



REPORT

For

Avari Wireless Corporation

8618 Commerce Court,
Burnaby, BC V5A 4N6
Canada

1400 112th Ave SE, Ste 100, Bellevue, WA, USA 98004

Date of Issue: October 24, 2024
Report No.: 20.01.22327-1
Project No.: 22327
Equipment: Quad-Band Medium Power Remote Unit
Model No.: RU37-4-PS-ABGH-41-C-D0-2C
ISED ID: 32235-RU374PSABGH
FCC ID: 2BA6ERU374PSABGH41A
HVIN: RU37-4-PS-ABGH-41-C-D0-2C
RU37-4-PS-ABGH-51-C-D0-2W

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Prepared by: LabTest Certification Inc.
Date Issued: October 24, 2024
Project No.: 22327

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TEST REPORT

RSS-119 — Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz RSS-Gen — General Requirements for Compliance of Radio Apparatus FCC Part 90 - PRIVATE LAND MOBILE RADIO SERVICES

Report Reference No.:	20.01.22327-1	
Report Revision History	Rev. 0 October 3, 2024 Rev. 1 October 24, 2024	
Compiled by (+ signature)	Zara Vali	
Approved by (+ signature)	Jack Qin	
Date of issue	October 24, 2024	
Total number of pages.....	103	
FCC Site Registration No.:	CA5970	
IC Site Registration No.:	5970A-2	
Testing Laboratory	LabTest Certification Inc.	
Address.....	Unit 3128-20800 Westminster HWY, Richmond, BC, V6V 2W3, Canada	
Applicant's name	Avari Wireless Corporation	
Address.....	8618 Commerce Court, Burnaby, BC V5A 4N6 Canada 1400 112th Ave SE, Ste 100, Bellevue, WA, USA 98004	
Manufacture's Name	Avari Wireless Corporation	
Address	8618 Commerce Court, Burnaby, BC V5A 4N6 Canada 1400 112th Ave SE, Ste 100, Bellevue, WA, USA 98004	
Test specification:		
Standards	<ul style="list-style-type: none"> ➤ RSS-119, Issue 12 2015, Amendment (April 1, 2022) ➤ RSS-Gen, Issue 5 2018 ➤ RSS-131, Issue 4 2022 ➤ FCC Part 90 ➤ FCC Part 2 	
Test procedure	<ul style="list-style-type: none"> ➤ ANSI C63.26: 2015 ➤ KDB 935210 D05, v01r04 	
Test item description :		
Trade Mark	RU37™	
Model/Type reference (HVIN).....	RU37-4-PS-ABGH-41-C-D0-2C RU37-4-PS-ABGH-51-C-D0-2W	

FVIN.....:	7
PMN.....:	VL-Series Remote Unit
Serial Number.....:	10911150E01BE1003
ISED ID.....:	32235-RU374PSABGH
FCC ID.....:	2BA6ERU374PSABGH41A
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Date of receipt of test item	August 20, 2024
Date of performance of tests	August 20, 2024

Revision History

Revision	Date	Reason For Change	Author
0	October 3, 2024	Initial Data	Zara Vali
1	October 24, 2024	Report update for ISED submission	Zara Vali

Result Summary

The tests indicated in Test Summary were performed on the product constructed as described below. The test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item tested. LabTest does not make any claims of compliance for samples or variants which were not tested.

The Compliance Status is a judgment based on the direct measurements and calculated highest emissions to appropriate standard limits. Measurement uncertainty values, provided on calibration certificates, were not be used in the judgment of the final status of compliance.

Test Item	Standard	Measurement Method	Result
AGC Threshold	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 2 2.1046(a) FCC Part 90	ANSI C63.26-2015, Section 7.2.3.1 KDB 935210 D05, v01r04, Clause 3.2, 4.2	PASS
Occupied Bandwidth	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 2 2.1046(a) FCC Part 90	ANSI C63.26-2015, Section 7.2.3.1 KDB 935210 D05, v01r04	PASS
Out of Band Rejection	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.26-2015, Section 7.2.3.2 KDB 935210 D05, v01r04, Clause 3.3, 4.3	PASS
Input-versus-output Signal Comparison	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.26-2015, Section 7.2.3.3 KDB 935210 D05, v01r04, Clause 3.4, 4.4	PASS
Input/output Power and Amplifier/Booster Gain	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.26-2015, Section 7.2.3.4 KDB 935210 D05, v01r04, Clause 3.5, 4.5	PASS
Noise Figure	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.26-2015, Section 7.2.3.5 KDB 935210 D05, v01r04, Clause 4.6	PASS
Measuring out-of-band/out-of-block (including intermodulation) and spurious emissions	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.26-2015, Section 7.2.3.6 Section 7.2.3.7 KDB 935210 D05, v01r04, Clause 3.6, 4.7	PASS
Frequency stability	RSS-119, Issue 12 2015, Amendment (April 1, 2022)	ANSI C63.26-2015, Section 7.2.3.8	N/A

	RSS-Gen, Issue 5 2018 FCC Part 2.1055	KDB 935210 D05, v01r04, Clause 3.7, 4.8	
Spurious emissions radiated measurements above 1 GHz	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90 FCC Part 2.1053	ANSI C63.26-2015, Section 7.2.3.9 KDB 935210 D05, v01r04, Clause 3.8, 4.9	PASS
Spurious radiated emissions below 1 GHz	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90 FCC Part 2.1053	ANSI C63.26-2015, Section 5.5 KDB 935210 D05, v01r04, Clause 3.8, 4.9	PASS
Conducted Emissions at AC Main	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	ANSI C63.4: 2014	PASS

1. EUT Information

EUT Description and Variant Models

Description:

The 420-450-700-800MHz RU37 is a Quad-band Remote Unit (RU) that provides up to 5 Watt of output power per band. The unit supports up to 3 bands in a sealed type 4 chassis for Class A operation.

On the downlink path, the RU37 remote unit receives a stream of digitized RF signals from a Master Unit. The RU then converts the digital signal into analog RF signals. The analog RF signal is further amplified in the RF module and then sent through a filter to passive antenna for broadcasting.

On the UL path, the RU37 PS remote unit receives analog RF signals from portable radios over the air through passive antennae. The RF signals are then converted into a digital data stream and delivered over optical fiber to a Master Unit DMU . The RU37 Remote Unit also accommodates a 1 Gbps Ethernet backhaul for transporting IP data from nearby IP devices such as security cameras and Wi-Fi access points.

The intentional transmitter only exists in the downlink path and hence the EMC tests in this report is dedicated to the downlink emission.

In order to build up a complete signal booster system, the DMU was connected as the Auxiliary device. The DMU does NOT radiate over an antenna port. The radio RF signal source was directly injected and received via coaxial cables.

EUT Picture



Variant Models:

The following variant models were not tested as part of this evaluation but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the models tested. LabTest does not make any claims of compliance for samples or variants which were not tested.

- RU37-4-PS-ABGH-51-C-D0-2W

Quad-Band 5 Watt (Wall-Mount) Remote Unit, RU37 420-450-700-800MHz 64 ch (NEMA4)
Same hardware and software as tested model - RU37-4-PS-ABGH-51-C-D0-2C with different mounting kits.

- RU33-4-PS-ABGH-41-C-D0-2C

Quad-Band 2 Watt (Rack-Mount) Remote Unit, RU33 420-450-700-800MHz 64 ch (NEMA4)
Same hardware and software as tested model - RU32-4-PS-ABGH-51-C-D0-2C with less composite power and rack-mount kits.

- RU33-4-PS-ABGH-51-C-D0-2W
Quad-Band 2 Watt (Wall-Mount) Remote Unit, RU33 420-450-700-800MHz 64 ch (NEMA4)
Same hardware and software as tested model - RU37-4-PS-ABGH-51-C-D0-2C with less composite power and wall-mount kits.

Application for	PS 420-450-700-800MHz Remote Unit, Quad Band Medium Power DAS
Passing Transmit Frequency	405 – 425 MHz ¹ 450 – 512 MHz 851 MHz – 869 MHz 758 MHz – 775 MHz
Operating Transmit Frequency ISED	406.1 MHz – 410 MHz ¹ 410 MHz – 420 MHz 420 MHz – 425 MHz 450 MHz – 454 MHz 456 MHz – 462.5375 MHz 462.7375 MHz – 467.5375 MHz 467.7375 MHz – 512 MHz 851 MHz – 869 MHz 758 MHz – 768 MHz 769 MHz – 775 MHz
Passing Receive Frequency	405 – 430 MHz 450 – 512 MHz 806 MHz – 824 MHz 788 MHz – 805 MHz
Operating Receive Frequency ISED	406.1 MHz – 410 MHz 410 MHz – 420 MHz 420 MHz – 430 MHz 450 MHz – 454 MHz 456 MHz – 462.5375 MHz 462.7375 MHz – 467.5375 MHz 467.7375 MHz – 512 MHz 806 MHz – 824 MHz 788 MHz – 798 MHz 799 MHz – 805 MHz
Number of Channels	Up to 32 channels
Rated RF Output (e.i.r.p.)	37 dBm
Modulation Type	P25 Phase I C4FM, CQPSK; P25 Phase II HDQPSK on full band of Band 700, Band 800, Band 415 and Band 450 FM on Band 800 between 851 MHz – 869 MHz only;
Equipment mobility	Fixed
Operating condition.....	-40 to +50 °C
Mass of equipment (g)	< 48,000g

Dimensions (W X D X H)	433 mm X 313 mm X 855 mm
Supply Voltage:	<u>48V</u> DC <u>7.1</u> Amps
If DC Power:	<input type="checkbox"/> Internal Power Supply <input checked="" type="checkbox"/> External Power Supply <input type="checkbox"/> Battery <input type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Alkaline <input type="checkbox"/> Nickel-Metal Hydride <input type="checkbox"/> Lithium-Ion <input type="checkbox"/> Other

Note 1. The hardware is physically capable of starting at 405 MHz (passing frequencies as per the table), but the unit was tested starting at 406.1 MHz to meet the operating frequencies in FCC requirements. Since the tested unit support channelized operation, in domestic field installations the unit will always be configured to start above 410 MHz to comply with the ISED's restricted frequency band requirements.

Client Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	<i>RU37, 420-450-700-800 PS</i>	Avari Wireless Corporation	RU37-4-PS-ABGH-41-C-D0-2C	EUT where the RF (I/O) antenna is attached via duplexers/multiplexer when necessary.
AE1	<i>DMU, 420PS, 450PS, 700PS, 800PS</i>	Avari Wireless Corporation	DMU-4-PS-ABGH-1-8N-D-1F	Auxiliary equipment, which is the front end of system interfaced to Base Station.
AE2	Element Manager (DMC)	Avari Wireless Corporation	EM-1A	Auxiliary equipment provides the configuration and control interface to <i>DMU</i> and <i>RU37</i> .
AE3	Power Supply	MeanWell	HGL-480H-48	AC to DC Converter, I/P: 120VAC, 60Hz, 5.5A O/P: +48VDC, 480W

Abbreviations:
EUT - Equipment Under Test,
AE - Auxiliary/Associated Equipment, or
SIM - Simulator (Not Subjected to Test)

Software and Firmware

Use*	Description	Version
EUT	Software installed	7.0.0-1.5912
AE1	Software installed	7.0.0-1.5930
AE2	Software installed	7.0.0-1.1595

Abbreviations:
EUT - Equipment Under Test,

AE - Auxiliary/Associated Equipment, or
SIM - Simulator (Not Subjected to Test)

Input/Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	DC Power Port	DC	No	No	Dual feed 48 VDC Assembly
2	1 * RF Input/Output Ports	I/O	No	No	N-Type Coaxial
3	2 * Optical Fibre I/O Ports	I/O	No	No	LC/UPC Duplex
4	2 * TP	TP	No	No	RJ-45

*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	48	7.1	340	DC	-	DC power port is connected to AC/DC convertor.

EUT Operation Modes

Mode #	Description
1	UL and DL transmission and receiving ON

EUT Configuration Modes

Mode #	Description
1	DMU maximum input threshold set to -10 dBm, uplink attenuation set to 0dB; RU uplink and downlink attenuation set to 0dB.

2. Description of Test Setup

Test Equipment Verified for function

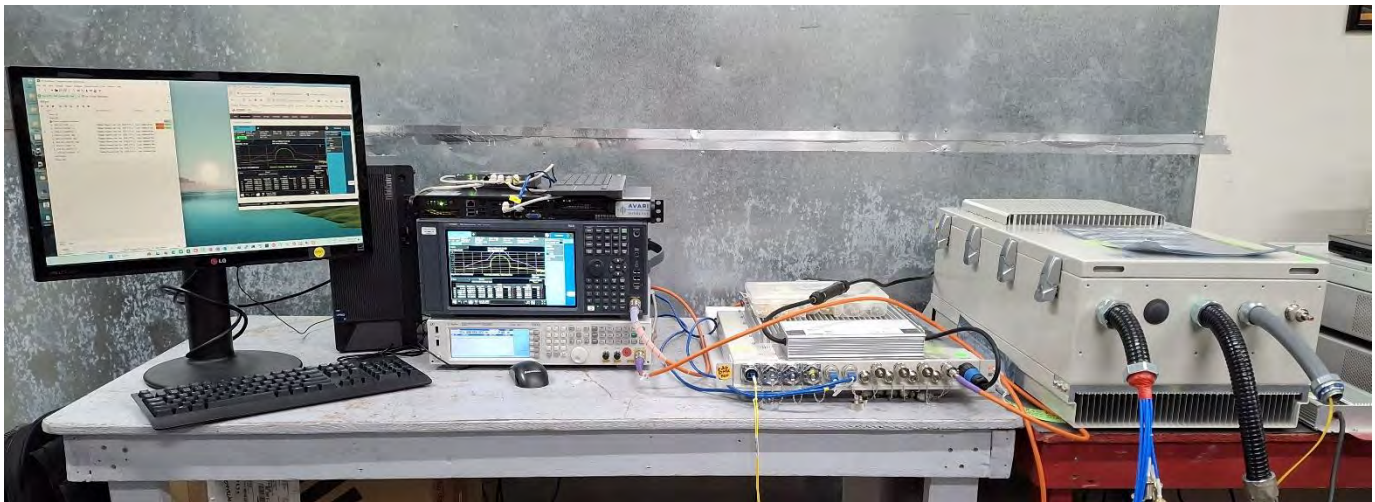
Model #	Description	Checked Function	Results
KT-N9038A	Spectrum Analyzer	Frequency and Amplitude	Connected 50MHz and -20 dBm Ref_signal and checked OK
JB1	Antenna, 30 to 2000MHz	Checked structure	Normal – no damage
SAS-571	Antenna, 1 to 18GHz	Checked structure	Normal – no damage
KT-N5172B	Signal Generator	Frequency, Amplitude and Modulation	Within MFR Specs
KT-N9020B-526	MXA Signal Analyzer	Frquency and Amplitude	Within MFR Specs

Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests:

Parameter	Uncertainty
Radio Frequency	±1 ppm
Total RF Power: Conducted	±1 dB
RF Power Density: Conducted	±2.75 dB
Spurious Emissions: Conducted	±3 dB
Temperature	±1 °C
Humidity	±5 %
DC and Low Frequency Voltages	±3 %
Radiated Emission, 30 to 18,000MHz	± 4.95 dB

Test Station Photo



Test Station Cables and Loads

Model #	Manufacture	Description
3 x TM8-N1S1-60	MegaPhase	N male to SMA male coaxial cable in 60 inches
1 x 49-30-34	Aeroflex	30dB 25W attenuator

Test Station Insertion Loss

	Band 800
DL Transmitter	31.7
UL Receiver	0.7

	Band 700
DL Transmitter	31.7
UL Receiver	0.7

	Band 465
DL Transmitter	31.3
UL Receiver	0.5

	Band 415
DL Transmitter	31.3
UL Receiver	0.5

3. Test Result

3.1 AGC Threshold

Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018		Room Temperature (°C)	21	
Test Procedure	ANSI C63.26-2015, Section 7.2.3.1 KDB 935210 D05, v01r04, Clause 3.2, 4.2		Relative Humidity (%)	45	
Test Location	Bench top, Richmond Lab		Barometric Pressure (hPa)	1012	
Test Engineer	Zara Vali		Date	August 20, 2024	
EUT Voltage	<input checked="" type="checkbox"/> +48VDC <input type="checkbox"/> 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B-506	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B-526	MY62153079	Aug 1, 2023	Aug 1, 2025
Frequency Range:	<input checked="" type="checkbox"/> 405 MHz – 425 MHz <input checked="" type="checkbox"/> 450 MHz – 512 MHz <input checked="" type="checkbox"/> 851 MHz – 869 MHz <input checked="" type="checkbox"/> 758 MHz – 775 MHz				
Detector:	<input checked="" type="checkbox"/> Peak				
Type of Facility:	<input checked="" type="checkbox"/> Test bench				
Distance:	<input checked="" type="checkbox"/> Direct				
Arrangement of EUT:	<input checked="" type="checkbox"/> Table-top only <input type="checkbox"/> Floor-standing only <input type="checkbox"/> Rack Mounted				
Output power is: less than or equal 36.99 dBm in 800 band less than or equal 37.09 dBm in 700 band less than or equal 36.98 dBm in 450 band less than or equal 37.05 dBm in 415 band					
Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/>					

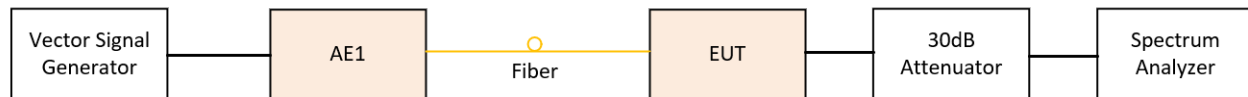
Test setup

Description of test set-up:

Output power is measured by connecting a spectrum analyzer to RF output connector of EUT via 30dB Attenuator. With a nominal input power and the amplifier properly adjusted the RF output is measured.

The EUT was set to **Operation Mode #1 with configuration Mode #1**.

The maximum output power is measured when the Automatic Level Control (ALC) starting to compress the power and hold to a constant level.



Results – Output Power ISED Requirement

Frequency Range (MHz)	Frequency (MHz)	Input Power Trip ALC (dBm)	Output Power (dBm)	Output Power (Watt)
415 PS 405 - 425	406.1	-11.0	37.00	5.01
	415.55	-11.0	36.99	5.00
	425	-10.6	37.05	5.07

Frequency Range (MHz)	Frequency (MHz)	Input Power Trip ALC (dBm)	Output Power (dBm)	Output Power (Watt)
450 PS 450 - 512	450	-12.0	36.95	4.95
	465	-12.6	36.97	4.98
	480	-13.2	36.98	4.99

Frequency Range (MHz)	Frequency (MHz)	Input Power Trip ALC (dBm)	Output Power (dBm)	Output Power (Watt)
700PS 758 - 775	758	-11.8	37.00	5.01
	766.5	-12.2	37.06	5.08
	775	-12.0	37.09	5.12

Frequency Range (MHz)	Frequency (MHz)	Input Power Trip ALC (dBm)	Output Power (dBm)	Output Power (Watt)
800PS 851 - 869	851	-9.4	36.95	4.95
	860	-10.8	36.99	5.00
	869	-9.4	36.93	4.93

3.2 Occupied Bandwidth

Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018	Room Temperature (°C)	21		
Test Procedure	ANSI C63.26: 2015	Relative Humidity (%)	45		
Test Location	Bench top, Richmond Lab	Barometric Pressure (hPa)	1012		
Test Engineer	Zara Vali	Date	August 20, 2024		
EUT Voltage	<input checked="" type="checkbox"/> +48VDC <input type="checkbox"/> 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B-506	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B-526	MY62153079	Aug 1, 2023	Aug 1, 2025
Frequency Range:	<input checked="" type="checkbox"/> 405 MHz – 425 MHz <input checked="" type="checkbox"/> 450 MHz – 512 MHz <input checked="" type="checkbox"/> 851 MHz – 869 MHz <input checked="" type="checkbox"/> 758 MHz – 775 MHz				
Detector:	<input checked="" type="checkbox"/> Peak				
Type of Facility:	<input checked="" type="checkbox"/> Test bench				
Distance:	<input checked="" type="checkbox"/> Direct				
Arrangement of EUT:	<input checked="" type="checkbox"/> Table-top only <input type="checkbox"/> Floor-standing only <input type="checkbox"/> Rack Mounted				
Output signal has an 99% occupied channel bandwidth less than the designated channel bandwidth on any location on the operating band. - C4FM < 7.698 kHz - CQPSK < 4.83 kHz - HDQPSK < 9.685 kHz					
Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/>					

Test setup

Occupied Bandwidth is measured by connecting a Spectrum Analyzer to the RF output connector via 30dB attenuator. The required measurement resolution bandwidth (RBW) is 1% of the emission bandwidth. 99% energy rule was applied to measure the occupied channel bandwidth. The emission bandwidth is measured as the width of the signal between two frequency points on the channel edge, outside of which the transmission power is attenuated at least 26dB below the transmitter output power

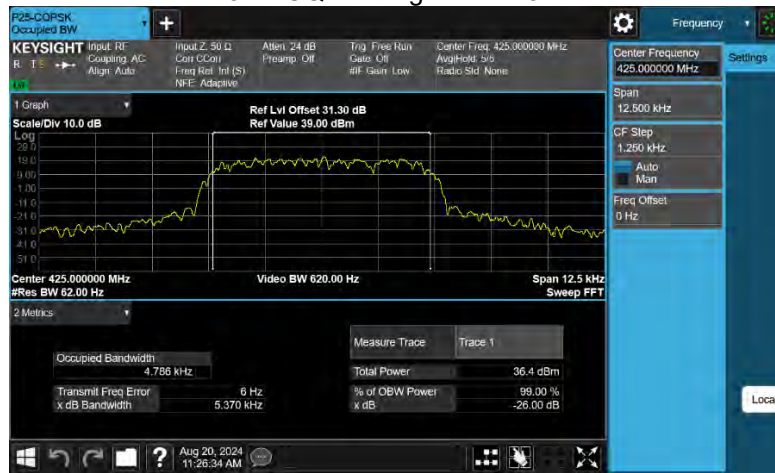
The EUT was set to **Operation Mode #1 with configuration Mode #1**.

The occupied bandwidth of UL output is measured under one input conditions: Nominal: with input 0.5dB below AGC threshold

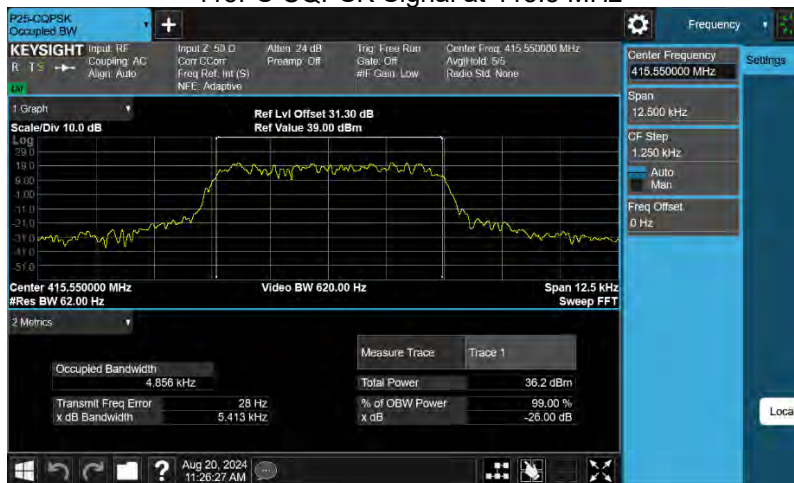


Results – Occupied Bandwidth 415PS

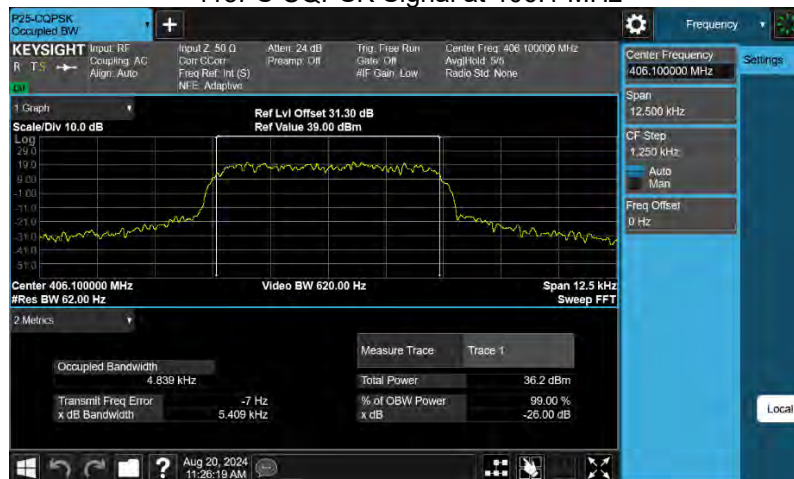
415PS CQPSK Signal at 425 MHz



415PS CQPSK Signal at 415.5 MHz



415PS CQPSK Signal at 406.1 MHz



415PS C4FM Signal at 425 MHz



415PS C4FM Signal at 415.5 MHz



415PS C4FM Signal at 406.1 MHz



415PS HDQPSK Signal at 425 MHz



415PS HDQPSK Signal at 415.5 MHz

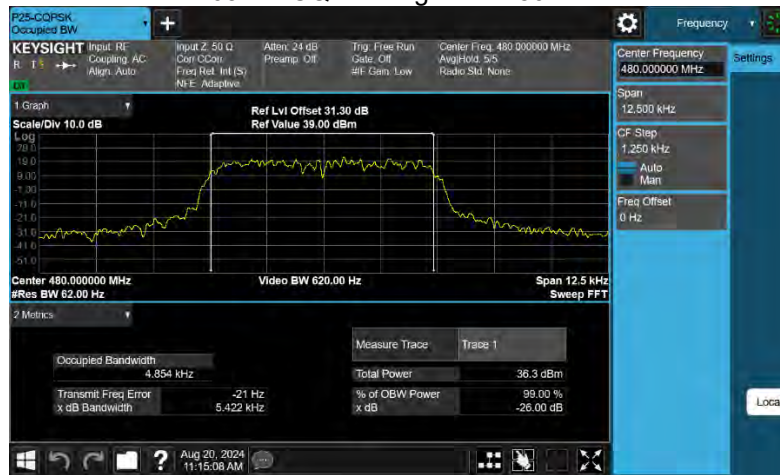


415PS HDQPSK Signal at 406.1 MHz

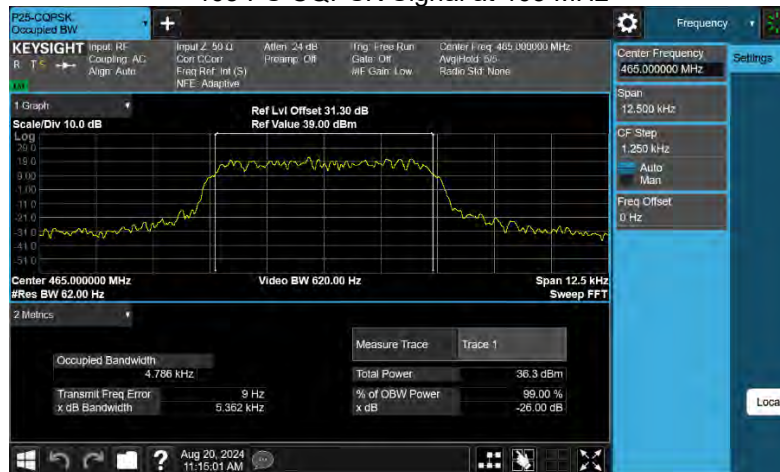


Results – Occupied Bandwidth 465 PS

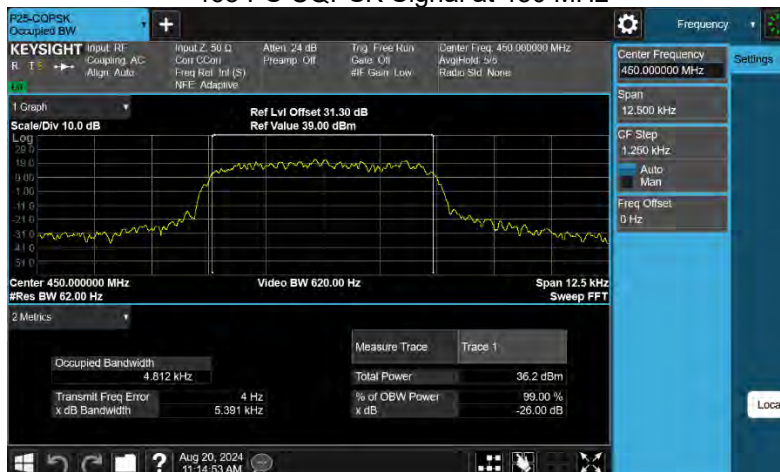
465 PS CQPSK Signal at 480 MHz



465 PS CQPSK Signal at 465 MHz



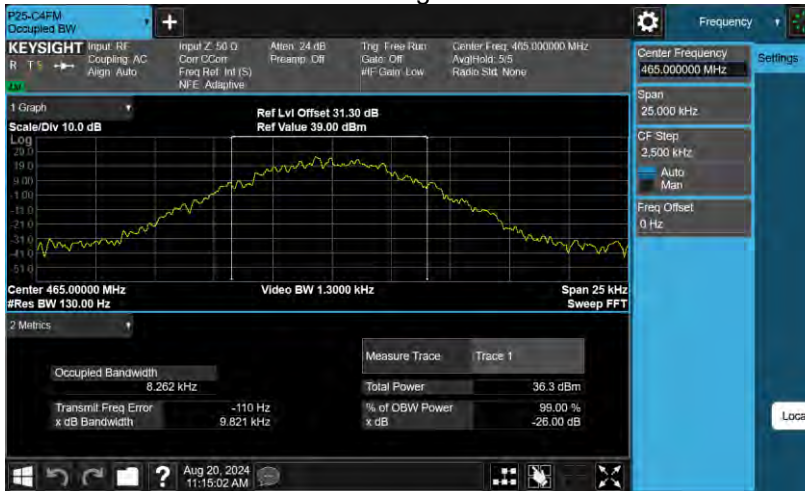
465 PS CQPSK Signal at 450 MHz



465 PS C4FM Signal at 480 MHz



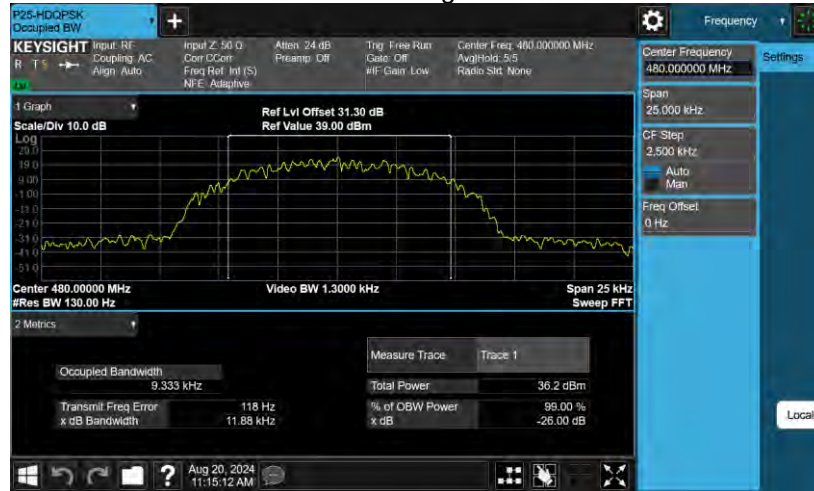
465 PS C4FM Signal at 465 MHz



465 PS C4FM Signal at 450 MHz



465 PS HDQPSK Signal at 480 MHz



465 PS HDQPSK Signal at 465 MHz



465 PS HDQPSK Signal at 450 MHz

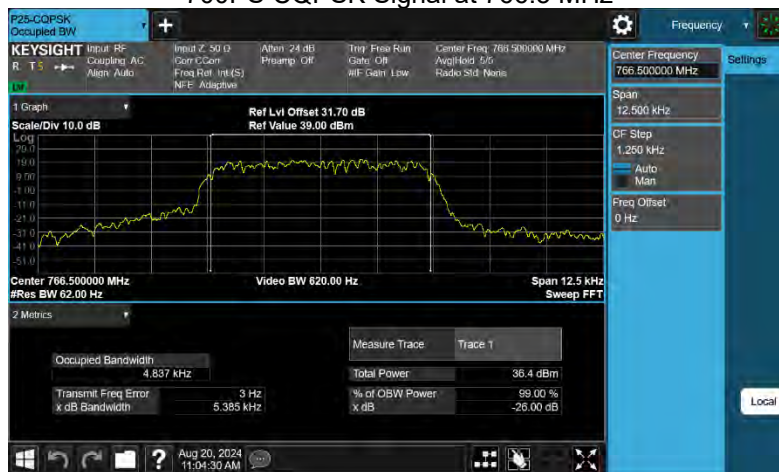


Results – Occupied Bandwidth 700PS

700PS CQPSK Signal at 775 MHz



700PS CQPSK Signal at 766.5 MHz



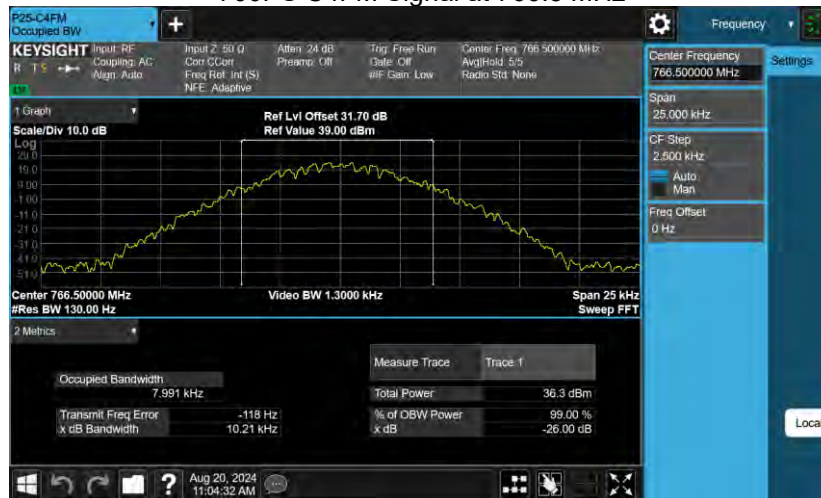
700PS CQPSK Signal at 758 MHz



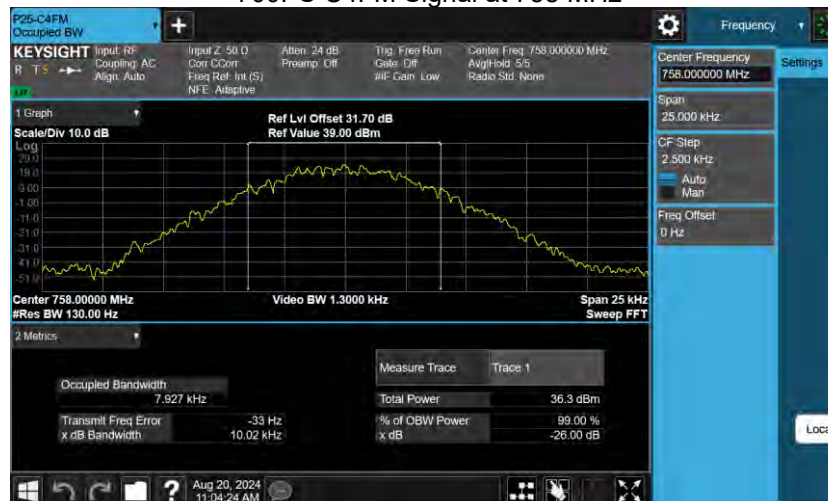
700PS C4FM Signal at 775 MHz



700PS C4FM Signal at 766.5 MHz



700PS C4FM Signal at 758 MHz



700PS HDQPSK Signal at 775 MHz



700PS HDQPSK Signal at 766.5 MHz

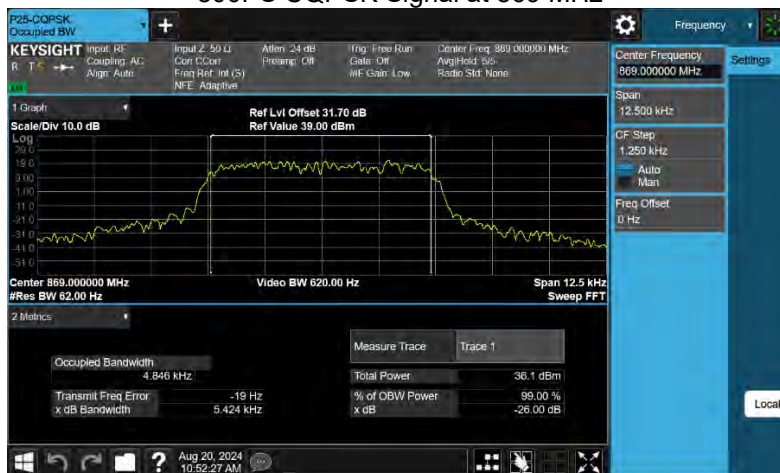


700PS HDQPSK Signal at 758 MHz



Results – Occupied Bandwidth 800PS

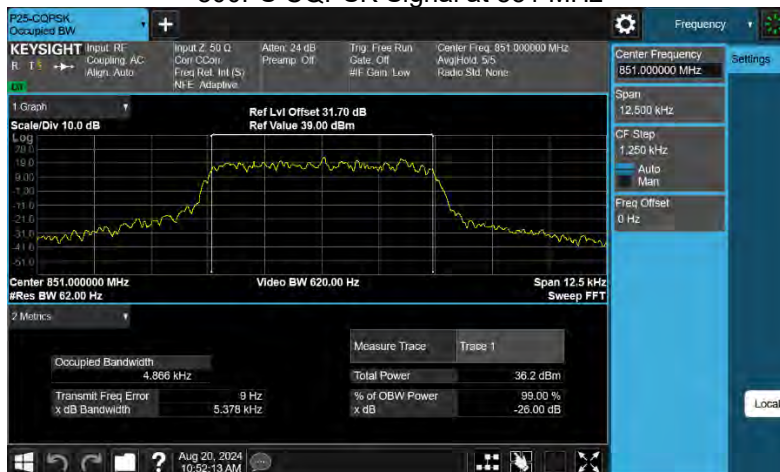
800PS CQPSK Signal at 869 MHz



800PS CQPSK Signal at 860 MHz



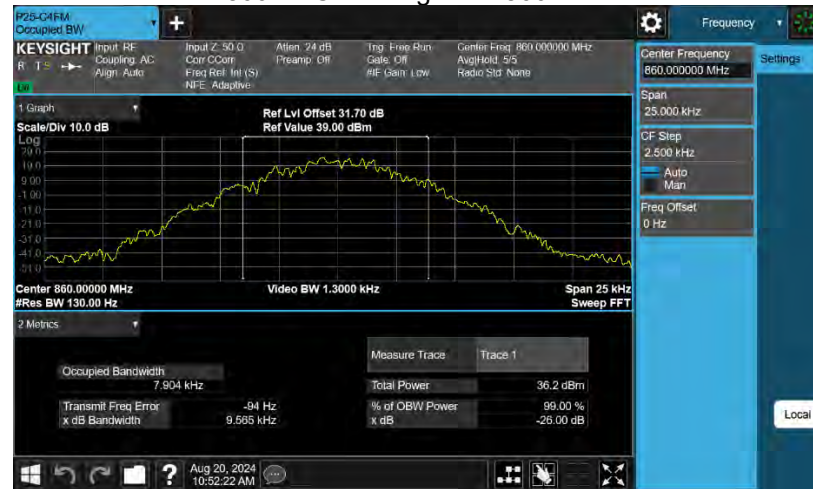
800PS CQPSK Signal at 851 MHz



800PS C4FM Signal at 869 MHz



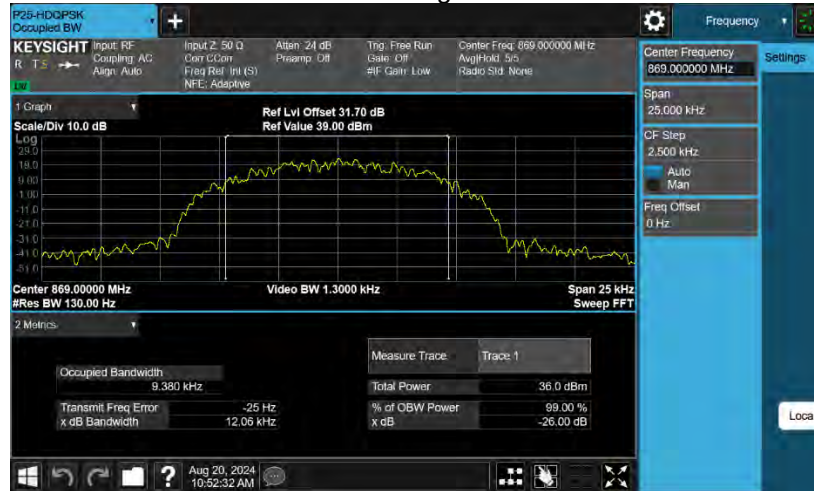
800PS C4FM Signal at 860 MHz



800PS C4FM Signal at 851 MHz



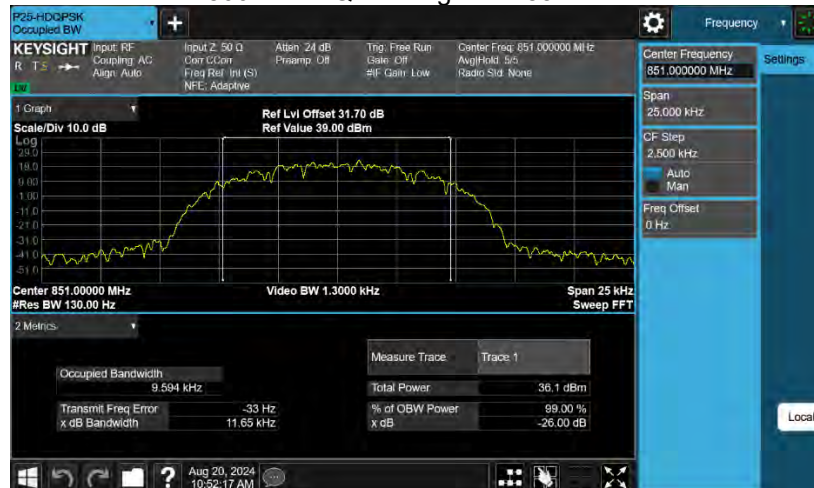
800PS HDQPSK Signal at 869 MHz



800PS HDQPSK Signal at 860 MHz



800PS HDQPSK Signal at 851 MHz



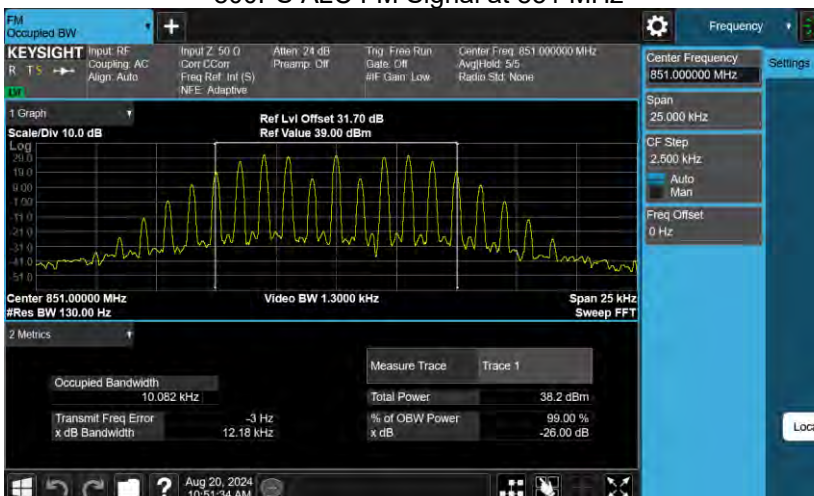
800PS ALC FM Signal at 869 MHz



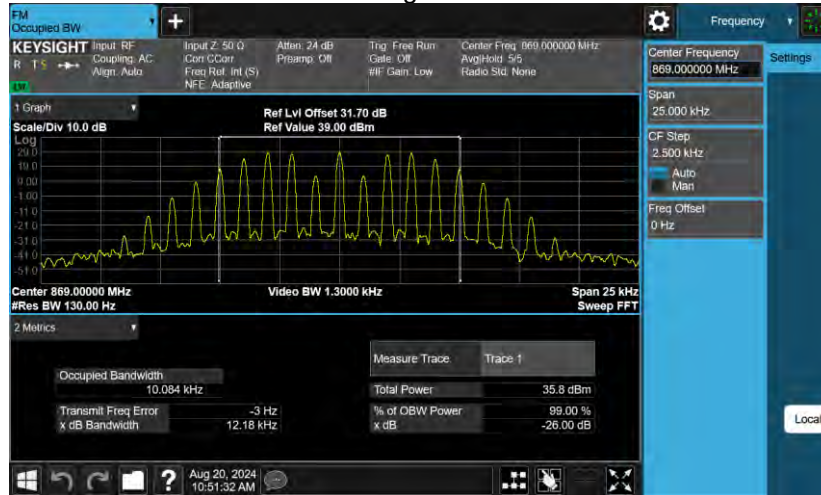
800PS ALC FM Signal at 860 MHz



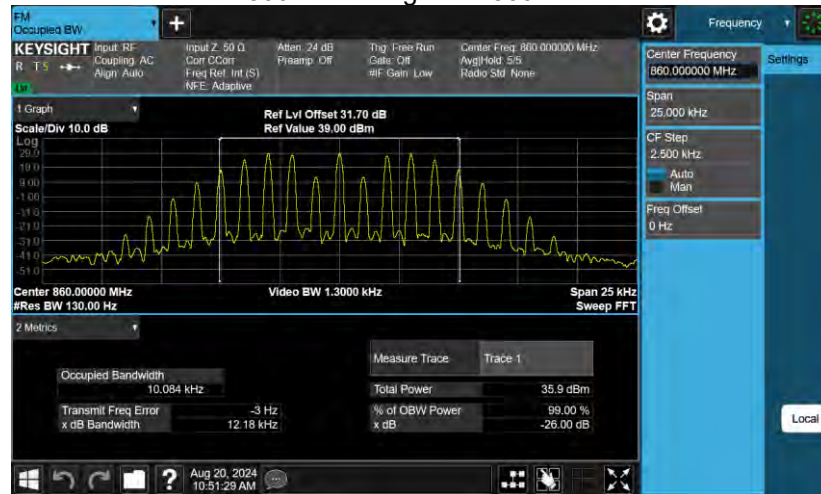
800PS ALC FM Signal at 851 MHz



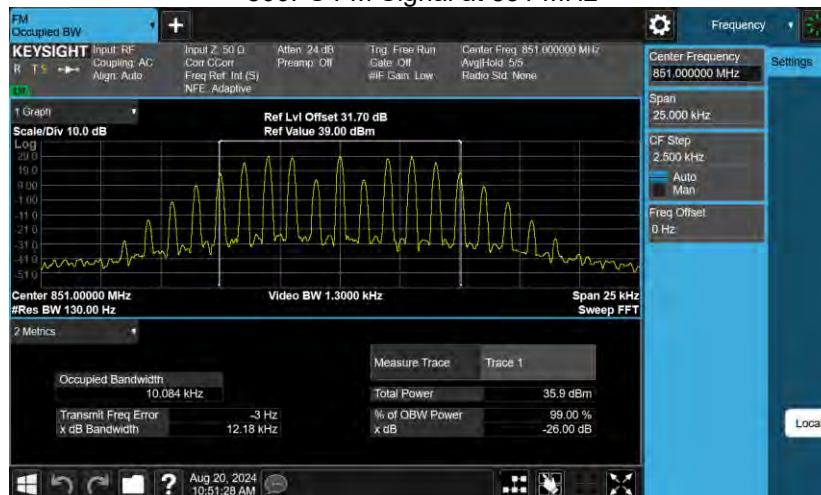
800PS FM Signal at 869 MHz



800PS FM Signal at 860 MHz



800PS FM Signal at 851 MHz



3.3 Out of Band Rejection

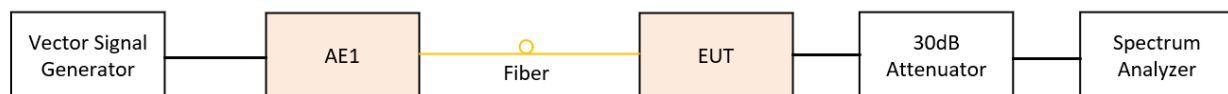
Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	Room Temperature (°C)	20.5		
Test Procedure	ANSI C63.26-2015, Section 7.2.3.2 KDB 935210 D05, v01r04, Clause 3.3, 4.3	Relative Humidity (%)	38.6		
Test Location	Bench top, Richmond Lab	Barometric Pressure	101.8		
Test Engineer	Zara Vali	Date	August 20, 2024		
EUT Voltage	<input checked="" type="checkbox"/> +48VDC <input type="checkbox"/> 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B-506	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B-526	MY62153079	Aug 1, 2023	Aug 1, 2025
Frequency Range:	<input checked="" type="checkbox"/> Product Passband \pm 250%				
Detector:	<input checked="" type="checkbox"/> Peak				
RBW/VBW:	<input checked="" type="checkbox"/> 1 to 5% of the EUT passband / \geq 3 X RBW				
Type of Facility:	<input checked="" type="checkbox"/> Tabletop				
Distance:	<input checked="" type="checkbox"/> Direct				
Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/>					

Test setup

The procedure used was ANSI C63.26-2015. The signal booster was set to maximum gain. A swept CW signal was set to the range of $\pm 250\%$ of the product pass band. The CW amplitude was set to 3 dB below the AGC threshold so that the ALC should not activate throughout the test.

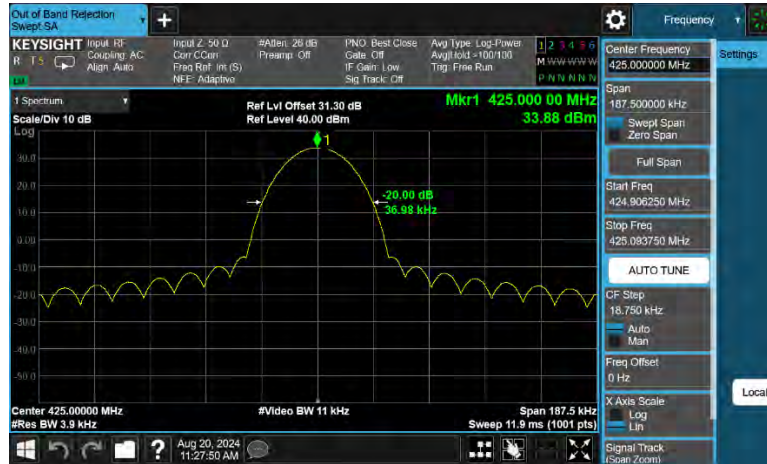
After the max-hold sweep trace was completed, a marker was set to the peak amplitude, and a 20dB bandwidth was measured between two additional markers fall 20 dB from the peak.

The EUT was set to Operation Mode #1 with configuration Mode #1.

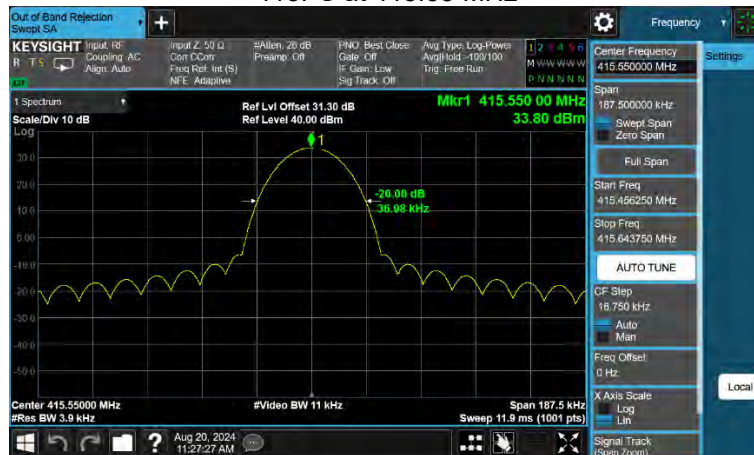


Results - Out of Band Rejection (415PS)

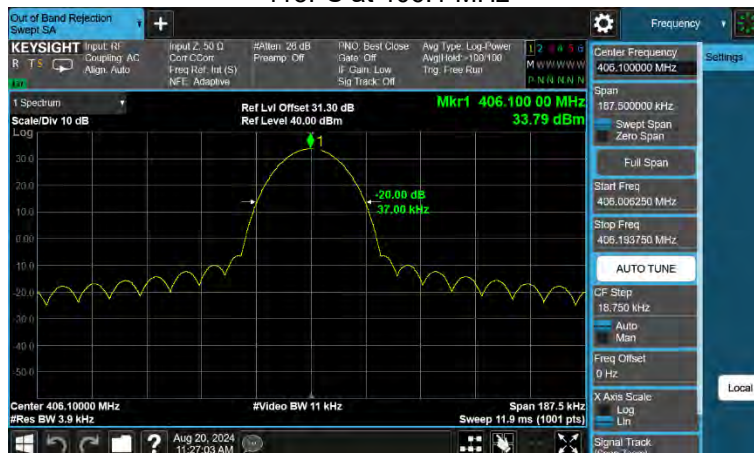
415PS at 425 MHz



415PS at 415.55 MHz

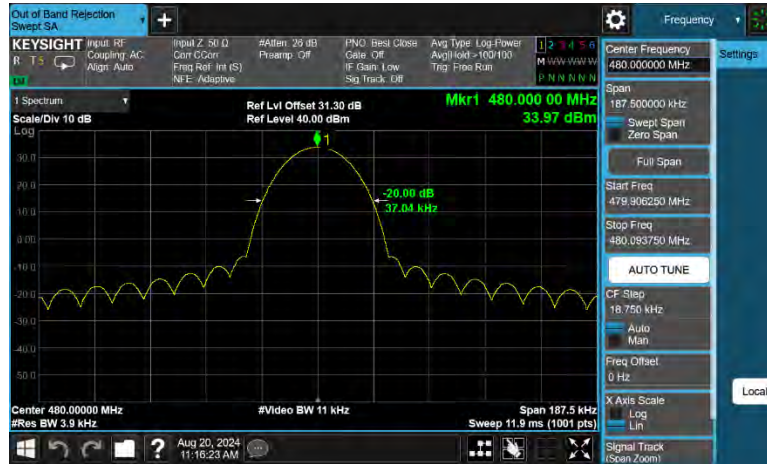


415PS at 406.1 MHz

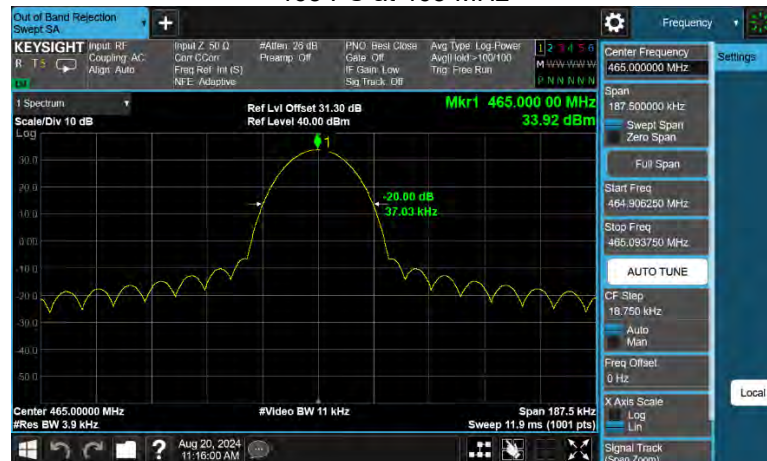


Results - Out of Band Rejection (465 PS)

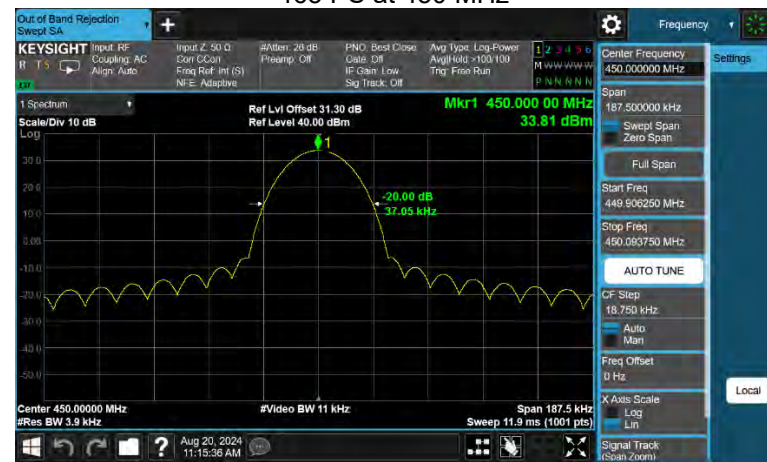
465 PS at 480 MHz



465 PS at 465 MHz

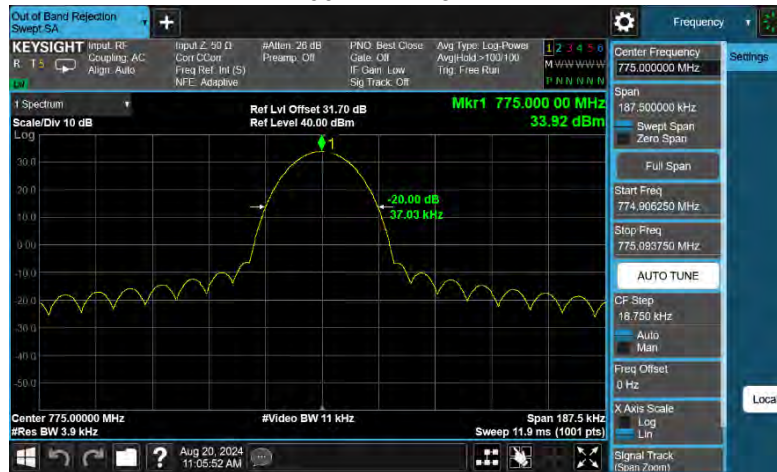


465 PS at 450 MHz

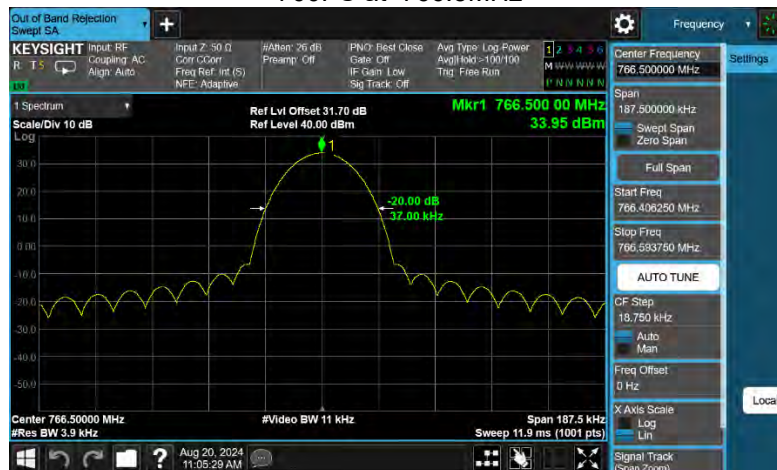


Results - Out of Band Rejection (700PS)

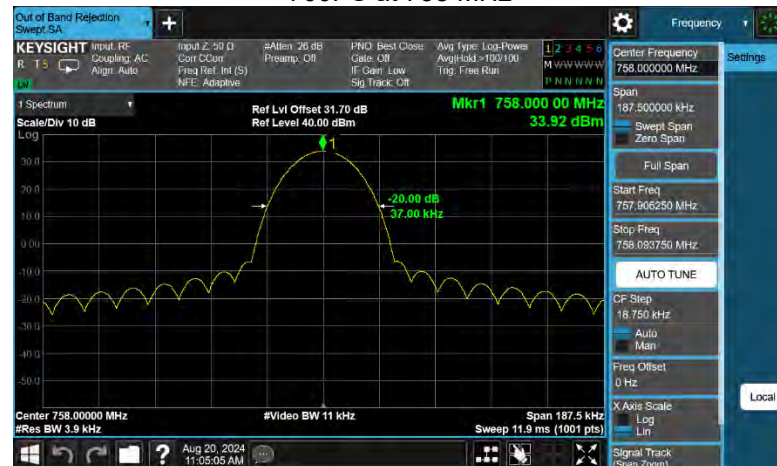
700PS at 775MHz



700PS at 766.5MHz

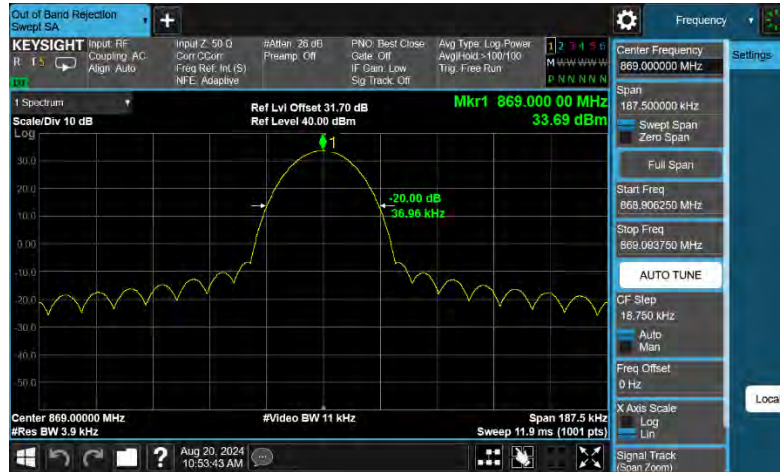


700PS at 758 MHz

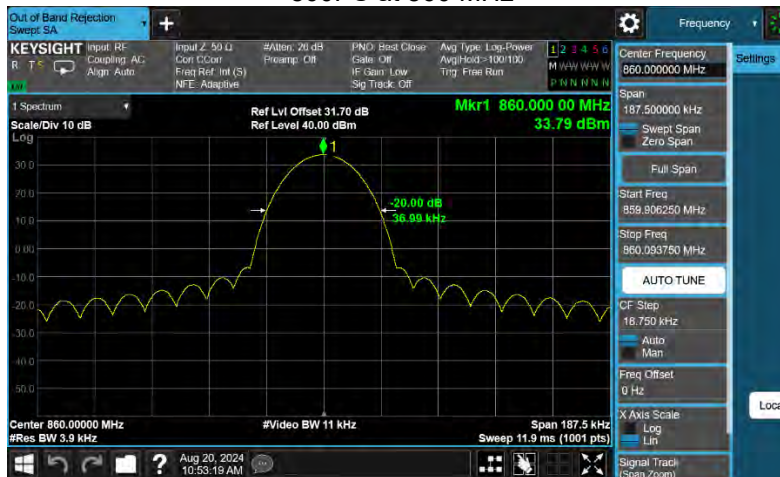


Results - Out of Band Rejection (800PS)

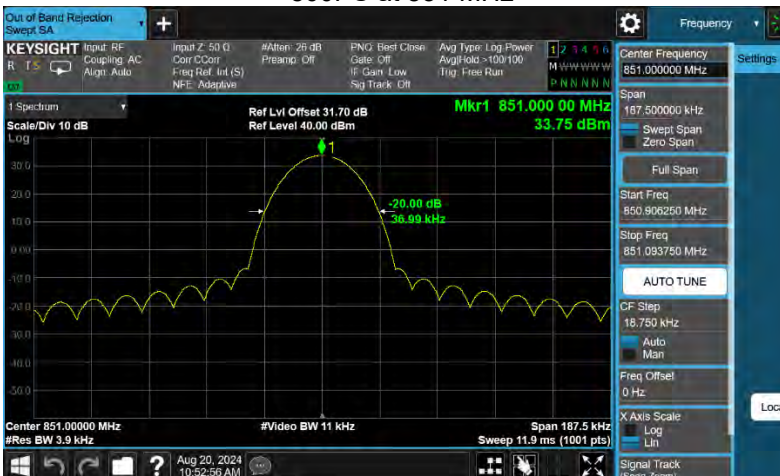
800PS at 869 MHz



800PS at 860 MHz



800PS at 851 MHz



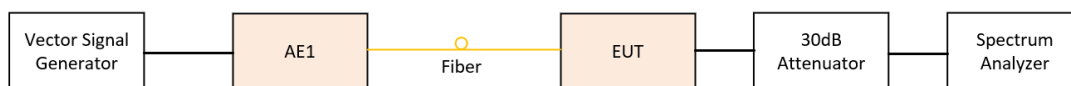
3.4 Input-Versus-Output Signal Comparison

Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	Room Temperature (°C)	20.5		
Test Procedure	ANSI C63.26-2015, Section 7.2.3.3 KDB 935210 D05, v01r04, Clause 3.4, 4.4	Relative Humidity (%)	38.6		
Test Location	Bench top, Richmond Lab	Barometric Pressure (kPa)	101.8		
Test Engineer	Zara Vali	Date	August 20, 2024		
EUT Voltage	<input checked="" type="checkbox"/> +48VDC <input type="checkbox"/> 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B-506	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B-526	MY62153079	Aug 1, 2023	Aug 1, 2025
Frequency Range:	<input checked="" type="checkbox"/> 405 MHz – 425 MHz <input checked="" type="checkbox"/> 450 MHz – 512 MHz <input checked="" type="checkbox"/> 851 MHz – 869 MHz <input checked="" type="checkbox"/> 758 MHz – 775 MHz				
Detector:	<input checked="" type="checkbox"/> Peak				
RBW/VBW:	<input checked="" type="checkbox"/> 100 Hz				
Type of Facility:	<input checked="" type="checkbox"/> Testbench				
Distance:	<input checked="" type="checkbox"/> direct connect				
Arrangement of EUT:	<input checked="" type="checkbox"/> Table-top only <input type="checkbox"/> Floor-standing only <input type="checkbox"/> Rack Mounted				
Signal of all types of modulation is contained within the emission mask.					
Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/>					

Test setup

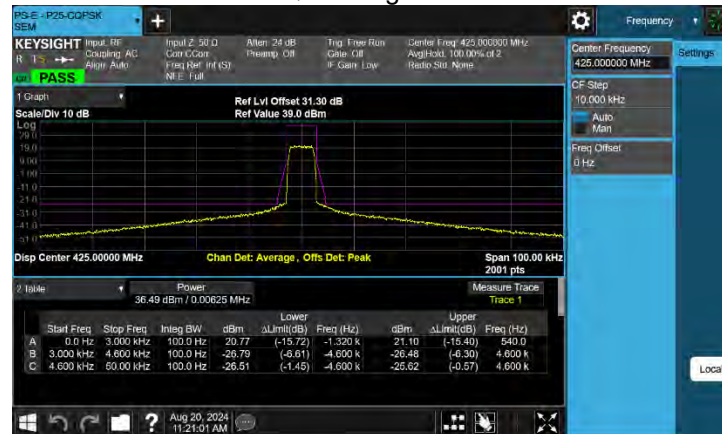
Spectrum Emission Mask is measured by connecting a Spectrum Analyzer to the RF output connector. The input power was adjusted to produce maximum output power on the antenna port. The reference level was measured with integrated BW of the designated channel BW. The emission was measured with RBW 100 Hz.

The EUT was set to **Operation Mode #1 with configuration Mode #1**.

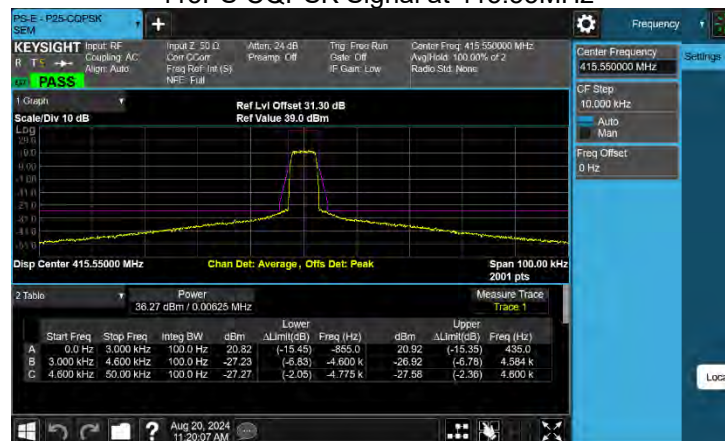


Results - Spectrum Emission Mask (415PS)

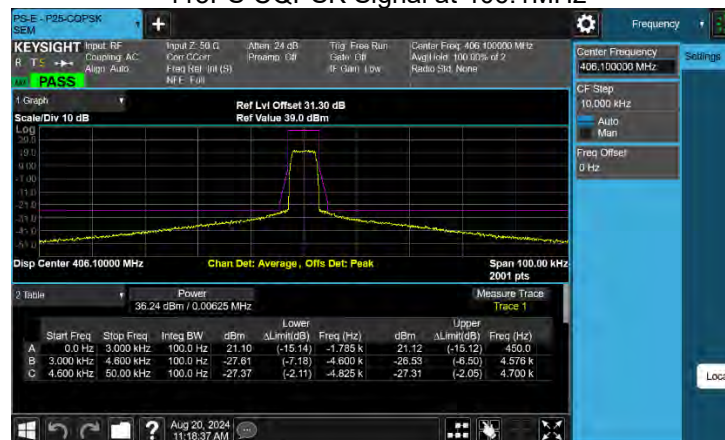
415PS CQPSK Signal at 425MHz



415PS CQPSK Signal at 415.55MHz



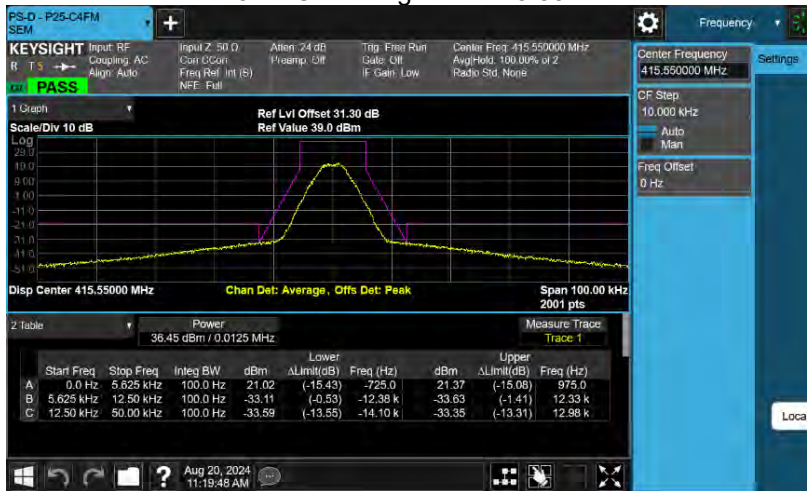
415PS CQPSK Signal at 406.1MHz



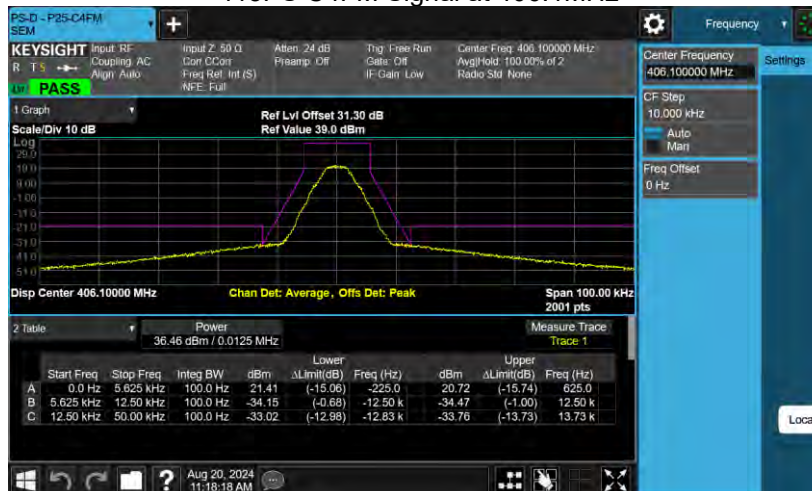
415PS C4FM Signal at 425MHz



415PS C4FM Signal at 415.55MHz



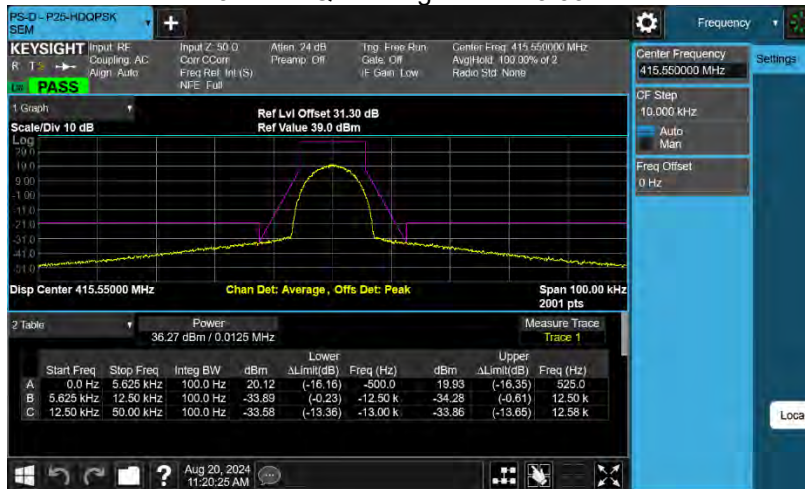
415PS C4FM Signal at 406.1MHz



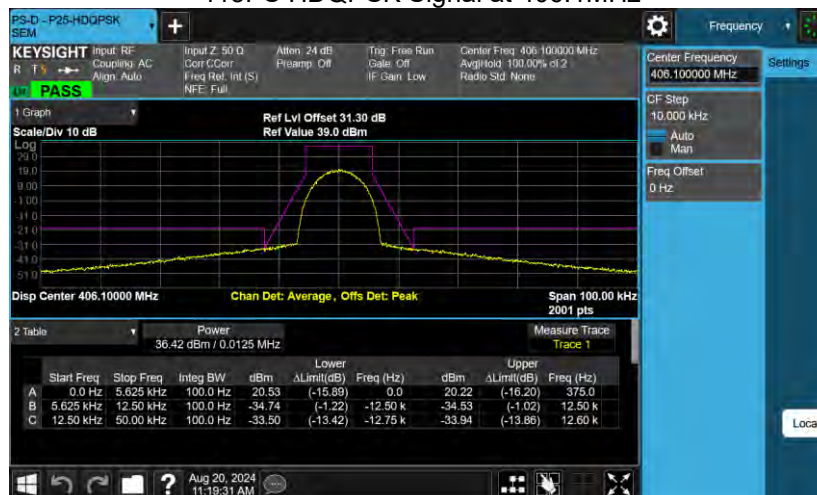
415PS HDQPSK Signal at 425MHz



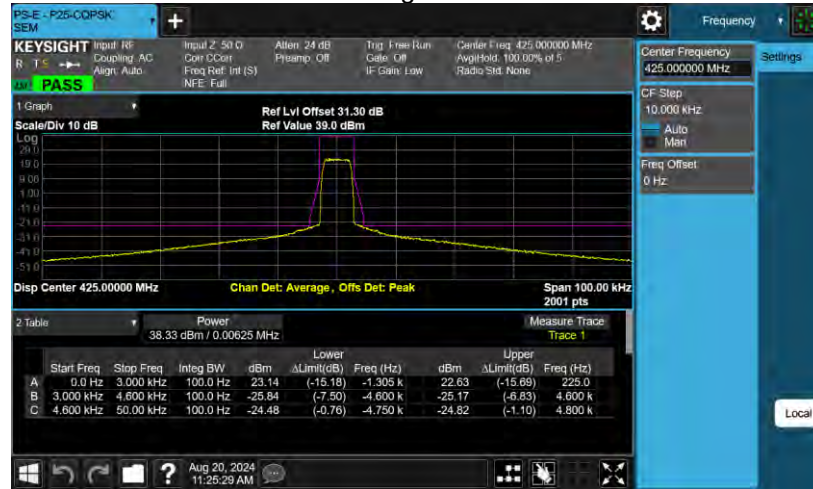
415PS HDQPSK Signal at 415.55MHz



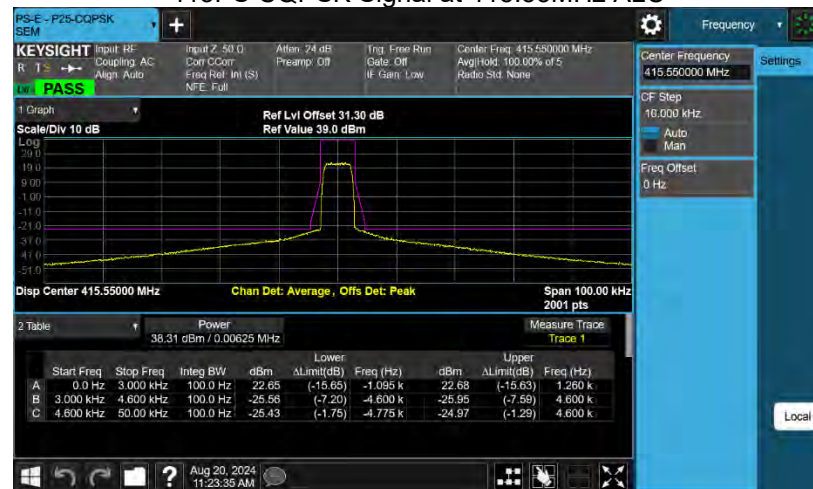
415PS HDQPSK Signal at 406.1MHz



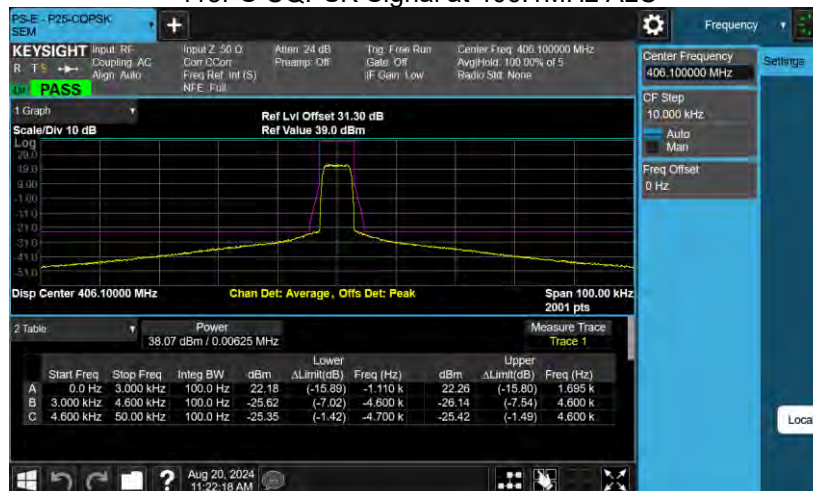
415PS CQPSK Signal at 425MHz ALC



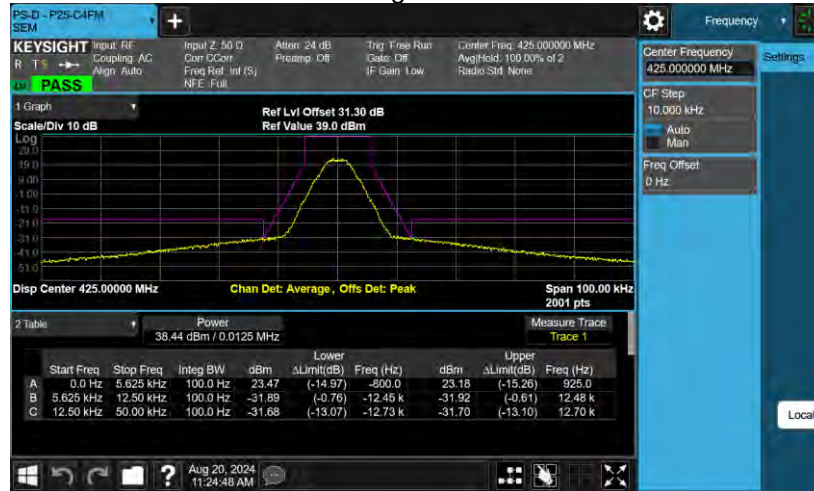
415PS CQPSK Signal at 415.55MHz ALC



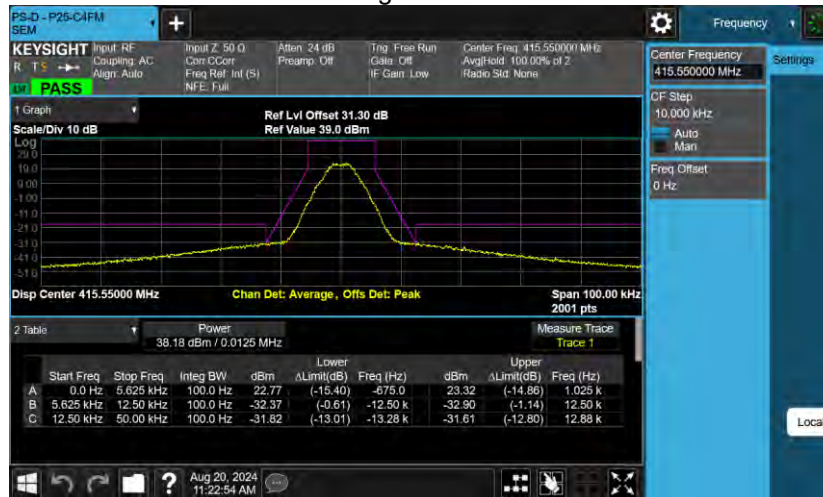
415PS CQPSK Signal at 406.1MHz ALC



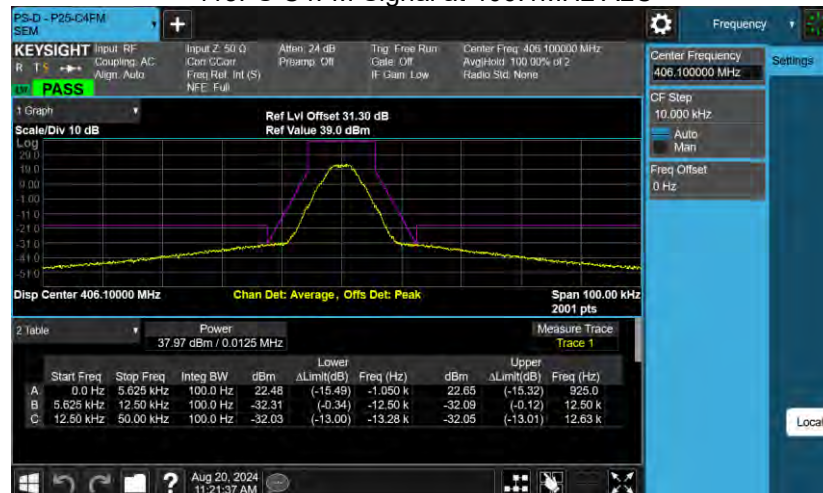
415PS C4FM Signal at 425MHz ALC



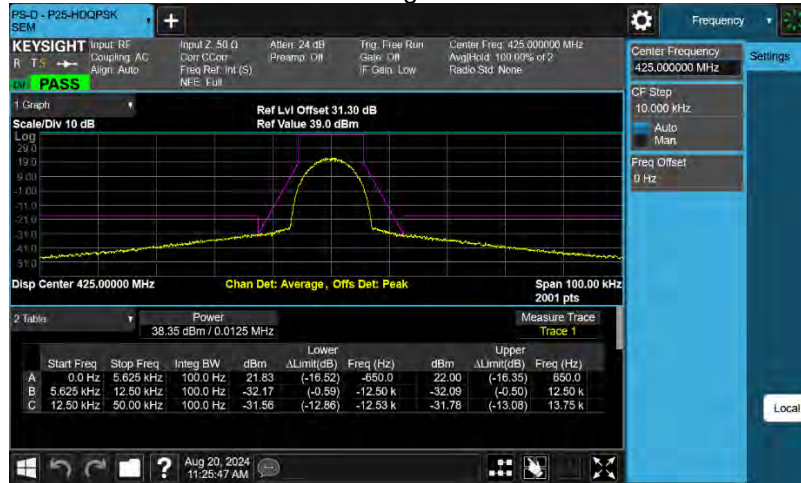
415PS C4FM Signal at 415.55MHz ALC



415PS C4FM Signal at 406.1MHz ALC



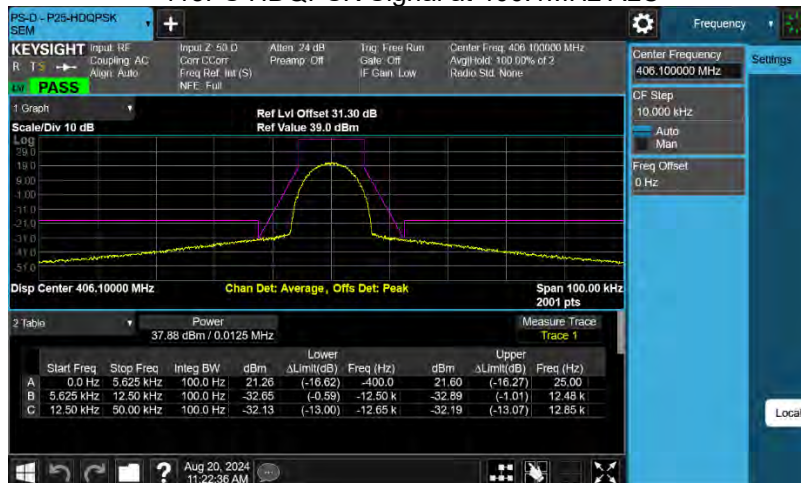
415PS HDQPSK Signal at 425MHz ALC



415PS HDQPSK Signal at 415.55MHz ALC

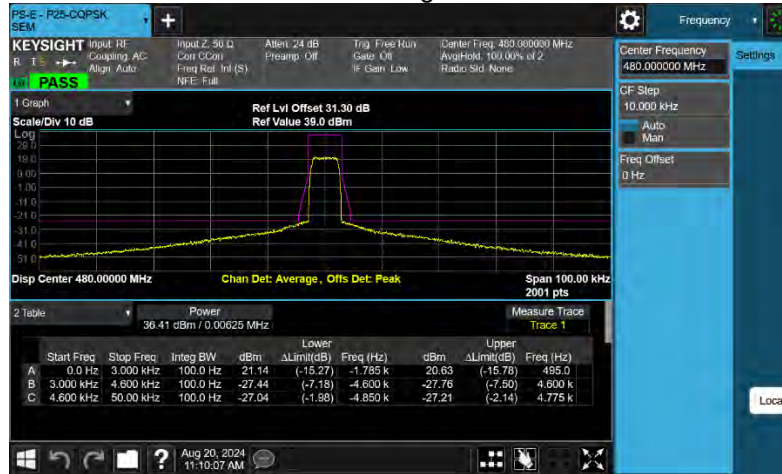


415PS HDQPSK Signal at 406.1MHz ALC

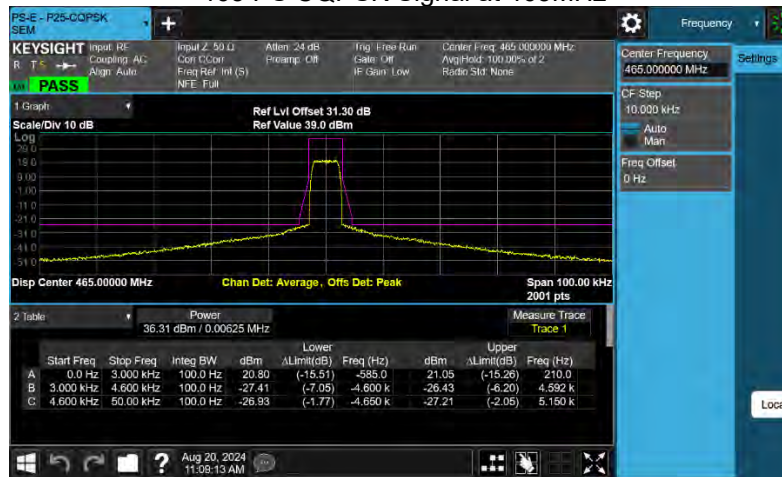


Results - Spectrum Emission Mask (465 PS)

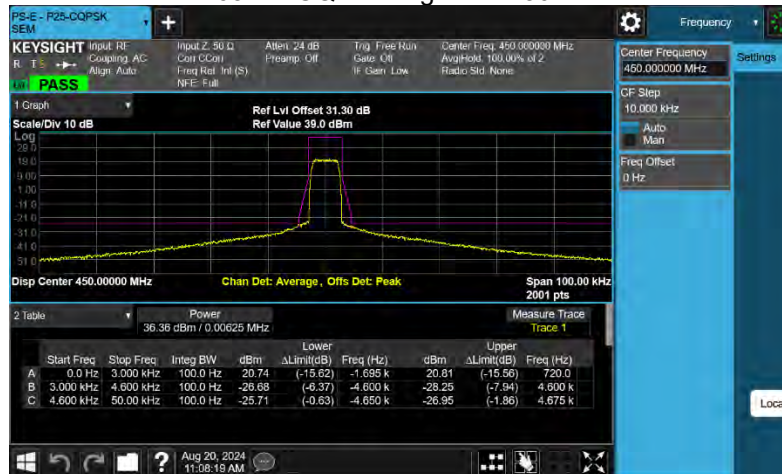
465 PS CQPSK Signal at 480MHz



465 PS CQPSK Signal at 465MHz



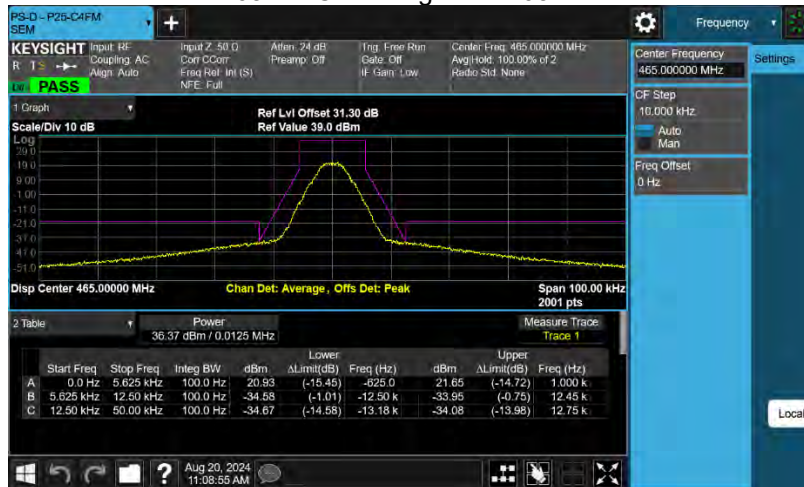
465 PS CQPSK Signal at 450MHz



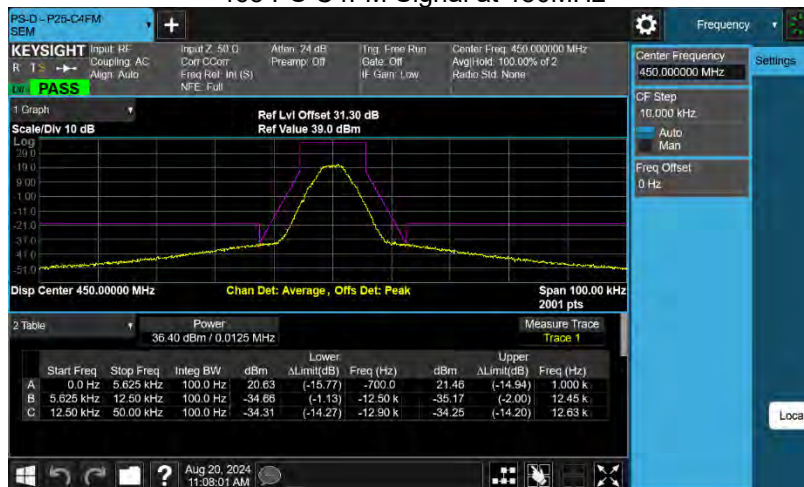
465 PS C4FM Signal at 480MHz



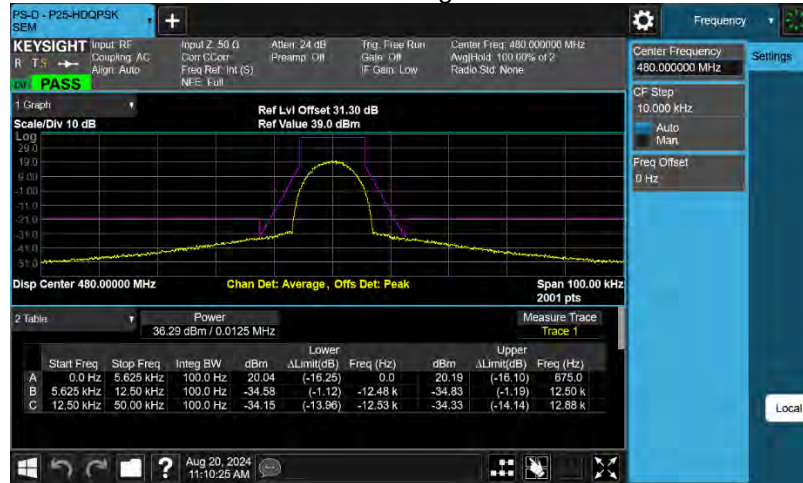
465 PS C4FM Signal at 465MHz



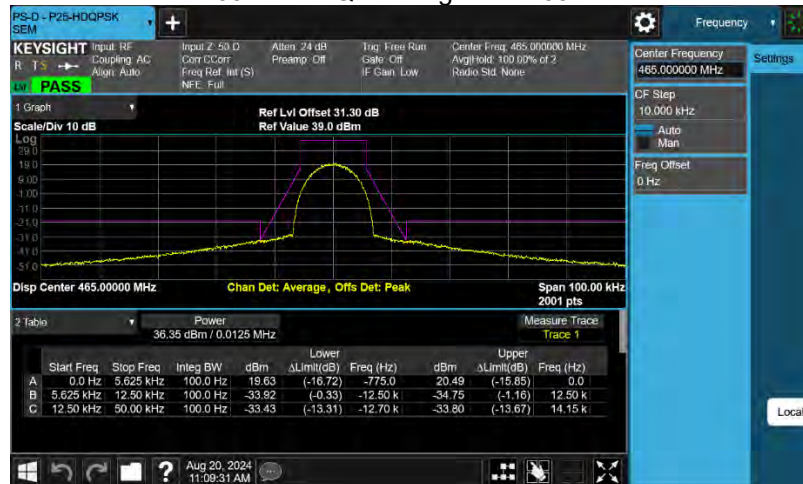
465 PS C4FM Signal at 450MHz



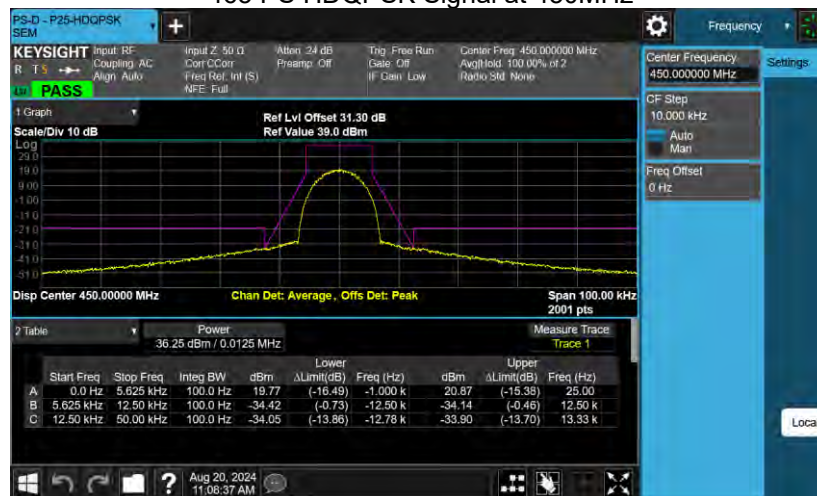
465 PS HDQPSK Signal at 480MHz



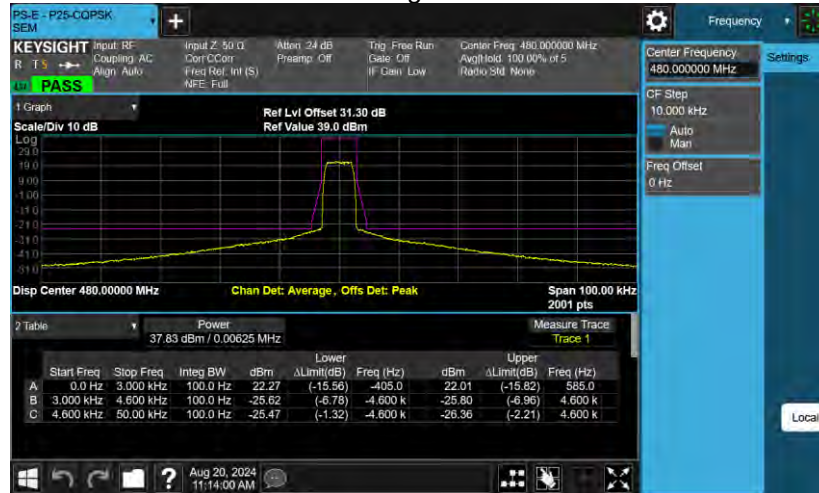
465 PS HDQPSK Signal at 465MHz



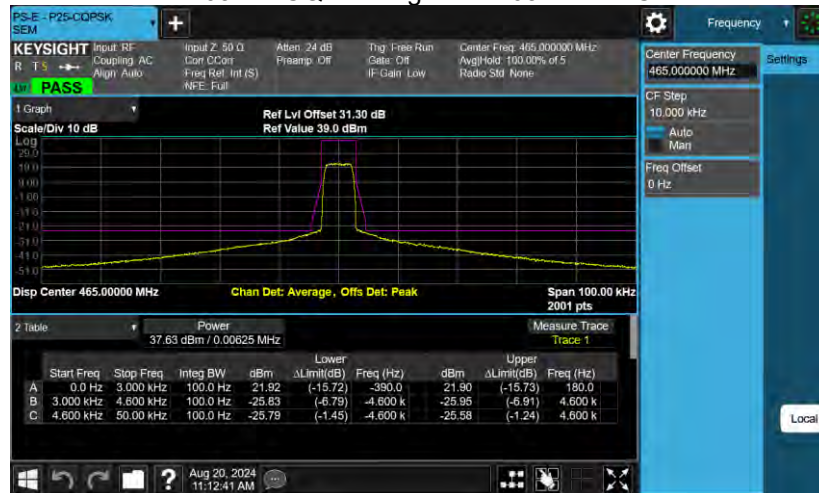
465 PS HDQPSK Signal at 450MHz



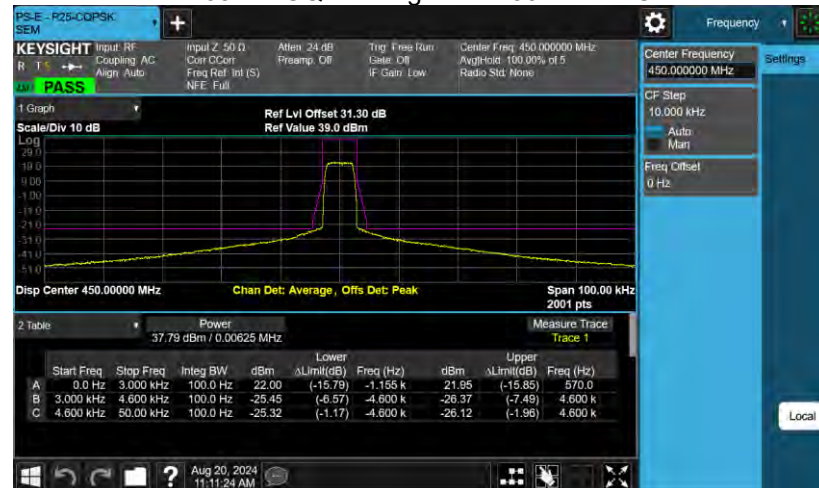
465 PS CQPSK Signal at 480MHz ALC



465 PS CQPSK Signal at 465MHz ALC



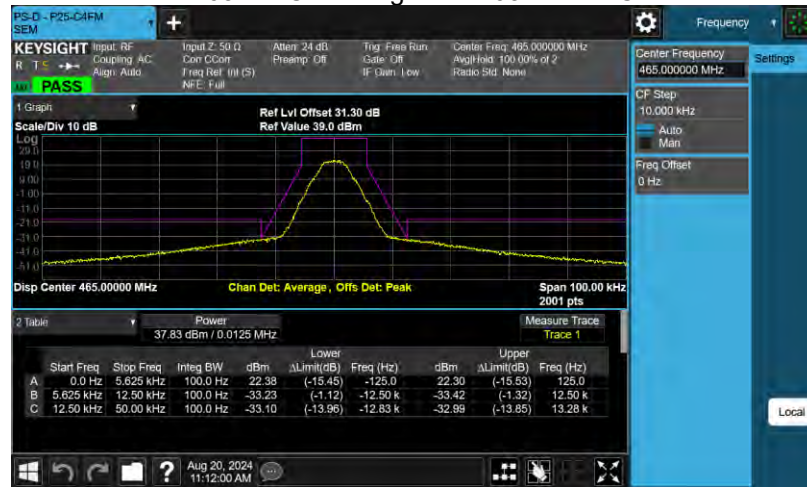
465 PS CQPSK Signal at 450MHz ALC



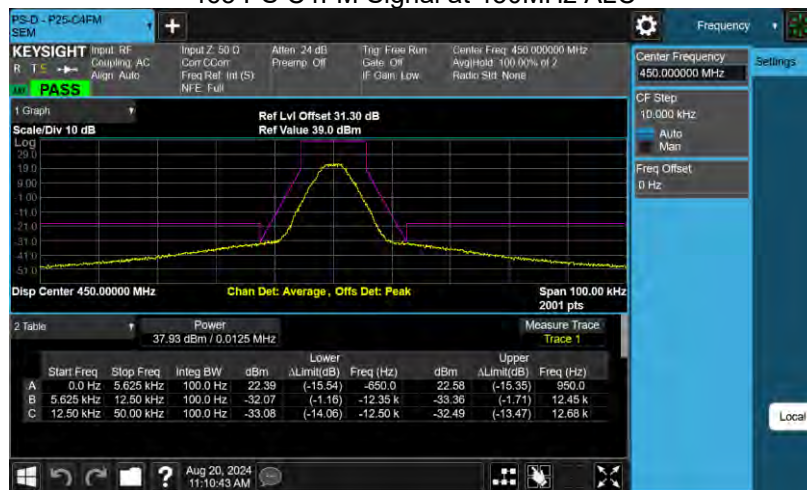
465 PS C4FM Signal at 480MHz ALC



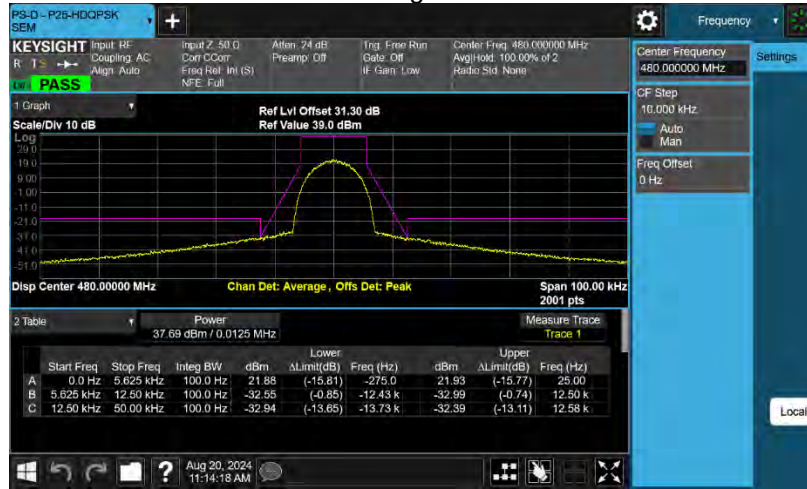
465 PS C4FM Signal at 465MHz ALC



465 PS C4FM Signal at 450MHz ALC

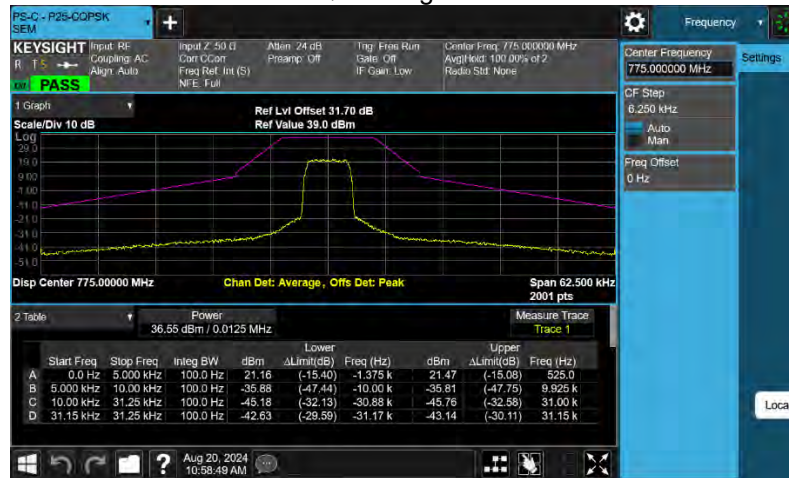


465 PS HDQPSK Signal at 480MHz ALC

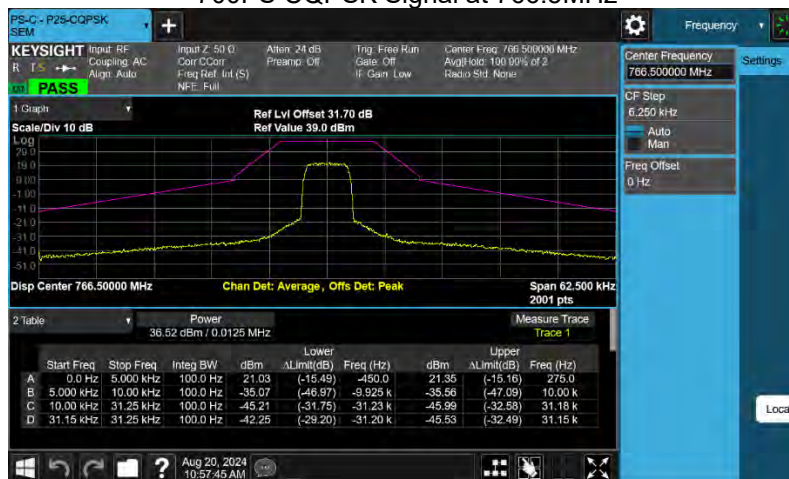


Results - Spectrum Emission Mask (700PS)

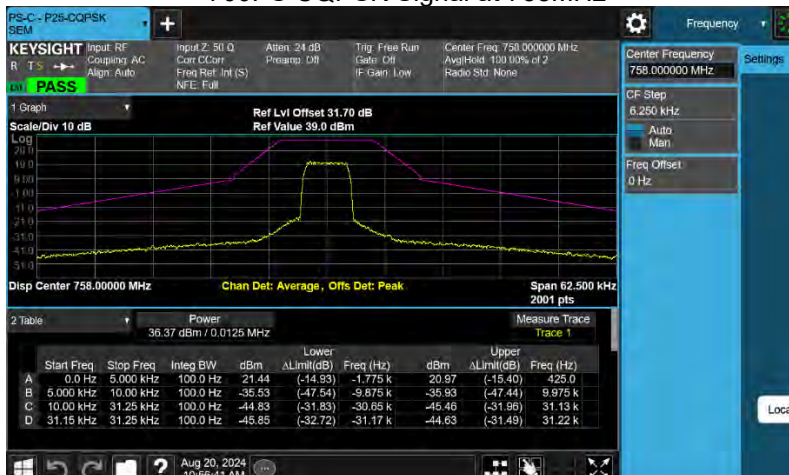
700PS CQPSK Signal at 775MHz



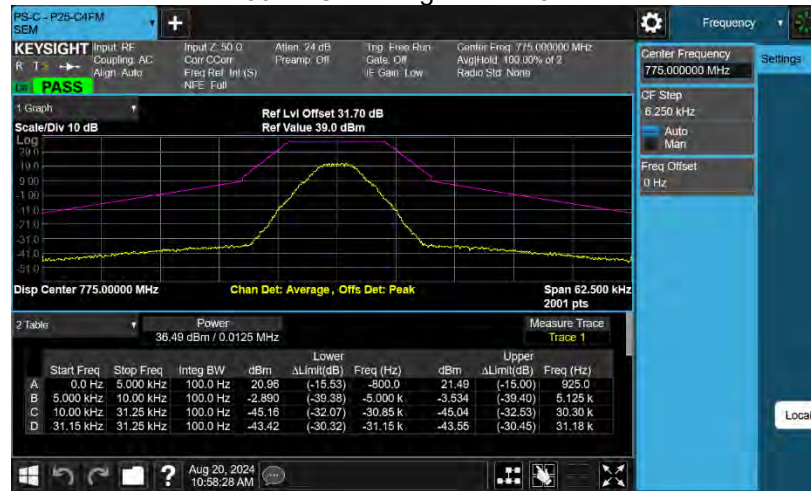
700PS CQPSK Signal at 766.5MHz



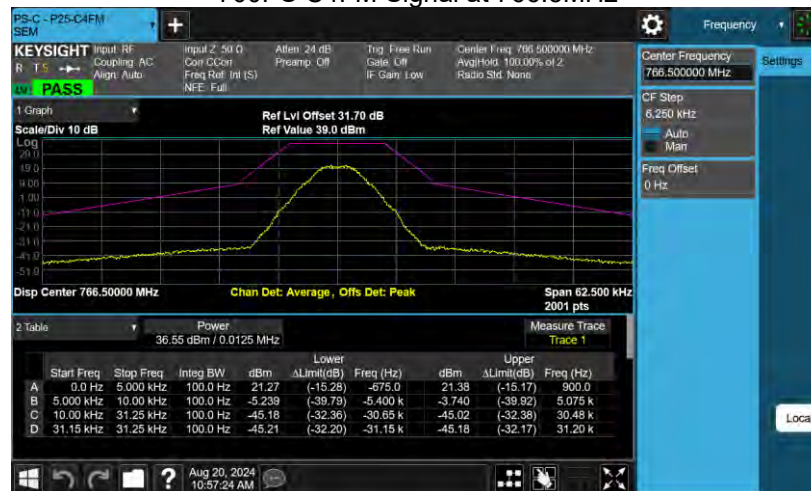
700PS CQPSK Signal at 758MHz



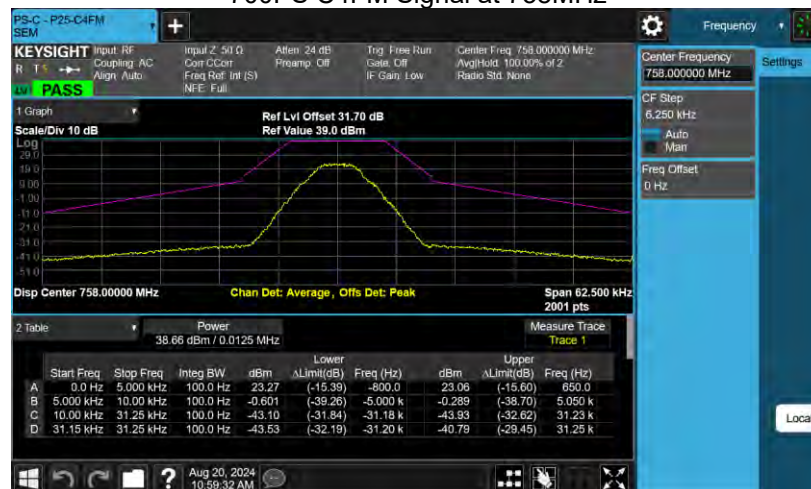
700PS C4FM Signal at 775MHz



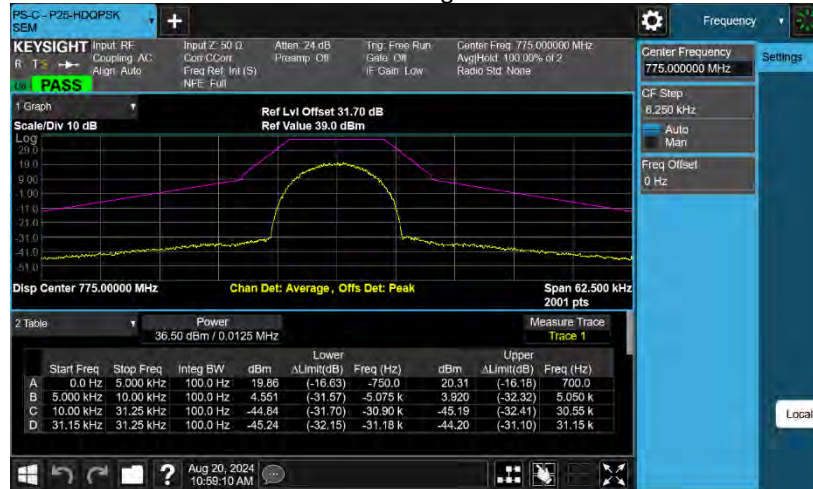
700PS C4FM Signal at 766.5MHz



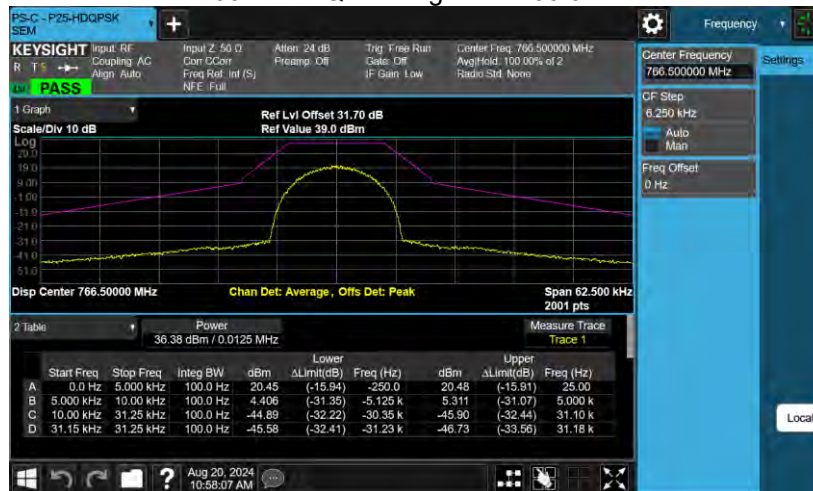
700PS C4FM Signal at 758MHz



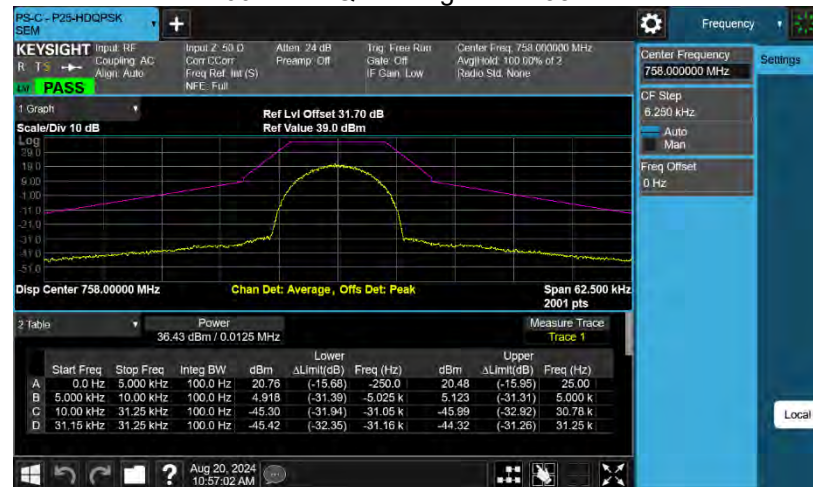
700PS HDQPSK Signal at 775MHz



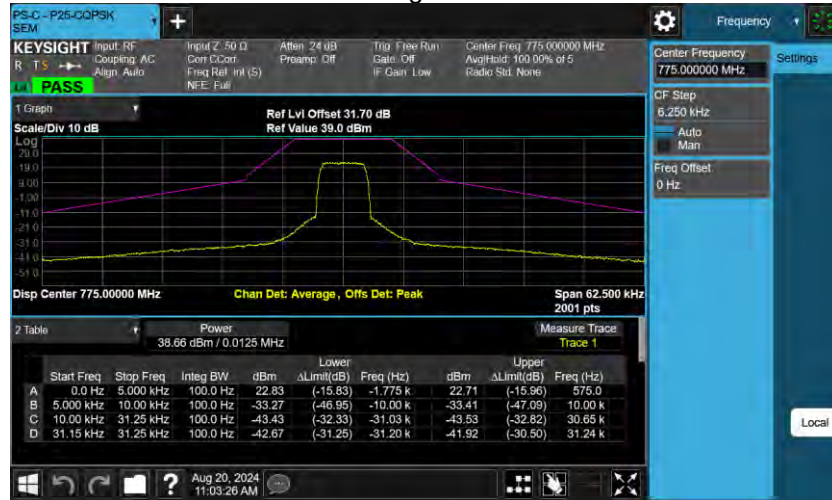
700PS HDQPSK Signal at 766.5MHz



700PS HDQPSK Signal at 758MHz



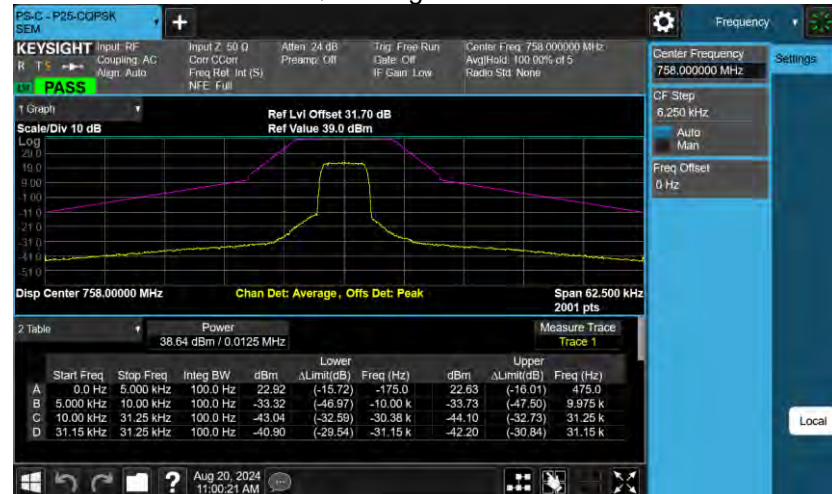
700PS CQPSK Signal at 775MHz ALC



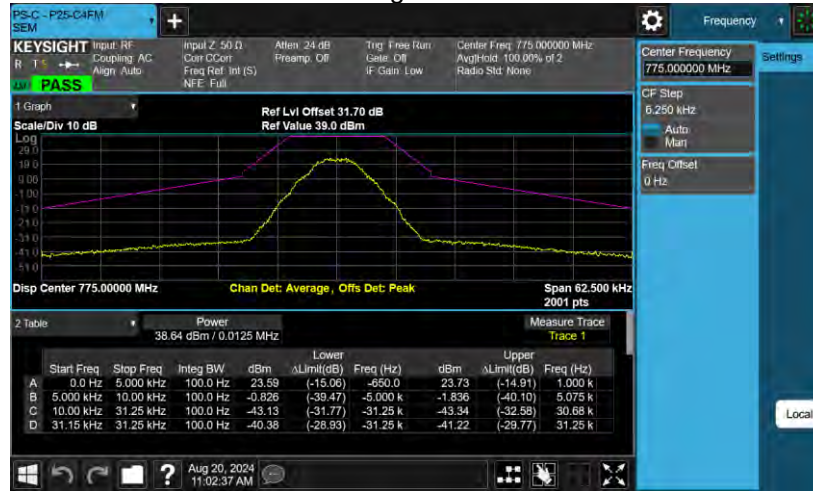
700PS CQPSK Signal at 766.5MHz ALC



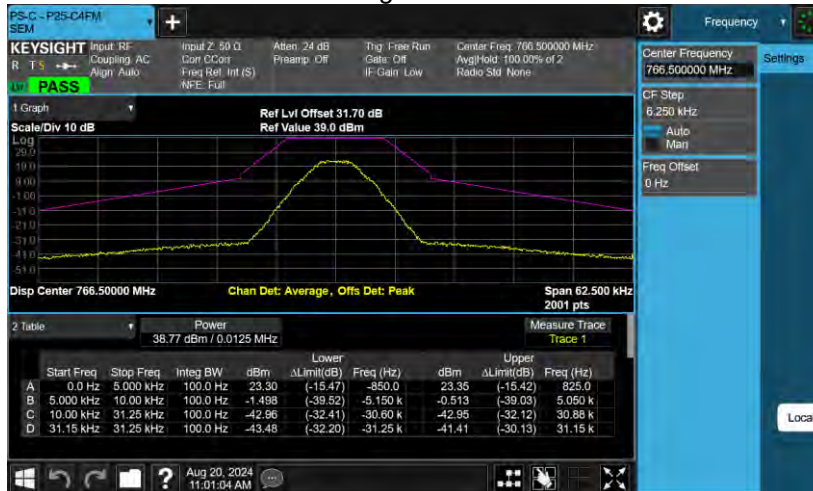
700PS CQPSK Signal at 758MHz ALC



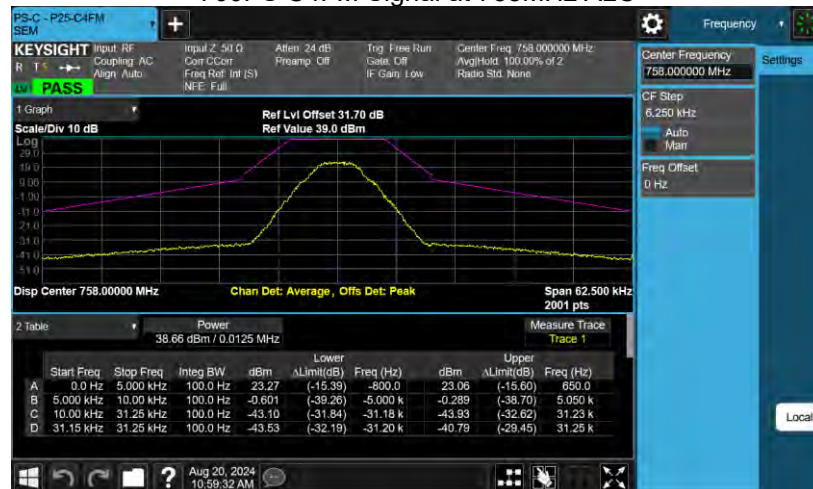
700PS C4FM Signal at 775MHz ALC



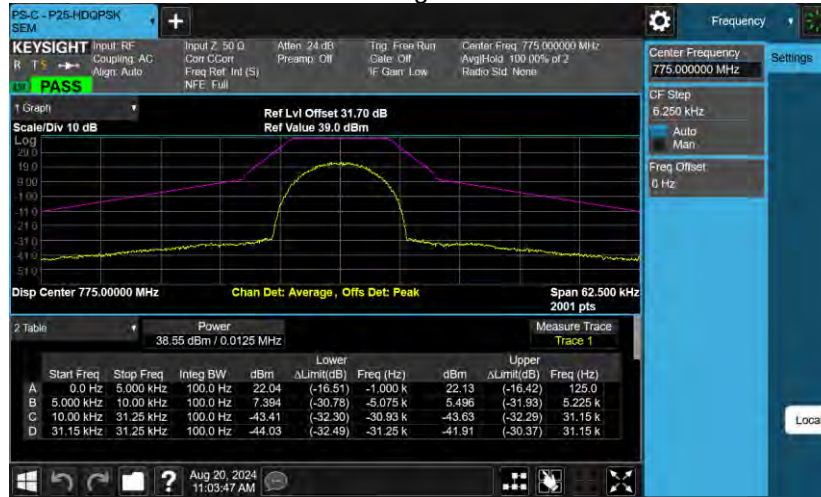
700PS C4FM Signal at 766.5MHz ALC



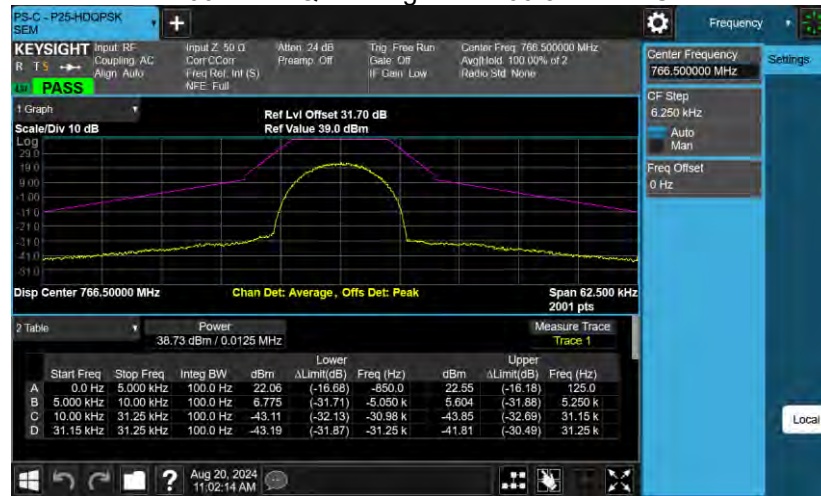
700PS C4FM Signal at 758MHz ALC



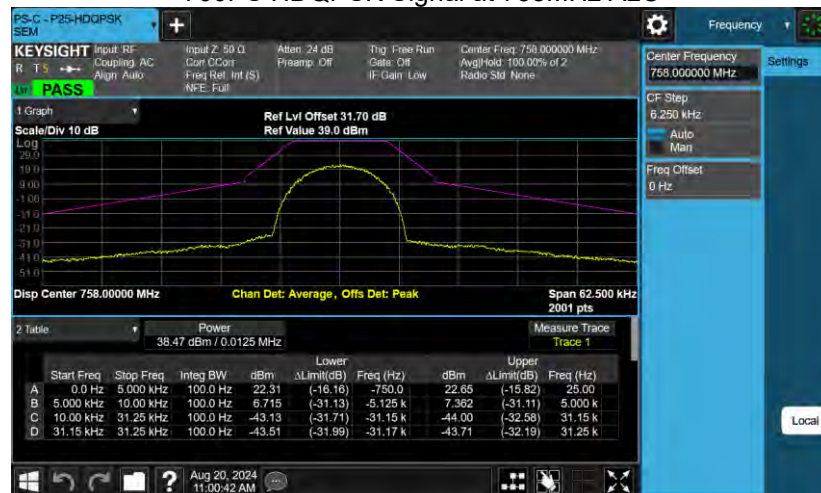
700PS HDQPSK Signal at 775MHz ALC



700PS HDQPSK Signal at 766.5MHz ALC

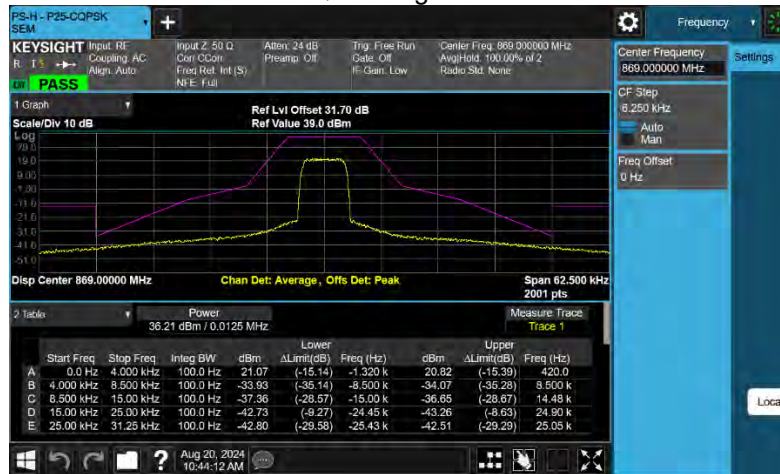


700PS HDQPSK Signal at 758MHz ALC

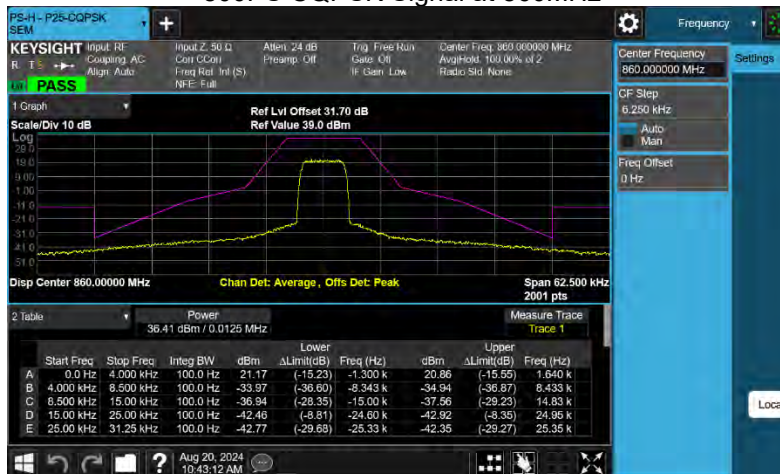


Results - Spectrum Emission Mask (800PS)

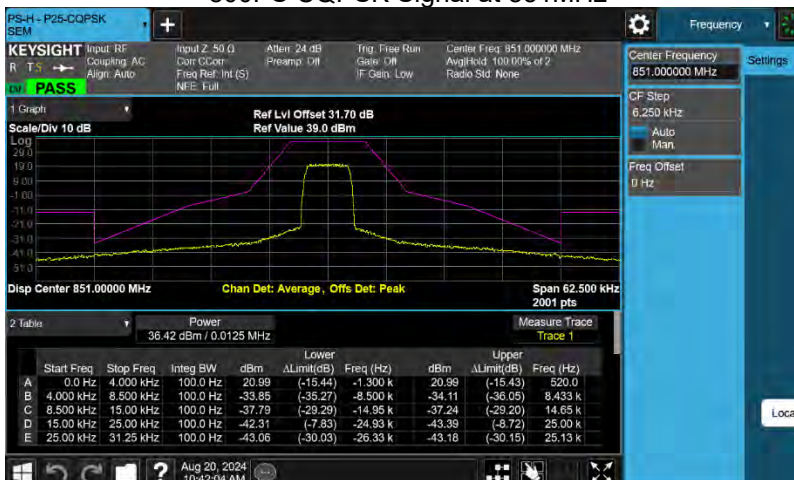
800PS CQPSK Signal at 869MHz



800PS CQPSK Signal at 860MHz



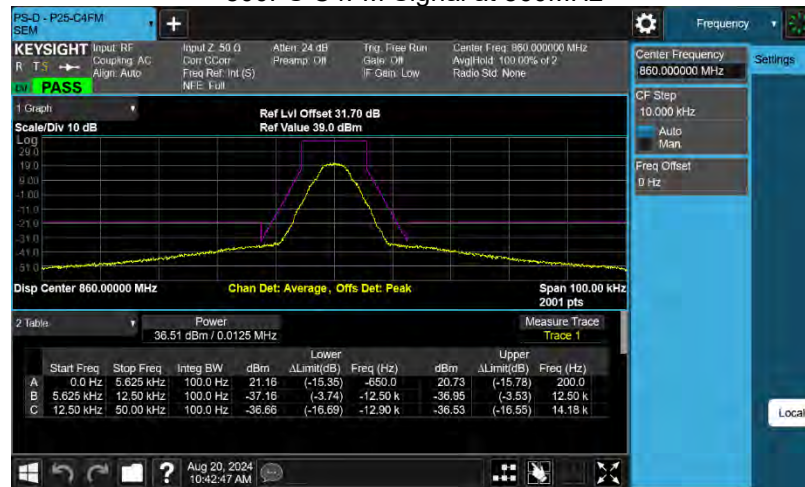
800PS CQPSK Signal at 851MHz



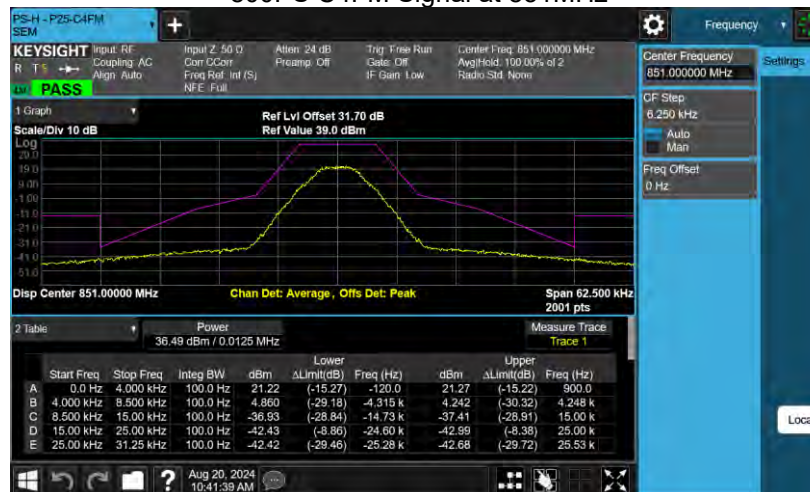
800PS C4FM Signal at 869MHz



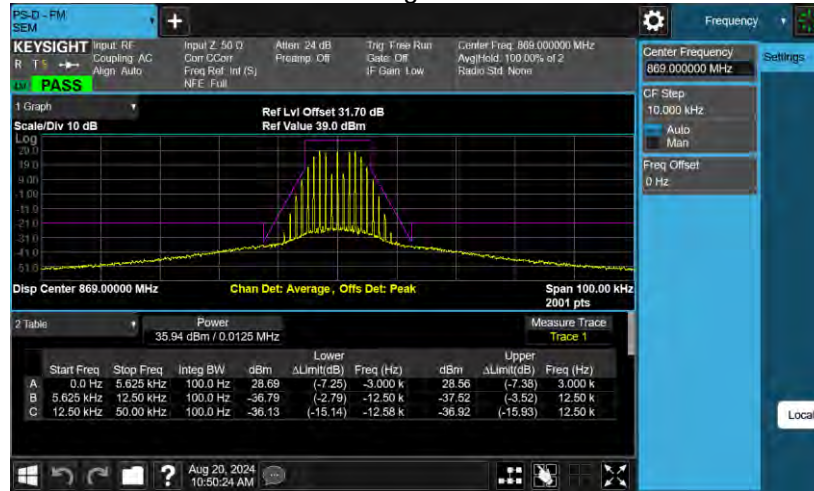
800PS C4FM Signal at 860MHz



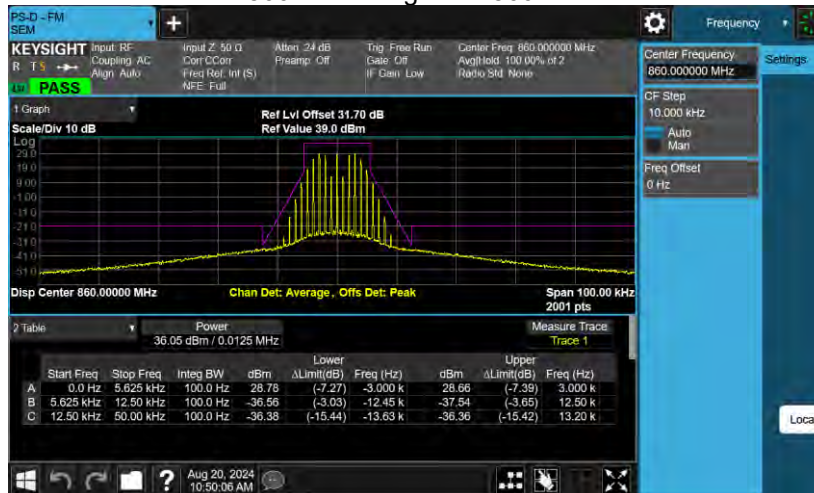
800PS C4FM Signal at 851MHz



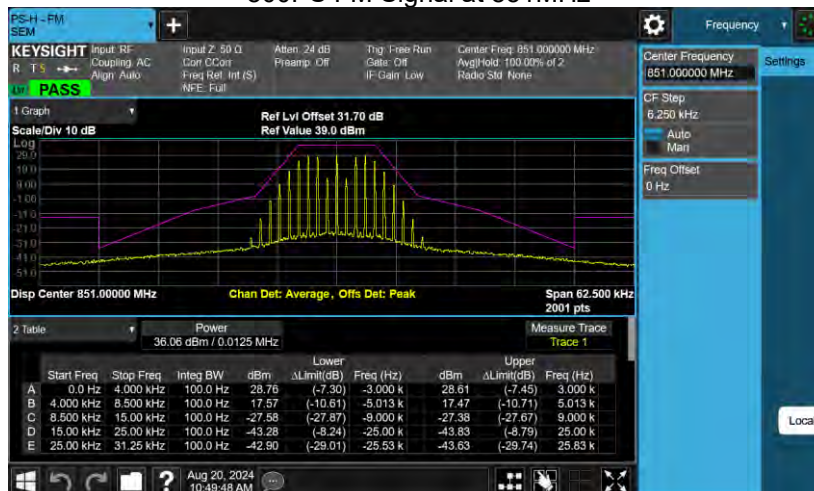
800PS FM Signal at 869MHz



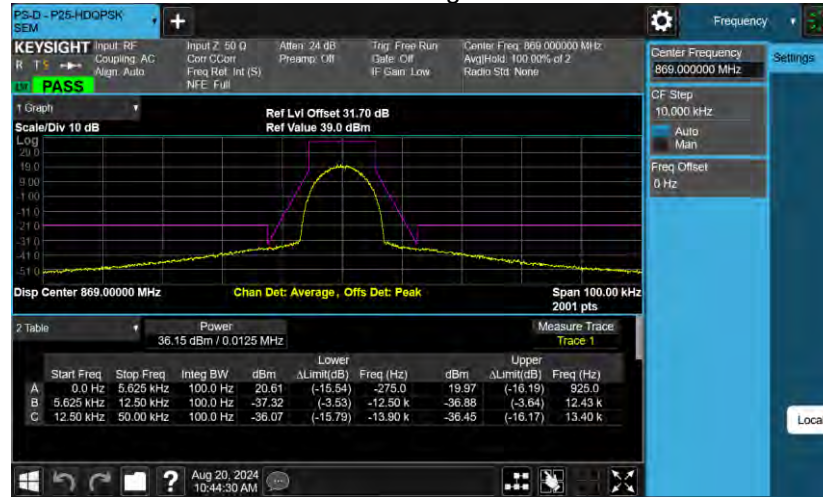
800PS FM Signal at 860MHz



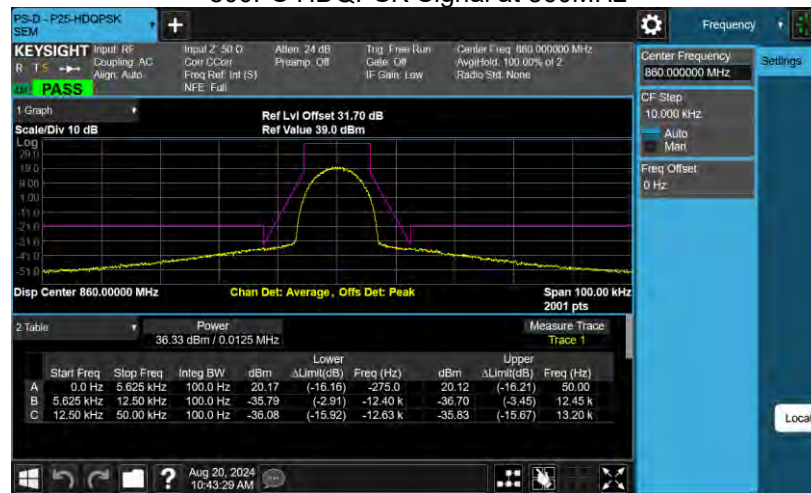
800PS FM Signal at 851MHz



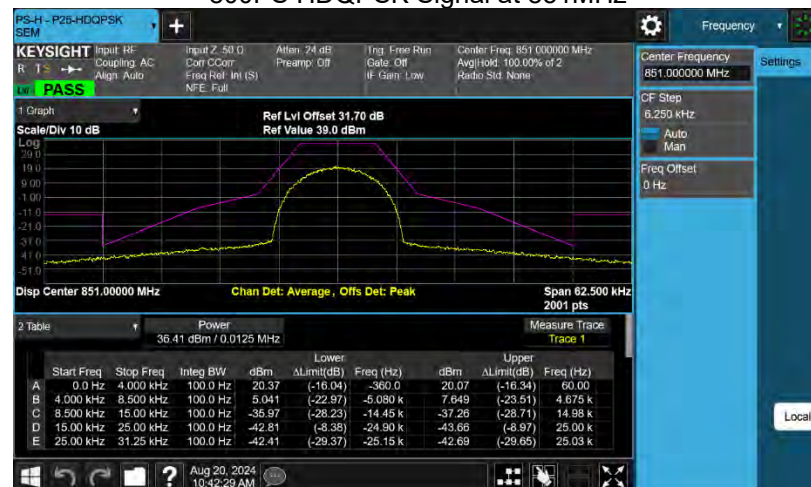
800PS HDQPSK Signal at 869MHz



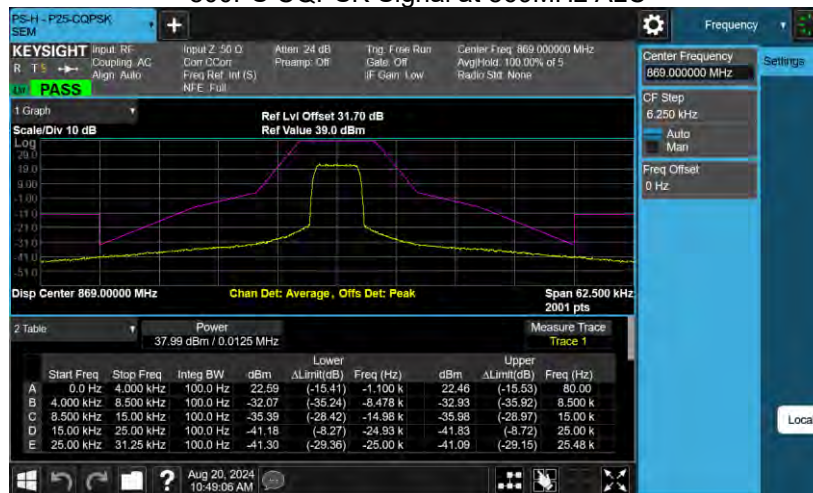
800PS HDQPSK Signal at 860MHz



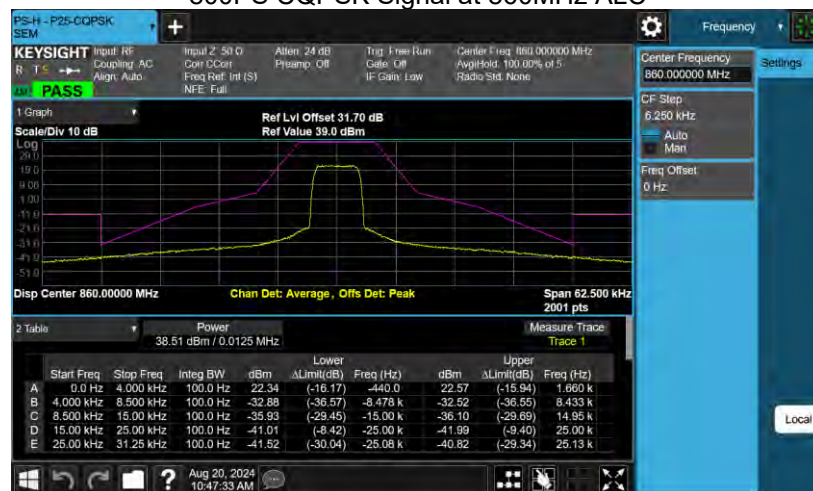
800PS HDQPSK Signal at 851MHz



800PS CQPSK Signal at 869MHz ALC



800PS CQPSK Signal at 860MHz ALC



800PS CQPSK Signal at 851MHz ALC

