

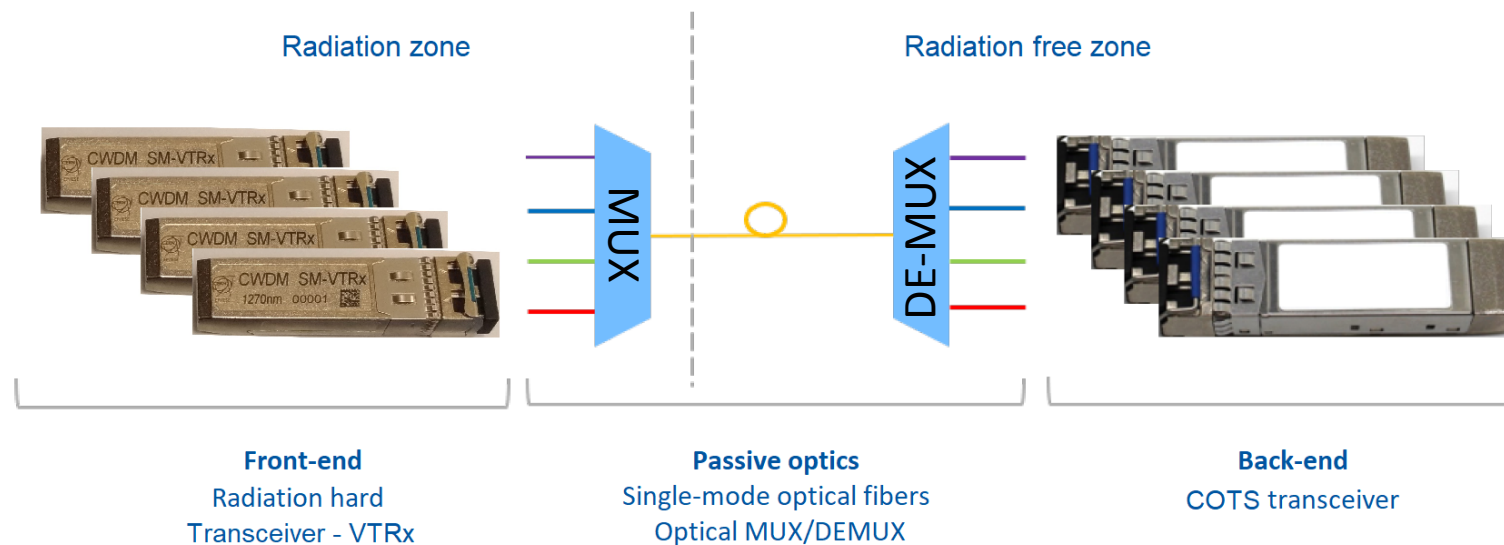
CWDM Link: SM-VTXx

EP-ESE/SY-BI Collaboration Seminar

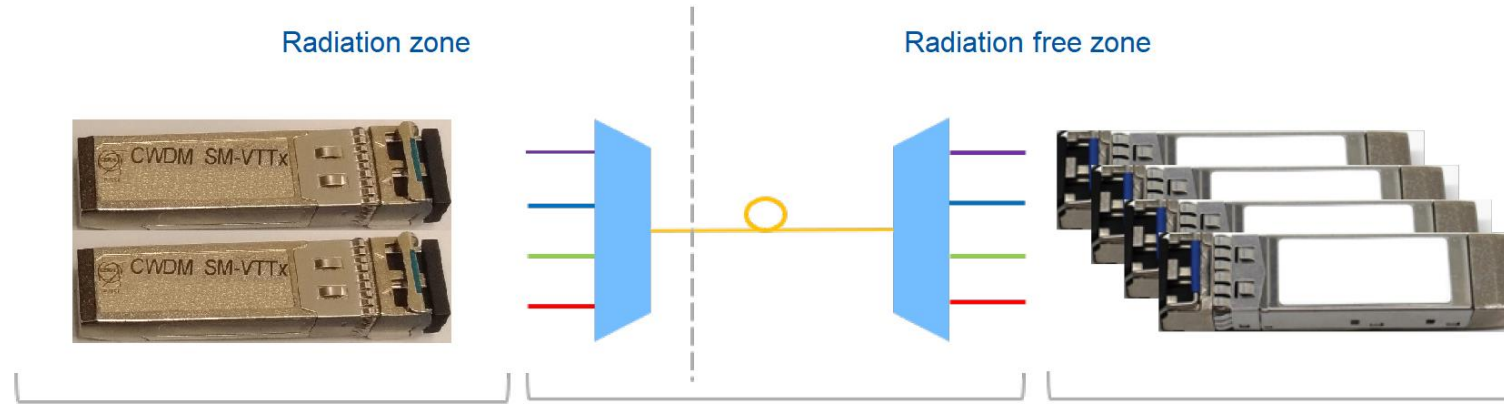
Leonardo Marcon (EP-ESE-BE)
leonardo.marcon@cern.ch

Outline:

- CWDM link
- VTRx/VTTx prototypes
- Production costs and timeline
- Early CWDM MUX irradiation results



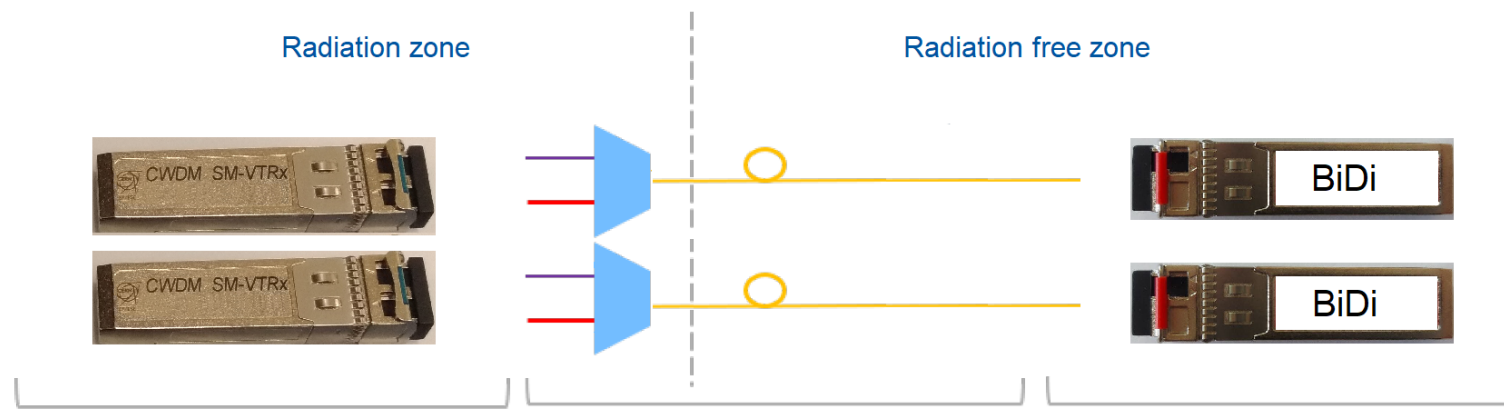
Parameter	Value	Units
Uplink Bit Rate	Up to 4x10.24	Gb/s
Downlink Bit Rate	Up to 4x5.12	Gb/s
Wavelengths	1270/1290/1310/1330	nm
Total ionizing dose (TID)	10	kGy
Fluence	$5 \cdot 10^{14}$	n/cm ² MeV neutrons



Front-end
 Radiation hard
 Twin transmitter - VTTx

Passive optics
 Single-mode optical fibers
 Optical MUX/DEMUX

Back-end
 COTS transceiver



Front-end
 Radiation hard
 Transceiver - VTRx

Passive optics
 Single-mode optical fibers
 Optical MUX/DEMUX

Back-end
 COTS transceiver

CWDM SM-VTRx
Single mode - transceiver

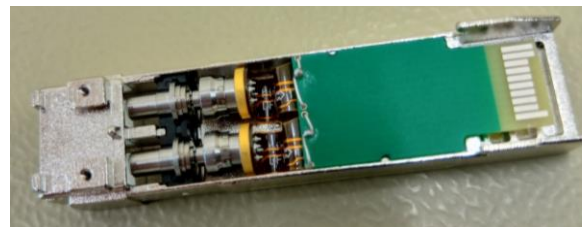


16 prototypes ready

Components:

- TOSA
- ROSA + TIA
- GBLD
- Electrical components
- PCB
- SFP+ Metal case

CWDM SM-VTTx
Single mode – twin transmitter



16 prototypes in production

Components:

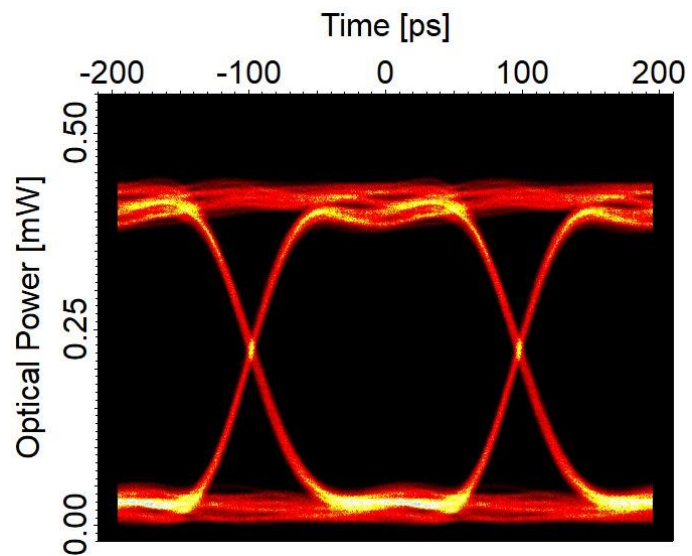
- 2x TOSA
- 2x GBLD
- Electrical components
- PCB
- SFP+ Metal case

TOSA = Transmitter Optical Sub-Assembly
ROSA = Receiver Optical Sub-Assembly

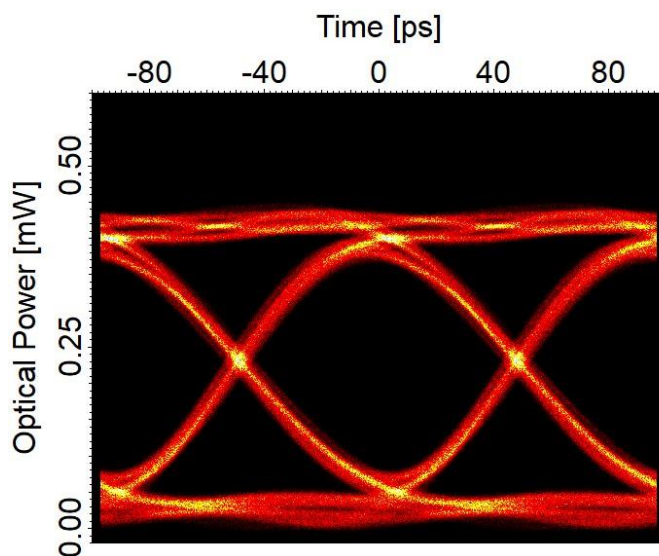
Legend:

GBLD = Laser Driver
TIA = Trans-Impedance Amplifier

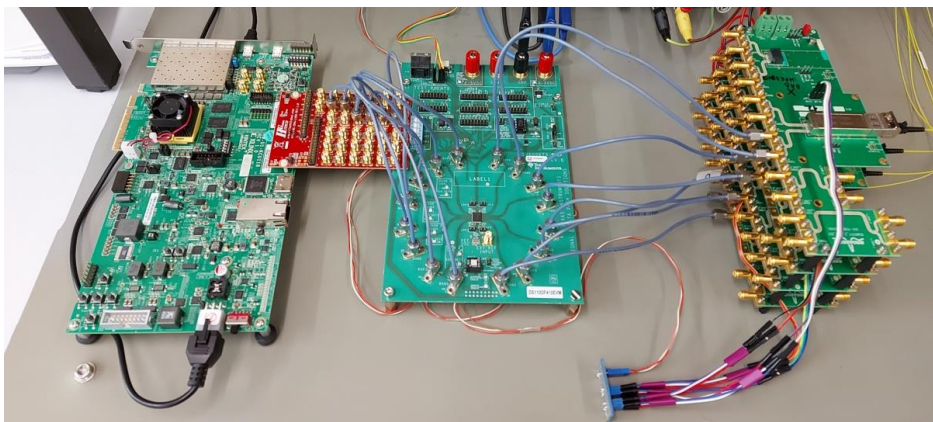
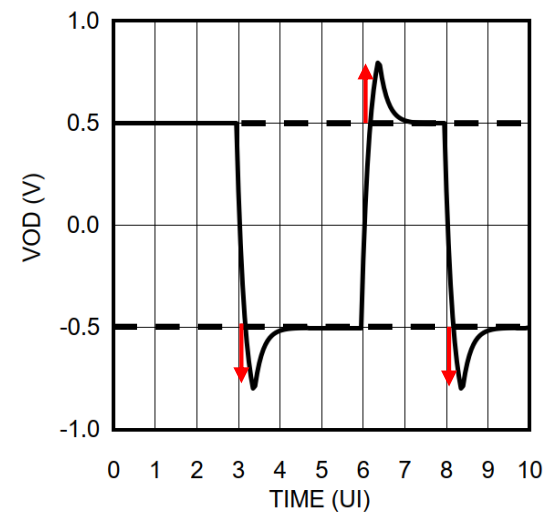
5 Gb/s



10 Gb/s



Pre-emphasis



Components:

- TOSA
- ROSA + TIA
- GBLD
- Metal case
- MUX
- Assembly

Procurement stage:

- Waiting for Bid
- Component identified and qualified
- Waiting to order wafers
- Component identified and qualified
- Component identified and qualified
- TBD

Quote (3000 VTTx + 3200 VTRx):

- ~500 kCHF
- ~200 kCHF (including TIA)
- ~70 kCHF
- <25 kCHF
- ~950 kCHF
- TBD

Total: 1.75 MCHF + Assembly

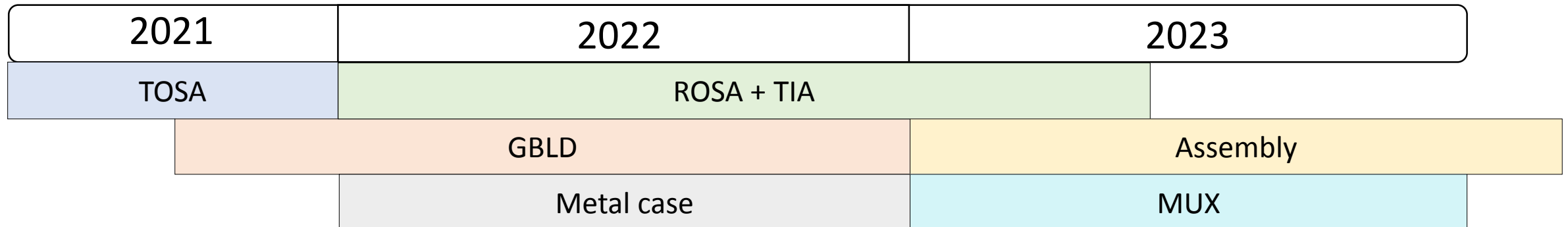


Components:

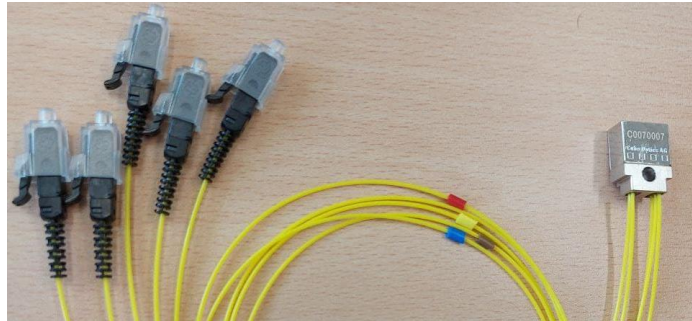
- TOSA
- ROSA + TIA
- GBLD
- Metal case
- MUX
- Assembly

ETA:

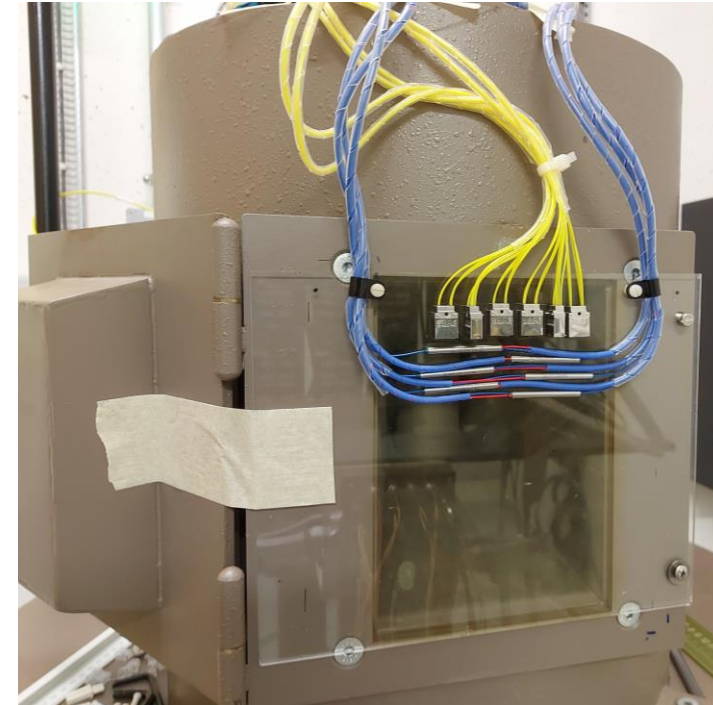
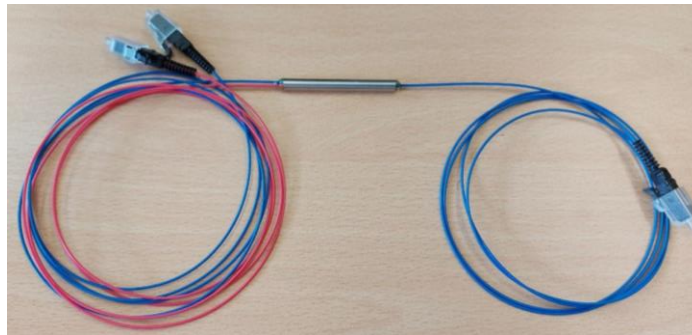
- End 2021/2022
- 1.5 years process (estimated, can be started anytime)
- 1 year process, but long queue
- no info (can be started anytime)
- no info (can be started anytime)
- 1 year process (estimated)



4 channel
CWDM MUX



2 channel
CWDM MUX



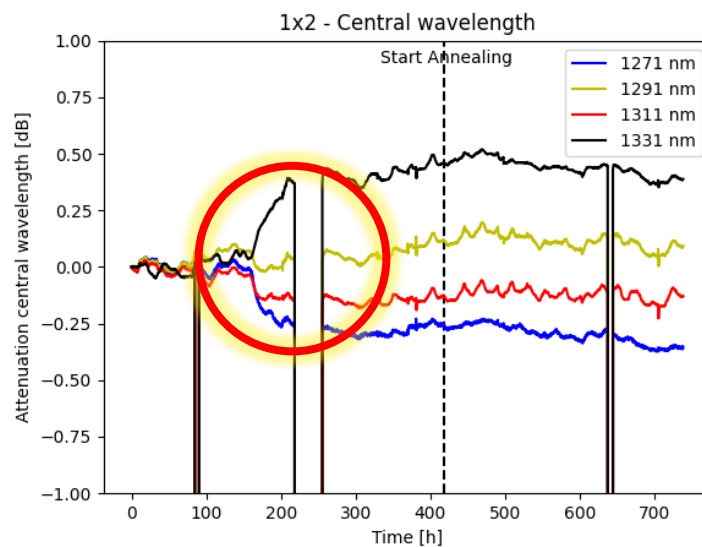
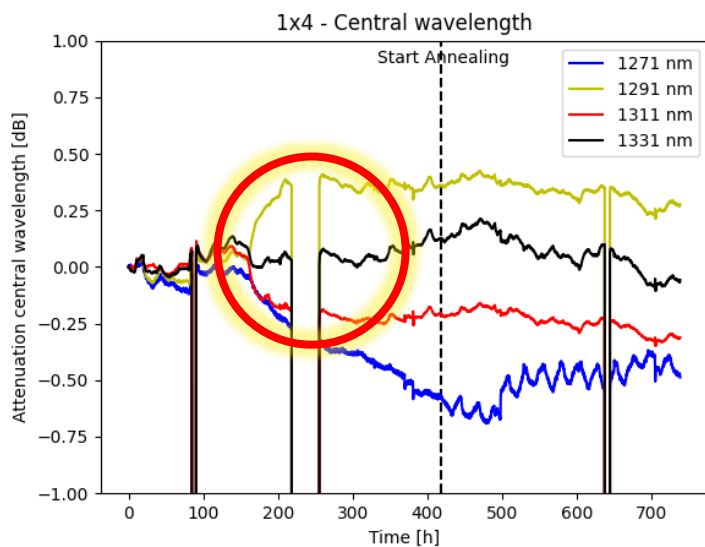
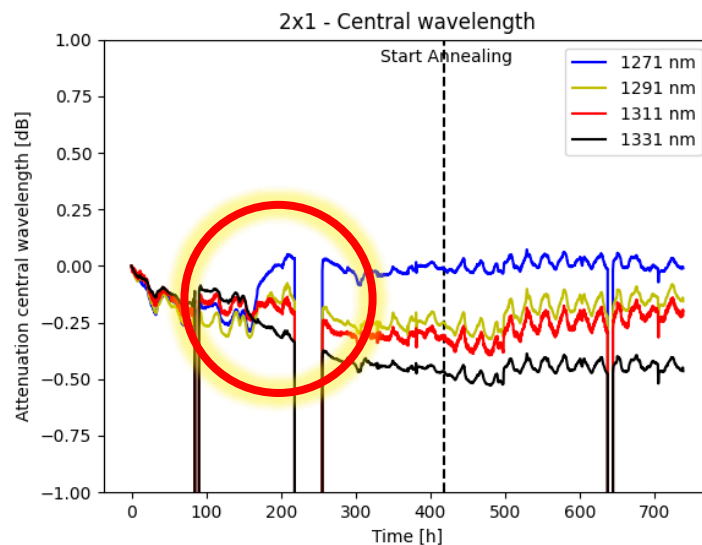
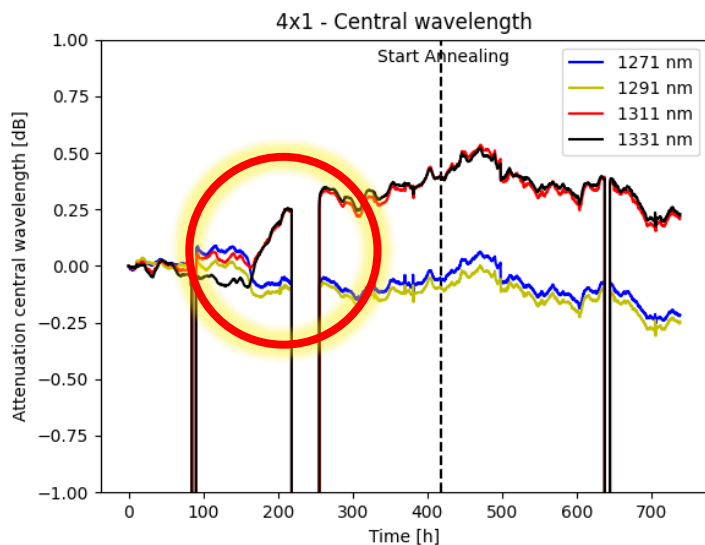
Gamma rays irradiation (Cobalt-60).

Irradiation started 3rd of May, stopped the 21st of May

Annealing started the 21st of May, stopped the 5th of June

Dose rate = 29.7 Gy/h

Total ionizing dose = 11.3 kGy



Something happened after 160h, further investigations are ongoing...

Conclusions:

- CWDM VTXx prototypes (almost) ready
 - Tests with front-end boards prototypes?
- Procurement of the components ongoing
 - Pipelining what's possible
- MUX qualifications almost completed
 - Further analysis ongoing