FCC Test Report

Apple Inc
Model: A3403

In accordance with FCC 47 CFR Part 15E (6 GHz WLAN)

TUV SUD Limited Digitally signed by TUV SUD Limited Date: 2024.11.07 14:20:25 Z

Prepared for: Apple Inc
One Apple Park Way
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95014
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FCC ID: BCGA3403

COMMERCIAL-IN-CONFIDENCE

Document 75961394-92 Issue 02

SIGNATURE			
			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
James O'Reilly	RF Engineer	Authorised Signatory	07 November 2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15E. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Rachael Watkins	07 November 2024	

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory
553713/UK2026 Concorde Park, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15E: 2023 for the tests detailed in section 1.3.

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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	15-October-2024
2	Updated sections 1.2, 2.1 and 2.8 for OBW/IBE test results (160 MHz) and addition of OBW 26 dB plots and limit in section 2.1.6	07-November-2024

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
EUT/Sample Identification	Refer to section 1.6
Test Specification/Issue/Date	FCC 47 CFR Part 15E: 2023
Start of Test	26-August-2024
Finish of Test	05-November-2024
Name of Engineer(s)	Thomas Biddlecombe, Stefan Gilfedder, Feda Hussein, Manohar Thota, Colin Brain, Elliot Callender, Ioan-Alexandru Bogatu, Morsalin Hossain and Ahmed Al Derdiri
Related Document(s)	ANSI C63.10 (2020) KDB 662911 D01 v02r01 KDB 789033 D02 v02r01 KDB 987594 D02 v02 KDB 987594 DR03-45383

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15E is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 6 GHz WLAN				
-	15.203	Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.407 (a)	Emission Bandwidth	Pass	KDB 789033 D02 v02r01
2.2	15.407(a)	Dual Client Test	Pass	KDB 987594 D02 v02r01
2.3	15.407 (d)(10)	Transmit Power Control	Pass	KDB 987594 DR03-45383
2.4	15.407 (a)	Maximum Conducted Output Power	Pass	KDB 662911 D01 v02r01 KDB 789033 D02 v02r01
2.5	15.407 (a)	Maximum Conducted Power Spectral Density	Pass	KDB 662911 D01 v02r01 KDB 789033 D02 v02r01
2.6	15.407 (b)	Authorised Band Edges	Pass	ANSI C63.10 (2020) KDB 789033 D02 v02r01
2.7	15.209 and 15.407 (b)	Spurious Radiated Emissions	Pass	ANSI C63.10 (2020) KDB 789033 D02 v02r01
2.8	15.407 (b)	Unwanted Emissions within the 5925-7125 MHz band	Pass	KDB 987594 D02 v02r01
2.9	15.407 (d)(6)	Contention Based Protocol	Pass	KDB 987594 D02 v02r01

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a portable laptop computer.

1.4.2 Test Modes

The EUT's 6 GHz 802.11 radio supported SISO (Single Input/Single Output) and 2x2 MIMO (Multiple Input/Multiple Output) modes. 802.11a supports 20 MHz bandwidth only. 802.11ax supported 20 MHz, 40 MHz, 80 MHz and 160 MHz bandwidths.

802.11a mode supported SISO operation only. 802.11ax supported SISO, Cyclic Delay Diversity (CDD) and Space Division Multiplexing (SDM) modes. It also supported Transmit Beamforming (TxBF) mode on 20 MHz, 40 MHz and 80 MHz bandwidths. The EUT supported 802.11ax Single User (SU) and Multi-User (MU) with all Resource Unit (RU) sizes from 26 subcarriers, up to the maximum allowed, dependent on channel bandwidth.

The EUT is categorized a Dual Client (6CD) device operating in the 5.925-7.125 GHz bands. It will operate under the control of a Low Power Indoor (LPI) access point, or a standard power access point.

The EUT can also operate as a Very Low Power (6VL) device.

The EUT uses different output powers per core dependent on how many cores are used. The EUT also uses different power tables for Cyclic Delay Diversity (CDD), Space Division Multiplexing (SDM) and Transmit Beamforming (TxBF) modes. It uses the same conducted power across all cores in any given mode, but due to the different antenna gains the radiated powers per core differ.

After preliminary investigations were performed to find worst-case operation, the EUT was tested in the following modes:

SISO Modes (5925 to 6875 MHz - Core 0 / 6875 to 7125 MHz - Core 1):

- 802.11a – 12 Mbps
- 802.11ax HE20 SU – MCS2x1
- 802.11ax HE40 SU – MCS2x1
- 802.11ax HE80 SU – MCS2x1
- 802.11ax HE160 SU – MCS2x1
- 802.11ax HE20 MU RU26/52/106 – MCS2x1

2x2 MIMO Modes (Core 0+1):

- 802.11ax HE20 SU – CDD (MCS2x1), SDM (MCS2x2) and TxBF (MCS2x1)
- 802.11ax HE40 SU – CDD (MCS2x1), SDM (MCS2x2) and TxBF (MCS2x1)
- 802.11ax HE80 SU – CDD (MCS2x1), SDM (MCS2x2) and TxBF (MCS2x1)
- 802.11ax HE160 SU – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE20 MU RU26/52/106 – CDD (MCS2x1) and SDM (MCS2x2)

*Note: The RU offset for bottom and middle channels were placed in the lowest position and on the top channel, the offset was placed in the upper most position

1.4.3 Test Setup

For conducted tests the EUT antennas were disconnected and replaced with U.FL to SMA test cables to enable conducted testing on each core. The loss of these test cables were known and compensated for in any conducted measurements.

For all testing except Contention Based Protocol, Dual Client & TPC tests the EUT was put into a continuous transmit test mode with the chipset manufacturer's test commands. The EUT then transmitted the required type of packeted 802.11 data frames of fixed length, containing the standard headers and with pseudo-random data content, ensuring the measured signals were representative and contained all the symbols at the highest power control level.

The test setup used for Contention Based Protocol, Dual Client & TPC tests are described in the relevant test result sections of the present document.

1.4.4 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	5925 to 6105	6.4	1.15
	6105 to 6265	6.1	1.17
	6265 to 6425	5.4	1.21
	6425 to 6525	3.9	1.27
	6525 to 6875	5.6	1.25
	6875 to 7125	3.2	1.26
Core 1	5925 to 6105	4.0	1.15
	6105 to 6265	2.9	1.17
	6265 to 6425	2.1	1.21
	6425 to 6525	2.8	1.27
	6525 to 6875	4.6	1.25
	6875 to 7125	4.0	1.26

Table 3

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Identification of the EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: A3403			
Serial Number	Hardware Version	Software Version	Firmware
JF4T7PYJ66	REV1.0	24A32191s	23.30.16
C57342PMXW	REV1.0	24B2056	23.10.889.3
M7J9X1XPGD	REV1.0	24A32190v	23.30.16
MFC9RJC40F	REV1.0	24B13a	23.10.876.0.41.51.158
LJHNW3N9XQ	REV1.0	24A32190v	23.30.16
F2VK90C443	REV1.0	24C29	23.10.897.0.41.51.163

Table 4

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: A3403, Serial Number: LJHNW3N9XQ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3403, Serial Number: JF4T7PYJ66			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3403, Serial Number: M7J9X1XPGD			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3403, Serial Number: MFC9RJC40F			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3403, Serial Number: C57342PMXW			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3403, Serial Number: F2VK90C443			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 6 GHz WLAN		
Emission Bandwidth	Thomas Biddlecombe	UKAS
Maximum Conducted Output Power	Thomas Biddlecombe	UKAS
Maximum Conducted Power Spectral Density	Thomas Biddlecombe	UKAS
Unwanted Emissions within the 5925-7125 MHz band	Thomas Biddlecombe	UKAS

Table 6

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom

TÜV SÜD conducted the following tests at our Concorde Park Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 6 GHz WLAN		
Emission Bandwidth	Feda Hussein	UKAS
Dual Client Test	Stefan Gilfedder	UKAS
Transmit Power Control	Stefan Gilfedder	UKAS
Maximum Conducted Output Power	Feda Hussein	UKAS
Maximum Conducted Power Spectral Density	Feda Hussein	UKAS
Authorised Band Edges	Manohar Thota, Colin Brain, Elliot Callender and Ioan-Alexandru Bogatu	UKAS
Spurious Radiated Emissions	Ioan-Alexandru Bogatu, Morsalin Hossain, Elliot Callender and Ahmed Al Derdiri	UKAS
Unwanted Emissions within the 5925-7125 MHz band	Feda Hussein	UKAS
Contention Based Protocol	Stefan Gilfedder	UKAS

Table 7

Office Address:

TÜV SÜD
Concorde Park
Concorde Way
Fareham
Hampshire
PO15 5FG
United Kingdom

2 Test Details

2.1 Emission Bandwidth

2.1.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (a)

2.1.2 Equipment Under Test and Modification State

A3403, S/N: M7J9X1XPGD - Modification State 0
A3403, S/N: MFC9RJC40F - Modification State 0

2.1.3 Date of Test

24-September-2024 to 05-November-2024

2.1.4 Test Method

The test was performed in accordance with KDB 789033 D02 clause II.C.1 for 26 dB bandwidth and clause II.D for 99% occupied bandwidth.

2.1.5 Environmental Conditions

Ambient Temperature	21.3°C - 22.7 °C
Relative Humidity	41.9 % - 59.0 %

2.1.6 Test Results

6 GHz WLAN

SISO

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11a LPI	20.940	21.180
802.11ax HE20 SU LPI	21.180	21.480
802.11ax HE40 SU LPI	41.760	42.120
802.11ax HE80 SU LPI	82.060	83.160
802.11ax HE160 SU LPI	166.740	167.580

Table 8 - 26 dB Bandwidth Summary Results - SISO LPI

Figure 1 - 802.11a LPI Minimum 26 dB EBW

Figure 2 - 802.11a LPI Maximum 26 dB EBW

Figure 3 - 802.11ax HE20 SU LPI Minimum 26 dB EBW

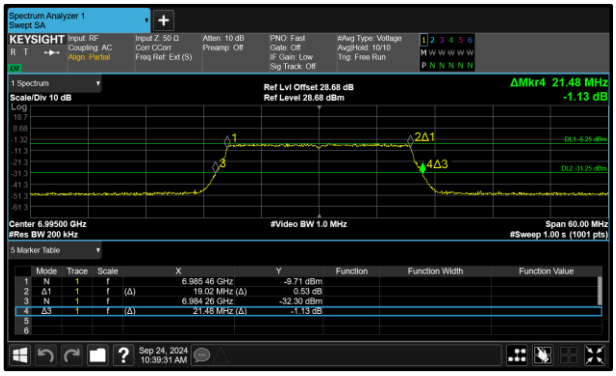

Figure 4 - 802.11ax HE20 SU LPI Maximum 26 dB EBW

Figure 5 - 802.11ax HE40 SU LPI Minimum 26 dB EBW

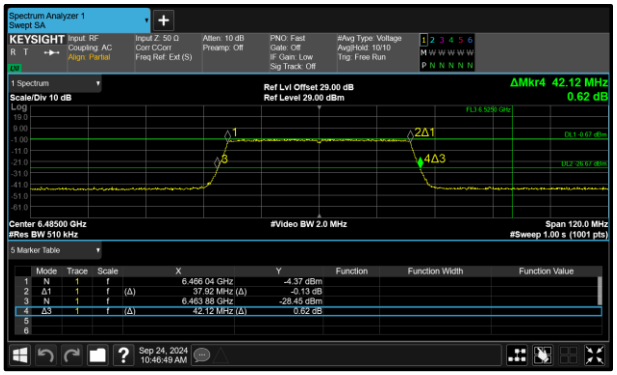

Figure 6 - 802.11ax HE40 SU LPI Maximum 26 dB EBW

Figure 7 - 802.11ax HE80 SU LPI Minimum 26 dB EBW

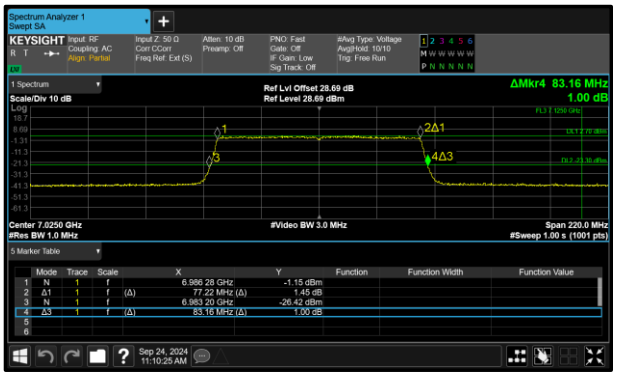

Figure 8 - 802.11ax HE80 SU LPI Maximum 26 dB EBW

Figure 9 - 802.11ax HE160 SU LPI Minimum 26 dB EBW

Figure 10 - 802.11ax HE160 SU LPI Maximum 26 dB EBW

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11a VLP	21.060	21.120
802.11ax HE20 SU VLP	21.240	21.360
802.11ax HE40 SU VLP	41.760	42.000
802.11ax HE80 SU VLP	82.500	82.720
802.11ax HE160 SU VLP	167.160	167.160

Table 9 - 26 dB Bandwidth Summary Results - SISO VLP

Figure 11 - 802.11a VLP Minimum 26 dB EBW

Figure 12 - 802.11a VLP Maximum 26 dB EBW

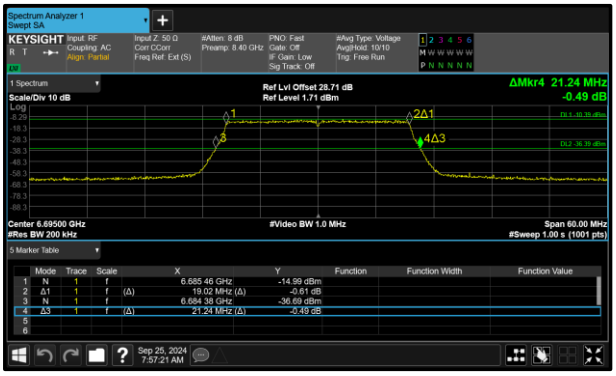

Figure 13 - 802.11ax HE20 SU VLP Minimum 26 dB EBW

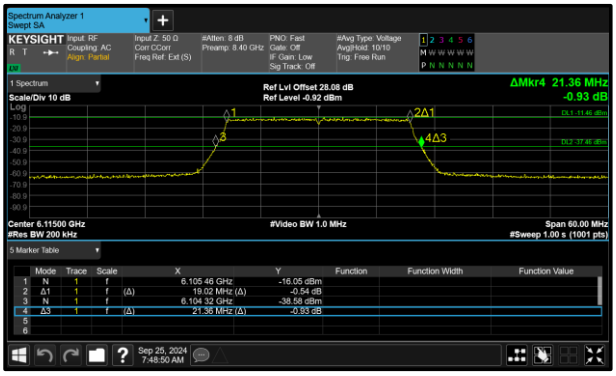

Figure 14 - 802.11ax HE20 SU VLP Maximum 26 dB EBW

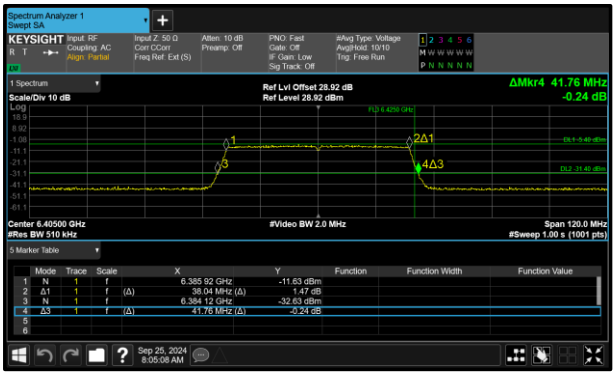

Figure 15 - 802.11ax HE40 SU VLP Minimum 26 dB EBW

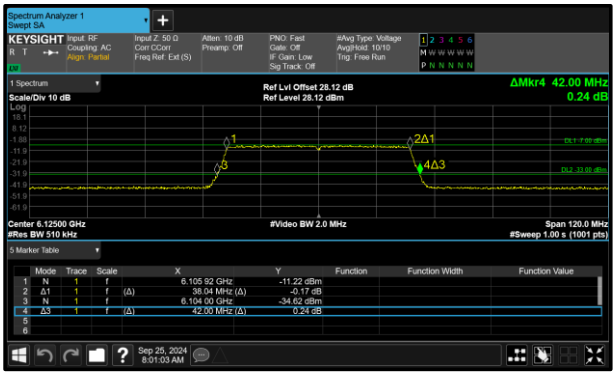

Figure 16 - 802.11ax HE40 SU VLP Maximum 26 dB EBW

Figure 17 - 802.11ax HE80 SU VLP Minimum 26 dB EBW

Figure 18 - 802.11ax HE80 SU VLP Maximum 26 dB EBW

Figure 19 - 802.11ax HE160 SU VLP Minimum 26 dB EBW

Figure 20 - 802.11ax HE160 SU VLP Maximum 26 dB EBW

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11a SP	21.060	21.180
802.11ax HE20 SU SP	21.300	21.540
802.11ax HE40 SU SP	41.880	42.480
802.11ax HE80 SU SP	82.720	83.380
802.11ax HE160 SU SP	166.740	167.580

Table 10 - 26 dB Bandwidth Summary Results - SISO SP

Figure 21 - 802.11a SP Minimum 26 dB EBW

Figure 22 - 802.11a SP Maximum 26 dB EBW

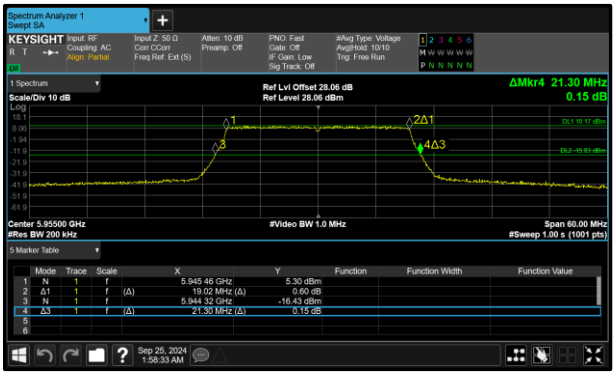

Figure 23 - 802.11ax HE20 SU SP Minimum 26 dB EBW

Figure 24 - 802.11ax HE20 SU SP Maximum 26 dB EBW

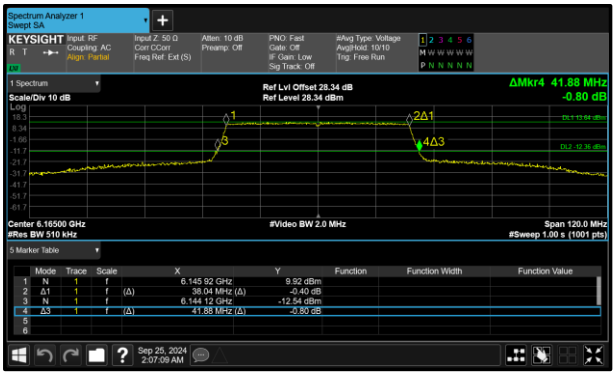

Figure 25 - 802.11ax HE40 SU SP Minimum 26 dB EBW

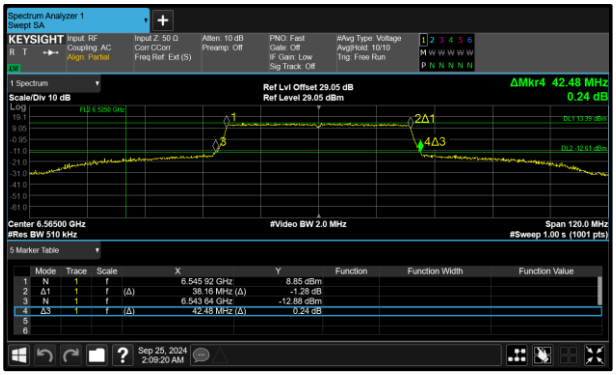

Figure 26 - 802.11ax HE40 SU SP Maximum 26 dB EBW

Figure 27 - 802.11ax HE80 SU SP Minimum 26 dB EBW

Figure 28 - 802.11ax HE80 SU SP Maximum 26 dB EBW

Figure 29 - 802.11ax HE160 SU SP Minimum 26 dB EBW

Figure 30 - 802.11ax HE160 SU SP Maximum 26 dB EBW

Protocol	99% Bandwidth (MHz)	
	Minimum	Maximum
802.11a LPI	16.680	16.680
802.11ax HE20 SU LPI	19.020	19.080
802.11ax HE40 SU LPI	37.920	38.040
802.11ax HE80 SU LPI	77.220	77.440
802.11ax HE160 SU LPI	156.240	156.660

Table 11 - 99% Bandwidth Summary Results - SISO LPI

Figure 31 - 802.11a LPI Minimum 99% OBW

Figure 32 - 802.11a LPI Maximum 99% OBW

Figure 33 - 802.11ax HE20 SU LPI Minimum 99% OBW

Figure 34 - 802.11ax HE20 SU LPI Maximum 99% OBW

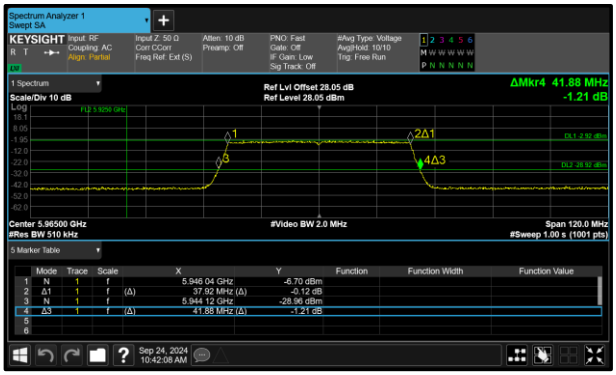

Figure 35 - 802.11ax HE40 SU LPI Minimum 99% OBW

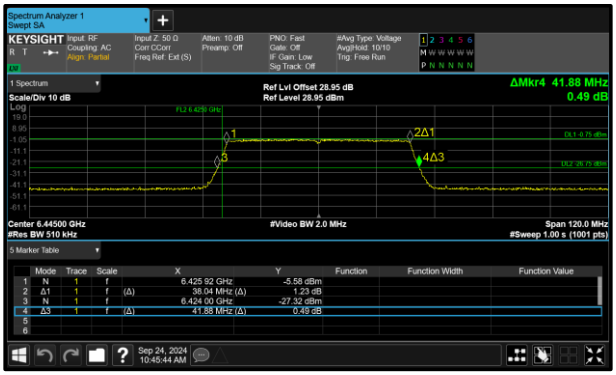

Figure 36 - 802.11ax HE40 SU LPI Maximum 99% OBW

Figure 37 - 802.11ax HE80 SU LPI Minimum 99% OBW

Figure 38 - 802.11ax HE80 SU LPI Maximum 99% OBW

Figure 39 - 802.11ax HE160 SU LPI Minimum 99% OBW

Figure 40 - 802.11ax HE160 SU LPI Maximum 99% OBW

Protocol	99% Bandwidth (MHz)	
	Minimum	Maximum
802.11a VLP	16.680	16.680
802.11ax HE20 SU VLP	19.020	19.020
802.11ax HE40 SU VLP	38.040	38.040
802.11ax HE80 SU VLP	77.220	77.440
802.11ax HE160 SU VLP	156.660	156.660

Table 12 - 99% Bandwidth Summary Results - SISO VLP

Figure 41 - 802.11a VLP Minimum 99% OBW

Figure 42 - 802.11a VLP Maximum 99% OBW

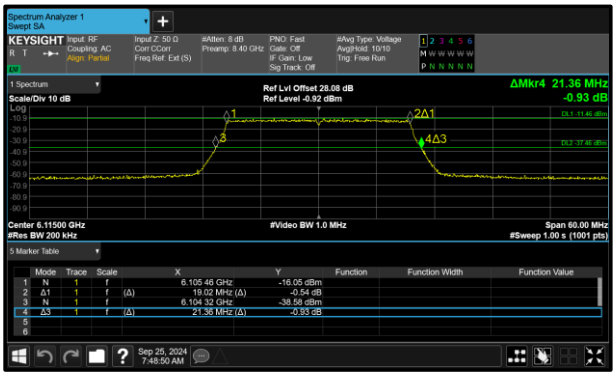

Figure 43 - 802.11ax HE20 SU VLP Minimum 99% OBW

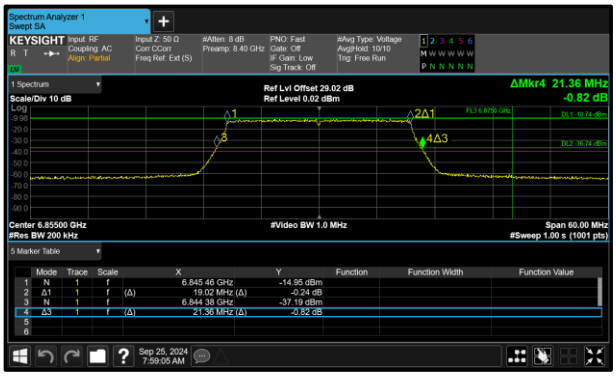

Figure 44 - 802.11ax HE20 SU VLP Maximum 99% OBW

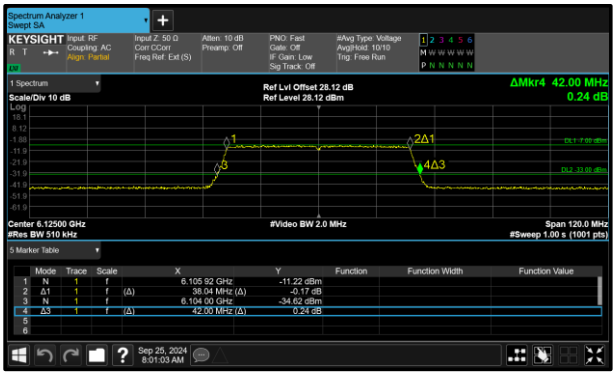

Figure 45 - 802.11ax HE40 SU VLP Minimum 99% OBW

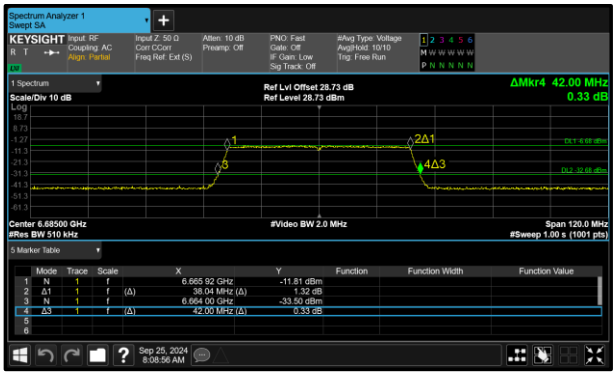

Figure 46 - 802.11ax HE40 SU VLP Maximum 99% OBW

Figure 47 - 802.11ax HE80 SU VLP Minimum 99% OBW

Figure 48 - 802.11ax HE80 SU VLP Maximum 99% OBW

Figure 49 - 802.11ax HE160 SU VLP Minimum 99% OBW

Figure 50 - 802.11ax HE160 SU VLP Maximum 99% OBW

Protocol	99% Bandwidth (MHz)	
	Minimum	Maximum
802.11a SP	16.680	16.680
802.11ax HE20 SU SP	19.020	19.080
802.11ax HE40 SU SP	38.040	38.160
802.11ax HE80 SU SP	77.220	77.440
802.11ax HE160 SU SP	156.240	156.660

Table 13 - 99% Bandwidth Summary Results - SISO SP

Figure 51 - 802.11a SP Minimum 99% OBW

Figure 52 - 802.11a SP Maximum 99% OBW

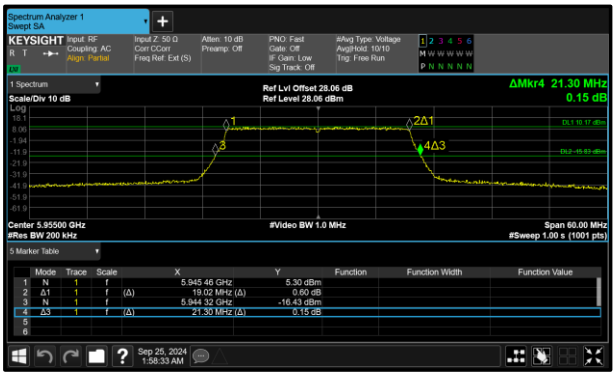

Figure 53 - 802.11ax HE20 SU SP Minimum 99% OBW

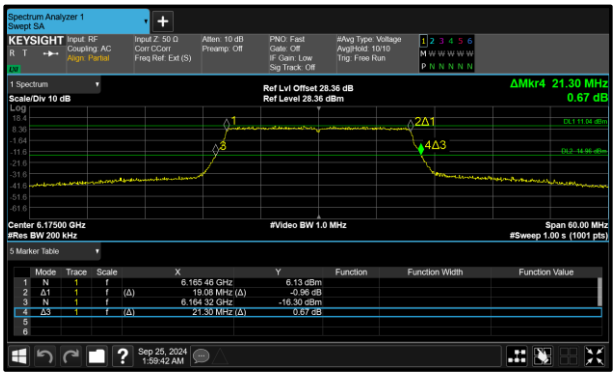

Figure 54 - 802.11ax HE20 SU SP Maximum 99% OBW

Figure 55 - 802.11ax HE40 SU SP Minimum 99% OBW

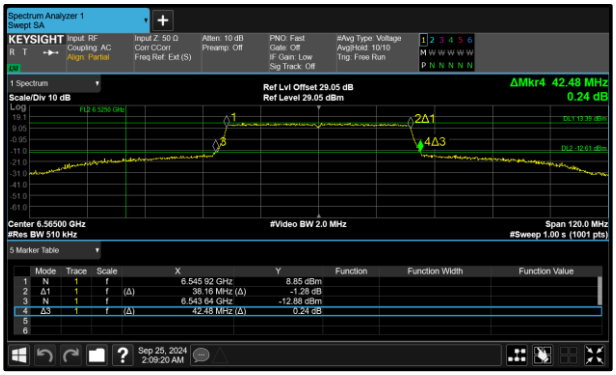

Figure 56 - 802.11ax HE40 SU SP Maximum 99% OBW

Figure 57 - 802.11ax HE80 SU SP Minimum 99% OBW

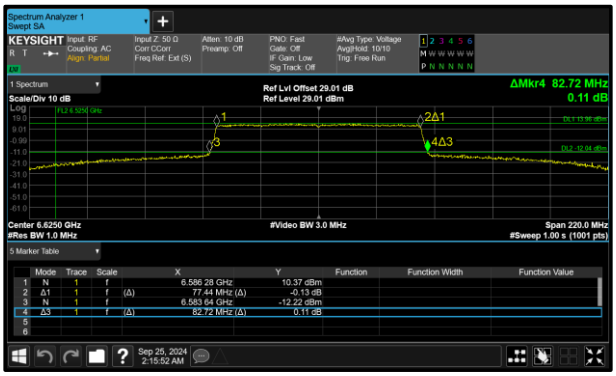

Figure 58 - 802.11ax HE80 SU SP Maximum 99% OBW

Figure 59 - 802.11ax HE160 SU SP Minimum 99% OBW

Figure 60 - 802.11ax HE160 SU SP Maximum 99% OBW

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz 6.875-7.125 GHz	Band:	U-NII-5 U-NII-6 U-NII-7 U-NII-8
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11a LPI	Duty Cycle (%):	-
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A|B (Core 0 | Core 1)	Active Chain(s):	0|1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5955	21.180	-	-	-	320.00
6175	21.120	-	-	-	320.00
6415	21.060	-	-	-	320.00
6435	21.120	-	-	-	320.00
6475	21.000	-	-	-	320.00
6515	21.120	-	-	-	320.00
6535	21.120	-	-	-	320.00
6695	21.120	-	-	-	320.00
6855	21.180	-	-	-	320.00
6875	21.060	-	-	-	320.00
6895	-	20.940	-	-	320.00
6995	-	21.000	-	-	320.00
7115	-	21.120	-	-	320.00

Table 14 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5955	16.680	-	-	-	320.00
6175	16.680	-	-	-	320.00
6415	16.680	-	-	-	320.00
6435	16.680				320.00
6475	16.680				320.00
6515	16.680				320.00
6535	16.680				320.00
6695	16.680				320.00
6855	16.680				320.00
6875	16.680				320.00
6895	-	16.680	-	-	320.00
6995	-	16.680	-	-	320.00
7115	-	16.680	-	-	320.00

Table 15 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz 6.875-7.125 GHz	Band:	U-NII-5 U-NII-6 U-NII-7 U-NII-8
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 SU LPI	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A|B (Core 0 | Core 1)	Active Chain(s):	0|1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5955	21.300	-	-	-	320.00
6175	21.240	-	-	-	320.00
6415	21.180	-	-	-	320.00
6435	21.300	-	-	-	320.00
6475	21.360	-	-	-	320.00
6515	21.360	-	-	-	320.00
6535	21.360				320.00
6695	21.360				320.00
6855	21.240				320.00
6875	21.180				320.00
6895	-	21.240			320.00
6995	-	21.480			320.00
7095	-	21.240			320.00

Table 16 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5955	19.020	-	-	-	320.00
6175	19.080	-	-	-	320.00
6415	19.020	-	-	-	320.00
6435	19.020	-	-	-	320.00
6475	19.020	-	-	-	320.00
6515	19.020	-	-	-	320.00
6535	19.020				320.00
6695	19.020				320.00
6855	19.020				320.00
6875	19.020				320.00
6895	-	19.020			320.00
6995	-	19.020			320.00
7095	-	19.020			320.00

Table 17 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz 6.875-7.125 GHz	Band:	U-NII-5 U-NII-6 U-NII-7 U-NII-8
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE40 SU LPI	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A|B (Core 0 | Core 1)	Active Chain(s):	0|1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5965	41.880	-	-	-	320.00
6165	41.880	-	-	-	320.00
6405	41.880	-	-	-	320.00
6445	41.880				320.00
6485	42.120				320.00
6525	42.120				320.00
6565	41.760				320.00
6685	42.000				320.00
6845	42.120				320.00
6885	41.880				320.00
6925	-	42.120			320.00
7005	-	42.000			320.00
7085	-	41.880			320.00

Table 18 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5965	37.920	-	-	-	320.00
6165	37.920	-	-	-	320.00
6405	37.920	-	-	-	320.00
6445	38.040				320.00
6485	37.920				320.00
6525	38.040				320.00
6565	38.040				320.00
6685	38.040				320.00
6845	37.920				320.00
6885	37.920				320.00
6925	-	38.040			320.00
7005	-	38.040			320.00
7085	-	38.040			320.00

Table 19 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz 6.875-7.125 GHz	Band:	U-NII-5 U-NII-6 U-NII-7 U-NII-8
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE80 SU LPI	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A|B (Core 0 | Core 1)	Active Chain(s):	0|1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5985	82.720	-	-	-	320.00
6145	82.940	-	-	-	320.00
6385	82.720	-	-	-	320.00
6465	82.720				320.00
6545	82.060				320.00
6625	82.500				320.00
6705	82.720				320.00
6785	82.720				320.00
6865	82.720				320.00
6945	-	82.500			320.00
7025	-	83.160			320.00

Table 20 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5985	77.220	-	-	-	320.00
6145	77.220	-	-	-	320.00
6385	77.220	-	-	-	320.00
6465	77.220				320.00
6545	77.220				320.00
6625	77.440				320.00
6705	77.220				320.00
6785	77.440				320.00
6865	77.220				320.00
6945	-	77.220			320.00
7025	-	77.220			320.00

Table 21 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz 6.875-7.125 GHz	Band:	U-NII-5 U-NII-6 U-NII-7 U-NII-8
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE160 SU LPI	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A|B (Core 0 | Core 1)	Active Chain(s):	0|1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6025	167.160	-	-	-	320.00
6185	166.740	-	-	-	320.00
6345	166.740	-	-	-	320.00
6505	166.740	-			320.00
6665	167.160	-			320.00
6825	166.740	-			320.00
6985	-	167.580			320.00

Table 22 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6025	156.660	-	-	-	320.00
6185	156.660	-	-	-	320.00
6345	156.660	-	-	-	320.00
6505	156.660	-			320.00
6665	156.240	-			320.00
6825	156.660	-			320.00
6985	-	156.660			320.00

Table 23 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11a SP	Duty Cycle (%):	-
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5955	21.120	-	-	-	320.00
6175	21.060	-	-	-	320.00
6415	21.180	-	-	-	320.00
6535	21.120				320.00
6695	21.120				320.00
6855	21.120				320.00

Table 24 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5955	16.680	-	-	-	320.00
6175	16.680	-	-	-	320.00
6415	16.680	-	-	-	320.00
6535	16.680				320.00
6695	16.680				320.00
6855	16.680				320.00

Table 25 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 SU SP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5955	21.300	-	-	-	320.00
6175	21.300	-	-	-	320.00
6415	21.480	-	-	-	320.00
6535	21.360				320.00
6695	21.300				320.00
6855	21.300				320.00

Table 26 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5955	19.020	-	-	-	320.00
6175	19.080	-	-	-	320.00
6415	19.020	-	-	-	320.00
6535	19.020				320.00
6695	19.020				320.00
6855	19.020				320.00

Table 27 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE40 SU SP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5965	42.120	-	-	-	320.00
6165	41.880	-	-	-	320.00
6405	42.360	-	-	-	320.00
6565	42.480				320.00
6685	42.240				320.00
6845	42.240				320.00

Table 28 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5965	38.040	-	-	-	320.00
6165	38.040	-	-	-	320.00
6405	38.040	-	-	-	320.00
6565	38.160				320.00
6685	38.040				320.00
6845	38.040				320.00

Table 29 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE80 SU SP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
5985	82.720	-	-	-	320.00
6145	82.720	-	-	-	320.00
6385	82.940	-	-	-	320.00
6625	82.720				320.00
6705	83.380				320.00
6785	82.720				320.00

Table 30 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
5985	77.220	-	-	-	320.00
6145	77.220	-	-	-	320.00
6385	77.220	-	-	-	320.00
6625	77.440				320.00
6705	77.440				320.00
6785	77.440				320.00

Table 31 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE160 SU SP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6025	167.160	-	-	-	320.00
6185	167.160	-	-	-	320.00
6345	167.580	-	-	-	320.00
6665	167.160	-			320.00

Table 32 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6025	156.660	-	-	-	320.00
6185	156.660	-	-	-	320.00
6345	156.660	-	-	-	320.00
6665	156.240	-			320.00

Table 33 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11a VLP	Duty Cycle (%):	-
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6115	21.060	-	-	-	320.00
6275	21.120	-	-	-	320.00
6415	21.120	-	-	-	320.00
6535	21.060				320.00
6695	21.060				320.00
6855	21.060				320.00

Table 34 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6115	16.680	-	-	-	320.00
6275	16.680	-	-	-	320.00
6415	16.680	-	-	-	320.00
6535	16.680				320.00
6695	16.680				320.00
6855	16.680				320.00

Table 35 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 SU VLP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6115	21.360	-	-	-	320.00
6275	21.300	-	-	-	320.00
6415	21.300	-	-	-	320.00
6535	21.360				320.00
6695	21.240				320.00
6855	21.360				320.00

Table 36 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6115	19.020	-	-	-	320.00
6275	19.020	-	-	-	320.00
6415	19.020	-	-	-	320.00
6535	19.020				320.00
6695	19.020				320.00
6855	19.020				320.00

Table 37 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE40 SU VLP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6125	42.000	-	-	-	320.00
6285	42.000	-	-	-	320.00
6405	41.760	-	-	-	320.00
6565	42.000				320.00
6685	42.000				320.00
6845	41.880				320.00

Table 38 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6125	38.040	-	-	-	320.00
6285	38.040	-	-	-	320.00
6405	38.040	-	-	-	320.00
6565	38.040				320.00
6685	38.040				320.00
6845	38.040				320.00

Table 39 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE80 SU VLP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6145	82.720	-	-	-	320.00
6305	82.720	-	-	-	320.00
6385	82.720	-	-	-	320.00
6625	82.720				320.00
6705	82.500				320.00
6785	82.720				320.00

Table 40 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6145	77.220	-	-	-	320.00
6305	77.440	-	-	-	320.00
6385	77.440	-	-	-	320.00
6625	77.440				320.00
6705	77.220				320.00
6785	77.440				320.00

Table 41 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-7
Limit Clause(s):	15.407(a)(11)	Test Method(s):	C63.10 6.9.3 C63.10 12.5.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE160 SU VLP	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (Core 0)	Active Chain(s):	0

Test Frequency (MHz)	26 dB Bandwidth (MHz)				FCC Limit (MHz)
	A	B	C	D	
6185	167.160	-	-	-	320.00
6345	167.160	-	-	-	320.00
6665	167.160	-	-	-	320.00

Table 42 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				ISED Limit (MHz)
	A	B	C	D	
6185	156.660	-	-	-	320.00
6345	156.660	-	-	-	320.00
6665	156.660	-	-	-	320.00

Table 43 - 99% Bandwidth Results

MIMO CDD

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11ax HE20 SU LPI	21.180	21.480
802.11ax HE40 SU LPI	41.640	42.120
802.11ax HE80 SU LPI	82.500	83.160
802.11ax HE160 SU LPI	166.320	167.580

Table 44 - 26 dB Bandwidth Summary Results - MIMO CDD LPI

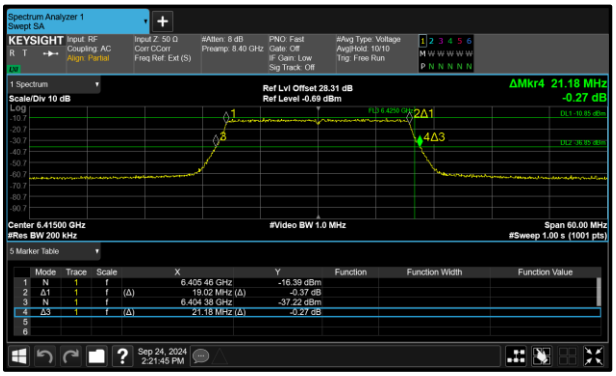

Figure 61 - 802.11ax HE20 SU LPI Minimum 26 dB EBW

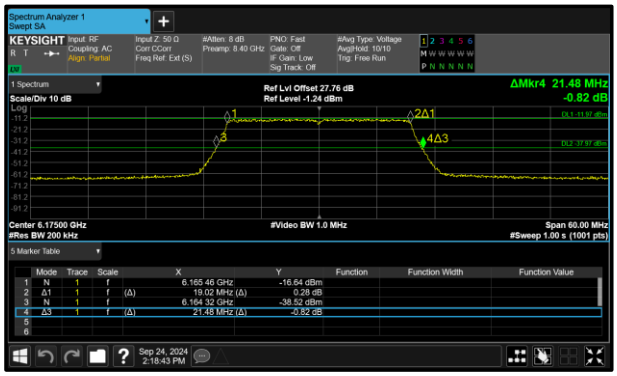

Figure 62 - 802.11ax HE20 SU LPI Maximum 26 dB EBW

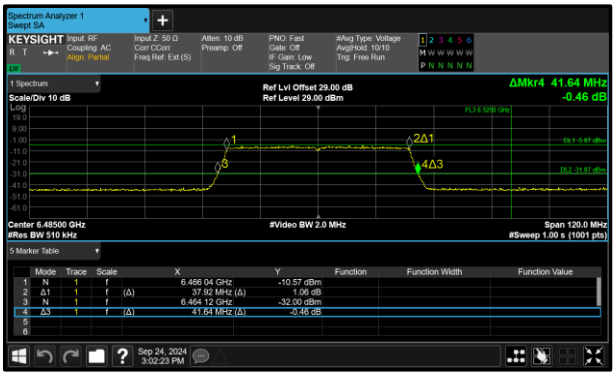

Figure 63 - 802.11ax HE40 SU LPI Minimum 26 dB EBW

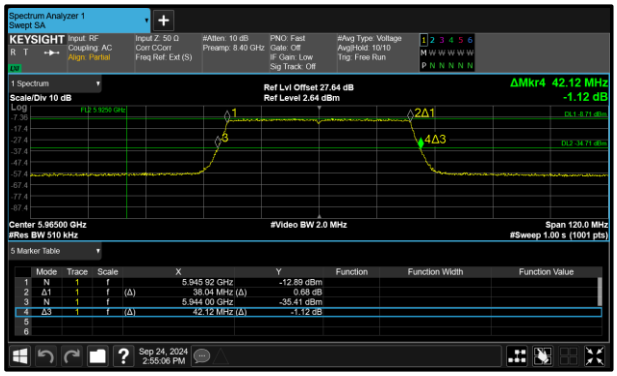

Figure 64 - 802.11ax HE40 SU LPI Maximum 26 dB EBW

Figure 65 - 802.11ax HE80 SU LPI Minimum 26 dB EBW

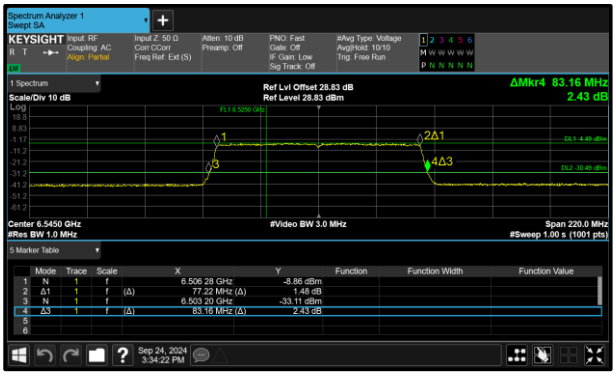

Figure 66 - 802.11ax HE80 SU LPI Maximum 26 dB EBW

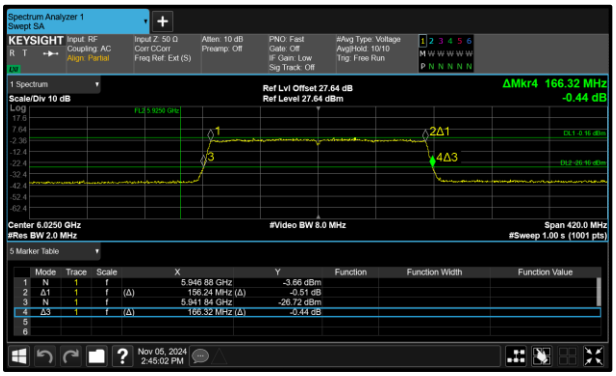

Figure 67 - 802.11ax HE160 SU LPI Minimum 26 dB EBW

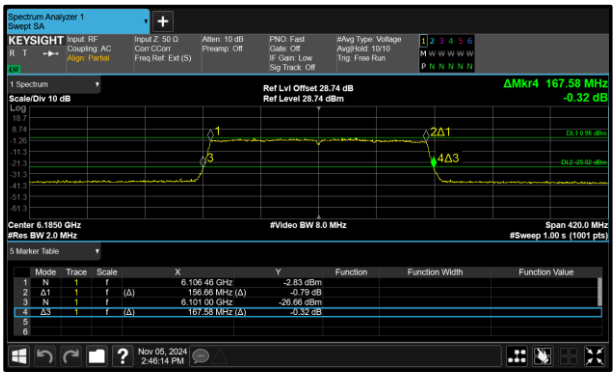

Figure 68 - 802.11ax HE160 SU LPI Maximum 26 dB EBW

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11ax HE40 SU VLP	41.760	42.120
802.11ax HE80 SU VLP	82.280	83.160
802.11ax HE160 SU VLP	165.900	167.160

Table 45 - 26 dB Bandwidth Summary Results - MIMO CDD VLP

Figure 69 - 802.11ax HE40 SU VLP Minimum 26 dB EBW

Figure 70 - 802.11ax HE40 SU VLP Maximum 26 dB EBW

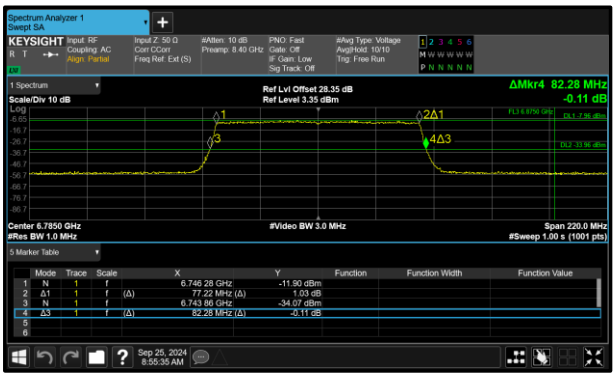

Figure 71 - 802.11ax HE80 SU VLP Minimum 26 dB EBW

Figure 72 - 802.11ax HE80 SU VLP Maximum 26 dB EBW

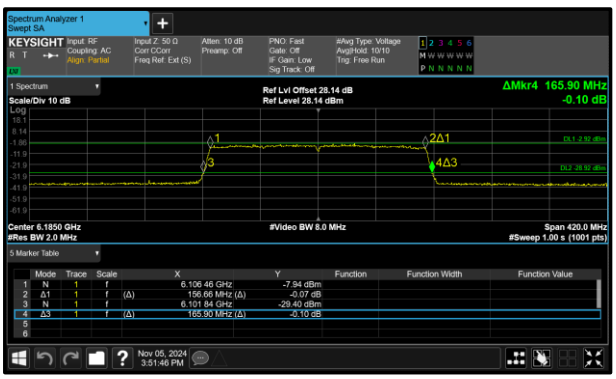

Figure 73 - 802.11ax HE160 SU VLP Minimum 26 dB EBW

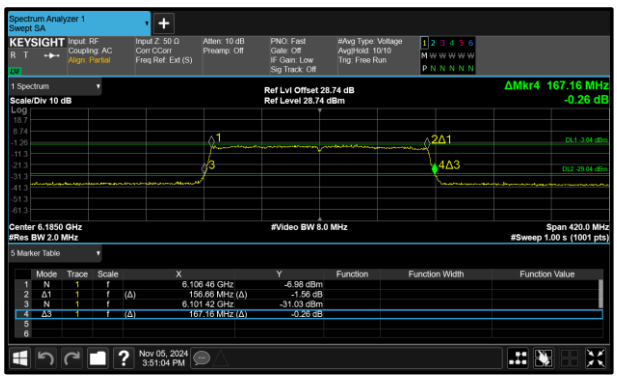

Figure 74 - 802.11ax HE160 SU VLP Maximum 26 dB EBW

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11ax HE20 SU SP	21.180	21.480
802.11ax HE40 SU SP	41.760	42.240
802.11ax HE80 SU SP	82.500	95.920
802.11ax HE160 SU SP	165.900	168.000

Table 46 - 26 dB Bandwidth Summary Results - MIMO CDD SP

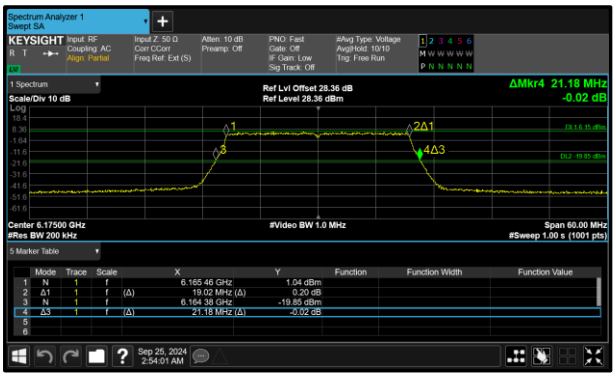

Figure 75 - 802.11ax HE20 SU SP Minimum 26 dB EBW

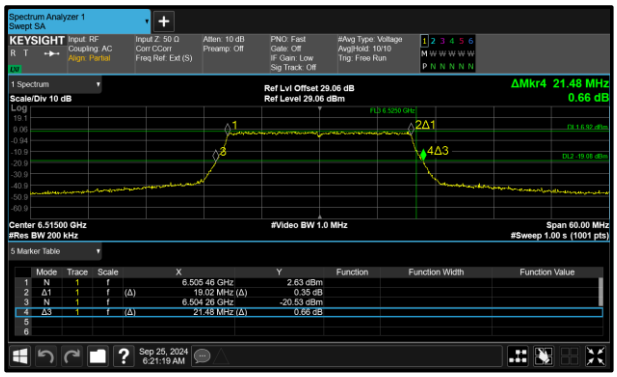

Figure 76 - 802.11ax HE20 SU SP Maximum 26 dB EBW

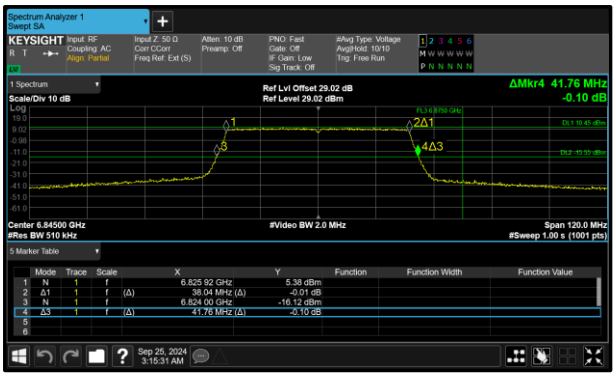

Figure 77 - 802.11ax HE40 SU SP Minimum 26 dB EBW

Figure 78 - 802.11ax HE40 SU SP Maximum 26 dB EBW

Figure 79 - 802.11ax HE80 SU SP Minimum 26 dB EBW

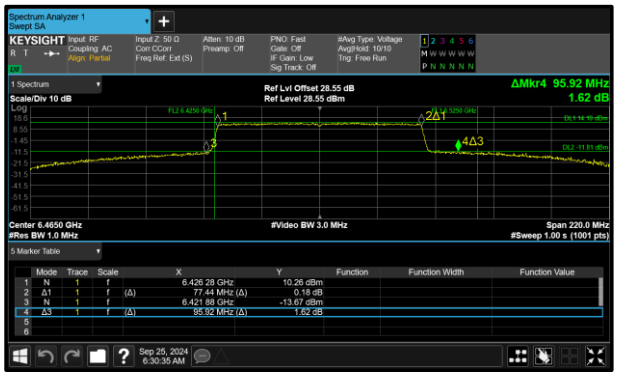

Figure 80 - 802.11ax HE80 SU SP Maximum 26 dB EBW