



AOS (ANTENNA OPTIMISATION SERVICE) REPORT

Customer: Buddi

Project: RUS2

Report: SZ25-024-R01

Date: June 25, 2025

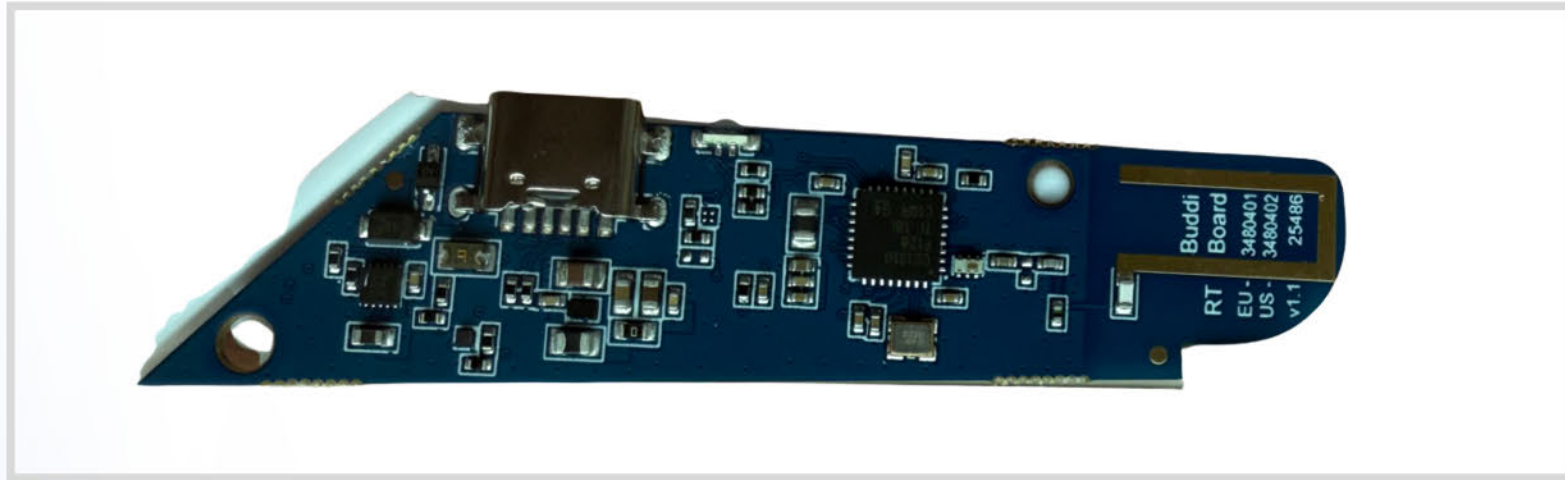
INTRODUCTION



This report details the antenna tuning and performance verification of the **RUS2** device provided by Buddi. The objective was to optimise the antenna for the US ISM 915 MHz band. Frequency range: **902-928MHz**

Testing and tuning were conducted with the **RUS2** device placed into both the Alco Tag release tool and the Smart Tag release tool. All measurements and validation were carried out using the phantom hand to simulate real-world usage conditions and account for detuning effects caused by proximity to the human body.

Antenna Used	VEGA (SZC-C-0M01)
Application	ISM 915
Frequency Range (MHz)	902-928



VEGA (SZC-C-0M01)

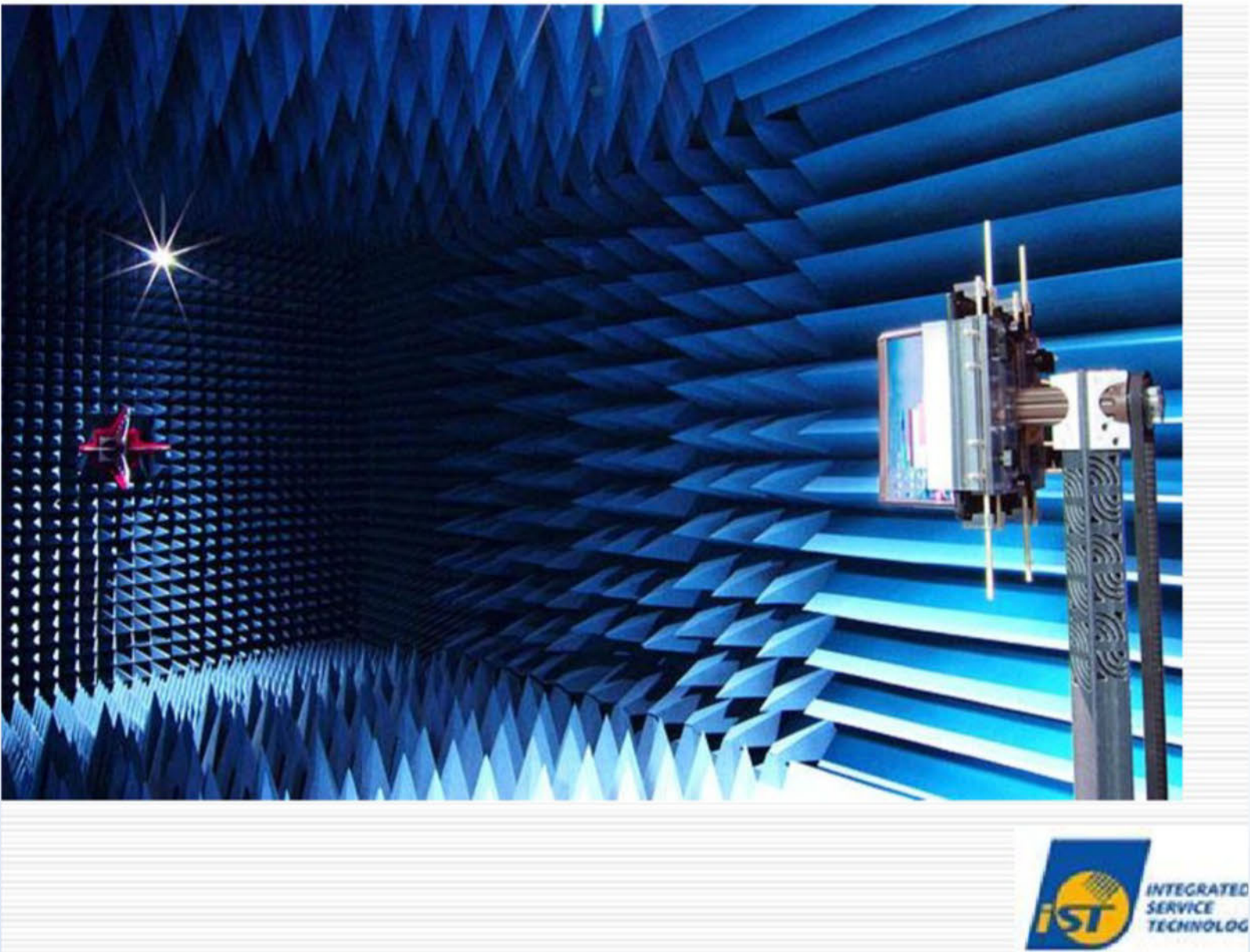
- RUS2 Device
- The PCBA has VEGA integrated

Comments

- The battery is on the underside and obstructs the antenna clearance area.
- The device was tested fully assembled.



TEST EQUIPMENT USED



Equipment	Model / Type	Calibration Due Date
Calibration Kit	Rhode&Schwarz ZV-Z132	Jan 10, 2026
Network Analyser	Rhode&Schwarz ZNB-8	Jan 10, 2026
Anechoic Chamber	AMS-8500 (CTIA Approved IST)	Mar 20, 2026



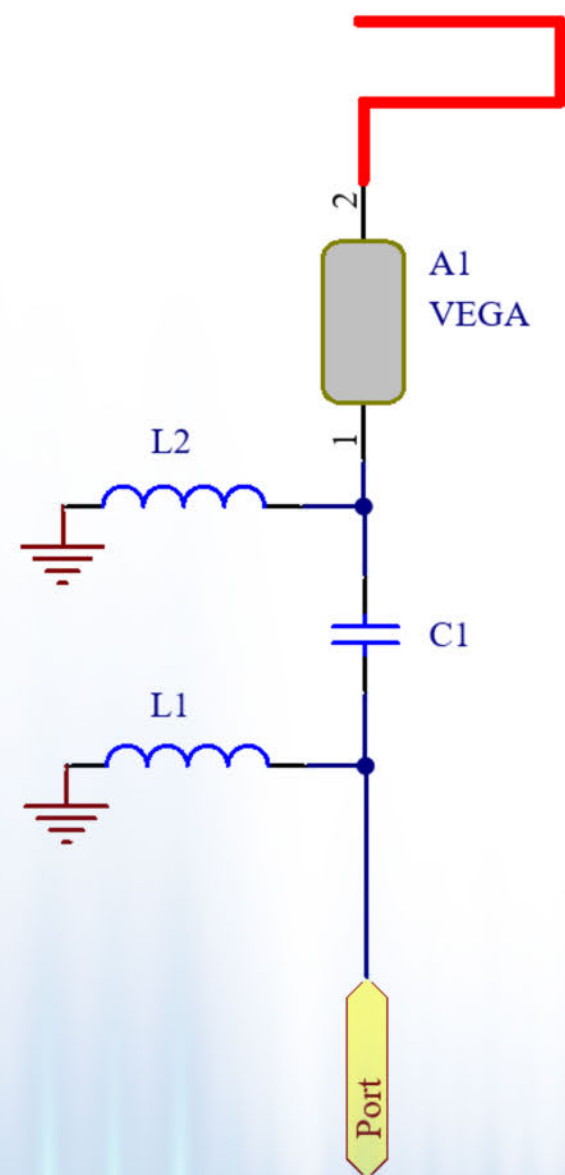
The antenna performance has been evaluated and key metrics are as follows:

	RUS2 - Alco Tool	RUS2 - Smart Tool
Frequency Range (MHz)	902-928	
Peak Gain: (dBi)	-3.85	-3.76
Peak Efficiency (%)	15.0	14.2
Average Efficiency (%)	13.7	13.9
S11 (Worst Case) (dB)	≥ -8.19	≥ -7.26



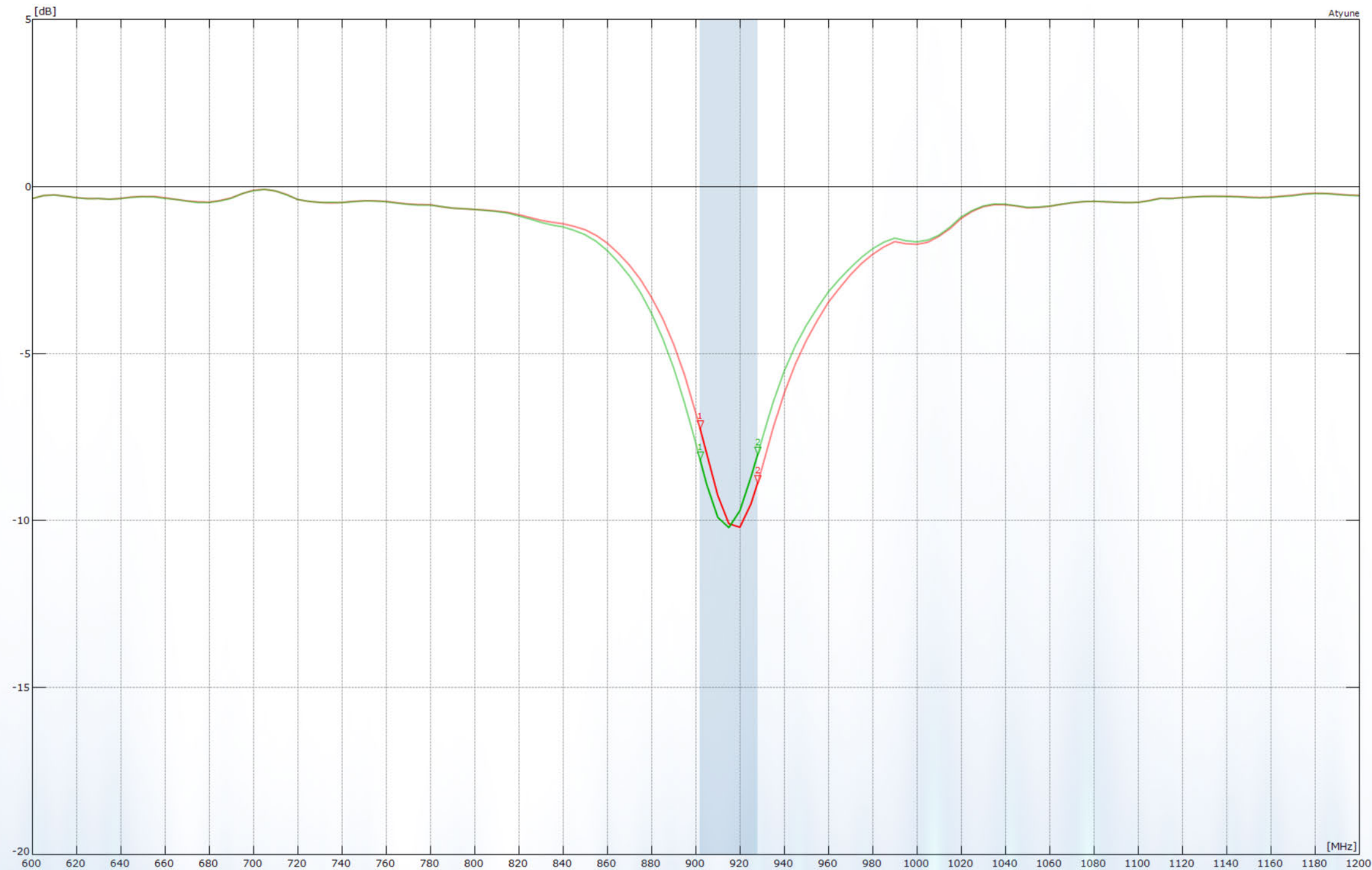
MATCHING CIRCUIT

The schematic and component values shown below represent the recommended matching circuit optimized for the intended frequency band and target performance. For best results, we advise using the specified component part numbers. However, equivalent components may be used if they meet similar tolerance, Q factor, and self-resonant frequency specifications. Matching performance may vary depending on final PCB layout and surrounding environment.



Designator	Type	Value	Size	MPN
C1	Capacitor	1.2pF	402	GJM1555C1H1R2WB01D
L2	Inductor	39nH	402	LQG15HS39NH02D
L1	-	NA	402	Not Fitted

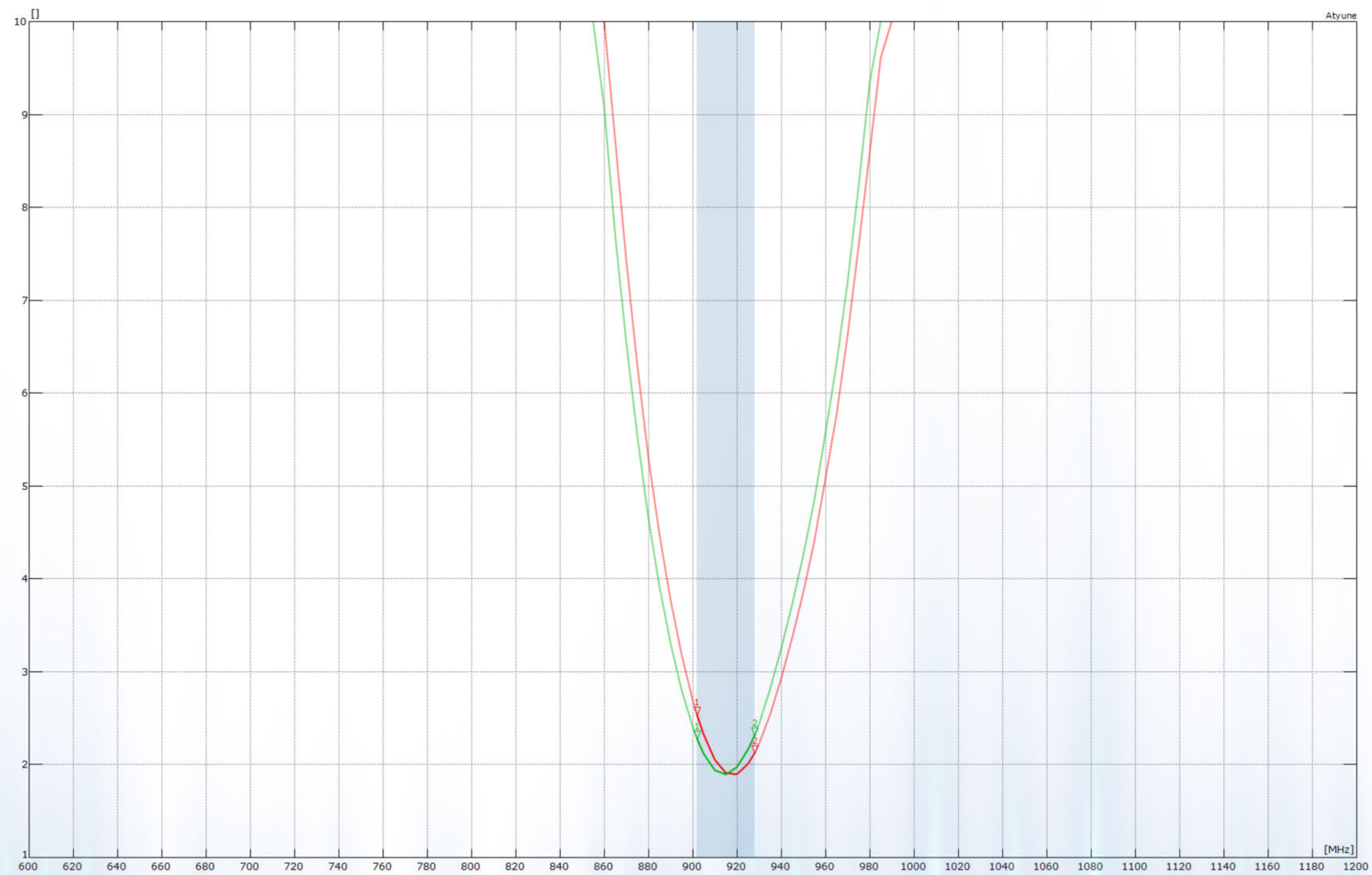
S11 - RETURN LOSS



MARKERS: MHz dB		
RUS2_RED_915_Phantom_1p2Fser_39nHshu.S1 - S11		
1: 902	-7.26	
2: 928	-8.90	
RUS2_GREEN_915_Phantom_1p2Fser_39nHshu.S1 - S11		
1: 902	-8.19	
2: 928	-8.05	

● RUS2 Alco Tool ● RUS2 Smart Tool

VSWR



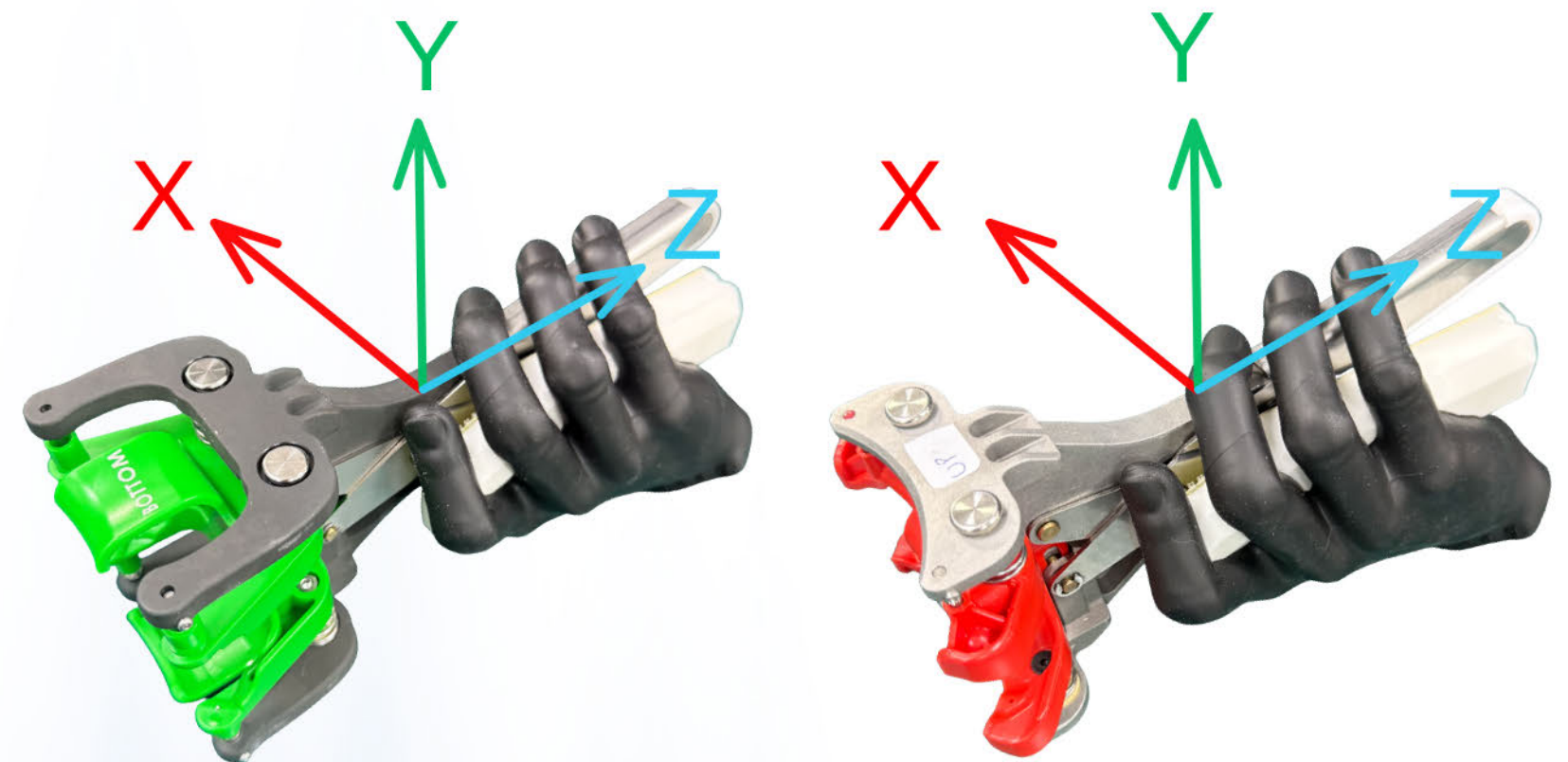
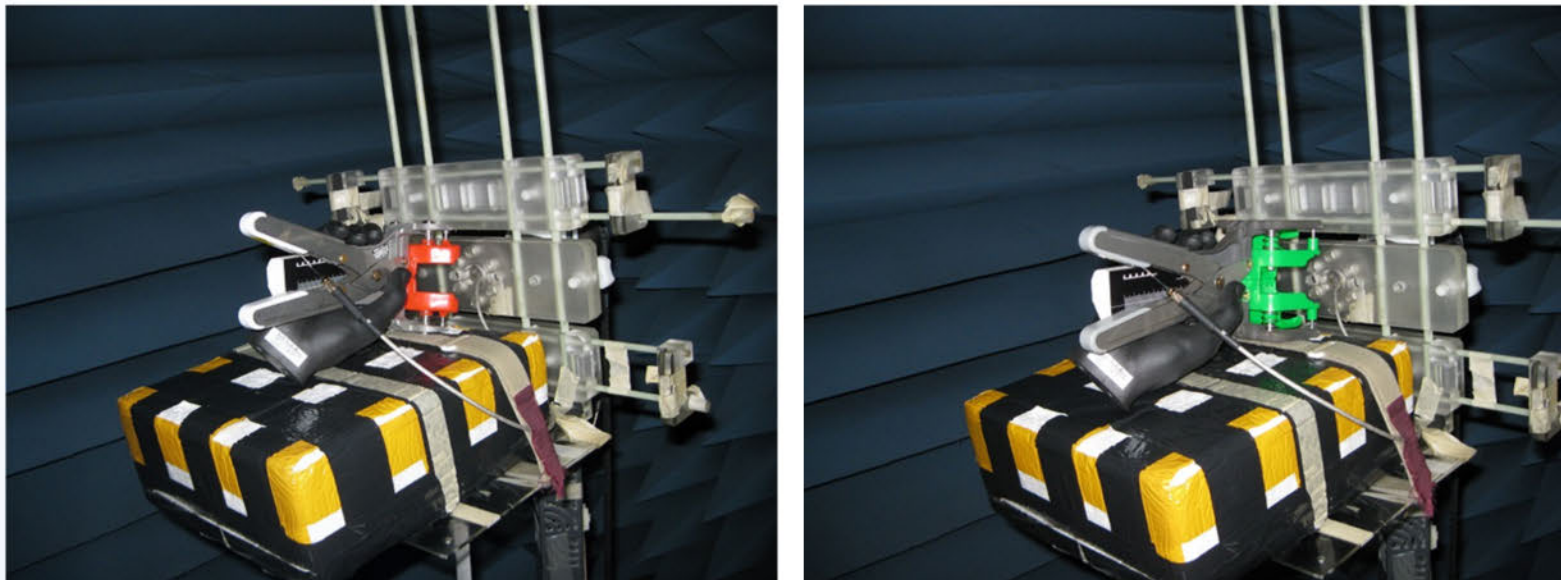
MARKERS: MHz		
RUS2_RED_915_Phantom_1p2Fser_39nHshu.S1 - S11		
1:	902	2.53
2:	928	2.12
RUS2_GREEN_915_Phantom_1p2Fser_39nHshu.S1 - S11		
1:	902	2.28
2:	928	2.31

● RUS2 Alco Tool ● RUS2 Smart Tool



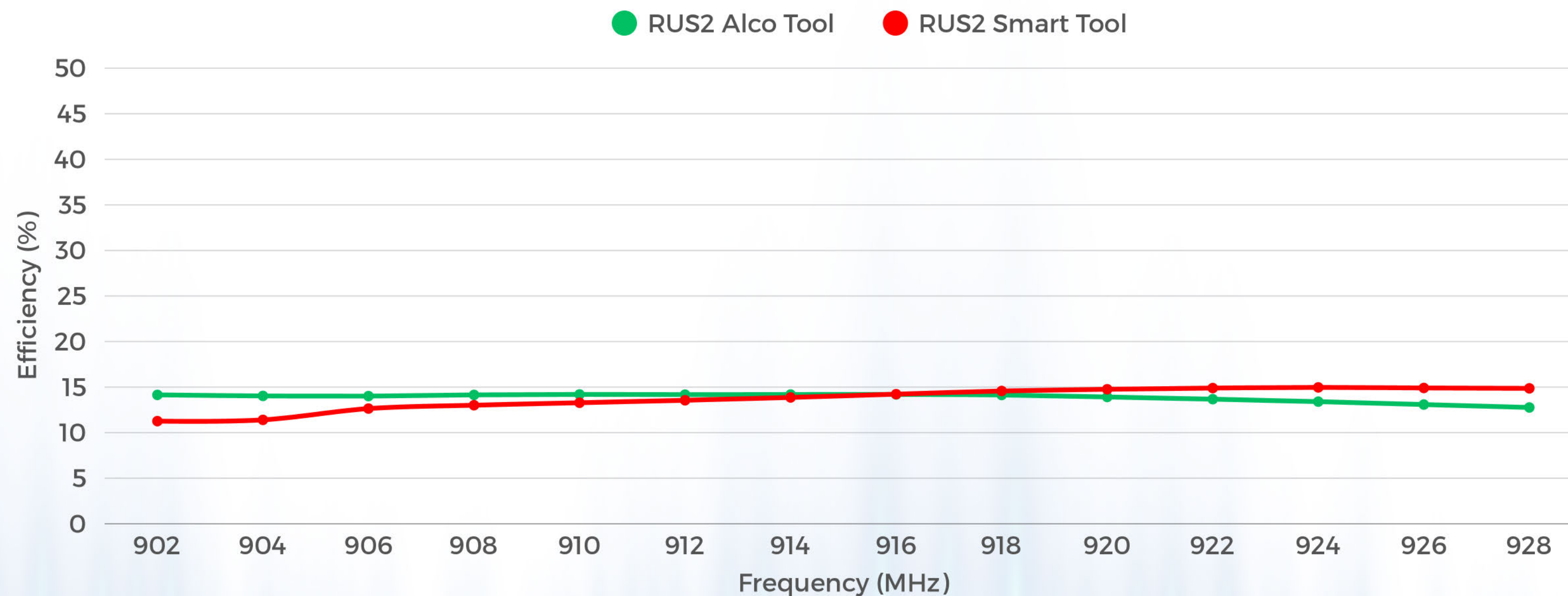
CHAMBER SETUP

This section shows the test device positioned inside the chamber during measurements. The accompanying diagram illustrates the device orientation relative to the X, Y, and Z axes to ensure consistency and repeatability across all tests.



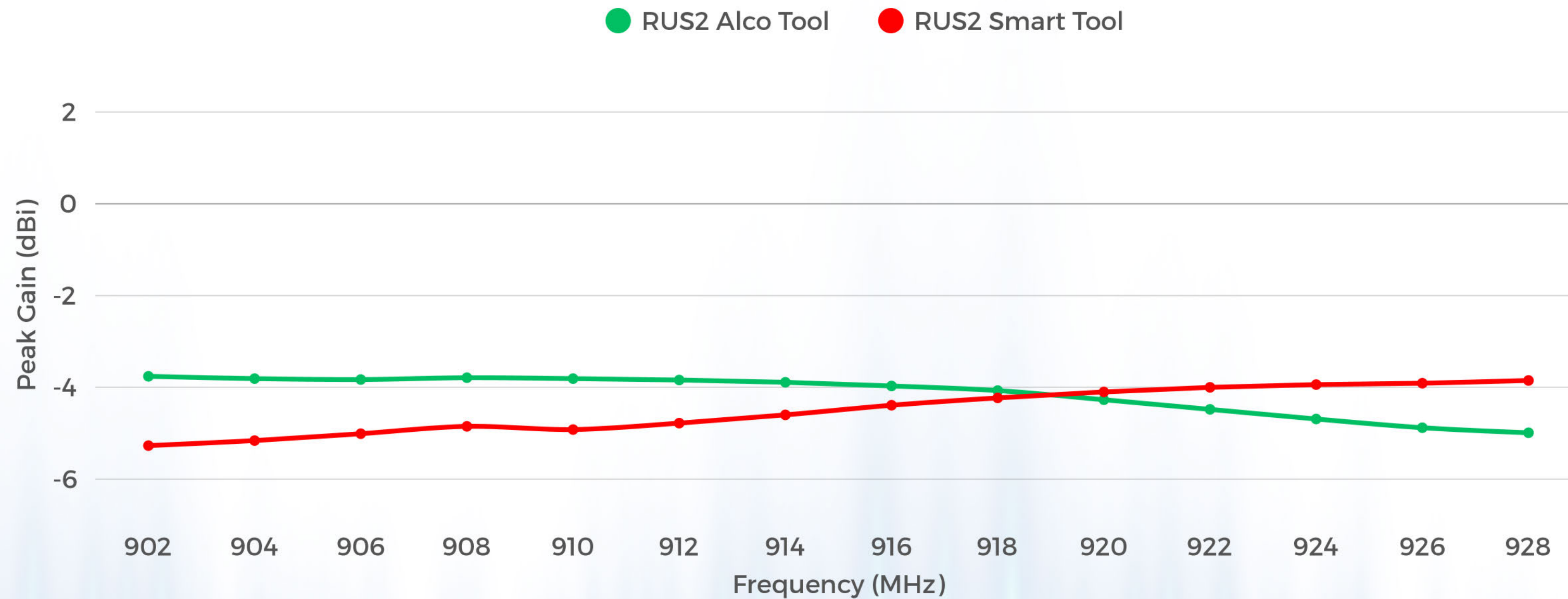
EFFICIENCY

The graph below illustrates the total radiation efficiency of the antenna across the designated frequency bands. Efficiency represents how effectively the antenna converts input power into radiated signal, factoring in matching losses and real-world test conditions. Data was captured using a CTIA approved anechoic chamber setup with the recommended matching circuit.



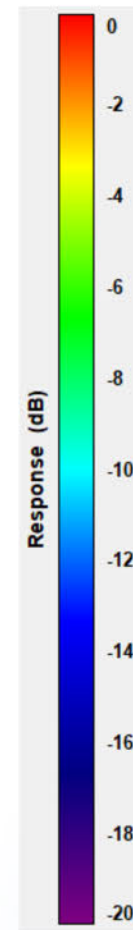
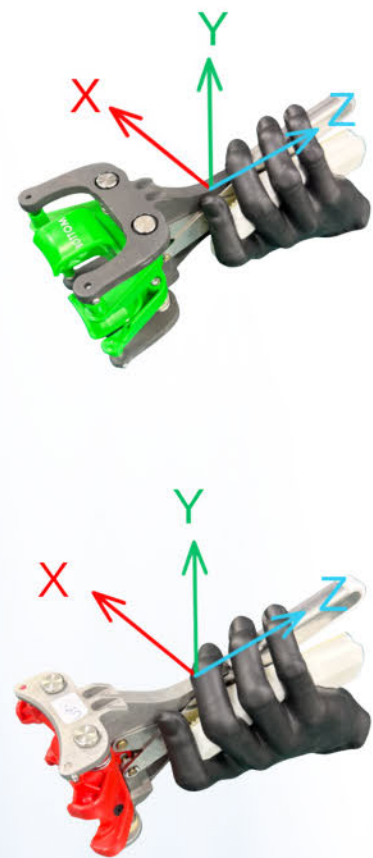
PEAK GAIN

This graph shows the peak gain performance of the antenna over the operating frequency range. Peak gain represents the highest directional radiation within the 3D pattern and reflects the antenna's ability to concentrate energy in a given direction. Measurements were taken in a CTIA approved chamber environment with the specified matching circuit applied.



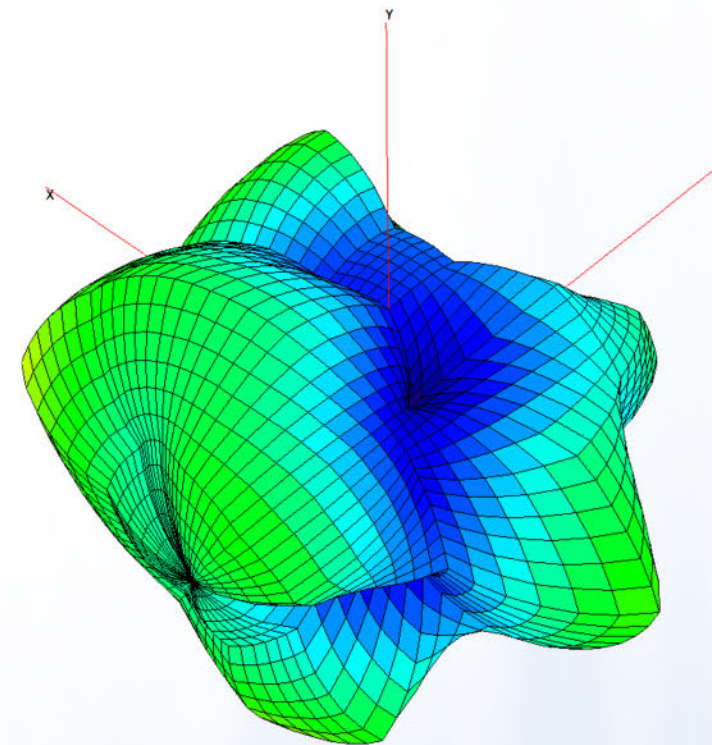
3D RADIATION PATTERNS

The following images show the 3D far-field radiation patterns of the antenna across the relevant frequency bands. These patterns illustrate how energy is radiated in space, highlighting the antenna's directivity and coverage characteristics. Data is measured in a calibrated anechoic chamber using the final matching circuit and standard test setup.

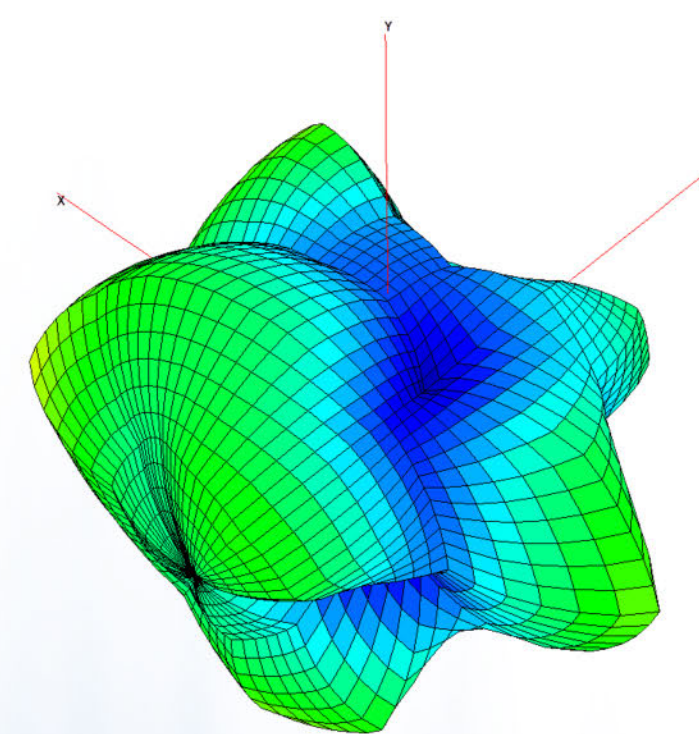


Patterns at 915 MHz

● RUS2 Alco Tool



● RUS2 Smart Tool





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