Huwin Solutions

ACVS

- Fully automated SI/PI analysis with report
- Basic-SI: IL/RL/X-talk, TDR, TDT etc.
- (LP)DDR3/4/5(x), HBM3(E) Transient simulation
- (LP)DDR5(x)/GDDR6 AMI simulation
- PCIe gen5/6 , UCIe AMI simulation with full X-talk automation
- C-PHY simulation

SnpView.Com

- Web-based S-parameters simulation service
- TDR, TDT, Eye-diagram, BER
- PerfectCal®
  (2xThru de-embedding with impedance correction)
- ChannelView: High-speed channel simulator with EQ/Jitter

Our Mission

To lead the high-performance segment of the EDA market by leveraging engineering automation across simulation, report, and design optimization.

Huwin is based on more than 20 years of experience in EM simulation, high-speed digital signal/power/ground design, RF and EMC, and more than 10 years of R&D. We continue to develop and supply engineering solutions and collaborate with enterprises through consulting.

SAMSUNG · SK hynix · LG Electronics · HYUNDAI MOBIS · Telechips · KAIST

meritech · StepSystem · SEMI FIVE · TSE · MOKPO NATIONAL UNIVERSITY

Ansys

Huwin is ANSYS Channel Partner specialized for technical support for the ANSYS solutions.

Huwin Solutions

ACVS Advanced Channel Verification System

S-para. analysis	Single S-parameter analysis (ex. Package,PCB)
Channel analysis	Auto channel configuration using multiple S-para. Freq. and time domain analysis
IBIS simulation	The fast transient simulation for (LP) DDR3/4/5(x), HBM3(E)
DDR5/GDDR6/HBM AMI simulation	The fast single-ended AMI simulation
C-PHY simulation	Full transient C-PHY simulation with Tx/Rx EQ
SerDes AMI simulation for PCIe Gen5/6 , UCIe	**PDN analysis**

SnpView.com free web S-para. Freq./Time simulation

Advanced port termination	Easy, fast configuration of S-parameters' ports
Frequency domain analysis	
Time domain analysis	Time domain reflectometry(TDR), Time domain transmission (TDT), Eye-diagram, BER
PerfectCal ®	Thru fixture de-embedding
ChannelView	High-speed channel simulator with EQ/Jitter

ACVS Advanced Channel Verification System

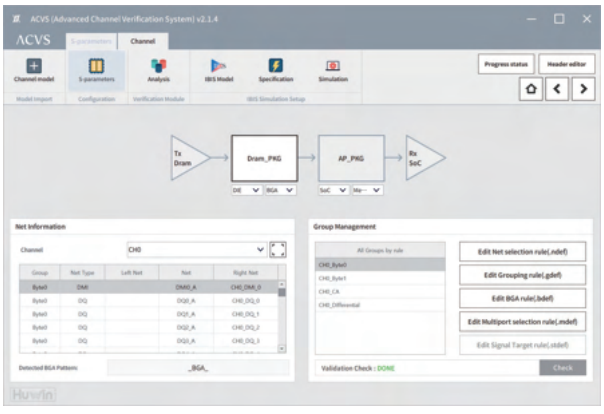
A memory bus channel or SerDes channel verification requires a lot of analysis time and effort. This is because channel systems (including driver/receiver, and S-parameter) should be configured, long-time simulation is required for various analysis cases, and simulation results should be analyzed and reported. Huwin ACVS enables full automation of all of these procedures, ensuring high efficiency of channel analysis. This solution allows engineers to quickly and easily analyze the various channels and cases. The accuracy and efficiency can be ensured by the **'SimNX'** engine, and the report can be fully customizable.

Huwin ACVS (Advanced channel verification system) is a verification solution for a bus or SerDes channel such as DDR, PCIe. Unlike conventional simulators, this solution enables full automation of system configuration, simulation, and reporting tasks required for channel analysis. Therefore, the user can quickly and accurately analyze the channels in a few steps. The accuracy and efficiency are ensured by the 'SimNX' engine. The customization of the report is also supported.
(e.g., formats and analysis items)

Key Benefits

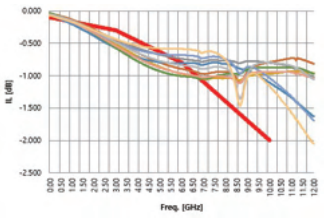
- Auto system configuration and simulation
- SimNX engine: Fast and accurate freq. and time domain simulation
- Supports the accurate and fast **HBM3/DDR5/GDDR6/PCIe Gen5/6 analysis**
- Fully customizable report

Step 1.
Auto configuration and simulation



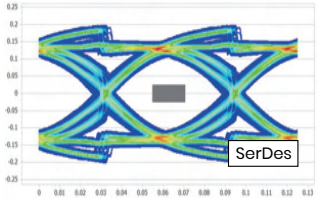
Step 2.
Auto reporting

Freq. domain



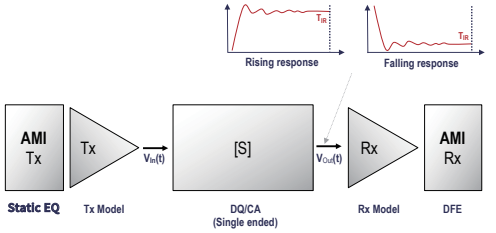
- Insertion/return loss
- NEXT, FEXT
- PDN analysis
- Z0 estimation

Time domain

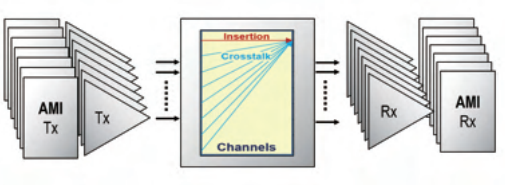


- TDR, TDT
- Eye-diagram
- BER, Bathtub
- Delay, skew, slew rate, etc.

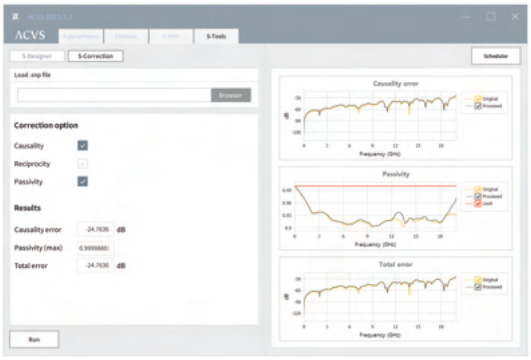
ACVS Advanced Channel Verification System



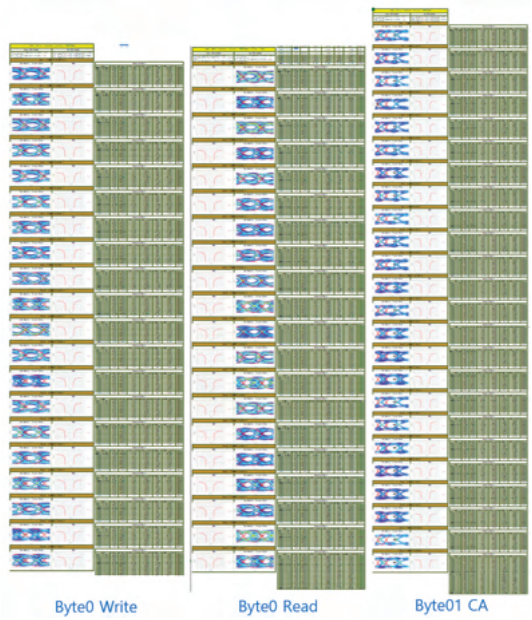
DDR5/GDDR6 AMI simulation
: Supports the fast single-ended AMI simulation and forward clocking.



SerDes (PCIe Gen5/6) AMI simulation
: Supports the fully automated x-talk analysis
: Flexible Tx/Rx -> IBIS-AMI, IBIS only, Source/load



S-Tools
: S-Correction (causality/passivity correction)
: S-Designer (Design channel [S] with spec. budget)
: PerfectCal Pro (2xThru de-embedding tool)



Report automation
: Full customization service for each customer.

Auto configuration

Complex system configuration is required to analyze bus channels such as DDR. Specifically, it requires a lot of complicated tasks such as the connection between S-parameters, a setting of each port condition, and configuration of driver/receiver. Huwin ACVS thus fully automates this process, maximizing the efficiency and accuracy of channel verification.

Auto channel configuration

The user-defined rule automatically proceeds the connection between S-parameters, port termination, and configuration of IBIS and IBIS-AMI models. Rule files can be edited directly by the user. Furthermore, we supports 'Rule assistant' that is deep learning-based auto configuration function.

Case sweep

Supports case sweeps for configuration parameters (e.g., Dara rate, IBIS models) needed for channel simulation.

SimNX engine

1) Frequency domain simulation

Various linear analysis methods in the frequency domain of the configured channel system are supported.

- **Insertion/return loss**
- **Crosstalk (NEXT, FEXT)**
- **Group delay, RLC extraction, Z0 estimation etc.**
- **PDN analysis (w/wo cap.)**
  : Impedance analysis (i.e. Differential Z-parameter)

2) Time domain simulation

More sophisticated techniques are required to conduct time-domain analysis using S-parameters. Huwin ACVS offers the following methods to maximize the accuracy and efficiency of time-domain analyses.

- **Band-limited S-parameter to causal time response**
  : Most of the S-parameters obtained through measurement or simulation are of limited bandwidth. Under these S-parameter conditions, the extrapolation method is applied to ensure the accuracy of transient simulation results. The extrapolation method developed by Huwin enables conversion to causal time response while maintaining the inherent characteristics of the band-limited S-parameter.
- **The accurate TDR and TDT**
- **Transient simulation**
  : Huwin transient solver supports IBIS or IBIS-AMI analysis.
  : Supports
  - HBM3/(LP)DDR full transient simulation
  - DDR5/GDDR6 AMI simulation (The fast engine)
  - PCIe Gen5/6 AMI simulation with X-talk automation
- **C-PHY transient simulation**
  : Supports Tx/Rx EQ, jitter, noise
- **Report automation**
  : Supports fully customized report
  : Compliance test
- **S-Tools**
  : S-Correction (causality/passivity correction)
  : S-Designer (Design channel [S] with spec. budget)
  : PerfectCal Pro (2xThru de-embedding tool without limitation

ACVS Demo

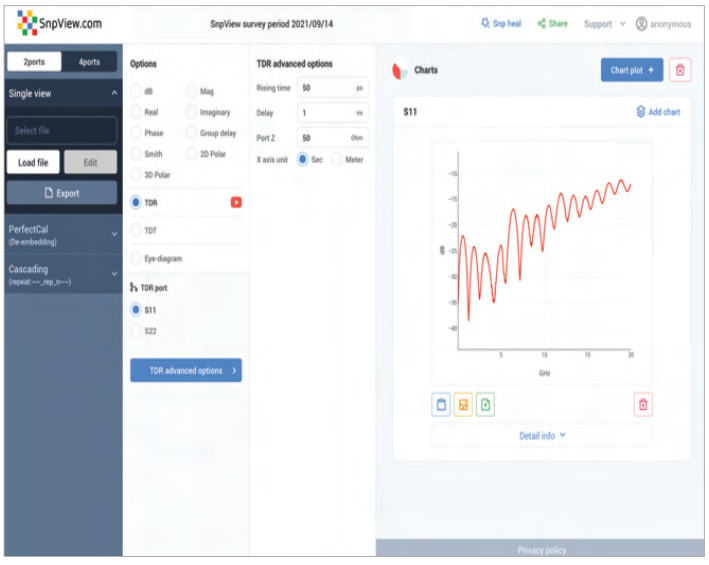
SnpView.com Easy, Fast and Accurate Channel Analysis Service

Channel analysis using S-parameters is costly and time-consuming. First, a high-performance computing server and channel simulator are required. In addition, the complex setup of the simulation and long computation time increase the verification time of the channel. To overcome this limitation, Snpview.com provides a web-based channel analysis service. Various analyses of the channel can be provided using only the local PC and web browser. In addition, newly developed time-domain analysis methods ensure fast and accurate channel analysis. It supports most of the analysis methods required for channel analysis, such as TDR, TDT, and eye-diagram.

Snpview.com is a web-based channel analysis solution. Channel analysis can be performed anytime and anywhere with a web browser without the need for expensive computing servers. Newly developed time-domain analysis methods provide fast and accurate channel analysis results. Currently, it offers most of the analytical methods required for channel verification and supports high-speed channel simulation.

Key Benefits

- Easy view of S-parameters
- Fast and accurate time domain analysis methods
  : TDR, TDT, eye-diagram, BER
- PerfectCal®
  : 2xThru de-embedding with impedance correction
- Enforcing causality and passivity of S-parameters
  : Heal function
- Share analysis results
- ChannelView
  : High-speed channel simulator with EQ/Jitter

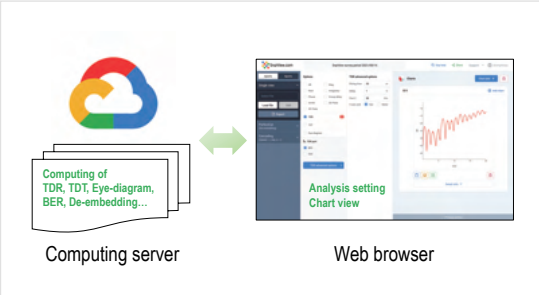


SnpView

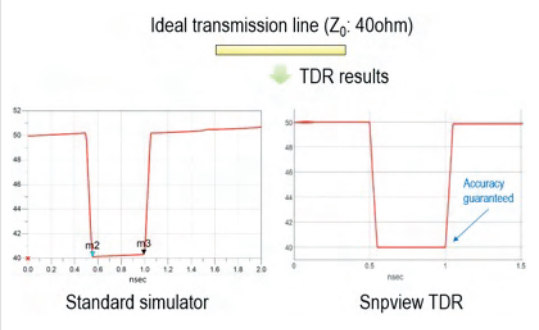
ChannelView

SnpView.com : Web based channel simulation
(Support chrome browser)

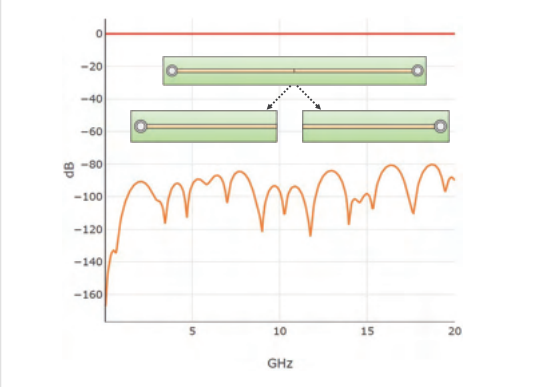
SnpView.com Easy, Fast and Accurate Channel Analysis on Web



Architecture of the Snpview.com



Comparison of TDR accuracy



Calibration results of 'PerfectCal'
: Half gating thru fixture.
: Support de-embedding function.

ChannelView

: High-speed channel simulator with EQ/Jitter
: Support PAM4 simulation

Efficient way for channel analysis

Usually, channel analysis is expensive and time-consuming. First of all, channel simulator and high-performance computing servers are needed for analysis. In addition, complicated analysis settings and long simulation times for channel analysis increase the development time of the system. Snpview.com is a web-based channel analysis solution that provides analysis results anytime and anywhere without the limitations of the computing environment.

- **Computing on the Snpview server**
- **Unnecessary for high performance PC**
- **Required only 'Chrome' or 'Edge' web browser**
- **Easy setup for channel analysis**

Fast and accurate time domain methods

More sophisticated techniques are required to conduct time-domain analysis using S-parameters. Snpview.com offers the following methods to maximize the efficiency and accuracy of time-domain analyses.

- **Band-limited S-parameter to causal time response**
  : Most of the S-parameters obtained through measurement or simulation are of limited bandwidth. Under these S-parameter conditions, the extrapolation method is applied to ensure the accuracy of transient simulation results. The extrapolation method developed by Huwin enables conversion to causal time response while maintaining the inherent characteristics of the band-limited S-parameter.
- **The accurate TDR and TDT**
- **Fast eye-diagram estimation**
  : Fast and accurate estimation of worst-case eye-diagrams is possible using the channel system's step response and optimization algorithms.
- **Fast BER estimation**
  : Fast and accurate BER estimation are possible using the channel system's step response and statistical approach.
- **PerfectCal® : 2xThru de-embedding with impedance correction**
  : Supporting an accurate half gating function for the thru-fixture structure. Therefore, the de-embedding of the fixture-DUT-fixture structure is possible.
- **ChannelView**
  : The time domain simulation of high-speed channel with the accurate impulse responses, Tx/Rx EQ, jitter and noise.

Additional functions for user convenience

- **Heal function**
  : Supporting the function to enforce causality and passivity of S-parameter.
- **Sharing analysis results**
  : Sharing S-parameters and analysis results. An open link can be created and sent to other users.

TDR accuracy

PerfectCal

SnpView demo

Huwin

For FREE ACVS evaluation license, just send email to Brian(brian.lee@huwin.com) and you can get the most accurate and the most convenient tool to help your Memory and SerDes channel analysis and reporting job.

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Huwin Solutions

ACVS

· Full automation of channel verification

ACVS-GSI

· SerDes channel analysis
· ANSYS SIwave automation
· Report automation

Snpview.com

· Web-based channel simulator and Thru-fixture gating for de-embedding