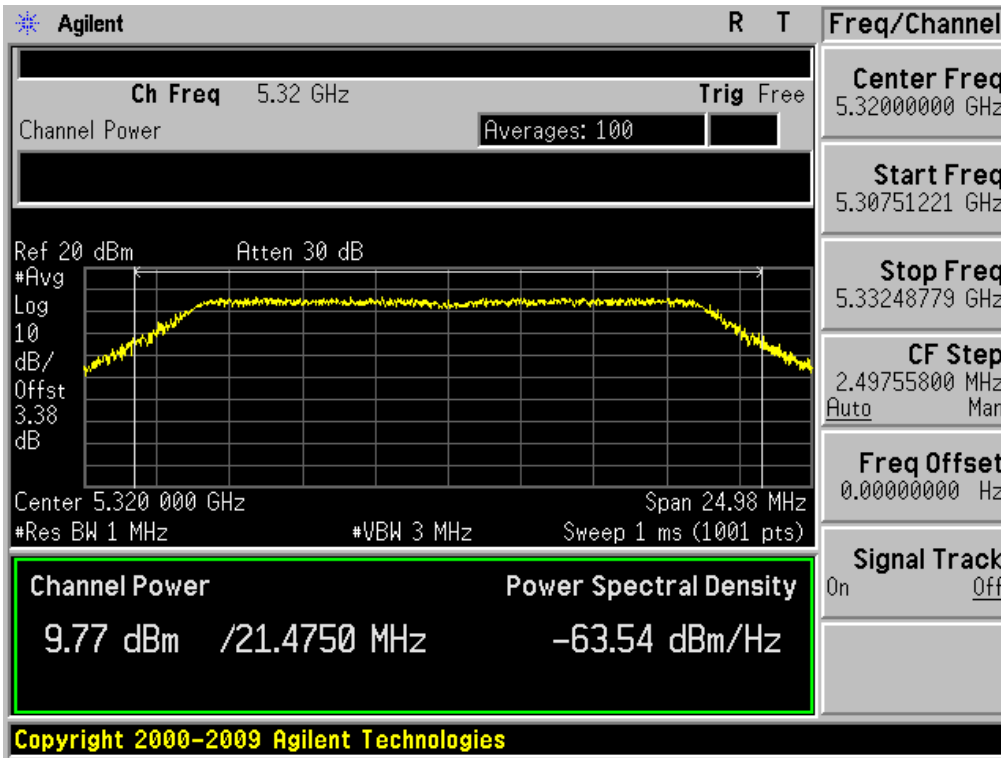
Output Power

Test Mode: 802.11n HT20 & Ch.56



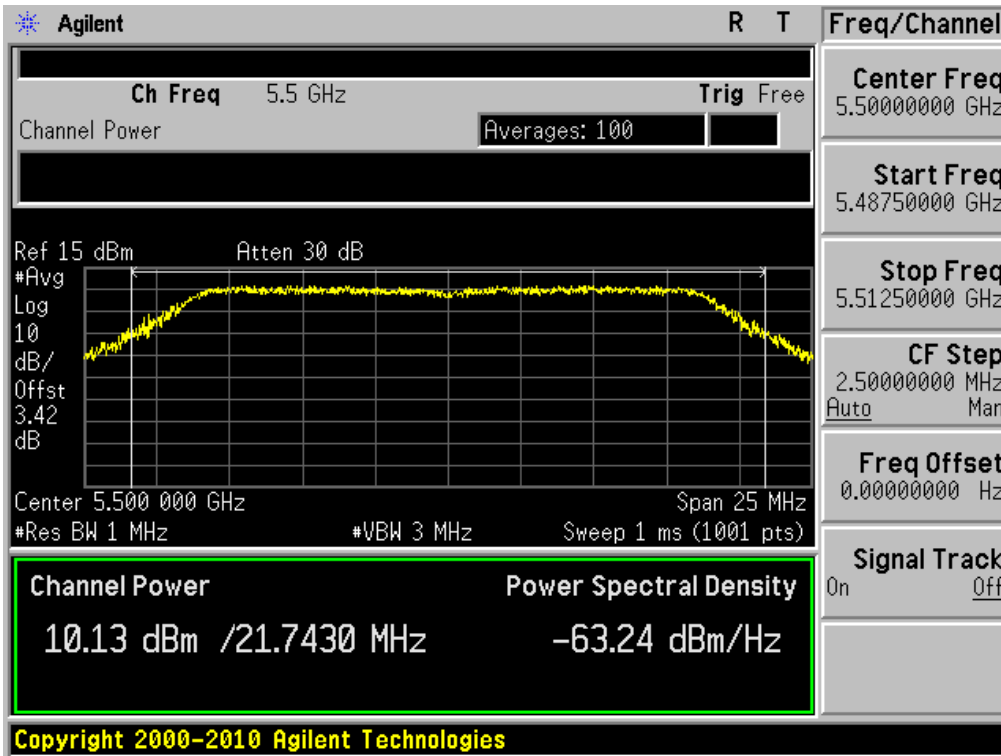
Output Power

Test Mode: 802.11n HT20 & Ch.64



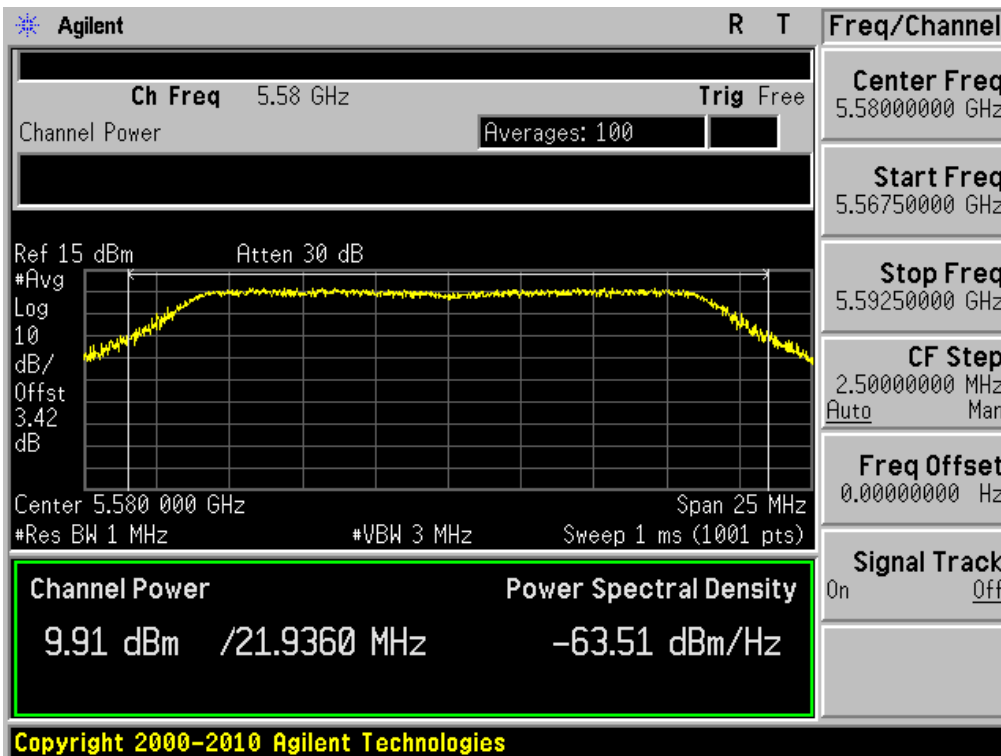
Output Power

Test Mode: 802.11n HT20 & Ch.100



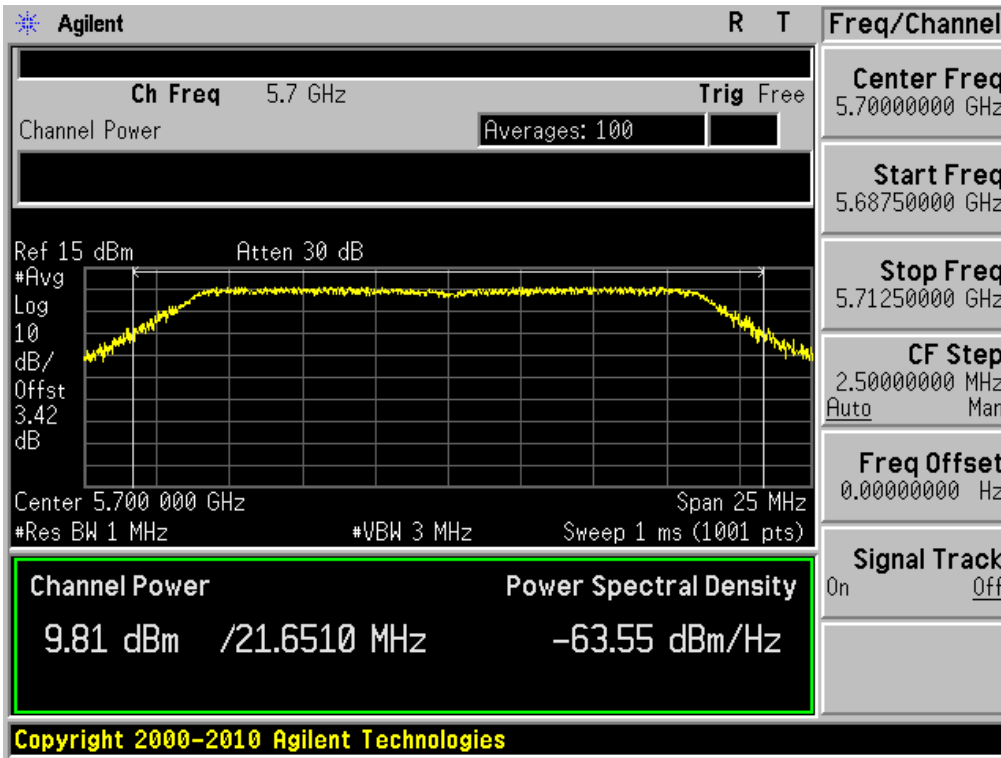
Output Power

Test Mode: 802.11n HT20 & Ch.116



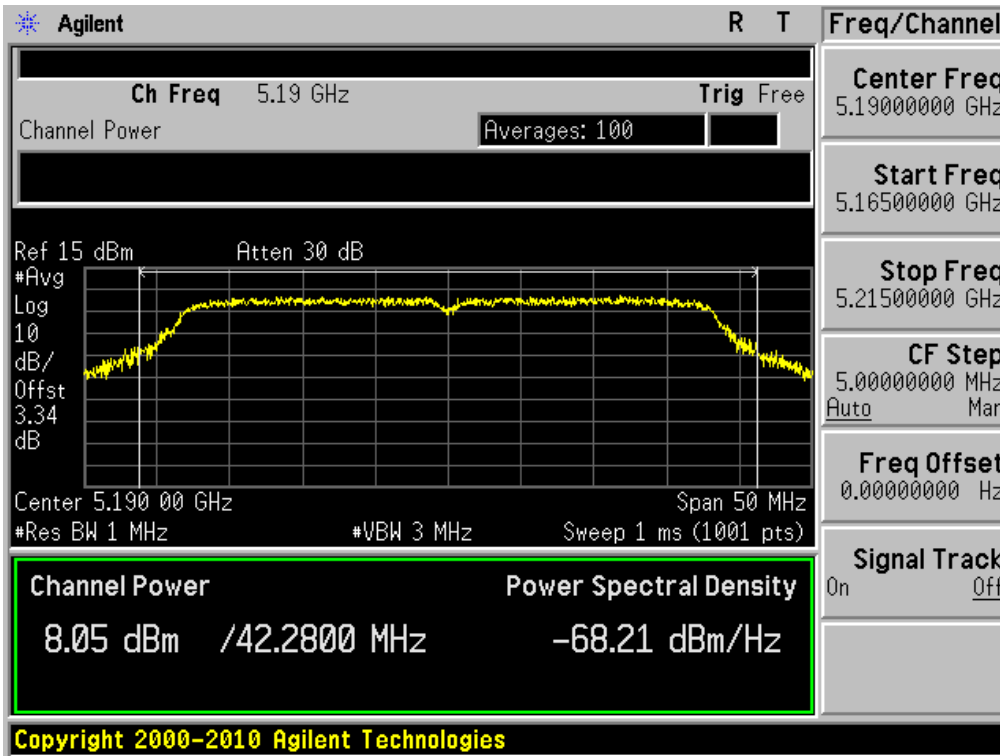
Output Power

Test Mode: 802.11n HT20 & Ch.140



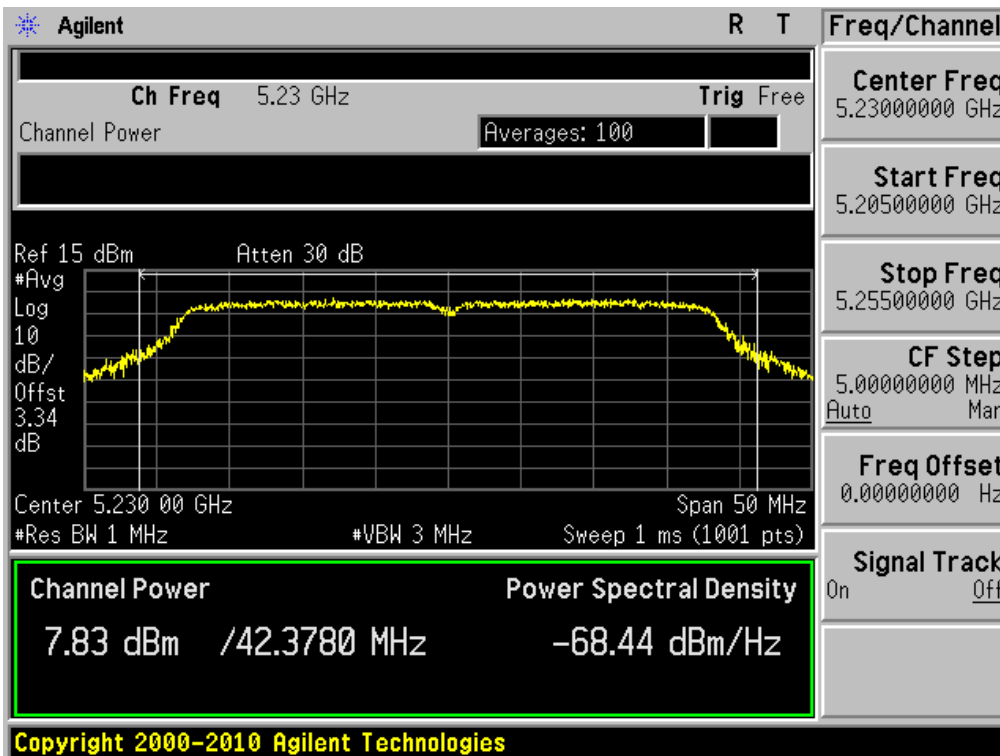
Output Power

Test Mode: 802.11n HT40 & Ch.38



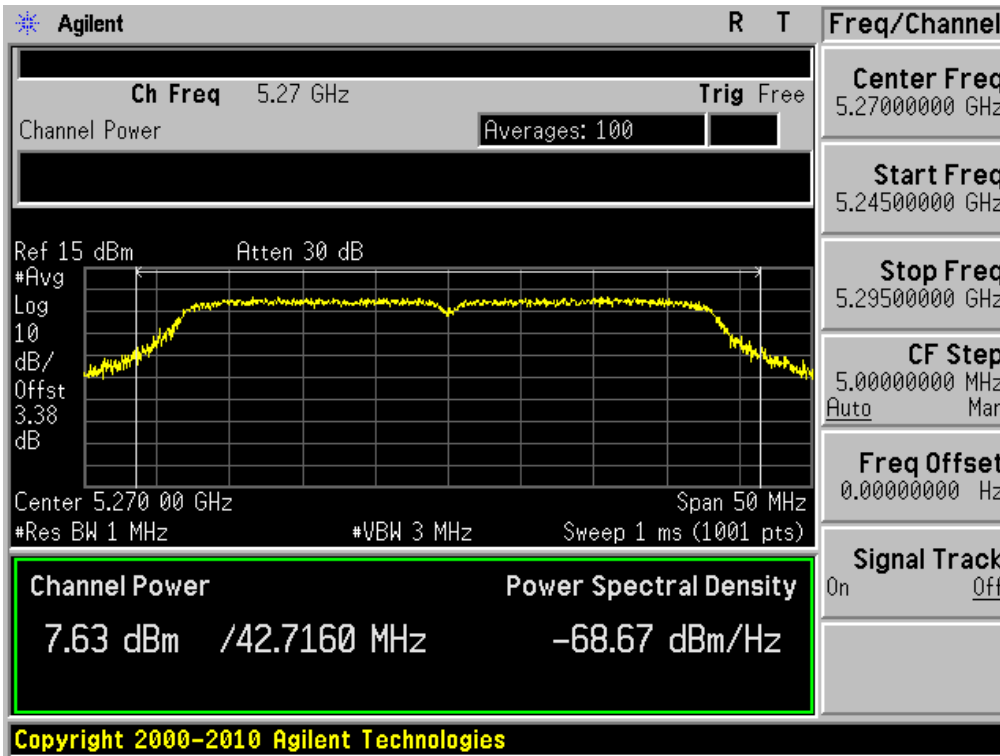
Output Power

Test Mode: 802.11n HT40 & Ch.46



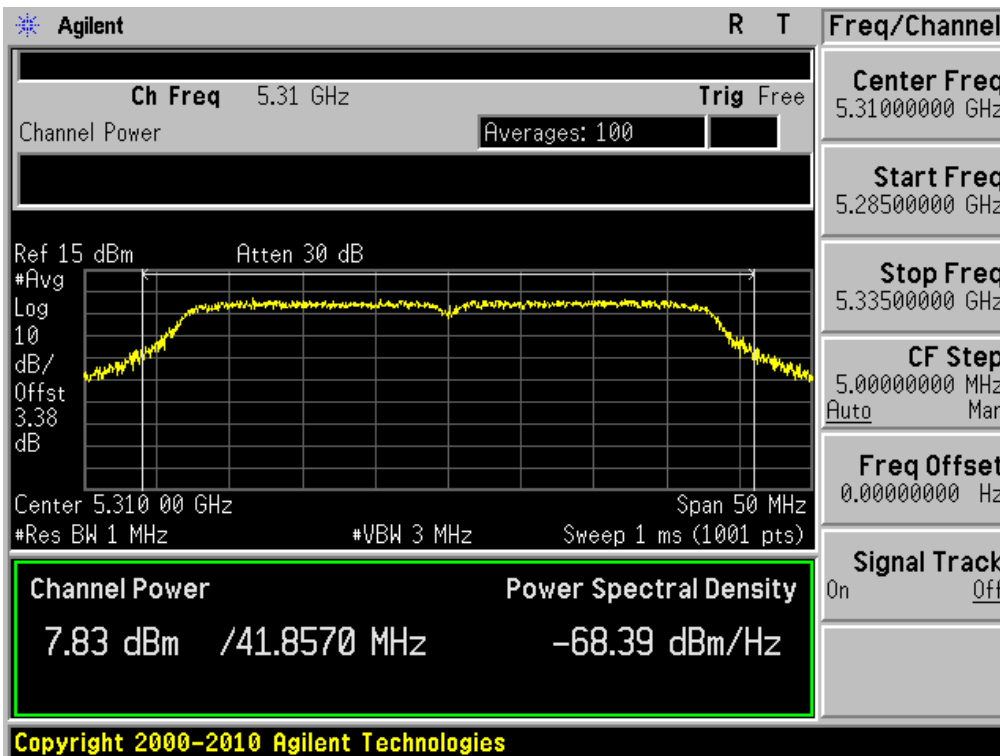
Output Power

Test Mode: 802.11n HT40 & Ch.54



Output Power

Test Mode: 802.11n HT40 & Ch.62



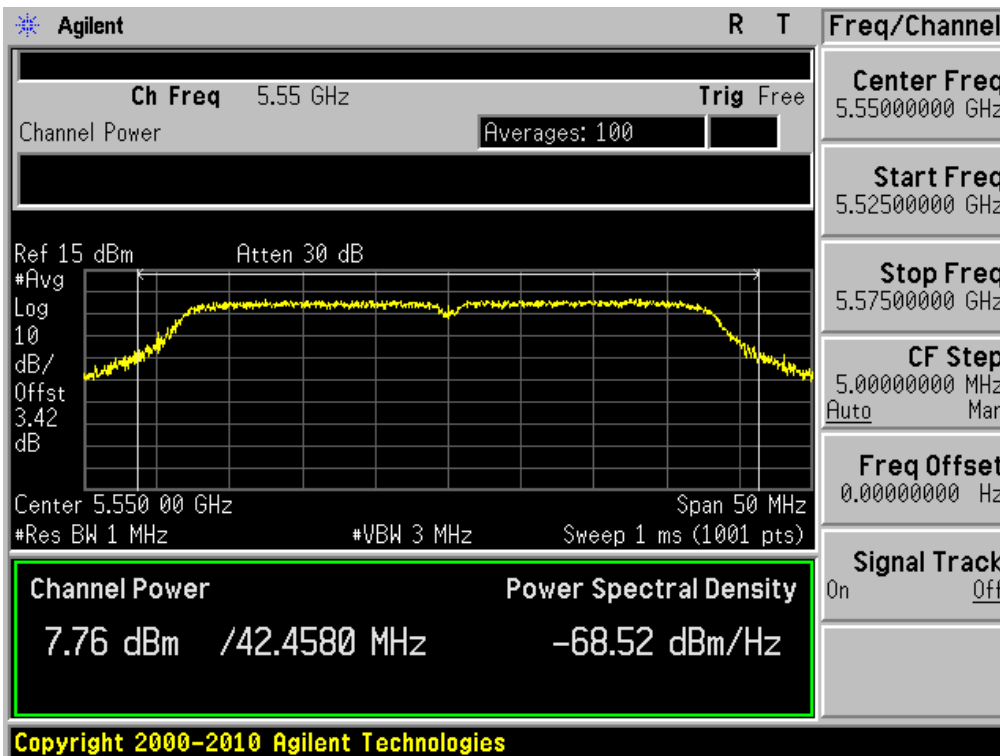
Output Power

Test Mode: 802.11n HT40 & Ch.102



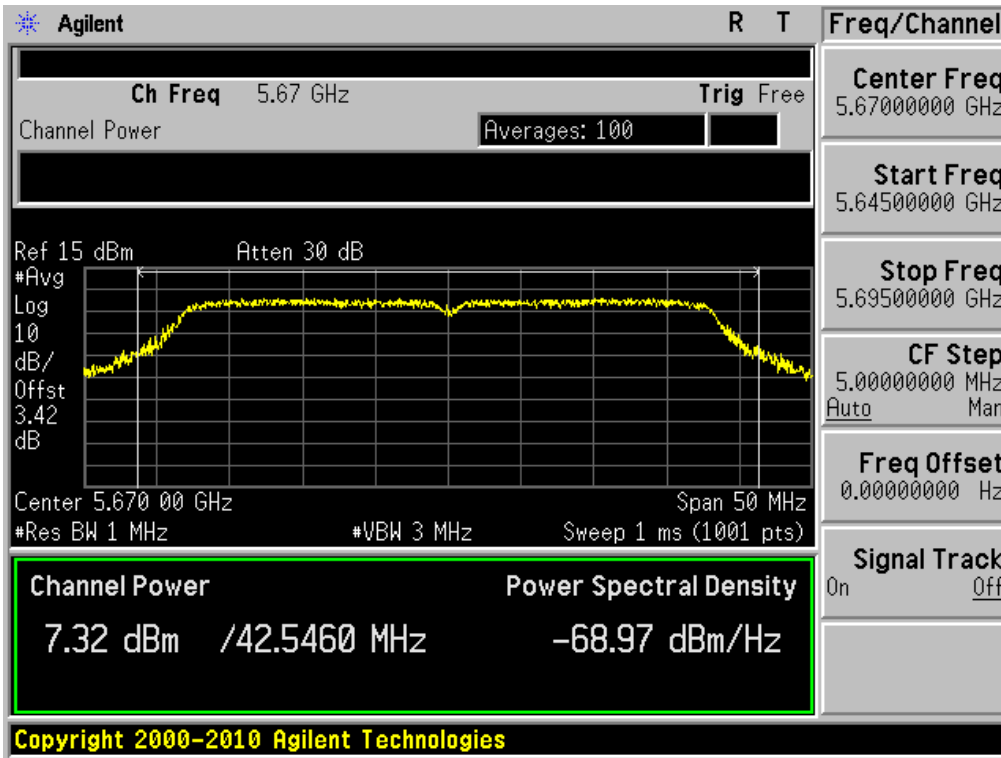
Output Power

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	1.514	1.360	1.480	0.91	0.41	1.924
	40	5200	1.443					1.853
	48	5240	1.263					1.673
	52	5260	1.417	1.360	1.480	0.91	0.41	1.827
	56	5280	1.328					1.738
	64	5320	1.152					1.562
	100	5500	1.608	1.360	1.480	0.91	0.41	2.018
	116	5580	1.294					1.704
140	5700	1.388	1.798					

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	-0.901	1.270	1.380	0.92	0.37	-0.531
	40	5200	-1.142					-0.772
	48	5240	-1.046					-0.676
	52	5260	-0.913	1.270	1.380	0.92	0.37	-0.543
	56	5280	-0.887					-0.517
	64	5320	-1.350					-0.980
	100	5500	-0.984	1.270	1.380	0.92	0.37	-0.614
	116	5580	-0.915					-0.545
140	5700	-1.051	-0.681					
802.11n (40MHz)	38	5190	-5.872	0.633	0.684	0.92	0.37	-5.502
	46	5230	-5.929					-5.559
	54	5270	-6.096	0.633	0.684	0.92	0.37	-5.726
	62	5310	-5.971					-5.601
	102	5510	-5.846	0.633	0.684	0.92	0.37	-5.476
	110	5550	-5.972					-5.602
134	5670	-6.725	-6.355					

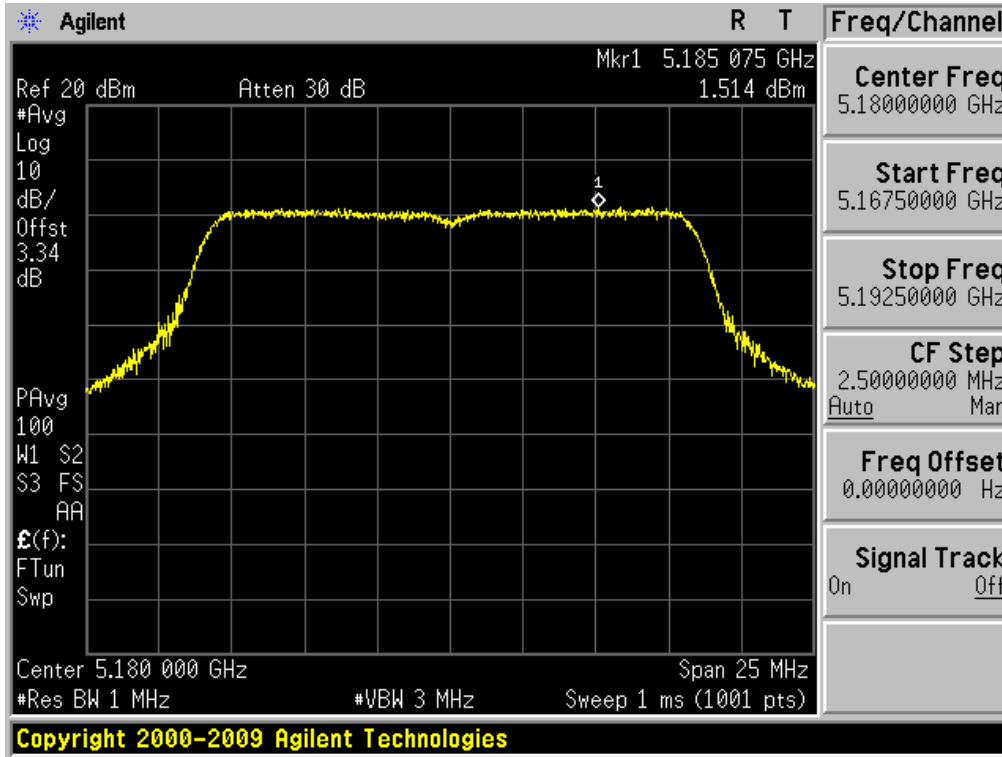
Note 1 : DCF = 10log(1 / X), X = On Time / (On+Off time)

Note 2 : Test Result = Measurement Data + DCF

Measurement Data PLOTS

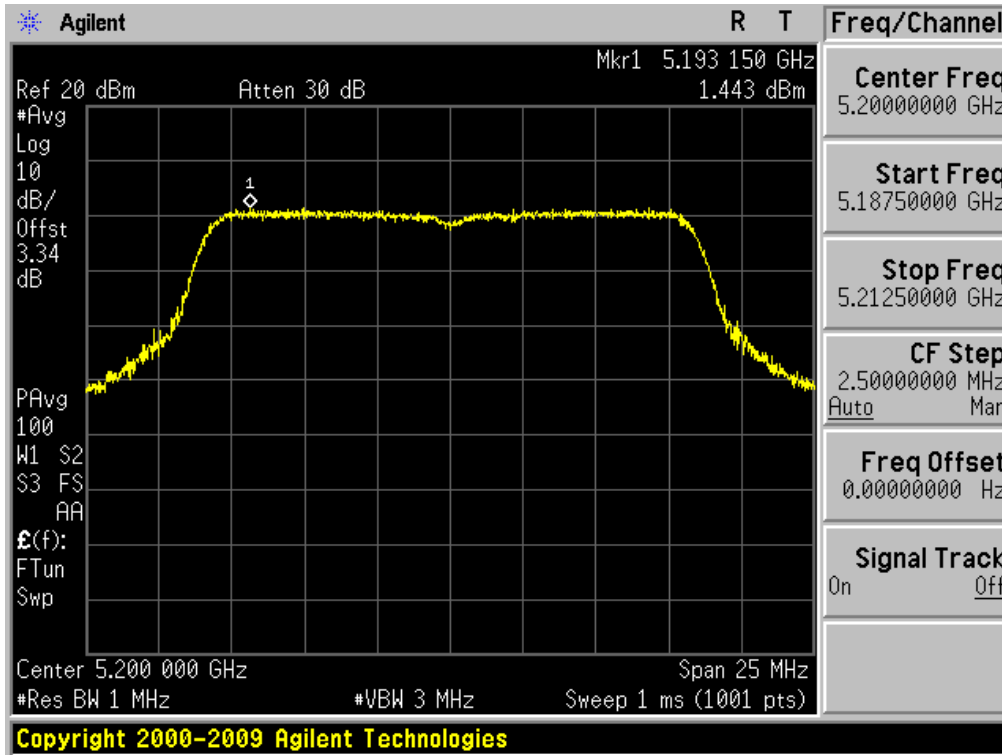
Peak Power Spectral Density

Test Mode: 802.11a & Ch.36



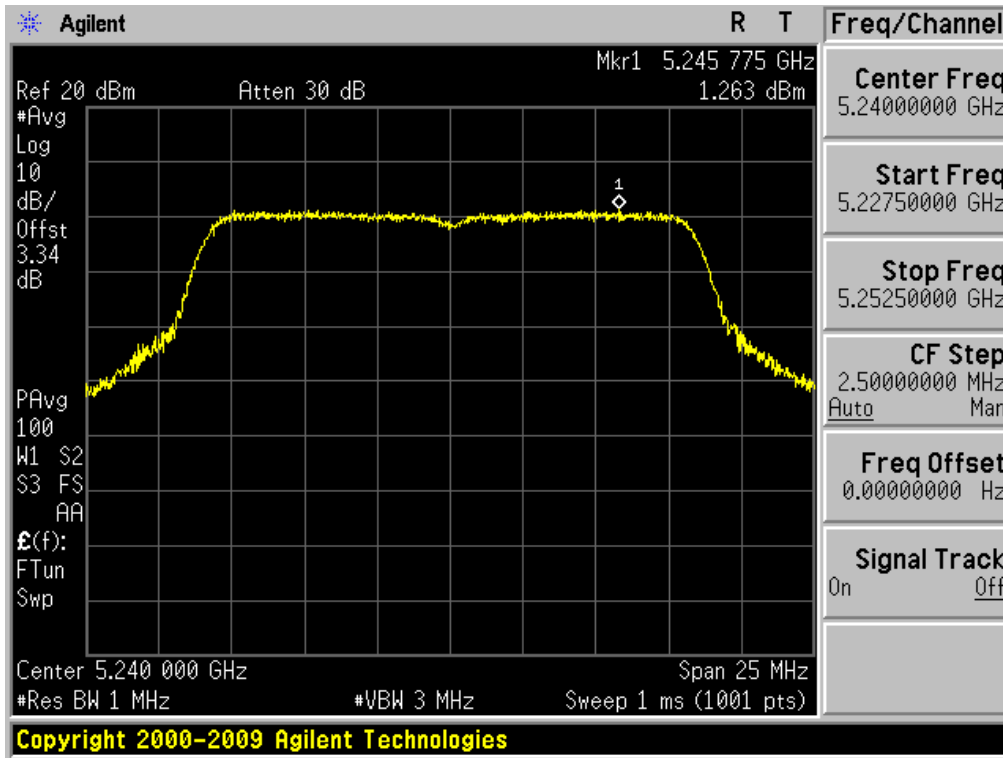
Peak Power Spectral Density

Test Mode: 802.11a & Ch.40



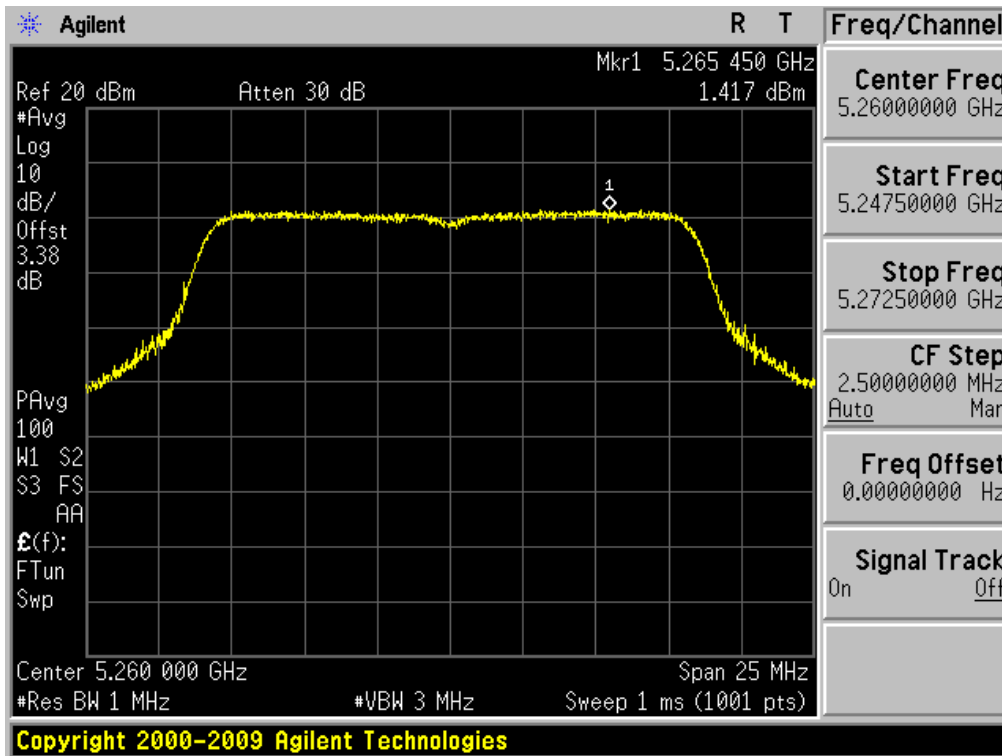
Peak Power Spectral Density

Test Mode: 802.11a & Ch.48



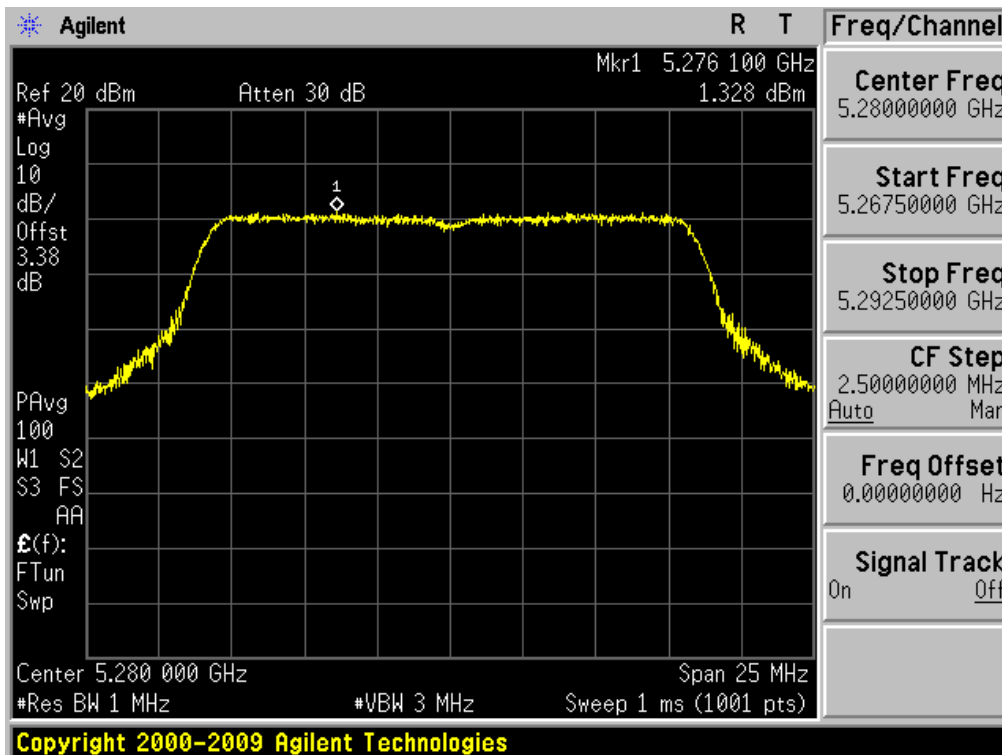
Peak Power Spectral Density

Test Mode: 802.11a & Ch.52



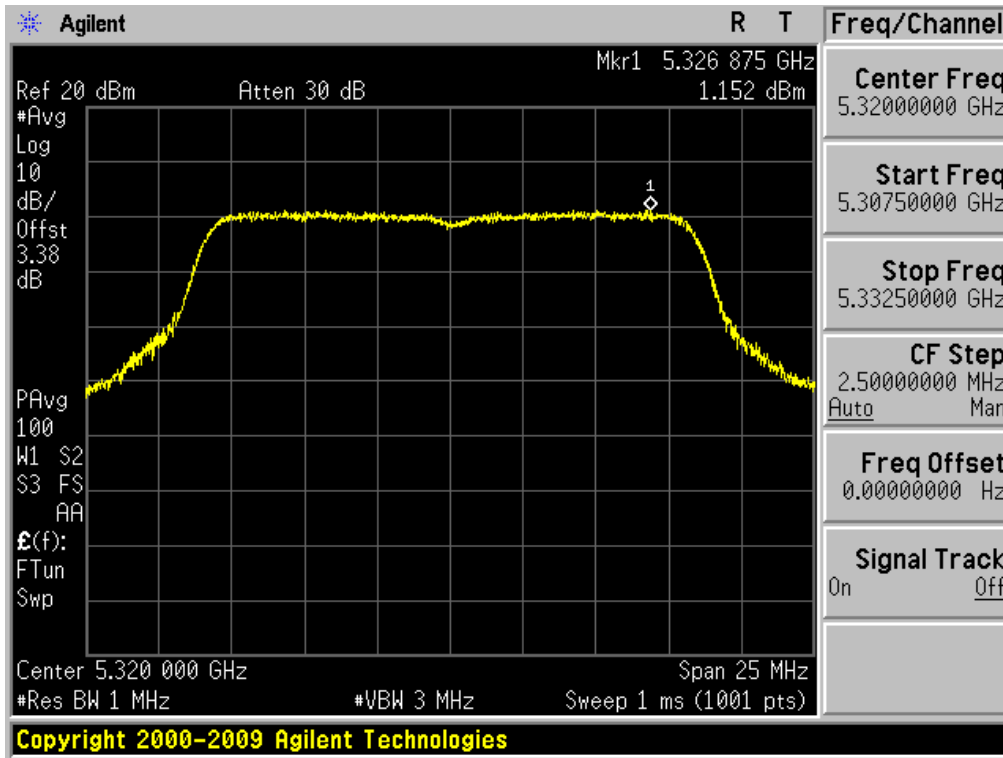
Peak Power Spectral Density

Test Mode: 802.11a & Ch.56



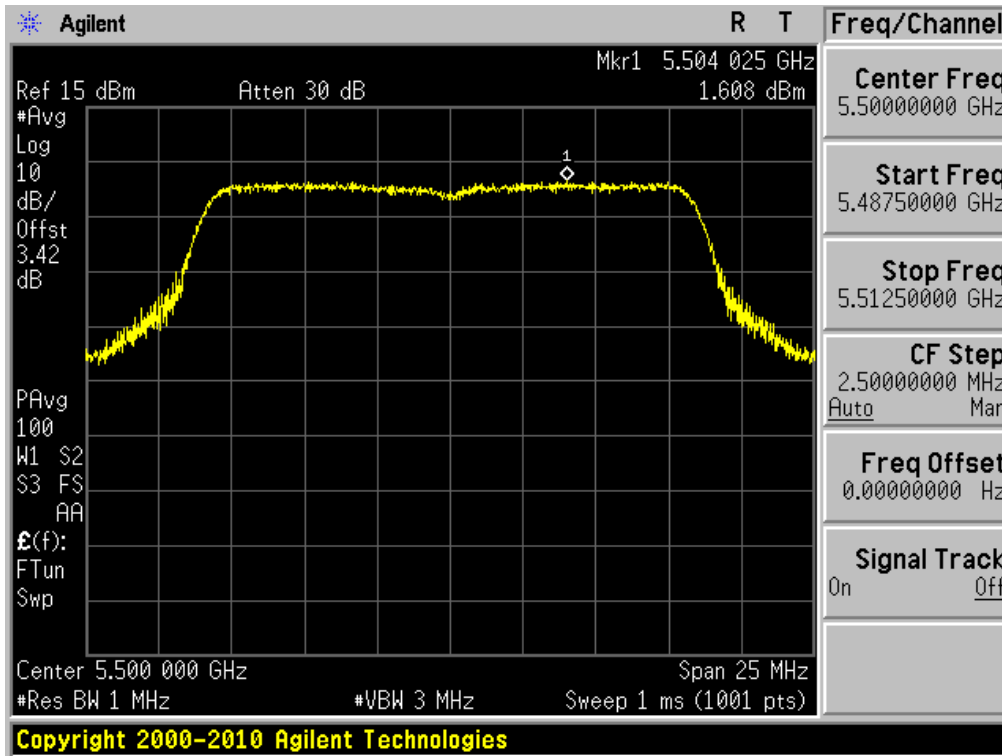
Peak Power Spectral Density

Test Mode: 802.11a & Ch.64



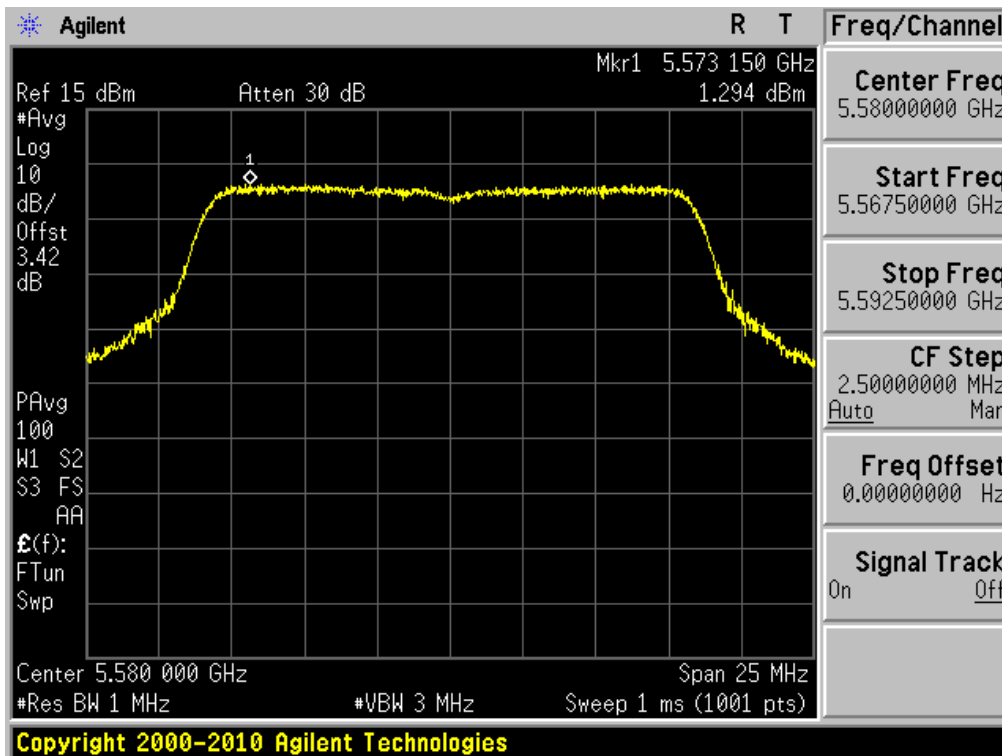
Peak Power Spectral Density

Test Mode: 802.11a & Ch.100



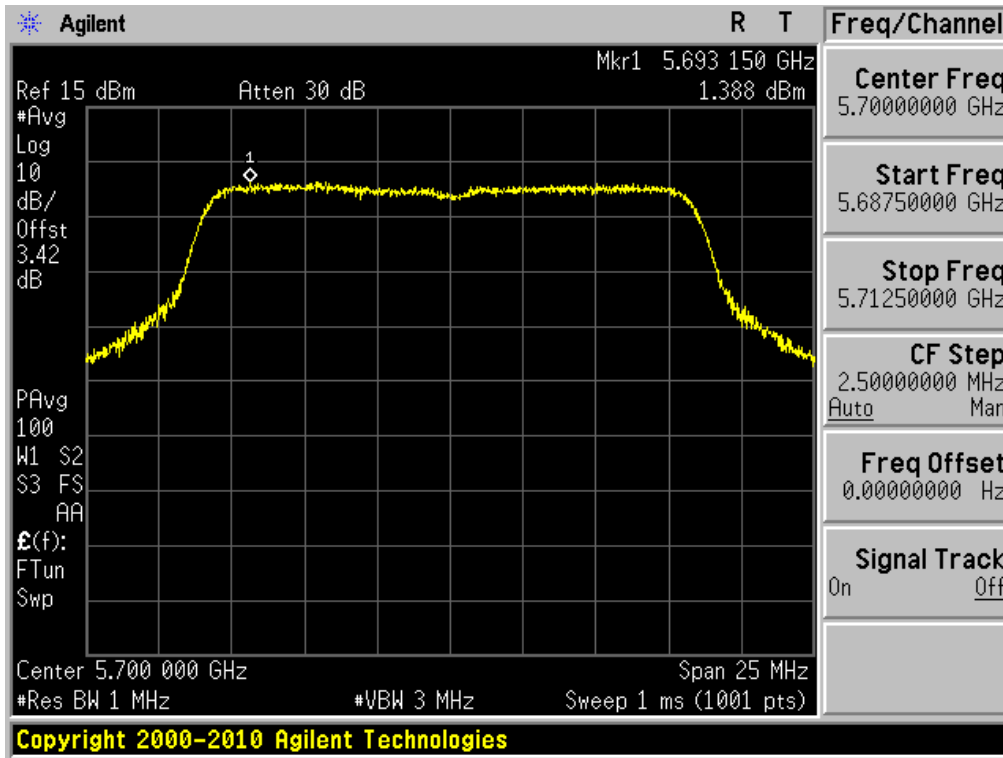
Peak Power Spectral Density

Test Mode: 802.11a & Ch.116



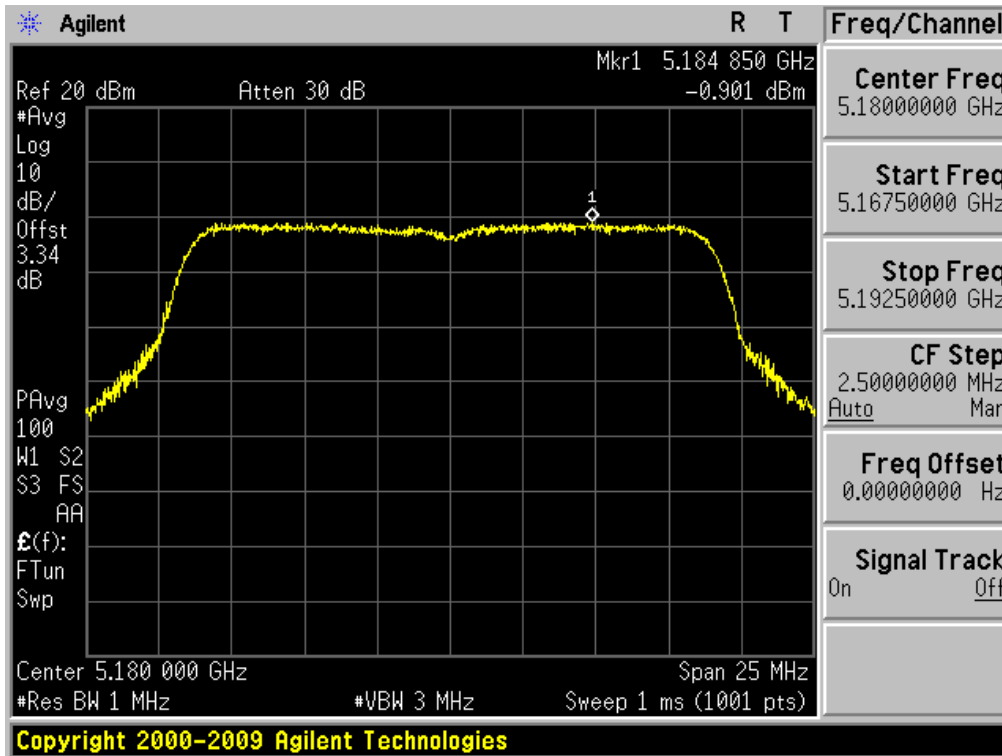
Peak Power Spectral Density

Test Mode: 802.11a & Ch.140



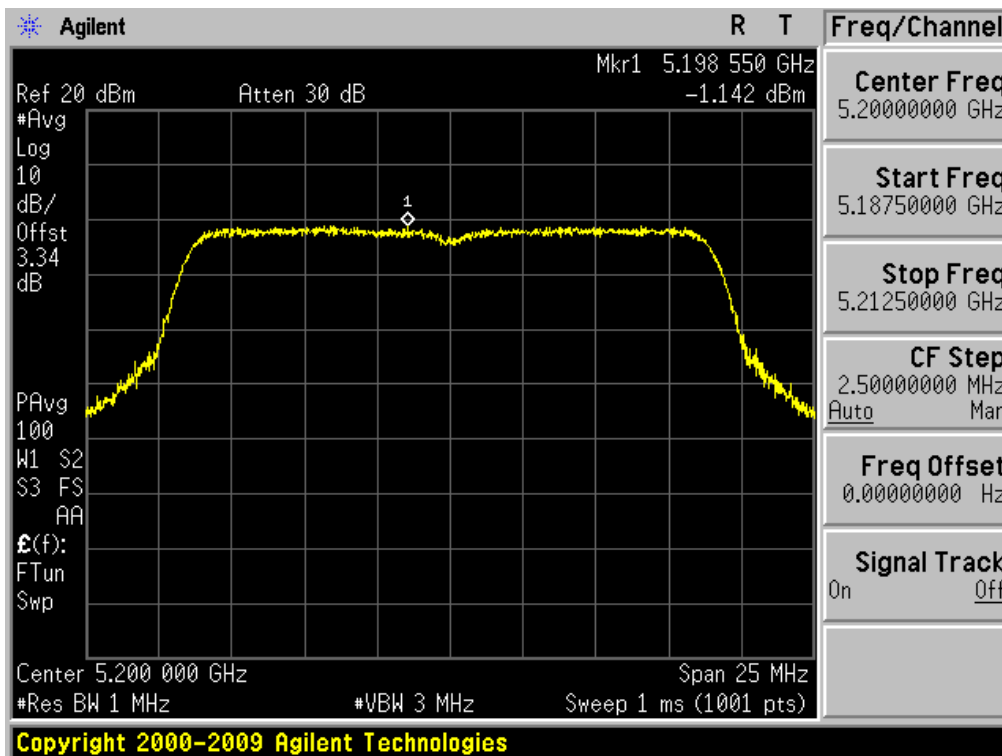
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.36



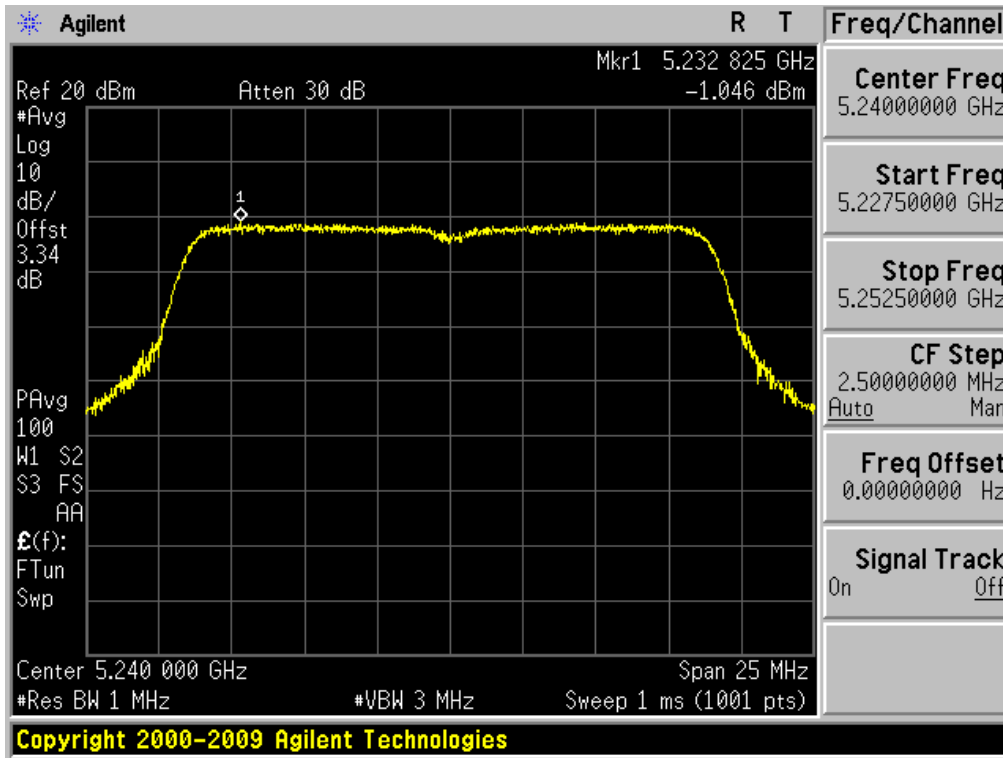
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.40



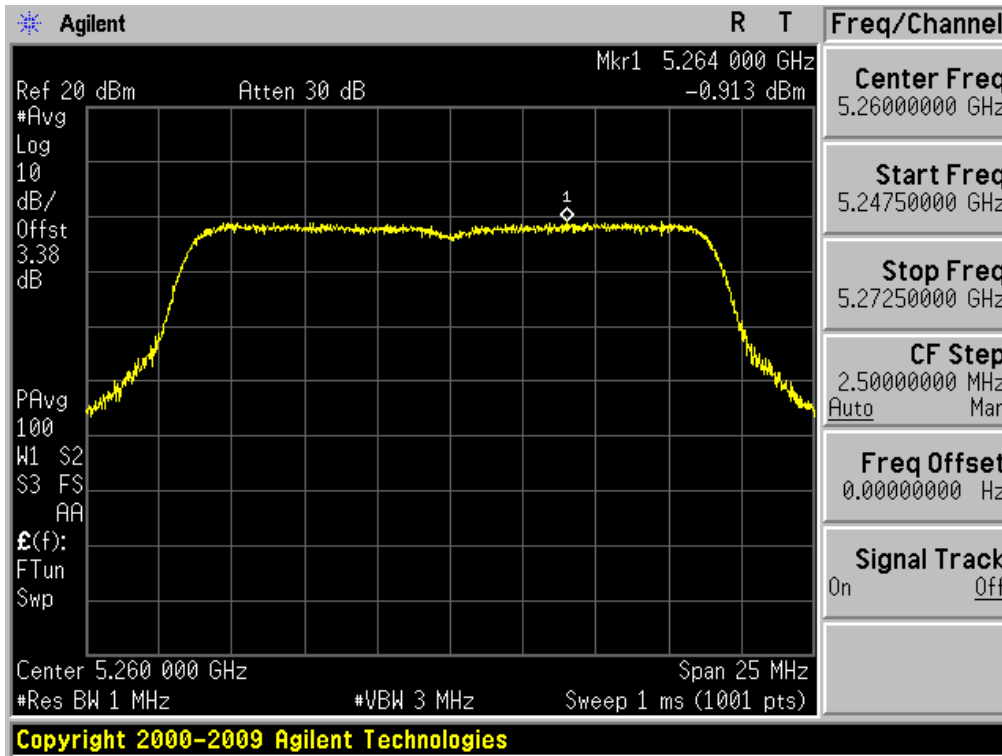
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.48



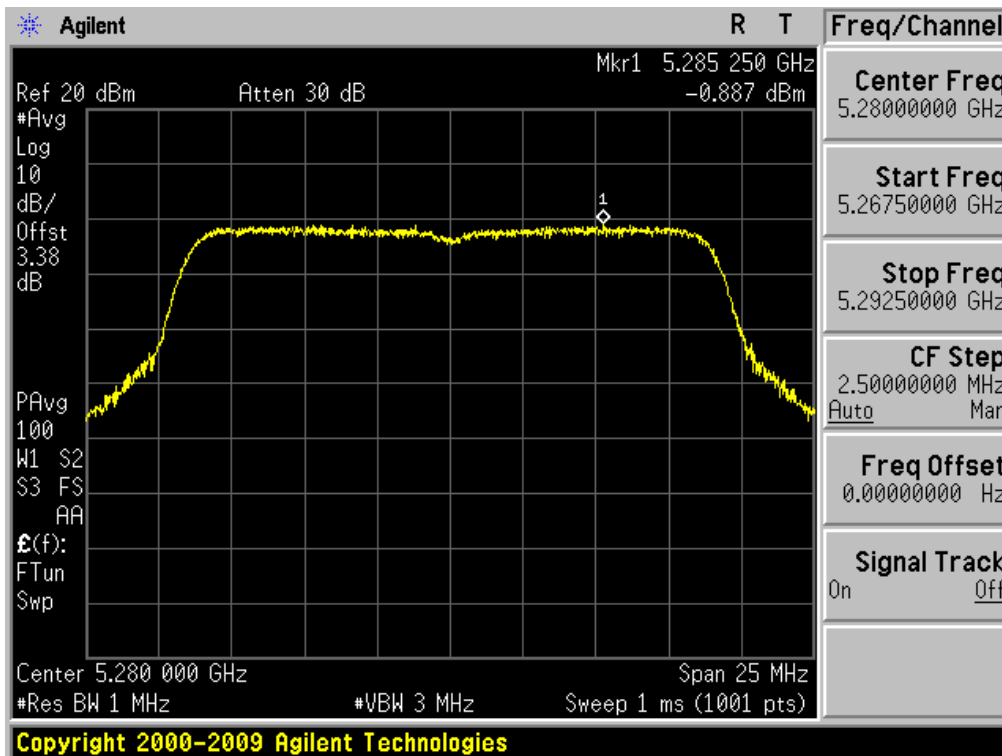
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.52



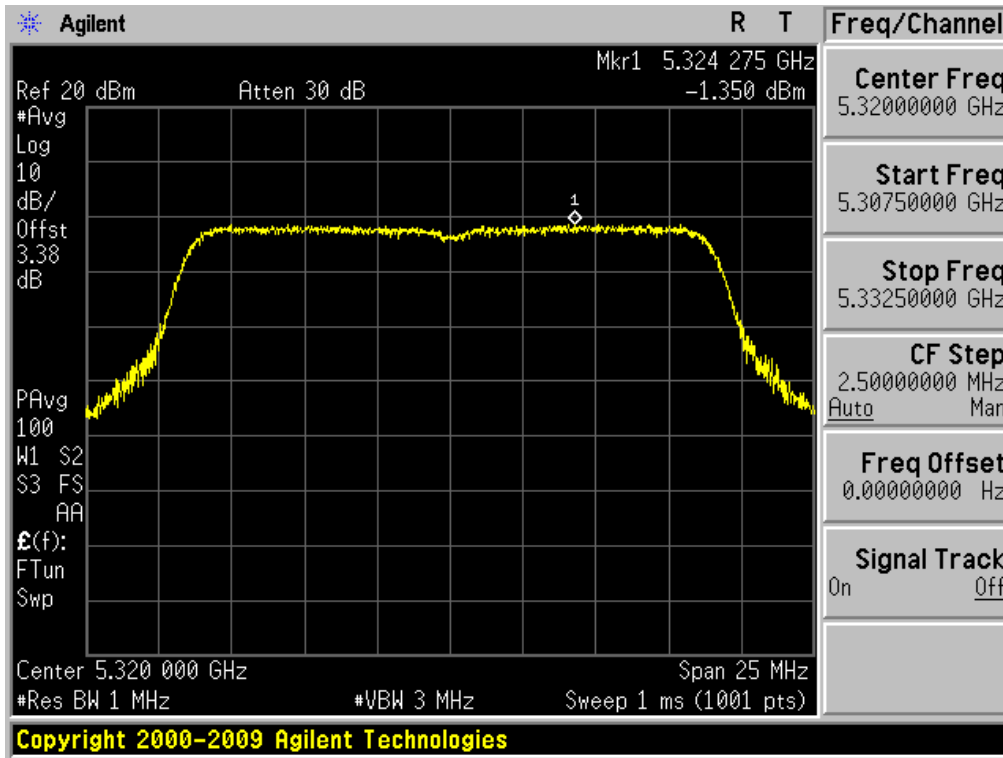
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.56



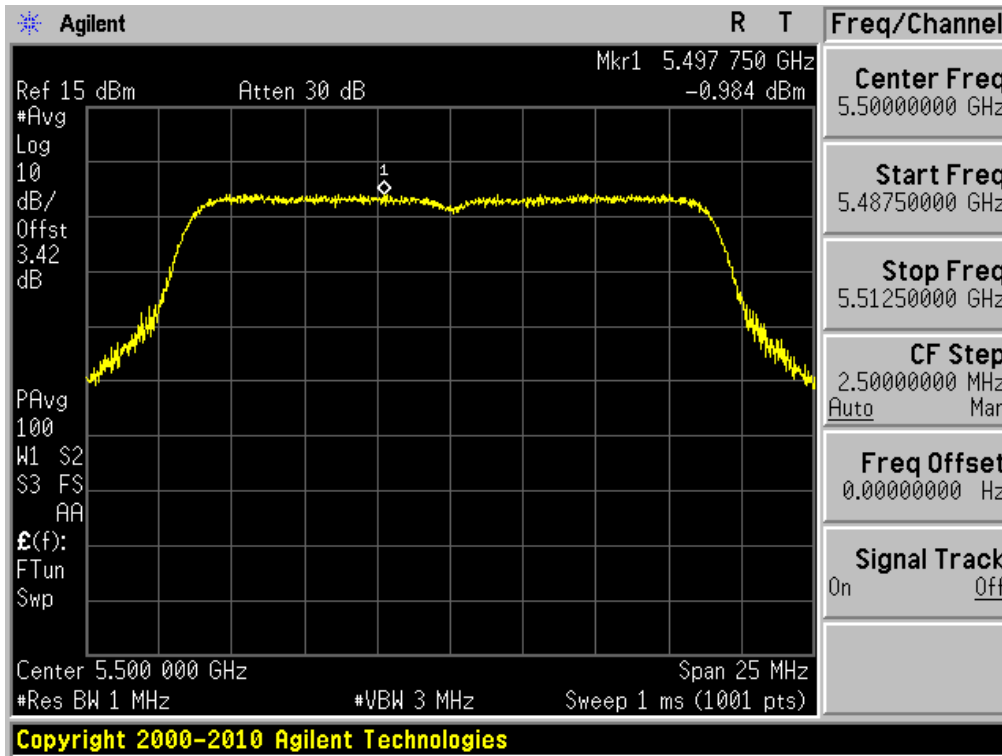
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.64



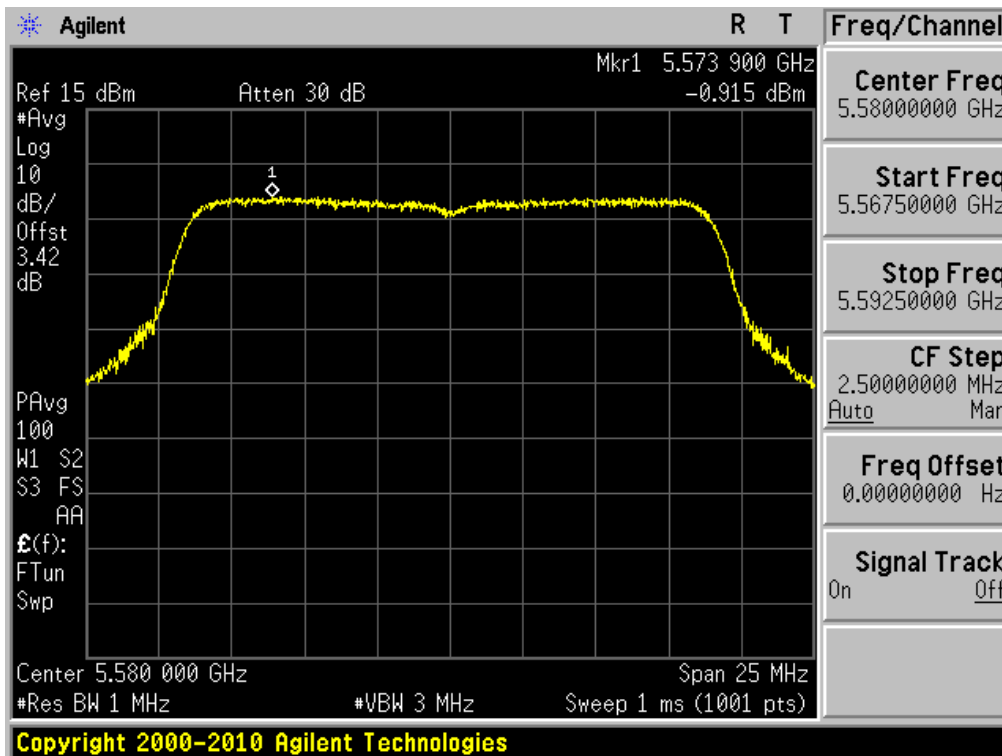
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.100



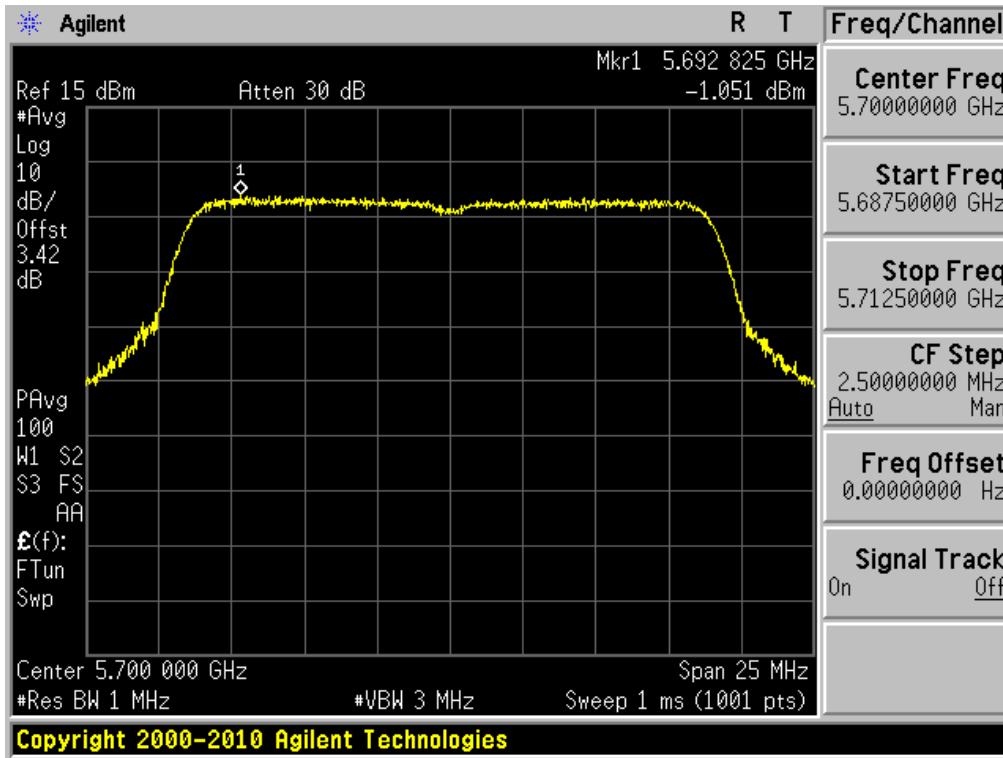
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.116



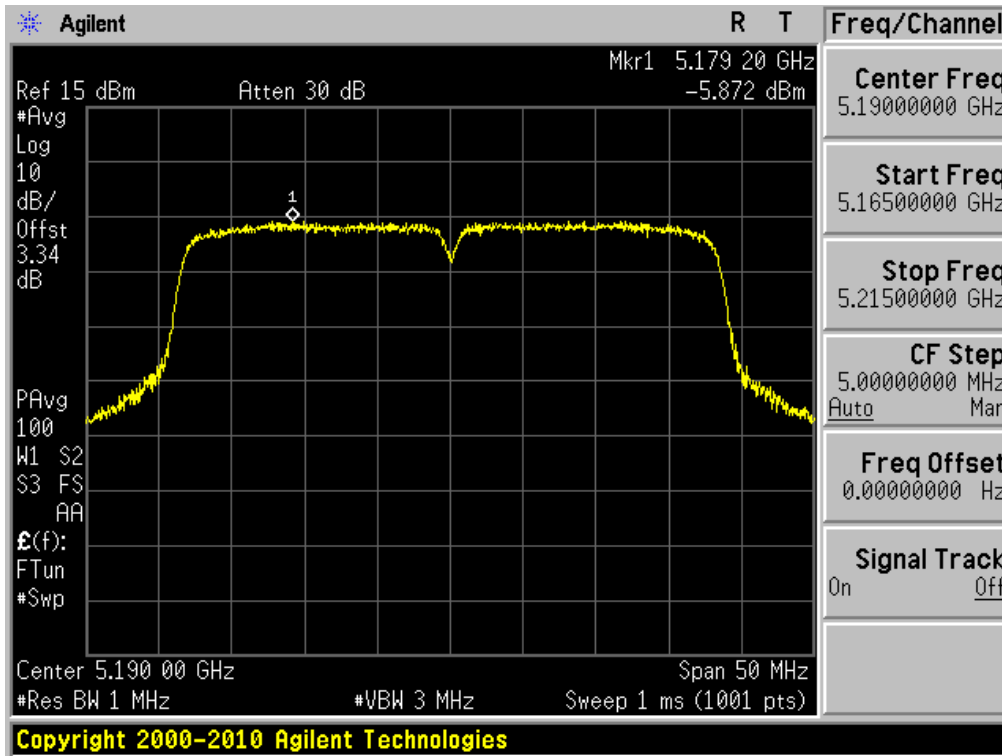
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.140



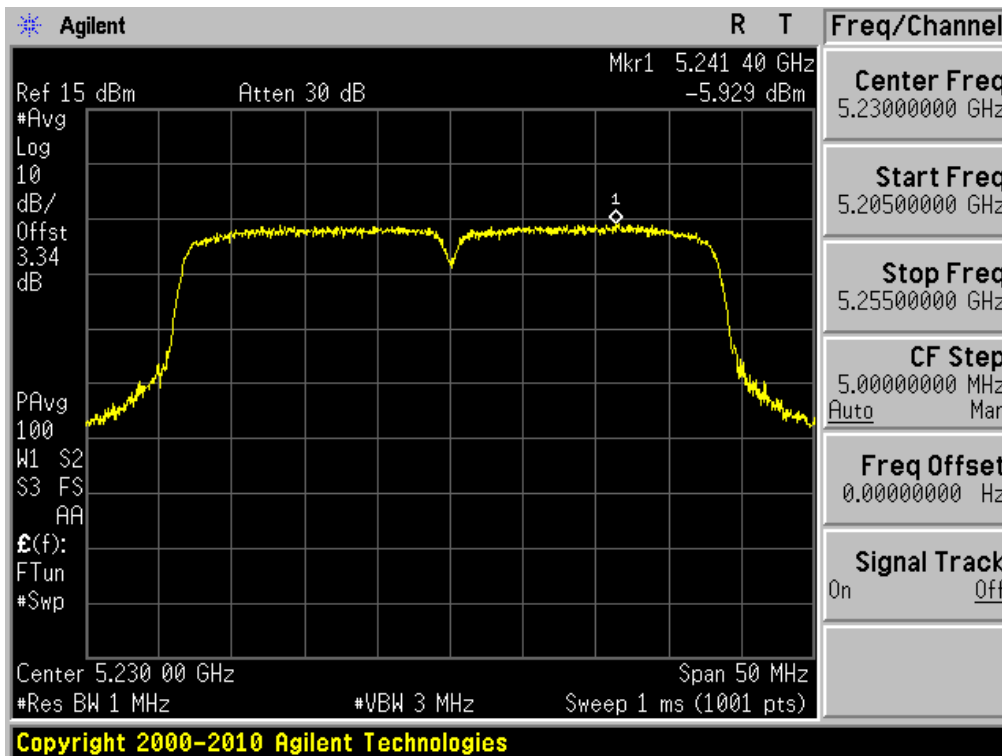
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.38



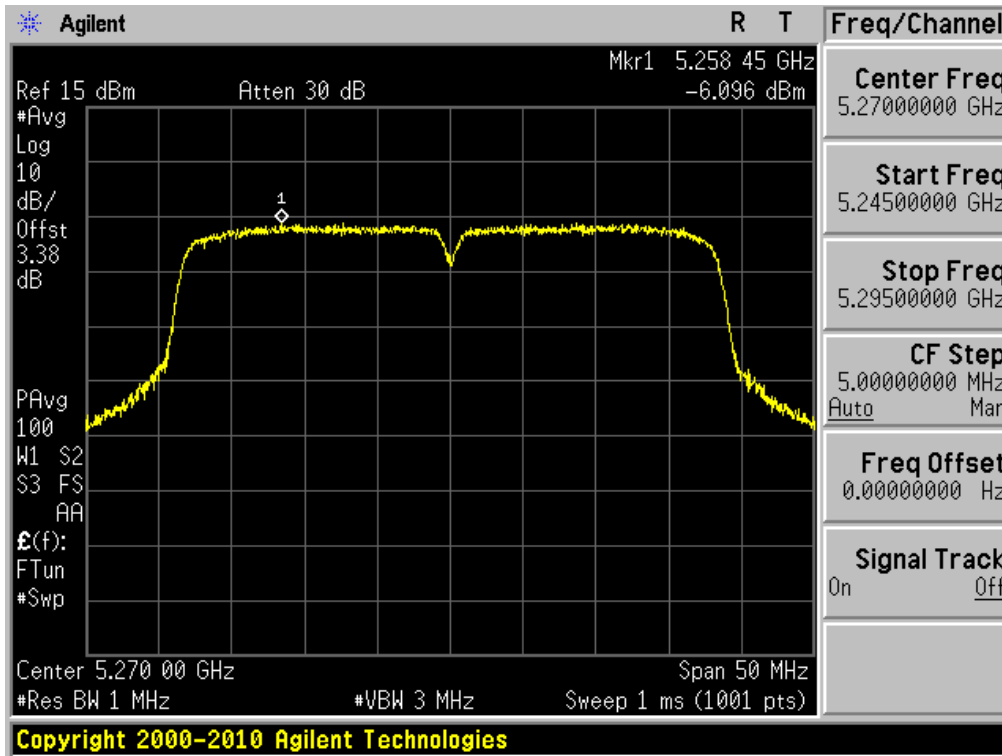
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.46



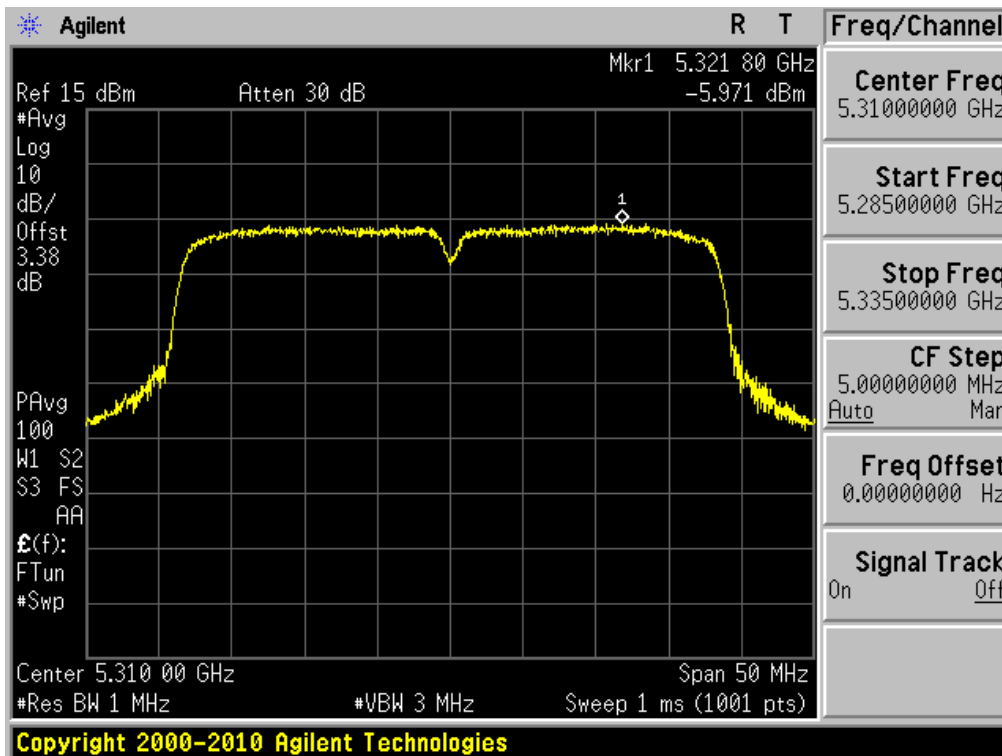
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.54



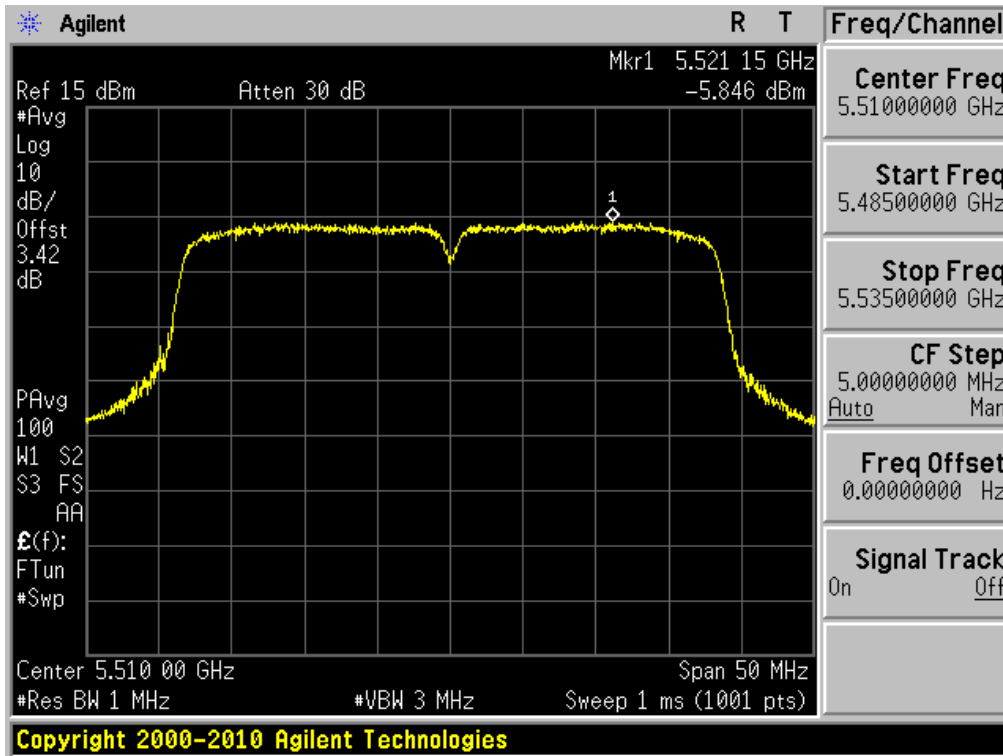
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.62



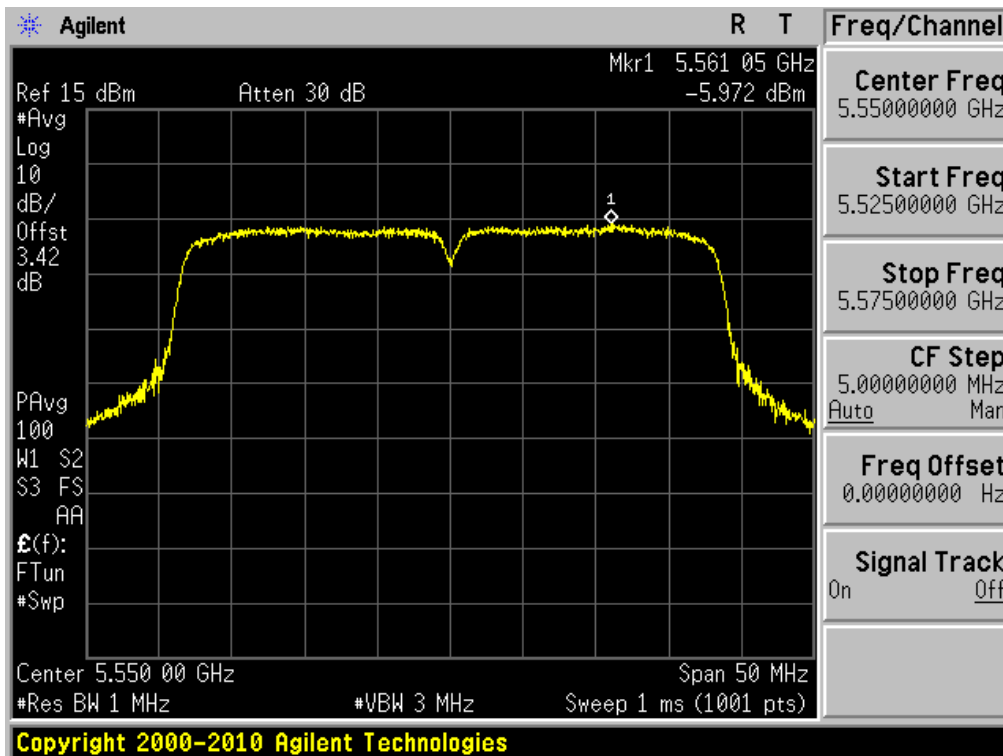
Peak Power Spectral Density

Test Mode: 802.11n HT40 & Ch.102



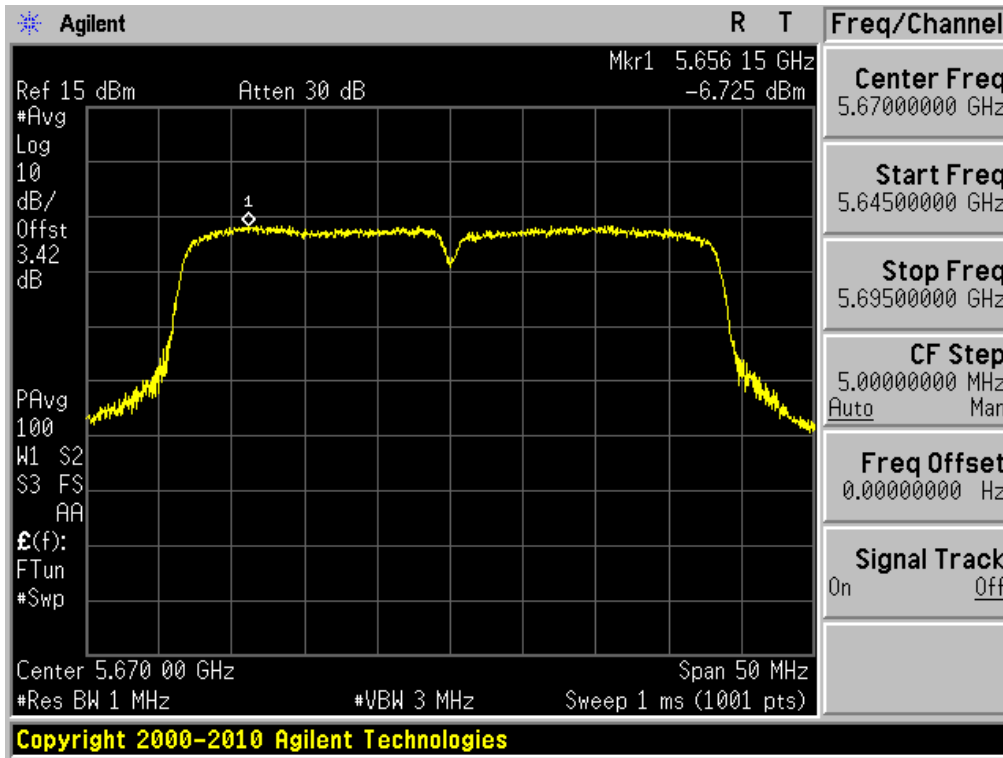
Peak Power Spectral Density

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.

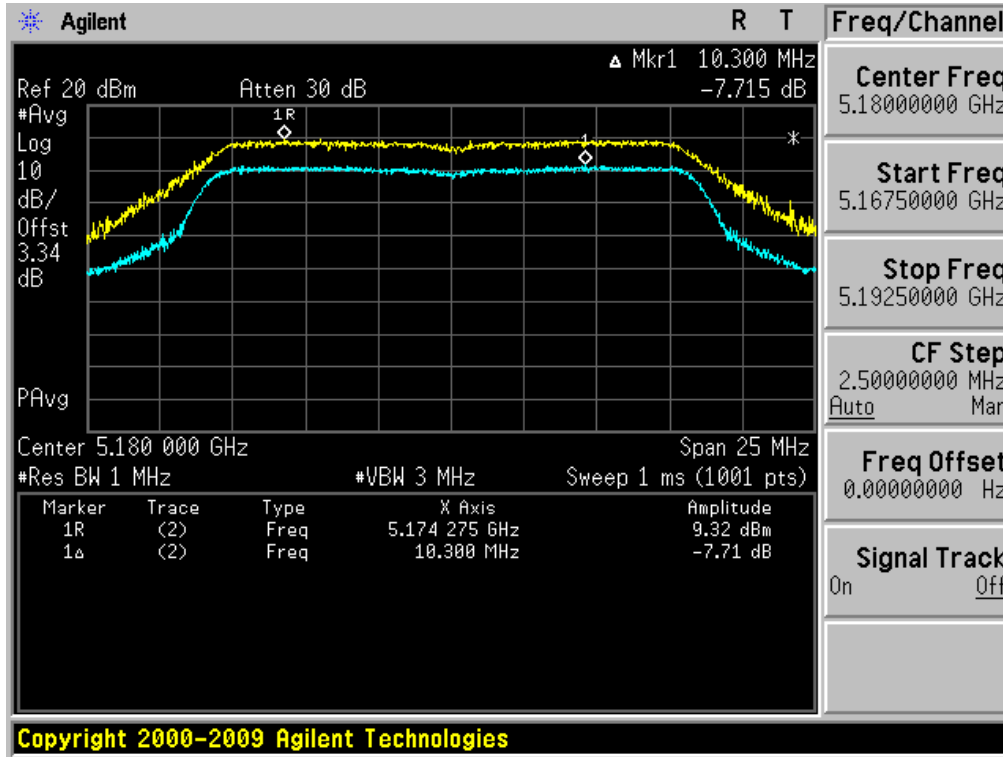
■ TEST RESULT : **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [dB/MHz]	Limit [dB/MHz]
802.11a	Band I	36	5180	7.715	13.000
		40	5200	7.550	
		48	5240	8.255	
	Band II	52	5260	8.325	
		56	5280	8.303	
		64	5320	8.085	
	Band III	100	5500	7.295	
		116	5580	8.342	
		140	5700	8.408	
802.11n (20MHz)	Band I	36	5180	8.158	
		40	5200	8.509	
		48	5240	8.974	
	Band II	52	5260	8.001	
		56	5280	8.154	
		64	5320	7.782	
	Band III	100	5500	8.024	
		116	5580	8.498	
		140	5700	8.976	
802.11n (40MHz)	Band I	38	5190	7.998	
		46	5230	7.745	
	Band II	54	5270	8.340	
		62	5310	8.595	
	Band III	102	5510	8.628	
		110	5550	8.667	
		134	5670	8.689	

Measurement Data PLOTS

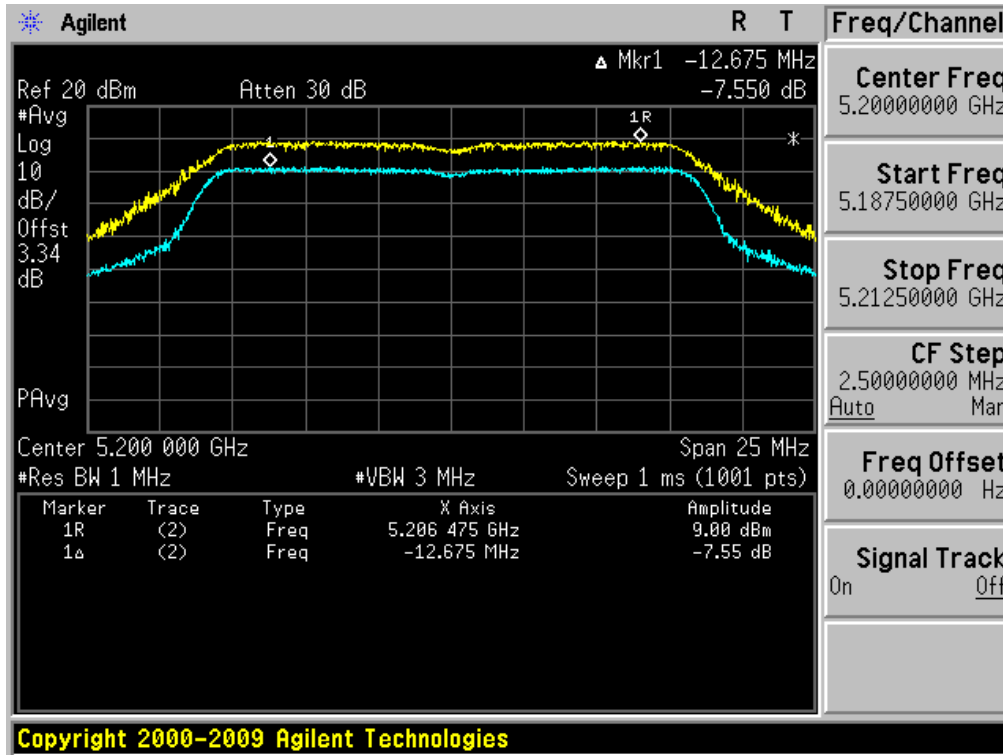
Peak Excursion Ratio

Test Mode: 802.11a & Ch.36



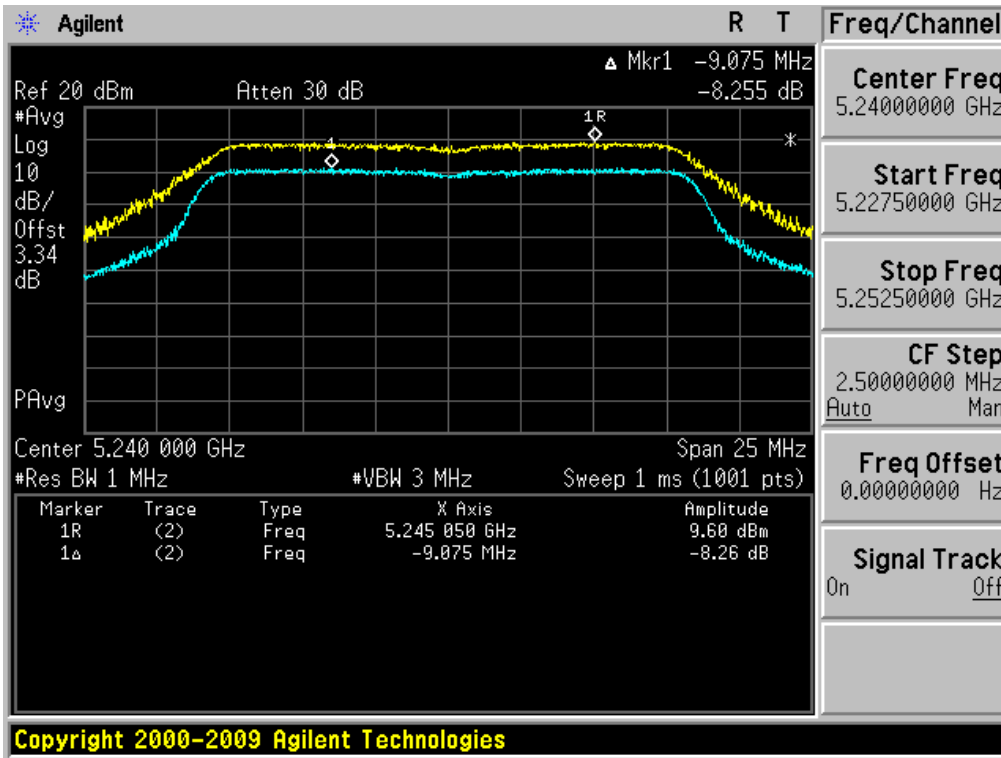
Peak Excursion Ratio

Test Mode: 802.11a & Ch.40



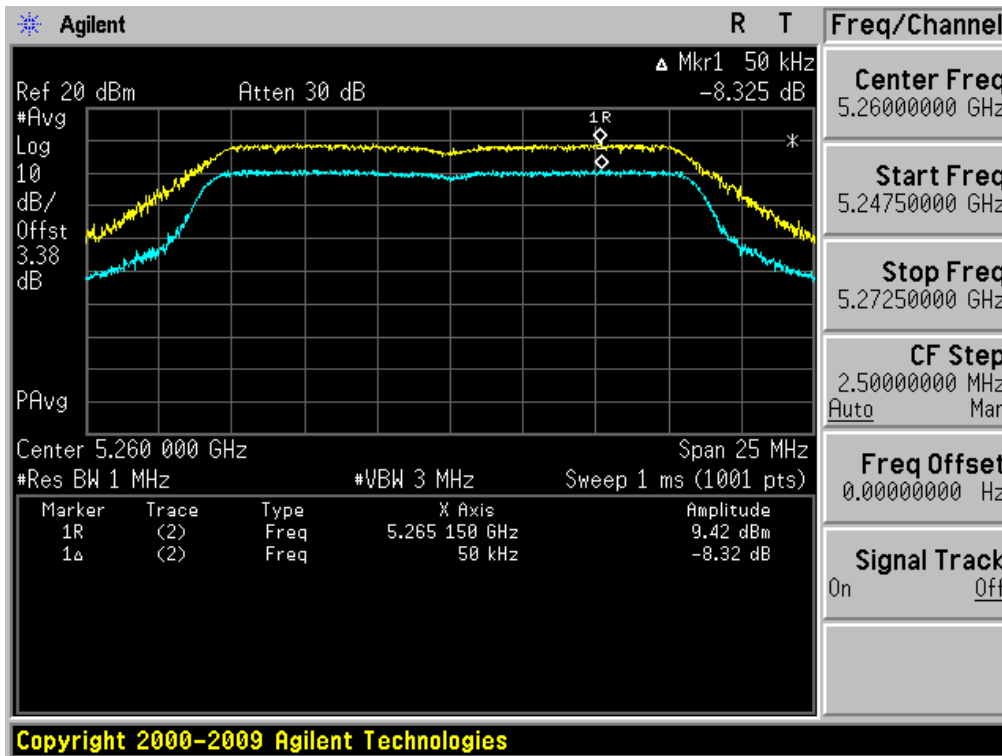
Peak Excursion Ratio

Test Mode: 802.11a & Ch.48



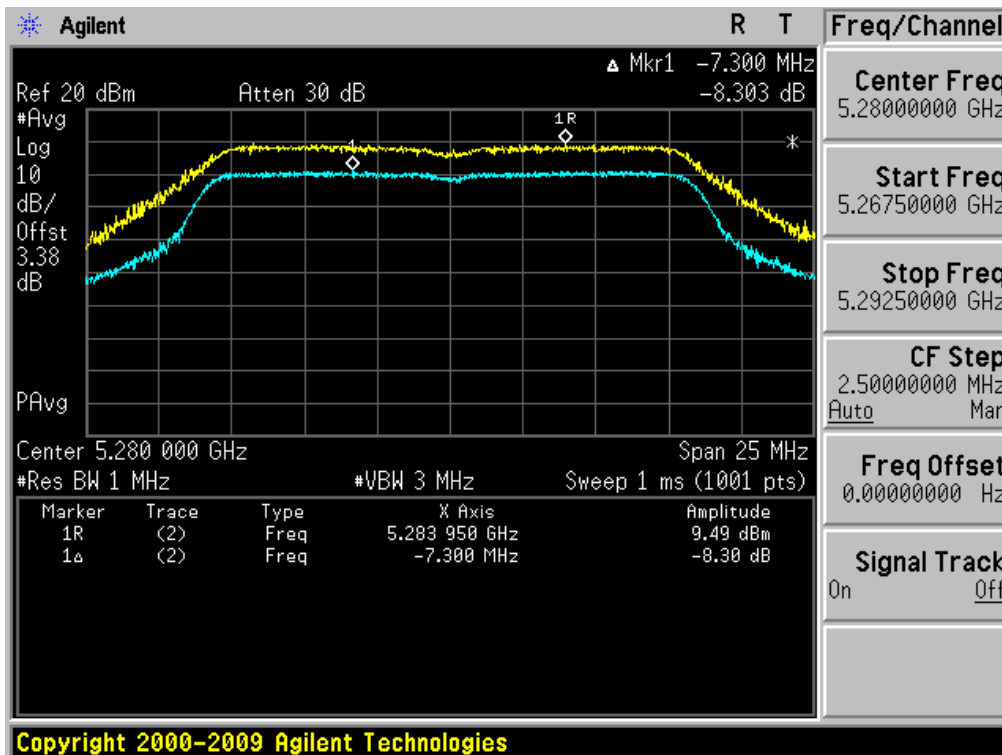
Peak Excursion Ratio

Test Mode: 802.11a & Ch.52



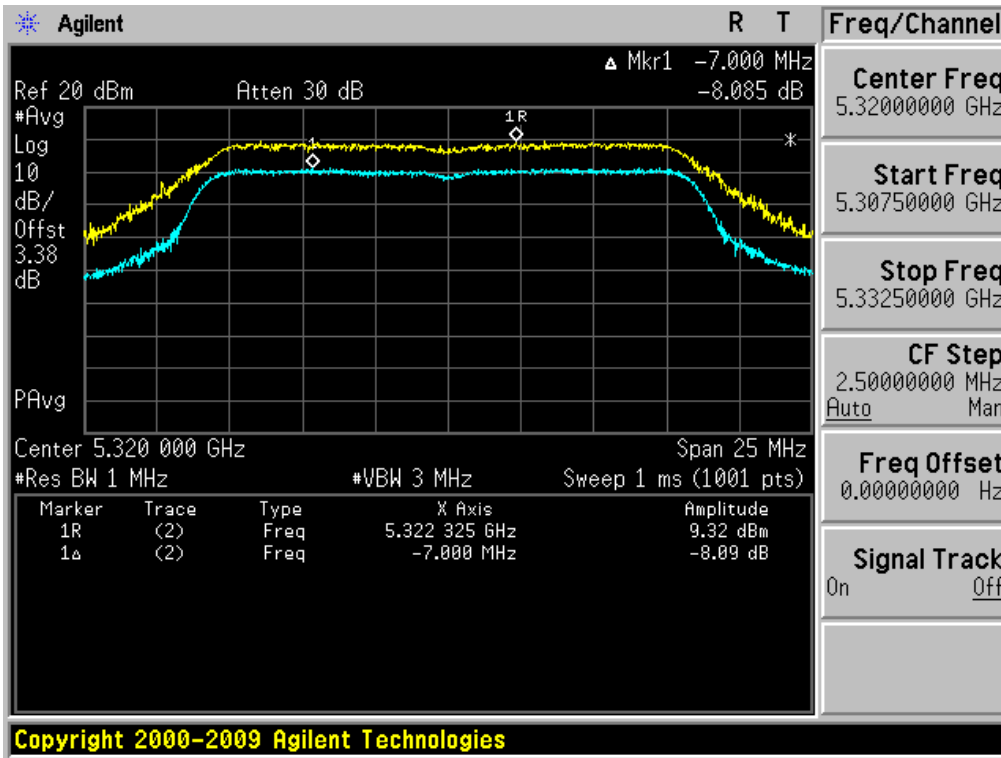
Peak Excursion Ratio

Test Mode: 802.11a & Ch.56



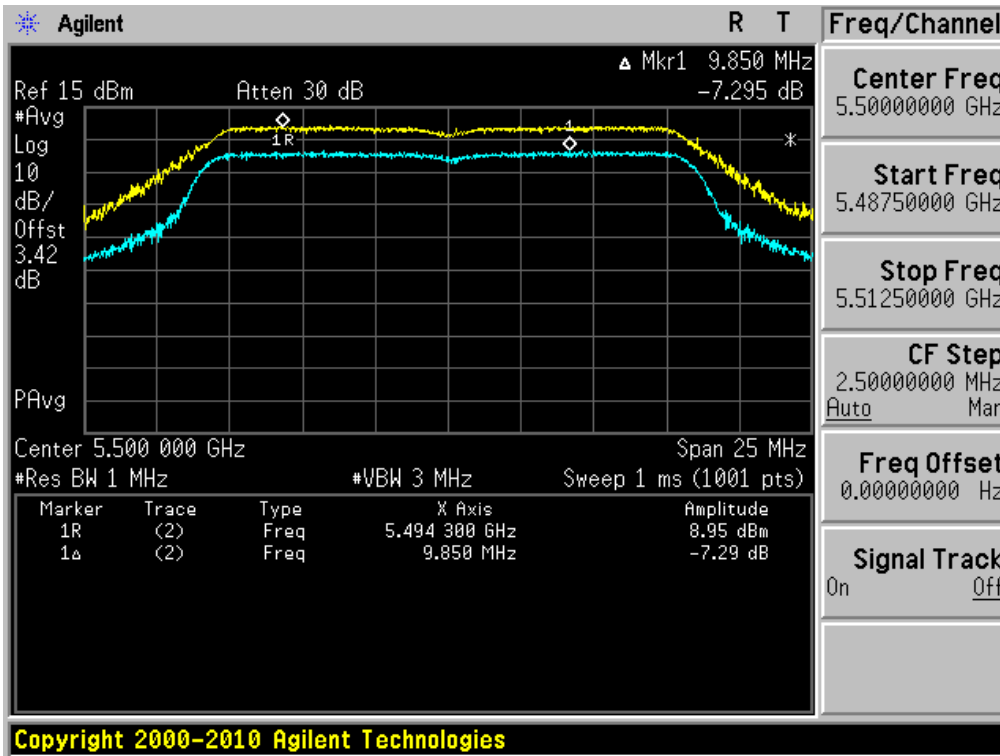
Peak Excursion Ratio

Test Mode: 802.11a & Ch.64



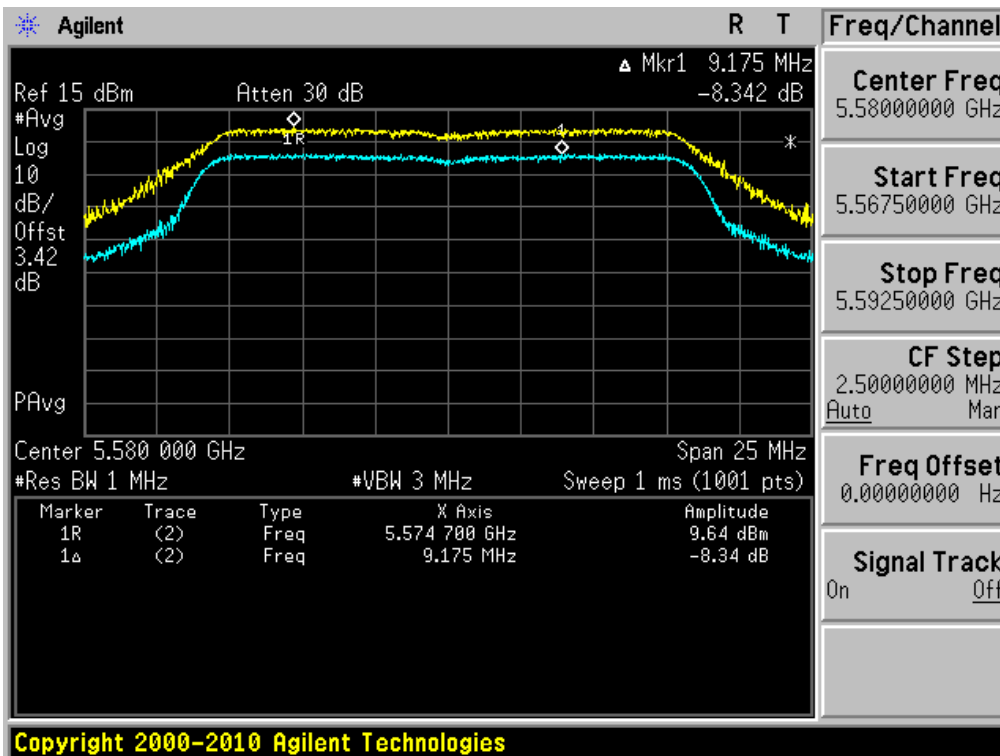
Peak Excursion Ratio

Test Mode: 802.11a & Ch.100



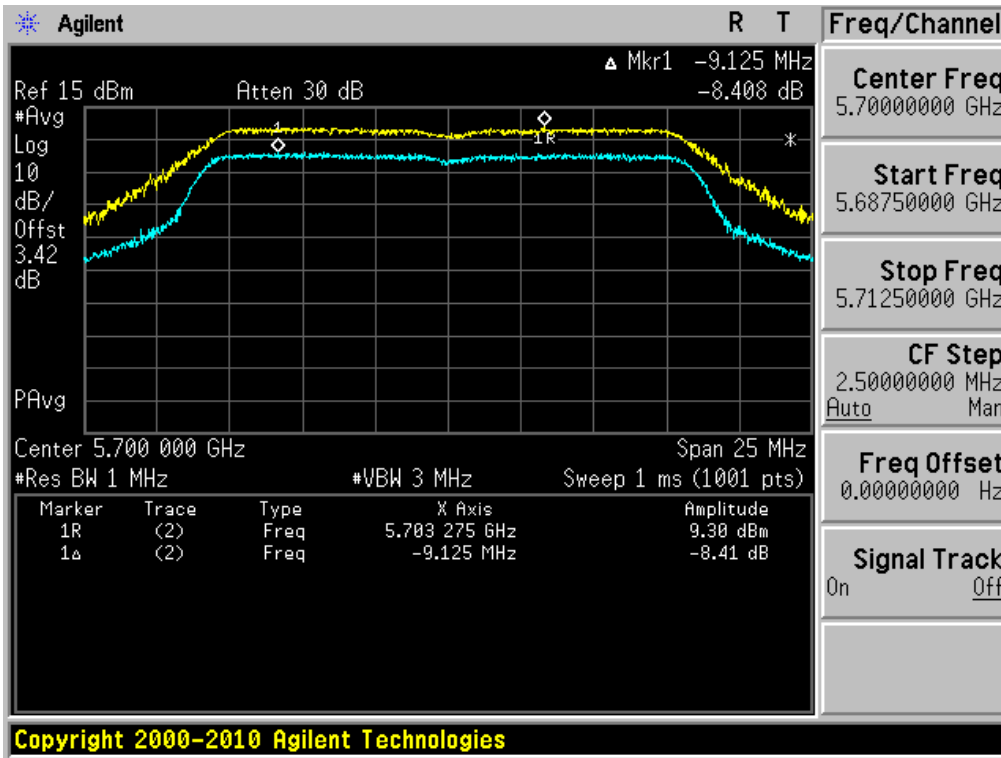
Peak Excursion Ratio

Test Mode: 802.11a & Ch.116



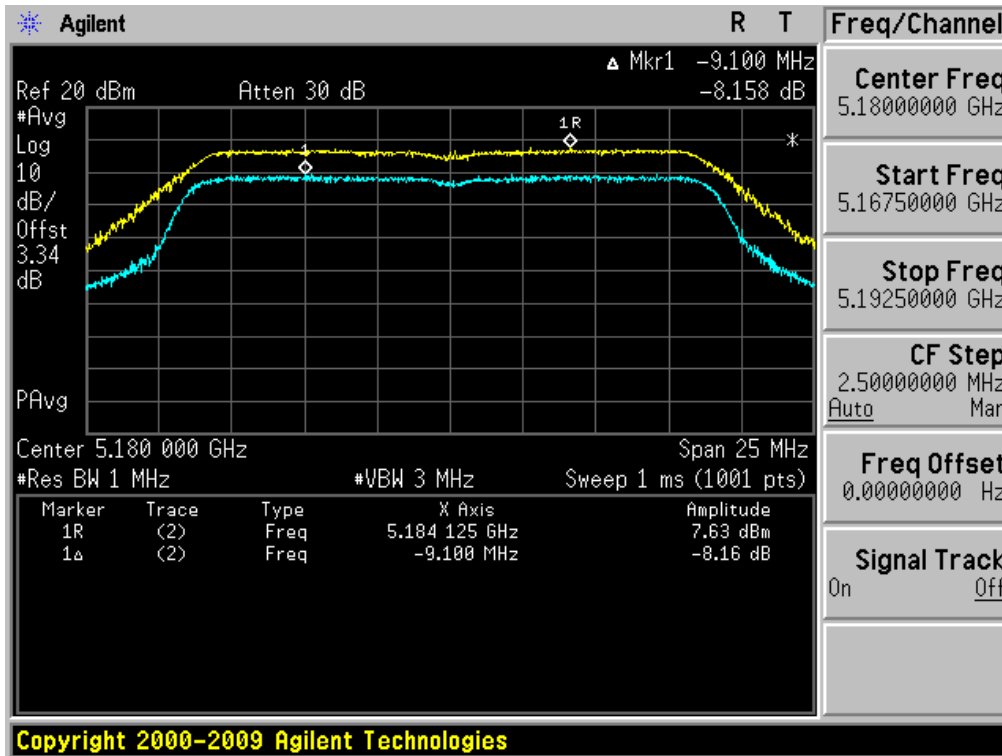
Peak Excursion Ratio

Test Mode: 802.11a & Ch.140



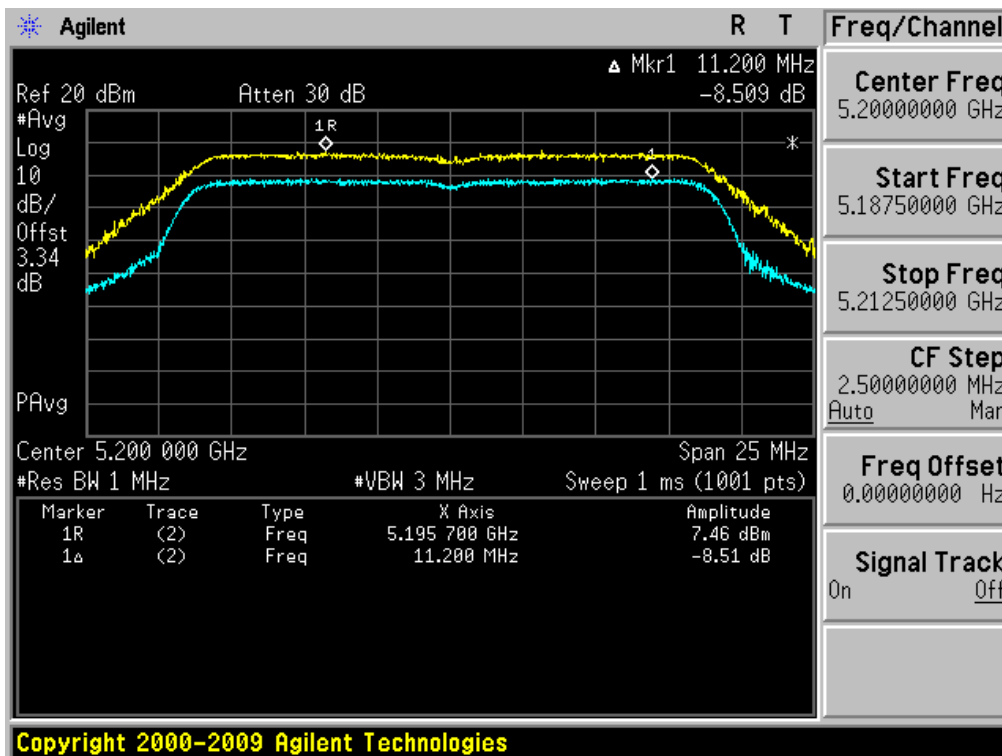
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.36



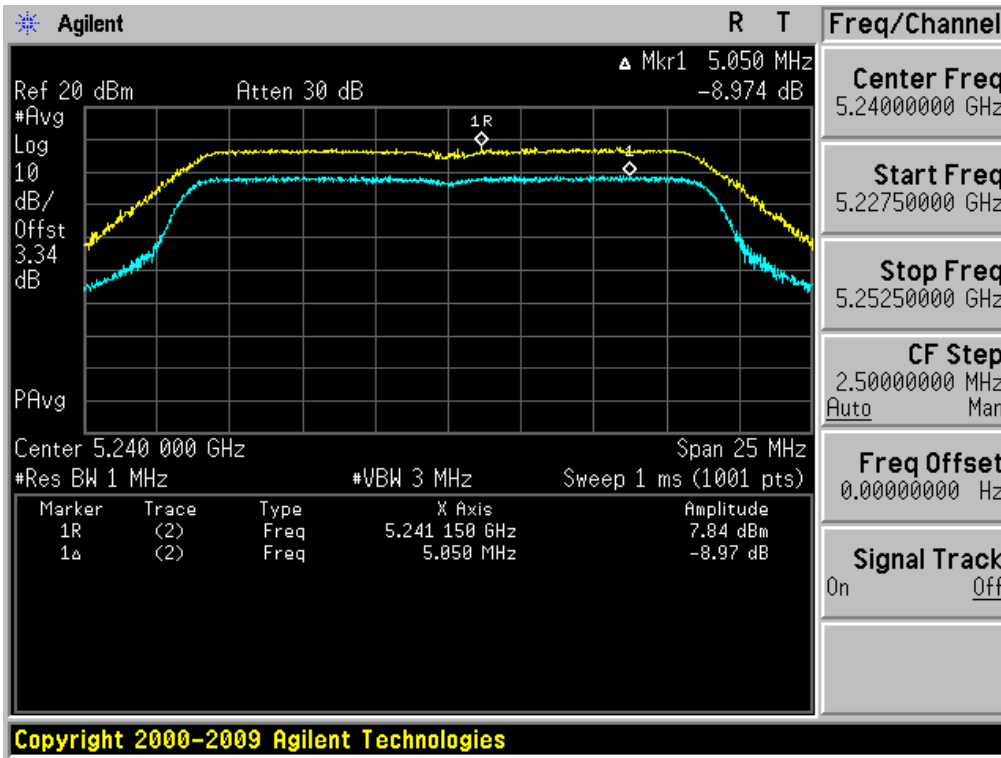
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.40



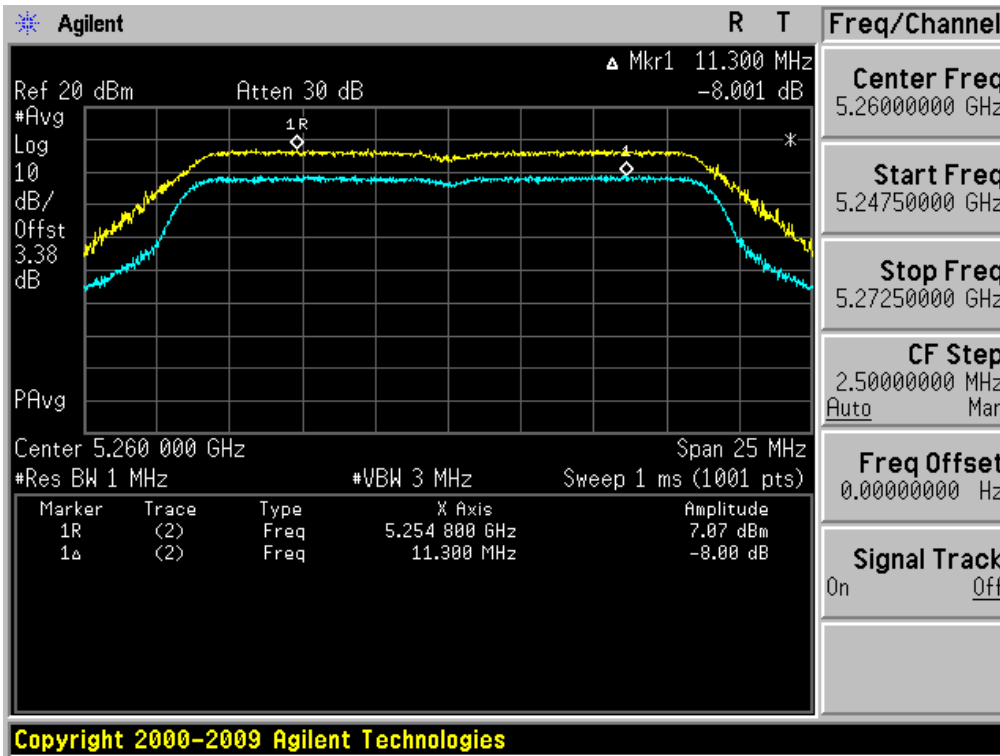
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.48



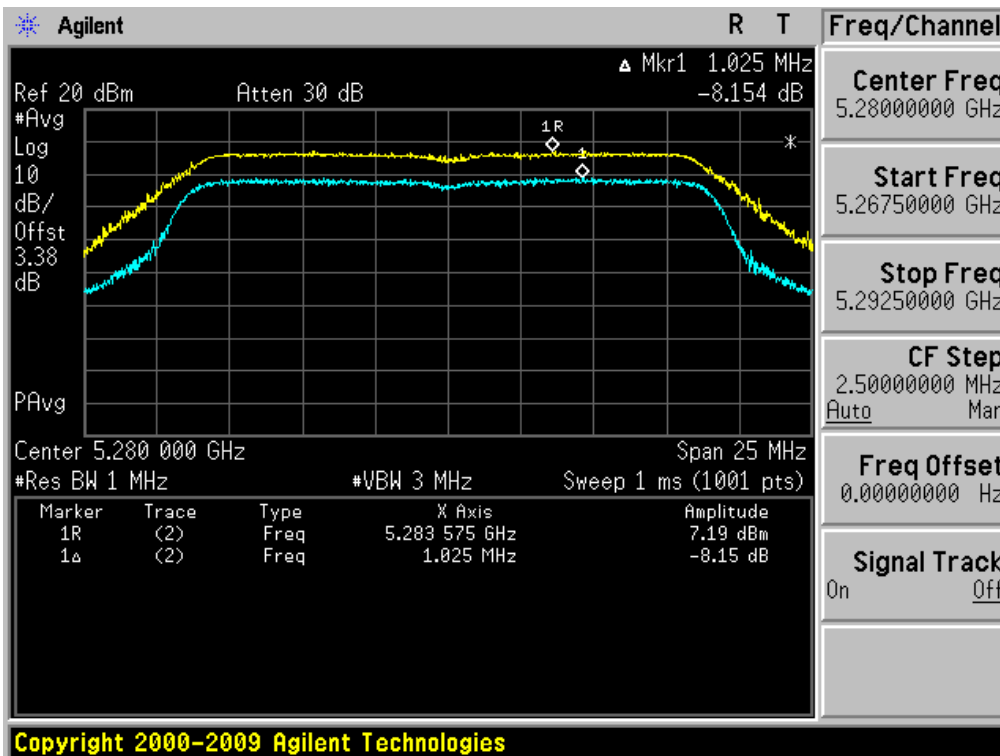
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.52



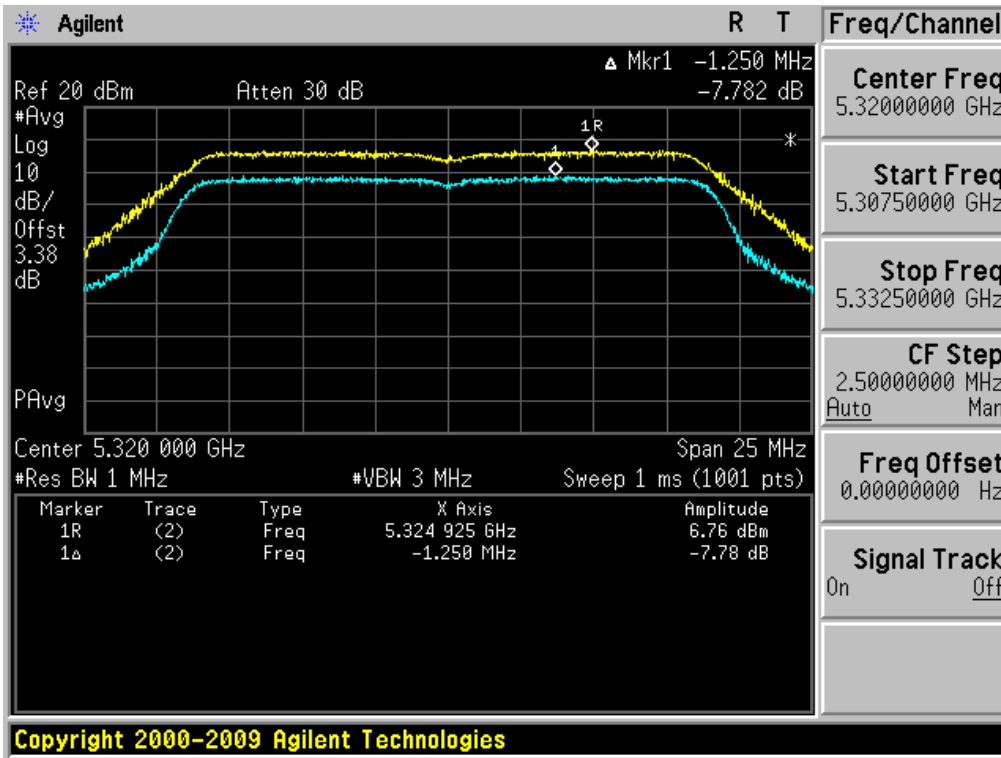
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.56



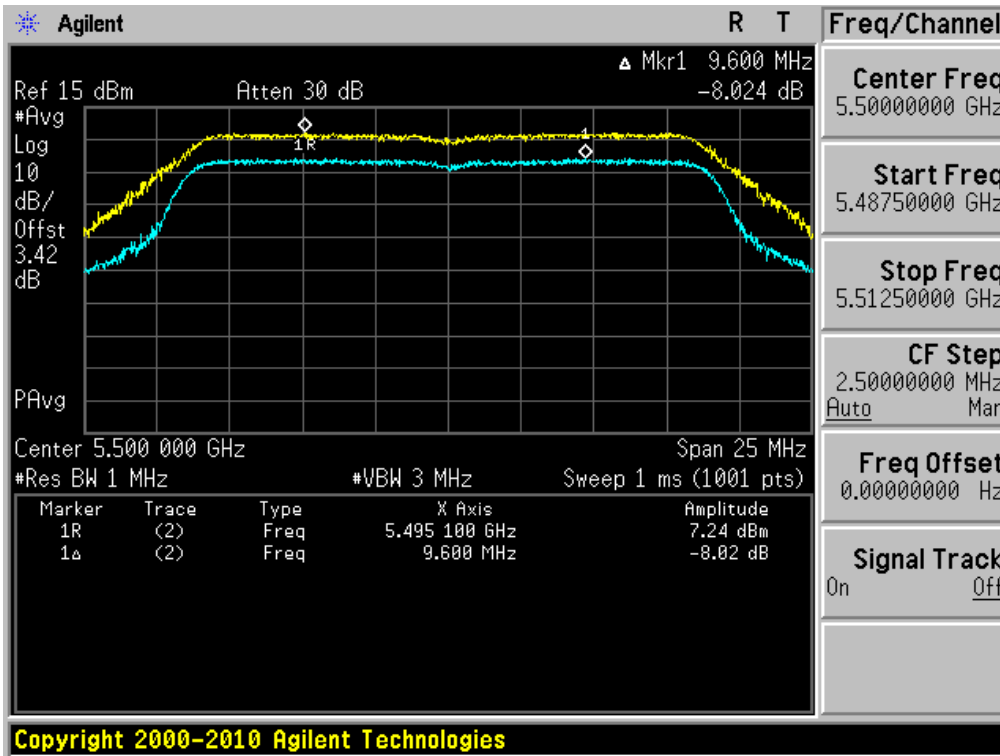
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.64



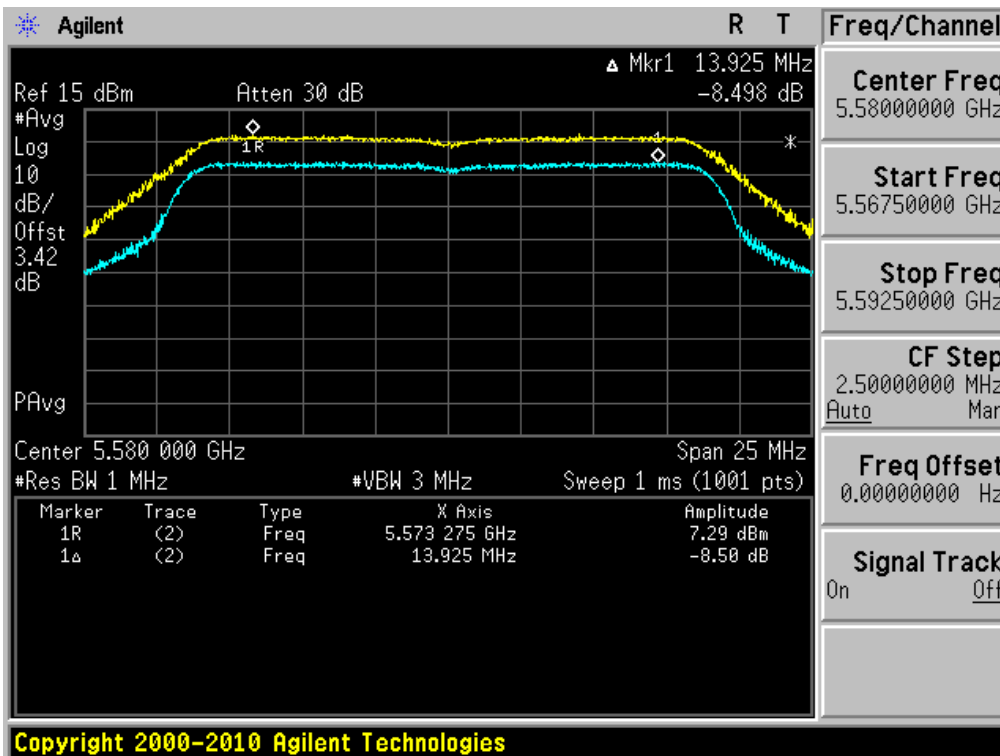
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.100



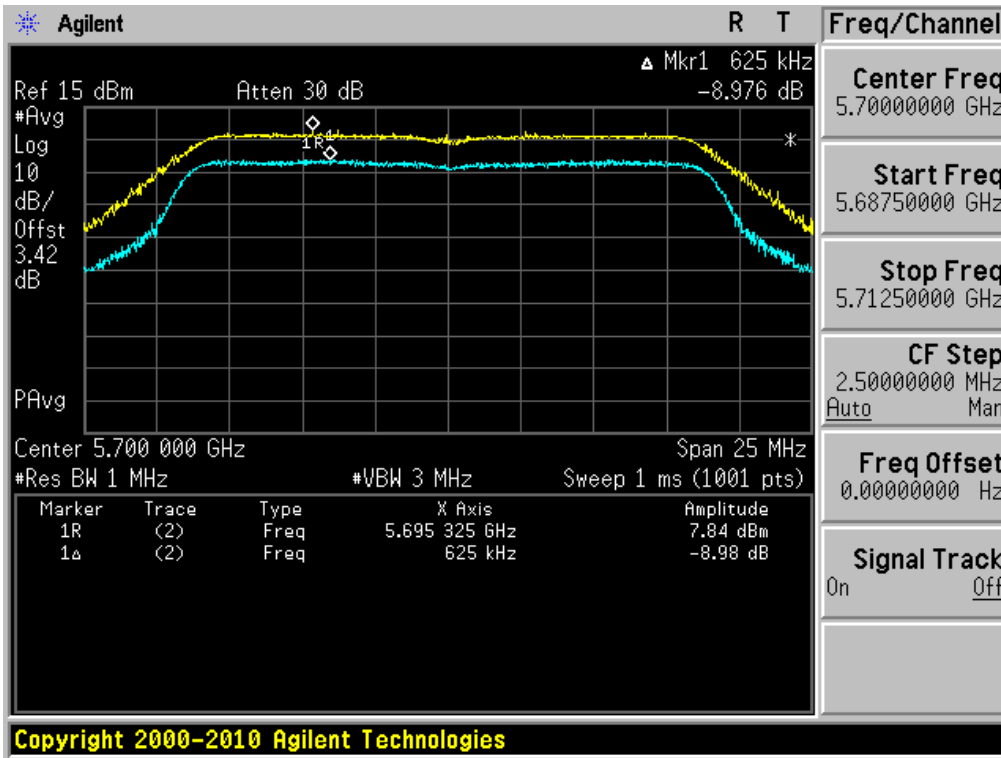
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.116



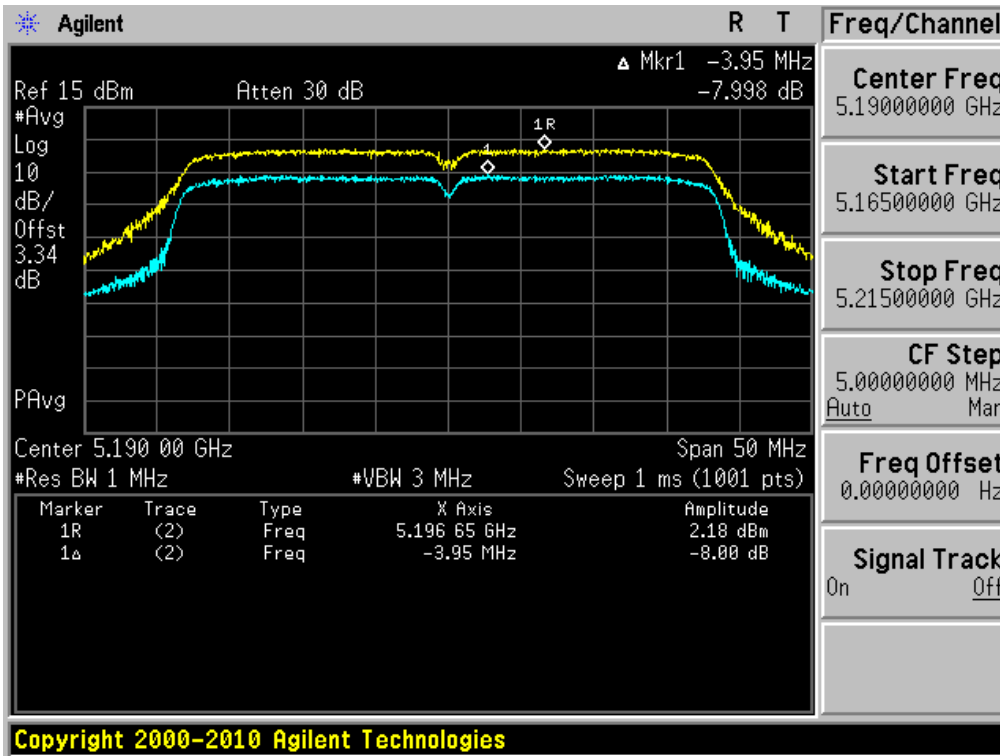
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.140



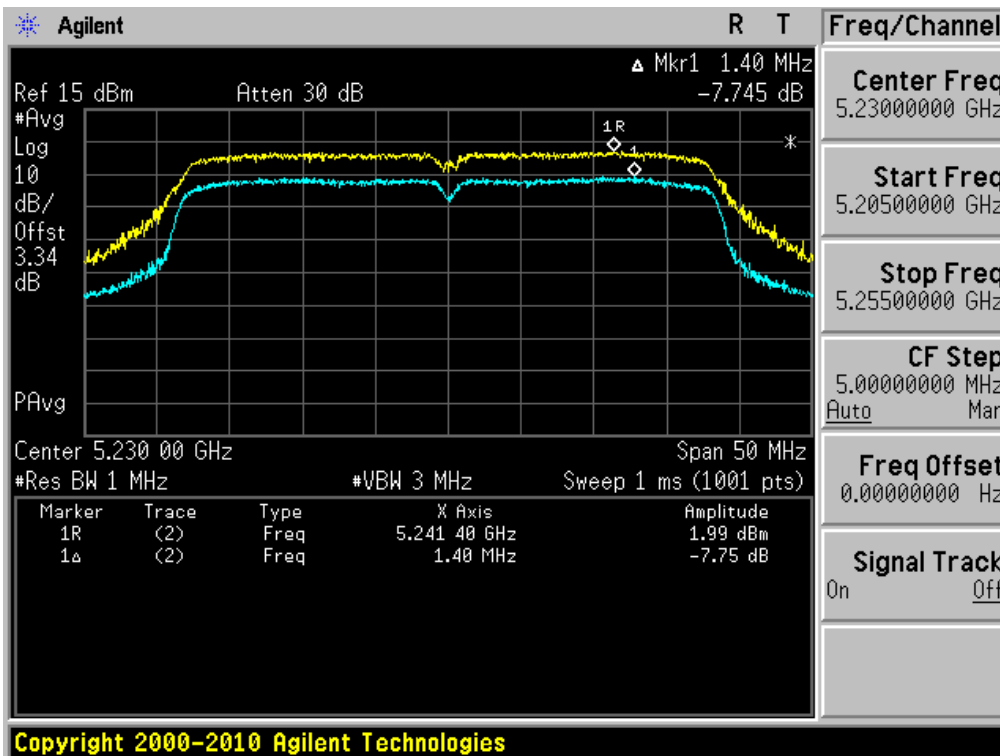
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.38



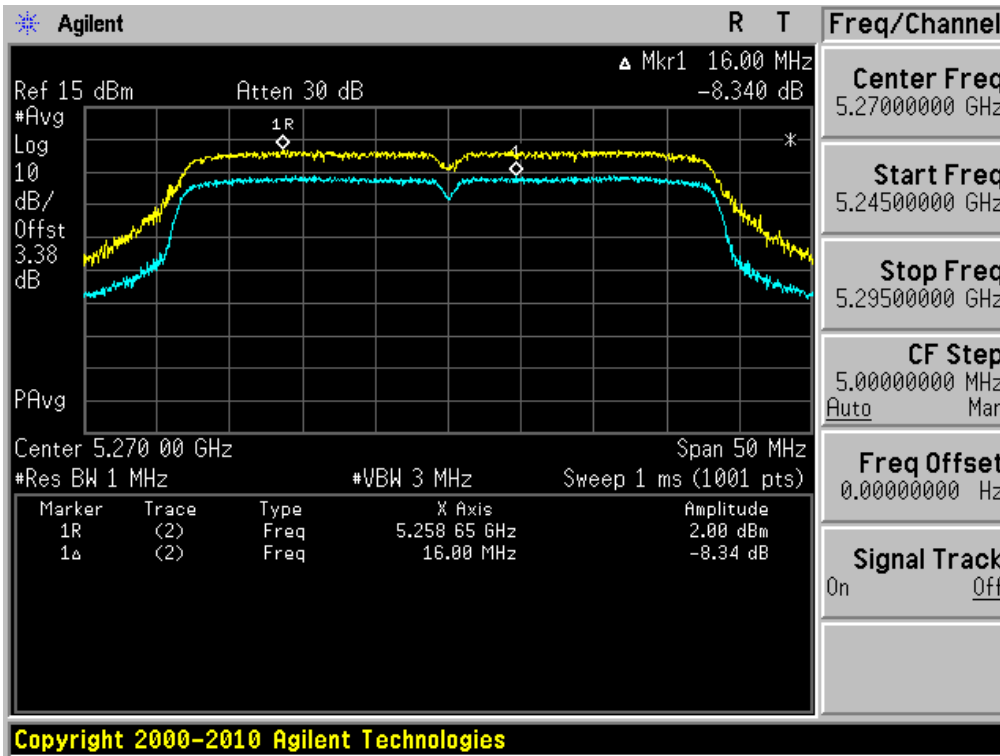
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.46



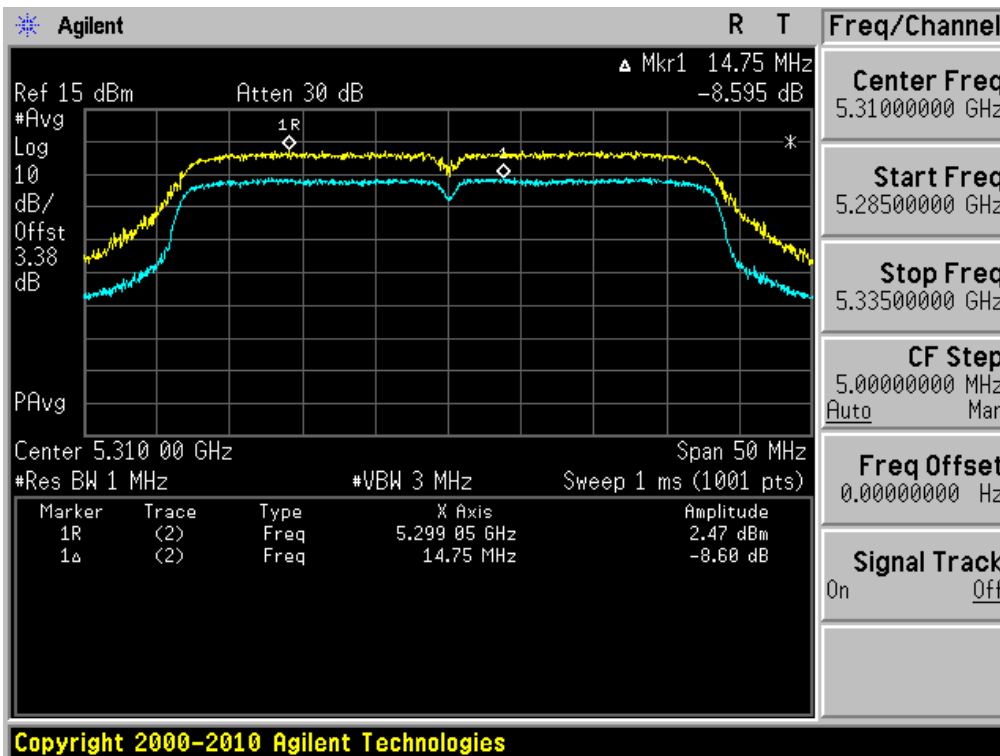
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.54



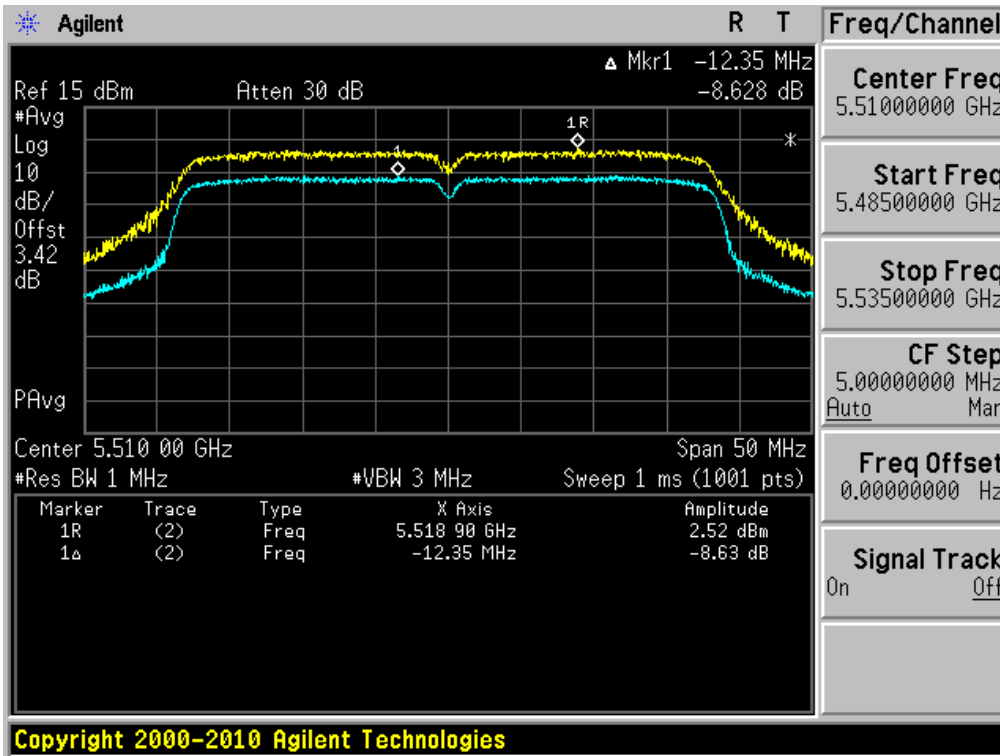
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.62



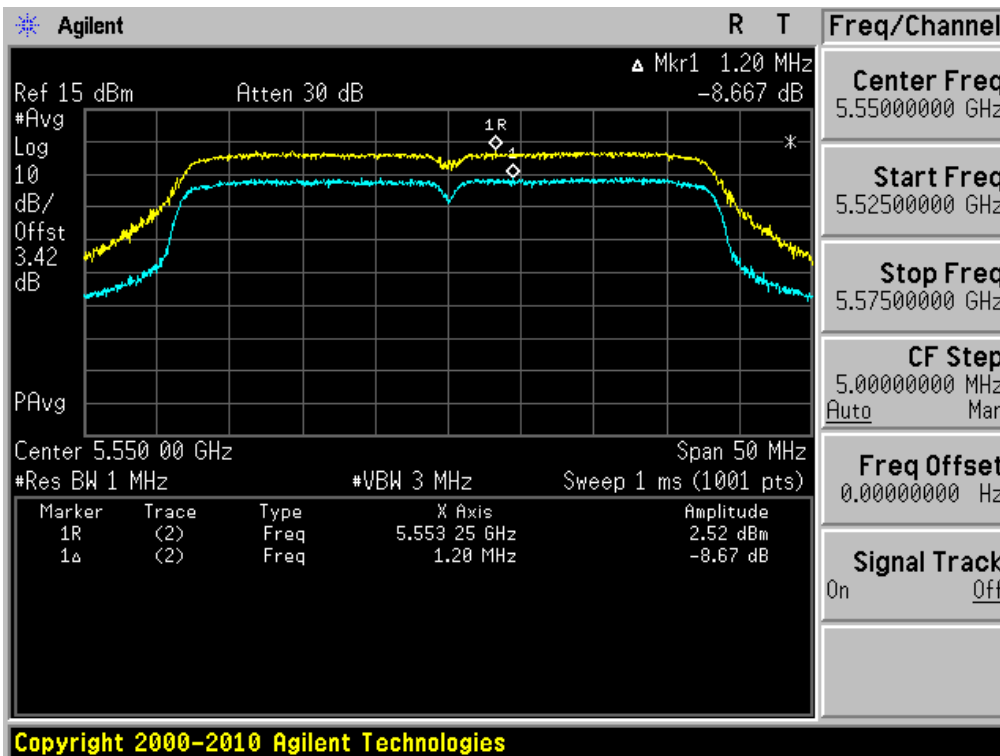
Peak Excursion Ratio

Test Mode: 802.11n HT40 & Ch.102



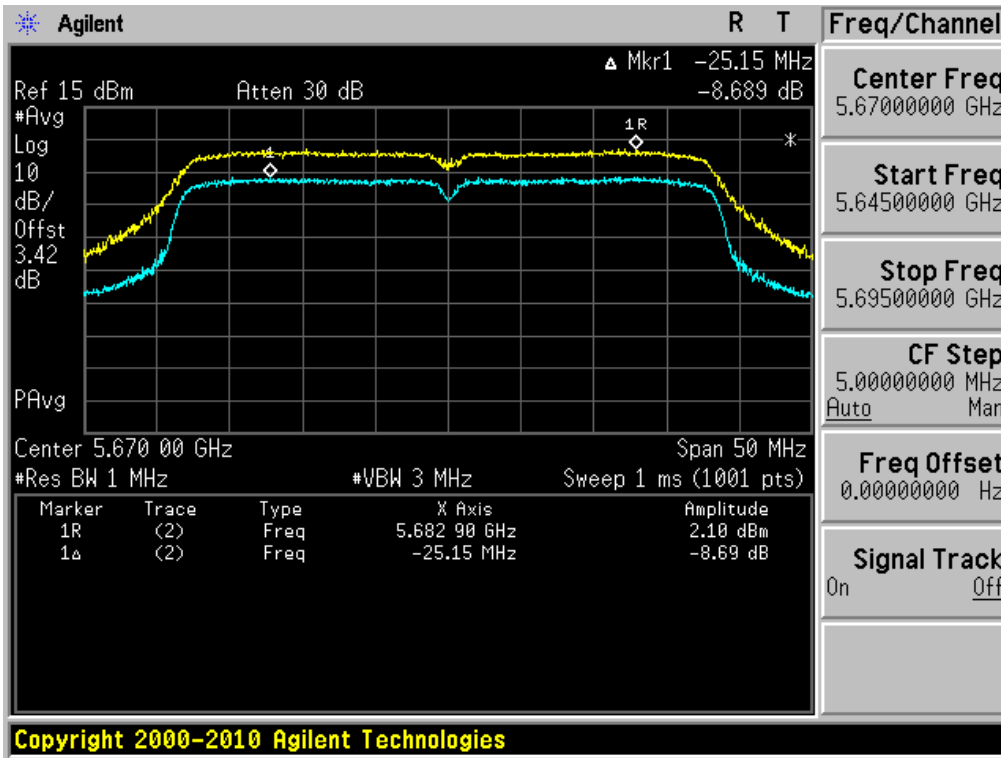
Peak Excursion Ratio

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 : 5,180,000,000 Hz
 CHANNEL : 36
 REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,180,001,117	0.000022
100%		-30	5,180,081,394	0.001571
100%		-20	5,180,068,240	0.001317
100%		-10	5,180,050,278	0.000971
100%		0	5,180,032,442	0.000626
100%		+10	5,180,015,782	0.000305
100%		+20	5,180,001,241	0.000024
100%		+30	5,180,020,242	0.000391
100%		+40	5,180,031,437	0.000607
100%		+50	5,180,045,522	0.000879
100%		+60	5,180,051,260	0.000990
85%		3.230	+25	5,180,001,194
115%	4.370	+25	5,180,001,221	0.000024
BATT.ENDPOINT	3.200	+25	5,180,001,283	0.000025

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

- Measurement Data:

OPERATING FREQUENCY : 5,260,000,000 Hz
 CHANNEL : 52
 REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,260,005,242	0.000100
100%		-30	5,260,077,682	0.001477
100%		-20	5,260,060,247	0.001145
100%		-10	5,260,045,385	0.000863
100%		0	5,260,027,640	0.000525
100%		+10	5,260,014,387	0.000274
100%		+20	5,260,005,487	0.000104
100%		+30	5,260,021,384	0.000407
100%		+40	5,260,036,241	0.000689
100%		+50	5,260,052,672	0.001001
100%		+60	5,260,058,431	0.001111
85%		3.230	+25	5,260,005,268
115%	4.370	+25	5,260,005,283	0.000100
BATT.ENDPOINT	3.200	+25	5,260,005,341	0.000102

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

- Measurement Data:

OPERATING FREQUENCY : 5,500,000,000 Hz
 CHANNEL : 100
 REFERENCE VOLTAGE : 3.800 V DC

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,500,007,026	0.000128
100%		-30	5,500,075,381	0.001371
100%		-20	5,500,059,662	0.001085
100%		-10	5,500,043,240	0.000786
100%		0	5,500,023,485	0.000427
100%		+10	5,500,012,640	0.000230
100%		+20	5,500,007,335	0.000133
100%		+30	5,500,012,283	0.000223
100%		+40	5,500,024,382	0.000443
100%		+50	5,500,033,470	0.000609
100%		+60	5,500,046,238	0.000841
85%		3.230	+25	5,500,007,112
115%	4.370	+25	5,500,007,146	0.000130
BATT.ENDPOINT	3.200	+25	5,500,007,224	0.000131

- 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)
5149.700	H	Z	PK	54.21	3.08	-	-	57.29	74.00	16.71
5149.950	H	Z	AV	41.37	3.08	0.82	-	45.27	54.00	8.73
10360.030	H	Z	PK	52.99	11.39	-	-9.54	54.84	68.20	13.36

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)
10400.430	H	Z	PK	51.75	11.98	-	-9.54	54.19	68.20	14.01
-	-	-	-	-	-	-	-	-	-	-

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)
10479.885	H	Z	PK	47.99	12.36	-	-9.54	50.81	68.20	17.39
-	-	-	-	-	-	-	-	-	-	-

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 : 0.82 dB = 20*log(1/0.91) for Method AD.
- Measurement Distance above 10 GHz = 1 m. 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)
10519.950	H	Z	PK	48.56	12.08	-	-9.54	51.10	68.20	17.10
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11a & 5280MHz(Ch. 56)

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)
10560.020	H	Z	PK	50.44	12.21	-	-9.54	53.11	68.20	15.09
-	-	-	-	-	-	-	-	-	-	-

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)
5350.150	H	Z	PK	55.24	3.61	-	-	58.85	74.00	15.15
5350.470	H	Z	AV	43.31	3.61	0.82	-	47.74	54.00	6.26
10640.090	H	Z	PK	48.03	12.53	-	-9.54	51.02	74.00	22.98
10640.220	H	Z	AV	42.64	12.53	0.82	-9.54	46.45	54.00	7.55

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 : 0.82 dB = 20*log(1/0.91) for Method AD.
3. Measurement Distance above 10 GHz = 1 m. 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)
5459.740	H	Z	PK	51.17	3.40	-	-	54.57	74.00	19.43
5459.260	H	Z	AV	38.71	3.40	0.82	-	42.93	54.00	11.07
5469.630	H	Z	PK	56.24	3.47	-	-	59.71	68.20	8.49
10999.980	H	Z	PK	49.93	12.92	-	-9.54	53.31	74.00	20.69
11000.040	H	Z	AV	44.99	12.92	0.82	-9.54	49.19	54.00	4.81

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)
11160.080	H	Z	PK	50.74	14.65	-	-9.54	55.85	74.00	18.15
11160.050	H	Z	AV	46.24	14.65	0.82	-9.54	52.17	54.00	1.83

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)
5725.630	H	Z	PK	54.63	3.80	-	-	58.43	68.20	9.77
11400.135	H	Z	PK	51.11	14.65	-	-9.54	56.22	74.00	17.78
11400.080	H	Z	AV	46.67	14.65	0.82	-9.54	52.60	54.00	1.40

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 : 0.82 dB = 20*log(1/0.91) for Method AD.
- Measurement Distance above 10 GHz = 1 m. 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)
5148.970	H	Z	PK	54.84	3.08	-	-	57.92	74.00	16.08
5148.840	H	Z	AV	41.22	3.08	0.74	-	45.04	54.00	8.96
10360.220	H	Z	PK	51.79	11.39	-	-9.54	53.64	68.20	14.56

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)
10400.295	H	Z	PK	50.78	11.98	-	-9.54	53.22	68.20	14.98
-	-	-	-	-	-	-	-	-	-	-

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)
10480.015	H	Z	PK	47.67	12.36	-	-9.54	50.49	68.20	17.71
-	-	-	-	-	-	-	-	-	-	-

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 = 1 m. So Distance Correction Factor : -9.54 dB = 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)
10520.190	H	Z	PK	48.58	12.08	-	-9.54	51.12	68.20	17.08
-	-	-	-	-	-	-	-	-	-	-

30MHz ~ 40GHz Radiated Spurious Emissions: 802.11n HT20 & 5280MHz(Ch. 56)

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)
10560.080	H	Z	PK	50.37	12.21	-	-9.54	53.04	68.20	15.16
-	-	-	-	-	-	-	-	-	-	-

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)
5350.450	H	Z	PK	55.81	3.61	-	-	59.42	74.00	14.58
5350.000	H	Z	AV	41.98	3.61	0.74	-	46.33	54.00	7.67
10640.370	H	Z	PK	47.71	12.53	-	-9.54	50.70	74.00	23.30
10640.100	H	Z	AV	41.23	12.53	0.74	-9.54	44.96	54.00	9.04

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 = 1 m. So Distance Correction Factor : -9.54 dB = 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)
5458.430	H	Z	PK	50.24	3.40	-	-	53.64	74.00	20.36
5459.010	H	Z	AV	38.39	3.40	0.74	-	42.53	54.00	11.47
5469.590	H	Z	PK	56.38	3.47	-	-	59.85	68.20	8.35
10999.975	H	Z	PK	49.75	12.92	-	-9.54	53.13	74.00	20.87
10999.950	H	Z	AV	44.74	12.92	0.74	-9.54	48.86	54.00	5.14

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)
11160.240	H	Z	PK	51.04	14.65	-	-9.54	56.15	74.00	17.85
11160.080	H	Z	AV	46.16	14.65	0.74	-9.54	52.01	54.00	1.99

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)
5725.030	H	Z	PK	54.55	3.80	-	-	58.35	68.20	9.85
11400.030	H	Z	PK	51.66	14.65	-	-9.54	56.77	74.00	17.23
11399.985	H	Z	AV	46.54	14.65	0.74	-9.54	52.39	54.00	1.61

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 = 1 m. So Distance Correction Factor : -9.54 dB = 20*log(1m/3m)

■ 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)
5149.070	H	Z	PK	55.02	3.08	-	-	58.10	74.00	15.90
5149.860	H	Z	AV	41.72	3.08	0.74	-	45.54	54.00	8.46
10379.855	H	Z	PK	51.57	11.52	-	-9.54	53.55	68.20	14.65

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)
10460.015	H	Z	PK	47.54	12.03	-	-9.54	50.03	68.20	18.17
-	-	-	-	-	-	-	-	-	-	-

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 = 1 m. So Distance Correction Factor : -9.54 dB = 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)
10540.025	H	Z	PK	48.25	12.16	-	-9.54	50.87	68.20	17.33
-	-	-	-	-	-	-	-	-	-	-

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)
5350.780	H	Z	PK	55.24	3.61	-	-	58.85	74.00	15.15
5350.110	H	Z	AV	42.62	3.61	0.74	-	46.97	54.00	7.03
10620.030	H	Z	PK	47.77	12.63	-	-9.54	50.86	74.00	23.14
10620.925	H	Z	AV	41.32	12.63	0.74	-9.54	45.15	54.00	8.85

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 = 1 m. So Distance Correction Factor : -9.54 dB = 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)
5457.320	H	Z	PK	50.99	3.40	-	-	54.39	74.00	19.61
5457.450	H	Z	AV	38.79	3.40	0.74	-	42.93	54.00	11.07
5469.380	H	Z	PK	56.10	3.47	-	-	59.57	68.20	8.63
11019.895	H	Z	PK	50.04	12.78	-	-9.54	53.28	74.00	20.72
11020.080	H	Z	AV	44.87	12.78	0.74	-9.54	48.85	54.00	5.15

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)
11100.450	H	Z	PK	51.43	13.12	-	-9.54	55.01	74.00	18.99
11099.965	H	Z	AV	46.74	13.12	0.74	-9.54	51.06	54.00	2.94

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)
5725.100	H	Z	PK	48.61	3.80	-	-	52.41	68.20	15.79
11399.935	H	Z	PK	50.82	14.46	-	-9.54	55.74	74.00	18.26
11340.055	H	Z	AV	46.04	14.46	0.74	-9.54	51.70	54.00	2.30

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 = 1 m. So Distance Correction Factor : -9.54 dB = 20*log(1m/3m)

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)

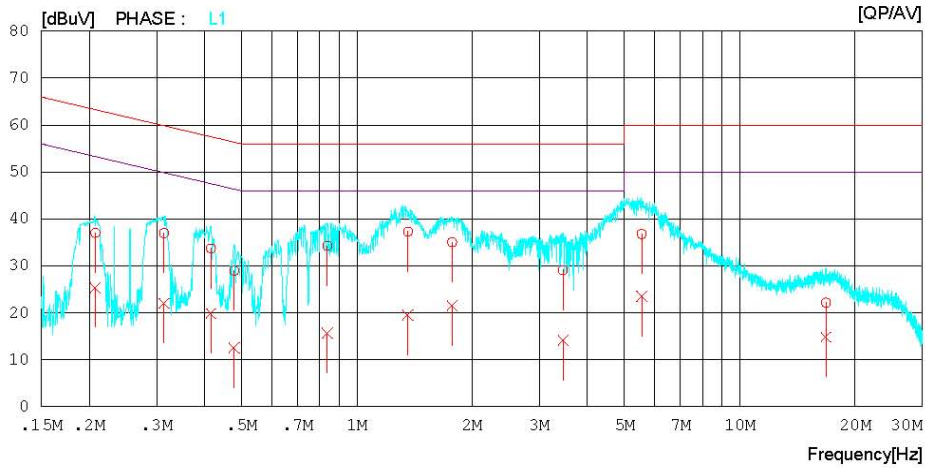
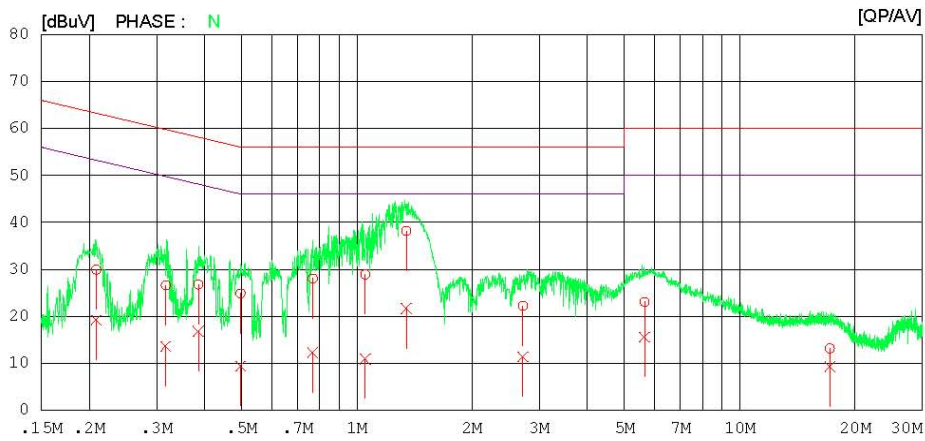
Test Mode: 802.11a_5.1G



Results of Conducted Emission

Digital EMC
Date : 2012-09-18

Model No.	: KYL21	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 °C 44 % R.H.
Test Condition	: WLAN	Operator	: H.S SON
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 : 2012-09-18

Model No. : KYL21 Reference No. :
 Type : Power Supply : 120 V 60 Hz
 Serial No. : Identical prototype Temp/Humi. : 23 'C 44 % R.H.
 Test Condition : WLAN Operator : H.S SON

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	0.20881	29.7	19.0	0.2	29.9	19.2	63.3	53.3	33.4	34.1	N
2	0.31691	26.4	13.4	0.2	26.6	13.6	59.8	49.8	33.2	36.2	N
3	0.38554	26.5	16.5	0.3	26.8	16.8	58.2	48.2	31.4	31.4	N
4	0.49718	24.7	9.2	0.2	24.9	9.4	56.0	46.0	31.1	36.6	N
5	0.76745	27.8	12.1	0.2	28.0	12.3	56.0	46.0	28.0	33.7	N
6	1.05150	28.6	10.6	0.3	28.9	10.9	56.0	46.0	27.1	35.1	N
7	1.34650	37.9	21.4	0.3	38.2	21.7	56.0	46.0	17.8	24.3	N
8	2.71450	21.9	11.0	0.3	22.2	11.3	56.0	46.0	33.8	34.7	N
9	5.64700	22.6	15.1	0.5	23.1	15.6	60.0	50.0	36.9	34.4	N
10	17.20100	12.0	8.1	1.1	13.1	9.2	60.0	50.0	46.9	40.8	N
11	0.20758	36.8	25.2	0.2	37.0	25.4	63.3	53.3	26.3	27.9	L1
12	0.31368	36.8	21.8	0.2	37.0	22.0	59.9	49.9	22.9	27.9	L1
13	0.41621	33.4	19.6	0.3	33.7	19.9	57.5	47.5	23.8	27.6	L1
14	0.47860	28.8	12.4	0.2	29.0	12.6	56.4	46.4	27.4	33.8	L1
15	0.83795	34.0	15.4	0.3	34.3	15.7	56.0	46.0	21.7	30.3	L1
16	1.36000	37.0	19.2	0.3	37.3	19.5	56.0	46.0	18.7	26.5	L1
17	1.77400	34.8	21.2	0.3	35.1	21.5	56.0	46.0	20.9	24.5	L1
18	3.45650	28.7	13.7	0.4	29.1	14.1	56.0	46.0	26.9	31.9	L1
19	5.54550	36.3	23.0	0.5	36.8	23.5	60.0	50.0	23.2	26.5	L1
20	16.79500	21.2	13.9	1.0	22.2	14.9	60.0	50.0	37.8	35.1	L1

AC Line Conducted Emissions (Graph)

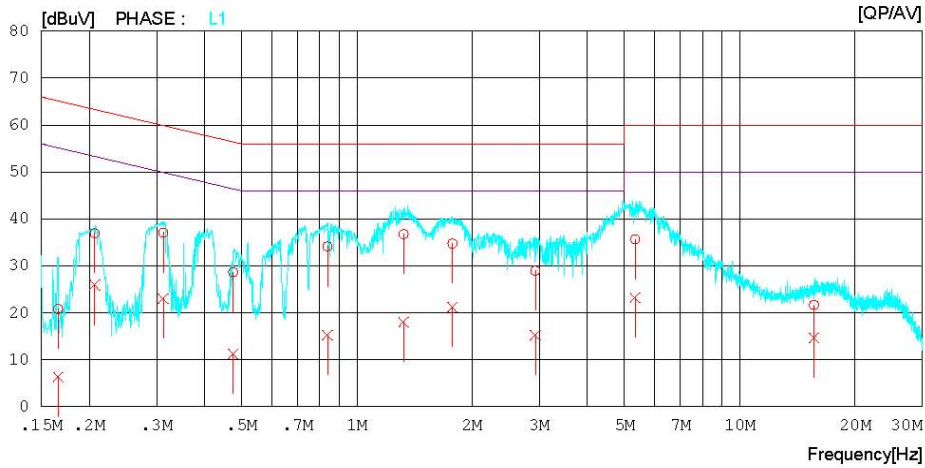
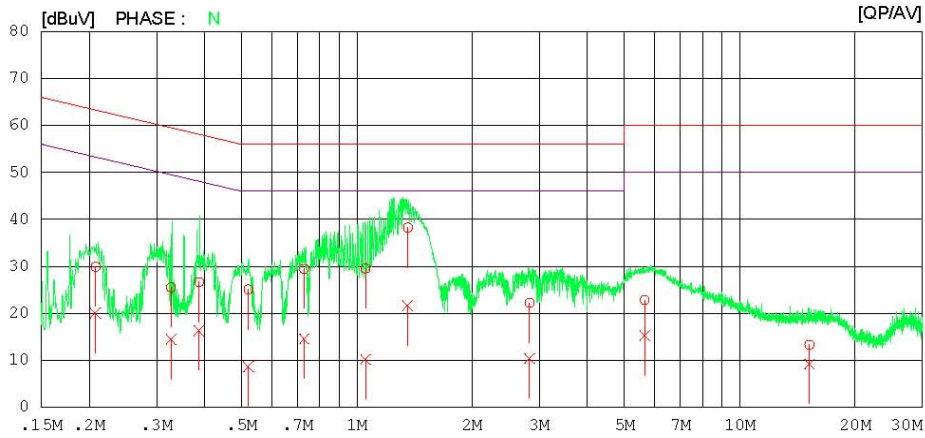
Test Mode: 802.11a_5.3G



Results of Conducted Emission

Digital EMC
Date : 2012-09-18

Model No.	: KYL21	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 °C 44 % R.H.
Test Condition	: WLAN	Operator	: H.S SON
Memo	: 5.3GHz		
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 : 2012-09-18

Model No. : KYL21
Type :
Serial No. : Identical prototype
Test Condition : WLAN
Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 23 'C 44 % R.H.
Operator : H.S SON

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	0.20801	29.7	19.8	0.2	29.9	20.0	63.3	53.3	33.4	33.3	N
2	0.32720	25.3	14.2	0.2	25.5	14.4	59.5	49.5	34.0	35.1	N
3	0.38709	26.4	16.0	0.3	26.7	16.3	58.1	48.1	31.4	31.8	N
4	0.52114	24.9	8.4	0.2	25.1	8.6	56.0	46.0	30.9	37.4	N
5	0.72841	29.3	14.3	0.2	29.5	14.5	56.0	46.0	26.5	31.5	N
6	1.05400	29.2	9.9	0.3	29.5	10.2	56.0	46.0	26.5	35.8	N
7	1.35950	37.9	21.3	0.3	38.2	21.6	56.0	46.0	17.8	24.4	N
8	2.82350	21.9	10.1	0.3	22.2	10.4	56.0	46.0	33.8	35.6	N
9	5.64800	22.3	14.7	0.5	22.8	15.2	60.0	50.0	37.2	34.8	N
10	15.19500	12.4	8.3	0.9	13.3	9.2	60.0	50.0	46.7	40.8	N
11	0.16600	20.5	6.0	0.3	20.8	6.3	65.2	55.2	44.4	48.9	L1
12	0.20678	36.8	25.8	0.2	37.0	26.0	63.3	53.3	26.3	27.3	L1
13	0.31230	36.9	22.9	0.2	37.1	23.1	59.9	49.9	22.8	26.8	L1
14	0.47525	28.5	11.1	0.2	28.7	11.3	56.4	46.4	27.7	35.1	L1
15	0.83838	33.8	14.9	0.3	34.1	15.2	56.0	46.0	21.9	30.8	L1
16	1.32600	36.5	17.7	0.3	36.8	18.0	56.0	46.0	19.2	28.0	L1
17	1.77650	34.5	20.9	0.3	34.8	21.2	56.0	46.0	21.2	24.8	L1
18	2.92500	28.7	14.9	0.3	29.0	15.2	56.0	46.0	27.0	30.8	L1
19	5.33500	35.3	22.9	0.4	35.7	23.3	60.0	50.0	24.3	26.7	L1
20	15.63150	20.7	13.7	1.0	21.7	14.7	60.0	50.0	38.3	35.3	L1

AC Line Conducted Emissions (Graph)

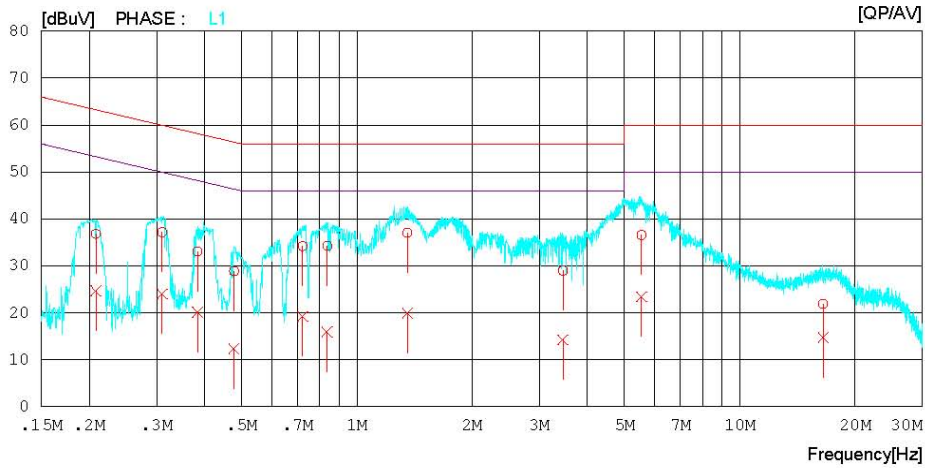
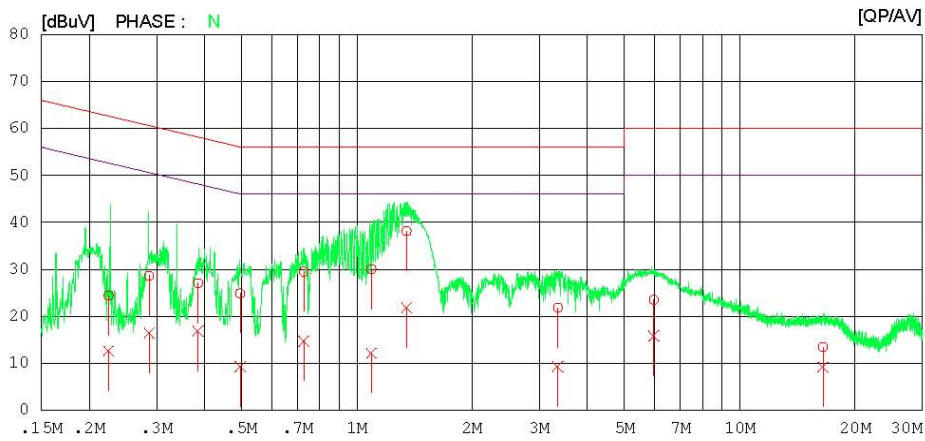
Test Mode: 802.11a_5.5G



Results of Conducted Emission

Digital EMC
Date : 2012-09-18

Model No.	: KYL21	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 °C 44 % R.H.
Test Condition	: WLAN	Operator	: H.S SON
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 : 2012-09-18

Model No.	: KYL21	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 'C 44 % R.H.
Test Condition	: WLAN	Operator	: H.S SON
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	0.22479	24.2	12.4	0.2	24.4	12.6	62.6	52.6	38.2	40.0	N
2	0.28693	28.4	16.2	0.2	28.6	16.4	60.6	50.6	32.0	34.2	N
3	0.38496	26.8	16.6	0.3	27.1	16.9	58.2	48.2	31.1	31.3	N
4	0.49569	24.7	9.1	0.2	24.9	9.3	56.1	46.1	31.2	36.8	N
5	0.72715	29.3	14.5	0.2	29.5	14.7	56.0	46.0	26.5	31.3	N
6	1.09200	29.7	11.8	0.3	30.0	12.1	56.0	46.0	26.0	33.9	N
7	1.34850	37.8	21.5	0.3	38.1	21.8	56.0	46.0	17.9	24.2	N
8	3.35000	21.4	8.9	0.4	21.8	9.3	56.0	46.0	34.2	36.7	N
9	5.96800	23.0	15.3	0.5	23.5	15.8	60.0	50.0	36.5	34.2	N
10	16.48500	12.4	8.1	1.0	13.4	9.1	60.0	50.0	46.6	40.9	N
11	0.20815	36.6	24.5	0.2	36.8	24.7	63.3	53.3	26.5	28.6	L1
12	0.31015	37.0	23.8	0.2	37.2	24.0	60.0	50.0	22.8	26.0	L1
13	0.38395	32.8	19.8	0.3	33.1	20.1	58.2	48.2	25.1	28.1	L1
14	0.47814	28.7	12.1	0.2	28.9	12.3	56.4	46.4	27.5	34.1	L1
15	0.72216	34.0	19.0	0.2	34.2	19.2	56.0	46.0	21.8	26.8	L1
16	0.83754	34.0	15.7	0.3	34.3	16.0	56.0	46.0	21.7	30.0	L1
17	1.35550	36.8	19.6	0.3	37.1	19.9	56.0	46.0	18.9	26.1	L1
18	3.45300	28.6	13.8	0.4	29.0	14.2	56.0	46.0	27.0	31.8	L1
19	5.54250	36.1	22.9	0.5	36.6	23.4	60.0	50.0	23.4	26.6	L1
20	16.51300	20.9	13.8	1.0	21.9	14.8	60.0	50.0	38.1	35.2	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

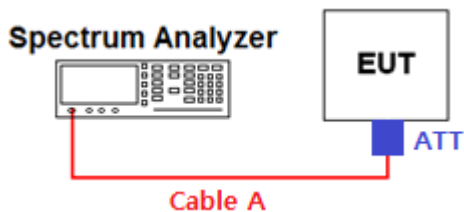
■ **RESULT PLOT : N/A**

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	11/10/11	12/10/11	US45303022
Spectrum Analyzer	Agilent	E4440A	12/09/18	13/09/18	MY45304199
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, US36122178
Spectrum Analyzer	Agilent	N9020A	12/01/09	13/01/09	MY49100833
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
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	13/02/20	6419
HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	154
Attenuator (3dB)	WEINSCHTEL	56-3	11/09/30	12/09/30	Y2342
Amplifier (22dB)	H.P	8447E	12/01/09	13/01/09	2945A02865
Amplifier (30dB)	Agilent	8449B	12/03/05	13/03/05	3008A01590
EMI TEST RECEIVER	R&S	ESU	12/03/05	13/03/05	100014
EMI TEST RECEIVER	R&S	ESCI	12/03/06	13/03/06	100364
CVCF	KIKUSUI	PCR1000L	12/09/15	13/09/15	14110610
ARTIFICIAL MAINS NETWORK	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)
5.180 ~ 5.240	3.34	5.500 ~ 5.700	3.42
5.260 ~ 5.320	3.38	-	-

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)

APPENDIX II

Duty cycle plots

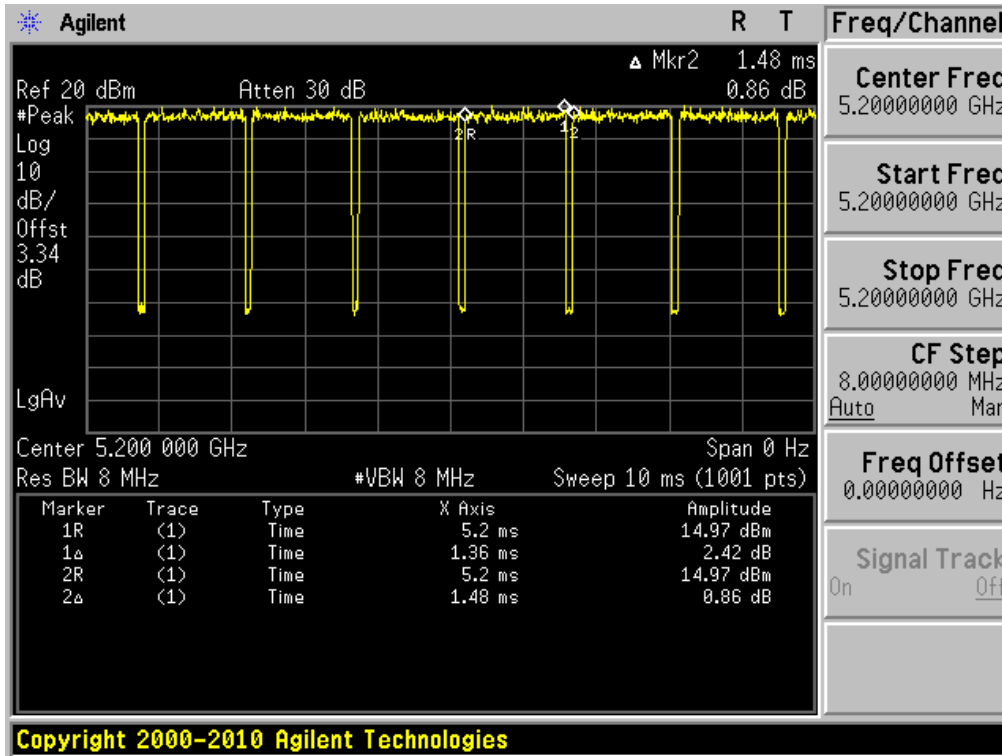
TEST PROCEDURE

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.)

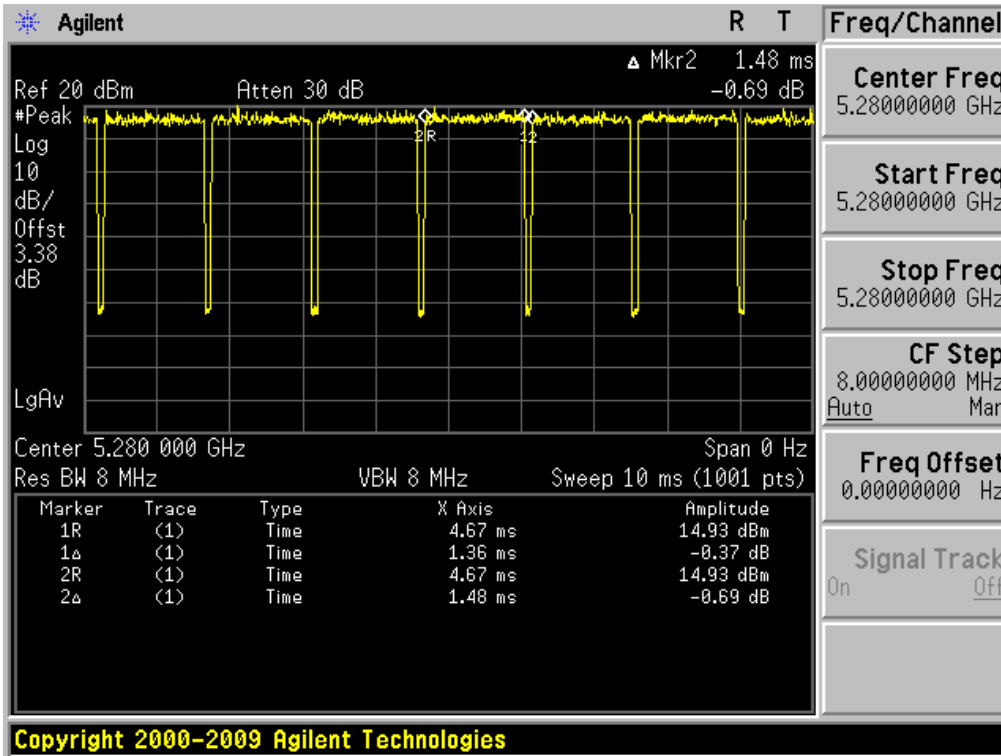
Duty Cycle

Test Mode: 802.11a & Ch.40



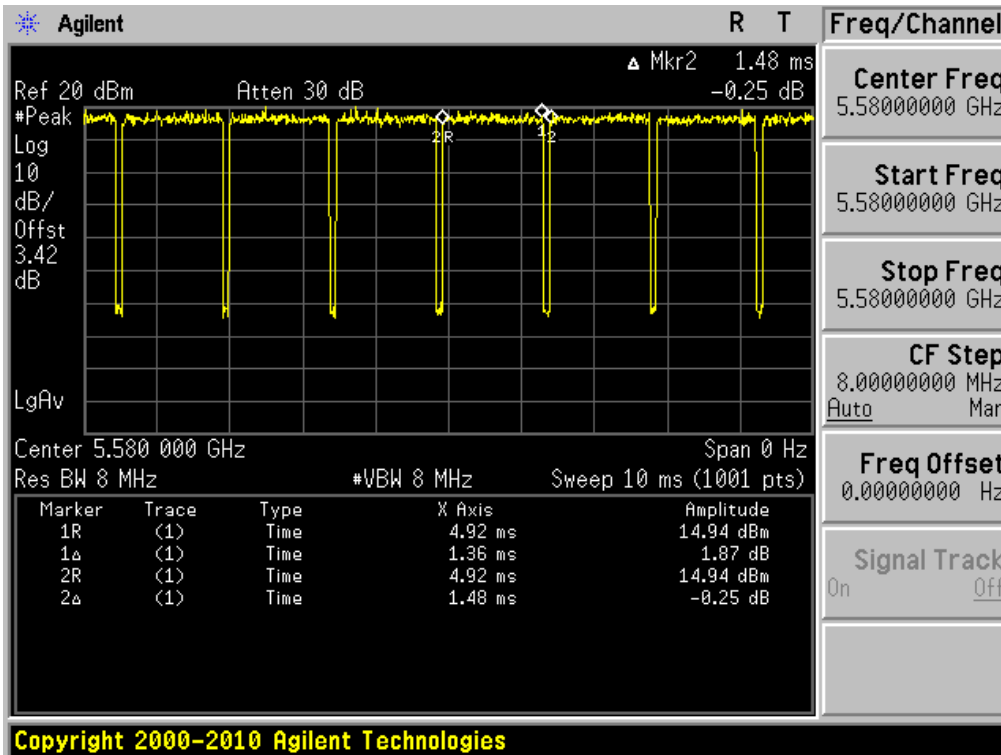
Duty Cycle

Test Mode: 802.11a & Ch.56



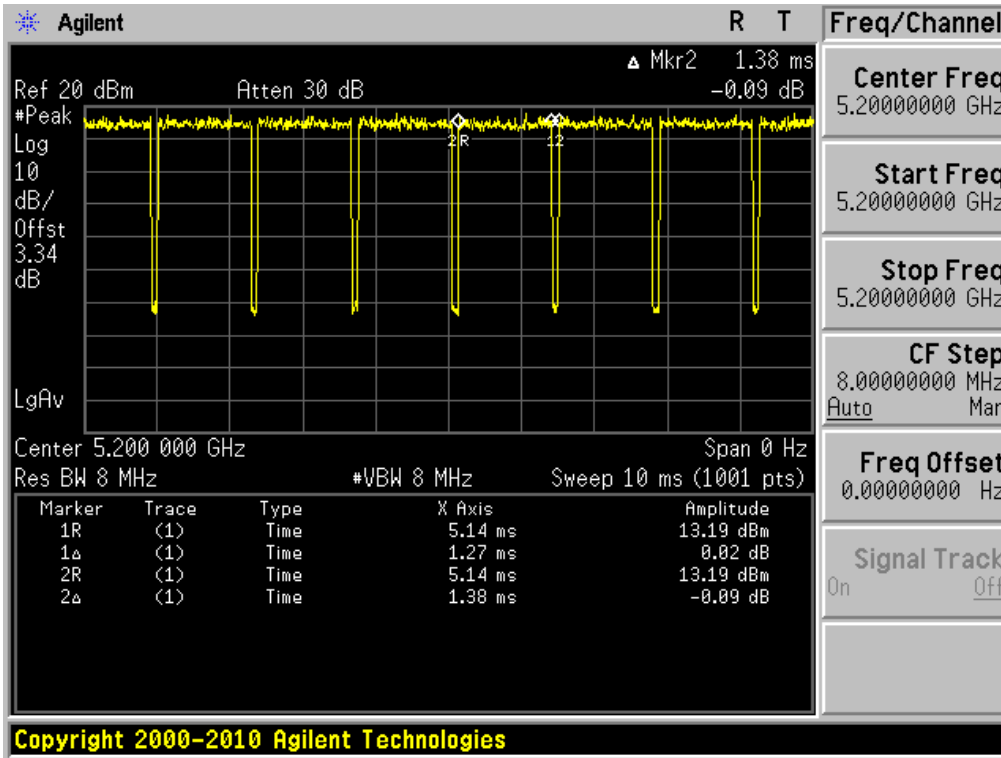
Duty Cycle

Test Mode: 802.11a & Ch.116



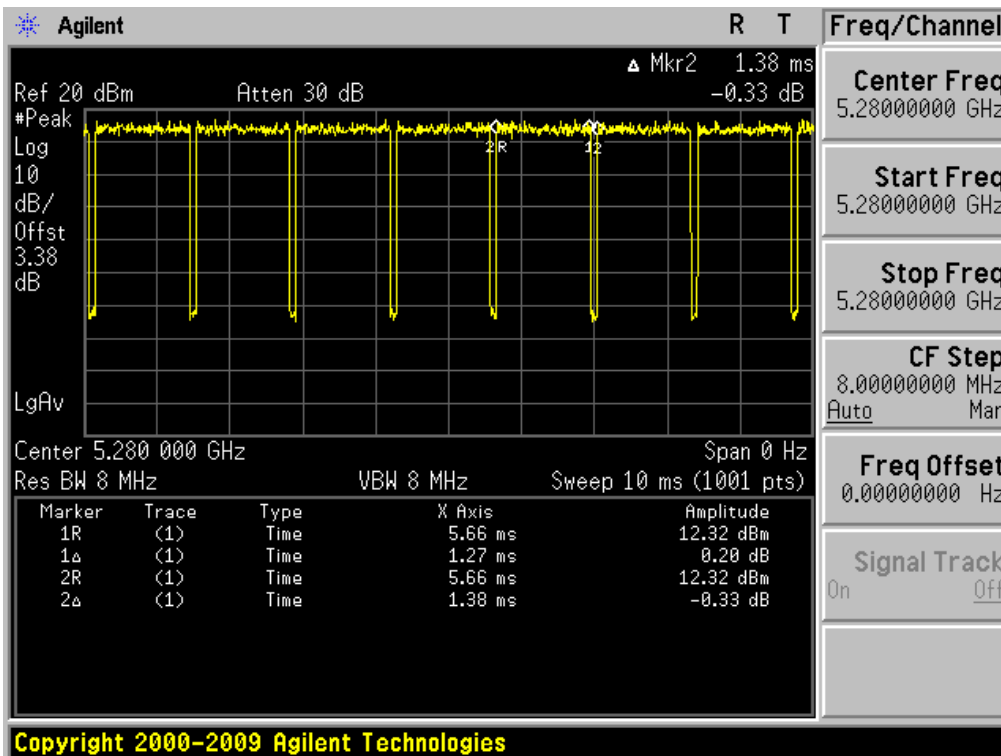
Duty Cycle

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



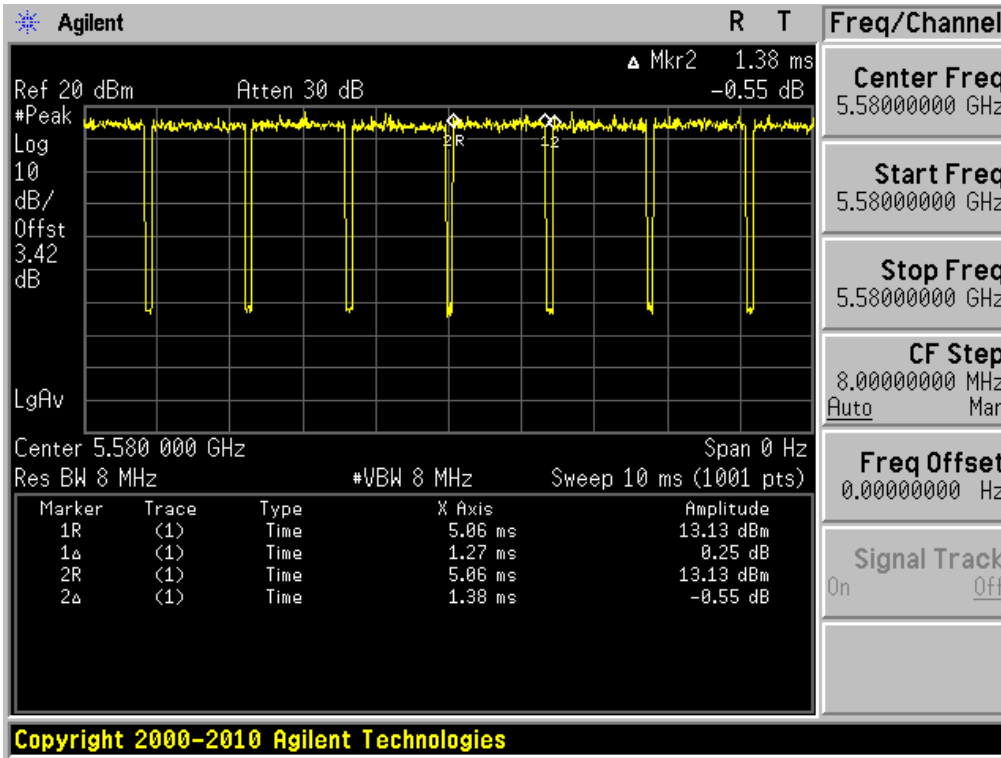
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.56



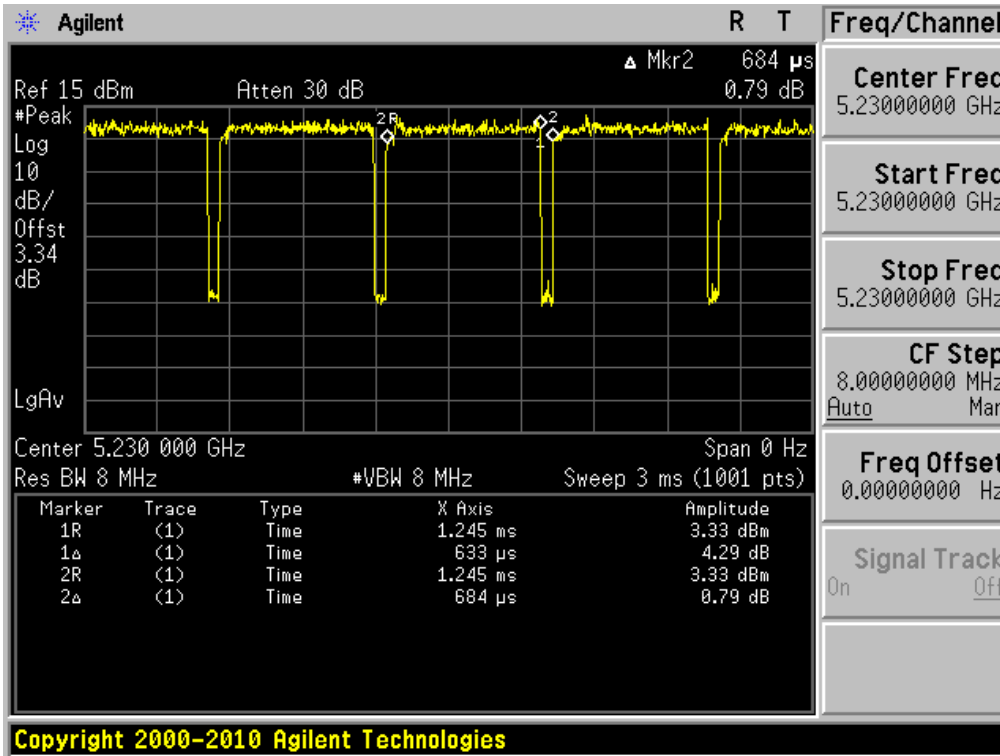
Duty Cycle

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



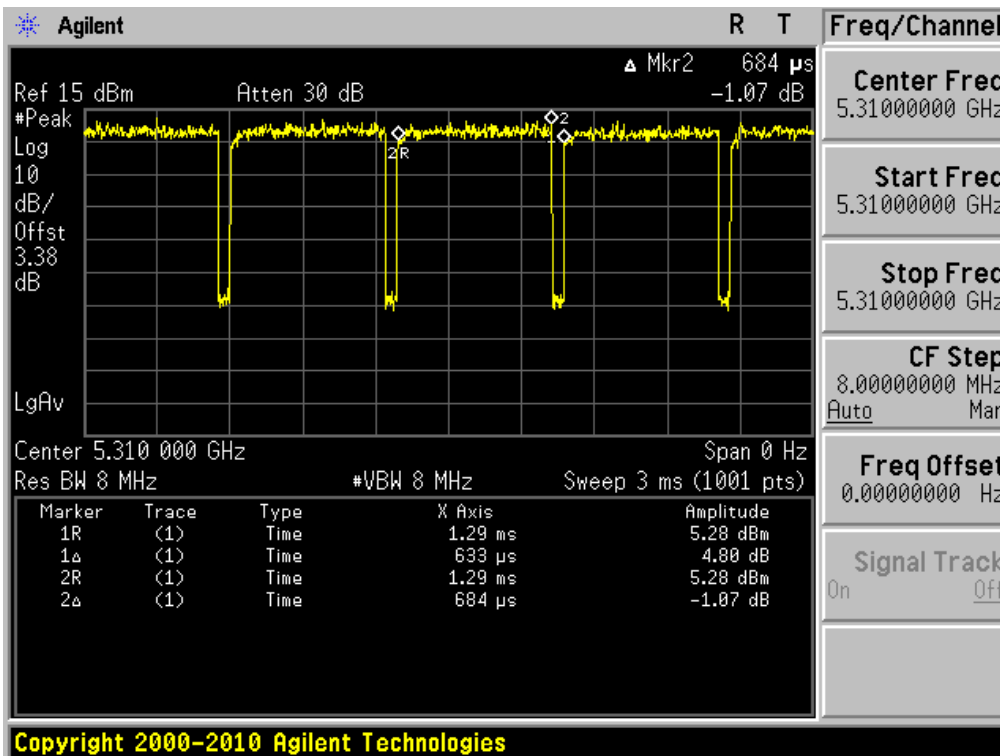
Duty Cycle

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

