

FCC and ISED Test Report

Manufacturer: TTP PLC

Model: Velaris Multilink



In accordance with FCC 47 CFR Part 25, FCC 47 CFR Part 2 and ISED RSS-170 and ISED RSS-GEN, Technology: (Broadband Global Area Network)

Prepared for: TTP PLC
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FCC ID: 2B04Q-VMULTIL200A

IC: 33922-VMULTIL200A

COMMERCIAL-IN-CONFIDENCE

Document 75962190-17 Issue 03

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	09 December 2025

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 25, FCC 47 CFR Part 2 and Industry Canada RSS-170 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Ahmad Javid	09 December 2025	
	Hugo Petty	09 December 2025	

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 25: 2024, FCC 47 CFR Part 2: 2024, ISED RSS-170 Issue 4 (09-2022) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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ACCREDITATION

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited). Results of tests covered by our Flexible UKAS Accreditation Schedule are marked FS (Flexible Scope).

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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	16 May 2025
2	Additional information provided by TTP	19 June 2025
3	Full testing added to scope of supply	09 December 2025

Table 1

1.2 Introduction

Applicant	TTP PLC
Manufacturer	Gotonomi
Model Number(s)	Velaris Multilink
Serial Number(s)	SN690006
Hardware Version(s)	1
Software Version(s)	1.5.8931
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 25: 2024 FCC 47 CFR Part 2: 2024 ISED RSS-170: Issue 4 (09-2022) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number 1	PURORDTTP23503
Date	06-August-2024
Order Number 2	PURORDTTP34627
Date	05-November-2025
Date of Receipt of EUT	13-September-2024
Start of Test	25-September-2024
Finish of Test	18-November-2025
Name of Engineer(s)	Ahmad Javid and Hugo Petty
Related Document(s)	ANSI C63.26 (2015)



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 25, FCC 47 CFR Part 2 and Industry Canada RSS-170 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	FCC 47 CFR Part 25	FCC 47 CFR Part 2	ISED RSS-170	ISED RSS-GEN			
Configuration and Mode: Velaris Multilink - 1.6 GHz communications link							
2.1	25.202(f)	2.1053	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26 (2015)
		2.1047 (d)			Modulation Characteristics	N/T	ANSI C63.26 (2015)
2.2	25.202(d)	2.1055	5.3	6.11	Frequency Tolerance	Pass	ANSI C63.26 (2015)
2.3	25.202(f),	2.1051	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26 (2015)
2.4	25.204	2.1046	5.5	6.12	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26 (2015)
2.5	25.216		5.9	5.10	Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation Satellite Service	Pass	ANSI C63.26 (2015)
2.6		2.1049		6.7	Occupied Bandwidth	Pass	ANSI C63.26 (2015)

Table 2



1.4 Application Form

Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)		Mobile earth station satellite communication data modem L-Band, up to 200kbps	
Manufacturer:		Gotonomi	
Model:		Velaris Multilink	
Part Number:		VML01	
Hardware Version:		1	
Software Version:		1.5.8931	
FCC ID of the product under test – see guidance here		2B04Q-VMULTIL200A	
IC ID of the product under test – see guidance here		33922-VMULTIL200A	
Device Category	Mobile ☐	Portable ☒	Fixed ☒
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☐

Table 3

Intentional Radiators

Technology			Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G
Frequency Range (MHz to MHz)	1525.0 - 1559.0	1626.5 - 1660.5	LTE Cat-1 Band 1	LTE Cat-1 Band 2	LTE Cat-1 Band 3	LTE Cat-1 Band 4	LTE Cat-1 Band 5
Conducted Declared Output Power (dBm)	Rx	37.5	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm
Antenna Gain (dBi)	2	2.5	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	200kHz	200kHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM	QPSK/QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	200KX2D	200KX2D					
Bottom Frequency (MHz)	1525	1626.5	1920MHz	1850MHz	1710MHz	1710MHz	824MHz
Middle Frequency (MHz)	1540	1643.5					
Top Frequency (MHz)	1559	1660.5	1980MHz	1910MHz	1785MHz	1755MHz	849MHz



Technology	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G
Frequency Range (MHz to MHz)	LTE Cat-1 Band 7	LTE Cat-1 Band 8	LTE Cat-1 Band 12	LTE Cat-1 Band 13	LTE Cat-1 Band 18	LTE Cat-1 Band 20	LTE Cat-1 Band 25
Conducted Declared Output Power (dBm)	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm
Antenna Gain (dBi)	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)							
Bottom Frequency (MHz)	2500MHz	850MHz	699MHz	777MHz	815MHz	832MHz	1850MHz
Middle Frequency (MHz)							
Top Frequency (MHz)	2570MHz	915MHz	716MHz	787MHz	830MHz	862MHz	1915MHz

Technology	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G
Frequency Range (MHz to MHz)	LTE Cat-1 Band 26	LTE Cat-1 Band 28	LTE Cat-1 Band 38	LTE Cat-1 Band 39	LTE Cat-1 Band 40	LTE Cat-1 Band 41	GSM 850MHz
Conducted Declared Output Power (dBm)	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm	+23dBm	+33dBm
Antenna Gain (dBi)	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)							
Bottom Frequency (MHz)	814MHz	703MHz	2570MHz	1880MHz	2300MHz	2496MHz	824.2MHz
Middle Frequency (MHz)							
Top Frequency (MHz)	849MHz	748MHz	2620MHz	1920MHz	2400MHz	2690MHz	848.8MHz

Technology	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G
Frequency Range (MHz to MHz)	GSM 900MHz	GSM 1800MHz	GSM 1900MHz
Conducted Declared Output Power (dBm)	+33dBm	+30dBm	+30dBm
Antenna Gain (dBi)	+2dBi	+2dBi	+2dBi



Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz	1.4, 3, 5, 10, 15, and 20 MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)			
Bottom Frequency (MHz)	880.0MHz	1710.2MHz	1850.2MHz
Middle Frequency (MHz)			
Top Frequency (MHz)	915.0MHz	1784.8MHz	1909.8MHz

Technology	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G	Quectel EG21-G
Frequency Range (MHz to MHz)	WCDMA B1	WCDMA B2	WCDMA B4	WCDMA B5	WCDMA B6	WCDMA B8	WCDMA B19
Conducted Declared Output Power (dBm)	+24dBm	+24dBm	+24dBm	+24dBm	+24dBm	+24dBm	+24dBm
Antenna Gain (dBi)	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi	+2dBi
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	5MHz	5MHz	5MHz	5MHz	5MHz	5MHz	5MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM	QPSK/QAM /16QAM/64 QAM
Bottom Frequency (MHz)	1920	1850	1710	824	830	880	830
Top Frequency (MHz)	1980	1910	1755	849	840	915	845

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	2690 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	26MHz
Class A Digital Device (Use in commercial, industrial or business environment) ☒	
Class B Digital Device (Use in residential environment only) ☐	

Table 5

AC Power Source

AC supply frequency:	-	Hz
Voltage	-	V
Max current:	-	A
Single Phase ☐ Three Phase ☐		

Table 6



DC Power Source

Nominal voltage:	24	V
Extreme upper voltage:	30	V
Extreme lower voltage:	18	V
Max current:	3	A

Table 7

Battery Power Source

Voltage:	-	V
End-point voltage:	-	V (Point at which the battery will terminate)
Alkaline ☐ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ *(Vehicle regulated)		
Other ☐	Please detail:	

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☐
---	--

Table 9

Temperature

Minimum temperature:	Ambient	°C
Maximum temperature:	Ambient	°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)	0 (Satcom)	dB
--	------------	----

Table 11



Antenna Characteristics

Antenna connector ☒			State impedance	50	Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☐	Type:		Gain		dBi
External antenna ☒	Type:	200 A	Gain	2.5	dBi
For external antenna only: Standard Antenna Jack ☒ If yes, describe how user is prohibited from changing antenna (if not professional installed): By instruction Equipment is only ever professionally installed ☒ Non-standard Antenna Jack ☐ All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.					

Table 12

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

I hereby declare that the information supplied is correct and complete.

Name: Roderick van den Bergh
Position held: Operations Manager
Date: 11/9/24



1.5 Product Information

1.5.1 Technical Description

Mobile earth station satellite communication data modem L-Band, up to 200kbps.

1.6 Deviations from the Standard

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

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: , Serial Number: 690002			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

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: Velaris Multilink - 1.6 GHz communications link		
Radiated Spurious Emissions	Ahmad Javid	UKAS
Frequency Tolerance	Hugo Petty	UKAS
Spurious Emissions at Antenna Terminals	Hugo Petty	UKAS
Equivalent Isotropic Radiated Power	Hugo Petty	UKAS
Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation Satellite Service	Hugo Petty	UKAS
Occupied Bandwidth	Hugo Petty	UKAS

Table 15

Office Address:

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



2 Test Details

2.1 Radiated Spurious Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 25: Clause 25.202(f)
FCC 47 CFR Part 2: Clause 2.1053
ISED RSS-170: Clause 5.8
ISED RSS-GEN, Clause 6.13

2.1.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: SN690006 - Modification State 0

2.1.3 Date of Test

25-September-2024 to 26-September-2024

2.1.4 Test Method

A preliminary profile of the Radiated Spurious Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Testing was performed in accordance with ANSI C63.26, Clause 5.5.

Prescans and final measurements were performed using the direct field strength method.

Field strength measurements were performed and then converted to Equivalent Power Measurements in accordance with ANSI C63.26, Clause 5.2.7 equation c)

Example calculation:

$E \text{ (dBuV/m)} + 20\log(d) - 104.8 = \text{EIRP (dBm)}$ where (d) is the measurement distance.

$82.2 \text{ (dBuV/m)} + 20\log(3) - 104.8 = \text{EIRP (dBm)}$

$-13.0 = \text{EIRP (dBm)}$

2.1.5 Example Test Setup Diagram

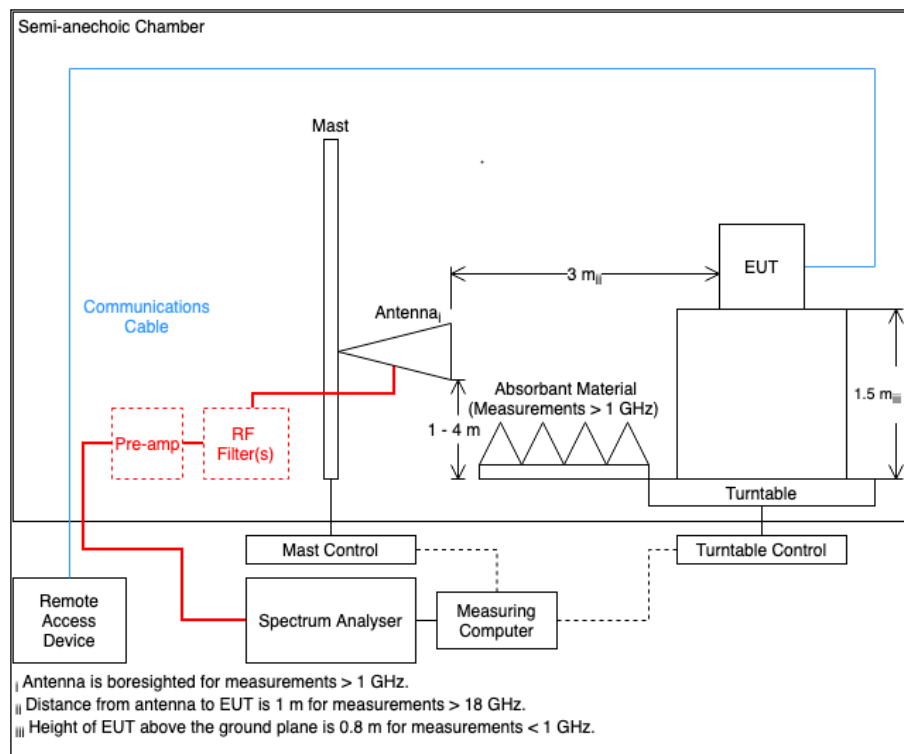


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	20.8 - 23.3 °C
Relative Humidity	49.8 - 54.4 %



2.1.7 Test Results

Velaris Multilink - 1.6 GHz communications link

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 16 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

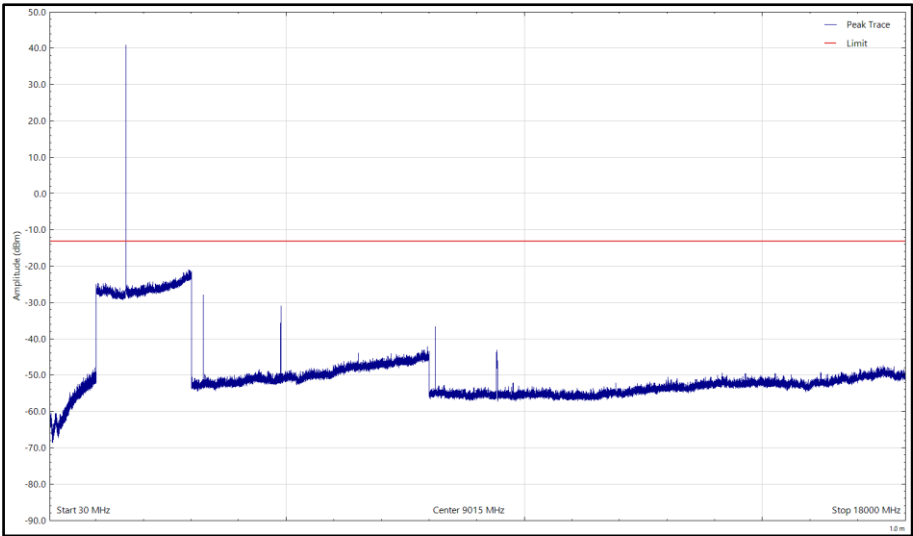


Figure 2 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

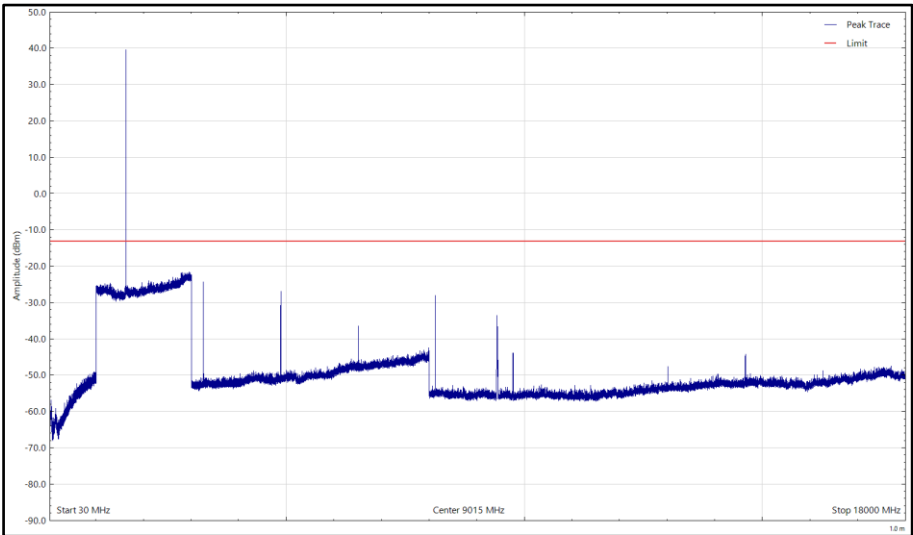


Figure 3 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
3252.965	-20.18	-13.00	-7.18	Peak	357	150	Vertical
3253.020	-17.21	-13.00	-4.21	Peak	17	309	Horizontal

Table 17- Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz

No other emissions found within 10 dB of the limit.



Figure 4 - Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

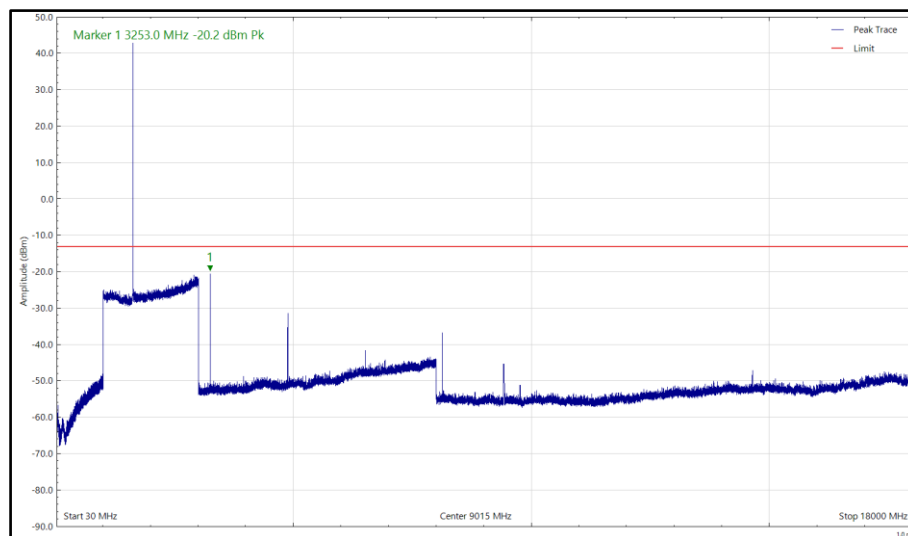


Figure 5 - Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
3252.970	-20.68	-13.00	-7.68	Peak	295	150	Horizontal
3253.005	-19.29	-13.00	-6.29	Peak	341	277	Vertical

Table 18- Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz

No other emissions found within 10 dB of the limit.

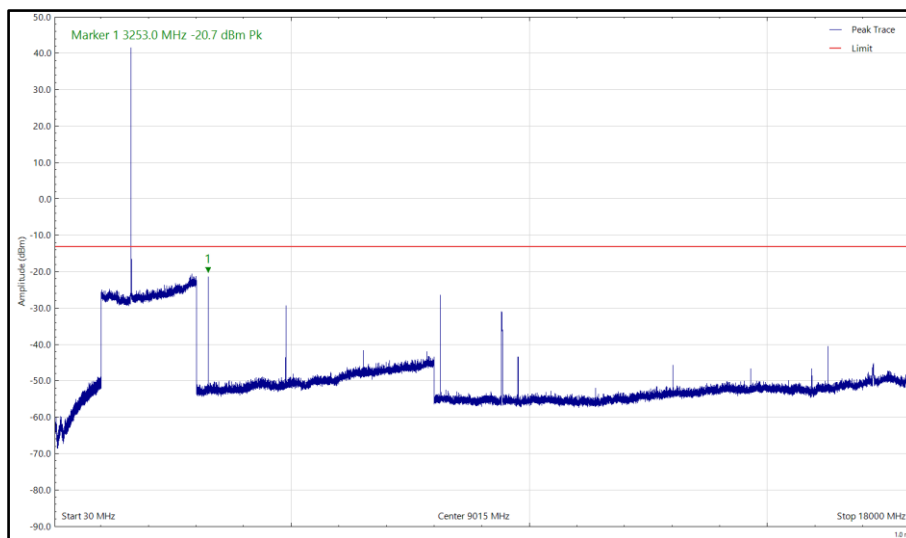


Figure 6 - Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

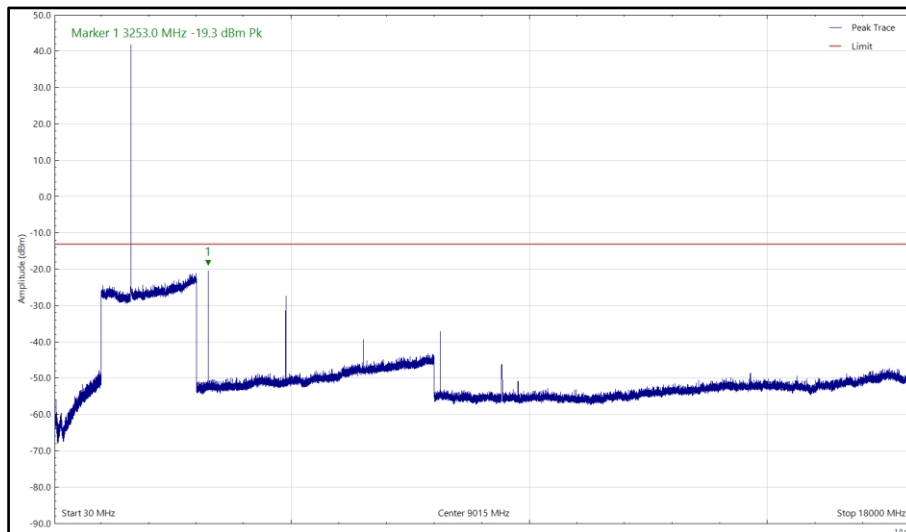


Figure 7 - Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 19 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

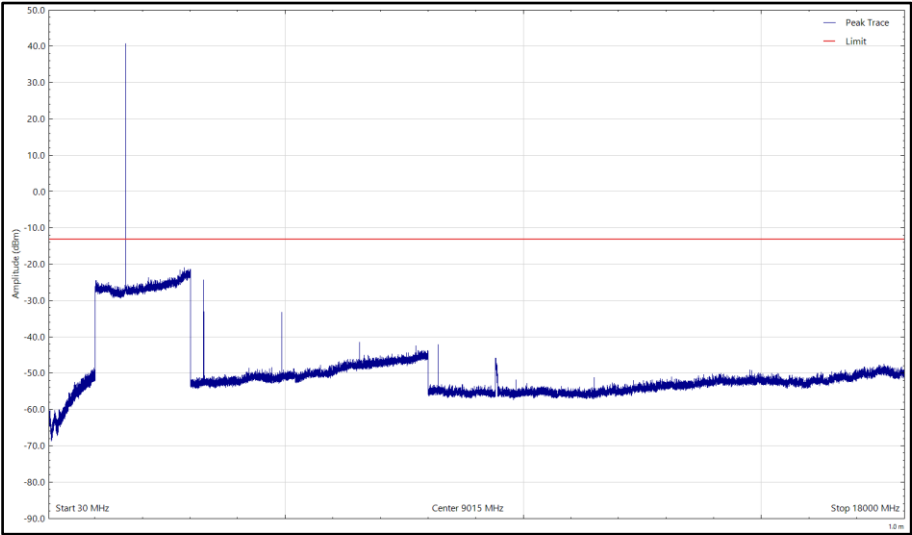


Figure 8 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

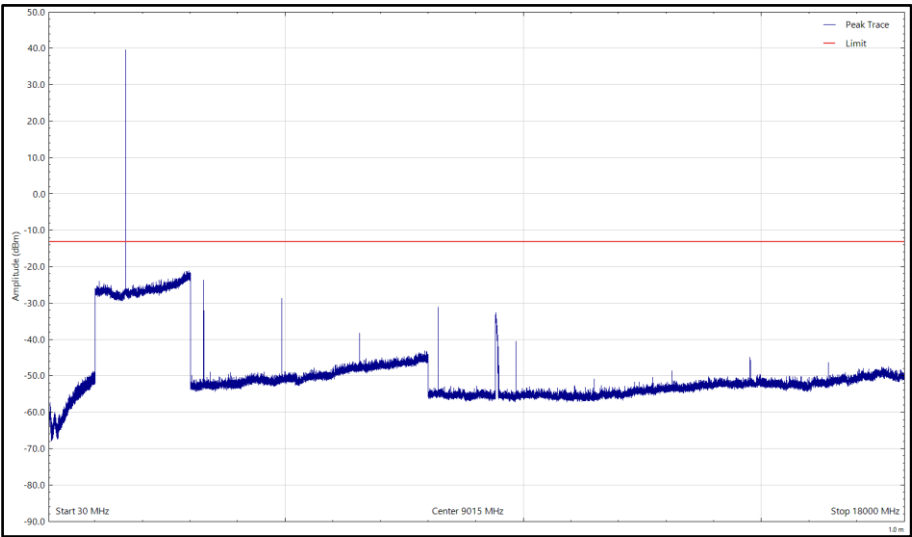


Figure 9 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4920.220	-17.87	-13.00	-4.87	Peak	54	188	Horizontal

Table 20 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz

No other emissions found within 10 dB of the limit.

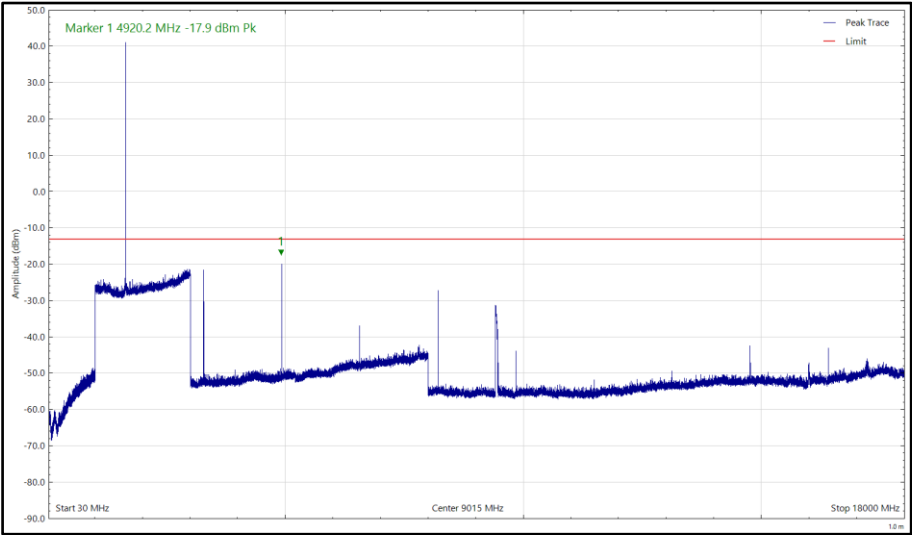


Figure 10 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

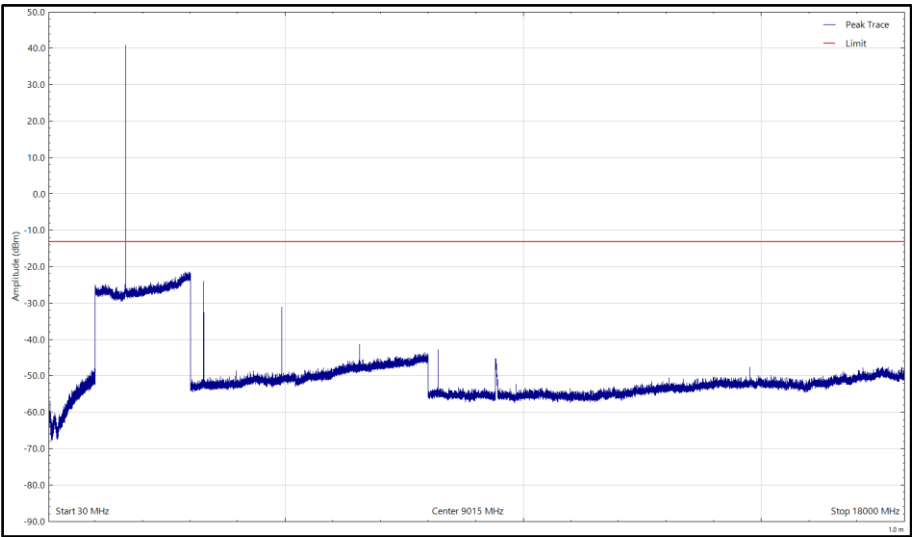


Figure 11 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
3279.960	-20.83	-13.00	-7.83	Peak	331	252	Vertical

Table 21 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz

No other emissions found within 10 dB of the limit.

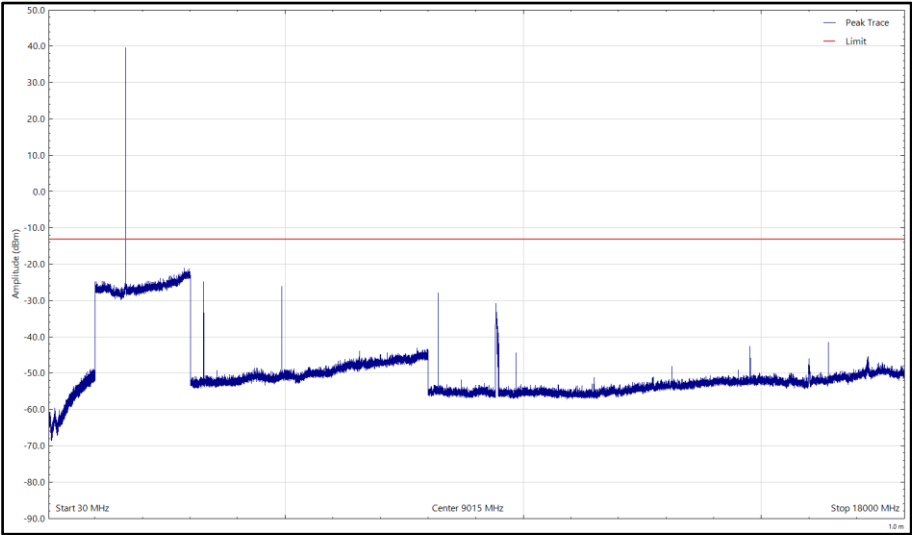


Figure 12 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

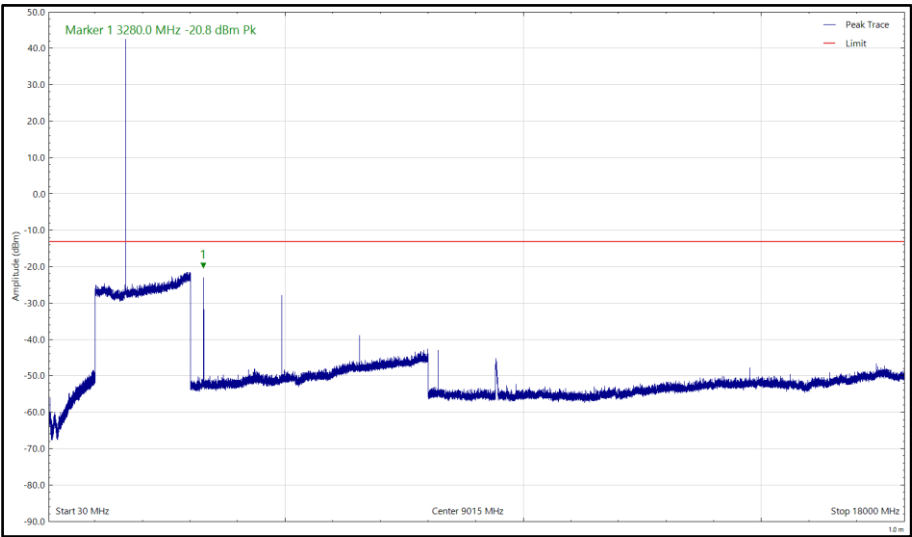


Figure 13 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 22 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

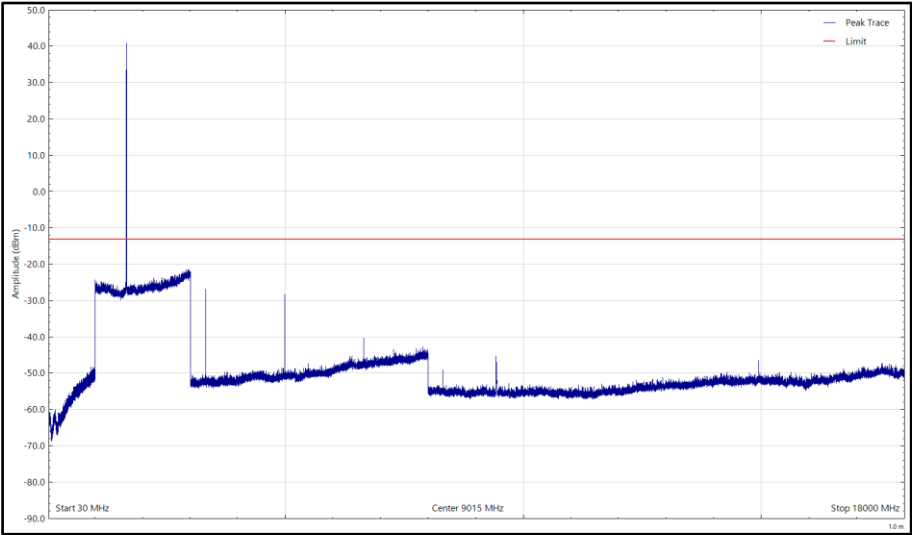


Figure 14 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

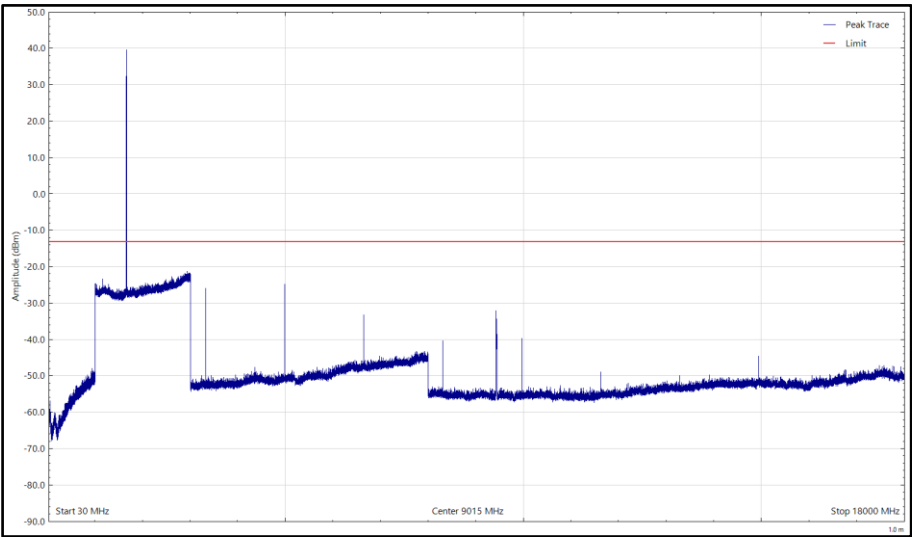


Figure 15 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 23 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

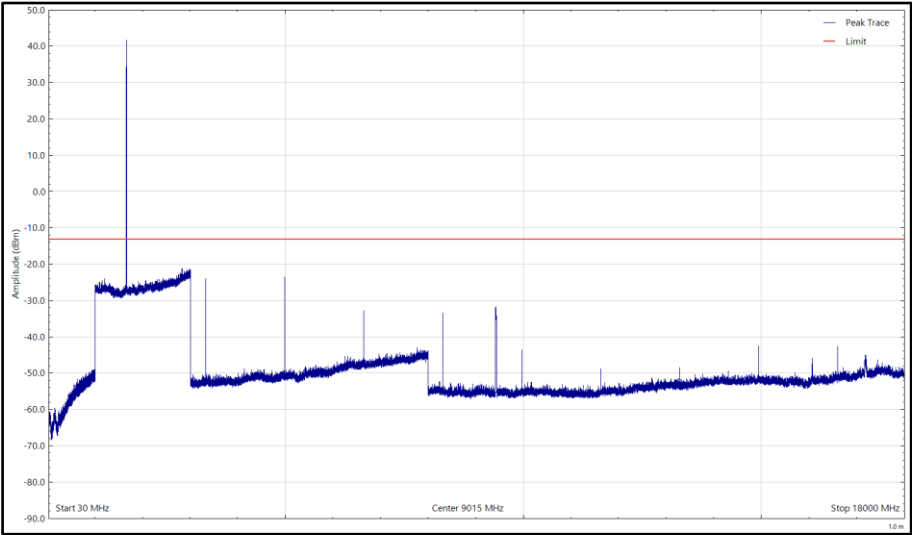


Figure 16 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

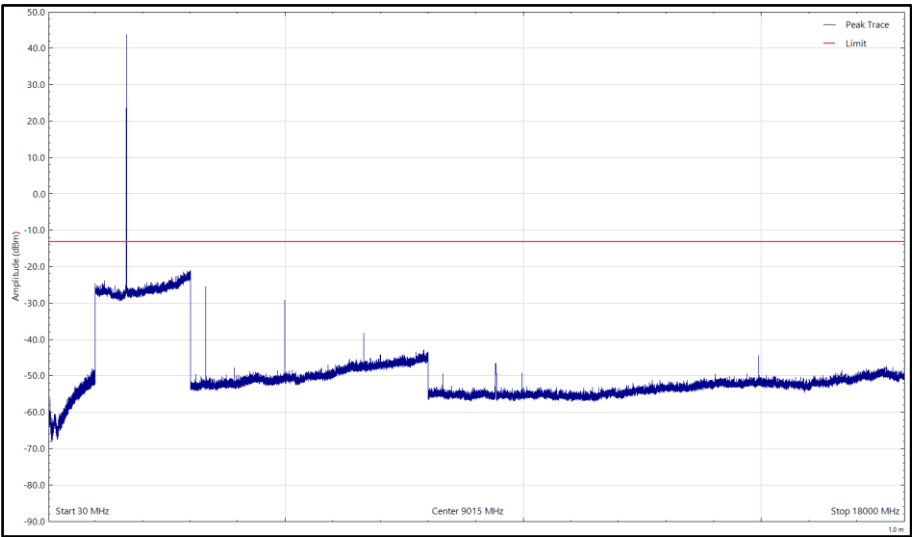


Figure 17 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4980.025	-18.85	-13.00	-5.85	Peak	339	393	Vertical

Table 24 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz

No other emissions found within 10 dB of the limit.

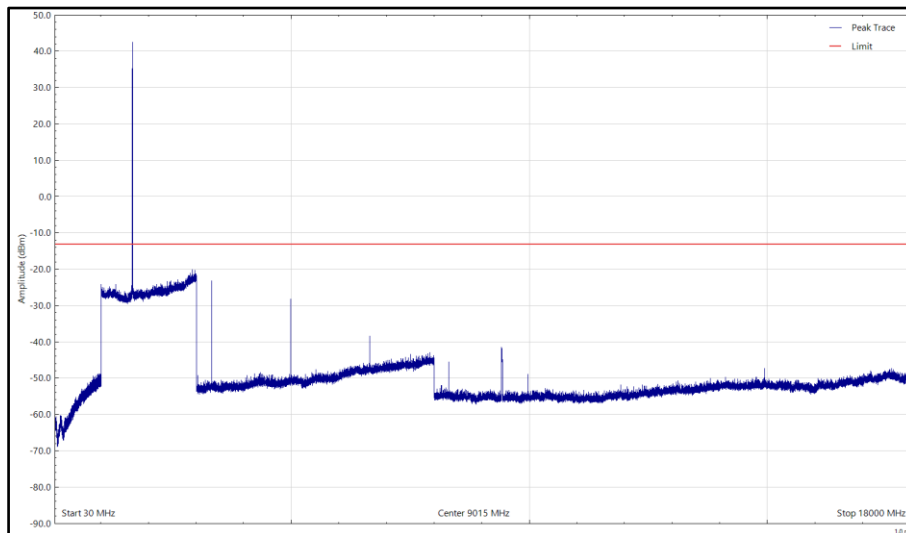


Figure 18 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

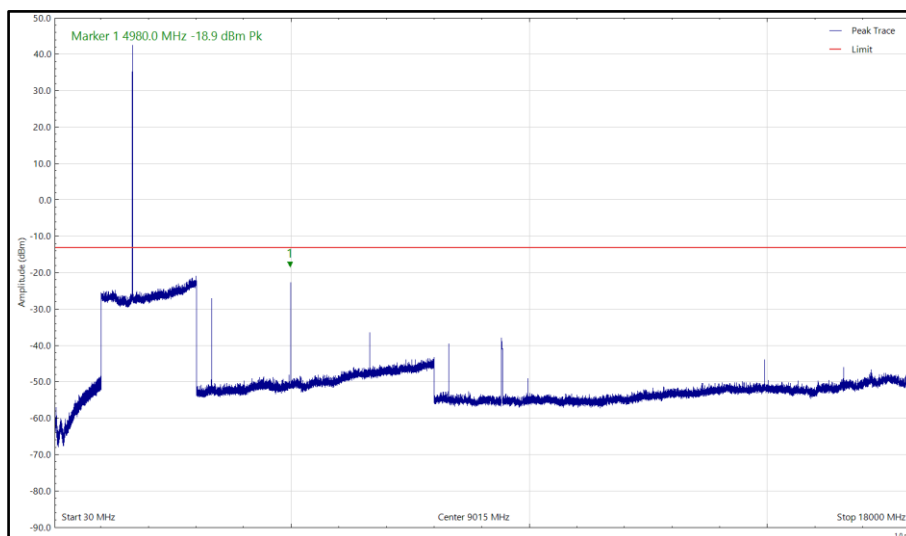


Figure 19 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)



FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;

35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;

$43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.

ISED RSS-170, Limit Clause 5.8

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the occupied bandwidth or necessary bandwidth, whichever is greater;

35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the occupied bandwidth or necessary bandwidth, whichever is greater;

$43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the occupied bandwidth or necessary bandwidth, whichever is greater.



2.1.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
True RMS Multimeter	Fluke	179	4007	12	17-Nov-2024
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	01-Feb-2025
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.5.1	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5216	12	14-Jul-2025
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	03-Apr-2025
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	23-May-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	13-May-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	30-May-2025
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	26-Oct-2024
TRILOG Super Broadband Test Antenna	Schwarzbeck	VULB 9168	5942	24	24-May-2026
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	6	17-Feb-2025
Spectrum Analyser	Anritsu	MT8821C	6542	12	28-Jun-2025

Table 25

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.2 Frequency Tolerance

2.2.1 Specification Reference

FCC 47 CFR Part 25: Clause 25.202(d)
FCC 47 CFR Part 2: Clause 2.1055
Industry Canada RSS-170 Clause 5.3
ISED RSS-GEN Clause 6.11

2.2.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: 690002 - Modification State 0

2.2.3 Date of Test

13-November-2025 to 17-November-2025

2.2.4 Test Method

Velaris Multilink - 1.6 GHz communications link

This test was performed in accordance with ANSI C63.26, clause 5.6.
All measurements were made using an unmodulated carrier.
The spectrum analyser was set up:
Span - 5kHz
RBW - 10Hz
VBW - 3x RBW = 30Hz
Trace - Max Hold
Detector - Peak

DUT was powered using a DC supply for all measurements

2.2.5 Environmental Conditions

Ambient Temperature	20.7 - 21.6 °C
Relative Humidity	30.0 - 59.6 %



2.2.6 Test Results

Velaris Multilink - 1.6 GHz communications link

Temperature (°C)	Voltage	1626.5 MHz		1640 MHz		1660 MHz	
		Frequency Error (%)	Frequency Error (ppm)	Frequency Error (%)	Frequency Error (ppm)	Frequency Error (%)	Frequency Error (ppm)
-30	24	0.000097	0.973	0.000119	1.186	0.000119	1.185
-20	24	0.000129	1.286	0.000128	1.284	0.000127	1.266
-10	24	0.000117	1.169	0.000106	1.058	0.000163	1.627
0	24	0.000085	0.854	0.000079	0.794	0.000079	0.793
10	24	0.000114	1.141	0.000072	0.722	0.000071	0.709
20	18	0.000061	0.608	0.000060	0.601	0.000058	0.585
20	24	0.000048	0.485	0.000058	0.585	0.000056	0.559
20	30	0.000050	0.499	0.000057	0.572	0.000055	0.554
30	24	0.000040	0.397	0.000036	0.361	0.000033	0.334
40	24	0.000037	0.373	0.000041	0.408	0.000039	0.39
50	24	0.000035	0.35	0.000035	0.346	0.000032	0.317

Table 26 - Frequency Error Results

FCC 47 CFR Part 2, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

ISED RSS-170, Limit Clause 5.3

For MES equipment, the carrier frequency shall not drift from the reference frequency by more than ± 10 ppm.



2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
Thermocouple Thermometer	Fluke	51	3173	12	17-Jun-2026
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	18-Mar-2026
Digital Multi-meter	Iso-tech	IDM93N	4435	12	06-Mar-2026
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5514	12	06-Jun-2026
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6181	12	19-Aug-2026
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6376	12	06-Jun-2026
MXA Signal Analyser	Keysight Technologies	N9020B	6418	24	15-Oct-2027
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	6558	12	29-Nov-2025
20dB 10W/18GHz F/M SMA bidirectional Attenuator	Weinschel	WA41-20-0102	7027	12	06-Jun-2026

Table 27

O/P Mon – Output Monitored using calibrated equipment



2.3 Spurious Emissions at Antenna Terminals

2.3.1 Specification Reference

FCC 47 CFR Part 25: Clause 25.202(f)
FCC 47 CFR Part 2: Clause 2.1051
Industry Canada RSS-170 Clause 5.8
ISED RSS-GEN Clause 6.13

2.3.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: 690002 - Modification State 0

2.3.3 Date of Test

17-November-2025 to 18-November-2025

2.3.4 Test Method

Velaris Multilink - 1.6 GHz communications link

This test was performed in accordance with ANSI C63.26, clause 5.7.

For the emission masks measurements the reference level used was the measured Conducted Band Power per Symbol Rate speed measured during the E.I.R.P test process.

Due to the use of a 1kHz RBW for the 16800 Symbol Rate Emission Mask measurements the Ref. Level Offset was increased by 6dB to correct back to the 4kHz bandwidth requirement.

As the power and bandwidth was considered to be equivalent for all modulation scheme, this test was only performed on the lowest order modulation scheme, which was QPSK. Emission mask measurements were performed for each symbol rate as the nominal channel bandwidth was different.

For emission measurements beyond 250% of the authorised channel bandwidth measurements were limited to a symbol rate of 16800 kbps as this was shown to have the highest power spectral density in a 4 kHz bandwidth. Where an RBW greater than 4 kHz was used, this was considered worst case and used to speed up the measurement time.

As per Rec. ITU-R SM.329-13, for the range 9kHz to 150kHz a reference bandwidth of 1kHz should be used. Therefore, the limit -13dBm should be adjusted by -6dB to account for bandwidth reduction from 4kHz.

2.3.5 Environmental Conditions

Ambient Temperature	20.7 - 21.3 °C
Relative Humidity	26.8 - 27.8 %



2.3.6 Test Results

Velaris Multilink - 1.6 GHz communications link

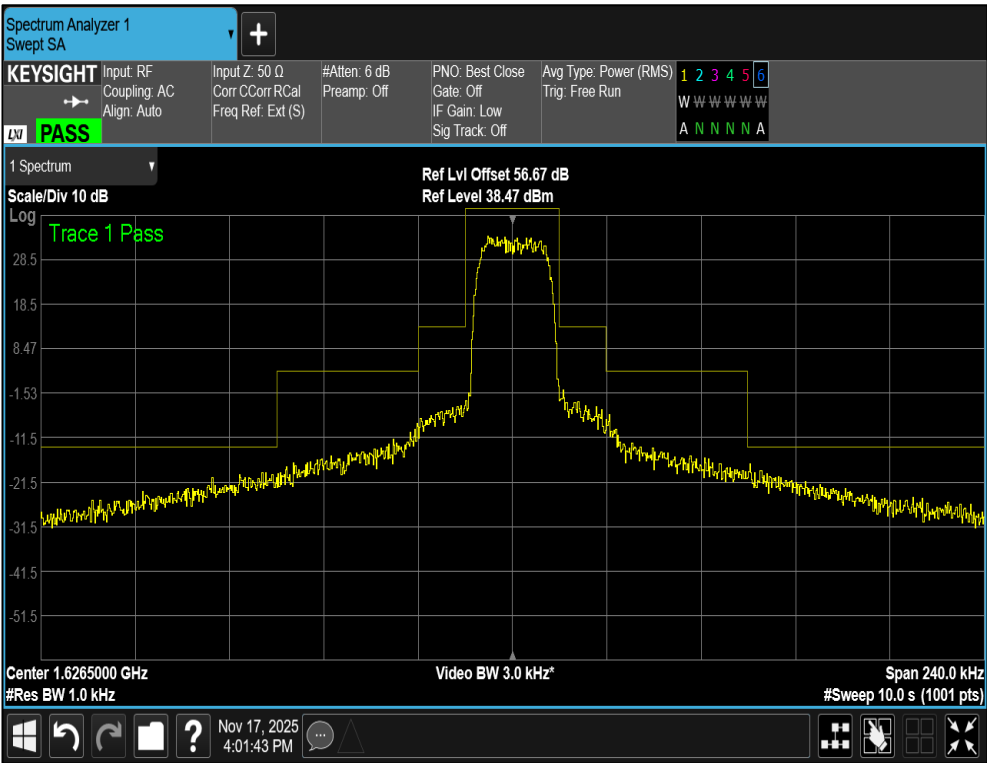


Figure 20 - 1626.5 MHz - Emission Mask - 16800

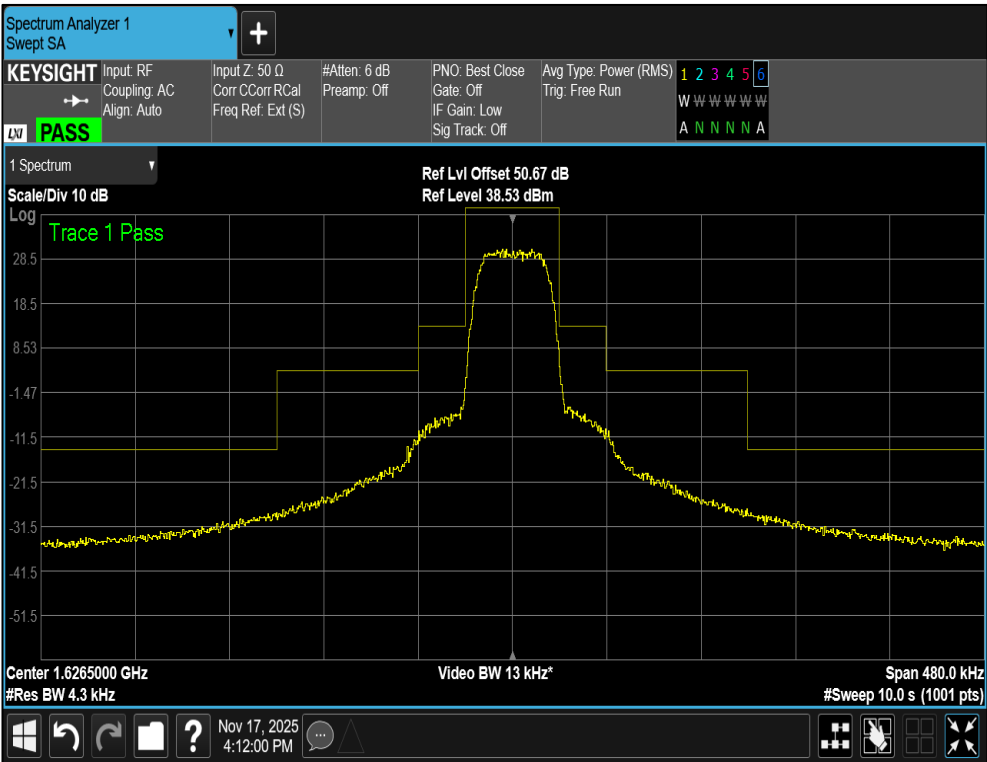


Figure 21 - 1626.5 MHz - Emission Mask - 33000

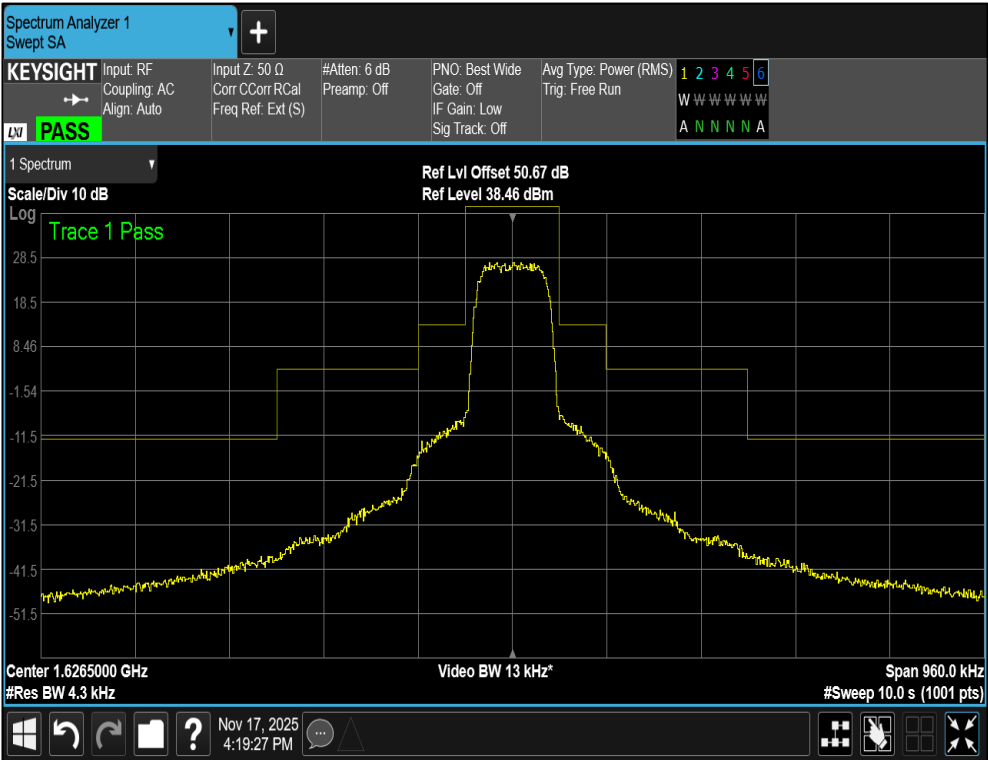


Figure 22 - 1626.5 MHz - Emission Mask -67200

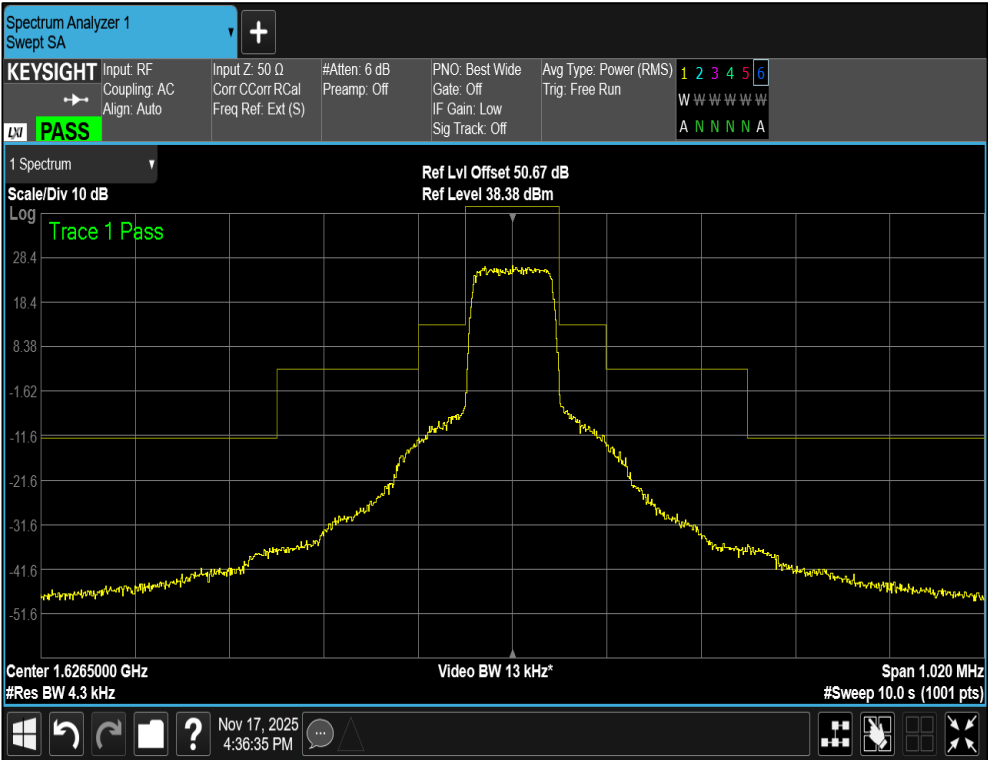


Figure 23 - 1626.5 MHz - Emission Mask - 84000

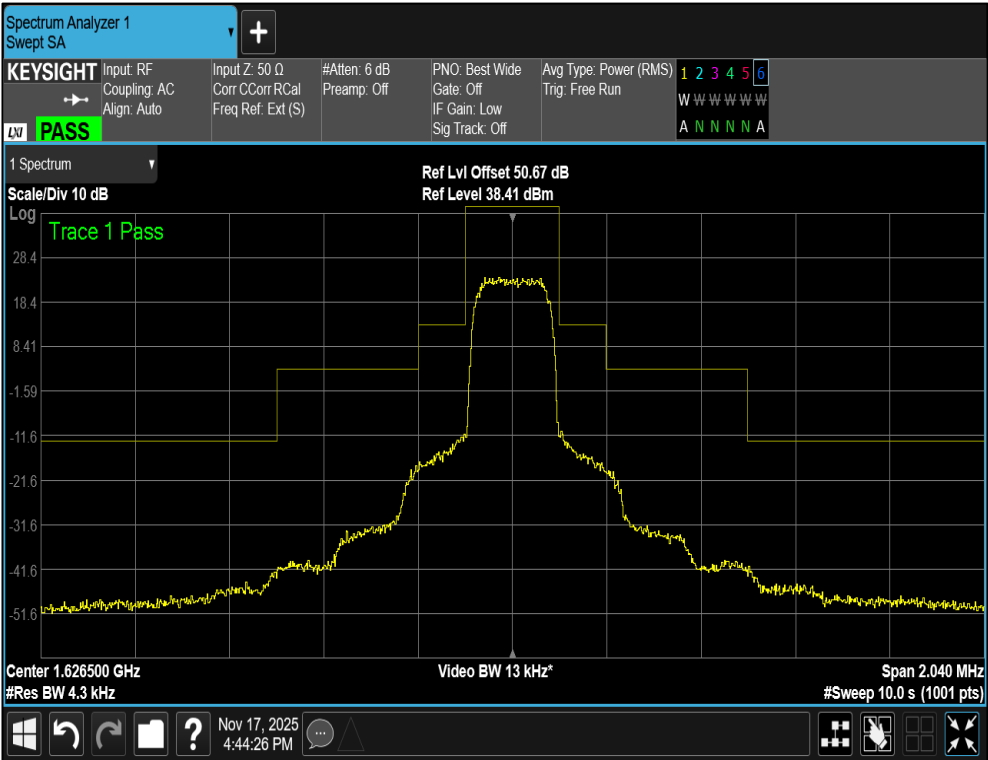


Figure 24 - 1626.5 MHz - Emission Mask - 151200

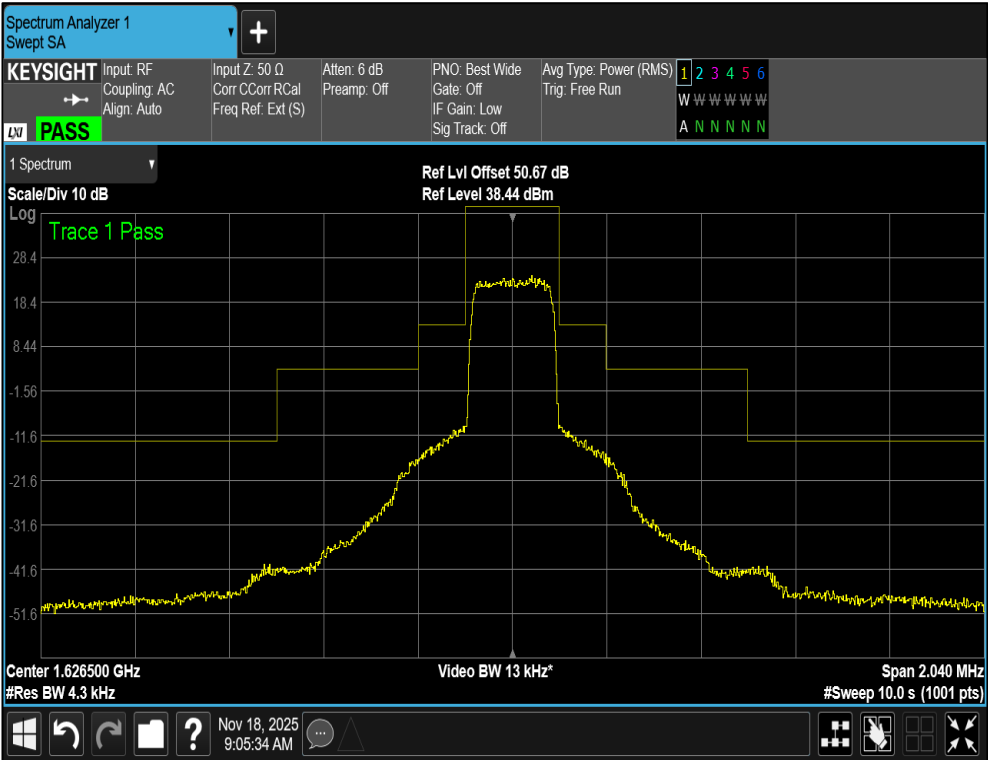


Figure 25 - 1626.5 MHz - Emission Mask - 168000

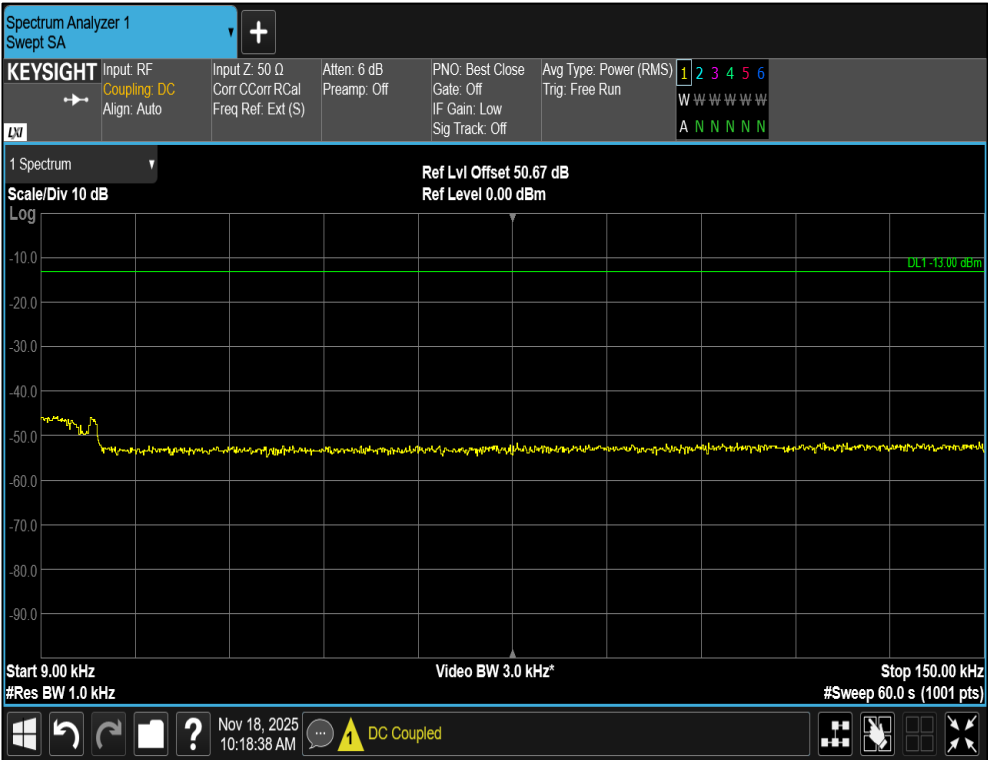


Figure 26 - 1626.5 MHz - 9 kHz to 150 kHz

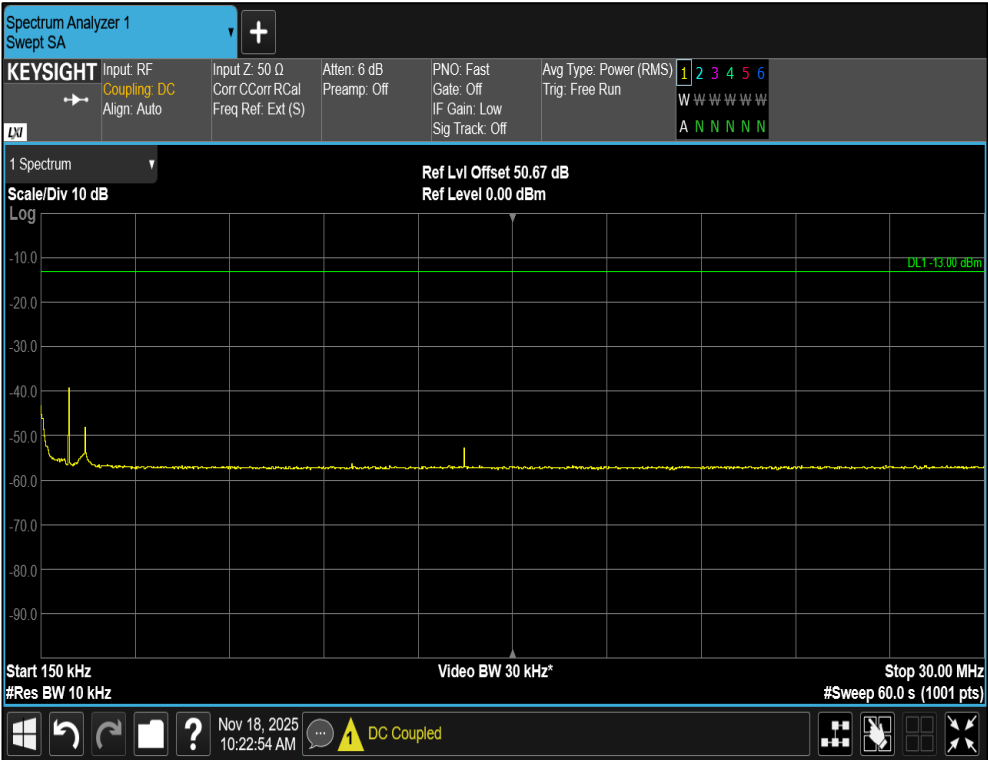


Figure 27 - 1626.5 MHz - 150 kHz to 30 MHz

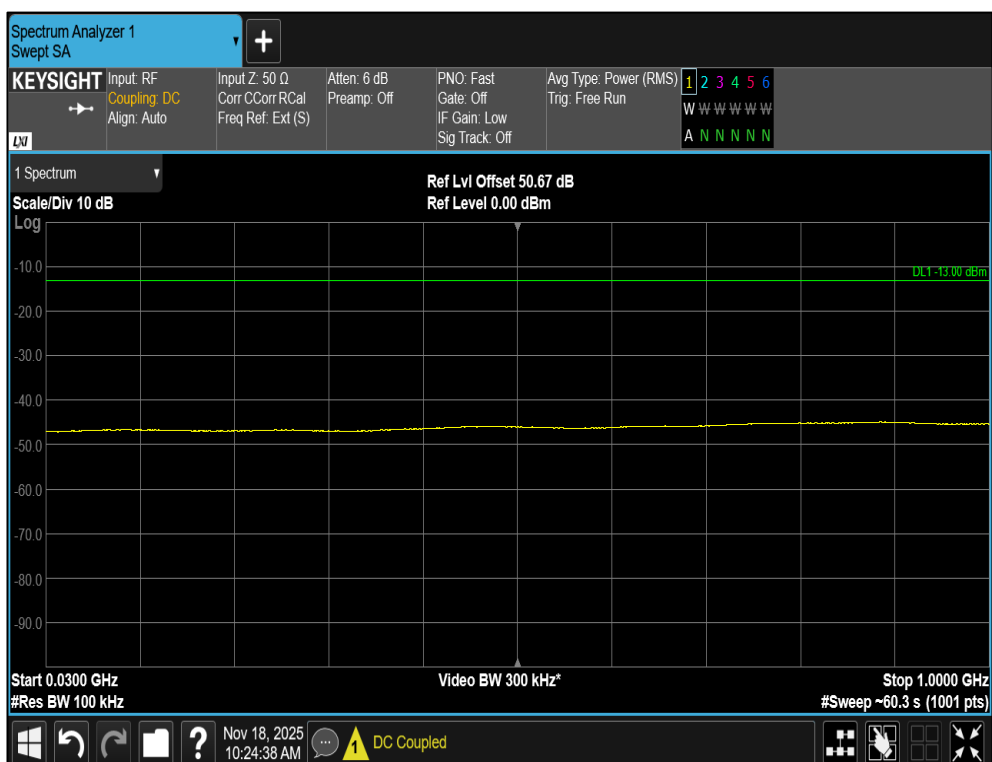


Figure 28 - 1626.5 MHz - 30 MHz to 1 GHz

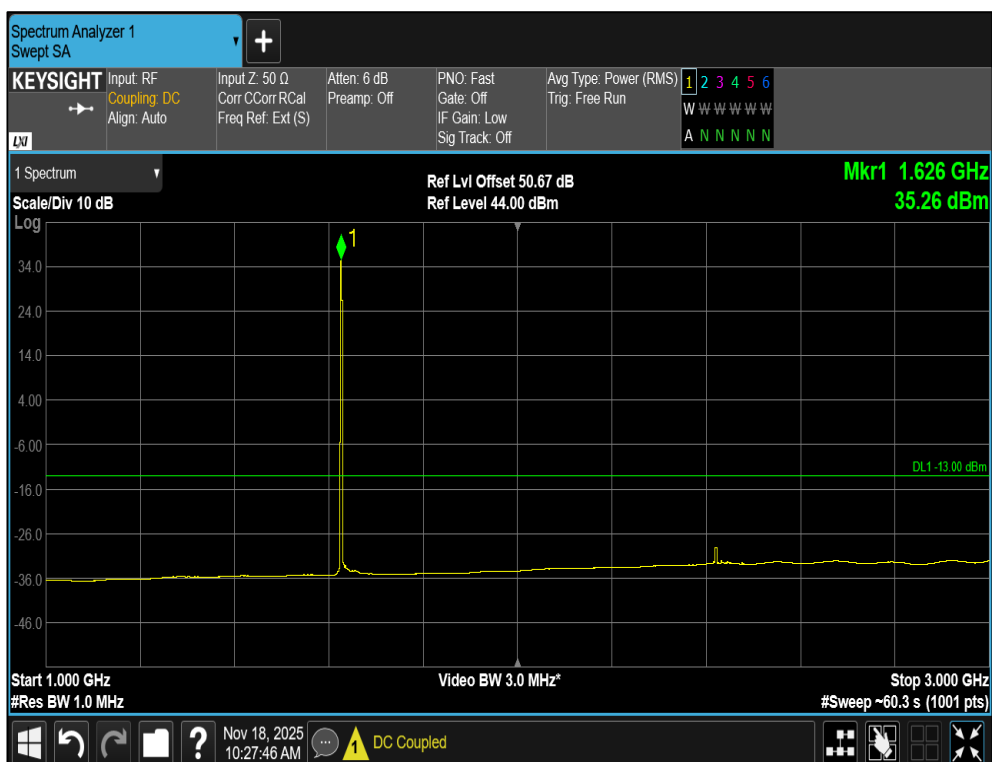


Figure 29 - 1626.5 MHz - 1 GHz to 3 GHz

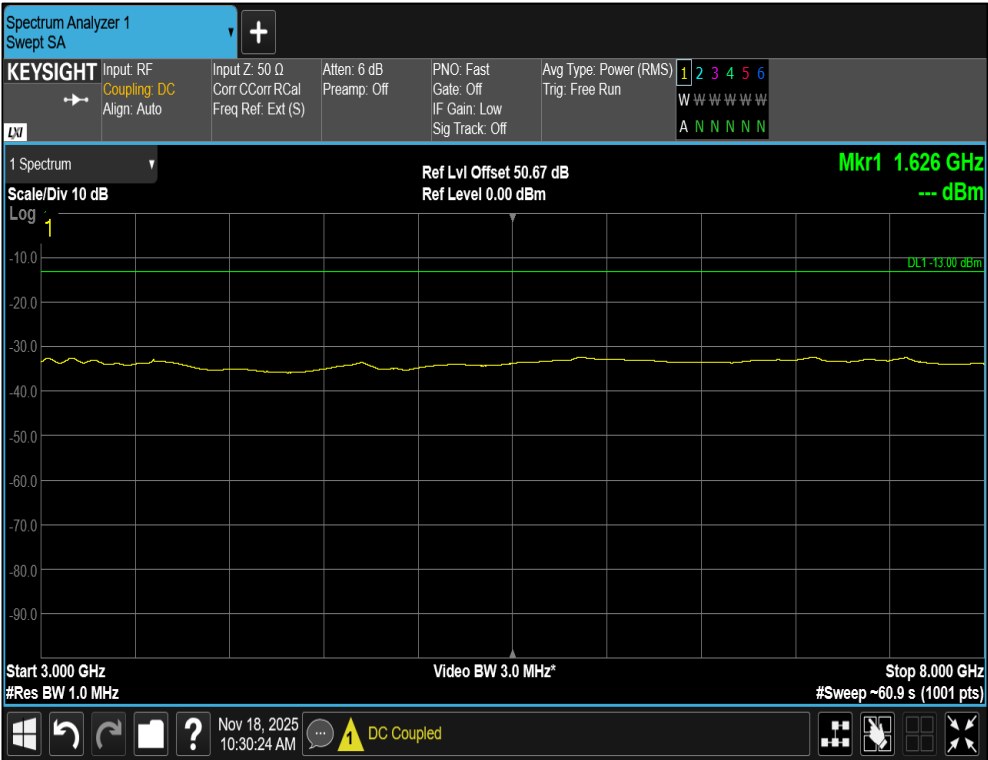


Figure 30 - 1626.5 MHz - 3 GHz to 8 GHz

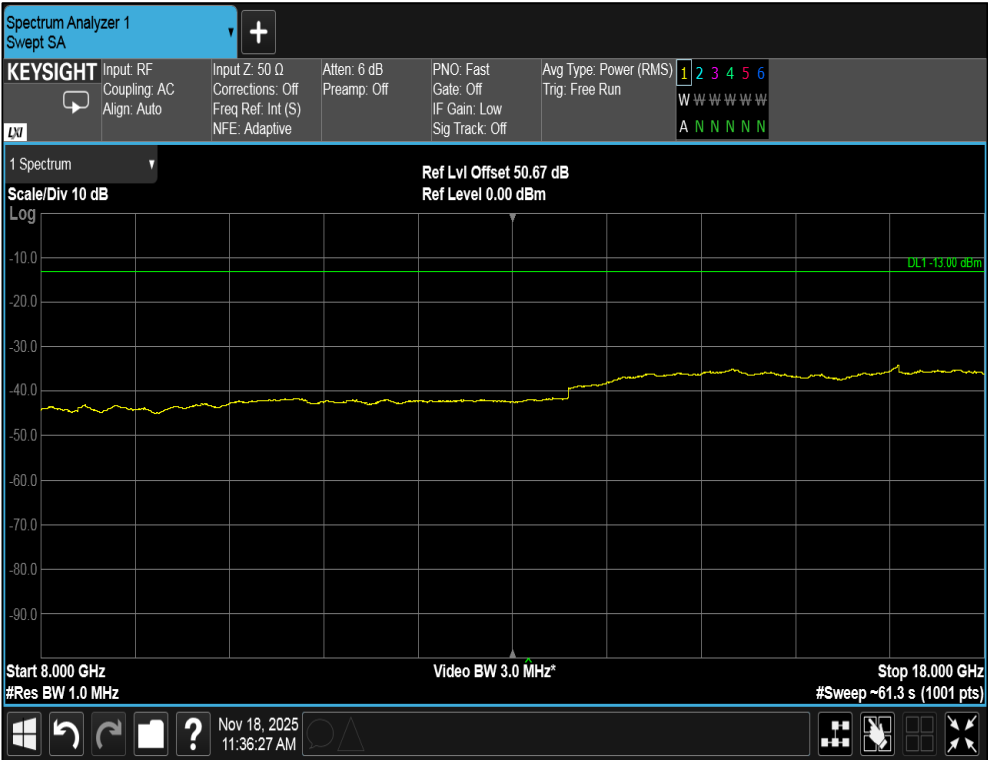


Figure 31 - 1626.5 MHz - 8 GHz to 18 GHz

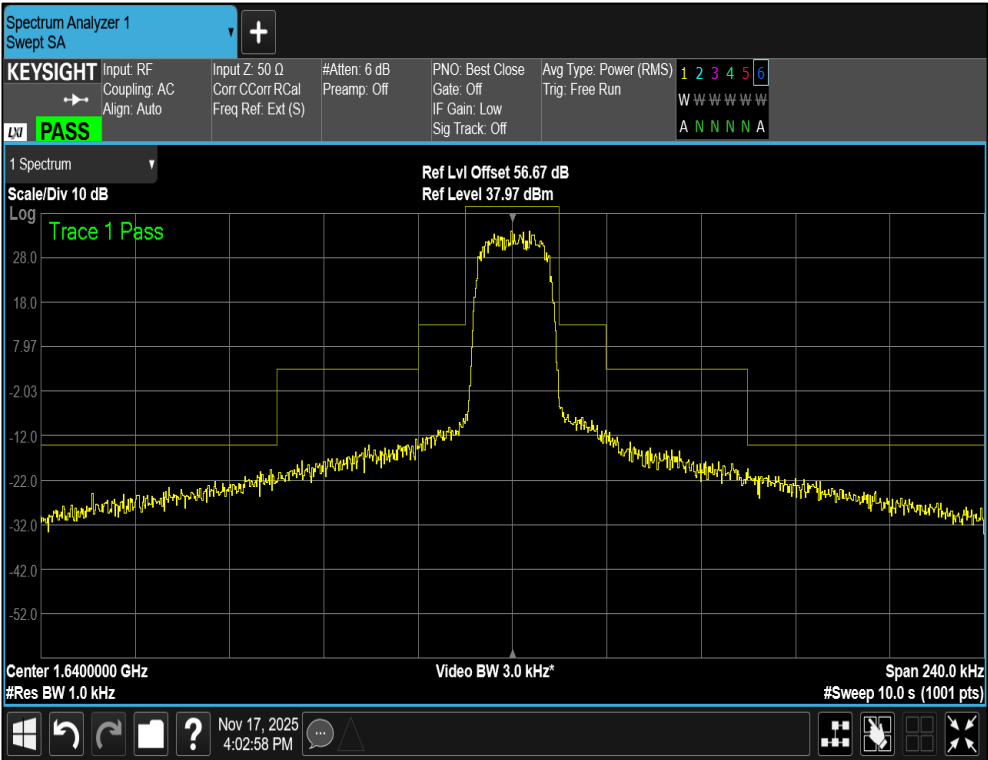


Figure 32 - 1640 MHz - Emission Mask - 16800

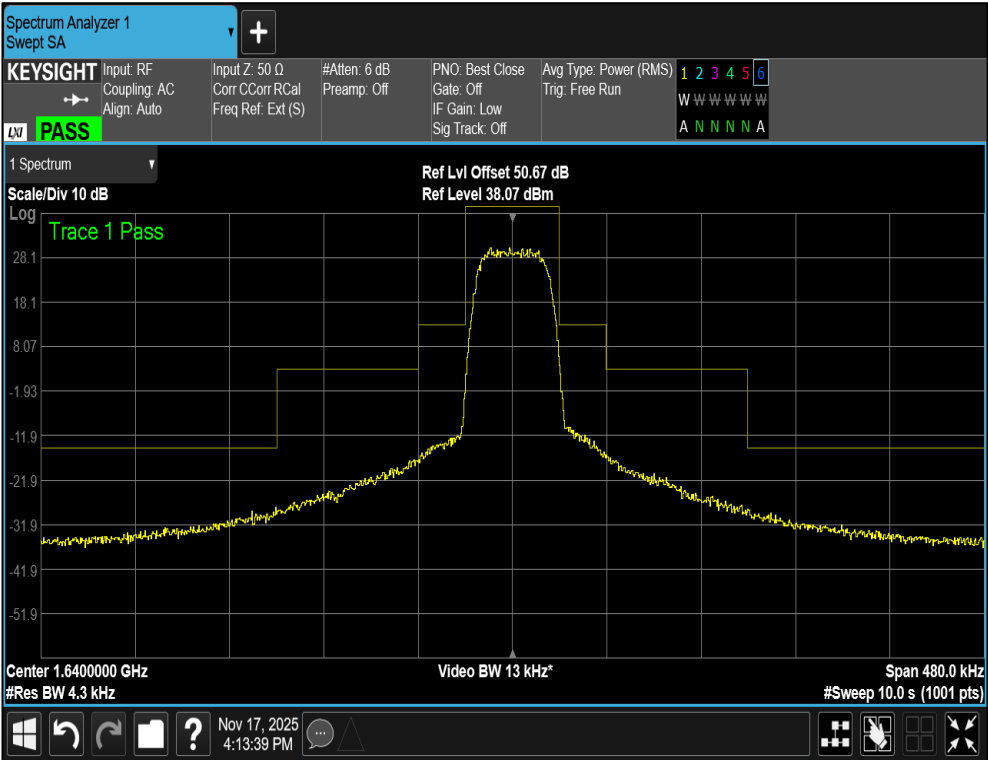


Figure 33 - 1640 MHz - Emission Mask - 33000

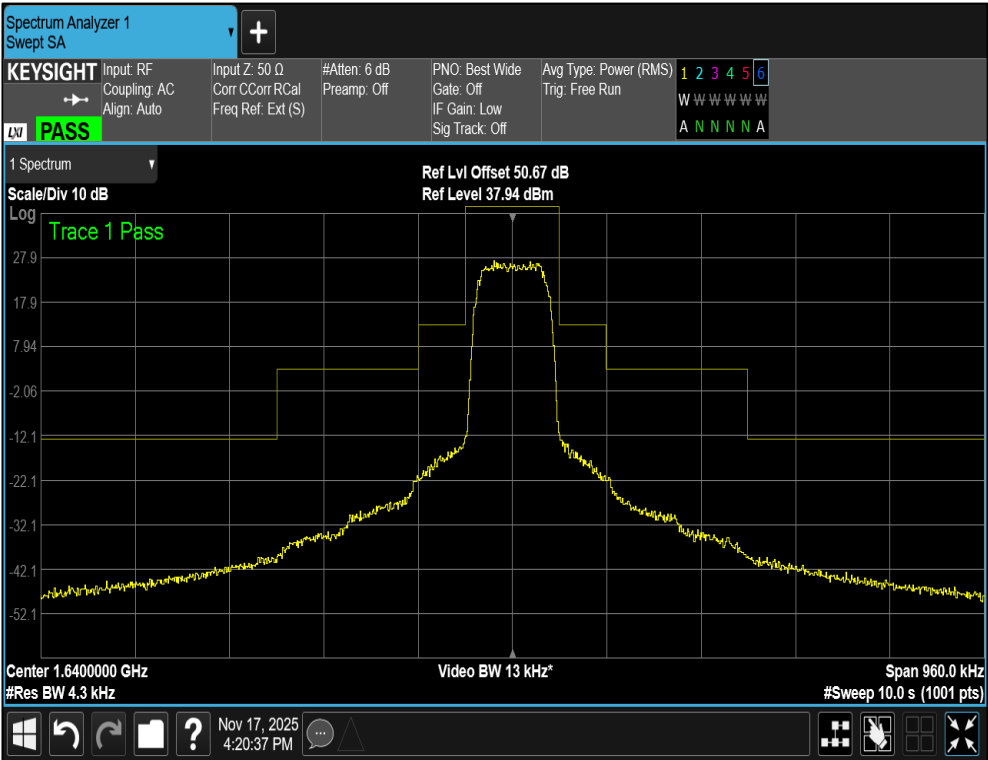


Figure 34 - 1640 MHz - Emission Mask - 67200

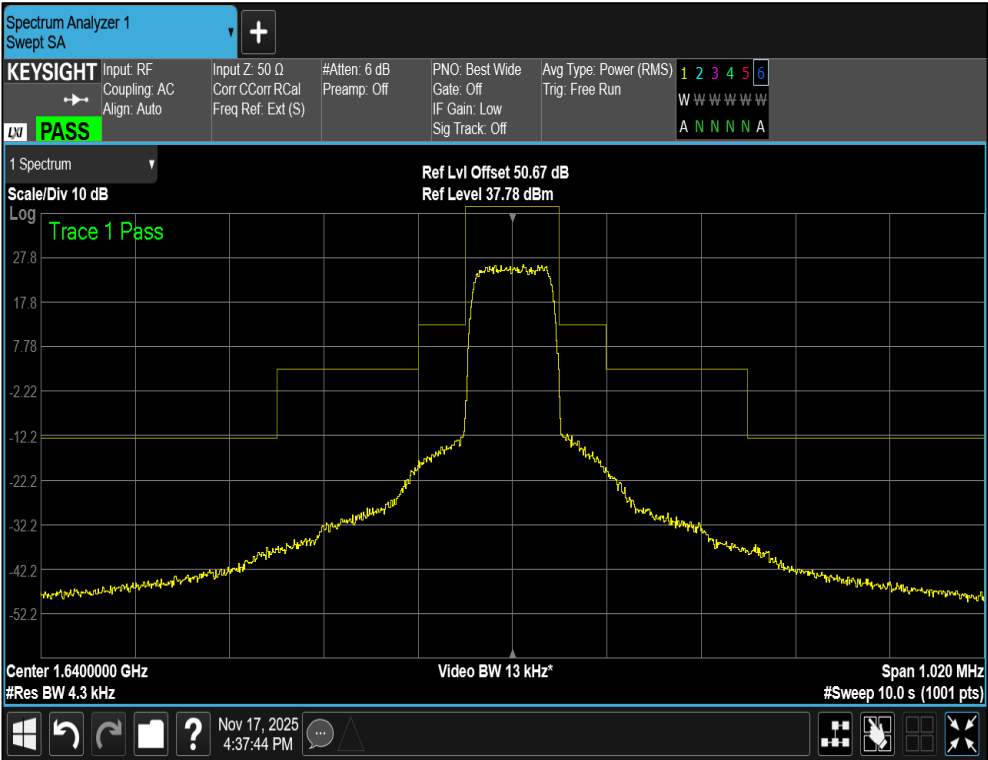


Figure 35 - 1640 MHz - Emission Mask - 84000

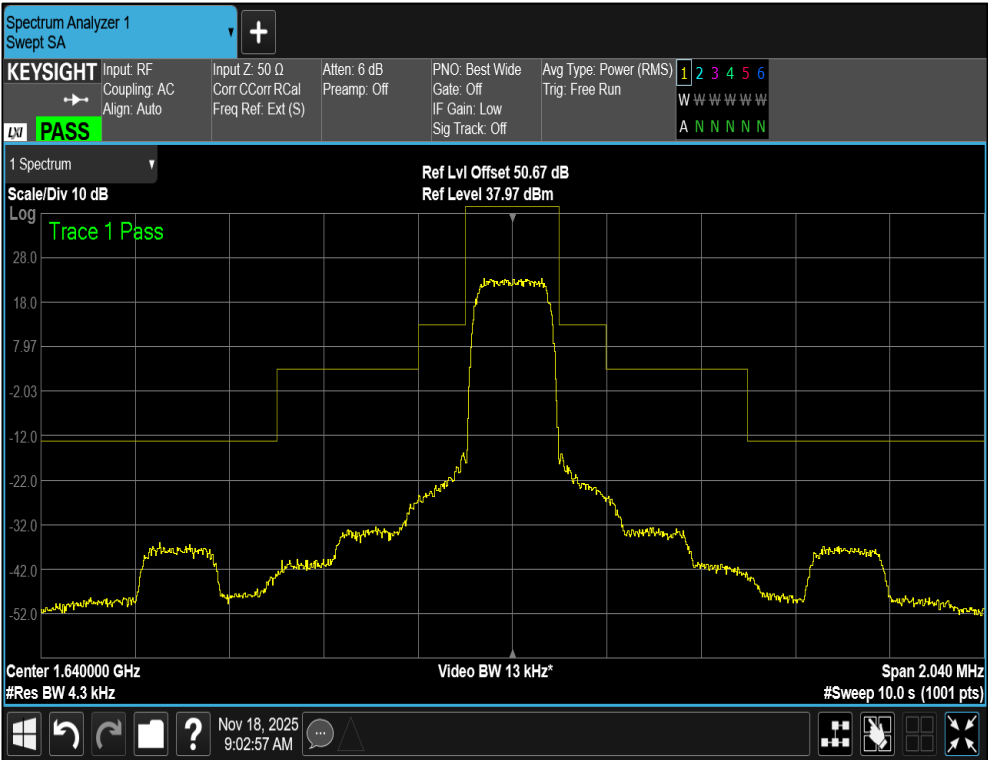


Figure 36 - 1640 MHz - Emission Mask - 151200

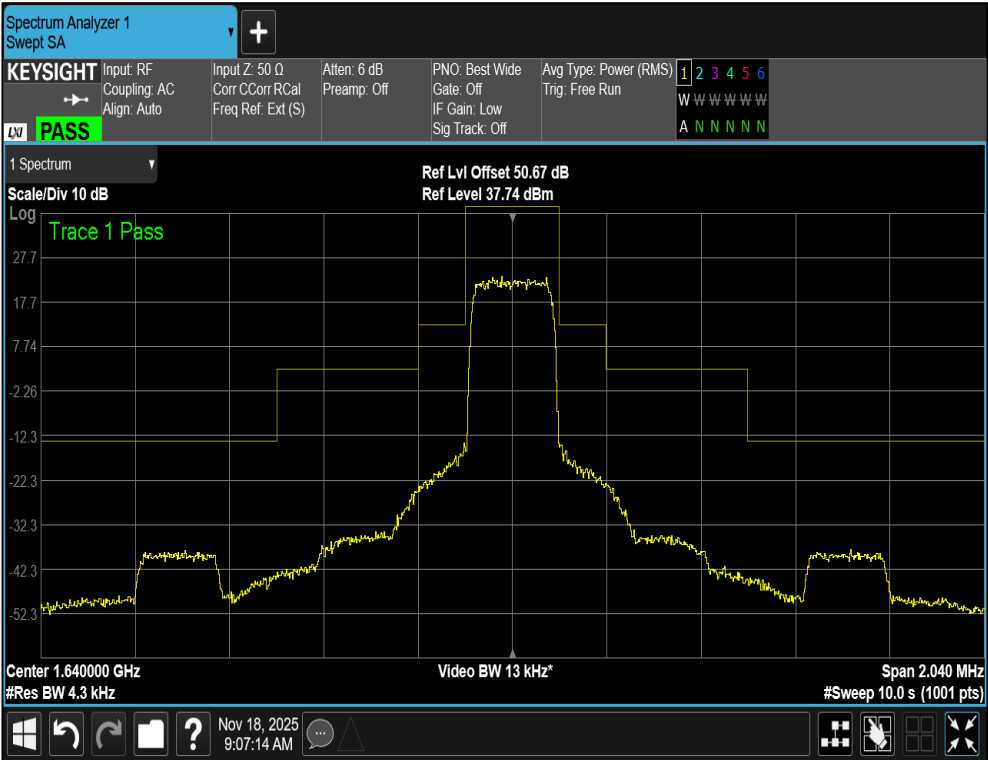


Figure 37 - 1640 MHz - Emission Mask - 168000

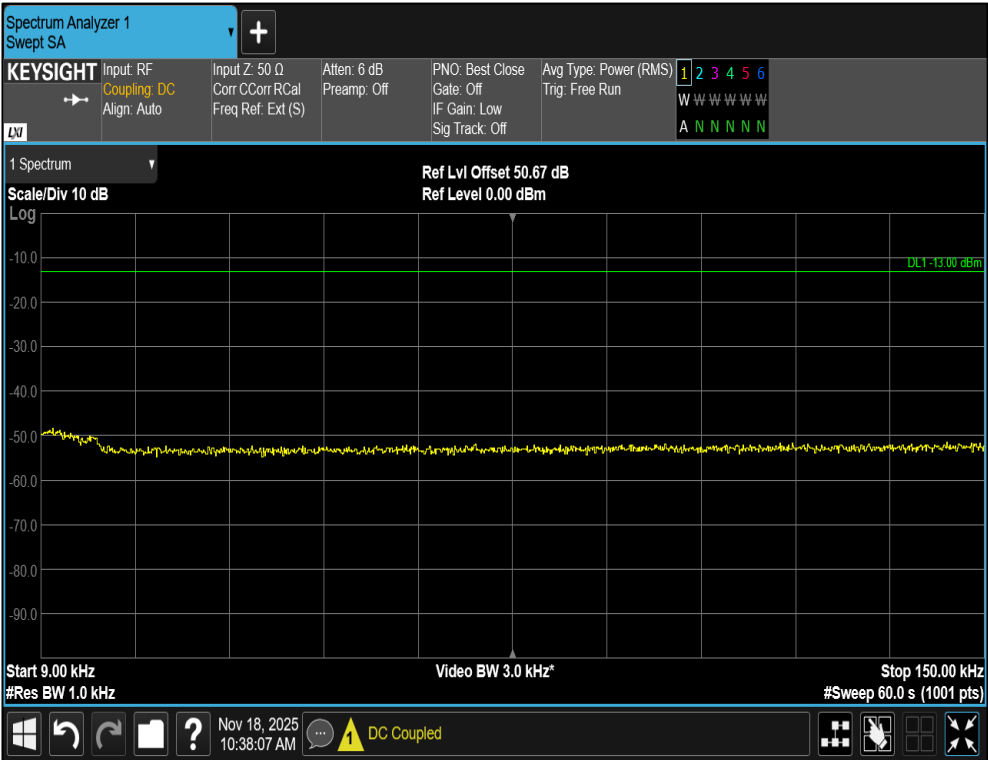


Figure 38 - 1640 MHz - 9 kHz to 150 kHz

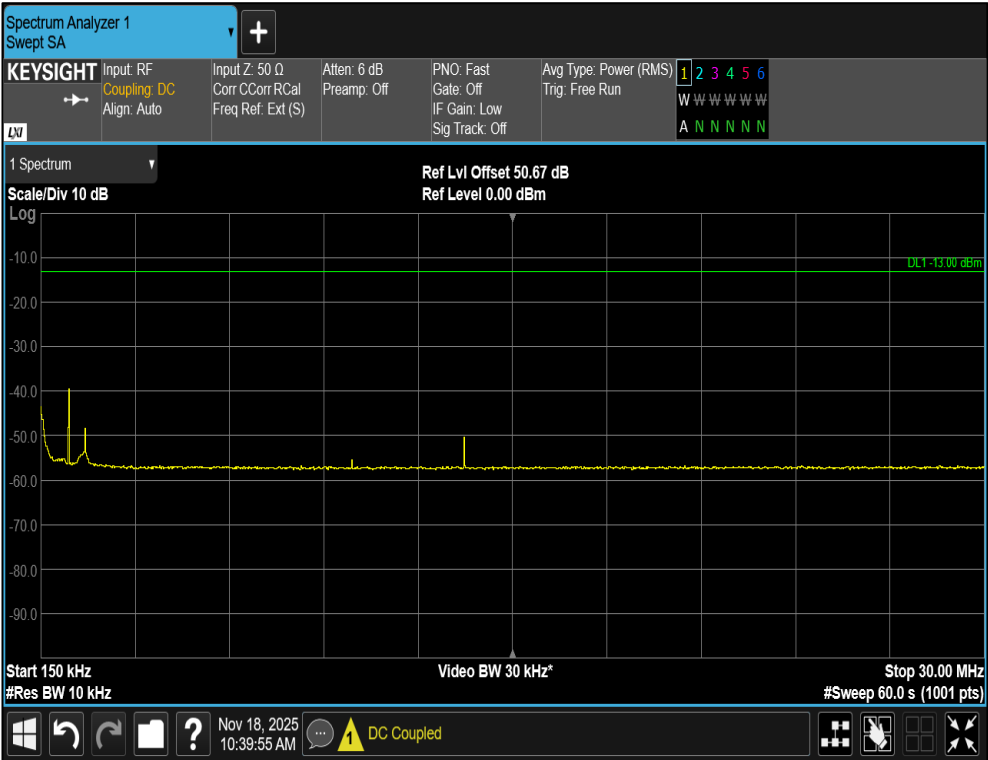


Figure 39 - 1640 MHz - 150 kHz to 30 MHz

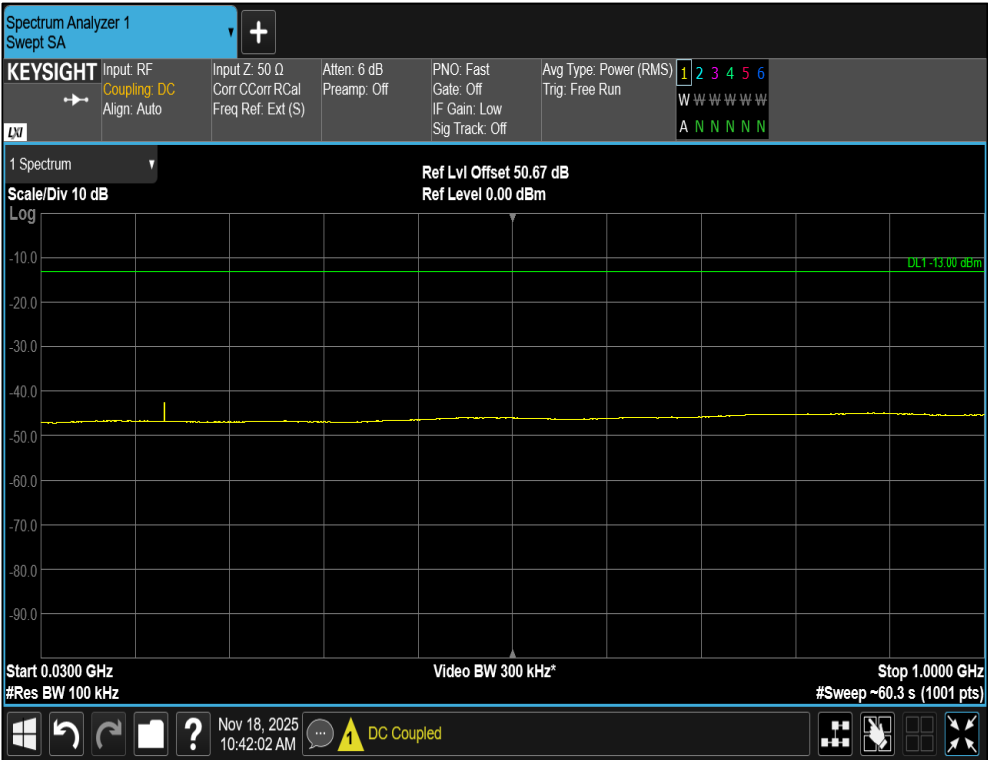


Figure 40 - 1640 MHz - 30 MHz to 1 GHz

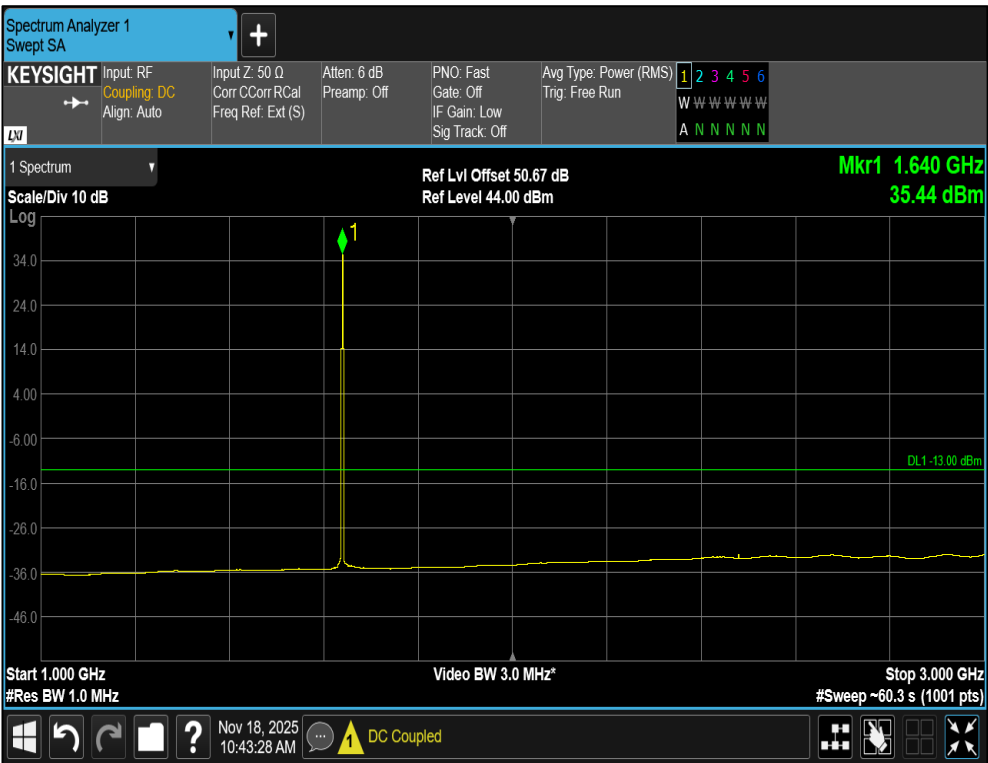


Figure 41 - 1640 MHz - 1 GHz to 3 GHz

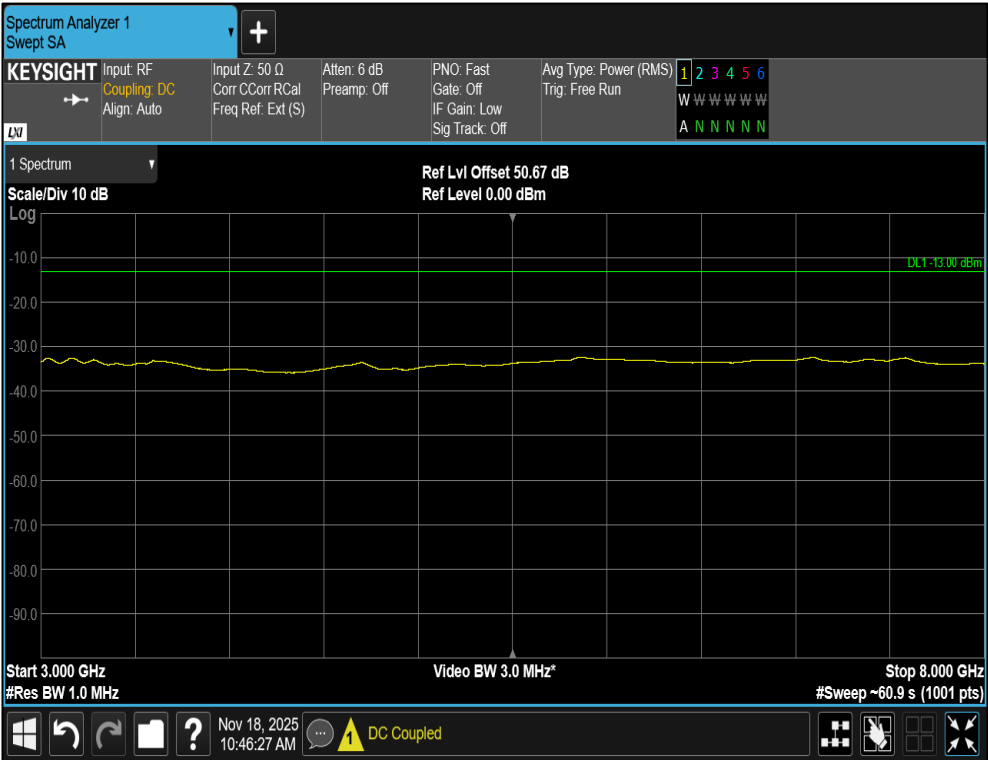


Figure 42 - 1640 MHz - 3 GHz to 8 GHz

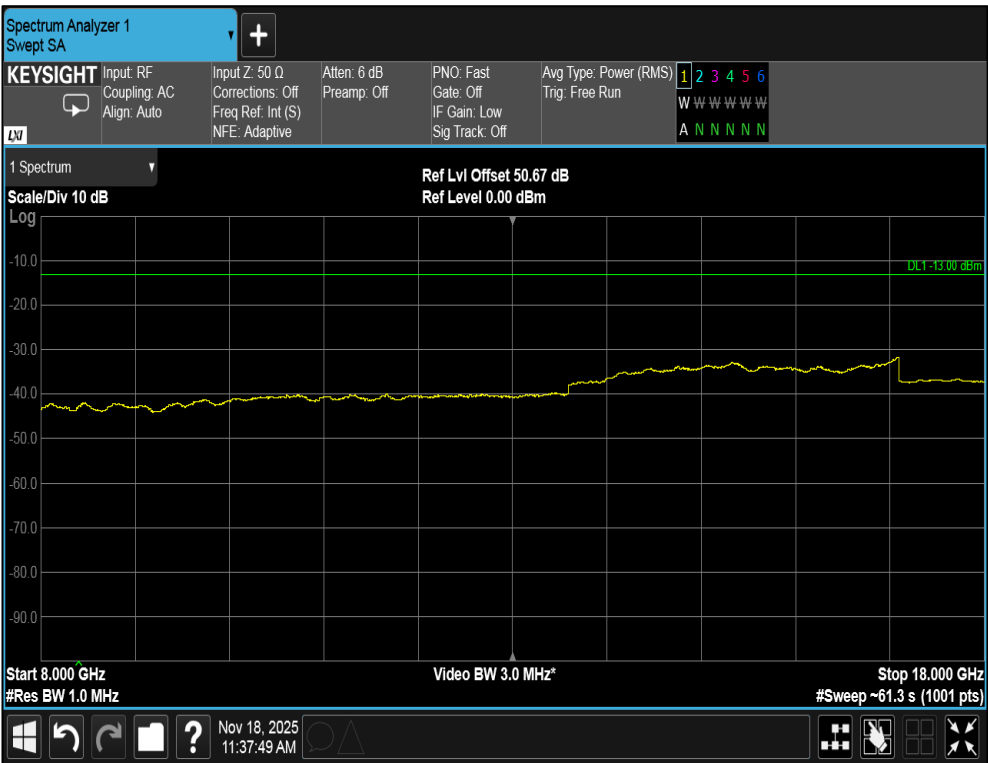


Figure 43 - 1640 MHz - 8 GHz to 18 GHz

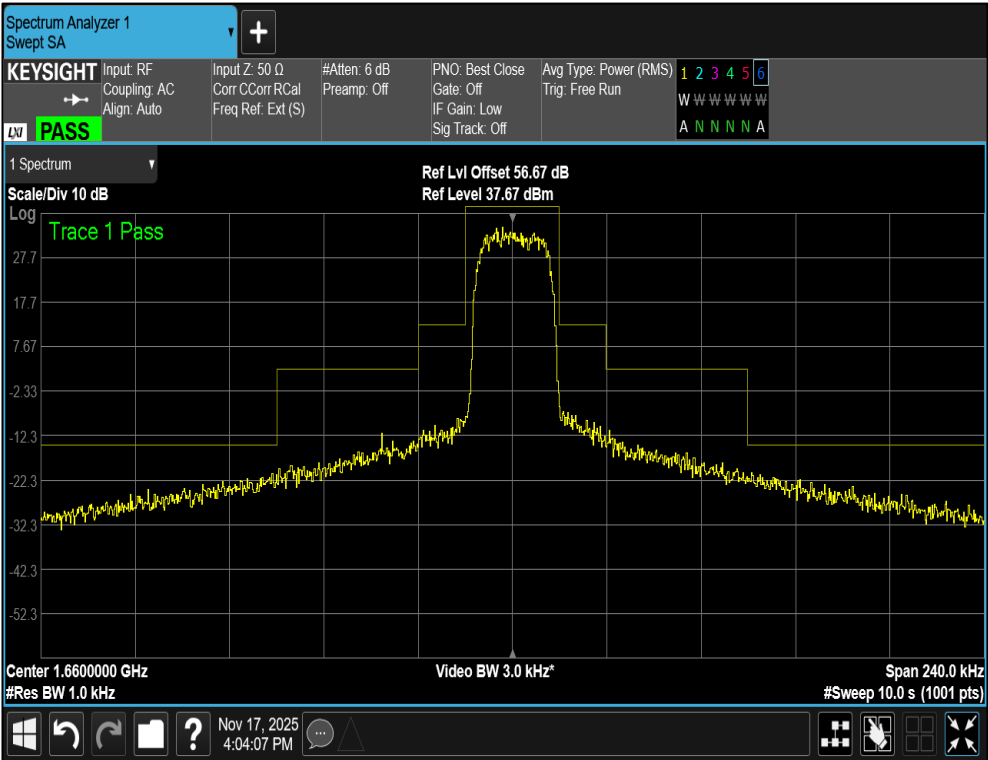


Figure 44 - 1660 MHz - Emission Mask - 16800

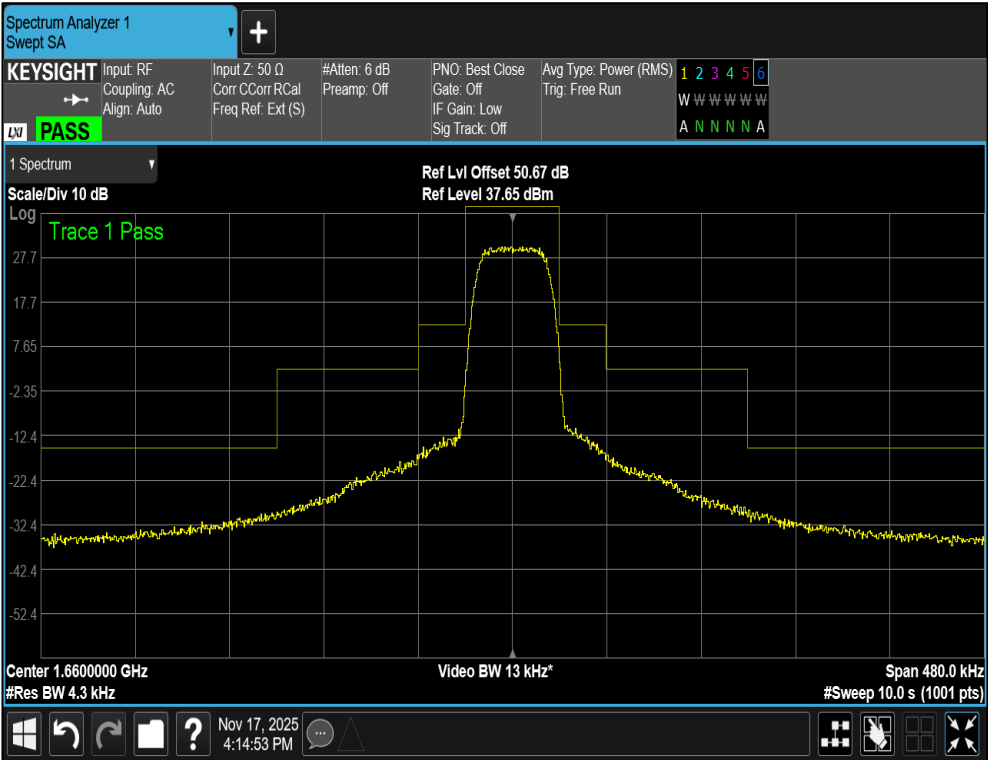


Figure 45 - 1660 MHz - Emission Mask - 33000



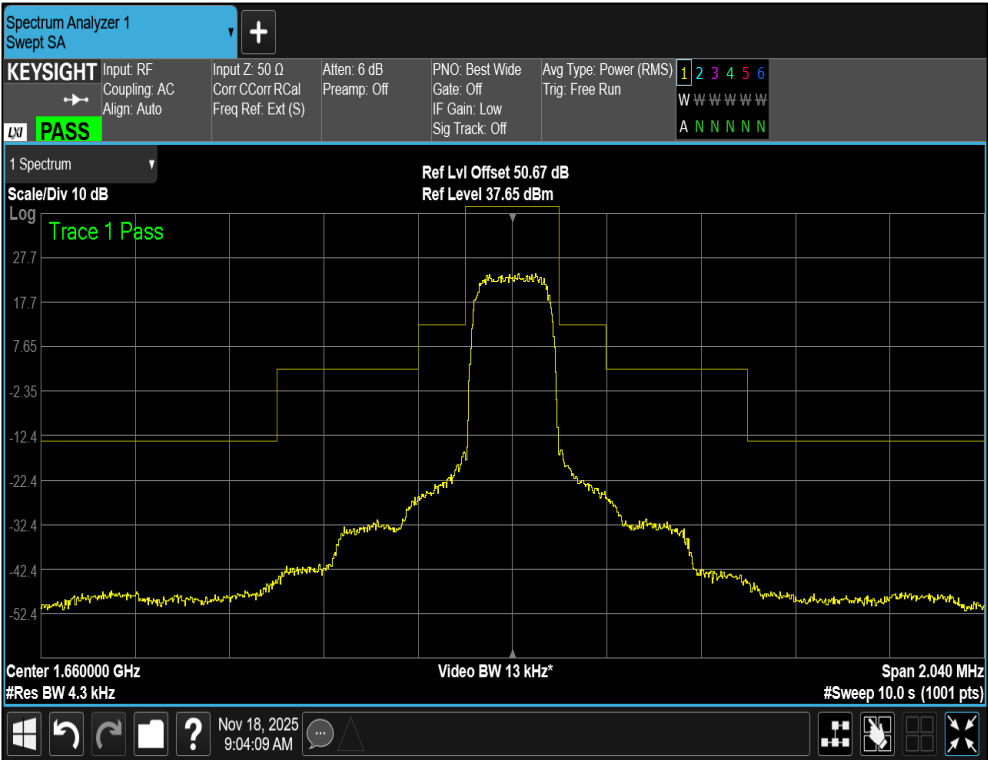


Figure 48 - 1660 MHz - Emission Mask - 151200

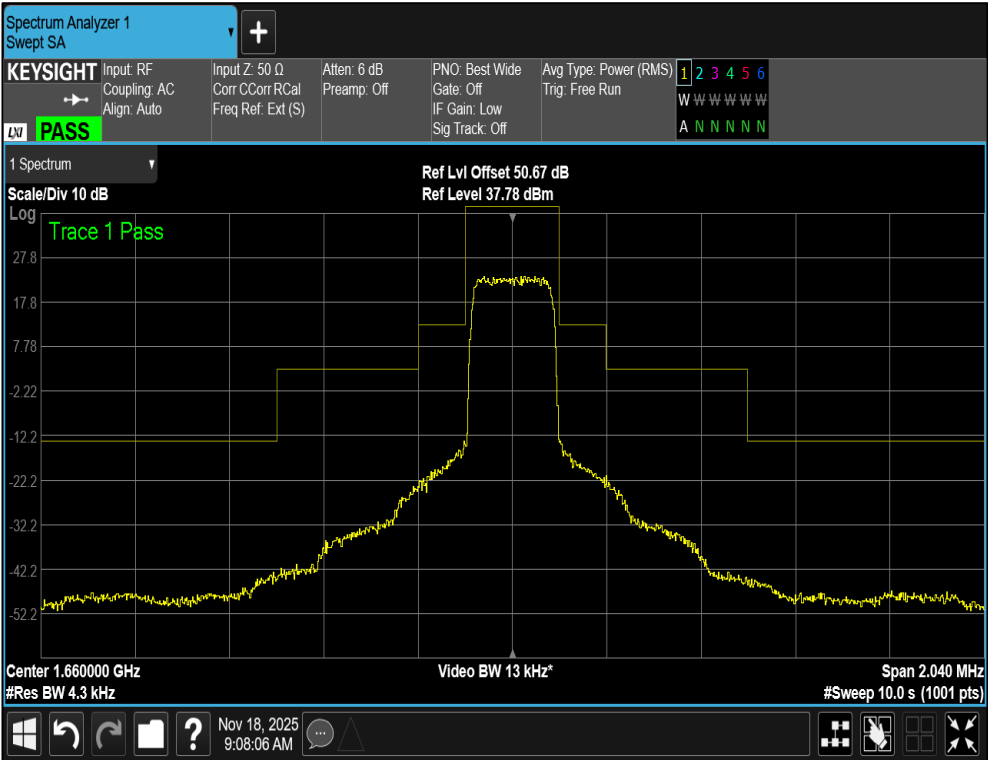


Figure 49 - 1660 MHz - Emission Mask - 168000

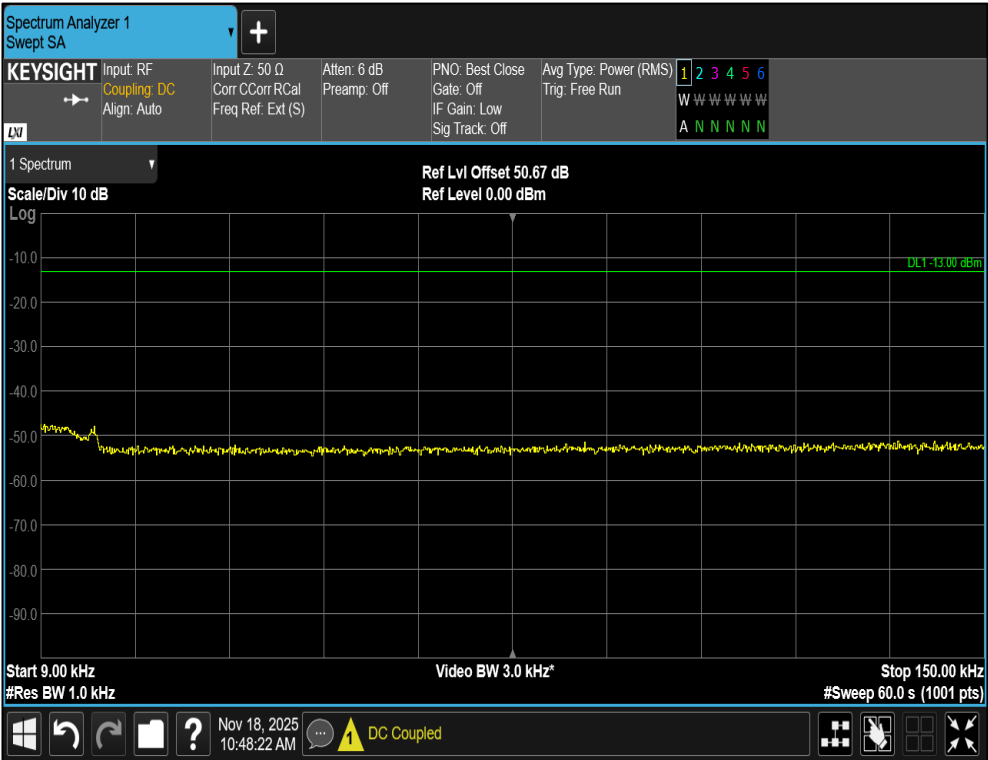


Figure 50 - 1660 MHz - 9 kHz to 150 kHz

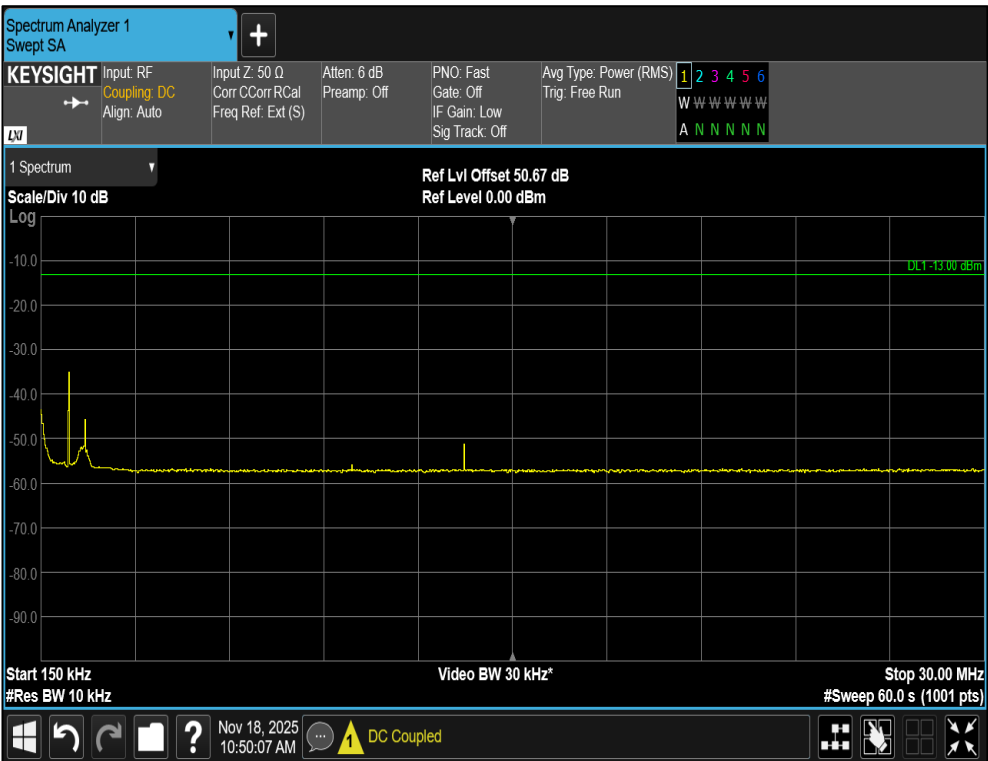


Figure 51 - 1660 MHz - 150 kHz to 30 MHz

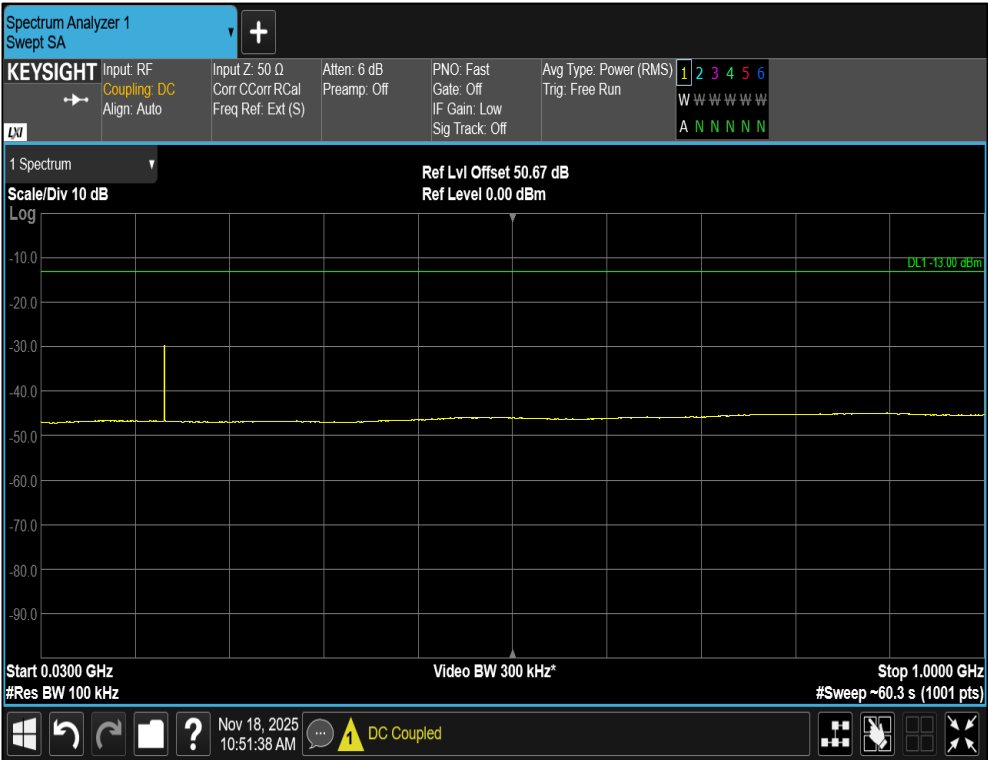


Figure 52 - 1660 MHz - 30 MHz to 1 GHz

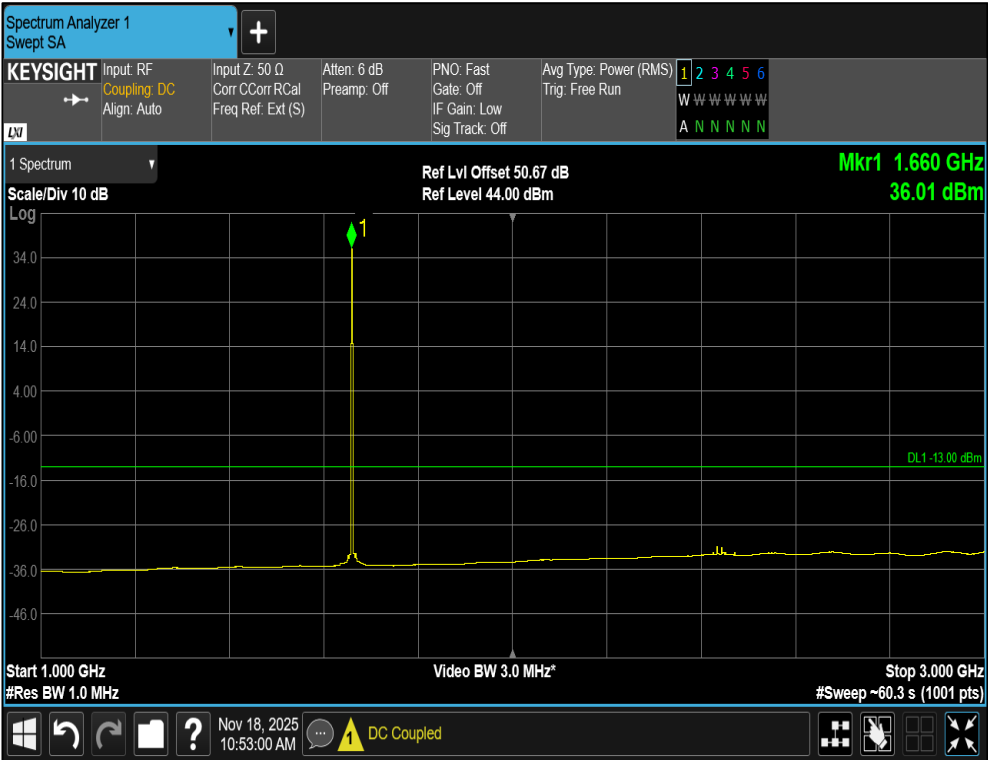


Figure 53 - 1660 MHz - 1 GHz to 3 GHz

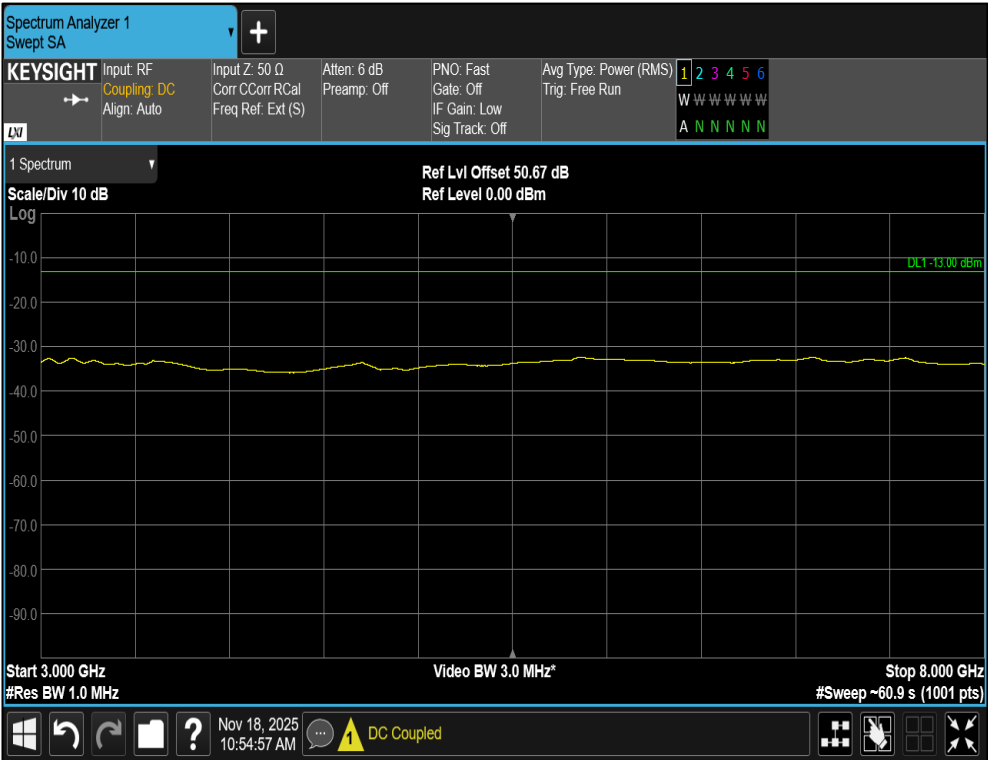


Figure 54 - 1660 MHz - 3 GHz to 8 GHz

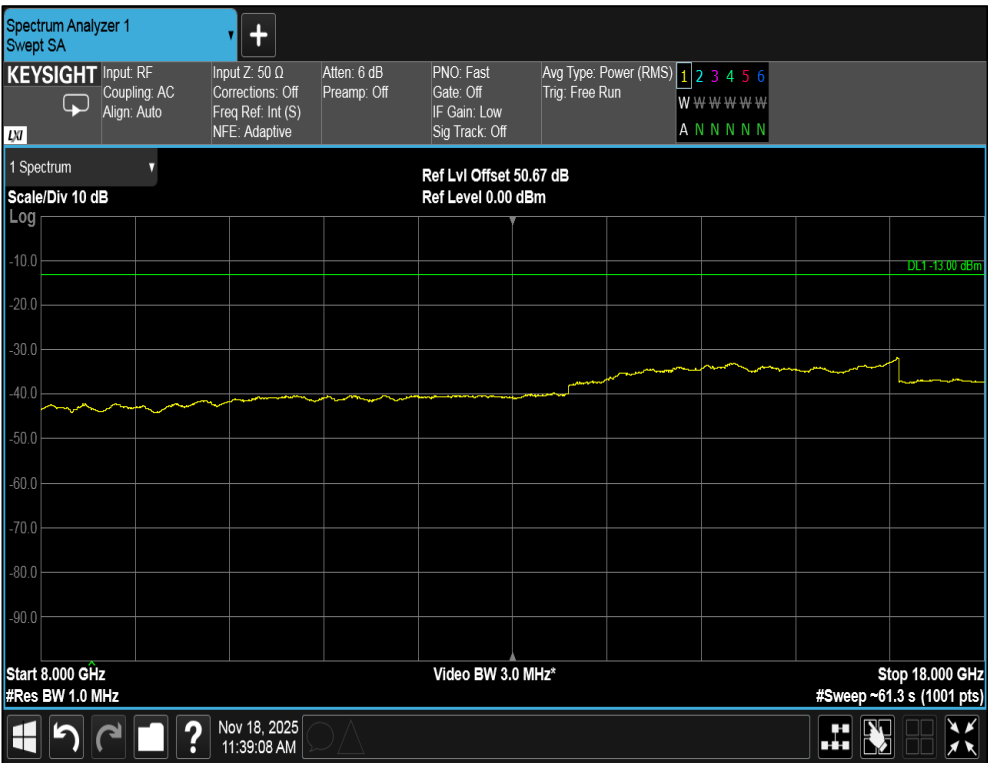


Figure 55 - 1660 MHz - 8 GHz to 18 GHz



FCC 47 CFR Part 2, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

1. 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50 %, up to and including 100 % of the authorised bandwidth;
2. 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100 %, up to and including 250 % of the authorised bandwidth;
3. $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250 % of the authorised bandwidth.

ISED RSS-170, Limit Clause 5.8

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

1. 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50 %, up to and including 100 % of the occupied bandwidth or necessary bandwidth, whichever is greater
2. 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100 %, up to and including 250 % of the occupied bandwidth or necessary bandwidth, whichever is greater
3. $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250 % of the occupied bandwidth or necessary bandwidth, whichever is greater.



2.3.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
Power Supply	Farnell	LT30/2	3422		TU
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	18-Mar-2026
Digital Multi-meter	Iso-tech	IDM93N	4435	12	06-Mar-2026
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
EXA Signal Analyser	Keysight Technologies	N9010B	4969	24	07-Feb-2026
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5514	12	06-Jun-2026
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6181	12	19-Aug-2026
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6376	12	06-Jun-2026
MXA Signal Analyser	Keysight Technologies	N9020B	6418	24	15-Oct-2027
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	6558	12	29-Nov-2025
20dB 10W/18GHz F/M SMA bidirectional Attenuator	Weinschel	WA41-20-0102	7027	12	06-Jun-2026

Table 28

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.4 Equivalent Isotropic Radiated Power

2.4.1 Specification Reference

FCC 47 CFR Part 25: Clause 25.204
FCC 47 CFR Part 2: Clause 2.1046
Industry Canada RSS-170 Clause 5.5
ISED RSS-GEN Clause 6.12

2.4.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: 690002 - Modification State 0

2.4.3 Date of Test

12-November-2025 to 13-November-2025

2.4.4 Test Method

Velaris Multilink - 1.6 GHz communications link

Power Spectral Density measurements in a 4 kHz bandwidth were performed in accordance with ANSI C63.26, clause 5.2.3.5 (Peak-PSD).

The RBW was configured to 3 kHz and the reference level offset increased to account for the correction factor required to show the result as 4 kHz bandwidth. The correction factor was obtained using the following formula:

$$10\text{Log}(4/3) = 1.25 \text{ dB}$$

Total EIRP measurements were performed in accordance with ANSI C63.26, clause 5.2.4.4 (average power with integration). The Antenna Gain was added to the measured Conducted Output Power to determine the EIRP.

2.4.5 Environmental Conditions

Ambient Temperature	20.9 °C
Relative Humidity	55.2 - 56.7 %



2.4.6 Test Results

Velaris Multilink - 1.6 GHz communications link

Mode	EIRP (dBm/4kHz)		
	Bottom Channel	Middle Channel	Top Channel
QPSK: 16800	35.66	34.05	34.21
QPSK: 33000	33.05	30.22	31.1
QPSK: 67200	32.13	29.14	28.59
QPSK: 84000	27.65	26.72	27.77
QPSK: 151200	25.39	24.65	25.09
QPSK: 168000	26.03	24.84	24.76
P4-QPSK: 16800	35	34.33	34.25
P4-QPSK: 33000	33.05	31.8	31.99
P4-QPSK: 67200	32.13	27.34	28.43
P4-QPSK: 84000	27.65	27.75	27.27
P4-QPSK: 151200	25.39	25.83	26.16
P4-QPSK: 168000	26.03	24.14	23.93
16-QAM: 16800	35.75	35.48	33.05
16-QAM: 33000	32.51	32.22	31.64
16-QAM: 67200	29.91	27.68	28
16-QAM: 84000	29.3	28.2	27.99
16-QAM: 151200	25.01	25.5	24.1
16-QAM: 168000	25.91	24.69	24.03
32-QAM: 16800	35.2	34.56	33.84
32-QAM: 33000	32.53	31.06	31.01
32-QAM: 67200	29.5	27.74	29.6
32-QAM: 84000	29.56	27.48	27.21
32-QAM: 151200	25.68	24.99	24.23
32-QAM: 168000	25.44	24.15	24.54
64-QAM: 16800	35.54	34.23	34.71
64-QAM: 33000	32.53	31.59	31.48
64-QAM: 67200	29.66	28.11	29.6
64-QAM: 84000	28.65	27.3	27.21
64-QAM: 151200	25.58	24.27	24.23
64-QAM: 168000	25.16	23.47	24.54

Table 29 - EIRP/4 kHz Results Table



Mode	Bottom Channel		Middle Channel		Top Channel	
	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)
QPSK: 16800	40.97	0.97	40.47	0.47	40.15	0.15
QPSK: 33000	41.03	1.03	40.51	0.51	40.29	0.29
QPSK: 67200	40.96	0.96	40.44	0.44	40.24	0.24
QPSK: 84000	40.88	0.88	40.38	0.38	40.27	0.27
QPSK: 151200	40.91	0.91	40.43	0.43	40.21	0.21
QPSK: 168000	40.94	0.94	40.34	0.34	40.28	0.28
P4-QPSK: 16800	40.95	0.95	40.2	0.2	40.2	0.2
P4-QPSK: 33000	40.93	0.93	40.32	0.32	40.26	0.26
P4-QPSK: 67200	40.88	0.88	40.34	0.34	40.26	0.26
P4-QPSK: 84000	40.92	0.92	40.3	0.3	40.23	0.23
P4-QPSK: 151200	40.89	0.89	40.36	0.36	40.19	0.19
P4-QPSK: 168000	40.89	0.89	40.35	0.35	40.26	0.26
16-QAM: 16800	41.17	1.17	40.34	0.34	40.25	0.25
16-QAM: 33000	41.15	1.15	40.46	0.46	40.23	0.23
16-QAM: 67200	41.19	1.19	40.41	0.41	40.22	0.22
16-QAM: 84000	41.16	1.16	40.35	0.35	40.23	0.23
16-QAM: 151200	41.17	1.17	40.35	0.35	40.25	0.25
16-QAM: 168000	41.15	1.15	40.37	0.37	40.25	0.25
32-QAM: 16800	41.11	1.11	40.32	0.32	40.19	0.19
32-QAM: 33000	41.16	1.16	39.98	-0.02	40.19	0.19
32-QAM: 67200	41.1	1.1	39.88	-0.12	40.2	0.2
32-QAM: 84000	41.12	1.12	39.88	-0.12	40.22	0.22
32-QAM: 151200	41.1	1.1	39.91	-0.09	40.21	0.21
32-QAM: 168000	41.17	1.17	39.92	-0.08	40.23	0.23
64-QAM: 16800	41.1	1.1	39.88	-0.12	40.22	0.22
64-QAM: 33000	41.08	1.08	39.87	-0.13	40.23	0.23
64-QAM: 67200	41.04	1.04	39.86	-0.14	40.22	0.22
64-QAM: 84000	41.05	1.05	39.83	-0.17	40.34	0.34
64-QAM: 151200	41.05	1.05	39.84	-0.16	40.24	0.24
64-QAM: 168000	41.06	1.06	39.87	-0.13	40.29	0.29

Table 30 - EIRP Results Table

FCC 47 CFR Part 25, Limit Clause 25.204

+40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

For angles of elevation of the horizon greater than 5° there shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.



Industry Canada RSS-170, Limit Clause 5.3

The application for MES certification shall state the MES e.i.r.p. that is necessary for satisfactory communication. The maximum permissible e.i.r.p. will be the stated necessary e.i.r.p. plus a 2 dB margin. If a detachable antenna is used, the certification application shall state the recommended antenna type and manufacturer, the antenna gain and the maximum transmitter output power at the antenna terminal.

2.4.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
Digital Multi-meter	Iso-tech	IDM93N	4435	12	06-Mar-2026
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5514	12	06-Jun-2026
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6181	12	19-Aug-2026
MXA Signal Analyser	Keysight Technologies	N9020B	6418	24	15-Oct-2027
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	6558	12	29-Nov-2025
20dB 10W/18GHz F/M SMA bidirectional Attenuator	Weinschel	WA41-20-0102	7027	12	06-Jun-2026

Table 31

O/P Mon – Output Monitored using calibrated equipment



2.5 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation Satellite Service

2.5.1 Specification Reference

FCC 47 CFR Part 25: Clause 25.216 (h)
FCC 47 CFR Part 2: Clause N/A
Industry Canada RSS-170 Clause 5.9
ISED RSS-GEN Clause 5.10

2.5.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: 690002 - Modification State 0

2.5.3 Date of Test

18-November-2025

2.5.4 Test Method

Velaris Multilink - 1.6 GHz communications link

This test was performed in accordance with ANSI C63.26, clause 5.7 within the requirements of FCC CFR 47 Part 25, Clause 25.216 (h) and Industry Canada RSS-170, clause 5.4.3.

The DUT transmits continuously whilst in Test Mode which allows for a higher RBW and Sweep Time to prevent Calibration issues with the Spectrum Analyser.

2.5.5 Environmental Conditions

Ambient Temperature	21.3 °C
Relative Humidity	32.7 %

2.5.6 Test Results

Velaris Multilink - 1.6 GHz communications link

Frequency (MHz)	Level (dBW)
*	N/A

Table 32 - 1626.5 MHz – Broadband Emission Results

*No emissions were detected within 10 dB of the limit.

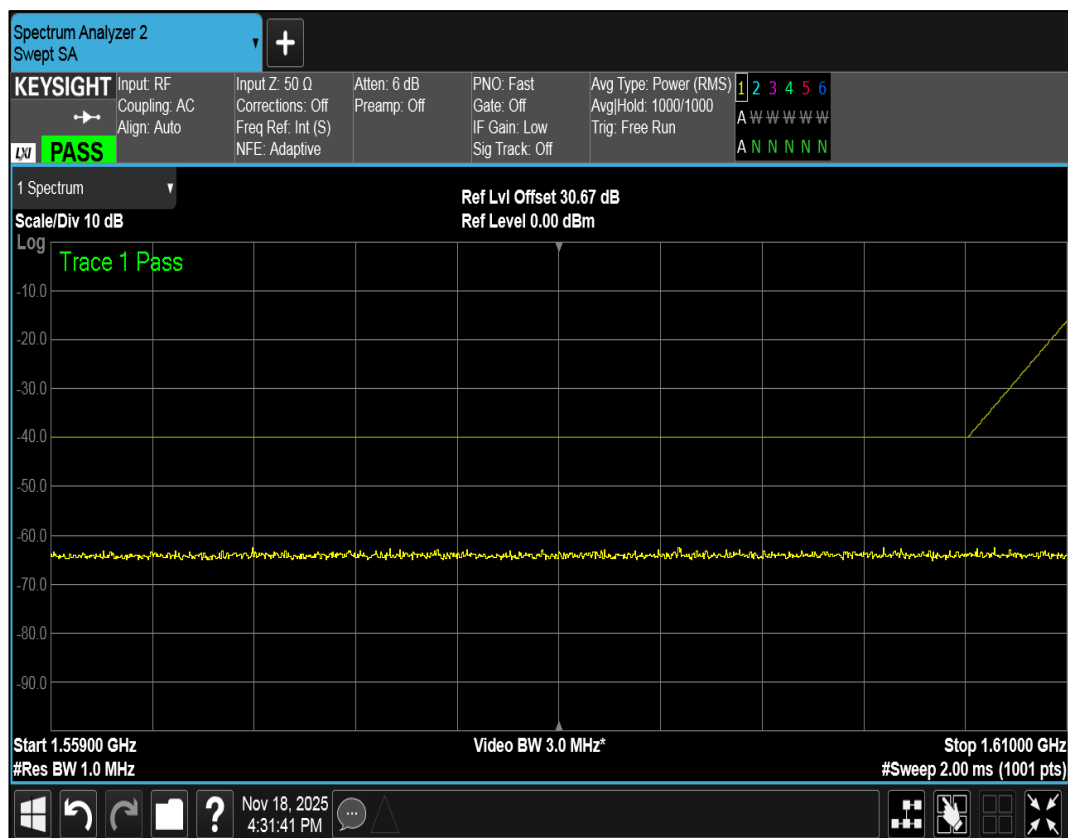


Figure 56 - 1626.5 MHz – Broadband Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 33 - 1626.5 MHz – Discrete Emission Results

*No emissions were detected within 10 dB of the limit.

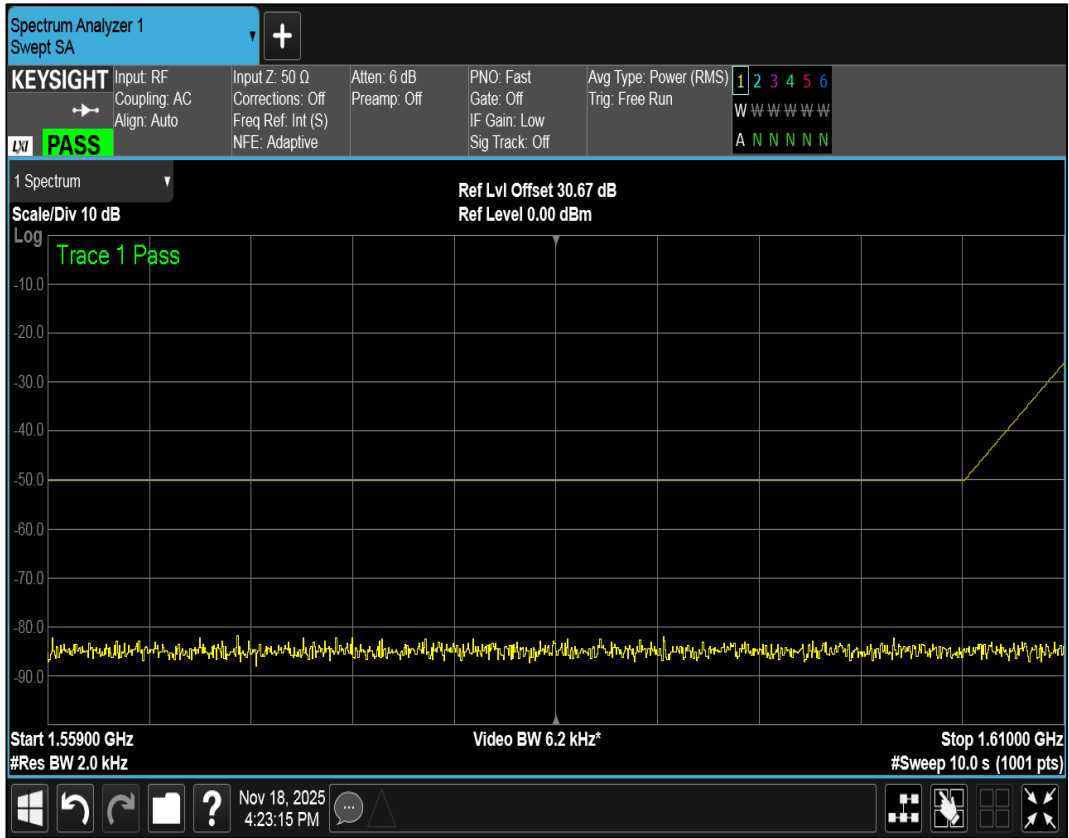


Figure 57 - 1626.5 MHz – Discrete Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 34 - 1640 MHz – Broadband Emission Results

*No emissions were detected within 10 dB of the limit.

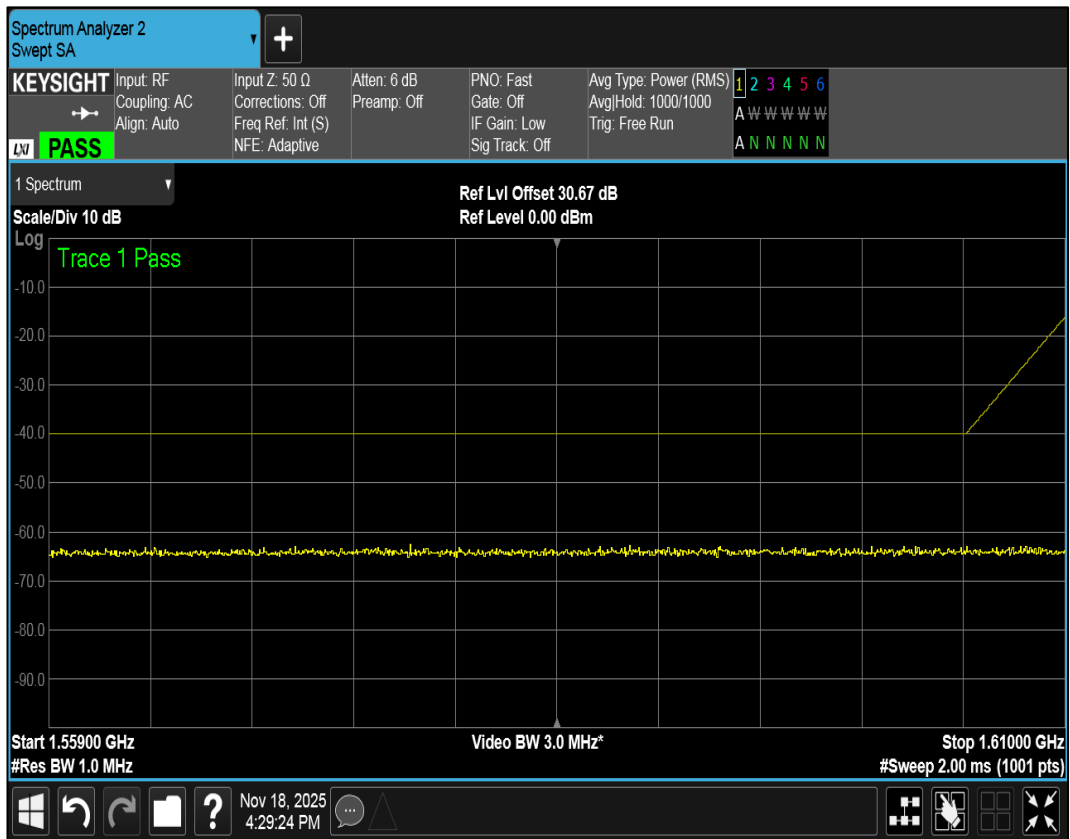


Figure 58 - 1640 MHz – Broadband Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 35 - 1640 MHz – Discrete Emission Results

*No emissions were detected within 10 dB of the limit.

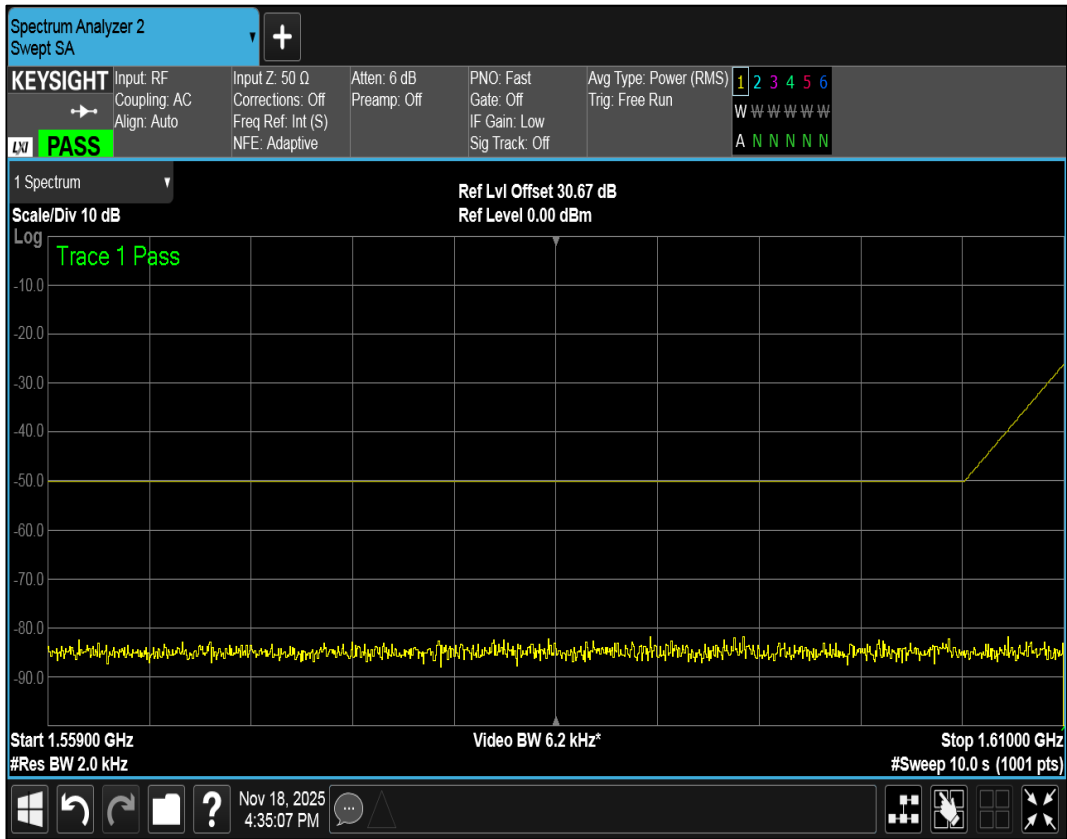


Figure 59 - 1640 MHz – Discrete Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 36 - 1660 MHz – Broadband Emission Results

*No emissions were detected within 10 dB of the limit.

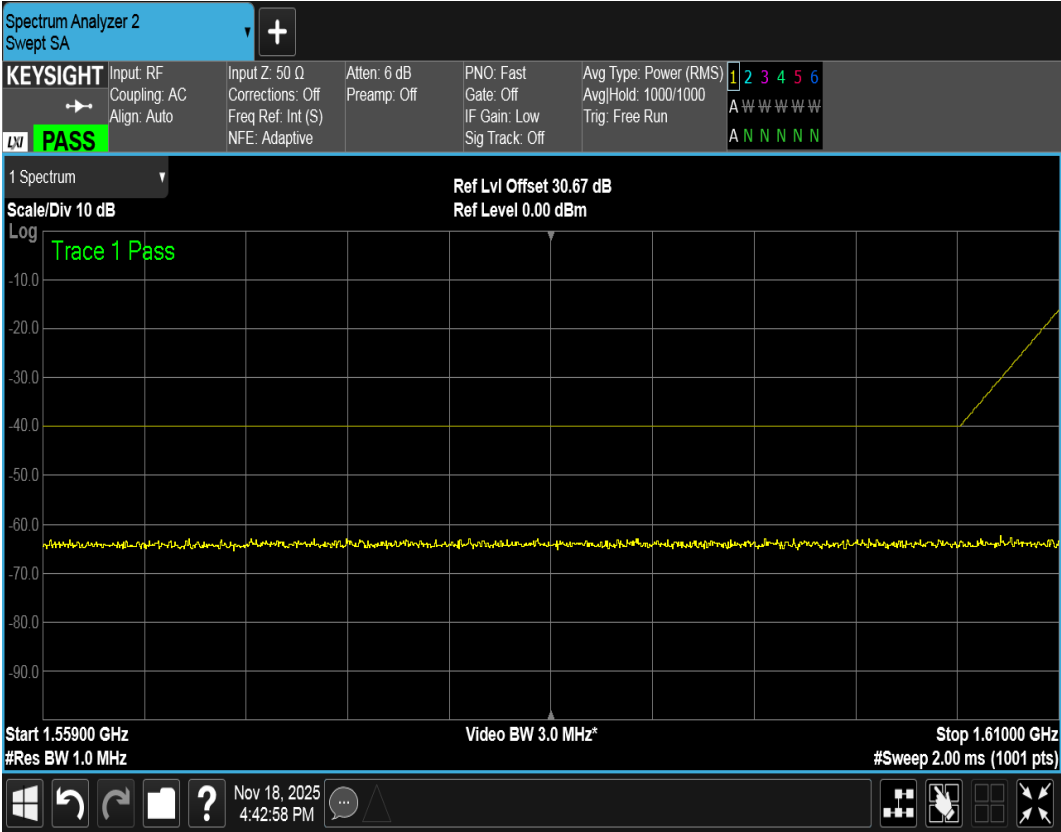


Figure 60 - 1660 MHz – Broadband Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 37 - 1660 MHz – Discrete Emission Results

*No emissions were detected within 10 dB of the limit.

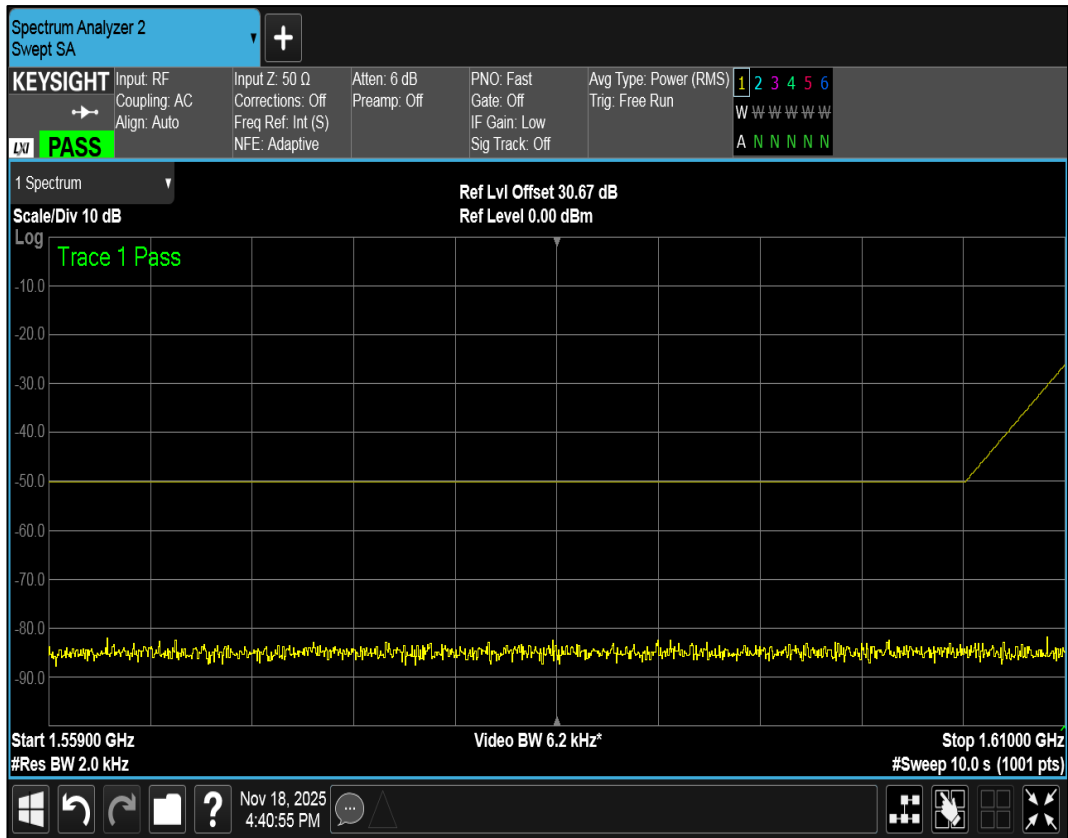


Figure 60 - 1660 MHz – Discrete Emission Results



Frequency (MHz)	Level (dBW)
*	N/A

Table 38 - Carrier-off state

*No emissions were detected within 10 dB of the limit.

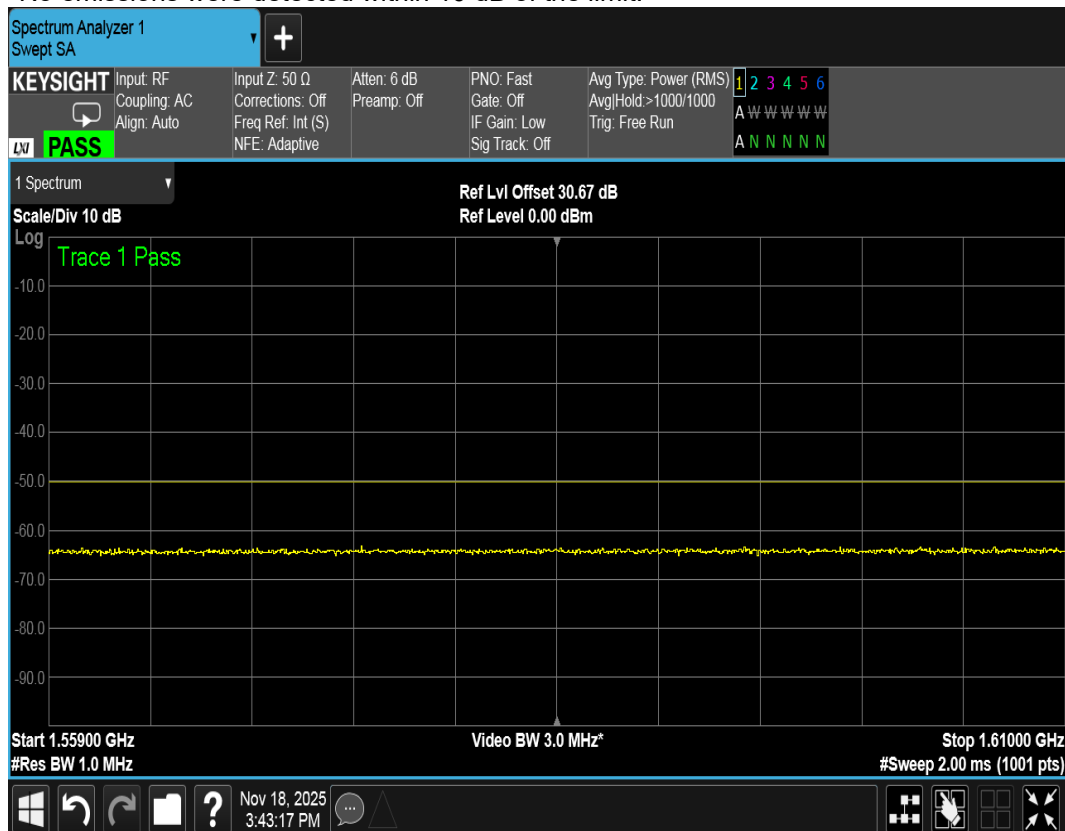


Figure 62 - Carrier-off State Emissions

FCC 47 CFR Part 25, Limit Clause 25.216

(h) Mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1626.5-1660.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. The e.i.r.p of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from -80 dBW at 1605 MHz to -56 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

(i) The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed -80 dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.



ISED, RSS-170, Limit Clause 5.9 and 5.10

MESs with transmitting frequencies in the bands 1610-1626.5 MHz and 1626.5-1660.5 MHz shall comply with the unwanted emission limits specified below:

Band 1610-1626.5 MHz:

For MESs with transmitting frequencies between 1610 MHz and 1626.5 MHz, the e.i.r.p. density of unwanted emissions shall not exceed the limits shown below, which are the same as those for the band 1605-1610 MHz, averaged over any 2 ms active transmission interval:

-70 dBW/MHz at 1605 MHz, linearly interpolated to -10 dBW/MHz at 1610 MHz, for broadband emissions

-80 dBW/kHz at 1605 MHz, linearly interpolated to -20 dBW/kHz at 1610 MHz, for discrete emissions

Band 1626.5-1660.5 MHz:

For MESs with transmitting frequencies between 1610 MHz and 1626.5 MHz, the e.i.r.p. density of unwanted emissions shall not exceed the limits shown below, which are the same as those for the band 1605-1610 MHz, averaged over any 2 ms active transmission interval:

-70 dBW/MHz at 1605 MHz, linearly interpolated to -46 dBW/MHz at 1610 MHz, for broadband emissions

-80 dBW/kHz at 1605 MHz, linearly interpolated to -56 dBW/kHz at 1610 MHz, for discrete emissions

Carrier-off state emissions:

MESs with transmitting frequencies between 1 GHz and 3 GHz shall not exceed -80 dBW/MHz, which is the e.i.r.p. density of carrier-off state emissions in the band 1559-1610 MHz.



2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
Power Supply	Farnell	LT30/2	3422		TU
Digital Multi-meter	Iso-tech	IDM93N	4435	12	06-Mar-2026
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
EXA Signal Analyser	Keysight Technologies	N9010B	4969	24	07-Feb-2026
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5514	12	06-Jun-2026
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6181	12	19-Aug-2026
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6376	12	06-Jun-2026
20dB 10W/18GHz F/M SMA bidirectional Attenuator	Weinschel	WA41-20-0102	7027	12	06-Jun-2026

Table 39

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.6 Occupied Bandwidth

2.6.1 Specification Reference

FCC 47 CFR Part 2: Clause 2.1049
ISED RSS-GEN 6.7

2.6.2 Equipment Under Test and Modification State

Velaris Multilink, S/N: 690002 - Modification State 0

2.6.3 Date of Test

10-November-2025

2.6.4 Test Method

Velaris Multilink - 1.6 GHz communications link
This test was performed in accordance with ANSI C63.26, clause 5.4.4.

2.6.5 Environmental Conditions

Ambient Temperature	20.7 °C
Relative Humidity	55.2 %



2.6.6 Test Results

Velaris Multilink - 1.6 GHz communications link

Mode	Occupied Bandwidth (kHz)		
	Bottom Channel (1626.5MHz)	Middle Channel (1640MHz)	Top Channel (1660MHz)
QPSK: 16800 SR	18.59	18.5	18.58
QPSK: 33000 SR	37.4	37.02	37.15
QPSK: 67200 SR	74.61	74.19	74.22
QPSK: 84000 SR	86.89	87.35	86.72
QPSK: 151200 SR	166.3	169	166.7
QPSK: 168000 SR	174.47	174.3	174.3
P4-QPSK: 16800 SR	18.6	18.7	18.61
P4-QPSK: 33000 SR	37.14	36.84	37.14
P4-QPSK: 67200 SR	74.57	74.44	74.23
P4-QPSK: 84000 SR	86.68	87.18	87.46
P4-QPSK: 151200 SR	168.14	167.8	167.5
P4-QPSK: 168000 SR	173.9	173.4	174.01
16-QAM: 16800 SR	18.68	18.63	18.52
16-QAM: 33000 SR	37.16	37.14	37.02
16-QAM: 67200 SR	74.7	74.04	74.46
16-QAM: 84000 SR	87.4	87	87.04
16-QAM: 151200 SR	167.35	167.17	167.85
16-QAM: 168000 SR	174.71	173.9	174.64
32-QAM: 16800 SR	18.41	18.54	18.61
32-QAM: 33000 SR	37.1	36.94	37.06
32-QAM: 67200 SR	74.41	74.08	73.9
32-QAM: 84000 SR	87.91	87.27	87.46
32-QAM: 151200 SR	167.75	166.67	166.88
32-QAM: 168000 SR	175	174.26	174.11
64-QAM: 16800 SR	18.74	18.54	18.48
64-QAM: 33000 SR	37.44	36.84	37.11
64-QAM: 67200 SR	74.32	74.19	74.21
64-QAM: 84000 SR	87.16	86.88	87.08
64-QAM: 151200 SR	167.11	166.33	167.31
64-QAM: 168000 SR	174.9	173.75	174.19

Table 40 - Occupied Bandwidth

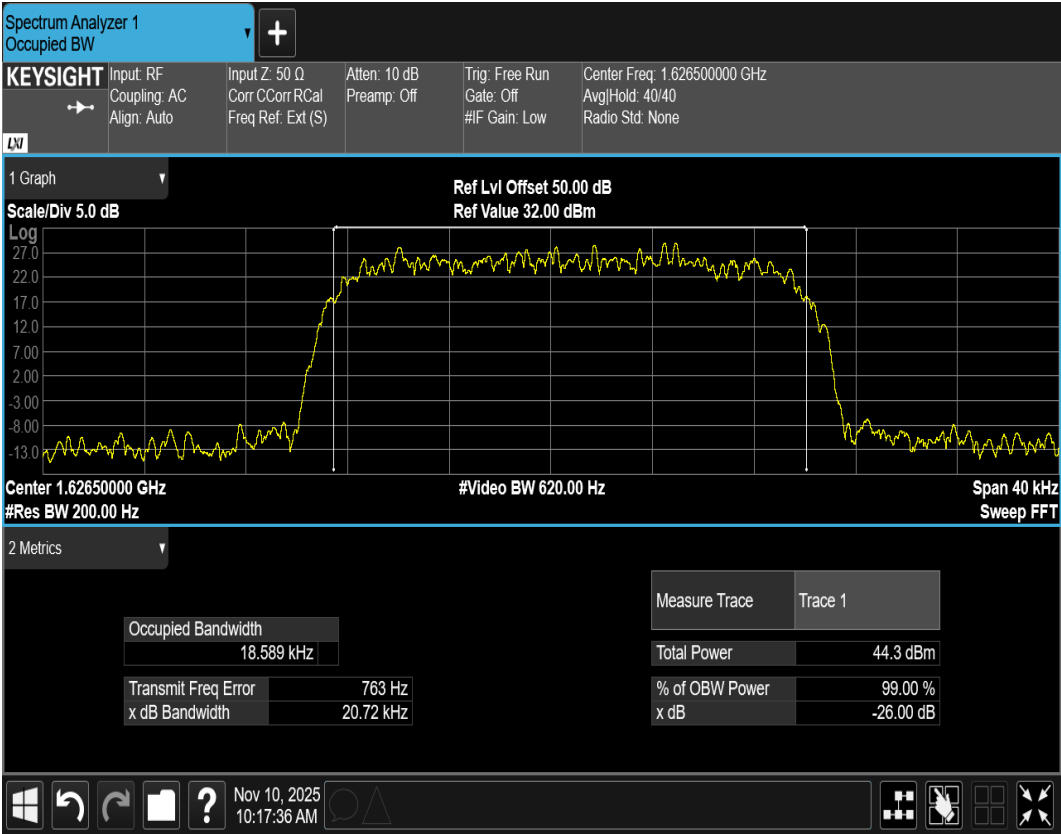


Figure 63- Bottom Channel, QPSK: 16800 SR

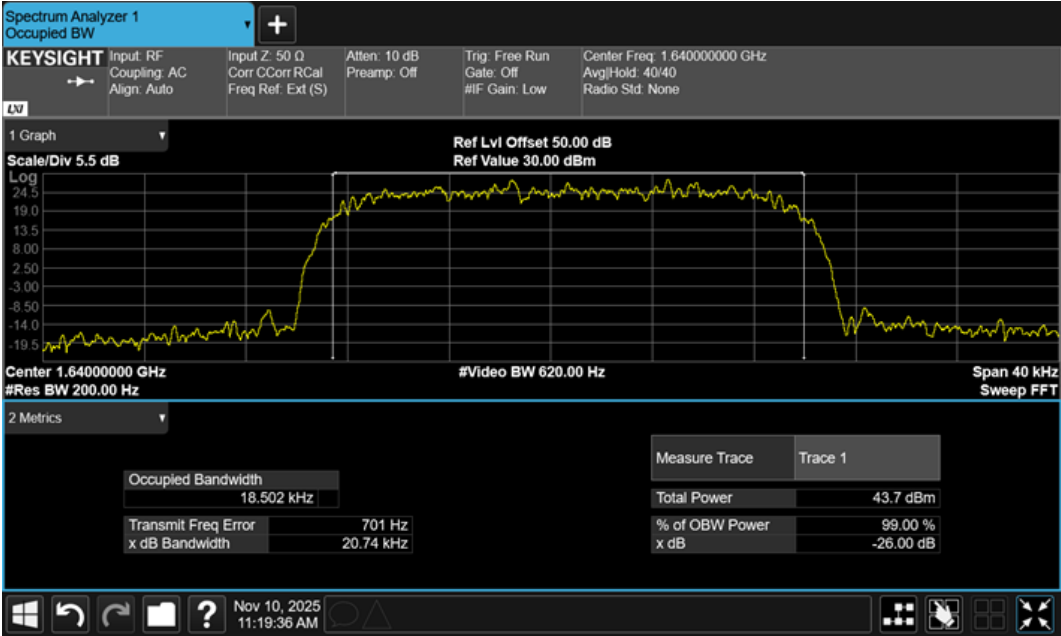


Figure 64 - Middle Channel, QPSK: 16800 SR

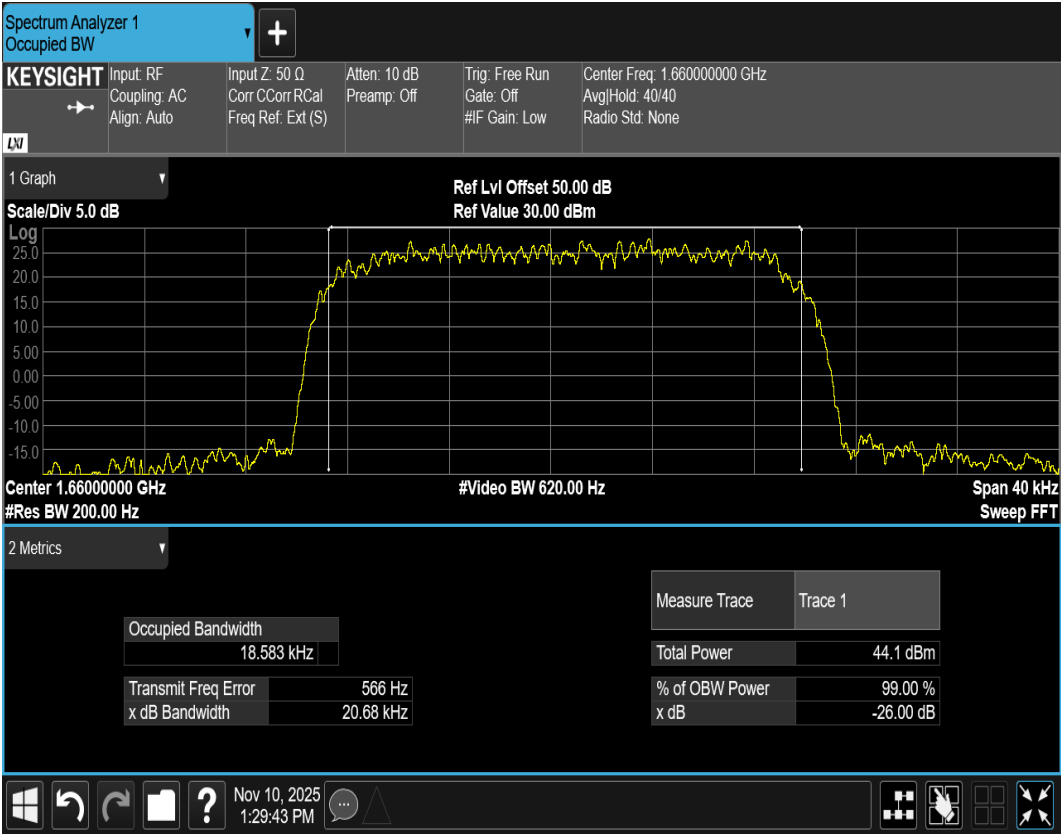


Figure 65 - Top Channel, QPSK: 16800 SR

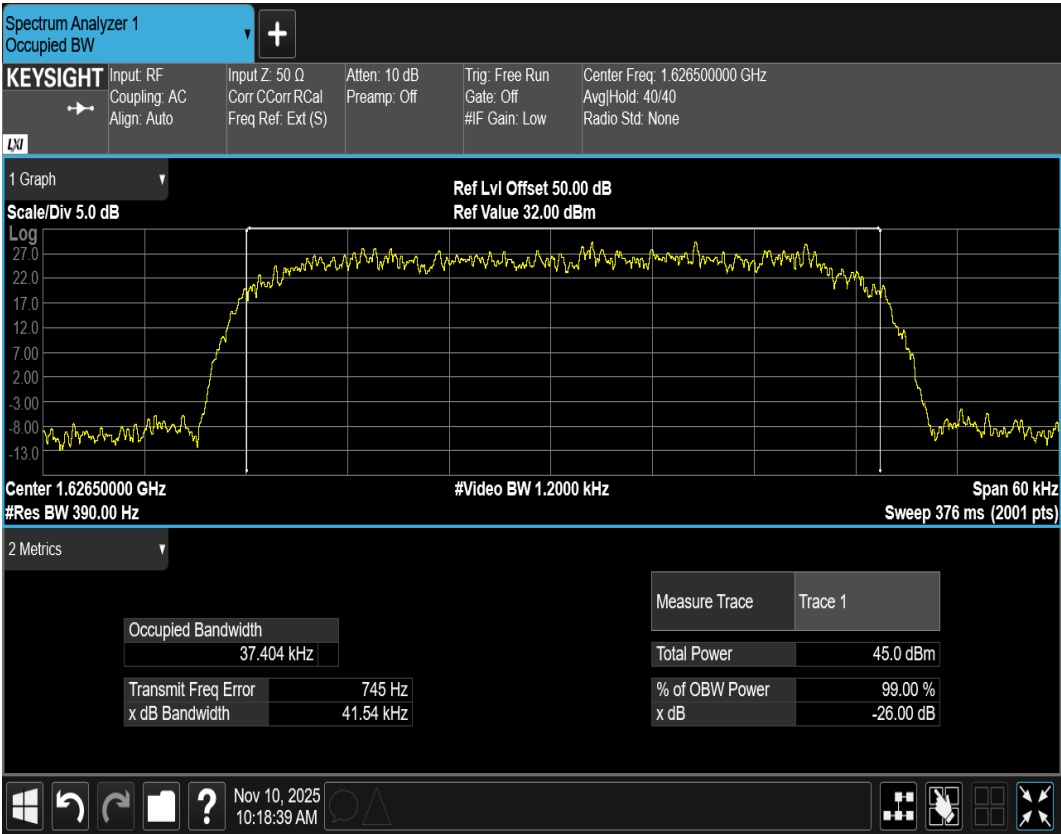


Figure 66 - Bottom Channel, QPSK: 33000 SR

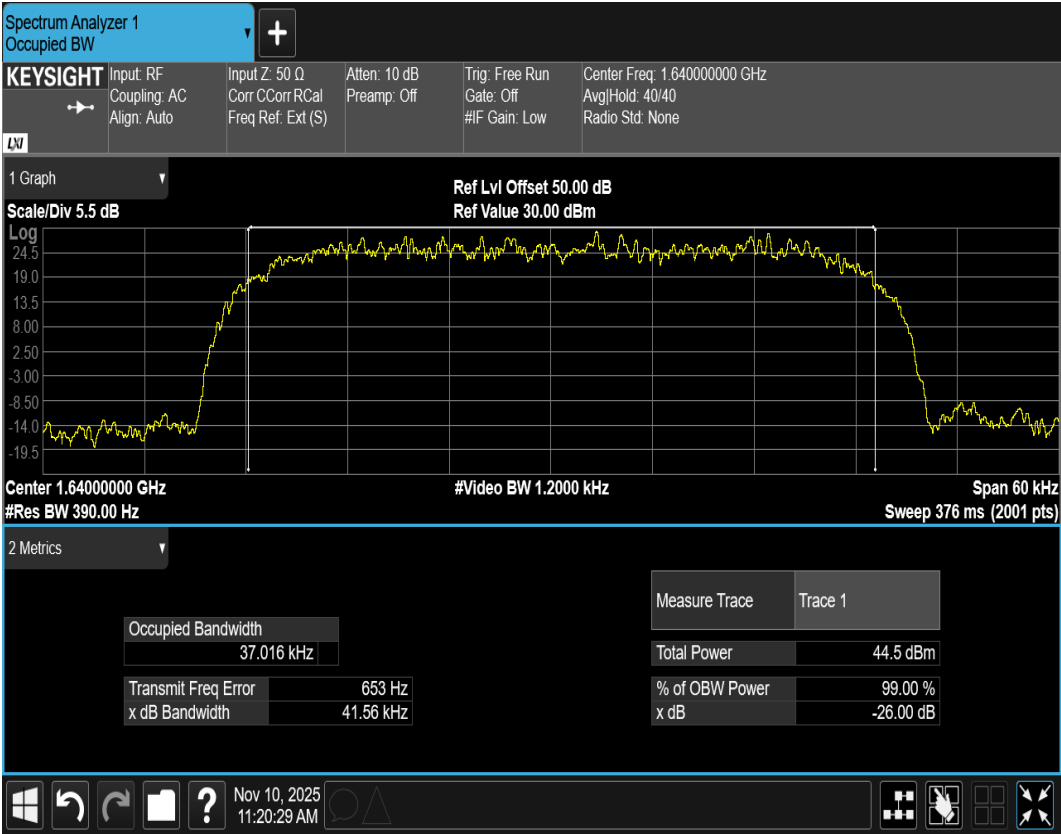


Figure 67 - Middle Channel, QPSK: 33000 SR

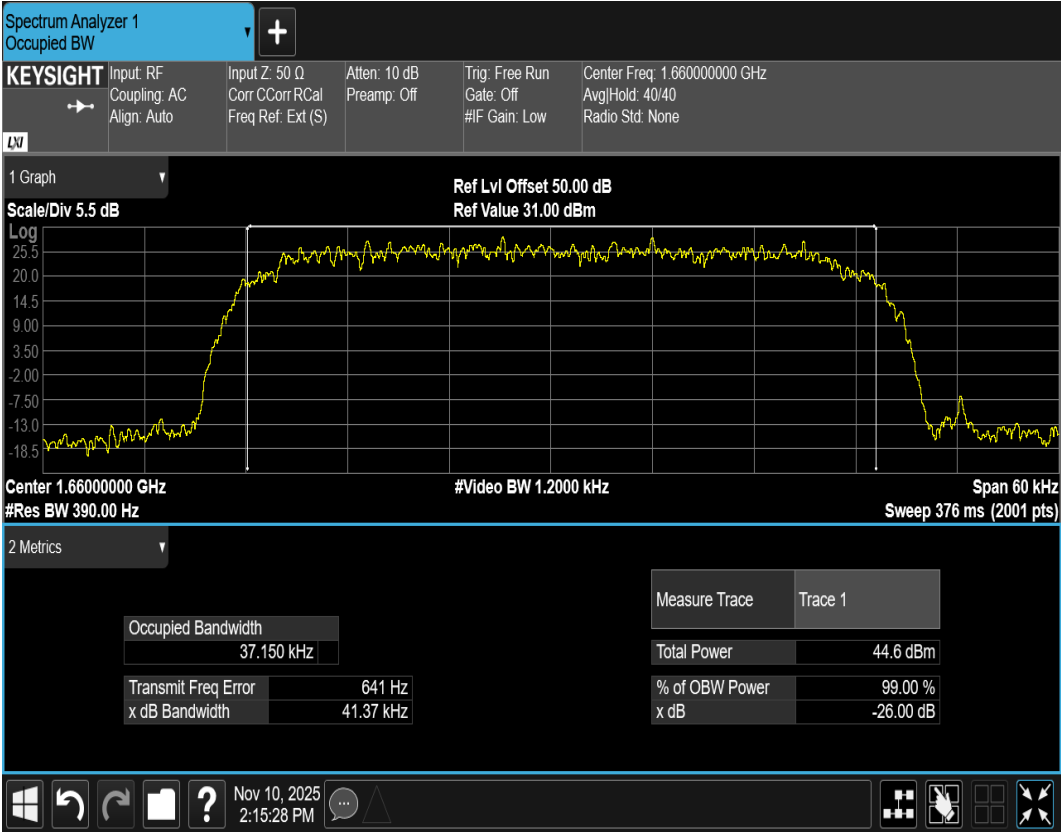


Figure 68 - Top Channel, QPSK: 33000 SR

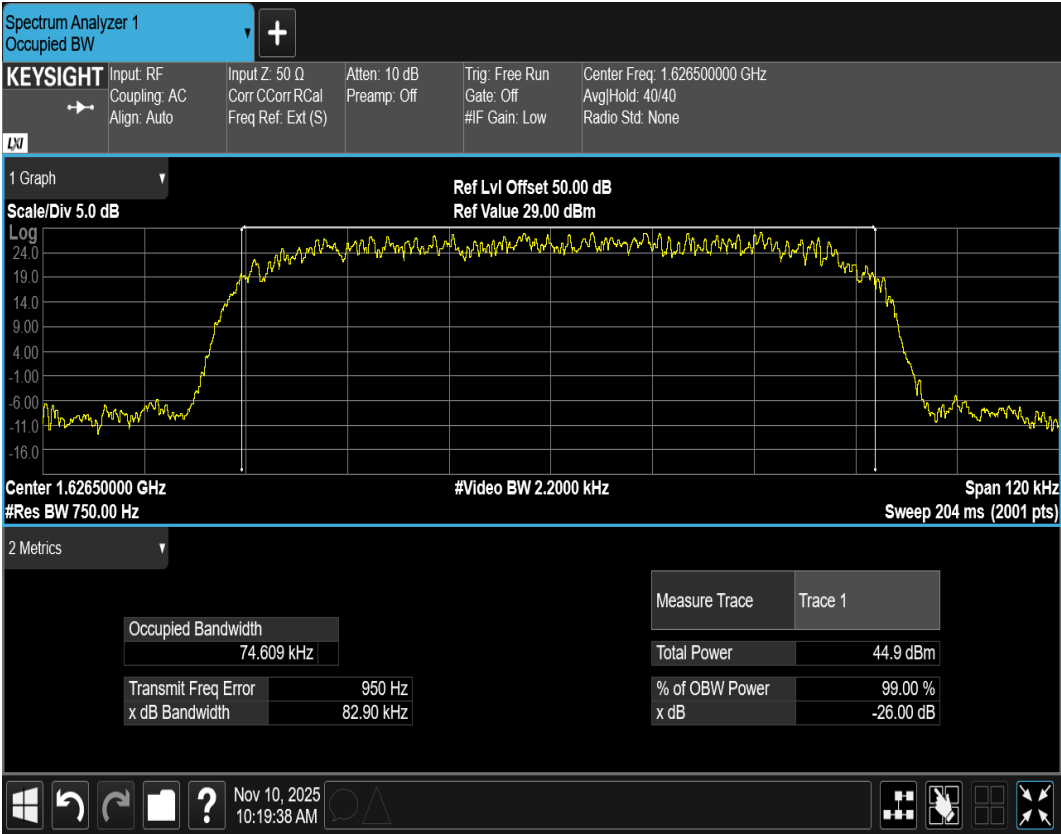


Figure 69 - Bottom Channel, QPSK: 67200 SR

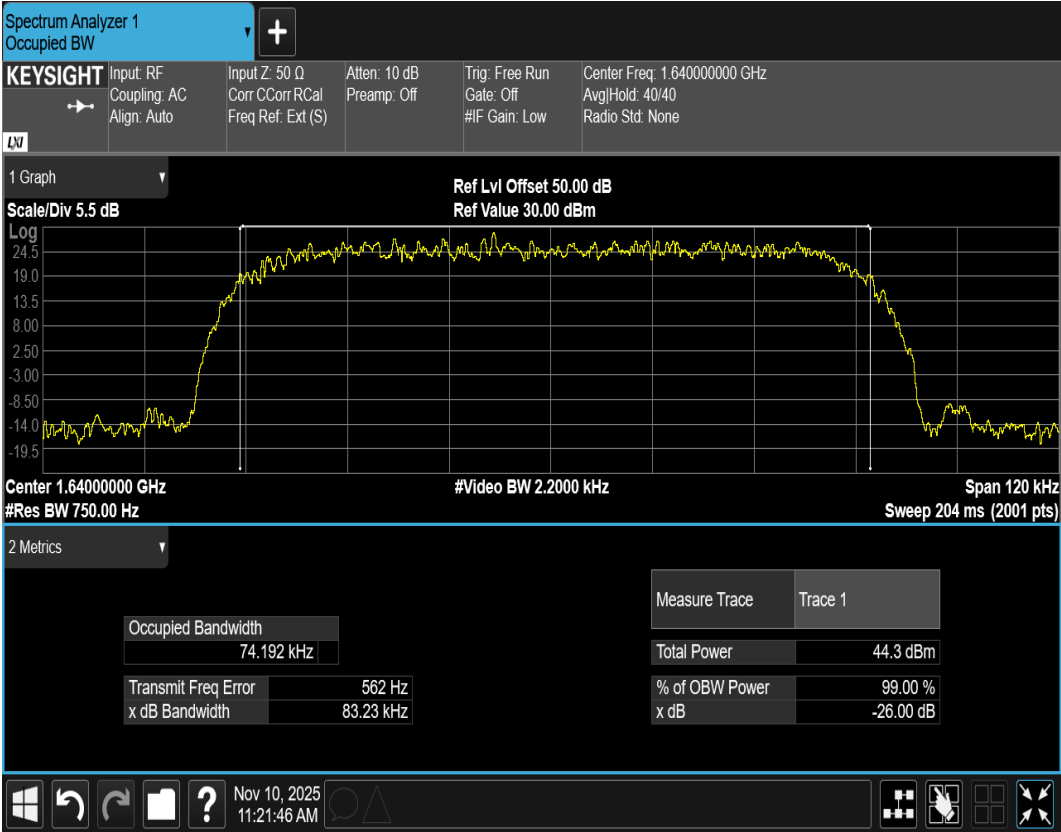


Figure 70 - Middle Channel, QPSK: 67200 SR

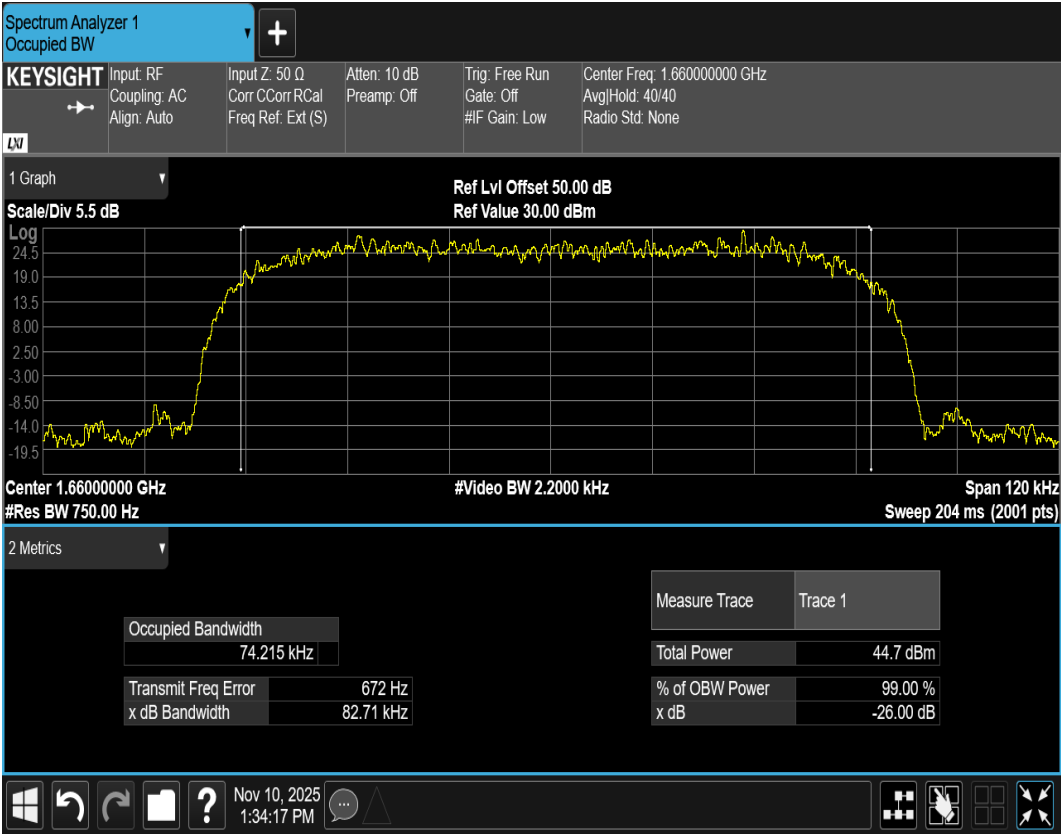


Figure 71 - Top Channel, QPSK: 67200 SR

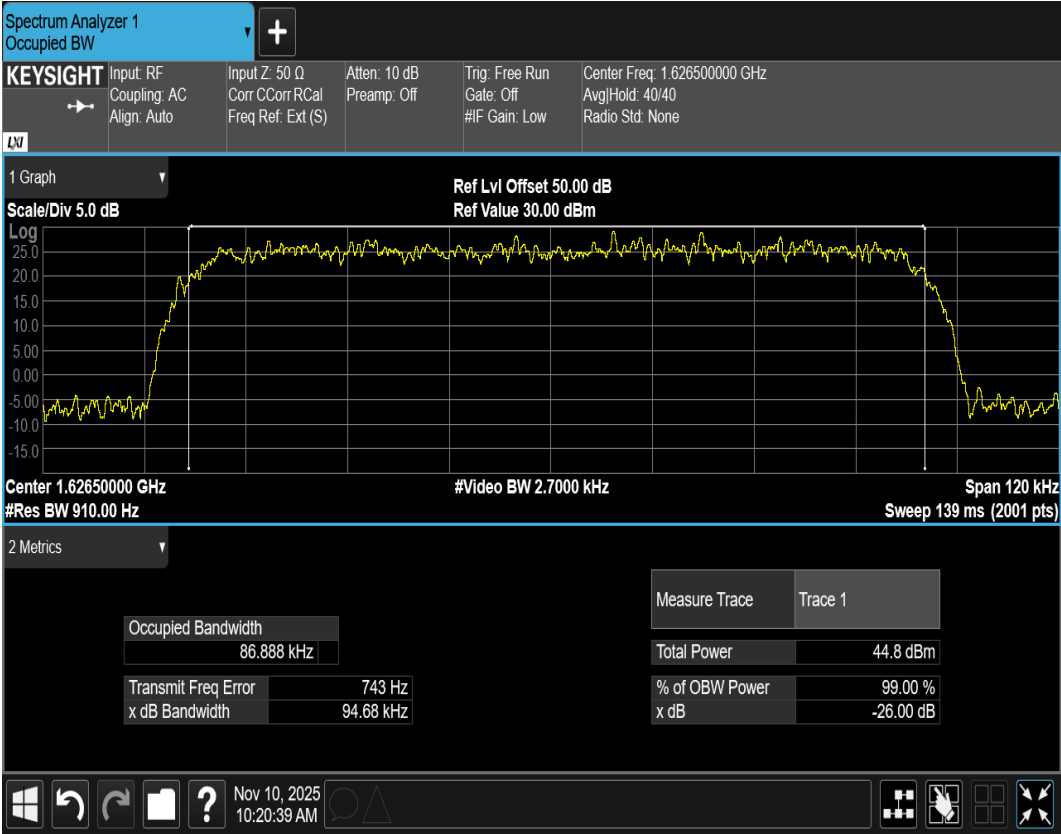


Figure 72 - Bottom Channel, QPSK: 84000 SR

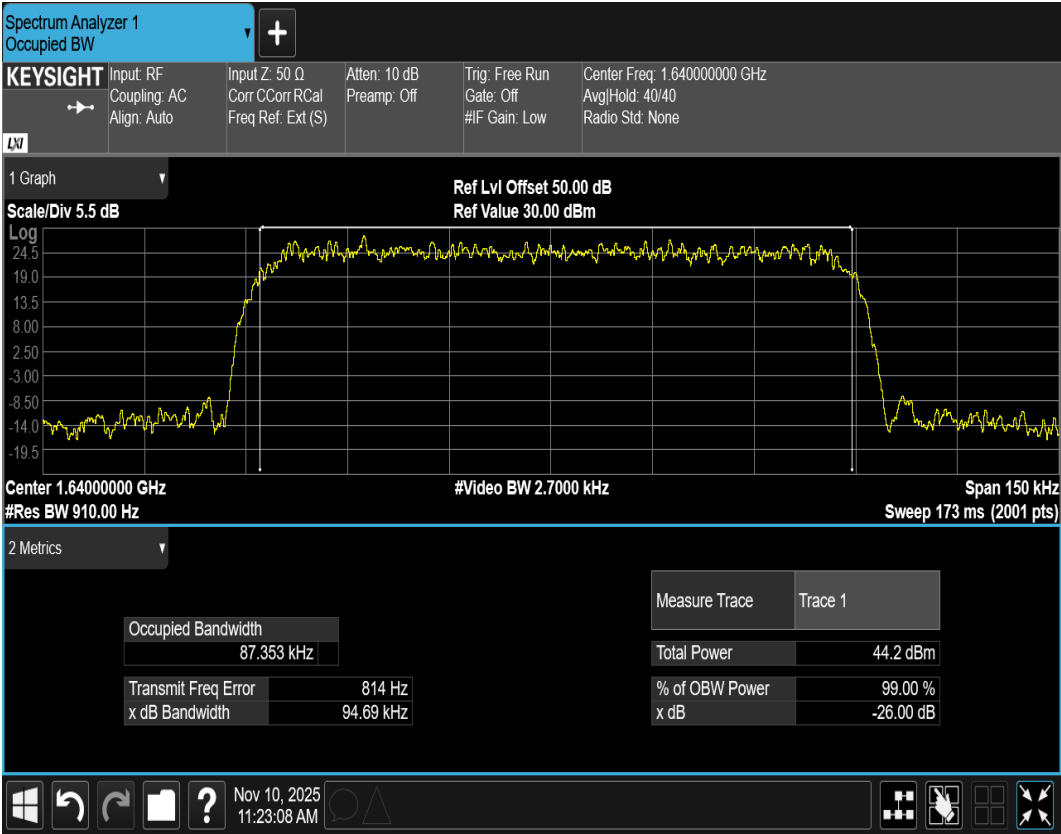


Figure 73 - Middle Channel, QPSK: 84000 SR

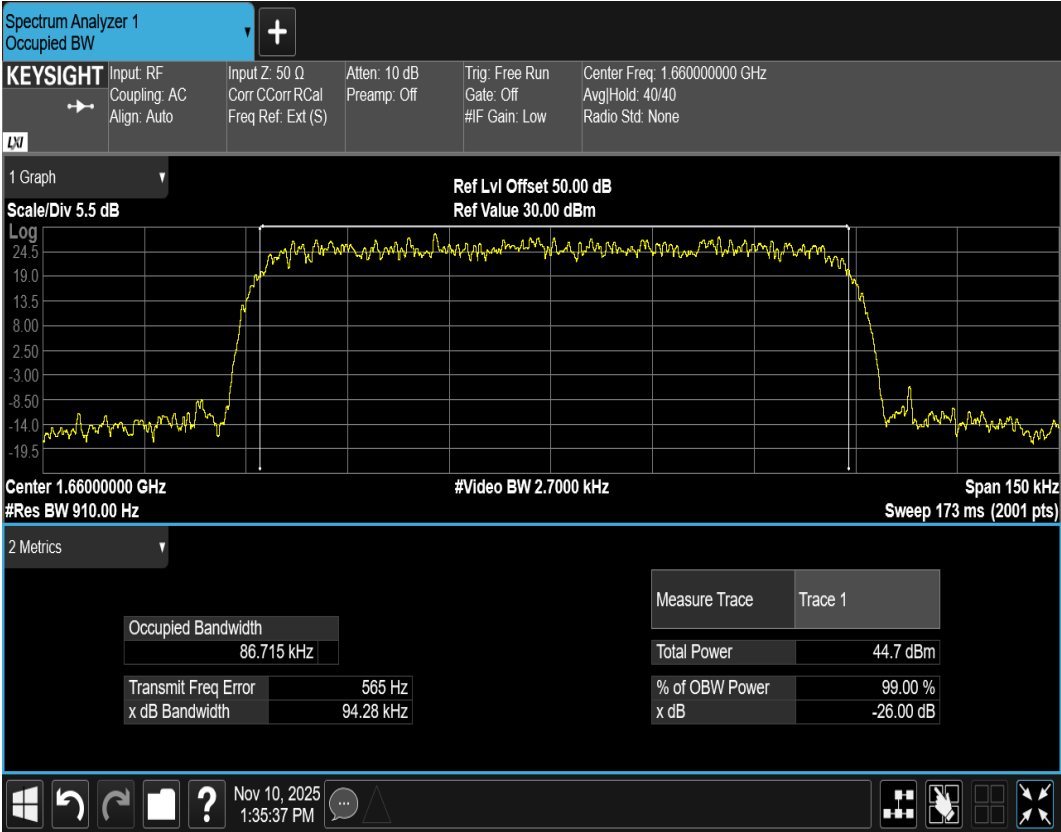
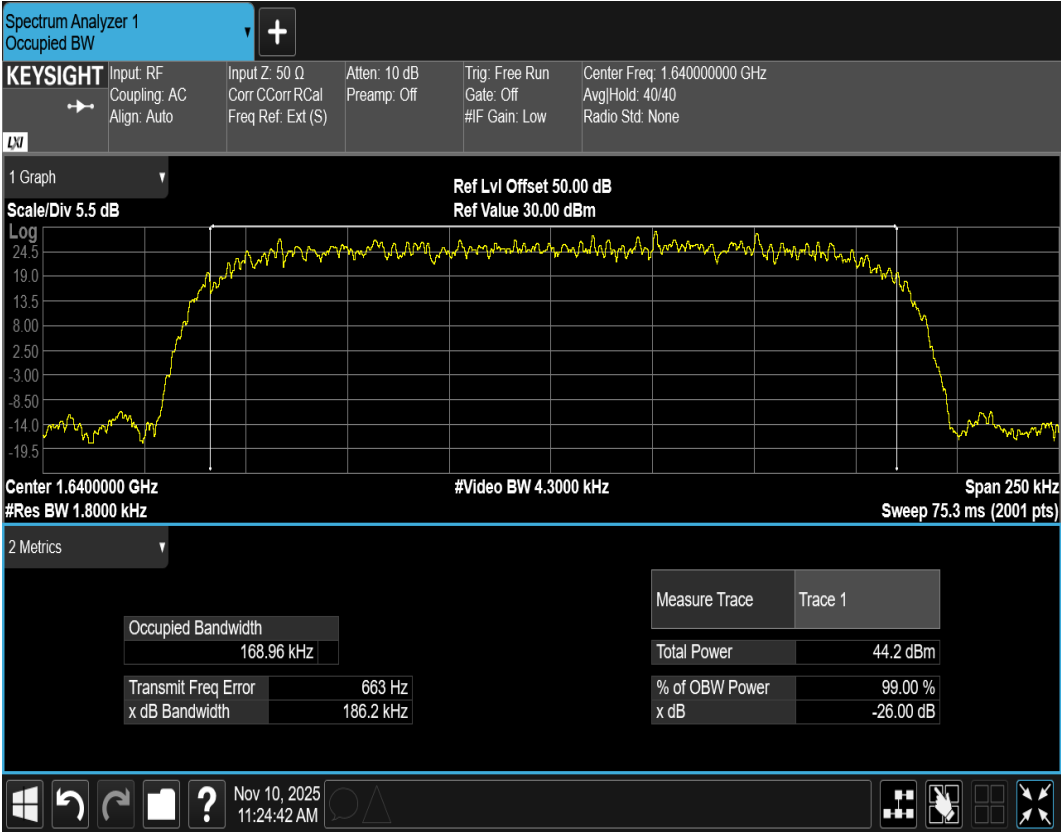
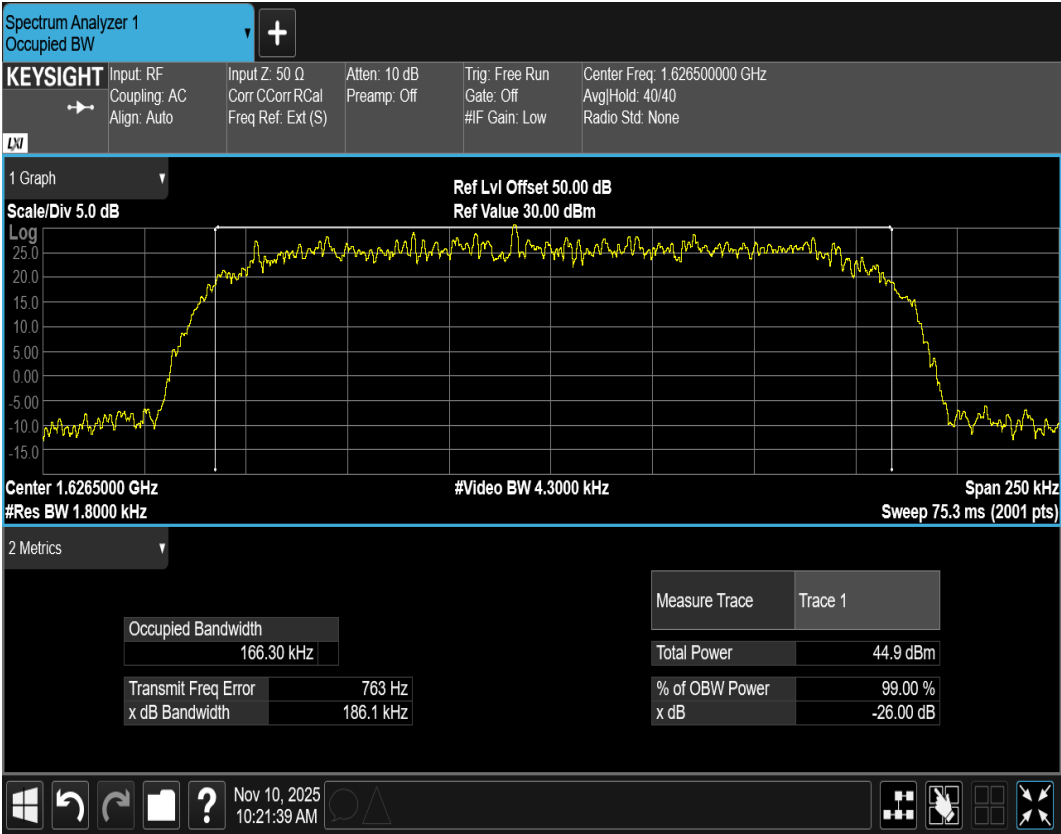


Figure 74 - Top Channel, QPSK: 84000 SR



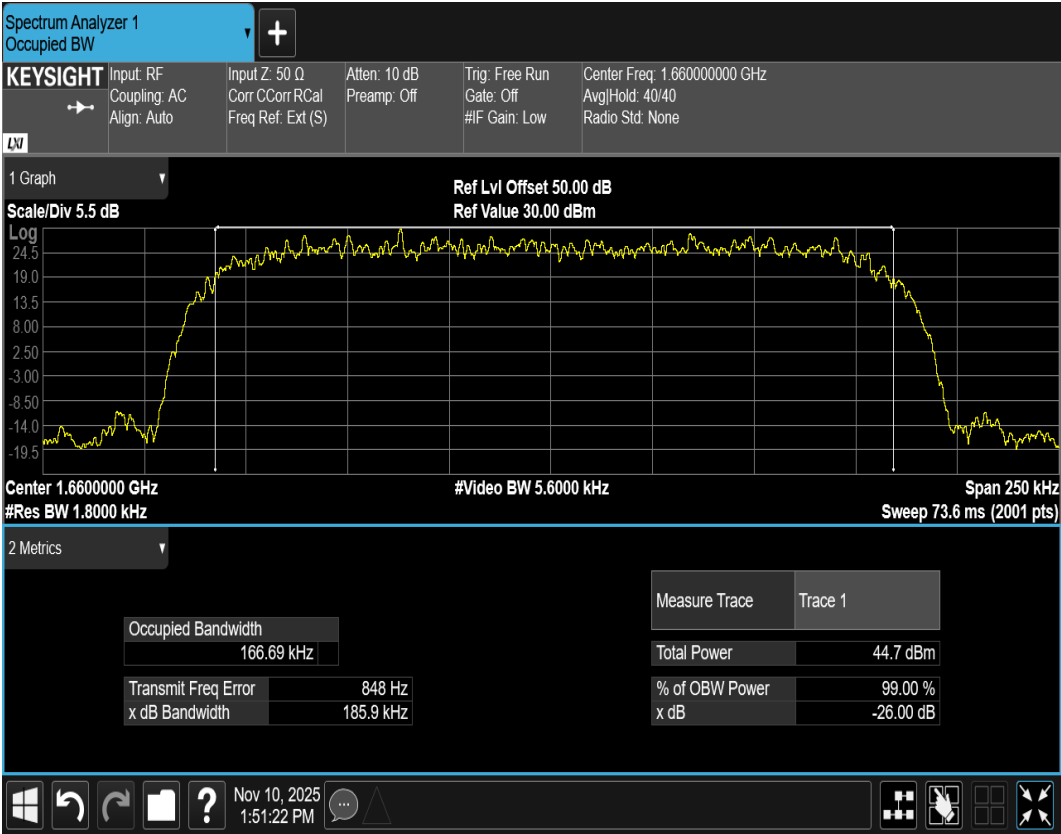


Figure 77 - Top Channel, QPSK: 151200 SR

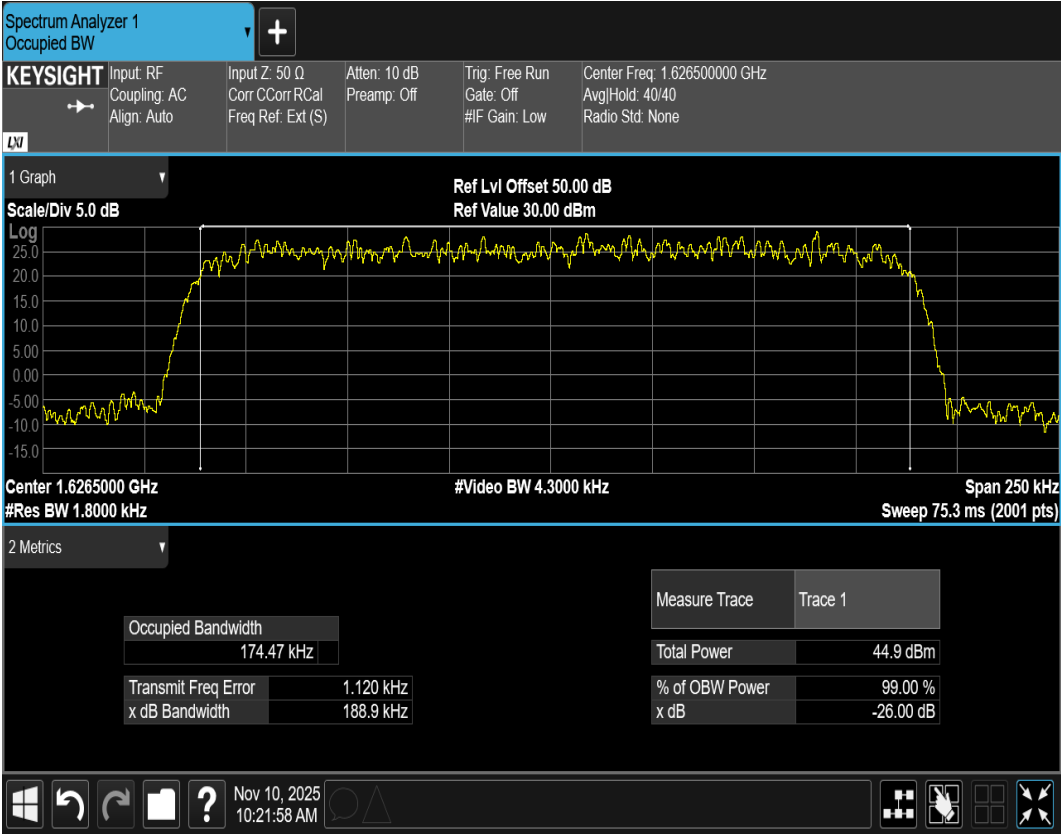


Figure 78 - Bottom Channel, QPSK: 168000 SR

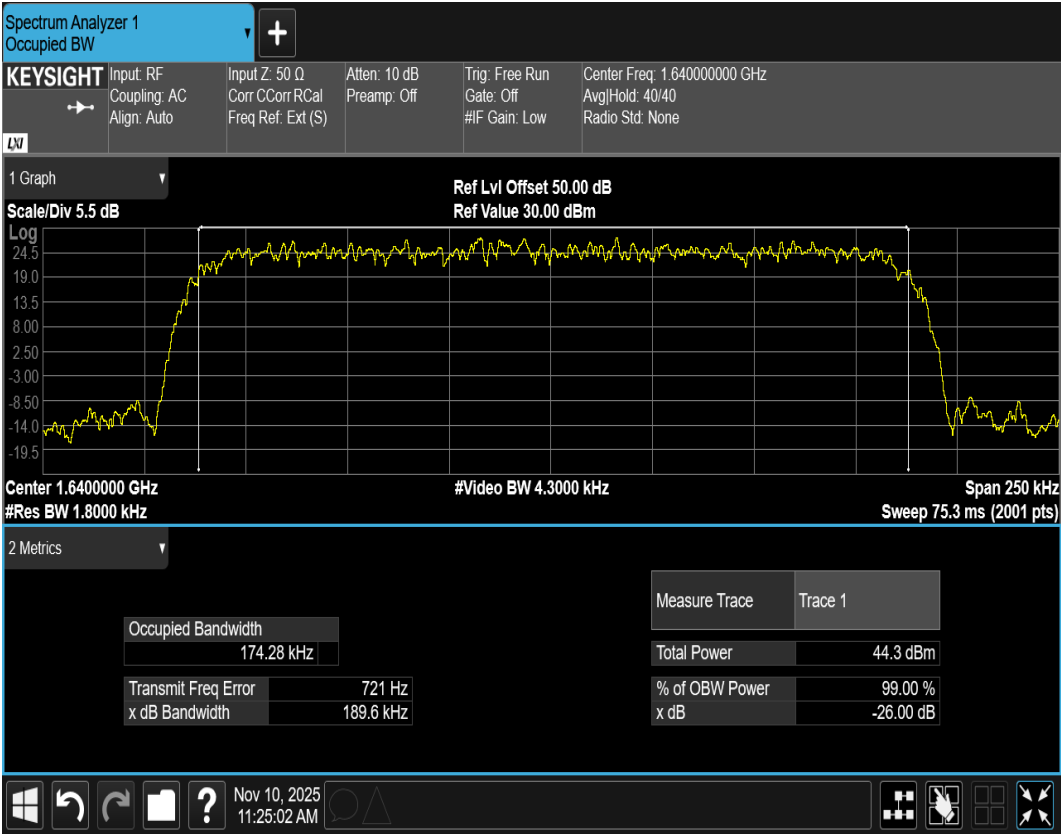


Figure 79 - Middle Channel, QPSK: 168000 SR

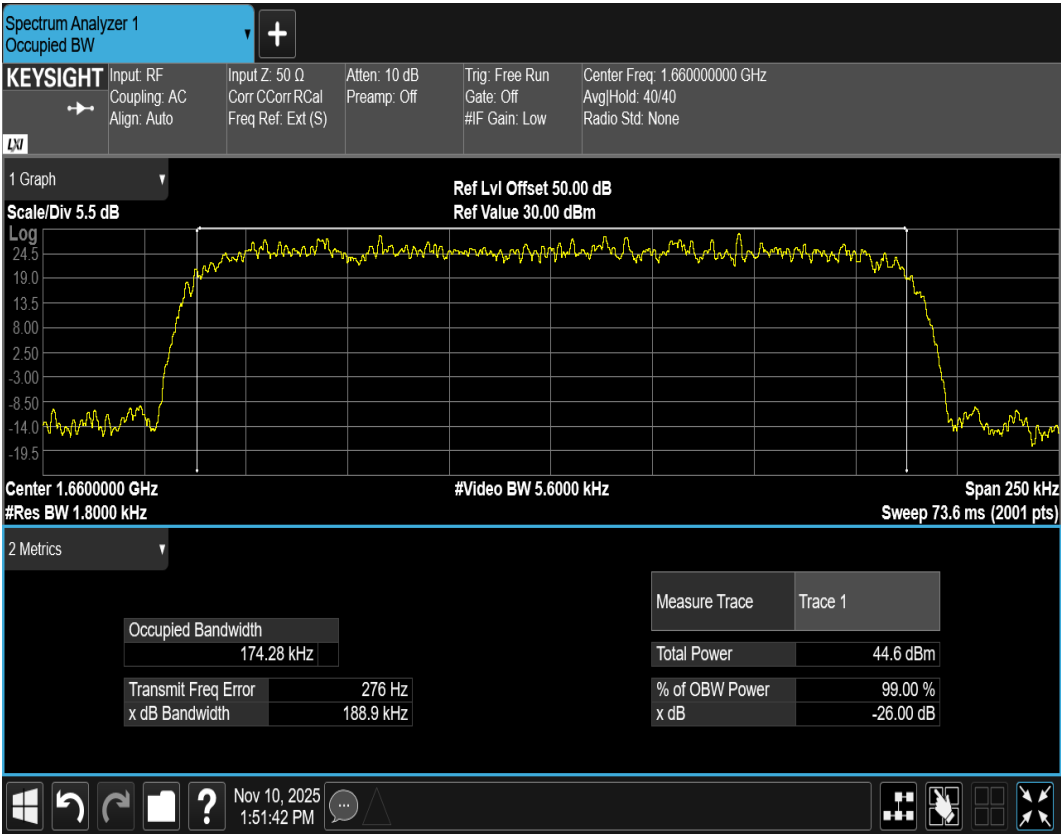


Figure 80 - Top Channel, QPSK: 168000 SR

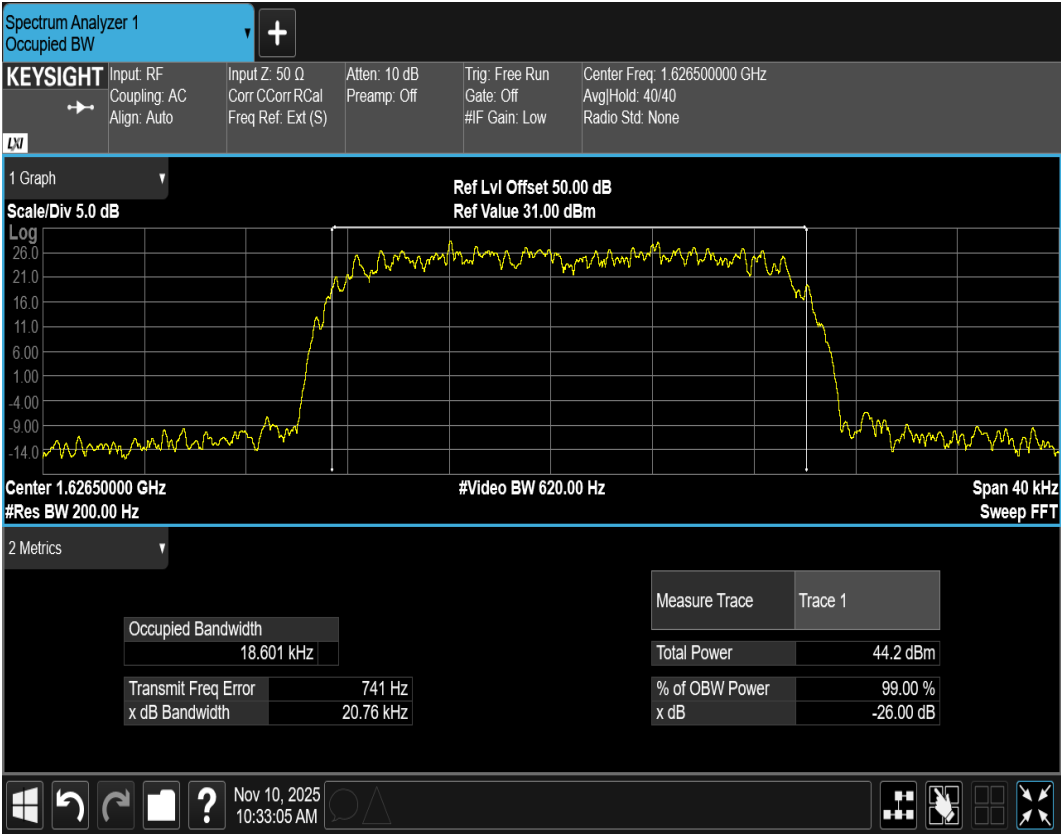


Figure 81 - Bottom Channel, P4-QPSK: 16800 SR

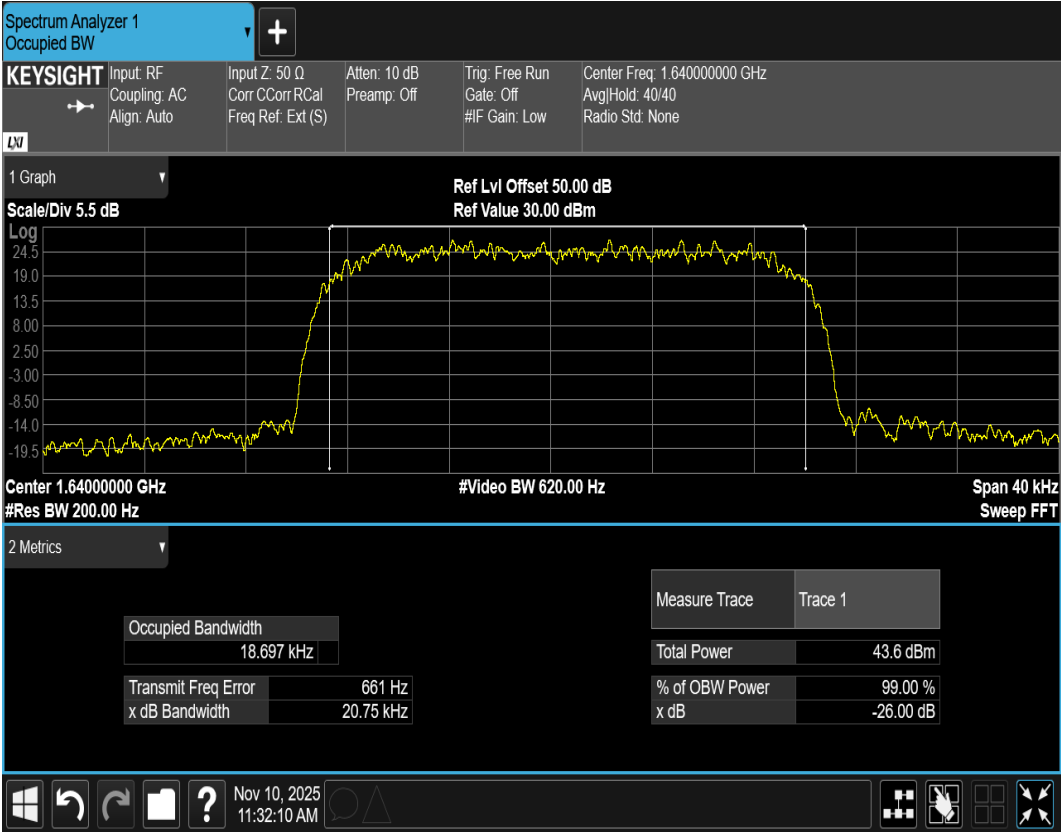


Figure 82 - Middle Channel, P4-QPSK: 16800 SR

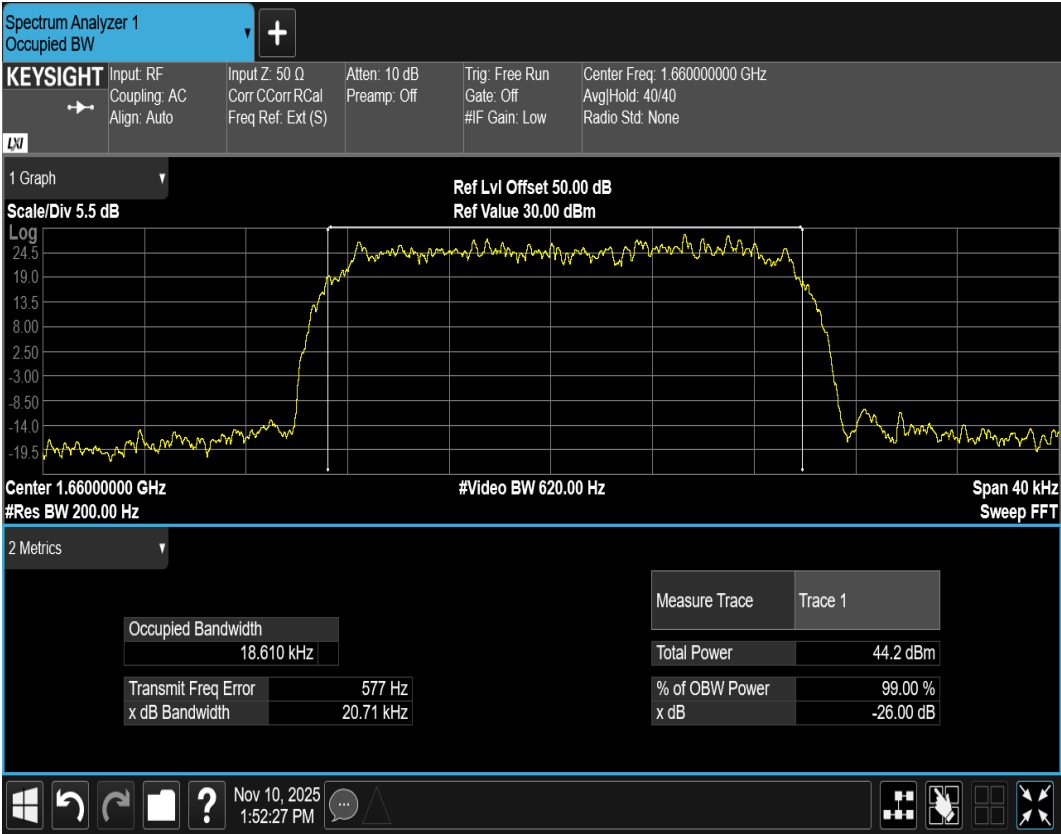


Figure 83 - Top Channel, P4-QPSK: 16800 SR

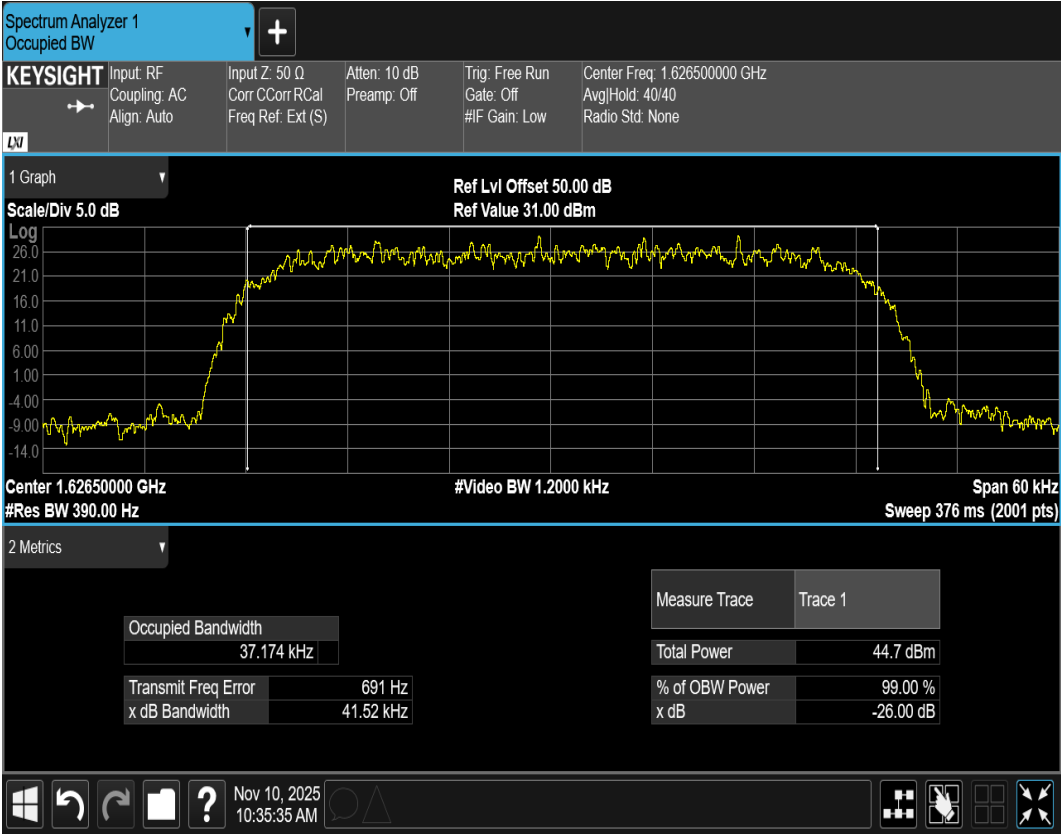


Figure 84 - Bottom Channel, P4-QPSK: 33000 SR

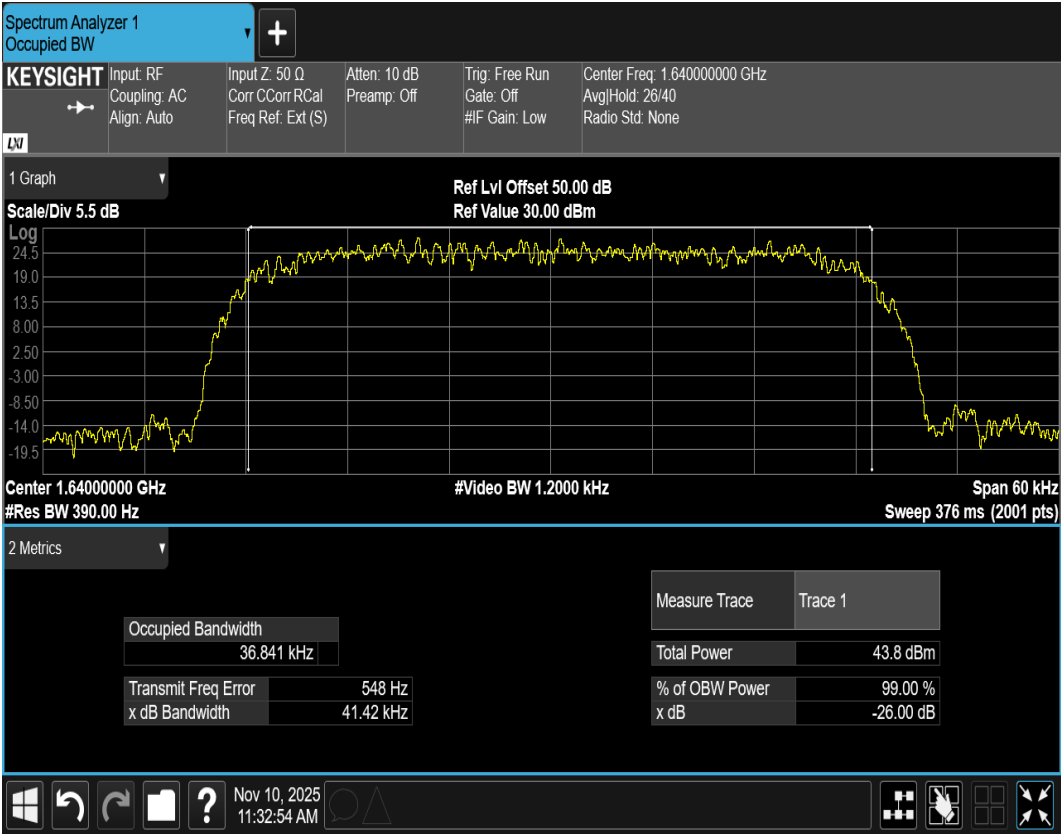


Figure 85 - Middle Channel, P4-QPSK: 33000 SR

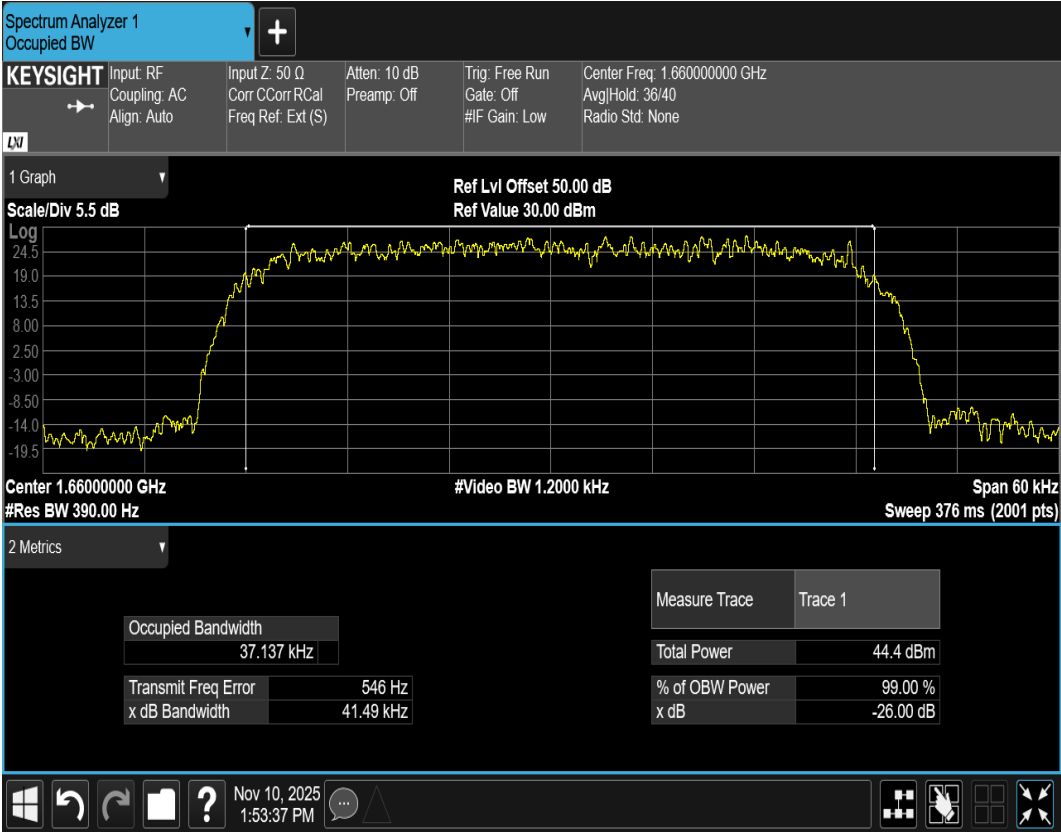


Figure 86 - Top Channel, P4-QPSK: 33000 SR

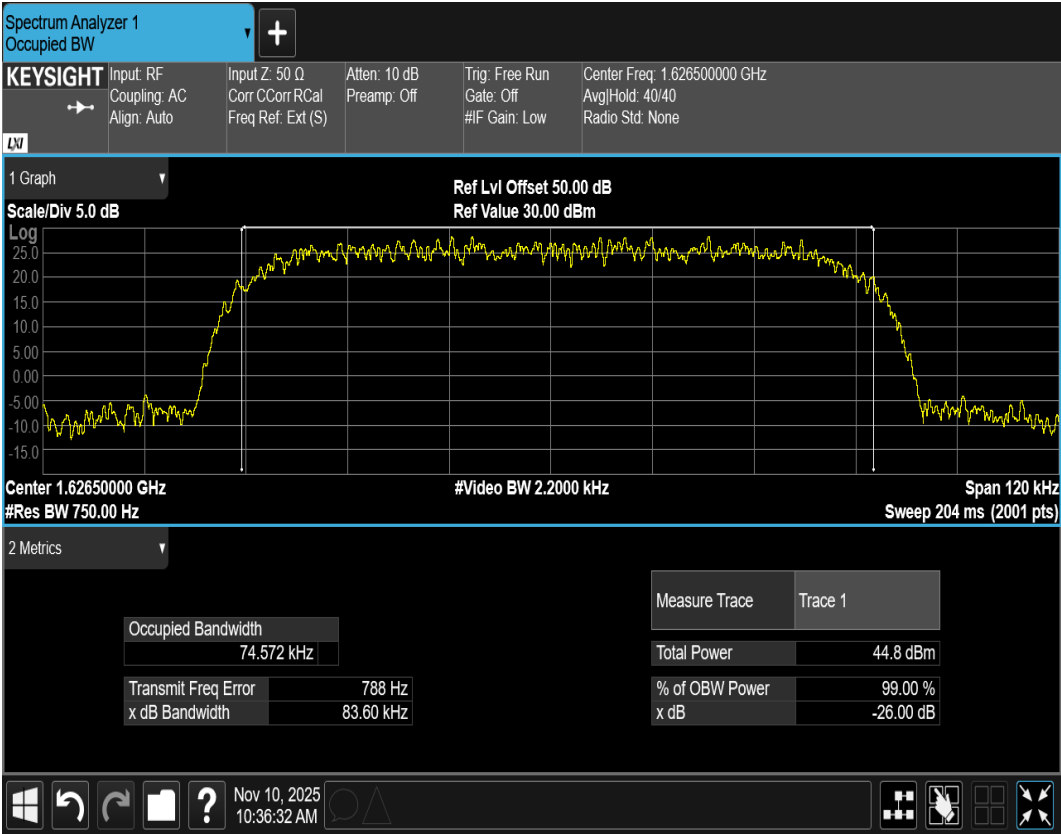


Figure 87 - Bottom Channel, P4-QPSK: 67200 SR

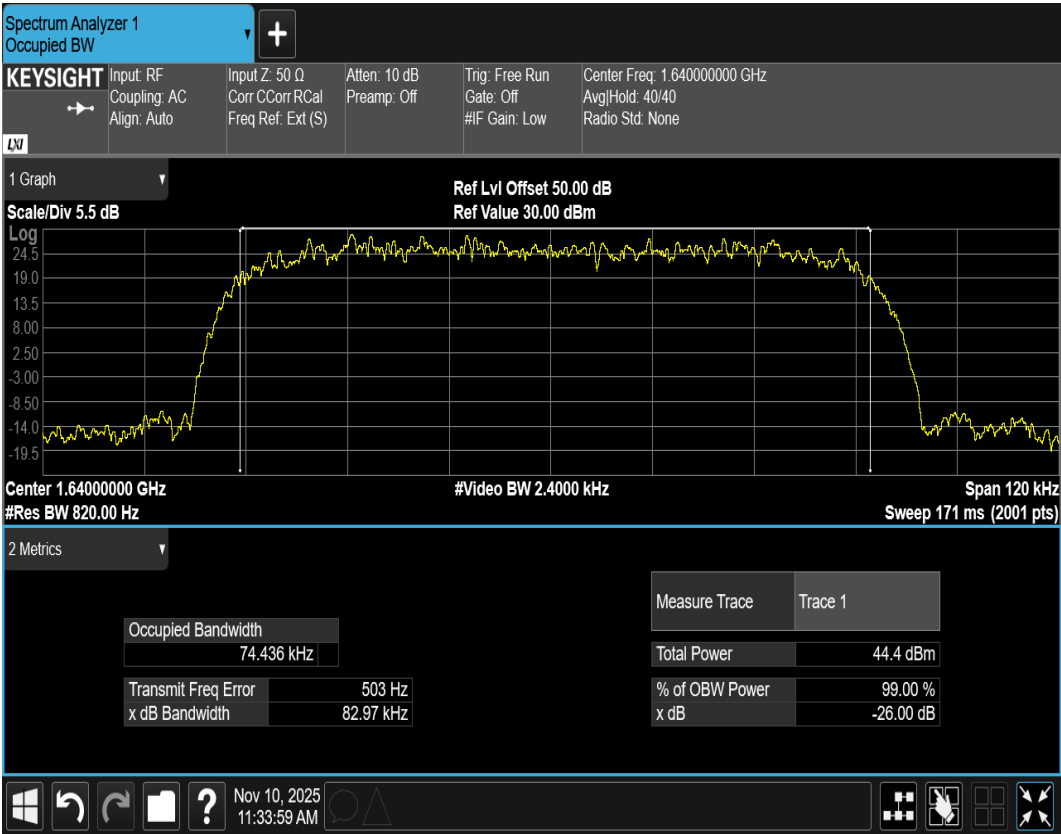


Figure 88 - Middle Channel, P4-QPSK: 67200 SR