

High Speed Link Simulator

Stateye and Matlab

EE689-606

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PROCEDURES

1. Channel Model Download

- STATEYE does not provide channel information, therefore we have to get touchstone type channel modeling files

Ex) <http://www.t11.org/ftp/t11/models/index.html>

http://grouper.ieee.org/groups/802/3/ap/public/channel_model/archive/index.html#Channel Model Material

2. Create STATEYE Script File

3. High Speed link Simulation will be done by STATEYE Simulator

- STATEYE generate only MATLAB script files

<http://www.stateye.org/stateyev4/index.html>

4. The Result Figure will be shown by MATLAB Simulator

- Matlab 2007a and Stateye installed Lab 213B

Stateye do not run at 2009 version

1. Download Channel

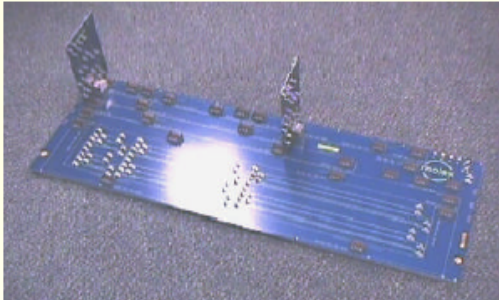
Channel Description

➤ Backplane Channels:

◆ FR408 GBX Reference Backplane

◆ 15", 25" and 30" channels (two connectors; 2.5" trace on each line card)

◆ Backdrilled, bottom routed and 185 mil via stub



➤ SCA2 channel:

◆ Single channel (no Xtalk aggressors at this time), two measurement based connector models (thru-hole receptacle to straddle-mount SMT plug), 18" simulated FR408 backplane channel, 5 mm trace on each paddle card

Data Listing

What is provided:

- Molex Case 1 (15" FR408 Backplane channel, bottom routed, moderate crosstalk)
- Molex Case 2 (25" FR408 Backplane channel, backdrilled, moderate crosstalk)
- Molex Case 3 (25" FR408 Backplane channel, backdrilled, high crosstalk)
- Molex Case 4 (30" FR408 Backplane channel, backdrilled, moderate crosstalk)
- Molex Case 5 (15" FR408 Backplane channel, via stub, moderate crosstalk)

- 📁 Molex_Case2_F1
- 📁 Molex_Case2_F2
- 📁 Molex_Case2_F3
- 📁 Molex_Case2_N1
- 📁 Molex_Case2_N2
- 📁 Molex_Case2_N3
- 📁 Molex_Case2_N4
- 📁 Molex_Case2_T

1. Download Channel Model –We are using 25inches FR4 channel in this example.

2. Read Channel Description

1. Download Channel

File Name Conventions

- S-parameter data for each channel comes in an accordingly named folder. The Thru channel data is designated by “_T” in the filename, NEXT aggressor data by “_N1” through “_N4”, and FEXT by “_F1” through “_F3”. For instance, Molex Case 1 data is found in the

Molex_Case1 folder and consists of:

Molex_Case1_T.s4p : Through Channel

Molex_Case1_N1.s4p, Molex_Case1_N2.s4p, Molex_Case1_N3.s4p,

Molex_Case1_N4.s4p: NEXT Aggressors

Molex_Case1_F1.s4p, Molex_Case1_F2.s4p, Molex_Case1_F3.s4p : FEXT Aggressors

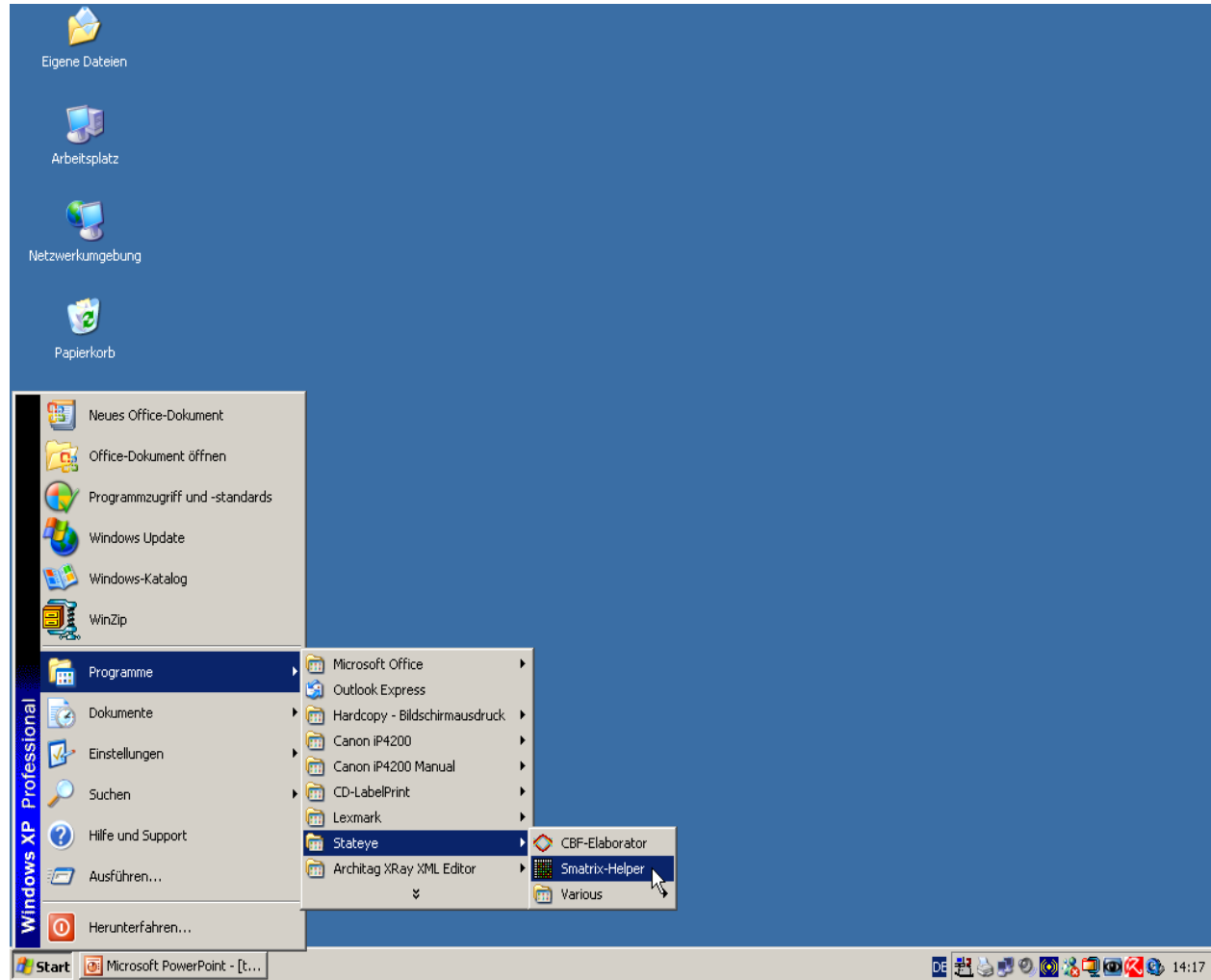
- Data format is standard real/imaginary S-parameters

Ex) Molex_case2_T.s4p (touchstone file type)

```
FILE: D:\users\goganessyan\NEW 408 backplane S Parameters\Molex_T11_Channels\Molex_Case2\Molex_Case2_T.s4p
# MHZ S DB R 50.00
FREQ          S11          S12          S13          S14
              S21          S22          S23          S24
              S31          S32          S33          S34
              S41          S42          S43          S44
              DB          ANG          DB          ANG          DB          ANG          DB          ANG
50.000        -17.468255  17.592245   -0.598598  -57.018001  -19.065630  32.411460  -34.953414  165.303432
              -0.593463  -57.648337  -17.269707  18.465607  -34.930167  164.884877  -19.084841  31.601300
              -19.119529  32.406244  -34.750492  165.762297  -17.108563  17.469597  -0.594390  -57.278942
              -34.760035  165.703378  -19.135560  31.918333  -0.585966  -57.499542  -17.052375  18.031386
75.000        -16.364795  -4.619189   -0.694203  -85.248126  -17.499165  5.990685   -34.955757  117.894157
              -0.682937  -85.629148  -16.237144  -8.983909  -34.933093  118.035351  -17.511757  4.590984
              -17.526695  5.916828   -34.988549  117.530545  -15.994633  -4.286948  -0.697838  -85.188182
              -35.090696  117.086339  -17.537425  4.727861   -0.685963  -85.422054  -15.966294  -8.325409
100.000       -17.167138  -28.089571  -0.723515  -113.154072  -17.816076  -19.699127  -37.925789  81.544340
              -0.717646  -113.488943  -17.193305  -32.088788  -37.673384  81.078617  -17.827793  -21.750163
              -17.853236  -19.727073  -37.841945  81.998876   -16.694223  -27.590234  -0.719680  -113.031183
              -37.915598  82.357265  -17.863863  -21.668177  -0.719750  -113.160992  -16.807415  -31.365738
```

2. Create STATEYE Script File

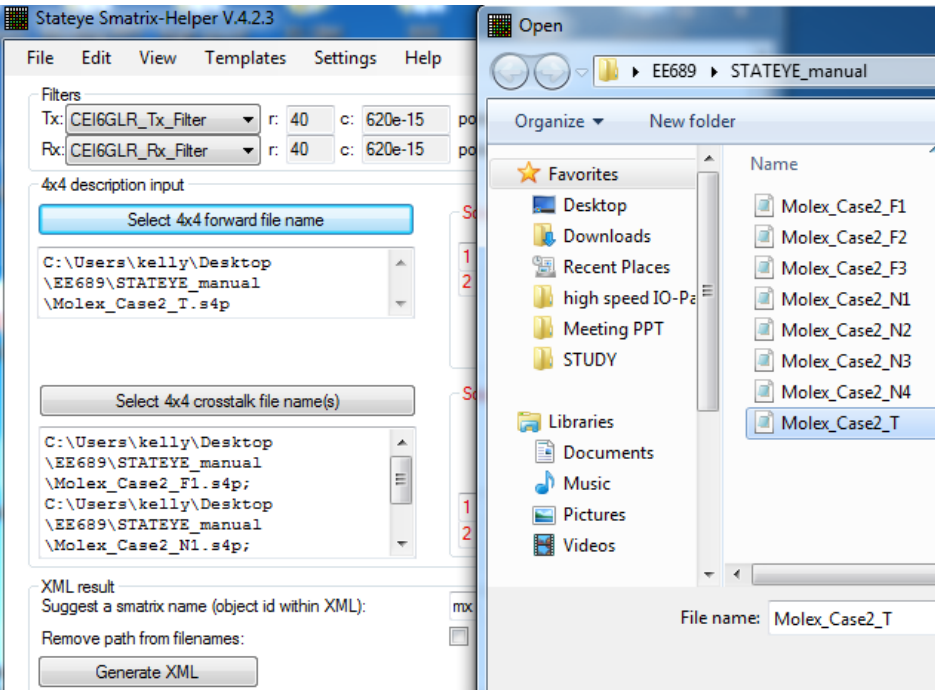
□ Starting SmatrixHelper



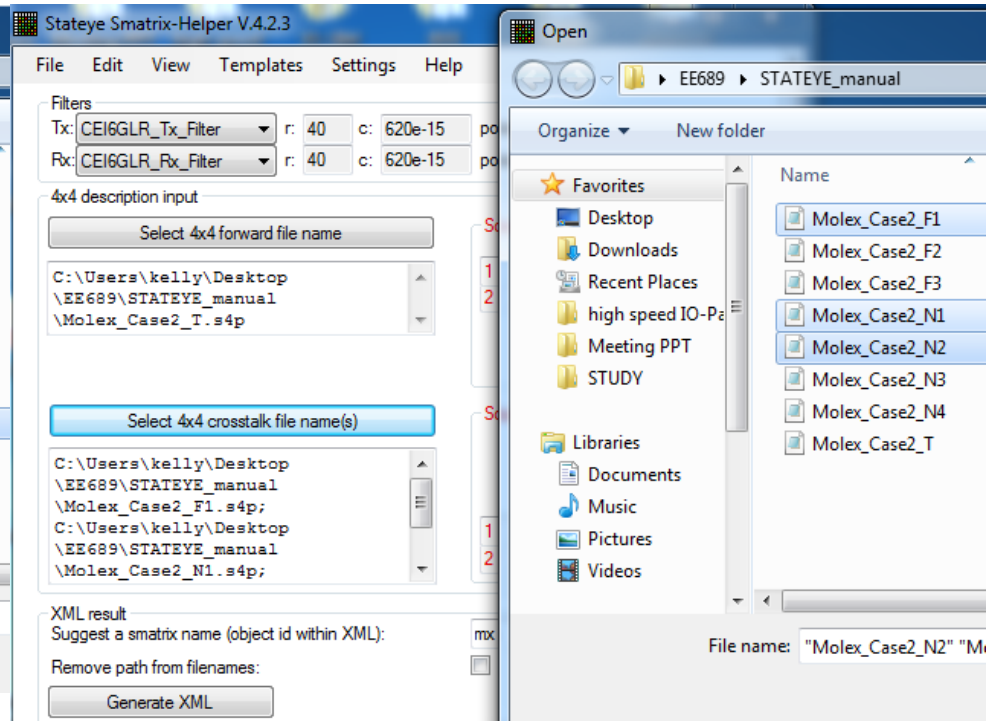
We will now show how to analyse a single channel using the default settings of Stateye. Firstly we recommend for entry of the touchstone files the use of smatrixhelper

2. Create STATEYE Script File

1. Through Channel Add

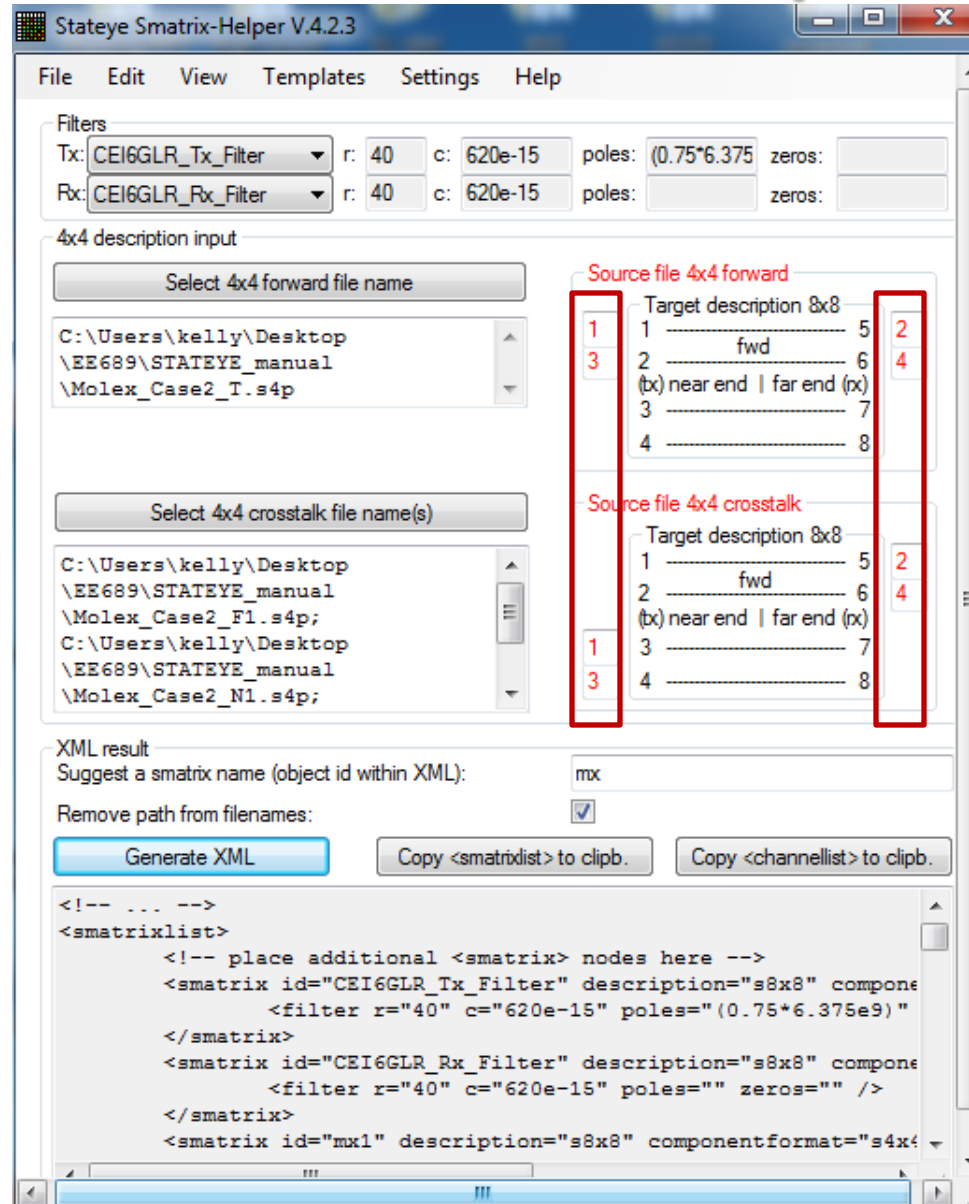


2. Cross Talk Channel Add



1. we select the transmit and receiver linear filter that is to be cascaded with the touchstone files. Note we select the same OIF standard for tx and rx Please note that the filter is only defining the return loss, plus transmit filter, and time continuous filters. Decision Feedback Equalisation is performed later, during the selection of the receiver type in the XML definition files.
2. we select the touchstone file for the forward channel. In this case a 4x4 matrix is selected by pressing the appropriate button

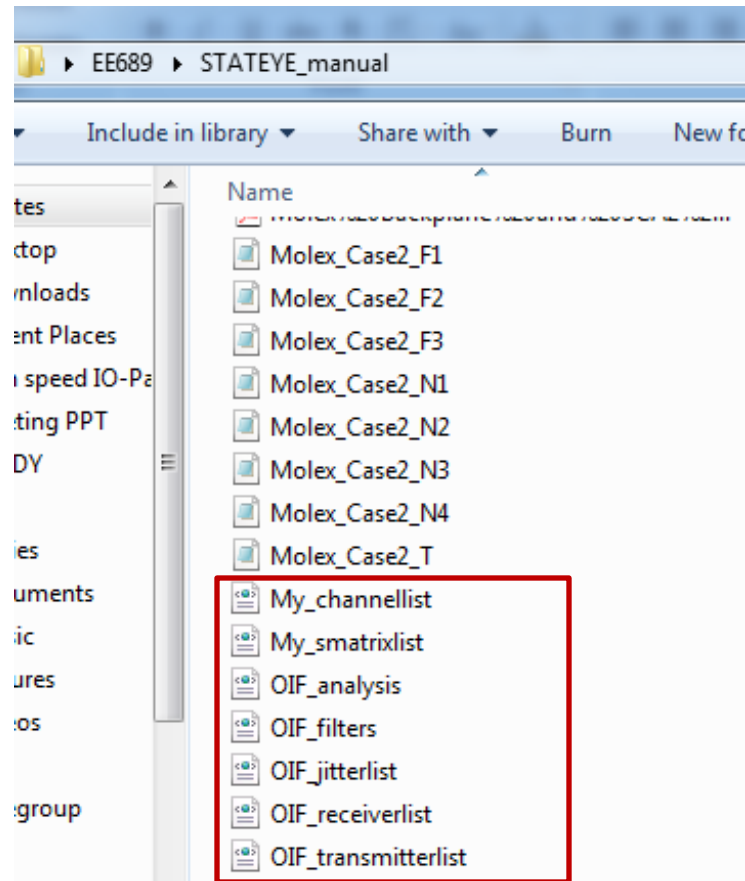
2. Create STATEYE Script File



Each touchstone file has its own definitions for the ports connected to the transmitter and receiver. For this example we must swap ports 2 and 3. Clearly if this is wrong then the results will also be wrong.

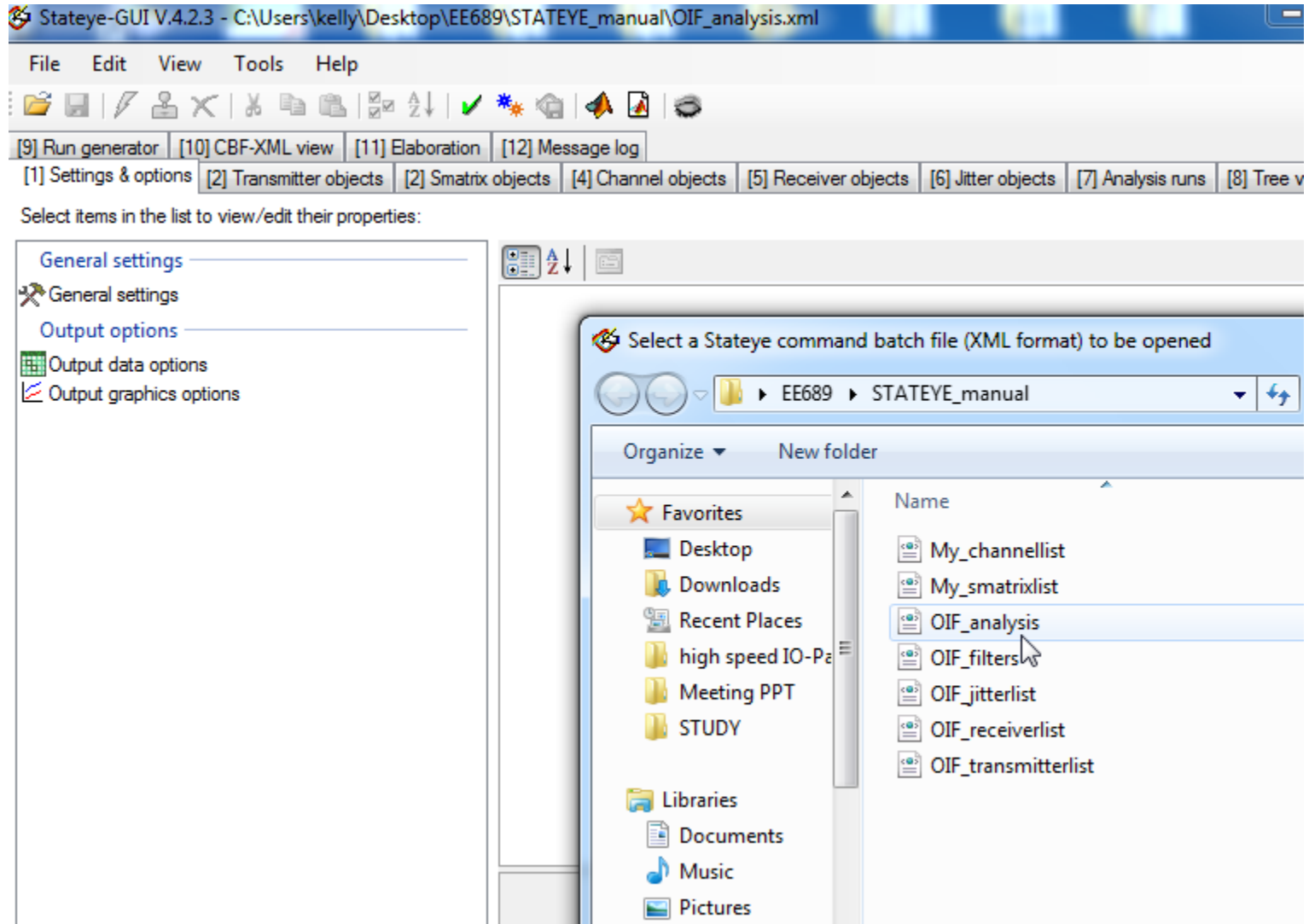
2. Create STATEYE Script File

1. We will now leave the other options as default and generate the XML code for the matrices and channels in two separate definition files
2. smatrixhelper will ask if you wish to copy the oif templates from the installation directory also to this directory. Say yes as we will need these files to generate the final matlab script

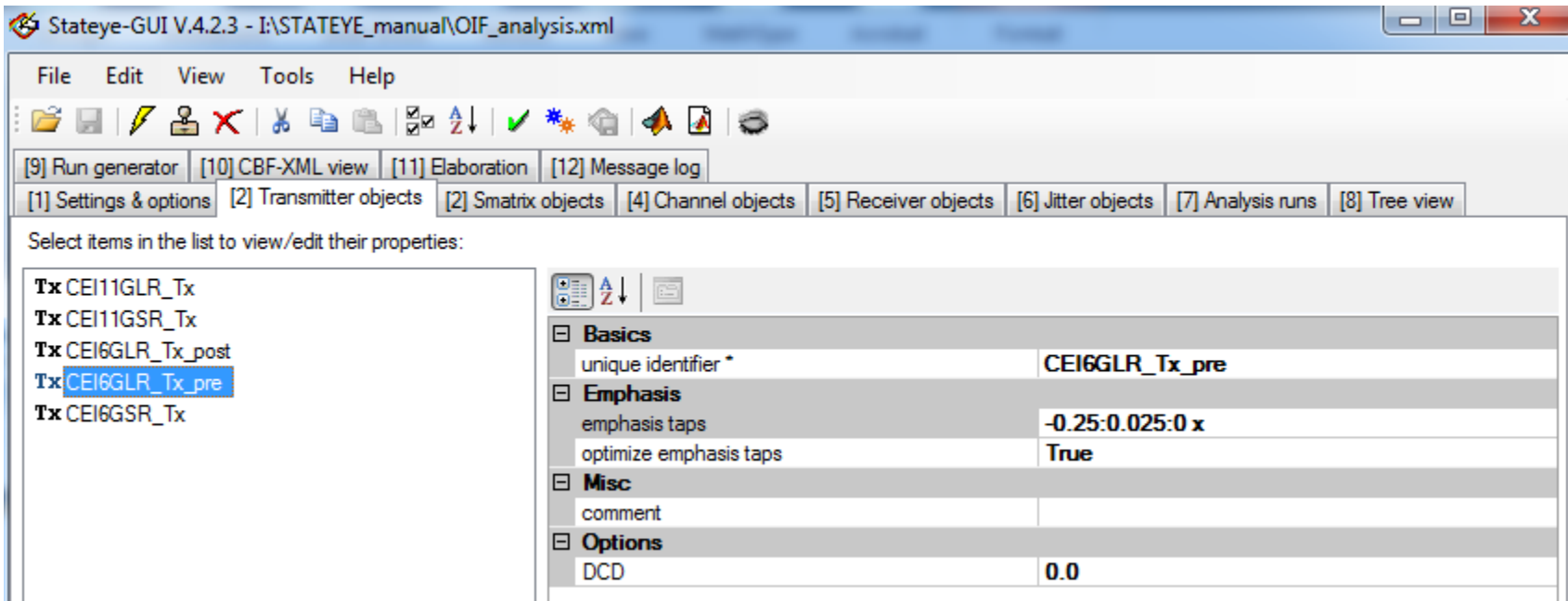


3. Create Matlab Script File

1. Run Stateye Gui
2. Open OIF_analysis



1. CEI6GLR_TX_Pre



Examples:

- `emphasis=""` : equivalent to `emphasis="1"` (i.e. no specific emphasis to be applied)
- `emphasis="-0.05 0.85 -0.10"` : fixed pre-tap -0.05, main tap 0.85, post-tap -0.10
- `emphasis="-0.05 x -0.10"` : will be converted to `emphasis="-0.05 0.85 -0.1"` (see above)
- `emphasis="x -0.3"` : will be converted to `emphasis="0.7 -0.3"`
- `emphasis="0:-0.05:-0.1 x -0.1"` : will be converted to "0 0.9 -0.1" and "-0.05 0.85 -0.1" and "-0.1 0.8 -0.1" (sweep)

Either a single pre or post tap transmitter, with ≤ 6 dB of emphasis, with infinite precision accuracy.

1. Previous SmatrixHelper already generate cascade Channel model, however we can customize

2. CEIGLR_RX – 5 Taps DFE

[9] Run generator [10] CBF-XML view [11] Elaboration [12] Message log
[1] Settings & options [2] Transmitter objects [2] Smatrix objects [4] Channel objects [5] Receiver objects [6] Jitter objects [7] Analysis runs [8] Tree view

Select items in the list to view/edit their properties:

- Ch ch_filter_mx
- Ch ch_filter_mx1
- Ch ch_filter_mx2
- Ch ch_filter_mx3
- Ch ch_mx
- Ch ch_mx1
- Ch ch_mx2
- Ch ch_mx3

Basics	
unique identifier *	ch_filter_mx
Misc	
comment	
Smatrix input data	
characteristic components	(characteristic collection)

characteristicPropertyTable Collection Editor

Members:

0	type=fwd reference=casc_filter_mx1	↑
1	type=xt reference=casc_filter_mx	
2	type=xt reference=casc_filter_mx	↓
3	type=xt reference=casc_filter_mx	

type=fwd reference=casc_filter_mx1 propert...

Basics	
chartype *	fwd
description *	smatrix
Data source	
filename *	
reference *	casc_filter_mx1

Select items in the list to view/edit their properties:

- Rx CEI11GLR_Rx_A
- Rx CEI11GLR_Rx_B
- Rx CEI11GSR_Rx_A
- Rx **CEI6GLR_Rx**
- Rx CEI6GSR_Rx

Basics	
unique identifier *	CEI6GLR_Rx
Characteristics	
bit error rate *	1e-15
CDR enabled	False
number of DFE taps	5
Eye compliance requirements	
eye opening *	(50*2)/800
Jitter compliance requirements	
required dj *	0.325
required q *	(2*7.94)
required tj *	0.60
Misc	
comment	

1. Analysis runs, we will do CEI6GLR_post simulation.
2. Validate Project Data

Stateye-GUI V.4.2.3 - C:\Users\kelly\Desktop\STATEYE_manual\OIF_analysis.xml

File Edit View Tools Help

[9] Run generator [10] CBF-XML view [11] Elaboration [12] Message log

[1] Settings & options [2] Transmitter objects [2] Smart [6] Jitter objects [7] Analysis runs [8] Tree view

Select items in the list to view/edit their properties:

- CEI11GLR_DFE_Template
- CEI11GLR_TC_Template
- CEI11GMR_Template
- CEI11GSR_Template
- CEI6GLR_Template_post
- CEI6GLR_Template_pre
- CEI6GLR_Template_pre_DFE
- CEI6GSR_Template

validate project data, i.e. check whether project can be elaborated

Analysis timing parameters	
baudrate *	6.375e9
jitter	CEI6GLR_Jit
Basics	
deactivated run	False
unique identifier *	CEI6GLR_Template_pre
Composition elements	
transmitter *	CEI6GLR_Tx_pre
channel *	ch_filter_mx
receiver *	CEI6GLR_Rx_No_DFE
Cursors	
postcursors *	90
precursors *	4
Misc	
comment	Note that two transmitters exist for CEI6GLR, CE
Stateye analysis parameters	
bins *	4000
width *	60

Validation finished successfully

Current project data are valid and could be elaborated.

OK

- 1. Elaborate
- 2. After Elaborate, save elaboration results, however make sure you save this file at directory which have channel model files
- 3. Further information – download manual in stateye website

The screenshot shows the Stateye-GUI V.4.2.3 interface. The 'Tools' menu is open, with 'Elaborate ...' selected. The background shows a MATLAB script editor with code for file path management. A file explorer on the right shows a directory structure with 'OIF_analysis' highlighted in a red box. In the foreground, a dialog box titled 'Elaboration finished successfully' displays an information icon and the text: 'Current project data were elaborated successfully, resulting m-code will be displayed now.' with an 'OK' button.

```
XML Data Import ...
Smatrix-Helper
Validate Project Data
Elaborate ...
Save Elaboration Results
Start MATLAB
Start MATLAB m-File Editor
Hide Parameters Of Secondary Importance
Allow Free Text In Dropdown Lists
```

```
[5] Receiver objects [6] Jitter objects [7] Analysis runs [8] Tree view
```

```
% This m file was
% by Stateye-GUI
% using cbfElabor
echo on;
disp(sprintf('\nM
clear all;
pack;
% BEGIN of analys
disp('BEGIN of an
clear all;
pack;
if isempty(which('twoport')) && strcmp(computer,'PCWIN') && (exist([getenv('progra
path([getenv('programfiles') '\Stateye\bin'], path);
end;
if isempty(which('create8.m'))&& strcmp(computer,'PCWIN') && (exist([getenv('progr
path([getenv('programfiles') '\Stateye\scripts'], path);
end;
if isempty(which('twoport'))
if strcmp(computer,'PCWIN') && (exist('C:\Program Files\Stateye\bin') == 7
path('C:\Program Files\Stateye\bin', path);
else
```

- Molex_Case2_F1
- Molex_Case2_F2
- Molex_Case2_F3
- Molex_Case2_N1
- Molex_Case2_N2
- Molex_Case2_N3
- Molex_Case2_N4
- Molex_Case2_T
- My_channellist
- My_smatrixlist
- OIF_analysis**
- OIF_analysis
- OIF_filters
- OIF_jitterlist
- OIF_receiverlist
- OIF_transmitterlist

Elaboration finished successfully

Current project data were elaborated successfully, resulting m-code will be displayed now.

OK

3.1 Link Characteristic –StatEye Sim

❑ CEI-6G-SR Short Reach Interface

6.2 Requirements

1. Support serial baud rate from 4.976Gsym/s to 6.375Gsym/s.
2. Capable of low bit error rate (required BER of 10^{-15}).
3. Capable of driving 0 – 200mm of PCB and up to 1 connector. 200mm = 7.9 inch
4. Shall support AC coupled operation and optionally DC-coupled operation.
5. Shall allow multi-lanes (1:N).
6. Shall support hot plug.

❑ CEI-6G-LR Long Reach Interface

7.2 Requirements

1. Support serial baud rate from 4.976Gsym/s to 6.375Gsym/s.
2. Capable of low bit error rate (required BER of 10^{-15}). 1m = 39.9 inch
3. Capable of driving 0 – 1m of PCB (such as IEEE 802.3 XAUI/TFI-5 compliant backplane) and up to 2 connector.
4. Shall support AC coupled operation and optionally DC-coupled operation.
5. Shall allow multi-lanes (1:N).
6. Shall support hot plug.

3.1 Link Characteristic –StatEye Sim

□ CEI-11G-SR Short Reach Interface

8.1 Requirements

1. Support serial data rate from 9.95 Gsym/s to 11.1 Gsym/s.
2. Capable of low bit error rate (required BER¹ of 10^{-15}).
3. Capable of driving 0 – 200 mm of PCB and up to 1 connector.
4. Shall support AC-coupled and optionally DC-coupled operation.
5. Shall allow multi-lanes (1 to n).
6. Shall support hot plug.

□ CEI-11G-LR/MR Long/Medium Reach Interface

9.1 Requirements

1. Support NRZ coded serial data rate from 9.95 Gsym/s to 11.1 Gsym/s.
2. Capable of low bit error rate (required BER < 10^{-15}).
3. Capable of driving 0 — 1 meter (39 inches) of PCB and up to 2 connectors.
4. Capable of driving 0 — 600 mm of PCB and up to 2 connectors for low-power applications.
5. Shall support AC-coupled and optionally DC-coupled operation.
6. Shall allow multi-lanes (1 to n).
7. Shall support hot plug.

3.1 Link Characteristic –StatEye Sim

❑ CEI-6G-LR Long Reach Interface

- Main Template in this manual

Table 7-2. CEI-6G-LR Transmitter Output Electrical Specifications

Characteristic	Symbol	Condition	MIN.	TYP.	MAX.	UNIT
Baud Rate	T_Baud	See 7.4.1.2	4.976		6.375	Gsym/s
Output Differential voltage (into floating load Rload=100Ω)	T_Vdiff	See 7.4.1.3 & Note 1	800		1200	mVppd
Differential Resistance	T_Rd	See 7.4.1.5	80	100	120	Ω
Recommended output rise and fall times (20% to 80%)	T_tr, T_tf	See 7.4.1.4	30			ps
Differential Output Return Loss (100MHz to 0.75*T_Baud)	T_SDD22	See 7.4.1.5			-8	dB
Differential Output Return Loss (0.75*T_Baud to T_Baud)						
Common Mode Return Loss (100MHz to 0.75 *T_Baud)	T_S11	See 7.4.1.5			-6	dB
Transmitter Common Mode Noise	T_Ncm				5% of T_Vdiff	mVppd
Output Common Mode Voltage See Notes 2, 3 & 4 See also 3.2.2	T_Vcm	Load Type 0 See Note 2	100		1700	mV
		Load Type 1 See Note 3 & 4	630		1100	mV

NOTES:

1. The Transmitter must be capable of producing a minimum T_Vdiff greater than or equal to 800 mVppd. In applications where the channel is better than the worst case allowed, a Transmitter device may be provisioned to produce T_Vdiff less than this minimum value, but greater than or equal to 400 mVppd, and is still compliant with this specification.
2. Load Type 0 with min T_Vdiff, AC-Coupling or floating load.
3. For Load Type 1: $R_{Zvt} \leq 30\Omega$; T_{Vtt} & $R_{Vtt} = 1.2V +5\%/-8\%$
4. DC Coupling compliance is optional (Load Type 1). Only Transmitters that support DC coupling are required to meet this parameter.

3.1 Link Characteristic –StatEye Sim

❑ CEI-6G-LR Long Reach Interface

Table 7-7. CEI-6G-LR Receiver Electrical Input Specifications

Characteristic	Symbol	Condition	MIN.	TYP.	MAX.	UNIT
Rx Baud Rate	R_Baud	See 7.4.2.1	4.976		6.375	Gsym/s
Input Differential voltage	R_Vdiff	See 7.4.2.3			1200	mVppd
Differential Resistance	R_Rdin	See 7.4.2.7	80	100	120	Ω
Bias Voltage Source Impedance (load type 1)	R_Zvtt	See Note 1			30	Ω
Differential Input Return Loss (100MHz to 0.75*R_Baud)	R_SDD11	See 7.4.2.7			-8	dB
Differential Input Return Loss (0.75*R_Baud to R_Baud))						
Common Mode Input Return Loss (100MHz to 0.75 *R_Baud)	R_SCC11	See 7.4.2.7			-6	dB
Input Common Mode Voltage See Notes: 1, 2 & 3	R_Vfcm	Load Type 0 See Note 2	0		1800	mV
		Load Type 1 Notes: 1 & 3	595		R_Vtt - 60	mV
Wander divider (in Figure 2-27 & Figure 2-28)	n			10		
NOTES: 1. DC Coupling compliance is optional (Load Type 1). Only receivers that support DC coupling are required to meet this parameter. 2. Load Type 0 with min T_Vdiff, AC-Coupling or floating load. For floating load, input resistance must be $\geq 1k\Omega$ 3. For Load Type 1: T_Vtt & R_Vtt = 1.2V +5%/-8%.						

3.1 Link Characteristic –StatEye Sim

❑ CEI-6G-LR Long Reach Interface

Reference Receiver:

1. Rx equalization: 5 tap DFE, with infinite precision accuracy and having the following restriction on the coefficient values:

Let $W[N]$ be sum of DFE tap coefficient weights from taps N through M where

$N = 1$ is previous decision (i.e. first tap)

M = oldest decision (i.e. last tap)

$R_Y2 = T_Y2 = 400\text{mV}$

$Y = \min(R_X1, (R_Y2 - R_Y1) / R_Y2) = 0.30$

$Z = 2/3 = 0.66667$

Then $W[N] \leq Y * Z^{(N - 1)}$

For the channel compliance model the number of DFE taps (M) = 5. This gives the following maximum coefficient weights for the taps:

$W[1] \leq 0.2625$ (sum of taps 1 to 5)

$W[2] \leq 0.1750$ (sum of taps 2 to 5)

$W[3] \leq 0.1167$ (sum of taps 3 to 5)

$W[4] \leq 0.0778$ (sum of taps 4 and 5)

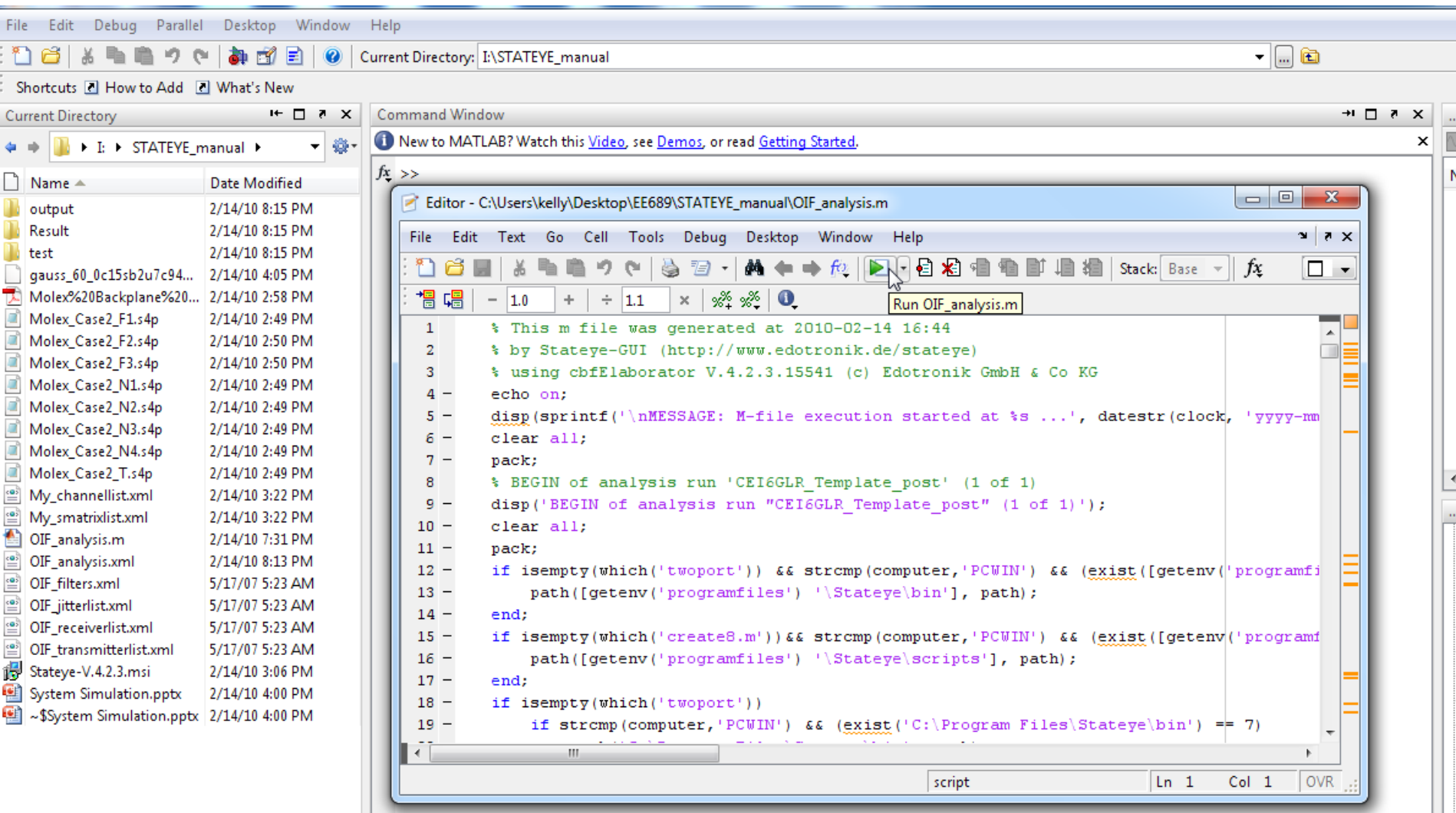
$W[5] \leq 0.0519$ (tap 5)

Notes:

- These coefficient weights are absolute assuming a $T_V\text{diff}$ of 1Vppd
- For a real receiver the restrictions on tap coefficients would apply for the actual number of DFE taps implemented (M)

4. Run Matlab – High speed link Simulation

1. Open OIF_analysis.m by Matlab simulator
2. Run OIF_analysis.m



The screenshot displays the MATLAB interface with the following components:

- File Explorer:** Shows the current directory as `I:\STATEYE_manual`. The file list includes `output`, `Result`, `test`, `gauss_60_0c15sb2u7c94...`, `Molex%20Backplane%20...`, `Molex_Case2_F1.s4p`, `Molex_Case2_F2.s4p`, `Molex_Case2_F3.s4p`, `Molex_Case2_N1.s4p`, `Molex_Case2_N2.s4p`, `Molex_Case2_N3.s4p`, `Molex_Case2_N4.s4p`, `Molex_Case2_T.s4p`, `My_channellist.xml`, `My_smatrixlist.xml`, `OIF_analysis.m`, `OIF_analysis.xml`, `OIF_filters.xml`, `OIF_jitterlist.xml`, `OIF_receiverlist.xml`, `OIF_transmitterlist.xml`, `Stateye-V.4.2.3.msi`, `System Simulation.pptx`, and `~$System Simulation.pptx`.
- Command Window:** Displays the prompt `fx >>` and a message: `New to MATLAB? Watch this Video, see Demos, or read Getting Started.`
- Editor:** Shows the `OIF_analysis.m` script with the following code:

```
1 % This m file was generated at 2010-02-14 16:44
2 % by Stateye-GUI (http://www.edotronik.de/stateye)
3 % using cbfElaborator V.4.2.3.15541 (c) Edotronik GmbH & Co KG
4 echo on;
5 disp(sprintf('\nMESSAGE: M-file execution started at %s ...', datestr(clock, 'yyyy-mm
6 clear all;
7 pack;
8 % BEGIN of analysis run 'CEI6GLR_Template_post' (1 of 1)
9 disp('BEGIN of analysis run "CEI6GLR_Template_post" (1 of 1)');
10 clear all;
11 pack;
12 if isempty(which('twoport')) && strcmp(computer,'PCWIN') && (exist([getenv('programfi
13 path([getenv('programfiles') '\Stateye\bin'], path);
14 end;
15 if isempty(which('create8.m')) && strcmp(computer,'PCWIN') && (exist([getenv('programf
16 path([getenv('programfiles') '\Stateye\scripts'], path);
17 end;
18 if isempty(which('twoport'))
19 if strcmp(computer,'PCWIN') && (exist('C:\Program Files\Stateye\bin') == 7)
```
- Toolbar:** The `Run` button (a green play icon) is highlighted, with the label `Run OIF_analysis.m` below it.
- Status Bar:** Shows `script`, `Ln 1`, `Col 1`, and `OVR`.

1. Previously Stateye simulator – created CEI6LR_pre_DFE
2. As we can see, in matlab simulation result is shown

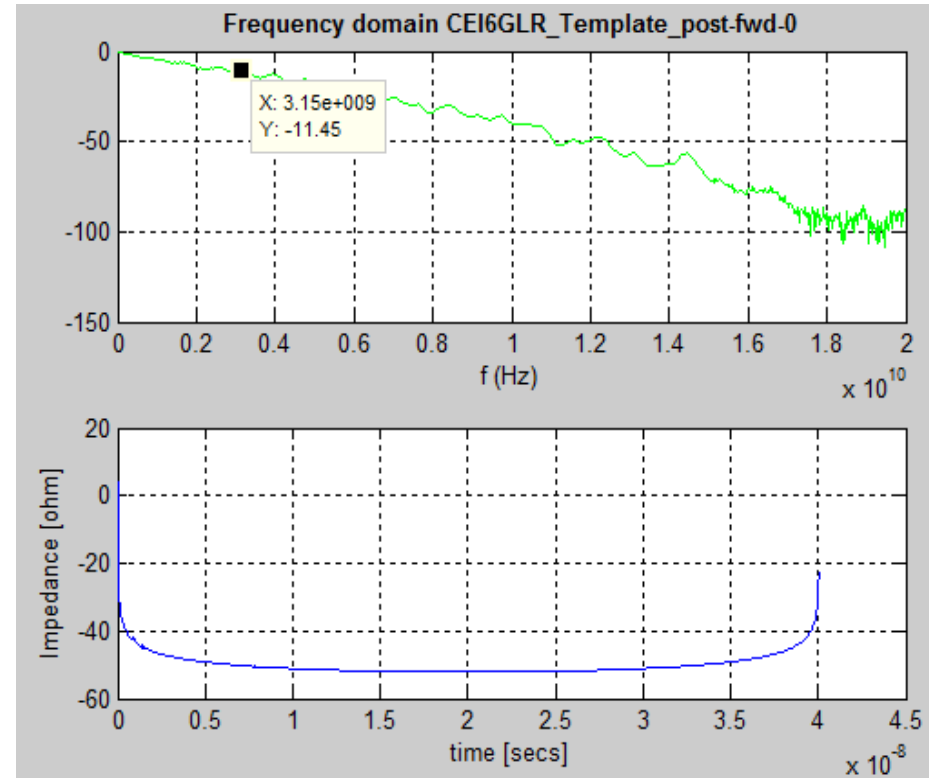
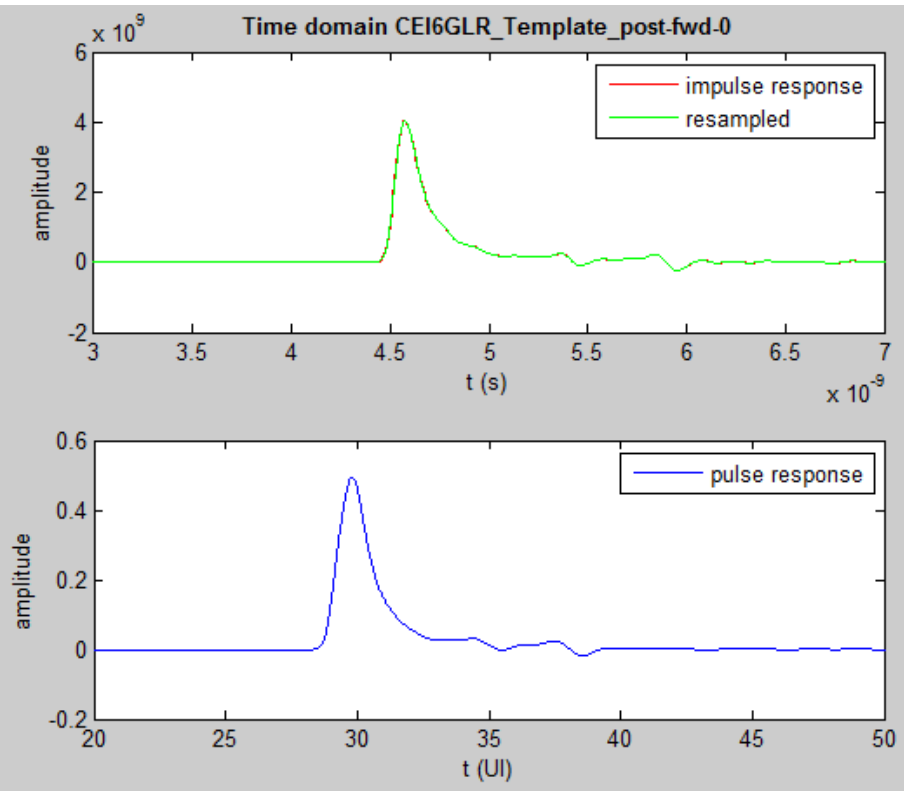
- bathtub_20100407T022211
- charFD-fwd-0_20100407T022211
- charFD-xt-1_20100407T022211
- charFD-xt-2_20100407T022211
- charFD-xt-3_20100407T022211
- diary_20100407T022211
- eye_20100407T022211
- optimizationlog_20100407T022211
- results_20100407T022211

```
transmitterId =CEI6GLR_Tx_pre
emphasis =-0.00625  0.99375
optemphasis =1 [-0.25:0.025:0 x ]
dcd =0
channelId =ch_filter_mx
receiverId =CEI6GLR_RX
ber =1e-015
dfetapsNumber =5
dfetapsFound =0.203113  0.0775882  0.0311997  0.0267718  0.0201809
cdEnabled =0
tjRequired =0.6
djRequired =0.325
qRequired =15.88
eyeRequired =0.125
jitterId =CEI6GLR_Jit
jitterTemplate =gauss
jitterDj =0.15
jitterRj =0.00944584
precursors =4
postcursors =90
width =60
baudrate =6.375e+009
bins =4000
mustIncreaseBins =0
tictoc =265.928
dj =0.2027
rj =0.0146271
tj =0.434979
statMiddle =0
```

Result.txt

4. Channel Characteristic

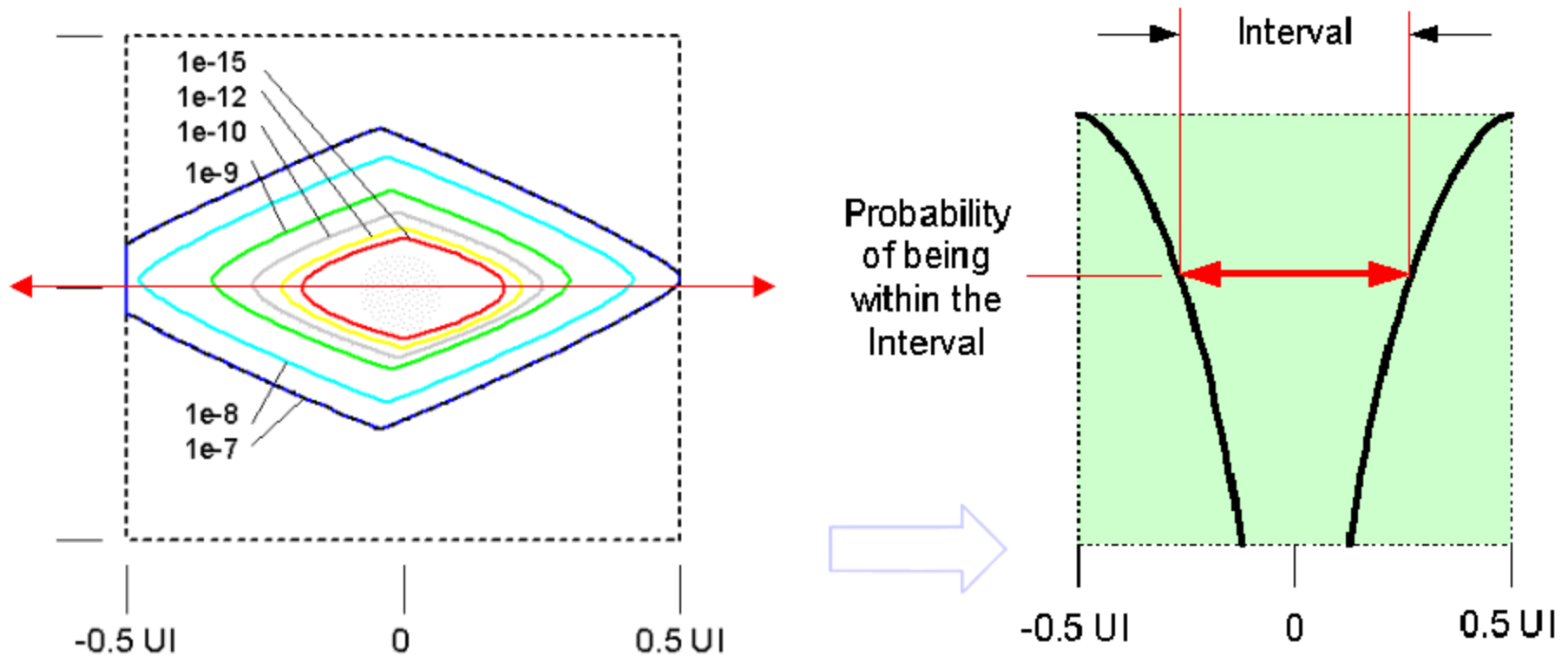
- Channel time domain and Frequency domain analysis (also we can see cross talk channel information)



- This can be done by Matlab simulator with touch stone file without STATEYE.

4. High Speed Link Simulation Result

Stat Eye to Bathtub



Slice Through Contours along Horizontal Axis of Stat Eye = Bert Scan

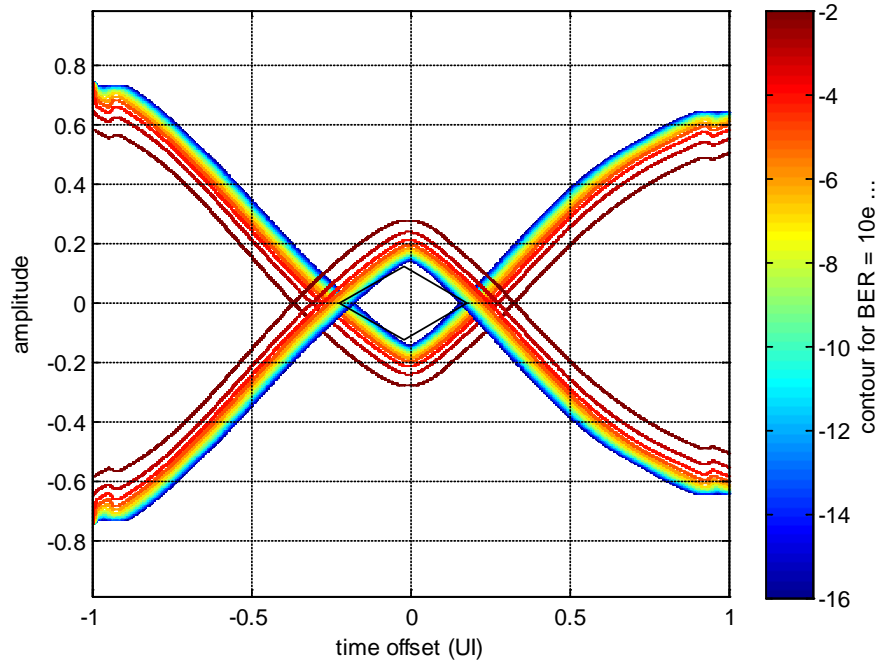
Note: Not the same as Bert Scan Calculated from RJ, DJ

4. High Speed Link Simulation Result

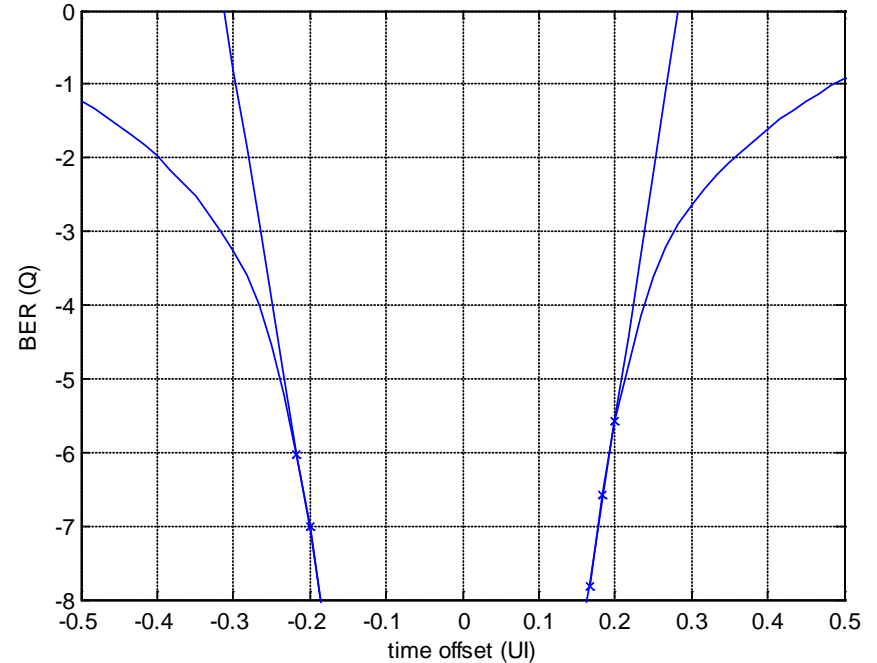
□ CEI6GLR_Template_Pre_1 tap TX

□ $Q=7.94 \Rightarrow \text{BER} = 10^{-15}$

Statistical eye CEI6GLR_Template_pre
(vert.opening=0.132263)



Bathtub (Q vs. time offset) CEI6GLR_Template_pre
DJ = 0.404, RJ = 0.015

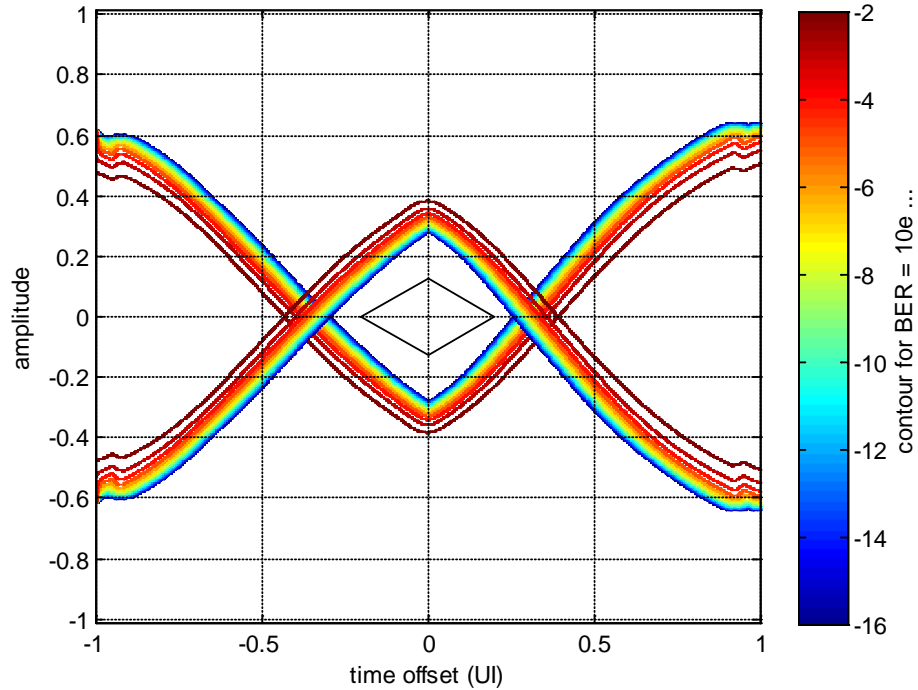


4. High Speed Link Simulation Result

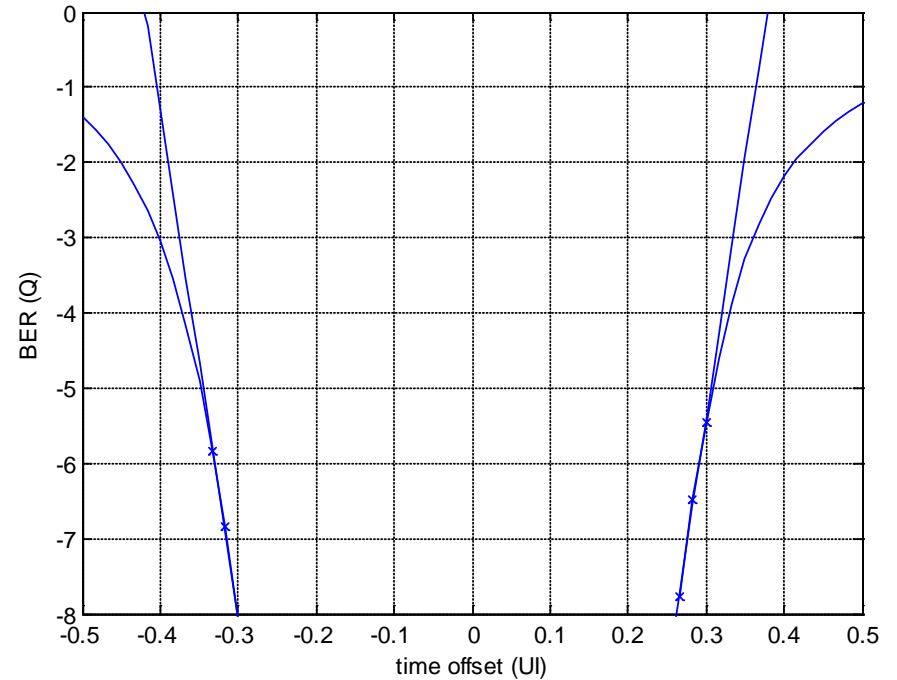
❑ CEI6GLR_Template_Pre_1 taps TX and 5 taps DFE RX

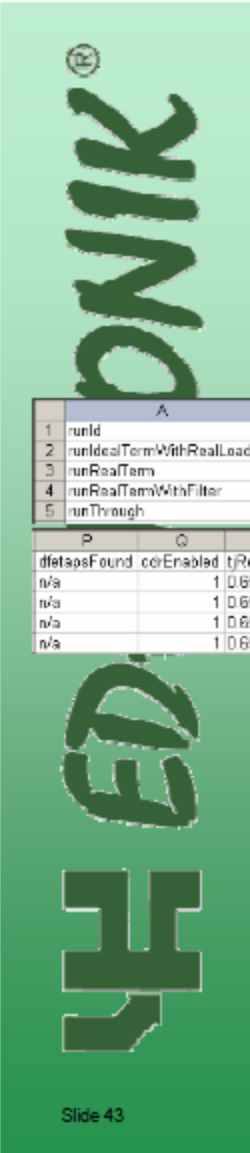
❑ $Q=7.94 \Rightarrow \text{BER} = 10^{-15}$

Statistical eye CEI6GLR_Template_pre_DFE
(vert.opening=0.282467)



Bathtub (Q vs. time offset) CEI6GLR_Template_pre_DFE
DJ = 0.203, RJ = 0.015





Results (2) – Contents

- Depending on the output settings of the project, a data file (csv format by default) and one or more graphic files (default: fig format) will be written during the execution of the analysis m file:
 - The data files contain one row per run with general data, input parameters and the calculated results:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
runId	runCounter	startedAt	computer	machineName	lastWarning	lastError	transmitterId	emphasis	optemphasis	dcd	channelId	receiverId	ber	dfstapsNumber
runIdealTermWithRealLoad	1 of 4	24.07.2006 21:59	PCWIN	ALEXANDER-SMS			CEH11GSR_Tx	1	0	0	chIdealTermWithRealLoad	CEH11GSR_Rx_A	1.00E-15	0
runRealTerm	2 of 4	24.07.2006 22:03	PCWIN	ALEXANDER-SMS			CEH11GSR_Tx	1	0	0	chRealTerm	CEH11GSR_Rx_A	1.00E-15	0
runRealTermWithFilter	3 of 4	24.07.2006 22:07	PCWIN	ALEXANDER-SMS			CEH11GSR_Tx	1	0	0	chRealTermWithFilter	CEH11GSR_Rx_A	1.00E-15	0
runThrough	4 of 4	24.07.2006 22:10	PCWIN	ALEXANDER-SMS			CEH11GSR_Tx	1	0	0	chThrough	CEH11GSR_Rx_A	1.00E-15	0

P	Q	R	S	T	U	V	W	X	Y	Z	AA	AD	AC	AD	AE	AF	AG	AH	I
dfstapsFound	corEnabled	tRequired	dRequired	qRequired	eyeRequired	jitterId	jitterTemplate	jitterOj	jitterFj	precursors	postcursors	width	baudrate	bins	mustIncreaseBins	tictoc	dj	qj	lj
n/a	1	0.65	0.45	15.88	0.306656	CEH11GSR_Jir	gauss	0.15	0.00944684	4	90	60	1.11e+010	4000	0	258.679	0.142184	0.0101142	0.30
n/a	1	0.65	0.45	15.88	0.306656	CEH11GSR_Jir	gauss	0.15	0.00944684	4	90	60	1.11e+010	4000	0	242.05	0.145688	0.00977286	0.30
n/a	1	0.65	0.45	15.88	0.306656	CEH11GSR_Jir	gauss	0.15	0.00944684	4	90	60	1.11e+010	4000	0	155.613	0.139004	0.0116022	0.32
n/a	1	0.65	0.45	15.88	0.306656	CEH11GSR_Jir	gauss	0.15	0.00944684	4	90	60	1.11e+010	4000	0	125.913	0.145691	0.00977234	0.30

- Graphic files contain the desired diagrams, e.g. a statistical eye:

