

Panel Session TP-TU3 High-speed Channel Designs IBIS AMI Solution

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Challenges

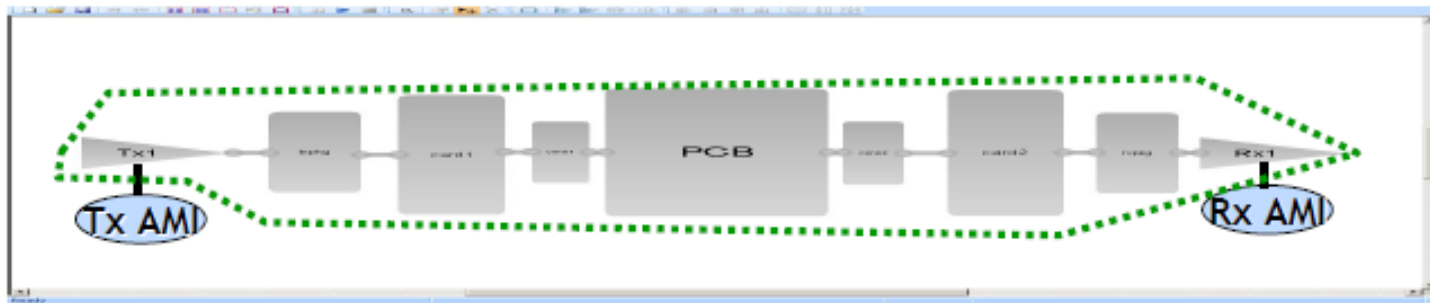
- Modeling of Equalization schemes including FFE, DFE
- Representing Clock and Data Recovery
- Computing Bit Error Rates == High Simulation Performance
- Architectural Exploration

Algorithm Level Modeling

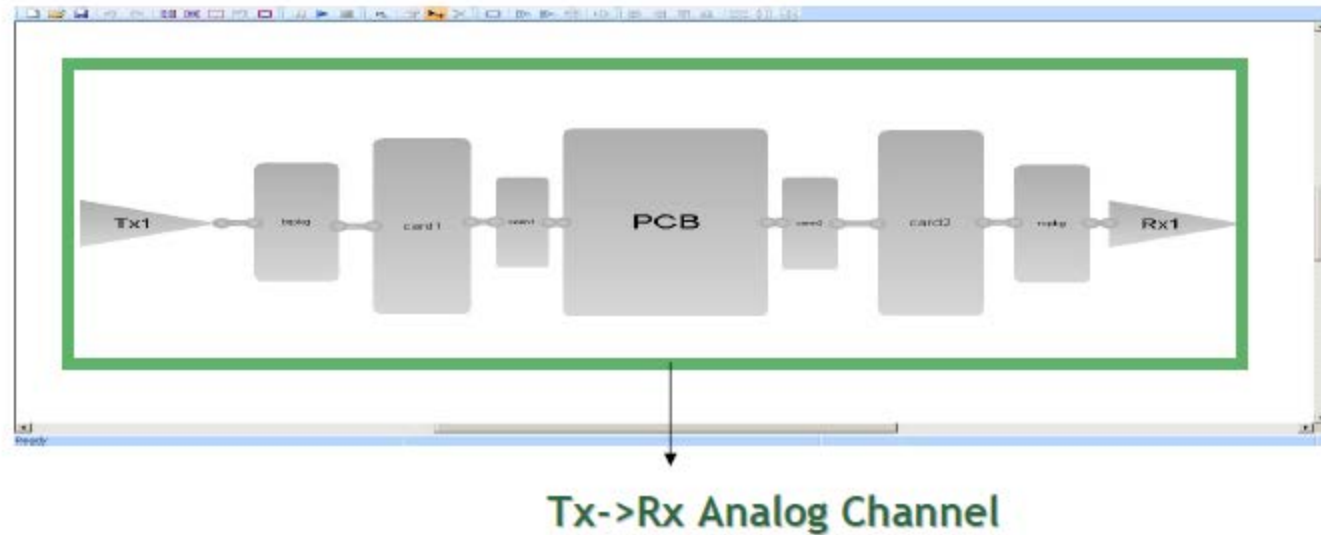
- Addressed device modeling challenges
- Enables pre Architectural level Exploration and post layout
- Already prevalent in IC design houses
- IBIS Version 5(Aug 2008) includes AMI Modeling support
- IBIS AMI Models are interoperable

AMI – key concepts

- The Tx –to– Rx pathway is composed of 3 separate entities
 - Tx algorithmic part
 - The Analog channel
 - The Rx algorithmic part
- Three “decoupled” parts can be *independently* solved in time domain
- Executable model delivered as a dynamically linked library (DLL)
 - Data flow between these three parts is addressed by the standardized API
 - Robust and flexible parameter passing to Tx & Rx

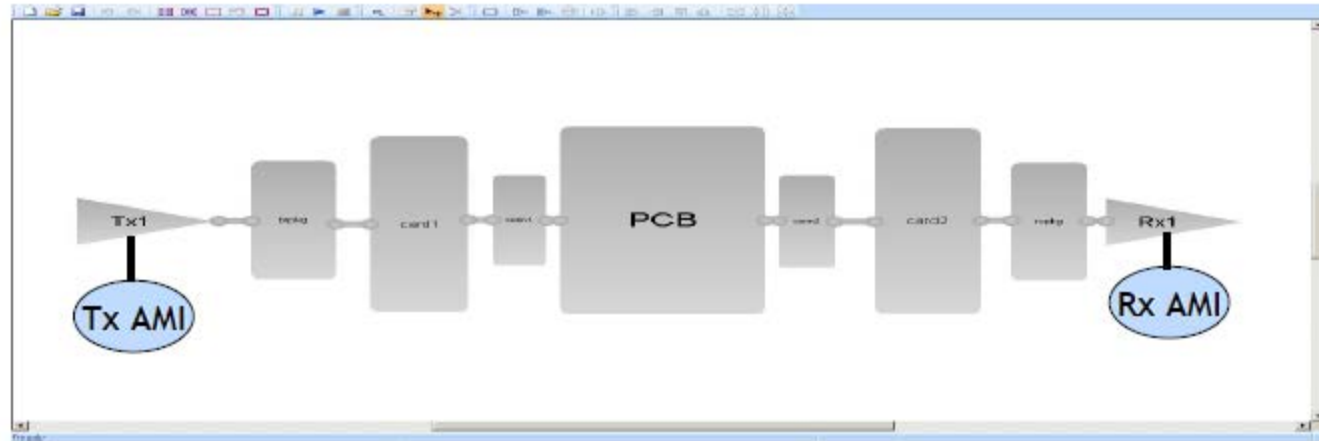


IBIS AMI Analog Channel



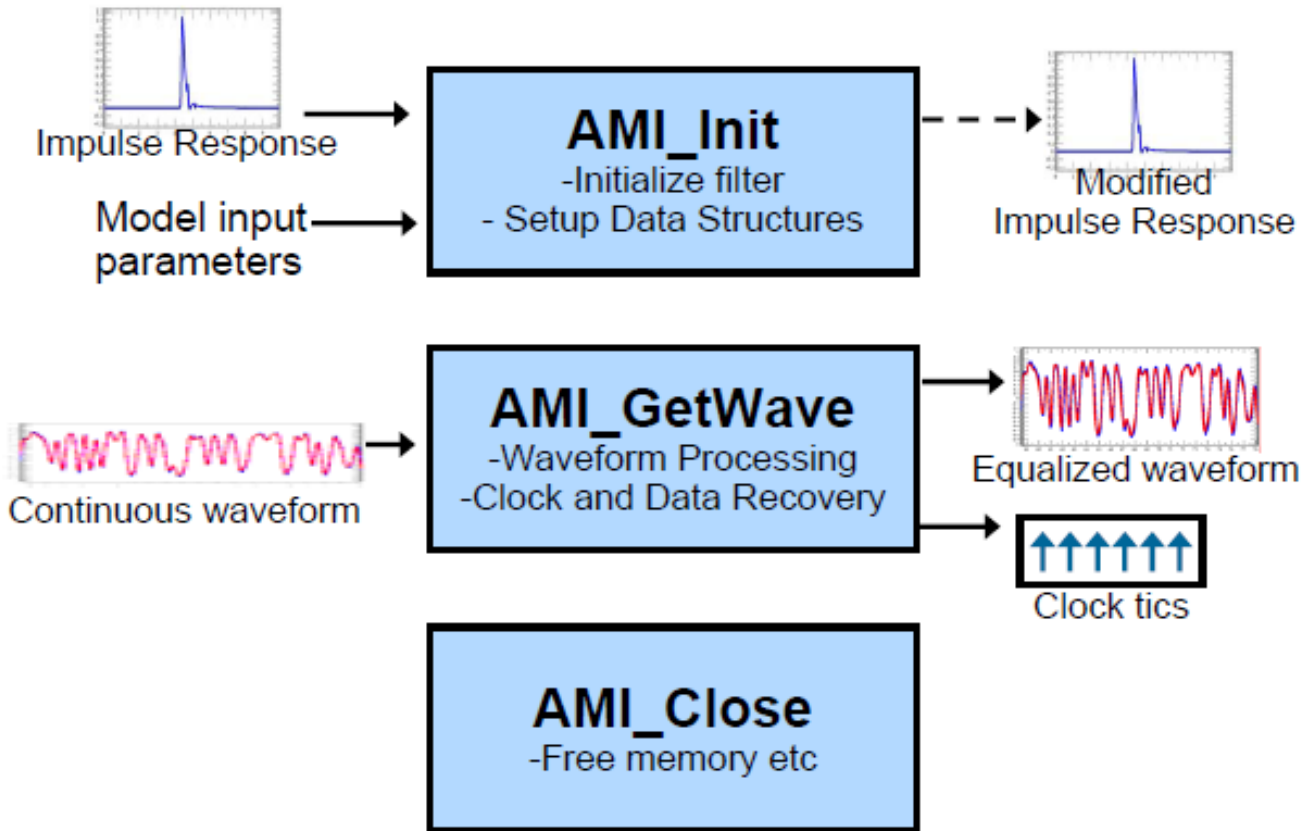
- EDA tools leverage/build on existing infrastructure
- Tx/Rx will still require an analog I/O front end model

AMI Model Section



- AMI Models are Executable “blackbox”
- Platform dependent
- One AMI model/device
- Accompanied by Parameter Definition File

IBIS AMI Data Flow API



IBIS AMI-What it does and does not

■ Does

- How and what data is interchanged between eda tool and ic ami model during 'Init' and 'GetWave' call
- Pass the user settable parameters to the AMI model

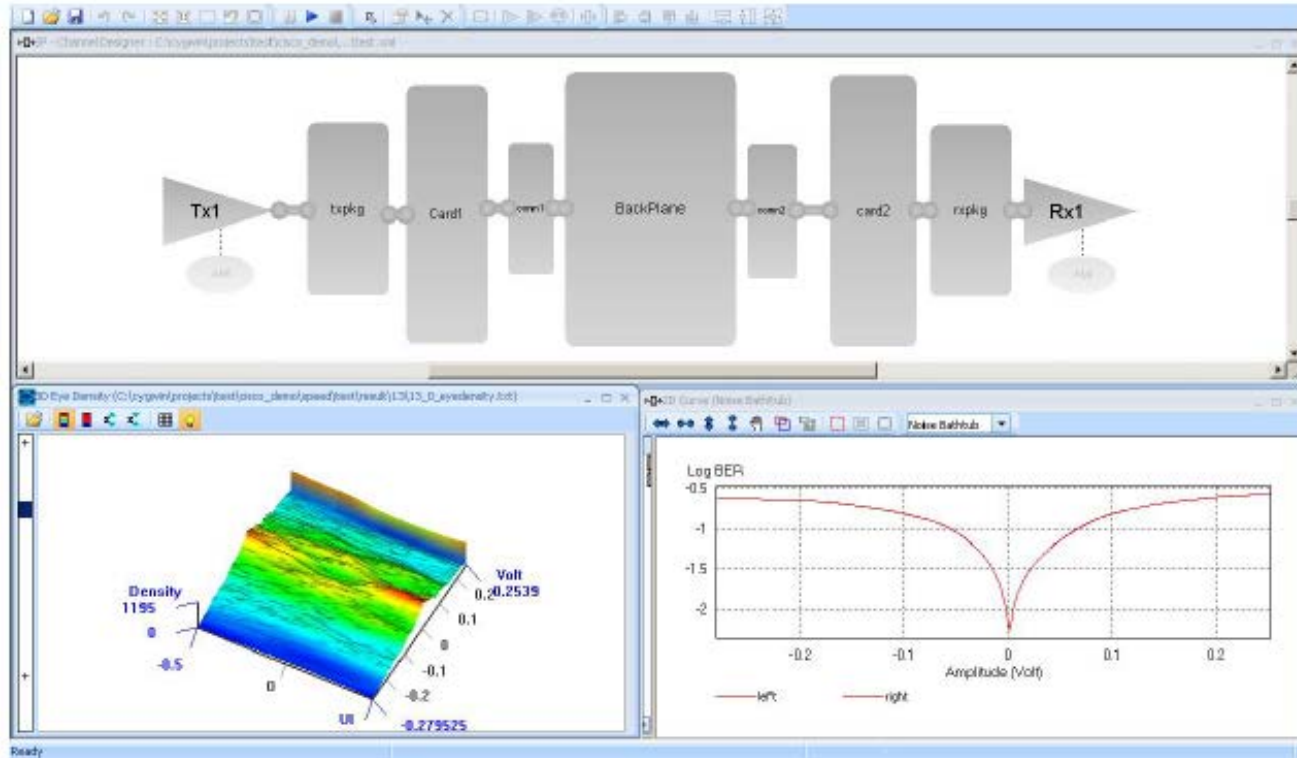
■ Does not

- Prescribe how the device has to be modeled
- State and limit the parameters which can be passed
- Specify how the eda tool should perform the simulation (Simulator Agnostic)
- Stipulate how eye diagram, Bit Error Rates have to be computed

AMI Status

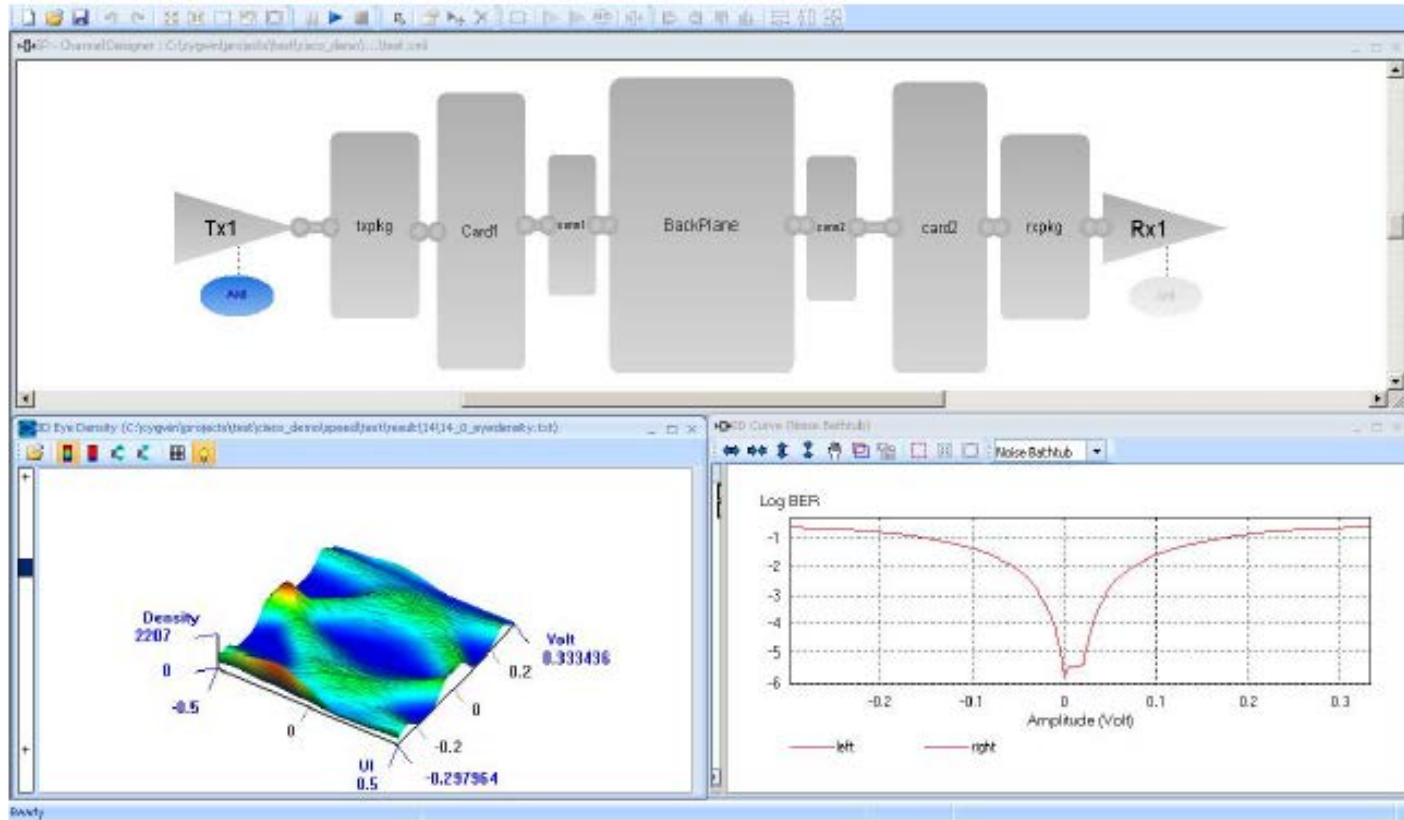
- AMI Models being developed and delivered by various ic vendors
- EDA tools need to support ami
- Models are available so far through nda

AMI in action

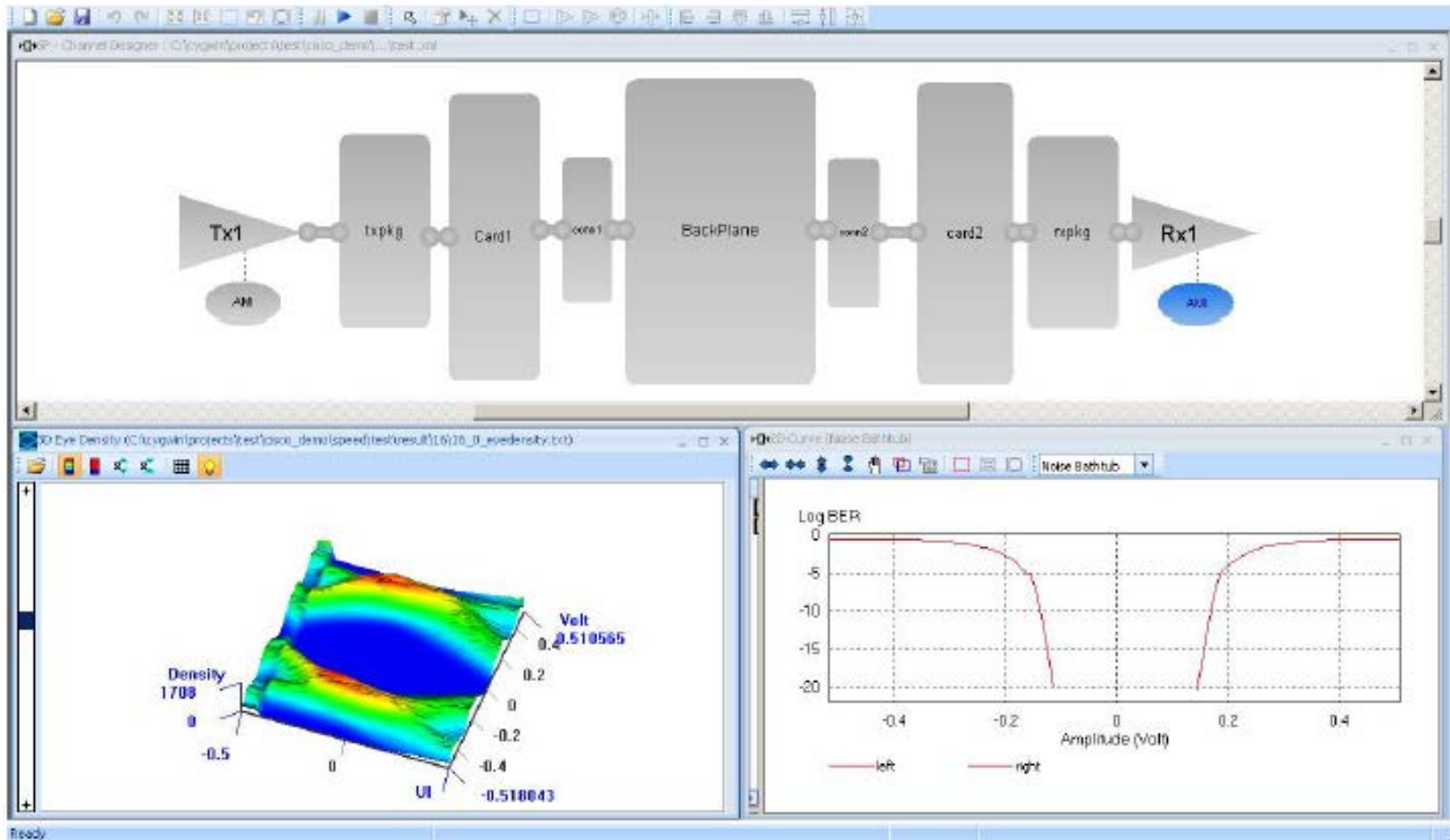


No AMI

AMI FFE



FFE + DFE



AMI Models enable practical design space exploration

The screenshot displays the Channel Designer interface. The top window shows a signal path diagram with components: Tx1, bpk1, card1, conn1, BackPlane, conn2, card2, rxpk1, and Rx1. Below this is the Sweeping Manager dialog box, which is configured for AMI Parameters Sweeping. The dialog shows a list of parameters to sweep, with 'pre:Txl:amiffe' selected. The results table shows four iterations with varying values for 'pre:Txl:amiffe' and corresponding Eye Height (mV) values.

Sweeping Manager

Sweeping type: AMI Parameters Sweeping Total iterations: 4

AMI File: amiffe

Parameters to sweep:

Parameter	Min	Max	Step	Value List
pre:Txl:amiffe	0	3	1	

Results: in the same windows

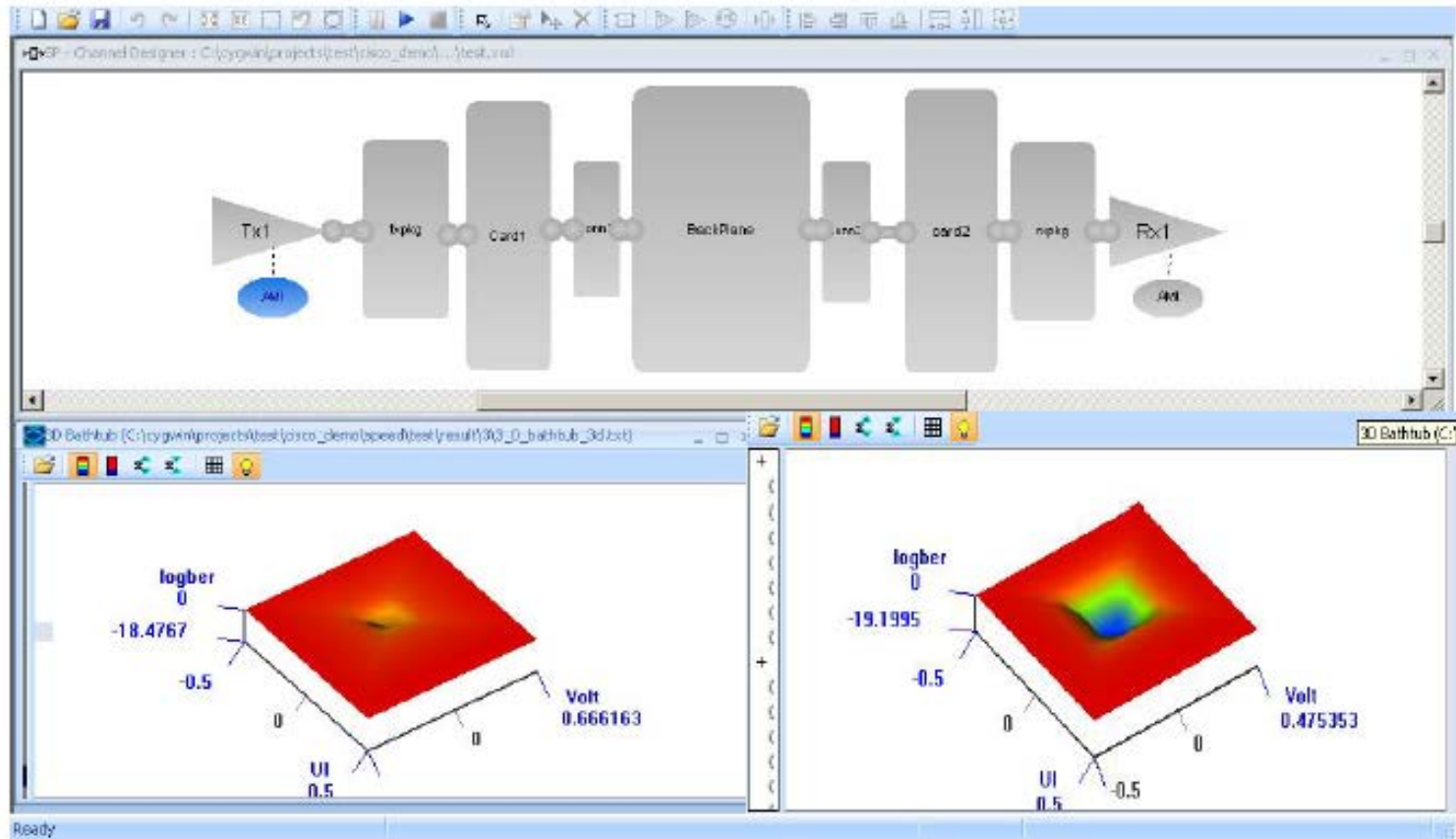
Iteration	Values	Time iter(UD)	Eye Height(mV)
1	pre:Txl:amiffe:0	0.56	218
2	pre:Txl:amiffe:1	0.12	365
3	pre:Txl:amiffe:2	0.12	356
4	pre:Txl:amiffe:3	0.12	477

Click on a parameter to add it to Parameter to sweep list. Click in Min, Max, Step, or Value List column to input data. Right click to delete. Double click on an iteration to display the results.

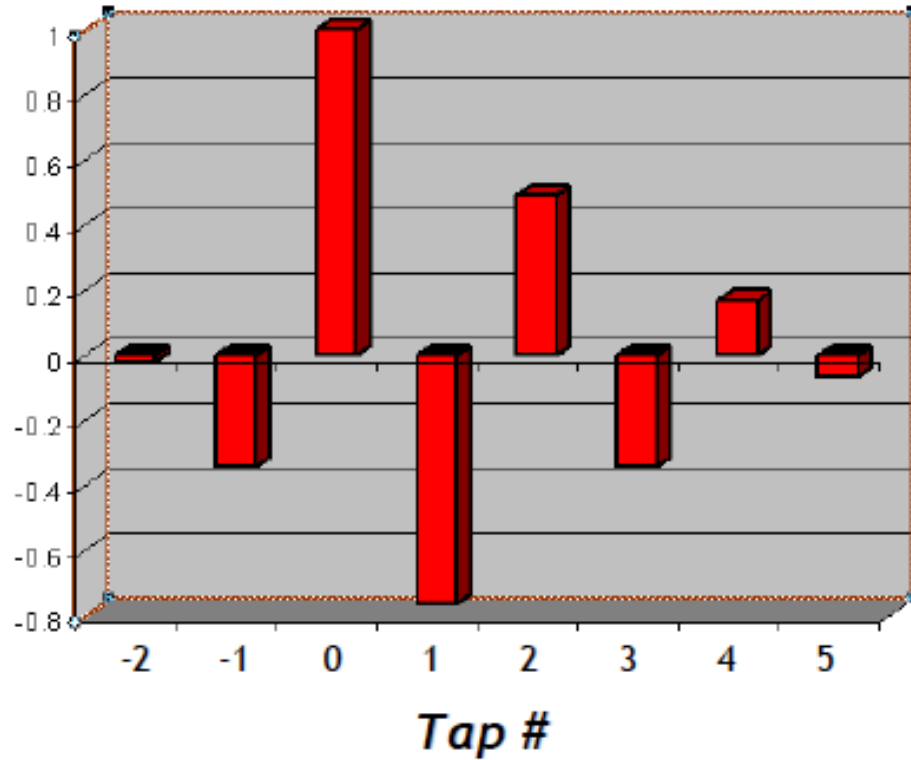
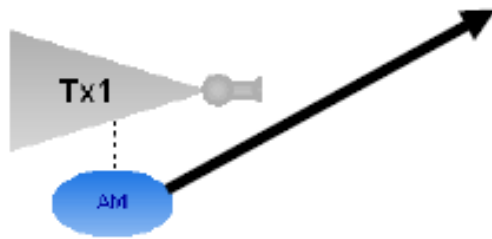
Eye Contour Eye Density Bathtub Report

OK Cancel Apply

Design Space



AMI optimizes tap coefficient



Final Thoughts

- AMI Modeling is here
 - Essential for serial link analysis
- Pre and post layout
- Increasing model availability
- EDA tools support AMI

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