
Using DATA Files for IBIS-AMI Models

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Outline

This was originally presented in 2017 DesignCon IBIS Summit, and it is with updates.

- Motivation
- Platform/OS dependent DLL, SO
- Using DATA Files for AMI models
- The advantages using DATA Files for AMI models
- Test case for AMI models with DATA Files
- Summary

Special thanks to ANSYS
for providing some images
in this presentation

Motivation

When we make and use AMI models:

- Who makes AMI executable:
 - Did I write the code that is compatible with all platform/OSs and compilers?
- Who puts everything together into an IBIS file:
 - Did I mess up 64bits and 32bits dll/so files in the IBIS file?
- Who uses AMI models:
 - Why doesn't this AMI model support my OS? Did I do anything wrong with them?

Motivation

- Of course, everyone will blame EDA vendors



Motivation



Can we make everyone a LITTLE happier?

Platform/OS/Compiler Dependent

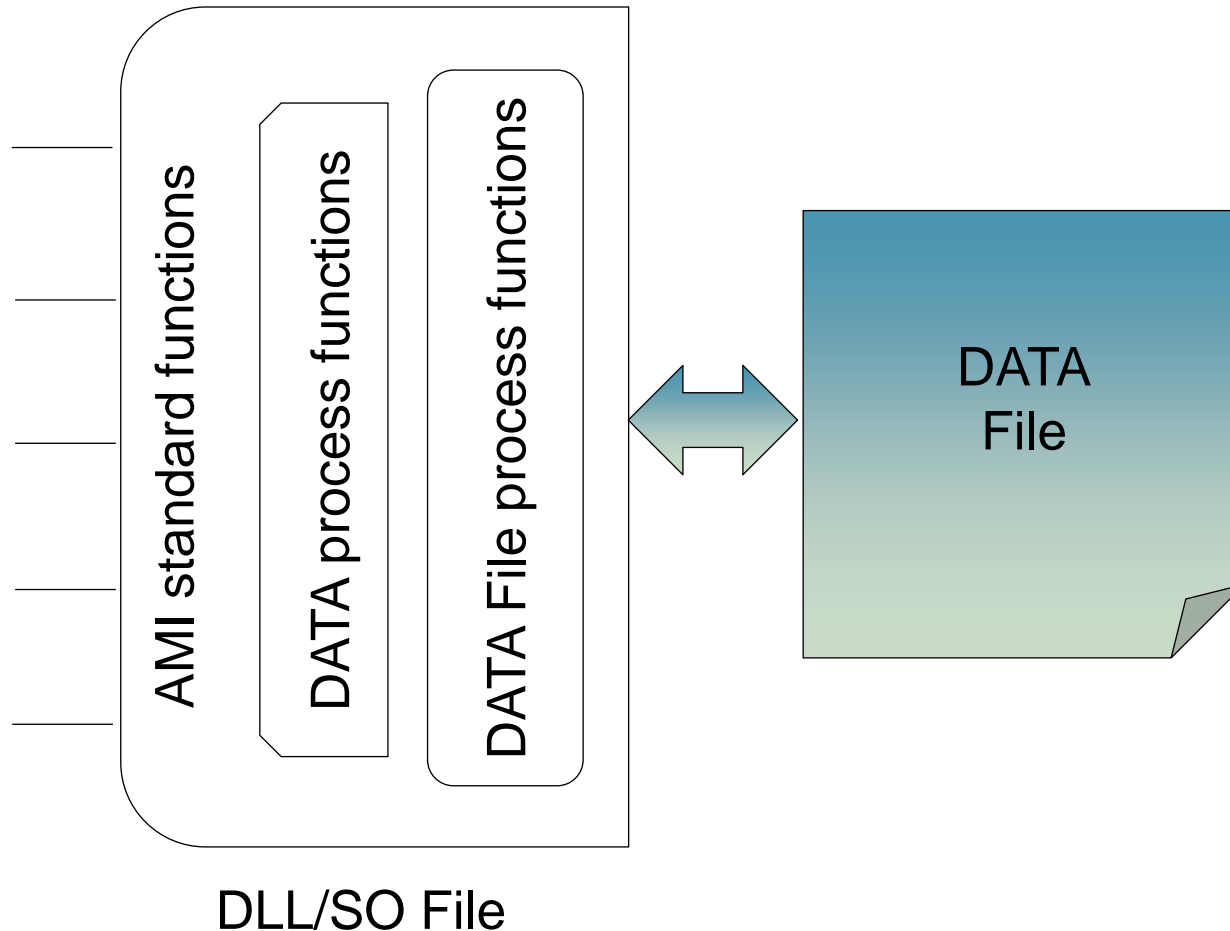
- We have so many platform/OS/Compilers to cover:
 - Windows, Linux, Unix, Mac OS, etc.
 - WinXP, Win8, Win10, Ubuntu, Debian, Fedora, CentOS, Red Hat, etc. Solaris, Solaris 10, HP-UX, OSx, etc.
 - Visual Studio 8 – 11, CC, gcc, etc.
- We also have 32 bit, 64 bit and maybe 128 bit in the future to cover.

This is not all!

Platform/OS/Compiler Dependent

- This makes Designers/Modelers have many headaches:
 - Can my programmed source code be compiled successfully in all platforms?
 - How do I compile and debug my code in all platforms and compilers?
 - Do I need to support all of them?

Using DATA Files for AMI models



Using DATA Files for AMI models

- In DLL/SO

- AMI standard functions

- AMI_Init(), AMI_GetWave(), AMI_Close(). Etc.

- DATA process functions

- Process the DATA for algorithms
 - Take inputs from AMI standard functions
 - Apply algorithms
 - Put results back to AMI standard functions

- DATA File process functions

- Read DATA File
 - Decryption (Optional)

Using DATA Files for AMI models

- In DATA File
 - Software code, and/or
 - Behavioral data, and/or
 - Parameters, or/and
 - Other data
 - Encrypted contents (Optional)

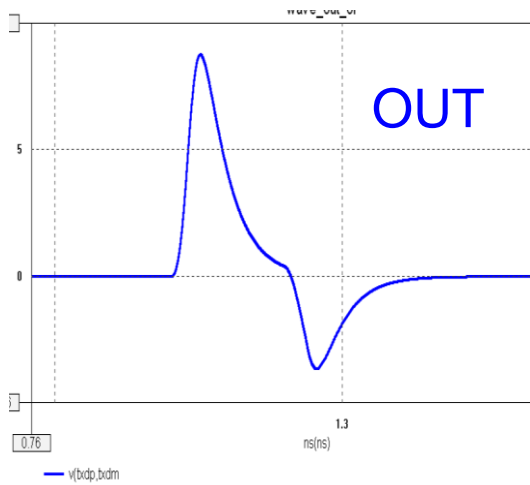
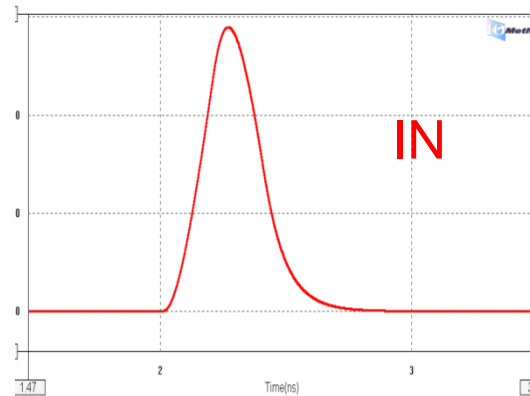
Using DATA Files for AMI models

- The DLL/SO file
 - Could be made by professional software programmers for model vendors or EDA vendors
 - **One time job!** It can be used for many different DATA Files
- The DATA File
 - Can be created by Designers or Modelers
 - No compilation needed.
Platform/OS/Compiler/Bits **independent.**

The advantages using DATA Files for AMI models

- DATA File is Platform/OS/Compiler/Bit INDEPENDENT
- Although we will still have to build Platform/OS/Compiler/Bit dependent DLL/SO files to fulfill current IBIS specification, they only need to be built ONCE for model vendor and/or EDA vendor since it can be used for different DATA Files
- The DATA File will be easier to build. And it can be used for different data types that the Model or EDA vendor defines
- The DATA can be securely encrypted with advanced encryption algorithms. It is even more secured than software executables.

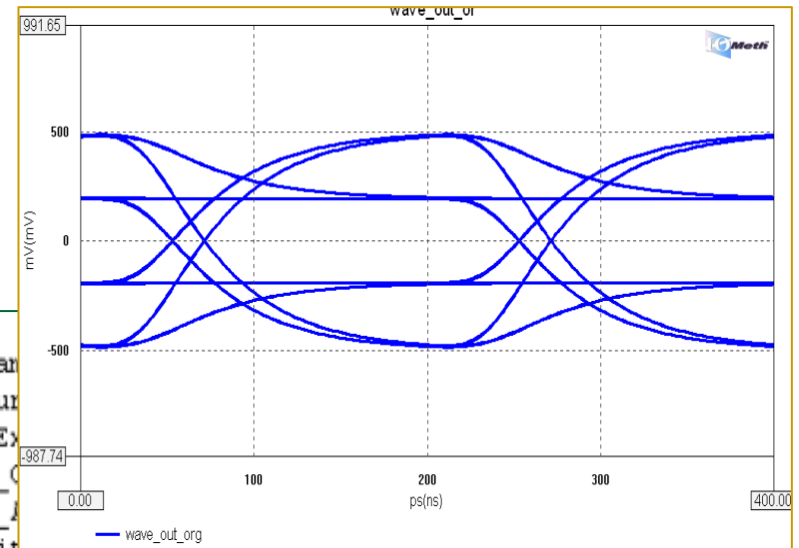
Generic Test case for AMI models with DATA Files



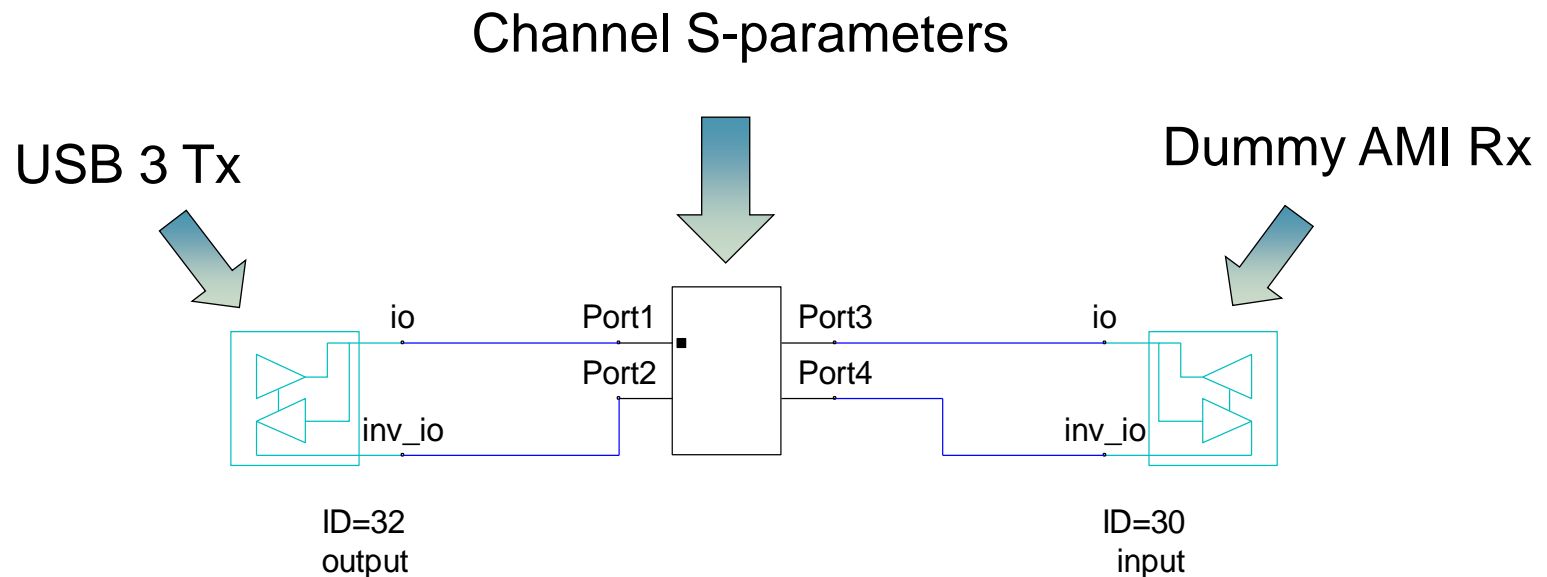
```

1 (TestEmphasis
2   (Reserved_Param
3     (Init_Return
4     (GetWave_Ex
5     (Use_Init_C
6     (Max_Init_A
7     (Ignore_Bit
8   )
9   (Model_Specific
10    (DATA_File
11      (Usage In) (Type String)
12      (Format Value "/data/AMI_Test/AMI_SPICE_ENC.dat")
13      (Description "AMI DATA file for Spice preemphasis Tx")
14    )
15    (NumBitsToAvg (Usage In) (Type Integer) (Format Value 200))
16    (TargetV (Usage In) (Type Float) (Format Value 0.15) (Defa
17    (ThresholdV (Usage In) (Type Float) (Format Value 0.015) (

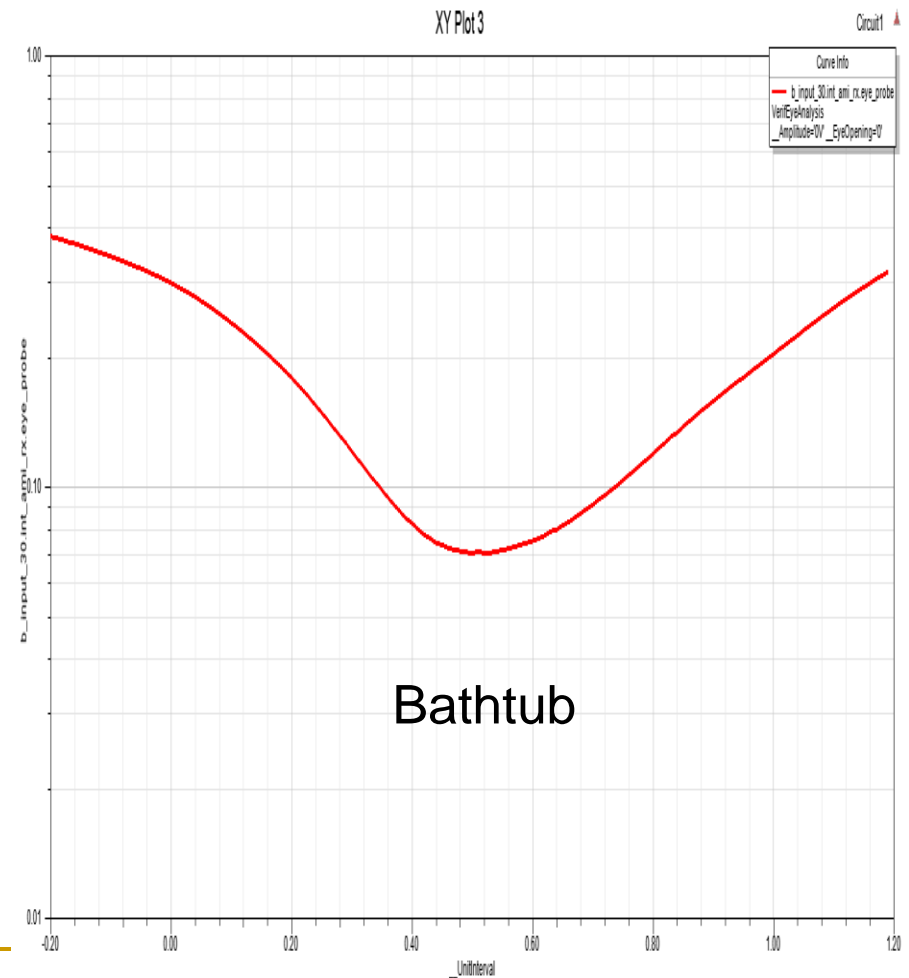
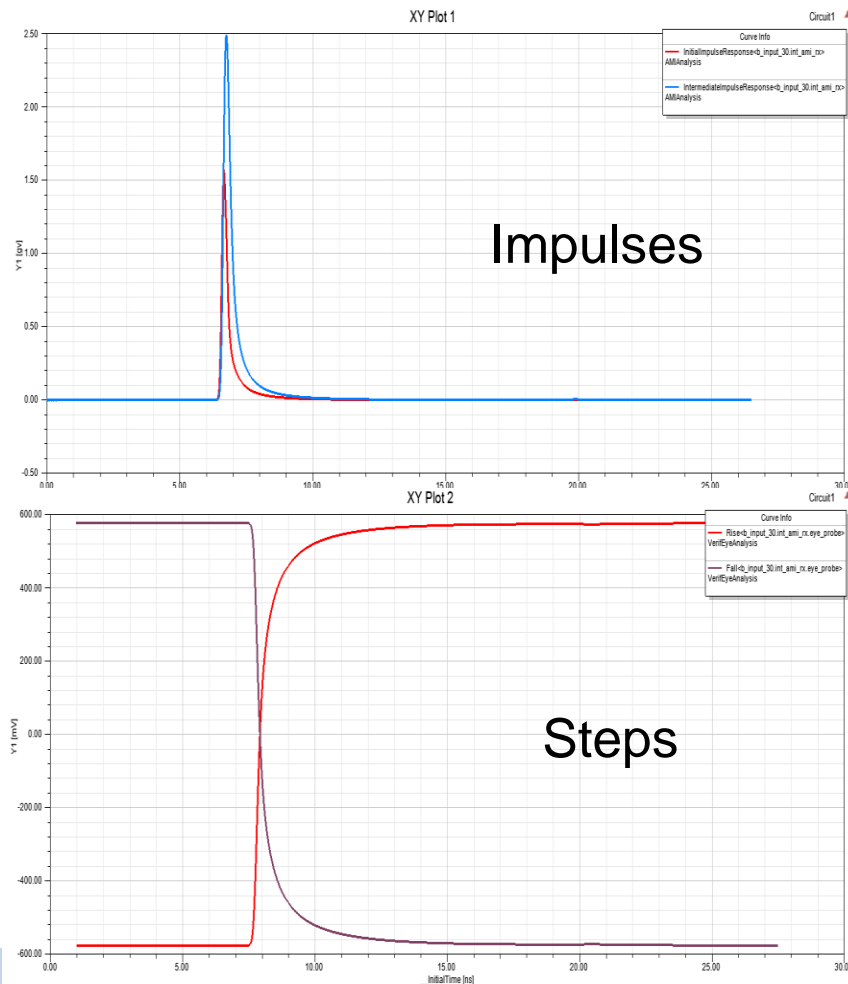
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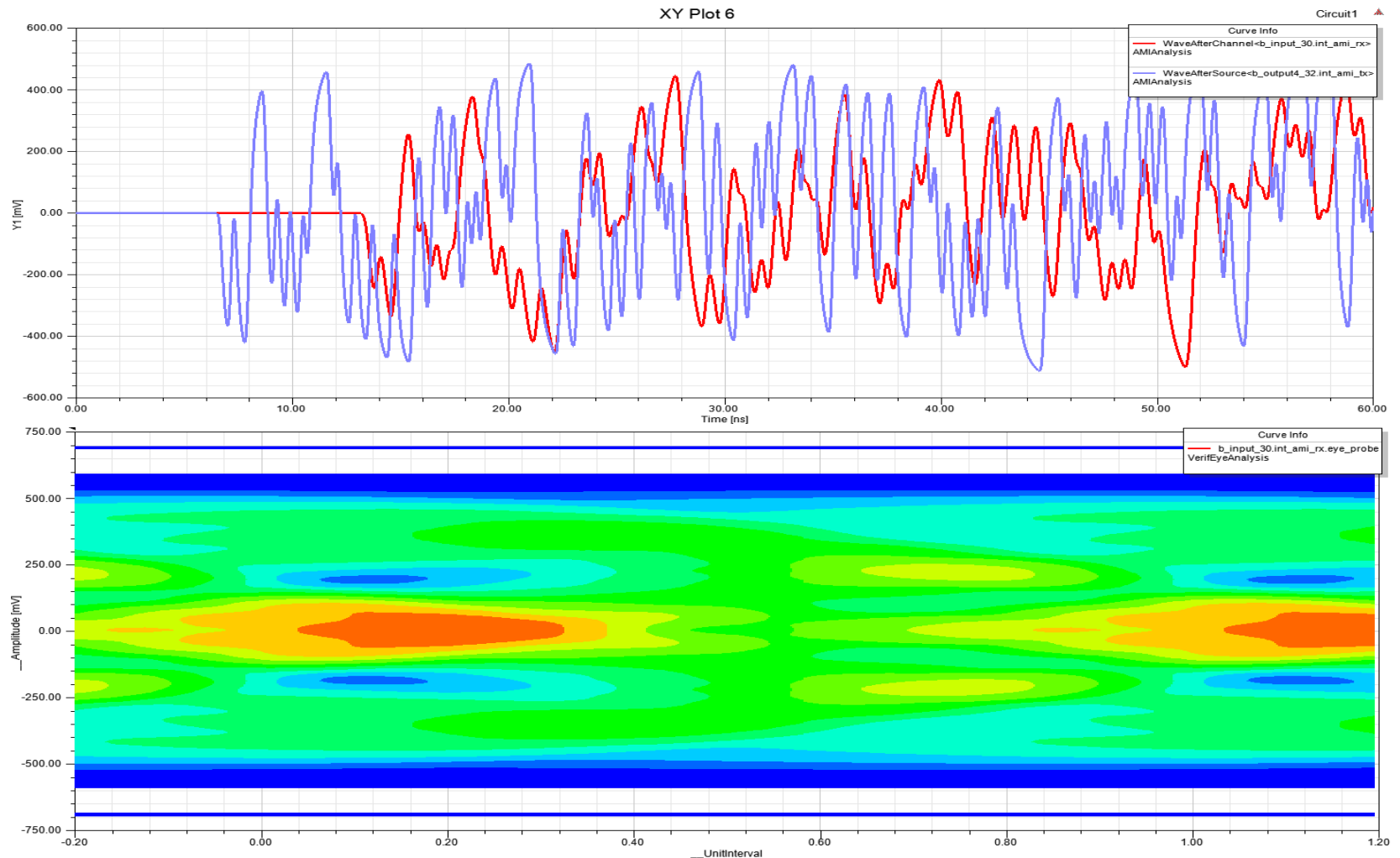
USB3 TX Test case for AMI models with DATA Files



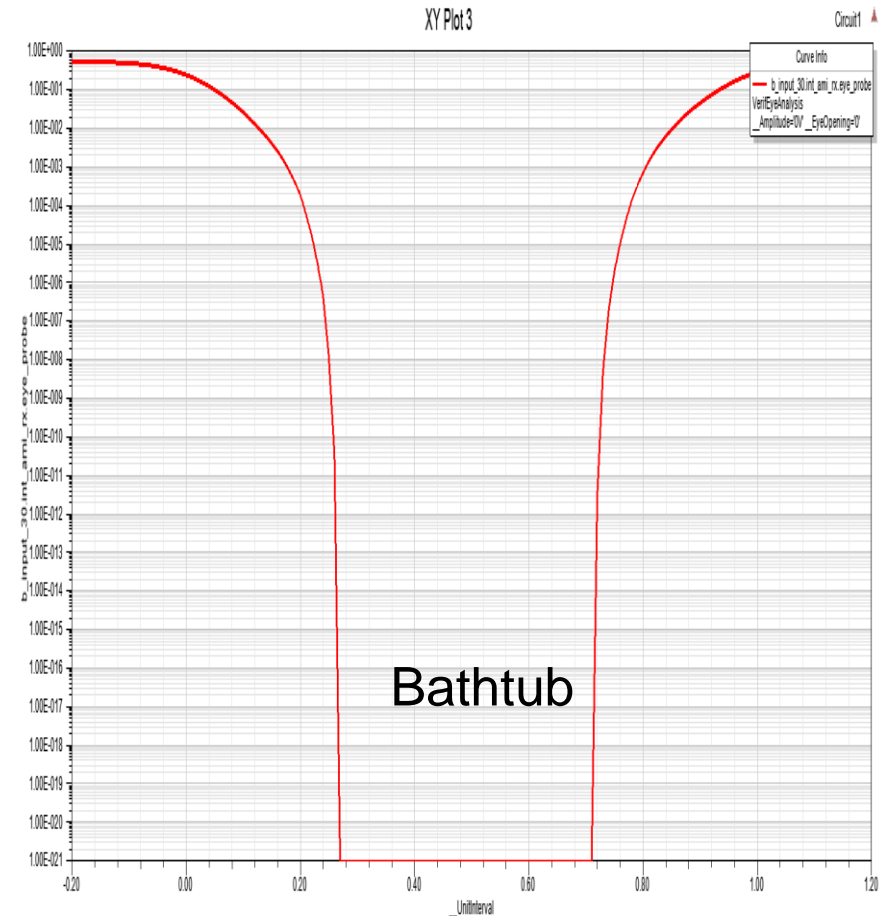
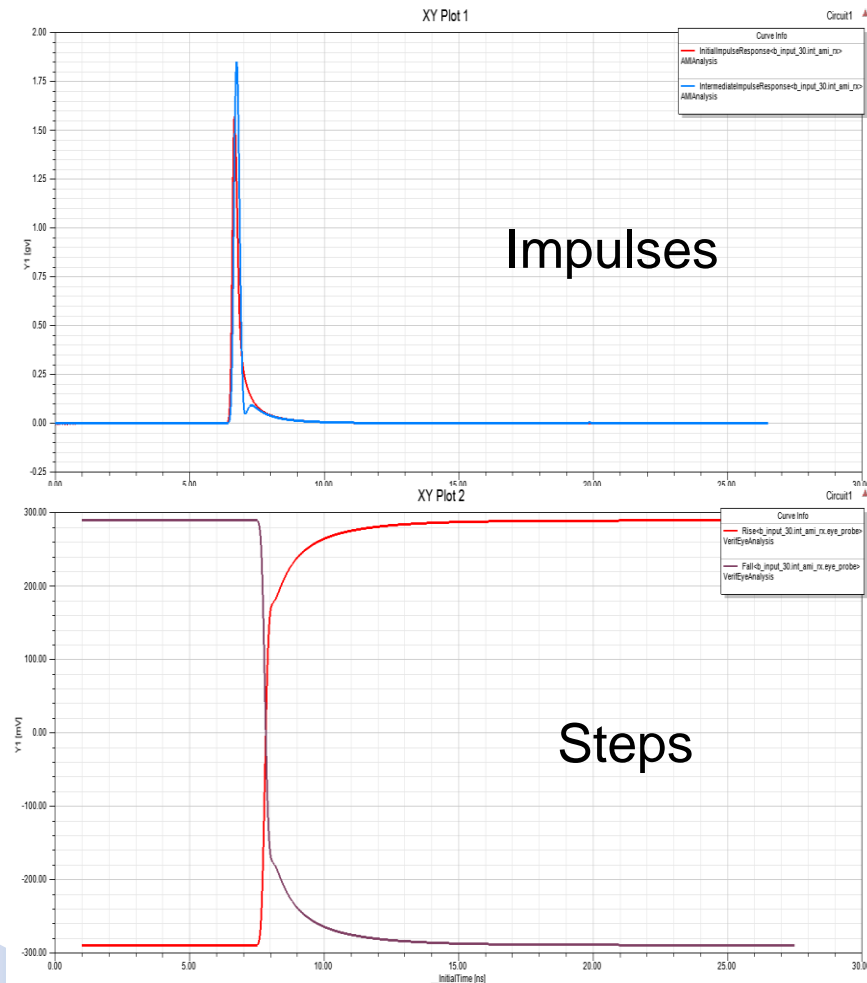
USB3 TX Test case for AMI models with DATA Files – AMP 105 No EQ Applied



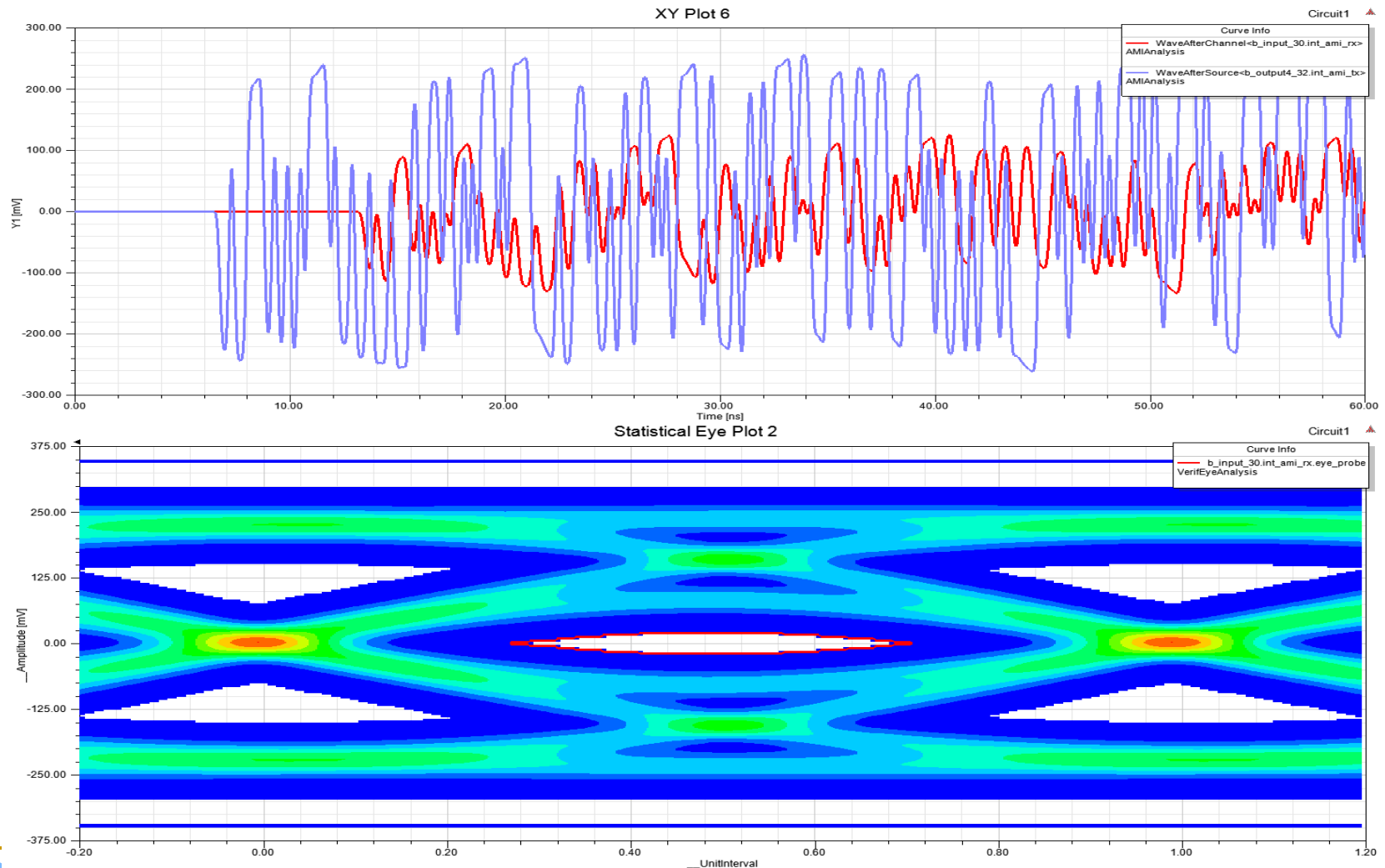
USB3 TX Test case for AMI models with DATA Files – AMP 105 No EQ Applied



USB3 TX Test case for AMI models with DATA Files – AMP 105 EQ 30 Applied



USB3 TX Test case for AMI models with DATA Files – AMP 105 EQ 30 Applied



Summary

- This presentation introduces a DATA File method for IBIS AMI models
 - The DATA File is easier to be created by modeler
 - The DATA File can be very secure through advanced encryption technologies
 - The DLL/SO will only be made by software professional ONCE and used for different DATA files
- This method is currently supported by IBIS specification and works with multiple EDA AMI tools



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