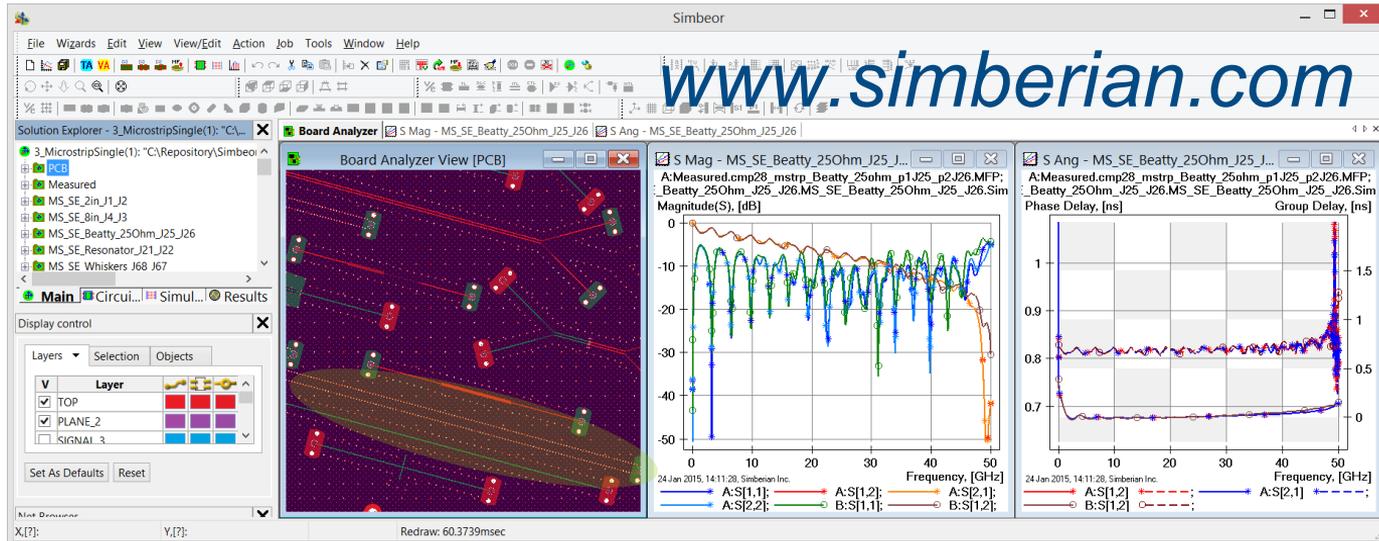




Simbeor Application Note #2018\_04, June 2018  
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# Analysis of traces over meshed planes for flexible interconnects



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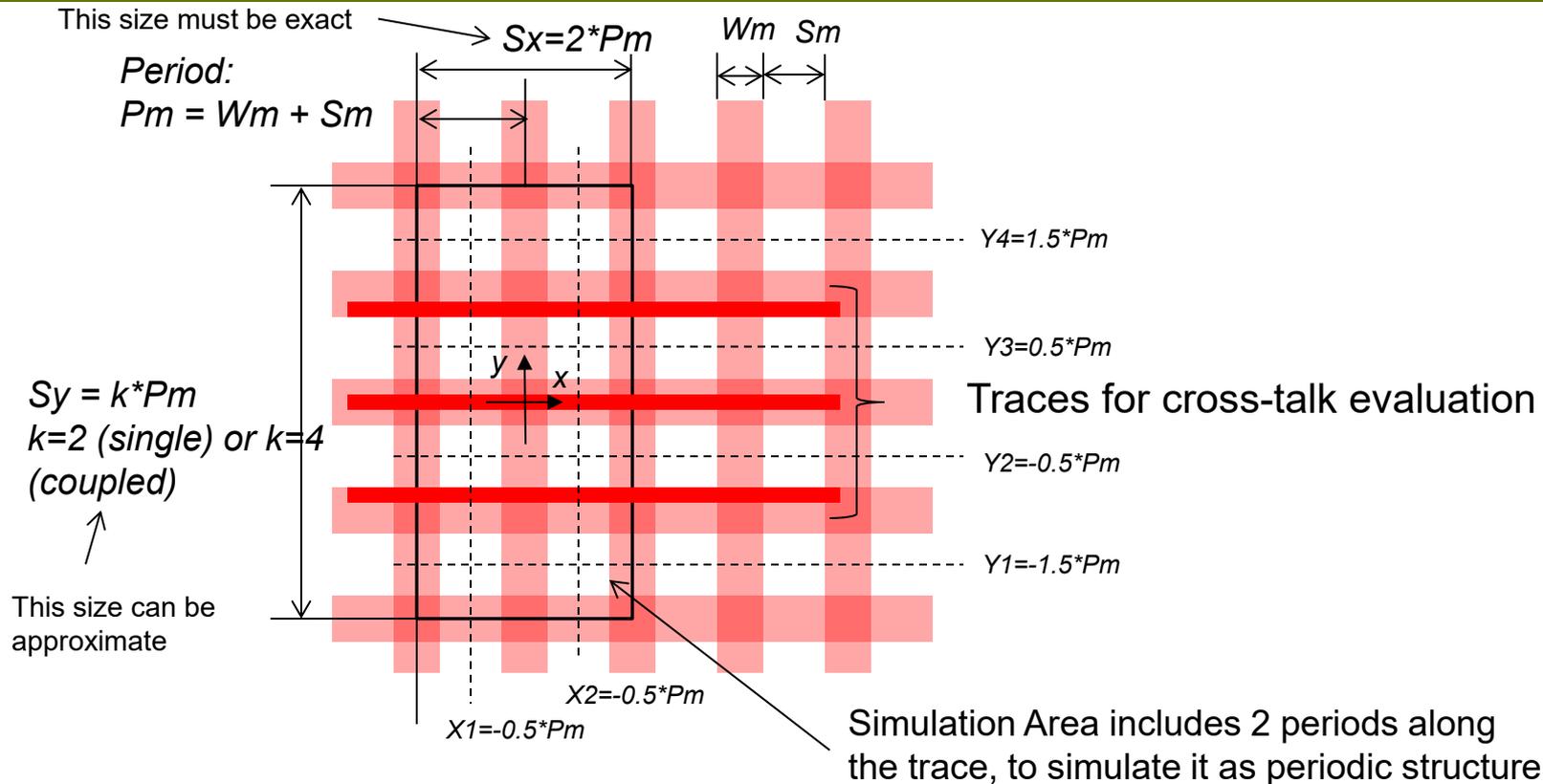


# Outline

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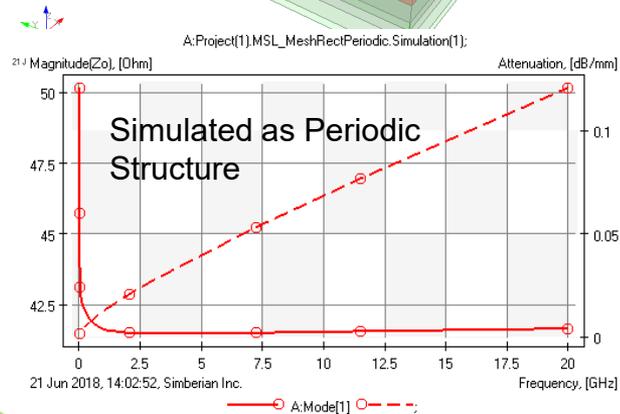
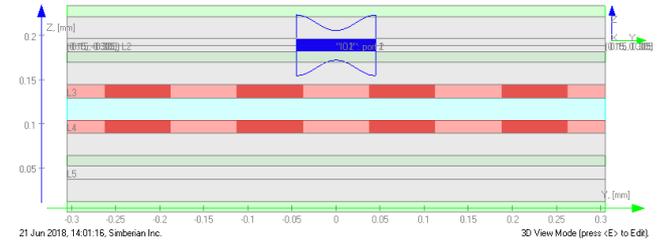
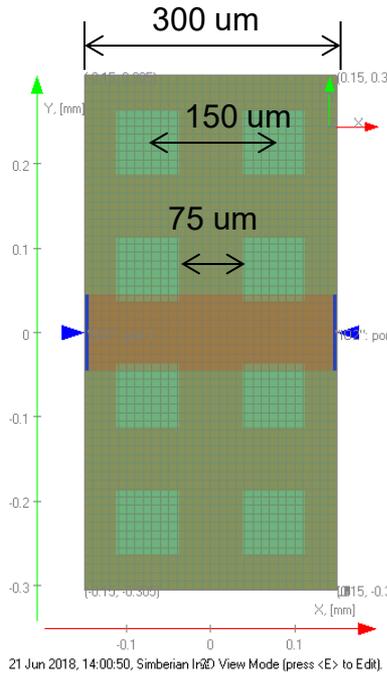
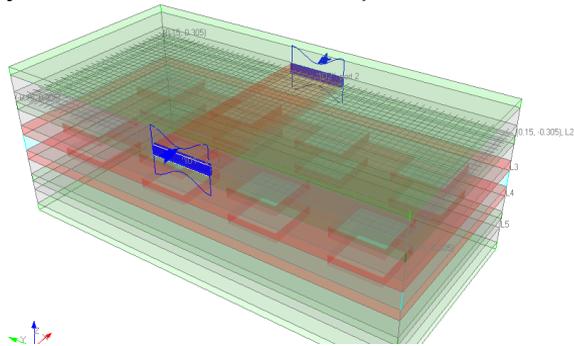
- ❑ Traces over meshed planes are often used in flexible interconnects
- ❑ Models for such traces can be effectively built with Simbeor 3DML and 3DTF solvers
  - Simbeor 3DML solver is used here
- ❑ This is example of analysis of traces over plane with rectangular cut-outs
  - Analysis of a segment as periodic structure with per unit length parameters extraction is used here
  - Alternatively, a segment can be simulated as discontinuity and multiple segments concatenated in linear network
- ❑ Solution used here is available at <http://kb.simberian.com/SimbeorExample.php?id=220>

# Meshed plane geometry - rectangular



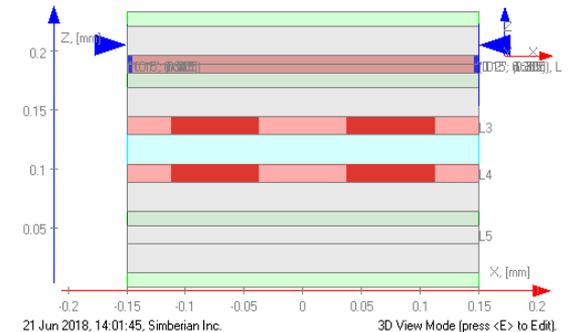
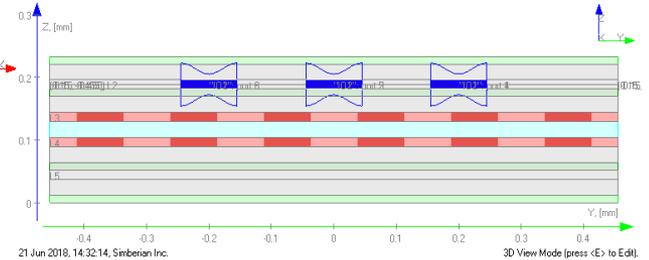
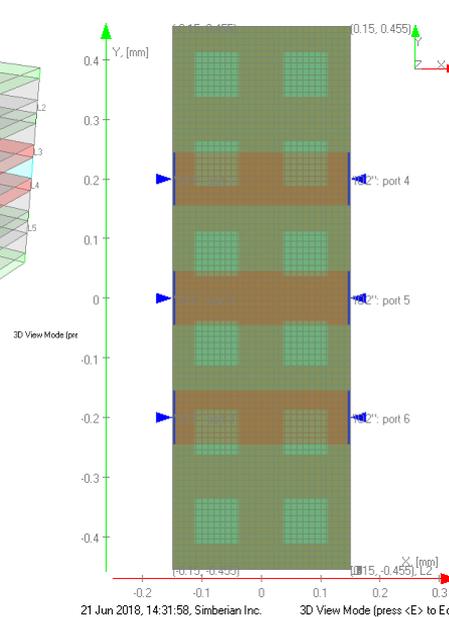
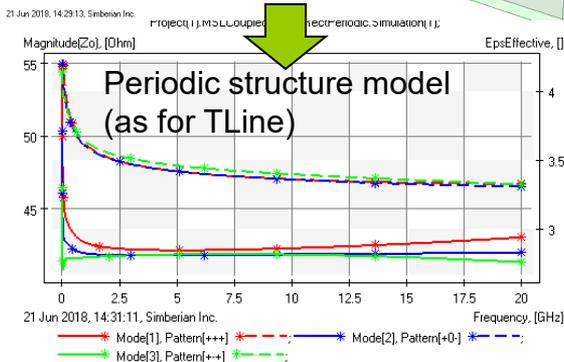
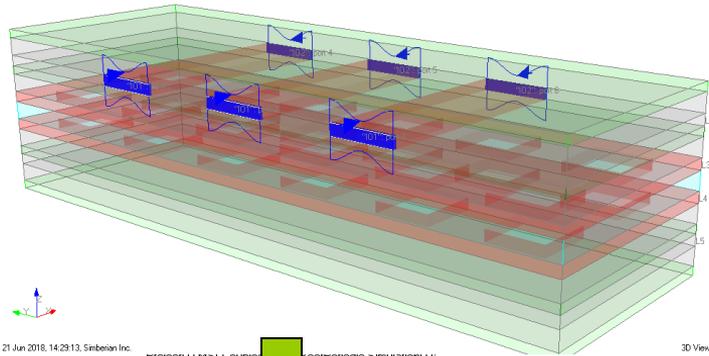
# Example: MeshedPlaneFlex

Circuit MSL\_MeshRectPeriodic: 90  $\mu\text{m}$  trace over 75 by 75  $\mu\text{m}$  cutouts, separated by 75  $\mu\text{m}$  (edge to edge) in DuPont Pyralux dielectric, 150  $\mu\text{m}$  period



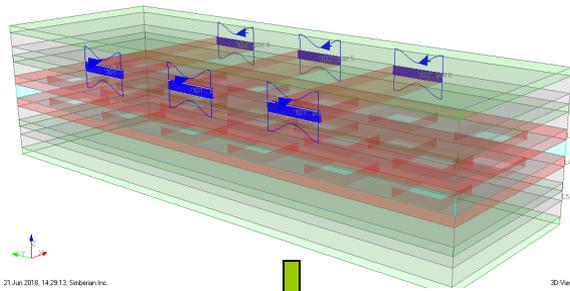
# Example: MeshedPlaneFlex

Circuit MSLCoupled\_MeshRectPeriodic: 90 um trace over 75 by 75 um cutouts, separated by 75 um (edge to edge) in DuPont Pyralux dielectric

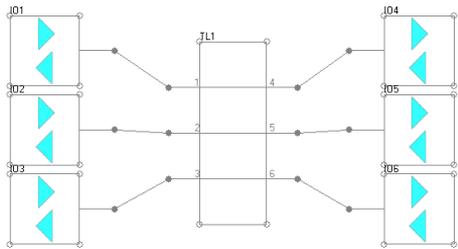


# Example: MeshedPlaneFlex

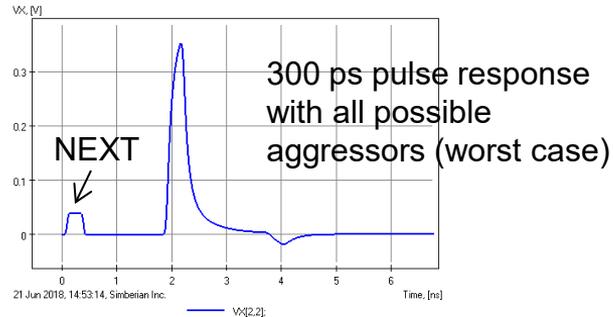
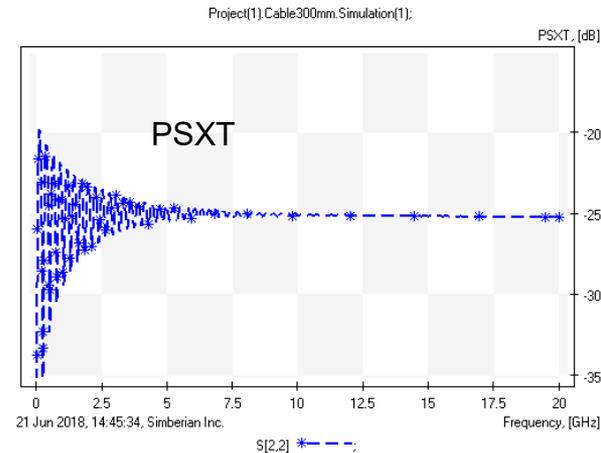
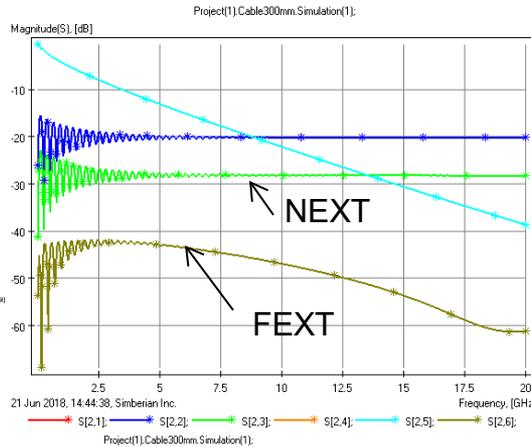
## Circuit MeshRectCable300mm:Cross-talk investigation for the middle trace



300 mm segment in linear network



This model is equivalent to 1000 concatenated segments!



See how to evaluate MDXT at [http://kb.simberian.com/brows\\_e\\_item.php?id=880](http://kb.simberian.com/brows_e_item.php?id=880)

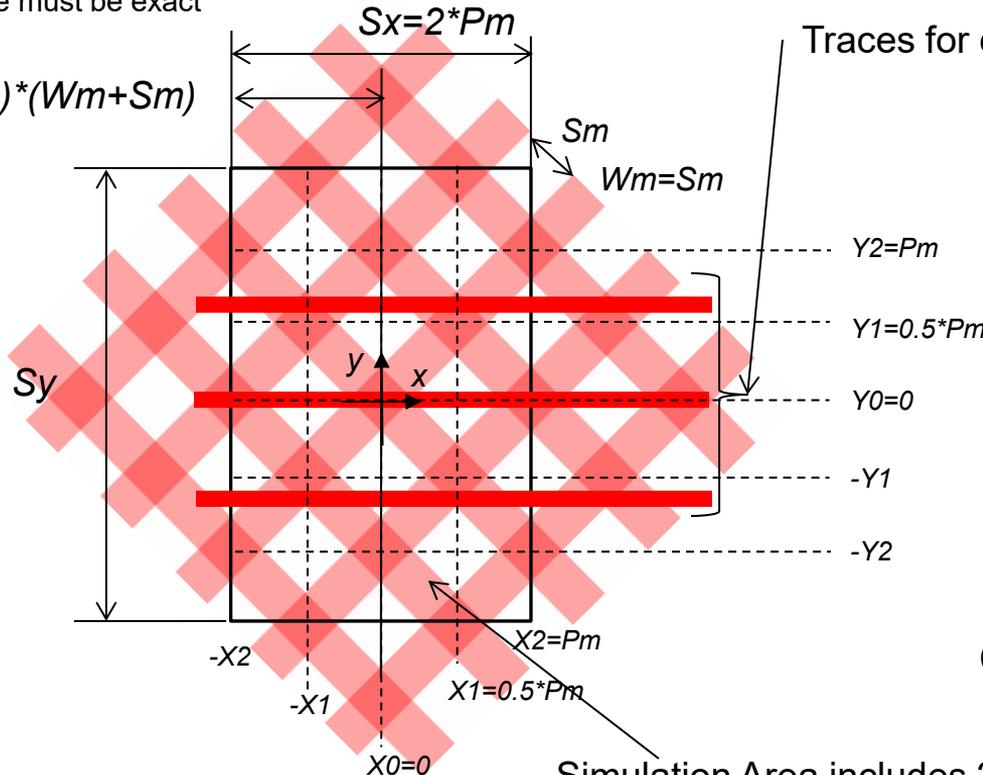
- NEXT – Near End Crosstalk
- FEXT – Far End Crosstalk
- PSXT – Power Sum Crosstalk
- MDXT – Multiple Disturber X-talk

# Meshed plane geometry for 45 deg.

This size must be exact

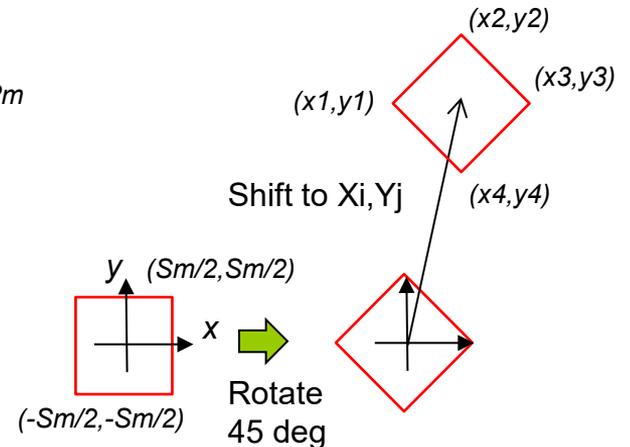
Period:

$$P_m = \sqrt{2} * (W_m + S_m)$$



Traces for cross-talk evaluation

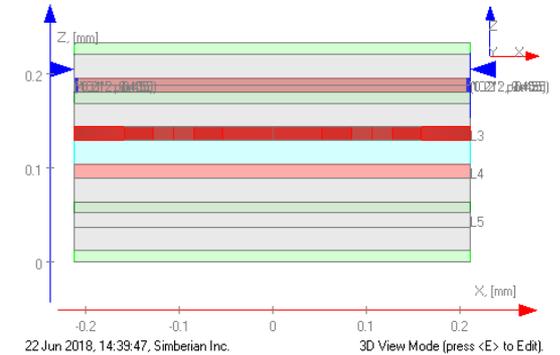
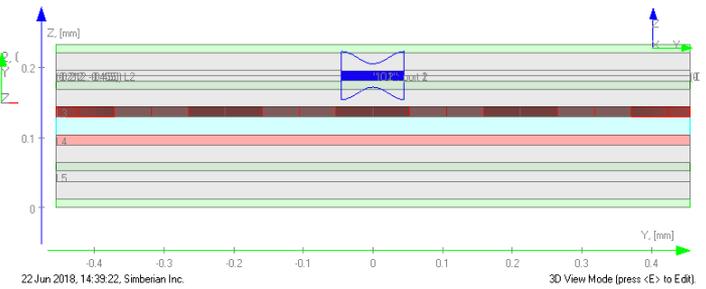
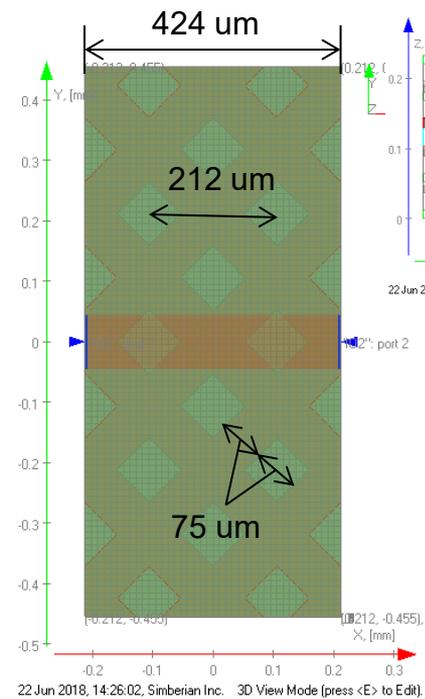
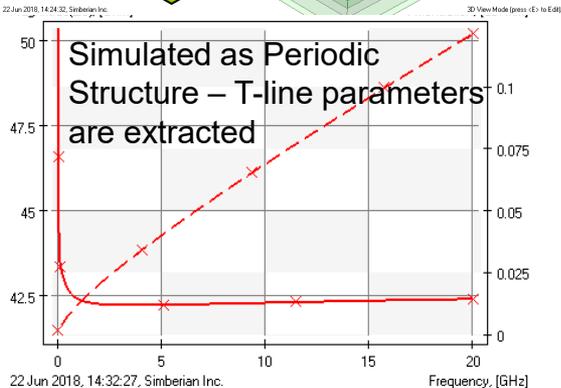
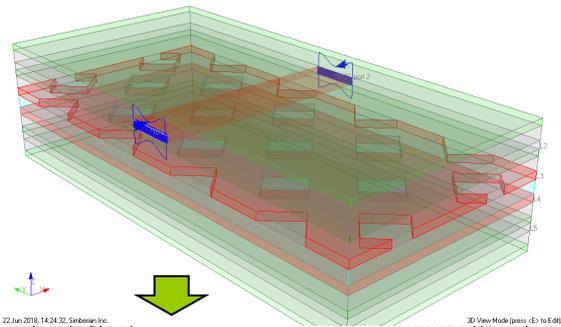
To compute coordinates of the cut-outs, use rotate and shift to one of the point  $(X_i, Y_j)$



Simulation Area includes 2 periods along the trace, to simulate it as periodic structure

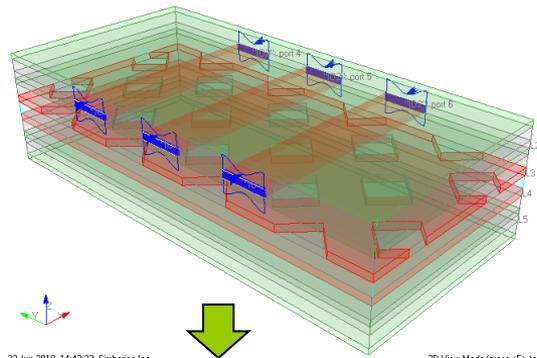
# Example: MeshedPlaneFlex

Circuit MSL\_Mesh45Periodic: 90  $\mu\text{m}$  trace over 75 by 75  $\mu\text{m}$  cutouts rotated by 45 deg., separated by 75  $\mu\text{m}$  (edge to edge) in DuPont Pyralux dielectric, 212  $\mu\text{m}$  period

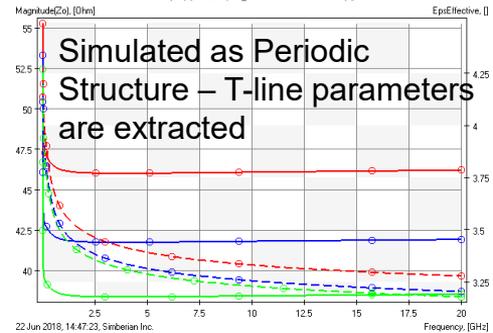


# Example: MeshedPlaneFlex

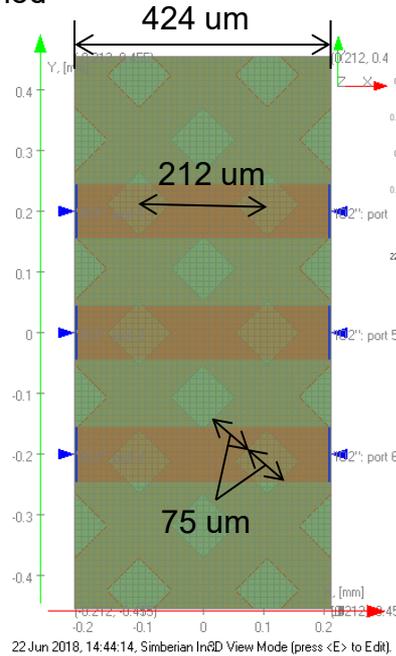
Circuit MSLCoupled\_Mesh45Periodic: 90  $\mu\text{m}$  trace over 75 by 75  $\mu\text{m}$  cutouts rotated by 45 deg., separated by 75  $\mu\text{m}$  (edge to edge) in DuPont Pyralux dielectric, 212  $\mu\text{m}$  period



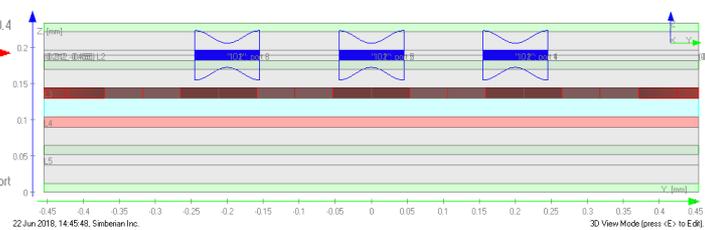
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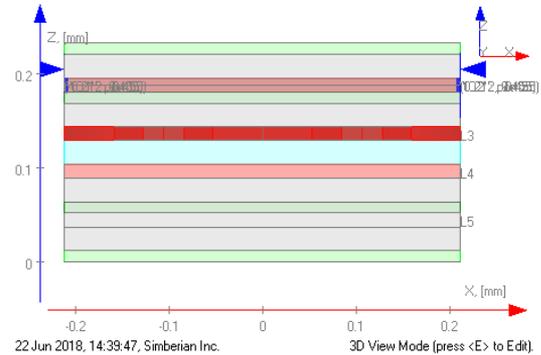
22 Jun 2018, 14:47:23, Simberian Inc. A.Mode[1], Pattern[++] A.Mode[2], Pattern[+] A.Mode[3], Pattern[+] A.Mode[2], Pattern[+0]



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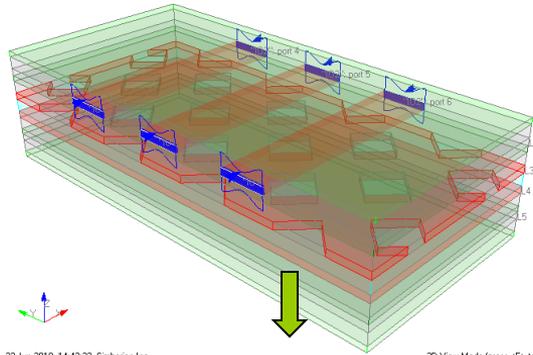
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22 Jun 2018, 14:39:47, Simberian Inc. 3D View Mode (press <E> to Edit)

# Example: MeshedPlaneFlex

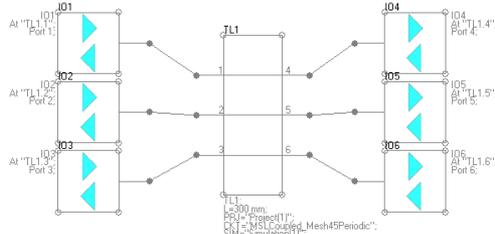
## Circuit Mesh45Cable300mm:Cross-talk investigation for the middle trace



22 Jun 2018, 14:43:23, Simberian Inc.

3D View Mode (press <E> to Edit)

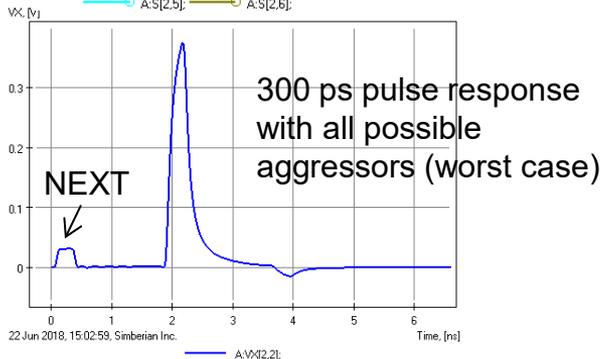
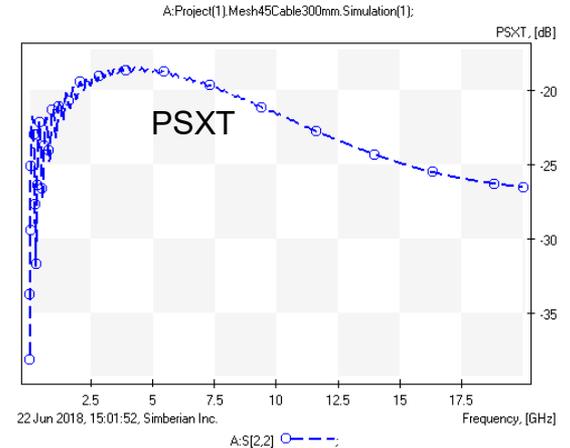
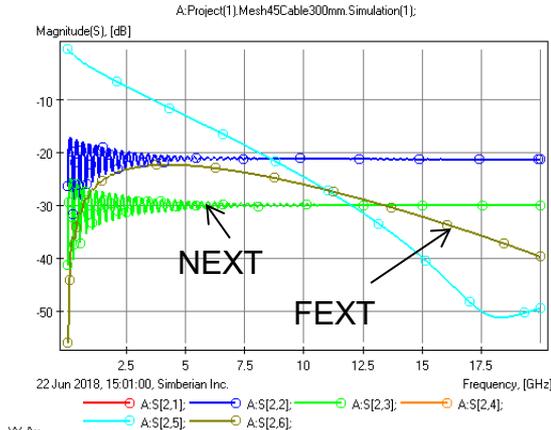
300 mm segment in linear network



22 Jun 2018, 15:02:59, Simberian Inc.

Editor Mode (press <E> for Net)

This model is equivalent to 707 concatenated segments!



See how to evaluate MDXT at [http://kb.simberian.com/brows\\_e\\_item.php?id=880](http://kb.simberian.com/brows_e_item.php?id=880)

NEXT – Near End Crosstalk  
 FEXT – Far End Crosstalk  
 PSXT – Power Sum Crosstalk  
 MDXT – Multiple Disturber X-talk

# What is next?

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