Changing Water Properties with Lasers, Magnets, Geometry and Conscious Intention

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Acknowledgement

Help from

Jim Caffrey
Guangmin Haralick

were essential for some of the experiments.

Purpose Of Experiments

- To see the extent of differences in instrument readings on different kinds of water
- To see if exposing water to
  - Lasers: Different Wavelengths
  - Magnets: Circumferentially, Axially, and Radially polarized
  - Copper Geometric Shapes
  - Conscious Intention

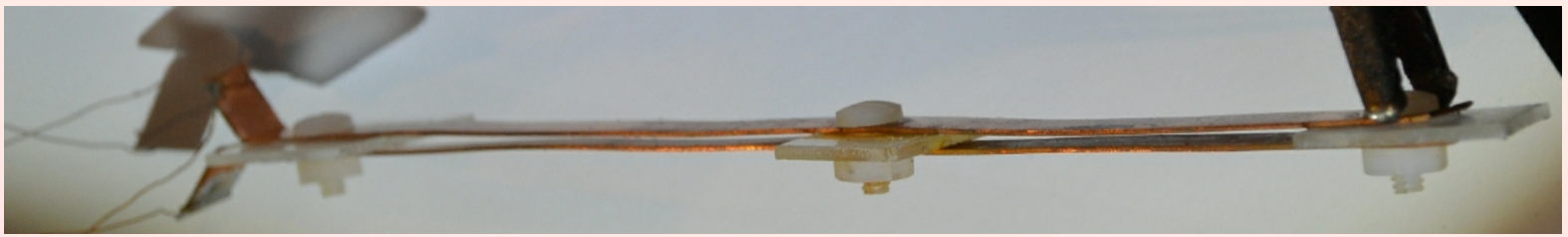
Is there anything there to further explore?

Instruments

- Vector Network Analyzer
- Impedance Analyzer
- Spectrometer

Vector Network Analyzer: Tektronix TTR506A

- Frequency Range
- 300KHz - 6 GHz
- Flat Plate Capacitor Dielectric Probe



Faraday Cage

Vector Network Analyzer

Measures the complex value of the reflection coefficient

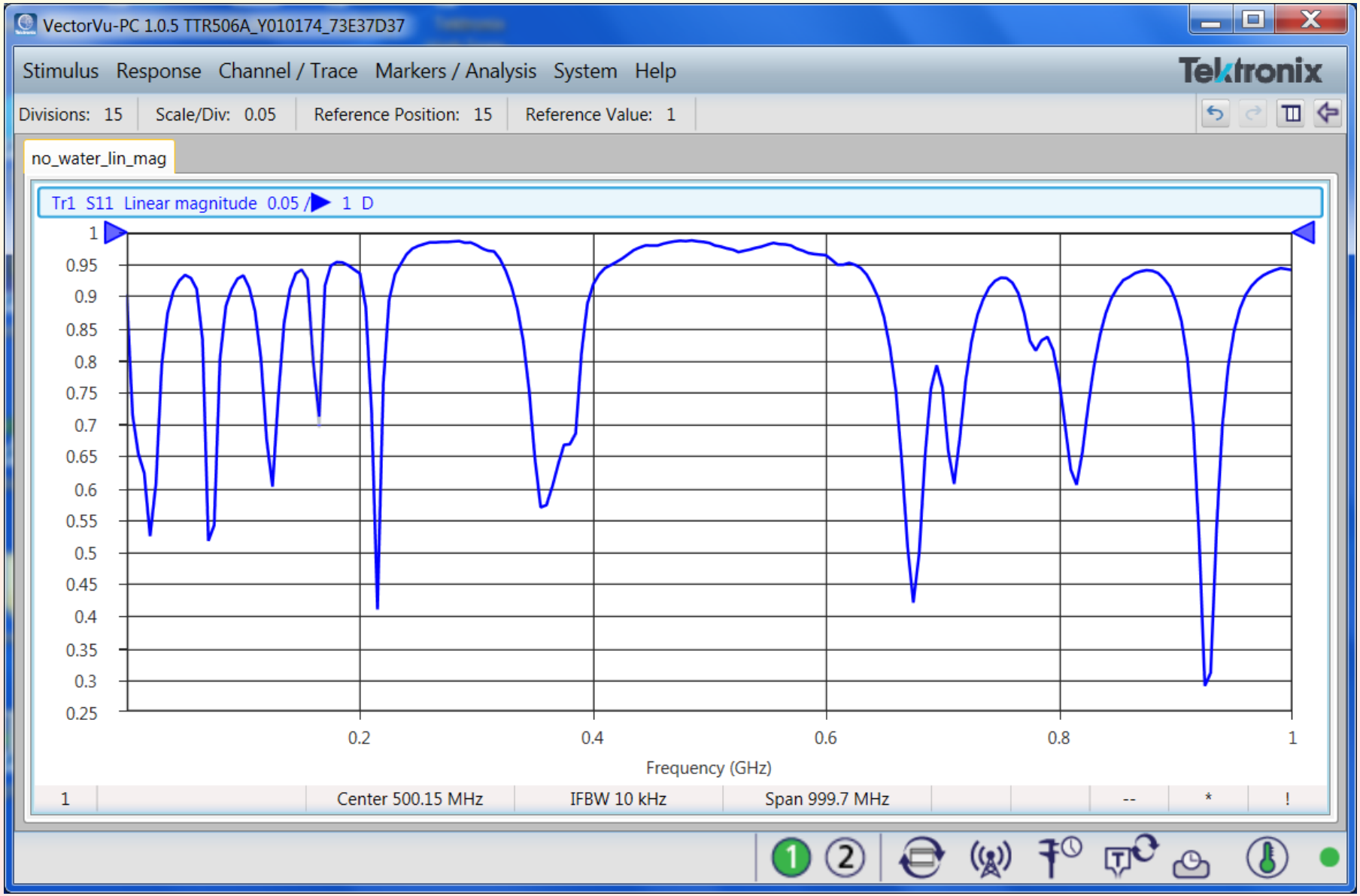
- The coaxial cable and wires that connect the VNA to the capacitor act as a transmission line
- The capacitor has inductance and resistance
- The complex impedance of the capacitor changes as a function of frequency
- Also changes as a function of the water permittivity and permeability
- The VNA sends a sinuosoid with phasor V^+
- The capacitor end of the transmission line sends back a sinuosoid phasor $V^- = \Gamma V^+$
- If $V^- \neq 0$ the result is a standing wave on the transmission line

$$\Gamma = \frac{Z_0 - Z_R}{Z_0 + Z_R}$$

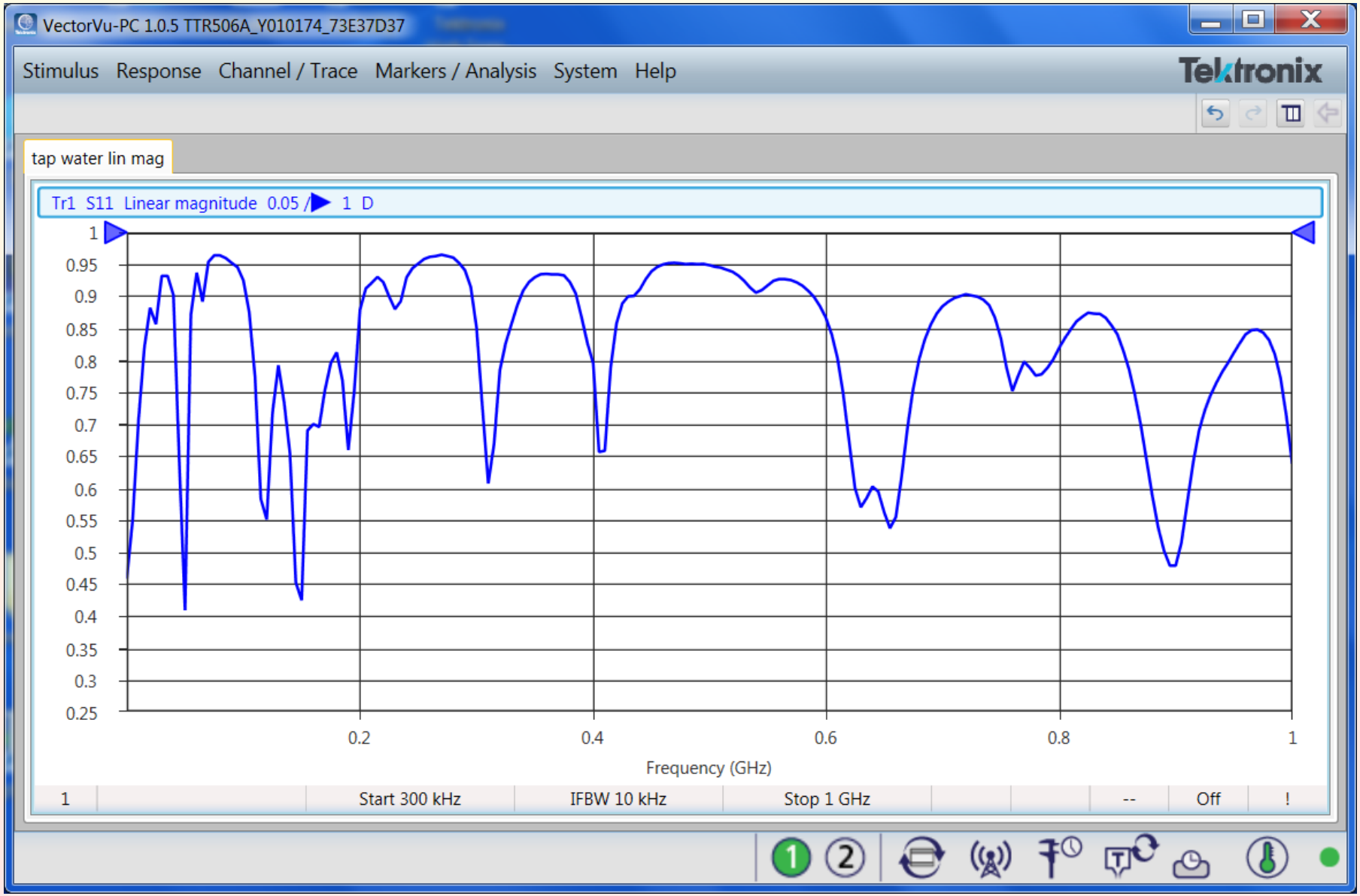
Kinds of VNA Measurements

- Magnitude and Phase
  - $\Gamma(\omega) = |\Gamma(\omega)|e^{j\theta(\omega)}$
- Real and Imaginary
  - $\Gamma(\omega) = \mathit{Real}(\Gamma(\omega)) + j\ \mathit{Imaginary}(\Gamma(\omega))$
- Group Delay
  - $T_G(\omega) = -\frac{\partial\theta(\omega)}{\partial\omega}$

No Water Linear Magnitude



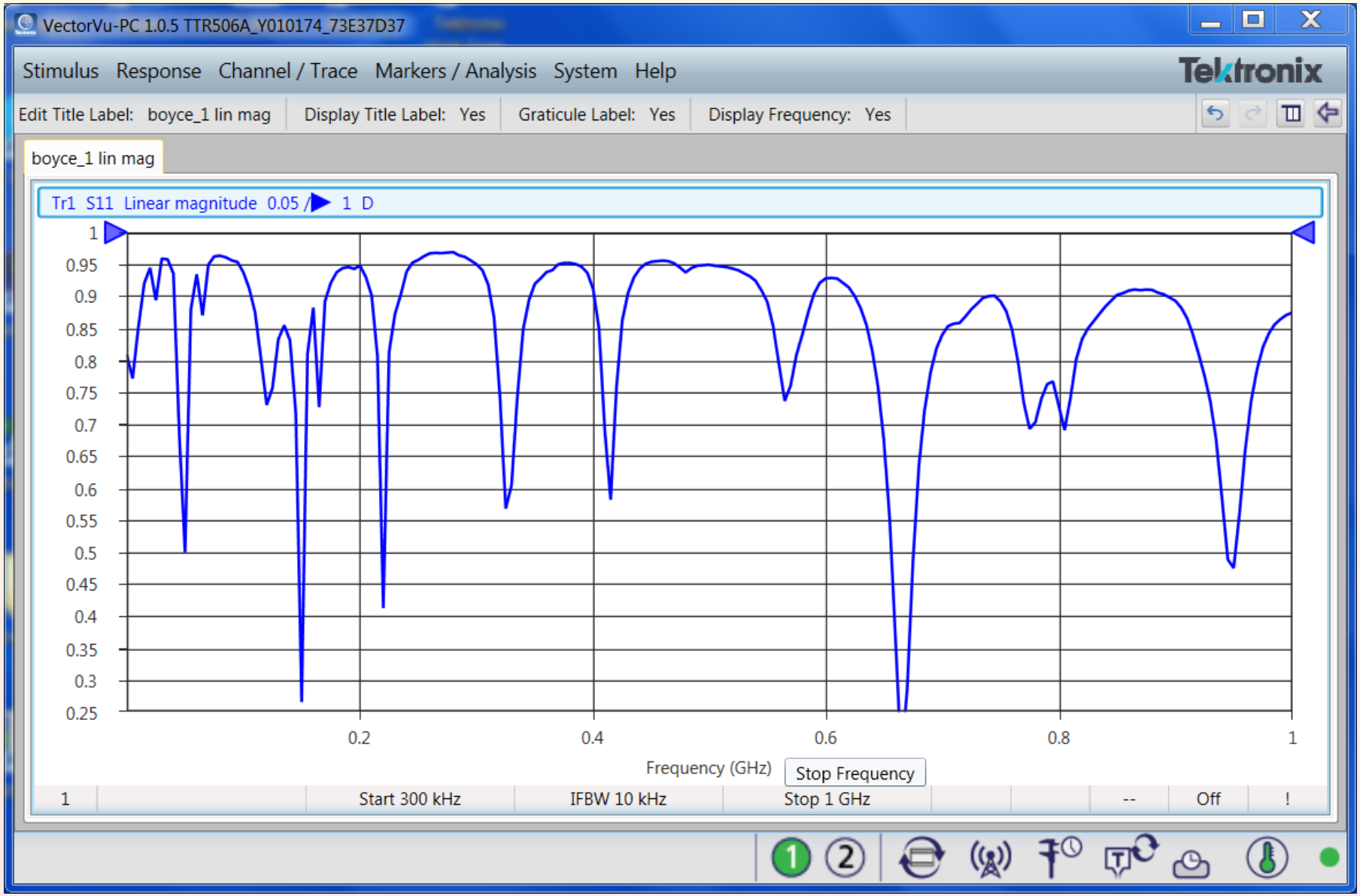
Tap Water Linear Magnitude



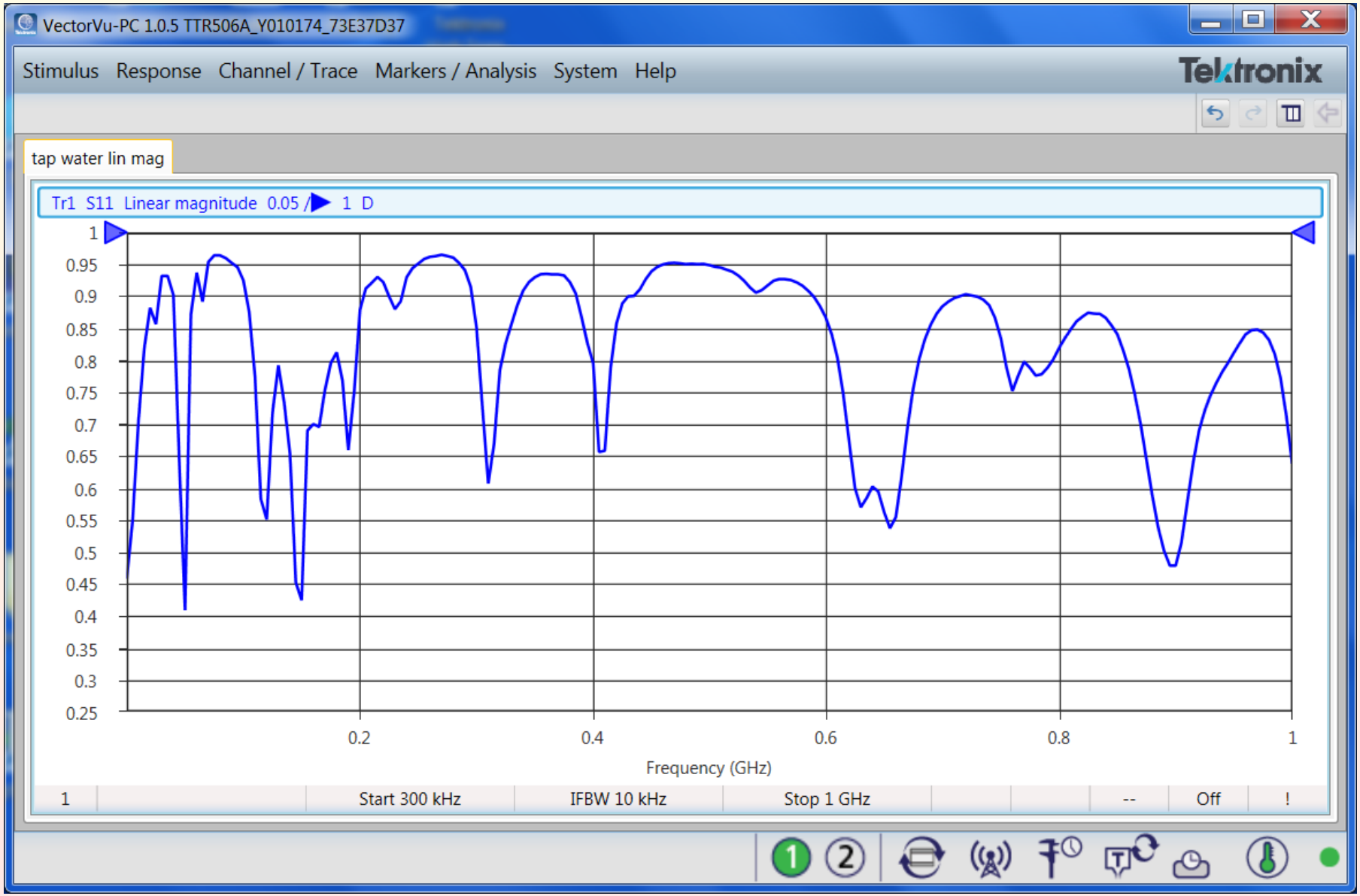
Boyce Water Smacker

Micro Structures Water

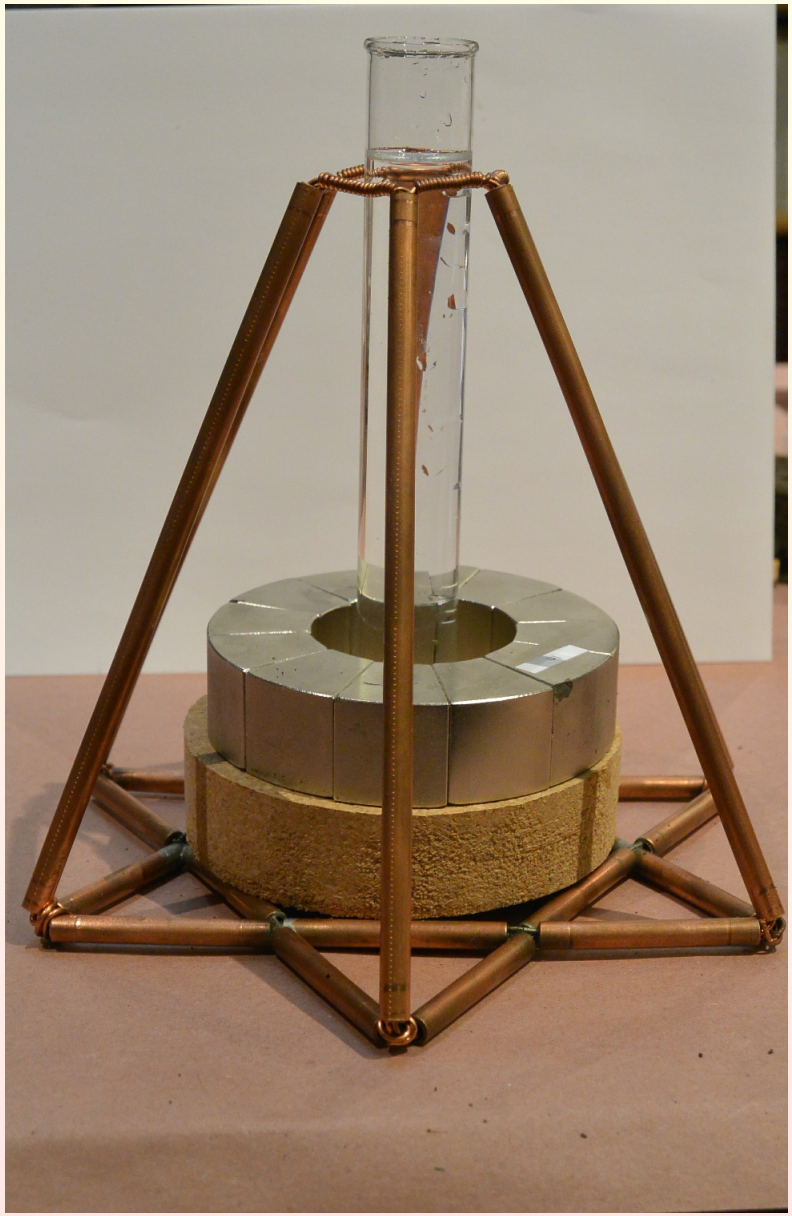
Boyce Water Linear Magnitude



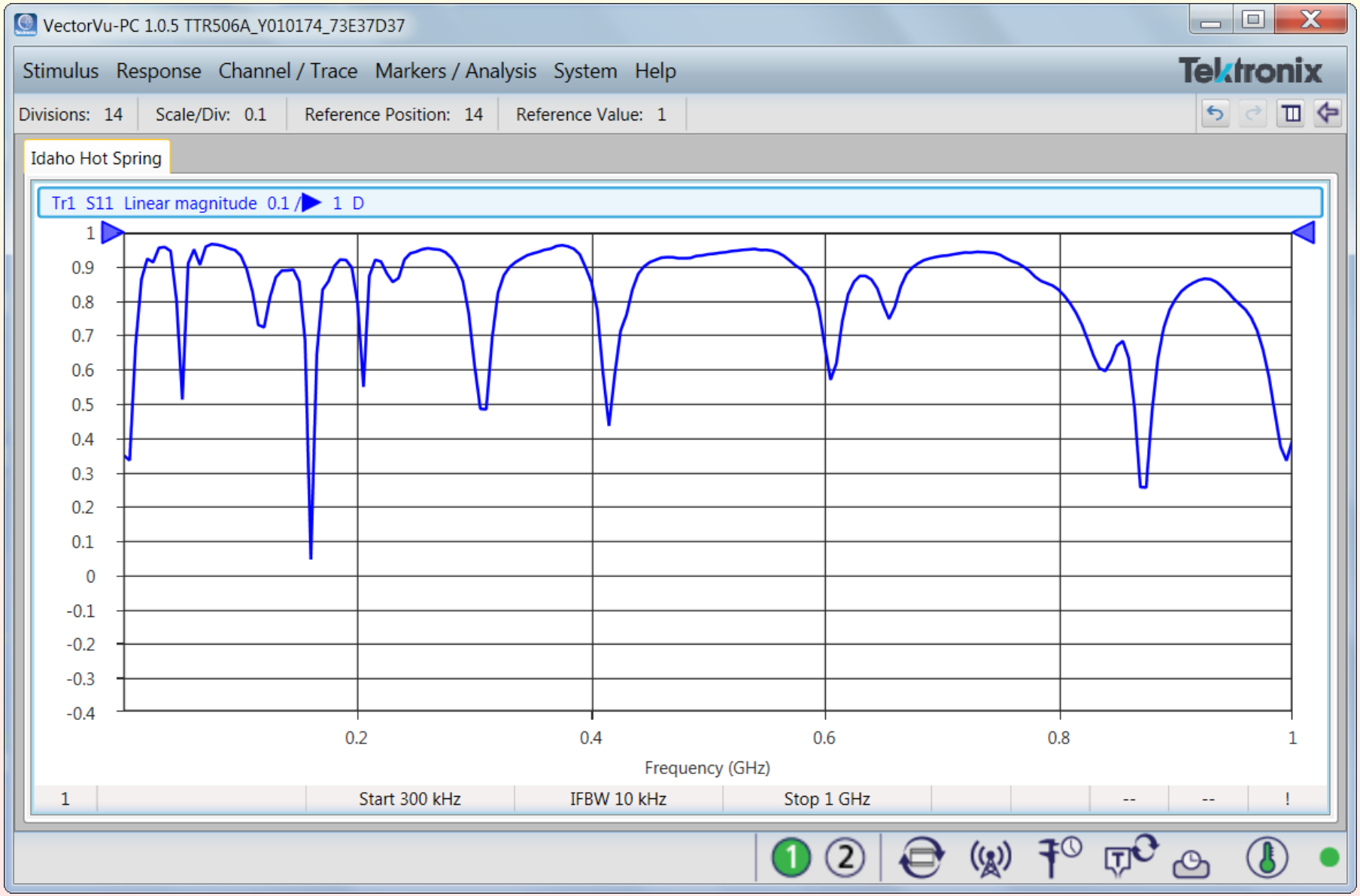
Tap Water Linear Magnitude



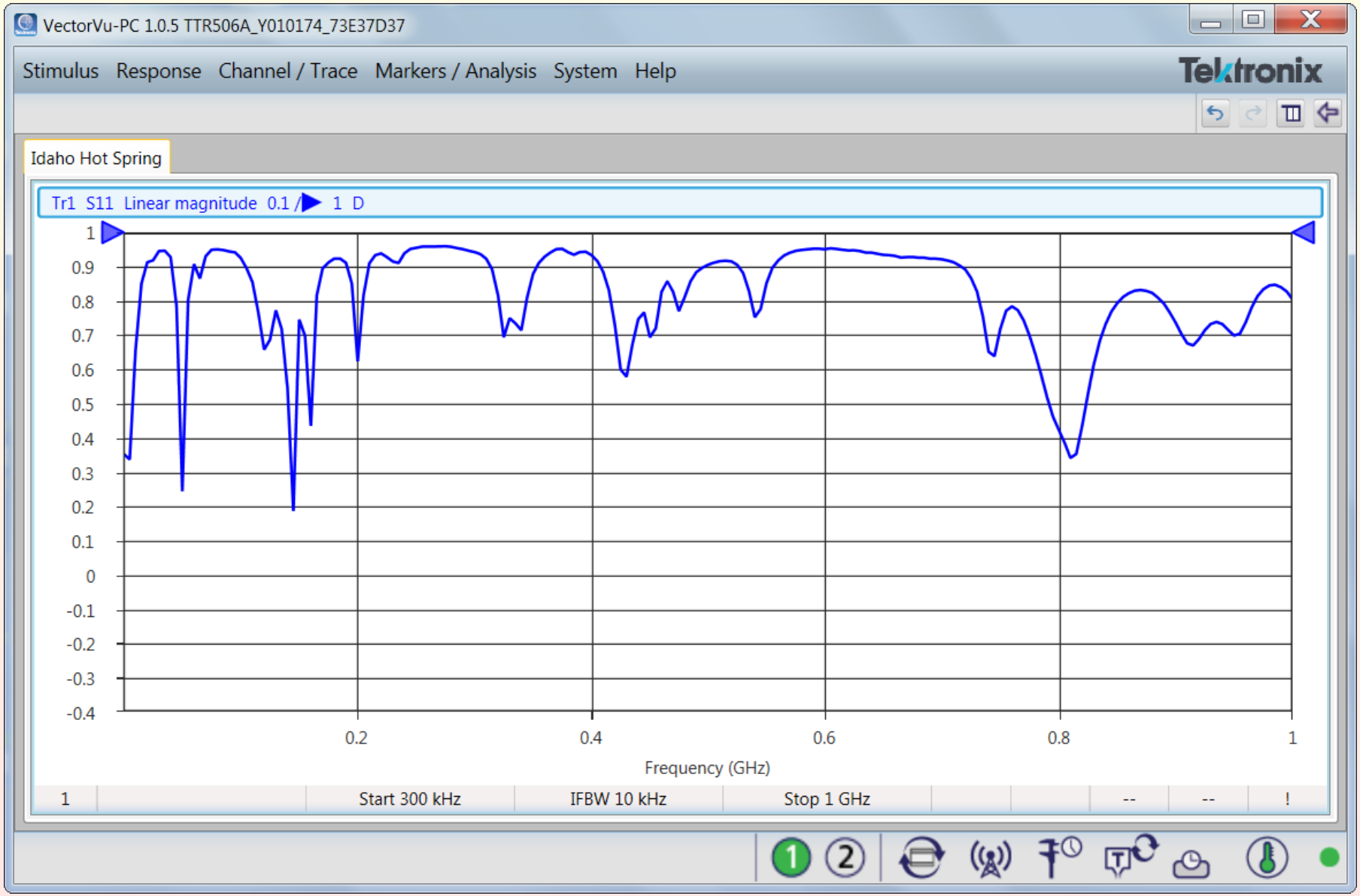
Circumferentially Polarized



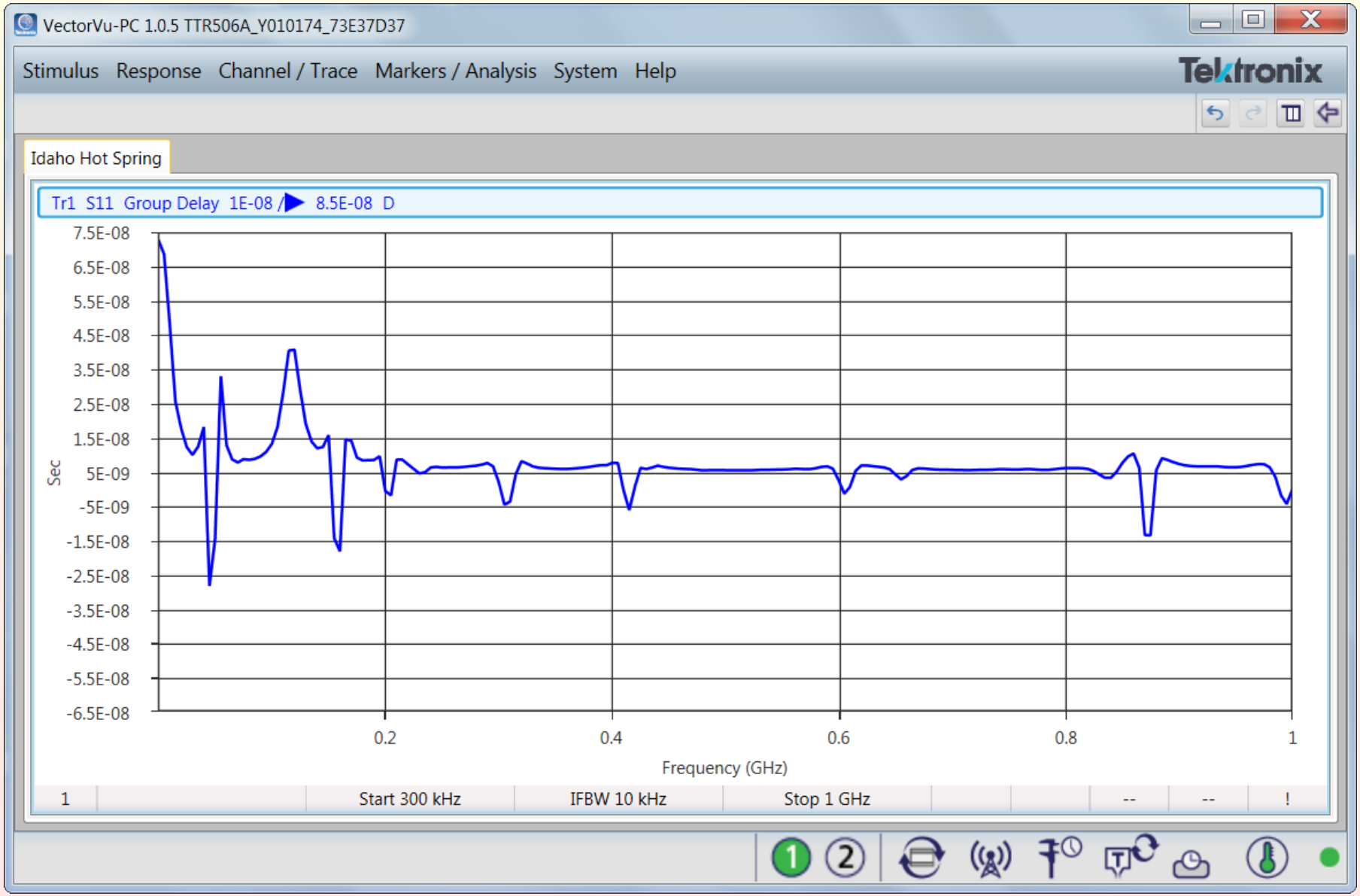
Idaho Hot Spring Linear Magnitude



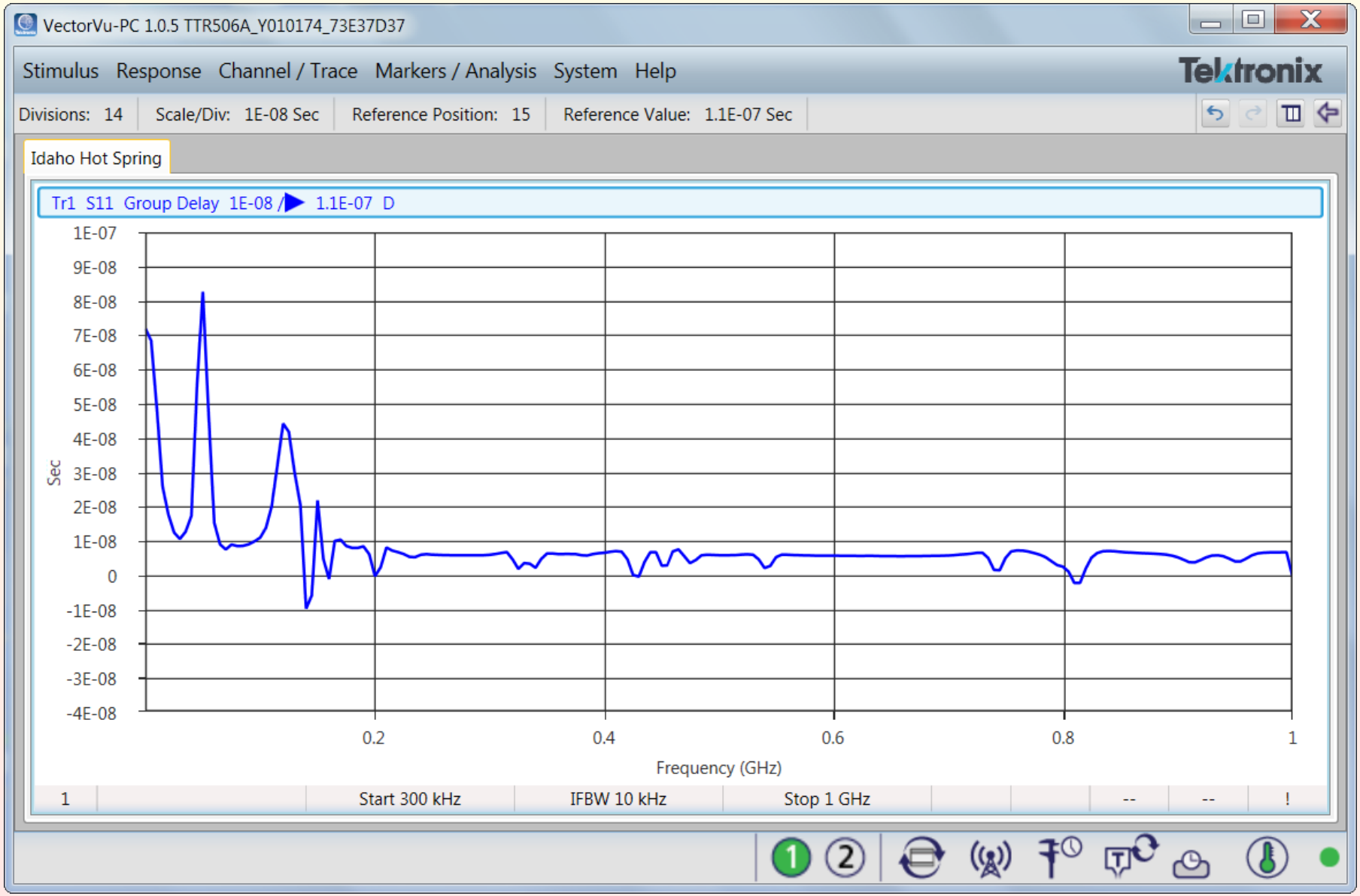
Idaho Hot Spring Circumferential Linear Magnitude



Idaho Hot Spring Delay



Idaho Hot Spring Circumferential Delay



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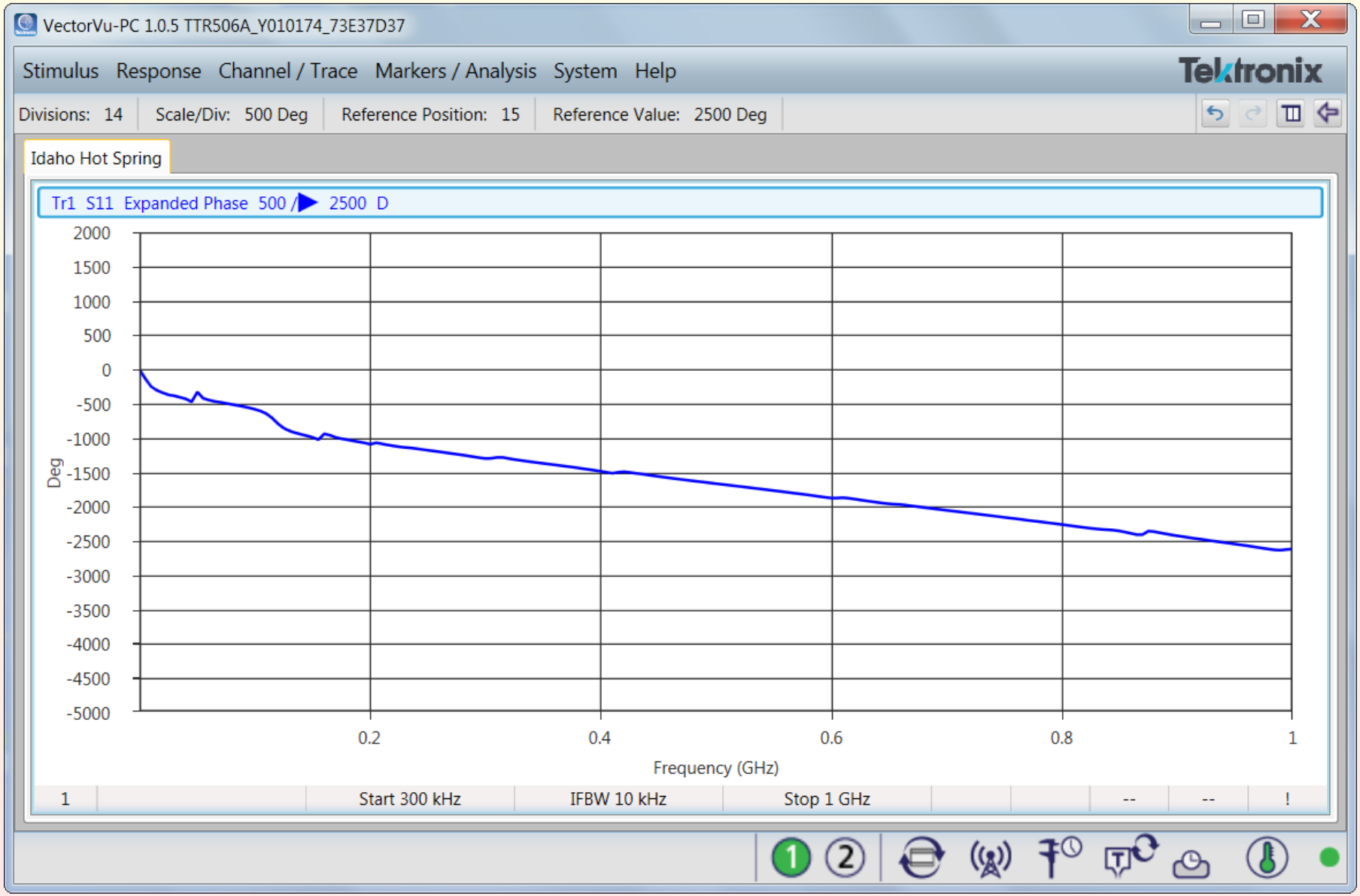

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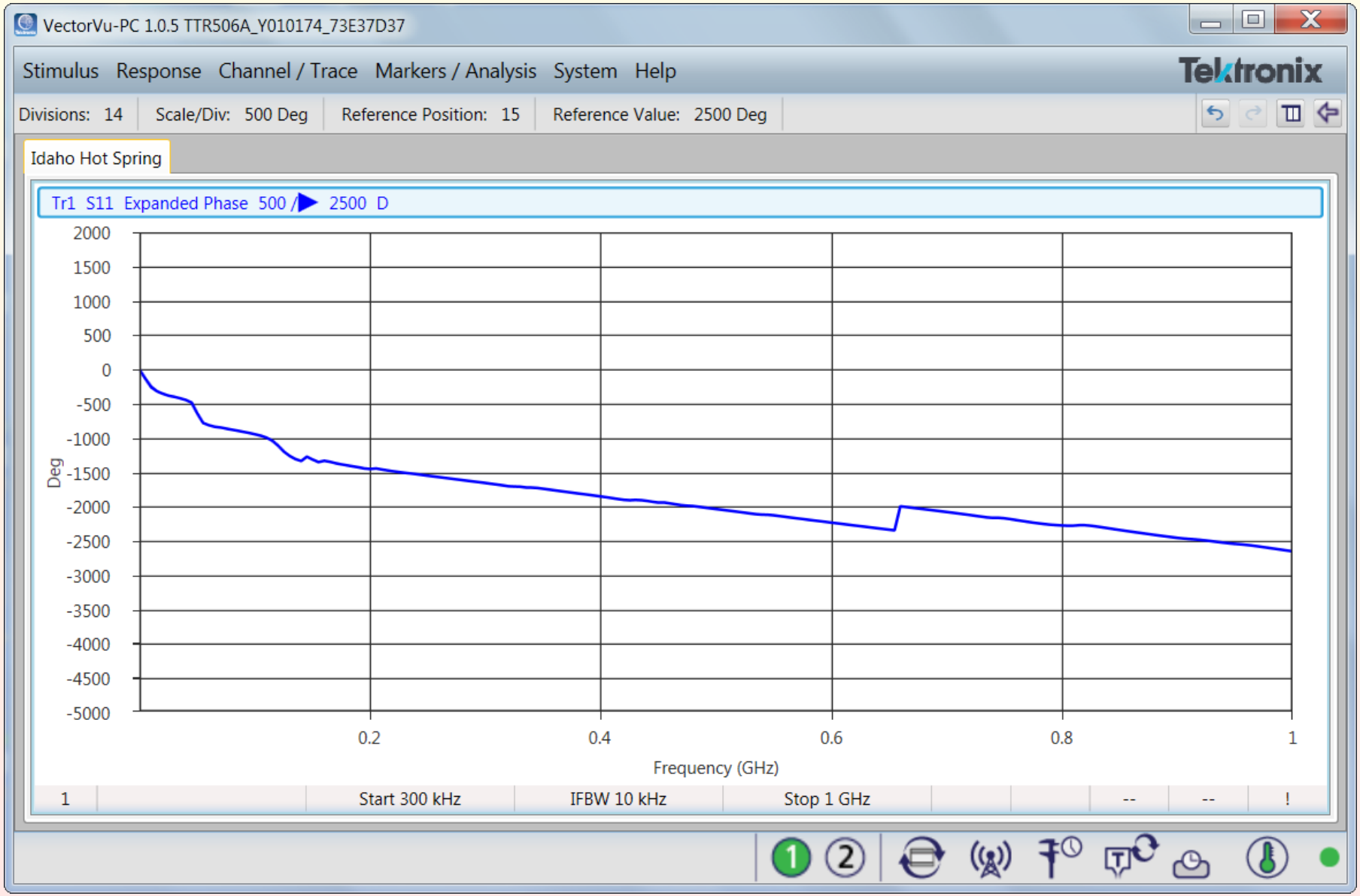
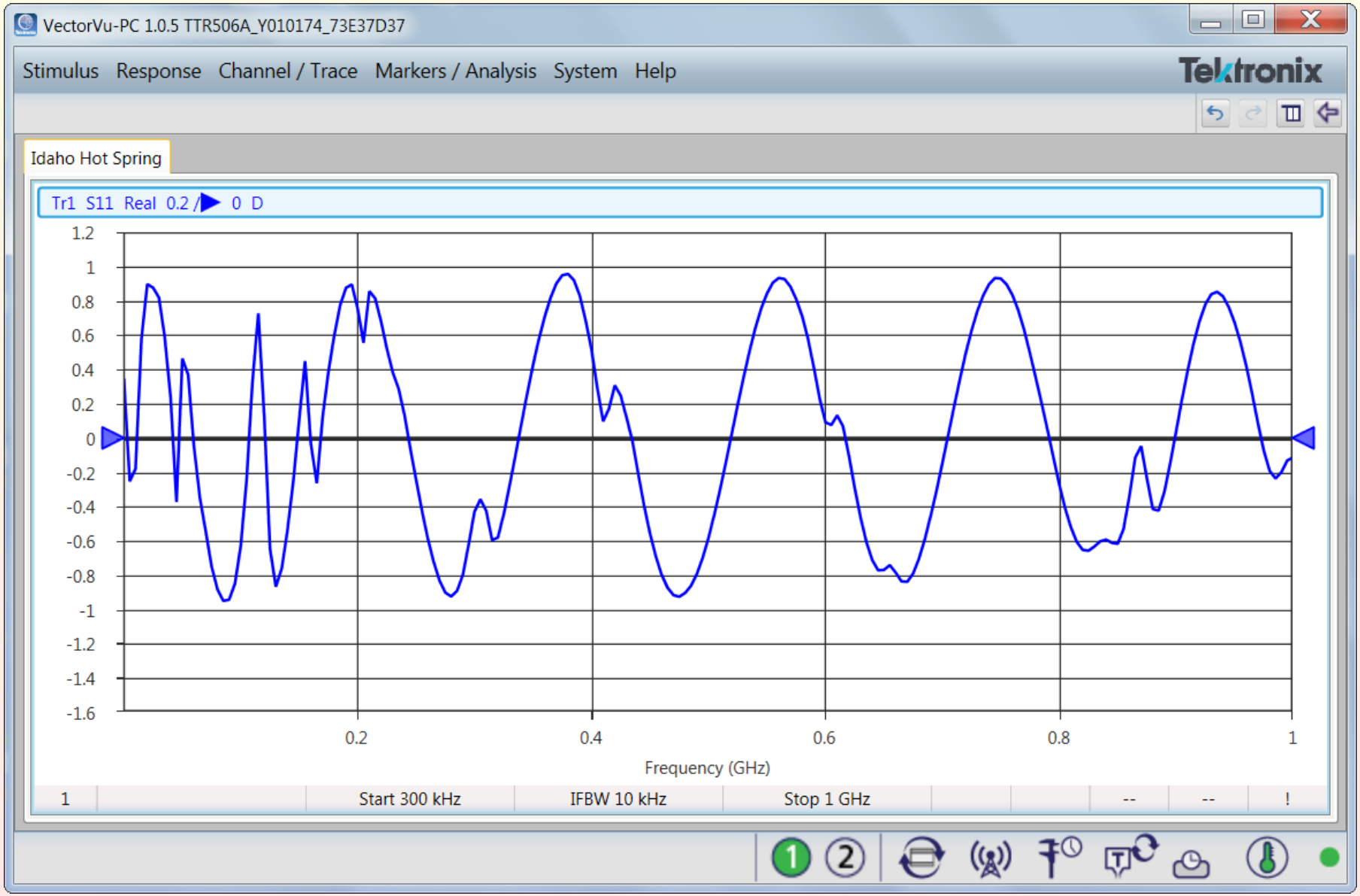


Idaho Hot Spring Real



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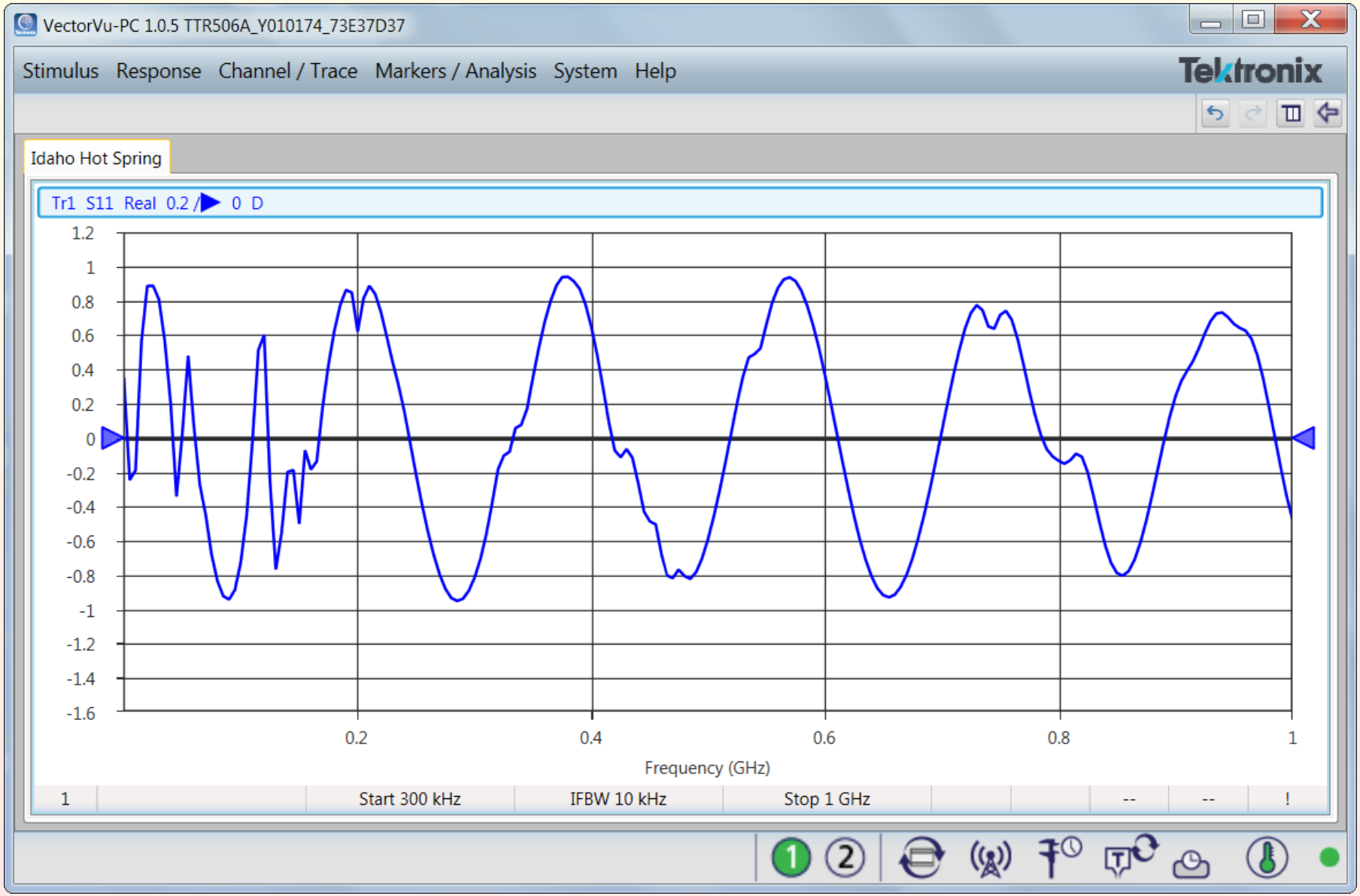
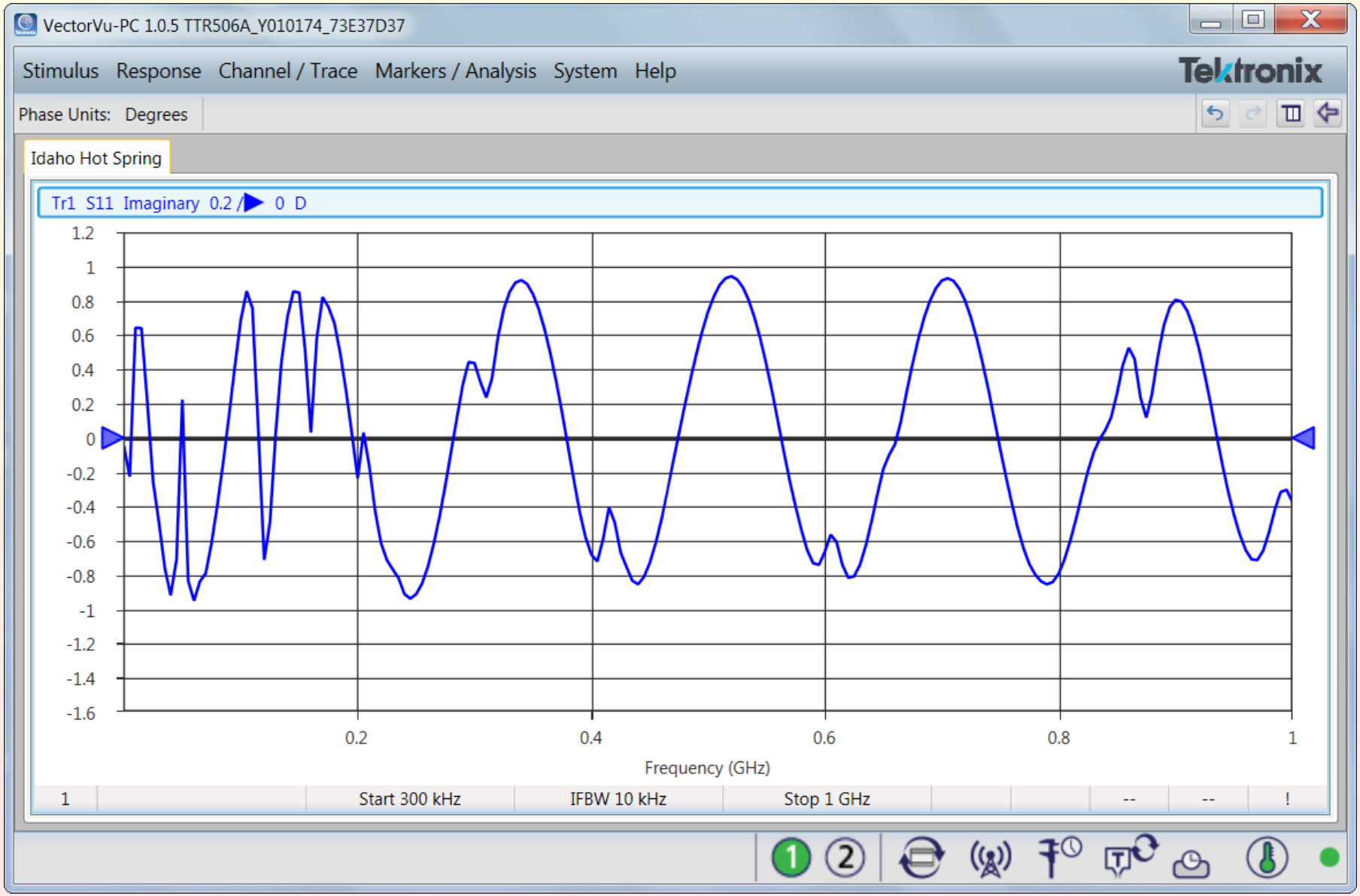
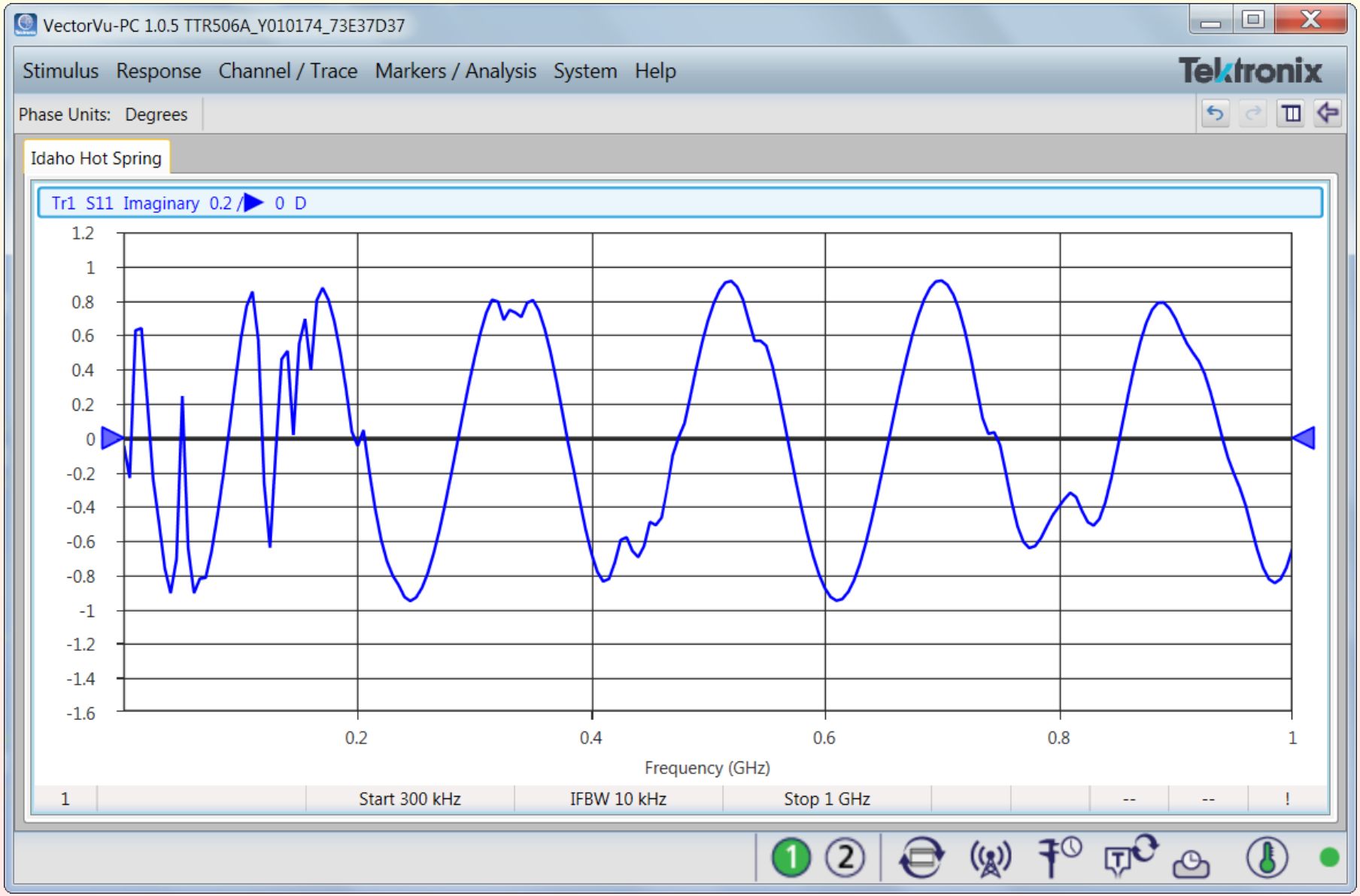


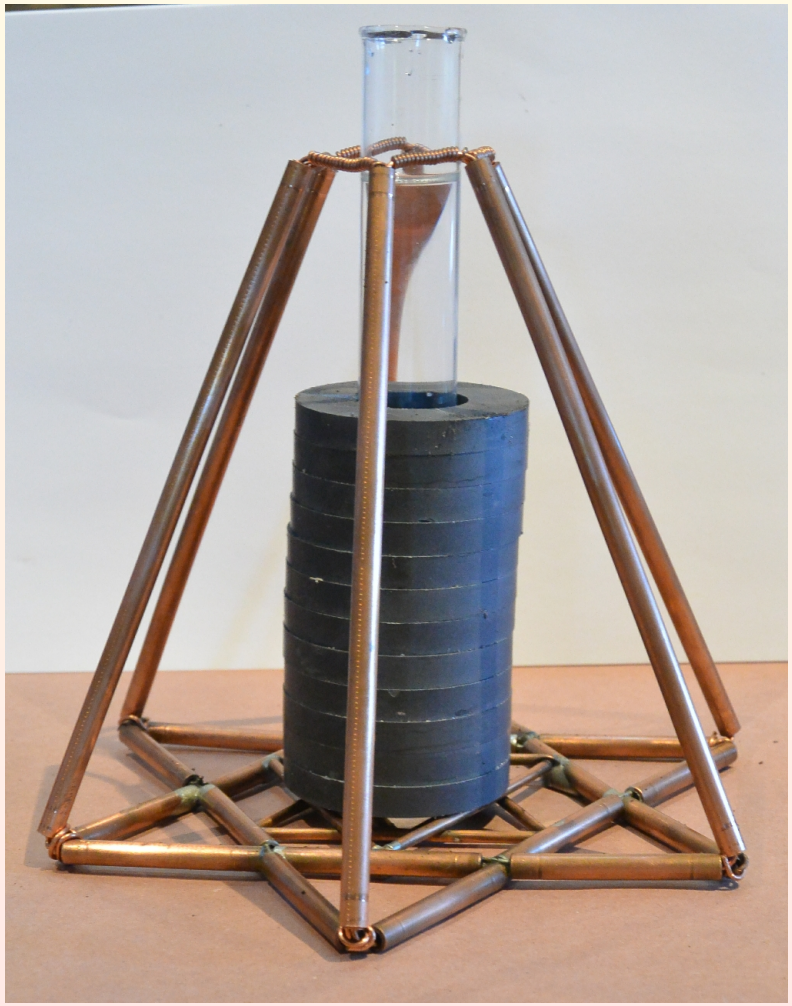
Idaho Hot Spring Imaginary



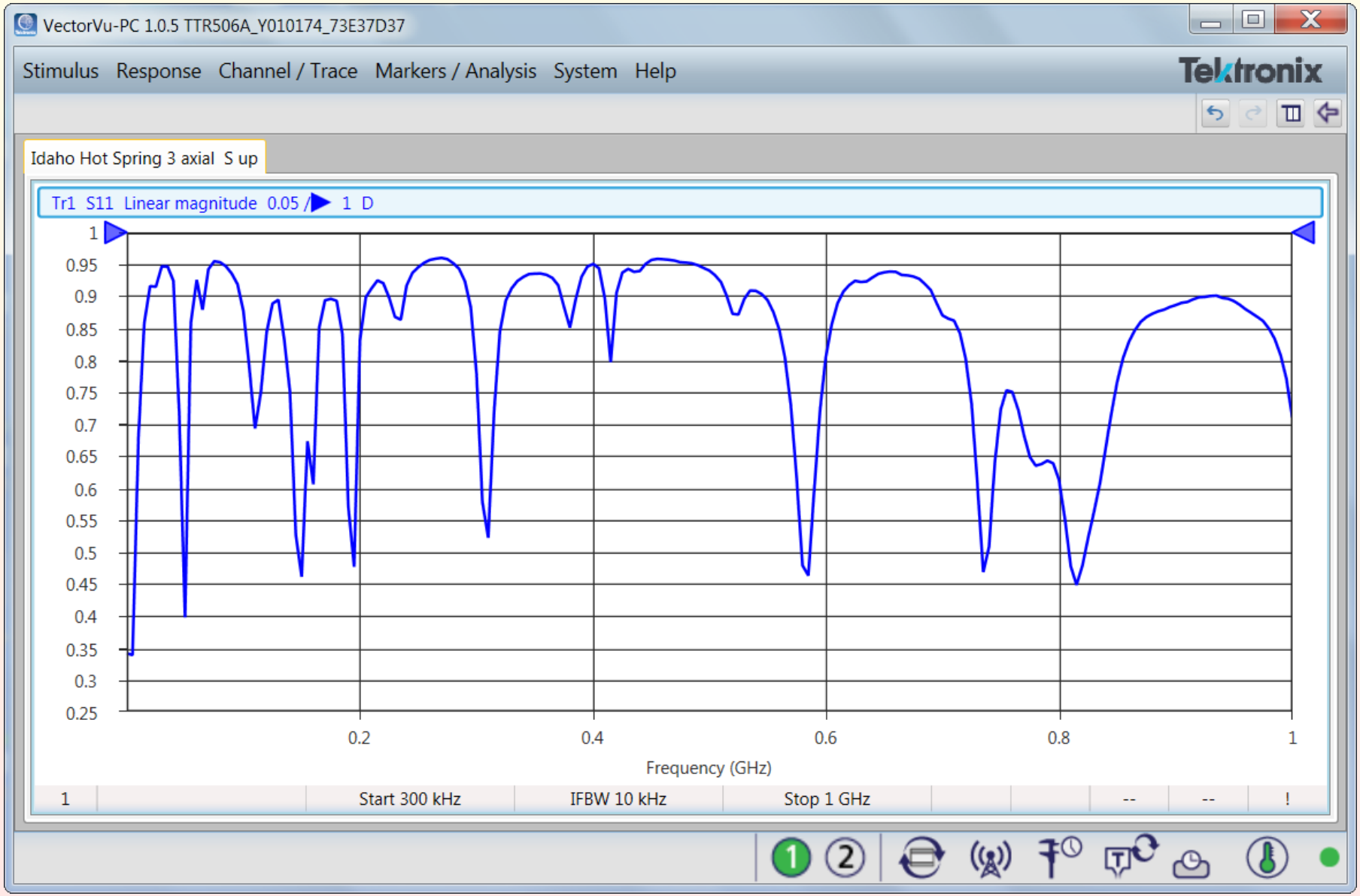
Idaho Hot Spring Circumferential Imaginary



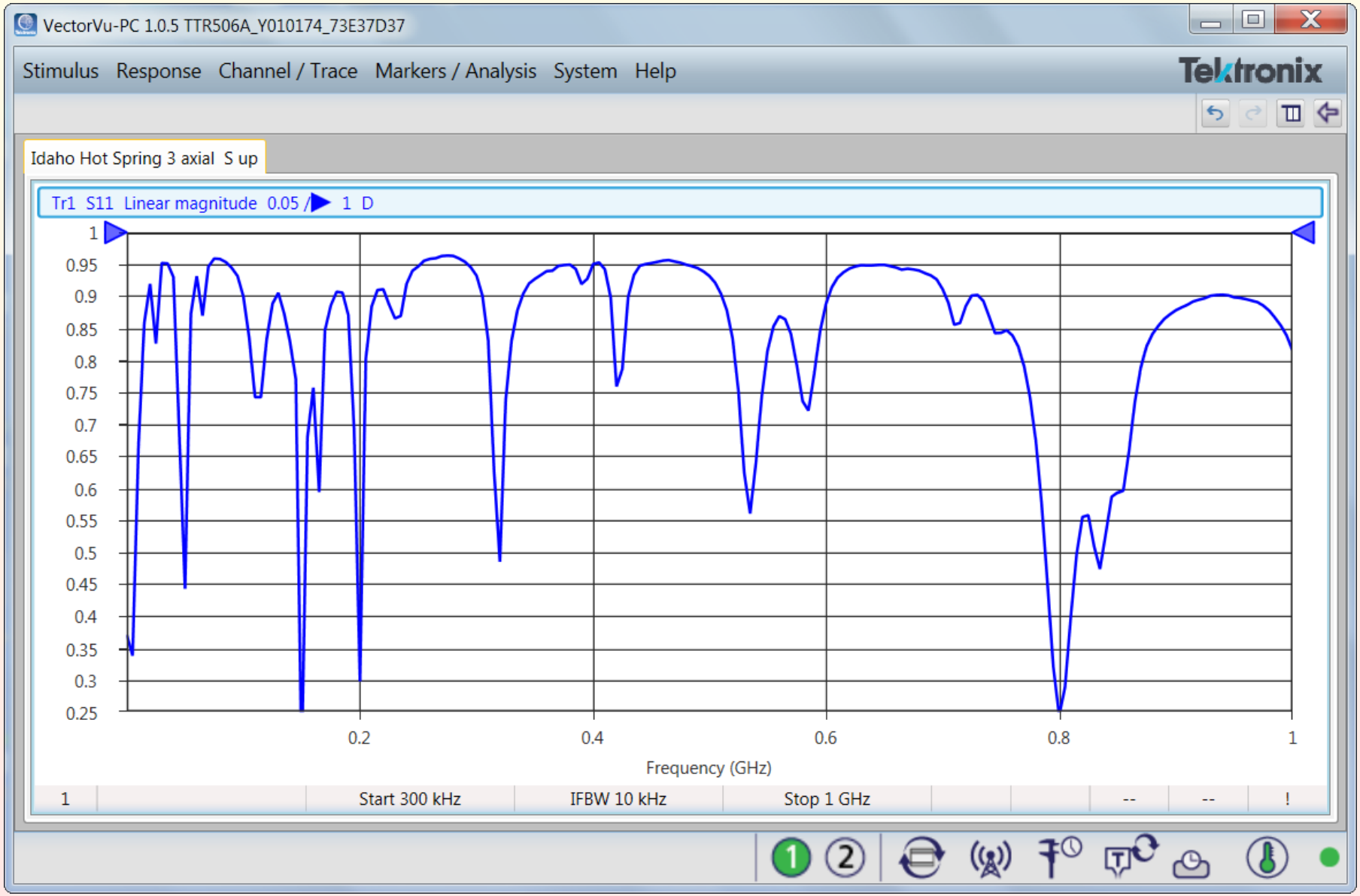
Axially Polarized



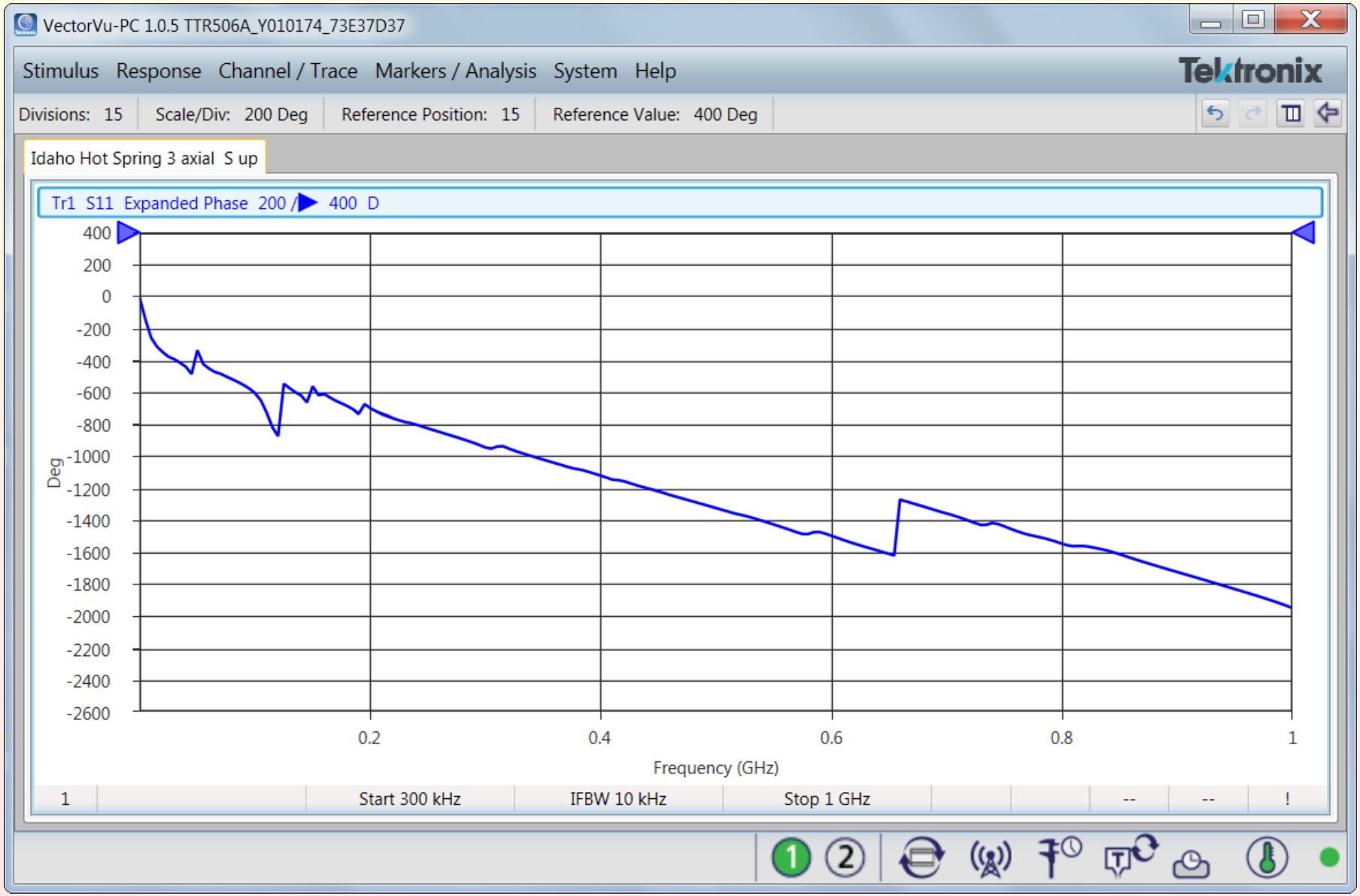
Idaho Hot Spring Linear Magnitude



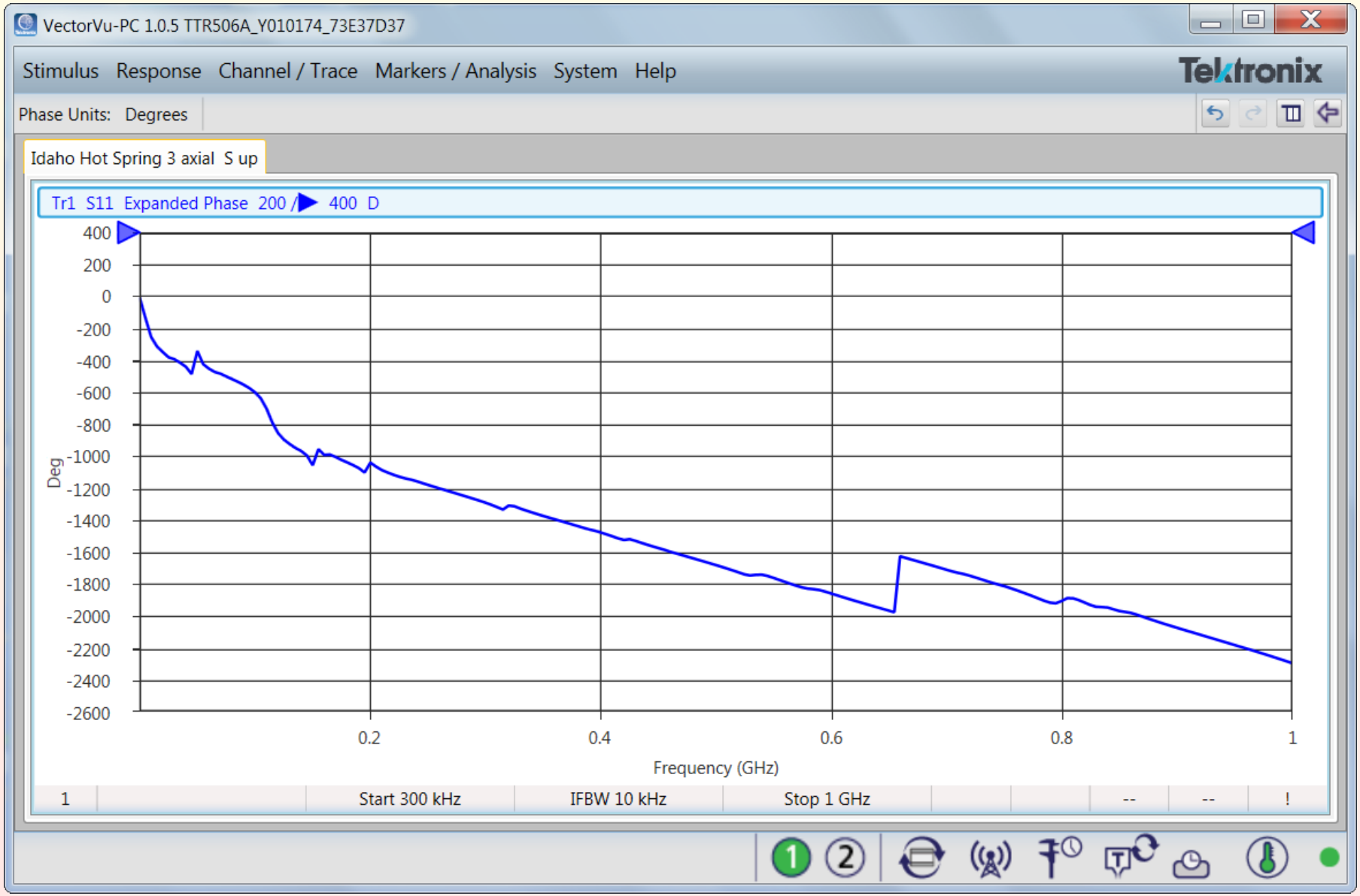
Idaho Hot Spring Axial Linear Magnitude



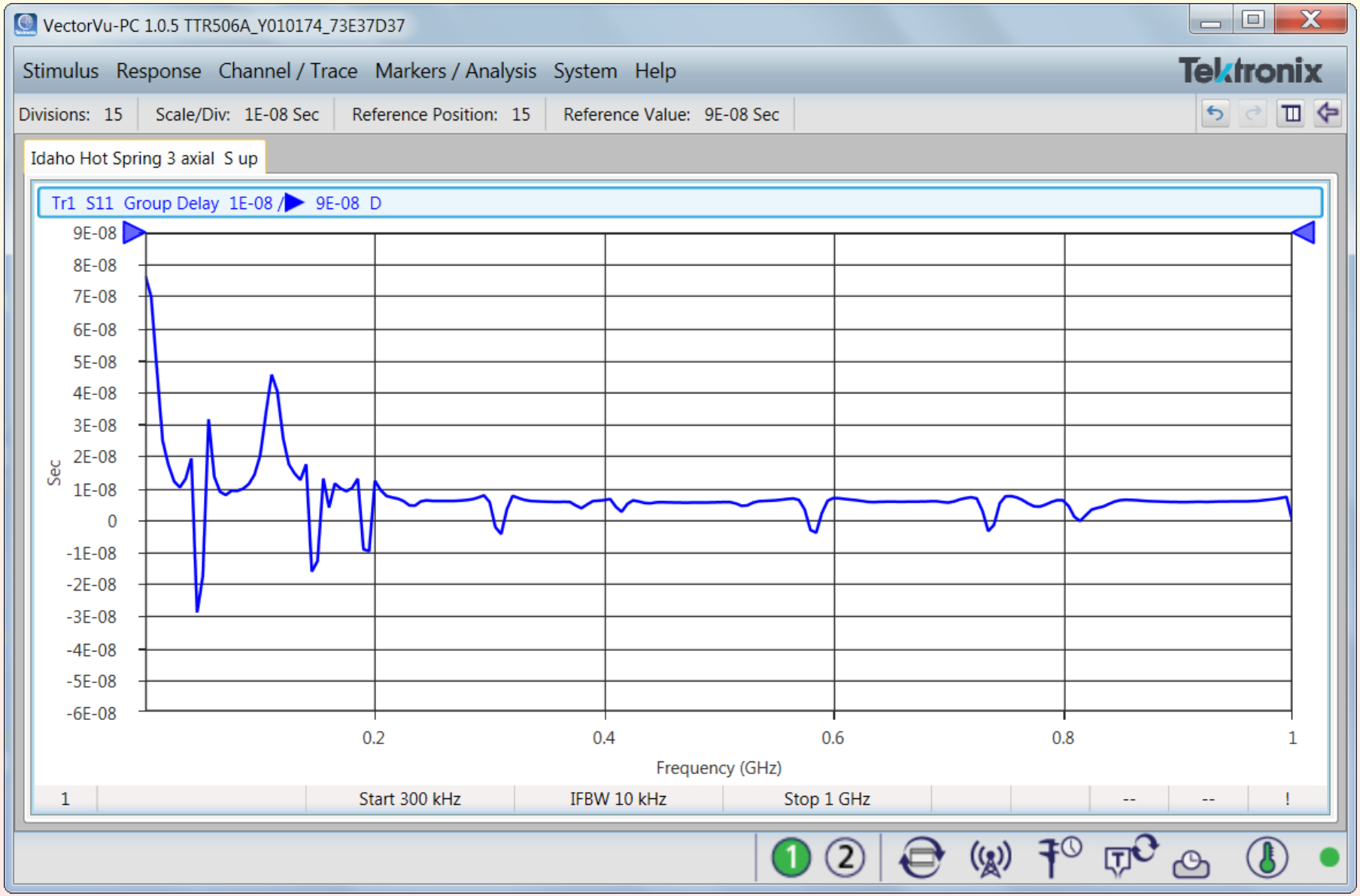
Idaho Hot Spring Extended Phase



Idaho Hot Spring Axial Extended Phase



Idaho Hot Spring Delay



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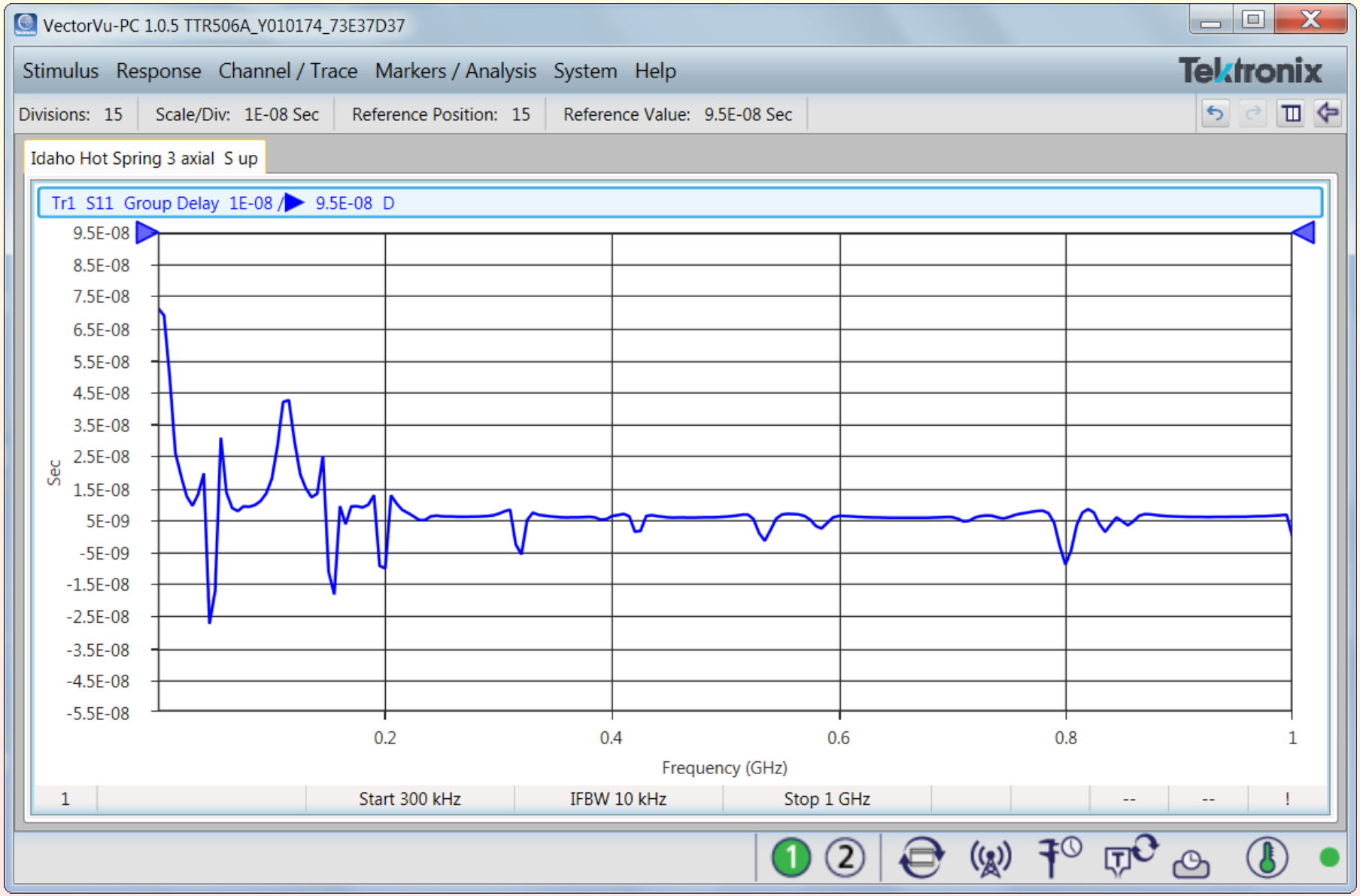
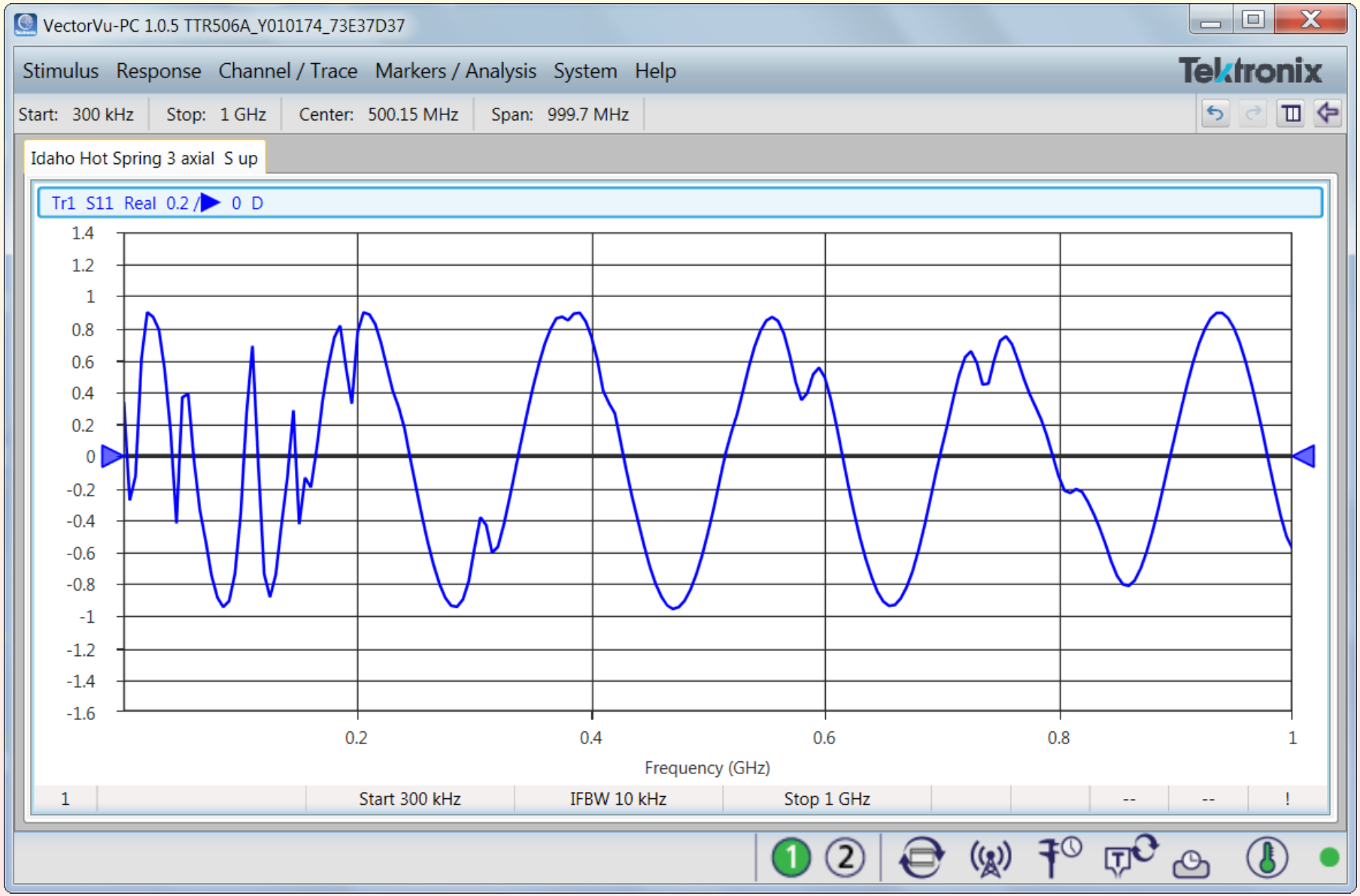


Idaho Hot Spring Real



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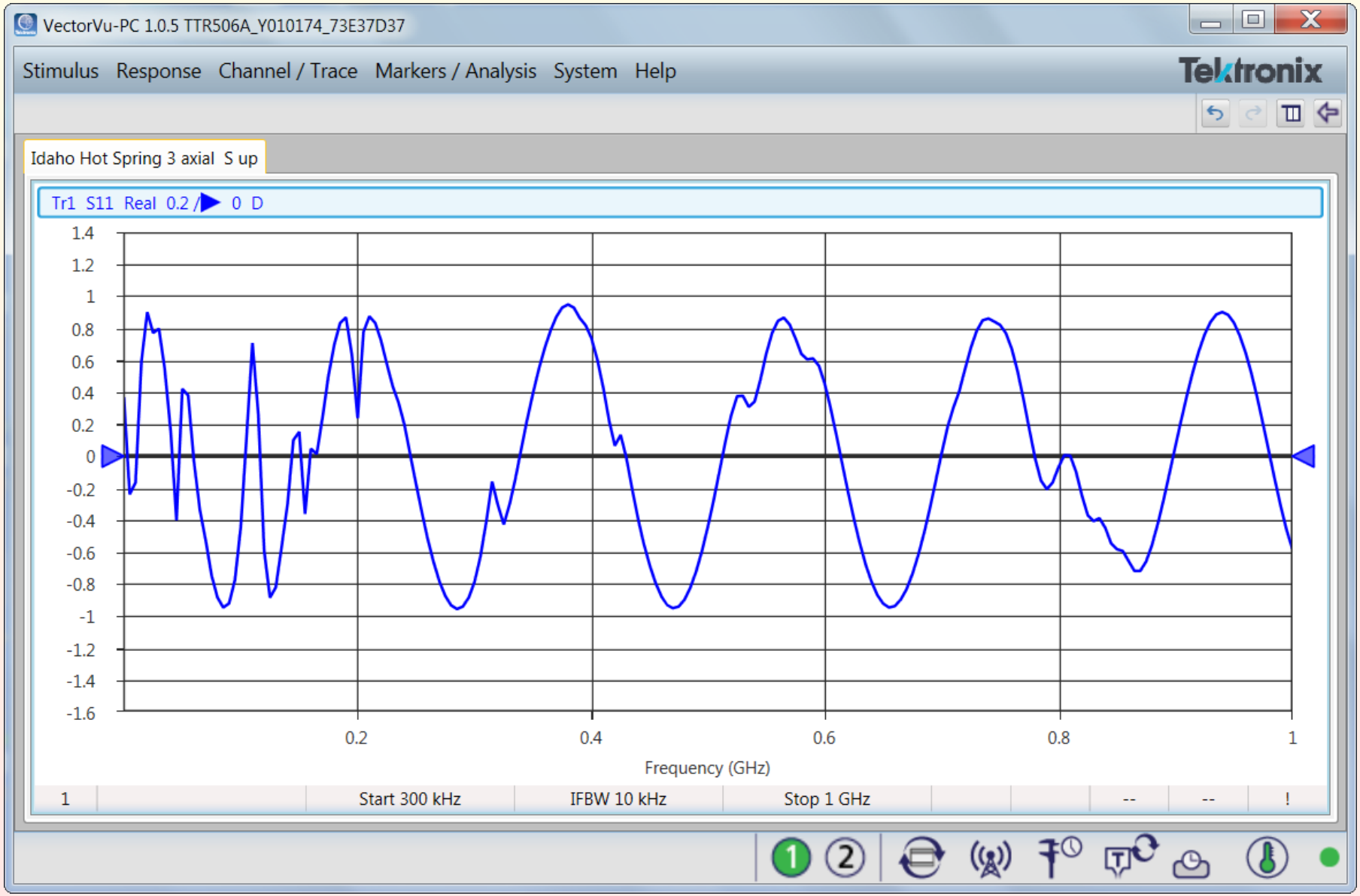
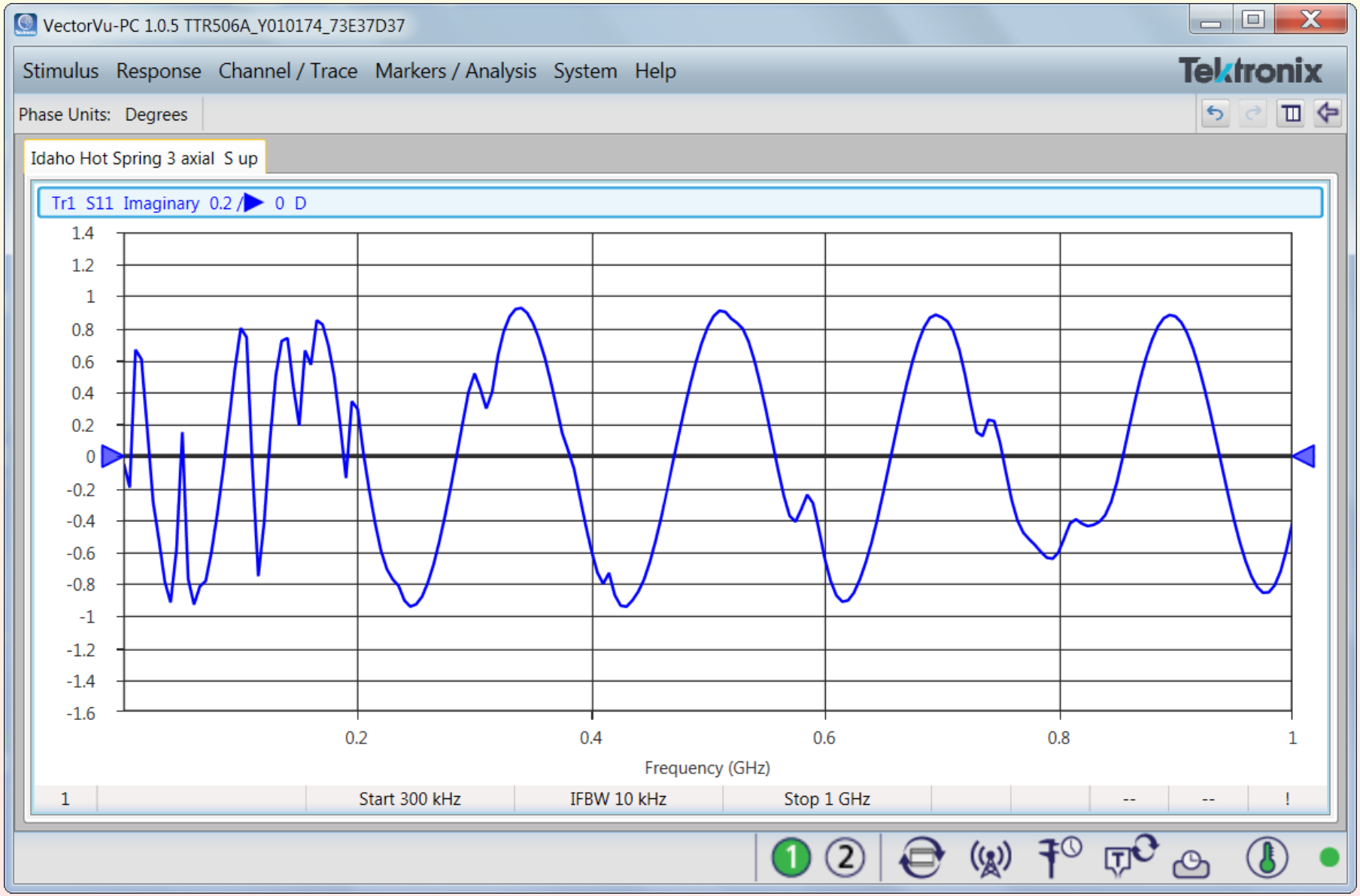
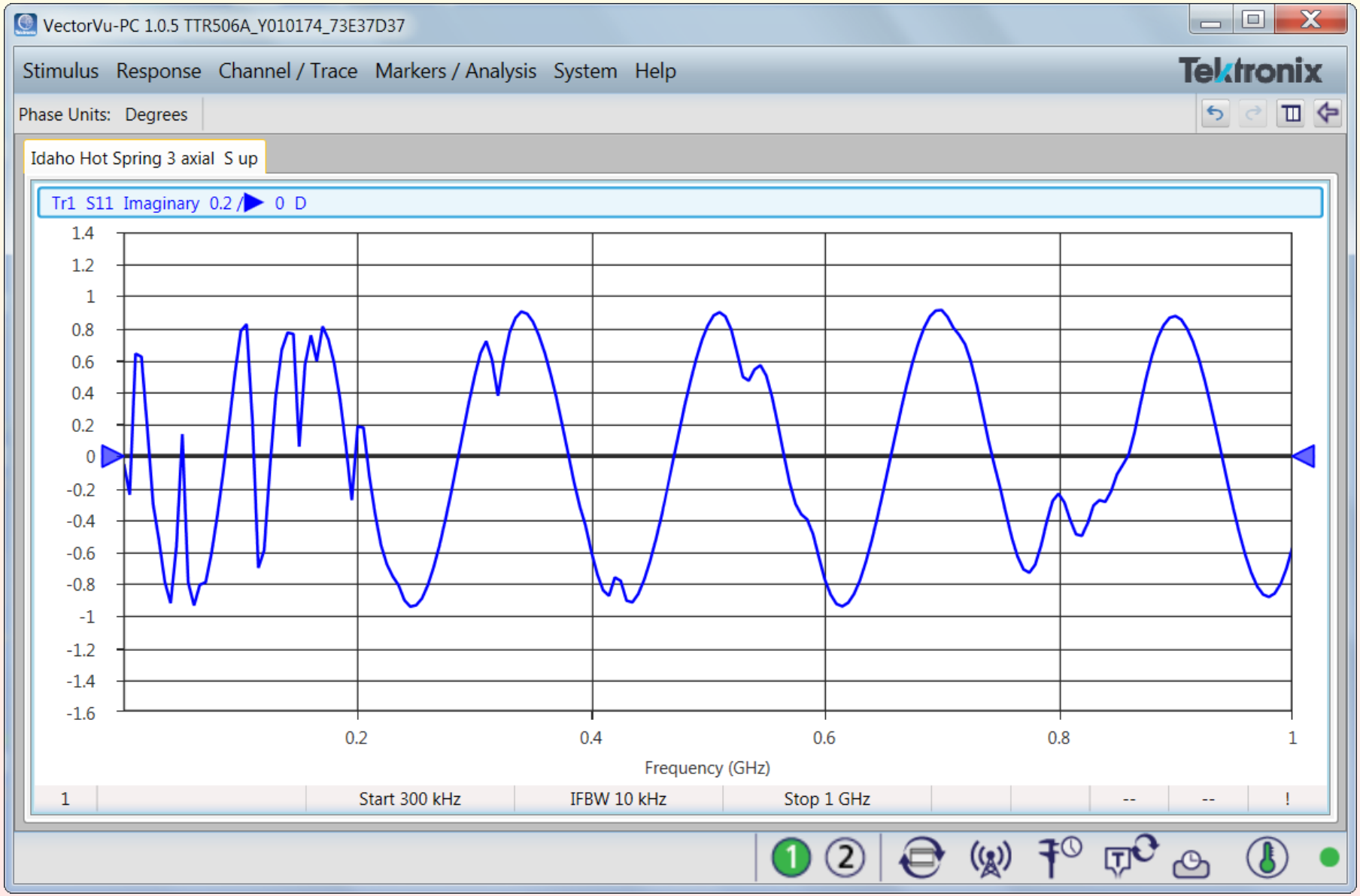


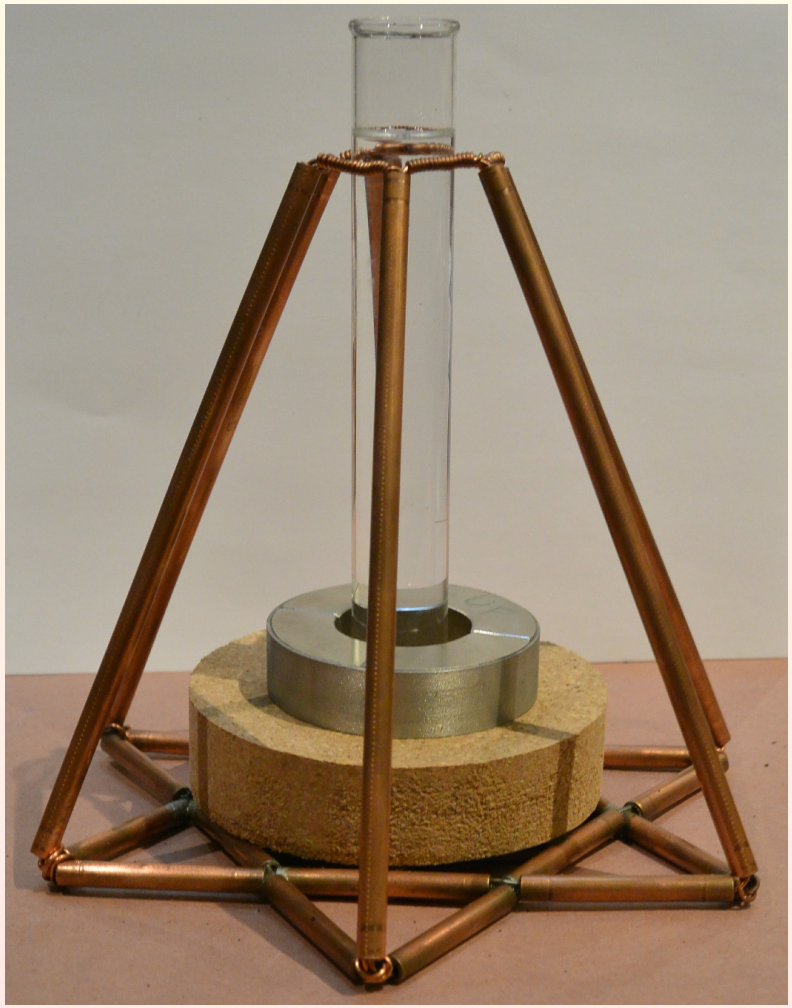
Idaho Hot Spring Imaginary



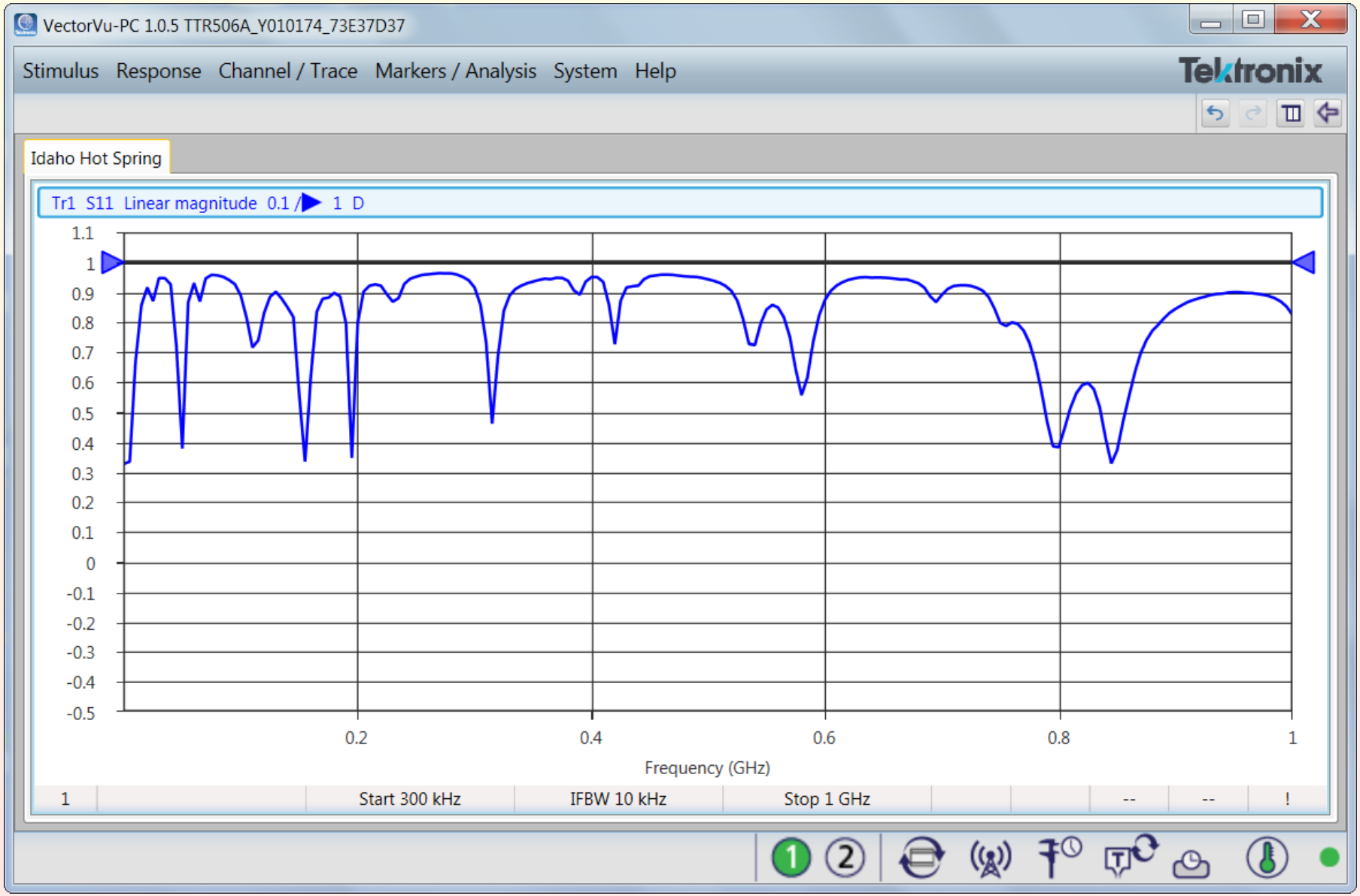
Idaho Hot Spring Axial Imaginary



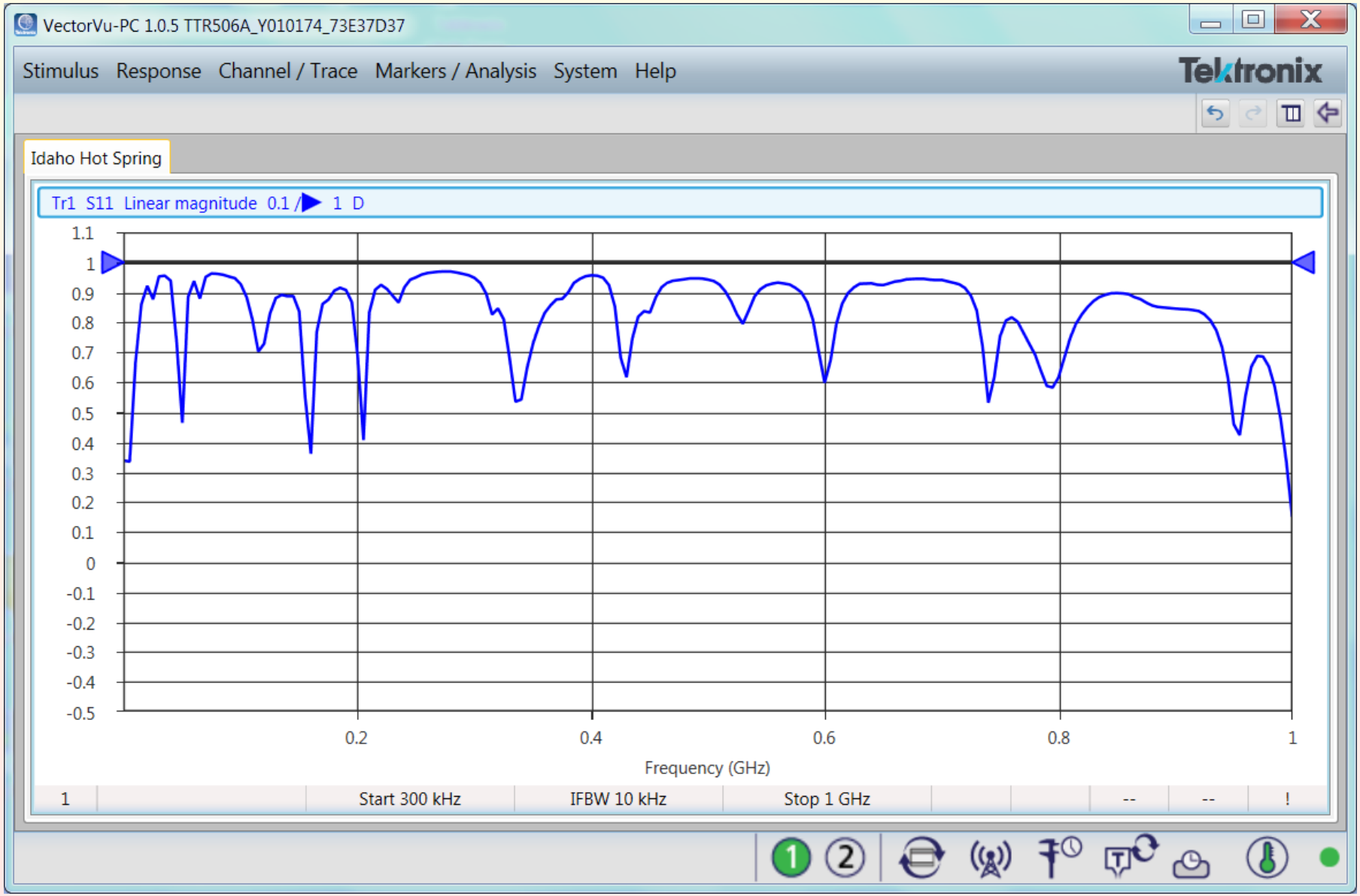
Radially Polarized South Inside



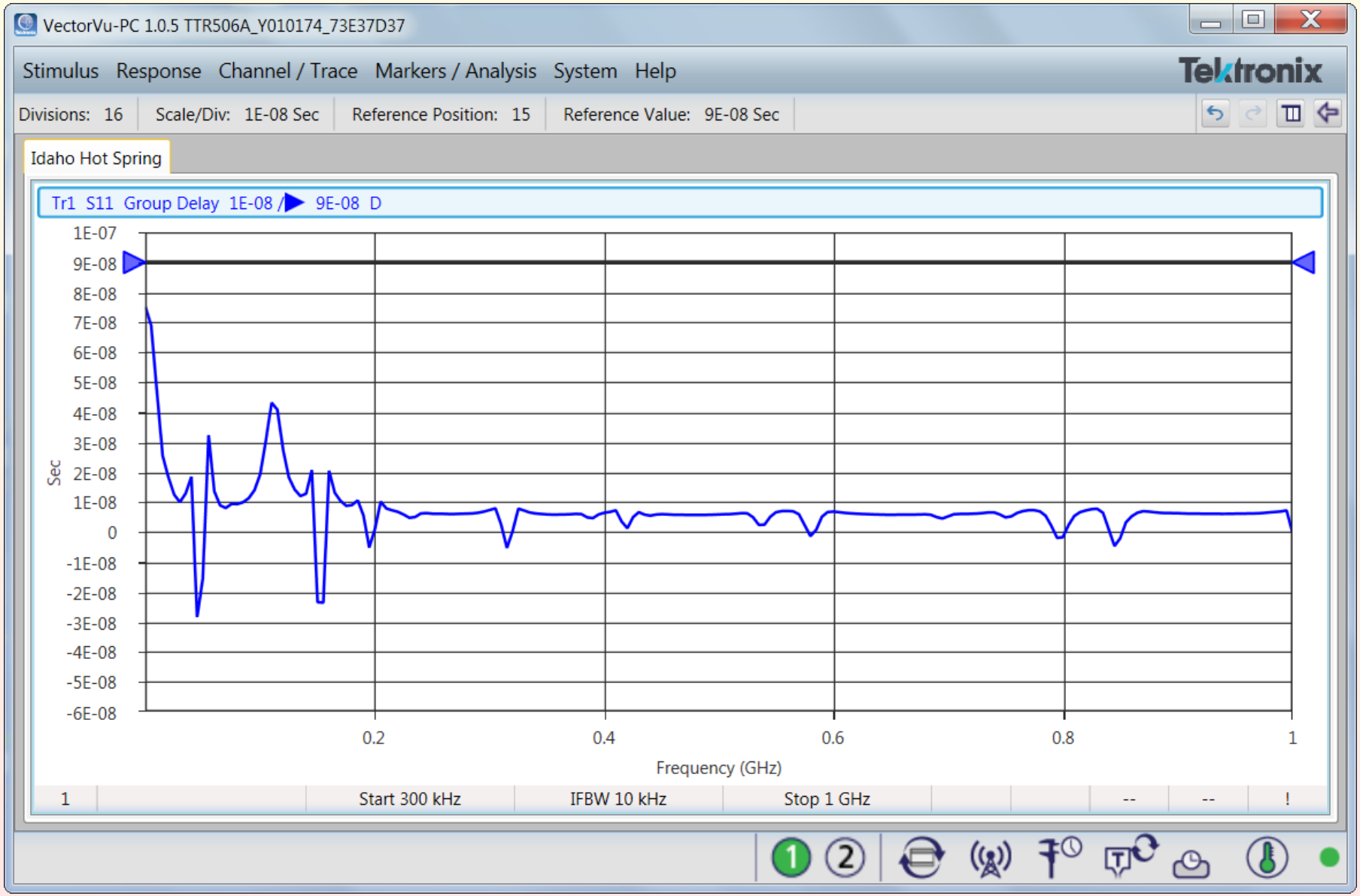
Idaho Hot Spring Linear Magnitude



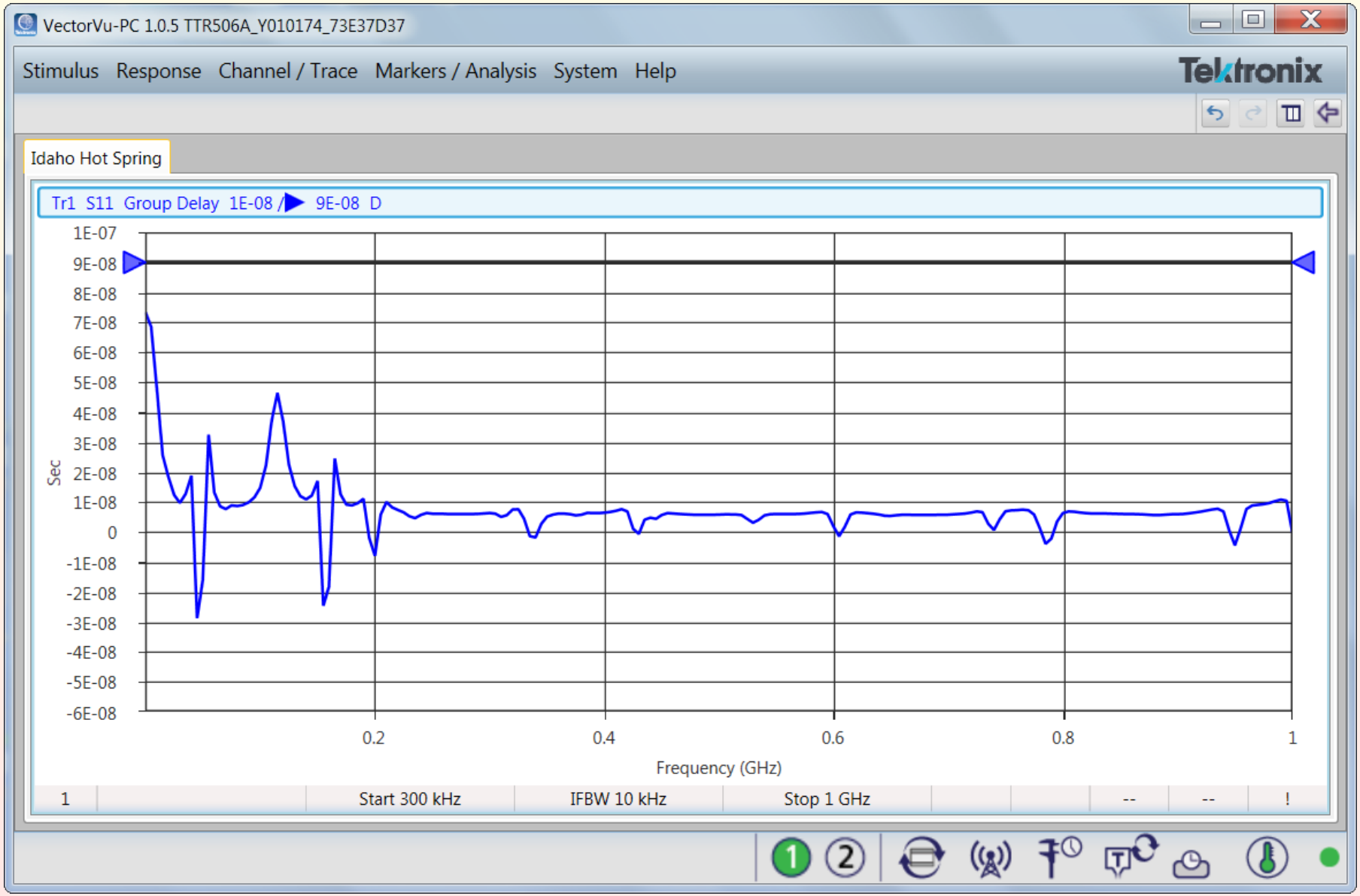
Idaho Hot Spring Radial South Linear Magnitude



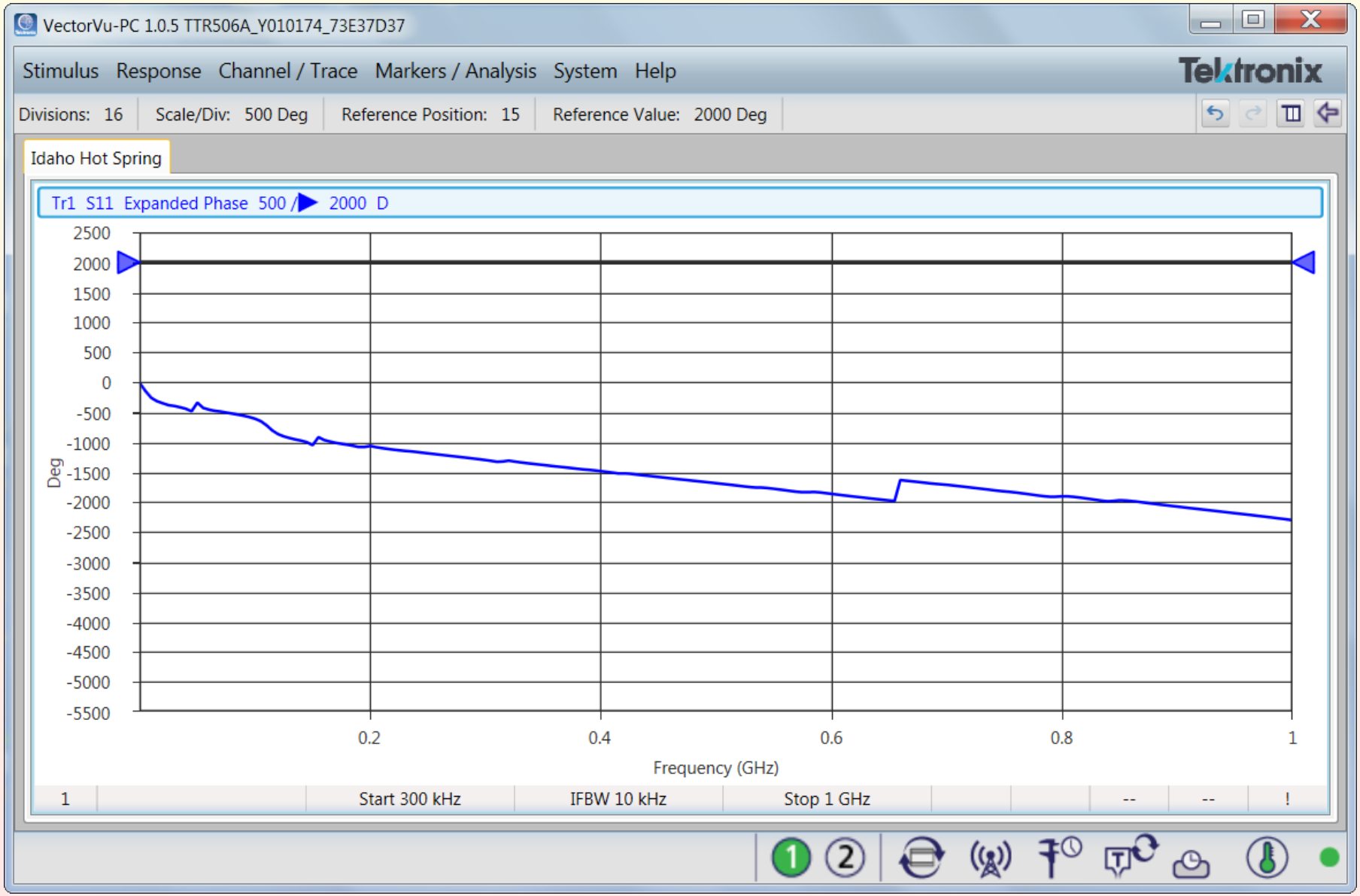
Idaho Hot Spring Delay



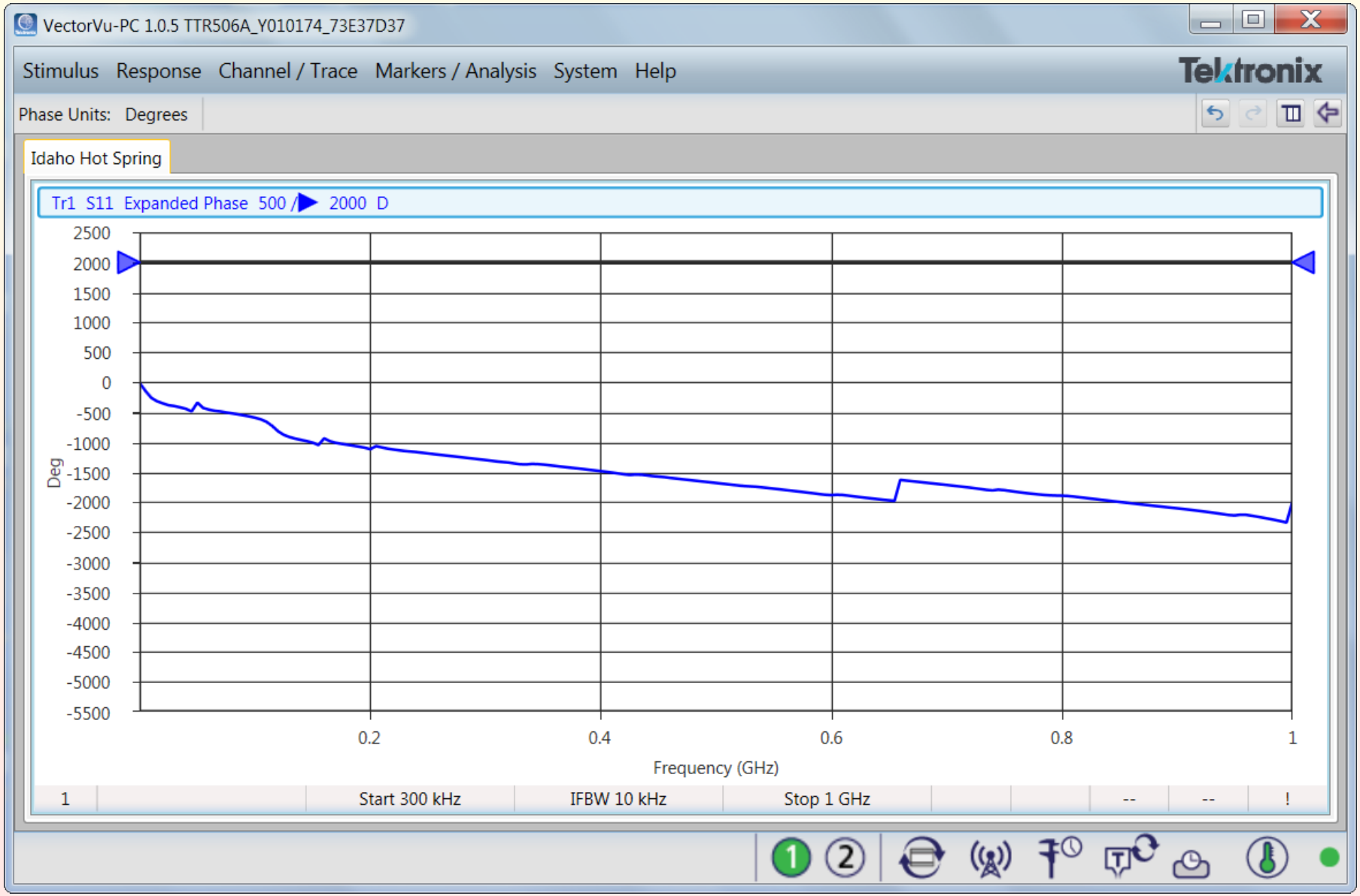
Idaho Hot Spring Radial South Delay



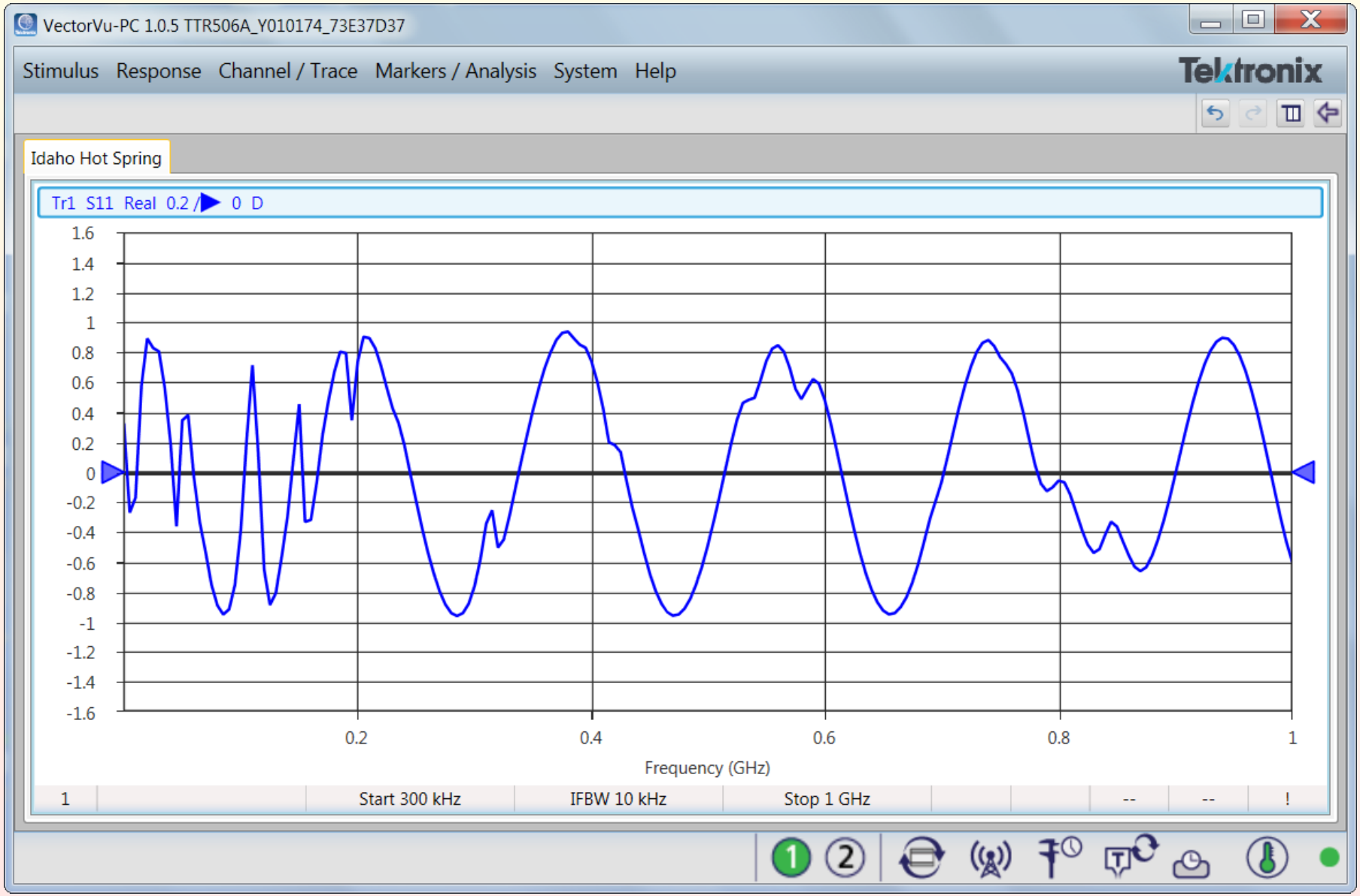
Idaho Hot Spring Phase



Idaho Hot Spring Radial South Phase



Idaho Hot Spring Real



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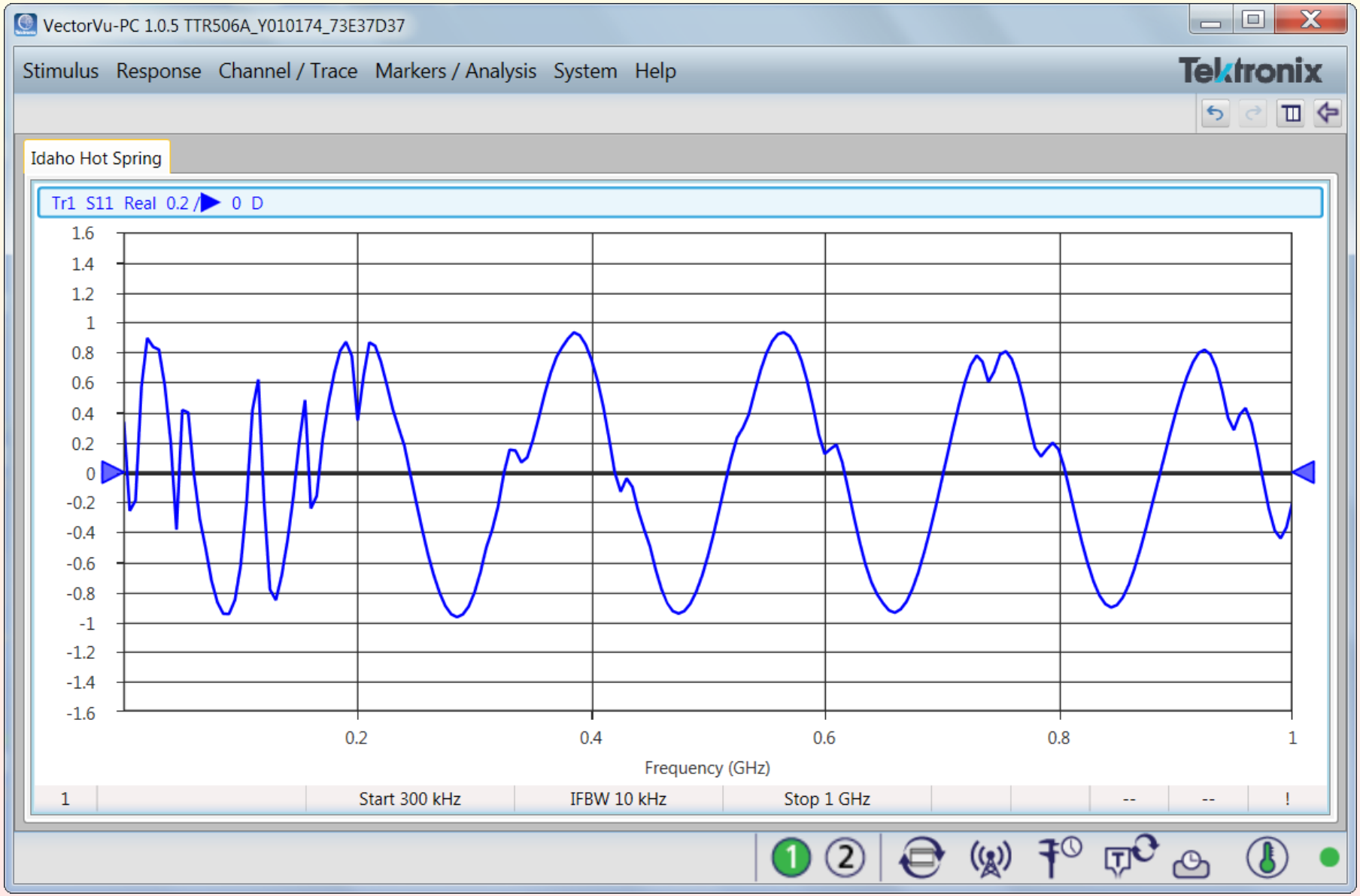
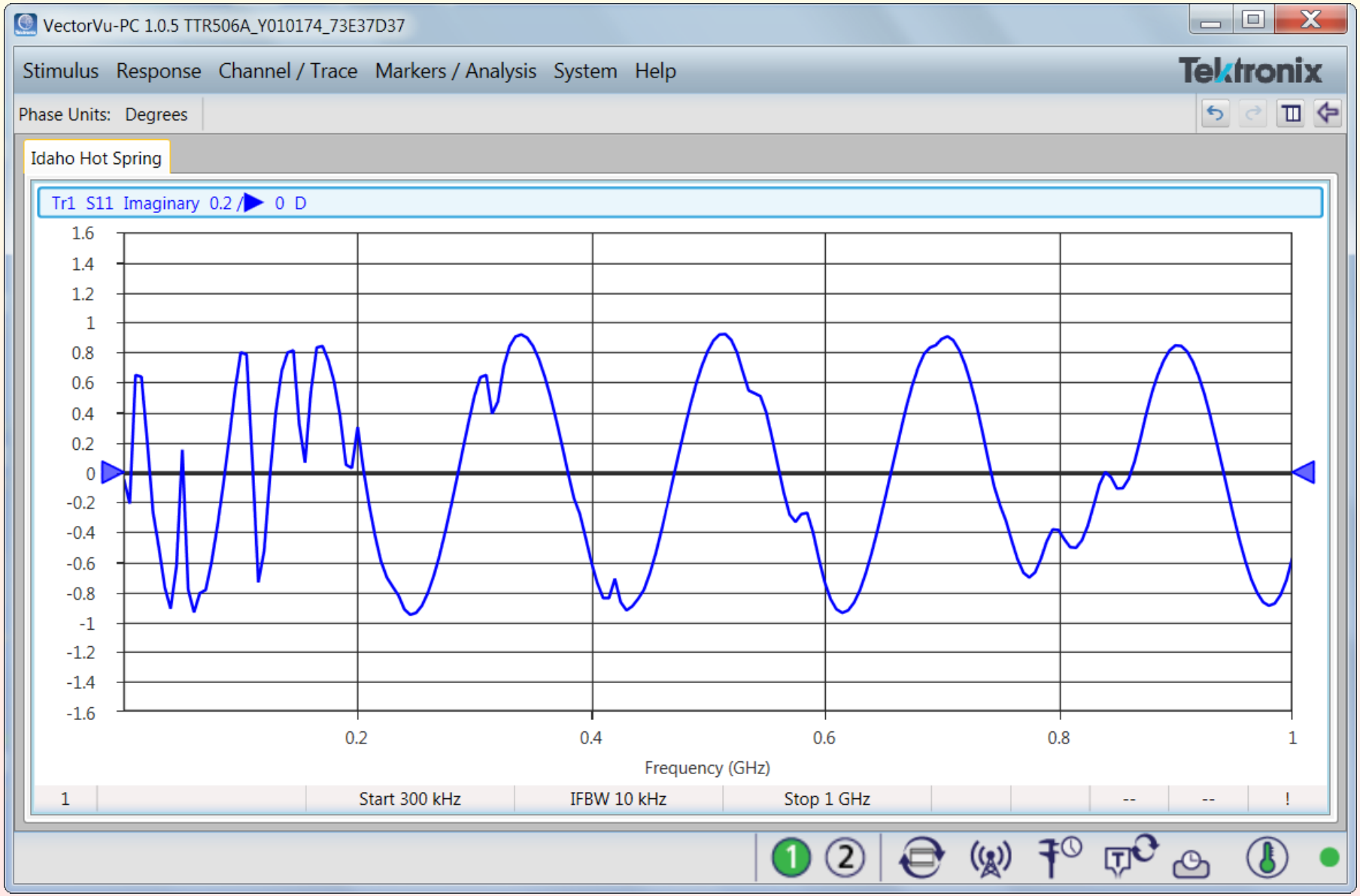
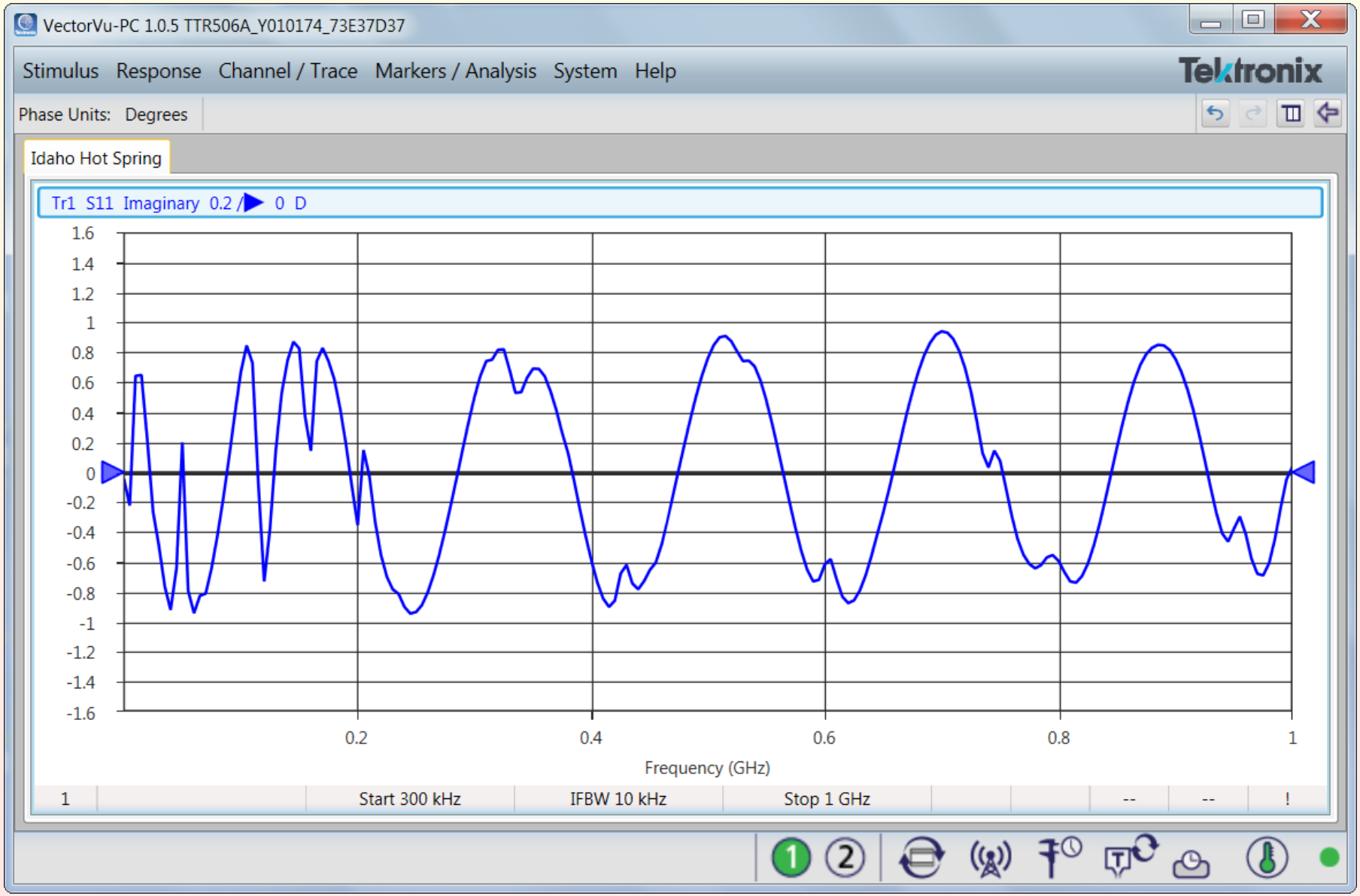


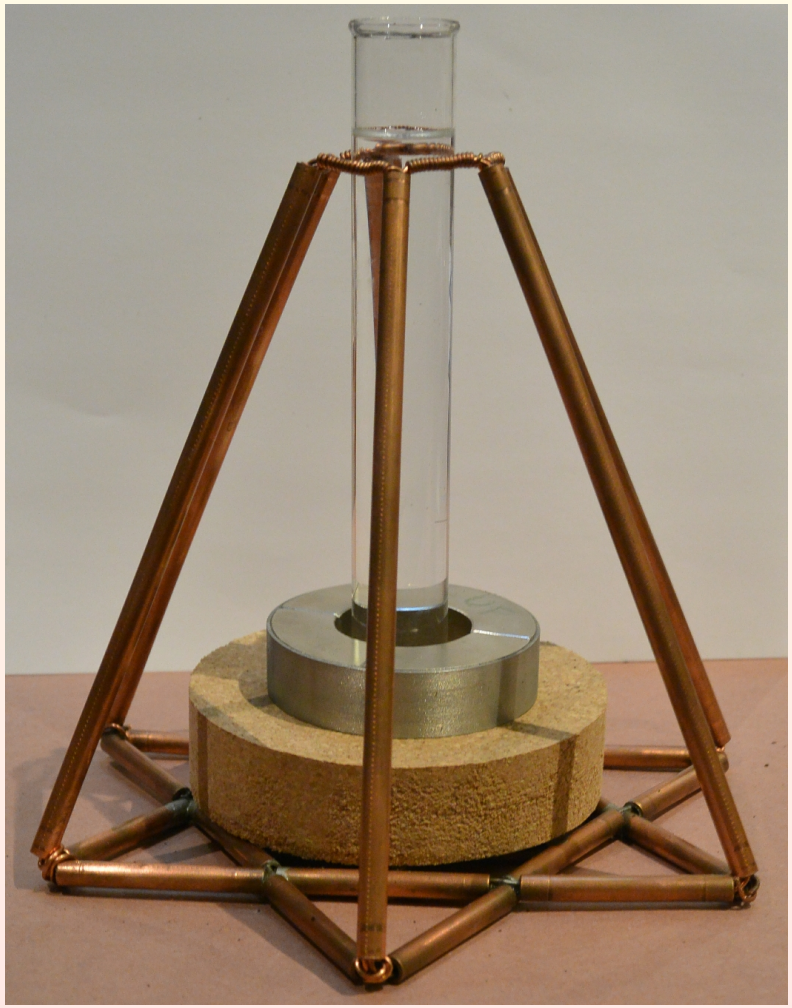
Idaho Hot Spring Imaginary



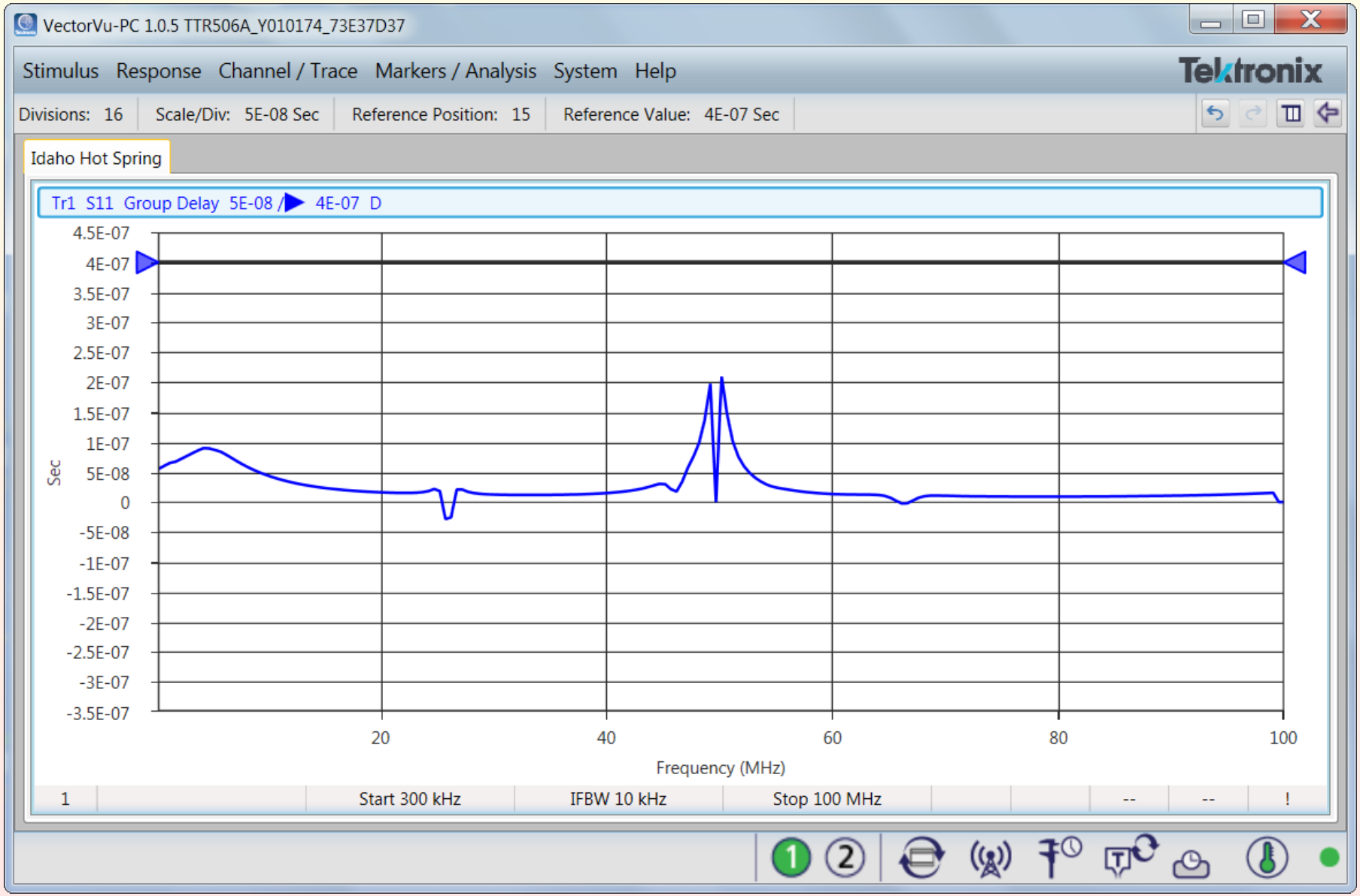
Idaho Hot Spring Radial South Imaginary



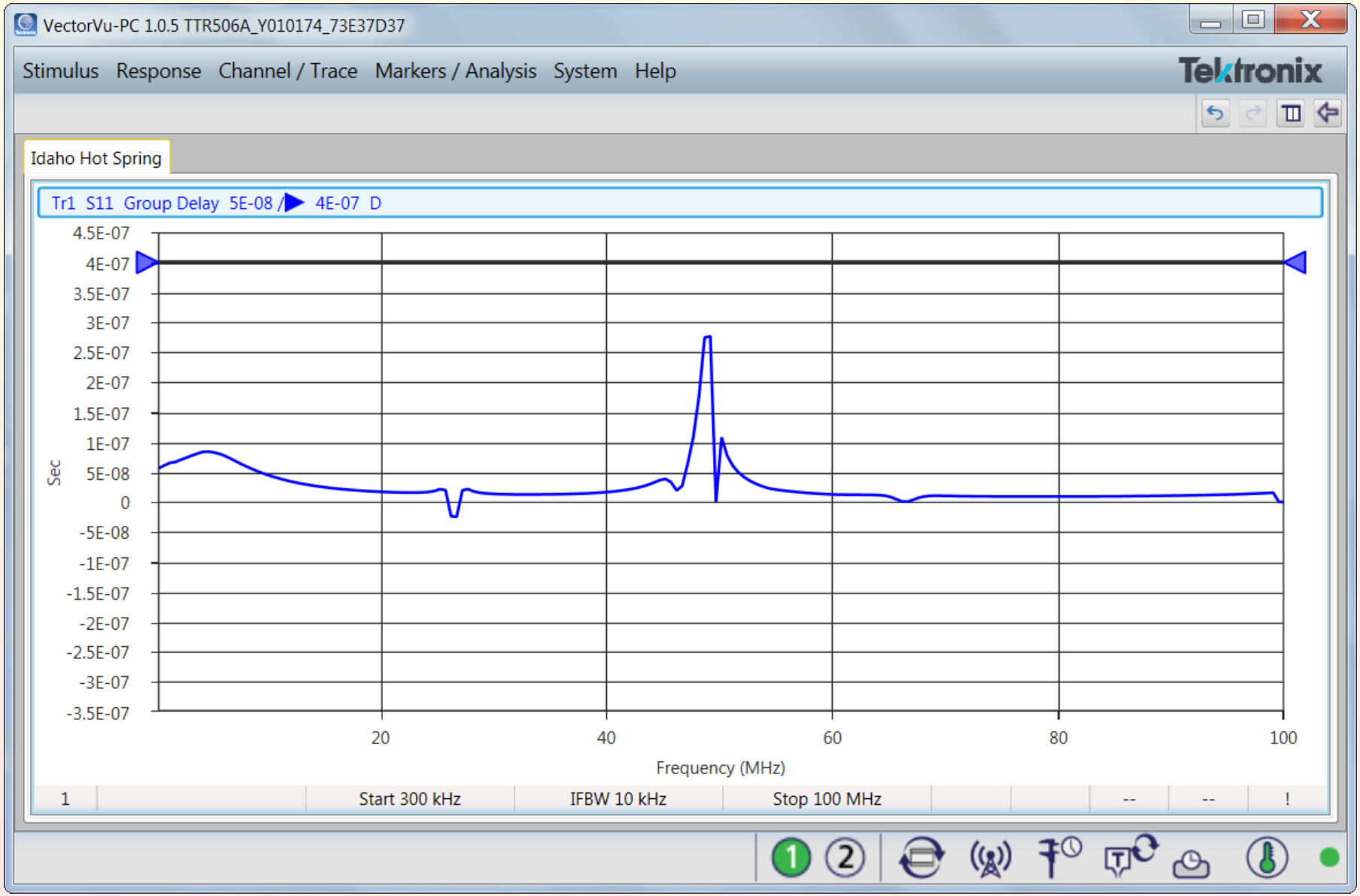
Radially Polarized North Inside



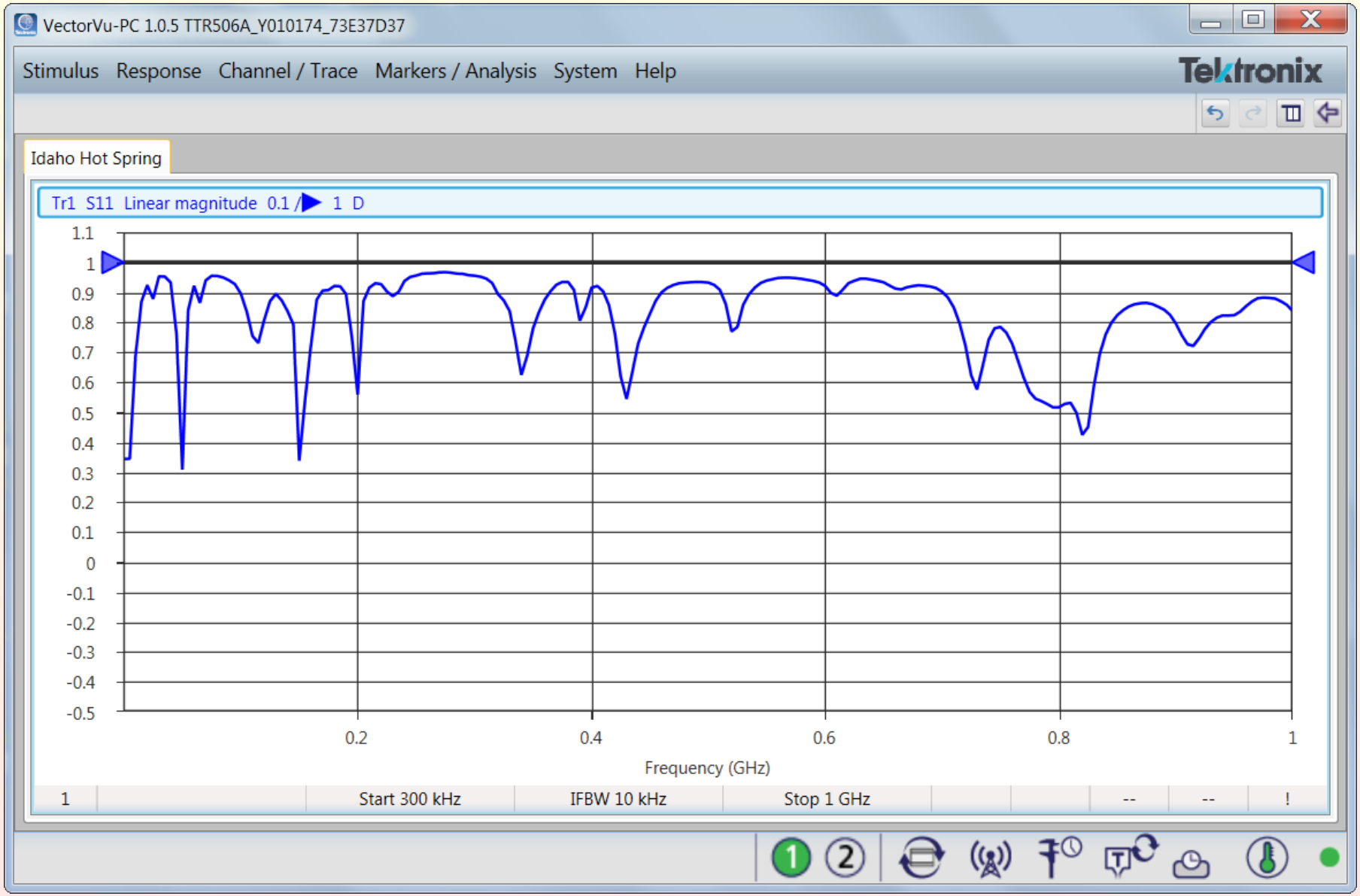
Idaho Hot Spring Delay



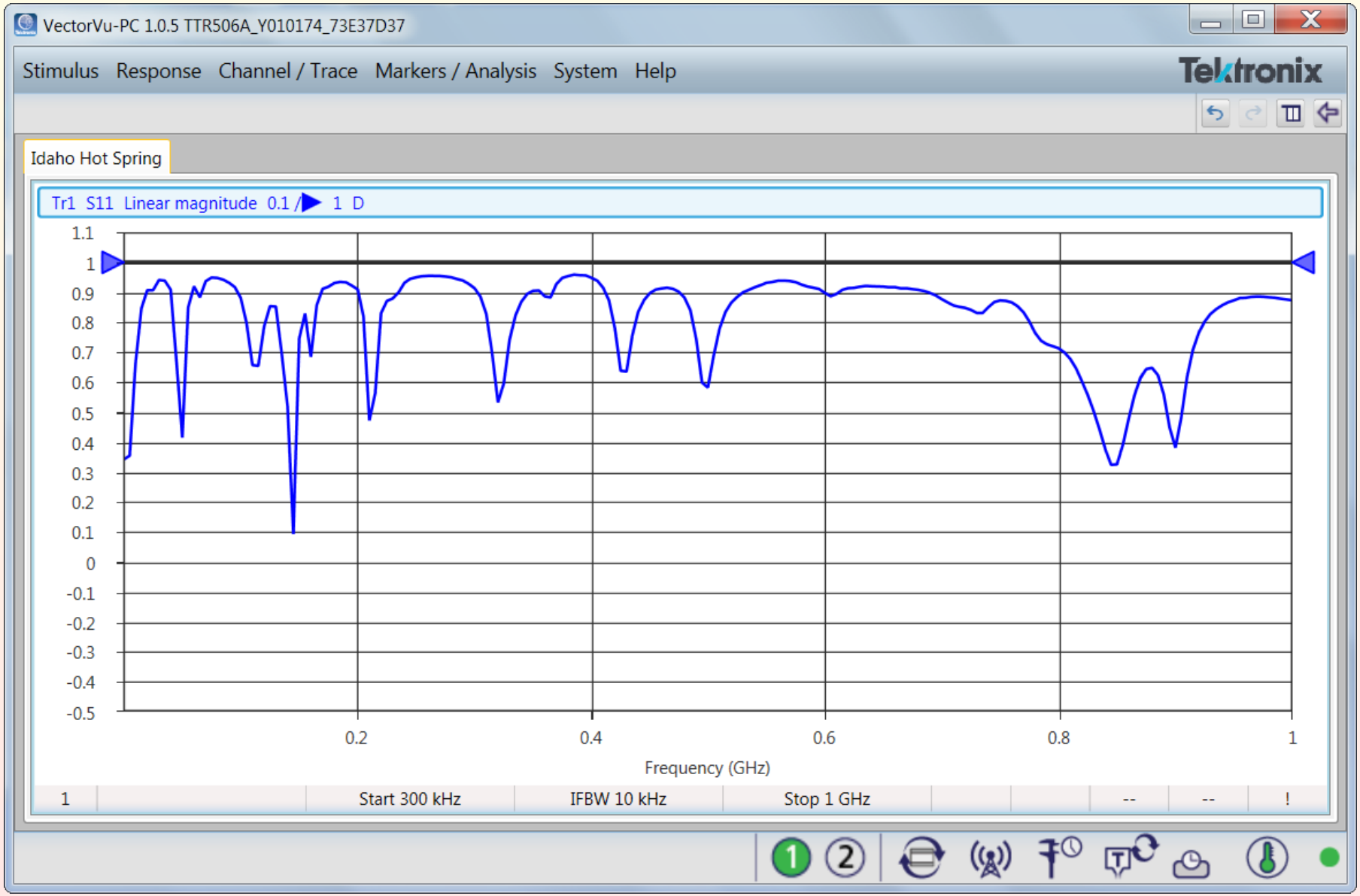
Idaho Hot Spring Radial North Delay



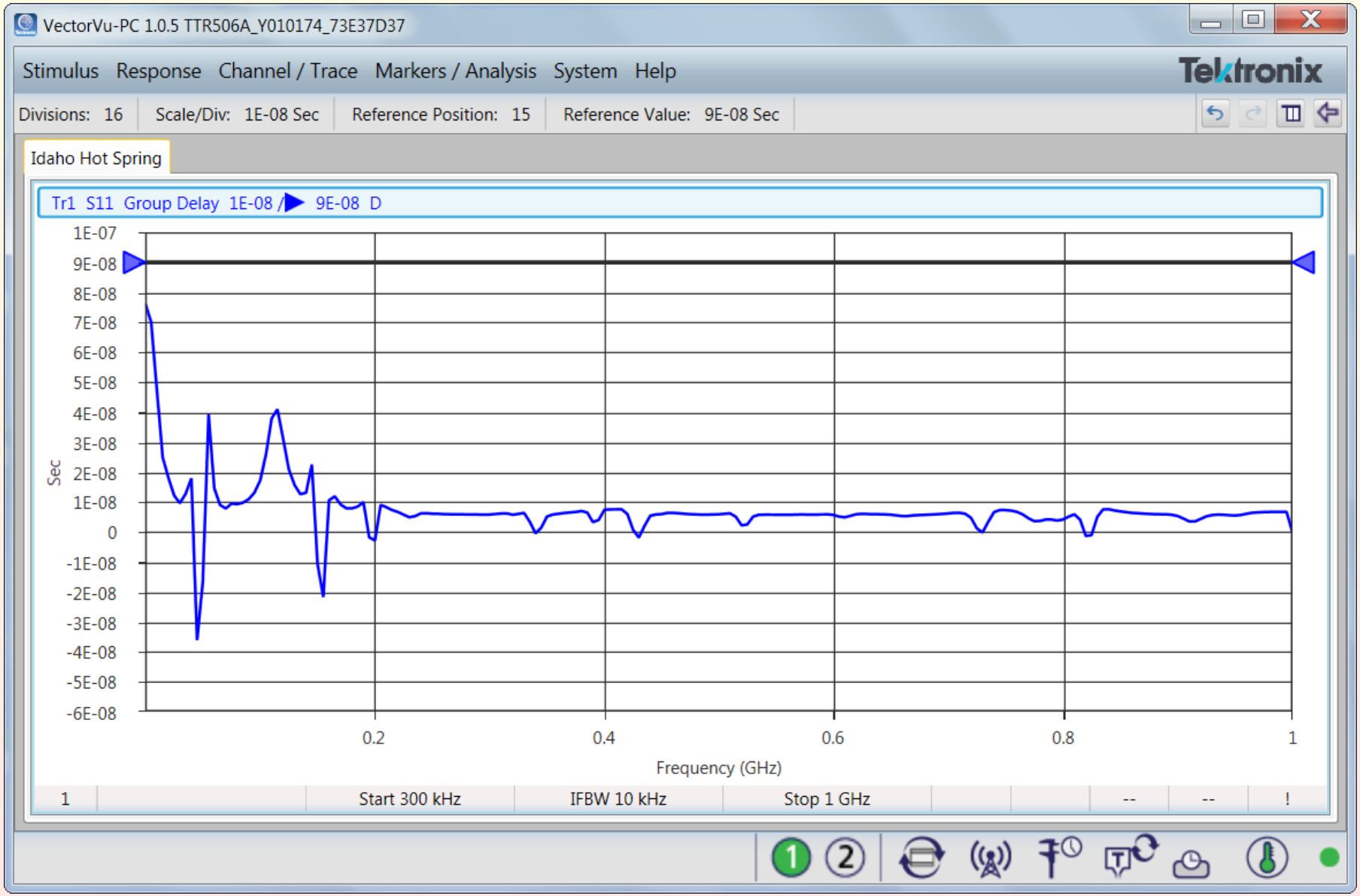
Idaho Hot Spring Linear Magnitude



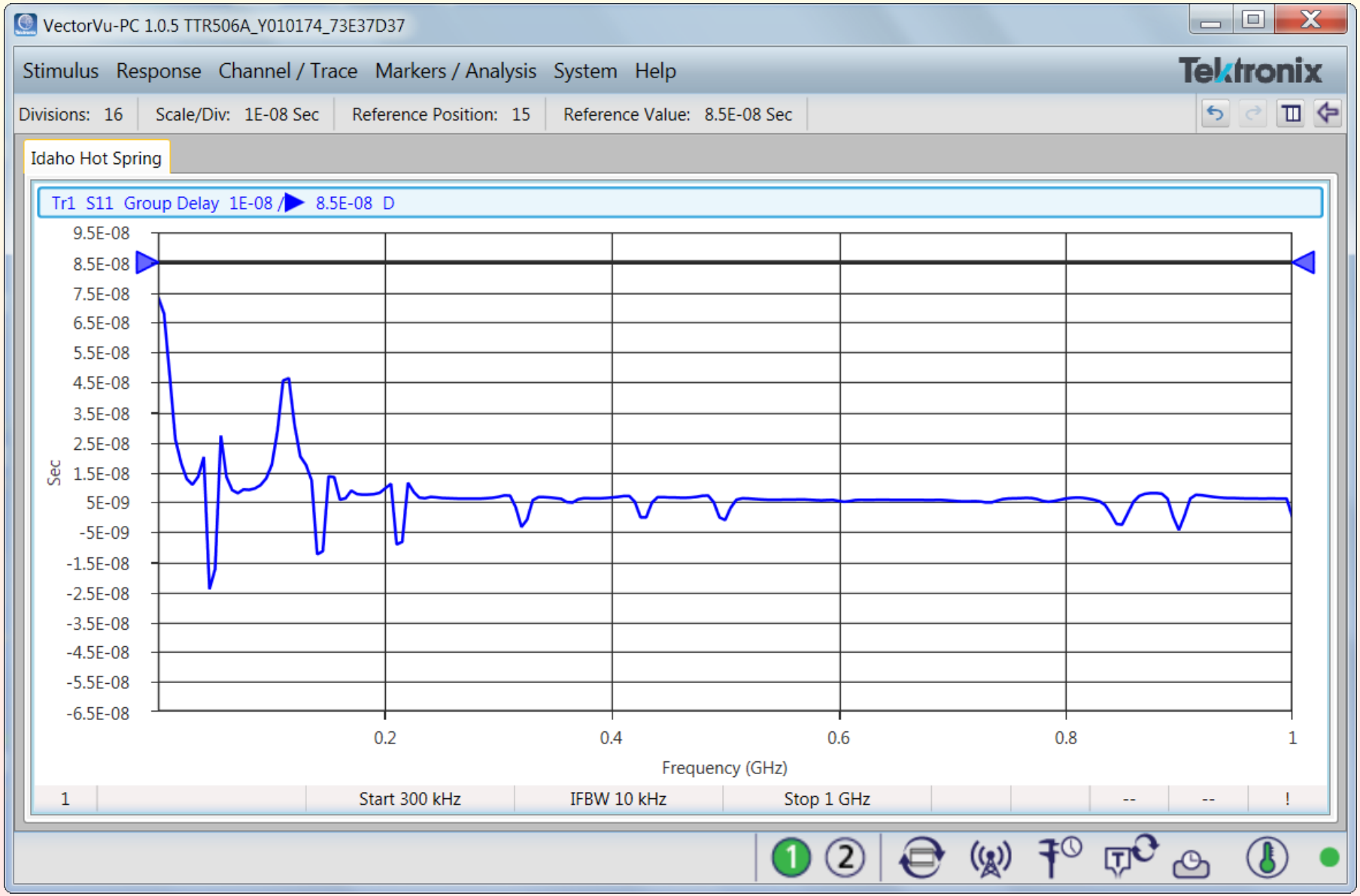
Idaho Hot Spring Radial North Linear Magnitude



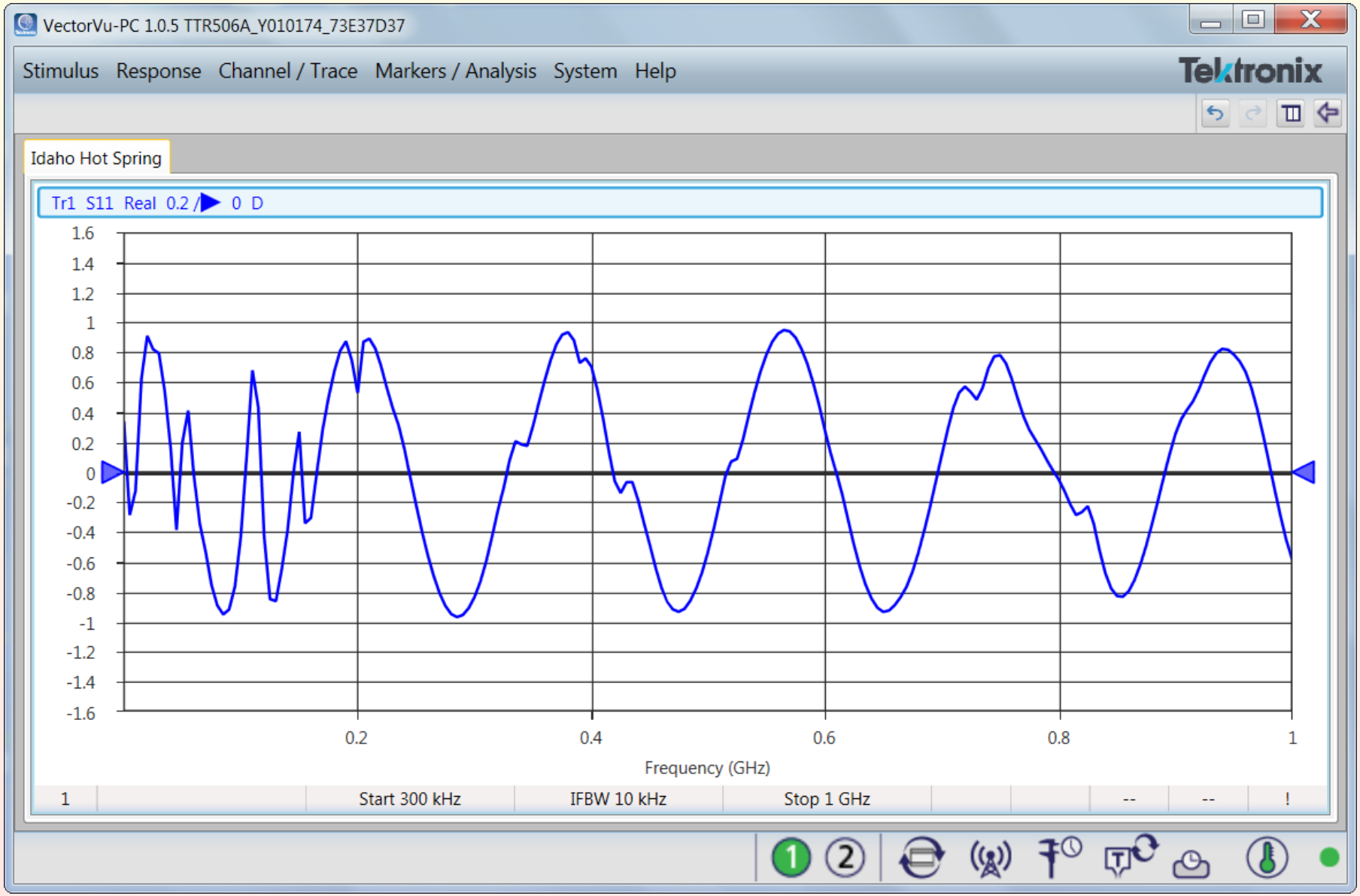
Idaho Hot Spring Delay



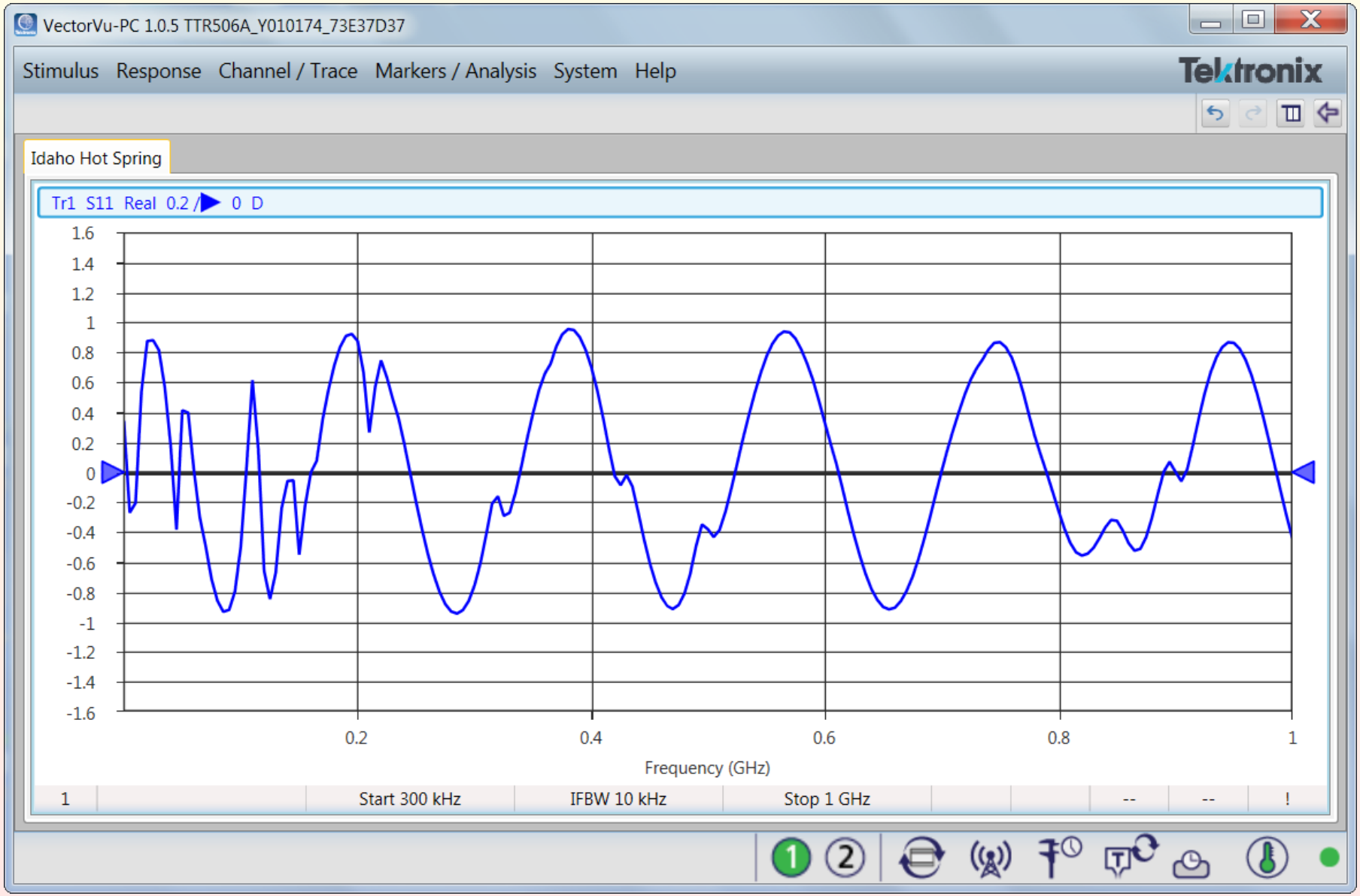
Idaho Hot Spring Radial North Delay



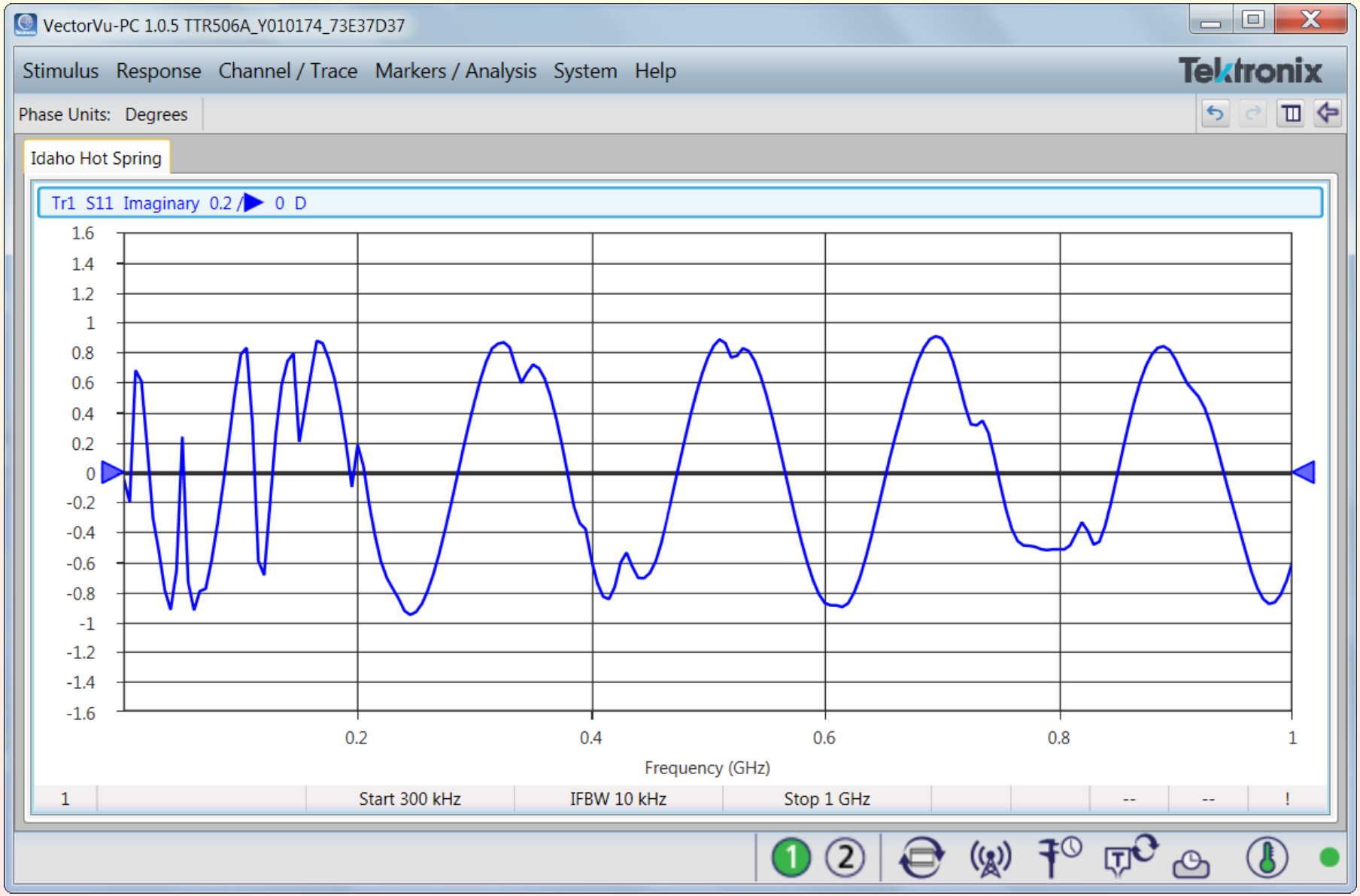
Idaho Hot Spring Real



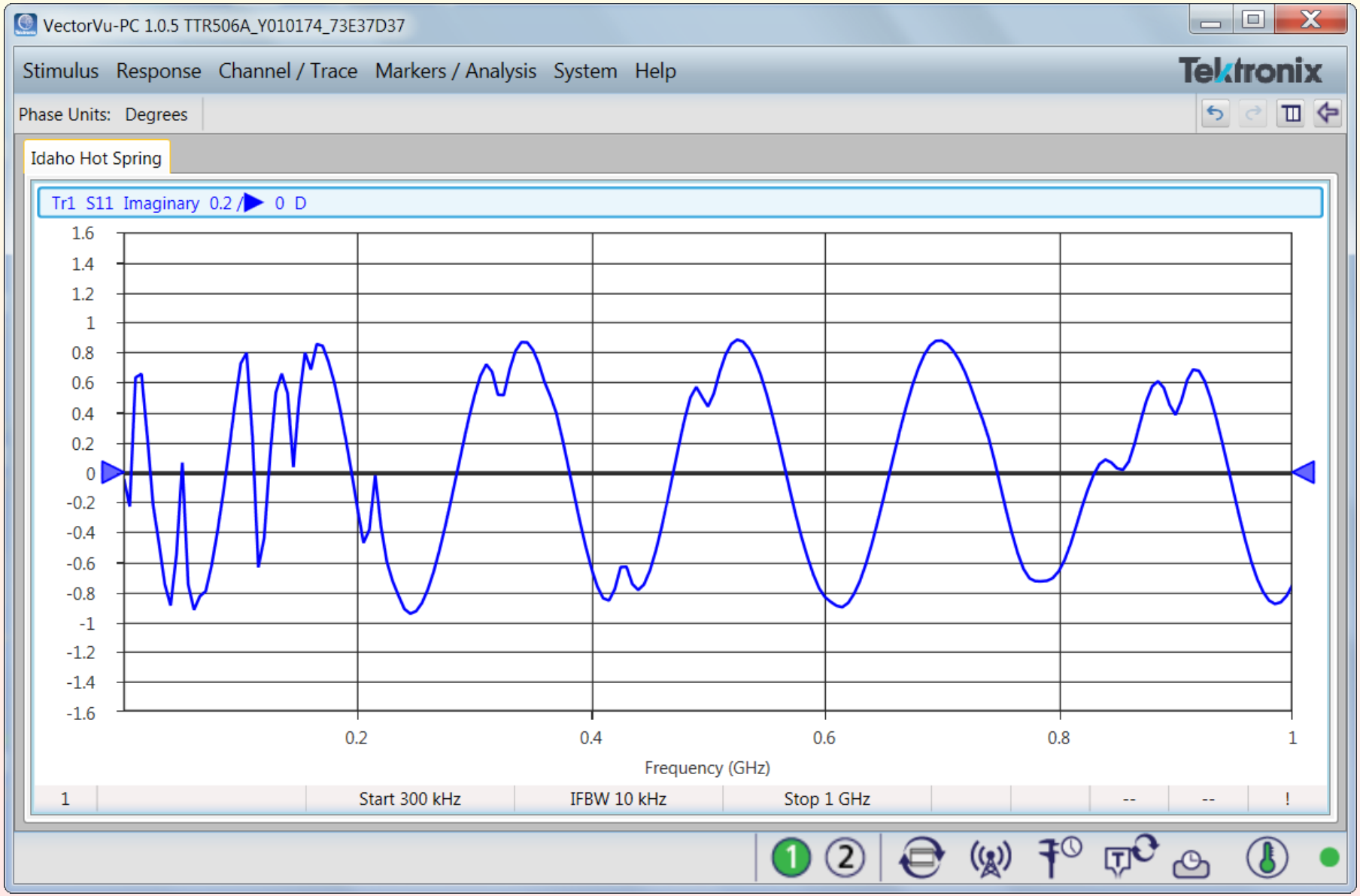
Idaho Hot Spring Radial North Real



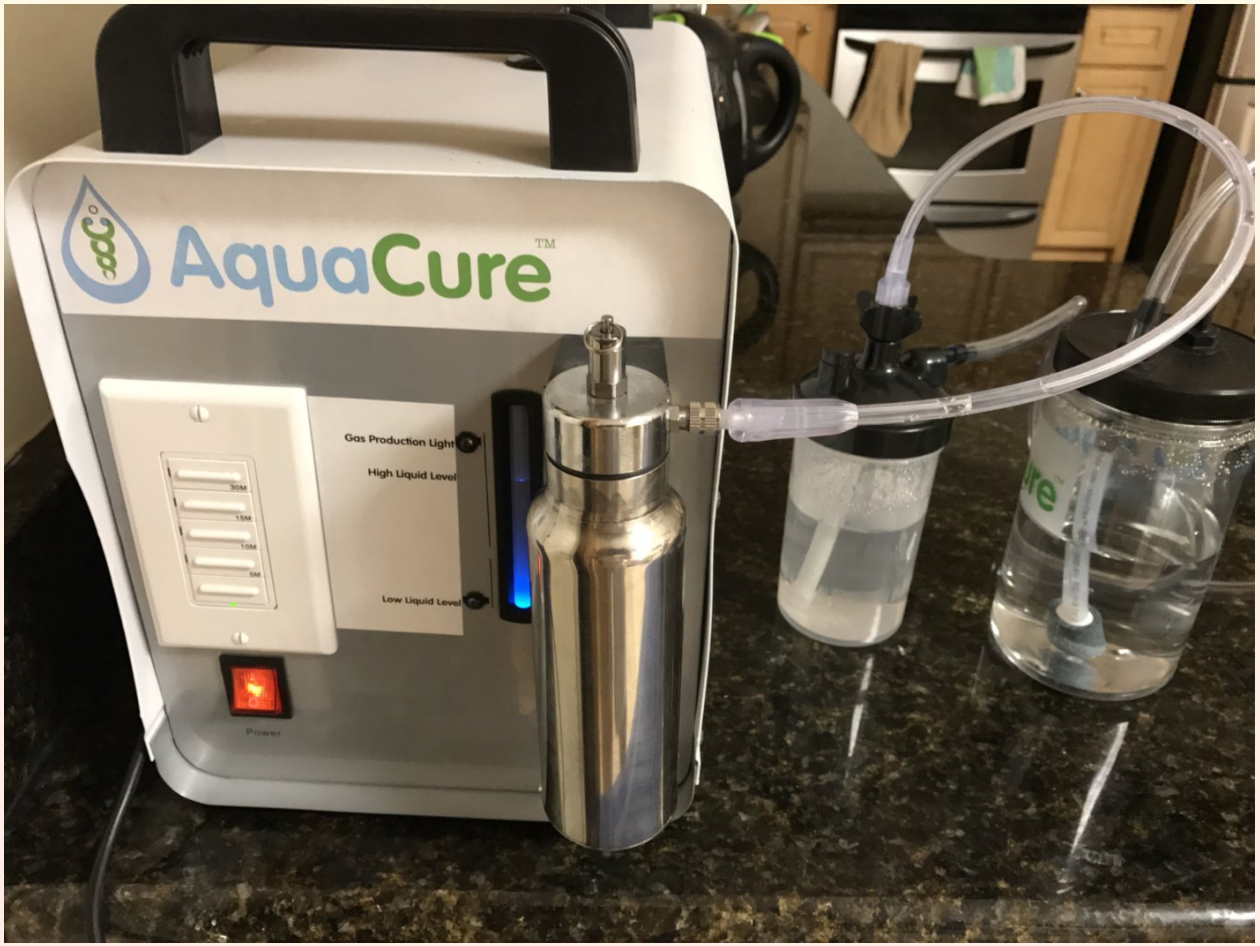
Idaho Hot Spring Imaginary



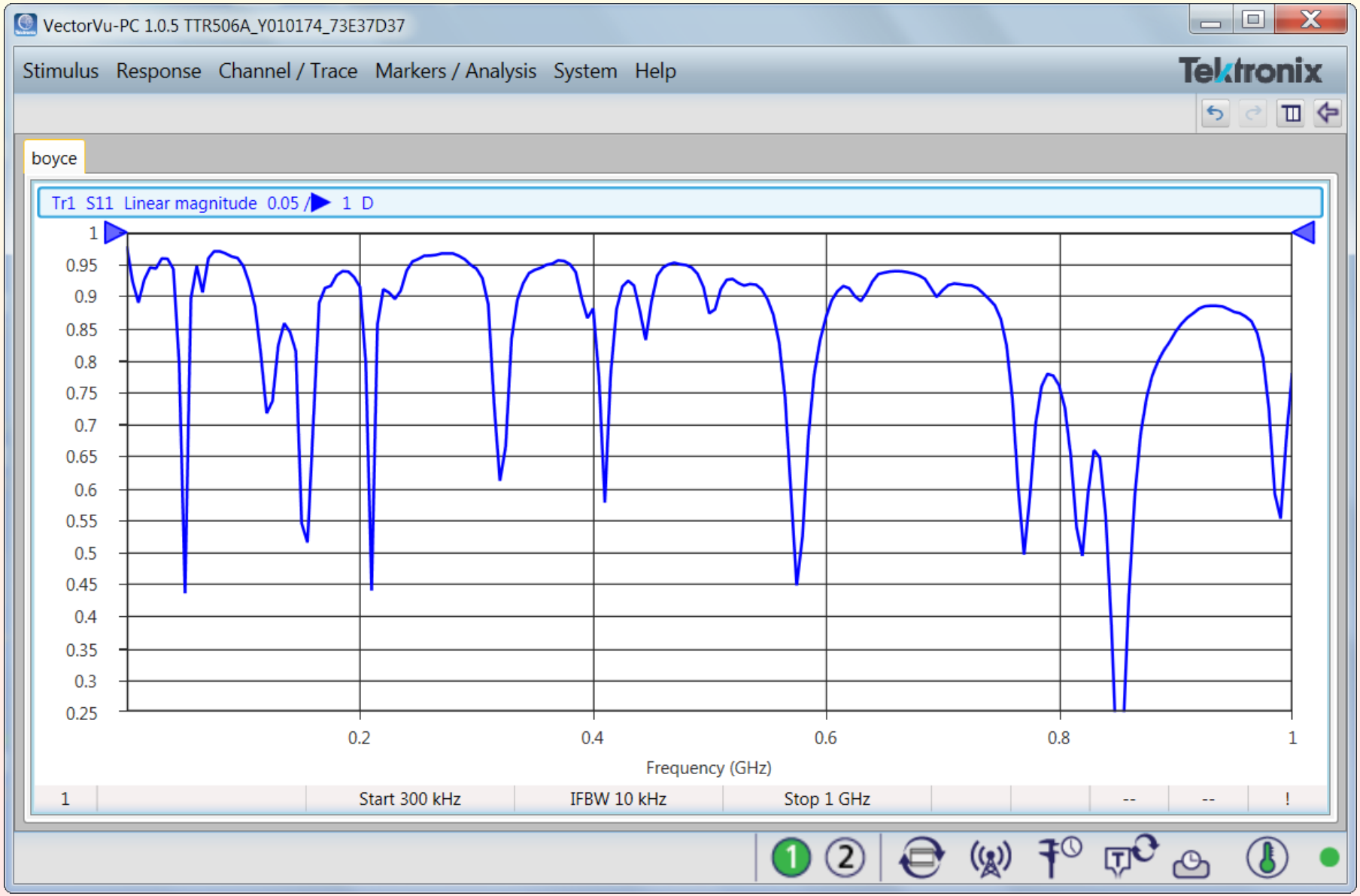
Idaho Hot Spring Radial North Imaginary



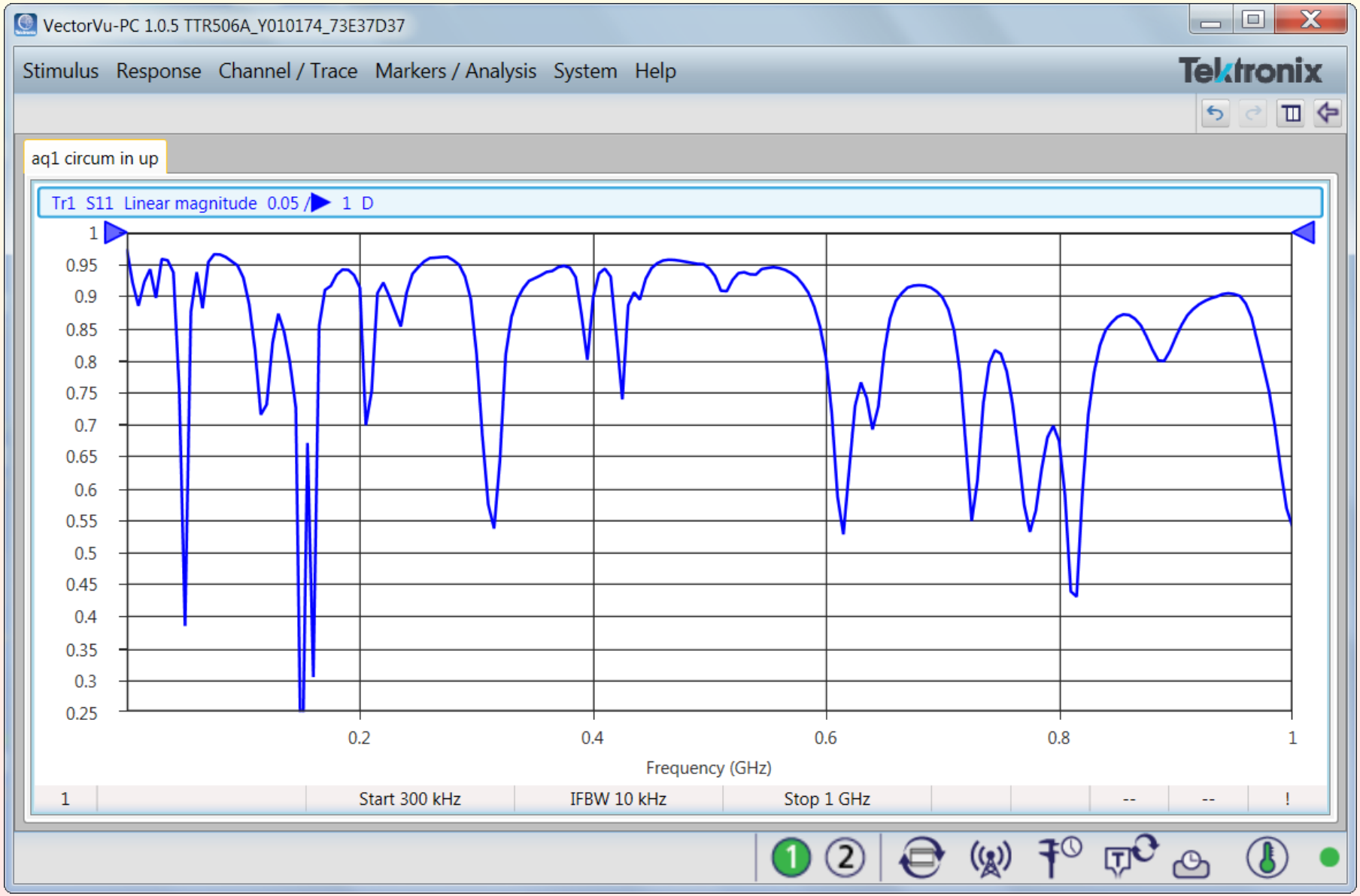
Aquacure Water



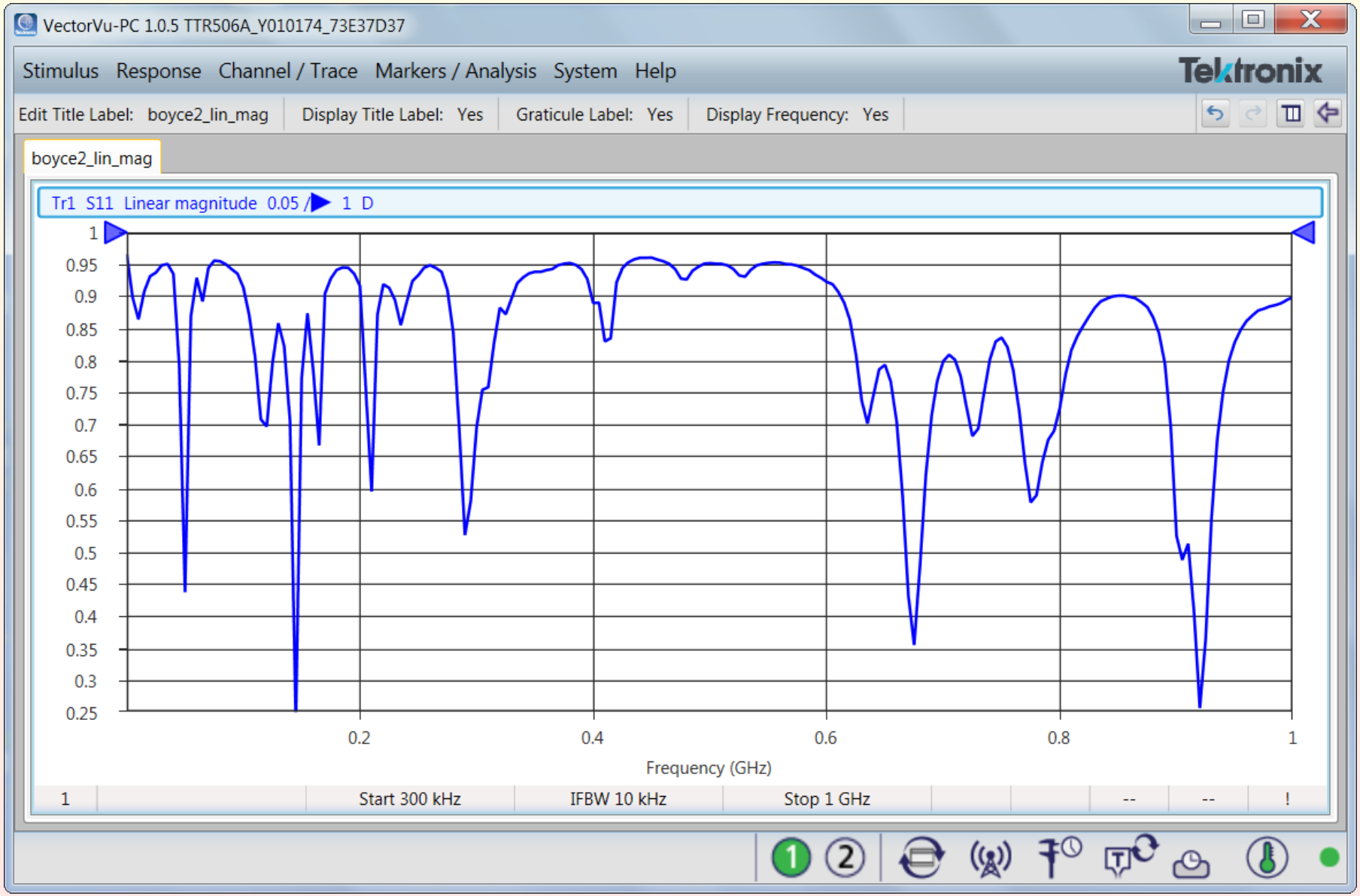
Aquacure Linear Magnitude



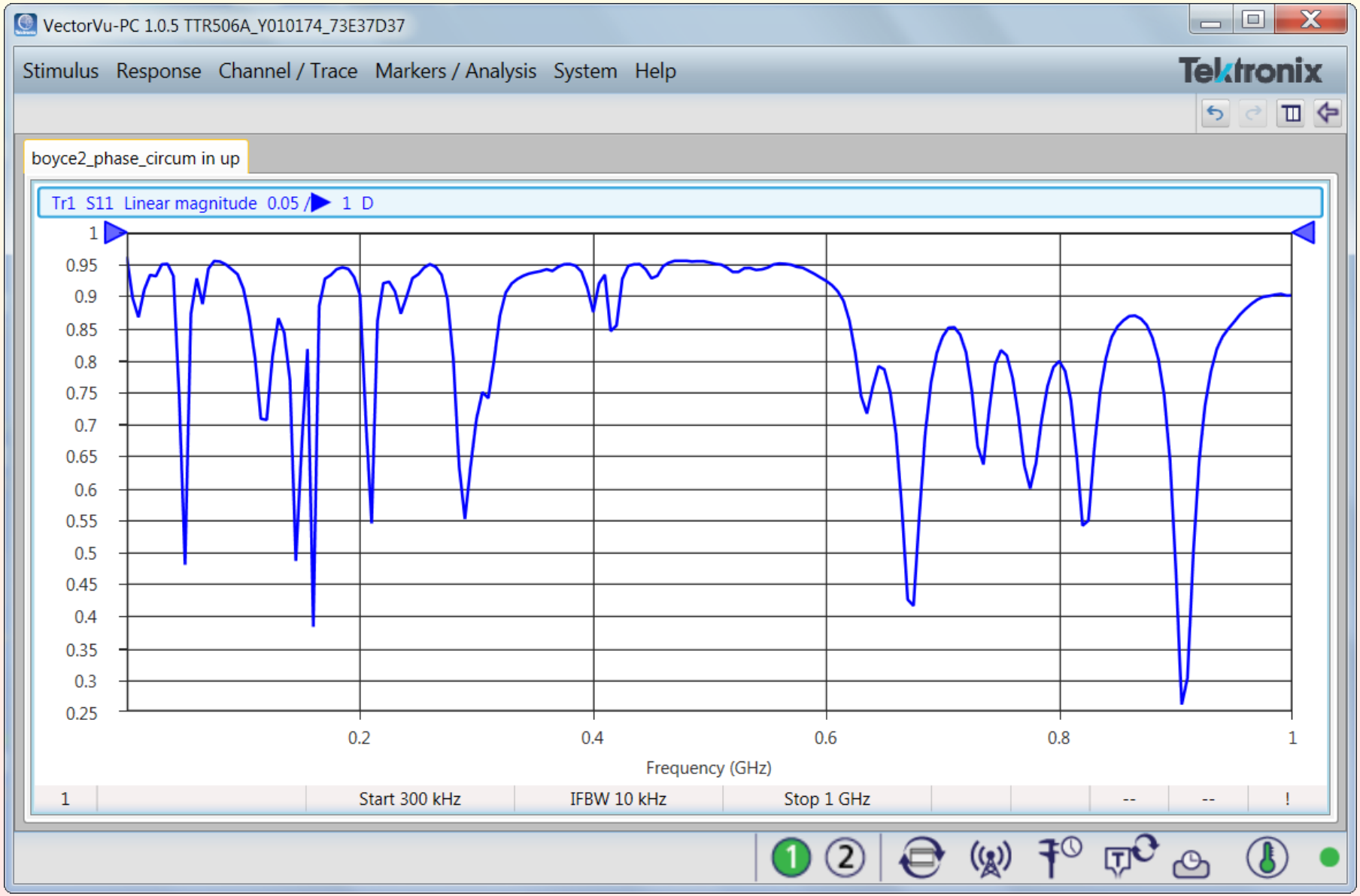
Aquacure Circum In Linear Magnitude



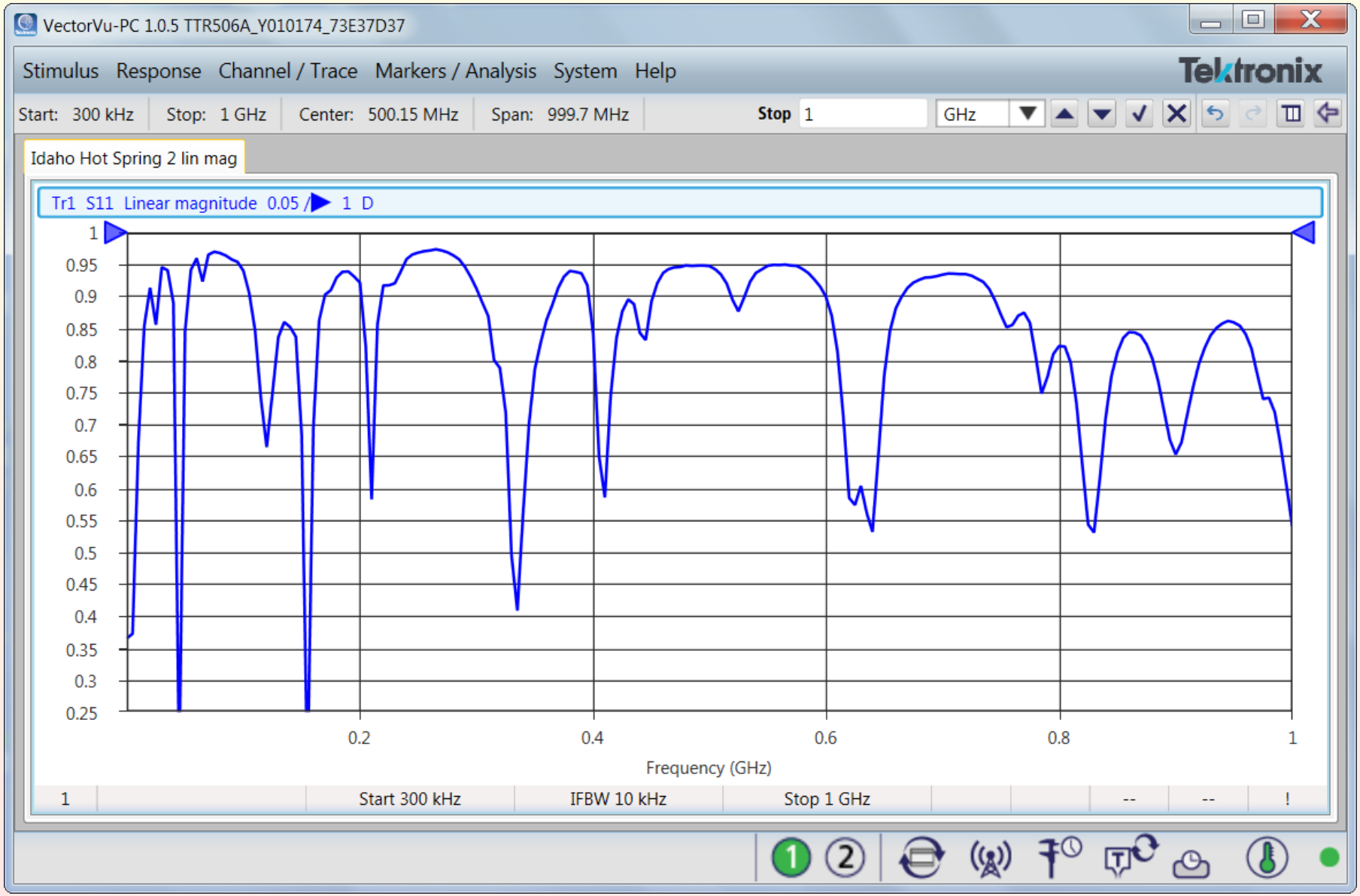
Boyce Linear Magnitude



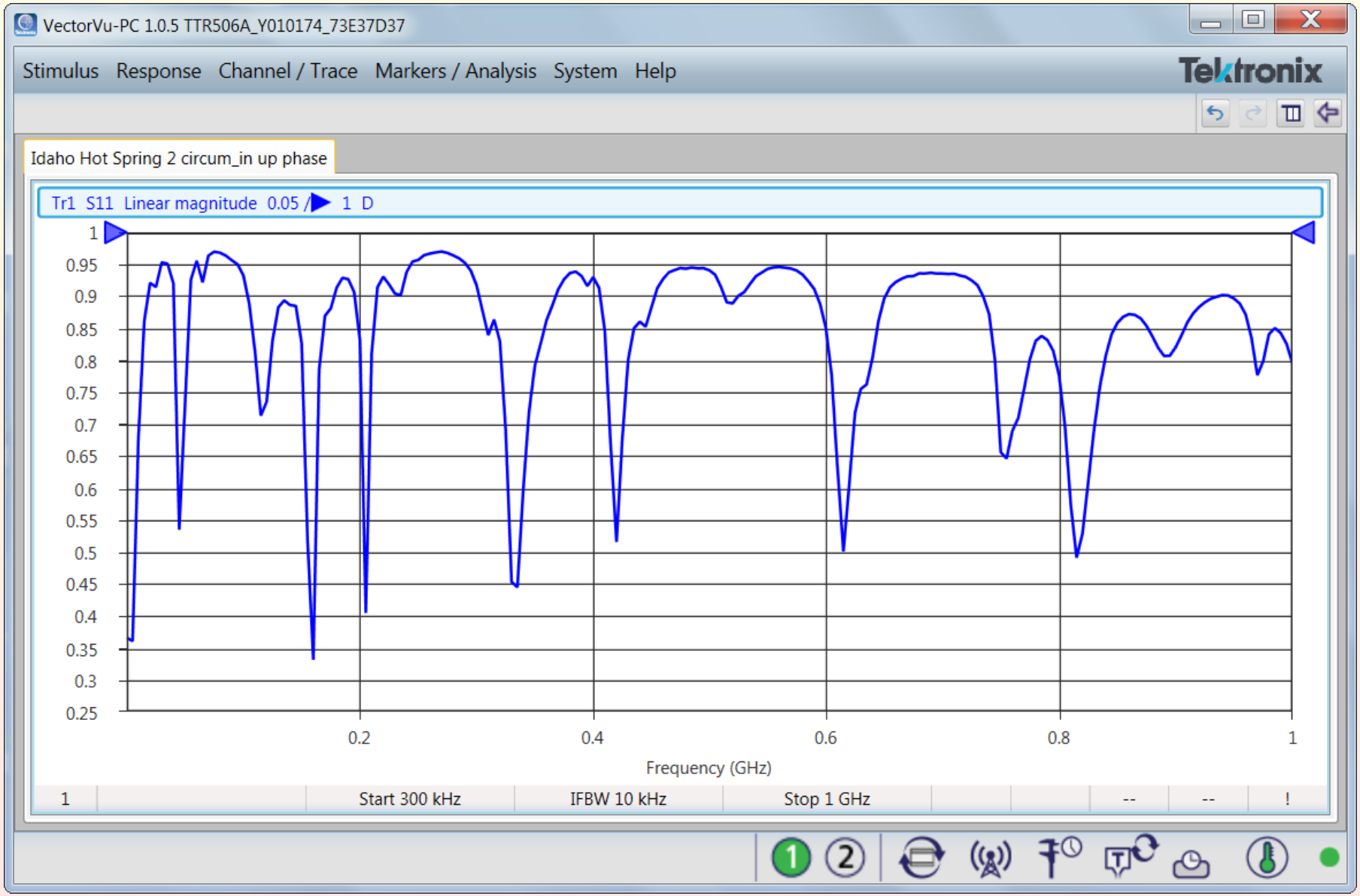
Boyce Circum In Linear Magnitude



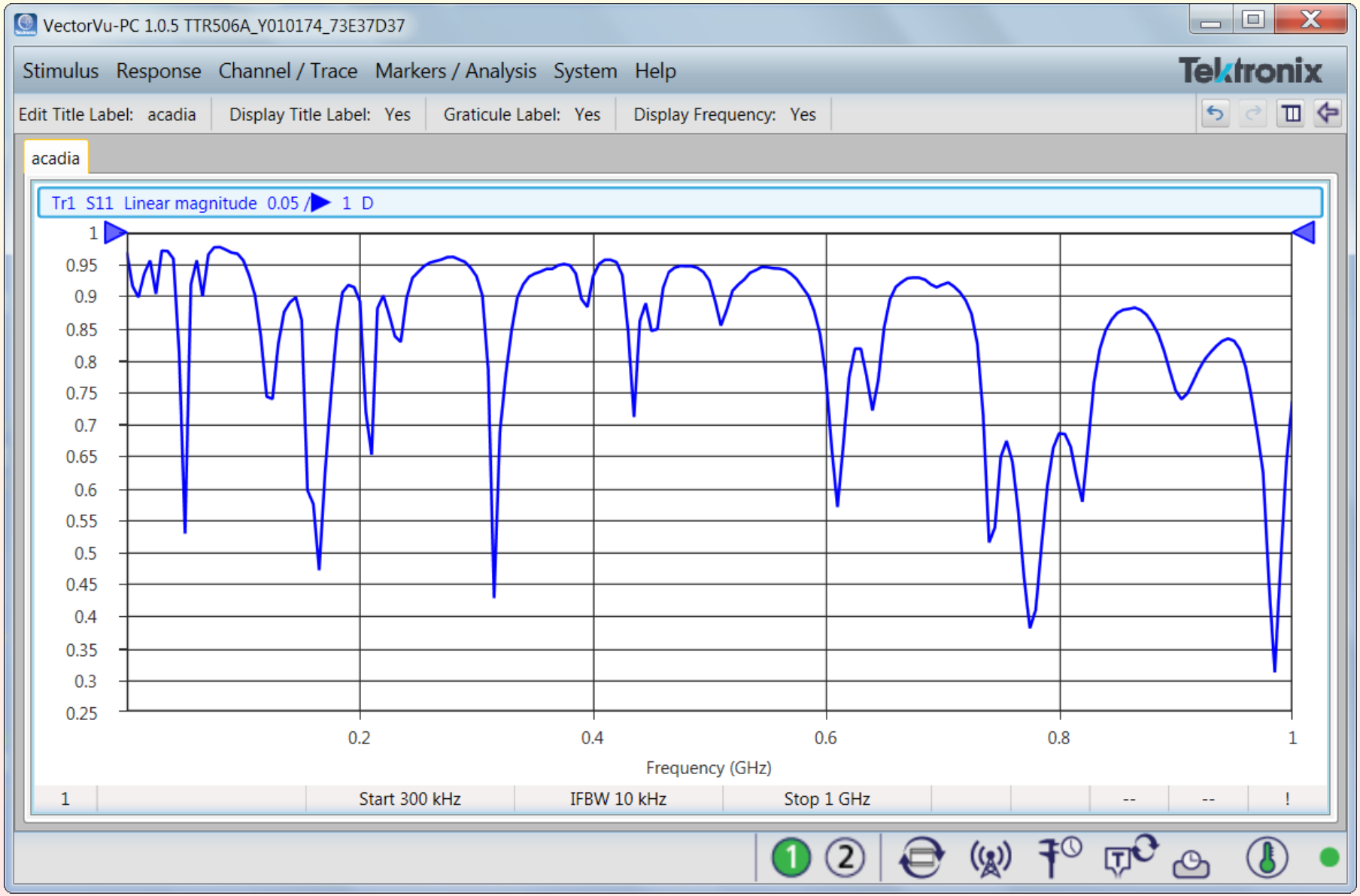
Idaho Hot Spring Linear Magnitude



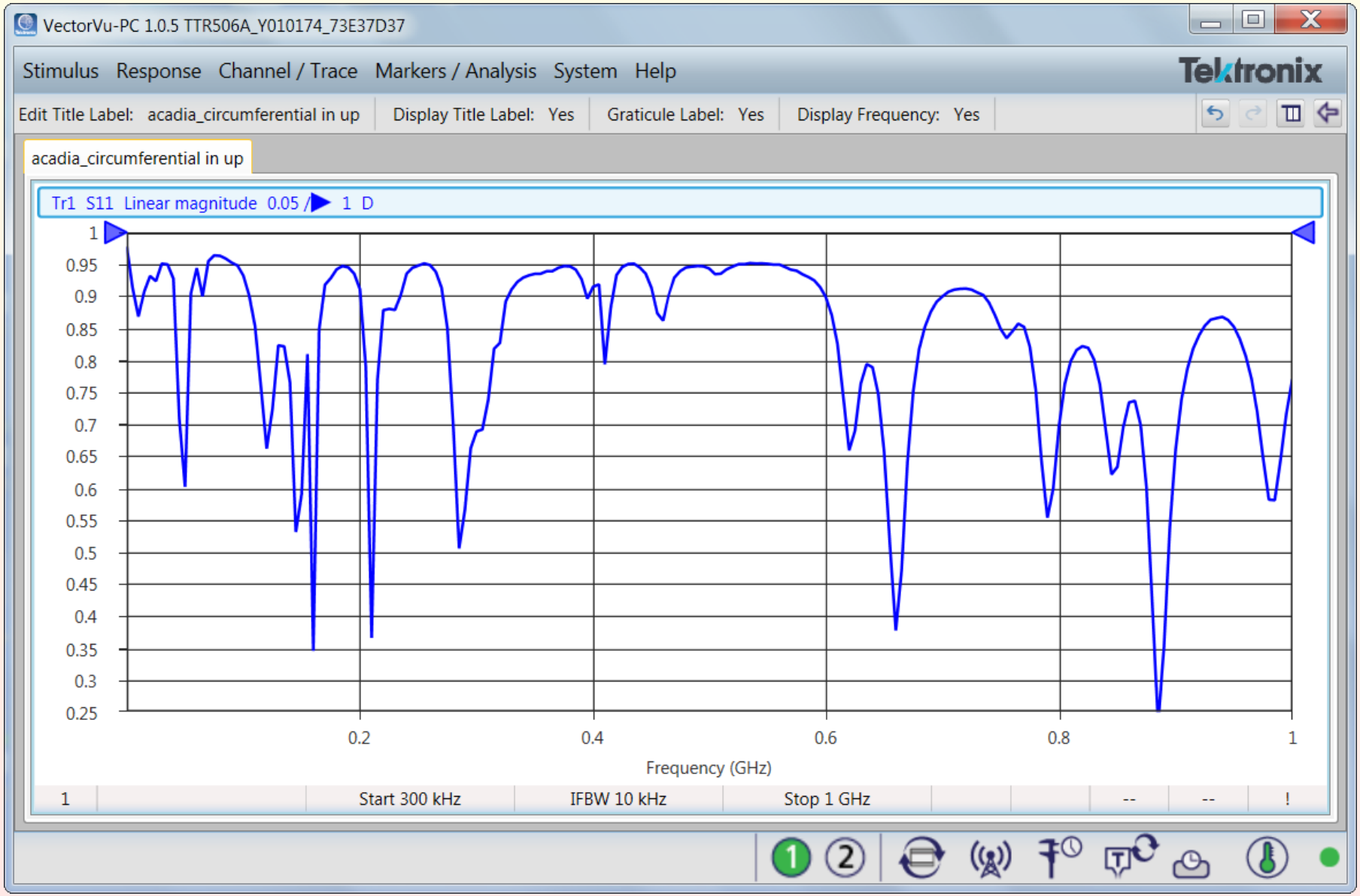
Idaho Hot Spring Circum In Linear Magnitude



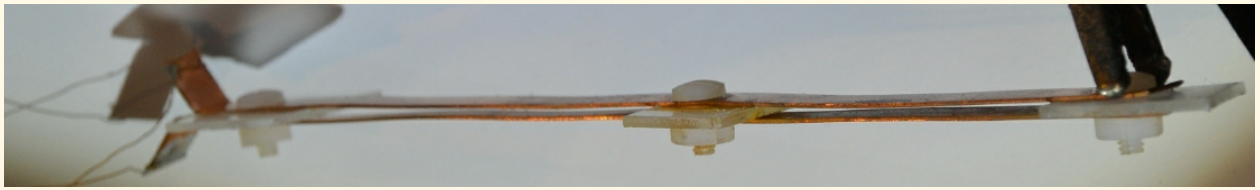
Acadia Linear Magnitude



Acadia Circum In Linear Magnitude



Impedance Spectroscopy



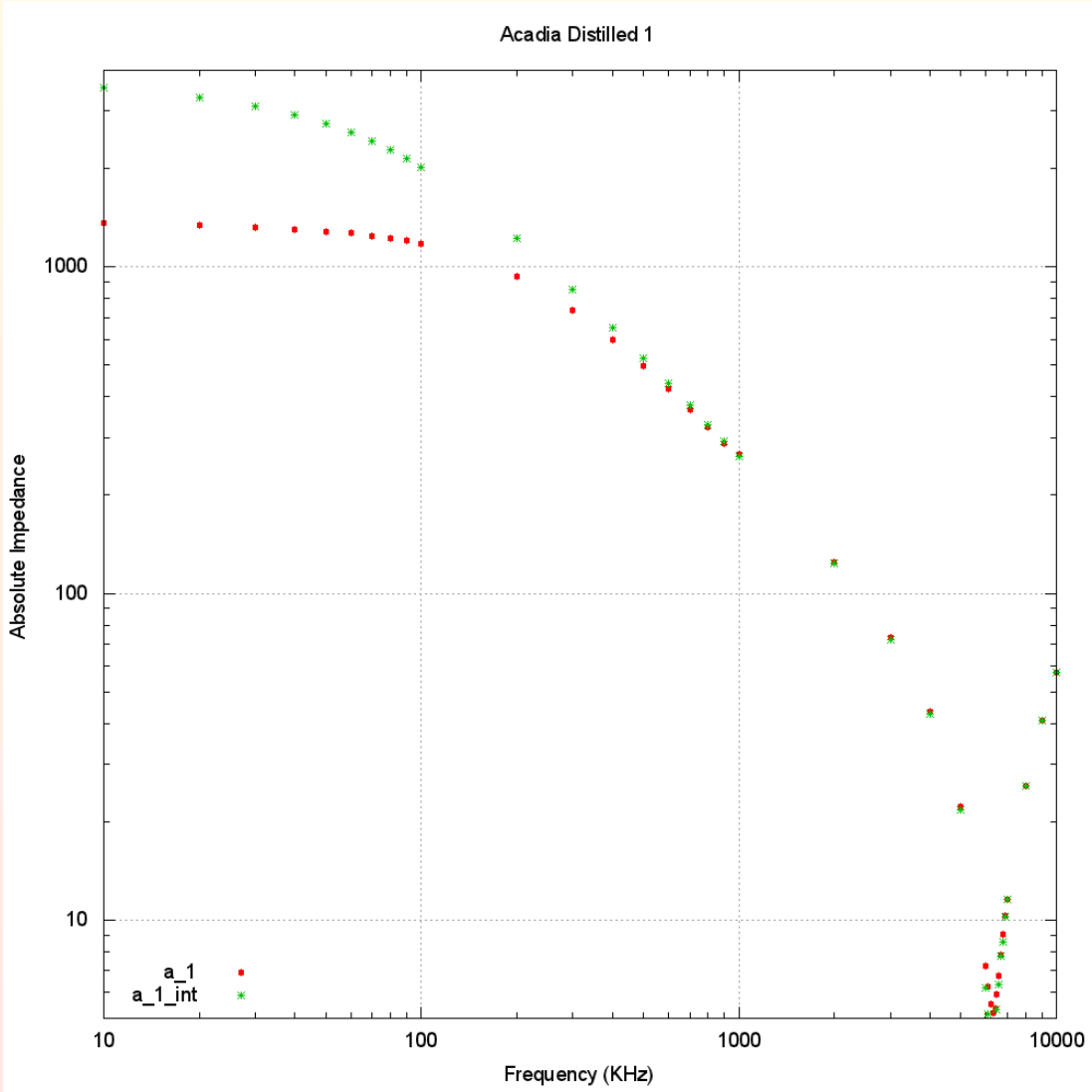
- Water is put in a Test Tube
- Use a 2 plate parallel capacitor probe (nominal .14nF in air)
- Connected to an HP 4192 Impedance Analyzer (300mv signal)
- Frequency is Scanned from 1kHz to 10,000kHz
- For each Chosen Frequency Record
  - Impedance Magnitude
  - Impedance Phase

HP 4192A


HEWLETT · PACKARD
DISPLAY A
-31.59
53.7
3200.000
kHz
mA
V
FREQUENCY
5Hz TO 13MHz
BIAS
-35V TO 35V
OSC LEVEL
5mV TO 1.1V
BIAS ON
LINE
OFF
ON
SRQ
LISTEN
TALK
REMOTE
LOCAL
DISPLAY A
DISPLAY B
PARAMETER
DATA
ENTER
SWEEP
UNKNOWN
CHANNEL A
REFERENCE INPUT
CHANNEL B
TEST INPUT
CIRCUIT MODE
GAIN MODE
ZY RANGE
TRIGGER

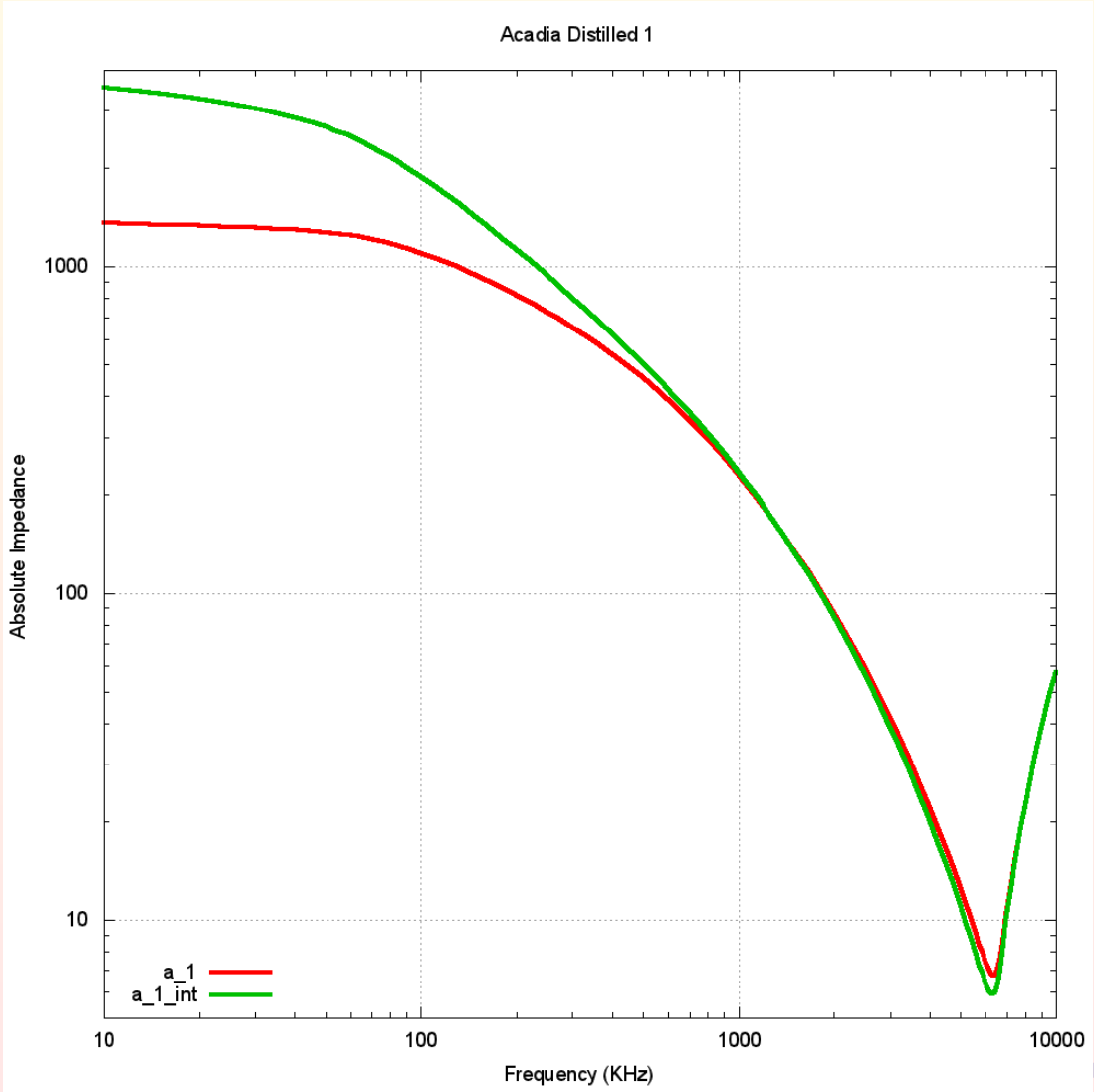
Acadia Distilled Water 1 Points Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention



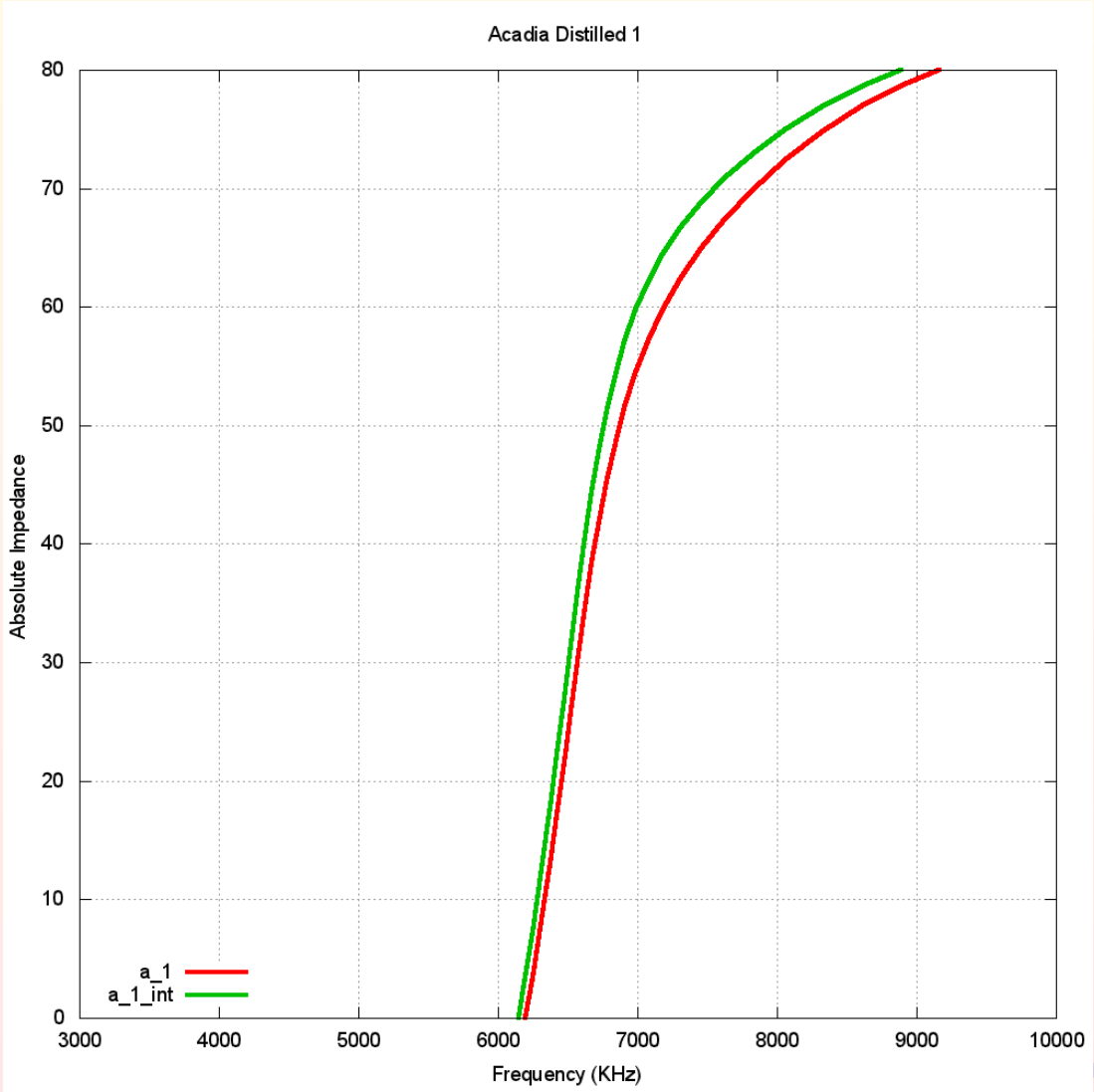
Acadia Distilled Water 1 Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention



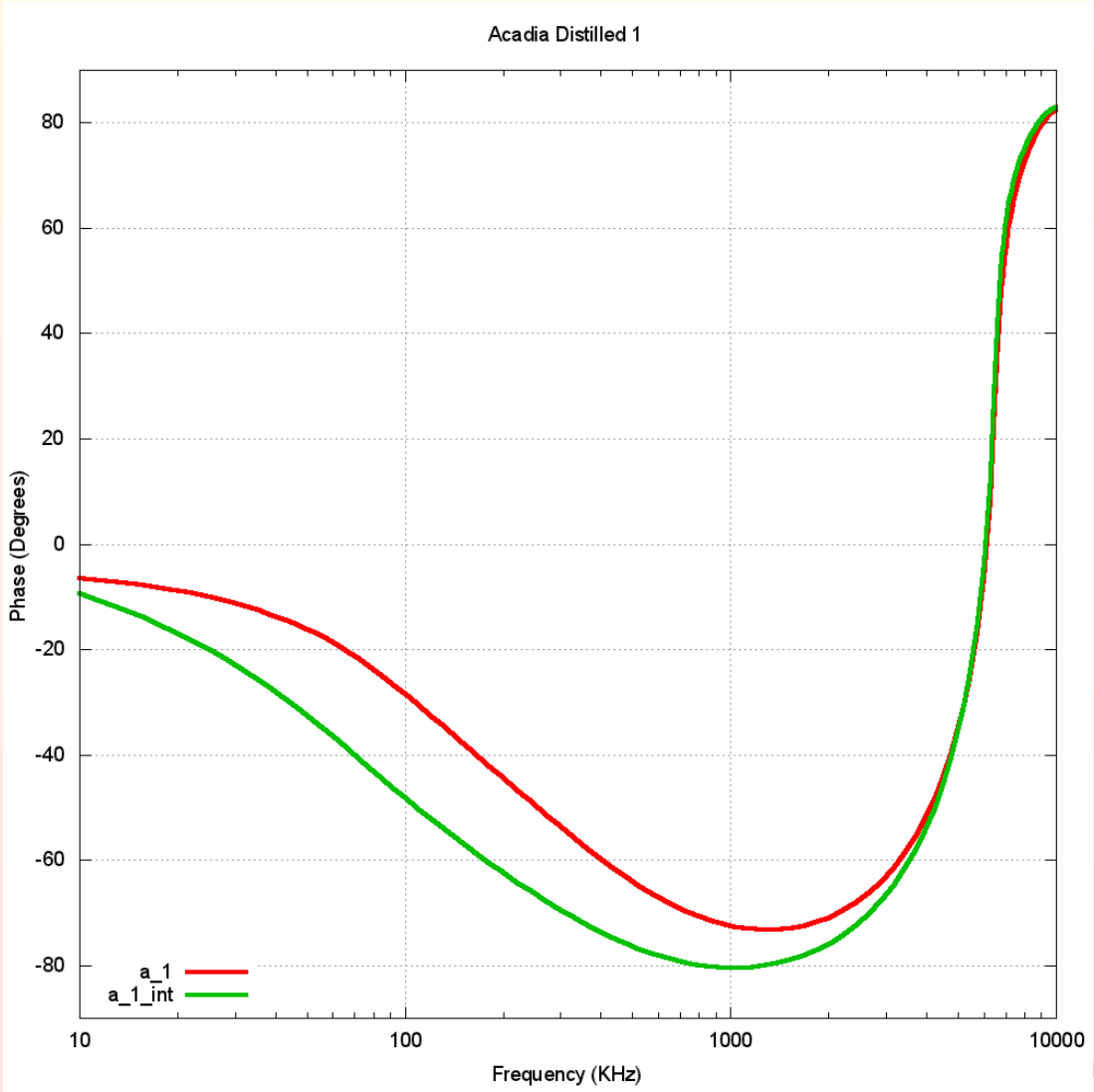
Acadia Distilled Water 1 Magnitude:Jim Caffrey

- Before Intention
- After 2 Minute Intention



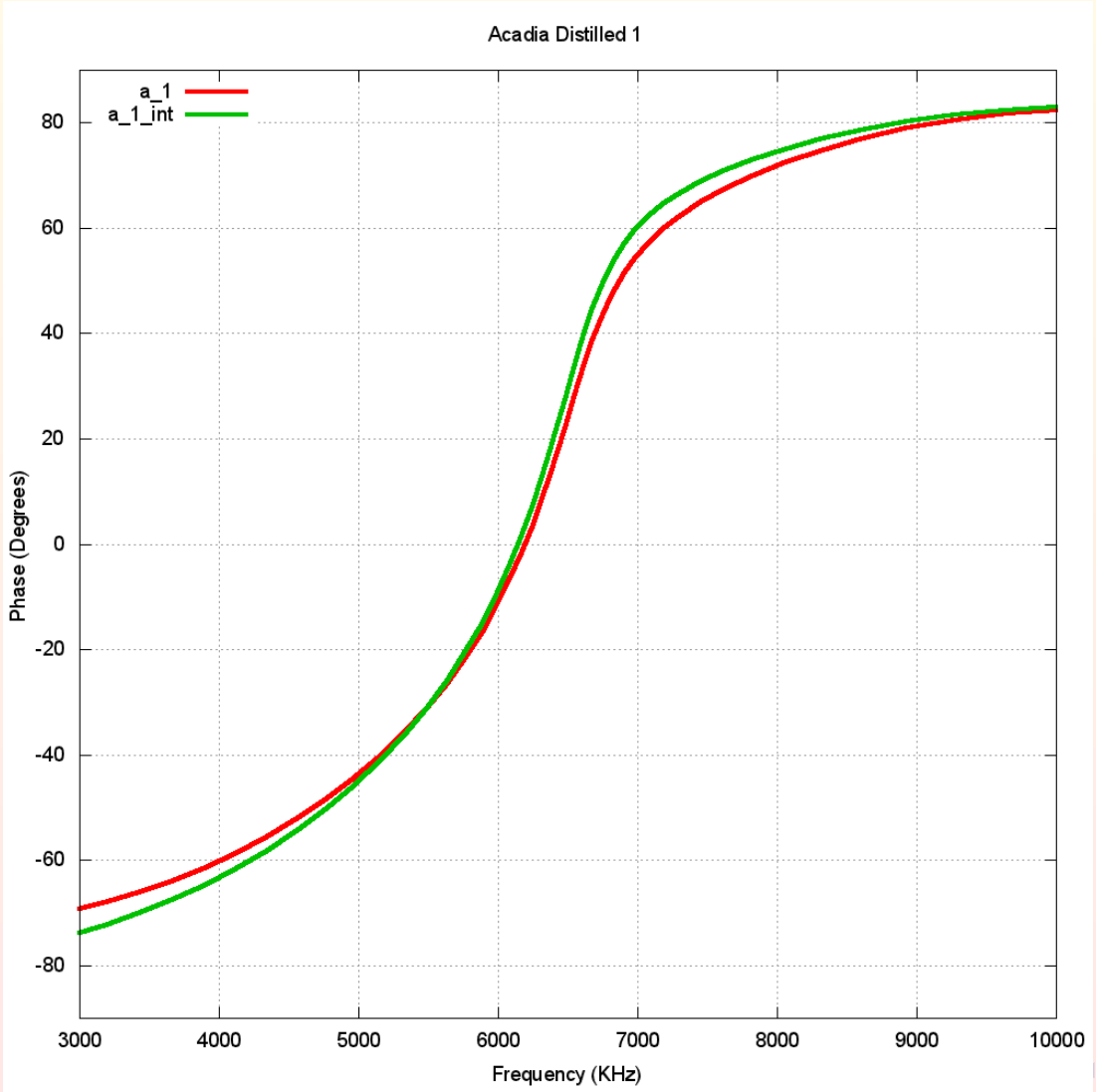
Acadia Distilled Water 1 Phase Angle: Jim Caffrey

- Before Intention
- After 2 Minute Intention



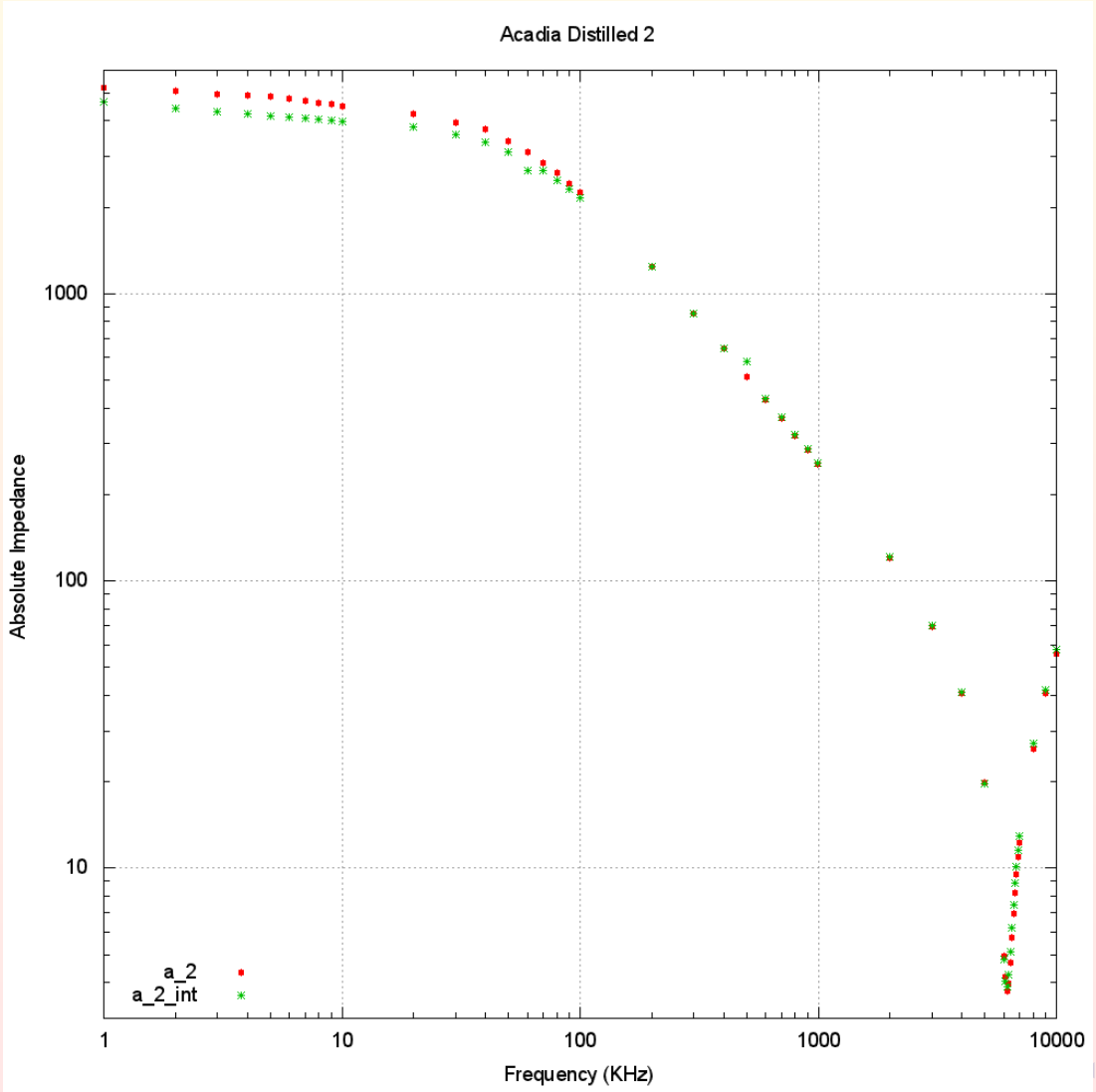
Acadia Distilled Water 1 Phase Angle: Jim Caffrey

- Before Intention
- After 2 Minute Intention



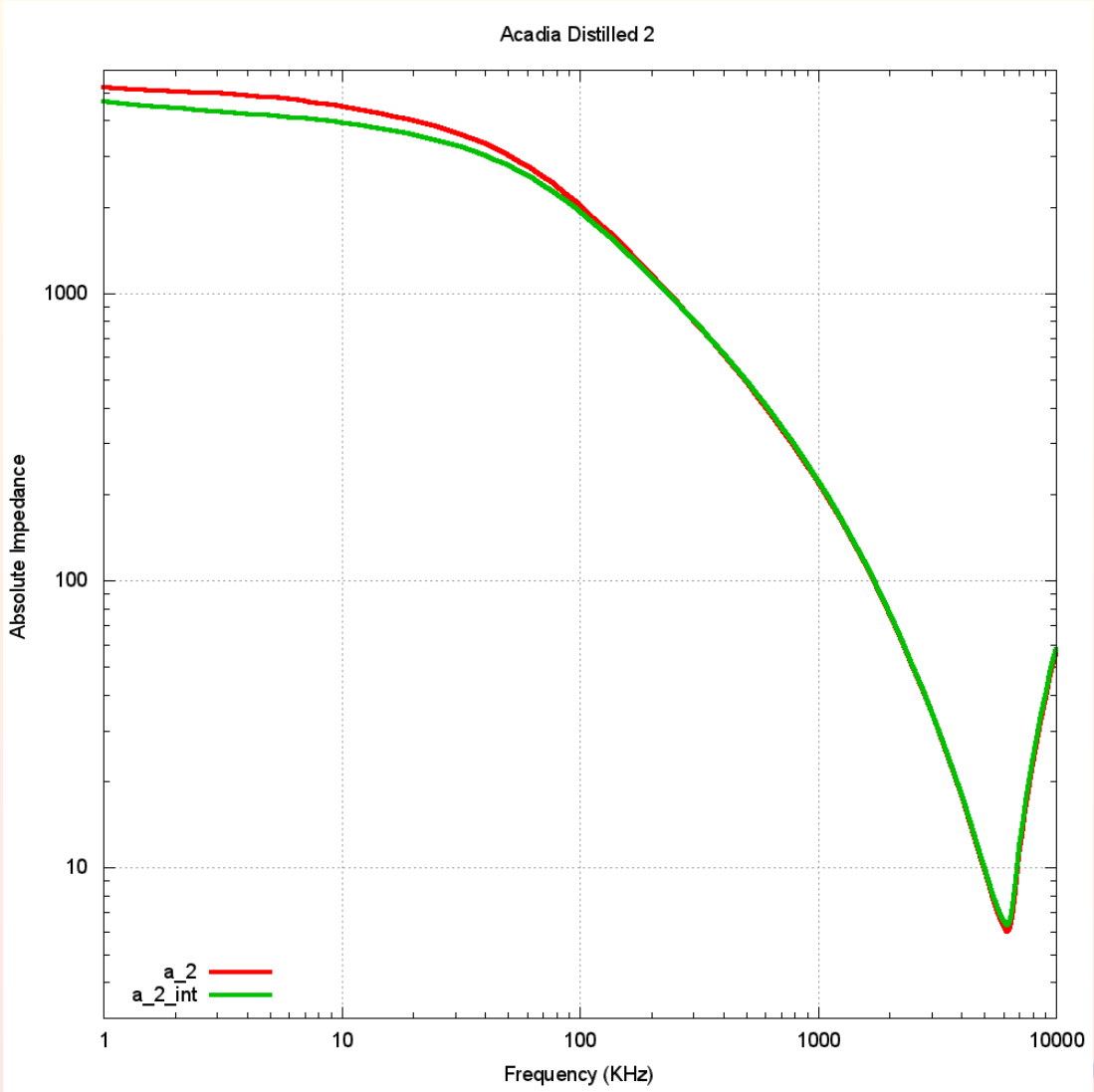
Acadia Distilled Water 2 Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention

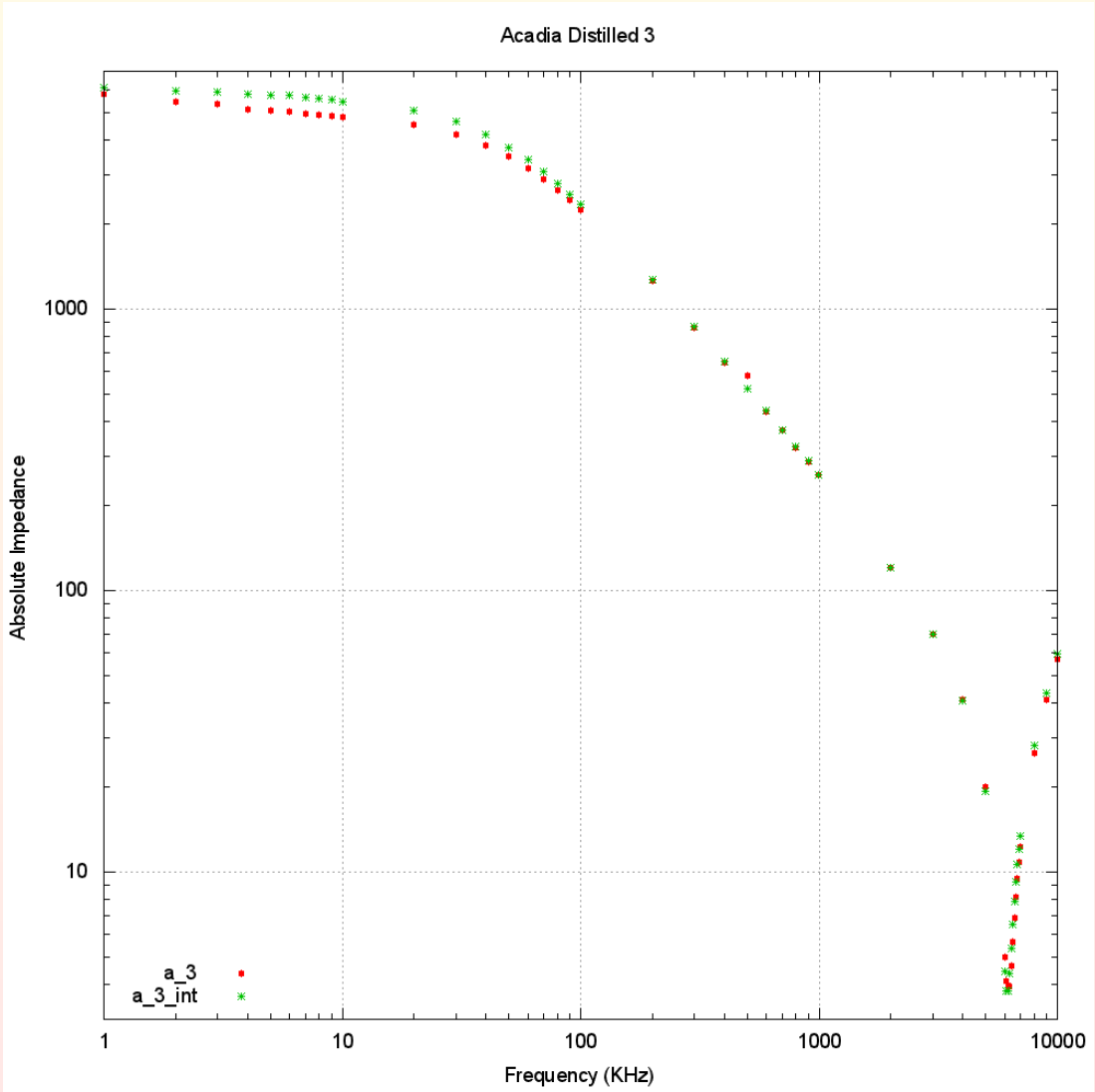


Acadia Distilled Water 2 Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention

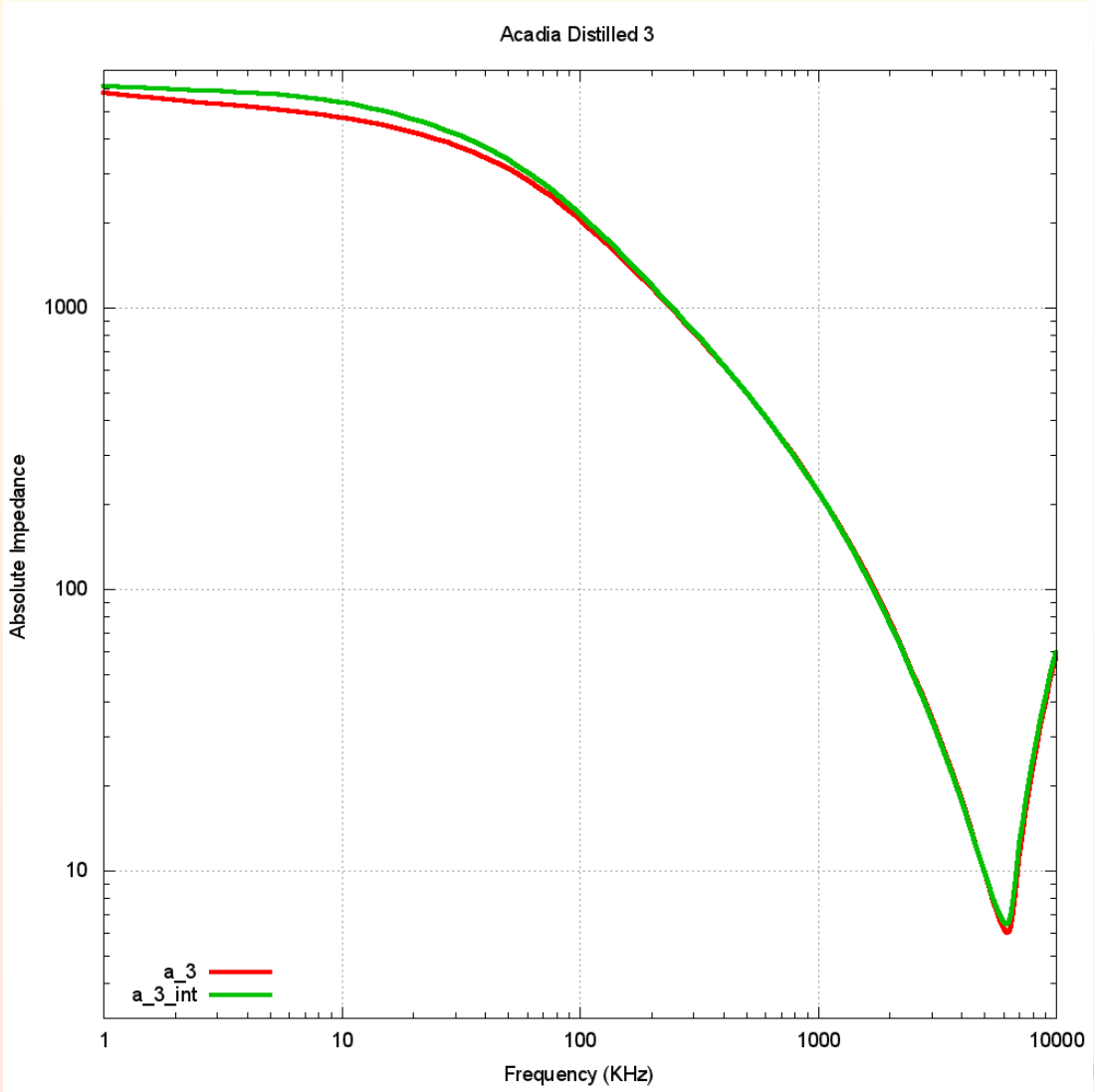


Acadia Distilled Water 3 Points Magnitude: Michael Hobson



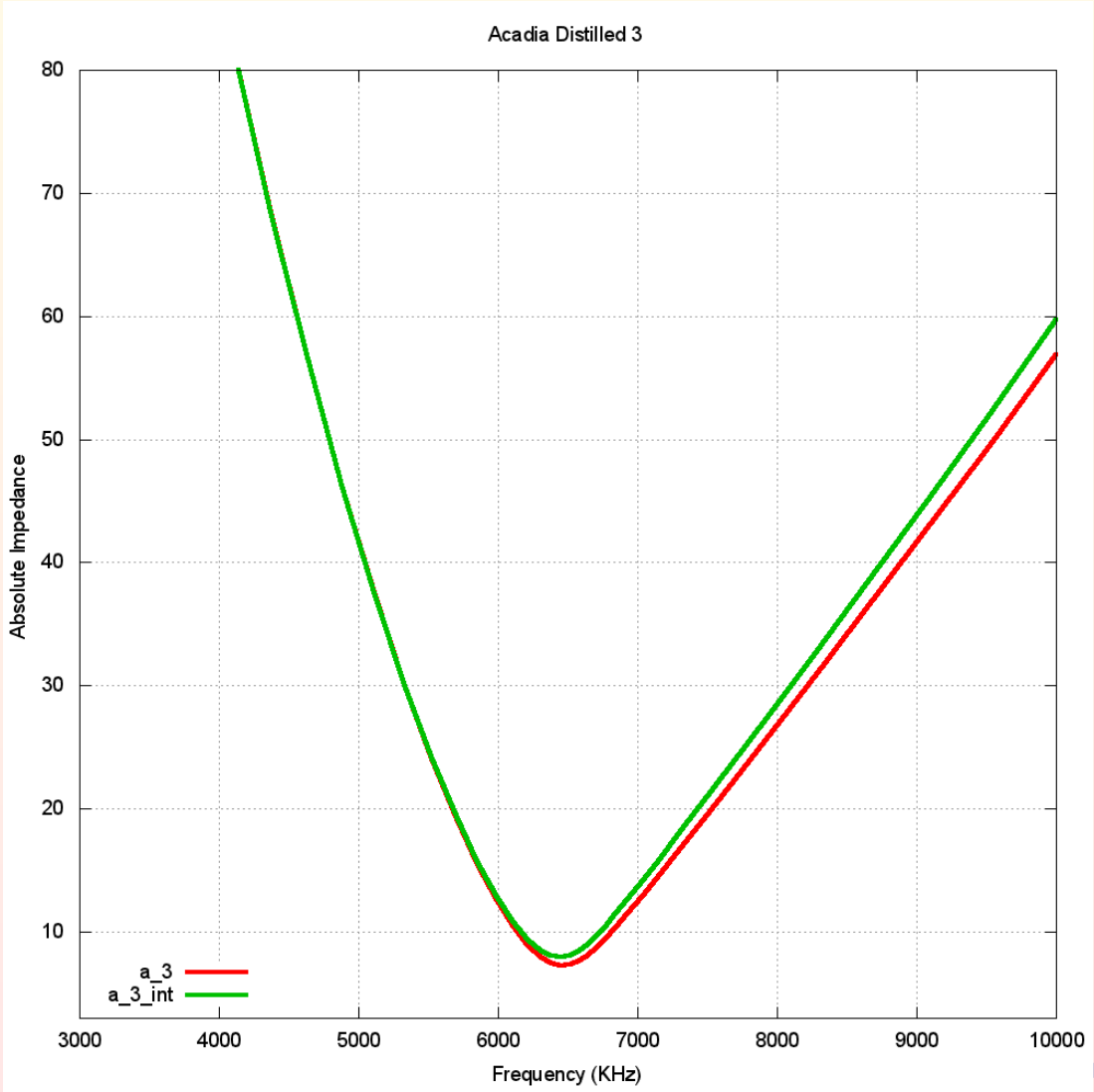
Acadia Distilled Water 3 Magnitude: Michael Hobson

- Before Intention
- After 1 Minute Intention



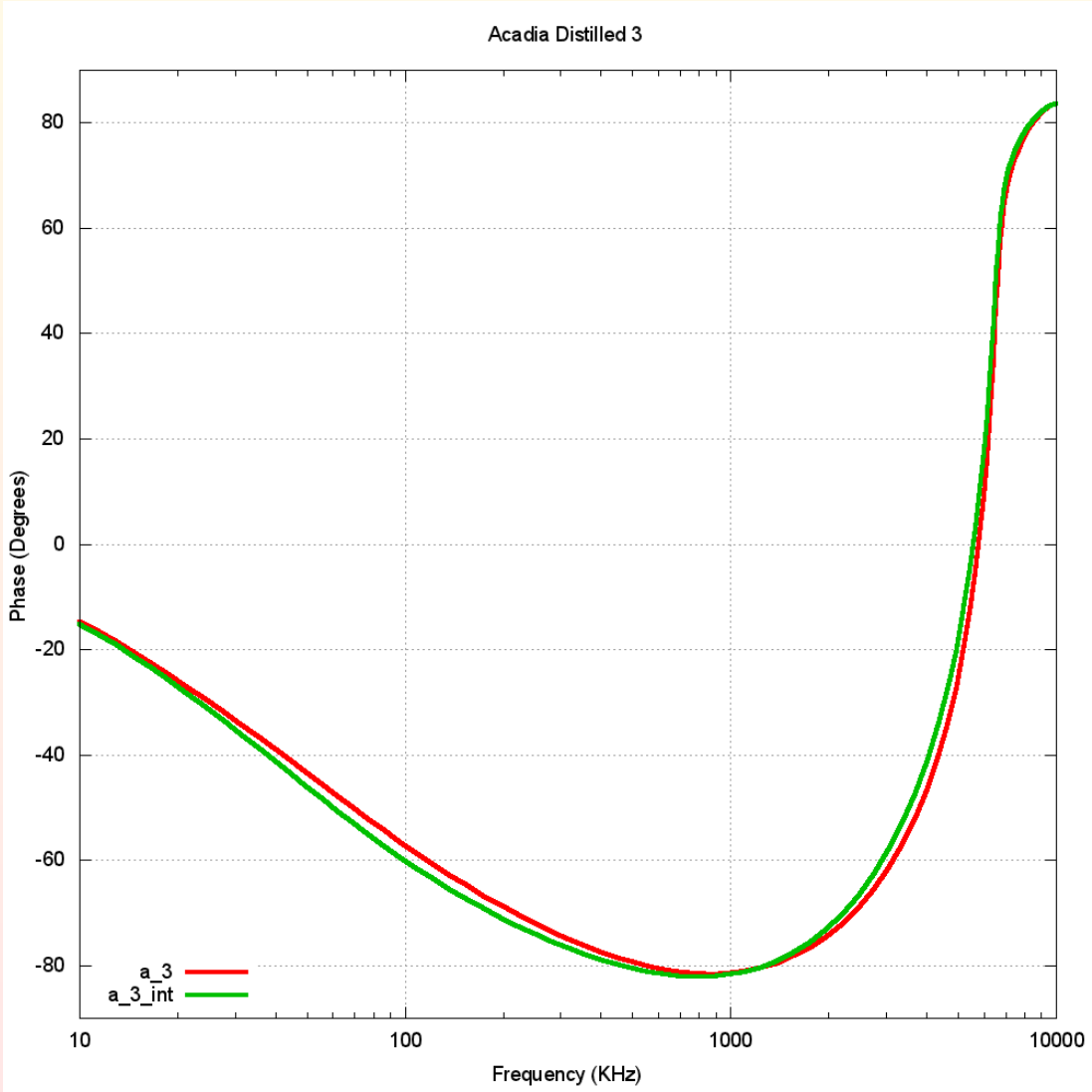
Acadia Distilled Water 3 Magnitude: M. Hobson

- Before Intention
- After 1 Minute Intention



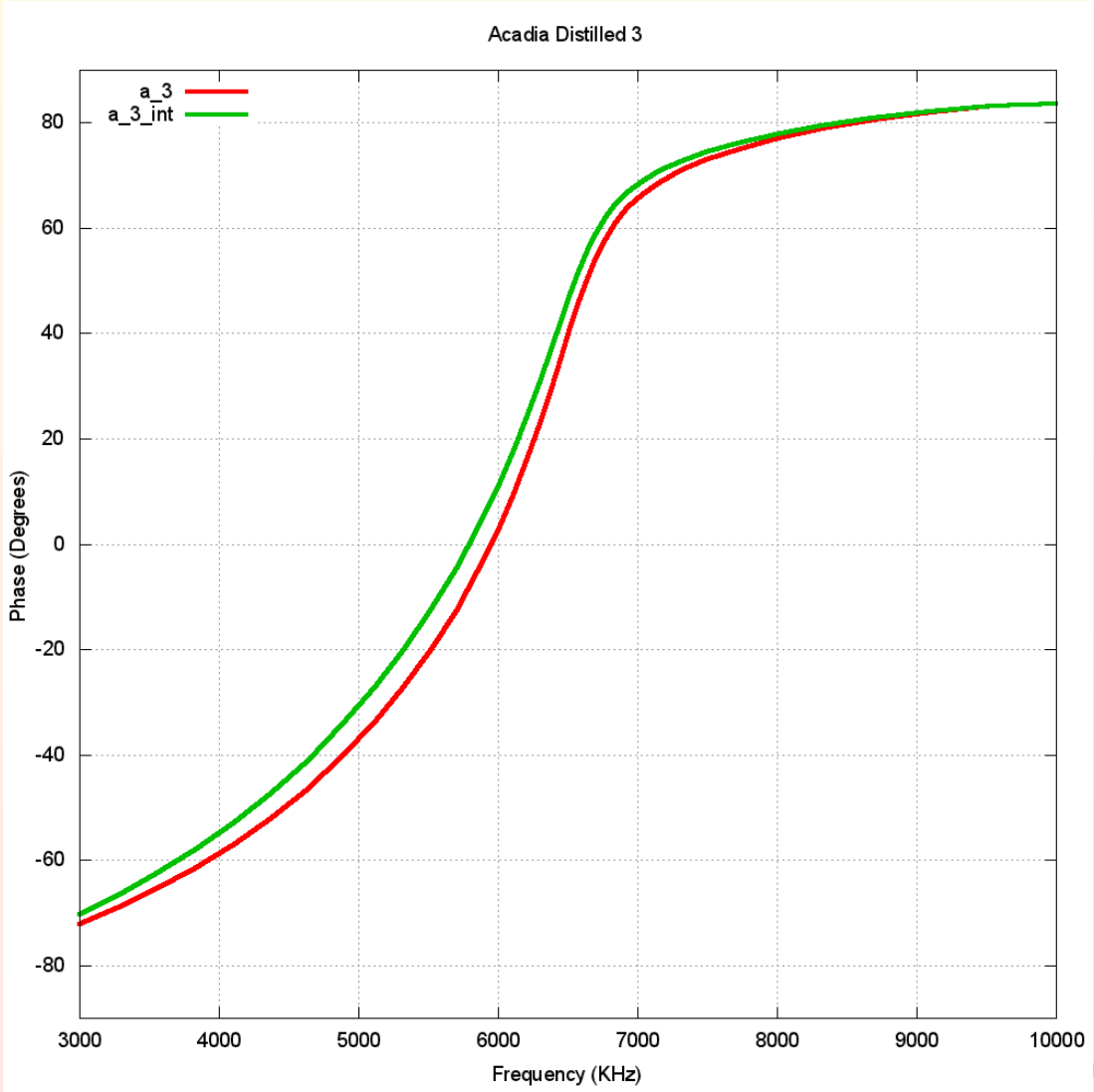
Acadia Distilled Water 3 Phase Angle: M. Hobson

- Before Intention
- After 1 Minute Intention

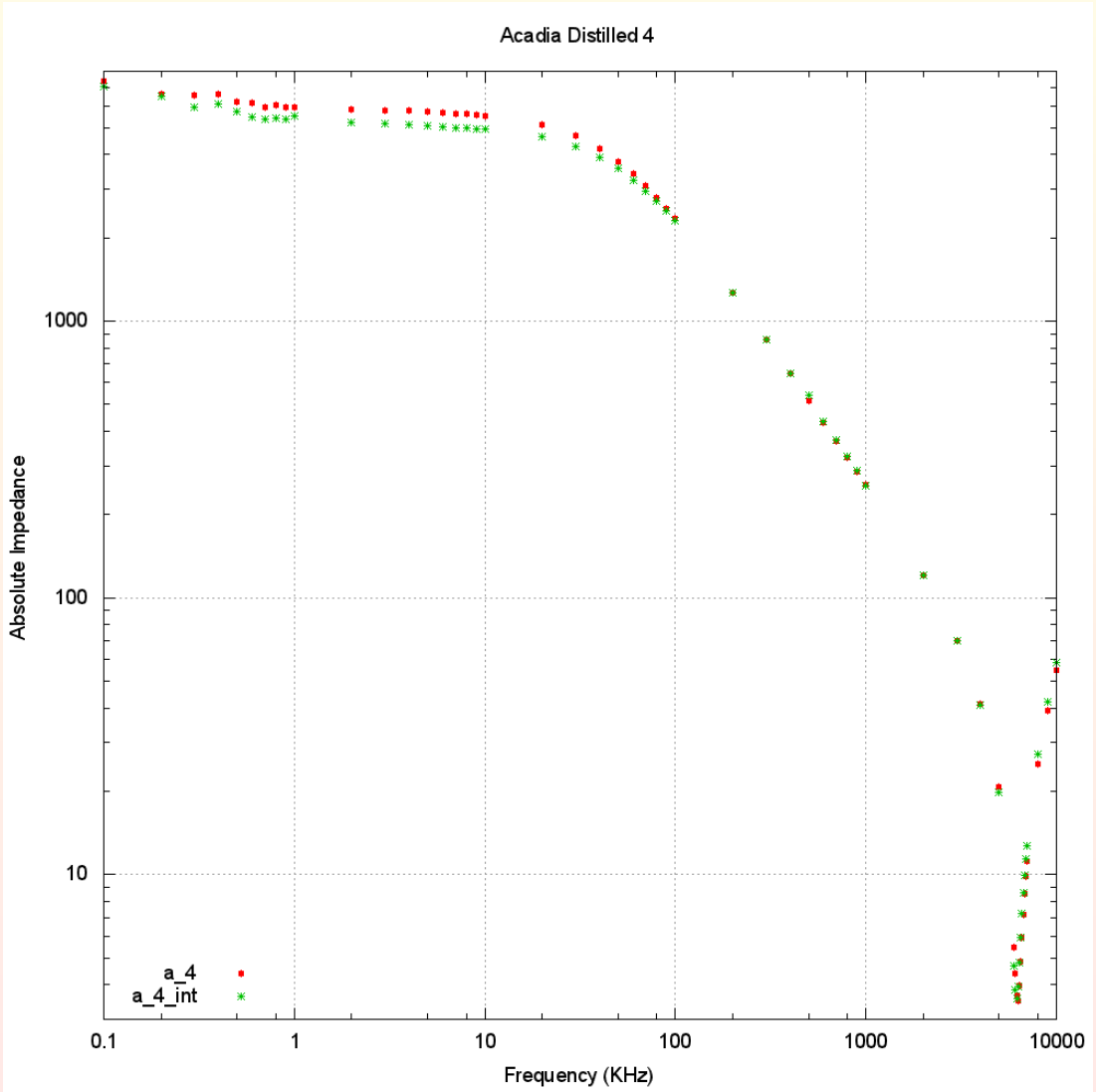


Acadia Distilled Water 3 Phase Angle: M. Hobson

- Before Intention
- After 1 Minute Intention

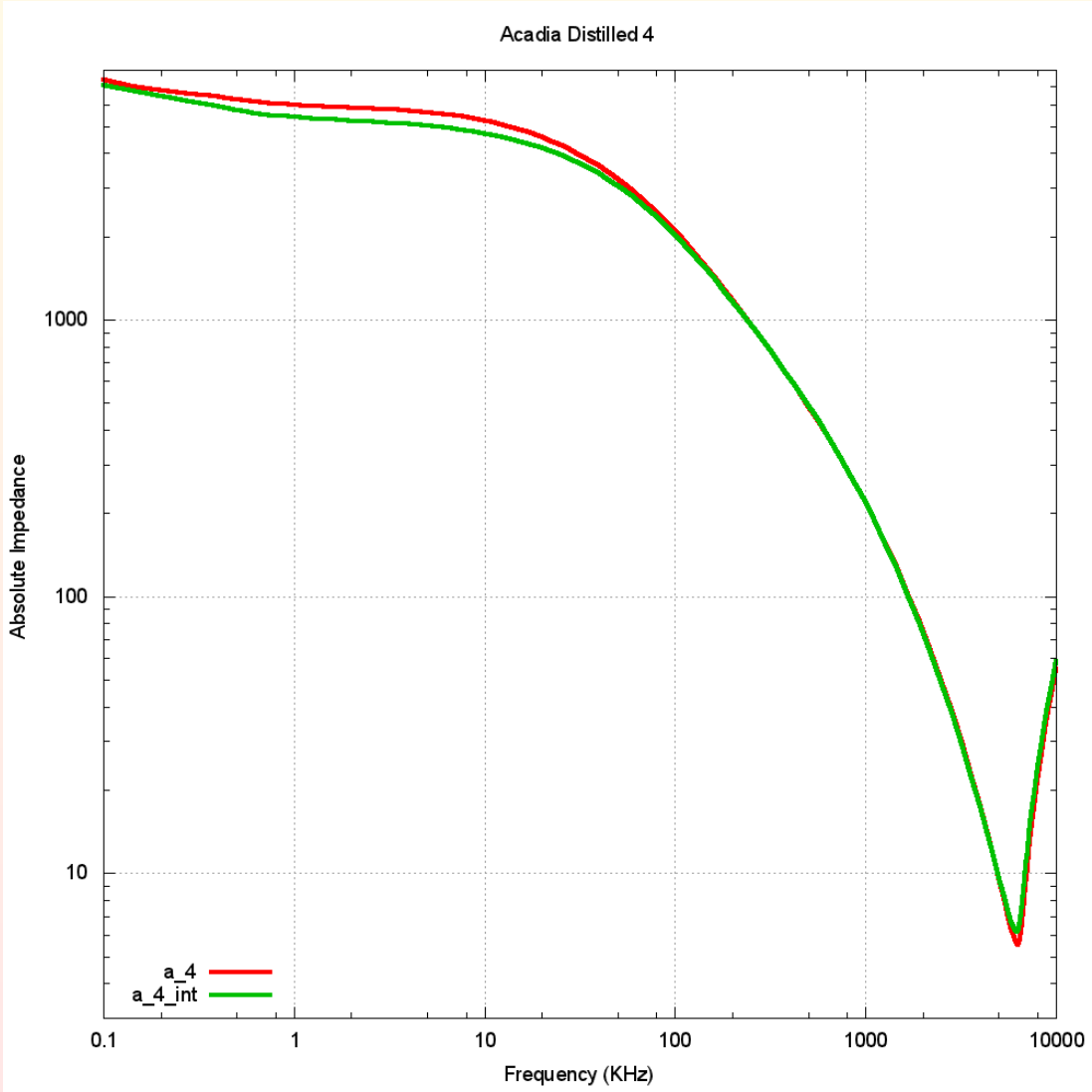


Acadia Distilled Water 4 Magnitude: Jim Caffrey



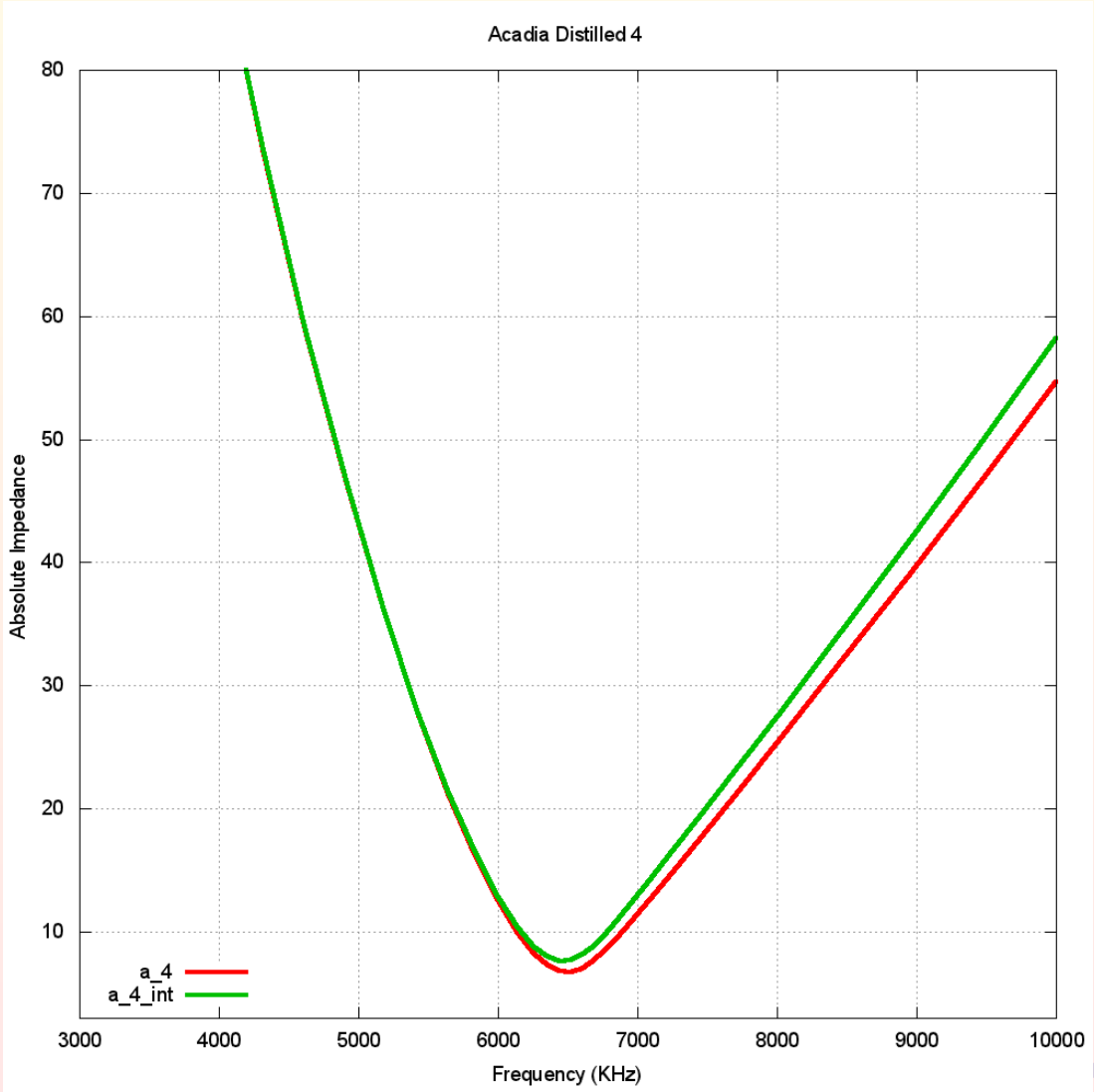
Acadia Distilled Water 4 Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention



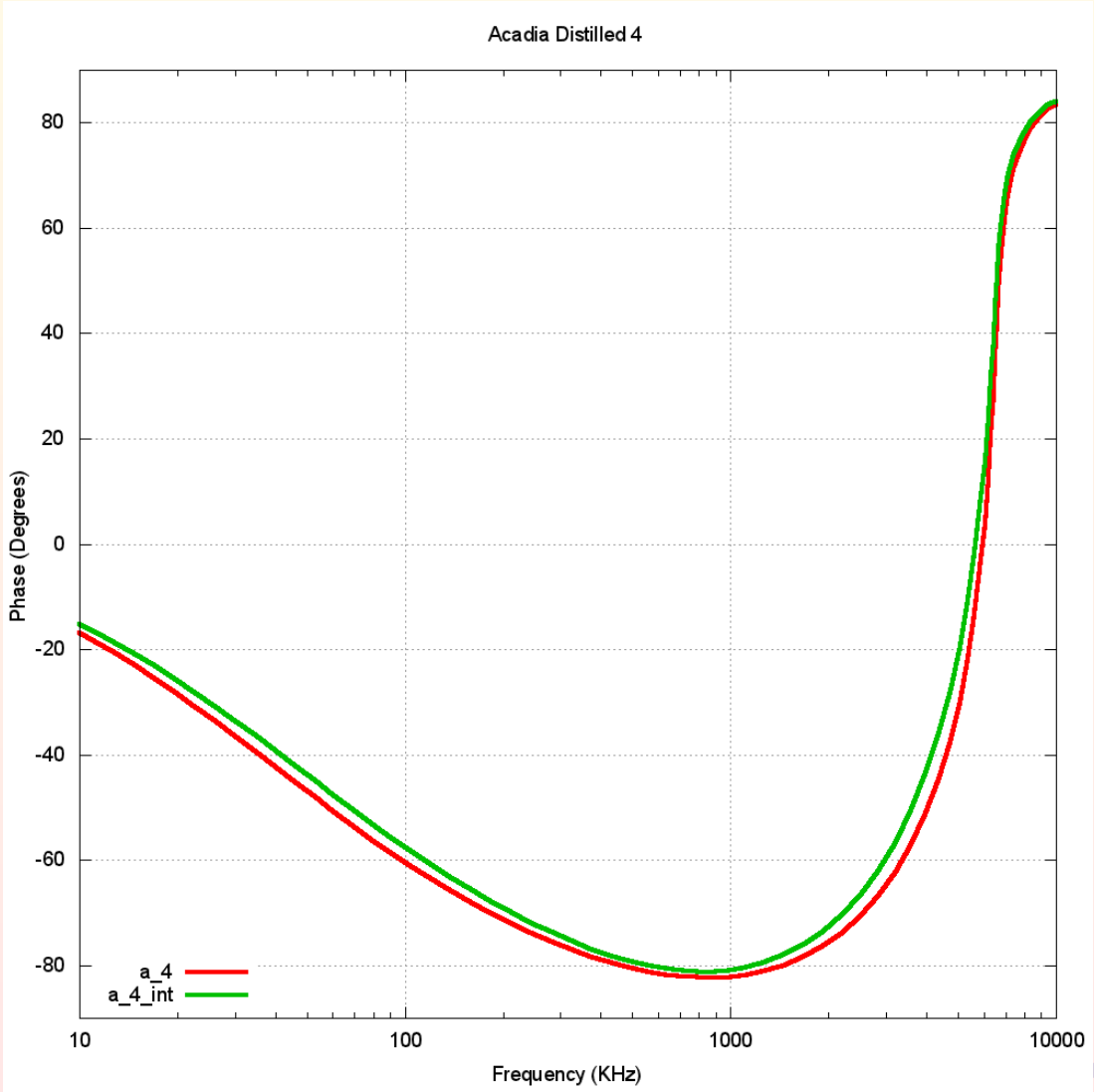
Acadia Distilled Water 4 Magnitude: Jim Caffrey

- Before Intention
- After 2 Minute Intention



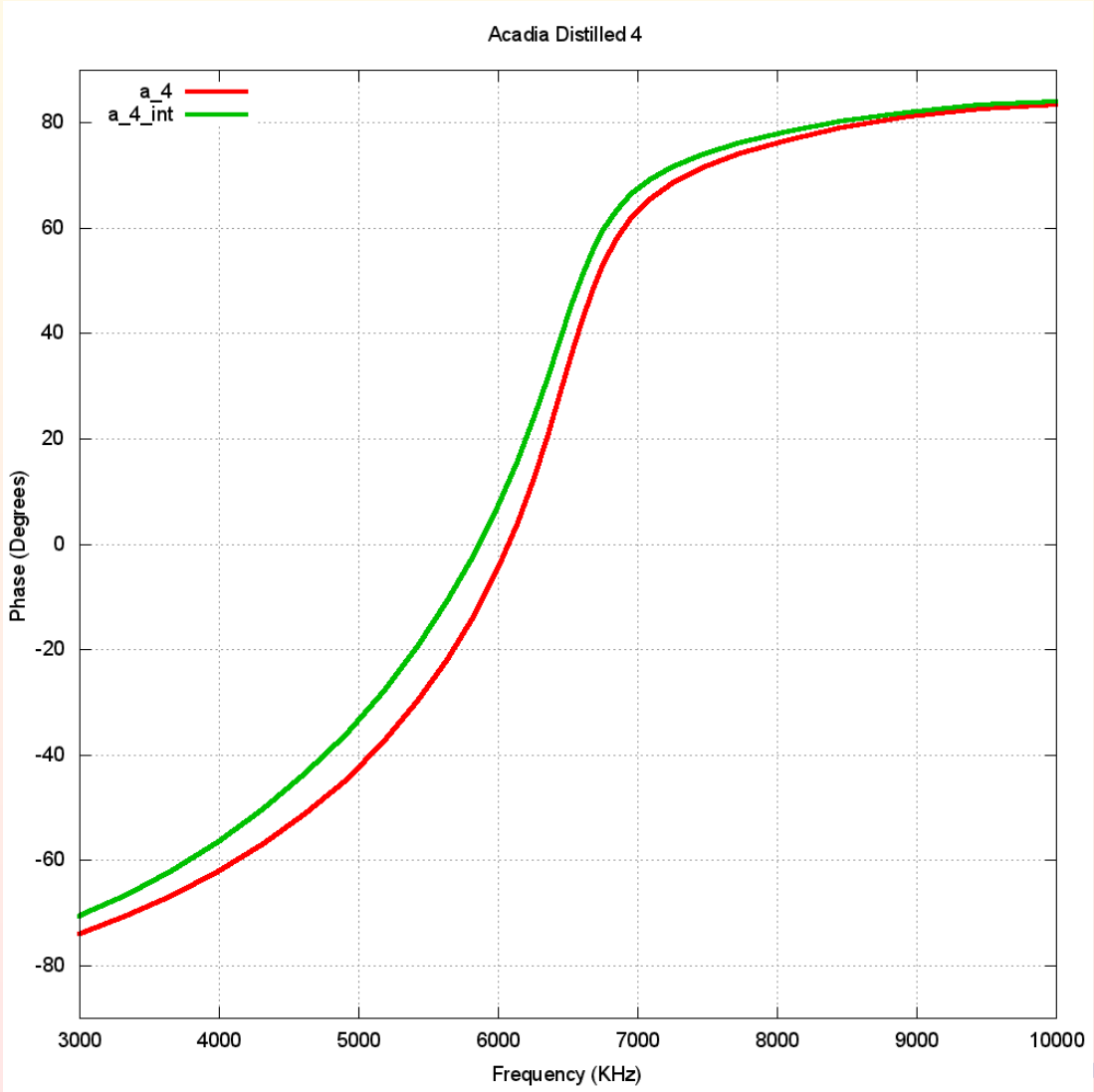
Acadia Distilled Water 4 Phase Angle: Jim Caffrey

- Before Intention
- After 2 Minute Intention



Acadia Distilled Water 4 Phase Angle: Jim Caffrey

- Before Intention
- After 2 Minute Intention



Ocean Optics Modular Light Source

- Light Source: Miniature Deuterium / Tungsten Halogen
- Wavelenth: 200-1100nm
- 5-volt DC Power Supply
- SMA Collimator for Spectrometer SMA coupling

Ocean Optics Spectrometer

Ocean Optics Spectrometer

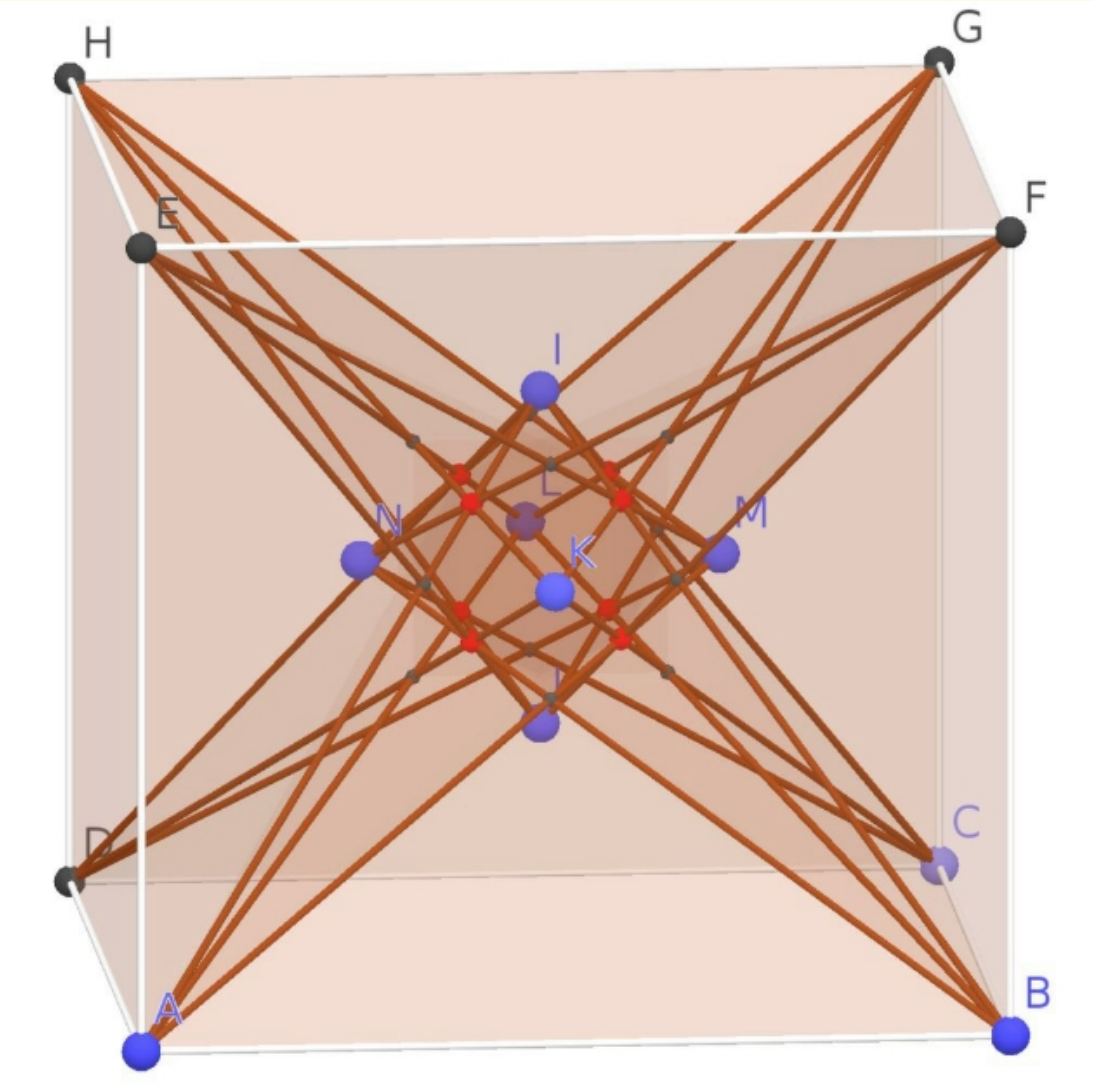
- Size: 8.91cm x 6.33cm x 3.44cm
- Wavelength: 180-1100nm
- Signal-to-noise ratio: 300:1
- 3648 Element CCD Array
- Dynamic range: 1300:1 for a single acquisition
- Integration Time 3.8ms-10sec
  - Integration Time 200ms
- Average 40 transmission spectrums
- Box Filter 5

Cuvettes

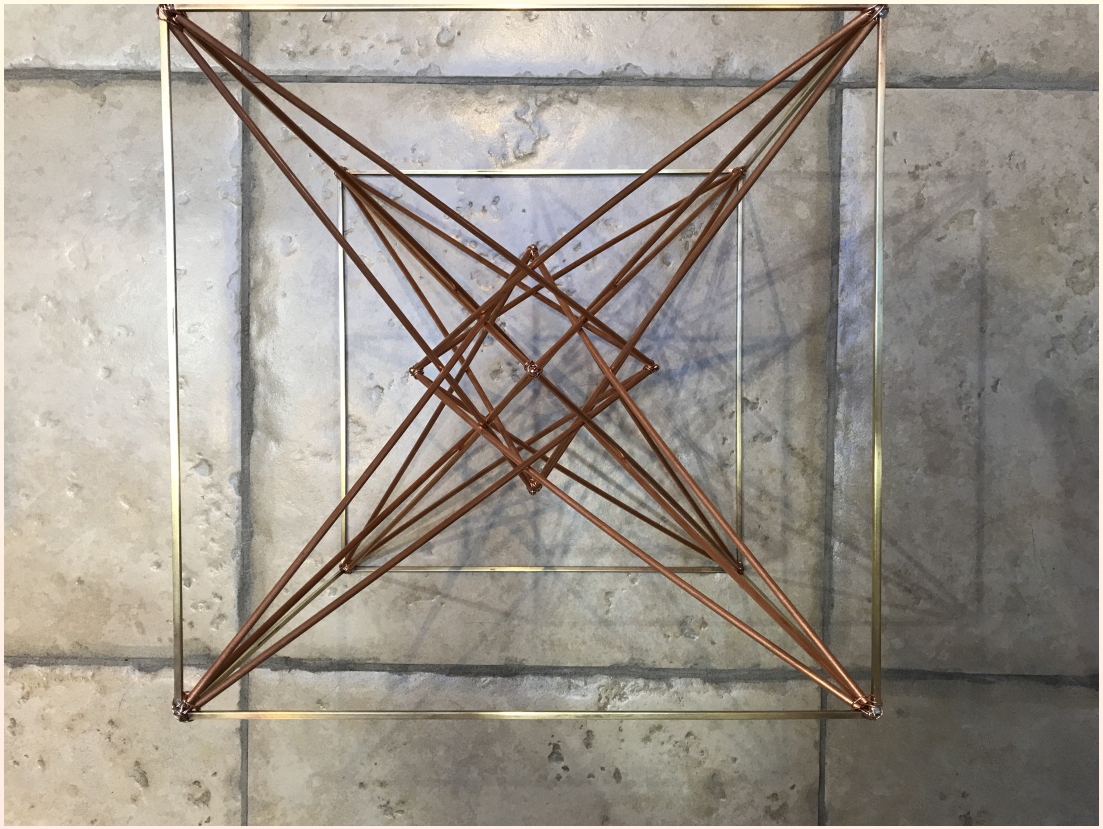
BrandTech Scientific Semi-micro UV-Transparent

- Polycyclical Olefin
- 230nm-900nm
- Minimum 1.5mL
- Maximum 3.0mL
- 4.5mm x 23mm
- Light Path 10mm
- Are Grouped by Manufacturing Mold Cavity Number To Ensure The Lowest Variation In Extinction Coefficient

Copper Model

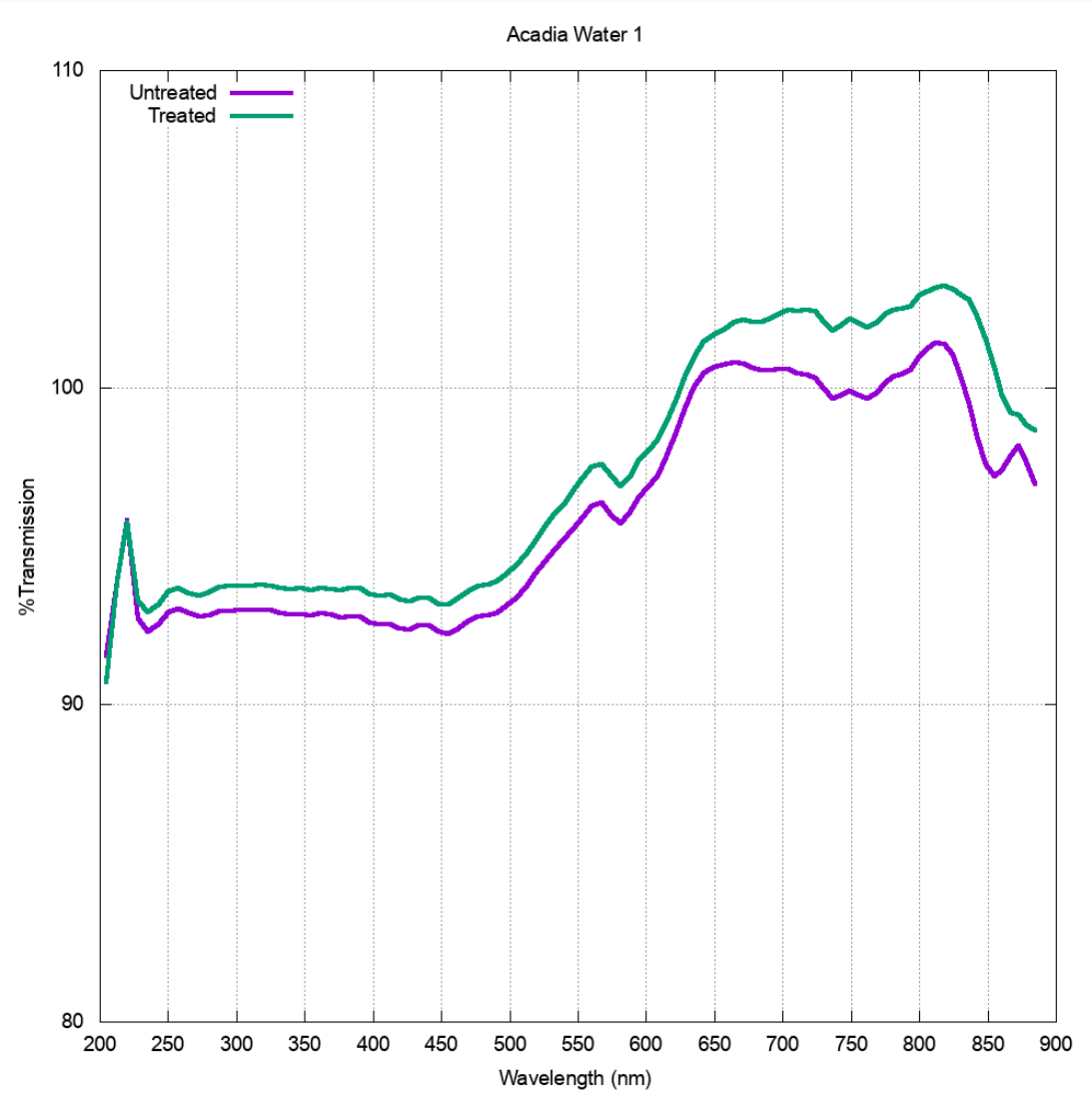


Copper Models

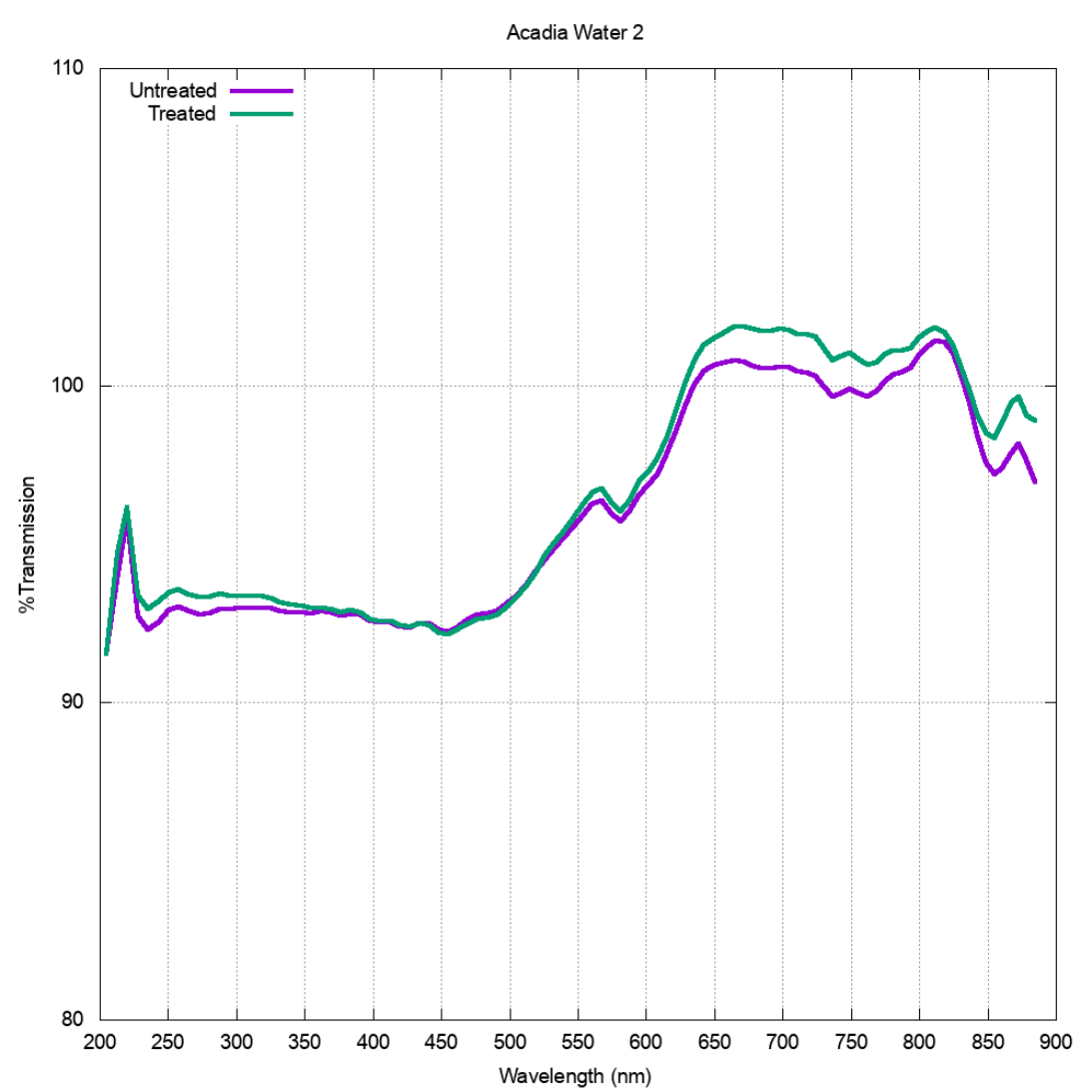


All copper tubes are one foot long

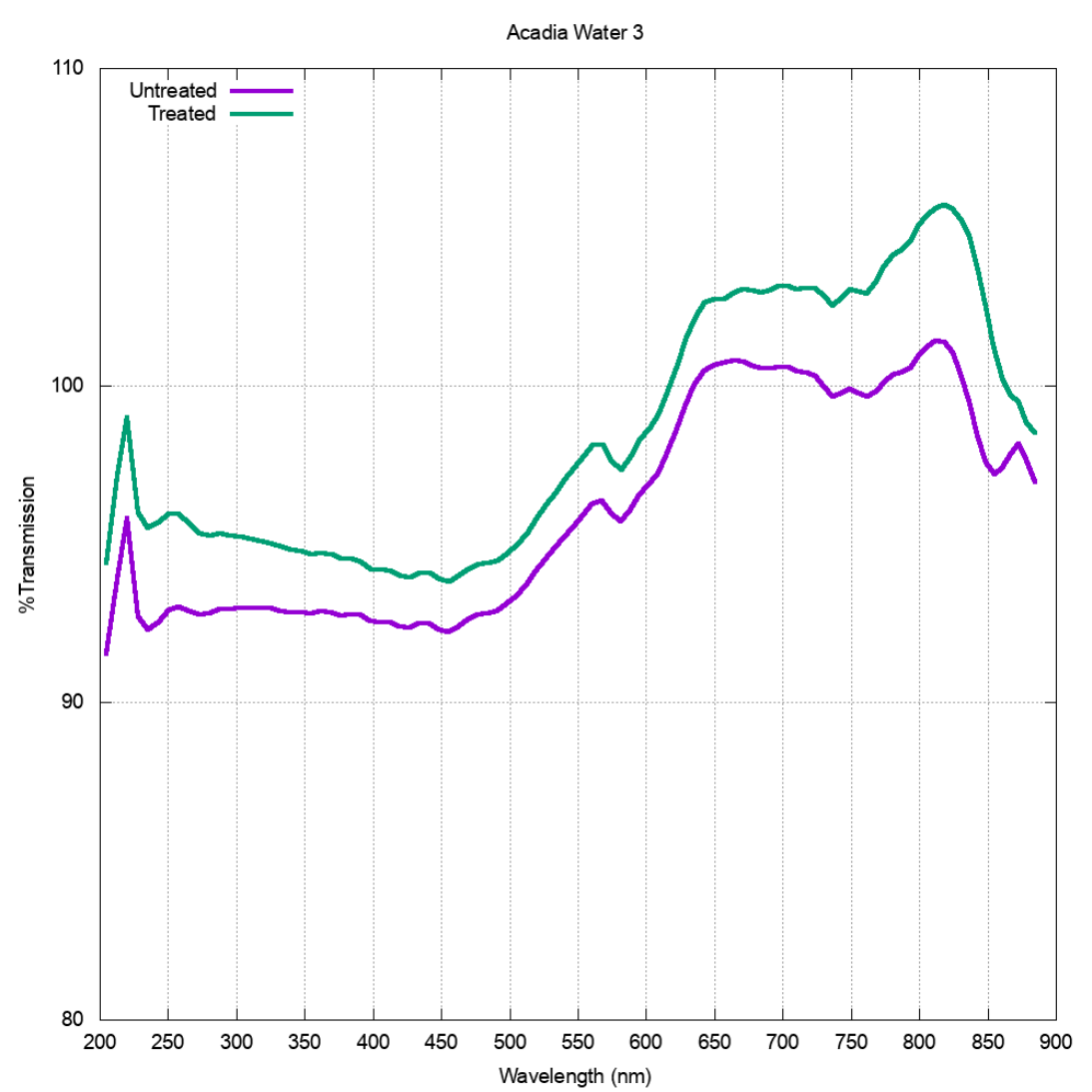
Copper Model Treatment Water 1



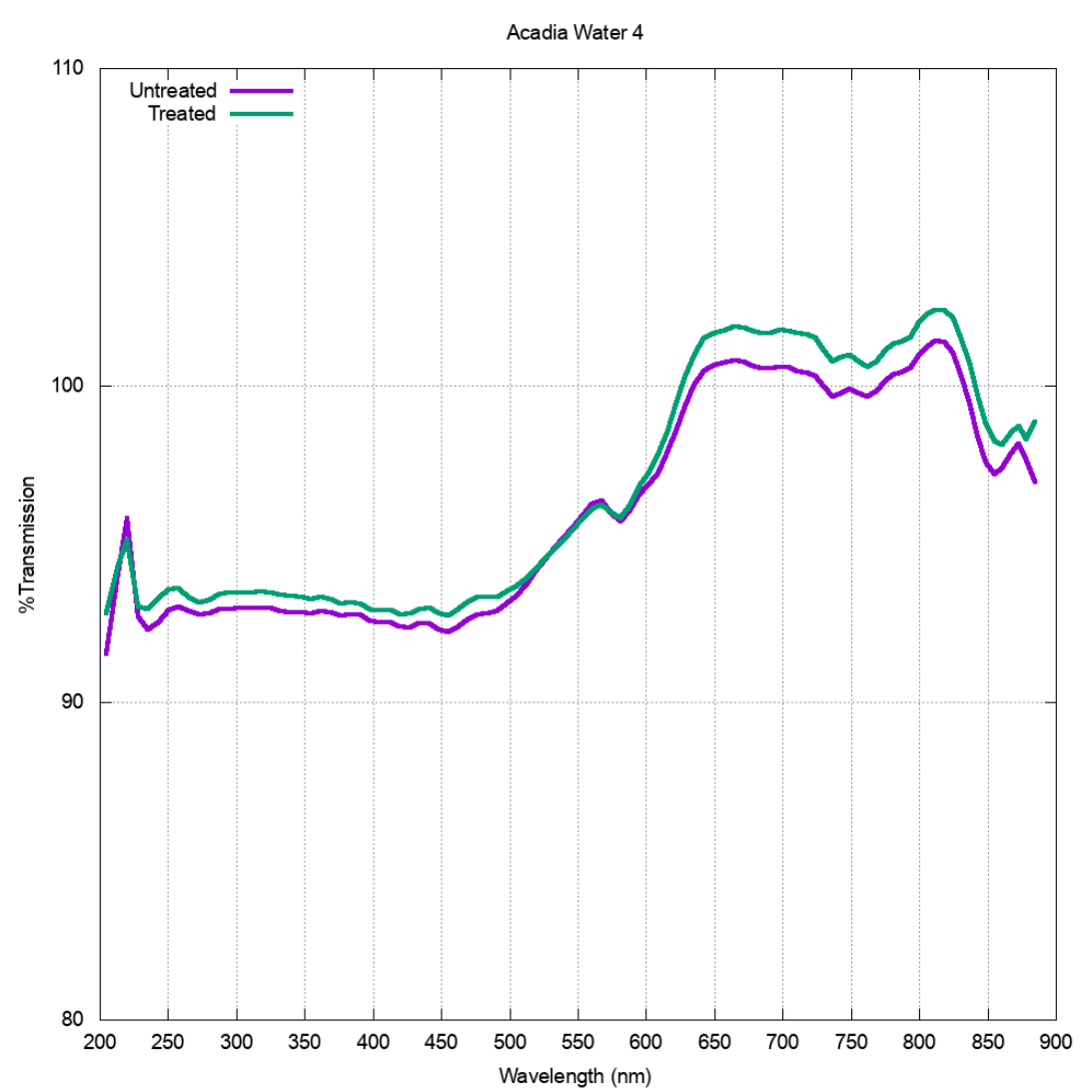
Copper Model Treatment Water 2



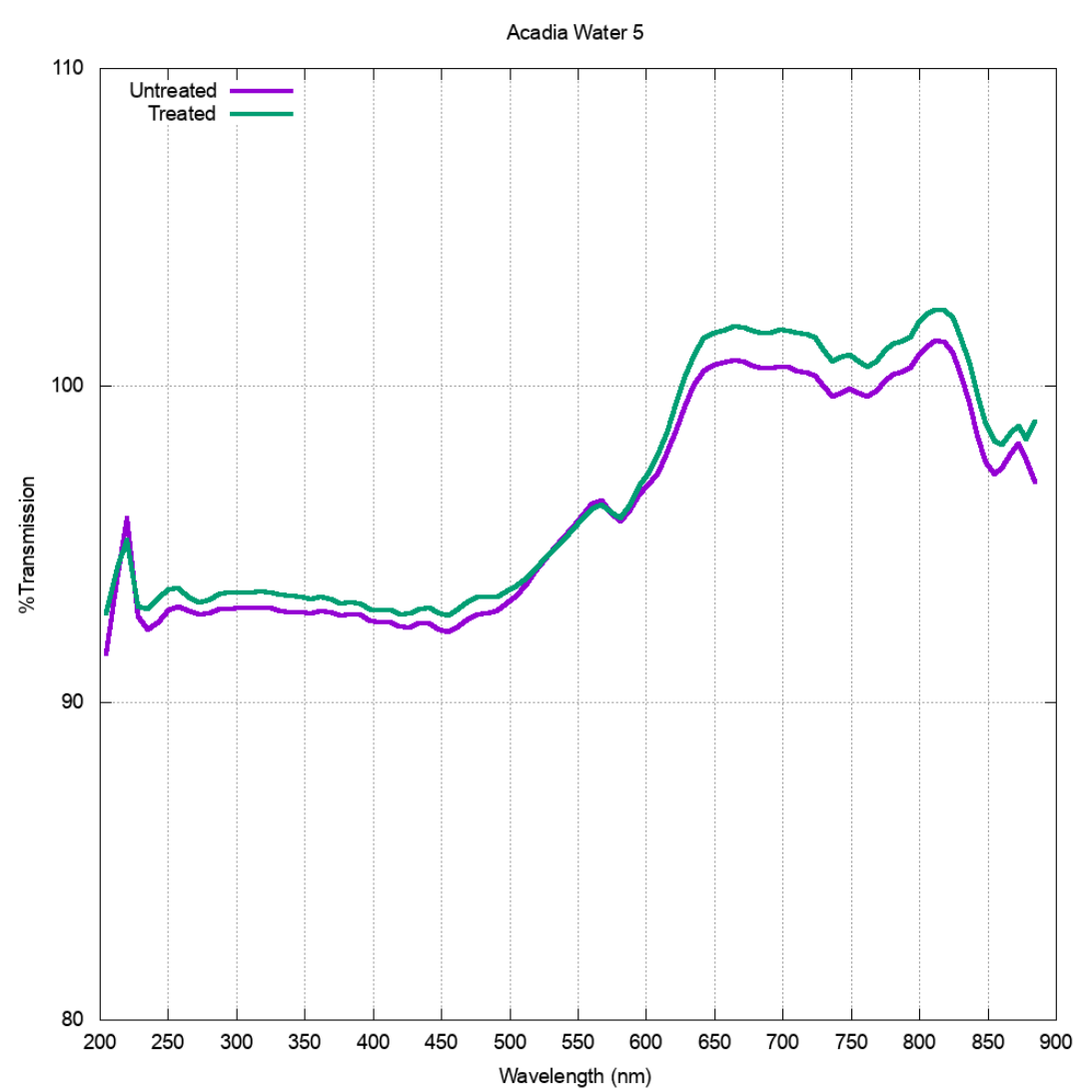
Copper Model Treatment Water 3



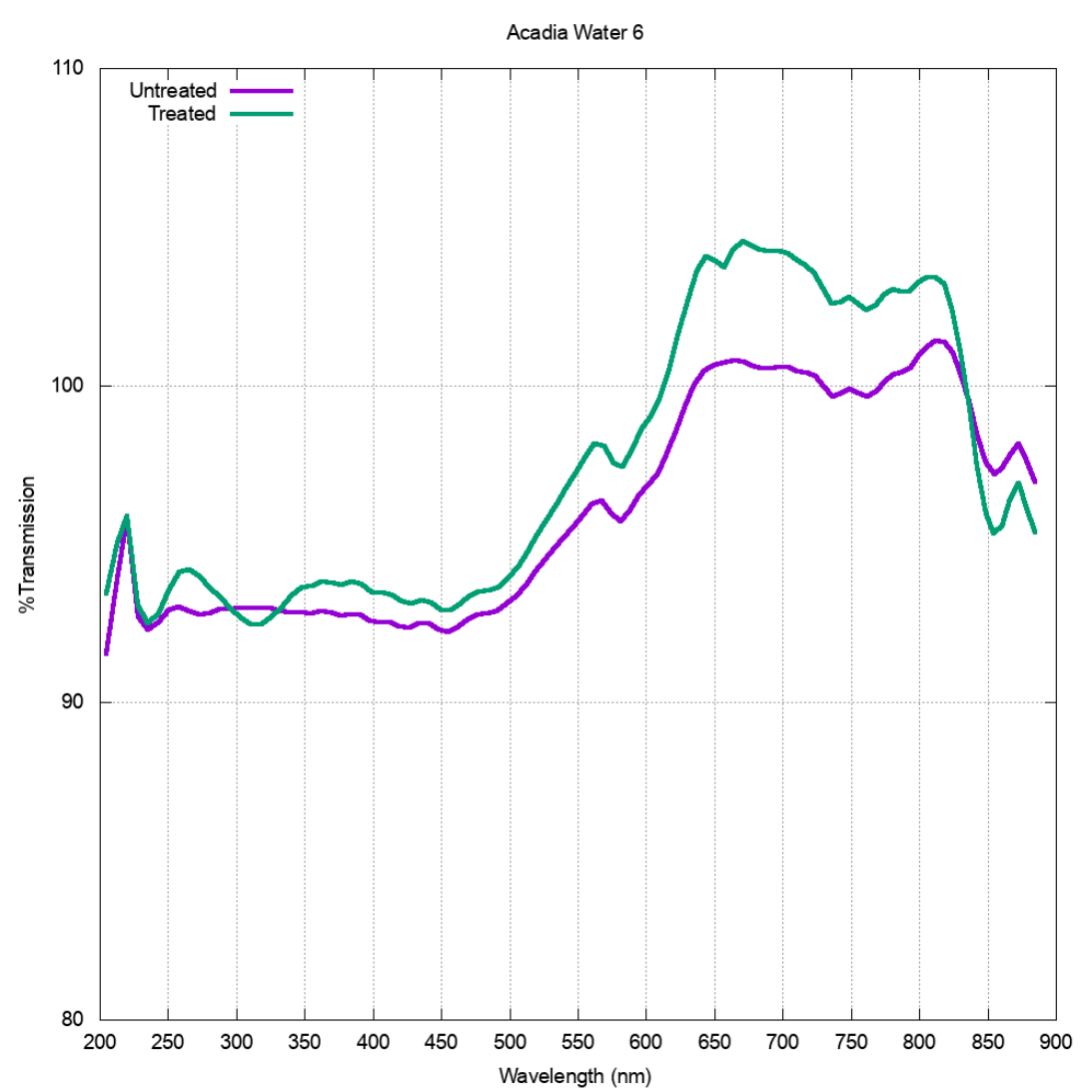
Copper Model Treatment Water 4



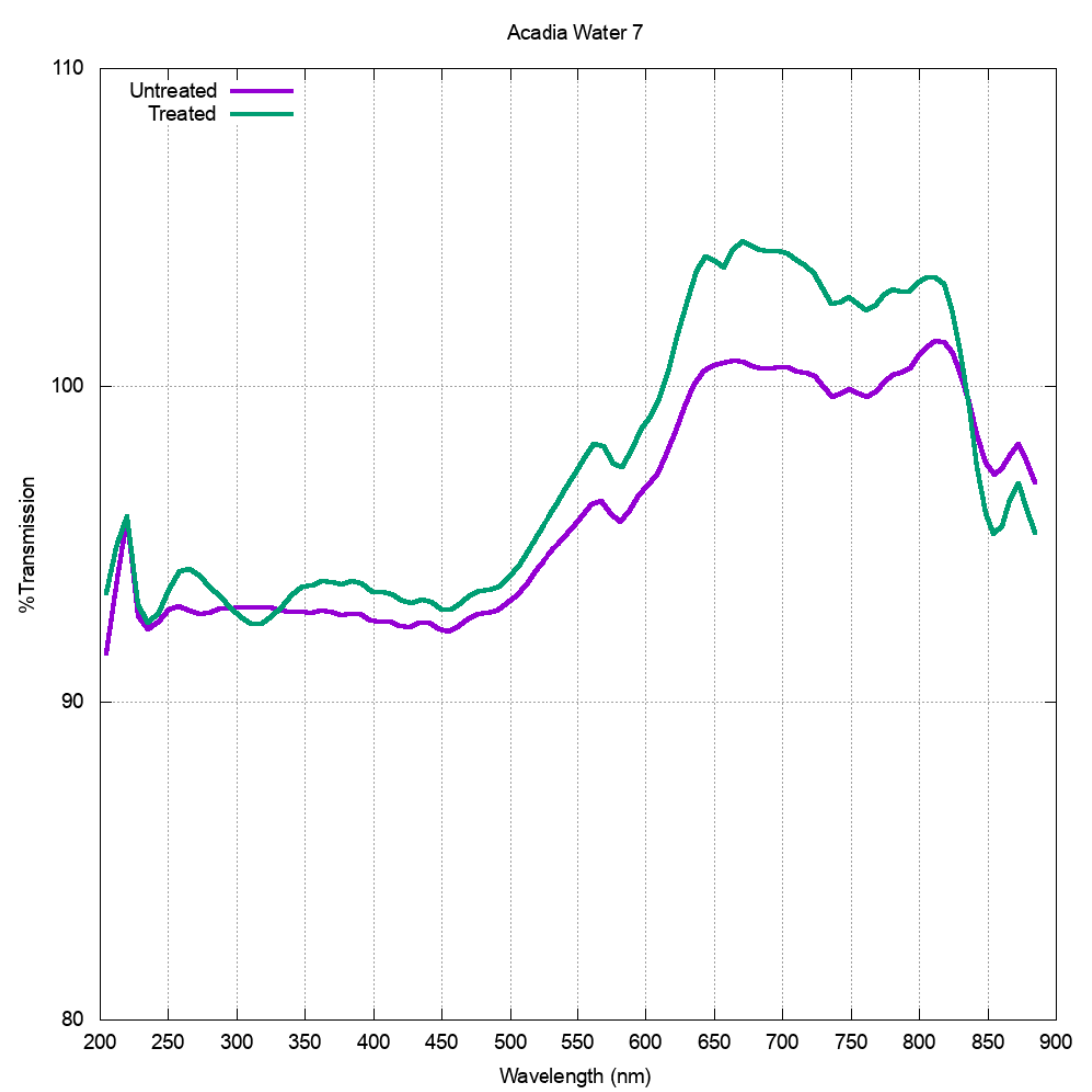
Copper Model Treatment Water 5



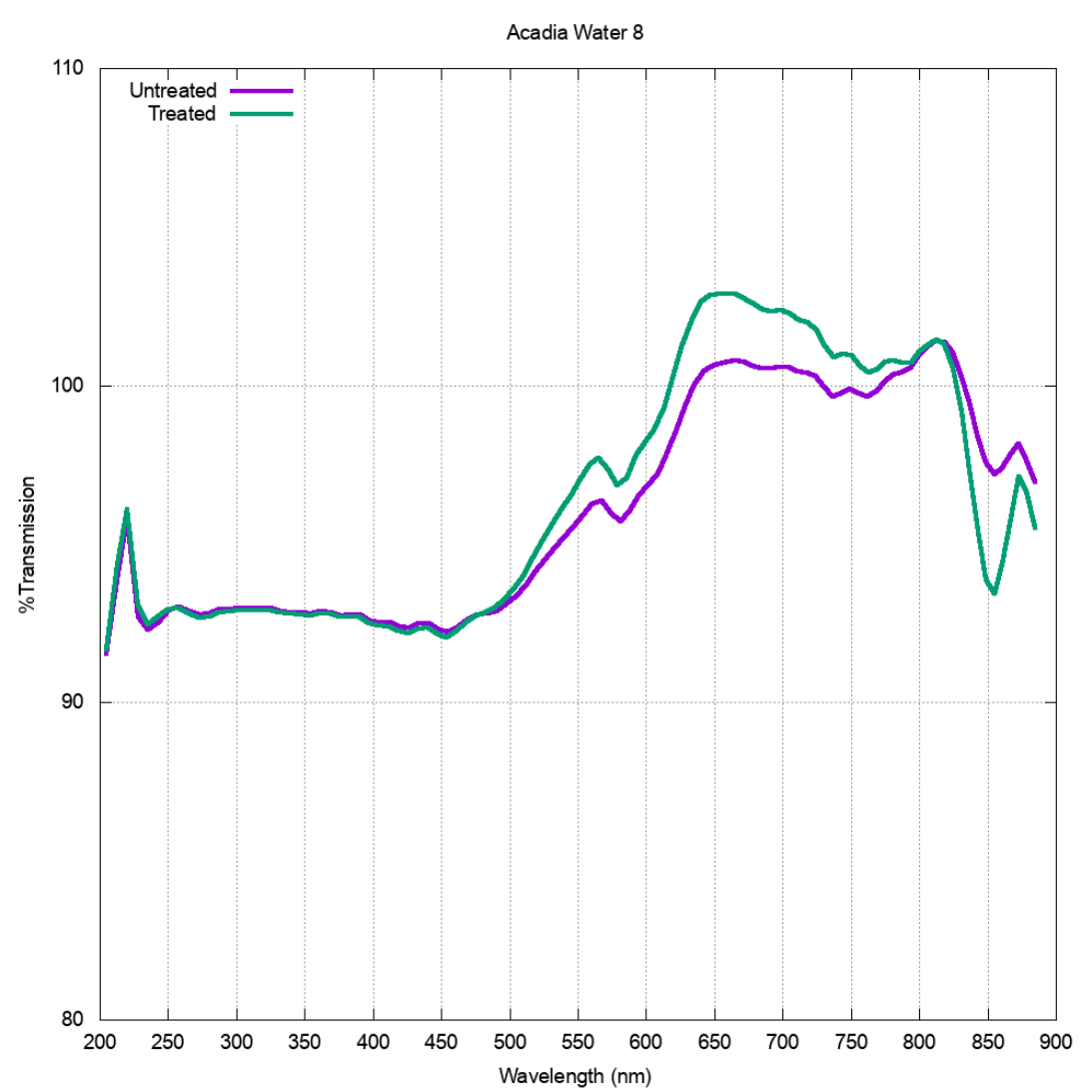
Copper Model Treatment Water 6



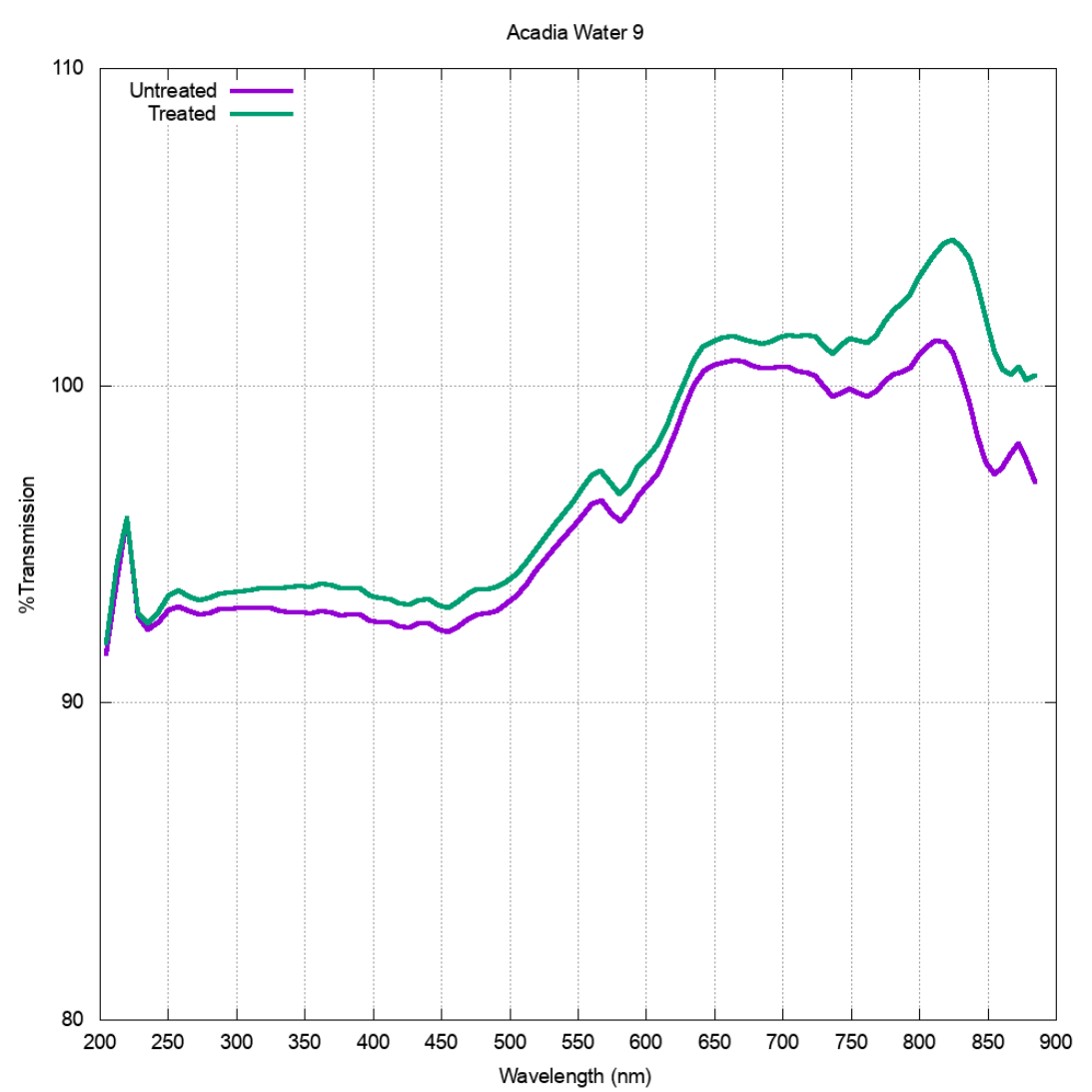
Copper Model Treatment Water 7



Copper Model Treatment Water 8



Copper Model Treatment Water 9



Copper Model Treatment Water 14