

Ethernet in the First Mile Optical Architecture Options

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EFM FTTH/B Optical Architectures

FTTH/B planned and projected architecture implementations

	Homes/Businesses Served		Current/pending Service Providers
	<u>2003</u>	<u>2010</u>	
Remote Switched Ethernet	>2M	>10M	New service providers (Overbuilders)
PONs (TDMA, WWDM)	>2M	>10M	BellSouth, SBC other RBOCs and overbuilders.

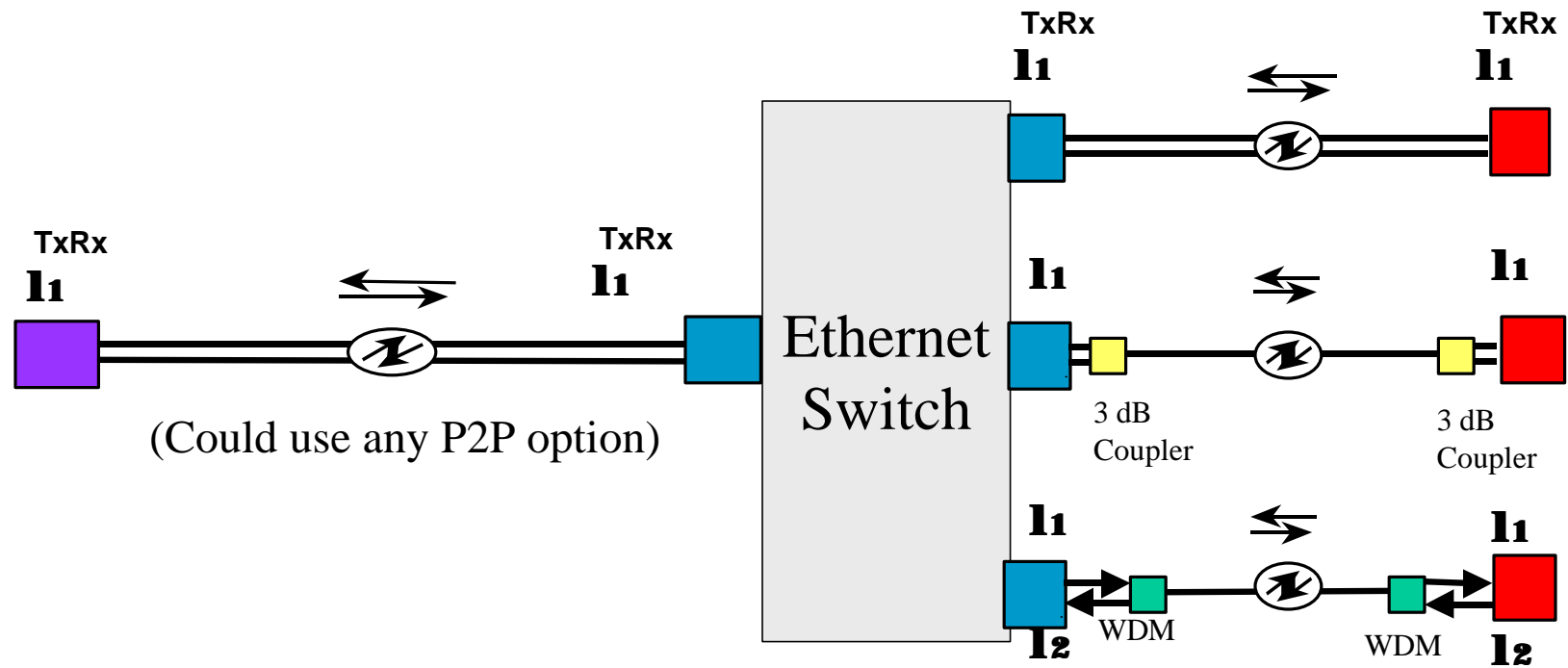
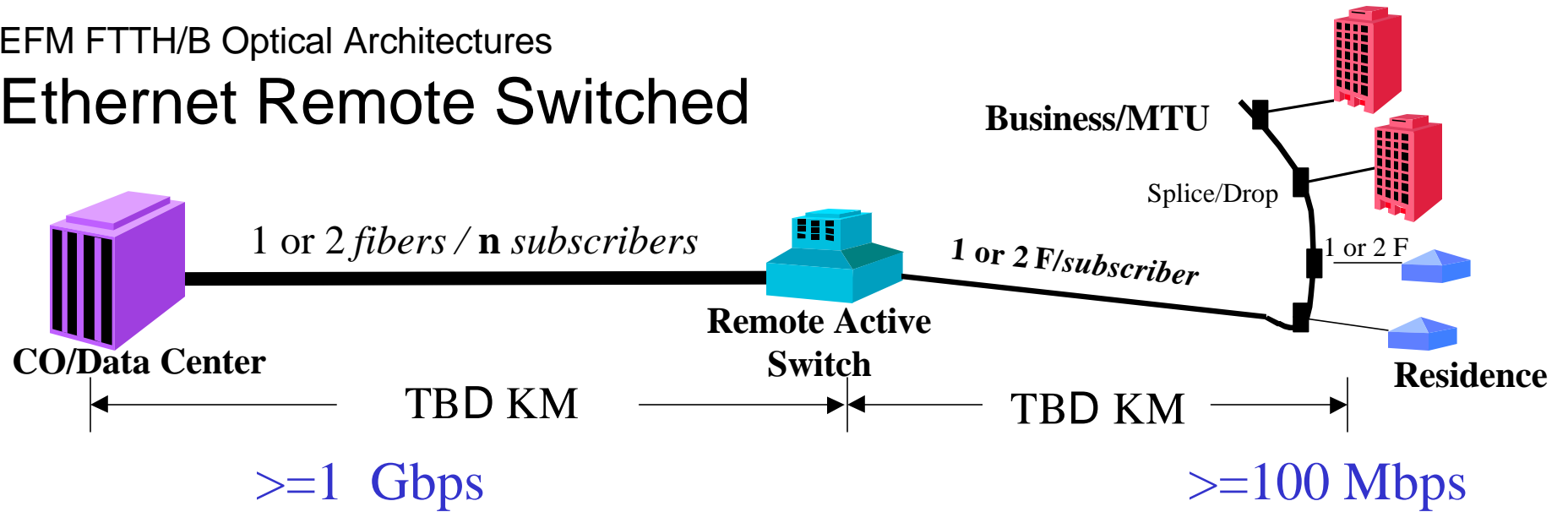
Drivers of FTTH/B

- Poor quality of copper loop/drops
- Copper exhaust due to cross talk
- Need for BW \gg 10 Mbps (Switched Digital Video, Video clips, etc)

Conclusion: Large market for FTTH/B

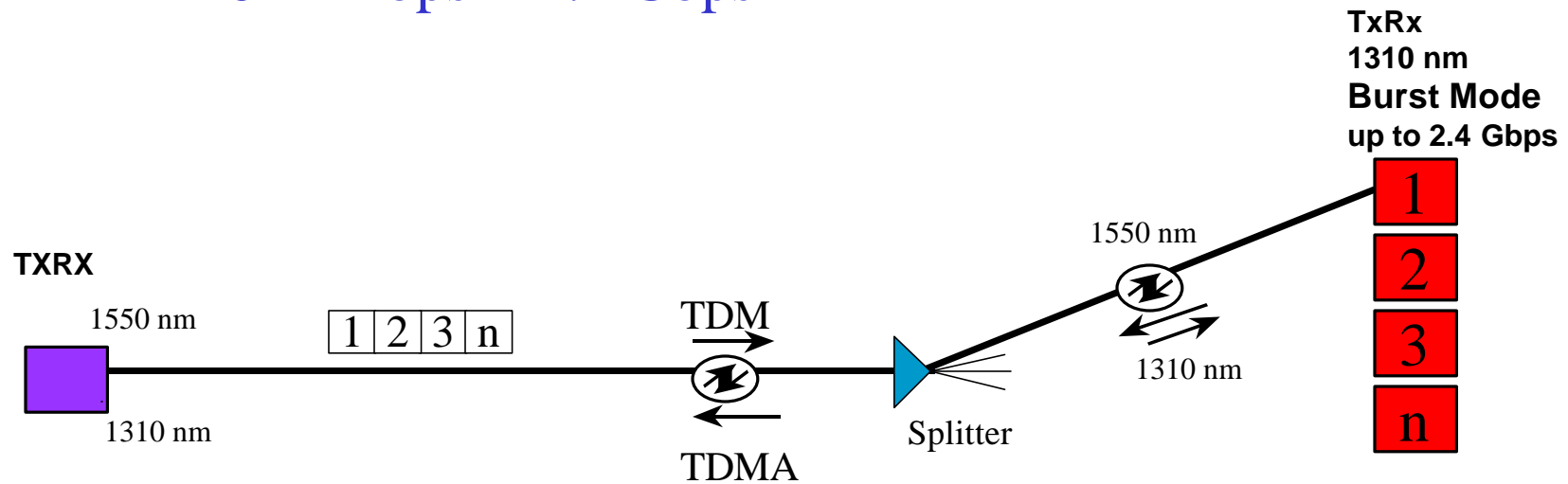
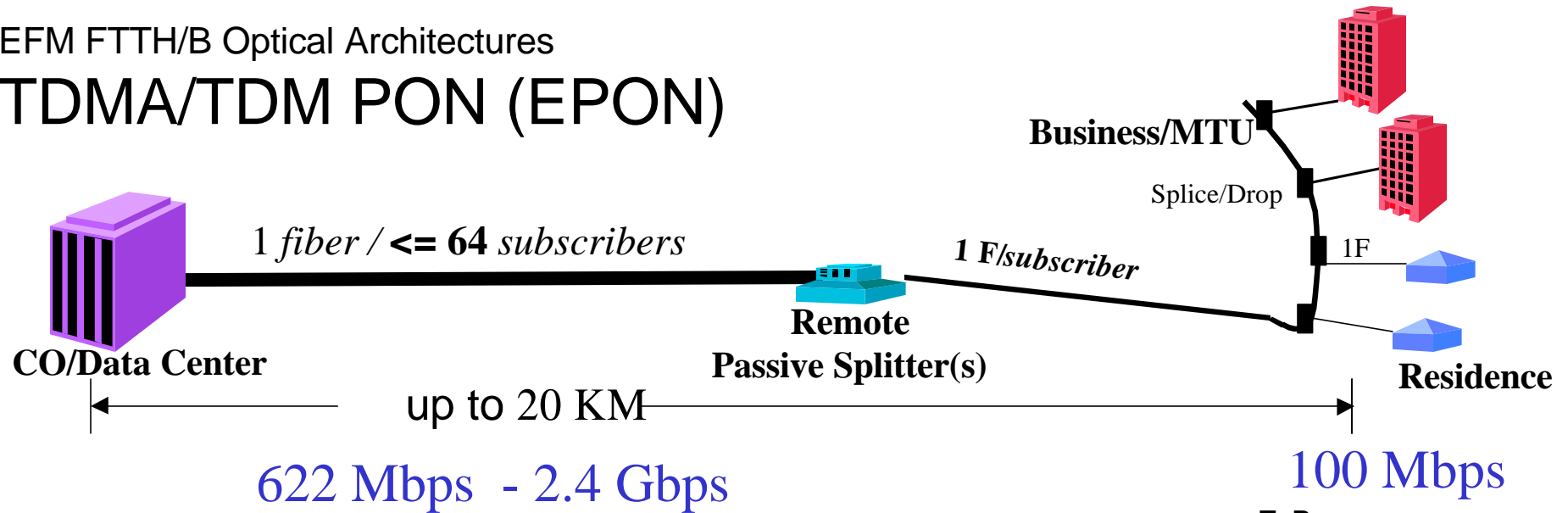
IEEE EFM should support viable FTTH/B Architectures

Ethernet Remote Switched



EFM FTTH/B Optical Architectures

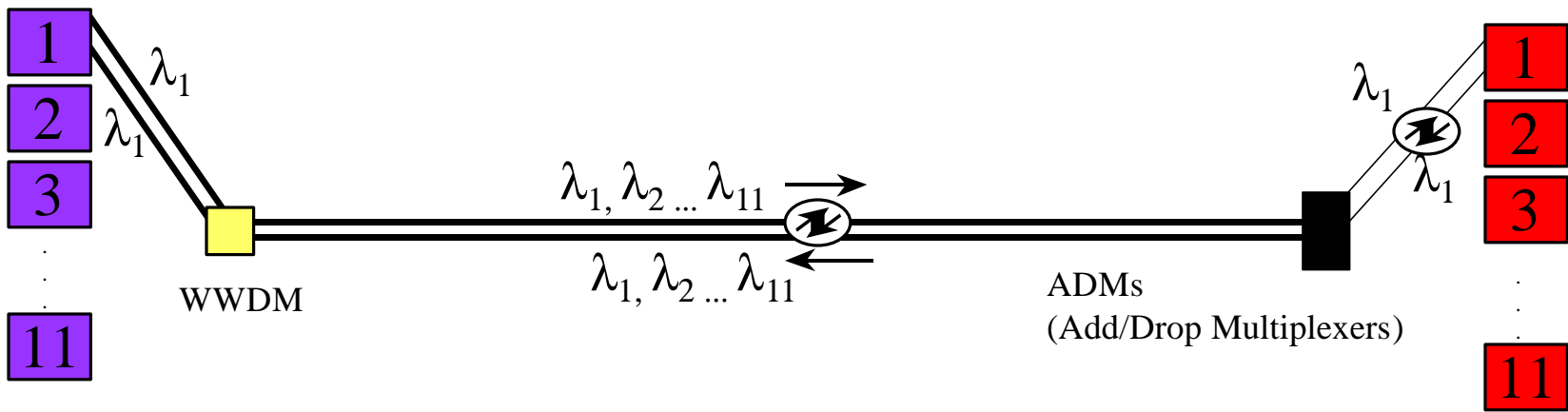
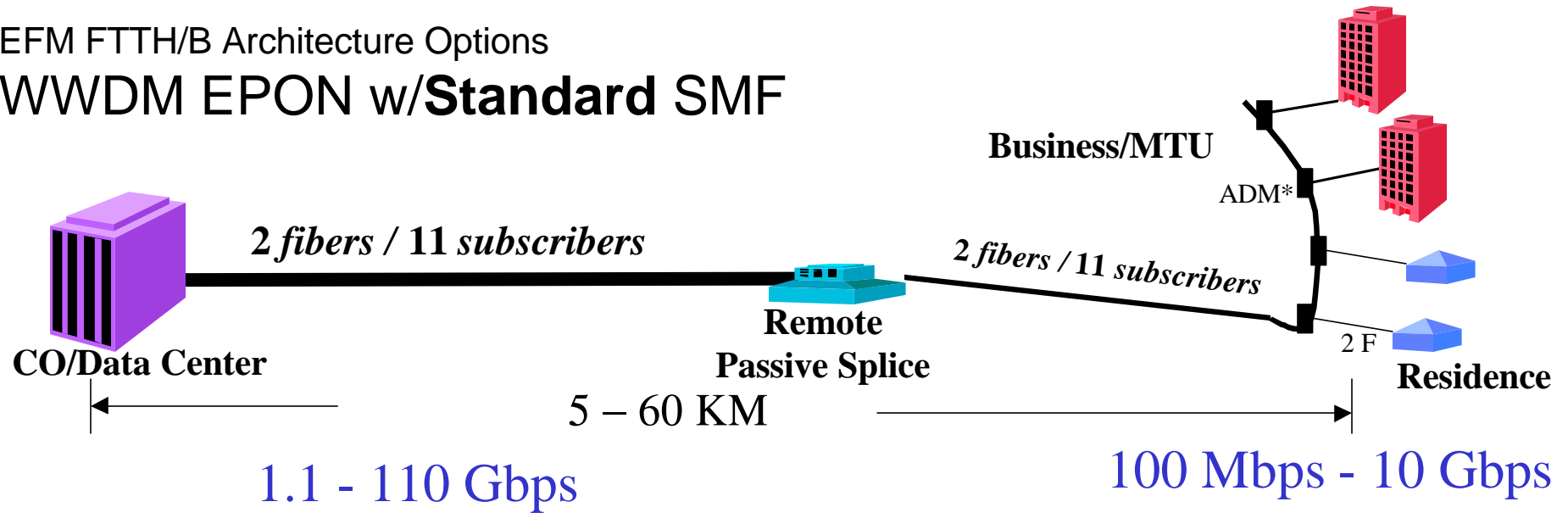
TDMA/TDM PON (EPON)



- Single Fiber
- Passive, flexible OSP
- Physical/Optical Layer re-use from ITU G.983.1 (FSAN ATM-PON)

EFM FTTH/B Architecture Options

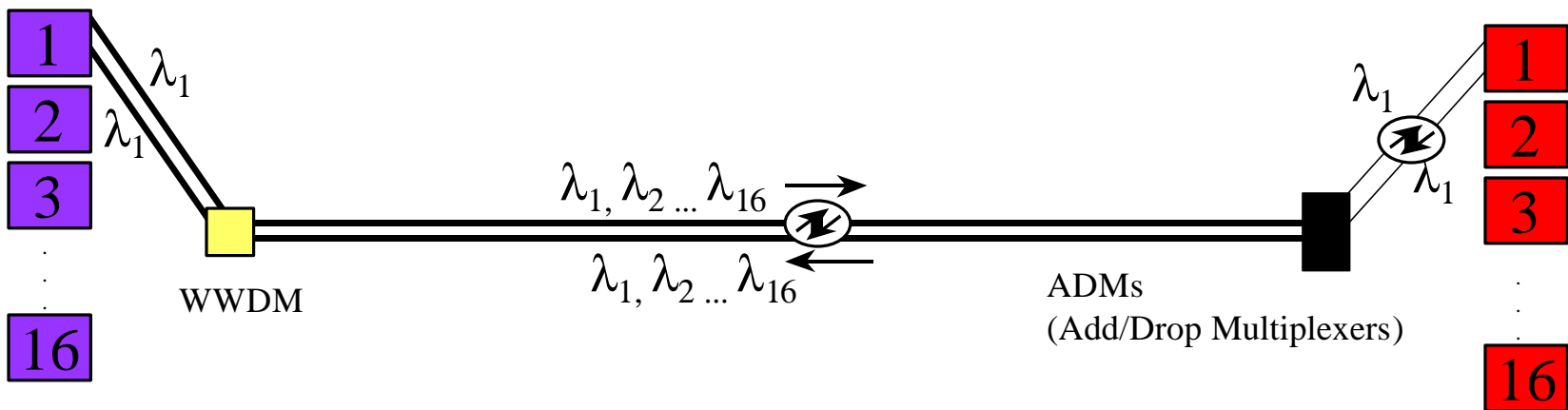
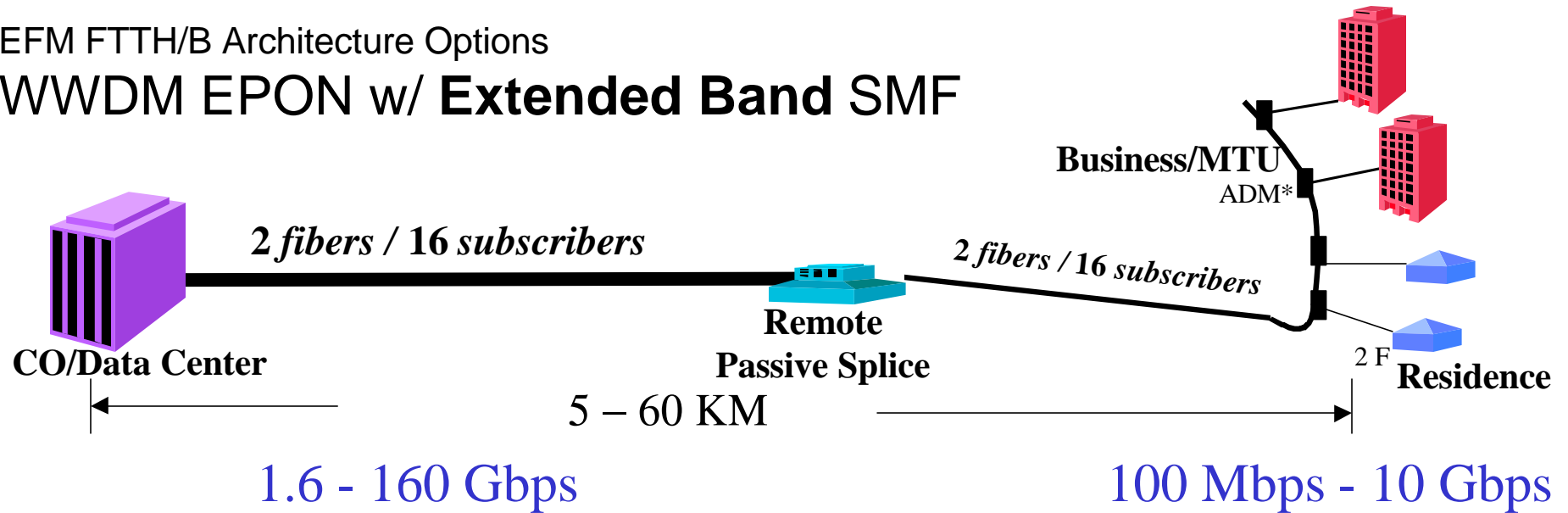
WWDM EPON w/Standard SMF



- Future higher bandwidth implementation
- Can re-use fiber plant from EPON or Remote Switched

EFM FTTH/B Architecture Options

WWDM EPON w/ **Extended Band SMF**



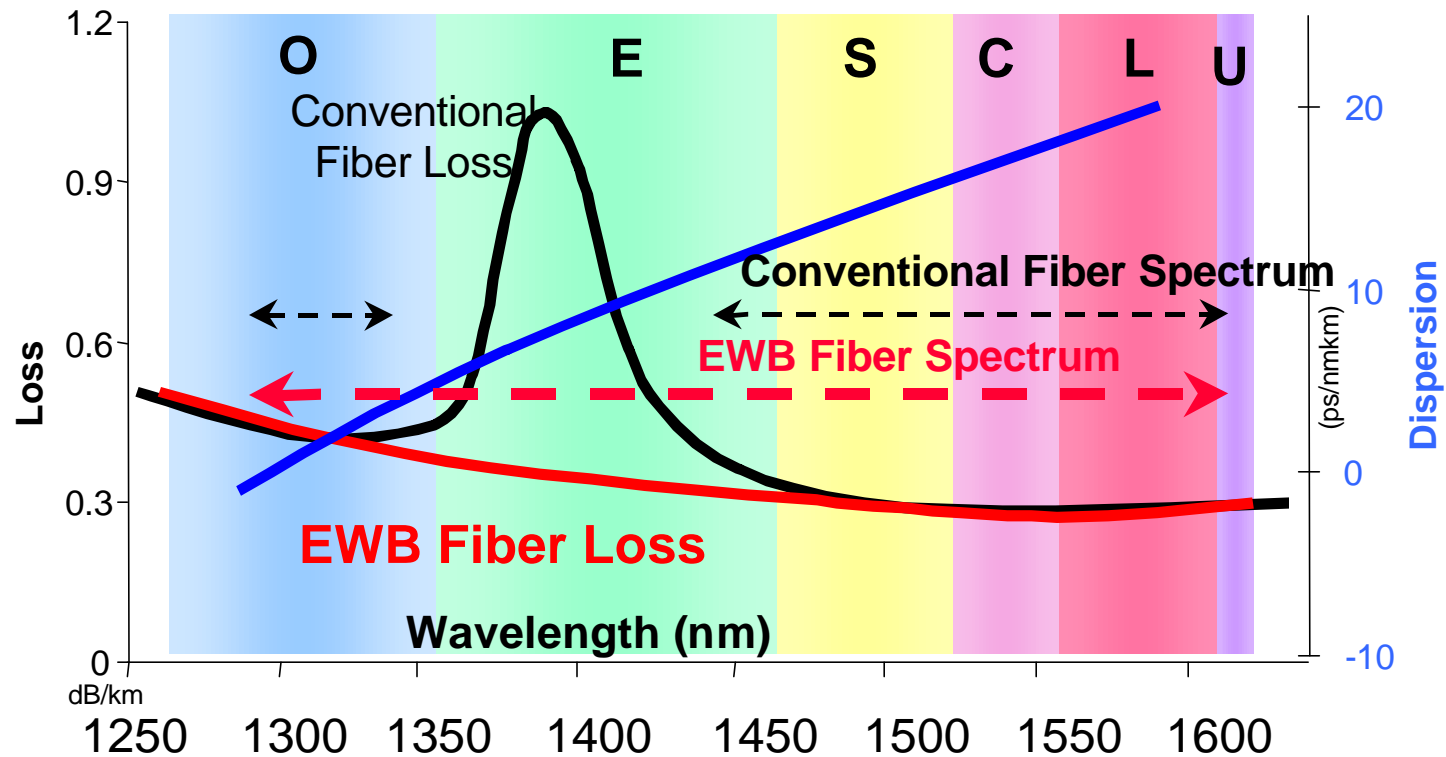
Extended Band Fiber vs Std SMF

- Requires 30% fewer fibers in feeder
- Reduces CO floor space and apparatus requirements
- Improves WWDWM packaging economy
- Lowers installed system cost by 10%

Technical/Economic Feasibility

Extended Wavelength Band SM Fiber

- EWB Fiber eliminates the 1385 nm water peak
- Provides 50% add usable spectrum



Example:

EWB Fiber: 16 Wavelength WWDW

Conventional SMF: 11 “ “

Extended Wavelength Band Fiber

- Over 2 Million KM installed in Metro Rings
- Lasers to leverage E- band spectrum available from NEC and others, Conoga Perkins offers line cards.
- EWB SMF fully compatible with EPON and Remote Switched architectures
 - Can upgrade to 16 λ WWDM.

Recommendation

IEEE EFM should reference the following fiber types and architectures

	<u>Std SMF</u>	<u>EWB SMF</u>
IEC (Category)	B1.1	B1.3 (extended wavelength band)
ITU (Recommendation)	G.652.B	G.652.C (extended wavelength band)
TIA (Class)	IVa	IVa (dispersion-unshifted with low water peak)
Architectures Supported	EPON Remote Switched Eth. 11 λ WWDM EPON	EPON Remote Switched Eth. 11 λ WWDM EPON 16 λ WWDM EPON