NOTICE: This document contains references to Agilent Technologies. Agilent's former Test and Measurement business has become Keysight Technologies. For more information, go to **www.keysight.com.**

Agilent Technologies

MQA

Model QA with Electrical Test Data

Application Note

Copyright Notice and Proprietary Information

Copyright © Agilent Technologies, Inc. 2003, 2011. All rights reserved. This software and documentation contain confidential and proprietary information that is the property of Agilent Technologies, Inc. The software and documentation are furnished under a license agreement and may be used or copied only in accordance with the terms of the license agreement. No part of the software and documentation may be reproduced, transmitted, or translated, in any form or by any means, electronic, mechanical, manual, optical, or otherwise, without prior written permission of Agilent Technologies, Inc., or as expressly provided by the license agreement.

Right to Copy Documentation

The license agreement with Agilent Technologies permits licensee to make copies of the documentation for its internal use only. Each copy shall include all copyrights, trademarks, service marks, and proprietary rights notices, if any. Licensee must assign sequential numbers to all copies.

Disclaimer

AGILENT TECHNOLOGIES, INC. AND ITS LICENSORS MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Registered Trademarks (®)

Agilent, Model Builder Program, MBP, Model Quality Assurance, MQA, Advanced Model Analysis, AMA, Proximity Quality Assurance, PQA are registered trademarks of Agilent Technologies, Inc.

Model QA with Electrical Test Data

Application Note

This application note describes how to run a QA on models with electrical test data in Model Quality Assurance (MQA). **Note**: This document was originally released for MQA V2010.2.0.1 in May 2011.

Introduction

MQA can realize comprehensive QA on various models, including the model with electrical test (ET) data. In this document, ET data with capacitance is used as the example to show the steps required to run the QA. For more information go to www.agilent.com/find/eesof or contact your local Agilent office. The complete list is available at: www.agilent.com/find/contactus.

Steps

The user can follow the following steps, one by one, to complete a full QA process for models with ET data.

Create New Project

Choose *Project --> Create and Run Project* from the main menu. In the popup window click *New* to create a new project (Figure 1).

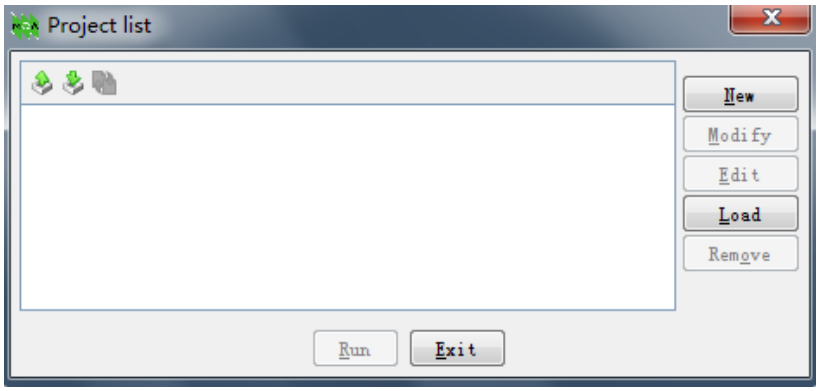

Figure 1. Project list window

The Project Wizard window will pop up. The user must then type in the name of the new project (necessary) and its description (optional), as shown in Figure 2. Click *Next*.

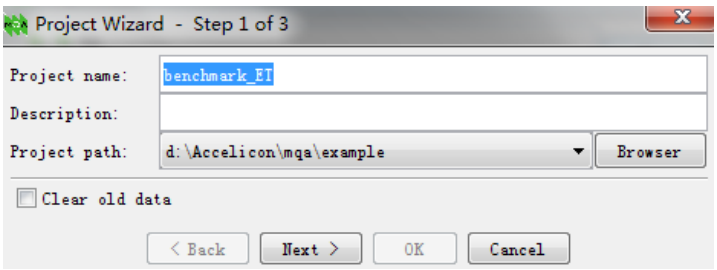

Figure 2. Project Wizard, step 1 of 3

Load Model

In the window shown in Figure 3, choose *QA* as the action type, *Analog* as the application type

and NMOS as the model type. Then, click *Add*.

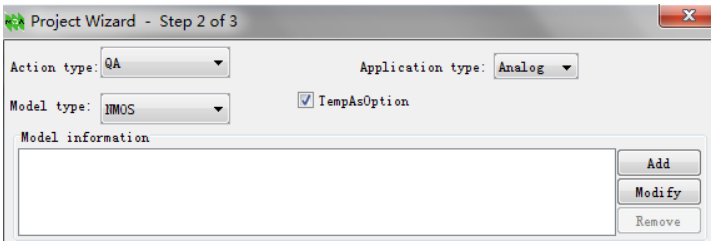

Figure 3. Project Wizard, step 2 of 3

Click *Browser* to choose the model library or model card. The resulting window is shown in Figure 4.

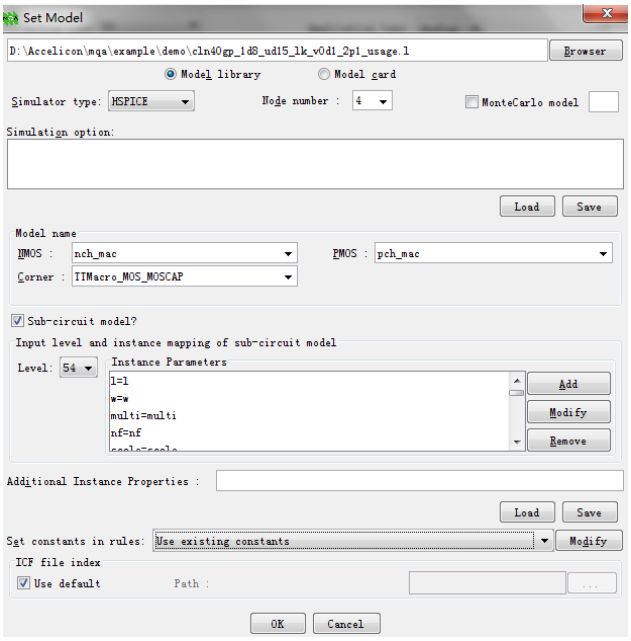

Figure 4. Set model

After loading the model, the user can give it a shorter file name. To do this, right click on the model name and select *Rename*, as shown in Figure 5. The new name needs to follow the unified format, for example, "*cln40gp.nch.TT*". Here dot "**.**" is a keyword to separate the filename, model name and corner name.

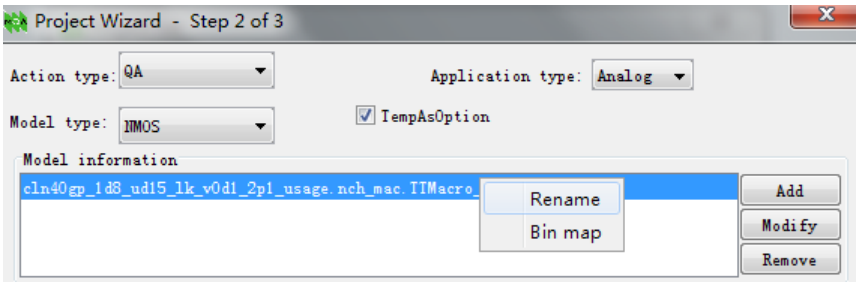

Figure 5. Project Wizard, step 2 of 3

Load ET Data

The user must enable the *Use ET* checkbox to load the ET data (Figure 6). For the format of the ET data used in this example, refer to the ET Data Format section at the end of the application note.

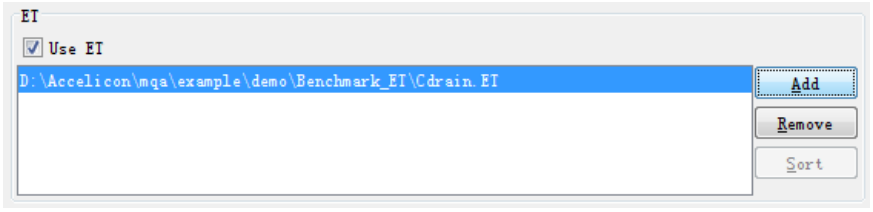

Figure 6. Load ET data

Load Rule

The load rule is a benchmark rule based on the netlist "*cdrainn.sp.*" as shown in Figure 7. Select rule and click the *OK* button.

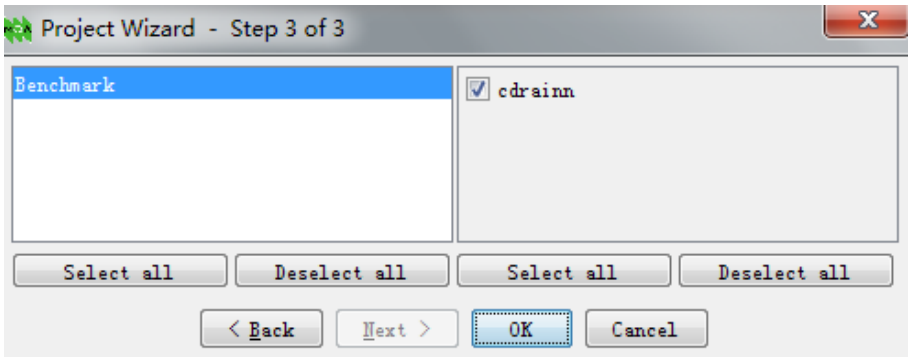

Figure 7. Project Wizard, step 3 of 3

Run

Select the project just created and click the *Run* button. The project list window is shown in Figure 8.

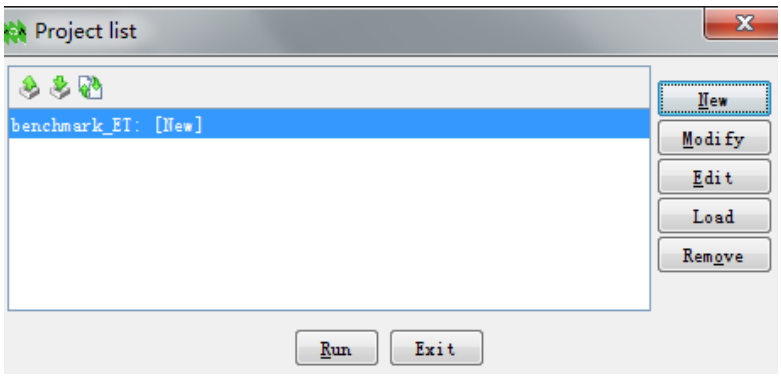

Figure 8. Project list

Export to Report

After QA is done, right click on the project node and select *Export to Report* (as shown in Figure 9) to pop up the Report Wizard window.

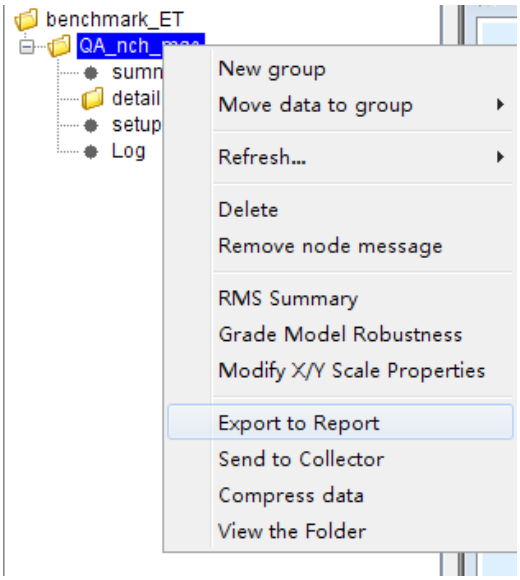

Figure 9. Export to Report

From here the user can customize the report format as shown in Figure 10.

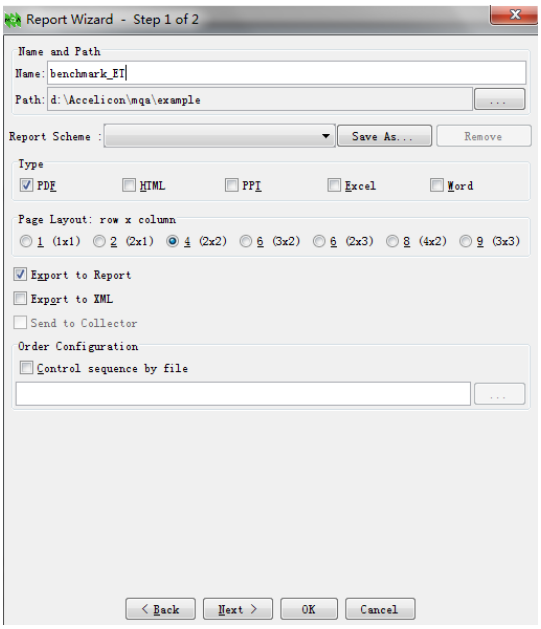

Figure 10. Report Wizard window

Sample Result

A sample report result is shown in Figure 11.

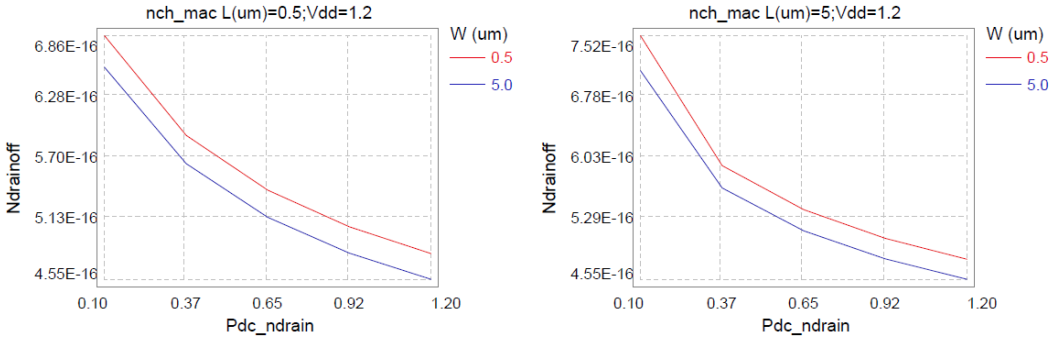

Figure 11. Sample result

ET Data Format

Below is an example of MQA compatible ET file syntax. It contains several parts as follows:

*Define Target Value here
[block target=Vth polarity=N]

*List all variables here
site_LVT=string
W=double

L=double
T=double

*Define Coordinates for ET Data
[data X=L Y=site_LVT]

* X-Axis value and index of Y values are indicated here
<L=0.8e-6,0.9e-6,1.0e-6,1.1e-6,1.2e-6,1.3e-6,1.4e-6;site_LVT=site1,site2,site3,site4,site5;W=1.0e-6;T=25>

*This 7*5 matrix below shows that*
L value is from 0.800~1.430 with 5 sites and the Vth varies from 0.5 to 0.54:
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54
0.50, 0.51, 0.52, 0.53, 0.54