FCC and ISED Test Report

Apple Inc
Model: A3143

In accordance with FCC 47 CFR Part 15E, ISED RSS-248 and ISED RSS-GEN (6 GHz WLAN)

TUV SUD Limited
Digitally signed by TUV SUD Limited
Date: 2024.11.28 13:10:17 Z

Prepared for: Apple Inc
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FCC ID: BCGA3143 IC: 579C-A3143

COMMERCIAL-IN-CONFIDENCE

Document 75961400-19 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Tiago De Camargo Alves	Technical Support	Authorised Signatory	28 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, ISED RSS-248 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Lauren Walters	28 November 2024	

FCC Accreditation
553713/UK2026 Concorde Park, Fareham Test Laboratory

ISED Accreditation
28798/UK0003 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, ISED RSS-248: Issue 2 (2022-12) and ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) 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	28-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 ISED RSS-248: Issue 2 (2022-12) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Start of Test	15-July-2024
Finish of Test	15-November-2024
Name of Engineer(s)	David Hill, Feda Hussein, Mustafa Murad, Stefan Gilfedder, Jayvir Makwana, Akhil Rajendran Bhaskaran Nair, Dale Hills, Elliot Callender, Ioan-Alexandru Bogatu, Jamal Imoro Abubakar, Manohar Thota, Marius Vasii, Morsalin Hossain, Vineeth Nagaraj, Ian Hart and Thomas Randall
Related Document(s)	ANSI C63.10 (2020) KDB 662911 D01 v02r01 KDB 789033 D02 v02r01 KDB 987594 D02 v03

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15E, ISED RSS-248 and ISED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15E	RSS-248	RSS-GEN			
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)	4.4	6.7	Emission Bandwidth	Pass	KDB 789033 D02 v02r01
2.2	15.407 (a)	4.5	6.12	Dual Client Test	Pass	KDB 987594 D02 v03
2.3	15.407 (a)	4.5	6.12	Maximum Conducted Output Power	Pass	KDB 662911 D01 v02r01 KDB 789033 D02 v02r01
2.4	15.407 (a)	4.5	-	Maximum Conducted Power Spectral Density	Pass	KDB 662911 D01 v02r01 KDB 789033 D02 v02r01
2.5	15.407 (b)	4.6	6.13	Authorised Band Edges	Pass	ANSI C63.10 (2020) KDB 789033 D02 v02r01
2.6	15.209 and 15.407 (b)	4.6	6.13 and 8.9	Spurious Radiated Emissions	Pass	ANSI C63.10 (2020) KDB 789033 D02 v02r01
2.7	15.407 (b)	4.6	6.13	Unwanted Emissions within the 5925-7125 MHz band	Pass	KDB 987594 D02 v03
2.8	15.407 (d)(6)	4.7	-	Contention Based Protocol	Pass	KDB 987594 D02 v03
2.9	15.407 (d)(10)	-	-	Transmit Power Control	Pass	KDB 987594 D02 v03

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a desktop 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 as a Dual Client (6CD) 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 (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 + Core 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 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 is described in the test result section 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	0.23	1.15
	6105 to 6265	0.37	1.17
	6265 to 6425	-0.15	1.21
	6425 to 6525	0.33	1.27
	6525 to 6875	0.88	1.25
	6875 to 7125	-1.11	1.26
Core 1	5925 to 6105	0.71	1.15
	6105 to 6265	1.37	1.17
	6265 to 6425	1.63	1.21
	6425 to 6525	1.37	1.27
	6525 to 6875	1.62	1.25
	6875 to 7125	1.85	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: A3143			
Serial Number	Hardware Version	Software Version	Firmware
C3QWHF6CNX	REV1.0	24A62400u	23.30.16
KF7HX3N4PJ	REV1.0	24A61871k	23.10.819.0.41.51.140
P44KN4197F	REV1.0	24A62401d	23.30.16
VCXLW6763J	REV1.0	24A62401d	23.30.16
JHJ0Q3L9N0	REV1.0	24A62401d	23.30.16
K36DT67Y70	REV1.0	24A62400u	23.30.16
QWX9XGVV4Q	REV1.0	24B13a	23.10.876.0.41.51.158
XJ32YWNFP0	REV1.0	24D3	23.10.889.3
NTP2P9W067	REV1.0	24A62401d	23.30.16
VXR3QWTV2G	REV1.0	24B13a	23.10.876.0.41.51.158

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: A3143, Serial Number: KF7HX3N4PJ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: P44KN4197F			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: JHJ0Q3L9N0			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: C3QWHF6CNX			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: K36DT67Y70			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: QWX9XGVV4Q			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: NTP2P9W067			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: VCXLW6763J			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: VXR3QWTV2G			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3143, Serial Number: XJ32YWNFP0			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5

1.8 Test Location

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	David Hill, Feda Hussein and Mustafa Murad	UKAS
Dual Client Test	Stefan Gilfedder	UKAS
Maximum Conducted Output Power	David Hill, Feda Hussein and Jayvir Makwana	UKAS
Maximum Conducted Power Spectral Density	David Hill, Feda Hussein and Jayvir Makwana	UKAS
Authorised Band Edges	Akhil Rajendran Bhaskaran Nair, Dale Hills, Elliot Callender, Ioan-Alexandru Bogatu, Jamal Imoro Abubakar, Manohar Thota, Marius Vasii, Morsalin Hossain, Vineeth Nagaraj	UKAS
Spurious Radiated Emissions	Elliot Callender, Ian Hart, Ioan-Alexandru Bogatu and Thomas Randall	UKAS
Unwanted Emissions within the 5925-7125 MHz band	David Hill, Feda Hussein, Jayvir Makwana and Mustafa Murad	UKAS
Contention Based Protocol	Stefan Gilfedder	UKAS
Transmit Power Control	Stefan Gilfedder	UKAS

Table 6

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)
ISED RSS-248, Clause 4.4
ISED RSS-GEN, Clause 6.7

2.1.2 Equipment Under Test and Modification State

A3143, S/N: NTP2P9W067 - Modification State 0
A3143, S/N: VCXLW6763J - Modification State 0
A3143, S/N: VXR3QWTV2G - Modification State 0

2.1.3 Date of Test

18-October-2024 to 06-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 D for 99% occupied bandwidth.

2.1.5 Environmental Conditions

Ambient Temperature	20.6 - 21.9 °C
Relative Humidity	49.0 - 58.9 %

2.1.6 Test Results

6 GHz WLAN

SISO

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11a LPI	20.940	21.060
802.11ax HE20 SU LPI	21.180	21.420
802.11ax HE40 SU LPI	41.760	42.120
802.11ax HE80 SU LPI	82.500	82.940
802.11ax HE160 SU LPI	166.740	167.580
802.11a SP	21.000	21.600
802.11ax HE20 SU SP	21.300	21.480
802.11ax HE40 SU SP	41.880	42.720
802.11ax HE80 SU SP	82.500	83.380
802.11ax HE160 SU SP	166.740	167.580
802.11a VLP	20.940	21.060
802.11ax HE20 SU VLP	21.240	21.360
802.11ax HE40 SU VLP	41.880	42.120
802.11ax HE80 SU VLP	82.500	82.940
802.11ax HE160 SU VLP	166.740	167.580

Table 7 - 26 Bandwidth Summary Results - SISO

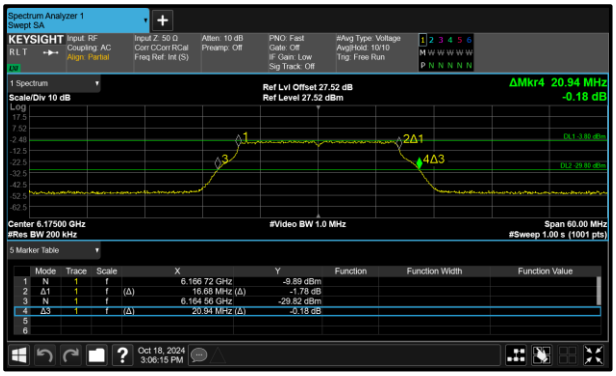

Figure 1 - 802.11a LPI Minimum 26 dB EBW

Figure 2 - 802.11a LPI Maximum 26 dB EBW

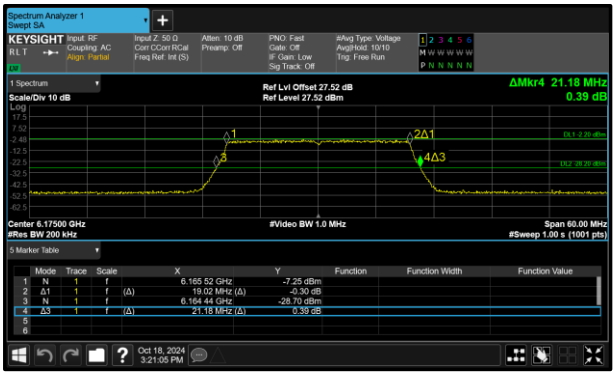

Figure 3 - 802.11ax HE20 SU LPI Minimum 26 dB EBW

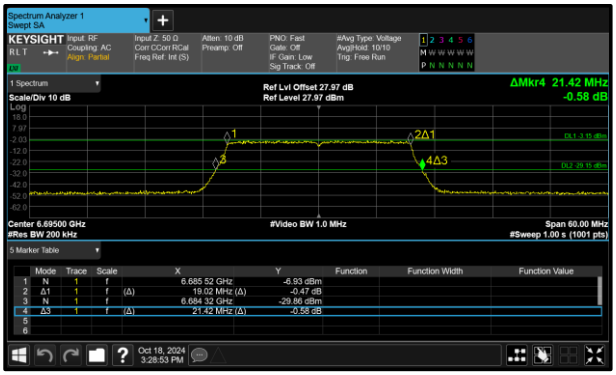

Figure 4 - 802.11ax HE20 SU LPI Maximum 26 dB EBW

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

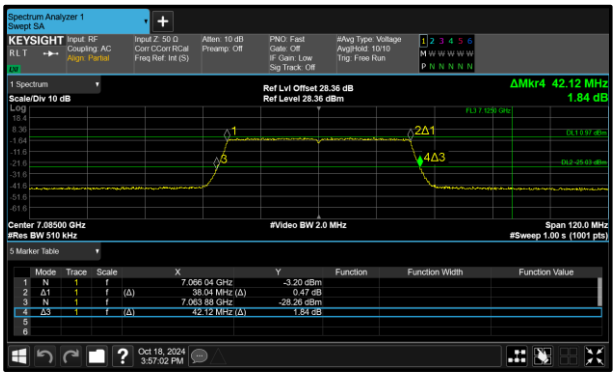

Figure 6 - 802.11ax HE40 SU LPI Maximum 26 dB EBW

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

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

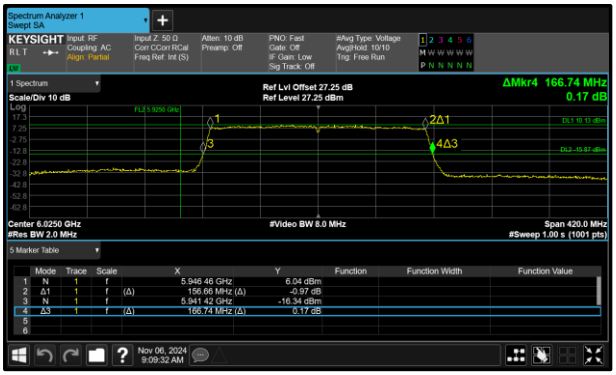

Figure 9 - 802.11ax HE160 SU LPI Minimum 26 dB EBW

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

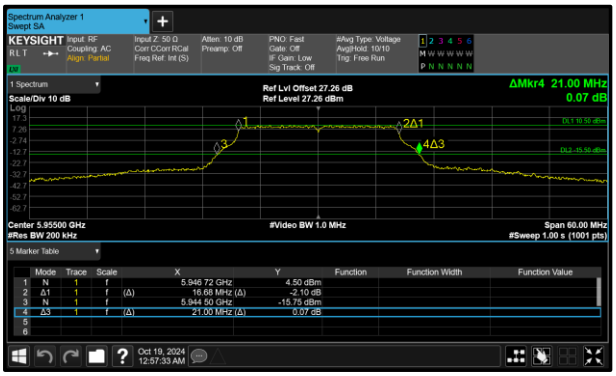

Figure 11 - 802.11a SP Minimum 26 dB EBW

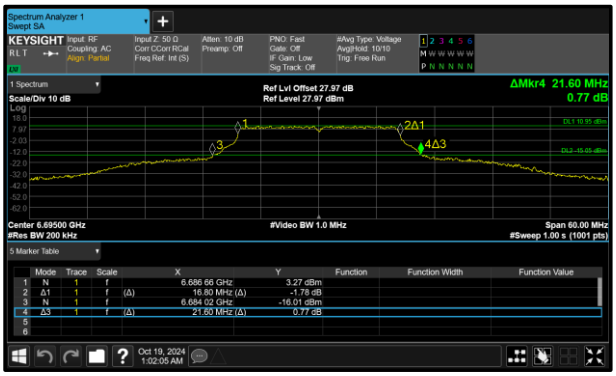

Figure 12 - 802.11a SP Maximum 26 dB EBW

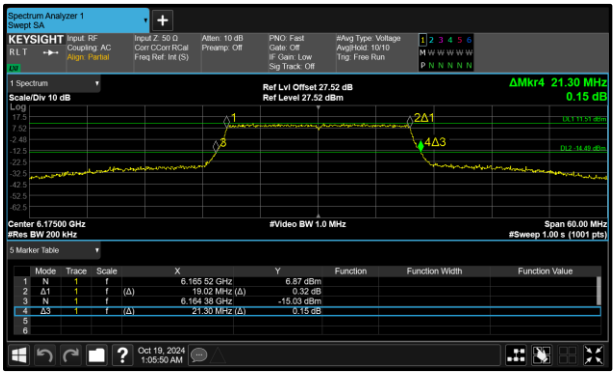

Figure 13 - 802.11ax HE20 SU SP Minimum 26 dB EBW

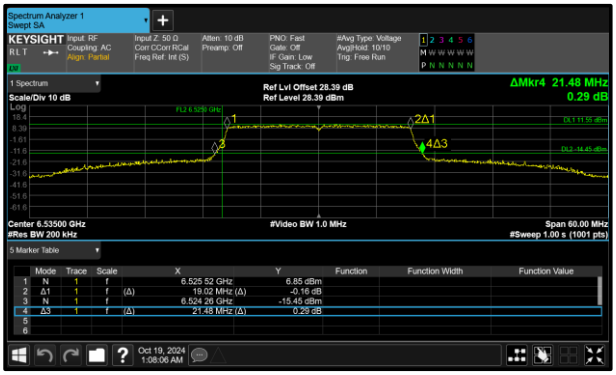

Figure 14 - 802.11ax HE20 SU SP Maximum 26 dB EBW

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

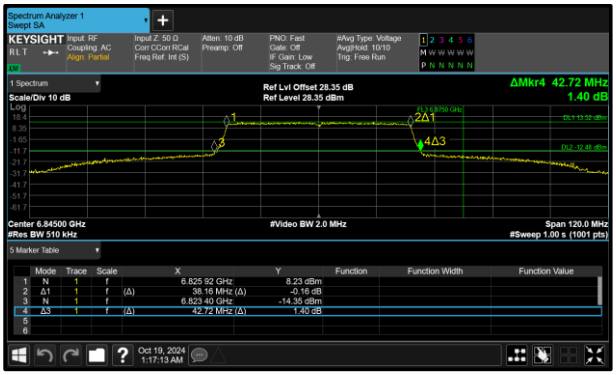

Figure 16 - 802.11ax HE40 SU SP Maximum 26 dB EBW

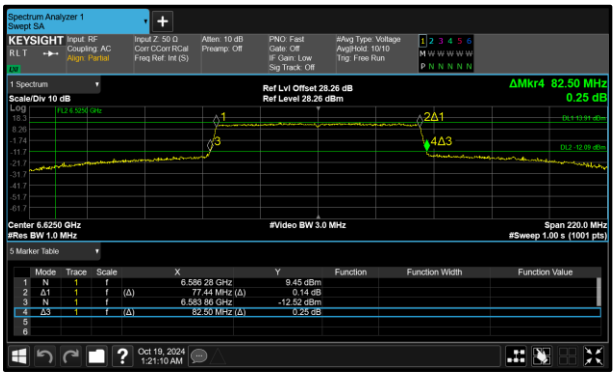

Figure 17 - 802.11ax HE80 SU SP Minimum 26 dB EBW

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

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

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

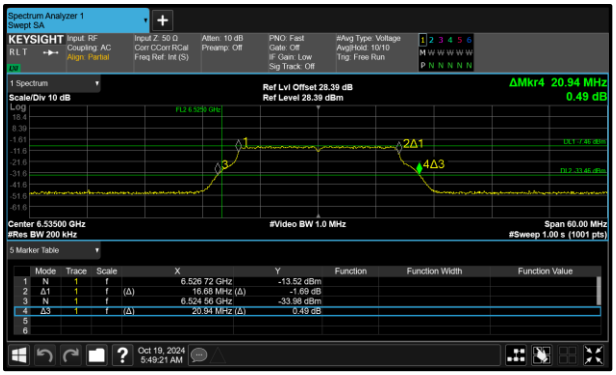

Figure 21 - 802.11a VLP Minimum 26 dB EBW

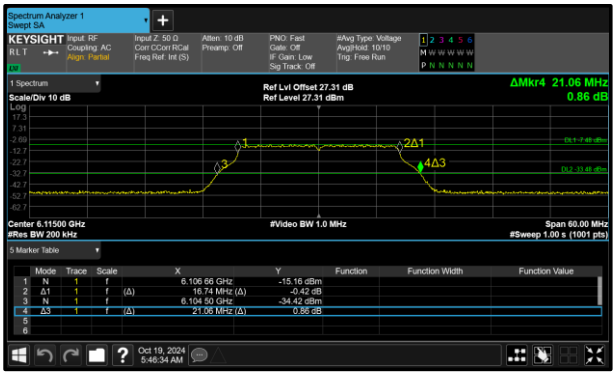

Figure 22 - 802.11a VLP Maximum 26 dB EBW

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

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

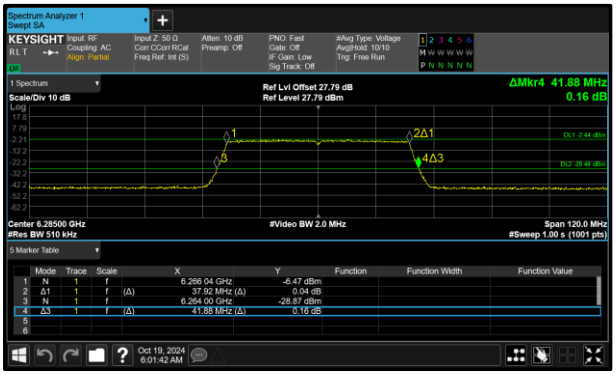

Figure 25 - 802.11ax HE40 SU VLP Minimum 26 dB EBW

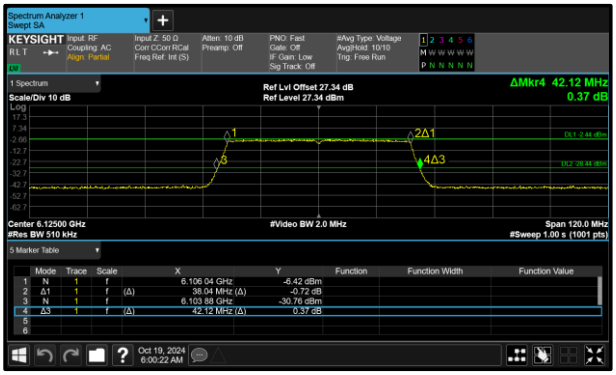

Figure 26 - 802.11ax HE40 SU VLP Maximum 26 dB EBW

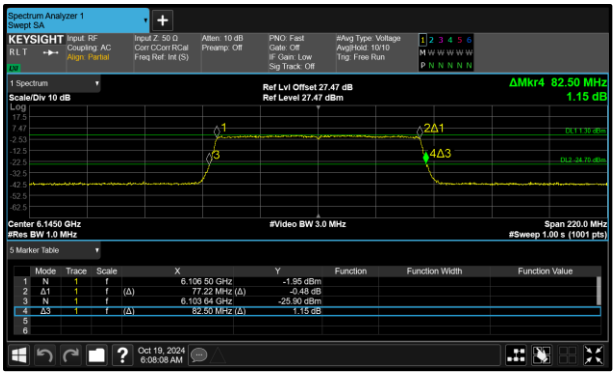

Figure 27 - 802.11ax HE80 SU VLP Minimum 26 dB EBW

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

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

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

Protocol	99% Bandwidth (MHz)	
	Minimum	Maximum
802.11a LPI	16.620	16.680
802.11ax HE20 SU LPI	19.020	19.020
802.11ax HE40 SU LPI	37.920	38.040
802.11ax HE80 SU LPI	77.000	77.440
802.11ax HE160 SU LPI	156.240	156.660
802.11a SP	16.680	16.800
802.11ax HE20 SU SP	19.020	19.080
802.11ax HE40 SU SP	37.920	38.160
802.11ax HE80 SU SP	77.220	77.440
802.11ax HE160 SU SP	156.240	156.660
802.11a VLP	16.620	16.740
802.11ax HE20 SU VLP	19.020	19.020
802.11ax HE40 SU VLP	37.920	38.040
802.11ax HE80 SU VLP	77.220	77.220
802.11ax HE160 SU VLP	156.240	156.240

Table 8 - 99% Bandwidth Summary Results - SISO

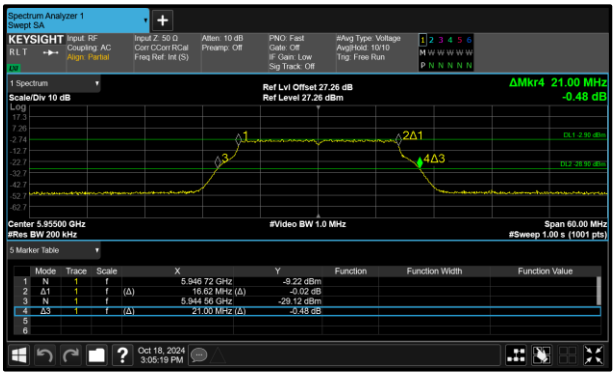

Figure 31 - 802.11a LPI Minimum 99% OBW

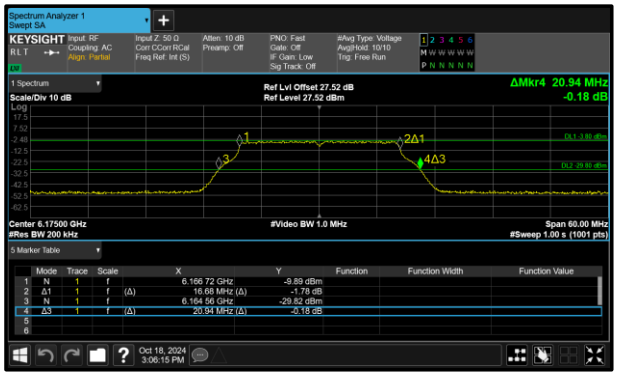

Figure 32 - 802.11a LPI Maximum 99% OBW

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

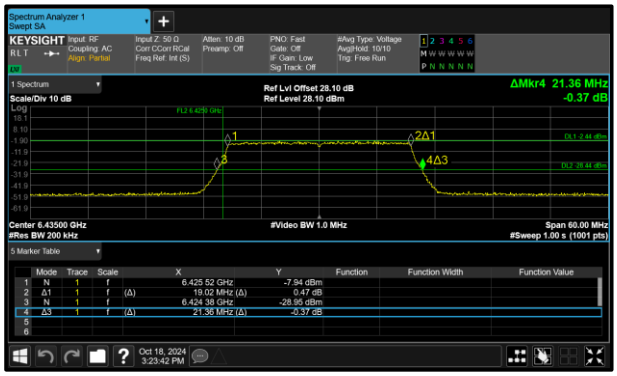

Figure 34 - 802.11ax HE20 SU LPI Maximum 99% OBW

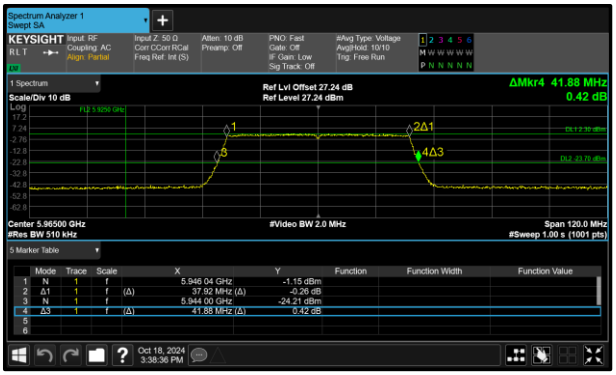

Figure 35 - 802.11ax HE40 SU LPI Minimum 99% OBW

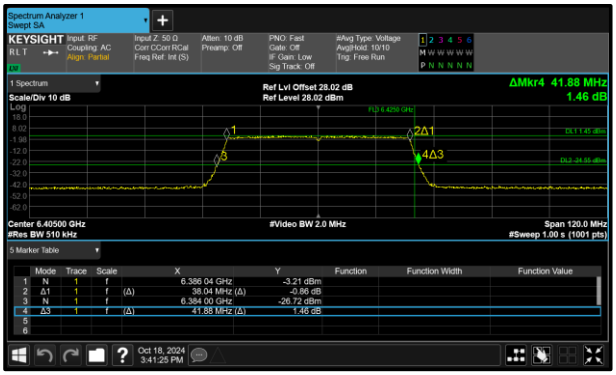

Figure 36 - 802.11ax HE40 SU LPI Maximum 99% OBW

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

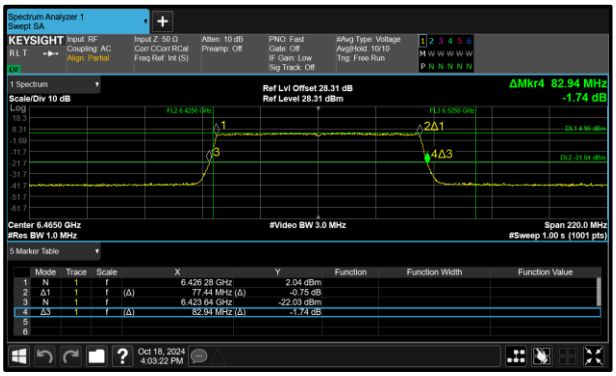

Figure 38 - 802.11ax HE80 SU LPI Maximum 99% OBW

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

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

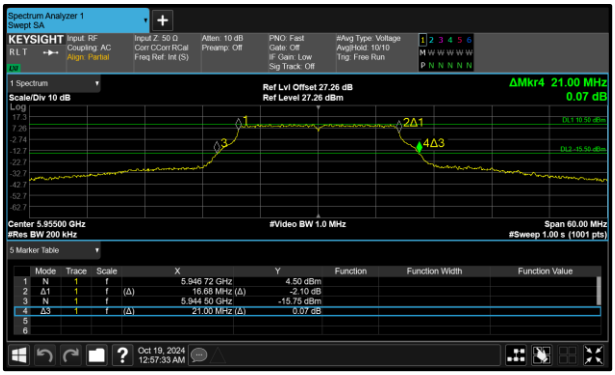

Figure 41 - 802.11a SP Minimum 99% OBW

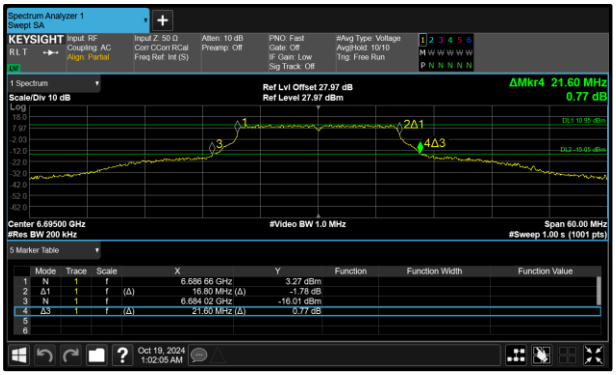

Figure 42 - 802.11a SP Maximum 99% OBW

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

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

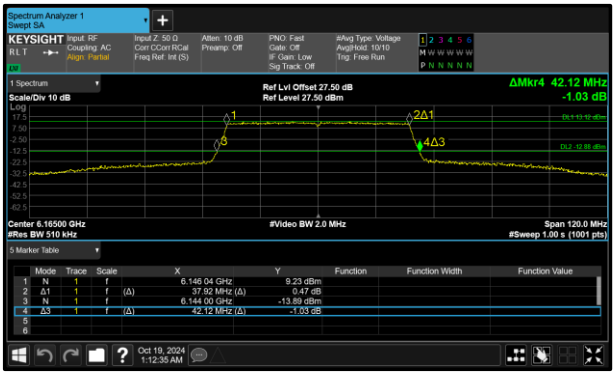

Figure 45 - 802.11ax HE40 SU SP Minimum 99% OBW

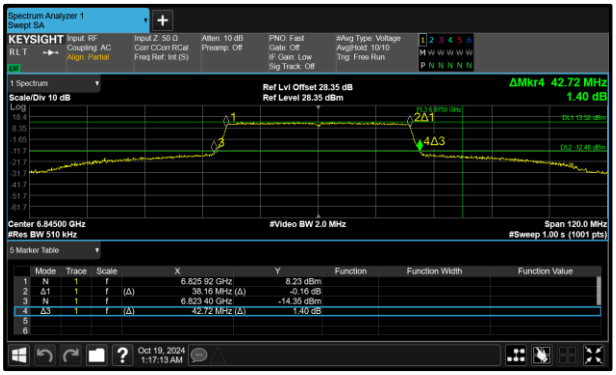

Figure 46 - 802.11ax HE40 SU SP Maximum 99% OBW

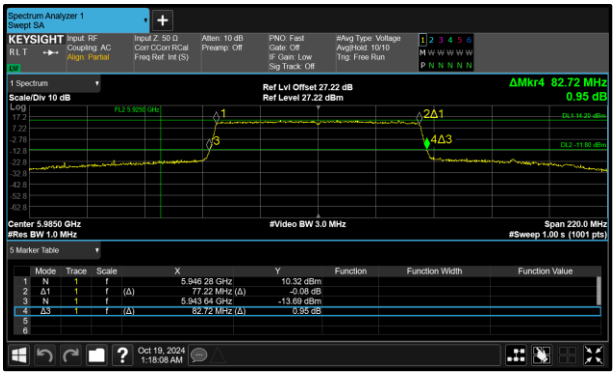

Figure 47 - 802.11ax HE80 SU SP Minimum 99% OBW

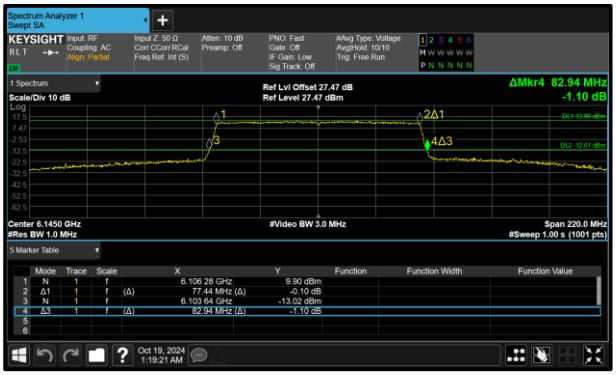

Figure 48 - 802.11ax HE80 SU SP Maximum 99% OBW

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

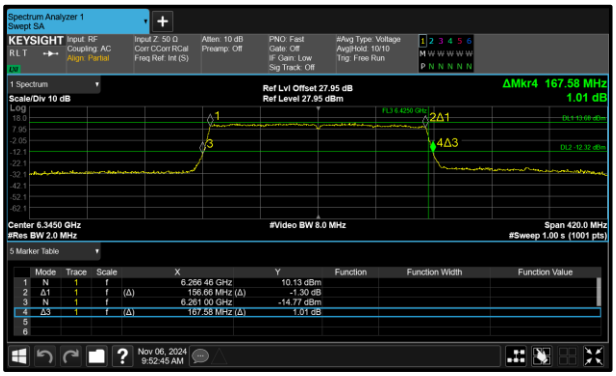

Figure 50 - 802.11ax HE160 SU SP Maximum 99% OBW

Figure 51 - 802.11a VLP Minimum 99% OBW

Figure 52 - 802.11a VLP Maximum 99% OBW

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

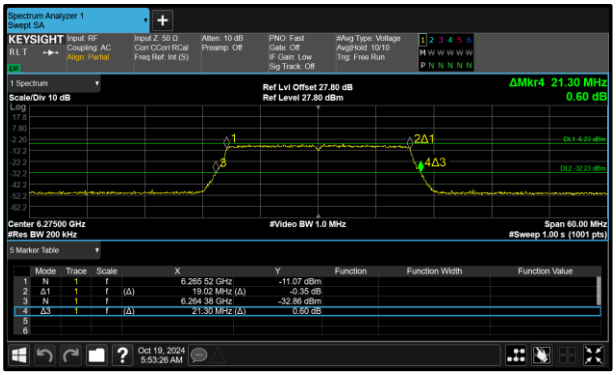

Figure 54 - 802.11ax HE20 SU VLP Maximum 99% OBW

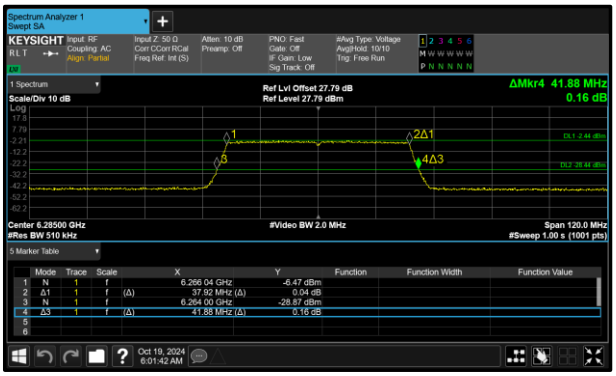

Figure 55 - 802.11ax HE40 SU VLP Minimum 99% OBW

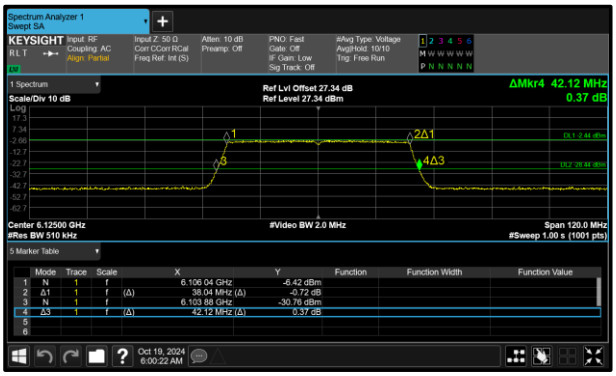

Figure 56 - 802.11ax HE40 SU VLP Maximum 99% OBW

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

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

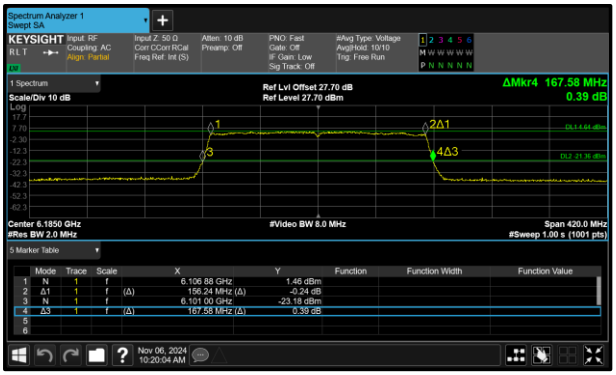

Figure 59 - 802.11ax HE160 SU VLP Minimum 99% OBW

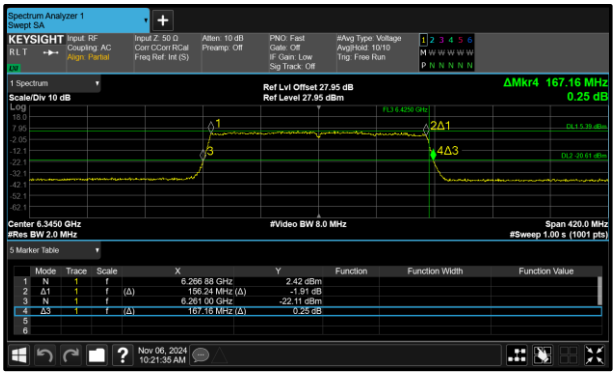

Figure 60 - 802.11ax HE160 SU VLP Maximum 99% OBW

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) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	21.000	-	-	320.0
6175	-	20.940	-	-	320.0
6415	-	21.060	-	-	320.0
6435	-	20.940	-	-	320.0
6475	-	21.000	-	-	320.0
6515	-	20.940	-	-	320.0
6535	-	21.000	-	-	320.0
6695	-	21.000	-	-	320.0
6855	-	21.000	-	-	320.0
6875	-	21.000	-	-	320.0
6895	-	21.000	-	-	320.0
6995	-	21.060	-	-	320.0
7115	-	21.000	-	-	320.0

Table 9 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	16.620	-	-	320.0
6175	-	16.680	-	-	320.0
6415	-	16.680	-	-	320.0
6435	-	16.620	-	-	320.0
6475	-	16.680	-	-	320.0
6515	-	16.680	-	-	320.0
6535	-	16.680	-	-	320.0
6695	-	16.680	-	-	320.0
6855	-	16.620	-	-	320.0
6875	-	16.680	-	-	320.0
6895	-	16.620	-	-	320.0
6995	-	16.680	-	-	320.0
7115	-	16.680	-	-	320.0

Table 10 - 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) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	21.360	-	-	320.0
6175	-	21.180	-	-	320.0
6415	-	21.360	-	-	320.0
6435	-	21.360	-	-	320.0
6475	-	21.300	-	-	320.0
6515	-	21.360	-	-	320.0
6535	-	21.360	-	-	320.0
6695	-	21.420	-	-	320.0
6855	-	21.300	-	-	320.0
6875	-	21.360	-	-	320.0
6895	-	21.300	-	-	320.0
6995	-	21.300	-	-	320.0
7095	-	21.180	-	-	320.0

Table 11 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	19.020	-	-	320.0
6175	-	19.020	-	-	320.0
6415	-	19.020	-	-	320.0
6435	-	19.020	-	-	320.0
6475	-	19.020	-	-	320.0
6515	-	19.020	-	-	320.0
6535	-	19.020	-	-	320.0
6695	-	19.020	-	-	320.0
6855	-	19.020	-	-	320.0
6875	-	19.020	-	-	320.0
6895	-	19.020	-	-	320.0
6995	-	19.020	-	-	320.0
7095	-	19.020	-	-	320.0

Table 12 - 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) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5965	-	41.880	-	-	320.0
6165	-	41.880	-	-	320.0
6405	-	41.880	-	-	320.0
6445	-	41.760	-	-	320.0
6485	-	41.880	-	-	320.0
6525	-	42.000	-	-	320.0
6565	-	41.880	-	-	320.0
6685	-	41.760	-	-	320.0
6845	-	41.880	-	-	320.0
6885	-	42.000	-	-	320.0
6925	-	41.880	-	-	320.0
7005	-	41.760	-	-	320.0
7085	-	42.120	-	-	320.0

Table 13 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5965	-	37.920	-	-	320.0
6165	-	37.920	-	-	320.0
6405	-	38.040	-	-	320.0
6445	-	37.920	-	-	320.0
6485	-	38.040	-	-	320.0
6525	-	38.040	-	-	320.0
6565	-	38.040	-	-	320.0
6685	-	37.920	-	-	320.0
6845	-	37.920	-	-	320.0
6885	-	38.040	-	-	320.0
6925	-	38.040	-	-	320.0
7005	-	38.040	-	-	320.0
7085	-	38.040	-	-	320.0

Table 14 - 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) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5985	-	82.720	-	-	320.0
6145	-	82.500	-	-	320.0
6385	-	82.720	-	-	320.0
6465	-	82.940	-	-	320.0
6545	-	82.500	-	-	320.0
6625	-	82.720	-	-	320.0
6705	-	82.720	-	-	320.0
6785	-	82.500	-	-	320.0
6865	-	82.720	-	-	320.0
6945	-	82.720	-	-	320.0
7025	-	82.720	-	-	320.0

Table 15 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5985	-	77.220	-	-	320.0
6145	-	77.220	-	-	320.0
6385	-	77.220	-	-	320.0
6465	-	77.440	-	-	320.0
6545	-	77.440	-	-	320.0
6625	-	77.220	-	-	320.0
6705	-	77.220	-	-	320.0
6785	-	77.440	-	-	320.0
6865	-	77.000	-	-	320.0
6945	-	77.220	-	-	320.0
7025	-	77.220	-	-	320.0

Table 16 - 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) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6025	-	166.740	-	-	320.0
6185	-	166.740	-	-	320.0
6345	-	167.160	-	-	320.0
6505	-	167.160	-	-	320.0
6665	-	167.160	-	-	320.0
6825	-	167.580	-	-	320.0
6985	-	166.740	-	-	320.0

Table 17 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6025	-	156.660	-	-	320.0
6185	-	156.240	-	-	320.0
6345	-	156.660	-	-	320.0
6505	-	156.240	-	-	320.0
6665	-	156.240	-	-	320.0
6825	-	156.240	-	-	320.0
6985	-	156.240	-	-	320.0

Table 18 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-6 U-NII-7
Limit Clause(s):	15.407 (a)(11) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	21.000	-	-	320.0
6175	-	21.060	-	-	320.0
6415	-	21.000	-	-	320.0
6535	-	21.120	-	-	320.0
6695	-	21.600	-	-	320.0
6855	-	21.240	-	-	320.0

Table 19 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	16.680	-	-	320.0
6175	-	16.740	-	-	320.0
6415	-	16.740	-	-	320.0
6435	-	16.740	-	-	320.0
6475	-	16.740	-	-	320.0
6515	-	16.740	-	-	320.0
6535	-	16.740	-	-	320.0
6695	-	16.800	-	-	320.0
6855	-	16.740	-	-	320.0

Table 20 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-6 U-NII-7
Limit Clause(s):	15.407 (a)(11) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	21.420	-	-	320.0
6175	-	21.300	-	-	320.0
6415	-	21.420	-	-	320.0
6535	-	21.480	-	-	320.0
6695	-	21.360	-	-	320.0
6855	-	21.480	-	-	320.0

Table 21 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5955	-	19.020	-	-	320.0
6175	-	19.020	-	-	320.0
6415	-	19.020	-	-	320.0
6435	-	19.020	-	-	320.0
6475	-	19.020	-	-	320.0
6515	-	19.020	-	-	320.0
6535	-	19.020	-	-	320.0
6695	-	19.020	-	-	320.0
6855	-	19.080	-	-	320.0

Table 22 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-6 U-NII-7
Limit Clause(s):	15.407 (a)(11) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5965	-	41.880	-	-	320.0
6165	-	42.120	-	-	320.0
6405	-	41.880	-	-	320.0
6565	-	42.480	-	-	320.0
6685	-	42.360	-	-	320.0
6845	-	42.720	-	-	320.0

Table 23 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5965	-	38.040	-	-	320.0
6165	-	37.920	-	-	320.0
6405	-	38.040	-	-	320.0
6445	-	38.040	-	-	320.0
6485	-	38.040	-	-	320.0
6525	-	38.040	-	-	320.0
6565	-	38.040	-	-	320.0
6685	-	38.040	-	-	320.0
6845	-	38.160	-	-	320.0

Table 24 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-6 U-NII-7
Limit Clause(s):	15.407 (a)(11) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5985	-	82.720	-	-	320.0
6145	-	82.940	-	-	320.0
6385	-	82.720	-	-	320.0
6625	-	82.500	-	-	320.0
6705	-	83.160	-	-	320.0
6785	-	83.380	-	-	320.0

Table 25 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
5985	-	77.220	-	-	320.0
6145	-	77.440	-	-	320.0
6385	-	77.440	-	-	320.0
6465	-	77.220	-	-	320.0
6545	-	77.440	-	-	320.0
6625	-	77.440	-	-	320.0
6705	-	77.440	-	-	320.0
6785	-	77.440	-	-	320.0

Table 26 - 99% Bandwidth Results

Test Configuration			
Frequency Range:	5.925-6.425 GHz 6.425-6.525 GHz 6.525-6.875 GHz	Band:	U-NII-5 U-NII-6 U-NII-7
Limit Clause(s):	15.407 (a)(11) RSS-248 4.4	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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6025	-	167.160	-	-	320.0
6185	-	166.740	-	-	320.0
6345	-	167.580	-	-	320.0
6665	-	167.160	-	-	320.0

Table 27 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6025	-	156.240	-	-	320.0
6185	-	156.240	-	-	320.0
6345	-	156.660	-	-	320.0
6505	-	156.240	-	-	320.0
6665	-	156.660	-	-	320.0

Table 28 - 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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6115	-	21.060	-	-	320.0
6275	-	21.060	-	-	320.0
6415	-	21.060	-	-	320.0
6535	-	20.940	-	-	320.0
6695	-	21.000	-	-	320.0
6855	-	21.060	-	-	320.0

Table 29 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6115	-	16.740	-	-	320.0
6275	-	16.680	-	-	320.0
6415	-	16.620	-	-	320.0
6535	-	16.680	-	-	320.0
6695	-	16.680	-	-	320.0
6855	-	16.680	-	-	320.0

Table 30 - 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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6115	-	21.300	-	-	320.0
6275	-	21.300	-	-	320.0
6415	-	21.360	-	-	320.0
6535	-	21.240	-	-	320.0
6695	-	21.360	-	-	320.0
6855	-	21.300	-	-	320.0

Table 31 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6115	-	19.020	-	-	320.0
6275	-	19.020	-	-	320.0
6415	-	19.020	-	-	320.0
6535	-	19.020	-	-	320.0
6695	-	19.020	-	-	320.0
6855	-	19.020	-	-	320.0

Table 32 - 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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6125	-	42.120	-	-	320.0
6285	-	41.880	-	-	320.0
6405	-	42.120	-	-	320.0
6565	-	41.880	-	-	320.0
6685	-	42.120	-	-	320.0
6845	-	42.000	-	-	320.0

Table 33 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6125	-	38.040	-	-	320.0
6285	-	37.920	-	-	320.0
6405	-	37.920	-	-	320.0
6565	-	37.920	-	-	320.0
6685	-	38.040	-	-	320.0
6845	-	37.920	-	-	320.0

Table 34 - 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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6145	-	82.500	-	-	320.0
6225	-	82.720	-	-	320.0
6385	-	82.720	-	-	320.0
6625	-	82.720	-	-	320.0
6705	-	82.500	-	-	320.0
6785	-	82.940	-	-	320.0

Table 35 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6145	-	77.220	-	-	320.0
6225	-	77.220	-	-	320.0
6385	-	77.220	-	-	320.0
6625	-	77.220	-	-	320.0
6705	-	77.220	-	-	320.0
6785	-	77.220	-	-	320.0

Table 36 - 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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6185	-	167.580	-	-	320.0
6345	-	167.160	-	-	320.0
6665	-	166.740	-	-	320.0

Table 37 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (MHz)
	A	B	C	D	
6185	-	156.240	-	-	320.0
6345	-	156.240	-	-	320.0
6665	-	156.240	-	-	320.0

Table 38 - 99% Bandwidth Results

MIMO CDD

Protocol	26 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11ax HE20 SU LPI	21.240	21.480
802.11ax HE40 SU LPI	41.640	42.120
802.11ax HE80 SU LPI	82.500	82.940
802.11ax HE160 SU LPI	165.900	167.580
802.11ax HE20 SU SP	21.240	21.480
802.11ax HE40 SU SP	42.000	42.600
802.11ax HE80 SU SP	82.720	88.660
802.11ax HE160 SU SP	165.900	167.580
802.11ax HE20 SU VLP	21.240	21.480
802.11ax HE40 SU VLP	41.880	42.240
802.11ax HE80 SU VLP	82.280	82.940
802.11ax HE160 SU VLP	166.320	167.160

Table 39 - 26dB Bandwidth Summary Results - MIMO CDD

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

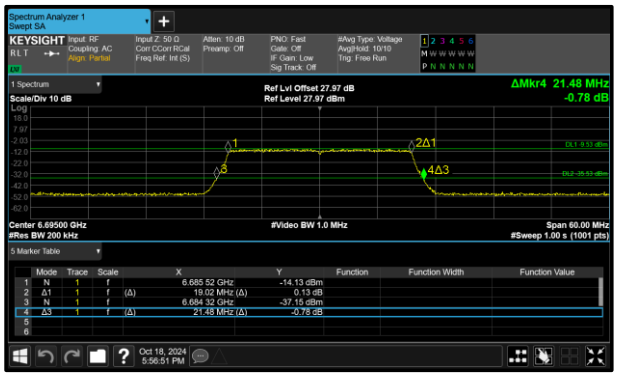

Figure 62 - 802.11ax HE20 SU LPI Maximum 26 dB EBW

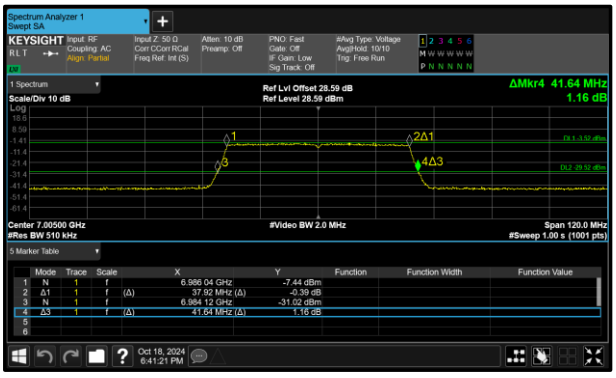

Figure 63 - 802.11ax HE40 SU LPI Minimum 26 dB EBW

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

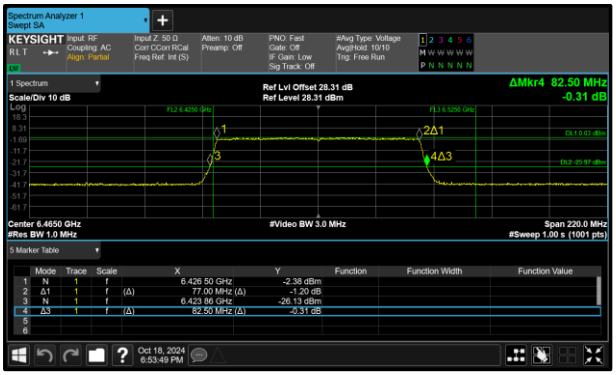

Figure 65 - 802.11ax HE80 SU LPI Minimum 26 dB EBW

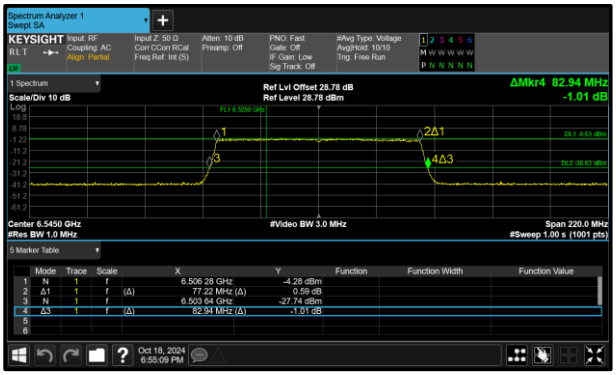

Figure 66 - 802.11ax HE80 SU LPI Maximum 26 dB EBW

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

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

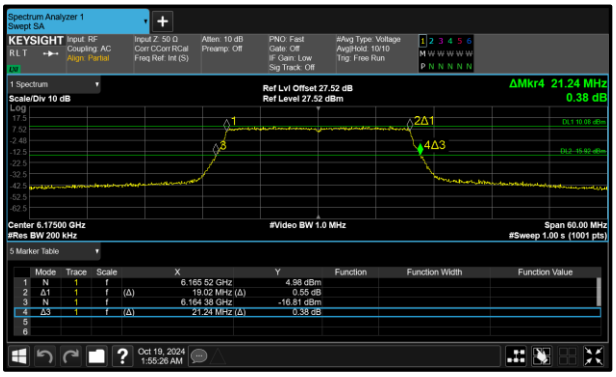

Figure 69 - 802.11ax HE20 SU SP Minimum 26 dB EBW

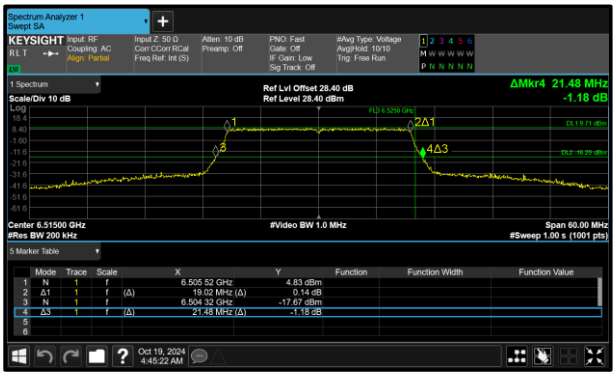

Figure 70 - 802.11ax HE20 SU SP Maximum 26 dB EBW

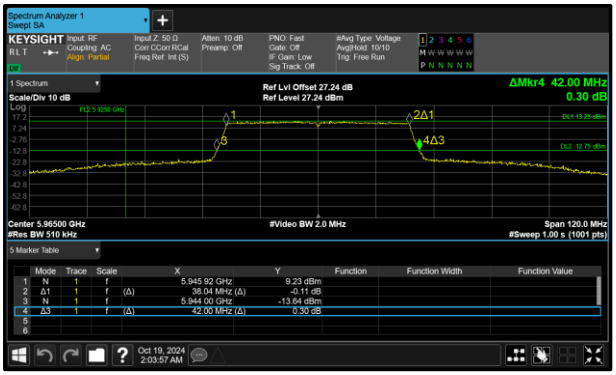

Figure 71 - 802.11ax HE40 SU SP Minimum 26 dB EBW

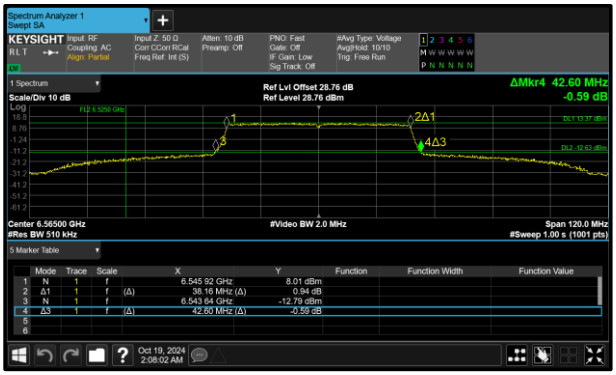

Figure 72 - 802.11ax HE40 SU SP Maximum 26 dB EBW

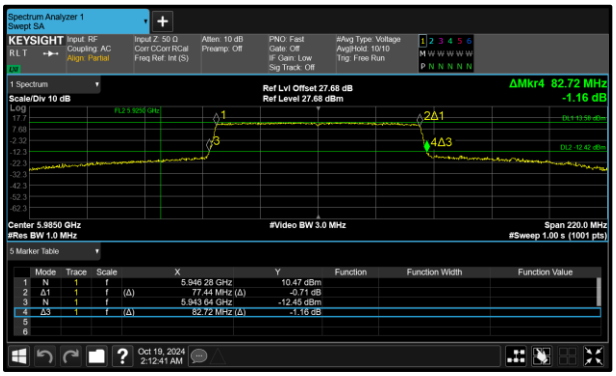

Figure 73 - 802.11ax HE80 SU SP Minimum 26 dB EBW

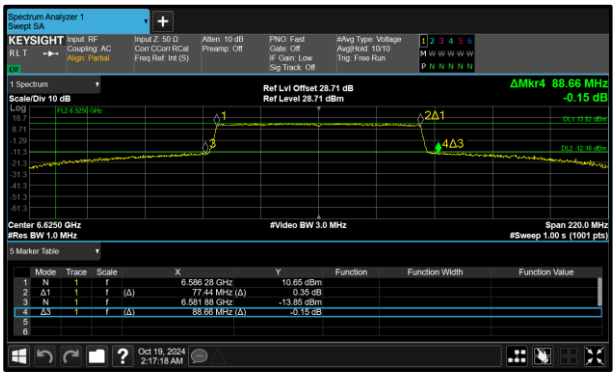

Figure 74 - 802.11ax HE80 SU SP Maximum 26 dB EBW

Figure 75 - 802.11ax HE160 SU SP Minimum 26 dB EBW

Figure 76 - 802.11ax HE160 SU SP Maximum 26 dB EBW

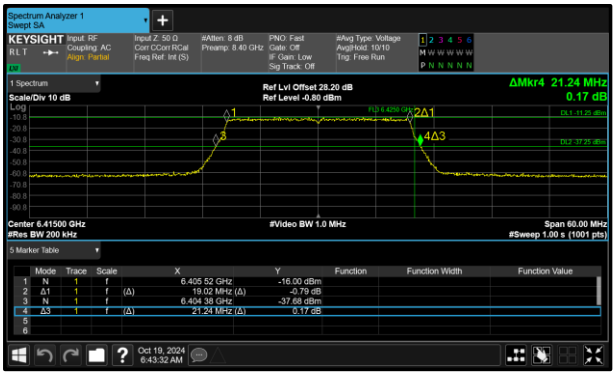

Figure 77 - 802.11ax HE20 SU VLP Minimum 26 dB EBW

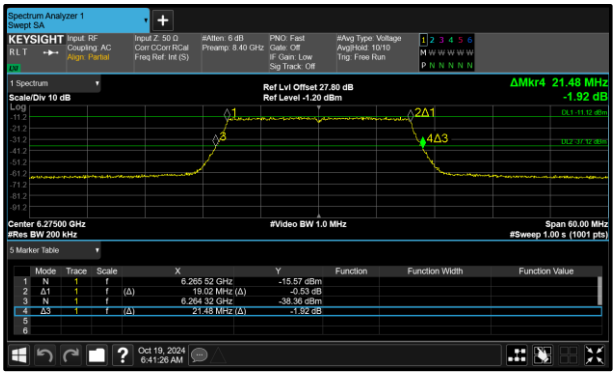

Figure 78 - 802.11ax HE20 SU VLP Maximum 26 dB EBW

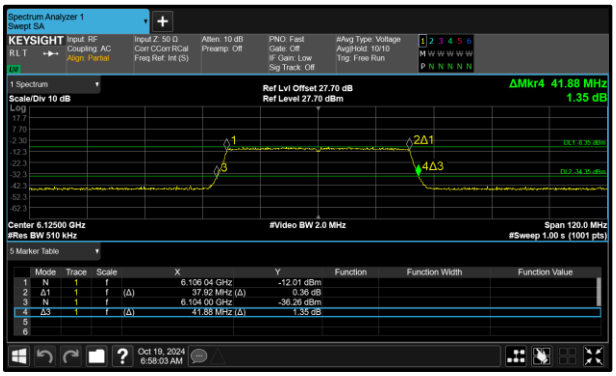

Figure 79 - 802.11ax HE40 SU VLP Minimum 26 dB EBW

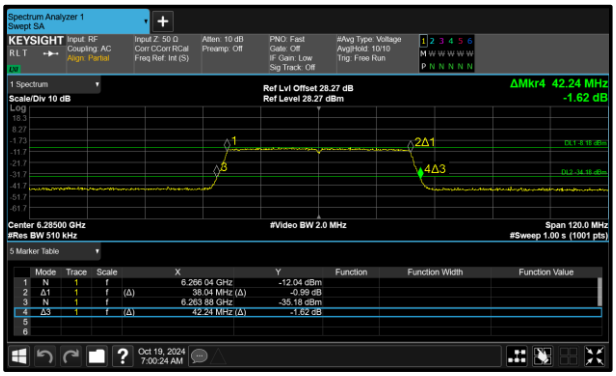

Figure 80 - 802.11ax HE40 SU VLP Maximum 26 dB EBW

Figure 81 - 802.11ax HE80 SU VLP Minimum 26 dB EBW

Figure 82 - 802.11ax HE80 SU VLP Maximum 26 dB EBW