

APPENDIX E RETURN LOSS&IMPEDANCE MEASUREMENT

Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D750V3
Serial Number: 1229
Calibration Date: 2024/03/26
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

- 1. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 2. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

Calibrated Equipment:

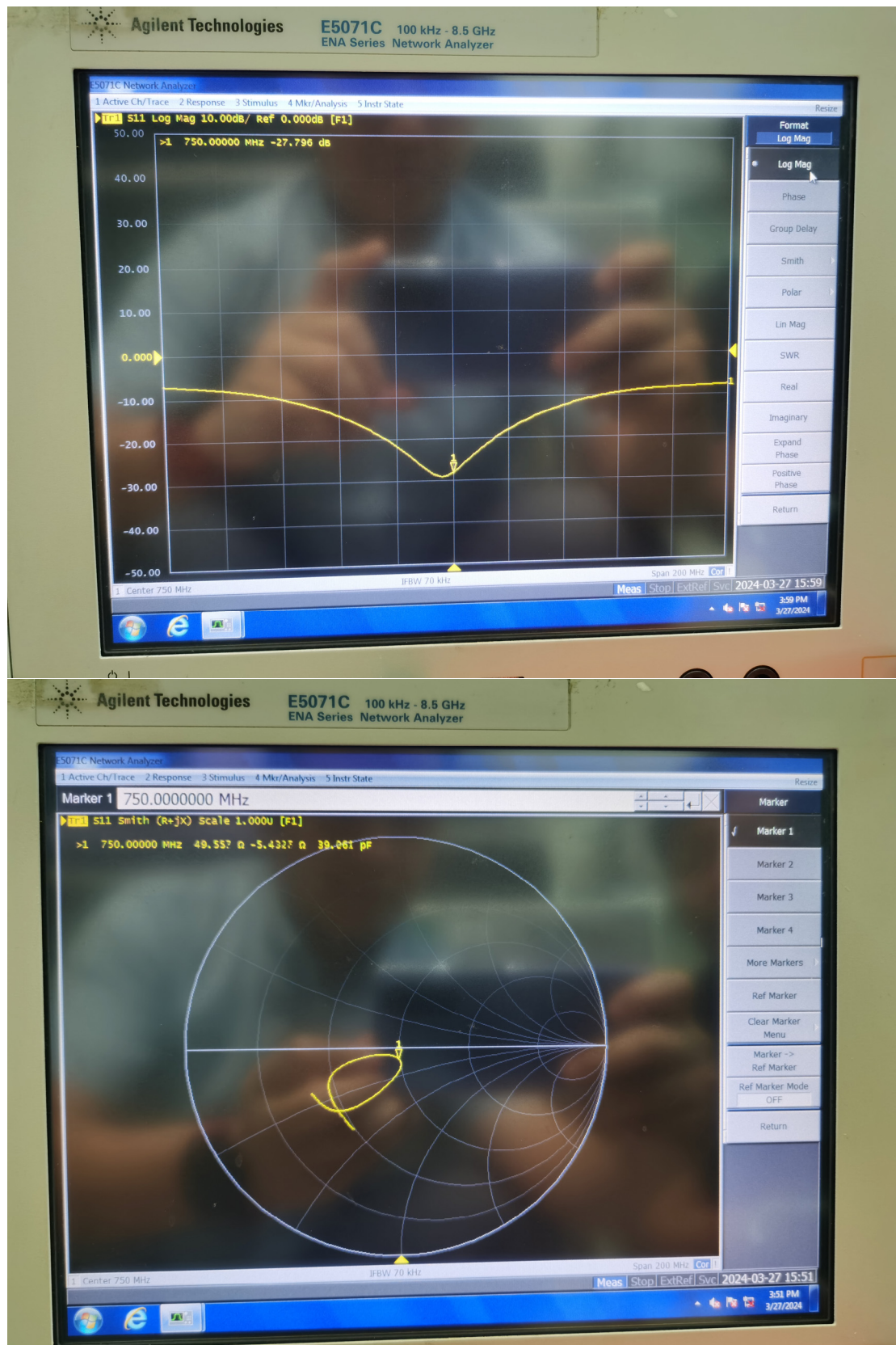
Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
750	Head	Return Loss	27.796 dB	29.503 dB	-5.786%	±20%; ≥20dB	Pass
		Real Impedance	49.557 Ω	53.314 Ω	3.757 Ω	≤ 5 Ω	Pass
		Imaginary Impedance	-5.432 Ω	-0.992 Ω	4.44 Ω	≤ 5 Ω	Pass

Note: Return Loss Deviation = (Measured-Target)/Target×100%

Dipole, 750MHz, 1229



Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D1750V2
Serial Number: 1199
Calibration Date: 2024/03/26
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

3. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
4. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

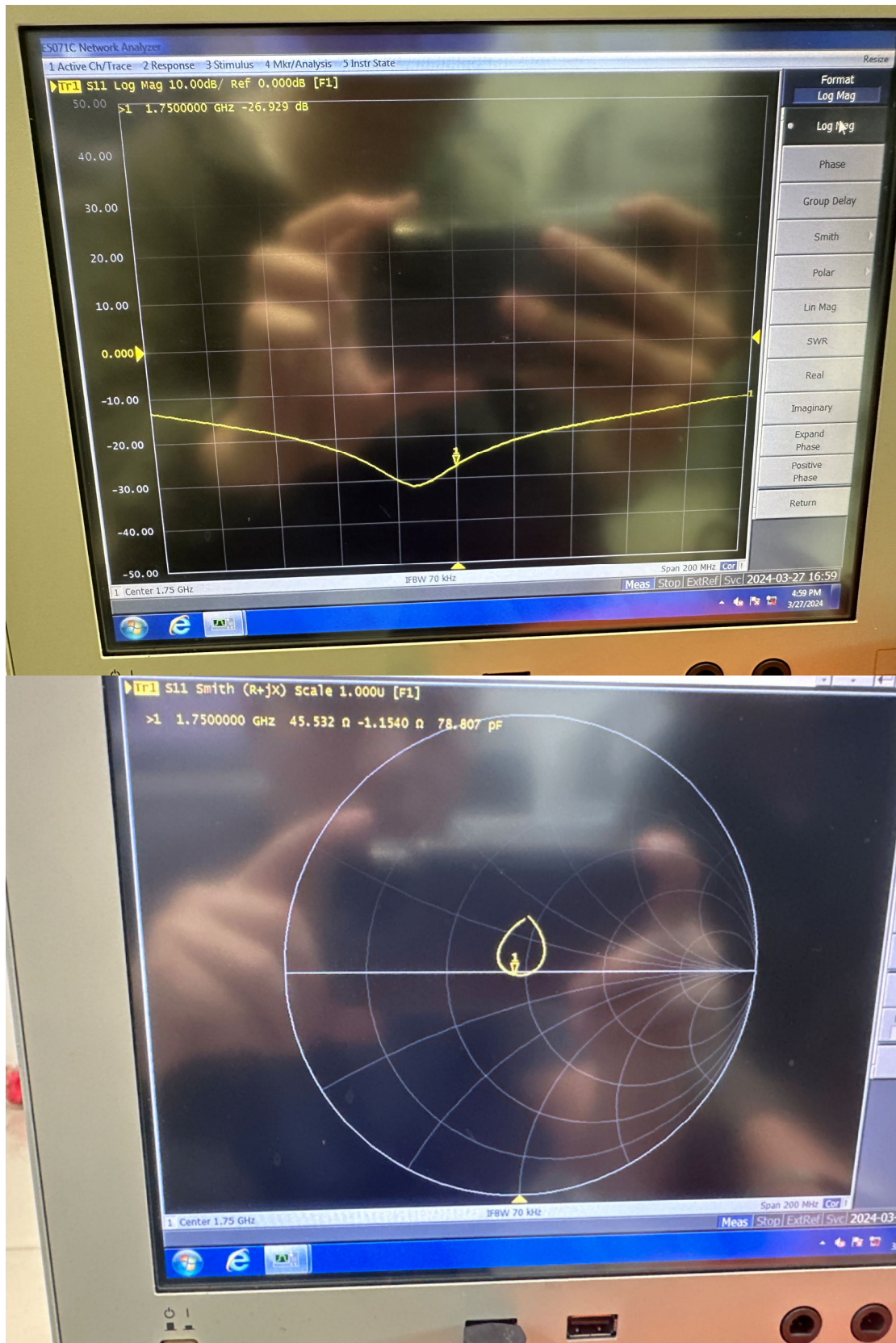
Calibrated Equipment:

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
1750	Head	Return Loss	26.929 dB	26.017 dB	3.505%	±20%; ≥20dB	Pass
		Real Impedance	45.532 Ω	46.939 Ω	1.407 Ω	≤ 5 Ω	Pass
		Imaginary Impedance	-1.154 Ω	3.765 Ω	4.919 Ω	≤ 5 Ω	Pass

Note: Return Loss Deviation = (Measured-Target)/Target×100%

Dipole, 1750MHz, 1199

Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D1900V2
Serial Number: 5d231
Calibration Date: 2024/02/01
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

5. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
6. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

Calibrated Equipment:

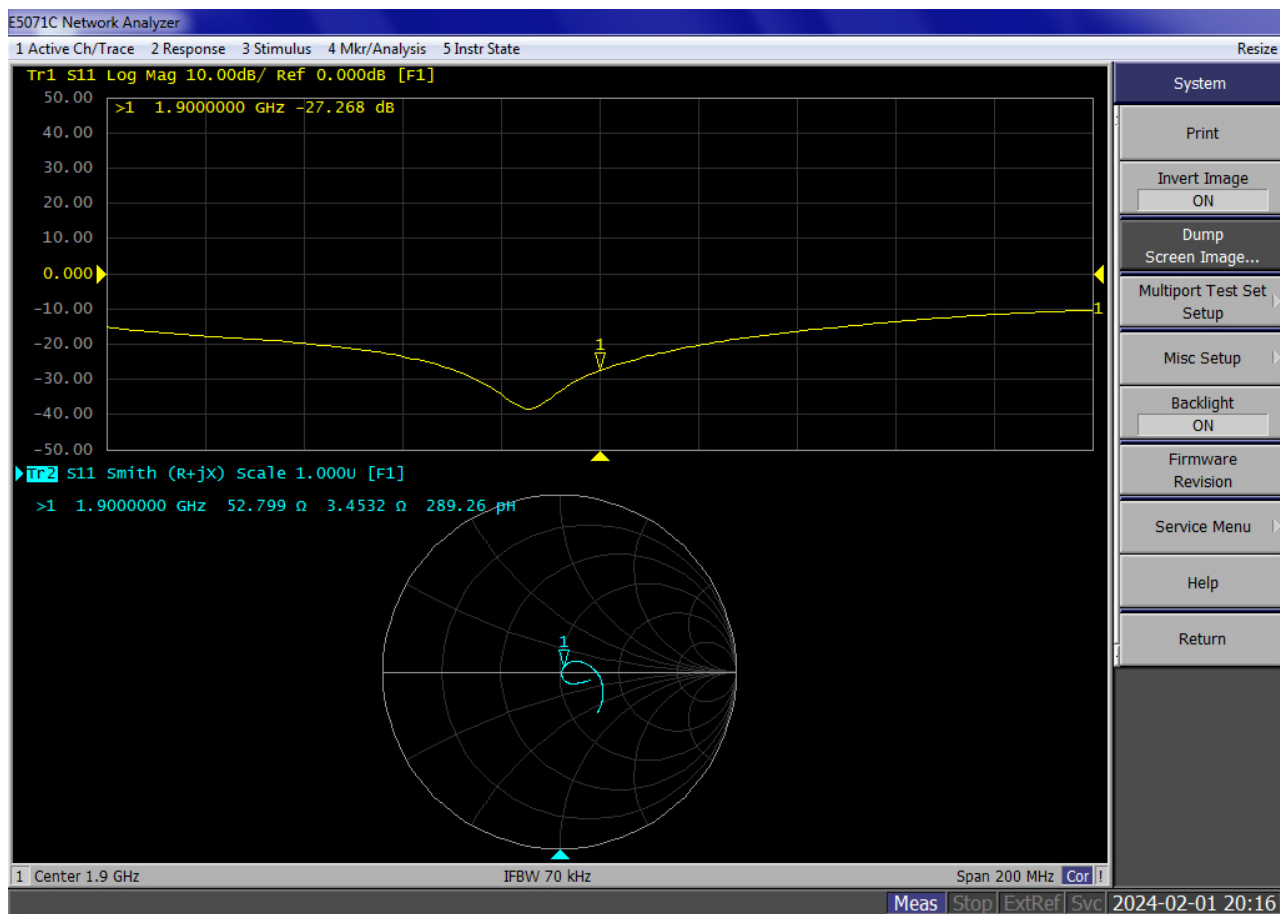
Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
1900	Head	Return Loss	27.268 dB	26.067 dB	4.607 %	±20%; ≥20dB	Pass
		Real Impedance	52.799 Ω	50.307 Ω	2.492 Ω	≤ 5 Ω	Pass
		Imaginary Impedance	3.453 Ω	4.985 Ω	-1.532 Ω	≤ 5 Ω	Pass

Note: Return Loss Deviation = (Measured-Target)/Target×100%

Dipole, 1900MHz, 5d231



Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D2450V2
Serial Number: 1103
Calibration Date: 2024/03/26
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

7. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
8. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

Calibrated Equipment:

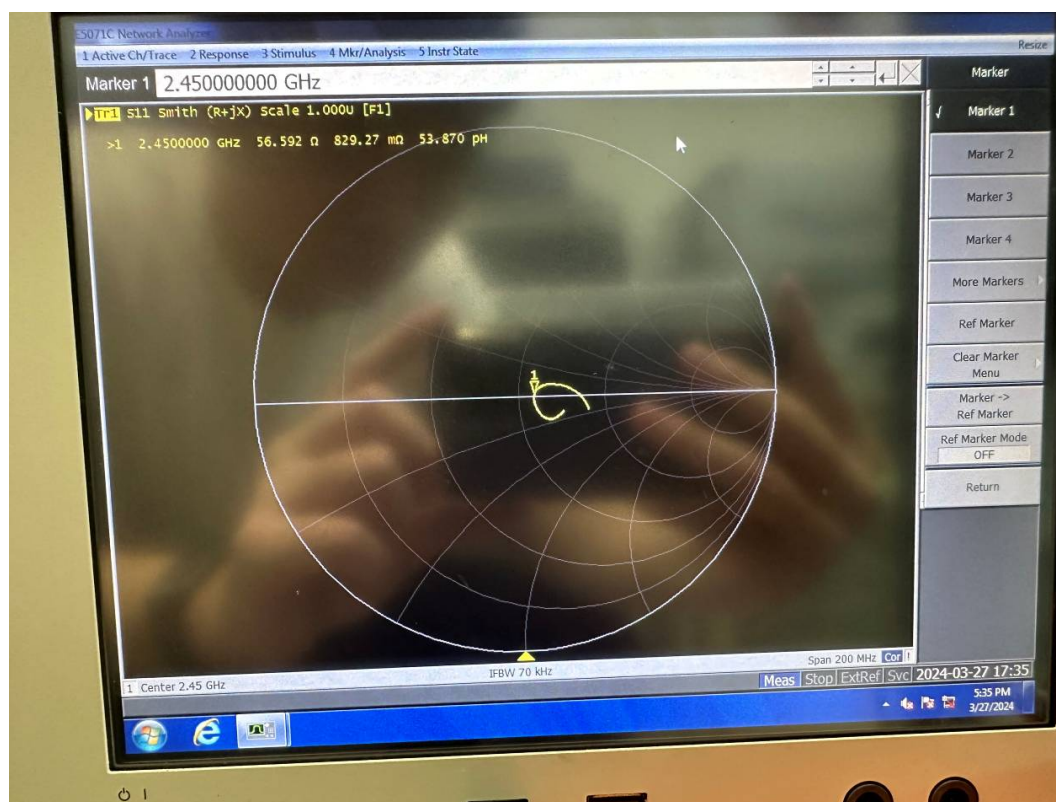
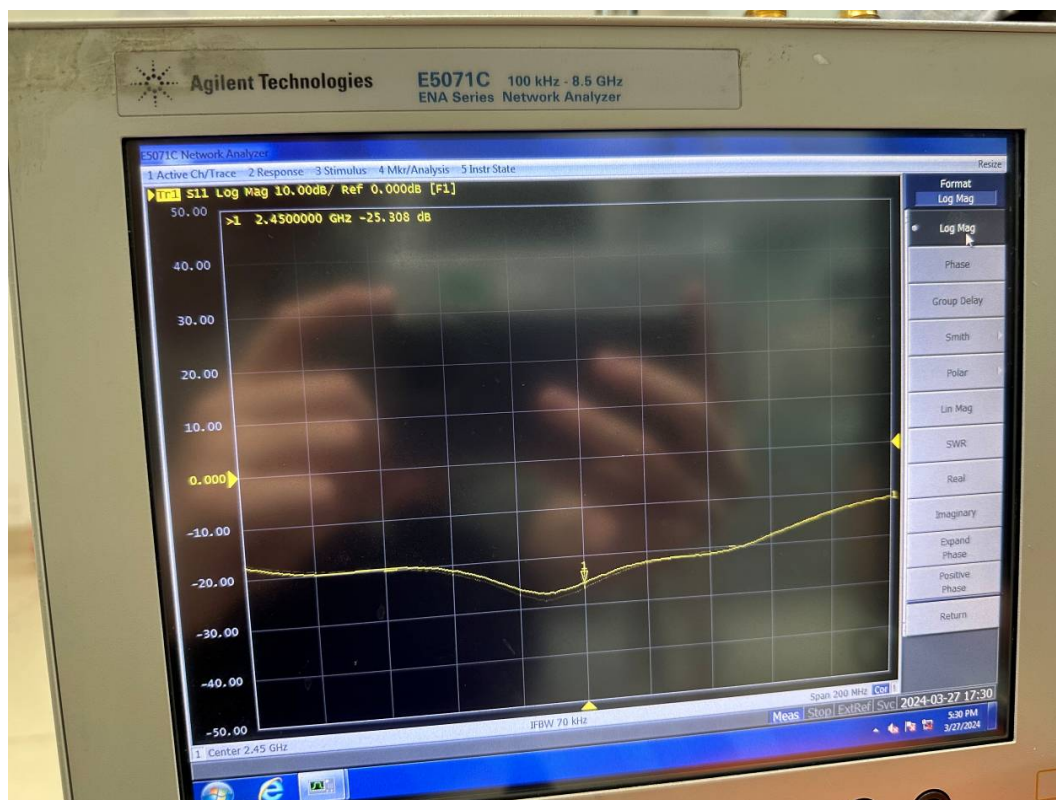
Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
2450	Head	Return Loss	25.308 dB	24.161 dB	4.747 %	±20%; ≥20dB	Pass
		Real Impedance	56.592 Ω	53.467 Ω	3.125 Ω	≤ 5 Ω	Pass
		Imaginary Impedance	0.829 Ω	5.400 Ω	-4.571 Ω	≤ 5 Ω	Pass

Note: Return Loss Deviation = (Measured-Target)/Target×100%

Dipole, 2450MHz, 1103



Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D2600V2
Serial Number: 1207
Calibration Date: 2024/03/26
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

9. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
10. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

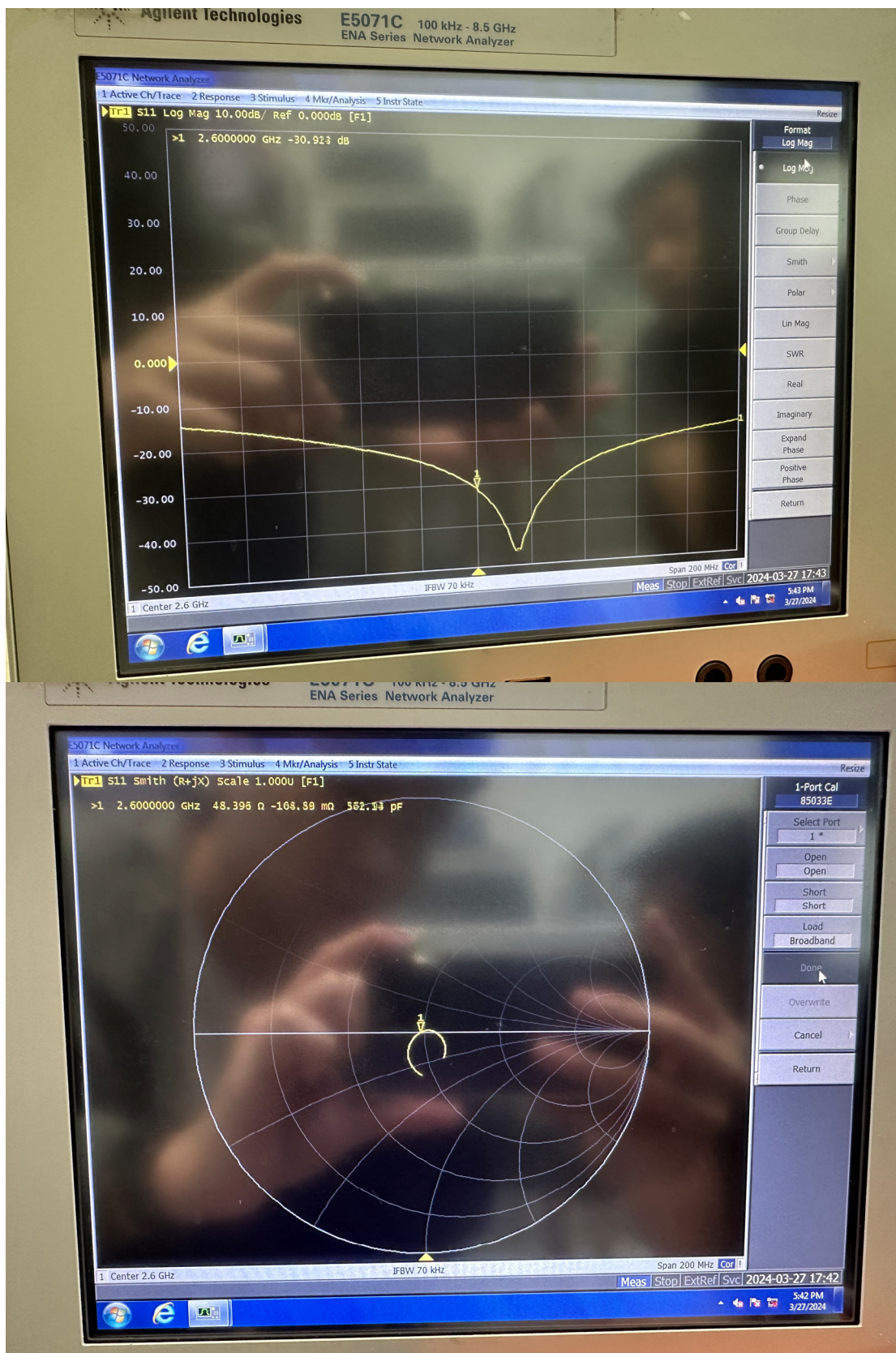
Calibrated Equipment:

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
2600	Head	Return Loss	30.923 dB	27.361 dB	13.019%	±20%; ≥20dB	Pass
		Real Impedance	48.396 Ω	45.943 Ω	2.453 Ω	≤ 5 Ω	Pass
		Imaginary Impedance	-0.109 Ω	-0.667 Ω	0.558 Ω	≤ 5 Ω	Pass

Note: Return Loss Deviation = (Measured-Target)/Target×100%

Dipole, 2600MHz, 1207

Equipment Details:

Description: Dipole
Manufacturer: Speag
Model Number: D5GHzV2
Serial Number: 1374
Calibration Date: 2024/03/26
Calibrated By: Bob Lu
Signature: Bob Lu

All Calibration have been conducted in the closed laboratory facility: Lab Temperature 18°C-25°C and humidity < 70%

The calibration methods and procedures used were as detailed in:

KDB Publication Number: “KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”

11. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
12. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

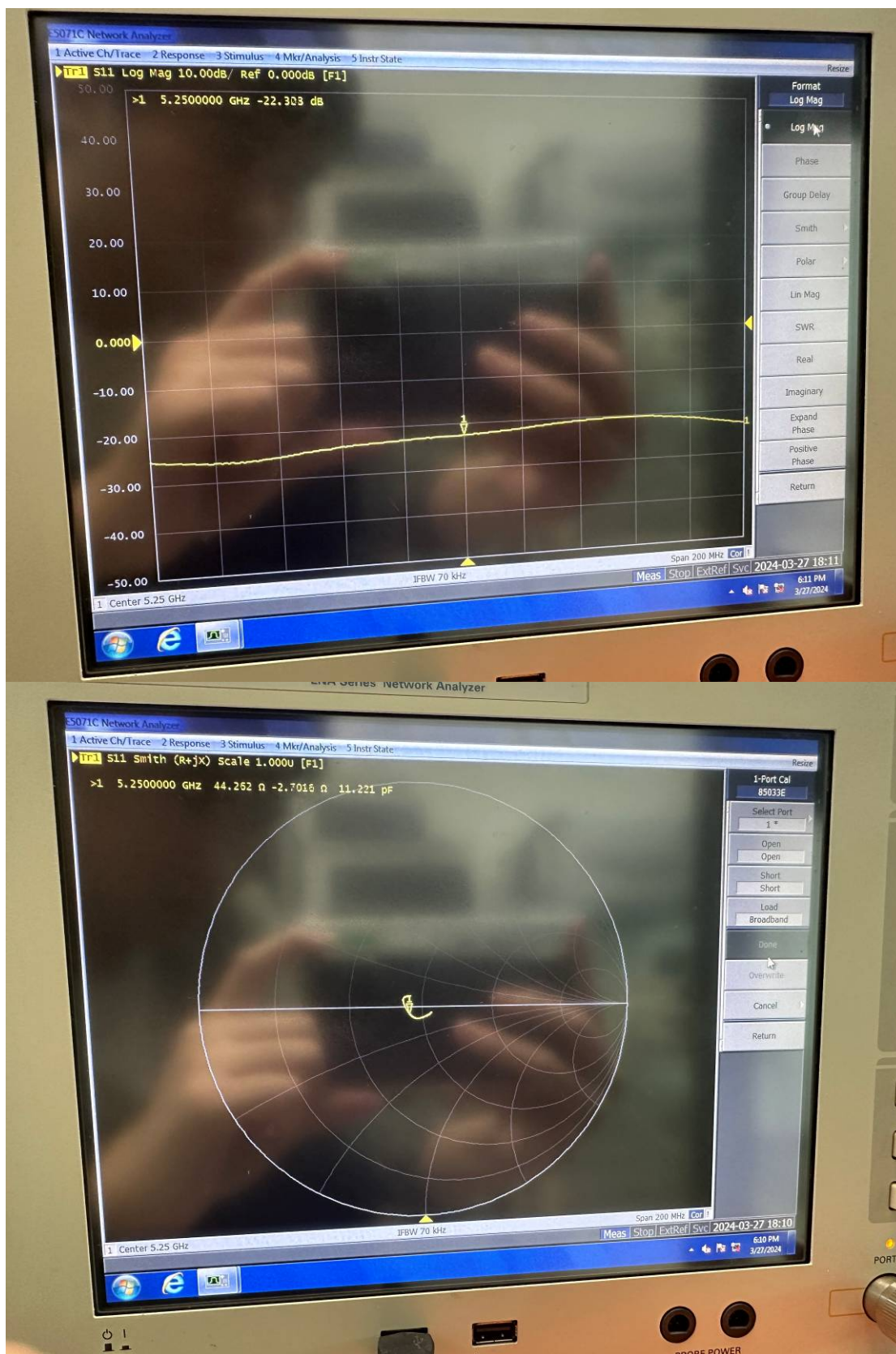
Calibrated Equipment:

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Simulated Tissue Liquid Head	HBBL600-10000V6	2200808-2	Each Time	
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Network Analyzer	E5071C	SER MY46519680	2023/06/08	2024/06/07
Network Analyzer Calibration Kit	50 Ω	51026	NCR	NCR

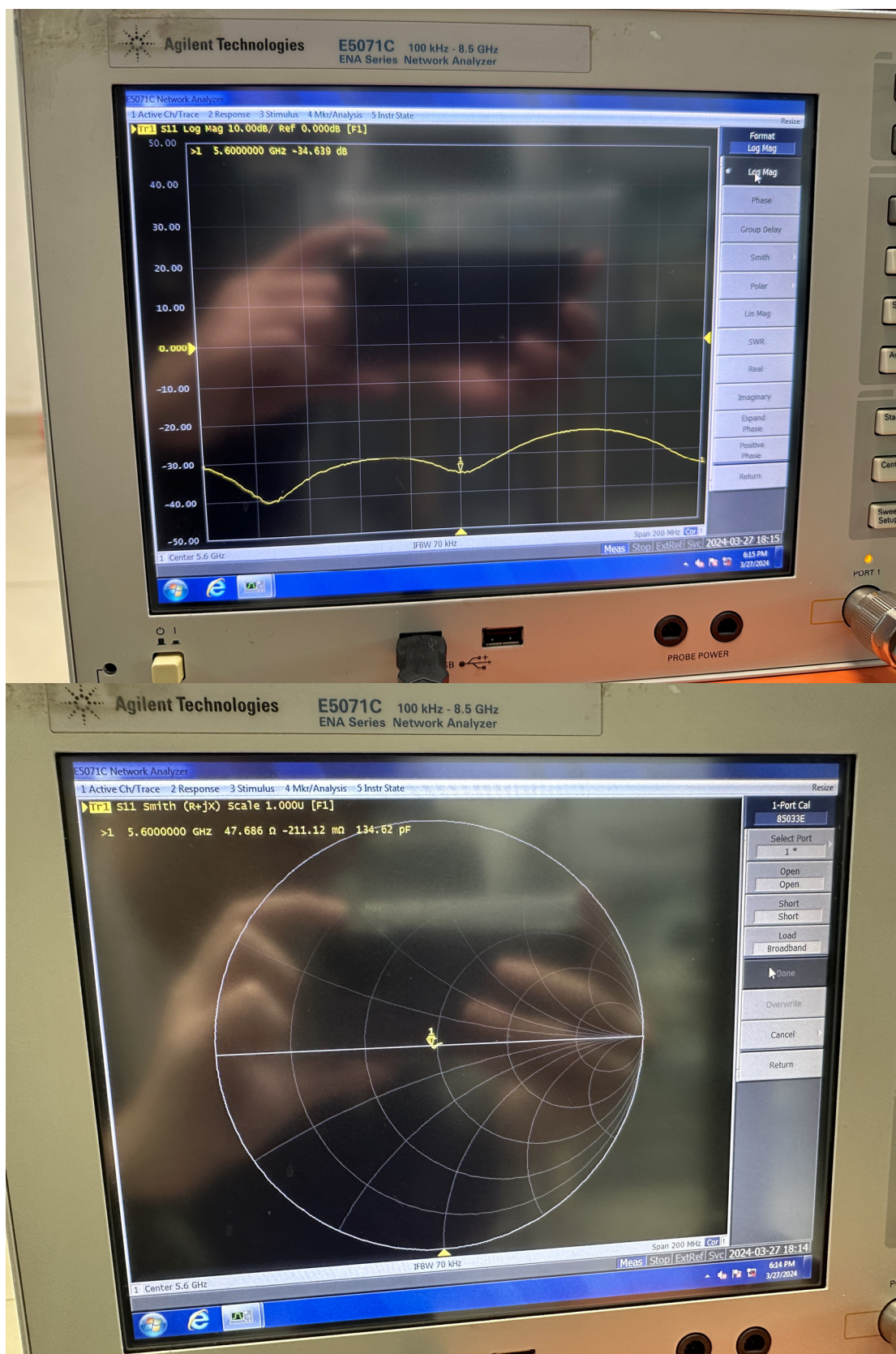
Test Data:

Frequency (MHz)	Simulated Liquid	Parameter	Measured Value	Target Value	Deviation	Reference Range	Results
5250	Head	Return Loss	22.303 dB	23.781 dB	-6.215 %	$\pm 20\%$; $\geq 20\text{dB}$	Pass
		Real Impedance	44.252 Ω	45.776 Ω	1.524 Ω	$\leq 5 \Omega$	Pass
		Imaginary Impedance	-2.702 Ω	-4.545 Ω	1.843 Ω	$\leq 5 \Omega$	Pass
5600	Head	Return Loss	34.639 dB	35.868 dB	3.426%	$\pm 20\%$; $\geq 20\text{dB}$	Pass
		Real Impedance	47.686 Ω	43.421 Ω	4.265 Ω	$\leq 5 \Omega$	Pass
		Imaginary Impedance	-0.211 Ω	1.492 Ω	1.703 Ω	$\leq 5 \Omega$	Pass
5800	Head	Return Loss	29.943 dB	27.331 dB	9.557 %	$\pm 20\%$; $\geq 20\text{dB}$	Pass
		Real Impedance	50.363 Ω	54.232 Ω	-3.869 Ω	$\leq 5 \Omega$	Pass
		Imaginary Impedance	-2.534 Ω	1.475 Ω	-4.009 Ω	$\leq 5 \Omega$	Pass

Note: Return Loss Deviation = (Measured-Target)/Target $\times 100\%$

Dipole, 5250MHz, 1374

Dipole, 5600MHz, 1374



Dipole, 5800MHz, 1374