Orthomode Transducer Test Program User's Guide

Larry Wurtz, Phd

1 May 2021

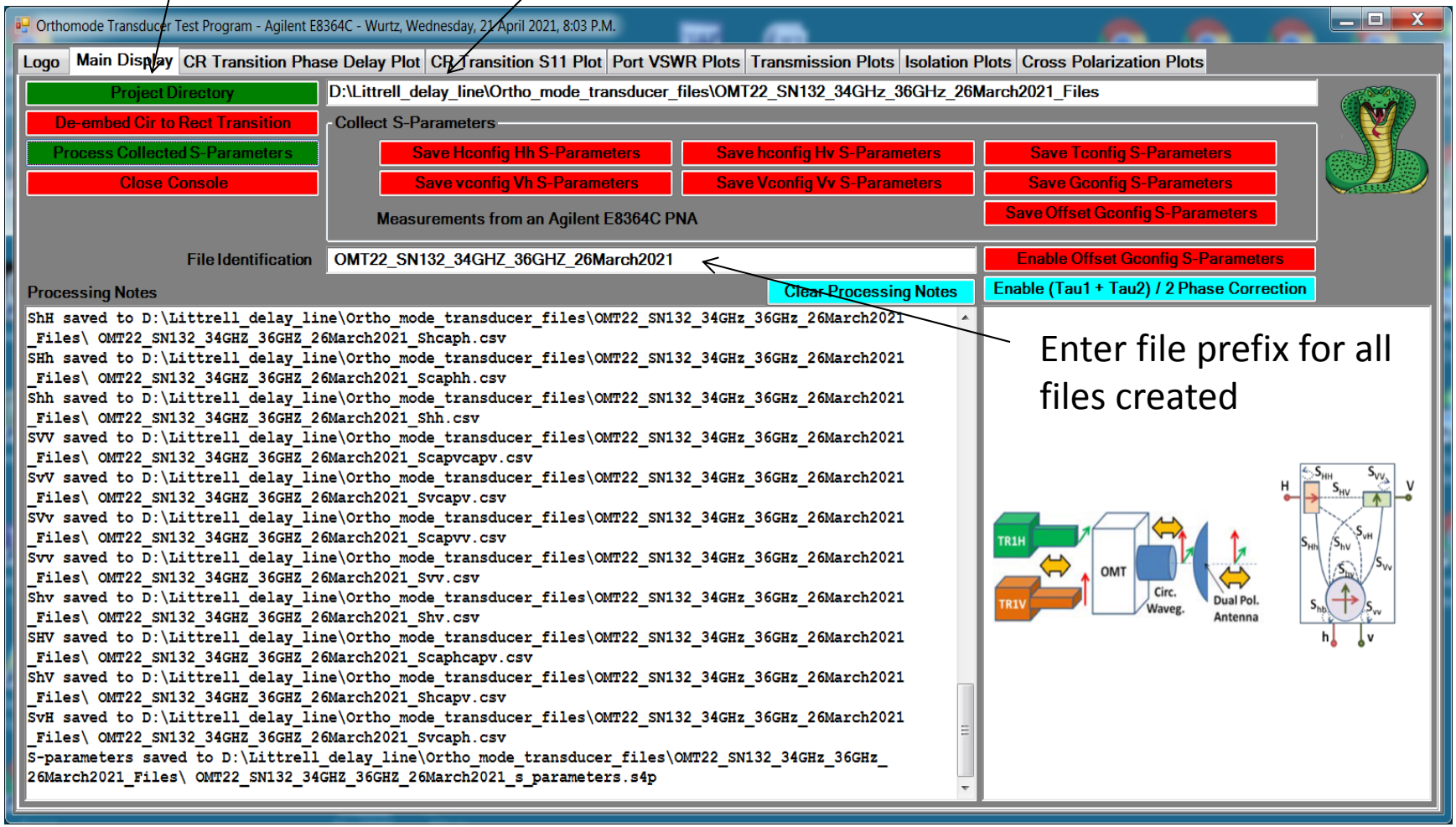
- Procedure for OMT test program was taken from a paper entitled “Cheap Method for Accurate Characterization of Orthomode Transducers” by M. Oldoni and D. Tresoldi, 2016 IEEE
- Additional reference paper: “A Technique for the Measurement of the Generalized Scattering Matrix of Overmoded Waveguide Devices” by Antonio Morini, Marco Guglielmi, and Marco Farina, IEEE Transactions of Microwave Theory and Techniques, Vol. 61, No. 7, July 2013
- Additional reference paper: “A Microwave Measurement Procedure for a Full Characterization of Ortho-Mode Transducers”, Oscar Peverini and others, IEEE Transactions on Microwave Theory and Techniques, Vol. 51, No. 4, April 2003

- The following slides provide a step-by-step sequence of instructions to measure the performance of a Millitech OMT22 with SN 132
- A Keysight E8364C network analyzer with 2 hour warm-up and two separate full 2-port calibrations provided the following results.

Press project directory button as last step

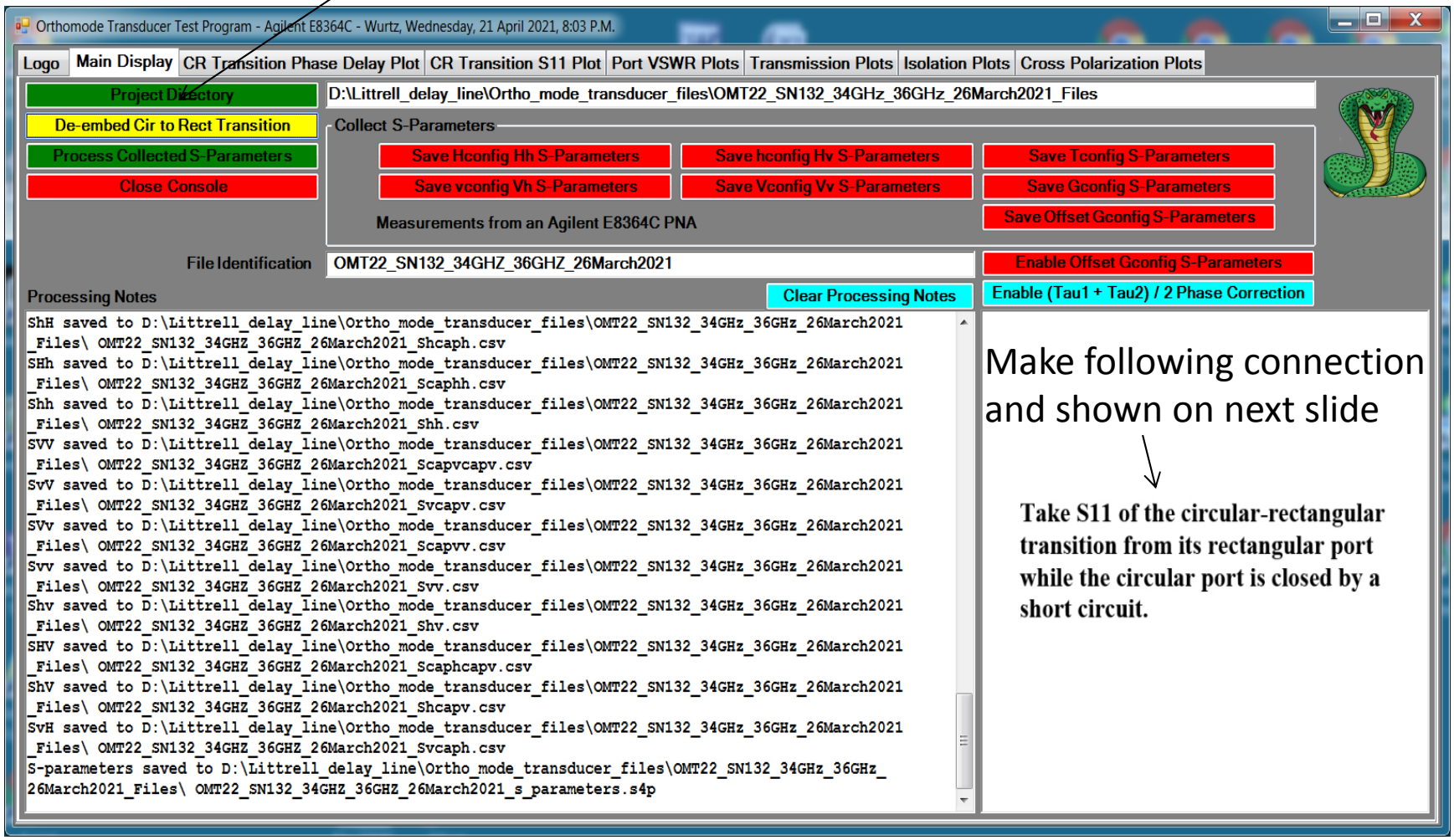
Main Display

Enter project directory, best to copy and rename existing project directory

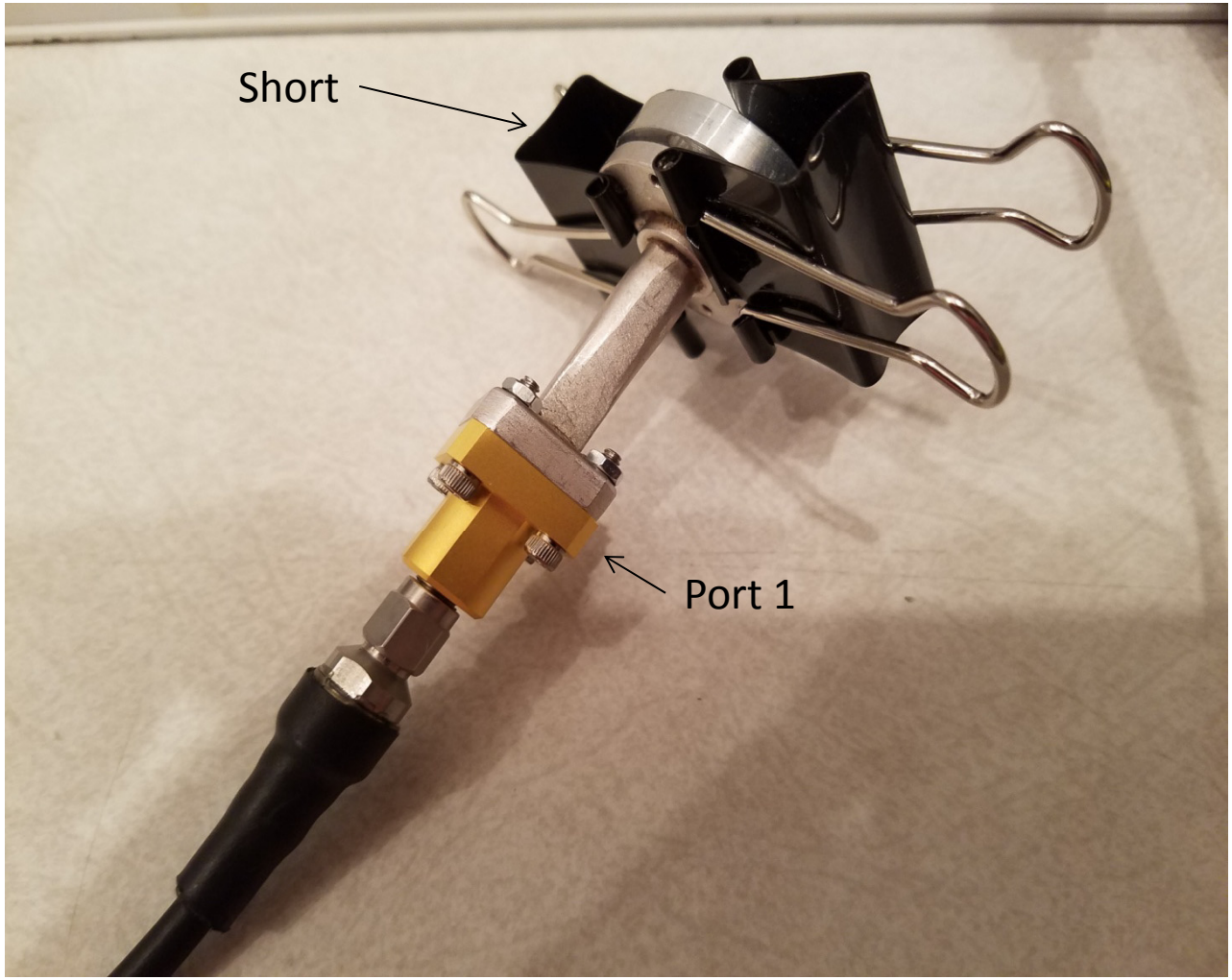


De-embed circular to rectangular transition

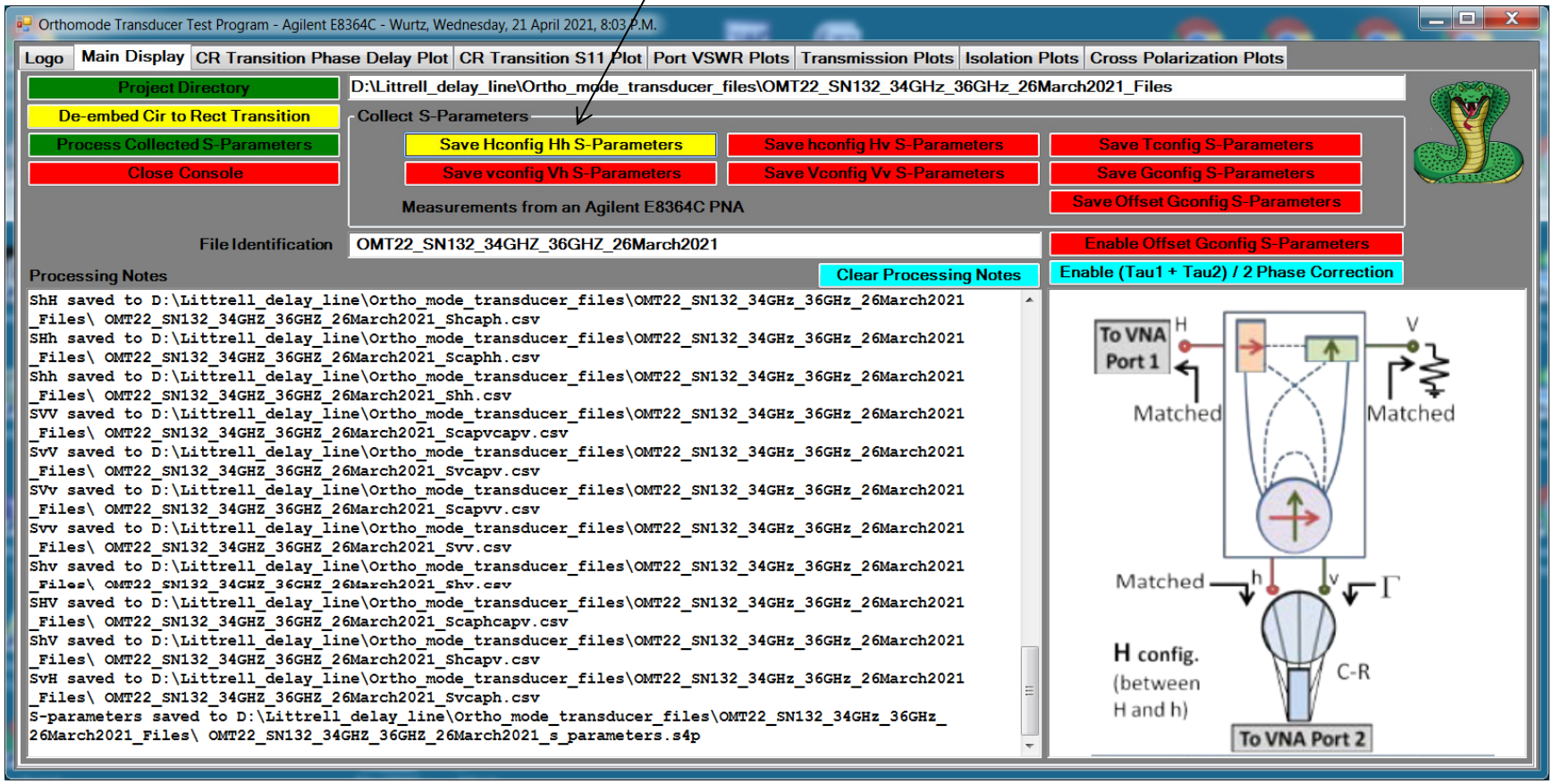
Press once to show required network analyzer connection
Press twice to take measurement, repeat if needed



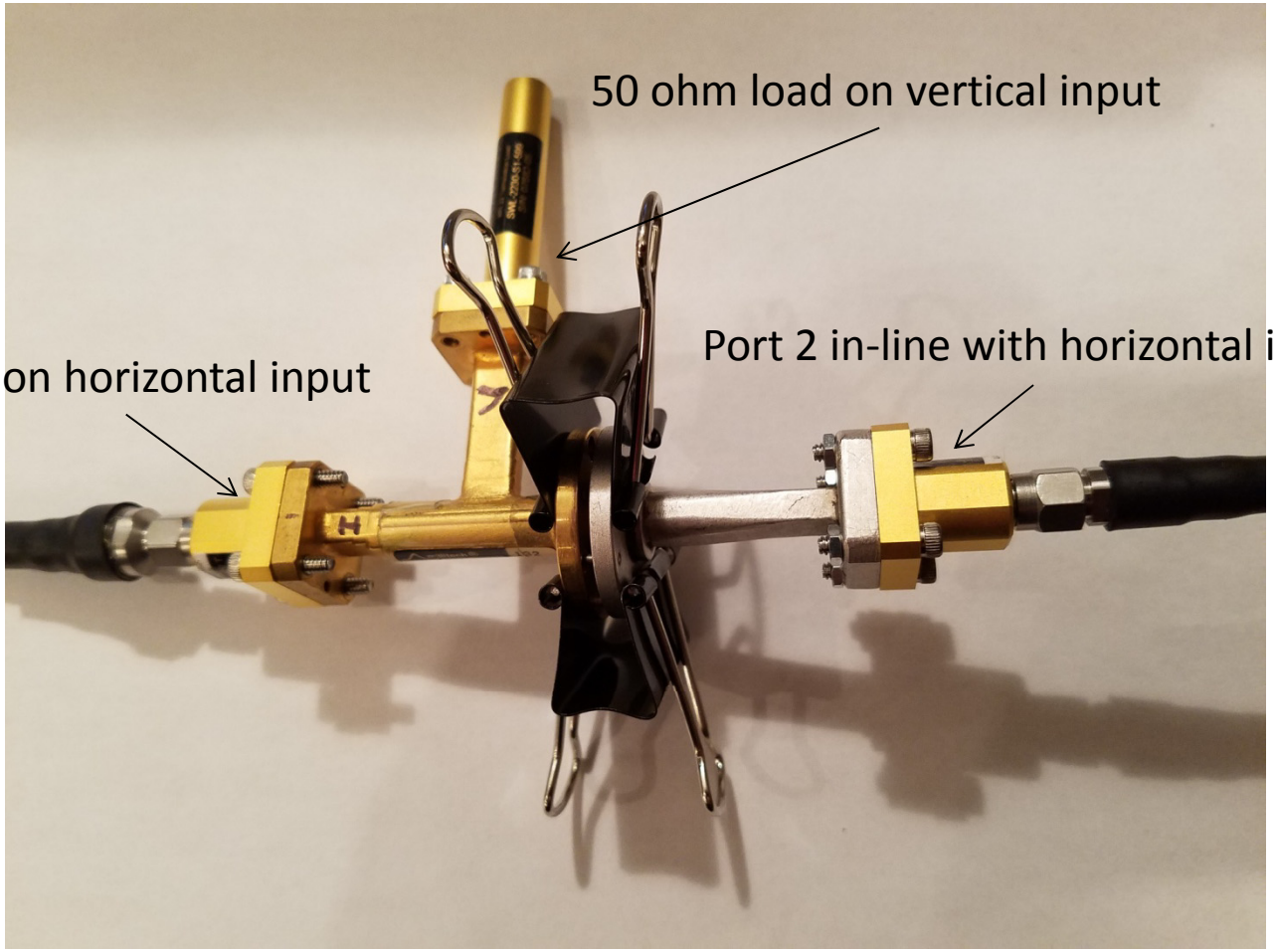
De-embed circular to rectangular transition



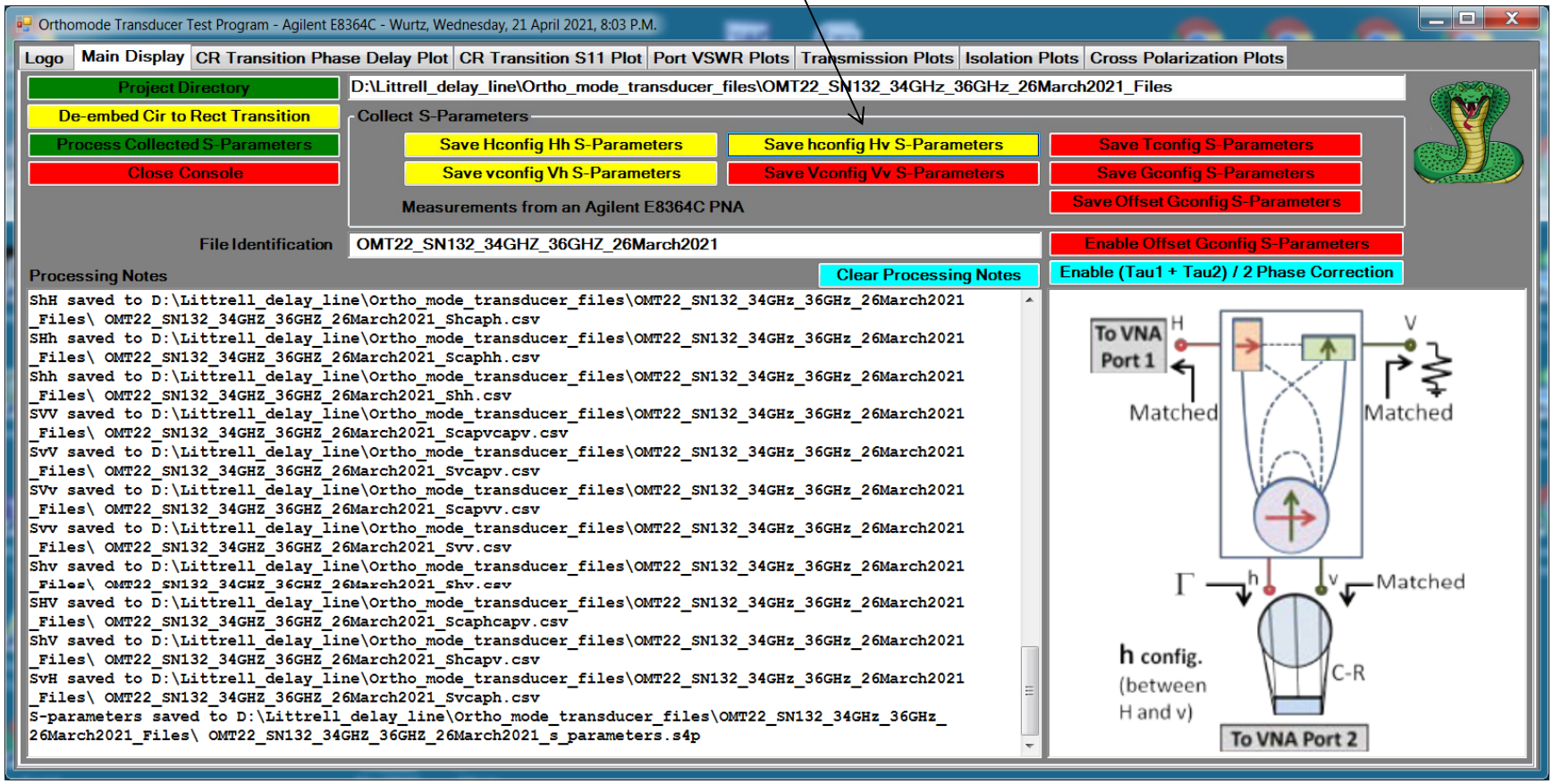
Take Hconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



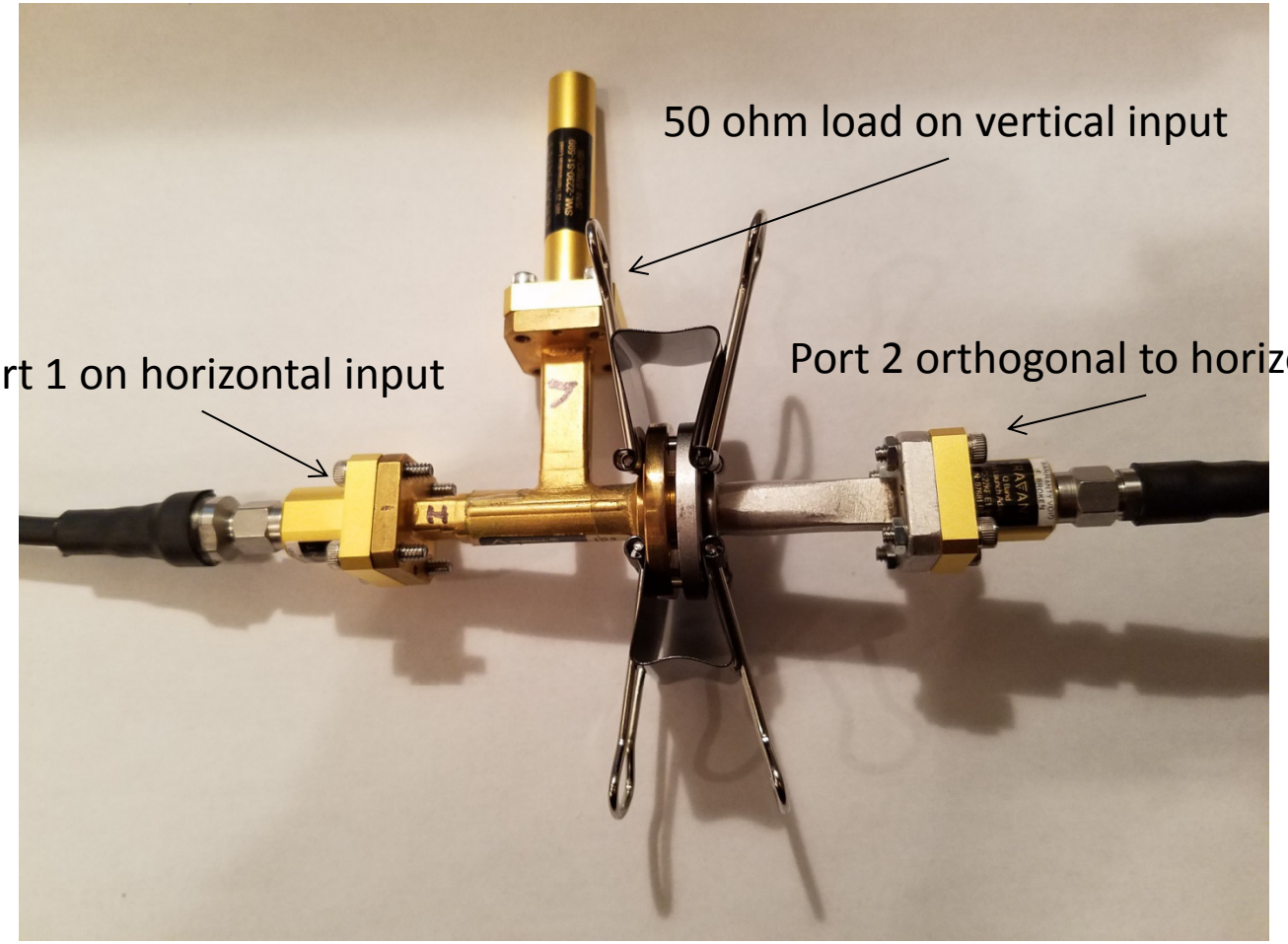
Hconfig measurement



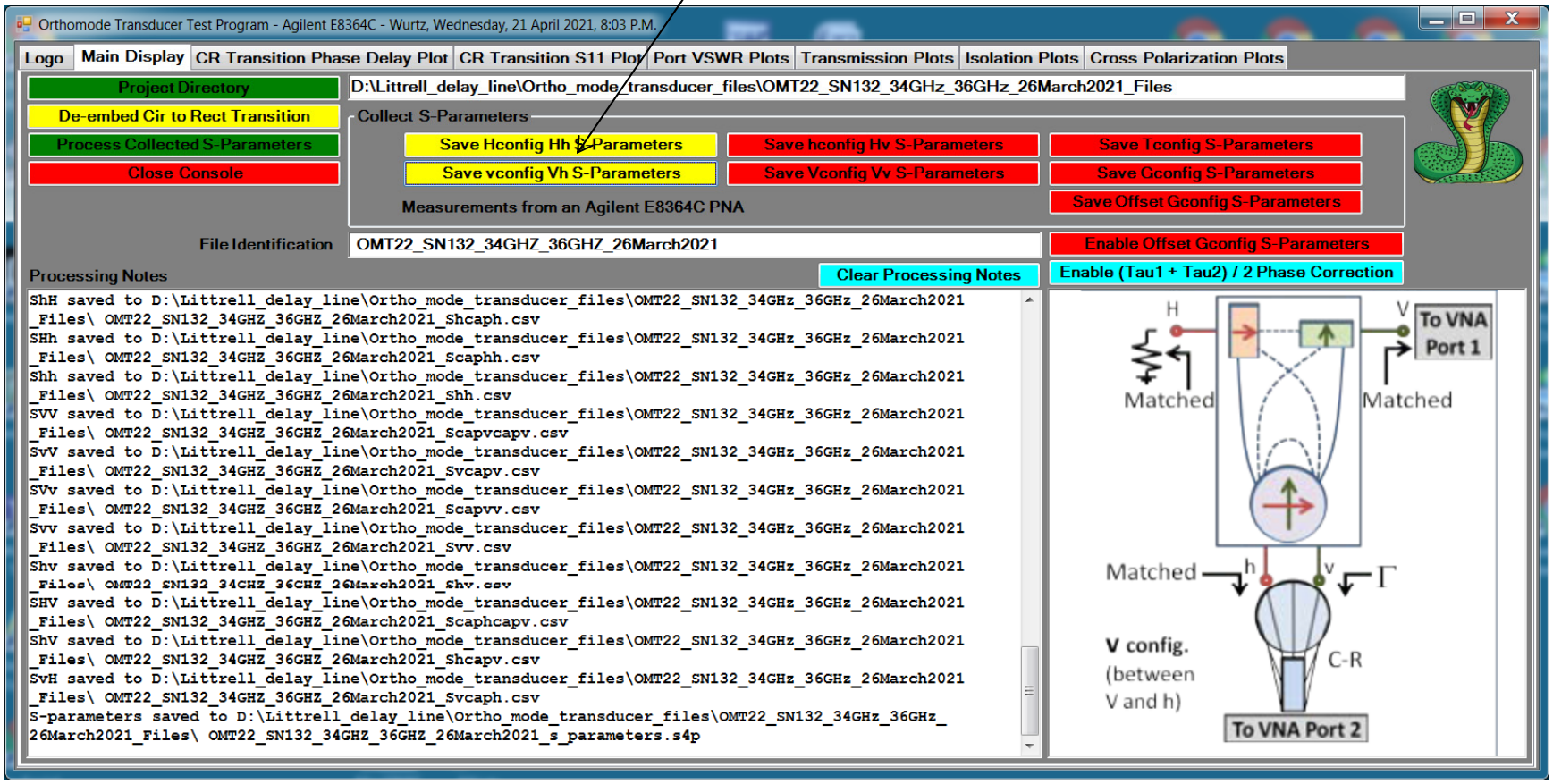
Take hconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



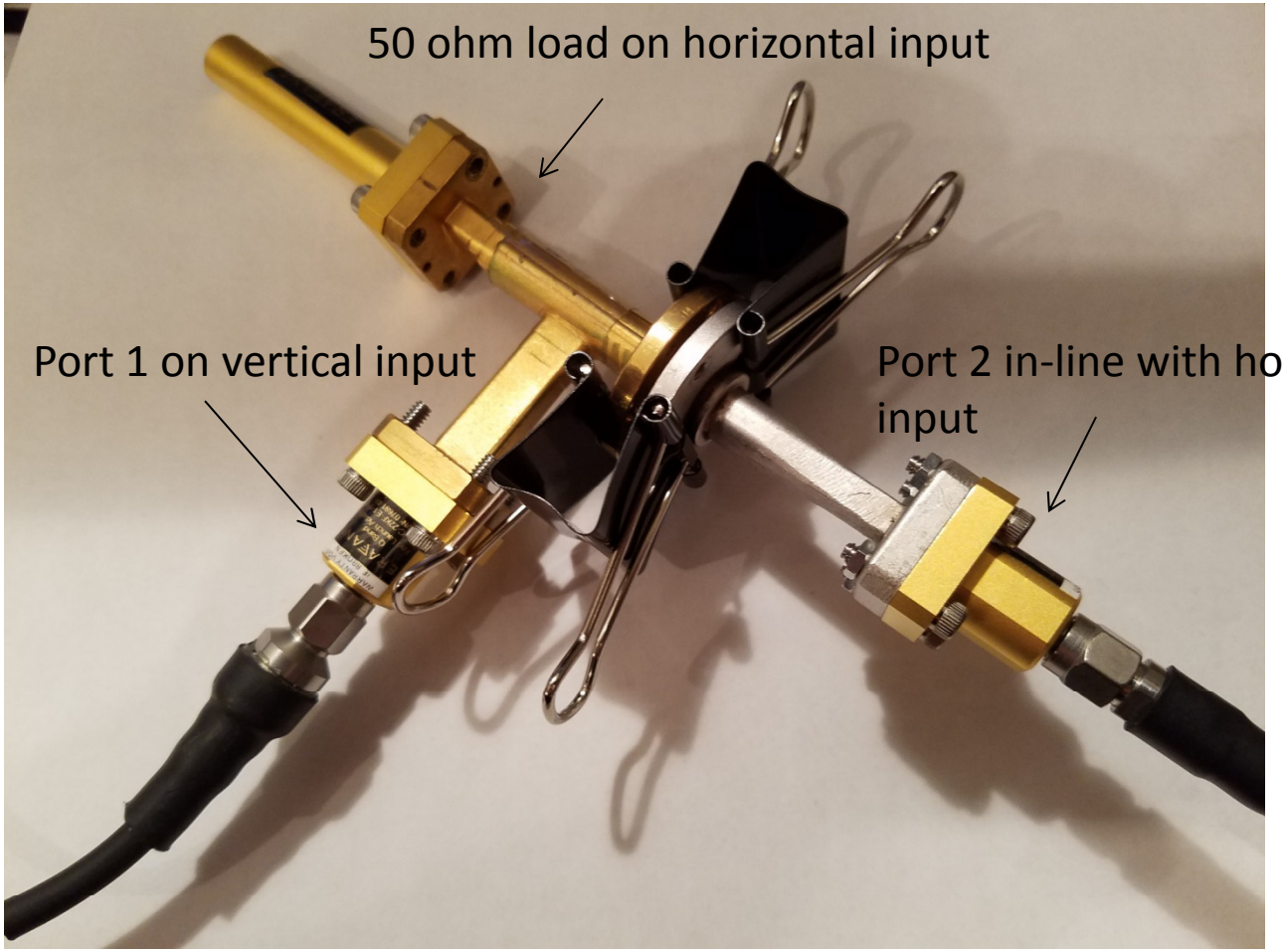
hconfig measurement



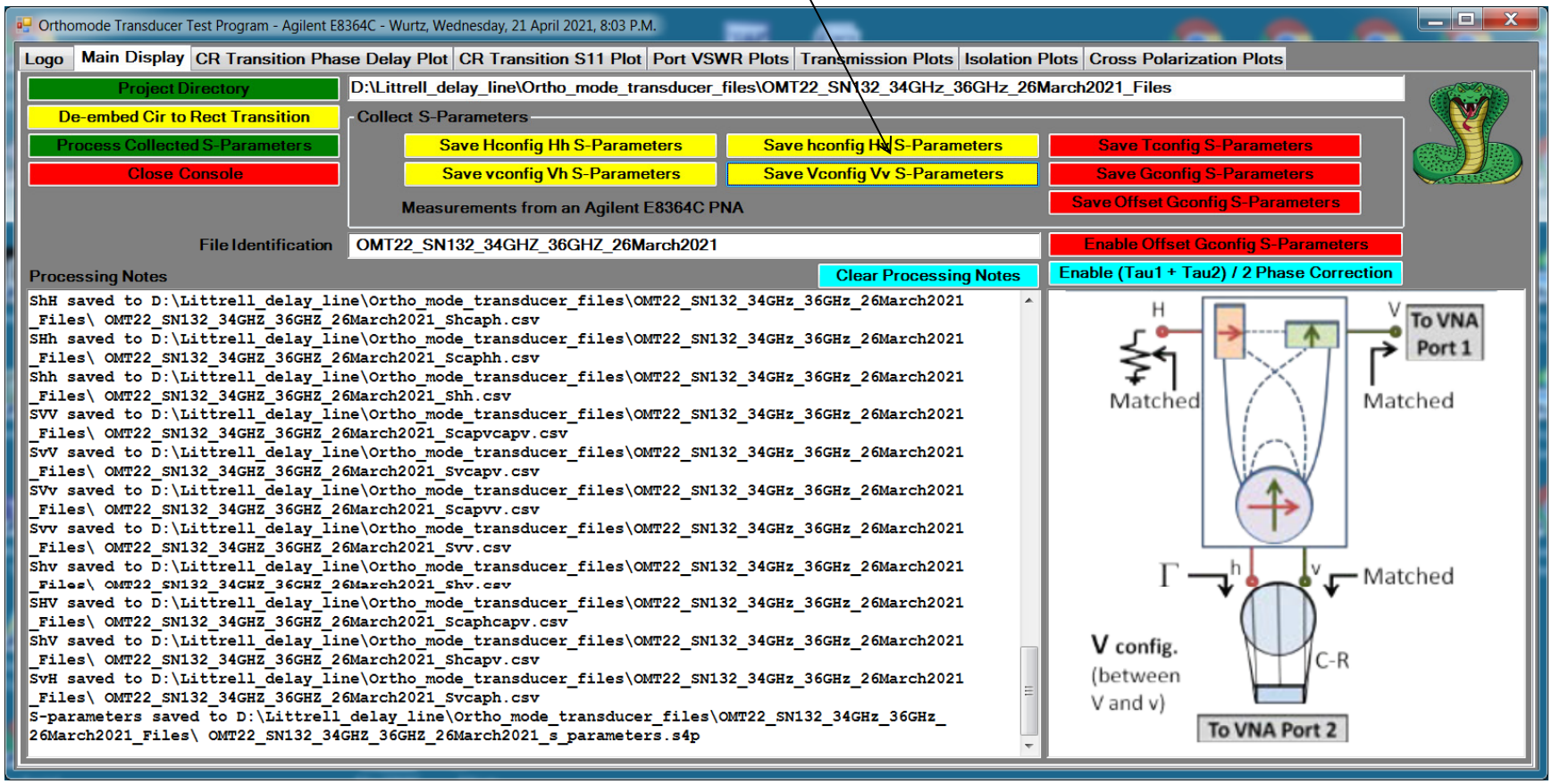
Take vconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



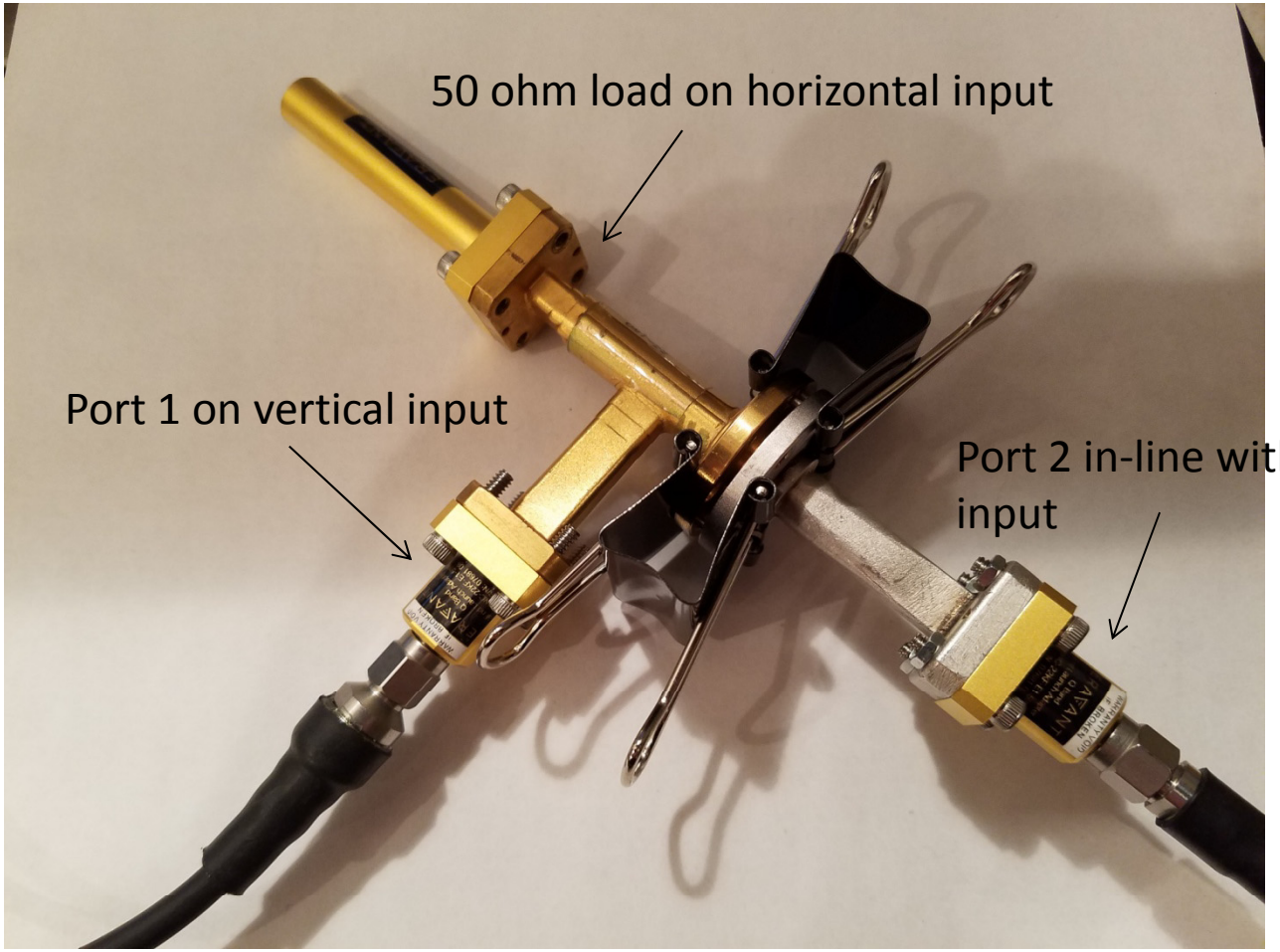
vconfig measurement



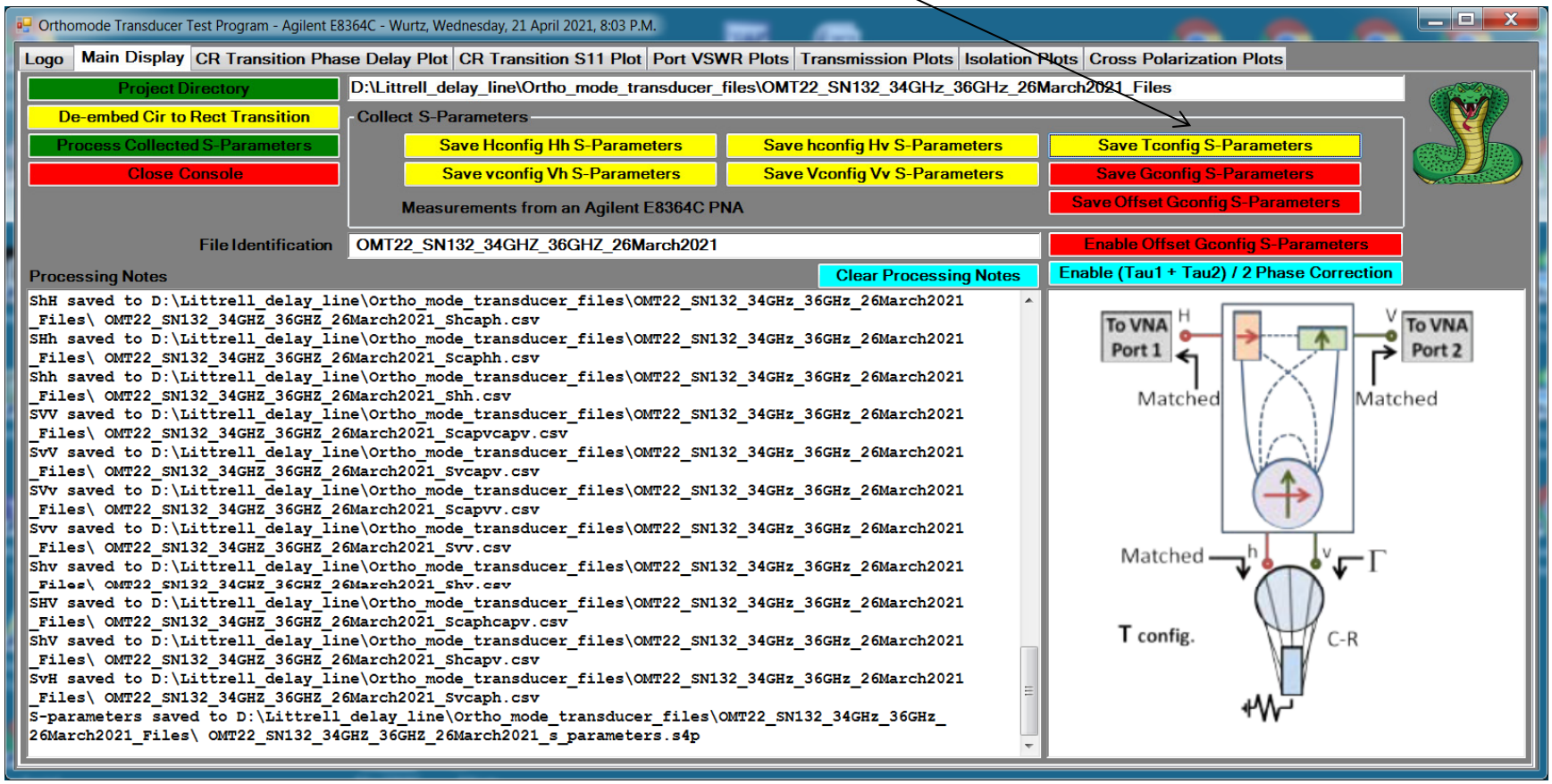
Take Vconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



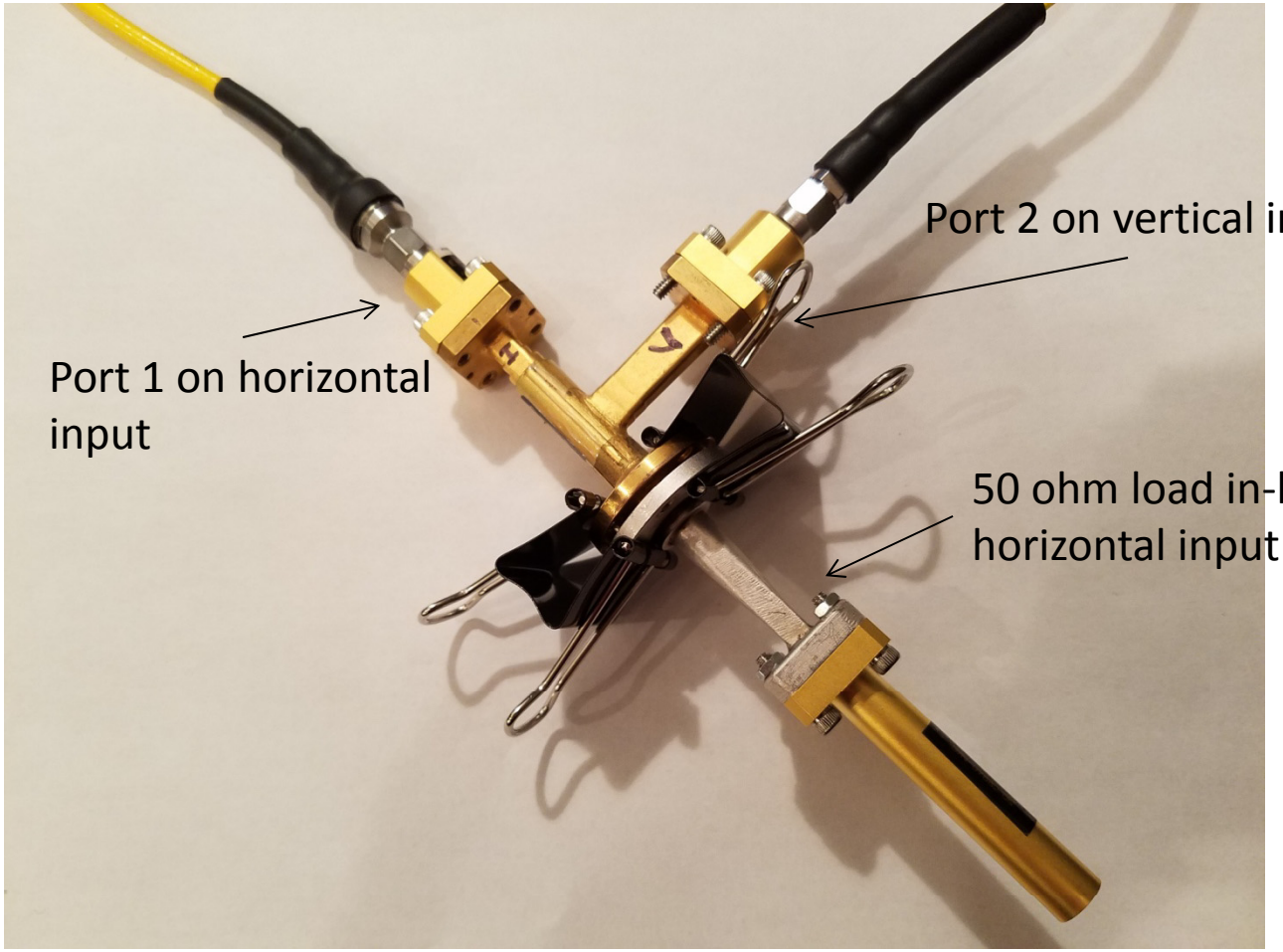
Vconfig measurement



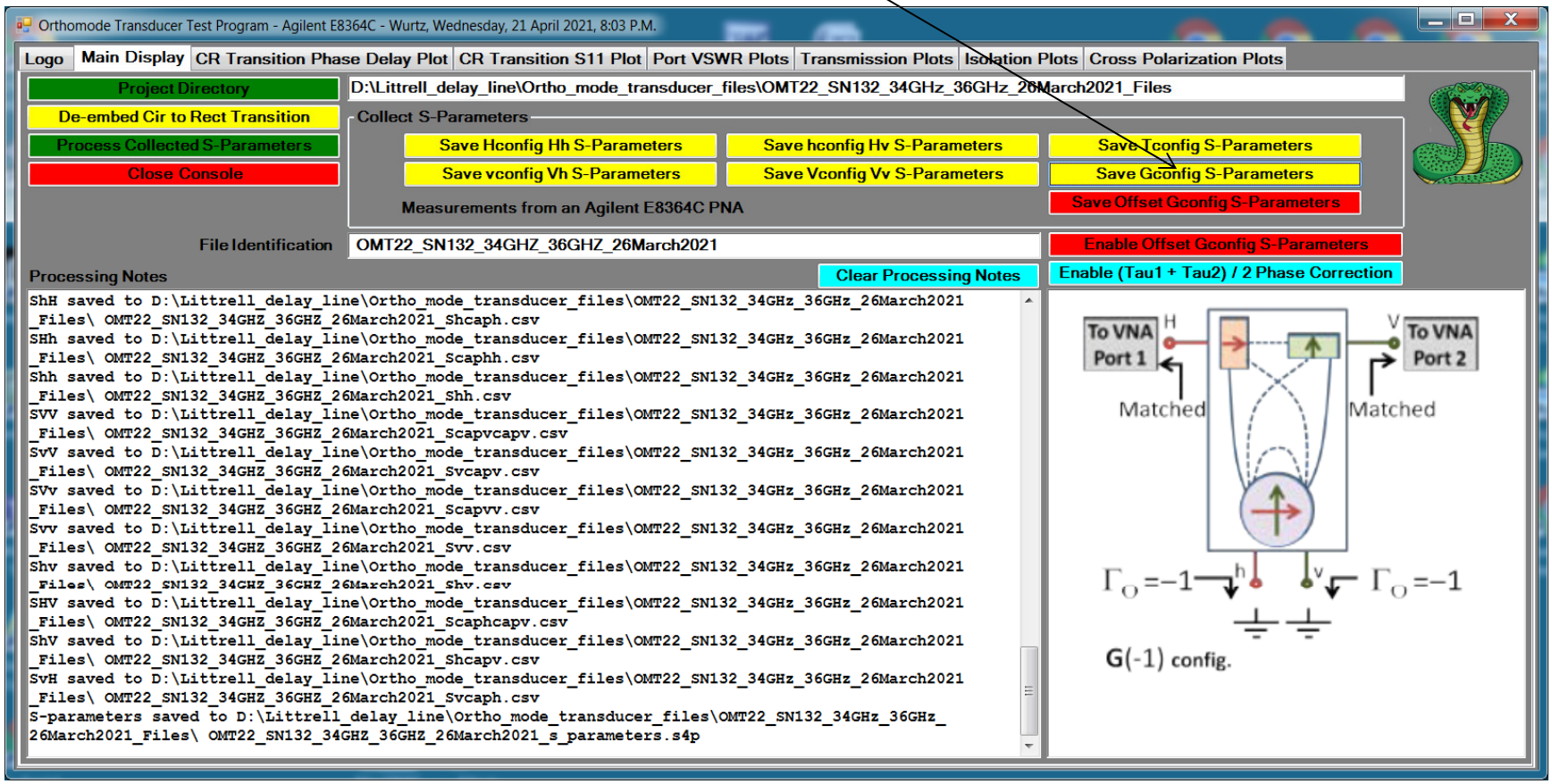
Take Tconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



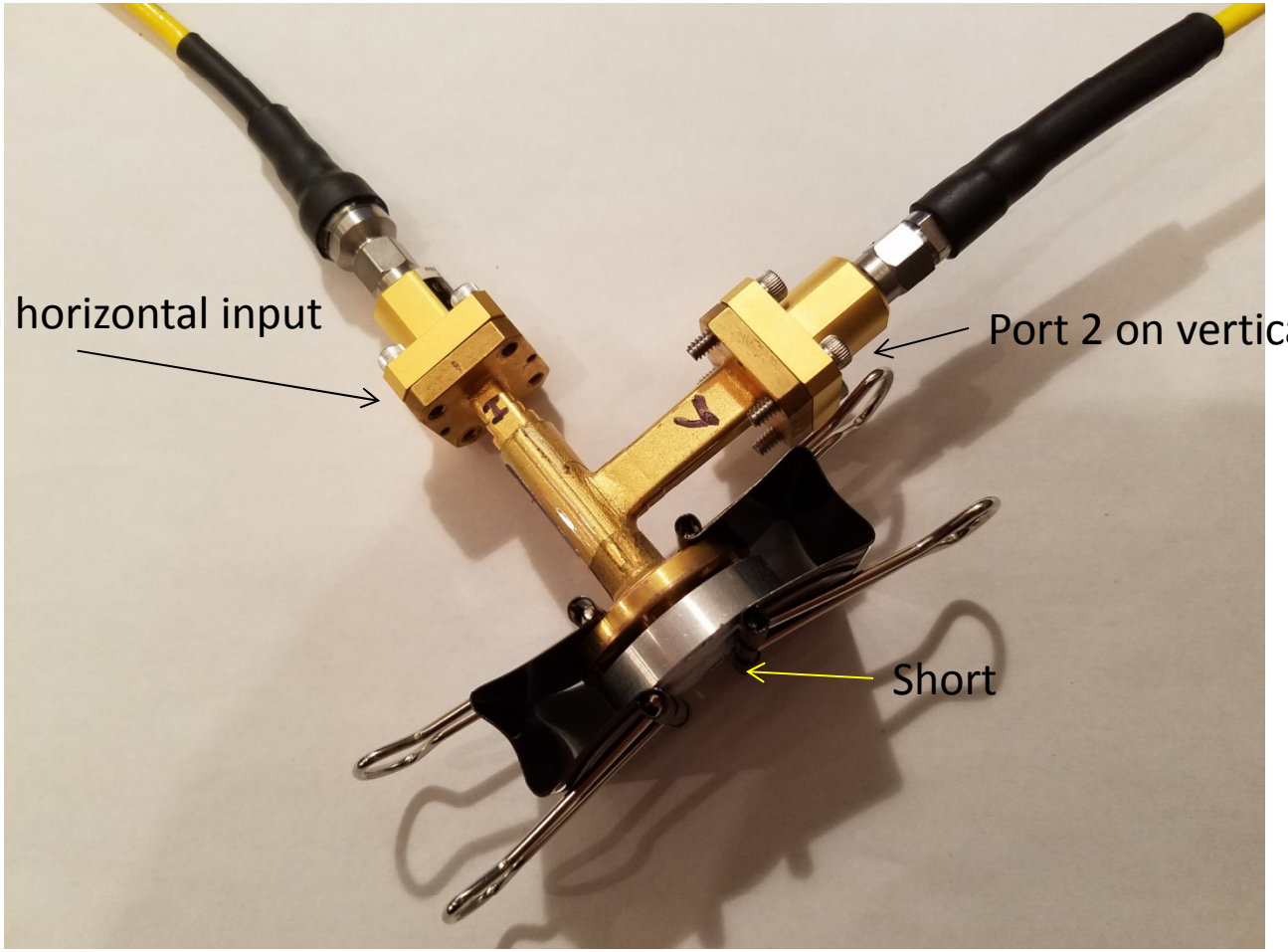
Tconfig measurement



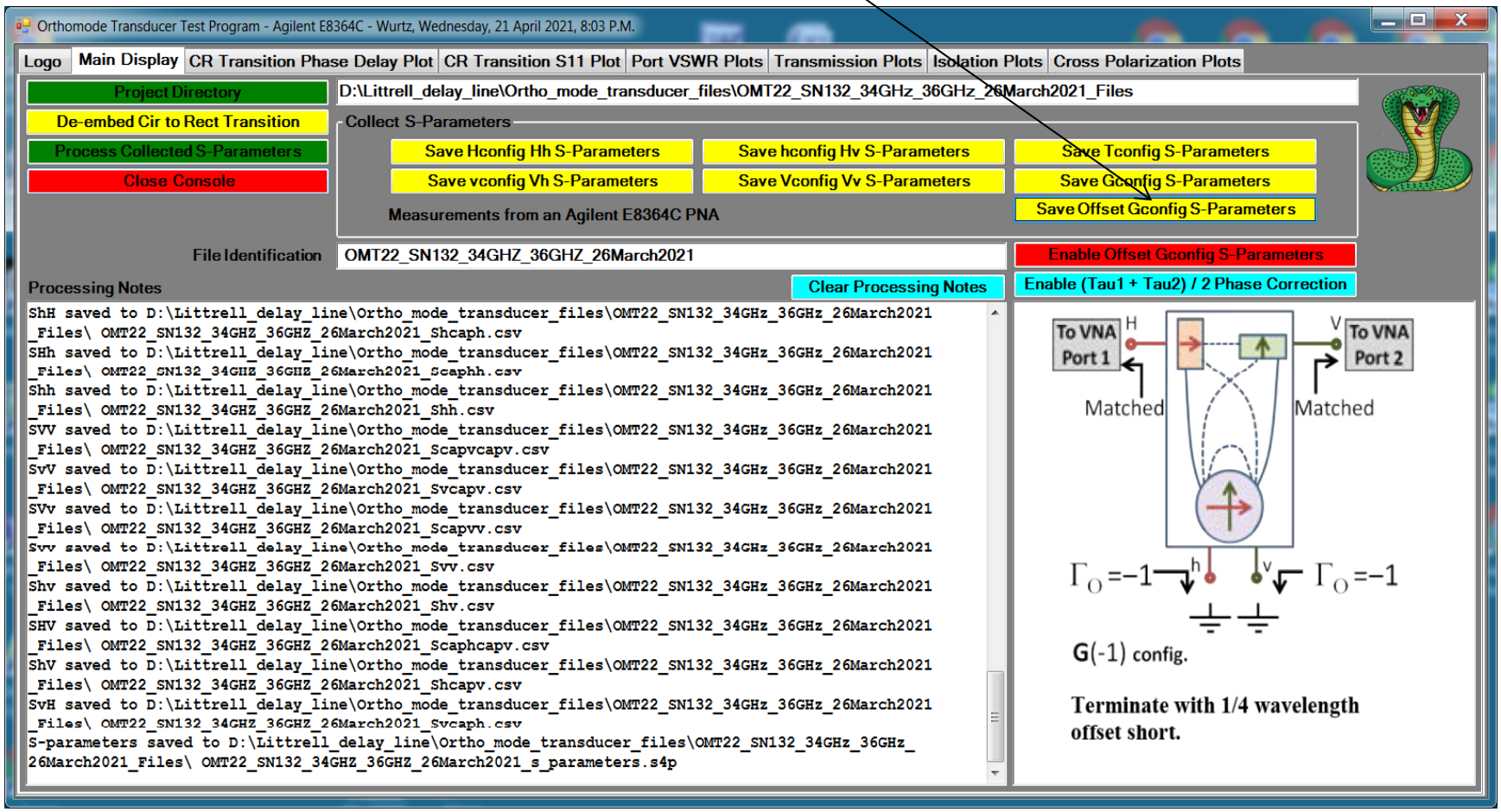
Take Gconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)



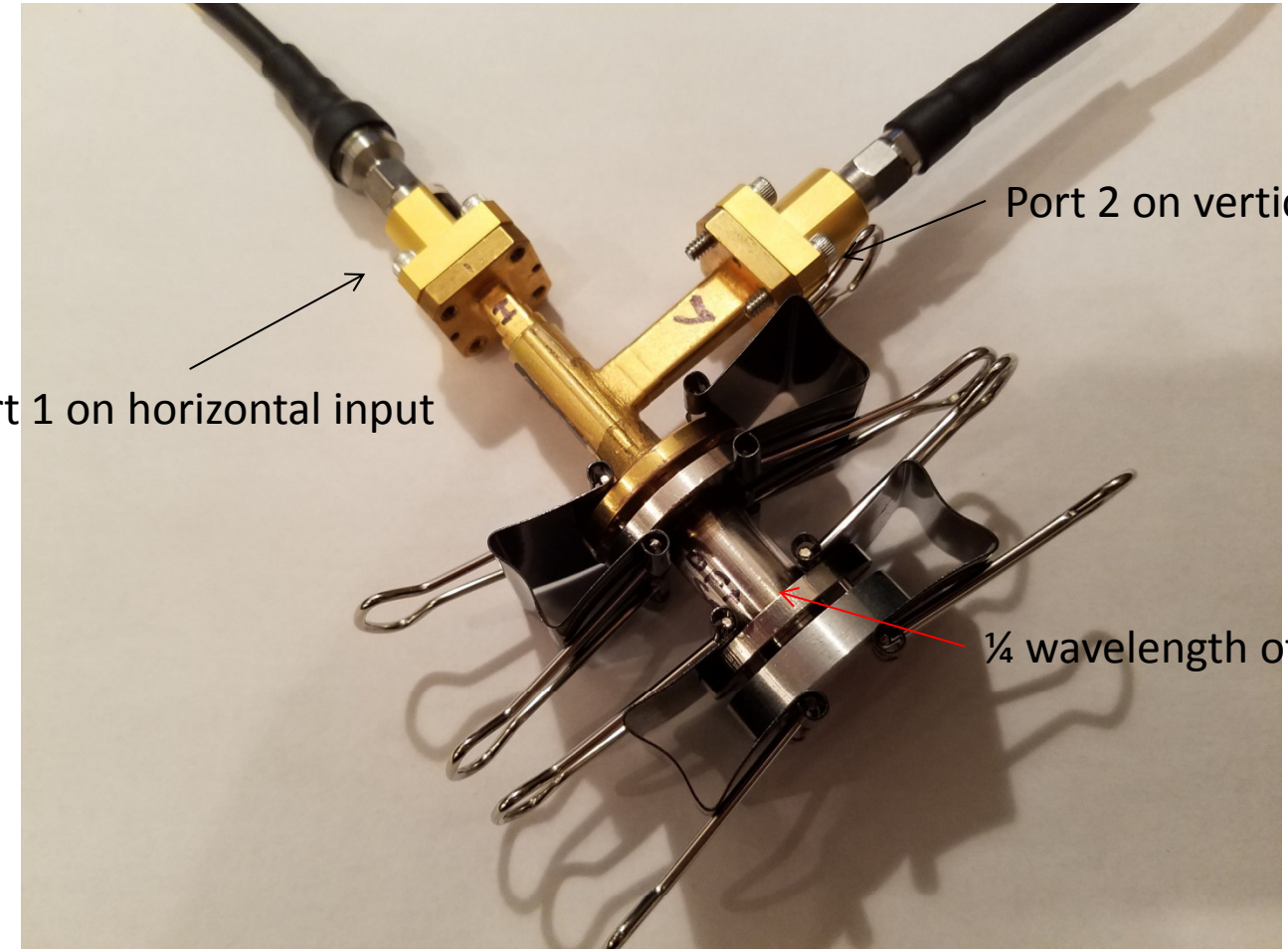
Gconfig measurement



Take Offset Gconfig measurement
press once for required setup and twice for measurement
Setup shown bottom right and on next slide (repeat if needed)
This measurement needed only if pole condition(s) appear in results

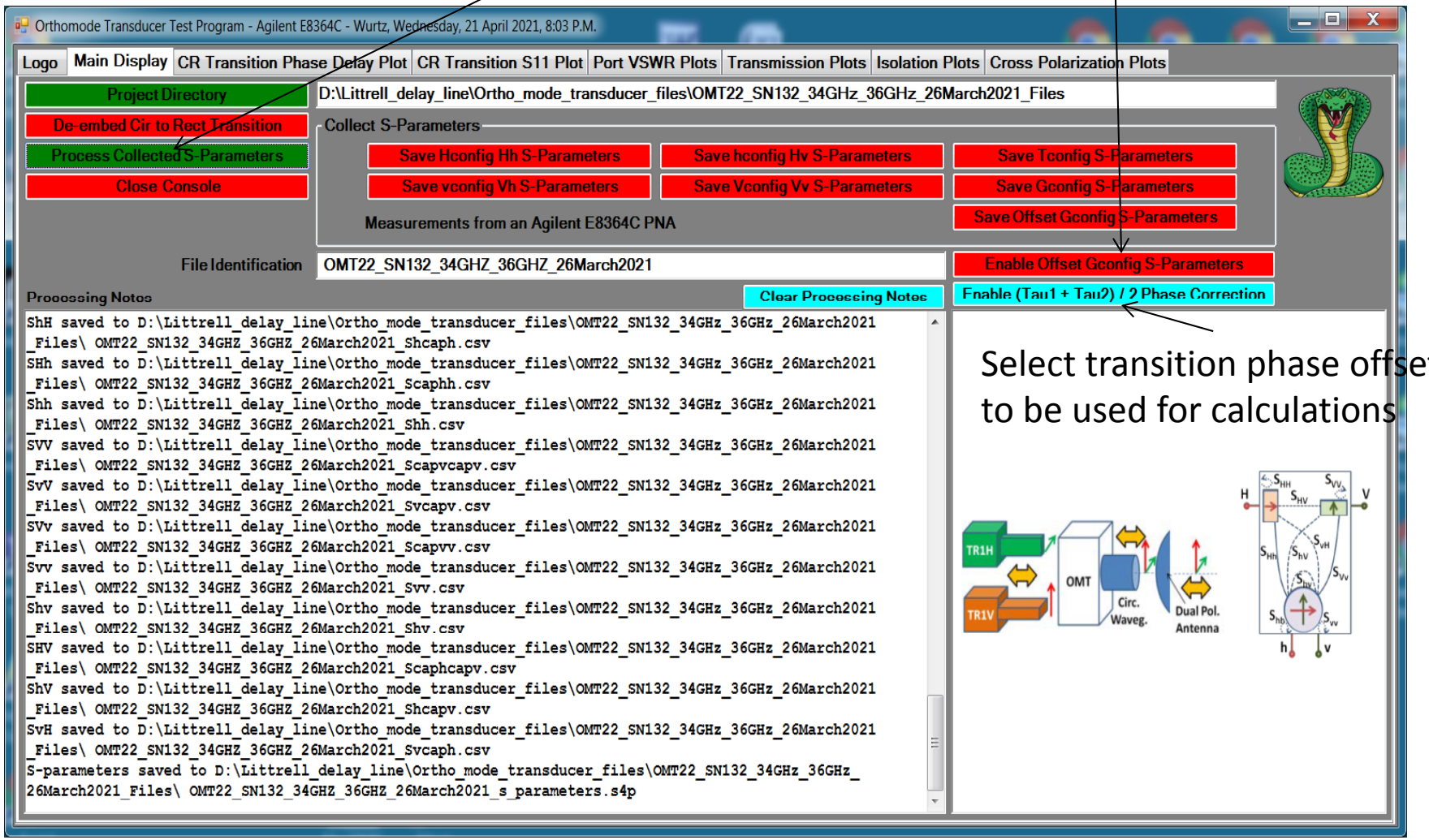


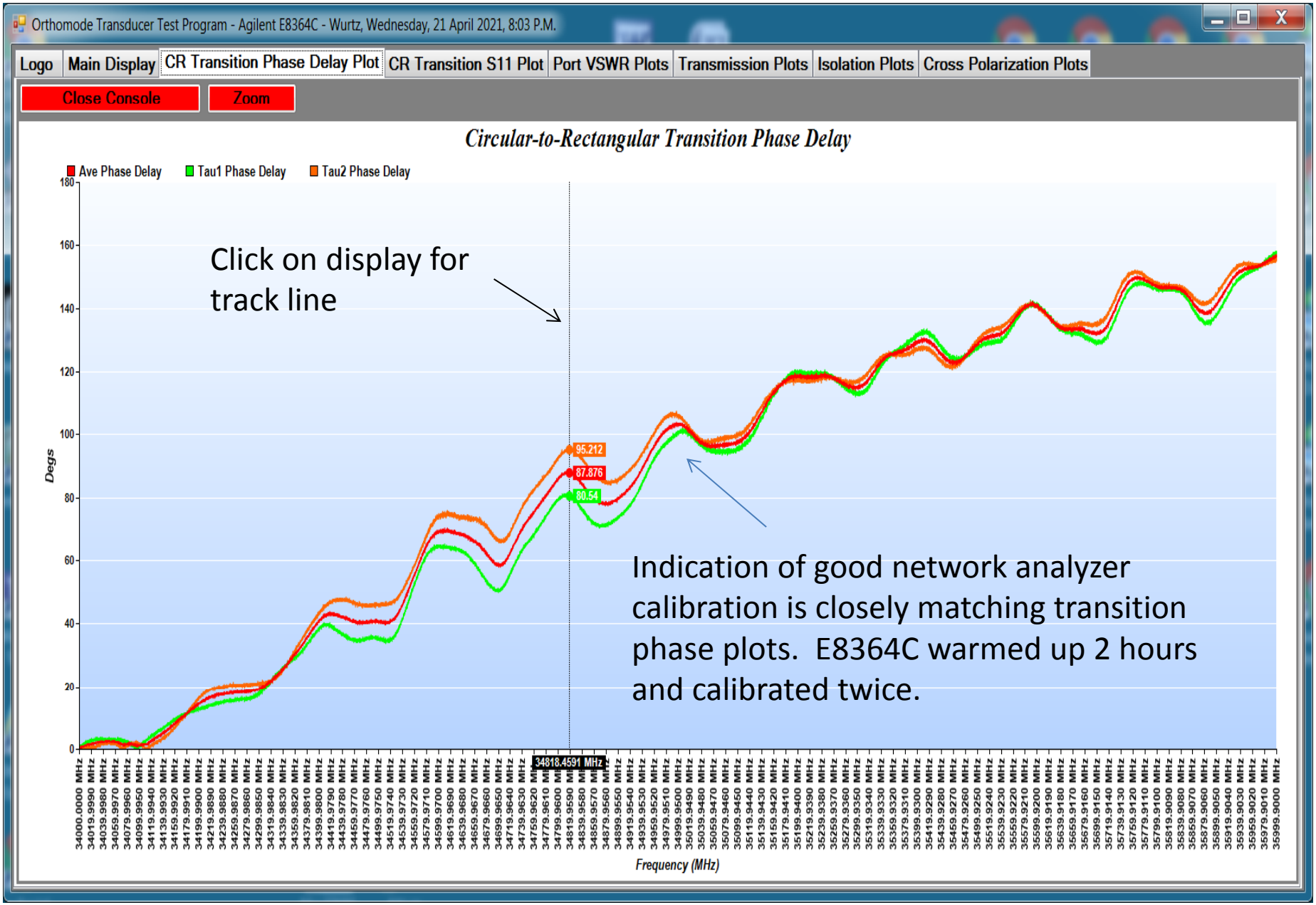
Offset Gconfig measurement



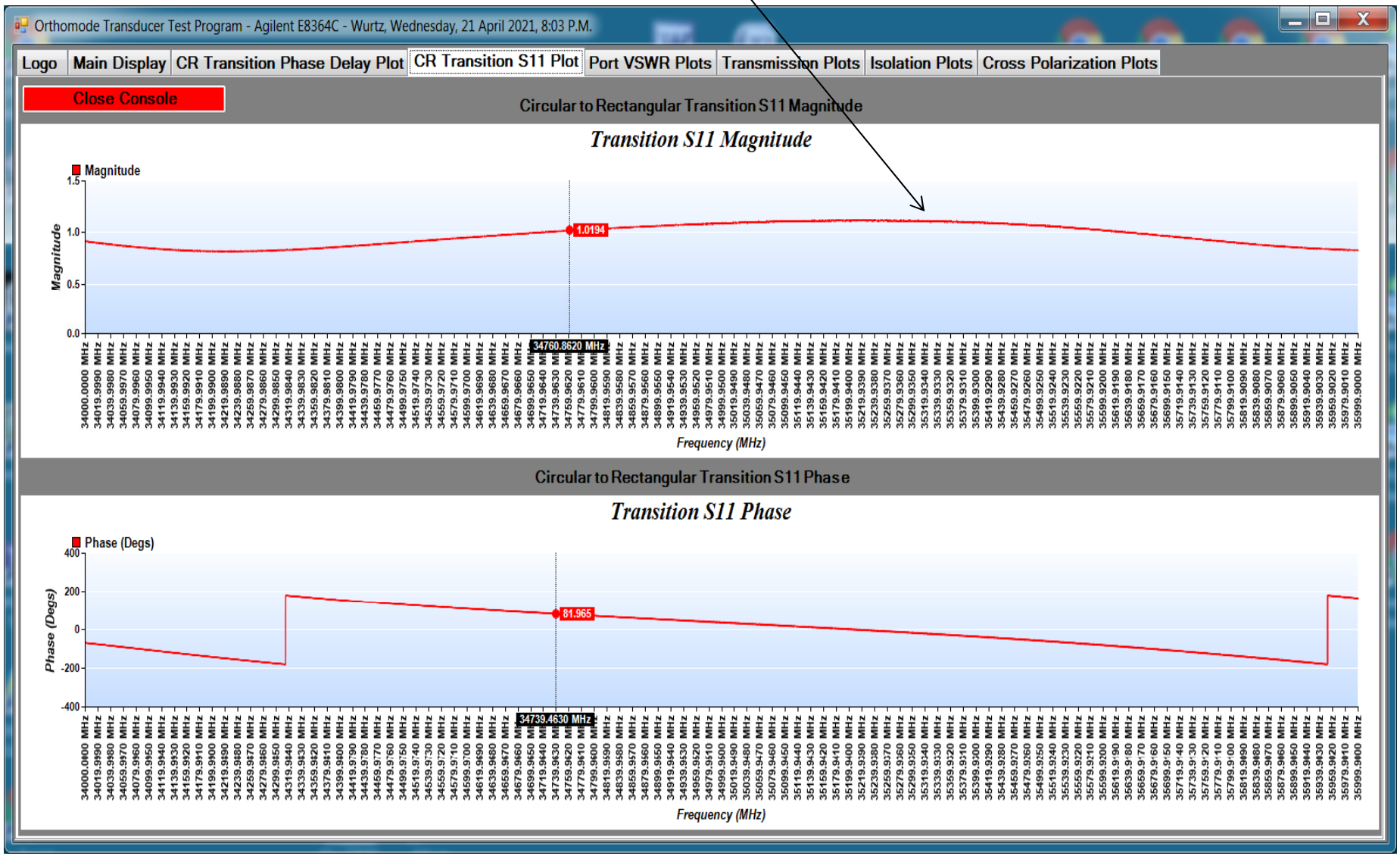
Process S-parameter measurements

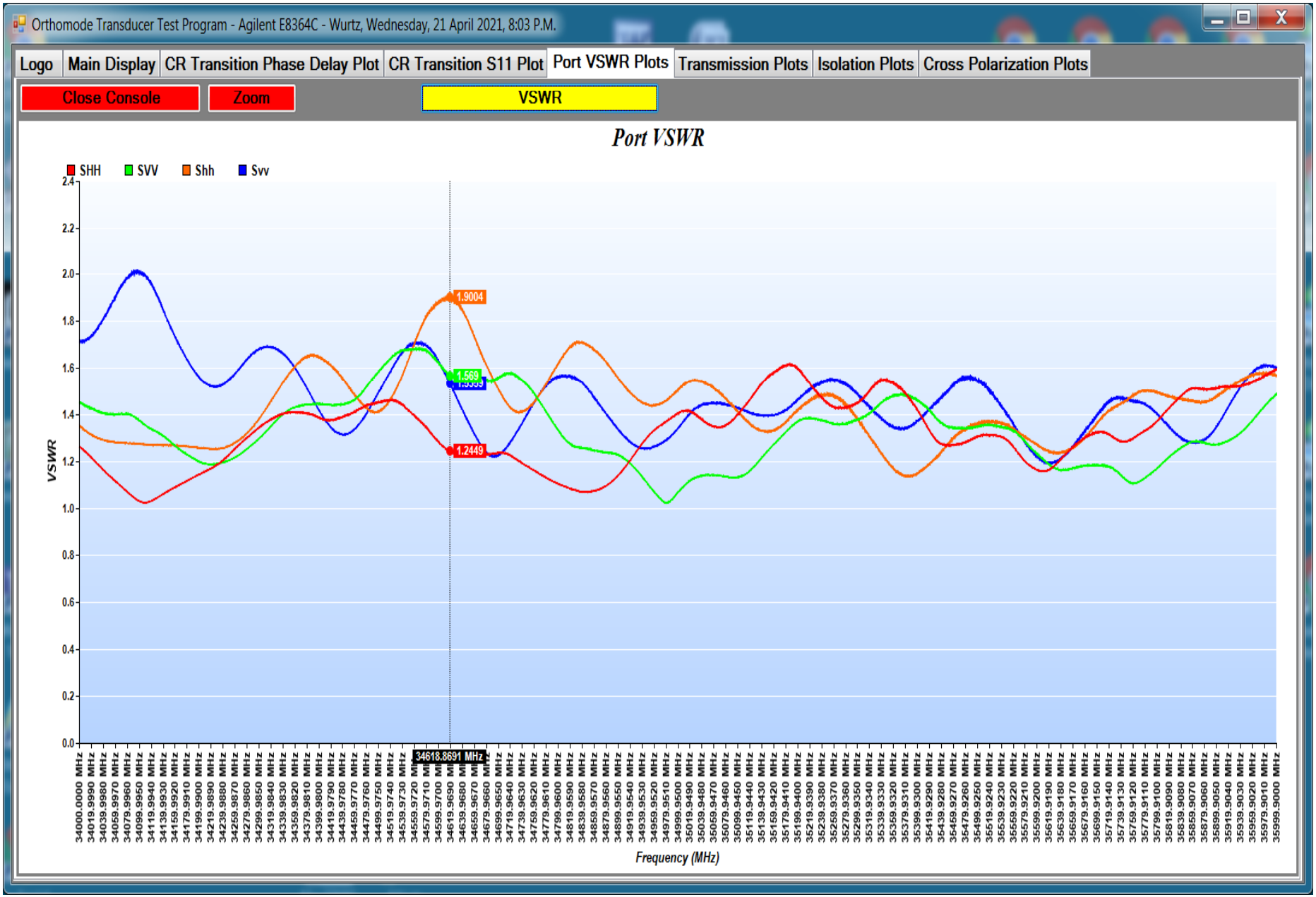
Select Offset Gconfig measurements only if pole condition(s) appear in results

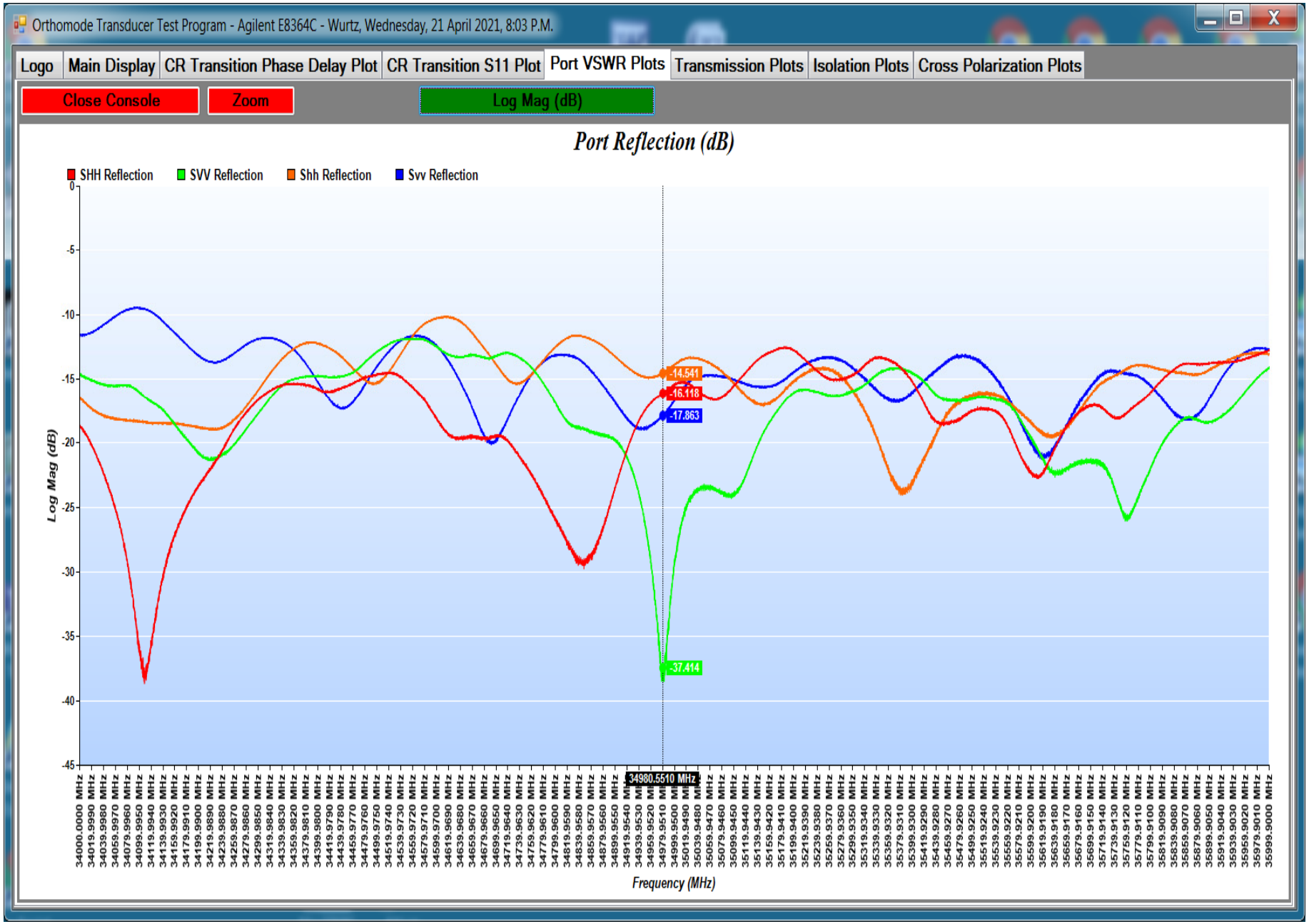



Orthomode Transducer Test Program - Agilent E8364C - Wurtz, Wednesday, 21 April 2021, 8:03 P.M.
Logo
Main Display
CR Transition Phase Delay Plot
CR Transition S11 Plot
Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
Circular-to-Rectangular Transition Phase Delay
Ave Phase Delay
Tau1 Phase Delay
Tau2 Phase Delay
Degs
Frequency (MHz)
95.212
87.876
80.64
34818.4591 MHz
Click on display for track line
Indication of good network analyzer calibration is closely matching transition phase plots. E8364C warmed up 2 hours and calibrated twice.

Indicates quality of circular to rectangular transition
Perfect result should be 1.0 for 100% reflection




Orthomode Transducer Test Program - Agilent E8364C - Wurtz, Wednesday, 21 April 2021, 8:03 P.M.
Logo
Main Display
CR Transition Phase Delay Plot
CR Transition S11 Plot
Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
VSWR
Port VSWR
SHH
SVV
Shh
Svv
1.9004
1.569
1.2449
34618.8691 MHz
VSWR
Frequency (MHz)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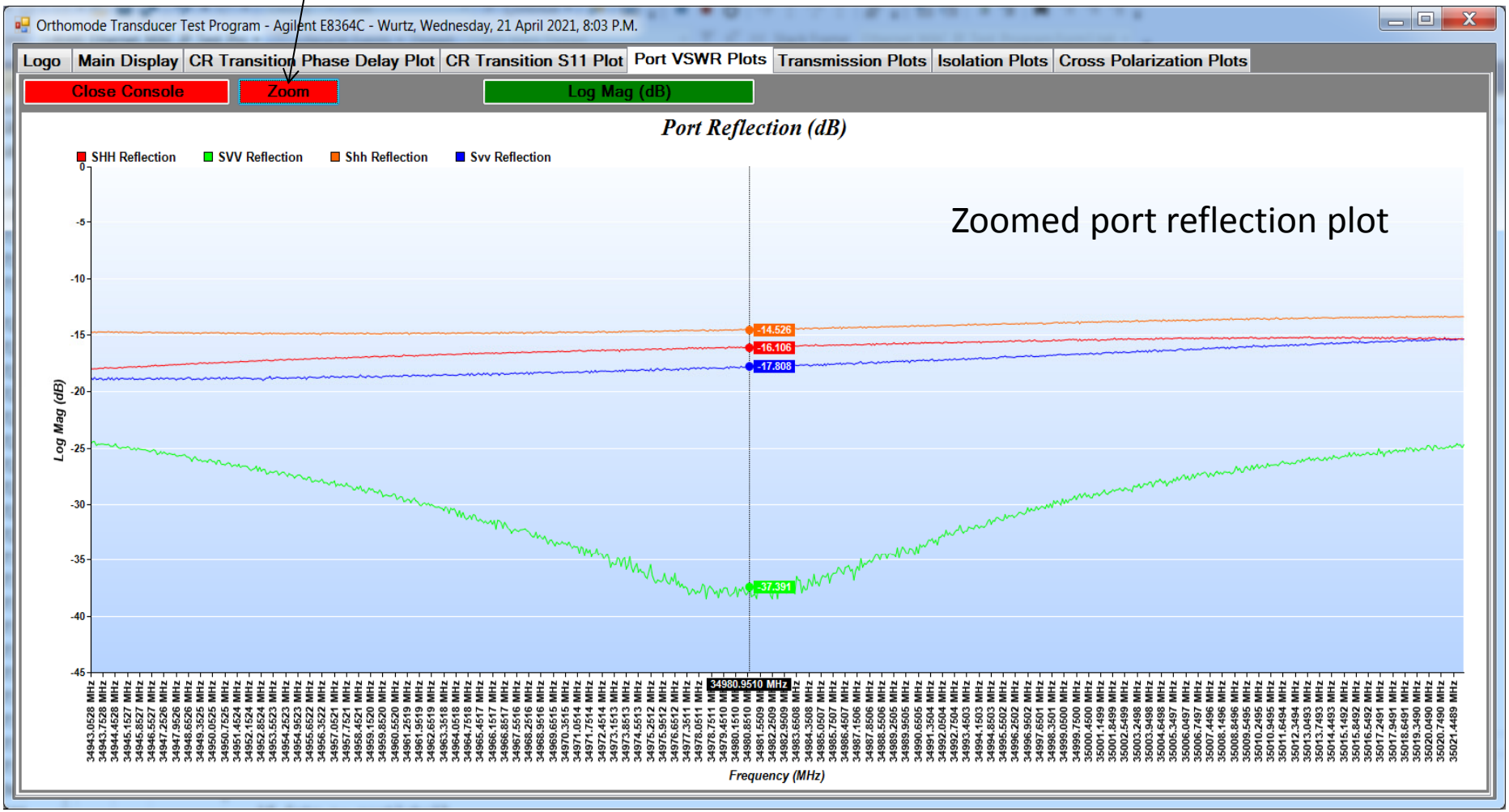
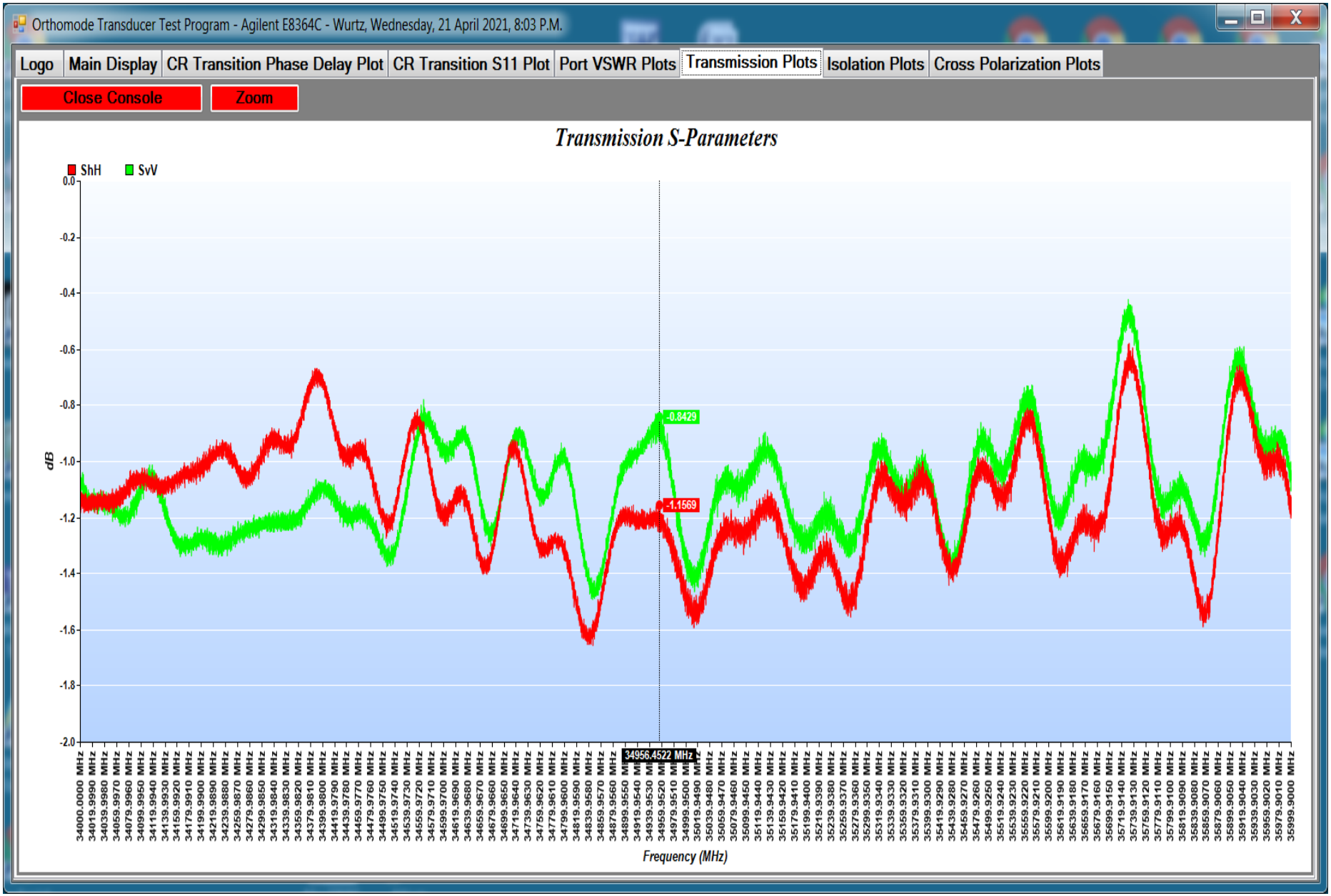
Logo
Main Display
CR Transition Phase Delay Plot
CR Transition S11 Plot
Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
Log Mag (dB)
Port Reflection (dB)
SHH Reflection
SVV Reflection
Shh Reflection
Svv Reflection
Log Mag (dB)
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-14.541
-16.118
-17.863
-37.414
34980.5510 MHz
Frequency (MHz)

To zoom plot:

1. Press zoom button (will turn green)
2. Click on display start point
3. Click on display stop point (display will zoom and button will turn red)
4. Press zoom button twice for full display

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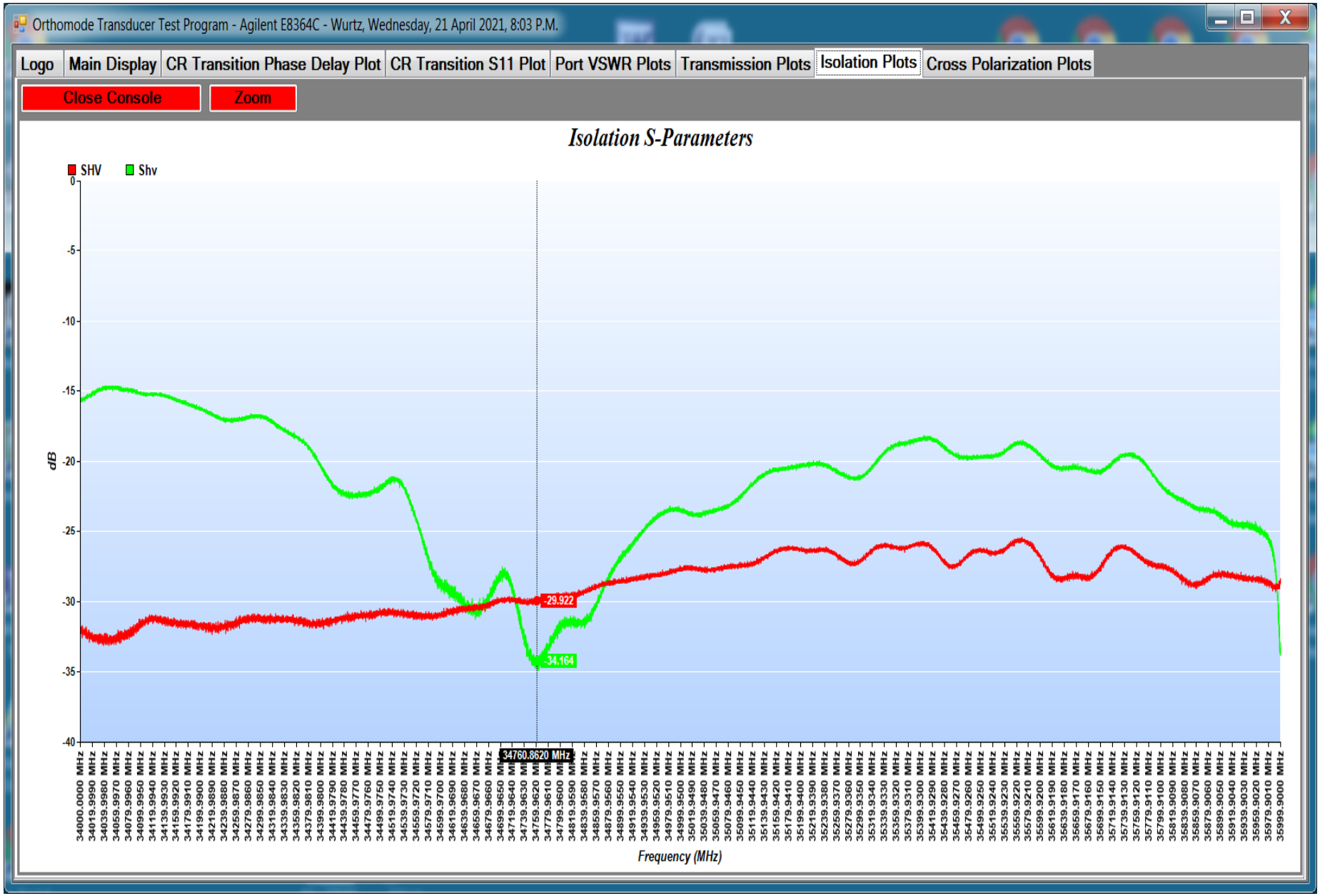
Logo
Main Display
CR Transition Phase Delay Plot
CR Transition S11 Plot
Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
Transmission S-Parameters
ShH
SvV
dB
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
-0.8429
-1.1569
34956.4522 MHz
Frequency (MHz)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Main Display
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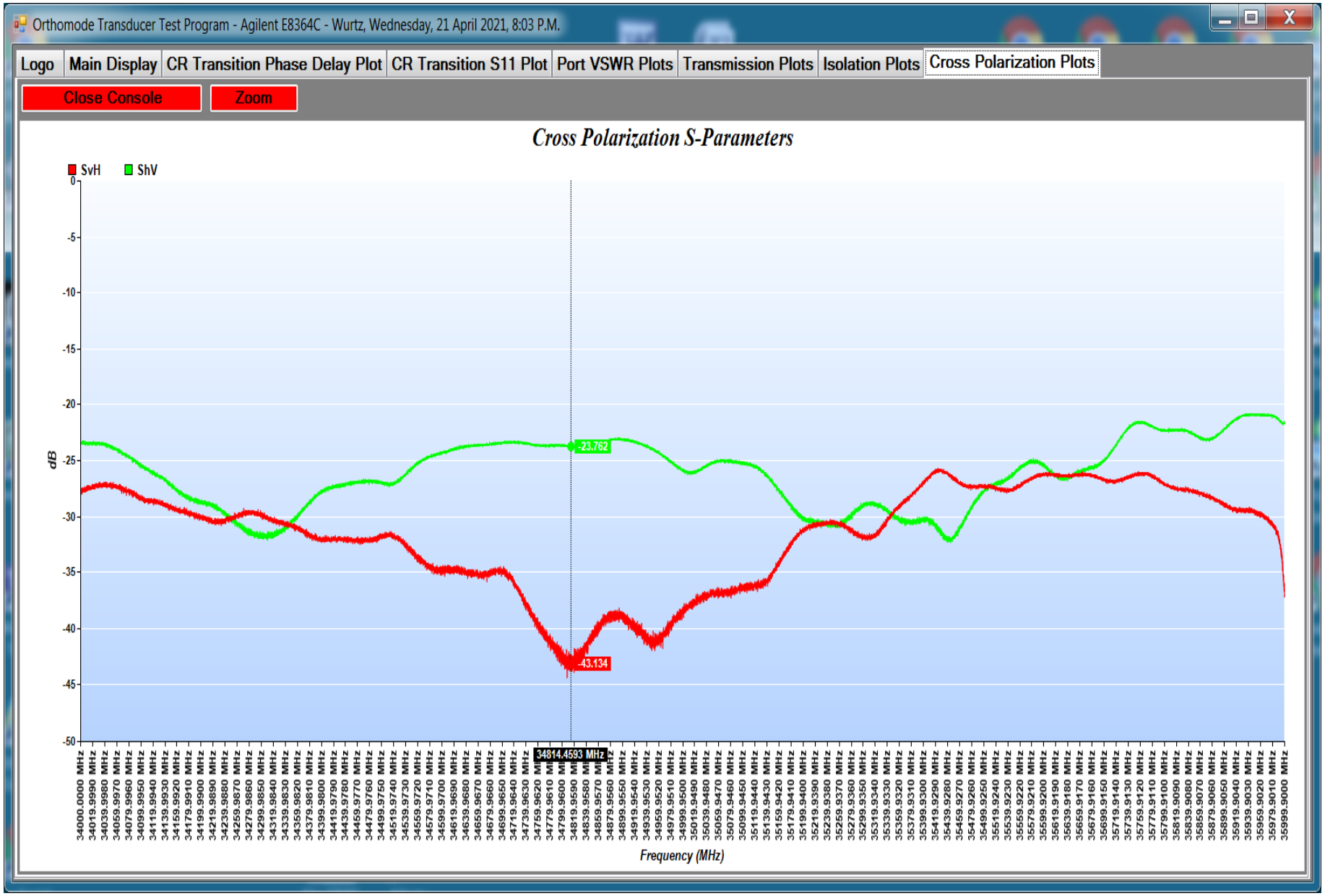
Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
Isolation S-Parameters
SHV
Shv
dB
0
-5
-10
-15
-20
-25
-30
-35
-40
-29.922
-34.164
34760.8620 MHz
Frequency (MHz)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Port VSWR Plots
Transmission Plots
Isolation Plots
Cross Polarization Plots
Close Console
Zoom
Cross Polarization S-Parameters
SvH
ShV
dB
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-23.762
-43.134
34814.4593 MHz
Frequency (MHz)

Files saved in project directory: OMT22_SN132_34GHZ_36GHZ_26March2021_Files