Test Report Generation with R&S©EMC32-K84

EMC32
Application Note

Products:

- R&S®EMC32-EB
- R&S®EMC32-S
- R&S®EMC32-K84

The option R&S®EMC32-K84 extends the internal report generator to support the generation of a summary test report over all selected test cases done for a EUT. Comprehensive report content can be written directly to Microsoft®Word and thus easily combined with customer specific report templates.

This Application Note shows all necessary steps to configure and execute the report generation.

Note:

Please find the most up-to-date document on our homepage www.rohde-schwarz.com
Search term: EMC32-K84

This document is complemented by software. The software may be updated even if the version of the document remains unchanged

**ROHDE & SCHWARZ**

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1. Introduction

This application note gives an introduction to the summary report generator using the extension R&S®EMC32-K84 together with the EMI (R&S®EMC32-EB) or EMS (R&S®EMC32-S) base licenses. The report will be directly generated in .docx document format using a Microsoft®Word installation.

The summary report consists of a main report template (in .dotx format) containing both the required customer specific report contents of the test lab like test case and test setup descriptions as well as equipment lists and calibration data (refer to Figure 1: Summary Report Structure). This main report file will be compiled with information from R&S®EMC32 like EUT Information or Tests Summary Verdict Table together with contents of the individual EMC test results (graphics, tables, test setup settings) to a report document in *.docx format.

The usage of different sub report templates for EMI or EMS allows an easy adaptation of the test report contents to the appropriate test case.

The user interface of this summary test report generator easily allows to add either all tests for an EUT or individual EMC tests to the report.

Beside this summary report R&S®EMC32-K84 additionally provides the function to generate .docx files for single EMC tests using the test template reporting function.
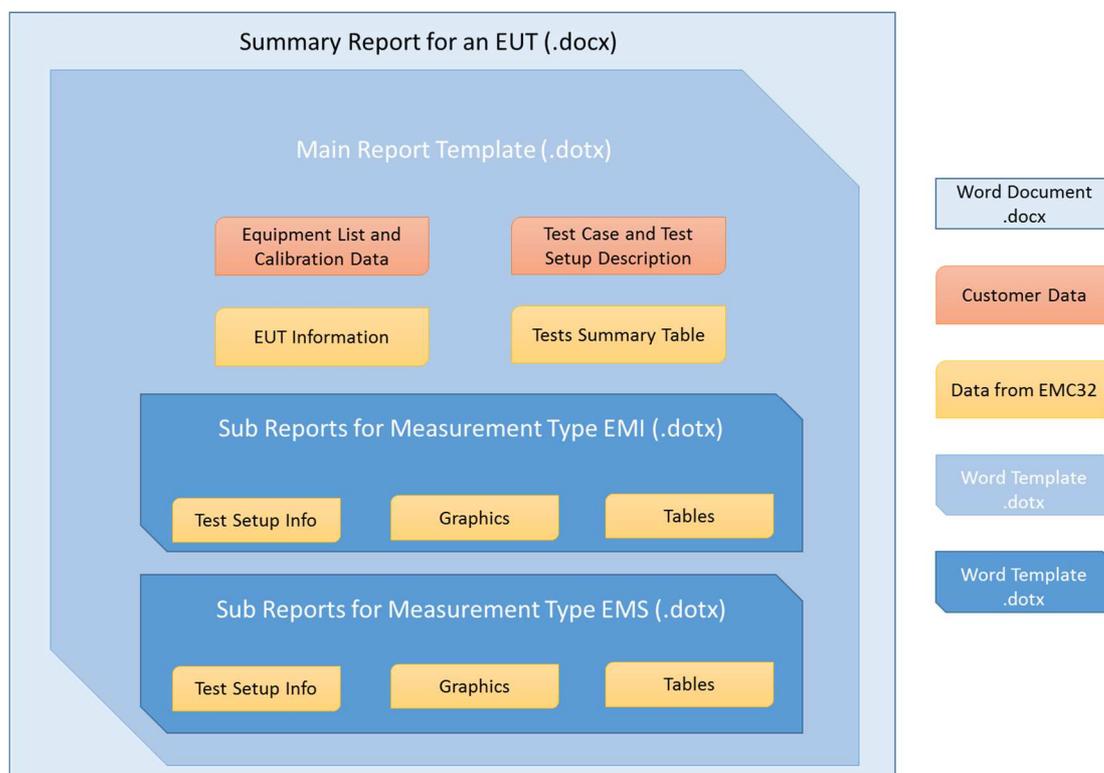
Figure 1: Summary Report Structure

2. Preparing Microsoft®Word Templates

2.1 Overview

As described in chapter 1 the R&S®EMC32-K84 Summary Report Generator is using Microsoft®Word Templates in .dotx format as a source input to generate the summary report. Thus first these templates need to be prepared.

This chapter describes the typical contents of the required main report template (.dotx) and the sub report template (.dotx) for EMI and EMS tests and how the appropriate R&S®EMC32 field text commands are added to the Microsoft®Word templates. These field text commands are parsed during the report generator run and replaced by the corresponding test contents from R&S®EMC32.

2.2 R&S®EMC32 Word Template Field Text Commands

All R&S®EMC32 field text commands in the Microsoft®Word template files are inserted as normal text and follow this syntax:

<E32/FIELD TEXT[:FIELD TEXT OPTION]>

For the Main Report Template the following field text commands are supported:

Field Text Command	OPTION Parameters	Description
EUTINFO	<none>	Global EUT Information data defined by the selected EUT Information file in the "Office Report Template and Output File" frame of the report generator dialog.
VERDICTSUMMARY	<none> <Test Category>	Generates a table of all tests selected for the summary report with the test verdict of each test in a second column. The optional parameter <Test Category> can be: EMS_RAD EMS_CON EMI_RAD EMI_CON Added user-defined Test Categories → refer to 2.5
MEASUREMENTS	<none> (1) <Test Category>	Place holder in the summary Word template file which is replaced by the Sub Report Template .dotx file for this measurement class. When the optional parameter <Test Category> is used only tests with this Test Category are added to the measurement report. If more than one test for this test category is selected then a Sub Report Template file for each test is inserted to the summary report. The optional parameter <Test Category> can be: EMS_RAD EMS_CON EMI_RAD EMI_CON Added user-defined Test Categories → refer to 2.5
NEWPAGE	<none>	Inserts a page break.

Table 1: Main Report Template Field Text Commands

Examples for field text commands – means test information placeholders:

<none> means this option extension is left blank; for example "<E32/EUTINFO>".

<Test Category> means the option is including tests of this particular test category:

<E32/MEASUREMENTS:EMI_RAD>

(1) Please note:

When there is no Test Category selected, the full "Table of Measurements" – see.
Figure 8 – is depicted, including the heading paragraphs.
Otherwise – if a Test Catergory is selected, the tests are depicted without heading
structure.

For the **Sub Report Templates** the following field text commands are supported. These field text commands are always replaced by the appropriate data of the current R&S®EMC32 test.

Field Text Command	OPTION Parameters	Description
EUTINFO	<none>	Global EUT Information data defined by the selected EUT Information file in the "Office Report Template and Output File" frame of the report generator dialog.
TESTINFO	<none>	Test Information text block of the current test
TESTNAME	<none>	Current test name (short format)
TESTVERDICT	<none>	Current test verdict
HARDWARESETUP	<none>	Hardware Setup text block of the current test
TESTTEMPLATE	LONG SHORT	Current Test Template either in short or long format
EUTMONITORING	LONG SHORT	EUT Monitoring of the current test either in short or long format
GRAPHIC	MEASUREMENT:<R,C> EVALUATION:<R,C>	All measurement or evaluation graphics from the test. Additional with the OPTION Parameter extension ":<R,C>" the size and arrangement of the graphics can be defined. Here R is the number of rows and C the number of columns. For example ":2,1" will output two graphics in one row on one page.
TABLE		Measurement result table of the current test defined by the OPTION Parameter key word. Tables with more than 500 rows are limited to 500 rows in the report.
	RESULT SINGLE NOGO NOGOMASTER PREVIEW1 PREVIEW2 AUTOMOTIVEDATA1 AUTOMOTIVEDATA2 NSA CRITICAL FINAL CHART SUMMARY RAW	Current Result Table Single Measurement Result Table EMS Nogo Table EMS Master Nogo Table Preview Result Table 1 Preview Result Table 2 Automotive Data Reduction Result Detector 1 Automotive Data Reduction Result Detector 2 Site Attenuation Measurement Result EMI Auto Test Critical Frequency Table EMI Auto Test Final Result Table Azimuth Chart Result Table Summary Table (Azimuth Chart) Raw Result Table (Azimuth Chart) Note: only one table per .dotx paragraph is supported.
PROTOCOL	<none>	Adds the Test Execution Protocol File of the current test
NEWPAGE	<none>	Inserts a page break

Table 2: Sub Report Template Field Text Commands

<none> means this option extension is left blank for example "<E32/EUTINFO>".

In general all field text commands are removed even if they cannot be processed since for example the referenced table is not available. For testing purpose using the

Summary Report Generator option "Add warning in report for unresolved field text commands" the field text commands are replaced by an appropriate warning text. The report templates are based on Microsoft®Word .dotx template files and thus will be edited in Microsoft®Word directly. This is typically done in the Windows File Explorer via **Template File → right mouse click → Open.**
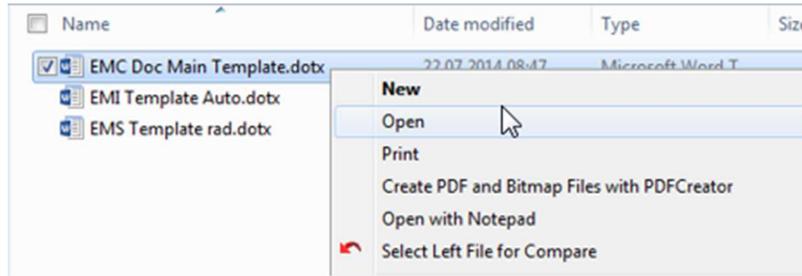

Figure 2: Open Word Template .dotx File for Editing

2.3 Main Report Template

The Main Report Template .dotx file is the base template for the summary report (refer to Figure 1). Here all field text commands referenced in Table 1 may be used.

In this example we want to add the EUT Information data of the particular EUT which is tested as well as the summary verdict table to chapter 1 Global Section.
We can add all performed EMI/EMS tests as sub reports – please refer to next chapter 2.5 for further details.
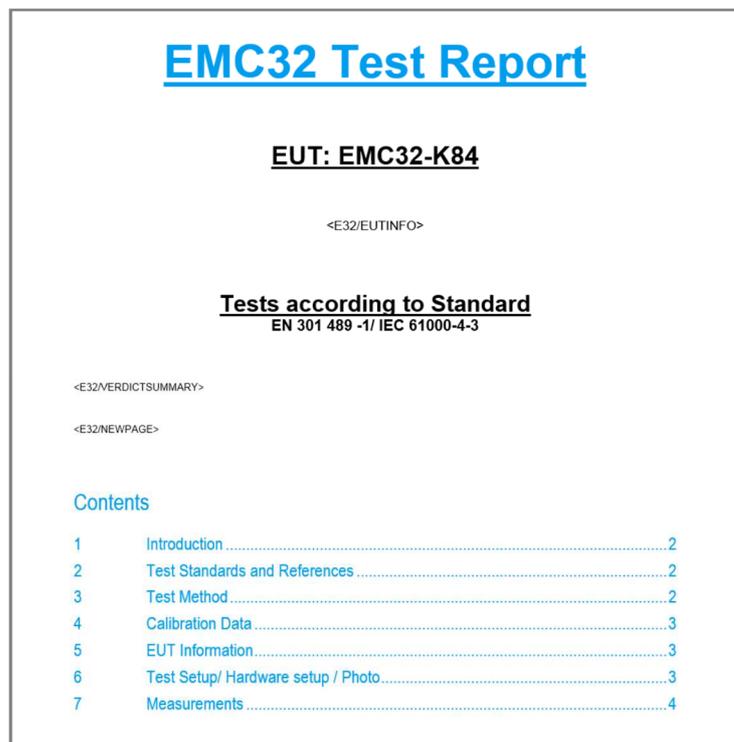
Figure 3 a): "Main Report Template.dotx" Example

2.4   Reporting Overview - Main and Subtemplates

The Main Report Template .dotx file will be concatenated with all specified Sub-Templates which are assigned to the test cases in the "Table of Measurements".

Each Sub-Template can be called and filled with measurement information multiple times according to the table.

Further headings can be added to either the template (*.dotx) or can be written to the report contents as "Paragraph" directly. For this purpose you may enter further headings to the "Table of Measurements" manually by the command button "Add Paragraph" and align the indention accordingly.

Main Report Template.dotx

EMI_CON → EMI Conducted.dotx

EMI_RAD → EMI Radiated.dotx

EMS_CON → EMS Conducted.dotx

EMS_RAD → EMS Radiated.dotx

**e.g.
AZIMUTH → Azimuth.dotx**

YourReport_Test-Name_Number_Date.docx
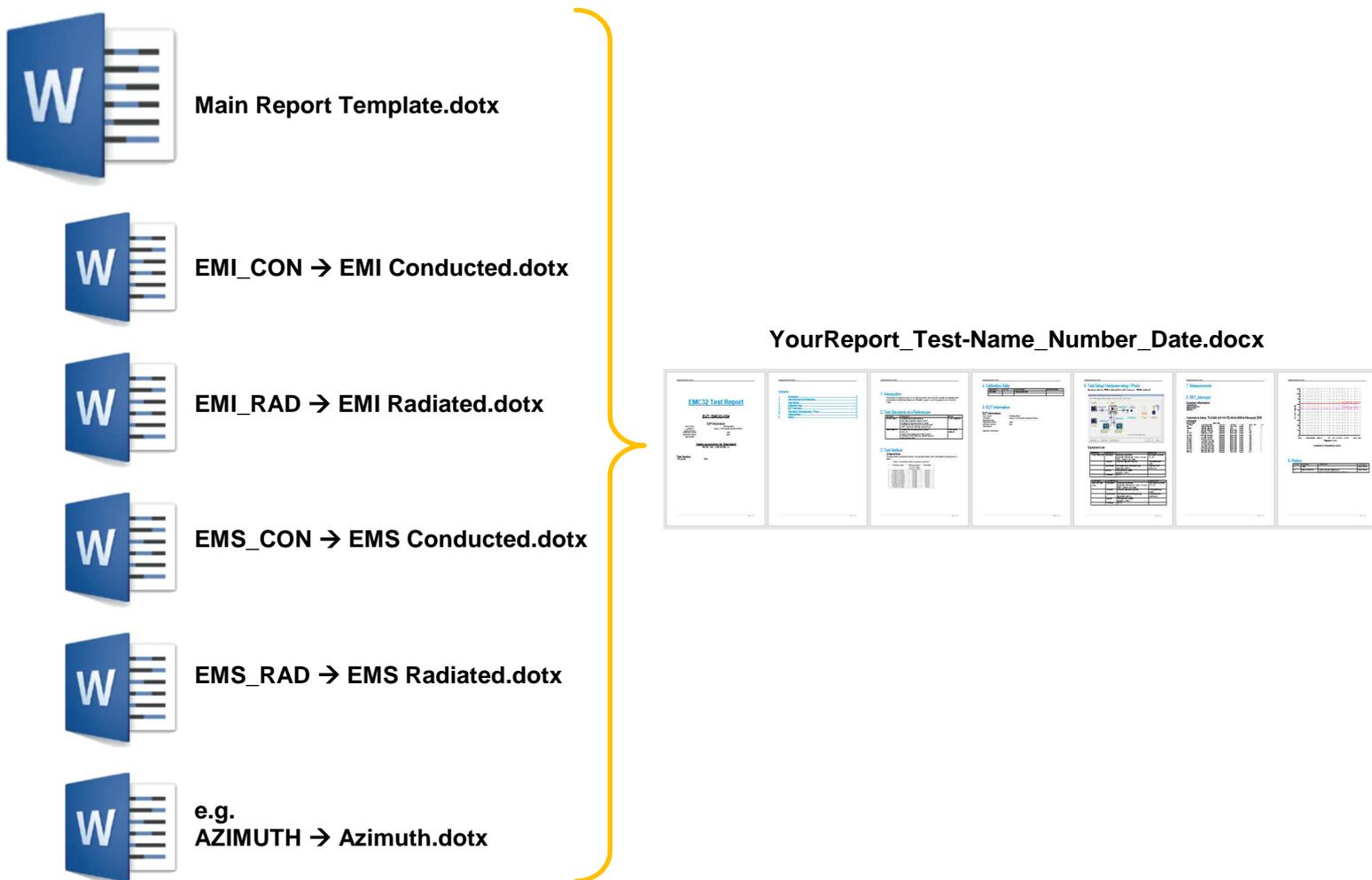
Figure 3 b): Combination of Main- and Sub-Templates

2.5 Sub Report Template

The Sub Report Template .dotx files are the base templates for reporting a single EMI/EMS test (refer to Figure 1). Since EMI and EMS test reports may contain different items for example the "Final Result Table" for EMI and the "EUT Nogo Table" for EMS the R&S®EMC32-K84 Report Generator supports different Sub Report Templates for each test type, here EMI Conducted.dotx, EMI Radiated.dotx, EMS Conducted.dotx, EMS Radiated.dotx .
Here all field text commands referenced in Table 2 may be used.

In this example, we want to add the following report components from an EMI radiated test to our EMI Auto Test sub report:

- Test Information
- EMI Auto Test Template in short format
- All measurement graphics in a 2 rows x 1 column arrangement
- The Final Result table

This leads to the following Sub Report Template in .dotx format. The paragraph heading is now taken from the "Table of Measurements" and does appear in the final document.

```
¶
<E32/TESTINFO>¶
¶
<E32/HARDWARESETUP>¶
¶
<E32/TESTTEMPLATE:SHORT>→  →  Option:·short¶
¶
<E32/GRAPHIC:MEASUREMENT:2,1>→  →  Option:·Measurement·graphics·in·a·2·rows·x·1·column·arrangement¶
¶
<E32/TABLE:FINAL>→  →  →  →  Option:·Result,·Nogo,·Single,·Preview,·Critical,·Final,·etc.¶
¶
<E32/TABLE:CRITICAL> →  →  →  →  Option:·Result,·Nogo,·Single,·Preview,·Critical,·Final,·etc.¶
¶
```

Figure 4 a): Sub Report Template .dotx Example

If the "Table of Measurements" is not referenced – means not used – the headline could be inserted to the Sub Report Template and derived as a paragraph heading, like implemented in the previous version of EMC32-K84:

```
·1.1→ EMI·Test:·<E32/TESTNAME>¶
¶
<E32/TESTINFO>¶
¶
…
```

Figure 5 b): Sub Report Template .dotx Example including paragraph heading

## 2.6 Prepare EMC32-K84 Report Options

From the main menu please select "Report" and further choose
- "EMC32-K84 Report Options …"

Now please edit the table for test categories – means "test type" and please enter an appropriate template file .dotx for each "TestCategory".

These are: EMI_CON   → e.g. EMI Conducted.dotx

                    EMI_RAD   → e.g. EMI Radiated.dotx

                    EMS_CON   → e.g. EMS Conducted.dotx

                    EMS_RAD   → e.g. EMS Radiated.dotx

                    AZIMUTH   → e.g. Azimuth.dotx
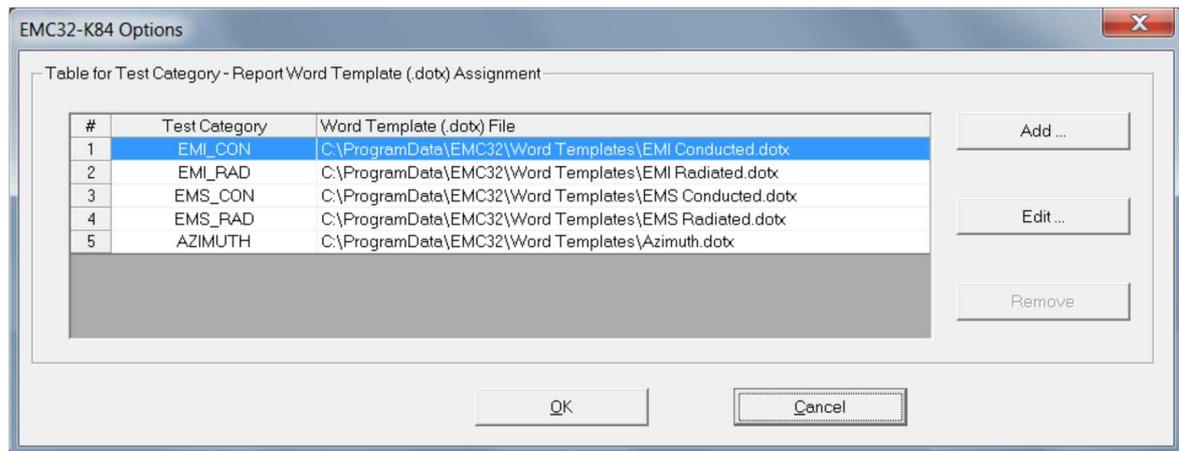
Figure 5 a): Options concerning TestCategory and corresponding Word Templates → please check and adapt to your file-pathes !

With the button "Add …" it is possible to add user-specific Test Categories like "ACI", "Stripline", "ALSE",
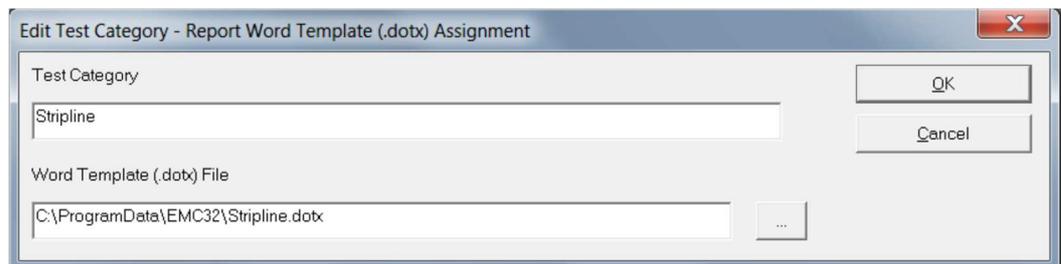
Figure 5 b): Add user-specific Test Category and assign a Word Template

Please click "OK" on the panel "EMC32-K84 Options" to confirm and save the assignment used for the entire Summary Report Generator.

2.7 Use the Structure of Test Folders for well-arranged Results

The EUT root folder structure with subfolders containing all tests applied to the EUT can be reused and immediately converted to a report configuration which is representing the test folders comprising tests which were applied to the EUT.

Please note: There must be no test loaded in the EMC32 main window – otherwise please unload a test from the main menue:
"Test" → "Close Test (Sequence)"

or use the shortcut button _____

Please have a look at the example folder structure within the tab "EMC32 Explorer":

Figure 6: Structure of Test Folder will be reused for the structure of the Summary Report

The corresponding report structure can be created with the following simple procedure:

Please select from the menu "Report" → "Generate Summary Report …" or use the shortcut button, now please select your "Main Report Template" and appropriate "EUT Information" and finally specify a Report File (.docx).
Just use the file dialogs which are opened by the buttons with "…"
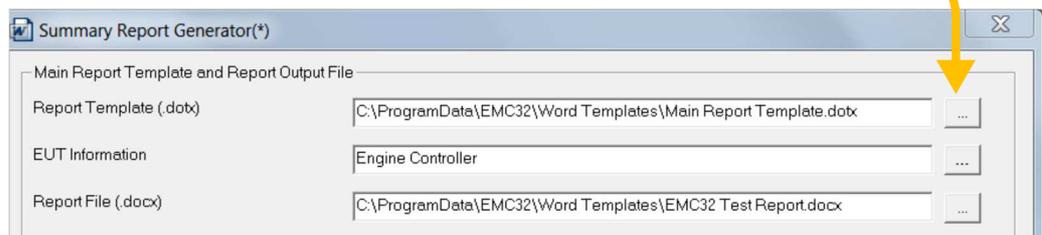
In the next step please select the button "New Configuration" and with the dialog box – straight forward select the dedicated folder comprising the tests applied to the EUT.

Please note: Every folder can hold a single configuration – therefore it is not required to assign a filename !
Just klick on "Save Configuration" after the assignment of the folder, the example shows the assignment of folder "EUT #12345667":
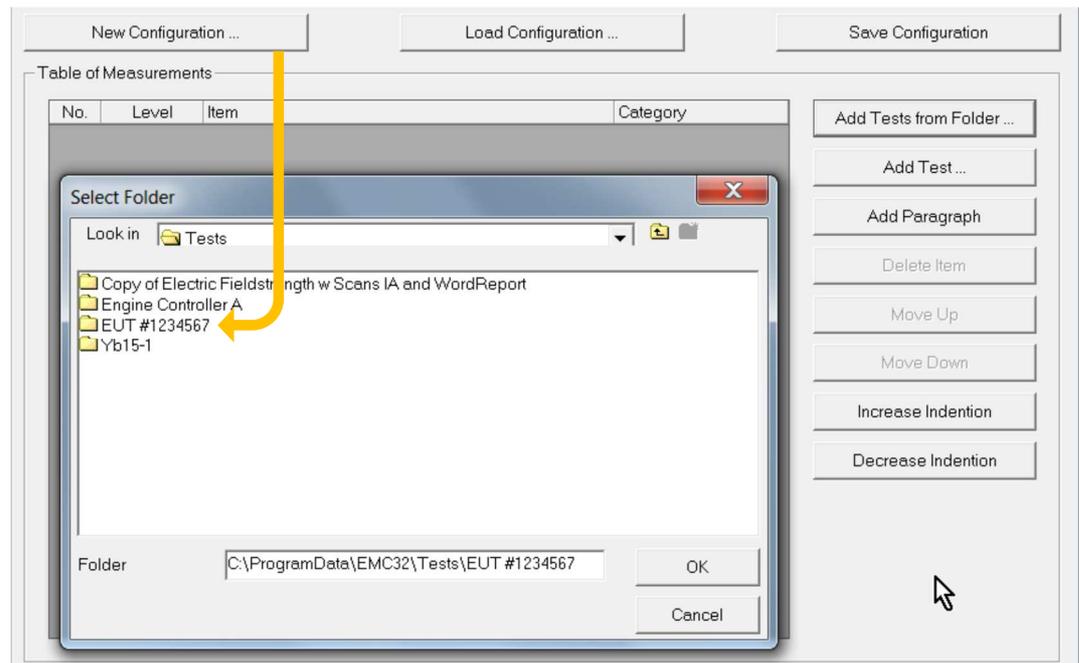
Figure 7: Create a new configuration for the Table of Measurements by simply selecting a Test folder

After creating a "New Configuration" the "Table of Measurements" will be populated automatically by "Items" – with correct "Level" and appropriate assignment of "Category":

Figure 8: Table of Measurements derived automatically from a Test folder

Now we could already press the Button "Generate Report" … or create further paragraphs manually – please see next passage.

2.8 Enhance your Report with structured Paragraphs

The EUT root folder structure with subfolders containing all tests applied to the EUT can be reused and further textured by paragraphs.

Please use the Buttons right-hand of the Table of Measurements to add a group of tests from a folder → "Add Tests from Folder …" or a single Test by "Add Test …" or add paragraphs which may be edited within the table.

Furthermore you may reorganize the table by moving items or changing their indention.

Figure 9: Edit and reorganize the Table of Measurements

3. Report Generator Dialog

This chapter gives an overview how to start, configure and run the summary test report generator.

3.1 Prerequisites

The following environment is required in order to use the summary test report generator:

- At least R&S®EMC32 Version 9.20 with R&S®EMC32-K84 option needs to be installed.
- An iKey hardlock containing the R&S®EMC32-K84 option needs to be connected.
  Note: R&S®EMC32-K84 does not run in demo mode without hardlock.
- Microsoft®Office 2007 or newer version.
- No EMC32 test loaded in EMC32 main window.

When these conditions are given the "Generate Summary Report" icon in the shortcut bar is visible.

Figure 10: R&S®EMC32 Shortcut Bar

The summary report generator may be opened optionally via the main menu entry "**Report → Generate Summary Report"**.
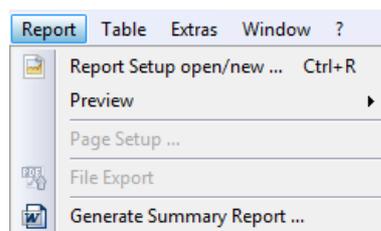

Figure 11: R&S®EMC32 Report Menu

3.2 Working with Office Report Generation tab

By clicking on the icon from the shortcut bar or from the menu function, the "Summary Report Generator" dialog will be opened (Figure).

The dialog is subdivided into the following logical areas:
- Main Report Template and Report Output File
- Referenced Sub Report Templates for each Test Type
- List of Tests to be included to the report
- Reporting Options
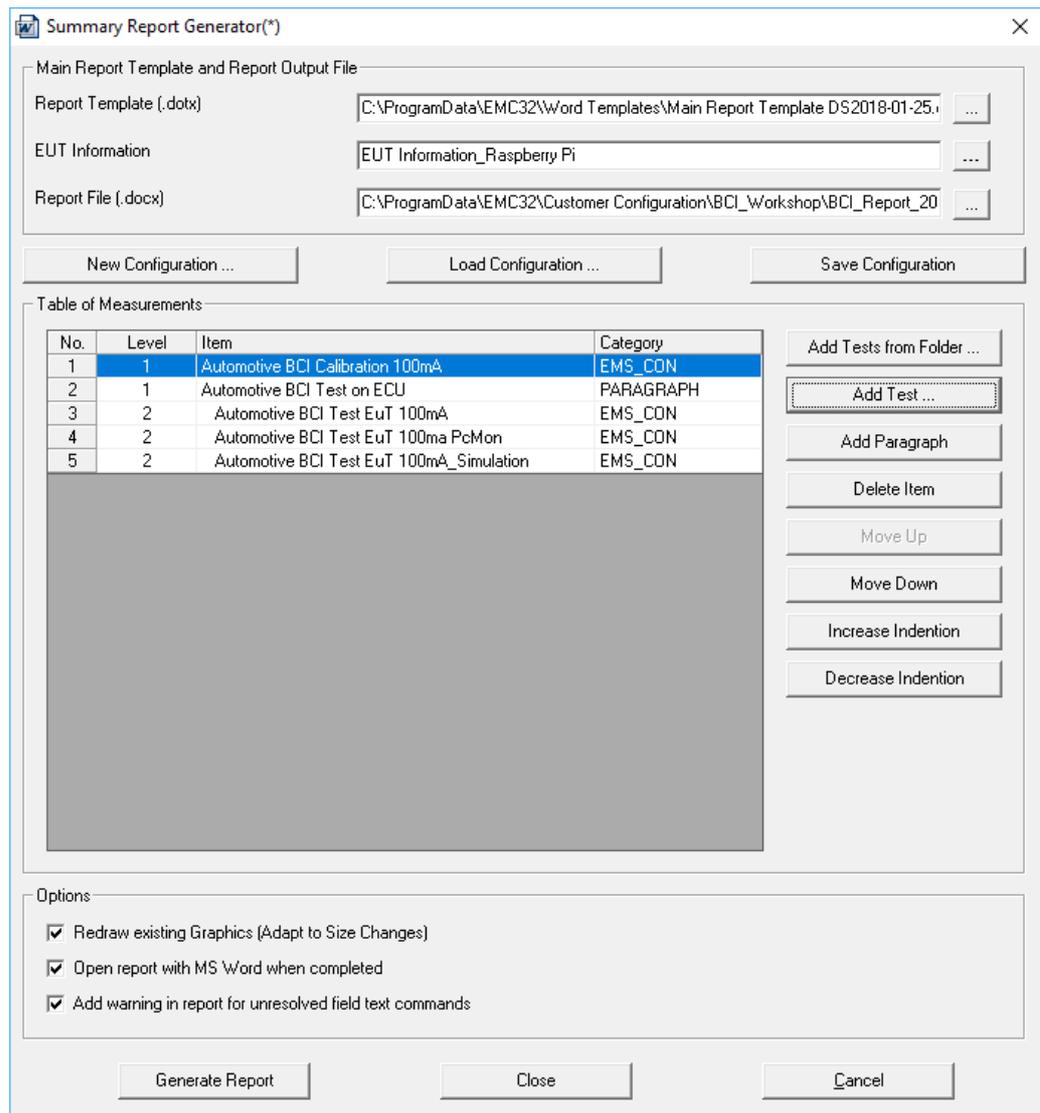
Figure 12: Summary Report Generator Dialog

The following chapter will give further details on the logical sections and parameters of this dialog.

### 3.2.1   Main Report Template and Report Output File

These sections allow to define the "Main Report Template.dotx" file for the summary report and also the report output file in .docx format. Optionally the R&S®EMC32 EUT Information to be included in the Main Report section (global for all reported tests) can be selected. Corresponding EUT Information files can be retrieved from the path:
C:\ProgramData\EMC32\System\EUT Information\Engine Controller.EUTInfo
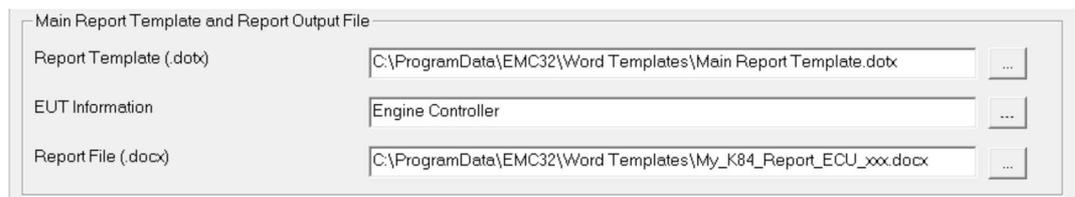
Figure 13: Main Report Template and Report Output File Section

Main Report Template:

By clicking on the selection icon⌷ of the Main Report Template (.dotx), a new Windows file selection dialog will be opened to select the used Microsoft®Word Template file (refer to chapter 2.3). The location of the .dotx file can be on any drive or network drive of the PC.
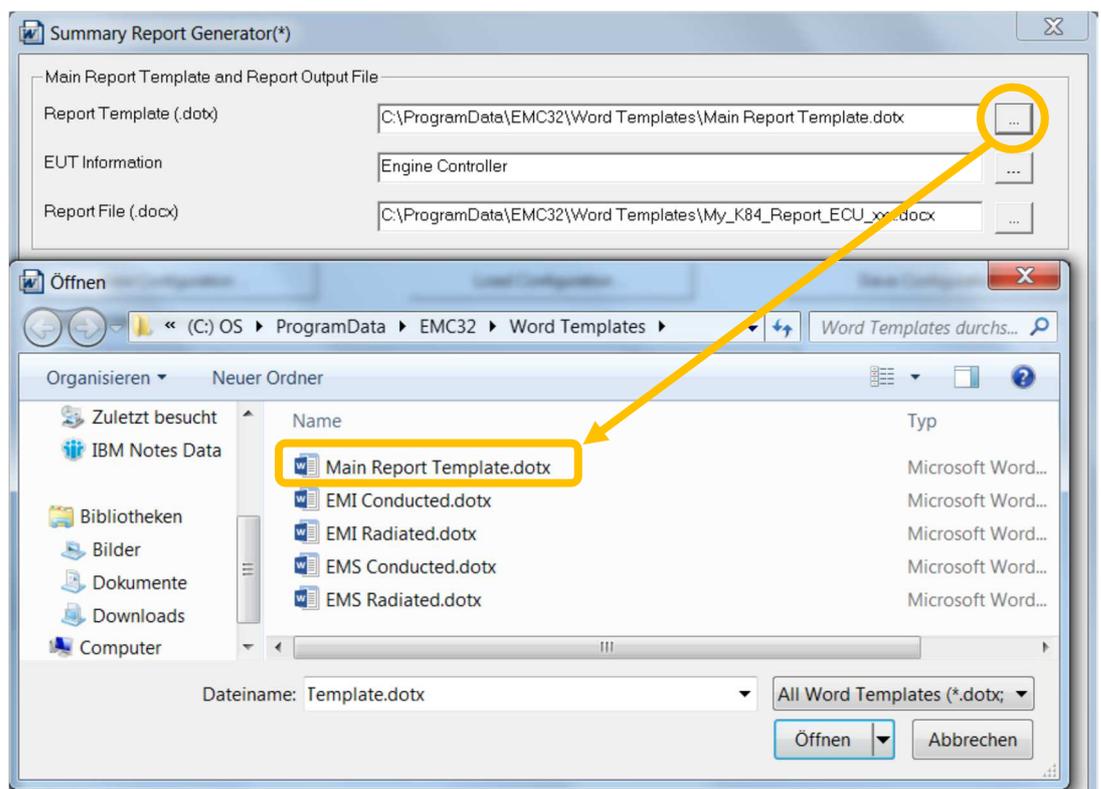
Figure 14: "Main Report Template" File Selection

EUT Information:

Defines the optional R&S®EMC32 EUT Information file from the EMC32 SYSTEM folder to be included in the Main Report Template (.dotx) file.
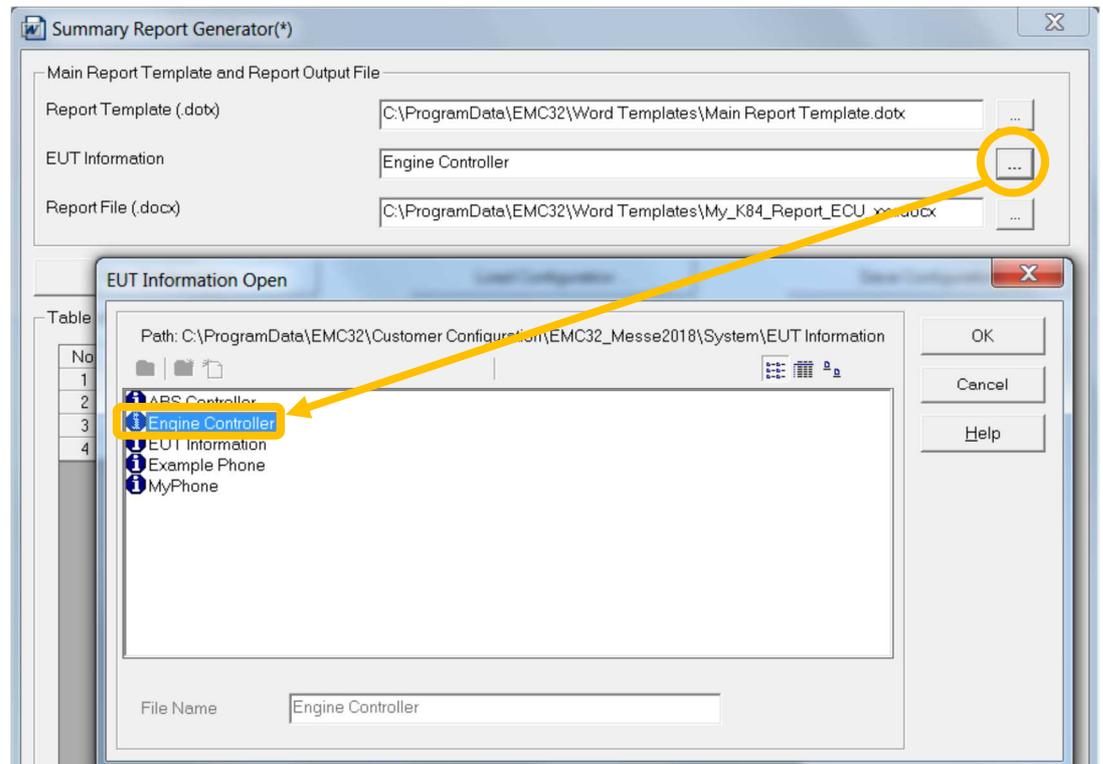
Figure 15: "EUT Information" File Selection

Report File (.docx):

Here the Report Generator Output File Name with fully qualified path is defined where the generated report file in Microsoft®Word .docx file format is written. The location of the .dotx file can be on any local drive or network drive of the PC.

3.2.2 Tests for Reporting

In this section all tests to be included into the summary test report are selected.

The tests will be added to the summary report in the order of this test list.
Either all tests from a subfolder of the R&S®EMC32 TESTS folder (measurement session for an EUT) can be simultaneously added by pressing the "Add Tests from the Folder …" or individual tests can be added by pressing "Add Test …" button.
Deleting of the selected tests as well as arranging of the test order is supported – keep particular buttons pressed for repeating rapidly.
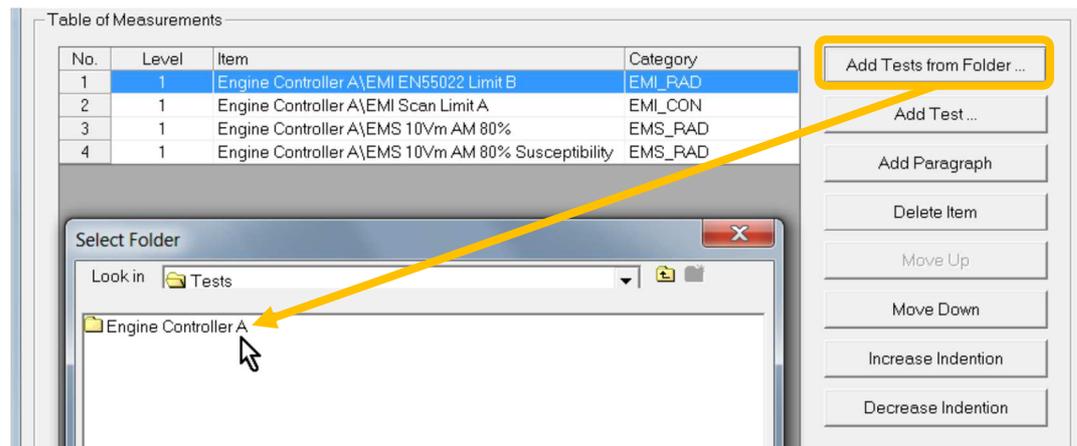

Figure 16: Add Tests from the folder

The selected test table shows the relative path name to the "Tests" root folder and the Category which indicates which kind of Sub Report Template will be selected.

3.2.3 Options

Redraw existing Graphics (Adapt to Size Changes):
For existing graphics, generated by a previous test, in may be necessary to redraw in order to force the graphics size to fit into layouts with multiple graphics on one page.

Open report with MS Word when completed:
By checking this option, the summary report will be opened in Microsoft®Word immediately after finishing the report generation process.

**Add warnings in report for unresolved field text commands:**
When this option is checked the report generator will replace unresolved field text commands with a warning text (e.g. no EUT Monitoring template available). This function is useful for testing new report templates.


Figure 17: Options Dialog

4. Generating Summary Report in Five Steps

1. Main Report Template and Report Output File section:
   - Define the Main Report Template
   - Optionally define the EUT Information file
   - Define the name and path of the report output file
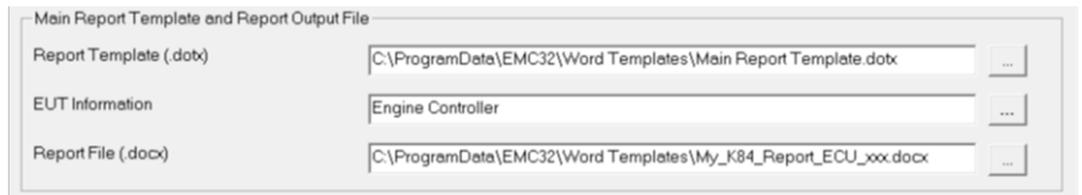
2. Assign Sub Report Templates (.dotx) for Test Category section:
   - Define the required Sub Report Templates for each used Test Type (e.g. EMI conducted) within the menu "Report" → "EMC32-K84 Report Options"
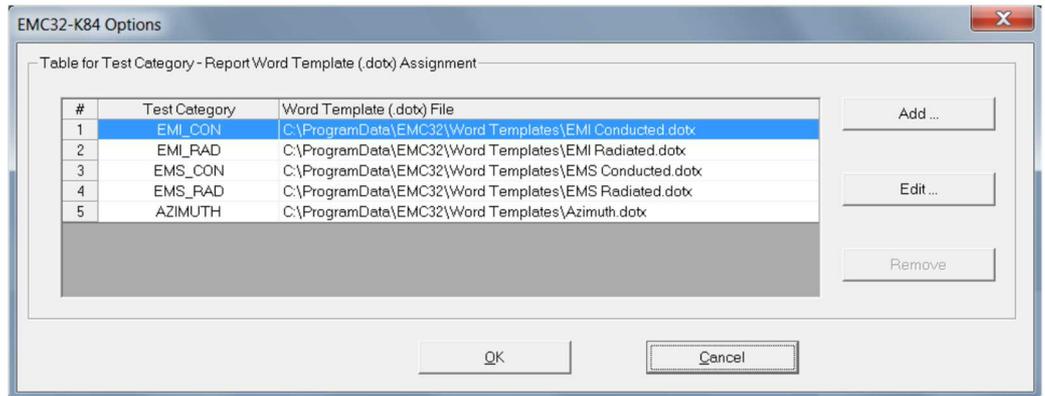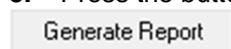

3. Test for Reporting list:
   - Add the "Table of Measurements" in the same order as they shall be added to the summary report.
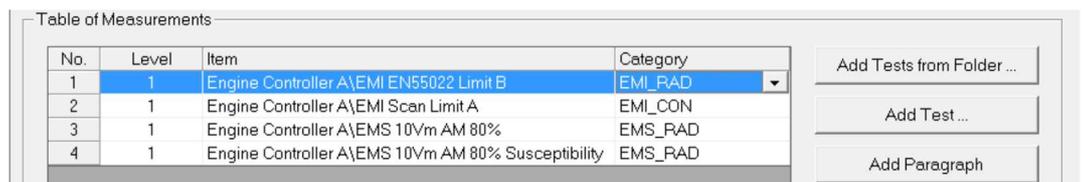
4. Options section:
   - Check the "**Open report with MS Word when completed**" in order to open the report .docx output file immediately after the end of the generation process.

5. Press the button "Generate Report" to start the report generation process.

When R&S®EMC32-K84 is generating the report the following windows appears and shows the current reporting progress. Here the report generation can be stopped optionally.
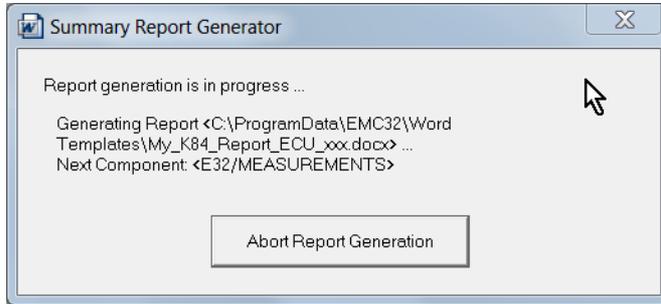
Figure 68: During Report Generation the process can be monitored or could be stopped

When the report document is completed and the corresponding option "Open report with MS Word when completed" has been selected (see step 4 above) Microsoft®Word will be started and the report output file is shown.
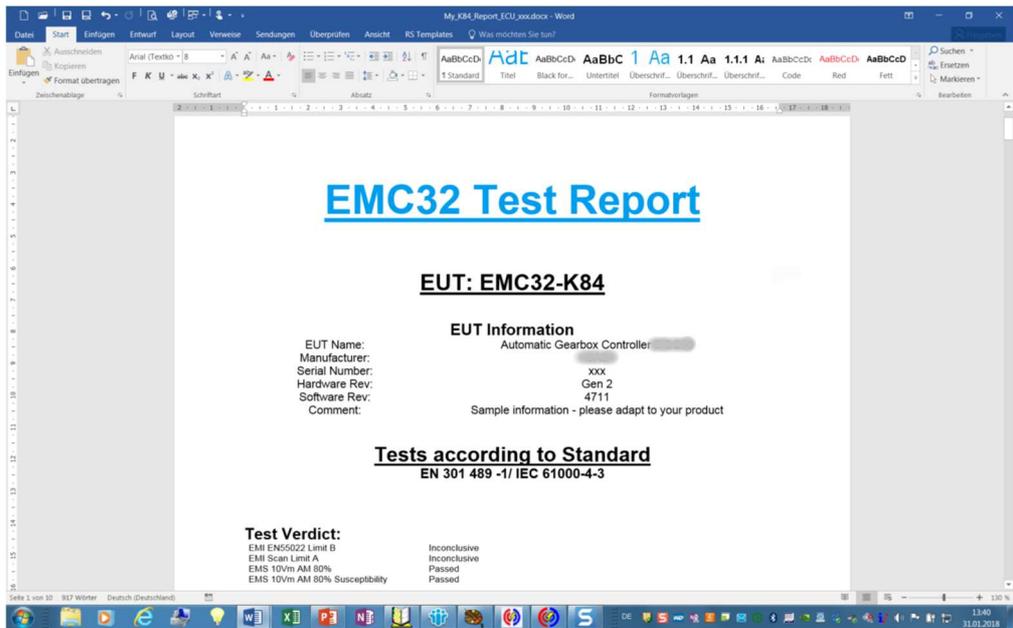
Figure 79: Open report with MS Word when completed - done

Remark:
Please update the Table "Contents" before Printing – it is recommended to "Update entire table"

5. Single Test Report to Microsoft®Word

Additional to the summary report generation R&S®EMC32-K84 provides the following functions for a single test (test is opened in EMC32 environment):

- Automated report generation at the end of a single test to output this report as Microsoft®Word .docx file using the field text commands for a Sub Report Template (refer to Table 2: Sub Report Template Field Text Commands).
- Create interactively a test report as Microsoft®Word .docx file based on a Sub Report Template to the current open test or to an arbitrary file folder.

Automated Test Report to Microsoft®Word .docx File

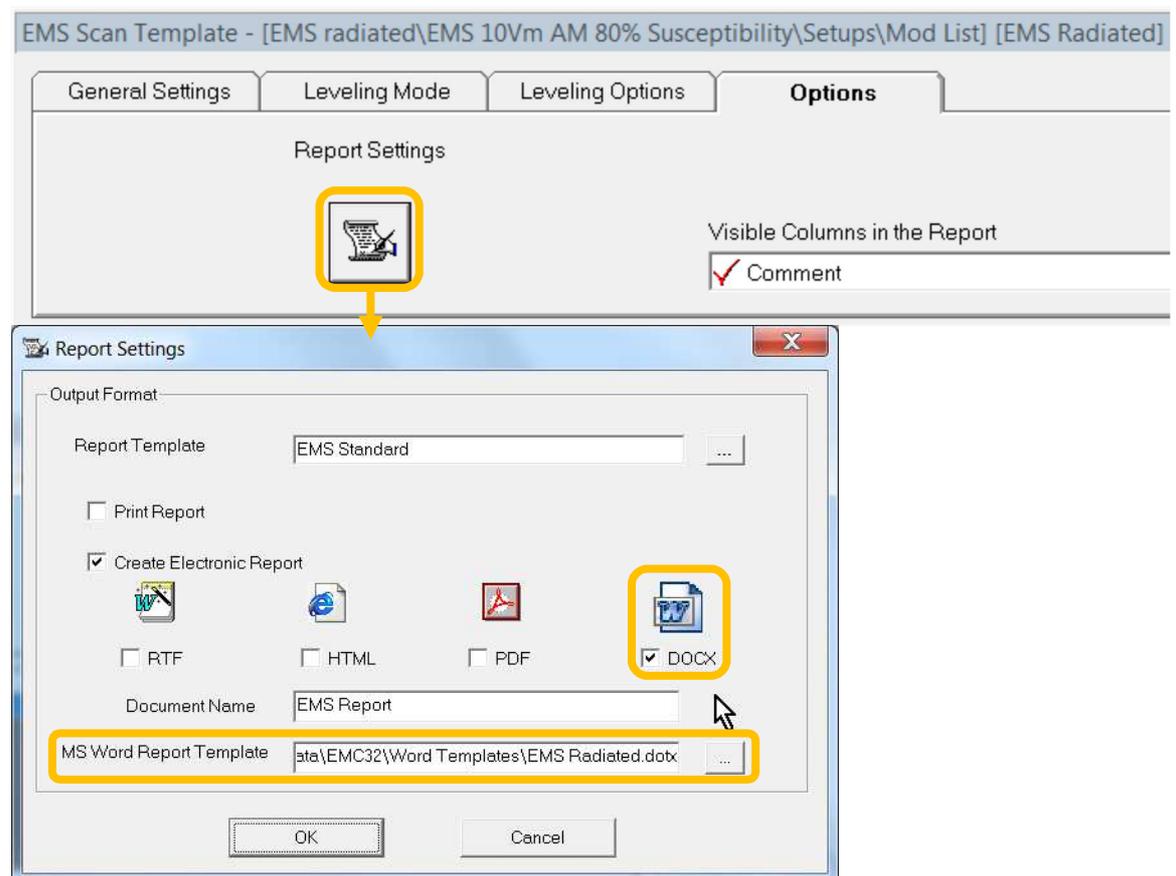This is configured in the Report Settings of the corresponding test template as shown in the figure below:

Figure 20: Automated Test Report Extension for .docx File Format

Create interactively a Test Report of Current Test to Microsoft®Word .docx File

When an EMC32 test is open the icon for the summary report generator is changed to the icon for the Microsoft®Word report generator for a single test.

Figure 21: R&S®EMC32 Shortcut Bar when a test is open

The report generator may be opened optionally via the main menu entry "**Report → Generate Summary Report**".
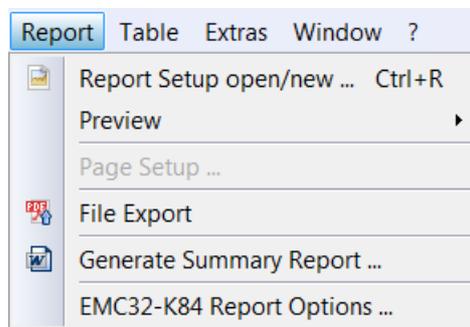
Figure 22: R&S®EMC32 Report Menu when a test is open

In this case the report generator for a single test is opened and after selecting a sub report template, the document name and the report output target folder the report generation is started via the "Generate Report" button.
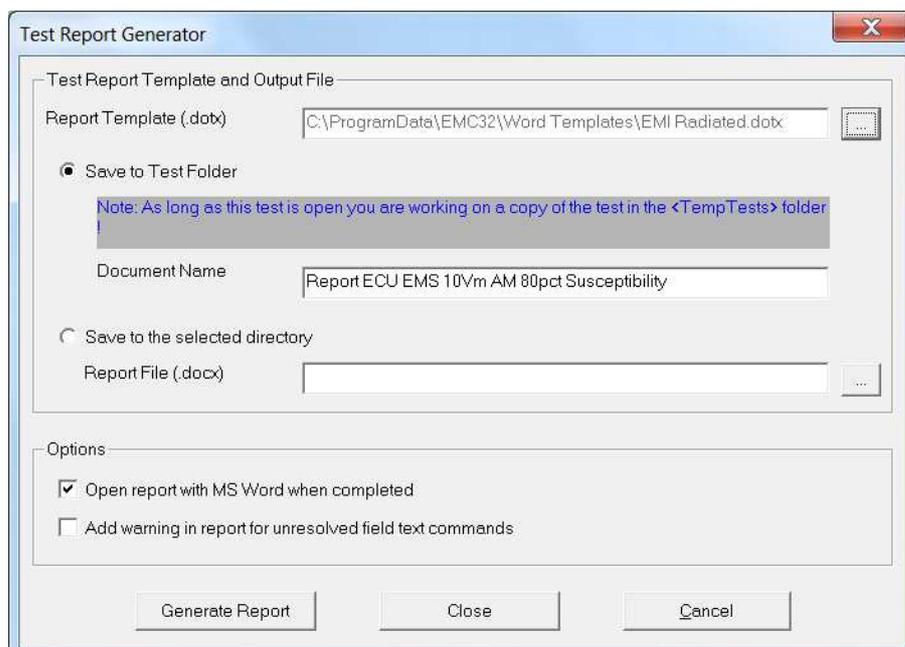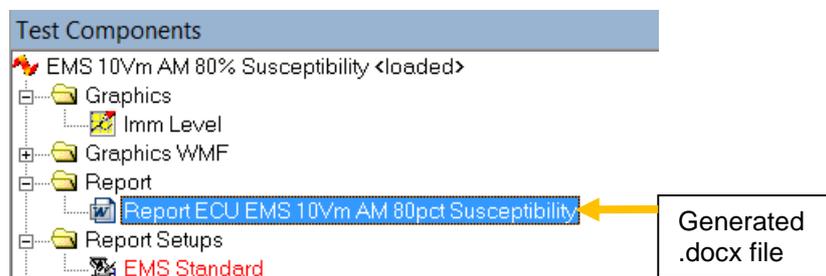
Figure 23: R&S®EMC32 Test Report Generator for a single test

When the report generation is completed the generated .docx file is either accessible via the R&S®EMC32 file explorer or in the directory selected for output.

Figure 24: R&S®EMC32 Test Report Generator for a single test

6. Document Templates – available Samples for MS WORD

This document is complemented by software, i.e. the document templates for MS WORD.
The software may be updated even if the version of the document remains unchanged.

Please see a list of currently available document template files:

  Main Report Template.dotx

Sub Templates	Sub Templates with heading
ALSE.dotx	ALSE - with heading.dotx
Azimuth.dotx	Azimuth - with heading.dotx
EMI Conducted.dotx	EMI Conducted - with heading.dotx
EMI Radiated.dotx	EMI Radiated - with heading.dotx
EMS Conducted.dotx	EMS Conducted - with heading.dotx
EMS Radiated.dotx	EMS Radiated - with heading.dotx
Stripline.dotx	Stripline - with heading.dotx

7. Ordering Information

Designation	Type	Order No.
EMI measurement software	R&S®EMC32-EB	1119.4638.02
EMS measurement software	R&S®EMC32-S	1300.7010.02
Report Interface	R&S®EMC32-K84	1522.9076.02

About Rohde & Schwarz

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Environmental commitment
- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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