

Upgrading to HFSS v9: Tips and Tricks

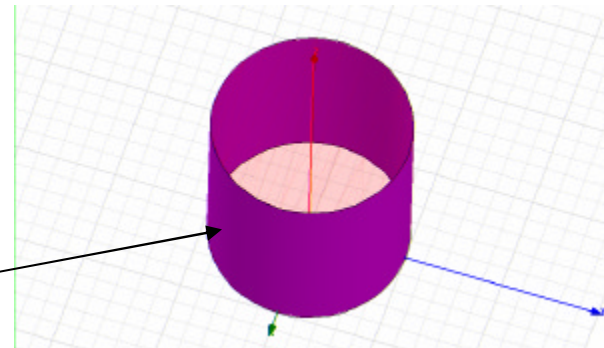
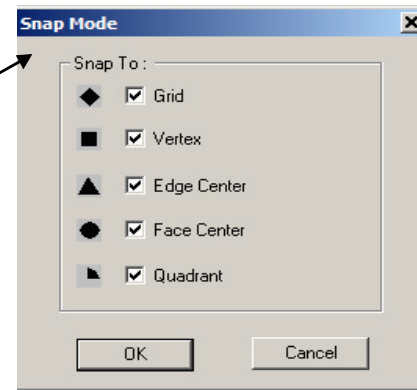
Dr. John Silvestro



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Modeler

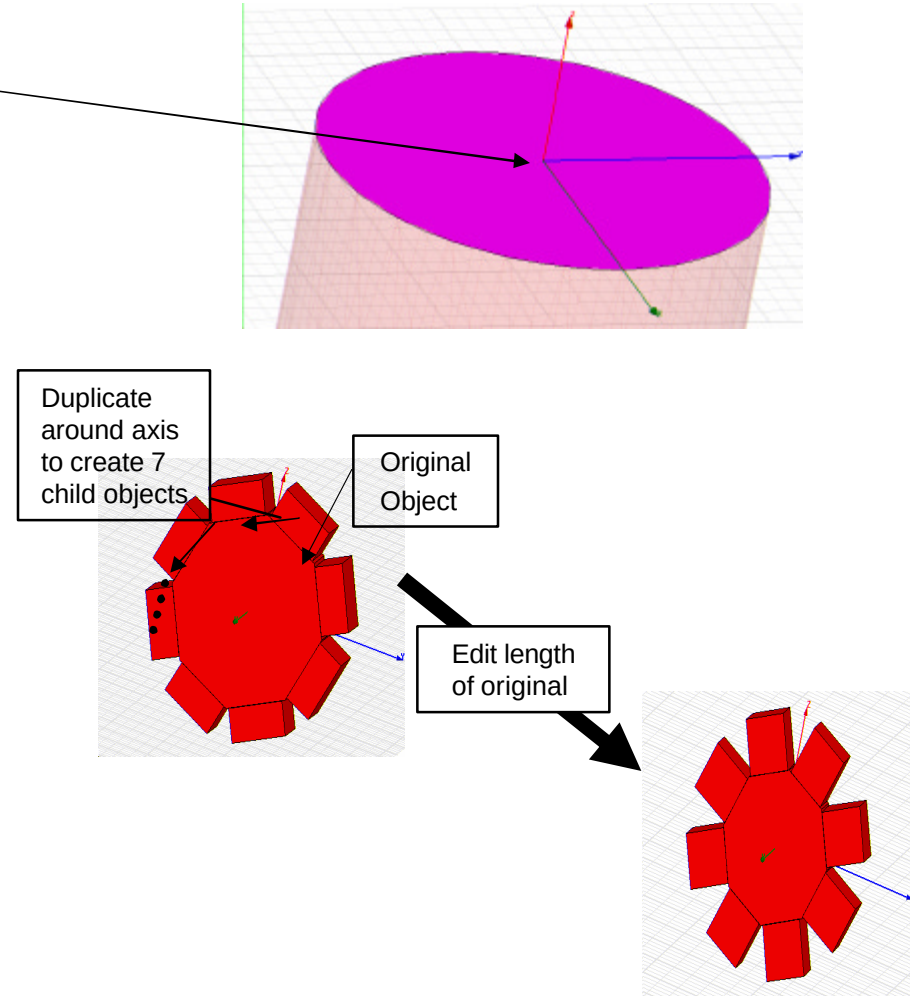
- Improved Snapping and selection
 - Cursor changes shape depending on where it is on a given object
- Next behind hotkey is now “**b**”- it works with faces or objects.
- Ctrl** for multi-selection.
- Alt** replaces **Ctrl** for rotate
- Ctrl+d** for fit all views
- Shift+F1** – context sensitive help
- All circles and cylinders are true surface by default.



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Part Dependency

- ▶ **Face Coordinate system** ties the coordinates to the face of an existing object.
- ▶ Child objects are created by using duplicate command (duplicate along line, mirror, around axis)
 - ▶ Child objects will have all properties of parent object
 - ▶ Material Property, Color, transparency, Size
 - ▶ If option is set, Child will have Boundary Conditions of parent object
 - ▶ Modifying parent's history will modify the child.
 - ▶ Modifying parent's color/material properties will not affect child's properties
 - ▶ **Note:** using copy and paste does NOT create a dependent (child) object. The 2 are independent.

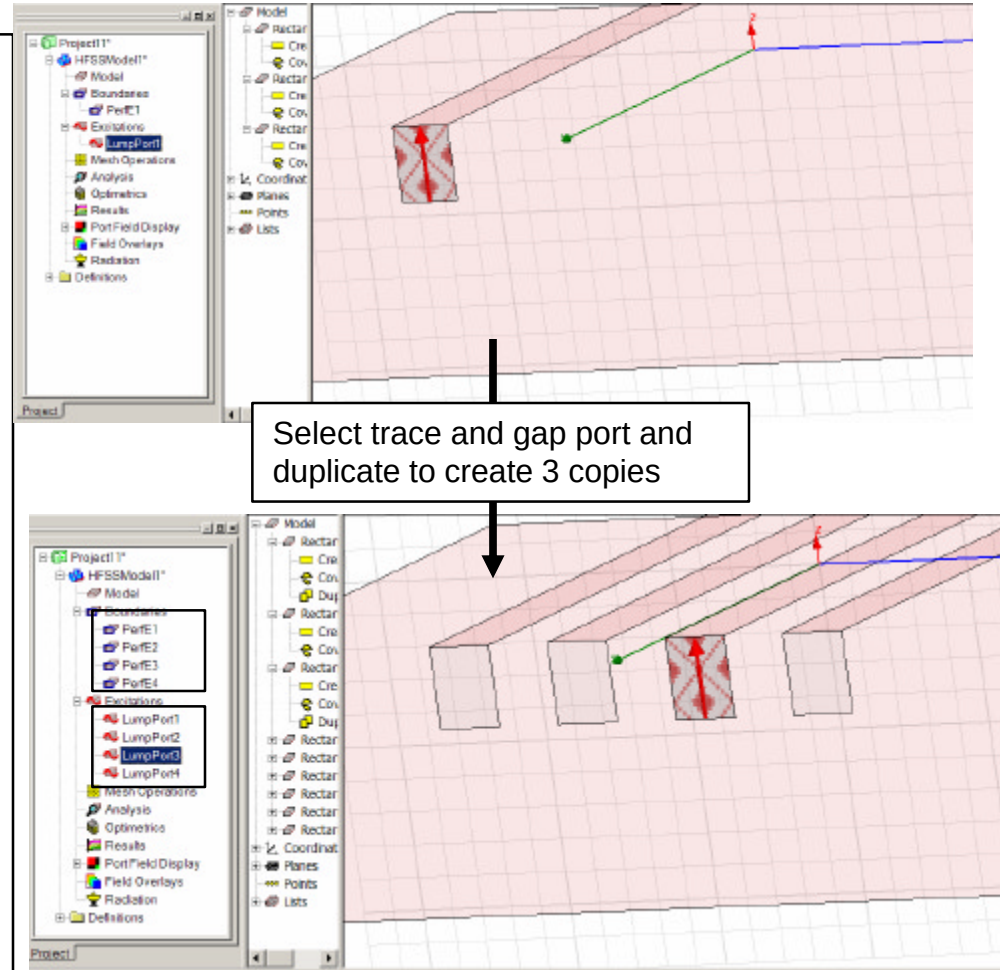


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Duplicating Boundaries

If you set the option
Duplicate boundaries with geometry
under
Tools>Options>HFSS options...

All boundary and excitations
defined on a given object will be
copied whenever the object is
copied or duplicated.



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Solution Type and Port Enhancements

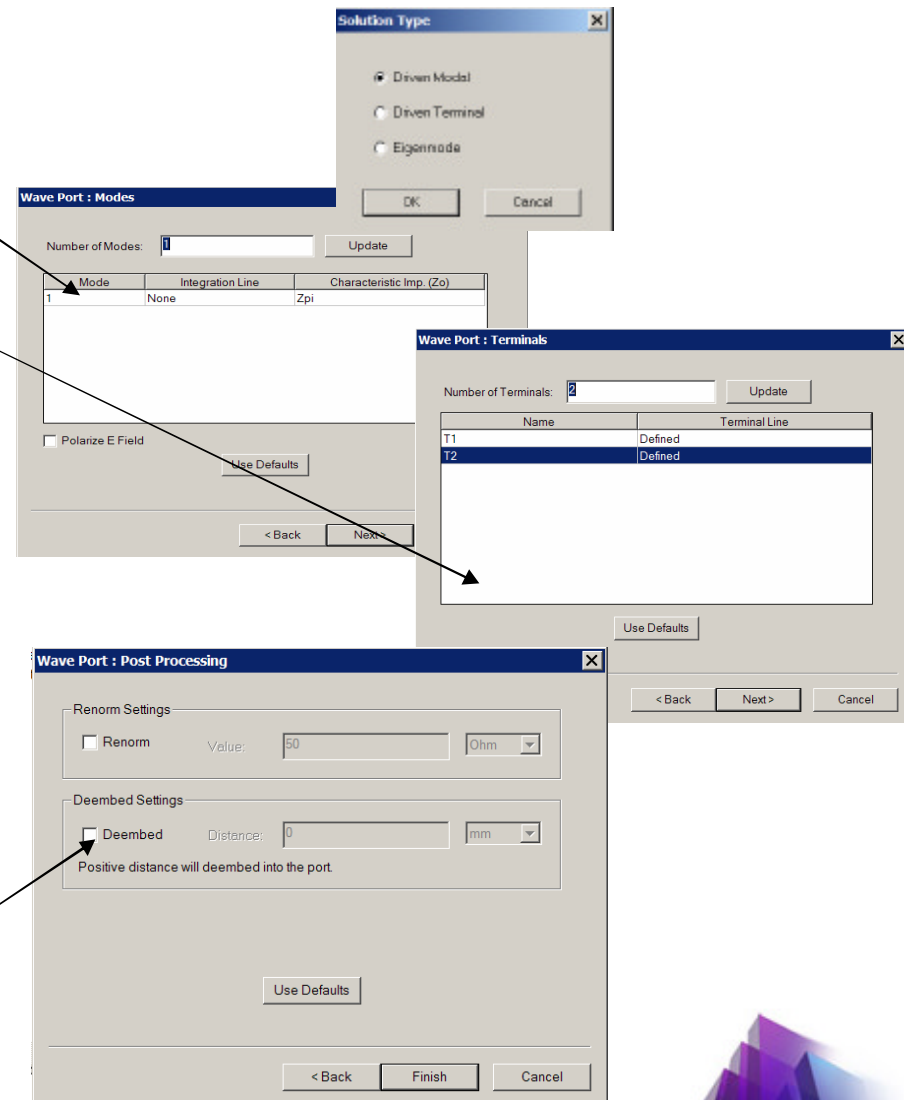
Solution Type

- ▶ **HFSS>Solution Type...** now has 3 choices.
 1. **Driven Modal** - V8* driven solution without terminals defined.
 2. **Driven Terminal** - V8* driven solution with terminals defined, except now the terminal scattering matrix will be computed directly. (Hint: for equally spaced and equal length terminal lines you can draw in the first line and duplicate it to create the others – just click on the word **Defined** for the first terminal line and go to **Duplicate...**)
 3. **Eigenmode** - unchanged.

- ▶ **Advantage:** The convergence criteria (?S) is now based on the desired [S].
- ▶ **Note:** Once you solve in a given solution type you can not change the type to view the other results without resolving.

Other Port Setup Changes

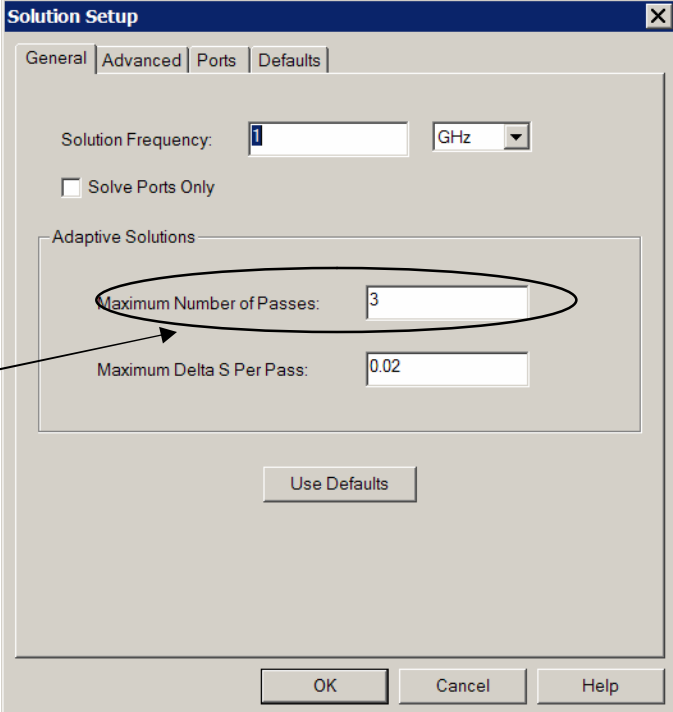
- ▶ In the last panel of a port definition is the **Post Processing** window. Here you can instruct HFSS to deembed and/or renormalize the [S]. Again this is the [S] that will be used in determining ?S.



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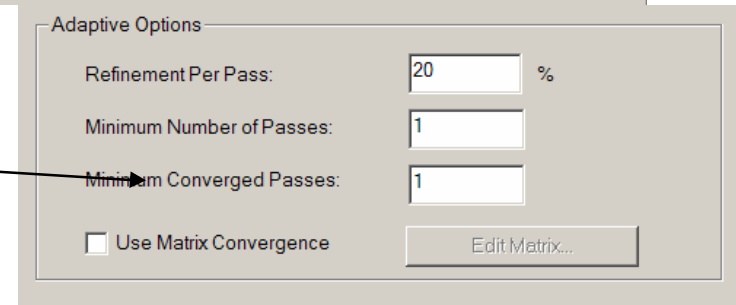
Solution Setup

- Before solving verify setup using  and verify boundary condition under **HFSS>Boundary Display (Solver view)**
- Add a solution setup and enter the setup info in the **General Tab**.
 - Notice you are entering the **Maximum Number of Passes**. In V8* you entered the number of **Requested Passes**.
 - On the Advanced tab you can also set the **Minimum Number of Passes** and **Minimum Converged Passes**. The latter sets the stop criteria at the number of consecutive passes with a ?S below the entered ?S.



The image shows the 'Solution Setup' dialog box with the 'General' tab selected. The 'Solution Frequency' is set to 1 GHz. The 'Solve Ports Only' checkbox is unchecked. In the 'Adaptive Solutions' section, the 'Maximum Number of Passes' is set to 3, which is circled in red. The 'Maximum Delta S Per Pass' is set to 0.02. A 'Use Defaults' button is located below the adaptive solutions section. At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

Field	Value
Solution Frequency	1 GHz
Solve Ports Only	☐
Maximum Number of Passes	3
Maximum Delta S Per Pass	0.02



The image shows the 'Adaptive Options' dialog box. The 'Refinement Per Pass' is set to 20%. The 'Minimum Number of Passes' is set to 1. The 'Minimum Converged Passes' is set to 1. The 'Use Matrix Convergence' checkbox is unchecked. An 'Edit Matrix...' button is located at the bottom right.

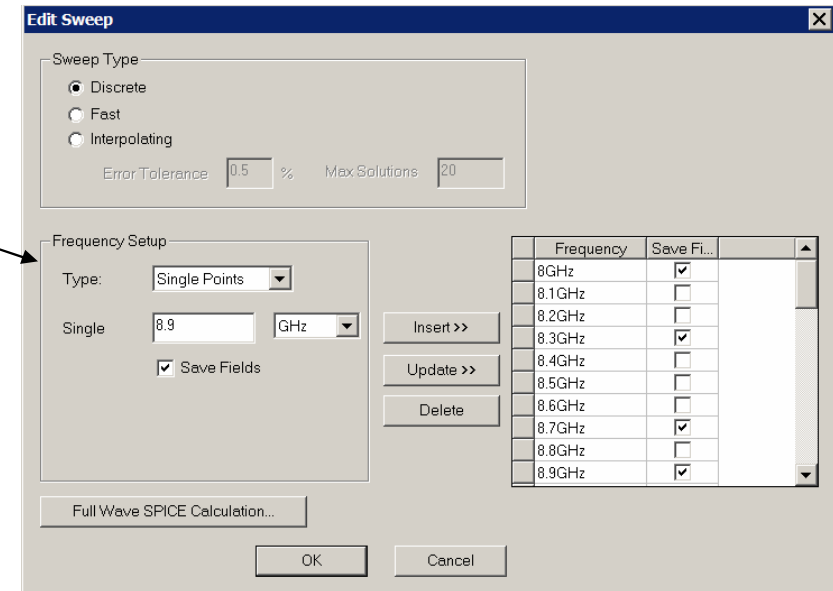
Field	Value
Refinement Per Pass	20 %
Minimum Number of Passes	1
Minimum Converged Passes	1
Use Matrix Convergence	☐

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Sweep Setup

Once you have defined a solution setup you can add a sweep(s). Right mouse click on the Setup and **Add sweep...**

- ▶ Note: you can save the field solutions for all or part of a Discrete sweep and you have the option to not save the field solution for a Fast sweep.
- ▶ There is no option to save fields for Interpolating Sweep.

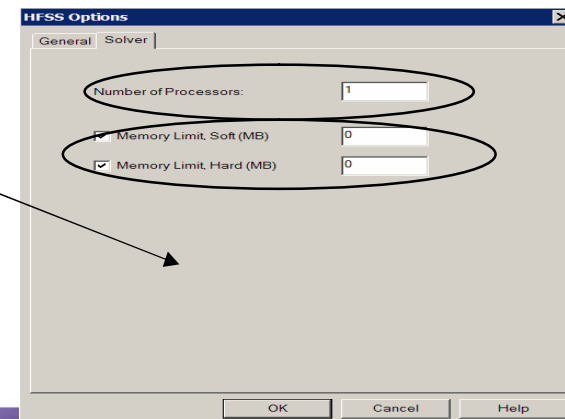
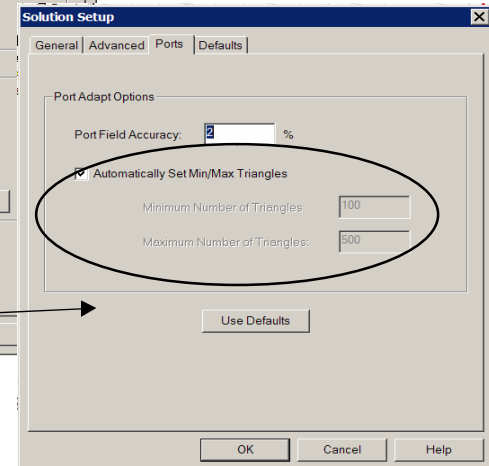
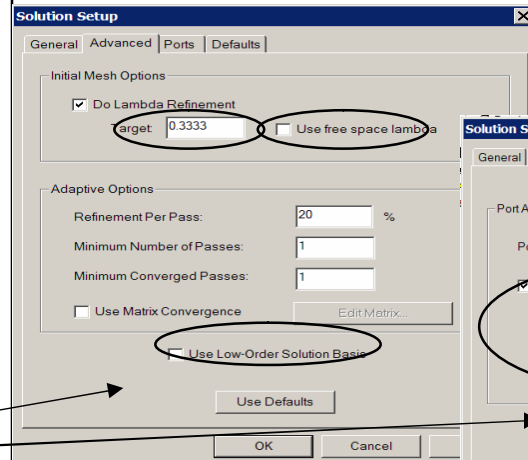


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Environment Variables

The important environment variables and prefs needed in V8* solutions are now available in the interface.

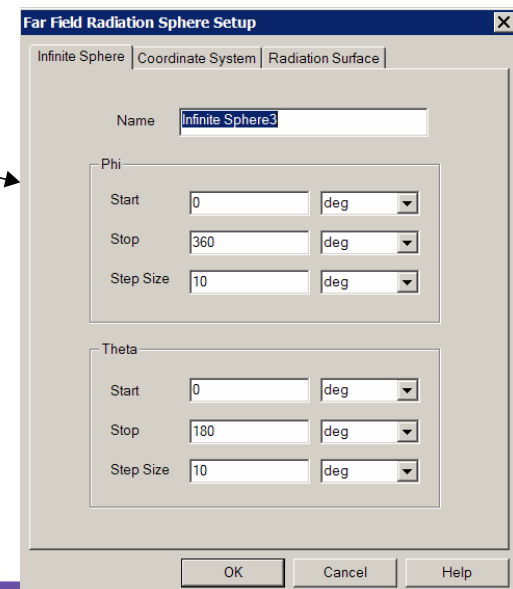
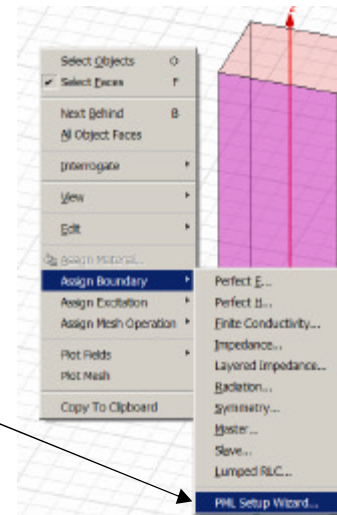
- ▶ The **Advanced** and **Ports** tab under **Solution Setup**
- ▶ Under **Tools>Options>HFSS options...** you can set solver prefs



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Antennas

- ▶ PML now defined same as any other boundary
- ▶ Before you can plot Near or Far field data you must define the setup:
 - ▶ Right mouse click on **Radiation** in tree and select **Insert Far field Setup>Infinite sphere...** (or **Insert Near Field Setup**). Enter pattern data
 - ▶ Note on the remaining tabs you can select a different coordinate system and/or a custom radiation surfaces.
- ▶ Then use **Create report...** to generate the plot.

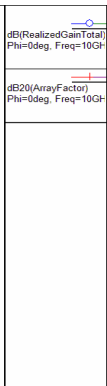
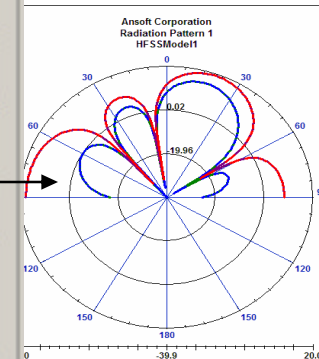
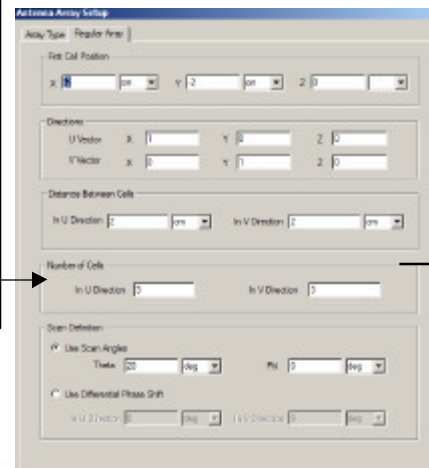
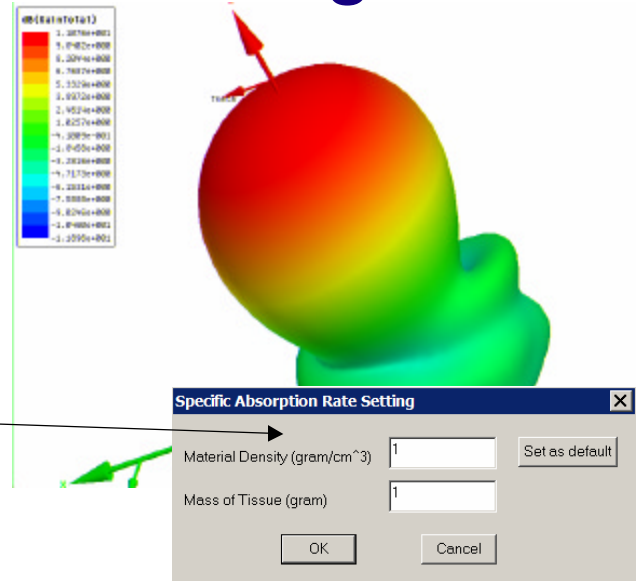


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Antenna post processing

Notes:

- Realized Gain has been added: gain normalized to input power.
- SAR is available for plotting. To set the SAR parameters use **HFSS>Fields>SAR settings...**
- For multi port devices you can edit the sources under **HFSS>Fields>Edit sources...**
- New interface for array factor.



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