

34C3 Alien Wave

100G / 200G OTU-C2



34C3.GUWAH!

Leipzig - Berlin
27.12 — 30.12.2017

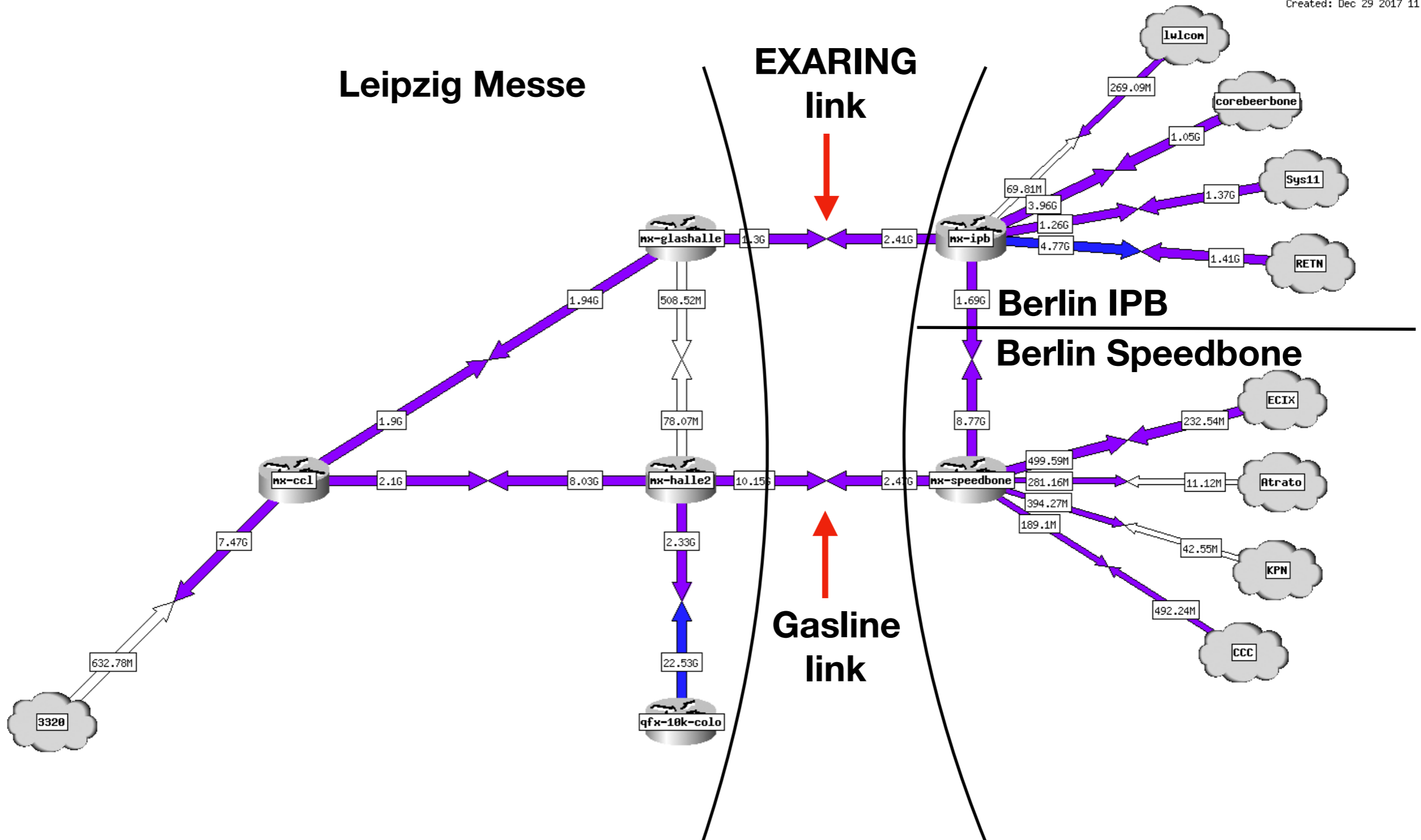
Motivation

- Supporting 34C3
- Playing tricks on physics
- Testing the network



Overview

Created: Dec 29 2017 11:45:02

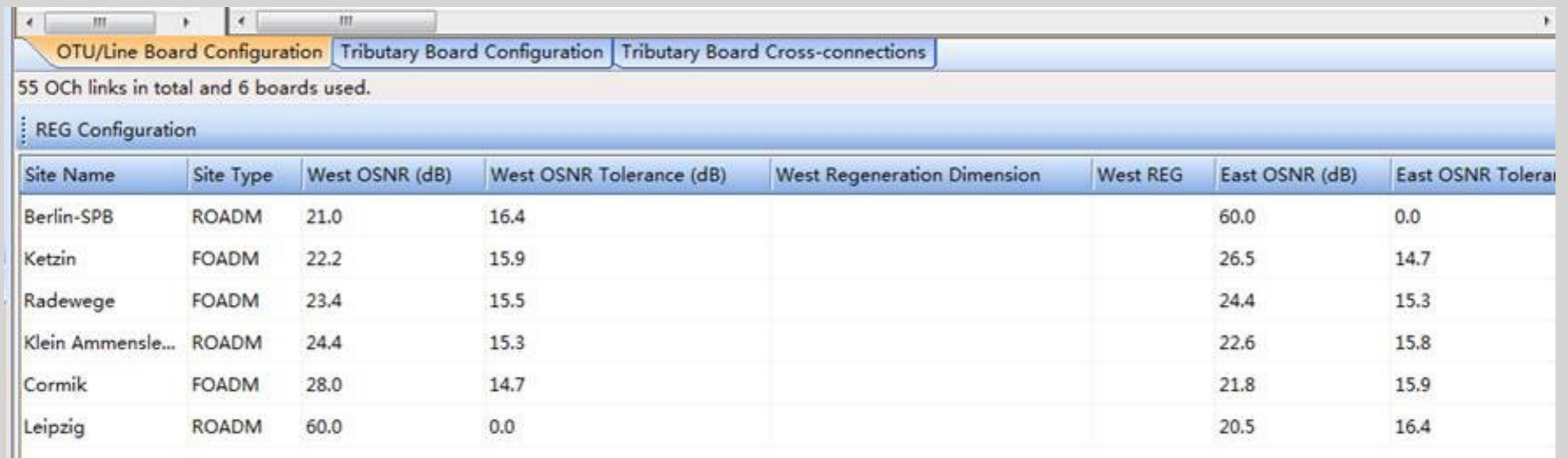


Gasline link Participants

- C3noc -> <3
- GasLINE / magellan Netzwerke -> Alien Wave
- HLkomm -> Fiber Local Link
- Globalways -> Optical Transport Hardware
- KPN, atrato, ECIX, Core Backbone -> Peering
- speedbone -> Colo & Crossconnects
- many others !

Technical

- 200G OTU-C2
- Length of OMS 385 km L - MD - BER
- Expected OSNR Rx Leipzig 20.5db, Berlin 21.0db
- Expected RTD L1 4,34 ms
- 3 ROADMs, 3 FOADMs



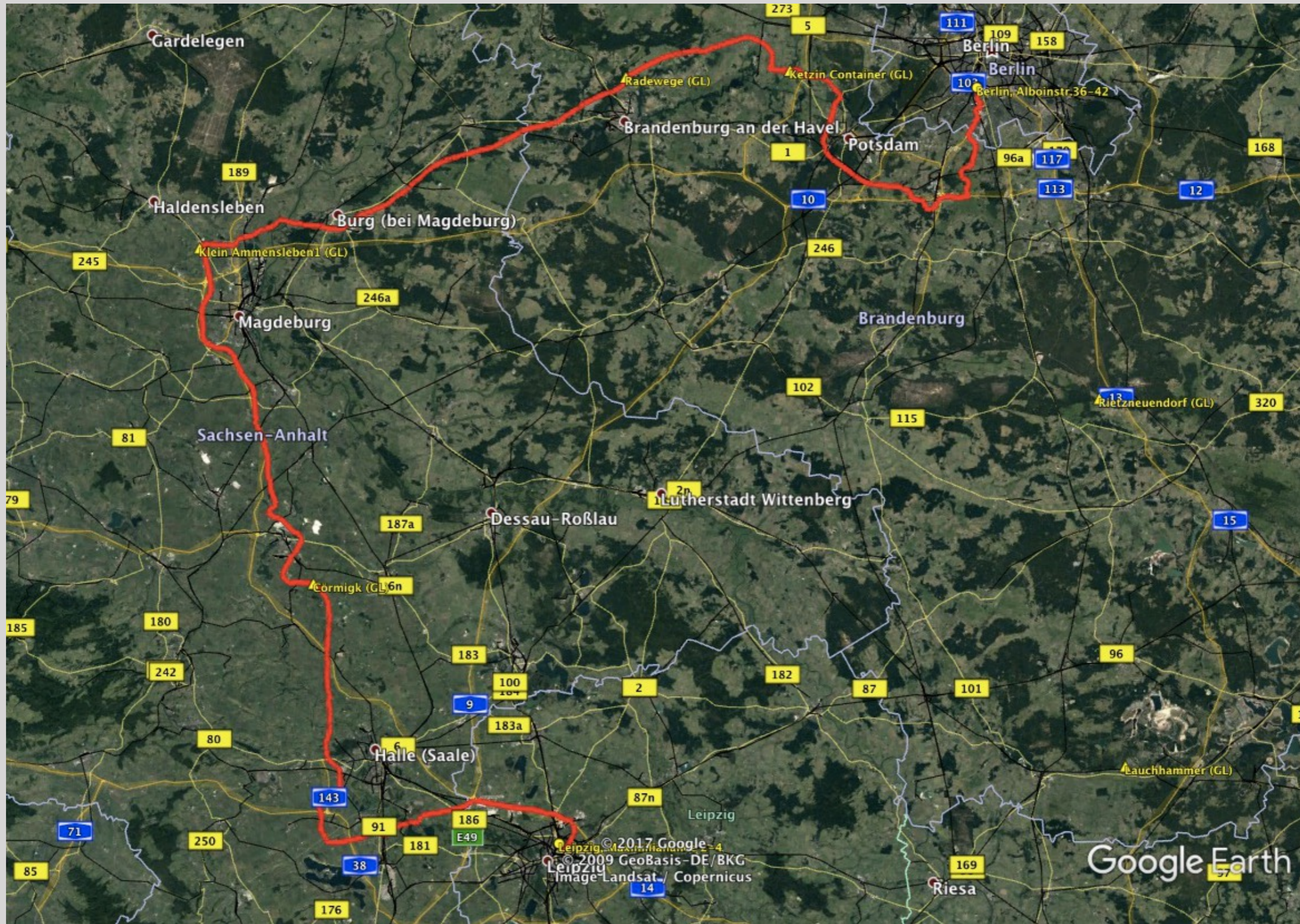
The screenshot shows a software interface with three tabs: "OTU/Line Board Configuration", "Tributary Board Configuration", and "Tributary Board Cross-connections". Below the tabs, a summary line states "55 OCh links in total and 6 boards used." A section titled "REG Configuration" contains a table with the following data:

Site Name	Site Type	West OSNR (dB)	West OSNR Tolerance (dB)	West Regeneration Dimension	West REG	East OSNR (dB)	East OSNR Tolerance
Berlin-SPB	ROADM	21.0	16.4			60.0	0.0
Ketzin	FOADM	22.2	15.9			26.5	14.7
Radewege	FOADM	23.4	15.5			24.4	15.3
Klein Ammensle...	ROADM	24.4	15.3			22.6	15.8
Cormik	FOADM	28.0	14.7			21.8	15.9
Leipzig	ROADM	60.0	0.0			20.5	16.4

Platform OTN

- Huawei OSN8800 with ROADMs / FOADMs
- 50GHz spacing, C-Band
- max. capacity per channel 200 Gigabit/s OTUC2
- usually operated with OTU4 or OTU2

Optical path and hops

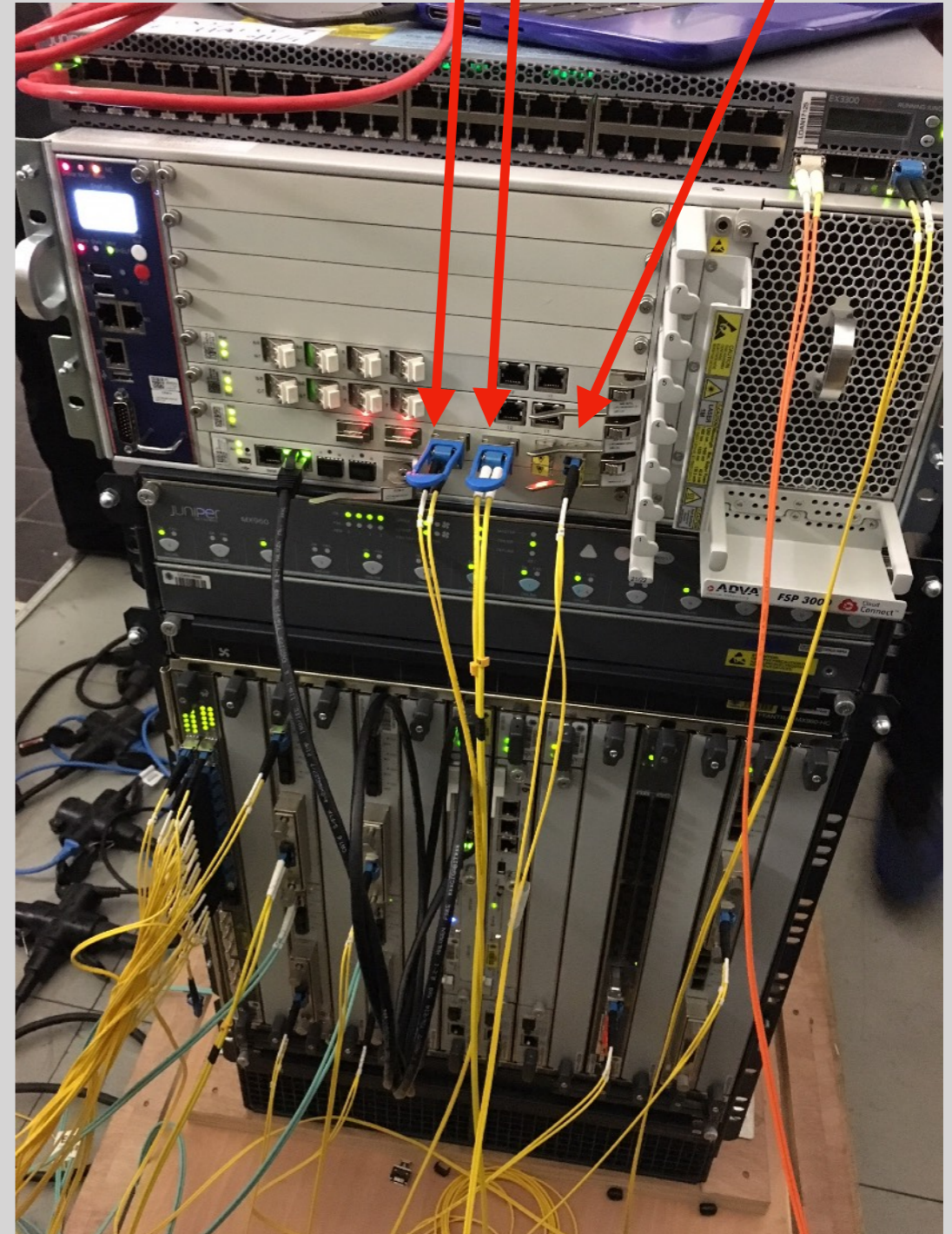
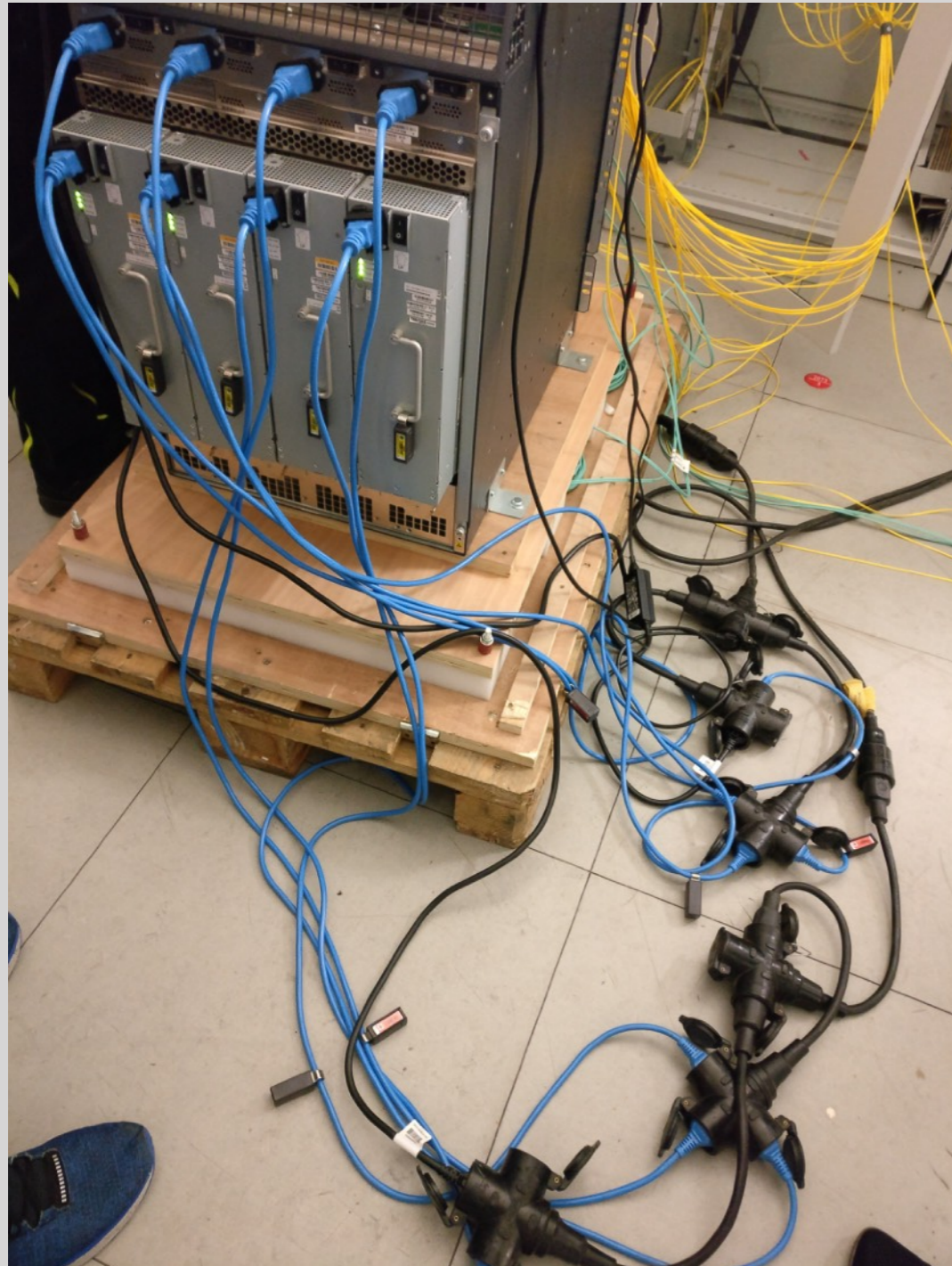


Leipzig



Leipzig

2 * 100G Client 200G LINE

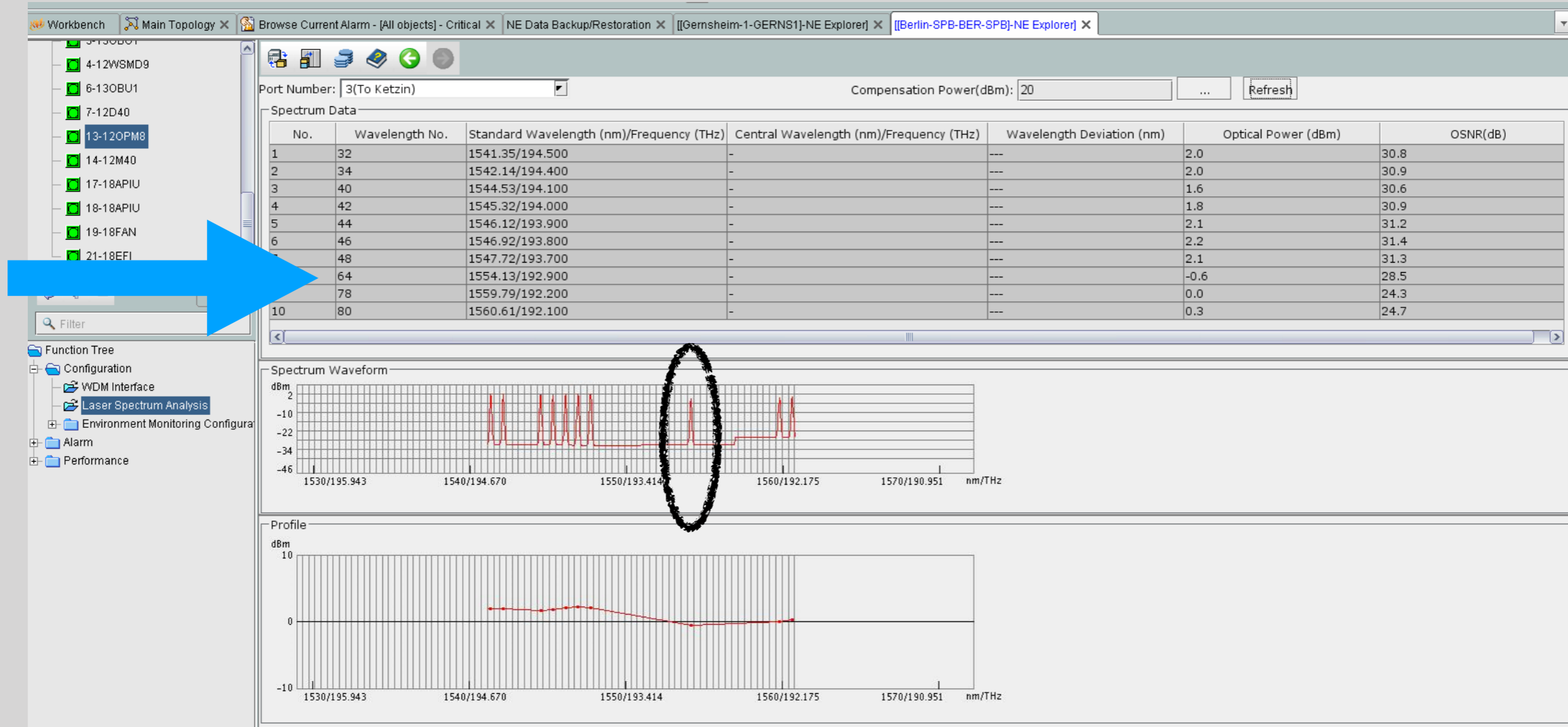


Trust your power supply...

Berlin



Here we go!



EXARING link participants

- c3noc
- EXARING AG, dacoso -> Alien Wave
- ECI -> 100G Transponder, optical protection
- ADVA -> VOA
- enviaTEL -> local loop in Leipzig
- IPB -> cross connect in Berlin

Technical

- ADVA DWDM optical network, 50 GHz grid
- Proof of concept (POC) 200G (OTU-C2) as alien wave on direct path
- Then switched to 100G to use optical protection over two paths
- Length of paths:

1. Direct path: ~360 km

2. Indirect path: ~1.700 km (NUE, FRA, DUS, HAM)

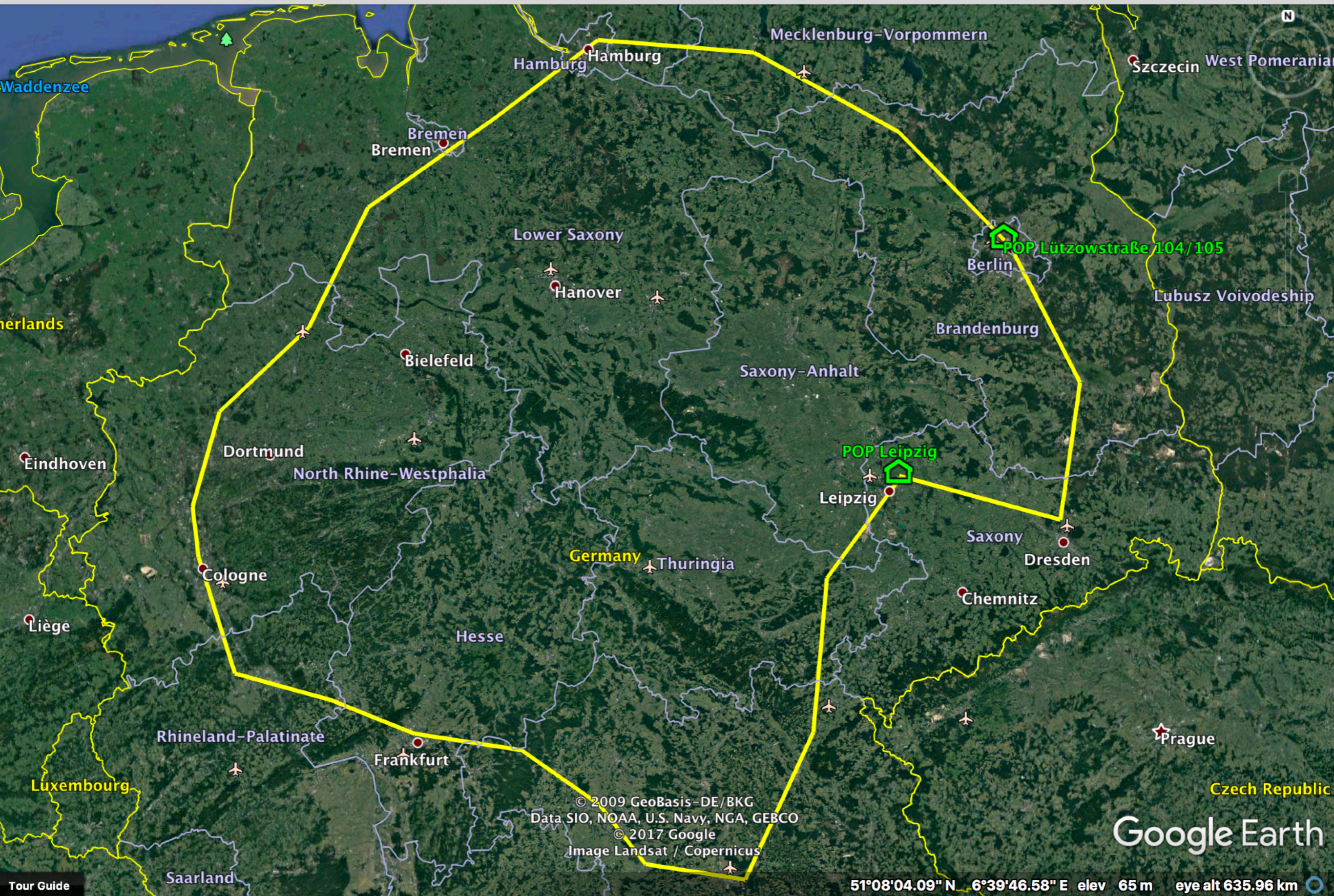
- Expected OSNR: ~22 - 24dm

Expected OSNR: 16 - 18 dB

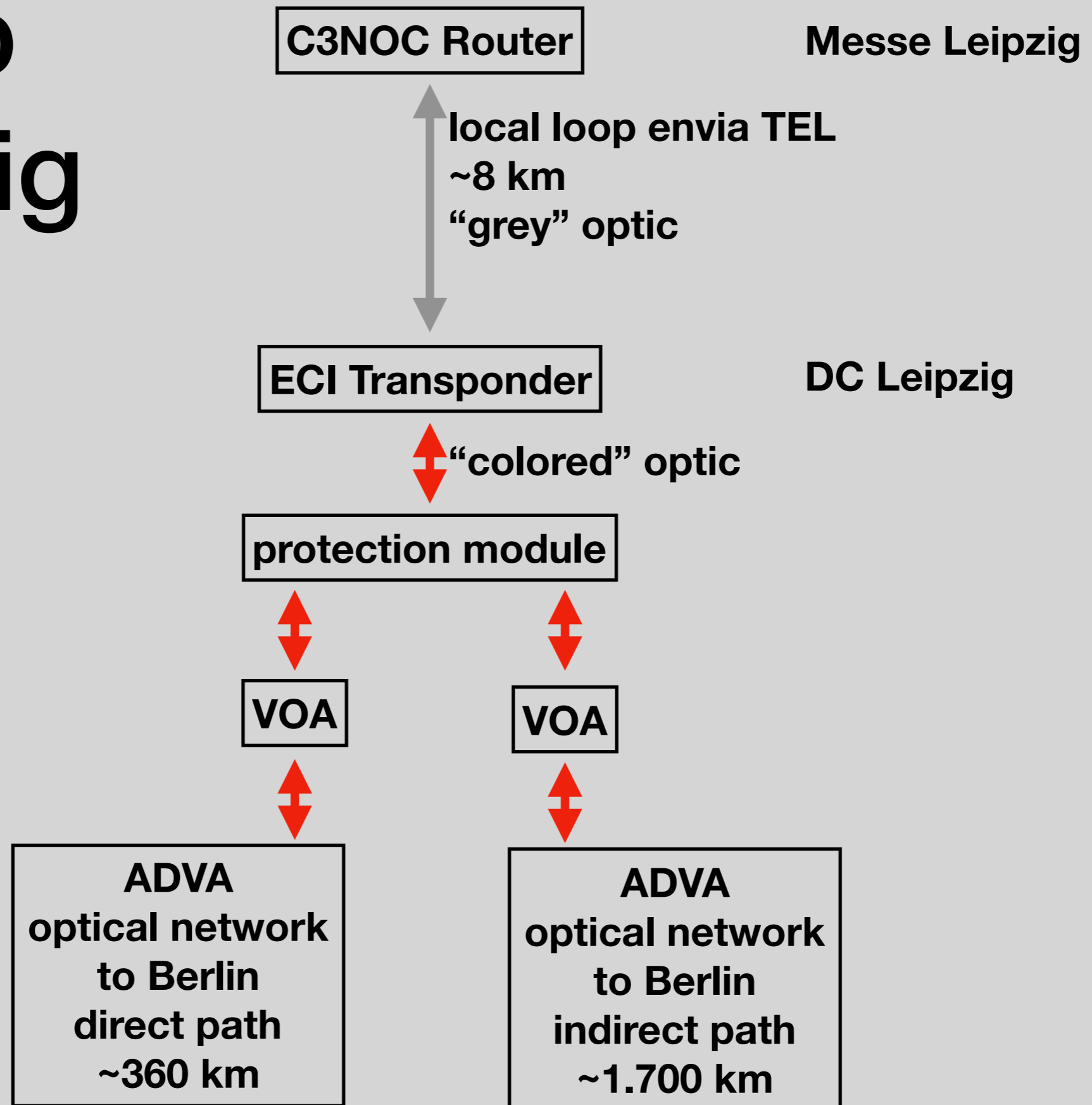
- 2 ROADMs, 2 ILA

7 ROADMs, 18 ILA

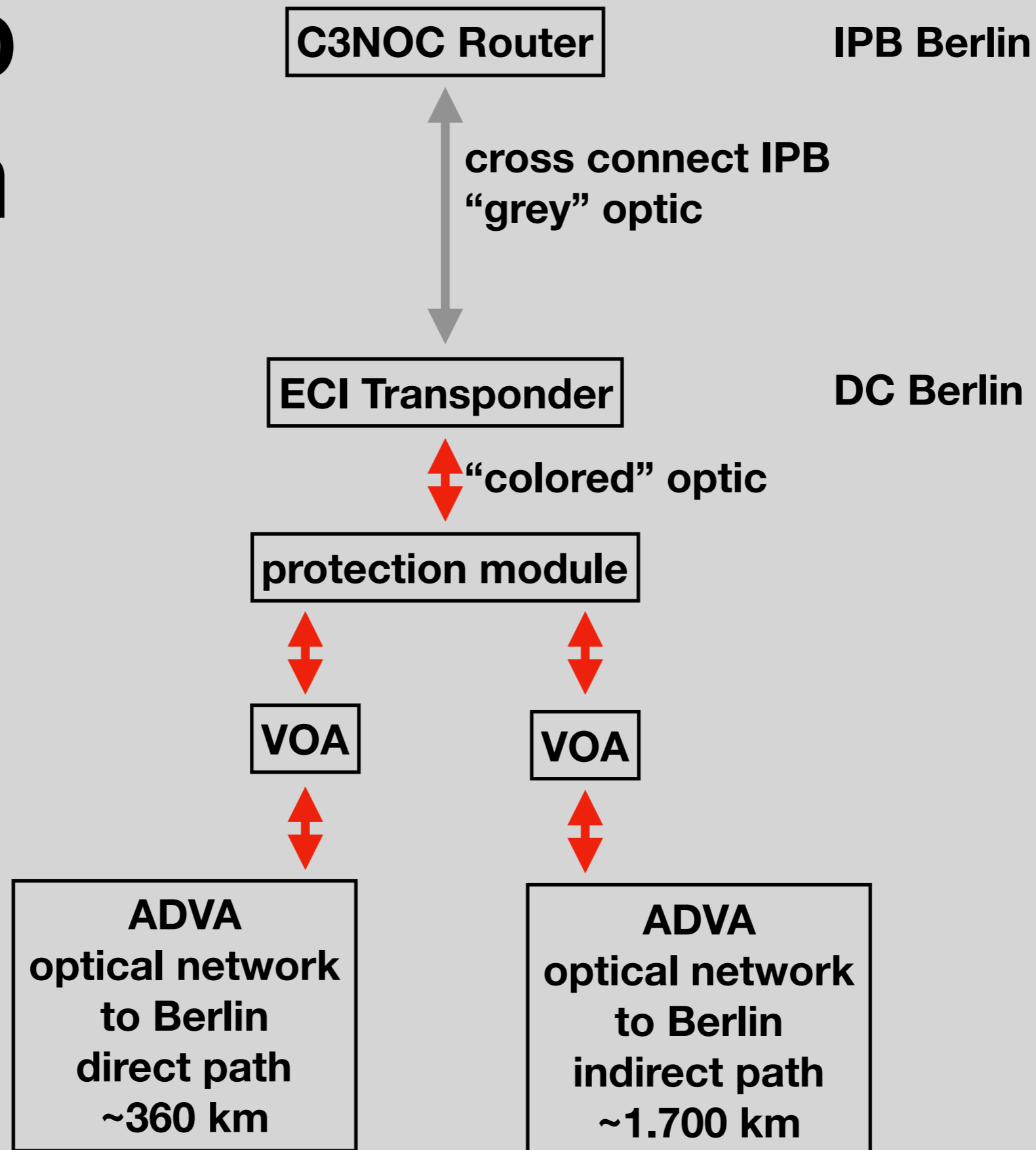
Optical Path and hops



Setup Leipzig



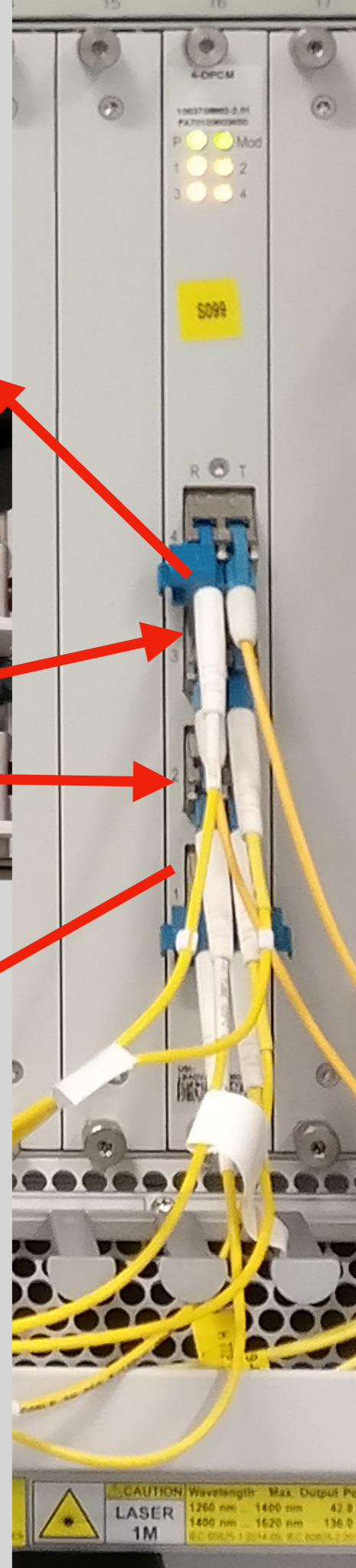
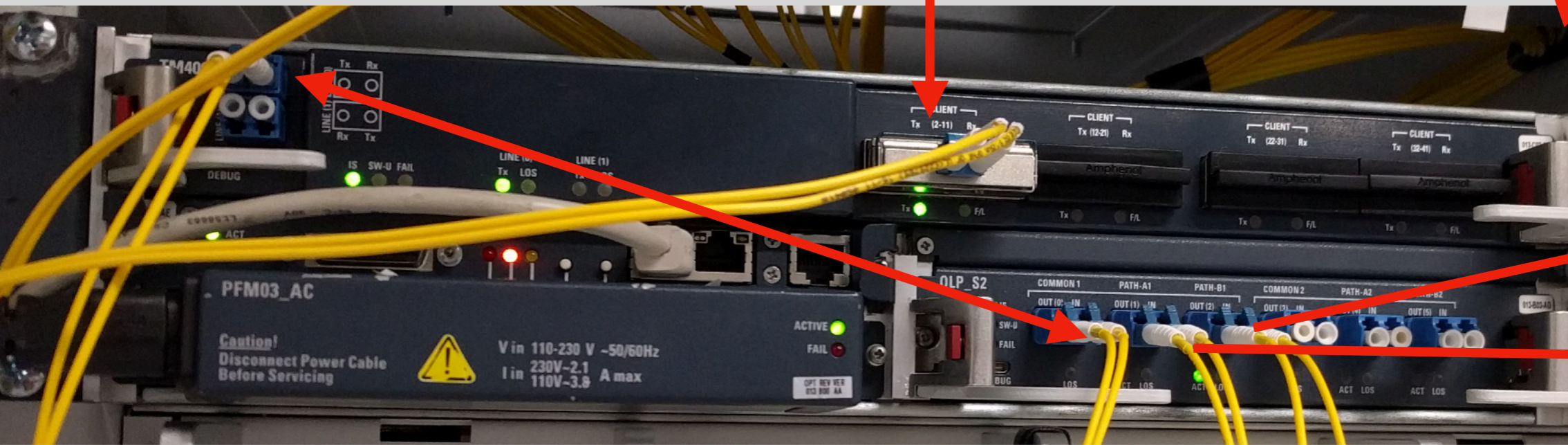
Setup Berlin



Setup

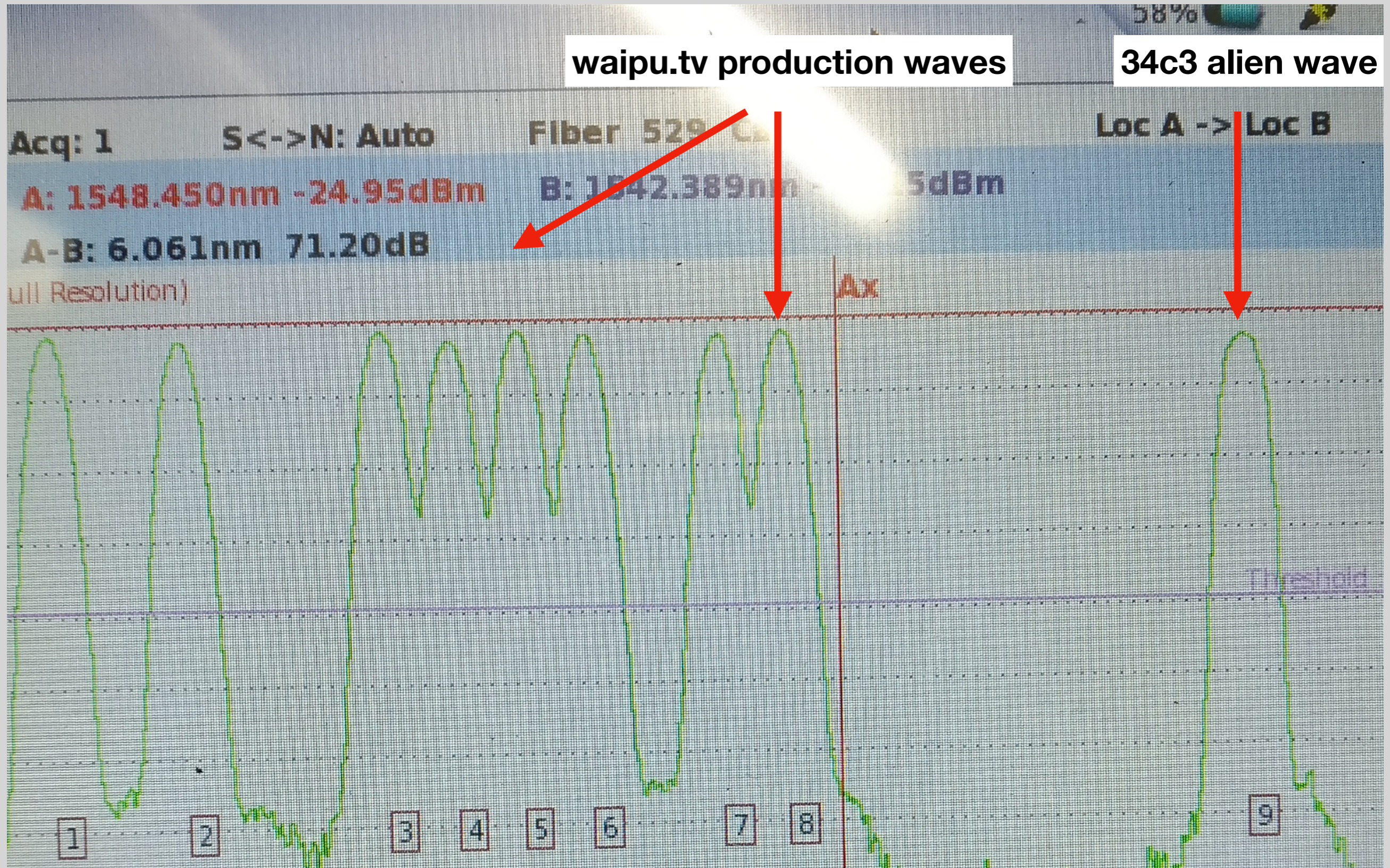
C3NOC Router
"Client" side

ADVA
optical network
to Berlin
direct path
~360 km



ADVA
optical network
to Berlin
indirect path
~1.700 km

OSA spectrum



We did something



Thanks to

- ADVA, Babiel, Core Backbone, Deutsche Telekom, ECI, ECIX, enviaTEL, Eventinfra, EXARING/waipu.tv, Flexoptix, Datacenter One, HL komm, I/P/B, Juniper, KPN, LWLCOM, PROACT, PylonONE, RETN NET, Speedbone, syseleven, and may more

Contact

Marc Helmus

mail@marchelmus.de

Threema: 7UAEVZH7

@marcnetismus



Tim Kleefass

tim@exaring.de

@TimKleefass

@waipuTech

Kay Rechthien

kay@ccc.de

@frapzz0r

Moritz Frenzel

moritz.frenzel@globalways.net

@momorientes

Backup Slides

- Have a drink on that
- Any questions?
- Ping us / me

