

RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and NFC
Model No. : LG-P760, LGP760, P760
Order No. : DEMC1207-01318
Date of receipt : 2012-07-30
Test duration : 2012-08-16 ~ 2012-08-27
Date of issue : 2012-09-03
Use of report : FCC Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

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

CONTENTS

1. EUT information 3

 1.1 EUT description 3

 1.2 Ancillary equipment 3

2. Information about test items 4

 2.1 Test mode / Channel Information 4

 2.2 Tested Channel Information 4

 2.3 Auxiliary equipment 4

 2.4 Tested environment 5

 2.5 EMI Suppression Device(s)/Modifications 5

3. Test Report 6

 3.1 Summary of tests 6

 3.2 Transmitter requirements 7

 3.2.1 26 dB Bandwidth 7

 3.2.2 Output Power 20

 3.2.3 Peak Power Spectral Density 34

 3.2.4 Peak Excursion Ratio 48

 3.2.5 Frequency Stability 61

 3.2.6 Radiated Spurious Emission Measurements 64

 3.2.7 AC Conducted Emissions 73

 3.2.8 Antenna Requirements 80

4. LIST OF TEST EQUIPMENT 81

APPENDIX I 82

1. EUT information

1.1 EUT description

FCC Equipment Class	Unlicensed National Information Infrastructure (UNII)
Product	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and NFC
Model Name	LG-P760
Add Model Name	LGP760, P760
Equipment serial no.	Identical prototype
Frequency Range	802.11a/n(20MHz) : Band I: 5180 ~ 5240MHz Band II: 5260 ~ 5320MHz Band III: 5500 ~ 5700MHz
Channel number	802.11a/n(20MHz): 4 (Band I) / 4 (Band II) / 8 (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
Antenna Specification	Internal Antenna (1TX / 1RX) / Max. peak gain: 1.39dBi
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)	-
Band II	802.11a	6Mbps
	802.11n(20MHz)	MCS0
	802.11n(40MHz)	-
Band III	802.11a	6Mbps
	802.11n(20MHz)	MCS0
	802.11n(40MHz)	-

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	-	-
	40	5200	-	-
	48	5240	-	-
Band II	52	5260	-	-
	56	5280	-	-
	64	5320	-	-
Band III	100	5500	-	-
	116	5580	-	-
	140	5700	-	-

2.3 Auxiliary equipment

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

2.4 Tested environment

Temperature	: 22 ~ 25 °C
Relative humidity content	: 34 ~ 45 % 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		C
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%.

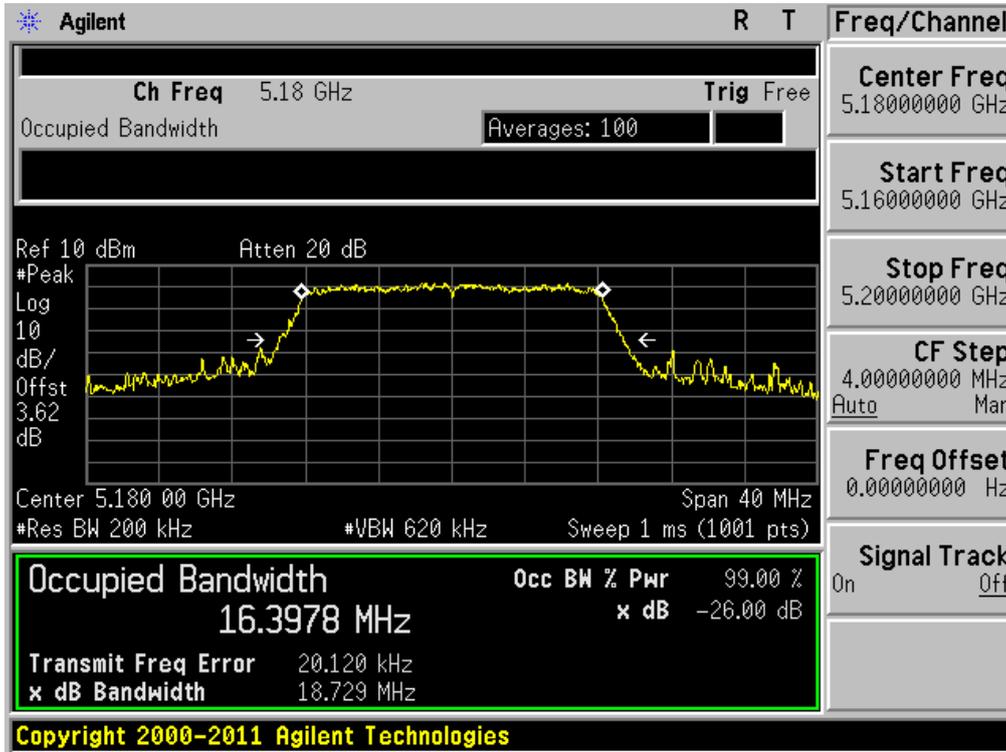
■ TEST RESULTS: **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	Band I	36	5180	18.729
		40	5200	18.526
		48	5240	18.743
	Band II	52	5260	18.695
		56	5280	18.530
		64	5320	18.528
	Band III	100	5500	18.511
		116	5580	18.593
		140	5700	18.426
802.11n (20MHz)	Band I	36	5180	18.960
		40	5200	18.964
		48	5240	19.057
	Band II	52	5260	18.939
		56	5280	18.961
		64	5320	19.098
	Band III	100	5500	18.976
		116	5580	19.004
		140	5700	18.997

RESULT PLOTS

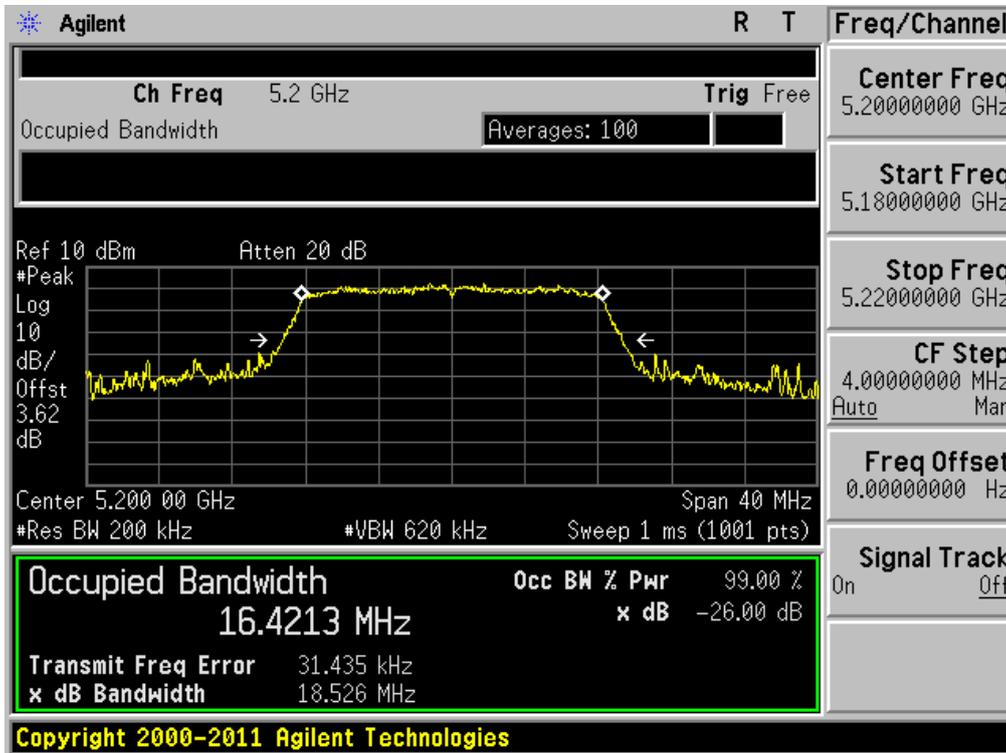
26 dB Bandwidth

Test Mode: 802.11a & Ch.36



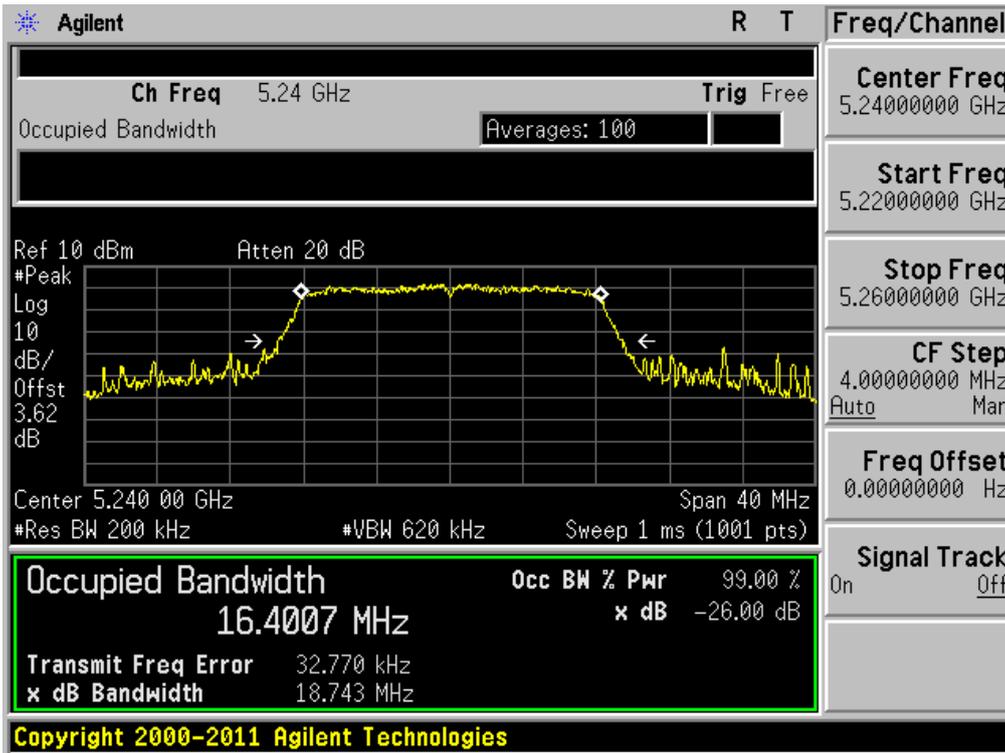
26 dB Bandwidth

Test Mode: 802.11a & Ch.40



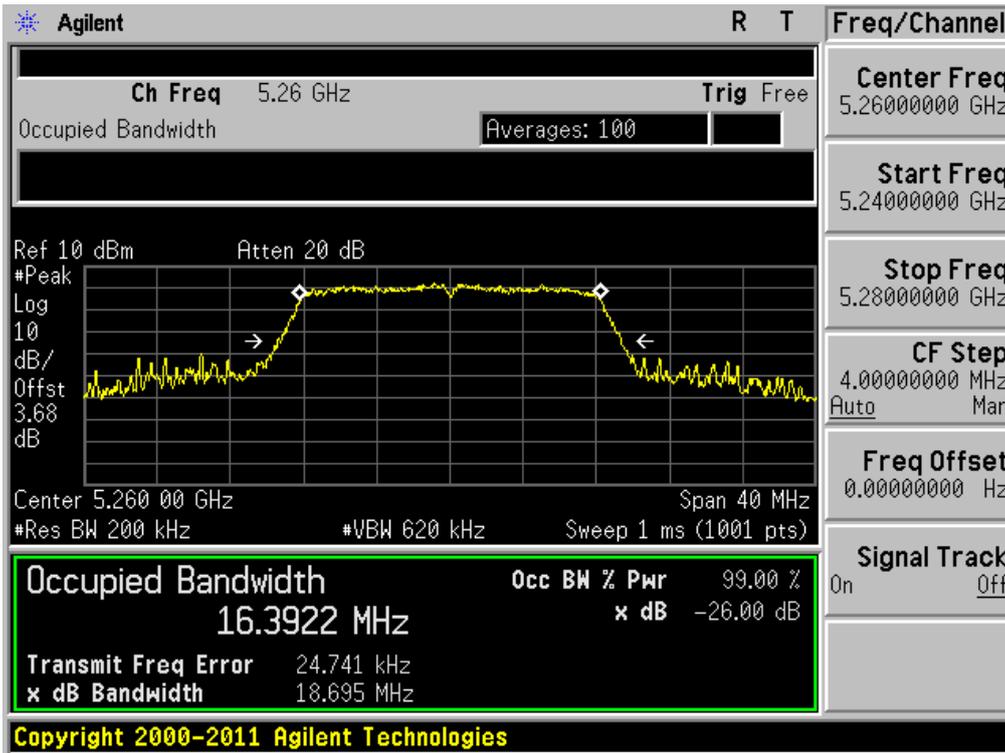
26 dB Bandwidth

Test Mode: 802.11a & Ch.48



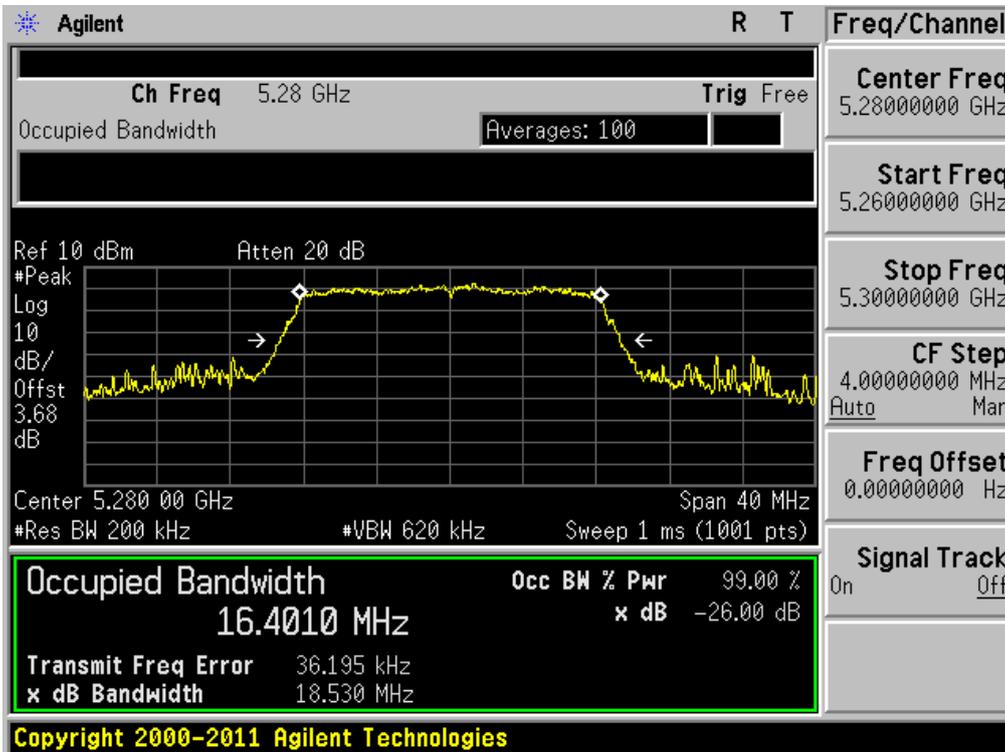
26 dB Bandwidth

Test Mode: 802.11a & Ch.52



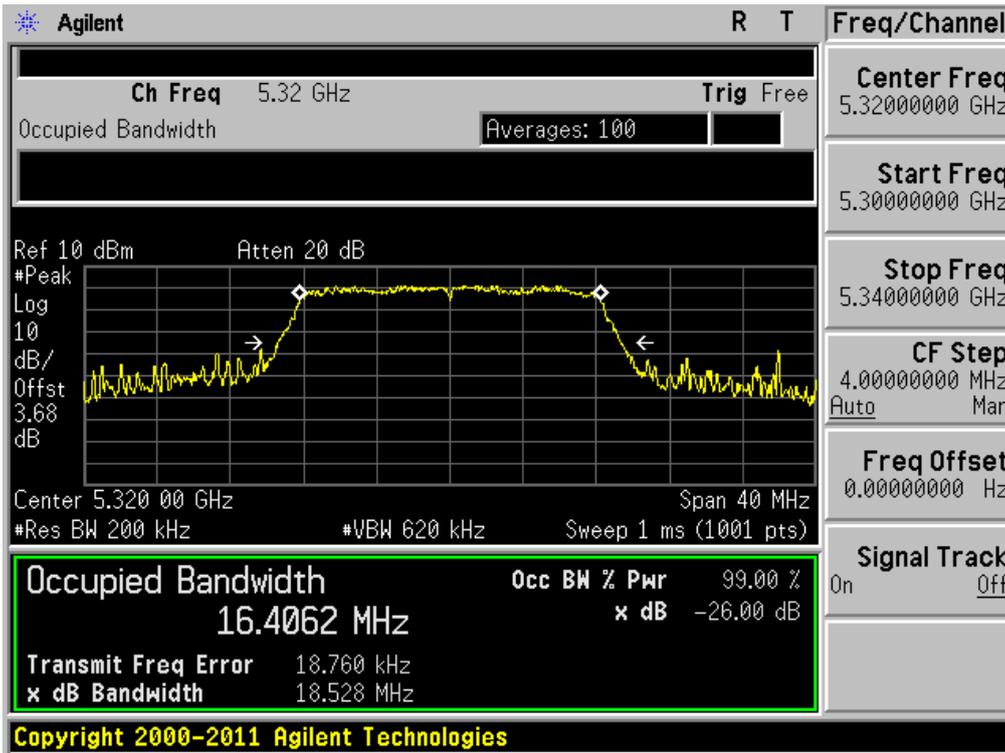
26 dB Bandwidth

Test Mode: 802.11a & Ch.56



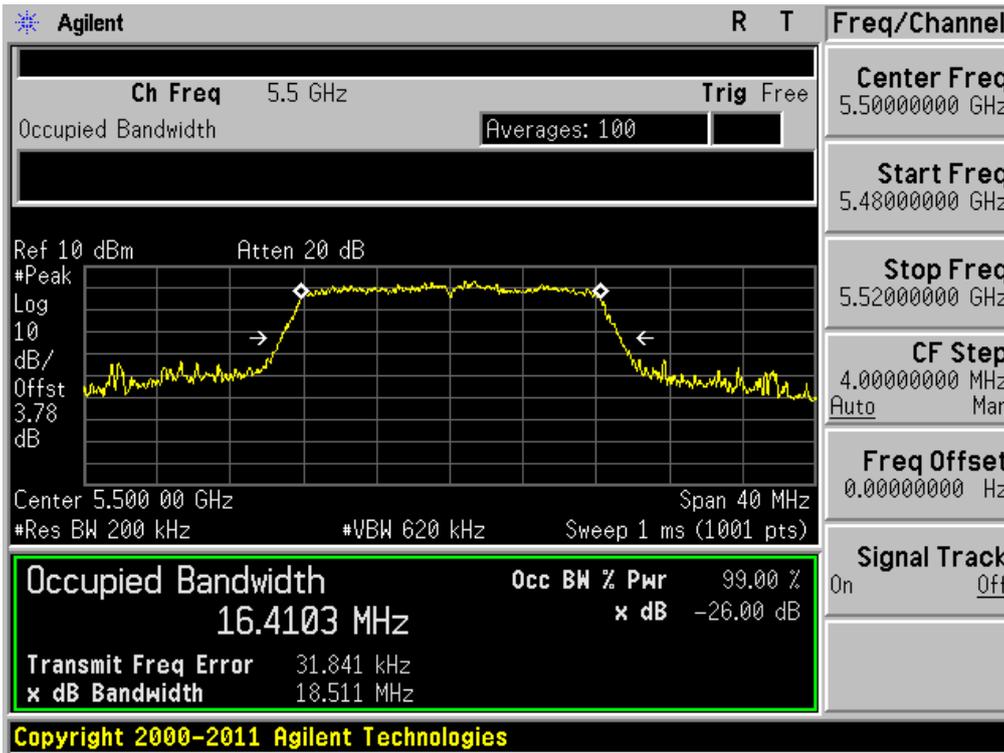
26 dB Bandwidth

Test Mode: 802.11a & Ch.64



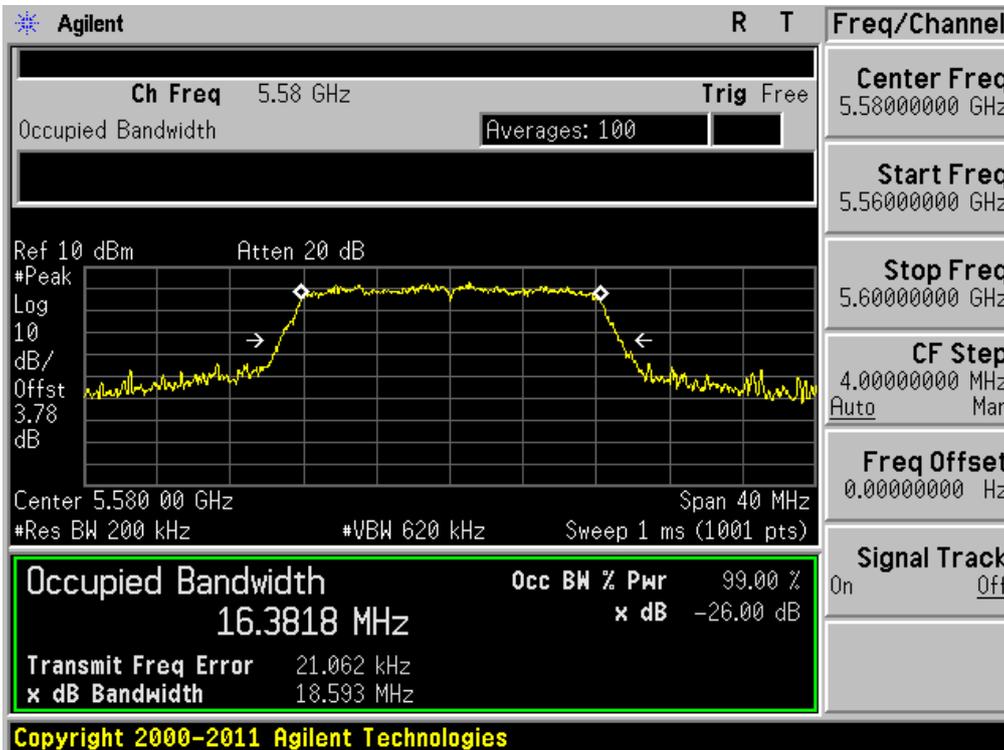
26 dB Bandwidth

Test Mode: 802.11a & Ch.100



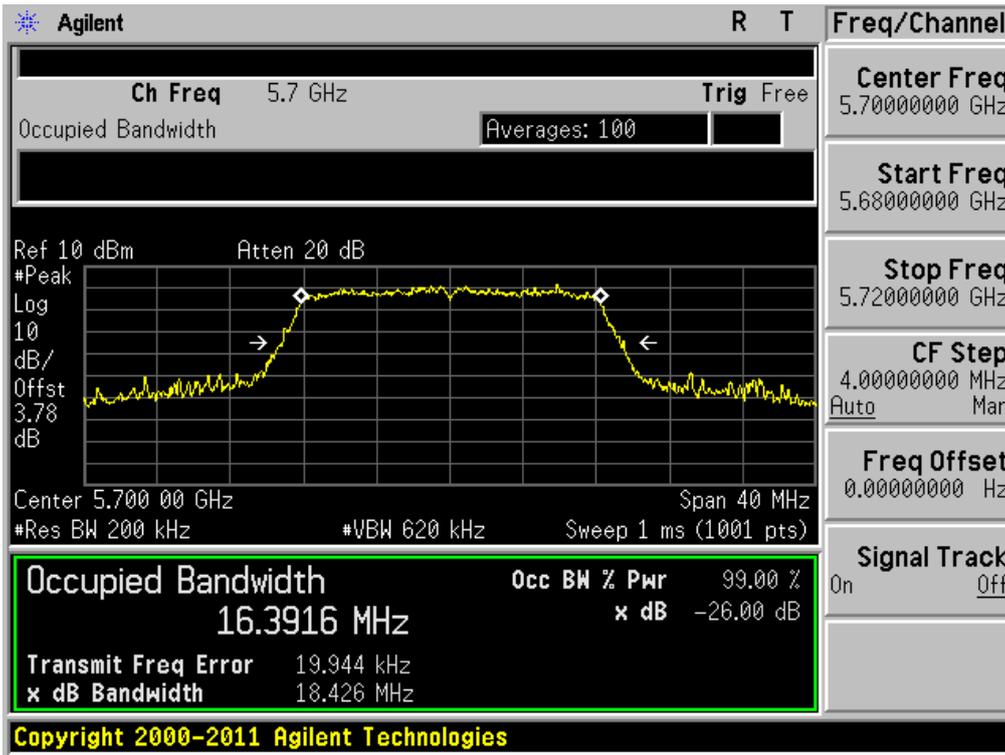
26 dB Bandwidth

Test Mode: 802.11a & Ch.116



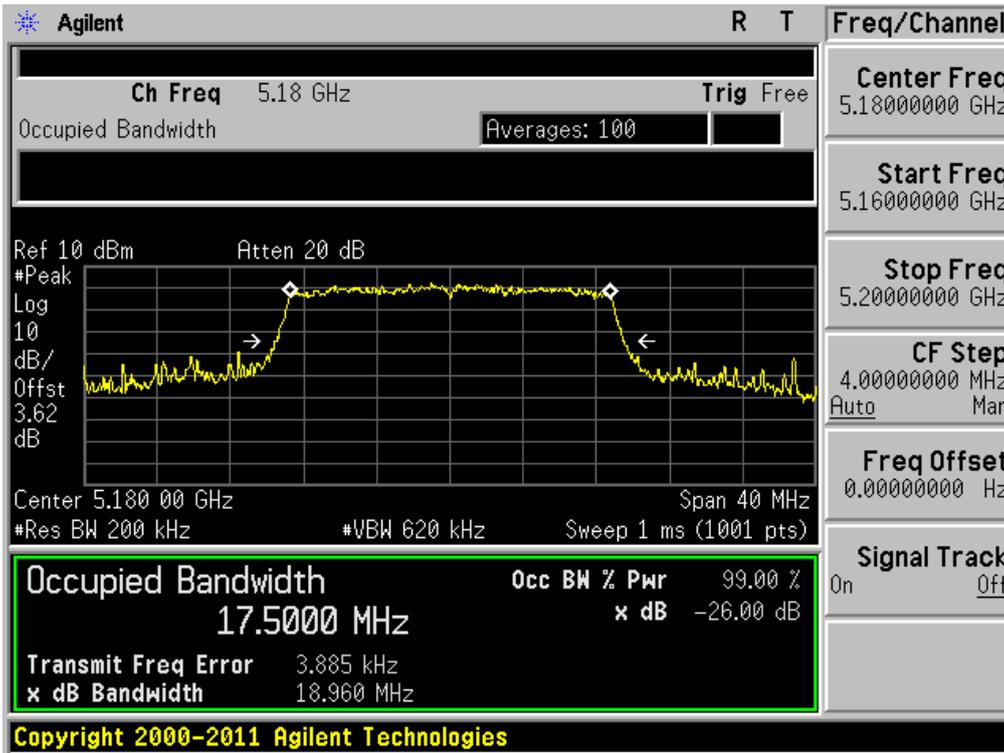
26 dB Bandwidth

Test Mode: 802.11a & Ch.140



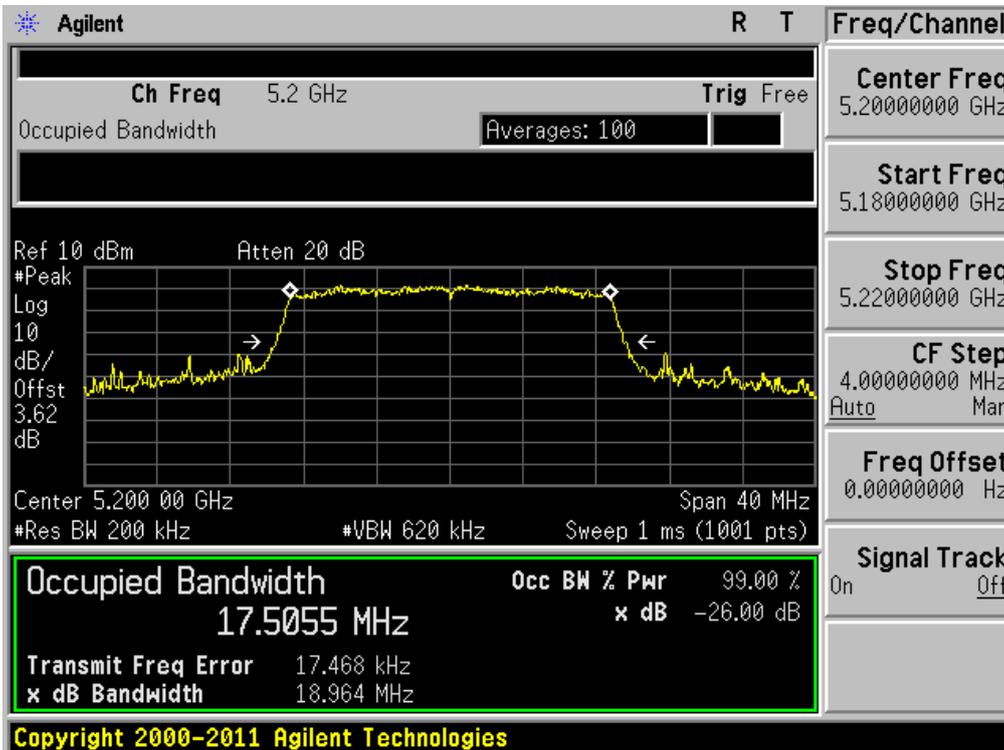
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.36



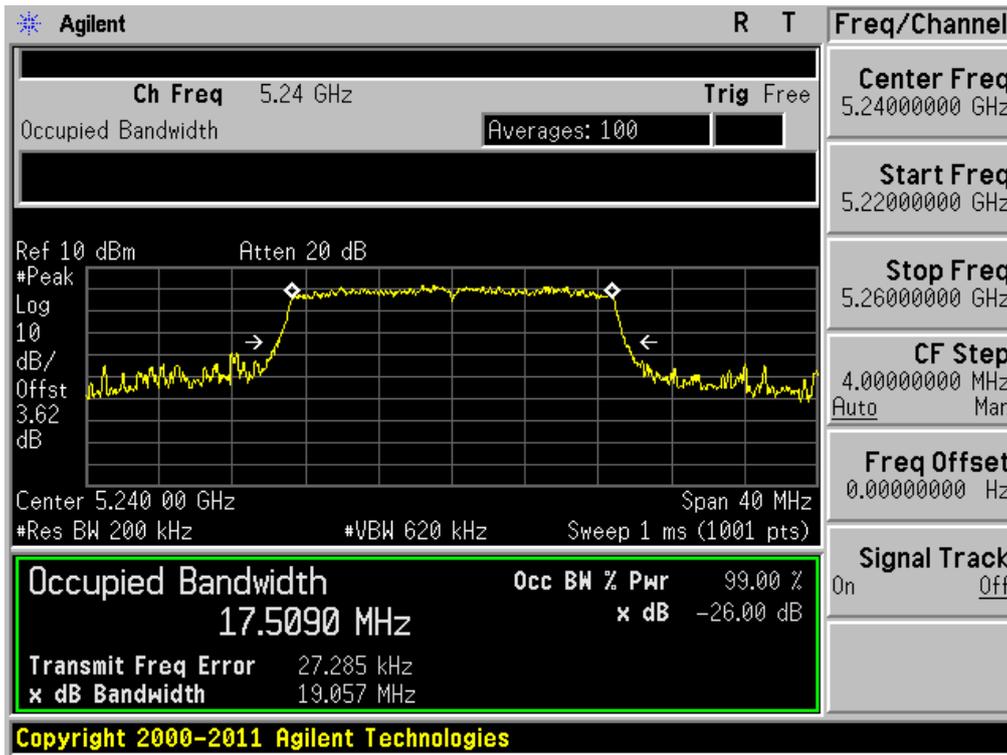
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.40



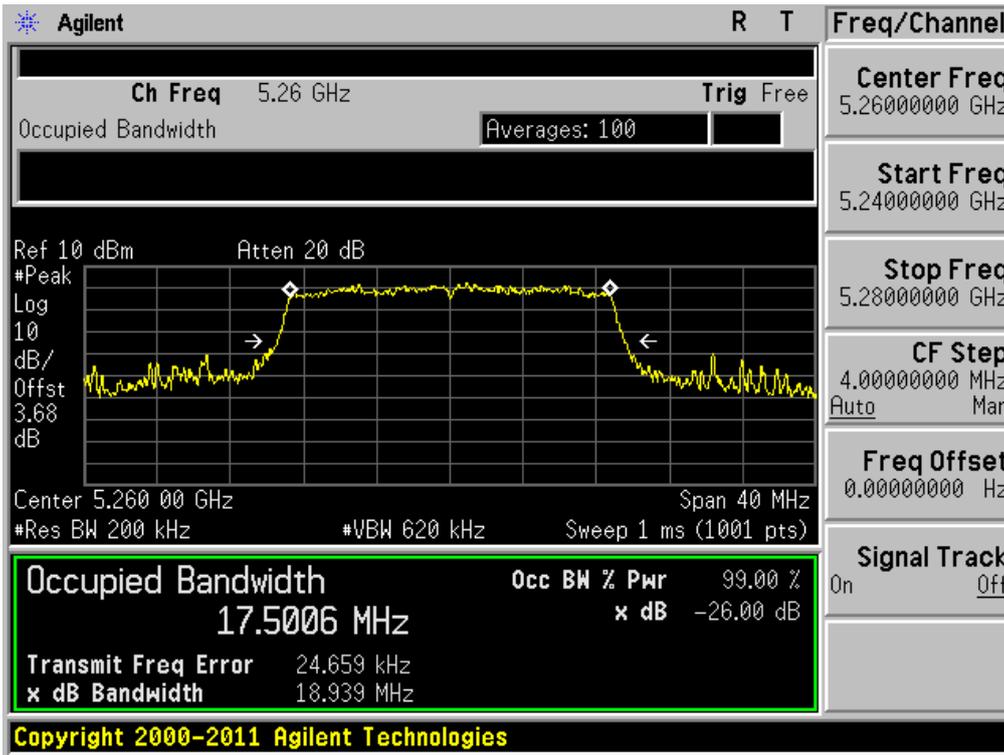
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.48



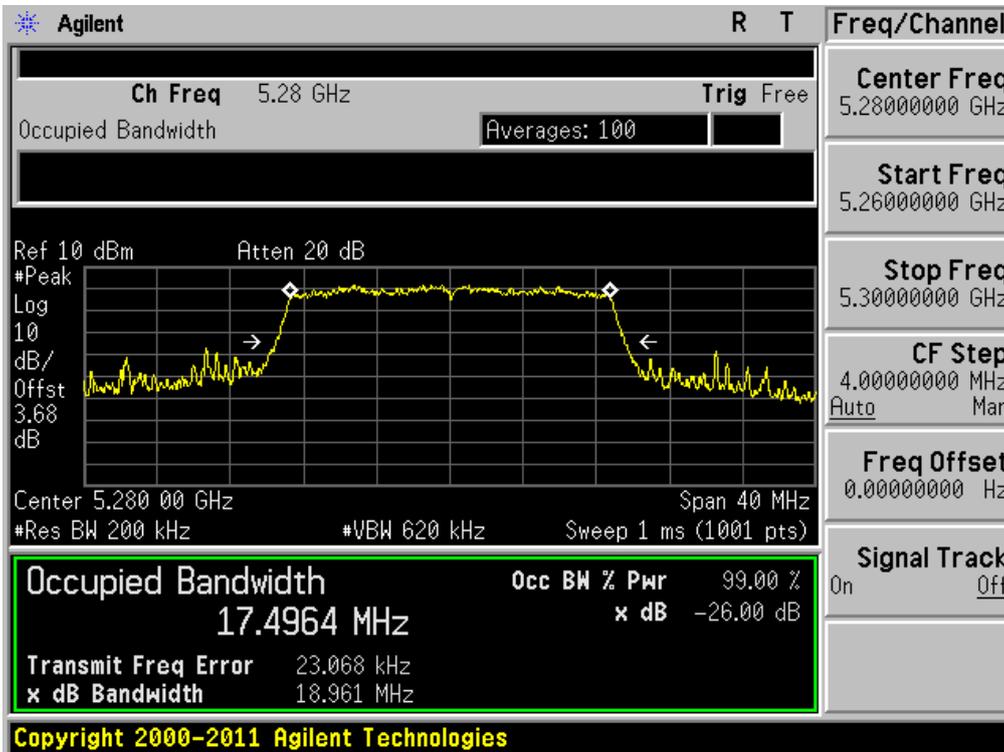
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.52



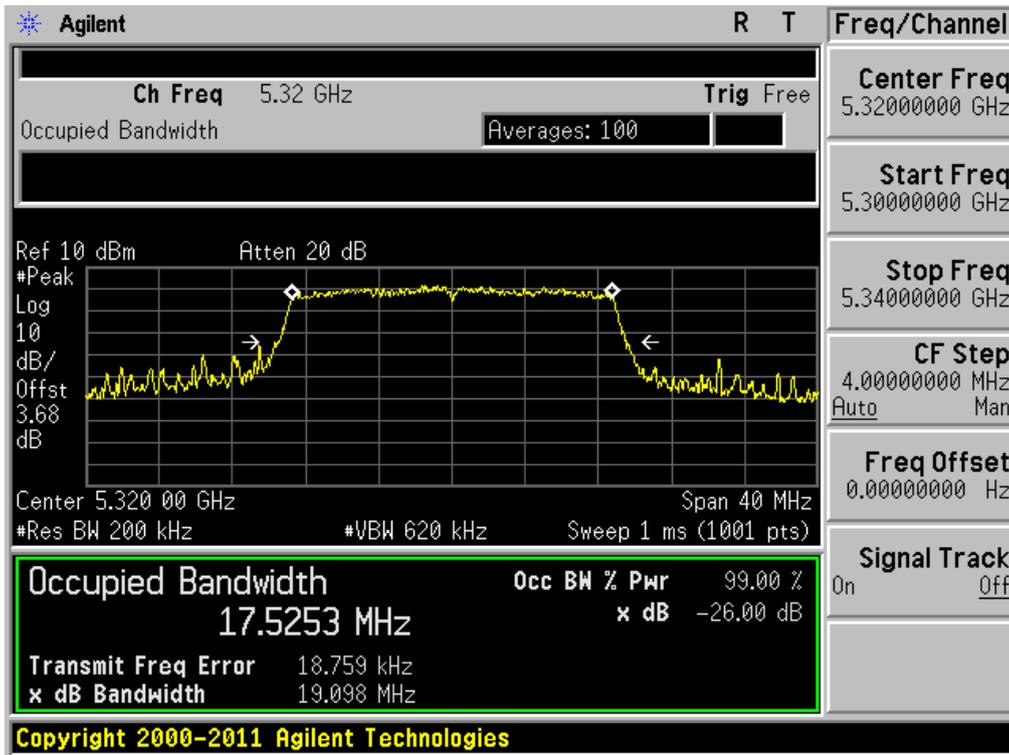
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.56



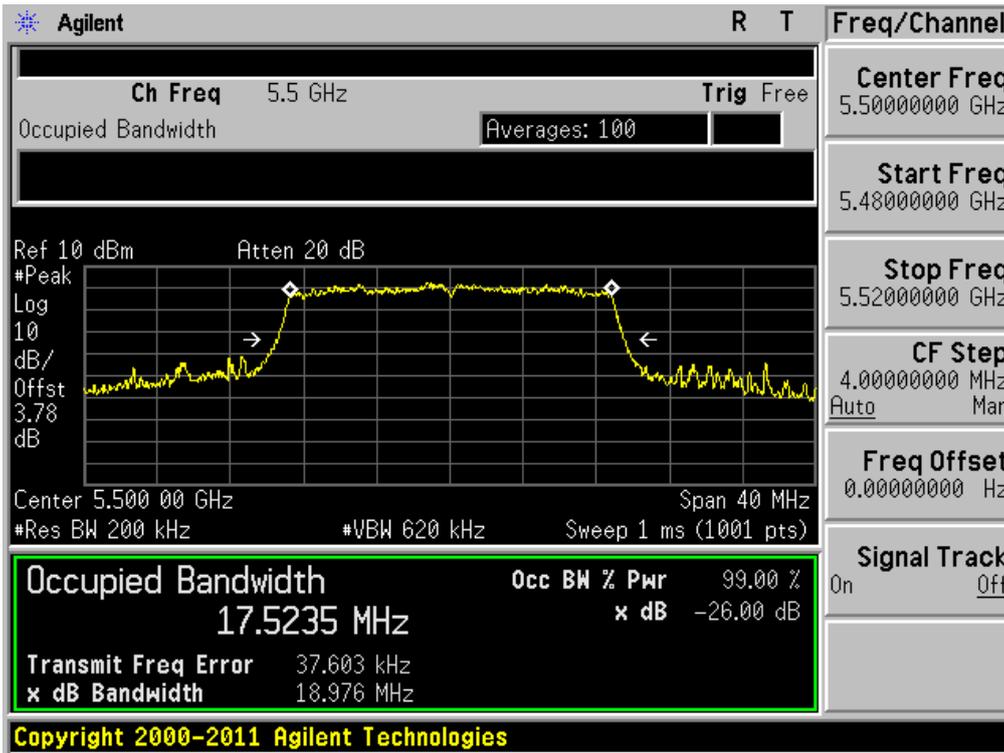
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.64



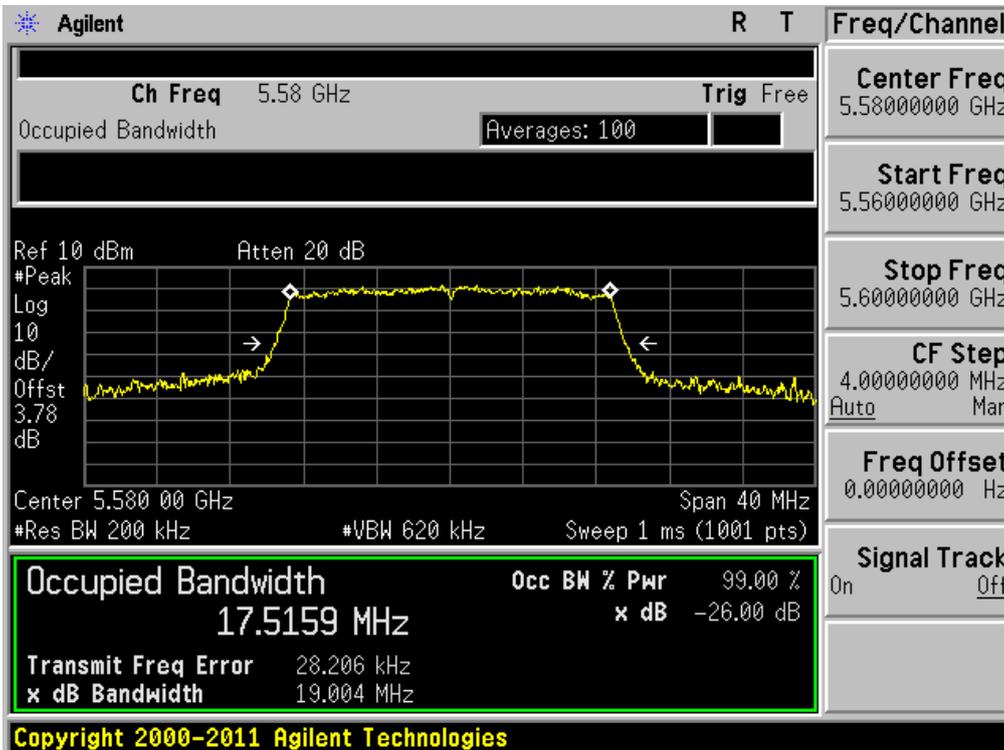
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.100



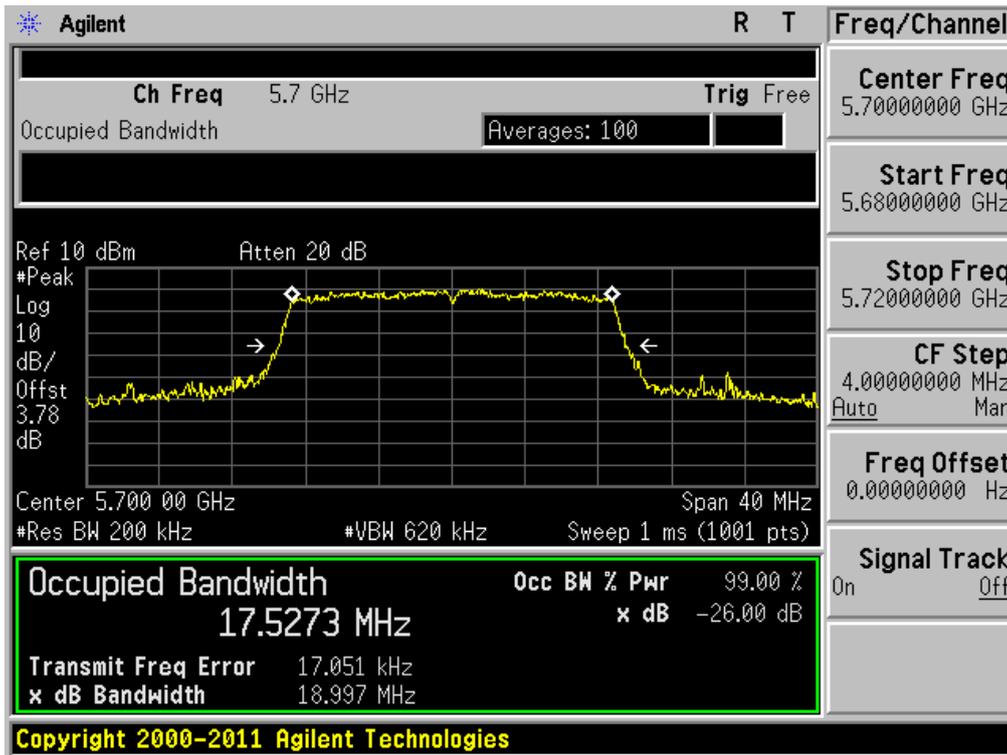
26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.116



26 dB Bandwidth

Test Mode: 802.11n-HT20 & Ch.140



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 dBm + 10log 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 dBm + 10log 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	-0.31	16.67
		18.526	16.67		
	802.11n HT20	50	16.98		16.77
		18.960	16.77		
	802.11n HT40	-	-		-
		-	-		-

Bands	Mode	Power Limit [mW]	Calculation Limit [dBm]	ANT Gain	Determined Limit [dBm]
		Least 26dBC BW [MHz]			
Band II	802.11a	250	23.97	-0.31	23.67
		18.528	23.67		
	802.11n HT20	250	23.97		23.77
		18.939	23.77		
	802.11n HT40	-	-		-
		-	-		-
Band III	802.11a	250	23.97	1.39	23.65
		18.426	23.65		
	802.11n HT20	250	23.97		23.78
		18.976	23.78		
	802.11n HT40	-	-		-
		-	-		-

■ 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	11.65	2.06	2.16	0.95	0.22	11.87
	40	5200	11.48					11.70
	48	5240	11.38					11.60
	52	5260	11.47	2.06	2.16	0.95	0.22	11.69
	56	5280	11.33					11.55
	64	5320	11.01					11.23
	100	5500	11.47	2.06	2.16	0.95	0.22	11.69
	116	5580	11.17					11.39
	140	5700	9.63					9.85

Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Result
				On Time[ms]	On+Off Time[ms]	X		
802.11n (20MHz)	36	5180	11.35	1.92	2.02	0.95	0.22	11.57
	40	5200	11.26					11.48
	48	5240	11.20					11.42
	52	5260	11.26	1.92	2.02	0.95	0.22	11.48
	56	5280	11.16					11.38
	64	5320	10.90					11.12
	100	5500	11.48	1.92	2.02	0.95	0.22	11.70
	116	5580	10.99					11.21
	140	5700	9.57					9.79
802.11n (40MHz)	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

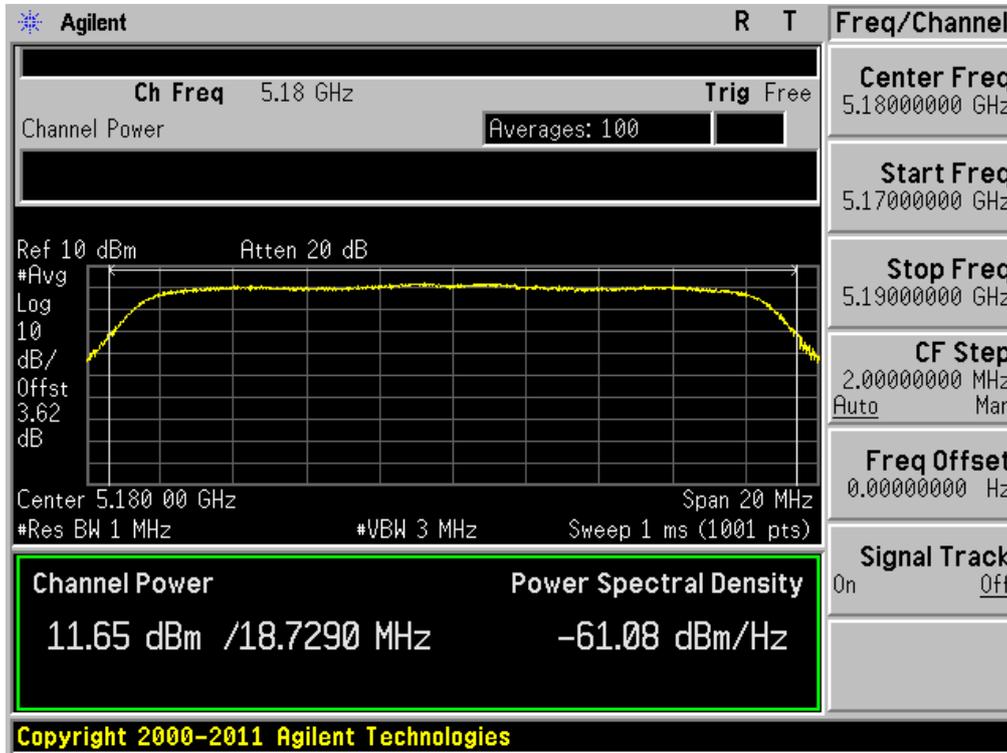
Note 1 : DCF = 10log(1 / X), X = On Time / On+Off time

Note 2 : Test Result = Measurement Data + DCF

Measurement Data PLOTS

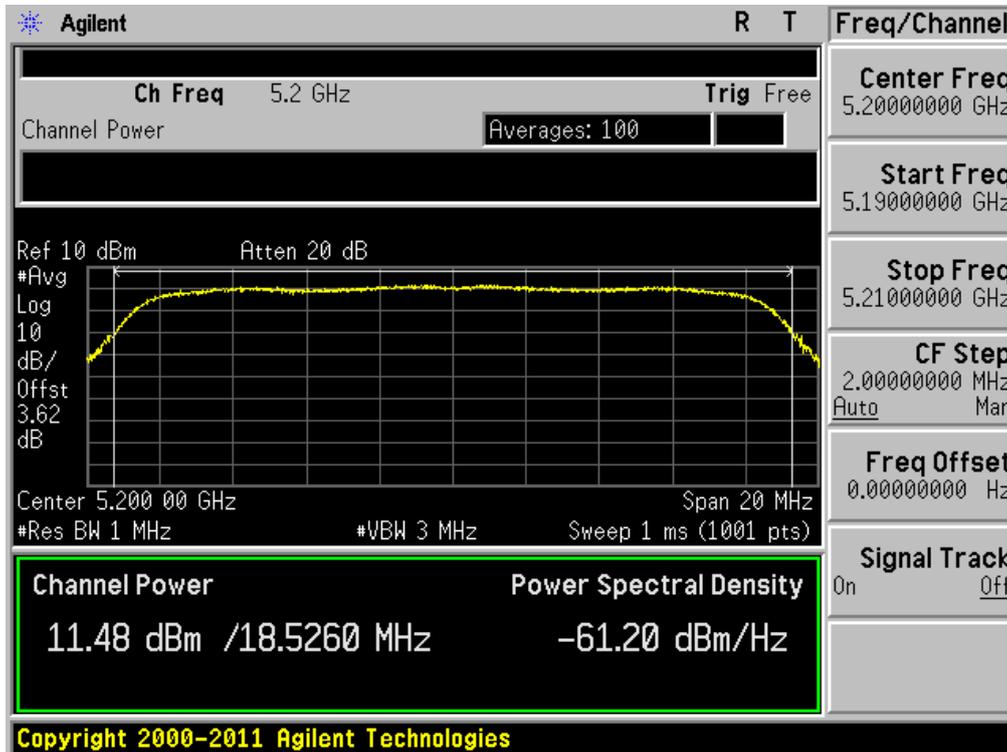
Output Power

Test Mode: 802.11a & Ch.36



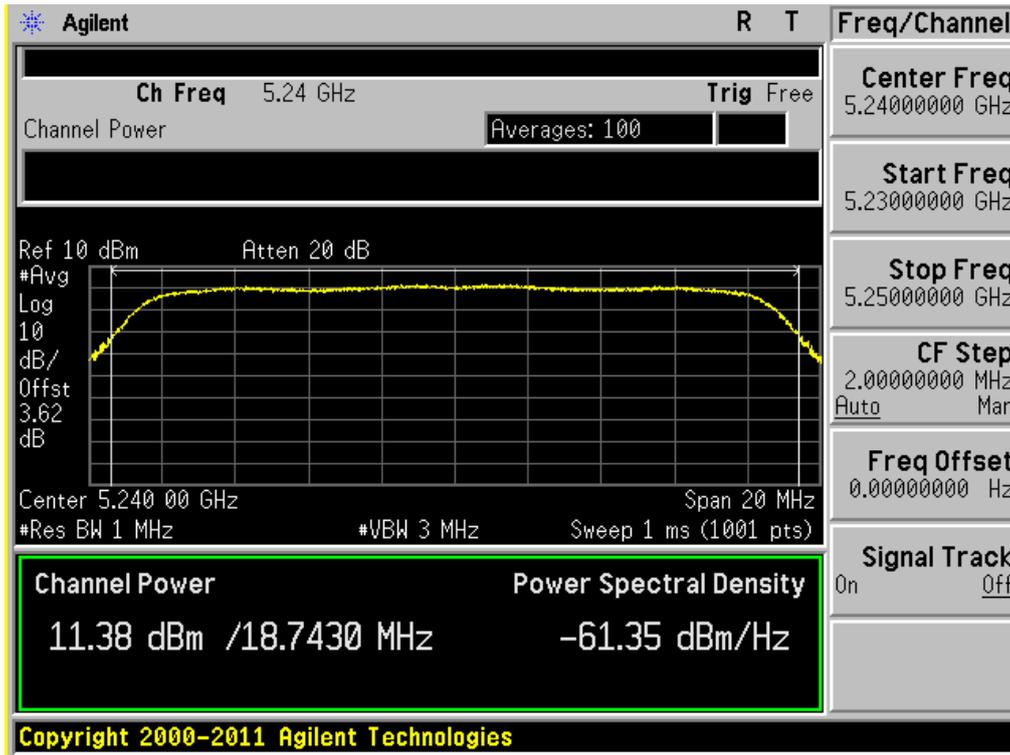
Output Power

Test Mode: 802.11a & Ch.40



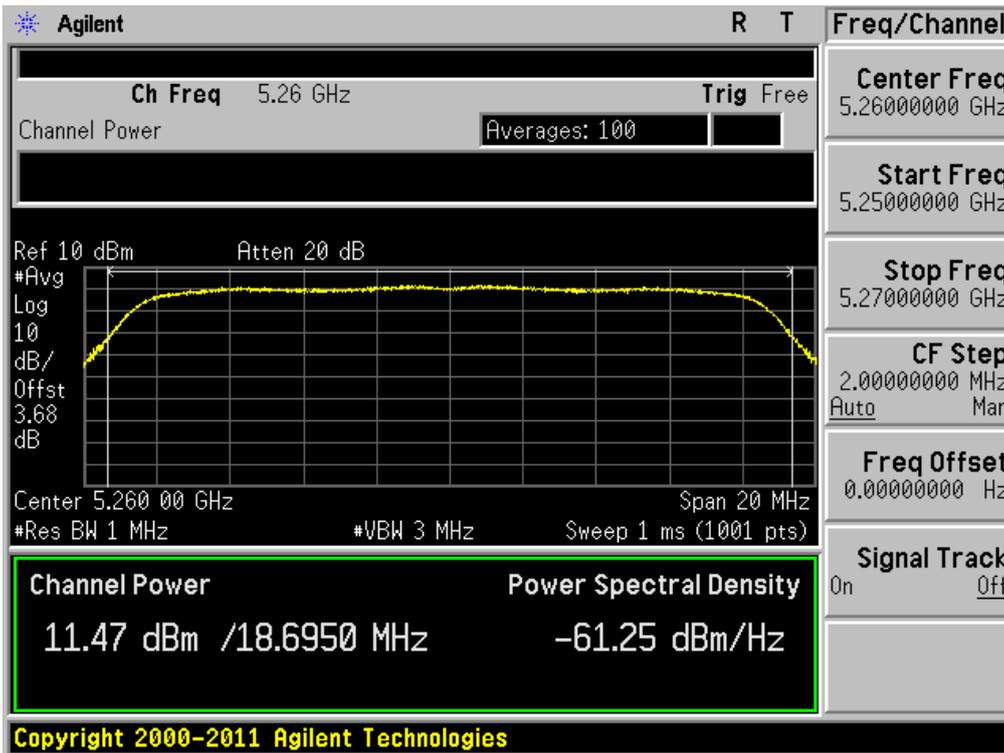
Output Power

Test Mode: 802.11a & Ch.48



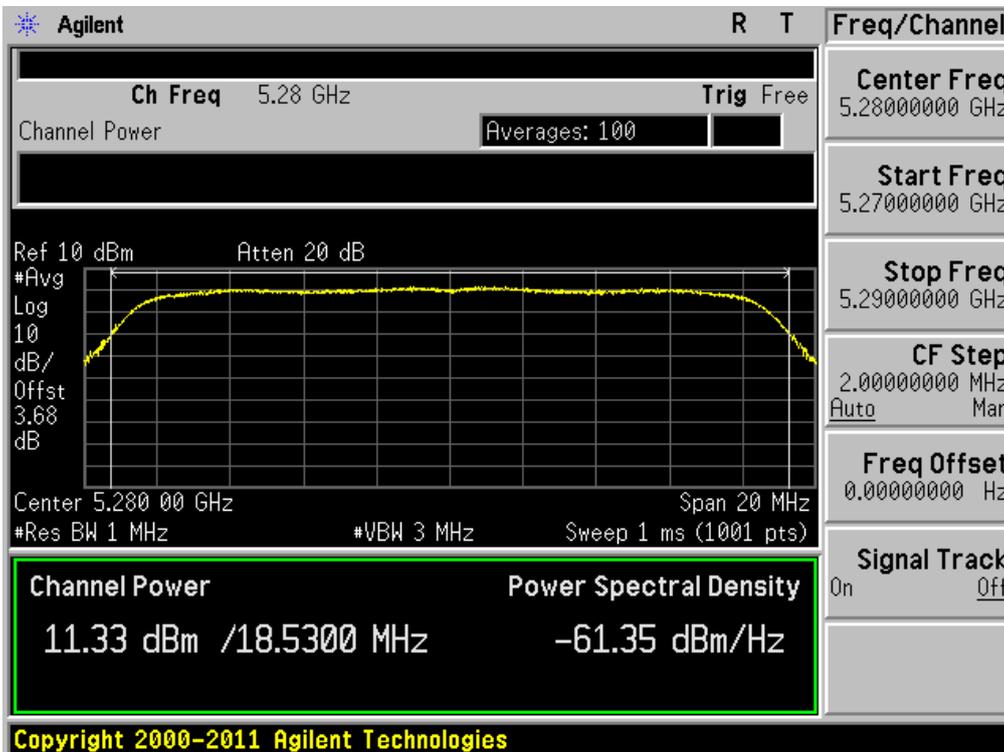
Output Power

Test Mode: 802.11a & Ch.52



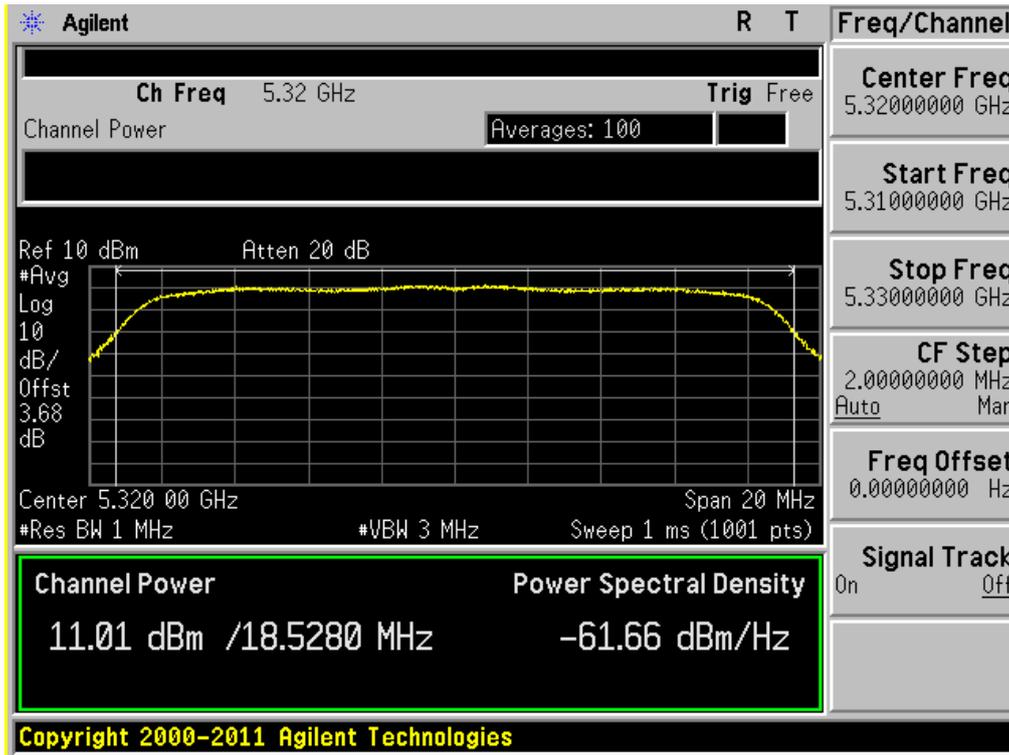
Output Power

Test Mode: 802.11a & Ch.56



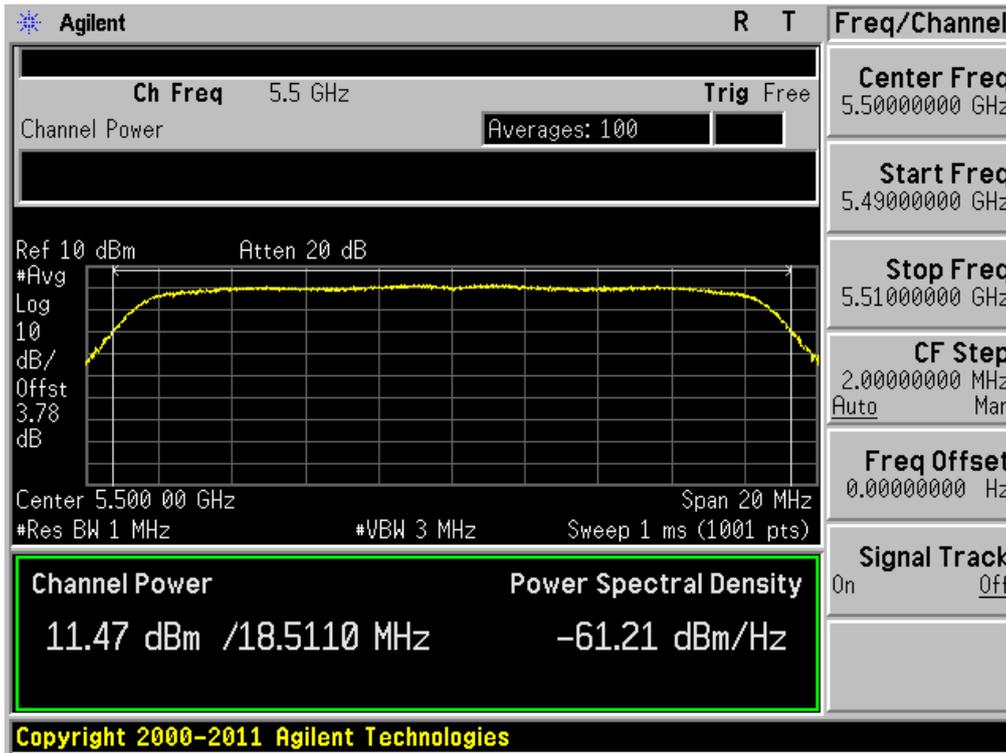
Output Power

Test Mode: 802.11a & Ch.64



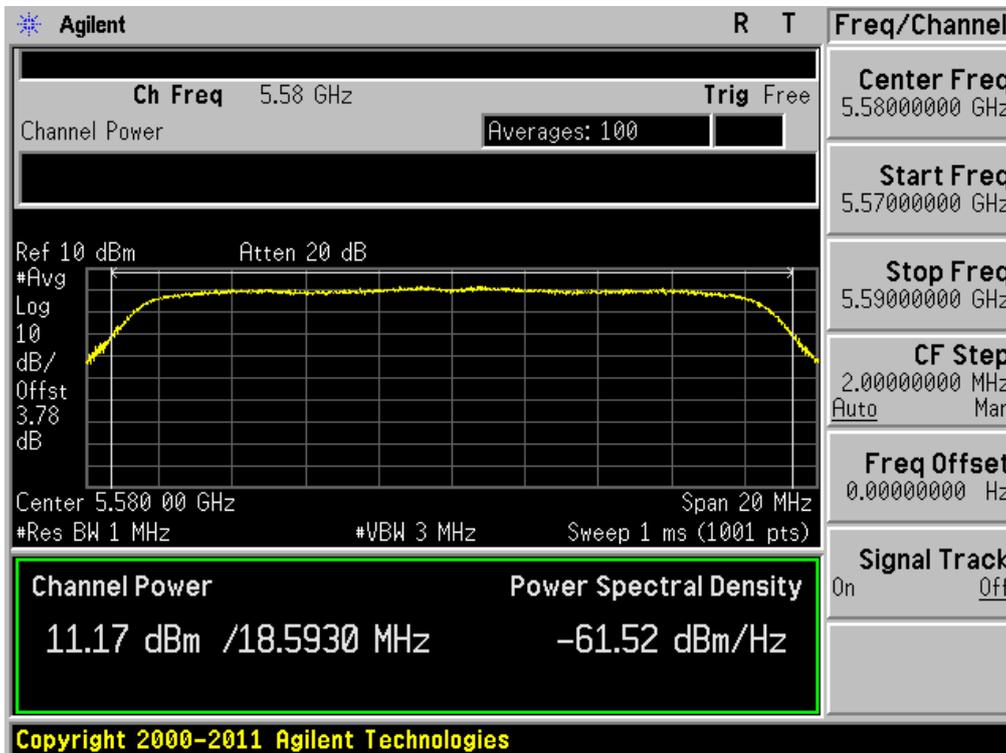
Output Power

Test Mode: 802.11a & Ch.100



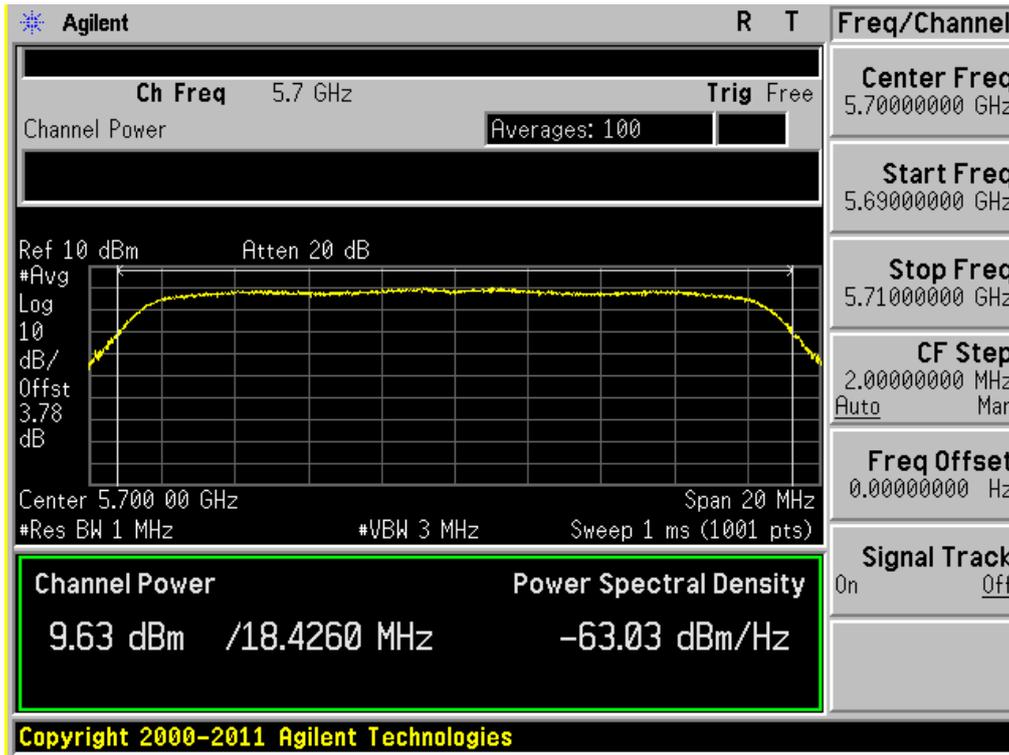
Output Power

Test Mode: 802.11a & Ch.116



Output Power

Test Mode: 802.11a & Ch.140



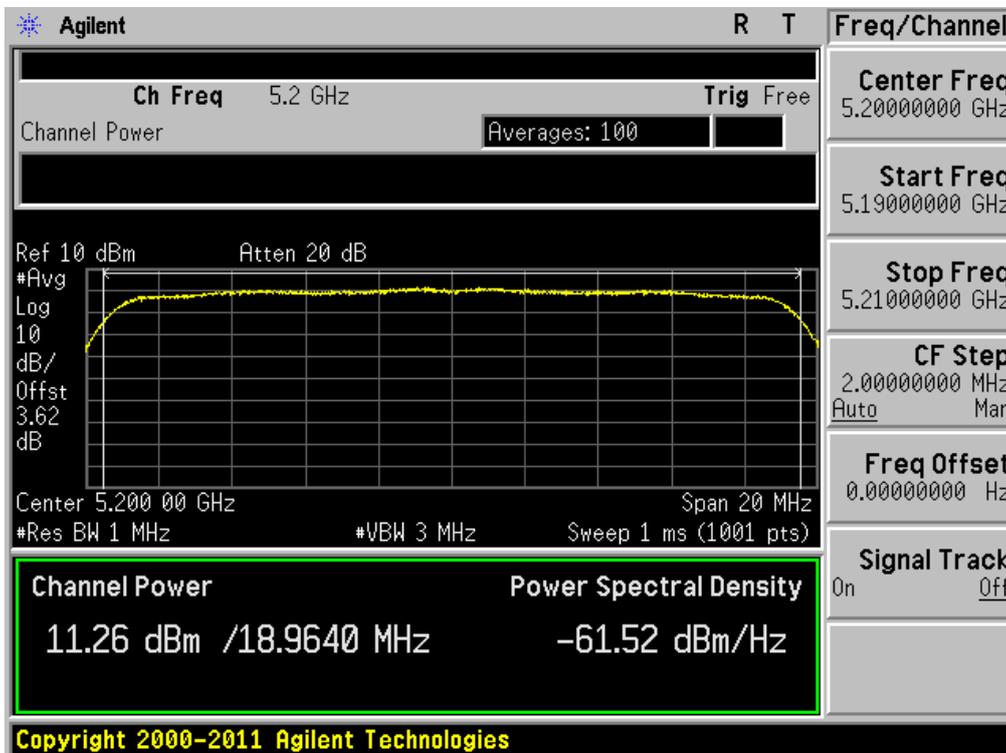
Output Power

Test Mode: 802.11n HT20 & Ch.36



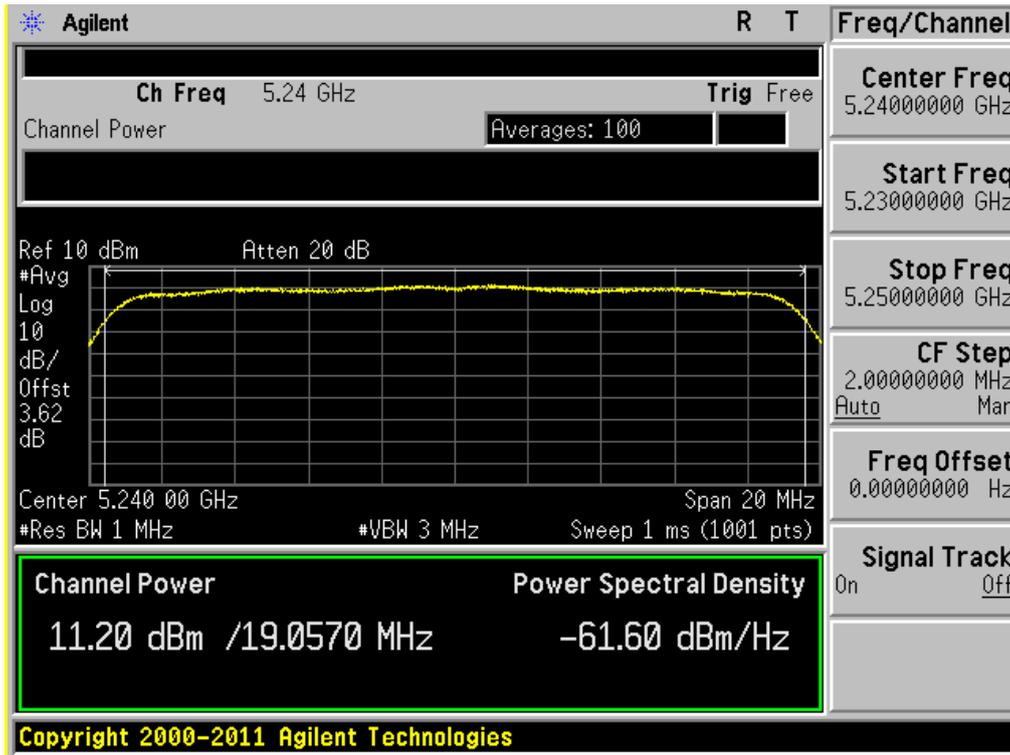
Output Power

Test Mode: 802.11n HT20 & Ch.40



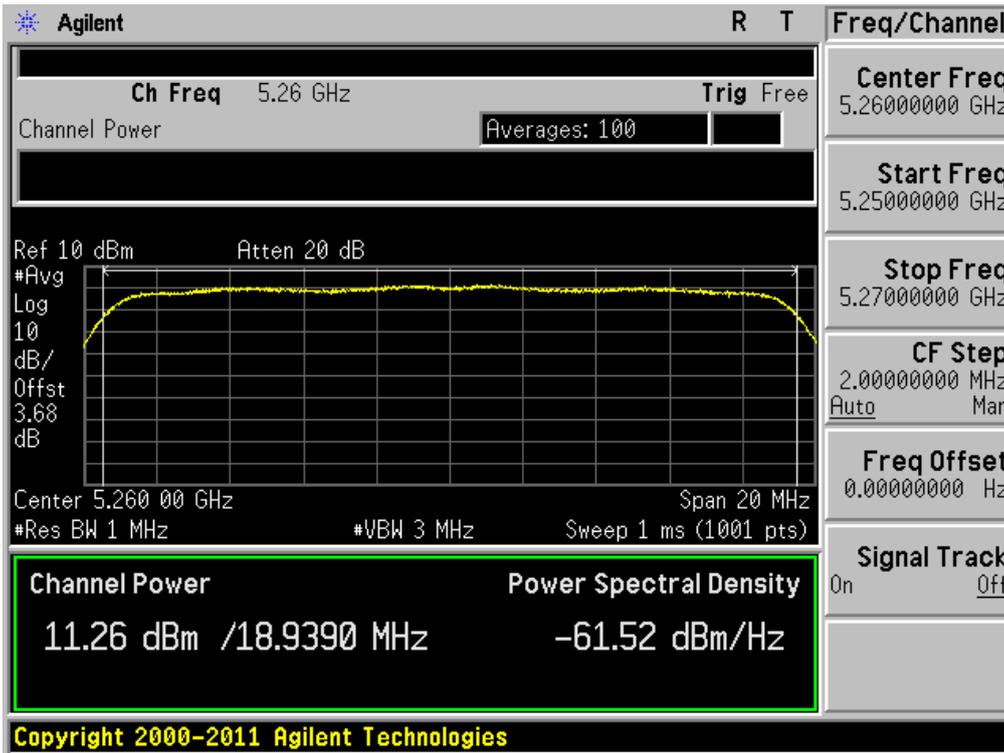
Output Power

Test Mode: 802.11n HT20 & Ch.48



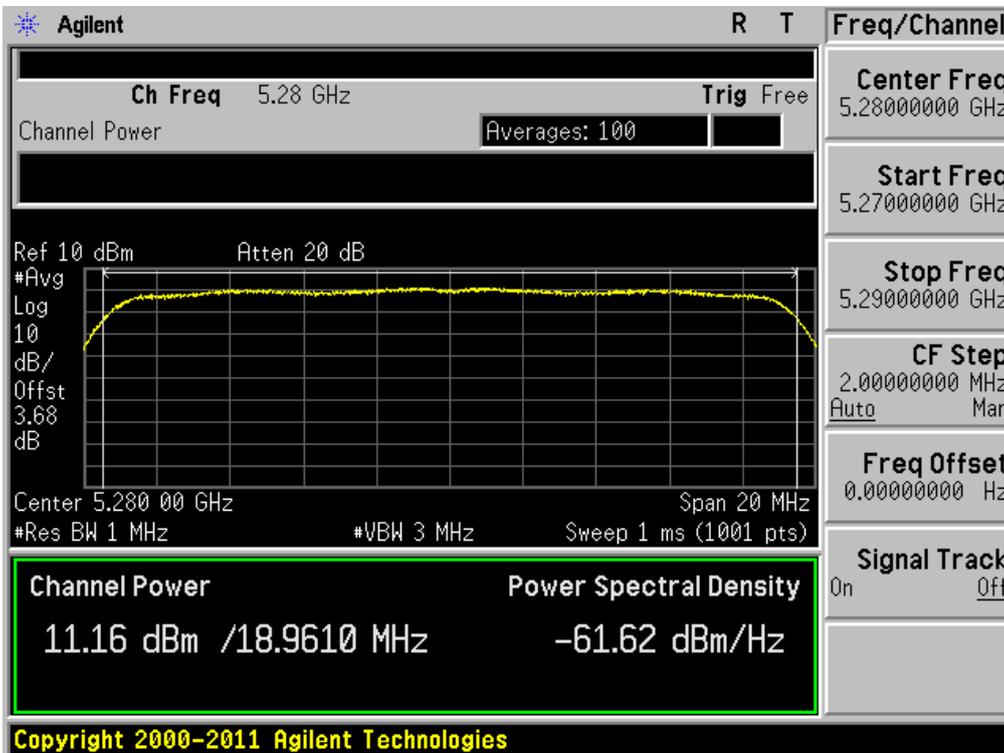
Output Power

Test Mode: 802.11n HT20 & Ch.52



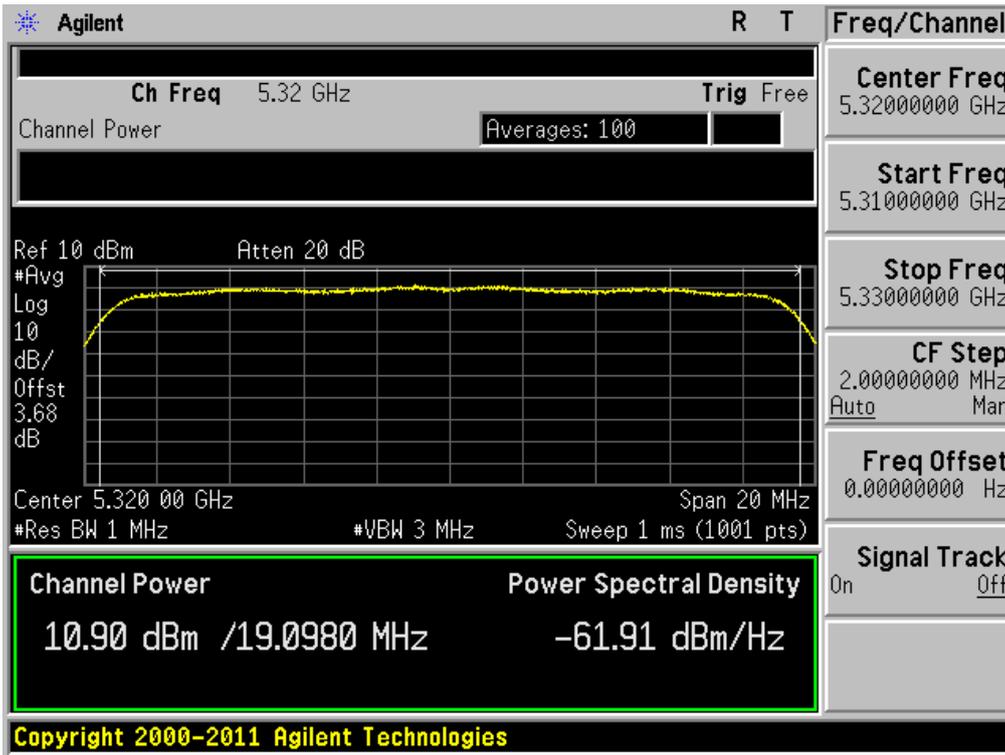
Output Power

Test Mode: 802.11n HT20 & Ch.56



Output Power

Test Mode: 802.11n HT20 & Ch.64



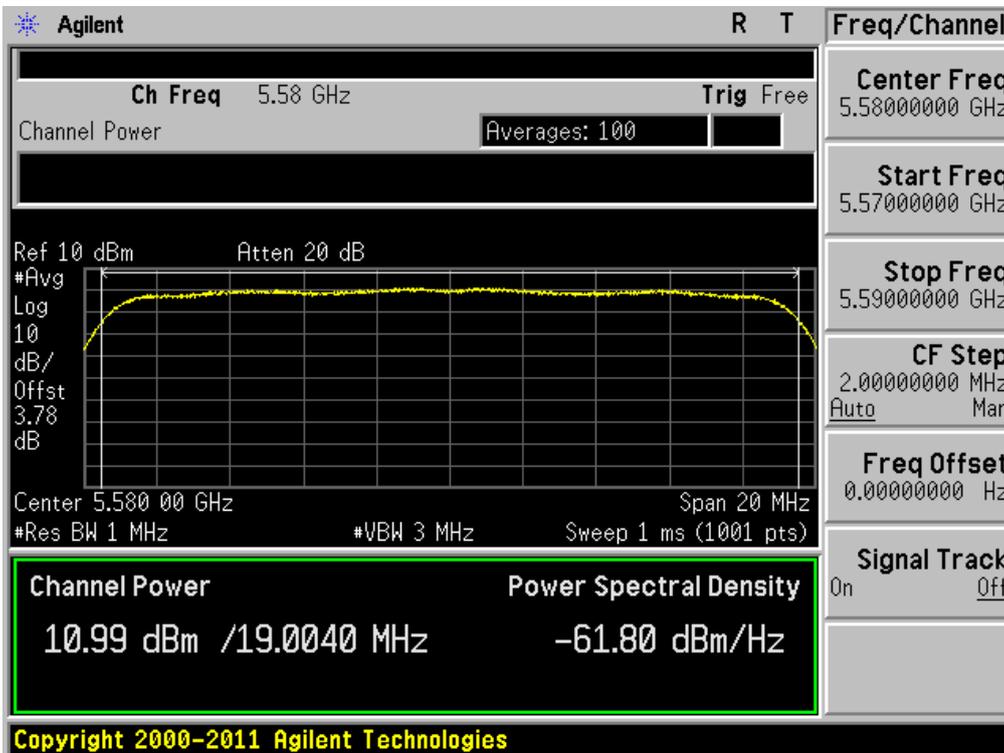
Output Power

Test Mode: 802.11n HT20 & Ch.100



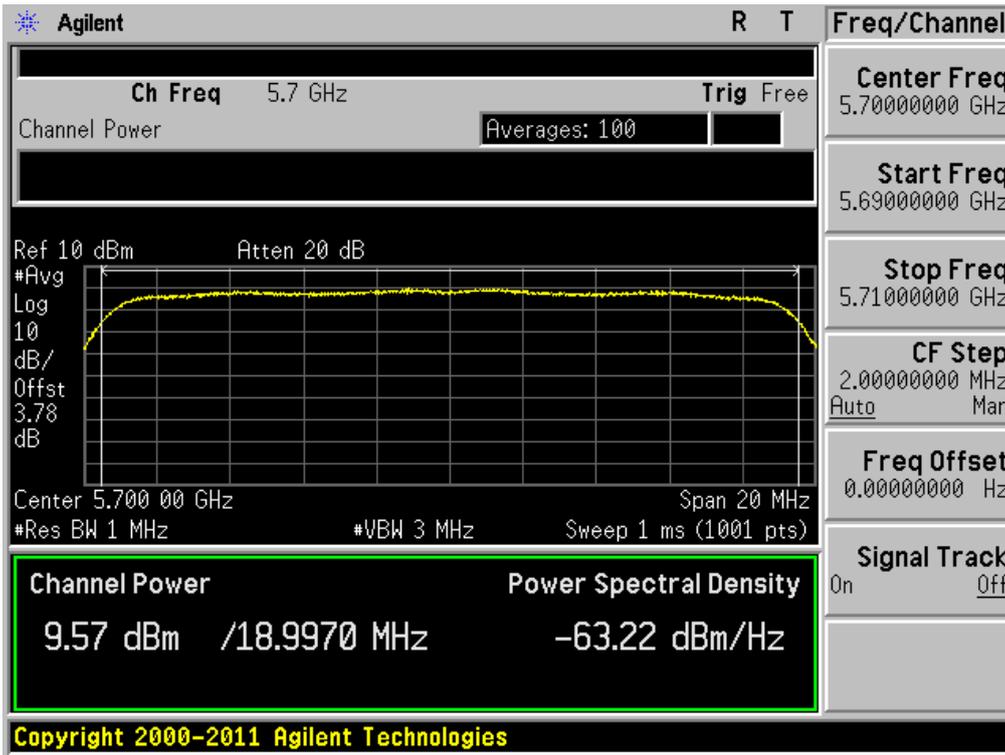
Output Power

Test Mode: 802.11n HT20 & Ch.116



Output Power

Test Mode: 802.11n HT20 & Ch.140



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	-0.31	4
Band II	11	-0.31	11
Band III	11	1.39	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	1.471	2.06	2.16	0.95	0.22	1.691
	40	5200	1.359					1.579
	48	5240	1.727					1.947
	52	5260	1.558	2.06	2.16	0.95	0.22	1.778
	56	5280	1.167					1.387
	64	5320	1.153					1.373
	100	5500	1.608	2.06	2.16	0.95	0.22	1.828
	116	5580	1.364					1.584
140	5700	-0.206	0.014					

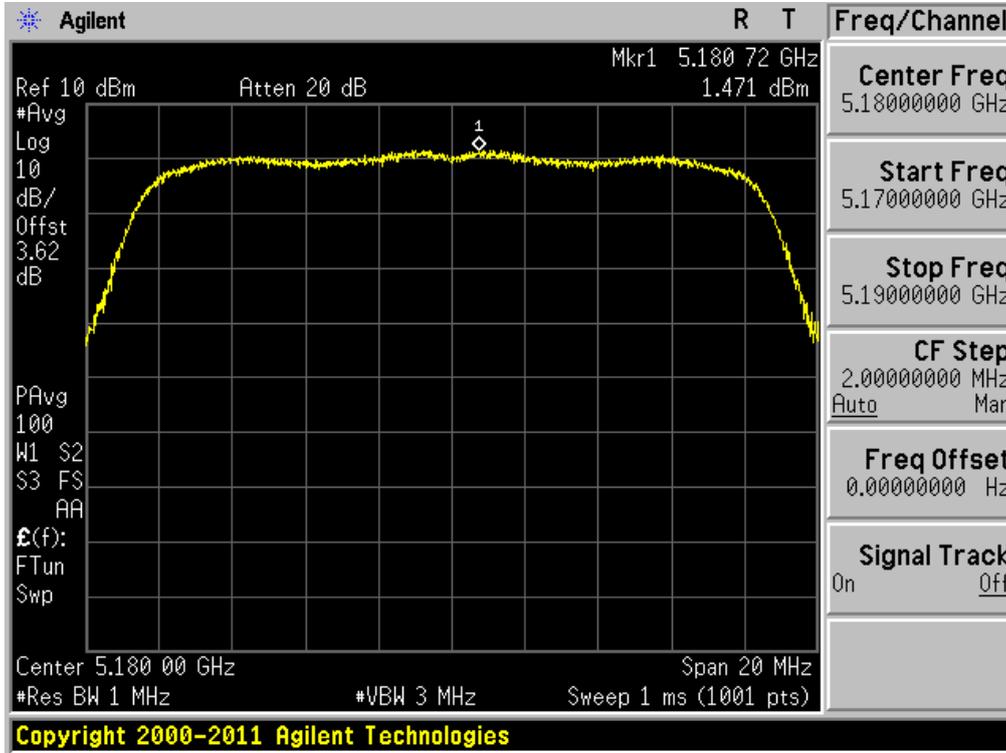
Mode	Channel	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Test Result [dBm]
				On Time[ms]	On+Off Time[ms]	X		
802.11n (20MHz)	36	5180	1.157	1.92	2.02	0.95	0.22	1.377
	40	5200	1.329					1.549
	48	5240	1.254					1.474
	52	5260	1.404	1.92	2.02	0.95	0.22	1.624
	56	5280	1.100					1.320
	64	5320	0.696					0.916
	100	5500	1.495	1.92	2.02	0.95	0.22	1.715
	116	5580	0.741					0.961
140	5700	-0.656	-0.436					
-802.11n (40MHz)	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

Note 1 : DCF = 10log(1 / X), X = On Time / On+Off time
 Note 2 : Test Result = Measurement Data + DCF

Measurement Data PLOTS

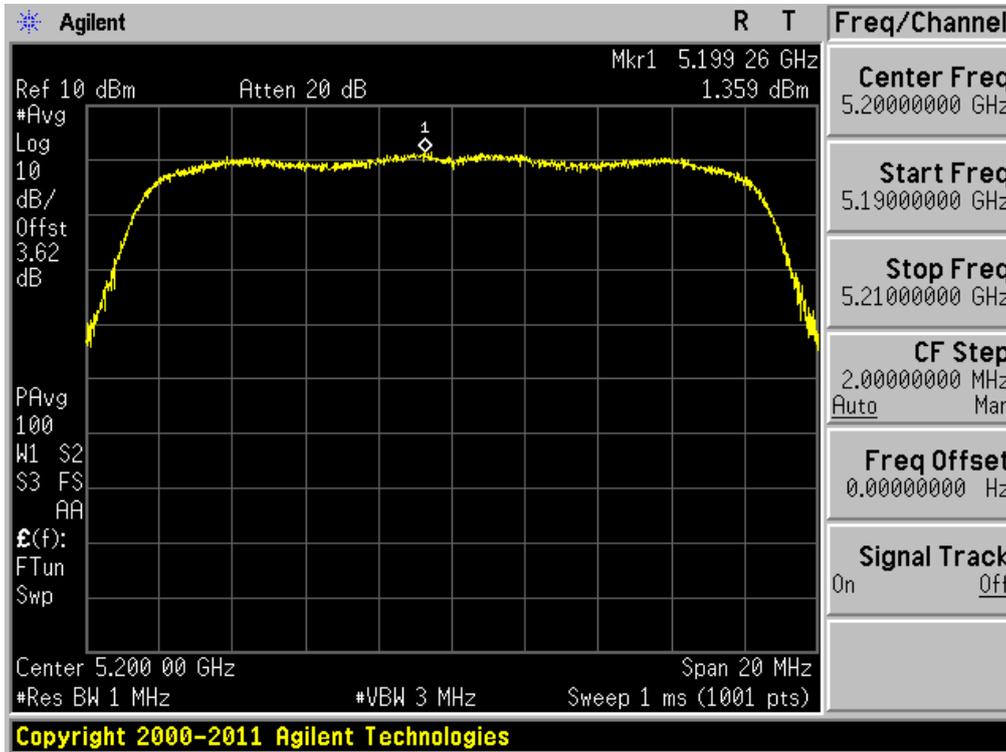
Peak Power Spectral Density

Test Mode: 802.11a & Ch.36



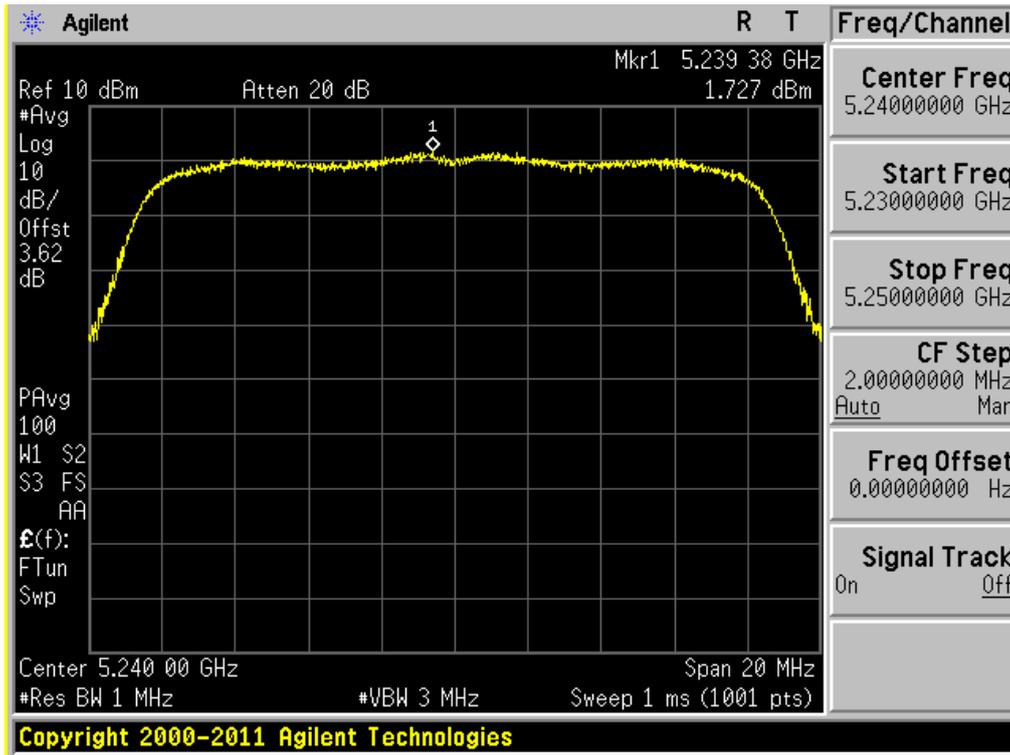
Peak Power Spectral Density

Test Mode: 802.11a & Ch.40



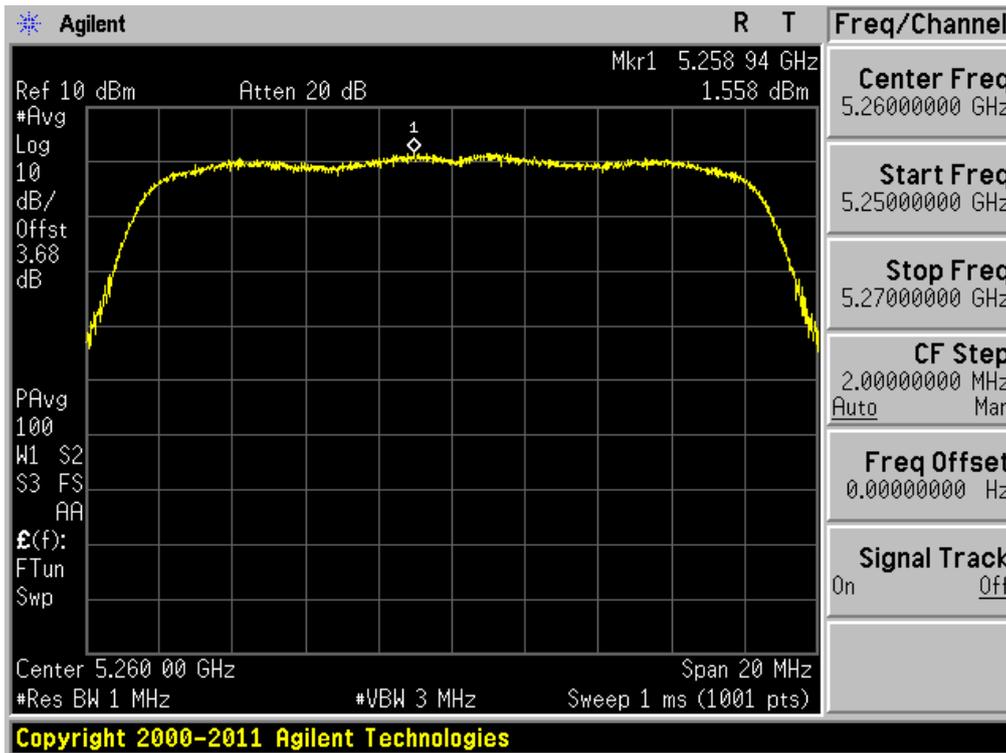
Peak Power Spectral Density

Test Mode: 802.11a & Ch.48



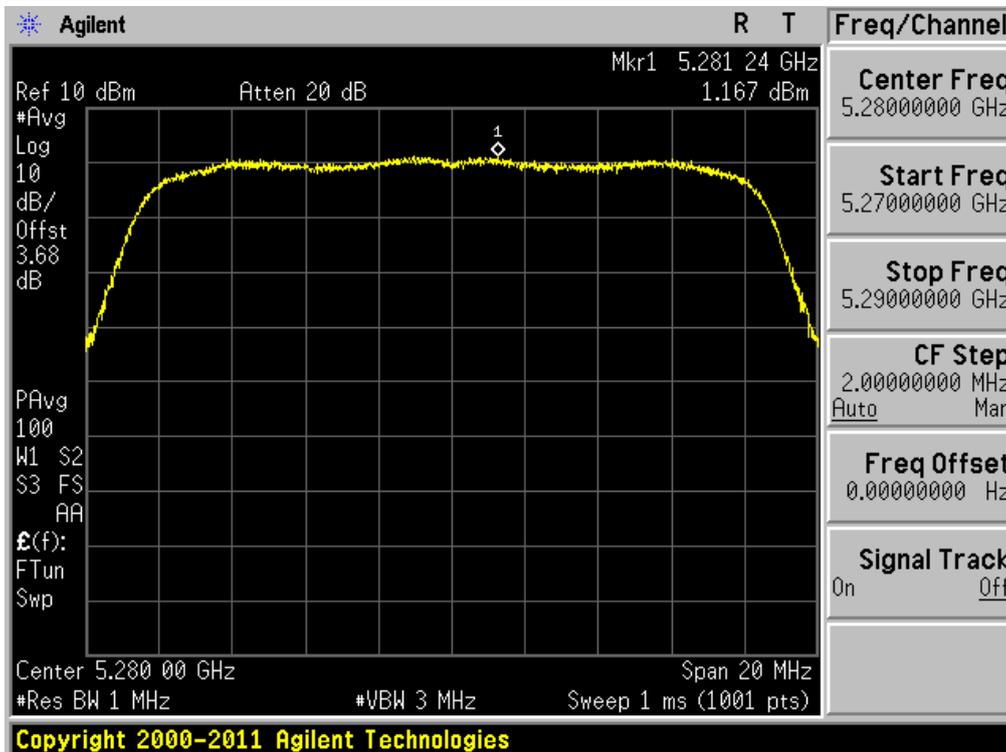
Peak Power Spectral Density

Test Mode: 802.11a & Ch.52



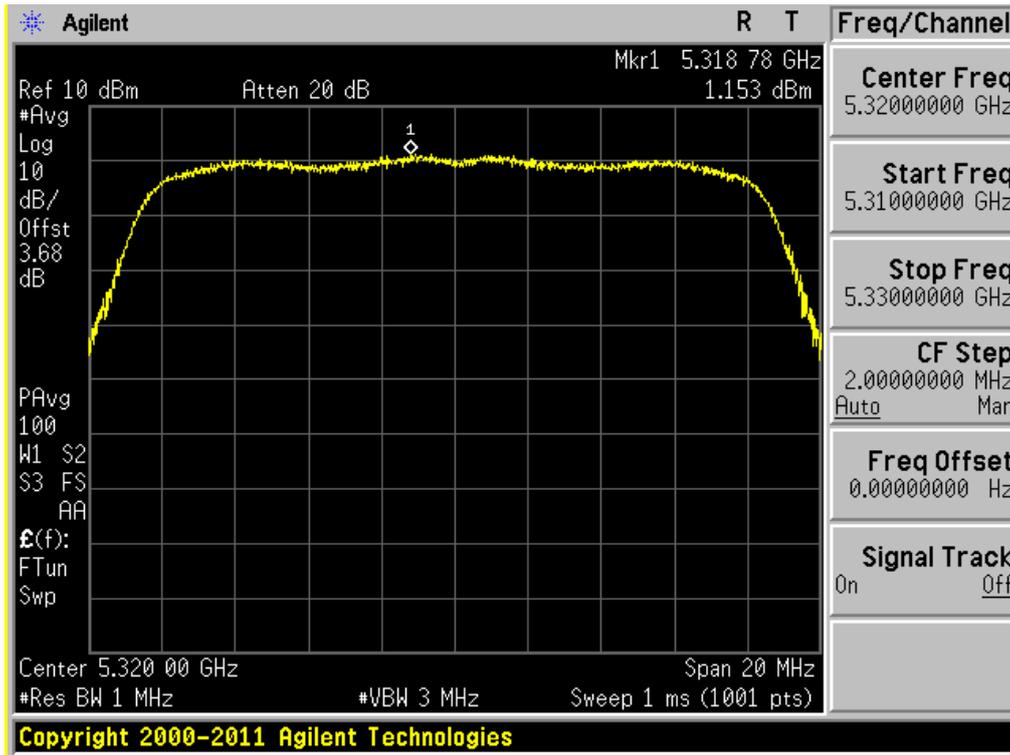
Peak Power Spectral Density

Test Mode: 802.11a & Ch.56



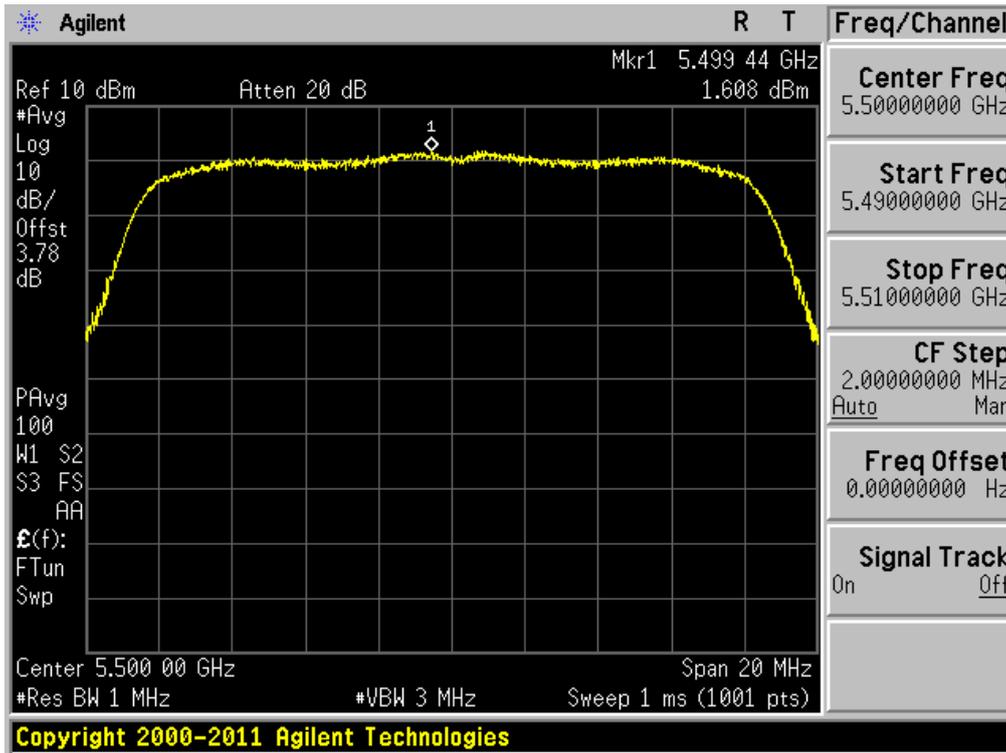
Peak Power Spectral Density

Test Mode: 802.11a & Ch.64



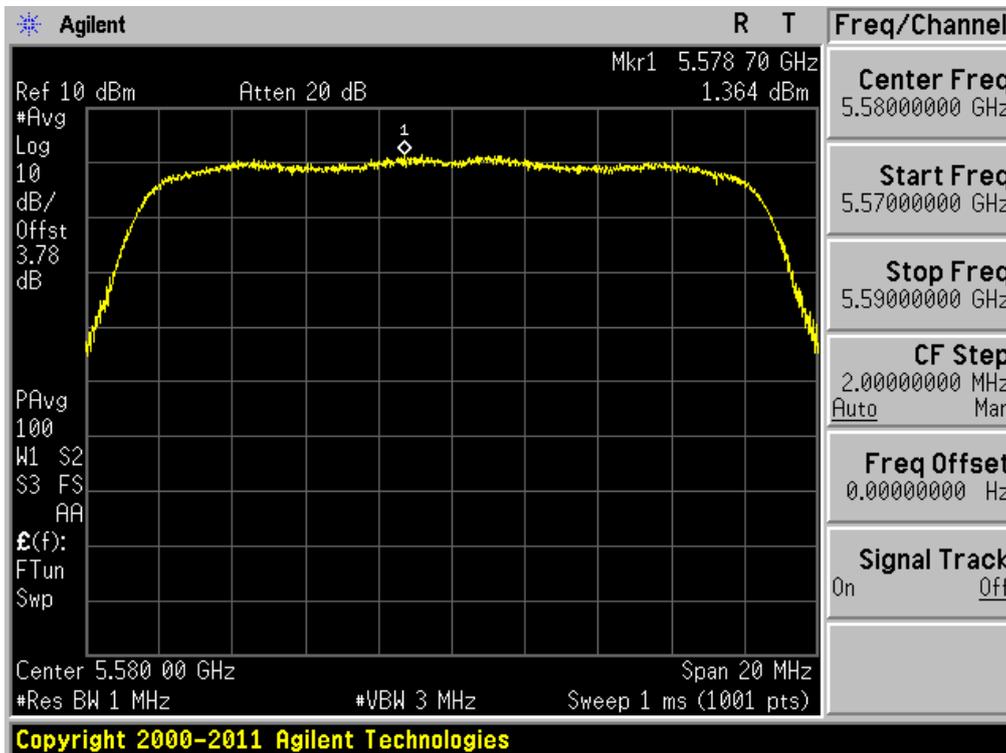
Peak Power Spectral Density

Test Mode: 802.11a & Ch.100



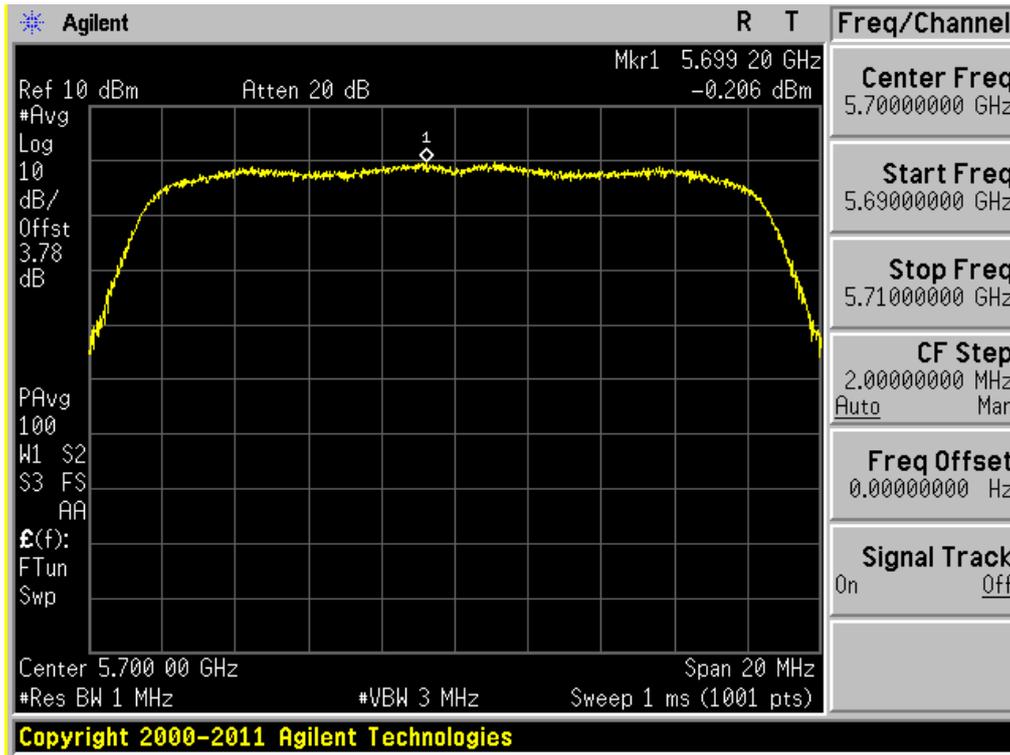
Peak Power Spectral Density

Test Mode: 802.11a & Ch.116



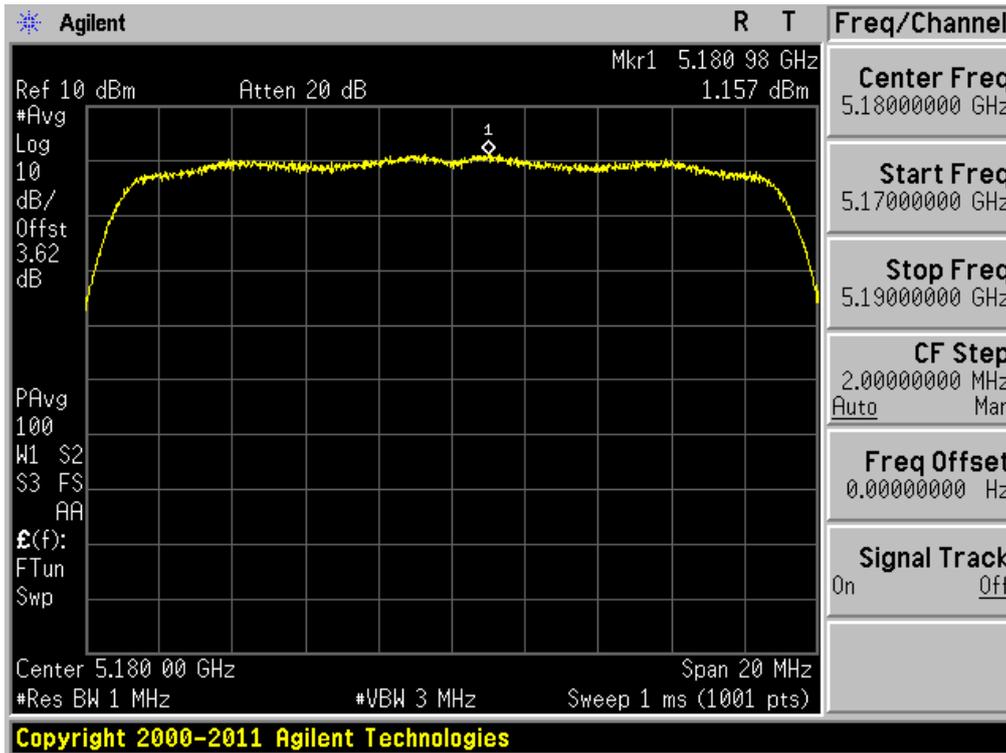
Peak Power Spectral Density

Test Mode: 802.11a & Ch.140



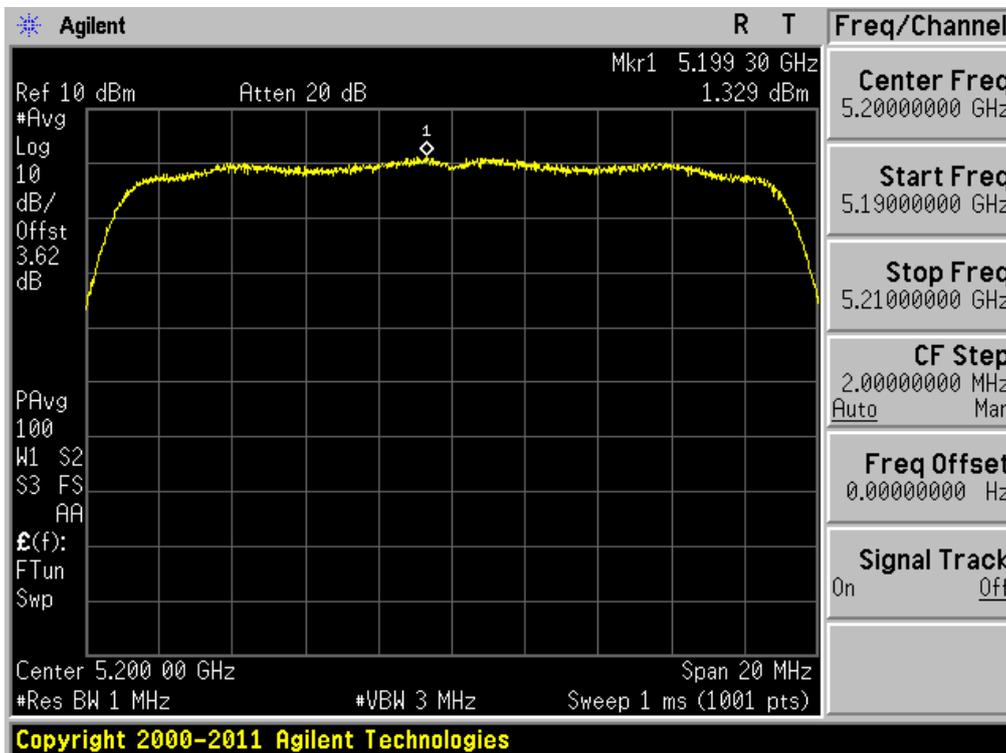
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.36



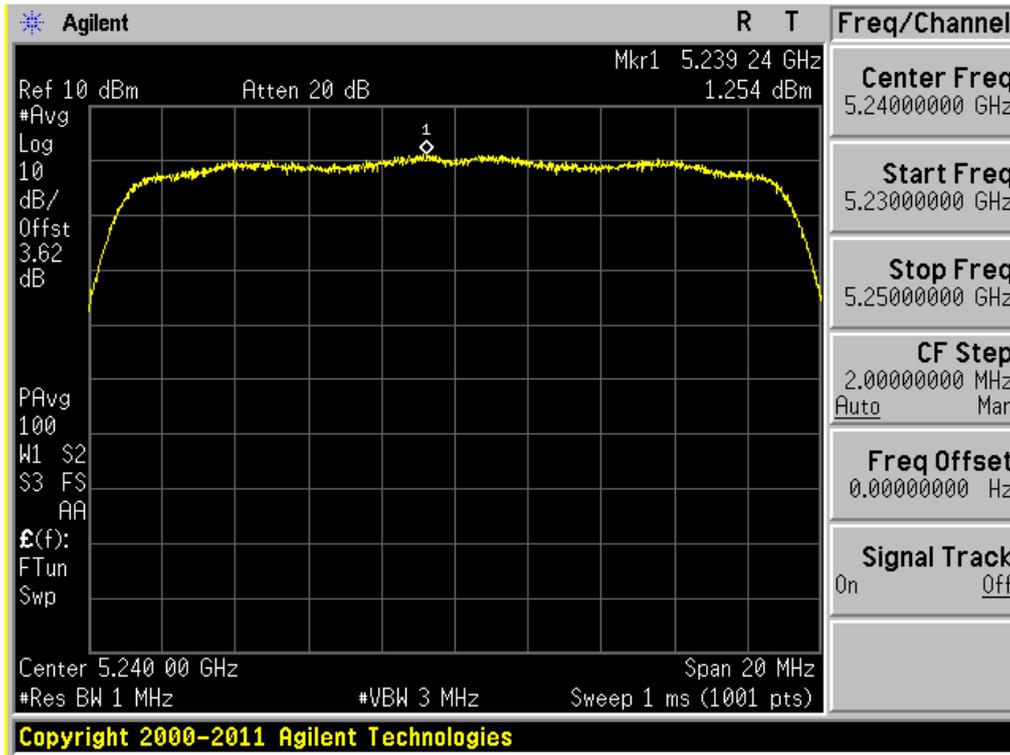
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.40



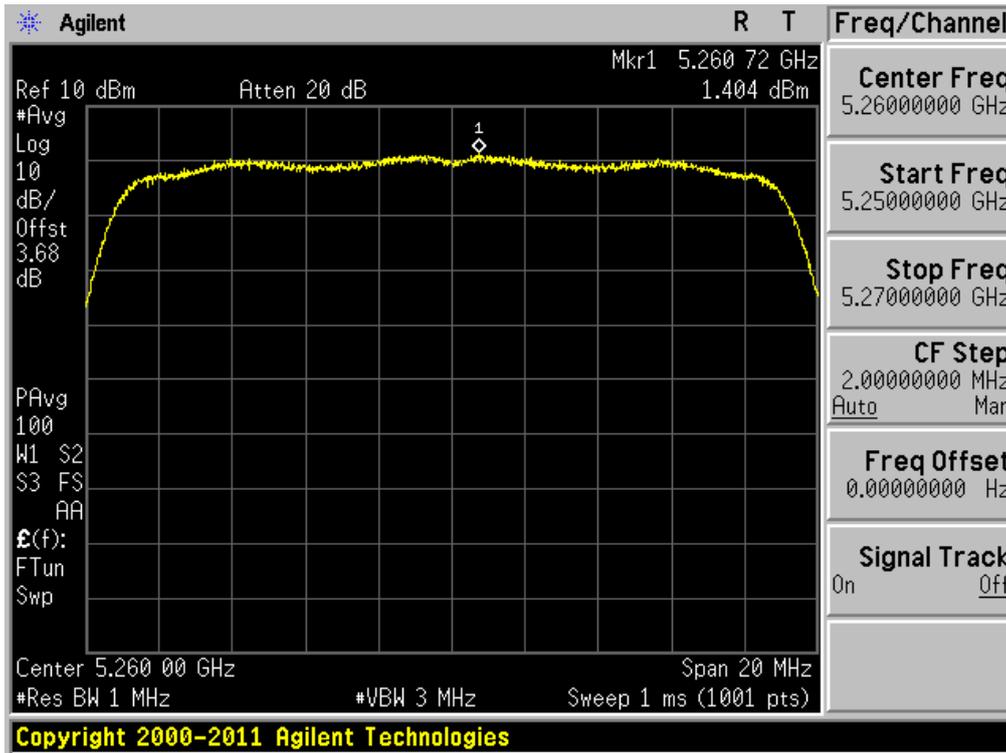
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.48



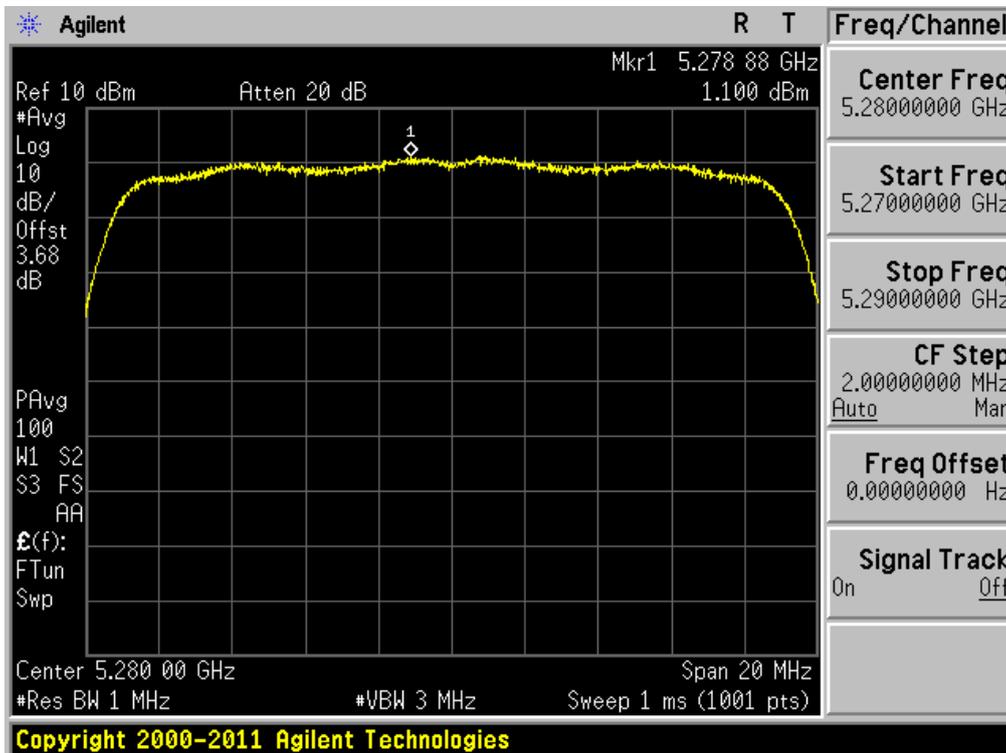
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.52



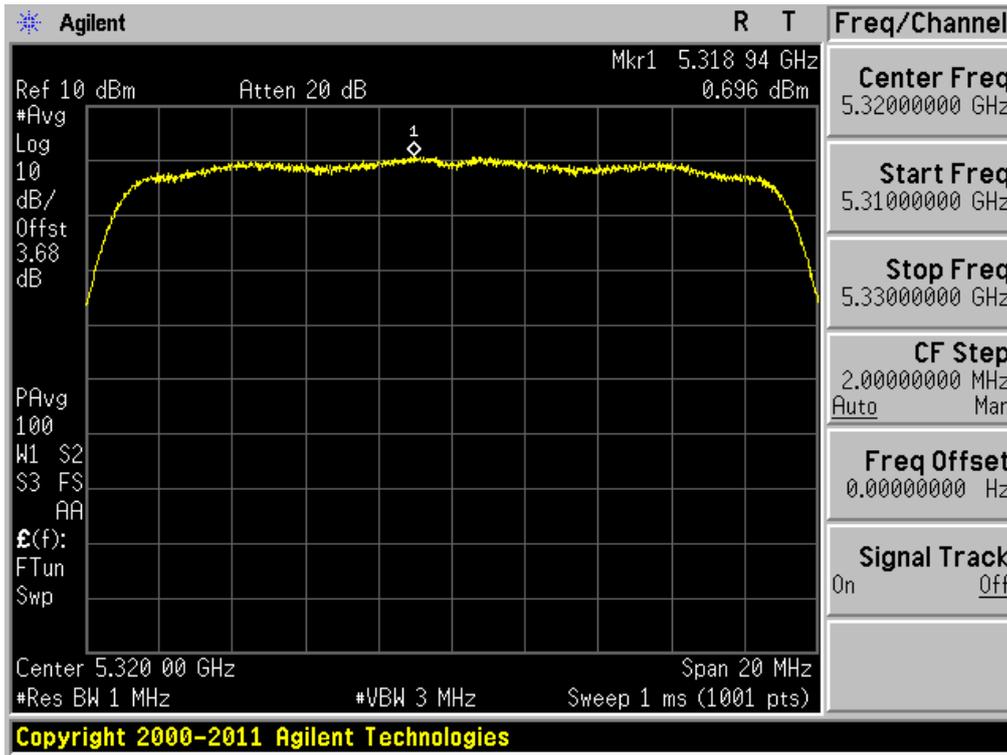
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.56



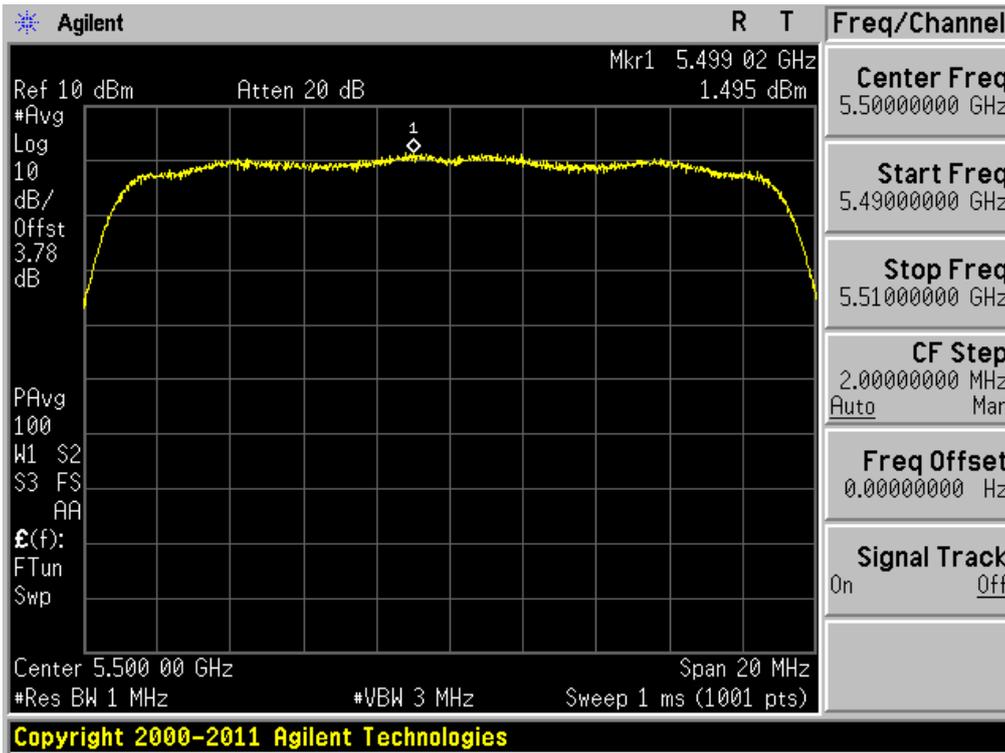
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.64



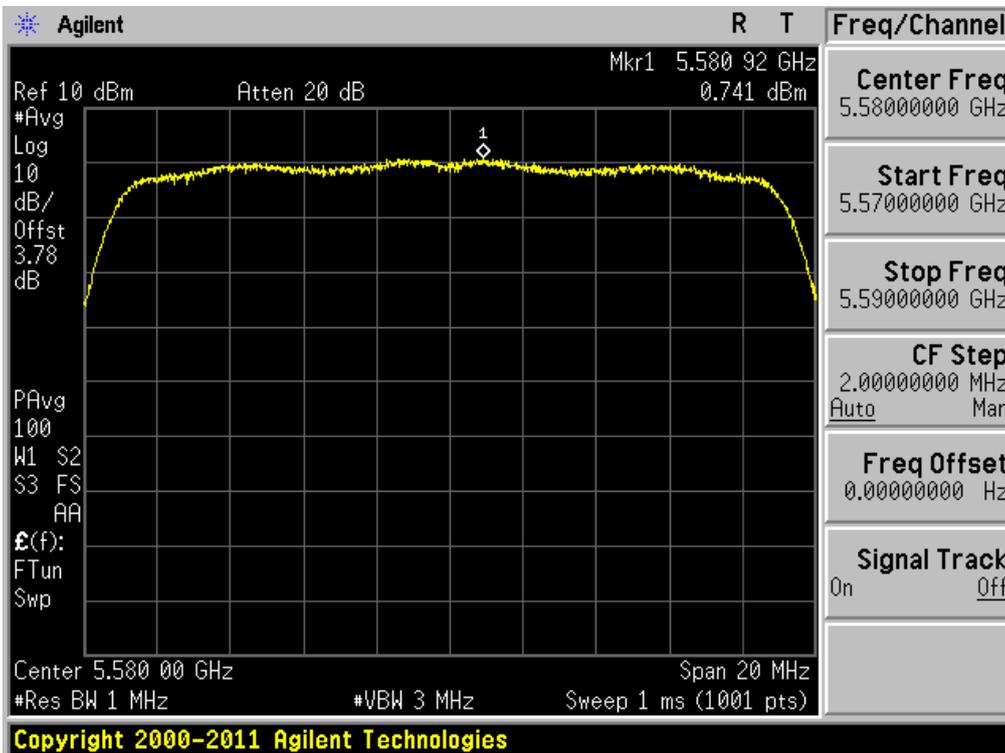
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.100



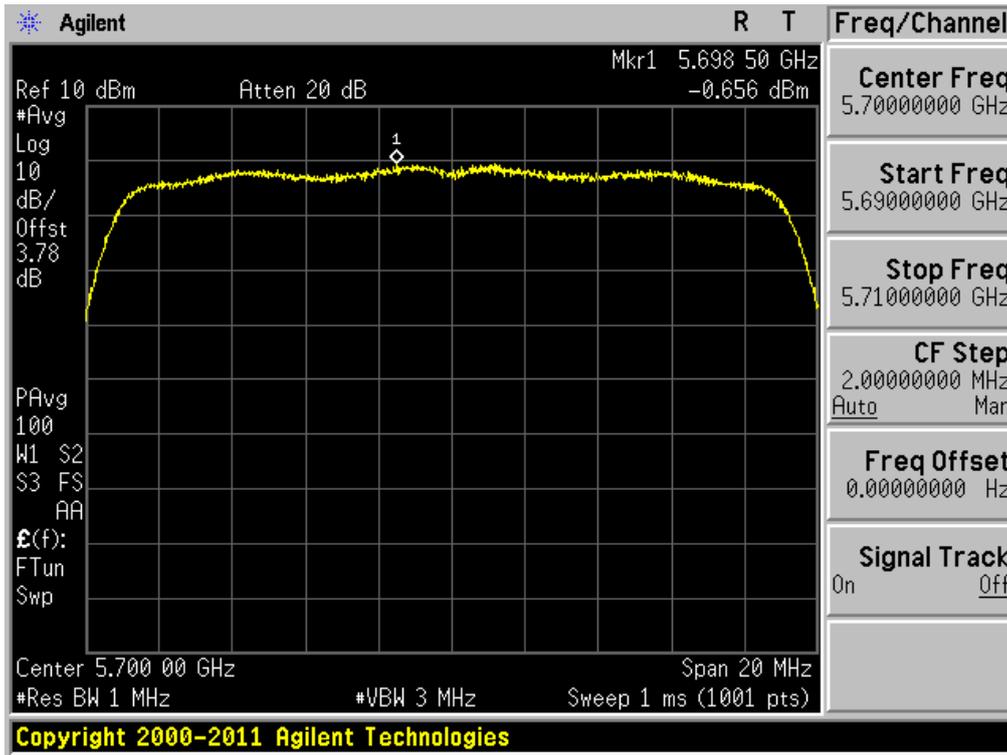
Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.116



Peak Power Spectral Density

Test Mode: 802.11n HT20 & Ch.140



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.

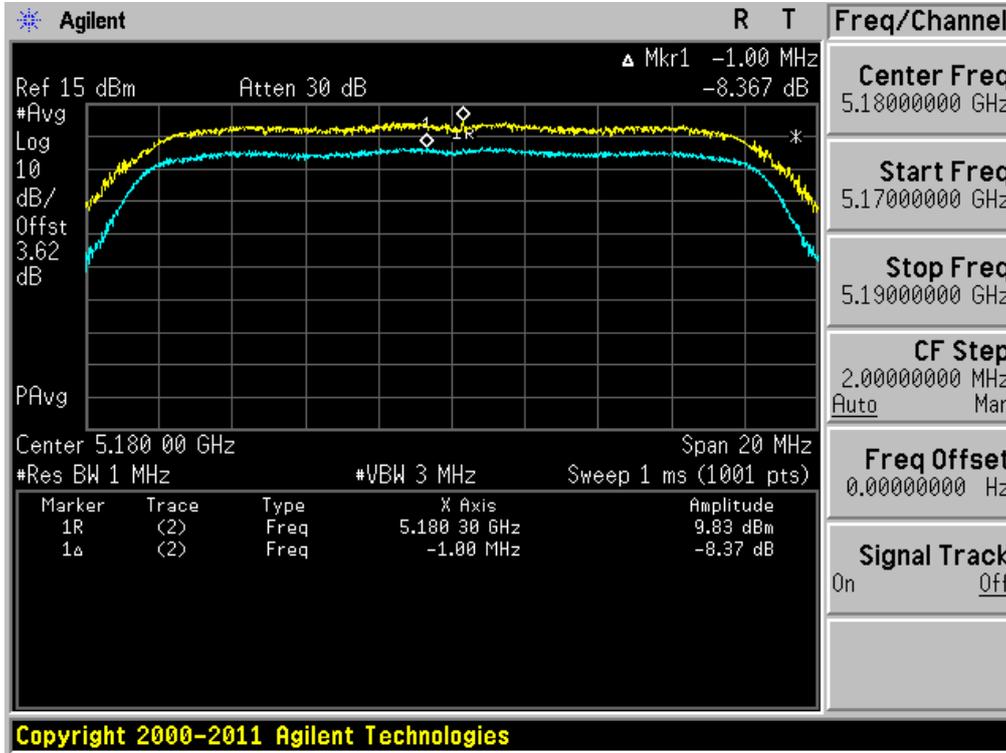
■ TEST RESULT : **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [dB/MHz]	Limit [dB/MHz]
802.11a	Band I	36	5180	8.367	13.000
		40	5200	8.506	
		48	5240	7.387	
	Band II	52	5260	7.611	
		56	5280	7.456	
		64	5320	7.355	
	Band III	100	5500	7.727	
		116	5580	7.188	
		140	5700	7.433	
802.11n (20MHz)	Band I	36	5180	7.383	
		40	5200	7.765	
		48	5240	7.400	
	Band II	52	5260	7.983	
		56	5280	8.150	
		64	5320	7.799	
	Band III	100	5500	7.929	
		116	5580	7.771	
		140	5700	7.744	
802.11n (40MHz)	Band I	-	-	-	
		-	-	-	
	Band II	-	-	-	
		-	-	-	
	Band III	-	-	-	
		-	-	-	

Measurement Data PLOTS

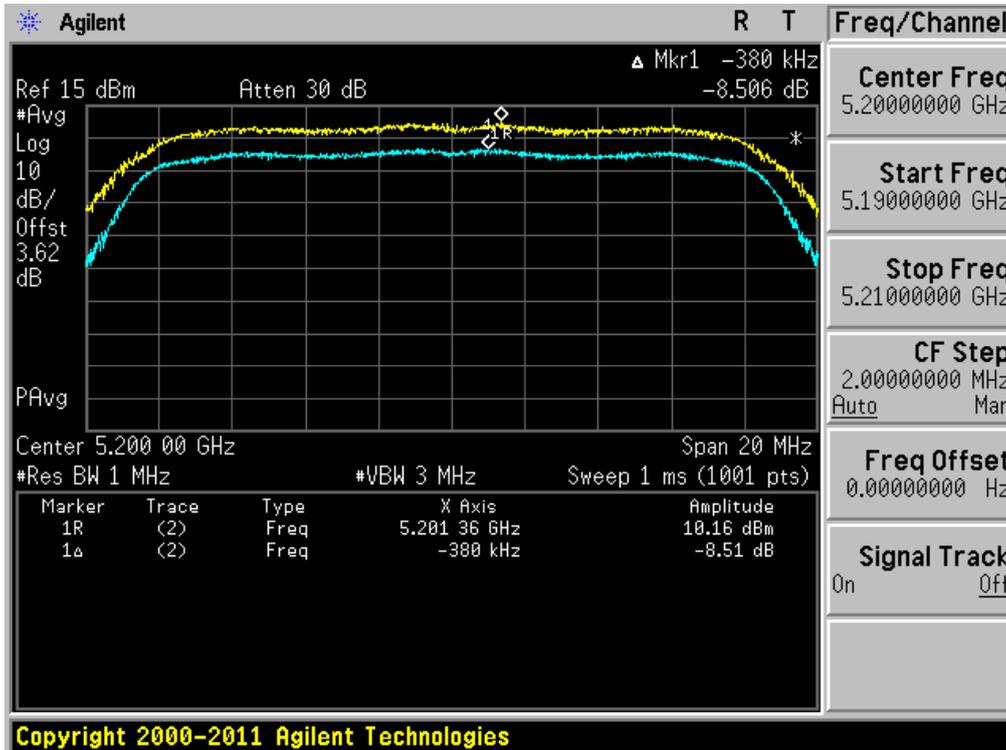
Peak Excursion Ratio

Test Mode: 802.11a & Ch.36



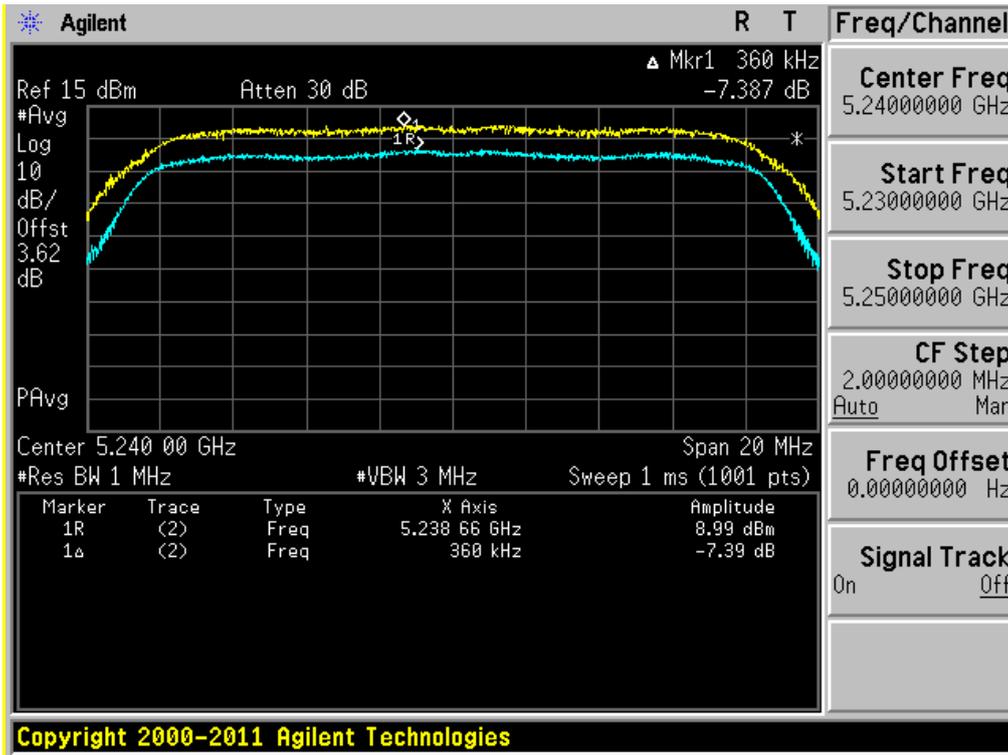
Peak Excursion Ratio

Test Mode: 802.11a & Ch.40



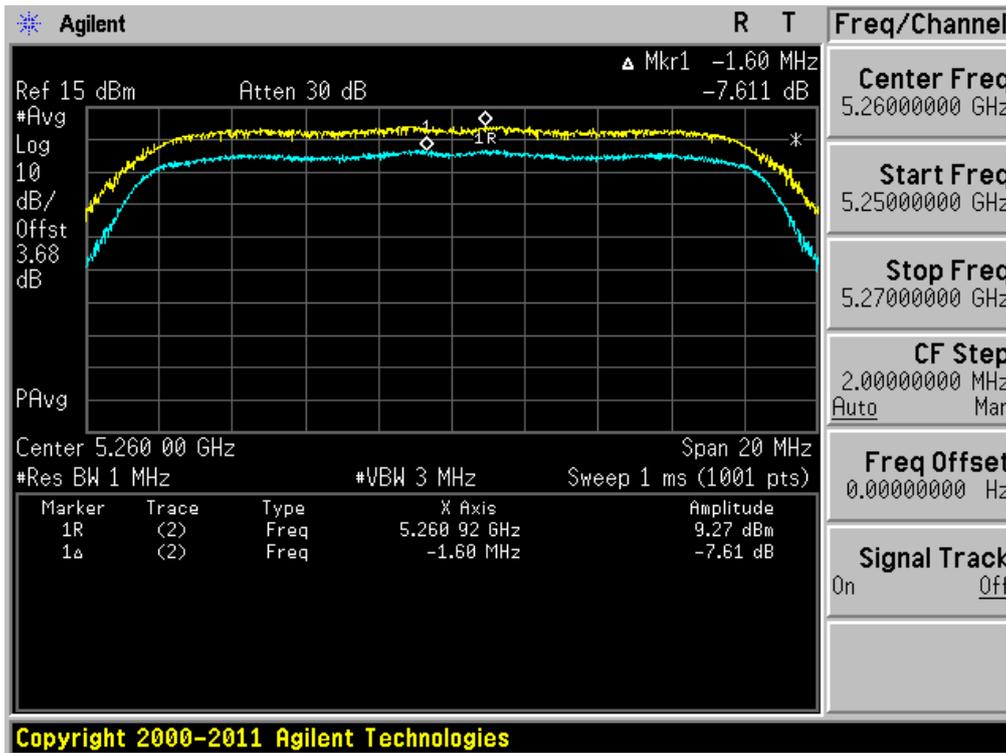
Peak Excursion Ratio

Test Mode: 802.11a & Ch.48



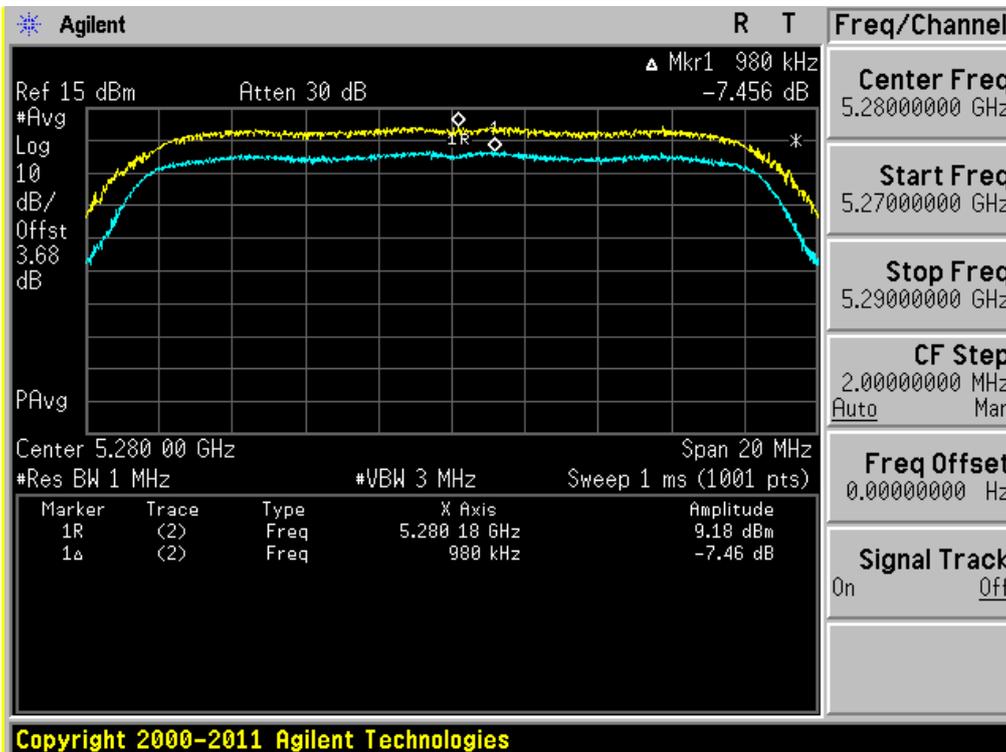
Peak Excursion Ratio

Test Mode: 802.11a & Ch.52



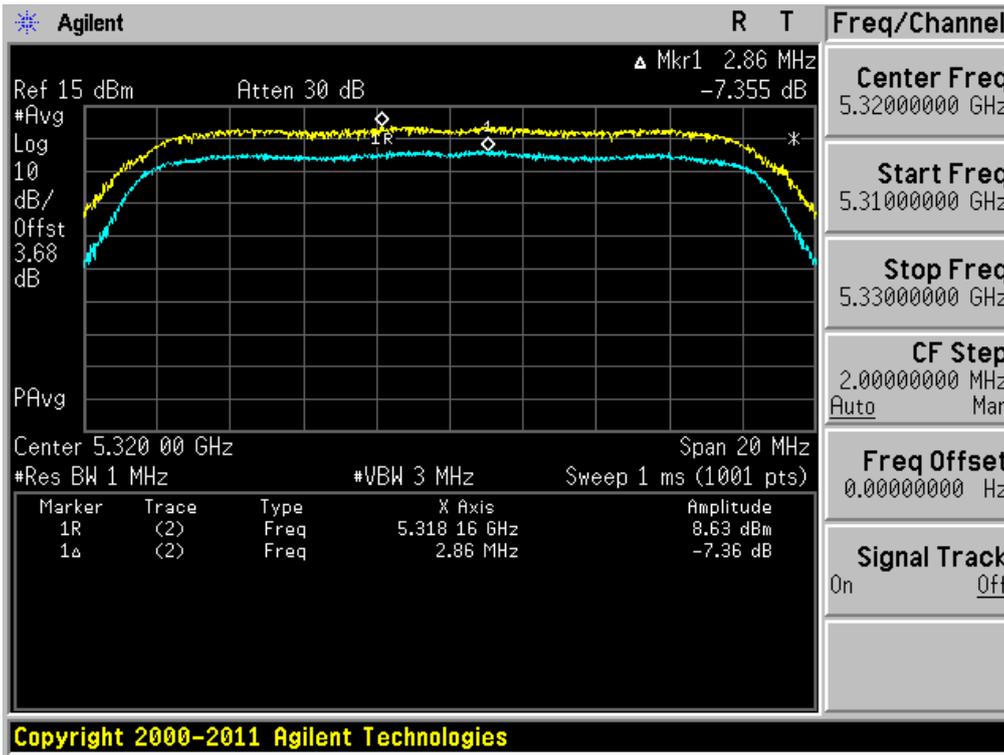
Peak Excursion Ratio

Test Mode: 802.11a & Ch.56



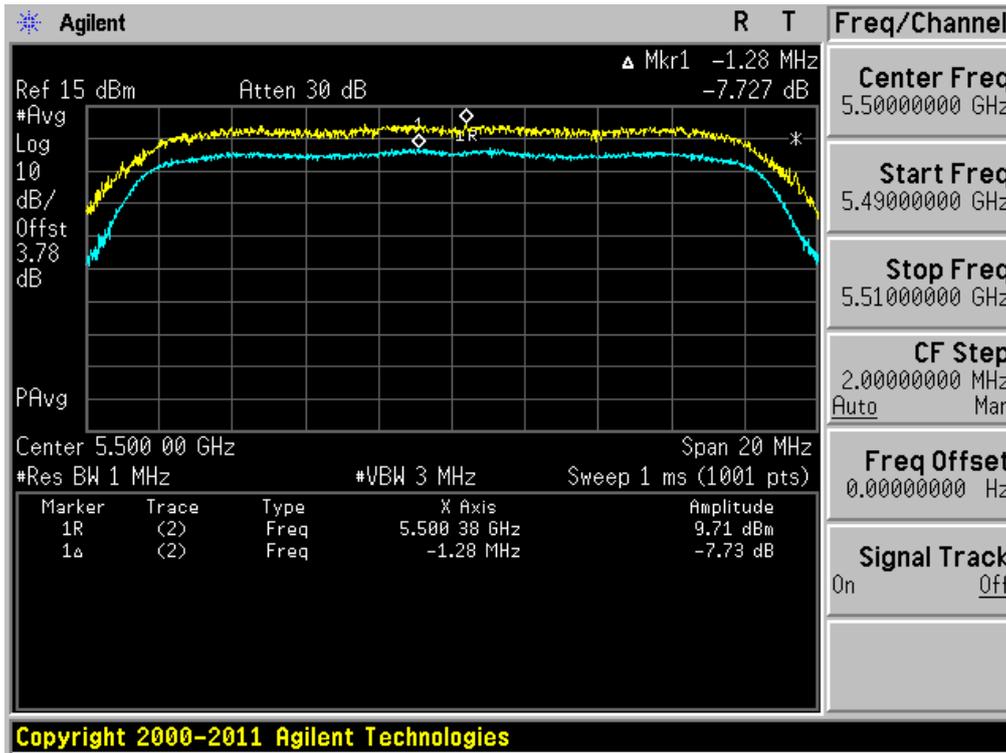
Peak Excursion Ratio

Test Mode: 802.11a & Ch.64



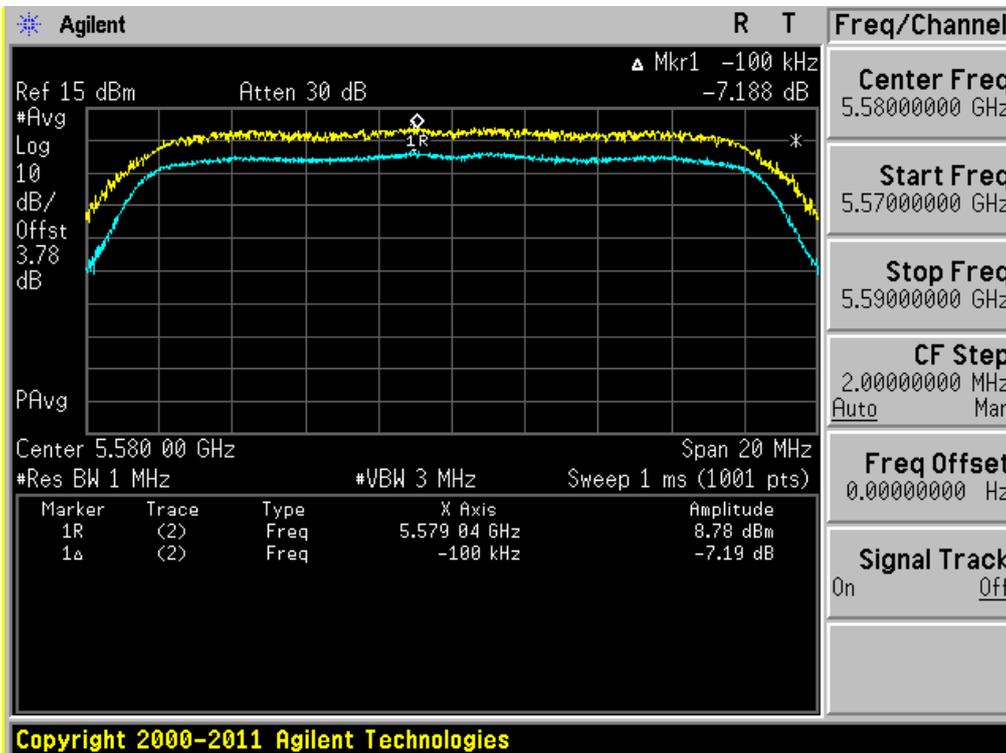
Peak Excursion Ratio

Test Mode: 802.11a & Ch.100



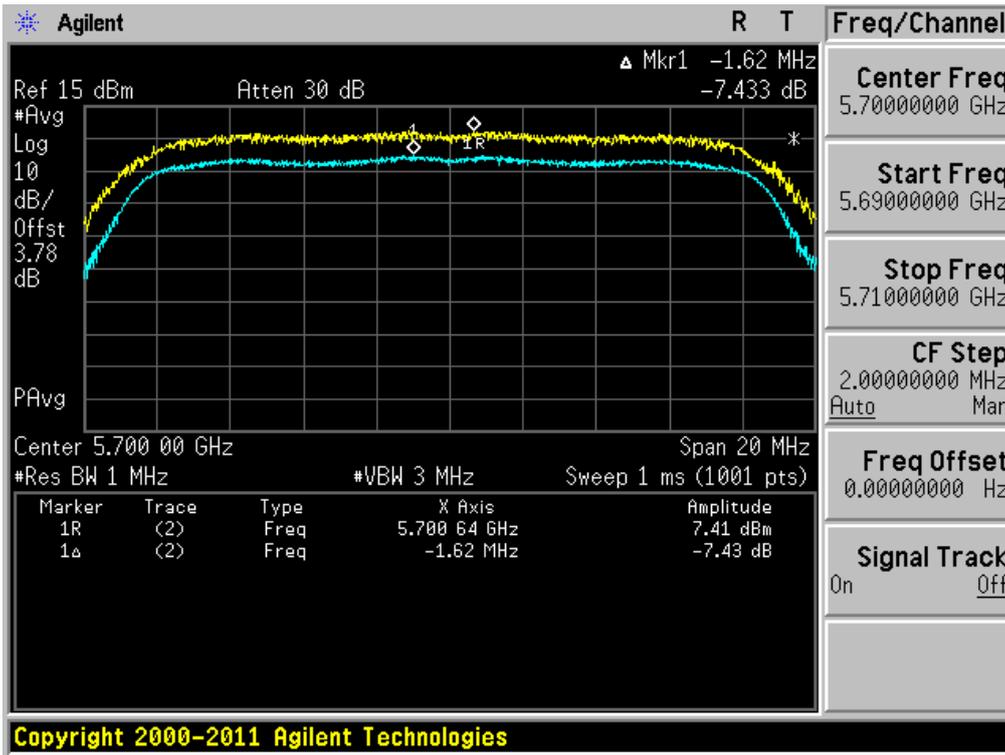
Peak Excursion Ratio

Test Mode: 802.11a & Ch.116



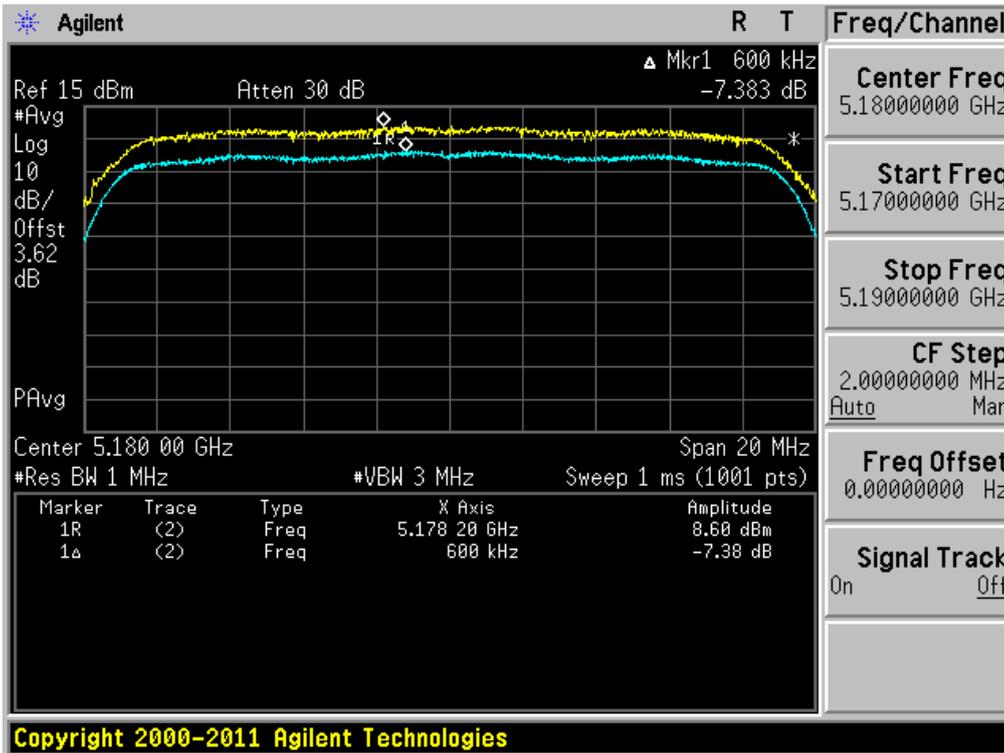
Peak Excursion Ratio

Test Mode: 802.11a & Ch.140



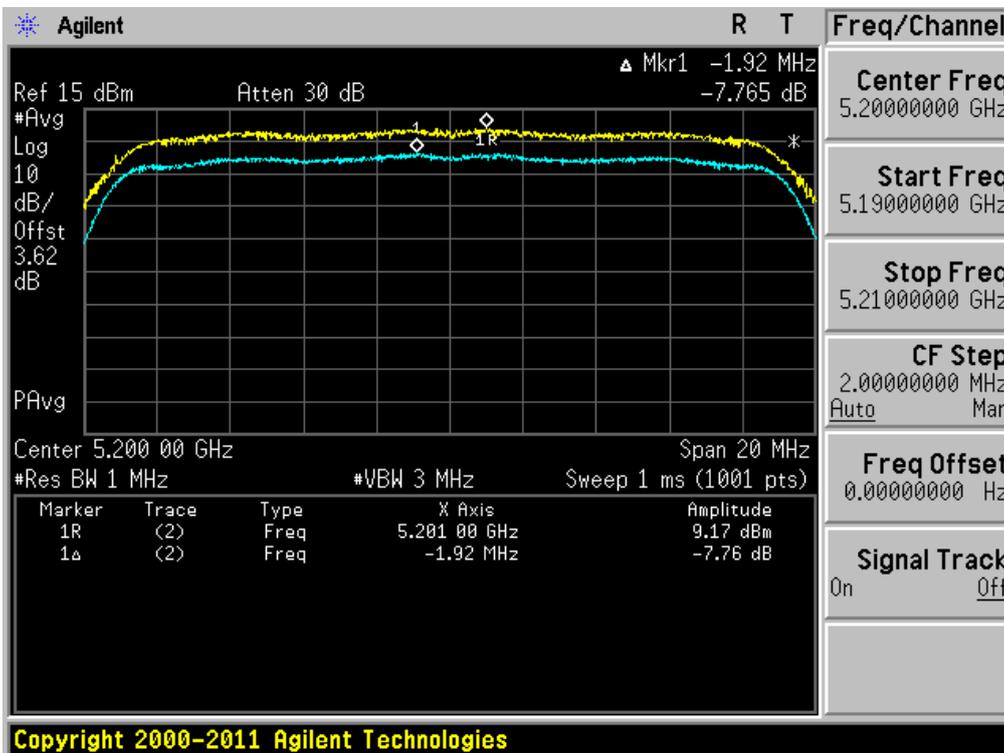
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.36



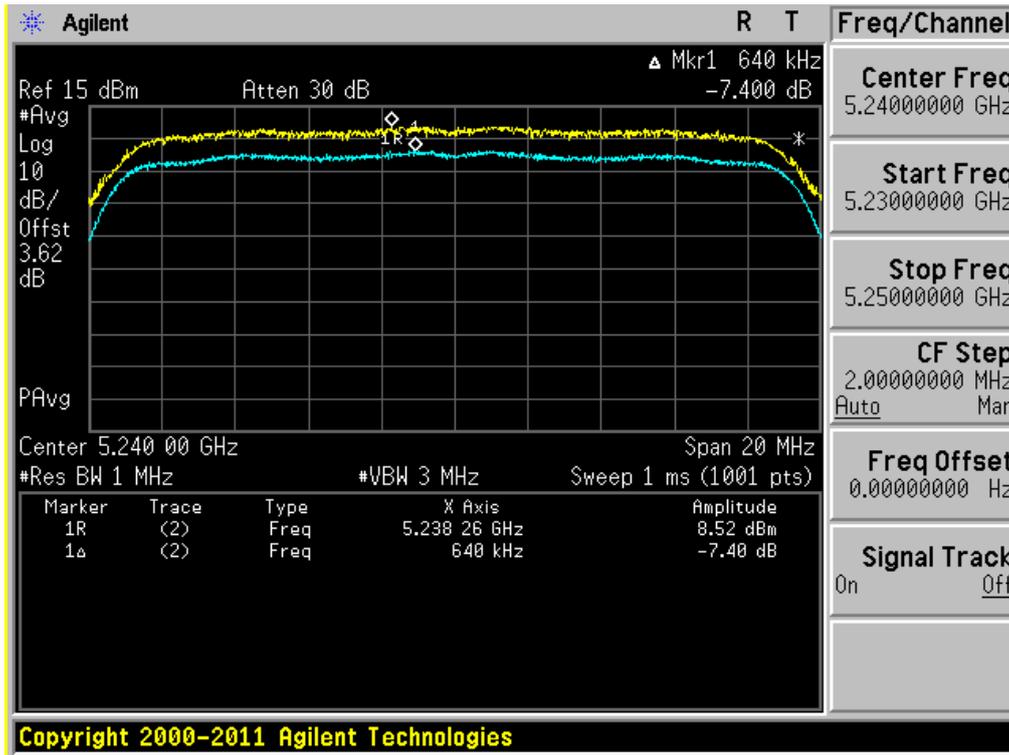
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.40



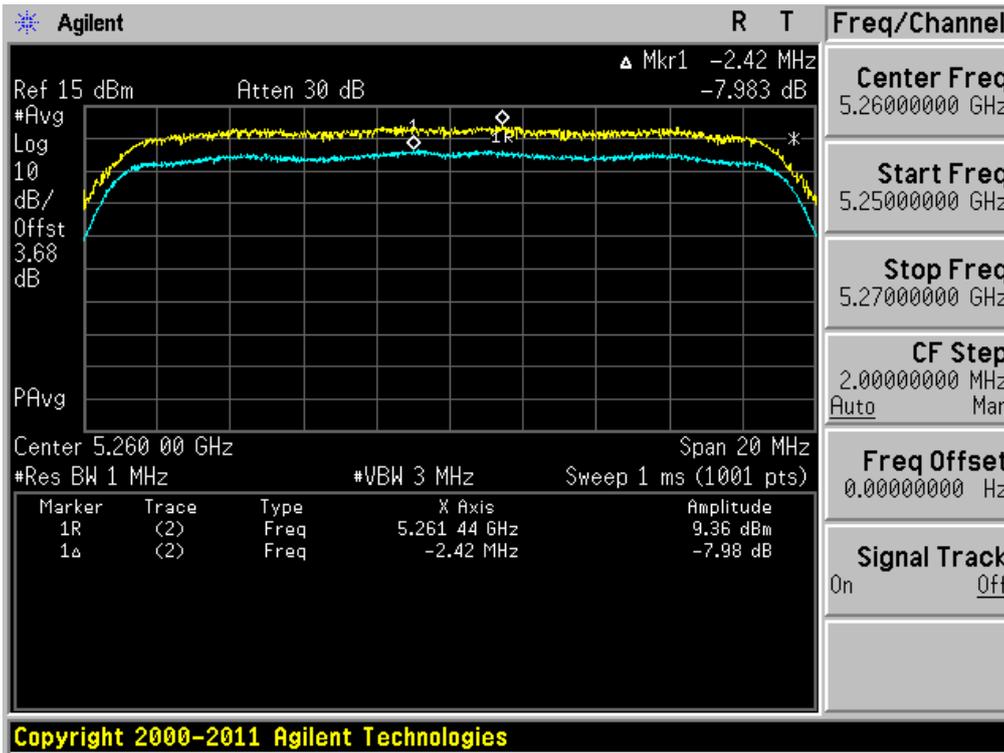
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.48



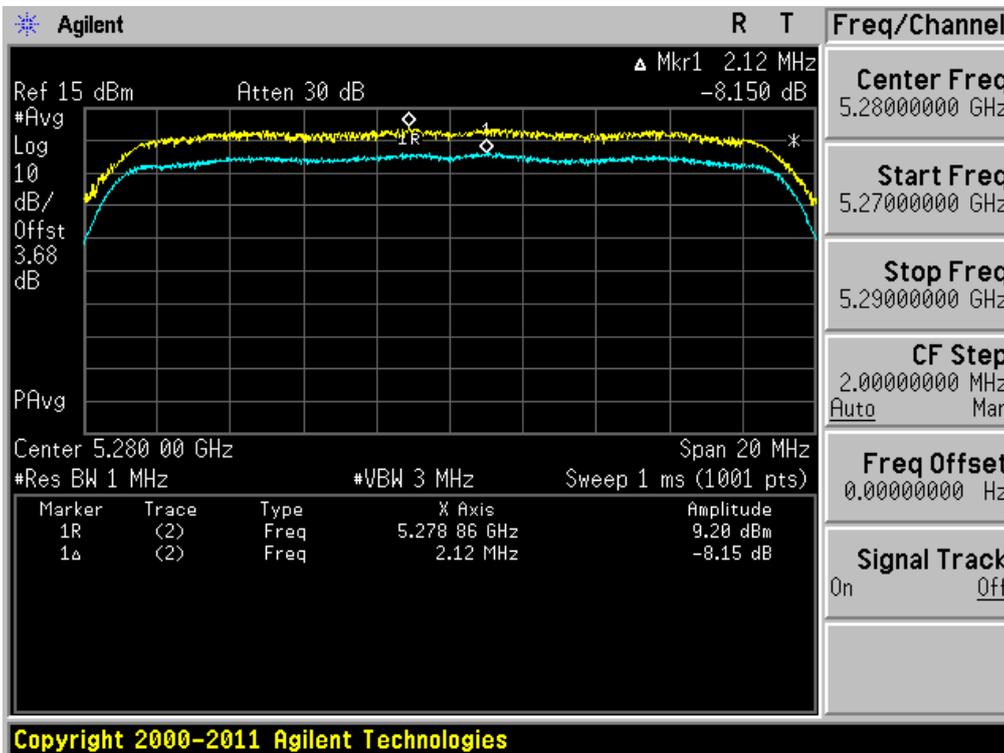
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.52



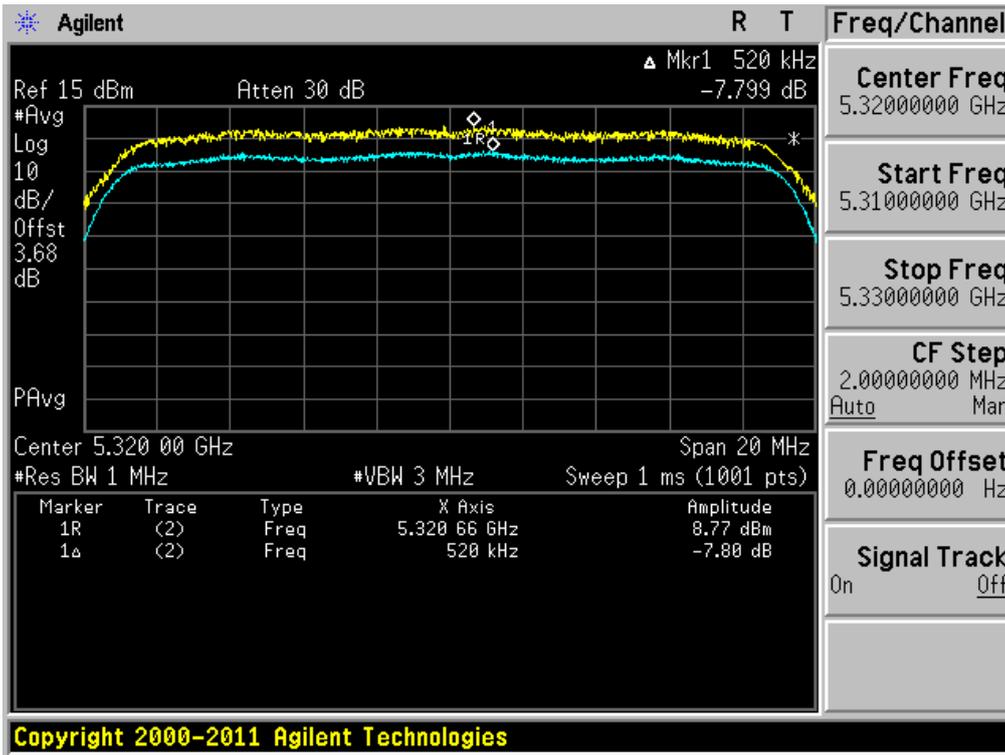
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.56



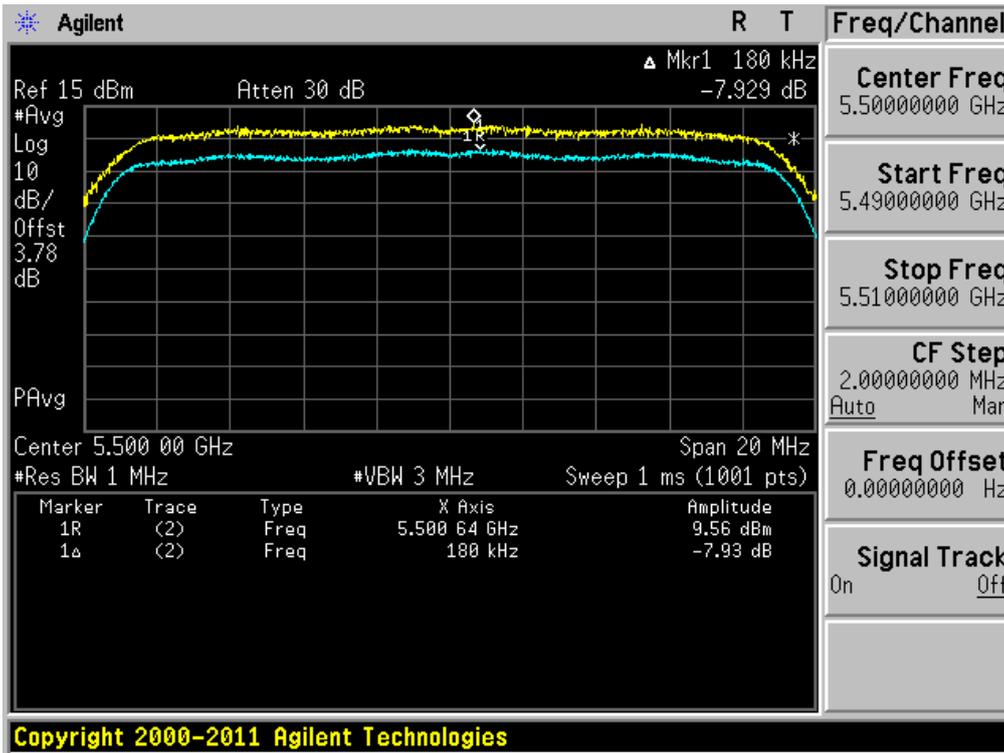
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.64



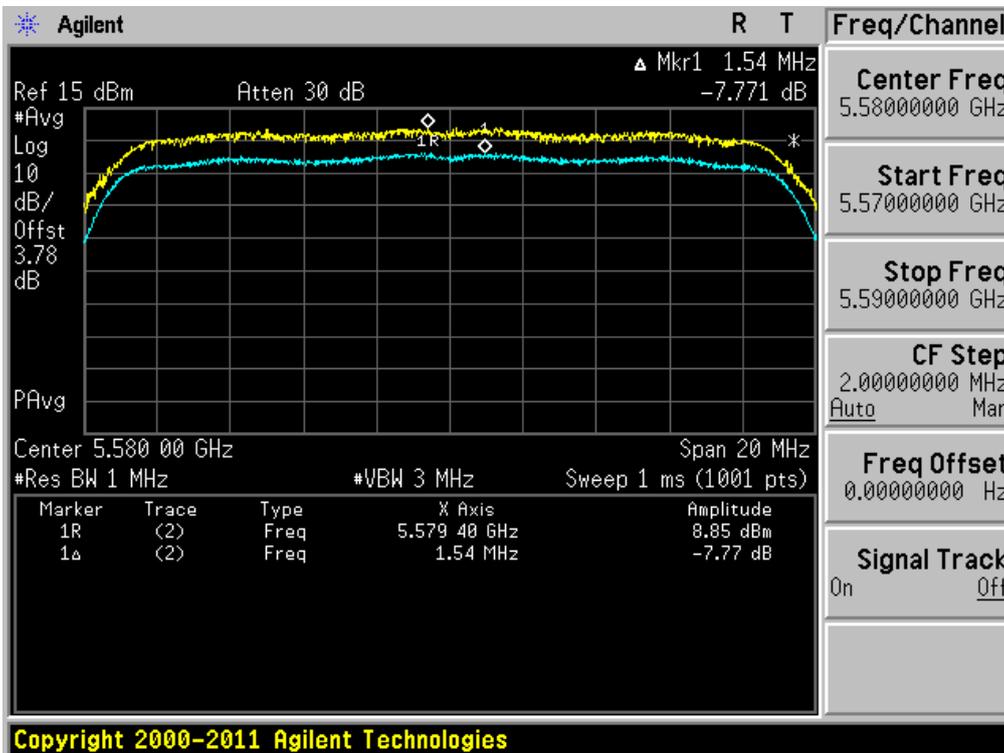
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.100



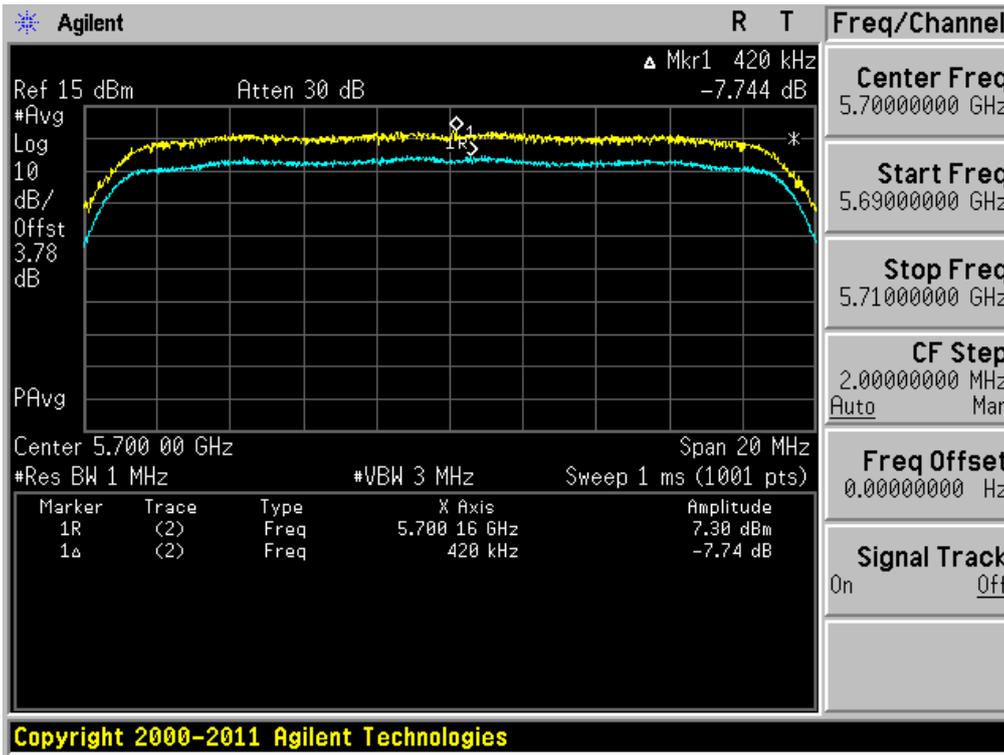
Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.116



Peak Excursion Ratio

Test Mode: 802.11n HT20 & Ch.140



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)	5,179,982,323	-0.000341
100%		-30	5,180,030,242	0.000584
100%		-20	5,180,021,845	0.000422
100%		-10	5,180,010,202	0.000197
100%		0	5,180,004,787	0.000092
100%		+10	5,179,993,260	-0.000130
100%		+20	5,179,982,387	-0.000340
100%		+30	5,179,985,386	-0.000282
100%		+40	5,179,987,441	-0.000242
100%		+50	5,179,989,084	-0.000211
100%		+60	5,179,991,337	-0.000167
85%		3.230	+25	5,179,982,582
115%	4.370	+25	5,179,983,103	-0.000326
BATT.ENDPOINT	3.200	+25	5,179,982,146	-0.000345

- 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)	5,259,982,305	-0.000336
100%		-30	5,260,031,086	0.000591
100%		-20	5,260,022,896	0.000435
100%		-10	5,260,010,896	0.000207
100%		0	5,260,005,731	0.000109
100%		+10	5,259,994,787	-0.000099
100%		+20	5,259,982,396	-0.000335
100%		+30	5,259,984,566	-0.000293
100%		+40	5,259,987,212	-0.000243
100%		+50	5,259,987,989	-0.000228
100%		+60	5,259,989,472	-0.000200
85%		3.230	+25	5,259,982,221
115%	4.370	+25	5,259,982,398	-0.000335
BATT.ENDPOINT	3.200	+25	5,259,982,187	-0.000339

- 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)	5,499,981,358	-0.000339
100%		-30	5,500,032,109	0.000584
100%		-20	5,500,023,286	0.000423
100%		-10	5,500,011,768	0.000214
100%		0	5,500,005,278	0.000096
100%		+10	5,499,994,549	-0.000099
100%		+20	5,499,983,428	-0.000301
100%		+30	5,499,985,562	-0.000263
100%		+40	5,499,986,238	-0.000250
100%		+50	5,499,988,241	-0.000214
100%		+60	5,499,989,983	-0.000182
85%		3.230	+25	5,499,981,272
115%	4.370	+25	5,499,981,495	-0.000336
BATT.ENDPOINT	3.200	+25	5,499,981,193	-0.000342

- 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)(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 –27dBm/MHz.

■ 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)
5149.140	H	Z	PK	57.28	3.08	-	-	60.36	74.00	13.64
5149.980	H	Z	AV	39.56	3.08	0.45	-	43.09	54.00	10.91
10363.860	H	Z	PK	49.03	11.39	-	-6.02	54.40	68.20	13.80

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)
10399.020	H	Z	PK	46.79	11.98	-	-6.02	52.75	68.20	15.45
-	-	-	-	-	-	-	-	-	-	-

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)
10480.140	H	Z	PK	47.65	12.36	-	-6.02	53.99	68.20	14.21
-	-	-	-	-	-	-	-	-	-	-

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
- Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)
10521.120	H	Z	PK	47.02	12.08	-	-6.02	53.08	68.20	15.12
-	-	-	-	-	-	-	-	-	-	-

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)
10567.060	H	Z	PK	45.50	12.21	-	-6.02	51.69	68.20	16.51
-	-	-	-	-	-	-	-	-	-	-

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)
5350.730	H	Y	PK	51.95	3.61	-	-	55.56	74.00	18.44
5350.150	H	Y	AV	39.07	3.61	0.45	-	43.13	54.00	10.87
10639.060	H	Z	PK	44.02	12.53	-	-6.02	50.53	74.00	23.47
10638.800	H	Z	AV	34.48	12.53	0.45	-6.02	41.44	54.00	12.56

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
- Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)
5431.990	H	Y	PK	48.61	3.40	-	-	52.01	74.00	21.99
5431.470	H	Y	AV	38.29	3.40	0.45	-	42.14	54.00	11.86
5468.460	H	Y	PK	49.05	3.51	-	-	52.56	68.20	15.64
11000.980	H	Z	PK	41.79	12.92	-	-6.02	48.69	74.00	25.31
11000.920	H	Z	AV	30.99	12.92	0.45	-6.02	38.34	54.00	15.66

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)
11162.260	H	Z	PK	44.13	14.65	-	-6.02	52.76	74.00	21.24
11161.420	H	Z	AV	33.63	14.65	0.45	-6.02	42.71	54.00	11.29

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)
5725.320	H	Y	PK	59.81	3.80	-	-	63.61	68.20	4.59
11400.580	H	Z	PK	49.34	14.65	-	-6.02	57.97	74.00	16.03
11399.780	H	Z	AV	36.81	14.65	0.45	-6.02	45.89	54.00	8.11

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
3. Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)
5147.840	H	Z	PK	56.80	3.08	-	-	59.88	74.00	14.12
5147.100	H	Z	AV	38.63	3.08	0.45	-	42.16	54.00	11.84
10360.700	H	Z	PK	47.04	11.39	-	-6.02	52.41	68.20	15.79

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)
10399.200	H	Z	PK	45.58	11.98	-	-6.02	51.54	68.20	16.66
-	-	-	-	-	-	-	-	-	-	-

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)
10480.820	H	Z	PK	45.07	12.36	-	-6.02	51.41	68.20	16.79
-	-	-	-	-	-	-	-	-	-	-

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
- Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)
10520.740	H	Z	PK	46.03	12.08	-	-6.02	52.09	68.20	16.11
-	-	-	-	-	-	-	-	-	-	-

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)
10563.340	H	Z	PK	44.39	12.21	-	-6.02	50.58	68.20	17.62
-	-	-	-	-	-	-	-	-	-	-

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)
5353.340	H	Y	PK	51.81	3.61	-	-	55.42	74.00	18.58
5353.690	H	Y	AV	38.44	3.61	0.45	-	42.50	54.00	11.50
10641.180	H	Z	PK	42.92	12.53	-	-6.02	49.43	74.00	24.57
10640.420	H	Z	AV	33.49	12.53	0.45	-6.02	40.45	74.00	33.55

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
- Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)
5457.960	H	Y	PK	49.63	3.40	-	-	53.03	74.00	20.97
5457.380	H	Y	AV	38.38	3.40	0.45	-	42.23	54.00	11.77
5467.690	H	Y	PK	53.65	3.51	-	-	57.16	68.20	11.04
11001.900	H	Z	PK	41.02	12.92	-	-6.02	47.92	74.00	26.08
11000.800	H	Z	AV	31.32	12.92	0.45	-6.02	38.67	54.00	15.33

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)
11158.440	H	Z	PK	43.23	14.65	-	-6.02	51.86	74.00	22.14
11160.240	H	Z	AV	32.78	14.65	0.45	-6.02	41.86	54.00	12.14

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)
5725.380	H	Y	PK	60.24	3.8	-	-	64.04	68.20	4.16
11401.300	H	Z	PK	45.29	14.65	-	-6.02	53.92	74.00	20.08
11400.800	H	Z	AV	34.42	14.65	0.45	-6.02	43.50	54.00	10.50

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 : 0.45 dB = 20*log(1/0.95) for Method AD.
- Measurement Distance above 10 GHz = 1.5 m. So Distance Correction Factor : -6.02dB = 20*log(1.5m/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)

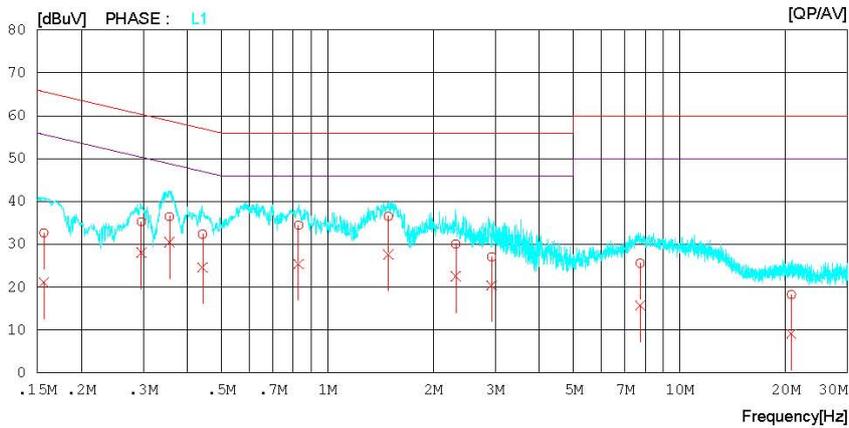
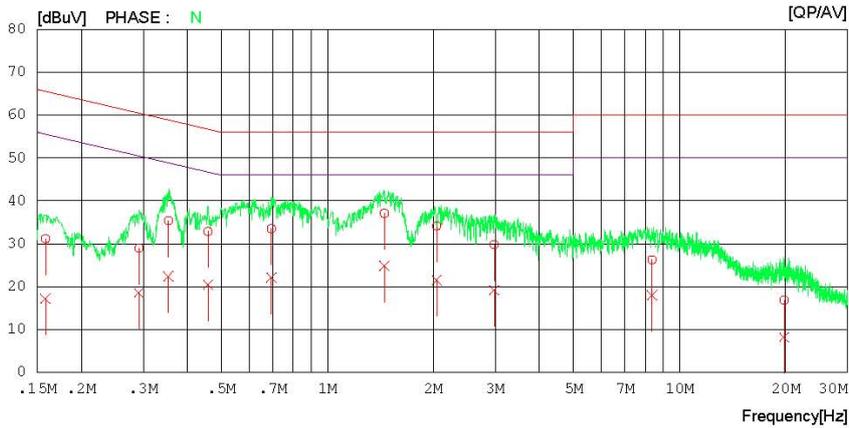
Test Mode: 802.11a_5.1G



Results of Conducted Emission

Digital EMC
Date : 2012-08-27

Model No.	: LG-P760	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 °C 45 % R.H.
Test Condition	: WLAN	Operator	: H.S SON
Memo	: 5.1GHz		
LIMIT	: CISPR22_B QP CISPR22_B AV		



AC Line Conducted Emissions (Graph)

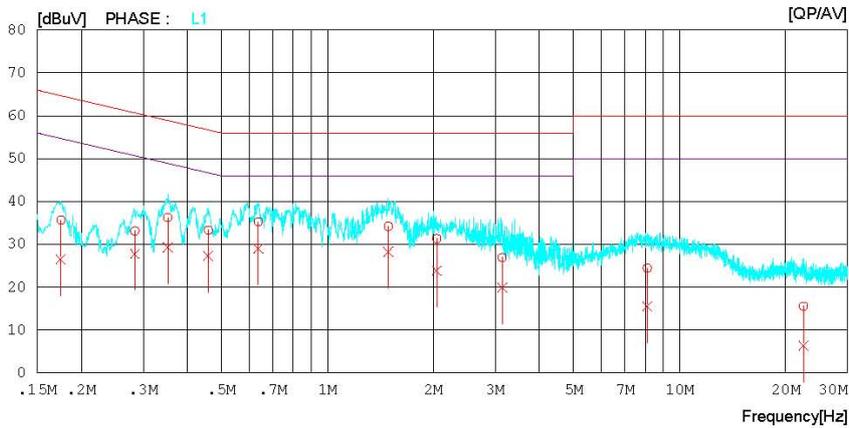
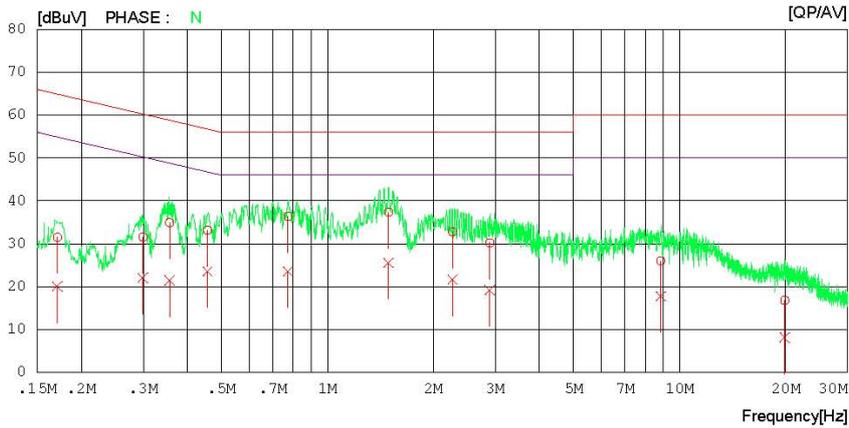
Test Mode: 802.11a_5.3G



Results of Conducted Emission

Digital EMC
Date : 2012-08-27

Model No.	: LG-P760	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 22 °C 45 % 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: 2012-08-27

Model No. :	LG-P760	Reference No. :	
Type :		Power Supply :	120 V 60 Hz
Serial No. :	Identical prototype	Temp/Humi. :	22 °C 45 % R.H.
Test Condition :	WLAN	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	0.17120	31.3	19.8	0.2	31.5	20.0	64.9	54.9	33.4	34.9	N
2	0.29964	31.4	21.9	0.2	31.6	22.1	60.3	50.3	28.7	28.2	N
3	0.35639	34.6	21.1	0.3	34.9	21.4	58.8	48.8	23.9	27.4	N
4	0.45668	32.9	23.3	0.2	33.1	23.5	56.8	46.8	23.7	23.3	N
5	0.77266	36.2	23.3	0.2	36.4	23.5	56.0	46.0	19.6	22.5	N
6	1.49100	37.0	25.2	0.3	37.3	25.5	56.0	46.0	18.7	20.5	N
7	2.26650	32.5	21.4	0.3	32.8	21.7	56.0	46.0	23.2	24.3	N
8	2.89050	29.9	18.9	0.3	30.2	19.2	56.0	46.0	25.8	26.8	N
9	8.84300	25.3	17.1	0.7	26.0	17.8	60.0	50.0	34.0	32.2	N
10	19.89100	15.6	6.9	1.2	16.8	8.1	60.0	50.0	43.2	41.9	N
11	0.17511	35.5	26.3	0.2	35.7	26.5	64.7	54.7	29.0	28.2	L1
12	0.28399	32.9	27.6	0.2	33.1	27.8	60.7	50.7	27.6	22.9	L1
13	0.35225	36.0	29.0	0.3	36.3	29.3	58.9	48.9	22.6	19.6	L1
14	0.45921	33.1	27.1	0.2	33.3	27.3	56.7	46.7	23.4	19.4	L1
15	0.63656	35.1	28.8	0.2	35.3	29.0	56.0	46.0	20.7	17.0	L1
16	1.49000	33.9	28.0	0.3	34.2	28.3	56.0	46.0	21.8	17.7	L1
17	2.04600	31.0	23.5	0.3	31.3	23.8	56.0	46.0	24.7	22.2	L1
18	3.13650	26.5	19.6	0.4	26.9	20.0	56.0	46.0	29.1	26.0	L1
19	8.09750	24.0	15.1	0.5	24.5	15.6	60.0	50.0	35.5	34.4	L1
20	22.47350	14.4	5.2	1.2	15.6	6.4	60.0	50.0	44.4	43.6	L1

AC Line Conducted Emissions (Graph)

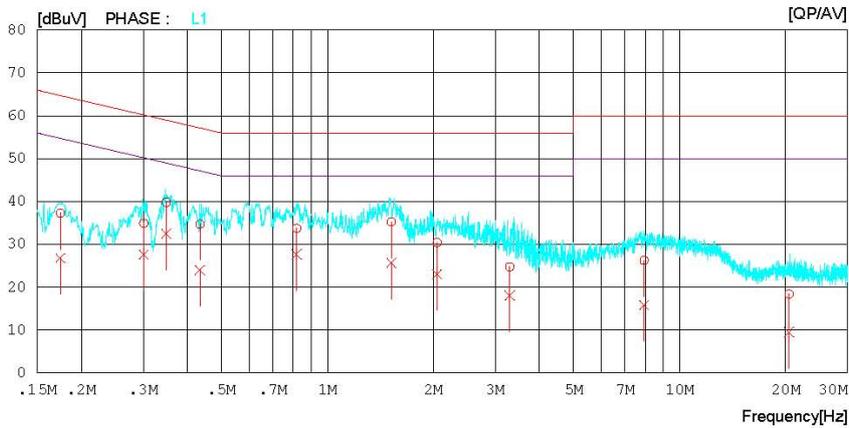
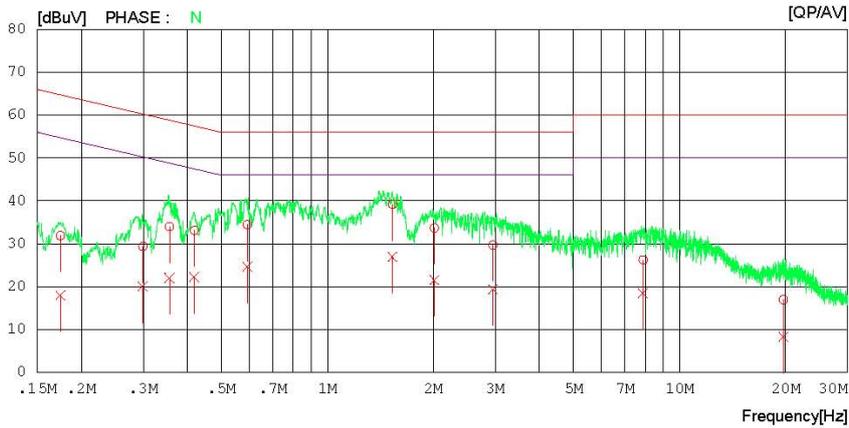
Test Mode: 802.11a_5.5G



Results of Conducted Emission

Digital EMC
Date : 2012-08-27

Model No.	: LG-P760	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 22 °C 45 % 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 : 2012-08-27

Model No.	: LG-P760	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 22 'C 45 % 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	0.17459	31.7	17.8	0.2	31.9	18.0	64.7	54.7	32.8	36.7	N
2	0.29939	29.2	19.8	0.2	29.4	20.0	60.3	50.3	30.9	30.3	N
3	0.35604	33.7	21.7	0.3	34.0	22.0	58.8	48.8	24.8	26.8	N
4	0.41923	32.8	22.0	0.3	33.1	22.3	57.5	47.5	24.4	25.2	N
5	0.59250	34.3	24.4	0.2	34.5	24.6	56.0	46.0	21.5	21.4	N
6	1.53000	38.9	26.6	0.3	39.2	26.9	56.0	46.0	16.8	19.1	N
7	2.01250	33.4	21.2	0.3	33.7	21.5	56.0	46.0	22.3	24.5	N
8	2.95200	29.4	19.1	0.3	29.7	19.4	56.0	46.0	26.3	26.6	N
9	7.87700	25.7	17.9	0.5	26.2	18.4	60.0	50.0	33.8	31.6	N
10	19.70950	15.8	7.1	1.2	17.0	8.3	60.0	50.0	43.0	41.7	N
11	0.17466	37.1	26.6	0.2	37.3	26.8	64.7	54.7	27.4	27.9	L1
12	0.30109	34.7	27.4	0.2	34.9	27.6	60.2	50.2	25.3	22.6	L1
13	0.34864	39.5	32.2	0.3	39.8	32.5	59.0	49.0	19.2	16.5	L1
14	0.43464	34.5	23.8	0.2	34.7	24.0	57.2	47.2	22.5	23.2	L1
15	0.81846	33.4	27.4	0.3	33.7	27.7	56.0	46.0	22.3	18.3	L1
16	1.51950	35.0	25.4	0.3	35.3	25.7	56.0	46.0	20.7	20.3	L1
17	2.04950	30.1	22.8	0.3	30.4	23.1	56.0	46.0	25.6	22.9	L1
18	3.29200	24.4	17.7	0.4	24.8	18.1	56.0	46.0	31.2	27.9	L1
19	7.92850	25.8	15.4	0.5	26.3	15.9	60.0	50.0	33.7	34.1	L1
20	20.46050	17.2	8.3	1.2	18.4	9.5	60.0	50.0	41.6	40.5	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:**

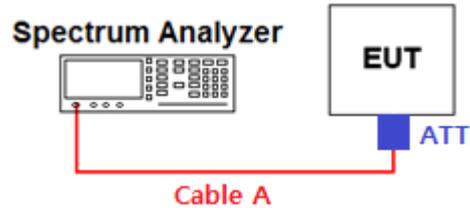
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

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	11/09/30	12/09/30	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	11/09/19	12/09/19	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)	WEINSCHL	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
RFI/Field intensity Meter	KYORITSU	KNM-2402	12/07/02	13/07/02	4N-170-3
Spectrum Analyzer	H/P	8591E	12/03/05	13/03/05	3649A05889
CVCF	NF	4420	11/09/15	12/09/15	3049354420023
LISN	R&S	ESH2-Z5	11/09/30	12/09/30	8287391006

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	3.62	5.500 ~ 5.700	3.78
5.260 ~ 5.320	3.68	-	-

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)