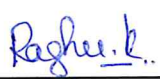


Produkte
Products

Prüfbericht - Nr.:		ULR-TC568819300000023F 001		Seite 1 von 212 Page 1 of 212	
<i>Test Report No.:</i>					
Auftraggeber: <i>Client:</i>		Jason Schmidt Director Government Relations Whirlpool Corporation 2000 M-63 Benton Harbor, MI 49022			
Gegenstand der Prüfung: <i>Test item:</i>		REBEL UI Module			
Bezeichnung: <i>Identification:</i>		EICHRB01		Serien-Nr.: <i>Serial No.</i>	
				Engineering Sample	
Wareneingangs-Nr.: <i>Receipt No.:</i>		166117823		Eingangsdatum: <i>Date of receipt:</i>	
				17.03.2019	
Prüfört: <i>Testing location:</i>		Refer Page 5 of 212 for test facilities			
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15 Subpart E, 15.407 ANSI C63.10-2013			
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test items passed the test specification(s).</i>			
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (India) Pvt. Ltd. 27/B, 2nd cross, Electronic City Phase 1 Bangalore – 560 100, India FCC Test Site Registration no.: 496599			
geprüft / tested by:			kontrolliert / reviewed by:		
29.04.2019 Raghavendra G Katti Senior Engineer 			17.05.2019 Shrikanth S Naik Assistant Manager 		
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other Aspects: FCC ID :A5UEICHRB01, On receipt the equipment was in good condition					
Abkürzungen:			Abbreviations:		
P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet			P(ass) = passed F(ail) = failed N/A = not applicable 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. <i>This test report 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 safety mark on this or similar products.</i>					

TÜV Rheinland India Pvt. Ltd. 27/B, 2nd cross Electronic City Phase 1, Bangalore-560100,
 IndiaTel.: +9180 6723 3500 · Fax: +9180 6723 3542 · Web: <https://www.tuv.com>

Prüfbericht - Nr.:

Test Report No.:

ULR-TC568819300000023F 001

Seite 2 von 212

Page 2 of 212

Test Summary

Section	Test item	Result
15.407 (a)	Emission Bandwidth	Pass
15.407 (a)	Maximum conducted output power	Pass
15.407 (a)	Maximum Power spectral density	Pass
15.407 (b) / (15.205 & 15.209)	Restricted bands of emission and Restricted bands of operation	Pass
15.207	Conducted emission on A.C power lines	Pass

Discipline: Electronics Testing

Group: EMC Test Facility

Note: Conducted measurements are done according to the procedure given in KDB No. 789033 D02 General UNII
Test Procedures v02r0

Table of Contents

1	GENERAL REMARKS	4
1.1	Complimentary Materials	4
2	TEST SITES	5
2.1	Testing Facilities.....	5
2.2	List of Test and Measurement Instruments.....	5
3	GENERAL PRODUCT INFORMATION	6
3.1	Product Function and Intended Use.....	6
3.2	Ratings and System Details	6
3.1	Measurement Uncertainty:	6
4	TEST SET-UP AND OPERATION MODE	7
4.1	Principle of Configuration Selection	7
4.2	Test Operation and Test Software	7
4.3	Special Accessories and Auxiliary Equipment	7
4.4	Countermeasures to achieve EMC Compliance	7
4.5	Test modes – data rates and modulations	7
4.6	List of Test Frequencies and Frequency bands.....	8
5	TEST METHODOLOGY	9
5.1	Radiated Emission Test	9
5.1.1	Test Setup Configuration	9
6	TEST RESULTS	11
6.1	Emission Bandwidth.....	11
6.2	Maximum Conducted Output Power	79
6.3	Maximum power spectral density.....	84
6.4	Radiated Spurious Emissions and Emissions in Restricted bands of operation	178
7	LIST OF TABLES.....	209

Prüfbericht - Nr.:

Test Report No.:

ULR-TC568819300000023F 001

Seite 4 von 212

Page 4 of 212

1 GENERAL REMARKS

1.1 Complimentary Materials

All attachments are integral part of this test report.

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

TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

2.2 List of Test and Measurement Instruments

Table 1: Test and measurements instrument used

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	15-11-2019	Yearly	Antenna - Port Measurements
USB Peak power sensor	AIMIL Ltd	55006	10231	22-12-2019	Yearly	
EMI Test Receiver	Rohde & Schwarz	ESW 44	101732	26-05-2019	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	LAX-10	LAX-10-800	15-01-2020	Yearly	
Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	9124-656	16-01-2020	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	17-01-2020	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	17-05-2019	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	AC Power line conducted emission
EMI Receiver	Rohde & Schwarz	ESR7	101133	16-01-2020	Yearly	
LISN	Rohde & Schwarz	ENV 216	100022	18-10-2019	Yearly	
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100811	09-08-2019	Yearly	

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

REBEL UI Module is the platform which will be used across different appliances categories (Refrigeration, Cooking, Laundry, Dishwashers, etc.) based on Qualcomm Snapdragon 660 (SDA 660) processor. The Rebel Module is 2.4G/5G Wi-Fi-connected graphical user interface. It supports LCD with touch-screen and audio video interfaces. It supports mics, cameras, speaker and other sensor interfaces for smart appliance application. The module contains the high bandwidth Wi-Fi module (WCN3990) for data and video transfer over Wi-Fi interface. Which also supports the communication over Bluetooth. It supports Wi-Fi (802.11 a/b/g/n/ac - 2x2 MIMO, ISM 2.4GHz at 20MHz/40MHz and 5GHz at 20/40/80 MHz), Bluetooth (BT5.0) and BLE. It supports FPC antennas, mentioned in user manual.

3.2 Ratings and System Details

Table 2: Ratings and System Details

Operating frequency range	U-NII-1 : 5150MHz to 5250MHz U-NII-3 : 5725MHz to 5850MHz	
Radio Protocol	WLAN_5GHz	
Bandwidth	20,40,80	
Modulation	802.11a:	OFDM with BPSK,QPSK,16QAM , 64QAM
	802.11n:	OFDM with BPSK,QPSK,16QAM , 64QAM
	802.11ac:	OFDM with BPSK,QPSK,16QAM , 64QAM, 256QAM
Number of antennas	2	
Antenna type	External FPC(Flexible Printed Circuit) Antenna	
Antenna gain	Antennova	5.10 dBi
	Molex	4.75 dBi
Supply Voltage to Product	11V-13.5V(Typically 12.7V) DC	
Dimensions	Width: 45mm	
	Length: 190 mm	
Environmental conditions	Operating Temperature Range: -10°C to +70°C (No air flow) Storage Temperature Range: -40°C to +80°C Humidity requirement: is 5% to 95%, non-condensing.	

3.1 Measurement Uncertainty:

Table 3: 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
All emissions, radiated	±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 transmission on low, mid and high channels to obtain maximum emissions.

4.2 Test Operation and Test Software

Test Software - QRCT (Qualcomm Radio Control Tool) Version 4.0.00113
Hardware version - PCBA Rev - W11324868

4.3 Special Accessories and Auxiliary Equipment

- Test Laptop was used to configure the device in transmission mode and module was tested with following accessories 1. Display 2, Speaker and 3 Camera.

4.4 Countermeasures to achieve EMC Compliance

- None

4.5 Test modes – data rates and modulations

For Radiated spurious emissions only the worst case results are reported in this report.

4.6 List of Test Frequencies and Frequency bands

5GHz Band – 20MHz Bandwidth Channel List

Frequency Band	Channel No.	Frequency (MHz)
5150 – 5250 MHz	36	5180
	48	5240
5725 – 5850MHz	149	5745
	165	5825

5GHz Band – 40MHz Bandwidth Channel List

Frequency Band	Channel No.	Frequency (MHz)
5150 – 5250 MHz	38	5190
	46	5230
5725 – 5850MHz	151	5755
	159	5795

5GHz Band – 80MHz Bandwidth Channel List

Frequency Band	Channel No.	Frequency (MHz)
5150 – 5250 MHz	42	5210
5725 – 5850MHz	155	5775

Note: TUV Sample Identification number :
A000893143-001 (Conducted Sample)
A000893143-002 (Radiated Sample)
A000893143-003 (Radiated Sample)

5 TEST METHODOLOGY

5.1 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.

5.1.1 Test Setup Configuration

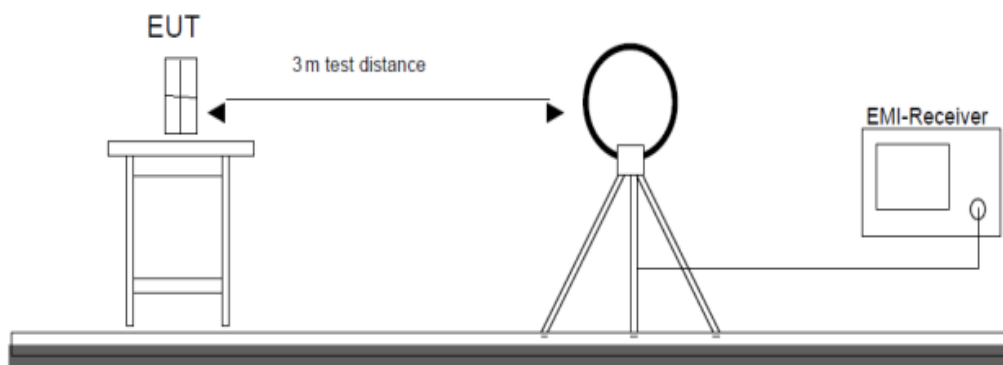


Figure 1: Frequency Range 9 kHz- 30 MHz

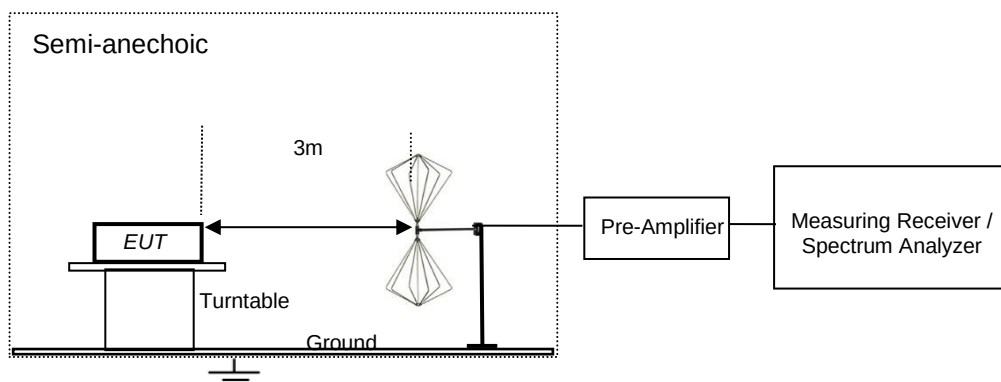


Figure 2: Frequency Range 30 MHz – 200 MHz

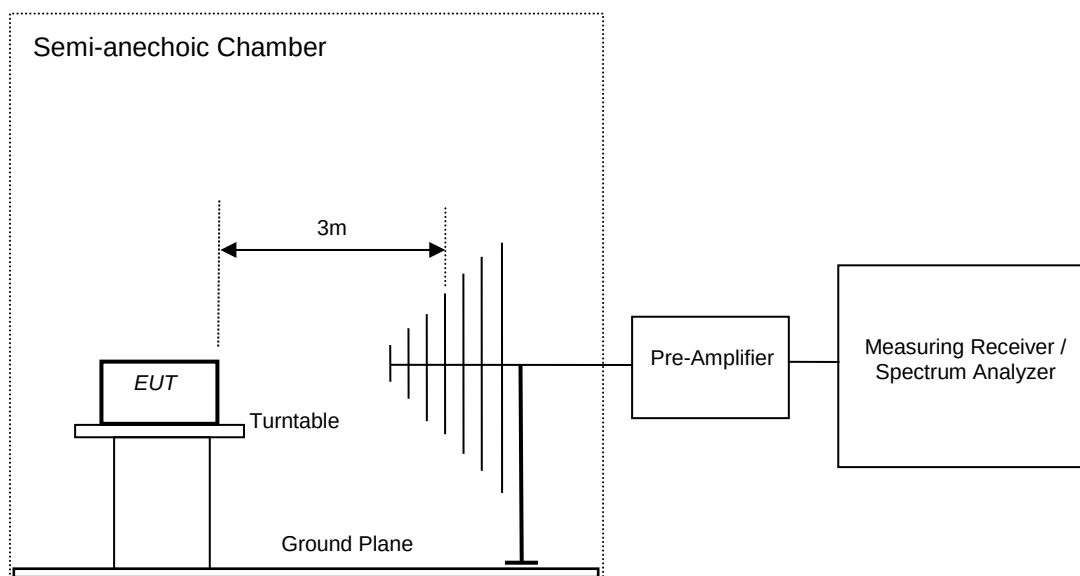


Figure 3: Frequency Range 200 MHz - 1GHz

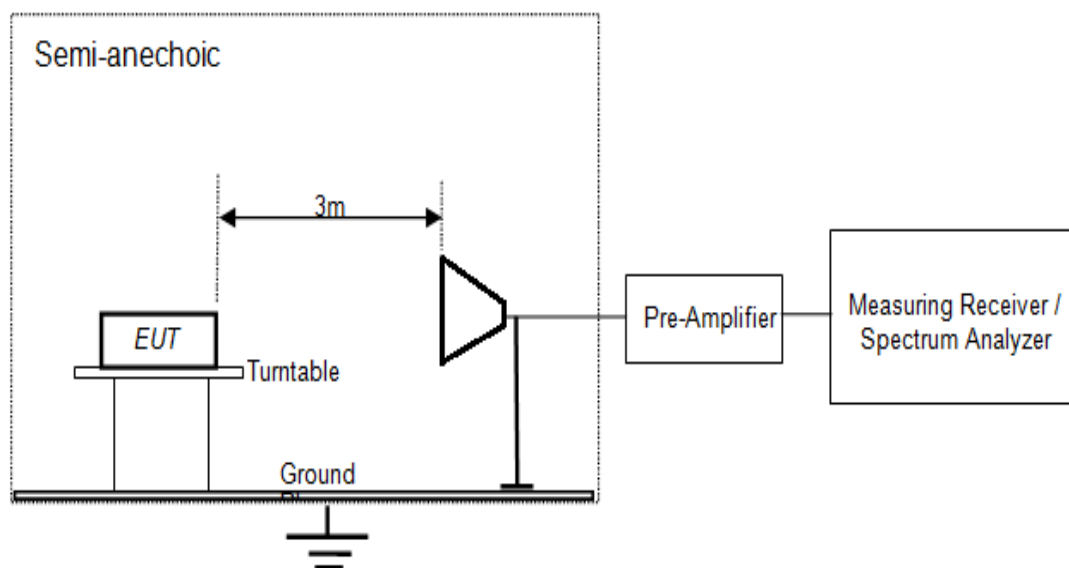


Figure 4: Frequency Range above 1 GHz

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 11 von 212
Page 11 of 212

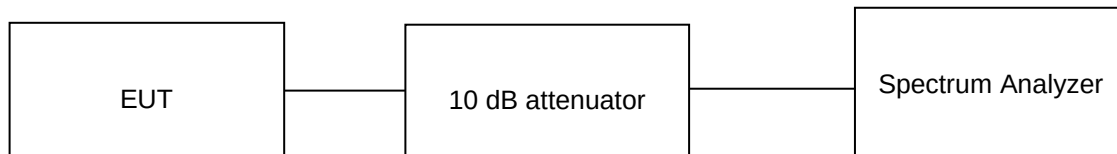
6 TEST RESULTS

6.1 Emission Bandwidth

Result

Pass

Test Specification FCC Part 15 Section 15.407(a)
Measurement
Bandwidth 300kHz



Environmental and Test conditions:

Normal Temperature = +25 °C

Voltage (V norm) = 12 V DC

RH = 63.2 %

Test results:

10 dB attenuator + 1 dB Cable loss = 11 dB offset is considered in below results

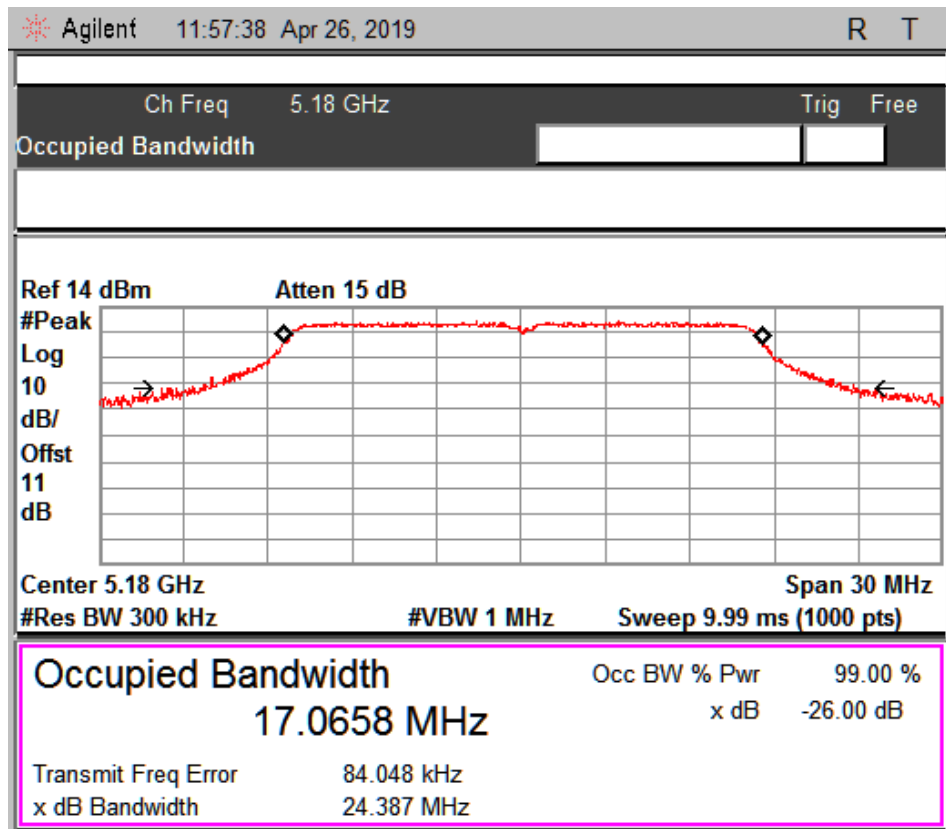
Modulation: 802.11a mode SISO

Mode	Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
a	6	5180	24.38	17.06
		5240	24.30	17.04
		5745	16.37	16.47
		5825	16.37	16.46
	24	5180	22.11	16.86
		5240	22.72	16.89
		5745	16.44	16.42
		5825	16.46	16.42
	54	5180	22.89	16.86
		5240	23.30	16.90
		5745	16.48	16.43
		5825	16.45	16.43

Prüfbericht - Nr.:
Test Report No.:

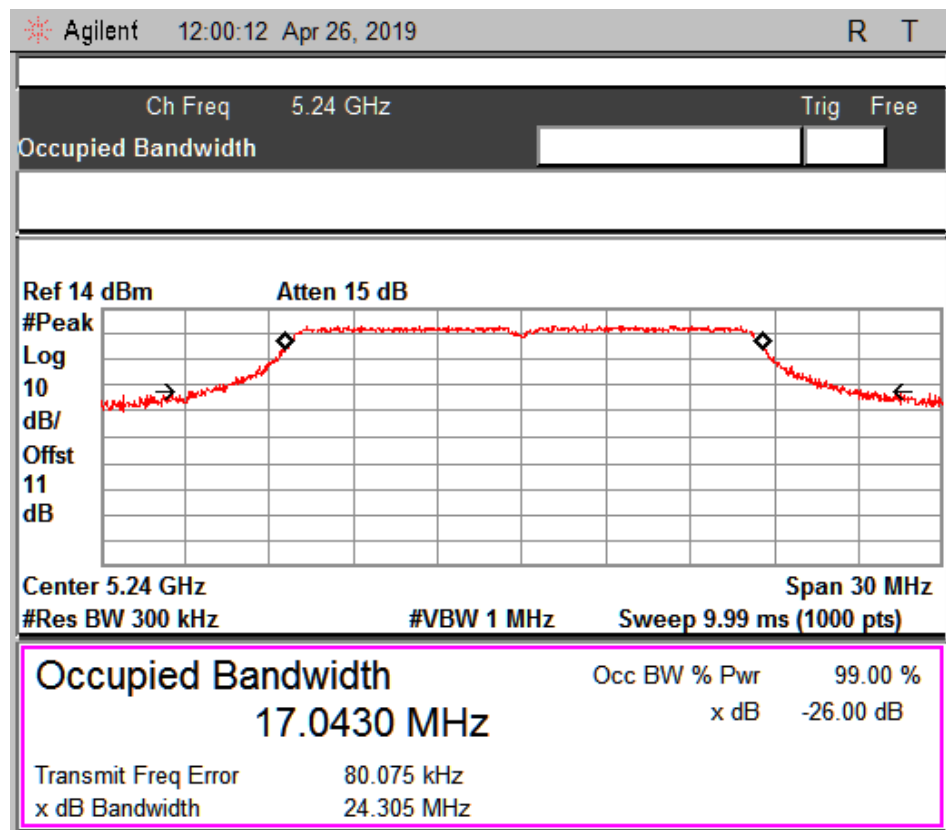
ULR-TC568819300000023F 001

Seite 12 von 212
Page 12 of 212



Data rate: 6 Mbps

Channel Frequency : 5.180 GHz



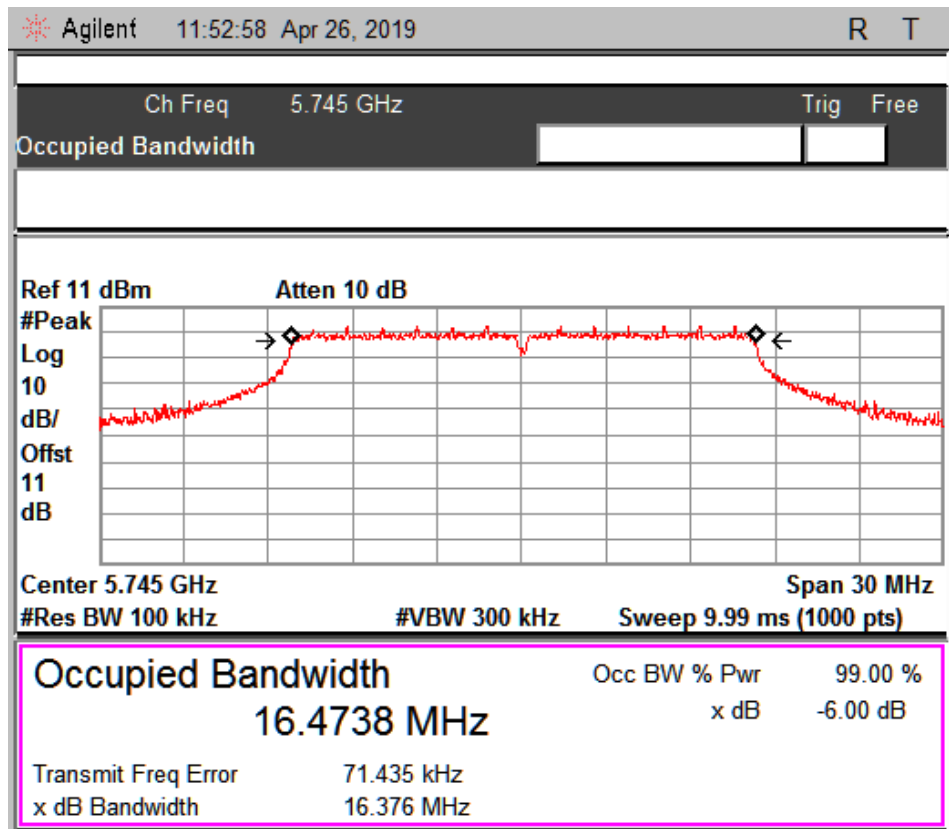
Data rate: 6 Mbps

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

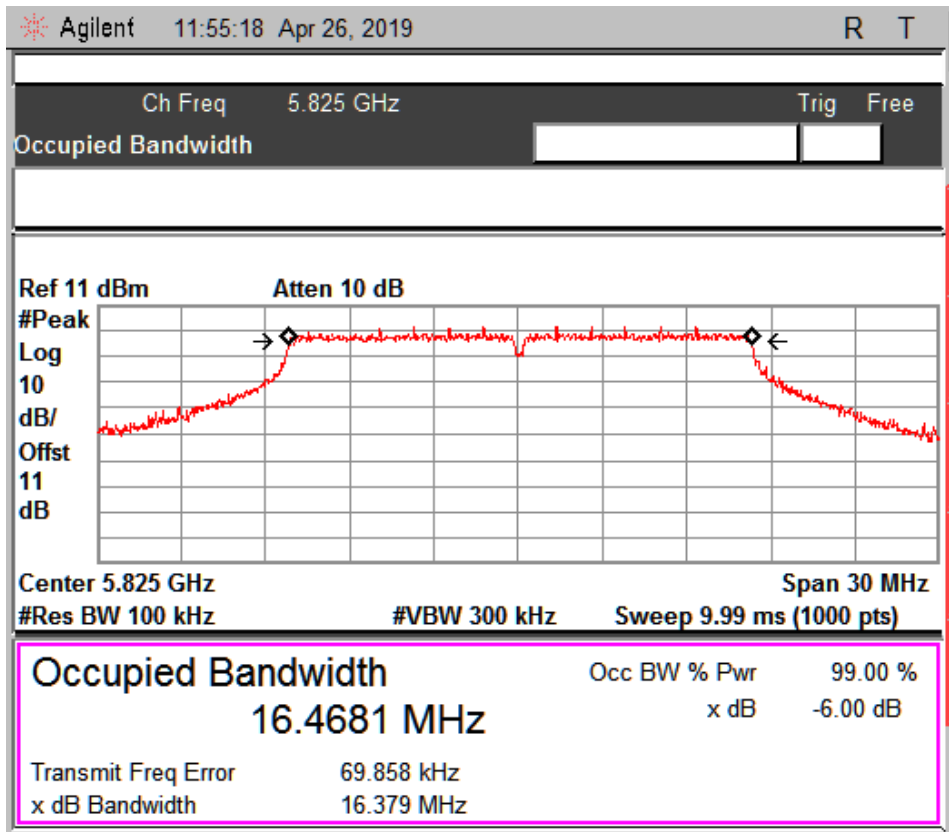
ULR-TC568819300000023F 001

Seite 13 von 212
Page 13 of 212



Data rate: 6 Mbps

Channel Frequency : 5.745 GHz



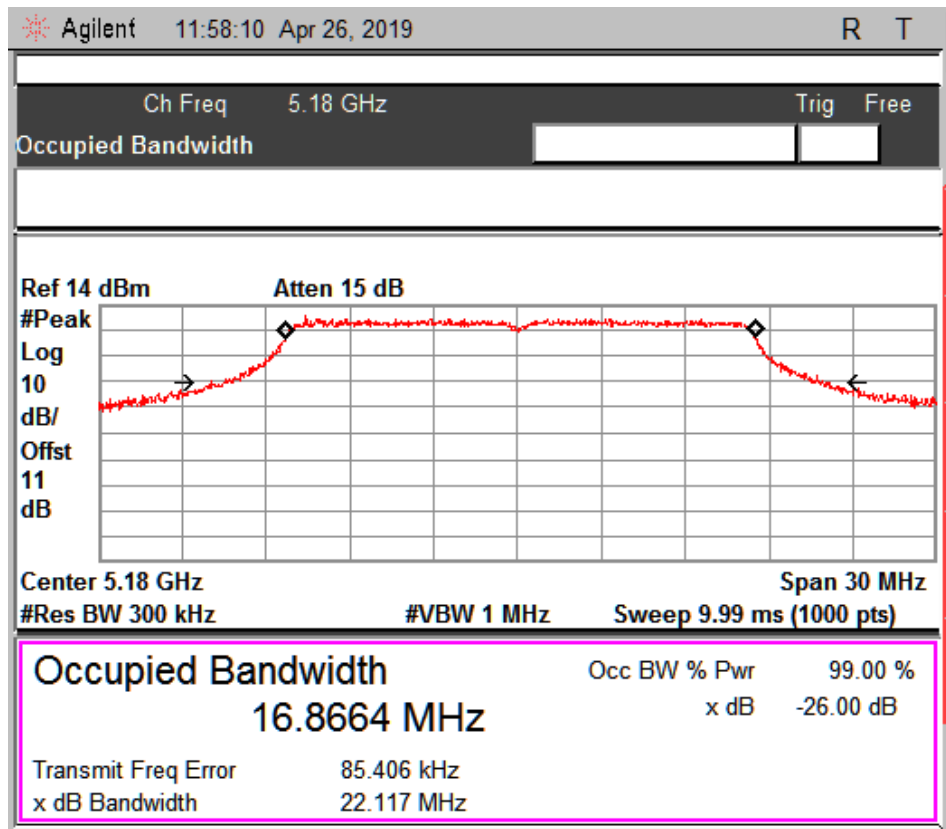
Data rate: 6 Mbps

Channel Frequency : 5.825 GHz

Prüfbericht - Nr.:
Test Report No.:

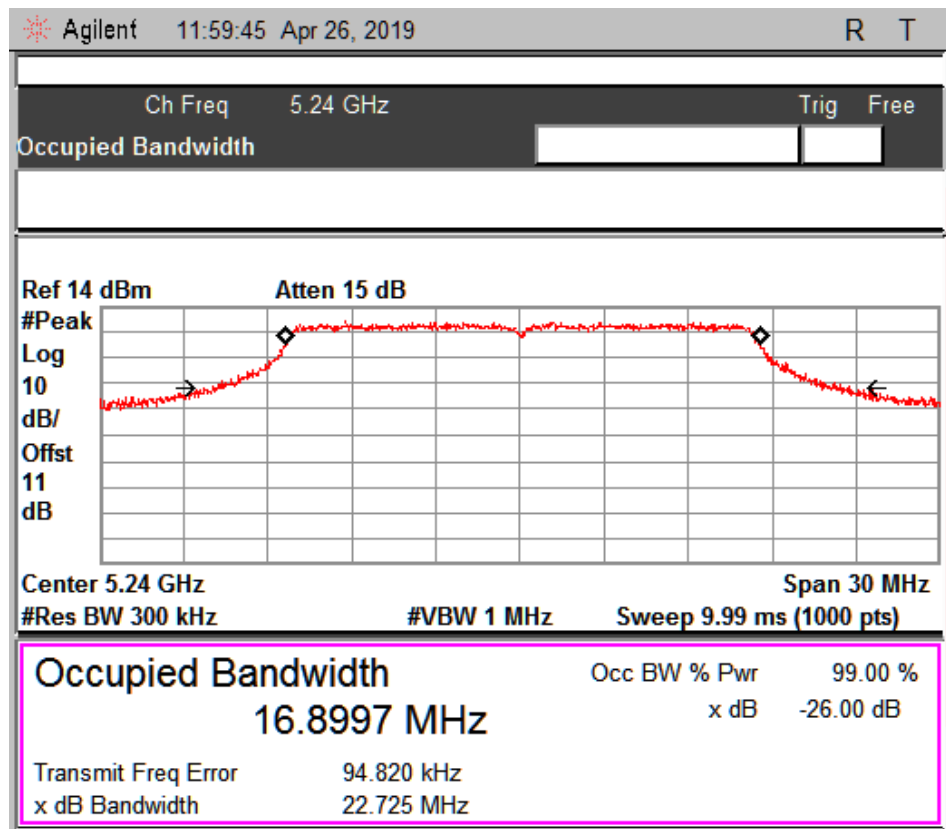
ULR-TC568819300000023F 001

Seite 14 von 212
Page 14 of 212



Data rate: 24 Mbps

Channel Frequency : 5.180 GHz



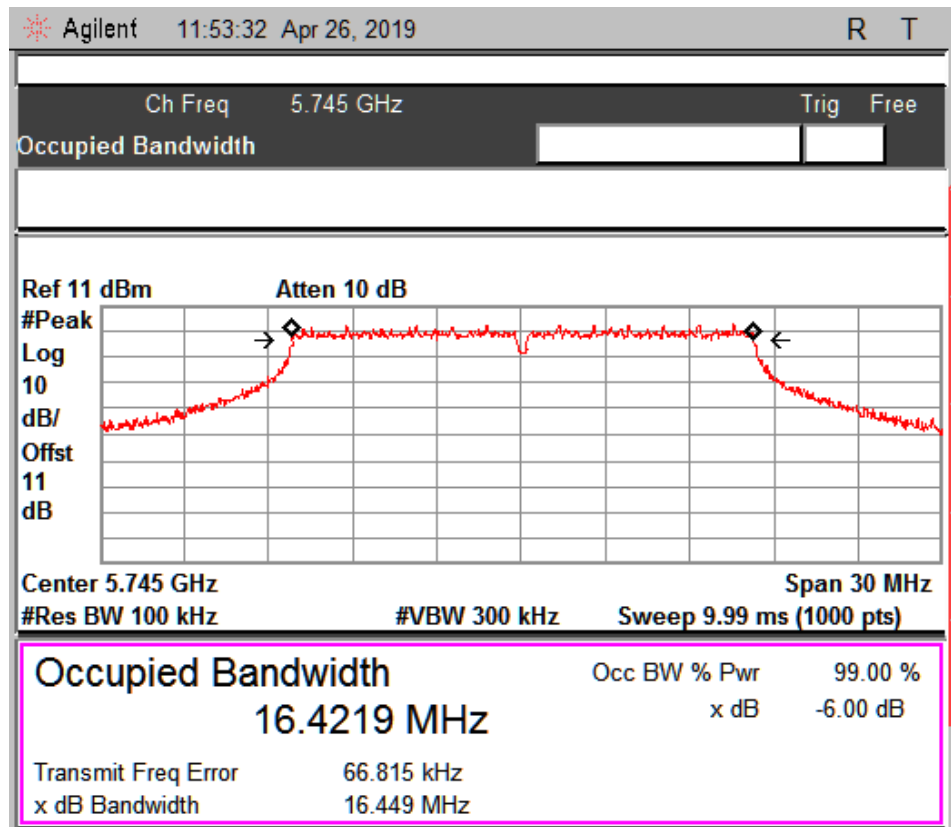
Data rate: 24 Mbps

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

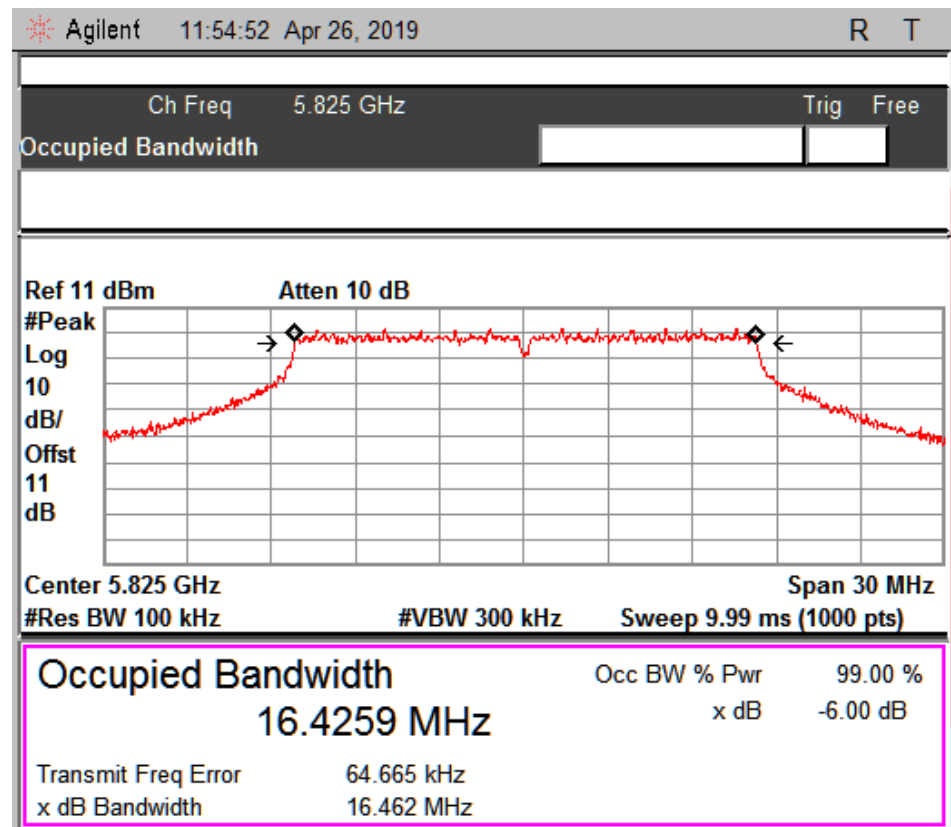
ULR-TC568819300000023F 001

Seite 15 von 212
Page 15 of 212



Data rate: 24 Mbps

Channel Frequency : 5.745 GHz



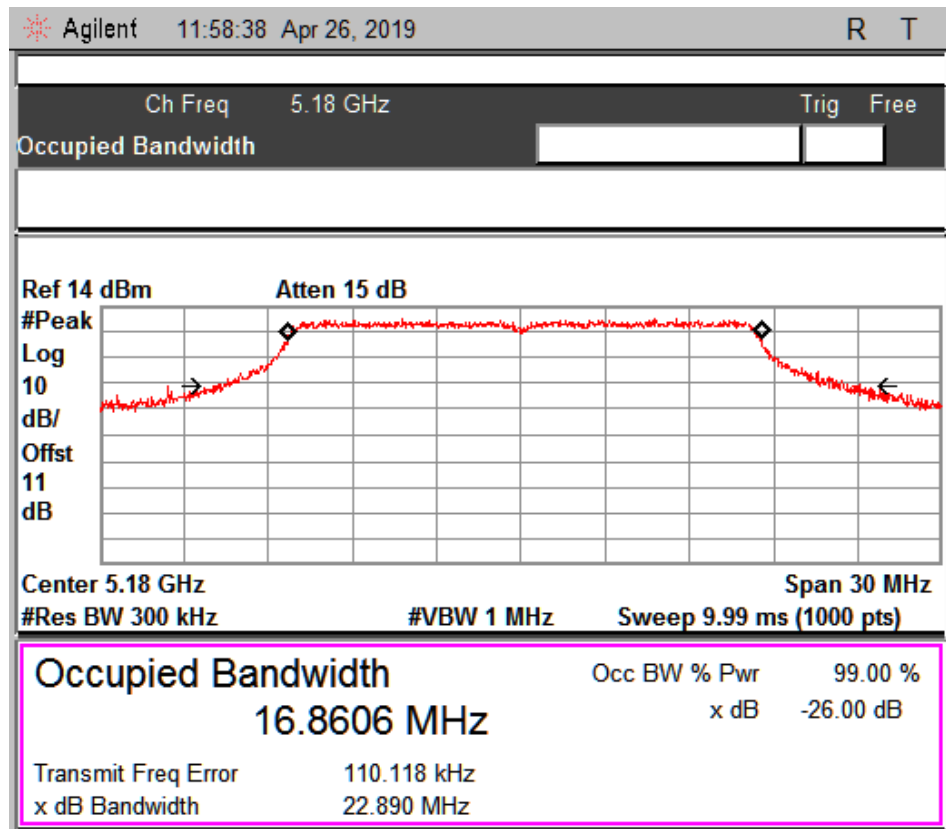
Data rate: 24 Mbps

Channel Frequency : 5.825 GHz

Prüfbericht - Nr.:
Test Report No.:

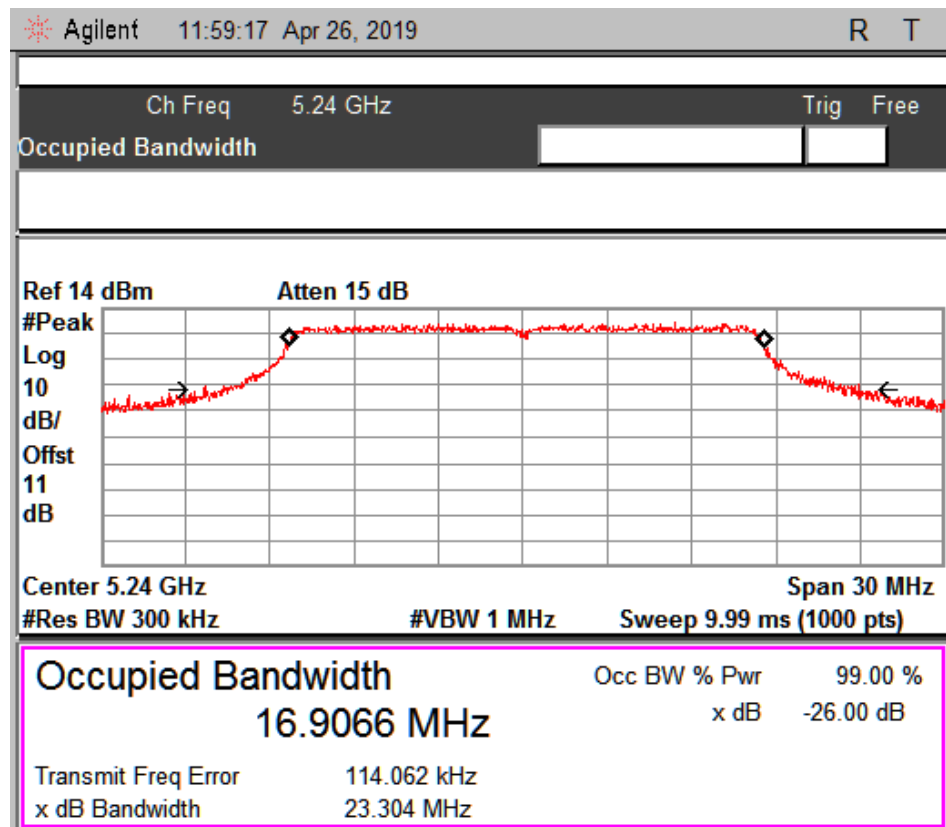
ULR-TC568819300000023F 001

Seite 16 von 212
Page 16 of 212



Data rate: 54 Mbps

Channel Frequency : 5.180 GHz



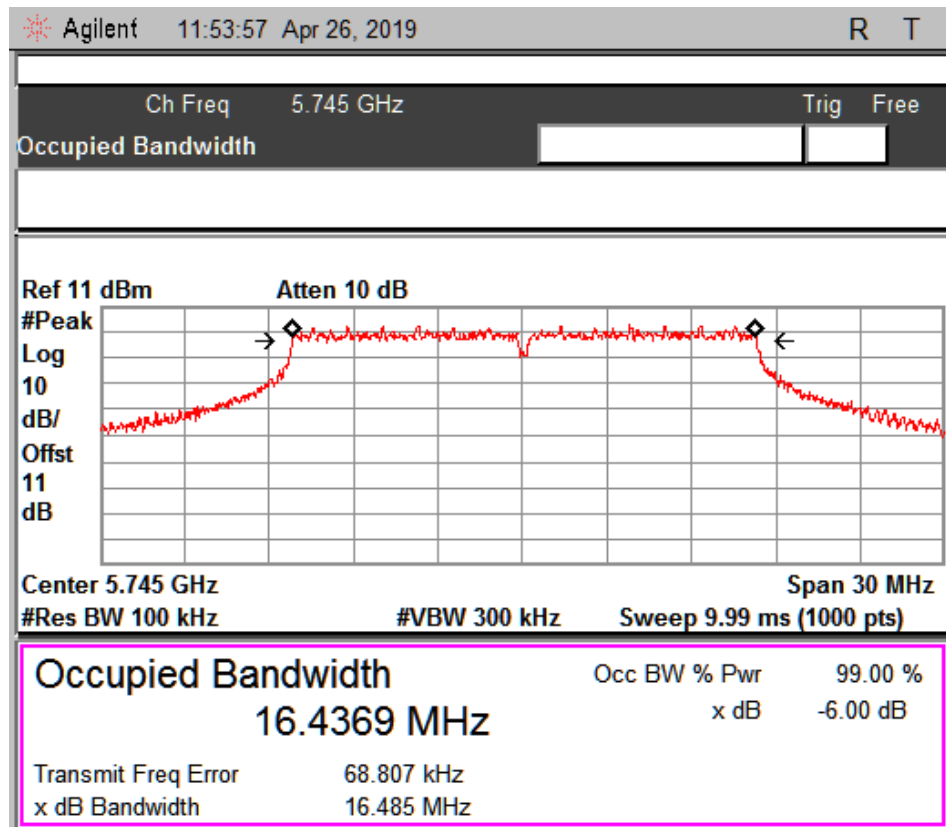
Data rate: 54 Mbps

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

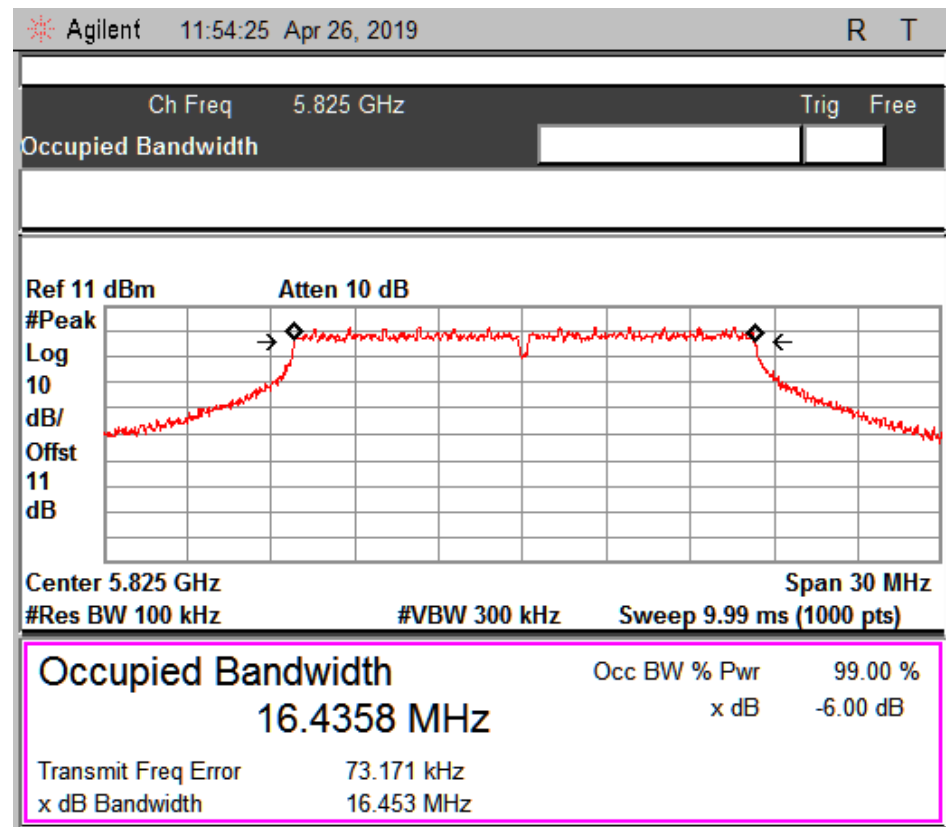
ULR-TC568819300000023F 001

Seite 17 von 212
Page 17 of 212



Data rate: 54 Mbps

Channel Frequency : 5.745 GHz



Data rate: 54 Mbps

Channel Frequency : 5.825 GHz

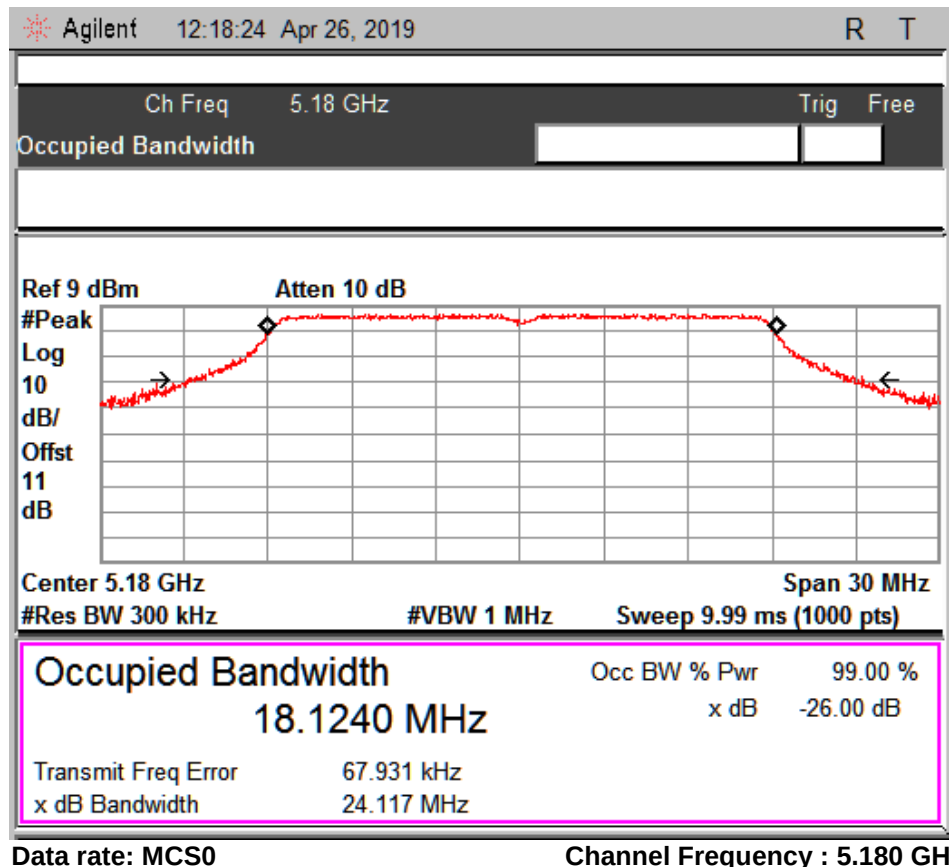
Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 18 von 212
Page 18 of 212

Modulation: 802.11ac mode SISO_VHT20

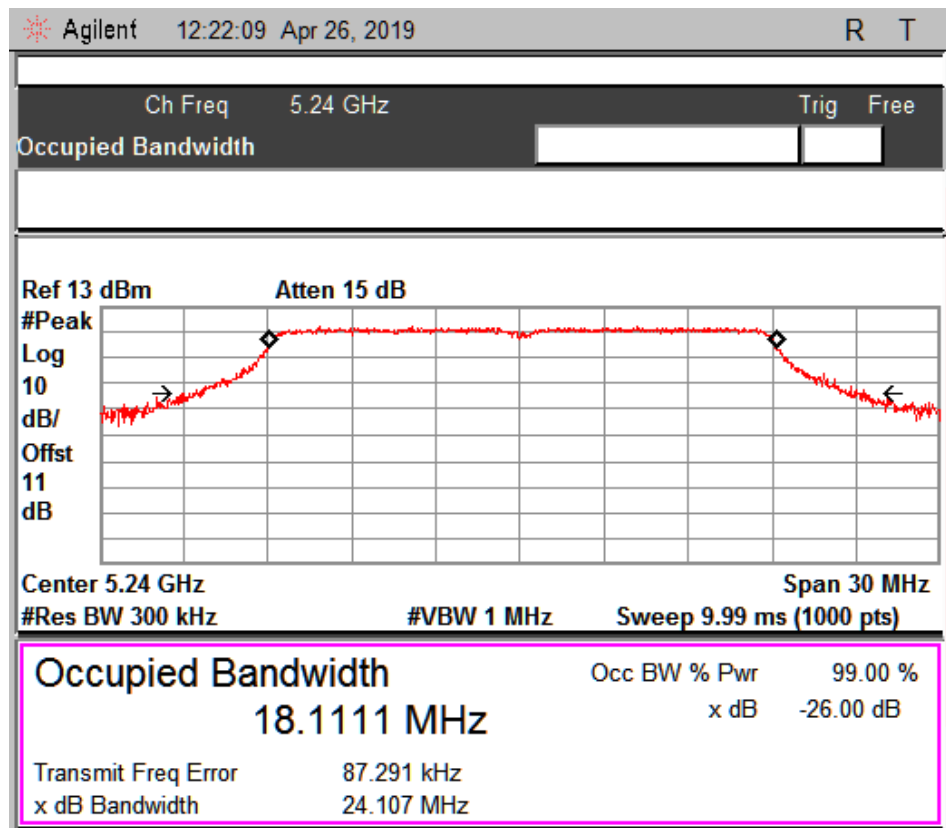
Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5180	24.11	18.12
	5240	24.10	18.11
	5745	17.60	17.67
	5825	17.60	17.66
MCS5	5180	22.47	17.97
	5240	22.71	18.03
	5745	17.71	17.64
	5825	17.72	17.64
MCS8	5180	22.9	18.02
	5240	22.75	18.00
	5745	17.70	17.63
	5825	17.723	17.65



Prüfbericht - Nr.:
Test Report No.:

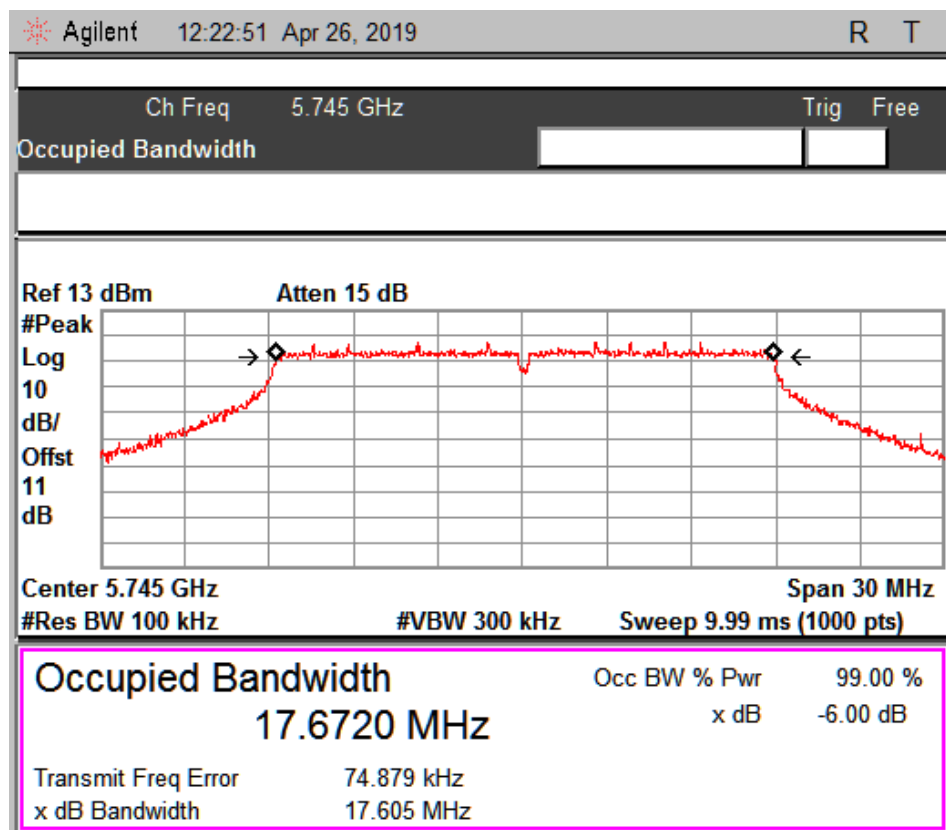
ULR-TC568819300000023F 001

Seite 19 von 212
Page 19 of 212



Data rate: MCS0

Channel Frequency : 5.240 GHz



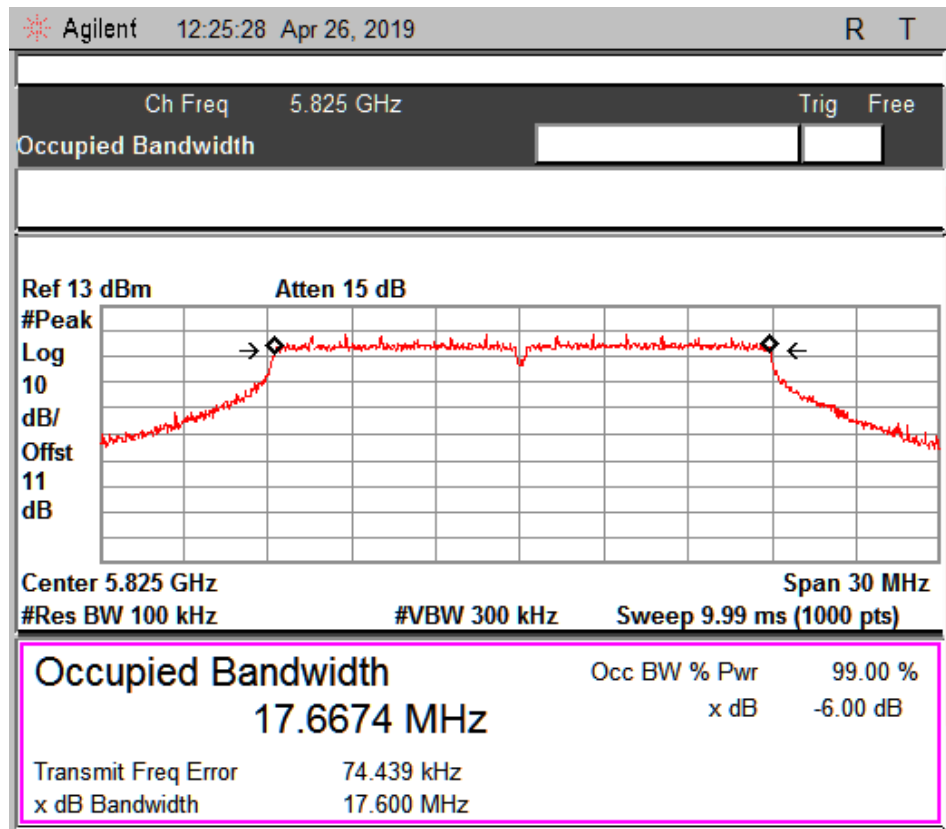
Data rate: MCS0

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

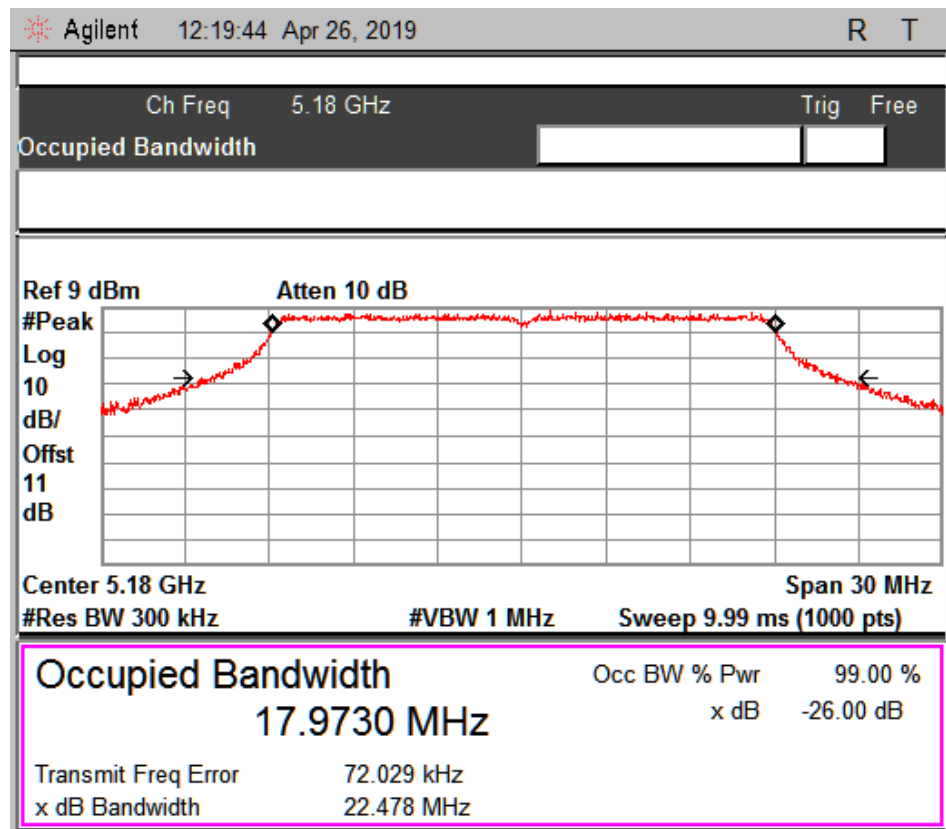
ULR-TC568819300000023F 001

Seite 20 von 212
Page 20 of 212



Data rate: MCS0

Channel Frequency : 5.825 GHz



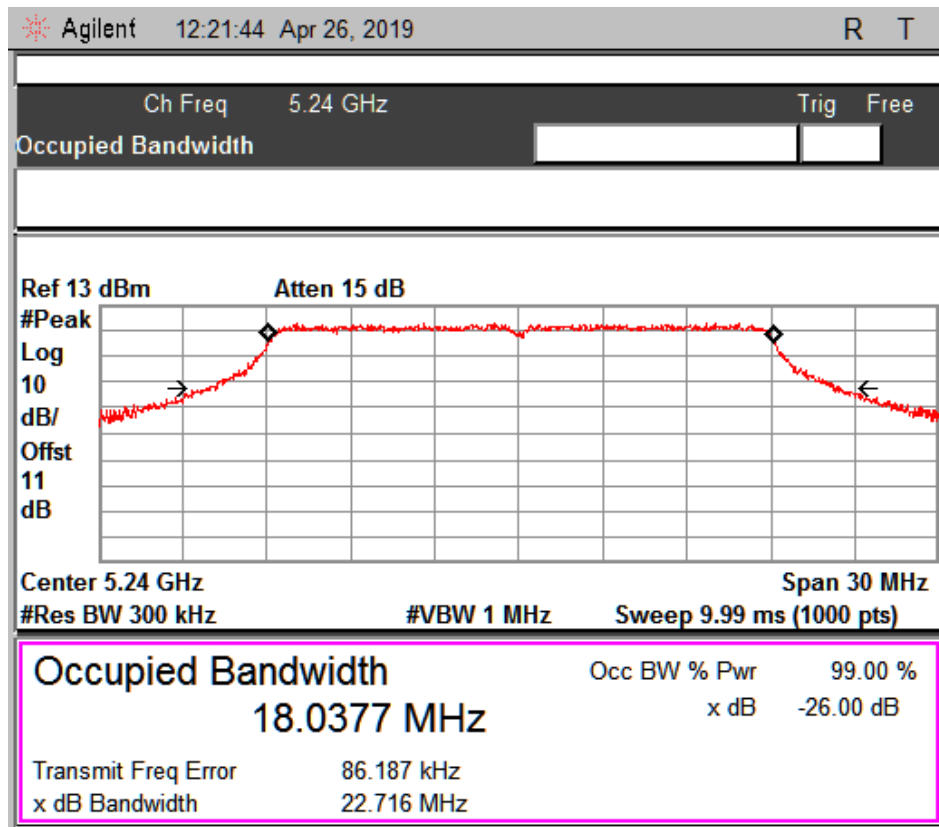
Data rate: MCS5

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

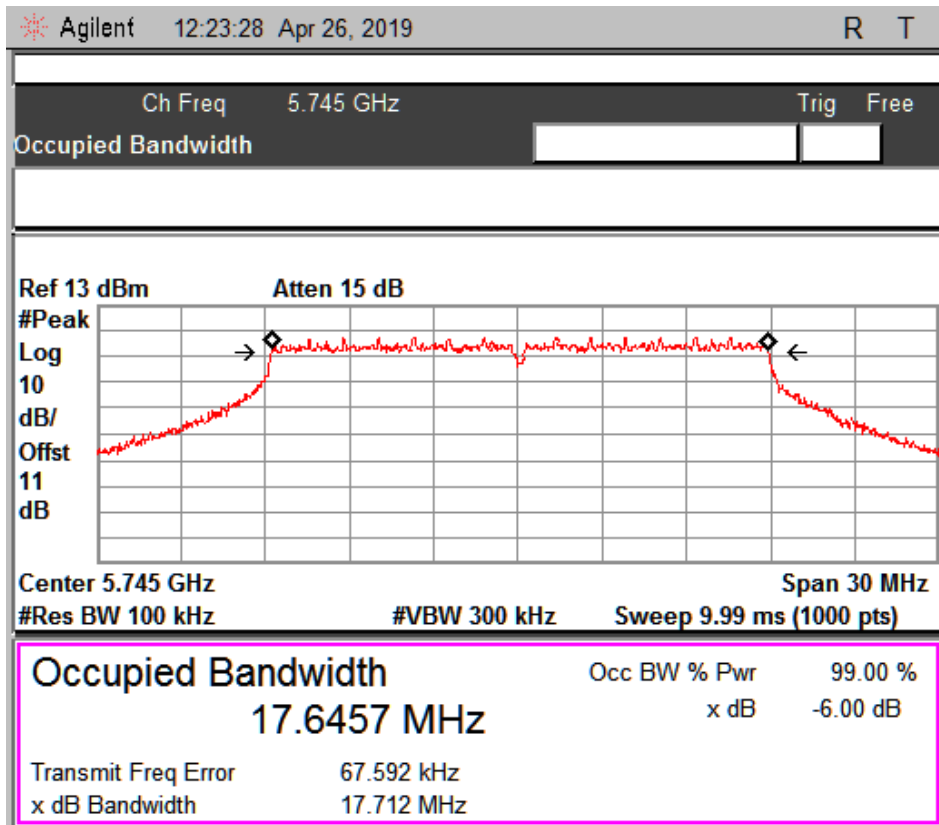
ULR-TC568819300000023F 001

Seite 21 von 212
Page 21 of 212



Data rate: MCS5

Channel Frequency : 5.240 GHz



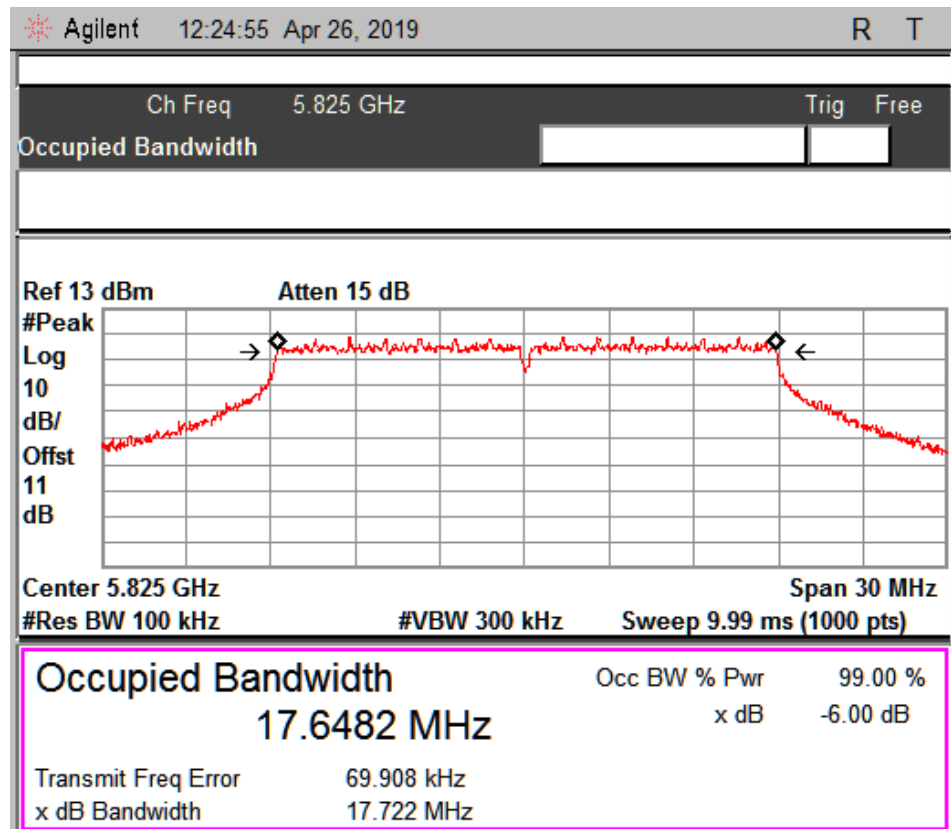
Data rate: MCS5

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

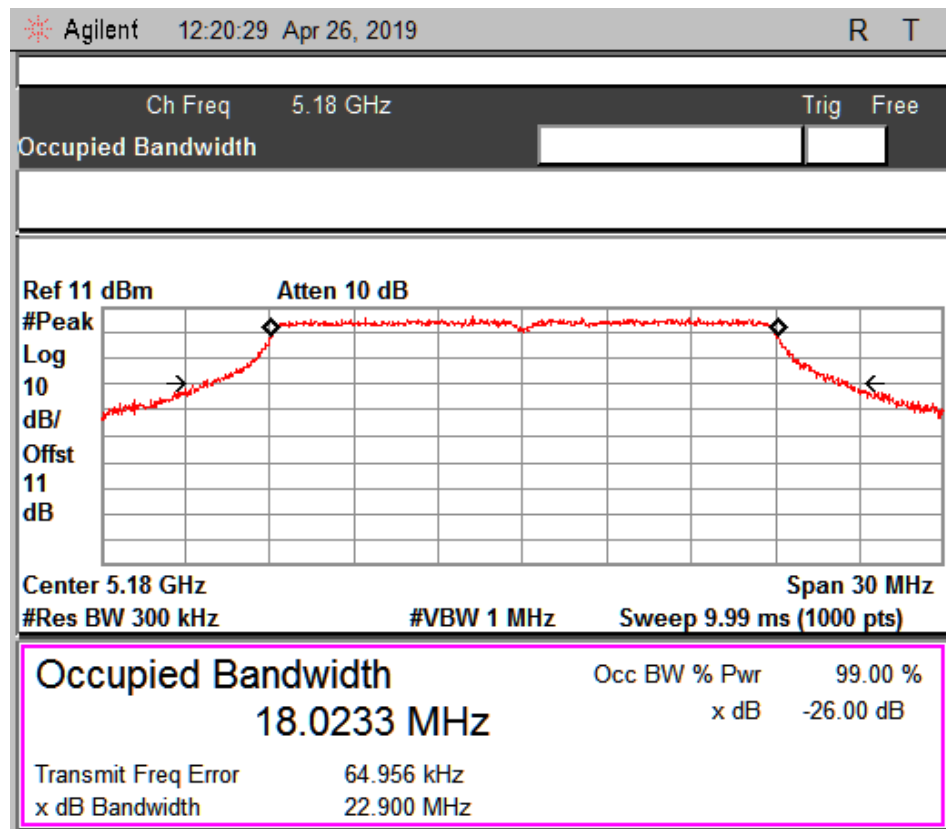
ULR-TC568819300000023F 001

Seite 22 von 212
Page 22 of 212



Data rate: MCS5

Channel Frequency : 5.825 GHz



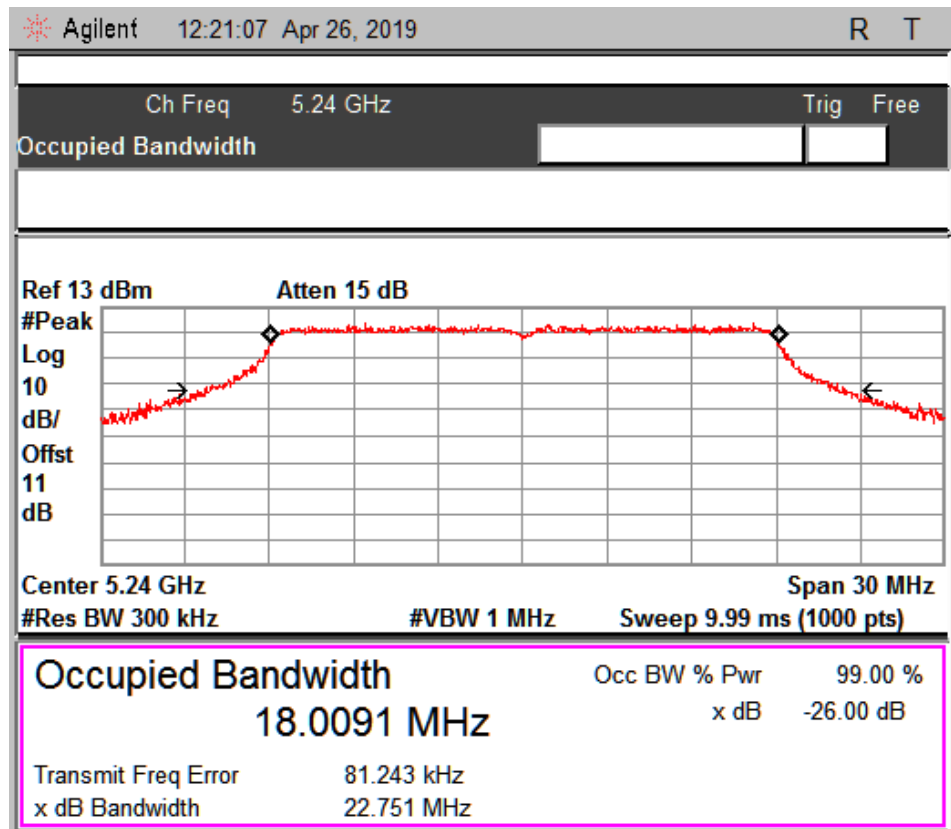
Data rate: MCS8

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

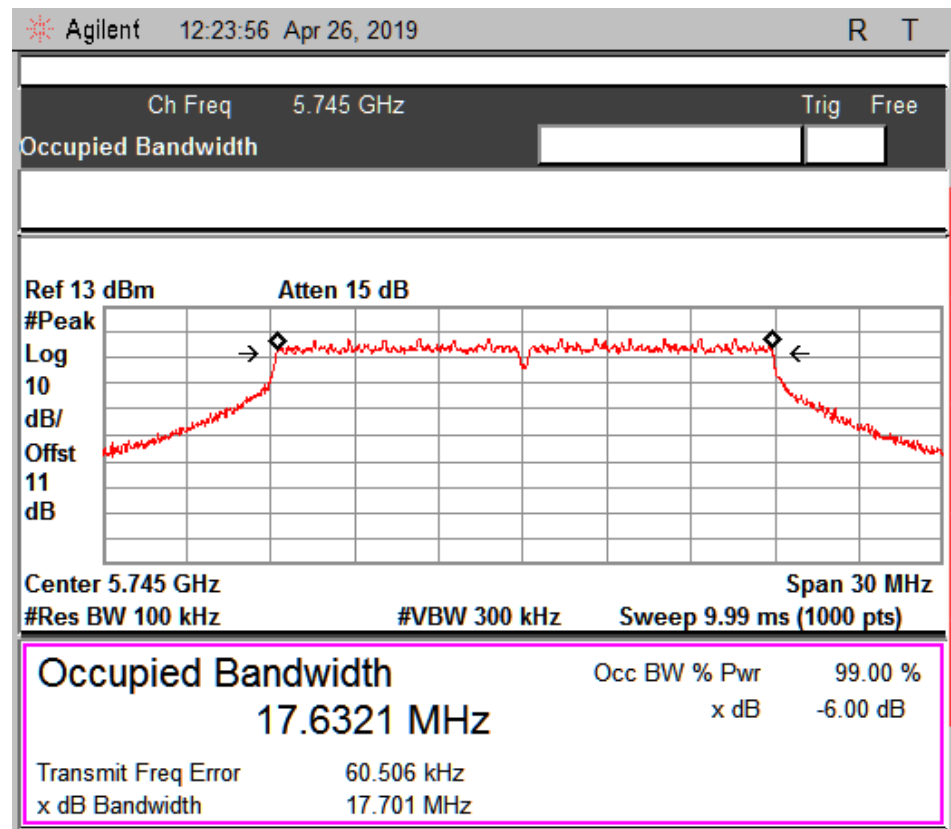
ULR-TC568819300000023F 001

Seite 23 von 212
Page 23 of 212



Data rate: MCS8

Channel Frequency : 5.240 GHz



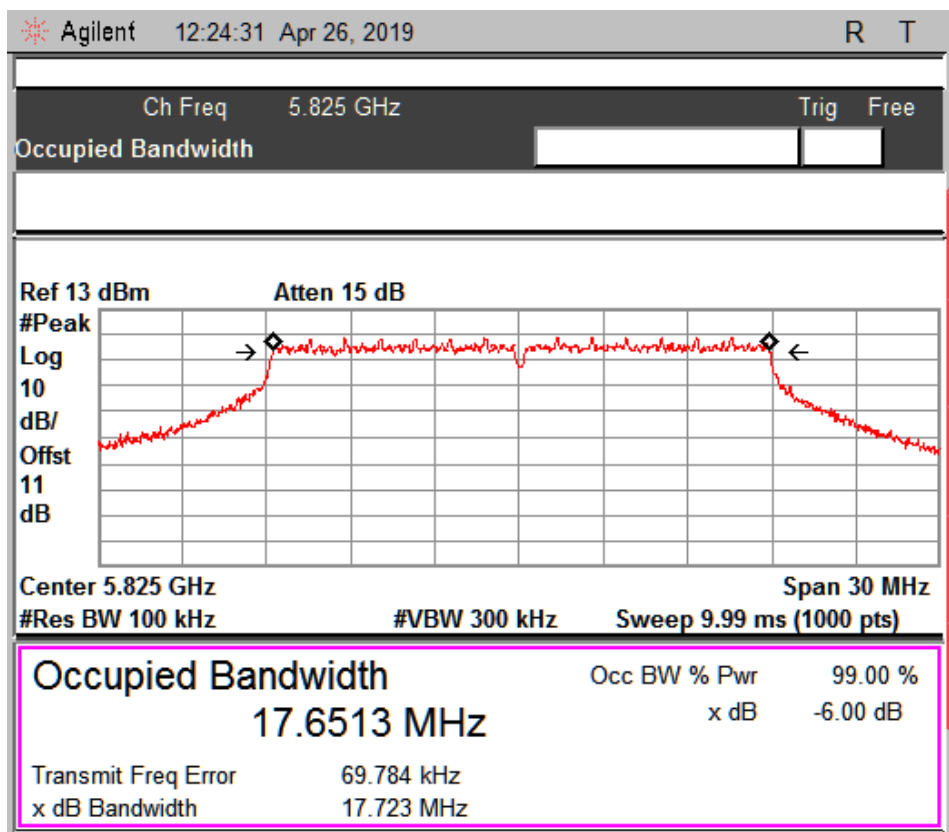
Data rate: MCS8

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 24 von 212
Page 24 of 212



Data rate: MCS8

Channel Frequency : 5.825 GHz

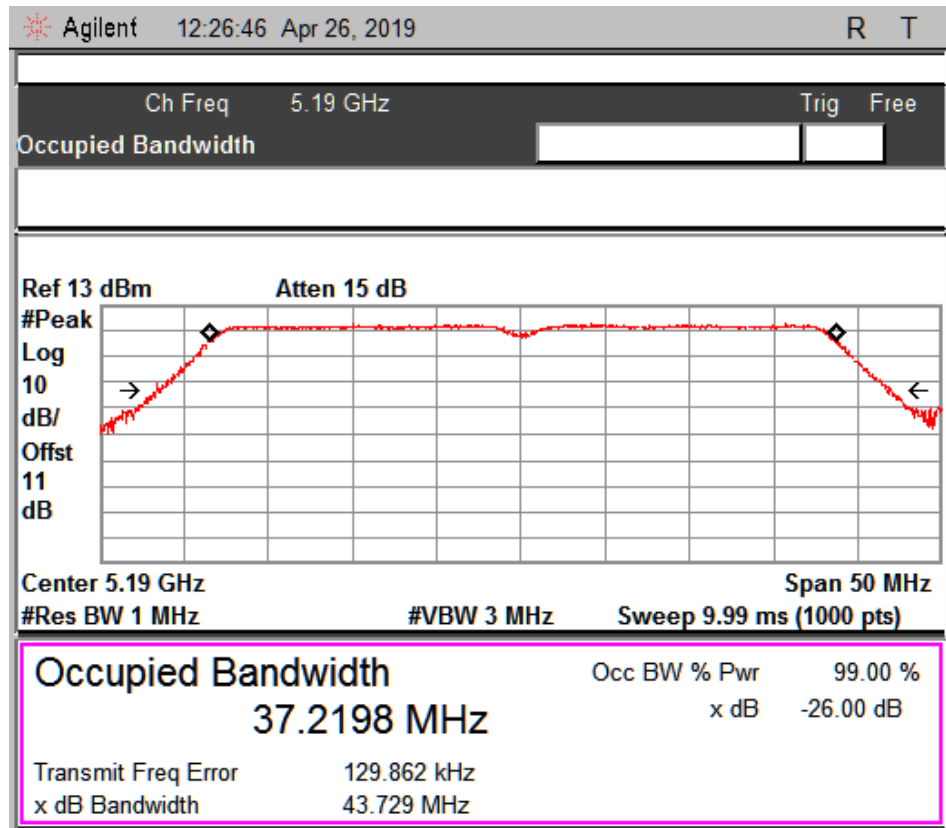
Modulation: 802.11ac mode SISO_VHT40

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5190	43.72	37.21
	5230	43.70	37.30
	5755	36.36	36.16
	5795	36.36	36.18
MCS5	5190	46.01	37.28
	5230	45.55	37.42
	5755	36.44	36.18
	5795	36.40	36.18
MCS9	5190	43.56	37.30
	5230	43.31	37.34
	5755	36.35	36.17
	5795	36.32	36.17

Prüfbericht - Nr.:
Test Report No.:

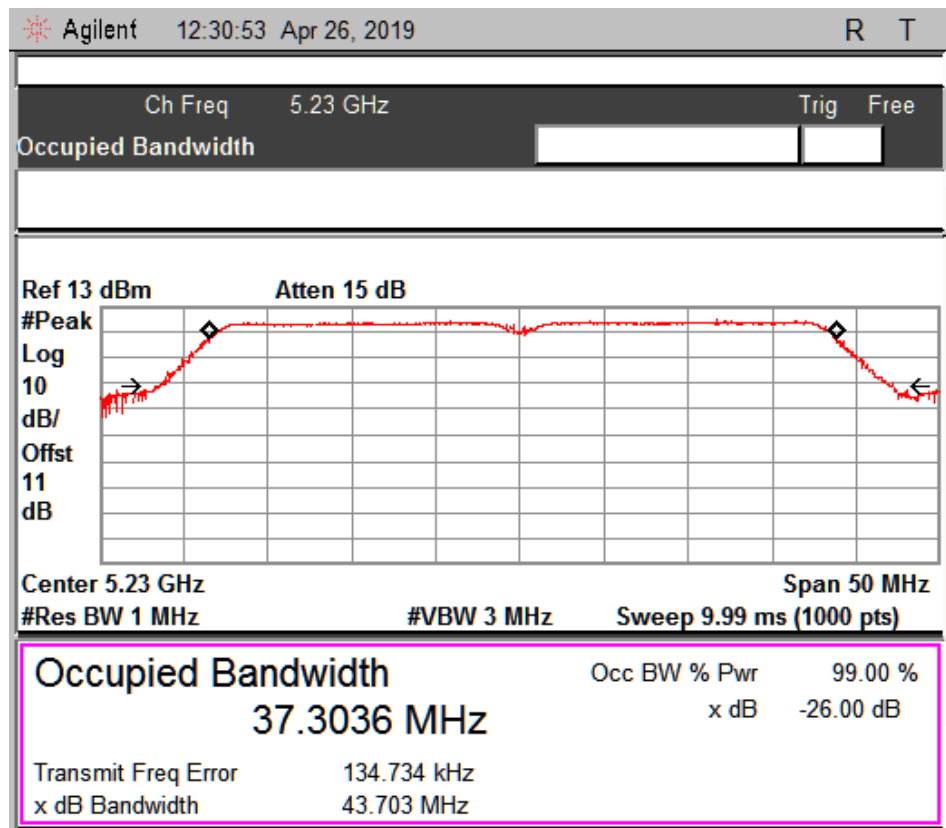
ULR-TC568819300000023F 001

Seite 25 von 212
Page 25 of 212



Data rate: MCS0

Channel Frequency : 5.190 GHz



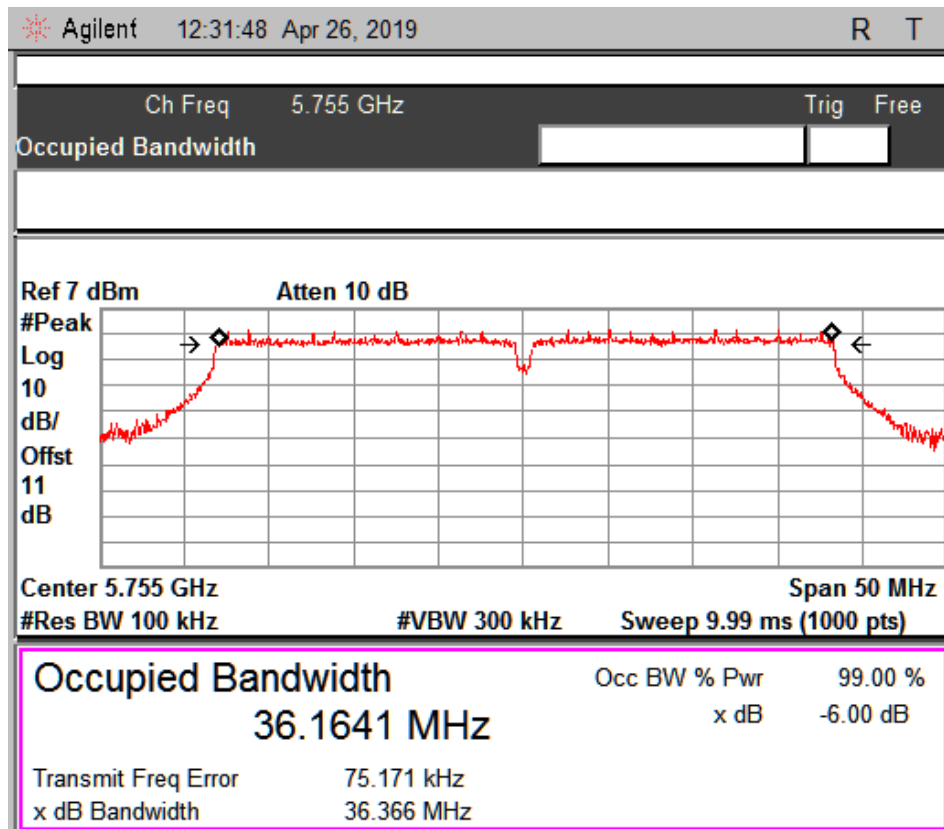
Data rate: MCS0

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

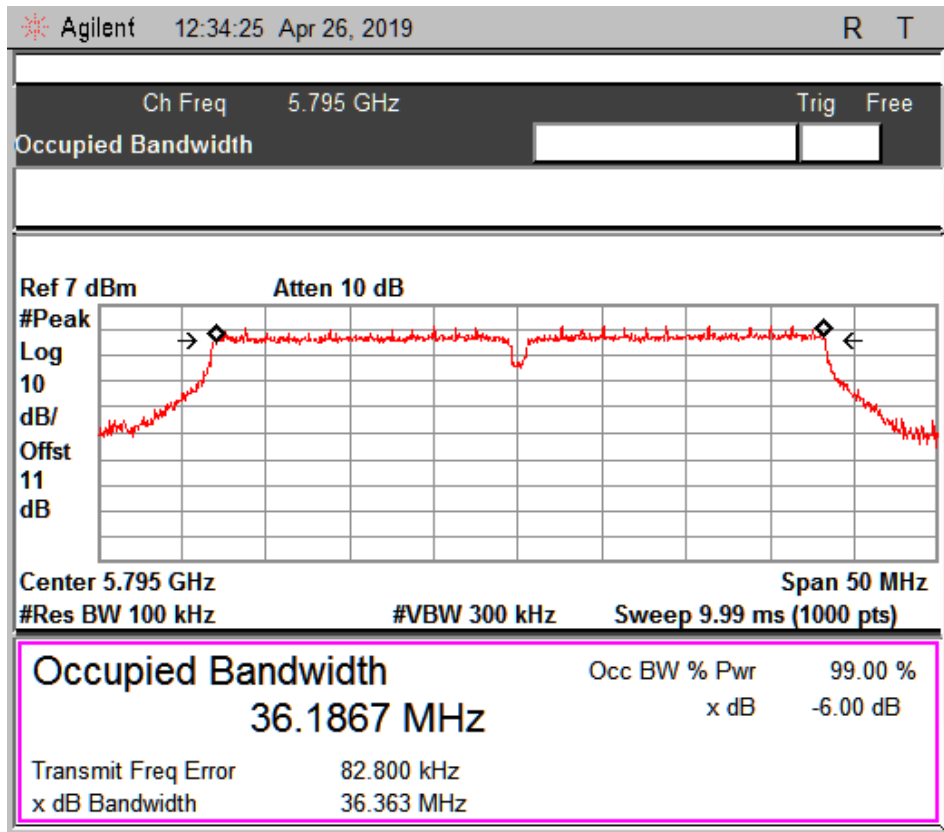
ULR-TC568819300000023F 001

Seite 26 von 212
Page 26 of 212



Data rate: MCS0

Channel Frequency : 5.755 GHz



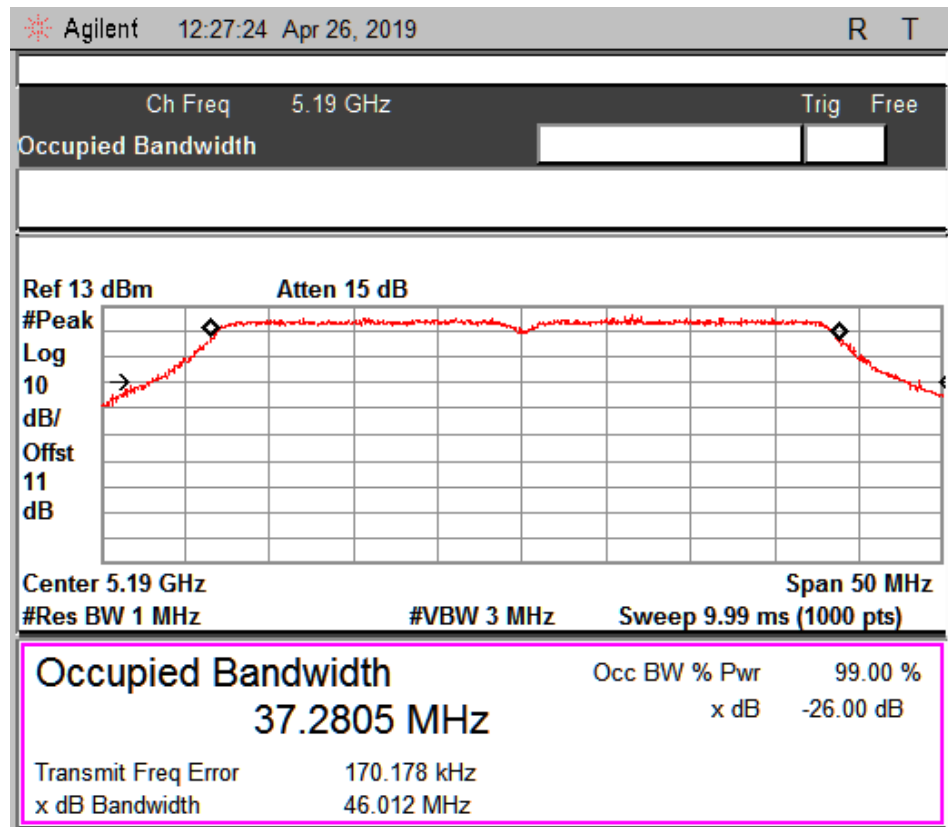
Data rate: MCS0

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

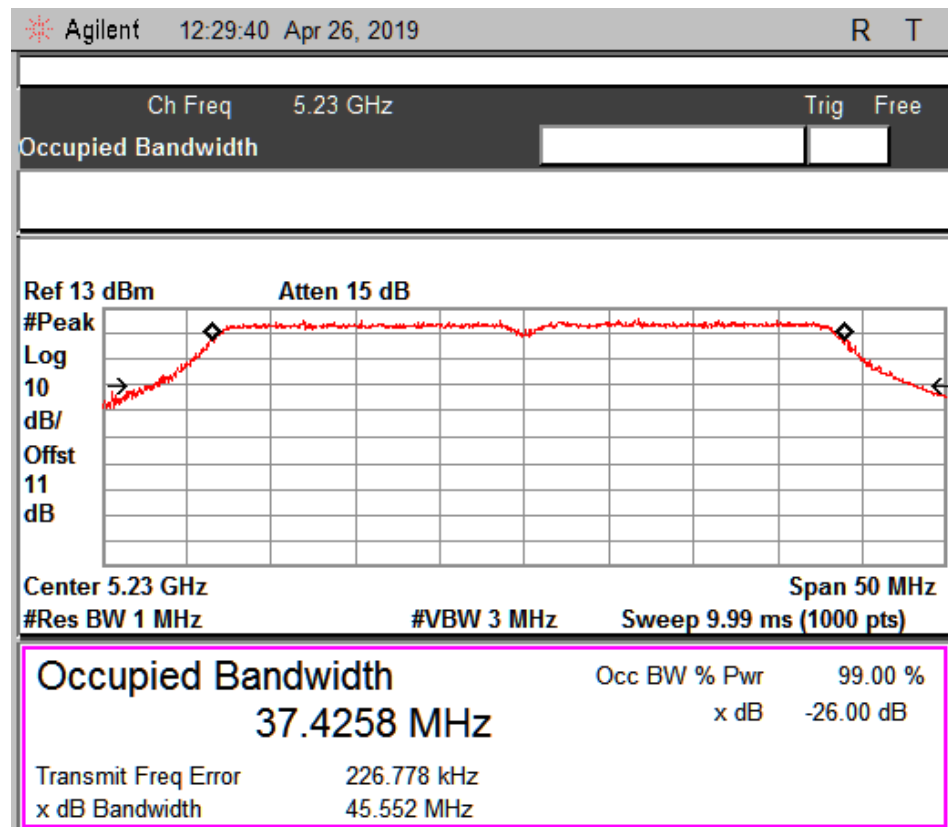
ULR-TC568819300000023F 001

Seite 27 von 212
Page 27 of 212



Data rate: MCS5

Channel Frequency : 5.190 GHz



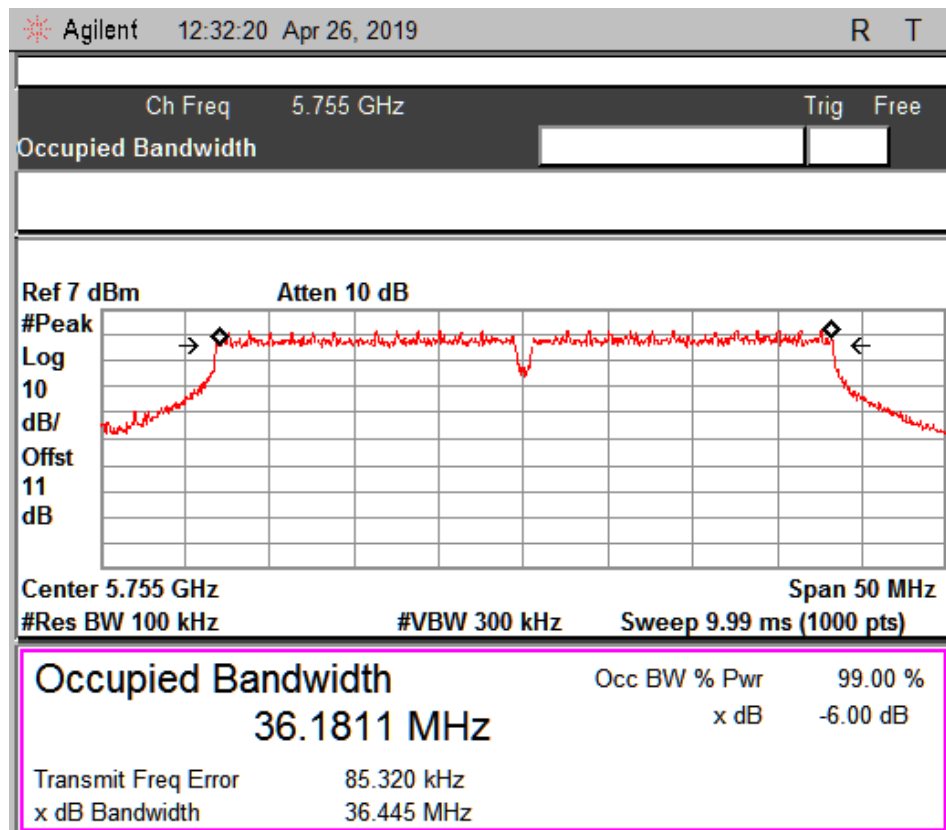
Data rate: MCS5

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

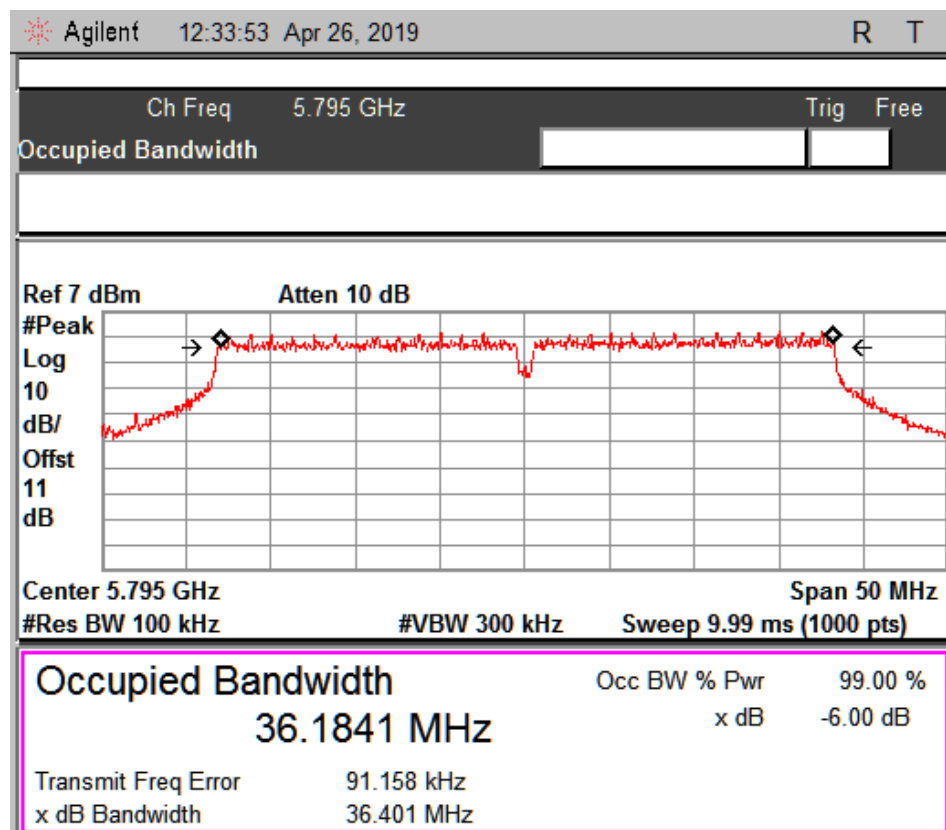
ULR-TC568819300000023F 001

Seite 28 von 212
Page 28 of 212



Data rate: MCS5

Channel Frequency : 5.755 GHz



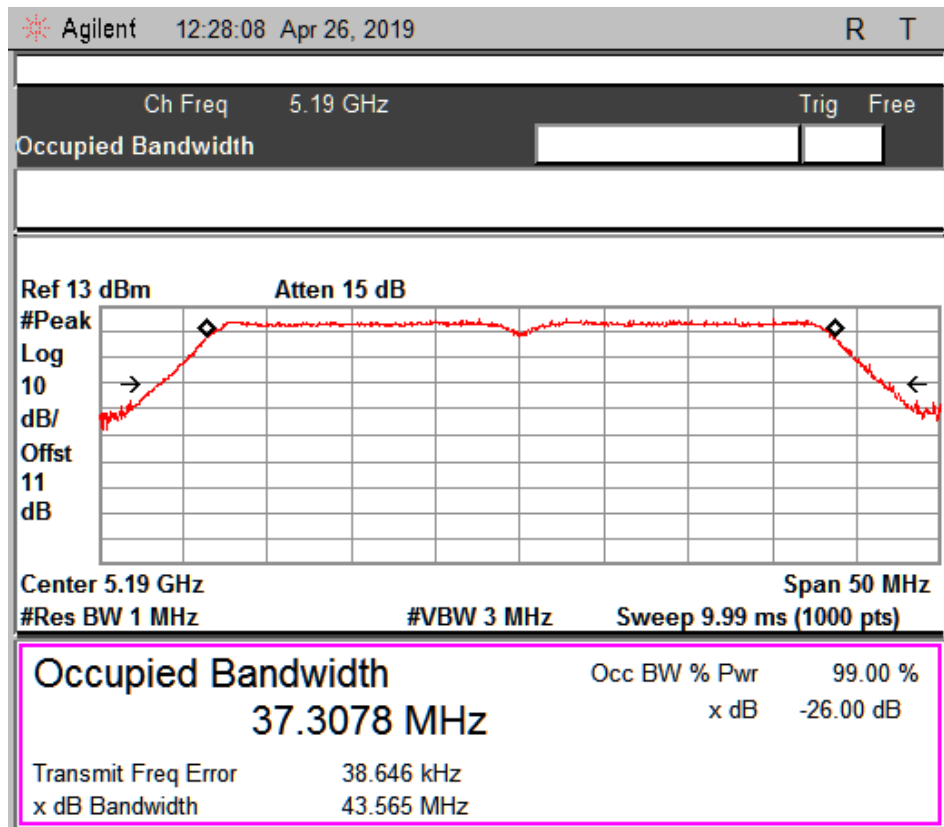
Data rate: MCS5

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

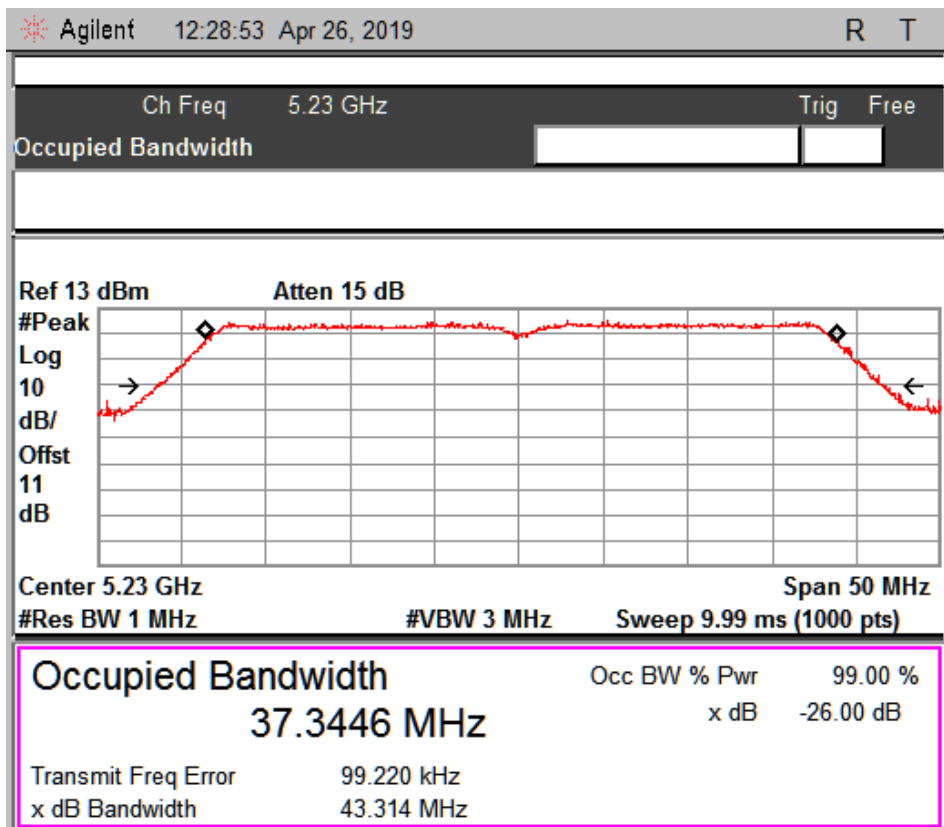
ULR-TC568819300000023F 001

Seite 29 von 212
Page 29 of 212



Data rate: MCS5

Channel Frequency : 5.190 GHz



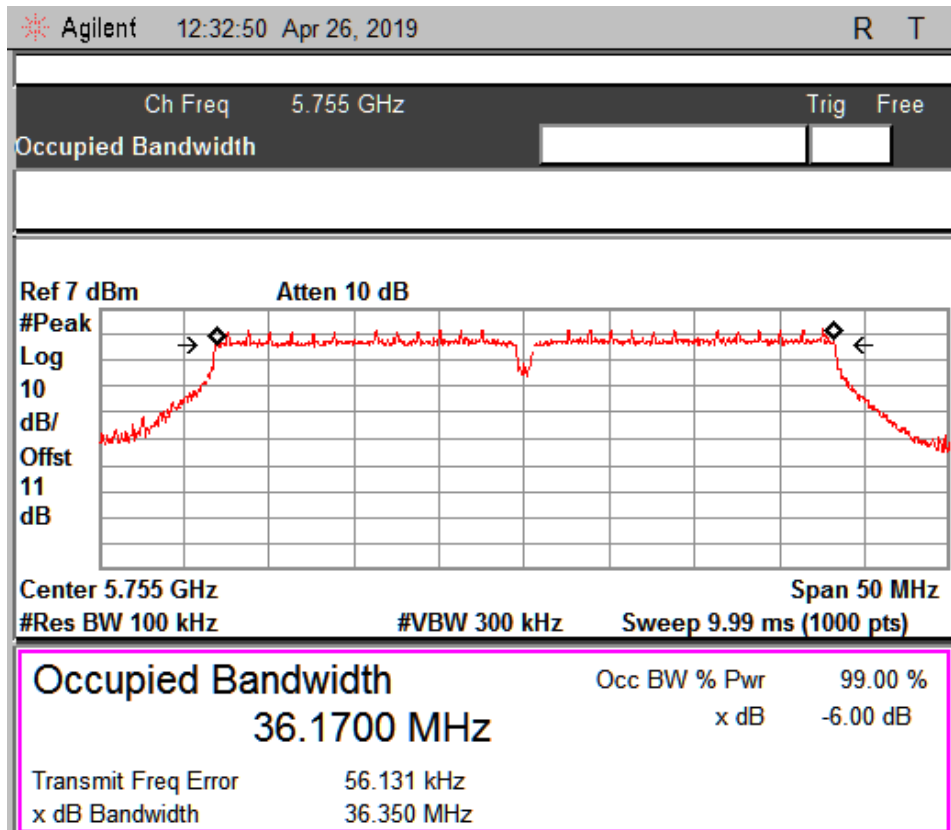
Data rate: MCS5

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

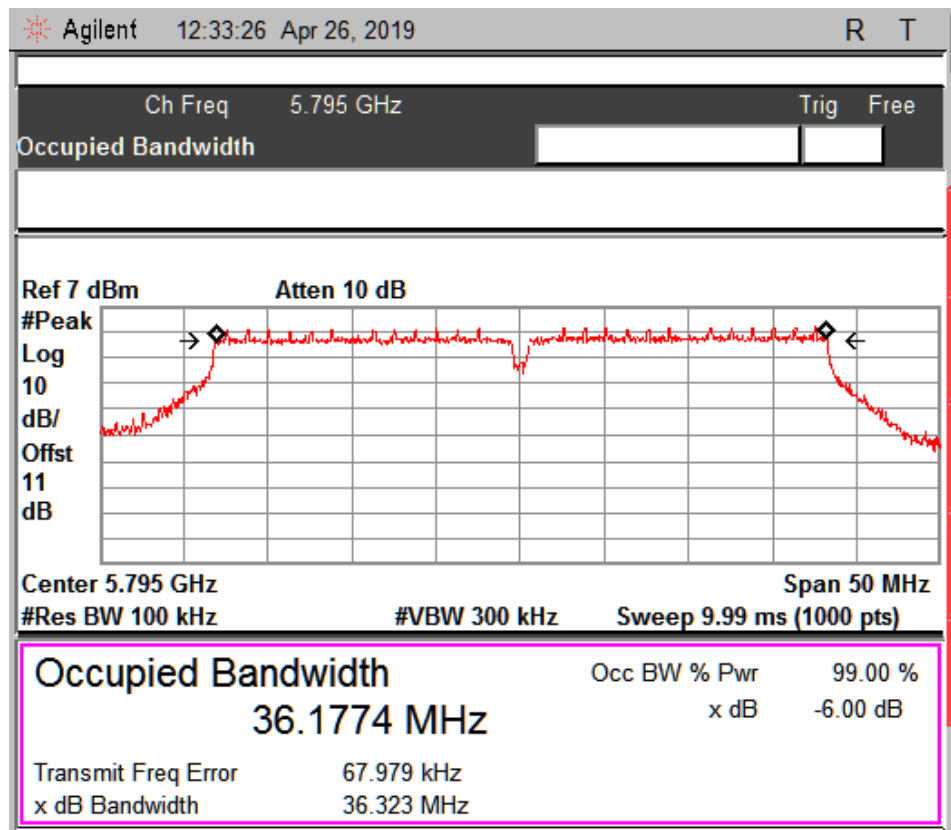
ULR-TC568819300000023F 001

Seite 30 von 212
Page 30 of 212



Data rate: MCS5

Channel Frequency : 5.755 GHz



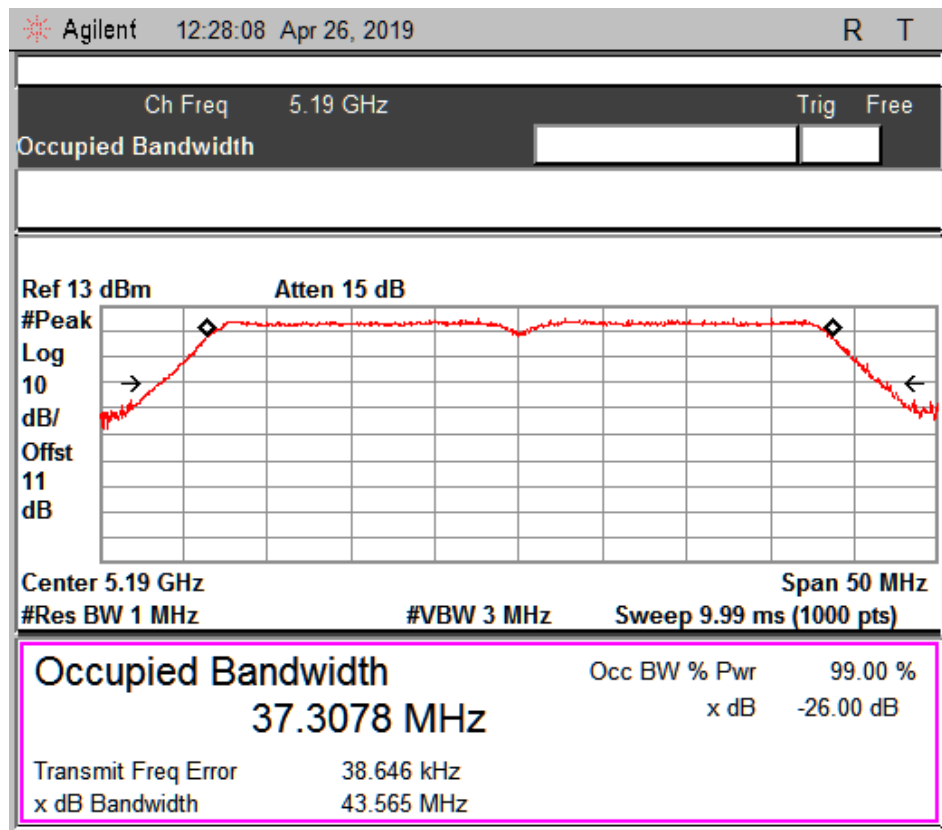
Data rate: MCS5

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

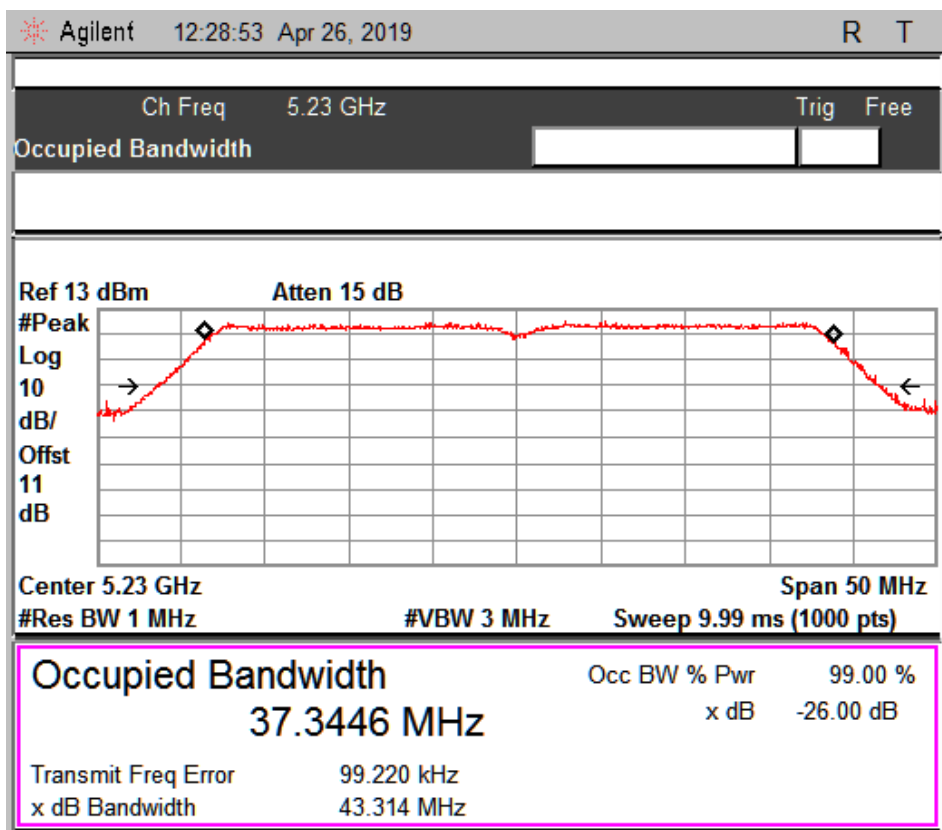
ULR-TC568819300000023F 001

Seite 31 von 212
Page 31 of 212



Data rate: MCS9

Channel Frequency : 5.190 GHz



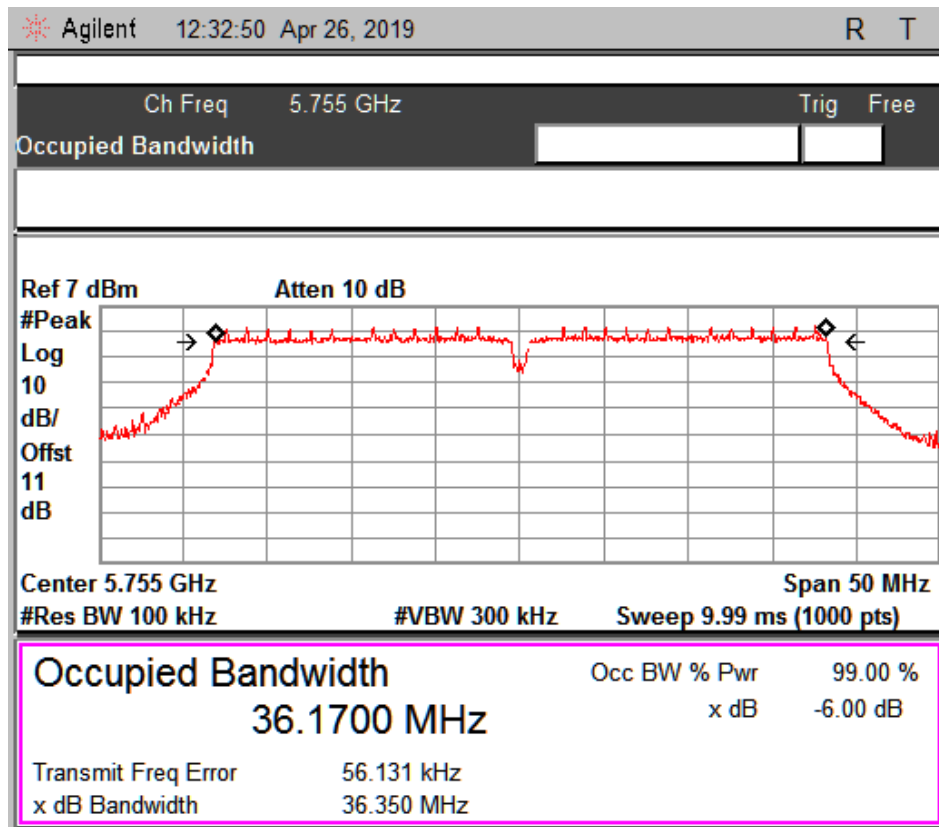
Data rate: MCS9

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

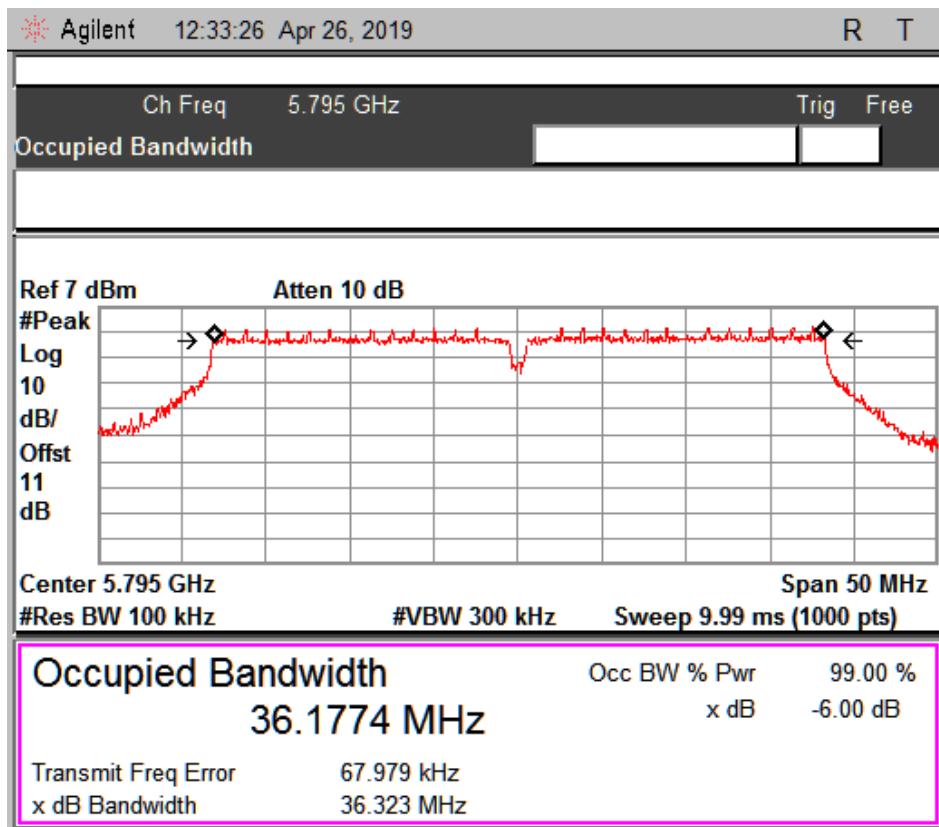
ULR-TC568819300000023F 001

Seite 32 von 212
Page 32 of 212



Data rate: MCS9

Channel Frequency : 5.755 GHz



Data rate: MCS9

Channel Frequency : 5.795 GHz

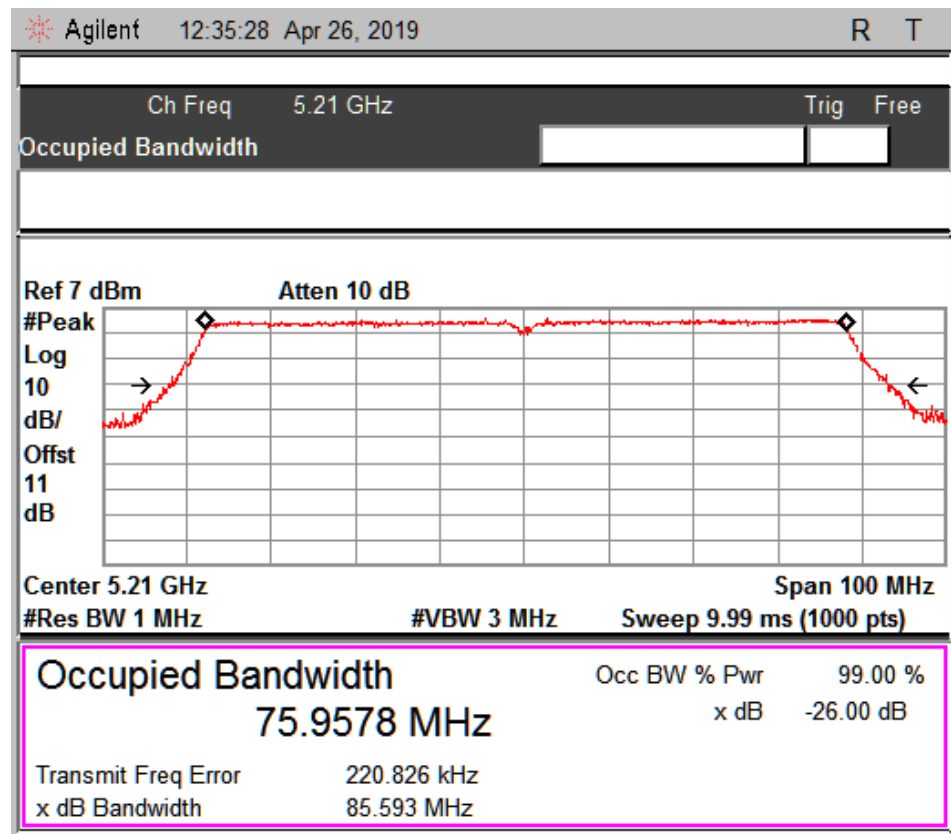
Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 33 von 212
Page 33 of 212

Modulation: 802.11ac mode SISO_VHT80

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5210	85.59	75.95
	5775	75.77	75.50
MCS5	5210	90.56	76.35
	5775	76.43	75.71
MCS9	5210	90.43	76.37
	5775	76.11	75.65



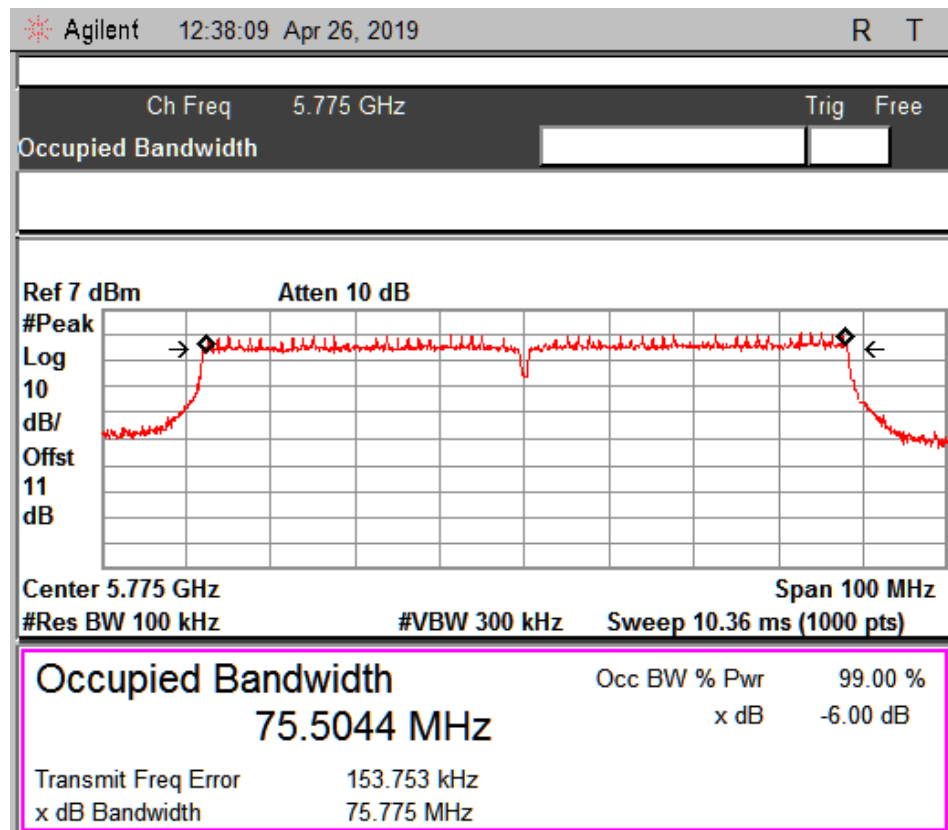
Data rate: MCS0

Channel Frequency : 5.210 GHz

Prüfbericht - Nr.:
Test Report No.:

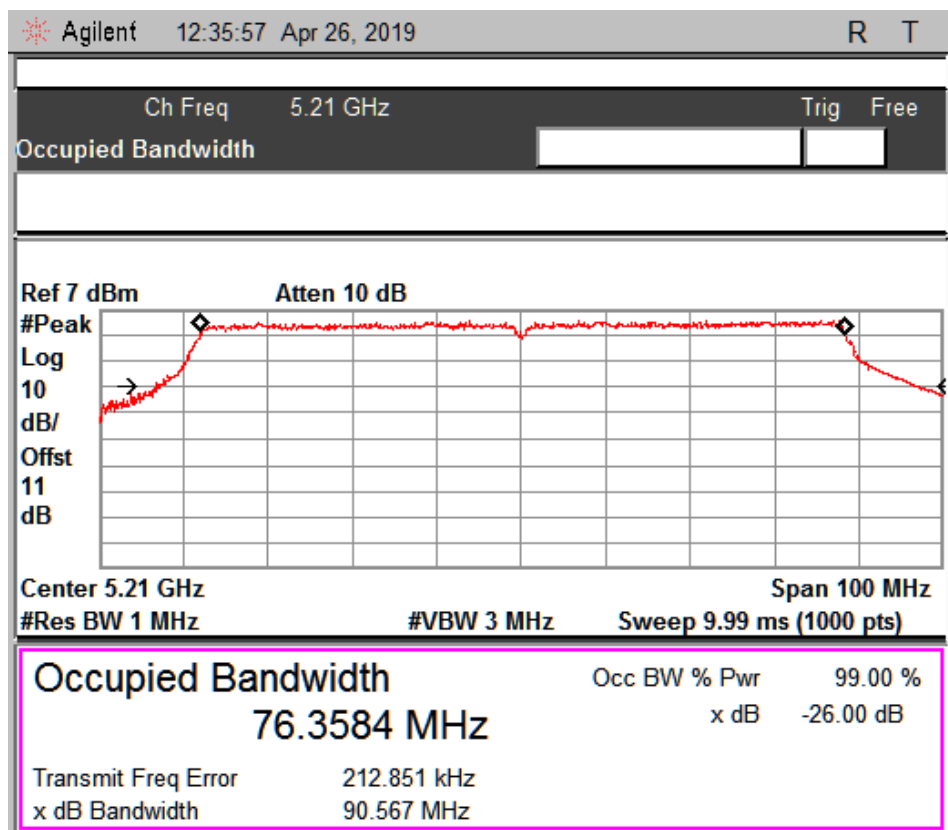
ULR-TC568819300000023F 001

Seite 34 von 212
Page 34 of 212



Data rate: MCS0

Channel Frequency : 5.775 GHz



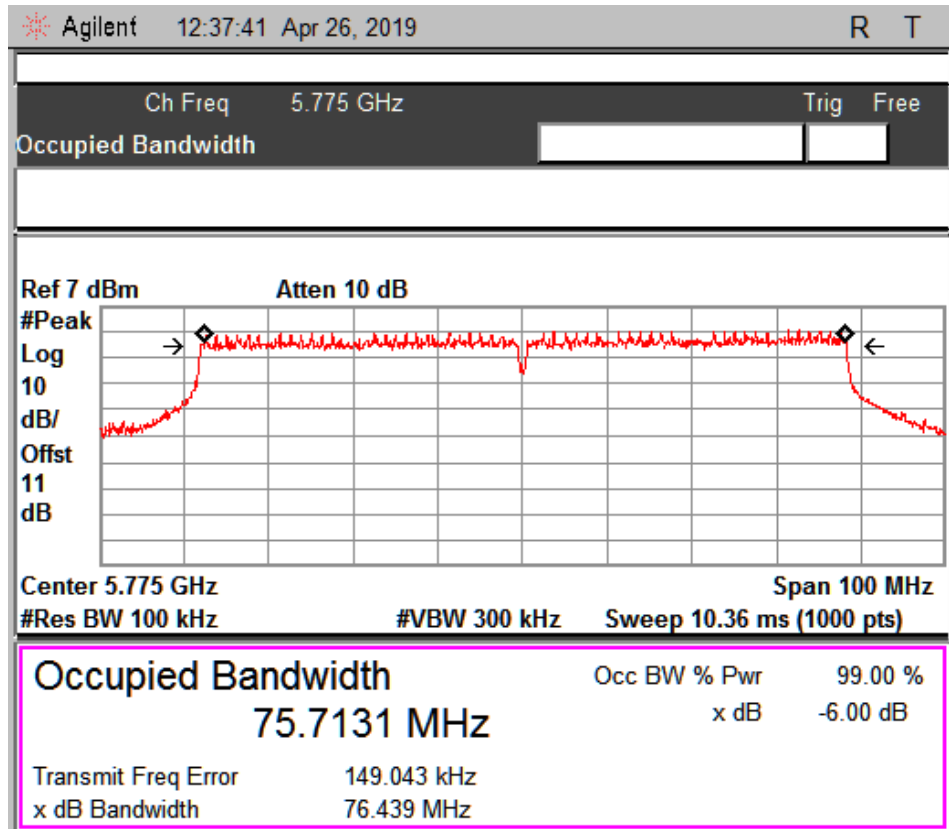
Data rate: MCS5

Channel Frequency : 5.210 GHz

Prüfbericht - Nr.:
Test Report No.:

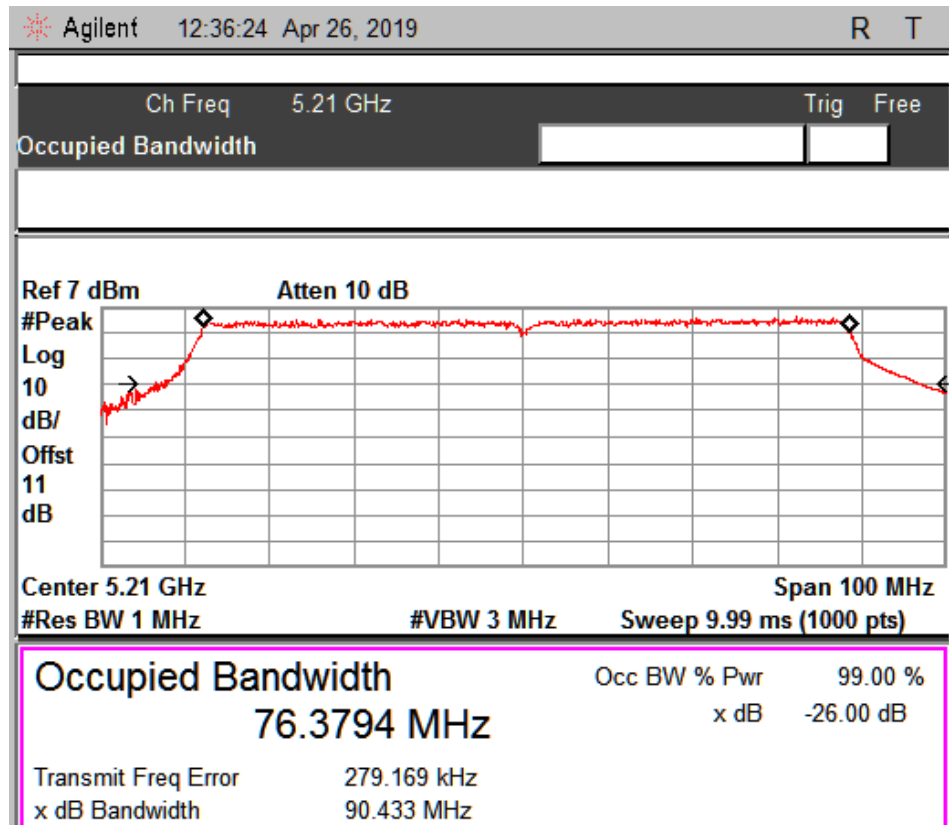
ULR-TC568819300000023F 001

Seite 35 von 212
Page 35 of 212



Data rate: MCS5

Channel Frequency : 5.775 GHz



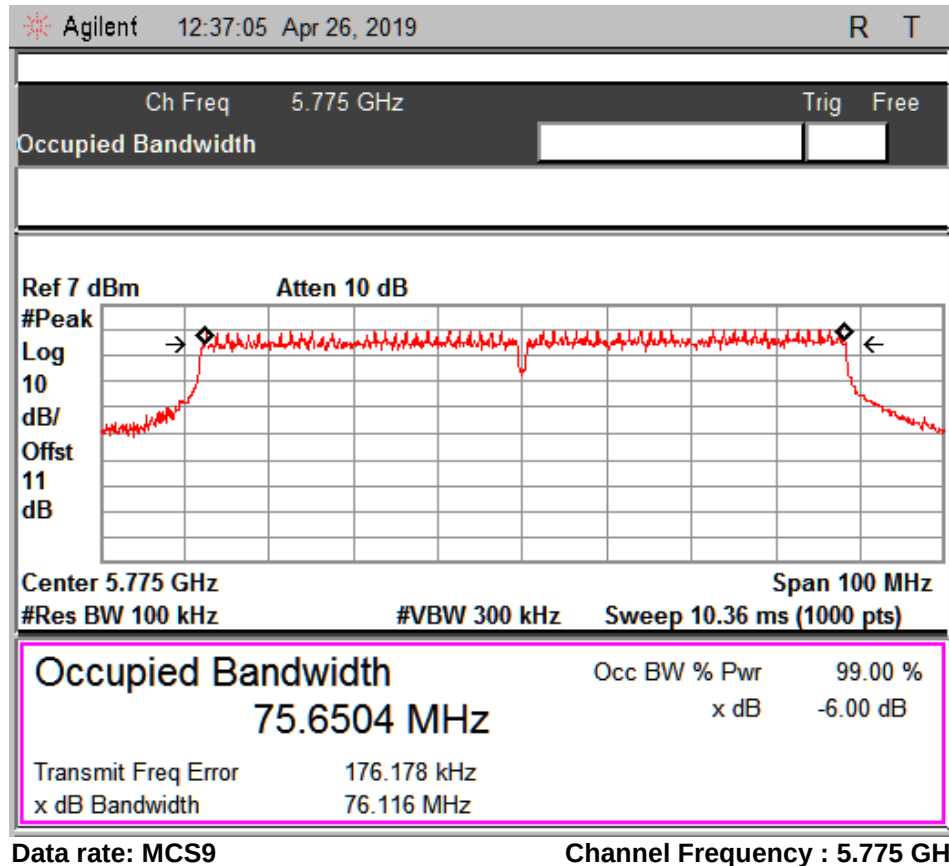
Data rate: MCS9

Channel Frequency : 5.210 GHz

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 36 von 212
Page 36 of 212



Modulation: 802.11ac mode MIMO_VHT20

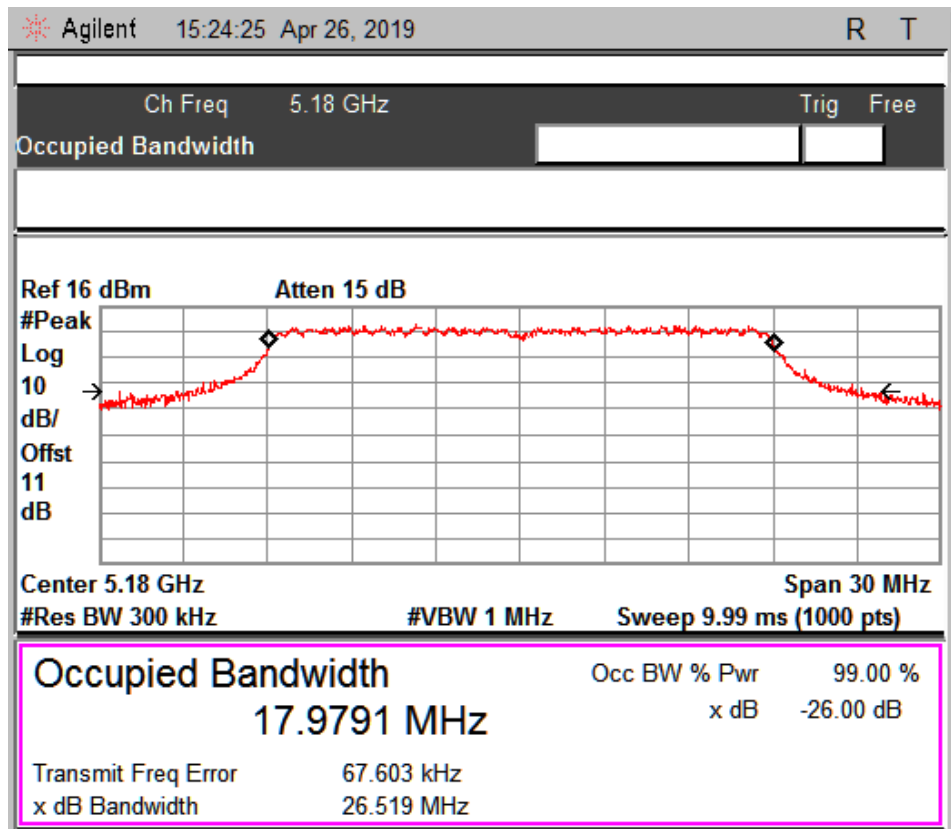
Note: Test was performed on both the transmit chains and worst case results were from chain 2 and the respective results has been reported.

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5180	26.51	17.97
	5240	25.44	18.00
	5745	17.57	17.64
	5825	17.62	17.65
MCS5	5180	24.10	18.01
	5240	23.13	18.02
	5745	17.66	17.63
	5825	17.68	17.63
MCS8	5180	22.73	17.97
	5240	23.08	18.01
	5745	17.68	17.62
	5825	17.65	17.63

Prüfbericht - Nr.:
Test Report No.:

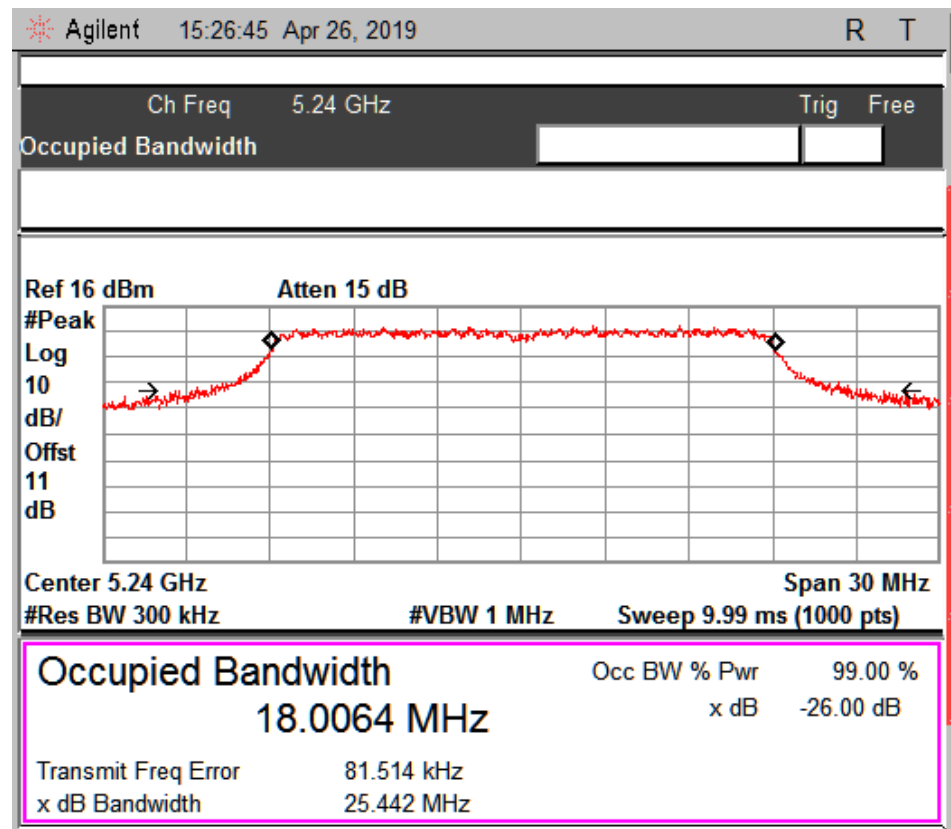
ULR-TC568819300000023F 001

Seite 37 von 212
Page 37 of 212



Data rate: MCS0

Channel Frequency : 5.180 GHz



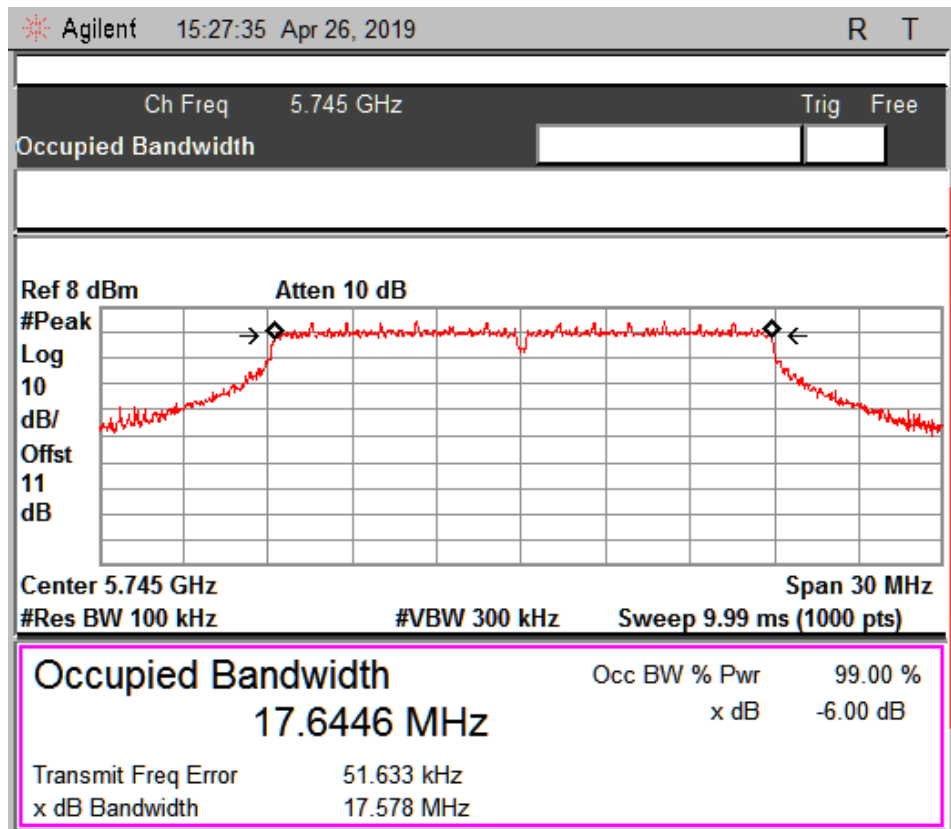
Data rate: MCS0

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

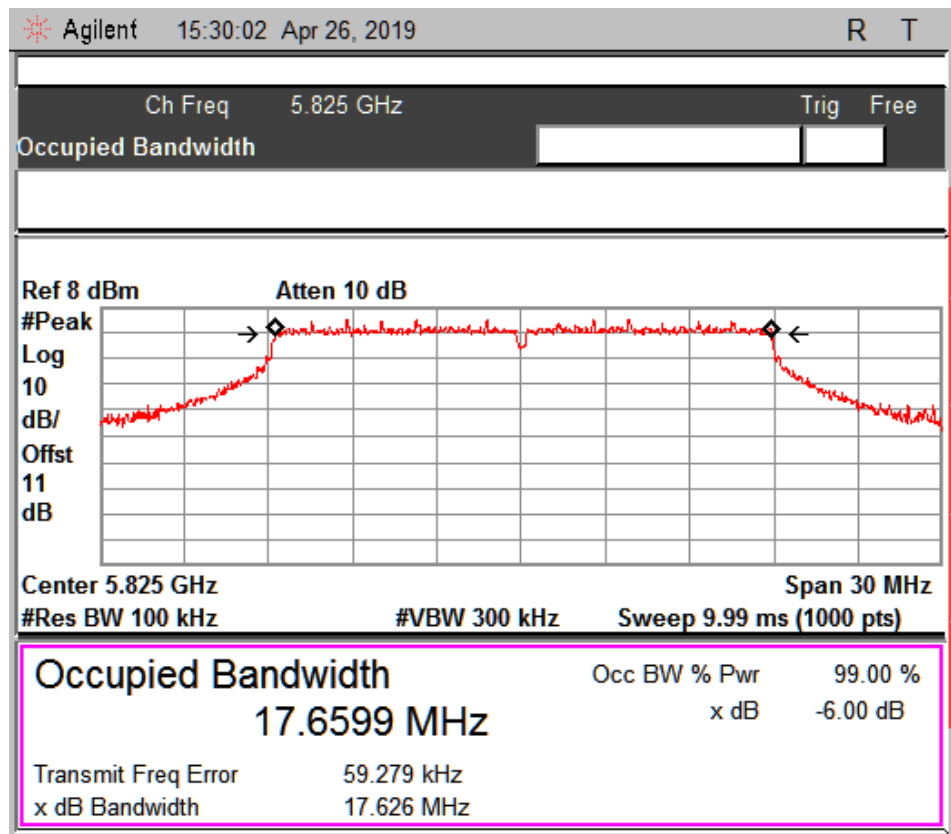
ULR-TC568819300000023F 001

Seite 38 von 212
Page 38 of 212



Data rate: MCS0

Channel Frequency : 5.745 GHz



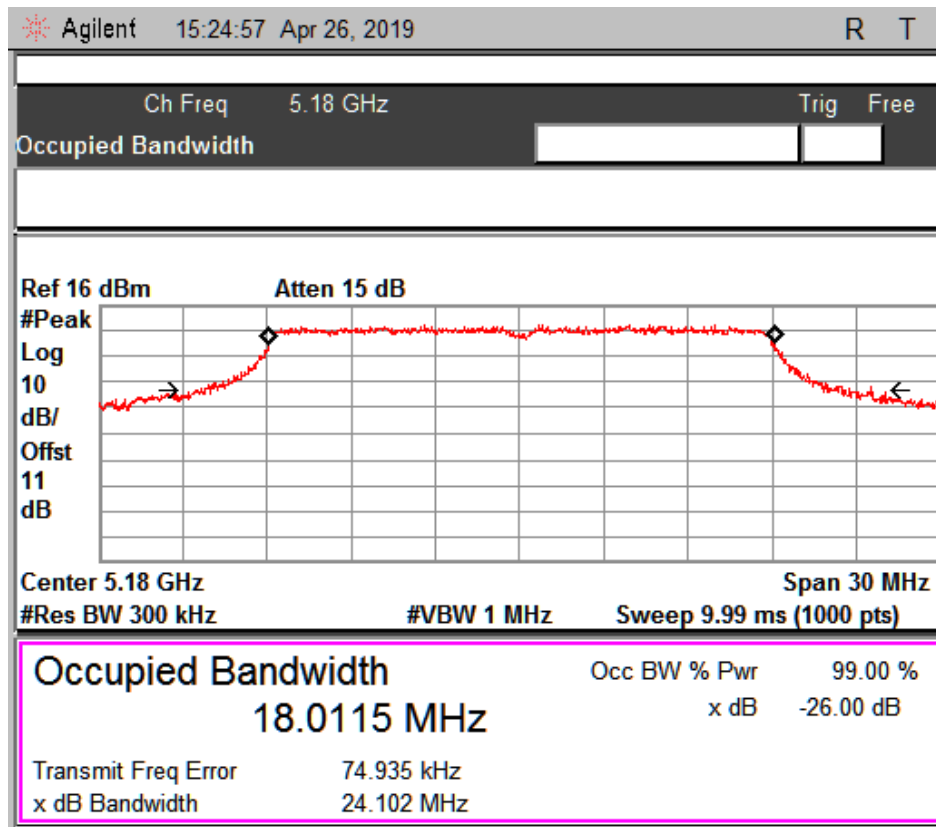
Data rate: MCS0

Channel Frequency : 5.825 GHz

Prüfbericht - Nr.:
Test Report No.:

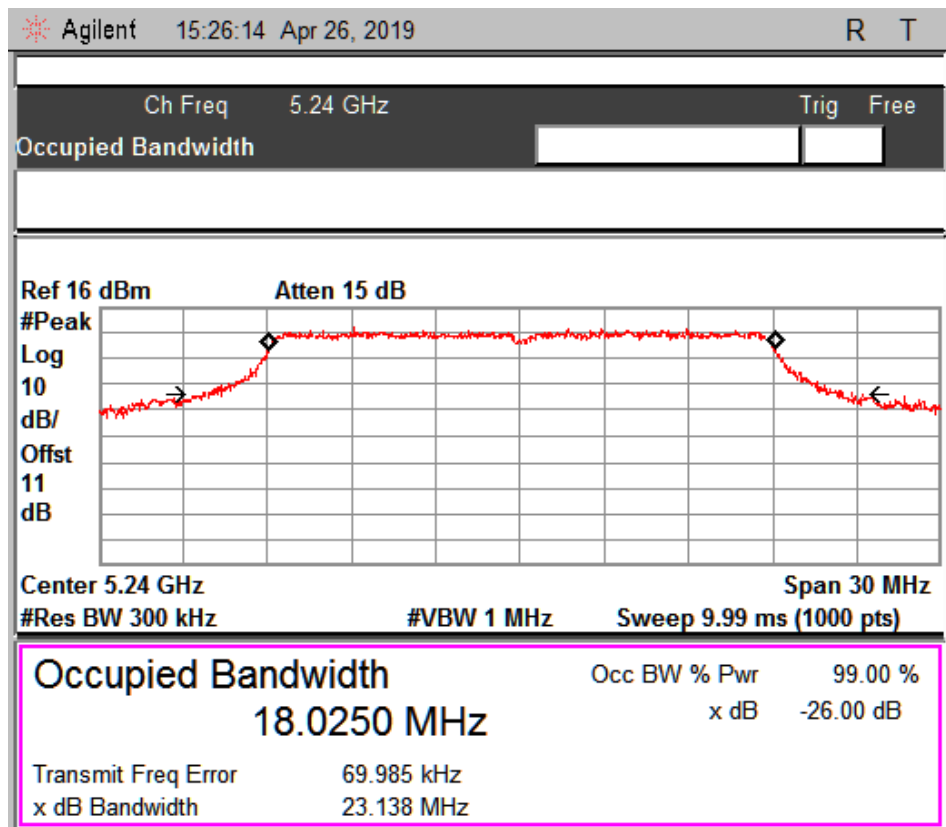
ULR-TC568819300000023F 001

Seite 39 von 212
Page 39 of 212



Data rate: MCS5

Channel Frequency : 5.180 GHz



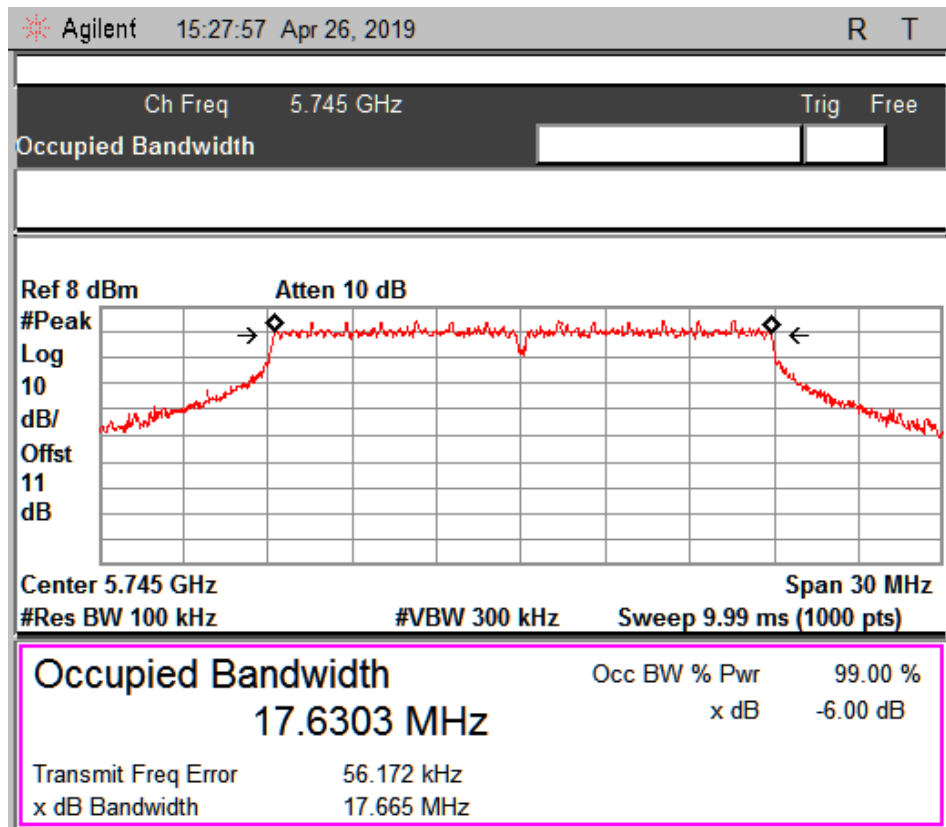
Data rate: MCS5

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

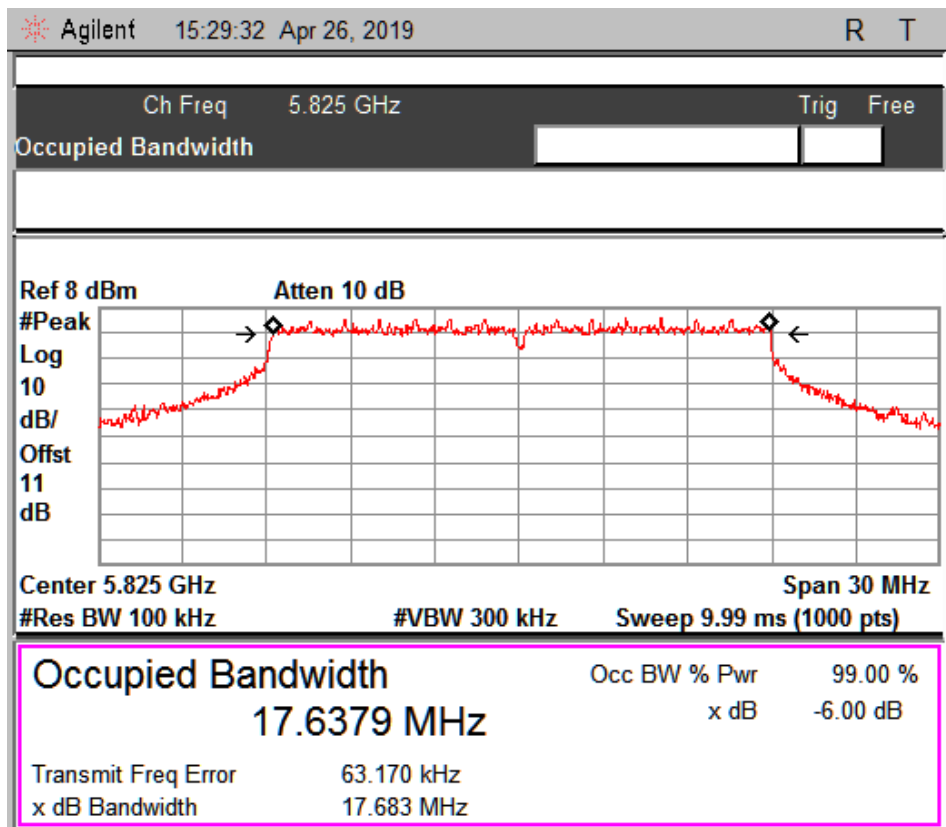
ULR-TC568819300000023F 001

Seite 40 von 212
Page 40 of 212



Data rate: MCS5

Channel Frequency : 5.745 GHz



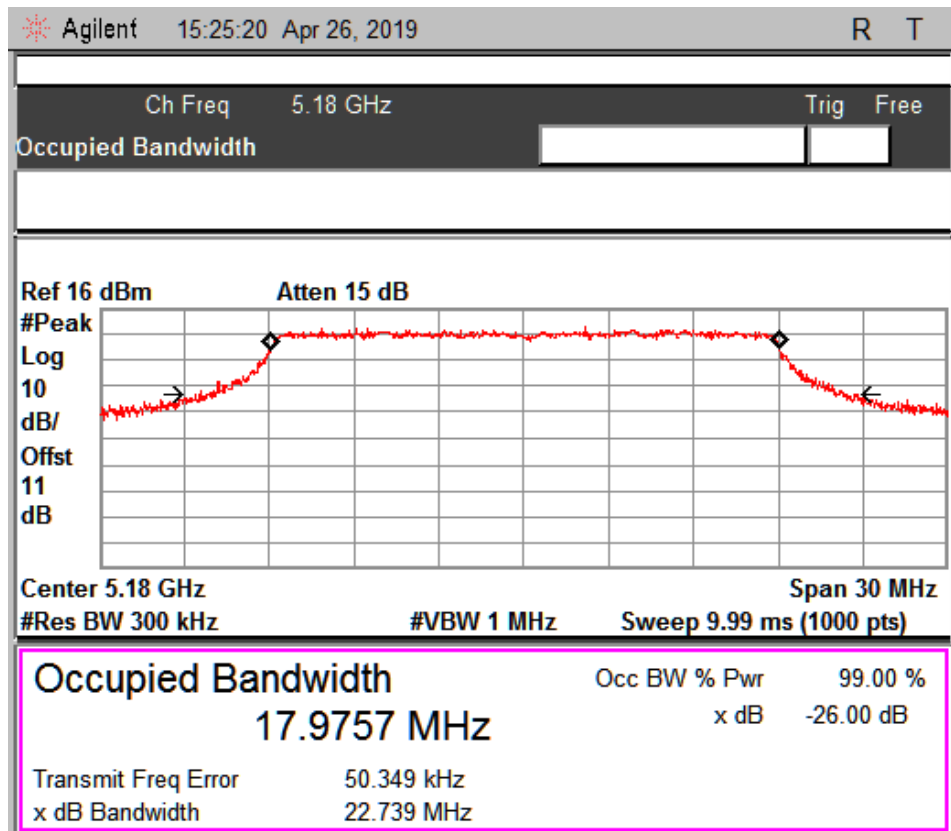
Data rate: MCS5

Channel Frequency : 5.825 GHz

Prüfbericht - Nr.:
Test Report No.:

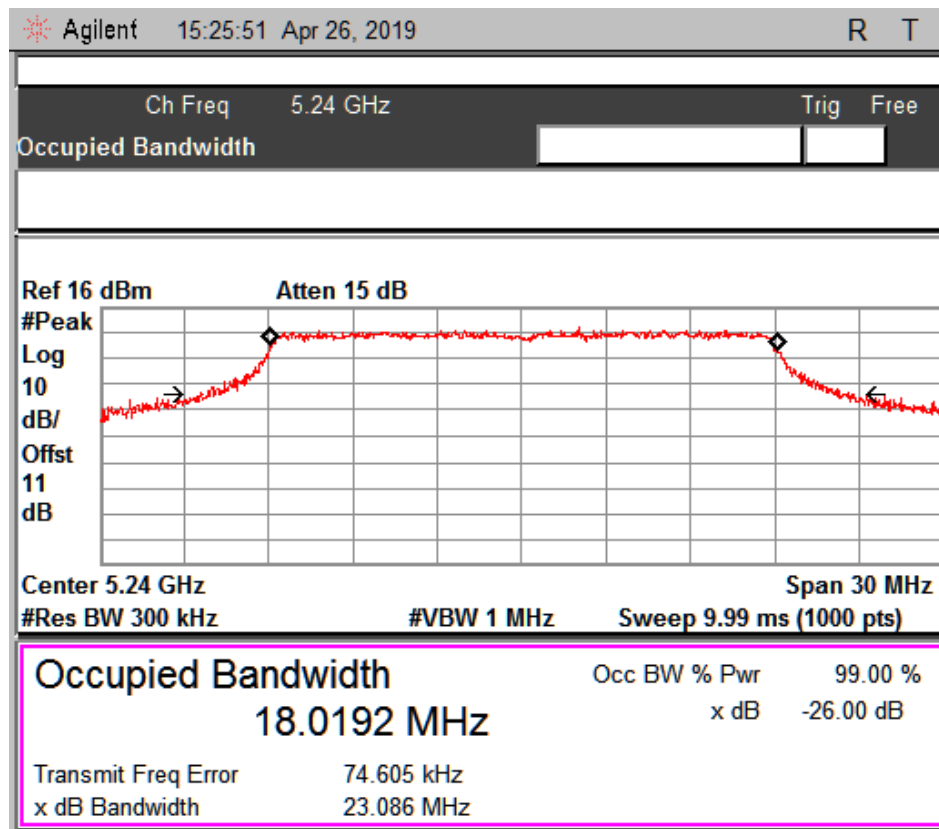
ULR-TC568819300000023F 001

Seite 41 von 212
Page 41 of 212



Data rate: MCS8

Channel Frequency : 5.180 GHz



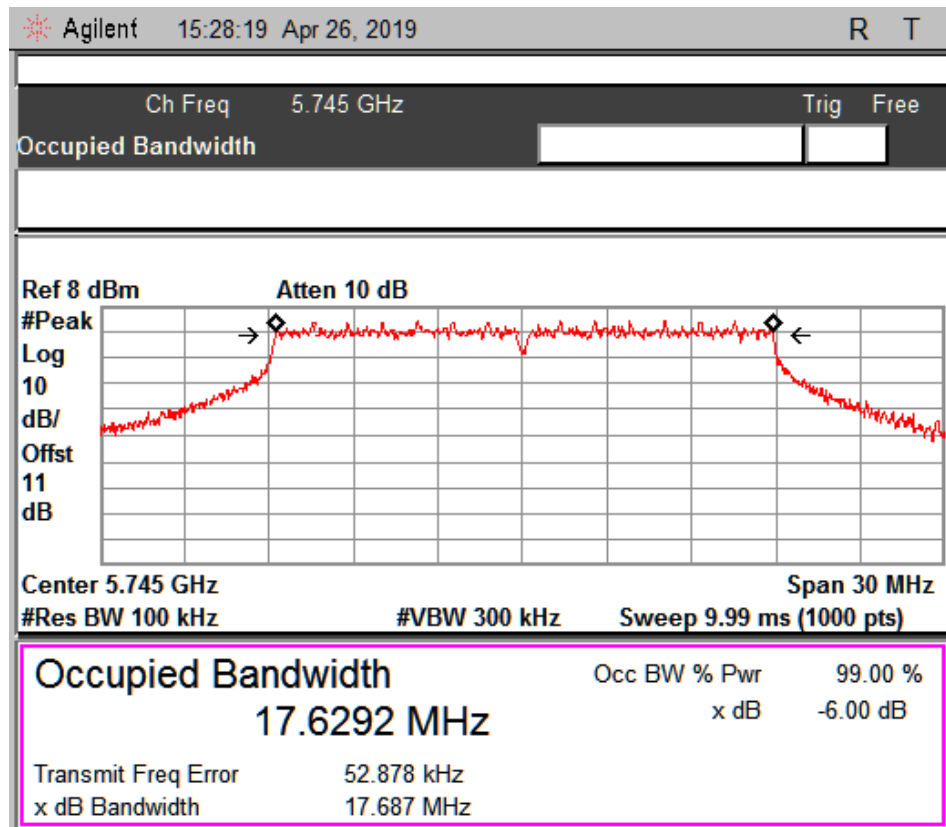
Data rate: MCS8

Channel Frequency : 5.240 GHz

Prüfbericht - Nr.:
Test Report No.:

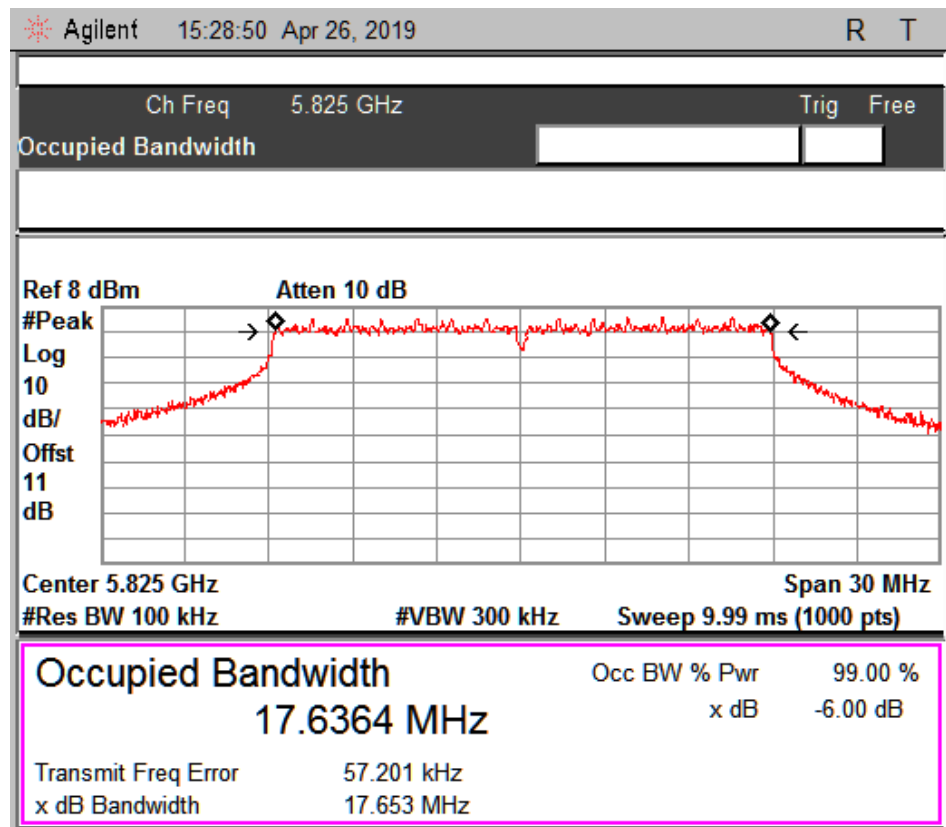
ULR-TC568819300000023F 001

Seite 42 von 212
Page 42 of 212



Data rate: MCS8

Channel Frequency : 5.745 GHz



Data rate: MCS8

Channel Frequency : 5.825 GHz

Prüfbericht - Nr.:
Test Report No.:

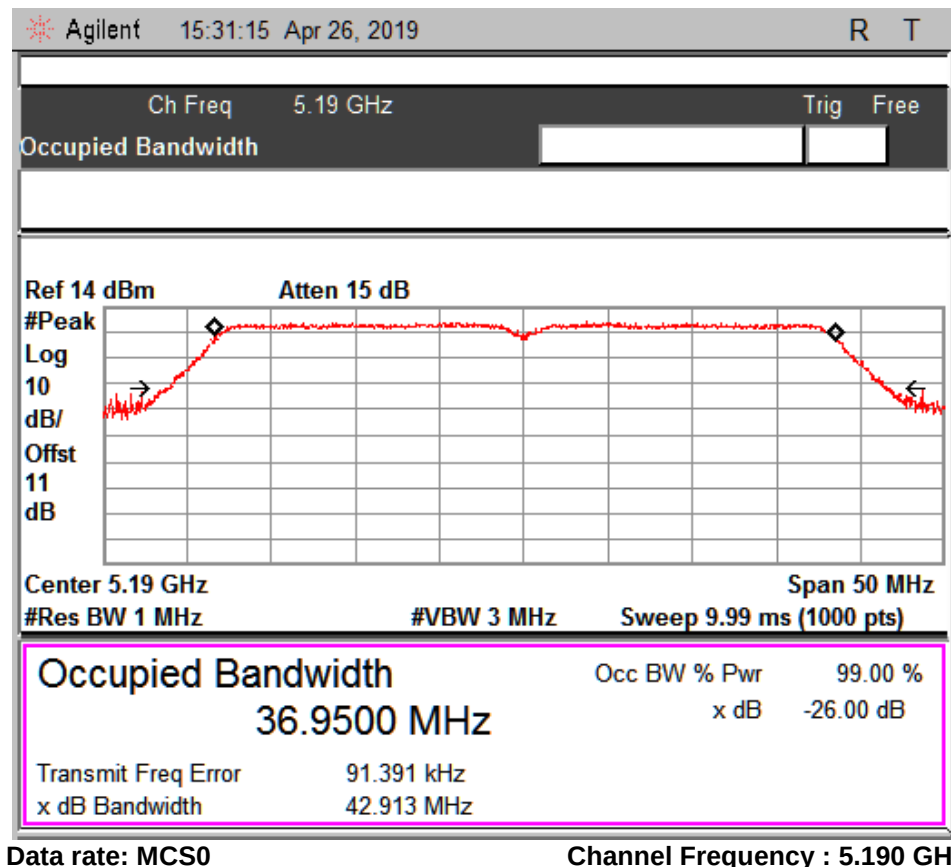
ULR-TC568819300000023F 001

Seite 43 von 212
Page 43 of 212

Modulation: 802.11ac mode MIMO_VHT40

Note: Test was performed on both the transmit chains and worst case results were from chain 2 and the respective results has been reported.

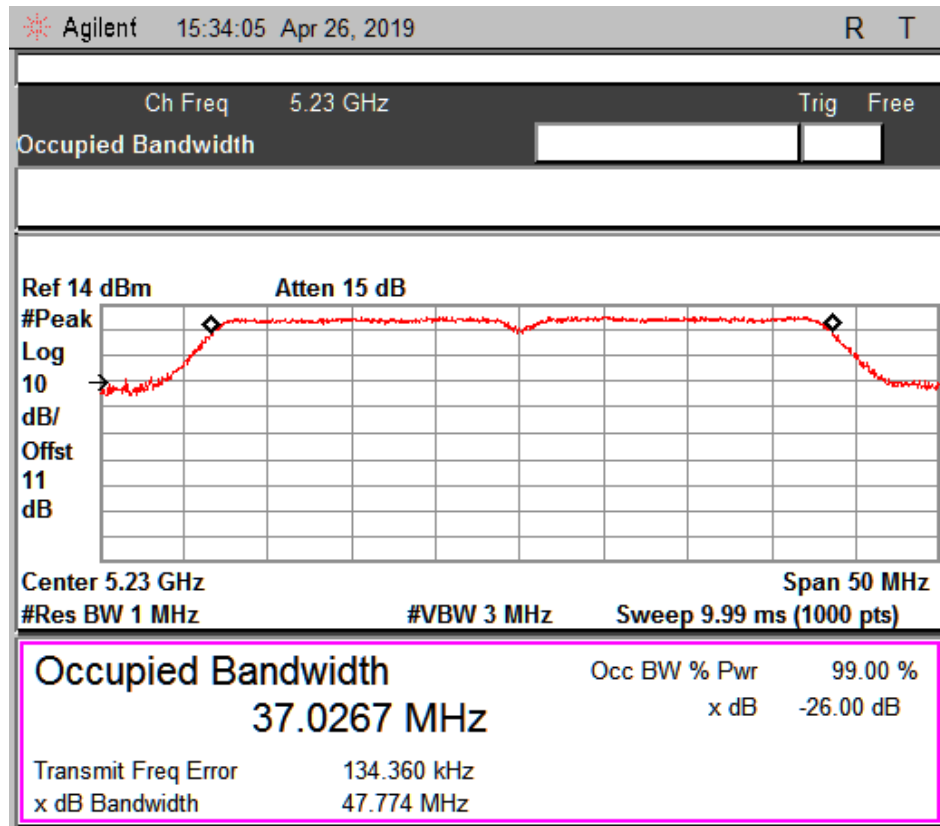
Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5190	42.91	36.95
	5230	47.77	37.02
	5755	36.36	36.17
	5795	36.36	36.19
MCS5	5190	45.46	37.17
	5230	47.67	37.31
	5755	36.41	36.16
	5795	36.4	36.19
MCS9	5190	45.46	37.11
	5230	44.94	37.18
	5755	36.35	36.16
	5795	36.3	36.15



Prüfbericht - Nr.:
Test Report No.:

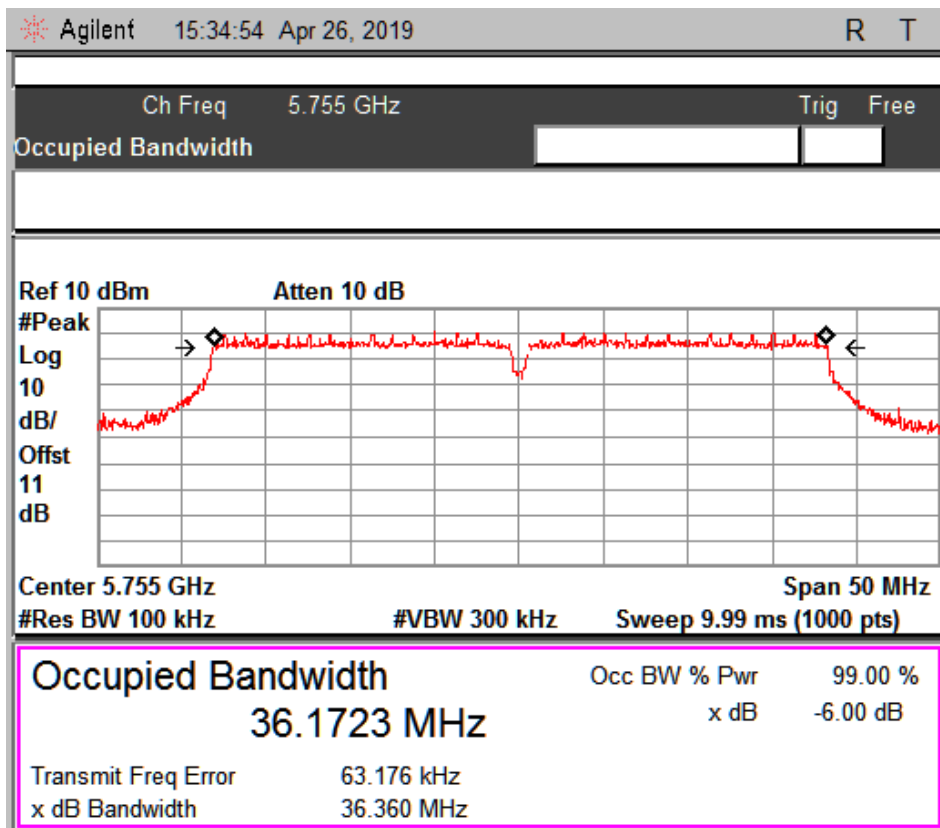
ULR-TC568819300000023F 001

Seite 44 von 212
Page 44 of 212



Data rate: MCS0

Channel Frequency : 5.230 GHz



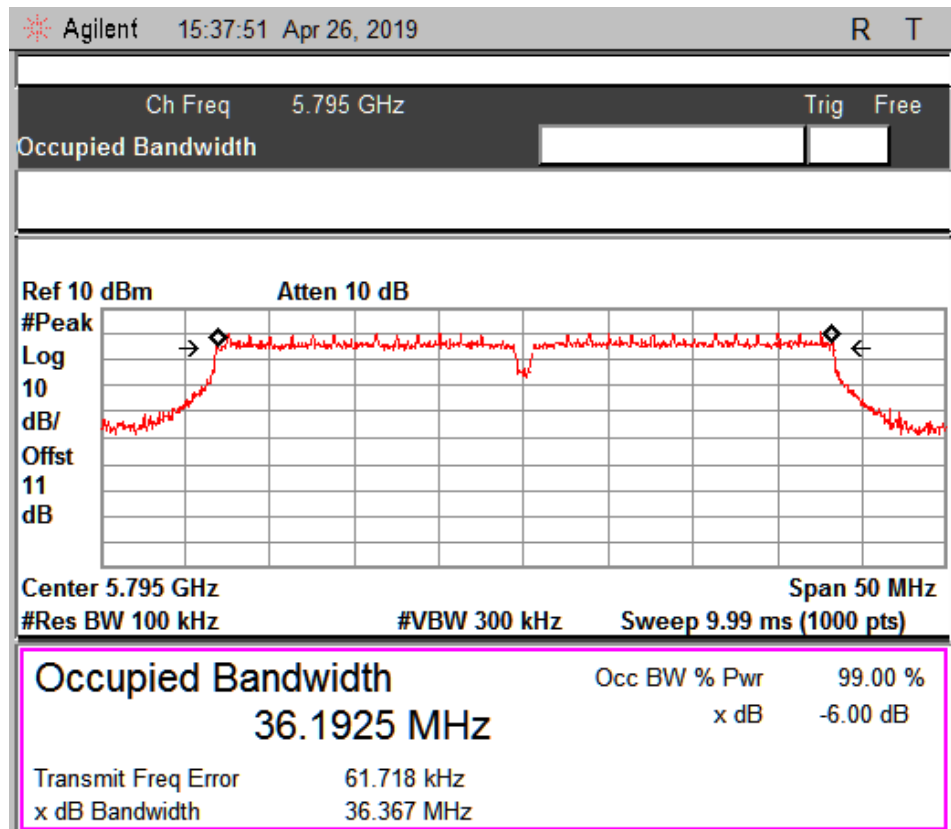
Data rate: MCS0

Channel Frequency : 5.755 GHz

Prüfbericht - Nr.:
Test Report No.:

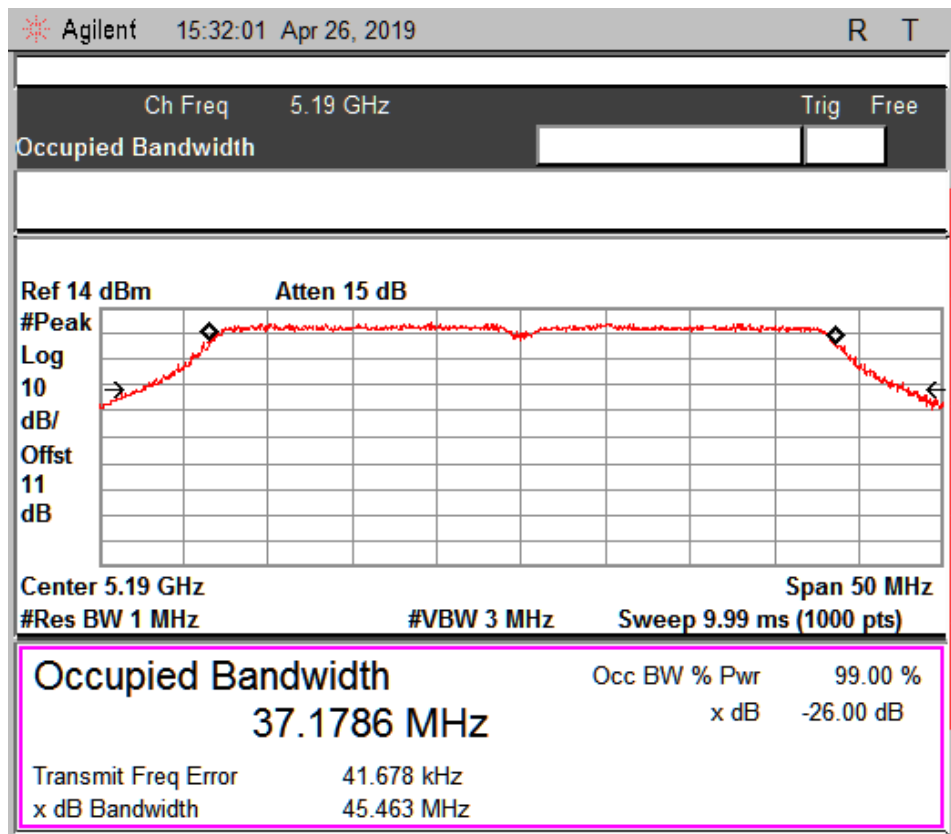
ULR-TC568819300000023F 001

Seite 45 von 212
Page 45 of 212



Data rate: MCS0

Channel Frequency : 5.795 GHz



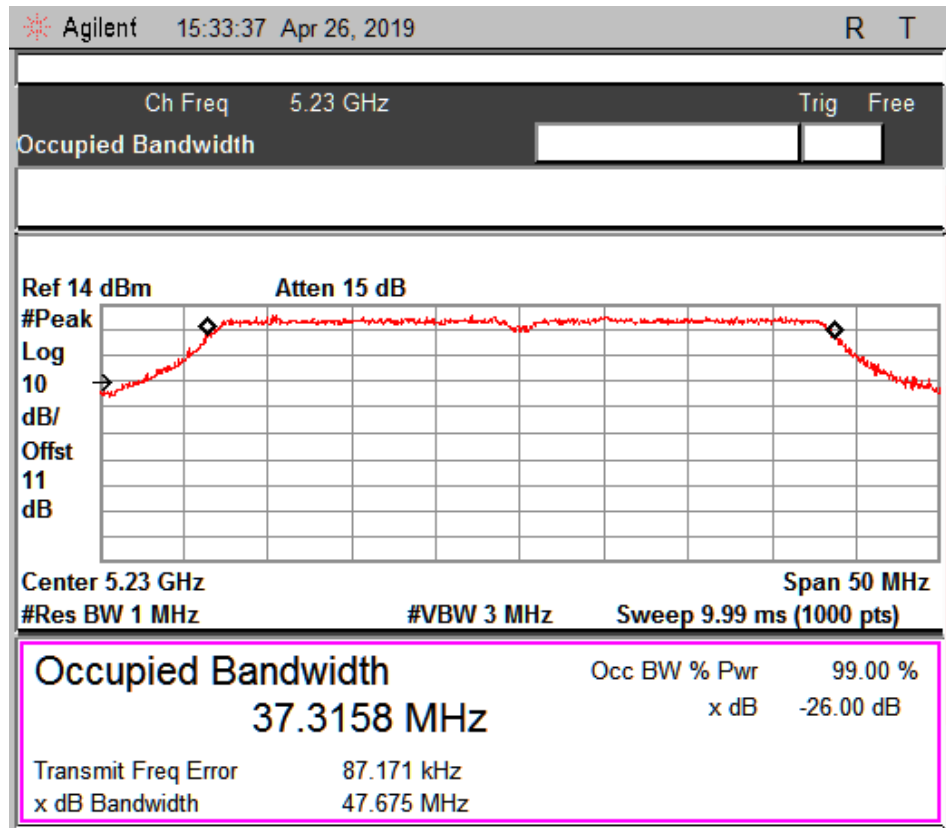
Data rate: MCS5

Channel Frequency : 5.190 GHz

Prüfbericht - Nr.:
Test Report No.:

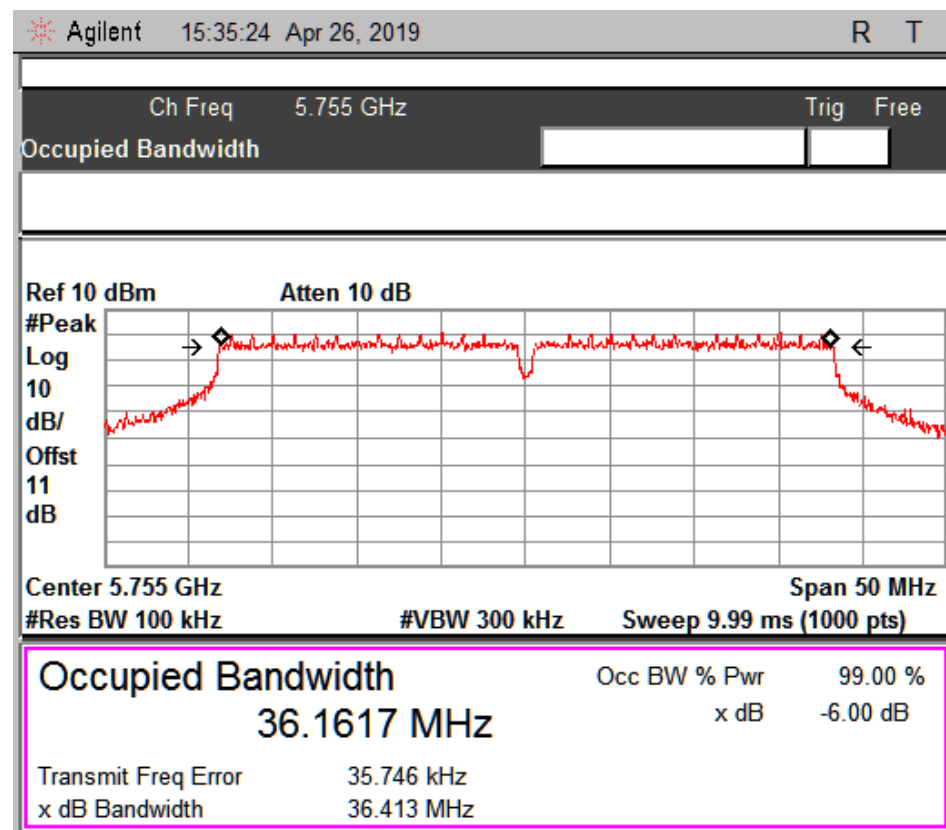
ULR-TC568819300000023F 001

Seite 46 von 212
Page 46 of 212



Data rate: MCS5

Channel Frequency : 5.230 GHz



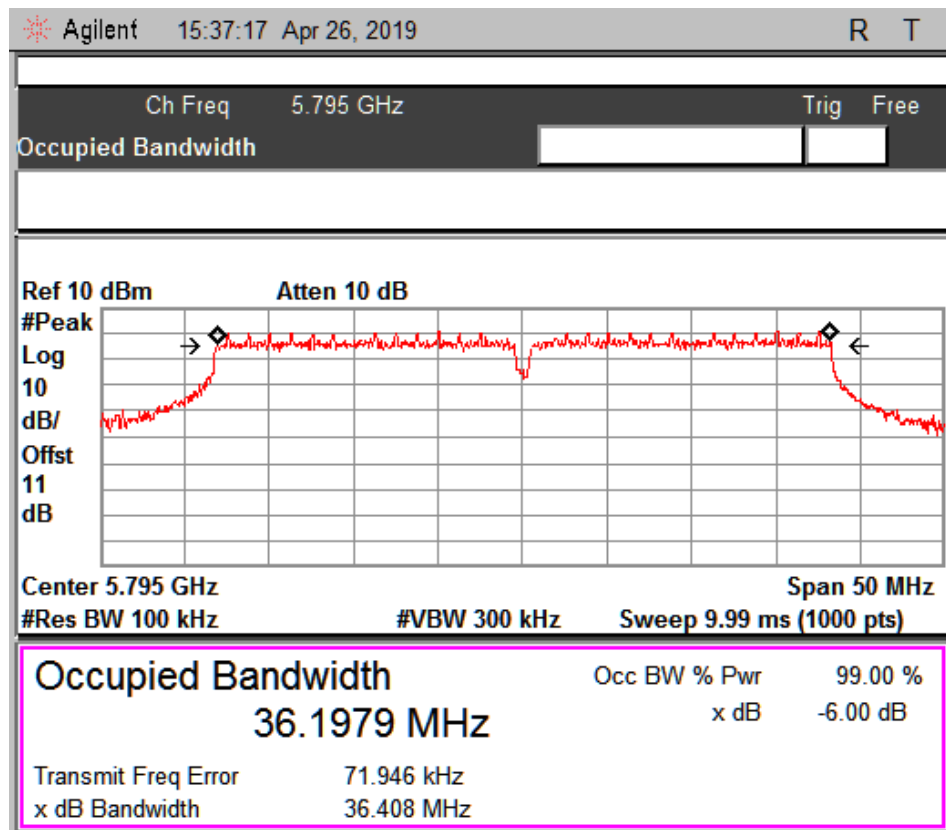
Data rate: MCS5

Channel Frequency : 5.755 GHz

Prüfbericht - Nr.:
Test Report No.:

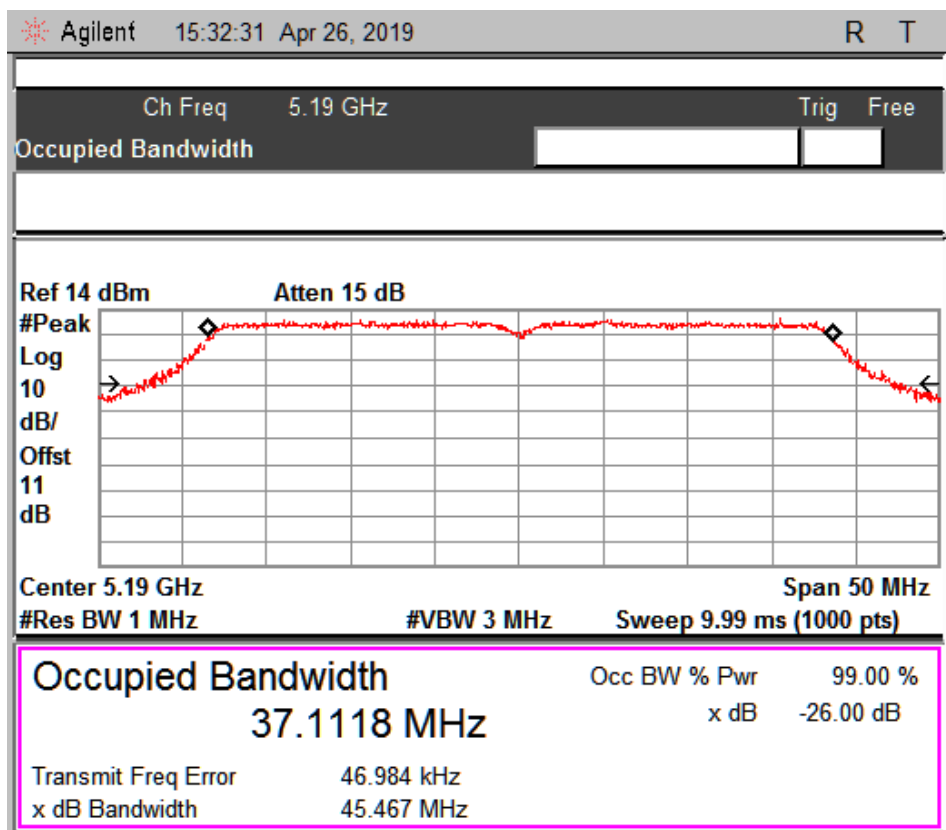
ULR-TC568819300000023F 001

Seite 47 von 212
Page 47 of 212



Data rate: MCS5

Channel Frequency : 5.795 GHz



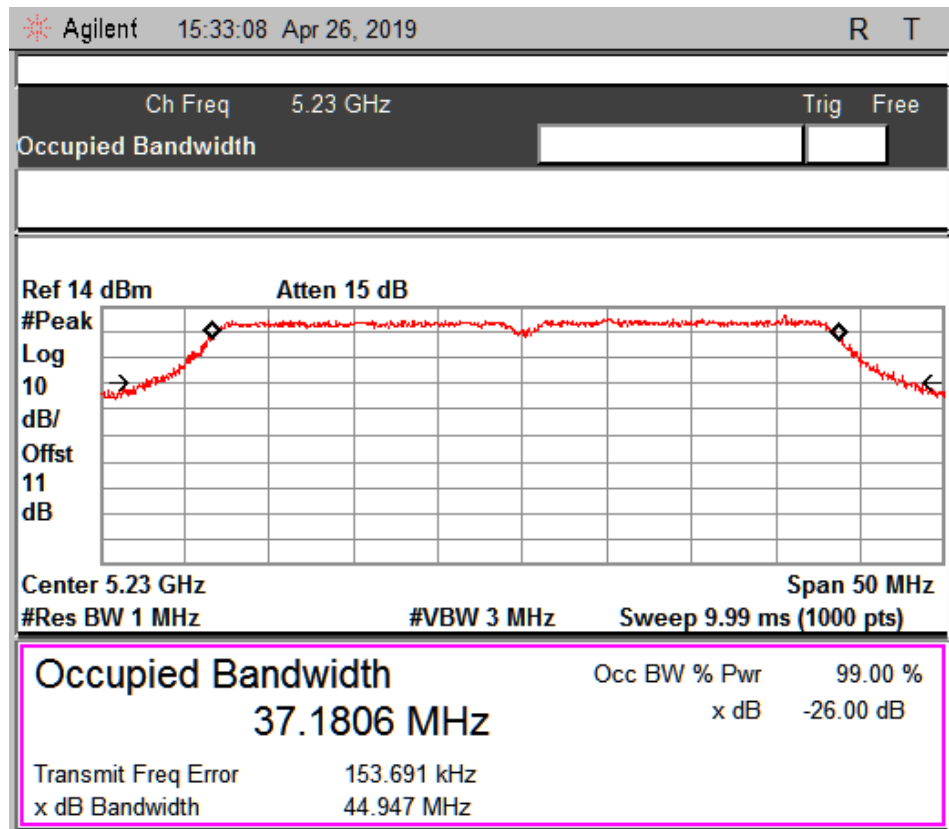
Data rate: MCS9

Channel Frequency : 5.190 GHz

Prüfbericht - Nr.:
Test Report No.:

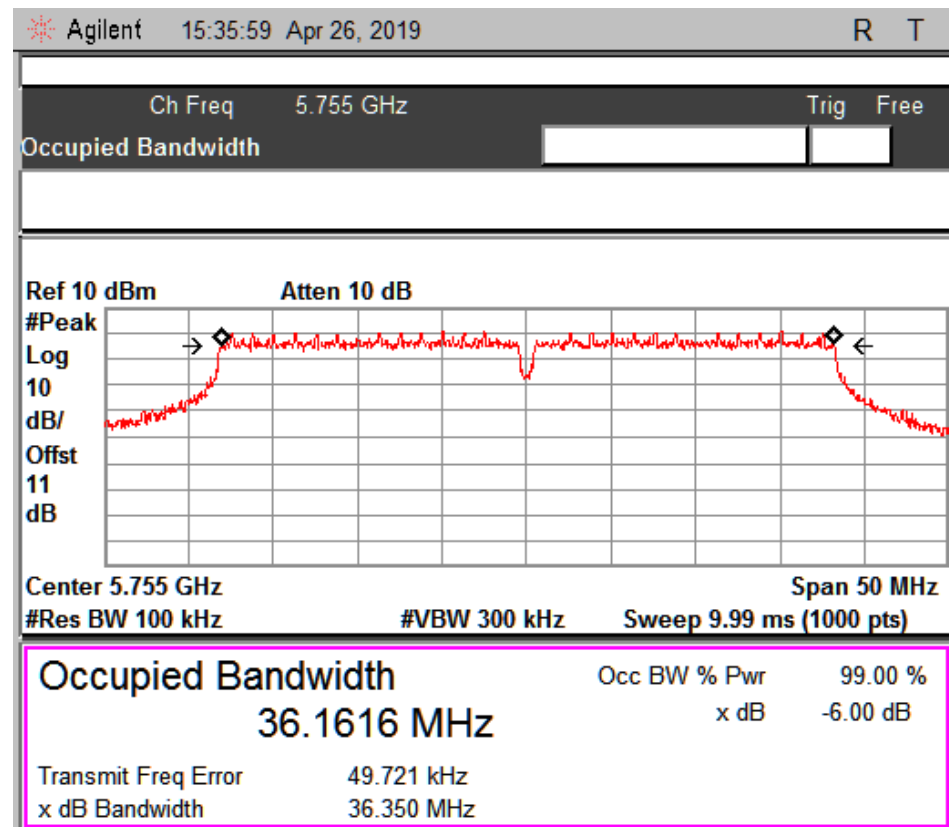
ULR-TC568819300000023F 001

Seite 48 von 212
Page 48 of 212



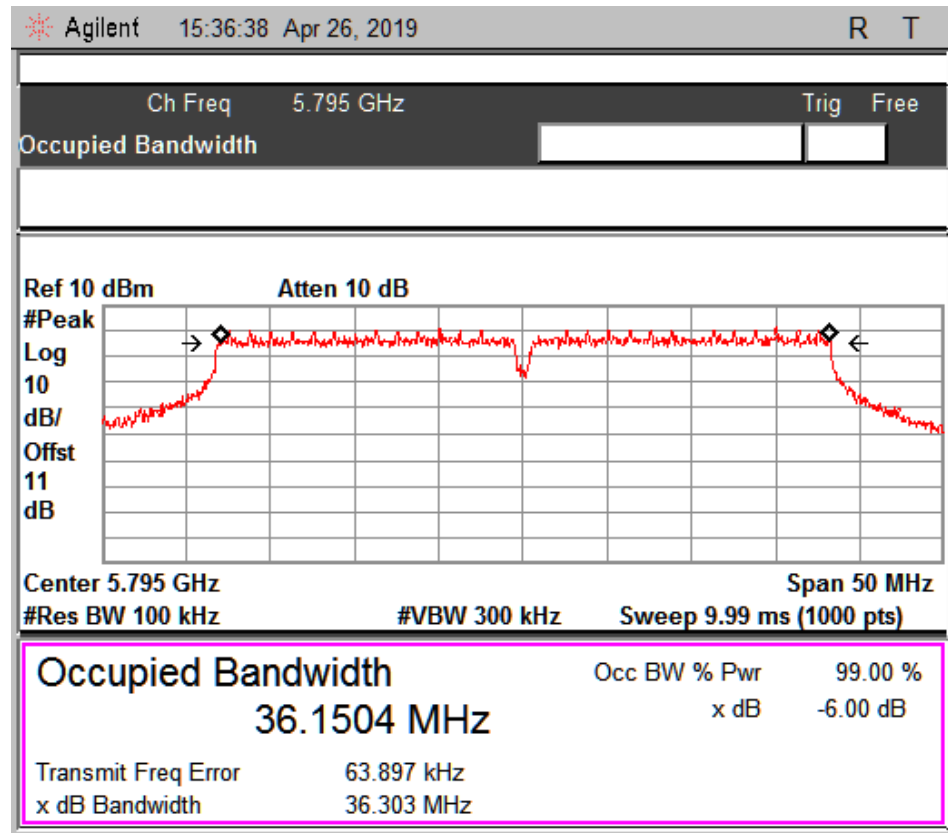
Data rate: MCS9

Channel Frequency : 5.230 GHz



Data rate: MCS9

Channel Frequency : 5.755 GHz



Data rate: MCS9

Channel Frequency : 5.795 GHz

Modulation: 802.11ac mode MIMO_VHT80

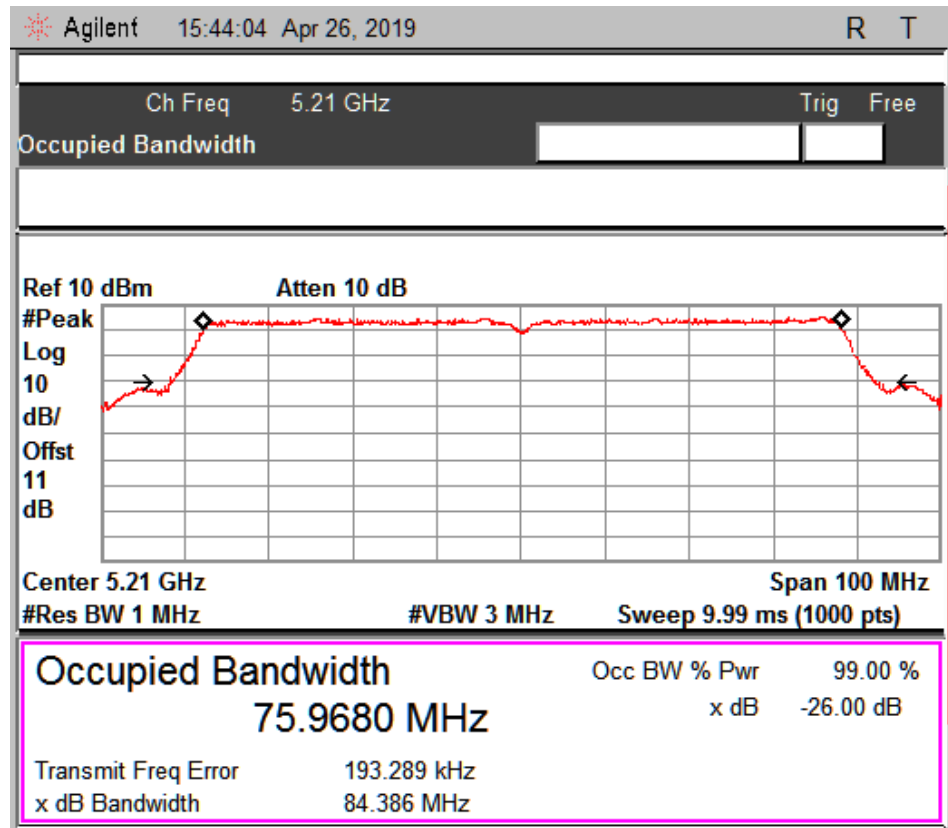
Note: Test was performed on both the transmit chains and worst case results were from chain 2 and the respective results has been reported.

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5210	84.38	75.96
	5775	76.10	75.54
MCS5	5210	88.85	76.33
	5775	76.27	75.67
MCS9	5210	88.72	76.33
	5775	76.36	75.59

Prüfbericht - Nr.:
Test Report No.:

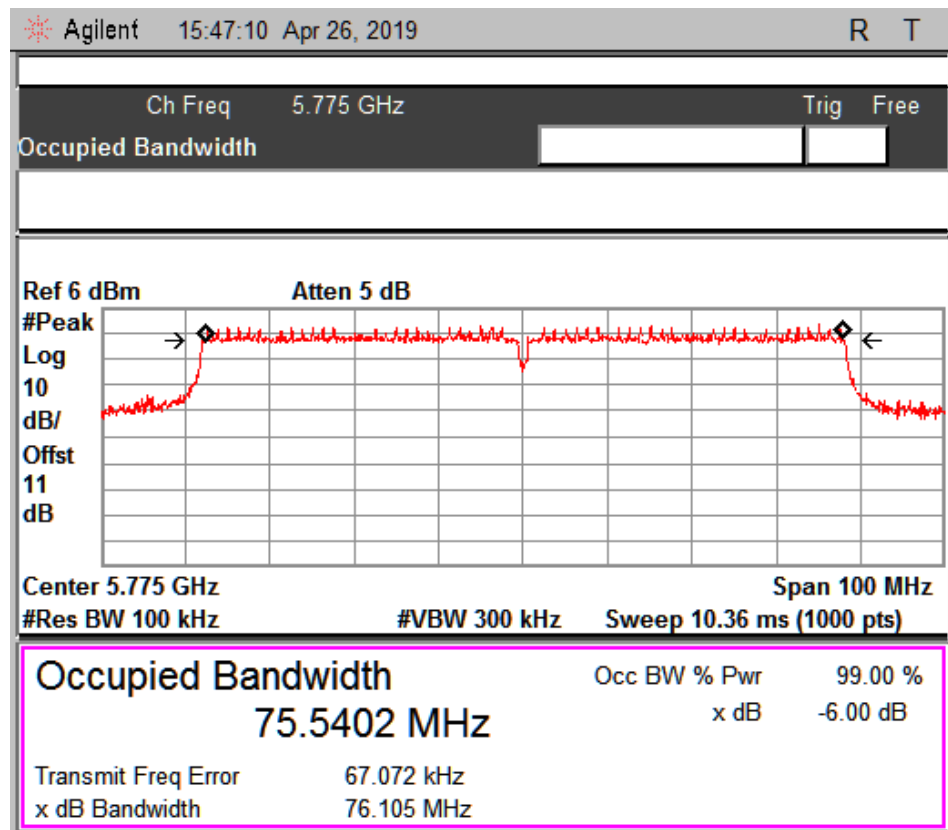
ULR-TC568819300000023F 001

Seite 50 von 212
Page 50 of 212



Data rate: MCS0

Channel Frequency : 5.210 GHz



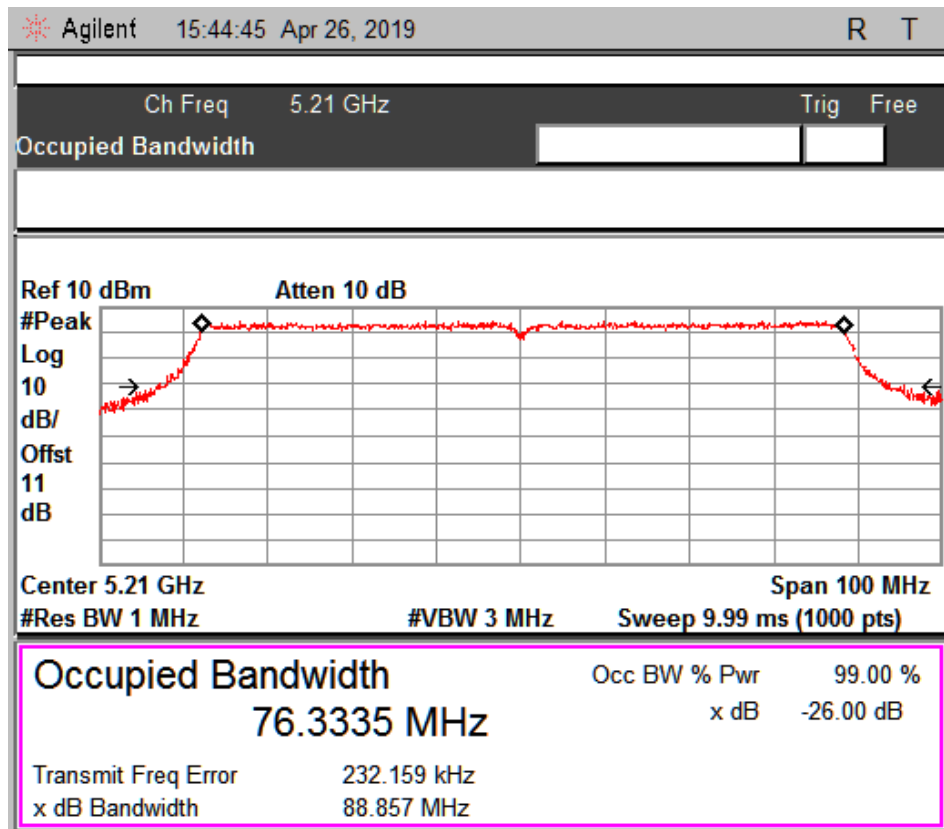
Data rate: MCS0

Channel Frequency : 5.775 GHz

Prüfbericht - Nr.:
Test Report No.:

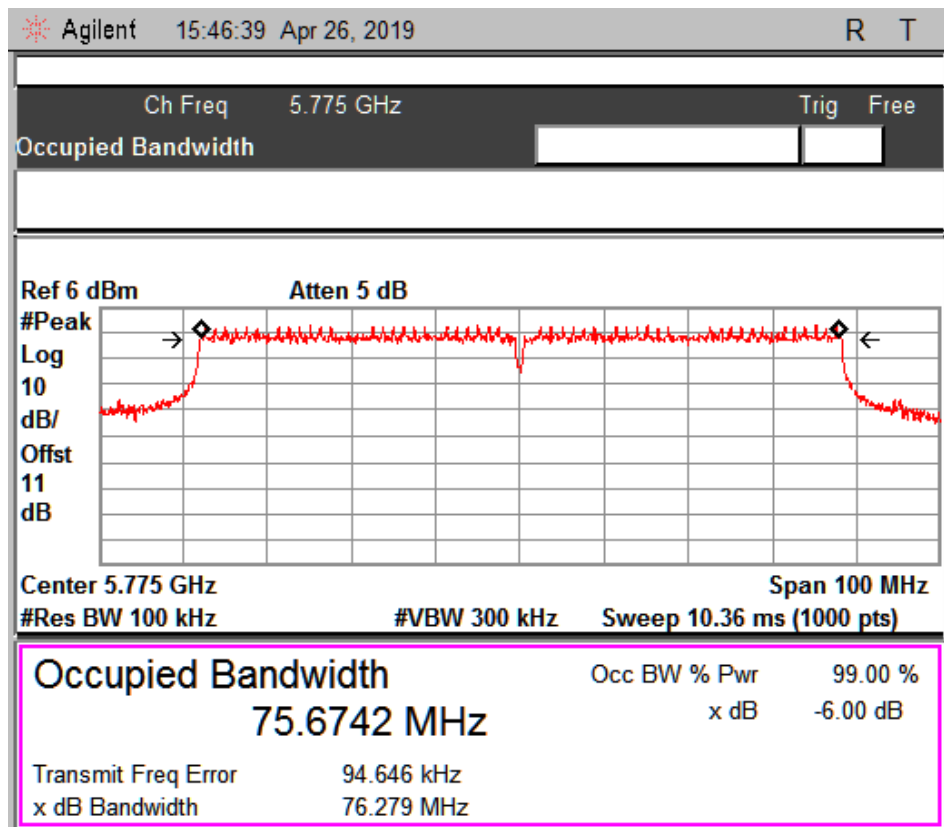
ULR-TC568819300000023F 001

Seite 51 von 212
Page 51 of 212



Data rate: MCS5

Channel Frequency : 5210 GHz



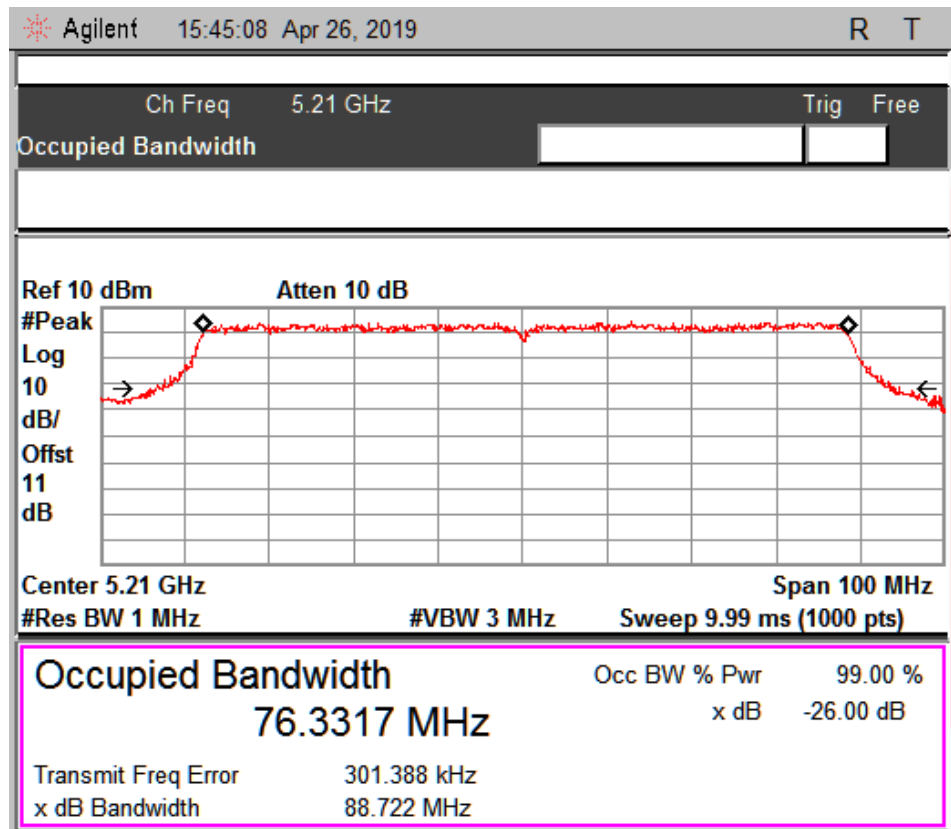
Data rate: MCS5

Channel Frequency : 5.775 GHz

Prüfbericht - Nr.:
Test Report No.:

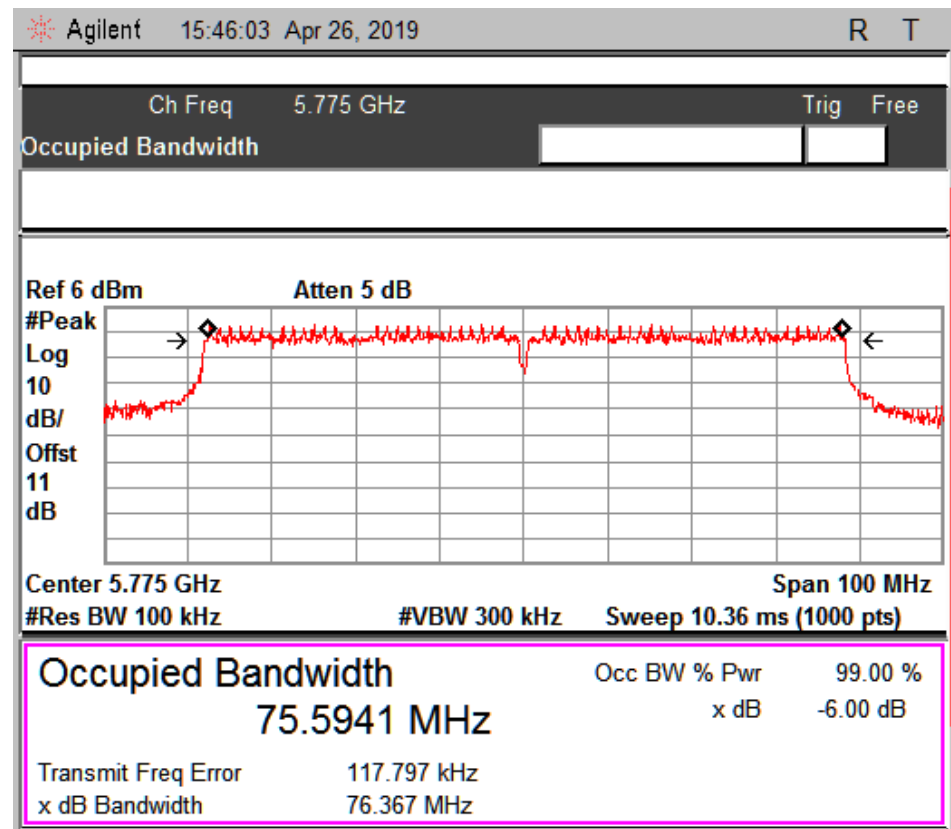
ULR-TC568819300000023F 001

Seite 52 von 212
Page 52 of 212



Data rate: MCS9

Channel Frequency : 5.775 GHz



Data rate: MCS9

Channel Frequency : 5.775 GHz

Prüfbericht - Nr.:

Test Report No.:

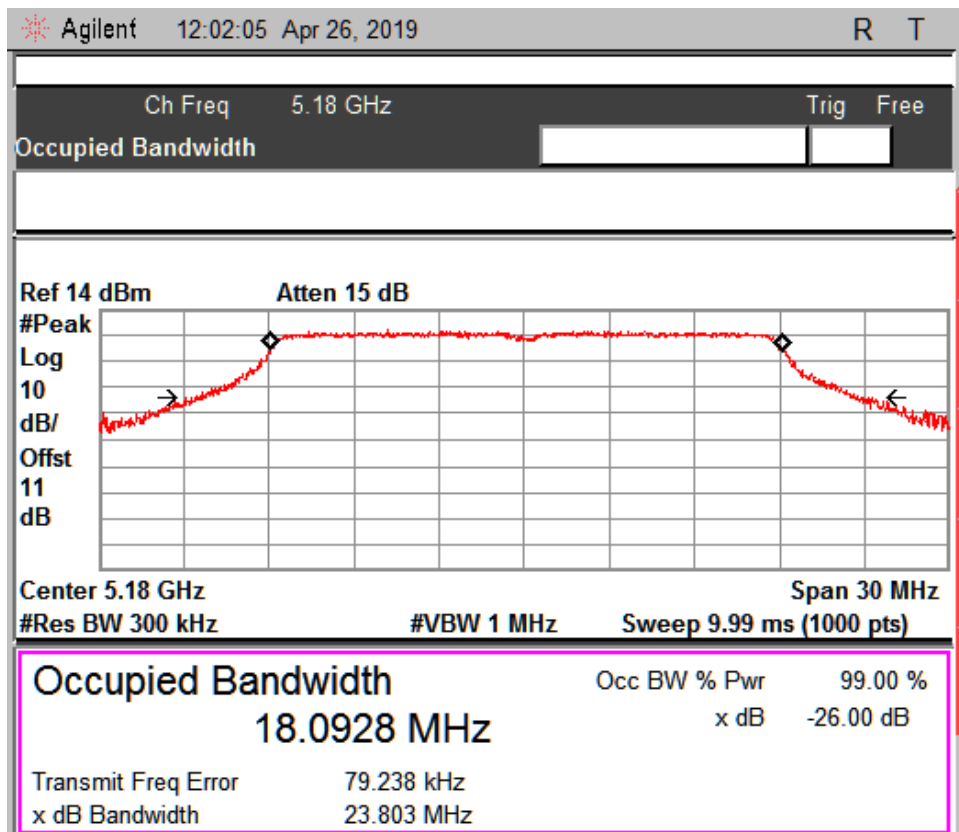
ULR-TC568819300000023F 001

Seite 53 von 212

Page 53 of 212

Modulation: 802.11n mode SISO_VHT20

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5180	23.80	18.09
	5240	23.91	18.10
	5745	17.60	17.66
	5825	17.59	17.67
MCS4	5180	22.79	18.01
	5240	22.85	18.00
	5745	17.71	17.65
	5825	17.70	17.64
MCS7	5180	22.85	17.98
	5240	22.65	17.97
	5745	17.71	17.65
	5825	17.71	17.64



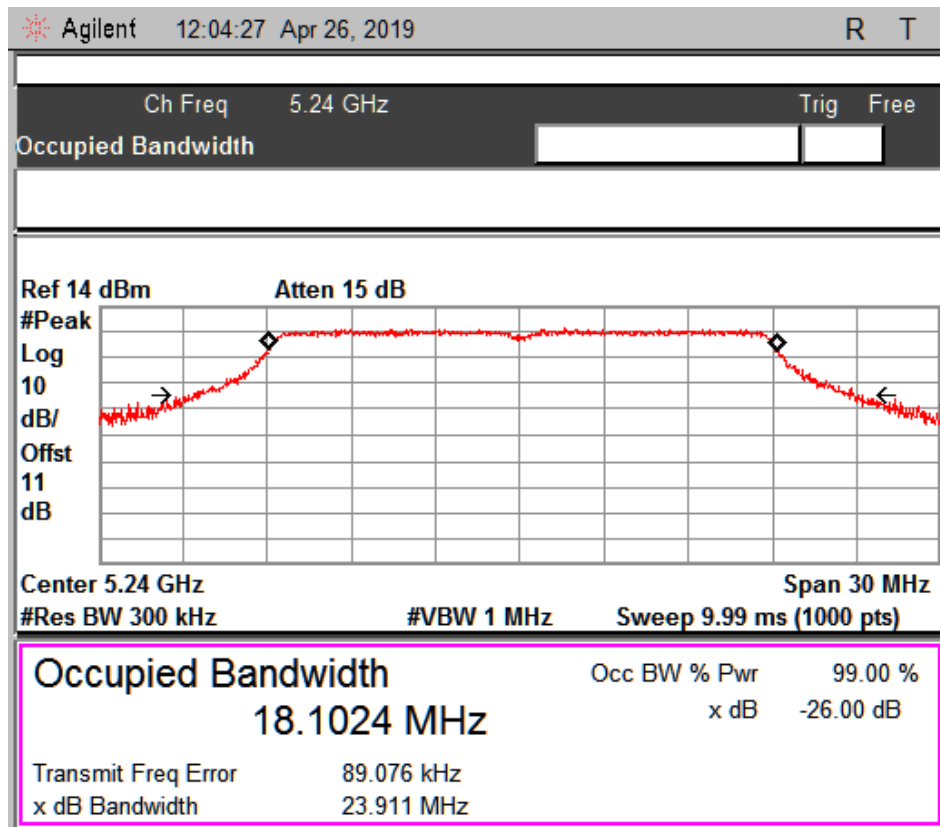
Data rate: MCS0

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

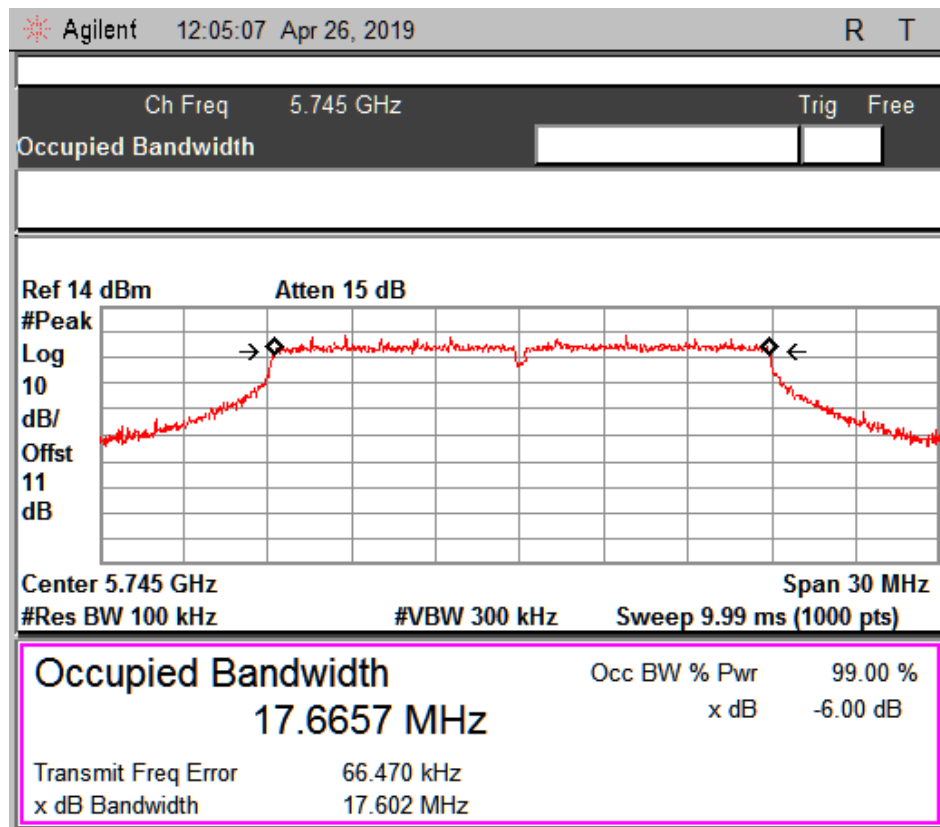
ULR-TC568819300000023F 001

Seite 54 von 212
Page 54 of 212



Data rate: MCS0

Channel Frequency : 5.240 GHz



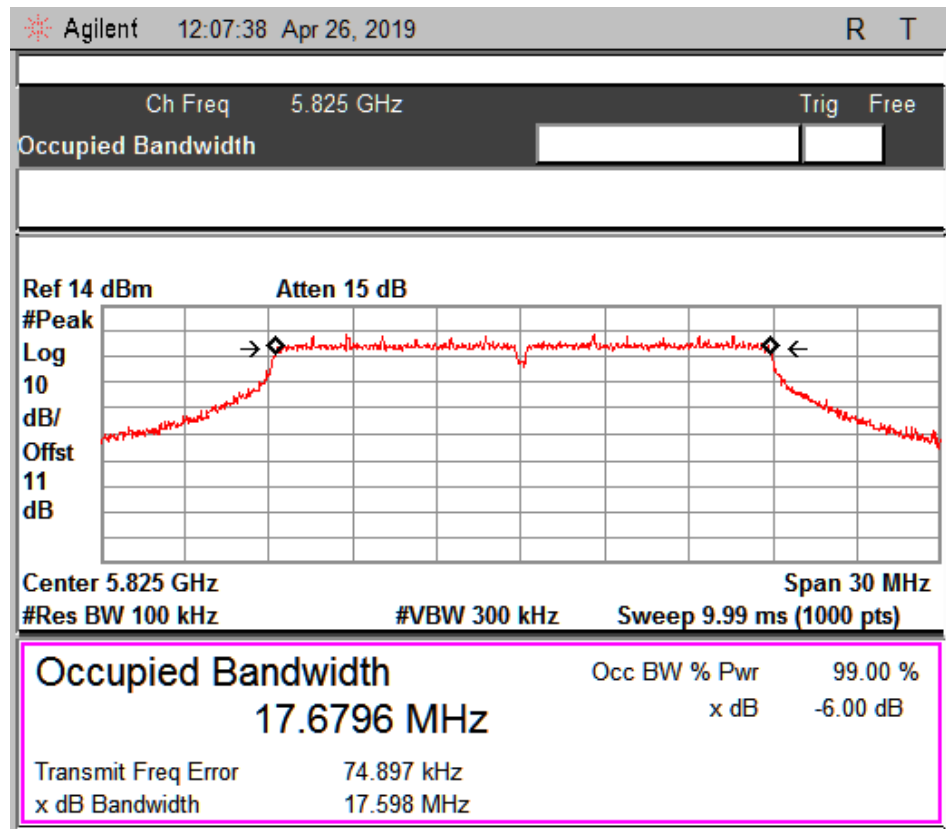
Data rate: MCS0

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

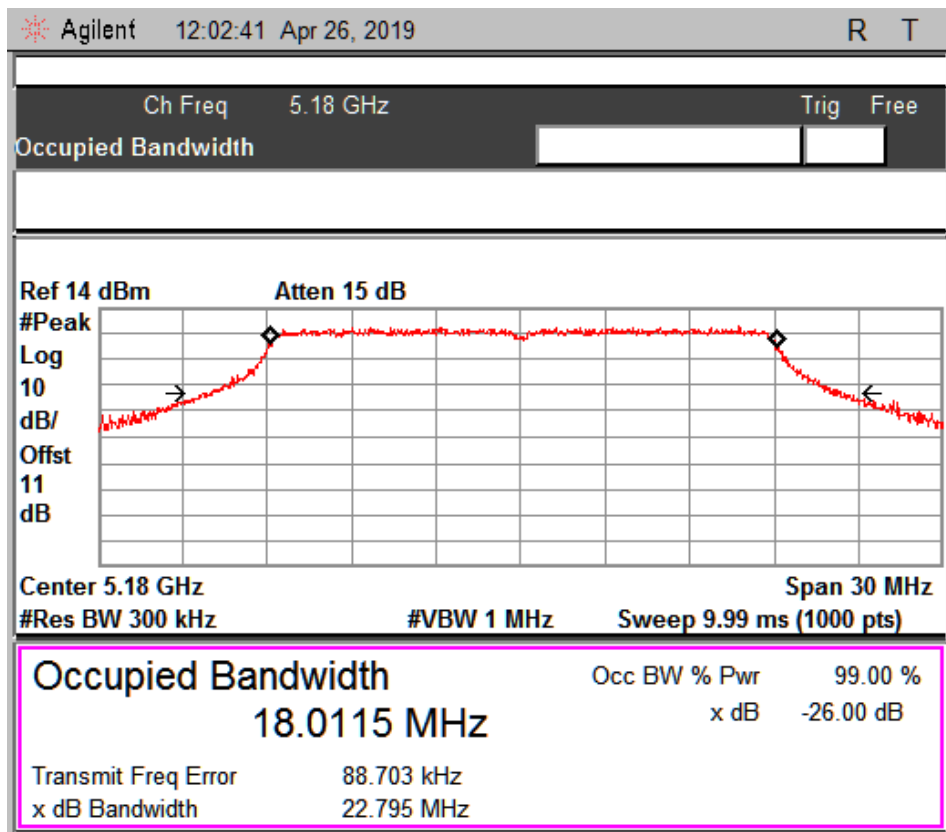
ULR-TC568819300000023F 001

Seite 55 von 212
Page 55 of 212



Data rate: MCS0

Channel Frequency : 5.825 GHz



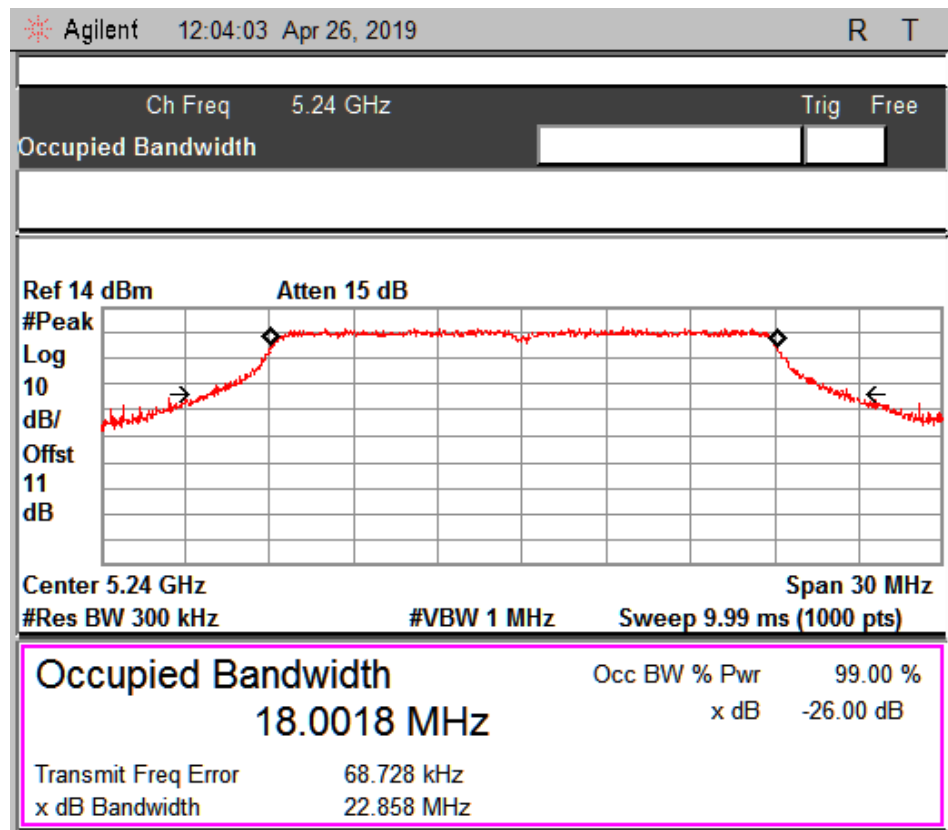
Data rate: MCS4

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

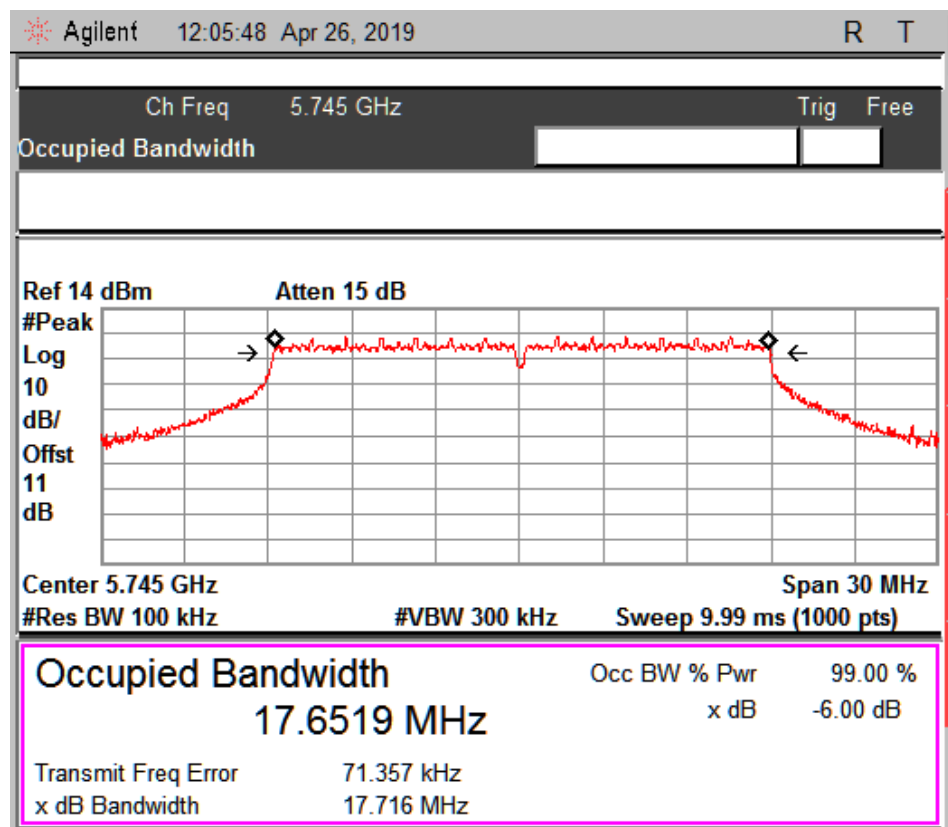
ULR-TC568819300000023F 001

Seite 56 von 212
Page 56 of 212



Data rate: MCS4

Channel Frequency : 5.240 GHz



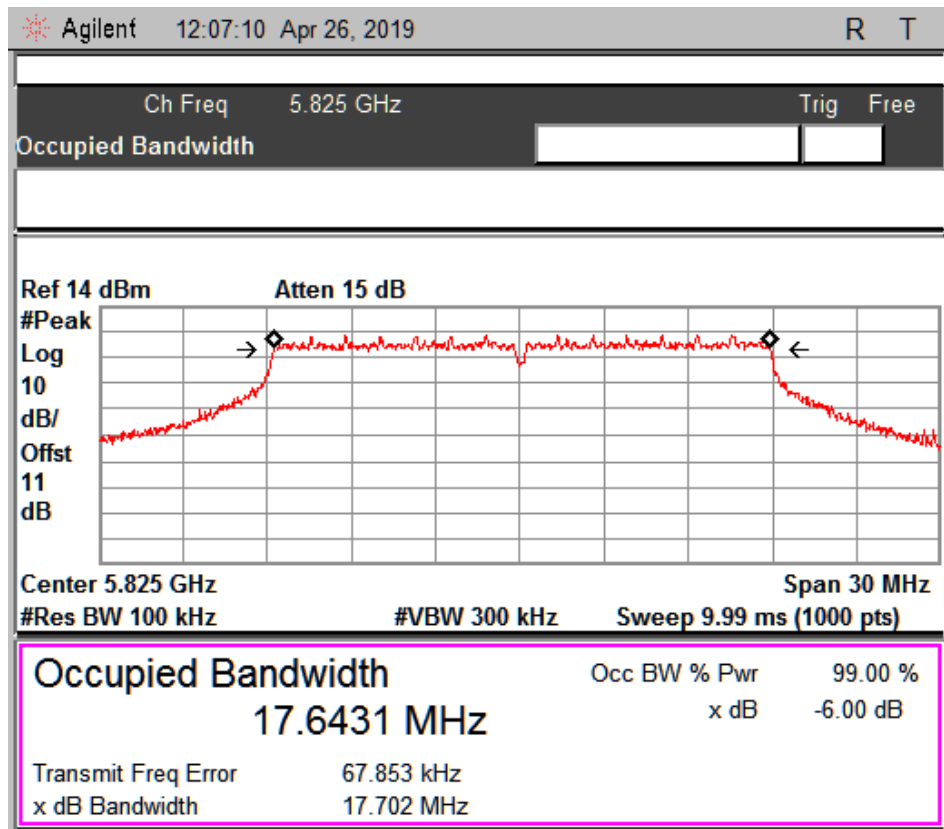
Data rate: MCS4

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

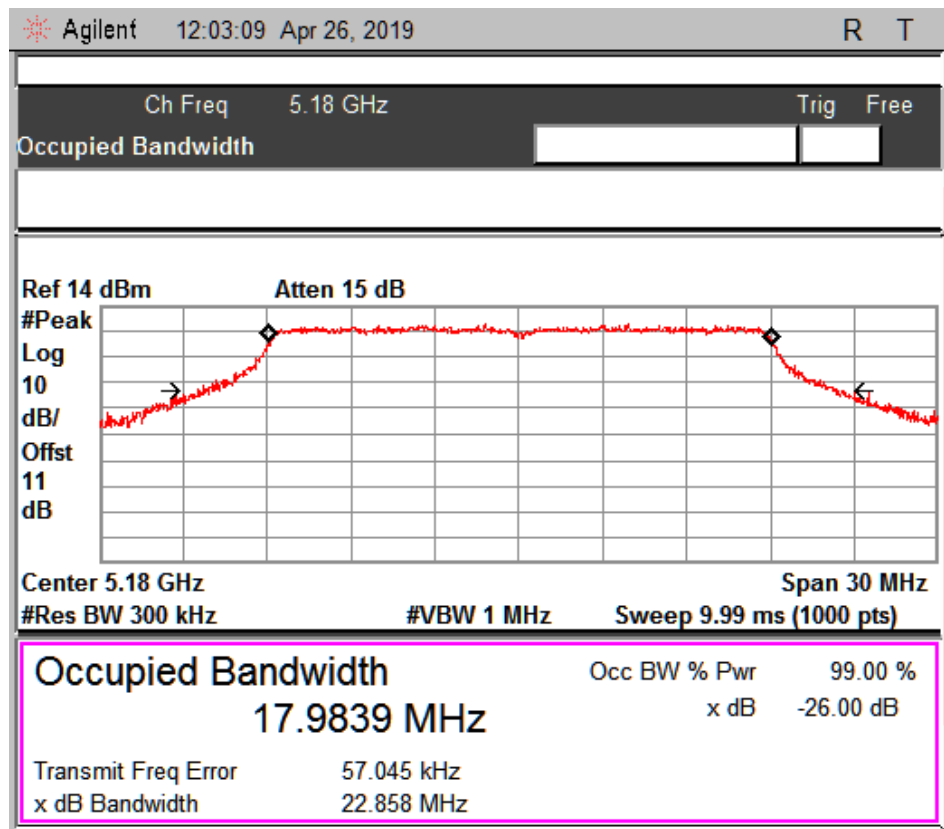
ULR-TC568819300000023F 001

Seite 57 von 212
Page 57 of 212



Data rate: MCS4

Channel Frequency : 5.825 GHz



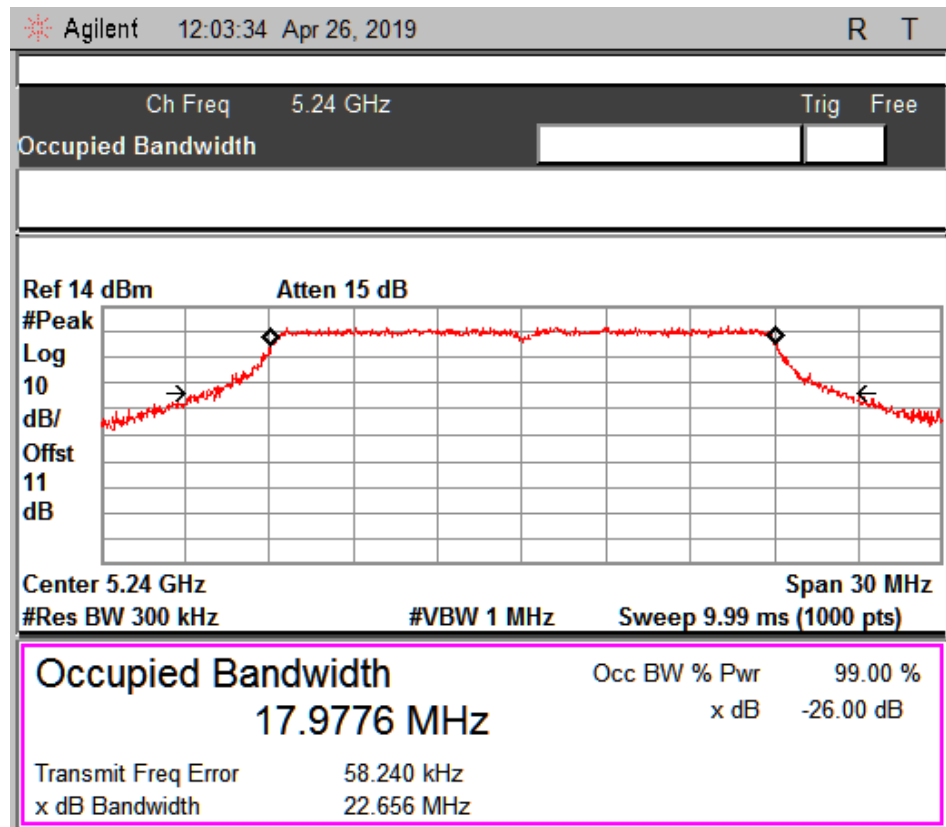
Data rate: MCS7

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

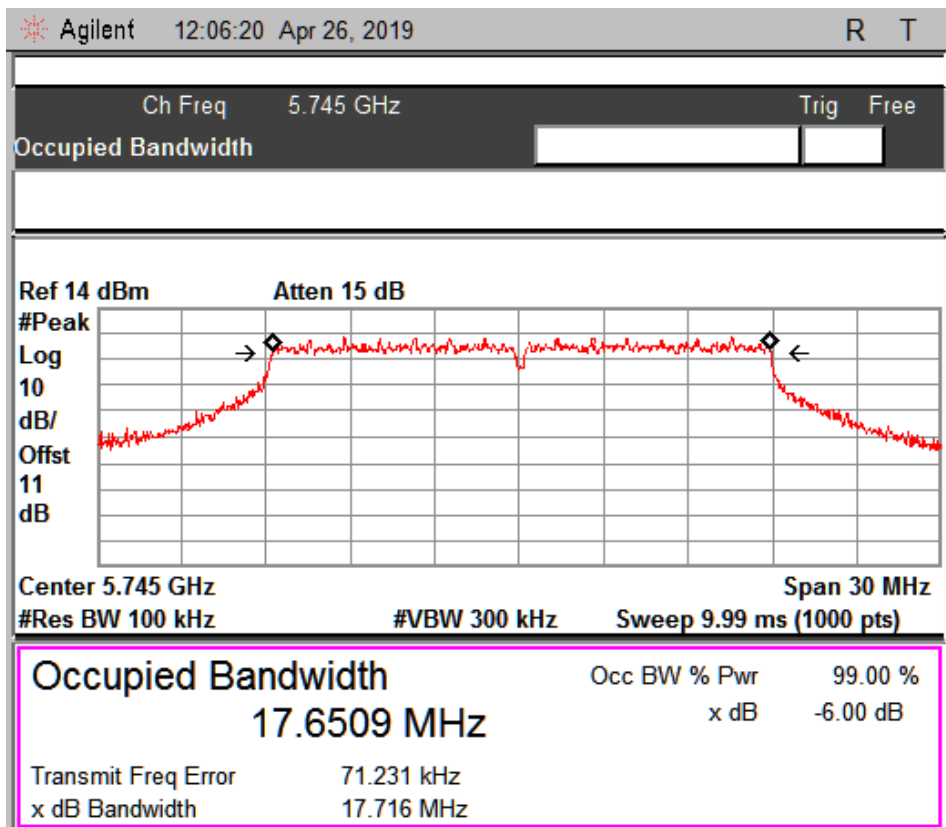
ULR-TC568819300000023F 001

Seite 58 von 212
Page 58 of 212



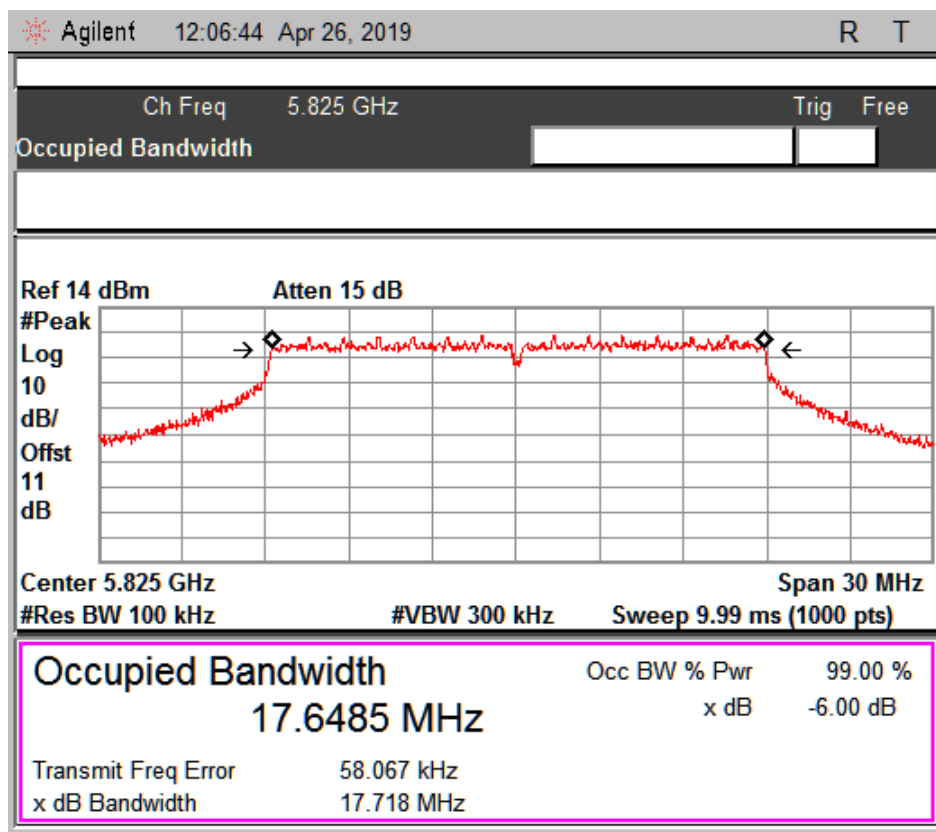
Data rate: MCS7

Channel Frequency : 5.240 GHz



Data rate: MCS7

Channel Frequency : 5.745 GHz



Data rate: MCS7

Channel Frequency : 5.825 GHz

Modulation: 802.11n mode SISO_VHT40

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS0	5190	43.57	37.20
	5230	47.26	37.32
	5755	36.34	36.14
	5795	36.33	36.16
MCS4	5190	45.97	37.20
	5230	46.27	37.38
	5755	36.43	36.16
	5795	36.45	36.16
MCS7	5190	45.90	37.15
	5230	46.08	37.29
	5755	36.48	36.19
	5795	36.47	36.19

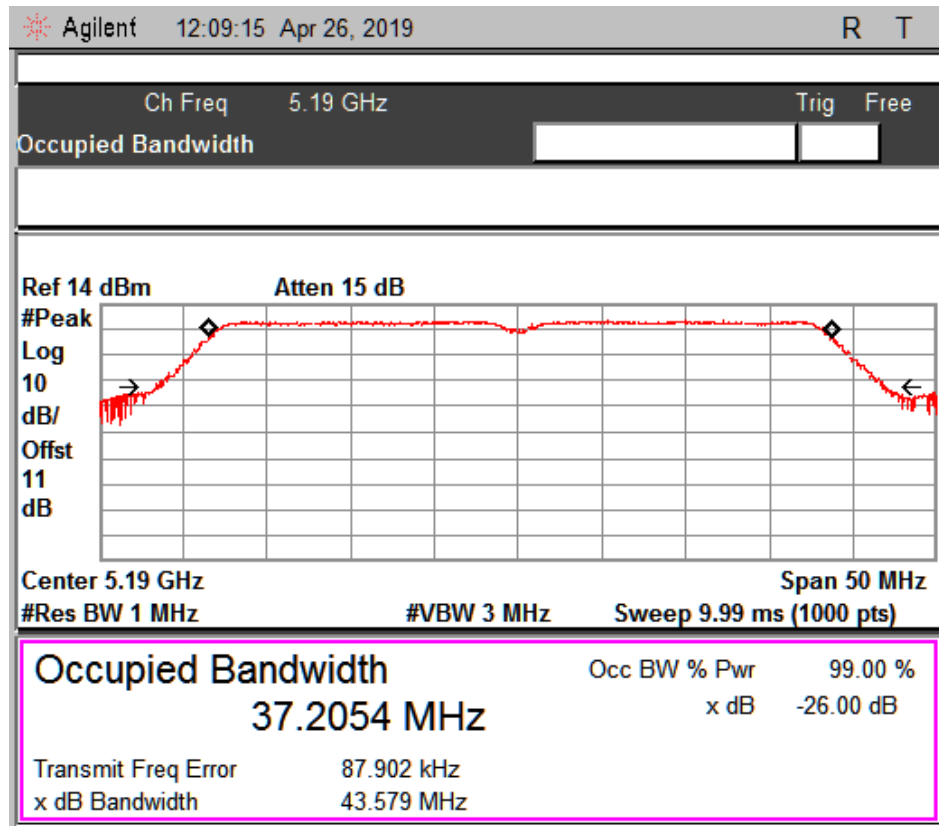
Prüfbericht - Nr.:

Test Report No.:

ULR-TC568819300000023F 001

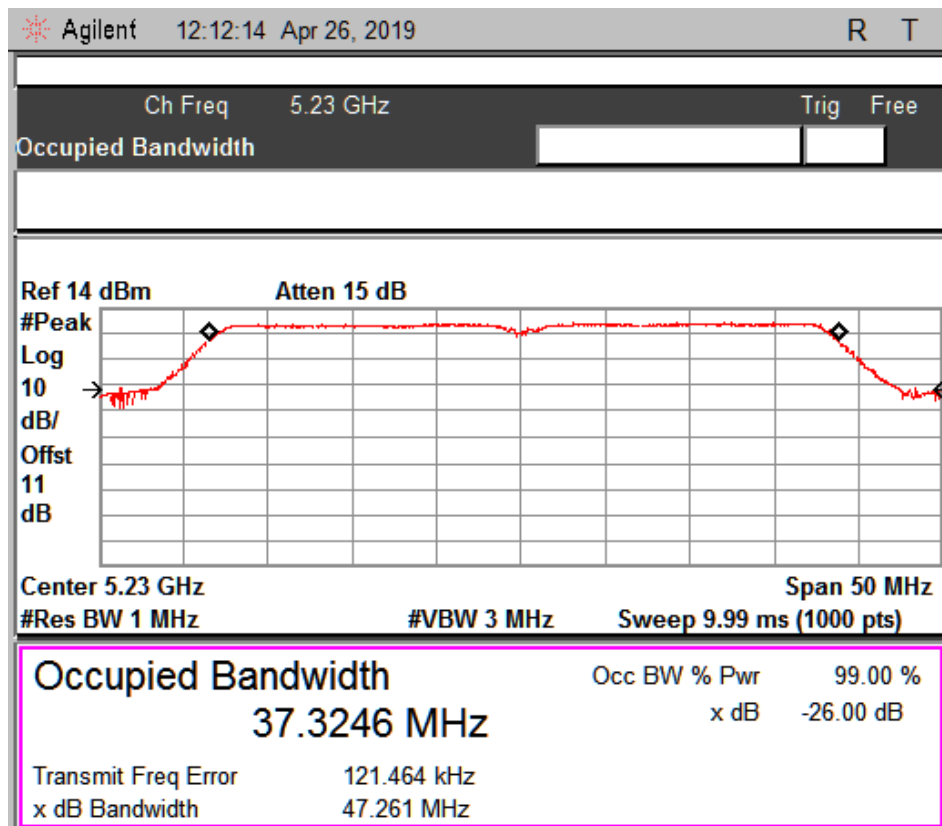
Seite 60 von 212

Page 60 of 212



Data rate: MCS0

Channel Frequency : 5.190 GHz



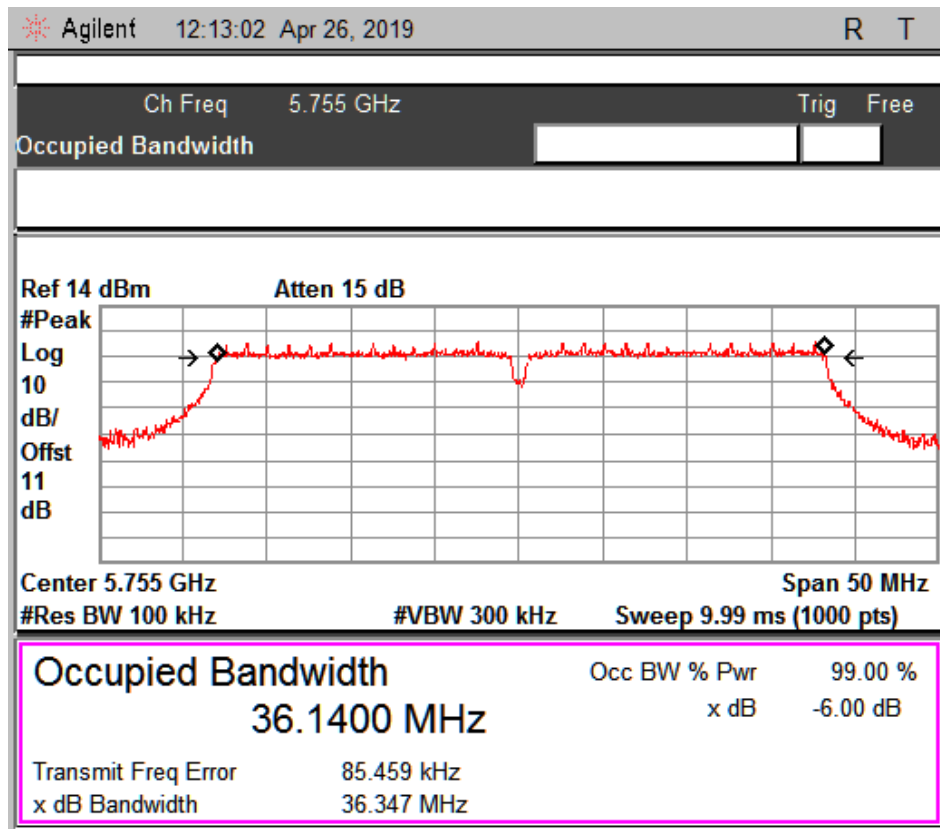
Data rate: MCS0

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

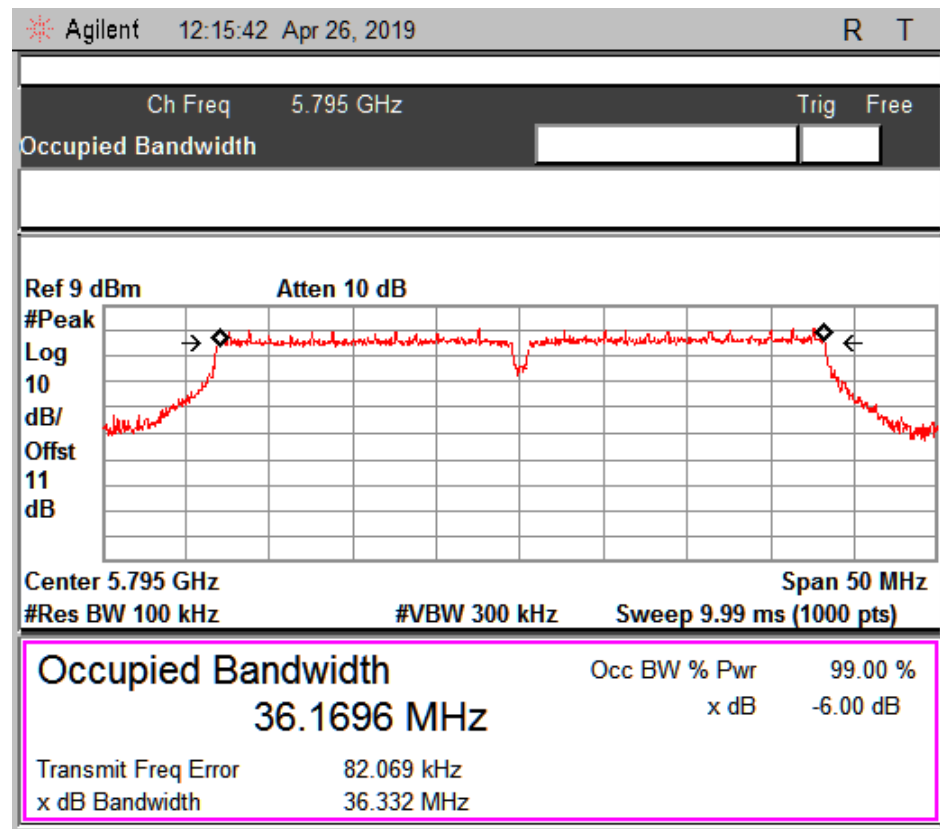
ULR-TC568819300000023F 001

Seite 61 von 212
Page 61 of 212



Data rate: MCS0

Channel Frequency : 5.755 GHz



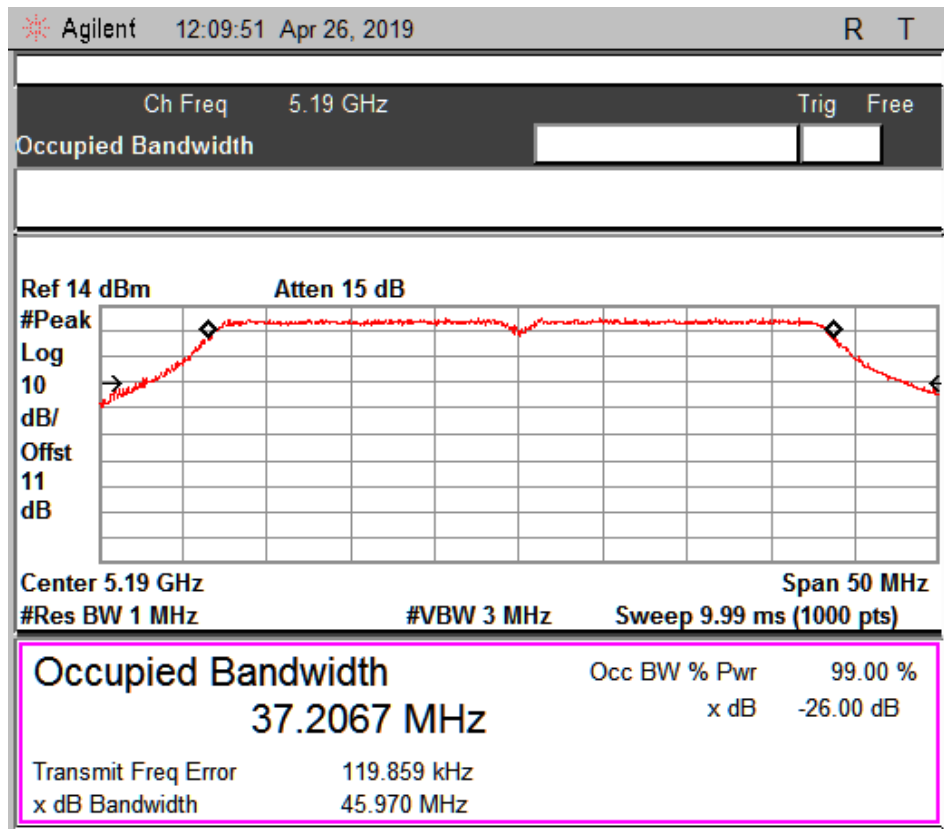
Data rate: MCS0

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

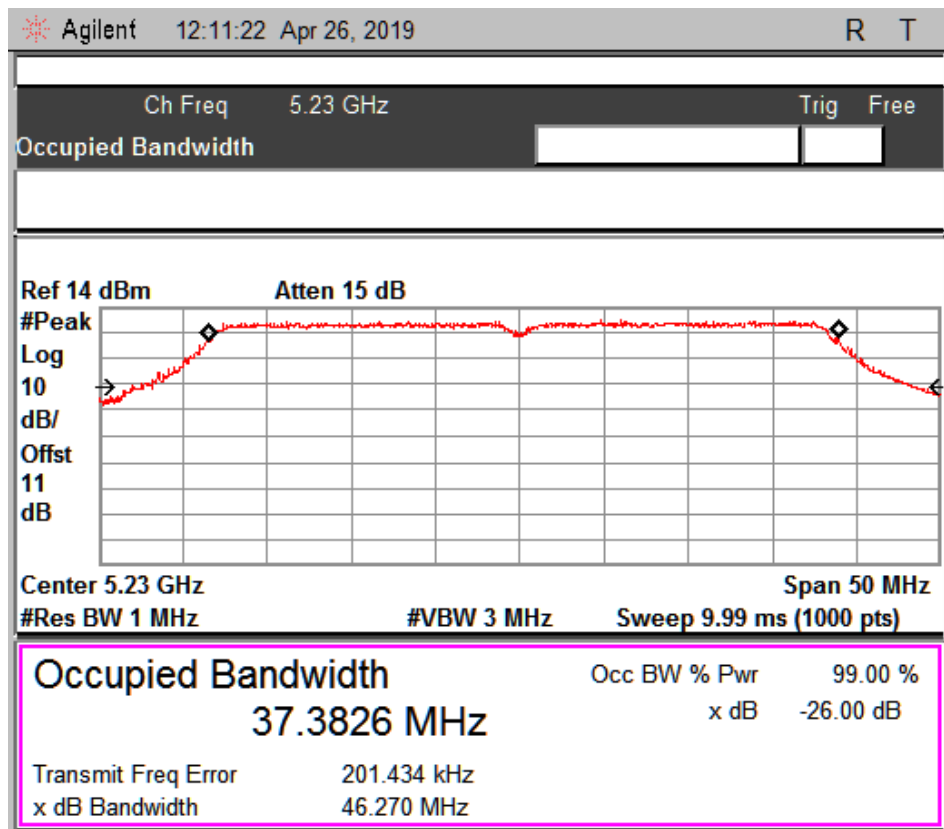
ULR-TC568819300000023F 001

Seite 62 von 212
Page 62 of 212



Data rate: MCS4

Channel Frequency : 5.190 GHz



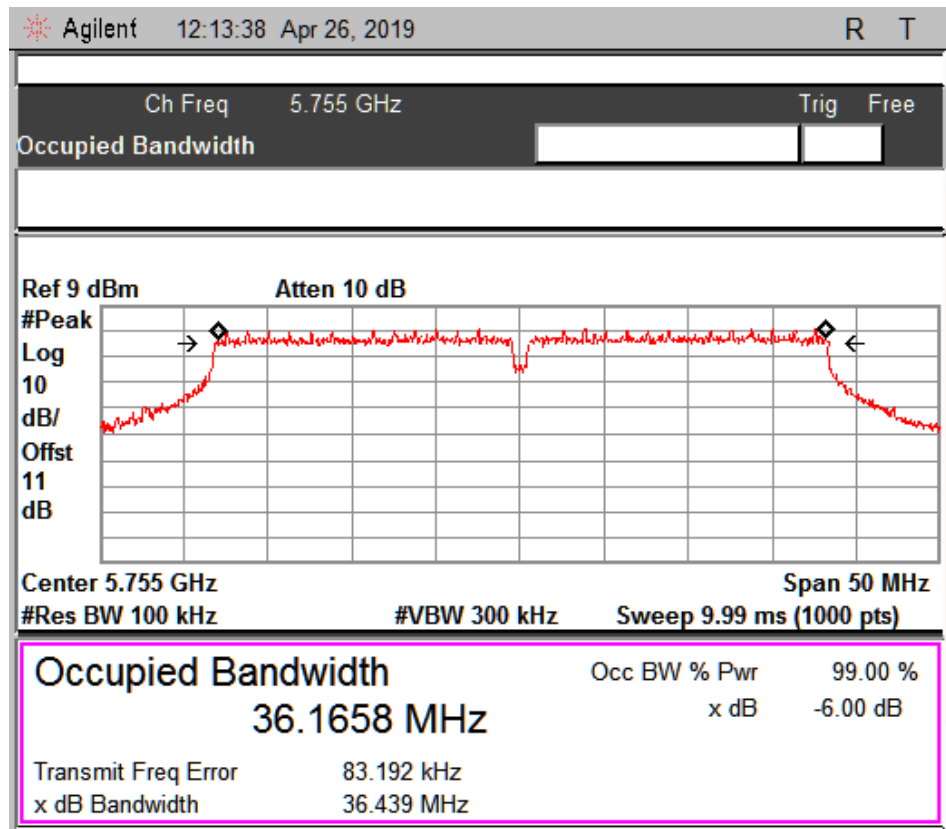
Data rate: MCS4

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

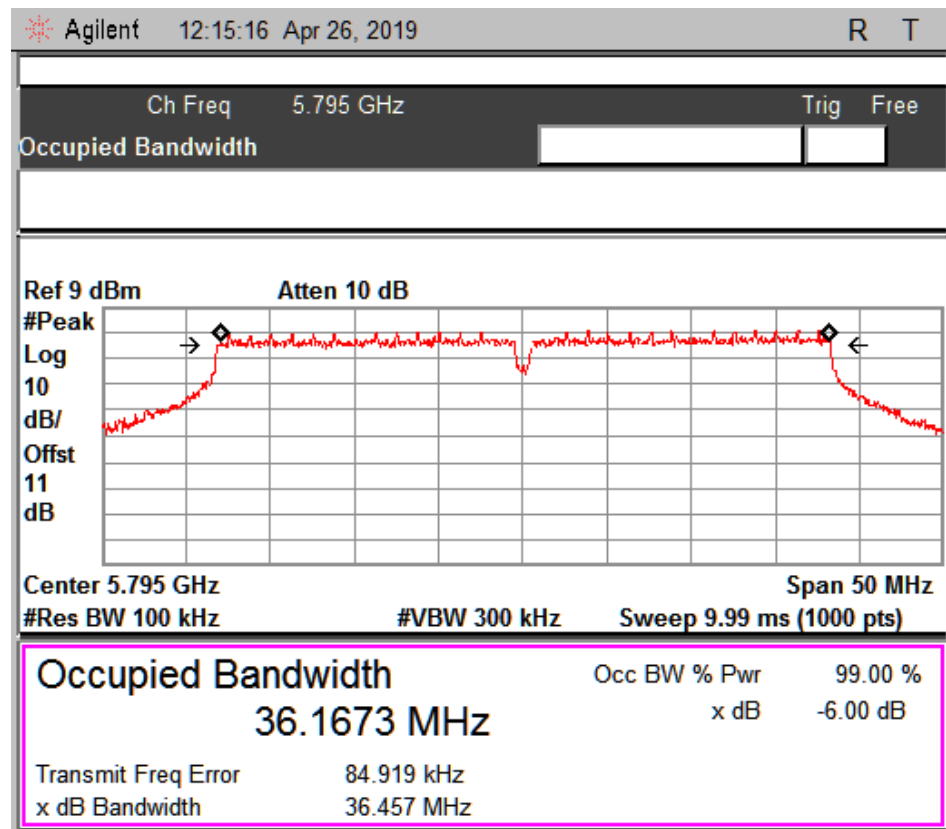
ULR-TC568819300000023F 001

Seite 63 von 212
Page 63 of 212



Data rate: MCS4

Channel Frequency : 5.755 GHz



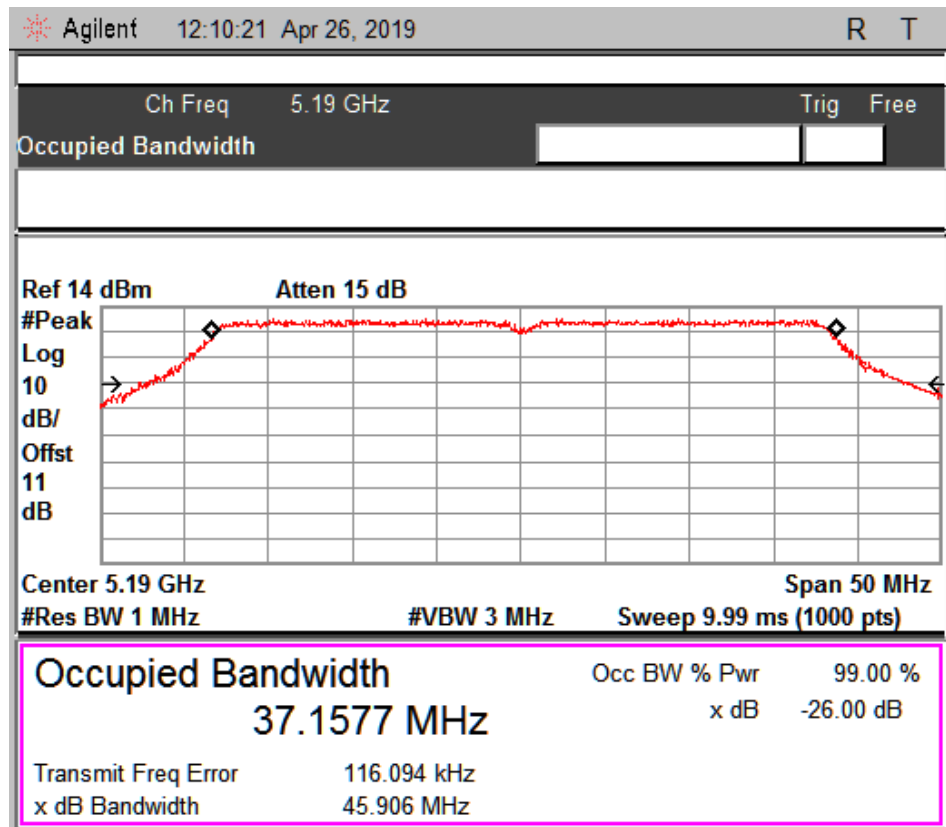
Data rate: MCS4

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

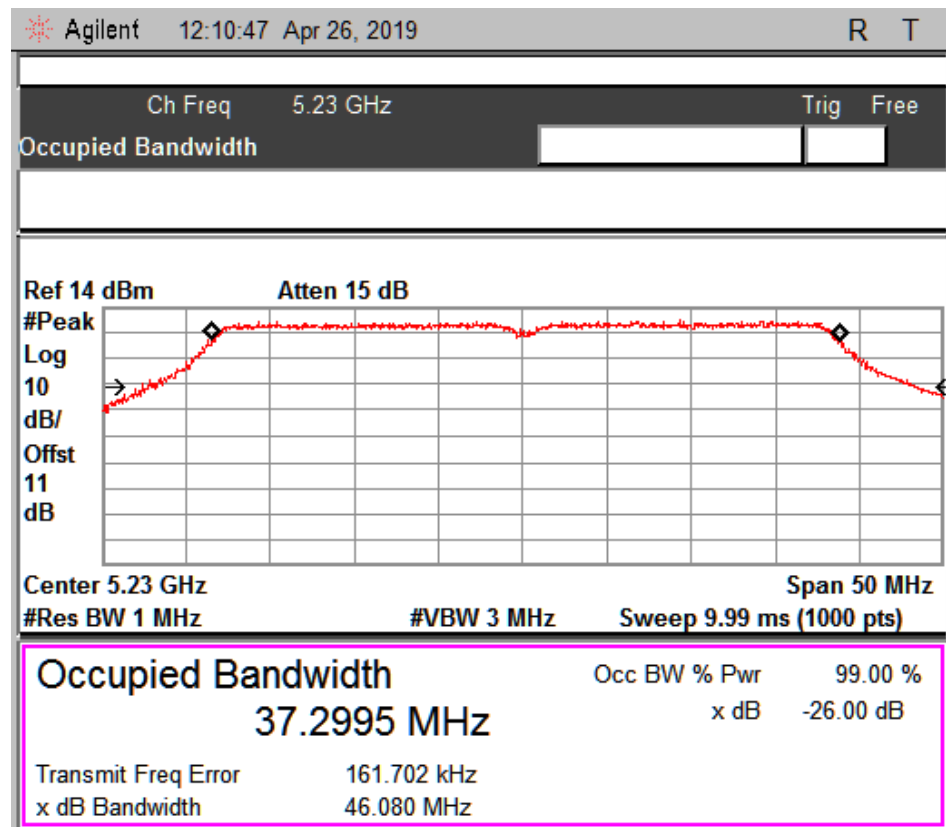
ULR-TC568819300000023F 001

Seite 64 von 212
Page 64 of 212



Data rate: MCS7

Channel Frequency : 5.190 GHz



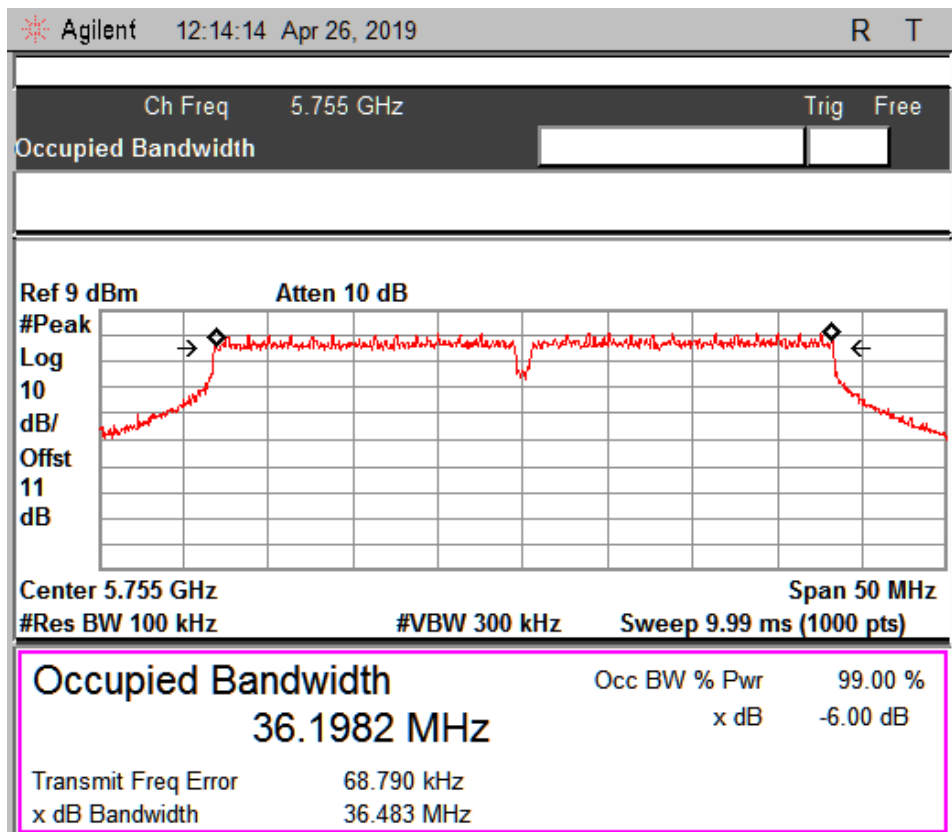
Data rate: MCS7

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

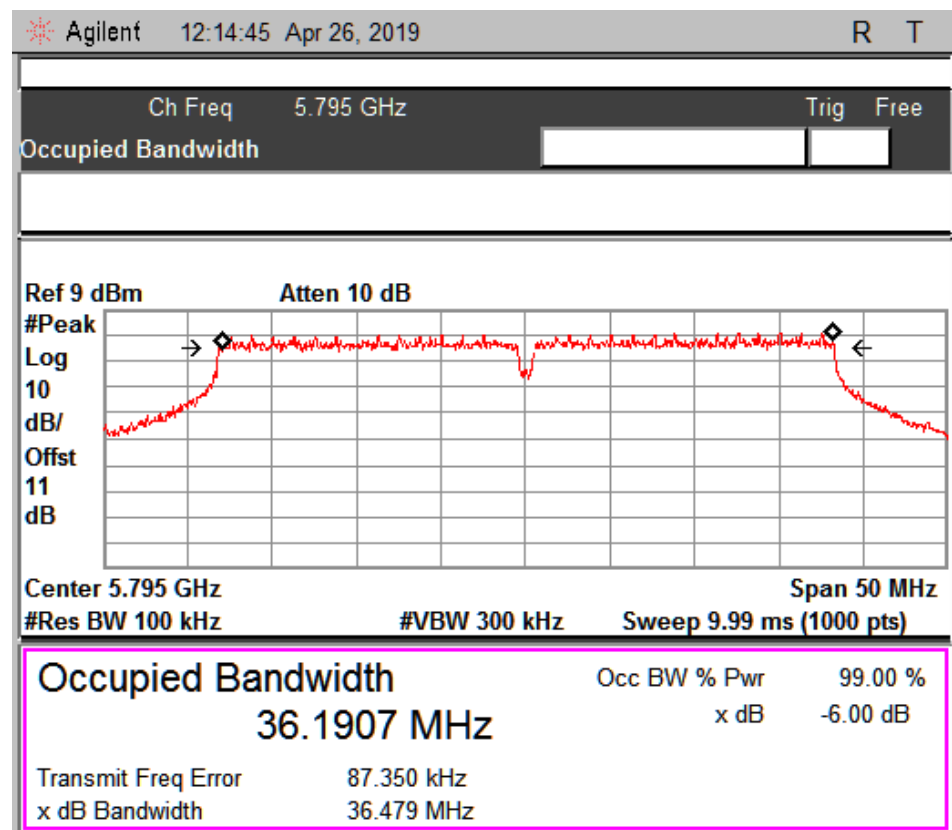
ULR-TC568819300000023F 001

Seite 65 von 212
Page 65 of 212



Data rate: MCS7

Channel Frequency : 5.755 GHz



Data rate: MCS7

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

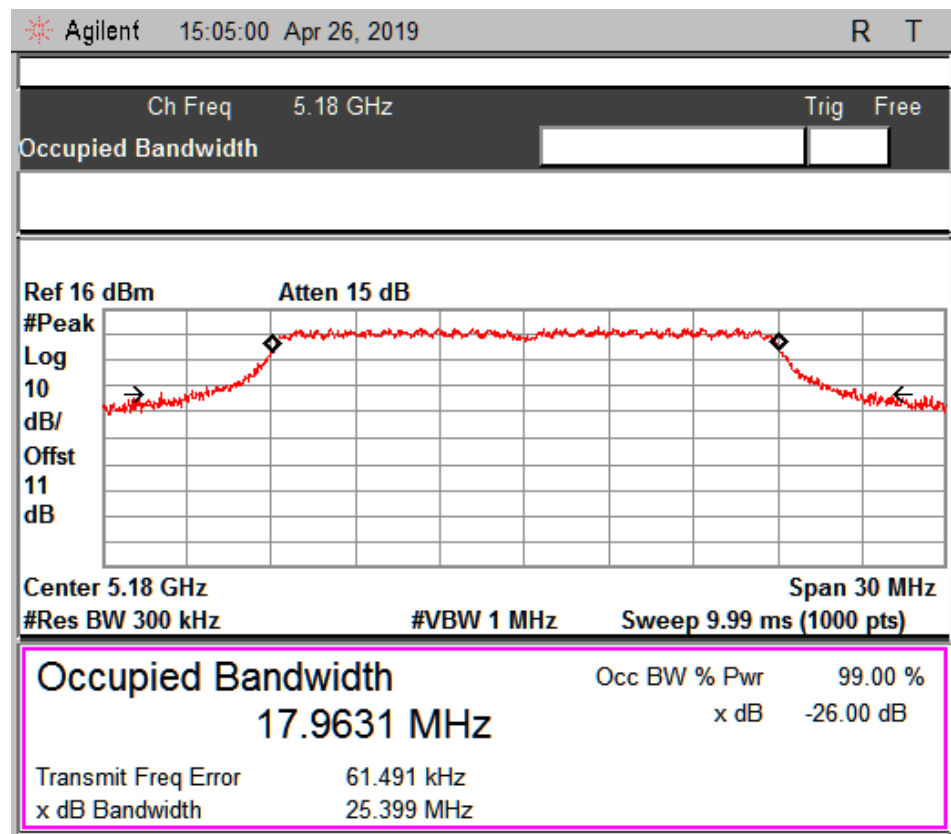
ULR-TC568819300000023F 001

Seite 66 von 212
Page 66 of 212

Modulation: 802.11n mode MIMO_HT20

Note: Test was performed on both the transmit chains and worst case results were from chain 2 and the respective results has been reported.

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS8	5180	25.99	17.96
	5240	29.12	18.01
	5745	17.61	17.68
	5825	17.61	17.67
MCS11	5180	26.21	18.02
	5240	24.48	18.04
	5745	17.65	17.64
	5825	17.73	17.66
MCS15	5180	23.59	18.01
	5240	24	18.08
	5745	17.66	17.65
	5825	17.71	17.65



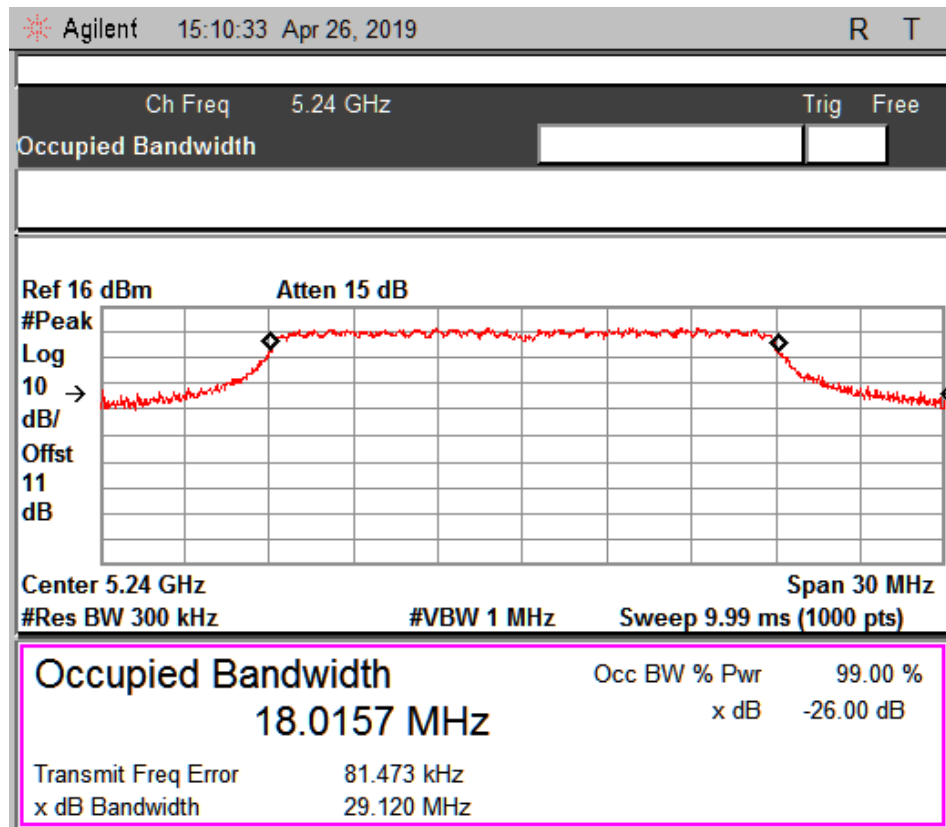
Data rate: MCS8

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

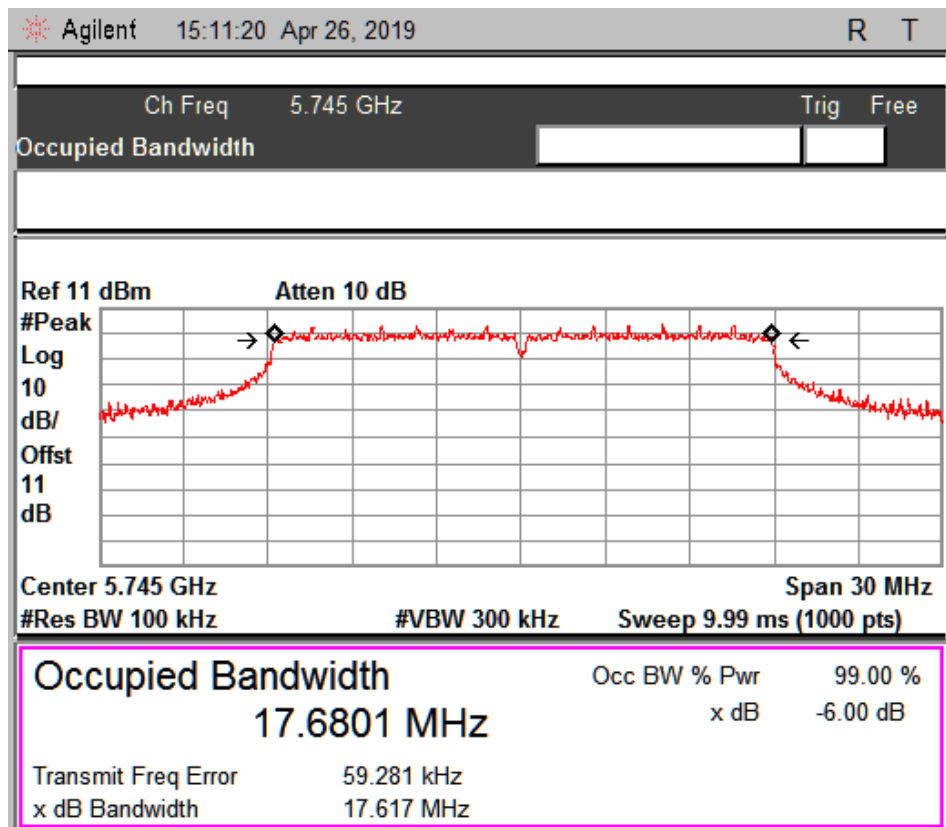
ULR-TC568819300000023F 001

Seite 67 von 212
Page 67 of 212



Data rate: MCS8

Channel Frequency : 5.240 GHz



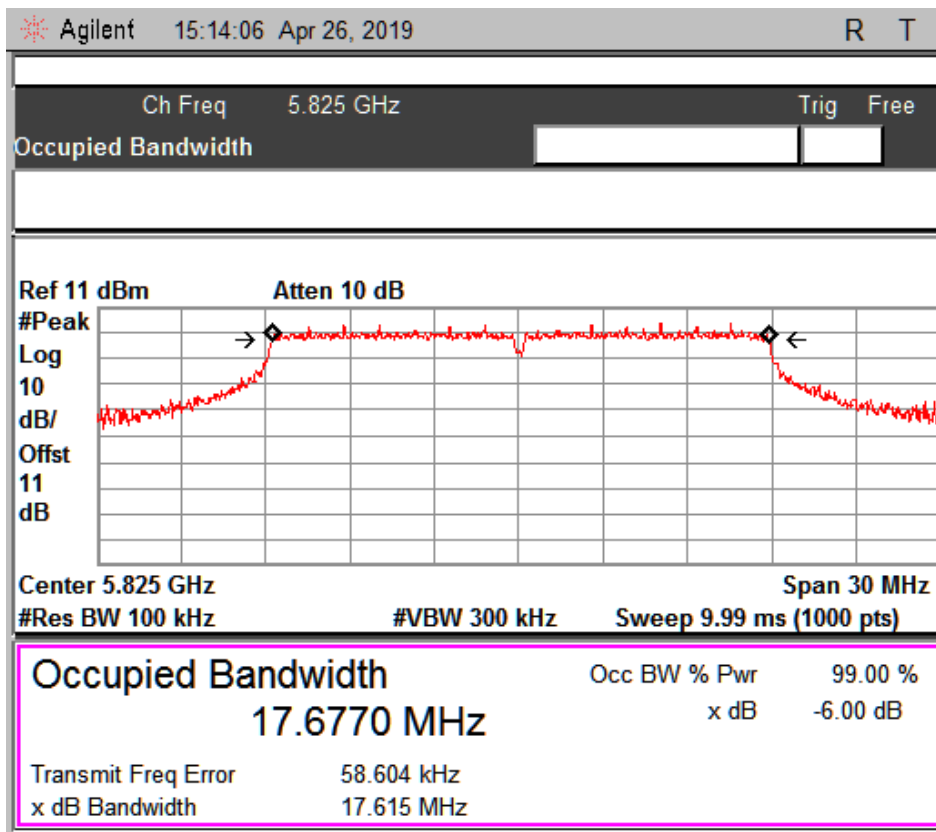
Data rate: MCS8

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

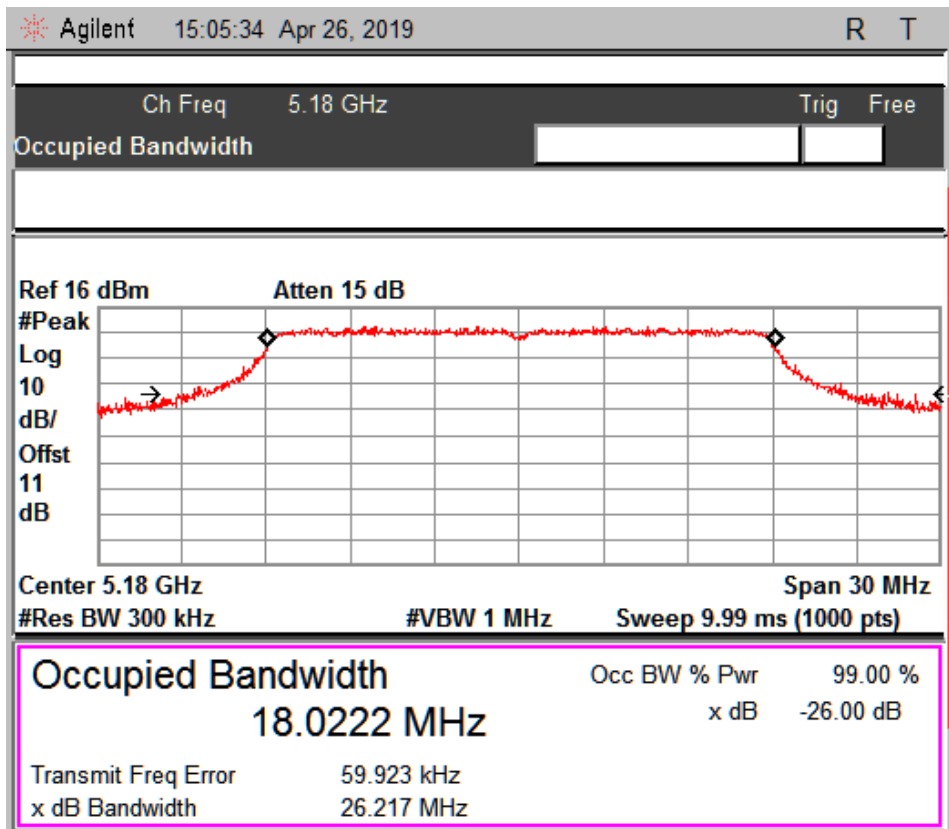
ULR-TC568819300000023F 001

Seite 68 von 212
Page 68 of 212



Data rate: MCS8

Channel Frequency : 5.825 GHz



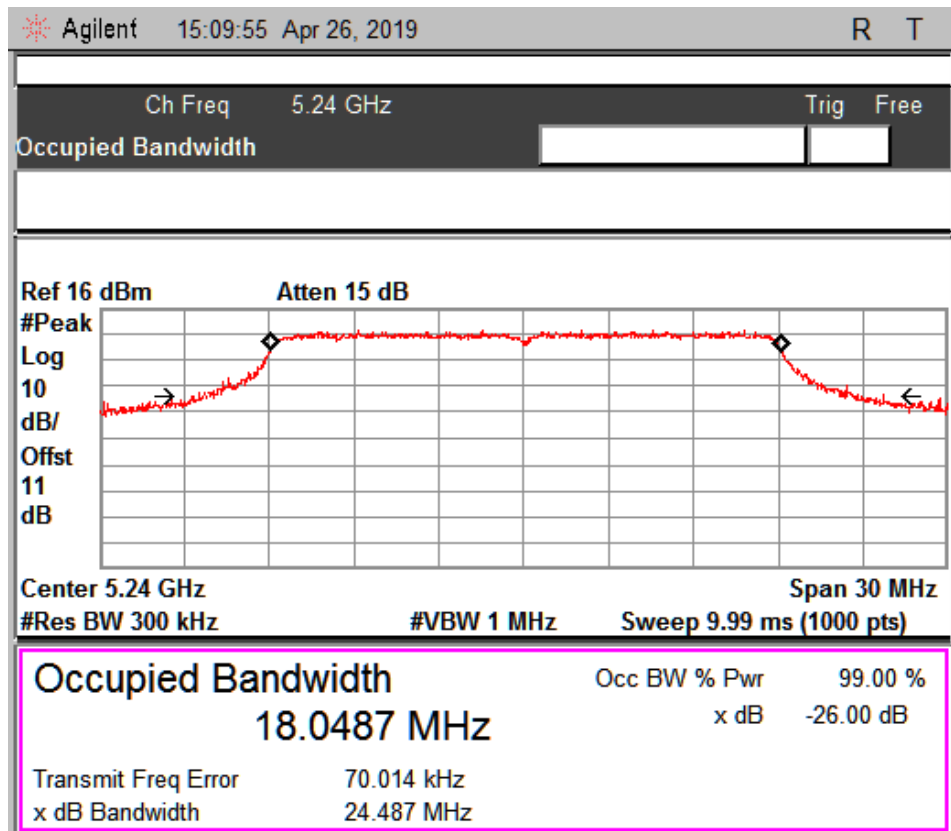
Data rate: MCS11

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

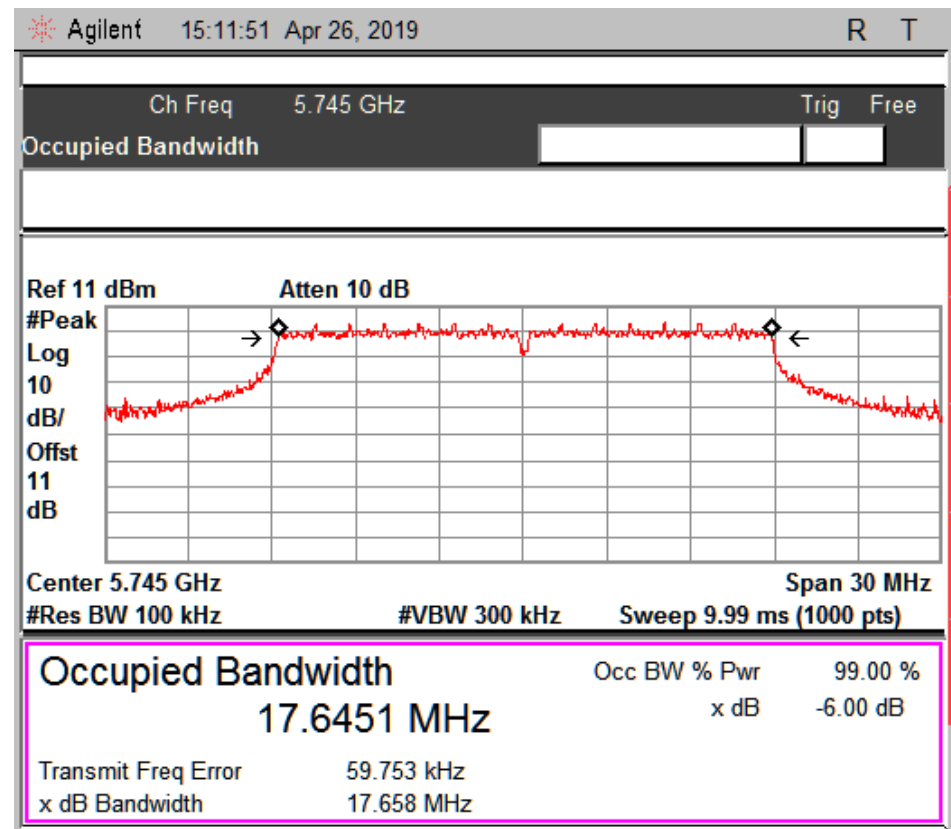
ULR-TC568819300000023F 001

Seite 69 von 212
Page 69 of 212



Data rate: MCS11

Channel Frequency : 5.240 GHz



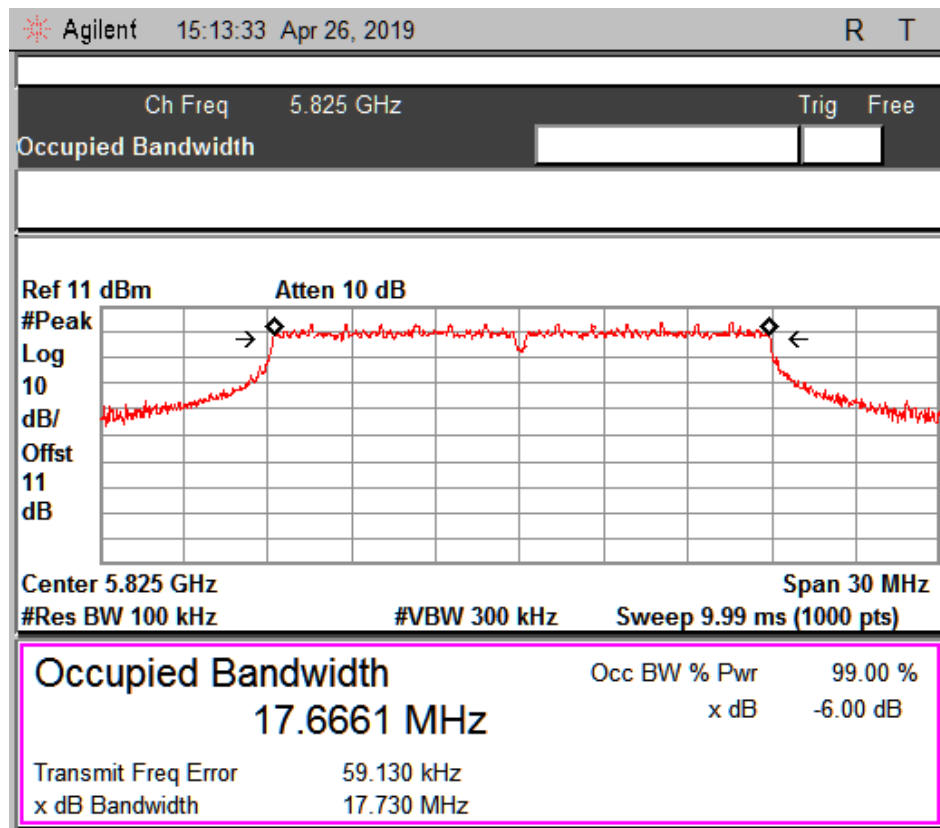
Data rate: MCS11

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

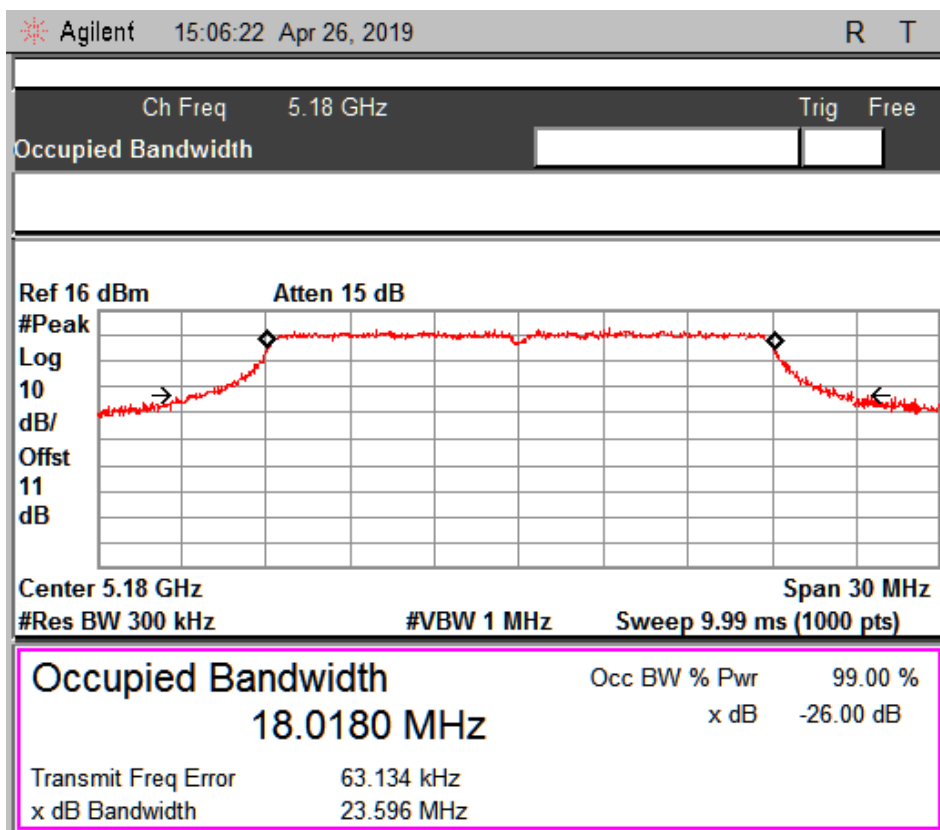
ULR-TC568819300000023F 001

Seite 70 von 212
Page 70 of 212



Data rate: MCS11

Channel Frequency : 5.825 GHz



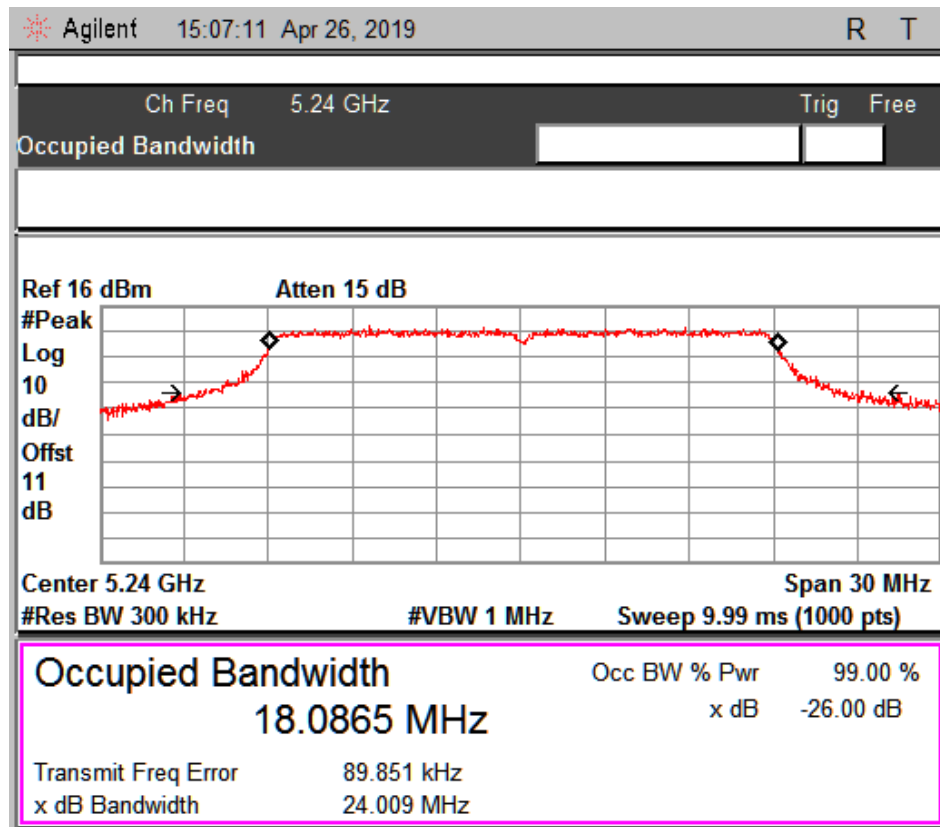
Data rate: MCS15

Channel Frequency : 5.180 GHz

Prüfbericht - Nr.:
Test Report No.:

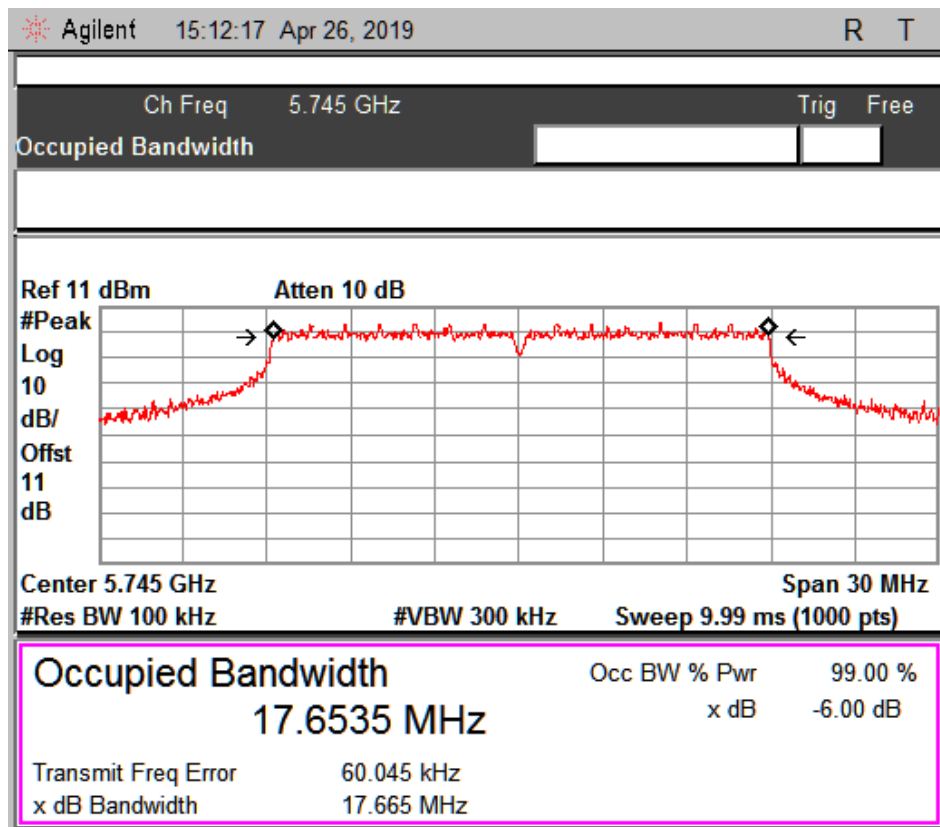
ULR-TC568819300000023F 001

Seite 71 von 212
Page 71 of 212



Data rate: MCS15

Channel Frequency : 5.240 GHz



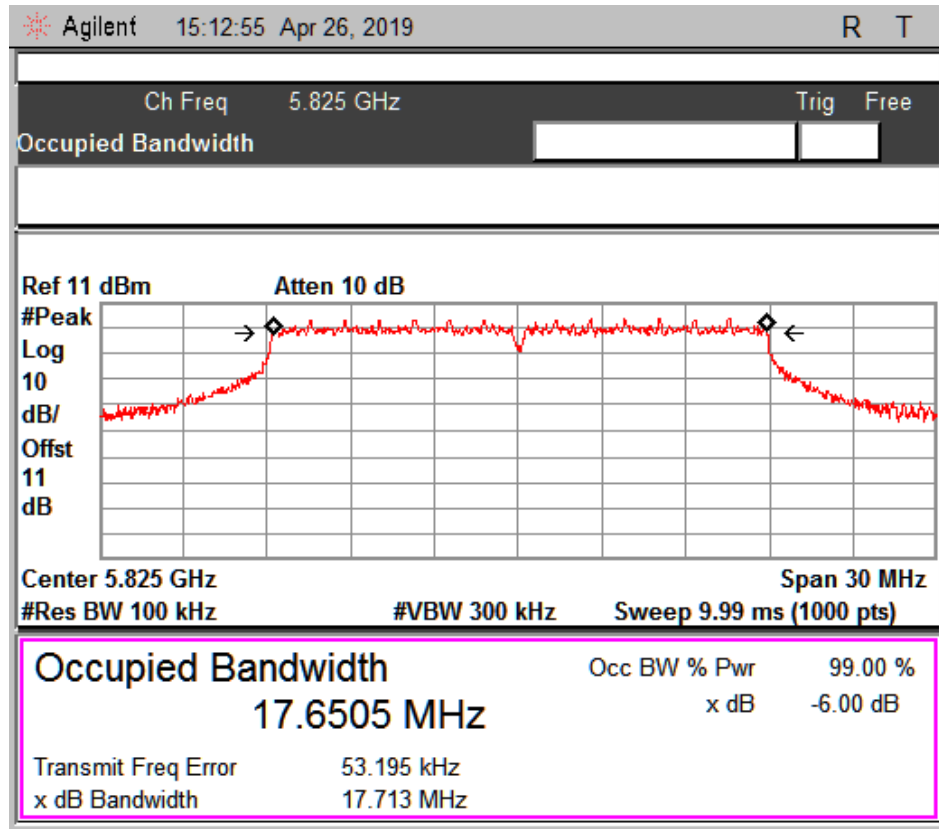
Data rate: MCS15

Channel Frequency : 5.745 GHz

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568819300000023F 001

Seite 72 von 212
Page 72 of 212



Data rate: MCS15

Channel Frequency : 5.825 GHz

Modulation: 802.11n mode MIMO_VHT40

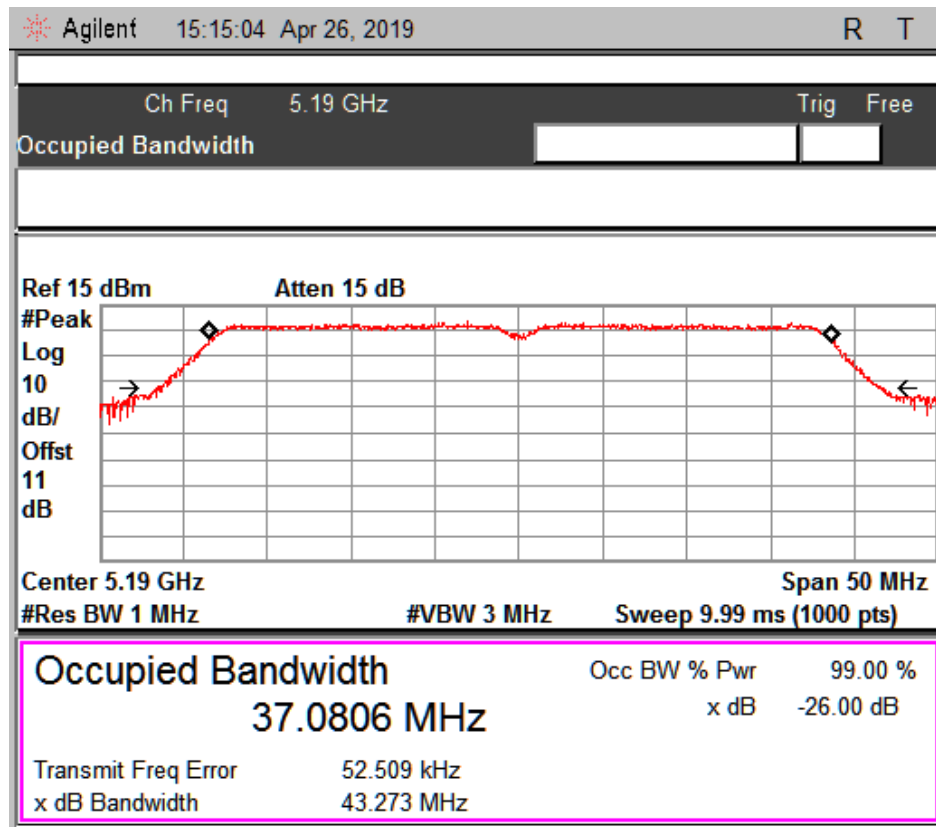
Note: Test was performed on both the transmit chains and worst case results were from chain 2 and the respective results has been reported.

Data rate (Mbps)	Frequency (MHz)	Emission Bandwidth (MHz)	OBW (MHz)
MCS8	5190	43.27	37.08
	5230	48.81	37.22
	5755	36.36	36.18
	5795	36.37	36.18
MCS11	5190	46.30	37.40
	5230	49.32	37.42
	5755	36.40	36.18
	5795	36.37	36.17
MCS15	5190	45.78	37.14
	5230	49.00	37.35
	5755	36.39	36.17
	5795	36.46	36.18

Prüfbericht - Nr.:
Test Report No.:

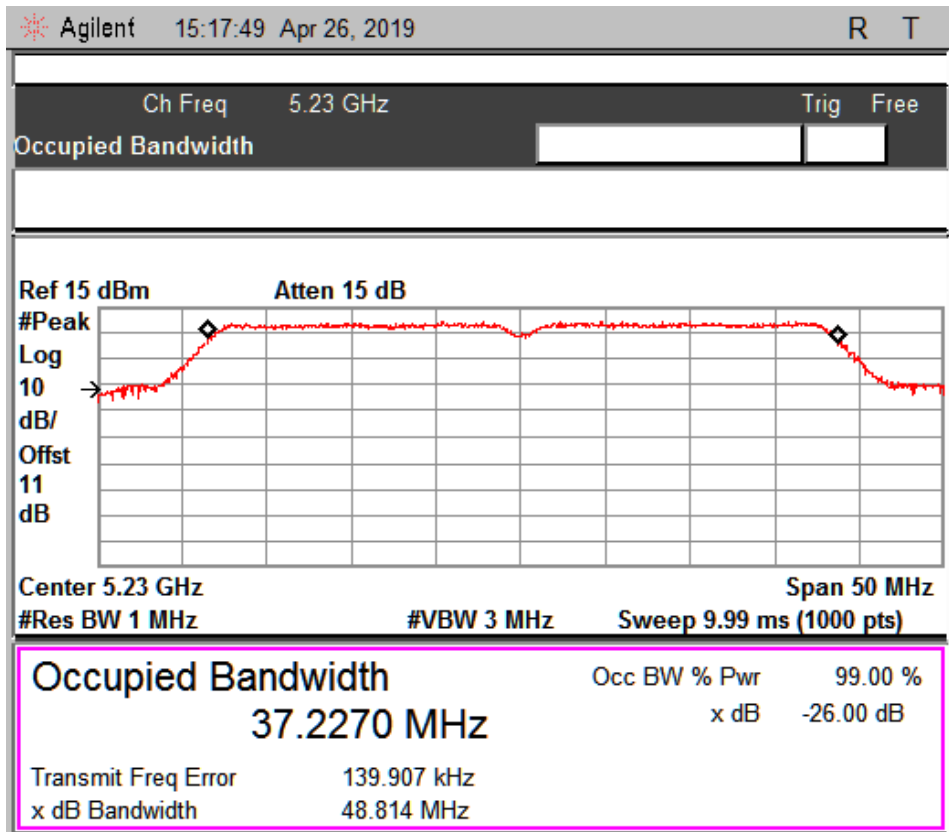
ULR-TC568819300000023F 001

Seite 73 von 212
Page 73 of 212



Data rate: MCS8

Channel Frequency : 5.190 GHz



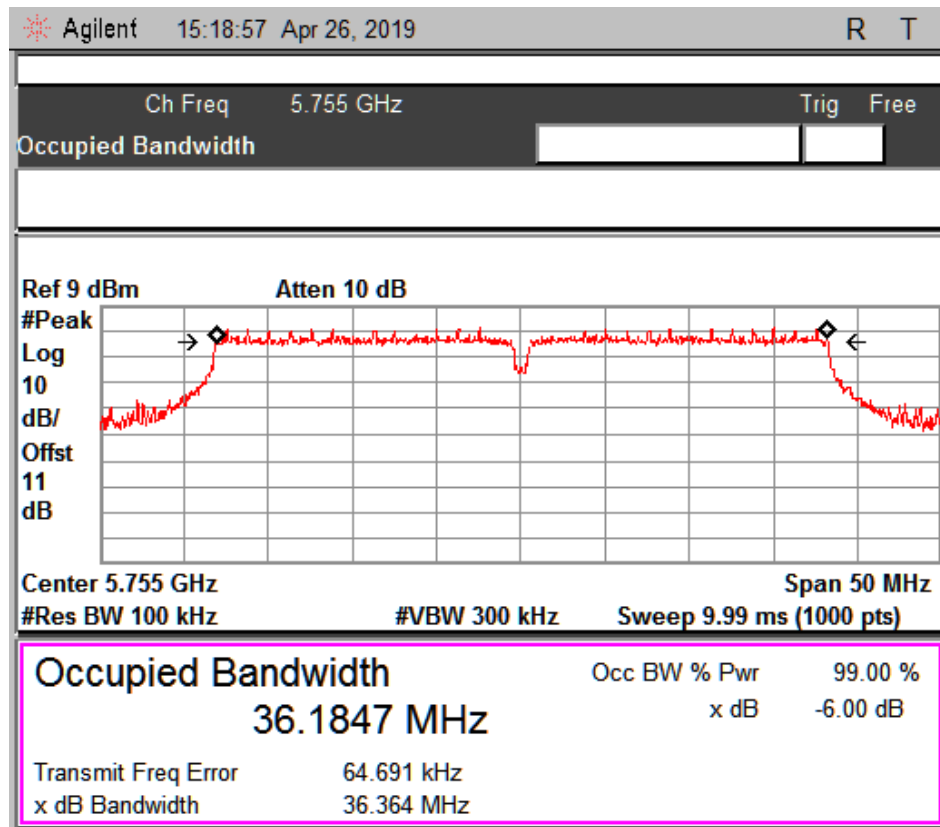
Data rate: MCS8

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

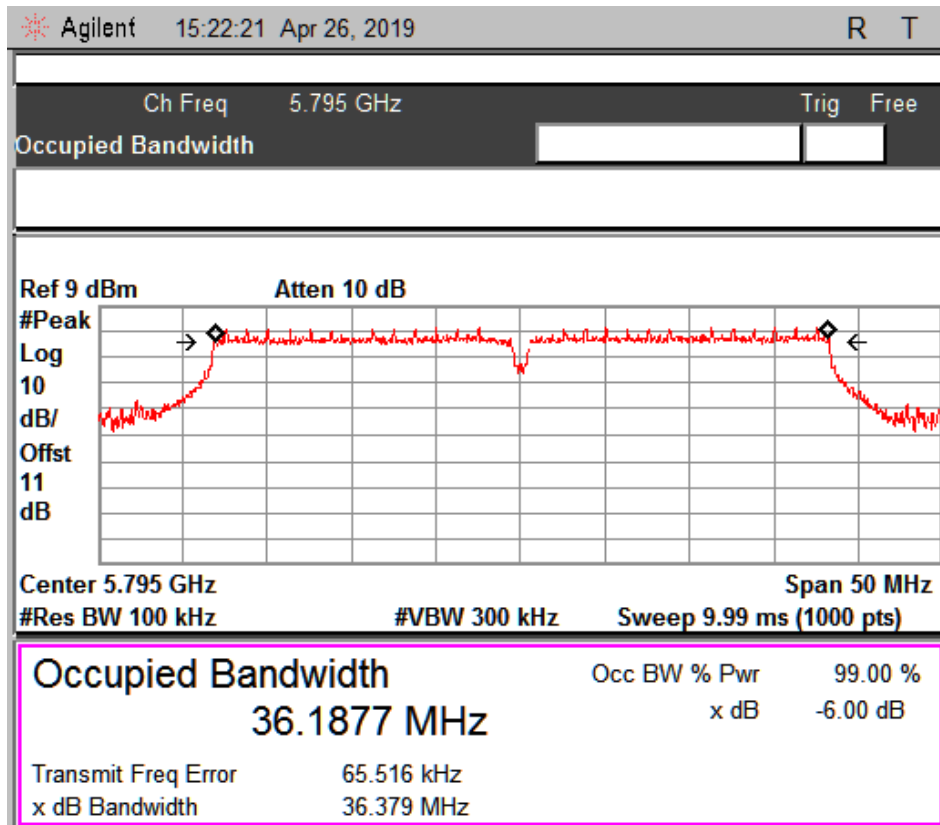
ULR-TC568819300000023F 001

Seite 74 von 212
Page 74 of 212



Data rate: MCS8

Channel Frequency : 5.755 GHz



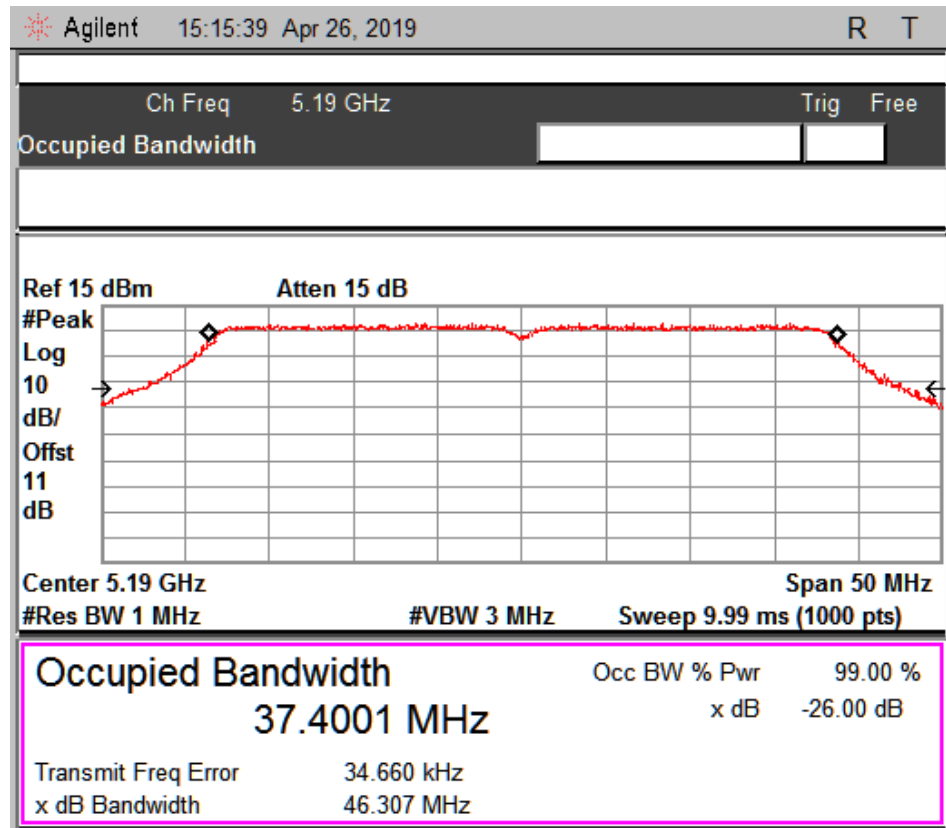
Data rate: MCS8

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

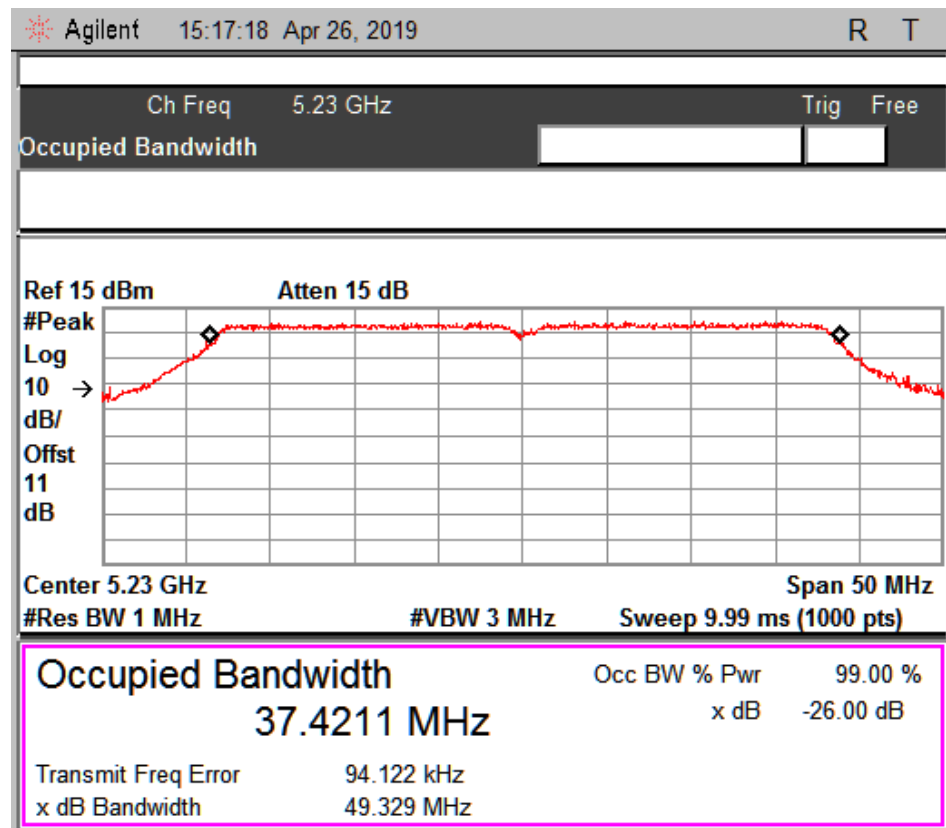
ULR-TC568819300000023F 001

Seite 75 von 212
Page 75 of 212



Data rate: MCS11

Channel Frequency : 5.190 GHz



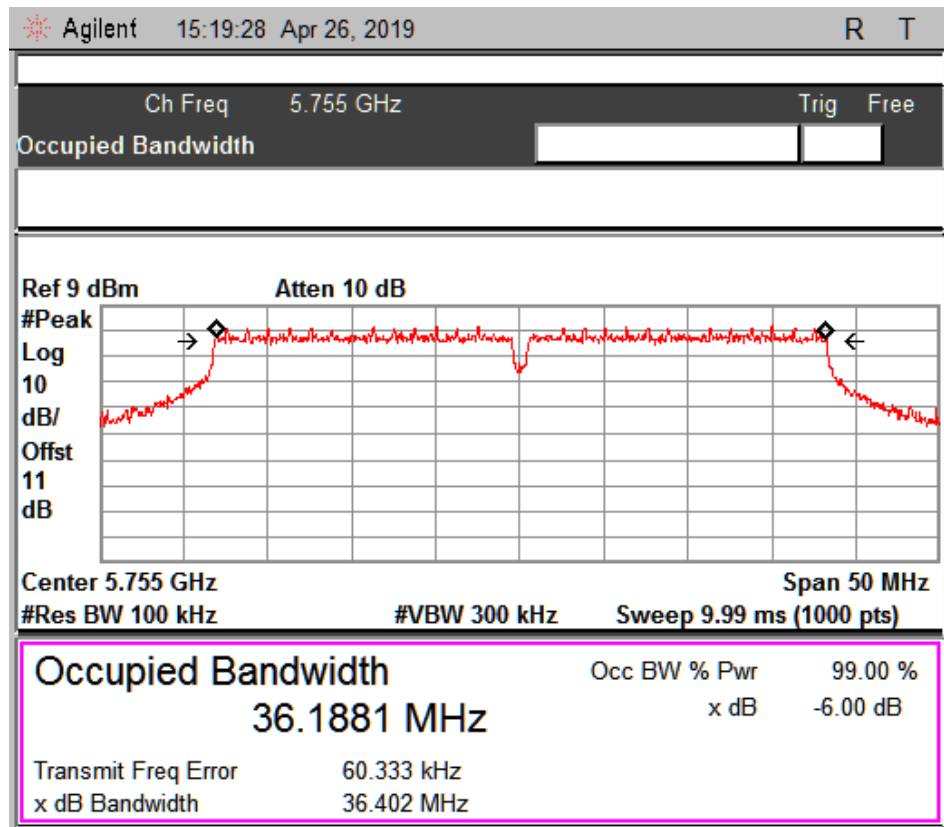
Data rate: MCS11

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

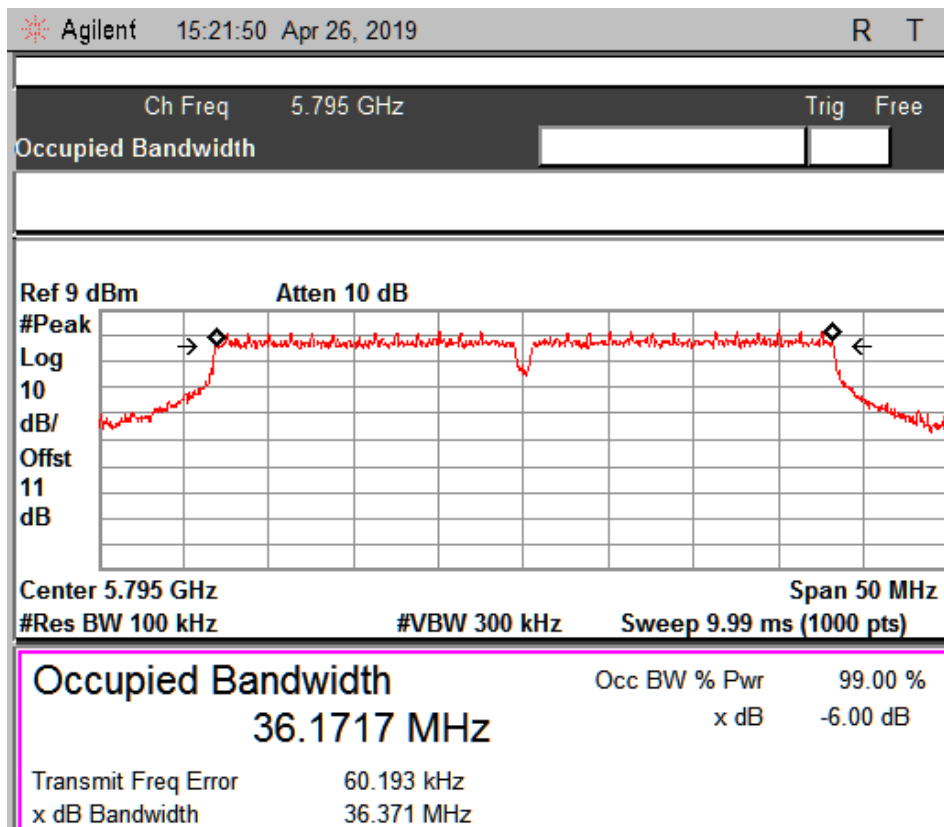
ULR-TC568819300000023F 001

Seite 76 von 212
Page 76 of 212



Data rate: MCS11

Channel Frequency : 5.755 GHz



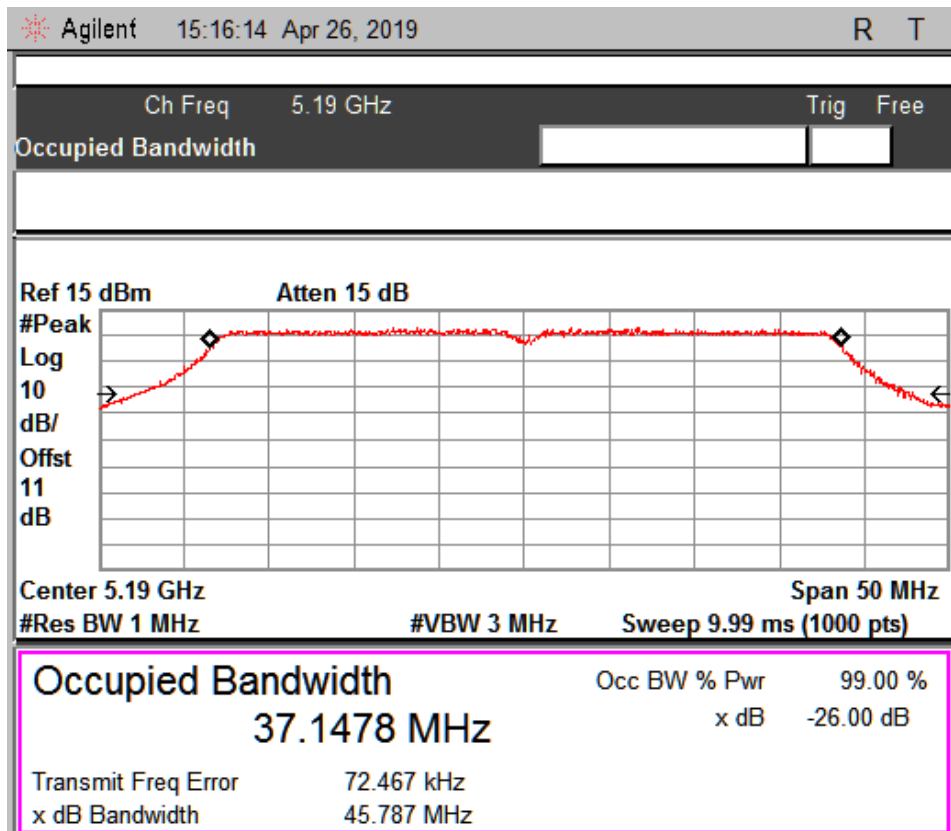
Data rate: MCS11

Channel Frequency : 5.795 GHz

Prüfbericht - Nr.:
Test Report No.:

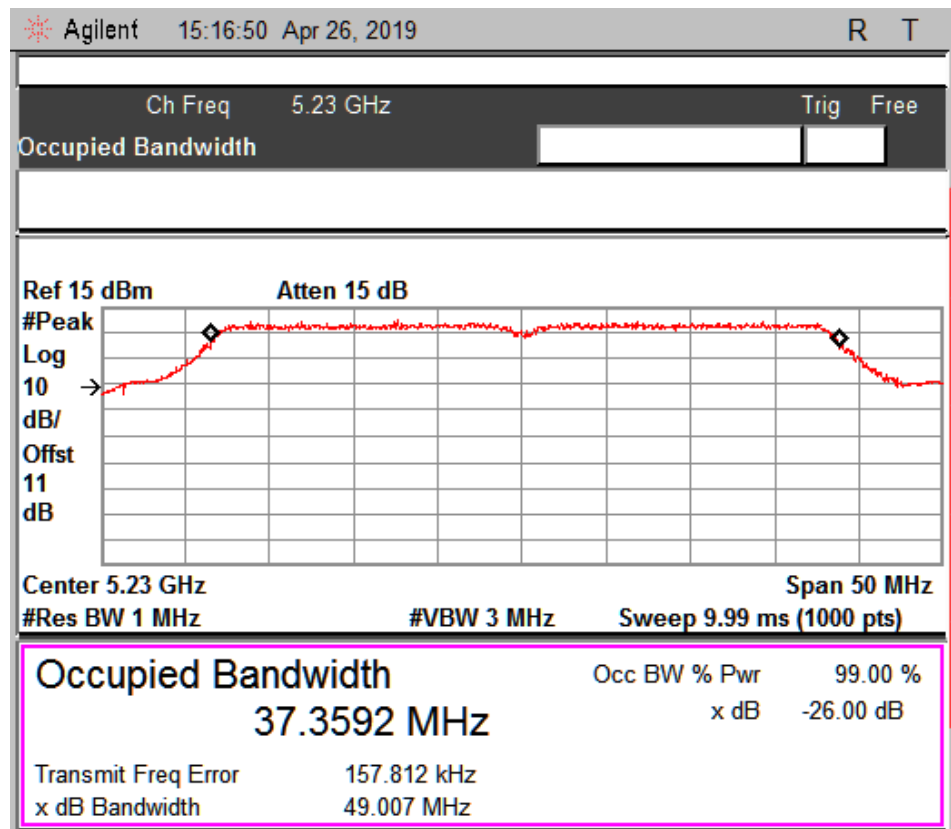
ULR-TC568819300000023F 001

Seite 77 von 212
Page 77 of 212



Data rate: MCS15

Channel Frequency : 5.190 GHz



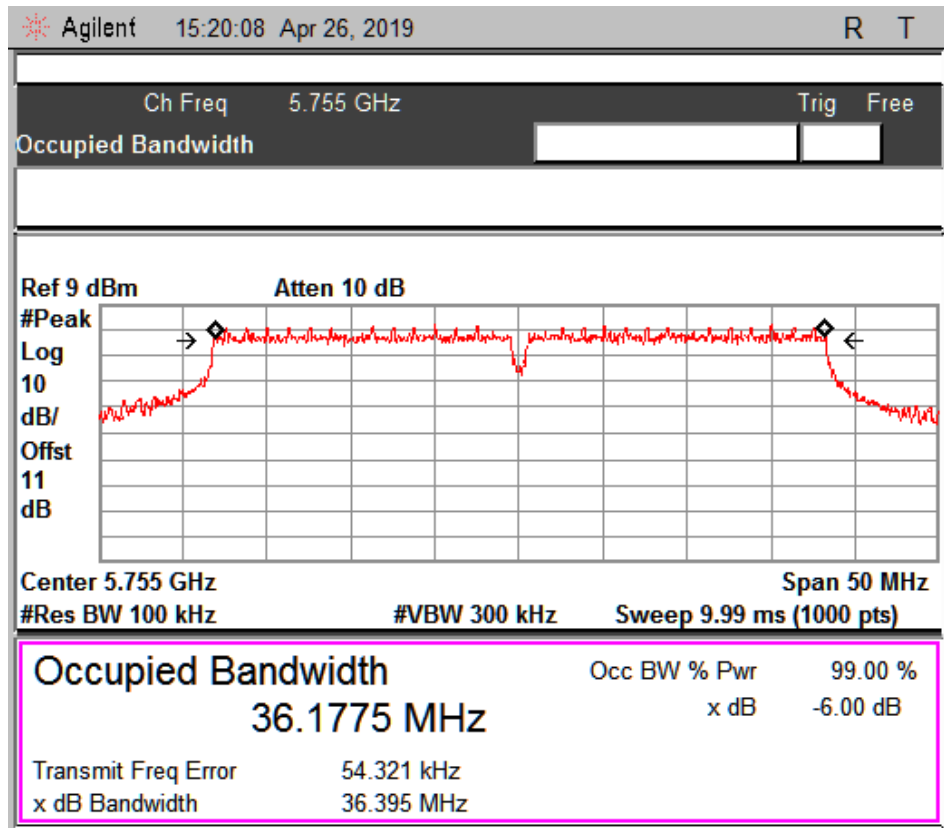
Data rate: MCS15

Channel Frequency : 5.230 GHz

Prüfbericht - Nr.:
Test Report No.:

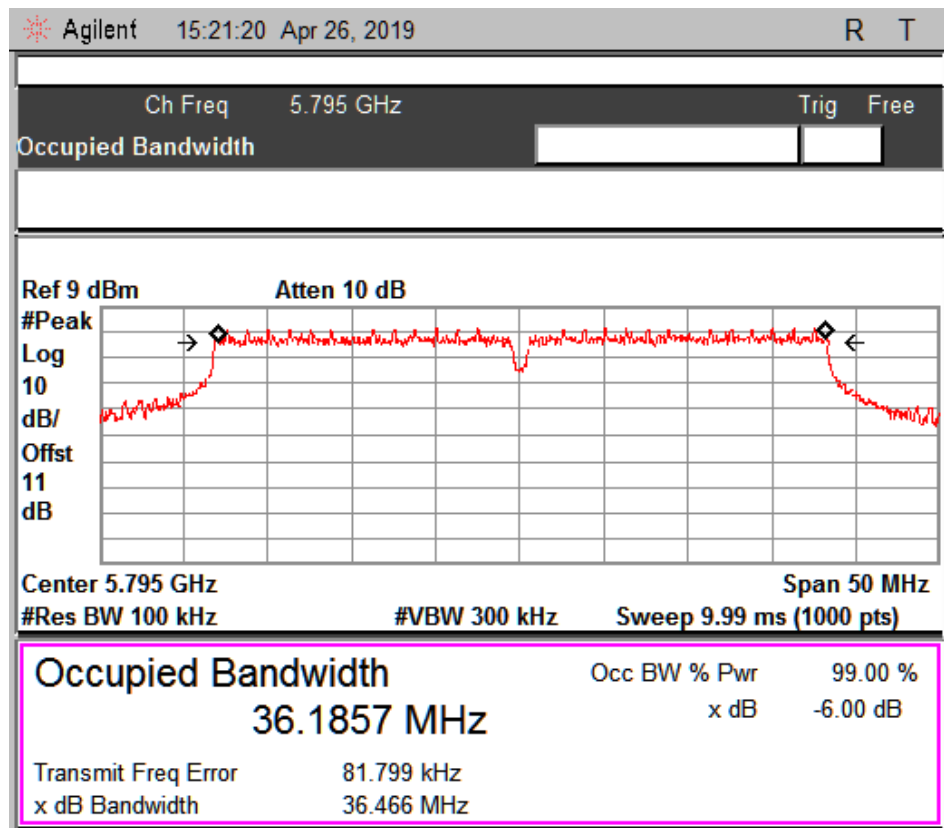
ULR-TC568819300000023F 001

Seite 78 von 212
Page 78 of 212



Data rate: MCS15

Channel Frequency : 5.755 GHz



Data rate: MCS15

Channel Frequency : 5.795 GHz