FCC and ISED Test Report

Apple Inc
Model: A2779

In accordance with FCC 47 CFR Part 15E, ISED RSS-247 and ISED RSS-GEN (Narrowband)

Prepared for: Apple Inc
One Apple Park Way
Cupertino, California
95014, USA

FCC ID: BCGA2779 IC: 579C-A2779

Add value.
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TUV SUD Limited Digitally signed by TUV SUD Limited Date: 2022.12.13 09:59:34 Z

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Document 75955428-07 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve White	Key Account Manager	Authorised Signatory	13 December 2022

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-247 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	Hollie Marshall	13 December 2022	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15E: 2021, ISED RSS-247: Issue 2 (2017-02) and ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

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ACCREDITATION

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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	13 December 2022

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2779
Serial Number(s)	JM67M9K770 and NX7LCFL417
Hardware Version(s)	REV 1.0
Software Version(s)	22A31991j
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15E: 2021 ISED RSS-247: Issue 2 (2017-02) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Order Number	0540246998
Start of Test	11-August-2022
Finish of Test	24-November-2022
Name of Engineer(s)	Ian Hart, Colin Brain, Thomas Randall, Thomas Biddlecombe, Elliot Callender, Mohammad Malik and Ioan-Alexandru Bogatu
Related Document(s)	KDB 662911 D01 v02r01 ANSI C63.10 (2013) ANSI C63.10 (2020)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15E, ISED RSS-247 and ISED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	FCC Part 15E	RSS-247	RSS-GEN			
Configuration and Mode: NarrowBand						
-	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.2	15.407 (a)	6.2	-	Emission Bandwidth	Pass	
2.3	15.407 (a)	6.2	-	Maximum Conducted Output Power	Pass	
2.4	15.407 (a)	6.2	-	Maximum Conducted Power Spectral Density	Pass	
2.5	15.407 (b).	6.1	-	Authorised Band Edges	Pass	
2.6	15.209 and 15.407 (b)	6.2	6.13 and 8.9	Spurious Radiated Emissions	Pass	

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test was an Apple laptop computer with Bluetooth® and IEEE 802.11 a/b/g/n/ac/ax Wi-Fi capabilities in the 2.4 GHz, 5 GHz and 6 GHz bands.

1.4.2 Test Setup

For conducted tests, a conducted test point was provided by the manufacturer via a UFL connector and cable. The loss of these test cables were known and compensated for in any conducted measurements.

For tests in SISO operation, conducted tests were performed on the core with the highest antenna gain as Core 0 and Core 1 are identical but with unequal antenna gains.

Narrowband was supported in the following frequency bands:

US: 5162-5245 MHz
US and Canada: 5733-5844 MHz

The following modes were supported:

BT Core 0 (SISO) – iPA BDR/HDR and ePA HDR
BT Core 1 (SISO) – iPA BDR/HDR and ePA HDR
BT Core 0 + BT Core 1 (TxBF) – iPA BDR and HDR and ePA HDR

For all tests, the EUT was put into a continuous transmit test mode with the manufacturer's test commands via a script running in the EUTs terminal application. The EUT then transmitted the required type of modulation/packet type on a static channel selected within the test script.

All testing was performed with the EUT powered via a 120 V AC, 60 Hz source.

1.4.3 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
BT Core 0	5150 to 5250	6.61	1.10
	5725 to 5850	5.17	1.20
BT Core 1	5150 to 5250	4.53	1.10
	5725 to 5850	6.72	1.20

Table 3

1.5 Deviations from the Standard

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

1.6 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: A2779, Serial Number: NX7LCFL417			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2779, Serial Number: JM67M9K770			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.7 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: NarrowBand		
Emission Bandwidth	Thomas Biddlecombe	UKAS
Maximum Conducted Output Power	Thomas Biddlecombe	UKAS
Maximum Conducted Power Spectral Density	Thomas Biddlecombe	UKAS

Table 5

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: NarrowBand		
Restricted Band Edges	Ian Hart, Colin Brain and Thomas Randall	UKAS
Authorised Band Edges	Ian Hart, Colin Brain and Thomas Randall	UKAS
Spurious Radiated Emissions	Elliot Callender, Mohammad Malik and Ioan-Alexandru Bogatu	UKAS

Table 6

Office Address:

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

2 Test Details

2.1 Restricted Band Edges

2.1.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.205
ISED RSS-247, Clause 3.3
ISED RSS-GEN, Clause 8.10

2.1.2 Equipment Under Test and Modification State

A2779, S/N: JM67M9K770 - Modification State 0

2.1.3 Date of Test

11-August-2022 to 13-August-2022

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.10.5.
As per ANSI C63.10 clause 6.10.5.2, this testing was performed with frequency hopping turned off.

Restricted Band Edge measurements were performed with the device operating in SISO and TxBF, across the various modes supported by the device.

The measurements displayed within this report have been limited to those modes which have been shown to be worst case.

Further measurements are held on file by TÜV SÜD and are available if required.

2.1.5 Environmental Conditions

Ambient Temperature	21.3 - 22.5 °C
Relative Humidity	38.0 - 54.3 %

2.1.6 Test Results

NarrowBand

iPA - SISO

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
Static	GFSK	0	DH5	5162	5150	56.17	44.37
Static	π/4 DQPSK	0	4-DH5	5162	5150	57.26	44.24
Static	π/4 DQPSK	0	8-DH5	5162	5150	56.28	44.23
Static	GFSK	0	DH5	5245	5350	57.14	44.97
Static	π/4 DQPSK	0	4-DH5	5245	5350	57.68	45.02
Static	π/4 DQPSK	0	8-DH5	5245	5350	57.45	45.03

Table 7 - Restricted Band Edge Results

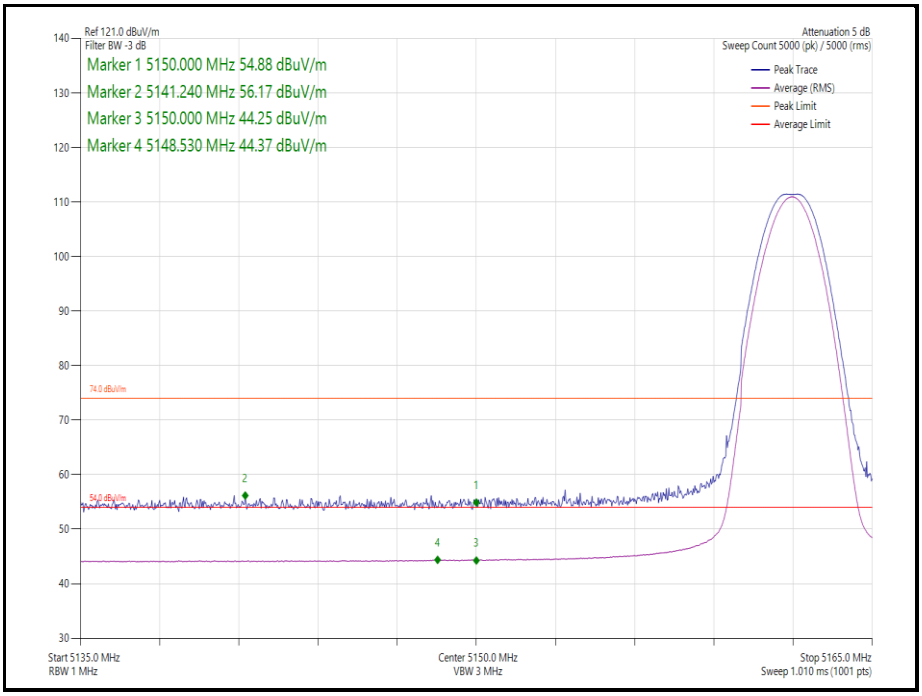

Figure 1 - Static - GFSK/DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

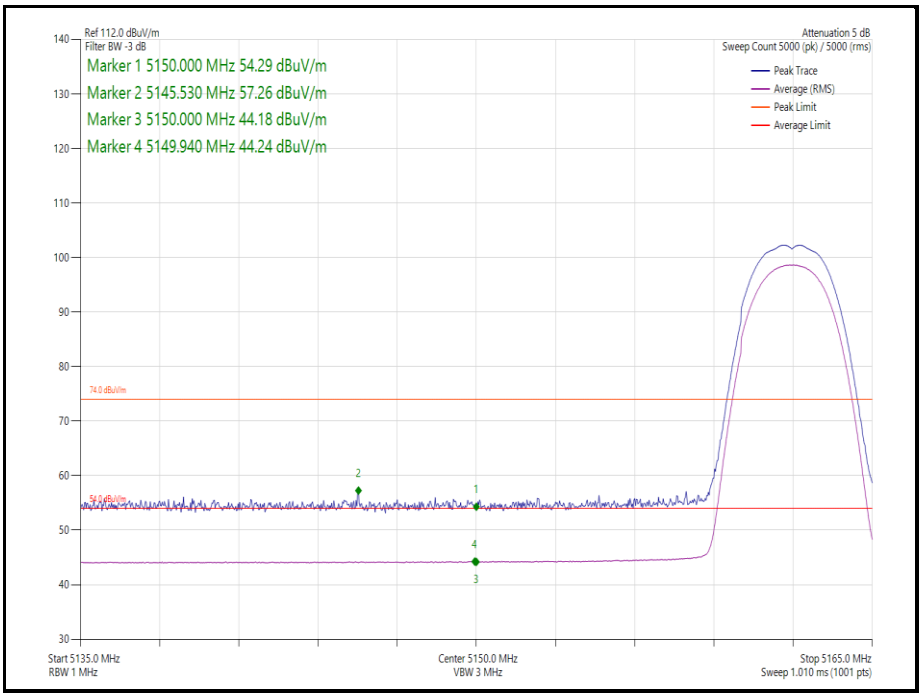

Figure 2 - Static - π/4 DQPSK/4-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

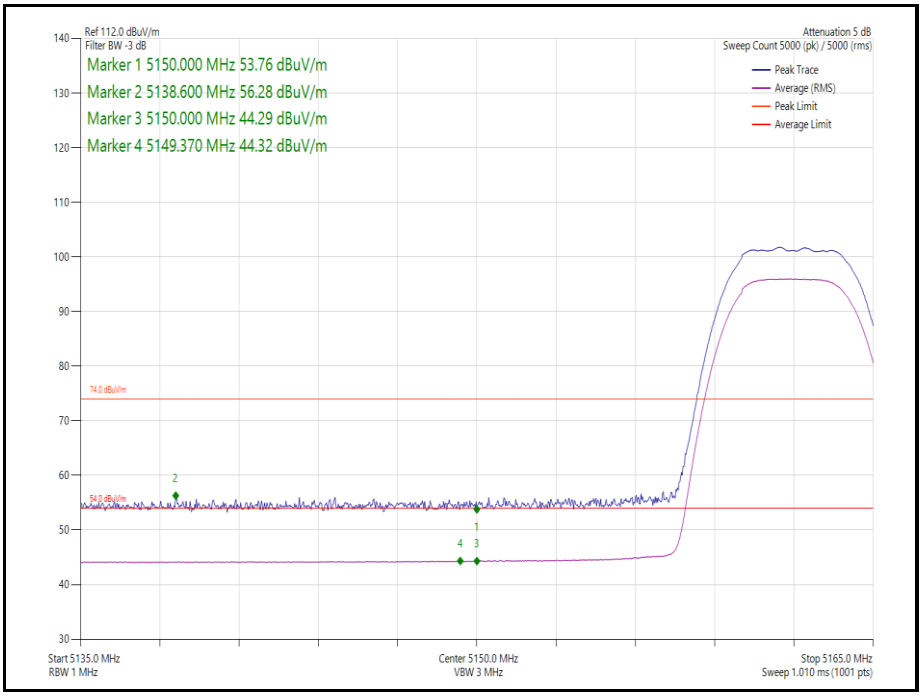

Figure 3 - Static - π/4 DQPSK/8-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

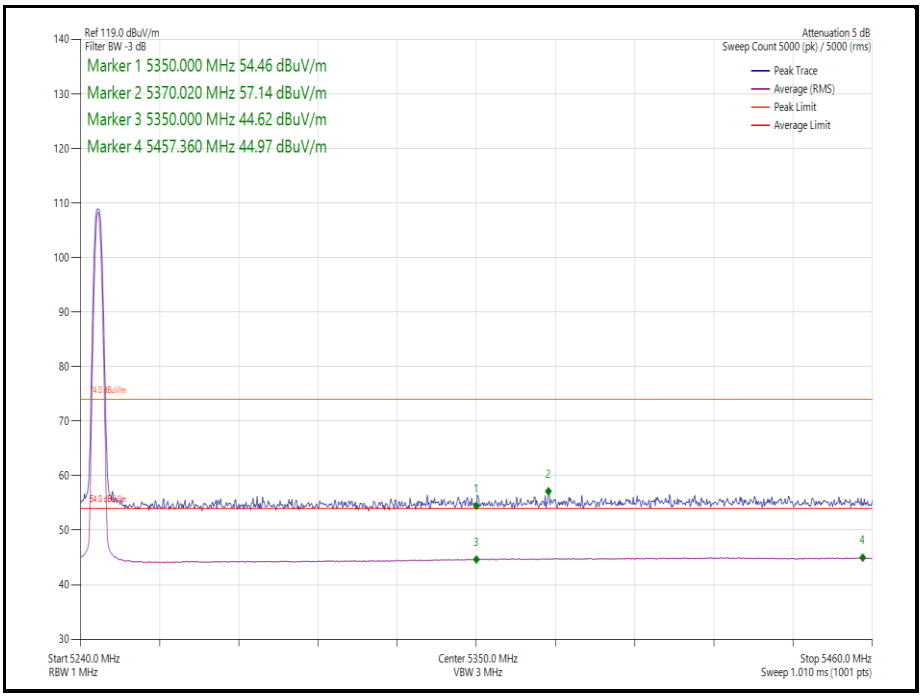

Figure 4 - Static - GFSK/DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

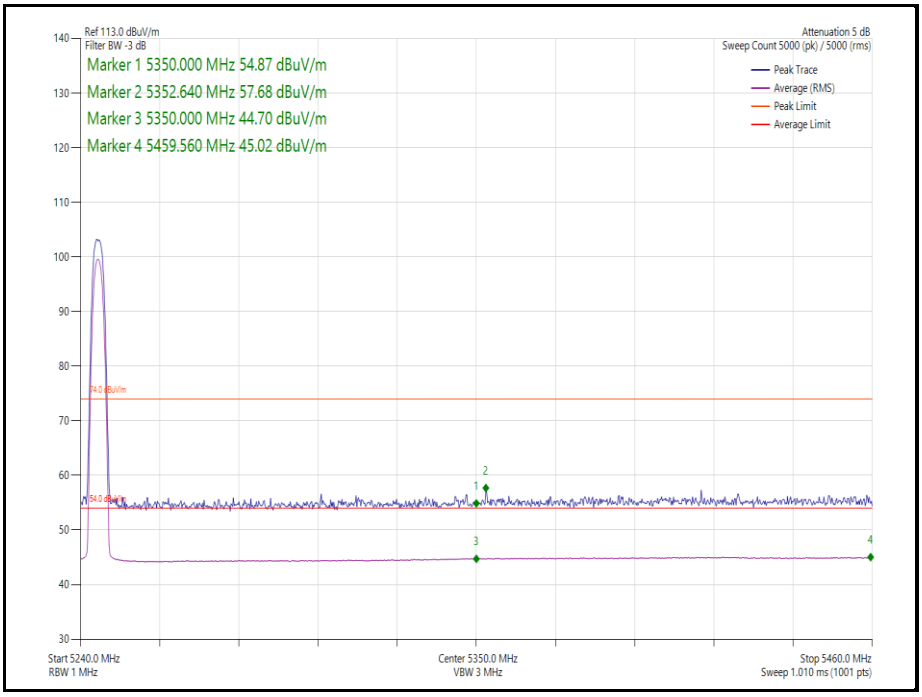

Figure 5 - Static - π/4 DQPSK/4-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

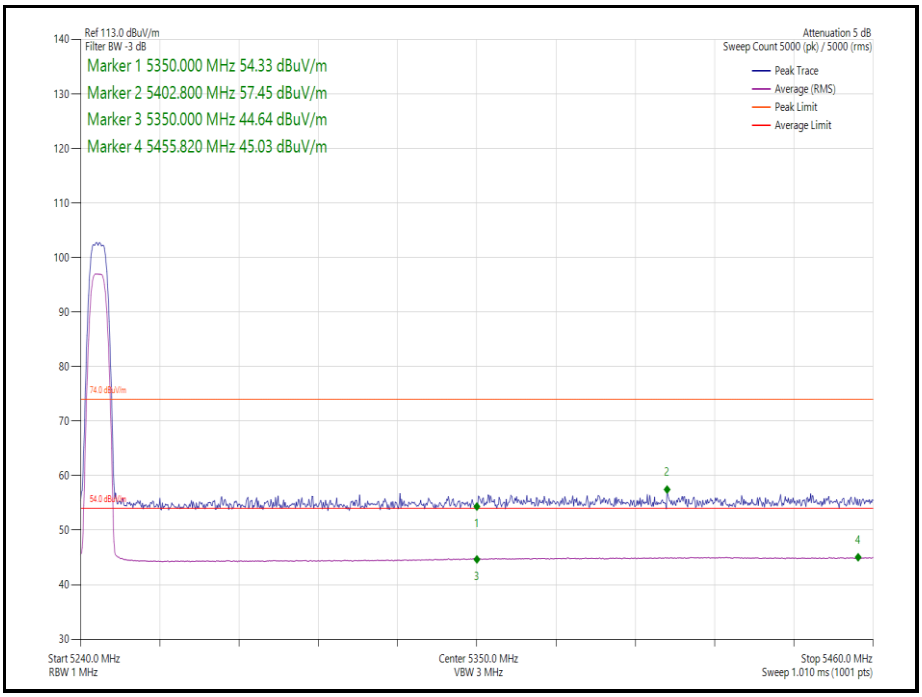

Figure 6 - Static - π/4 DQPSK/8-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

iPA - TXBF

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
Static	GFSK	0-1	DH5	5162	5150	56.49	44.12
Static	π/4 DQPSK	0-1	4-DH5	5162	5150	56.14	44.29
Static	π/4 DQPSK	0-1	8-DH5	5162	5150	56.10	44.45
Static	GFSK	0-1	DH5	5245	5350	56.61	44.78
Static	π/4 DQPSK	0-1	4-DH5	5245	5350	57.02	44.92
Static	π/4 DQPSK	0-1	8-DH5	5245	5350	56.96	44.95

Table 8 - Restricted Band Edge Results

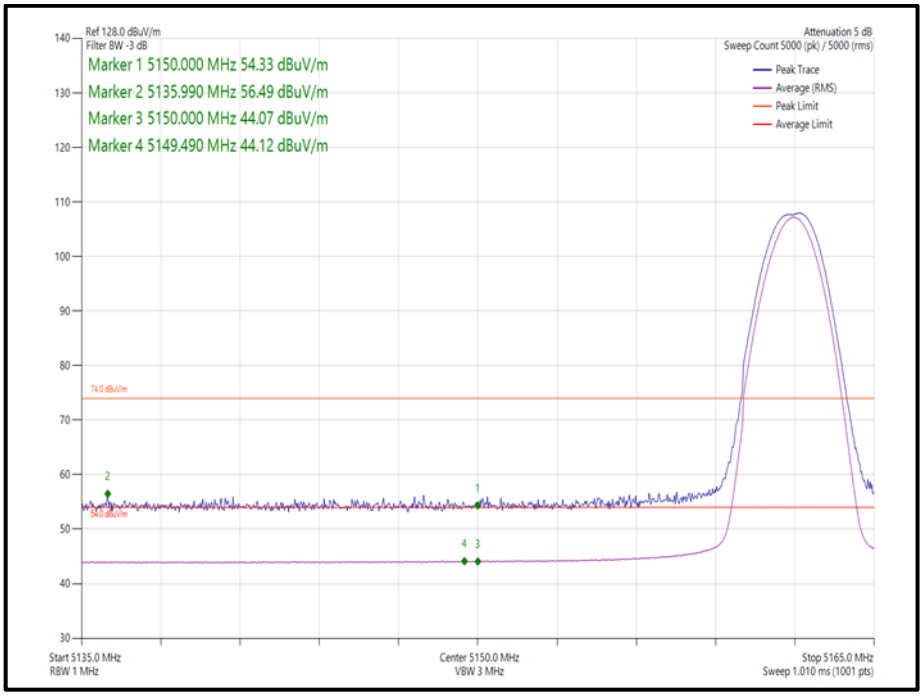

Figure 7 - Static - GFSK/DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

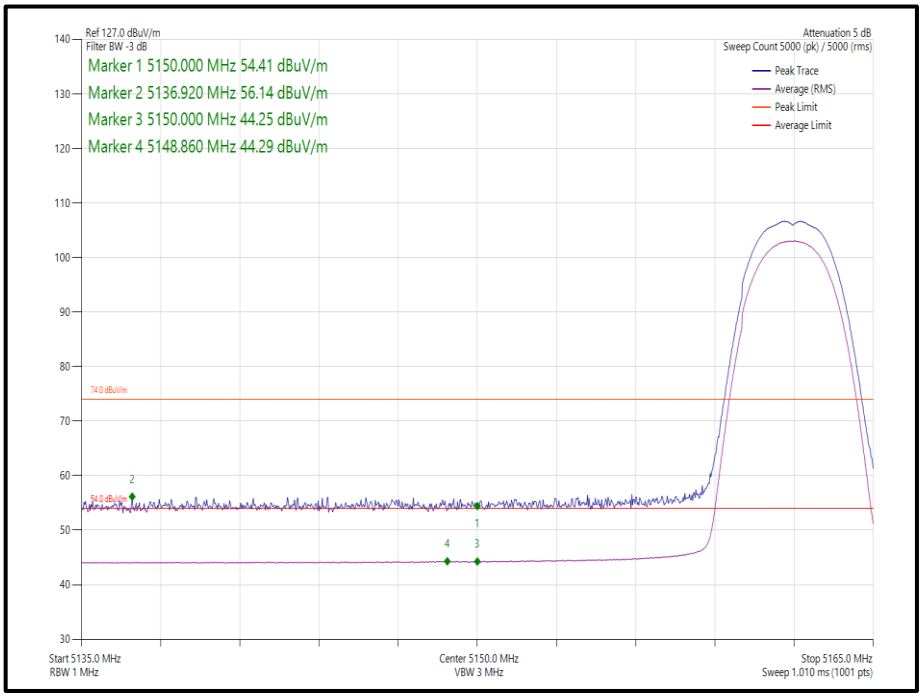

Figure 8 - Static - π/4 DQPSK/4-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

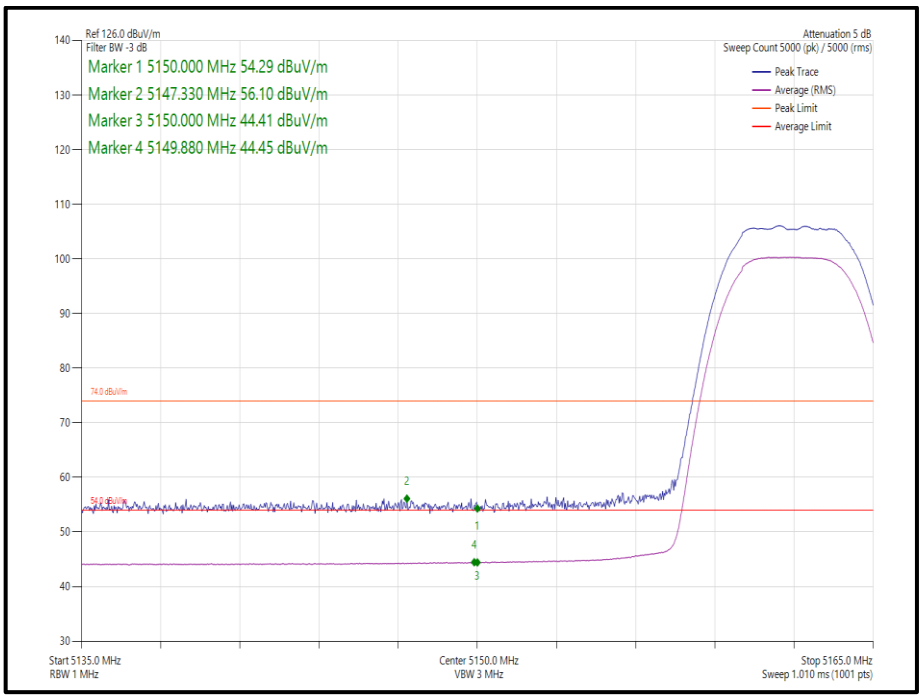

Figure 9 - Static - π/4 DQPSK/8-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

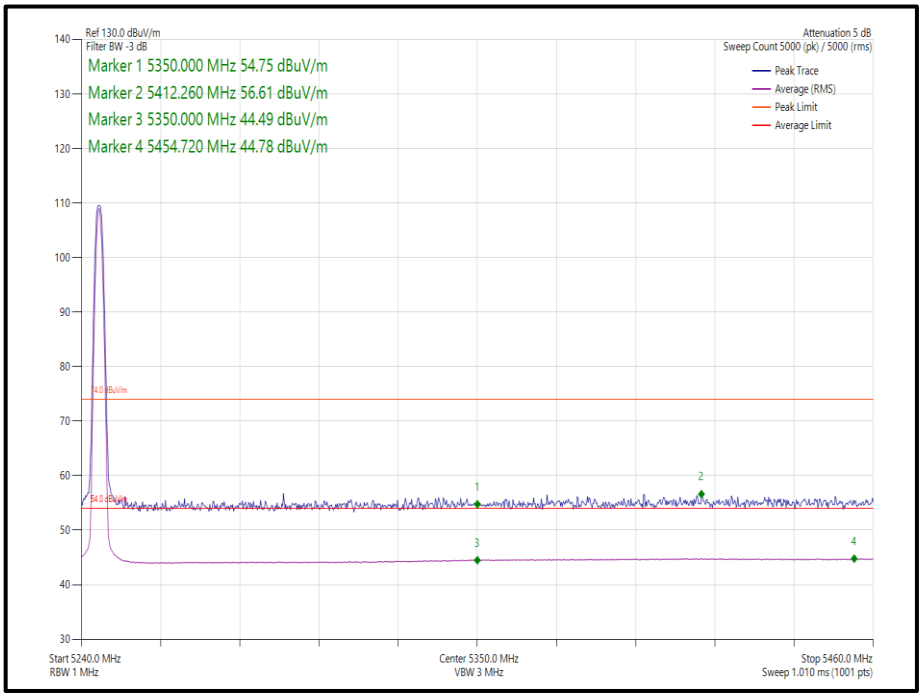

Figure 10 - Static - GFSK/DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

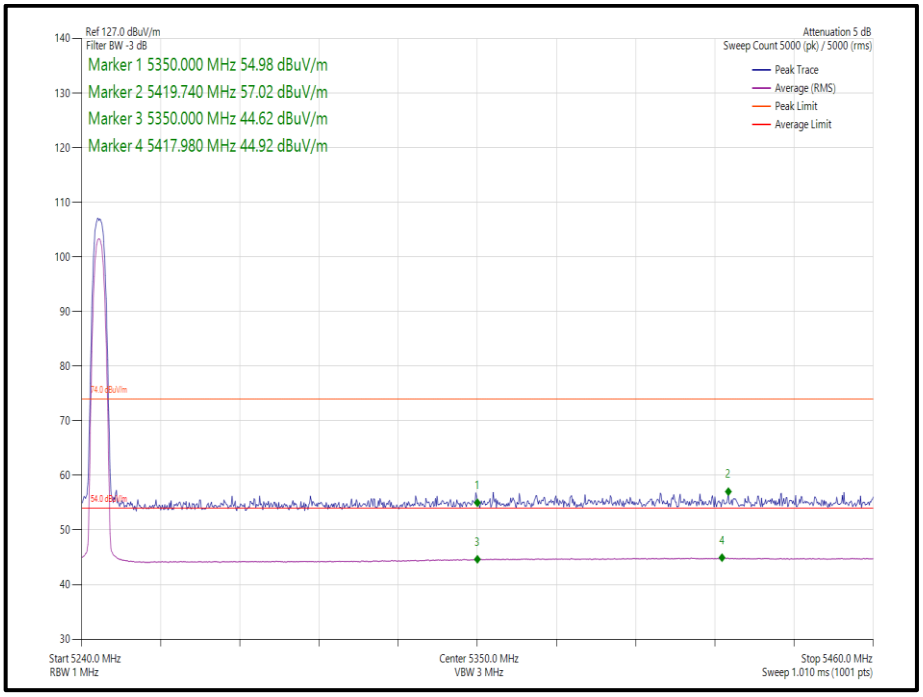

Figure 11 - Static - π/4 DQPSK/4-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

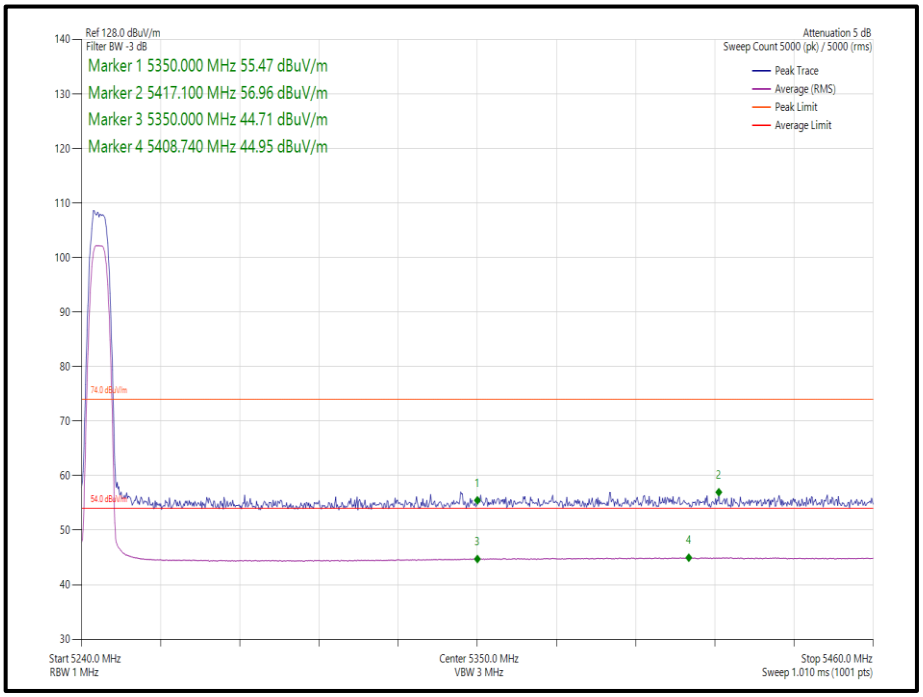

Figure 12 - Static - π/4 DQPSK/8-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

ePA - SISO

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
Static	π/4 DQPSK	0	4-DH5	5162	5150	56.72	44.87
Static	π/4 DQPSK	0	8-DH5	5162	5150	56.77	44.48
Static	π/4 DQPSK	0	4-DH5	5245	5350	57.12	45.13
Static	π/4 DQPSK	0	8-DH5	5245	5350	57.80	45.15

Table 9 - Restricted Band Edge Results

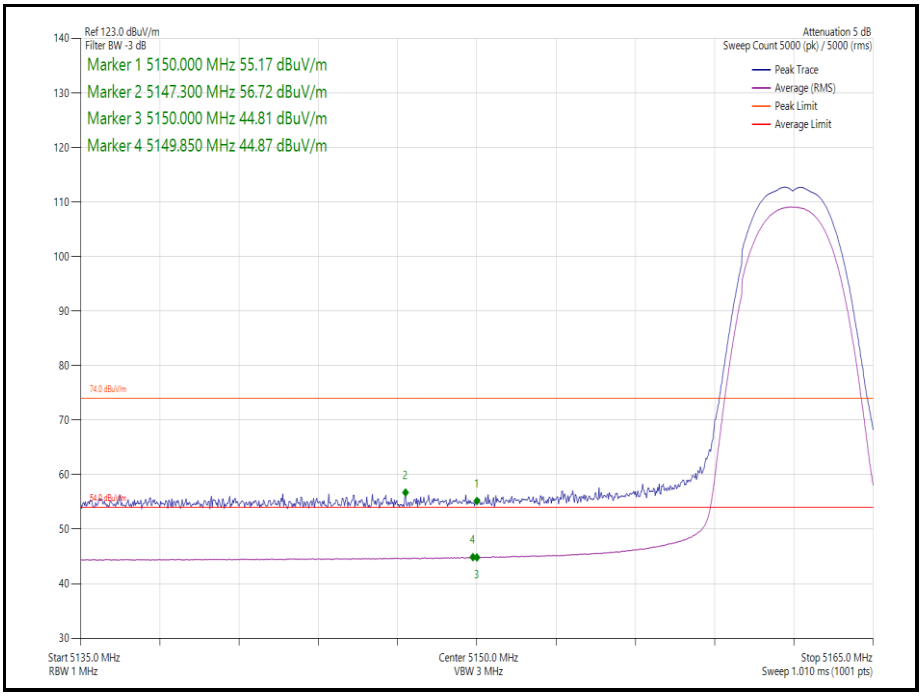

Figure 13 - Static - π/4 DQPSK/4-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

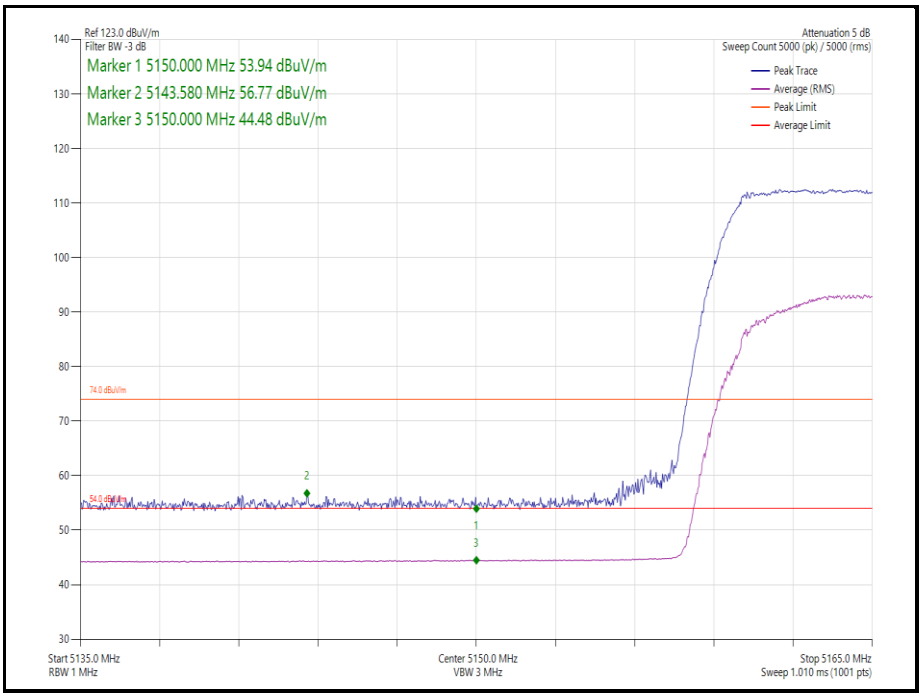

Figure 14 - Static - π/4 DQPSK/8-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

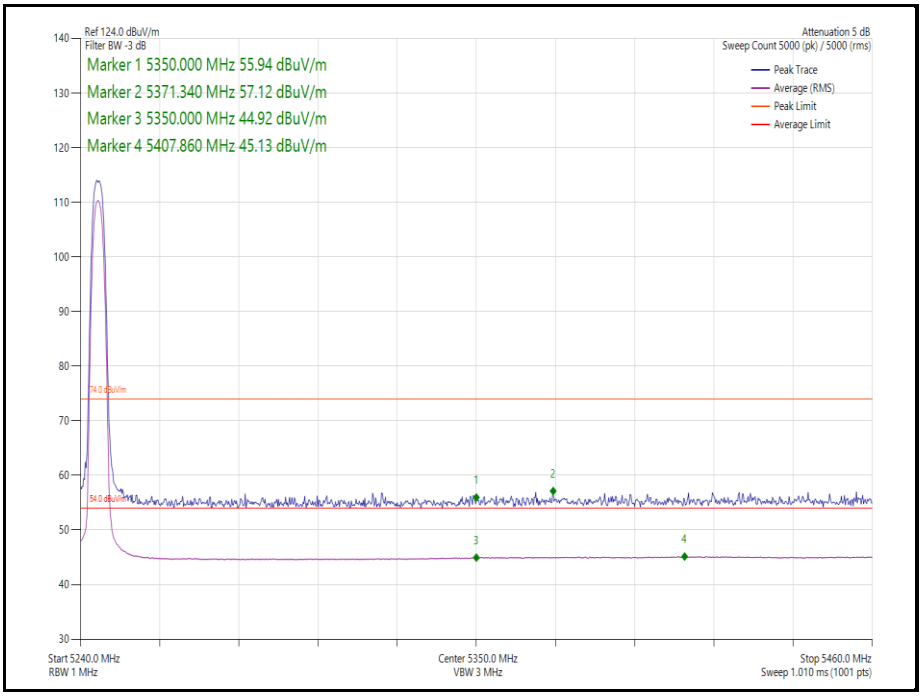

Figure 15 - Static - π/4 DQPSK/4-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

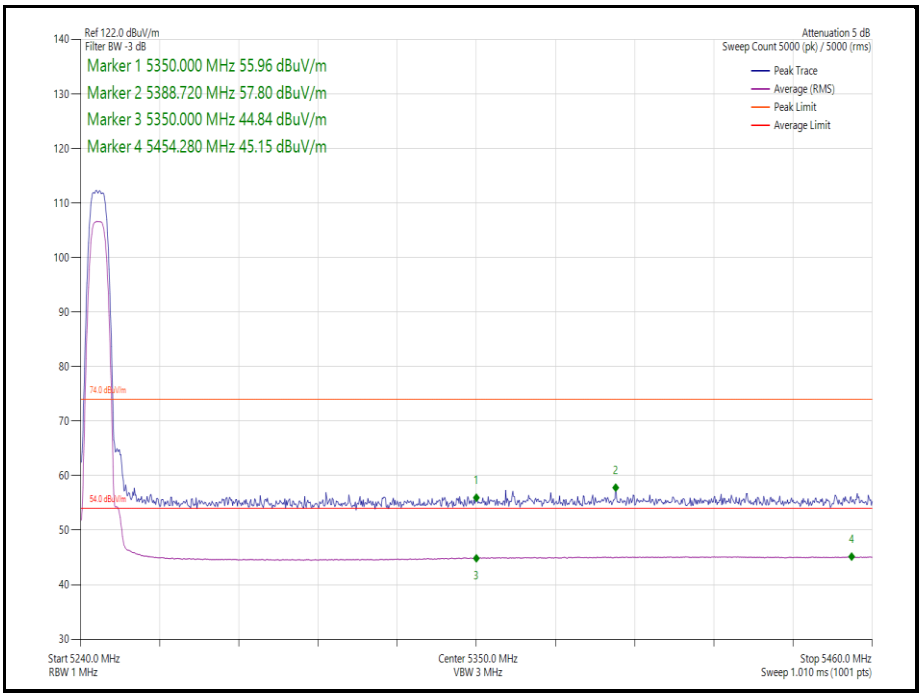

Figure 16 - Static - π/4 DQPSK/8-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

ePA - TXBF

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
Static	π/4 DQPSK	0-1	4-DH5	5162	5150	56.93	44.54
Static	π/4 DQPSK	0-1	8-DH5	5162	5150	57.14	44.92
Static	π/4 DQPSK	0-1	4-DH5	5245	5350	57.00	44.93
Static	π/4 DQPSK	0-1	8-DH5	5245	5350	56.95	44.94

Table 10 - Restricted Band Edge Results

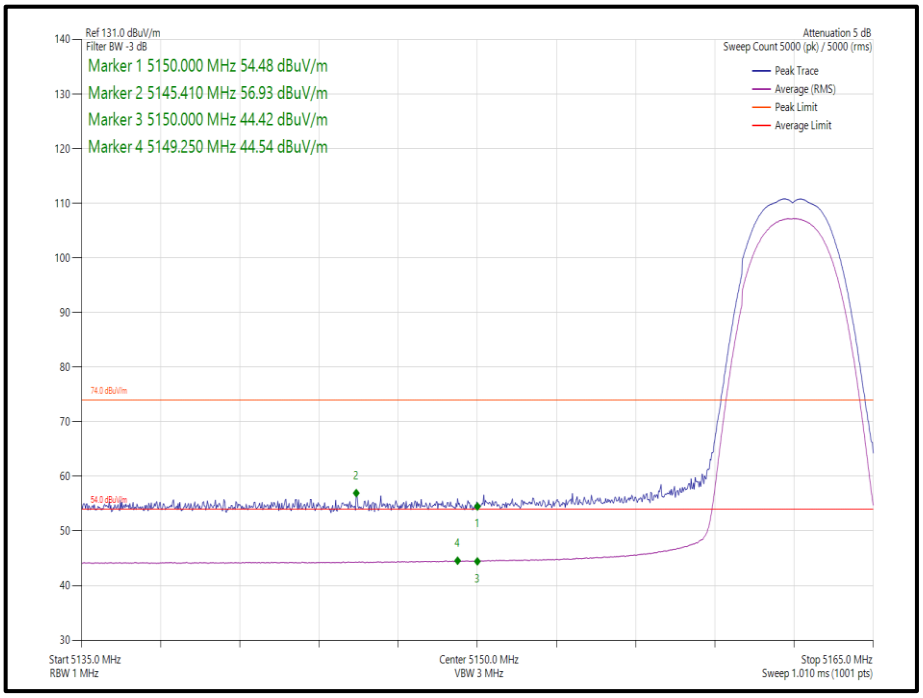

Figure 17 - Static - π/4 DQPSK/4-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

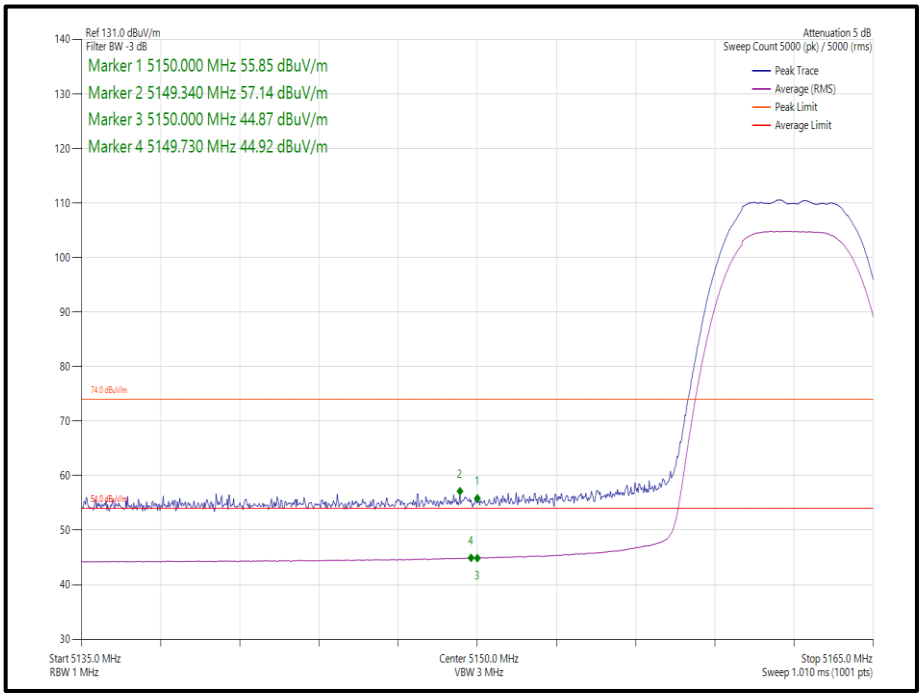

Figure 18 - Static - π/4 DQPSK/8-DH5 - 5162 MHz - Band Edge Frequency 5150 MHz

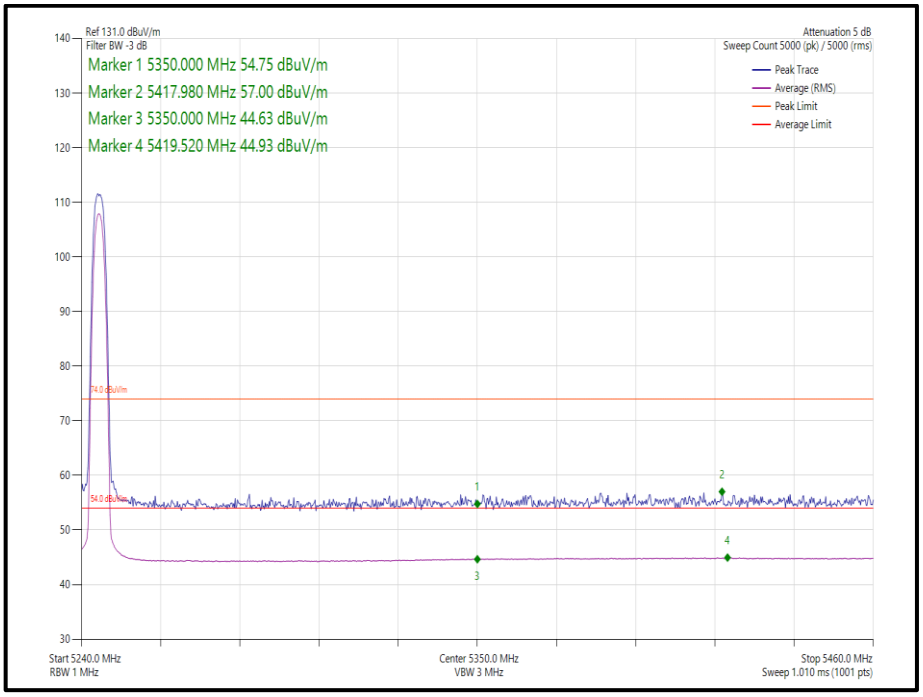

Figure 19 - Static - π/4 DQPSK/4-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

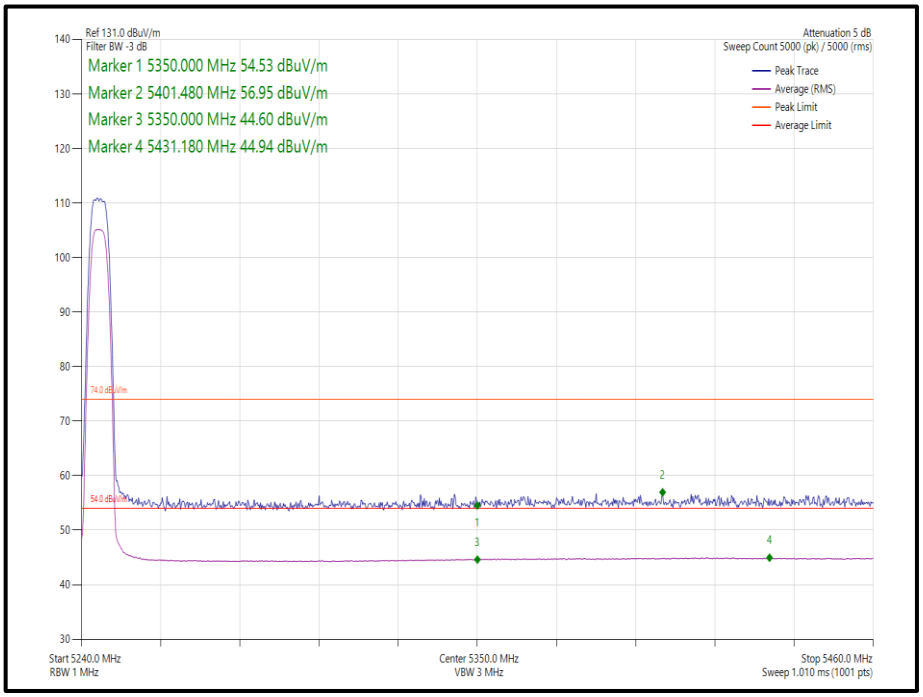

Figure 20 - Static - π/4 DQPSK/8-DH5 - 5245 MHz - Band Edge Frequency 5350 MHz

FCC 47 CFR Part 15, Limit Clause 15.205 and ISED RSS-GEN Limit Clause 8.10

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Table 11 - Restricted Band Edge Limit Table

2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 14.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
EMI Test Receiver	Rohde & Schwarz	ESW44	5912	12	17-Feb-2023
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5941	12	29-May-2023
1500W (300V 12A) AC Power Supply	iTech	IT7324	5955	-	O/P Mon
5m Semi-Anechoic Chamber (Dual-Axis)	Albatross Projects	RF Chamber 14	5958	36	26-Apr-2025
Compact Antenna Mast	Maturo Gmbh	CAM4.0-P	5959	-	TU
Mast & Turntable Controller	Maturo Gmbh	FCU3.0	5960	-	TU
Tilt Antenna Mast	Maturo Gmbh	BAM4.5-P	5961	-	TU
Turntable	Maturo Gmbh	TT1.5SI	5962	-	TU
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5996	12	06-Jun-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5997	12	06-Jun-2023
Cable (SMA to SMA 6.5m)	Junkosha	MWX221-06500AMSAMS/B	6003	12	07-Jun-2023
Cable (N to N 7m)	Junkosha	MWX221-07000NMSNMS/B	6005	12	05-Jun-2023
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/A	6006	12	05-Jun-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	6007	12	06-Jun-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	6008	12	06-Jun-2023
Cable (N to N 1m)	Junkosha	MWX221-01000NMSNMS/B	6010	12	05-Jun-2023
Cable (SMA to SMA 6.5m)	Junkosha	MWX221-06500AMSAMS/B	6014	12	07-Jun-2023
Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA9120B	6141	12	21-Jun-2023
Digital Multimeter	Fluke	115	6146	12	16-Jun-2023
Humidity & Temperature meter	R.S Components	1364	6149	12	17-Jun-2023
8GHz Highpass Filter	Wainwright	WHKX 7150 8000 18000 50SS	6194	12	15-Jul-2023
Pre Amp 8 - 18 GHz	Wright Technologies	APS06 0061	6199	12	19-Jul-2023
Cable (SMA to SMA 20cm)	TUV SUD	MH-FH 8-18	6215	12	25-Jul-2023

Table 12

TU – Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.2 Emission Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (a)
ISED RSS-247, Clause 6.2

2.2.2 Equipment Under Test and Modification State

A2779, S/N: NX7LCFL417 - Modification State 0

2.2.3 Date of Test

24-November-2022

2.2.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 12.5.1 and 12.5.2 and ISED RSS-GEN, clause 4.6.1 and 4.6.2.

For modes of operation using multiple cores, measurements were made on each core but only the worst case results are reported. Worst case was considered as the narrowest results for 6 dB bandwidth and the widest result for 26 dB bandwidth and 99% occupied bandwidth.

2.2.5 Environmental Conditions

Ambient Temperature	23.7 °C
Relative Humidity	31.9 %

2.2.6 Test Results

NarrowBand

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	A (Core 0)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	2.808	-	-	-	≥500.0
5204	2.816	-	-	-	≥500.0
5245	2.808	-	-	-	≥500.0

Table 13 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	2.392	-	-	-	-
5204	2.376	-	-	-	-
5245	2.384	-	-	-	-

Table 14 - 99% Bandwidth Results

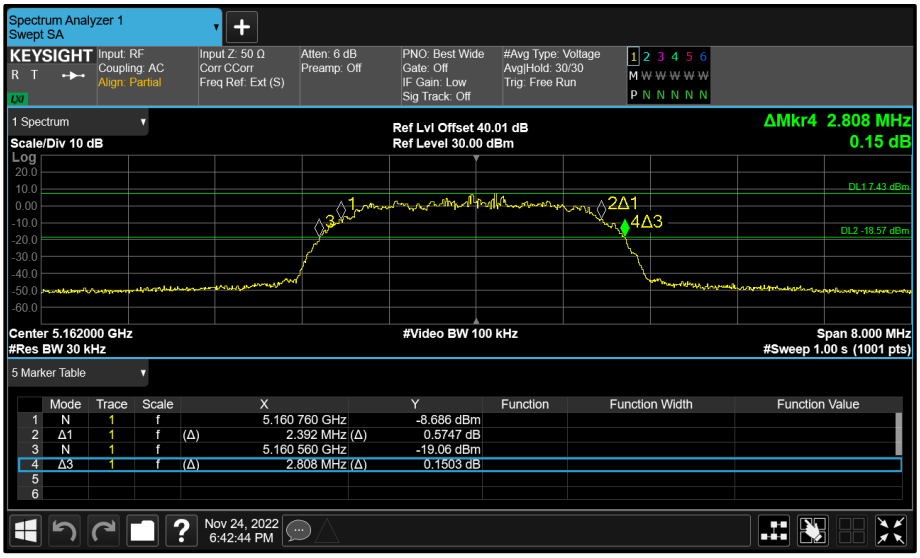

Figure 21 - Core 0 (A) 5162 MHz (CH12) 26 dB and 99% Bandwidth

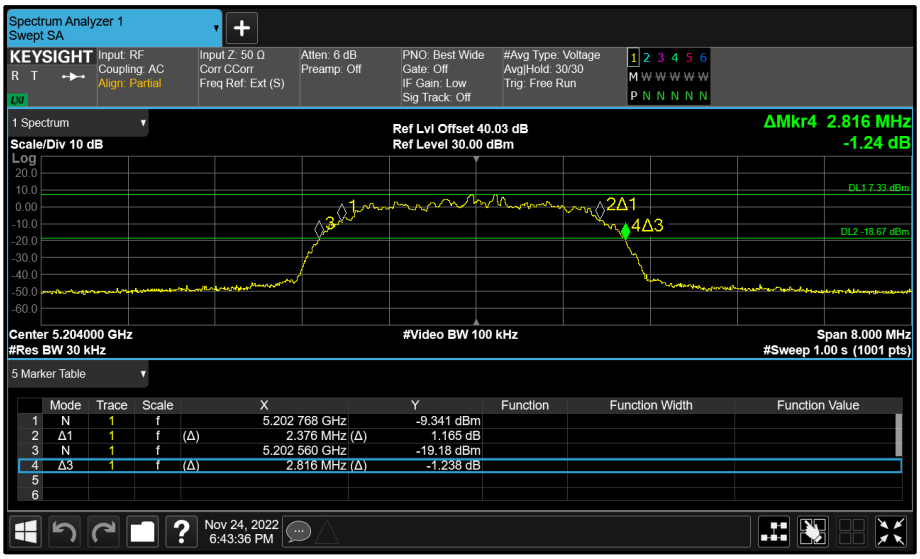

Figure 22 - Core 0 (A) 5204 MHz (CH54) 26 dB and 99% Bandwidth

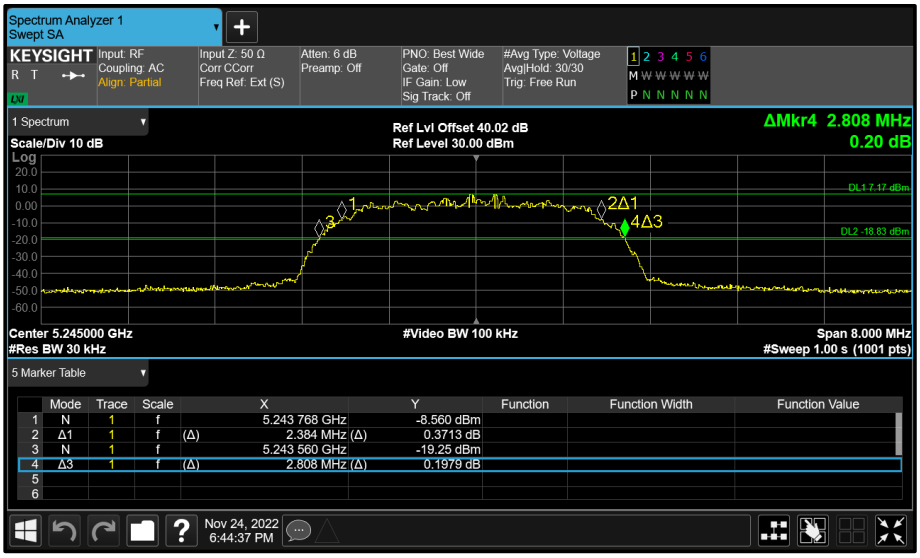

Figure 23 - Core 0 (A) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (8-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	A (Core 0)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	5.310	-	-	-	≥500.0
5204	5.325	-	-	-	≥500.0
5245	5.310	-	-	-	≥500.0

Table 15 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	4.650	-	-	-	-
5204	4.650	-	-	-	-
5245	4.635	-	-	-	-

Table 16 - 99% Bandwidth Results

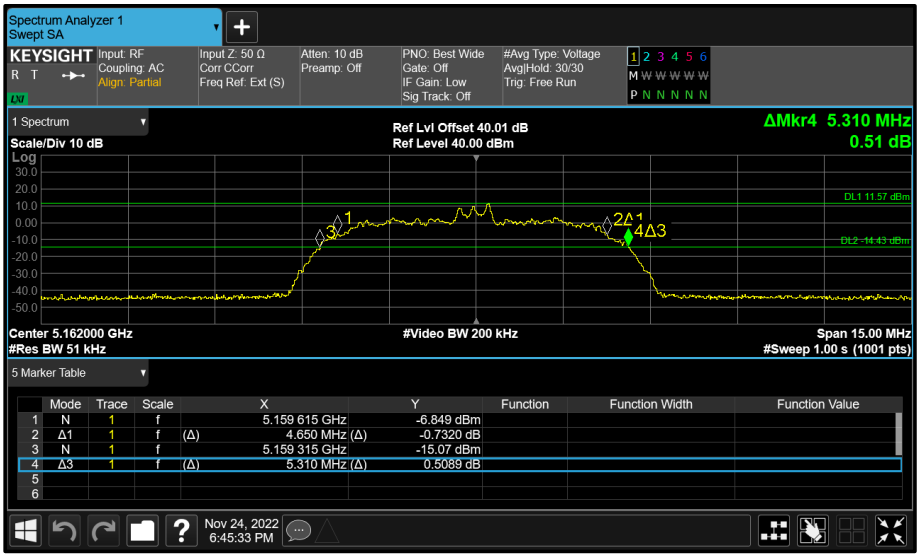

Figure 24 - Core 0 (A) 5162 MHz (CH12) 26 dB and 99% Bandwidth

Figure 25 - Core 0 (A) 5204 MHz (CH54) 26 dB and 99% Bandwidth

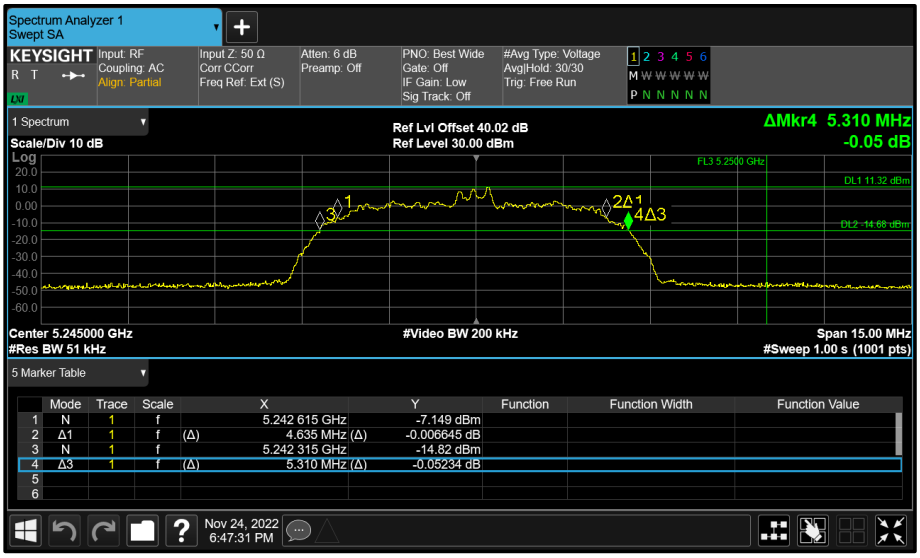

Figure 26 - Core 0 (A) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	-	2.808	-	-	≥500.0
5204	-	2.816	-	-	≥500.0
5245	-	2.808	-	-	≥500.0

Table 17 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	-	2.376	-	-	-
5204	-	2.376	-	-	-
5245	-	2.384	-	-	-

Table 18 - 99% Bandwidth Results

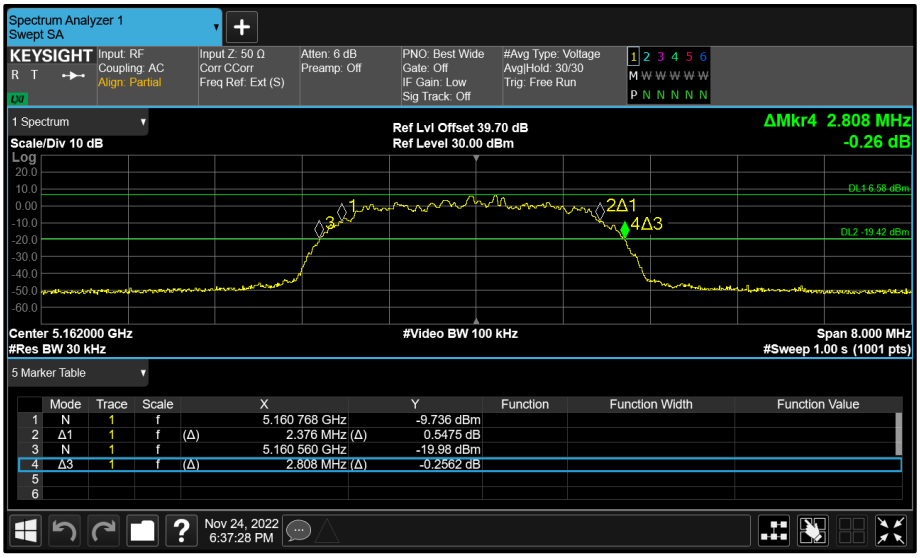

Figure 27 - Core 1 (B) 5162 MHz (CH12) 26 dB and 99% Bandwidth

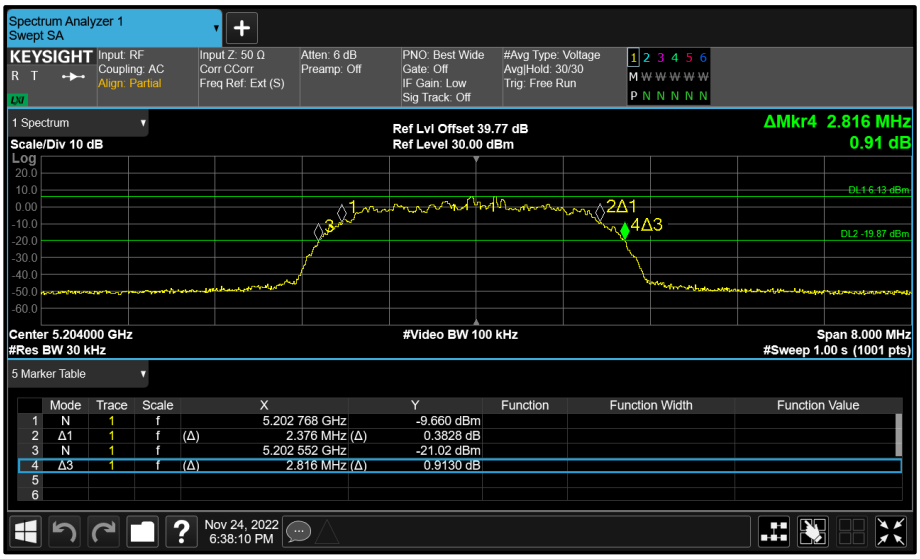

Figure 28 - Core 1 (B) 5204 MHz (CH54) 26 dB and 99% Bandwidth

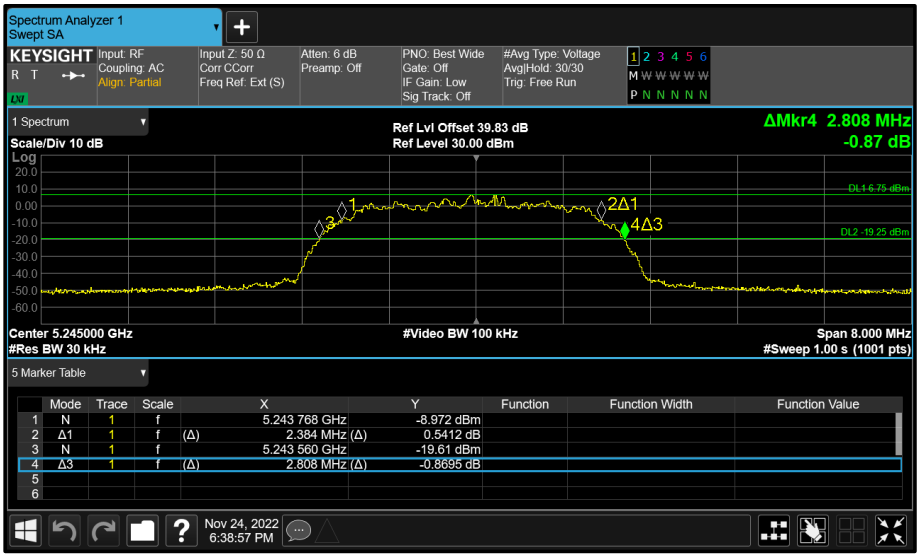

Figure 29 - Core 1 (B) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (8-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	-	5.310	-	-	≥500.0
5204	-	5.310	-	-	≥500.0
5245	-	5.310	-	-	≥500.0

Table 19 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	-	4.635	-	-	-
5204	-	4.635	-	-	-
5245	-	4.635	-	-	-

Table 20 - 99% Bandwidth Results

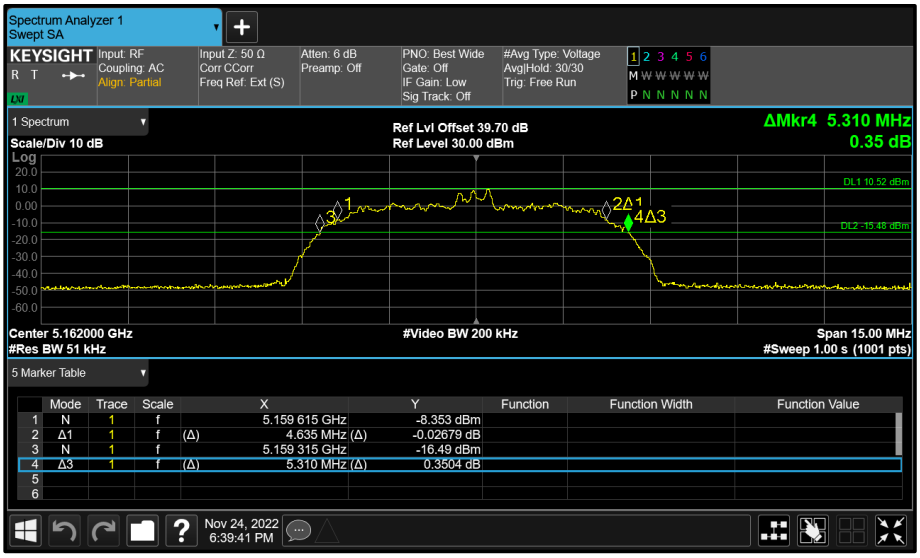

Figure 30 - Core 1 (B) 5162 MHz (CH12) 26 dB and 99% Bandwidth

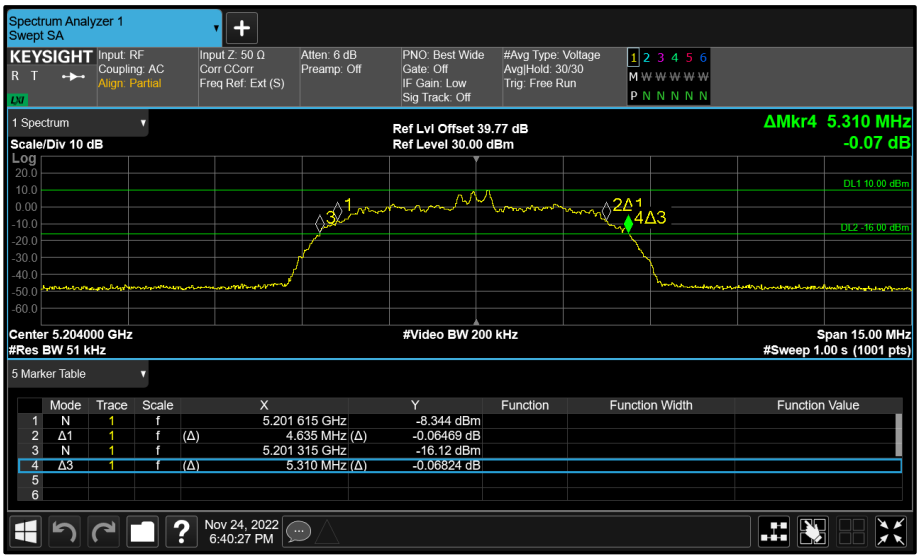

Figure 31 - Core 1 (B) 5204 MHz (CH54) 26 dB and 99% Bandwidth

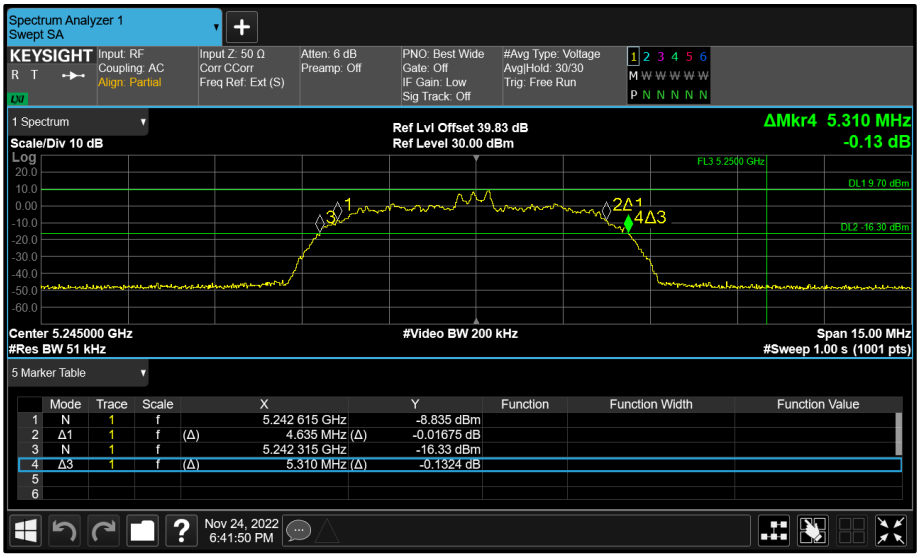

Figure 32 - Core 1 (B) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	2.816	2.808	-	-	≥500.0
5204	2.800	2.800	-	-	≥500.0
5245	2.800	2.816	-	-	≥500.0

Table 21 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	2.384	2.400	-	-	-
5204	2.384	2.392	-	-	-
5245	2.384	2.384	-	-	-

Table 22 - 99% Bandwidth Results

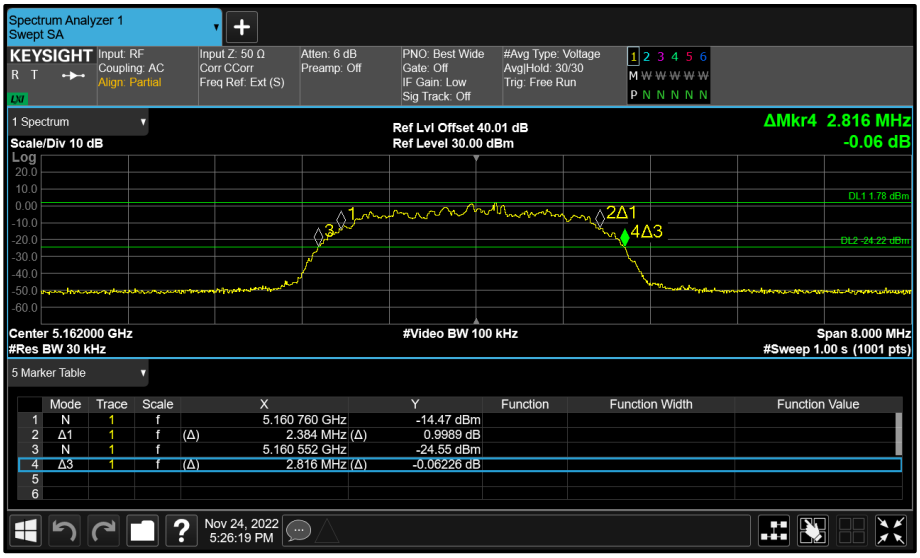

Figure 33 - Core 0 (A) 5162 MHz (CH12) 26 dB and 99% Bandwidth

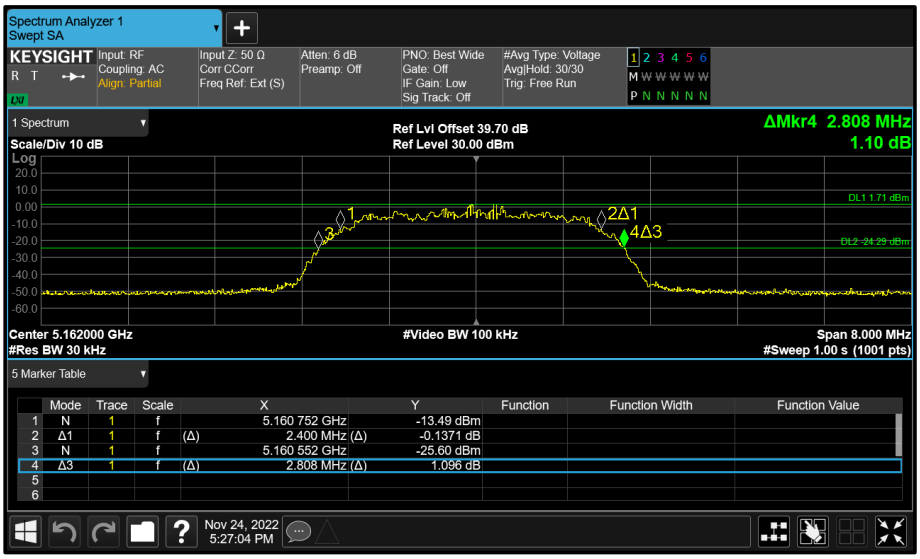

Figure 34 - Core 1 (B) 5162 MHz (CH12) 26 dB and 99% Bandwidth

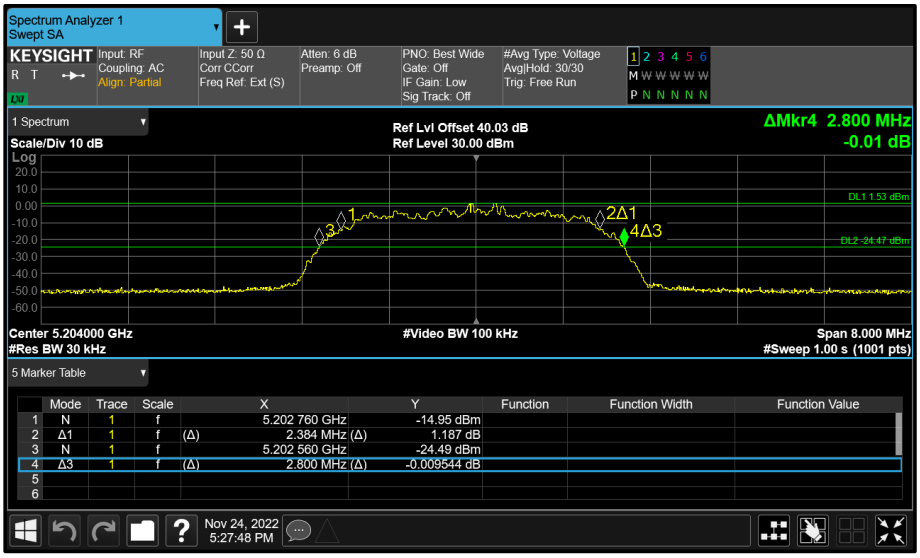

Figure 35 - Core 0 (A) 5204 MHz (CH54) 26 dB and 99% Bandwidth

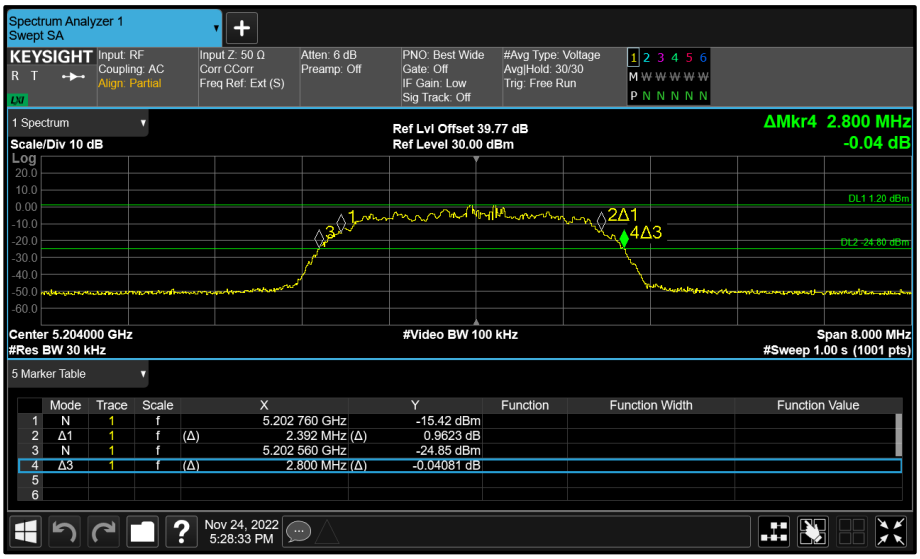

Figure 36 - Core 1 (B) 5204 MHz (CH54) 26 dB and 99% Bandwidth

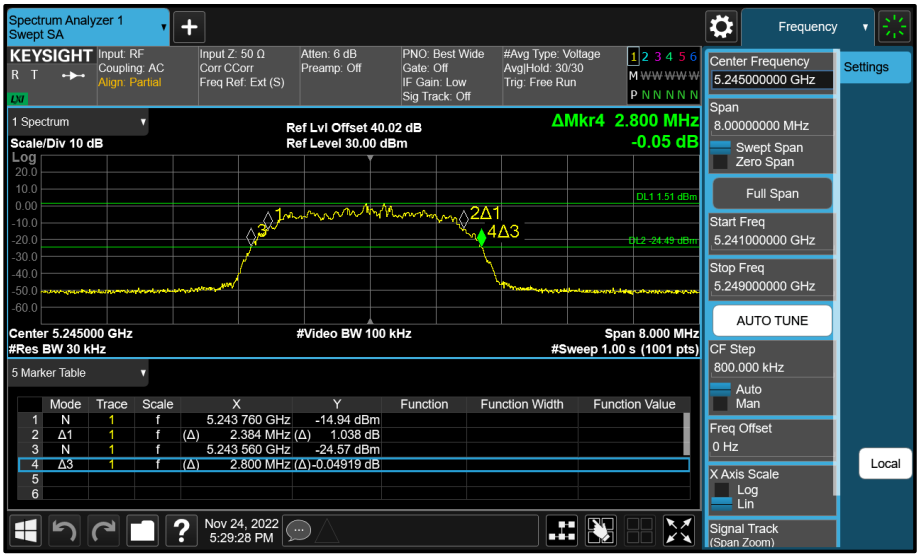

Figure 37 - Core 0 (A) 5245 MHz (CH95) 26 dB and 99% Bandwidth

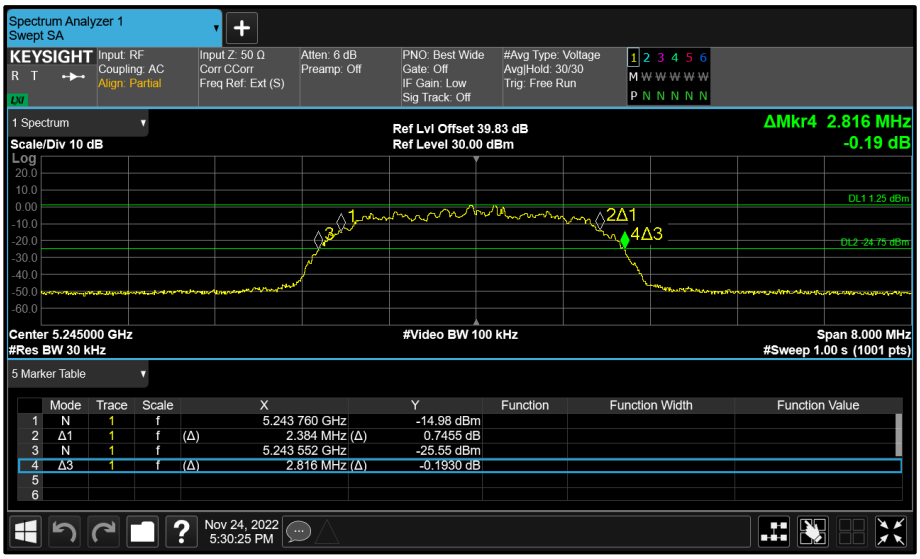

Figure 38 - Core 1 (B) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.150-5.250 GHz	Band:	U-NII-1
Limit Clause(s):	-	Test Method(s):	C63.10 6.9.3 C63.10 12.5.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (8-DH5)	Duty Cycle (%):	-
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	26 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	5.325	5.325	-	-	≥500.0
5204	5.325	5.325	-	-	≥500.0
5245	5.325	5.325	-	-	≥500.0

Table 23 - 26 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5162	4.650	4.635	-	-	-
5204	4.635	4.635	-	-	-
5245	4.635	4.635	-	-	-

Table 24 - 99% Bandwidth Results

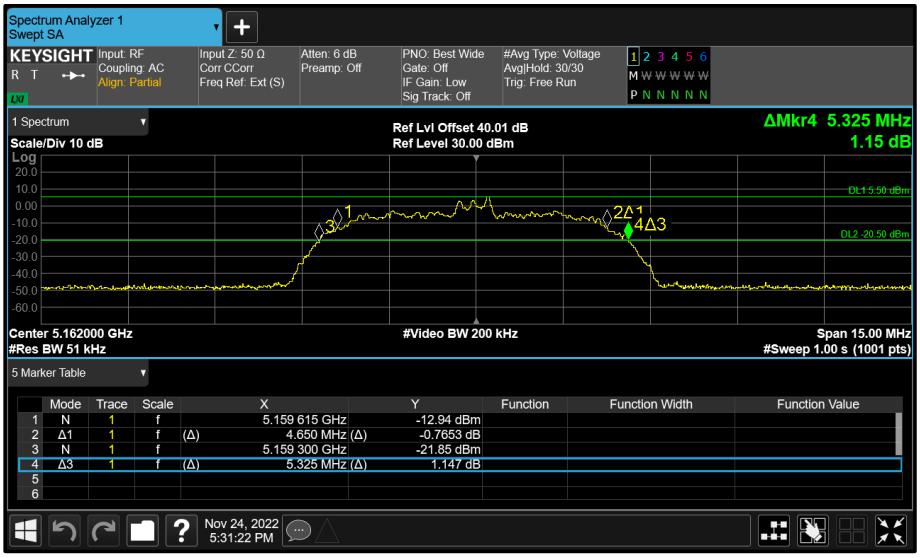

Figure 39 - Core 0 (A) 5162 MHz (CH12) 26 dB and 99% Bandwidth

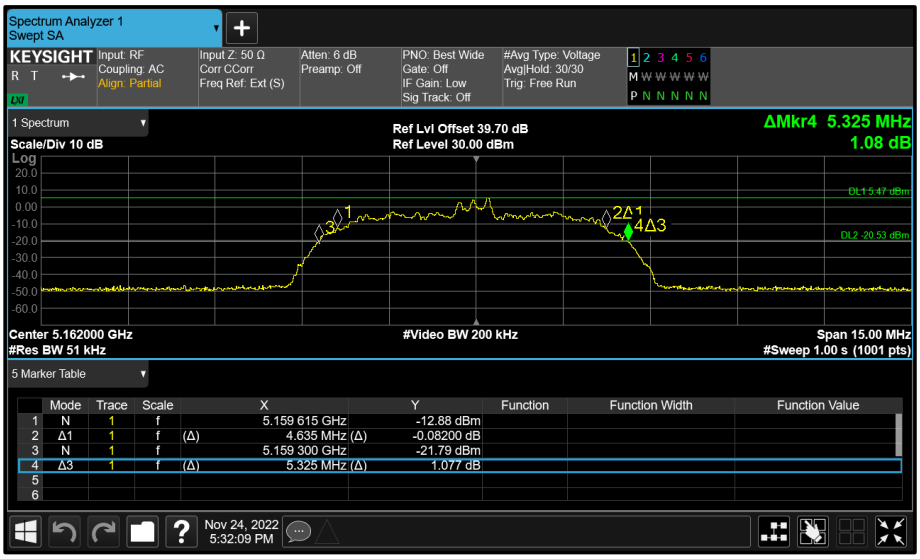

Figure 40 - Core 1 (B) 5162 MHz (CH12) 26 dB and 99% Bandwidth

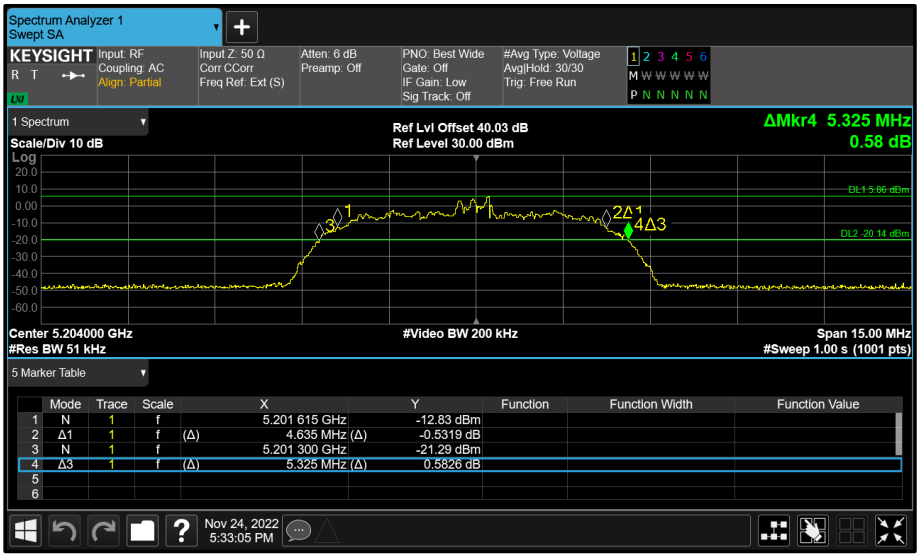

Figure 41 - Core 0 (A) 5204 MHz (CH54) 26 dB and 99% Bandwidth

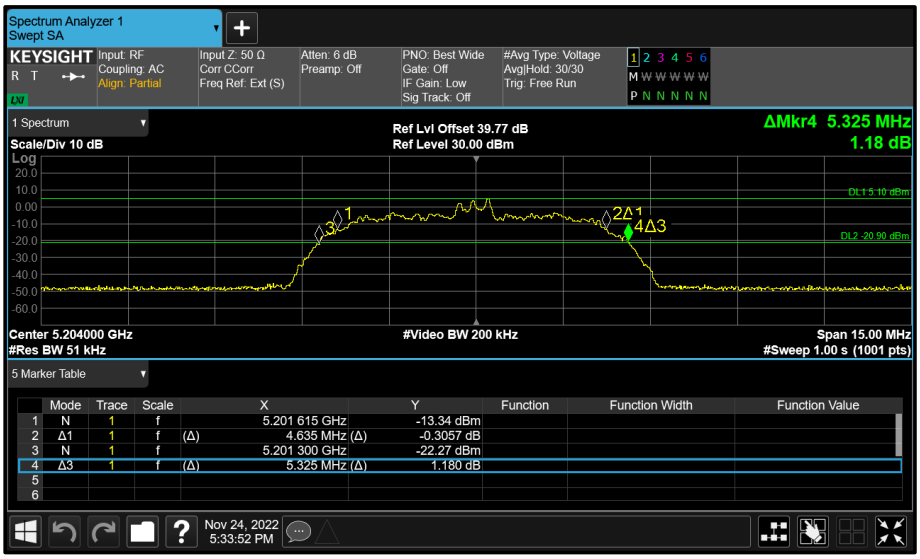

Figure 42 - Core 1 (B) 5204 MHz (CH54) 26 dB and 99% Bandwidth

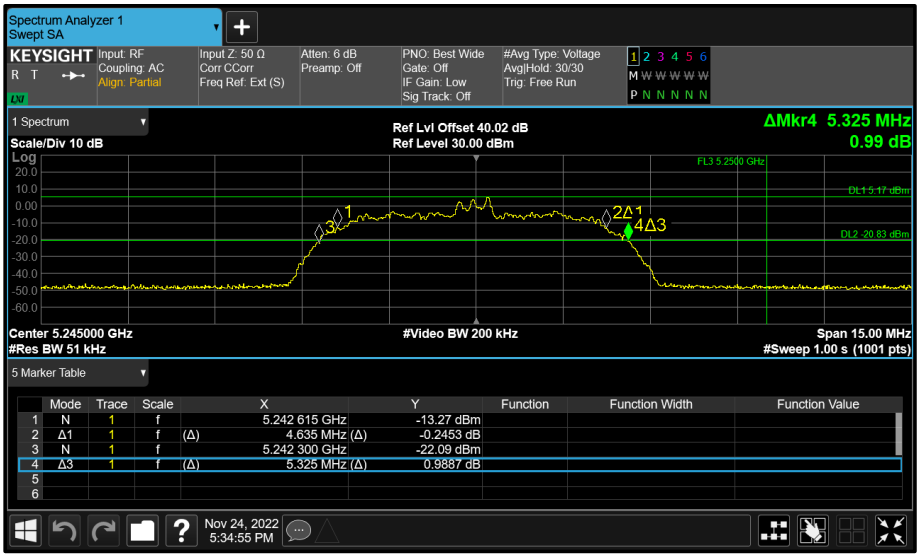

Figure 43 - Core 0 (A) 5245 MHz (CH95) 26 dB and 99% Bandwidth

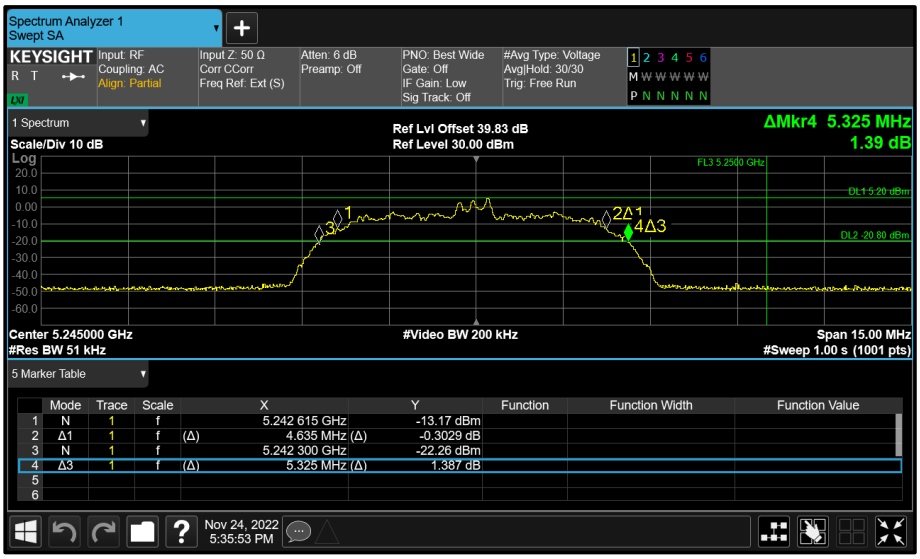

Figure 44 - Core 1 (B) 5245 MHz (CH95) 26 dB and 99% Bandwidth

Test Configuration			
Frequency Range:	5.725-5.850 GHz	Band:	U-NII-3
Limit Clause(s):	15.407(e) RSS-247 6.2.4.1	Test Method(s):	C63.10 6.9.3 789033 D02 v02r01 II.C.2.
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	A (Core 0)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	1.912	-	-	-	≥500.0
5789	1.920	-	-	-	≥500.0
5844	1.912	-	-	-	≥500.0

Table 25 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	2.384	-	-	-	-
5789	2.384	-	-	-	-
5844	2.384	-	-	-	-

Table 26 - 99% Bandwidth Results

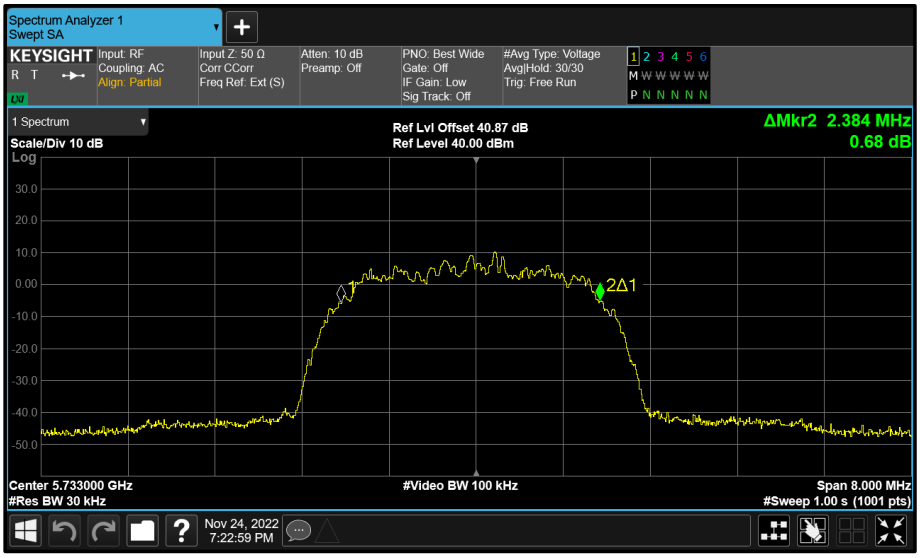

Figure 45 - Core 0 (A) 5733 MHz (CH8) 99% Bandwidth

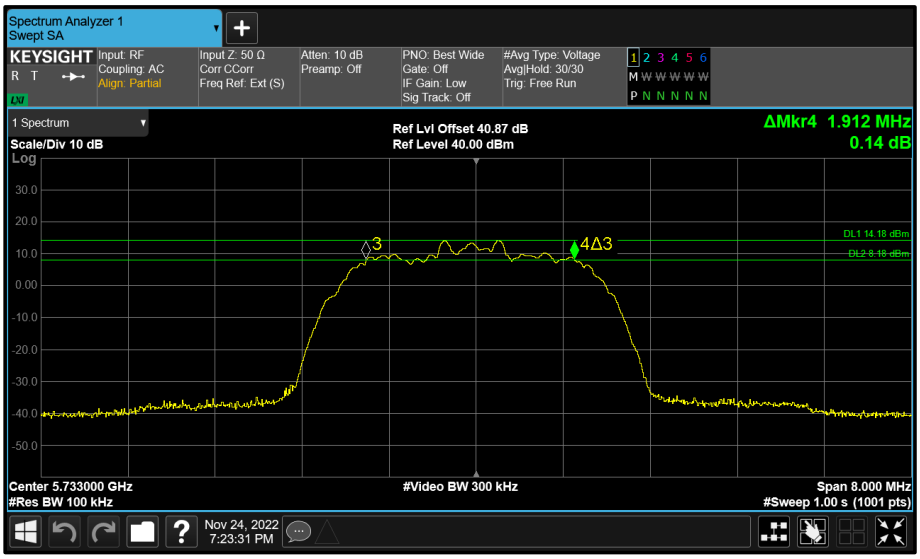

Figure 46 - Core 0 (A) 5733 MHz (CH8) 6 dB Bandwidth

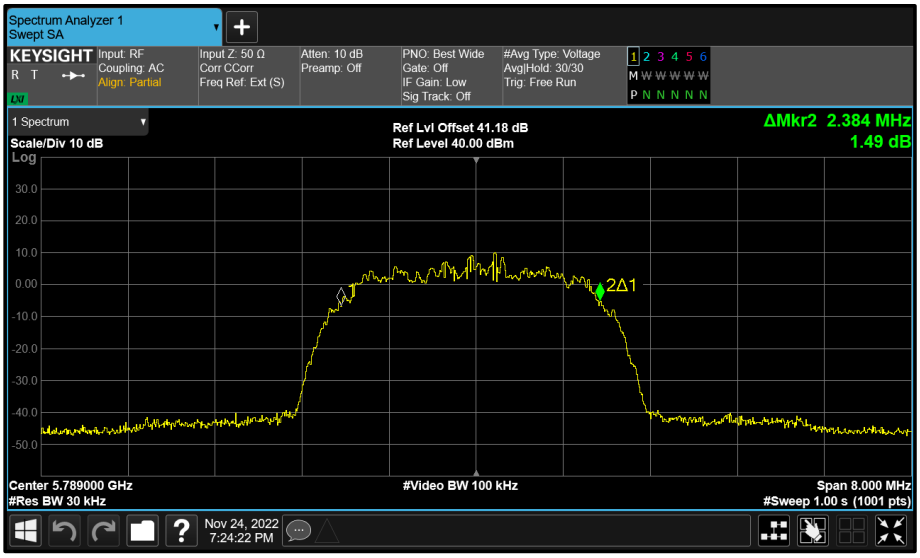

Figure 47 - Core 0 (A) 5789 MHz (CH64) 99% Bandwidth

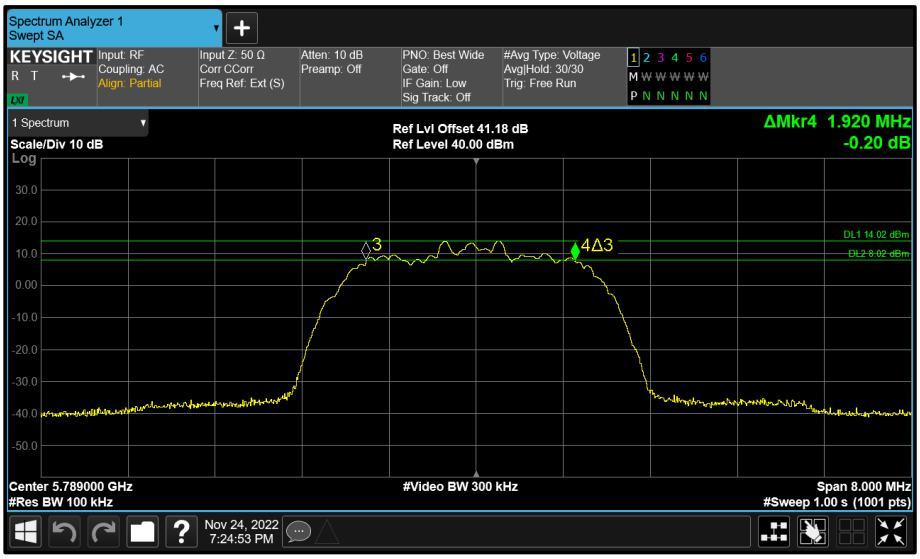

Figure 48 - Core 0 (A) 5789 MHz (CH64) 6 dB Bandwidth

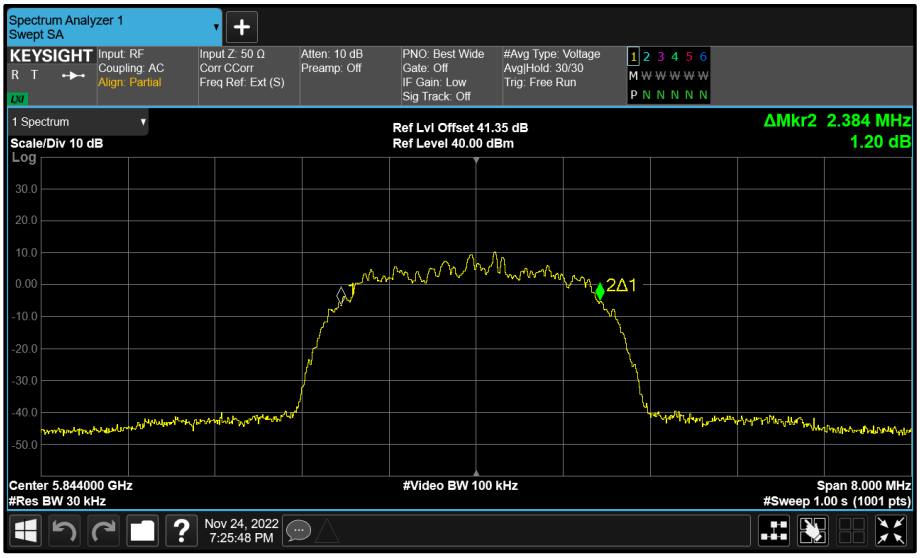

Figure 49 - Core 0 (A) 5844 MHz (CH119) 99% Bandwidth

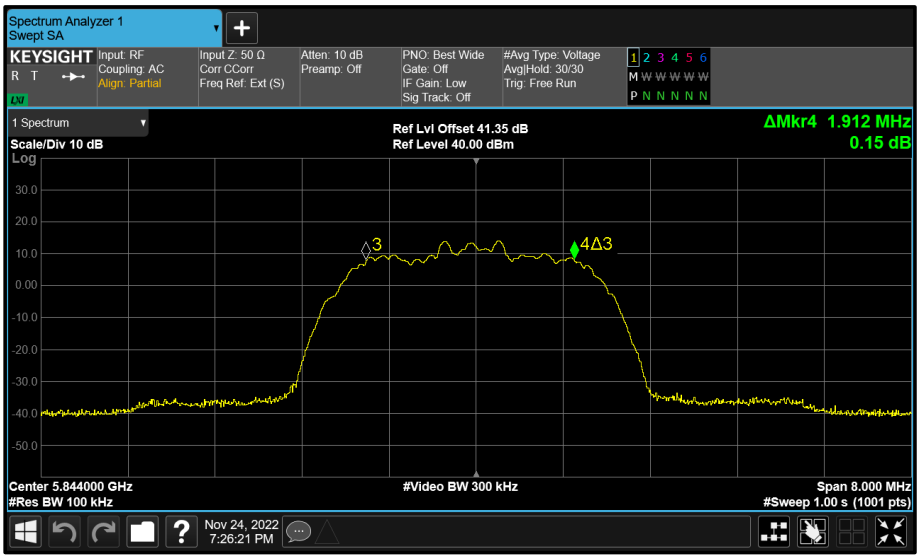

Figure 50 - Core 0 (A) 5844 MHz (CH119) 6 dB Bandwidth

Test Configuration			
Frequency Range:	5.725-5.850 GHz	Band:	U-NII-3
Limit Clause(s):	15.407(e) RSS-247 6.2.4.1	Test Method(s):	C63.10 6.9.3 789033 D02 v02r01 II.C.2.
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (8-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	A (Core 0)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	0.960	-	-	-	≥500.0
5789	1.005	-	-	-	≥500.0
5844	1.020	-	-	-	≥500.0

Table 27 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	4.635	-	-	-	-
5789	4.635	-	-	-	-
5844	4.635	-	-	-	-

Table 28 - 99% Bandwidth Results

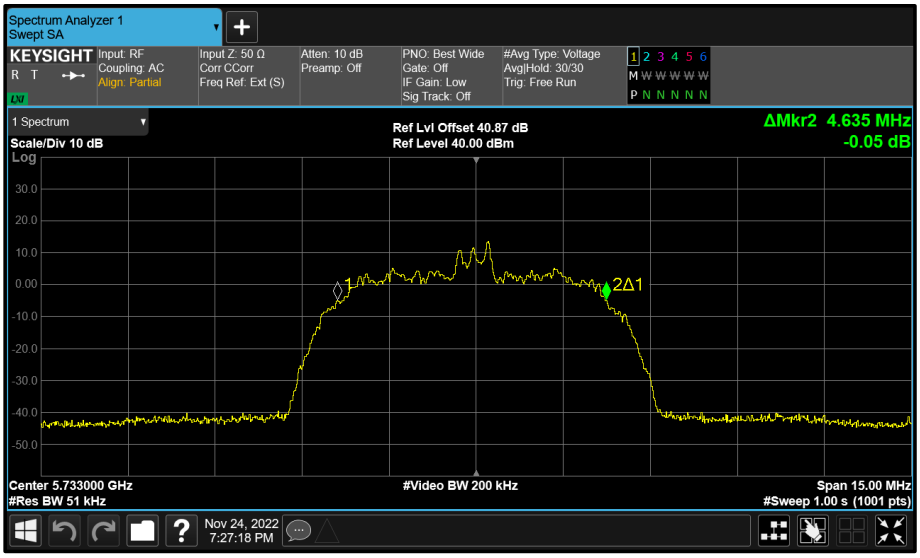

Figure 51 - Core 0 (A) 5733 MHz (CH8) 99% Bandwidth

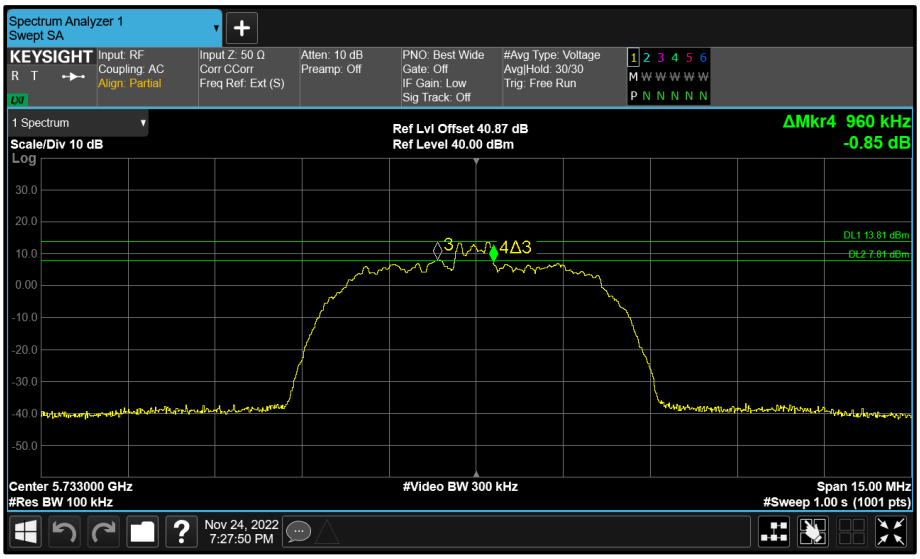

Figure 52 - Core 0 (A) 5733 MHz (CH8) 6 dB Bandwidth

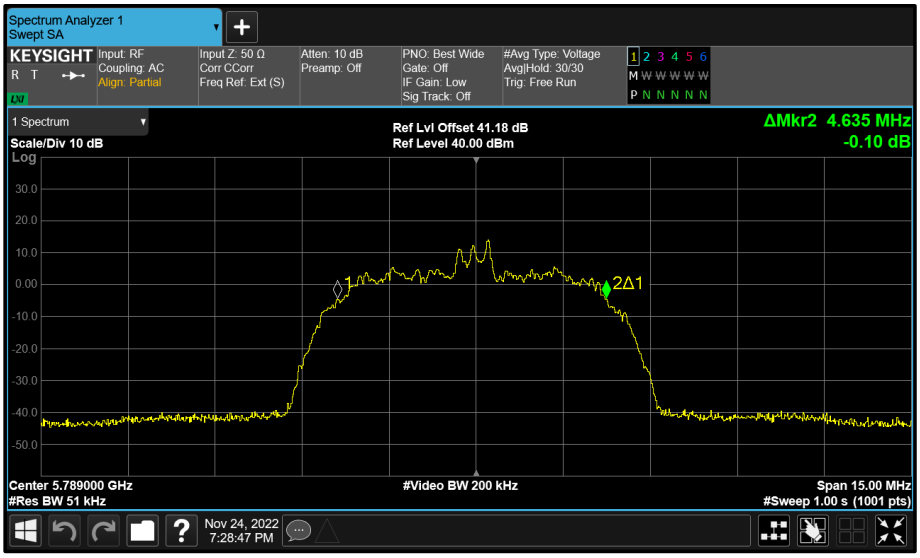

Figure 53 - Core 0 (A) 5789 MHz (CH64) 99% Bandwidth

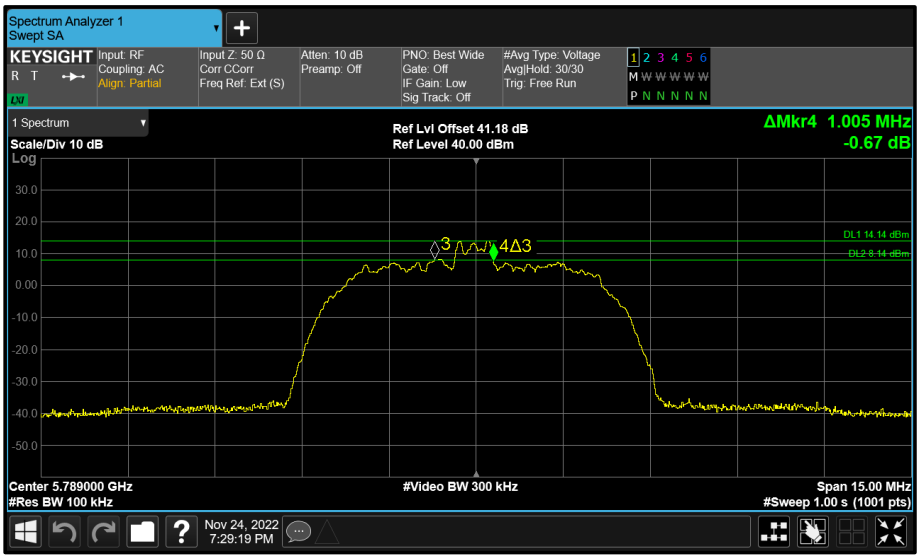

Figure 54 - Core 0 (A) 5789 MHz (CH64) 6 dB Bandwidth

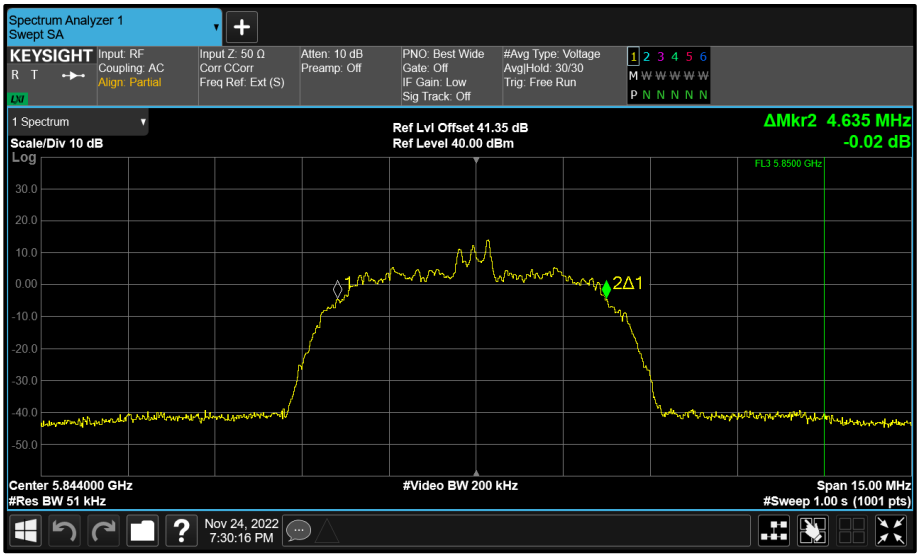

Figure 55 - Core 0 (A) 5844 MHz (CH119) 99% Bandwidth

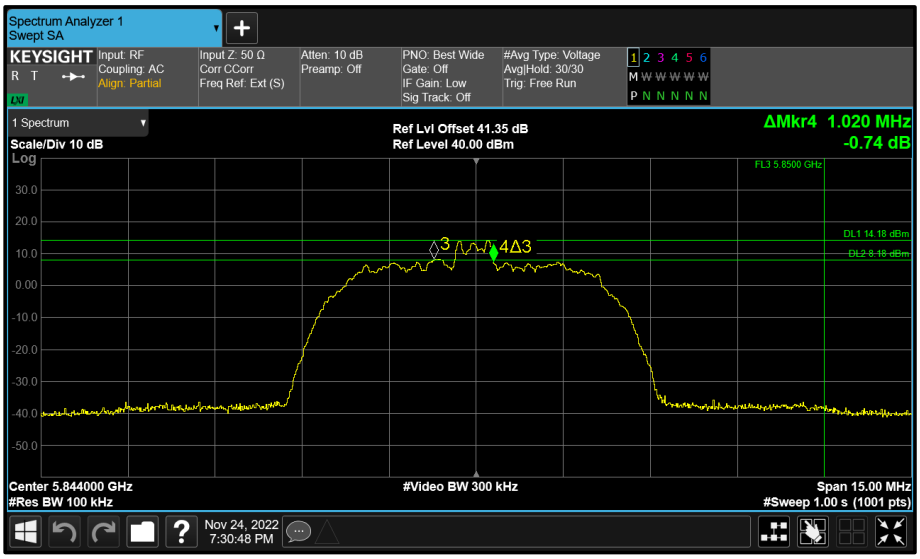

Figure 56 - Core 0 (A) 5844 MHz (CH119) 6 dB Bandwidth

Test Configuration			
Frequency Range:	5.725-5.850 GHz	Band:	U-NII-3
Limit Clause(s):	15.407(e) RSS-247 6.2.4.1	Test Method(s):	C63.10 6.9.3 789033 D02 v02r01 II.C.2.
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	-	1.920	-	-	≥500.0
5789	-	1.920	-	-	≥500.0
5844	-	1.912	-	-	≥500.0

Table 29 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	-	2.384	-	-	-
5789	-	2.376	-	-	-
5844	-	2.384	-	-	-

Table 30 - 99% Bandwidth Results

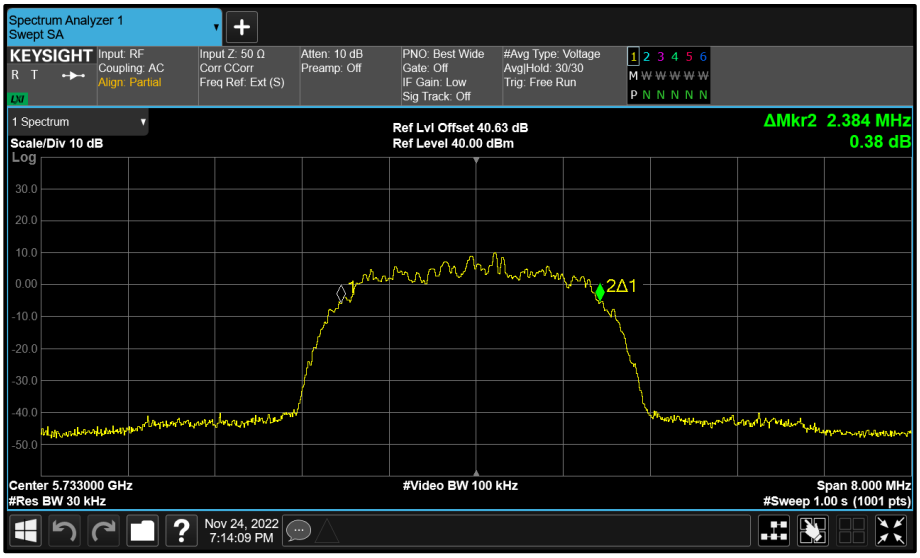

Figure 57 - Core 1 (B) 5733 MHz (CH8) 99% Bandwidth

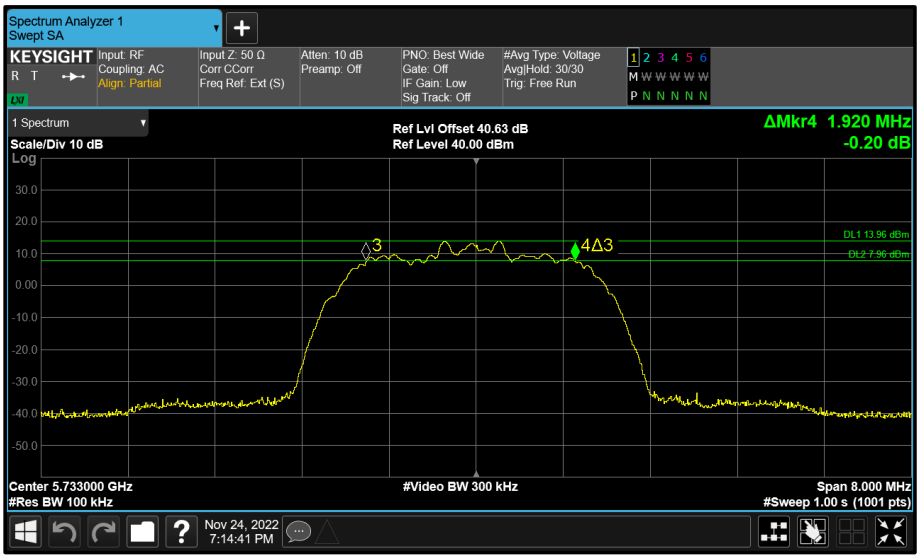

Figure 58 - Core 1 (B) 5733 MHz (CH8) 6 dB Bandwidth

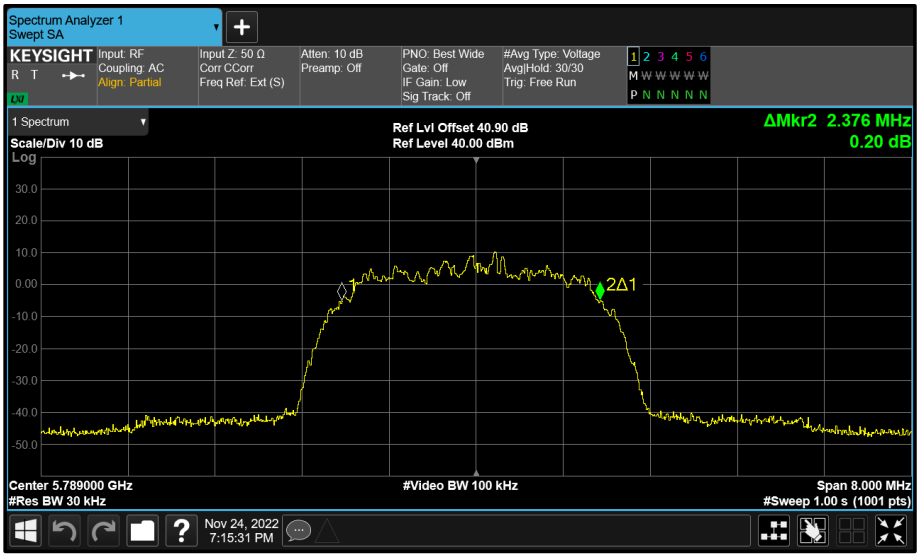

Figure 59 - Core 1 (B) 5789 MHz (CH64) 99% Bandwidth

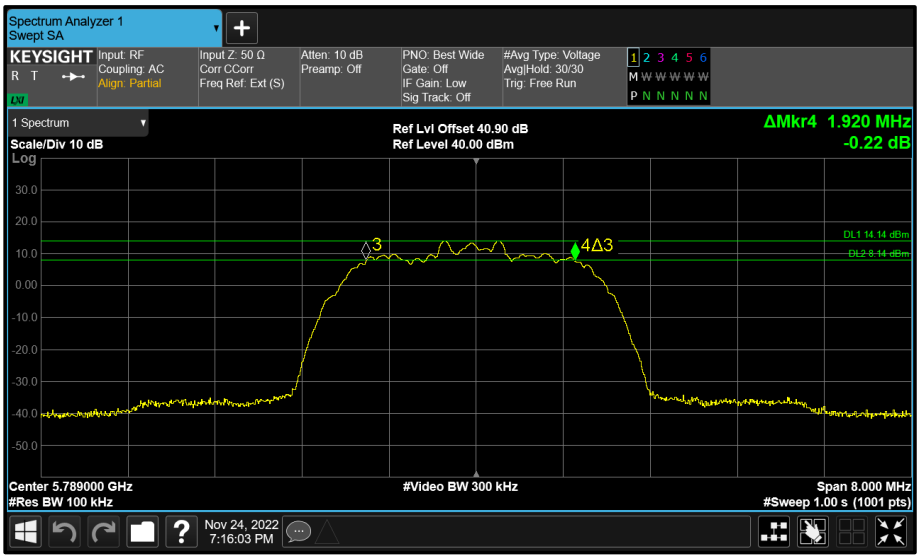

Figure 60 - Core 1 (B) 5789 MHz (CH64) 6 dB Bandwidth

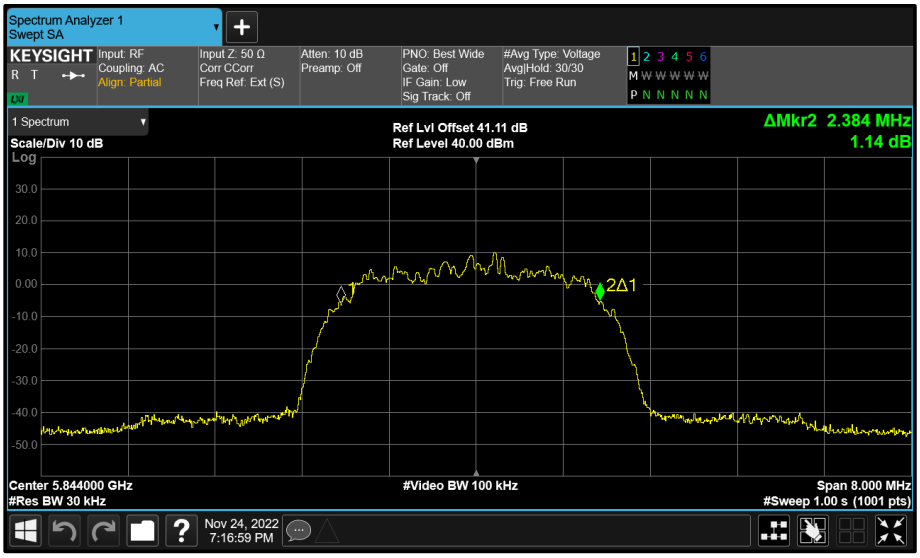

Figure 61 - Core 1 (B) 5844 MHz (CH119) 99% Bandwidth

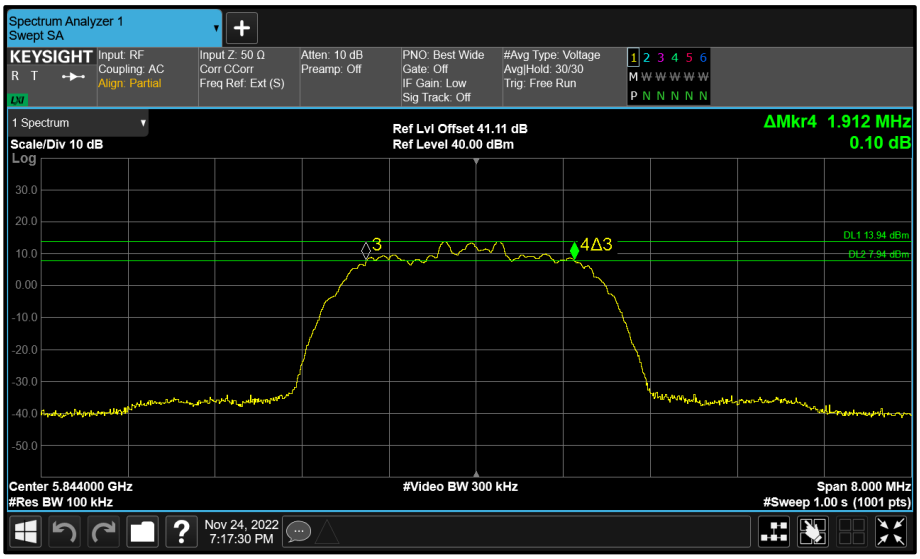

Figure 62 - Core 1 (B) 5844 MHz (CH119) 6 dB Bandwidth

Test Configuration			
Frequency Range:	5.725-5.850 GHz	Band:	U-NII-3
Limit Clause(s):	15.407(e) RSS-247 6.2.4.1	Test Method(s):	C63.10 6.9.3 789033 D02 v02r01 II.C.2.
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (8-DH5)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	-	1.020	-	-	≥500.0
5789	-	1.005	-	-	≥500.0
5844	-	1.020	-	-	≥500.0

Table 31 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	-	4.635	-	-	-
5789	-	4.635	-	-	-
5844	-	4.635	-	-	-

Table 32 - 99% Bandwidth Results

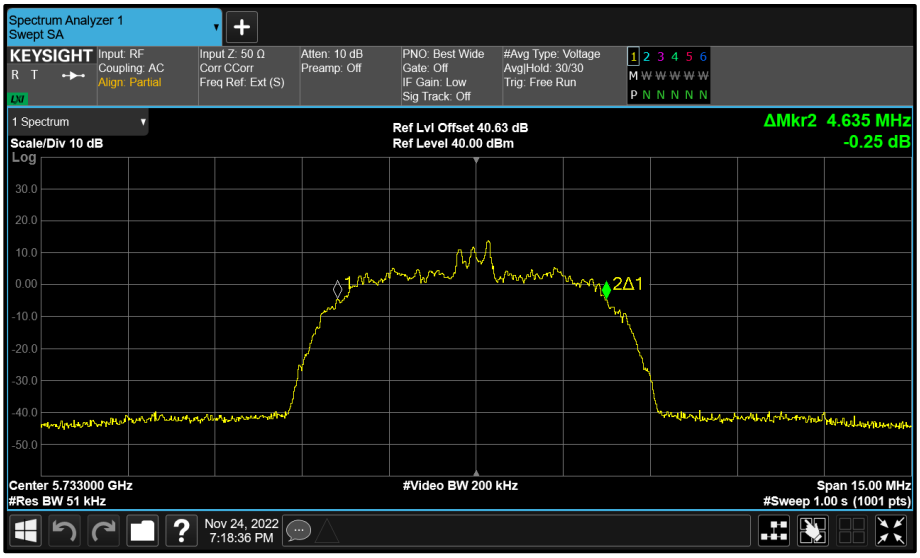

Figure 63 - Core 1 (B) 5733 MHz (CH8) 99% Bandwidth

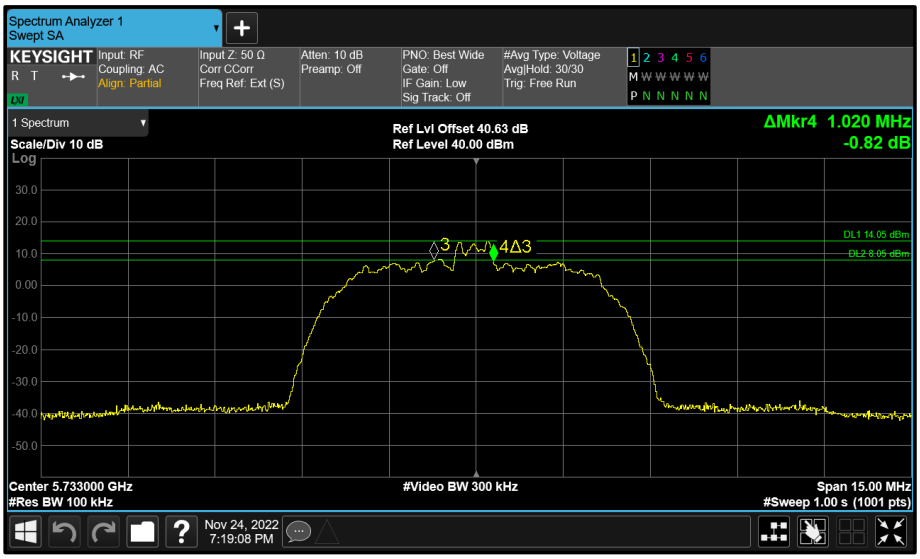

Figure 64 - Core 1 (B) 5733 MHz (CH8) 6 dB Bandwidth

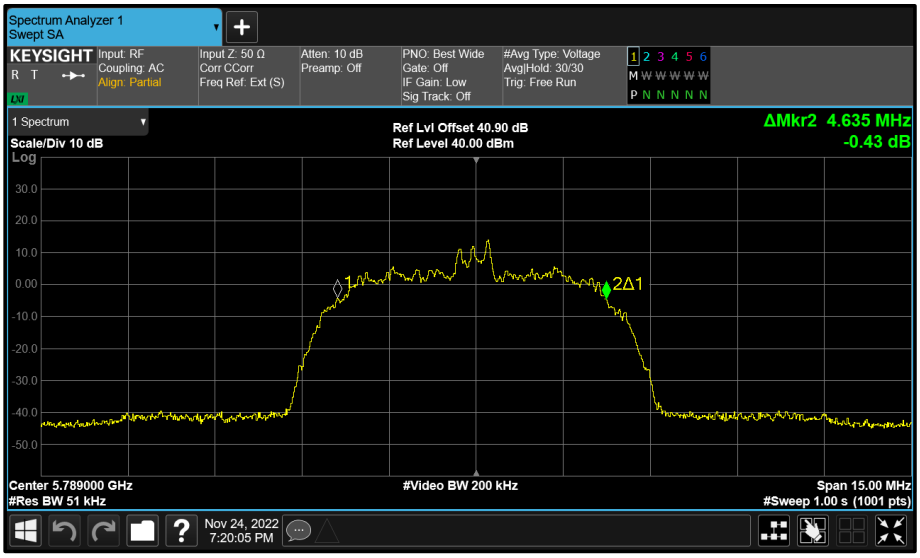

Figure 65 - Core 1 (B) 5789 MHz (CH64) 99% Bandwidth

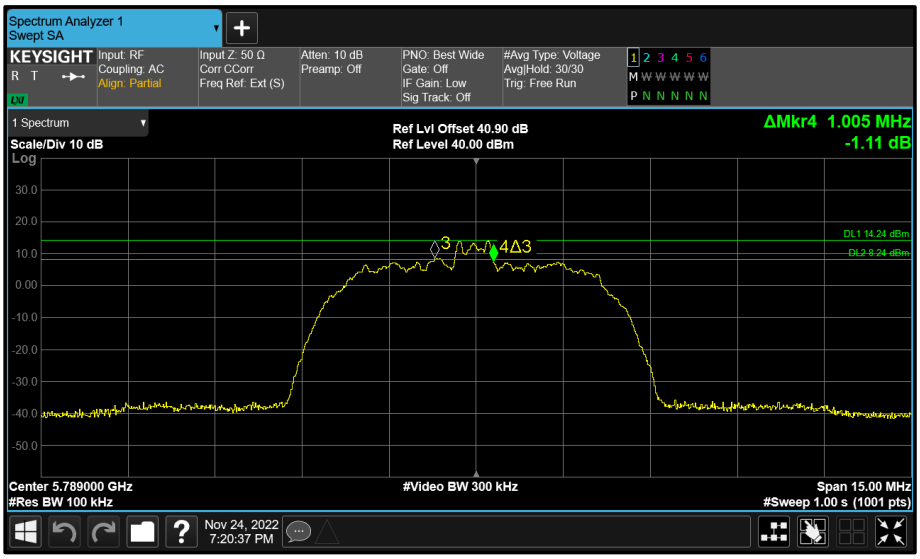

Figure 66 - Core 1 (B) 5789 MHz (CH64) 6 dB Bandwidth

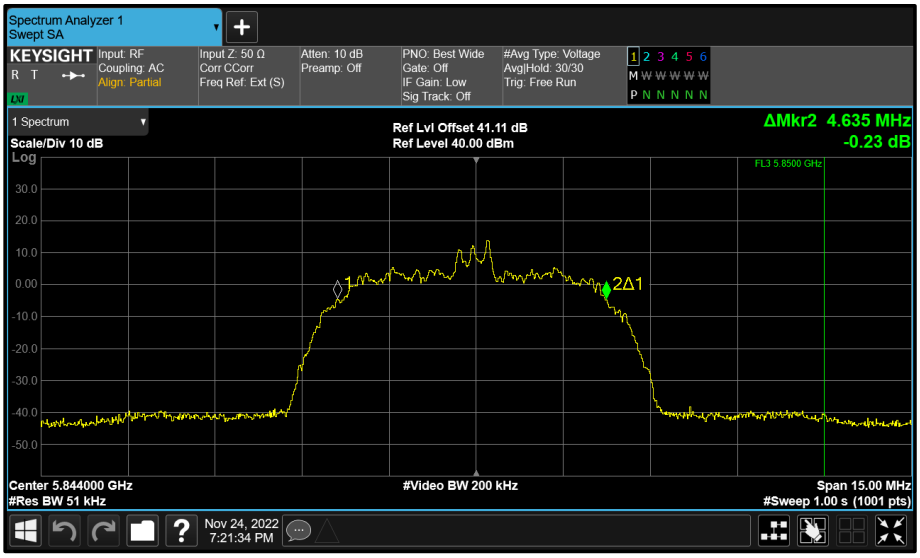

Figure 67 - Core 1 (B) 5844 MHz (CH119) 99% Bandwidth

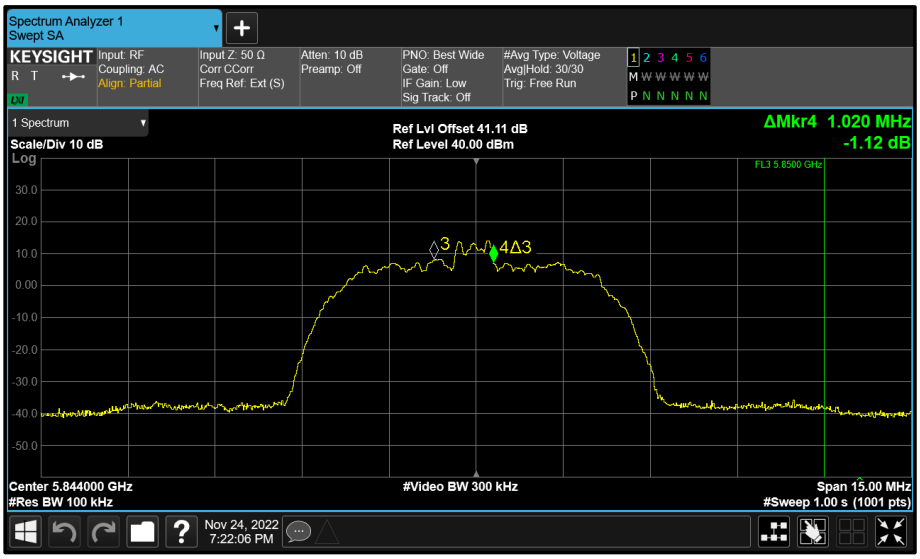

Figure 68 - Core 1 (B) 5844 MHz (CH119) 6 dB Bandwidth

Test Configuration			
Frequency Range:	5.725-5.850 GHz	Band:	U-NII-3
Limit Clause(s):	15.407(e) RSS-247 6.2.4.1	Test Method(s):	C63.10 6.9.3 789033 D02 v02r01 II.C.2.
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA π/4 DQPSK (4-DH5)	Duty Cycle (%):	-
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	1.920	1.920	-	-	≥500.0
5789	1.920	1.912	-	-	≥500.0
5844	1.920	1.920	-	-	≥500.0

Table 33 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
5733	2.392	2.392	-	-	-
5789	2.376	2.384	-	-	-
5844	2.376	2.392	-	-	-

Table 34 - 99% Bandwidth Results

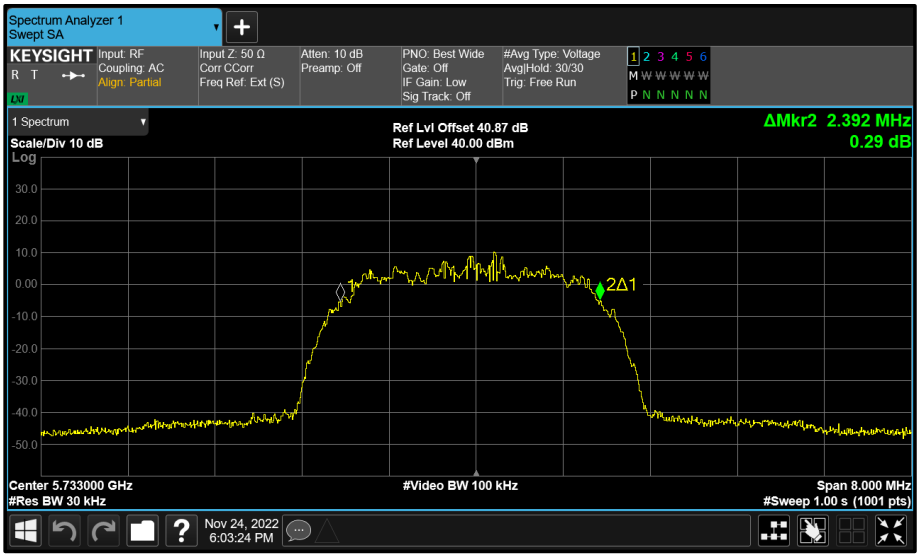

Figure 69 - Core 0 (A) 5733 MHz (CH8) 99% Bandwidth

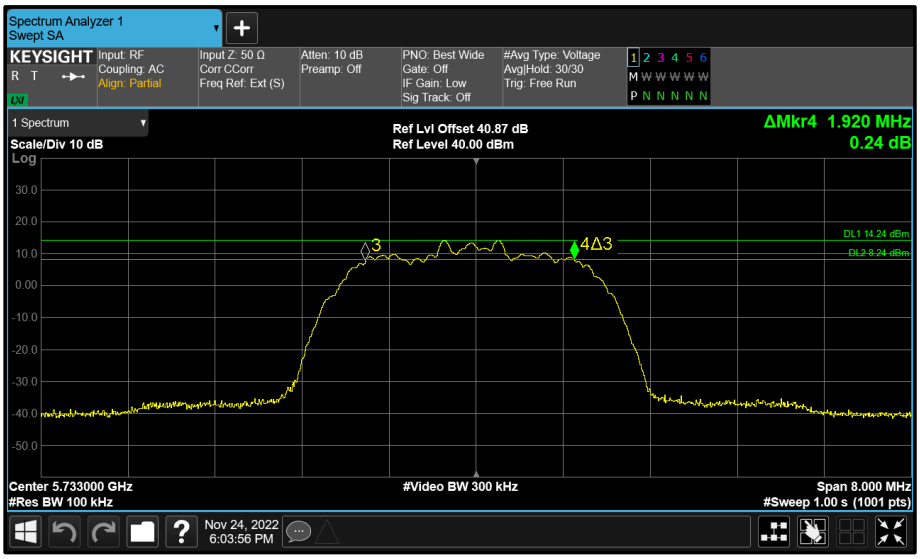

Figure 70 - Core 0 (A) 5733 MHz (CH8) 6 dB Bandwidth

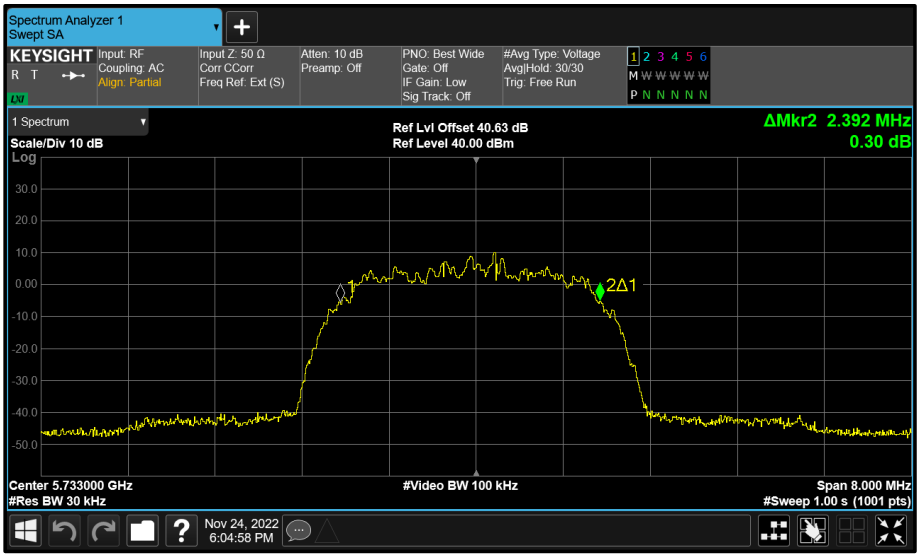

Figure 71 - Core 1 (B) 5733 MHz (CH8) 99% Bandwidth

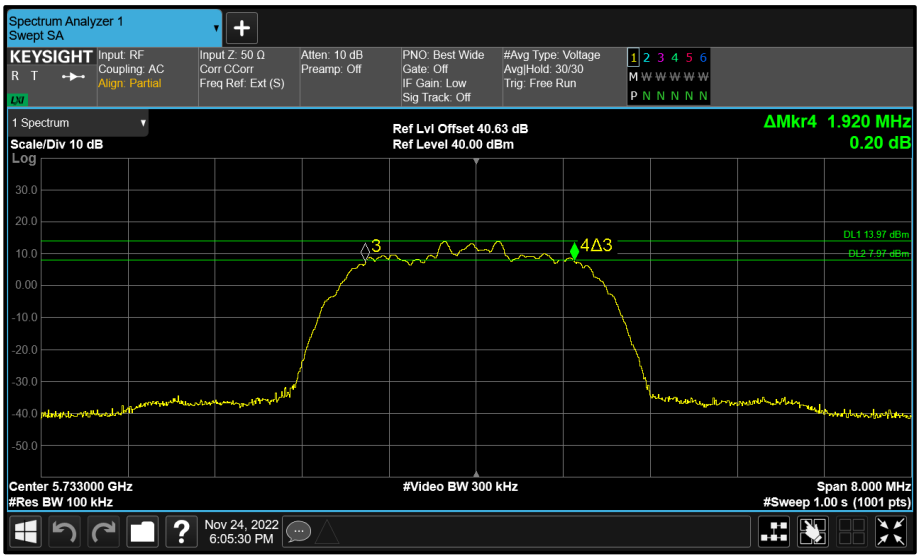

Figure 72 - Core 1 (B) 5733 MHz (CH8) 6 dB Bandwidth