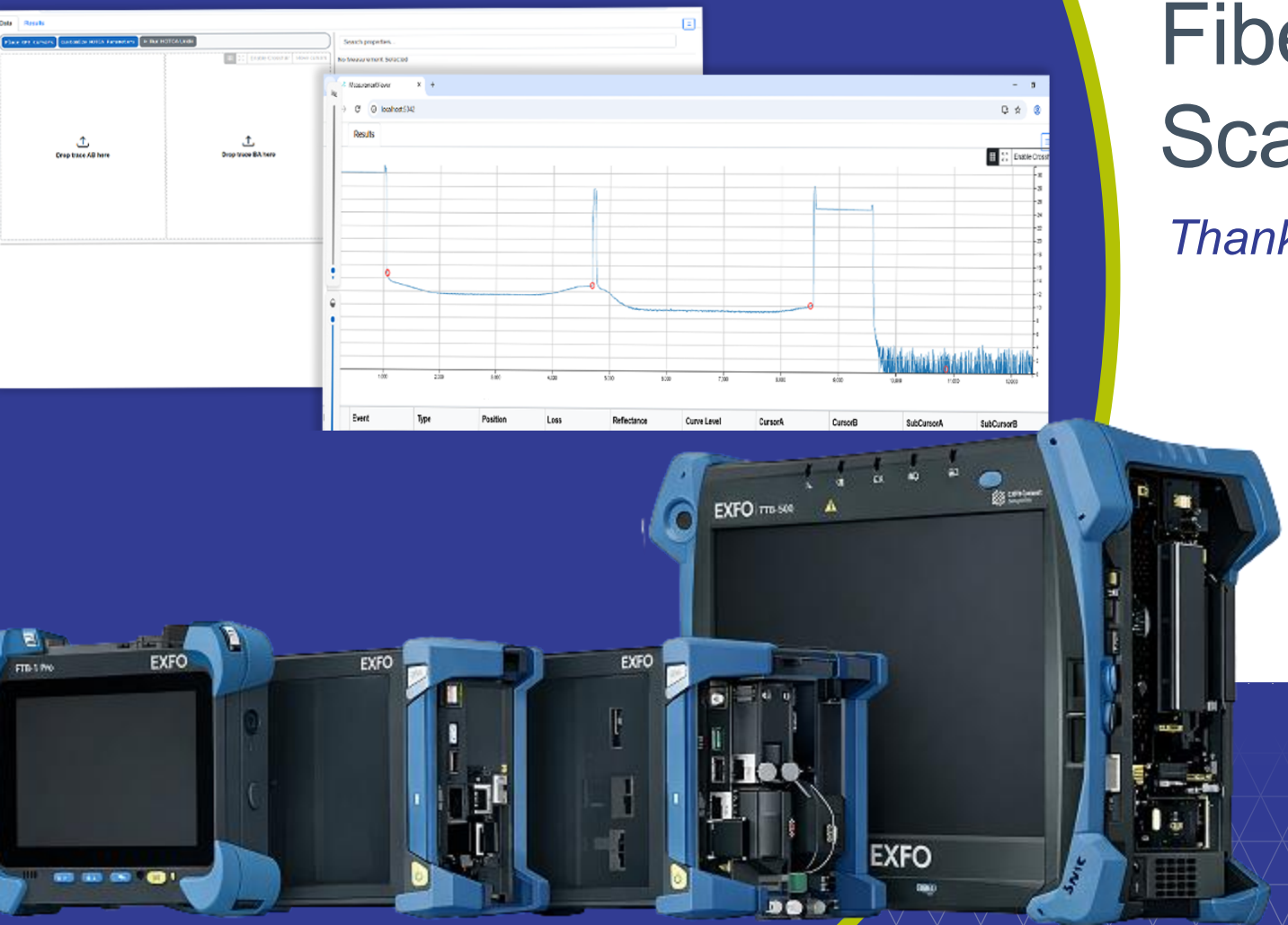
TRS RenTelco℠ EXFO

WEBINAR

Rethinking Long-Haul Connectivity: Hollow Core Fiber and the Future of Scalable Network Testing

Thank you for joining us. We will begin shortly



LIVE WEBINAR | April 30, 2026

Agenda

1. Welcome and Introductions
   - Lindsay Welch, TRS-RenTelco Marketing Manger
2. TRS-RenTelco: Test & Measurement Solutions
   - Micah Hurd, Product Manager
3. EXFO: Hollow Core Fiber and the Future of Scalable Network Testing
   - Gwenn Amice, Technical Sales Lead
4. TRS-RenTelco: Equipment & Special Promotions
   - Micah Hurd, Product Manager
5. Q&A – Joint TRS and EXFO

Test & Measurement Solutions: Rent, Lease, or Buy

Plan, acquire, and efficiently utilize instruments to maximize return on investment.

- End-to-end fulfillment from our Dallas, TX headquarters
- 5,000+ configurable models available, valued at over $500MM
- In-House Financing and flexible procurement programs to Rent, Lease, or Buy
- State-of-the-Art 20,000 sq ft Calibration Lab on site
- Same-Day-Shipping with Next Day Delivery Available

A proud member of the
McGrath Family of Businesses

mobile modular Portable Storage | TRS RenTelco | mobile modular | enviroplex

Why Do Customers Choose TRS-RenTelco?

Customer Service Excellence

Talk with a **Live Person** when you call

Extended Technical Sales Hours from 7am – 7pm CT

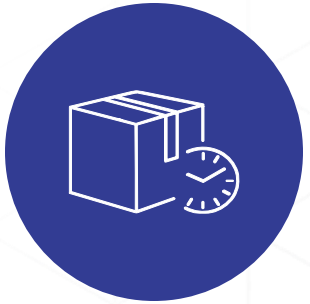
Late-Order processing

Comprehensive Solutions

Customized **In-house Financing**

Deep and wide **Inventory**

Equipment ships **Ready To Use**



Fulfillment Accuracy & Speed

Same-day Shipping

80% of Calibrations Performed In-house

99.72% Customer-Scored Equipment Quality Ranking

Reliable Expertise

Strategic singular focus on the rental market

Top-tier rental partner to all major manufacturers

Financially Secure publicly traded company

EXFO EXPERT SPEAKER

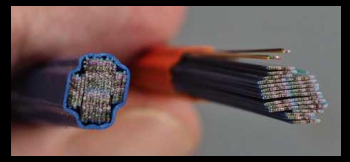
Gwenn Amice

Senior member of technical staff

Technical sales team leader

TOP TRENDS IN THE DATAWORLD

Context: AI deployment forcing technology to evolve quickly to improve bandwidth and latency. Fiber deployment as never seen before in term of scale and rapidity. Data Sovereignty and security is paramount.



High fiber count

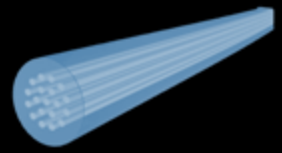
Need to Measure loss, length, and polarity on duplex and multi-fiber links.

Links could be trunks pre-connectorized or spliced, leading to polarity issue and fiber crossed.

Hollow core fiber

Deployment started while the research is not completed yet, No standard, testing trial as well as deployments.

Market will quickly adopt this technology in various network architectures.



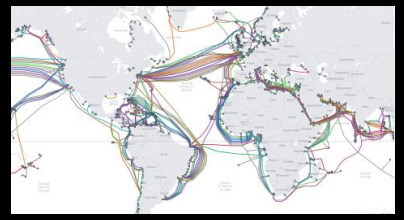
Multicore fiber

Mainly used for Submarine cables, there is a real need for native multicore transceivers and connectivity with 4 cores native

Crosstalk as a need?

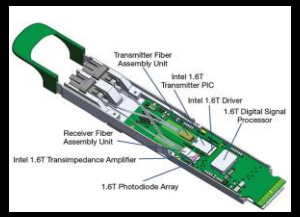
Post Quantum Encryption

The phenomenon of HNDL, Harvest now decrypt later is forcing the evolution of post quantum cryptography using QKD/QRNG. Secure the data now.



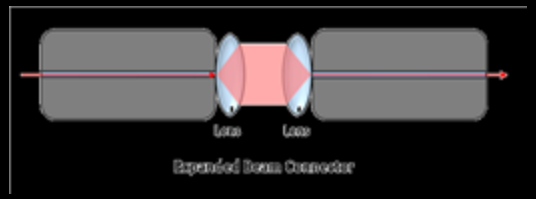
Submarine cable massive deployment and security

In the geo-political context, the protection of the submarine links is paramount increasing the demand testing



1.6T and 3.2 T transceivers developments

Transceivers cost, cooling and overheating are major issued. Cost per transceivers forces the Hyperscalers to find solutions to validate transceiver before throwing them away.



Expanded Beam Connector

Linked to the high-speed trend and fiber density, the connectivity challenges are bringing back Expanded Beam Connector to limit impact of contamination and need for cleaning/inspection.

Network automation, AI-driven

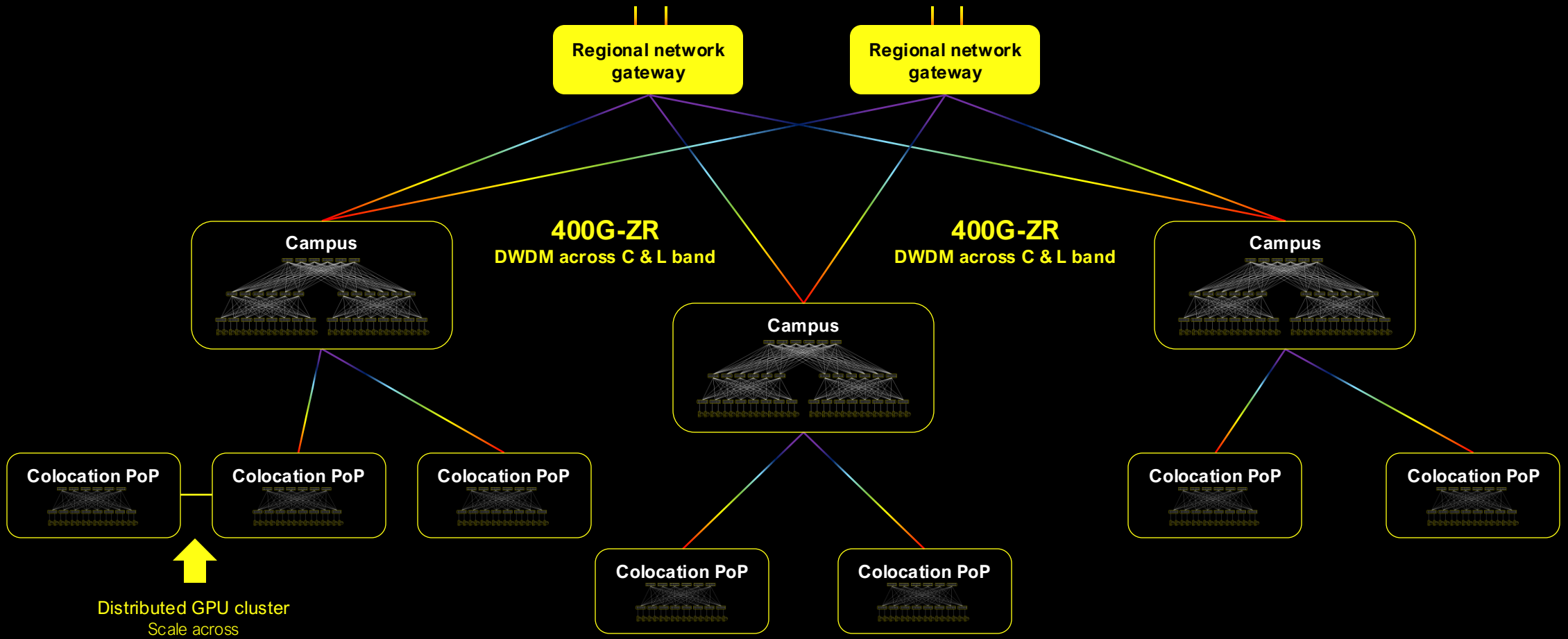
Closed-loop automation using telemetry and optical performance dataAI/ML used to predict degradation, fiber aging, and failure risk Shift from reactive testing to continuous monitoring/sensing.

Intent-Based Operations with AI Assistants.

METRO & EDGE DCI

NOW IN 2026

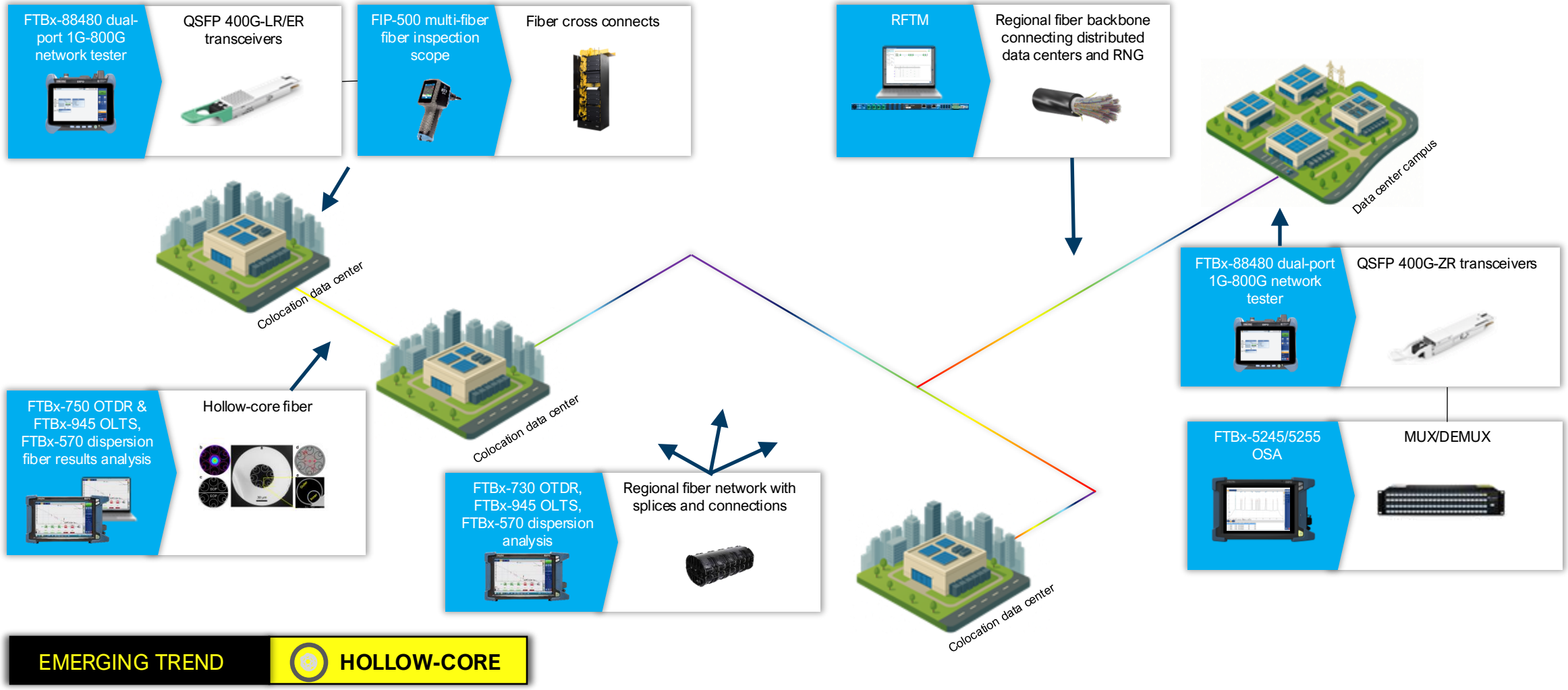
CONNECTING A GROWING NUMBER OF SITES



METRO & EDGE DCI

NOW IN 2026

IMPACT ON NETWORK INFRASTRUCTURE AND OPTICAL TESTING



LONG-HAUL & SUBSEA DCI

NOW IN 2026

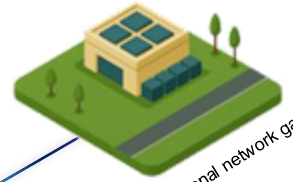
IMPACT ON NETWORK INFRASTRUCTURE AND OPTICAL TESTING

FTBx-88480 dual-port 1G-800G network tester

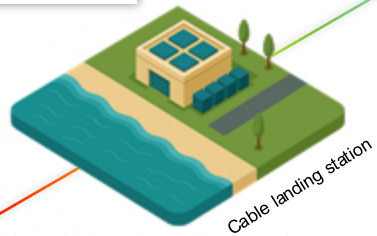
High speed transponder

FTBx-5245/5255 OSA

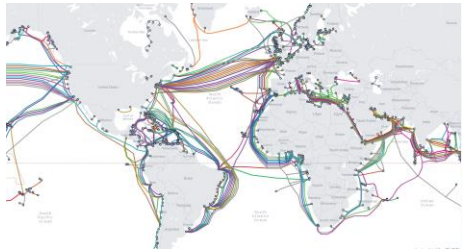
SLTE



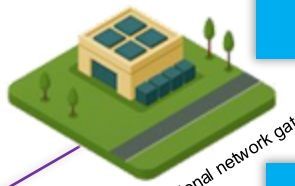
Regional network gateway



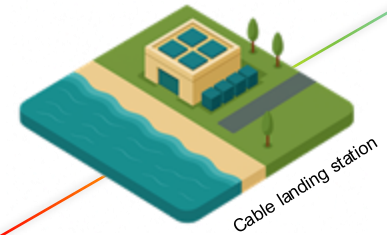
Cable landing station



Open cable with ter-abyte



Regional network gateway



Cable landing station

FTBx-88480 dual-port 1G-800G network tester

400G- ZR+

FTBx-5245/5255 OSA

ROADMs and switching

FTBx-730 OTDR, FTBx-945 OLTS, FTBx-570 dispersion analysis

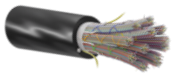
Regional fiber network with splices and connections

FTBx-750 OTDR, FTBx-945 OLTS, FTBx-570 dispersion analysis

Submarine with ROADMs, branching units and repeaters

RFTM

Regional fiber backbone connecting distributed data centers and RNG



HOLLOW-CORE FIBER: STATE OF MARKET

EMERGING TECHNOLOGY:
HCF IS NOW STARTING TO OUTPERFORM SMF IN TERM OF LOSS/KM AND LATENCY.

MANUFACTURER STARTING TO SELL FIBERS, MANUFACTURING OF LONG SEGMENTS IS STILL A CHALLENGE.

CURRENTLY HCF IS DEPLOYED BY THREE TYPES OF USERS:

- Hyperscalers with latency constraints - but need flexibility with the location of data center (long range - DCI application) — Focus
- Hyperscalers - but for intra DC application.
- High speed trader (very short link - FTTA application).

What Is Hollow Core Fiber (HCF)?

The Technology

NANF (Nested Antiresonant Nodeless Fiber) is the dominant HCF architecture.

HCF guides light through a hollow air/gas core rather than solid silica glass, using antiresonant glass tube cladding structures (~125 µm OD — splice-compatible with SMF).

The core fills with ambient gas (air, N_2) unless hermetically sealed. Gas composition affects refractive index, attenuation, and dispersion.

Why It Matters

Latency

~3.3–3.5 µs/km vs ~4.9 µs/km SMF
~30% faster propagation

Attenuation

Now below SMF ULL — targets <0.06 dB/km
(vs ~0.17 dB/km SMF)

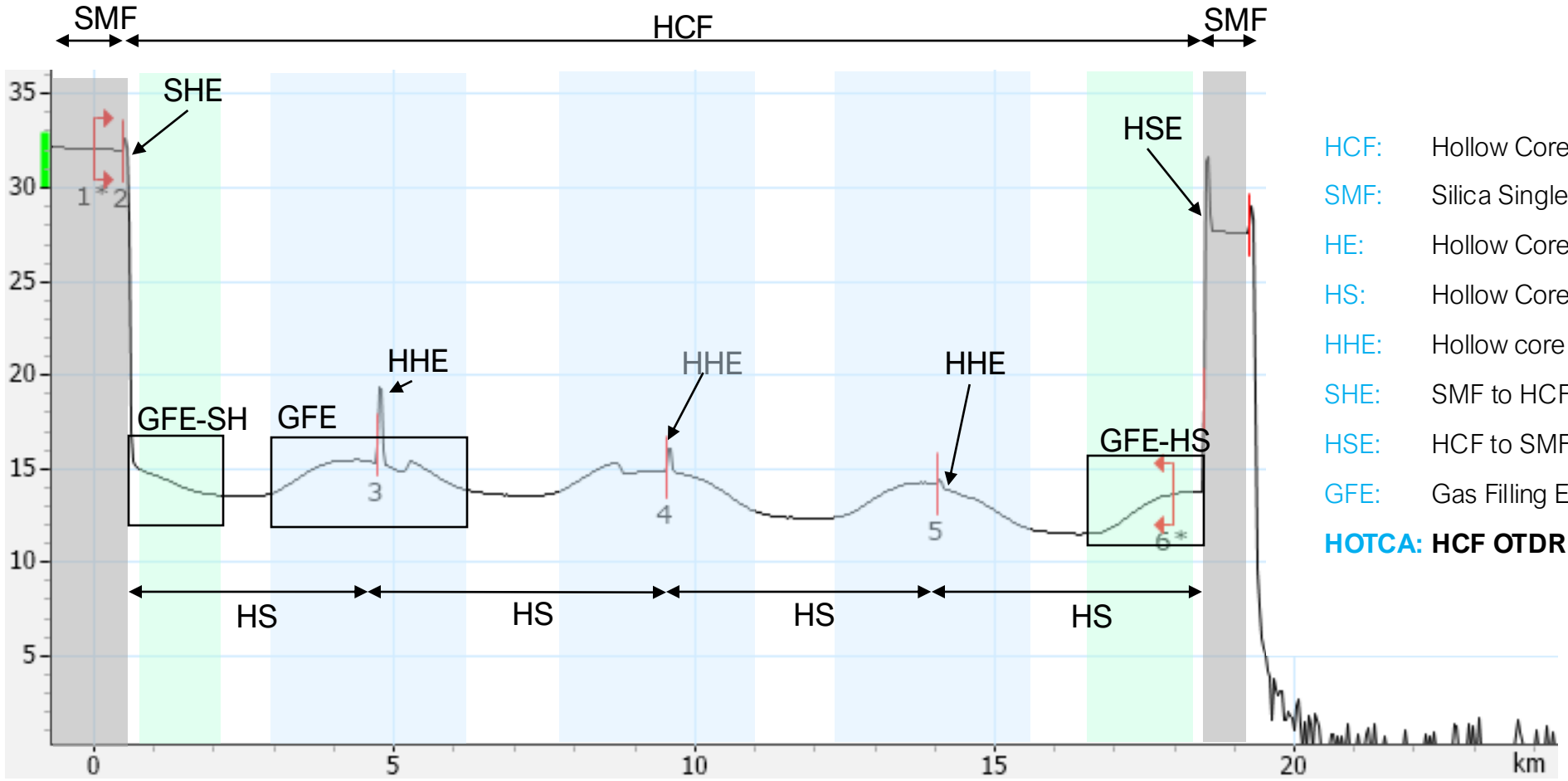
Markets

Hyperscale DCI, intra-DC, HFT
(short links, latency-critical)

IOR

≈1.000 (air/gas core)
vs 1.468 for silica SMF

EXFO HCF OTDR SOLUTION



HCF: Hollow Core Fiber.

SMF: Silica Single Mode Fiber.

HE: Hollow Core Event, one of below

HS: Hollow Core Fiber Section

HHE: Hollow core to Hollow core Event

SHE: SMF to HCF Event

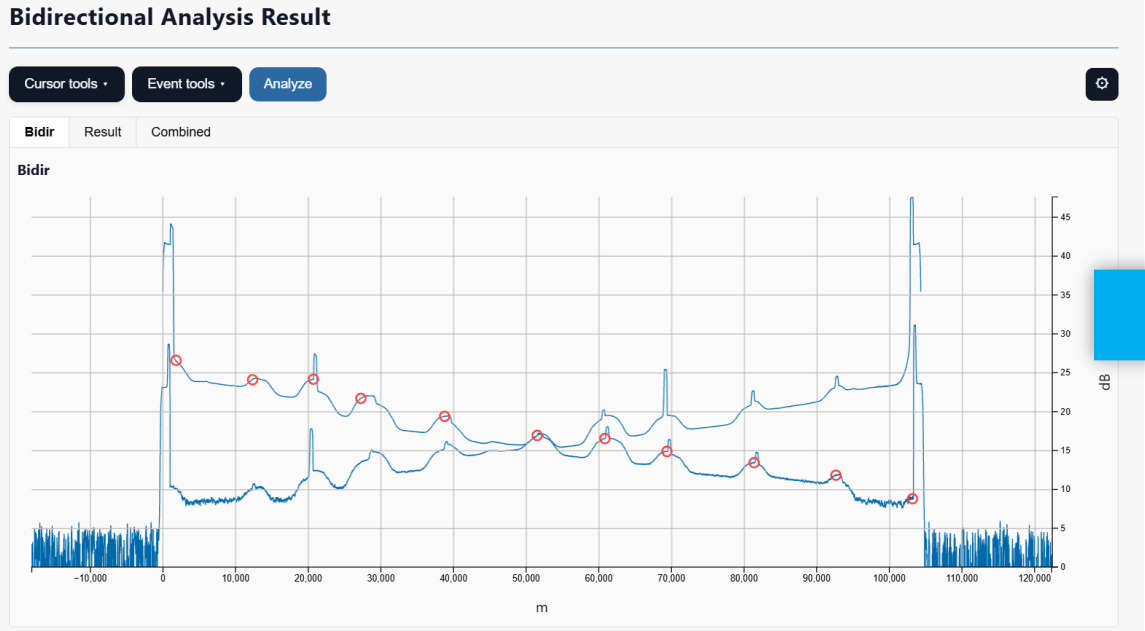
HSE: HCF to SMF Event

GFE: Gas Filling Event,

HOTCA: HCF OTDR Trace Component Analysis

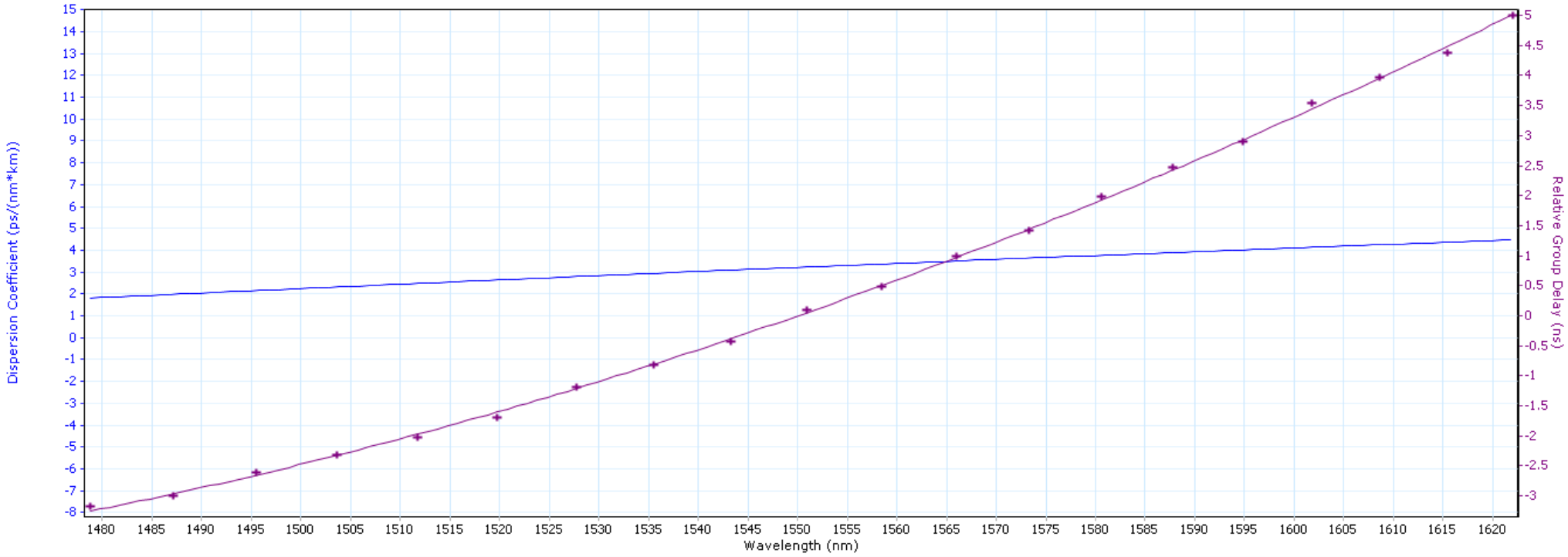
EXFO HCF ANALYSIS SOFTWARE

- Transform hollow core fiber trace to smf-like traces with all the metric you need.
- Offline solution that can be installed directly on the platform. Designed for red zones!
- Technicians focus on OTDR Fundamentals, EXFO's HCF software takes care of the complexity



#	Type	Position (m)	Length (m)	Loss (dB)	Reflectance (dB)	Attenuation (dB/km)	Cumul (dB)
1	SH-splice	1739.02	-	0.46	0.00	-	0.46
-	Hollow core fiber	-	10550.25	-	-	0.09	0.46
2	H-Splice	12289.27	-	0.15	-75.07	-	0.61
-	Hollow core fiber	-	8383.41	-	-	0.09	0.61
3	H-Splice	20672.68	-	1.18	-62.52	-	1.79
-	Hollow core fiber	-	6545.34	-	-	0.13	1.79
4	H-Splice	27218.02	-	1.08	-77.70	-	2.88
-	Hollow core fiber	-	11536.53	-	-	0.10	2.88
5	H-Splice	38754.56	-	0.76	-73.24	-	3.64
-	Hollow core fiber	-	12761.92	-	-	0.10	3.64
6	H-Splice	51516.47	-	0.28	-75.06	-	3.92
-	Hollow core fiber	-	9332.34	-	-	0.12	3.92
7	H-Splice	60848.81	-	0.17	-68.83	-	4.09
-	Hollow core fiber	-	8555.27	-	-	0.10	4.09
8	H-Splice	69404.08	-	0.25	-65.17	-	4.34
-	Hollow core fiber	-	12014.73	-	-	0.10	4.34
9	H-Splice	81418.81	-	0.35	-71.55	-	4.69
-	Hollow core fiber	-	11275.02	-	-	0.13	4.69
10	H-Splice	92693.83	-	0.52	-75.53	-	5.21
-	Hollow core fiber	-	10557.72	-	-	0.17	5.21
11	HS-splice	103251.55	-	0.58	0.00	-	5.79

DISPERSIONS: CD PMD



Results

Identification | Summary | Thresholds | CD Table

CD

Results	
Dispersion at 1550 nm	58.08 ps/nm
Slope at 1550 nm	0.0185 ps/(nm^2*km)
Coefficient at 1550 nm	3.22 ps/(nm*km)
Dispersion at 1625 nm	81.67 ps/nm
Slope at 1625 nm	0.0164 ps/(nm^2*km)

Test Parameters	
Acq. from	1479 nm
Acq. to	1622 nm

Analysis Settings	
Results from	1250 nm
Results to	1650 nm
Fiber type	None
RGD data fit	3-term Sellmeier
Secondary wavelength	1625 nm

Lambda Zero	Slope
1399.5 nm	0.0248 ps/(nm^2*km

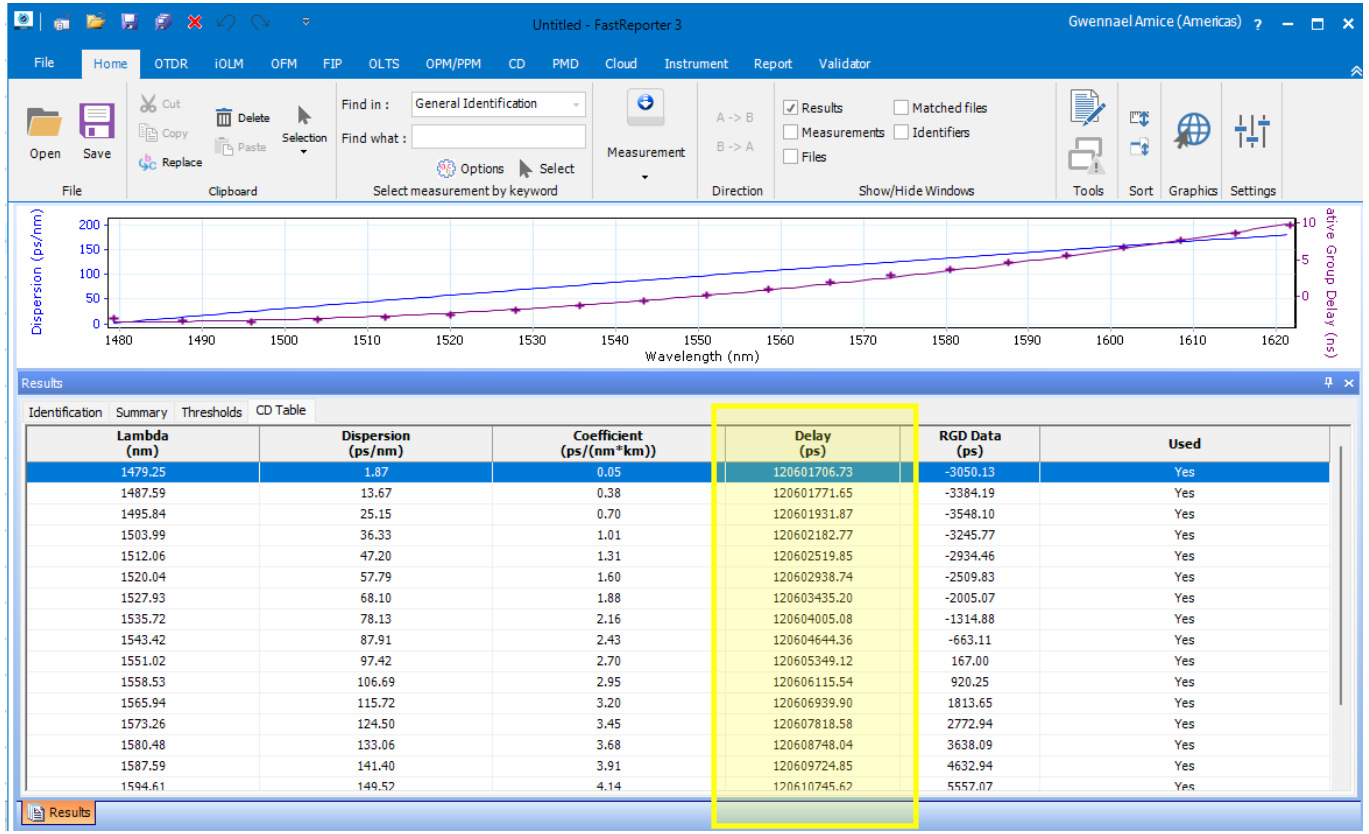
PMD

Results	
PMD value	0.322 ps
PMD coefficient	0.0759 ps/km^1/2
PMD value, 2nd order	0.0470 ps/nm
Measured Fiber Length	18.052 km

Test Parameters	
From	1476 nm
To	1624 nm
Fiber type	Telecom
No. of scans	1

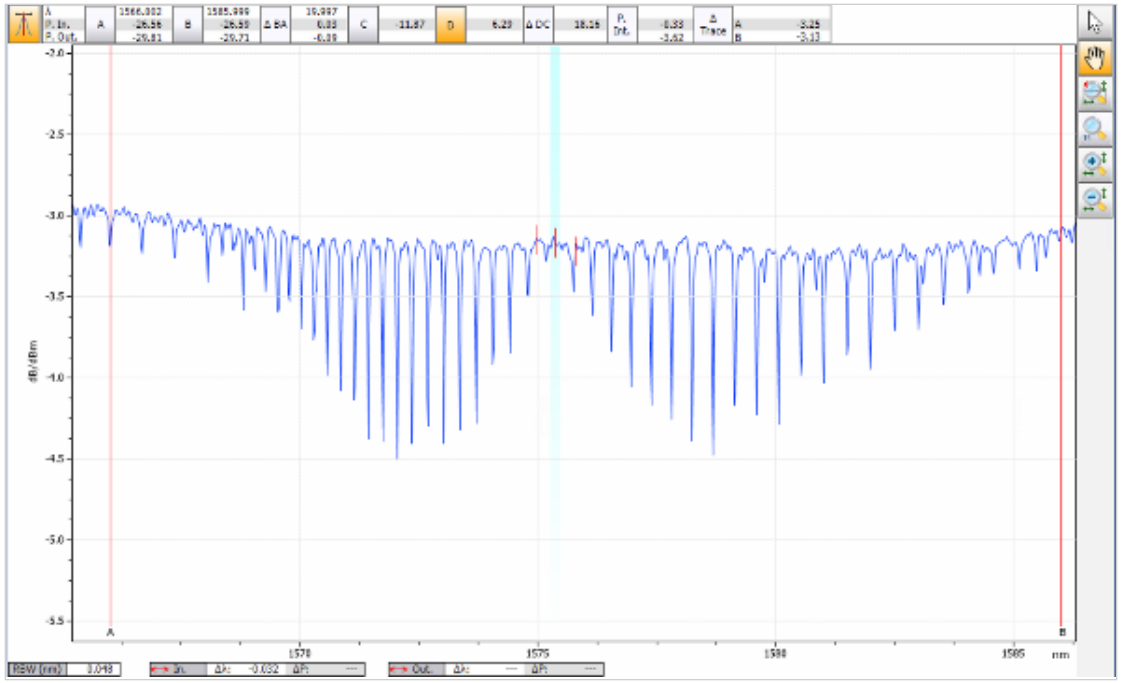
LATENCY: ONE-WAY PROPAGATION TIME THROUGH THE FIBER

- Standard SMF: ~4.9 µs/km
- Hollow core fiber: ~3.3 to 3.5 µs/km
- Directly measured with CD PMD with FTBx-570

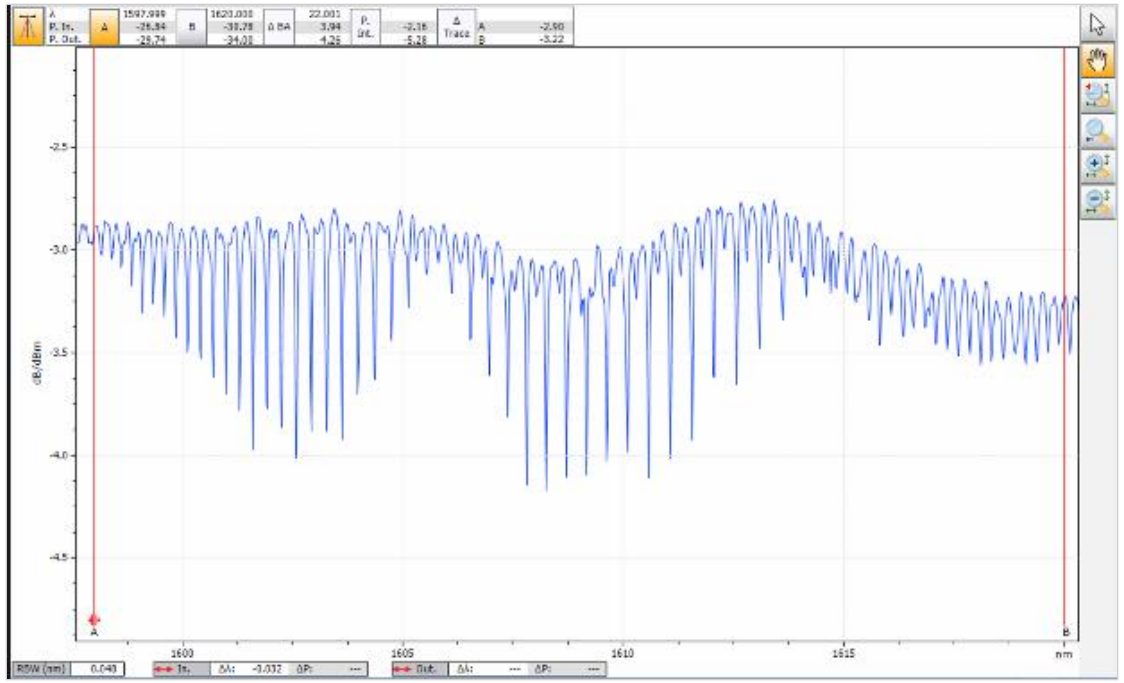


SPECTRAL ATTENUATION: 80 KM

1566-1586 nm



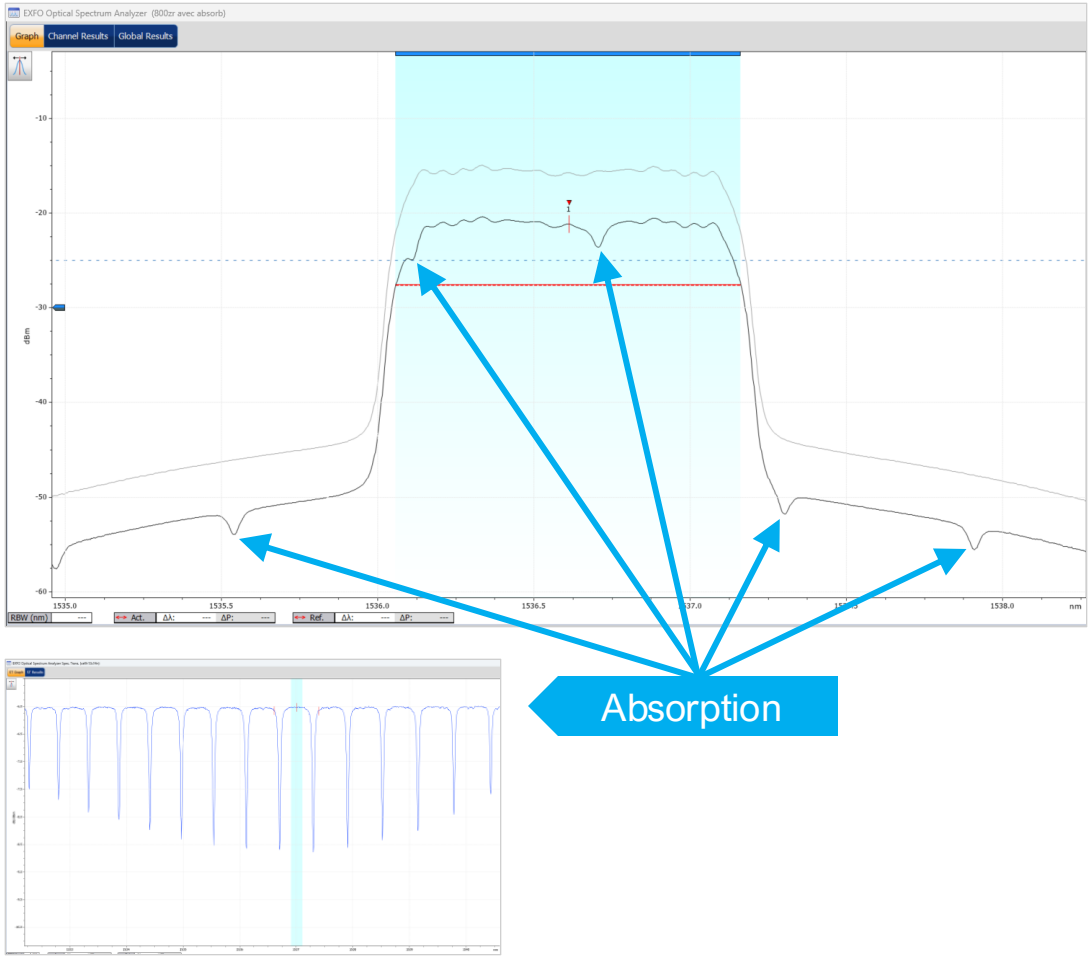
1598-1620 nm



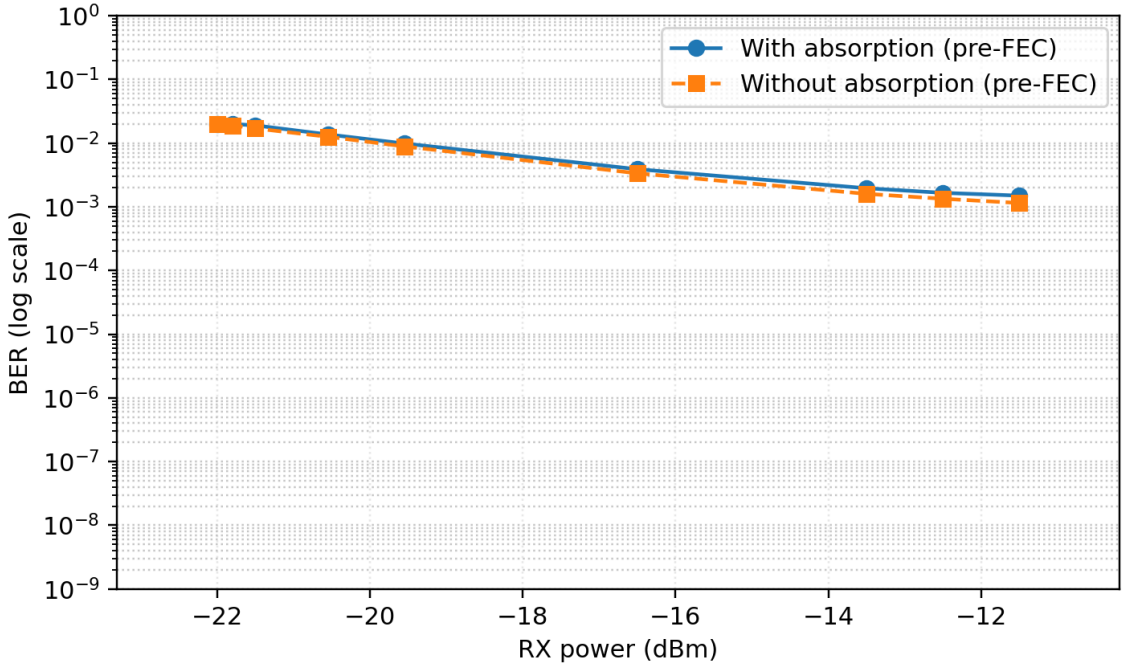
Using BB source and OSA (FTBx-5255)

REAL IMPACT OF ABSORPTION ON 800ZR

SPECTRAL IMPACT W/WO ABSORPTION



SPECTRAL IMPACT W/WO ABSORPTION



Impact pre-FEC is 0.5dB, no impact on POST FEC

Tested with FTBx-88810

CD, PMD, ATTENUATION PROFILE, AND LATENCY FOR HYPERSCALER NETWORKS

CHROMATIC DISPERSION IMPACT

Chromatic Dispersion affects signal reach and stability, increasing DSP complexity and power consumption at high data rates.

POLARIZATION MODE DISPERSION CHALLENGES

PMD causes unpredictable impairments, impacting modulation formats and increasing error rates in mixed or aging fiber routes.

ATTENUATION PROFILE ANALYSIS

Attenuation profile was brough back to life because of HCF deployment and will be implemented in the FTBX-570.

LATENCY MEASUREMENT FOR AI NETWORKS

Latency data enables route optimization and supports synchronized AI workloads requiring deterministic network behavior, measured in the FTBx-570.

COMPLETE HCF FIELD TEST SUITE

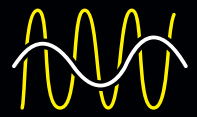
OTDR characterizes the physical link — additional instruments are required to fully validate HCF performance for deployment.

FTBx-945 / MAX-945
OLTS

Optimized for HCF — IOR settable to 1.000 for accurate end-to-end link loss and distance measurement. Supports bidirectional loss with standard workflow.

FTBx-570
CD/PMD Analyzer

Single-ended CD & PMD testing (ITU-T G.650.3, TIA-455-175B). HCF mode selects correct IOR and end-reflectance reference. Also measures absolute propagation delay — directly quantifies the ~30% latency advantage over SMF.



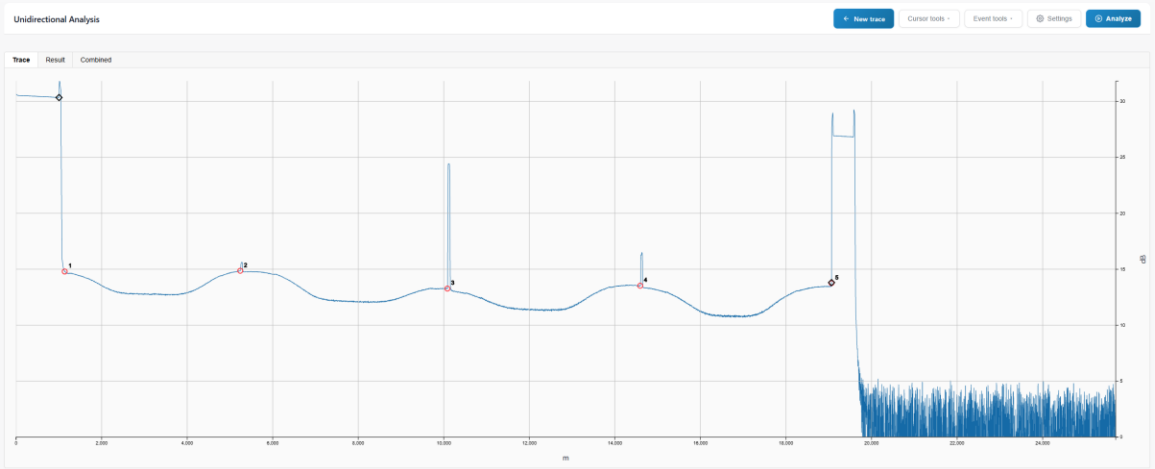
FTBx-5255
OSA

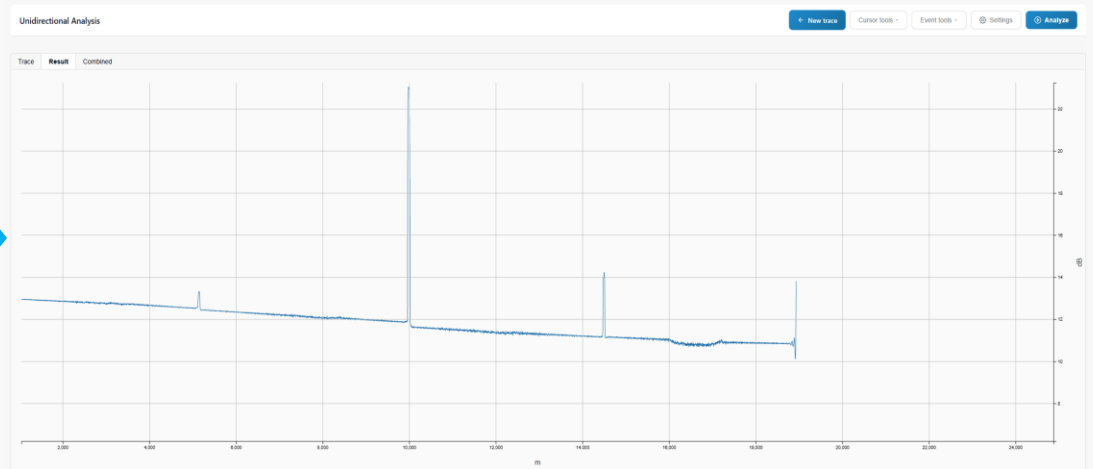
Spectral attenuation profiling using broadband source (FLS-5834). Identifies water-vapor absorption windows (1566–1586 nm, 1598–1620 nm). Essential for quantifying GFE impact on WDM channels.

FTBx-88810
1G–800G Traffic Tester

EtherBERT application enables precise latency measurement of live traffic over HCF. Validates ultra-low delay performance for HFT and hyperscale DCI applications. 800ZR / ZR+ transceiver support.

UNIDIRECTIONAL PATENTED EXFO



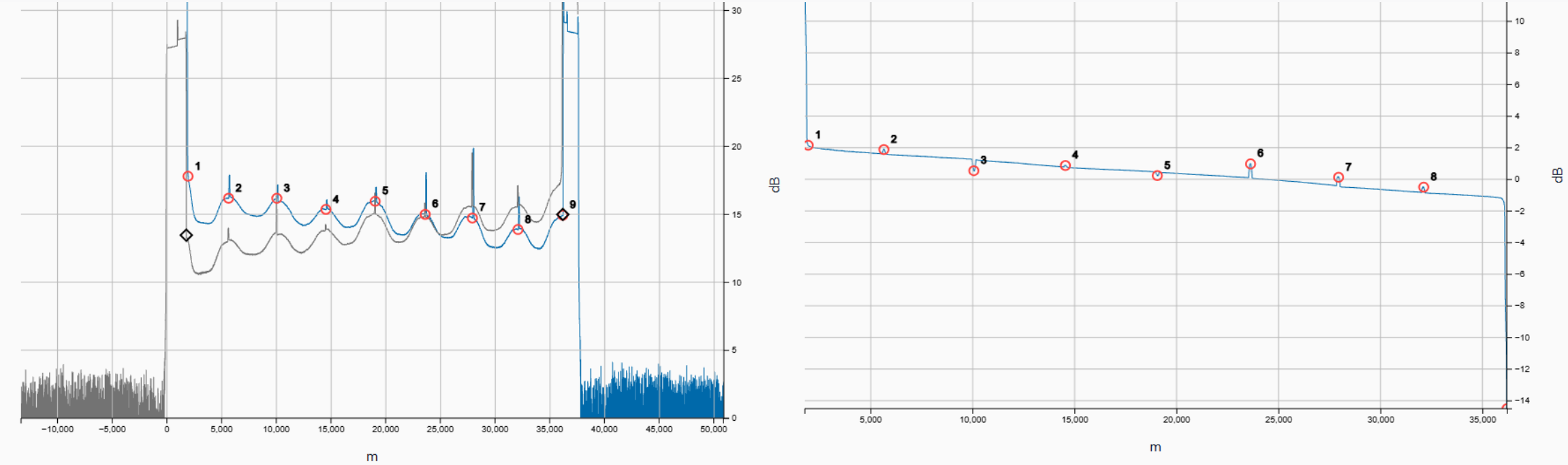


Events | General

Event Table

#	Type	Position (m)	Length (m)	Loss (dB)	Reflectance (dB)	Attenuation (dB/km)	Cumul (dB)
1	SH-splice	1137.03	-	0.00	0.00	-	0.00
-	Hollow core fiber	-	4103.79	-	-	0.04	0.18
2	H-Splice	5240.82	-	0.52	-80.65	-	0.70
-	Hollow core fiber	-	4843.48	-	-	0.04	0.89
3	H-Splice	10084.29	-	0.88	-60.53	-	1.77
-	Hollow core fiber	-	4507.26	-	-	0.02	1.86
4	H-Splice	14591.55	-	0.30	-75.36	-	2.16
-	Hollow core fiber	-	4471.77	-	-	0.07	2.46
5	HS-splice	19063.32	-	0.00	0.00	-	2.46

TYPICAL TRACE (BIDIR ANALYSIS)



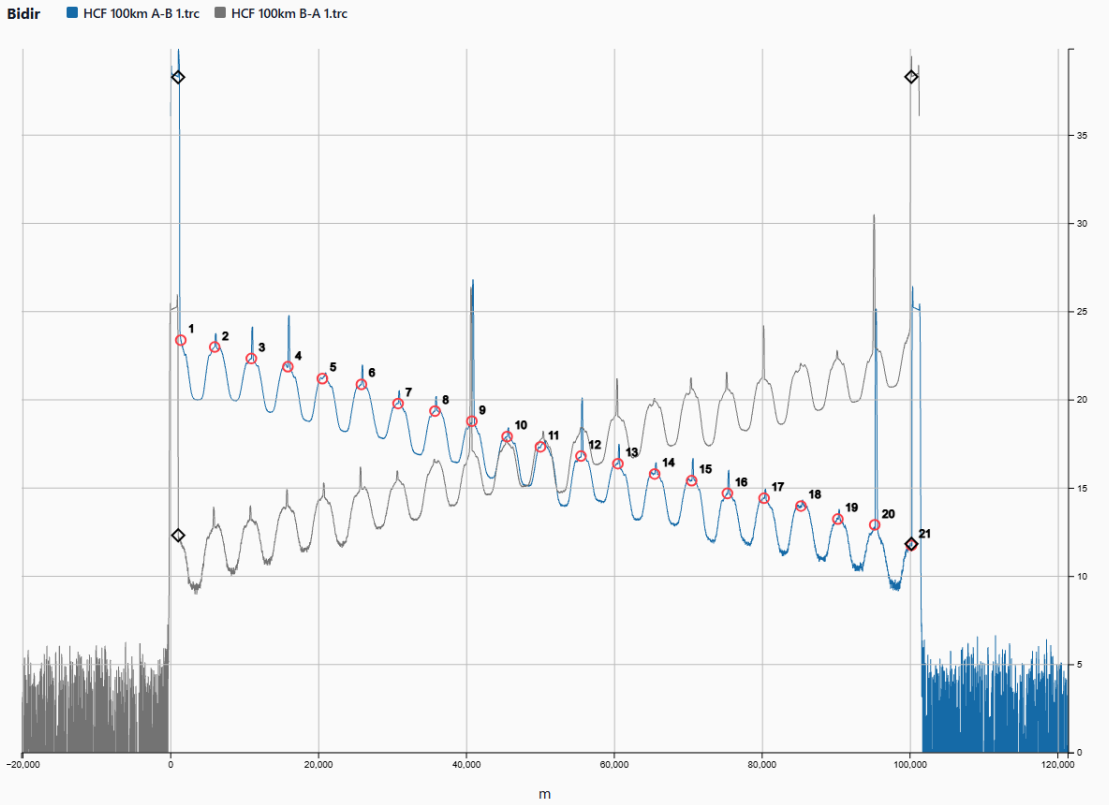
Events | General

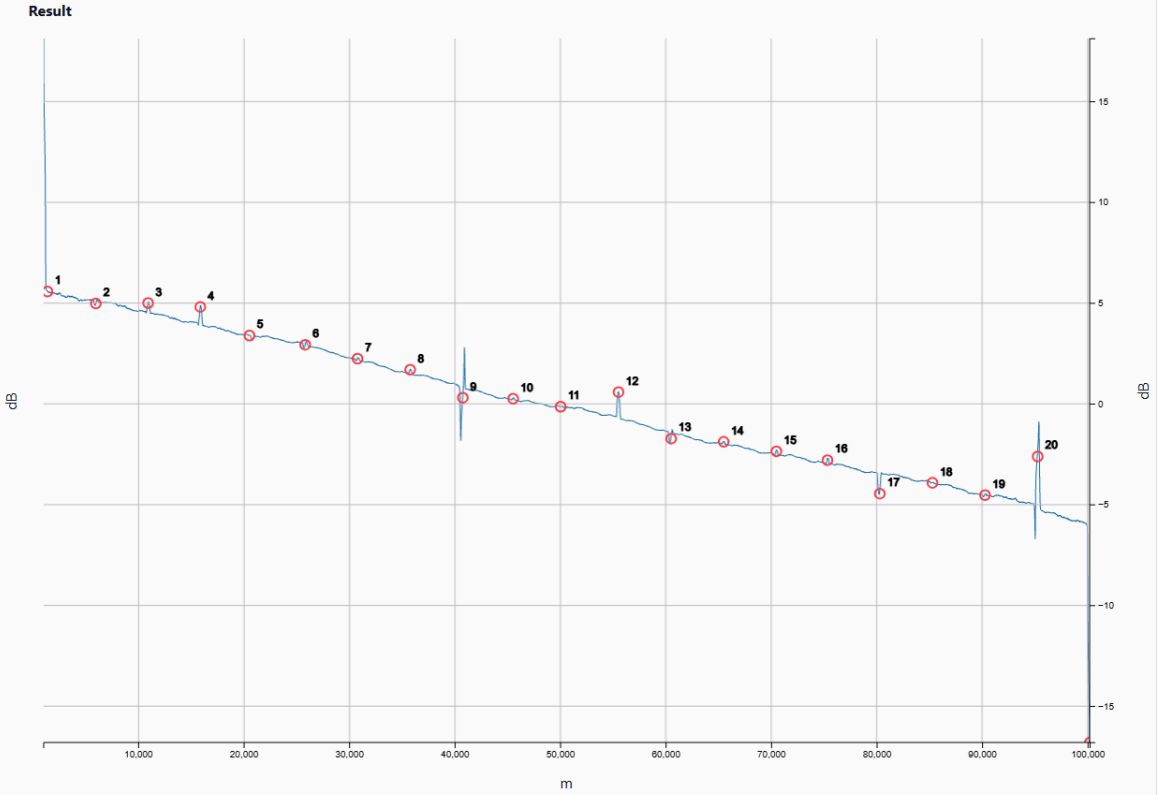
Bidir Event Table

#	Type	Position (m)	Length (m)	Loss (dB)	Reflectance (dB)	Attenuation (dB/km)	Cumul (dB)
1	SH-splice	1930.42	-	0.55	0.00	-	0.55
-	Hollow core fiber	-	3711.71	-	-	0.13	1.05
2	H-Splice	5642.13	-	0.01	-78.70	-	1.06
-	Hollow core fiber	-	4408.47	-	-	0.10	1.51
3	H-Splice	10050.61	-	0.03	-77.51	-	1.54

MEASURE LINKS >100KM TRACE

Bidir | Result | **Combined**



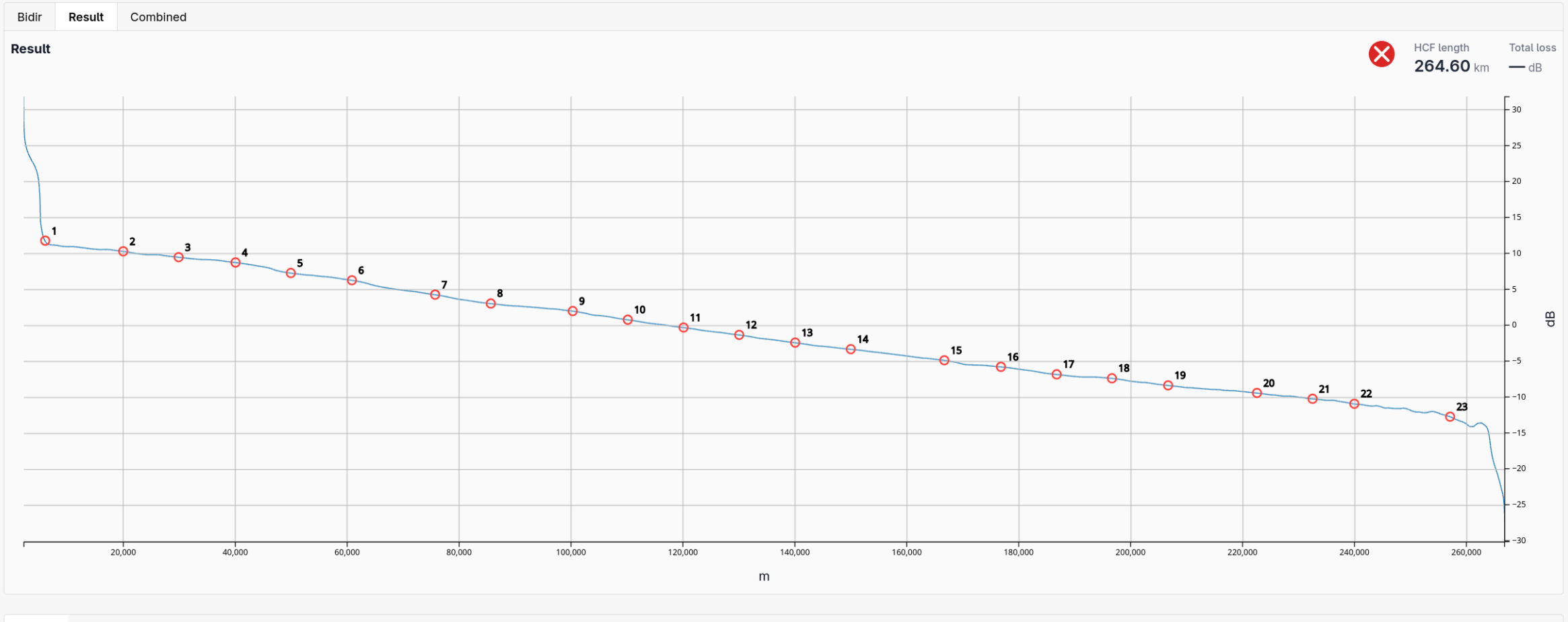


Events | General

Bidir Event Table

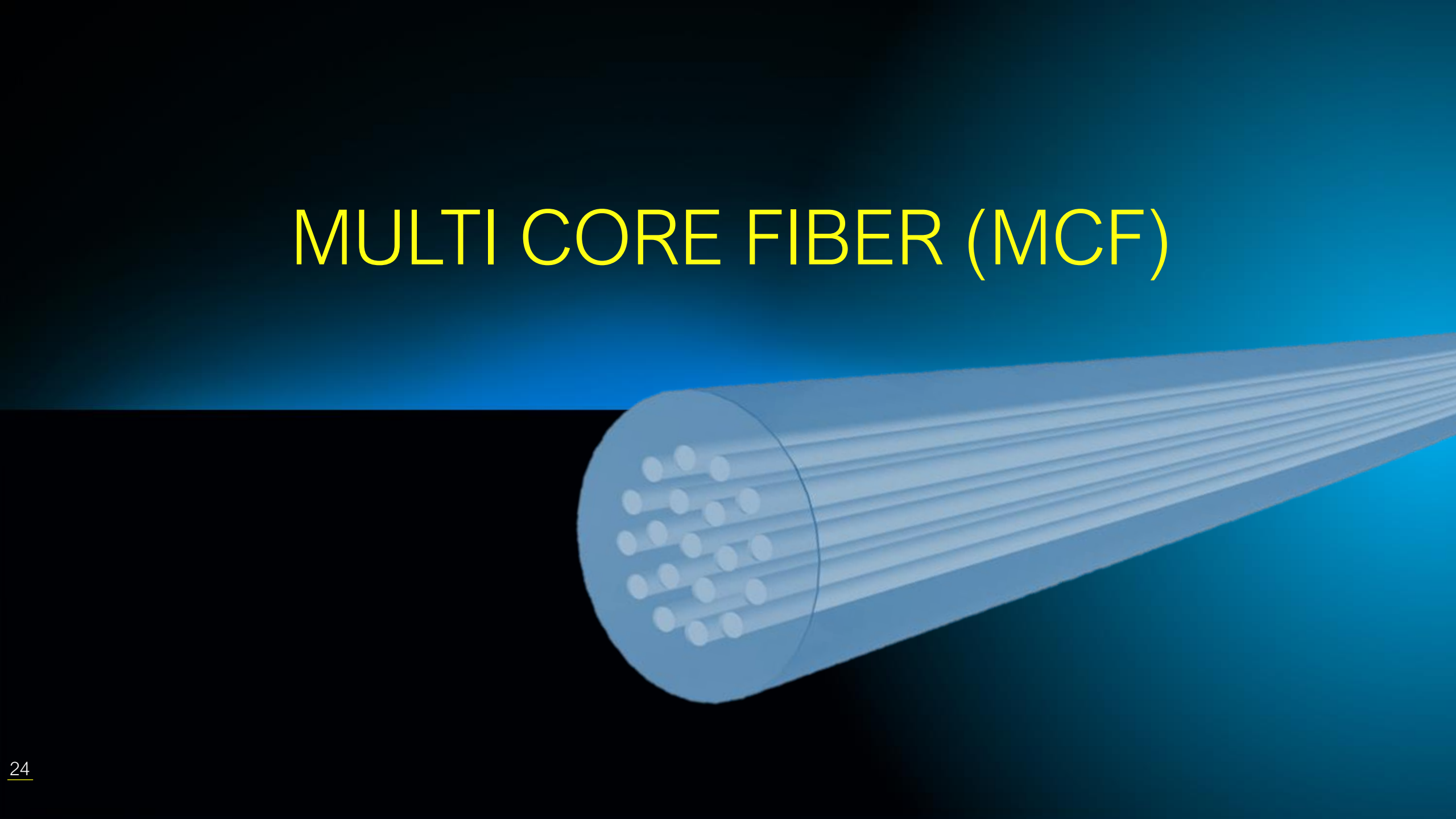
#	Type	Position (m)	Length (m)	Loss (dB)	Reflectance (dB)	Attenuation (dB/km)	Cumul (dB)
1	SH-splice	1357.96	-	1.16	0.00	-	1.16
-	Hollow core fiber	-	4587.70	-	-	0.17	1.92
2	H-Splice	5945.66	-	0.11	-73.36	-	2.03
-	Hollow core fiber	-	4953.82	-	-	0.21	3.07
3	H-Splice	10899.48	-	0.08	-72.83	-	3.15

MEASURING ULTRA LONG LINKS 264 KM

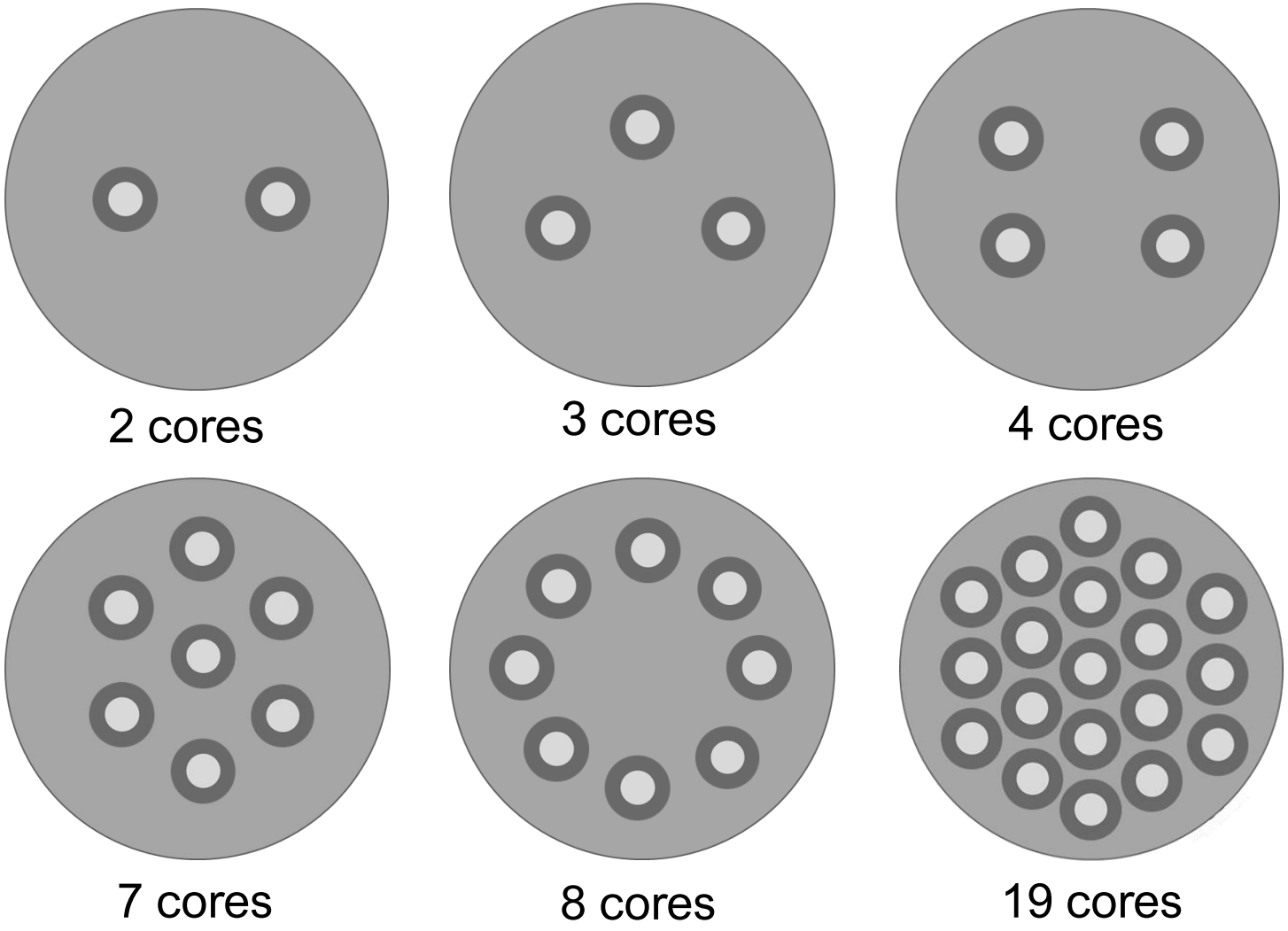


Courtesy of Nokia Bell Labs

MULTI CORE FIBER (MCF)



EXAMPLES OF MULTICORE FIBERS



APPLICATIONS FOR MULTICORE FIBERS

DATA CENTER INTERCONNECTS (DCI):

REMOVES FIBER CABLING CONSTRAINTS AND ENABLES HIGH-CAPACITY DATA TRANSFERS BETWEEN FACILITIES.

HIGH-PERFORMANCE COMPUTING (HPC):

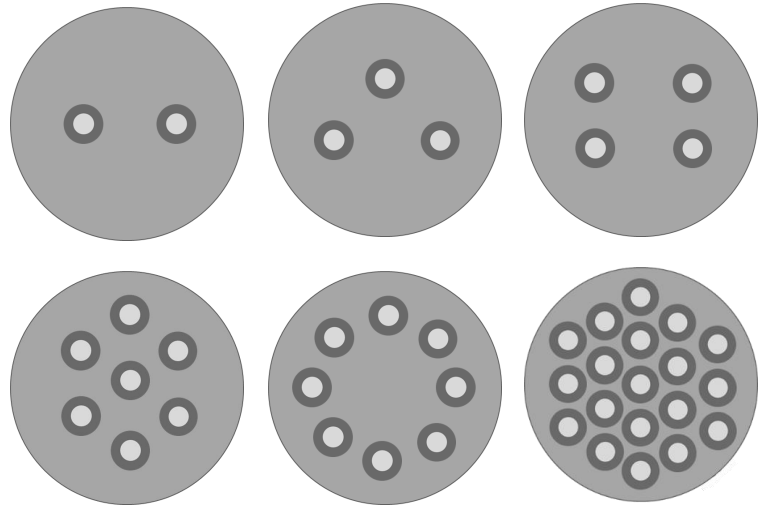
DELIVERS ULTRA-LOW LATENCY AND SCALABLE HIGH-BANDWIDTH OPTICAL INTERCONNECTS OPTIMIZED FOR EXASCALE COMPUTING WORKLOADS.

UNDERSEA CABLES:

ENABLES SIGNIFICANT CAPACITY UPGRADES WITHIN EXISTING TRANSOCEANIC CABLE DESIGNS.

AEROSPACE & AVIATION:

SAVES WEIGHT AND SPACE IN AIRCRAFT AND SATELLITES, WHERE EVERY GRAM COUNTS.



ADVANTAGES OF MULTICORE FIBERS

MASSIVE CAPACITY BOOST:

MULTIPLE CORES (4–32) MULTIPLY THROUGHPUT, ADDRESSING FIBER EXHAUSTION AND REAL ESTATE CONSTRAINTS.

SUPERIOR SPATIAL EFFICIENCY:

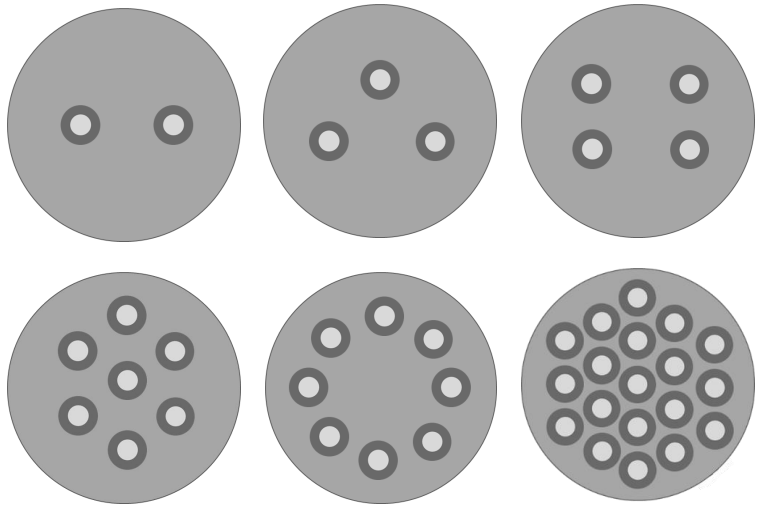
ONE MCF CABLE REPLACES BUNDLES OF SINGLE-CORE FIBERS, REDUCING SPACE AND WEIGHT.

REDUCED POWER CONSUMPTION:

MORE DATA PER FIBER = GREENER, ENERGY-EFFICIENT DCI SOLUTIONS.

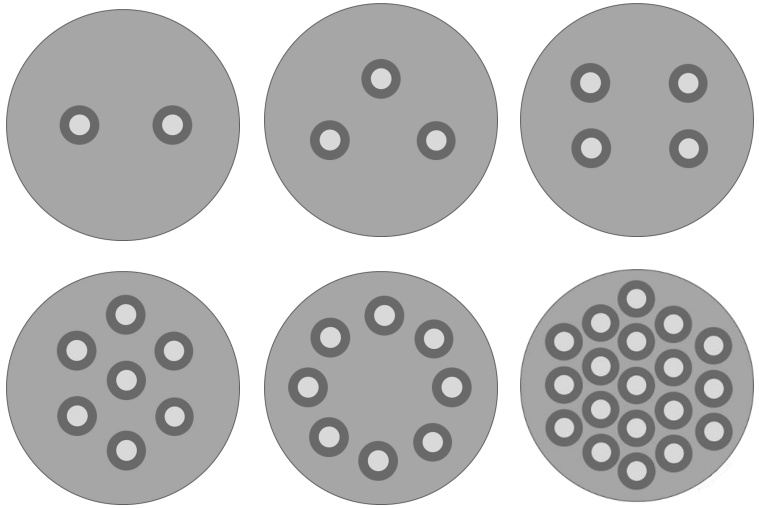
FUTURE-PROOFING NETWORKS:

PREPARES INFRASTRUCTURE FOR NEXT-GEN HIGH-SPEED OPTICAL COMMUNICATION.



EXTREME DENSITY POSSIBILITIES

USING EXISTING CONNECTOR TECHNOLOGIES WITH MULTICORE FIBER WILL TREMENDOUSLY INCREASE CAPACITY WITHIN THE SAME REAL ESTATE.



	Standard fiber	MCF 7	MCF 19
Duplex 	2 channels	14 channels	36 channels
MPO/ MMC16 	16 channels	112 channels	304 channels
MPO/ MMC32 	32 channels	112 channels	608 channels

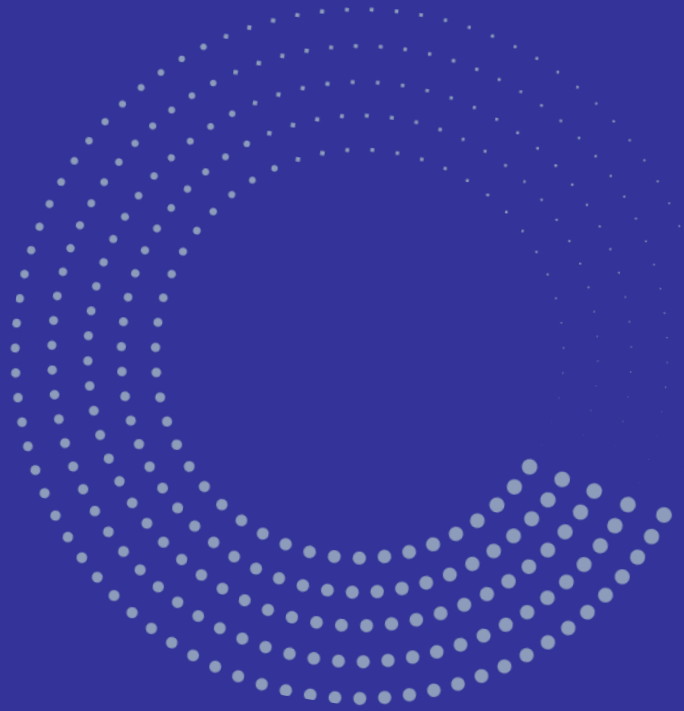
sales@trs-rentelco.com
800.874.7123

The TRS & EXFO Partnership

EXFO Rental Partner **with an expansive inventory and a full range of acquisition options:**

- Short and Long-Term, Full-Service Rentals (overnight exchanges available)
  - Minimize user downtime
- Operating Leases
- Sales of NEW equipment through distribution sales
- 0% Financing for New and Certified Pre-Owned Equipment

Questions?



EXFO

TRS RenTelco℠

TRS RenTelco℠

Thank you.

800-874-7123