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# MQA

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Application Note

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## Passive Subcircuit Model QA

## **Application Note**

This application note describes how to run passive subcircuit (subckt) model quality assurance (QA) in Model Quality Assurance (MQA). **Note**: This document was originally released for MQA V2010.2.0.1 in May 2011.

#### Introduction

MQA c an realize comprehensive QA on various models, including the passive subckt model. In this document, an RF resistor is used as the example to show the steps required to run the QA. For more information go to <u>www.agilent.com/find/eesof</u> or contact your local Agilent office. The complete list is available at: <u>www.agilent.com/find/contactus</u>.

#### Steps to QA

The user can follow the following steps, one by one, to complete a full QA process for the passive subckt model.

#### 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).

Project list		×
\$ \$ M		<u>N</u> ew
		<u>E</u> dit <u>L</u> oad
		Rem <u>o</u> ve
	<u>R</u> un <u>E</u> xit	

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*.

Project Wizar	d - Step 1 of 3
P <u>r</u> oject name:	demo
Description:	QA for RF Resistor
Project <u>p</u> ath:	d:\Accelicon\mqa\example
Clear old da	ta
[	< <u>Back</u> Itext > OK Cancel

Figure 2. Project Wizard, step 1 of 3

#### Load Subckt Model

In the window shown in Figure 3, choose *QA* as the action type, *RF* as the application type and *Resistor* as the model type. Then, click *Add*.

Project Wizard - Step 2 of 3		<b>X</b>
Action type: QA 🔹	Application type: RF 💌	
Model type: Resistor 👻	V IempAsOption	
Model information		
		Add
		Modify
		Remove

Figure 3. Project Wizard, step 2 of 3

Click *Browser* to choose the model library or model card. The model is automatically detected as a subckt model when it loads. Select *crtmom* in the Subcircuit drop down list. Make sure the Node number is correct. Instance Parameters (the instance name used in the Model and the instance name used in Rule) are normally mapped automatically. The window is shown in Figure 4.

Set Model		-				×
D:\Accelicon\mqa\example	\demo\cln40g	gp_1d8_ud15	_1k_v0d1_	2p1_usage	.1	Browser
	Mode <u>l</u> libr	ary	🔘 Model g	<u>c</u> ard		
Simulator type: HSPICE	•	No <u>d</u> e numb	er : 3	-	MonteCarl	o model
Simulation option:						
					Load	L Save
Model name						
			_			
Subcircuit : crtmom		•	Corner	: TT_RIMO	OM	-
Input level and instance Instance Parameters nv=nv	e mapping of	5 sub-circu	it model		A	Add
nh=nh						Modify
w=w s=s						mourry
ctm=ctm					*	Remove
Add <u>i</u> tional Instance Prope	erties :					
					Load	Save
Set constants in rules:	Use existin	g constants				▼ Mo <u>d</u> ify
ICF file index						
🔽 Use default	Path :					
	[	OK	Cancel	1		

Figure 4. Set model

Click OK. The window with model information is shown in Figure 5.

🙌 Project Wiz	zard - Step 2	of 3			×
Action type:	A	•	Application typ	e: RF 🔹	
Model type: F	Resistor	•	🗸 TempAsOption		
Model inform	ation				
cln40gp_1d8_	ud15_1k_v0d1_	2p1_usage. crt	tmom. TT_RIMOM		Add
					Modify
					Remove

Figure 5. Project Wizard, step 2 of 3

#### Select Rule

A rule file is needed to run QA. Refer to the rule file used in this example in the section titled "Rule File" at the end of the application note. After loading the rule file, the window in Figure 6 is shown.

heck CV	☑ Check CV

Figure 6. Project Wizard, step 3 of 3

#### <u>Run</u>

Click *OK* to return to the Project window to find the project just created (Figure 7). Click *Run* to proceed.

Project list	×
\$ \$ B	New
demo(QA for RF Resistor): [New]	<u>M</u> odify <u>E</u> dit <u>L</u> oad Rem <u>o</u> ve
<u>R</u> un <u>E</u> xit	

Figure 7. Project list window

#### **Generate Report**

After QA is done, right click on the project node and select *Export to Report* (as shown in Figure 8) to pop up the Report Wizard window.

demo(QA	for RF Resistor)	
• • s	New group	
- 📁 C	Move data to group	•
	Refresh	•
	Delete	
	Remove node message	
	RMS Summary	
	Grade Model Robustness	
	Modify X/Y Scale Properties	5
	Export to Report	
	Send to Collector	
	Compress data	
	View the Folder	

Figure 8. Export to Report

From here the user can customize the report format, as shown in Figure 9.

Name and Path				
Name: demo				
Path: d:\Accelic	con/mqa/exampl	Le		
Report Scheme :			Save As	Remove
Туре				
PD <u>F</u>	HTML	PP <u>I</u>	<u>Excel</u>	🔲 <u>¥</u> or d
Page Layout: ro	ow x column			
		(2x2) 🔘 6 (3x	2) 🔘 <u>6</u> (2x3) 🔘 <u>8</u>	(4x2) 🔘 9 (3x3)
Order Configura				
Order Configura				

Figure 9. Report Wizard window

#### Sample Result

A sample report result is shown in Figure 10.



Figure 10. Sample result

#### **Rule File**

Below is the rule file with comments used in the example in this application note.

[Label: 3501:title= Check CV] [Condition:1] # defines Vio, T, Vout, freq, w and s in loops section. # note: because there is no L in this model, so we use s instead. # as you see, we can sweep subckt instance parameters in loops directly, as long as we have them mapped on GUI. [Loops :X=Vio(start=0.1,stop=Vin,step=0.1) :p=T(tnom) :P1=Vout(0) :P2=freq(start=1e8,stop=1e10,num=101) :p3=w(0.063e-6,0.05e-6,0.06e-6,0.07e-6,0.09e-6) :p4=s(0.063e-6,0.09e-6) ] [Target: y1=Cgg]