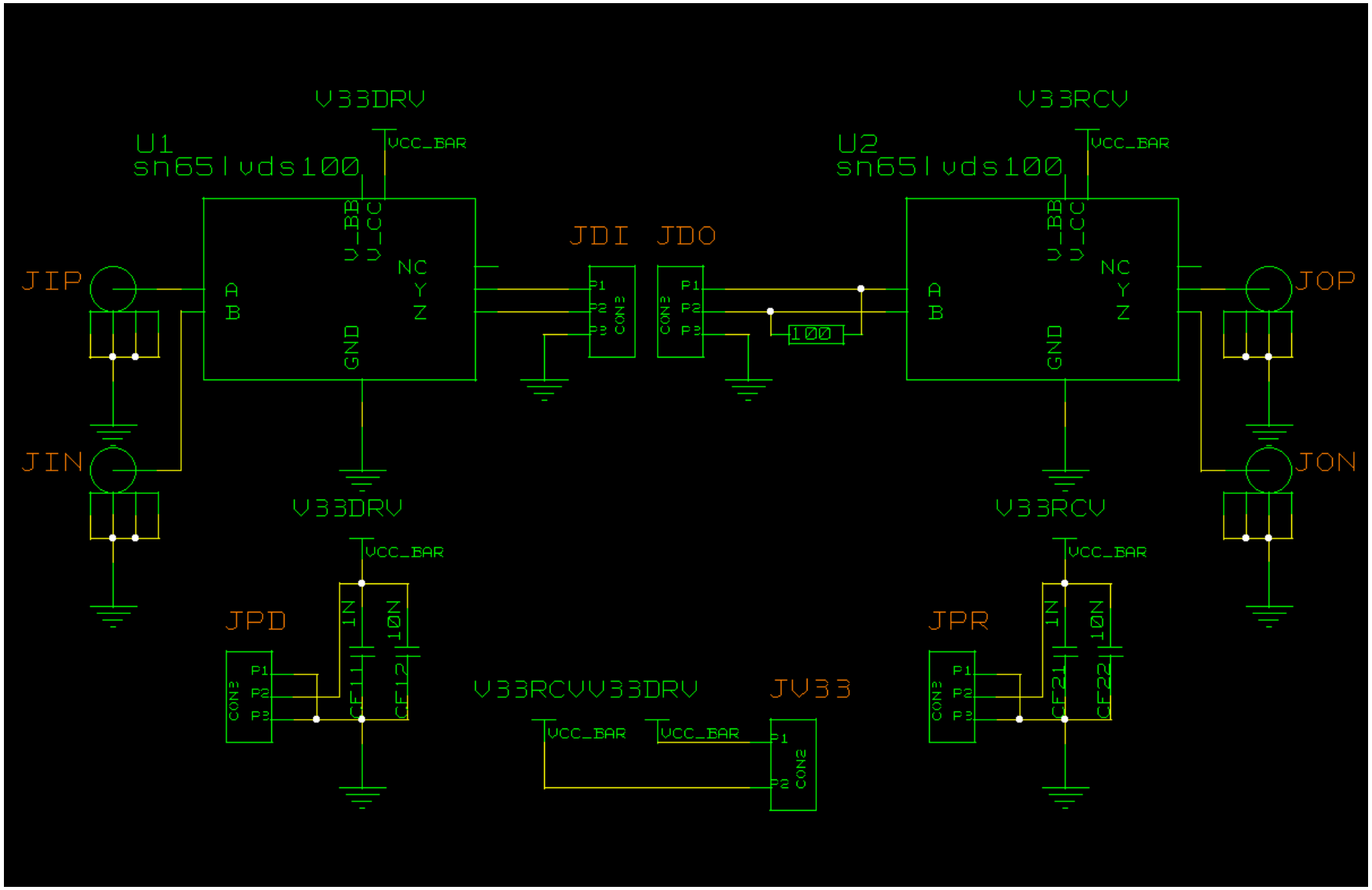
# Status of the low mass cables.

F. Benotto, D. Calvo, P. De Remigis, R. Wheadon
*INFN Torino*

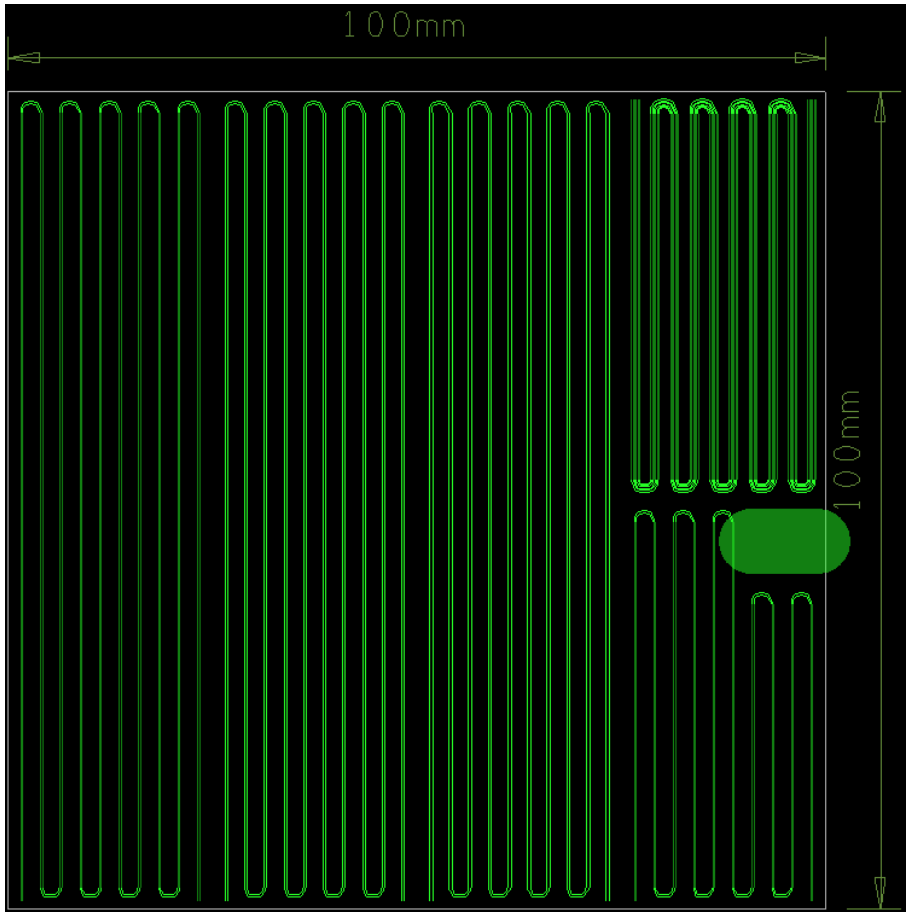
# Board schematic.




Schematic circuit for the cable test board, with differential buffers for high speed I/O (65lvds100, 2Gb/s).

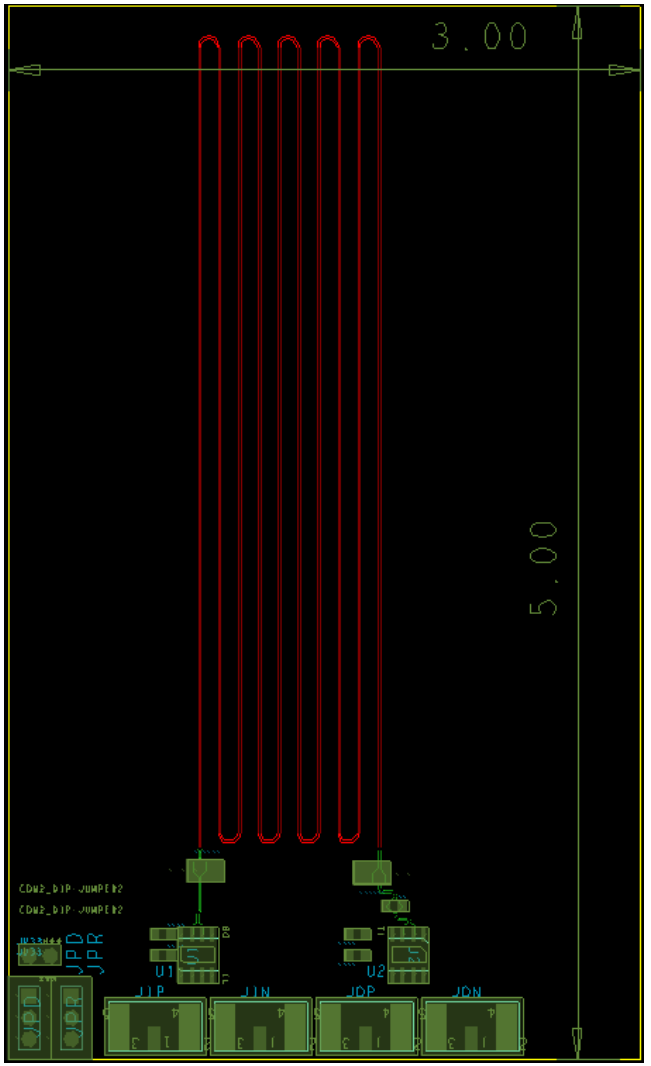
# Cable and board layout.

Aluminum over kapton




100µm 150µm 200µm test

Standard PCB




Different cable prototypes are produced, and after the cutting they are glued and bonded on the test board.

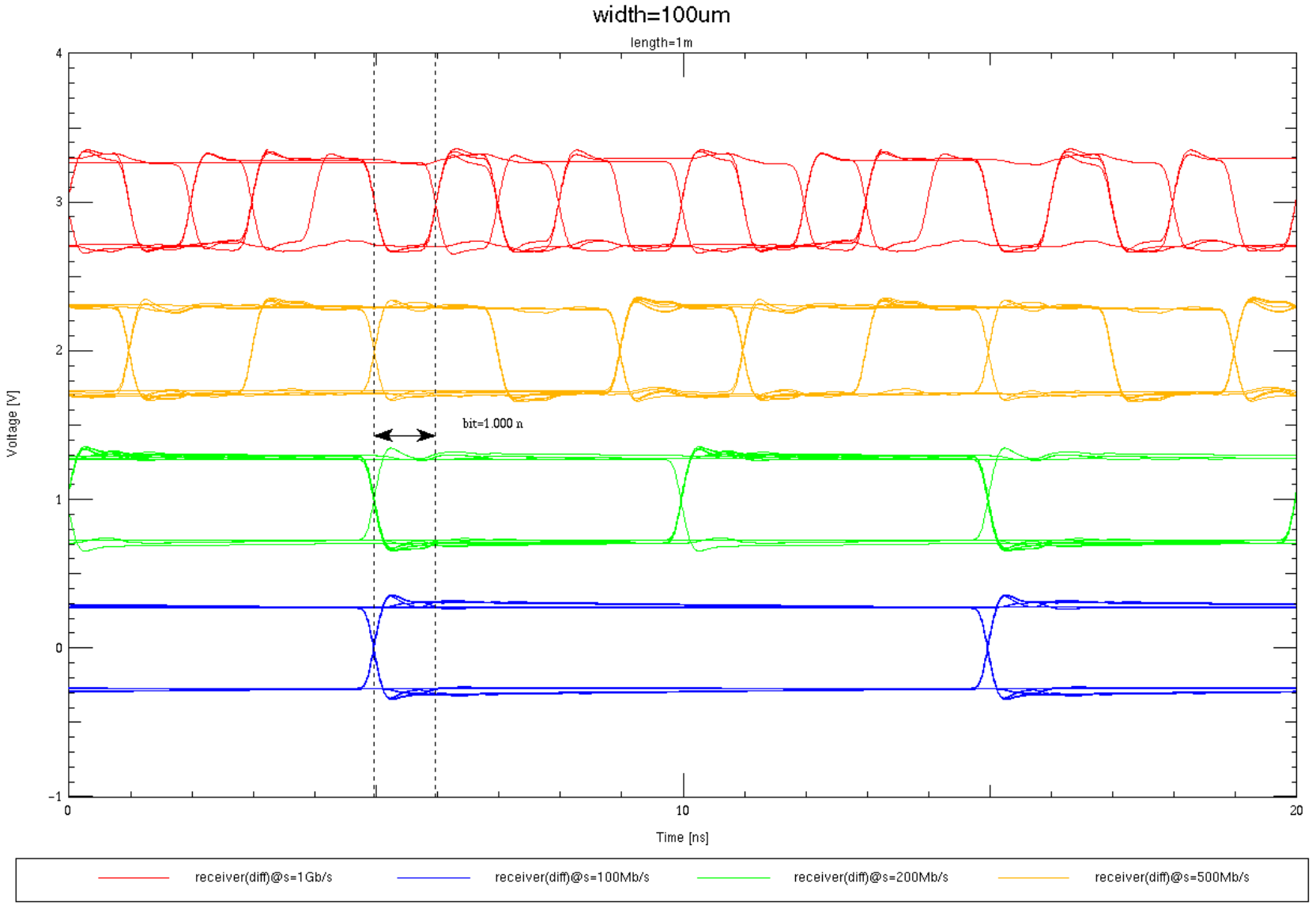
# Cross sections and parameters.

| Subclass Name | Type | Thickness (MIL) | Dielectric Constant | Loss Tangent | Shield | Width (MIL) | Impedance (ohm) | Coupling Type | Spacing (MIL) | DiffZ0 (ohm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | SURFACE | | 1.000000 | 0 | | | | | | |
| TOP | CONDUCTOR | 0.394 | 1.000000 | 0 | | 3.94 | 52.381 | EDGE | 3.94 | 96.886 |
| | DIELECTRIC | 1.97 | 3.500000 | 0 | | | | | | |
| BOTTOM | PLANE | 0.394 | 1.000000 | 0 | ☒ | | | | | |
| | SURFACE | | 1.000000 | 0 | | | | | | |

| | | | | |
|---|---|---|---|---|
| width | [µm] | 100 | 150 | 200 |
| capacitance | [pF/m] | 103 | 135 | 167 |

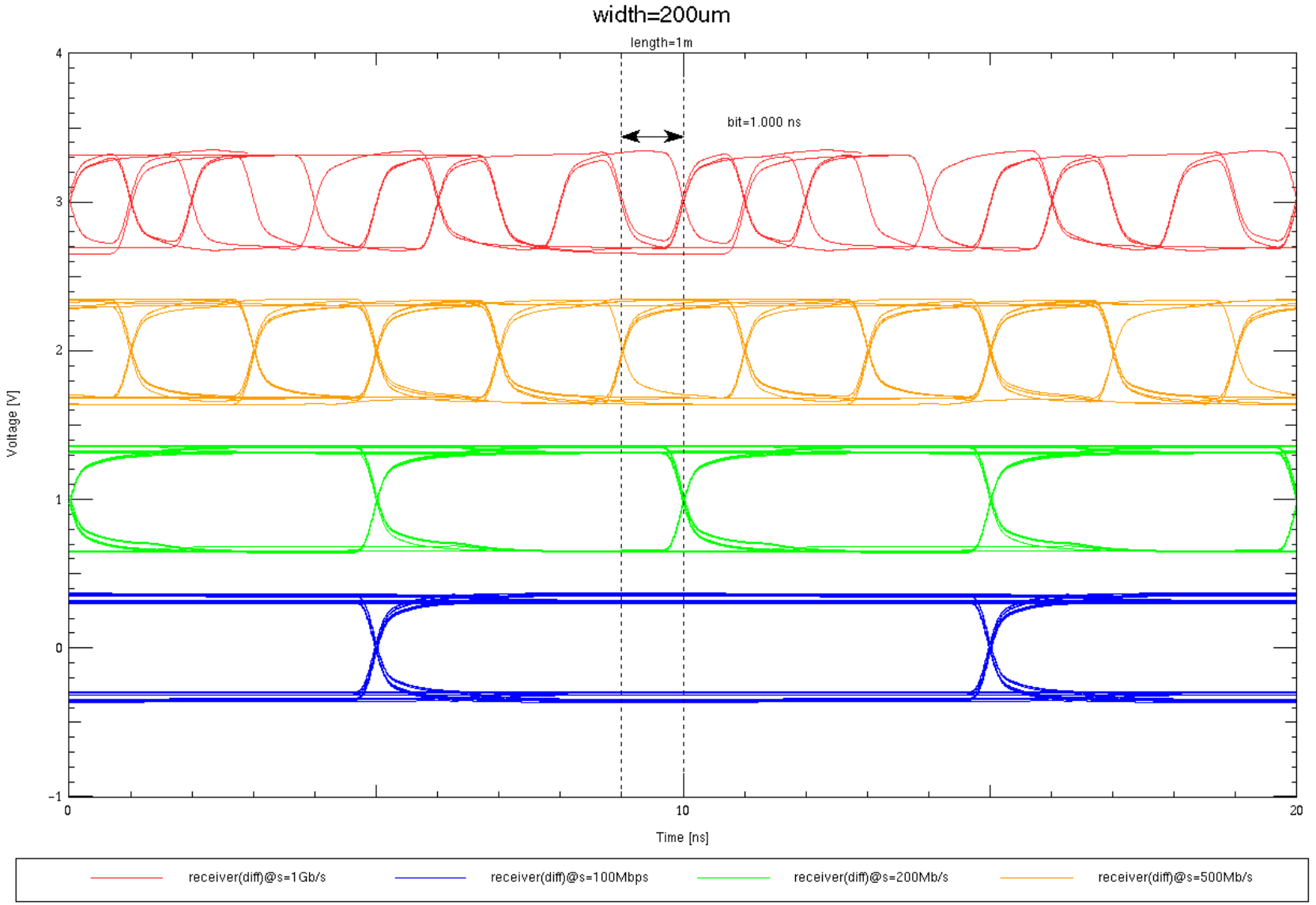
Cross section composed by Aluminum (10µm) with a support of kapton (50µm), and capacitance vs width.

# Width 100µm, folded layout.



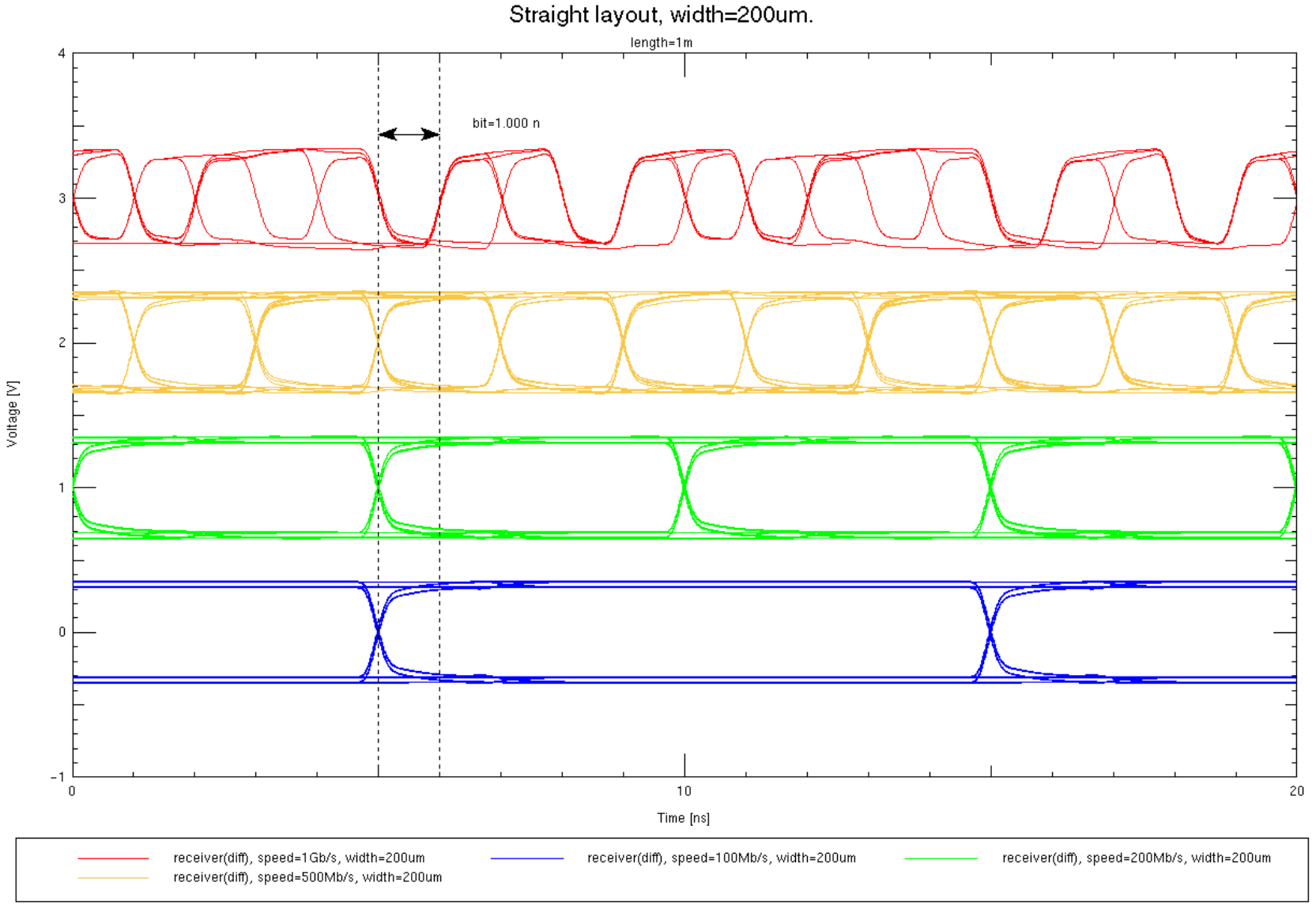

Eye diagram comparison between different speed, for a folded cable with the smallest pitch.

# Width 200µm, folded layout.



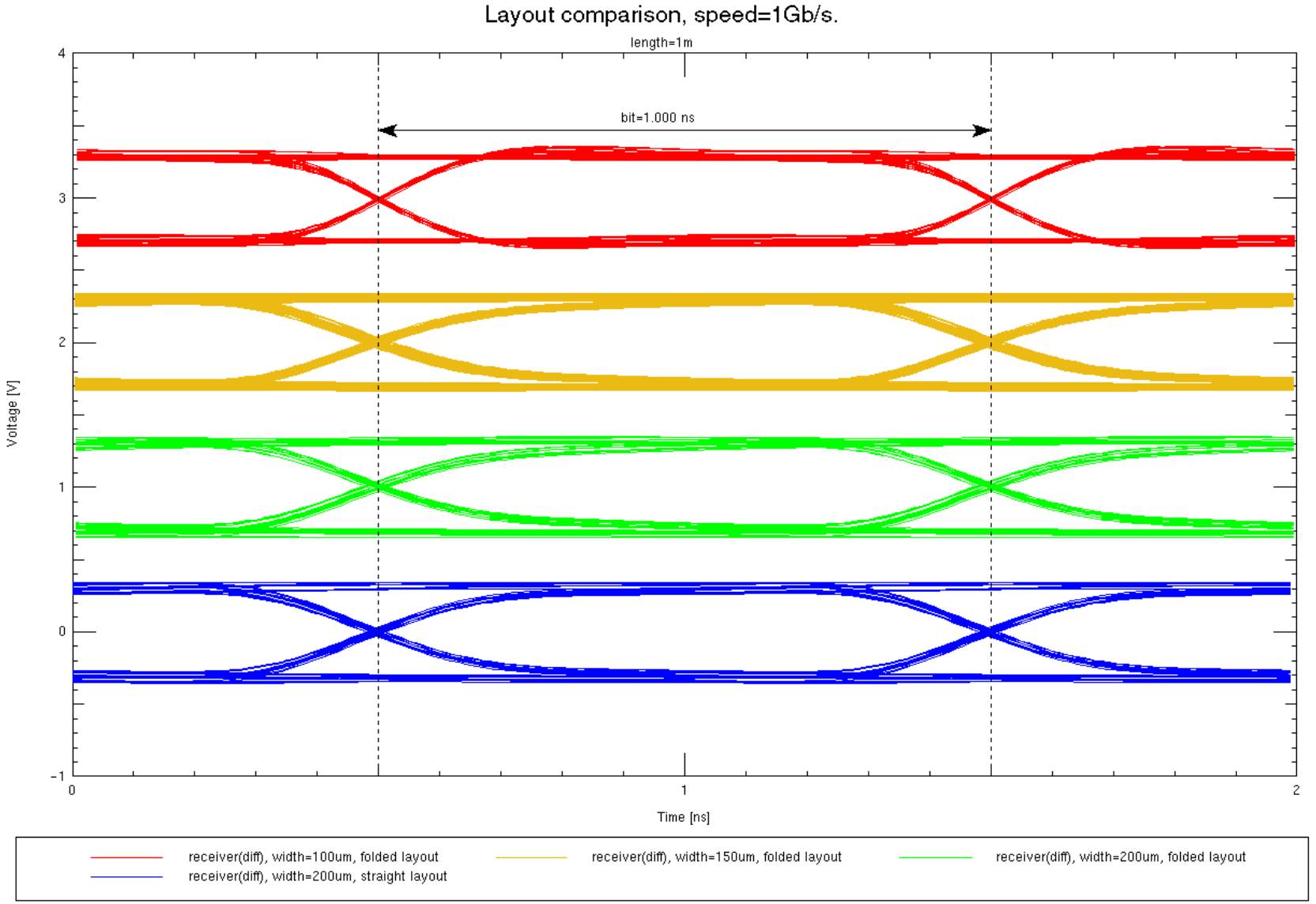

Eye diagram comparison between different speed, for a folded cable with the largest pitch.

# Width 200µm, straight layout.




Eye diagram comparison between different speed, for a straight cable with the largest pitch.

# Layout comparison.




Eye diagram comparison between different layouts, for the differential signal with a speed of 1Gb/s.

# Instrumentation for testing.


Agilent n5980: BERT feature, 3.13Gb/s rate, PRBS generator, error detector, LVDS output, USB interface.

# Short summary.

- Done:

  submission of the Aluminum cables;
  simulations for the different cable prototypes;
  design of the board layout for the cable testing;
  selection and purchasing of the instrumentations.

- To do:

  testing of the cable prototypes with different layouts;
  cross talk measurement between nearby tracks.