Using the reporting function

ArtemiS SUITE[1] provides a very versatile reporting functionality, which makes it easy for you to present your analysis results in clearly arranged reports. This Application Note describes the first steps with this function and explains how to generate a simple report based on the included templates, and how to create custom templates:

Other Application Notes are available, which explain, for example, how to include user documentation in reports, and provide general information on the reporting functions. You can download them in the Download Center on the website of HEAD acoustics:
https://www.head-acoustics.de/eng/nvh_application_notes_reporting.htm
The reporting function is described below using a Pool Project as an example. Basically, the descriptions also apply to other projects of ArtemiS suite, e.g., the Automation Project.

Creating your first report

To create the first report in ArtemiS SUITE, simply use your current Pool Project. In addition to the existing time domain data, any filters you might have added, and the analysis functions to be applied to your signals, you can now add a ***Report*** item to the Destination Pool. Figure 1 shows an example of such a Pool Project.

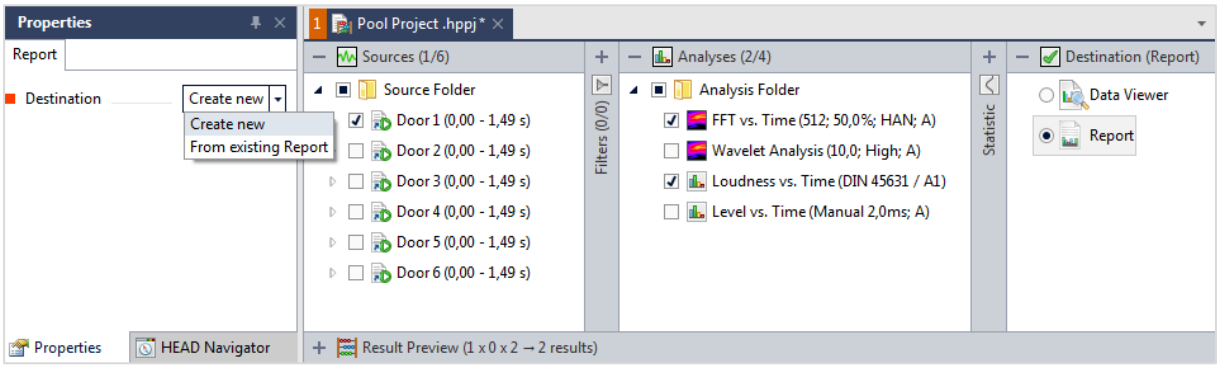

Figure 1: Pool Project in ArtemiS SUITE

The properties of the ***Report*** item are displayed on the left side of ArtemiS SUITE window (the position may vary depending on your custom settings). In this window, you can switch between two options: ***Create new*** or ***From existing report***. Select ***Create new*** to create your first report.
Now you can start the calculation by double-clicking on the ***Report*** item or by clicking on the button.

[1] The descriptions in this Application Note refer to version 9.0. The general procedures also apply to other versions. However, the scope of functionality and the user interface may differ.

ArtemiS SUITE now opens a report with two empty diagrams. This is the default page layout, which you can modify if desired. After clicking into any of these diagrams, the analysis results are displayed in the Properties window in the tab ***Data Binding*** -> ***Available Data***.
In our example, one time domain signal (***S1 [Door 1]***) has been subjected to two different analysis functions (***A1 [FFT vs. Time]*** and ***A2 [Loudness vs. Time***). Therefore, the folder ***S1*** lists the time domain signal (***TimeData***) as well as the analysis results ***A1*** and ***A2*** (see figure 2) as possible sources for the diagrams in the report.

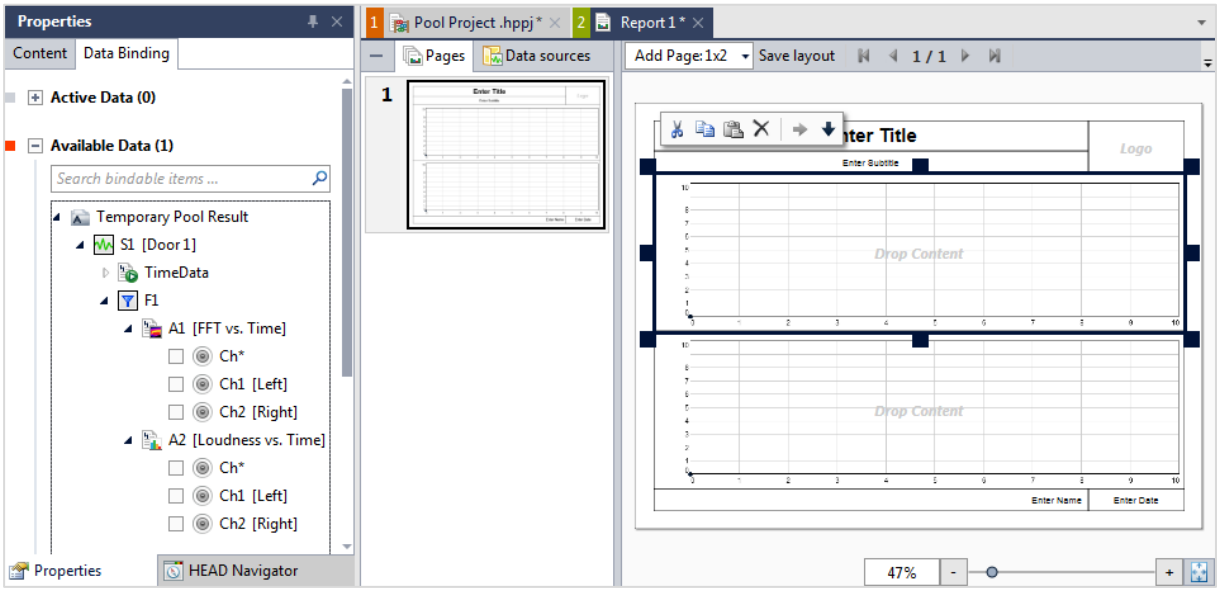

Figure 2: Blank report template and ***Available Data***

To populate the report (i.e., to link data to it), first activate the desired diagram by clicking on it, then click on the checkbox next to the desired source in the ***Available Data*** list. You can select all channels of the mark at once (***Ch****) or separately (here: ***Ch1*** and ***Ch2***). After inserting, you can modify the properties of the diagram (e.g., the axis range). You can also add text after double clicking on a text box and insert an image (e.g., a logo) simply by dragging and dropping it from the HEAD Navigator into the upper right corner of the report (*Logo*).
Now your first report is already done and can be exported to a PowerPoint[2] or PDF file using the ***Export to*** button.

The following chapters describe how to customize page layouts and how to use saved reports as templates.

[2] PowerPoint is a registered trademark of the Microsoft Corporation.

Customizing and reusing page layouts

Customizing the page layout

Of course, the default layout used in the previous chapter cannot cover all design requirements you might have. Depending on your application, you might need a layout with more or fewer diagrams and with text boxes in different places.
With the tools described in the following, you can customize the page layout of your report. First, open a new report via the command ***Start*** -> ***New*** -> ***Report***. Clicking on the ***Add Page:1x2*** button adds a page with two diagrams to the report. Clicking on the arrow beside this button opens a selection box (see figure 3), from which you can select a diagram arrangement that suits your needs.

Figure 3: Selection box of the ***Add Page*** command

You can now further modify the selected template to suit your requirements even better. Or you can start with the ***Empty*** template to design an entirely new layout from scratch.

After adding the new page, you can delete the original page if you no longer need it, e.g., via the context menu in the *Pages* overview: in the preview, right-click on the page you want to delete, and select *Delete* from the context menu.

Using the toolbar  you can place additional elements in your report. To do so, click on the desired element (e.g., the diagram), then use the mouse to drag a rectangle in the report as a placeholder. In the same way, you can drag placeholders for other elements (e.g., Text, Image, Border, Single Values Table, Single Values Diagram, XY diagram and Audio) to populate the report as you wish. When placing the elements, the snapping function helps you to align the size and position with other elements. You can temporarily disable the snapping function by pressing the Shift key.
Furthermore, above an active item or several items selected together, a toolbar with the following editing functions is displayed:

	***Cut/Copy/Paste/Delete:*** these are the standard functions familiar from Windows. The respective operation is applied to your current selection, allowing you to process multiple items at once.
	***Duplicate Selection beside / below:*** this allows you to copy the currently selected item(s) and paste the copy directly to the right of the original or below it. This function is only available if the new items would not exceed the borders of the report page.

Clicking on the  button opens the Properties window of an active item (you can activate an item in the report by clicking on it with the left mouse key). In the Properties window of an active text box you can

change, for example, the font and font size of a text box. After clicking on an empty position on the report page, you can configure the page properties (e.g., the format).
In the properties dialog of the diagram, you can configure among others the size and position of the diagram in the ***Layout*** section. In the ***2D / 3D Diagram Options*** the font size and other labeling settings can be configured.

Figure 4 shows a new page layout as an example.

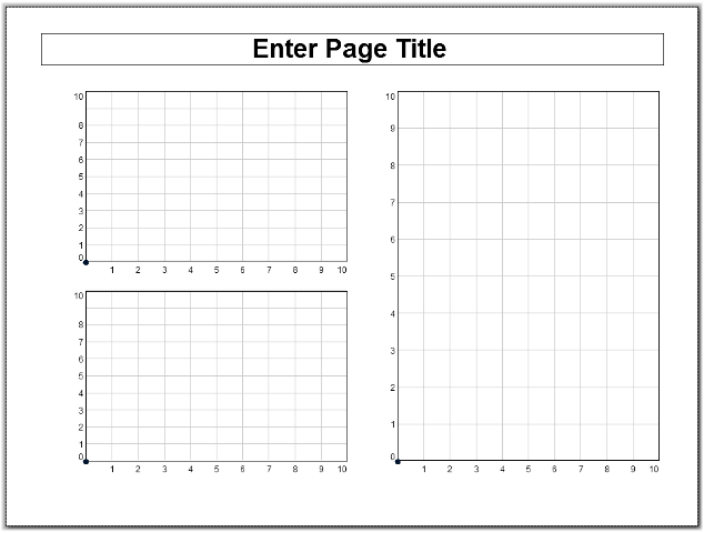

Figure 4: A custom-created page layout

Saving and reusing a page layout

If you want to reuse your custom layout for other pages or reports, save it as a layout template using the button ***Save layout***. You will then find it as a new template in the ***User*** section of the selection box opened with the ***Add Page*** button, so you can use it as many times as you like in your current report or other reports (see figure 5).

A new page layout can not only be created with the ***New*** -> ***Report*** command. You can also modify and save the layout after generating a new report via a calculation with the report item in the Destination Pool as described in the first chapter.

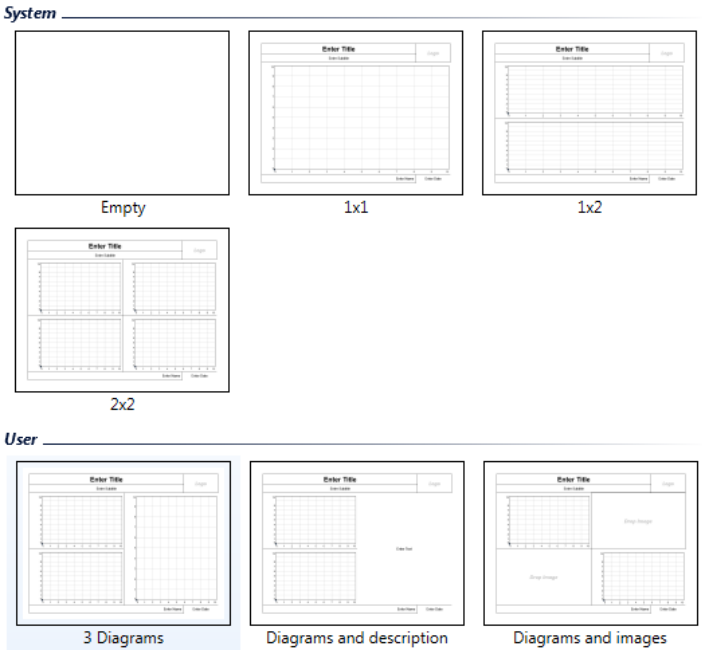

Figure 5: Standard layout templates and custom templates created by the user

Generating and reusing reports

Besides a one-page layout, you can also save and reuse an entire (one-page or multi-page) report. Reports are saved in the HPRX format and, besides the page layout information, can also contain information on data bindings. By means of the data binding you define the display of the available data, e.g., how the analysis results of one or several time domain signals are displayed in the various diagrams in the report.
You can take advantage of a saved report with data bindings by using the same report as a template for several time domain signals, whose analysis results are to be documented according to the same scheme. You need to create the report template (page layout and data links) only once, and then you can use it for additional reports as many times as you like. Furthermore, you can use the template not only in a Pool Project, but also in an Automation Project or a Standardized Test Project.

Data binding

A data binding can only be defined if data sources are available. This requires a calculation with one or several time domain signal(s), optional filter elements and analysis function(s) to be performed. In each Pool, one or multiple items can be activated for the calculation.
Using a Pool Project, you can preview the number and the types of calculation results in the ***Result Preview*** prior to the calculation (see figure 6), which are then displayed in the ***Available Data*** list in addition to the time domain signals.

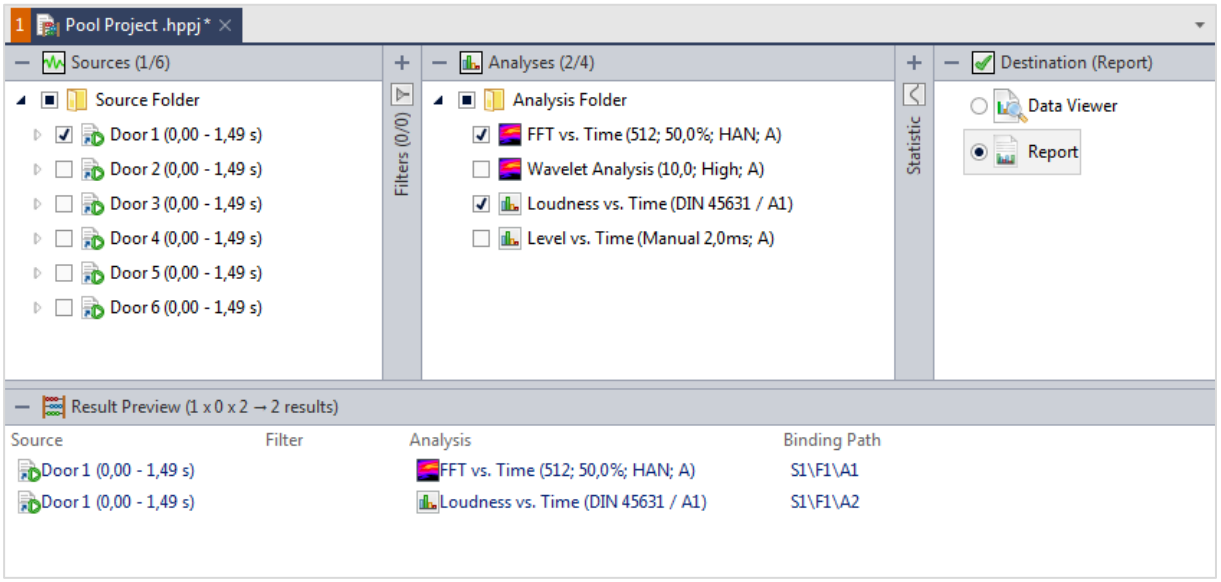

Figure 6: Pool Project with *Result Preview*

In the example below, a calculation with one time domain signal and two analysis functions has been chosen. If you activate the ***Create new*** function in a ***Report*** item for the calculation, ArtemiS SUITE opens a report containing one page with the default page layout[3] and lists the following available data sources in the second tab of the Properties window:

- in the ***TimeData*** folder: the time domain signal of the items activated for the calculation,
- in the ***A1*** folder: the results of the ***FFT vs. Time*** analysis,
- in the ***A2*** folder: the results of the ***Loudness vs. Time*** analysis.

With ***Add Page***, you can select a custom layout (with three diagrams in our example) and then delete the default page. Now you can start defining the data links: click on a diagram in the report, then (as described on page 2) check the checkbox of the data source you want to appear in this diagram. Do the same with the other diagrams (see figure 7).

[3] For instructions on how to configure a different default page layout, see the Application Note “Using the reporting function in ArtemiS SUITE”.

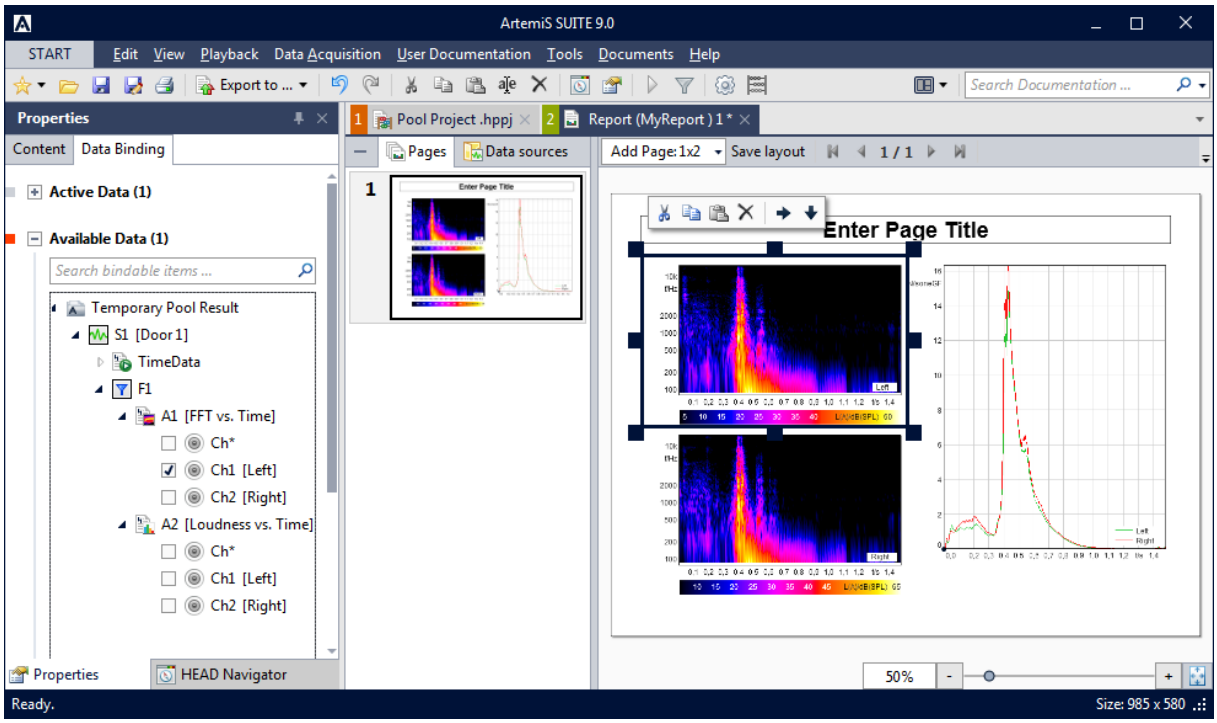

Figure 7: Report with data links

After entering a title in the appropriate text box, you can export the report, e.g., to a PowerPoint file, using the ***Export to*** button.
In addition, you can also save the report as an HRPX file (e.g., MyReport.hrpx) and reuse it as a template for other reports (including data link information).

Reusing reports

To do so, enable the option ***From existing Report*** for the report item in the Destination Pool, and click on the file browser button ... to select the desired template, e.g., MyReport.hrpx (see figure 8).

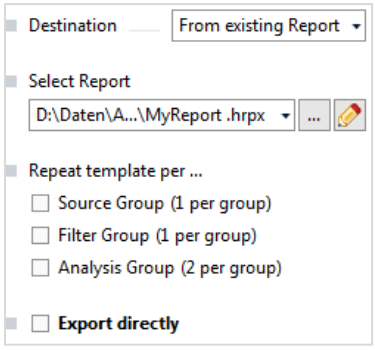

Figure 8: Properties of a report item

Now you can select a different time domain signal in the Source Pool, which is to be analyzed and documented in the same way as the previous file. After starting the calculation, the analysis results for the new time domain signal are displayed in the diagrams following the same scheme as the previous report. If required, you can now add specific information (e.g., on peculiarities or modifications) to the report before exporting it to PowerPoint or PDF.
Explanations of the other configuration options (***Repeat template per …*** etc.) can be found on the Application Note “Duplicating report templates for creating extended reports” and in the Help System of ArtemiS SUITE. The ***Export directly*** option allows you to configure the report creation in a way that the report is not displayed in ArtemiS SUITE, but saved directly in the defined format.

Modifications

One by one, you can now analyze and document all your time domain signals in the same way. The flexibility of the reporting function in ArtemiS SUITE allows for a wide range of adaptations and modifications.

The HRPX file you saved initially contains no analysis results, but only information on their placement (e.g., left channel of the first analysis in the upper left diagram, right channel in the lower left diagram, and results of the second analysis jointly in the right diagram). This structure is applied to all subsequent calculations. Regardless of which analysis functions you selected, the results of the first analysis will always be displayed in the two left diagrams and the results of the second analysis always in the right diagram. So if it turns out in the future that other analysis functions are more suitable for your needs, simply select the new functions in the Analysis Pool and start the calculation. The resulting report will contain different analysis functions than the older reports, but maintain their layout.
To get an overview of the number and kind of results that will be calculated, simply use the ***Result Preview***. Besides the number of results, the preview also shows the result type (2D curves, spectrograms or single values) as icons. The column ***Binding Path*** of the preview shows you the path name of the respective result (e.g., ***S1\F1\A1***, ***S1***: first item in the Source Pool, ***F1***: first item in the Filter Pool, ***A1***: first analysis in the Analysis Pool). This name indicates where you can find the respective result in the ***Available Data*** list. Changing the active items (e.g., a different selection in the Analysis Pool) affects which items are available, but not their position in the report (see figure 9).

If you want to compare the results of several time domain signals, simply activate several time domain signals when creating the report template for the first calculation. The ***Available Data*** list will accordingly show more items, which you can then link to the various diagrams in the report template. Of course, the report can also have several pages with more diagrams. Again, the HRPX file stores the information on the data links, so the diagrams are automatically populated with the current data sources when the calculation is performed.
Please note that the current calculation results are available in accordance with the stored data links only. For example, if a report is designed to display the results of three time domain signals, it is necessary to select exactly three time domain signals for the calculation, otherwise the new report will not be populated correctly.

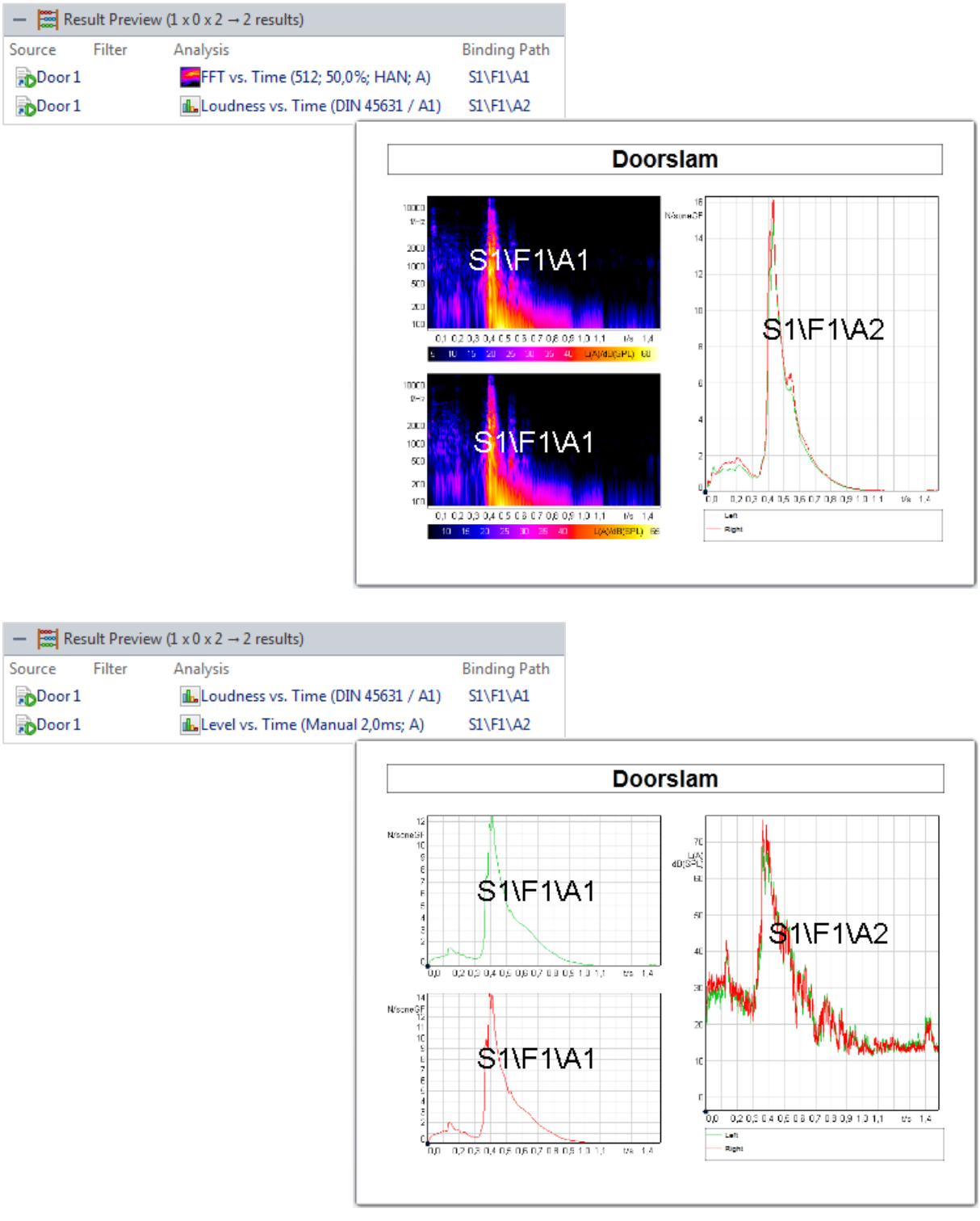

Figure 9: Changing the selection in the Analysis Pool leads to different reports with the same layout.

Additional application notes describing the reporting in ArtemiS SUITE you can find in the Download Center on our web site: http://www.head-acoustics.de/eng/nvh_application_notes_reporting.htm

Do you have questions to the author?
Contact us at imke.hauswirth@head-acoustics.de.
We are looking forward to your feedback!