



PBN – nejen TV distribuce v sítích FTTx

10. března 2011, BRNO

Pavel Dvořák, Jiří Göllner – PROFiber Networking CZ, s.r.o.

Zdroj: PBN / Max Newman

Bridging the Light™

About PBN



Head Office	Melbourne, Australia.
Employees	Over 150 employees globally - made up of Research, Development, Engineering, Manufacturing, Sales, Marketing, Finance and Administration.
Website	www.pbnglobal.com



• PBN (Americas)
Sales Office,
Florida



• PBN (Europe)
Representative
Office, Almere
The Netherlands



• PBN (China)
R&D Facility,
Beijing

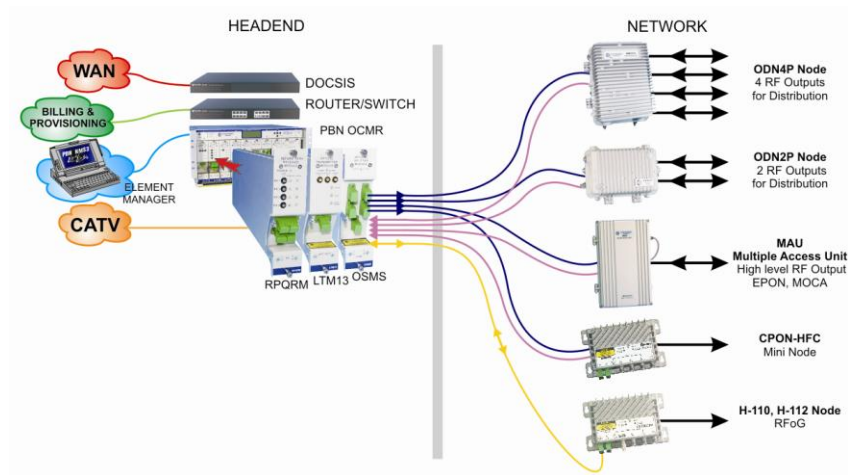


• PBN (China)
Representative
Office, Beijing

Distinctive Core Competencies



HFC Product Offering



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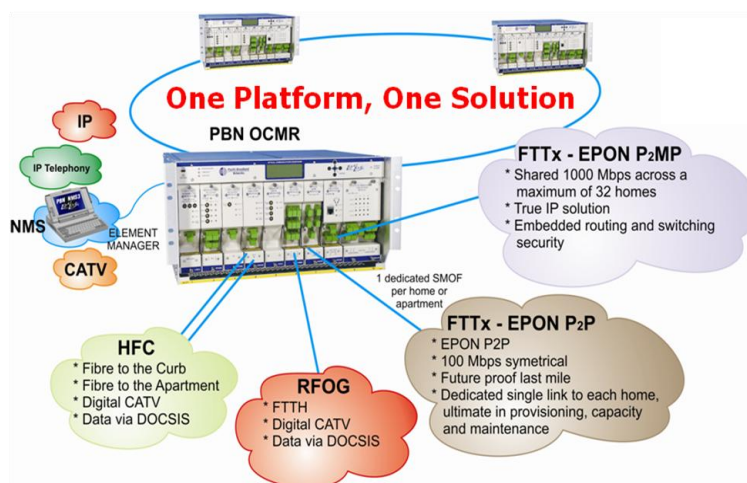
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Distinctive Core Competencies



HFC - RFOG - FTTx



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Optical Communication Mainframe



Chassis and Power Supply



OCMR - OCMR - SNMP - OCMPs

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OCMR Modules



Transmitters, Receivers and Media Converters



LTM13/LTM15 – FPRM – RPQRM – LTM802

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OCMR Modules



Optical / RF splitters, multiplexers, protection switches, amplifiers



OSMS – OWDM – OPSC – OPSAB – RFABM – EDFAM – AGC3

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Light Link® Series 2



High power 1550nm applications
Stand-alone transmitters, receivers, media converters, protection switches
Broadband optical nodes and customer premises equipment

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March 16, 2011

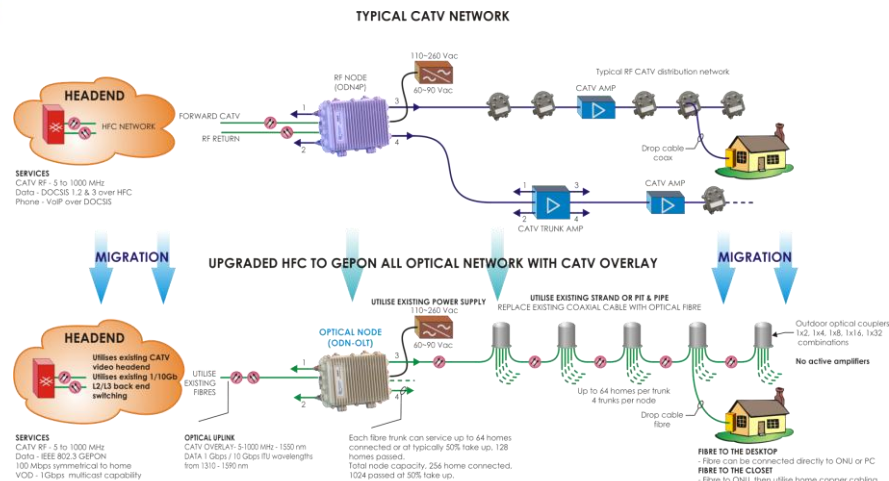
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Distinctive Core Competencies



Migration to all Fibre Networks



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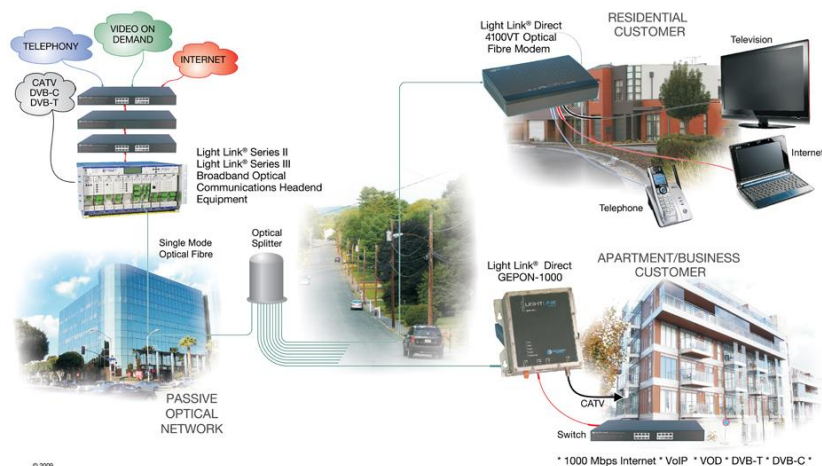
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Next Generation FTTH Networks



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Software Products

NMS3-ENTERPRISE-II

Enterprise Manager

Remotely manages all headend devices, including all active elements throughout the network.

NMS3-EPSM

EPON Provisioning Service Management Software

Facilitates provisioning of large and complex FTTx networks.

NMS3-NETCRAFT

Field Configuration Tool

Provides management tools to configure all Light Link® products.



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AOCM6000 – P2P



High Resilient Advanced Optical Communication Mainframe

2.4 Tb/s Backplane Capacity ensures Congestion-Free switching for all ports
L2/L3/L4 Hi-Performance Wire-Speed Aggregation Switch/Router
Supports up to 336-ports at 1Gb/s and 8x 10Gb/s in one chassis



Redundancy:

- Redundant Back-Up; Supports STP/RSTP/VRP
- 1+1 Power Redundancy
- All elements Hot Swappable

Sophisticated Switch Core Supporting:

- Identification Process Application Flow above Layer-4
- Data Package Filtration Function on all ports
- Differentiation, Management and Application Flow Control
- IPv6

Tight Security via:

- Standard, Extended and Time-Based ECL
- DAP (DOS-Defence) to avoid attacking from viruses like ICMP, SYN, UDP
- Support 802.1x based on user
- Mac-Address restriction to limit number of hosts

Powerful QoS Support:

- 802.1p, WDR, WERM and Diffserv.
- Priority-Based scheduling algorithms serve users with discrimination according to their priority level
- L2/L3/L4 Flow Classification

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PBN products



Proč PBN?

- Podpora mezinárodních standardů.
- Hardware & software migrace z HFC na PON (Lightlink Series 3 Platform).
- HFC, RFoG, GEAPON P2MP a P2P Active Ethernet řešení v jedné platformě.
- Dodavatel integrovaného RFoG/EPON řešení.



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RFoG – FTTx

10. března 2011, BRNO

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RF Over Glass



Co je RFOG?

- Nahrazení koaxiálního kabelu optickým vláknem v „last mile“ (FTTC/B → FTTH).
- Síť připravená pro nasazení PON technologie.
- Využití stávajících HFC komponent; struktura pasivní optické sítě odpovídá EPON / GPON / WDM PON standardům pro 'last mile'.
- RFOG podporuje všechny stávající koncová zařízení pro CATV, včetně STB pro VoD, DOCSIS modemů, atd.
- RFOG technologie umožňuje operátorům maximalizovat návratnost jejich investic (RF distribuce, DOCSIS a VoD) a zároveň umožňuje flexibilně zavést EPON / GPON / WDM PON technologie na té samé optické infrastruktuře

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RF Over Glass Products



(RFOG) applied in FTTH systems

Headend Equipment

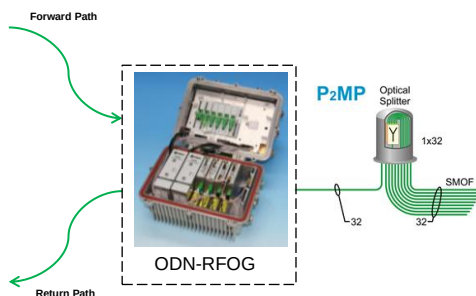


LTM15/EDFAM



RPQRM

Outside Plant



Customer Premises



DPON

MAU

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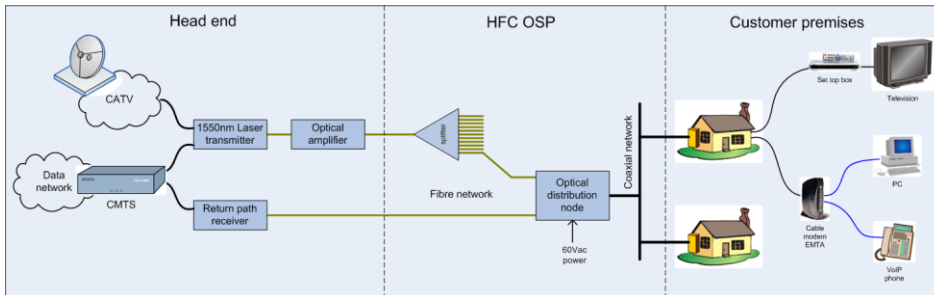
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RFoG Introduction

Typical HFC network



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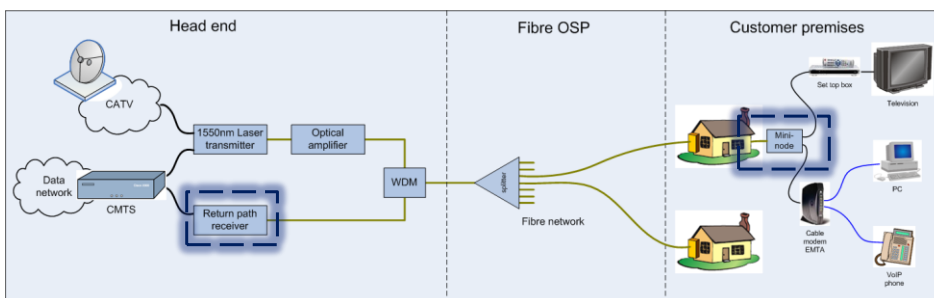
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RFoG Introduction

Typical RFoG network



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RPQRM Quad Return Receivers



“Standard “ RPQRM-[Y]-SMS = -10 to +3 dBm input

“RFOG” RPQRM-[Y]-RFOG = -28 to -12 dBm input

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RF Over Glass Products



DPON-HFC Optical Node Unit for HFC RFoG applications



- Designed to be implemented in a 1x32 FTTx environment
- Suitable for PAL, NTSC, DVB-C, DVB-T and more
- Can be optioned to either receive 1550nm forward path signal or pass it on to the ONT (EPON-ONU)
- Transmits return path on 1310nm or 1610nm (or 1590nm) at 0dBm
- Active Carrier Suppression (ACS) for burst mode operation. Allows up to 32 units to transmit on the same combined fibre network to one receiver
- DOCSIS 1.1, 2, 3 standards compatible
- Compact, sturdy enclosure can easily be mounted in a wiring closet

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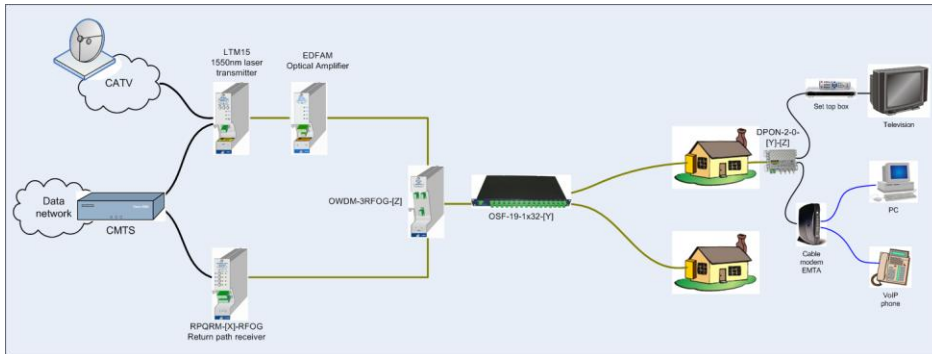
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RF Over Glass Products



PBN products associated with RFoG



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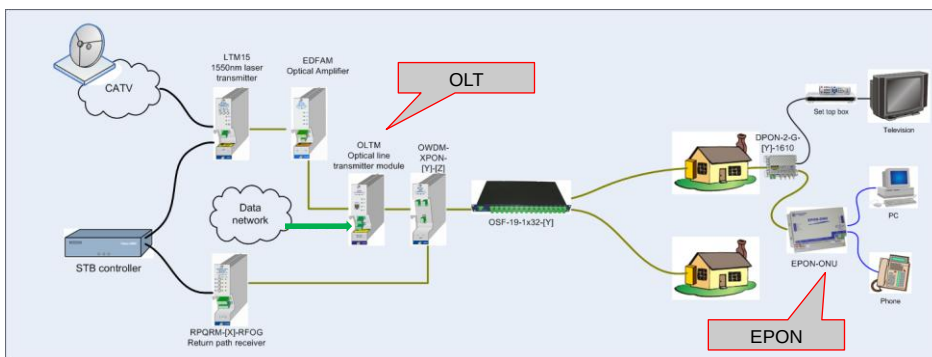
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PBN Hybrid xPON RFoG Products



PBN products associated with RFoG / EPON



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PBN Hybrid xPON RFoG Products



PBN products associated with RFoG

- PBN has developed its own customer premises mini-node, the DPON product line, for SCTE compliant RFoG applications
- Options for return path RF only units, or full duplex RF all over one fibre core, with optional digital PON by-pass.
- The PON by-pass option allows easy integration with the EPON/GPON solutions and products such as the 4100 (pictured bottom right)
- Traditional HFC product lines with added features complete the RFoG solution.



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PBN Hybrid xPON RFoG Products



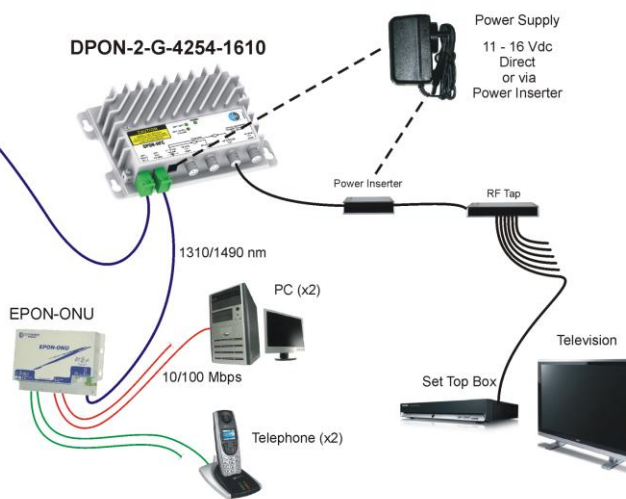
PASSIVE OPTICAL NETWORK RFoG + PON Overlay

DOWNSTREAM
DATA @ 1490nm
CATV @ 1550nm

UPSTREAM
DATA @ 1310nm
RETURN PATH RF @ 1610nm

CUSTOMER PREMISES

DPON-2-G-4254-1610



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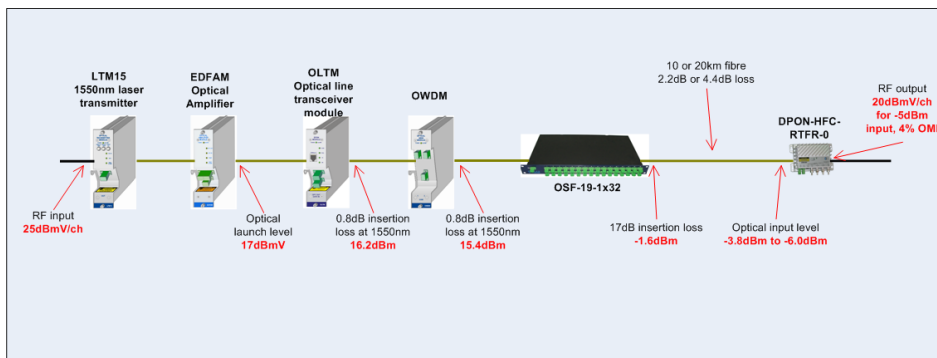
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RFoG and PBN products

Forward Path system levels



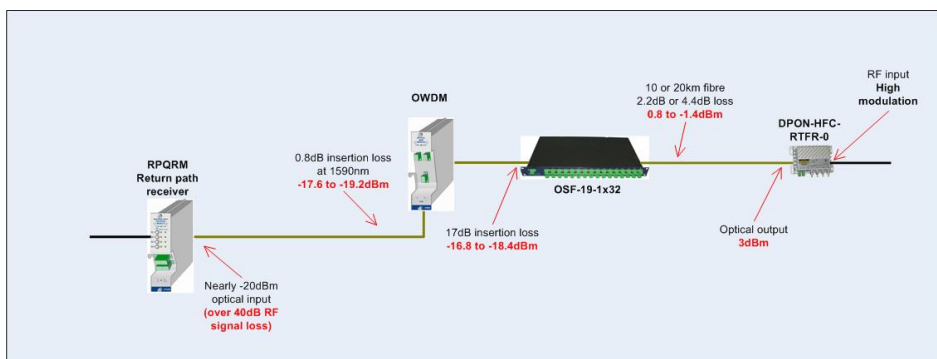
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RFoG and PBN products

Return Path system levels



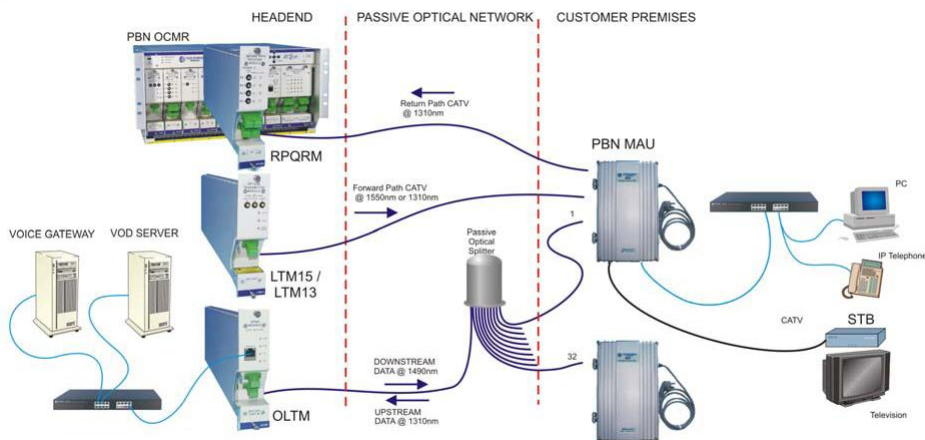
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PBN Products



MAU

Multiple Access Unit for HFC, RFoG, FTTH



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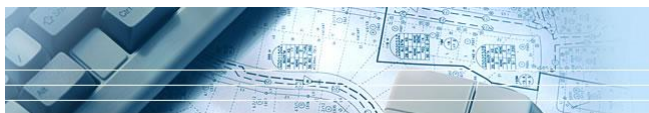
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Co je nutné mít na paměti při systémovém návrhu?

- RFoG má stejné požadavky na design jako EPON / GPON / WDM PON sítě
- Design dopředného směru je prakticky stejný jako u HFC
- Zpětný směr vyžaduje:
 - Dostatečnou úroveň na přijímači zpětného směru, WDM vložný útlum, útlum 1:32 optického splitteru a optického vlákna
 - Každý decibel optické úrovně se rovná 2 dB RF úrovně.
 - Dostatečná optická úroveň na výstupu pro kompenzaci ztrát na optické síti (útlum trasy)
 - Maximálně citlivý přijímač zpětného směru, který bude schopen zpracovat nízkou úroveň signálu ve zpětném směru z optické sítě (zpětný útlum trasy)



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RF Over Glass Products



ODN-RFoG

Optical Distribution Node for RFoG Networks



- For extending the distance of your RFoG network or for combining up to 4 RFoG networks on the same upstream fibre to the headend
- Uses a 4-port EDFA for the forward path
- Four individual receivers and upstream transmitter for the return path
- Return path can be segmented for increased network capacity
- Feeder link distance of 20 km or more between the headend and the ODN-RFoG.

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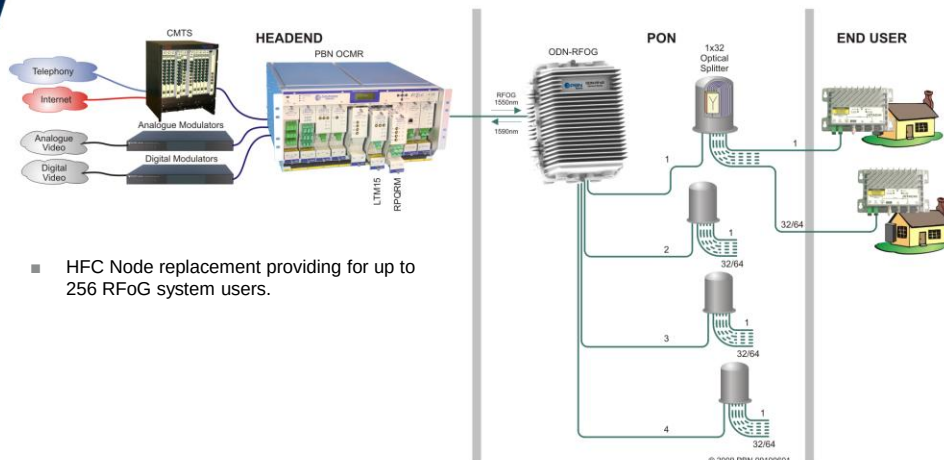
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ODN - RF Over Glass Products



ODN-RFoG Application Diagram



- HFC Node replacement providing for up to 256 RFoG system users.

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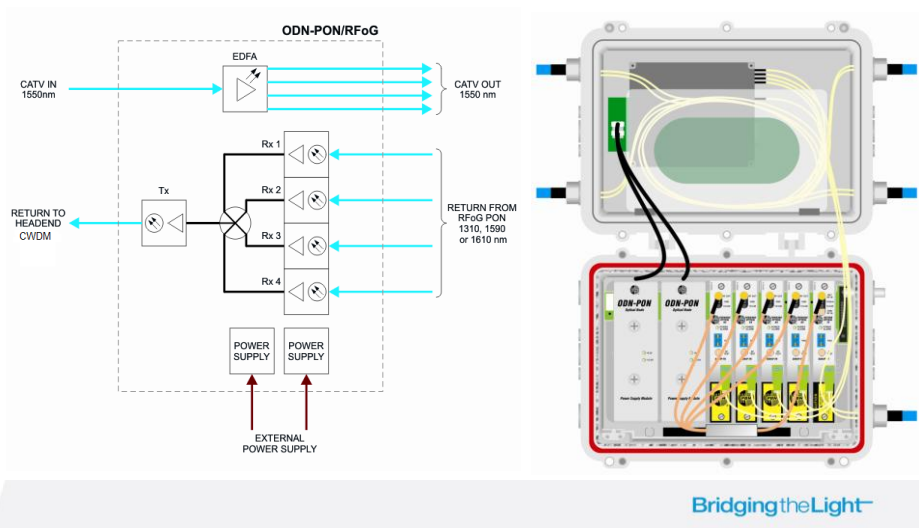
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ODN - RF Over Glass Products



Outdoor node with EDFA, RX, TX to address the issue of fibre conservation from Hub Site to optical split location's

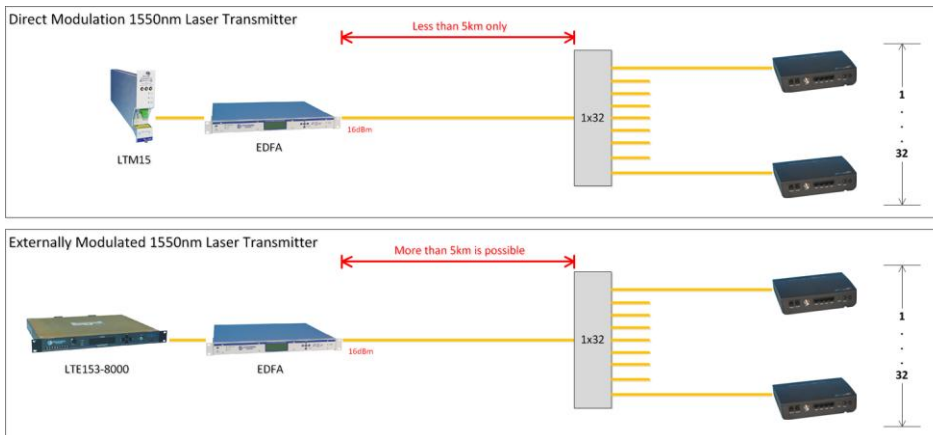


Light Link® Series 2



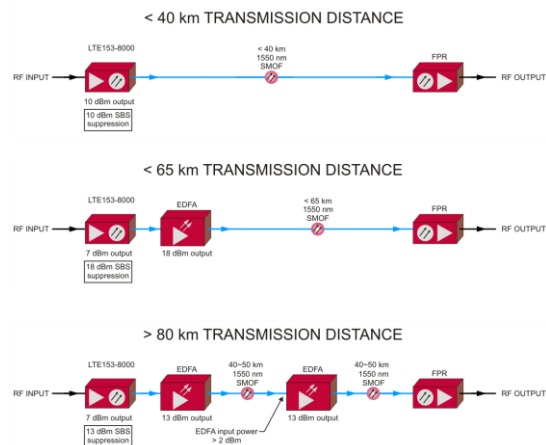
LTE153-8000

Externally modulated 1550nm laser transmitter



LTE153-5000

Externally modulated 1550nm laser transmitter



Děkujeme za pozornost!

Otázky?

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Zdroj: PBN / Max Newman

www.profiber.eu

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