



Test Report

Radio Test Report: EDCS - 1404741

CP-DX70 Desktop Telepresence

FCC ID:LDKDX700976 IC: 2461B- DX700976

5725-5850 MHz

Against the following Specifications:

CFR47 Part 15.247

RSS210

Cisco Systems

170 West Tasman Drive
San Jose, CA 95134

Author: Allan Beecroft

Approved By: See EDCS

Title: See EDCS

This report replaces any previously entered test report under EDCS - 1404741



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Section 1: Overview

1.1 Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Emission	Immunity
CFR47 Part 15.247 RSS210	N/A

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one or more of the following reasons.

1. Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2. A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3. Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4. Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
5. Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
6. Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7. Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8. Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9. Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

Notes:

- 1) Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
- 2) Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
- 3) Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.



Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.
- e) All AC testing was performed at the following supply voltage:
110V 60 Hz (+/-20%)

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2.2 Date of testing

04-MARCH-2014

2.3 Report Issue Date

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2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134
USA

Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 2461N-2
Building P, 5m Chamber	Company #: 2461N-1
Building I, 5m Chamber	Company #: 2461M-1

Test Engineers

Allan Beecroft, Technical Leader, CISCO Systems Inc.

2.5 Equipment Assessed (EUT)

CP-DX70 Desktop TelePresence

2.6 EUT Description

The Cisco DX70 offers uncompromised collaboration for every desk. Experience best in class HD video and expanded collaboration capabilities such as UC features, Android applications and email all within a single integrated device. Now is the time for simple to use Collaboration experience at a price so affordable you can empower every office and home office desktop.



The following antennas are supported by this product series.
The data included in this report represent the worst case data for all antennas.

Frequency	Part Number	Antenna Type	Antenna Gain (dBi)
5725MHz to 5850MHz	Internal	Omni-Directional	4



Section 3: Result Summary

Conducted emissions

Basic Standard	Result
6dB Bandwidth	Pass
99% and 26dB Bandwidth	Pass
Peak Output Power	Pass
Power Spectral Density	Pass
Conducted Spurious Emissions	Pass
Conducted Band Edge	Pass
AC Power Line Conducted Emissions	Pass

Radiated emissions

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass

Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the “Justification for worst Case test Configuration” section of this report for further details on the selection of EUT samples.

4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9SE	CP-DX70
S02	LITEON PA-1600-2A-LF AC/DC Adapter	LIT1748098P	N/A
S03	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9PR	CP-DX70
S04	AIR-CAP2702I-A-K9 Access Point	RFDP1BVZ017	N/A



The following antennas were evaluated as part of this testing process. The antennas listed reflect the maximum gain allowed for each family type of antenna:

Fixed internal Amphenol Dual Band Antenna at 5GHz, Gain: (no external antenna can be used.)

5150 – 5250MHz: 3.3dBi
5250 – 5350MHz: 3.1dBi
5500 – 5700MHz: 3.5dBi
5745 – 5850MHz: 4dBi

4.2 System Details

System #	Description	Samples
1	Radio Test Sample and Power Supply	S01 & S02
2	Radio Test Sample for Radiated Co-Located Tests	S03, S02 & S04

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11a/n Test Mode	System is placed in a continuous Transmit Mode at various channels per Test Requirements. Worse Case Data Rate used for all Testing. 802.11a set to 6Mbps, HT20 set to MCS0 & HT40 set to MCS0
2	802.11a/n & Bluetooth Test Mode	System is placed in a continuous Transmit Mode with wi-fi & Bluetooth active at various channels per Test Requirements. Worse Case Data Rate used for all Testing. 802.11a set to 6Mbps, HT20 set to MCS0 & HT40 set to MCS0.

Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.



Appendix A: Test Results

Target Maximum Channel Power

The following table details the maximum supported Total Channel Power for all operating modes.

Operating Mode	Maximum Channel Power (dBm)		
	Frequency (MHz)		
	5745	5785	5825
802.11a (6Mbps to 54Mbps)	13	16	16
802.11n HT20 (MCS0 to MCS7)			
	5755	5795	
802.11n HT40 (MCS0 to MCS7)	13	12	



6dB Bandwidth

15.247: Systems using digital modulation techniques may operate in the 5745-5825 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

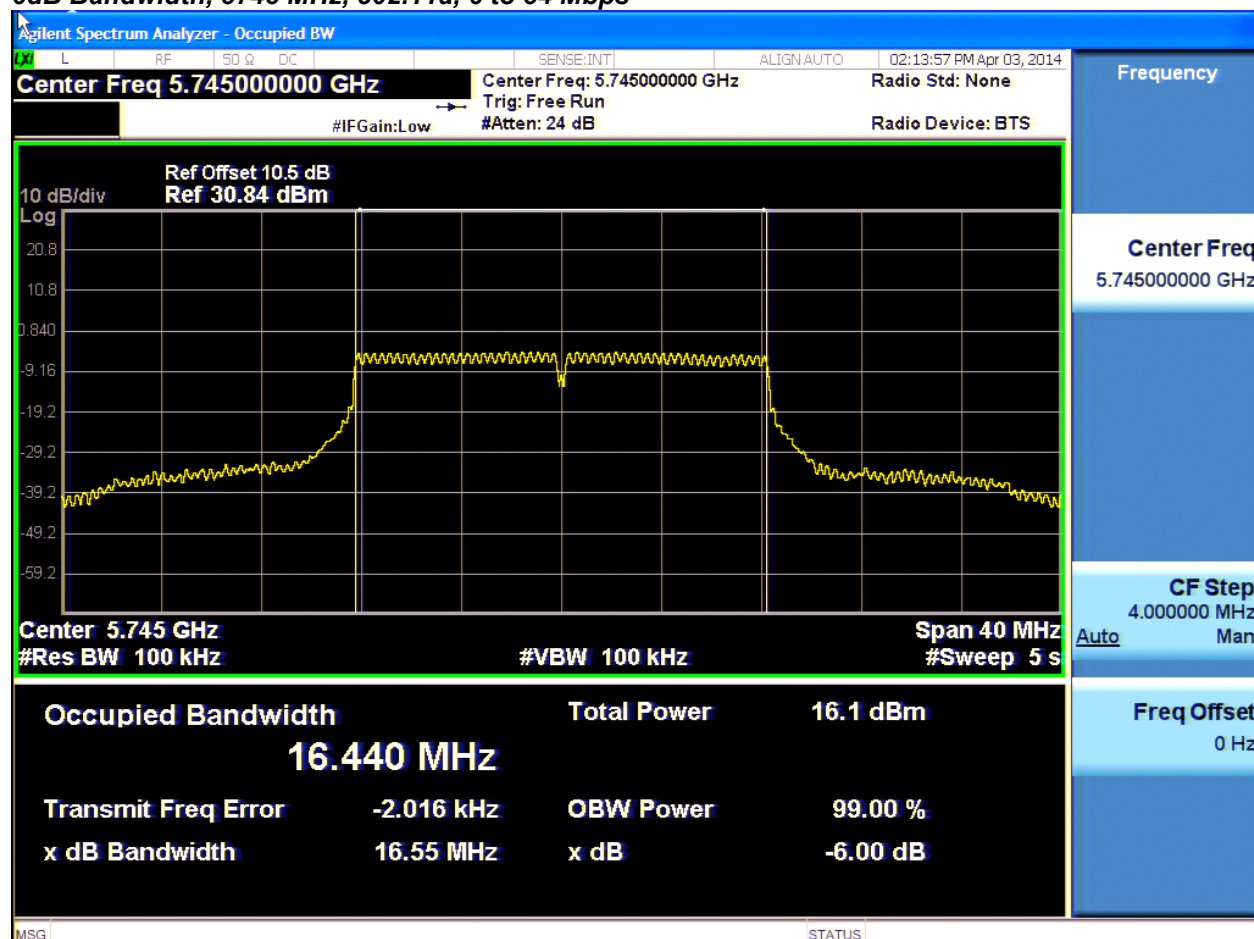
Center Frequency:	Frequency from table below
Span:	2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level:	30 dBm
Attenuation:	24 dB
Sweep Time:	5 s
Resolution Bandwidth:	100 kHz
Video Bandwidth:	100 kHz
X dB Bandwidth:	6 dB
Detector:	Peak
Trace:	Single

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:



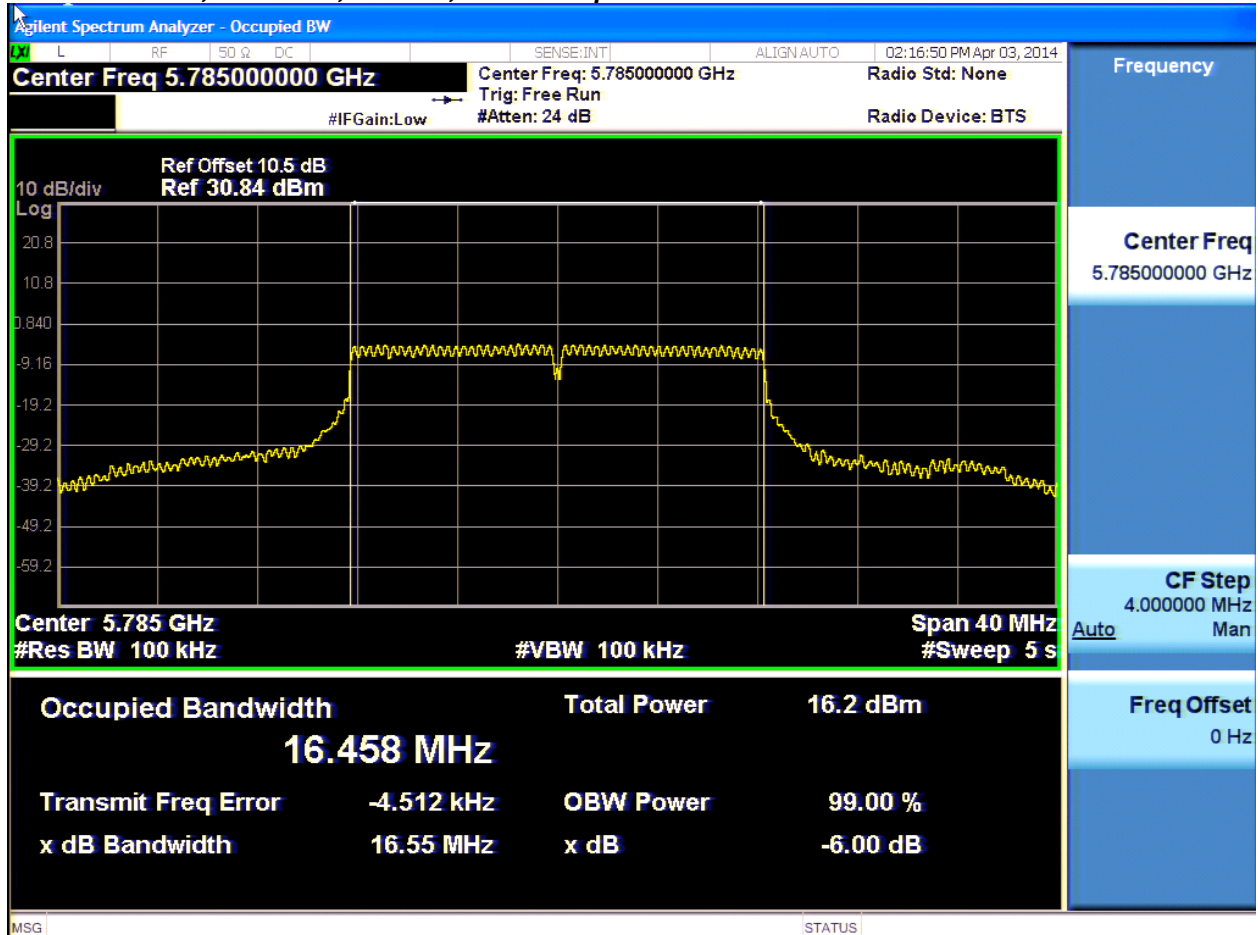
Frequency (MHz)	Mode	Data Rate	6dB BW (MHz)	Limit (kHz)	Margin (kHz)
5745	802.11a (6Mbps to 54Mbps)	6	16.55	>500	16050
	802.11n HT20 (MCS0 to MCS7)	MCS0	17.81	>500	17310
5785	802.11a (6Mbps to 54Mbps)	6	16.55	>500	16050
	802.11n HT20 (MCS0 to MCS7)	MCS0	17.82	>500	17320
5825	802.11a (6Mbps to 54Mbps)	6	16.55	>500	16050
	802.11n HT20 (MCS0 to MCS7)	MCS0	17.82	>500	17320
5755	802.11n HT40 (MCS0 to MCS7)	MCS0	36.96	>500	36460
5795	802.11n HT40 (MCS0 to MCS7)	MCS0	36.93	>500	36430

6dB Bandwidth, 5745 MHz, 802.11a, 6 to 54 Mbps



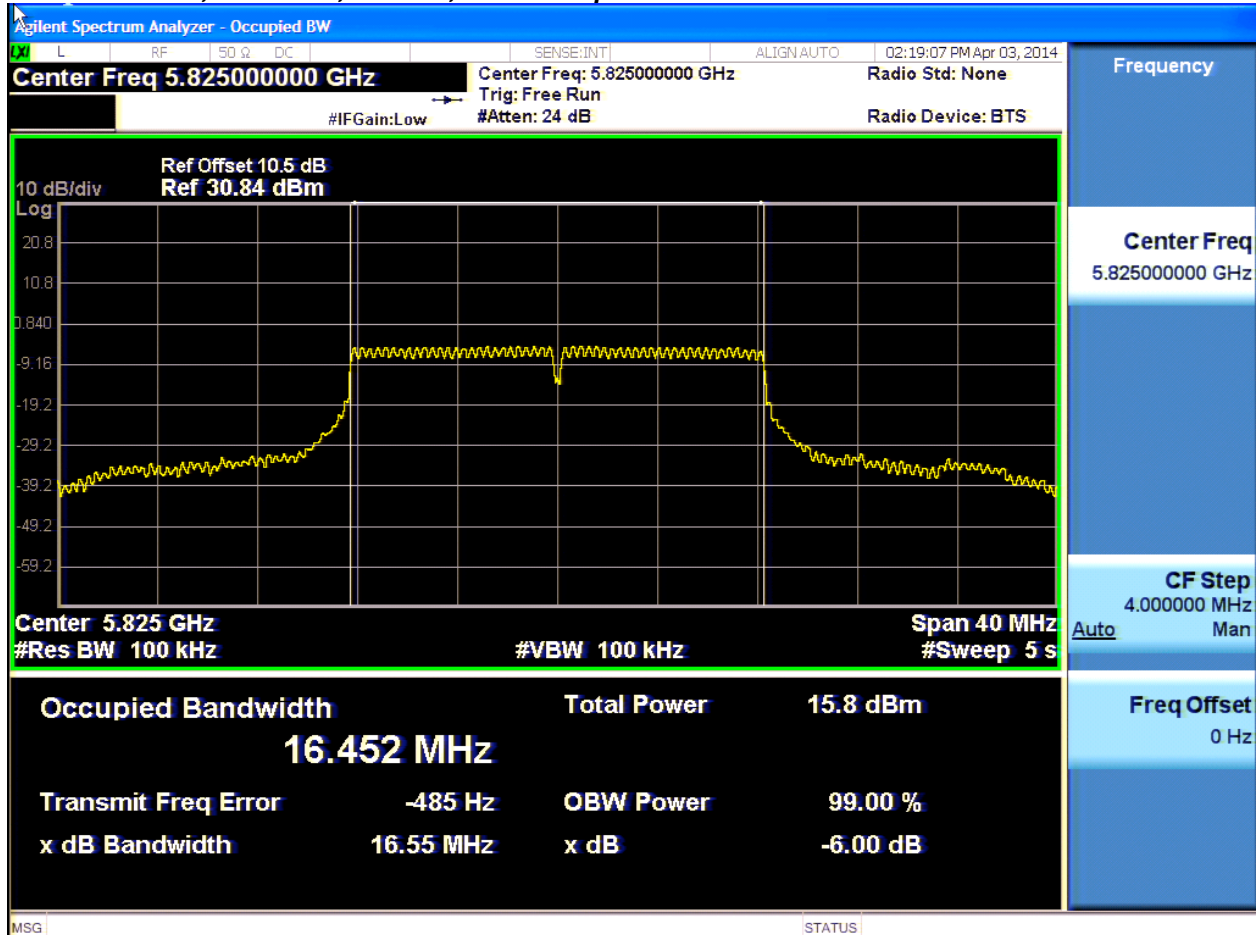


6dB Bandwidth, 5785 MHz, 802.11a, 6 to 54 Mbps



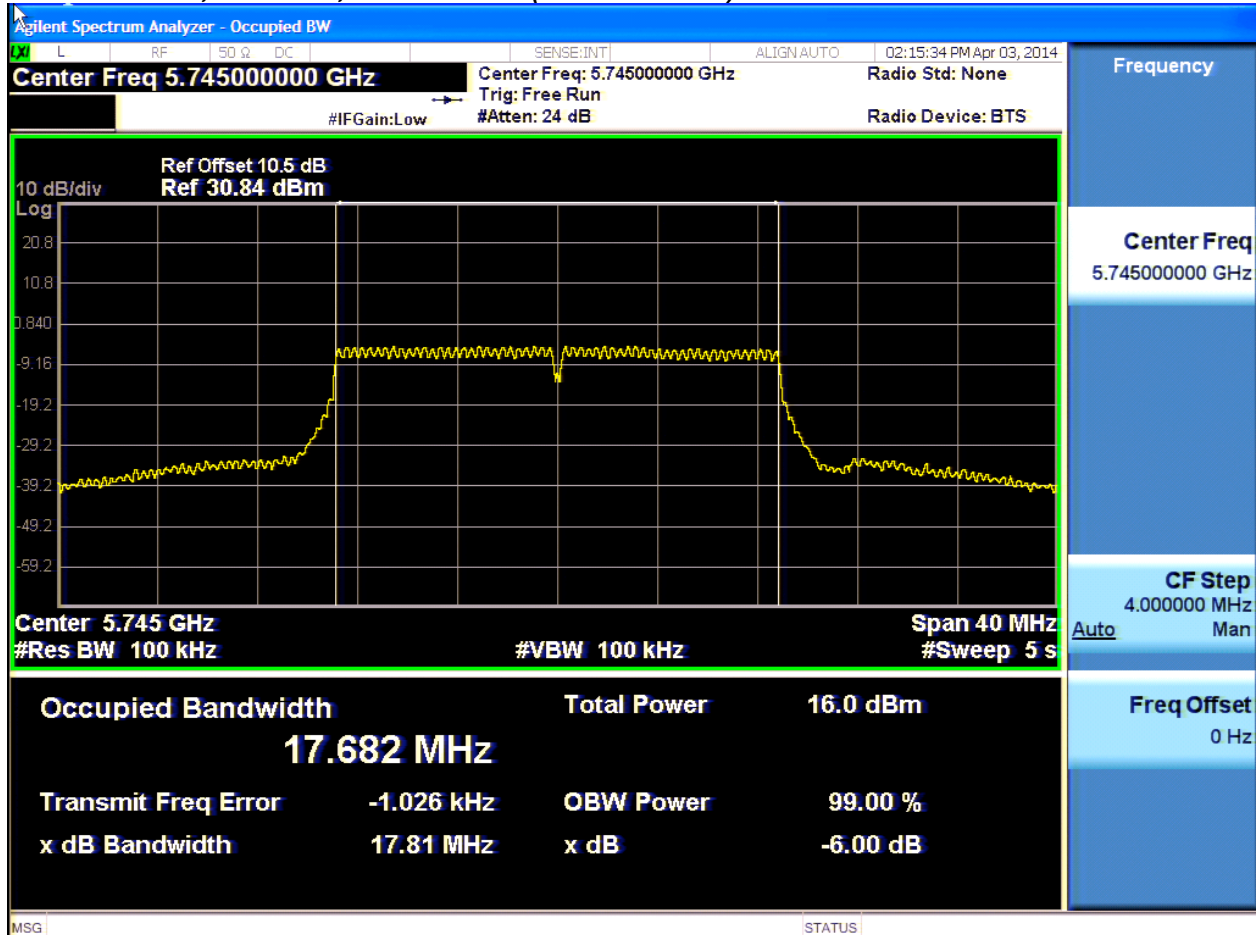


6dB Bandwidth, 5825 MHz, 802.11a, 6 to 54 Mbps



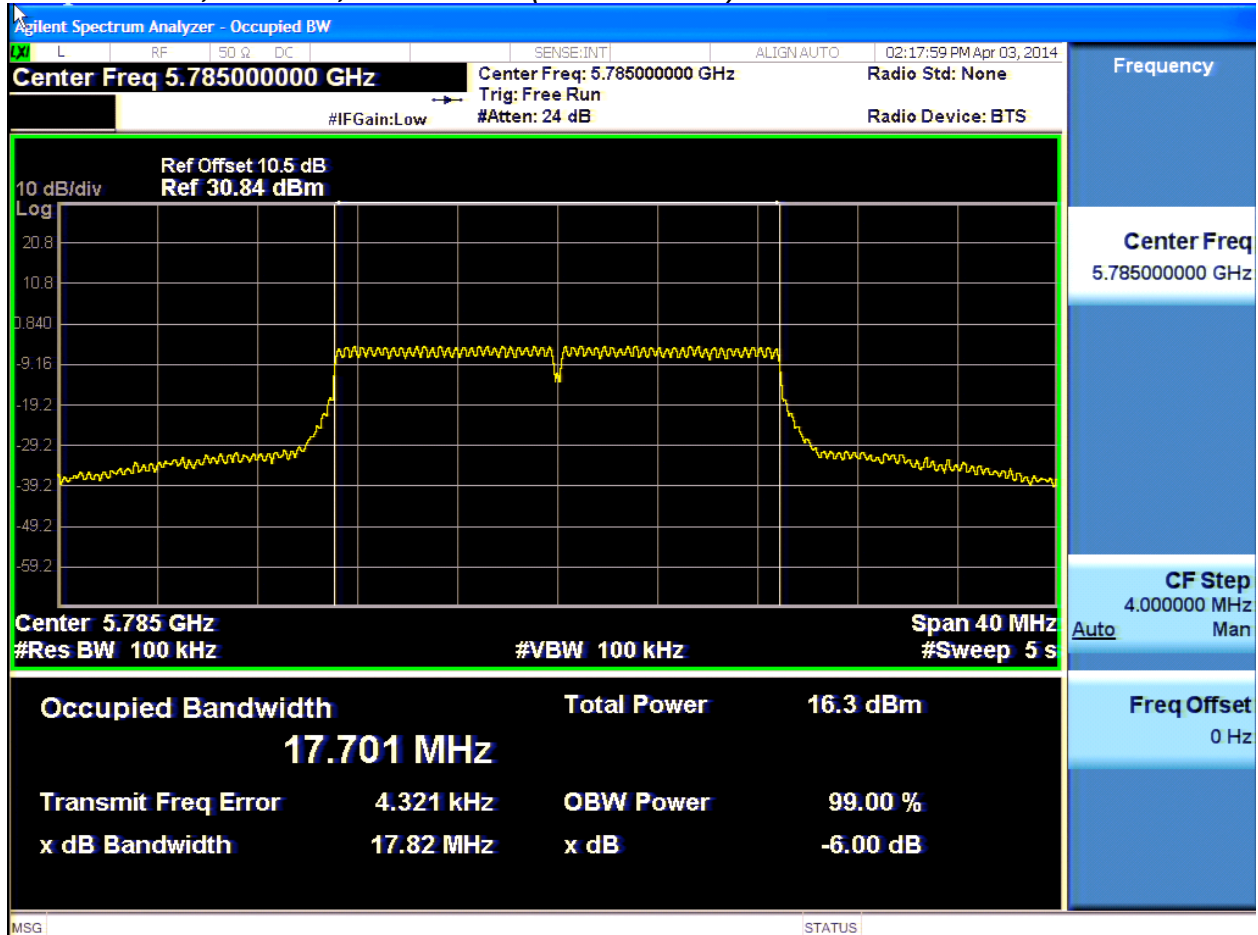


6dB Bandwidth, 5745 MHz, 802.11n HT20 (MCS0 to MCS7)



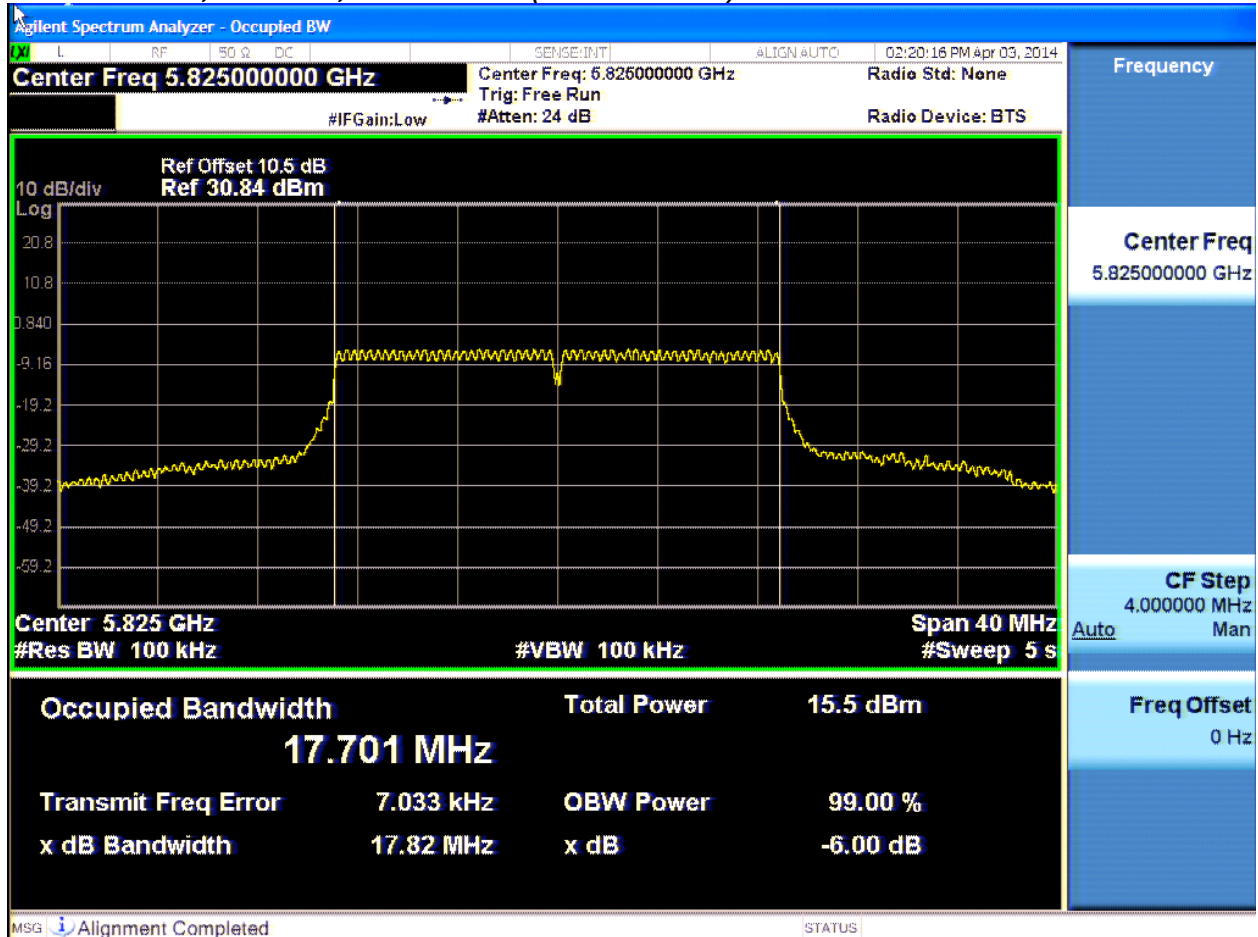


6dB Bandwidth, 5785 MHz, 802.11n HT20 (MCS0 to MCS7)



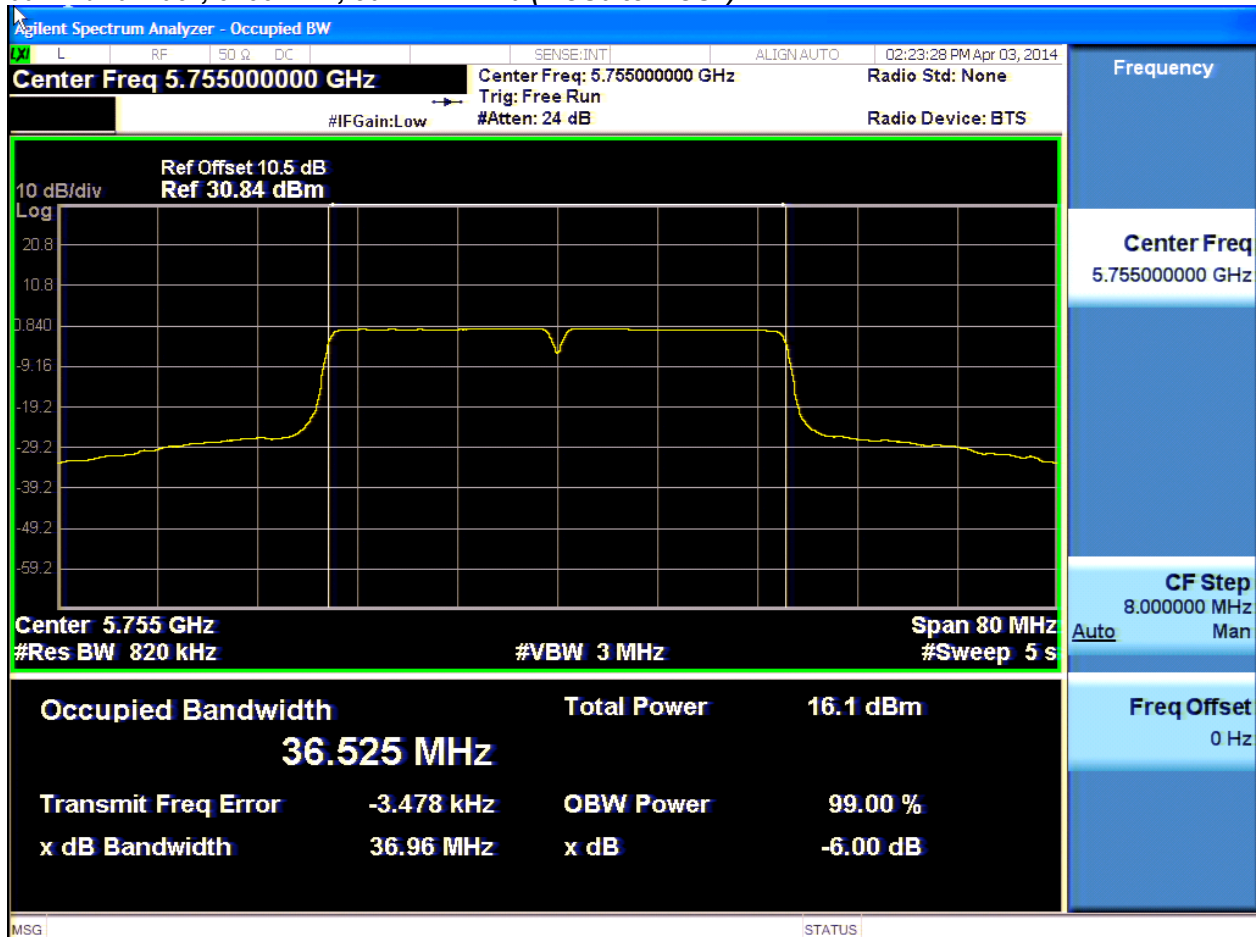


6dB Bandwidth, 5825 MHz, 802.11n HT20 (MCS0 to MCS7)



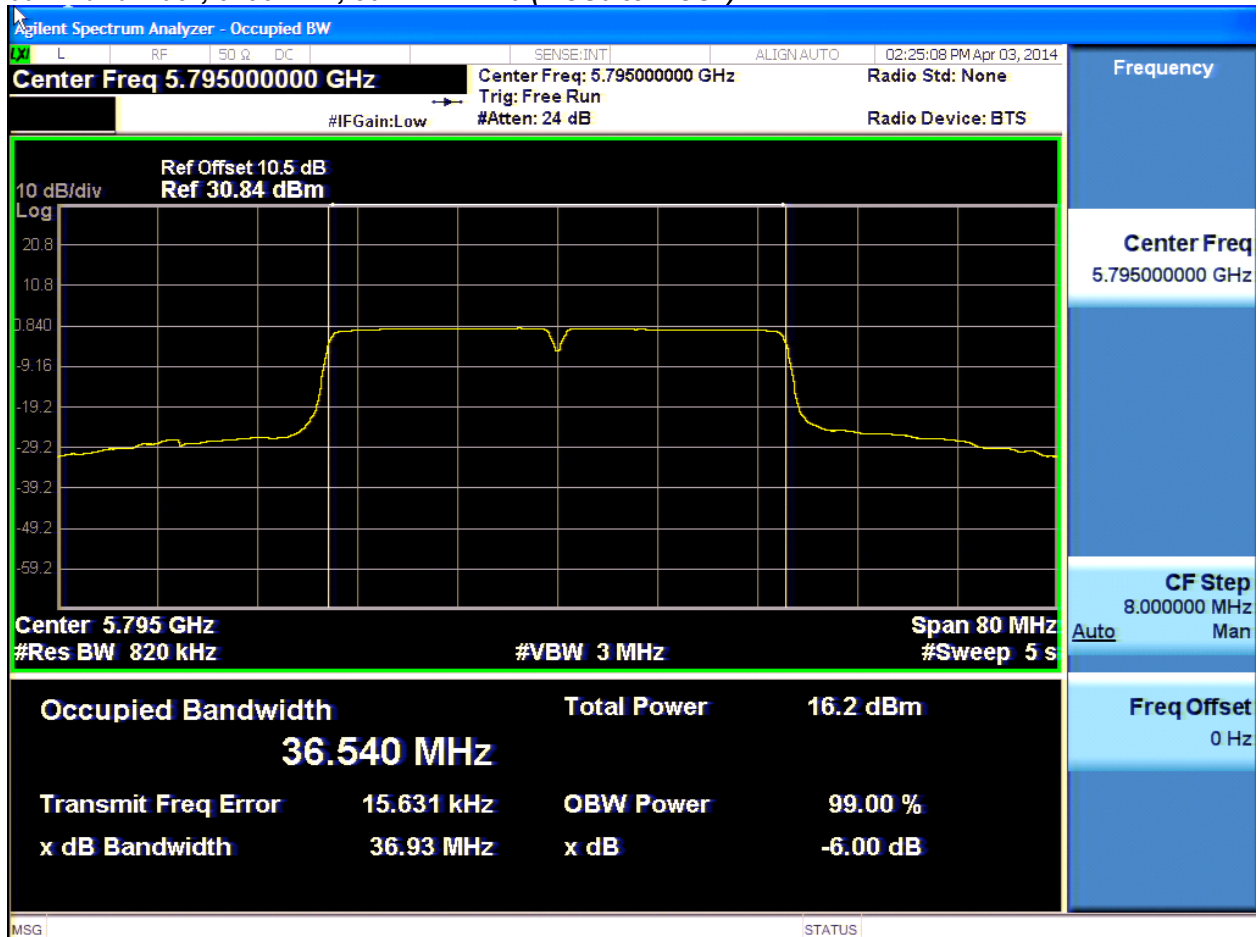


6dB Bandwidth, 5755 MHz, 802.11n HT40 (MCS0 to MCS7)





6dB Bandwidth, 5795 MHz, 802.11n HT40 (MCS0 to MCS7)





99% and 26dB Bandwidth

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

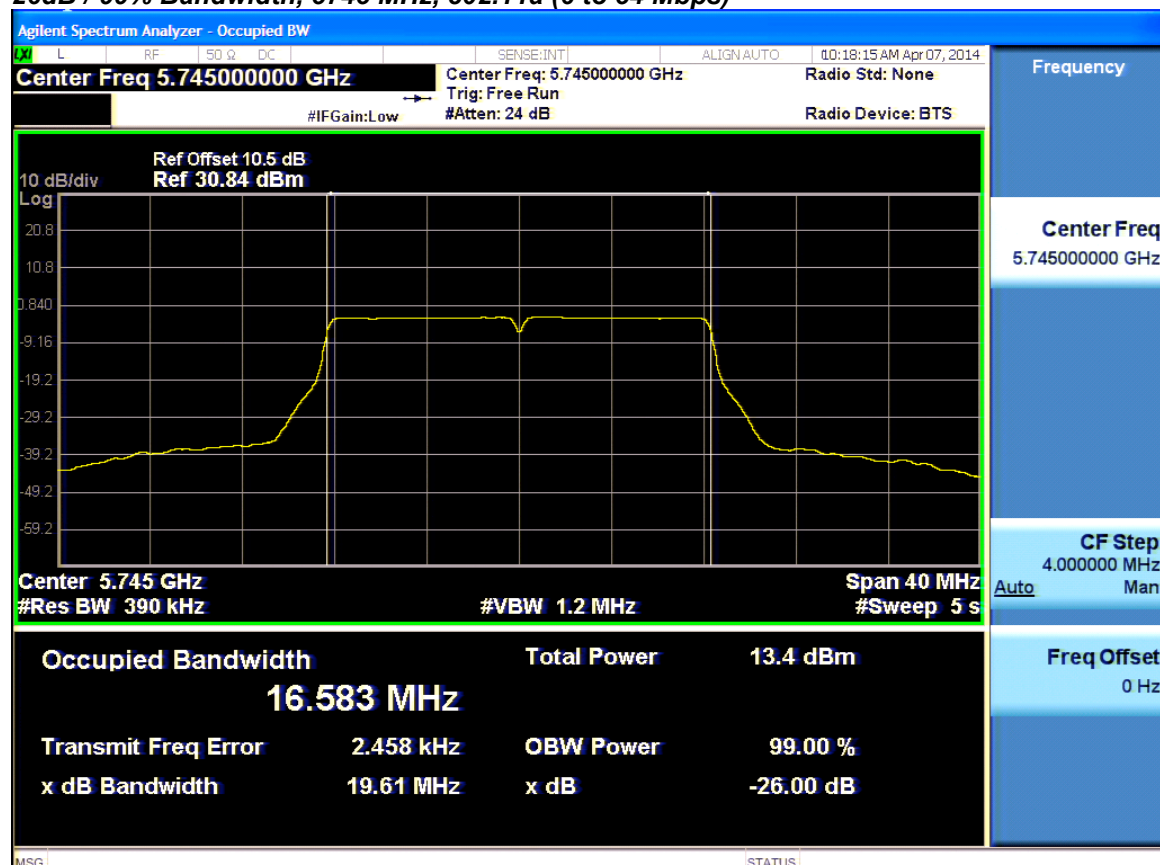
Center Frequency:	Frequency from table below
Span:	2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level:	30 dBm
Attenuation:	24 dB
Sweep Time:	5 s
Resolution Bandwidth:	1%-3% of 26 dB Bandwidth
Video Bandwidth:	≥Resolution Bandwidth
X dB Bandwidth:	26 dB
Detector:	Peak
Trace:	Single

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:



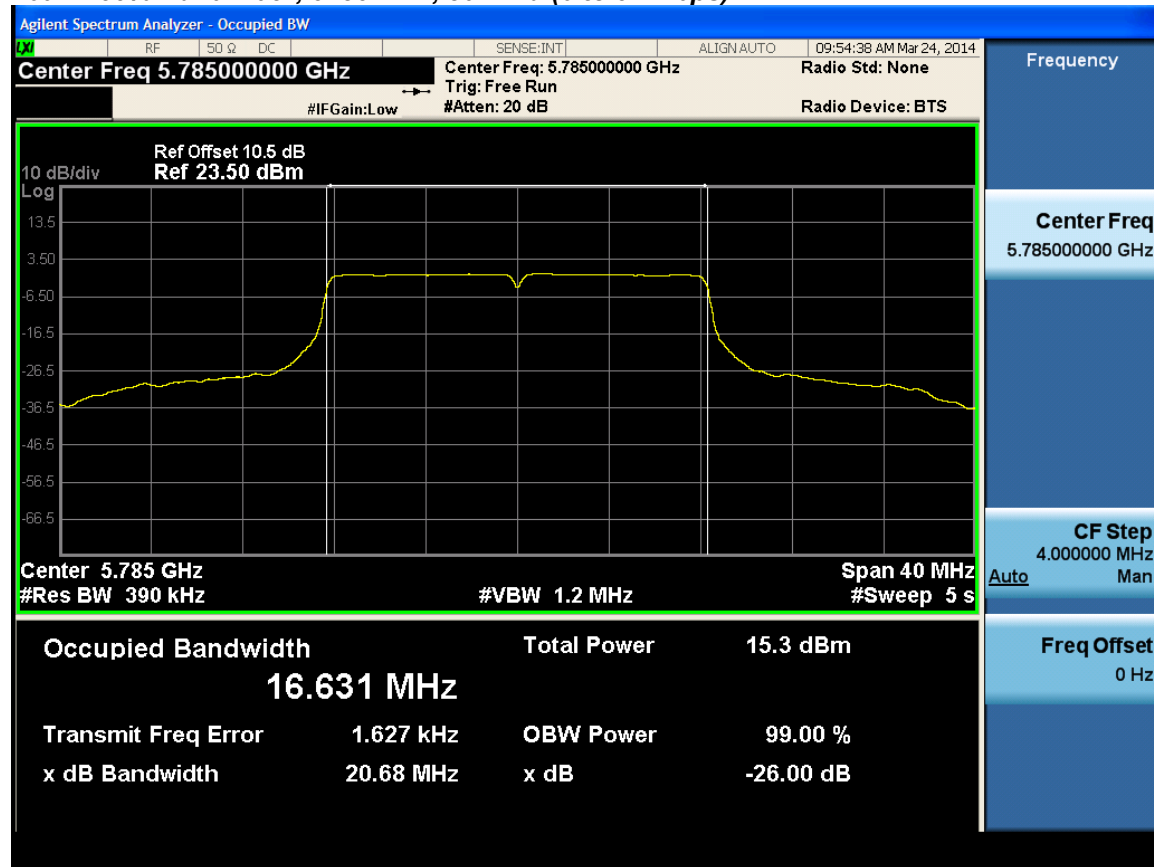
Frequency (MHz)	Mode	Data Rate	26dB BW (MHz)	99% BW (MHz)
5745	802.11a (6Mbps to 54Mbps)	6	19.61	16.583
	802.11n HT20 (MCS0 to MCS7)	MCS0	20.16	17.793
5785	802.11a (6Mbps to 54Mbps)	6	20.68	16.631
	802.11n HT20 (MCS0 to MCS7)	MCS0	20.80	17.843
5825	802.11a (6Mbps to 54Mbps)	6	21.24	16.644
	802.11n HT20 (MCS0 to MCS7)	MCS0	20.24	17.801
5755	802.11n HT40 (MCS0 to MCS7)	MCS0	39.94	36.425
5795	802.11n HT40 (MCS0 to MCS7)	MCS0	39.92	36.425

26dB / 99% Bandwidth, 5745 MHz, 802.11a (6 to 54 Mbps)



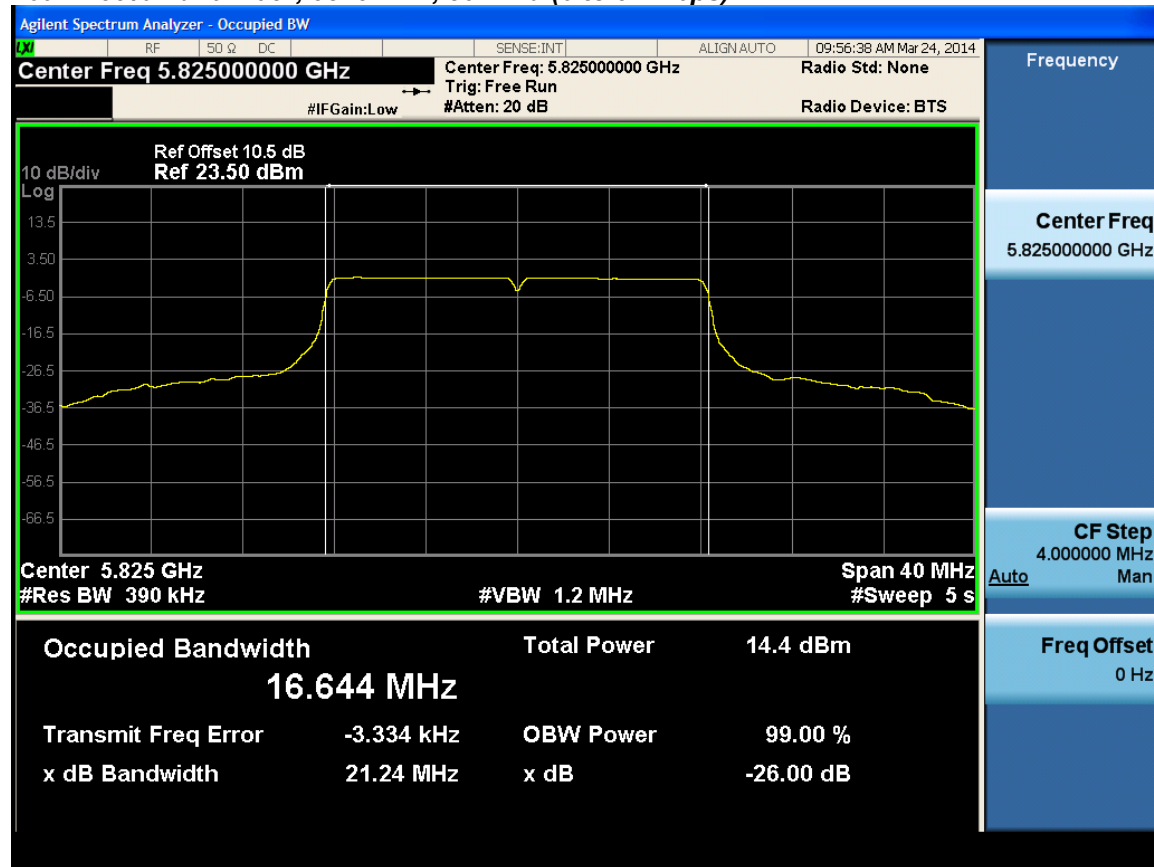


26dB / 99% Bandwidth, 5785 MHz, 802.11a (6 to 54 Mbps)



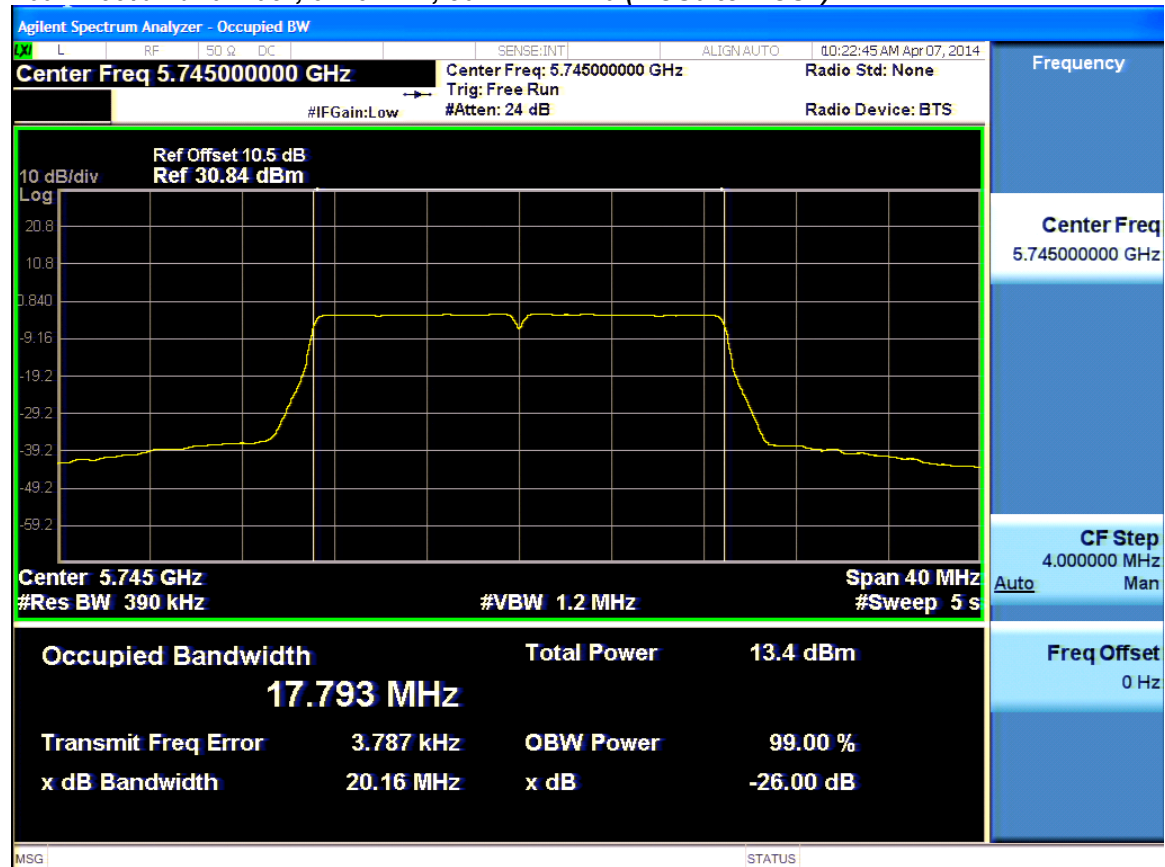


26dB / 99% Bandwidth, 5825 MHz, 802.11a (6 to 54 Mbps)



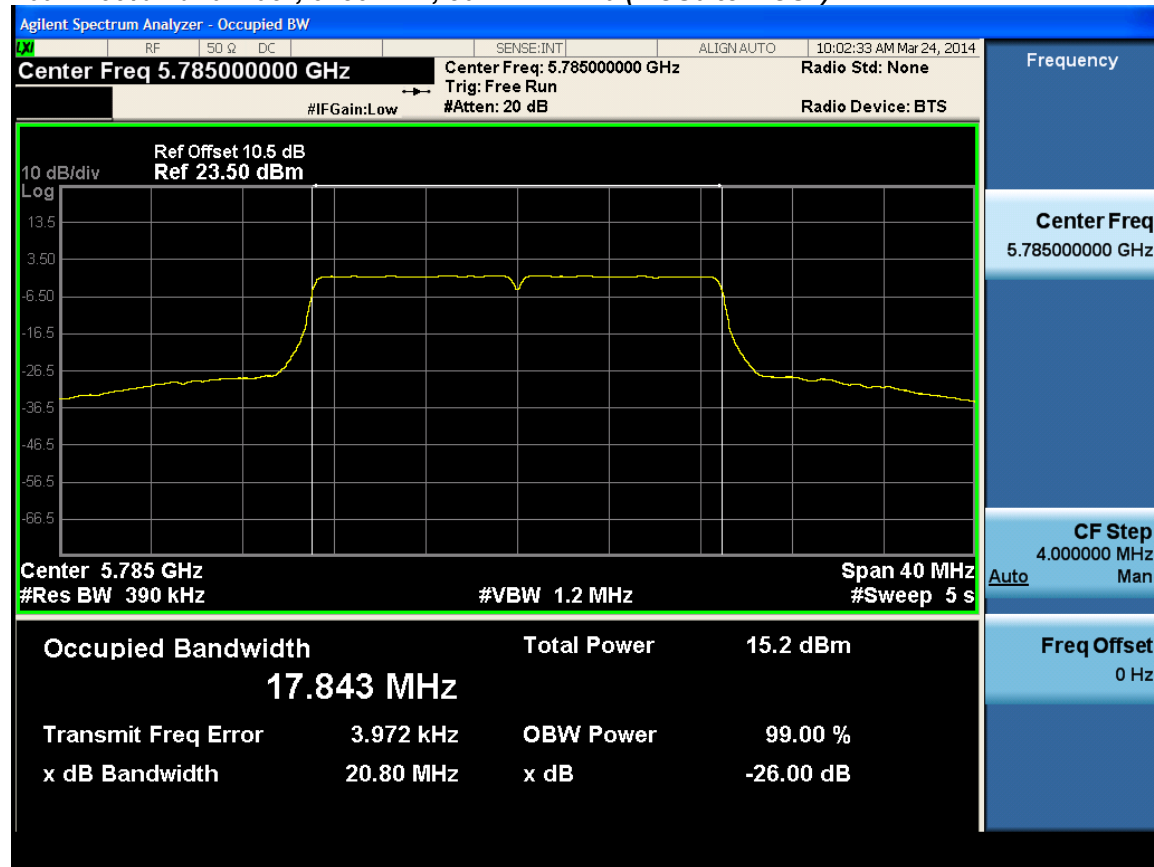


26dB / 99% Bandwidth, 5745 MHz, 802.11n HT20 (MCS0 to MCS7)



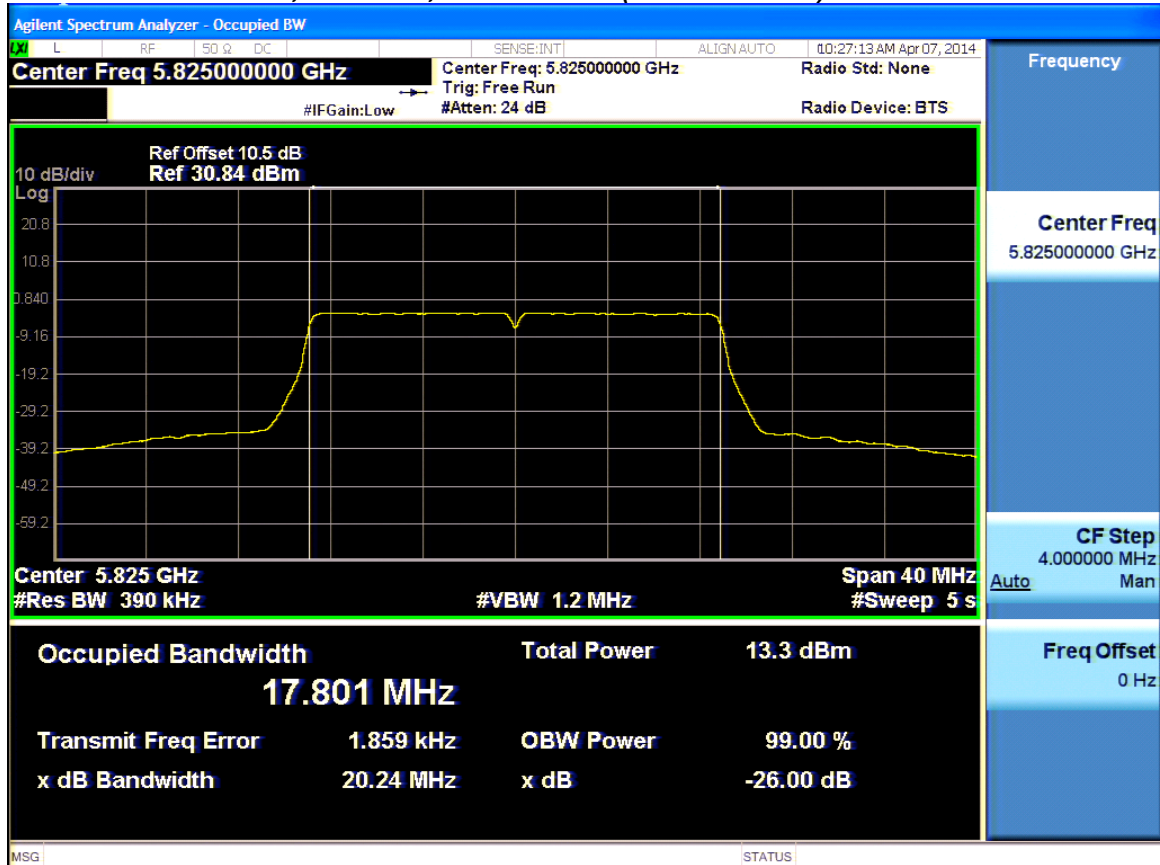


26dB / 99% Bandwidth, 5785 MHz, 802.11n HT20 (MCS0 to MCS7)



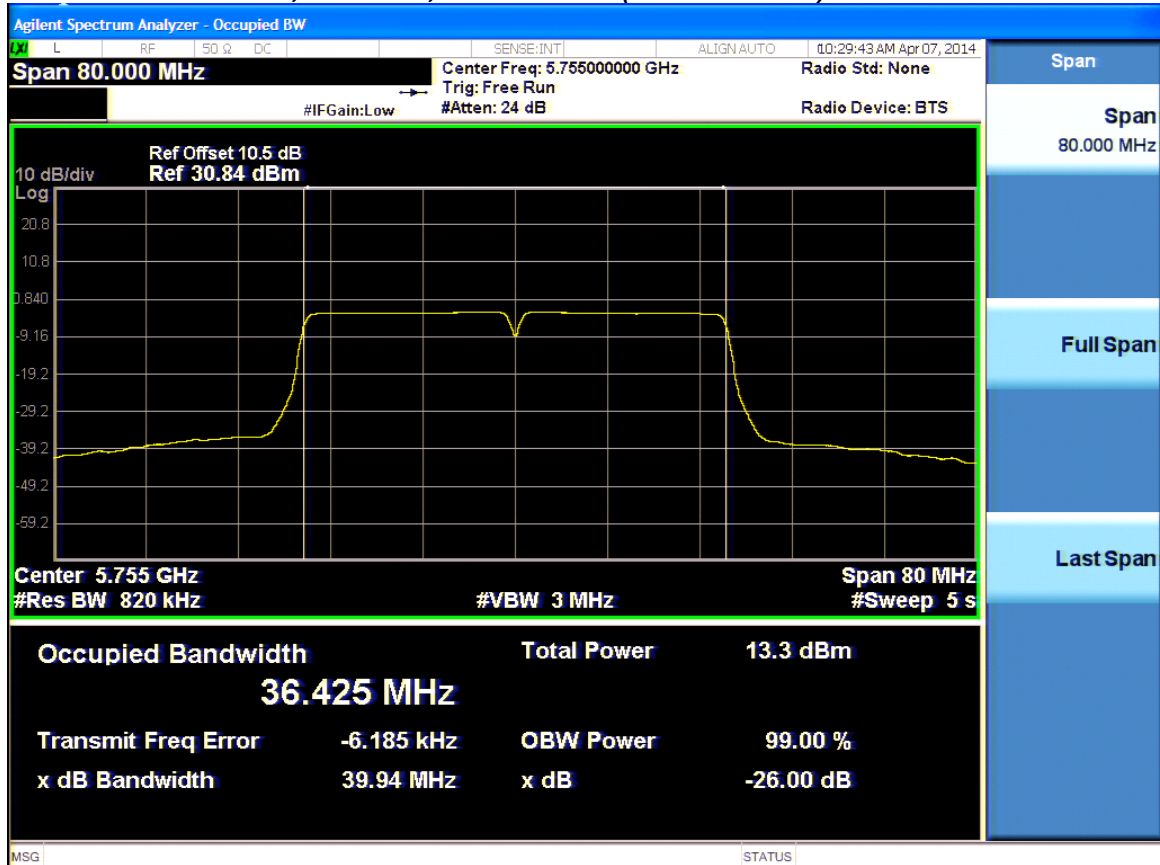


26dB / 99% Bandwidth, 5825 MHz, 802.11n HT20 (MCS0 to MCS7)



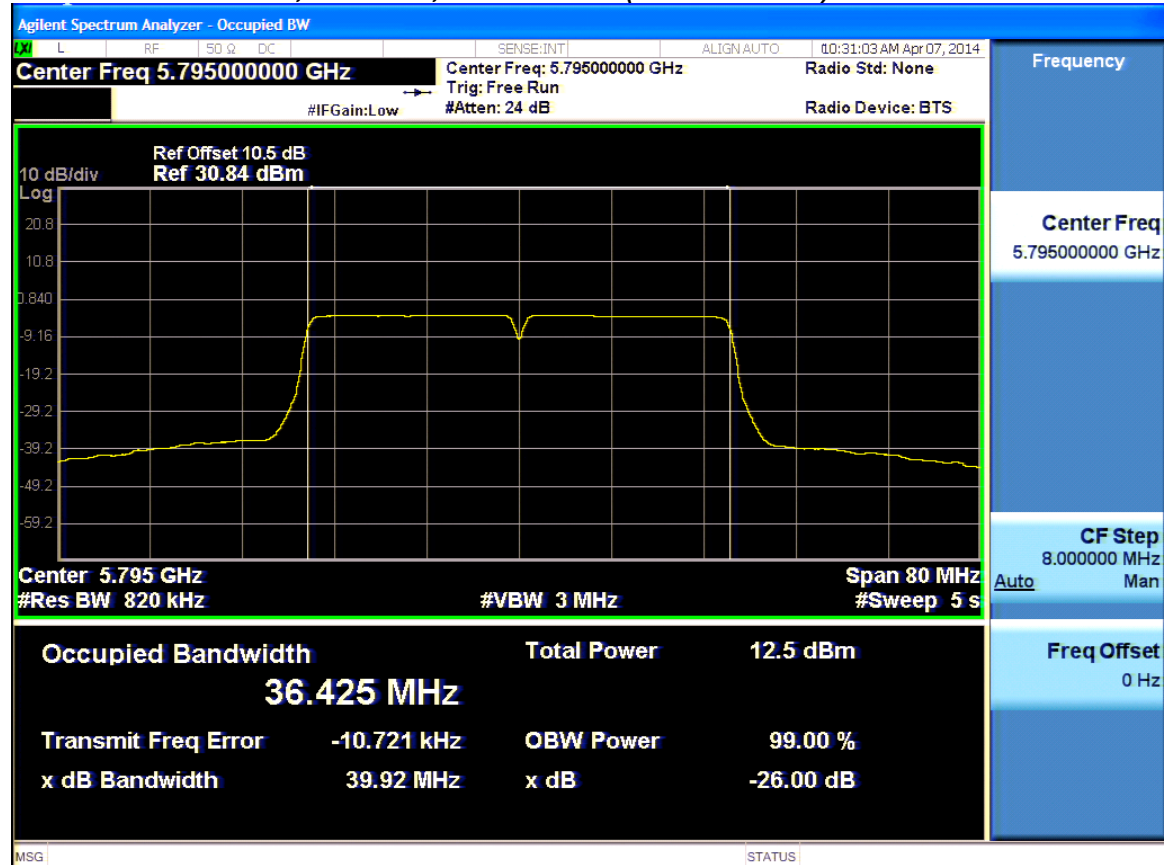


26dB / 99% Bandwidth, 5755 MHz, 802.11n HT40 (MCS0 to MCS7)





26dB / 99% Bandwidth, 5795 MHz, 802.11n HT40 (MCS0 to MCS7)





Peak Output Power

15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 5745-5825 MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 6dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Enable "Channel Power" function of analyzer	
Center Frequency:	Frequency from table below
Span:	20 MHz (must be greater than 26dB bandwidth, adjust as necessary)
Ref Level Offset:	Correct for attenuator and cable loss.
Reference Level:	26 dBm
Attenuation:	24 dB
Sweep Time:	100ms, Single sweep
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Sample
Trace:	Trace Average 100 traces in Power Averaging Mode
Integration BW:	=26 dB BW from 26 dB Bandwidth Data

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power.



Peak Output Power for 802.11a (6Mbps to 54Mbps):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5745	6	13.45	31.8	-18.35
5785	6	15.04	31.8	-16.76
5825	6	14.95	31.8	-16.85

Peak Output Power for 802.11n HT20 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5745	MCS0	13.41	31.8	-18.39
5785	MCS0	15.09	31.8	-16.71
5825	MCS0	13.31	31.8	-18.49

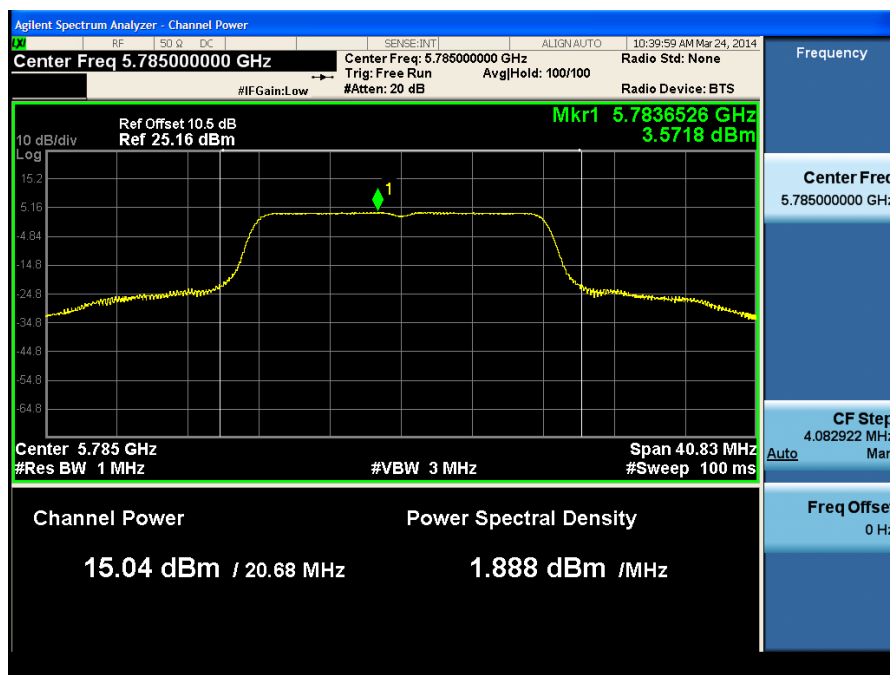
Peak Output Power for 802.11n HT40 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5755	MCS0	13.28	31.8	-18.52
5795	MCS0	12.58	31.8	-19.22

Peak Output Power 5745MHz 802.11a (6Mbps to 54Mbps)

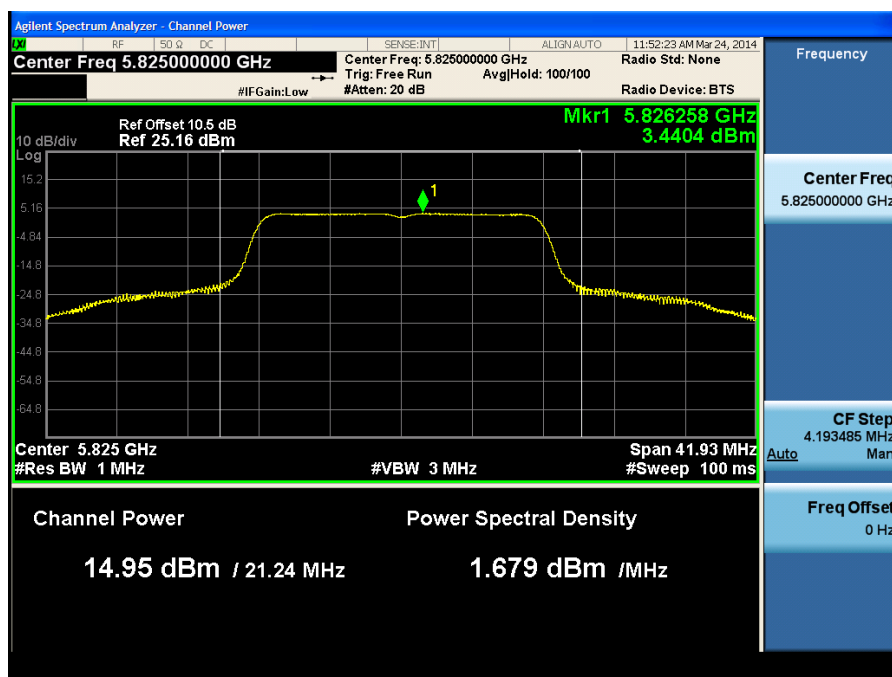


Peak Output Power 5785MHz 802.11a (6Mbps to 54Mbps)





Peak Output Power 5825MHz 802.11a (6Mbps to 54Mbps)

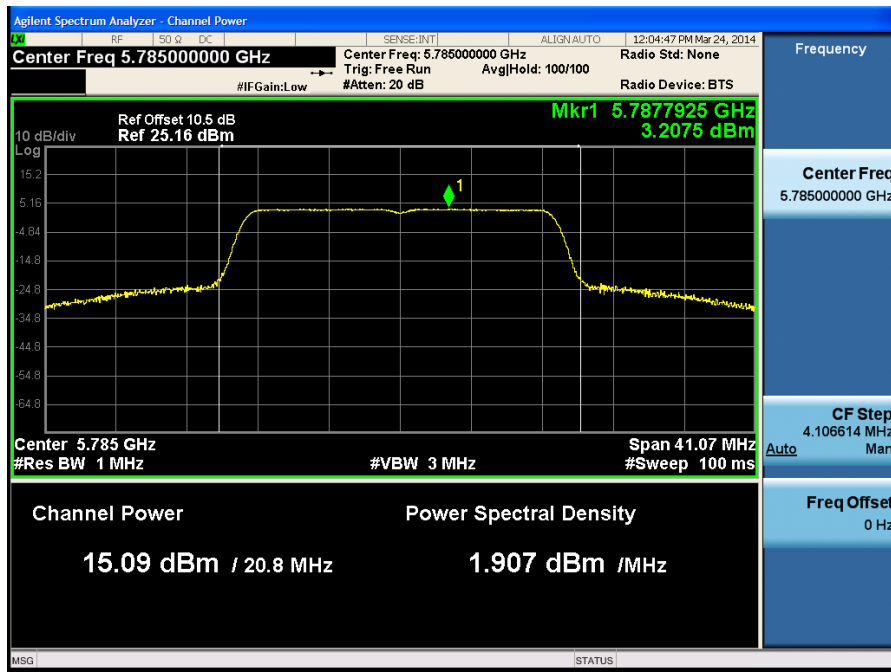


Peak Output Power 5745MHz 802.11n HT20 (MCS0 to MCS7)





Peak Output Power 5785MHz 802.11n HT20 (MCS0 to MCS7)

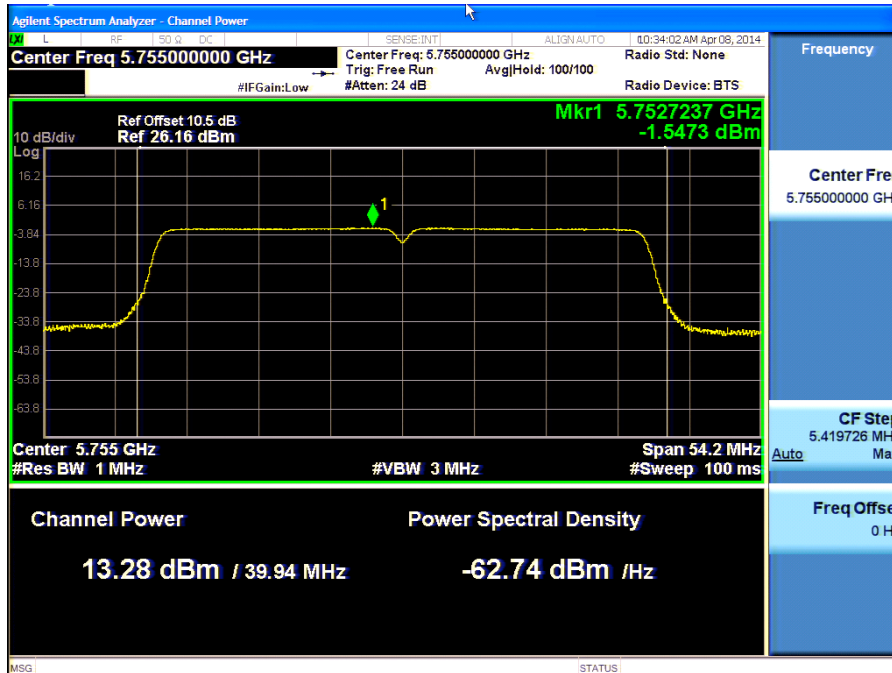


Peak Output Power 5825MHz 802.11n HT20 (MCS0 to MCS7)





Peak Output Power 5755MHz 802.11n HT40 (MCS0 to MCS7)



Peak Output Power 5795MHz 802.11n HT40 (MCS0 to MCS7)



Power Spectral Density

15.247: For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

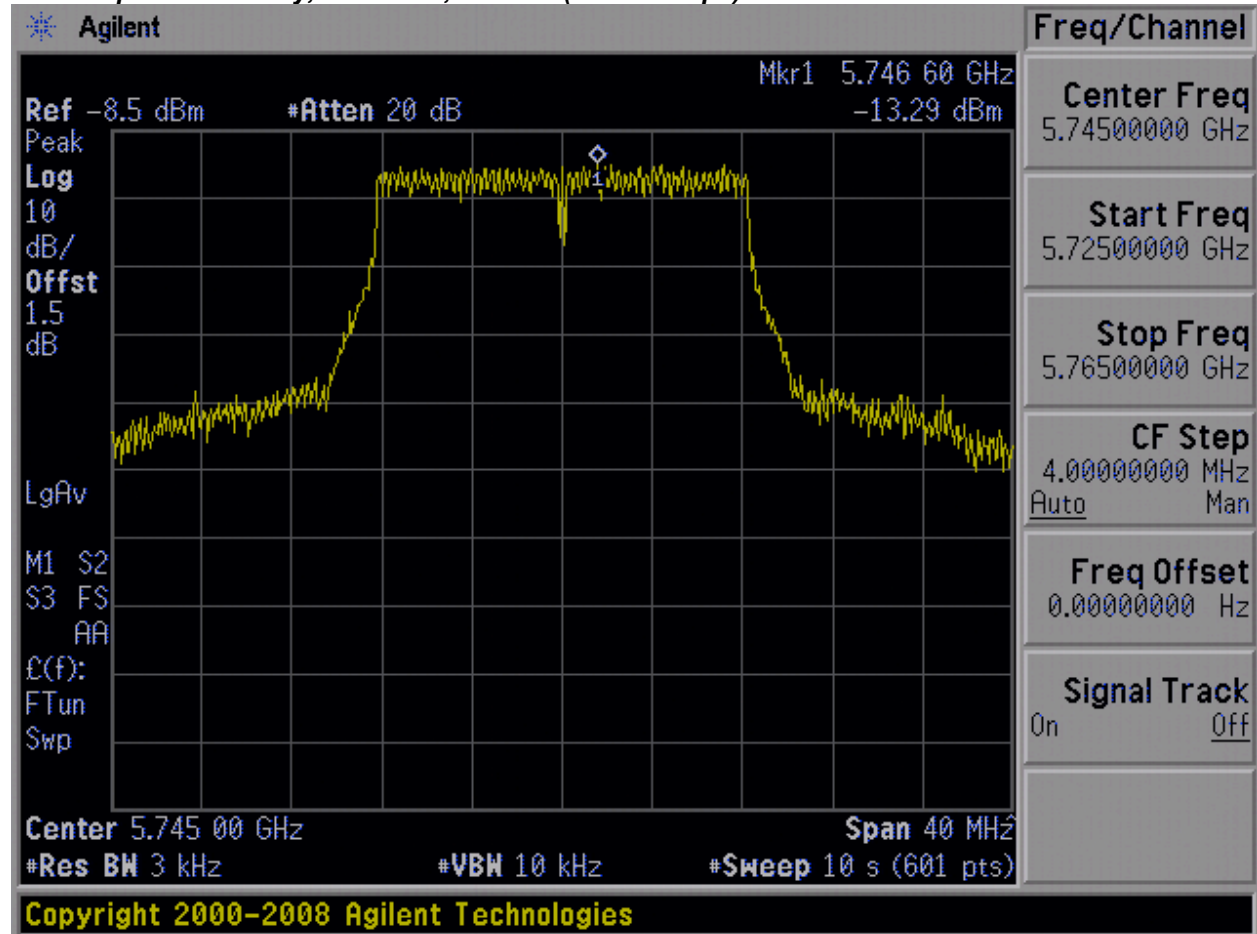
Center Frequency:	Frequency from table below
Span:	2 X Nominal Bandwidth
Ref Level Offset:	Correct for attenuator and cable loss.
Reference Level:	-10 dBm
Attenuation:	20 dB
Sweep Time:	10s
Resolution Bandwidth:	3 kHz
Video Bandwidth:	10 kHz
Detector:	Peak
Trace:	Single
Marker:	Peak Search

Record the Marker value.

Frequency (MHz)	Mode	Data Rate	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
5745	802.11a 6 to 54 Mbps	6Mbps	-13.29	8.0	-21.29
	802.11n HT20 MCS0 to MCS7	MCS0	-12.52	8.0	-20.52
5785	802.11a 6 to 54 Mbps	6Mbps	-10.88	8.0	-18.88
	802.11n HT20 MCS0 to MCS7	MCS0	-10.27	8.0	-18.27
5825	802.11a 6 to 54 Mbps	6Mbps	-10.30	8.0	-18.30
	802.11n HT20 MCS0 to MCS7	MCS0	-12.56	8.0	-20.56
5755	802.11n HT40 MCS0 to MCS7	MCS0	-14.93	8.0	-22.93
5795	802.11n HT40 MCS0 to MCS7	MCS0	-15.05	8.0	-15.05

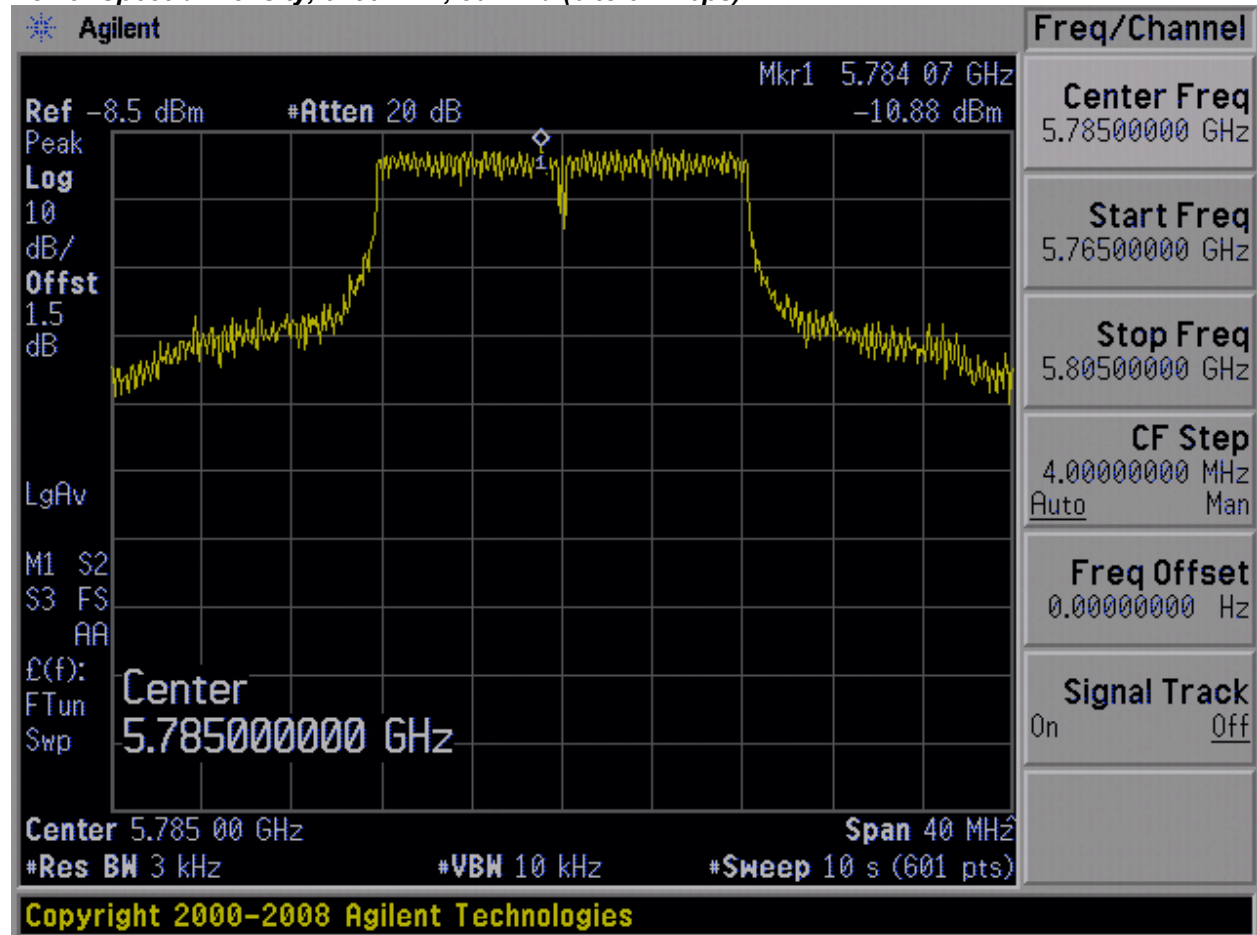


Power Spectral Density, 5745 MHz, 802.11a (6 to 54 Mbps)

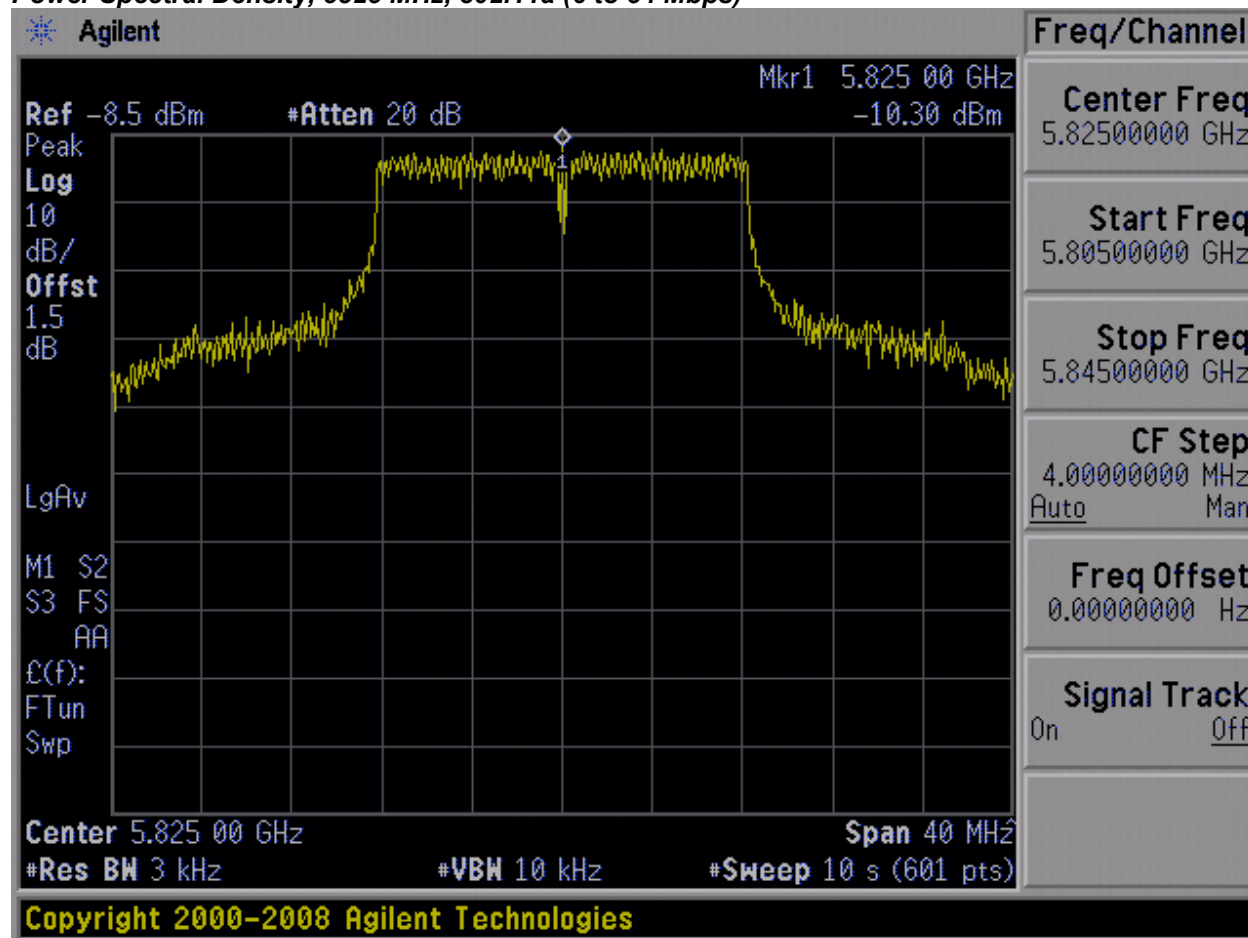




Power Spectral Density, 5785 MHz, 802.11a (6 to 54 Mbps)

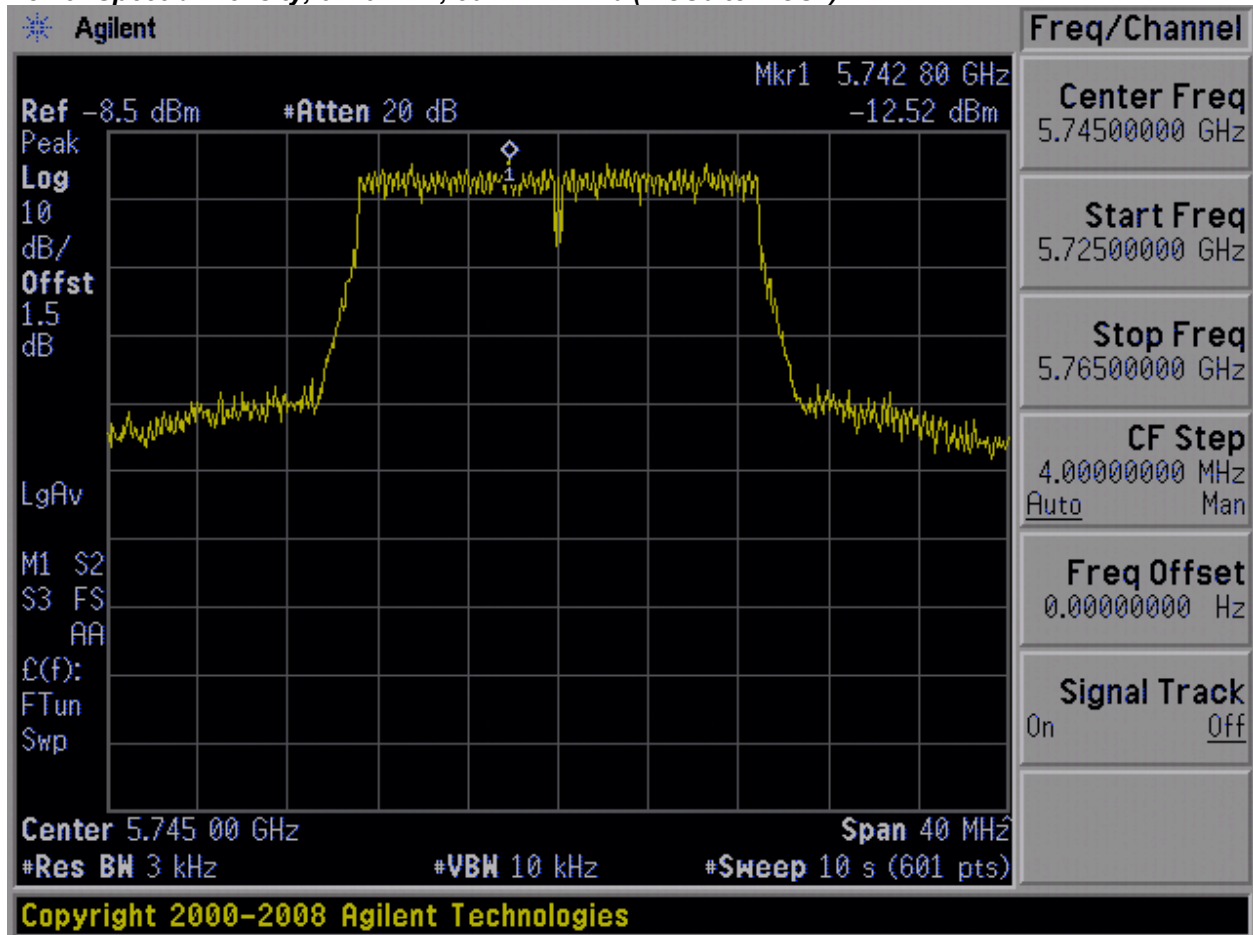


Power Spectral Density, 5825 MHz, 802.11a (6 to 54 Mbps)



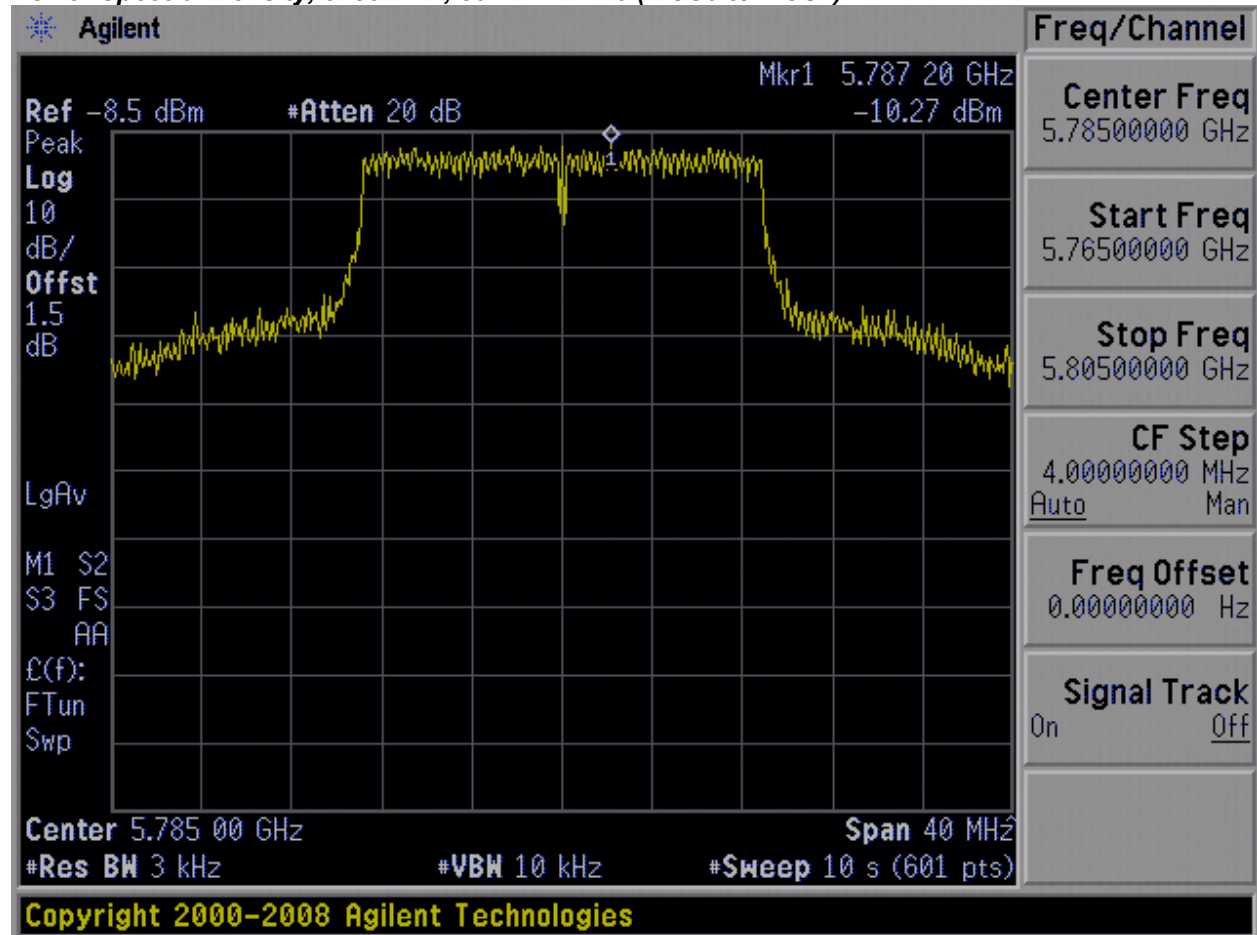


Power Spectral Density, 5745 MHz, 802.11n HT20 (MCS0 to MCS7)





Power Spectral Density, 5785 MHz, 802.11n HT20 (MCS0 to MCS7)





Power Spectral Density, 5825 MHz, 802.11n HT20 (MCS0 to MCS7)

