

8GHz_BPF_Model_Comparison

Where To Find This Example

AWR Version 14

Select Help > Open Examples... from the menus and type either the example name listed above or one of the keywords below.

Or you can open the project directly from this page using this button. Make sure to select the **Enable Guided Help** before clicking this button.

Open Install Example

AWR Version 13

This example was renamed since the previous version. Please see [Previous Example Page](#) for the version 13 page.

Design Notes

Band-Pass Filter Comparison:

This example shows a band-pass filter simulated using three different technologies within MWO. The filter is designed using conventional models, EM-based models (XModels), and EM Extraction to produce an actual EM simulation. As the "Return Loss" and "Transmission" plots show, the XModel design offers greater accuracy over conventional models similar to those used in other simulators.

XModels Versus Traditional Models

Traditional closed form distributed models were developed to be usable over a wide range of parameter values (like line width, substrate height, substrate relative permittivity for a microstrip line). These models make a tradeoff in accuracy for a wide range of parameters where they are accurate. When doing a design, the substrate characteristics are fixed. The XModels create a model specific for a particular substrate and are extremely accurate. These models are created using the built-in EM simulator of Microwave Office which allows new substrate models to easily be created.

For further help on the use of X-Models, and how they are generated, please review the Users Guide on **EM-Based Discontinuity Models**.

EM Extraction

EM Extraction was used to produce EM structure "Extraction_Using_Traditional_Models". When you simulate the project as given, you can see the results of an actual EM simulation and compare those to the results from schematics "Traditional_Models" and "X_Models". To watch the actual EM Extraction process, simply delete EM structure "Extraction_Using_Traditional_Models" and re-simulate the project. Note that it will take a few minutes to perform the EM Extraction.

For further help on the use of EM Extraction, please review the Users Guide on **Creating EM Structures with Extraction**.

Using Document Sets

Document sets are a way to easily plot the same measurement for many different sources. Additionally, you can easily change which source you want to see on each graph. The "Document_Set" Output Equations document has the DOC_SET element that controls how this works. The measurements on the graphs are pointing to the DOC_SET element which enables this functionality. Try double clicking on the DOC_SET element and changing what is enabled, notice the graphs and the view of the schematic. Next try duplicating the "Transmission" graph and changing the measurement to phase of S21 to see how easy it is to plot from all the sources for a new measurement.