

Test Report No:
83304RRF002A1

Test Report

USA FCC Part 15.407, 15.209

(*) Identification of item tested	Telematic control unit with wireless technologies, used in automotive industry.
(*) Trademark	VW AG
(*) Model and /or type reference	TKCMOD12E00W
(*) Derived model not tested	TKCMOD11000W
Other identification of the product	FCC ID: T8GCONMODMQB
(*) Features	GSM, UMTS, LTE, 5G, Bluetooth EDR, BT Low-Energy, Wi-Fi, GNSS receiver HW version: X07 SW version: Q113
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH Becker-Goering-Str. 16 76307, Karlsbad, GERMANY
Test method requested, standard	USA FCC Part 15.407 (10-1-23) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. USA FCC Part 15.209 (10-1-23) Edition: Radiated emission limits; general requirements. 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. Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated October 31, 2013 ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2025-06-24
Report template No.	FDT08_25 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
Detector	Detector used
Equipment	Equipment Type
EUT	Equipment Under Test
Freq	Frequency
Freq Rng	Frequency Range
MP	Measurement Point
Mod	Modulation
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

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

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

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

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Uncertainty

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

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is: Measurement uncertainty $\leq \pm 5,35$ dB with factor ($k = 2$). The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is: Measurement uncertainty $\leq \pm 4,32$ dB with factor ($k = 2$). The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 26 GHz is: Measurement uncertainty $\leq \pm 5,51$ dB with factor ($k = 2$). The total uncertainty of the measurement system for the radiated emissions of EUT from 26 GHz to 40 GHz is: Measurement uncertainty $\leq \pm 5,55$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the conducted testing of EUT is:

RF Average Output Power: Measurement uncertainty $\leq \pm 2,01$ dB

Duty Cycle: Measurement uncertainty $\leq \pm 0,84$ ms

Power Spectral Density: Measurement uncertainty $\leq \pm 2,01$ dB

Occupied/26 dBc Bandwidth: Measurement uncertainty

$\leq \pm 57,76$ kHz for BW 20MHz; $\leq \pm 115,53$ kHz for BW 40MHz; and $\leq \pm 231,06$ kHz for BW 80MHz.

6 dB Bandwidth: Measurement uncertainty

$\leq \pm 34,67$ kHz for BW 20MHz; $\leq \pm 46,22$ kHz for BW 40MHz; and $\leq \pm 80,90$ kHz for BW 80MHz.

Conducted Band-edge spurious emissions: Measurement uncertainty $\leq \pm 2,57$ dB

Data provided by the client

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 consists of a Telematics control unit with wireless technologies, used in automotive, equipped with one modem, OEM. This unit was designed for automotive usage and contains the following features: GSM, UMTS, LTE, 5G, GNSS, Wifi (a, b, g, n, ac, ax) and Bluetooth EDR.

Antennas: the device supports several antennas for the following transmission technologies:

- LTE 1: model 3WA.035. 507.N and 3WA.035. 507.G, sub-antenna Tel 5G 1
- LTE 2: model 3WA.035. 507.N and 3WA.035. 507.G, sub-antenna Tel 5G 2
- LTE 3: model 4M0.035. 507.A
- Internal antenna
- BT_WLAN_1: model 83H.035.225.F, used for 802.11 2.4 GHz
- BT_WLAN_2: model 4N0.035.500, used for 802.11 2.4 GHz and 5GHz and Bluetooth
- BT_WLAN_3: model 3WA.035. 507.N and 83H.035.225.F used for 802.11 2.4 GHz and 5GHz
- BTLE_1: model 3WA.035. 507.N and 3WA.035. 507.G, used for BTLE

3. Derived model not tested. These models have been declared by the supplier of the sample as being the same as the model under test.

HARMAN Becker Automotive Systems GmbH

Becker-Goering-Str. 16
76307 Karlsbad, Germany



Date: January 28th, 2025

To whom it may concern,

We,

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Becker-Goering-Str. 16; 76307 Karlsbad, Germany,

Hereby declare that the products listed below:

Type of equipment: Telematic control unit with wireless technologies used in automotive industry.

Brand name: VW AG

Model names: TKCMOD12N00W and TKCMOD11000W

are part of the same family and all the models are equal. The model TKCMOD12N00W is the most populated variant, and it is the one that has been tested. The model TKCMOD11000W is the same as TKCMOD12N00W but it has a different name because has the cellular module disabled (although is installed in the device).

The rest of interfaces (BT, WiFi, GNSS) are equal in all the variants.

In the table below you can find the different names based on the specific country target:

Country	Product Name	AUDI Part number	Variant	GNSS	Bluetooth WLAN	NAD (Activated)	WLAN P
NAR (online variant)	TKCMOD12N00W	57N.035.741	V160	x	x	x	-
Rest of the world (offline variant)	TKCMOD11000W	571.035.741	V333	x	x	-	-

As mentioned above, TKCMOD12N00W is the variant that has been tested and results are applicable to the rest of the variants.

Sincerely,

i.v. 

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Title: Customer Lead Certification
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Company: Harman Becker Automotive Systems GmbH

I.V. 

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Title: Regulatory Product Compliance Expert
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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 results. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	77617B_276.1	Module (V160 NAR)	TKCMOD12N00W	354205700032680	2024-10-16	Element Under Test
	77617B_121.1	Module Circuit Board	--	--	2024-04-05	Auxiliary Element
	77617B_144.1	Harness	CONMOD MEB/MQBW	--	2024-04-05	Auxiliary Element
	77617B_151.1	Yellow Box	--	--	2024-04-05	Auxiliary Element
	77617B_163.1	Shark Antenna (Cellular, GNSS & BTWLAN3)	3WA.035.507.N	--	2024-04-05	Auxiliary Element
	77617B_375.1	Antenna BTWLAN1	83H.035.225.F	--	2024-04-05	Auxiliary Element
	77617B_376.1	Antenna BTWLAN2	4N0.035.500	--	2024-04-05	Auxiliary Element
	77617B_377.1	Antenna LTE3	4M0.035.507.A	--	2024-04-05	Auxiliary Element
S/02	77617B_276.1	Module (V160 NAR)	TKCMOD12N00W	354205700032680	2024-10-16	Element Under Test
	77617B_25.1	Yellow Box	--	14910	2023-11-20	Auxiliary Element
	77617B_47.1	Harness	--	--	2023-11-20	Auxiliary Element
	77617B_148.1	Module Circuit Board	--	--	2024-04-05	Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for Radiated tests.
S/02	Samples used for Conducted tests.

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	RF connector – code			[]	[X]	[]	
	RF connector – code			[X]	[X]	[]	
	RF connector – code			[X]	[]	[]	
--							
Supplementary information to the ports..... :	--						
Rated power supply	Voltage and Frequency			Reference poles			
				L1	L2	L3	N
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 12V car battery (4.8 VDC inside of TCU)					
Rated Power	12V DC						
Clock frequencies..... :	--						
Other parameters	See Technical description						
Software version	Q113						
Hardware version	X07						
Dimensions in cm (W x H x D)	--						
Mounting position	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[X]	Other: automotive telematics control unit					
Modules/parts..... :	Module/parts of test item			Type		Manufacturer	
	--			--		--	
Accessories (not part of the test item)	Description			Type		Manufacturer	
	--			--		--	
Documents as provided by the applicant..... :	Description			File name		Issue date	
	--			--		--	

⁽³⁾ Only for Medical Equipment

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Becker-Goering-Str. 16
76307, Karlsbad, GERMANY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-11-05
Date (finish)	2025-02-05

Document history

Report number	Date	Description
83304RRF002	2025-06-06	First release.
83304RRF002A1	2025-06-24	Second release. Modification due to typos. This test report replaces and cancels to 83304RRF002

Environmental conditions

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Sergio Carrasco, Rafael Fernández, Álvaro Gutiérrez and Valentin Andarias Díaz.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
06144	PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2025-07-22
06496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2026-12-01
03783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-03-15
04657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2026-06-12
08856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
07817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-07-01
07445	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	N/A
07760	DIGITAL MULTIMETER	175	FLUKE	2025-11-07
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
07791	SIGNAL GENERATOR 8kHz-6GHz	SMB100B	ROHDE AND SCHWARZ	2026-03-15
07793	SIGNAL GENERATOR 8kHz-6GHz	SMBV100B	ROHDE AND SCHWARZ	2026-03-11
08847	VECTOR SIGNAL GENERATOR 100kHz-7.5GHz	SMW200A	ROHDE AND SCHWARZ	2025-09-29

Control No.	Equipment	Model	Manufacturer	Next Calibration
08848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE & SCHWARZ	2027-01-02
00922	POWER SUPPLY DC 40 V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	N/A
05850	DIGITAL MULTIMETER	179	FLUKE	2024-11-02
07798	WMS32	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

A. Common requirements for all Bands:

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

B. U-NII-1: 5.15 GHz – 5.25 GHz Band:

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

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

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

Appendix A: Test results of Common requirements for all Bands

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TEST CONDITIONS

(*) Declared by the Client.

POWER SUPPLY (*):

Vnominal: 12 Vdc
Type of Power Supply: External power supply (Vehicle Battery)

ANTENNA (*):

Type of Antennas: External

		Effective Antenna Gain
UNII-1	RF Output Port (Chain 0): Port 3	+7.70 dBi
	RF Output Port (Chain 1): Port 2	+2.38 dBi
UNII-3	RF Output Port (Chain 0): Port 3	+7.70 dBi
	RF Output Port (Chain 1): Port 2	+2.38 dBi

Directional Antenna Gain Calculations for CDD MIMO In-Band Measurements:

For 2Tx CDD MIMO modes, in accordance with KDB 662911 D01 v02r01 Section F)2)f)(ii) y F)2)e)ii), directional gain, directional gain was calculated as follows:

$$\begin{aligned}
 N_{SS} &= 1, N_{ANT} = 2, G_{ANT0} = 7.70, G_{ANT1} = 2.38 \\
 \text{Directional Gain} &= 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 10 \log \left[\frac{\sum_{j=1}^1 \left(\sum_{k=1}^2 g_{j,k} \right)^2}{2} \right] \\
 &= 10 \log \left[\frac{(g_{1,1} + g_{1,2})^2}{2} \right] = 10 \log \left[\frac{(10^{\frac{7.70}{20}} + 10^{\frac{2.38}{20}})^2}{2} \right] = 10 \log \left[\frac{(10^{\frac{7.70}{20}} + 10^{\frac{2.38}{20}})^2}{2} \right] = 8.45 \text{ dBi}
 \end{aligned}$$

For the SISO and MIMO techniques, the antenna gain are higher than 6 dBi.

POWER ADJUSTMENT (*):

Modes:	Power Adjustment SISO Port 3:	Power Adjustment MIMO (Port 3 + Port 2):
A20	15	15
N20	15	15
N40	15	15
AC20	15	15
AC40	15	15
AC80	15	15
AX20 SU	15	15
AX20 RU26	15	15
AX40 SU	15	15
AX40 RU26	15	15
AX80 SU	15	15
AX80 RU26	15	15

TEST FREQUENCIES (*):

Technology Tested:	WLAN (IEEE 802.11 a20 / n2040 / ac204080 / ax204080 1x1 & 2x2)
Modes:	802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps (1 or 2 spatial stream with either SISO or 2 chains MIMO CDD).
	802.11n HT20: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chains MIMO CDD).
	802.11n HT40: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chains MIMO CDD).
	802.11ac VHT20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
	802.11ac VHT40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
	802.11ac VHT80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
	802.11ax HE20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
	802.11ax HE40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
	802.11ax HE80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF).
Setting of cores / ports:	Chain 0, Chain 1, Chain 0 & 1
Beamforming:	No.

Band U-NII-1:

Frequency Range:	5150 - 5250 MHz	
Operating Channel Bandwidth:	20 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Low (36)	5180
	Middle (40)	5200
	Middle (44)	5220
	High (48)	5240
Operating Channel Bandwidth:	40 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Low (38)	5190
	High (46)	5230
Operating Channel Bandwidth:	80 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Single (42)	5210

Band U-NII-3:

Frequency Range:	5725 - 5850 MHz	
Operating Channel Bandwidth:	20 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Low (149)	5745
	Middle (157)	5785
	High (165)	5825
Operating Channel Bandwidth:	40 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Low (151)	5755
	High (159)	5795
Operating Channel Bandwidth:	80 MHz	
Transmission Channels:	Channels	Channel Frequency (MHz)
	Single (155)	5775

These tests were performed on all the supported modes of the EUT, in the worst data rates after preliminary testing.
SISO tests were performed on determined SISO Chain 0 (Port 3) as it is the worst-case after preliminary testing.

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at power setting according the table on all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and connected to the TS8997 using a low-loss RF cable. The reading in the spectrum analyzer is corrected taking into account the internal and external RF cable loss.

For all modes:



Transmitter. 99% Occupied Bandwidth

Limit

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained.

The following conditions shall be observed for measuring the occupied bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

Results

SISO (Port 3) (worst-case)

Modulation: 802.11a (OFDM 6 Mbit/s)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5180.00000	16.700
		5220.00000	16.600
		5240.00000	16.600
[5725, 5850]		5745.00000	16.700
		5785.00000	16.800
		5825.00000	16.600

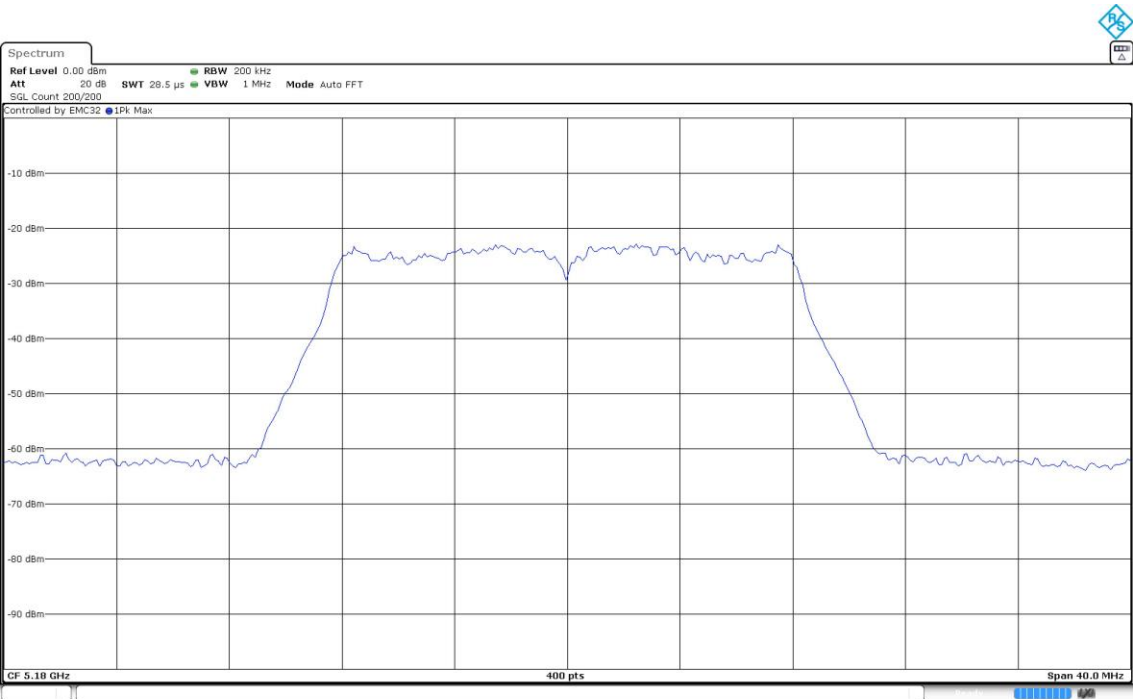
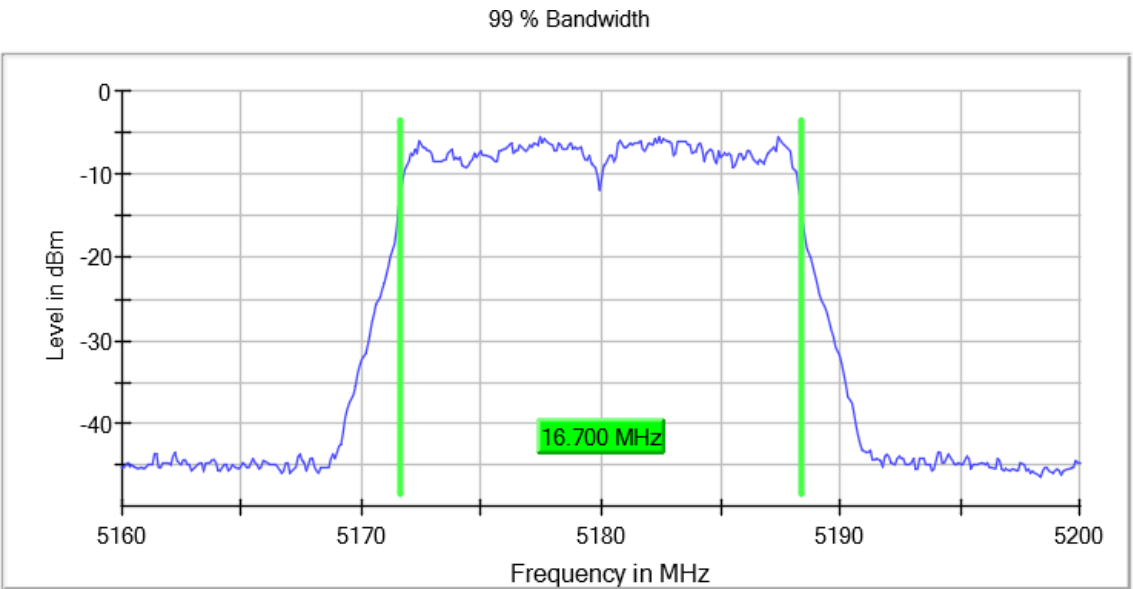
Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5180.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3

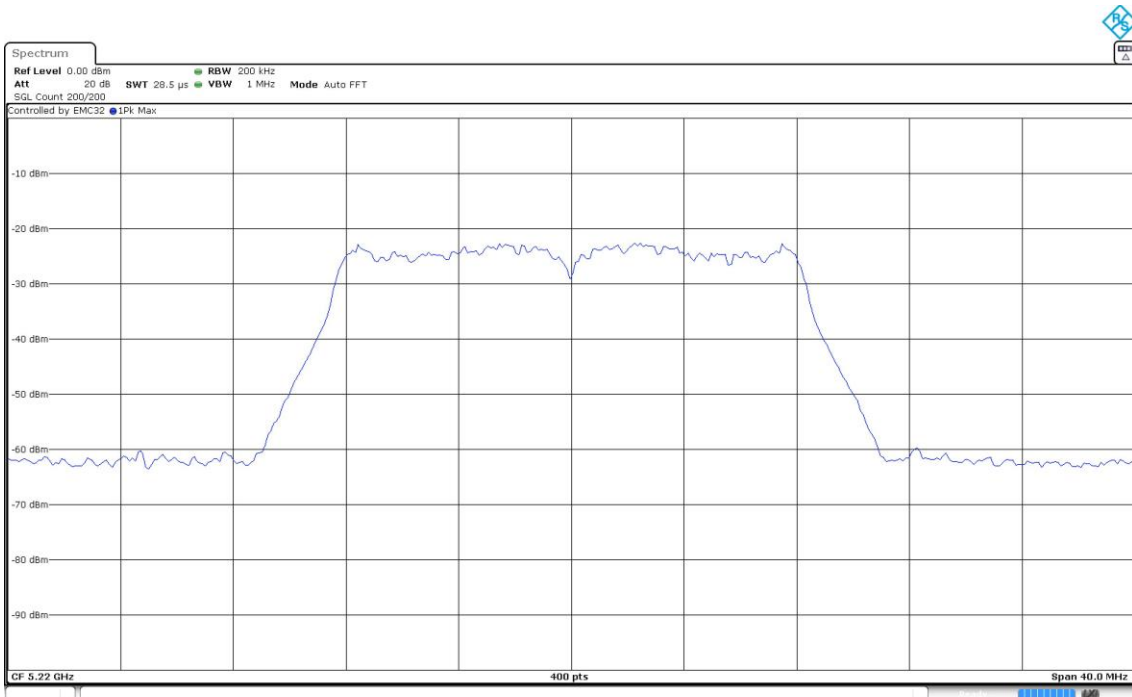
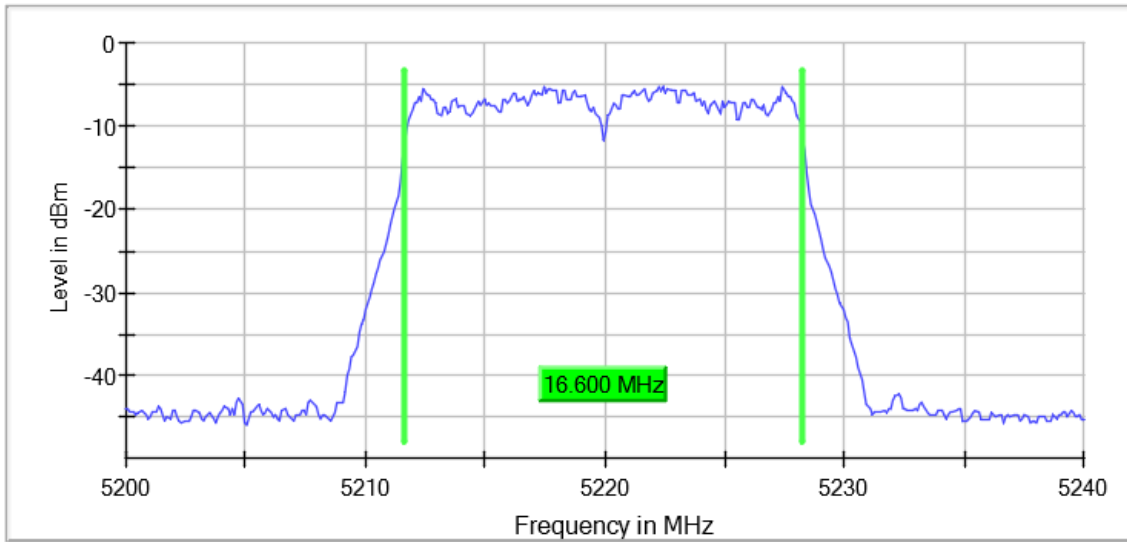
Frequency MHz = 5220.00000

Modulation = 802.11a (OFDM 6 Mbit/s)

Antenna Configuration = SISO

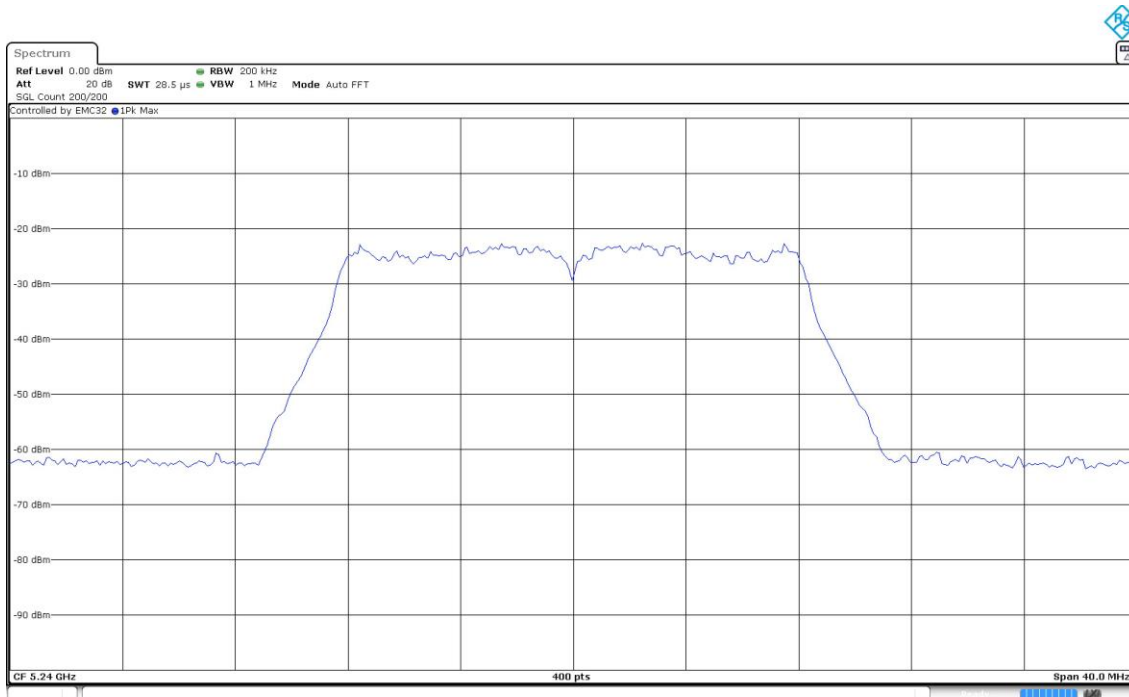
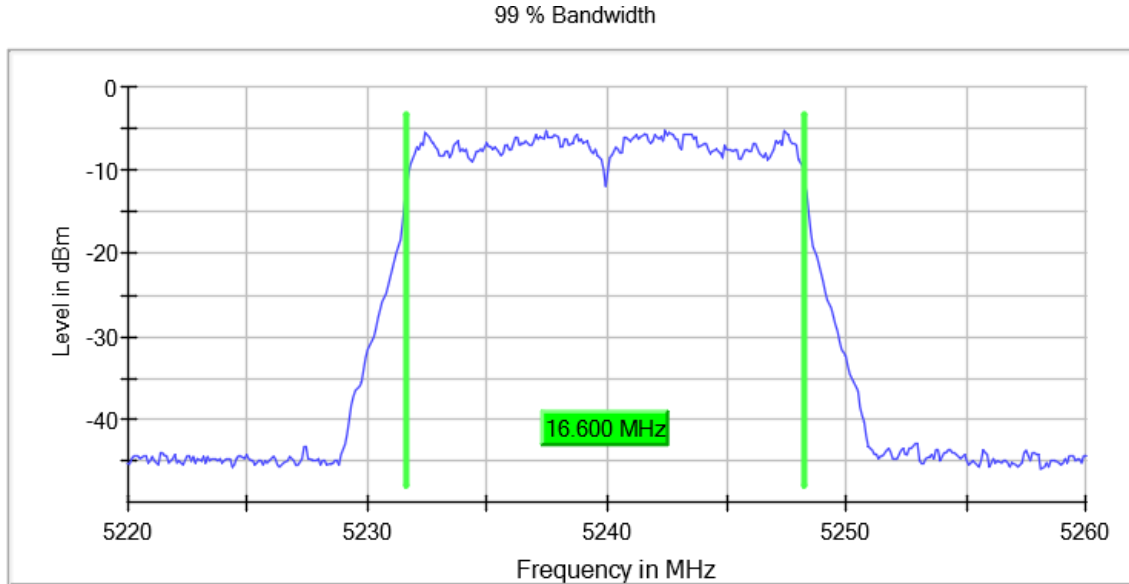
Images:

99 % Bandwidth



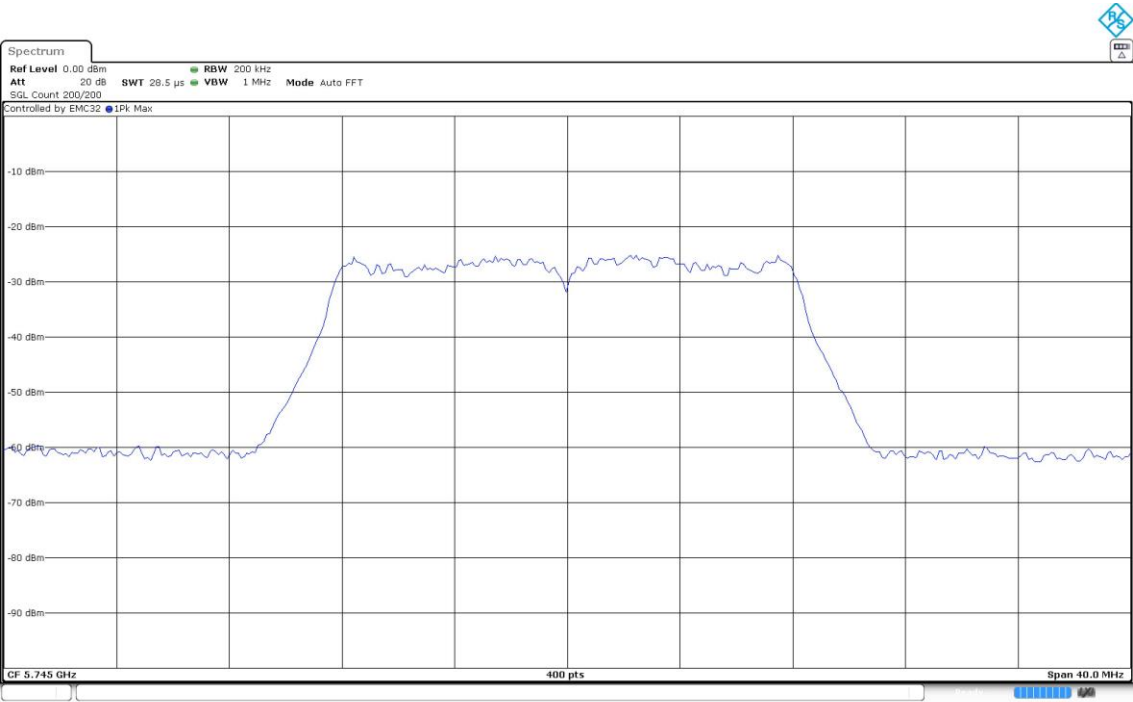
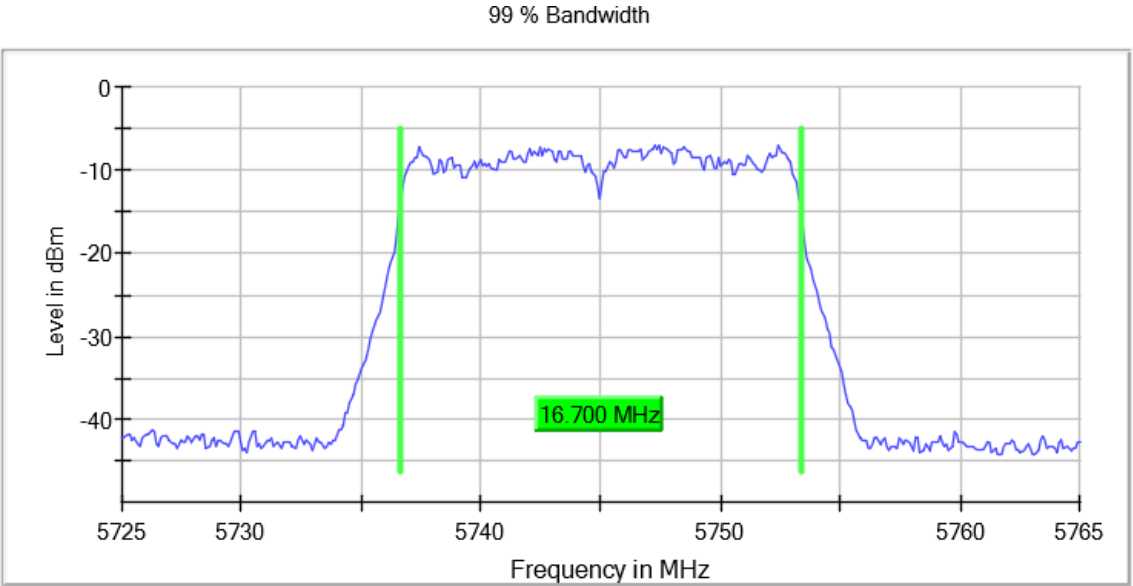
Operation Band MHz = [5150, 5250] Active Port = 3
 Frequency MHz = 5240.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
 Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5745.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3

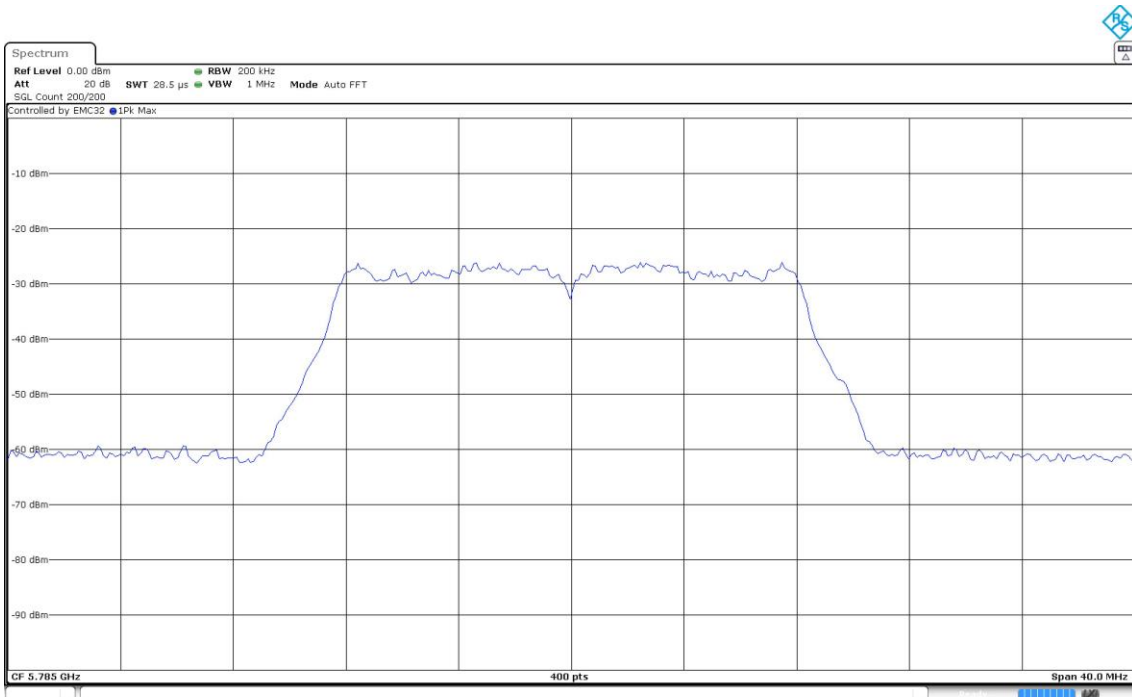
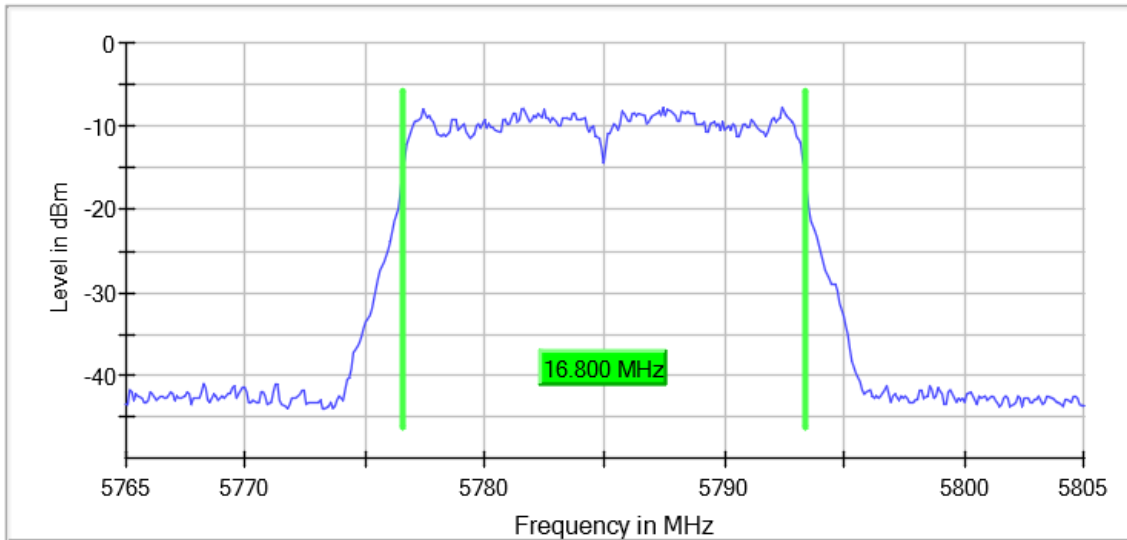
Frequency MHz = 5785.00000

Modulation = 802.11a (OFDM 6 Mbit/s)

Antenna Configuration = SISO

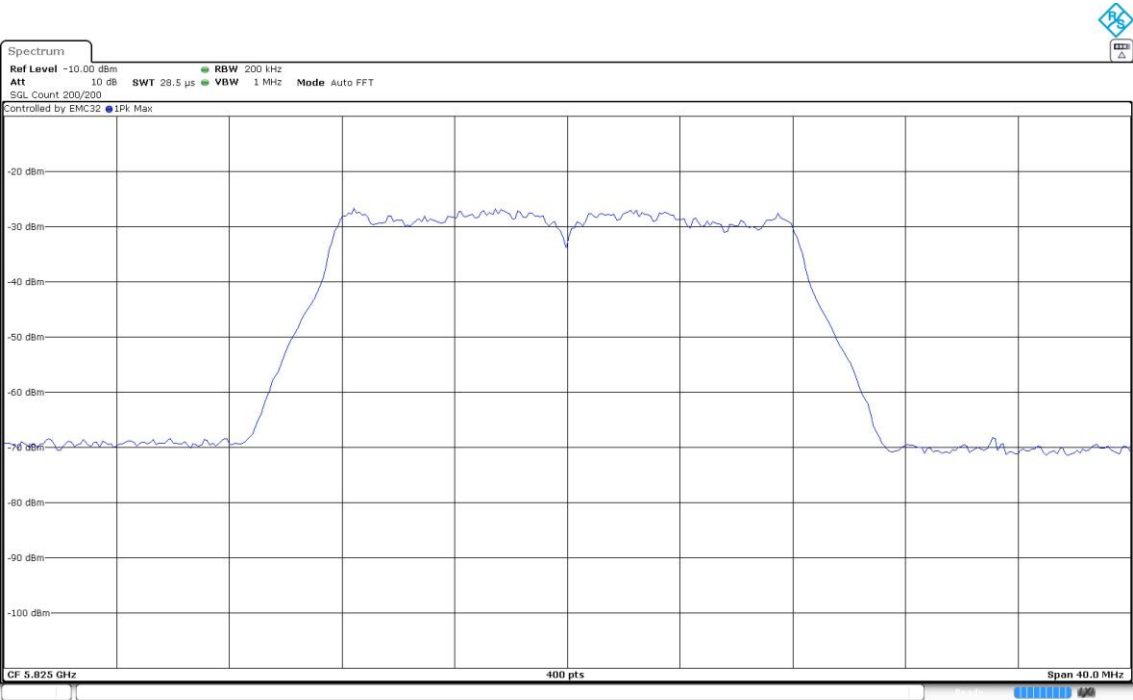
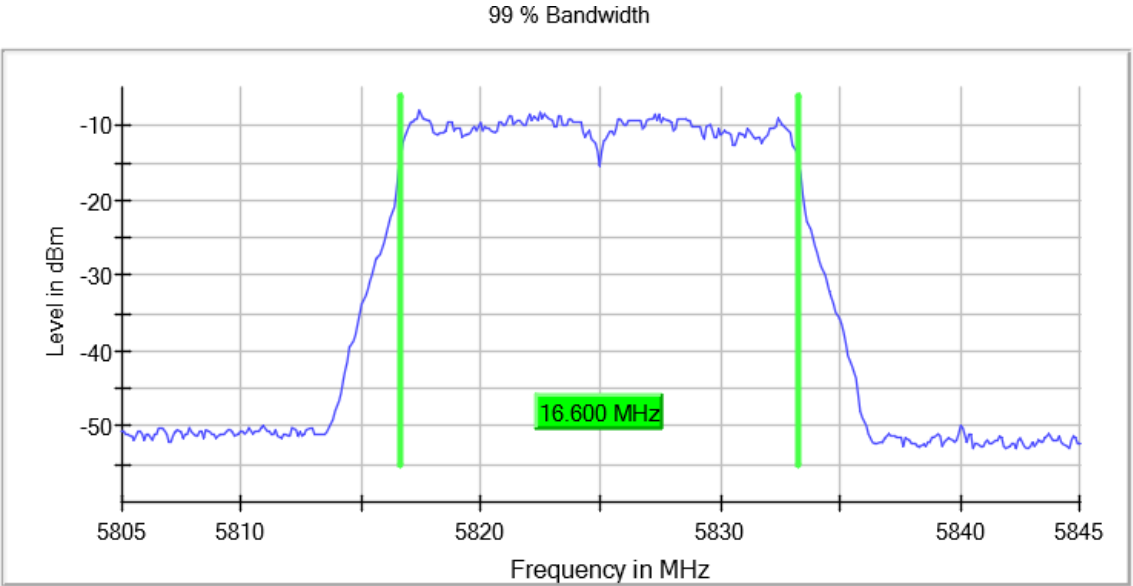
Images:

99 % Bandwidth



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5825.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
Antenna Configuration = SISO

Images:



Modulation: 802.11n HT20 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5180.00000	17.700
		5220.00000	17.600
		5240.00000	17.600
[5725, 5850]		5745.00000	17.700
		5785.00000	17.700
		5825.00000	17.600

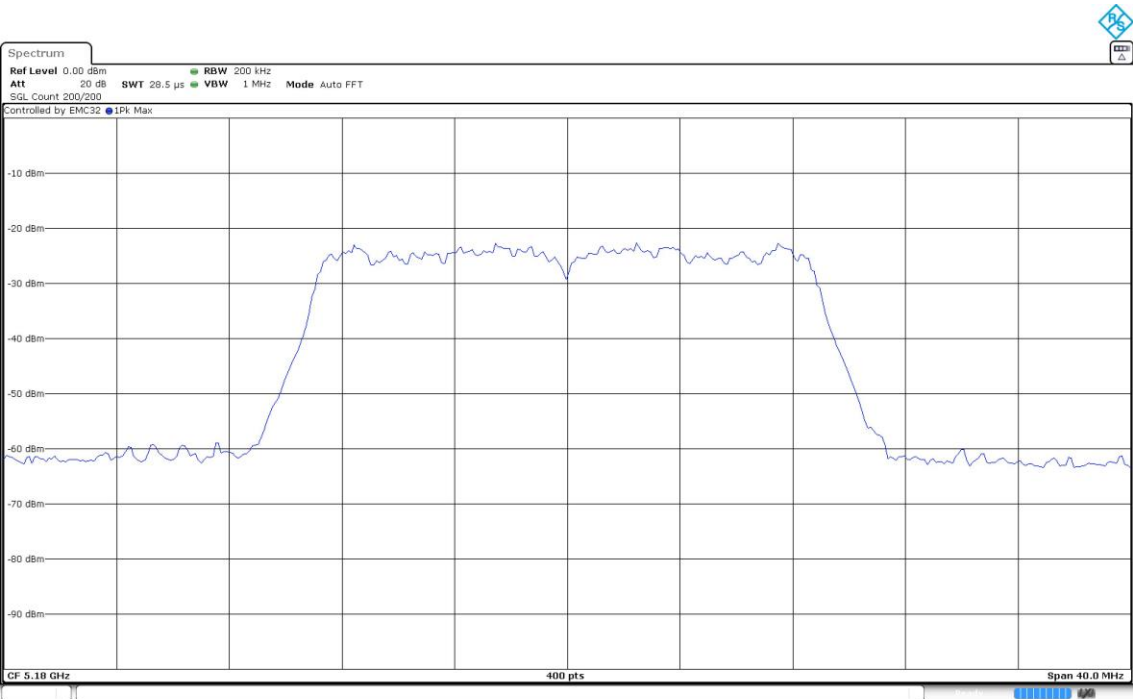
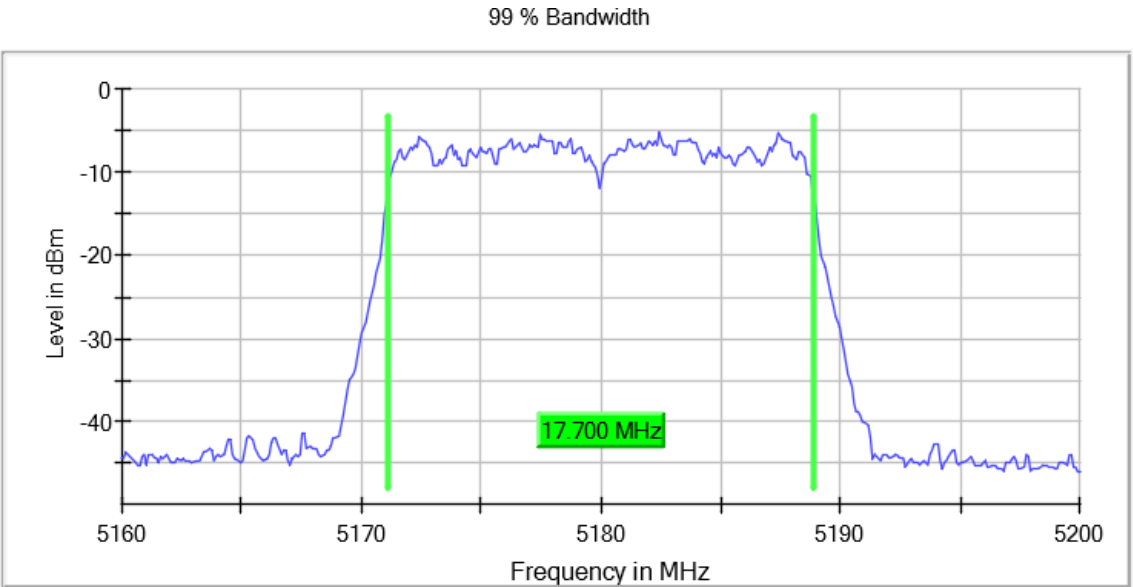
Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5180.00000 Modulation = 802.11n HT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



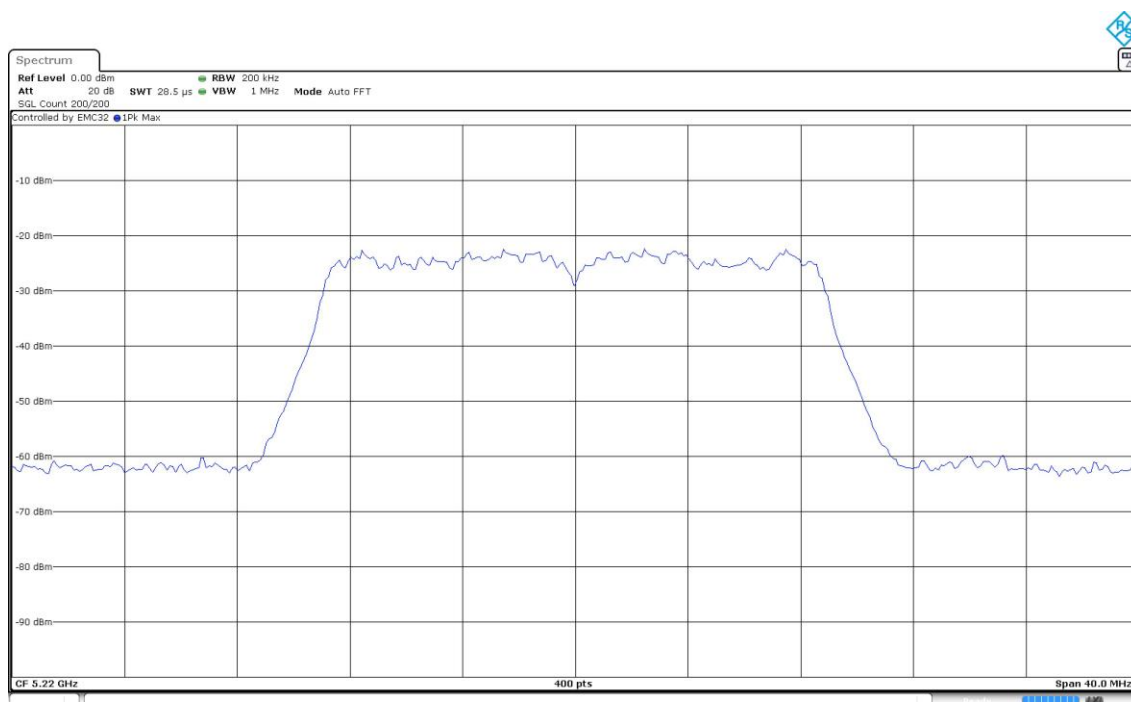
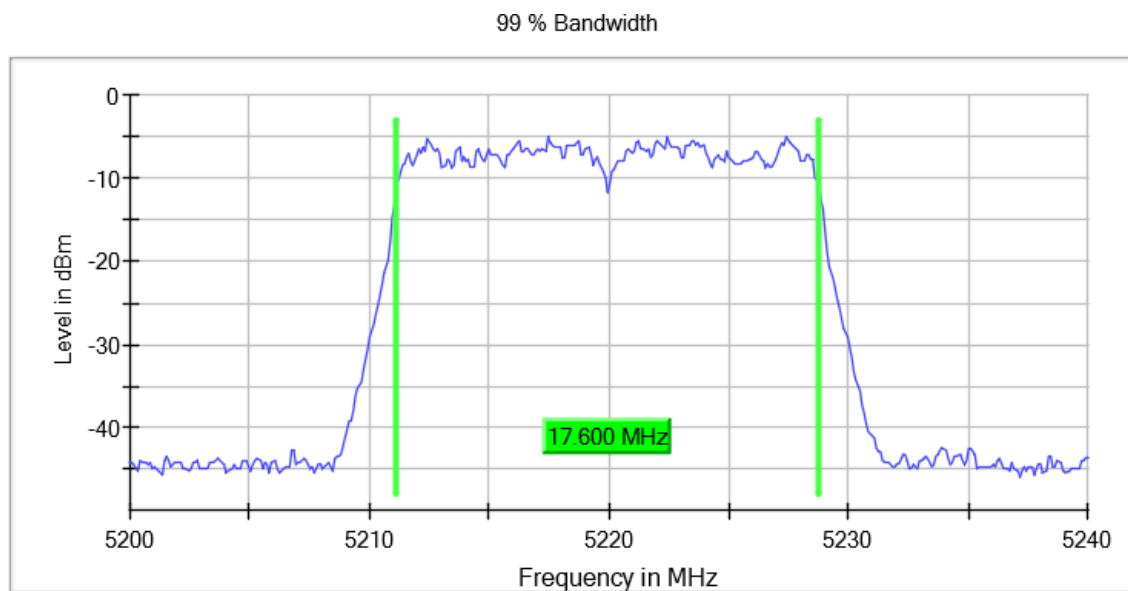
Operation Band MHz = [5150, 5250] Active Port = 3

Frequency MHz = 5220.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = SISO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3

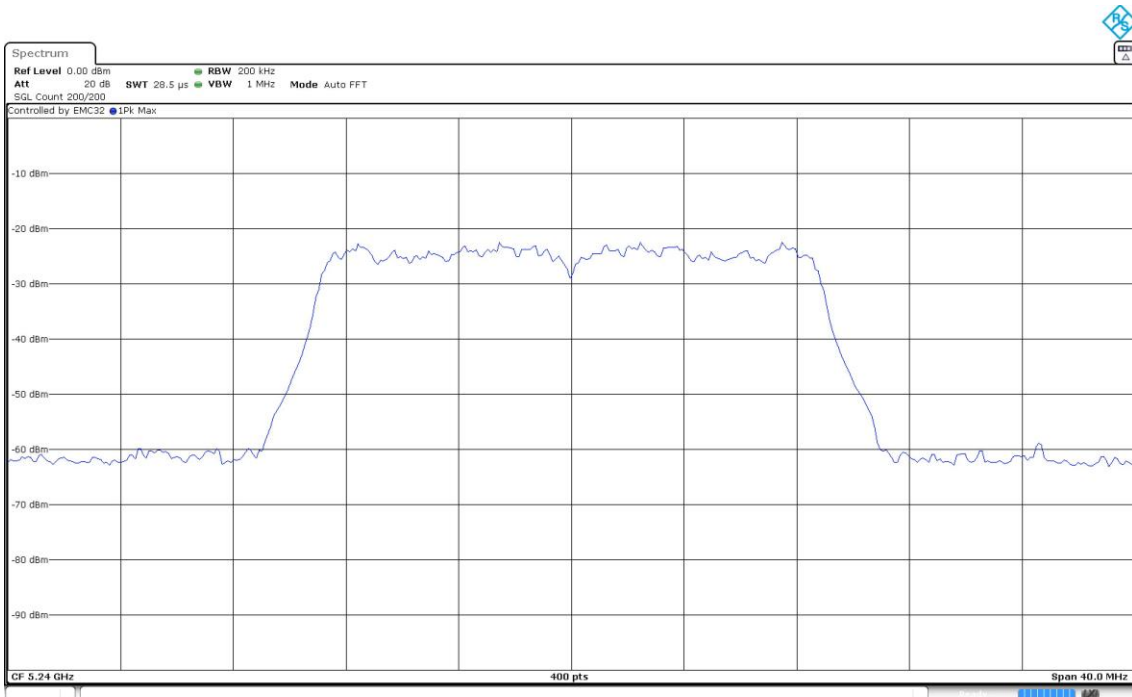
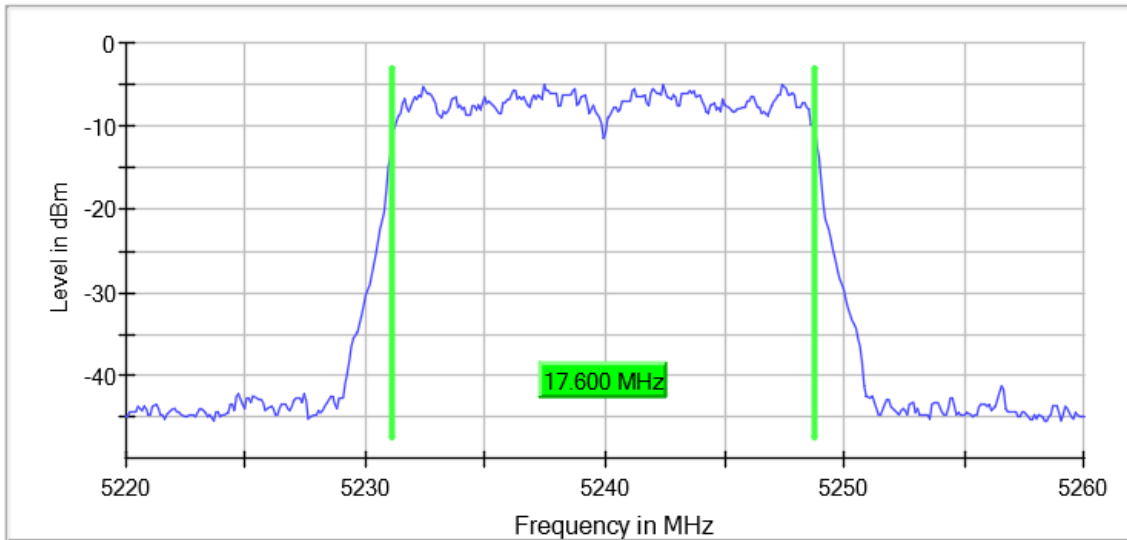
Frequency MHz = 5240.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = SISO

Images:

99 % Bandwidth



Operation Band MHz = [5725, 5850] Active Port = 3

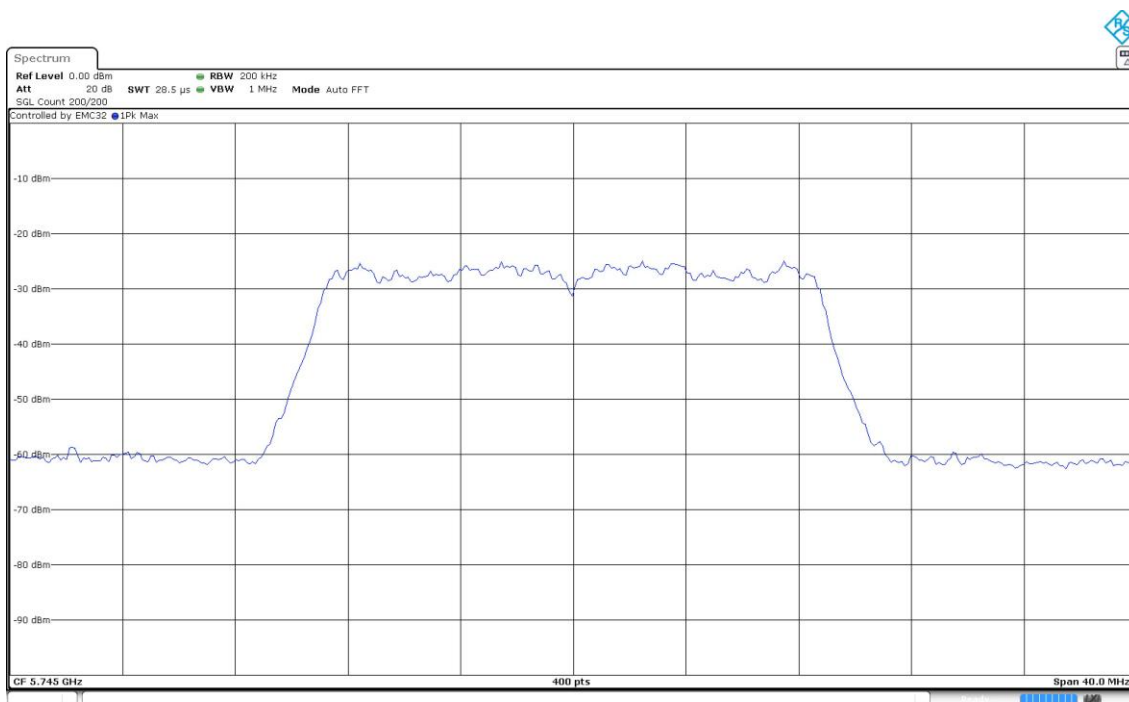
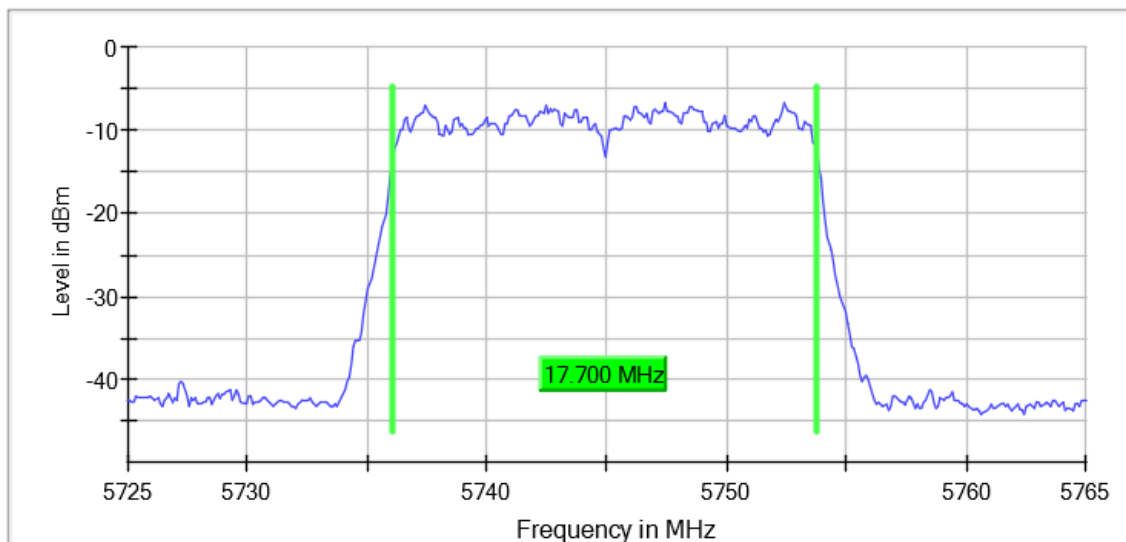
Frequency MHz = 5745.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = SISO

Images:

99 % Bandwidth



Operation Band MHz = [5725, 5850] Active Port = 3

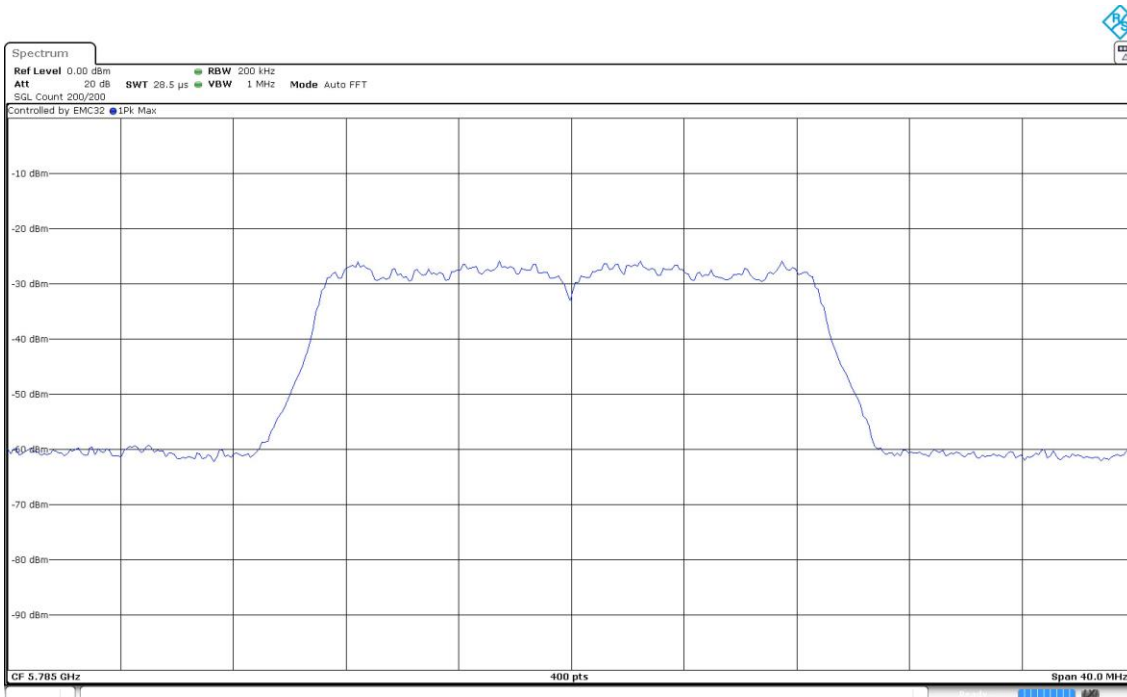
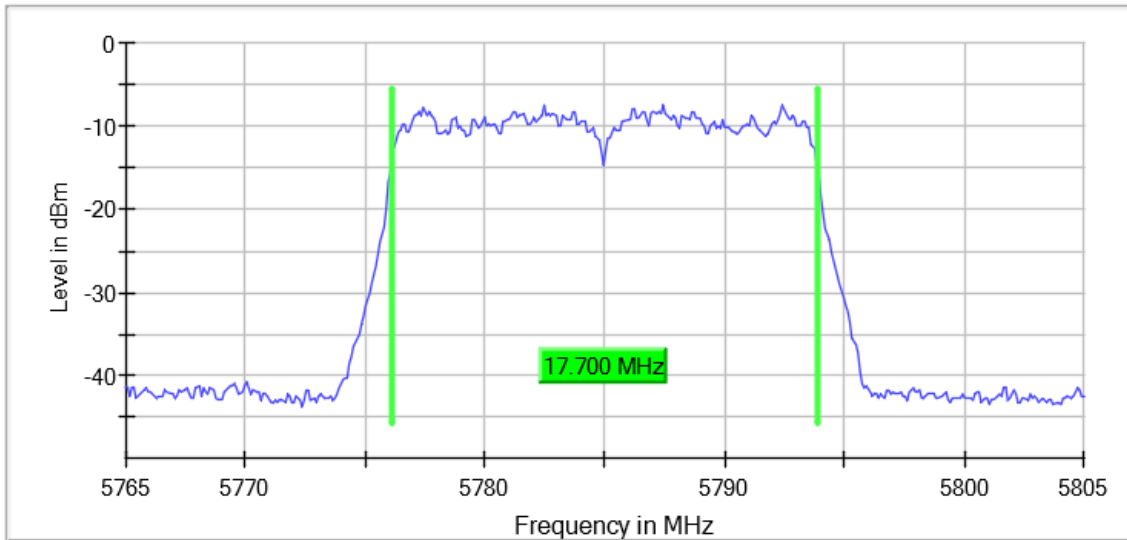
Frequency MHz = 5785.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = SISO

Images:

99 % Bandwidth



Operation Band MHz = [5725, 5850] Active Port = 3

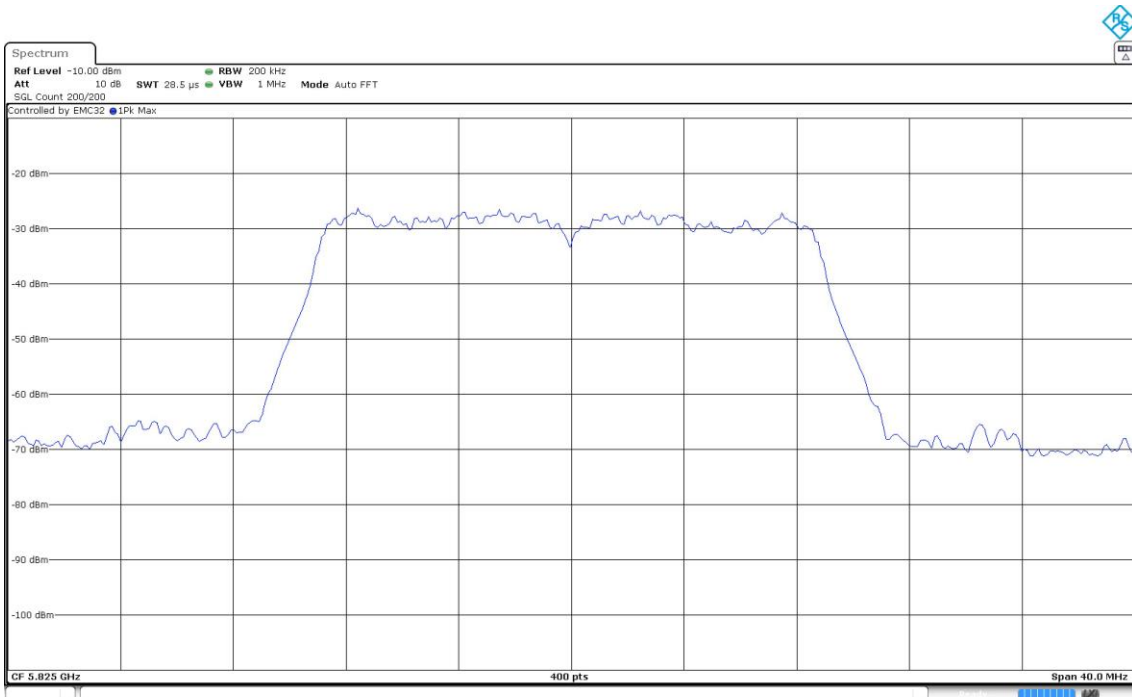
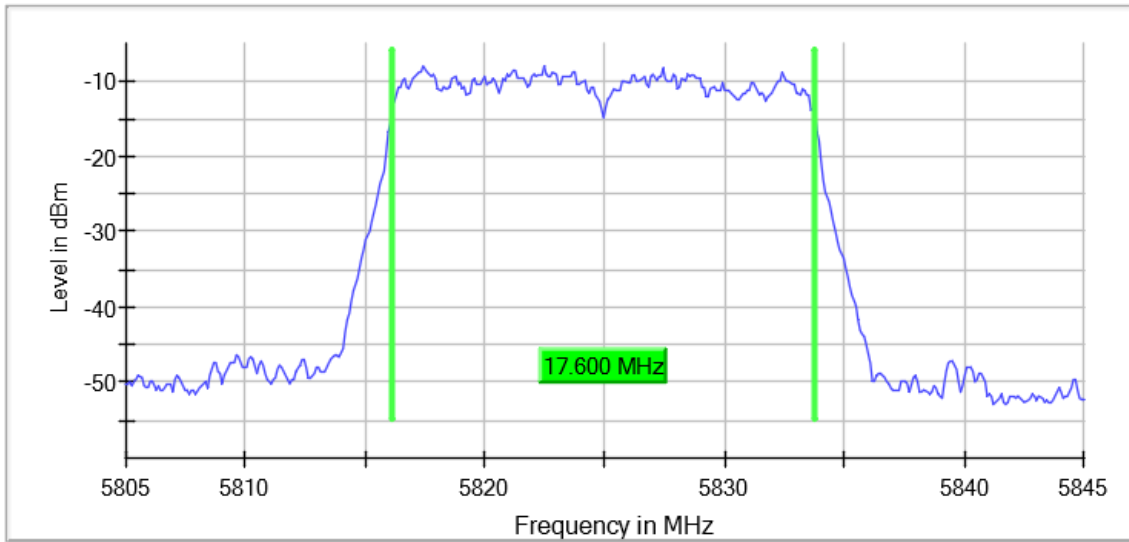
Frequency MHz = 5825.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = SISO

Images:

99 % Bandwidth



Modulation: 802.11n HT40 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5190.00000	36.250
		5230.00000	36.250
[5725, 5850]		5755.00000	36.500
		5795.00000	36.250

Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 3

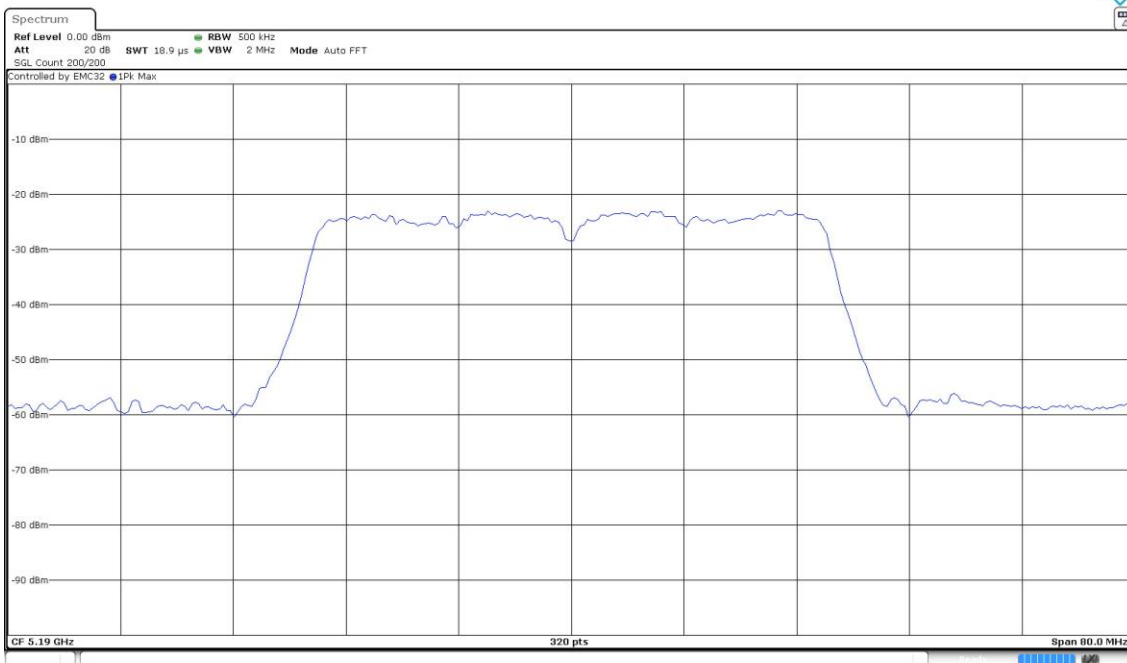
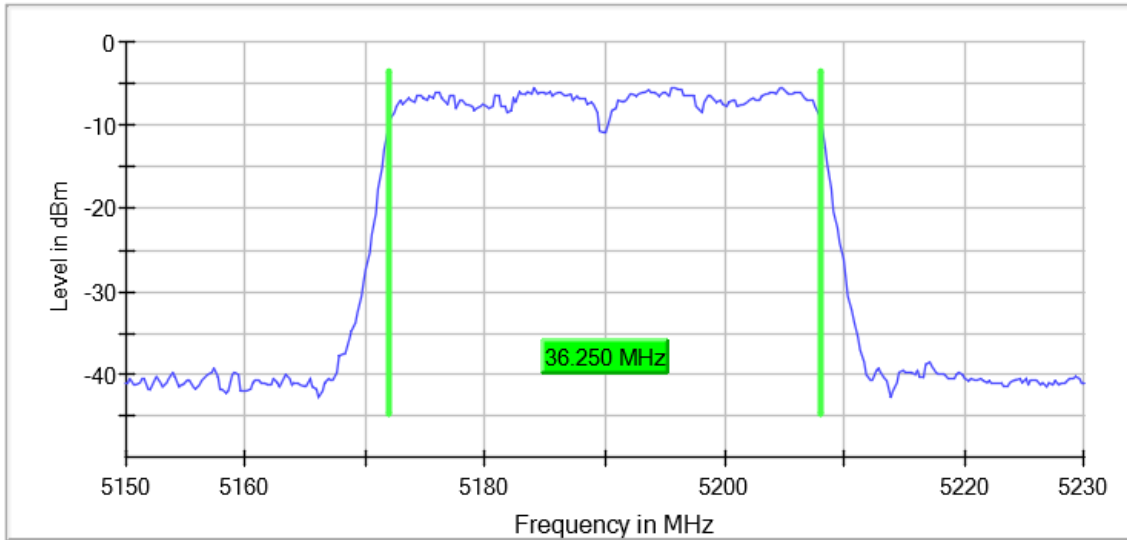
Frequency MHz = 5190.00000

Modulation = 802.11n HT40 (OFDM MCS0)

Antenna Configuration = SISO

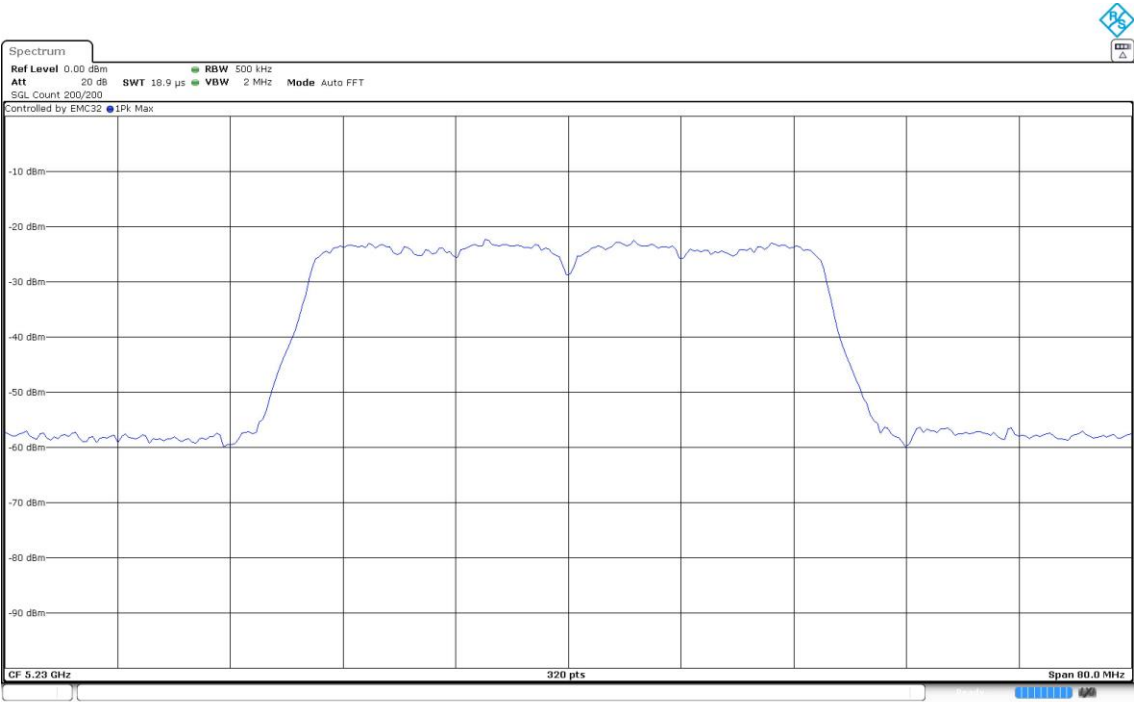
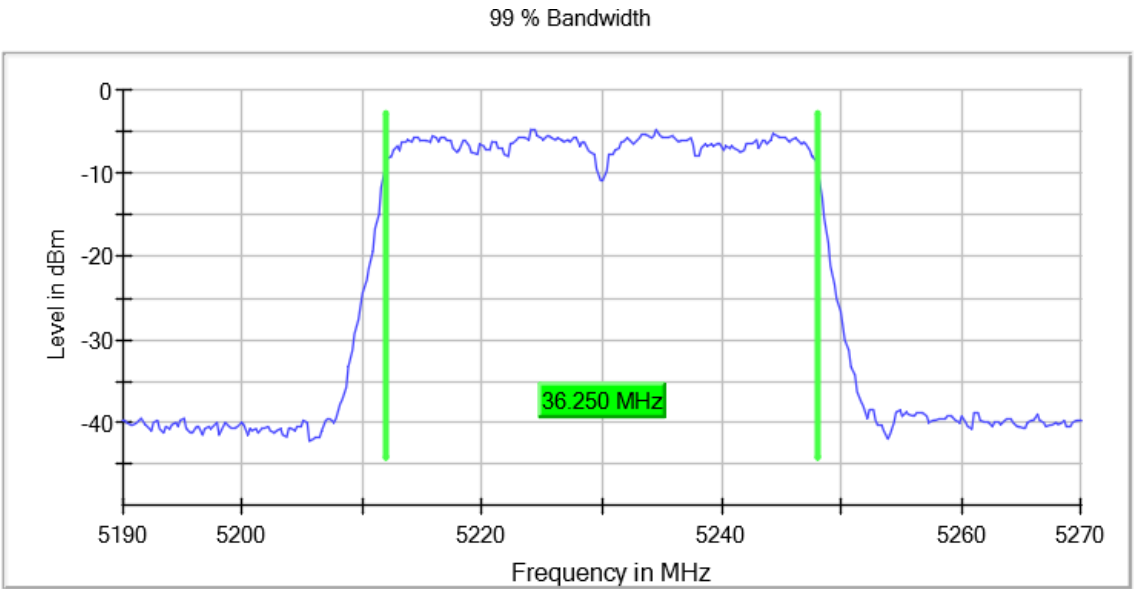
Images:

99 % Bandwidth



Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5230.00000 Modulation = 802.11n HT40 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3

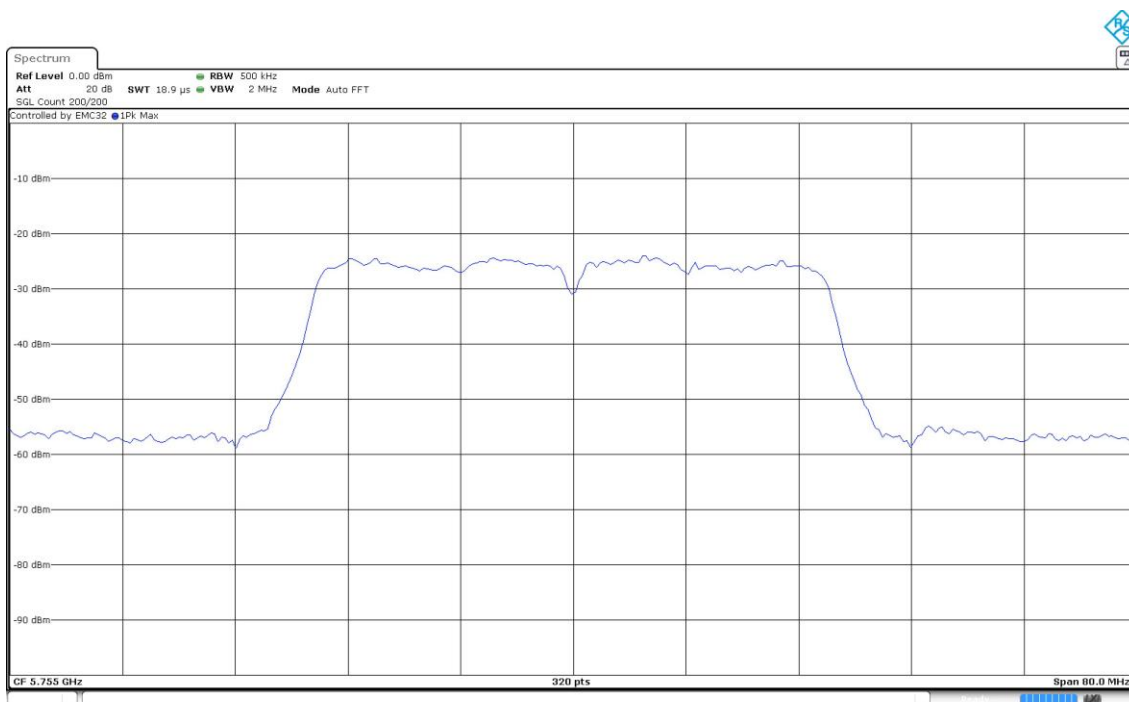
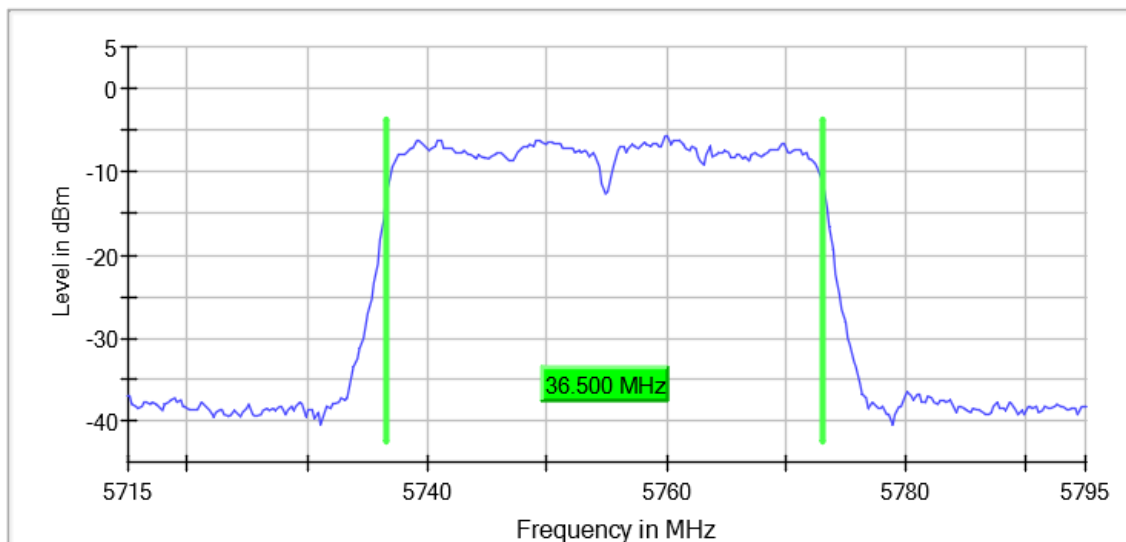
Frequency MHz = 5755.00000

Modulation = 802.11n HT40 (OFDM MCS0)

Antenna Configuration = SISO

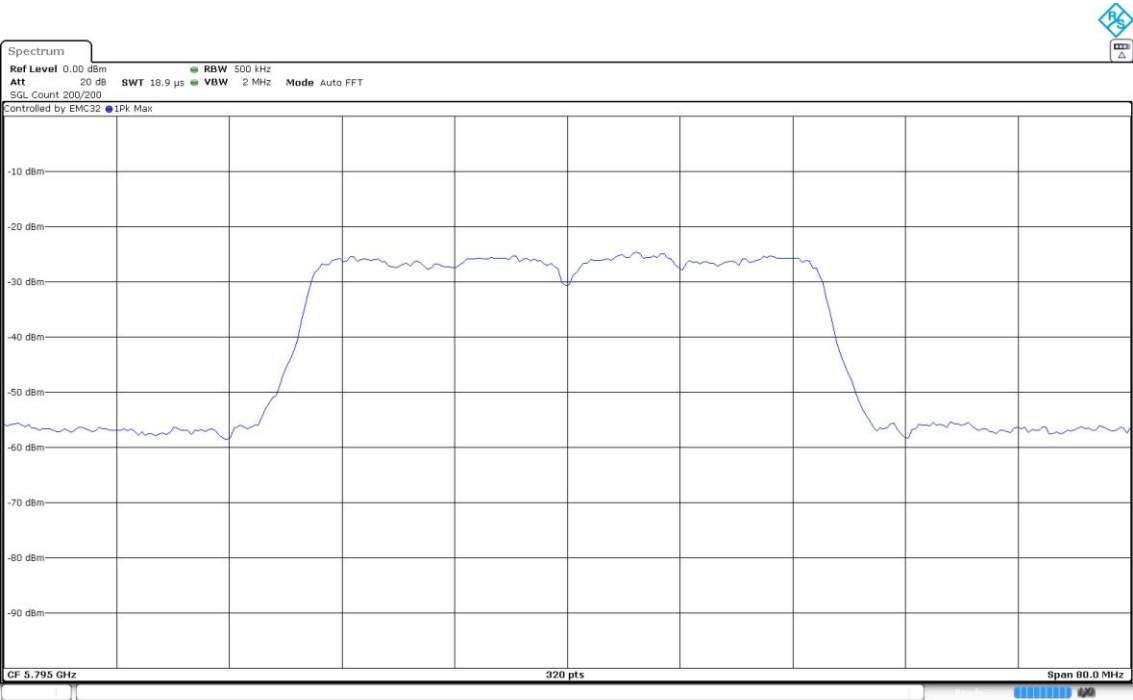
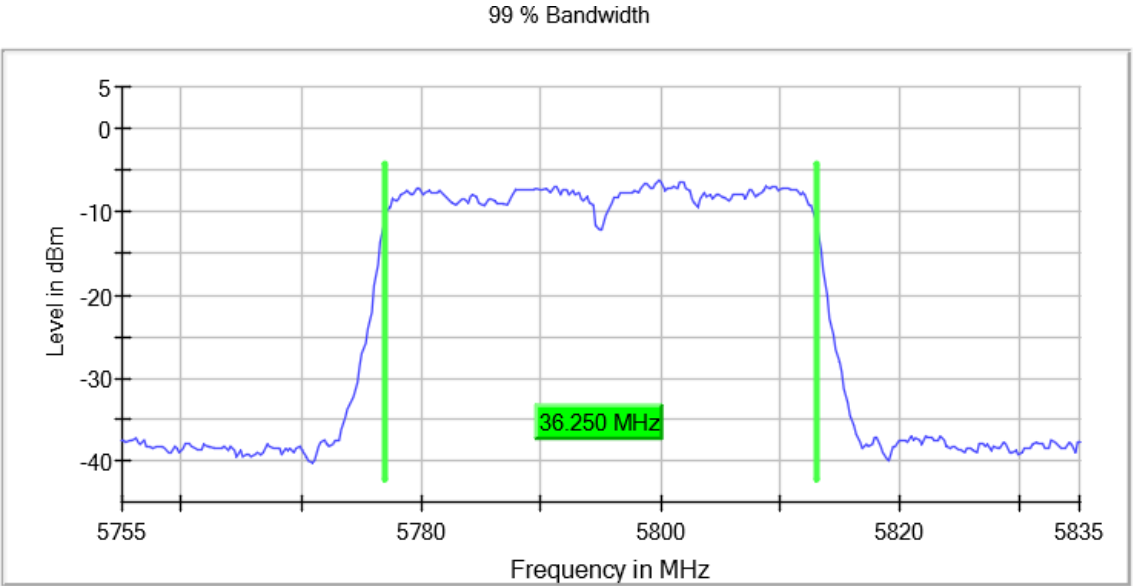
Images:

99 % Bandwidth



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5795.00000 Modulation = 802.11n HT40 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Modulation: 802.11ac VHT20 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5180.00000	17.700
		5220.00000	17.700
		5240.00000	17.600
[5725, 5850]		5745.00000	17.700
		5785.00000	17.700
		5825.00000	17.600

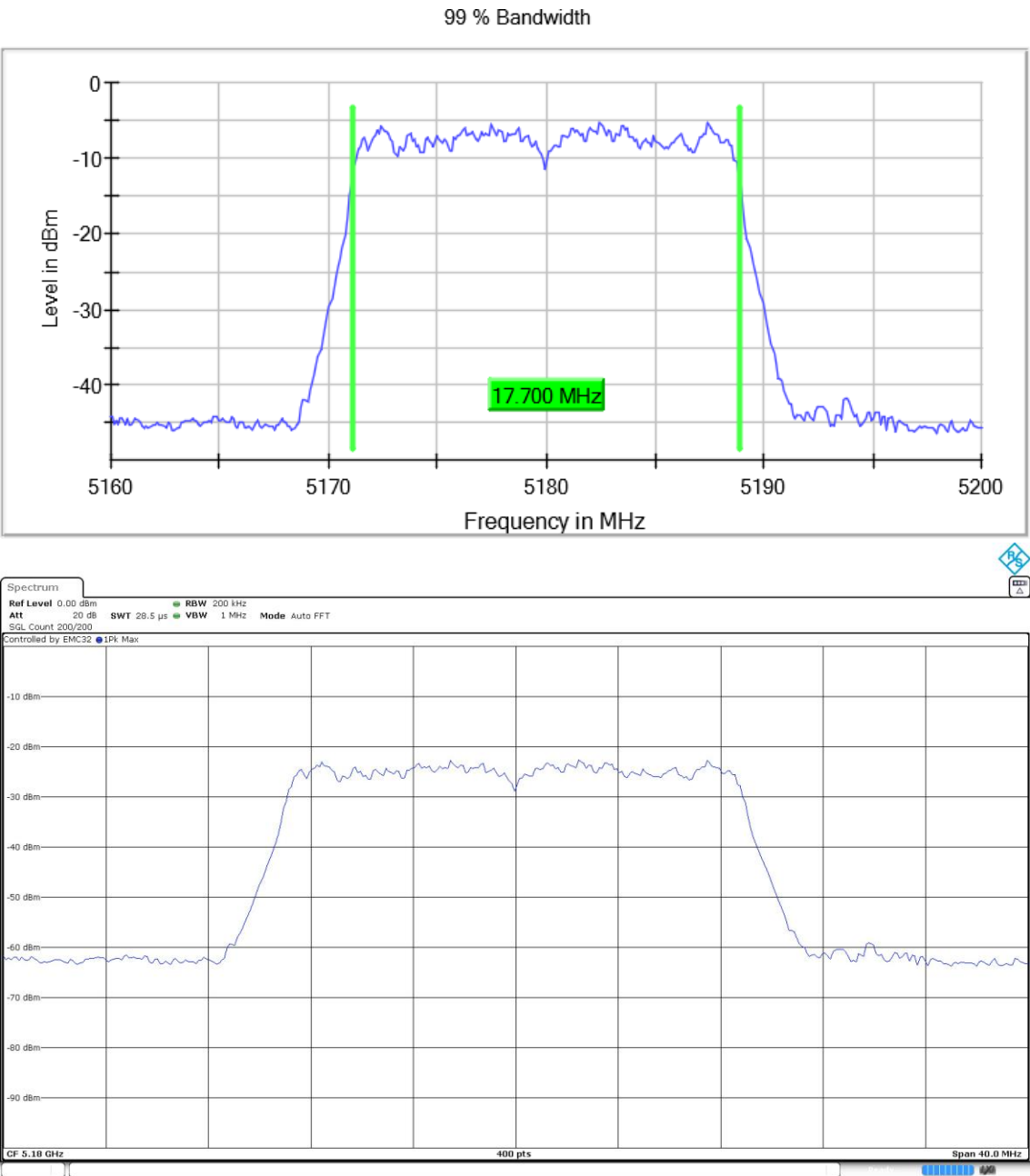
Verdict

Pass

Attachments

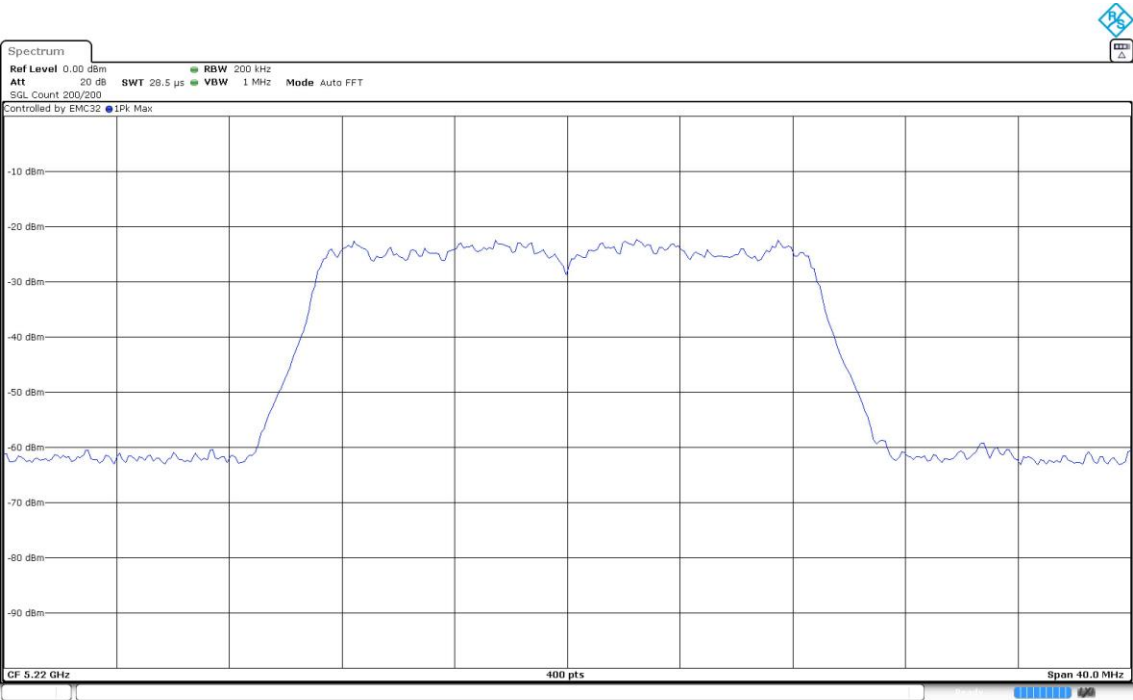
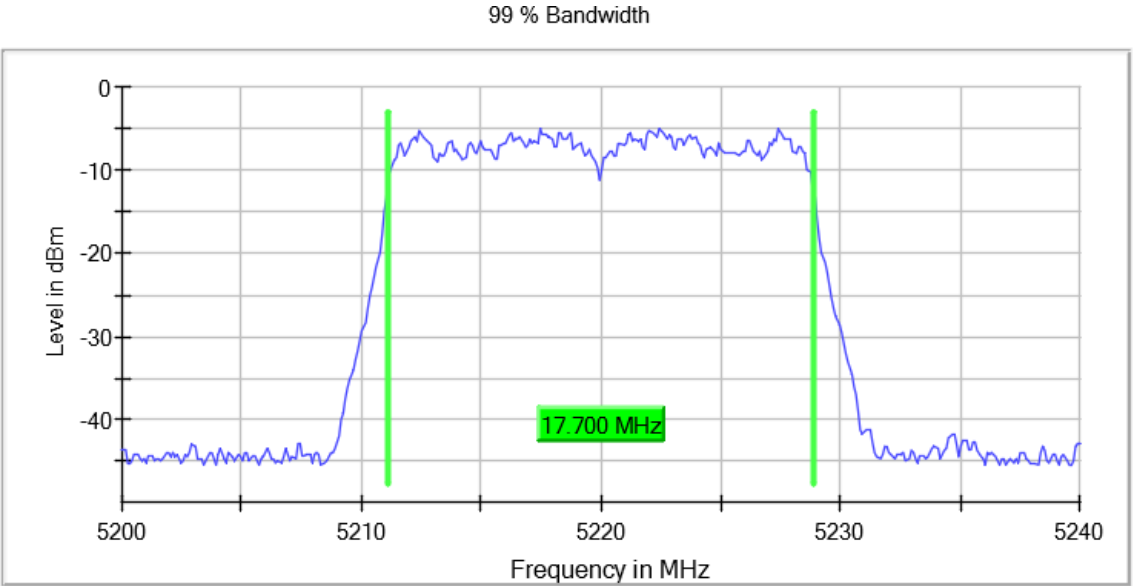
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5180.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



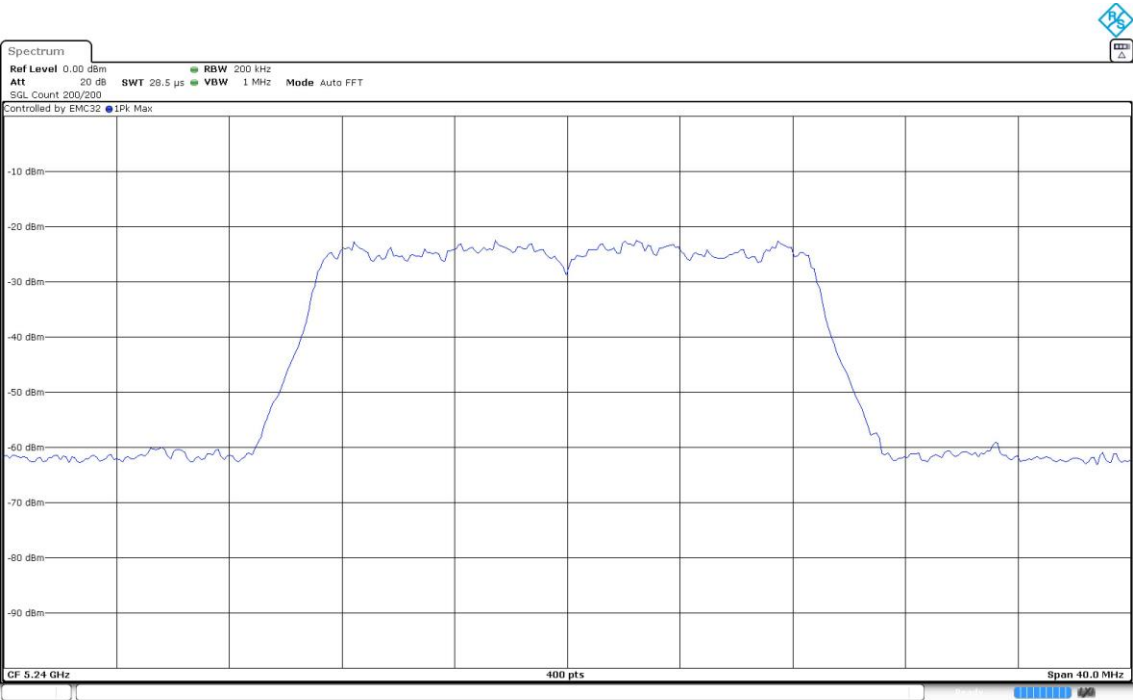
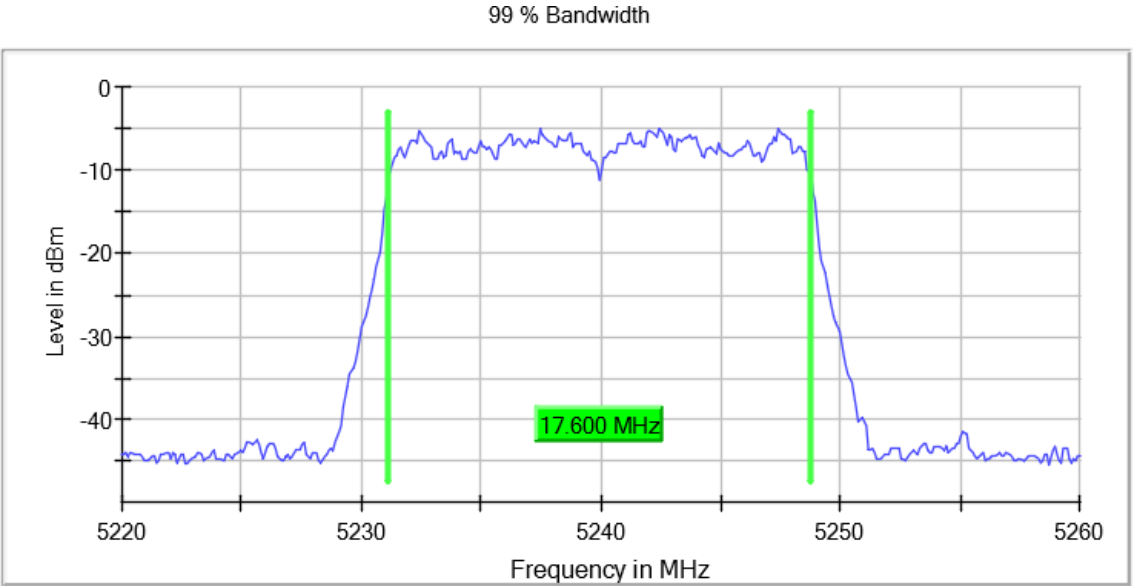
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5220.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



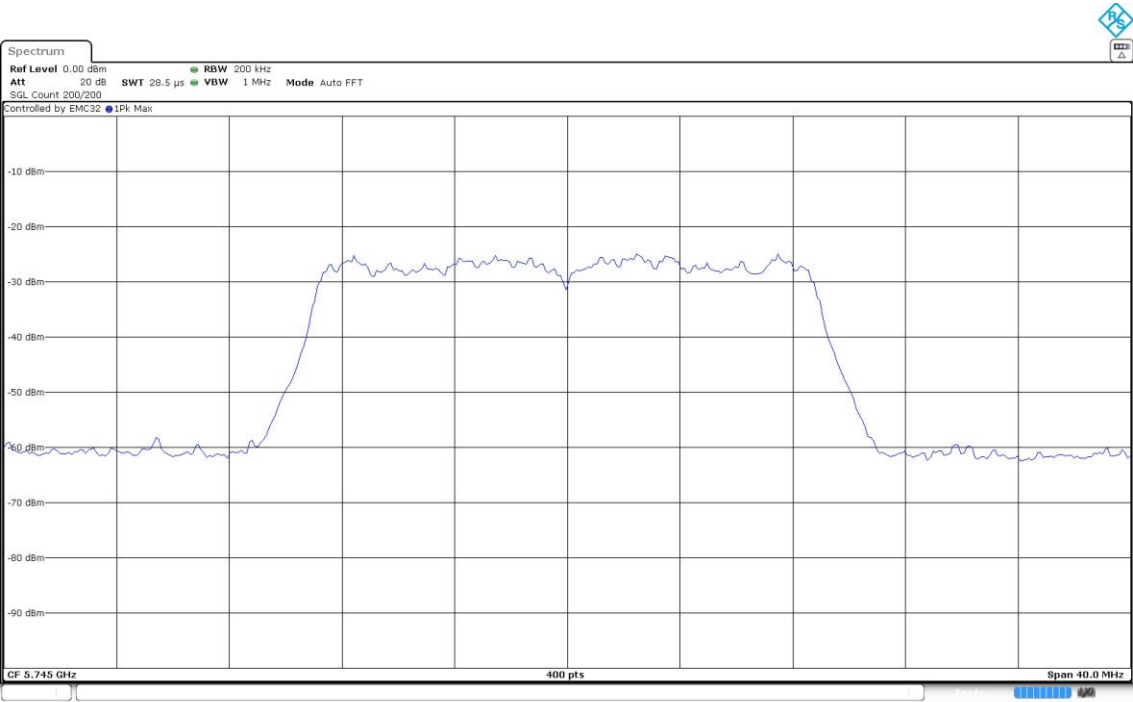
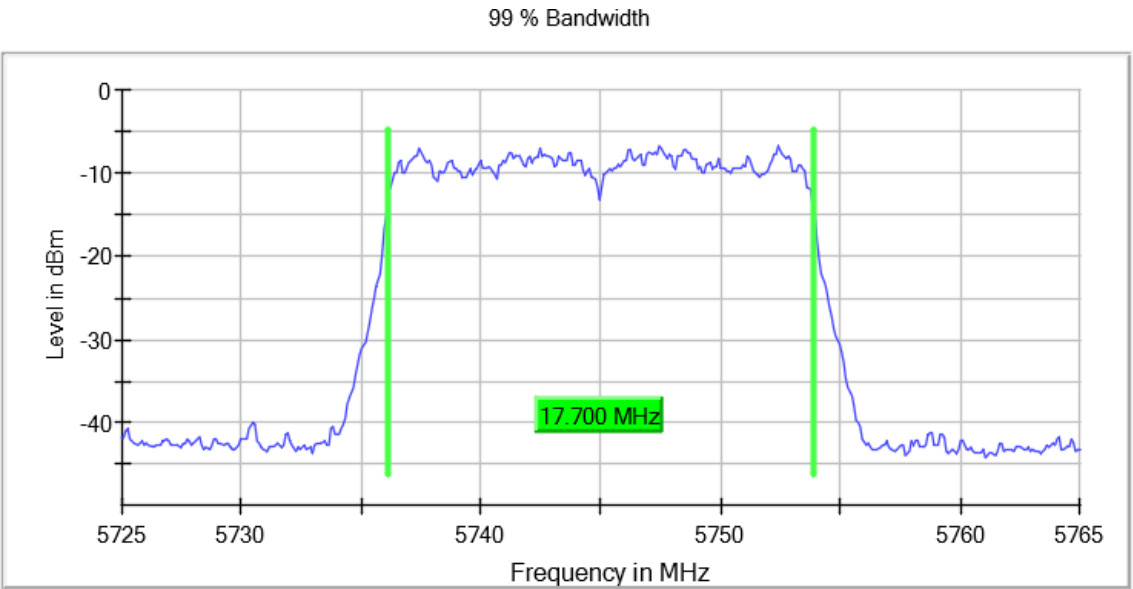
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5240.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



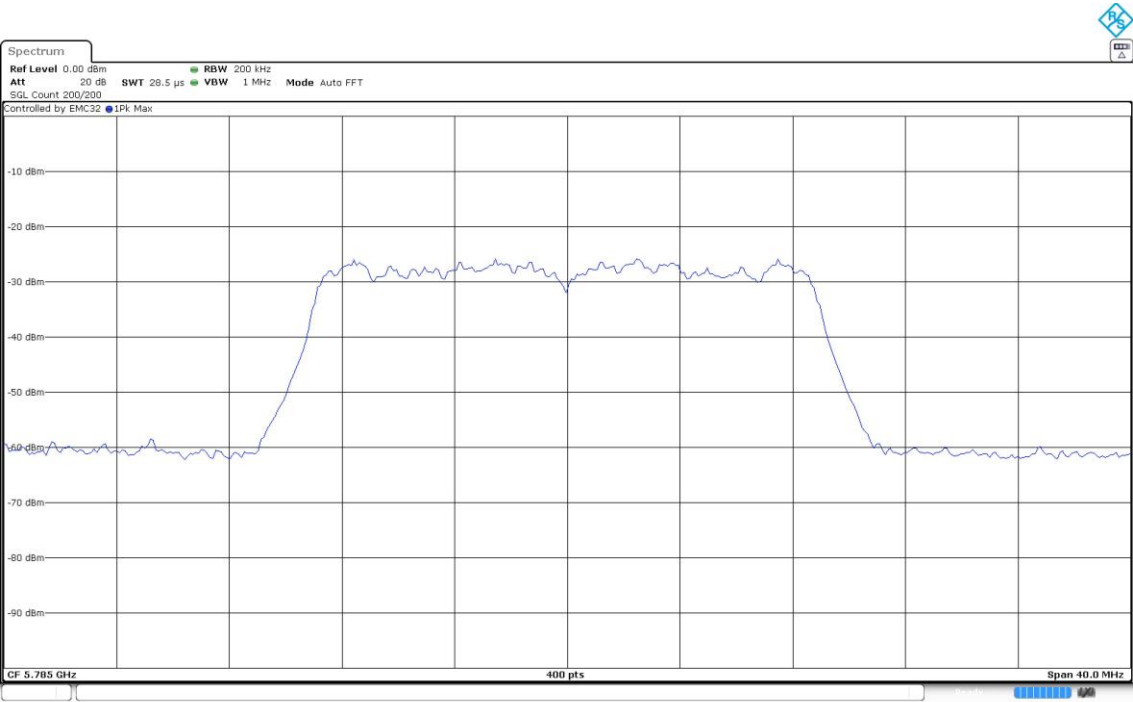
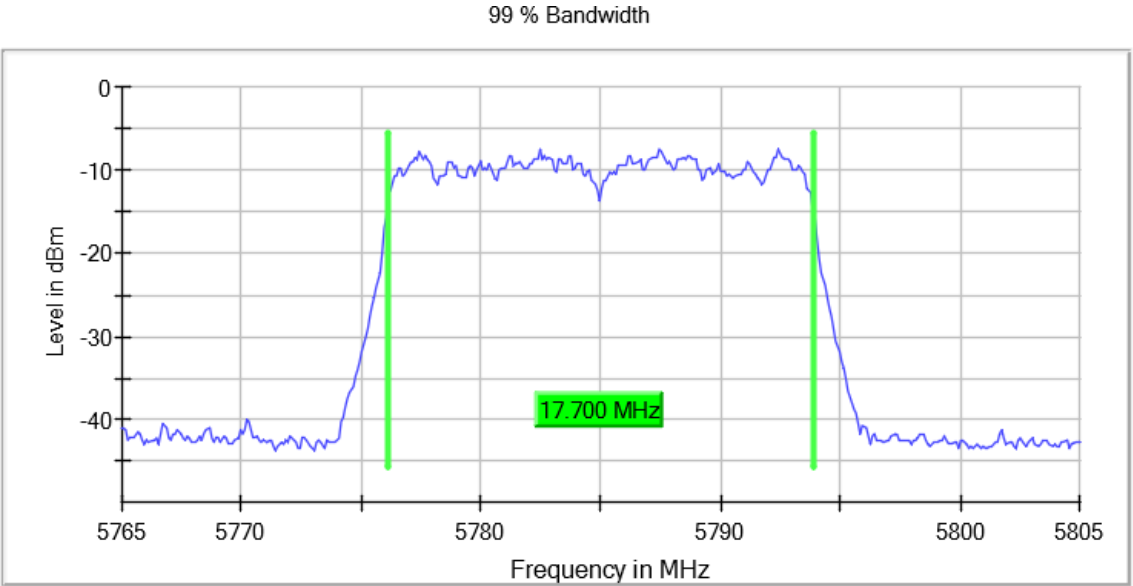
Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5745.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



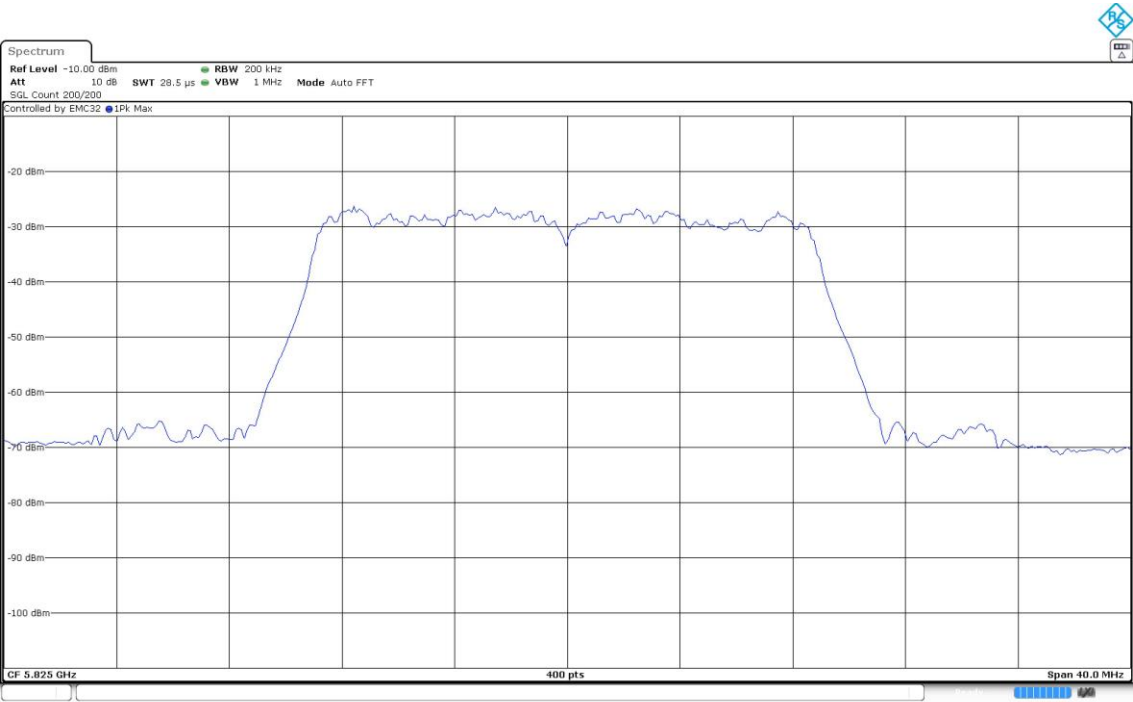
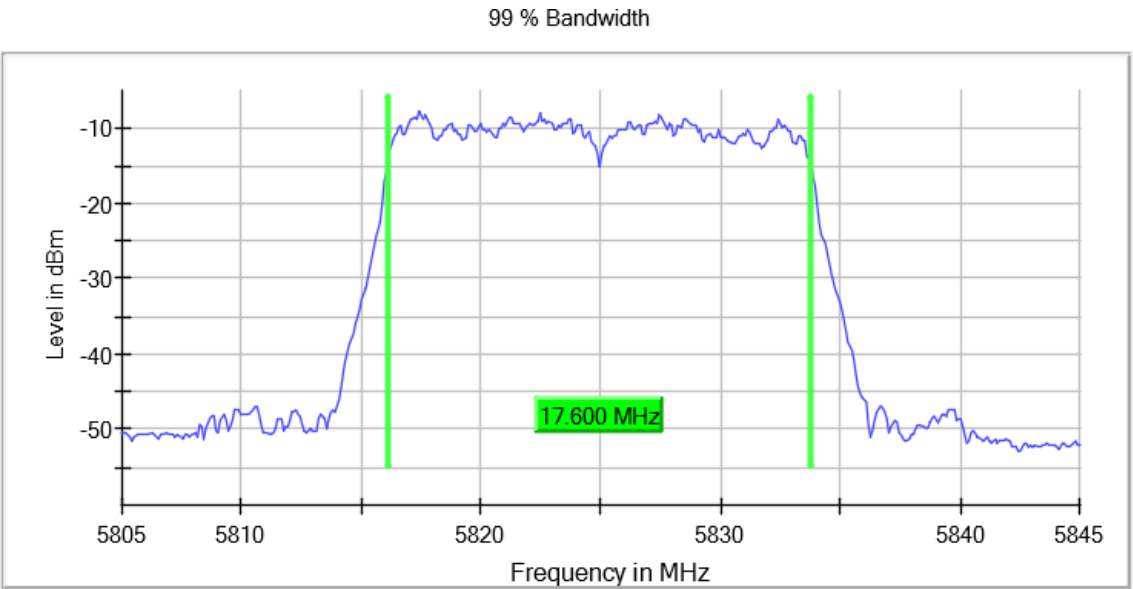
Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5785.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5825.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Modulation: 802.11ac VHT40 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5190.00000	36.250
		5230.00000	36.250
[5725, 5850]		5755.00000	36.250
		5795.00000	36.500

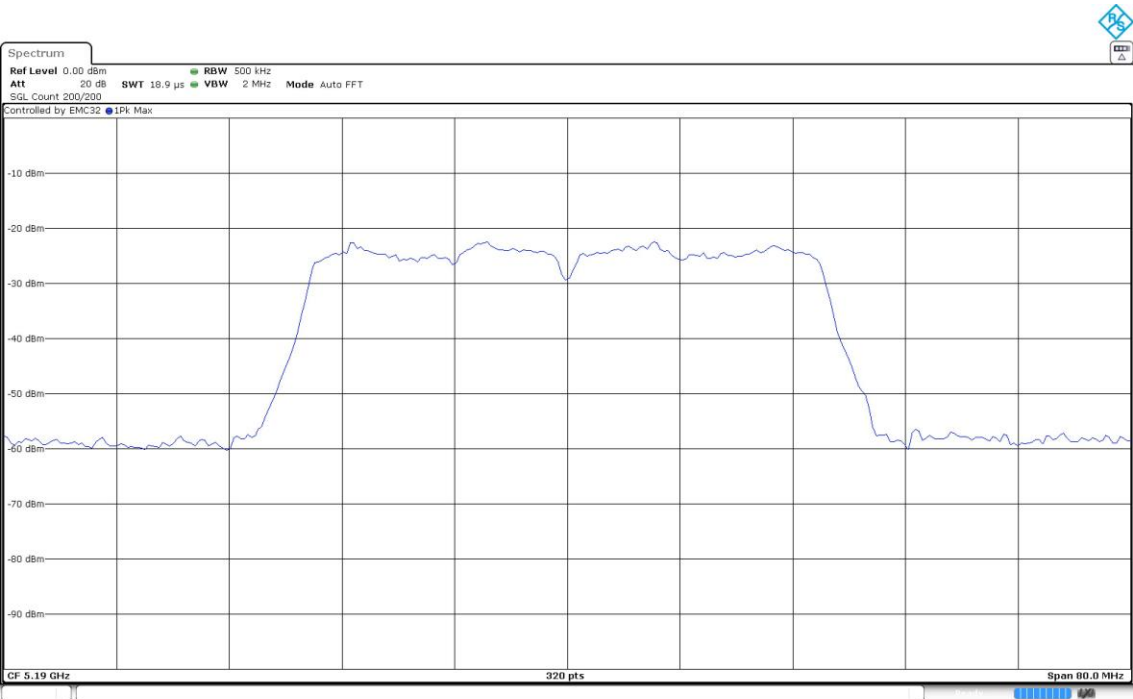
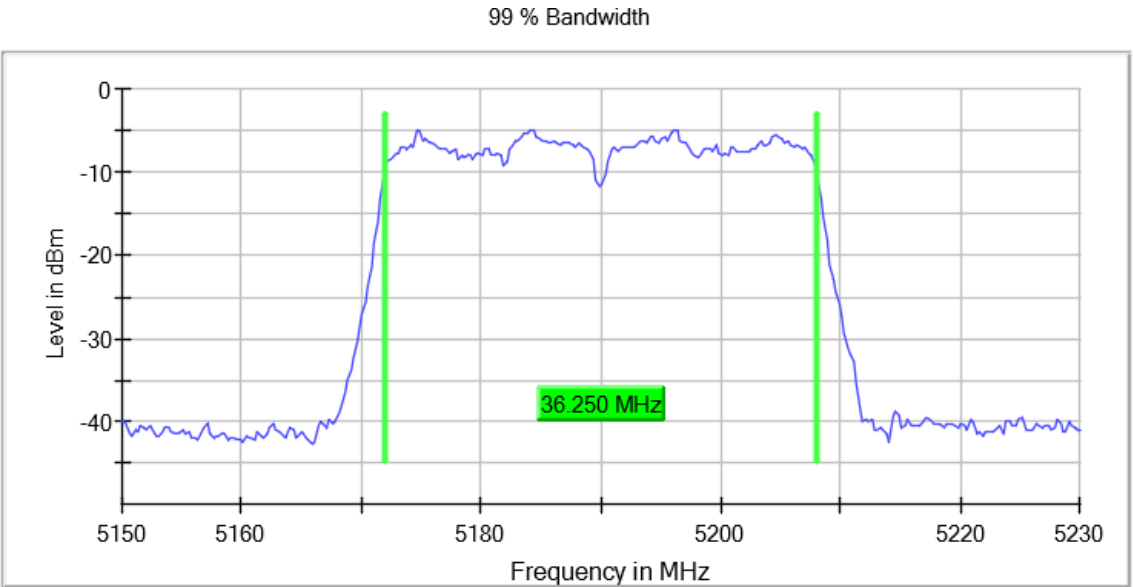
Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5190.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3

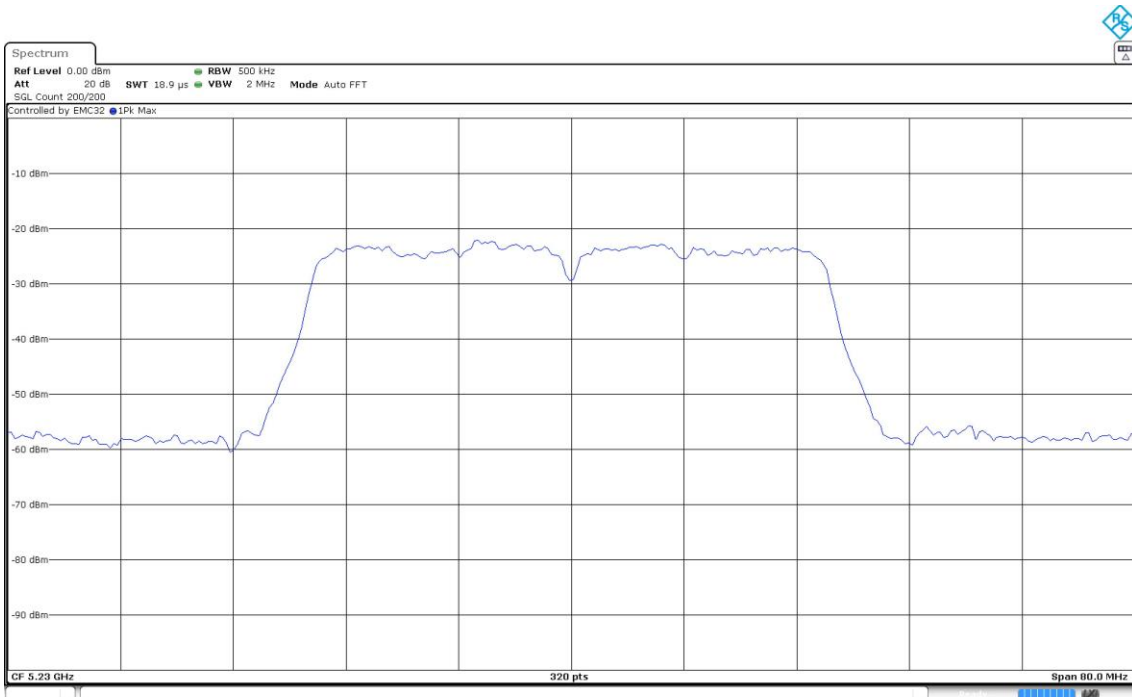
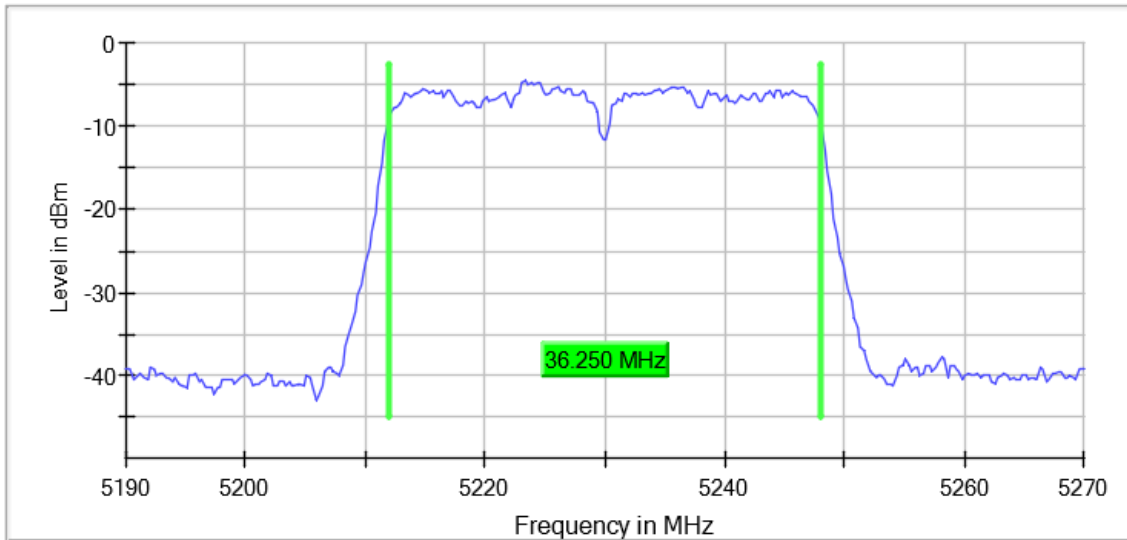
Frequency MHz = 5230.00000

Modulation = 802.11ac VHT40 (OFDM MCS0)

Antenna Configuration = SISO

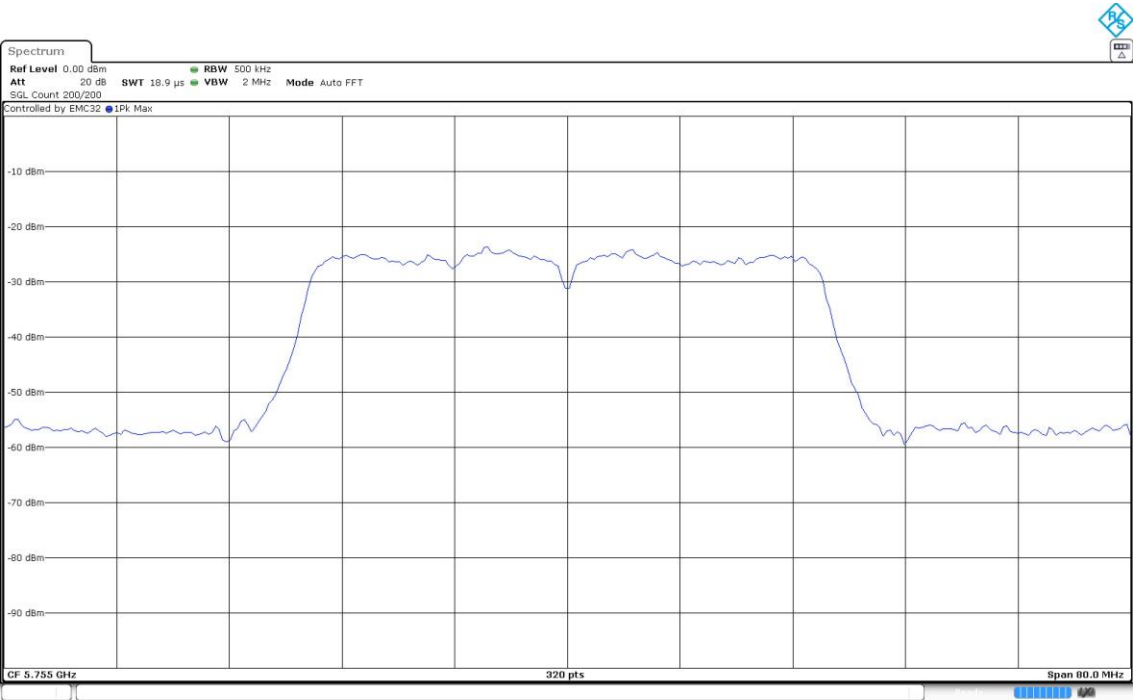
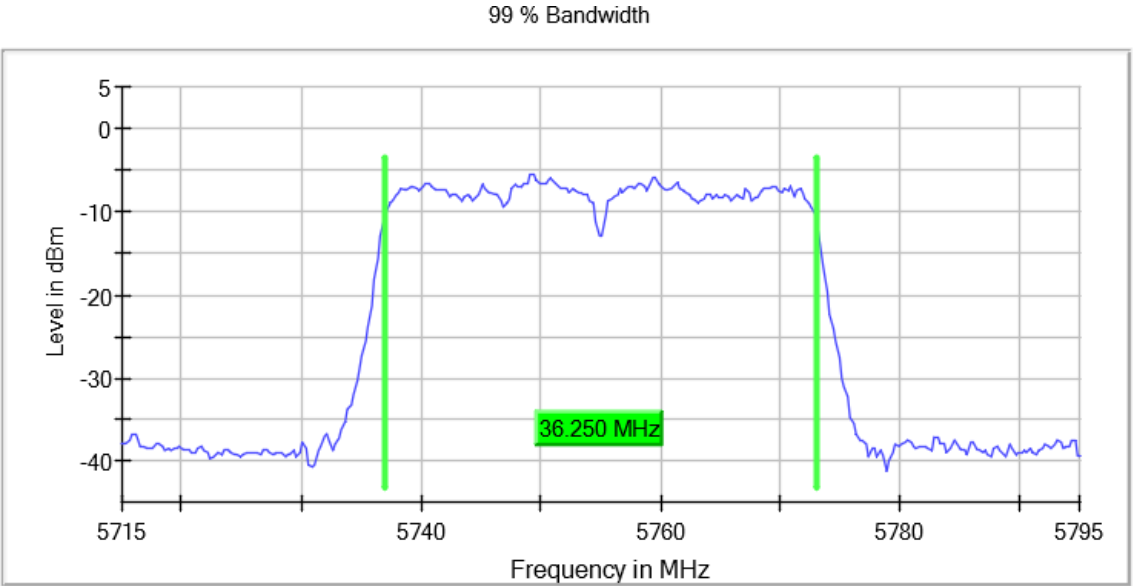
Images:

99 % Bandwidth



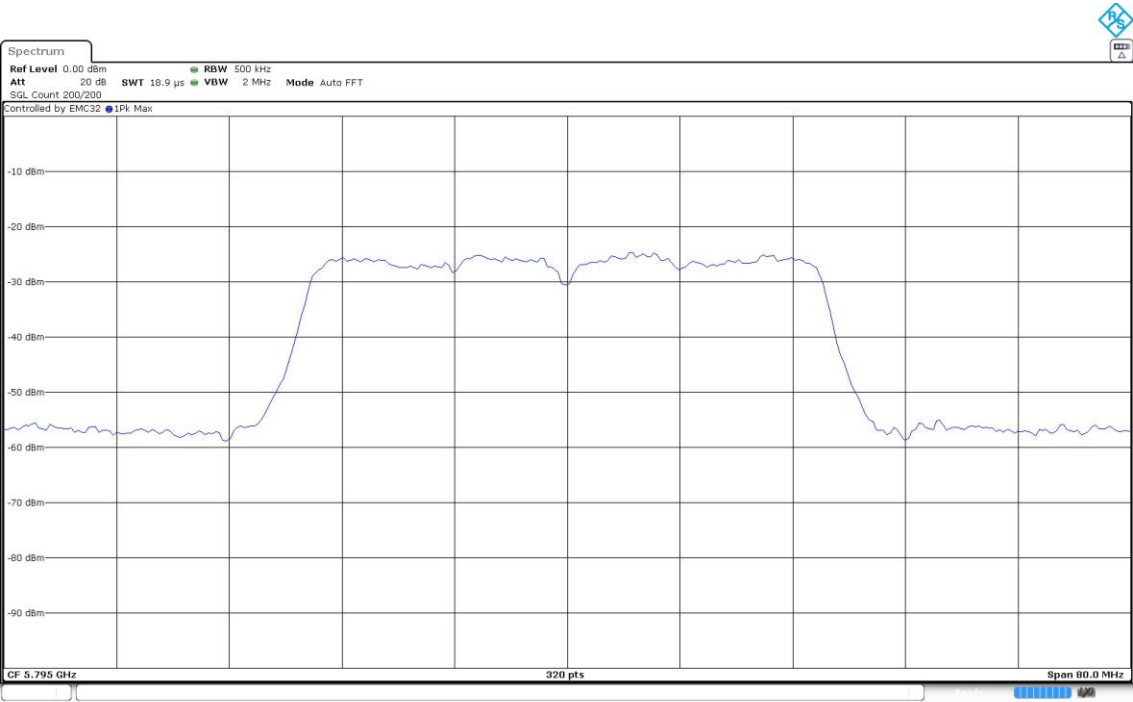
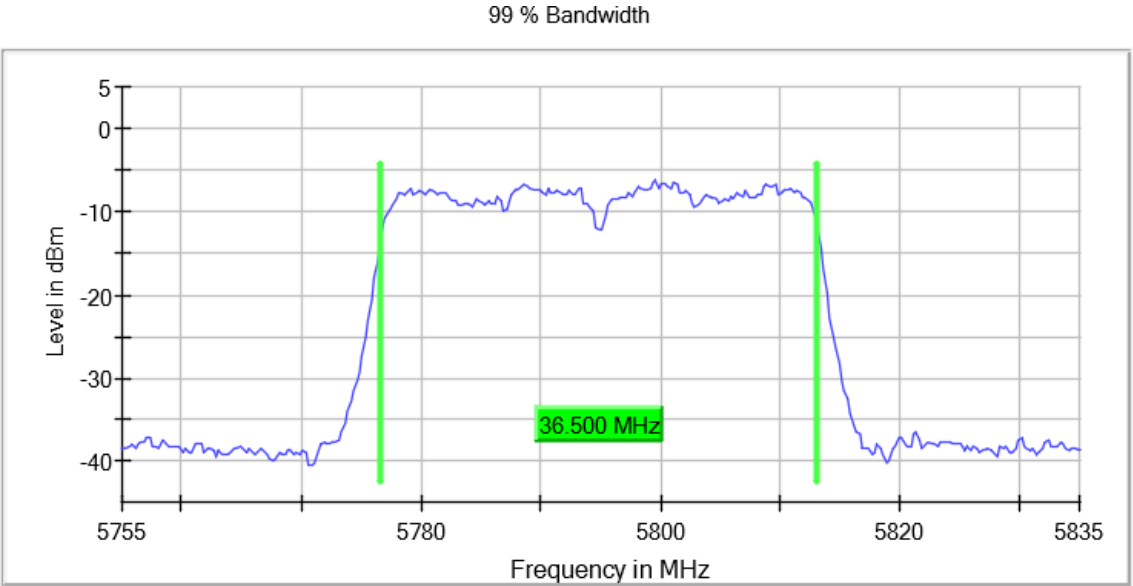
Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5755.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5795.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Modulation: 802.11ac VHT80 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5210.00000	76.500
[5725, 5850]		5775.00000	76.500

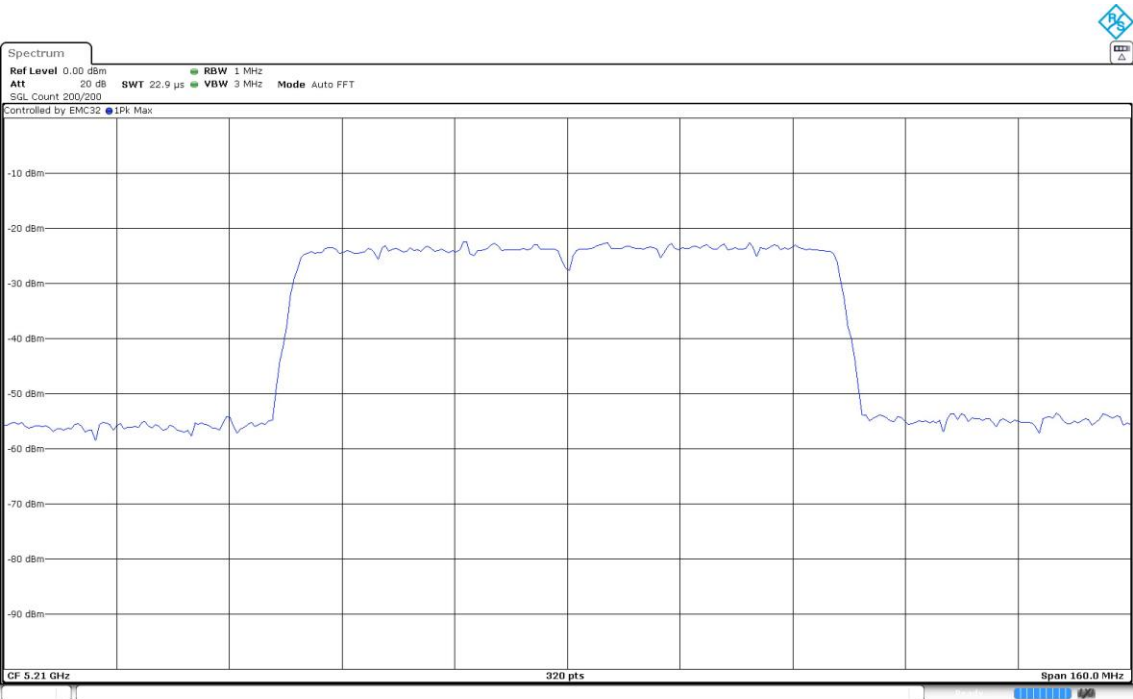
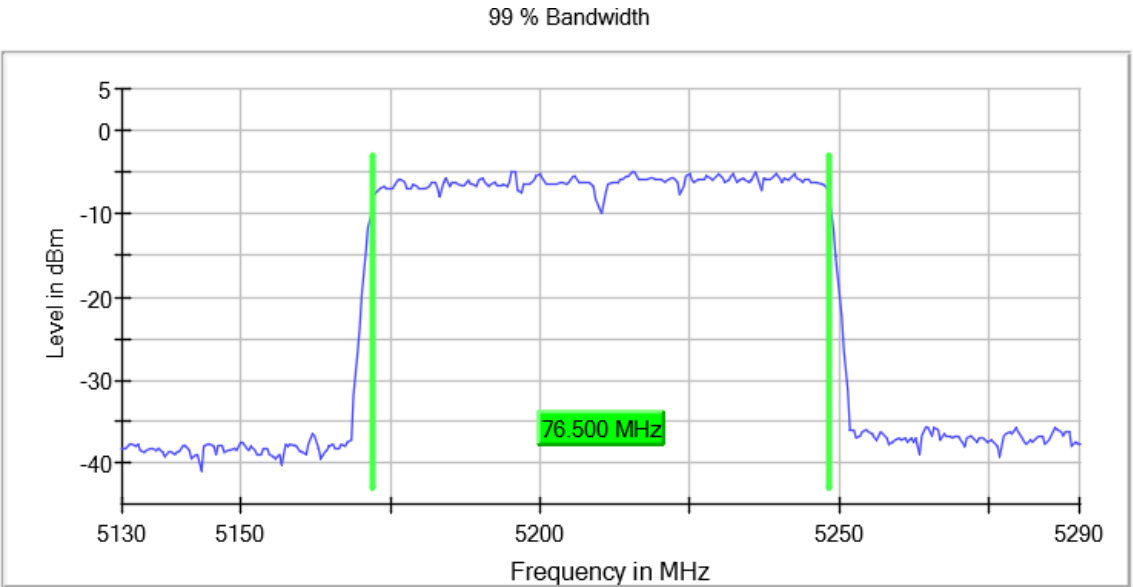
Verdict

Pass

Attachments

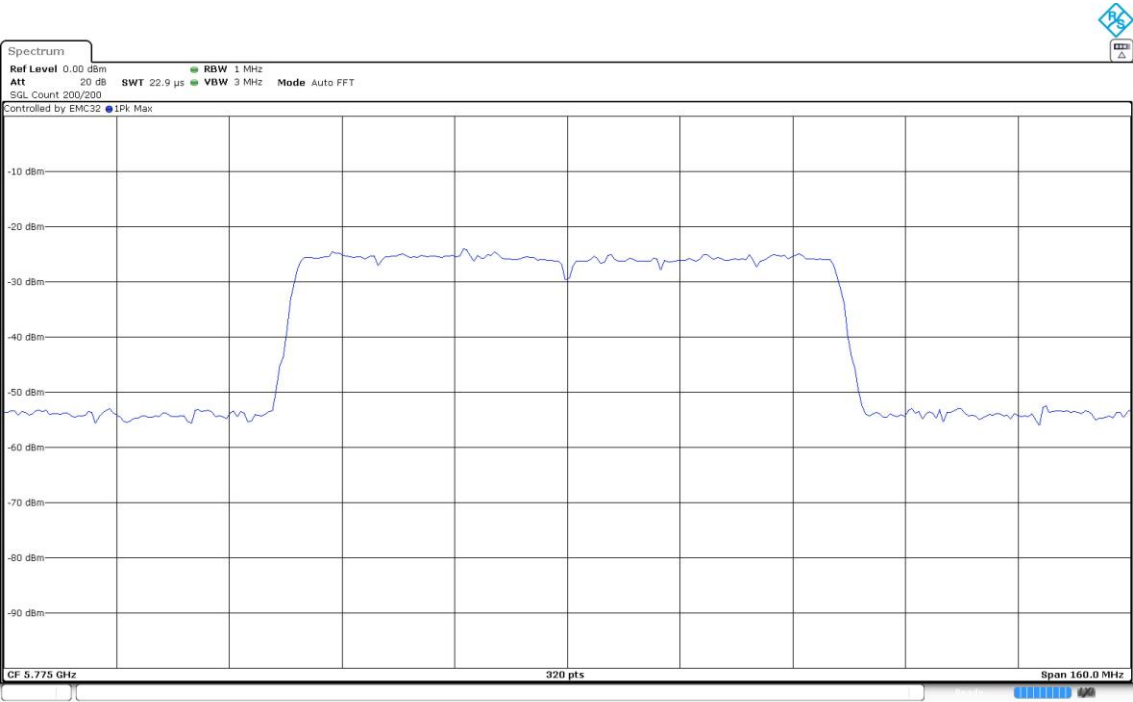
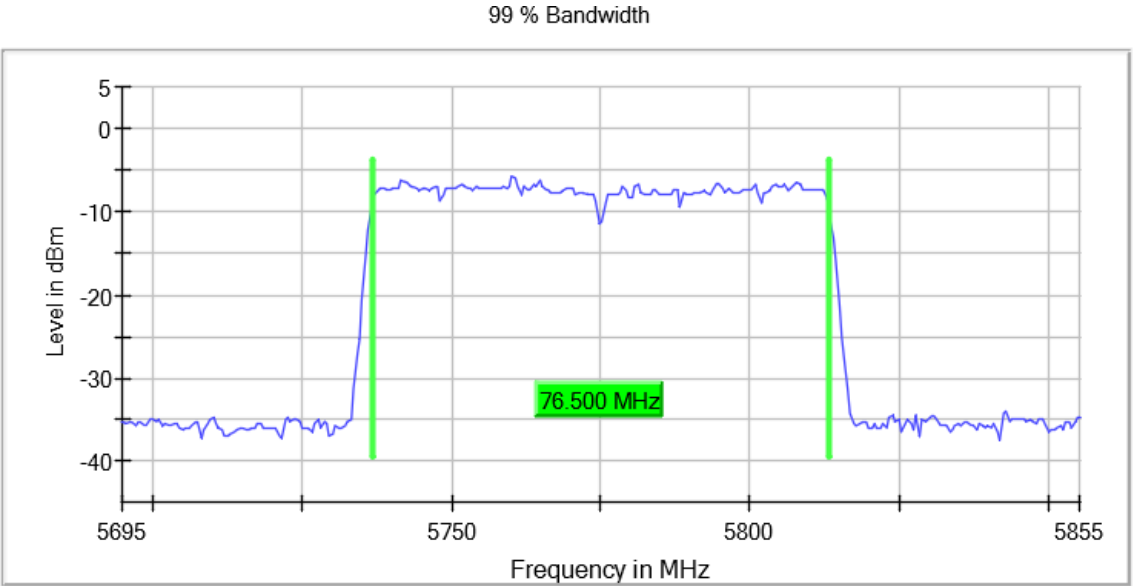
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5210.00000 Modulation = 802.11ac VHT80 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5775.00000 Modulation = 802.11ac VHT80 (OFDM MCS0)
Antenna Configuration = SISO

Images:



Modulation: 802.11ax HE20 (OFDMA MCS0) SU

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5180.00000	18.800
		5220.00000	18.800
		5240.00000	18.800
[5725, 5850]		5745.00000	18.800
		5785.00000	18.800
		5825.00000	18.800

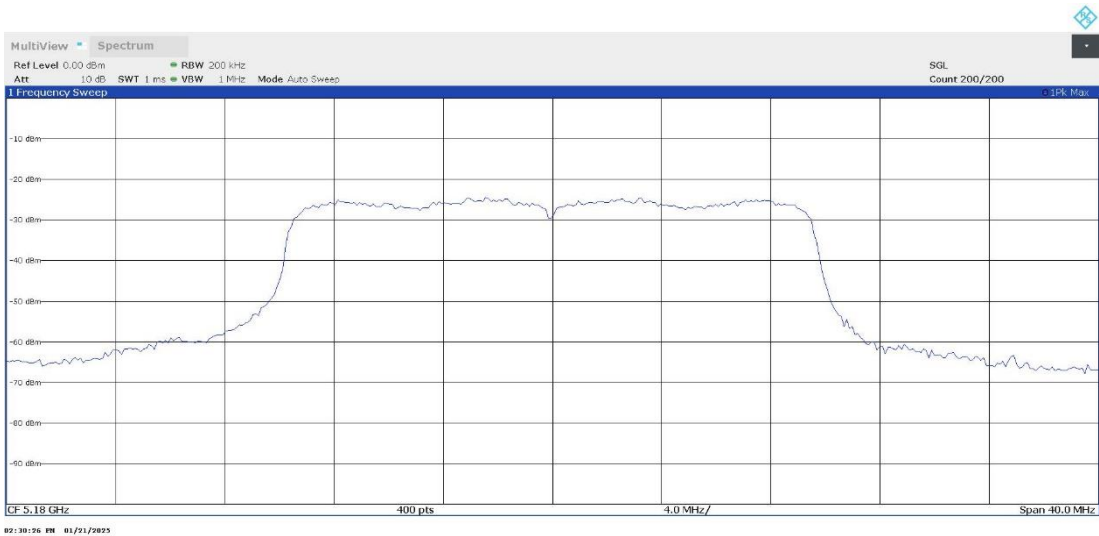
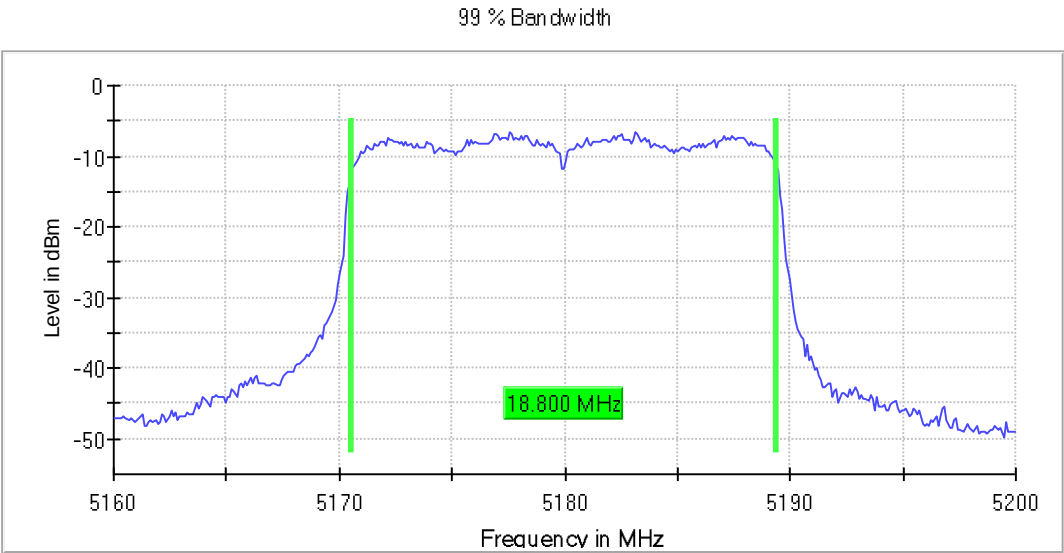
Verdict

Pass

Attachments

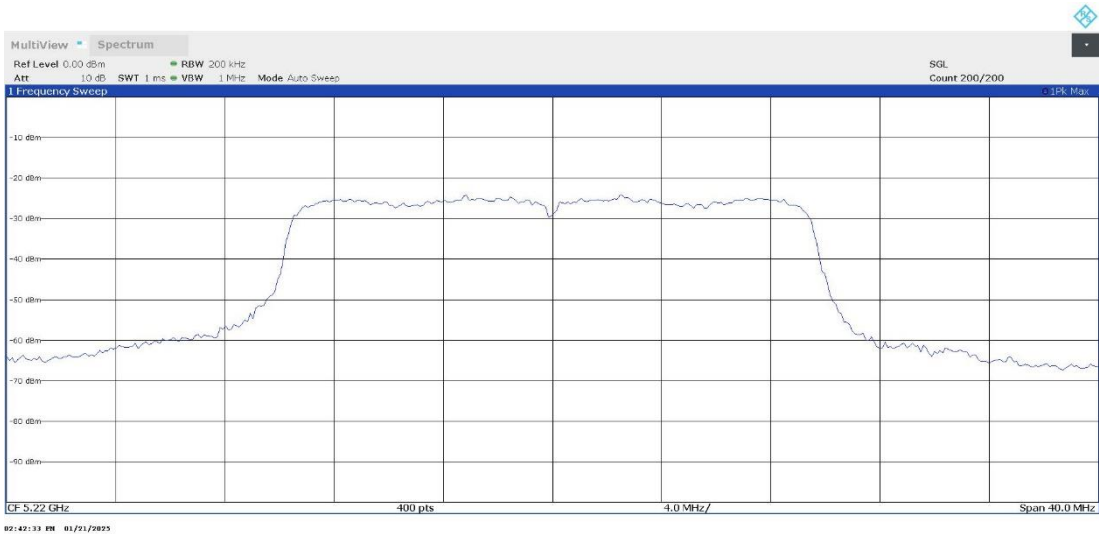
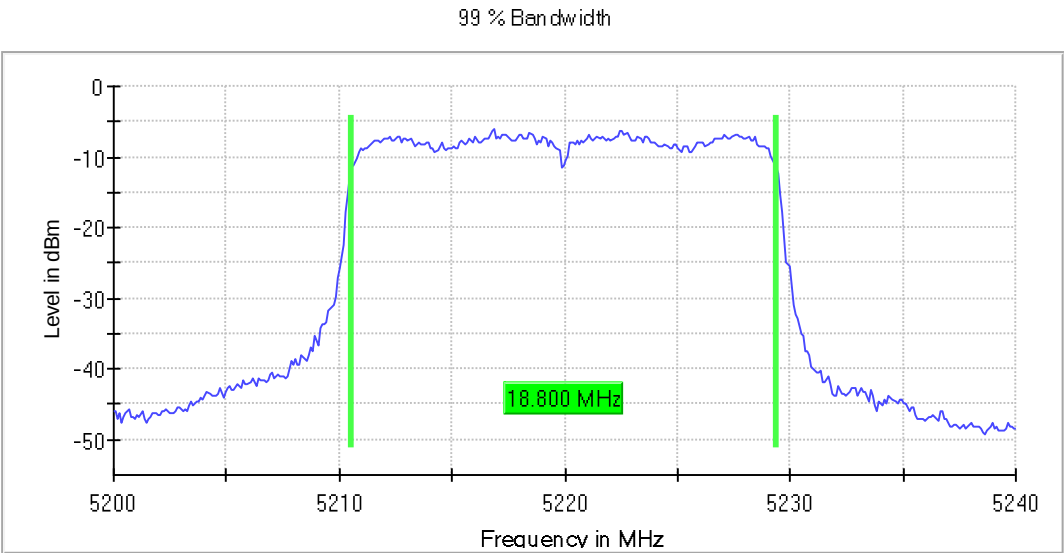
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5180.00000 Modulation = 802.11ax HE20 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



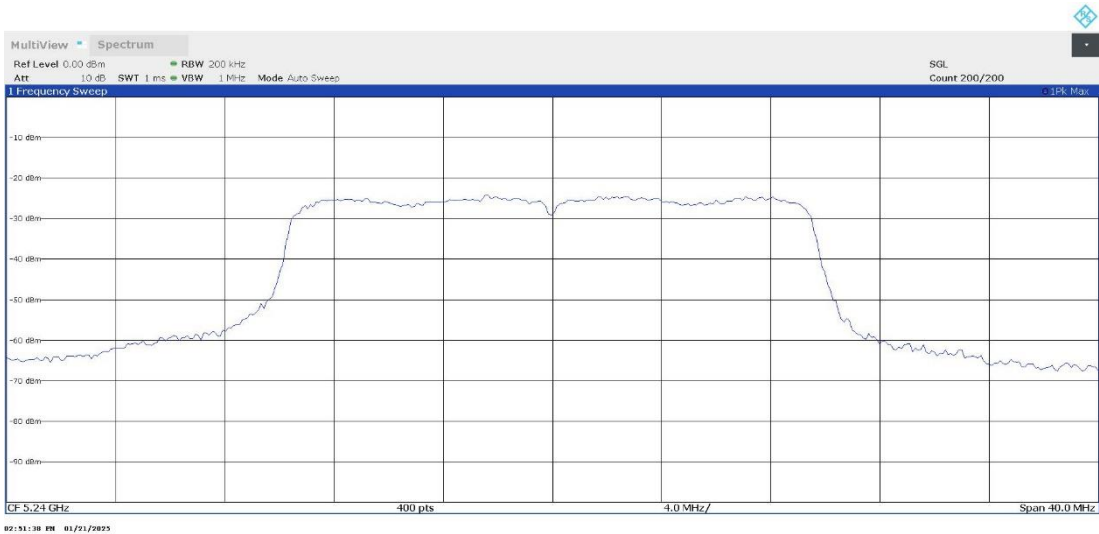
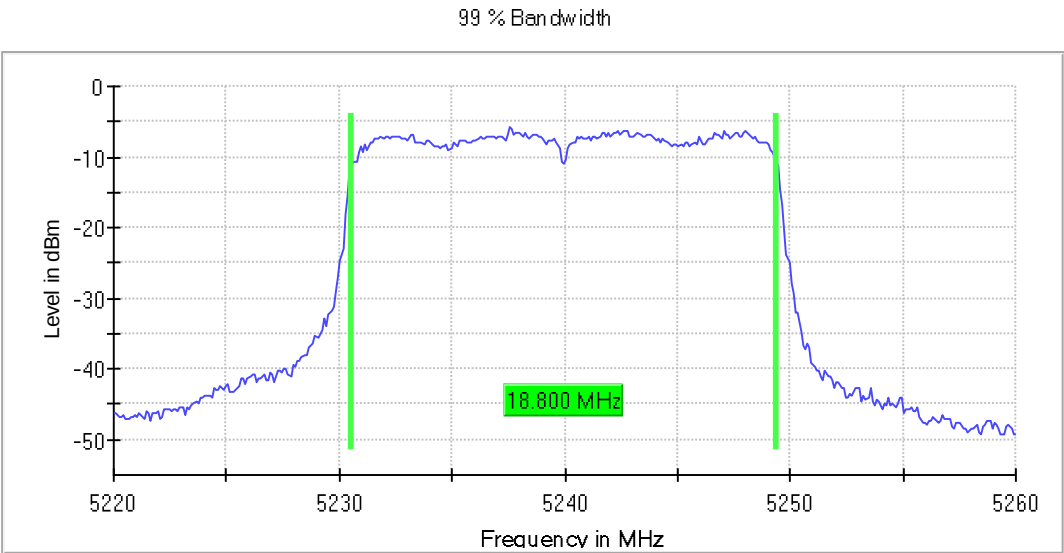
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5220.00000 Modulation = 802.11ax HE20 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5240.00000 Modulation = 802.11ax HE20 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



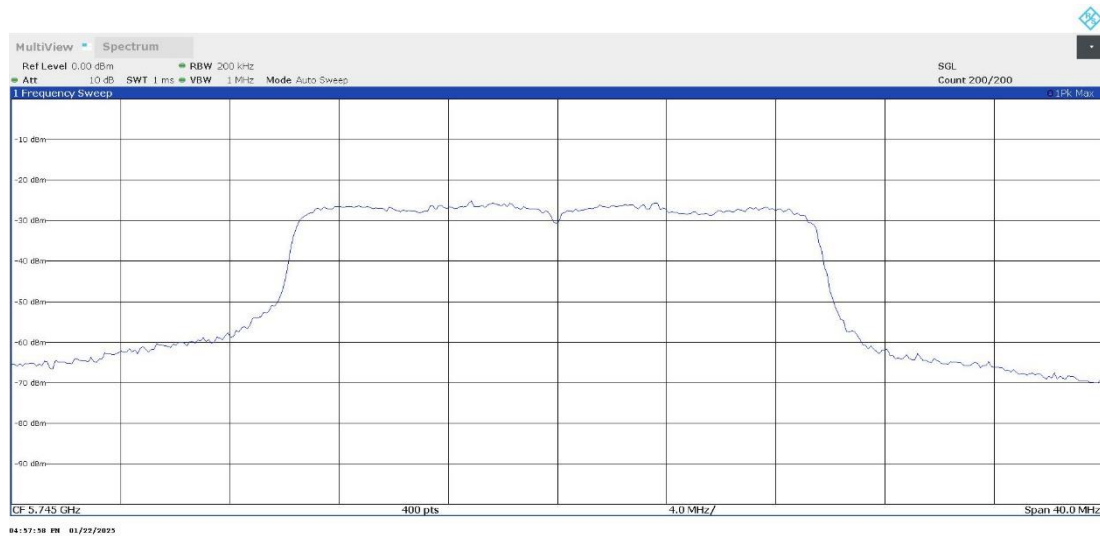
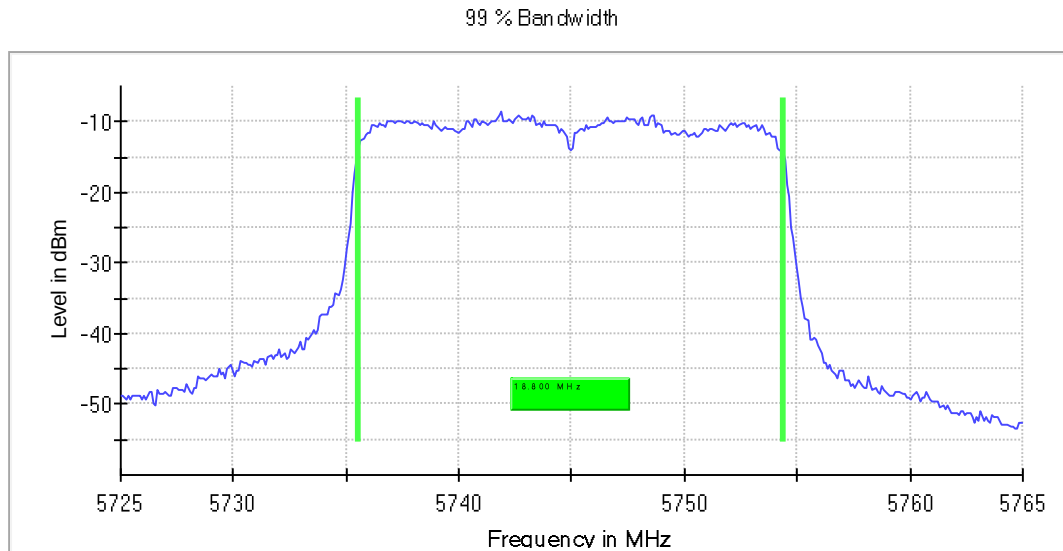
Operation Band MHz = [5725, 5850] Active Port = 3

Frequency MHz = 5745.00000

Modulation = 802.11ax HE20 (OFDMA MCS0) SU

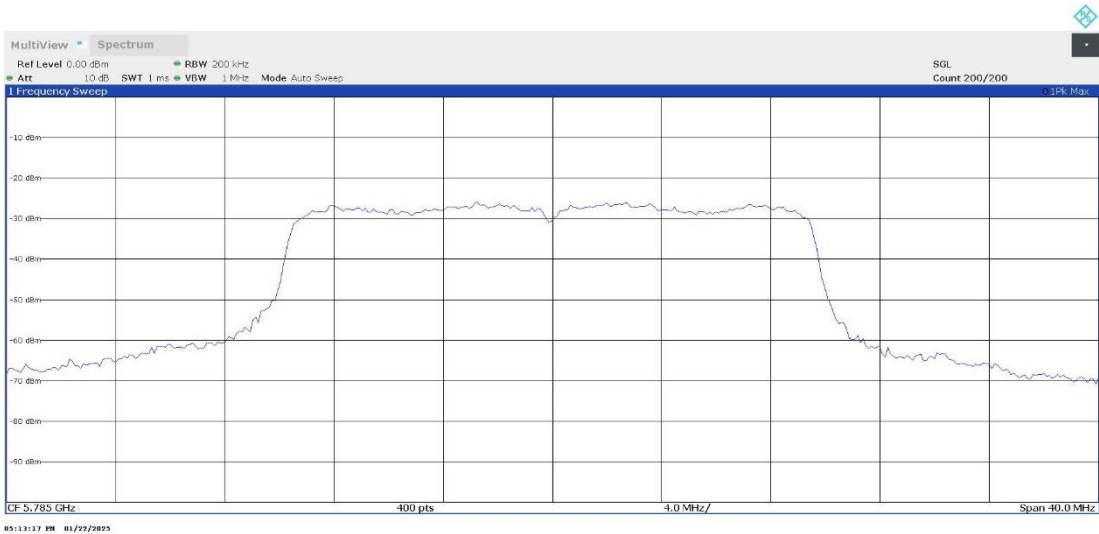
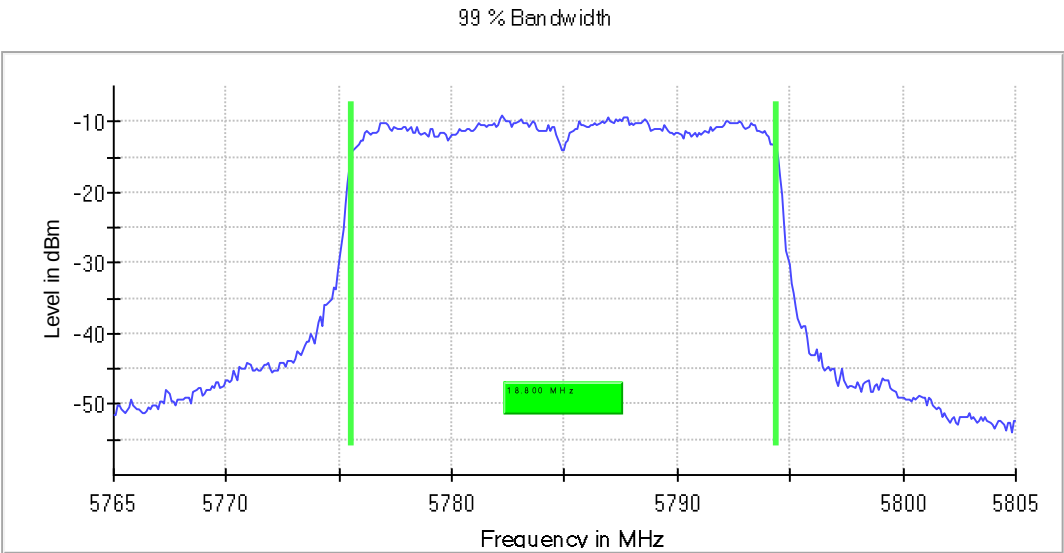
Antenna Configuration = SISO

Images:



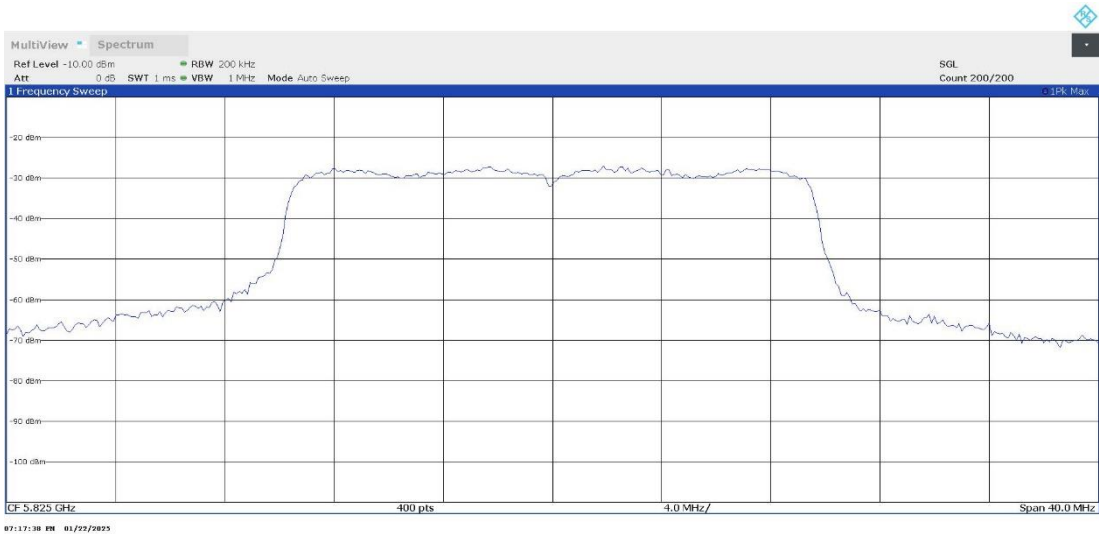
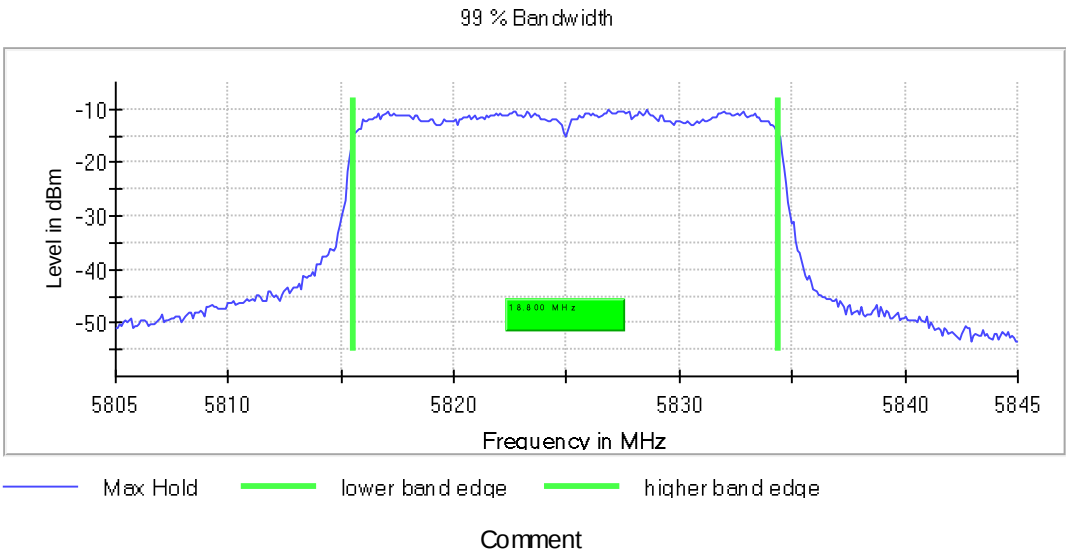
Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5785.00000 Modulation = 802.11ax HE20 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5825.00000 Modulation = 802.11ax HE20 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Modulation: 802.11ax HE40 (OFDMA MCS0) SU

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5190.00000	37.750
		5230.00000	37.750
[5725, 5850]		5755.00000	37.750
		5795.00000	37.500

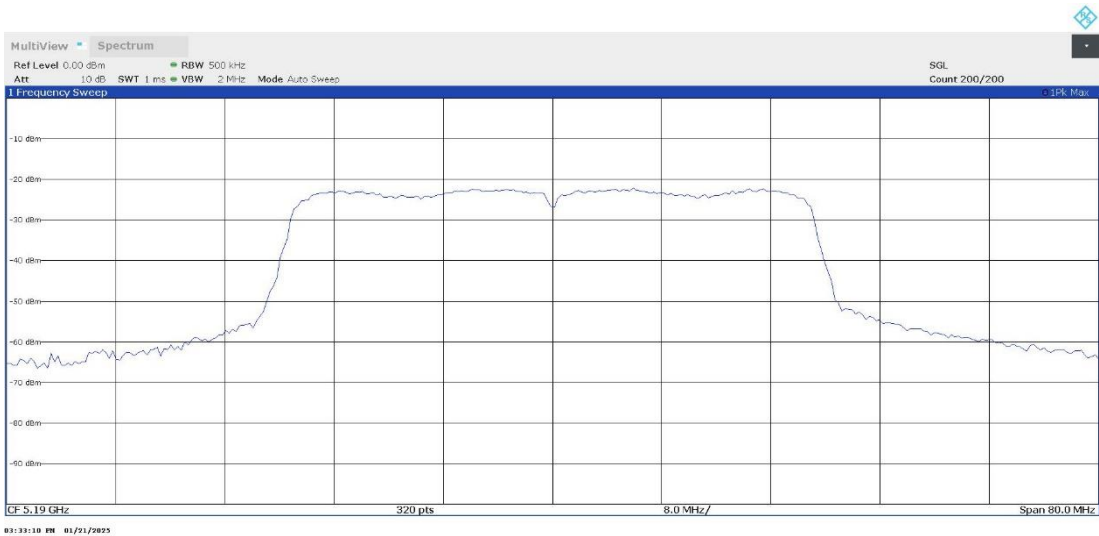
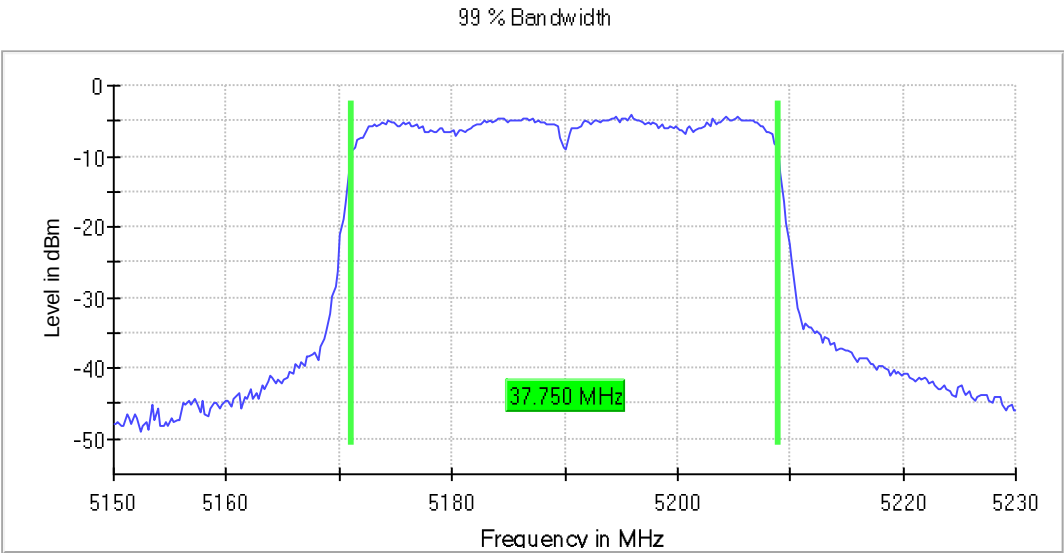
Verdict

Pass

Attachments

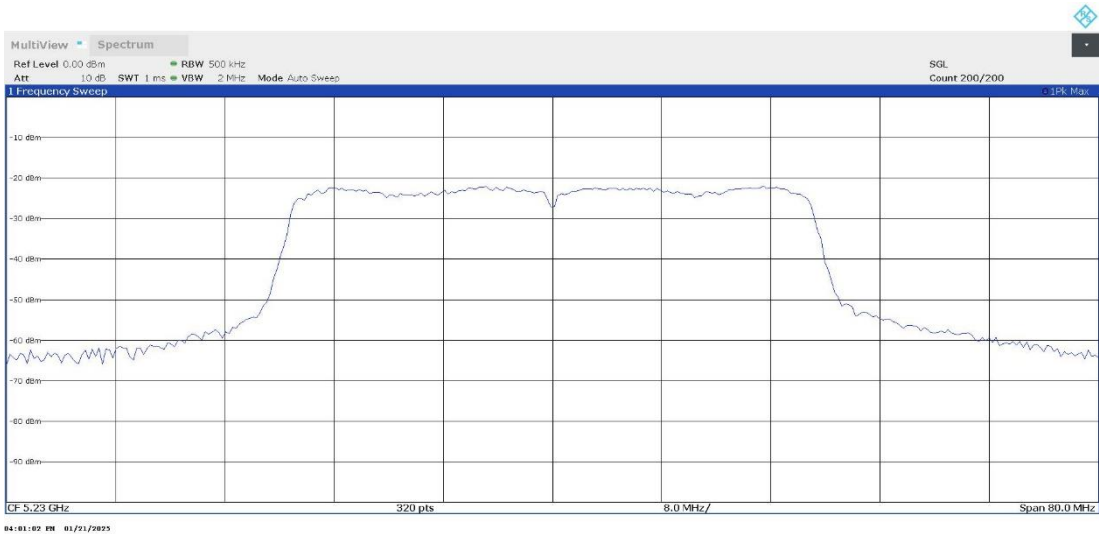
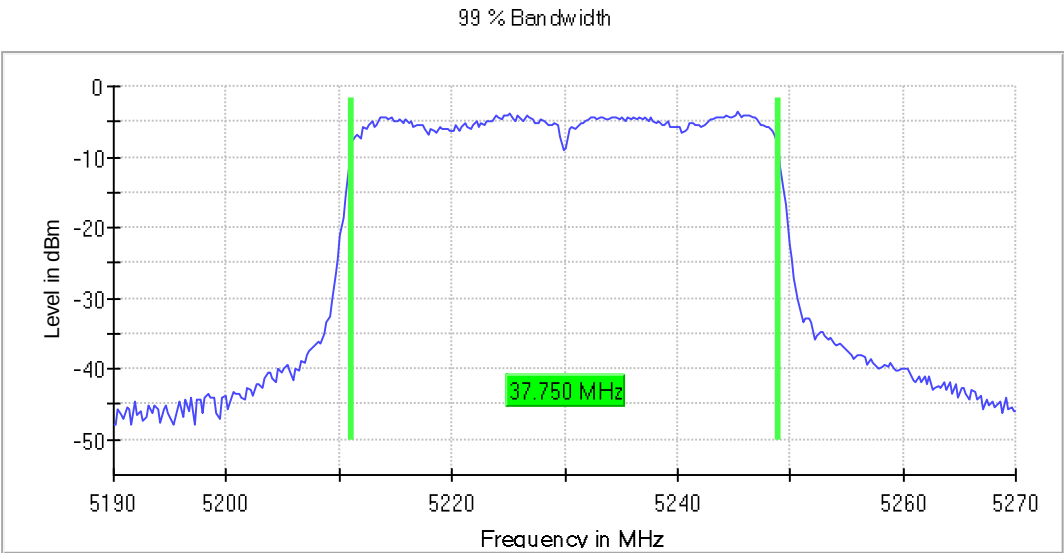
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5190.00000 Modulation = 802.11ax HE40 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5230.00000 Modulation = 802.11ax HE40 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3

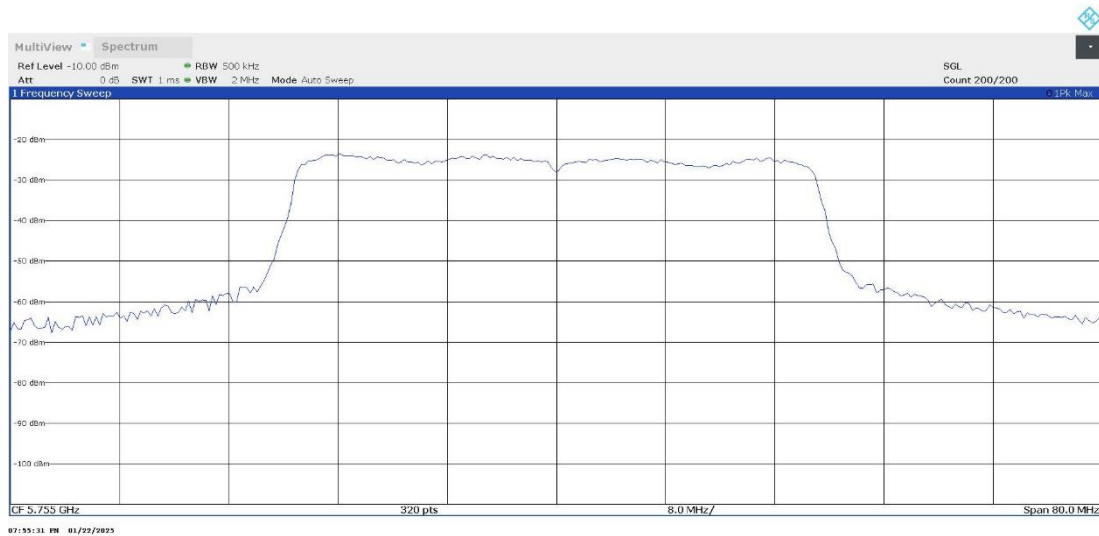
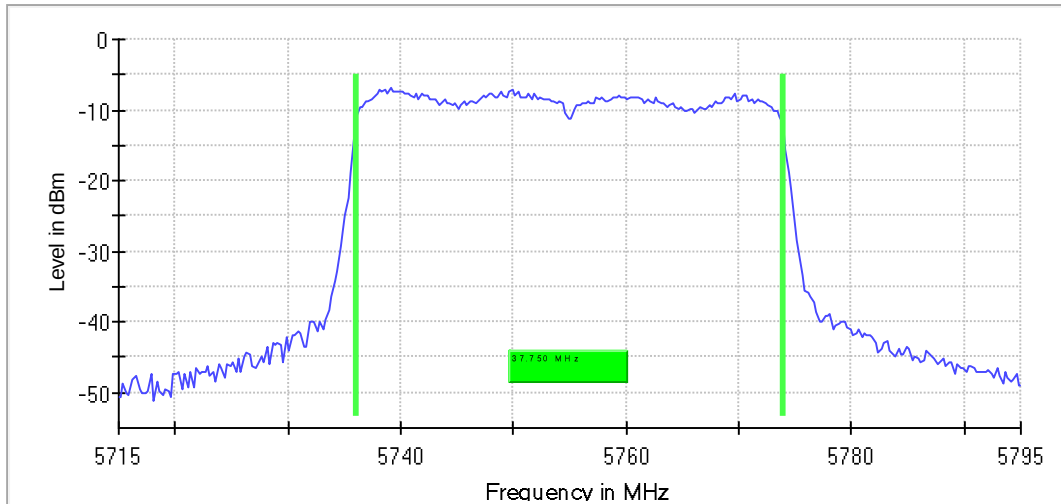
Frequency MHz = 5755.00000

Modulation = 802.11ax HE40 (OFDMA MCS0) SU

Antenna Configuration = SISO

Images:

99 % Bandwidth



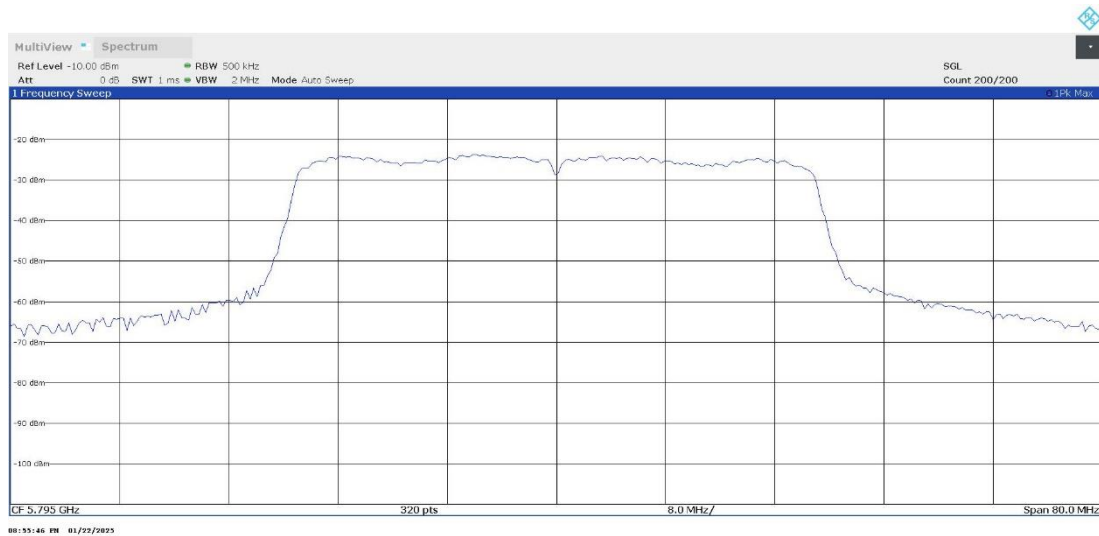
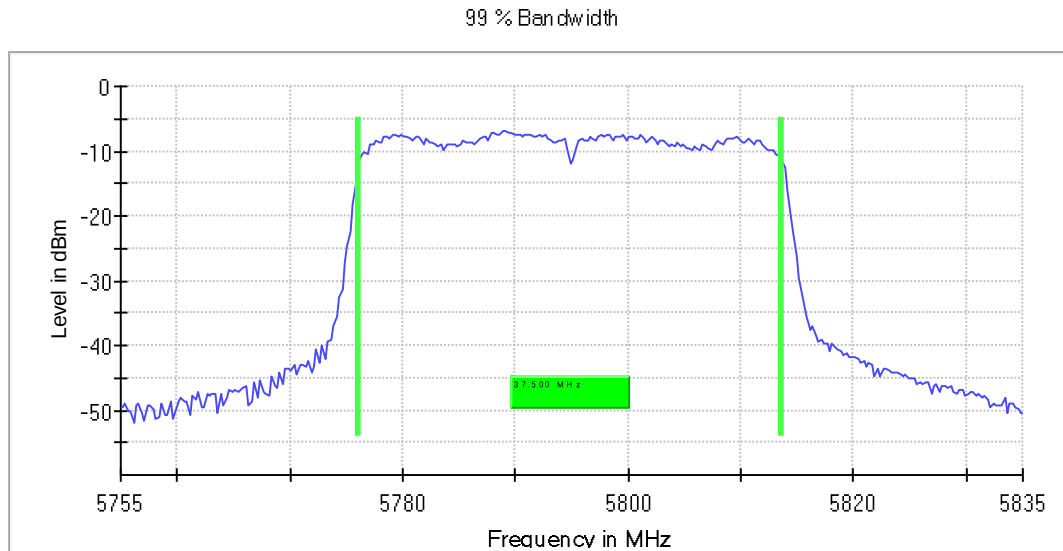
Operation Band MHz = [5725, 5850] Active Port = 3

Frequency MHz = 5795.00000

Modulation = 802.11ax HE40 (OFDMA MCS0) SU

Antenna Configuration = SISO

Images:



Modulation: 802.11ax HE80 (OFDMA MCS0) SU

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3	5210.00000	78.000
[5725, 5850]		5775.00000	78.000

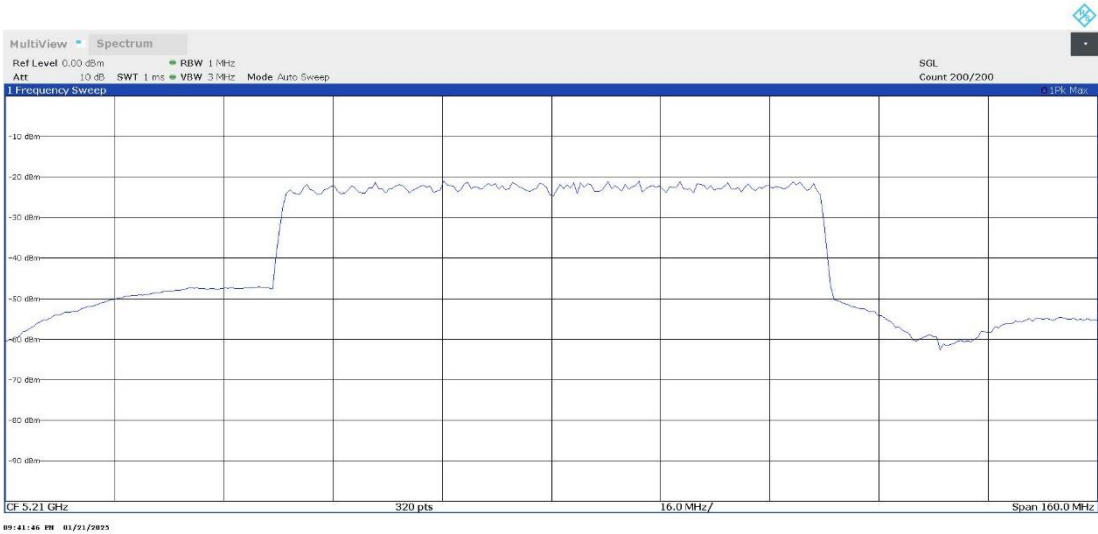
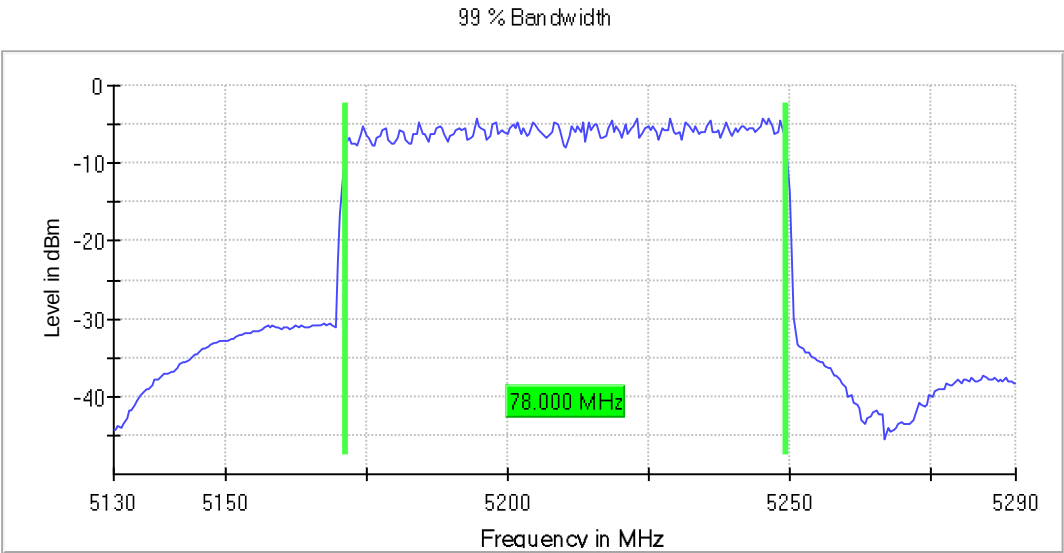
Verdict

Pass

Attachments

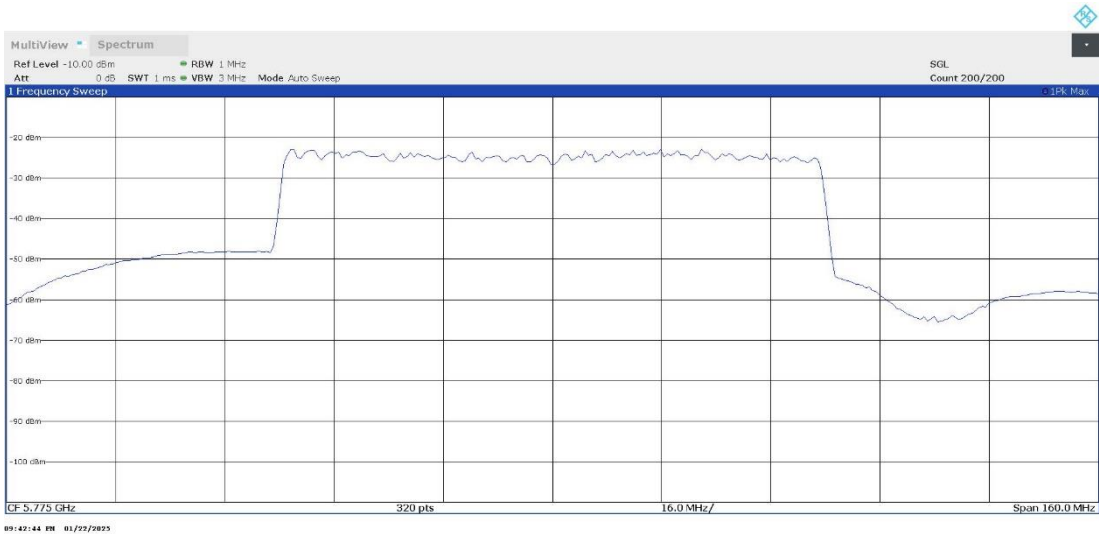
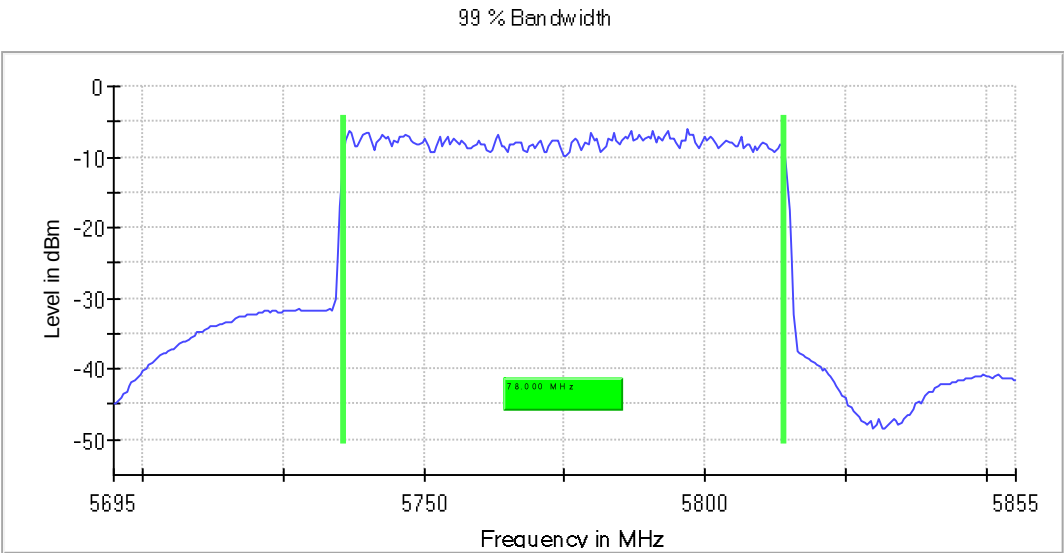
Operation Band MHz = [5150, 5250] Active Port = 3
Frequency MHz = 5210.00000 Modulation = 802.11ax HE80 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3
Frequency MHz = 5775.00000 Modulation = 802.11ax HE80 (OFDMA MCS0) SU
Antenna Configuration = SISO

Images:



MIMO (Port 3 + Port 2)

Modulation: 802.11a (OFDM 6 Mbit/s)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3+2	5180.00000	16.600
		5220.00000	16.600
		5240.00000	16.600
[5725, 5850]		5745.00000	16.600
		5785.00000	16.500
		5825.00000	16.600

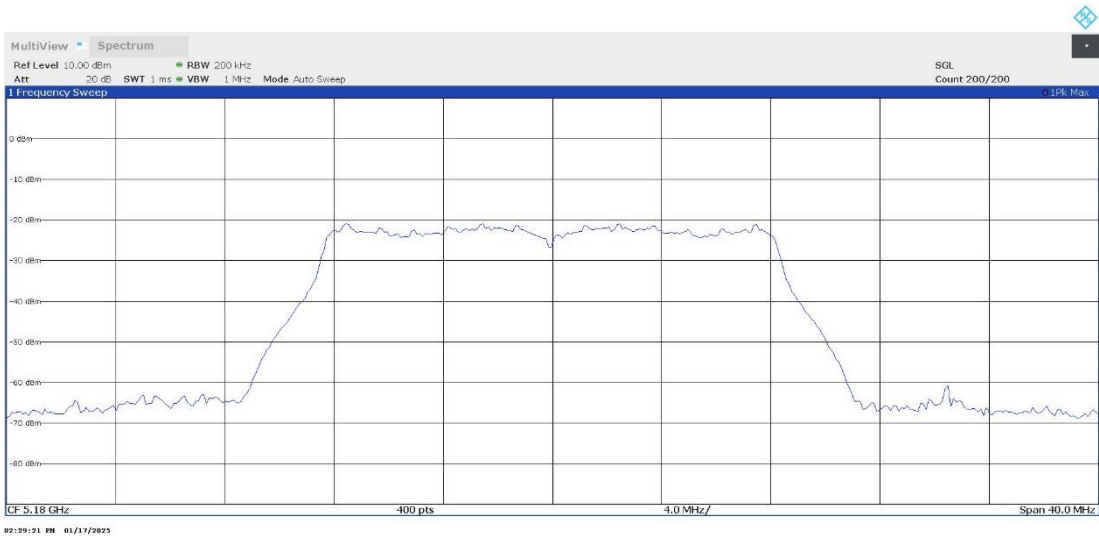
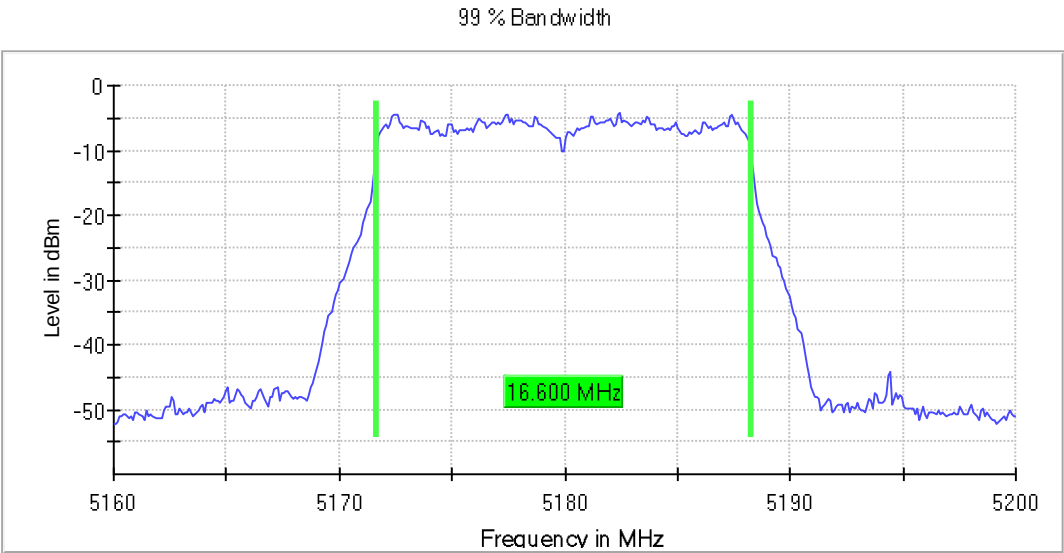
Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 3+2
Frequency MHz = 5180.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
Antenna Configuration = MIMO

Images:



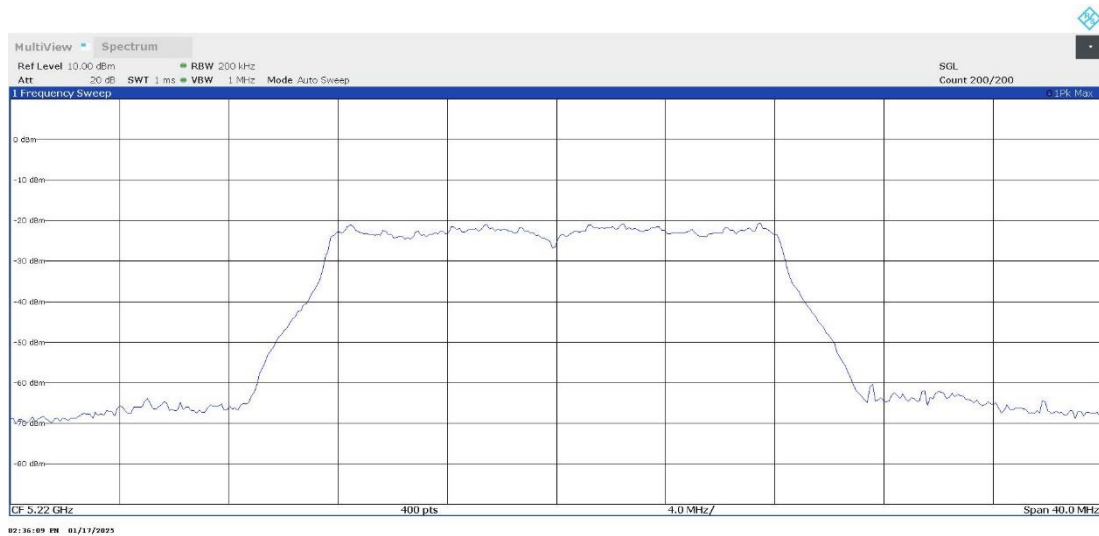
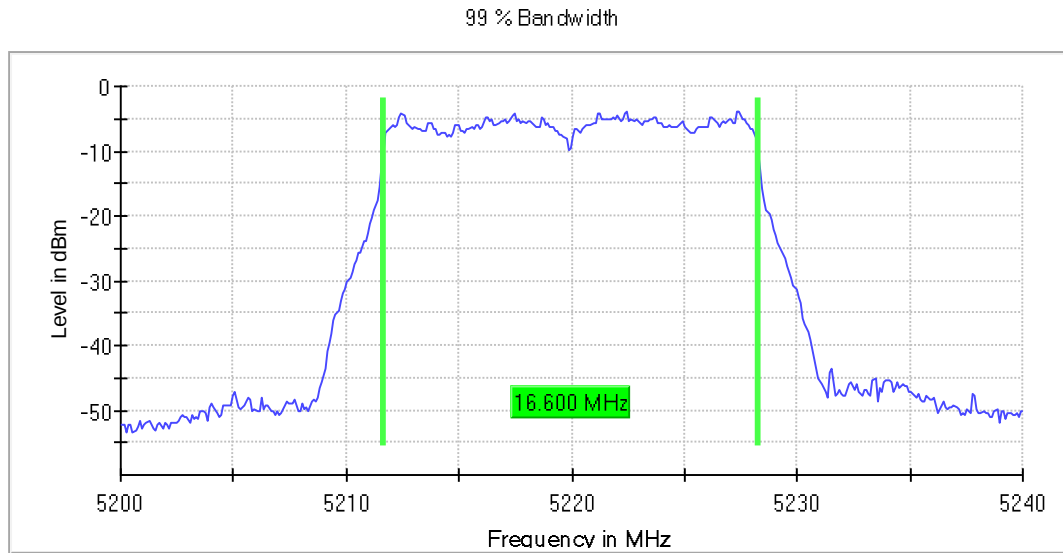
Operation Band MHz = [5150, 5250] Active Port = 3+2

Frequency MHz = 5220.00000

Modulation = 802.11a (OFDM 6 Mbit/s)

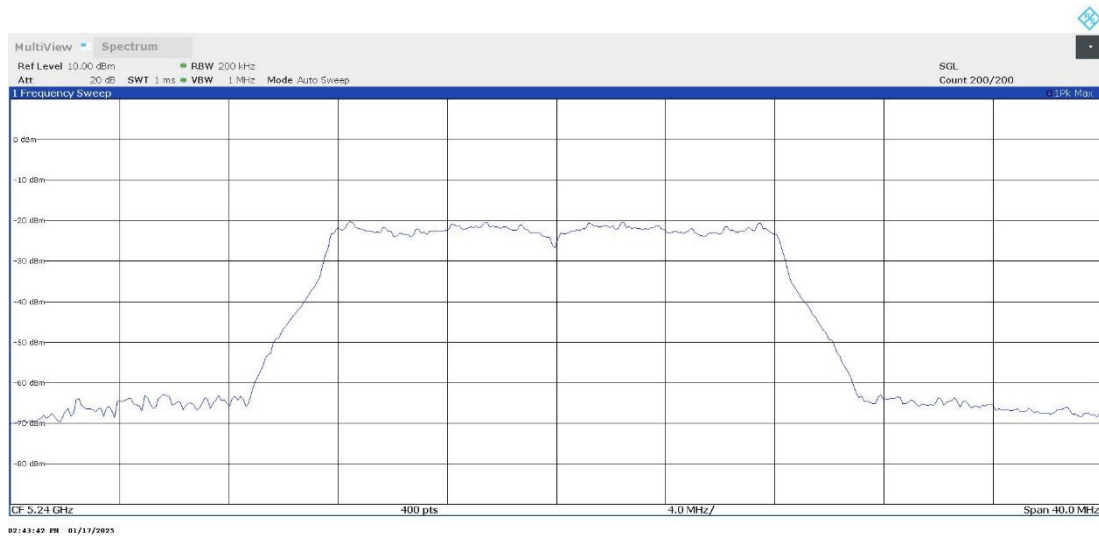
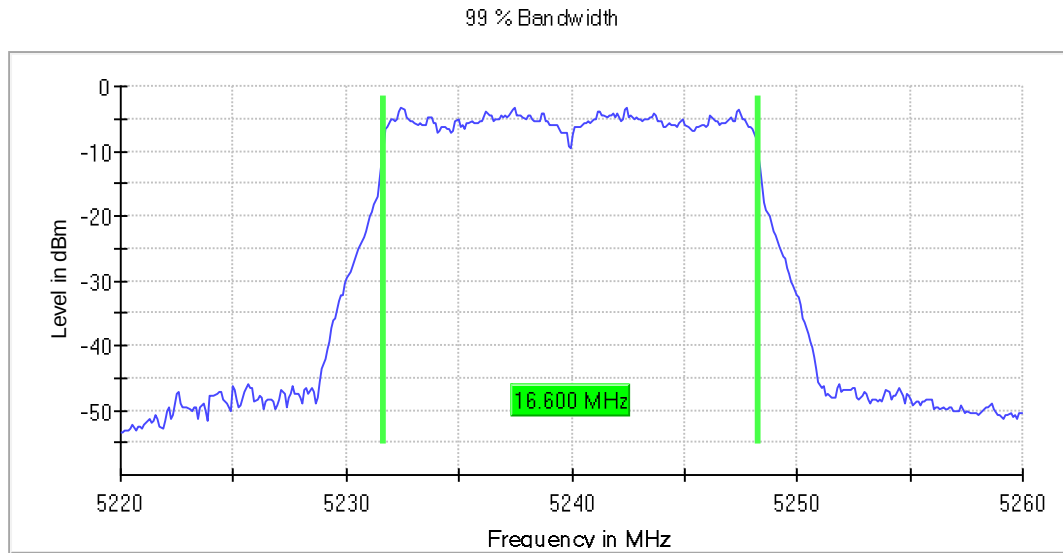
Antenna Configuration = MIMO

Images:



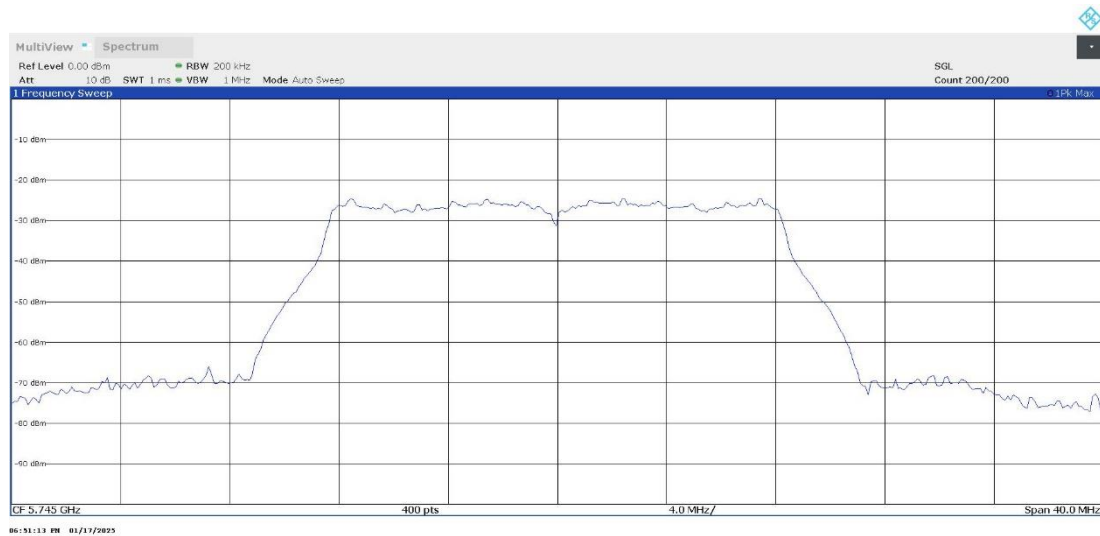
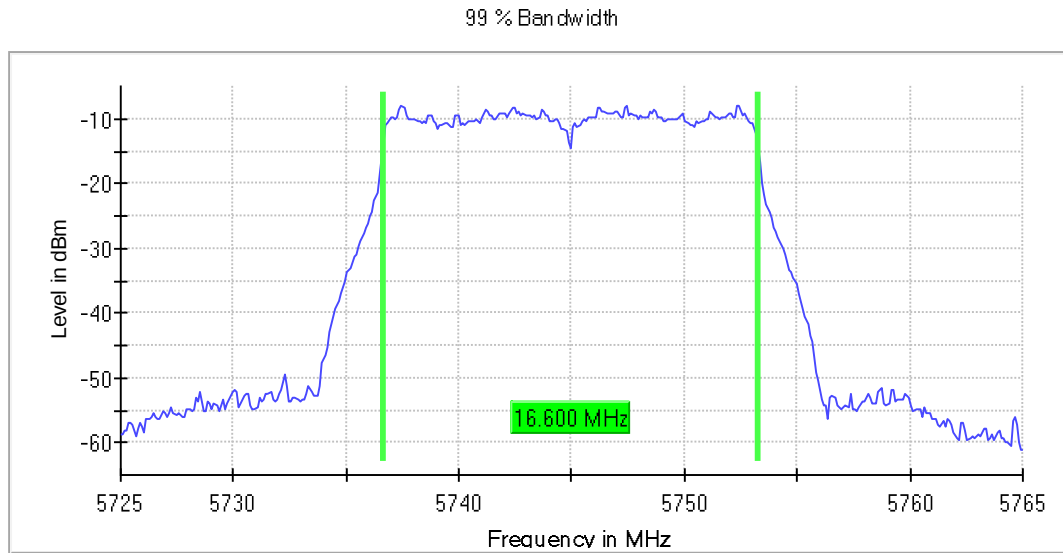
Operation Band MHz = [5150, 5250] Active Port = 3+2
 Frequency MHz = 5240.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
 Antenna Configuration = MIMO

Images:



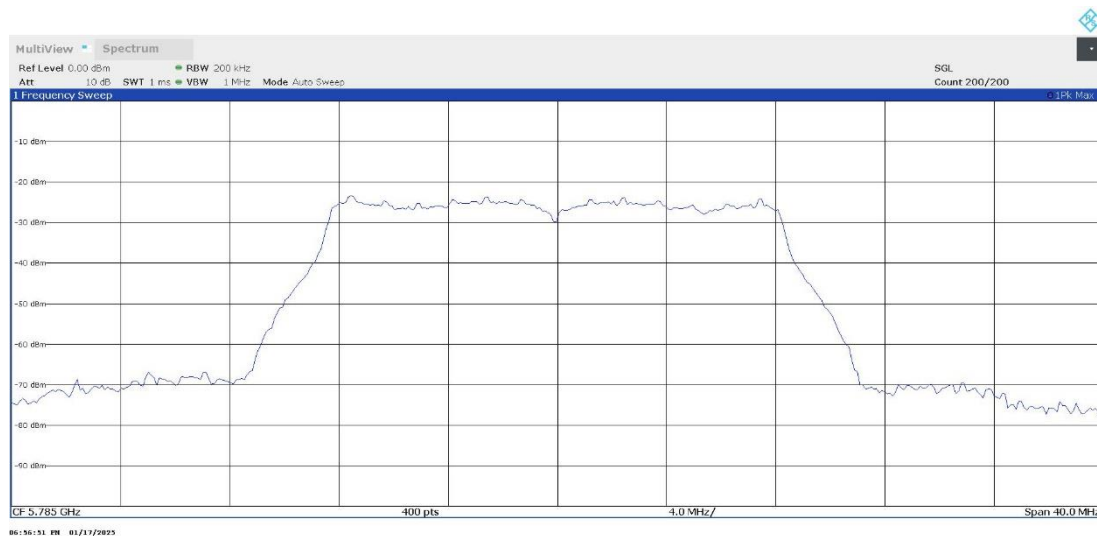
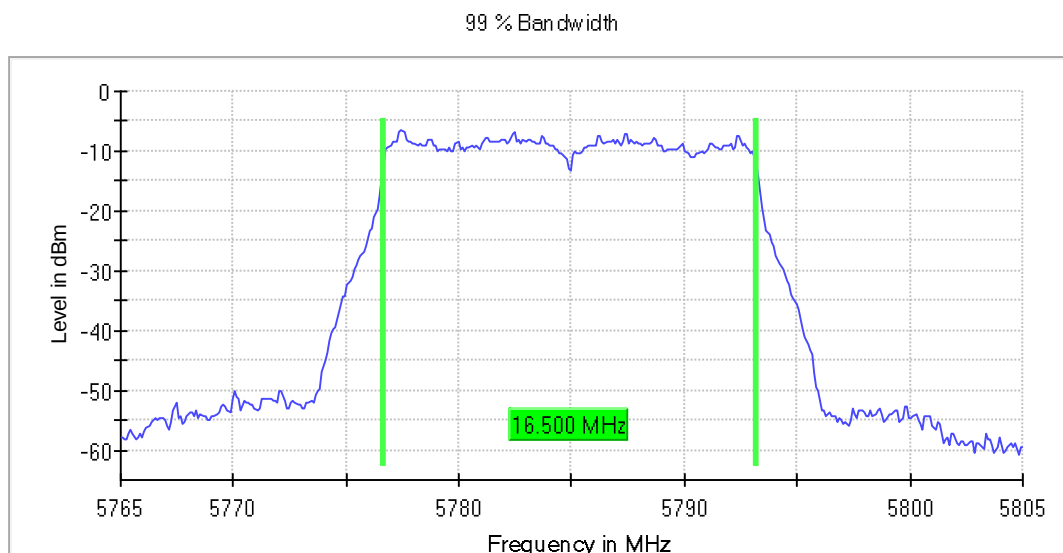
Operation Band MHz = [5725, 5850] Active Port = 3+2
 Frequency MHz = 5745.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
 Antenna Configuration = MIMO

Images:



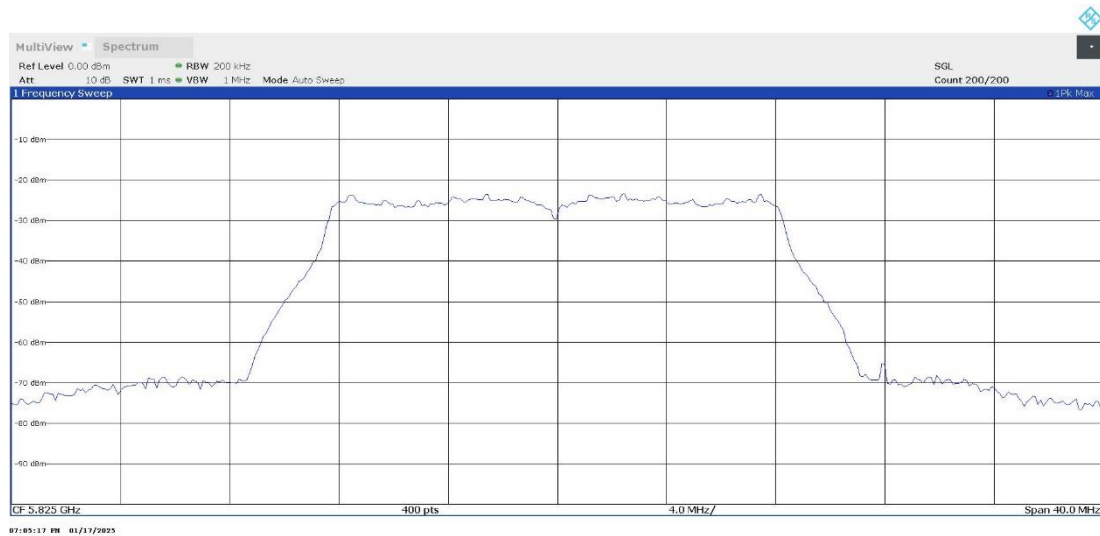
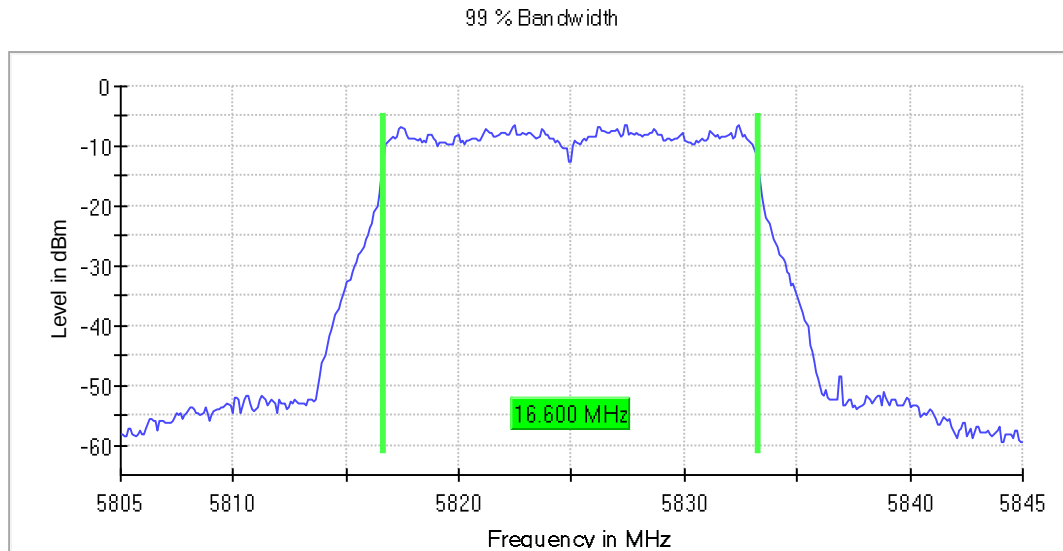
Operation Band MHz = [5725, 5850] Active Port = 3+2
Frequency MHz = 5785.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
Antenna Configuration = MIMO

Images:



Operation Band MHz = [5725, 5850] Active Port = 3+2
 Frequency MHz = 5825.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
 Antenna Configuration = MIMO

Images:



Modulation: 802.11n HT20 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3+2	5180.00000	17.600
		5220.00000	17.600
		5240.00000	17.600
[5725, 5850]		5745.00000	17.600
		5785.00000	17.700
		5825.00000	17.600

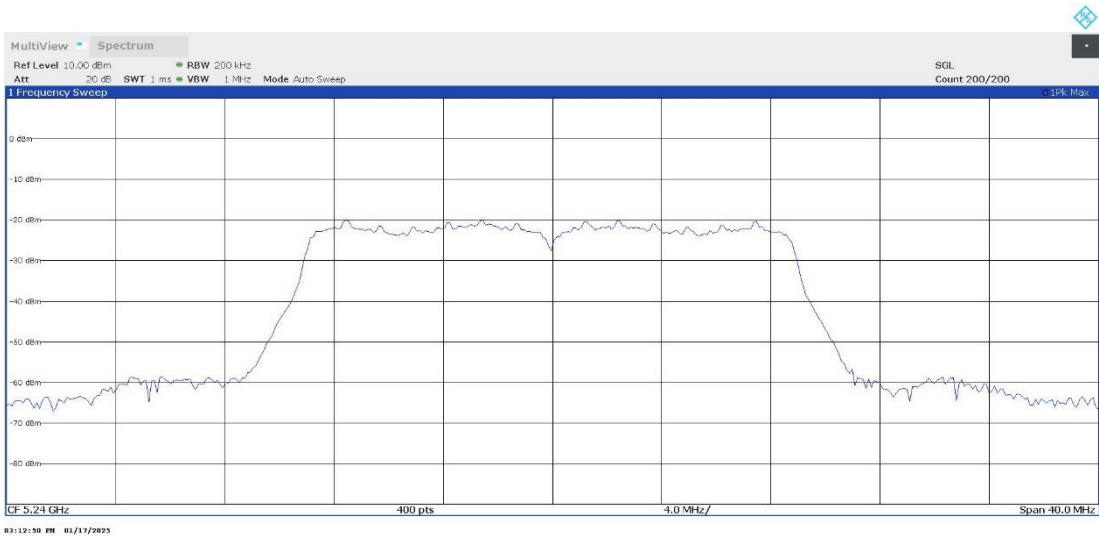
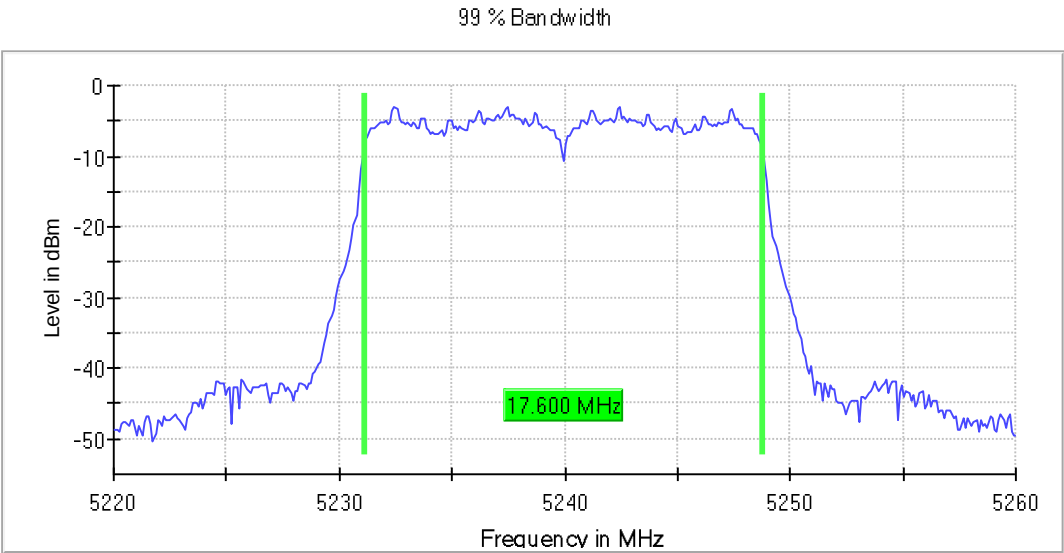
Verdict

Pass

Attachments

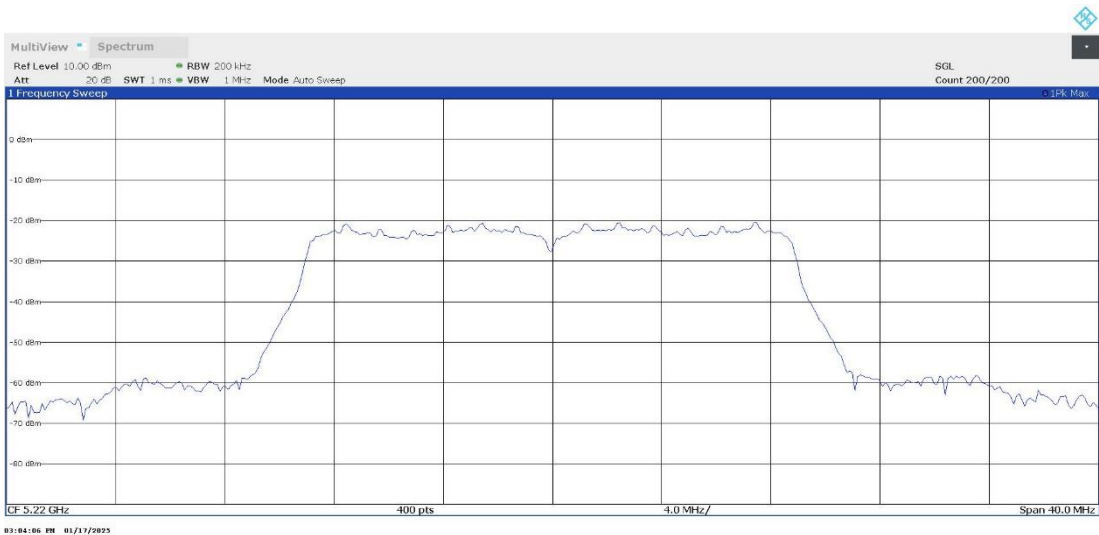
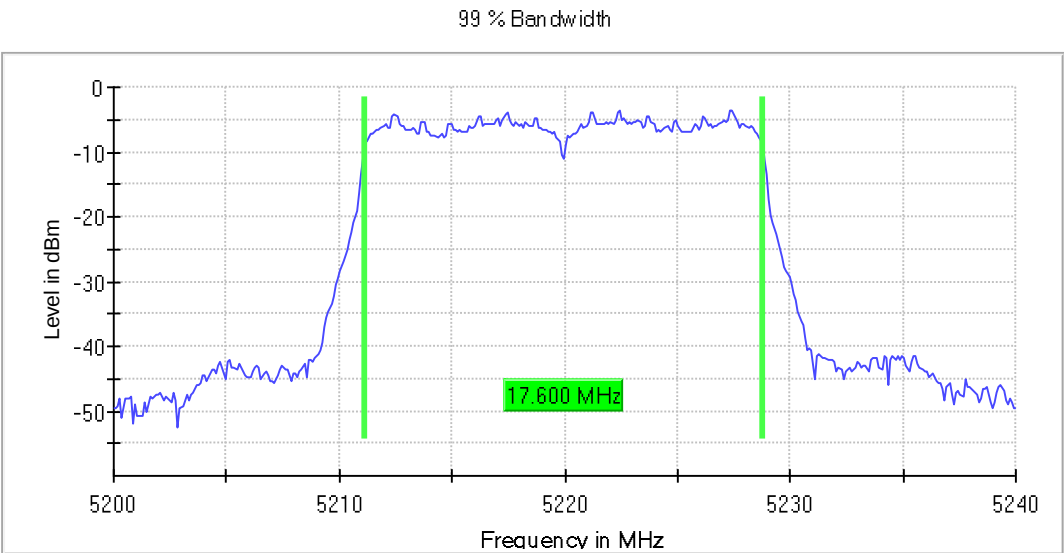
Operation Band MHz = [5150, 5250] Active Port = 3+2
Frequency MHz = 5180.00000 Modulation = 802.11n HT20 (OFDM MCS0)
Antenna Configuration = MIMO

Images:



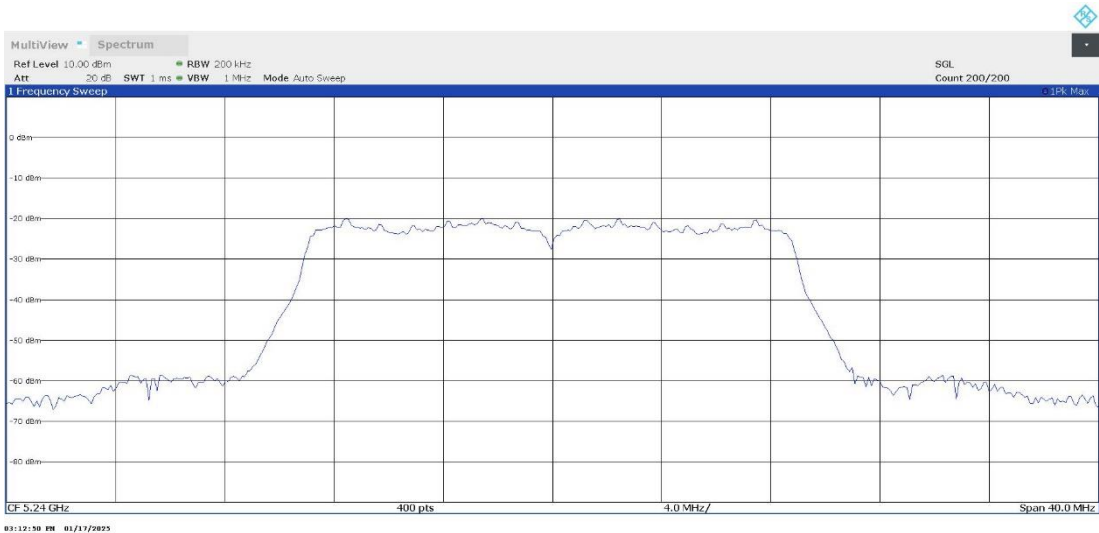
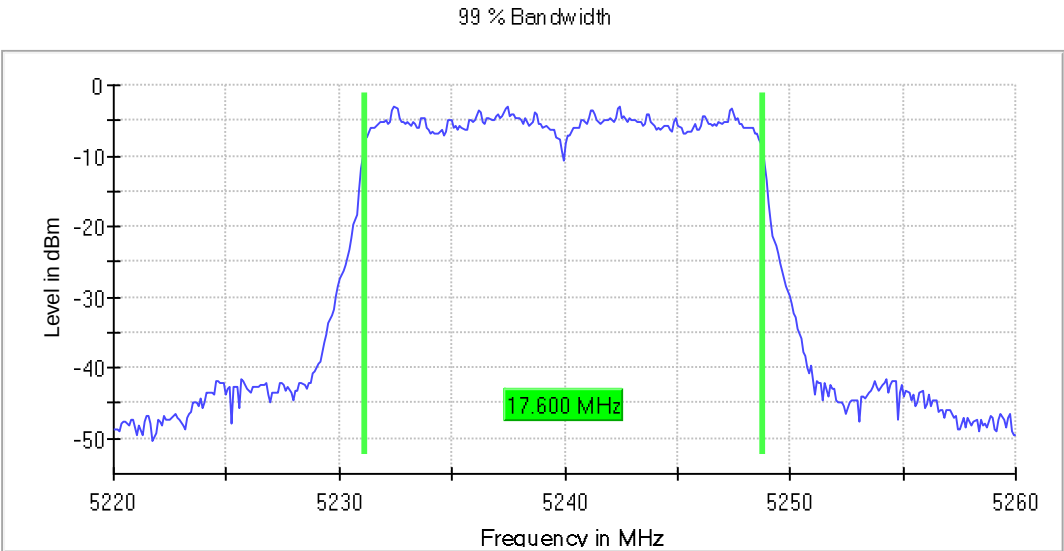
Operation Band MHz = [5150, 5250] Active Port = 3+2
Frequency MHz = 5220.00000 Modulation = 802.11n HT20 (OFDM MCS0)
Antenna Configuration = MIMO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3+2
Frequency MHz = 5240.00000 Modulation = 802.11n HT20 (OFDM MCS0)
Antenna Configuration = MIMO

Images:



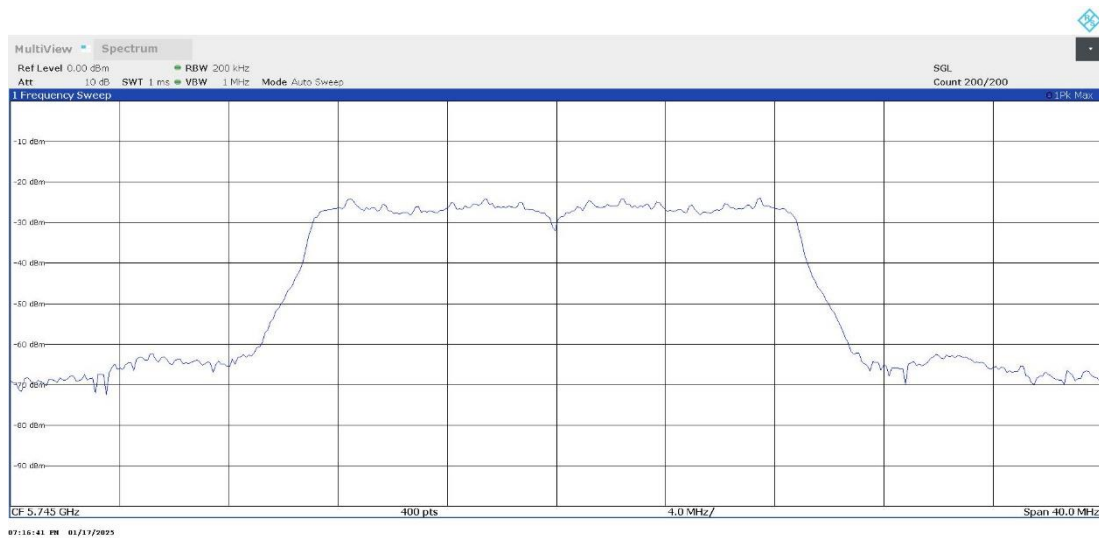
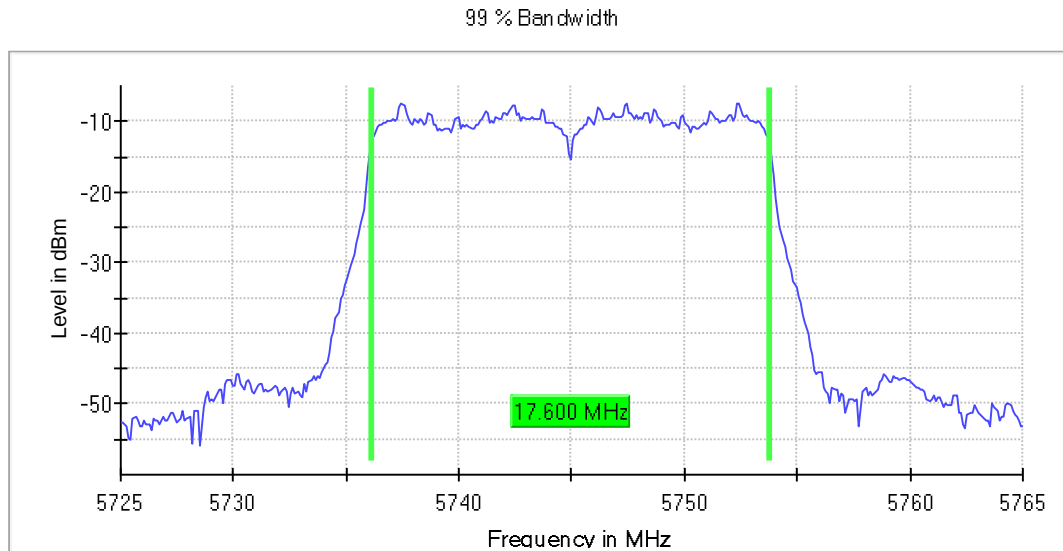
Operation Band MHz = [5725, 5850] Active Port = 3+2

Frequency MHz = 5745.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = MIMO

Images:



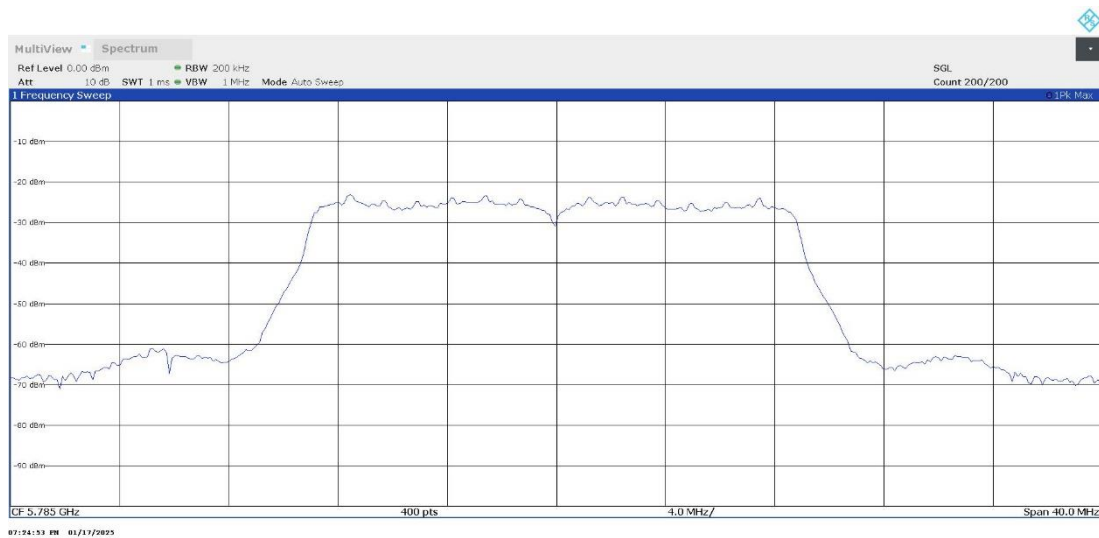
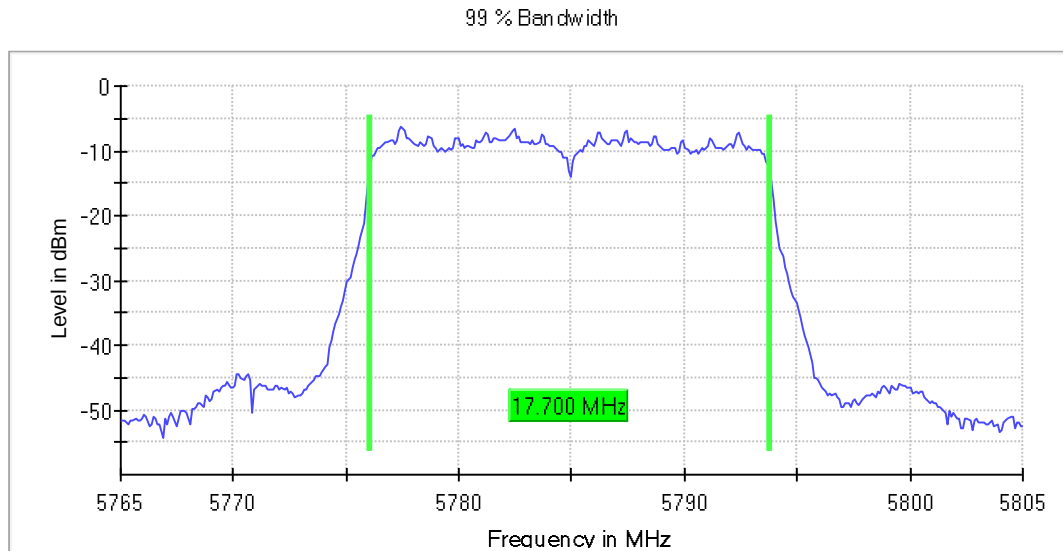
Operation Band MHz = [5725, 5850] Active Port = 3+2

Frequency MHz = 5785.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = MIMO

Images:



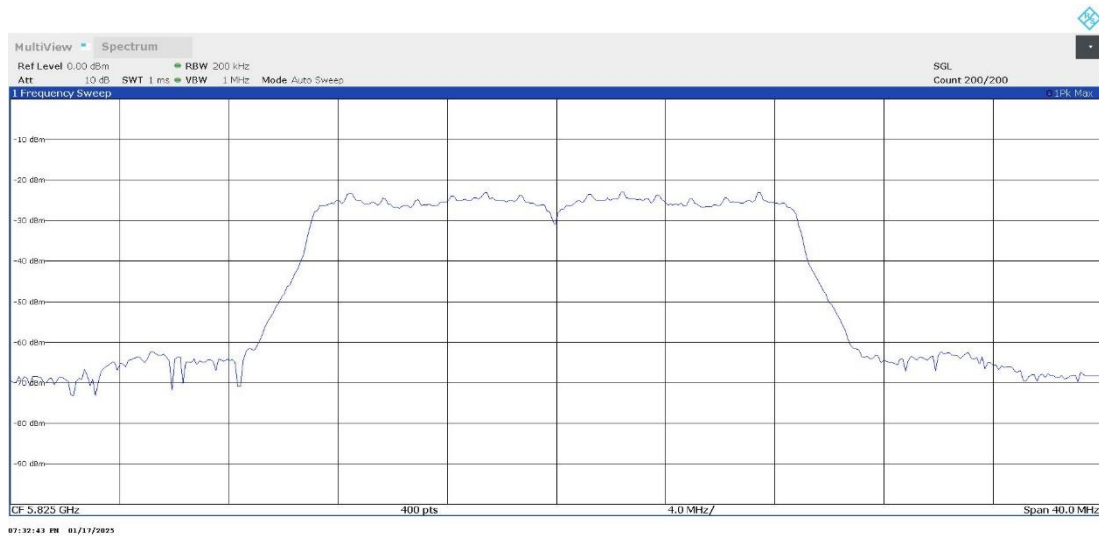
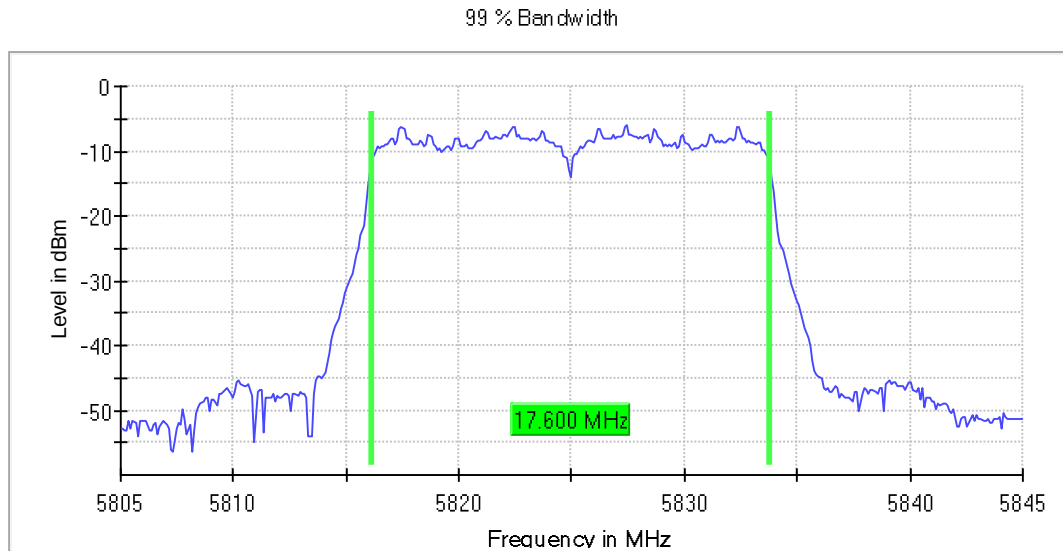
Operation Band MHz = [5725, 5850] Active Port = 3+2

Frequency MHz = 5825.00000

Modulation = 802.11n HT20 (OFDM MCS0)

Antenna Configuration = MIMO

Images:



Modulation: 802.11n HT40 (OFDM MCS0)

Operation Band (MHz)	Port	Freq (MHz)	Occ Ch BW (MHz)
[5150, 5250]	3+2	5190.00000	36.250
		5230.00000	36.250
[5725, 5850]		5755.00000	36.250
		5795.00000	36.250

Verdict

Pass

Attachments

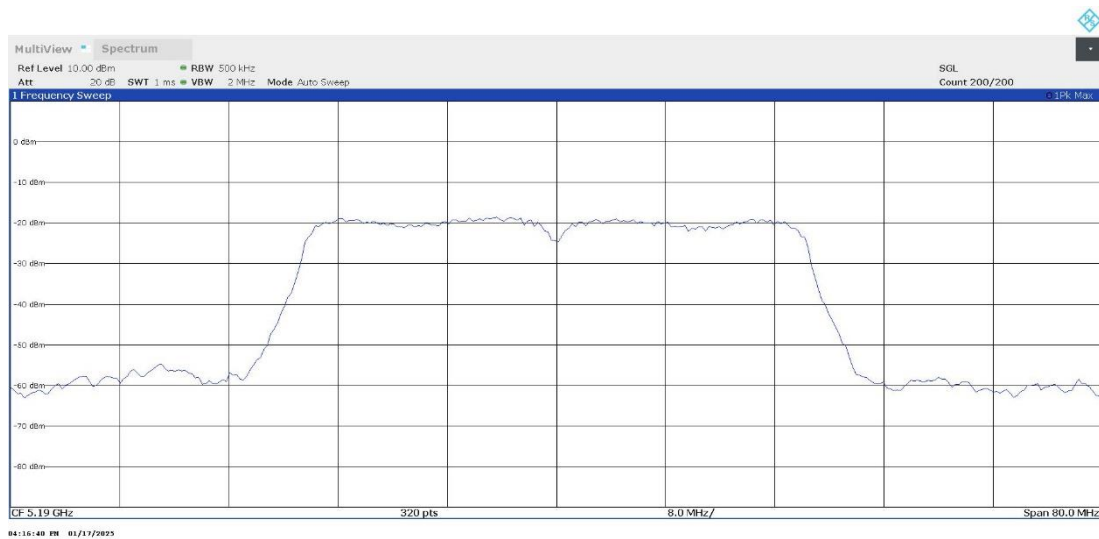
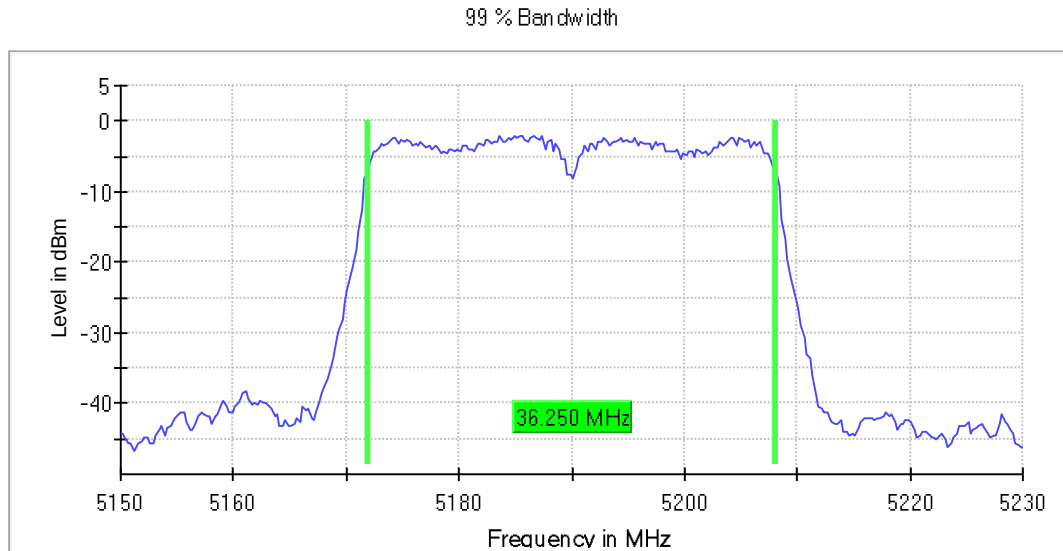
Operation Band MHz = [5150, 5250] Active Port = 3+2

Frequency MHz = 5190.00000

Modulation = 802.11n HT40 (OFDM MCS0)

Antenna Configuration = MIMO

Images:



Operation Band MHz = [5150, 5250] Active Port = 3+2

Frequency MHz = 5230.00000

Modulation = 802.11n HT40 (OFDM MCS0)

Antenna Configuration = MIMO

Images:

