



Test Report

For

Avari Wireless Inc.

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

Date: 2025-10-09
Report No.: 20.01.25-1213-1
Revision No.: 0
Project No.: 25-1213
Equipment: Single band UHF (450-480MHz) RU
Model No.: RU40-1-PS-H-21-1N-D0-1
FCC ID: 2BA6ERU401PSH21A

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EMC RF Test Report

Report Reference No.....:	20.01.25-1213-1	
Report Revision History.....:	Rev. 0	
Compiled by (+ signature).....	Jack Qin	
Approved by (+ signature).....	Zara Vali	
Date of issue.....:	2025-10-09	
Total number of pages	59	
FCC Site Registration No.:	721268	
IC Site Registration No.:	5970A-2	
Testing Laboratory	LabTest Certification Inc.	
Address	Unit 3128-20800 Westminster HWY, Richmond, B.C. V6V 2W3 Canada	
Applicant's name	Avari Wireless Inc.	
Address	1400 112th Ave SE, Ste 100 Bellevue, WA 98004	
Manufacture's Name	Avari Wireless Inc.	
Address	1400 112th Ave SE, Ste 100 Bellevue, WA 98004	
Test specification:		
Standards	➤ 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	➤ ANSI C63.26: 2015 ➤ KDB 935210 D05, v01r04	
Test item description :		
Trade Mark	RU40™	
Model/Type reference	RU40-1-PS-H-21-1N-D0-1	
Serial Number.....	10911139E01BD2001	
FCC ID.....	2BA6ERU401PSH21A	
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)

Revision History

Revision	Date	Reason For Change	Author(s)
0	2025-10-09	Initial	Jack Qin

Test Conditions

General Conditions	1. This report is only referred to the item that has undergone the test. 2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities. 3. This document is only valid if complete; no partial reproduction can be made without previous written permission of LabTest. 4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of LabTest.								
Environmental reference conditions	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits: <table><tr><td>Temperature</td><td>Humidity</td><td>Atmospheric pressure</td></tr><tr><td>15 °C – 35 °C</td><td>30 % - 60 %</td><td>86 kPa – 106 kPa</td></tr></table> If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.			Temperature	Humidity	Atmospheric pressure	15 °C – 35 °C	30 % - 60 %	86 kPa – 106 kPa
Temperature	Humidity	Atmospheric pressure							
15 °C – 35 °C	30 % - 60 %	86 kPa – 106 kPa							

Device Under Test Description

Application for	PS 450 Remote Unit, Single Band High Power DAS
Passing Transmit Frequency	450 – 480 MHz
Operating Transmit Frequency FCC	450 – 480 MHz
Passing Receive Frequency	450 – 480 MHz
Operating Receive Frequency FCC	450 – 480 MHz
Number of Channels	Up to 32 channels
Rated RF Output (e.i.r.p.)	45 dBm
Modulation Type	P25 Phase I C4FM, CQPSK; P25 Phase II HDQPSK
Equipment mobility	Fixed
Operating condition	-40 to +50 °C
Mass of equipment (g)	< 34,000
Dimensions (W X D X H)	271.2mm x 434.1mm x 733.5mm

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Nominal Voltages for:	<u>48V</u> DC <u>3.5</u> Amps
Supply Voltage:	<u>48V</u> DC <u>5</u> Amps
If DC Power:	☐ Internal Power Supply ☒ External Power Supply ☐ Battery ☐ Nickel Cadmium ☐ Alkaline ☐ Nickel-Metal Hydride ☐ Lithium-Ion ☐ Other

Program details

Testing Facility by procedure:		
☒	Radiated Measurement	LabTest Certification Inc.
Testing location/ address		Unit 3128-20800 Westminster HWY, Richmond, B.C. V6V 2W3 Canada
☒	Conducted Measurement:	LabTest Certification Inc.
Testing location/ address		Unit 3128-20800 Westminster HWY, Richmond, B.C. V6V 2W3 Canada

Description of Equipment Under Test (EUT) and Variant Models

Description:

The 450 RU40 is a Single-band Remote Unit (RU) that provides up to 10 Watt of output power in a sealed chassis for Class A operation.

On the downlink path, the RU40 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 Uplink path, the RU40 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 RU40 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 model(s) tested. LabTest does not make any claims of compliance for samples or variants which were not tested.

The variant models of RU40-1-PS-H-21-1N-D0-1 are listed as follows:

RU40-1-PS-H-21-1N-D0-2
RU40-1-PS-H-21-1N-A0-1
RU40-1-PS-H-21-1N-A0-2
RU37-1-PS-H-21-1N-D0-1
RU37-1-PS-H-21-1N-D0-2
RU37-1-PS-H-21-1N-A0-1
RU37-1-PS-H-21-1N-A0-2
RU33-1-PS-H-21-1N-D0-1
RU33-1-PS-H-21-1N-D0-2
RU33-1-PS-H-21-1N-A0-1
RU33-1-PS-H-21-1N-A0-2

Client Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	RU40, 450 PS	Avari Wireless Inc.	VL-RU40-1-PS-H-21-1N-D0-1	EUT where the RF (I/O) antenna is attached via duplexers/multiplexer when necessary.
AE1	DMU, 450PS	Avari Wireless Inc.	VL-DMU-1-PS-H-1-2N-D-1F	Auxiliary equipment, which is the front end of system interfaced to Base Station.
AE2	Element Manager (EM)	Avari Wireless Inc.	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 SIM - Simulator (Not Subjected to Test)				

Software and Firmware

Use*	Description	Version
EUT	Software installed	7.3.0-0.6089
AE1	Software installed	7.3.0-0.6089
AE2	Software installed	7.3.0-0.1794
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					

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Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	48	3.5	168	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; RU40 uplink and downlink attenuation set to 0dB.

Test Equipment Verified for function

Model #	Description	Checked Function	Results
KT-N5172B	Signal Generator	Frequency, Amplitude and Modulation	Within MFR Specs
KT-N9020B	Spectrum Analyzer	Frquency and Amplitude	Within MFR Specs

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 450
DL Transmitter	30.8
UL Receiver	0.6

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
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
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
Frequency stability	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 2.1055	ANSI C63.26-2015, Section 7.2.3.8 KDB 935210 D05, v01r04, Clause 3.7, 4.8	N/A
Radiated Spurious Emissions	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

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Test Result

1. AGC Threshold

Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 2 2.1046(a) FCC Part 90			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	Richmond			Barometric	1012
Test Engineer	Jack Qin			Date	2025-08-07
EUT Voltage	☒ +48VDC ☐ 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B	MY62153079	Oct 25, 2023	Oct 25, 2025
Frequency Range:	☒ 450 MHz – 480 MHz				
Detector:	☒ Peak				
Type of Facility:	☒ Test bench				
Distance:	☒ Direct				
Arrangement of EUT:	☒ Table-top only ☐ Floor-standing only ☐ Rack Mounted				
Output Power is less than or equal 44.95 dBm in band 450.					
Compliant ☒ Non-Compliant ☐ Not Applicable ☐					

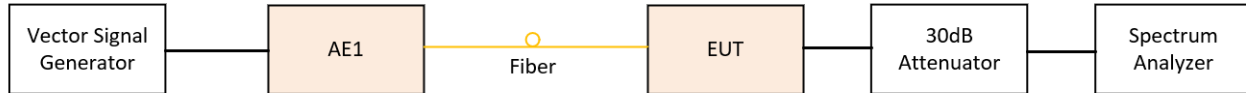
Test setup

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 FCC Requirement

Frequency Range (MHz)	Frequency (MHz)	Input Power Trip ALC (dBm)	Output Power (dBm)	Output Power (Watt)
450 PS 450 – 480	450	-10.4	44.15	26
	465	-11.8	44.95	31.3
	480	-10.4	44.21	26.4

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2. Occupied Bandwidth

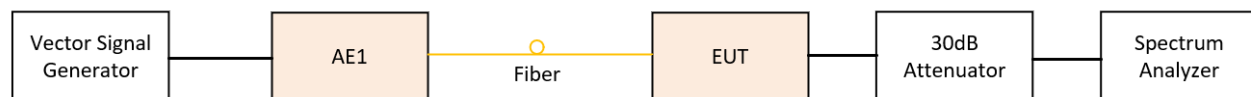
Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 2 2.1046(a) FCC Part 90	Room Temperature (°C)	21		
Test Procedure	ANSI C63.26-2015, Section 7.2.3.1 KDB 935210 D05, v01r04	Relative Humidity (%)	45		
Test Location	Richmond	Barometric	1012		
Test Engineer	Jack Qin	Date	2025-08-07		
EUT Voltage	☒ +48VDC ☐ 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B	MY62153079	Oct 25, 2023	Oct 25, 2025
Frequency Range:	☒ 450 MHz – 480 MHz				
Detector:	☒ Peak				
Type of Facility:	☒ Test bench				
Distance:	☒ Direct				
Arrangement of EUT:	☒ Table-top only ☐ Floor-standing only ☐ Rack Mounted				
Output signal has an occupied channel bandwidth less than the designated channel bandwidth on any location on the operating band. - C4FM < 12.5 kHz - CQPSK < 6.25 kHz - HDQPSK < 12.5 kHz					
Compliant ☒ Non-Compliant ☐ Not Applicable ☐					

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

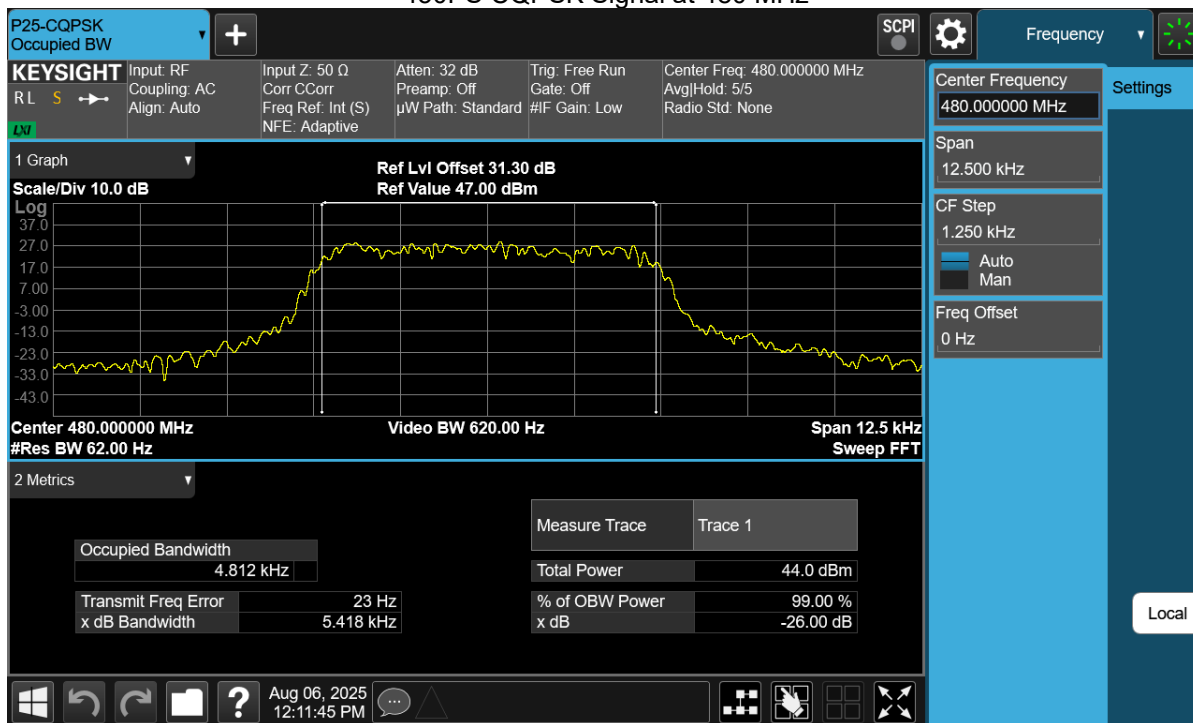
The EUT was set to **Operation Mode #1 with configuration Mode #1**.

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

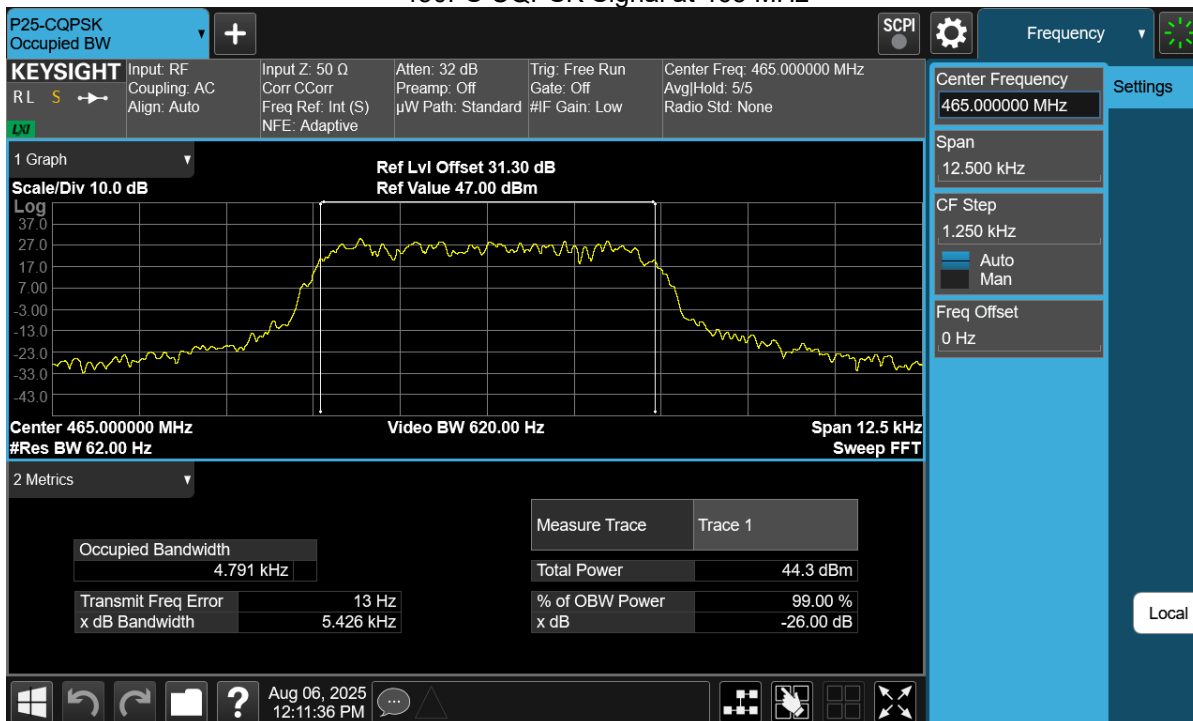


Test Results

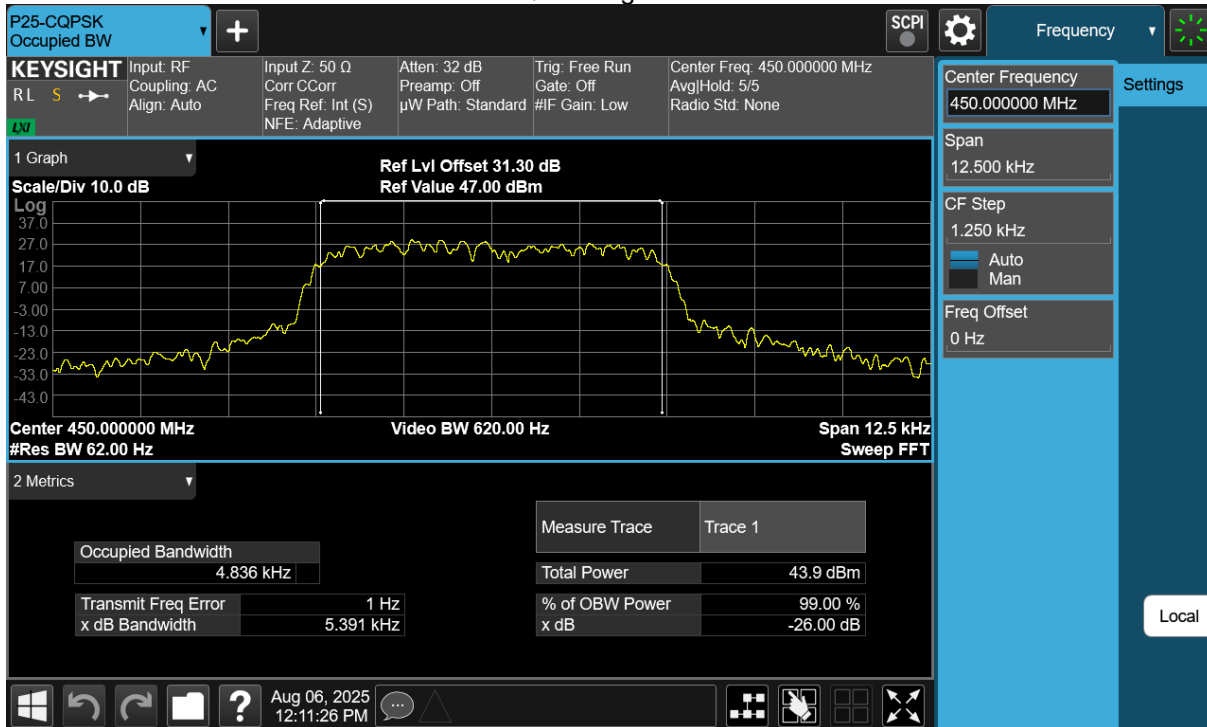
450PS CQPSK Signal at 480 MHz



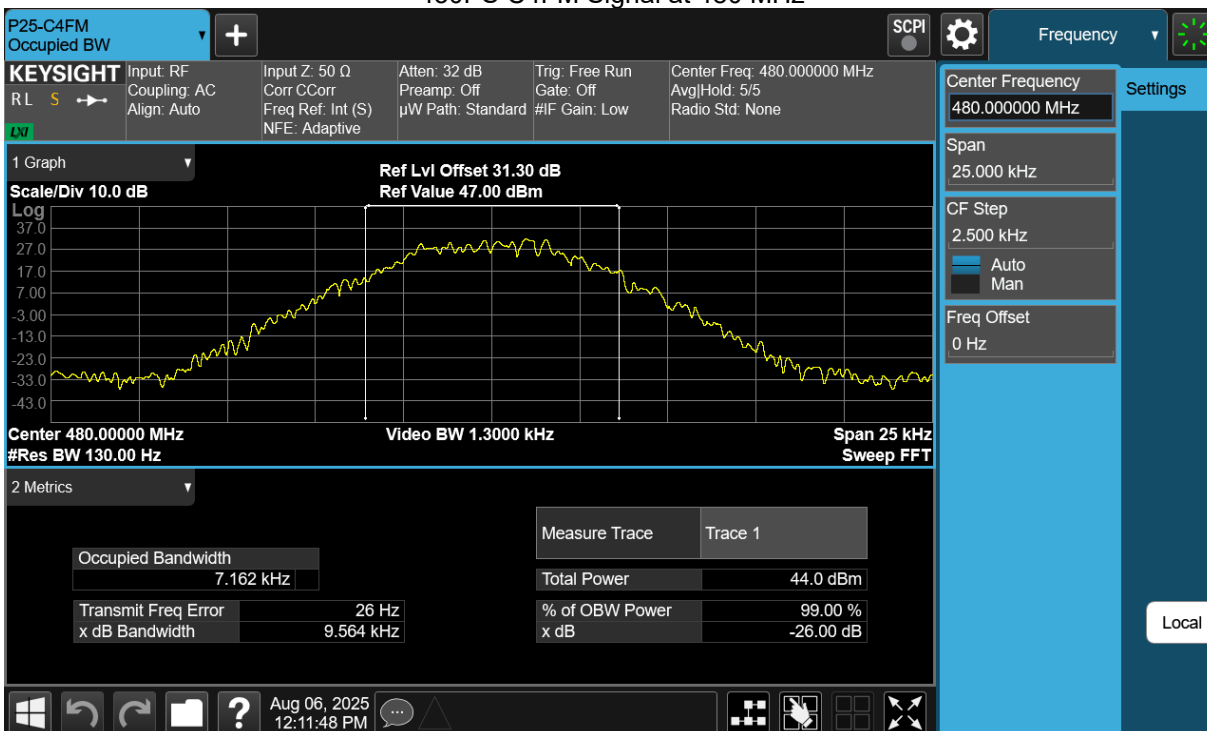
450PS CQPSK Signal at 465 MHz



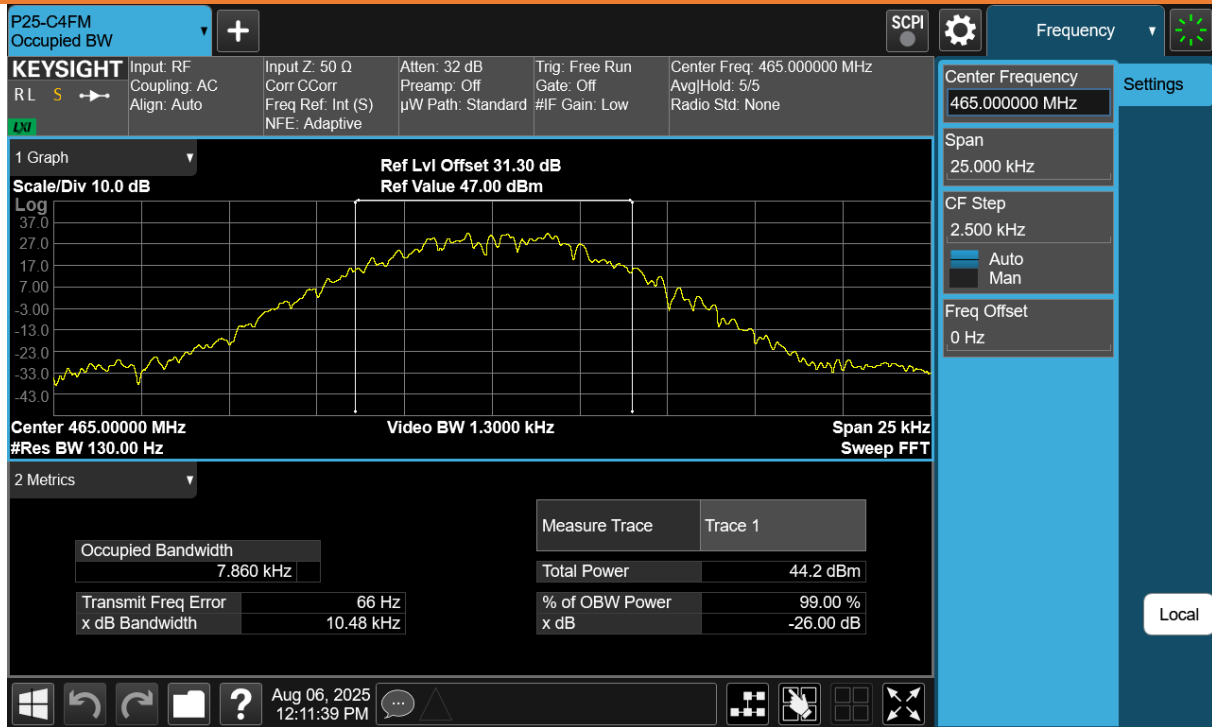
450PS CQPSK Signal at 450 MHz



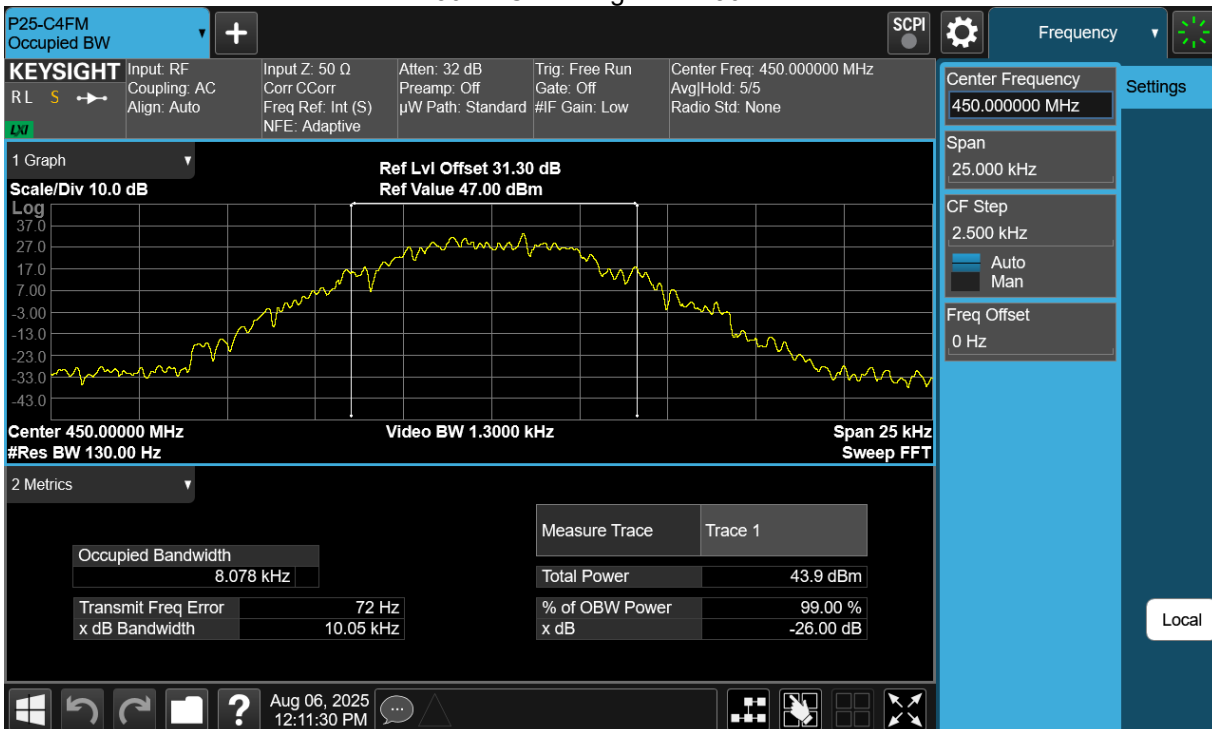
450PS C4FM Signal at 480 MHz



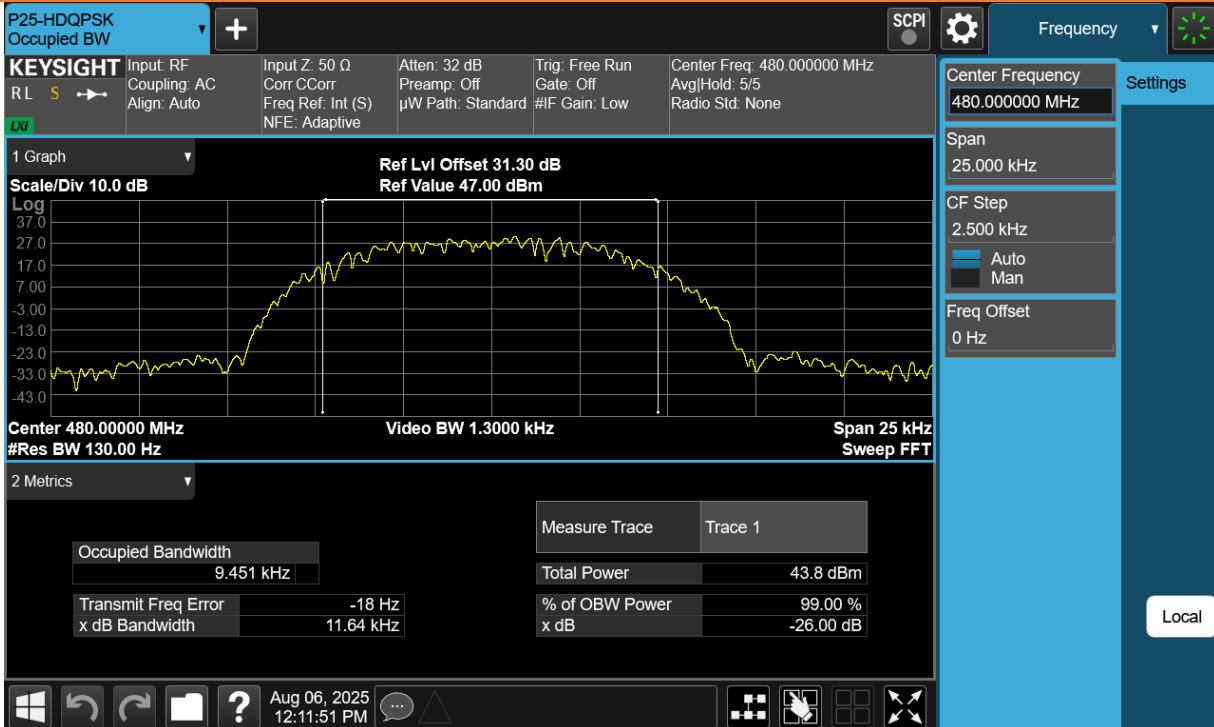
450PS C4FM Signal at 465 MHz



450PS C4FM Signal at 450 MHz



450PS HDQPSK Signal at 480 MHz

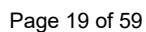


450PS HDQPSK Signal at 465 MHz



380PS HDQPS45Signal at 450 MHz

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3. Out of Band Rejection

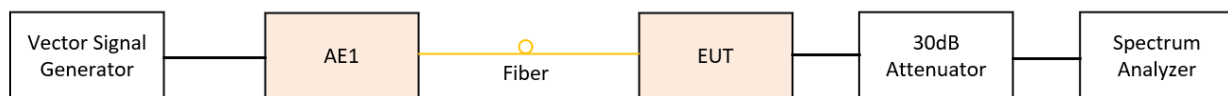
Governing Doc	RSS-119, Issue 12 2015, Amendment (April 1, 2022) RSS-Gen, Issue 5 2018 FCC Part 90	Room Temperature (°C)	20.5
Test Procedure	ANSI C63.26-2015, Section 7.2.3.2 KDB 935210 D05, v01r04, Clause 3.3, 4.3	Relative Humidity (%)	38.6
Test Location	Richmond	Barometric Pressure (kPa)	101.8
Test Engineer	Jack Qin	Date	2025-08-07
EUT Voltage	☒ +48VDC ☐ 120VAC @ 60Hz		
Test Equipment Used	Manufacturer	Model	Serial Number
Signal Generator	Keysight	N5172B	MY53050270
Spectrum Analyzer	Keysight	N9020B	MY62153079
Frequency Range:	☒ Product Passband $\pm 250\%$		
Detector:	☒ Peak		
RBW/VBW:	☒ 1 to 5% of the EUT passband / $\geq 3 \times \text{RBW}$		
Type of Facility:	☒ Tabletop		
Distance:	☒ Direct		
Compliant ☒ Non-Compliant ☐ Not Applicable ☐			

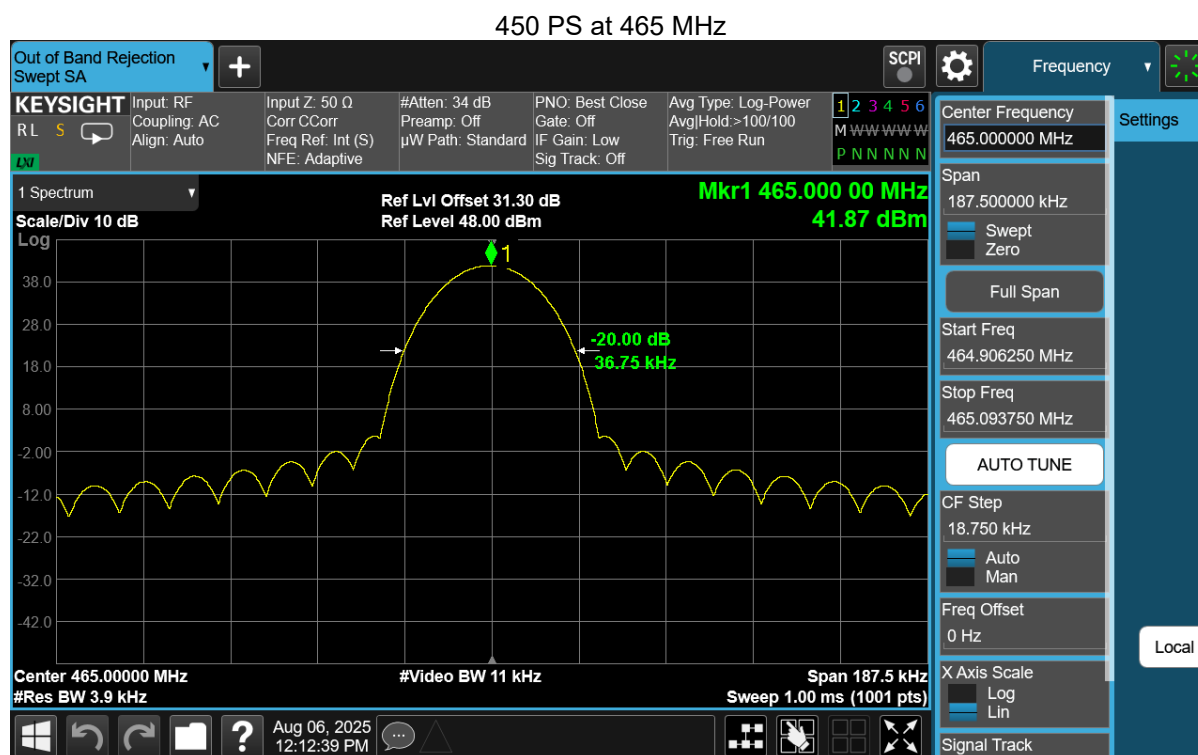
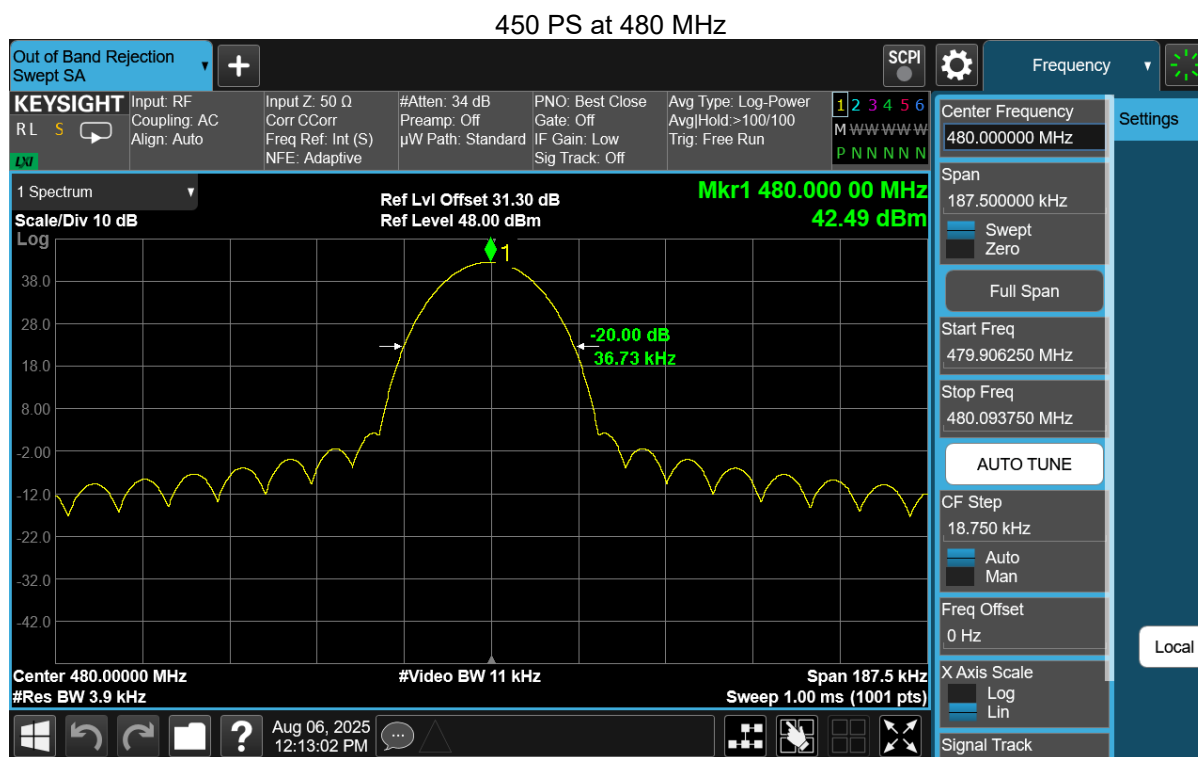
Test setup

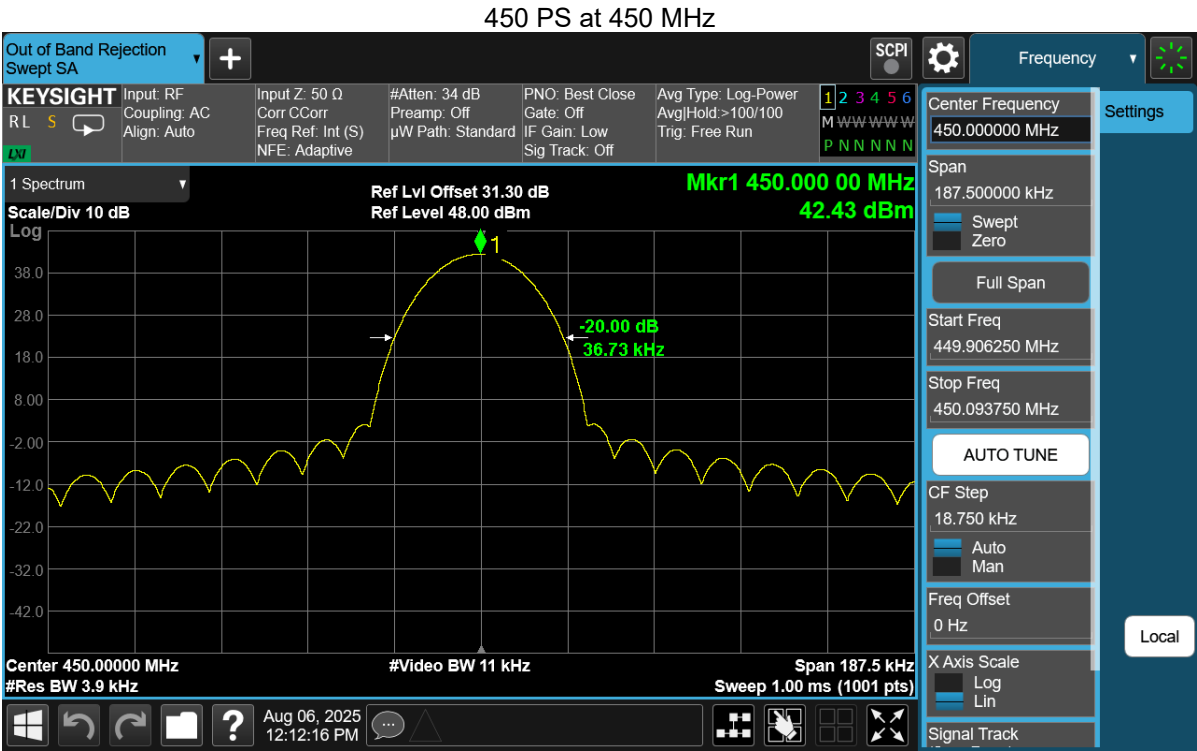
The procedure used was ANSI/TIA-603-E-2016 and FCC KDB 935210 D05 Indus Booster Basic Meas v01r03. The signal booster was set to maximum gain. A swept CW signal was set to the range of $\pm 250\%$ of the product pass band. The CW amplitude was set to 3 dB below the AGC threshold so that the ALC should 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**.







4. Input-Versus-Output Signal Comparison

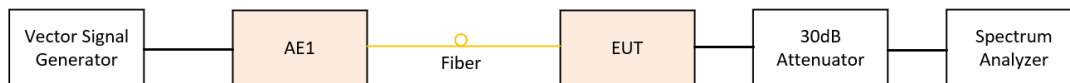
Governing Doc	FCC Part 90.210 (j) (h) (g) (c) (d) and (e)		Room Temperature (°C)	20.5	
Test Procedure	ANSI/TIA-603- E; FCC KDB 935210 D05, v01r03		Relative Humidity (%)	38.6	
Test Location	Richmond		Barometric Pressure (kPa)	101.8	
Test Engineer	Jack Qin		Date	2025-08-07	
EUT Voltage	☒ +48VDC ☐ 120VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Serial Number	Calibration date	Calibration due
Signal Generator	Keysight	N5172B	MY53050270	Dec 12, 2023	Dec 12, 2026
Spectrum Analyzer	Keysight	N9020B	MY62153079	Oct 25, 2023	Oct 25, 2025
Frequency Range:	☒ 450 MHz – 480 MHz				
Detector:	☒ Peak				
RBW/VBW:	☒ 100 Hz				
Type of Facility:	☒ Testbench				
Distance:	☒ direct connect				
Arrangement of EUT:	☒ Table-top only ☐ Floor-standing only ☐ Rack Mounted				
Signal of all types of modulation is contained within the emission mask.					
Compliant ☒ Non-Compliant ☐ Not Applicable ☐					

Test setup

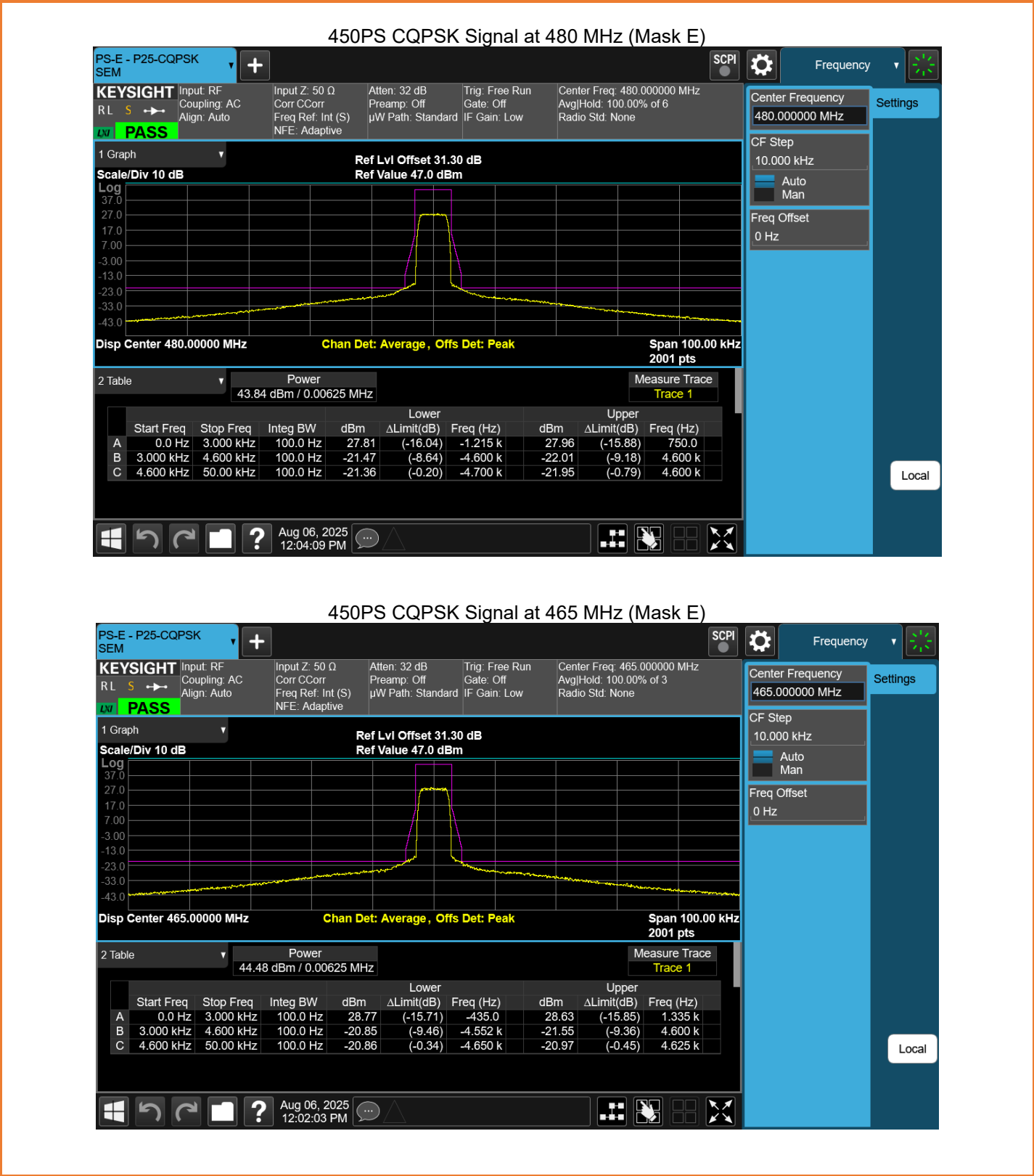
Spectrum Emission Mask is measured by connecting a Spectrum Analyzer to the RF output connector. The input power was adjusted to produce maximum output power on the antenna port. The reference level was measured with integrated BW of the designated channel BW. The emission was measured with RBW 100 Hz.

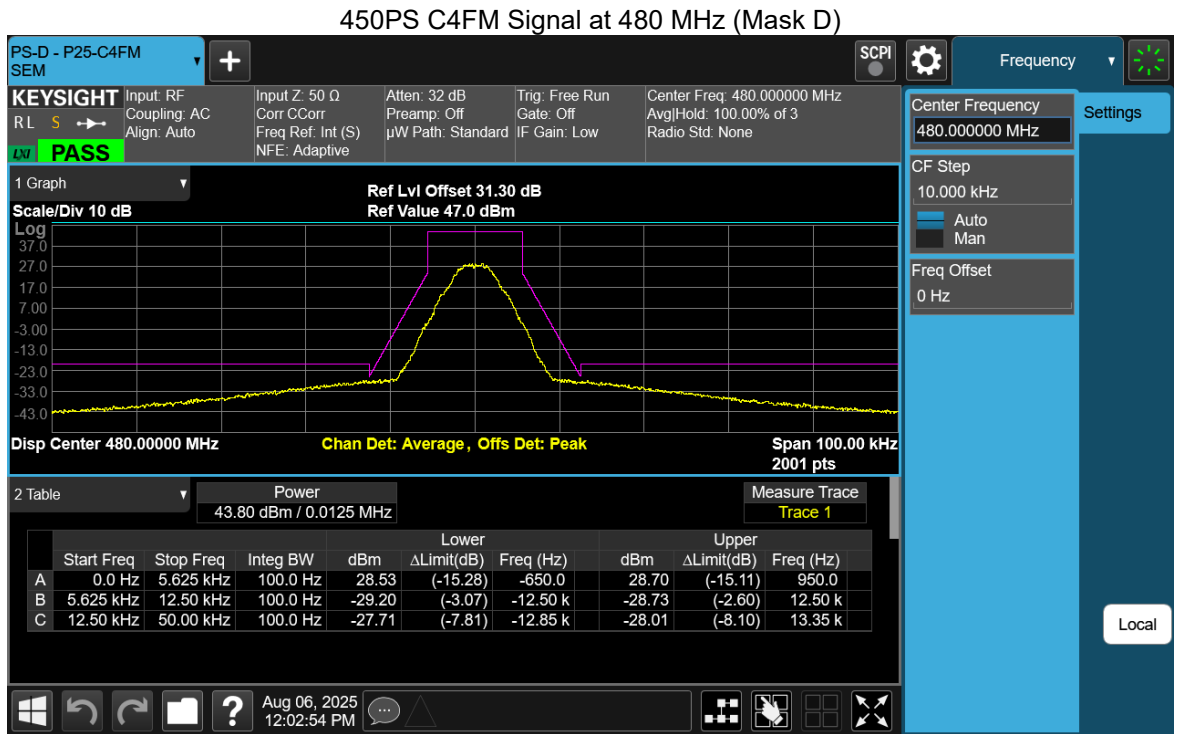
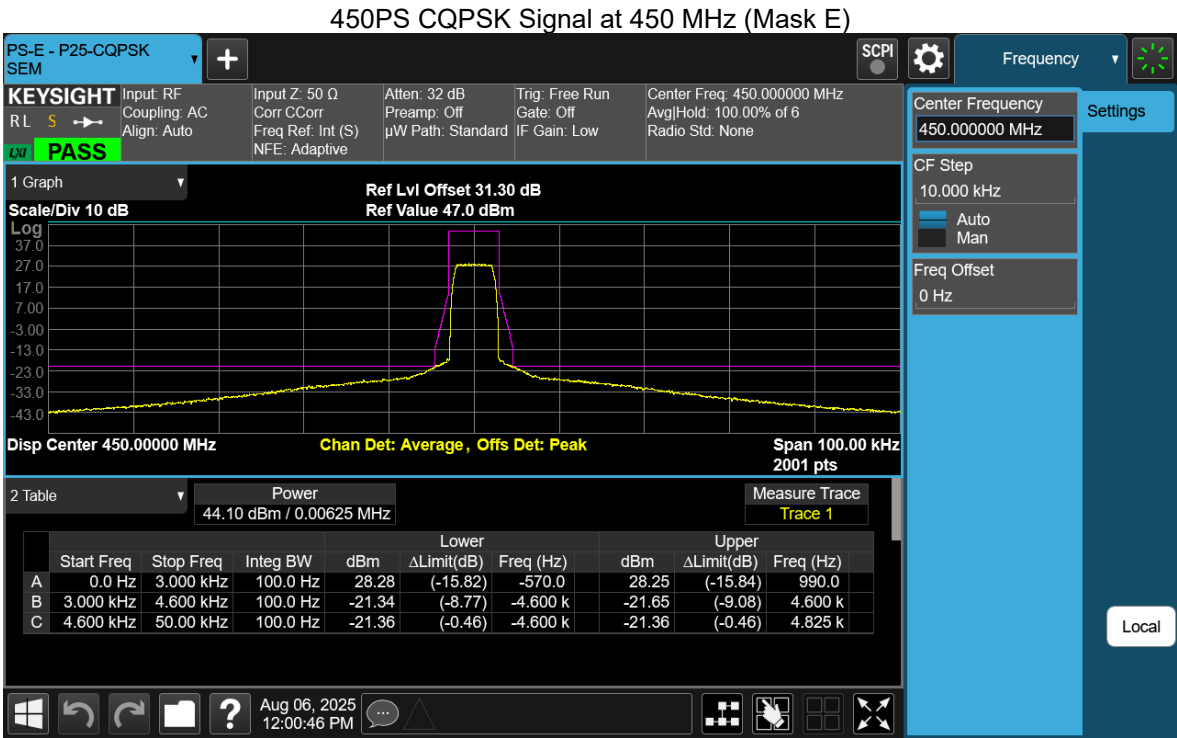
Mask types according to FCC § 90.210 Emission masks were applied to all measurements. The mask applied is specified in the title of each plot.

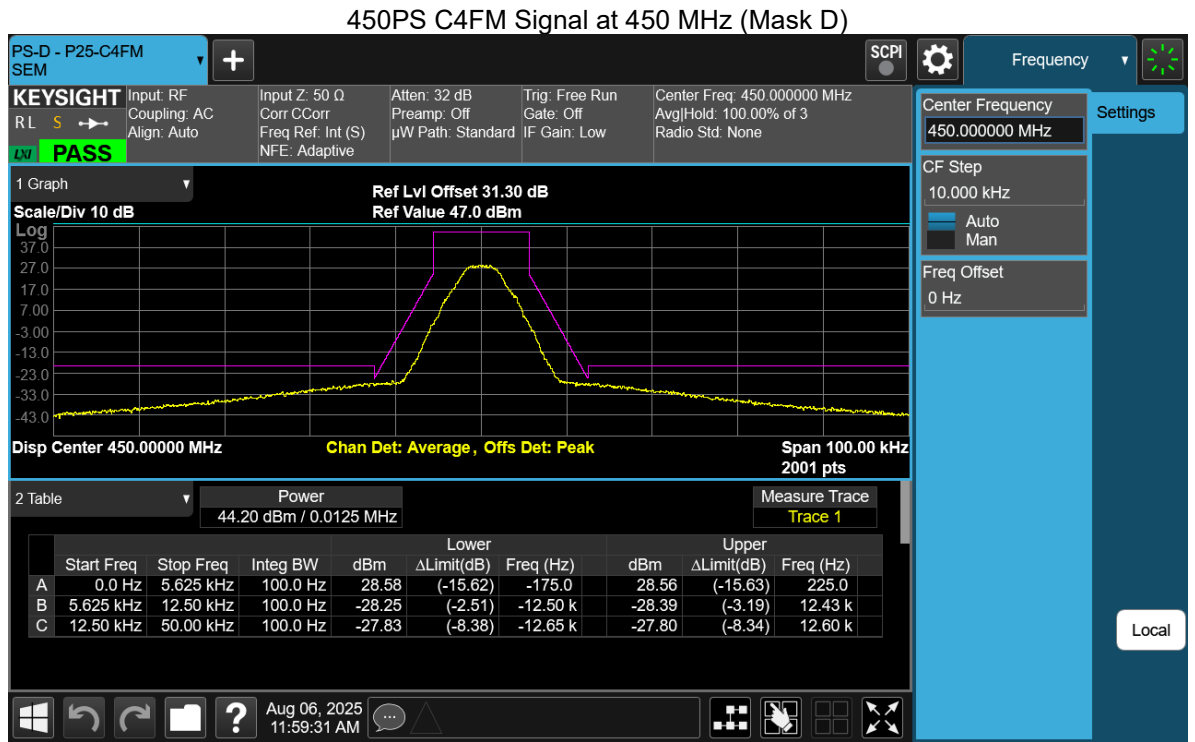
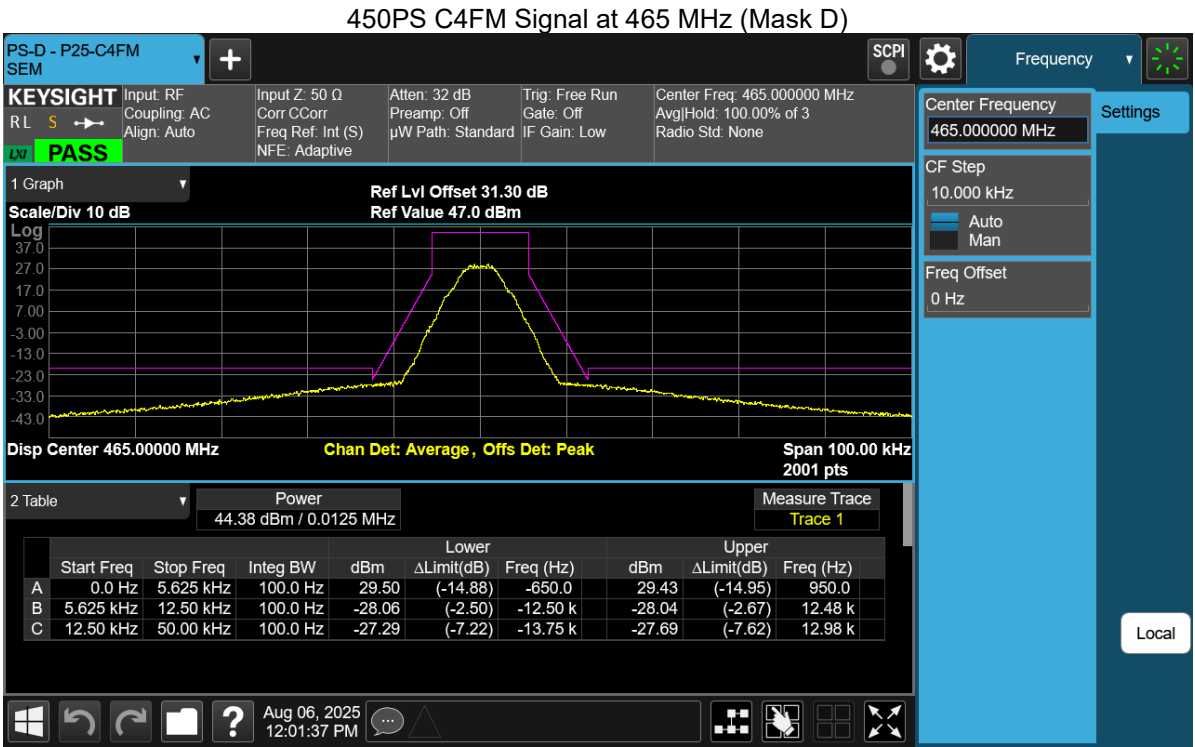
The EUT was set to **Operation Mode #1 with configuration Mode #1.**

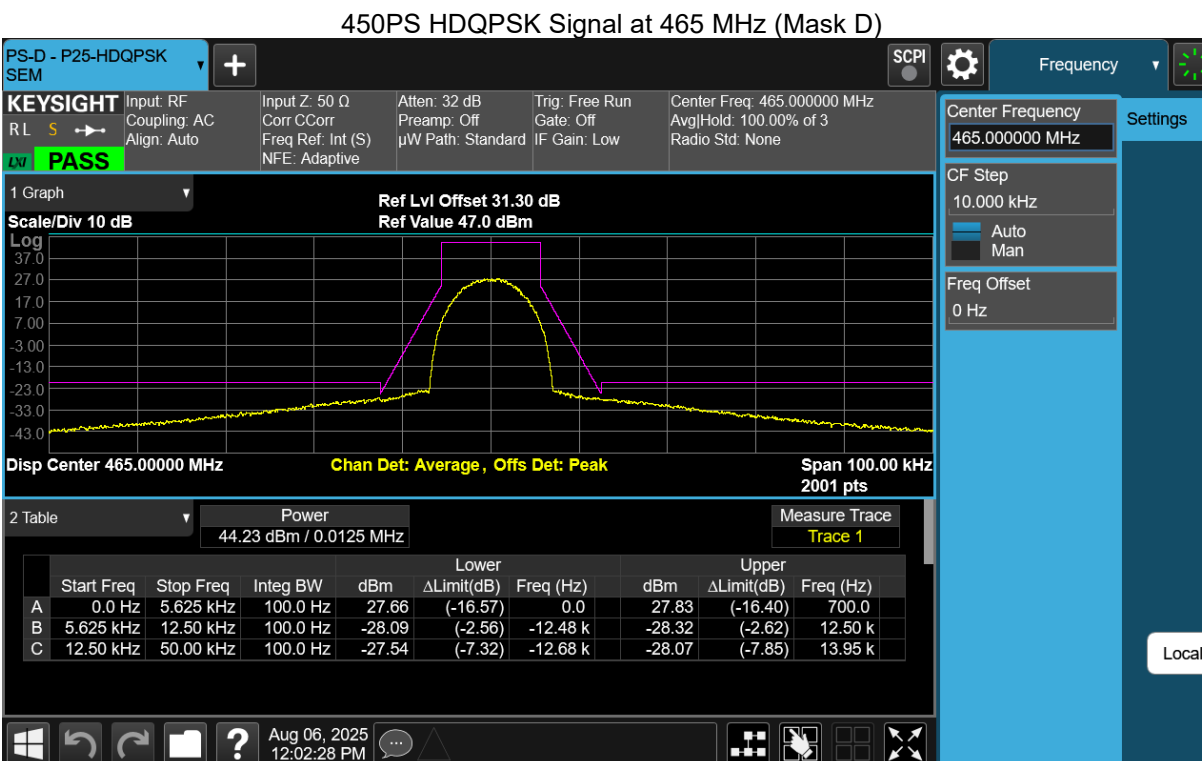


Test results -Spectrum Emission Mask (450PS)

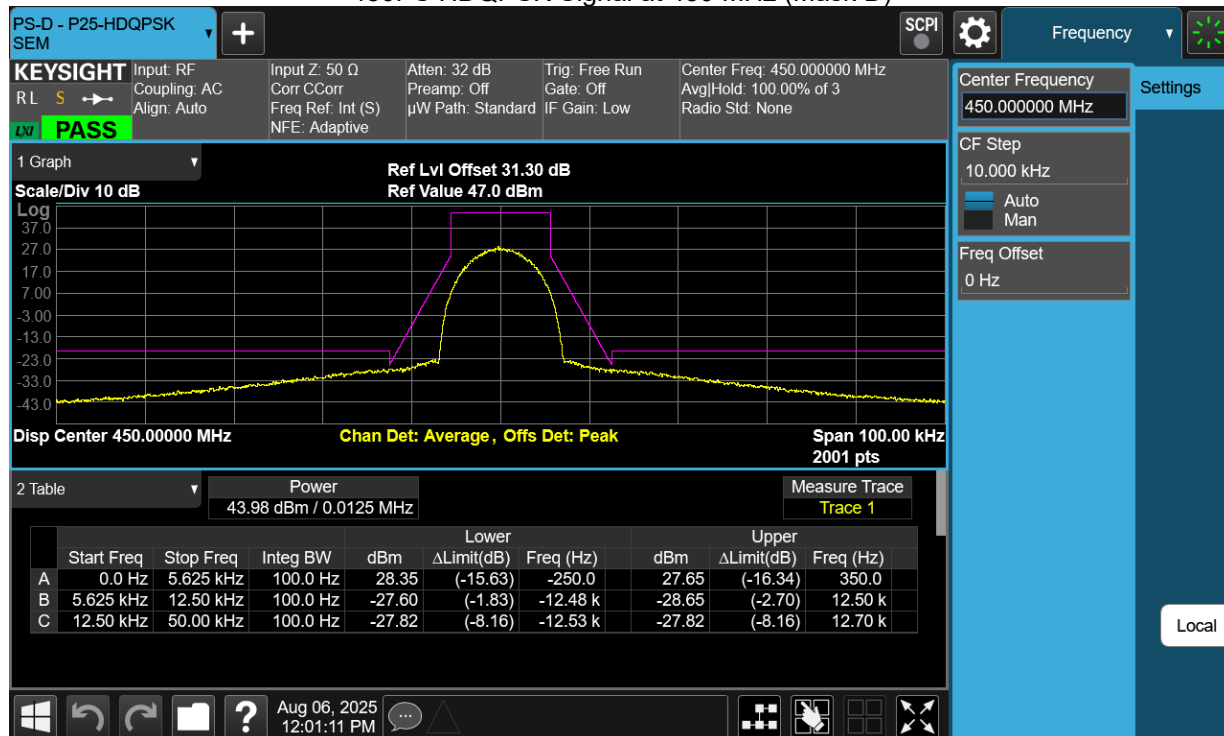








450PS HDQPSK Signal at 450 MHz (Mask D)



450PS CQPSK Signal at 480 MHz ALC (Mask E)

