NanoVNA

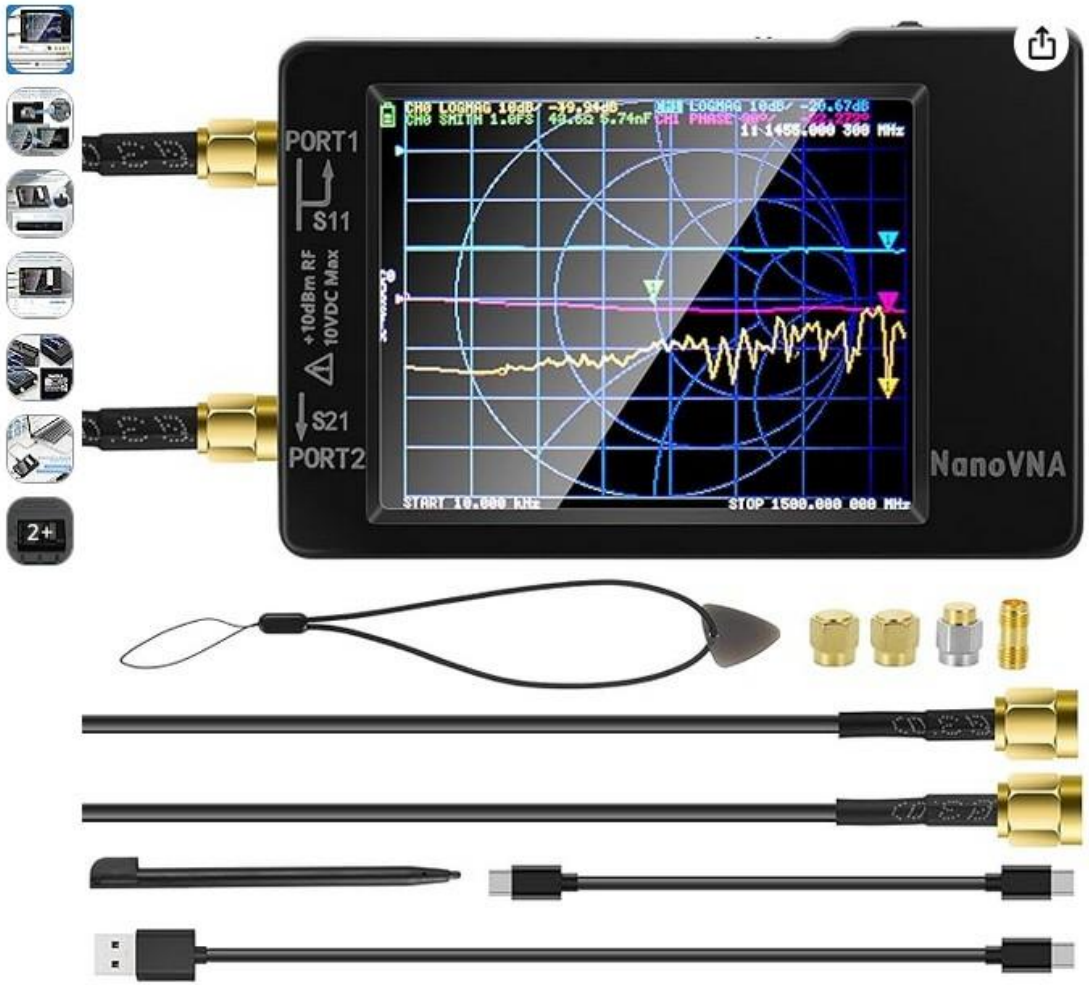
For the North Florida Amateur Radio Society

Sam Hancock – K4NAV

Bruce Sherman – N4OQV

12 MAR 2026

The NANO VNA (vector network analyzer) may be considered the “Swiss Army Knife” for amateur radio. It’s capable of many tasks hams can use day to day on the bench, in the shack or in the field. *A quality Nano VNA can be purchased on AMAZON for less than $50!*



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[Upgraded] AURSINC NanoVNA-H Vector Network Analyzer 9KHz -1.5GHz Latest HW V3.7 HF VHF UHF Antenna Analyzer, Measuring S Parameters, SWR, Phase, Delay, Smith Chart

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#1 Best Seller in Spectrum Analyzers

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-5% $47.49

Typical price: ~~$49.99~~ | Price history

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Antenna	Radio
Brand	AURSINC
Color	Black
Number of Channels	2
Impedance	50 Ohms
Maximum Range	300 Meters

$47.49

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Deliver to Amy - Jacksonville 32224

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➢ ***ANTENNA ANALYSIS AND TESTING***

- **Determine SWR**
  - Check antenna and feedline for resonance at the desired frequency
- **Impedance matching**
  - Measure the impedance of an antenna and adjust to transmitter's resonance (e.g. 50Ω's)
- **Resonance testing**
  - Identify the resonant frequency of an antenna

➢ ***TRANSMISSION LINE TESTING***

- **Coaxial cable analysis**
  - Measure loss
  - Check for faults
  - Analyze length using time-domain reflectometry (TDR) features
- **Velocity factor determination**
  - Calculate the velocity factor of a transmission line
- **Smith Chart Analysis**
  - Allows visualization of impedance and phase characteristics of feedlines and antennas

➢ ***FILTER DESIGN AND TUNING***

- **Design Verification**
  - Test and tune bandpass, low-pass, high-pass or notch filters for desired performance
- **Insertion loss measurement**
  - Evaluate the insertion loss and bandwidth of RF filters

➢ ***RF CIRCUIT TESTING***

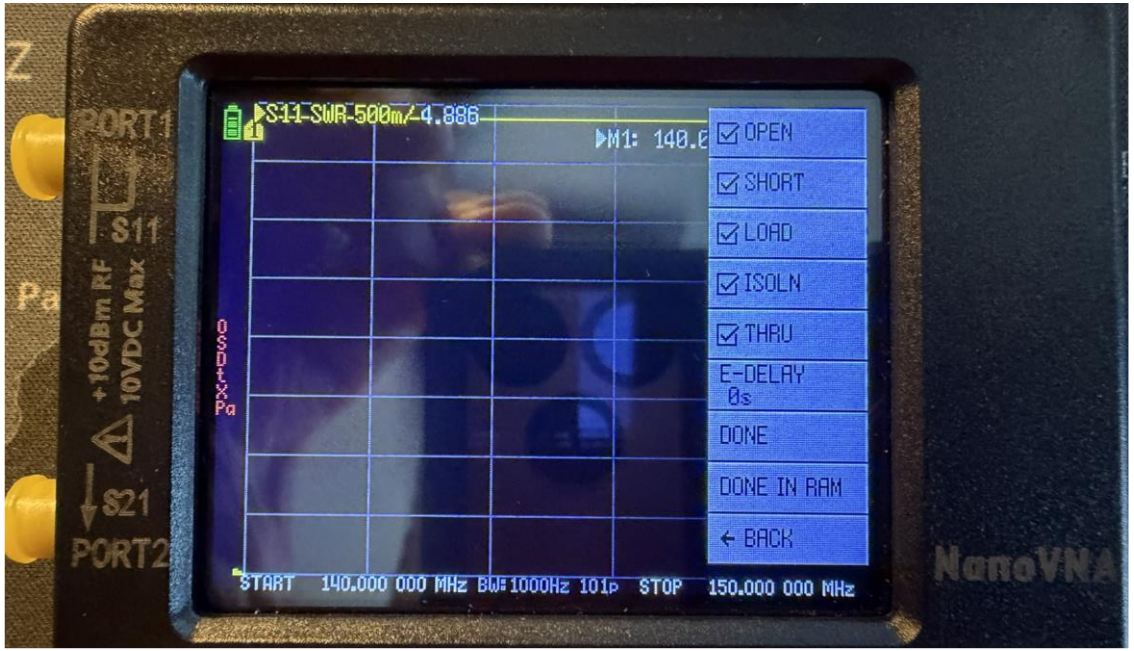
- **Component analysis**
  - Measure the properties of inductors, capacitors, resistors and resonators at RF frequencies
- **Matching network design**
  - Optimize matching networks for amplifiers and other RF components
- **Balun testing**
  - Evaluate the performance and balance of baluns or ununs

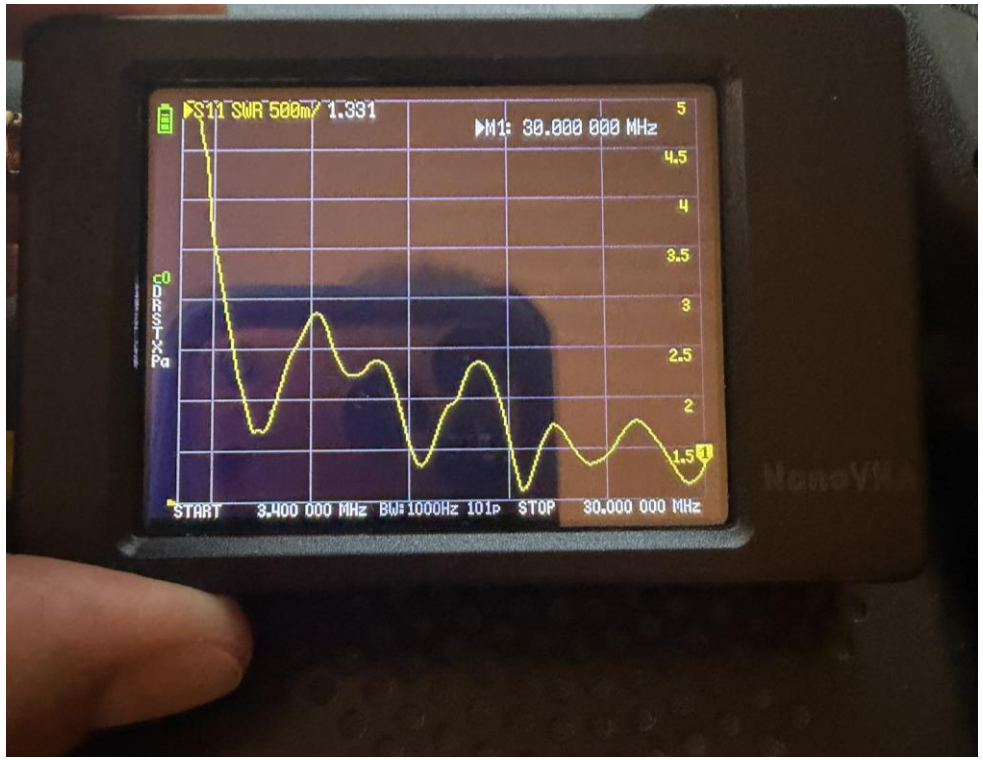
➢ ***Amplifier and Transmitter Optimization***

- **Impedance matching**
  - Match the amplifier's output impedance to the load for maximum efficiency
- **Harmonic Testing**
  - Evaluate the harmonics of a transmitter with appropriate filters

Calibration

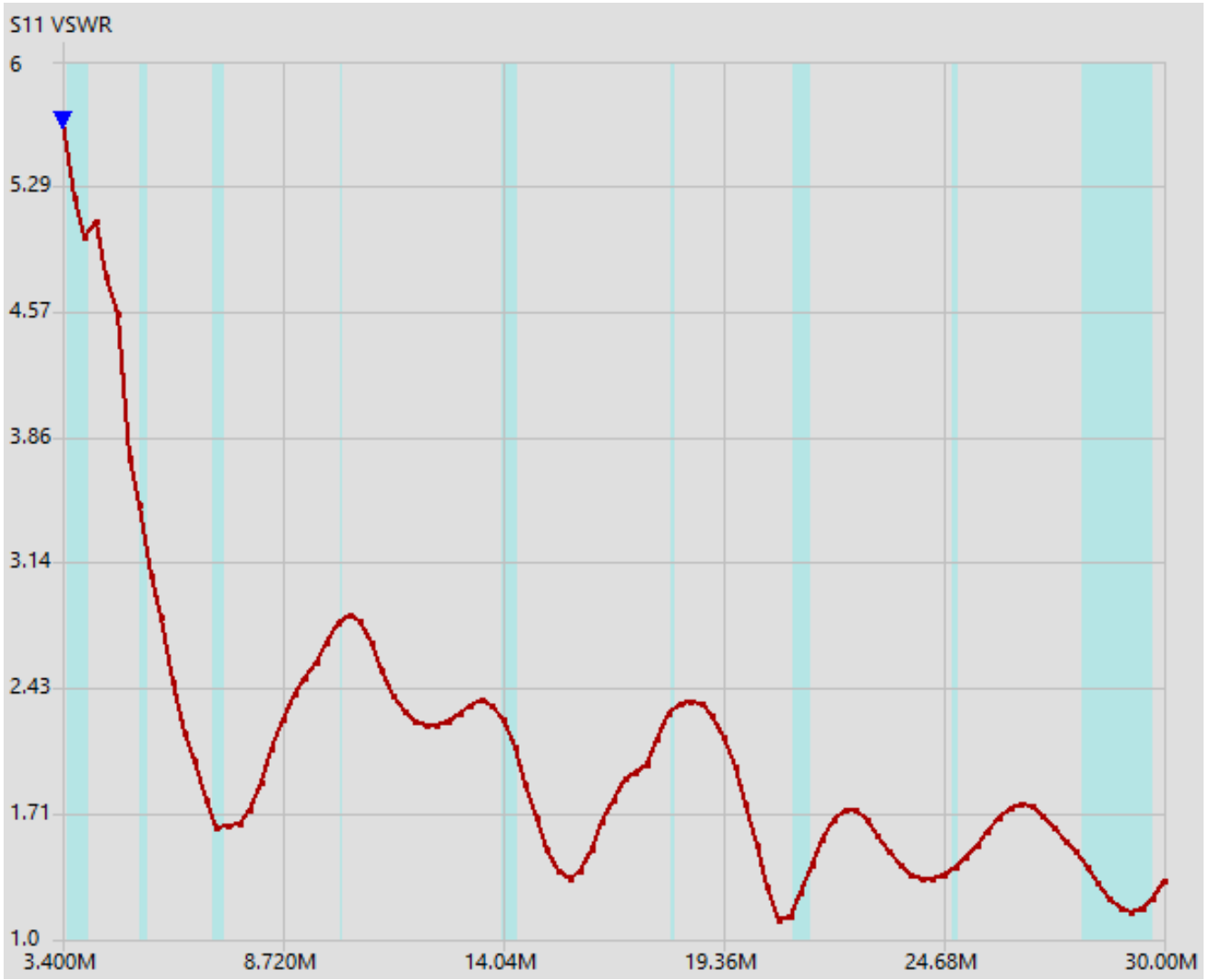
- Open
- Short
- Load
- Isolation
- Thru





NanoVNA Saver

https://nanovna.com/?page_id=90



NanoVNA Saver 0.6.8 (Sweep: nanovna_2026-03-11 19:23:04 @ 101 points)

Sweep control

Start 3.4MHz | Center 16.7MHz
Stop 30MHz | Span 26.6MHz
Segments 1 | 266.0kHz/step
Sweep settings ...
100%
Sweep | Stop

Markers

Marker 1 21.222MHz
Marker 2 3.666MHz
Marker 3 29.202MHz
Enable Delta Marker | Reference
Hide data | Locked

TDR

Estimated cable length: 24.382m
Time Domain Reflectometry ...

Reference sweep

Set current as reference
Reset reference

Serial port control

Port COM6 (NanoVNA) | Rescan
Disconnect | Manage

Files ... | Calibration ...
Display setup ... | About ...

Marker 1

Frequency:	21.2220 MHz	VSWR:	1.260
Impedance:	44.5+j9.44 Ω	Return loss:	-18.795 dB
Series L:	70.776 nH	Quality factor:	0.212
Series C:	-794.66 pF	S11 Phase:	114.44°
Parallel R:	46.522 Ω	S21 Gain:	-71.352 dB
Parallel X:	1.6459 µH	S21 Phase:	133.85°

Marker 2

Frequency:	3.66600 MHz	VSWR:	5.219
Impedance:	123+j125 Ω	Return loss:	-3.370 dB
Series L:	5.4287 µH	Quality factor:	1.021
Series C:	-347.19 pF	S11 Phase:	23.95°
Parallel R:	250.14 Ω	S21 Gain:	-69.034 dB
Parallel X:	10.641 µH	S21 Phase:	110.65°

Marker 3

Frequency:	29.2020 MHz	VSWR:	1.155
Impedance:	43.3-j148m Ω	Return loss:	-22.853 dB
Series L:	-807.78 pH	Quality factor:	0.003
Series C:	36.772 nF	S11 Phase:	-178.64°
Parallel R:	43.285 Ω	S21 Gain:	-84.013 dB
Parallel X:	431.14 fF	S21 Phase:	103.96°

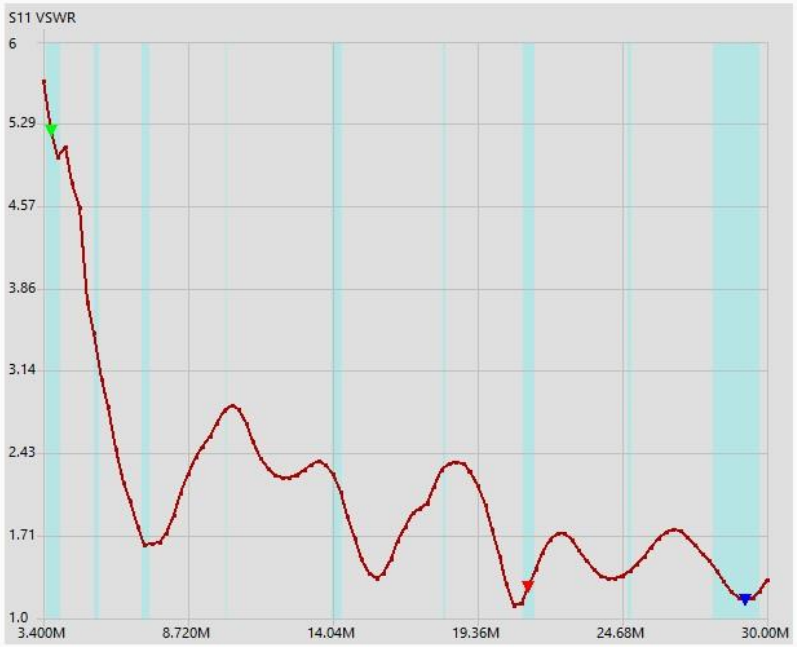
S11

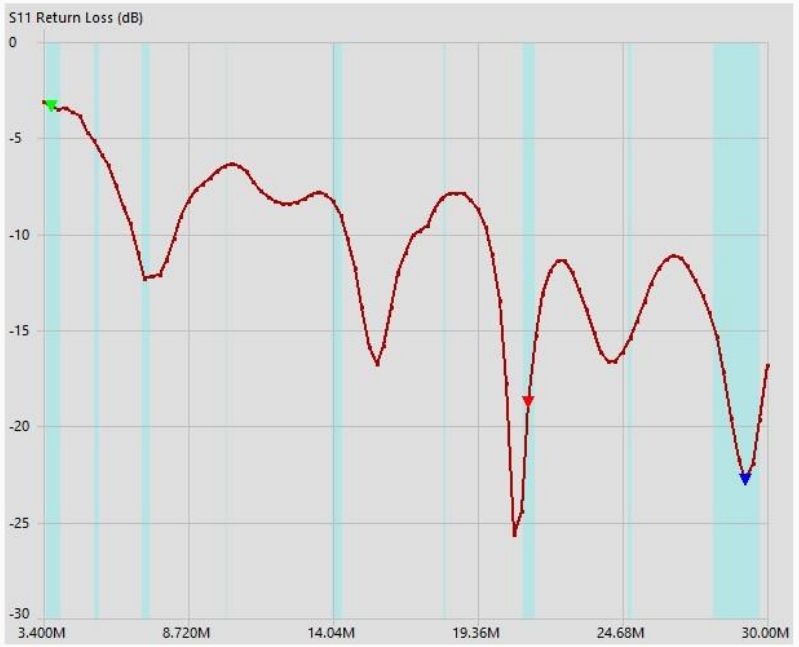
Min VSWR: 1.110 @ 20.6900MHz
Return loss: -25.657 dB

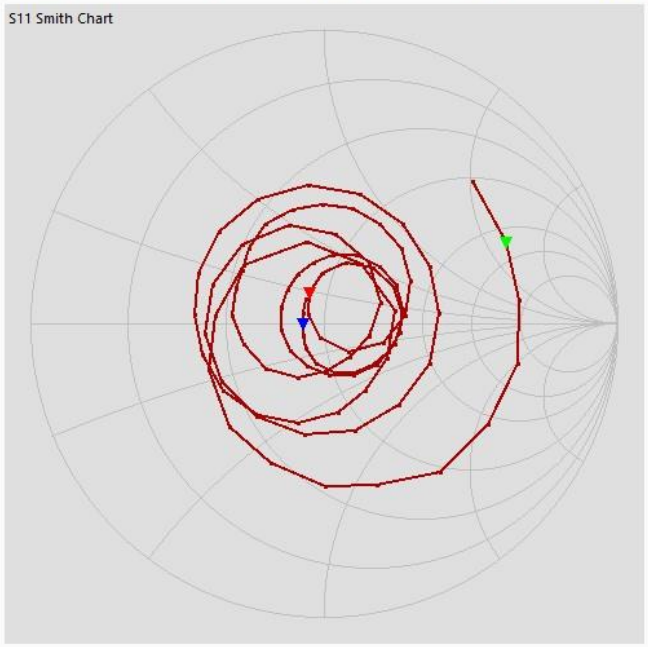
S21

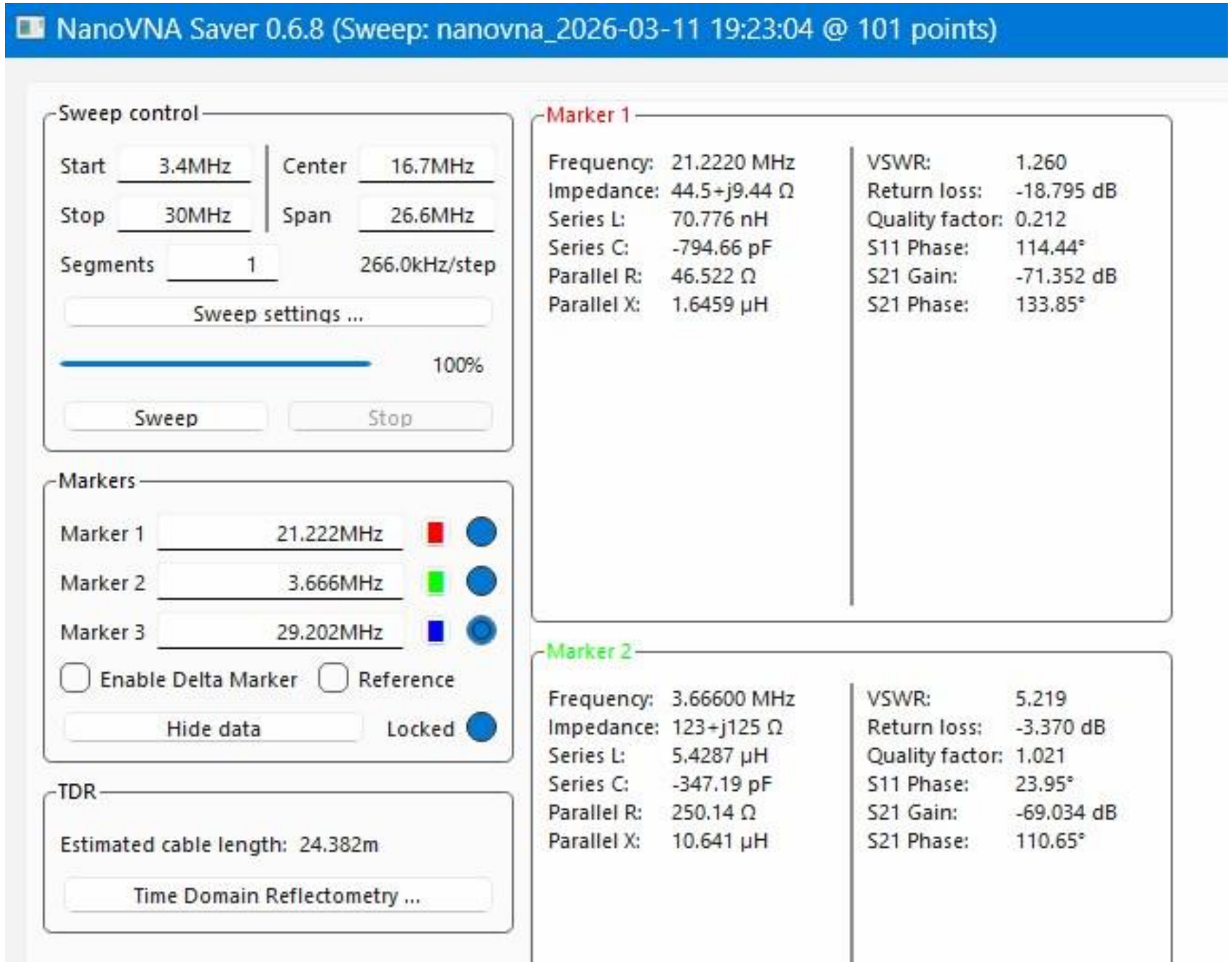
Min gain: -96.020 dB @ 13.2420MHz
Max gain: -68.686 dB @ 6.59200MHz

Analysis ...





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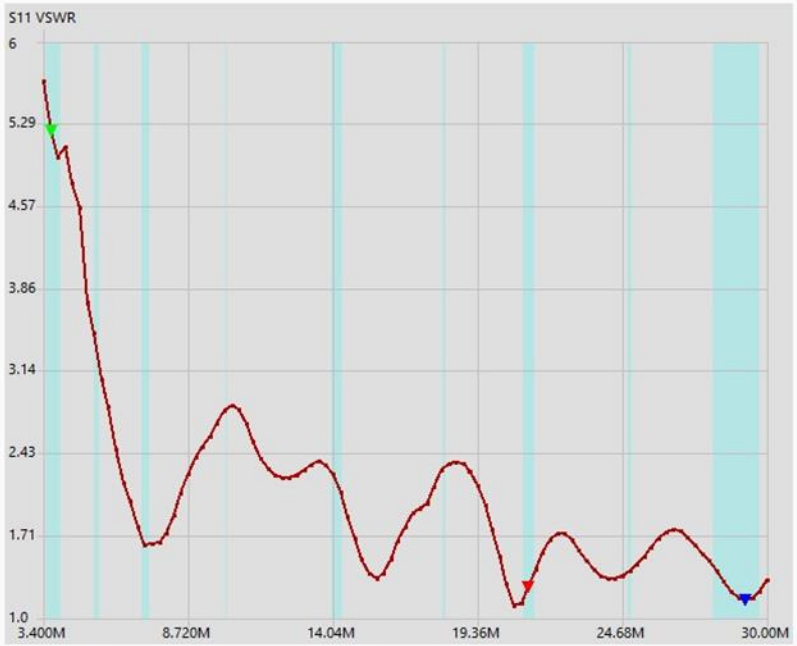
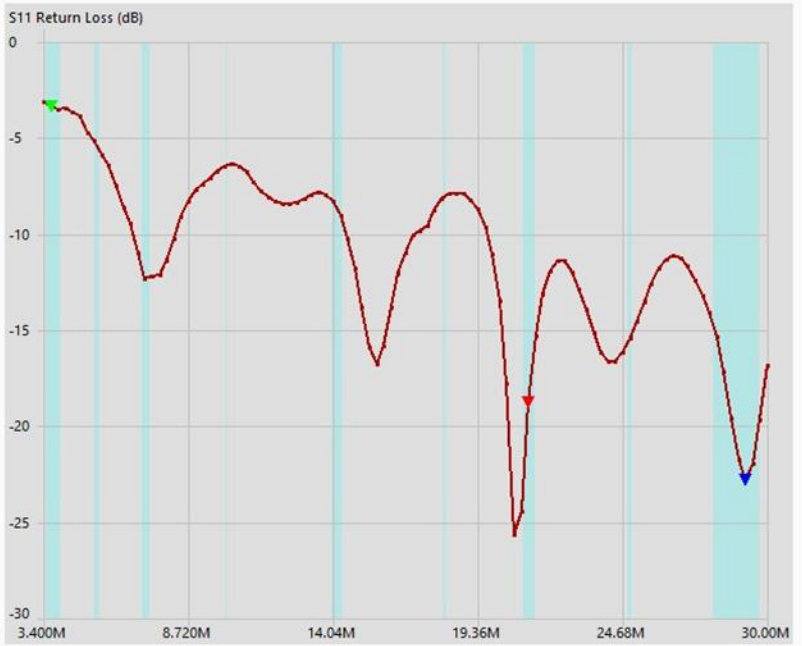
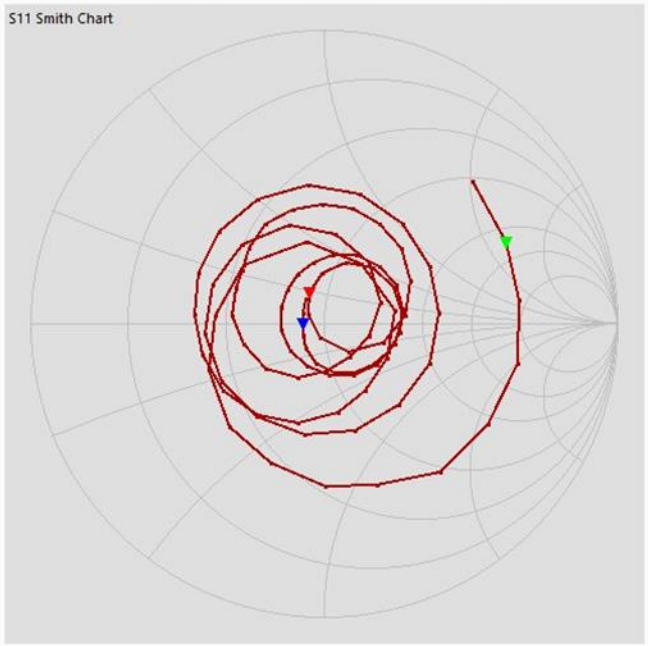
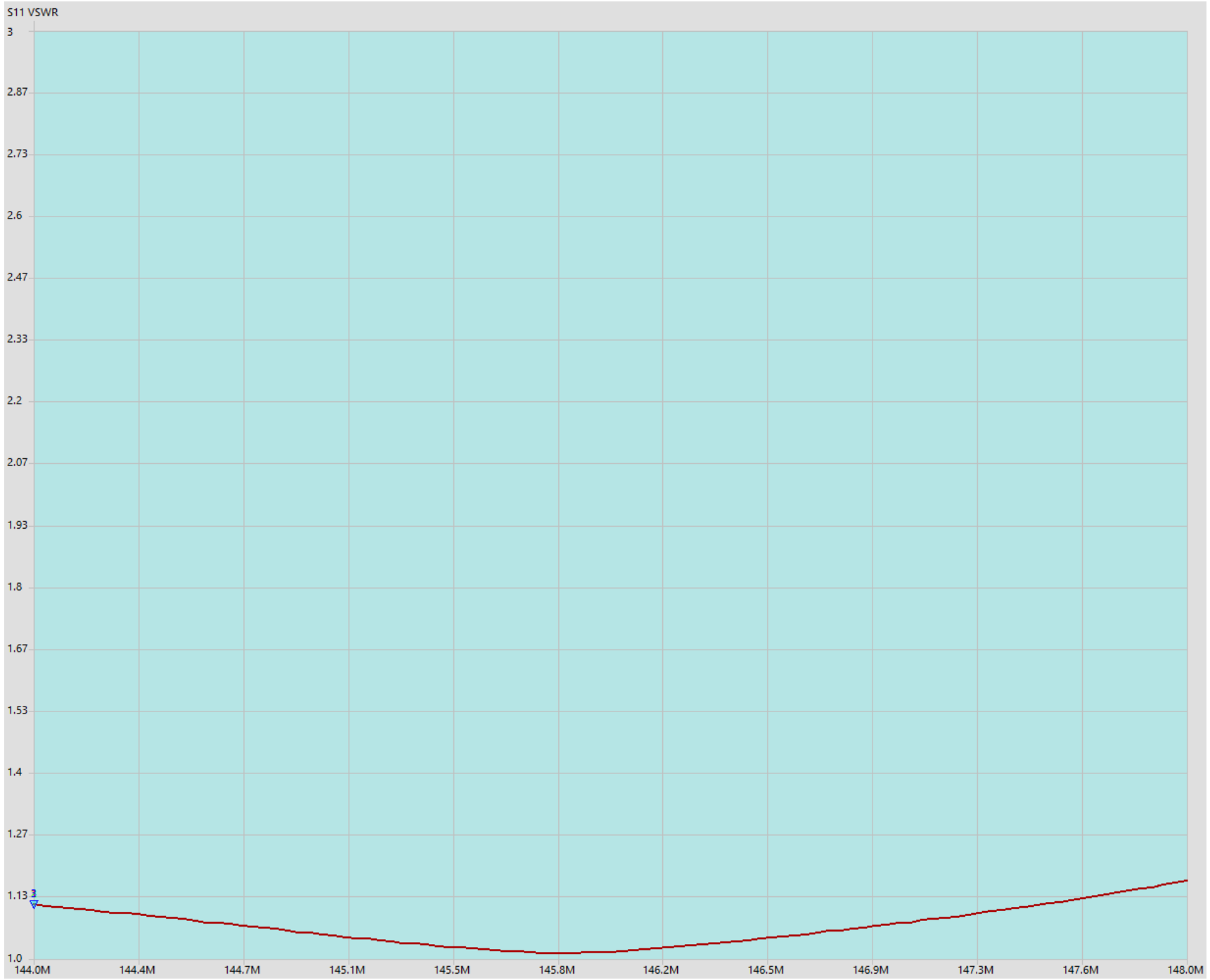


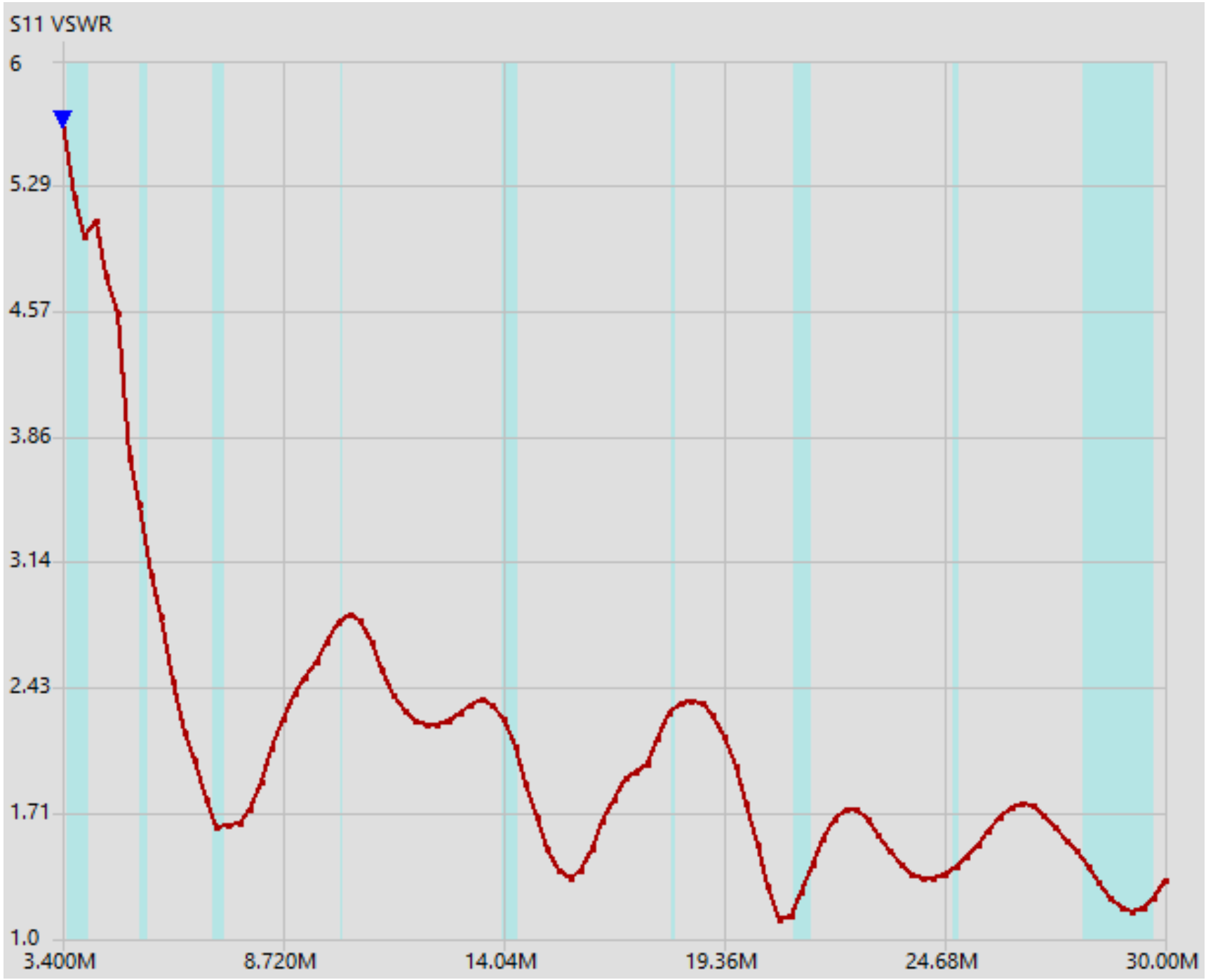




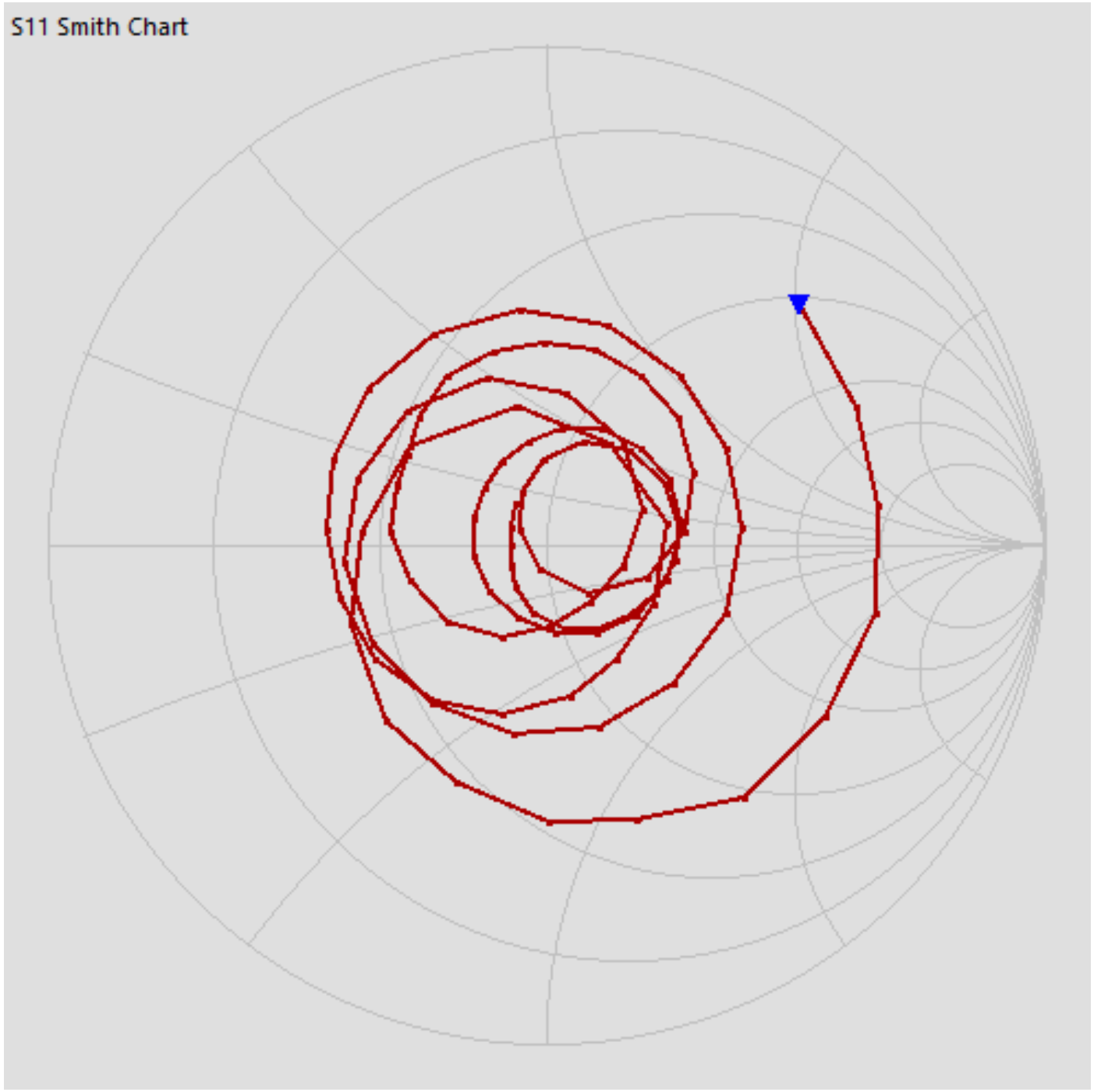
Arrow II Yagi 2M VSWR



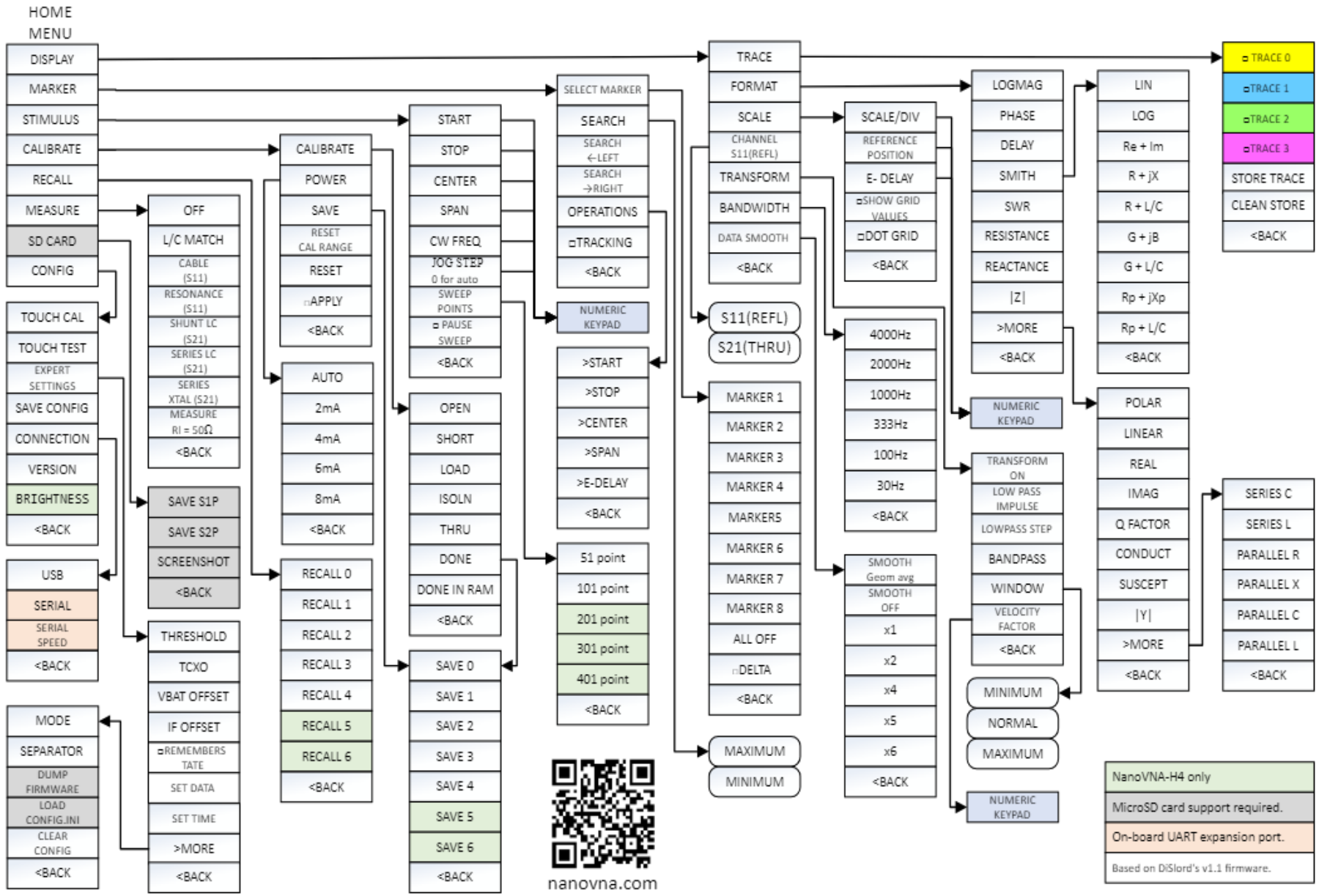
My compromised EFRW (57 ft) VSWR



EFRW
Smith Chart



NanoVNA Menu Structure Map



- Best way to learn is to use it…you can’t break it.
- There are many YouTube videos to get you started
- Much more capability beyond checking SWR
- NanoVNA Saver program makes it much easier