

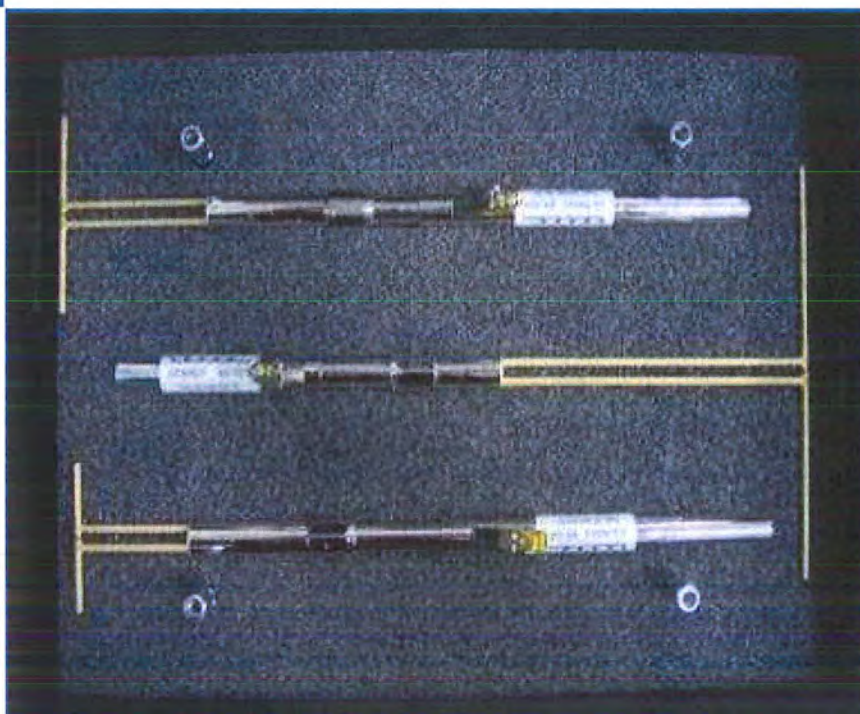
SAR Dipole

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.




Performance Measurement Report

FOR
Validation Dipoles



Tested by: 

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(Engineer)

Approved by: 

Liao Jianming
(Technical Director)



Report No.: LW-SZ2120037-701

EUT Type: SAR Validation Dipole

Model Name: D835V2, D1750V2, D1900V2,
D2450V2, D2600V2, D5GHzV2,

Brand Name: Speag

Test Conclusion: Pass

Test Date: Sep. 12, 2019 ~ Feb. 04, 2021

Date of Issue: Feb. 05, 2021

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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 5 Reference Dipoles |
| Manufacturer | Speag |

| Parameter | EUT 1 | EUT 2 | EUT 3 | EUT 4 | EUT 5 | EUT 6 |
|----------------------------------|-----------|------------|-----------|-----------|------------|-----------|
| Model | D835V2 | D1750V2 | D1900V2 | D2450V2 | D2600V2 | D5GHzV2 |
| Frequency | 835 MHz | 1750 MHz | 1900 MHz | 2450MHz | 2600 MHz | 5GHz-6GHz |
| Serial Number | SN 4d187 | SN 1130 | SN 5d193 | SN 952 | SN 1095 | SN 1200 |
| Product Condition (New/ Used) | Used | Used | Used | Used | Used | Used |
| Last Cal. Date | 2019/6/11 | 2019/09/12 | 2019/6/11 | 2019/6/10 | 2019/11/04 | 2020/2/17 |
| Current meas. Date | 2020/6/01 | 2020/09/08 | 2020/6/01 | 2020/6/02 | 2020/11/01 | 2021/2/04 |

1.3 EUT Photos

D835V2



D1750V2



D1900V2



D2450V2



D2600V2



D5GHzV2





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:

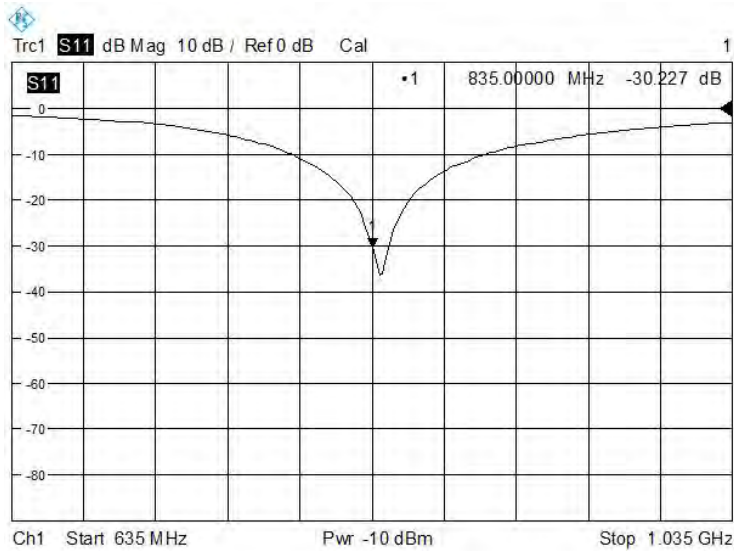
The "Previous Meas." in the following table refer to dipoles or other equivalent RF sources calibration reports.

2.1 D835V2

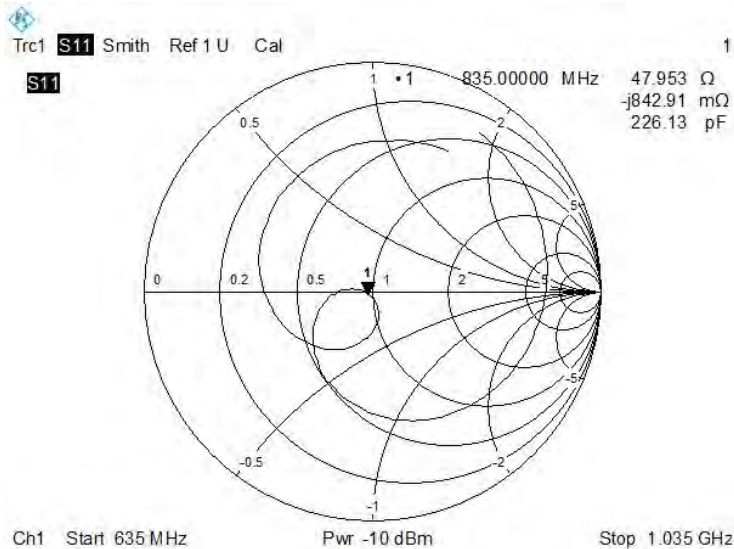
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|-----------------------|-----------------------|------------------------|
| Return Loss(dB) | -30.227 | -28.95 | -4.41% |
| Impedance | 47.953Ω – 0.843 jΩ | 51.919 Ω - 3.091jΩ | -3.966Ω (Real part) |

Return Loss



Impedance

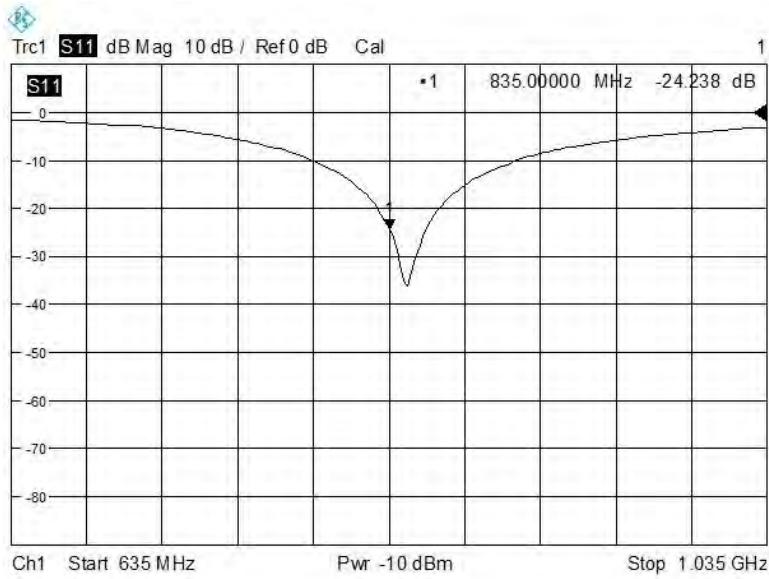




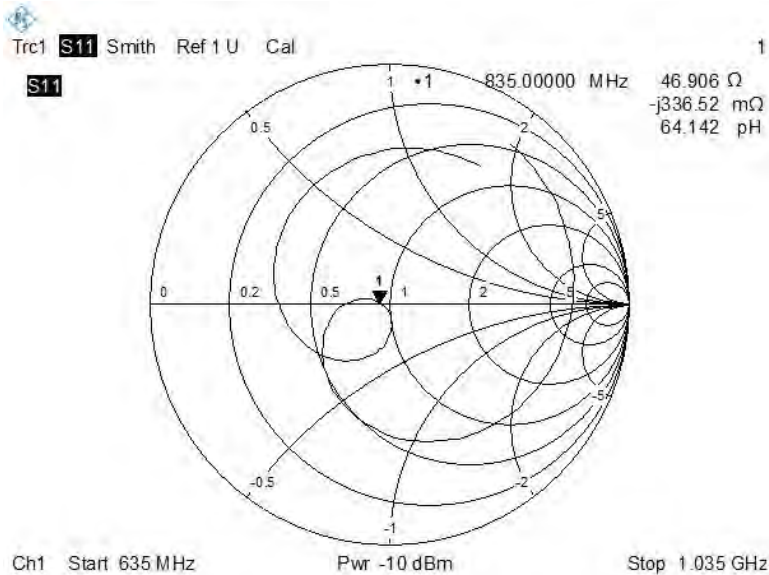
RETURN LOSS AND IMPEDANCE IN BODY LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|---------------------------------------|---------------------------------------|------------------------------------|
| Return Loss(dB) | -24.238 | -24.864 | 2.518% |
| Impedance | 46.906 Ω - 0.336 j Ω | 47.302 Ω - 4.868 j Ω | 4.532 Ω (Imaginary part) |

Return Loss



Impedance

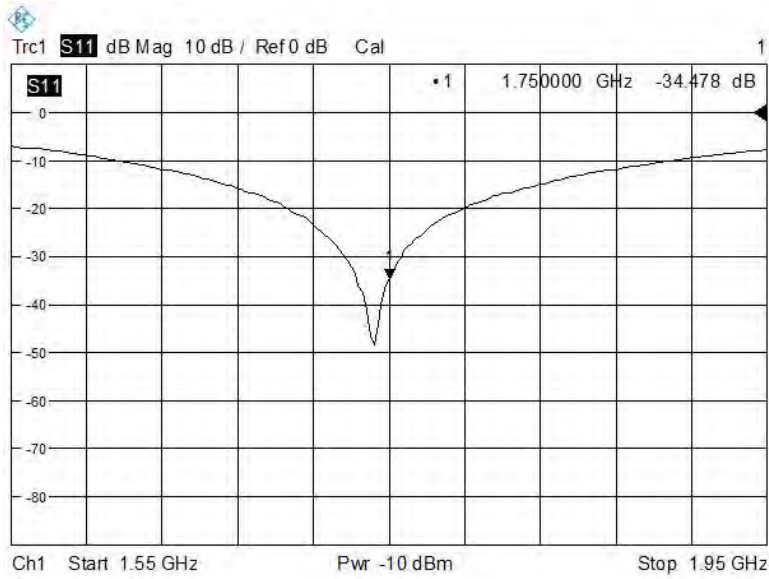


2.23.3 D1750V2

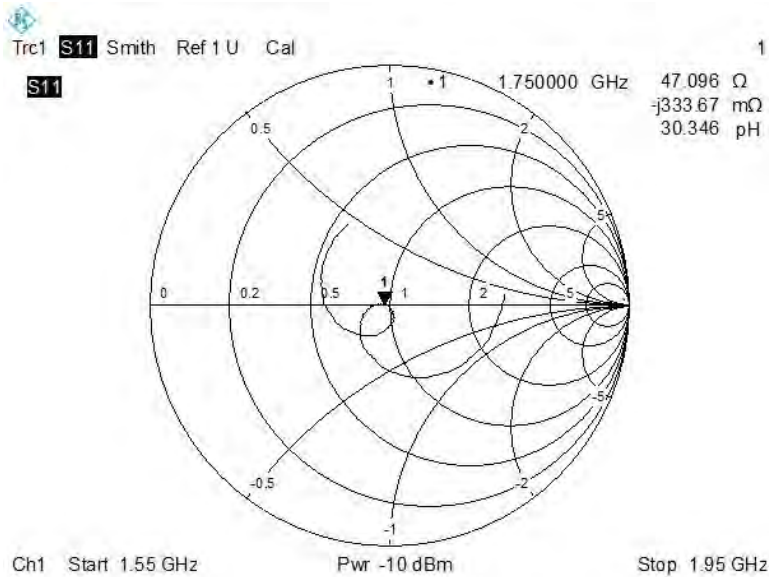
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|--------------------------------------|---------------------------------------|-------------------------------|
| Return Loss(dB) | -34.478 | -32.43 | 6.32% |
| Impedance | 47.096 Ω -0.334 j Ω | 50.193 Ω - 2.388 j Ω | 3.097 Ω (Real part) |

Return Loss



Impedance

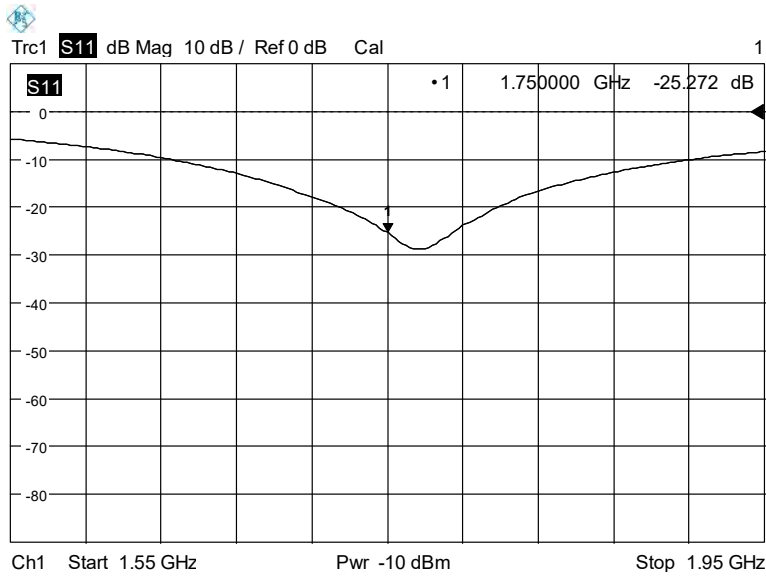




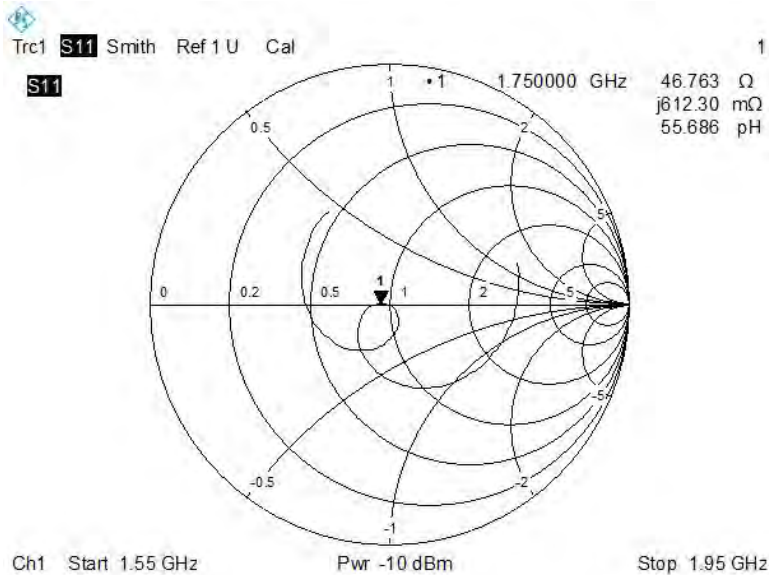
RETURN LOSS AND IMPEDANCE IN BODY LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|--------------------------------------|--------------------------------------|-------------------------------|
| Return Loss(dB) | -25.272 | -24.825 | 1.81% |
| Impedance | 46.763 Ω +0.612 j Ω | 45.20 Ω - 2.611 j Ω | 3.223 Ω (Real part) |

Return Loss



Impedance



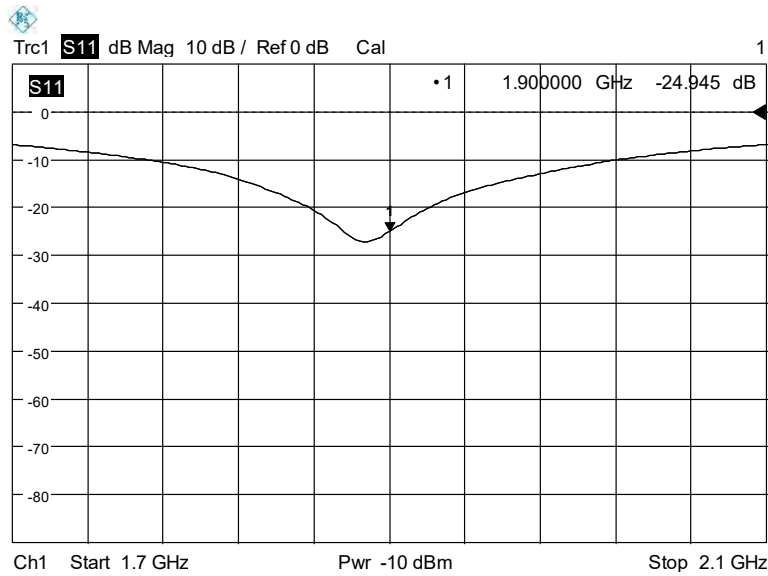


2.3D1900V2

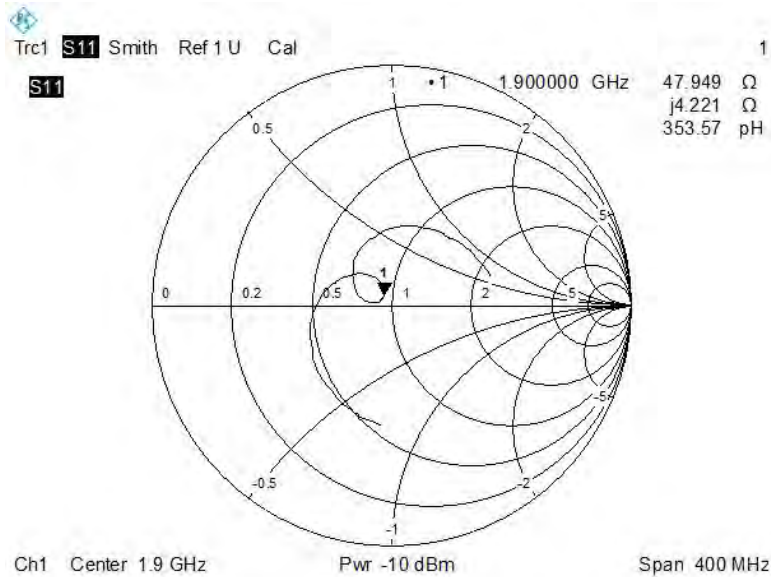
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|---------------------------------------|---------------------------------------|-------------------------------|
| Return Loss(dB) | -24.945 | -24.339 | 2.49% |
| Impedance | 47.949 Ω + 4.221 j Ω | 51.748 Ω + 5.933 j Ω | 3.799 Ω (Real part) |

Return Loss



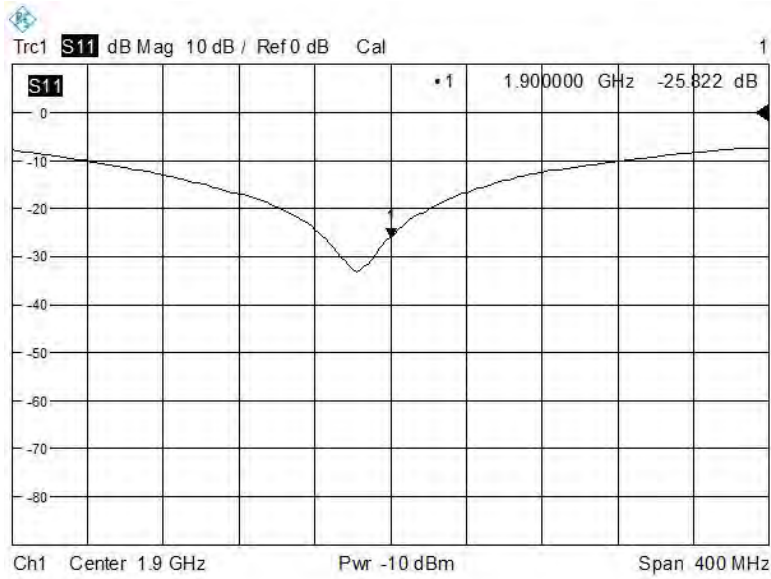
Impedance



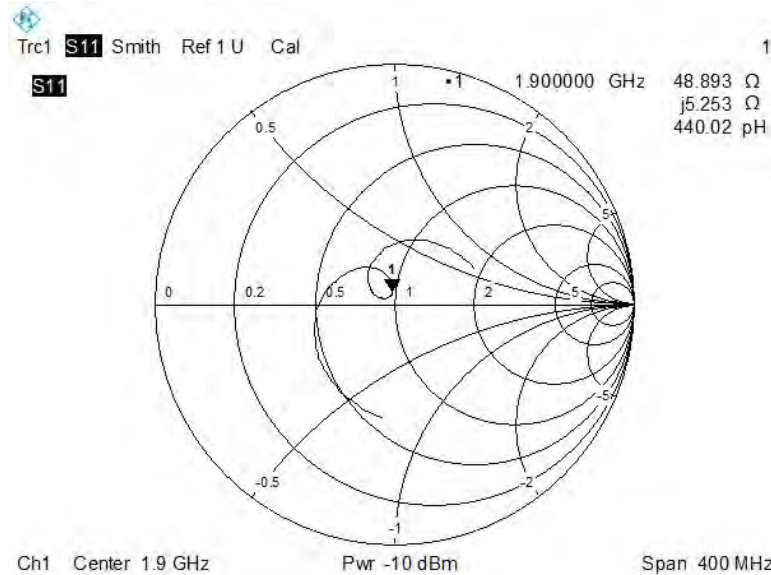
RETURN LOSS AND IMPEDANCE IN BODY LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|---------------------------------------|---------------------------------------|-------------------------------|
| Return Loss(dB) | -25.822 | -24.704 | 4.53% |
| Impedance | 48.893 Ω + 5.253 j Ω | 47.771 Ω + 5.242 j Ω | 1.122 Ω (Real part) |

Return Loss



Impedance



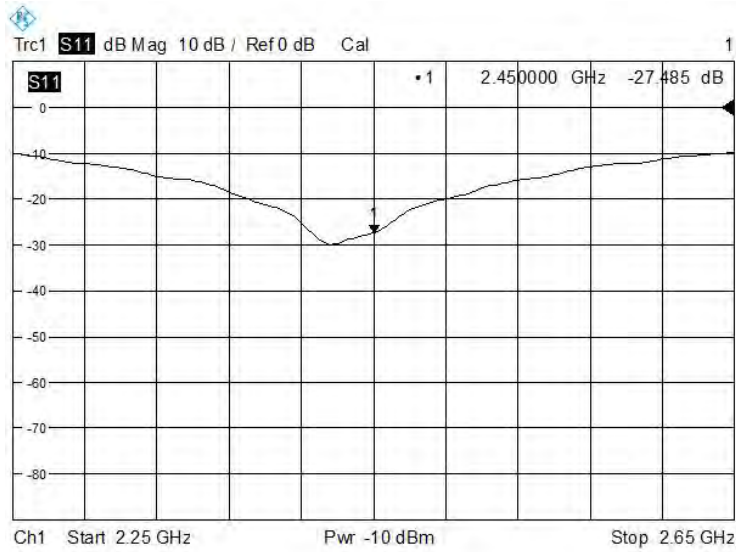


2.4D2450V2

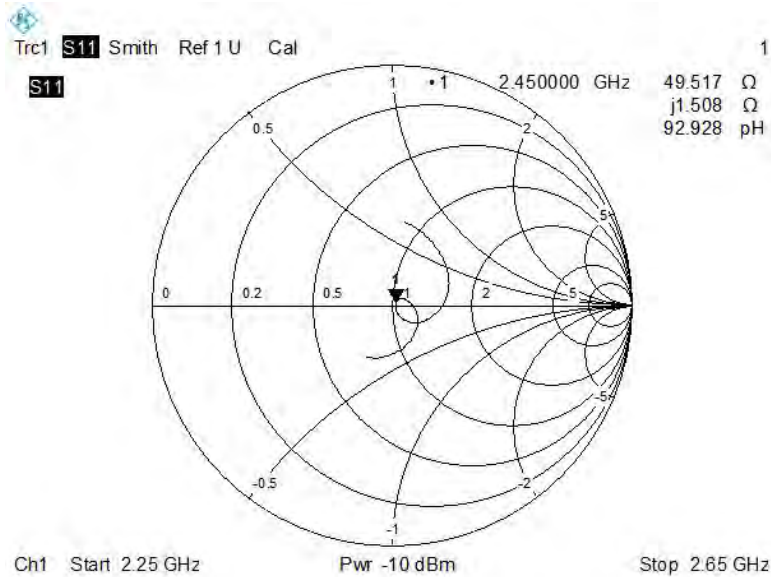
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|---------------------------------------|---------------------------------------|-------------------------------|
| Return Loss(dB) | -27.485 | -26.753 | 2.74% |
| Impedance | 49.517 Ω + 1.508 j Ω | 54.071 Ω + 2.513 j Ω | 4.554 Ω (Real part) |

Return Loss



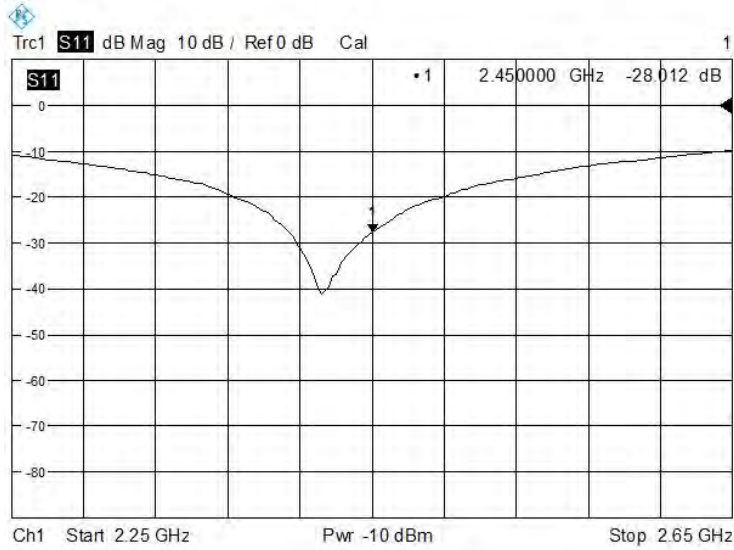
Impedance



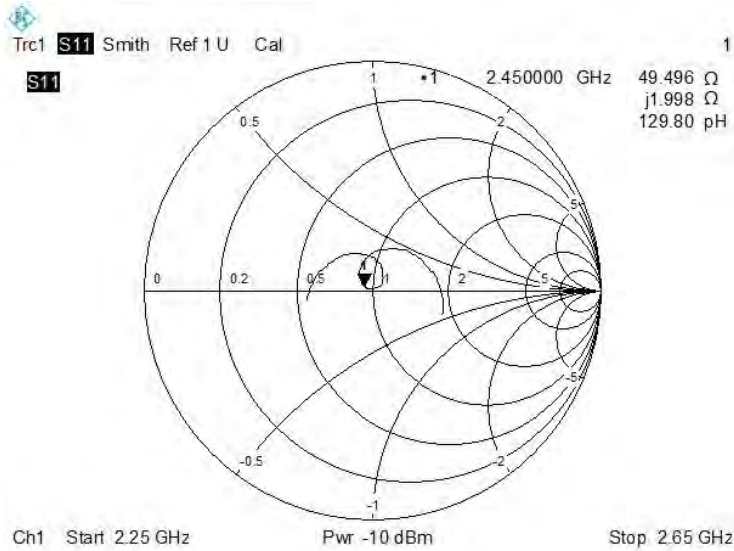
RETURN LOSS AND IMPEDANCE IN BODY LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|------------------|-----------------------------------|----------------------------------|------------------------------------|
| Return Loss (dB) | -28.012 | -27.882 | 0.47% |
| Impedance | 49.496 Ω + 1.998 $j\Omega$ | 52.349 Ω + 3.40 $j\Omega$ | 2.853 Ω (Imaginary part) |

Return Loss



+Impedance



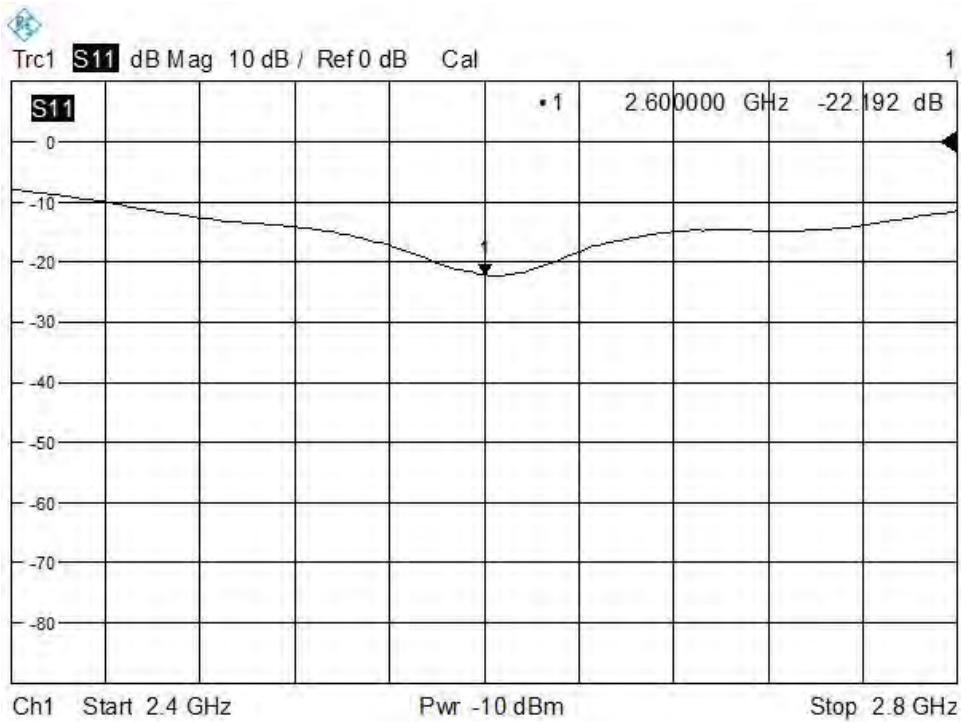


2.5 D2600V2

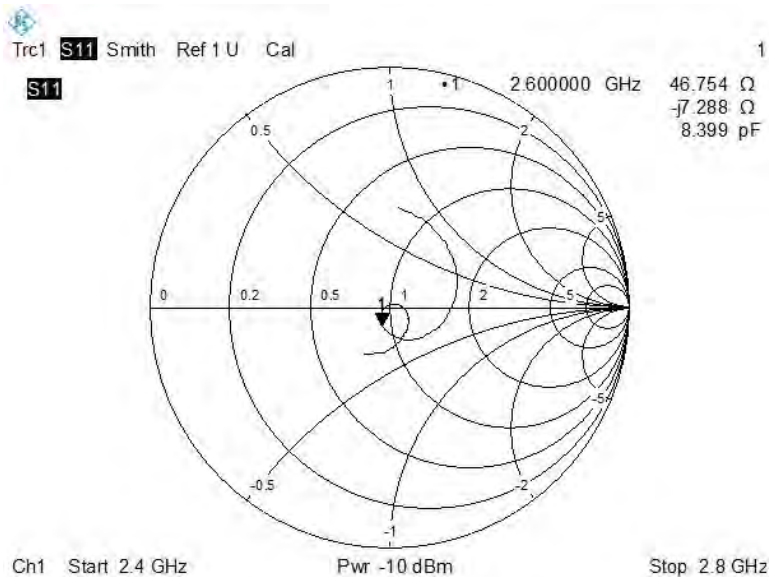
RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|---------------------------------------|-------------------------------------|-------------------------------|
| Return Loss(dB) | -22.192 | -25.784 | 13.93% |
| Impedance | 46.754 Ω -j7.288 j Ω | 49.443 Ω -5.089j Ω | 2.689 Ω (Real part) |

Return Loss



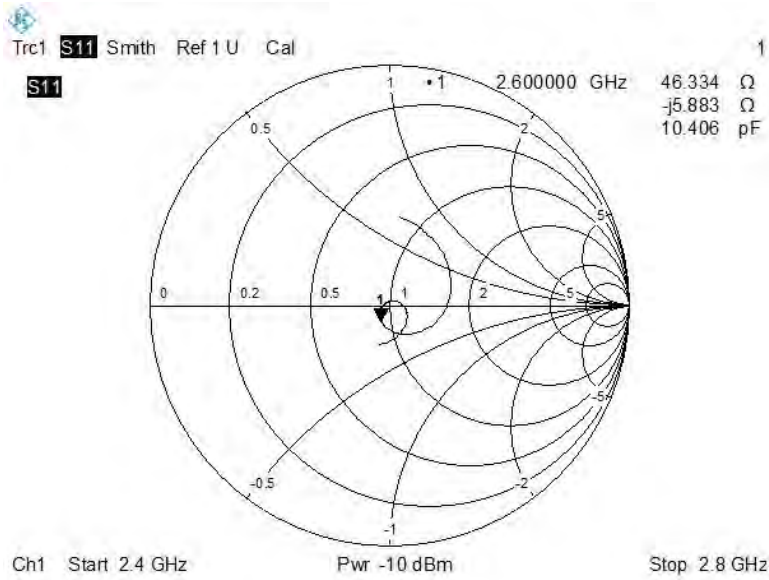
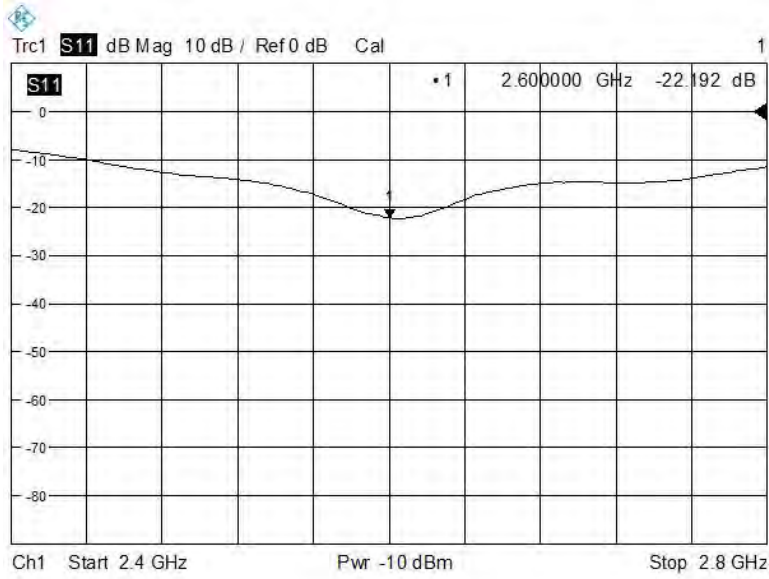
Impedance



RETURN LOSS AND IMPEDANCE IN BODY LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation |
|-----------------|----------------------------------|----------------------------------|-------------------------------|
| Return Loss(dB) | -22.192 | -23.544 | 5.74% |
| Impedance | 46.334 Ω -5.883 $j\Omega$ | 46.722 Ω -5.546 $j\Omega$ | 0.388 Ω (Real part) |

Return Loss



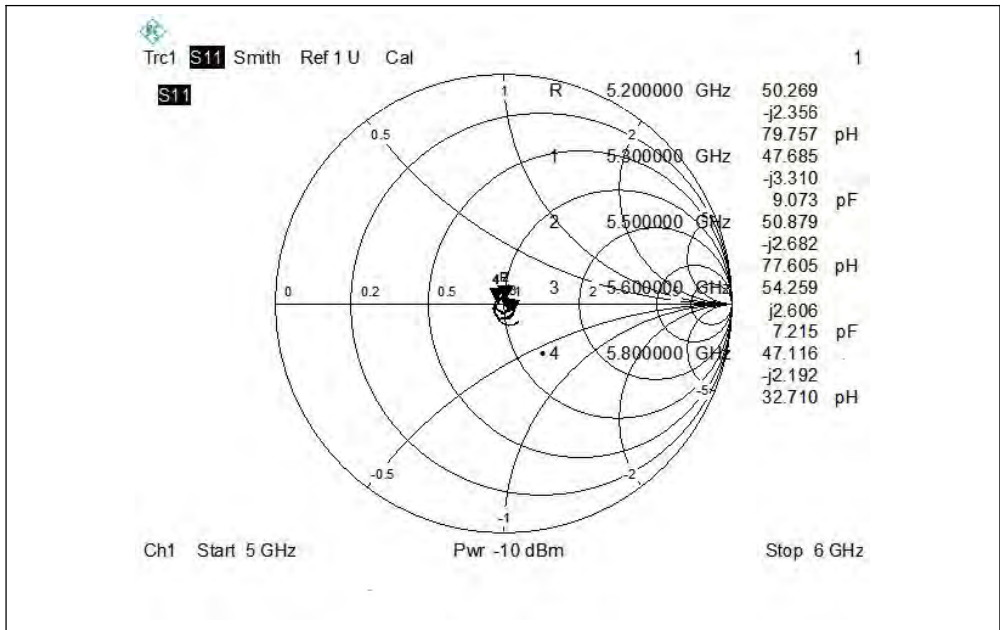
Impedance



2.6D5GHzV2

RETURN LOSS AND IMPEDANCE IN HEAD LIQUID

| Meas. Results | Current Meas. | Previous Meas. | Max. Deviation | | | | | | | | | | | | | | | |
|---|--------------------------------------|--------------------------------------|------------------------------------|-------|-----------------|------------------|---|----------|---------|---|----------|---------|---|----------|---------|---|----------|---------|
| 5200 MHz | | | | | | | | | | | | | | | | | | |
| Return Loss(dB) | -30.669 | -26.768 | 14.57% | | | | | | | | | | | | | | | |
| Impedance | 50.269 Ω -2.356 j Ω | 48.076 Ω -4.072 j Ω | 2.193 Ω (Real part) | | | | | | | | | | | | | | | |
| 5300 MHz | | | | | | | | | | | | | | | | | | |
| Return Loss(dB) | -28.296 | -24.513 | 15.43% | | | | | | | | | | | | | | | |
| Impedance | 47.685 Ω -3.310 j Ω | 44.645 Ω -1.737 j Ω | 3.040 Ω (Real part) | | | | | | | | | | | | | | | |
| 5500 MHz | | | | | | | | | | | | | | | | | | |
| Return Loss(dB) | -27.984 | -25.270 | 10.74% | | | | | | | | | | | | | | | |
| Impedance | 50.879 Ω -2.682 j Ω | 51.294 Ω -5.376 j Ω | 2.694 Ω (Imaginary part) | | | | | | | | | | | | | | | |
| 5600 MHz | | | | | | | | | | | | | | | | | | |
| Return Loss(dB) | -25.490 | -25.588 | 0.38% | | | | | | | | | | | | | | | |
| Impedance | 54.259 Ω +2.606j Ω | 55.495 Ω +0.732 j Ω | 1.874 Ω (Imaginary part) | | | | | | | | | | | | | | | |
| 5800 MHz | | | | | | | | | | | | | | | | | | |
| Return Loss(dB) | -29.226 | -28.185 | 3.69% | | | | | | | | | | | | | | | |
| Impedance | 47.116 Ω -2.192 j Ω | 49.545 Ω -3.856 j Ω | 2.429 Ω (Real part) | | | | | | | | | | | | | | | |
| Return Loss | | | | | | | | | | | | | | | | | | |
| <p>Trc1 S11 dB Mag 10 dB / Ref 0 dB Cal Smo 1</p> <table border="1"> <thead> <tr> <th>Point</th> <th>Frequency (GHz)</th> <th>Return Loss (dB)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5.200000</td> <td>-30.669</td> </tr> <tr> <td>2</td> <td>5.300000</td> <td>-28.296</td> </tr> <tr> <td>3</td> <td>5.500000</td> <td>-27.984</td> </tr> <tr> <td>4</td> <td>5.600000</td> <td>-25.490</td> </tr> </tbody> </table> <p>Ch1 Center 5.5 GHz Pwr -10 dBm Span 1 GHz</p> | | | | Point | Frequency (GHz) | Return Loss (dB) | 1 | 5.200000 | -30.669 | 2 | 5.300000 | -28.296 | 3 | 5.500000 | -27.984 | 4 | 5.600000 | -25.490 |
| Point | Frequency (GHz) | Return Loss (dB) | | | | | | | | | | | | | | | | |
| 1 | 5.200000 | -30.669 | | | | | | | | | | | | | | | | |
| 2 | 5.300000 | -28.296 | | | | | | | | | | | | | | | | |
| 3 | 5.500000 | -27.984 | | | | | | | | | | | | | | | | |
| 4 | 5.600000 | -25.490 | | | | | | | | | | | | | | | | |
| Impedance | | | | | | | | | | | | | | | | | | |



--END OF REPORT--