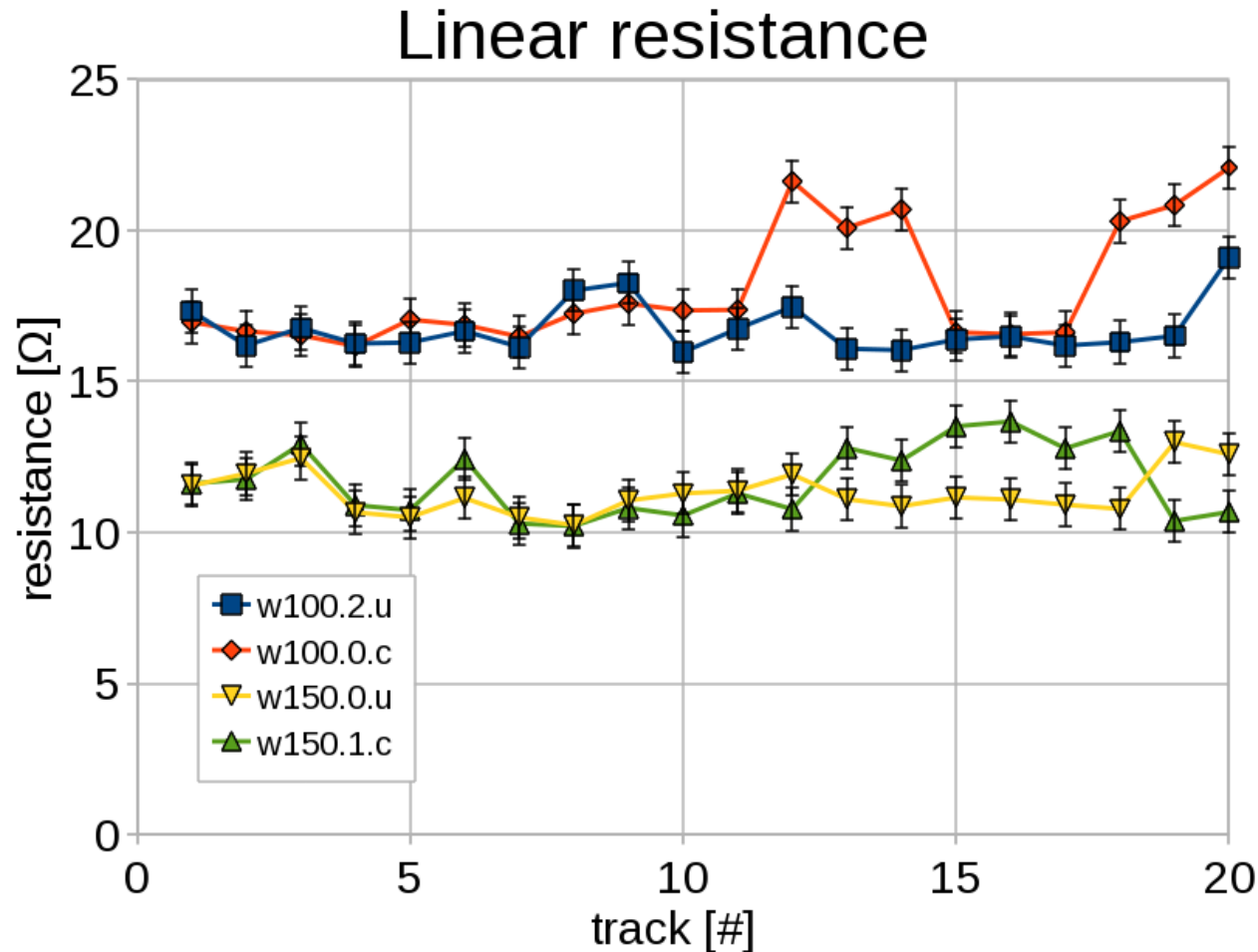


# Status update for the aluminium cables and power supply

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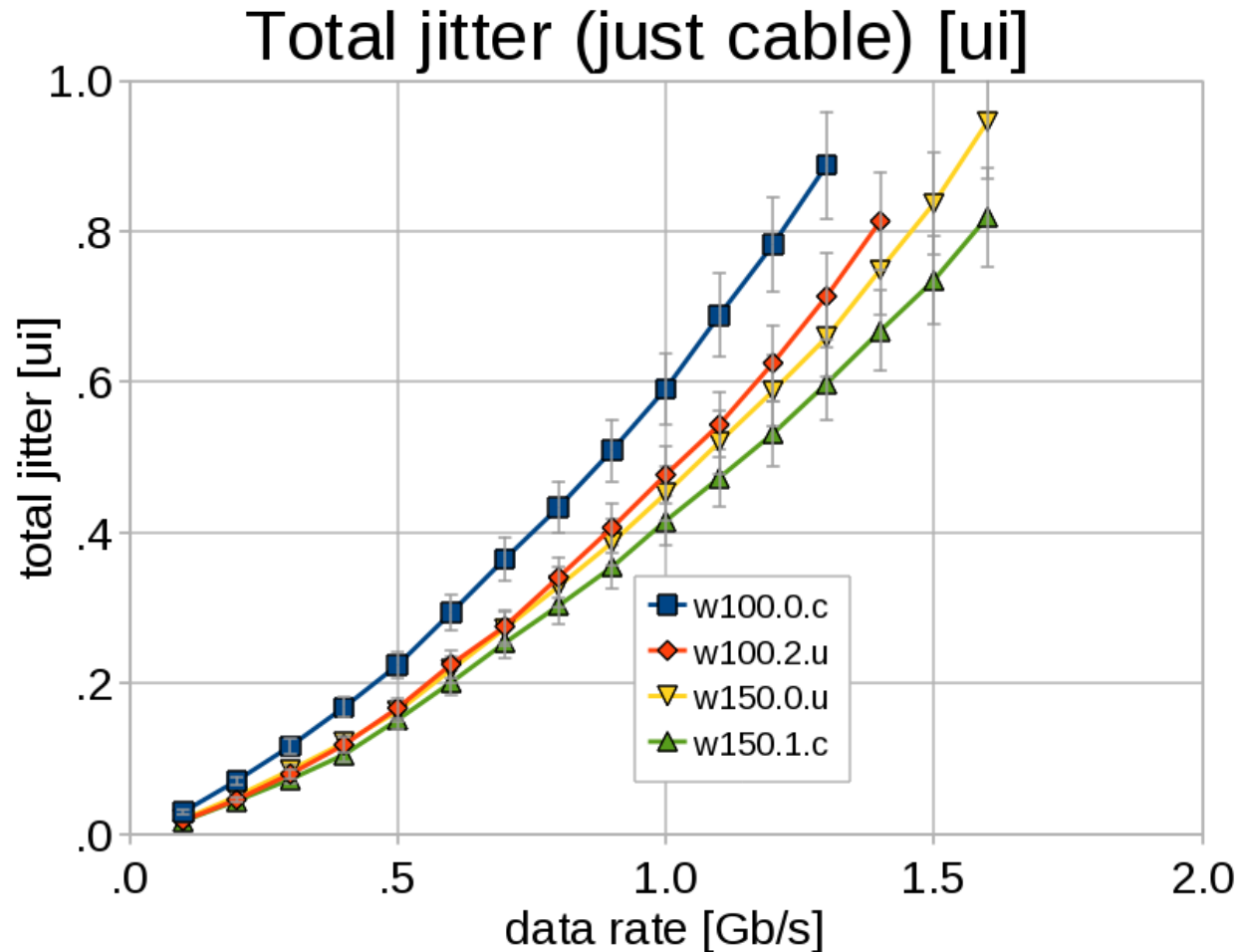
- Aluminium flexcable.
- Aluminium bus.
- DCDC converter.
- Beam test.

# Static parameters for the aluminium flexcable



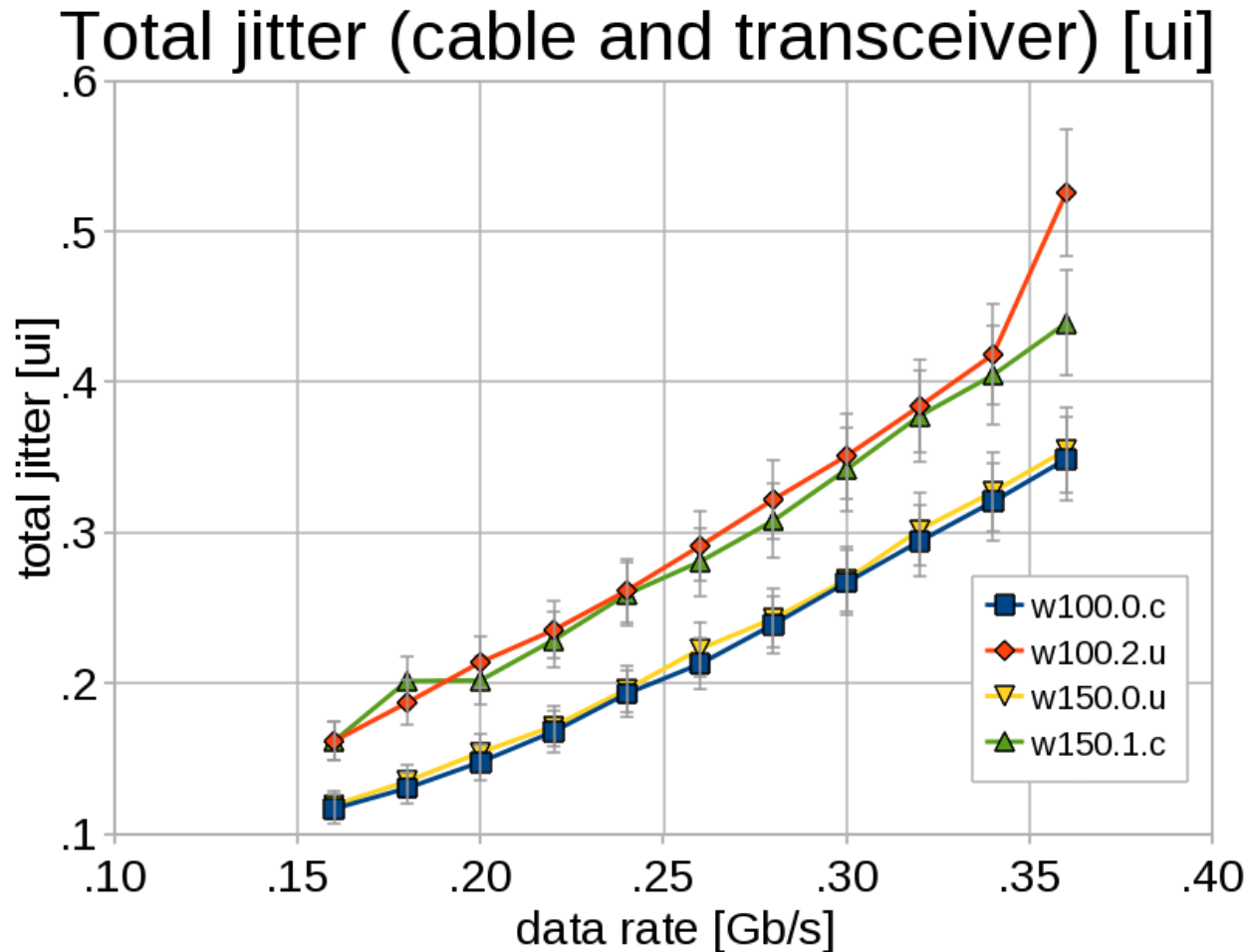
The measurements of the resistance and the capacitance report a good uniformity with respect to the line position along the section for both the parameters; only the external tracks show an increase in the capacitance below the 20%.

# Total jitter for the cable only



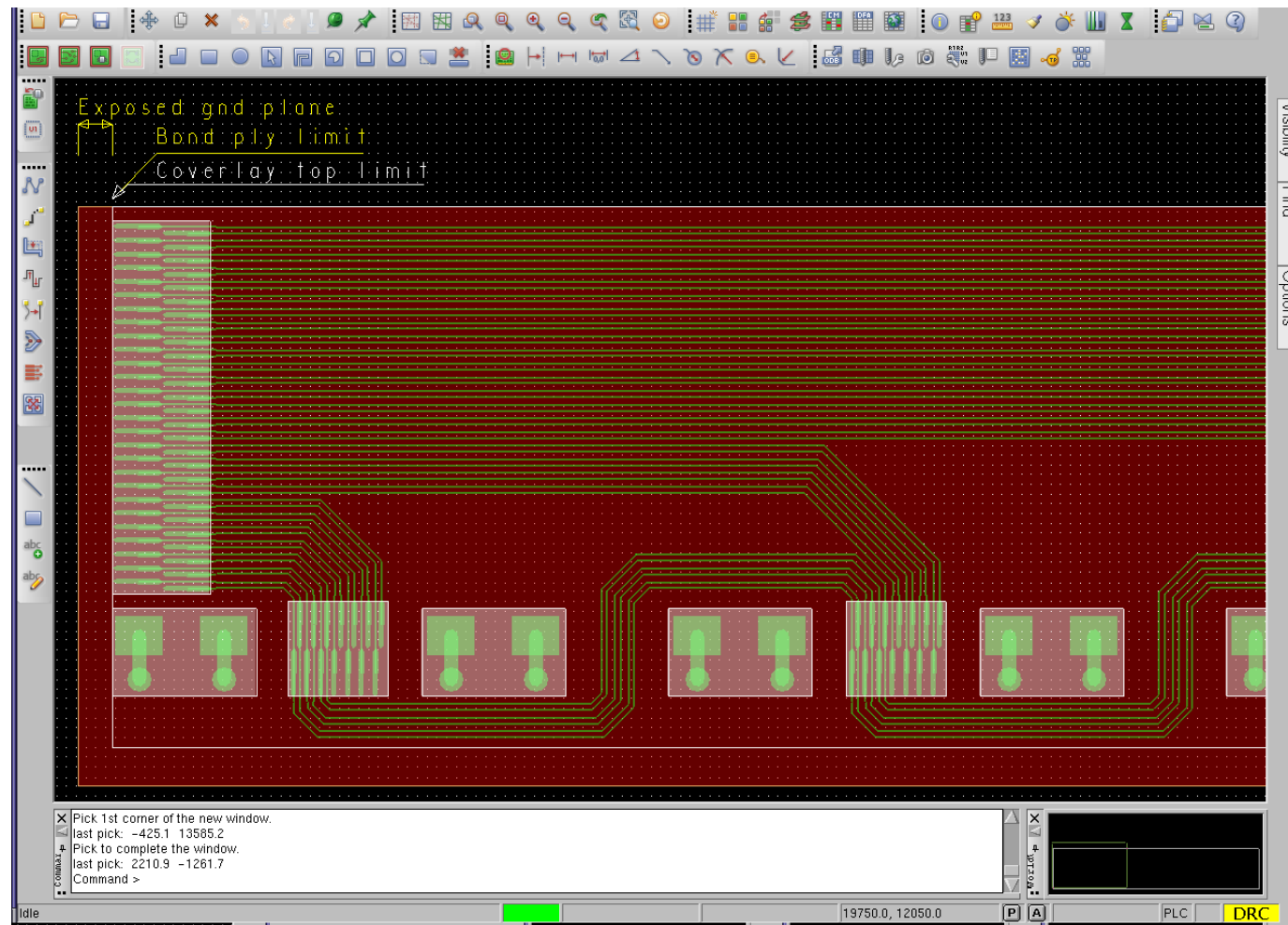
In this case the setup is composed by only the flexcable, without any transceivers, and considering acceptable a jitter level up to 0.3 UI it means that it is possible to run the system with a data rate around 600 Mb/s.

# Total jitter for the flexcable with transceivers



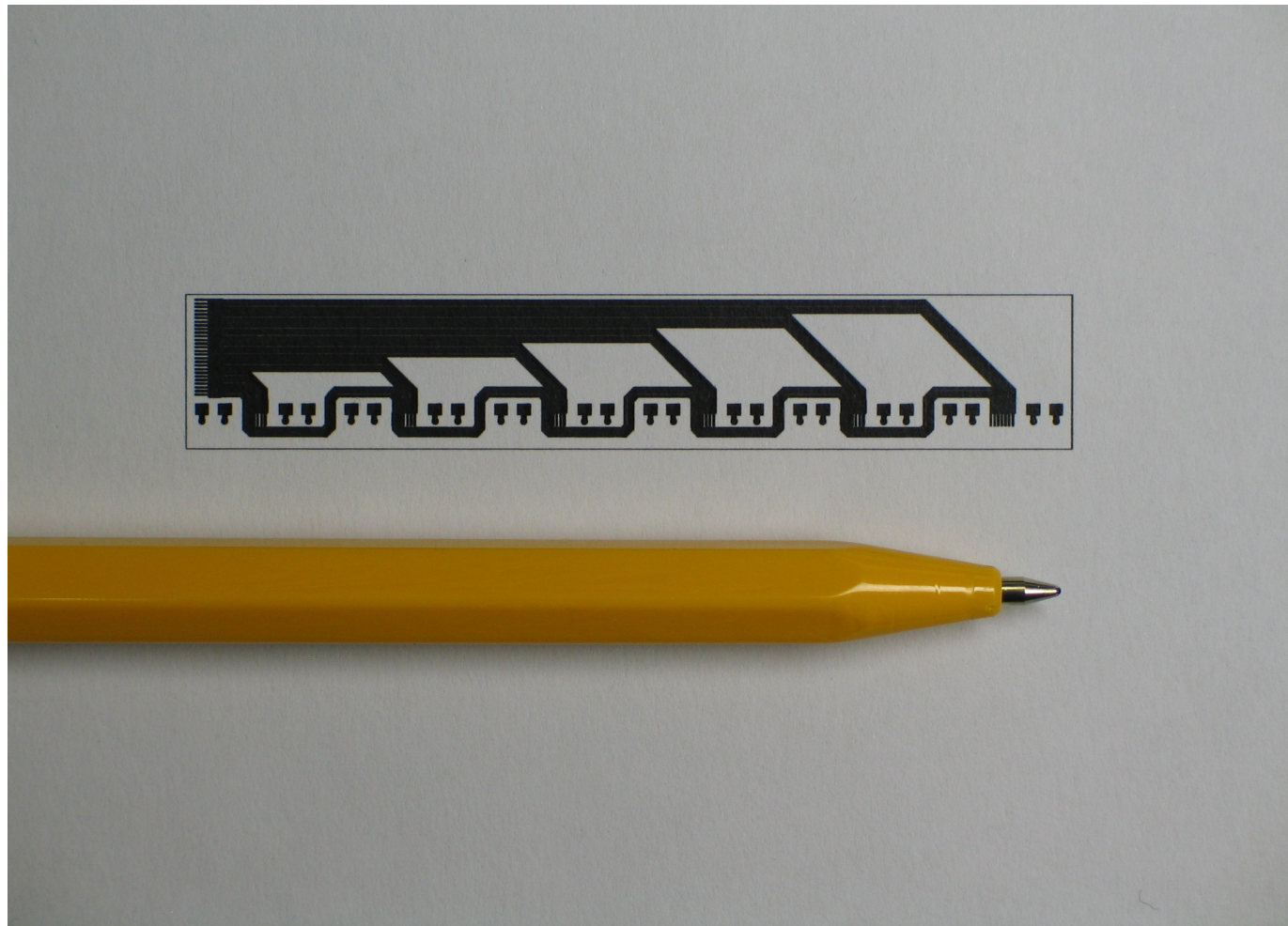
In this case the setup is composed by the flexcable with CERN transceivers, and the total jitter limit of 0.3 UI is reached for a data rate of 260 Mb/s that works well for testing purpose but it is not enough for the final application.

# Preliminary bus layout for the super module



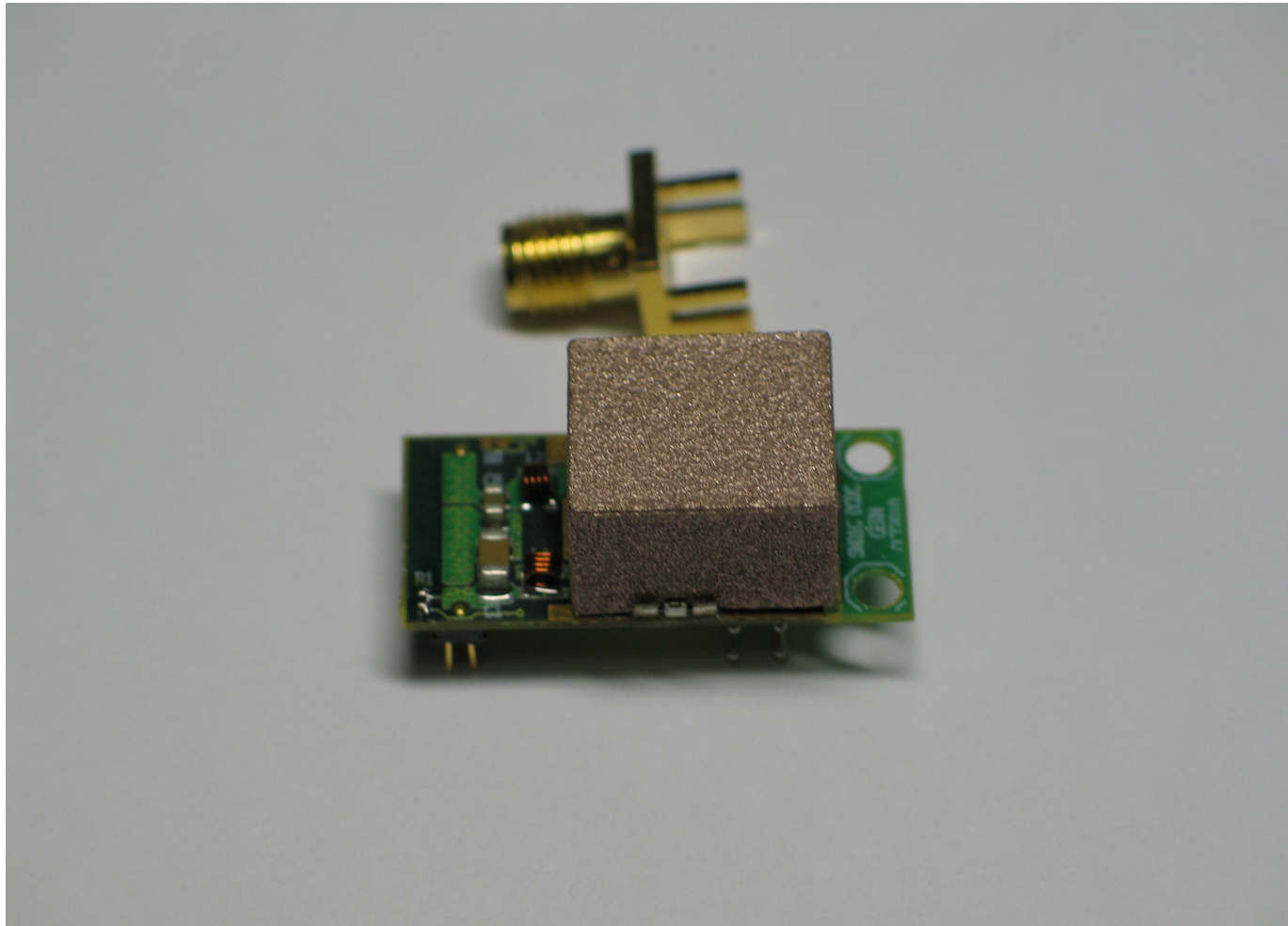
The hybrid structure will provide the bus for the input services and for the output data links at 320Mb/s, then the place for two filter capacitors and the pads for wire bonding has been allocated for each Topix along the super module.

# Actual size for an aluminium hybrid bus



The largest bus of the whole set can serve 6 Topix and its dimensions are  $67.9 \times 11.9 \text{ mm}^2$ , while the cross section is composed of 5 layers (3 kapton insulators and two  $15 \text{ }\mu\text{m}$  aluminium conductors) for an overall thickness of  $157 \text{ }\mu\text{m}$ .

# Present proposal for the voltage regulator



It is a switching DCDC converter based on inductor, developed at CERN, and tested to stand a total dose around 1 MGy with a particle fluence of  $10^{15} \text{ n}_{1\text{MeVeq}}/\text{cm}^2$  in a magnetic field up to 4 T; its dimensions are about  $30 \times 10 \times 10 \text{ mm}^3$ .

# Actual specification for the delivered parts

load current [A]	conversion efficiency [#]	output voltage [V]
1	0.80	1.5
5	0.65	1.4

The main parameters such as the conversion efficiency and the output voltage are mainly dependent on the load current, while they are much less sensitive from the input voltage that in this case is in the range from 6 V up to 10 V.



# Comment on the beam test

- During the beam test, a strange shadow with low counts appeared on the right side of the sensor.
- A possible hypothesis was that the internal copper planes could generate this behaviour.
- After a check, both the analogue and digital grounds look uniform under the sensor, thus excluding this hypothesis.
- Another possible answer could come from a filter capacitor, assembled on the bottom of the board behind Topix.

# Summary and outlook

- The 1 m long flexcables could run up to 600 Mb/s, but with the actual transceivers they run at 260 Mb/s.
- The purchasing order, for a new batch of 1.5 m long aluminium flexcable, was submitted at CERN.
- A new layout relative to the hybrid bus for the super module is ready, and has been submitted for a formal quotation.
- A Topix board will be modified to allow the delivery of the power supply through the new DCDC converter prototype.