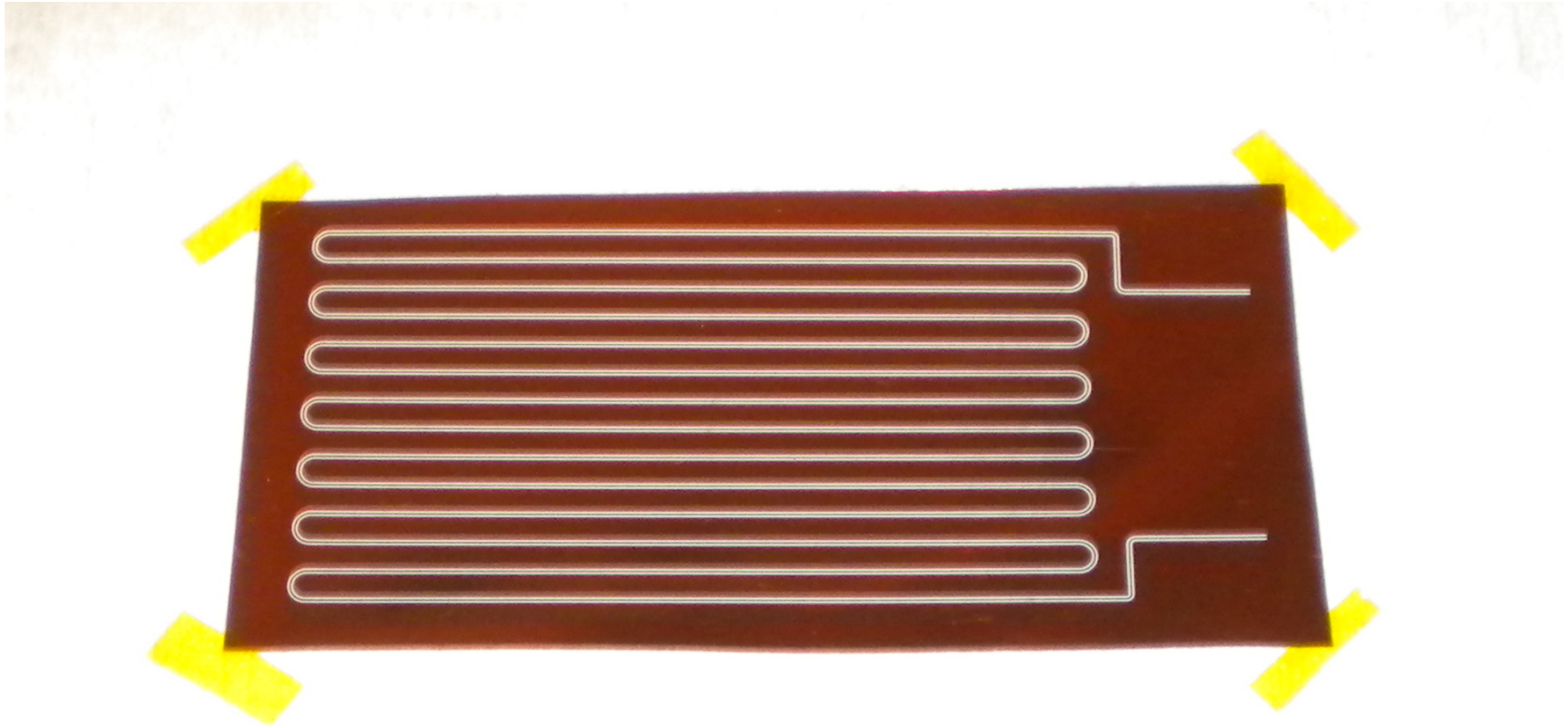


Status of the low mass cables.

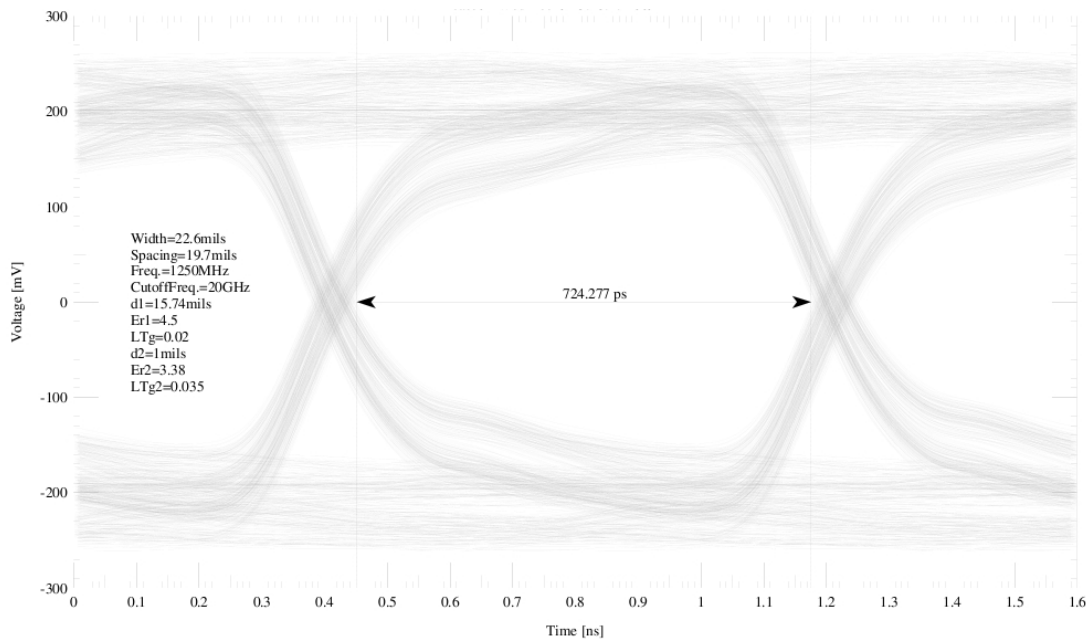


Calvo, De Remigis, Mignone, Wheadon
INFN Torino



Test on a copper cable 1m long.

The defined model for the device under simulation is working quite well, as confirmed by the measurement.



simulation



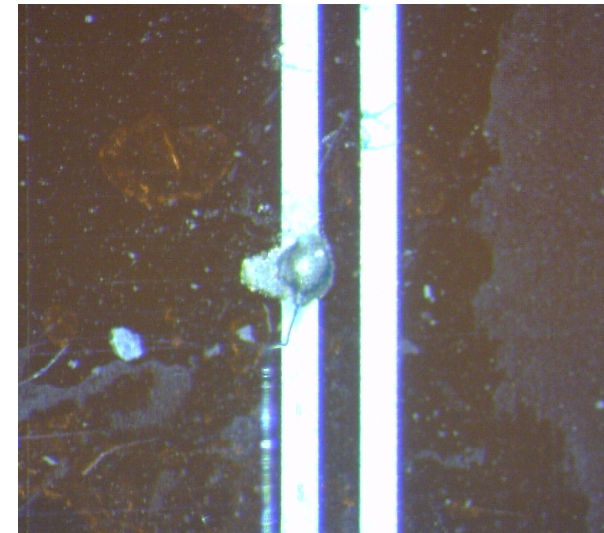
measurement

at data rate $s=1.25\text{Gb/s}$

Report on the prototype production.

Two requests for the same aluminum cable layout, to two different suppliers.

- Techfab (near Torino): order sent on June 09, only one sample received, technology with aluminum deposition, presently not reliable for bonding.



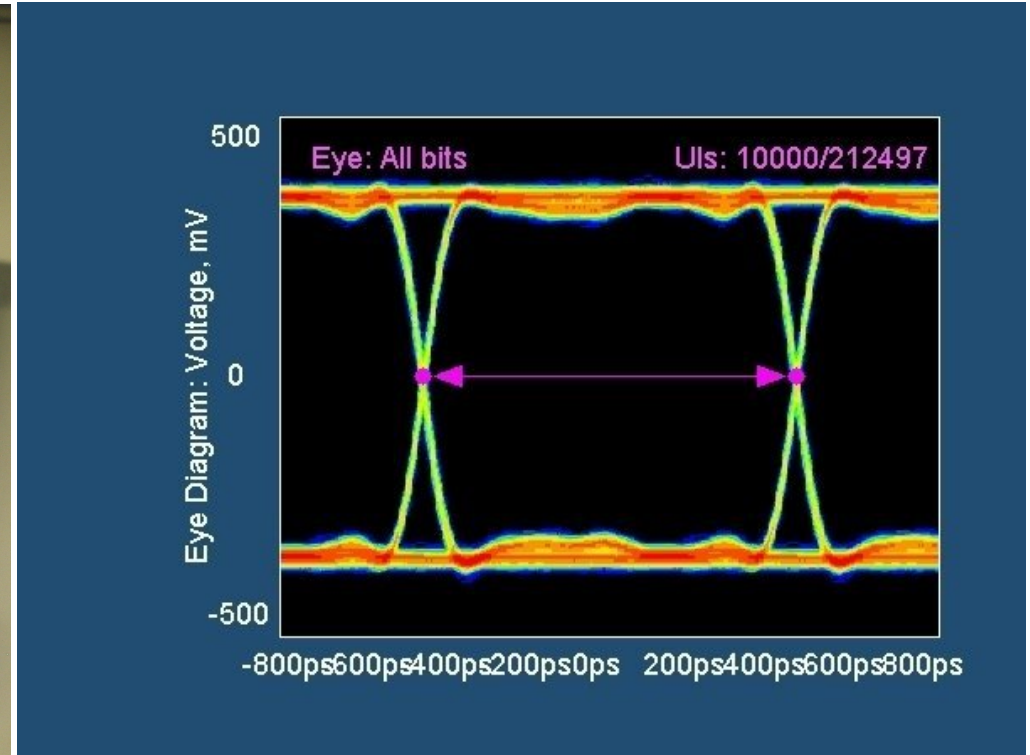
- De Oliveira (at Cern): order sent on October 09, no sample received yet, technology with laminated aluminum, declared easy to bond.

Specification of the low mass cable.

Made by Techfab on a kapton support, with a folded layout.

	requested	obtained
track length [m]	1.0	.9
track width [μm]	150	120
track thickness [μm]	5.0	6.5
differential impedance [Ω]	100	110
linear resistance [Ω]	37	46

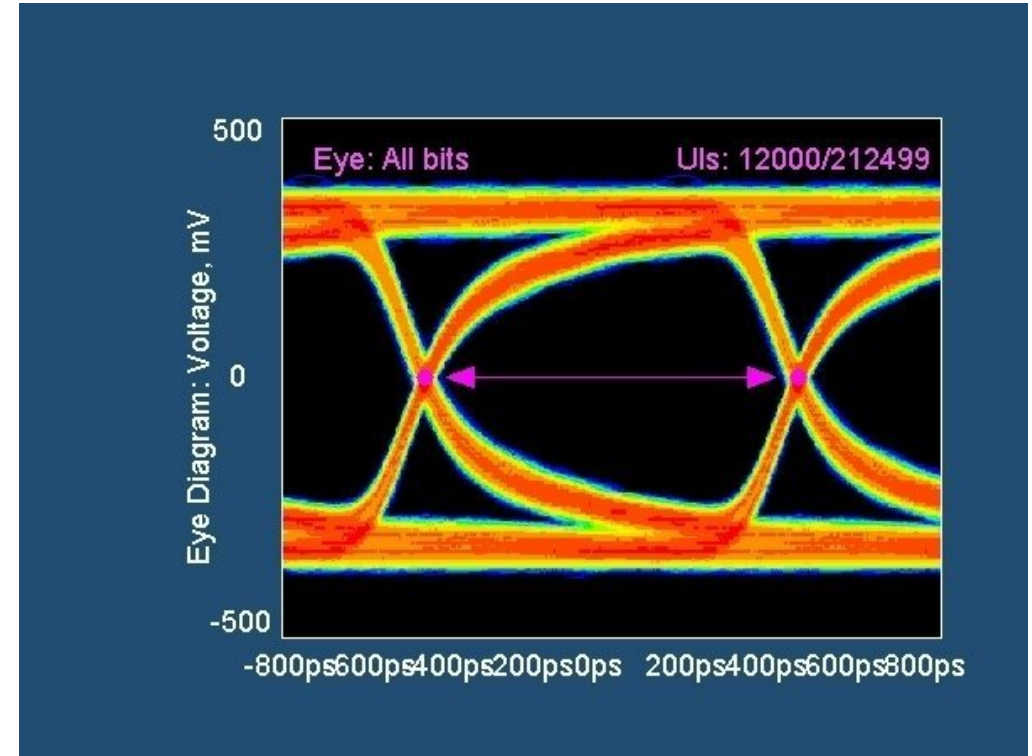
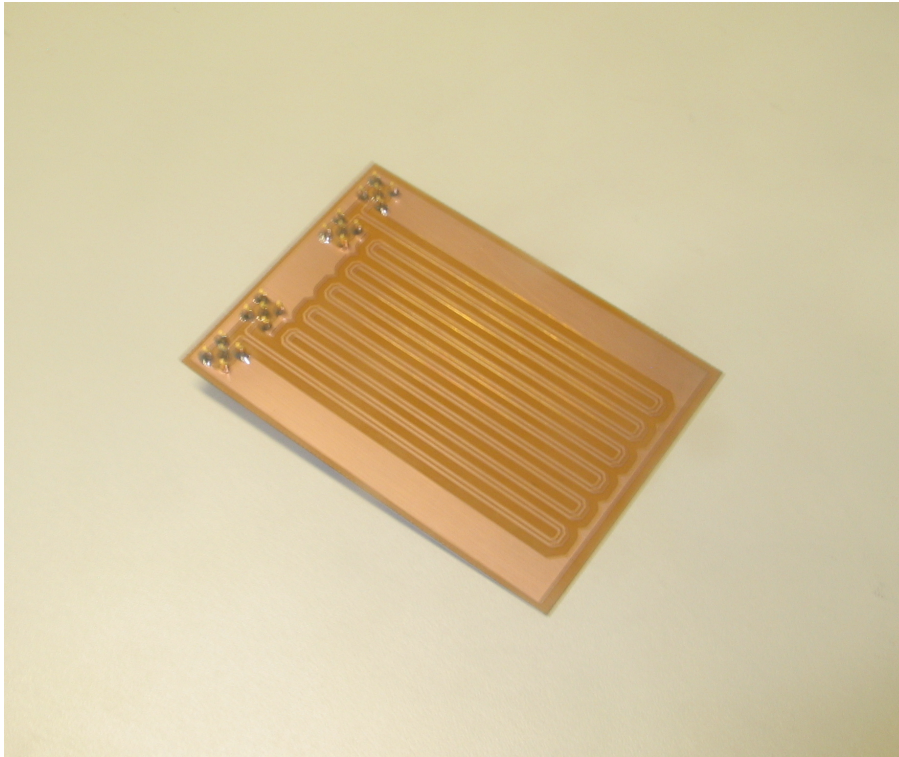
Total jitter with pulser only.



total jitter $T_j = 58.2\text{ps}$ @ $s = 1.06\text{Gb/s}$

The results, coming out from the measurements, are compatible with the data sheet specifications.

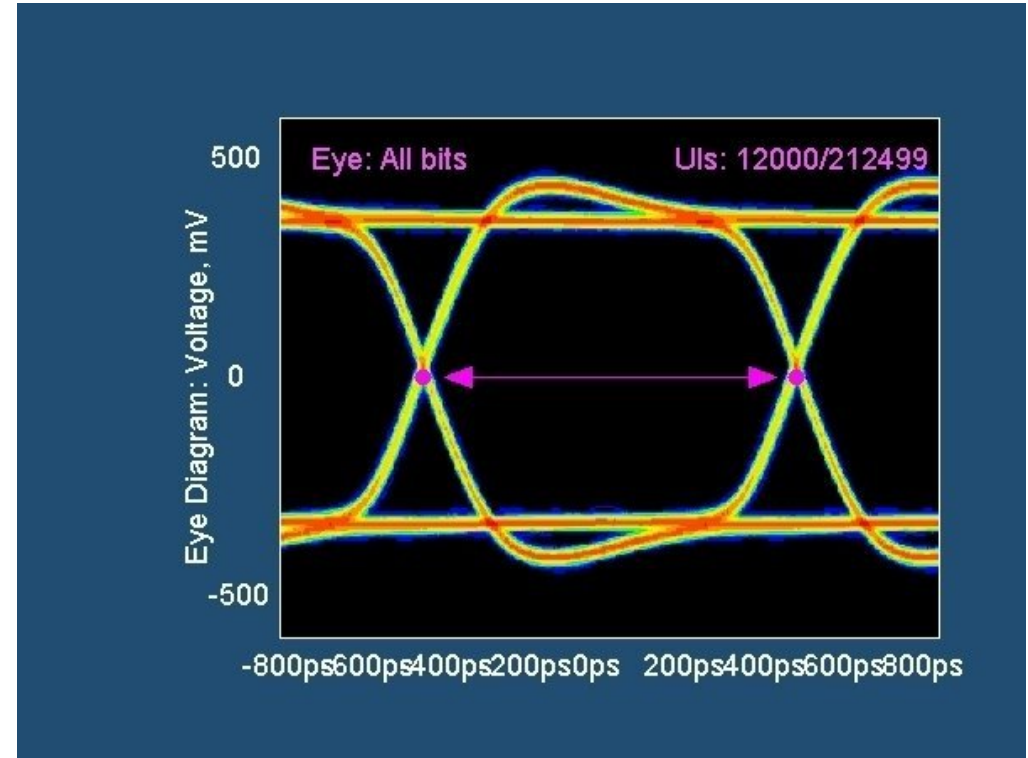
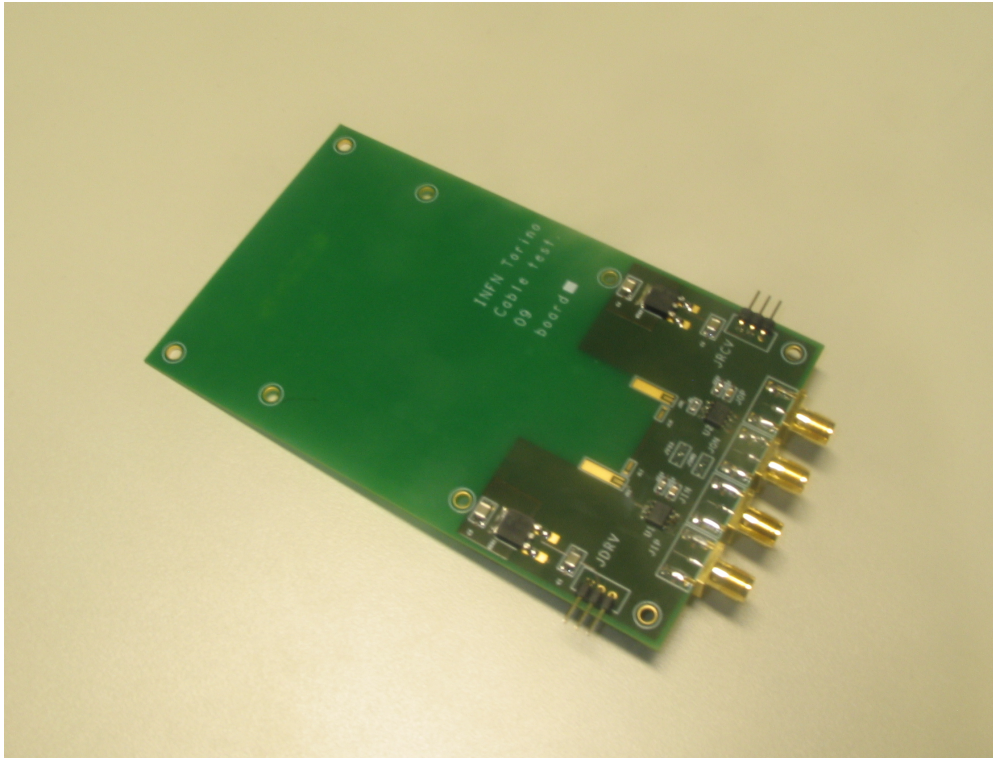
Total jitter with copper PCB (l=1m).



total jitter $T_j = 116\text{ps}$ @ $s = 1.06\text{Gb/s}$

Owing to the large capacitive load, the rise and fall time are getting worse but the eye diagram is still open enough.

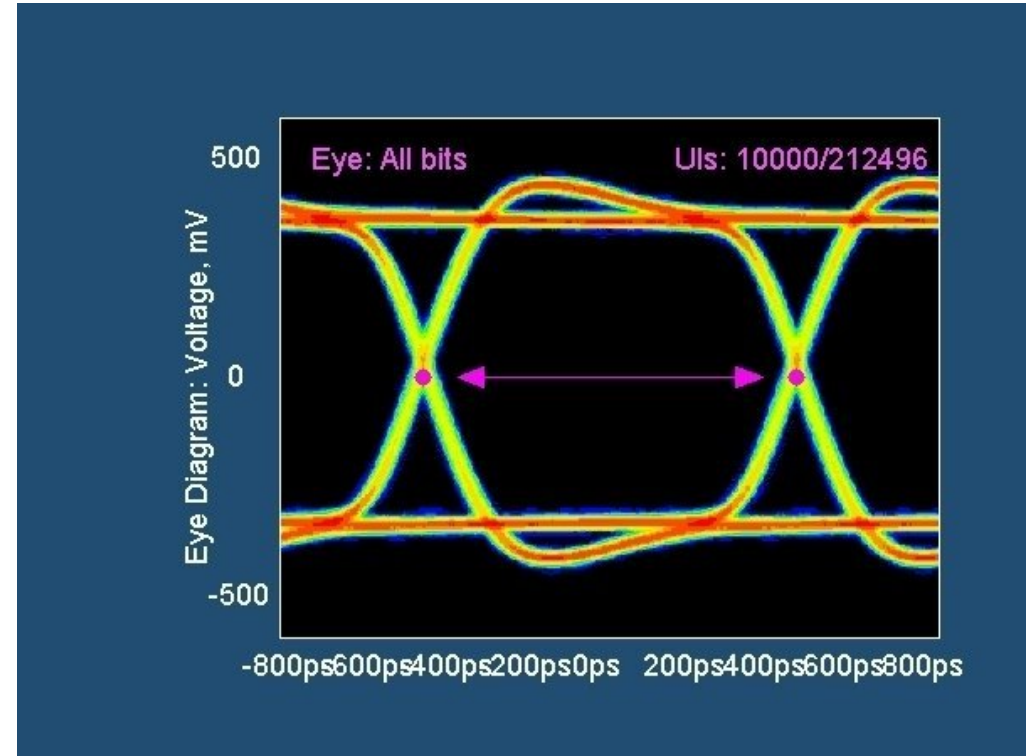
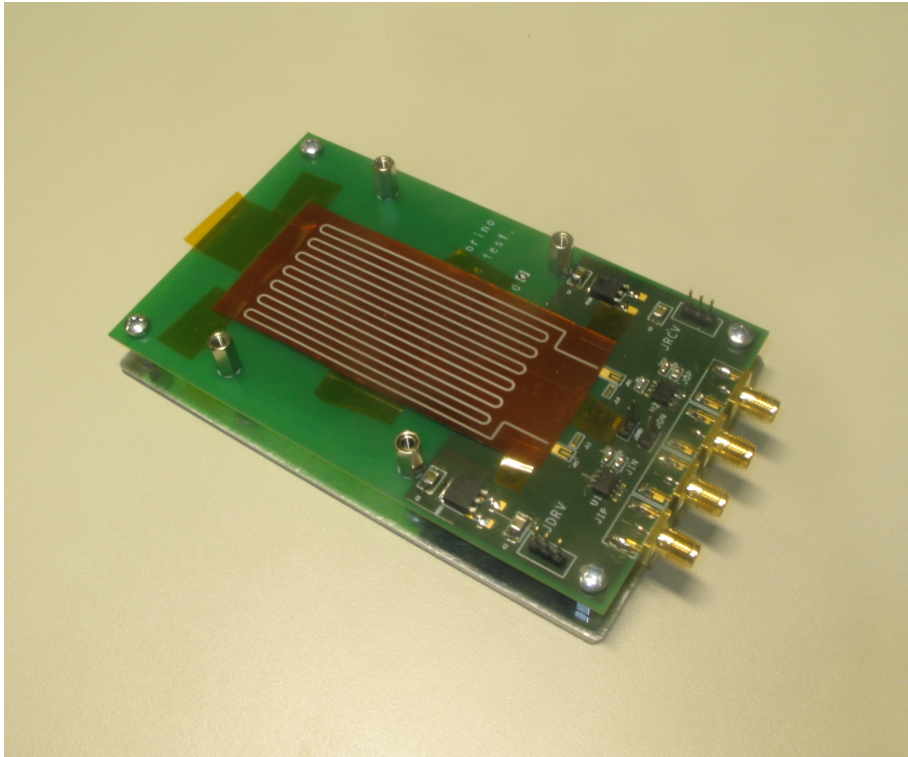
Total jitter with board in loopback.



total jitter $T_j = 107\text{ps}$ @ $s = 1.06\text{Gb/s}$

In this case the signal is going directly from the driver to the receiver chip, covering few centimeters of PCB.

Total jitter with aluminum cable (l=1m).

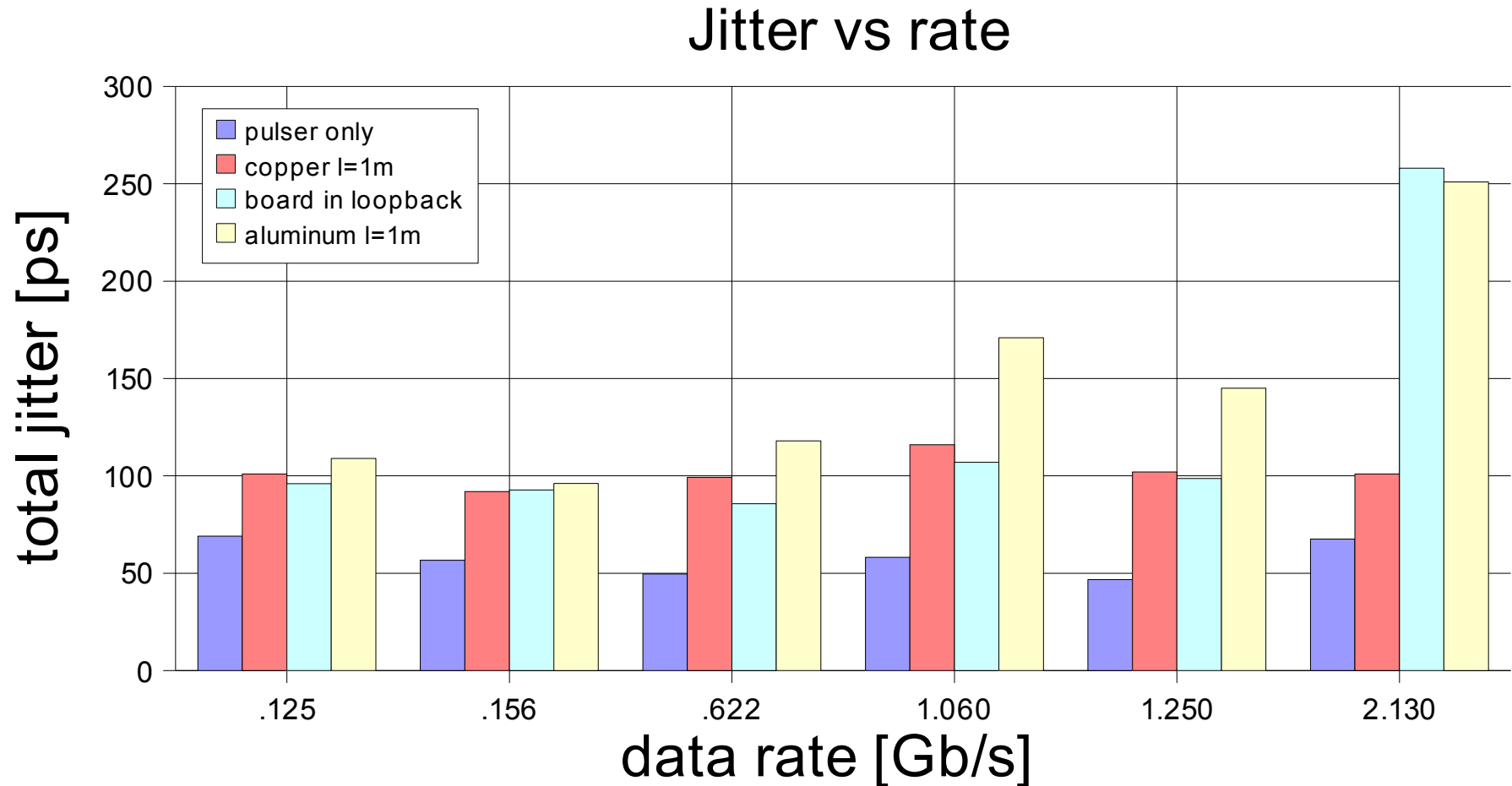


total jitter $T_j = 171 \text{ ps} @ s = 1.06 \text{ Gb/s}$

The signal is going through the aluminum cable, but the transition time is stable because of the receiver chip.

Comparison between the different setup.

The total jitter is represented vs the data rate: the worsening around 2Gb/s is probably due to the transceiver chips.



Short summary.

The cable production required a very long time: 6month at Techfab; greater than 4month at Cern (not delivered yet).

At present, the surface treatment is not optimized and the bonding yield is not compatible with a mass production.

The test for the evaluation of new surface treatment is in progress, to get a more reliable bonding.

The very preliminary results show a good behaviour, up to a data rate $>1\text{Gb/s}$.

The setup will be modified (driver and receiver) to allow the electrical test up to a data rate $>2\text{Gb/s}$.