

CST 3D Protected Models

Usage Guide

March 2021

Introduction

Sharing electrical models for interconnects between suppliers and end-users can be useful in accurately simulating end-to-end S-parameter data and optimizing PCB connector footprint design. However, many interconnect manufacturers are reluctant to share the internal structures of their product which are considered intellectual property.

CST Microwave Studios created a protection algorithm to enable their customers to share electrically functional models without divulging the IP in the design. SV Microwave is now offering these protected models for our standard items which can be downloaded on our site at www.svmicro.com.

A protected model has the same electrical properties as non-protected model. The internal features of the coaxial structure are masked using a placeholder. The placeholder (orange cylindrical structure below) is used for visualization purpose only.

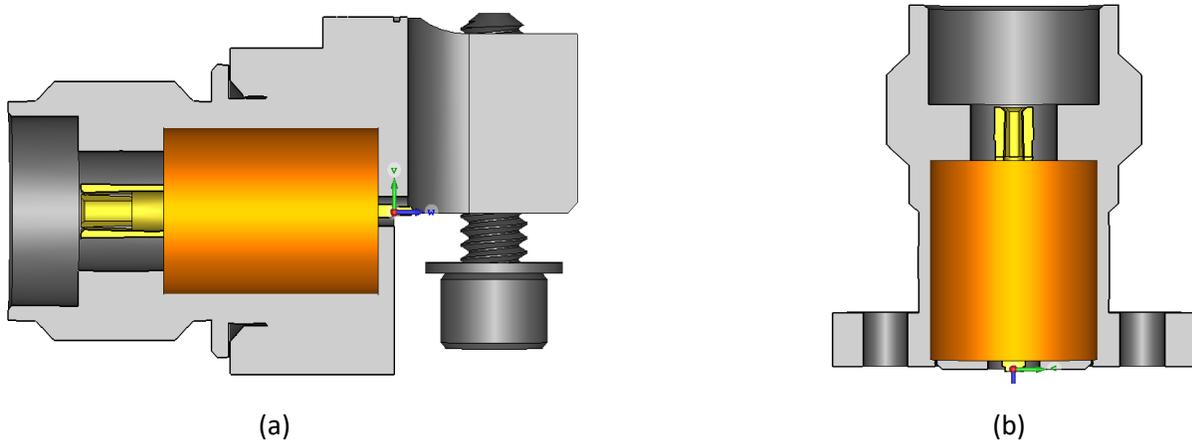


Fig 1: Protected models of Coaxial Connector

(a) SF1521-60107 Edge Launch Connector (b) SF1621-60029 Surface Mount connector

Once a protected file (*.cst) is downloaded from our website, the file can be inserted into an assembly model. Alternatively, a PCB structure can be imported into the protected project to simulate a smaller portion of system.

STEP 1: Download the Protected Model

Protected models for PCB connectors can be found at www.svmicro.com. The download link can be found on the Product Page for the item of interest (in the case below this is PN SF1521-60107). The downloaded *.zip file consists of the protected CST model, relevant mating connector and this application note.

Questions? We're here to help. 561.840.1800 [Check Inventory](#) [Sign-In](#)

SV MICROWAVE Amphenol PRODUCTS RESOURCES SUPPORT

2.92mm Female Solderless PCB Edge Launch Connector, 2 Hole

Part Number SF1521-60107

Inventory Status

In Stock At	QTY	ORDER	RFQ
Heilind Electronics®	118	Buy Now	RFQ
Digi-Key Electronics®	22	Buy Now	RFQ
TTI Inc Global Headquarters®	21	Buy Now	RFQ
Mouser Electronics®	19	Buy Now	RFQ
Newark®	6	Buy Now	RFQ
Farnell®	6	Buy Now	RFQ
Arrow Electronics Inc®	1	Buy Now	RFQ

Customers Also Viewed

- [SF1521-60150](#)
2.92mm Female Solderless PCB Reduced Flange Edge Launch ...
- [SF1621-60036](#)
2.4mm Female Solderless PCB Edge Launch Connector, ...
- [SF2921-61450](#)

REQUEST QUOTE CONTACT US DATA SHEET CAD MODEL **CST MODEL*** APP NOTE

*Encrypted Simulation Model Usage Guide (PDF)

Figure 2: Product Page with Protected Model Download Icon

To access the protected model, the user is required to either log-in (if already registered) or create a new account. SV Microwave does not share user information with third parties, registration is only required for follow up and analytics.

USER ACCOUNT

Log In

Username or e-mail address *

Password *

[Forgot Password?](#)

[Create new account](#)

Figure 3: User Registration Required

STEP 2(a): Import the Board File into the Protected Model

Open the *.cst file and paste the board simulation file at the exit geometry of the connector. The connector is pre-assigned with material properties. The female socket is heat treated in the simulation model. Jump to Step 3 for Port Assignment.

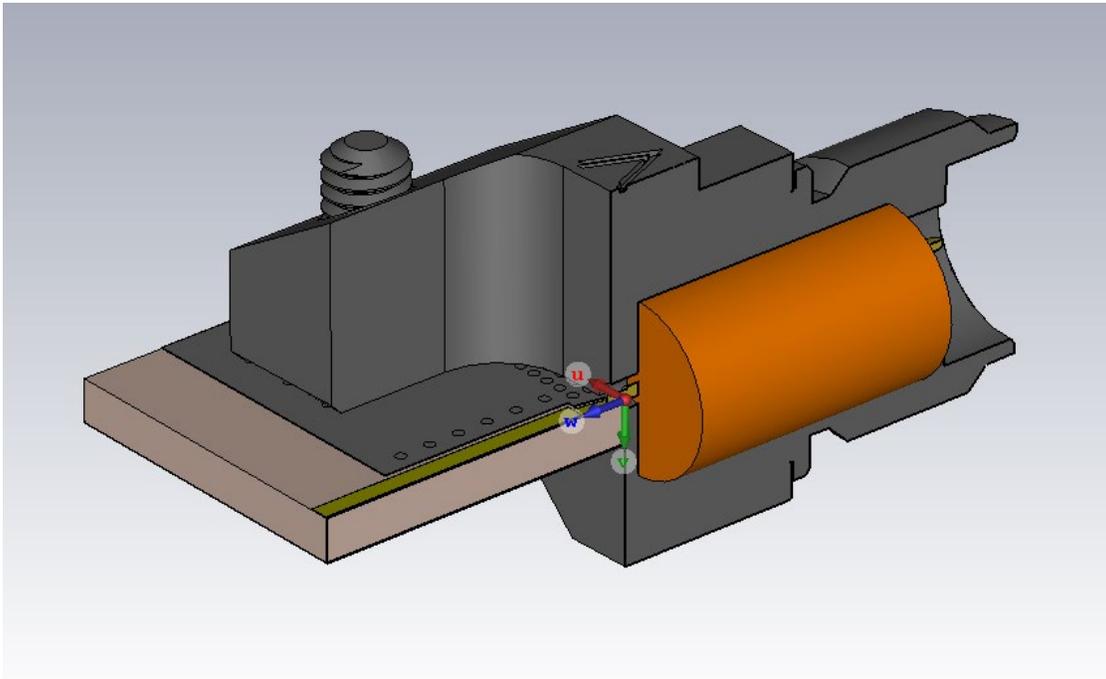


Figure 4: Board Simulation File Imported into SF1521-60107 Encrypted Connector File

STEP 2(b): Import the Protected Model File into Assembly

Create assembly project file

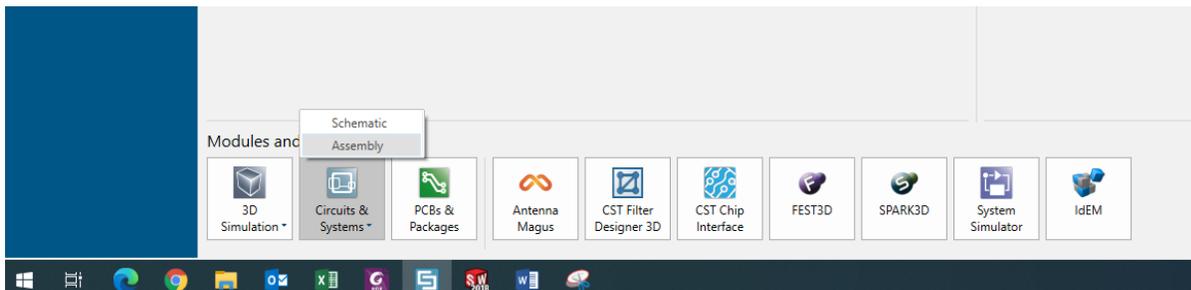


Figure 5: Screen Shot of Assembly Project File Location

Click on Schematics and Field Simulators, Drag and Drop CST Studio Suite Block into the workspace and select the protected file to open. Repeat as many times as needed.

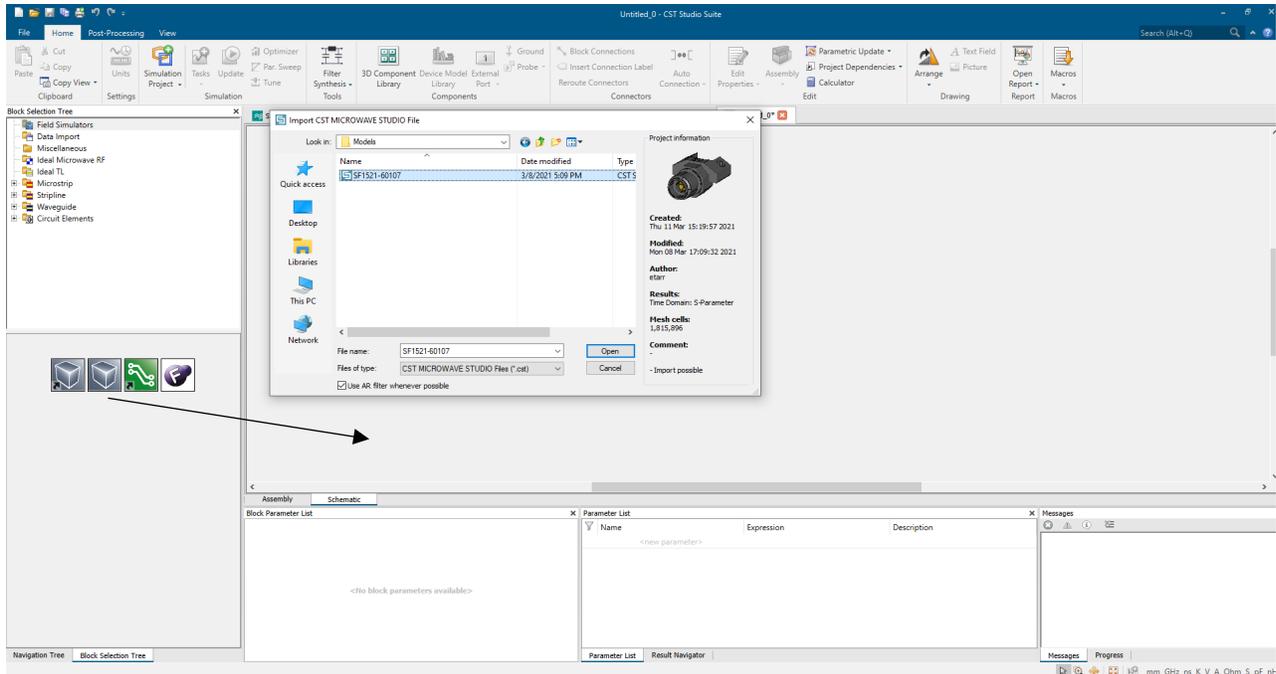


Figure 6: Screen Shot

Go to Assembly and move the protected element to desired location.

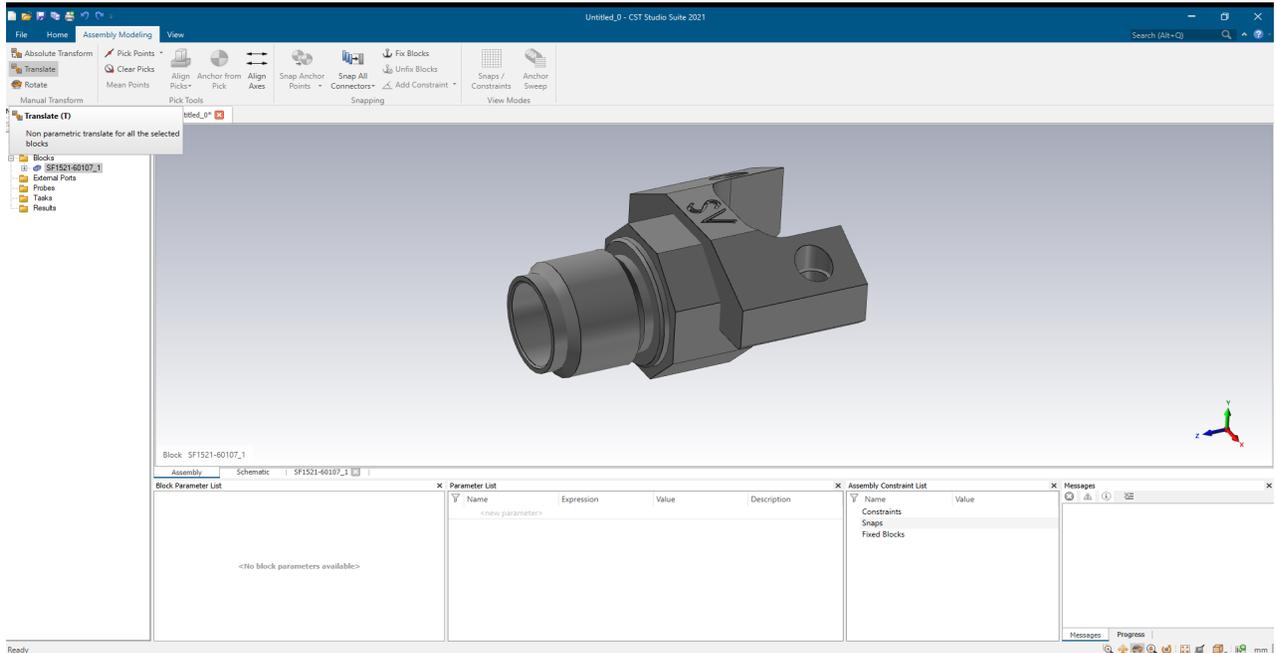


Figure 7: Screen Shot

Go back to Schematic and Create Simulation Project and select all necessary parameters to start the simulation.

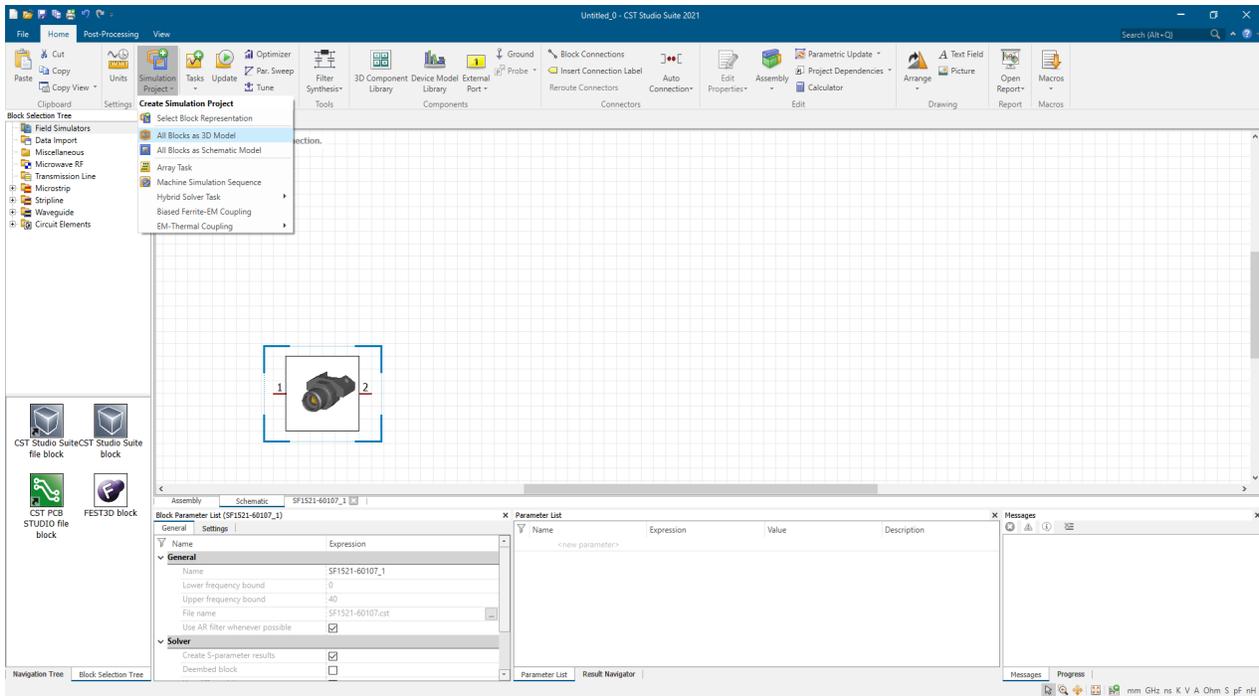


Figure 8: Screen Shot

STEP 3: Port Assignments

CST requires the first three mesh cells to be filled in homogeneously for the solver to start. This can be done by bringing a mating half (included in the *.zip file downloaded from website) to the reference plane (RP) of the connector. Mating half are designed in accordance with industry standards to have interoperability of connectors between different manufacturers. A mating half simulates the measurement conditions and can help correlate simulation and lab measurement results. Also, the mating half has a cylindrical structure extended out to easily assign a Waveguide Port and maintain 50 Ω port impedance.

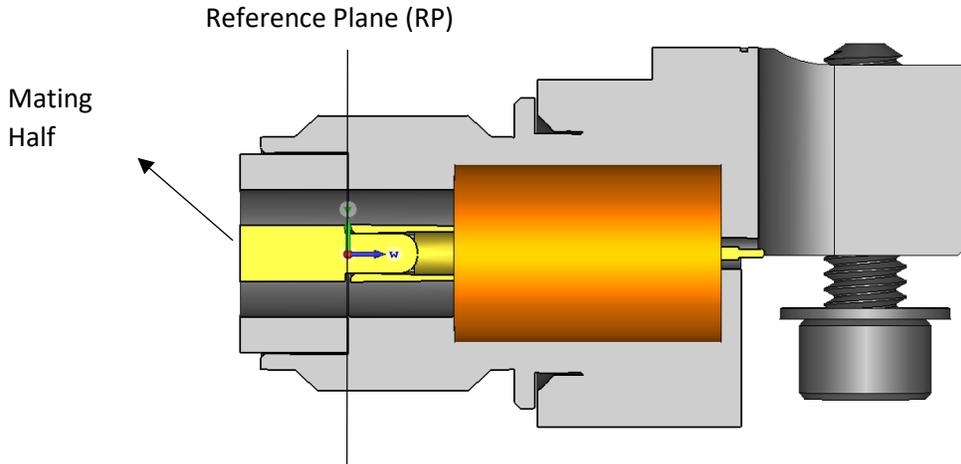


Figure 9: SF1521-60107 with mating half

If a mating half is not required, it is suggested to slice the female socket/male plug area at the 50 Ω section and assign a waveguide port. A waveguide port is assigned by selecting the internal edge of the outer conductor of connector. For a coaxial structure, external mechanical features like coupling nut, lock ring, screws can be excluded from simulation to reduce the mesh cells and simulation time.

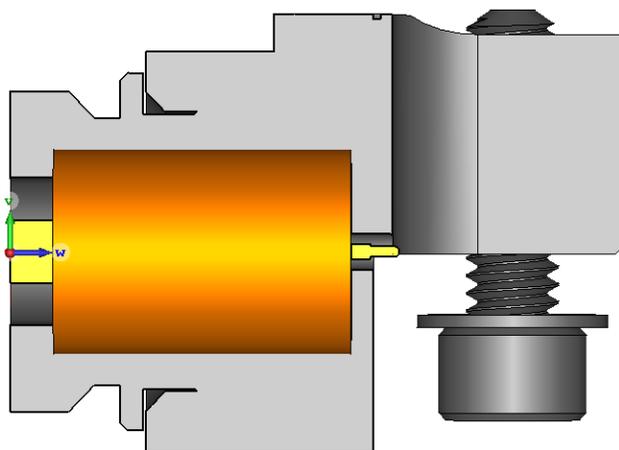


Figure 10: SF1521-60107 without mating half

STEP 4: Validating the Simulation

Before starting the simulation, ensure port impedance is 50Ω. For soldered connectors, users are requested to model appropriate amount of solder around the exit geometry of connector. For comparison, SV Microwave optimized board launch using protected and non-protected version of the connector and performance is exactly same.

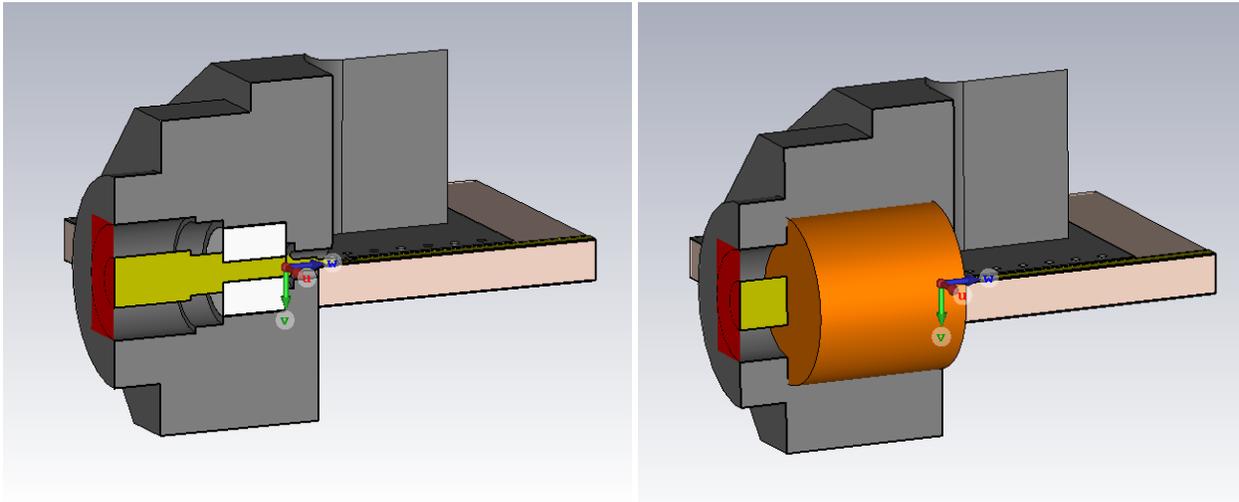


Figure 11: Simulation setup of non-protected and protected model

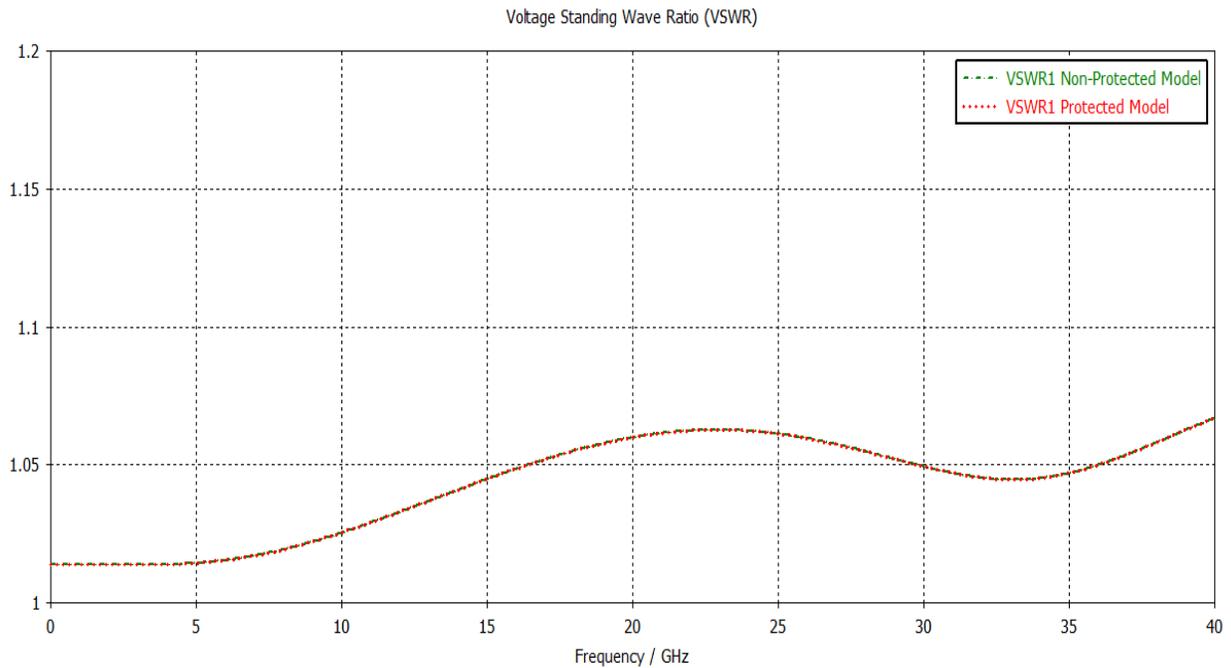


Figure 12: VSWR comparison of non-protected and protected model