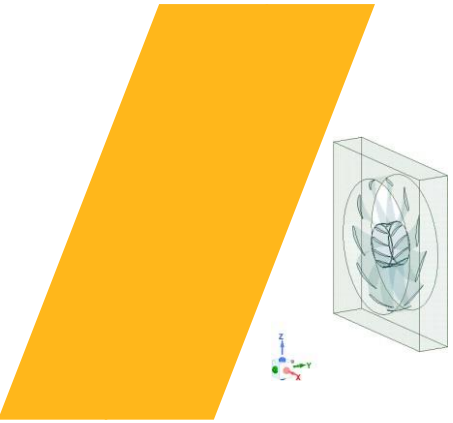
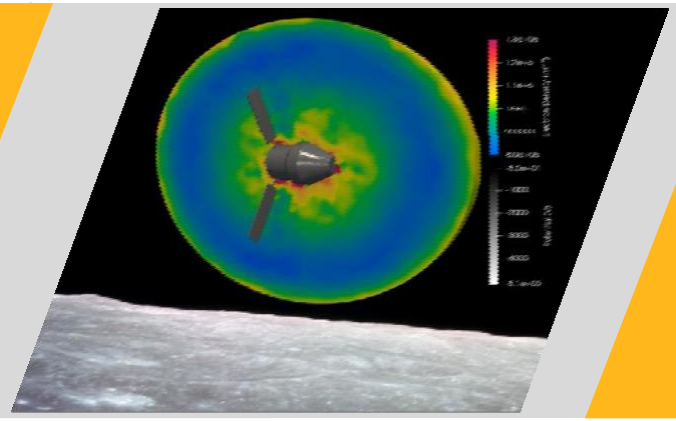
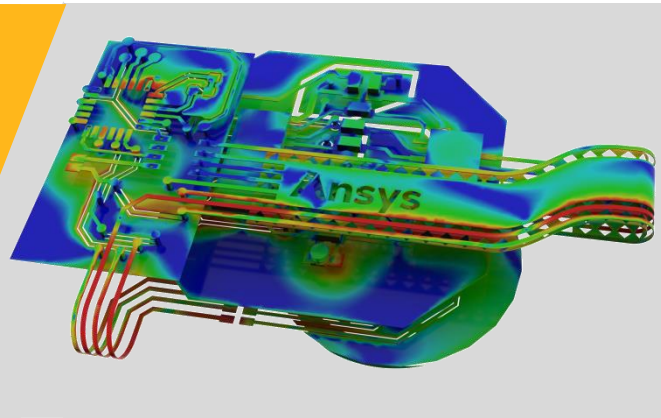
ANSYS Q3D 2022R2 新功能介绍

新科益系统与咨询（上海）有限公司

Agenda







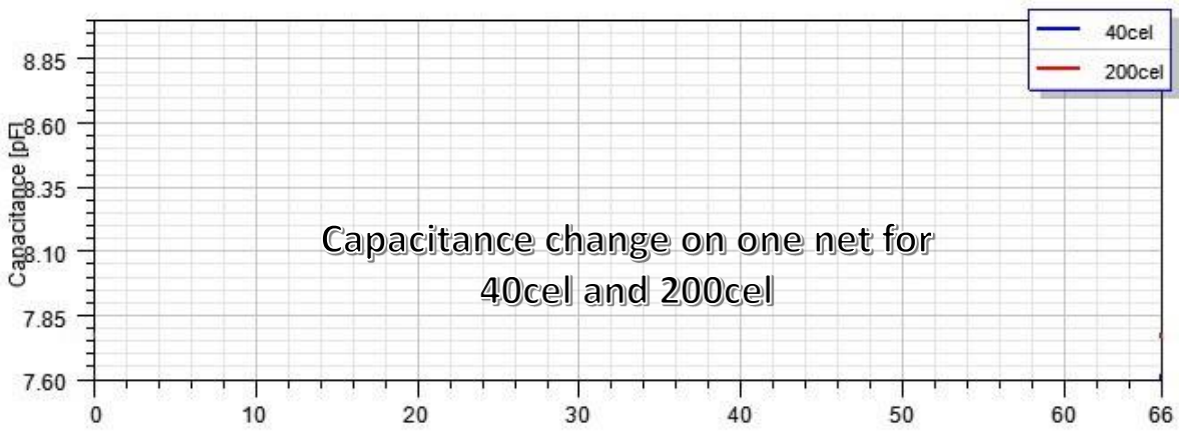
Highlights

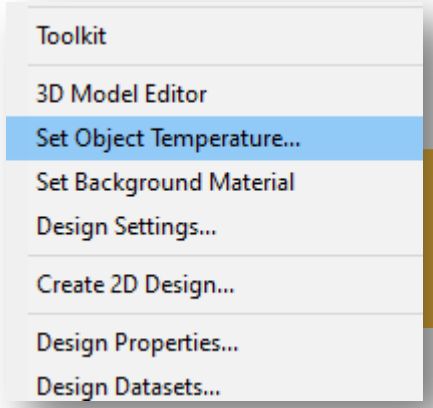
- ✓ Encrypted Verilog-A models
- ✓ Improved Handling and Logging of Transient Solver Settings
- ✓ Philosophy of option decision algorithm
- ✓ New Source Components in EMC Tools Library
- ✓ Thermal Design Creation, Icepak or Mechanical Thermal, from Existing HFSS/Maxwell/Q3D Design
- ✓ Temperature dependent materials for CG solver in Q3D

Q3D

Temperature dependent materials for capacitance extraction

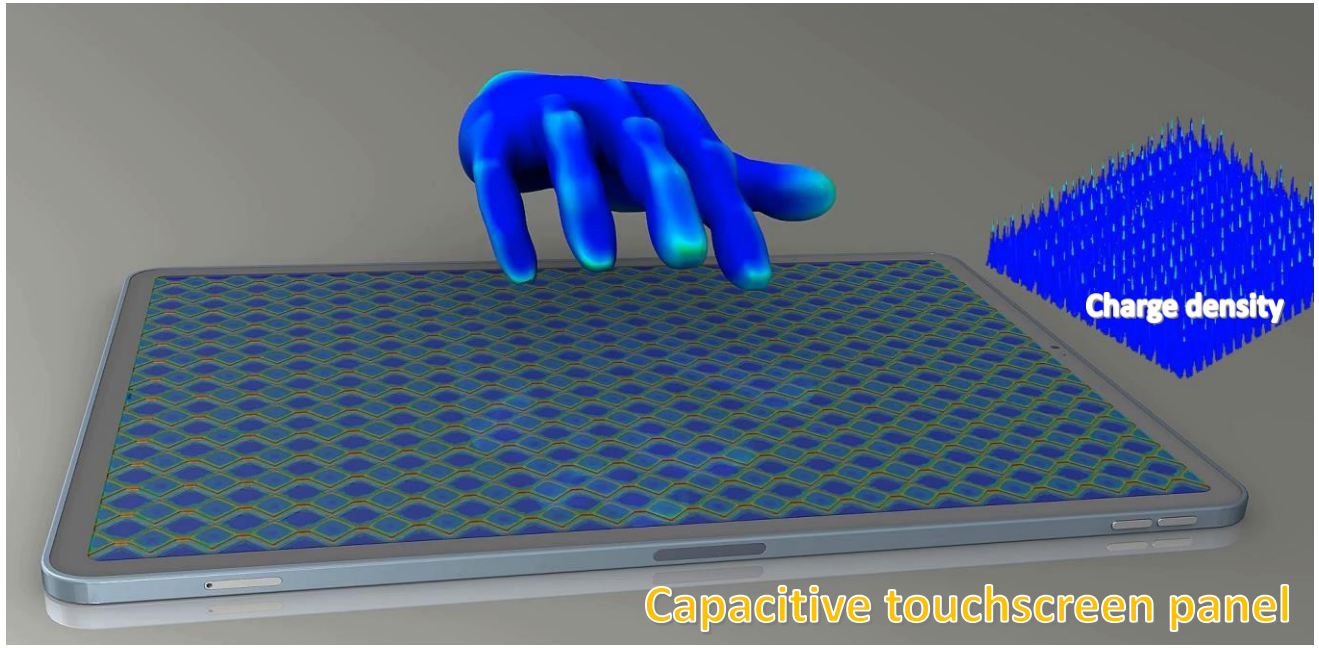
- Support temperature dependent material properties for dielectrics
- Temperature must be assigned to solid dielectrics





$\varepsilon_r(T)$

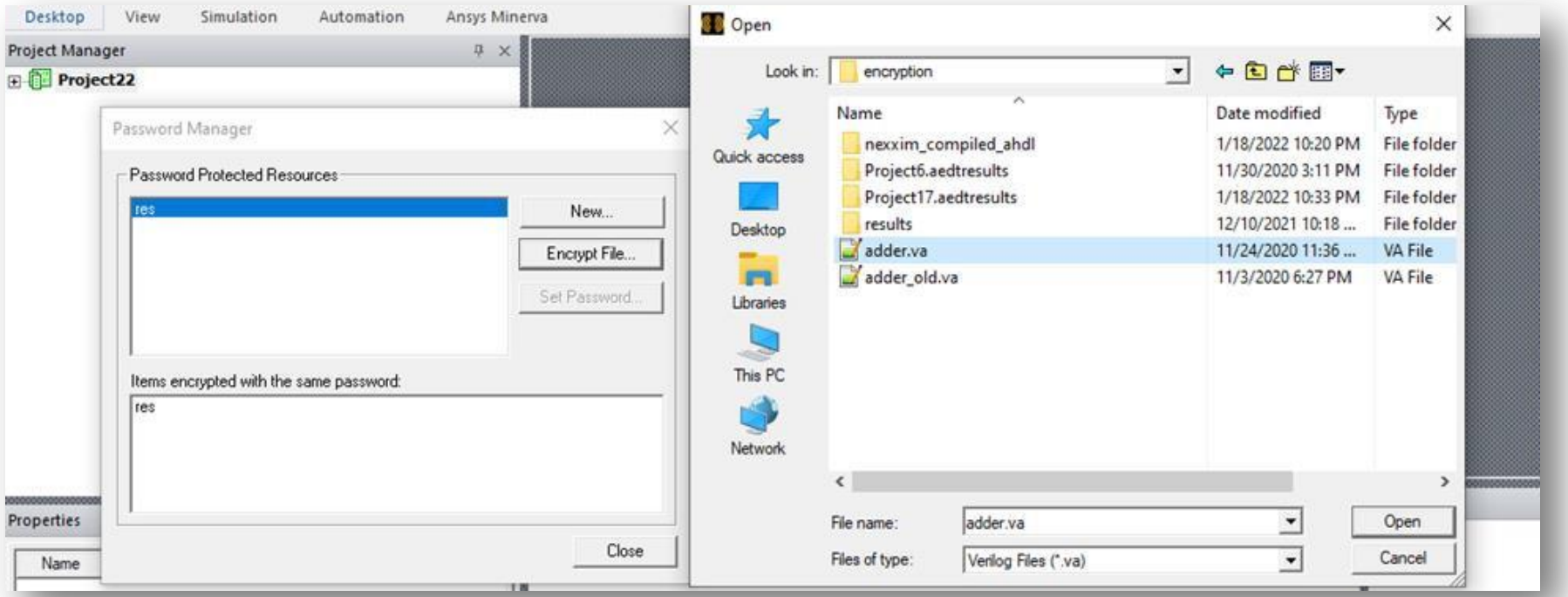
	Name	Type	Value	Units	Thermal Modifier
	Relative Permittivity	Simple	8.07118		pwl($ds1,Temp)
	Relative Permeability	Simple	1		None
	Bulk Conductivity	Simple	0	siemens/m	None
	Dielectric Loss Tangent	Simple	0.144701		None



Circuit

Encrypted Verilog-A models

- Support encrypting Verilog-A files in Password Manager (.va file extension)
- Users can create Verilog-A models and distribute them to customers while protecting their IP

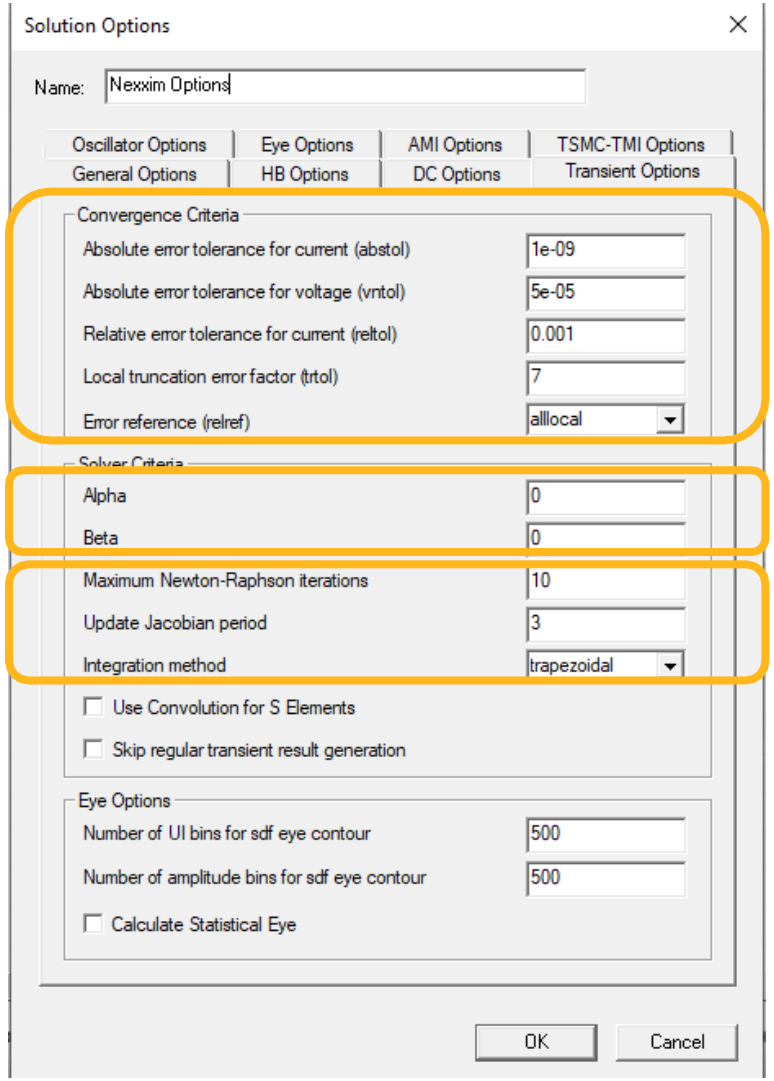


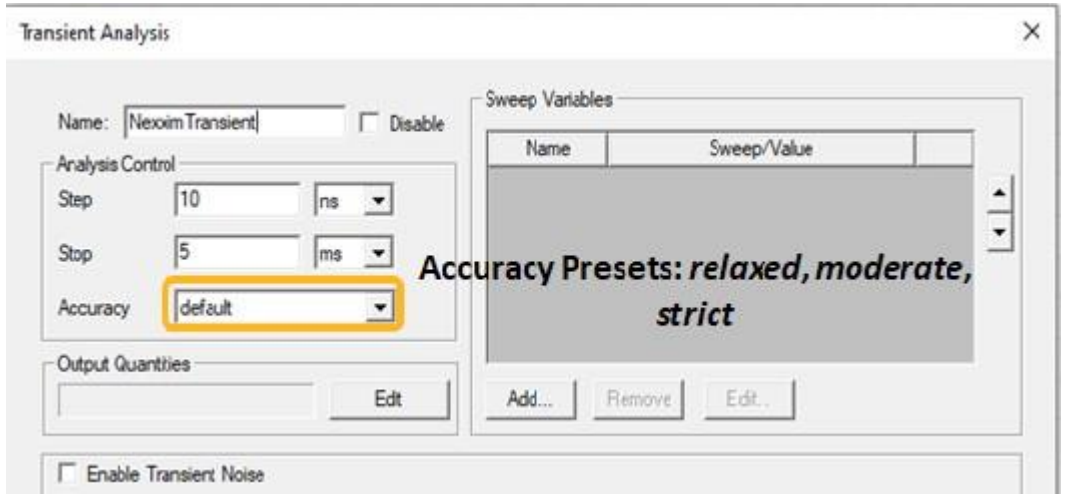
Improved Handling and Logging of Transient Solver Settings

Accuracy control

Nonlinearity control

Numerical Solver control

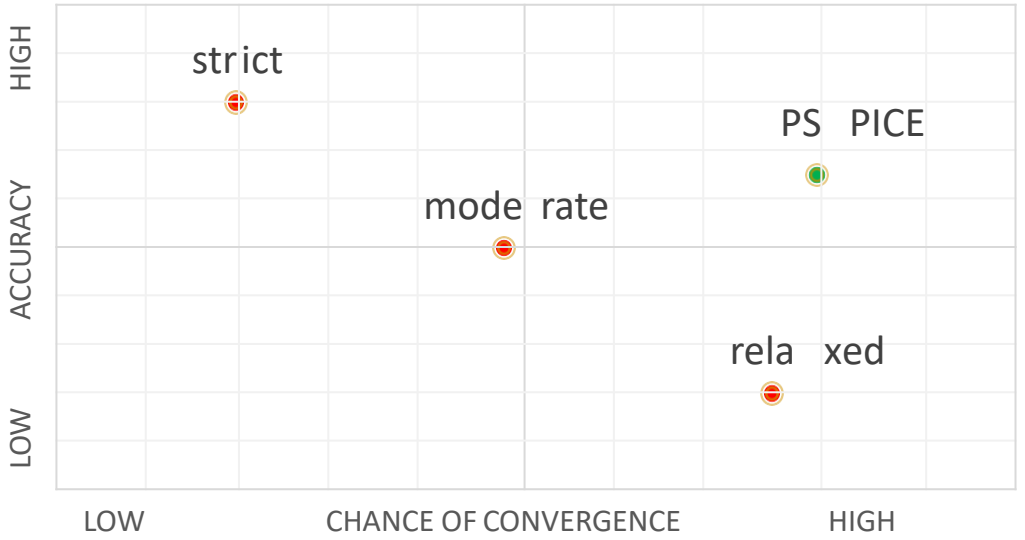




- Intended option settings may not be applied.
  - Can override optimal settings
  - Get locked out of improvements
- PSPICE preset is set automatically behind-the-scenes.
  - Need to control for convergence
- The logic of implementation is not always clear.

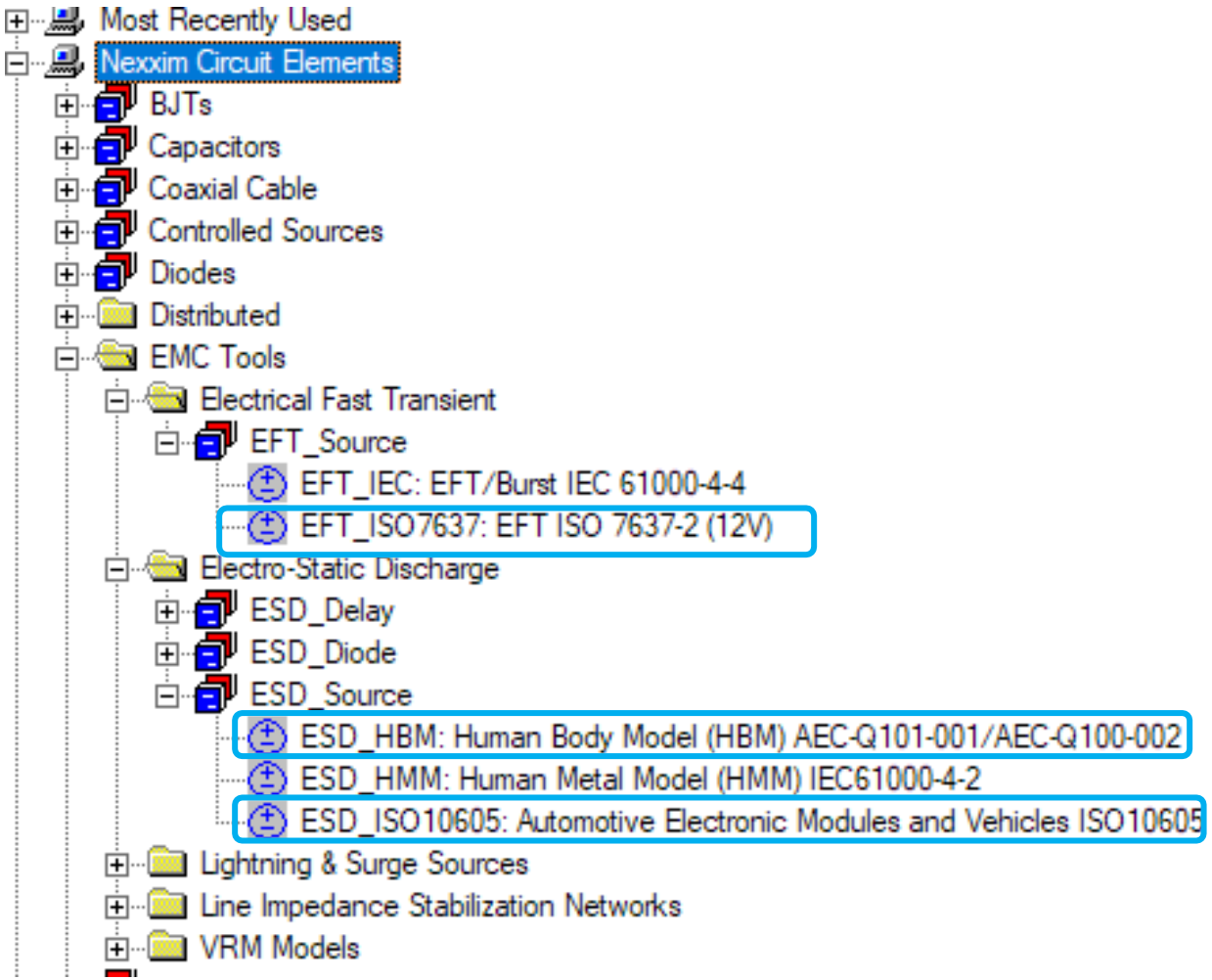
Philosophy of option decision algorithm

- Reserve functionalities of the existing presets.
- UI setting takes precedence if it is “better”.
  - Accuracy/Speed/Convergence
  - Preset function
- Otherwise errpreset overrides UI/default setting.
- If any difference between UI and solver:
  - A short message in message manager.
  - Details in log file.



Preset	Intended Function
Relaxed	Speed up by loosening tolerances
Moderate	Between relaxed and strict
Strict	Increase accuracy by tightening tolerances
PSPICE	Convergence w/ accuracy.

New Source Components in EMC Tools Library

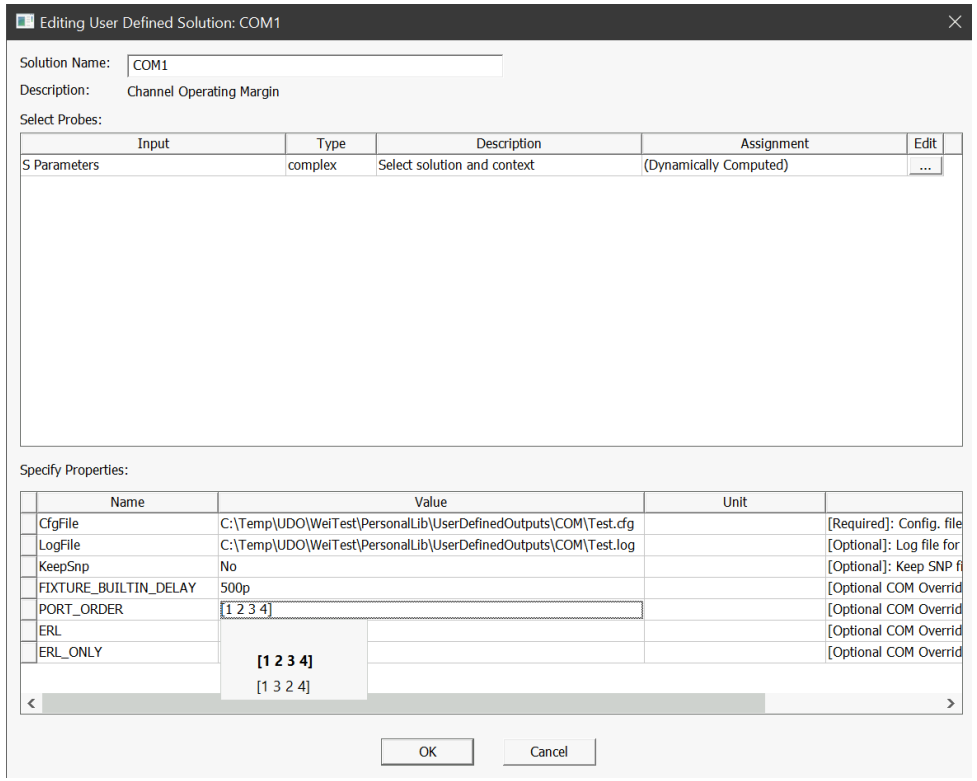


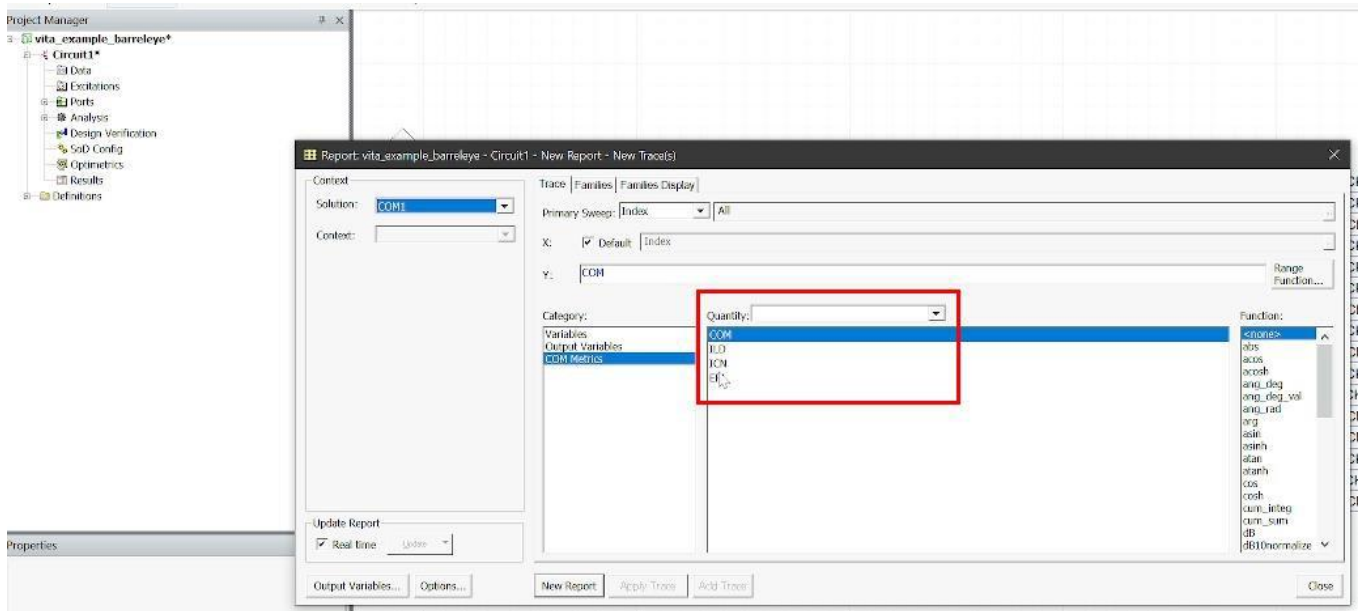
- AEC/JEDEC Human Body Model
- ISO10605 – ESD Road Vehicles
- EFT ISO7637-2
  - Fix for burst
  - Add repeat

SPISim

COM-based Optimization in AEDT

- UDO flow to enable COM optimization
- Metrics such as ERL and ILD can be used as optimization target





Data Table 1

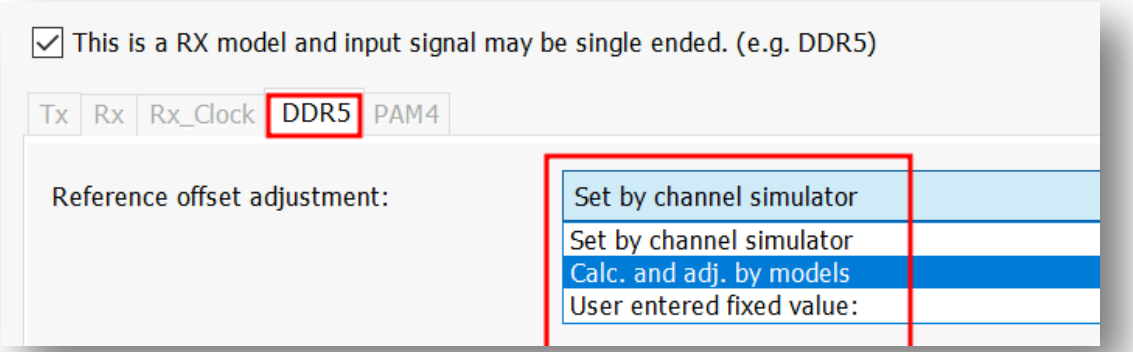
launch Ansys

4

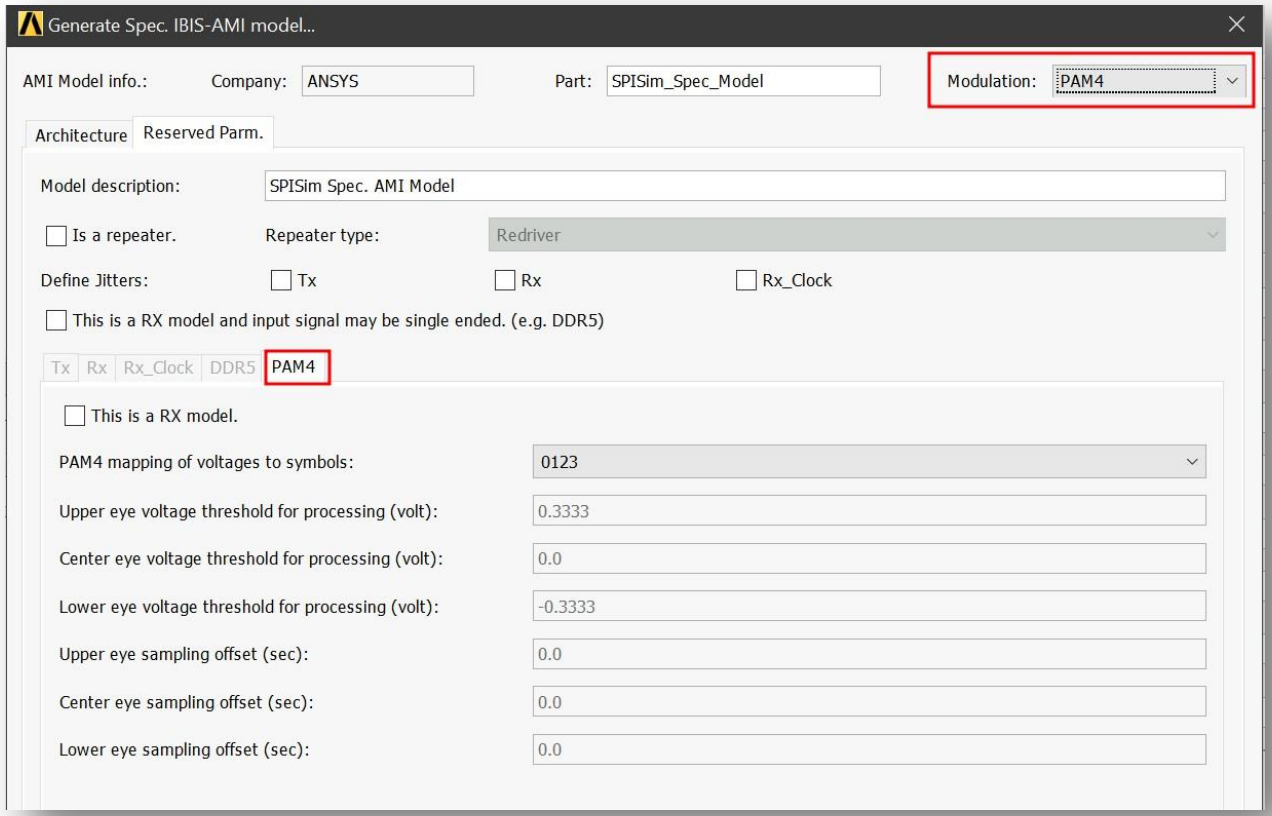
	$trace_out_width [um]	ERL COM1 $d_via_antipad='0.6mm'	ERL COM1 $d_via_antipad='0.675mm'	ERL COM1 $d_via_antipad='0.825mm'	ERL COM1 $d_via_antipad='0.975mm'	ERL COM1 $d_v...
1	65.625000		13.617900			
2	96.875000					
3	100.000000					19.86...
4	128.125000				20.237700	
5	159.375000					
6	190.625000			16.547900		
7	221.875000					
8	253.125000					
9	281.689610	12.370500				
10	284.375000					

Modeling Support for PAM4 and DC_Offset Keywords for IBIS/AMI

- Generation of DDR5 IBIS and IBIS-AMI models (IBISV7.1 compliant and not compliant for legacy simulators)
- Generation of PAM4 LTI models and Dfe with PAM4 slicing capabilities for SERDES channels with data rate =>56Gbps
- Support for DC_OFFSET for single ended DDR5 IBIS-AMI simulations



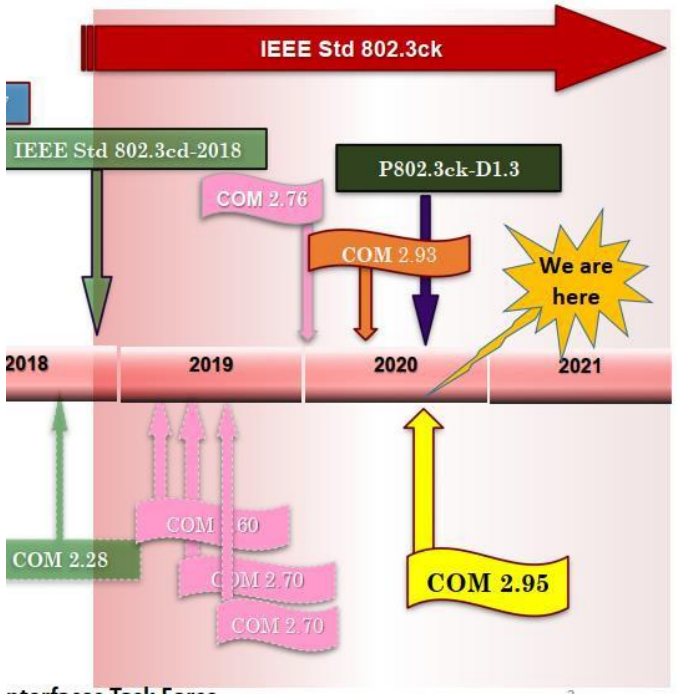
Reference: IBIS V7.1 Spec

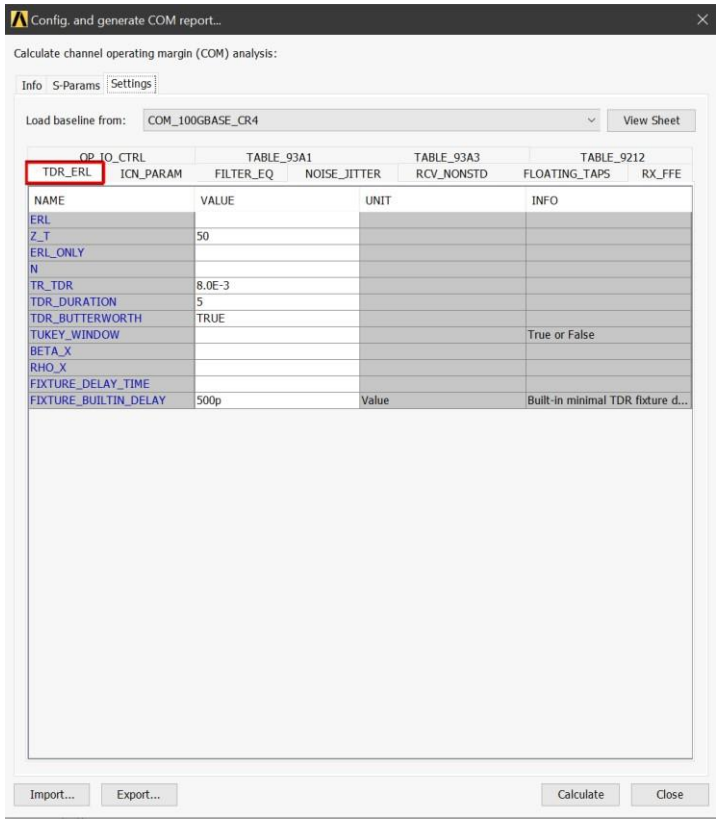


- Set by simulator: for IBIS V7.1 compliant simulators
- Calc. by models: for pre IBIS V7.1 compliant simulators..
- Fixed value: User controlled offset

Update COM implementation to reference ver. V2.95

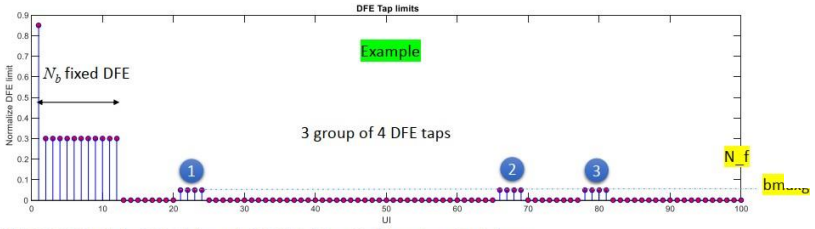
- SPISim COM upgraded to V2.95 introducing several enhancements:
  - Floating DFE taps
  - Added Eye H/W measurements (C2M)
  - Include Tx Package for TDR and ERL
  - Added support for 30 new keywords
- COM supports 802.3cd and 802.3ck



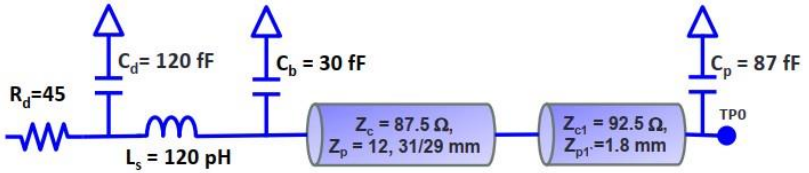


Parameters for Floating DFE Taps and Example
Values Maybe Further Refined

Floating Tap Control		
N_bg	3	0 1 2 or 3 groups
N_bf	4	taps per group
N_f	100	UI span for floating taps
bmaxg	0.1	max DFE value for floating taps



Package Proposal with LC Termination Compensation (single sided model)



OIF/MIPI S-parameter GUI/batch Mode Reporting

- SPISim s-param report now support OIF/MIPI
- Insertion loss deviation and integrated crosstalk ratio added
- Supports both GUI and batch mode for interactive or automated workflows

14.2.6.4 Insertion loss deviation (ILD)

The insertion loss deviation *ILD* is the difference between the measured insertion *IL* and the fitted insertion loss IL_{fitted} as defined in equation (14-3).

$$ILD = IL - IL_{fitted} \quad (14\text{-}3)$$

The insertion loss deviation ILD shall be within the region defined by equations (14-4) and (14-5) where f_b is the maximum baud rate to be supported by the channel under test and f_{ILmin} and f_{ILmax} are given in Table 14-4.

$$ILD \geq ILD_{min} = \begin{cases} -1.0 - 12.0(f/f_b) & f_{ILmin} \leq f < f_b/4 \\ -4.0 & f_b/4 \leq f \leq (3/4)f_{ILmax} \end{cases} \quad (14\text{-}4)$$

$$ILD \leq ILD_{max} = \begin{cases} 1.0 + 12.0(f/f_b) & f_{ILmin} \leq f < f_b/4 \\ 4.0 & f_b/4 \leq f \leq (3/4)f_{ILmax} \end{cases} \quad (14\text{-}5)$$

Table 14-5. Channel integrated crosstalk aggressor parameters

Parameter	Symbol	Value	Units
Baud rate	f_b	max. Baud Rate sup. by Channel	Gsym/s
Near-end aggressor peak to peak differential output amplitude	A_{nt}	1200	mVppd
Far-end aggressor peak to peak differential output amplitude	A_{ft}	1200	mVppd
Near-end aggressor 20 to 80% rise and fall times	T_{nt}	8	ps
Far-end aggressor 20 to 80% rise and fall times	T_{ft}	8	ps

$$\sigma_x \leq \sigma_{x,max} = \begin{cases} 10\ (mV, RMS) & for \quad 3\,dB < IL \leq 5.3\,dB \\ 12.4 - 0.45IL\ (mV, RMS) & for \quad 5.3\,dB < IL \leq 20\,dB \end{cases} \quad (14\text{-}9)$$

Results:

- FIGURE_1: PASS
- FIGURE_2: FAIL
- FIGURE_4: PASS
- FIGURE_5: PASS ICN: 2.72595 mv, Max: 4.47839 mv, IL(Fb/2) = 17.6036 dB

FIGURE_1:

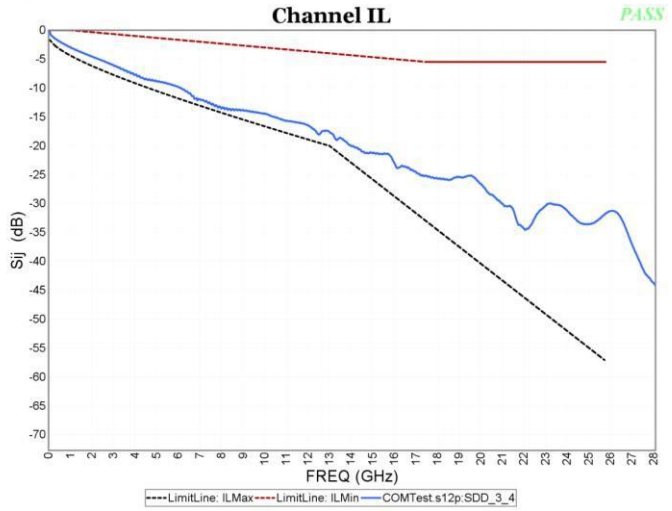
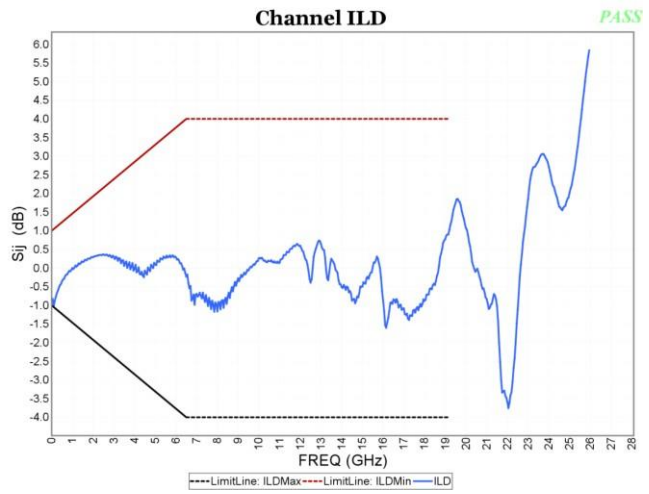


FIGURE_4:



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