RADIO TEST REPORT

For

MODEL NO.: 1707
FCC ID: C3K1707
IC ID: 3048A-1707

Test Report No. R-TR371-FCCIC-UNII1-3
Issue Date: 24 Oct 2016

FCC CFR47 Part 15 Subpart E
Innovation, Science and Economic Development
Canada RSS-247 Issue 1

Prepared by
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ACCREDITED
TESTING CERT #3472.01

1 Record of Revisions

Revision	Date	Section	Page(s)	Summary of Changes	Author/Revised By:
1.0	09/23/2016	All	All	Version 1.0	Andy Shen
2.0	10/14/2016	5 7	8 12	Updated Product description. Corrected Equipment list details for CE Test.	Daniel Salinas
3.0	10/24/2016	7	11	Corrected typo with Murata and MegaPhase RF Cable details.	Daniel Salinas

Table of Contents

Test Report Attestation

Microsoft Corporation
Model: 1707
FCC ID: C3K1707
ISED ID: 3048A-1707

Applicable Standards

Specification	Test Result
FCC CFR47 Rule Parts 15.207, 15.209, 15.407	Pass
Innovation, Science and Economic Development Canada RSS-247 Issue 1, RSS-GEN Issue 4	Pass

Microsoft EMC Laboratory attests that the product model identified in this report has been tested to and meets the requirements identified in the above standards. The test results in this report solely pertains to the specific sample tested, under the conditions and operating modes as provided by the customer.

This report shall not be used to claim product certification, approval, or endorsement by A2LA or any agency of any Government. Reproduction, duplication or publication of extracts from this test report is prohibited and requires prior written approval of Microsoft EMC Laboratory.

This report replaces the previously issued report #R-TR371-FCCIC-UNII1-2 issued by Microsoft EMC Labs on 10/14/2016.

Written By: Daniel Salinas
Radio Test Lead

Reviewed/ Issued By: Sajay Jose
EMC/RF Compliance Lab Manager

2 Deviations from Standards

None.

3 Facilities and Accreditations

3.1 Test Facility

All test facilities used to collect the test data are located at
Microsoft EMC Laboratory,
17760 NE 67th Ct,
Redmond WA, 98052, USA

3.2 Accreditations

The lab is established and follows procedures as outlined in IEC/ISO 17025 and A2LA accreditation requirements.
A2LA Accredited Testing Certificate Number: 3472.01
FCC Registration Number: US1141
IC Site Registration Numbers: 3048A-3, 3048A-4

3.3 Test Equipment

The site and related equipment are constructed in conformance with the requirements of ANSI C63.4:2014 and other equivalent applicable standards.
Test site requirements for measurements above 1 GHz are in accordance with ANSI C63.4:2014.
ANSI C63.10:2013 and the appropriate KDB test methods were followed.

4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the product, as specified in ETSI TR 100 028. This represents an expanded uncertainty expressed at 95% confidence level using a coverage factor k=2. These levels are for reference only and not included to determine product compliance.
Expanded uncertainty calculations are available upon request.

Test item	Uncertainty	Unit
Radiated disturbance (30 MHz to 1 GHz)	5.99	dB
Radiated disturbance (1 GHz to 18 GHz)	5.12	dB
Conducted Disturbance at Mains Port	3.31	dB
Uncertainty for Conducted Power test	1.277	dB
Uncertainty for Conducted Spurious emission test	2.742	dB
Uncertainty for Bandwidth test	178	kHz
Uncertainty for DC power test	0.05	%
Uncertainty for test site temperature	0.5	ºC
Uncertainty for test site Humidity	3	%
Uncertainty for time	0.189	%

5 Product Description

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Customer Contact:	Jennifer Liu
Functional Description of the EUT:	PC with IEEE 802.11a/b/g/n/ac MIMO supporting 20/40/80 MHz bandwidths, Bluetooth and additional 802.11n Radio.
Model:	1707
FCC ID:	C3K1707
IC ID:	3048A-1707
Radio under test:	IEEE 802.11a/n/ac supporting 20/40/80 MHz Bandwidths 5150- 5250 MHz, 5250-5350 MHz, 5470-5725 MHz and 5725- 5850 MHz.
Modulation(s):	OFDM – BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
EUT Classification:	UNII
Equipment Design State:	Prototype/Production Equivalent
Equipment Condition:	Good
Test Sample Details:	RF Conducted Test Sample SN: 000250762258 RF Radiated Test Sample SN: 000221262258, 000266762258

5.1 Test Configurations

Test software “WiFi Tool” (V2.7.3), provided by the customer, and “Lab Tool” (V2.0.0.77), from the module vendor, were used to program the EUT to transmit continuously and change modes of operation.
All modes of operation were investigated initially and full testing performed on the worst-case modes as described below-
802.11a: 6Mbps
802.11n HT20: MCS0
802.11n HT40: MCS0
802.11ac VHT80: MCS0

5.2 Environmental Conditions

Ambient air temperature of the test site was within the range of 10 ºC to 40 ºC (50 ºF to 104 ºF) unless the EUT specified testing over a different temperature range. Humidity levels were in the range of 10% to 90% relative humidity. Testing conditions were within tolerance and any deviations required from the EUT are reported.

5.3 Antenna Requirements and Gain Information

The antennas are internal, permanently attached and there are no provisions for connection to an external antenna.

Antenna Gain		
Frequency Band (MHz)	**Chain A MIMO Wi-Fi Antenna Peak Gain (dBi)**	**Chain B Main Antenna Wi-Fi Peak Gain (dBi)**
UNII Band 1- 5150 to 5250	5.59	5.37
UNII Band 2a – 5250 to 5350	6.41	6.19
UNII Band 2c – 5470 to 5725	6.89	6.71
UNII Band 3 – 5725 to 5850	5.05	5.56

Simultaneous transmission on both transmit chains was observed to be the worst case mode of operation for all test cases. Since the transmit signals are completely uncorrelated, the combined gain is calculated using the following formula as specified in KDB 662911 D01 Multiple Transmitter Output v02r01:

Directional gain = $10\log [(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})/N_{ANT}]$ dBi

Combined Directional Antenna Gain	
Frequency Band (MHz)	**Combined Directional Gain (dBi)**
UNII Band 1- 5150 to 5250	5.48
UNII Band 2a – 5250 to 5350	6.3
UNII Band 2c – 5470 to 5725	6.8
UNII Band 3 – 5725 to 5850	5.31

5.4 Equipment Modifications

No modifications were made during testing.

5.5 Dates of Testing

Testing was performed from June 9, 2016 to August 9, 2016.

6 Test Results Summary

Test Description	Applicable Bands (GHz)	FCC CFR 47/ ISED Rule Part	Limit	Test Result
26dB Emission Bandwidth	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725	15.407 (a) RSS-247 [6.2.1]	Reporting and Measurement Purposes	NA
99% bandwidth	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725	RSS-247 [6.2]	Reporting and Measurement Purposes	NA
6 dB Bandwidth	5.725 – 5.85	15.407 (e) RSS-247 [6.2.4]	≥ 500kHz	Pass
Output Power	5.15 – 5.25	15.407 (a)(1)(iv)	≤ 250 mW or $10 + 10 \log_{10}B$* whichever is less	Pass
		RSS-247 [6.2.1]	≤ 200 mW or $10 + 10 \log_{10}B$* e.i.r.p whichever is less	Pass
	5.25 – 5.35 5.47 – 5.725	15.407 (a)(2) RSS-247 [6.2]	≤ 250 mW or $11 + 10 \log_{10}B$* whichever is less ≤ 1 W or $17 + 10 \log_{10}B$* e.i.r.p whichever is less	N/A
	5.725 – 5.85	15.407 (a)(3) RSS-247 [6.2]	≤ 1000 mW	Pass
Power Spectral Density	5.15 – 5.25	15.407 (a)(1)(iv)	≤ 11dBm/MHz	Pass
		RSS-247 [6.2]	≤ 10dBm/MHz e.i.r.p.	Pass
	5.25 – 5.35 5.47 – 5.725	15.407 (a)(2) RSS-247 [6.2]	≤ 11dBm/MHz	N/A
	5.725 – 5.85	15.407 (a)(3) RSS-247 [6.2]	≤ 30dBm/500kHz	Pass
Radiated Spurious Emissions/ Restricted Band Emissions	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725 5.725 – 5.85	15.407 (b), 15.205, 15.209, RSS-Gen [8.9]	FCC CFR 47 15.209 limits RSS-Gen [8.9]	Pass

AC Power Line Conducted Emissions	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725 5.725 – 5.85	15.407 (b), 15.207 RSS-Gen [8.8]	FCC CFR 47 15.207 limits RSS-Gen [8.8]	Pass

* Note: **B-** FCC references 26dB bandwidth and ISED references 99% bandwidth.

7 Test Equipment List

Equipment used for Radiated and Conducted Measurements				
Manufacturer	**Description**	**Model #**	**Asset #**	**Calibration Due**
Rohde & Schwarz	EMI Test Receiver	ESU40	RF-192	4/13/2017
Rohde & Schwarz	EMI Test Receiver	ESU40	EMC-607	05/26/2017
Rohde & Schwarz	Signal Analyzer	FSV40	RF-228	4/12/2017
Rohde & Schwarz	Power Meter	NRP-Z91	RF-211	4/113/2017
Sunol Sciences	Antenna - Broadband Hybrid	JB6	EMC-640	9/29/2016
ETS-Lindgren	Antenna	3117	RF-137	2/25/2017
ETS-Lindgren	Antenna – Standard Gain	3160-09	RF-037	3/15/2017
Rohde & Schwarz	Custom Filter Bank+PreAmp	SFUNIT RX	RF-323	12/10/2016
Rohde & Schwarz	Pre-Amp	TS-PR26	RF-199	12/15/2016
Rohde & Schwarz	Switch and Control Unit	OSP130	RF-249	12/10/2016
Rohde & Schwarz	Switch and Control Unit	OSP130	RF-018	12/18/2016
Rohde & Schwarz	Switch and Control Unit	OSP150	RF-250	12/10/2016
Rohde & Schwarz	Switch and Control Unit	OSP150	RF-019	12/18/2016
Murata	RF Cable	MXHQ87WA3000	RF-415	11/09/2016
MegaPhase	RF Cable	EMC3-N1N1-394	EMC-1034	06/21/2017
Huber & Suhner	RF Cable	SucoFlex 100	RF-350	12/10/2016
Huber & Suhner	RF Cable	SucoFelx 100	RF-352	12/10/2016
Huber & Suhner	RF Cable	SucoFlex 100	RF-350	12/10/2016
Huber & Suhner	RF Cable	SucoFelx 100	RF-352	12/10/2016

Manufacturer	Description	Model #	Asset #	Calibration Due
Huber & Suhner	RF Cable	Sucoflex 102A	RF-269	12/16/2016
Madge Tech	THP Monitor	PRH Temp 2000	EMC-681	11/19/2016
Micro-Coax	RF Cable	UFA210A-0-0787-300300	RF-292	11/10/2016
Micro-Coax	RF Cable	UTI Flex	RF-354	12/10/2016
Pasternack	Attenuator	PE7087-3	RF-337	01/26/2017
Pasternack	3dB Attenuator	PE7087-3	RF-338	01/29/2017
Pasternack	6dB Attenuator	PE7087-6	RF-432	01/27/2017
ETS-Lindgren	Antenna - Standard Gain	3160-10	RF-179	10/03/2017
Rohde & Schwarz	Pre-Amp	TS-PR40	RF-042	12/18/2016
Rohde & Schwarz	Software	EMC-32 V9.25.00	N/A	N/A

Equipment used for Line Conducted Emissions Measurement				
Manufacturer	**Description**	**Model #**	**Asset #**	**Calibration Due**
Rohde & Schwarz	EMI Test Receiver	ESR 3	EMC-669	4/14/2017
Teseq	AE LISN	NNB 51	EMC-187	9/25/2016*
Teseq	Test LISN	NNB 51	EMC-642	11/24/2016
Micro-Coax	RF Cable	UFA210A-1-1800-50U50U	EMC-367	8/6/2016*
Madge Tech	THP Monitor	PRHTemp2000	EMC-169	8/18/2016*
ETS	TILE SW	Ver 7.1.3.22	N/A	N/A
Fluke	Multimeter	189	EMC-231	8/31/2016*

*Note- all equipment in valid calibration status at the time of test- Jun 13, 2016.

8 Test Site Description

8.1 Radiated Emissions Test Site

Radiated measurements are performed in a 3m semi-anechoic chamber, which meets NSA requirements for the frequency range of 30MHz to 1000MHz. For measurements above 1 GHz, absorbers are laid out on the ground plane between the receiving antenna and the EUT to meet Site VSWR requirements in accordance with ANSI C63.4:2014.

8.1.1 Radiated Measurements in 30 MHz - 1000 MHz

The EUT is positioned on a turntable at a height of 80cm using a non-conducting table. A linearly polarized broadband antenna is positioned at 3m from the EUT periphery. The turntable is rotated 360 degrees and the antenna height varied from 1m to 4m to determine the highest emissions. This is repeated for both Horizontal and Vertical polarizations of the measurement antenna. All possible orientations of the EUT were investigated for emissions and the vertical standing mode was identified as the worst case configuration.

8.1.2 Radiated Measurements above 1GHz

The EUT is positioned on a Turntable at a height of 150cm. A linearly polarized antenna is positioned at 3m from the EUT periphery. Guidelines in ANSI C63.10:2013 were followed with respect to maximizing the emissions. The turntable is rotated 360 degrees and the antenna height varied from 1m to 4m (with antenna bore-sighting enabled) to determine the highest emissions. This is repeated for both Horizontal and Vertical polarizations of the measurement antenna. Measurements above 18GHz were performed at a distance of 3m.

8.2 Antenna port conducted measurements

All antenna port conducted measurements were performed on a bench-top setup consisting of a spectrum analyzer, power meter (as necessary), splitters/combiners (as necessary), attenuators, and pre-characterized RF cables.
The correction factors between the EUT and the spectrum analyzer were added internally in the analyzer settings, where applicable. The plots displayed takes into account these correction factors.

8.3 Test Setup Diagrams

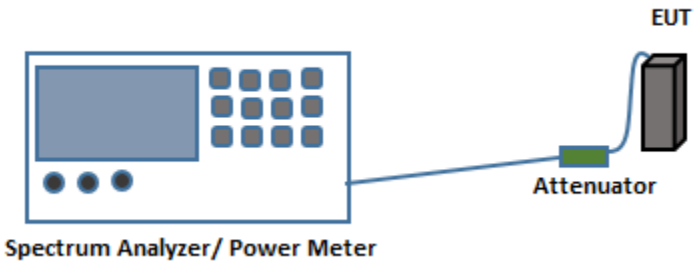


Fig.1. Test Setup for Antenna port conducted measurements

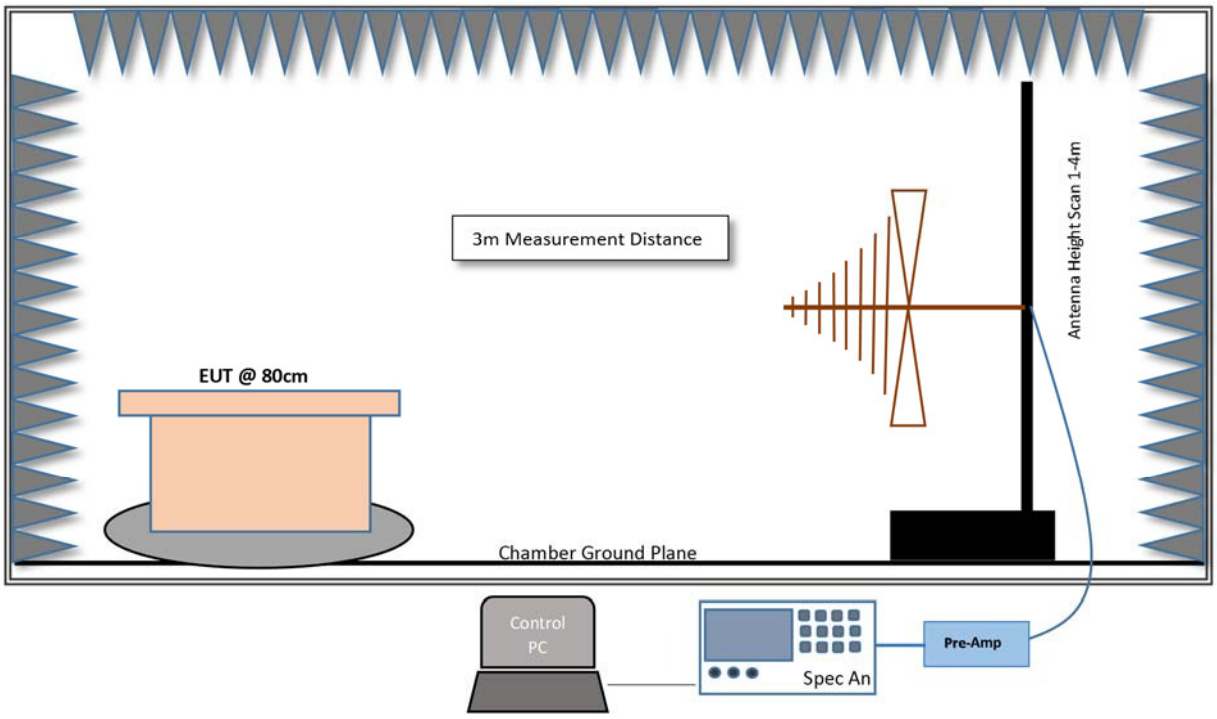


Fig.2. Test Setup for Radiated measurements in 30MHz- 1GHz Range

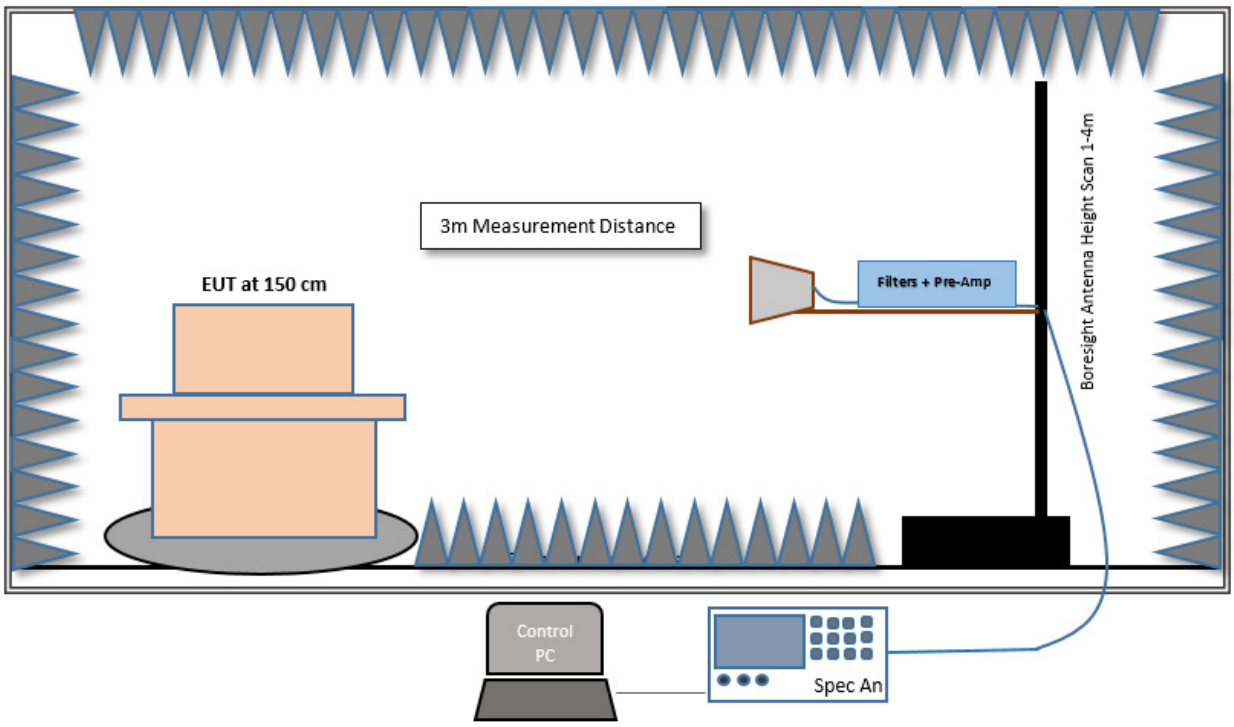


Fig.3. Test Setup for Radiated measurements in 1GHz- 18GHz Range

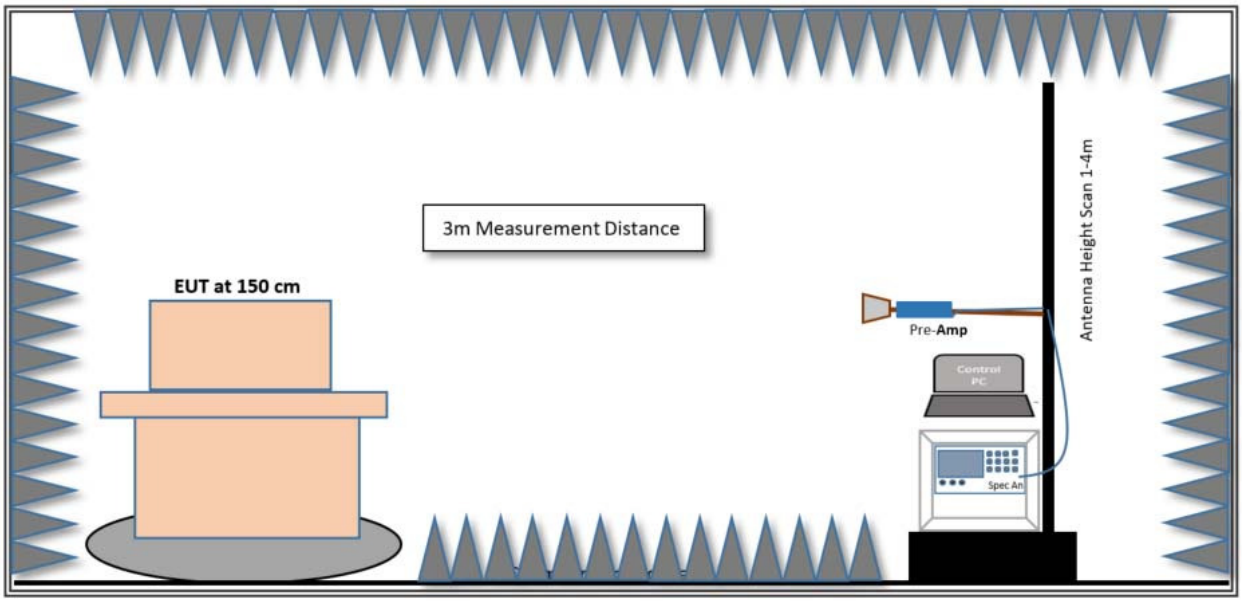


Fig.4. Test Setup for Radiated measurements >18GHz

9 Test Results- Conducted

9.1 26-dB Emission Bandwidth

9.1.1 Test Requirement:

FCC CFR 47 Rule Part 15.407 (a)
ISED RSS-247 [6.2.1]

9.1.2 Test Method:

Measurements were performed according to the procedures defined in KDB 789033- General UNII Test Procedures New Rules v01r02 and ANSI C63.10:2013.

Spectrum Analyzer settings:

RBW = approximately 1% of the Emissions Bandwidth
VBW ≥ 3xRBW
Trace Mode= Peak Detector (Max Hold)
Sweep time= Auto
The in-built functionality of the Spectrum Analyzer is used to measure the 26-dB emission bandwidth.

9.1.3 Limits:

Reporting and measurement purposes only.

9.1.4 Test Results:

See Section 9.2.5.

9.2 99% Occupied Bandwidth

9.2.1 Test Requirement:

ISED RSS-247 [6.2]

9.2.2 Test Method:

Measurements were performed according to the procedures defined in KDB 789033- General UNII Test Procedures New Rules v01r02 and ANSI C63.10 2013.

Spectrum Analyzer settings:

Set the center frequency to the nominal EUT channel center frequency
Span = 1.5 to 5.0 time the 99% Occupied Bandwidth
RBW = 1% to 5% of the 99% Occupied Bandwidth
VBW ≥ 3xRBW
Trace Mode= Peak Detector (Max Hold)
Sweep time= Auto
The built-in functionality of the Spectrum Analyzer is used to measure the 99% Occupied Bandwidth.

9.2.3 Limits:

Reporting and measurement purposes only.

9.2.4 Test Results:

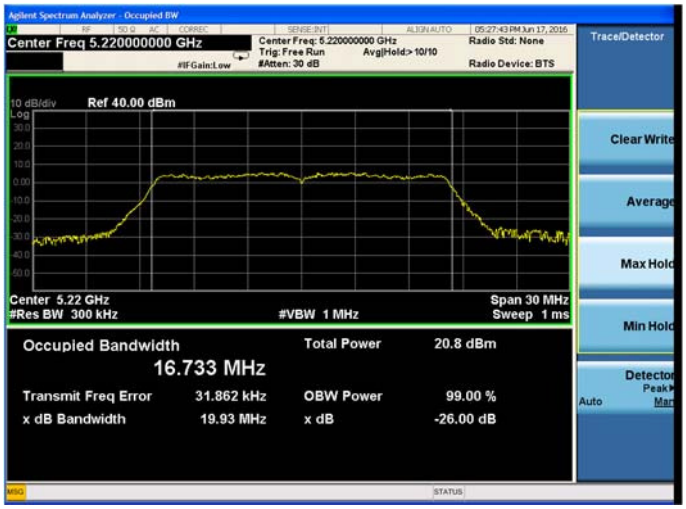
See Section 9.2.5.

9.2.5 Test Data:

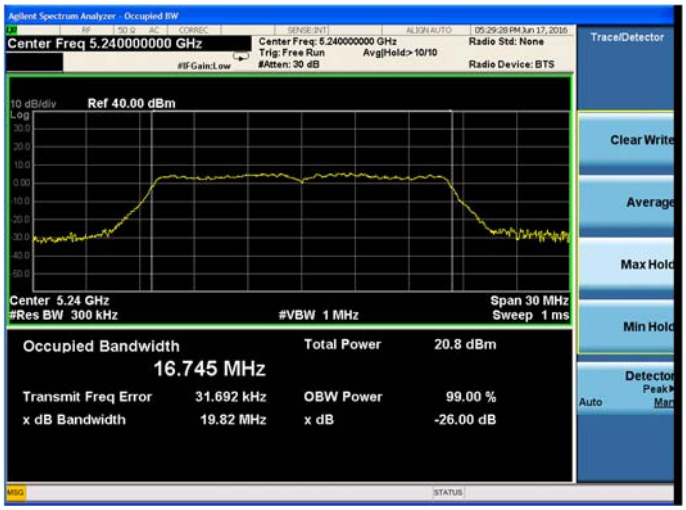
9.2.5.1 Chain A 802.11a 26-dB Emission Bandwidth

Chain A 802.11a 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	36	5180	19.97	16.76
	44	5220	19.93	16.73
	48	5240	19.82	16.75
UNII-2A	52	5260	19.89	16.74
	60	5300	19.96	17.11
	64	5320	20.08	16.76
UNII-2C	100	5500	19.99	16.77
	116	5580	19.92	16.76
	140	5700	20.08	16.77
UNII-3	149	5745	20.01	17.10
	157	5785	20.29	16.79
	165	5825	20.40	17.70

Plot 9-1. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 36)



Plot 9-2. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 44)



Plot 9-3 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 48)

Plot 9-4. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 52)

Plot 9-5. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 60)

Plot 9-6. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 64)

Plot 9-7 . 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 100)

Plot 9-8. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 116)

Plot 9-9. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 140)

Plot 9-10. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 149)

Plot 9-11. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 157)

Plot 9-12. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11a (Ch. 165)

9.2.5.2 Chain B 802.11a 26-dB Emission Bandwidth

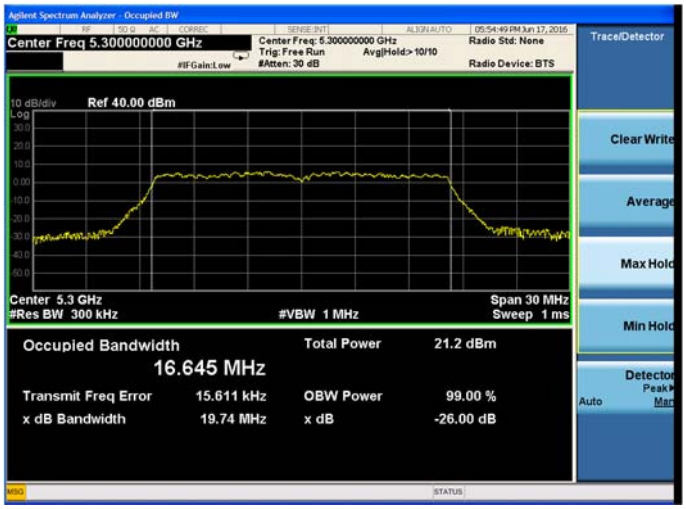
Chain B 802.11a 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	36	5180	19.84	16.65
	44	5220	19.87	16.65
	48	5240	19.75	16.67
UNII-2A	52	5260	19.80	16.65
	60	5300	19.74	16.65
	64	5320	19.78	16.64
UNII-2C	100	5500	19.92	16.67
	116	5580	19.78	16.66
	140	5700	19.84	16.68
UNII-3	149	5745	19.83	16.64
	157	5785	19.85	16.65
	165	5825	19.78	16.64

Plot 9-13. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 36)

Plot 9-14. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 44)

Plot 9-15. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 48)

Plot 9-16. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 52)



Plot 9-17. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 60)

Plot 9-18. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 64)

Plot 9-19. 26-dB Emission Bandwidth Chain and 99% OBW B 802.11a (Ch. 100)

Plot 9-20. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 116)

Plot 9-21. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 140)

Plot 9-22. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 149)

Plot 9-23. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 157)

Plot 9-24. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11a (Ch. 165)

9.2.5.3 Chain A 802.11n HT20 26-dB Emission Bandwidth

Chain A 802.11n HT20 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	36	5180	20.30	17.68
	44	5220	20.35	16.67
	48	5240	20.19	17.67
UNII-2A	52	5260	20.21	17.67
	60	5300	20.31	17.70
	64	5320	20.25	17.69
UNII-2C	100	5500	20.25	17.67
	116	5580	20.32	17.67
	140	5700	20.24	17.68
UNII-3	149	5745	20.18	17.67
	157	5785	20.31	17.68
	165	5825	20.31	17.68

Plot 9-25. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 36)

Plot 9-26. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 44)

sss

Plot 9-27. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 48)

Plot 9-28. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 52)

Plot 9-29. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 60)

Plot 9-30. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 64)

Plot 9-31. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 100)

Plot 9-32. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 116)

Plot 9-33. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 140)

Plot 9-34. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 149)

Plot 9-35. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 157)

Plot 9-36. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT20 (Ch. 165)

9.2.5.4 Chain B 802.11n HT20 26-dB Emission Bandwidth

Chain B 802.11n HT20 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	36	5180	20.07	17.66
	44	5220	20.14	17.67
	48	5240	20.14	17.66
UNII-2A	52	5260	20.19	17.67
	60	5300	20.20	17.67
	64	5320	20.13	17.66
UNII-2C	100	5500	20.20	17.66
	116	5580	20.17	17.66
	140	5700	20.19	17.67
UNII-3	149	5745	20.17	17.66
	157	5785	20.21	17.66
	165	5825	20.13	17.67

Plot 9-37. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 36)

Plot 9-38. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 44)

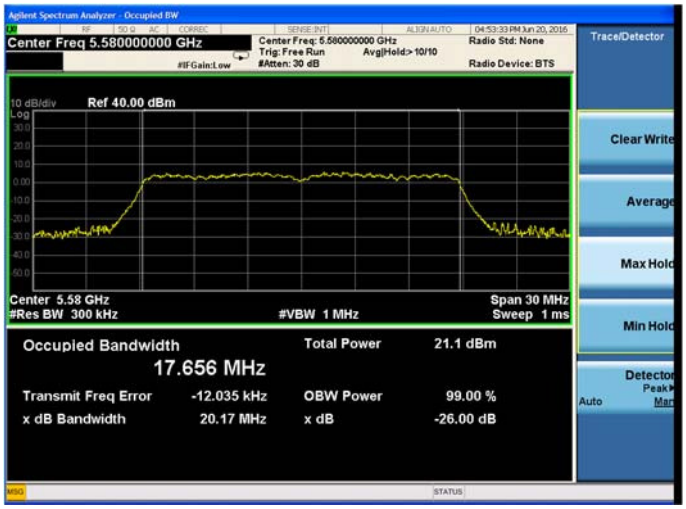
Plot 9-39. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 48)

Plot 9-40. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 52)

Plot 9-41. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 60)

Plot 9-42. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 64)

Plot 9-43. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 100)



Plot 9-44. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 116)

Plot 9-45. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 140)

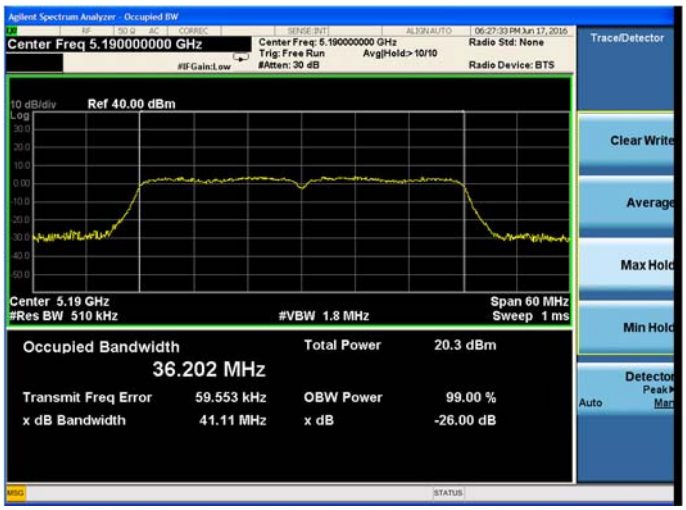
Plot 9-46. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 149)

Plot 9-47. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 157)

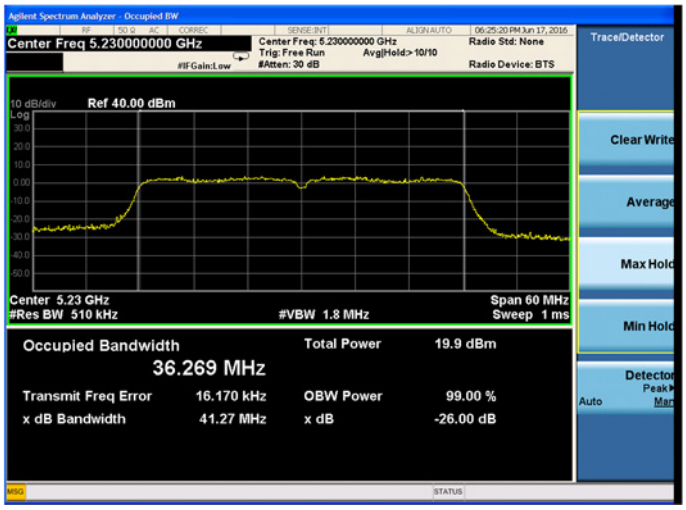
Plot 9-48. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT20 (Ch. 165)

9.2.5.5 Chain A 802.11n HT40 26-dB Emission Bandwidth

Chain A 802.11n HT40 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	38	5190	41.11	36.20
	46	5230	41.27	36.27
UNII-2A	54	5270	41.26	36.26
	62	5310	41.34	36.25
UNII-2C	102	5510	40.70	36.17
	110	5550	40.53	36.20
	134	5670	40.81	36.22
UNII-3	151	5755	40.80	36.23
	159	5795	40.94	36.21

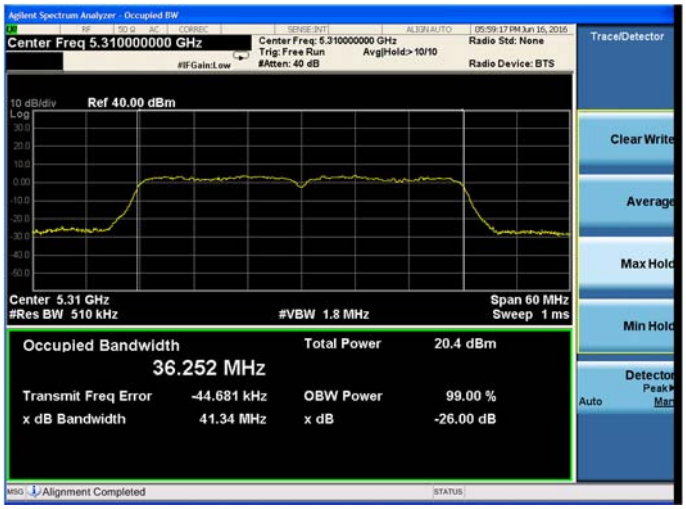


Plot 9-49. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 38)



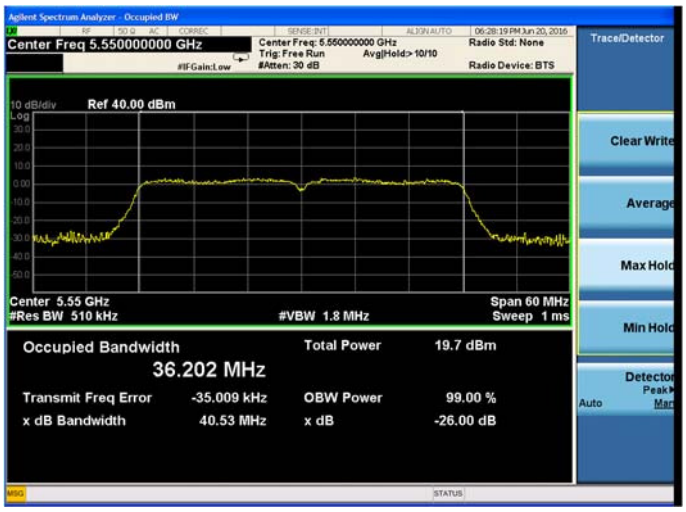
Plot 9-50. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 46)

Plot 9-51. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 54)



Plot 9-52. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 62)

Plot 9-53. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 102)



Plot 9-54. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 110)

Plot 9-55. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 134)

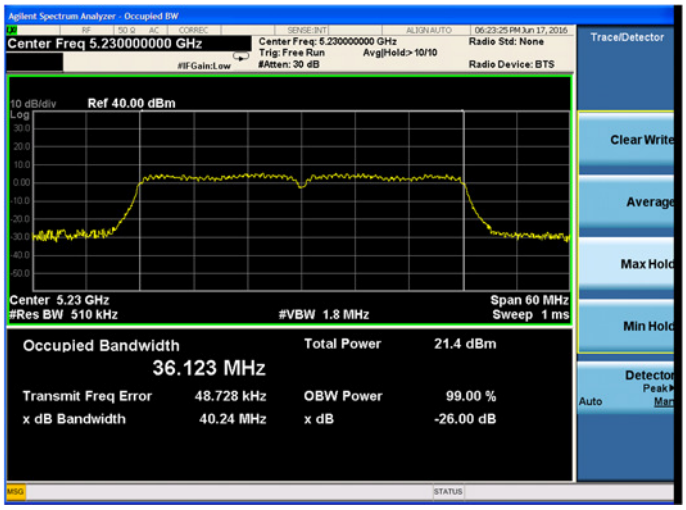
Plot 9-56. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 151)

Plot 9-57. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11n HT40 (Ch. 159)

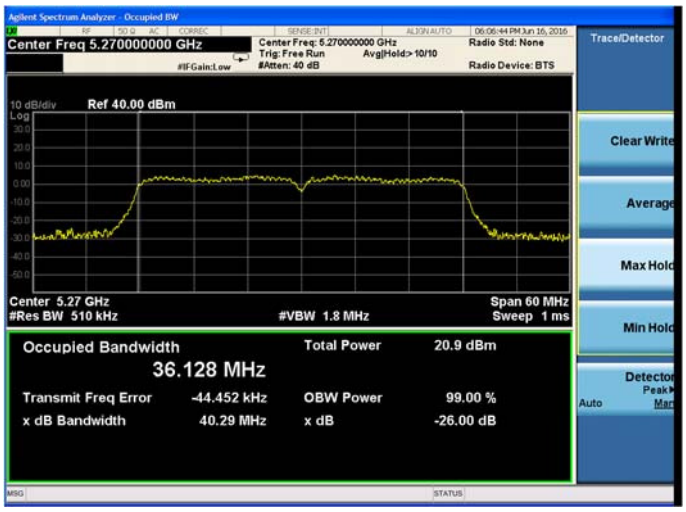
9.2.5.6 Chain B 802.11n HT40 26-dB Emission Bandwidth

Chain B 802.11n HT40 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	38	5190	40.25	36.11
	46	5230	40.24	36.12
UNII-2A	54	5270	40.29	36.13
	62	5310	40.36	36.11
UNII-2C	102	5510	40.26	36.13
	110	5550	40.24	36.11
	134	5670	40.32	36.12
UNII-3	151	5755	40.53	36.10
	159	5795	40.35	36.13

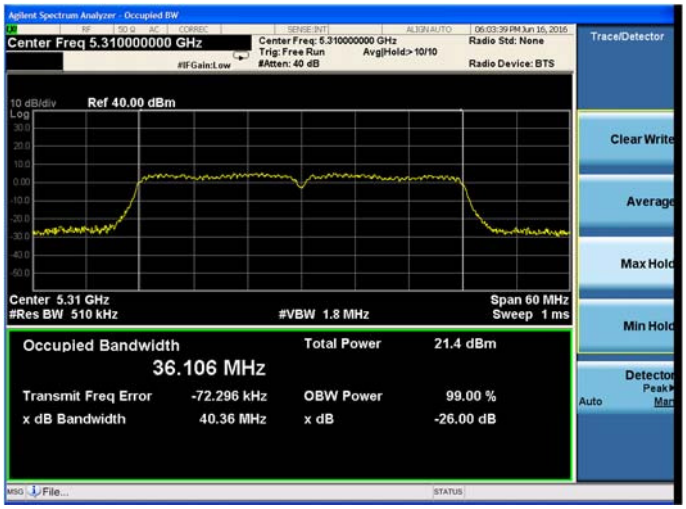
Plot 9-58. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 38)



Plot 9-59. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 46)



Plot 9-60. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 54)



Plot 9-61. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 62)

Plot 9-62. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 102)

Plot 9-63. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 110)

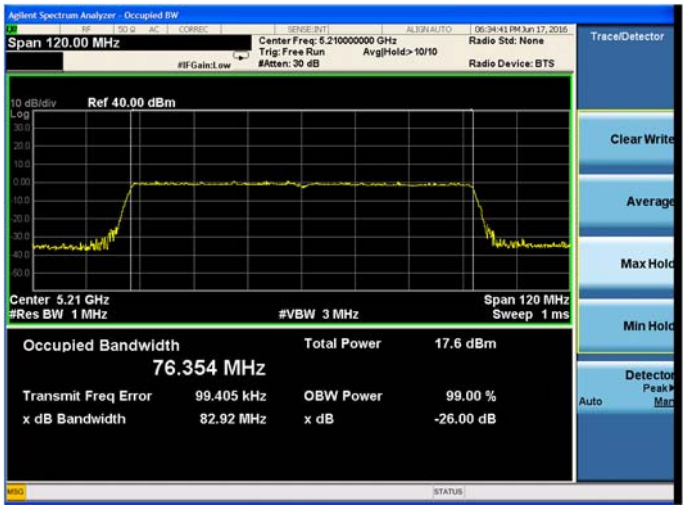
Plot 9-64. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 134)

Plot 9-65. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 151)

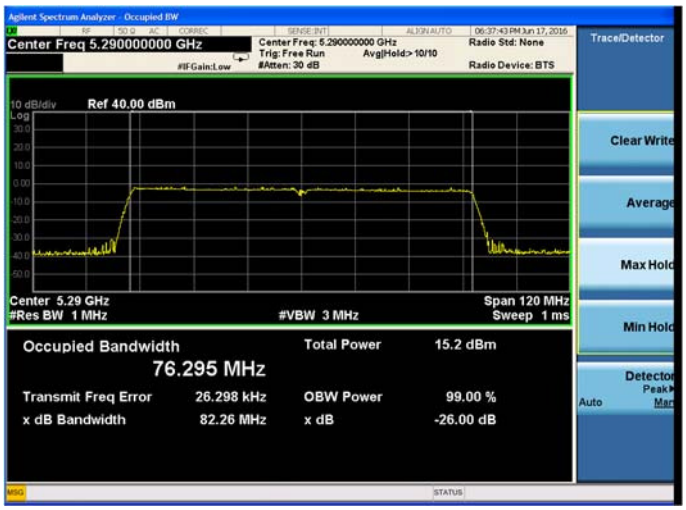
Plot 9-66. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11n HT40 (Ch. 159)

9.2.5.7 Chain A 802.11ac VHT80 26-dB Emission Bandwidth

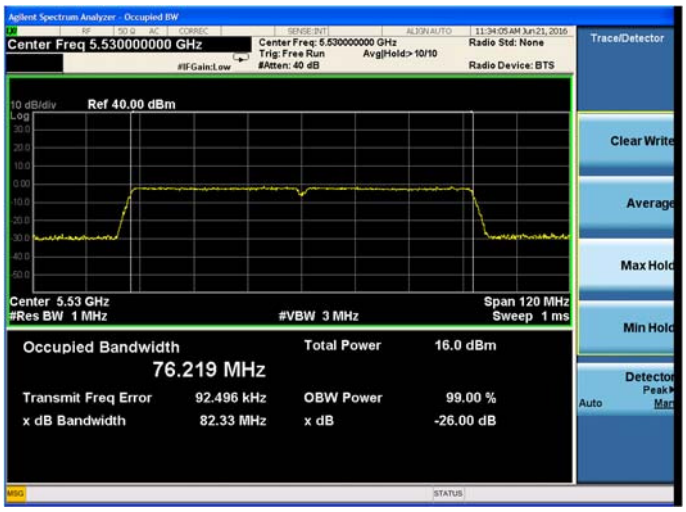
Chain A 802.11ac VHT80 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	42	5210	82.92	76.35
UNII-2A	58	5290	82.26	76.30
UNII-2C	106	5530	82.33	76.22
	122	5610	82.29	76.24
UNII-3	155	5775	81.93	76.22



Plot 9-67. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11ac VHT80 (Ch. 42)

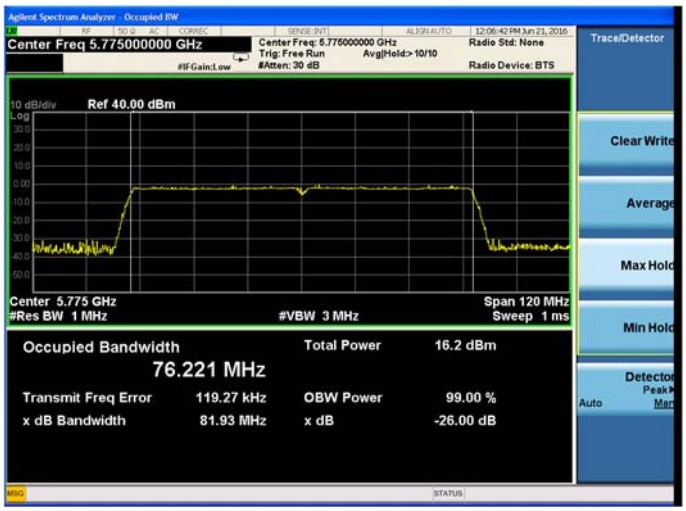


Plot 9-68. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11ac VHT80 (Ch. 58)



Plot 9-69. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11ac VHT80 (Ch. 106)

Plot 9-70. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11ac VHT80 (Ch. 122)

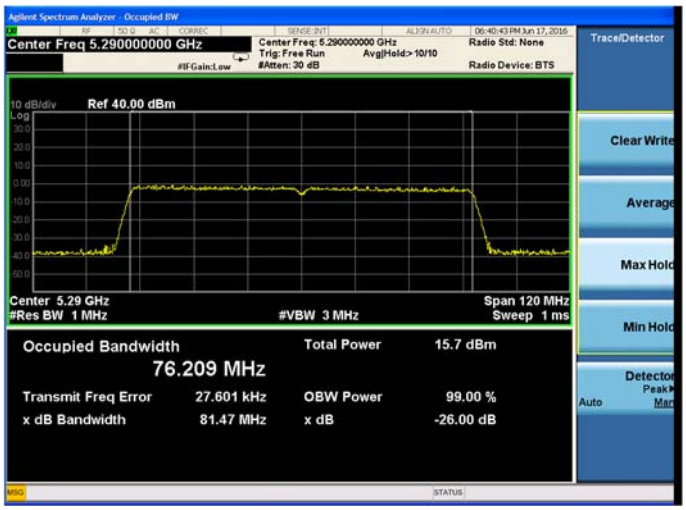


Plot 9-71. 26-dB Emission Bandwidth and 99% OBW Chain A 802.11ac VHT80 (Ch. 155)

9.2.5.8 Chain B 802.11ac VHT80 26-dB Emission Bandwidth

Chain B 802.11ac VHT80 26-dB Emission Bandwidth				
Band	**Channel No.**	**Frequency (MHz)**	**26-dB Emission Bandwidth (MHz)**	**99% Occupied BW (MHz)**
UNII-1	42	5210	81.55	76.19
UNII-2A	58	5290	81.47	76.21
UNII-2C	106	5530	81.54	76.07
	122	5610	81.35	76.17
UNII-3	155	5775	81.45	76.18

Plot 9-72. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11ac VHT80 (Ch. 42)



Plot 9-73. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11ac VHT80 (Ch. 58)

Plot 9-74. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11ac VHT80 (Ch. 106)

Plot 9-75. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11ac VHT80 (Ch. 122)

Plot 9-76. 26-dB Emission Bandwidth and 99% OBW Chain B 802.11ac VHT80 (Ch. 155)

9.3 6-dB Bandwidth

9.3.1 Test Requirement:

FCC CFR 47 Rule Part 15.407 (e)
ISED RSS-247 [6.2.4]

9.3.2 Test Method:

Measurements were performed according to the procedures defined in KDB 789033- General UNII Test Procedures New Rules v01r03 and ANSI C63.10:2013.

Spectrum Analyzer settings:

RBW = 100 kHz
VBW ≥ 3xRBW
Trace Mode= Peak Detector (Max Hold)
Sweep time= Auto
The in-built functionality of the Spectrum Analyzer is used to measure the 6-dB bandwidth.

9.3.3 Limits:

The 6-dB Bandwidth shall be ≥ 500 kHz.

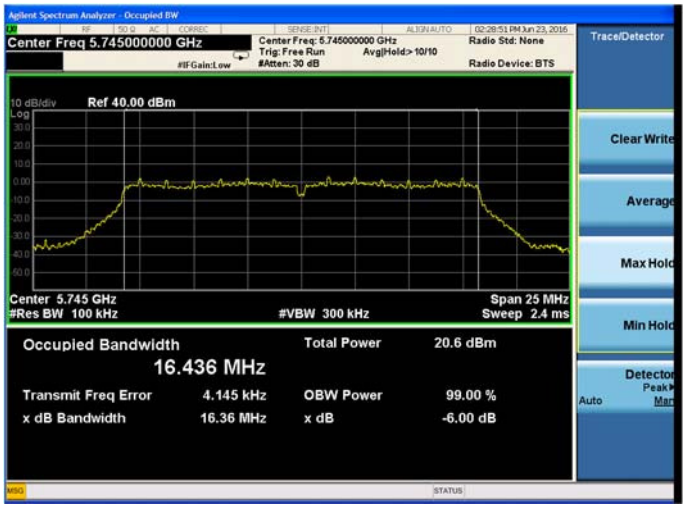
9.3.4 Test Results:

Pass

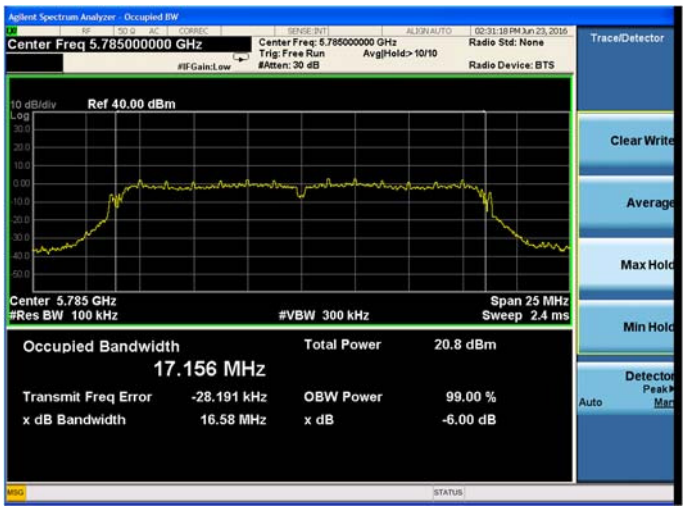
9.3.5 Test Data:

9.3.5.1 Chain A 802.11a 6-dB Bandwidth

Chain A 802.11a 6-dB Bandwidth		
Channel No.	**Frequency (MHz)**	**6-dB Bandwidth (MHz)**
149	5745	16.36
157	5785	16.58
165	5825	16.37



Plot 9-77. 6-dB Bandwidth Chain A 802.11a (Ch. 149)

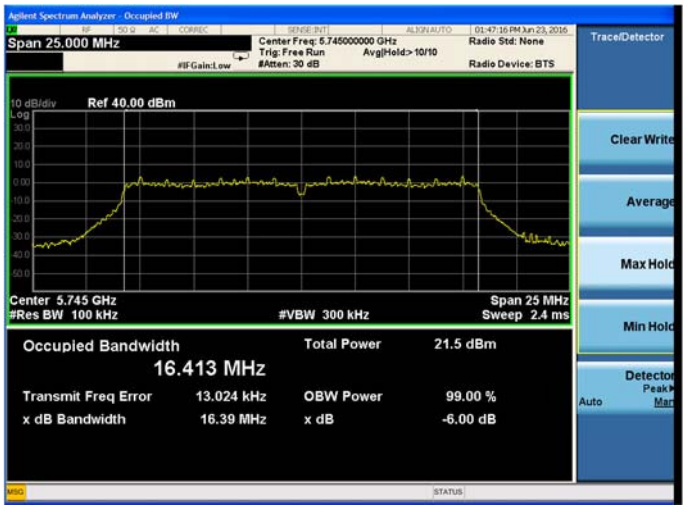


Plot 9-78. 6-dB Bandwidth Chain A 802.11a (Ch. 157)

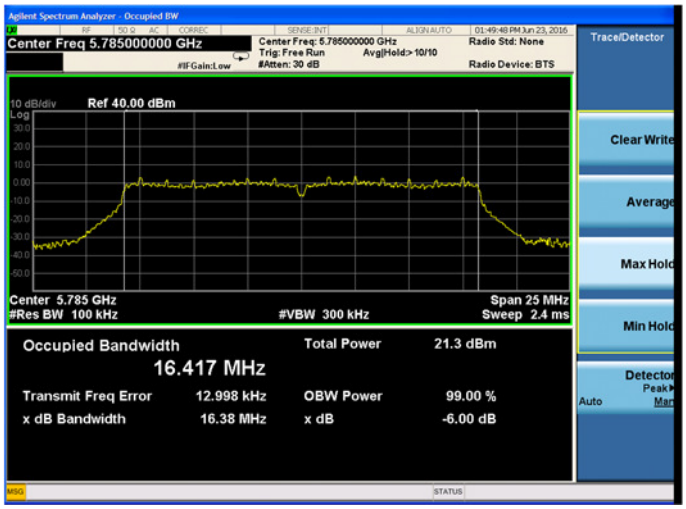
Plot 9-79. 6-dB Bandwidth Chain A 802.11a (Ch. 165)

9.3.5.2 Chain B 802.11a 6-dB Bandwidth

Chain B 802.11a 6-dB Bandwidth		
Channel No.	**Frequency (MHz)**	**6-dB Bandwidth (MHz)**
149	5745	16.39
157	5785	16.38
165	5825	16.41



Plot 9-80. 6-dB Bandwidth Chain B 802.11a (Ch. 149)

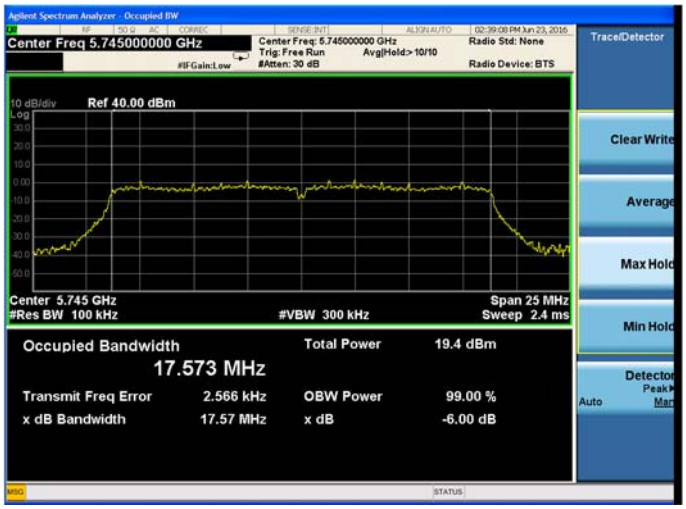


Plot 9-81. 6-dB Bandwidth Chain B 802.11a (Ch. 157)

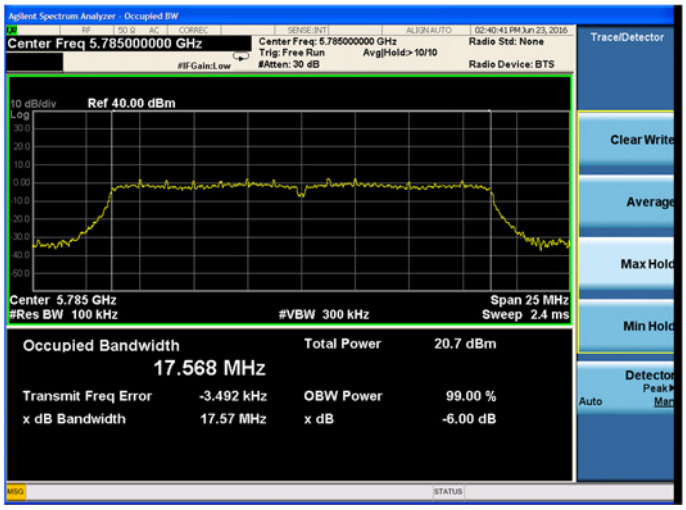
Plot 9-82. 6-dB Bandwidth Chain B 802.11a (Ch. 165)

9.3.5.3 Chain A 802.11n HT20 6-dB Bandwidth

Chain A 802.11n HT20 6-dB Bandwidth		
Channel No.	Frequency (MHz)	6-dB Bandwidth (MHz)
149	5745	17.57
157	5785	17.57
165	5825	17.57



Plot 9-83. 6-dB Bandwidth Chain A 802.11n HT20 (Ch. 149)

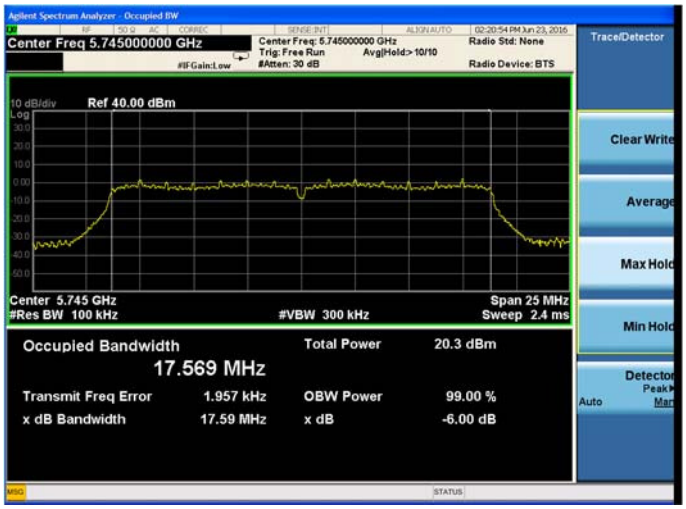


Plot 9-84. 6-dB Bandwidth Chain A 802.11n HT20 (Ch. 157)

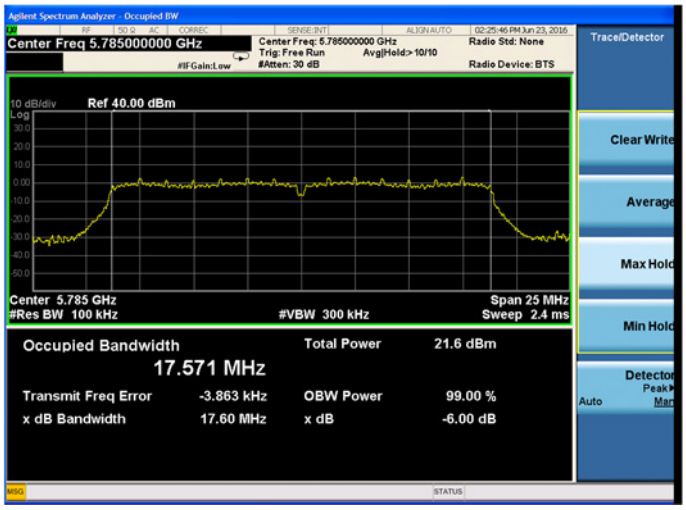
Plot 9-85. 6-dB Bandwidth Chain A 802.11n HT20 (Ch. 165)

9.3.5.4 Chain B 802.11n HT20 6-dB Bandwidth

Chain B 802.11n HT20 6-dB Bandwidth		
Channel No.	Frequency (MHz)	6-dB Bandwidth (MHz)
149	5745	17.59
157	5785	17.6
165	5825	17.6



Plot 9-86. 6-dB Bandwidth Chain B 802.11n HT20 (Ch. 149)



Plot 9-87. 6-dB Bandwidth Chain B 802.11n HT20 (Ch. 157)

Plot 9-88. 6-dB Bandwidth Chain B 802.11n HT20 (Ch. 165)

9.3.5.5 Chain A 802.11n HT40 6-dB Bandwidth

Chain A 802.11n HT40 6-dB Bandwidth		
Channel No.	**Frequency (MHz)**	**6-dB Bandwidth (MHz)**
151	5755	35.82
159	5795	35.82

Plot 9-89. 6-dB Bandwidth Chain A 802.11n HT40 (Ch. 151)

Plot 9-90. 6-dB Bandwidth Chain A 802.11n HT40 (Ch. 159)

9.3.5.6 Chain B 802.11n HT40 6-dB Bandwidth

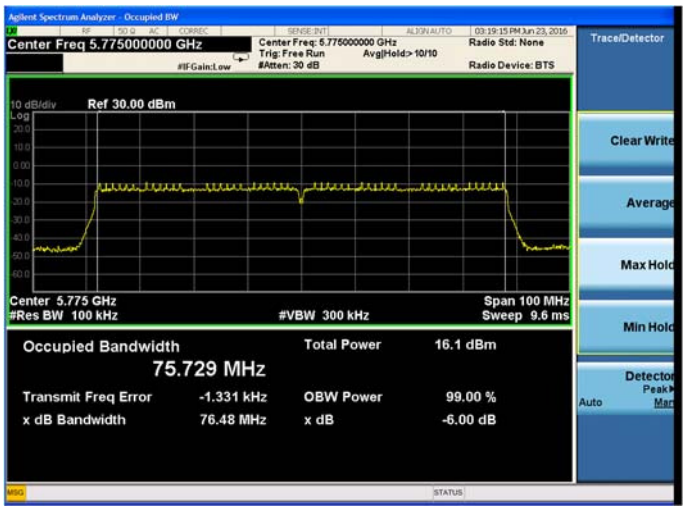
Chain B 802.11n HT40 6-dB Bandwidth		
Channel No.	**Frequency (MHz)**	**6-dB Bandwidth (MHz)**
151	5755	35.51
159	5795	35.53

Plot 9-91. 6-dB Bandwidth Chain B 802.11n HT40 (Ch. 151)

Plot 9-92. 6-dB Bandwidth Chain B 802.11n HT40 (Ch. 159)

9.3.5.7 Chain A 802.11ac VHT80 6-dB Bandwidth

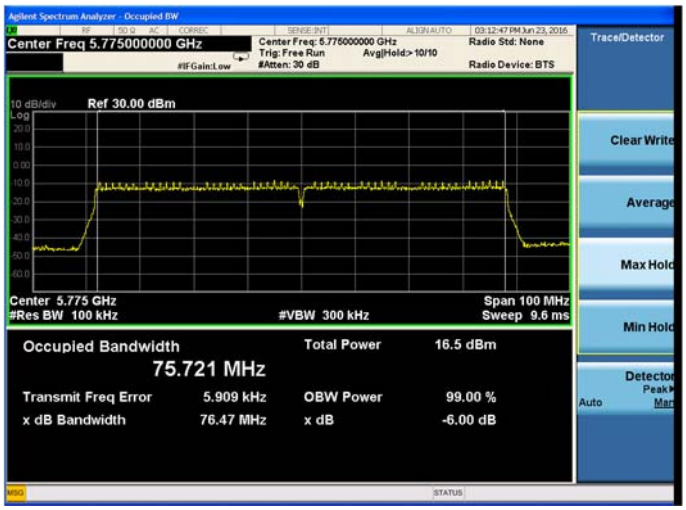
Chain A 802.11ac VHT80 6-dB Bandwidth		
Channel No.	Frequency (MHz)	6-dB Bandwidth (MHz)
155	5775	76.48



Plot 9-93. 6-dB Bandwidth Chain A 802.11ac VHT80 (Ch. 155)

9.3.5.8 Chain B 802.11ac VHT80 6-dB Bandwidth

Chain B 802.11ac VHT80 6-dB Bandwidth		
Channel No.	Frequency (MHz)	6-dB Bandwidth (MHz)
155	5775	76.47



Plot 9-94. 6-dB Bandwidth Chain B 802.11ac VHT80 (Ch. 155)