

Prüfbericht-Nr.: Test report no.:	ULR-TC568821300000075F	Auftrags-Nr.: Order no.:	166145926 0010	Seite 1 von 144 Page 1 of 144
Kunden-Referenz-Nr.: Client reference no.:	NA	Auftragsdatum: Order date:	2019-06-13	
Auftraggeber: Client:	1. HONEYWELL INTERNATIONAL INC, Honeywell Safety and Productivity Solutions 9680 OLD BAILES RD, FORT MILL, SC 29707, USA 2. Metro (Suzhou) Technologies Co., Ltd No: 221, Xinghai street china-Singapore Suzhou Industrial Park.			
Prüfgegenstand: Test item:	LUZON - WIFI & BT Module	Product Type	Wi-Fi BT Module	
Bezeichnung.: Identification .:	SOMAT39			
Auftrags-Inhalt: Order content:	Testing and issue of Test Report and Grant Certificate			
Prüfgrundlage: Test specification:	FCC Part 15 Subpart E 15.407,15.207 RSS 247 Issue 2 and RSS GEN Issue 5			
Wareneingangsdatum: Date of sample receipt:	2021-05-20			
Prüfmuster-Nr & Serien-Nr.: Test sample no & serial no.:	A000939665-002 A000939665-001 Engineering Sample			
Prüfzeitraum: Testing period:	2021-05-21 - 2021-06-08			
Ort der Prüfung: Place of testing:	Wireless laboratory, Bangalore			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (India) Pvt.Ltd., 27/B, 2nd Cross, Electronic City Phase1 Bangalore -560 100, India FCC Test site registration number: 496599 ISED Test site registration number: 3466E-1			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	genehmigt von: authorized by:			
Datum: Date: 2021-05-21	Likhithesh MD		Ausstellatum: Issue date: 2021-12-07	
Stellung / Position:	Engineer		Mahammadgouse Kaladagi Assistant Manager	
Sonstiges / Other:	FCC ID: HD5-HWUSIA IC: 1693B-HWUSIA			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				



TEST SUMMARY

Test Item	Applicable Standard		Result
	FCC	ISED	
Emission Bandwidth	15.407 (a) & (e)	RSS Gen Issue 5 Section 6.7 RSS 247 Issue 2 Section 6.2.4.1	Pass
Frequency Stability	15.407 (g)	RSS Gen Issue 5 Section 8.11	Pass
Maximum conducted output power	15.407 (a)	RSS 247 Issue 2 Section 6.2.1; 6.2.2; 6.2.3; & Section 6.2.4	Pass
Maximum Power spectral density	15.407 (a)	RSS 247 Issue 2 Section 6.2.1; 6.2.2; 6.2.3; & Section 6.2.4	Pass
Dynamic Frequency Selection	15.407 (h) FCC KDB Publication 905462 D02 & 905462 D03	RSS 247 Issue 2 Section 6.3	Pass
Spurious Radiated Emissions & Restricted Bands of Operation	15.407 (b) / (15.205 & 15.209)	RSS 247 Issue 2 Section 6.2.1; 6.2.2; 6.2.3; & Section 6.2.4 RSS Gen Issue 5 Section 8.9 & 8.10	Pass
Conducted AC Power Lines	15.207	RSS Gen Issue 5 Section 8.8	Pass

Product Category: Electronics Testing
Test Discipline : EMC Test Facility

Compliance statement for Part 15.203:

“THE ANTENNA TYPE IS PIFA ANTENNA & IS INTERNAL TO THE MODULE, WITH NO POSSIBILITY OF REPLACEMENT WITH A NON-APPROVED ANTENNA BY THE END-USER. THEREFORE, THE EUT IS CONSIDERED TO COMPLY WITH THIS PROVISION.”

REVISION HISTORY OF THIS REPORT

Report Number	Version	Description	Issue date
ULR-TC568821300000075F	01	Initial issue of report	2021-11-30
ULR-TC568821300000075F	01	Reviewer comments updated	2021-12-07

Table of Contents

1	GENERAL REMARKS	5
1.1	Attachments	5
2	TEST SITES	6
2.1	Testing Facilities.....	6
2.2	List of Test and Measurement Instruments.....	6
3	GENERAL PRODUCT INFORMATION.....	7
3.1	Product Function and Intended Use.....	7
3.2	Ratings and System Details of Equipment under Test	7
3.3	Measurement Uncertainty:	8
4	TEST SET-UP AND OPERATION MODE.....	9
4.1	Principle of Configuration Selection	9
4.2	UUT Operation and Software.....	9
4.3	Special Accessories and Auxiliary Equipment	9
4.4	Simultaneous Transmission	9
4.5	Countermeasures to achieve EMC Compliance	9
4.6	List of frequencies	10
4.7	Report Reference	11
5	Operational Description	12
6	TEST METHODOLOGY	12
6.1	Conducted Spurious Emission AC Power line Test.....	12
6.1.1	Test Setup Configuration	13
6.2	Radiated Emission Test	13
6.2.1	Test Setup Configuration	14
7	TEST RESULTS	18
7.1	Emission Bandwidth.....	18
7.2	Maximum Conducted Output Power	57
7.3	Maximum Power Spectral Density	77
7.4	Dynamic Frequency Selection (DFS).....	97
7.5	Spurious Radiated Emissions & Restricted Bands of Operation	107
8	Frequency Stability	138
9	Conducted Spurious Emission test on AC Power Line.....	140
10	LIST OF TABLES.....	144
11	Power level used for testing	144

1 GENERAL REMARKS

1.1 Attachments

All attachments are part of this test report and are issued in separate document

- 1: TEST SETUP PHOTOS
- 2: EUT EXTERNAL PHOTOS
- 3: EUT INTERNAL PHOTOS
- 4: FCC LABEL AND LABEL LOCATION
- 5: BLOCK DIAGRAM
- 6: SPECIFICATION OF EUT
- 7: SCHEMATIC DIAGRAM
- 8: BILL OF MATERIAL
- 9: USER MANUAL
- 10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

- | | |
|--|---|
| <p>1. TÜV Rheinland (India) Pvt.Ltd.,
27/B, 2nd Cross,
ElectronicCityPhase1
Bangalore – 560 100,
India</p> | <p>2. TUV Rheinland (India) Pvt.Ltd.,
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.
India</p> |
|--|---|

Radiated Measurement site type :
Fully anechoic chamber (used for above 1 GHz
measurements)

Radiated Measurement site type :
Semi anechoic chamber (used for below 1 GHz
measurements)

2.2 List of Test and Measurement Instruments

Table 1: List of test and measurement instruments

Equipment	Manufacturer	Model Name	Serial Number	Firmware Versions	Calibration Due Date	Periodicity	Test Facility
EMI Receiver	Rohde & Schwarz	ESW 44	101732	4.73 SP5	27.01.2022	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	FMZB 1519 B	1519B-00111	-	28.02.2022	Yearly	
Balloon and Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	01028	-	02.09.2021	Yearly	
Log - Periodical Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	-	31.08.2021	Yearly	
Horn Antenna	Frankonia	HAX-18	802	-	01.03.2022	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	-	
Fully Anechoic Chamber	Albatross	-	-	-	-	-	
Spectrum Analyser	Agilent Technologies	E4407B	US41192 772	A.14.06	10.08.2021	Yearly	Antenna-Port Conducted test
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100811	-	04.08.2021	Yearly	Conducted AC Power line Test
LISN	Rohde & Schwarz	ENV216	100022	-	04.09.2021	Yearly	

Table 2: Instrument application Software versions

SL. No.	Test Type	Application software	Version
1	Radiated spurious emission measurement in SAC	EMC 32	10.60.00
2	Radiated spurious emission measurement in FAC	EMC 32	10.60.00

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

LUZON - WIFI & BT Module is a single Modular. The module to be used inside the Honeywell Products. The Module has Dual Band WIFI (2.4GHz & 5GHz) and BLUETOOTH radio interface. This module communicates with external host using SDIO interface for WIFI and UART for BLUETOOTH.

This Module supports 802.11a/b/g/n/ac for WIFI and Supports BT (Basic , EDR & BLE) The module will act as Access Point / Master only in NON - DFS bands. In the DFS band, the Module acts as Slave /Station device which do not have Radar detection functionality.

Powered with QCA6174A, **LUZON - WIFI & BT Module** achieve the best possible connectivity and performance in RF Environment.

This Module will be used to provide the WIFI & BLUETOOTH wireless connectivity for Honeywell Products

3.2 Ratings and System Details of Equipment under Test

Table 3: Ratings and System Details as declared by the Client*

Radio Protocol	WI-FI 5GHz	
Operating Frequency Range	UNII-1 _ 5150MHz to 5250MHz UNII-2a _ 5250MHz to 5350MHz UNII-2c _ 5470MHz to 5725MHz* UNII-3 _ 5725MHz to 5825MHz	
No. of Channels	(Refer Table 5)	
Channel Spacing	5 MHz	
Modulation	802.11b: DSSS ; 802.11g: OFDM; 802.11n: OFDM 802.11b: 1, 2, 5.5 , 11Mbps; 802.11g: 6 to 54Mbps 802.11n: MCS0 to MCS7; 802.11a: 6Mbps & 54Mbps 802.11ac : MCS0 to MCS9	
Power level setting used	Refer Clause 11	
Maximum Measured Power (e.i.r.p)	18.92 dBm (5310MHz n_VHT40)	
Number of antennas	Supports 1 streaming with ANT0 (ANT1 is disabled)	
Frequency range of Antenna Gain	3.10 dBi	
Antenna Type	PIFA Antenna	
Supply Voltage to Product	3.3VDC ±0.1V	
Environmental Conditions	Storage	-40degC to +125degC Relative Humidity <85%
	Operating	-20degC to +65degC Relative Humidity <85% (Non-condensing, relative humidity)
EUT Dimension	15mm x 15 mm x 2.05mm (L x W X H)	

*Band 5600 MHz to 5650 MHz is not supported for Canada

***Disclaimer:** The information/data is supplied by the client and the same is considered to arrive at the final value. Any changes made apart from the specified specification, can directly impact on the tests results. Refer the products user manual for more details.

Note: Product LUZON - WIFI & BT Module has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, refer clause 4.7 Report references

3.3 Measurement Uncertainty:

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

Table 4: Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
SAC, radiated measurement	±6 dB
FAC, radiated measurement	±6 dB
Temperature	±3 °C
Supply Voltages	±3 %
Time	±5 %

Note: The listed uncertainties are the worst case uncertainty for the entire range of measurements and are for the reporting purpose only and are not used in determining the PASS/FAIL of the results.

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle on low, mid and high channels.

4.2 UUT Operation and Software

Hardware Version Identification number (HVIN) : SOMAT39
Software version : Version A.0 (QCMBR)

4.3 Special Accessories and Auxiliary Equipment

Test laptop (QRCT tool with Software Version : 3.0.296.0),
LAN cable &
Master device (Router) : FCC ID : LDK102087

4.4 Simultaneous Transmission

This product does not supports Simultaneous transmission

4.5 Countermeasures to achieve EMC Compliance

None

4.6 List of frequencies

Frequency Band	Channel No.	Frequency (MHz)
5150–5250 MHz	36	5180
	38	5190
	46	5230
	48	5240
UNII 2A (5250-5350)	52	5260
	54	5270
	56	5280
	58	5290
	60	5300
	62	5310
	64	5320
	UNII 2C (5470-5725)	100
102		5510
106		5530
108		5540
112		5560
116		5580
120		5600
124		5620
128		5640
132		5660
134		5670
136		5680
138		5690
140		5700
142		5710
144		5720
5725-5825 MHz	149	5745
	151	5755
	159	5795
	165	5825

Table 5: List of Wi-Fi center Frequencies

Channel used for Wi-Fi Testing

Channel Bandwidth (20MHz)	Channel Bandwidth (40MHz)	Channel Bandwidth (80MHz)
5180	5190	5210
5240	5230	5290
5260	5270	5530
5320	5310	5690
5500	5510	5755
5700	5590	-
5720	5670	-
5745	5710	-
5825	5755	-
-	5795	-

Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882130000075F

Seite 11 von 144
Page 11 of 144

Note:

TUV Sample Identification number : A000939665-002 – Radiated test Sample
A000939665-001 – Conducted test Sample

4.7 Report Reference

Note: Product LUZON - WIFI & BT Module has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, following table lists the report numbers.

Radio Protocol	Report Number
RF test report for Wi-Fi (2.4GHz) & BLE (2.4GHz)	ULR-TC56882130000073F
RF test report for Bluetooth (2.4GHz)	ULR-TC56882130000074F
RF test report for Wi-Fi (5GHz) – (This report)	ULR-TC56882130000075F

5 Operational Description

This LUZON - WIFI & BT Module is a WiFi/BT single modular which will be placed inside the Honeywell products like printers, barcode scanners, RFID readers etc. to enable wireless connectivity. This module includes MAC & physical layer of 802.11a/b/g/n/ac and the Bluetooth modem.

This module operates on 3.6V DC Power supply with internal on board regulation to generate 3.3v for powering ON all the circuits. The entire RF circuits is enclosed in RF shield of dimension 25mm X 25mm.

The module uses internal power amplifier and LNA for 2.4GHz frequency band and an external front end chip for 5GHz frequency band. All filters and diplexers are included in the module to ensure maximum power flatness and optimum VSWR. The module has one antenna chain for 1X1 output.

The module supports range of data rates from 1Mbps in 802.11b mode to MCS9 in 802.11ac mode. This chipset also supports concurrent operation of Bluetooth (Version 5.0) for wireless connectivity during browsing or other device applications. Along with both standard and high speed (HS) Bluetooth data rates, Bluetooth low energy modes are also supported. Hardware WAPI acceleration engine, AES, TKIP, WPA and WPA2 are supported to provide the latest security requirement on your network.

The Device communicates with HOST using SDIO interface for WIFI and UART interface for BLUETOOTH.

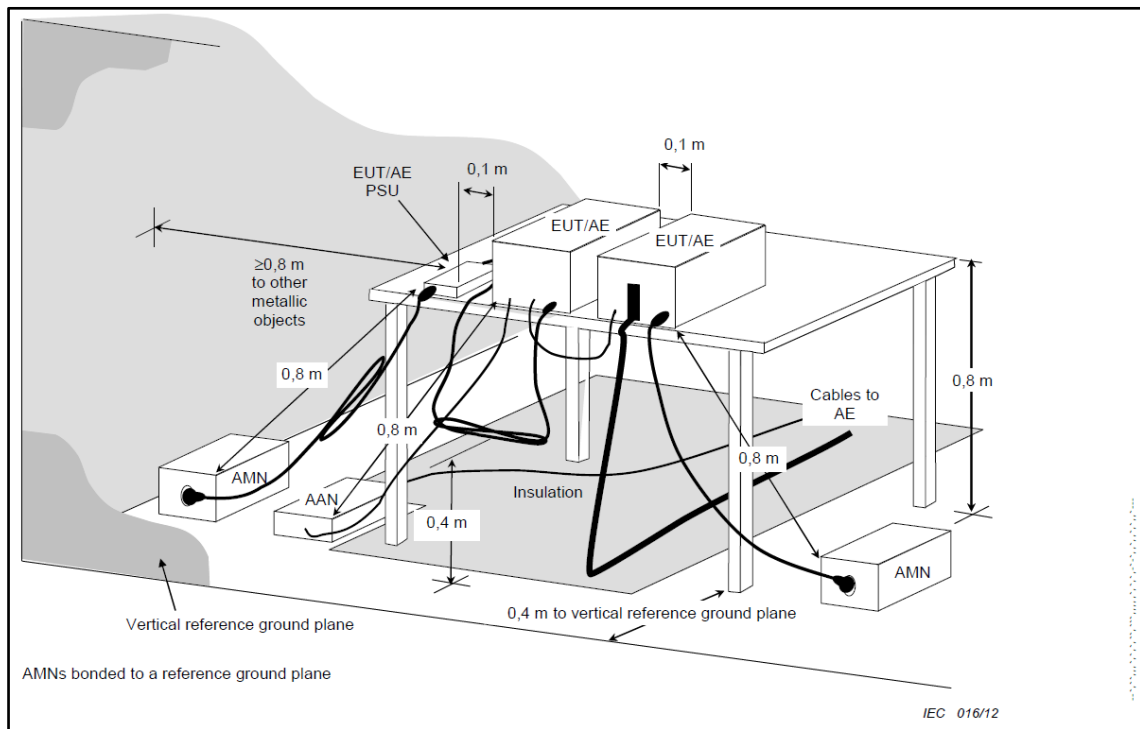
6 TEST METHODOLOGY

6.1 Conducted Spurious Emission AC Power line Test

Measured levels of ac power-line conducted emission across the 50Ω LISN port (to which the EUT is connected). All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer.

The device is placed on the test table, raised 80cm above the reference ground plane. The vertical conducting plane is located 40cm to the rear of the device. AC Conducted emission measurement is made over frequency range from 150kHz to 30MHz, this measurement was performed with EUT powered by 2 methods and both method are tested individually, one with an AC adaptor with 110V AC 60Hz supply and second with Wireless charger with supply 110V AC 60Hz.

6.1.1 Test Setup Configuration



6.2 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and mesurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded

6.2.1 Test Setup Configuration

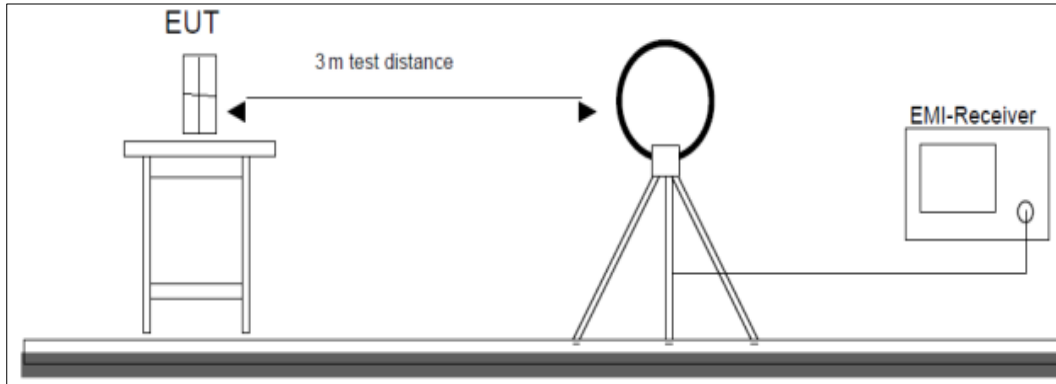


Figure 1: Frequency Range 9 kHz- 30 MHz

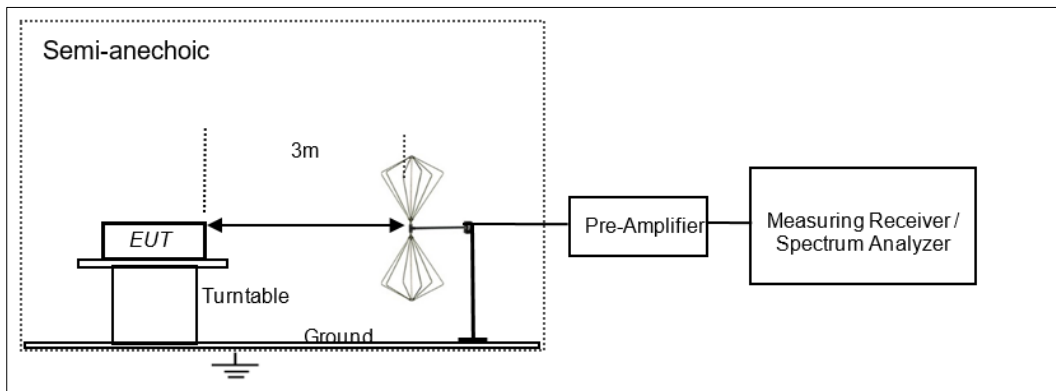


Figure 2: Frequency Range 30 MHz – 200 MHz

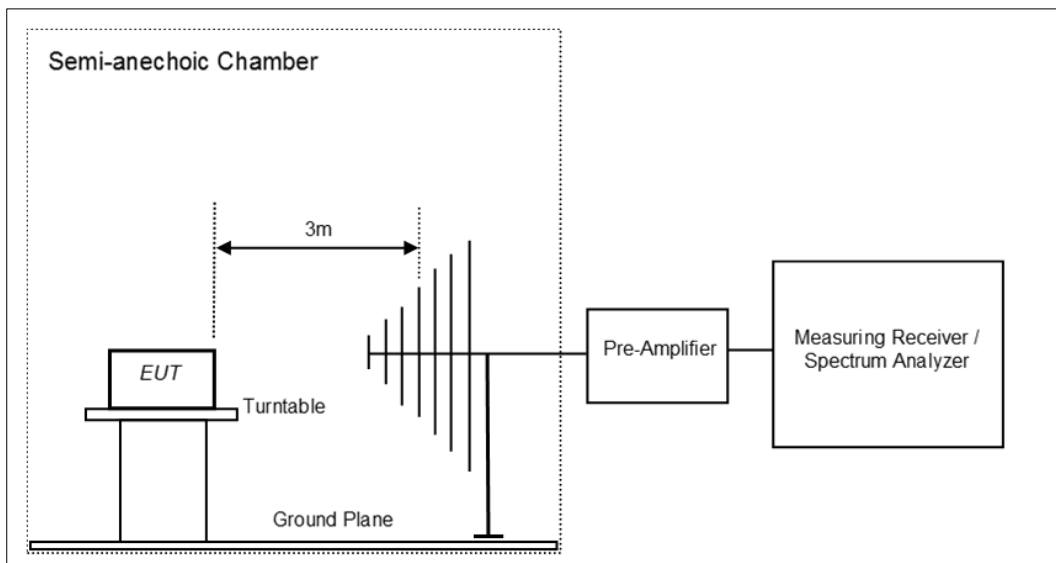


Figure 3: Frequency Range 200 MHz - 1GHz

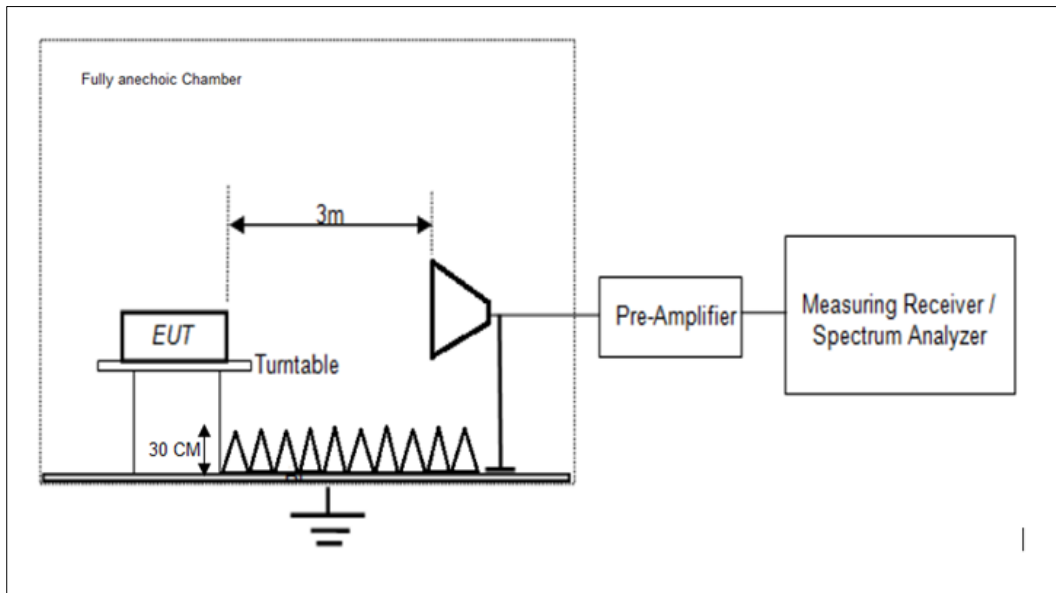


Figure 4: Frequency Range above 1 GHz

Frequency Range 30MHz to 10th harmonics of the highest fundamental frequency

Test performed as per ANSI C63.10-2013

Radiated spurious emission test are performed as below.

All the radiated emission measurements are performed in accordance with common requirement specified in 5.2 followed by substitution measurement as listed below

The equipment under test is placed on non-conductive table at 3m away from the receive antenna in accordance with above mentioned standard. Turn table is rotated through 360 degree, and receiver antenna height is varied in order to determine the level of maximum emission. The maximum emission level and position of the maximized emission is recorded with use of spectrum analyzer.

EUT power measured in a radiated test configuration using the signal (antenna) substitution techniques as per ANSI C63.10-2013 clause G.5.3

The ERP/EIRP may be determined from the power setting of a signal generator used in the signal (antenna) substitution test configuration as follows in Equation

$$\text{ERP EIRP} = \text{PT} + \text{GT} - \text{LC}$$

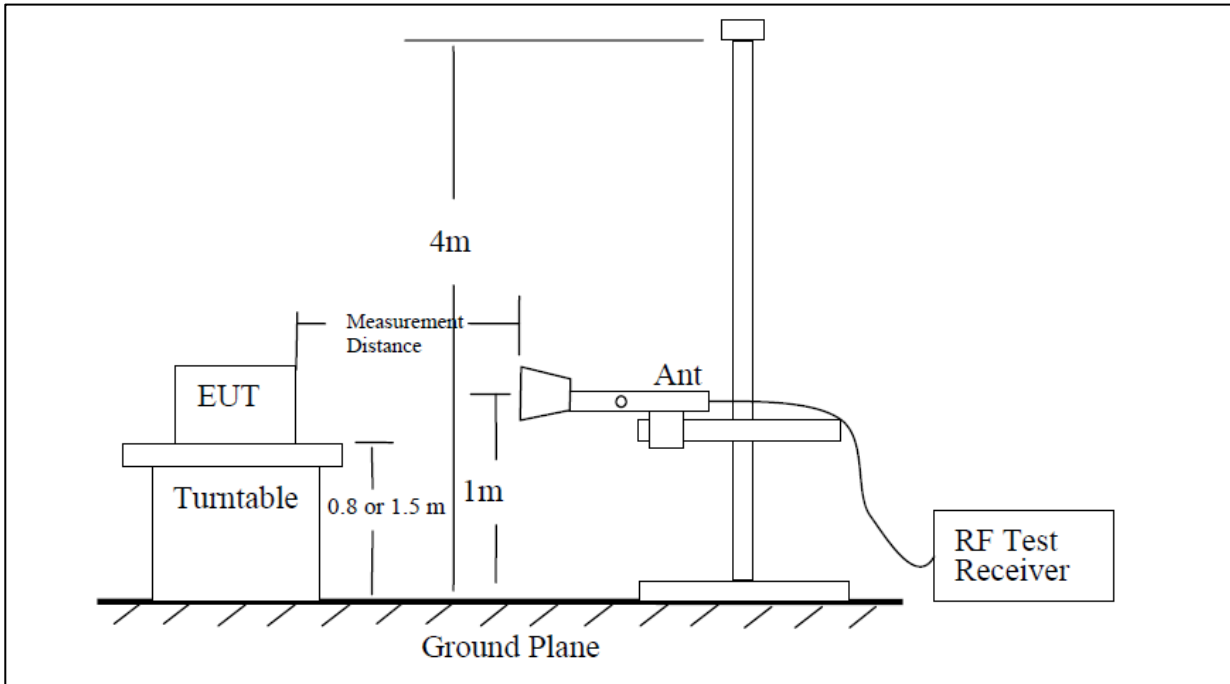
where

PSG is the power setting of the signal generator that produces the same received power reading as the DUT, in dBm, dBW, or psd

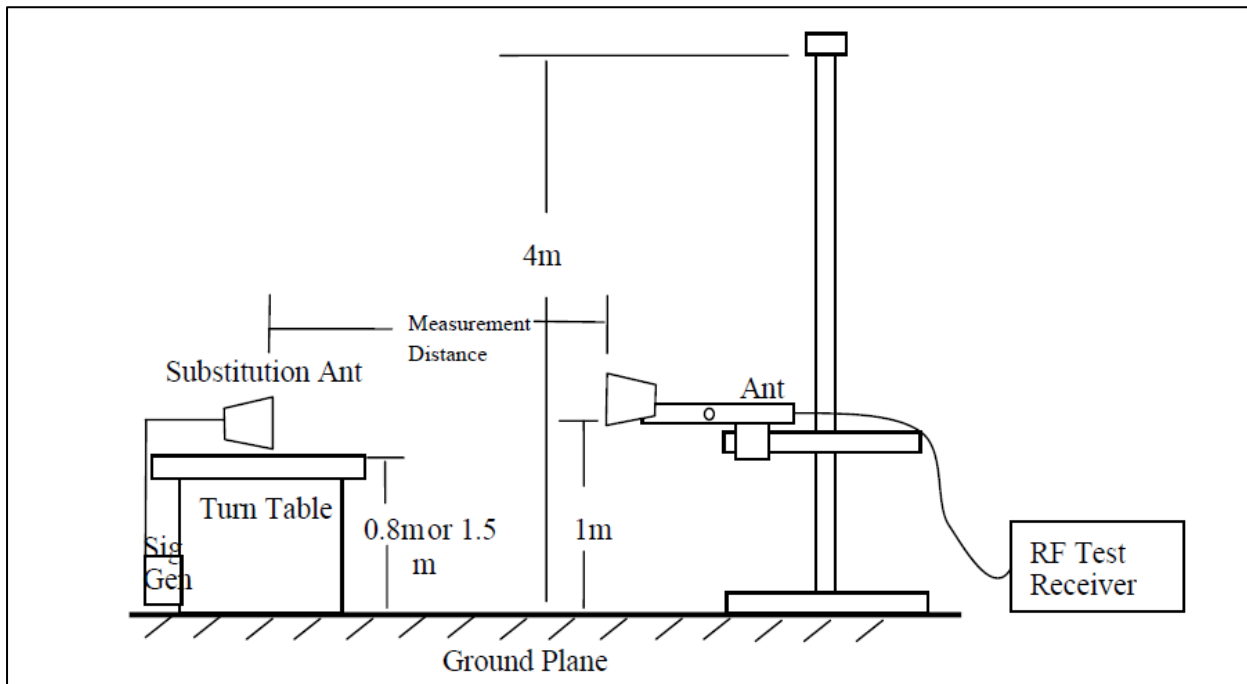
GT is the gain of the substitute antenna, in dBd (i.e., ERP) or dBi (i.e., EIRP)

LC is the signal loss in the cable connecting the signal generator to the substitute antenna, in dB

Test site-up for radiated measurements



Substitution method set-up for radiated emission



7 TEST RESULTS

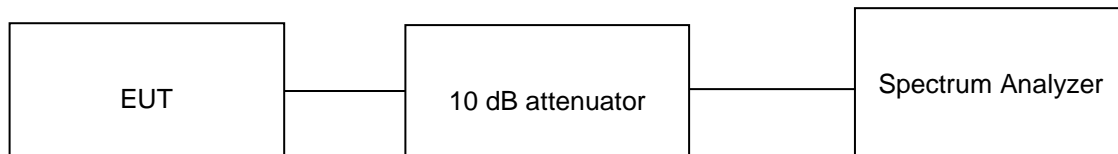
7.1 Emission Bandwidth

Result

Pass

Test Specification	FCC part 15 Subpart C 15.407 (a) & (e) / RSS 247 Issue 2, Section 6.2.4.1 & RSS Gen Issue 5, Section 6.7
Test Method	Subclause 6.9.2 of ANSI C63.10
Measurement Bandwidth	Refer Test Method below
Detector	Refer Test Method below
Port of testing	Antenna port
Requirement	<ol style="list-style-type: none"> 1. 99% emission band width measurement for reporting purpose only in the band 5150-5250 MHz 2. 99% emission band width measurement for reporting purpose only in the band 5250-5350 MHz 3. 99% emission band width measurement for reporting purpose only in the band 5470-5725 MHz 2. For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Method:



The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times the OBW
3. Set RBW = 1% to 5% of the OBW
4. Set VBW $\geq 3 \times$ RBW
5. Use the 99% power bandwidth function of the instrument
6. Use sample detector with single sweep mode, or use Peak detector and Max Hold mode (until the trace is stabilized)

The following procedure shall be used for measuring 6dB or 26dB emission bandwidth:

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times the OBW
3. Set RBW = 1% to 5% of the OBW (for 26 dB BW) & 100 kHz (for 6dB BW)
4. Set VBW $\geq 3 \times$ RBW
5. Determine the “-xx dB down amplitude” using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

Note : All the steps in measurement method of KDB 789033 D02, ANSI C63.10 section 6.9.2 & 6.9.3, RSS GEN section 6.9 are followed

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568821300000075F

Seite 19 von 144
Page 19 of 144

Test Condition:

Normal Test Condition:

Temperature (Norm) = + 25 °C Voltage = 3.3VDC Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section C & D in KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test results:

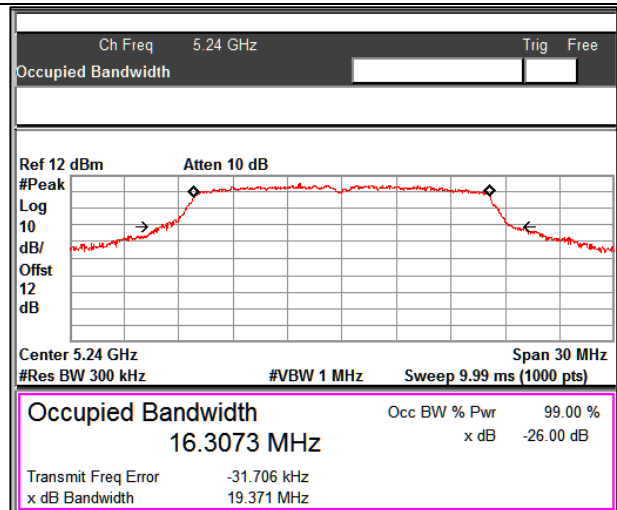
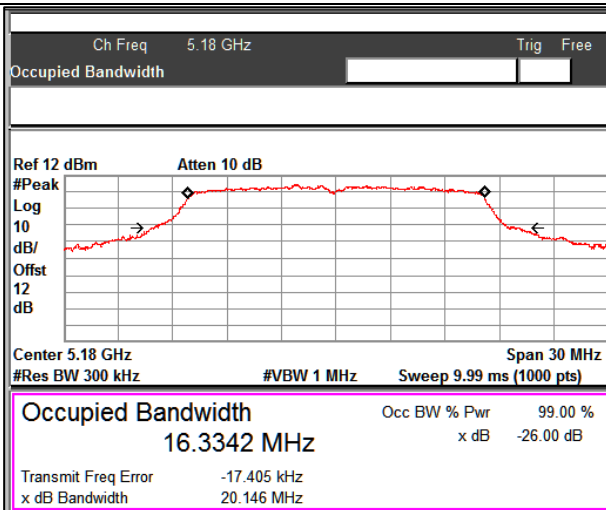
Note:

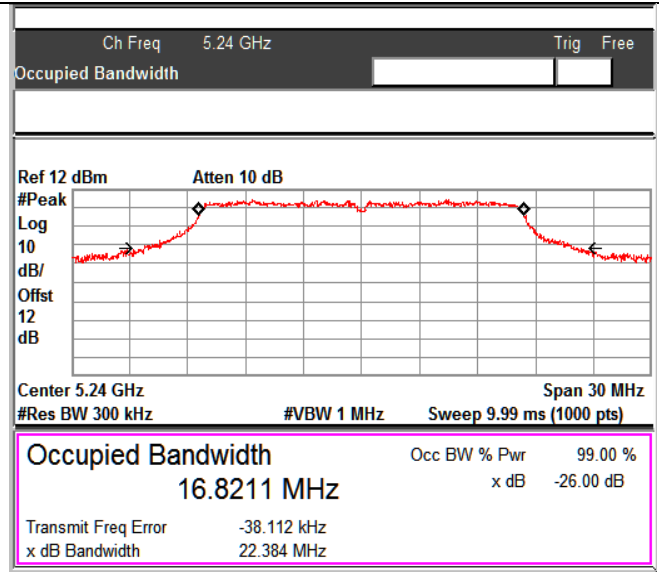
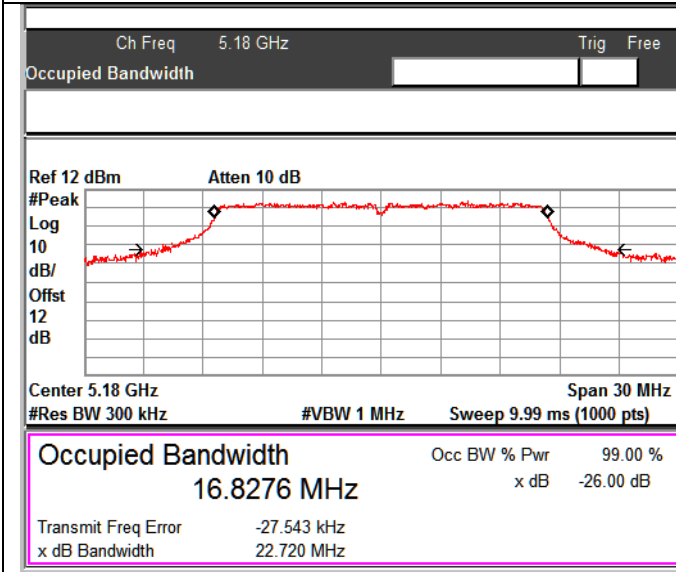
- All the losses are included during measurement and final values are mentioned in the test report.
11 dB attenuator + 1 dB Cable loss = 12 dB total offset

Modulation: 802.11a : UNII 1

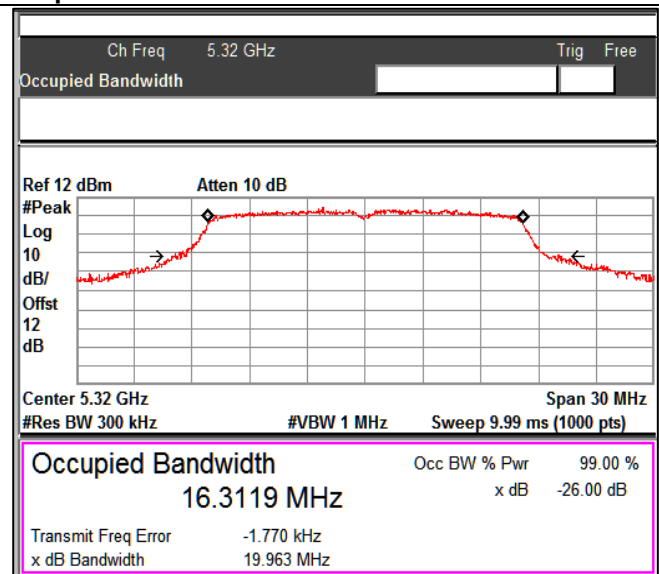
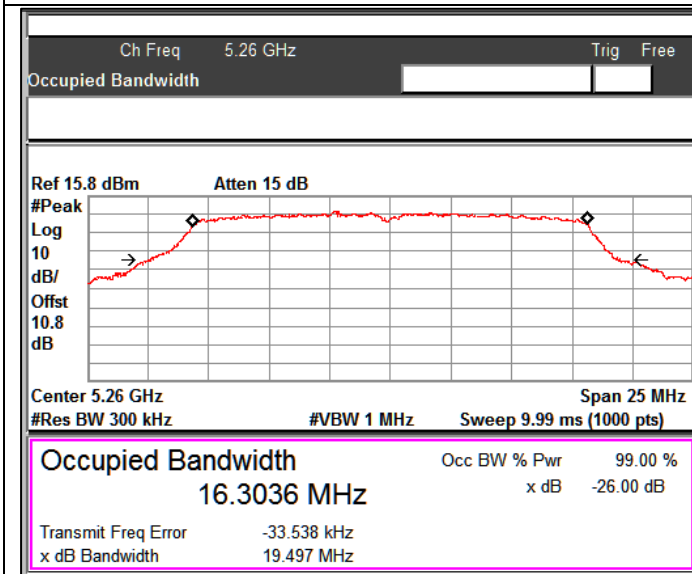
Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
6	5180	20.15	16.33
	5240	19.37	16.31
54	5180	22.72	16.83
	5240	22.38	16.82

Data rate: 6Mbps

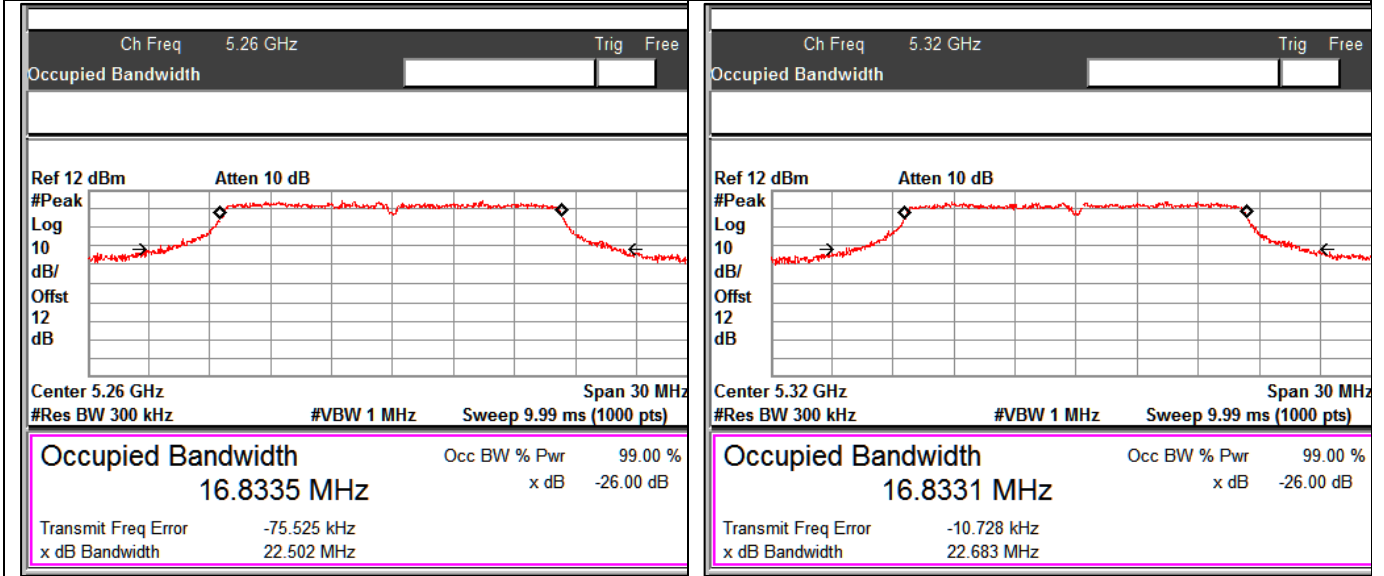


Data rate: 54Mbps

Modulation: 802.11a : UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
6	5260	19.50	16.30
	5320	19.96	16.31
54	5260	22.50	16.83
	5320	22.68	16.83

Data rate: 6Mbps


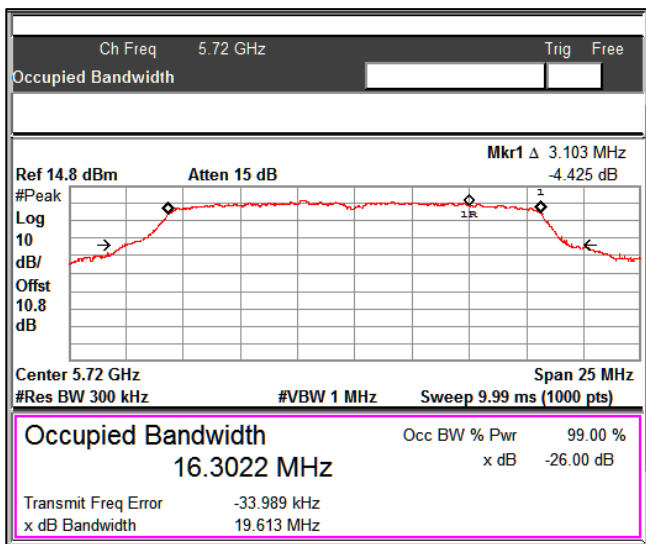
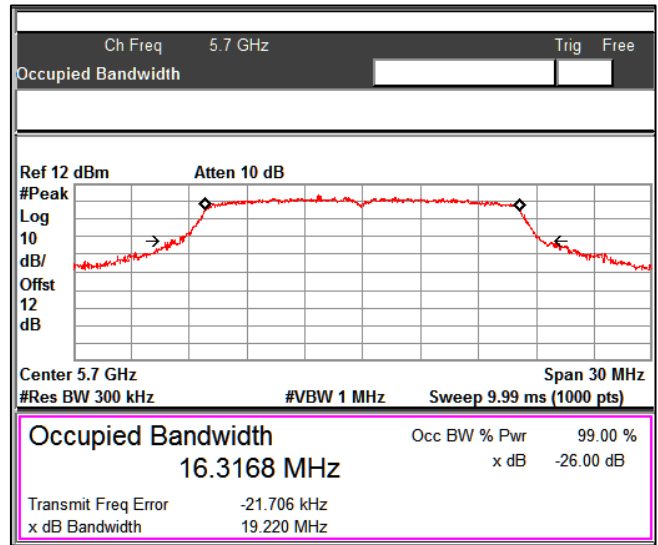
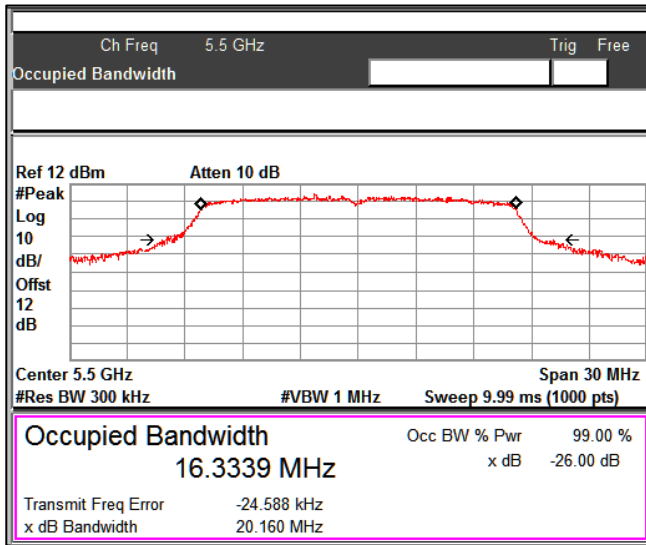
Data rate: 54Mbps



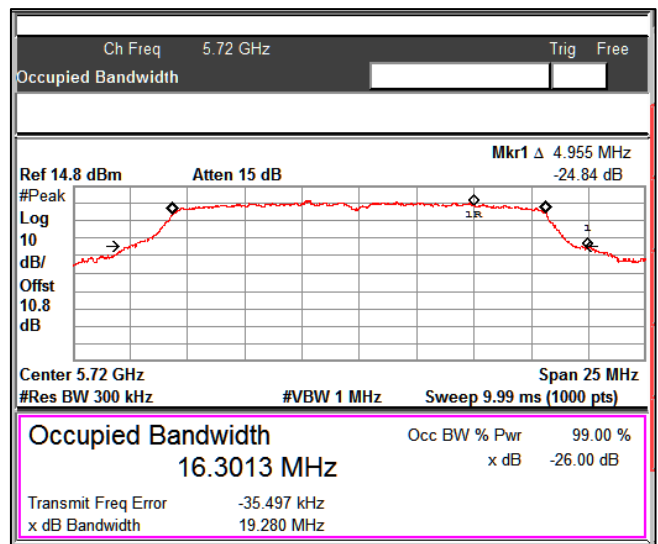
Modulation: 802.11a : UNII 2c

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
6	5500	20.16	16.33
	5700	19.22	16.32
	5720	19.28 14.33 – UNII 2C 4.95- UNII 3	16.30 13.20 – UNII 2C 3.10 – UNII 3
54	5500	22.55	16.86
	5700	22.13	16.82
	5720	22.68 15.95 – UNII 2C 6.73- UNII 3	16.79 13.44 – UNII 2C 3.35 – UNII 3

Data Rate 6Mbps

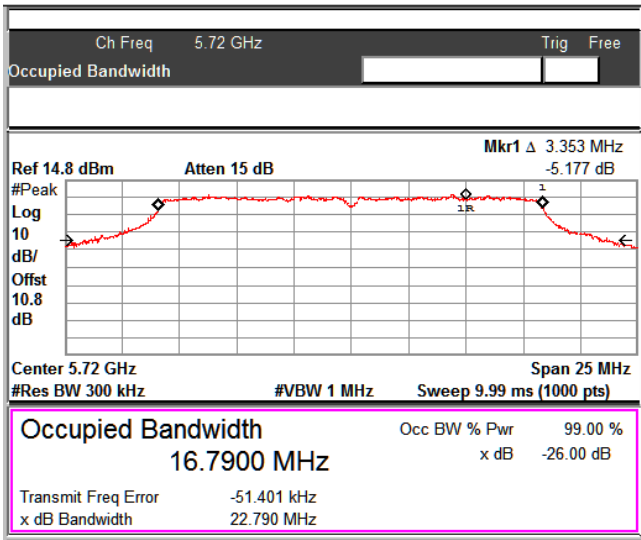
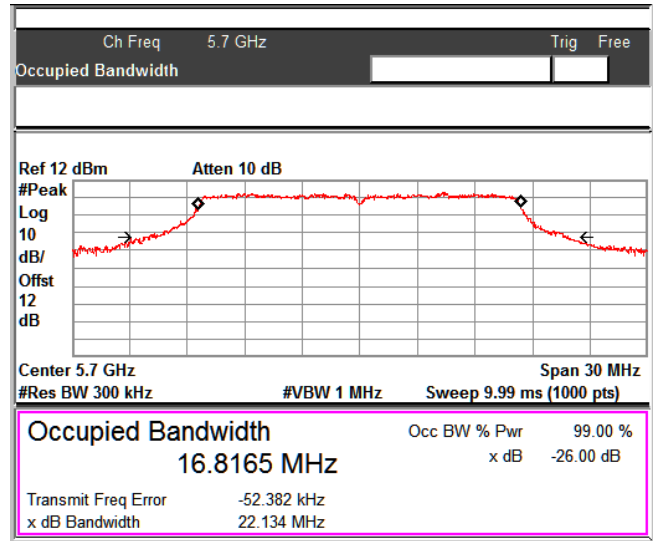
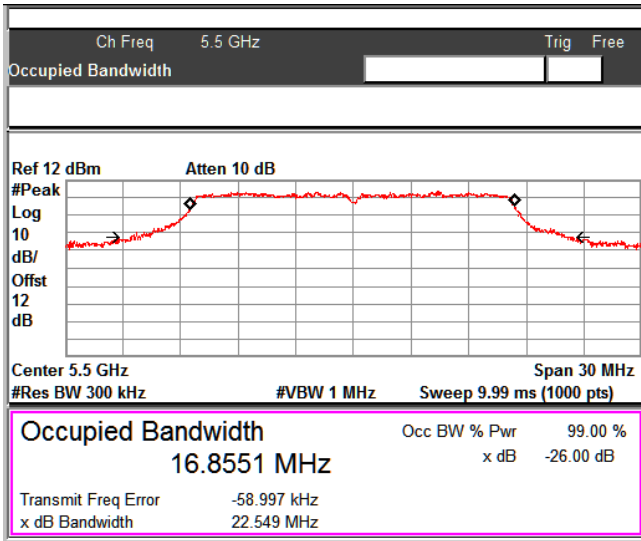


99% Bandwidth

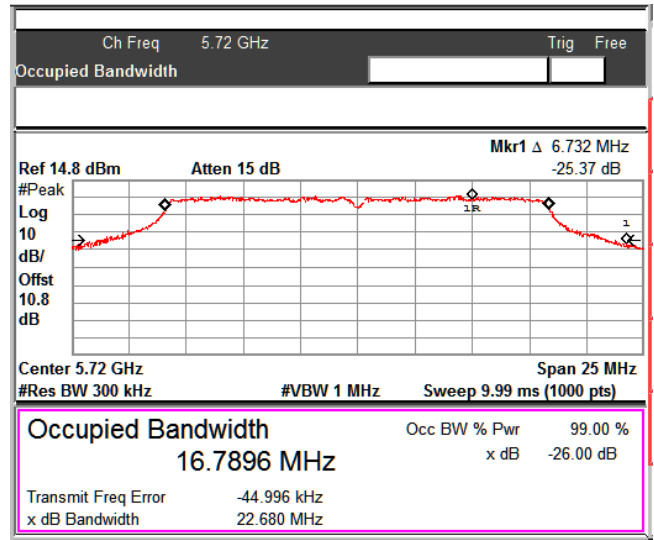


26 Bandwidth

Data Rate 54Mbps



99% Bandwidth

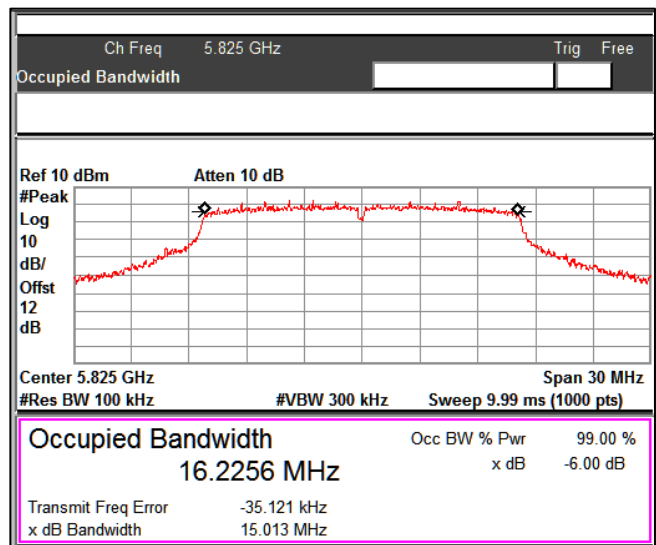
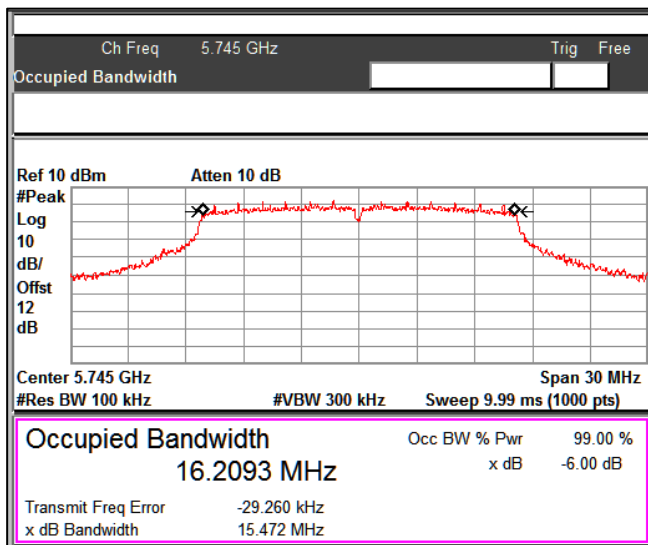


26 Bandwidth

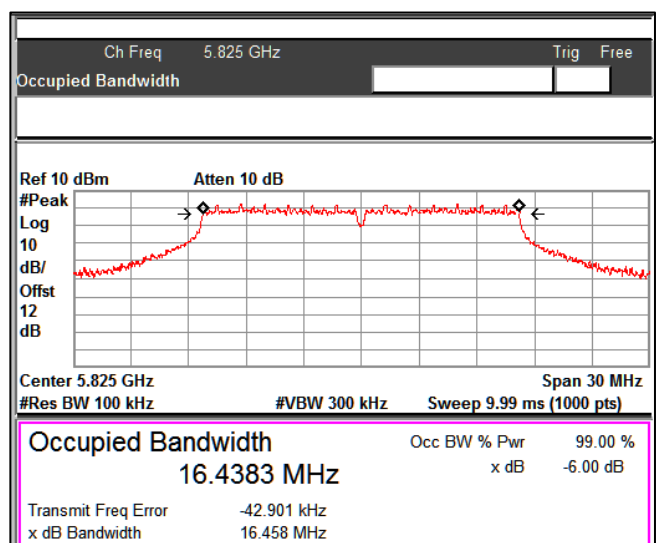
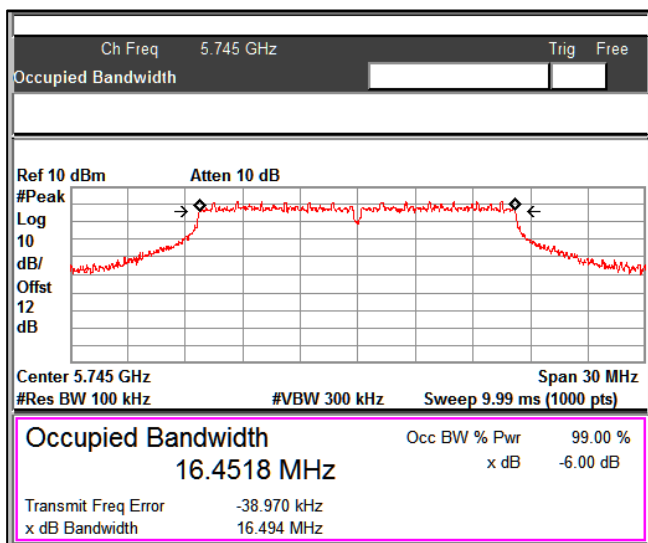
Modulation: 802.11a : UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
6	5745	15.47	0.5
	5825	15.01	0.5
54	5745	16.49	0.5
	5825	16.46	0.5

Data Rate 6Mbps

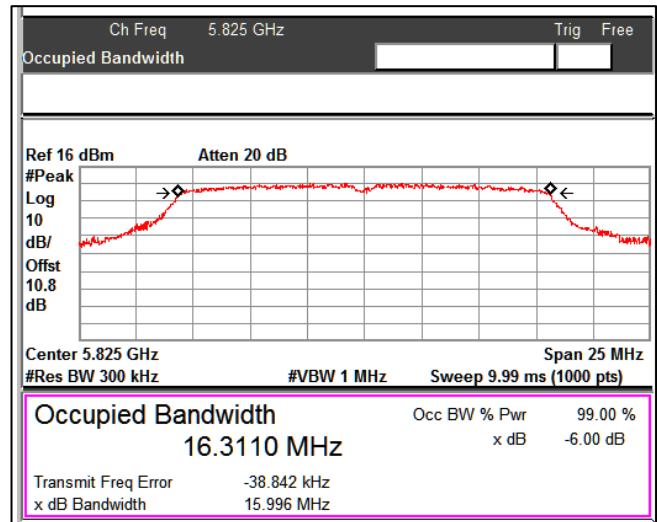
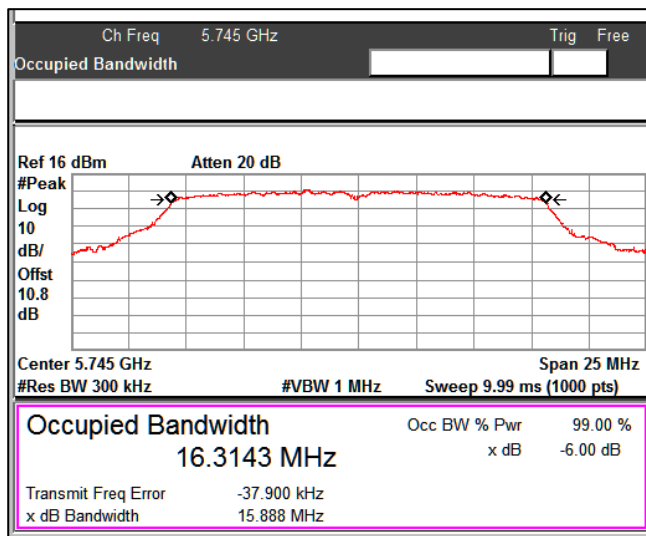


Data Rate 54Mbps

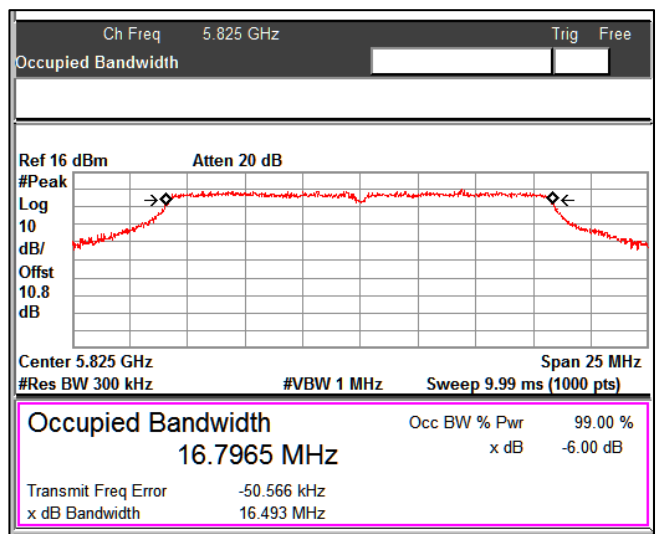
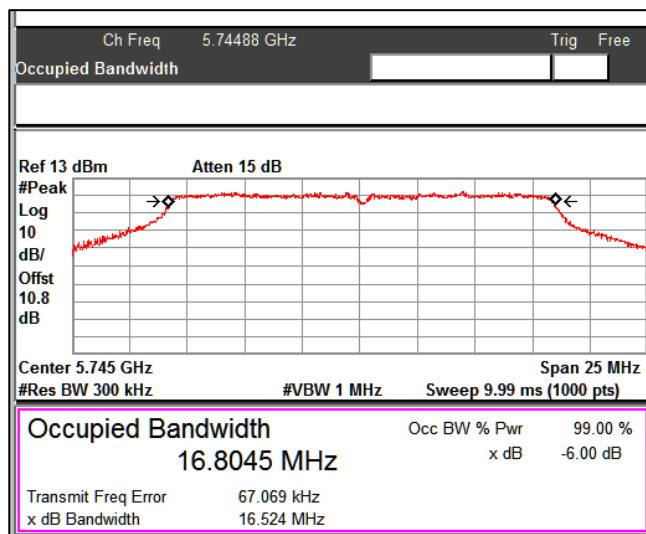


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
6	5745	16.31
	5825	16.31
54	5745	16.80
	5825	16.78

Data Rate 6Mbps



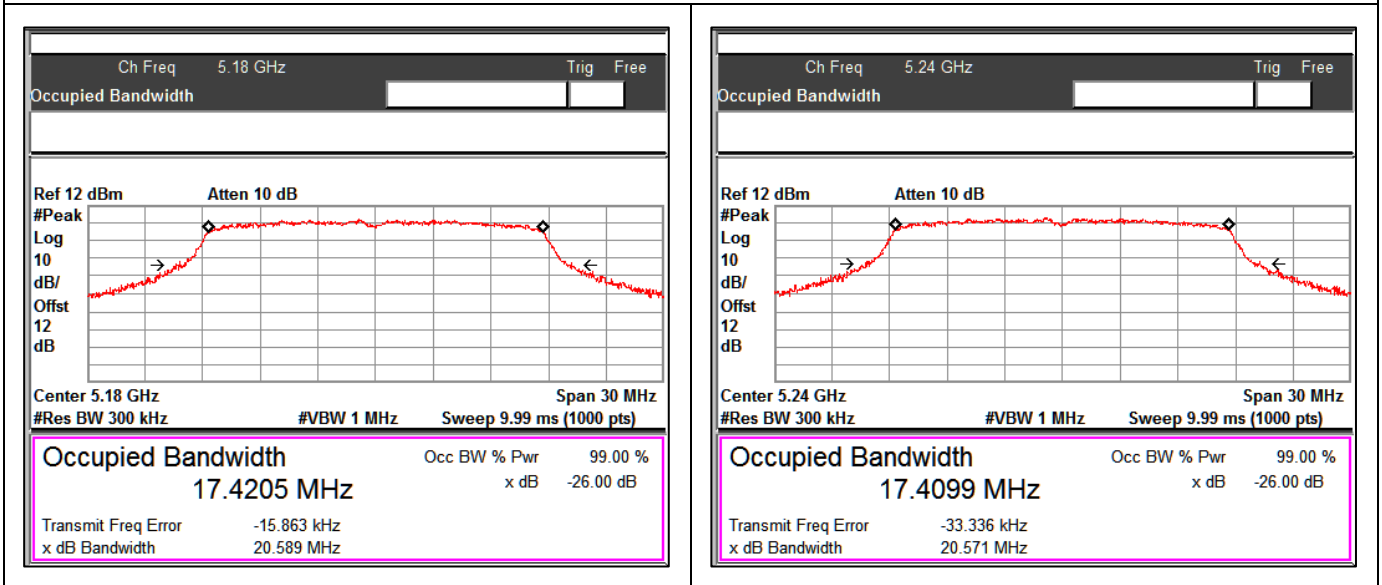
Data Rate 54Mbps



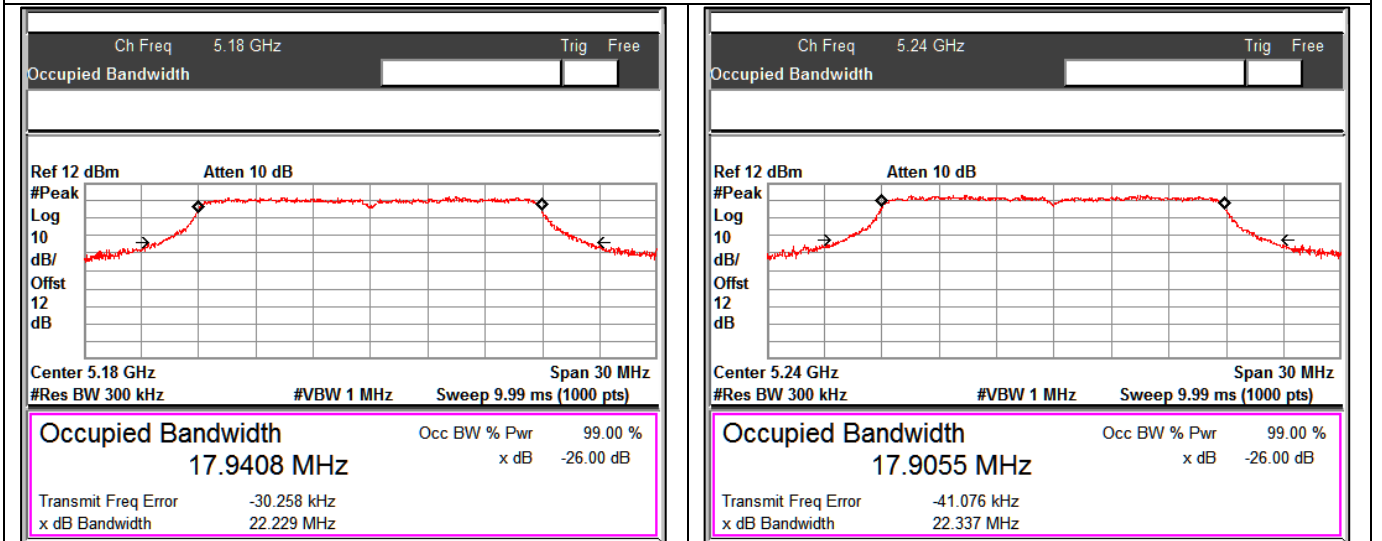
Modulation: 802.11n-20MHz : UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5180	20.59	17.42
	5240	20.57	17.41
MCS7	5180	22.23	17.94
	5240	22.34	17.91

Data Rate MCS0



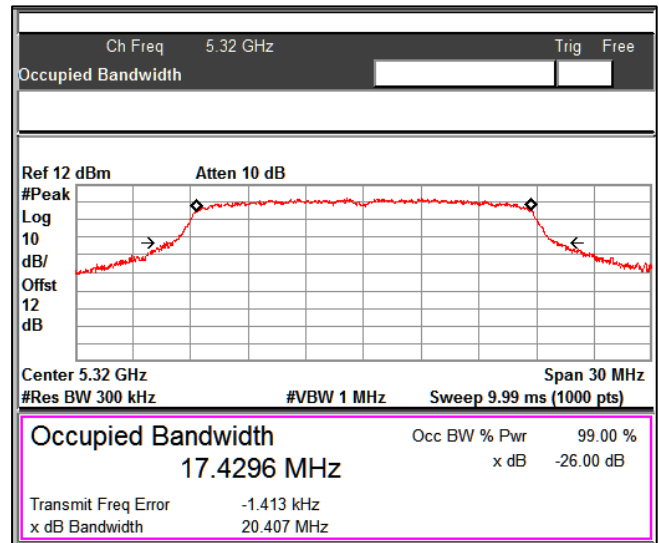
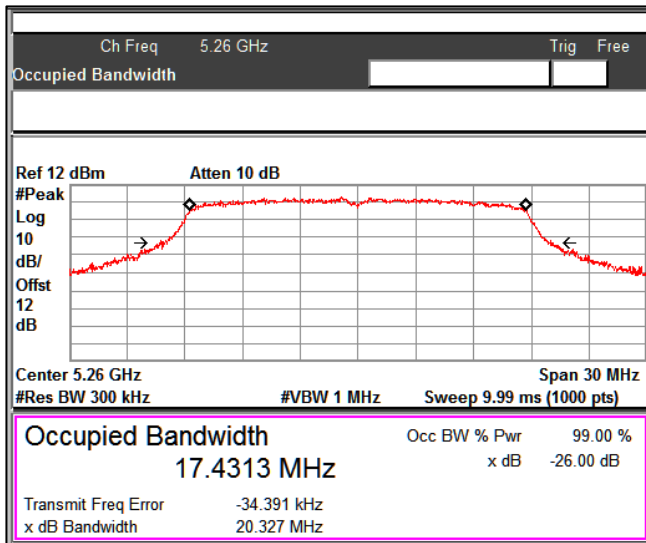
Data Rate MCS7



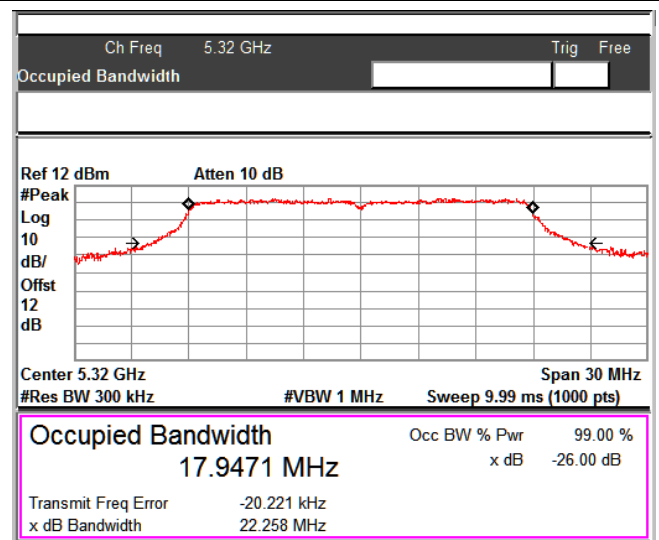
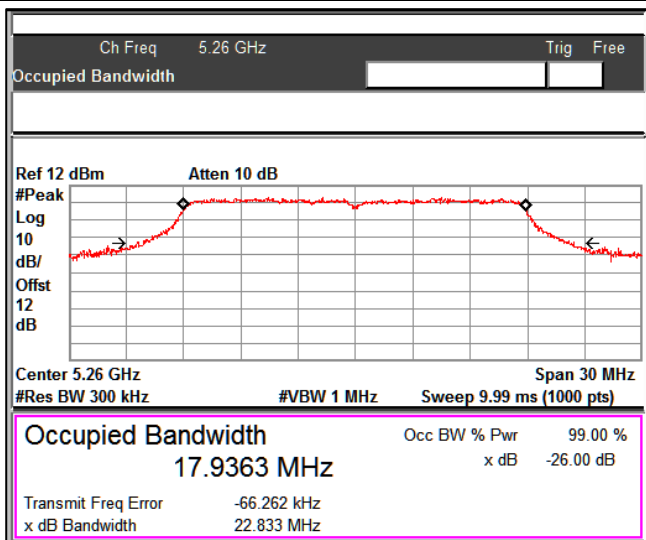
Modulation: 802.11n-20MHz : UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5260	20.33	17.43
	5320	20.41	17.43
MCS7	5260	22.83	17.94
	5320	22.26	17.95

Data Rate MCS0



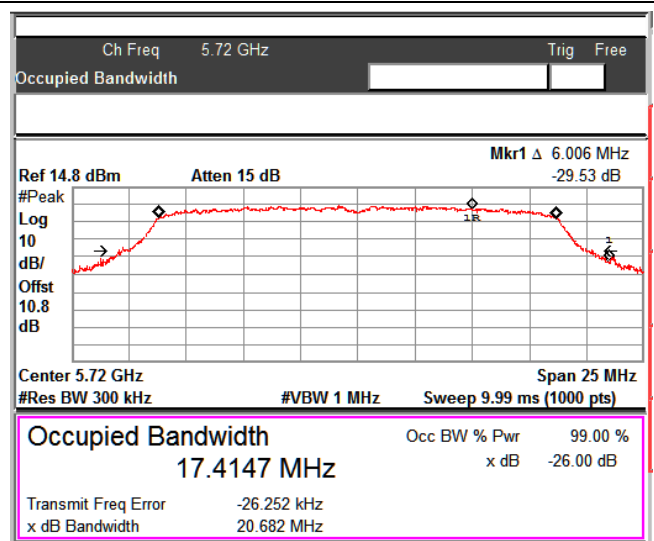
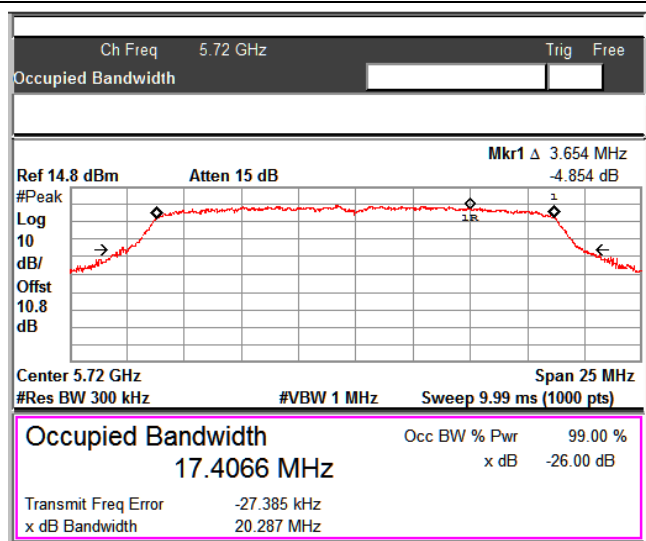
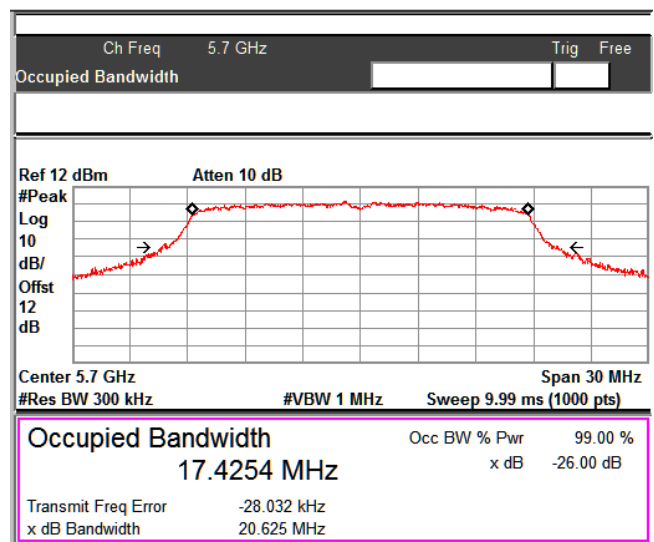
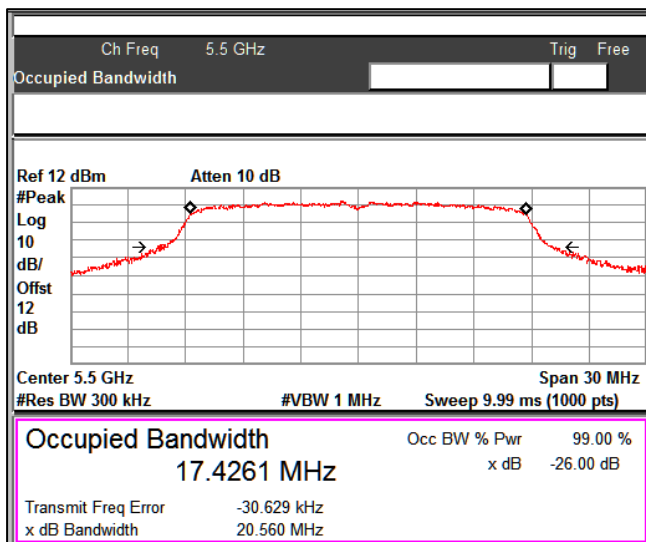
Data Rate MCS7



Modulation: 802.11n-20MHz : UNII 2c

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5500	20.56	17.43
	5700	20.52	17.42
	5720	20.68 14.68 – UNII 2C 6.00- UNII 3	17.40 13.75 – UNII 2C 3.65 – UNII 3
MCS7	5500	22.34	17.94
	5700	22.36	17.92
	5720	22.53 15.63 – UNII 2C 6.90- UNII 3	17.90 13.98 – UNII 2C 3.92 – UNII 3

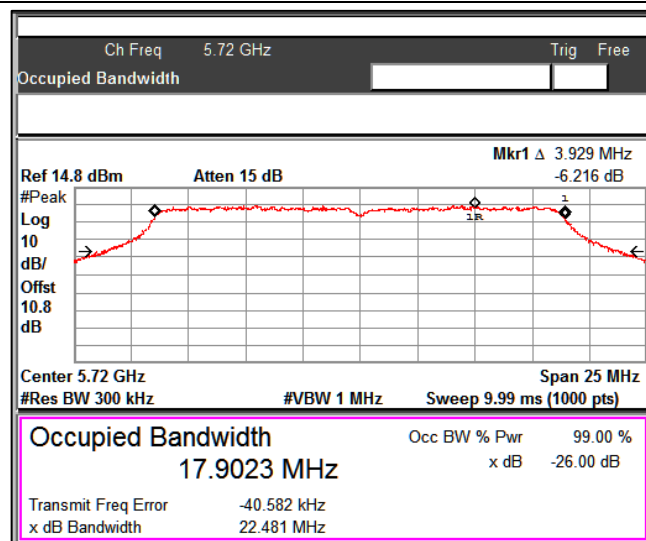
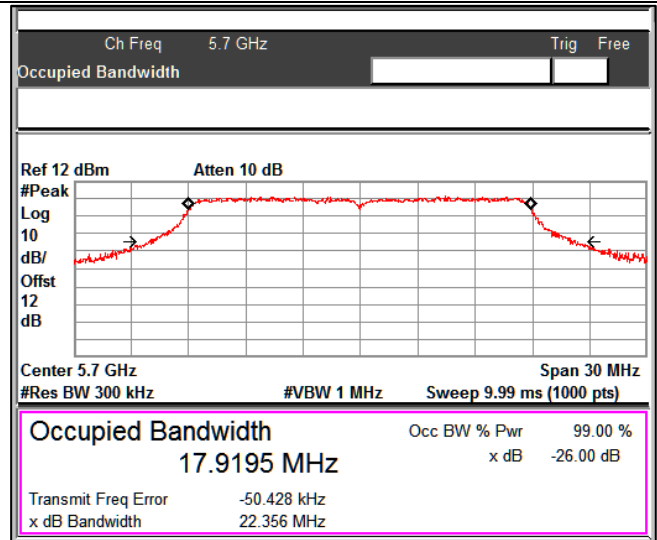
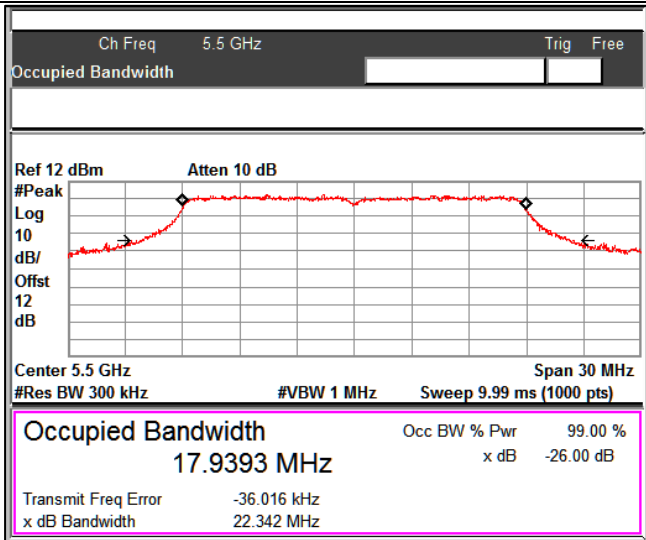
Data Rate MCS0



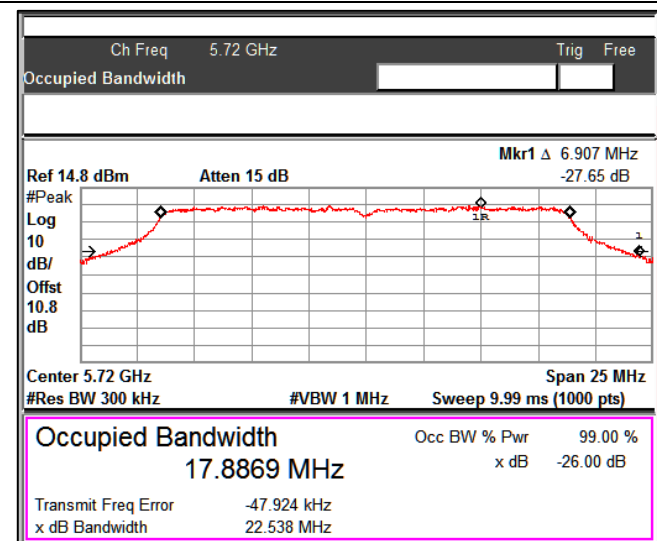
99% Bandwidth

26dB Bandwidth

Data Rate MCS7



99% Bandwidth

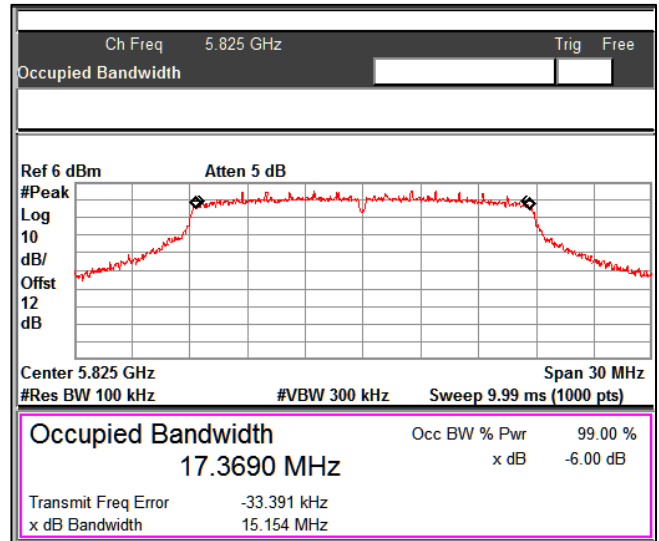
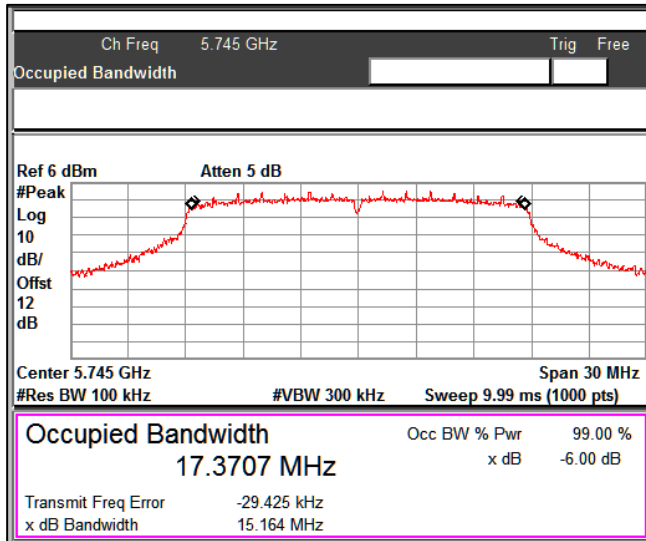


26dB Bandwidth

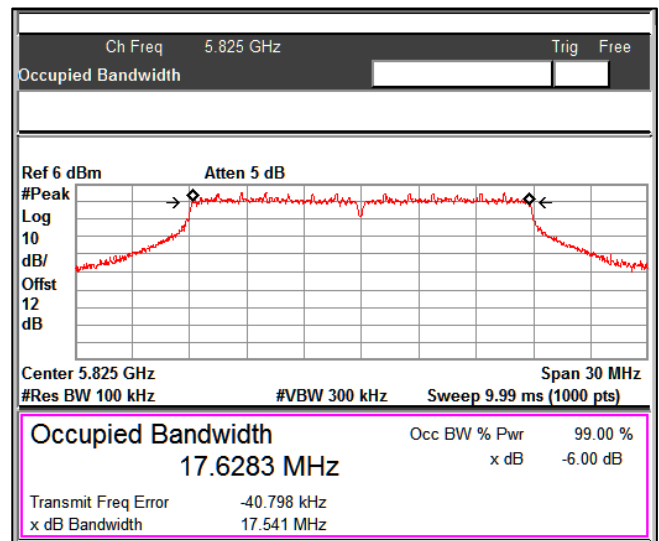
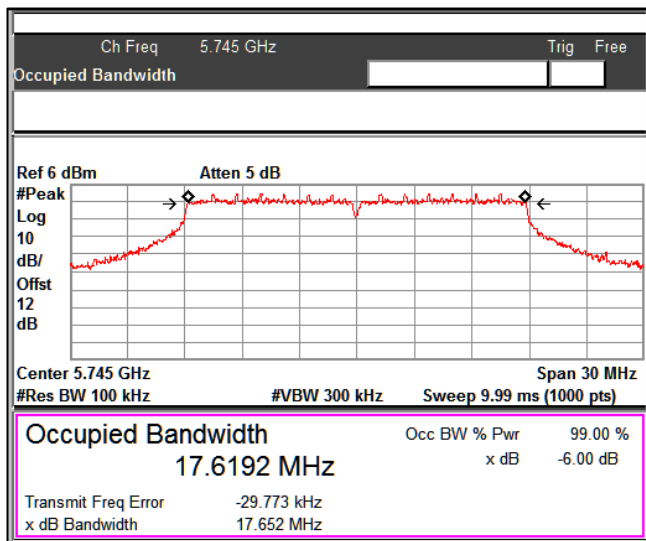
Modulation: 802.11n-20MHz : UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5745	15.16	0.5
	5825	15.15	0.5
MCS7	5745	17.65	0.5
	5825	17.54	0.5

Data Rate MCS0

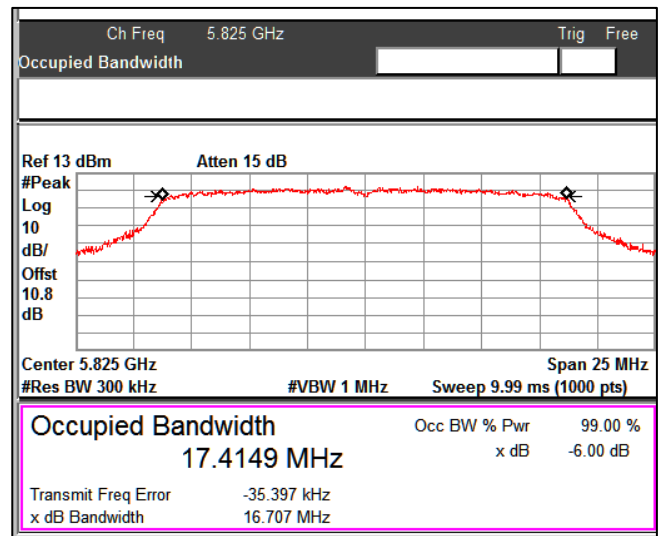
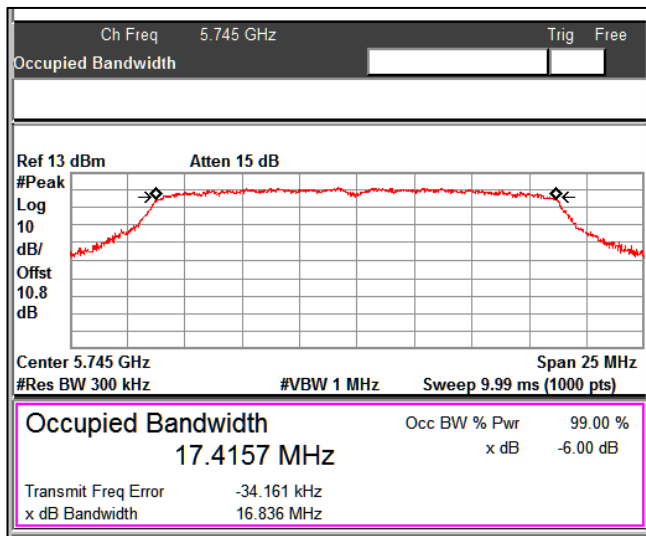


Data Rate MCS7

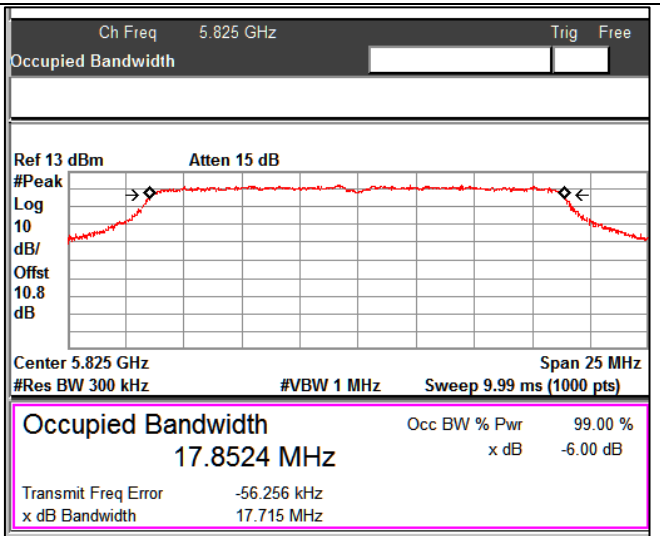
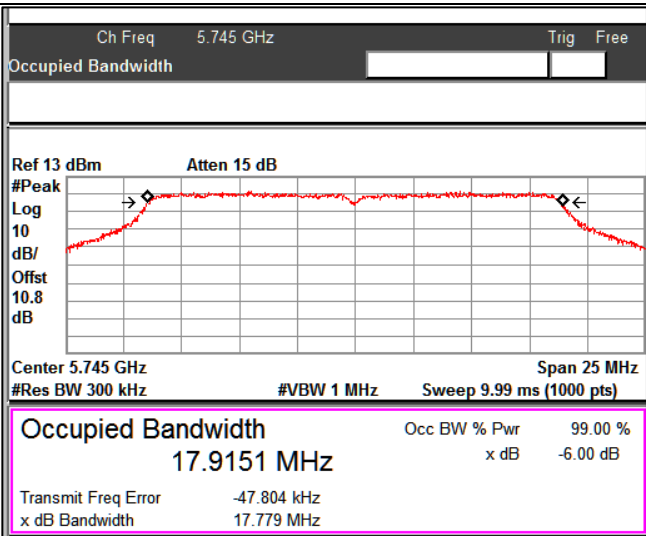


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5745	17.42
	5825	17.41
MCS7	5745	17.92
	5825	17.85

Data Rate MCS0



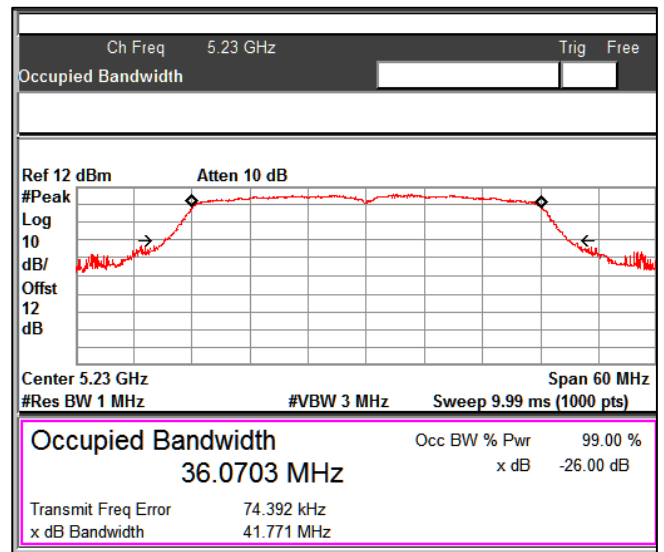
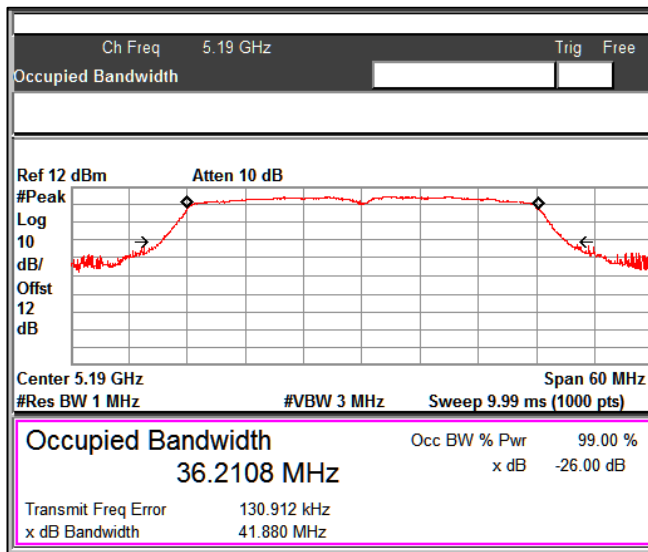
Data Rate MCS7



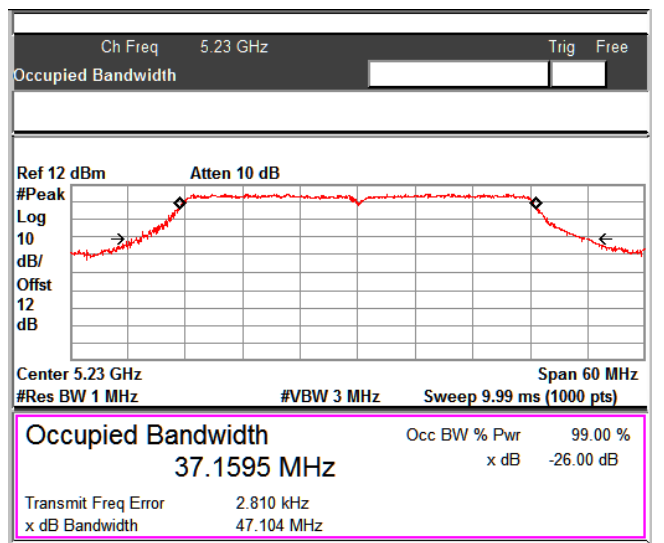
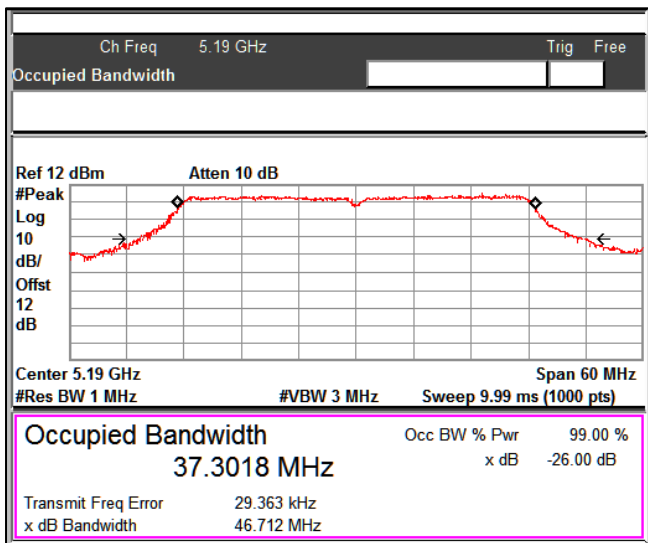
Modulation: 802.11n-HT40MHz: UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5190	41.88	36.21
	5230	41.77	36.07
MCS7	5190	46.71	37.30
	5230	47.10	37.16

Data Rate MCS0



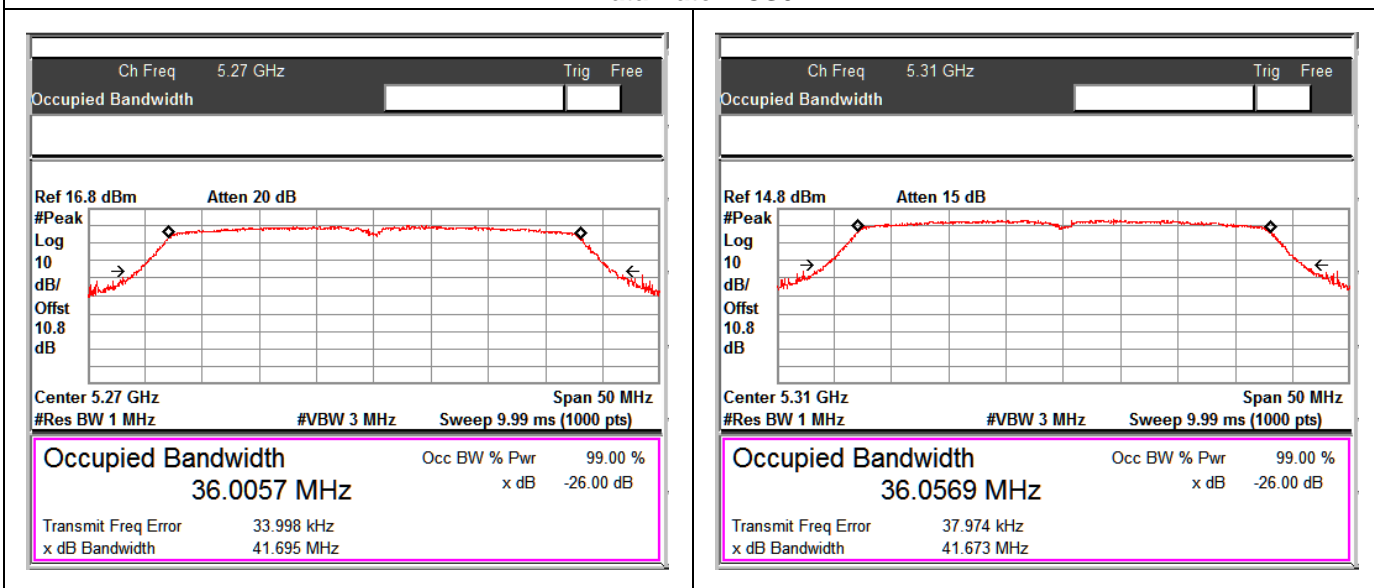
Data Rate MCS7



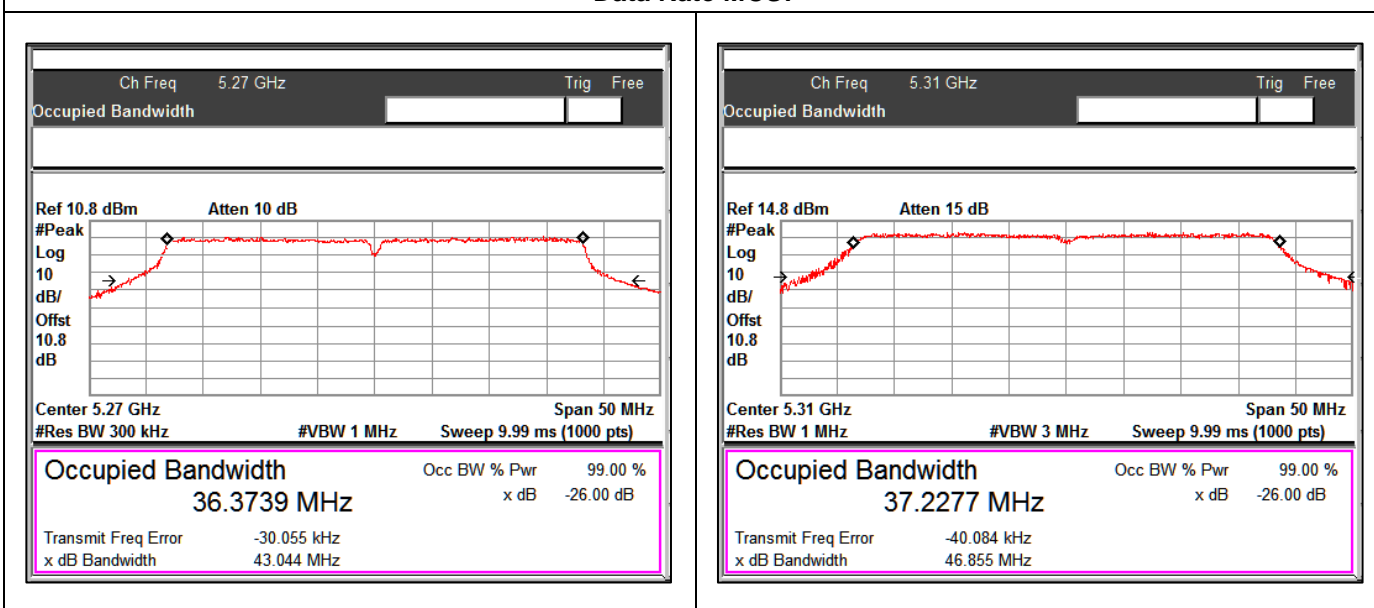
Modulation: 802.11n-HT40MHz: UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5270	41.70	36.00
	5310	41.67	36.06
MCS7	5270	43.04	36.37
	5310	46.86	37.23

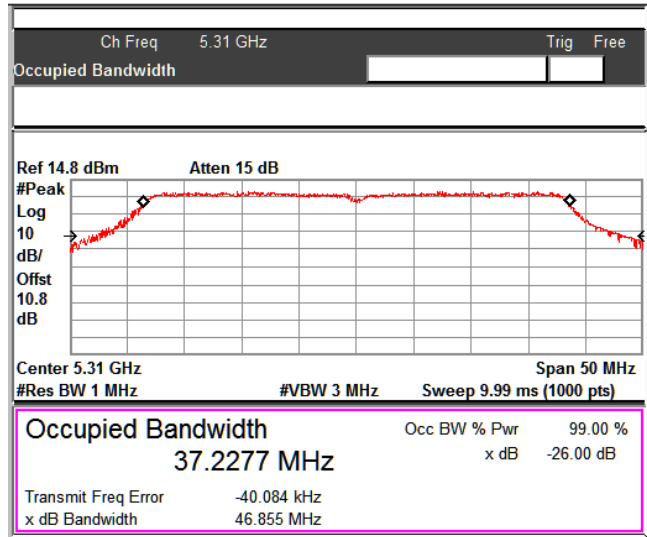
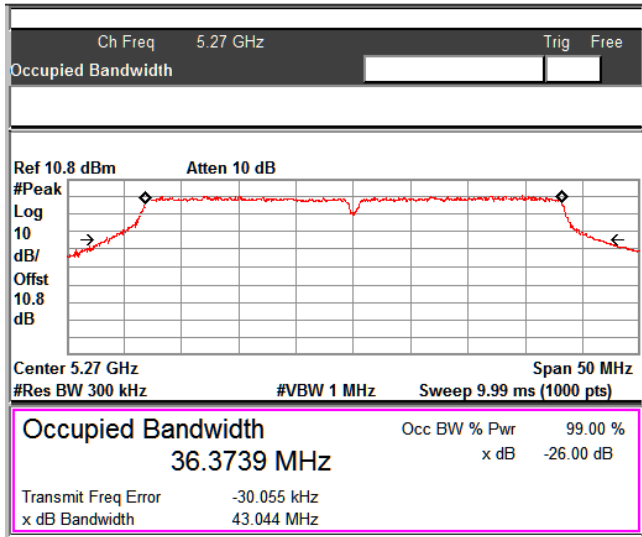
Data Rate MCS0



Data Rate MCS7

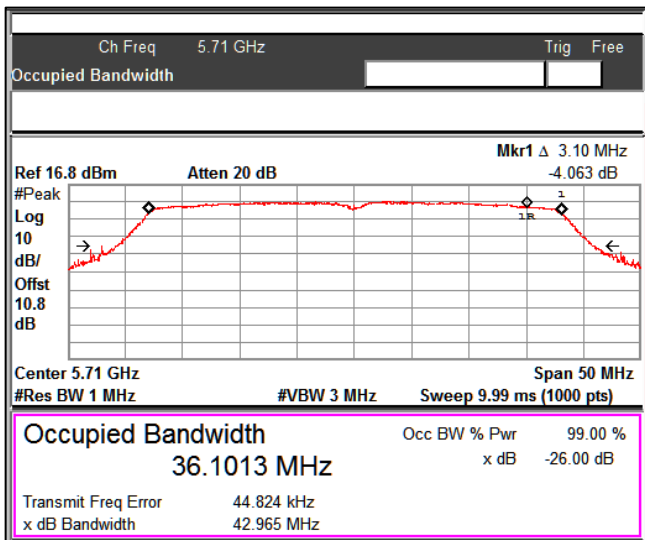
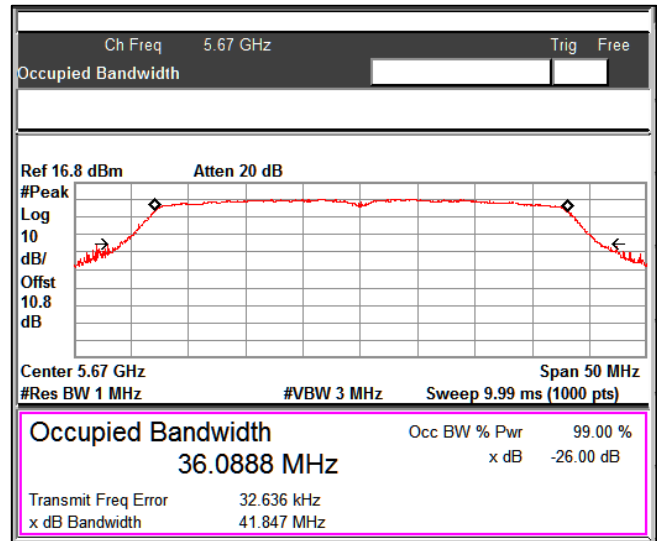
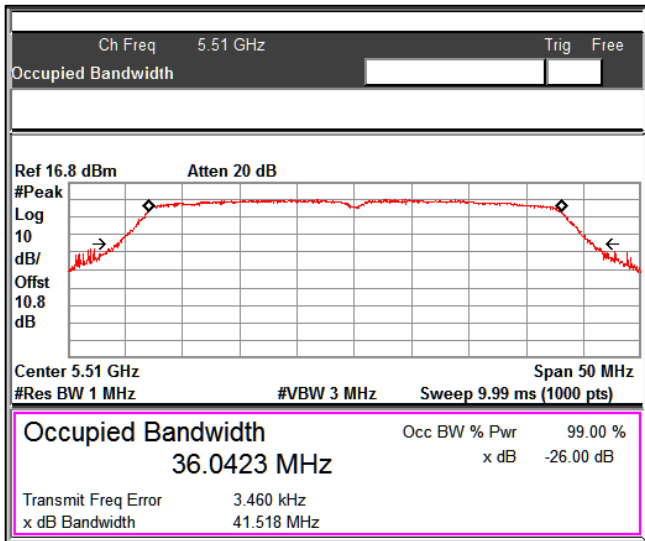
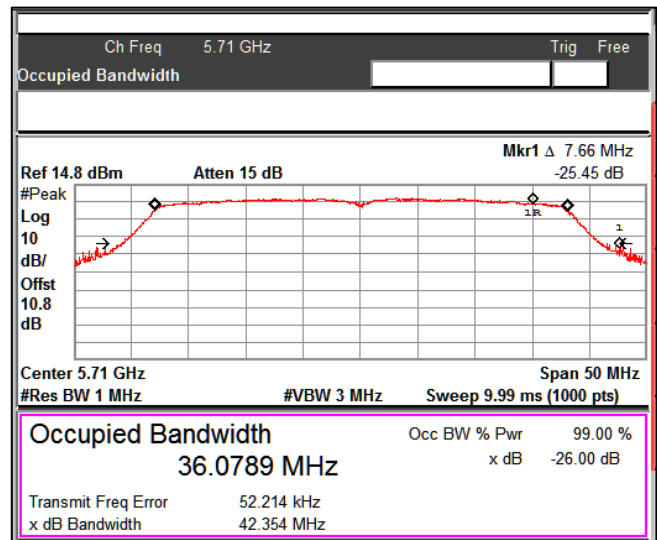


Data Rate: MCS 7

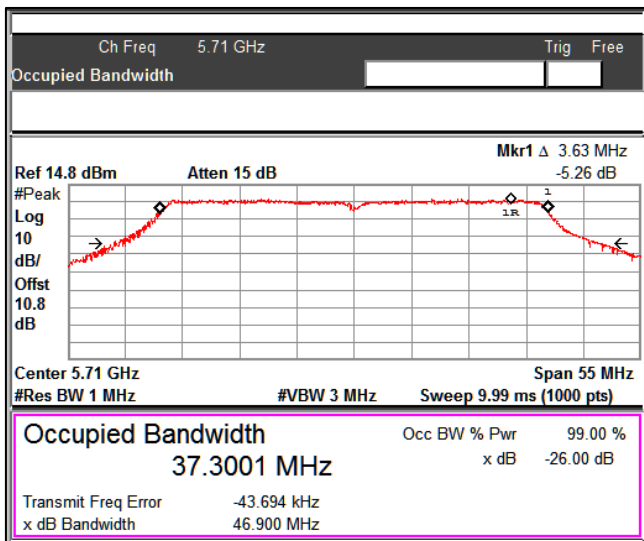
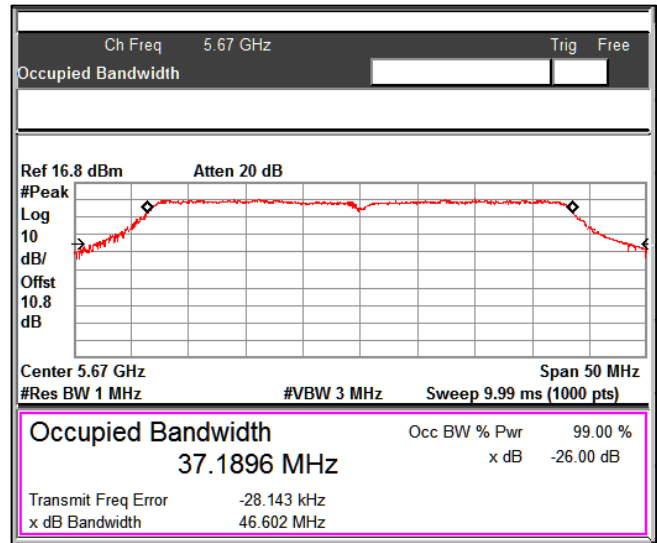
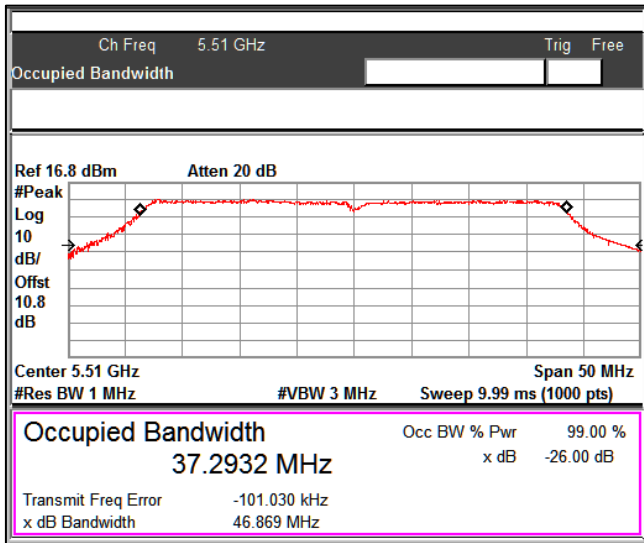


Modulation: 802.11n-HT40MHz: UNII 2c

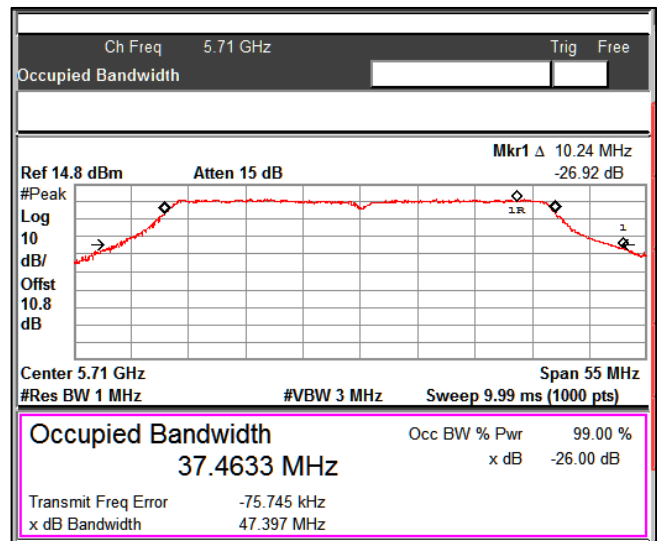
Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5510	41.51	36.04
	5590	43.40	36.09
	5670	41.85	36.08
	5710	42.35 34.69 – UNII 2C 7.66- UNII 3	36.10 33.00 – UNII 2C 3.10 – UNII 3
MCS7	5510	46.86	37.29
	5590	46.59	37.22
	5670	46.60	37.19
	5710	47.39 37.15 – UNII 2C 10.24- UNII 3	37.30 33.67 – UNII 2C 3.63 – UNII 3

Data Rate MCS0

99%Bandwidth

26dB bandwidth

Data Rate MCS7



99% Bandwidth

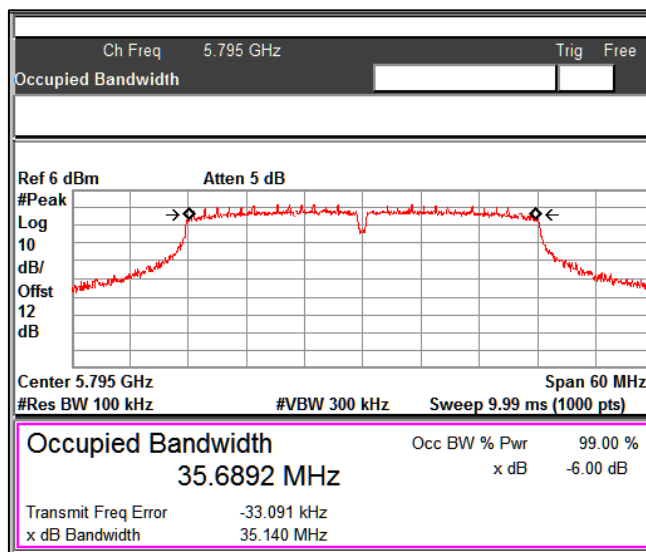
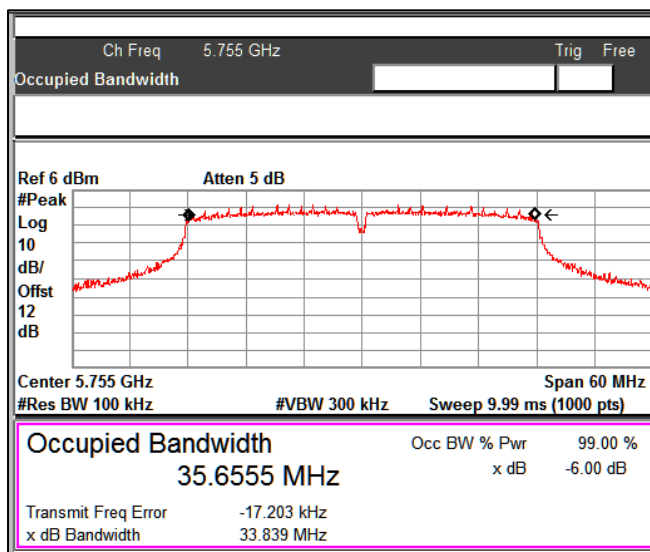


26dB Bandwidth

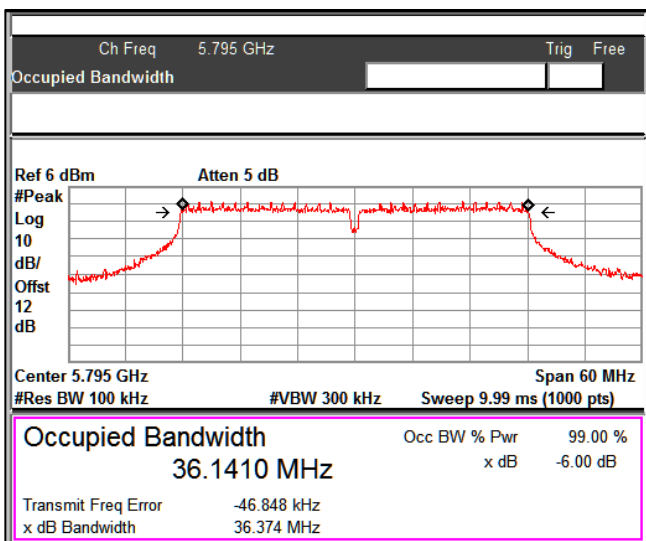
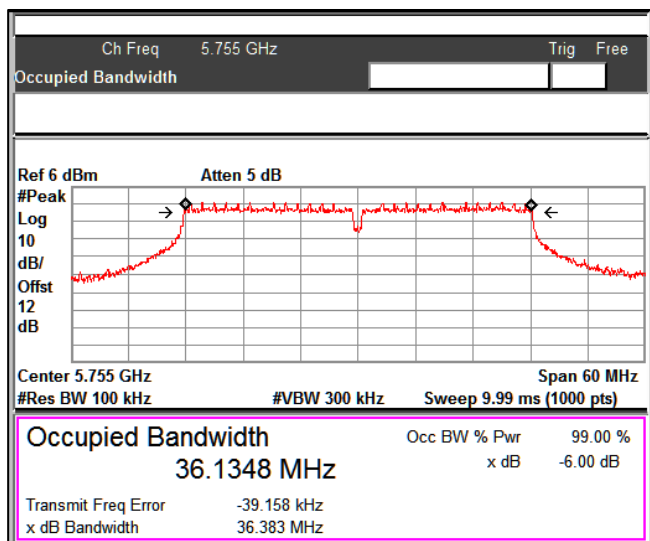
Modulation: 802.11n-HT40MHz: UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5755	35.66	0.5
	5795	35.69	0.5
MCS7	5755	36.13	0.5
	5795	36.14	0.5

Data Rate MCS0

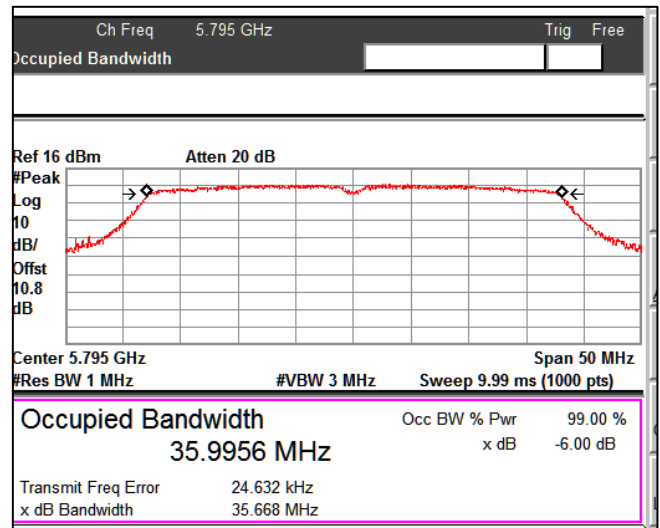
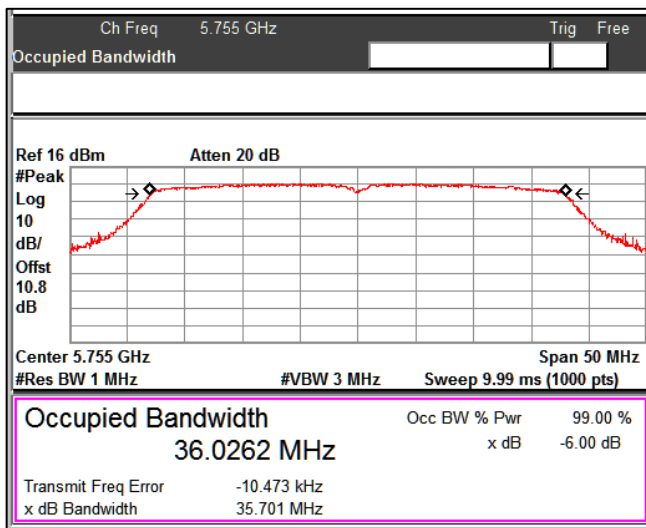


Data Rate MCS7

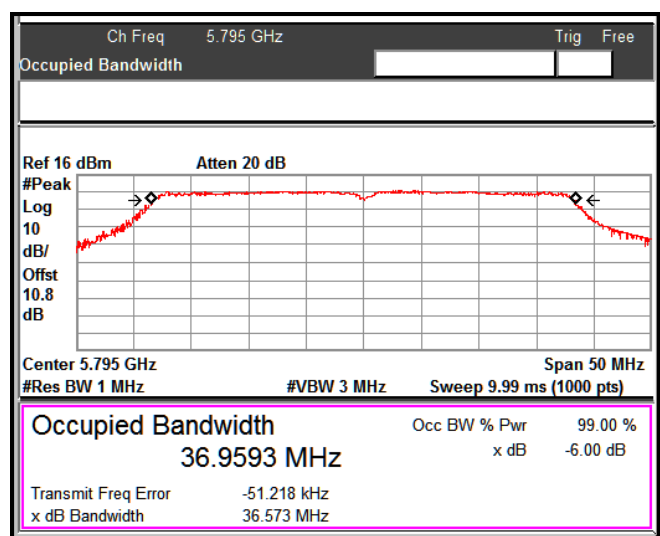
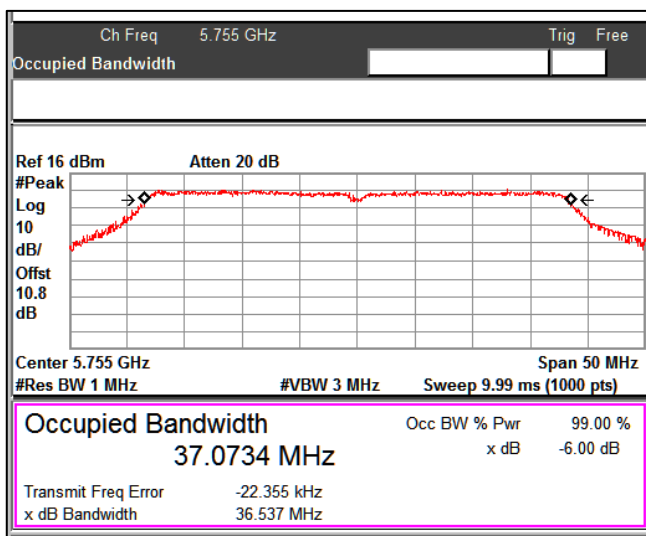


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5755	36.03
	5795	36.00
MCS7	5755	37.07
	5795	36.96

Data Rate MCS0



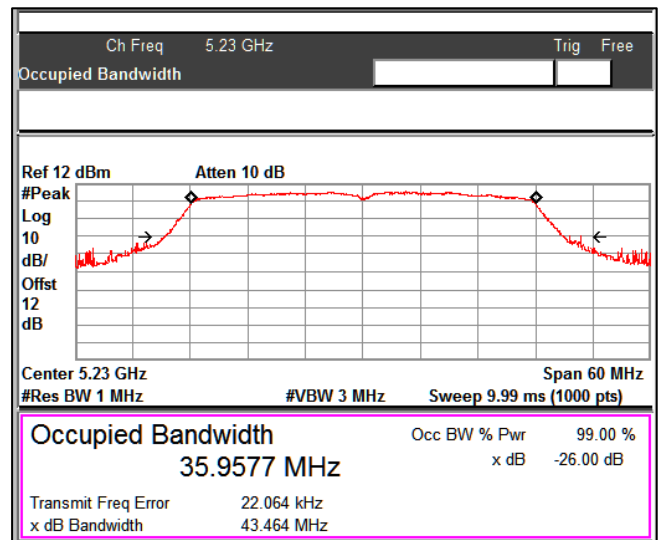
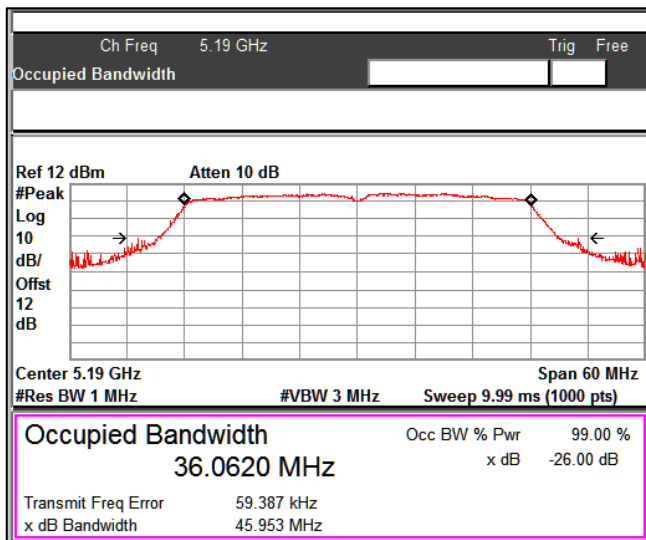
Data Rate MCS7



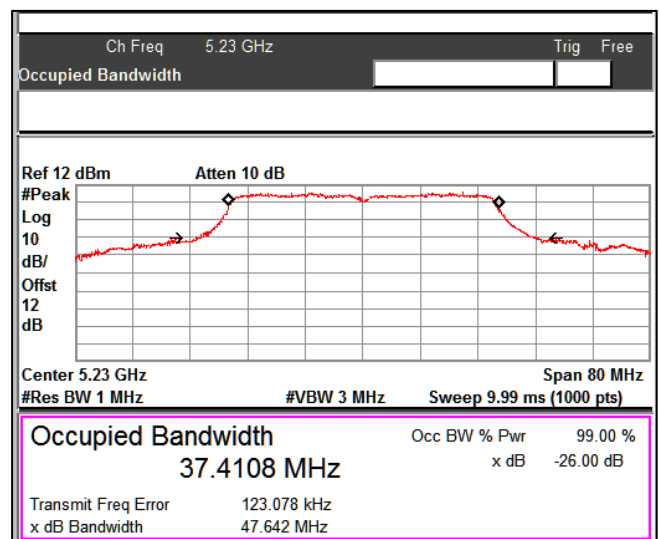
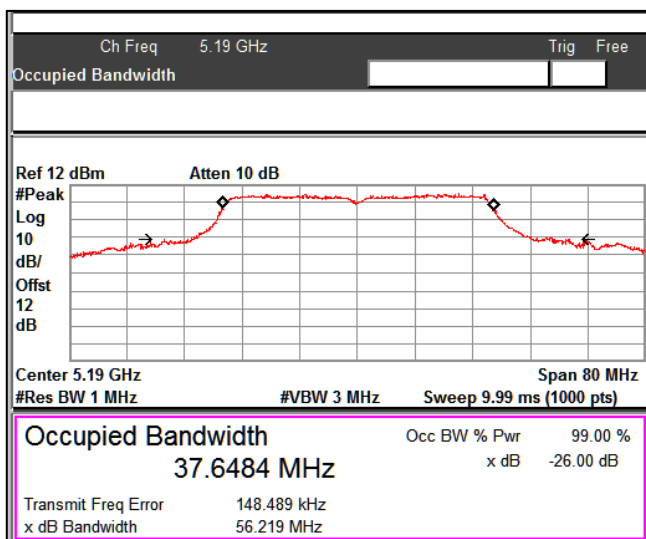
Modulation: 802.11n-VHT40MHz: UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5190	45.95	36.06
	5230	43.46	35.96
MCS9	5190	56.22	37.65
	5230	47.64	37.41

Data Rate MCS0



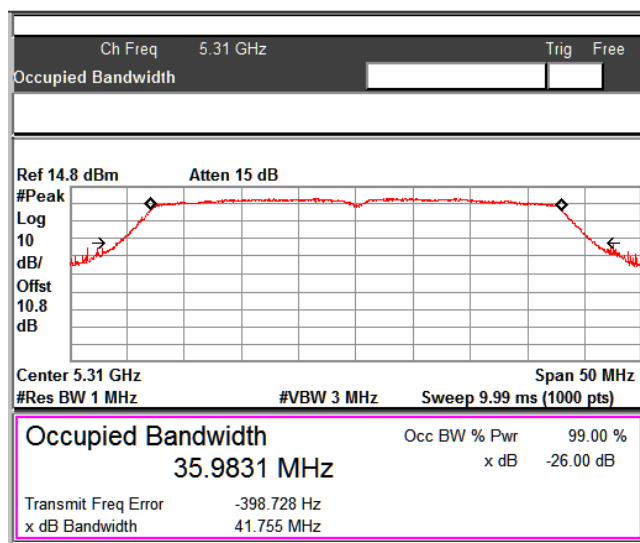
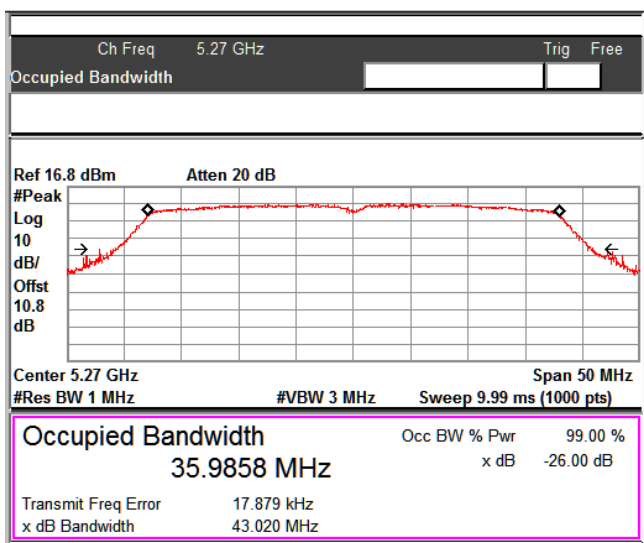
Data Rate MCS9



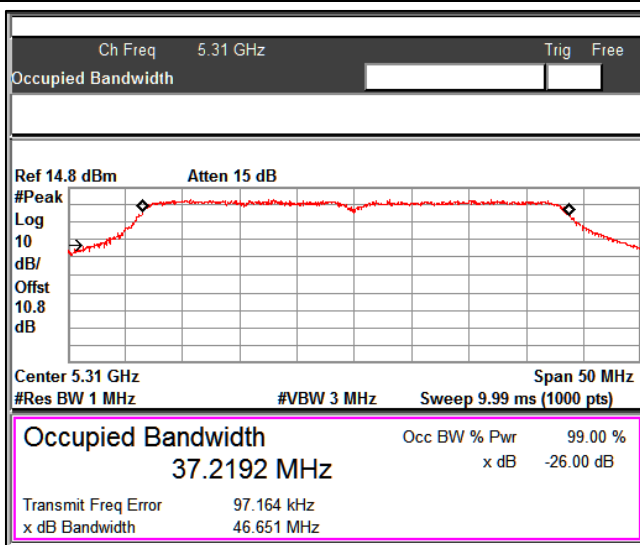
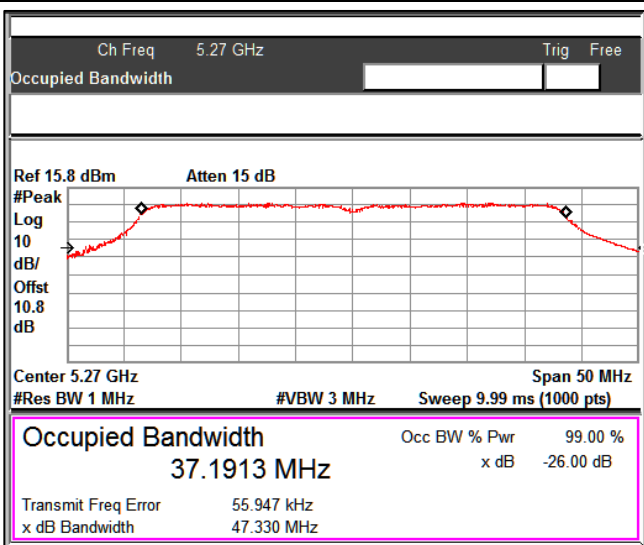
Modulation: 802.11n-VHT40MHz: UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5270	43.02	35.98
	5310	41.76	36.00
MCS9	5270	47.33	37.19
	5310	46.66	37.22

Data Rate MCS0



Data Rate MCS9



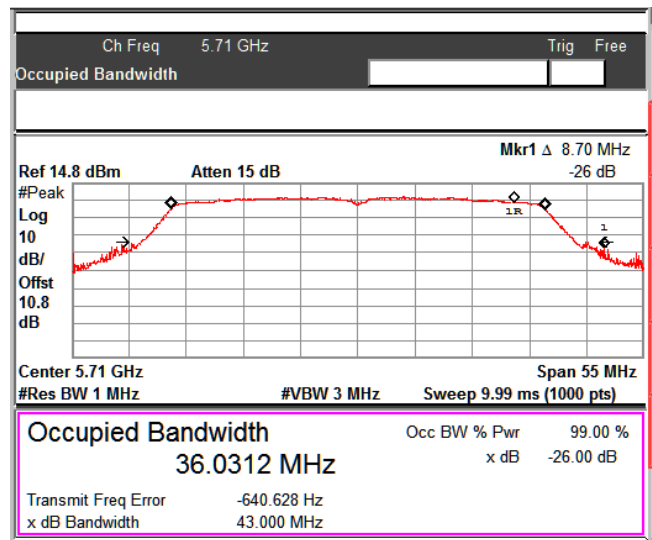
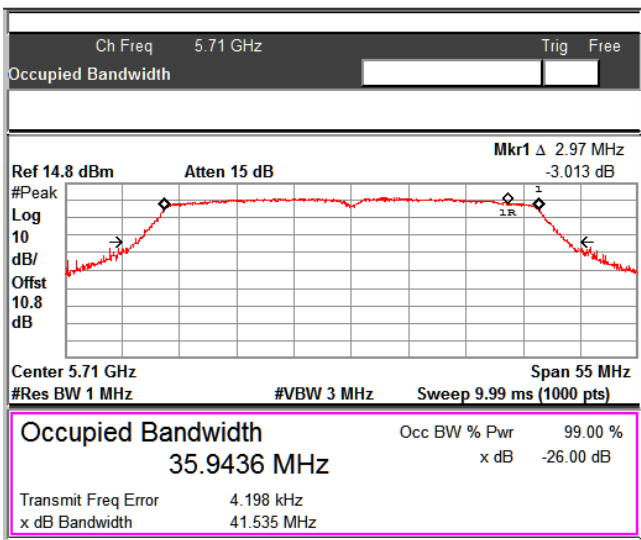
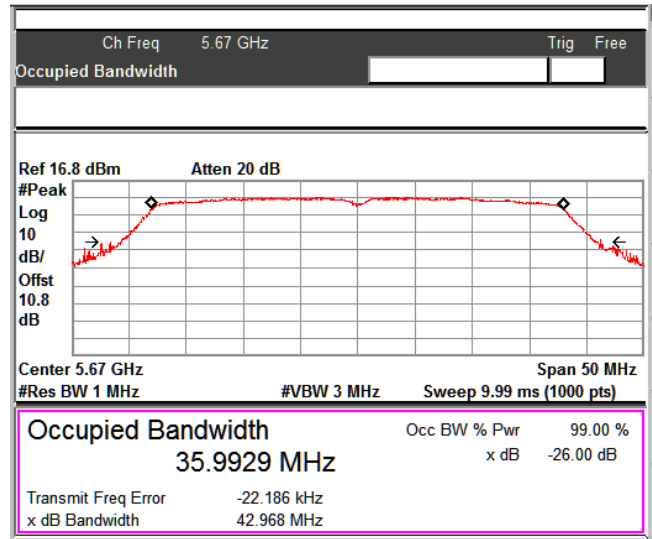
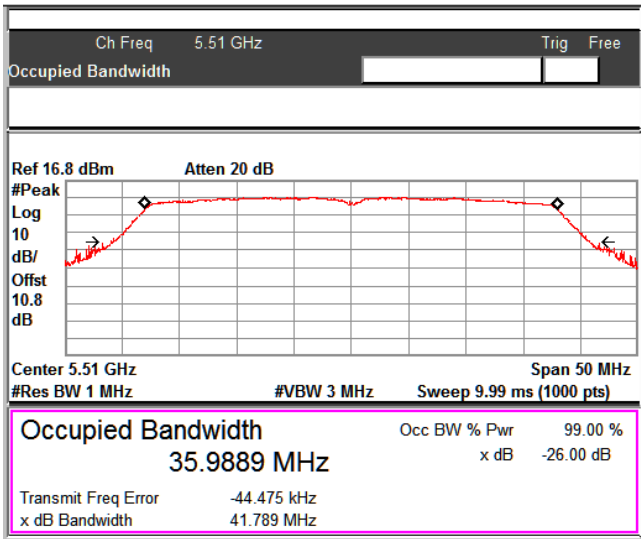
Prüfbericht - Nr.:
Test Report No.:

ULR-TC568821300000075F

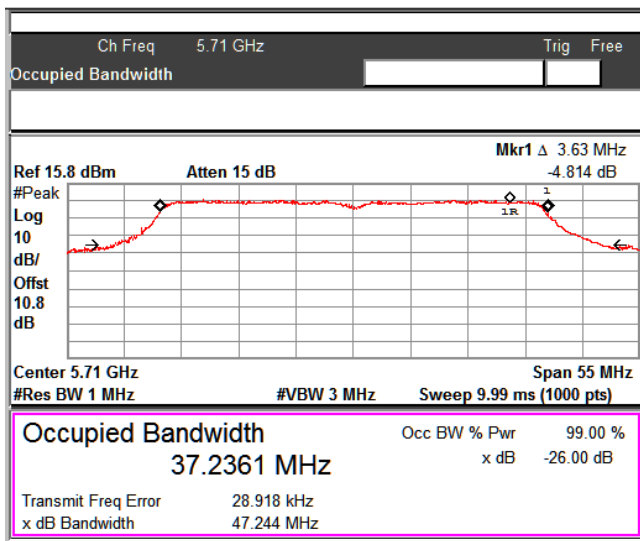
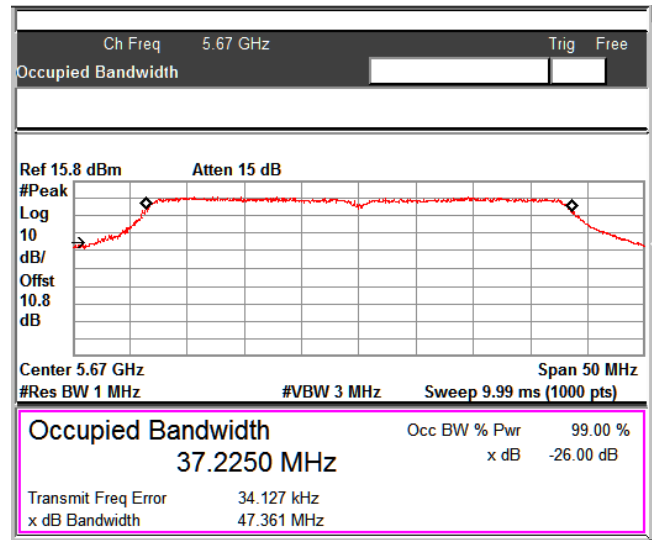
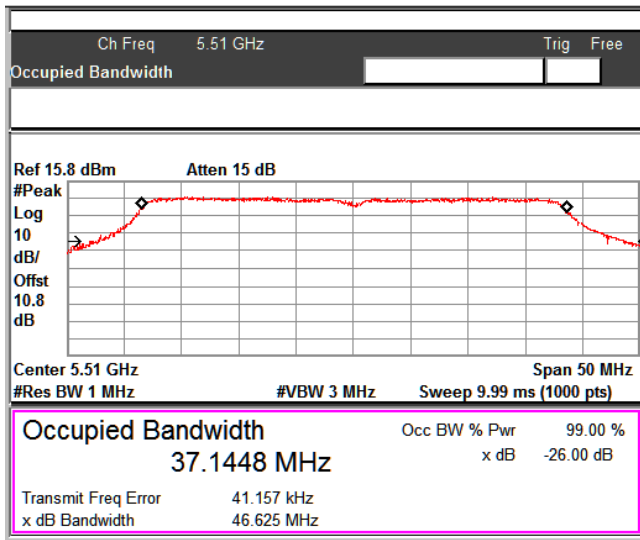
Seite 41 von 144
Page 41 of 144

Modulation: 802.11n-VHT40MHz: UNII 2c

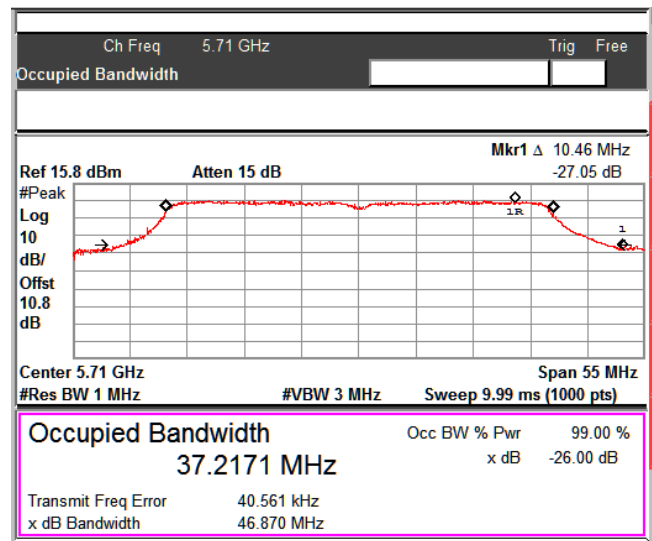
Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5510	41.78	35.98
	5590	41.63	35.95
	5670	42.96	35.99
	5710	43.00 34.30 – UNII 2C 8.70- UNII 3	35.94 32.97 – UNII 2C 2.97 – UNII 3
MCS9	5510	46.62	37.14
	5590	46.33	37.14
	5670	47.36	37.22
	5710	46.87 36.41 – UNII 2C 10.46- UNII 3	37.23 33.60 – UNII 2C 3.63 – UNII 3

Data Rate: MCS 0


Data Rate: MCS 9



99% Bandwidth

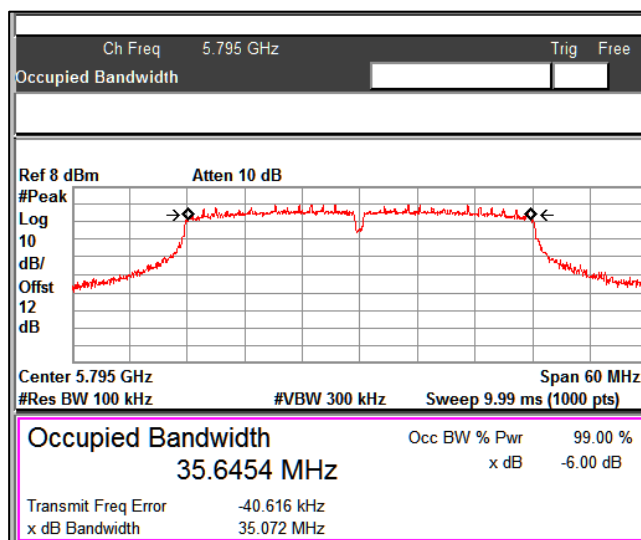
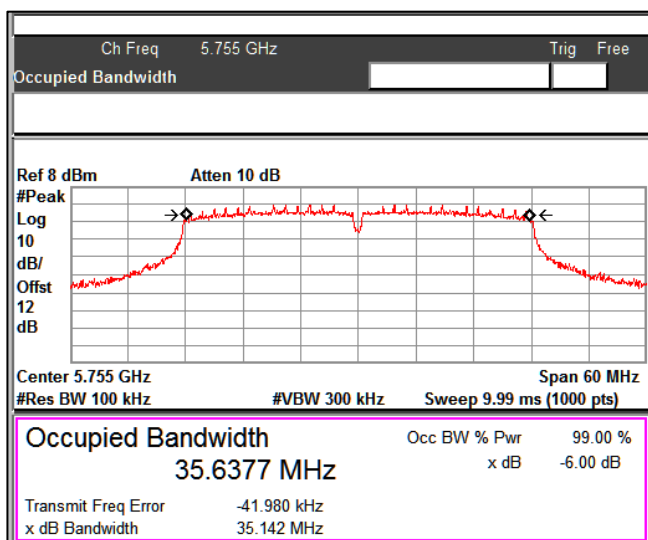


26dB Bandwidth

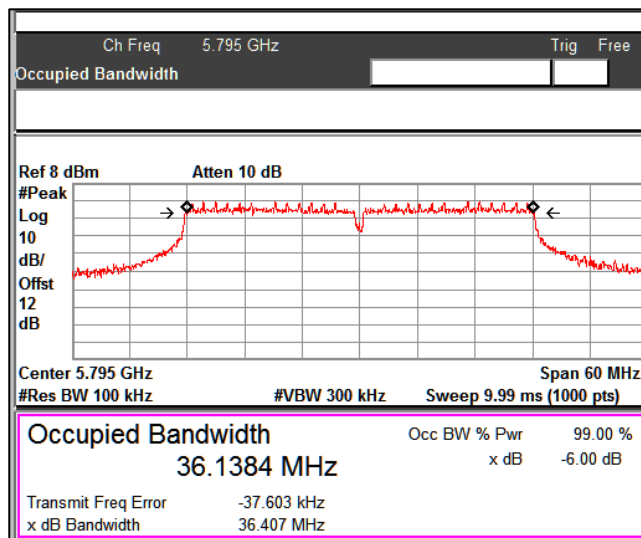
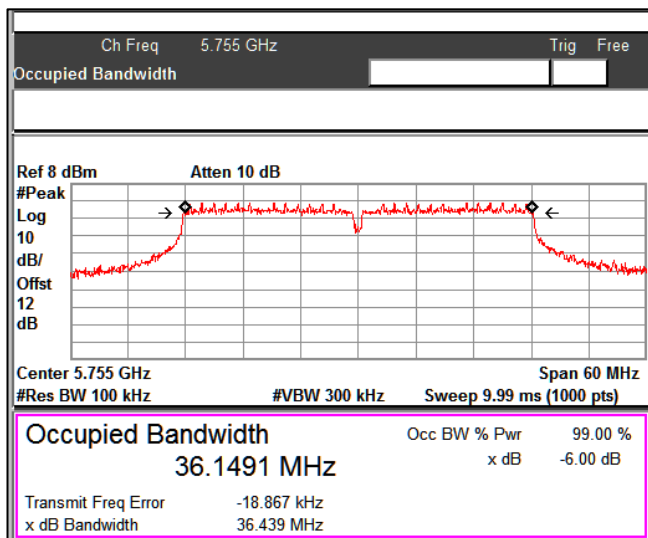
Modulation: 802.11n-VHT40MHz: UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5755	35.64	0.5
	5795	35.65	0.5
MCS9	5755	36.15	0.5
	5795	36.14	0.5

Data Rate MCS0

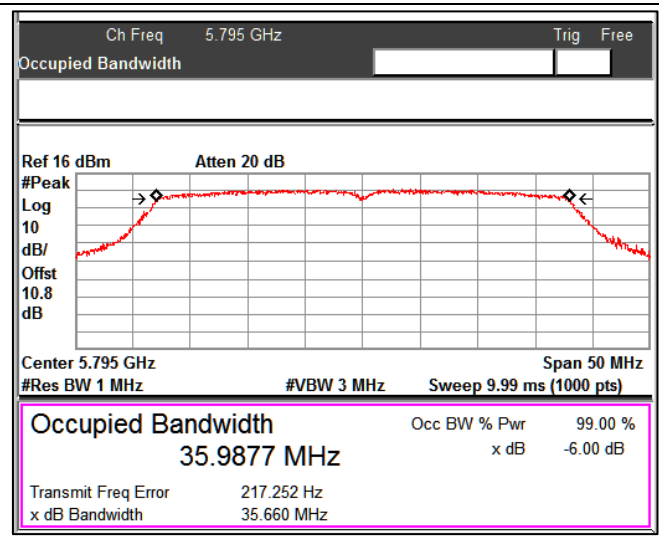
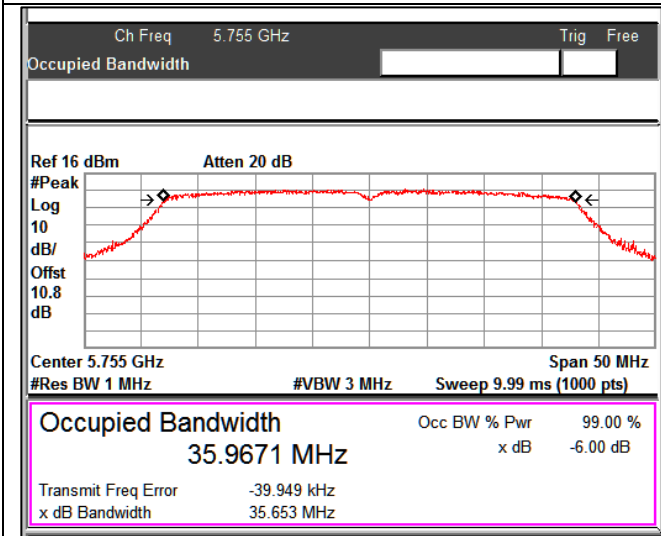


Data Rate MCS9

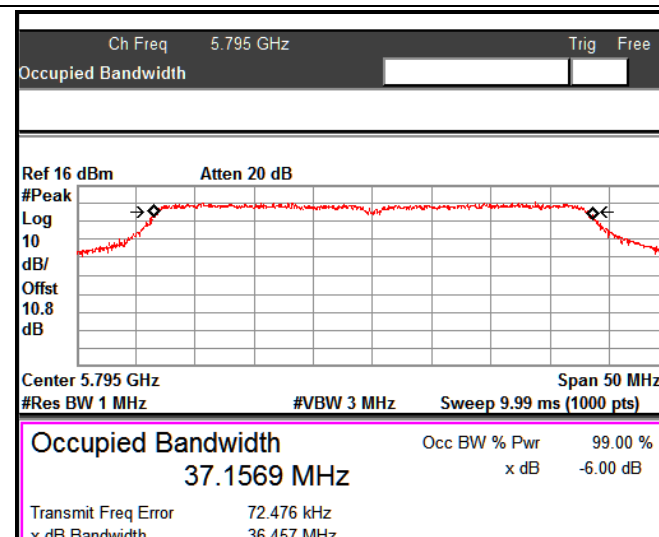
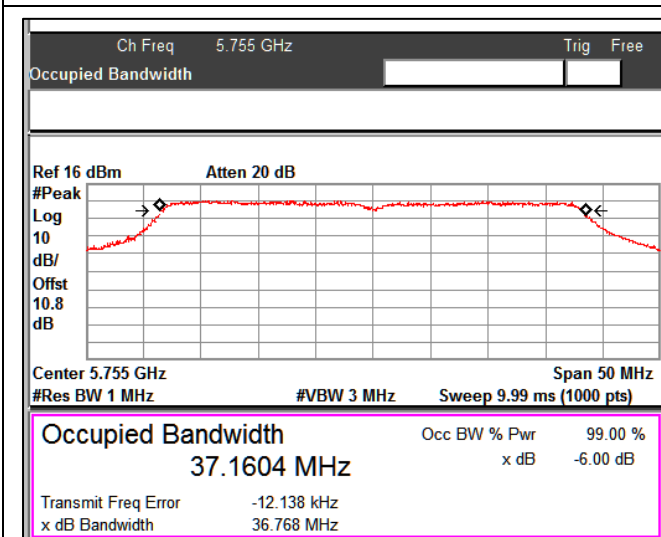


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5755	35.97
	5795	35.99
MCS9	5755	37.16
	5795	37.16

Data Rate MCS0



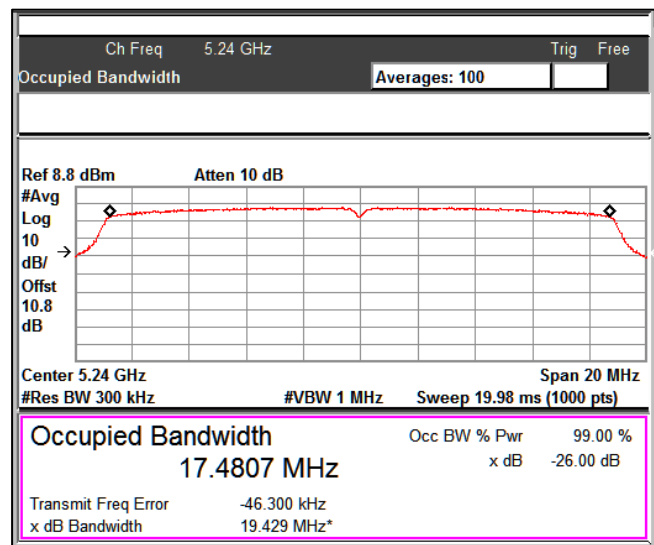
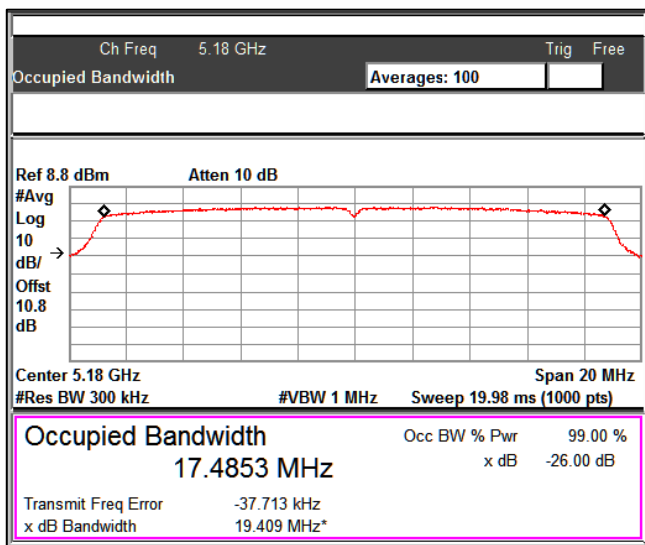
Data Rate MCS9



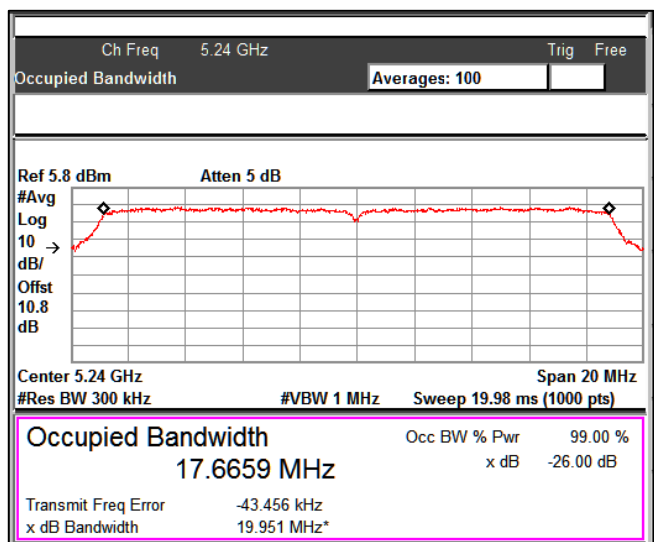
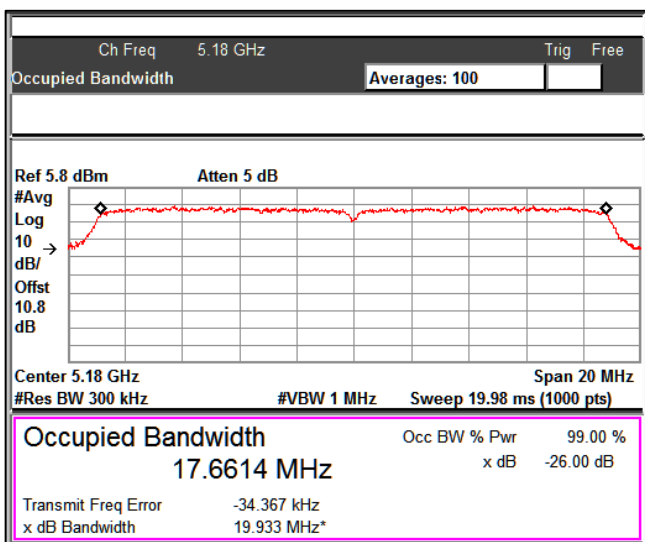
Modulation: 802.11ac-VHT20MHz: UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5180	19.41	17.48
	5240	19.42	17.48
MCS8	5180	19.93	17.66
	5240	19.95	17.66

Data Rate MCS0



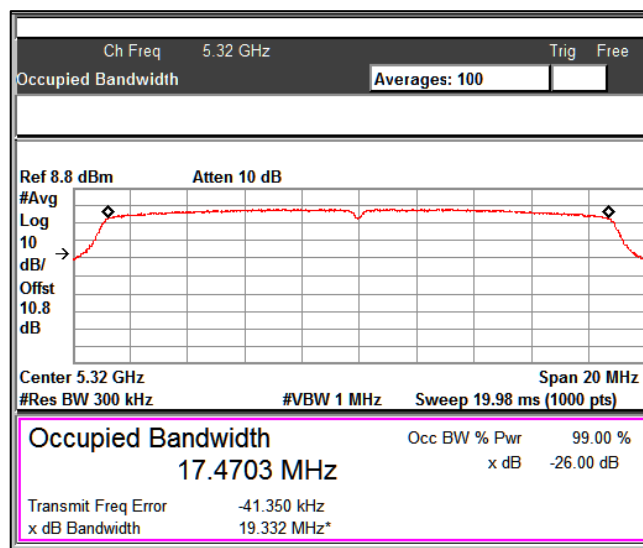
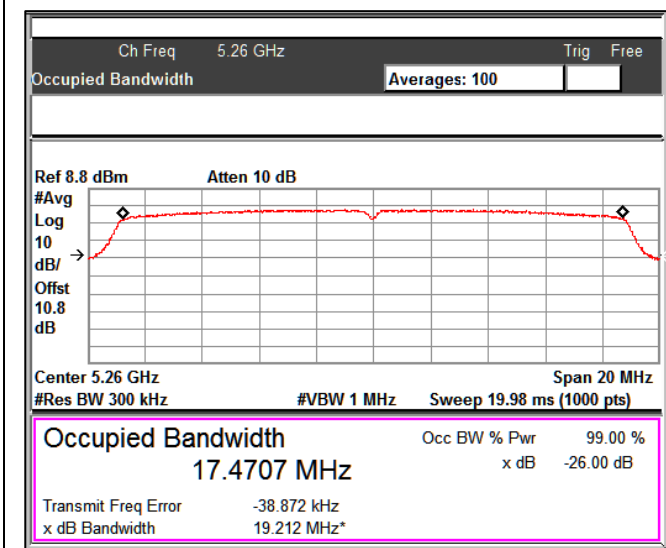
Data Rate MCS8



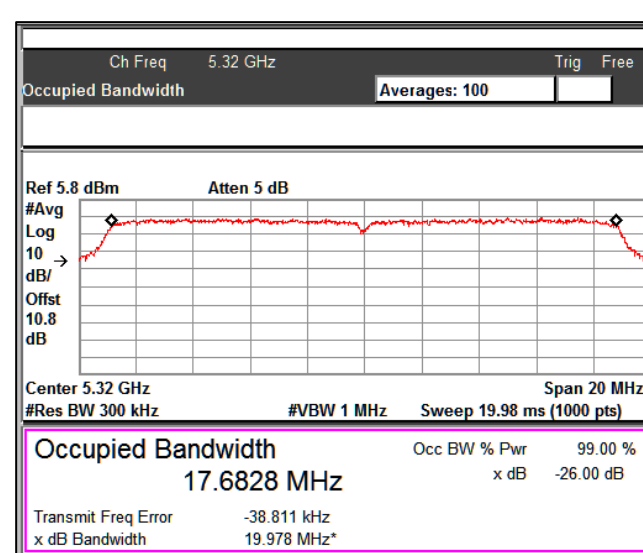
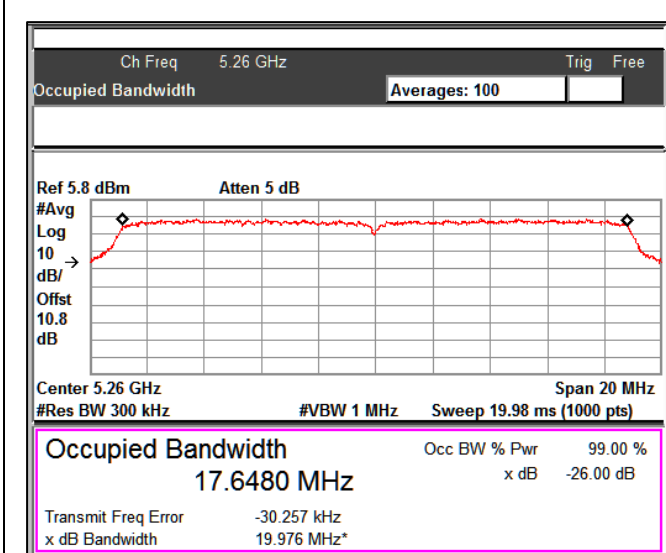
Modulation: 802.11ac-VHT20MHz: UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5260	19.21	17.47
	5320	19.33	17.47
MCS8	5260	19.97	17.64
	5320	19.98	17.68

Data Rate MCS0



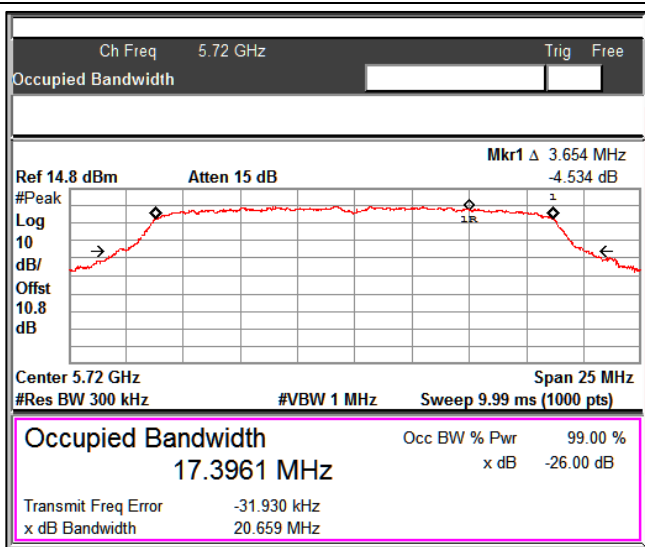
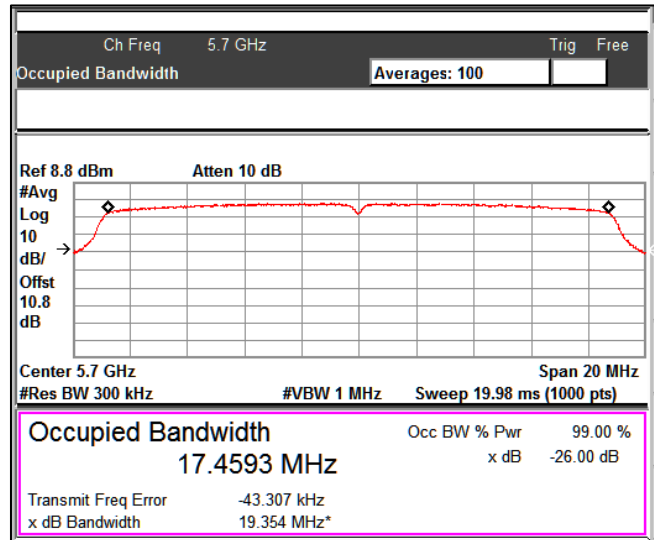
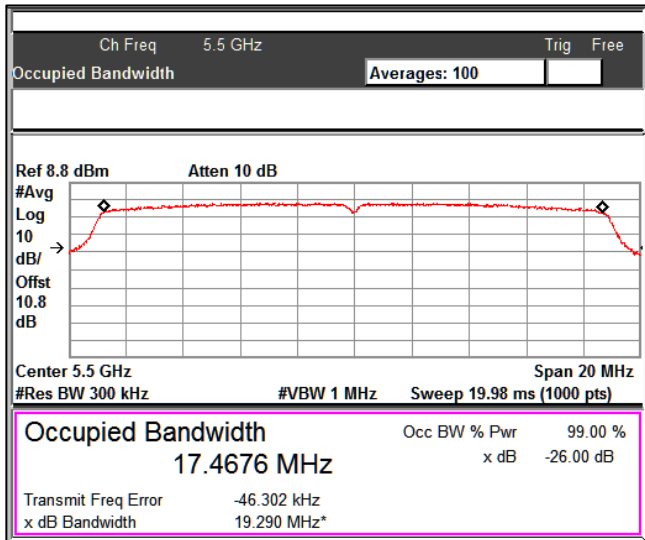
Data Rate MCS8



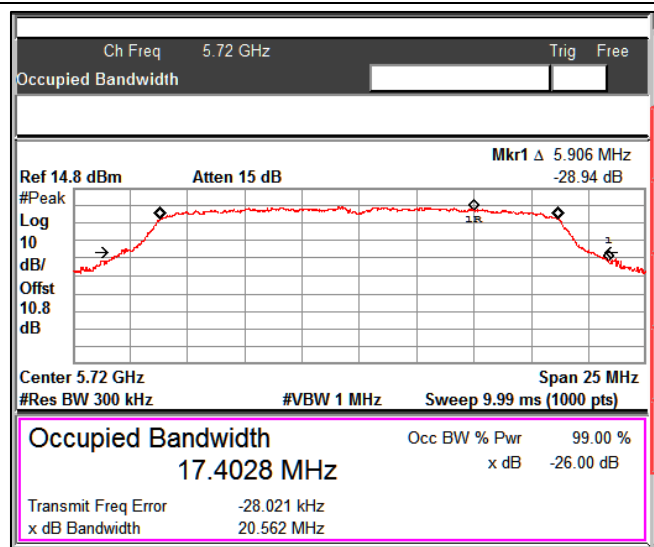
Modulation: 802.11ac-VHT20MHz: UNII 2c

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5500	19.29	17.46
	5700	19.35	17.45
	5720	20.56 14.66 – UNII 2C 5.90- UNII 3	17.39 13.74 – UNII 2C 3.65 – UNII 3
MCS8	5500	19.95	17.67
	5700	19.98	17.67
	5720	22.33 15.55 – UNII 2C 6.78- UNII 3	17.93 13.98 – UNII 2C 3.95 – UNII 3

Data Rate MCS0

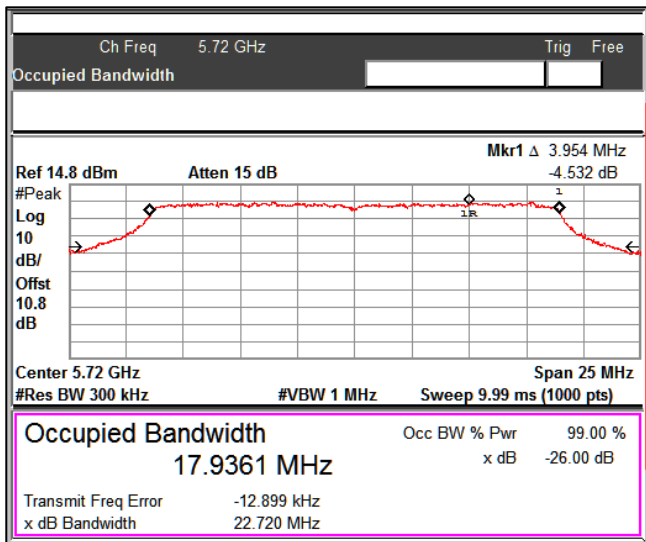
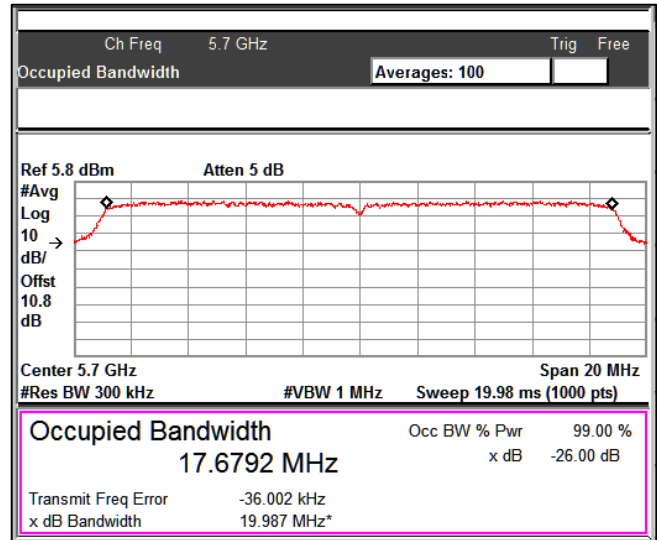
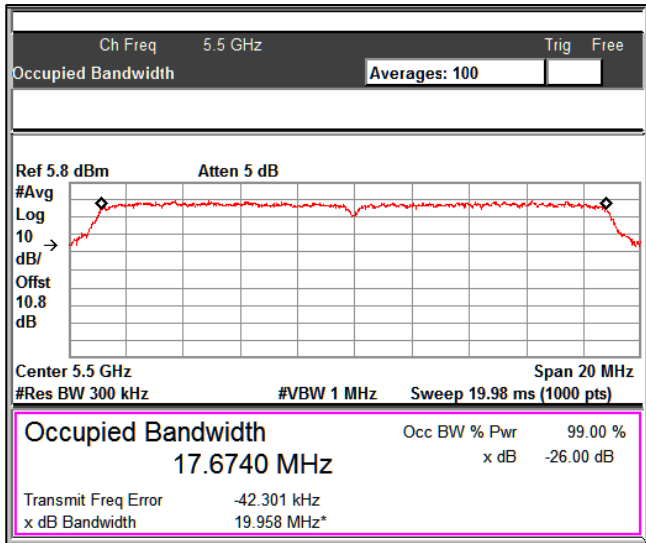


99% Bandwidth

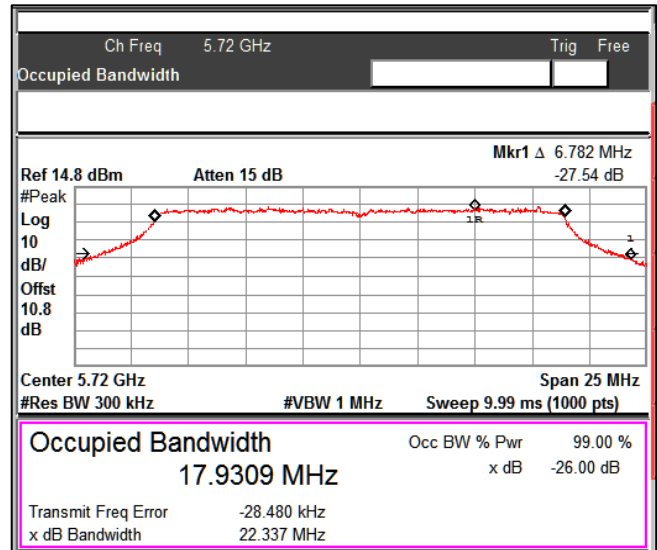


26dB Bandwidth

Data Rate MCS8



99% Bandwidth

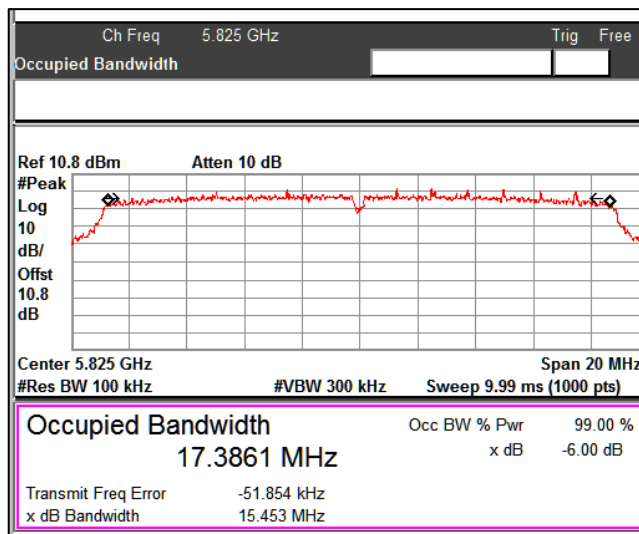
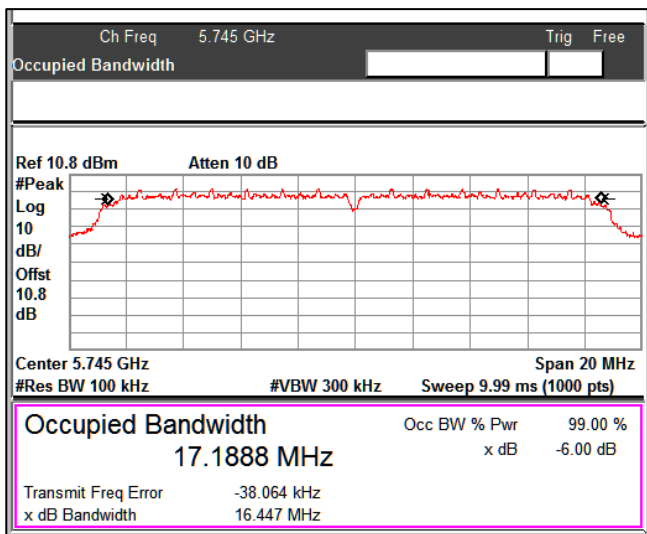


26dB Bandwidth

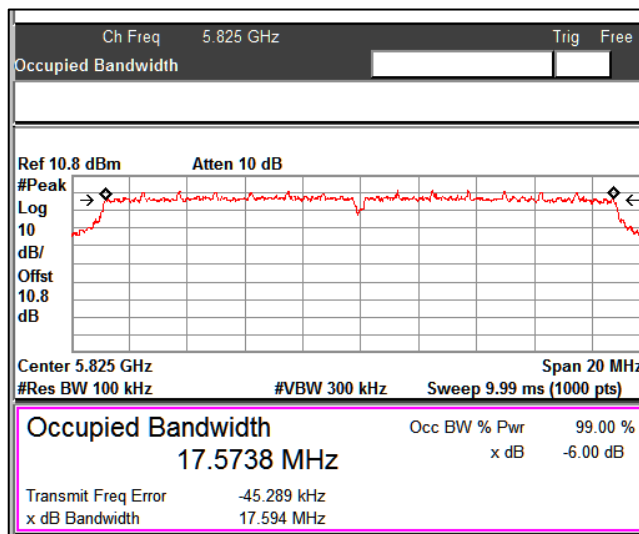
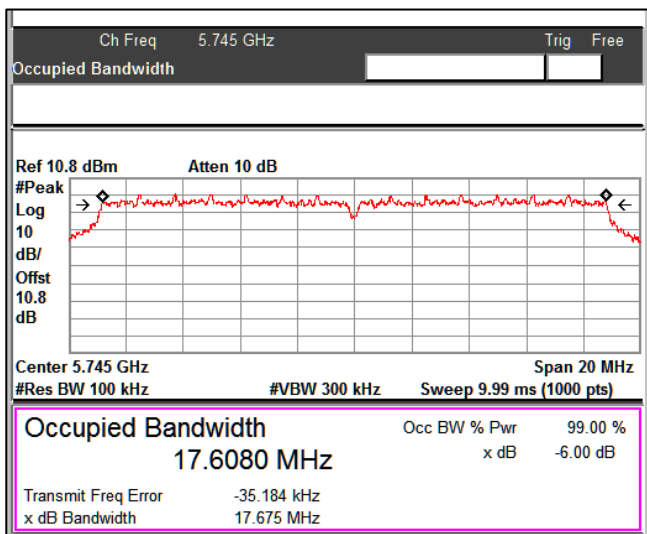
Modulation: 802.11ac-VHT20MHz: UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5745	16.45	0.5
	5825	15.45	0.5
MCS8	5745	17.67	0.5
	5825	17.59	0.5

Data Rate MCS0

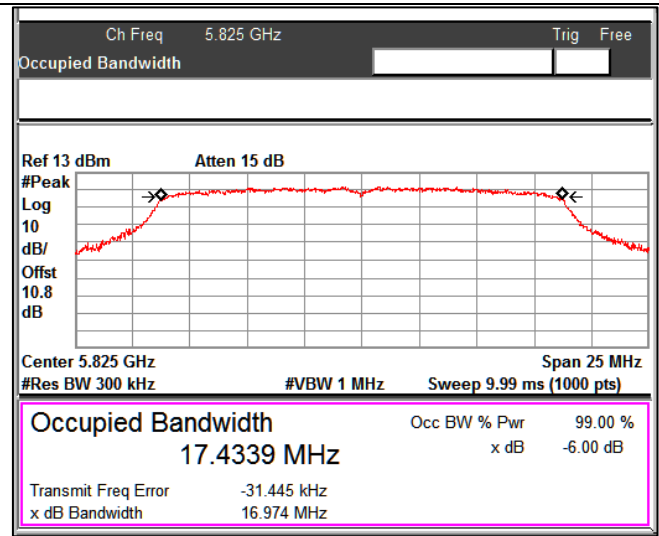
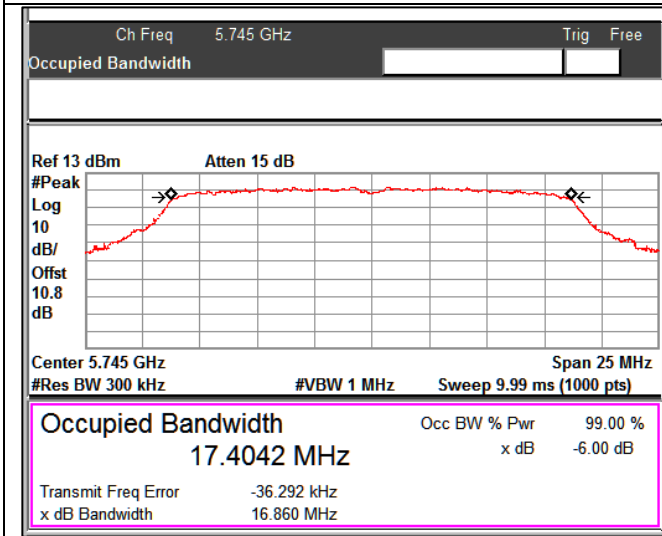


Data Rate MCS8

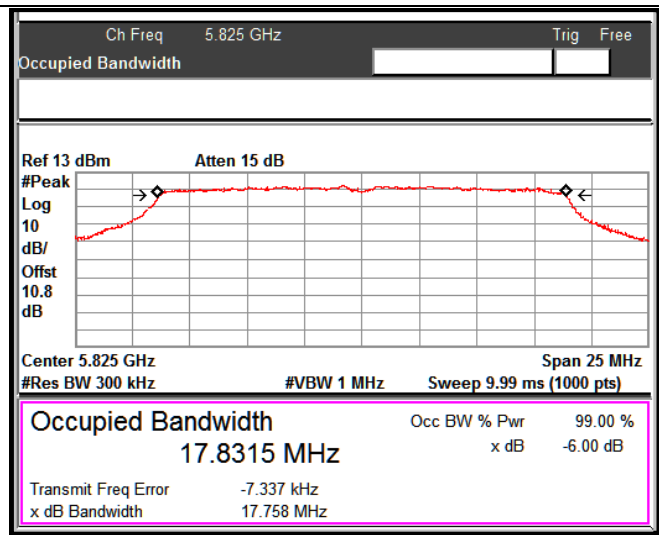
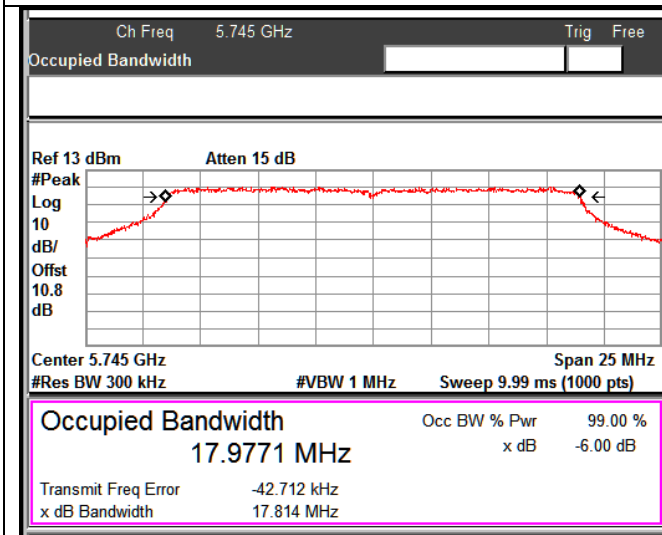


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5745	17.40
	5825	17.43
MCS8	5745	17.98
	5825	17.83

Data Rate MCS0



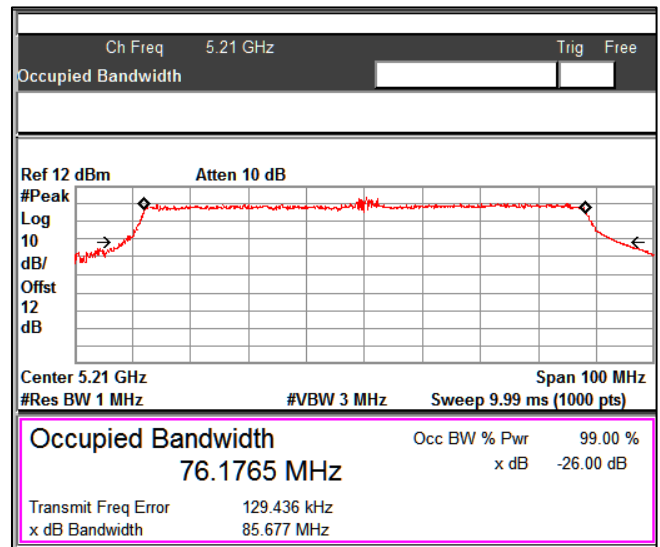
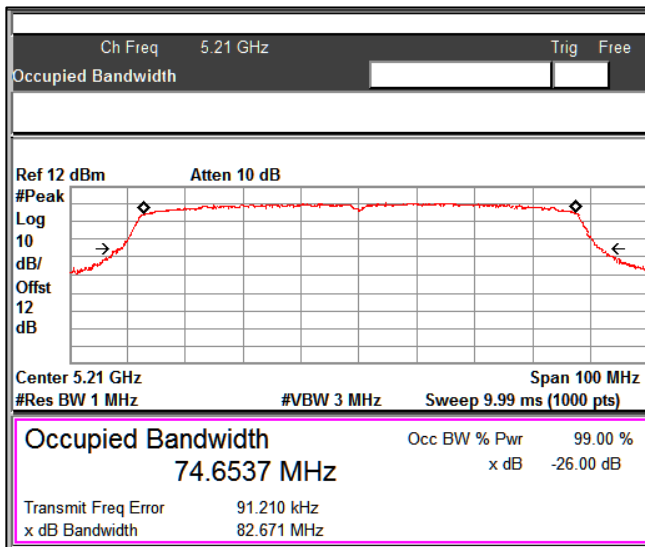
Data Rate MCS8



Modulation: 802.11ac-VHT80MHz: UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5210	82.67	74.65
MCS9	5210	85.68	76.18

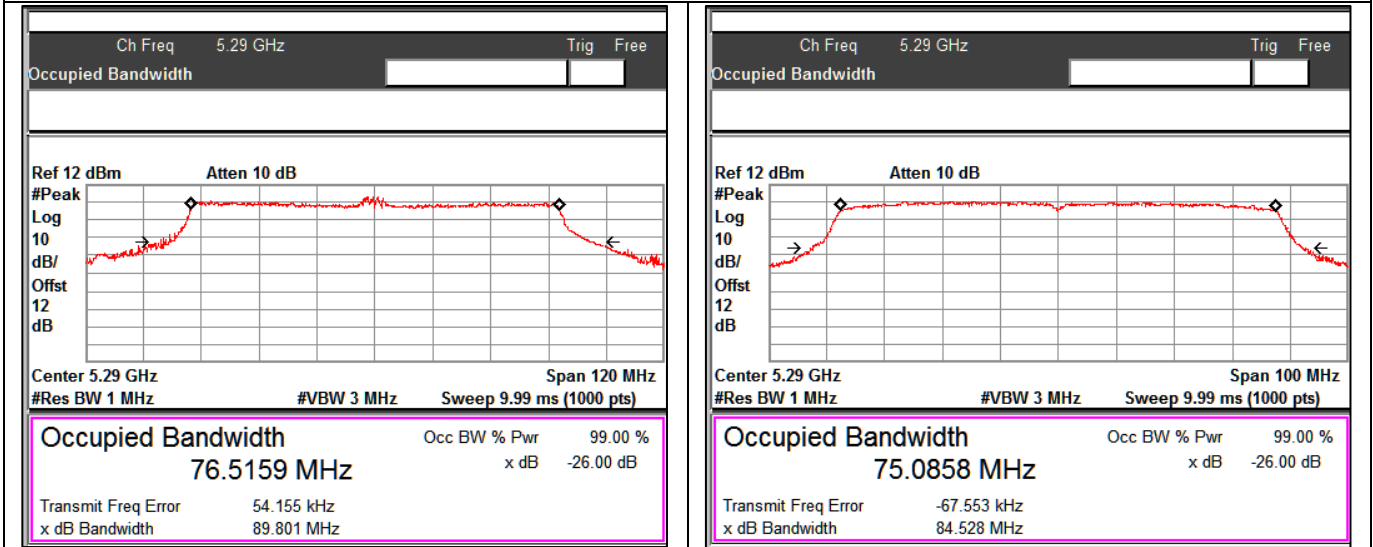
Data Rate: MCS 0 & MCS9



Modulation: 802.11ac-VHT80MHz: UNII 2a

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5290	84.53	75.09
MCS9	5290	89.80	76.52

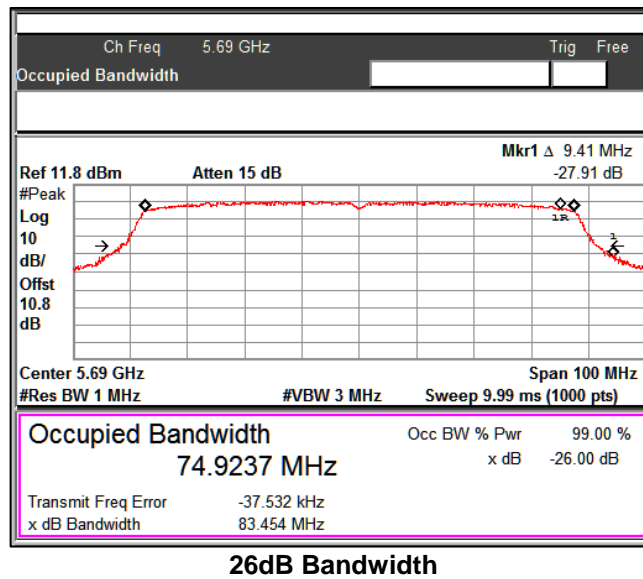
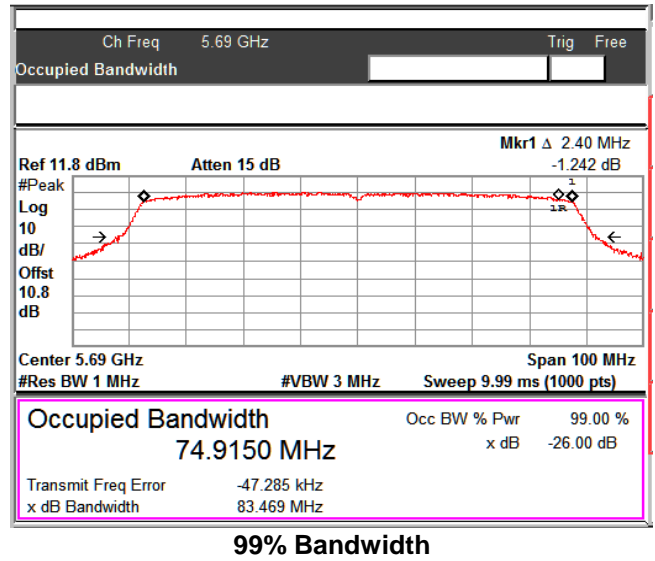
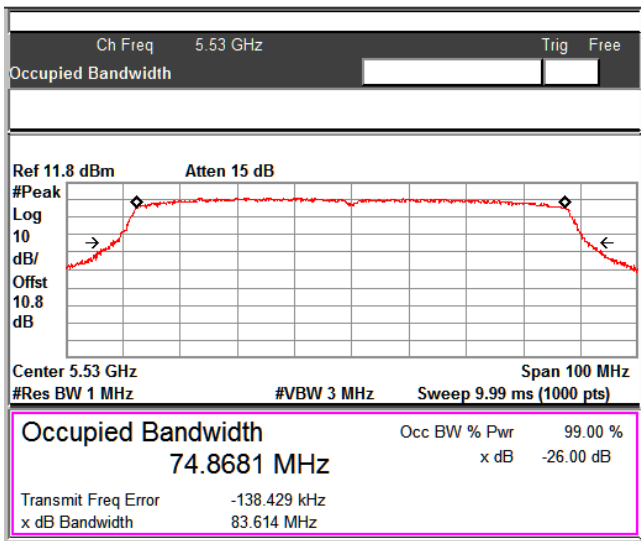
Data Rate: MCS0 & MCS9



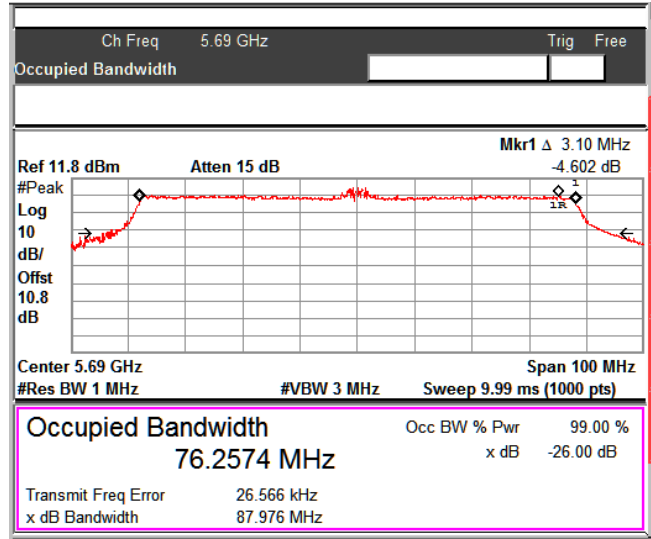
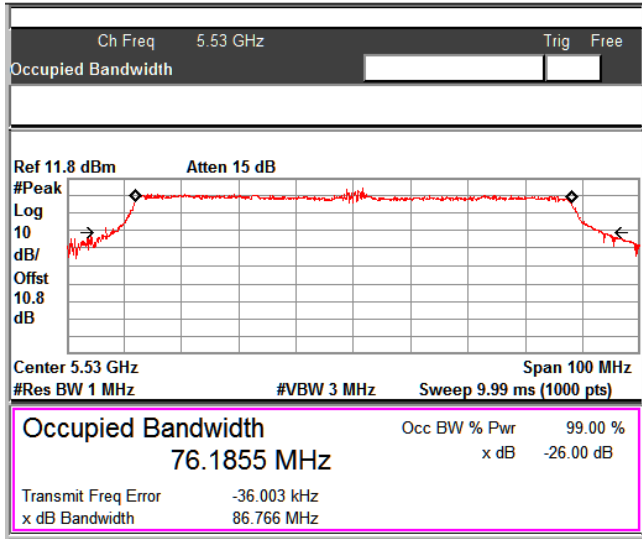
Modulation: 802.11ac-VHT80MHz: UNII 2c

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5530	84.50	74.94
	5690	83.45 74.04–UNII 2C 9.41- UNII 3	74.91 72.51 – UNII 2C 2.40 – UNII 3
MCS9	5530	90.05	76.38
	5690	87.43 75.82 –UNII 2C 11.61- UNII 3	76.25 73.15 – UNII 2C 3.10 – UNII 3

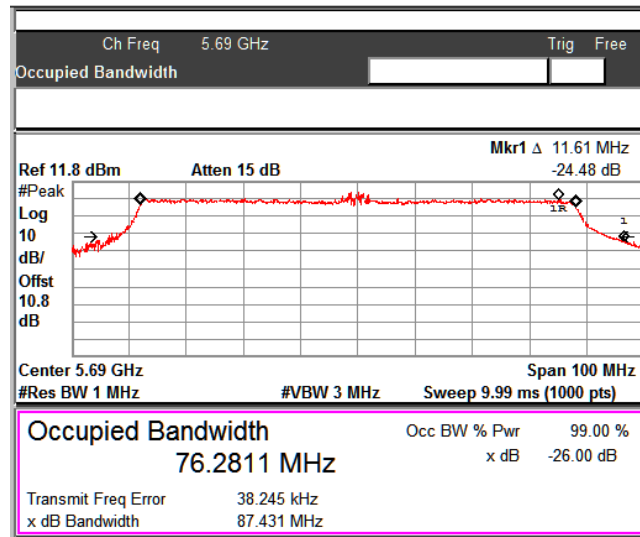
Data Rate: MCS0



Data Rate: MCS 9



99% Bandwidth



26dB Bandwidth