

Test report No:

ISED CABid: ES1909

NIE: 69534RRF.017

## Test Report

### USA FCC Part 15.407, 15.209

### CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Automotive infotainment System
(*) Trademark	Mercedes-Benz
(*) Model and /or type reference	NTG6NQ HIGH2
Other identification of the product	HW version: D10 SW version: E875.014 FCC ID: T8GNTG6NQH2 IC: 6434A-NTG6NQH2
(*) Features	FM, AM, DAB, USB, Bluetooth, WLAN (2,4 / 5 GHz), GNSS
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16, 76307 KARLSBAD, GERMANY
Test method requested, standard	USA FCC Part 15.407 (10-1-20) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. USA FCC Part 15.209 (10-1-20) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (April 2018). Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2022-01-20
Report template No	FDT08_23
	(*) "Data provided by the client"

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## Competences and guarantees

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DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

## Uncertainty

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Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification internal document PODT000.

## Data provided by the client

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The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of the model NTG6NQ HIGH2 is an Automotive head unit to be installed in cars with the following features: FM, AM, DAB, USB, Bluetooth, WLAN and GNSS.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

## Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
69534B/022	Automotive Infotainment System	NTG6NQ HIGH2	HBM736M96DRU3K	2021/11/15
69534B/101	BT/WLAN Antenna	--	--	2021/11/15
69534B/105	BT/WLAN Antenna	--	--	2021/11/15

Auxiliary elements used with the Sample S/01:

Control N°	Description	Model	Serial N°	Date of reception
69534B/072	Harness	--	--	2021/11/15
69534B/082	USB to Ethernet Adapter	UE300	--	2021/11/15
69534B/090	Ethernet Cable	--	--	2021/11/15
69534B/110	SMA Adapter	--	--	2021/11/15

Sample S/01 has undergone the following test(s): The Conducted tests indicated in the Appendixes A, B, C.

- Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
69534B/021	Automotive Infotainment System	NTG6NQ HIGH2	HBM736M96DRU3N	2021/11/15
69534B/101	BT/WLAN Antenna	--	--	2021/11/15
69534B/105	BT/WLAN Antenna	--	--	2021/11/15

Auxiliary elements used with the Sample S/02:

Control N°	Description	Model	Serial N°	Date of reception
69534B/072	Harness	--	--	2021/11/15
69534B/082	USB to Ethernet Adapter	UE300	--	2021/11/15
69534B/090	Ethernet Cable	--	--	2021/11/15
69534B/110	SMA Adapter	--	--	2021/11/15

Sample S/02 has undergone the following test(s): The Radiated tests indicated in the Appendixes B, C.

## Test sample description

Ports.....:	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>		
	Car Connector A and B	>3m	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Display Connector CID/PIP / RVC	>3m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	USB, Eth. Connector	<3m, >3m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	BT / WLAN-Antenna	>3m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	FM/AM, TV/SDARS Antenna	>3m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	GPS Antenna	>3m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports.....:	For EMC-Testing all cables should be connected to the connectors!						
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	DC: 12 V car battery / attenuator (9,5-15,5V normal operation)						
Rated Power.....:	9,5-15,5V normal operation						
Clock frequencies.....:	see schematics						
Other parameters .....	FCC ID: T8GNTG6NQH2 / IC: 6434A-NTG6NQH2						
Software version.....:	E875.014						
Hardware version .....	D10 / Serial Product						
Dimensions in cm (W x H x D) ...:	182 x 78 x 160 mm						
Mounting position .....	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input checked="" type="checkbox"/>	Other: Automotive headunit					
Modules/parts.....:	Module/parts of test item		Type	Manufacturer			
	-						
Accessories (not part of the test item) .....	Description		Type	Manufacturer			
	Display (vehicle touch display)		A247 905 69	DAIMLER original			
	CAN-Box		-	HBAS			
	Cable harness		-	HBAS			
	BT/WLAN-Antenna		A247 905 83	Hirschmann			
Documents as provided by the applicant.....:	Description		File name	Issue date			
	Technical Description		-	-			

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH  
BECKER-GOERING-STR. 16  
76307 KARLSBAD, GERMANY

## Testing period and place

<b>Test Location</b>	DEKRA Testing and Certification S.A.U.
<b>Date (start)</b>	2021-11-24
<b>Date (finish)</b>	2021-12-21

## Document history

Report number	Date	Description
69534RRF.017	2022-01-20	First release

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

## Remarks and comments

The tests have been performed by the technical personnel: Nicolás Salguero, José Manuel Jiménez and Javier Miguel Nadales.

Used instrumentation:

### Radiated Measurements

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber III FRANKONIA SAC-3	N.A.	N.A.
2. Shielded Room FRANKONIA	N.A.	N.A.
3. HYBRID BILOG ANTENNA 30MHz-6GHz ETS LINDGREN 3142E	2021/09	2024/09
4. PRE-AMPLIFIER G>30dB 17-40GHz BONN ELEKTRONIK BLMA 1840-4A	2021/09	2022/09
5. HORN ANTENNA 1-18GHz SCHWARZBECK MESS- ELEKTRONIK BBHA 9120 D	2021/07	2024/07
6. Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2020/05	2023/05
7. PREAMPLIFIER 30dB 500MHz-18GHz NARDA AMF-3D-00501800-24-10P	2021/01	2022/01
8. PREAMPLIFIER 30dB 500MHz-18GHz SCHWARZBECK BBV 9718 C	2021/06	2022/06
9. PRE-AMPLIFIER G>30dB 17-40GHz BONN ELEKTRONIK BLMA 1840-4A	2021/09	2022/09
10. EMI TEST RECEIVER 20Hz-26.5GHz ROHDE AND SCHWARZ ESU26	2021/11	2023/11
11. EMI TEST RECEIVER 20Hz-40GHz ROHDE AND SCHWARZ ESU40	2021/11	2023/11
12. EMI TEST RECEIVER 2Hz-44GHz ROHDE AND SCHWARZ ESW44	2021/09	2023/09
13. DC POWER SUPPLY 150V/22A AGILENT TECHNOLOGIES N8740A	N.A.	N.A.
14. Digital Multimeter FLUKE 179	2021/11	2022/11

### Conducted Measurements:

	Last Calibration	Due Calibration
1. Shielded Room ETS LINDGREN S101	N/A	N/A
2. Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021/02	2023/02
3. DC Power Supply, 40V/40A ROHDE AND SCHWARZ NGPE 40/40	N.A.	N.A.
4. Digital Multimeter FLUKE 179	2021/06	2022/06
5. OPEN SWITCH UNIT UP TO 7.5 GHz OSP150 ROHDE AND SCHWARZ	2021/08	2023/08

## Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

## Summary

### A. Common requirements for all bands

FCC PART 15 PARAGRAPH / RSS-247		
Requirement – Test case	Verdict	Remark
Duty Cycle	P	
99% Occupied Bandwidth	P	
26 dB Emission Bandwidth (EBW)	P	
<u>Supplementary information and remarks:</u>		
(1) None.		

### B. U-NII-1 Band: 5.15 - 5.25 GHz

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case	Verdict	Remark	
FCC 15.407 (a)(1)(iv)	Transmitter Maximum conducted Output Power	P	
RSS-247 6.2.1.1	Transmitter Maximum Equivalent Isotropically Radiated Power EIRP	P	
FCC 15.407 (a)(1)(iv)	Transmitter Maximum Power Spectral Density	P	
RSS-247 6.2.1.1	Transmitter EIRP Spectral Density	P	
FCC 15.407 (b)(1)(6) / RSS-247 6.2.1.2	Transmitter Out of Band Radiated Emissions	P	
FCC 15.407 (b)(1) / RSS-247 6.2.1.2	Transmitter Band Edge Radiated Emissions	P	
<u>Supplementary information and remarks:</u>			
None.			



## C. U-NII-3 Band: 5.725 - 5.85 GHz

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.407 (a)(3) / RSS-247 6.2.4.1	Transmitter Maximum conducted Output Power	P	
FCC 15.407 (e) / RSS-247 6.2.4.1	6 dB bandwidth.	P	
FCC 15.407 (a)(3) / RSS-247 6.2.4.1	Transmitter Maximum Power Spectral Density	P	
FCC 15.407 (b)(4) / RSS-247 6.2.4.2	Transmitter Band Edge Radiated Emissions	P	
FCC 15.407 (b)(4)(6) / RSS-247 6.2.4.2	Transmitter Out of Band Radiated Emissions	P	
<u>Supplementary information and remarks:</u>			
None			

## Appendix A: Test Common requirements for all bands

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99% Occupied Bandwidth .....	16
26 dB Emission Bandwidth (EBW) .....	32

## Duty Cycle

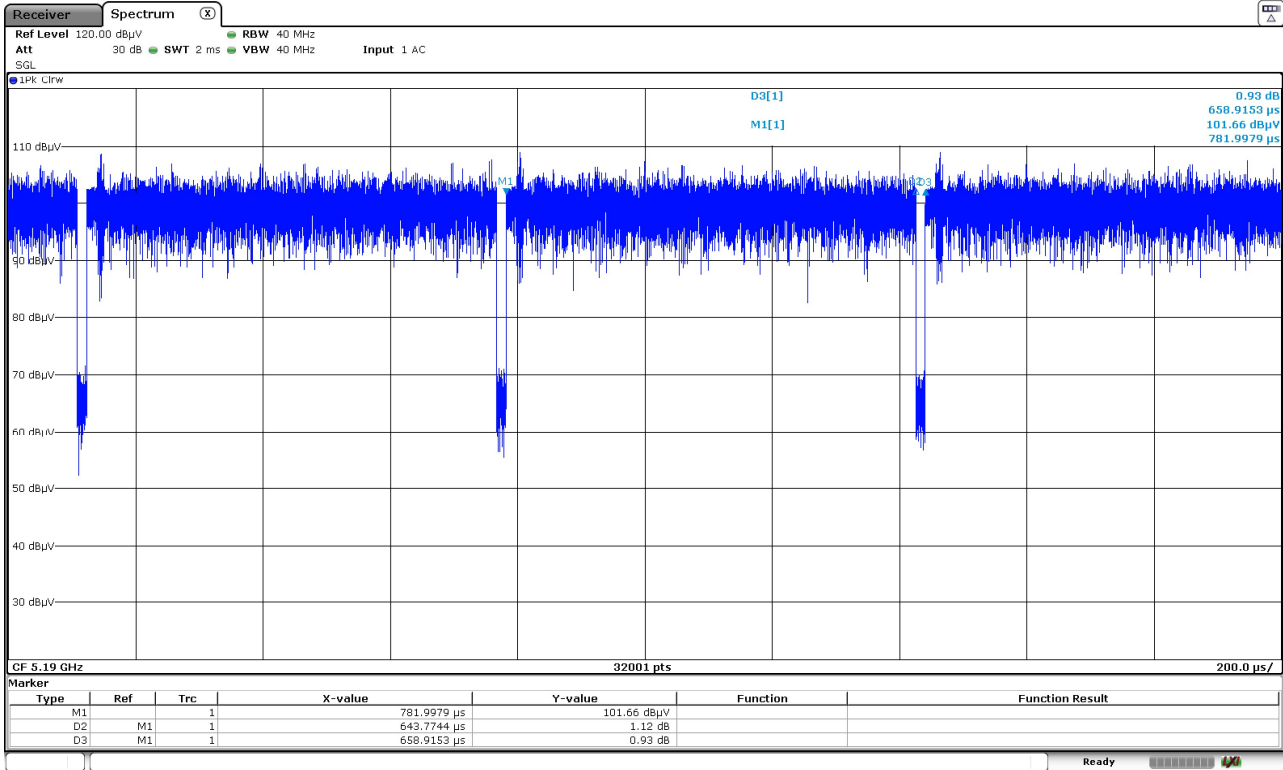
### RESULTS:

The results below are for data rates with a duty cycle less than 98%. The results for all rest of modes having a value > 98%.

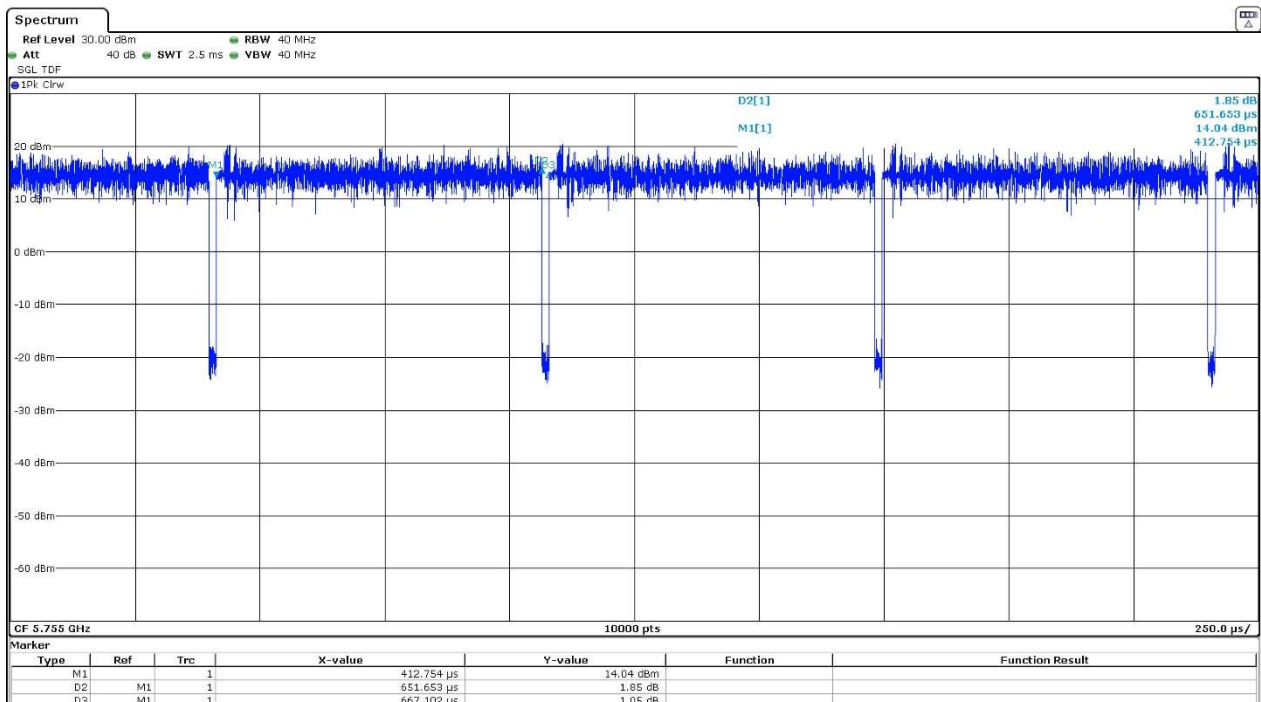
Mode	Sub-band U-NII-1			Sub-band U-NII-3		
	Pulse Duration (ms)	Period (ms)	Duty Cycle Correction (dB)	Pulse Duration (ms)	Period (ms)	Duty Cycle Correction (dB)
802.11ac40	0.65164	0.66688	0.10	0.65165	0.66710	0.10
802.11n40	0.64377	0.65891	0.10	0.64401	0.65912	0.10
802.11ac80	1.29959	1.31494	0.21	0.32356	0.33982	0.21

Mode 802.11 ac40 (HT40):

U-NII-1 (5150-5250 MHz)

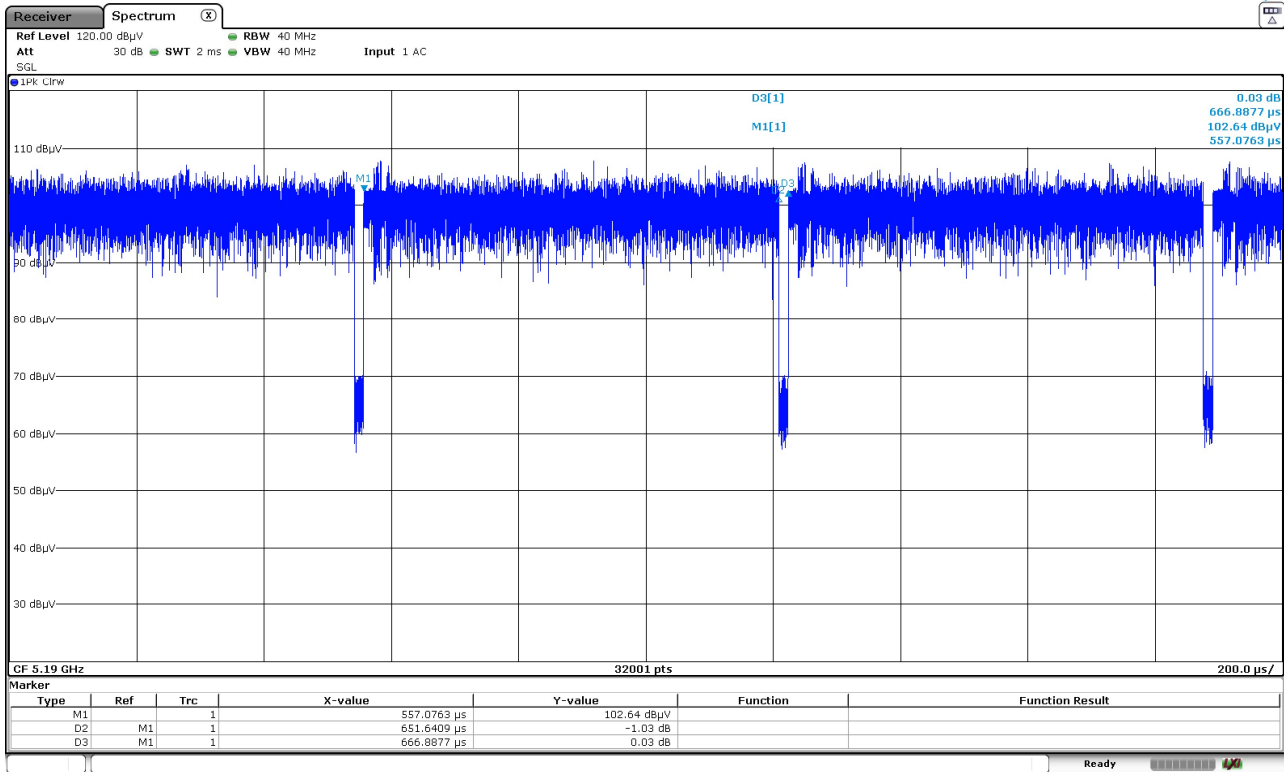


U-NII-3 (5725-5850 MHz)

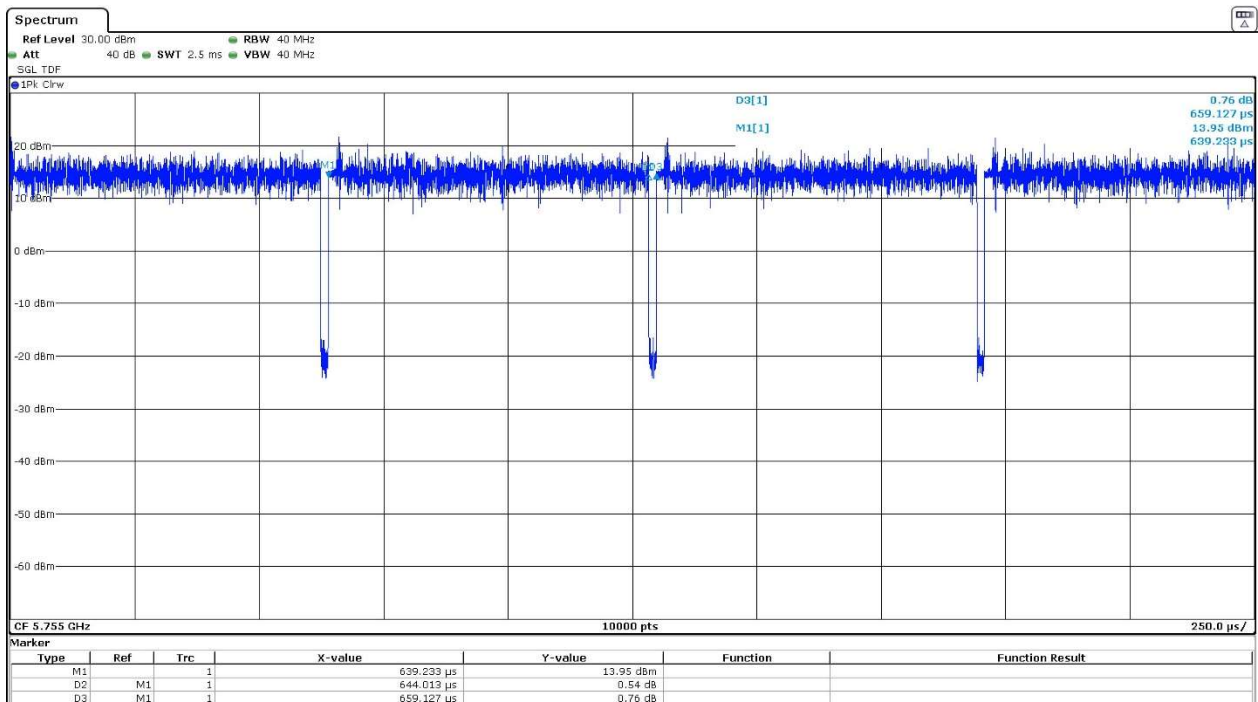


Mode 802.11 n40 (VHT40):

U-NII-1 (5150-5250 MHz)

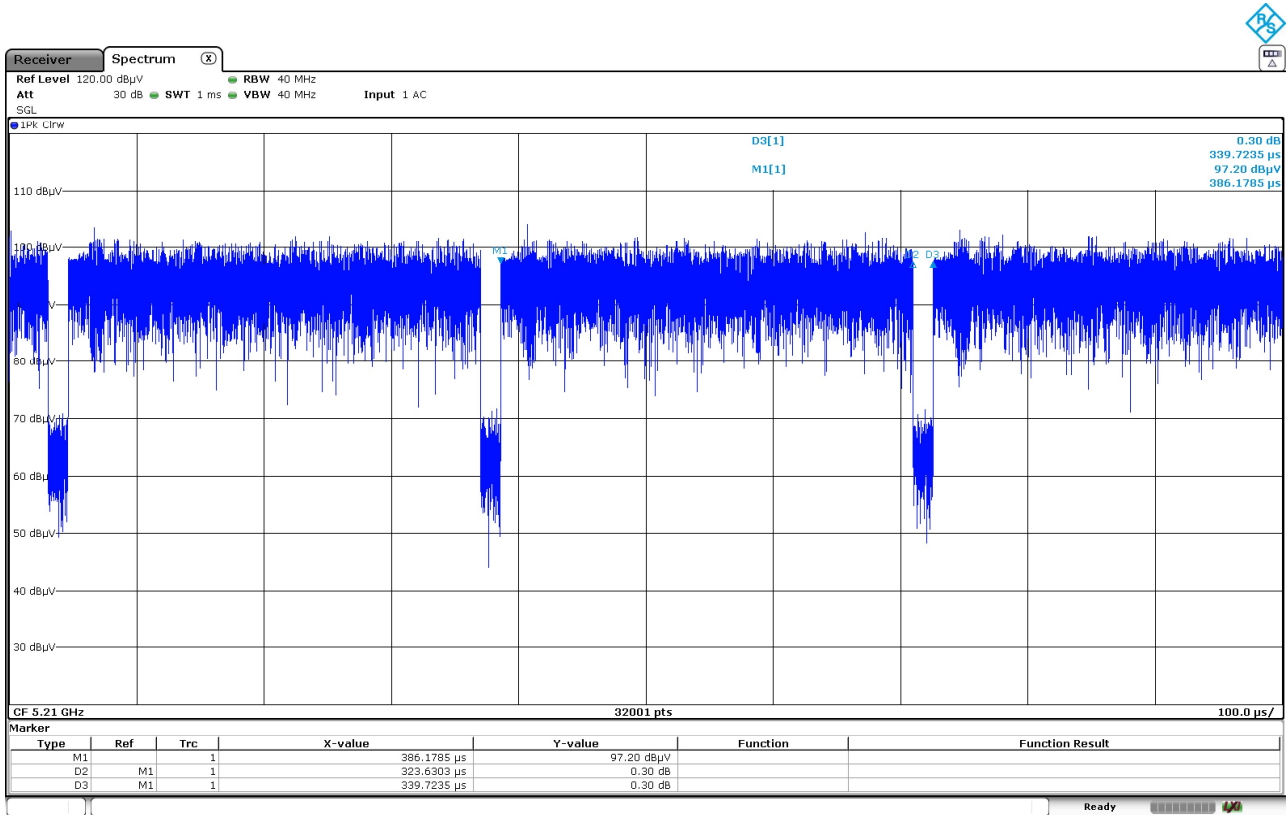


U-NII-3 (5725-5850 MHz)

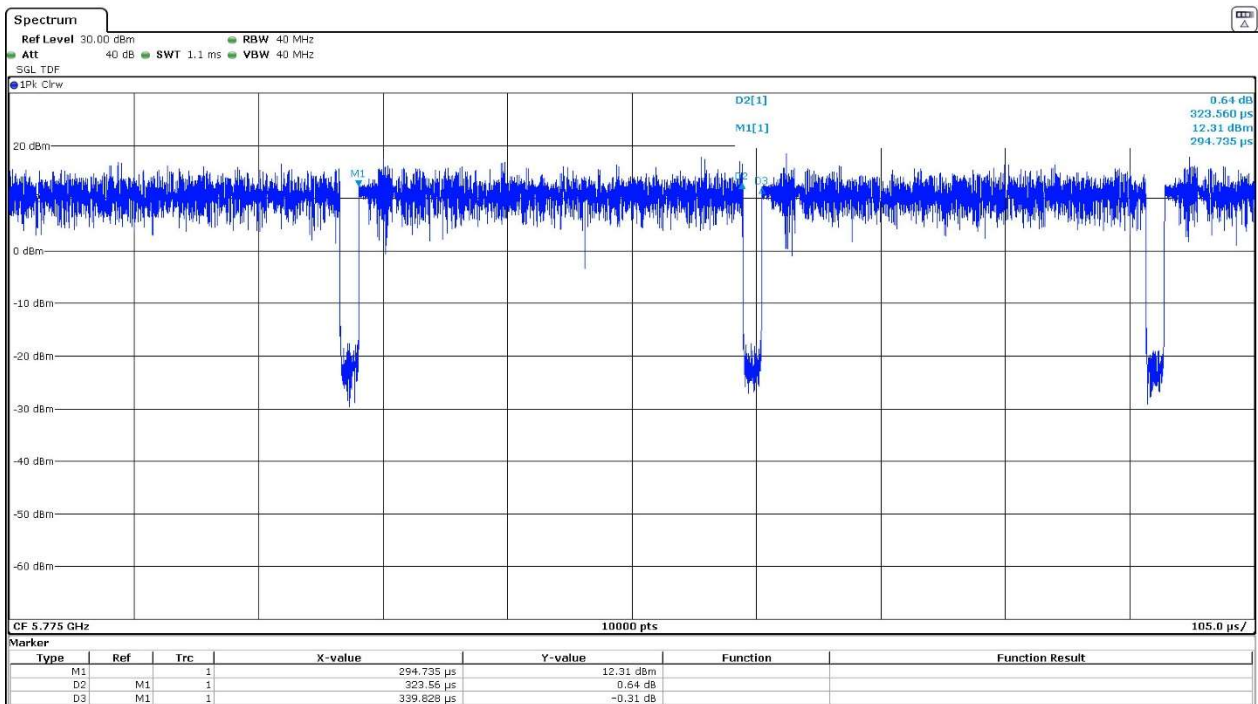


**Mode 802.11 ac80 (VHT80):**

**U-NII-1 (5150-5250 MHz)**



**U-NII-3 (5725-5850 MHz)**



## 99% Occupied Bandwidth

### RESULTS:

#### Mode 802.11 a20:

##### U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
99% Occupied Bandwidth (MHz)	16.60	16.60	16.60
Measurement uncertainty (%)	<±1.17		

##### U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
99% Occupied Bandwidth (MHz)	16.70	16.60	16.70
Measurement uncertainty (%)	<±1.17		

#### Mode 802.11 n20 (HT20):

##### U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
99% Occupied Bandwidth (MHz)	17.60	17.60	17.60
Measurement uncertainty (%)	<±1.17		

##### U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
99% Occupied Bandwidth (MHz)	17.60	17.70	17.60
Measurement uncertainty (%)	<±1.17		

#### Mode 802.11 ac20 (VHT20):

##### U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
99% Occupied Bandwidth (MHz)	17.70	17.60	17.60
Measurement uncertainty (%)	<±1.17		

##### U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
99% Occupied Bandwidth (MHz)	17.60	17.60	17.70
Measurement uncertainty (%)	<±1.17		



**Mode 802.11 n40 (HT40):**

**U-NII-1 (5150-5250 MHz)**

Channels	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
99% Occupied Bandwidth (MHz)	36.25	36.50
Measurement uncertainty (%)	<±1.15	

**U-NII-3 (5725-5850 MHz)**

Channels	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
99% Occupied Bandwidth (MHz)	36.50	36.50
Measurement uncertainty (%)	<±1.15	

**Mode 802.11 ac40 (VHT40):**

**U-NII-1 (5150-5250 MHz)**

Channels	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
99% Occupied Bandwidth (MHz)	36.25	36.50
Measurement uncertainty (%)	<±1.15	

**U-NII-3 (5725-5850 MHz)**

Channels	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
99% Occupied Bandwidth (MHz)	36.25	36.50
Measurement uncertainty (%)	<±1.15	

**Mode 802.11 ac80 (VHT80):**

**U-NII-1 (5150-5250 MHz)**

Channel	Single Channel 42 (5210 MHz)
99% Occupied Bandwidth (MHz)	76.50
Measurement uncertainty (%)	<±1.20

**U-NII-3 (5725-5850 MHz)**

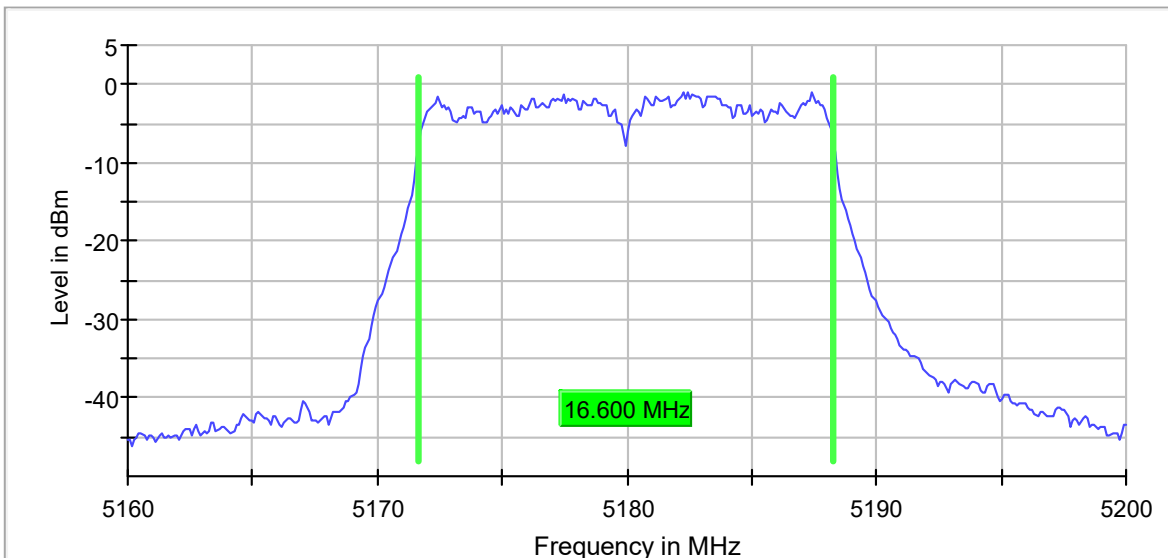
Channels	Single Channel 155 (5775 MHz)
99% Occupied Bandwidth (MHz)	76.50
Measurement uncertainty (%)	<±1.20

Mode 802.11 a20:

U-NII-1 (5150-5250 MHz)

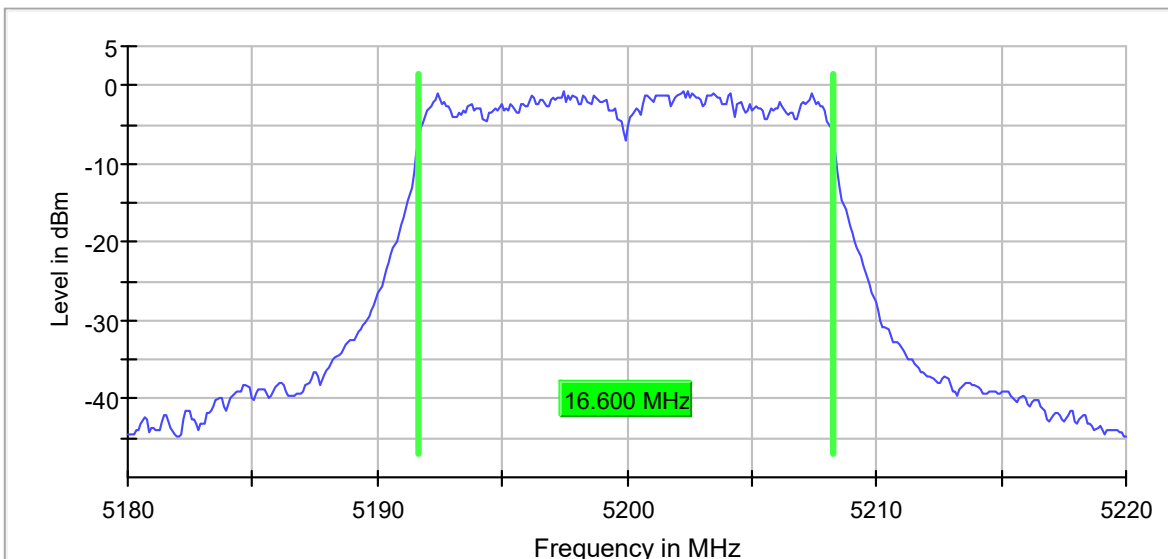
- Low Channel 36 (5180 MHz):

99 % Bandwidth



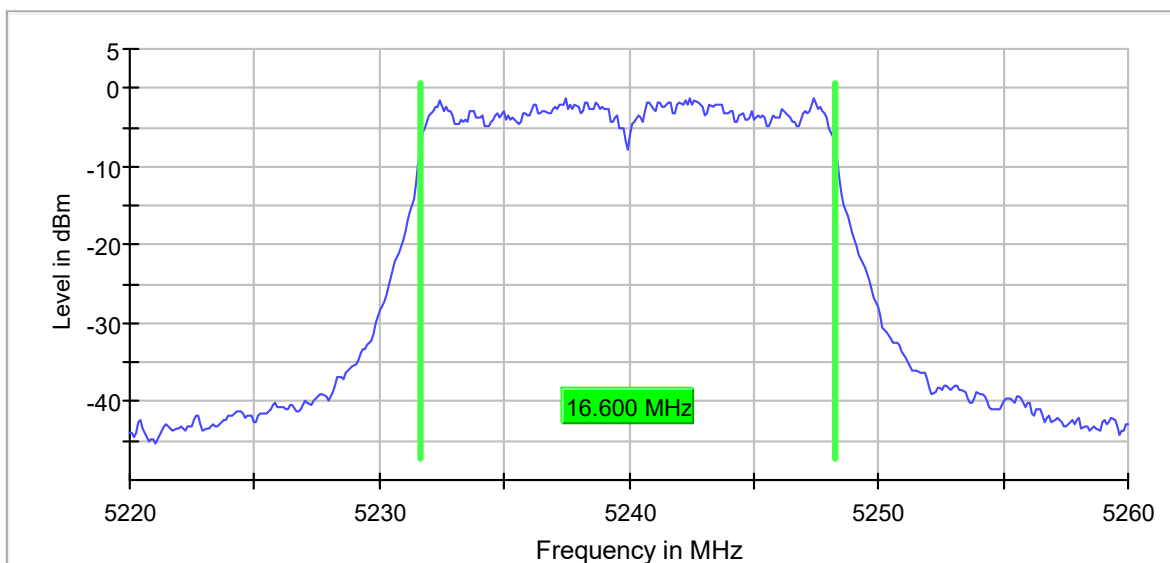
- Middle Channel 40 (5200 MHz):

99 % Bandwidth



- High Channel 48 (5240 MHz):

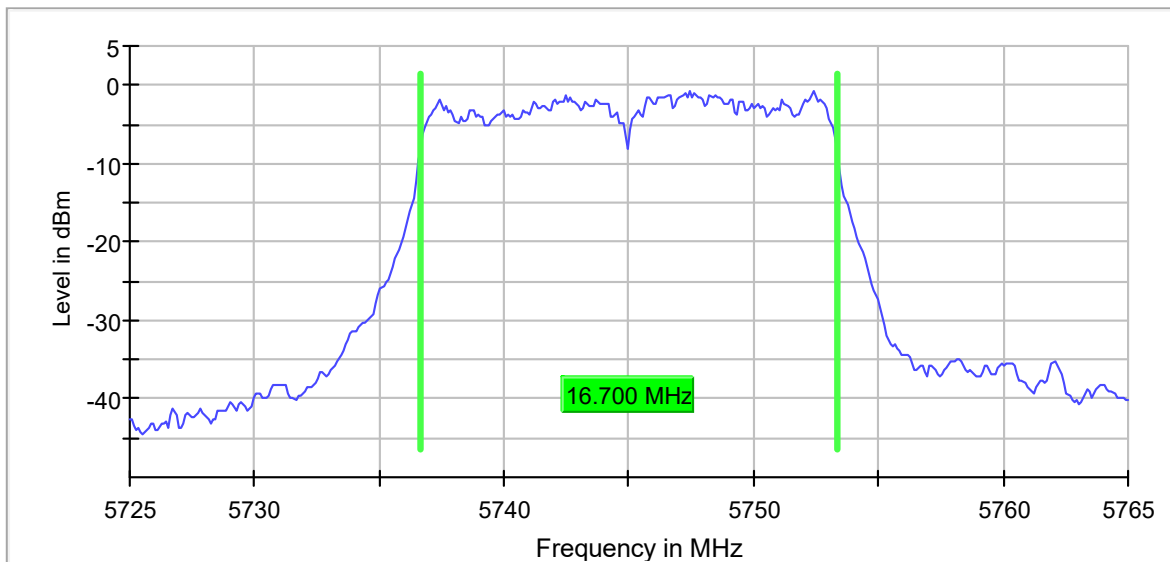
99 % Bandwidth



**U-NII-3 (5725-5850 MHz)**

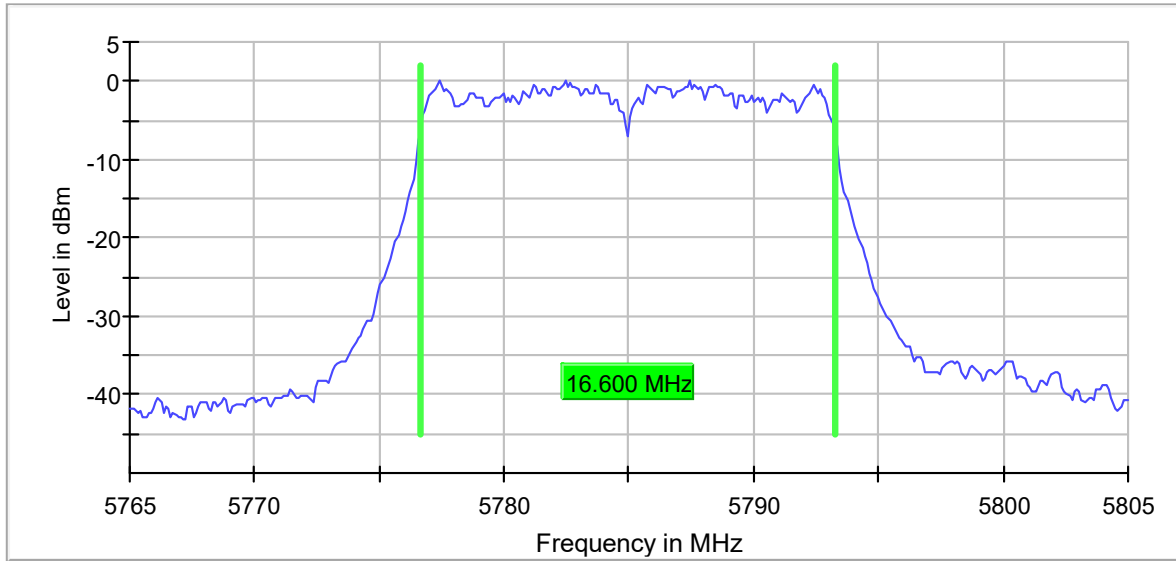
- Low Channel 149 (5745 MHz):

99 % Bandwidth



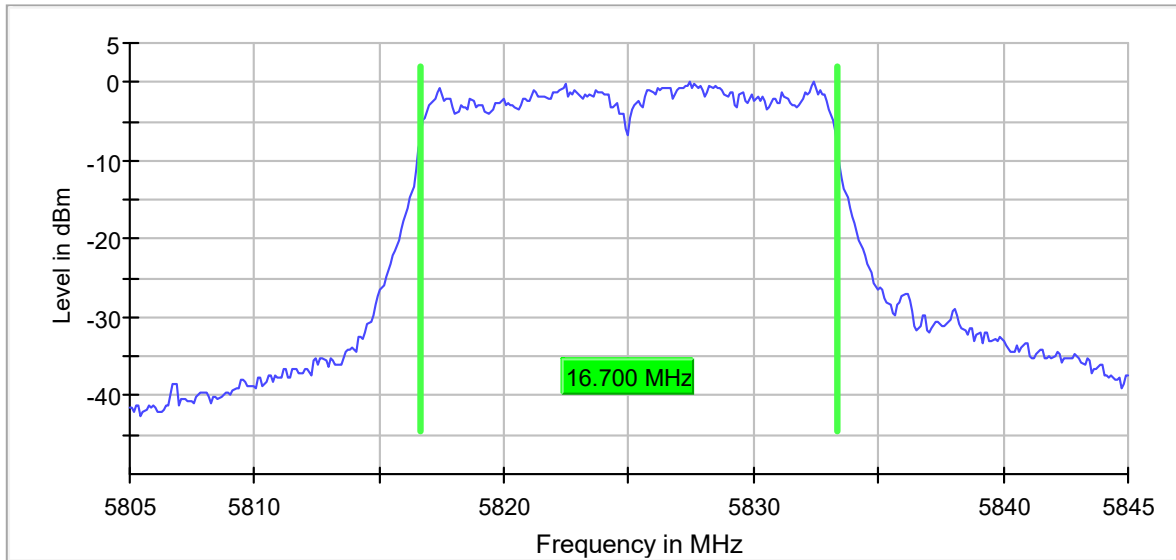
- Middle Channel 157 (5785 MHz):

99 % Bandwidth



- High Channel 165 (5825 MHz):

99 % Bandwidth

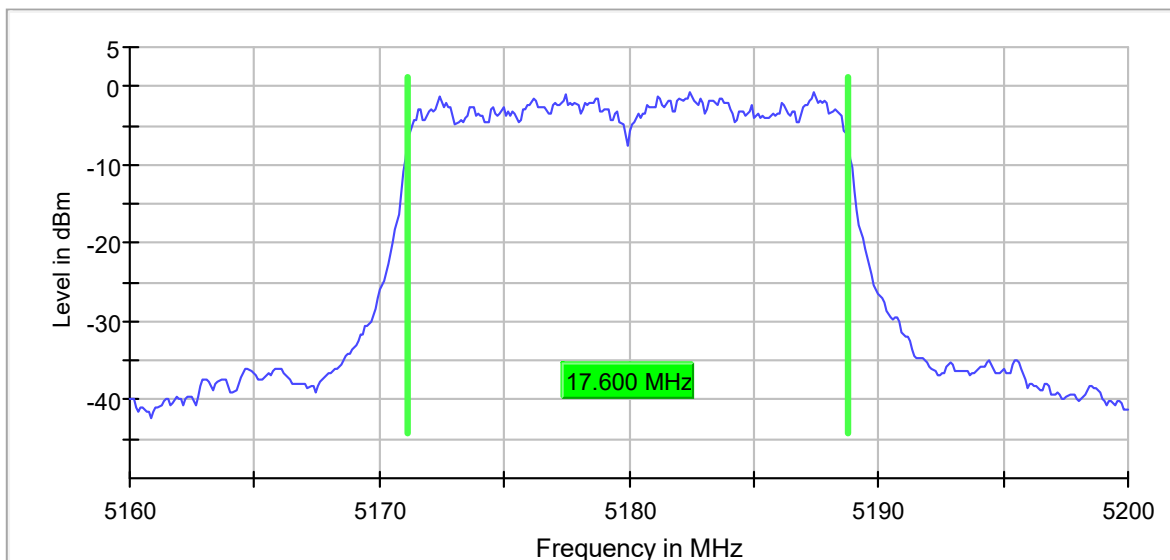


**Mode 802.11 n20 (HT20):**

**U-NII-1 (5150-5250 MHz)**

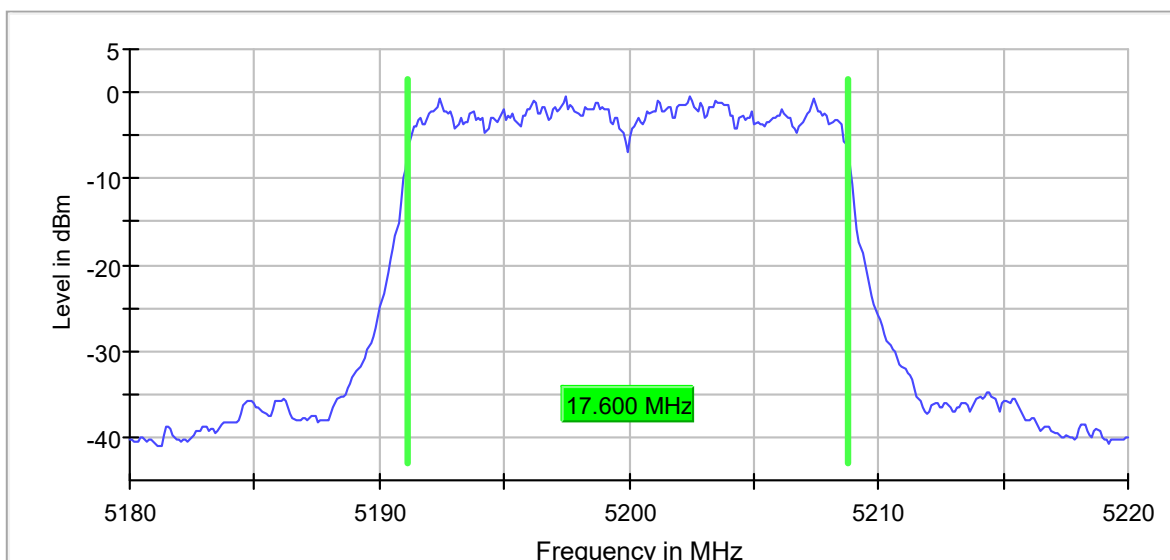
- Low Channel 36 (5180 MHz):

99 % Bandwidth



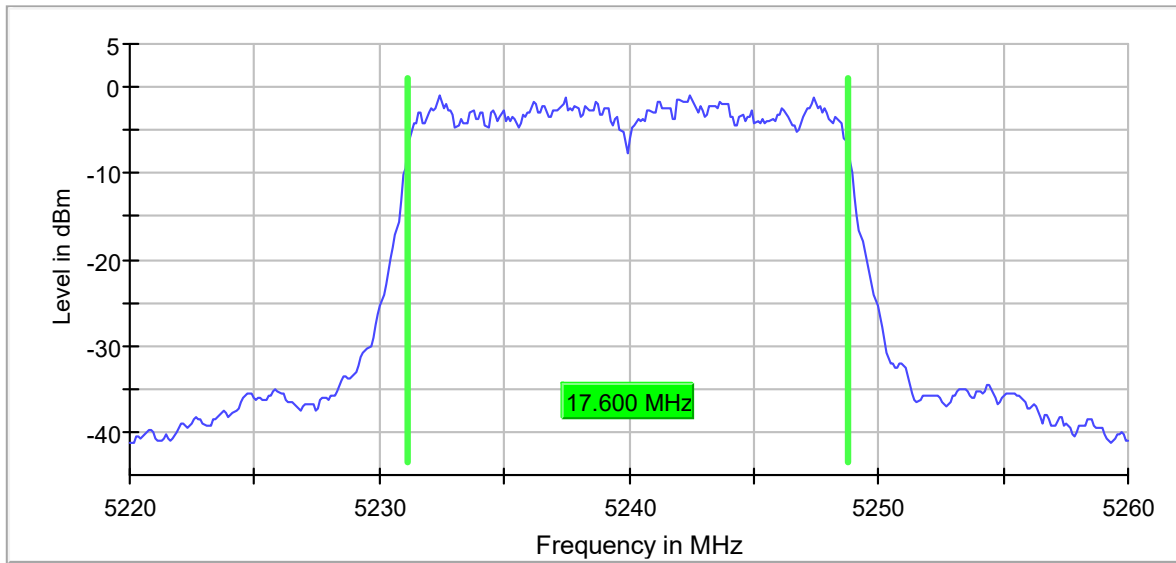
- Middle Channel 40 (5200 MHz):

99 % Bandwidth



- High Channel 48 (5240 MHz):

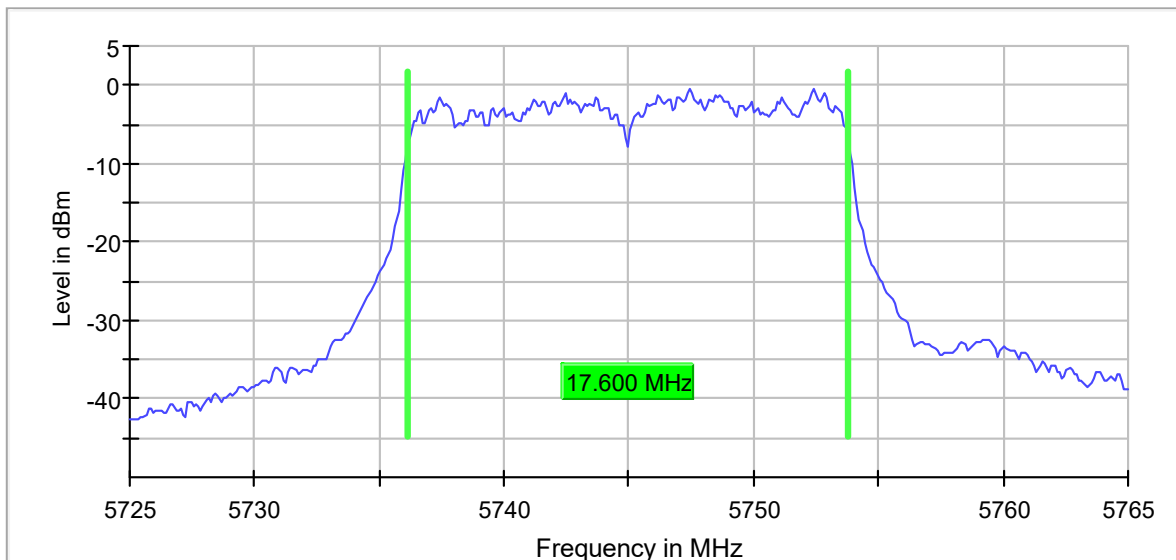
99 % Bandwidth



**U-NII-3 (5725-5850 MHz)**

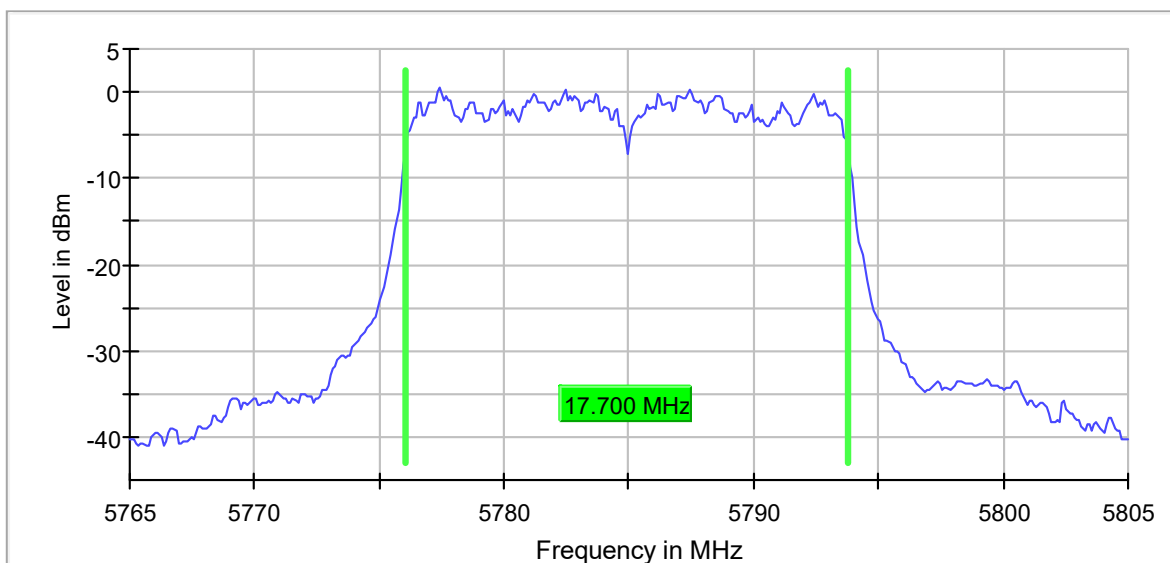
- Low Channel 149 (5745 MHz):

99 % Bandwidth



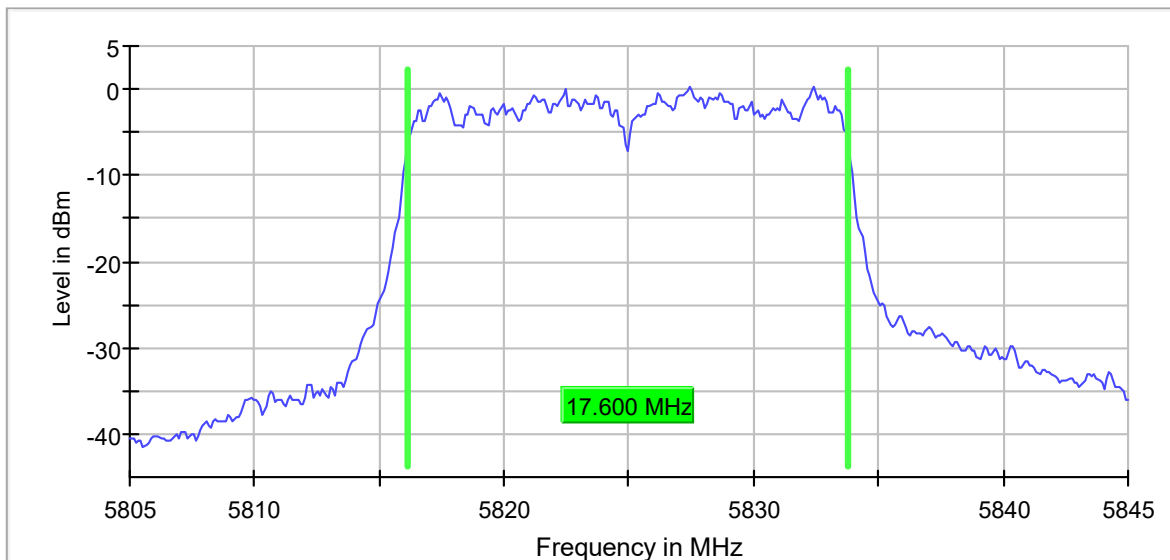
- Middle Channel 157 (5785 MHz):

99 % Bandwidth



- High Channel 165 (5825 MHz):

99 % Bandwidth

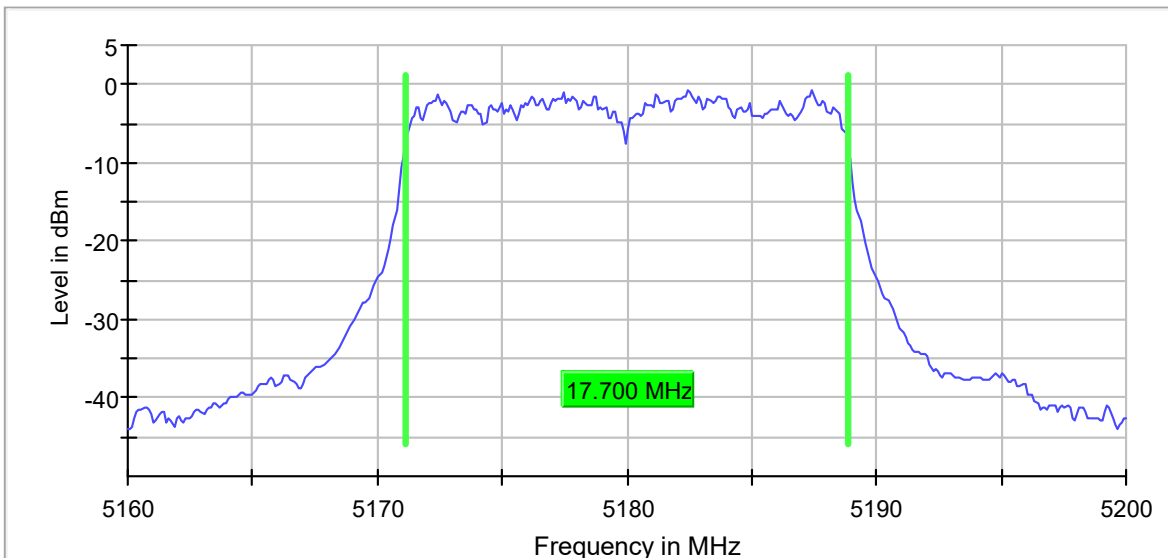


**Mode 802.11 ac20 (VHT20):**

**U-NII-1 (5150-5250 MHz)**

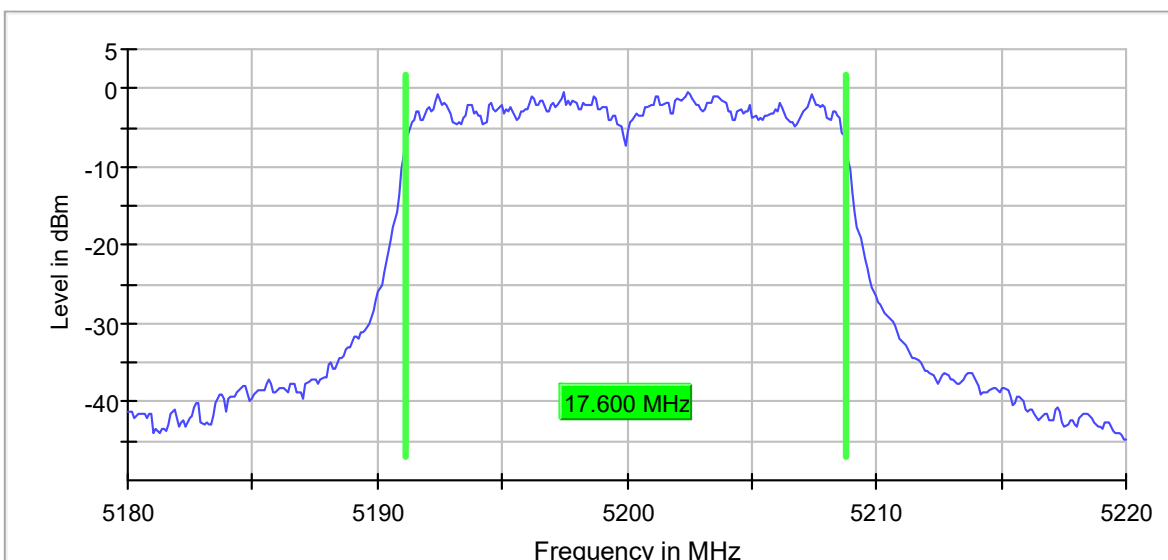
- Low Channel 36 (5180 MHz):

99 % Bandwidth



- Middle Channel 40 (5200 MHz):

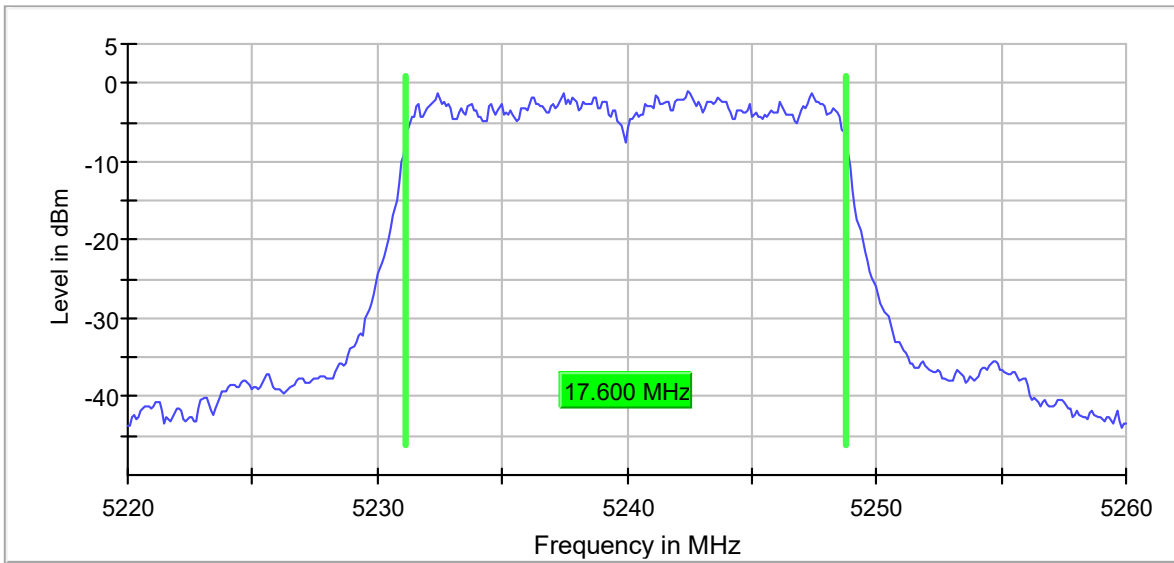
99 % Bandwidth





- High Channel 48 (5240 MHz):

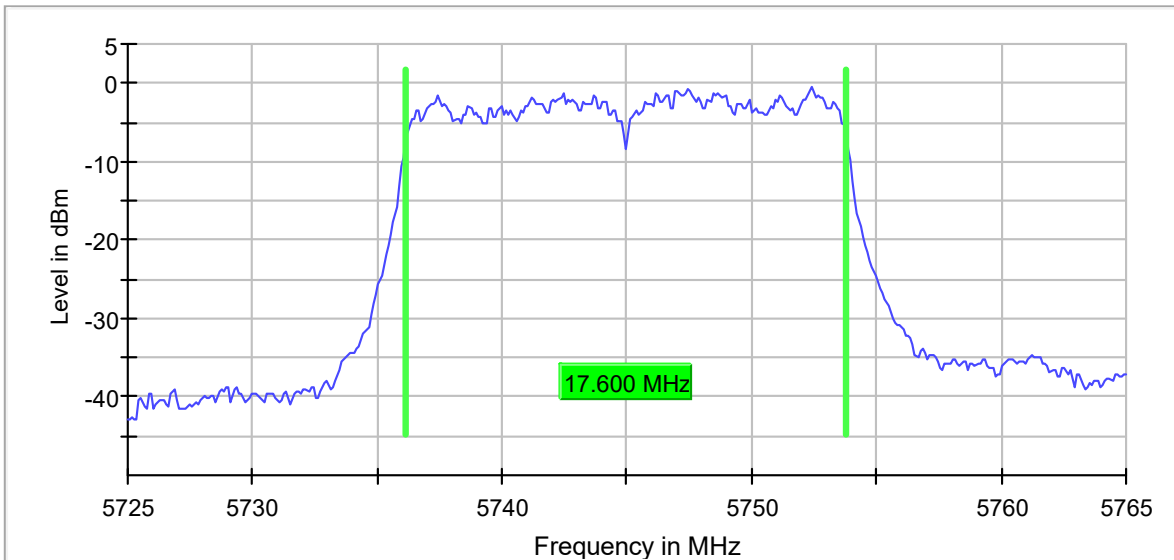
99 % Bandwidth



**U-NII-3 (5725-5850 MHz)**

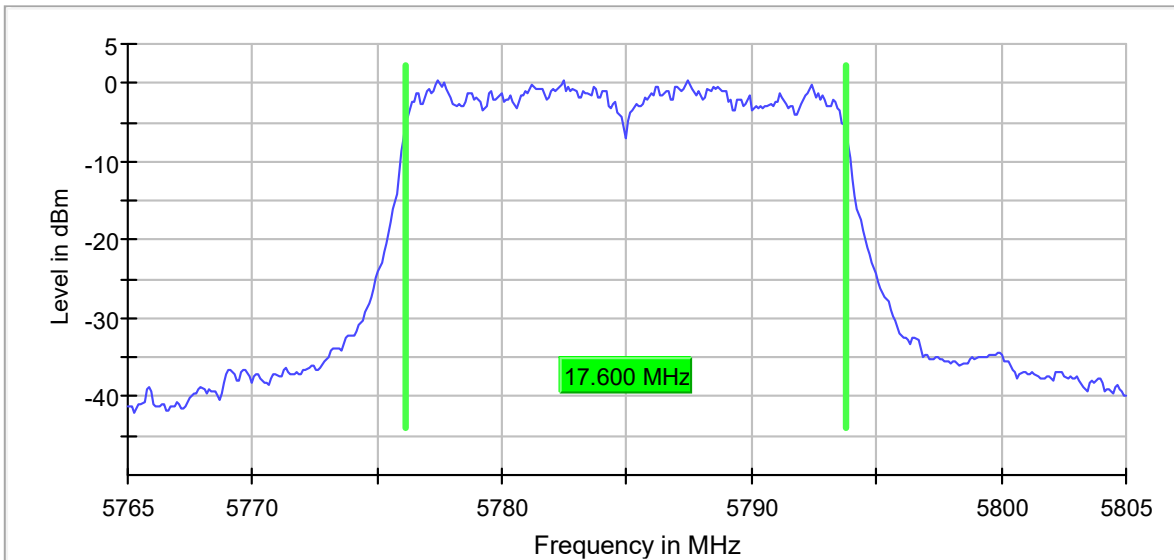
- Low Channel 149 (5745 MHz):

99 % Bandwidth



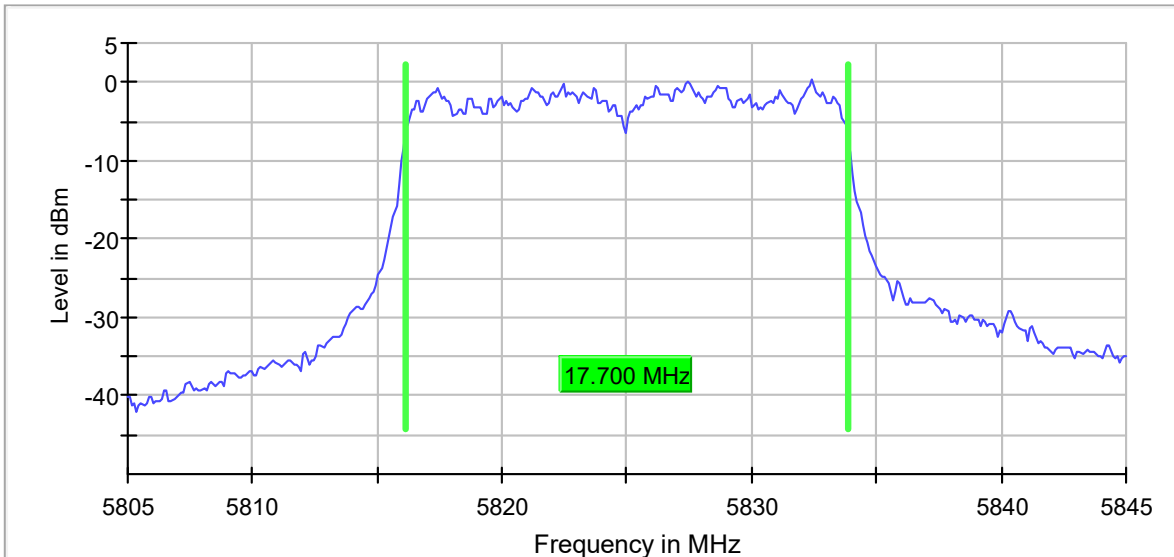
- Middle Channel 157 (5785 MHz):

99 % Bandwidth



- High Channel 165 (5825 MHz):

99 % Bandwidth

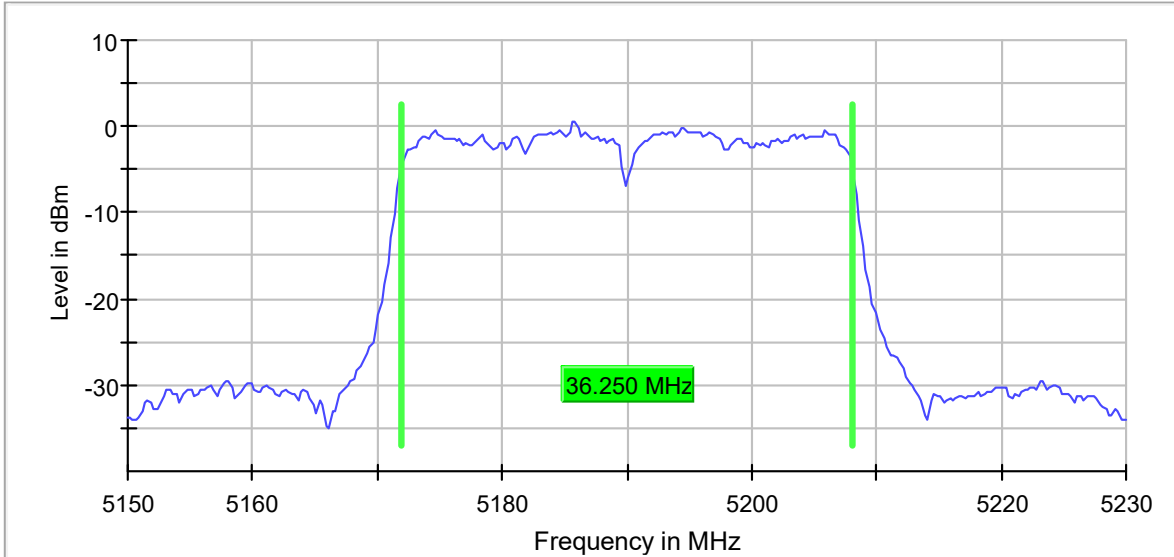


**Mode 802.11 n40 (HT40):**

**U-NII-1 (5150-5250 MHz)**

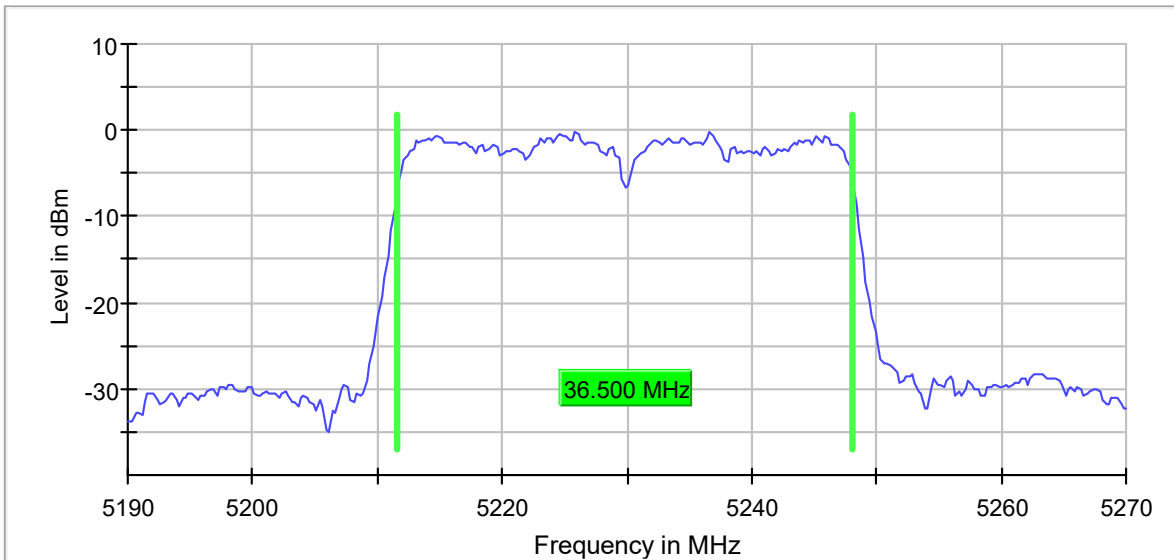
- Low Channel 38 (5190 MHz):

99 % Bandwidth



- High Channel 46 (5230 MHz):

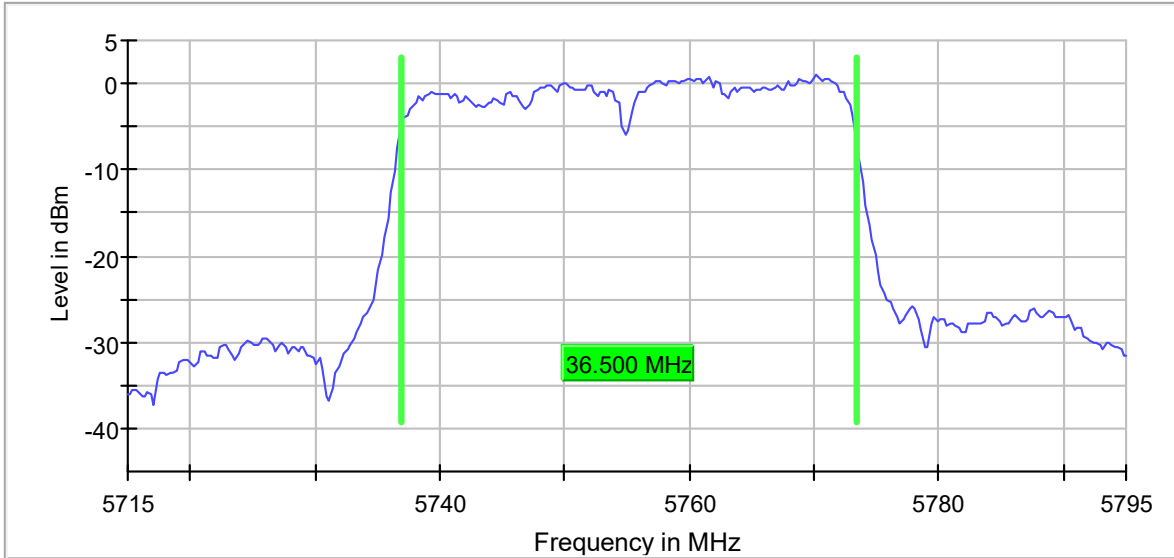
99 % Bandwidth



**U-NII-3 (5725-5850 MHz)**

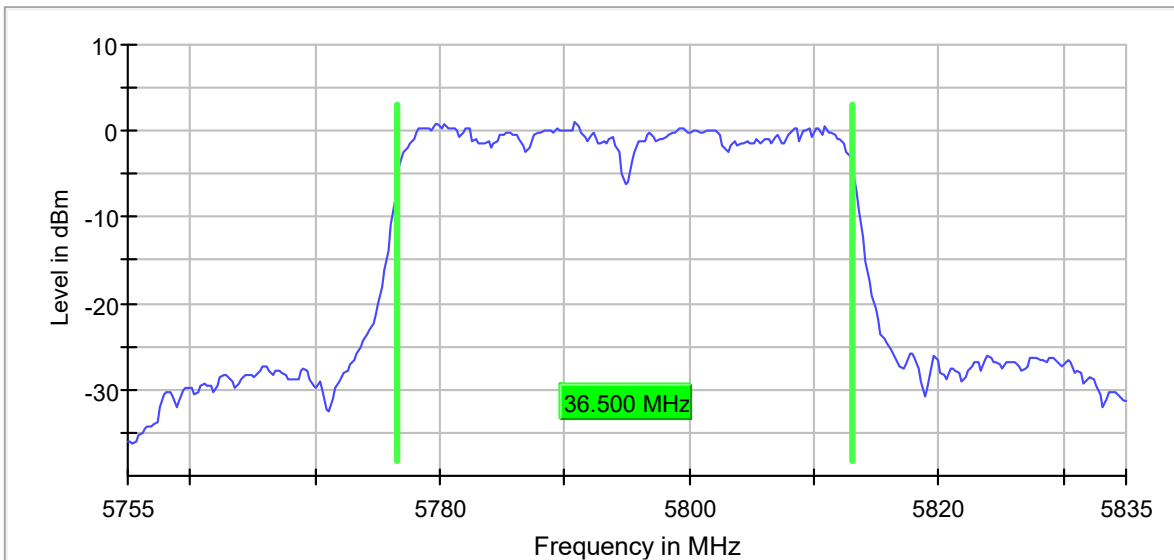
- Low Channel 151 (5755 MHz):

99 % Bandwidth



- High Channel 159 (5795 MHz):

99 % Bandwidth

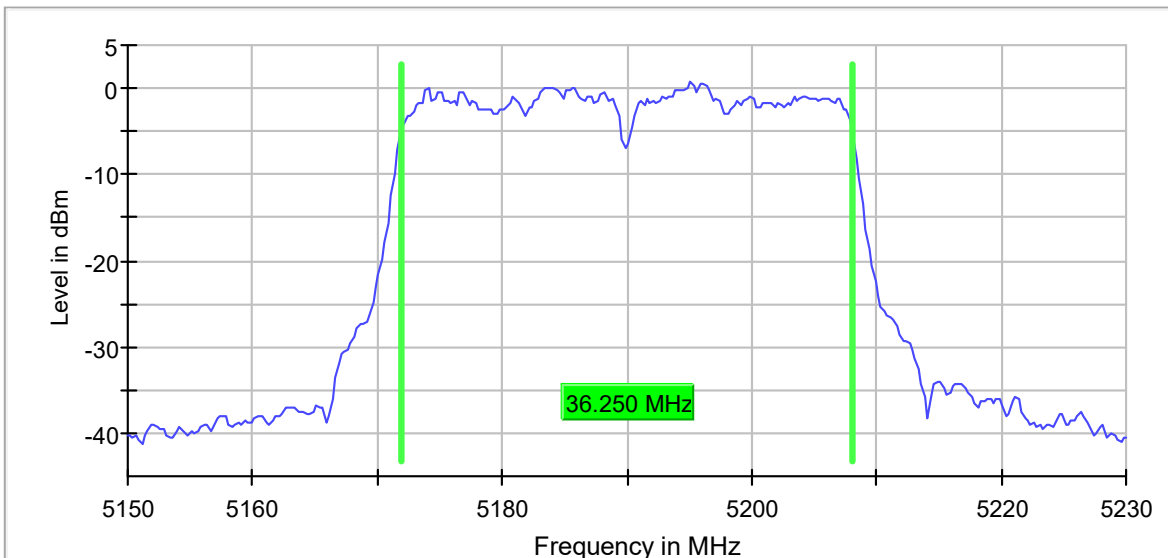


**Mode 802.11 ac40 (VHT40):**

**U-NII-1 (5150-5250 MHz)**

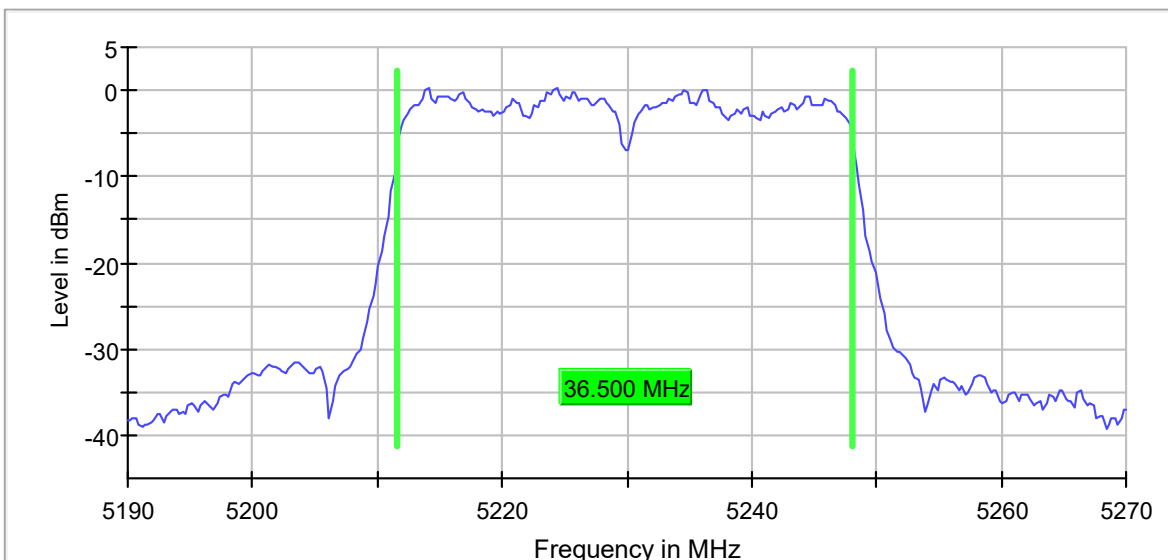
- Low Channel 38 (5190 MHz):

99 % Bandwidth



- High Channel 46 (5230 MHz):

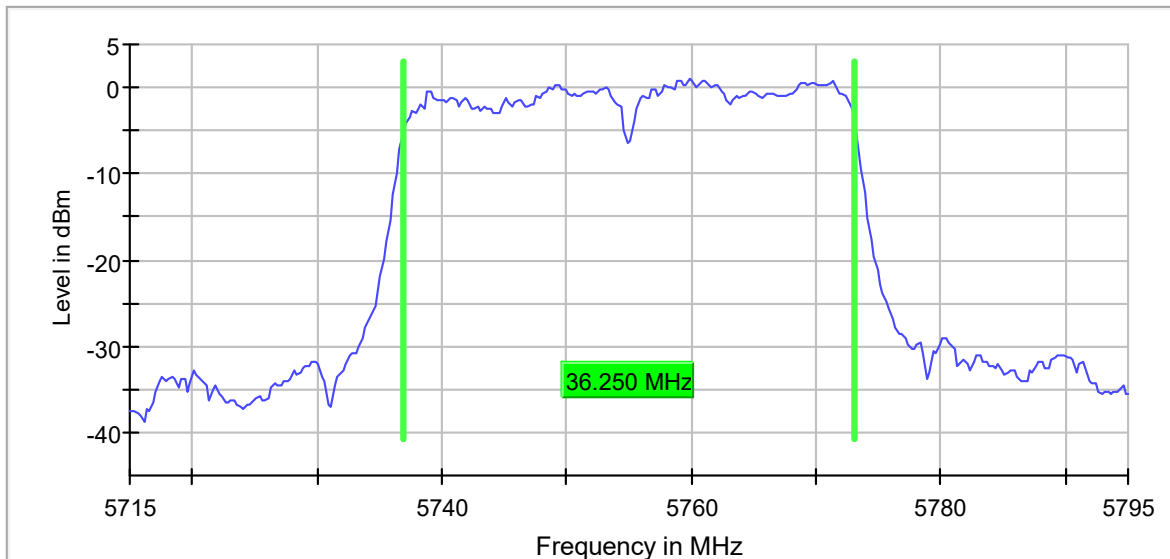
99 % Bandwidth



**U-NII-3 (5725-5850 MHz)**

- Low Channel 151 (5755 MHz):

99 % Bandwidth



- High Channel 159 (5795 MHz):

99 % Bandwidth

