Validation Dipoles

Report No.:	INW/2111/169-701
Equipment Type:	SAR Validation Dipole
Model Name:	D750V3, D1450V2, D2000V2 D2300V2, D3500V2, D3700V2 D3900V2, D4600V2, D4900V2
Brand Name:	Speag
Test Conclusion:	Pass
Test Date:	Nov. 10, 2021
Date of Issue:	Nov. 12, 2021

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Miao Yan **Checked by:** Zong Liyao **Approved by:** Liao Jianming (Technical Director)

1 GENERAL INFORMATION

1.1 Introduction

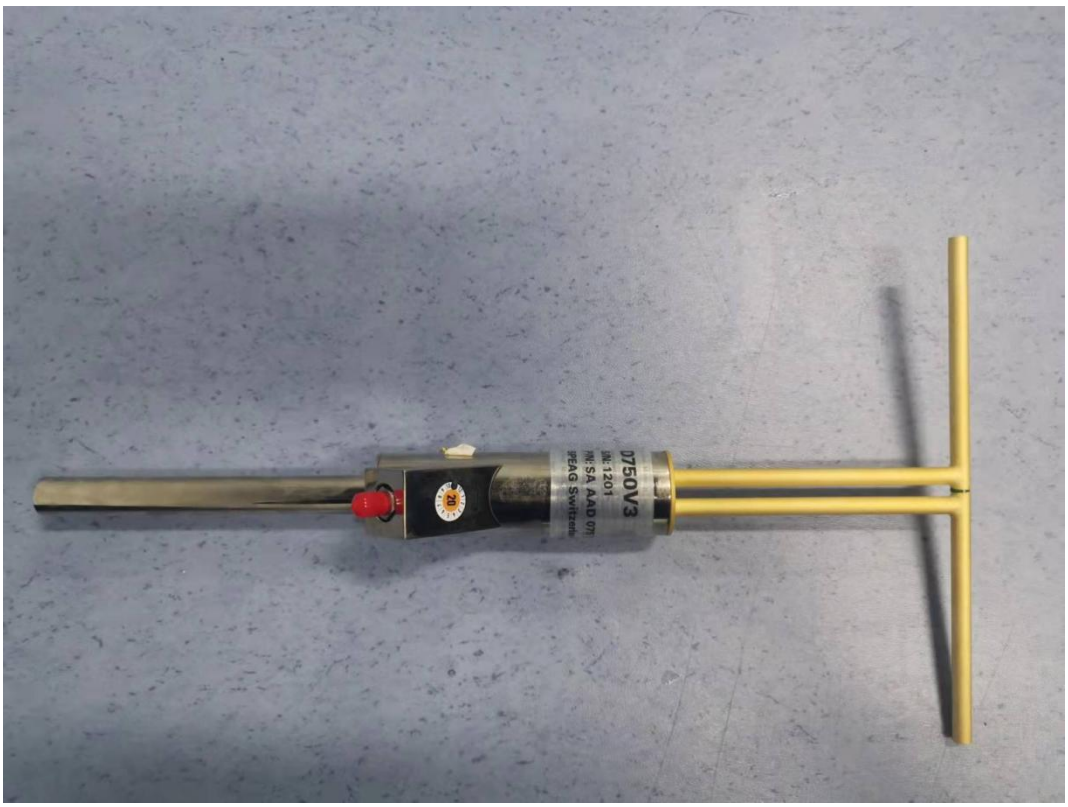
This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDB 865664 D01 for reference dipoles used for SAR measurement system validations. Instead of the typical annual calibration recommended by measurement standards, the reference dipoles were demonstrated that the SAR target, impedance and return loss have remain stable, so the longer calibration interval is acceptable.

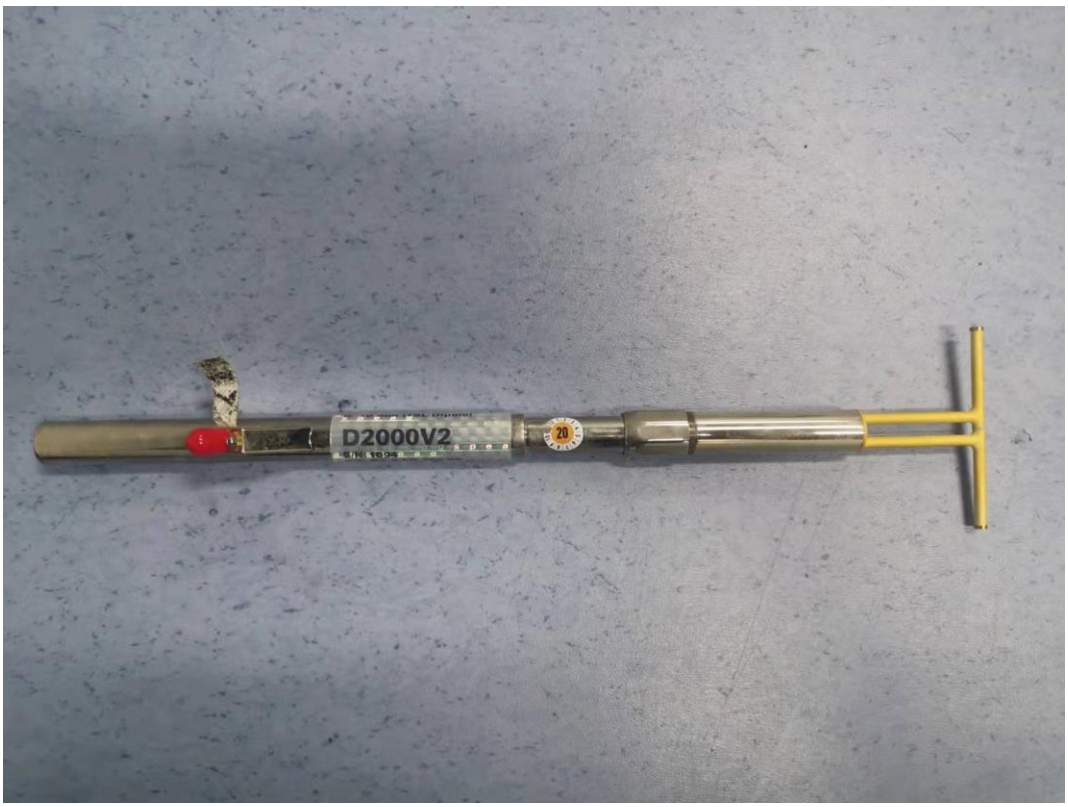
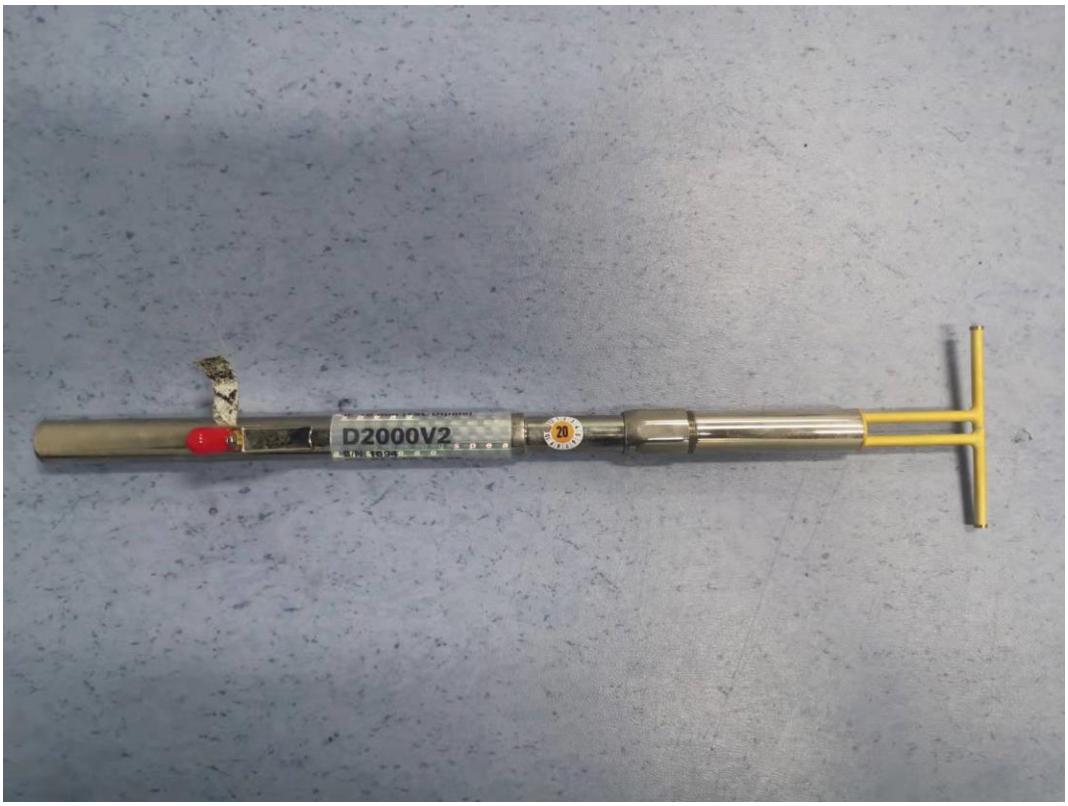
1.2 General Description for Equipment under Test (EUT)

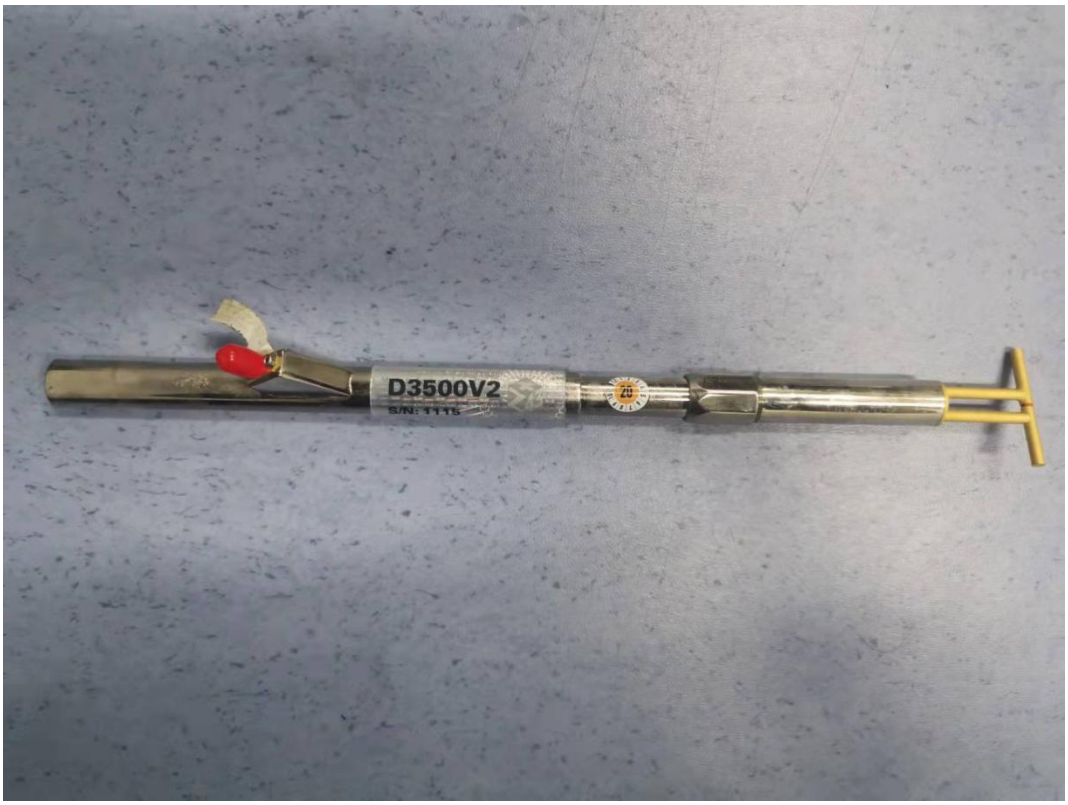
EUT Type	DASY SAR Test System Reference Dipoles
Manufacturer	Speag

Parameter	EUT 1	EUT 2	EUT 3	EUT 4	EUT 5	EUT 6	EUT 7
Model	D750V3	D1450V2	D2000V2	D2300V2	D3500V2	D3700V2	D3900V2
Frequency	750 MHz	1450 MHz	2000 MHz	2300 MHz	3400/3500 MHz	3700 MHz	3900/4100 MHz
Serial Number	SN 1201	SN 1084	SN 1094	SN 1111	SN 1115	SN 1086	SN 1059
Product Condition (New/ Used)	Used	Used	Used	Used	Used	Used	Used
Last Cal. Date	2020/11/11	2020/11/18	2020/11/18	2020/11/18	2020/11/11	2020/11/12	2020/11/13
Current meas. Date	2021/11/10	2021/11/10	2021/11/10	2021/11/10	2021/11/10	2021/11/10	2021/11/10
Parameter	EUT 8	EUT 9	N/A	N/A	N/A	N/A	N/A
Model	D4600V2	D4900V2	/	/	/	/	/
Frequency	4500/4700 MHz	4900 MHz	/	/	/	/	/
Serial Number	SN 1054	SN 1050	/	/	/	/	/
Product Condition (New/ Used)	Used	Used	/	/	/	/	/
Last Cal. Date	2020/11/13	2020/11/13	/	/	/	/	/
Current meas. Date	2021/11/10	2021/11/10	/	/	/	/	/

1.3 EUT Photos

D750V3

D1450V2


D2000V2

D2300V2


D3500V2


D3700V2


D3900V2

D4600V2

D4900V2


2 DIPOLE IMPEDANCE AND RETURN LOSS

The dipoles are designed to have low return loss when presented against a flat phantom at the specified distance. A Vector Network Analyser was used to perform a return loss measurement on the specific dipole when in the measurement location against the phantom and the distance was specified by the manufacturer with a special, low loss and low relative permittivity spacer.
The impedance was measured at the SMA-connector with the network analyser.

The measurement of verification with return loss should not deviate by more than 20% and minimum of 20 dB of the return loss, and the impedance (real or imaginary parts) should not deviate by more than 5 Ohms from the previous measurement using network analyzer.

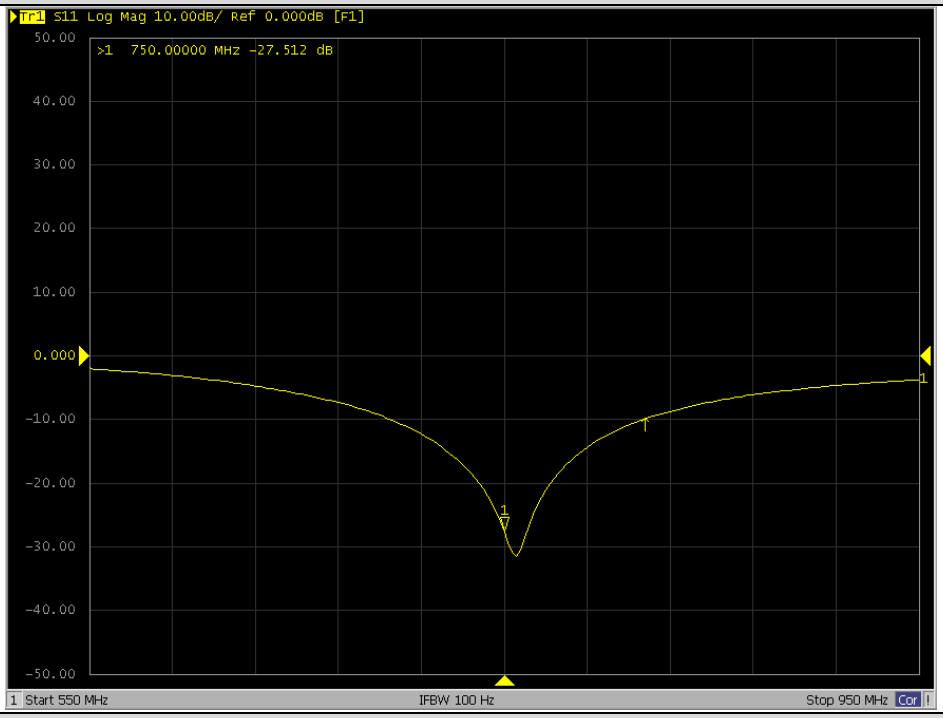
Note:
The “Previous Meas.” in the following table refer to dipoles or other equivalent RF sources calibration reports.

2.1 D750V3

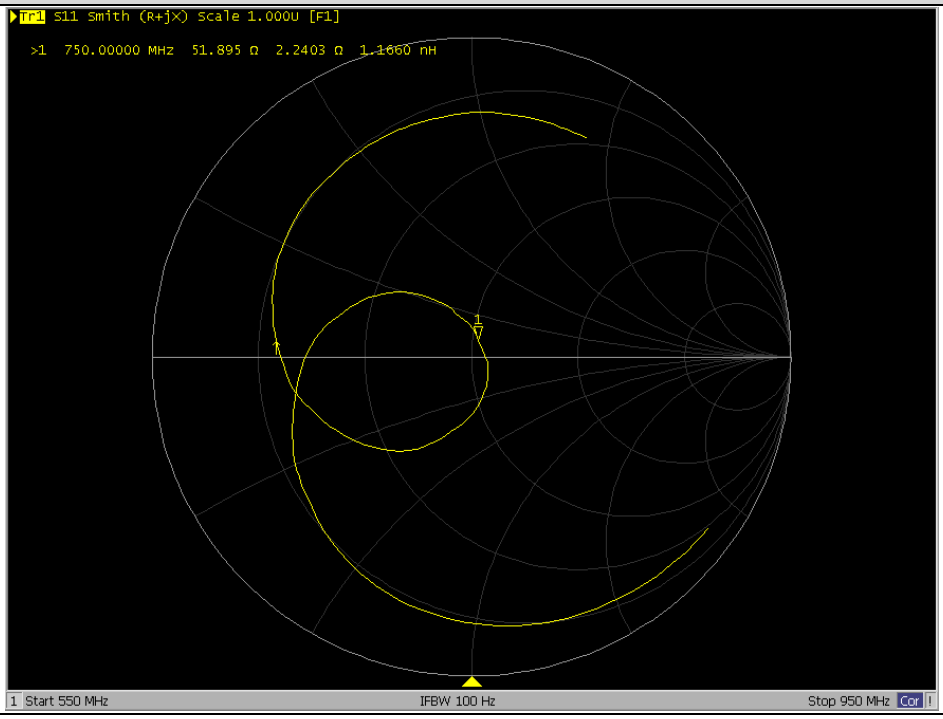
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-27.512	-28.167	-2.33%
Impedance	51.895 Ω + 2.240 jΩ	53.262 Ω - 2.374 jΩ	4.614Ω (Imaginary part)

Return Loss



Impedance

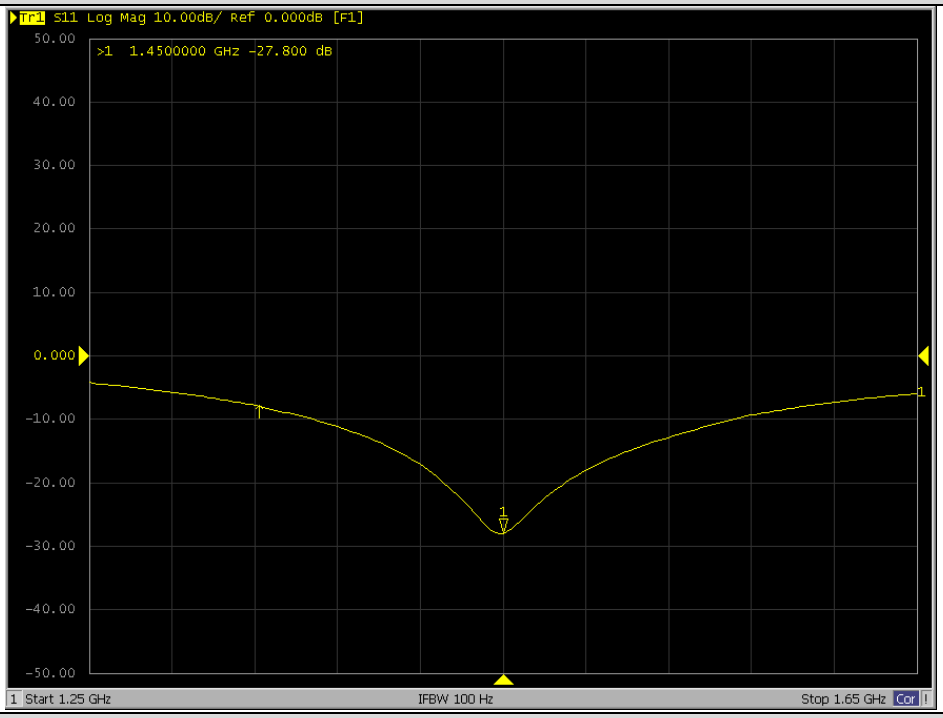


2.2 D1450V2

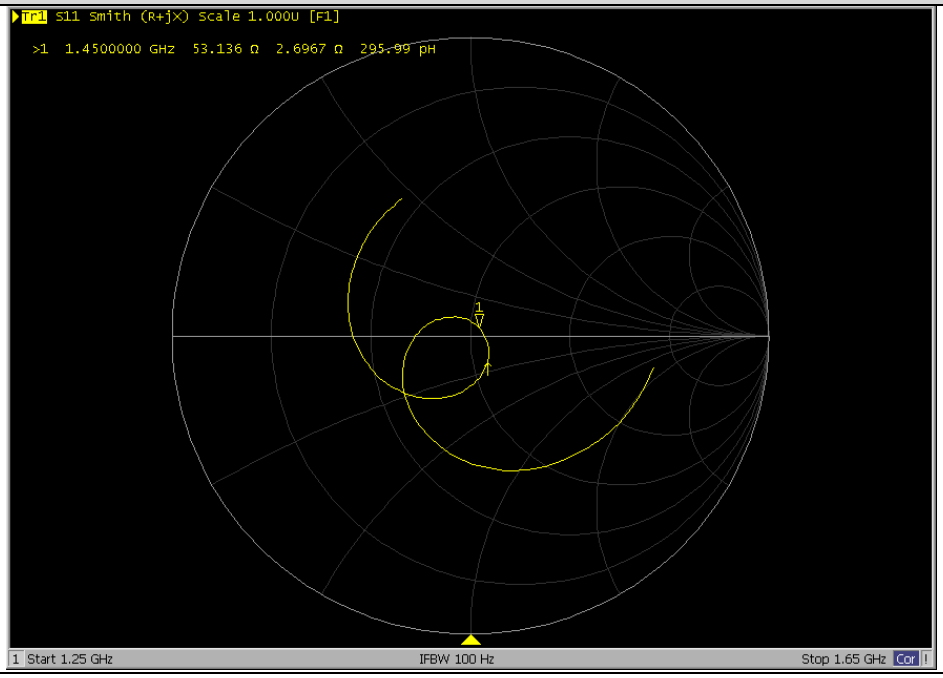
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-27.800	-26.942	3.185%
Impedance	53.136Ω + 2.697 jΩ	51.497 Ω + 4.316 jΩ	1.639Ω (Real part)

Return Loss



Impedance

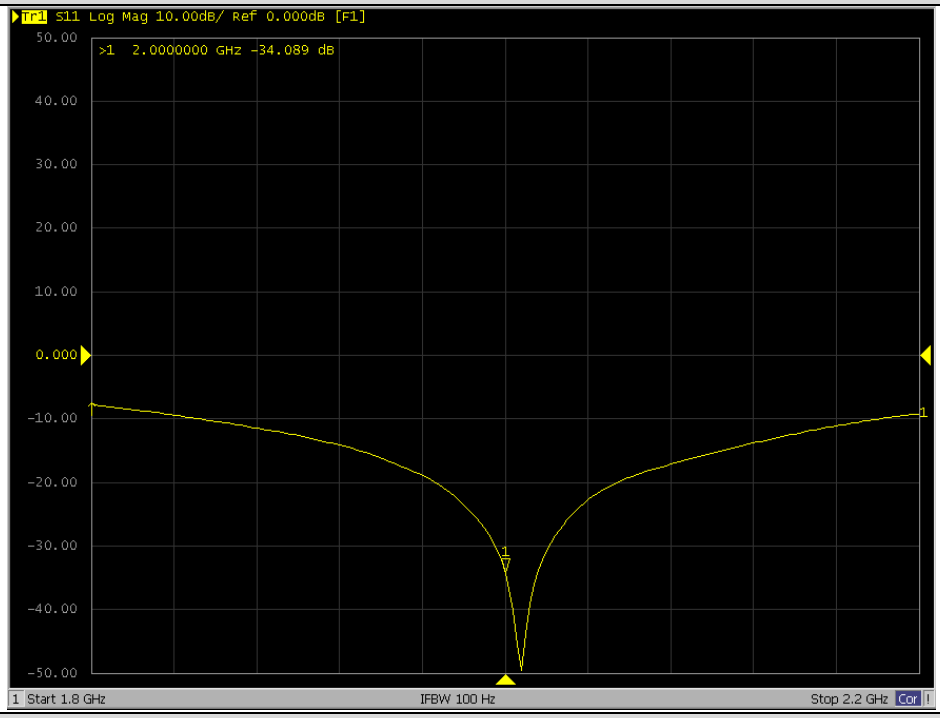


2.3 D2000V2

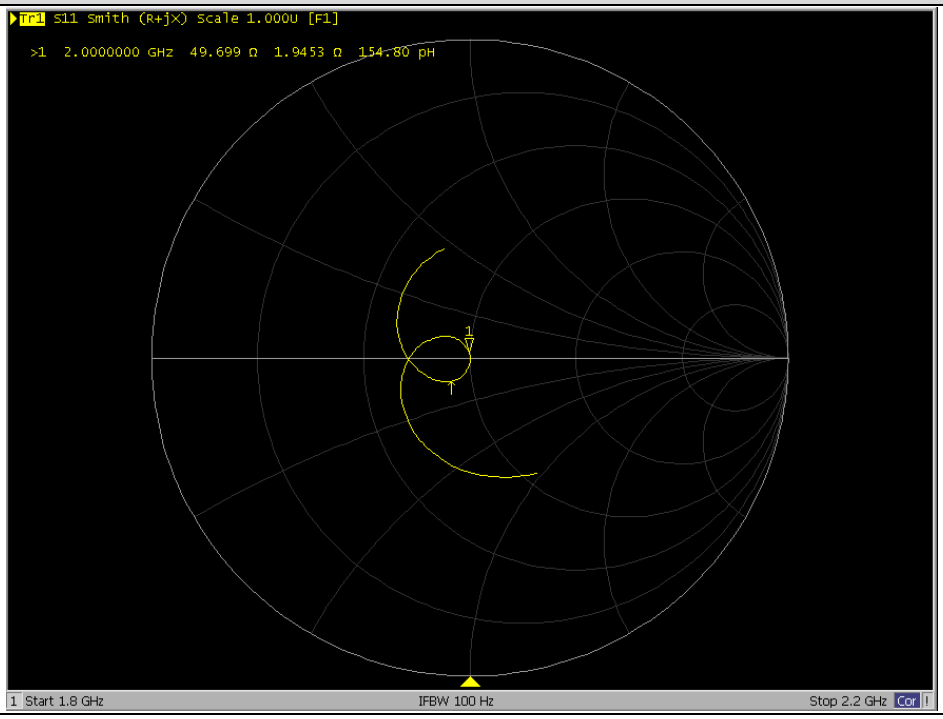
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-34.089	-33.154	2.82%
Impedance	49.699 Ω +1.945 jΩ	50.856 Ω – 2.047 jΩ	3.992Ω (Imaginary part)

Return Loss



Impedance

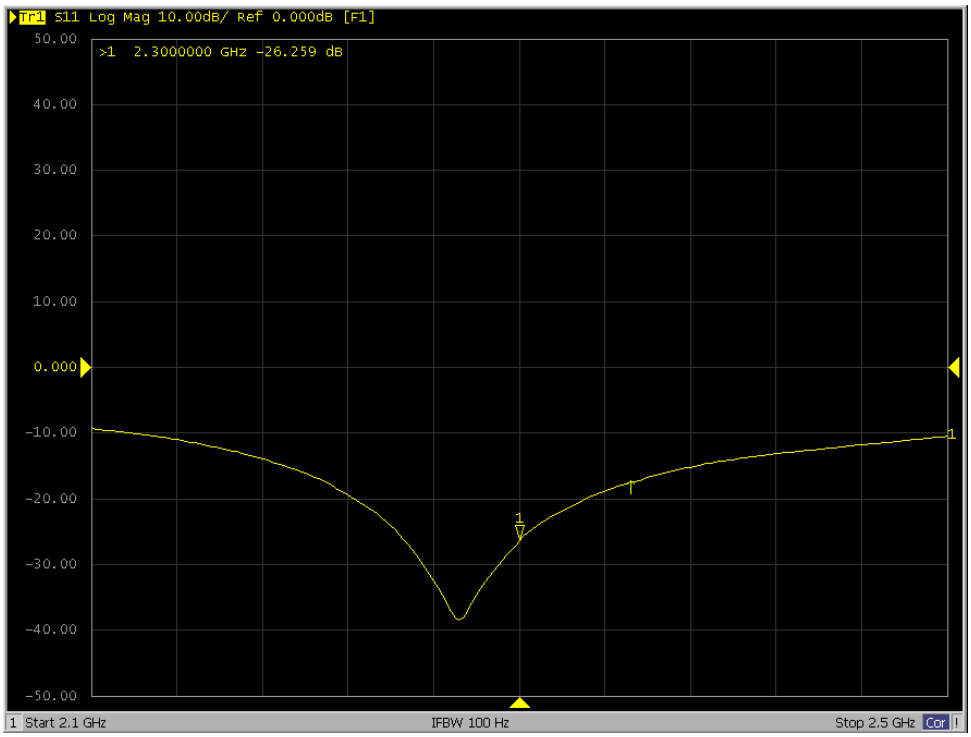


2.4 D2300V2

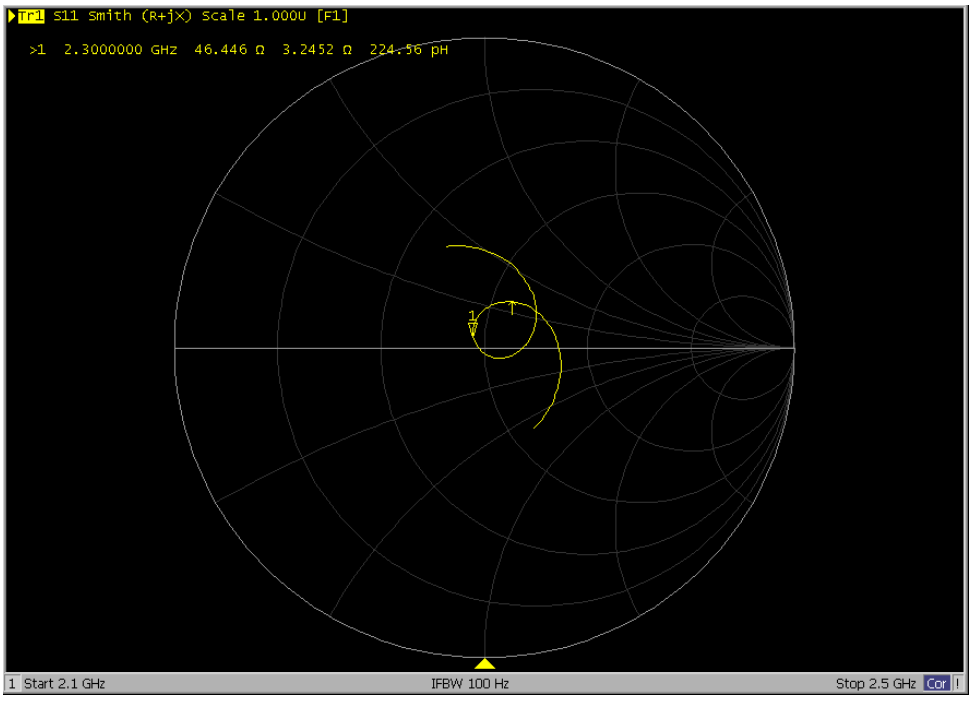
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-26.259	-27.635	-4.98%
Impedance	46.446 Ω + 3.245 jΩ	48.015 Ω + 3.556 jΩ	-1.569Ω (Real part)

Return Loss



Impedance

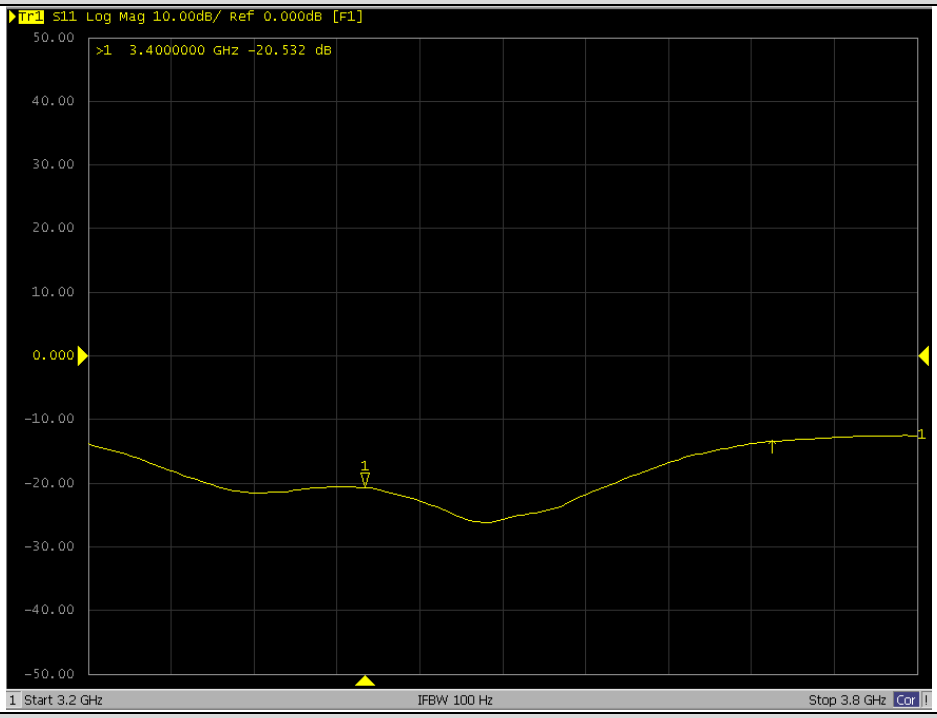


2.5 D3500V2

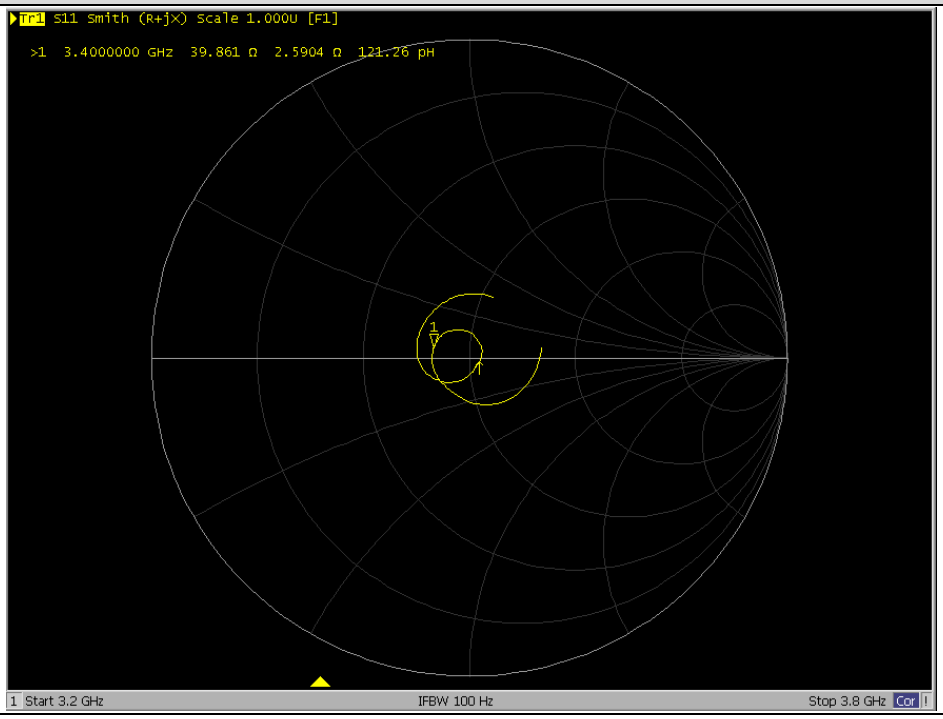
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 3400MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-20.532	-20.671	-0.67%
Impedance	39.861 Ω + 2.590 jΩ	41.538 Ω + 0.420 jΩ	2.17Ω (Imaginary part)

Return Loss



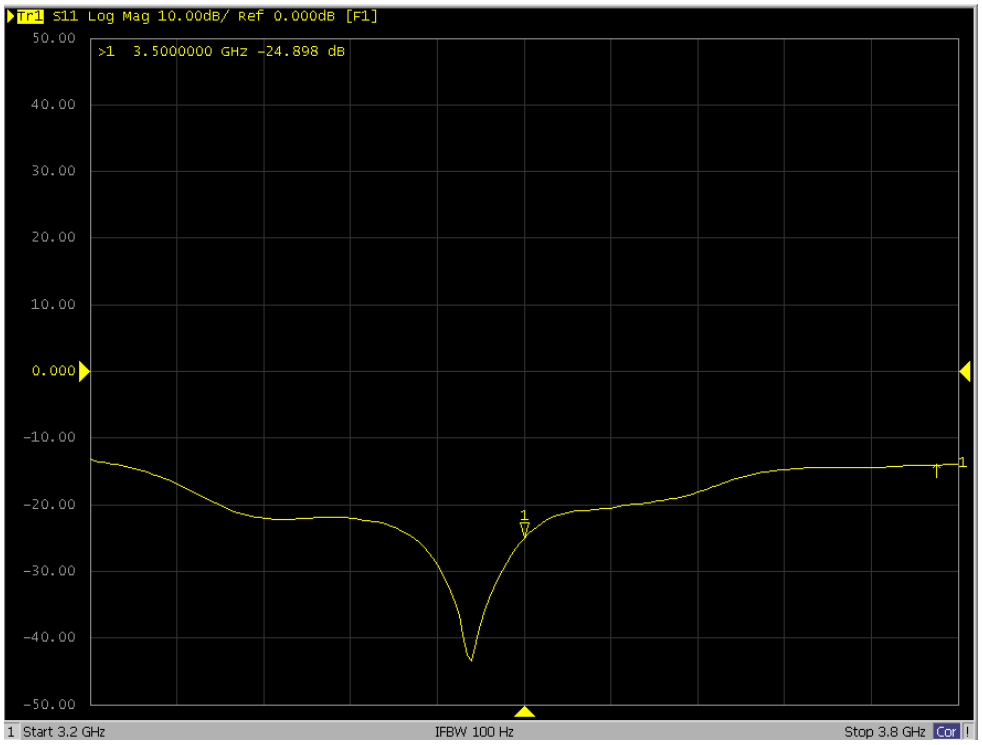
Impedance



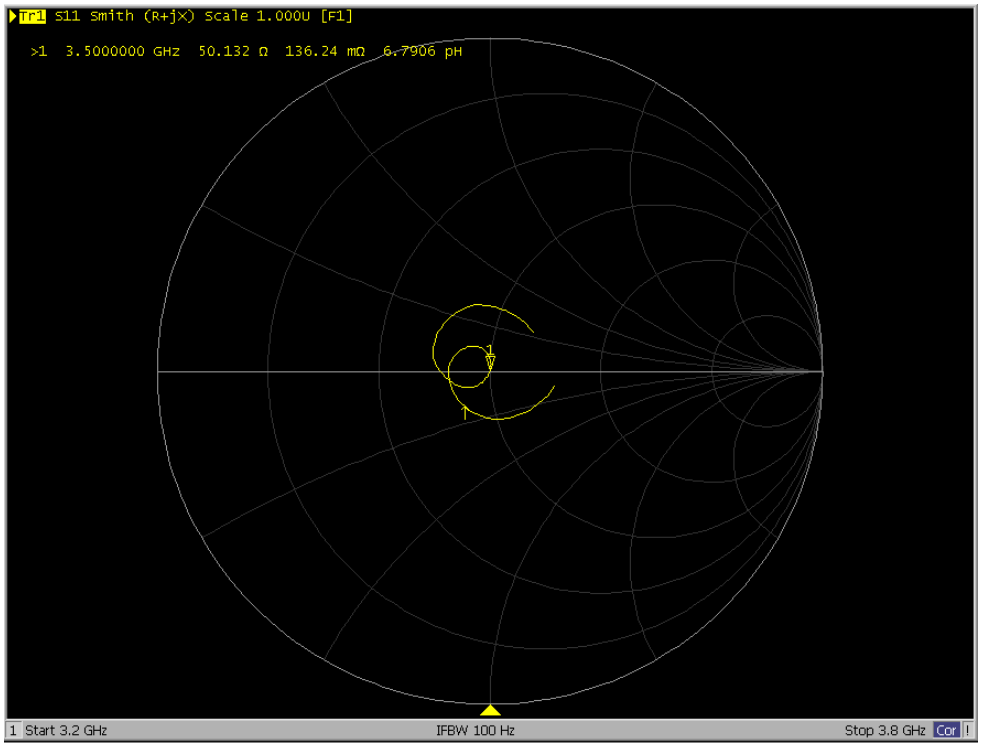
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 3500MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss (dB)	-24.898	-23.741	4.87%
Impedance	50.132 Ω + 0.136 jΩ	46.238 Ω + 5.009 jΩ	-4.873Ω (Imaginary part)

Return Loss



+Impedance

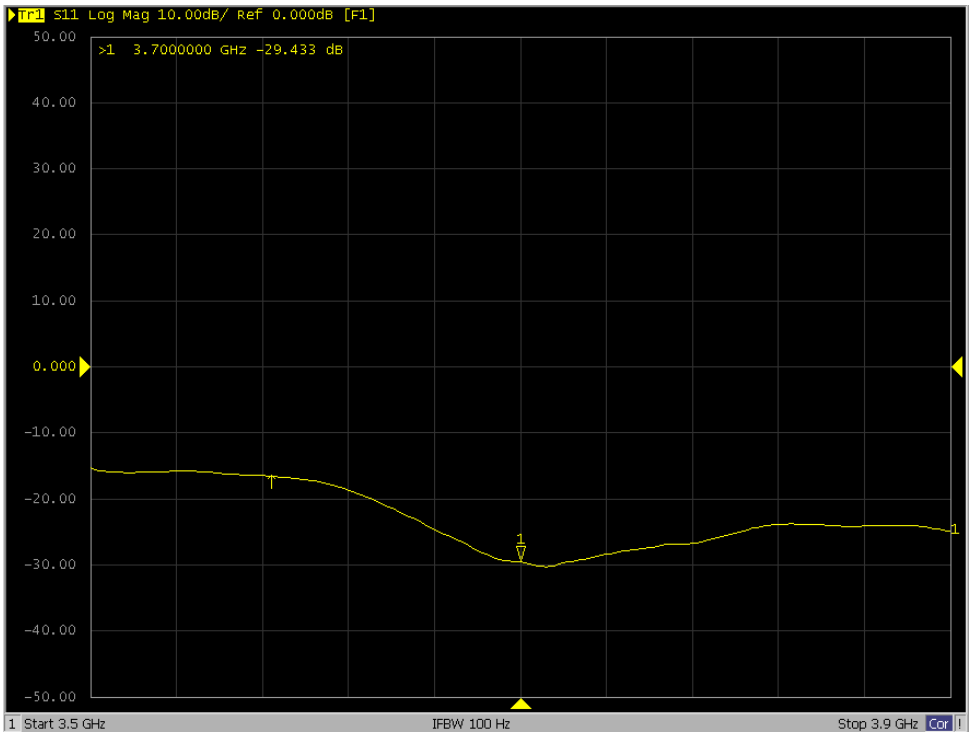


2.6 D3700V2

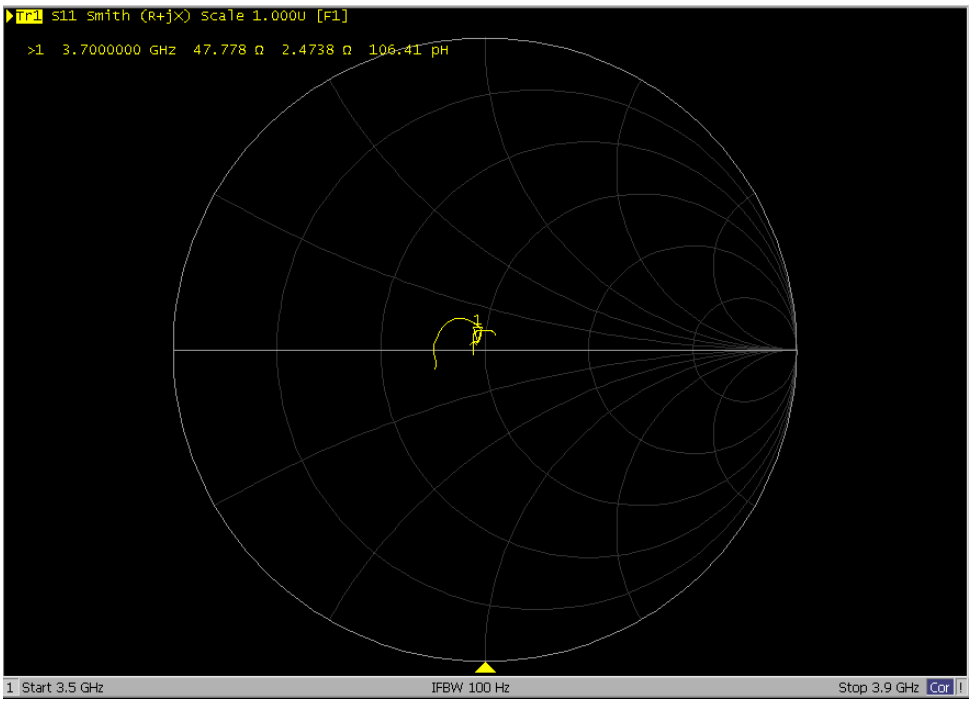
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-29.433	-27.791	5.91%
Impedance	47.778 Ω + 2.474 jΩ	46.084 Ω + 0.119 jΩ	2.355Ω (Imaginary part)

Return Loss



Impedance

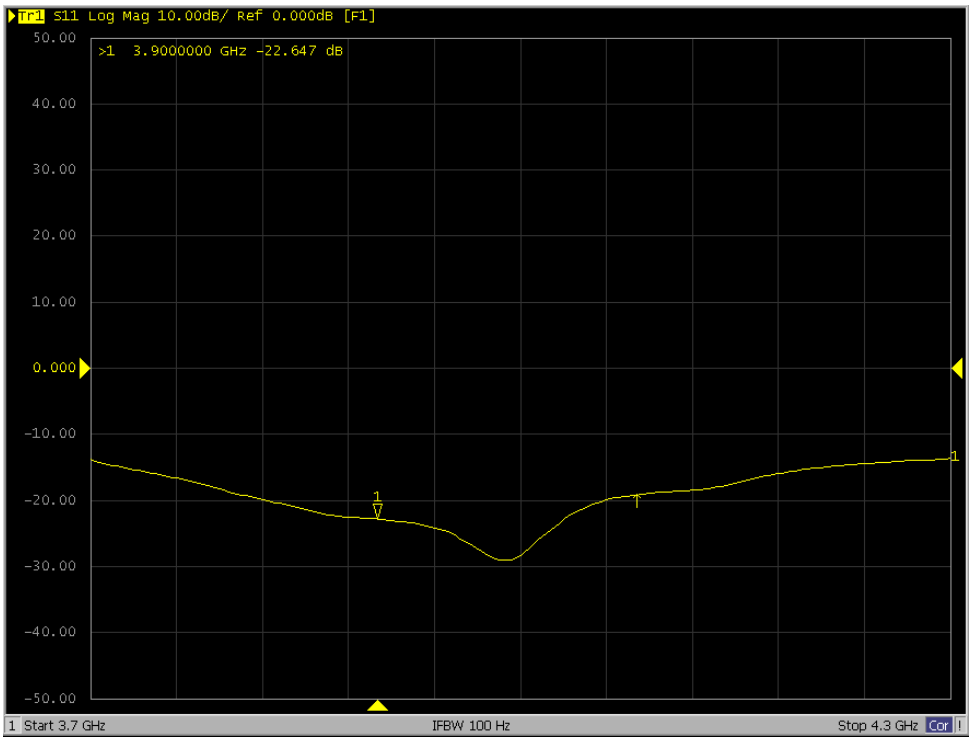


2.7 D3900V2

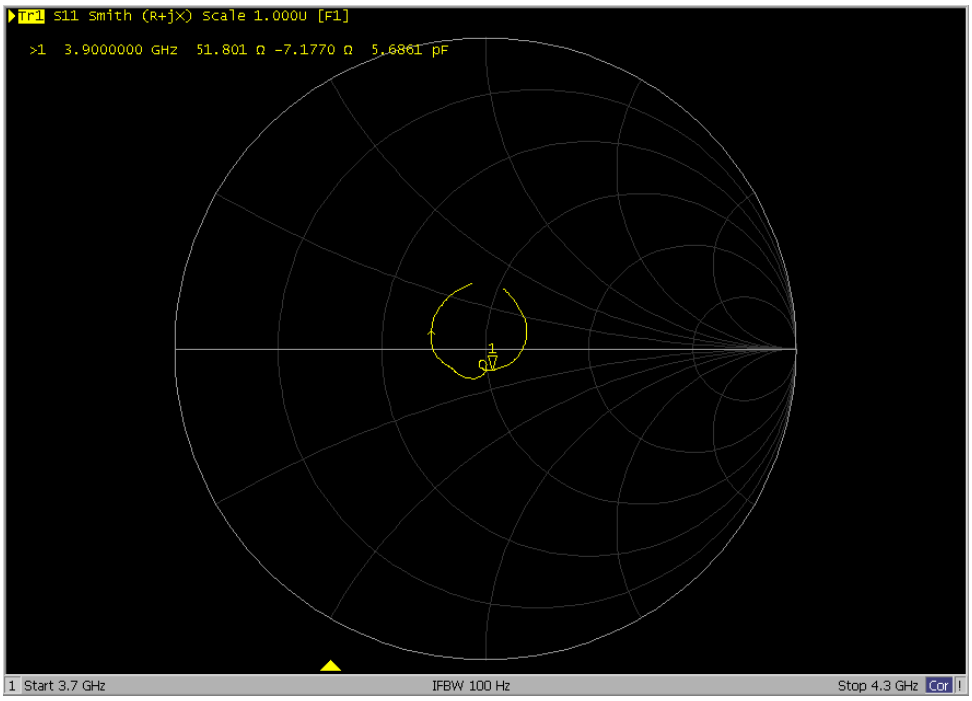
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 3900MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-22.647	-23.584	-3.97%
Impedance	51.801 Ω – 7.177 jΩ	48.779 Ω – 6.438 jΩ	3.022Ω (Real part)

Return Loss



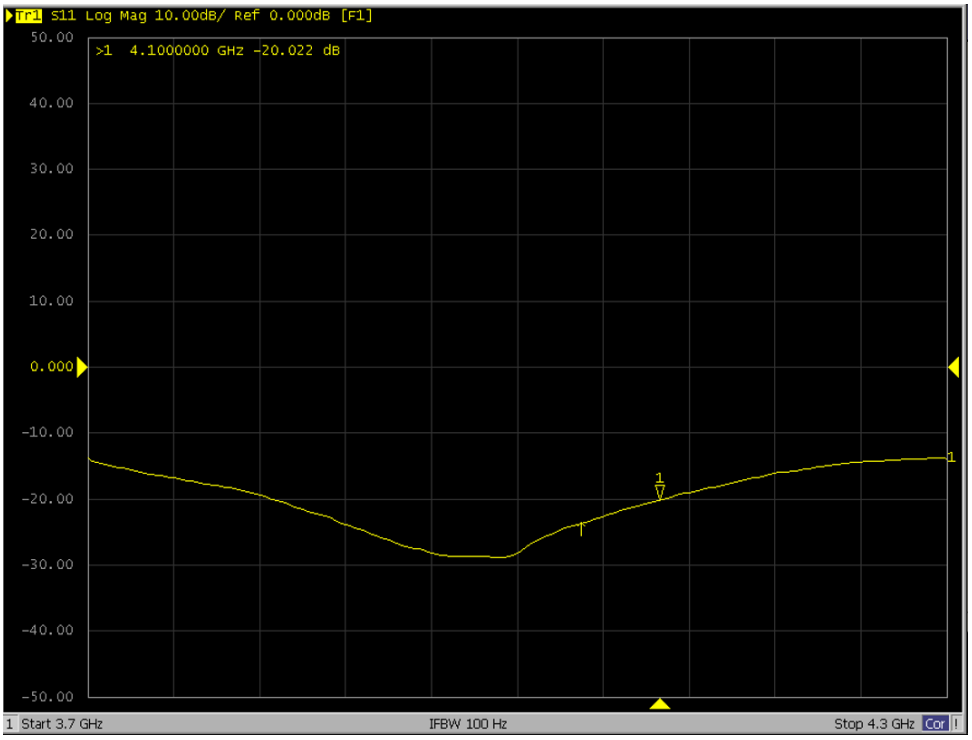
Impedance



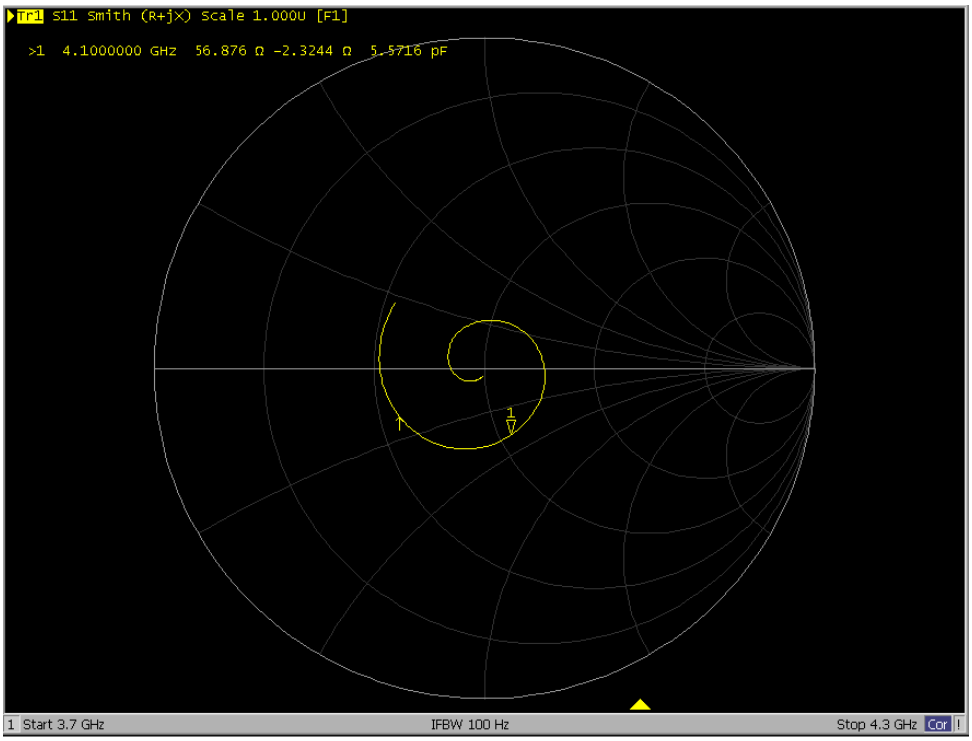
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 4100MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-20.022	-21.902	-8.58%
Impedance	56.876 Ω – 2.324 jΩ	58.735 Ω – 0.039 jΩ	-2.285Ω (Imaginary part)

Return Loss



Impedance

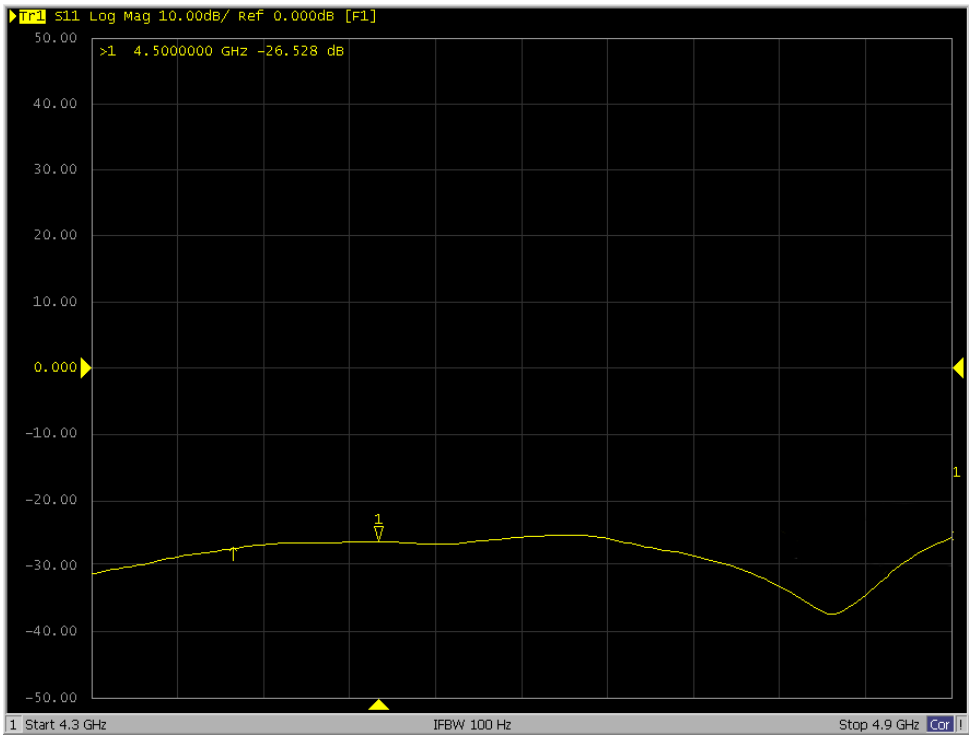


2.8 D4600V2

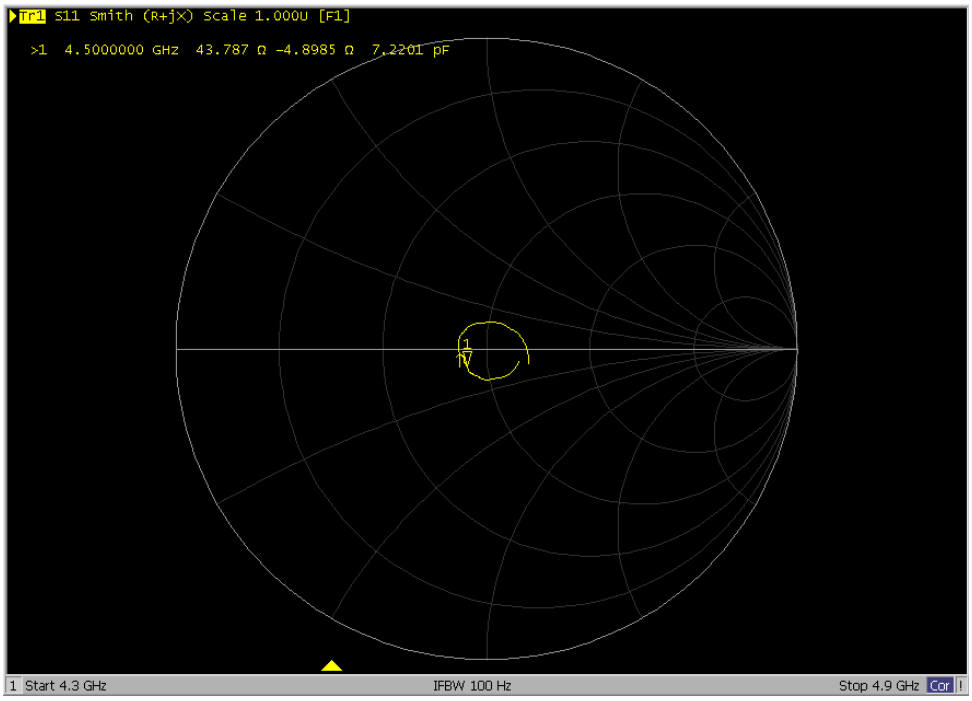
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 4500MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-26.528	-23.991	10.57%
Impedance	43.787 Ω – 4.899 jΩ	45.969 Ω – 4.536 jΩ	-2.182Ω (Real part)

Return Loss



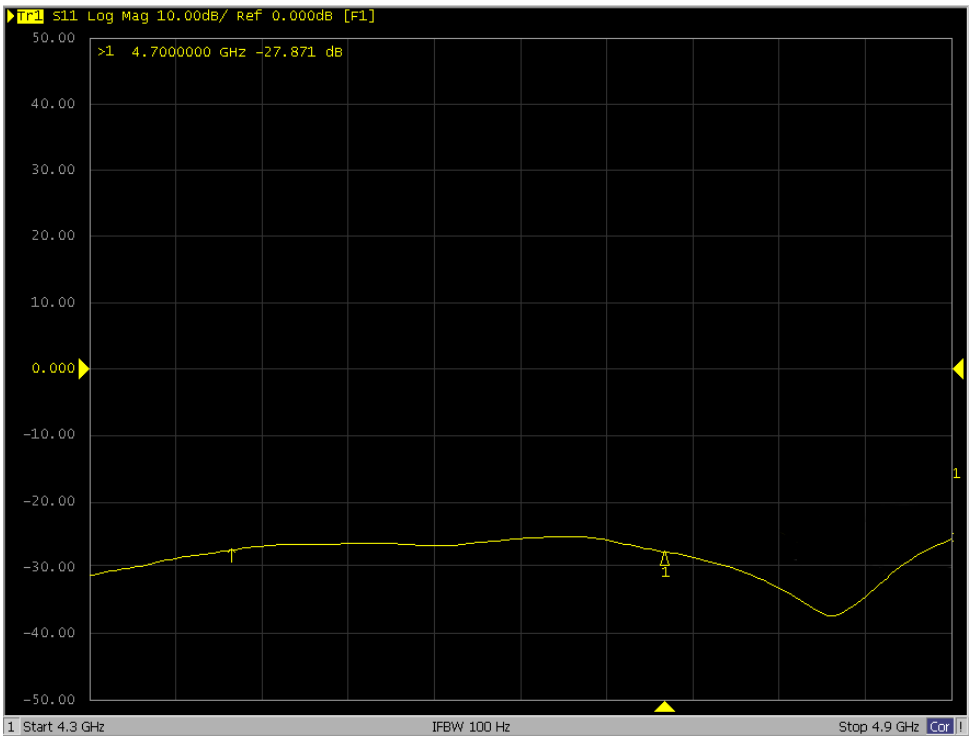
Impedance



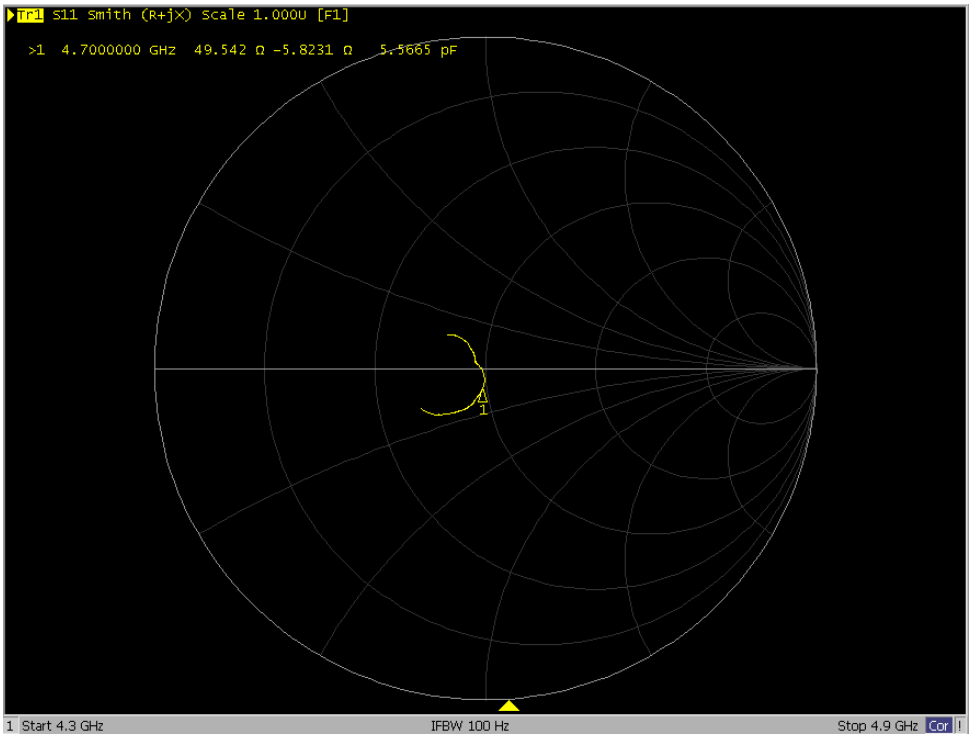
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID FOR 4700MHz

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-27.871	-23.949	16.38%
Impedance	49.542 Ω – 5.823 jΩ	53.921 Ω – 5.313 jΩ	-4.379Ω (Real part)

Return Loss



Impedance

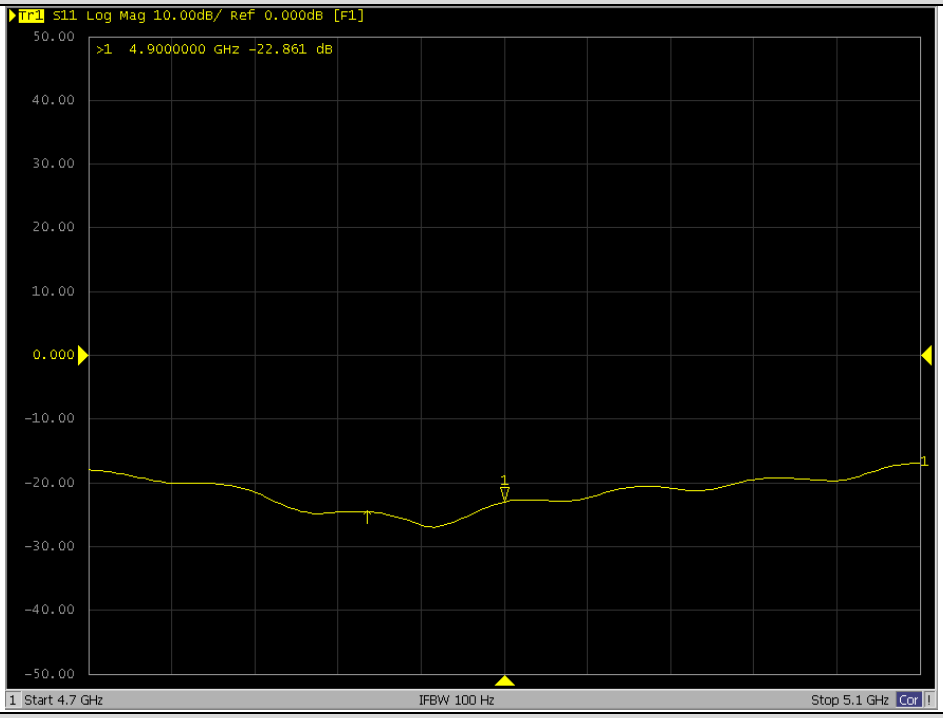


2.9 D4900V2

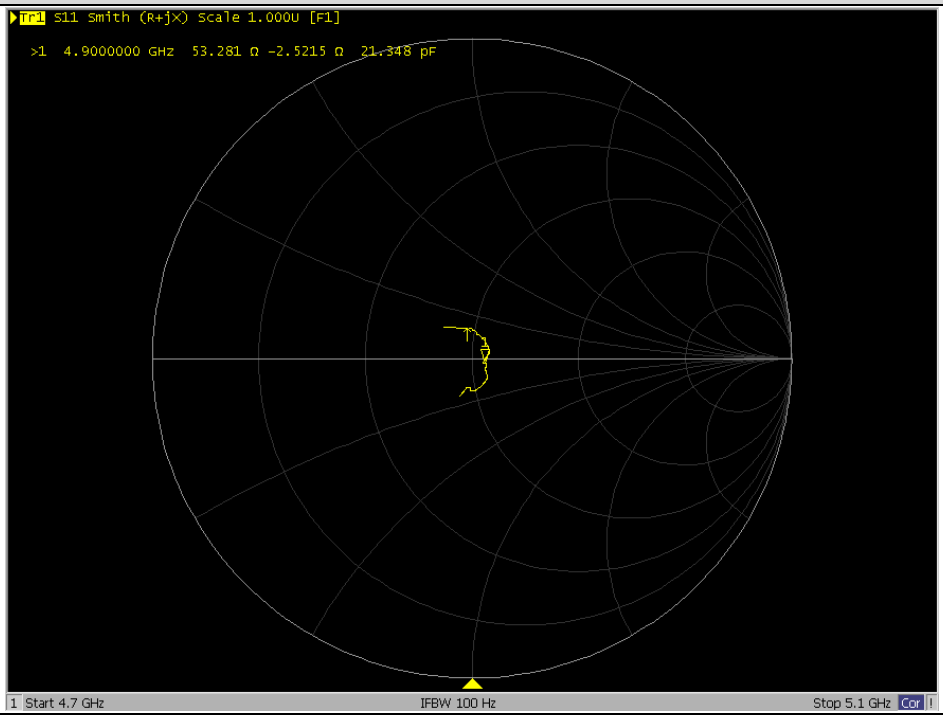
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

Meas. Results	Current Meas.	Previous Meas.	Max. Deviation
Return Loss(dB)	-22.861	-23.249	-1.67%
Impedance	53.281 Ω – 2.523 jΩ	50.863 Ω – 6.902 jΩ	-4.38Ω (Imaginary part)

Return Loss



Impedance



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