Test Report

Radio Test Report: EDCS - 1403067

CP-DX70
Desktop Telepresence

FCC ID:LDKDX700976 IC: 2461B- DX700976

5250-5350 MHz

Against the following Specifications:

CFR47 Part 15.407

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 - 1403067

This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

Section 1: Overview

1.1 Test Summary

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

Emission	Immunity
CFR47 Part 15.407 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%)

2.2 Date of testing

04-MARCH-2014

2.3 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

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)
5250MHz to 5350MHz	Internal	Omni-Directional	3.1

Section 4: Results Summary

Conducted Tests

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

Radiated Tests

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass
Radiated Emissions 30MHz to 1GHz	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 – 5805MHz: 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.

	Maximum Channel Power (dBm)			
	Frequency (MHz)			
Operating Mode	5260	5280	5300	5320
802.11a (6 to 54 Mbps)	16	16	16	15
802.11n (HT-20, MCS0 to MCS7 upto 72Mbps)	15	16	13	13
	5270	5310		
802.11n (HT-40, MCS0 to MCS7 upto 150Mbps)	16	16		

Frequency Stability 802.11a:

Test Conditions (see EN 301 893 V1.6.1, clause 5.3.2.1):

Power Setting (for a single TX chain): 16 dBm (5180MHz) ☐ EIRP ☒ Conducted

Duty Cycle: 100 %					Test results			
Rel. Humidity: 34 %					Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (+/- kHz)	Margin (kHz)
Test Frequency: **5 320 MHz**								
T_{nom}	23 °C	V_{nom}	230	Vac	5319.9585	-41.5	106.4	64.9
T_{min}	0 °C	V_{min}	207	Vac	5319.9495	-50.5	106.4	55.9
		V_{max}	253	Vac	5319.9550	-45.0	106.4	61.4
T_{max}	40 °C	V_{min}	207	Vac	5319.9705	-29.5	106.4	76.9
		V_{max}	253	Vac	5319.9530	-47.0	106.4	59.4

Frequency Stability 802.11n (HT20):

Test Conditions (see EN 301 893 V1.6.1, clause 5.3.2.1):

Power Setting (for a single TX chain):	15 dBm (5180MHz)	☐ EIRP	☒ Conducted

Duty Cycle: 100 %					Test results			
Rel. Humidity: 34 %					Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (+/- kHz)	Margin (kHz)
Test Frequency: **5 320 MHz**								
T_{nom}	23	°C	V_{nom}	230 Vac	5319.9400	-60.0	106.4	46.4
T_{min}	0	°C	V_{min}	207 Vac	5319.9290	-71.0	106.4	35.4
			V_{max}	253 Vac	5319.9560	-44.0	106.4	62.4
T_{max}	40	°C	V_{min}	207 Vac	5319.9725	-27.5	106.4	78.9
			V_{max}	253 Vac	5319.9485	-51.5	106.4	54.9

Frequency Stability 802.11n (HT40):

Test Conditions (see EN 301 893 V1.6.1, clause 5.3.2.1):			
Power Setting (for a single TX chain):	15 dBm (5190MHz)	☐ EIRP	☒ Conducted

Duty Cycle: 100 %					Test results			
Rel. Humidity: 34 %					Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (+/- kHz)	Margin (kHz)
Test Frequency: **5 310 MHz**								
T_{nom}	23	°C	V_{nom}	230 Vac	5310.0545	54.50	106.2	51.7
T_{min}	0	°C	V_{min}	207 Vac	5310.0600	60.00	106.2	46.2
			V_{max}	253 Vac	5310.0285	28.50	106.2	77.7
T_{max}	40	°C	V_{min}	207 Vac	5310.0930	93.00	106.2	13.2
			V_{max}	253 Vac	5310.0825	82.50	106.2	23.7

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
Reference Level:	20 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:

99% and 26dB Bandwidth for 802.11a

Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5260	6	17.183	20.89
5280	6	17.039	20.23
5300	6	17.051	20.96
5320	6	16.570	19.48

99% and 26dB Bandwidth for 802.11n (HT20)

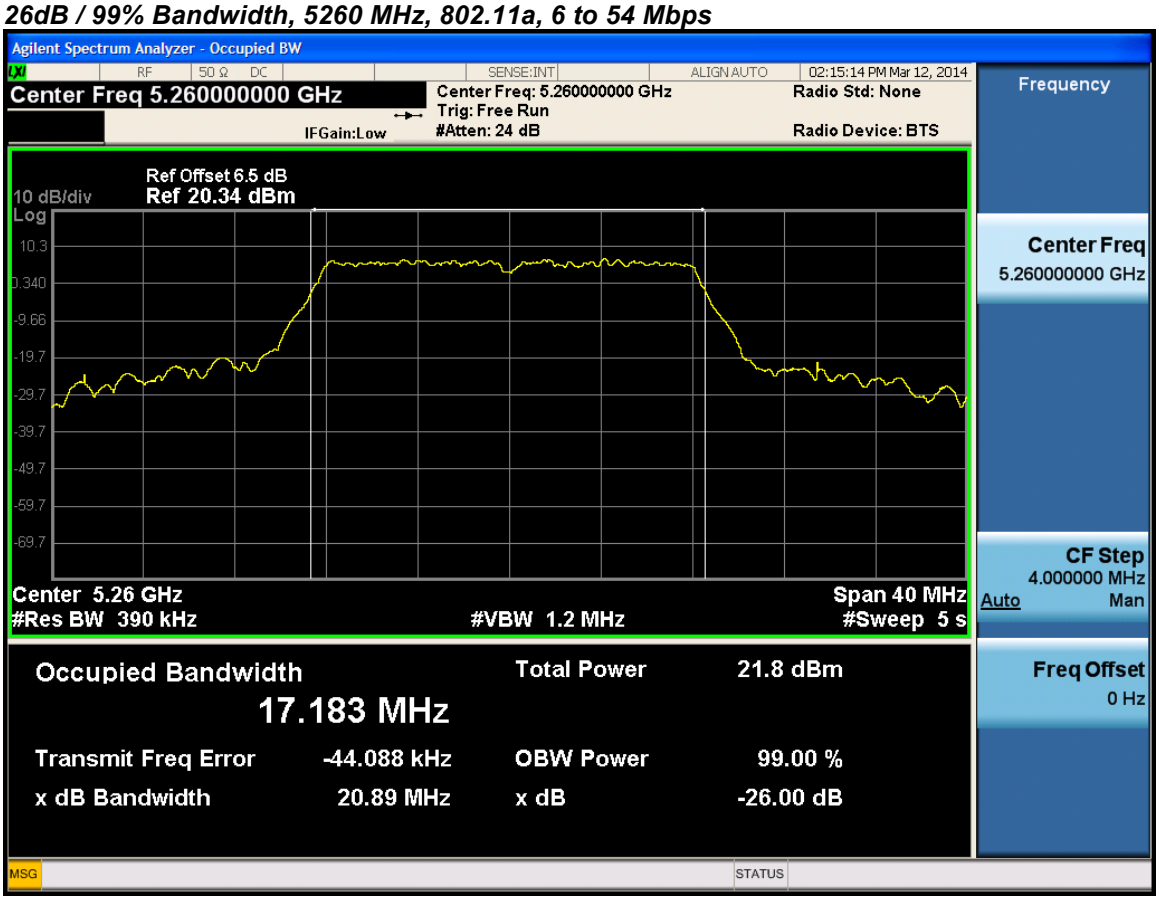
Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5260	MCS0	17.787	20.13
5280	MCS0	18.025	20.56
5300	MCS0	17.785	20.11
5320	MVS0	17.786	20.11

99% and 26dB Bandwidth for 802.11n (HT40)

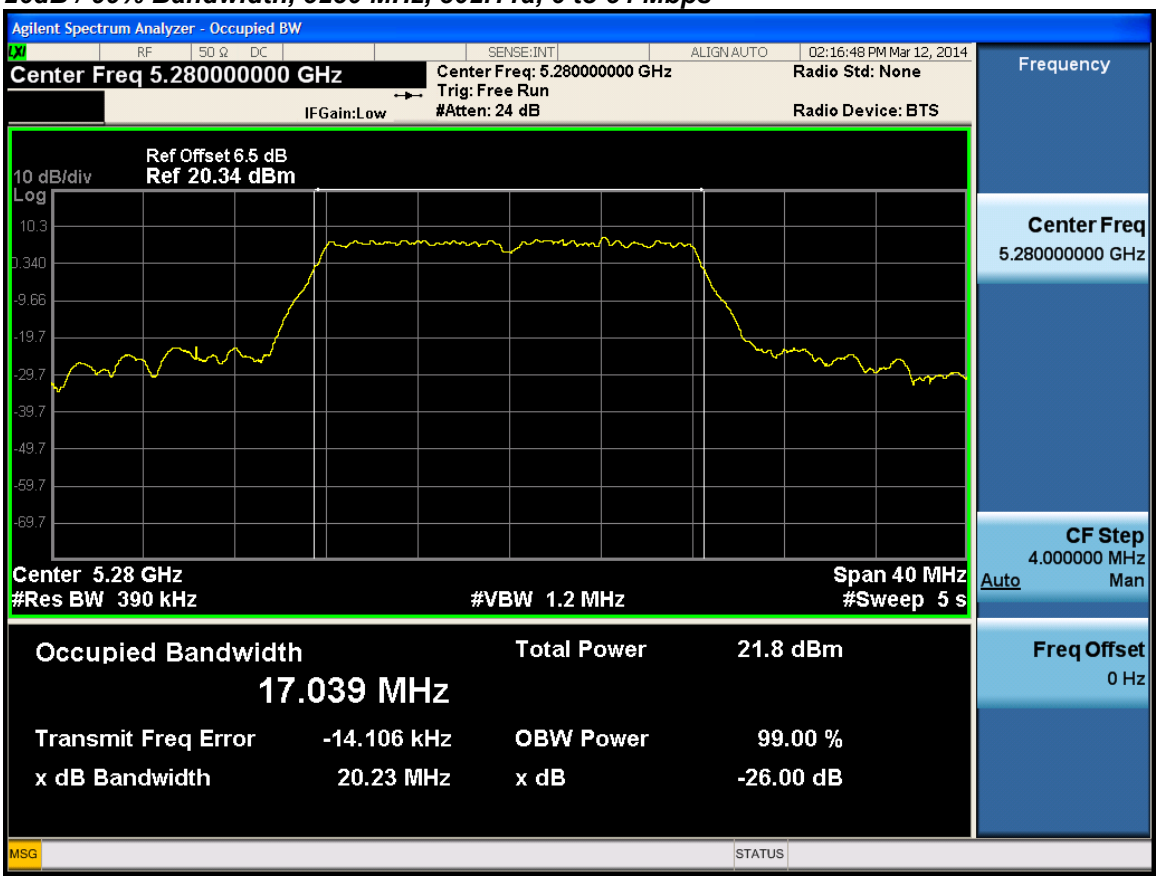
Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5270	MCS0	37.033	41.78
5310	MCS0	36.995	41.72

Graphical Data 802.11a (6Mbps to 54Mbps):

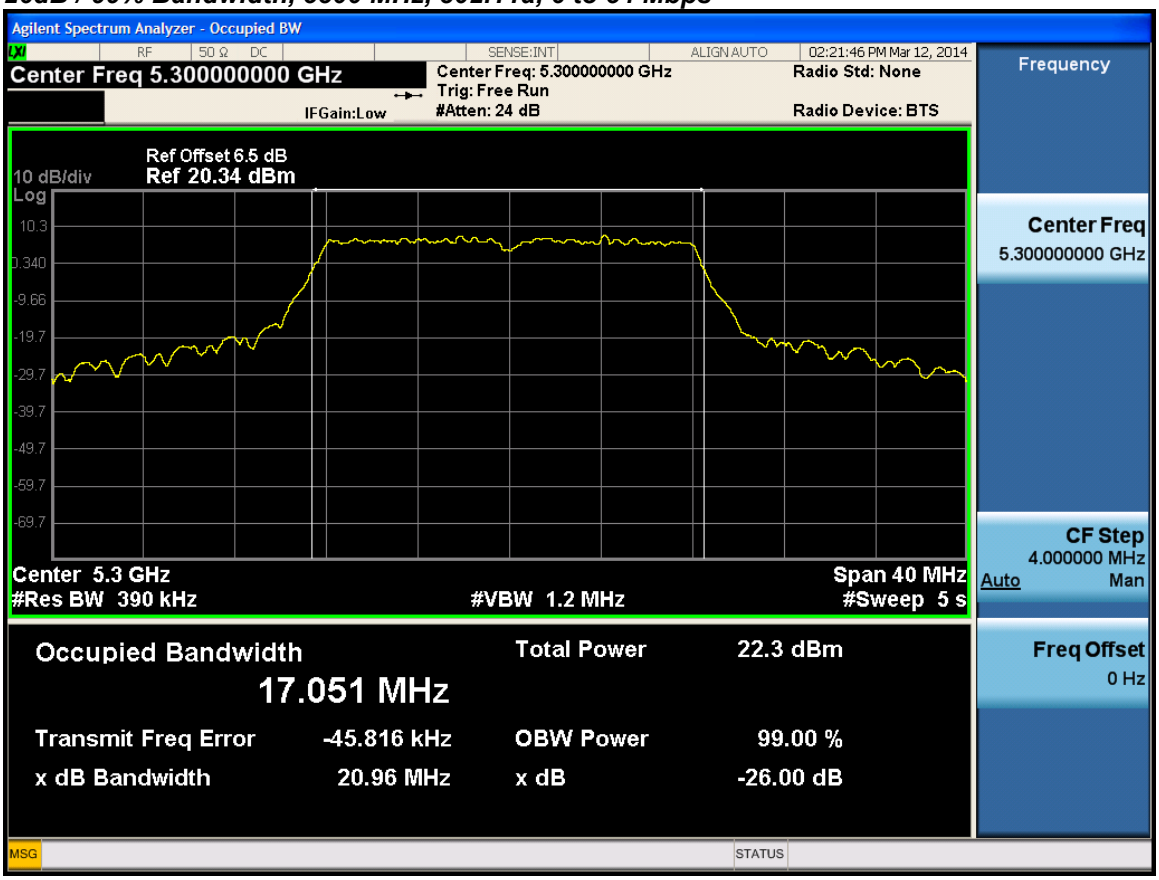
26dB / 99% Bandwidth, 5260 MHz, 802.11a, 6 to 54 Mbps



26dB / 99% Bandwidth, 5280 MHz, 802.11a, 6 to 54 Mbps



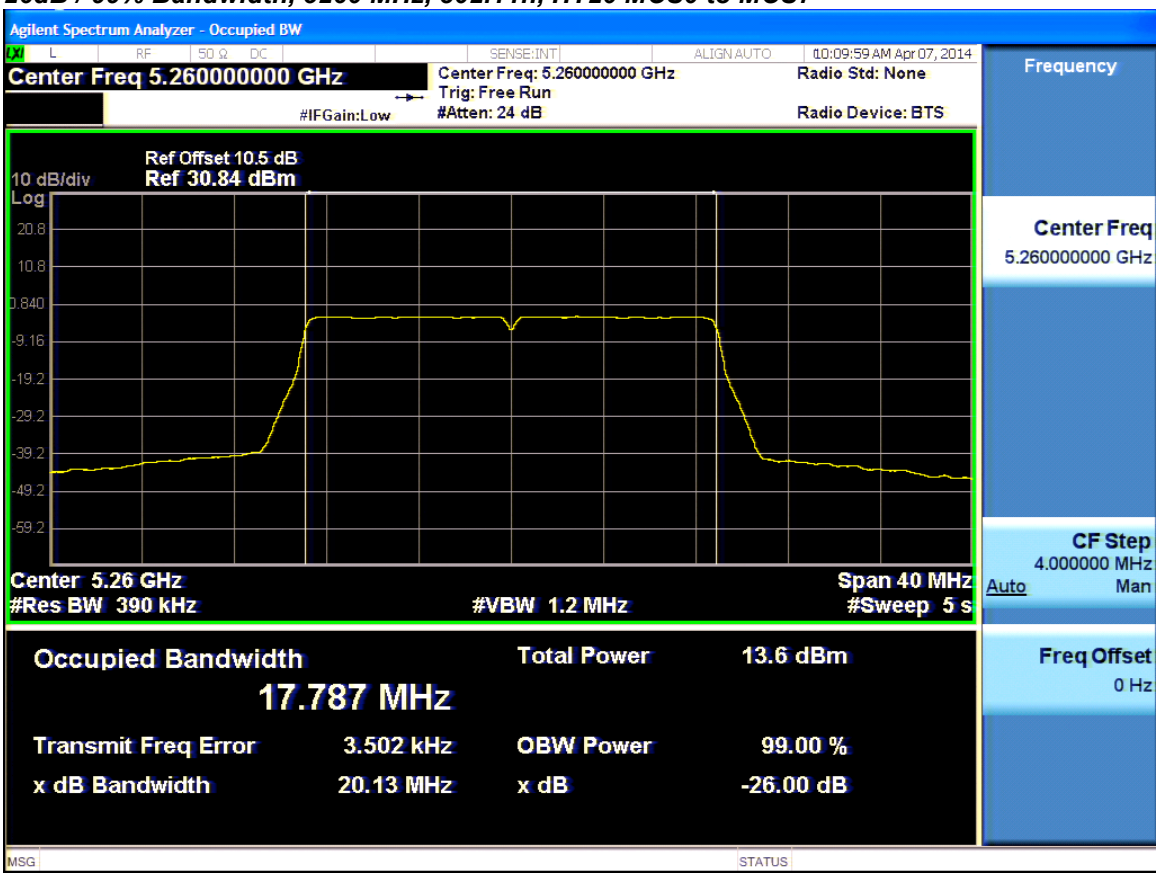
26dB / 99% Bandwidth, 5300 MHz, 802.11a, 6 to 54 Mbps



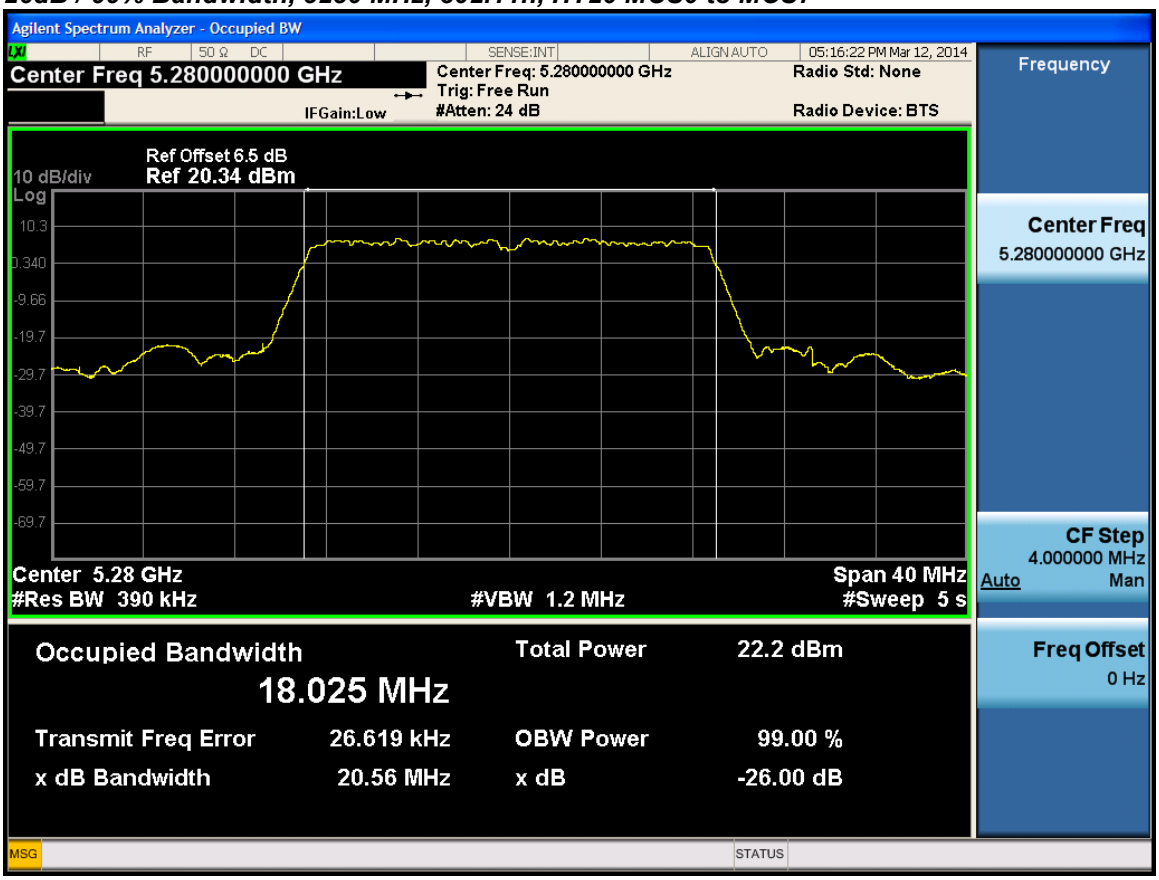
26dB / 99% Bandwidth, 5320 MHz, 802.11a, 6 to 54 Mbps

Graphical Data 802.11n (HT20 MCS0 to MCS7):

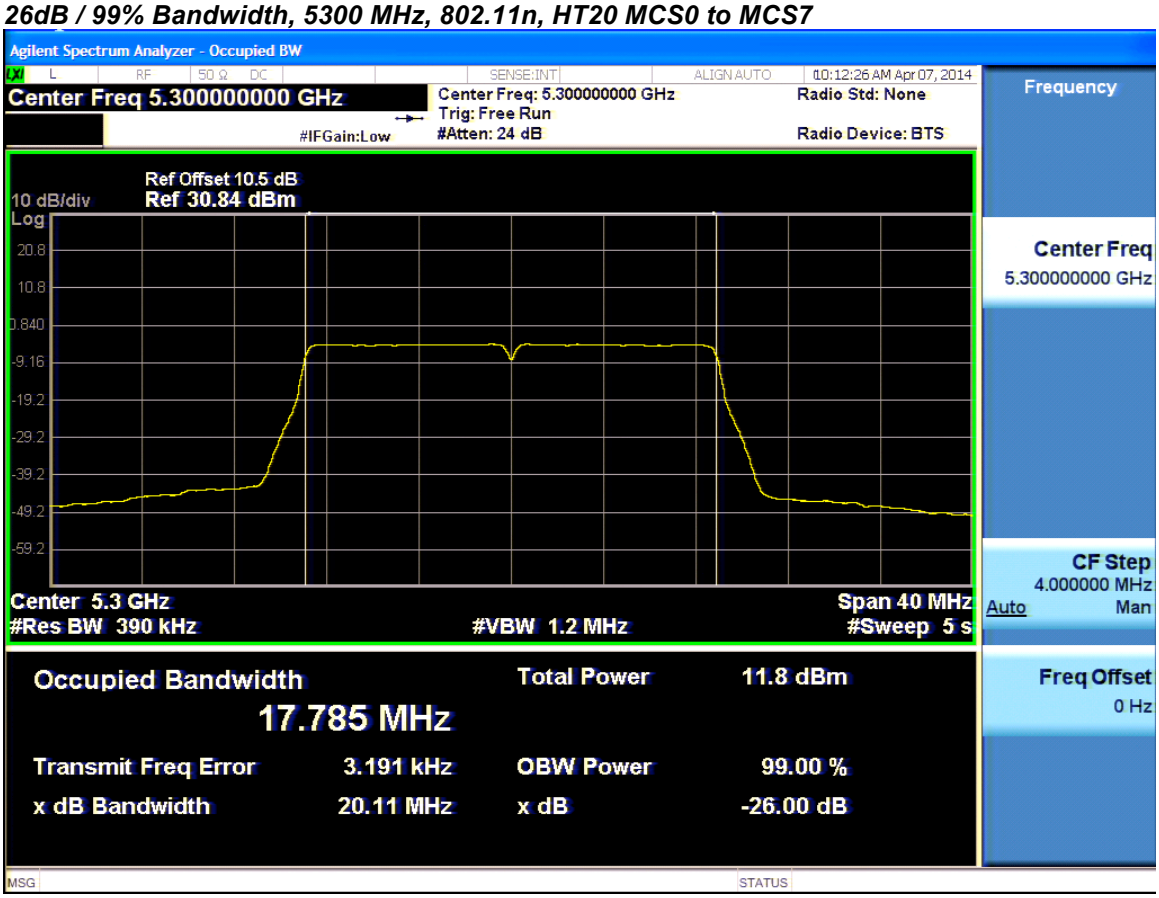
26dB / 99% Bandwidth, 5260 MHz, 802.11n, HT20 MCS0 to MCS7



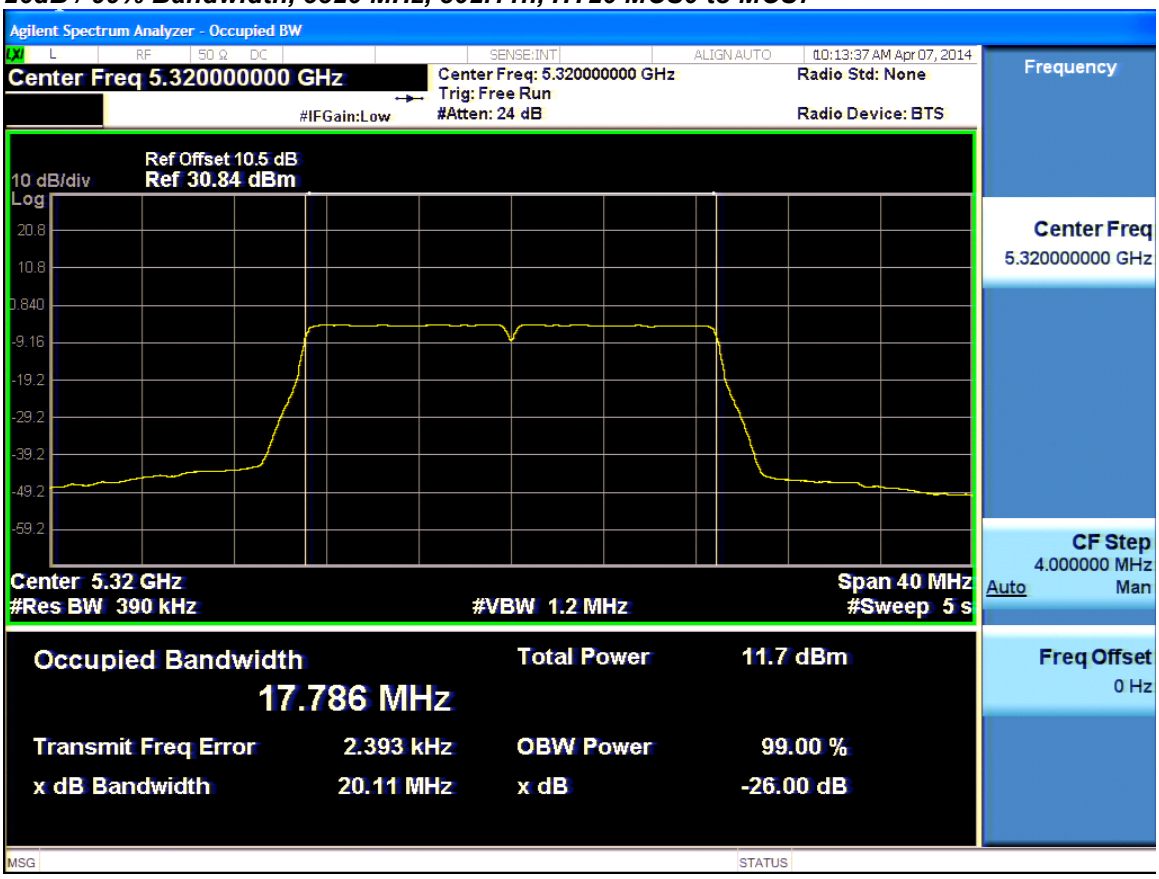
26dB / 99% Bandwidth, 5280 MHz, 802.11n, HT20 MCS0 to MCS7



26dB / 99% Bandwidth, 5300 MHz, 802.11n, HT20 MCS0 to MCS7

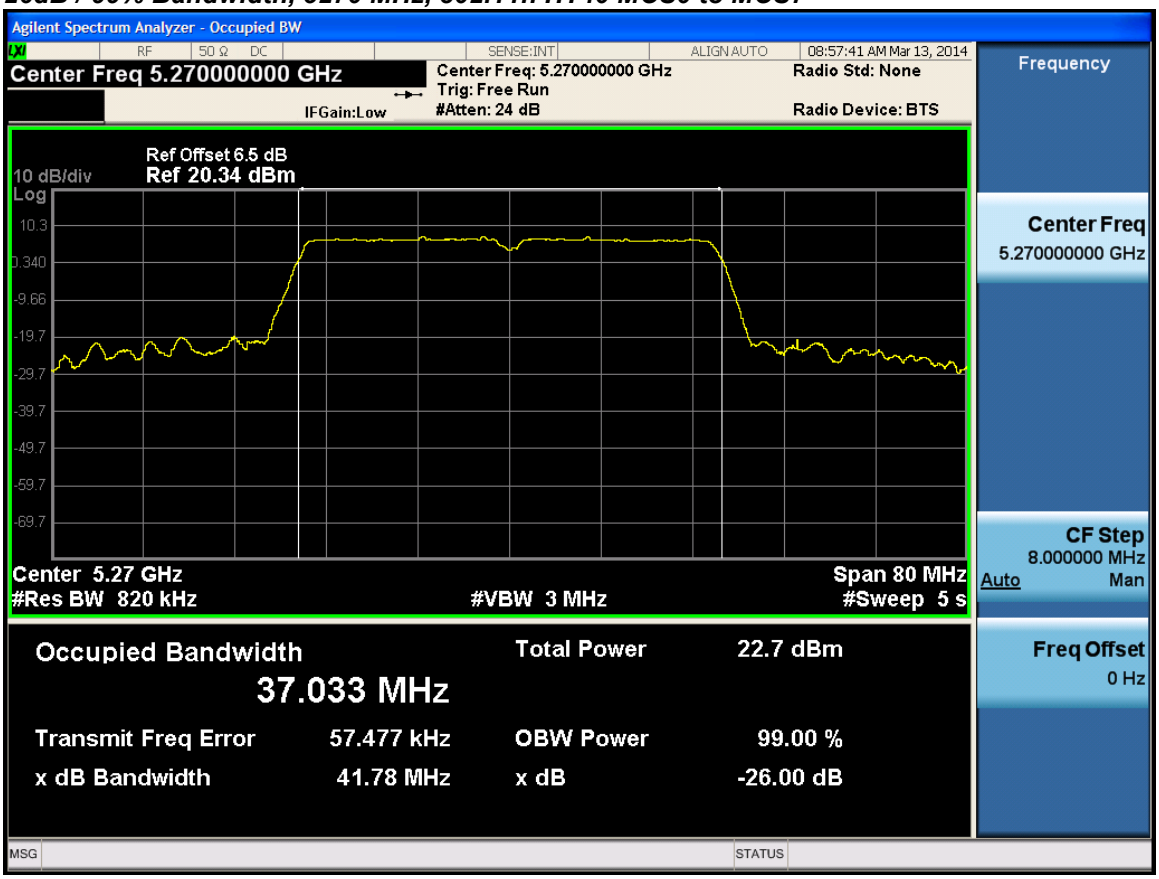


26dB / 99% Bandwidth, 5320 MHz, 802.11n, HT20 MCS0 to MCS7

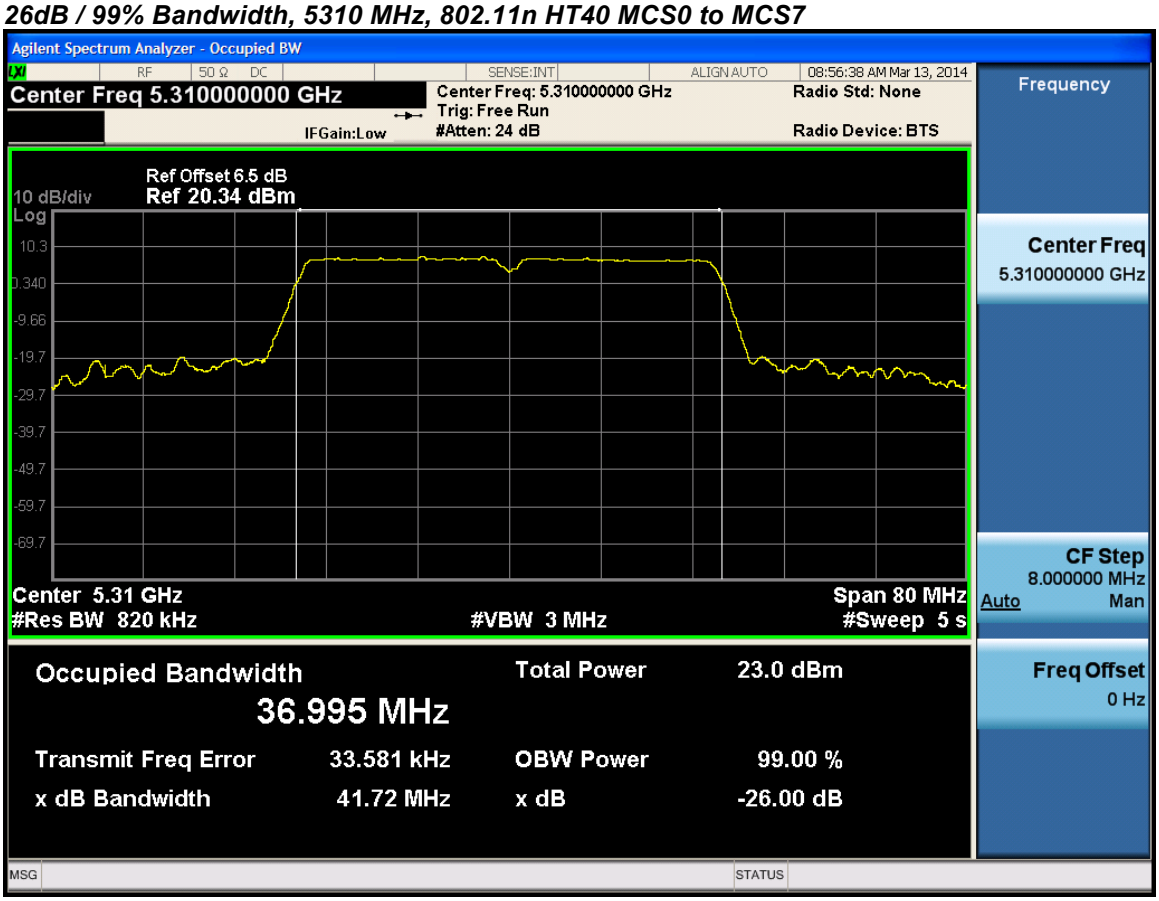


Graphical Data 802.11n (HT40 MCS0 to MCS7):

26dB / 99% Bandwidth, 5270 MHz, 802.11n HT40 MCS0 to MCS7



26dB / 99% Bandwidth, 5310 MHz, 802.11n HT40 MCS0 to MCS7



Peak Output Power

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 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, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The smallest 26dB bandwidth for all channels is 19.48 MHz. The maximum conducted output power is calculated as 11dBm+10*log(19.48MHz) = 23.9dBm

The maximum supported antenna gain for all bands 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.

The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units.

Power Spectral Density

15.407 & RSS210 (A9.2): For the bands 5.25-5.35 and 5.47-5.725 GHz, 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.

The maximum supported antenna gain is 3.1dBi.

Method SA-1 from KDB 789033

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:	20 dBm
Attenuation:	20 dB
Sweep Time:	Auto
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Sample
Trace:	Trace Average 100 traces in Power Averaging Mode
Integration BW:	=99% BW from 99% Bandwidth Data

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power. Perform a Marker Peak Search function, and record this value as the Power Spectral Density.

Peak Output Power for 802.11a:

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5260	6	14.45	23.9	-8.45
5280	6	15.53	23.9	-8.37
5300	6	15.93	23.9	-7.97
5320	6	13.92	23.9	-9.98

Power Spectral Density for 802.11a:

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5260	6	3.98	11	-7.02
5280	6	3.98	11	-7.02
5300	6	4.42	11	-6.58
5320	6	2.53	11	-8.47

Peak Output Power for 802.11n HT20:

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5260	6	13.74	23.9	-10.16
5280	6	15.23	23.9	-8.67
5300	6	11.88	23.9	-12.02
5320	6	11.77	23.9	-12.13

Power Spectral Density for 802.11n HT20:

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5260	6	1.86	11	-9.14
5280	6	3.36	11	-7.64
5300	6	-0.34	11	-11.34
5320	6	-0.08	11	-11.08

Peak Output Power for 802.11n HT40:

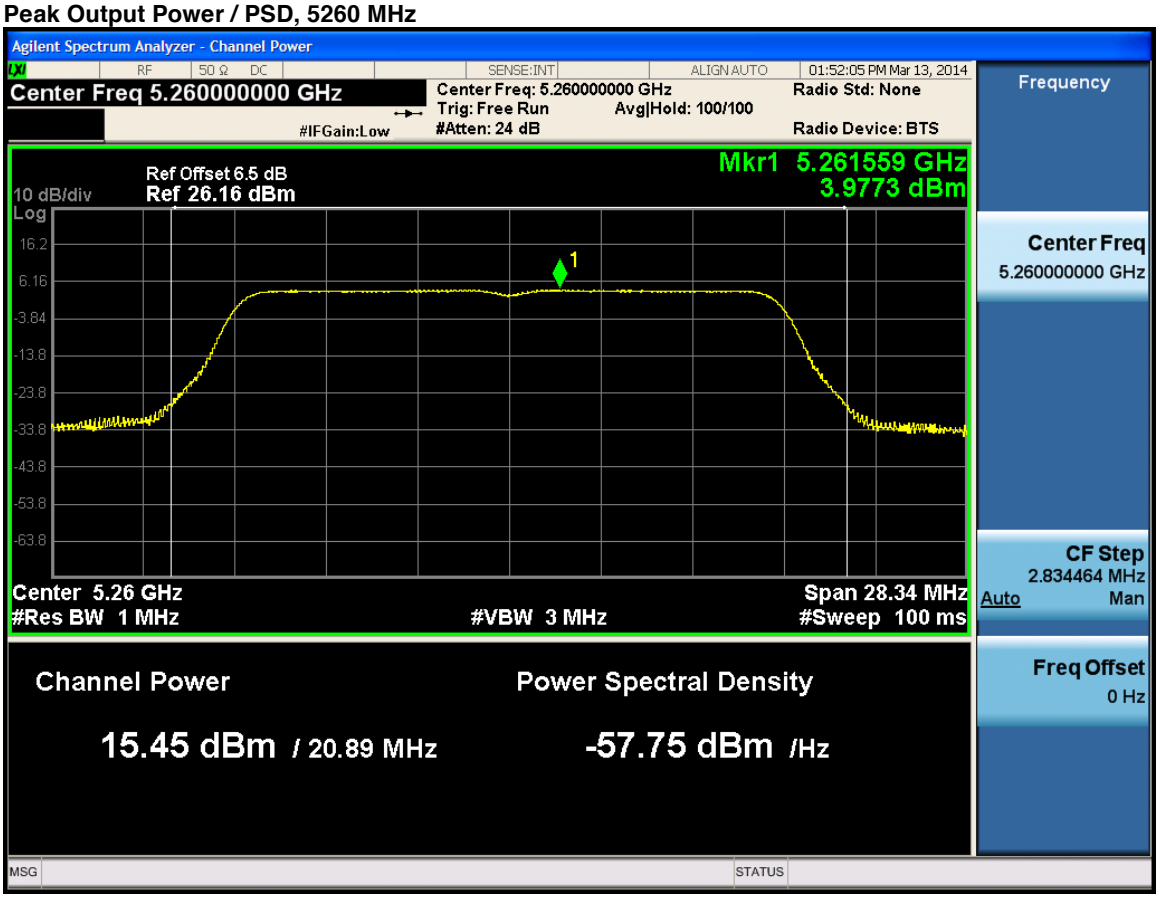
Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5270	6	15.52	23.9	-8.38
5310	6	15.29	23.9	-8.61

Power Spectral Density for 802.11n HT40:

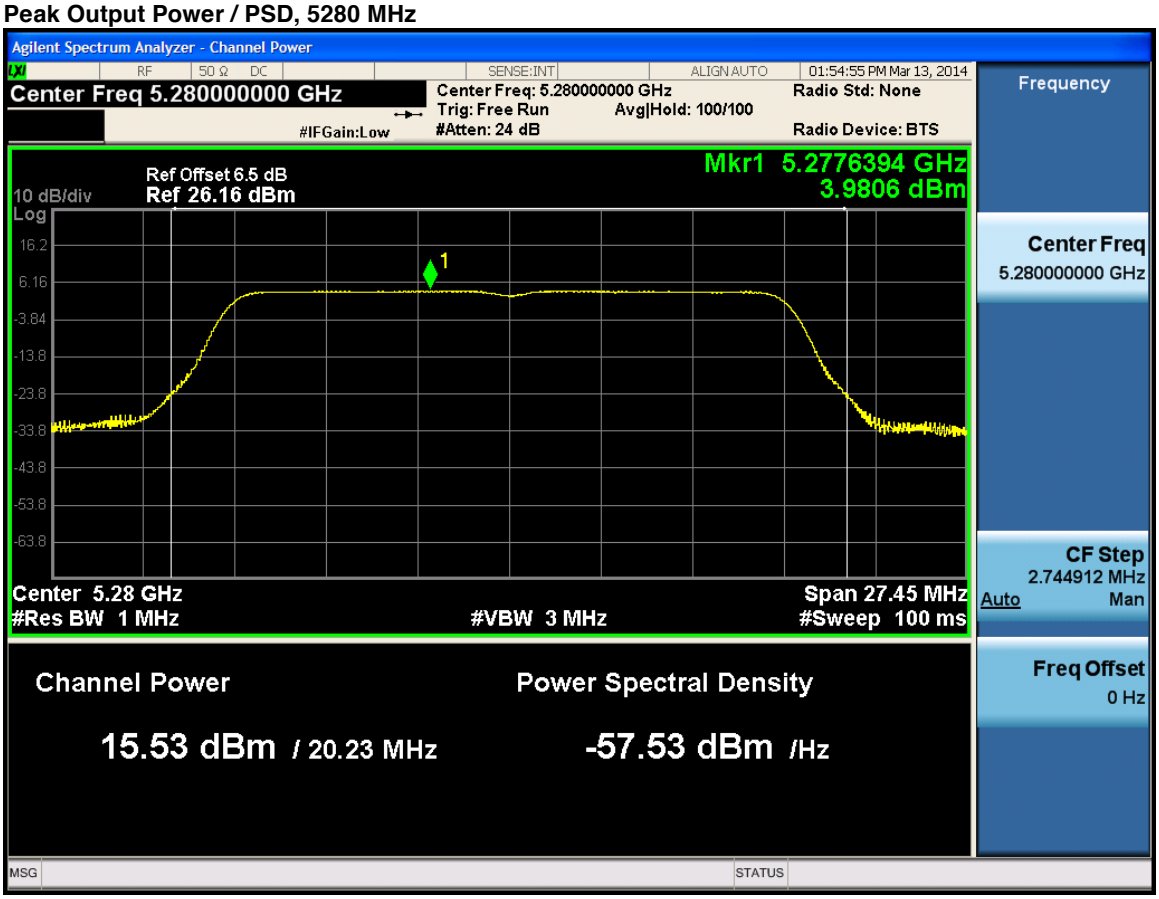
Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5270	6	0.64	11	-10.36
5310	6	0.49	11	-10.51

Graphical Data 802.11a (6Mbps to 54Mbps):

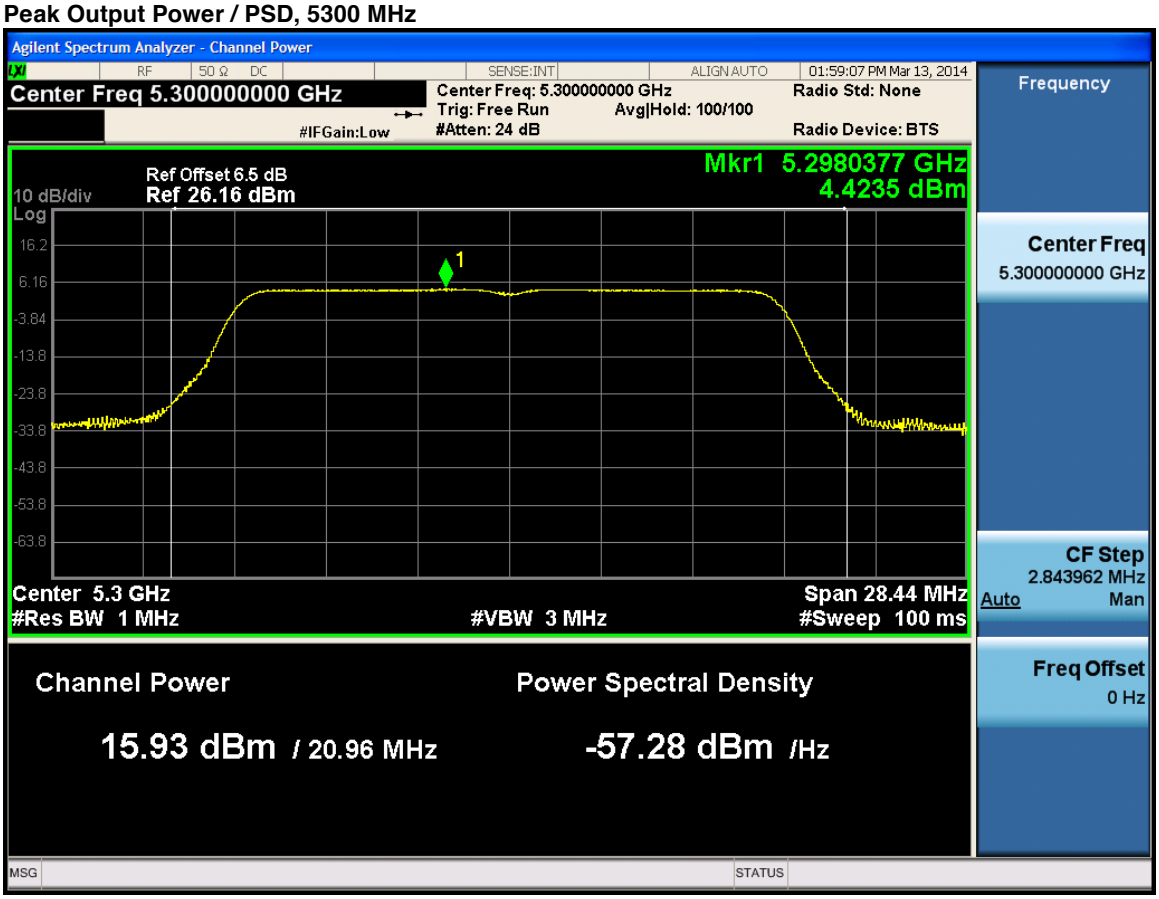
Peak Output Power / PSD, 5260 MHz



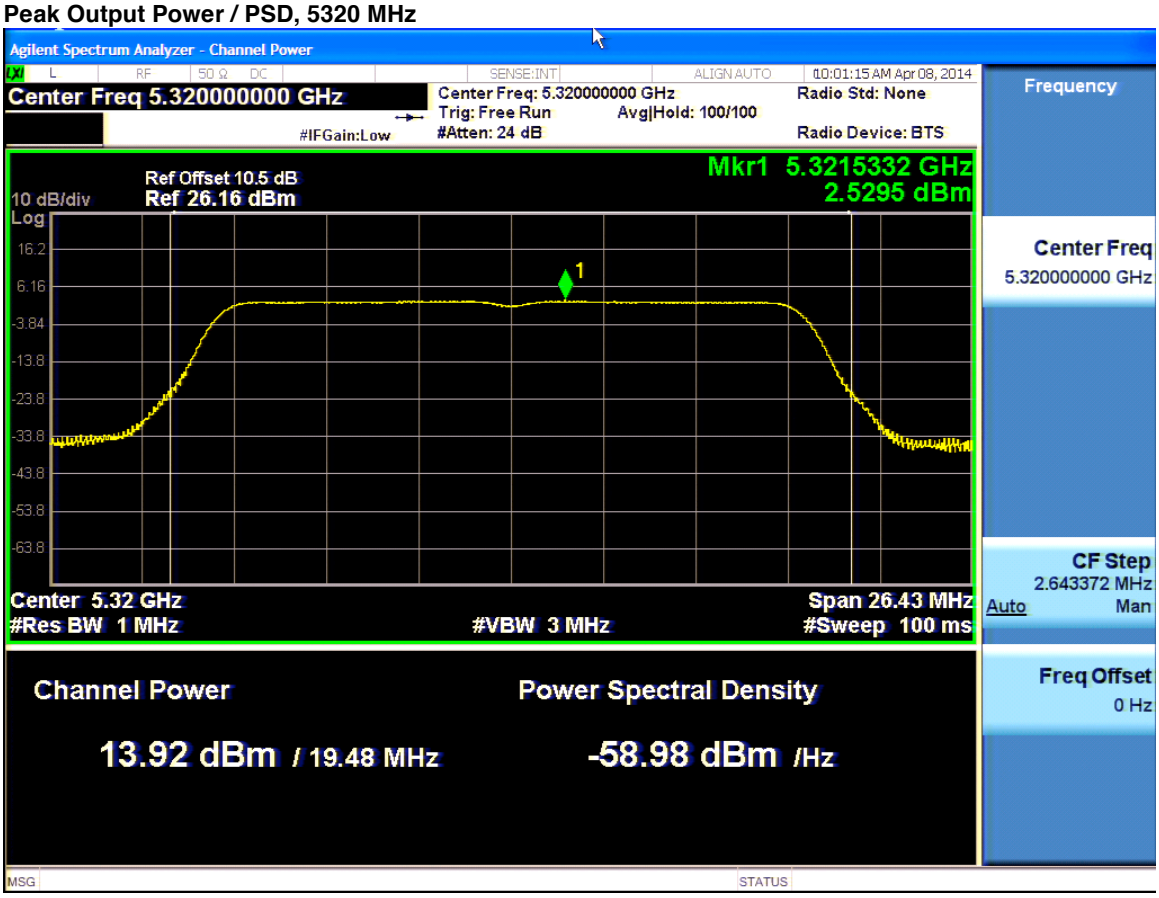
Peak Output Power / PSD, 5280 MHz



Peak Output Power / PSD, 5300 MHz

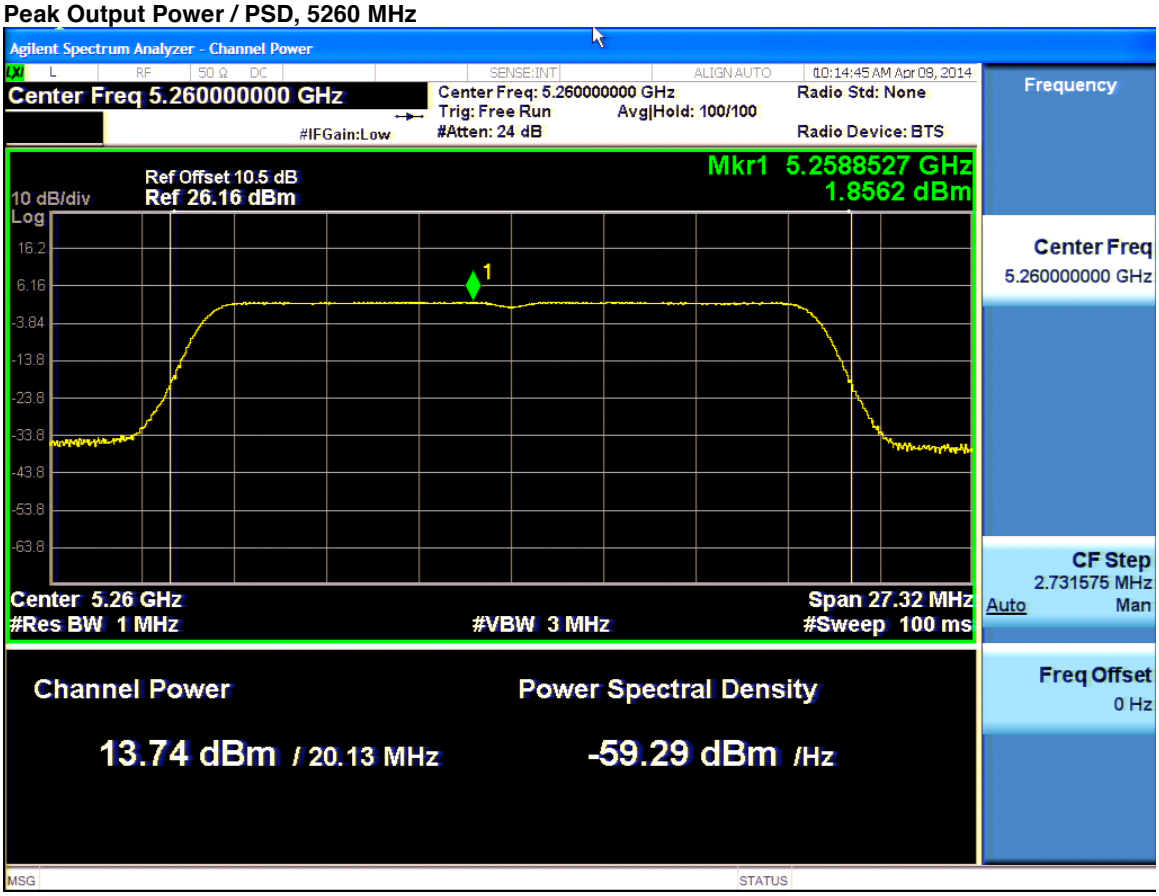


Peak Output Power / PSD, 5320 MHz

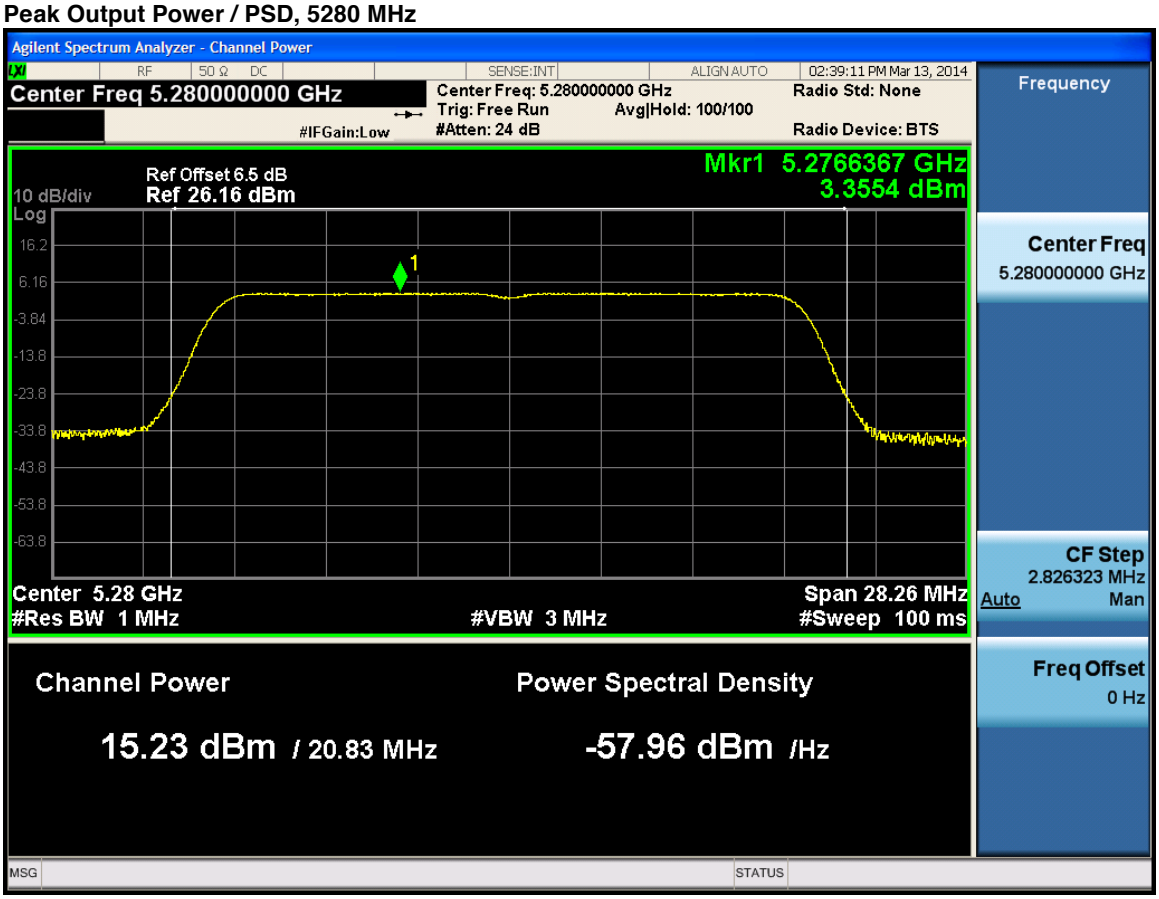


Graphical Data 802.11n HT20 (MCS0 to MCS7):

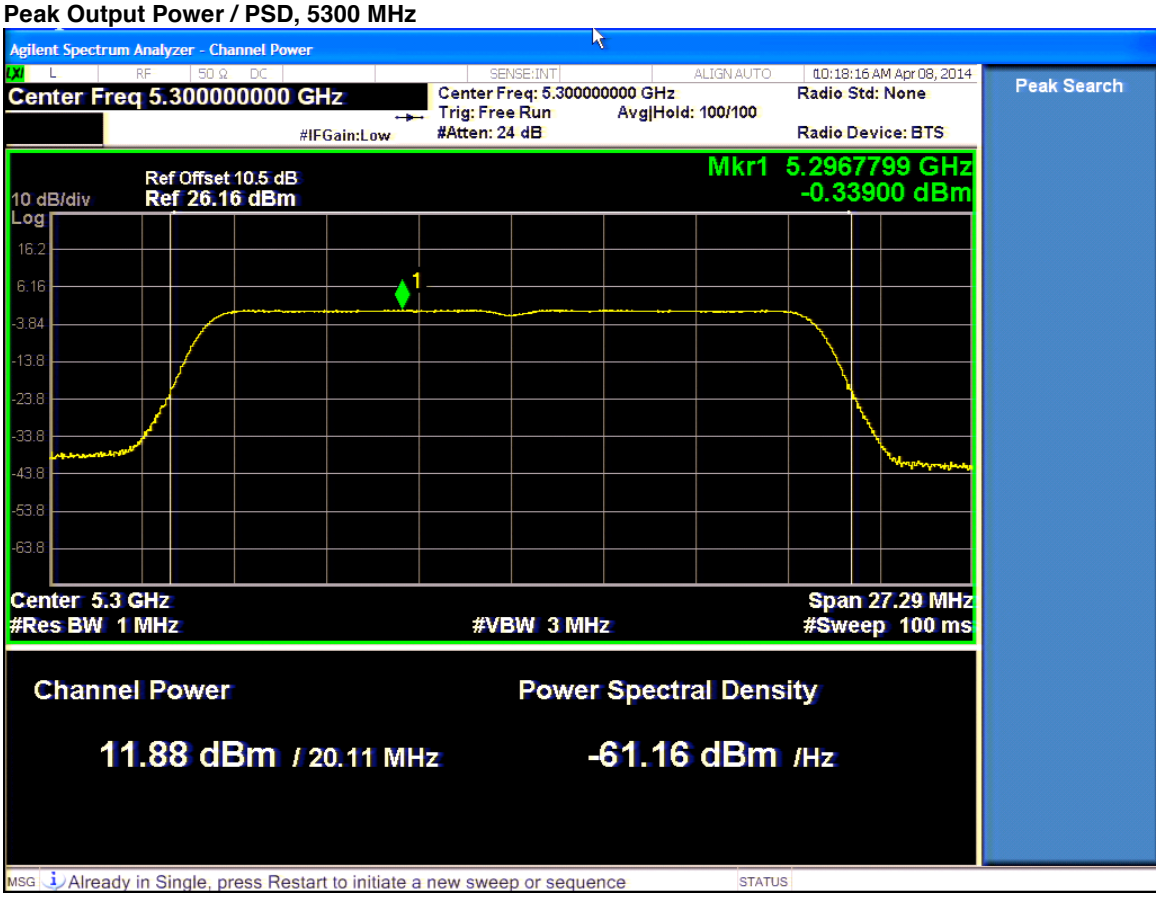
Peak Output Power / PSD, 5260 MHz



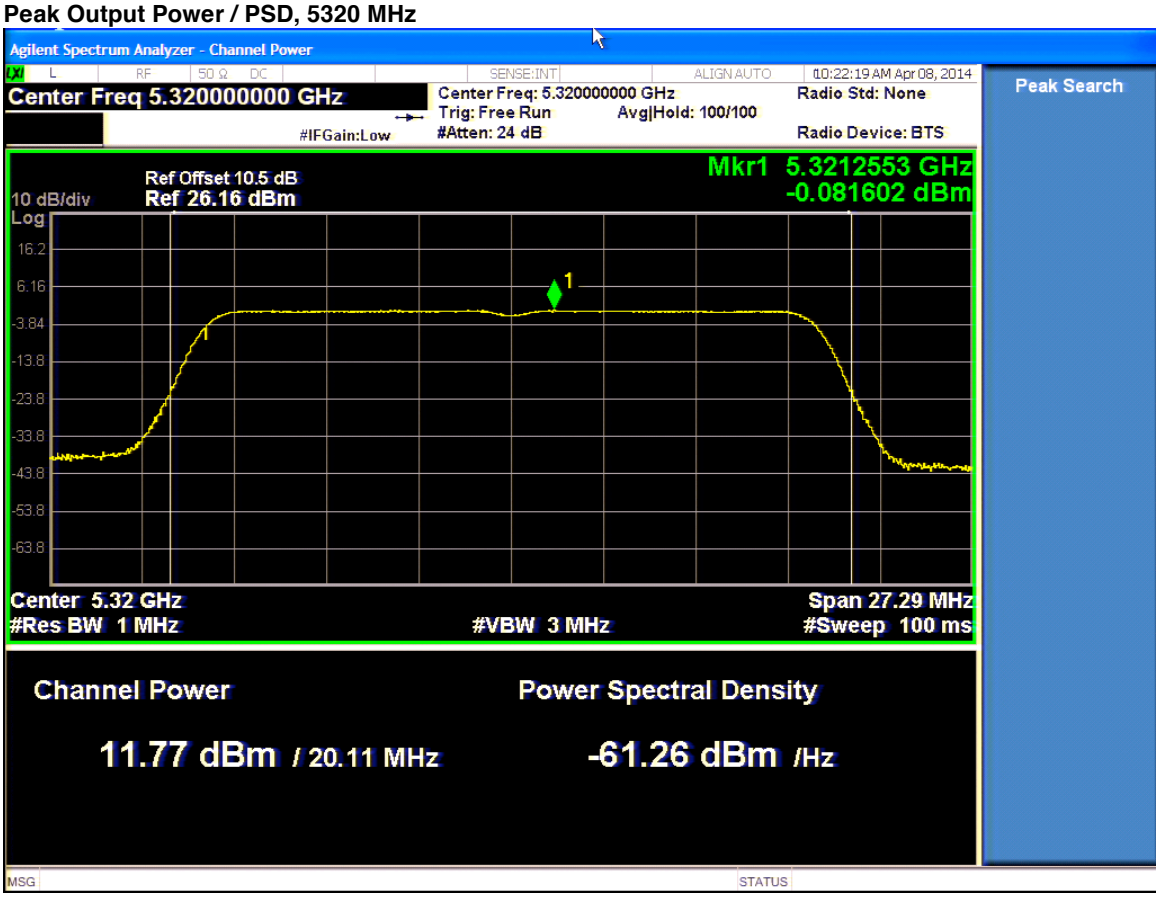
Peak Output Power / PSD, 5280 MHz



Peak Output Power / PSD, 5300 MHz

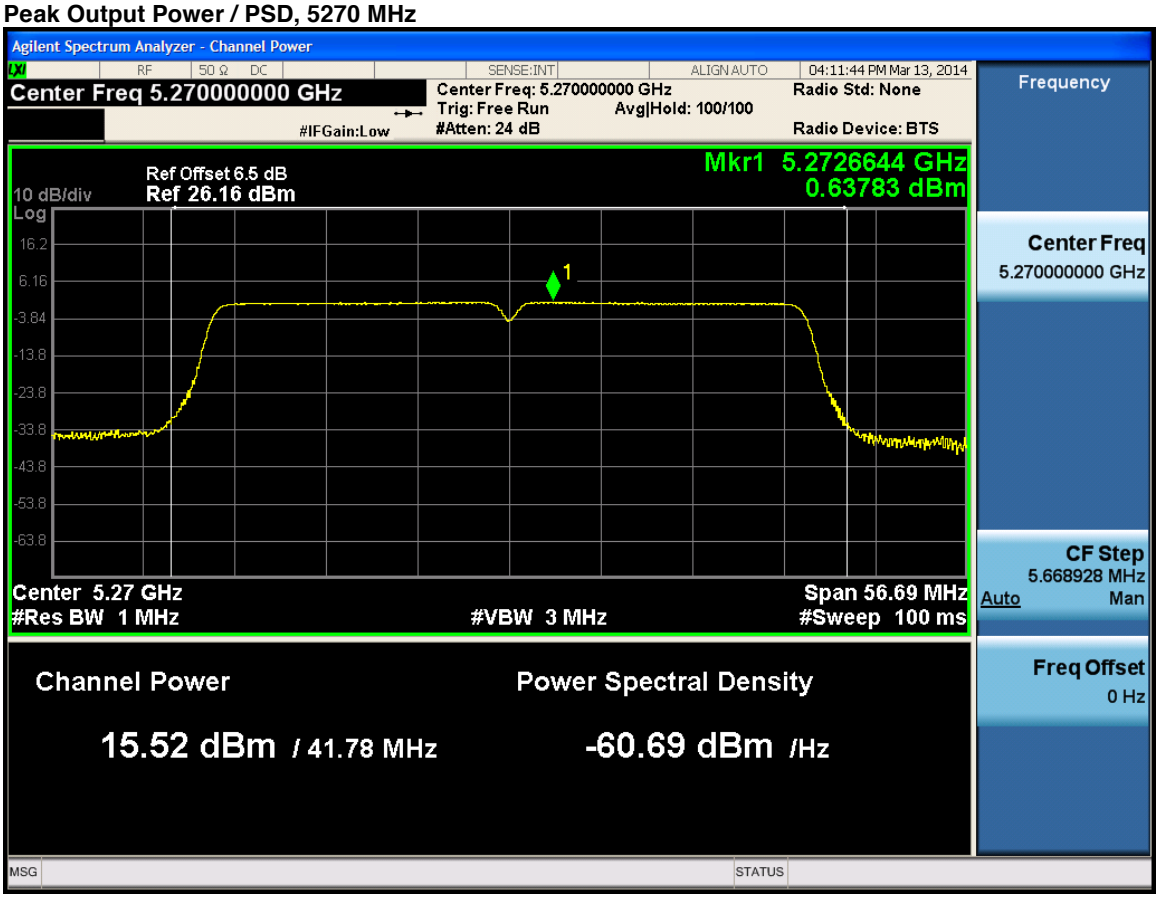


Peak Output Power / PSD, 5320 MHz

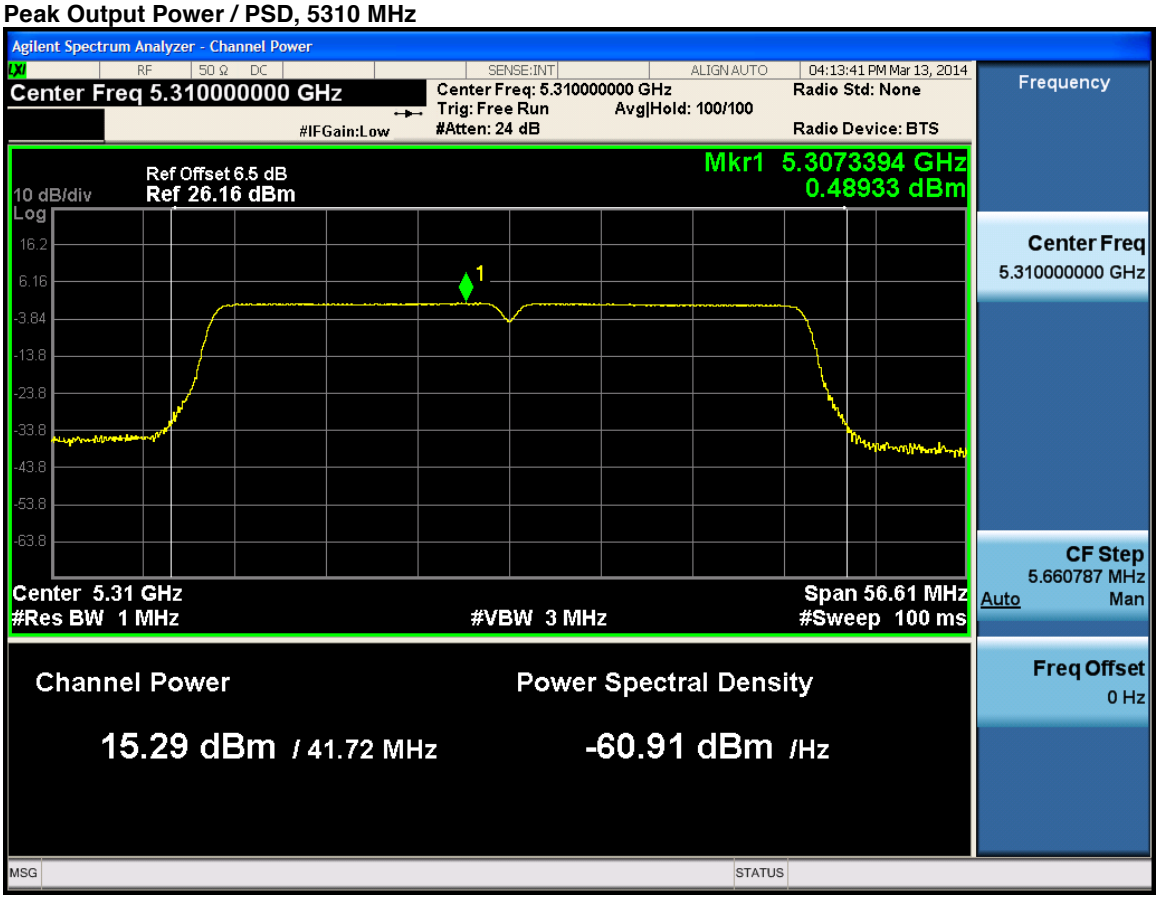


Graphical Data 802.11n HT40 (MCS0 to MCS7):

Peak Output Power / PSD, 5270 MHz



Peak Output Power / PSD, 5310 MHz



Peak Excursion

15.407: 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 across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

1st Trace: (Peak)

Set Span to encompass the entire emission bandwidth of the signal.
RBW = 1 MHz, VBW = 3 MHz
Detector = Peak
Sweep = Auto
Trace 1 = Max-hold
Ref Level Offset = correct for attenuator and cable loss
Ref Level = 20dBm
Atten = 30dBm

2nd Trace: (Average)

Trace 2 = clear right
Detector = Sample
Avg/VBW type = Pwr(RMS)
Average = 100
Sweep = single

Set marker Deltas

Trace 1 & Peak search
Marker Delta
Trace 2 & Peak search

Record the difference between the Peak and Average Markers

Results for 802.11a:

Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit 13(dBm)	Margin (dB)
5260	6	7.60	13	-5.40
5280	6	7.16	13	-5.84
5300	6	7.61	13	-5.39
5320	6	7.56	13	-5.44

Results for 802.11n HT20:

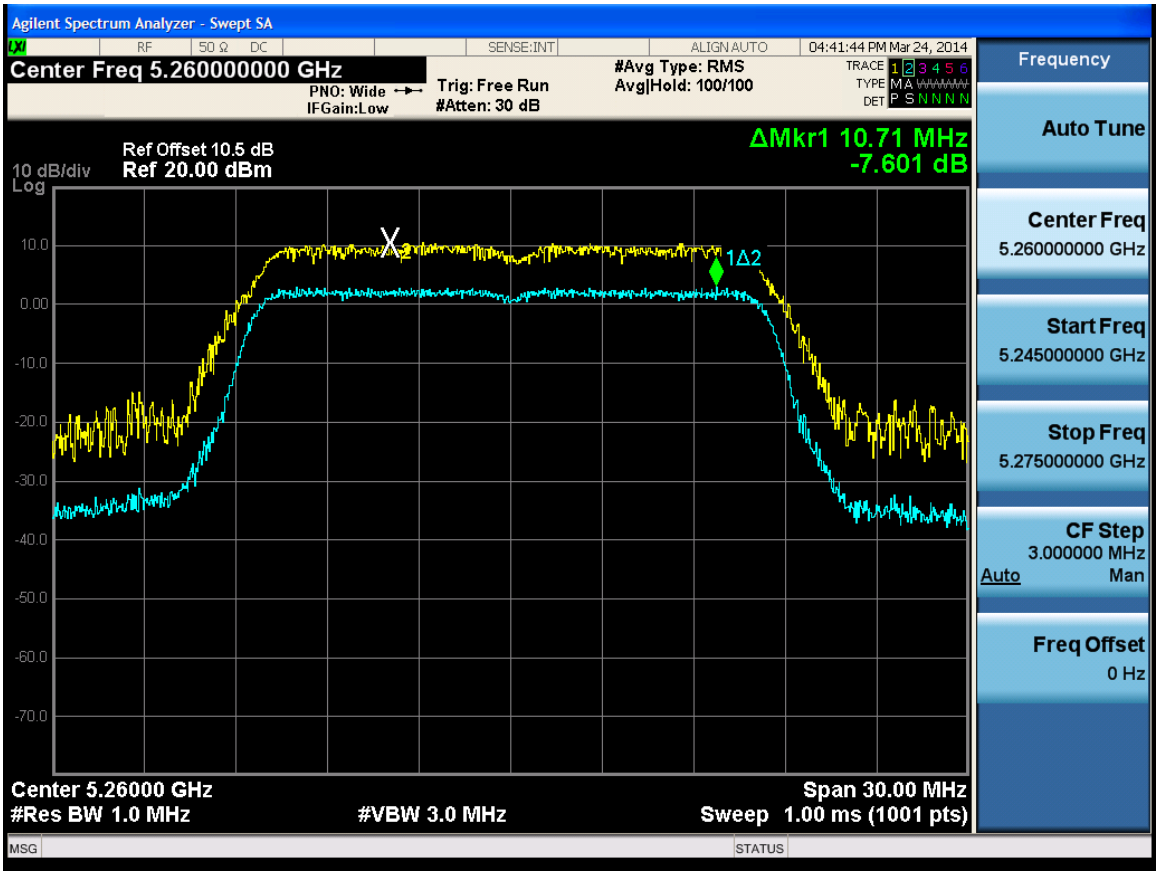
Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit 13(dBm)	Margin (dB)
5260	MCS0	7.62	13	5.38
5280	MCS0	7.04	13	5.96
5300	MCS0	7.51	13	5.49
5320	MCS0	7.2	13	5.80

Results for 802.11n HT40:

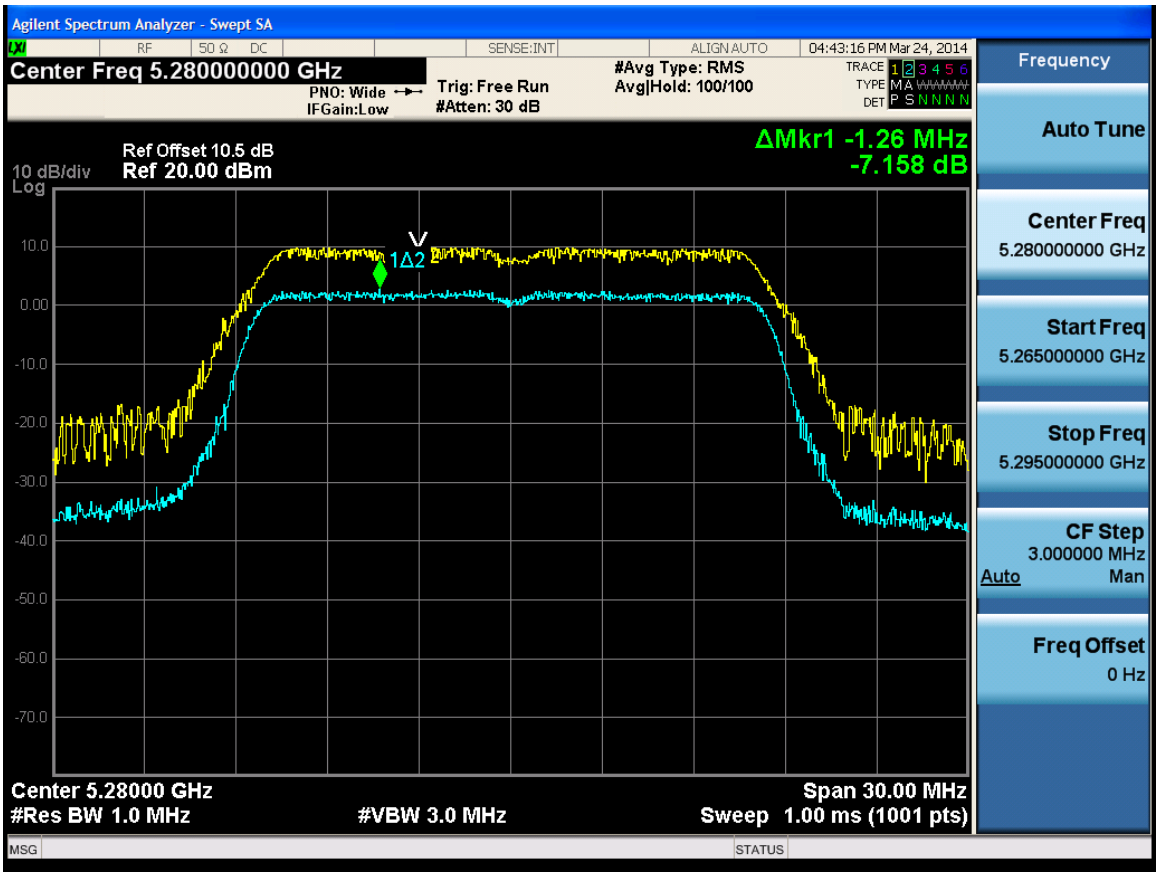
Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit 13(dBm)	Margin (dB)
5270	MCS0	7.34	13	5.66
5310	MCS0	7.33	13	5.67

Graphical Test Results for 802.11a:

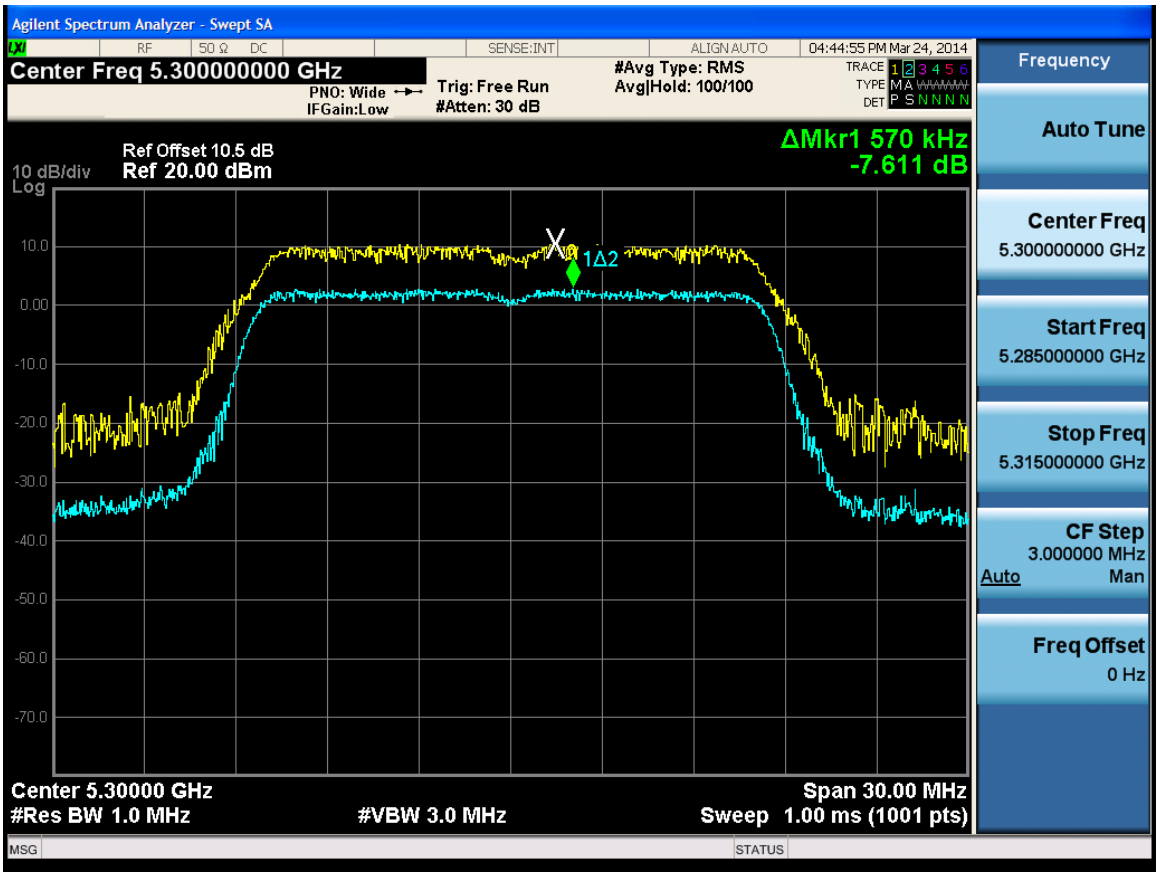
Peak Excursion, 5260 MHz, 6 to 54 Mbps



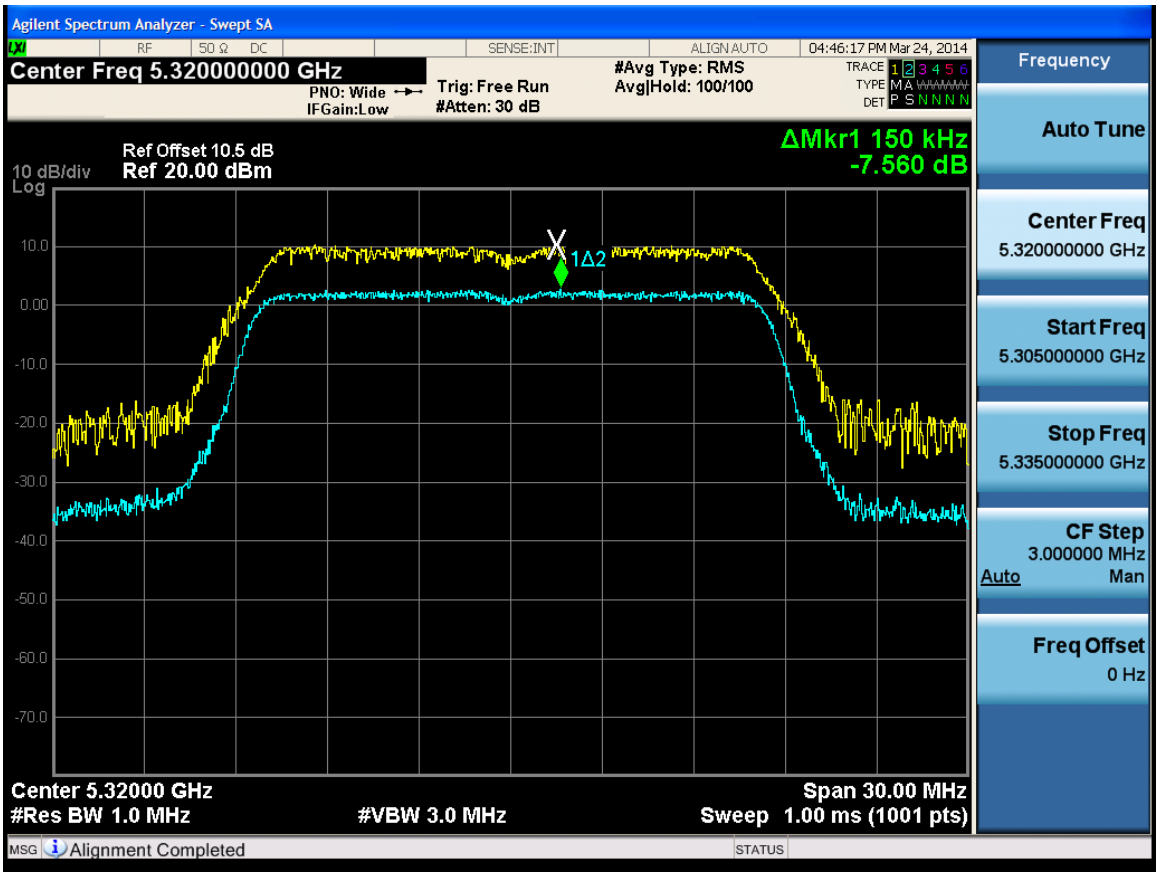
Peak Excursion, 5280 MHz, 6 to 54 Mbps



Peak Excursion, 5300 MHz, 6 to 54 Mbps

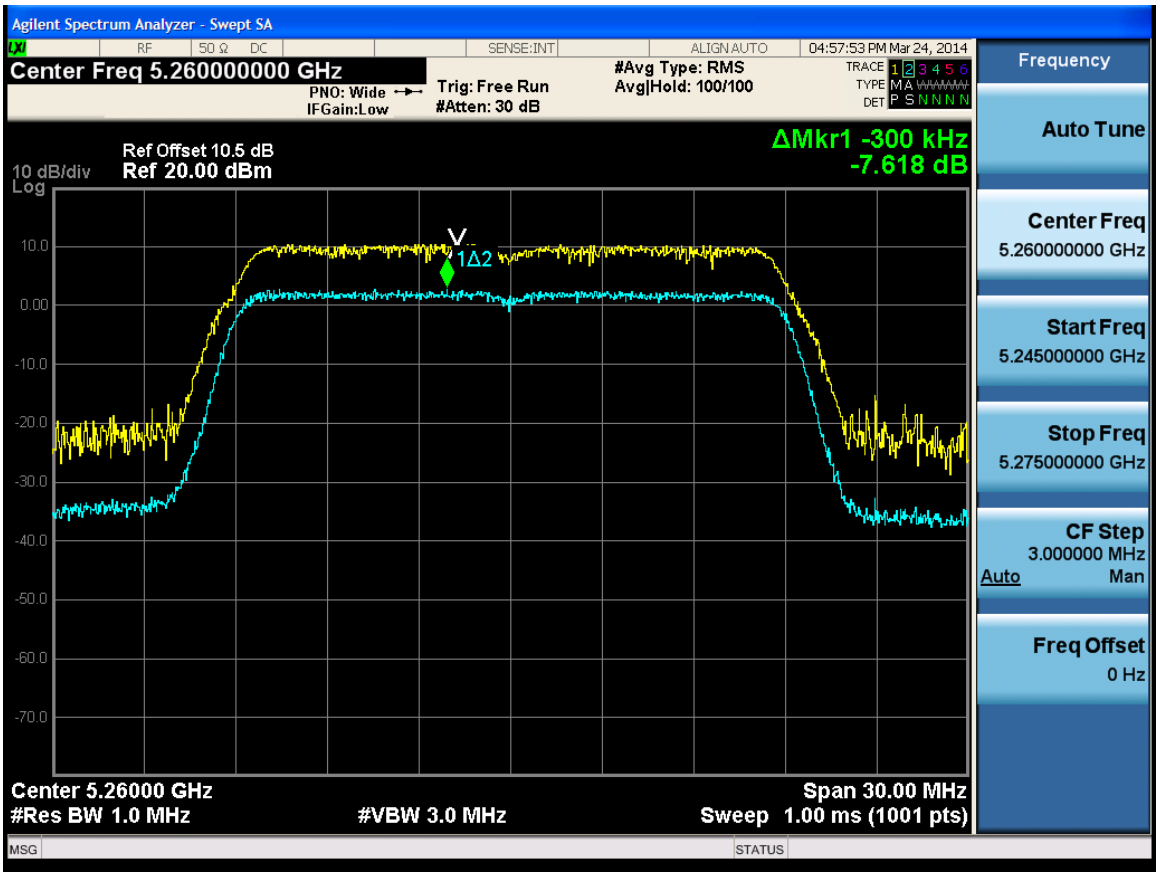


Peak Excursion, 5320 MHz, 6 to 54 Mbps

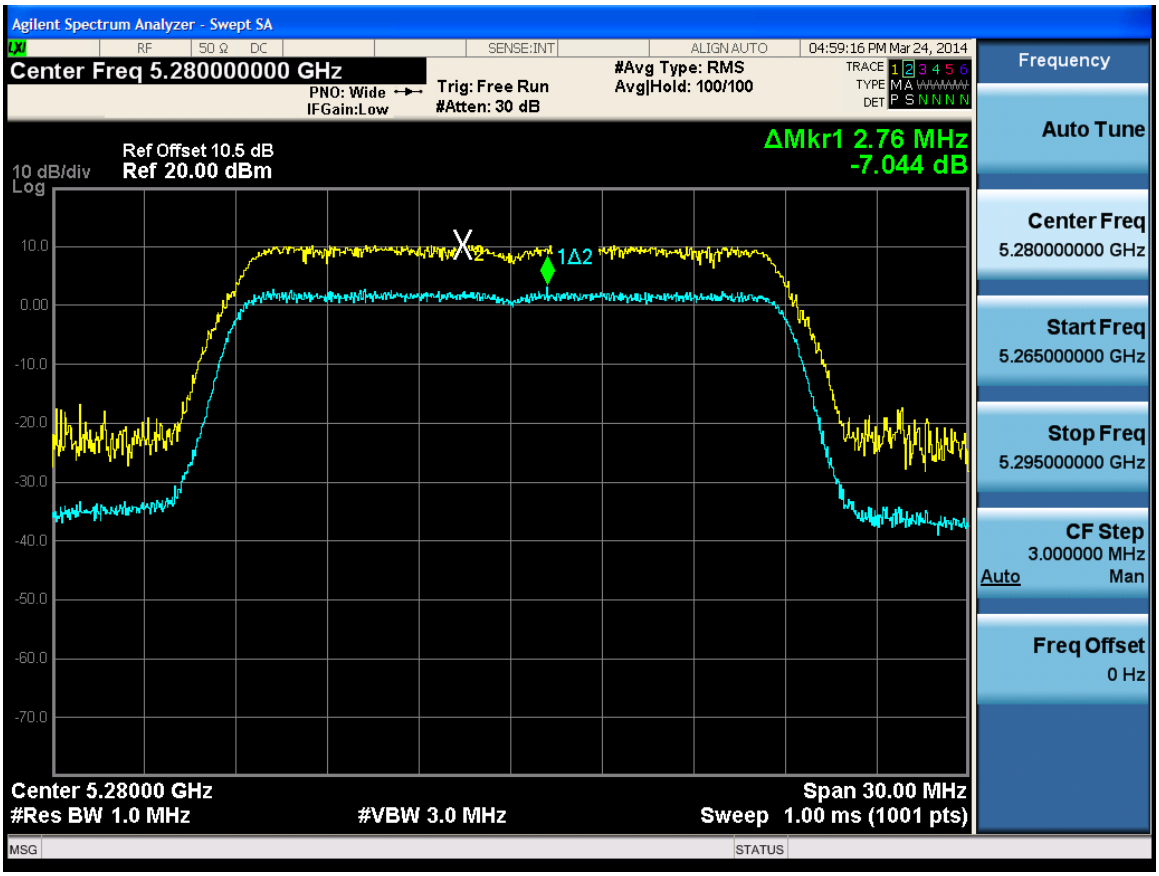


Graphical Test Results for 802.11n HT20:

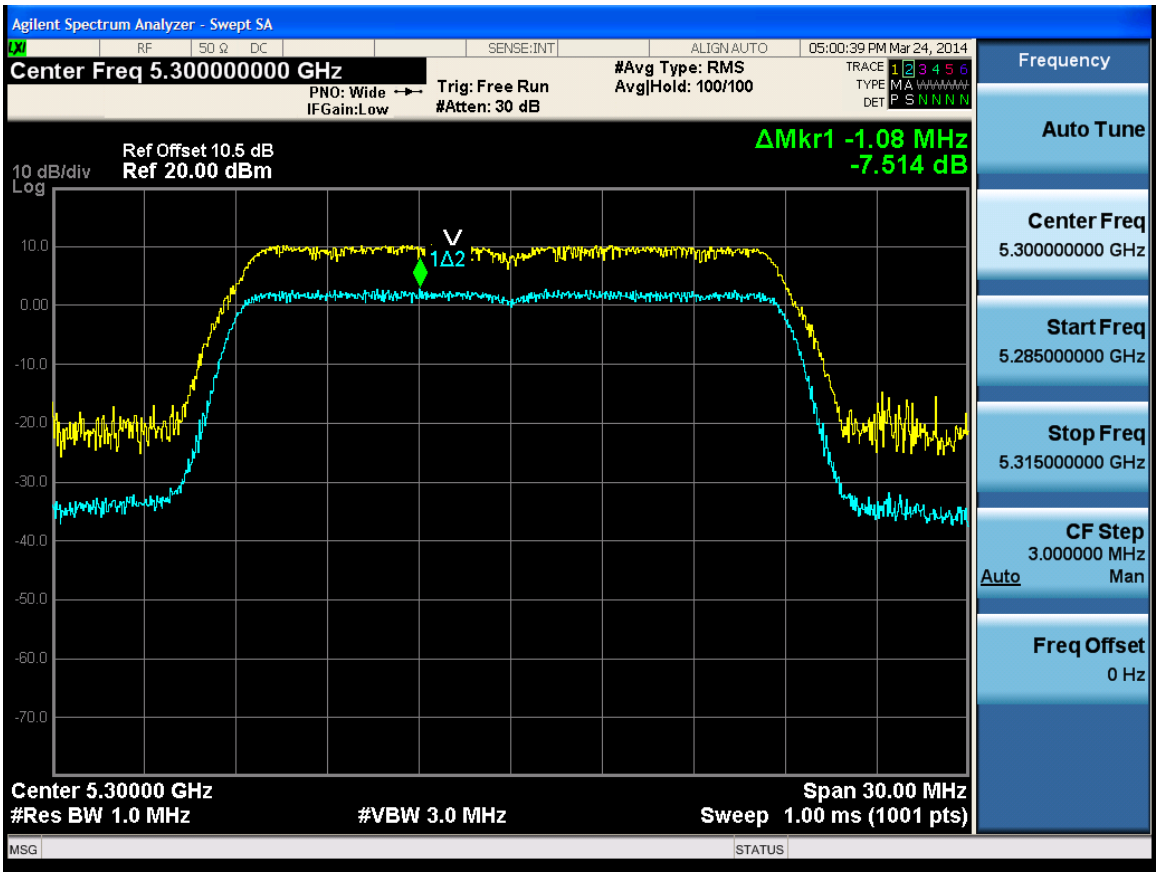
Peak Excursion, 5260 MHz, HT20 MCS0



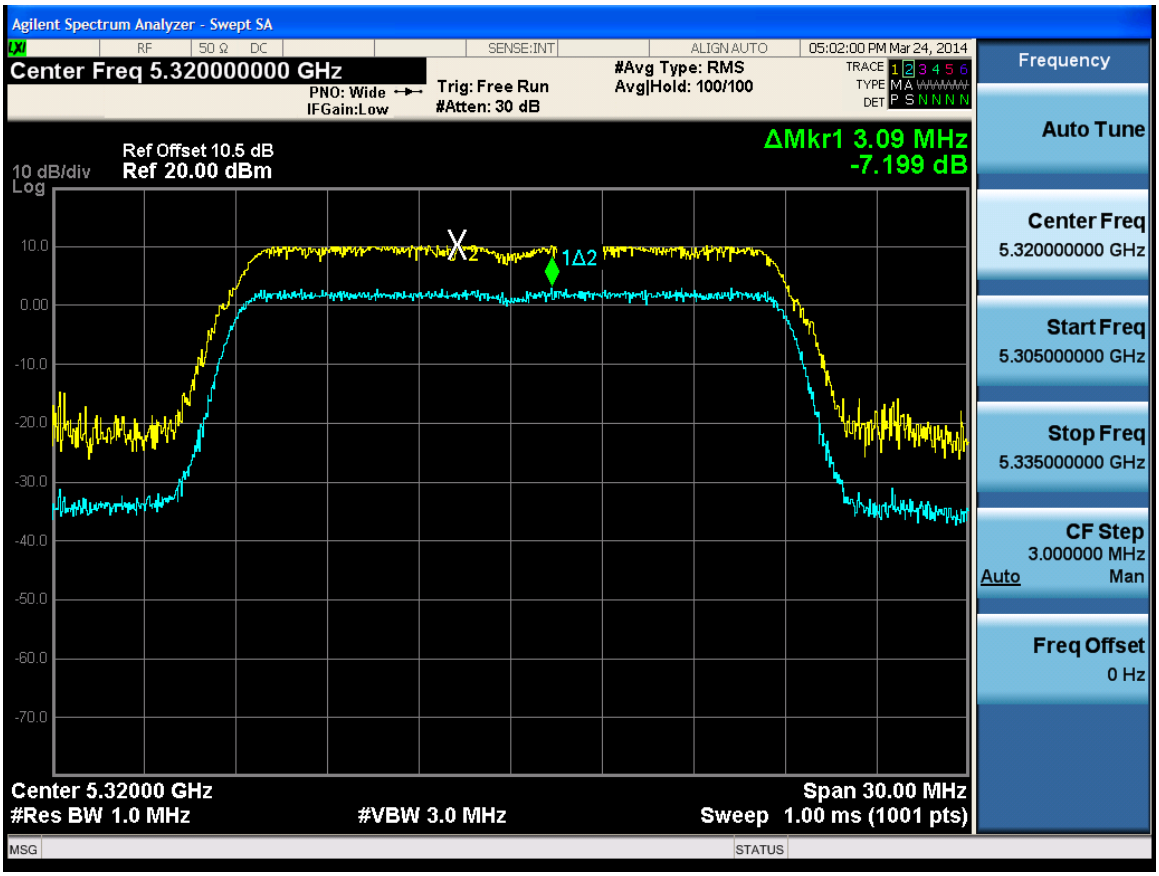
Peak Excursion, 5280 MHz, HT20 MCS0



Peak Excursion, 5300 MHz, HT20 MCS0

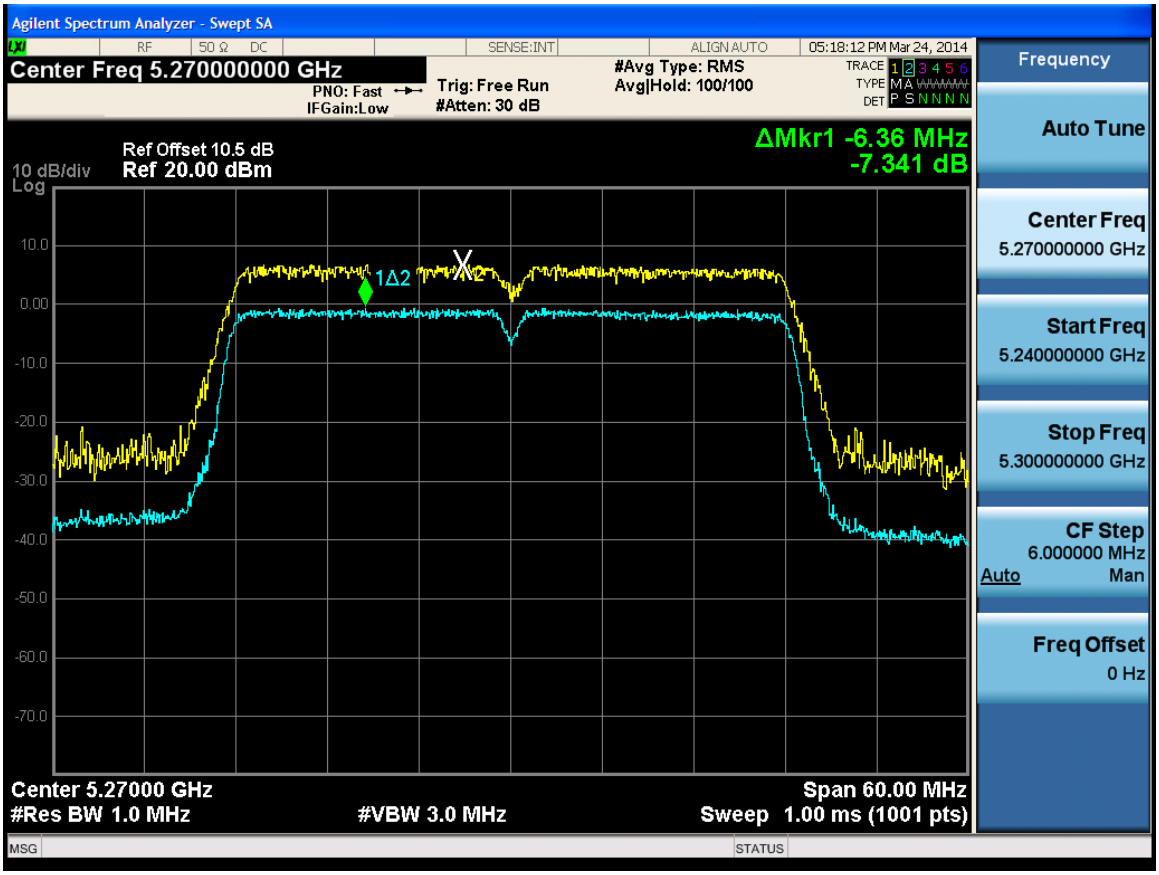


Peak Excursion, 5320 MHz, HT20 MCS0

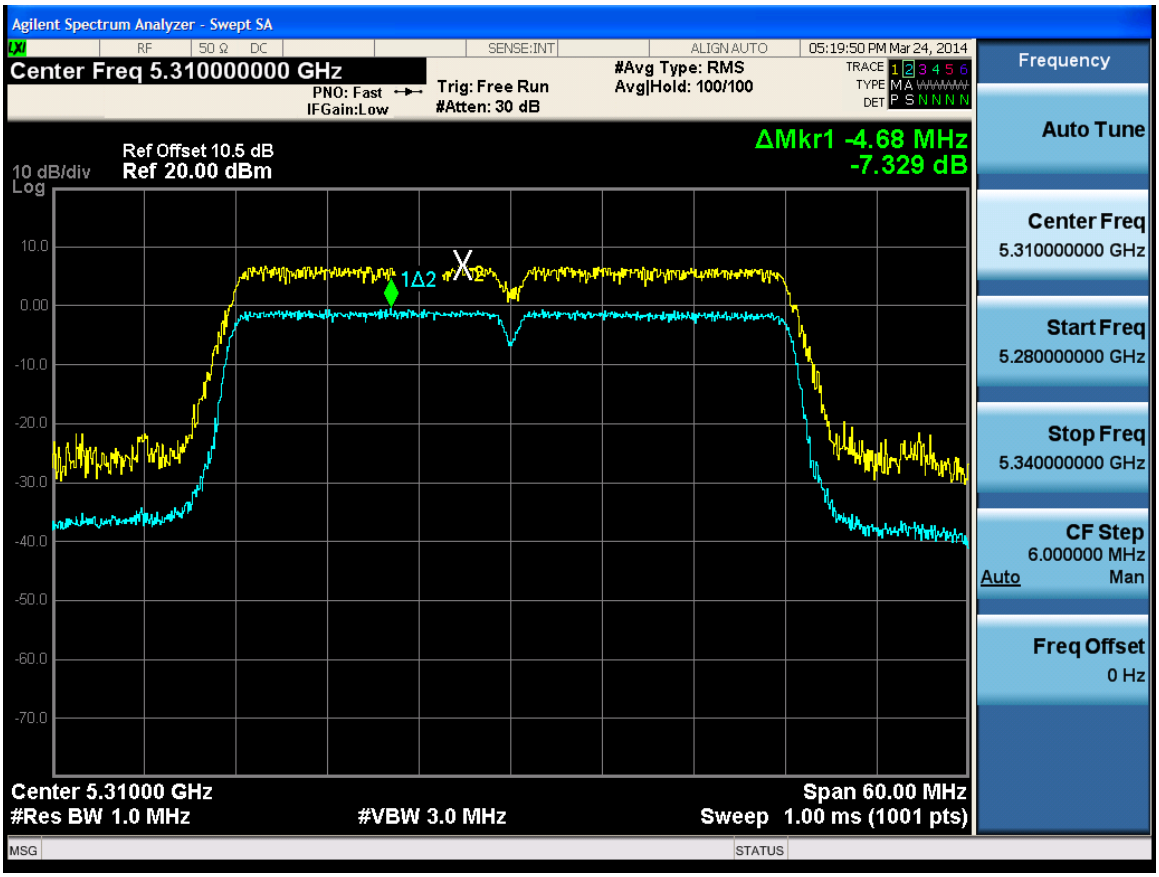


Graphical Test Results for 802.11n HT40:

Peak Excursion, 5270 MHz, HT40 MCS0



Peak Excursion, 5310 MHz, HT40 MCS0



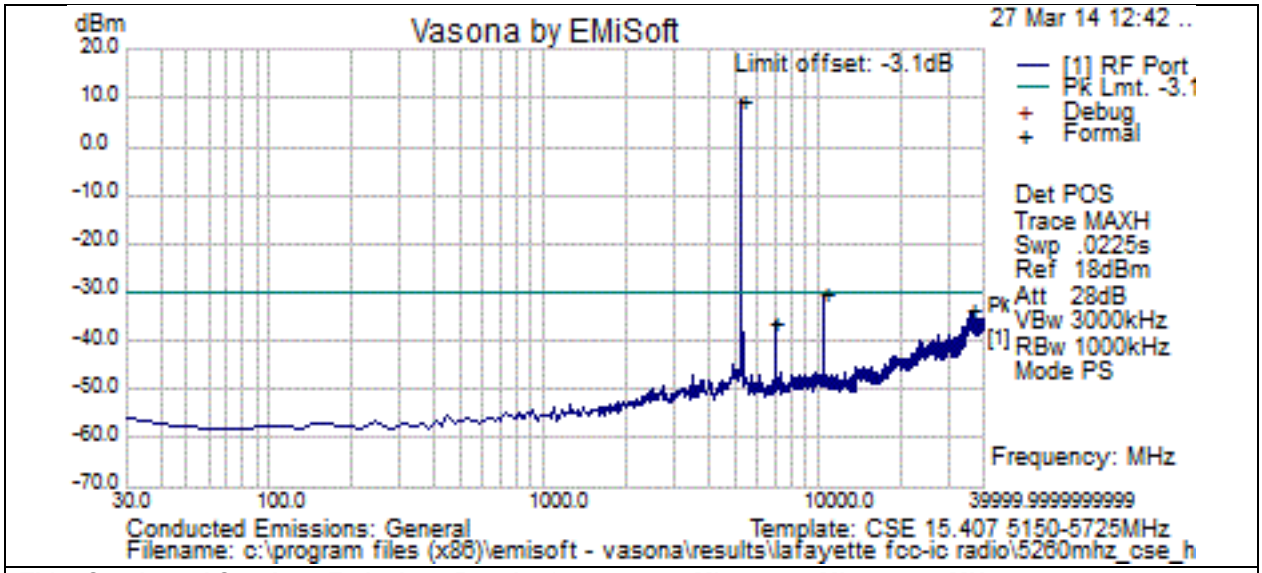
Conducted Spurious Emissions

15.407: For transmitters operating in the 5.25-5.35 and 5.47-5.725 GHz band: all emissions outside of the 5.25-5.35 and 5.47-5.725 GHz bands shall not exceed an EIRP of -27dBm/MHz.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

Span:	30 MHz-40 GHz
Reference Level:	18 dBm
Attenuation:	28 dB
Sweep Time:	Auto
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Peak
Trace:	Max Hold
Marker:	Peak

Record the marker waveform peak to spur difference

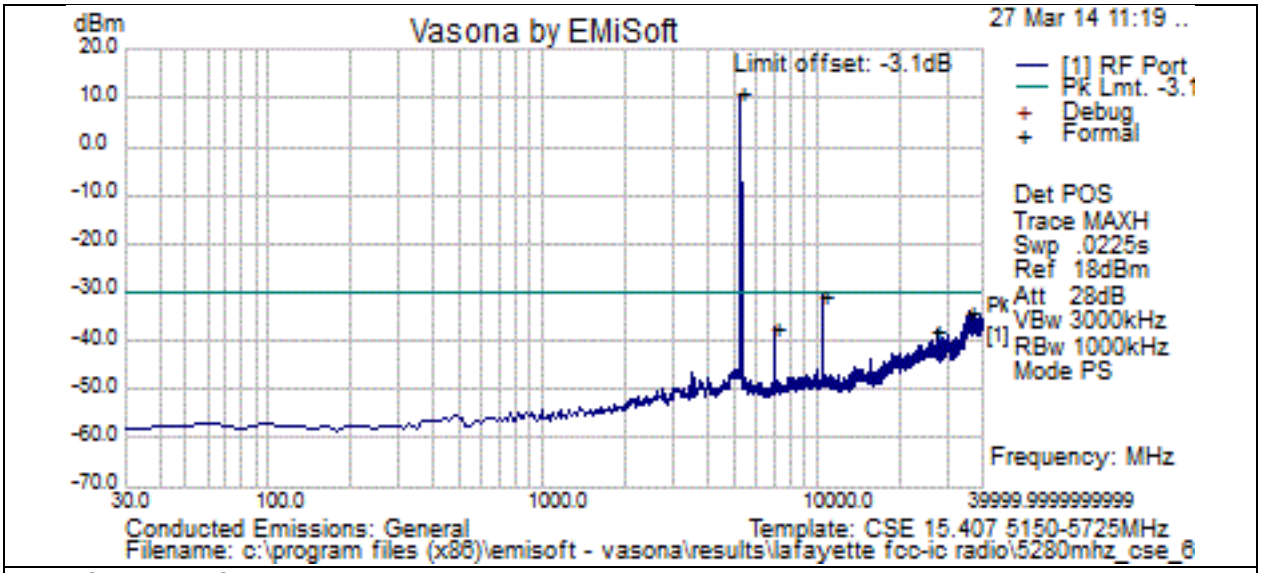


Title: Conducted Spurious Emissions Results for 802.11a 6Mbps to 54Mbps, 5260MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5260.000	10.3	.6	.0	10.9	Peak [Scan]	RF Port	-30.1	41.0	N/A	tx freq
2	10520.000	-31.6	.8	.0	-30.8	Peak [Scan]	RF Port	-30.1	-.6	Pass	2nd harmonic
3	35933.125	-36.0	1.7	.0	-34.4	Peak [Scan]	RF Port	-30.1	-4.3	Pass	
4	7011.463	-36.9	.7	.0	-36.2	Peak [Scan]	RF Port	-30.1	-6.1	Pass	
5	29832.813	-40.6	1.5	.0	-39.1	Peak [Scan]	RF Port	-30.1	-9.0	Pass	
6	26433.825	-41.3	1.4	.0	-39.9	Peak [Scan]	RF Port	-30.1	-9.8	Pass	
7	15780.000	-42.8	1.1	.0	-41.7	Peak [Scan]	RF Port	-30.1	-11.6	Pass	3rd harmonic

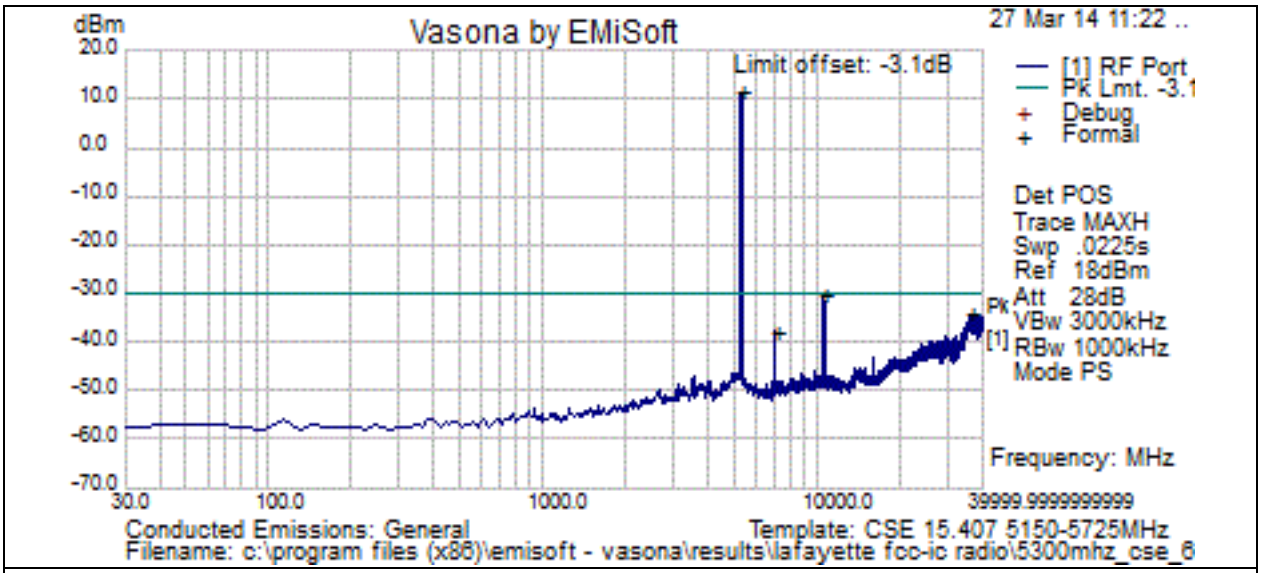


Title: Conducted Spurious Emissions Results for 802.11a 6Mbps to 54Mbps, 5280MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5280.000	10.3	.6	.0	11.0	Peak [Scan]	RF Port	-30.1	41.1	N/A	tx freq
2	10560.000	-31.5	.8	.0	-30.6	Peak [Scan]	RF Port	-30.1	-.5	Pass	2nd harmonic
3	36262.188	-35.5	1.7	.0	-33.9	Peak [Scan]	RF Port	-30.1	-3.8	Pass	
4	7044.550	-38.0	.7	.0	-37.3	Peak [Scan]	RF Port	-30.1	-7.2	Pass	
5	27234.063	-39.3	1.4	.0	-37.9	Peak [Scan]	RF Port	-30.1	-7.8	Pass	

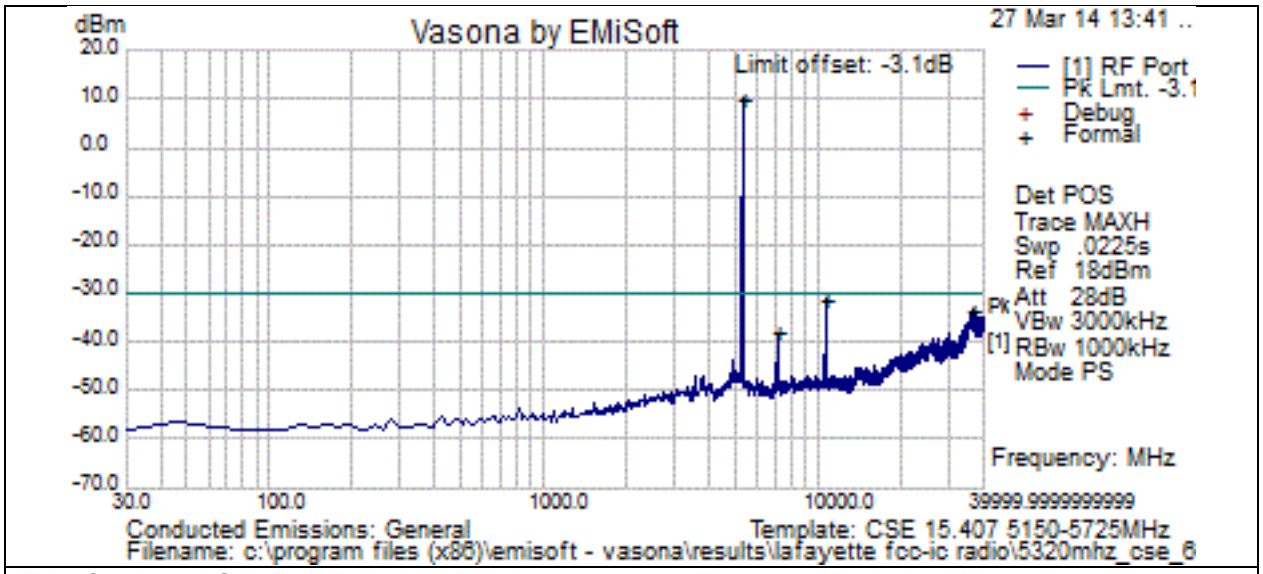


Title: Conducted Spurious Emissions Results for 802.11a 6Mbps to 54Mbps, 5300MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5300.000	10.8	.6	.0	11.4	Peak [Scan]	RF Port	-30.1	41.5	N/A	tx freq
2	10600.000	-31.2	.8	.0	-30.4	Peak [Scan]	RF Port	-30.1	-.3	Pass	2nd harmonic
3	36135.625	-35.8	1.7	.0	-34.2	Peak [Scan]	RF Port	-30.1	-4.1	Pass	
4	7061.094	-38.6	.7	.0	-37.9	Peak [Scan]	RF Port	-30.1	-7.8	Pass	

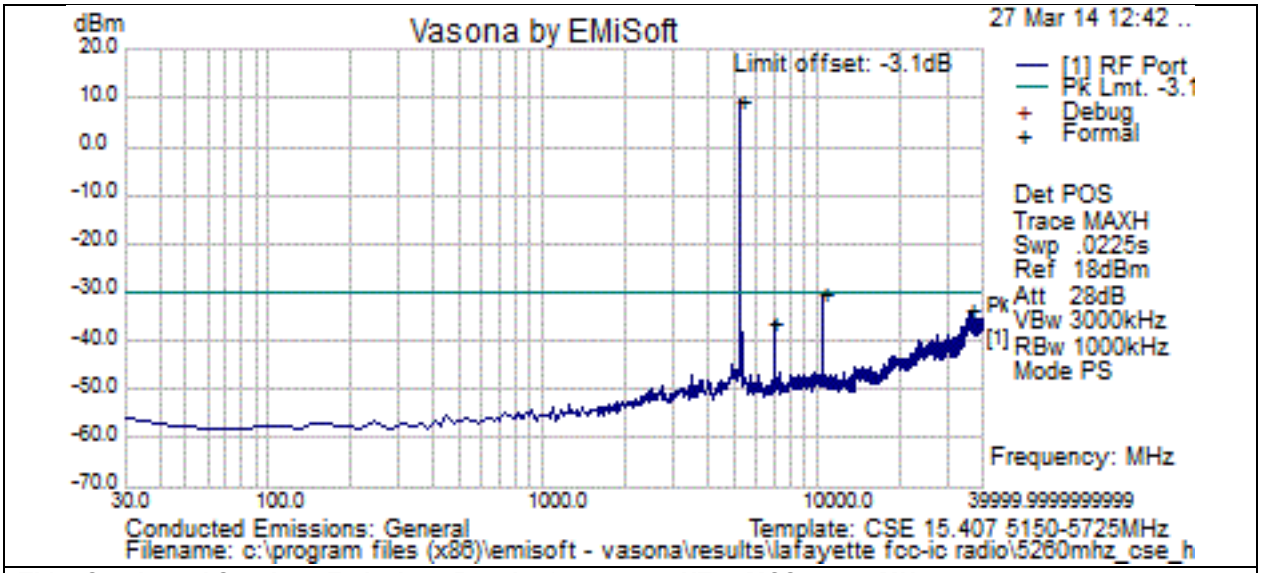


Title: Conducted Spurious Emissions Results for 802.11a 6Mbps to 54Mbps, 5320MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5320.000	9.6	.6	.0	10.2	Peak [Scan]	RF Port	-30.1	40.3	N/A	tx freq
2	10640.000	-32.0	.9	.0	-31.2	Peak [Scan]	RF Port	-30.1	-1.1	Pass	2nd harmonic
3	36608.125	-35.2	1.7	.0	-33.5	Peak [Scan]	RF Port	-30.1	-3.4	Pass	
4	7094.181	-38.7	.7	.0	-38.0	Peak [Scan]	RF Port	-30.1	-7.9	Pass	

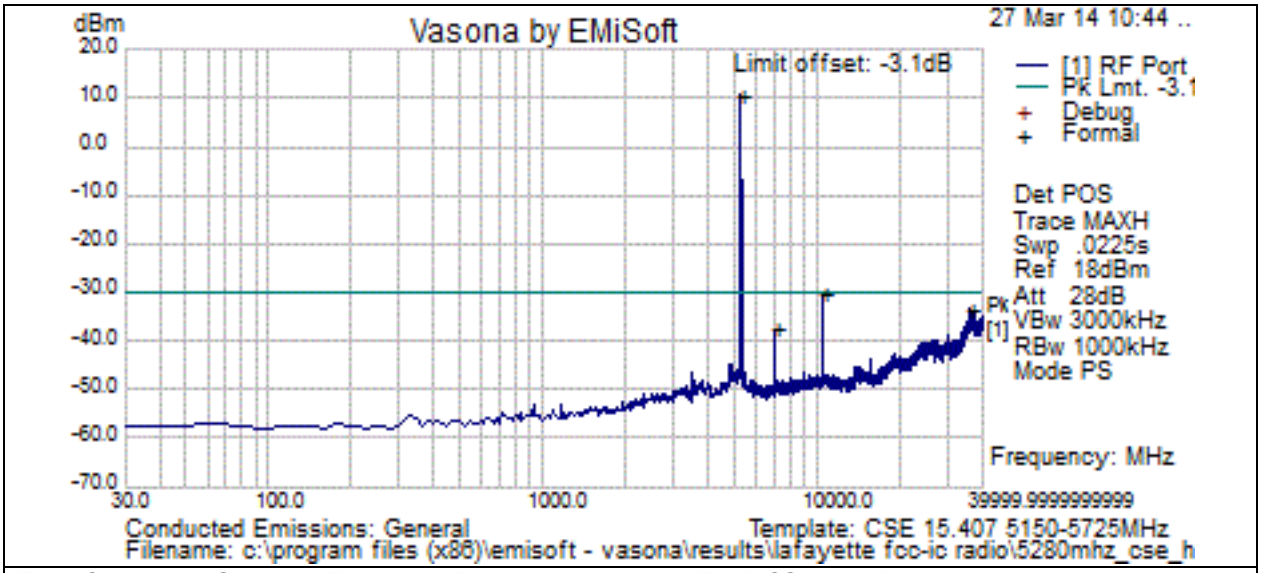


Title: Conducted Spurious Emissions Results for 802.11n HT20 MCS0, 5260MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5260.000	8.8	.6	.0	9.4	Peak [Scan]	RF Port	-30.1	39.5	N/A	tx freq
2	10520.000	-31.4	.8	.0	-30.5	Peak [Scan]	RF Port	-30.1	-.4	Pass	2nd harmonic
3	36169.375	-35.4	1.7	.0	-33.8	Peak [Scan]	RF Port	-30.1	-3.7	Pass	
4	7011.463	-36.8	.7	.0	-36.1	Peak [Scan]	RF Port	-30.1	-6.0	Pass	

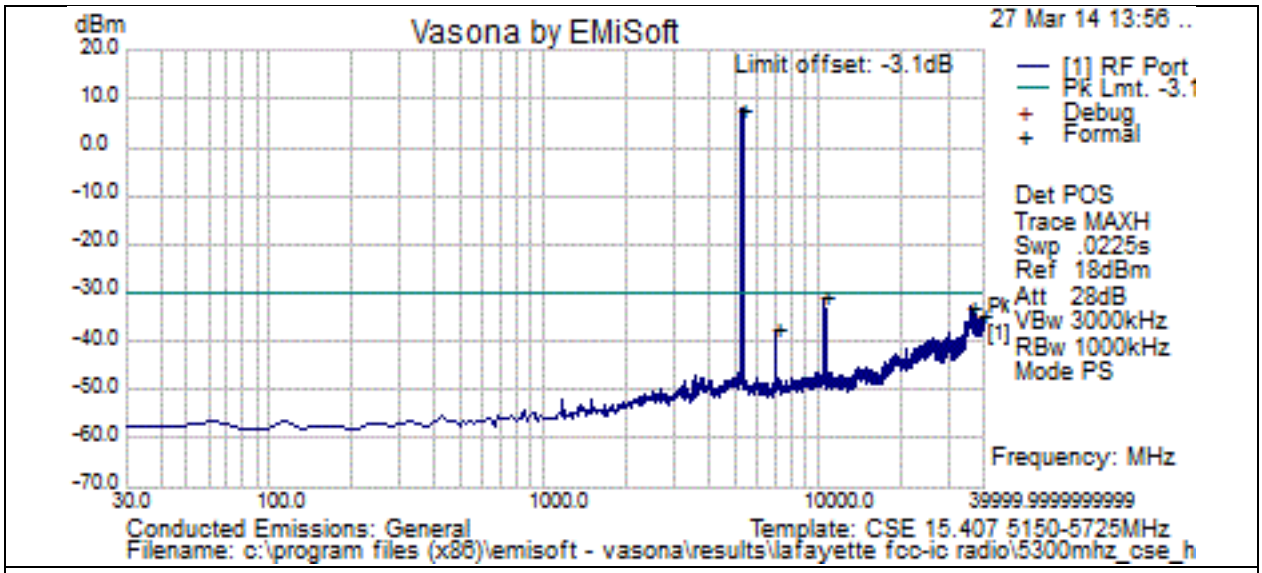


Title: Conducted Spurious Emissions Results for 802.11n HT20 MCS0, 5280MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5280.000	10.1	.6	.0	10.7	Peak [Scan]	RF Port	-30.1	40.8	N/A	tx freq
2	10560.000	-31.2	.8	.0	-30.3	Peak [Scan]	RF Port	-30.1	-.2	Pass	2nd harmonic
3	36371.875	-35.2	1.7	.0	-33.5	Peak [Scan]	RF Port	-30.1	-3.4	Pass	
4	7044.550	-38.2	.7	.0	-37.5	Peak [Scan]	RF Port	-30.1	-7.4	Pass	

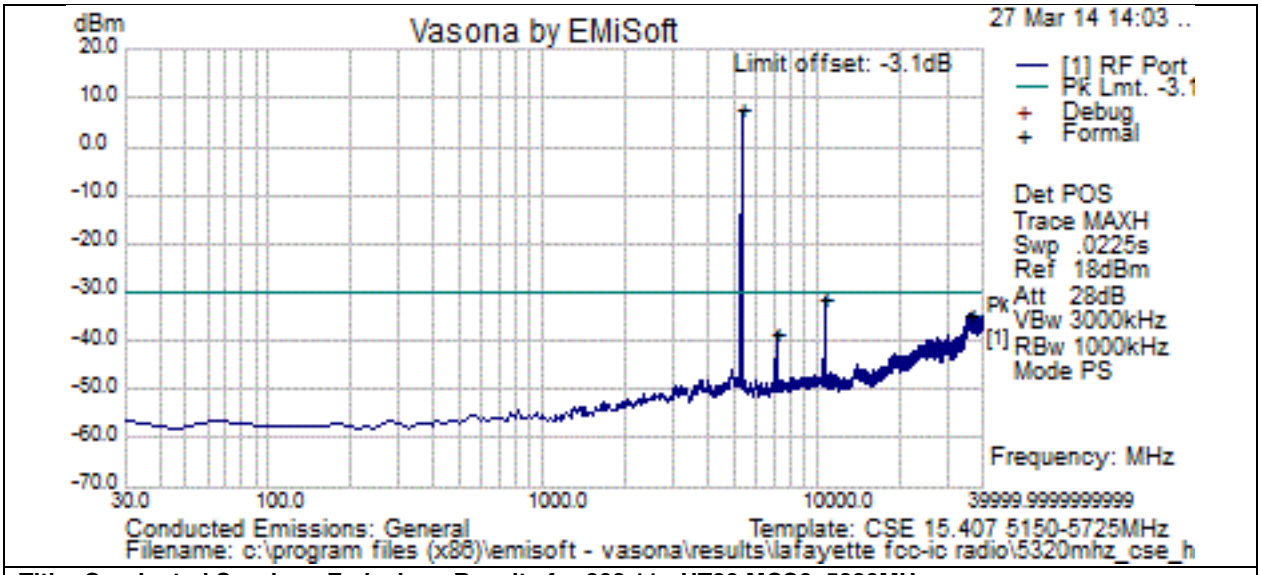


Title: Conducted Spurious Emissions Results for 802.11n HT20 MCS0, 5300MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5300.000	7.3	.6	.0	7.9	Peak [Scan]	RF Port	-30.1	38.0	N/A	tx freq
2	10600.000	-31.8	.8	.0	-31.0	Peak [Scan]	RF Port	-30.1	-.9	Pass	2nd harmonic
3	36186.250	-34.6	1.7	.0	-33.0	Peak [Scan]	RF Port	-30.1	-2.9	Pass	
4	39907.188	-36.5	1.8	.0	-34.7	Peak [Scan]	RF Port	-30.1	-4.6	Pass	
5	7061.094	-38.3	.7	.0	-37.6	Peak [Scan]	RF Port	-30.1	-7.5	Pass	

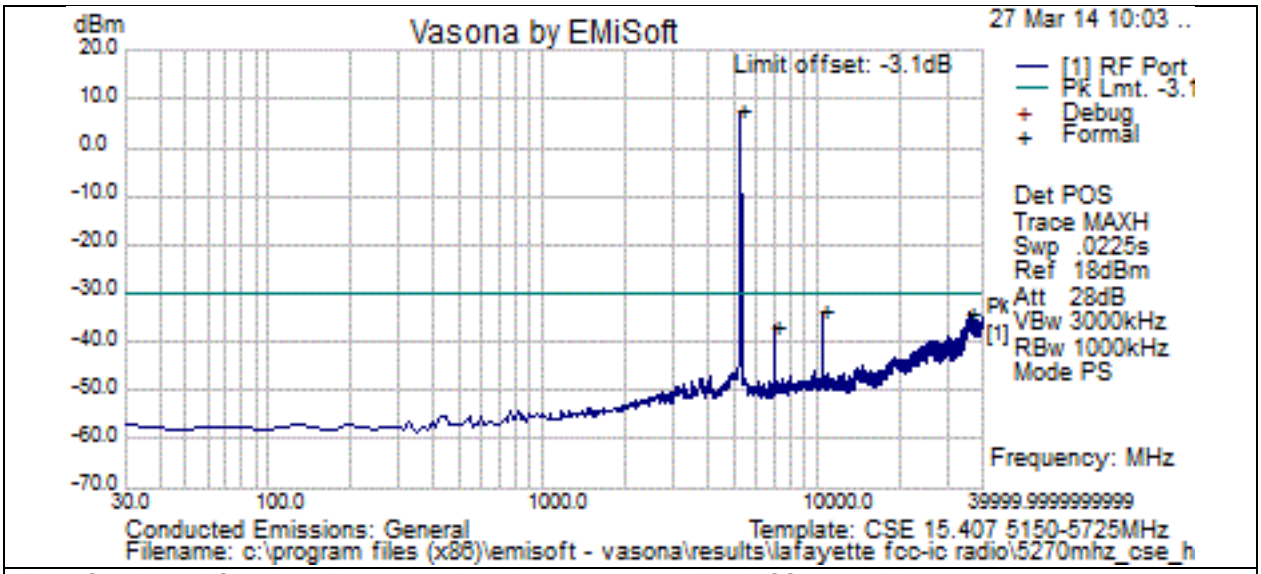


Title: Conducted Spurious Emissions Results for 802.11n HT20 MCS0, 5320MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5320.000	6.9	.6	.0	7.5	Peak [Scan]	RF Port	-30.1	37.6	N/A	tx freq
2	10640.000	-32.0	.9	.0	-31.2	Peak [Scan]	RF Port	-30.1	-1.1	Pass	2nd harmonic
3	36439.375	-36.1	1.7	.0	-34.4	Peak [Scan]	RF Port	-30.1	-4.3	Pass	
4	7094.181	-39.2	.7	.0	-38.5	Peak [Scan]	RF Port	-30.1	-8.4	Pass	

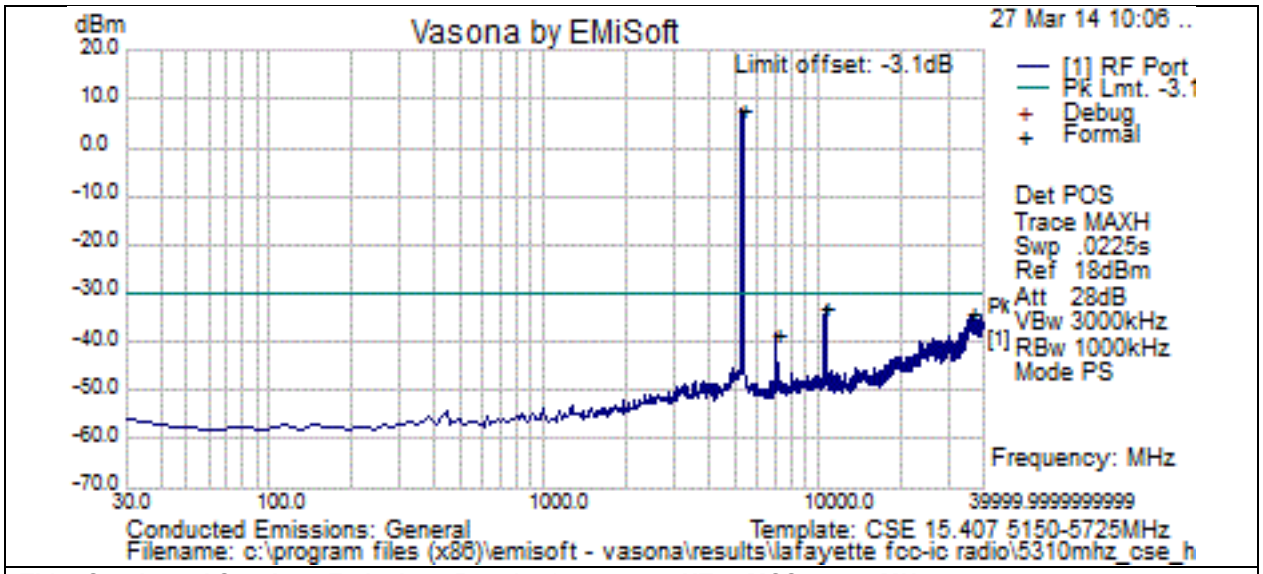


Title: Conducted Spurious Emissions Results for 802.11n HT40 MCS0, 5270MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5270.000	6.9	.6	.0	7.5	Peak [Scan]	RF Port	-30.1	37.6	N/A	tx freq
2	10540.000	-34.6	.8	.0	-33.8	Peak [Scan]	RF Port	-30.1	-3.7	Pass	2nd harmonic
3	36295.938	-35.6	1.7	.0	-33.9	Peak [Scan]	RF Port	-30.1	-3.8	Pass	
4	7028.006	-37.5	.7	.0	-36.8	Peak [Scan]	RF Port	-30.1	-6.7	Pass	



Title: Conducted Spurious Emissions Results for 802.11n HT40 MCS0, 5310MHz

Test Results Table

Formal Data

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5310.000	7.2	.6	.0	7.8	Peak [Scan]	RF Port	-30.1	37.9	N/A	tx freq
2	10620.000	-33.6	.8	.0	-32.8	Peak [Scan]	RF Port	-30.1	-2.7	Pass	2nd harmonic
3	36194.688	-35.9	1.7	.0	-34.3	Peak [Scan]	RF Port	-30.1	-4.2	Pass	
4	7077.638	-39.1	.7	.0	-38.4	Peak [Scan]	RF Port	-30.1	-8.3	Pass	

Conducted Bandedge

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Use the procedures in 718828 D01 DTS Meas Guidance v01 to substitute conducted measurements in place of radiated measurements.
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Be sure to enter all losses between the transmitter output and the spectrum analyzer.

Reference Level:	10 dBm
Attenuation:	4 dB
Sweep Time:	Coupled
Resolution Bandwidth:	1MHz
Video Bandwidth:	1 MHz for peak, 100 Hz for average
Detector:	Peak

Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= -41.25 dBm eirp (54dBuV @3m)
2) Peak plot (Vertical and Horizontal), Limit = -21.25 dBm eirp (74dBuV @3m)

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands.

The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units.

This report represents the worst case data for all supported operating modes and antennas.

802.11a Bandedge Average Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5280	6	-49.25	-41.25	-8.00
5320	6	-49.65	-41.25	-8.40

802.11a Bandedge Peak Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5280	6	-39.76	-21.25	-18.51
5320	6	-39.77	-21.25	-18.52

802.11n HT20 Bandedge Average Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5280	MCS0	-48.43	-41.25	-7.18
5320	MCS0	-48.99	-41.25	-7.74

802.11n HT20 Bandedge Peak Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5280	MCS0	-35.90	-21.25	-14.65
5320	MCS0	-34.23	-21.25	-12.98

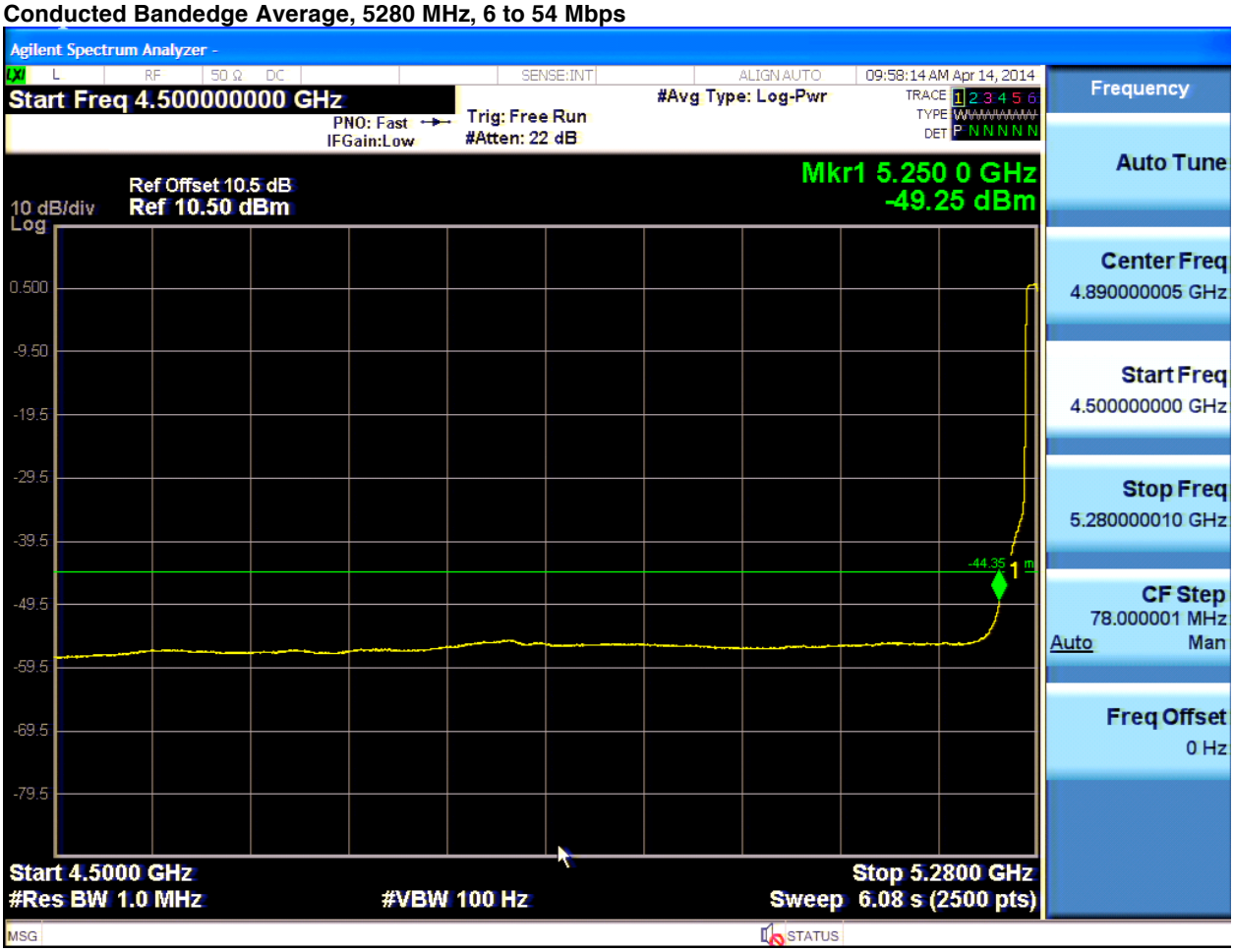
802.11n HT40 Bandedge Average Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5310	MCS0	-51.13	-41.25	-9.88

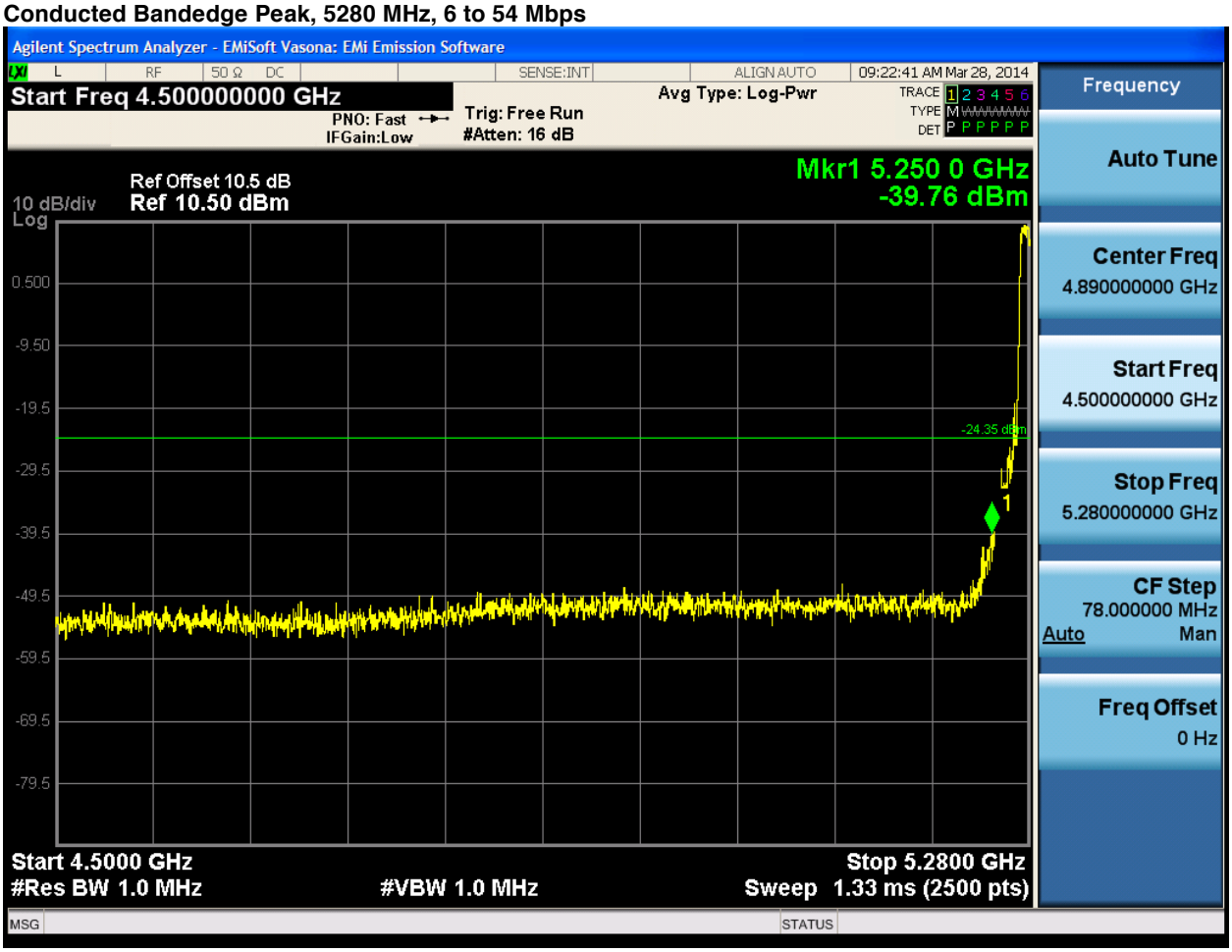
802.11n HT40 Bandedge Peak Test Results:

Frequency (MHz)	Data Rate	Band Edge Level (dBm)	Limit (dBm)	Margin (dB)
5310	MCS0	-29.07	-21.25	-7.82

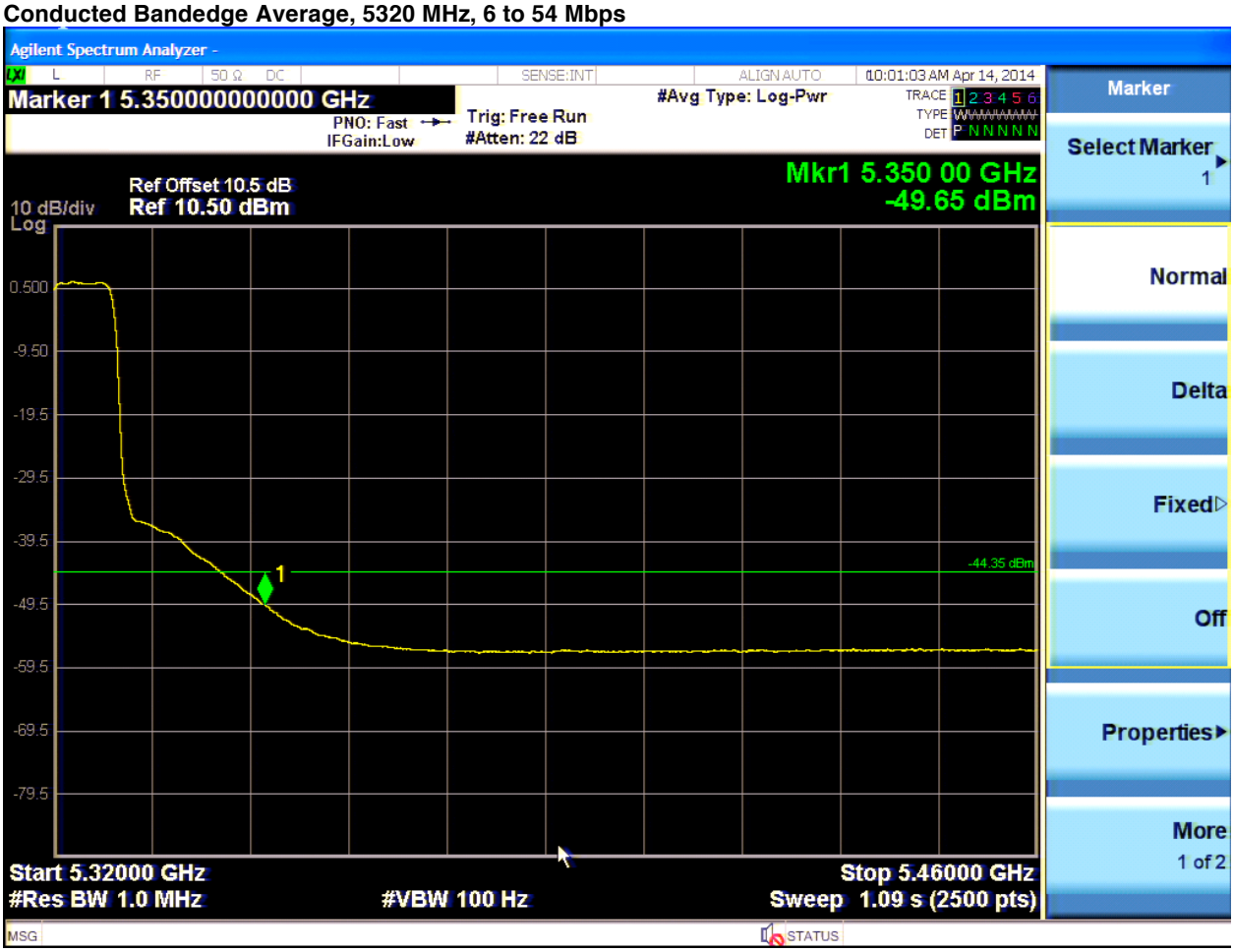
Conducted Bandedge Average, 5280 MHz, 6 to 54 Mbps



Conducted Bandedge Peak, 5280 MHz, 6 to 54 Mbps



Conducted Bandedge Average, 5320 MHz, 6 to 54 Mbps



Conducted Bandedge Peak, 5320 MHz, 6 to 54 Mbps