FTTH China 2009
A Top Level Executive Meeting Place in China
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LIGHTWAVE CHINA
光波通信

GPON - the right PON technology choice

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Broadlight

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Carriers' Dilemma

- Multiple technologies?
- High CAPEX?
- High OPEX?
- Low Band?
- High power consumption?
- Space?
- Spares?

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Agenda

- Trends in PON OLT design
  - Port density
  - Power Consumption
  - Maximum Reach
- Trends in PON ONU design
- GPON WW Acceptance
- GPON paves the road for 10G PON
- BroadLight in a nutshell

OLT ASIC: GPON vs. EPON

Vendors	Model	GPON	Uplink	CPU
Broadlight	BL3458	4 (2.5G/1.25G)	4 (2.5G SGMII)	MIPS32
PMC-Sierra	PAS5211	4 (2.5G/1.25G)	2 (XAUI)	MIP32
Marvell	ISL2404	4 (2.5G/1.25G)	4 (2.5G SGMII)	iMCM (6-core)

Vendors	Model	EPON	Uplink	CPU
PMC-Sierra	PAS5201	1 (1.25G/1.25G)	1 (GMII)	MIPS32
Teknovus	TK3723	2 (2.5G/1.25G)	2 (GMII/TBI)	ARM9

Higher port density ➔ Lower cost per port

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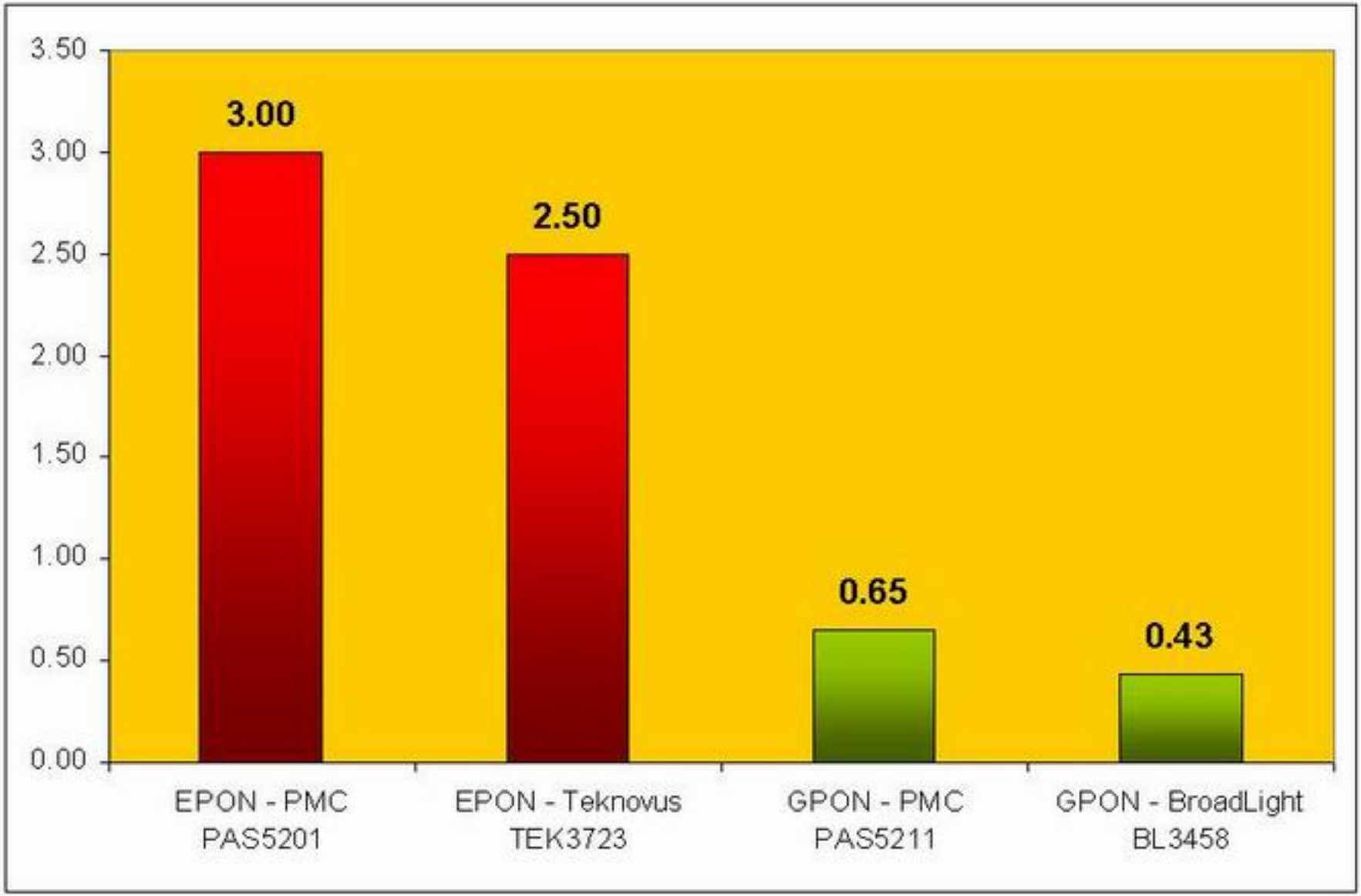
OLT GPON ASIC Power Consumption



Power per OLT Port (in Watts – normalized to 1Gbe DS)

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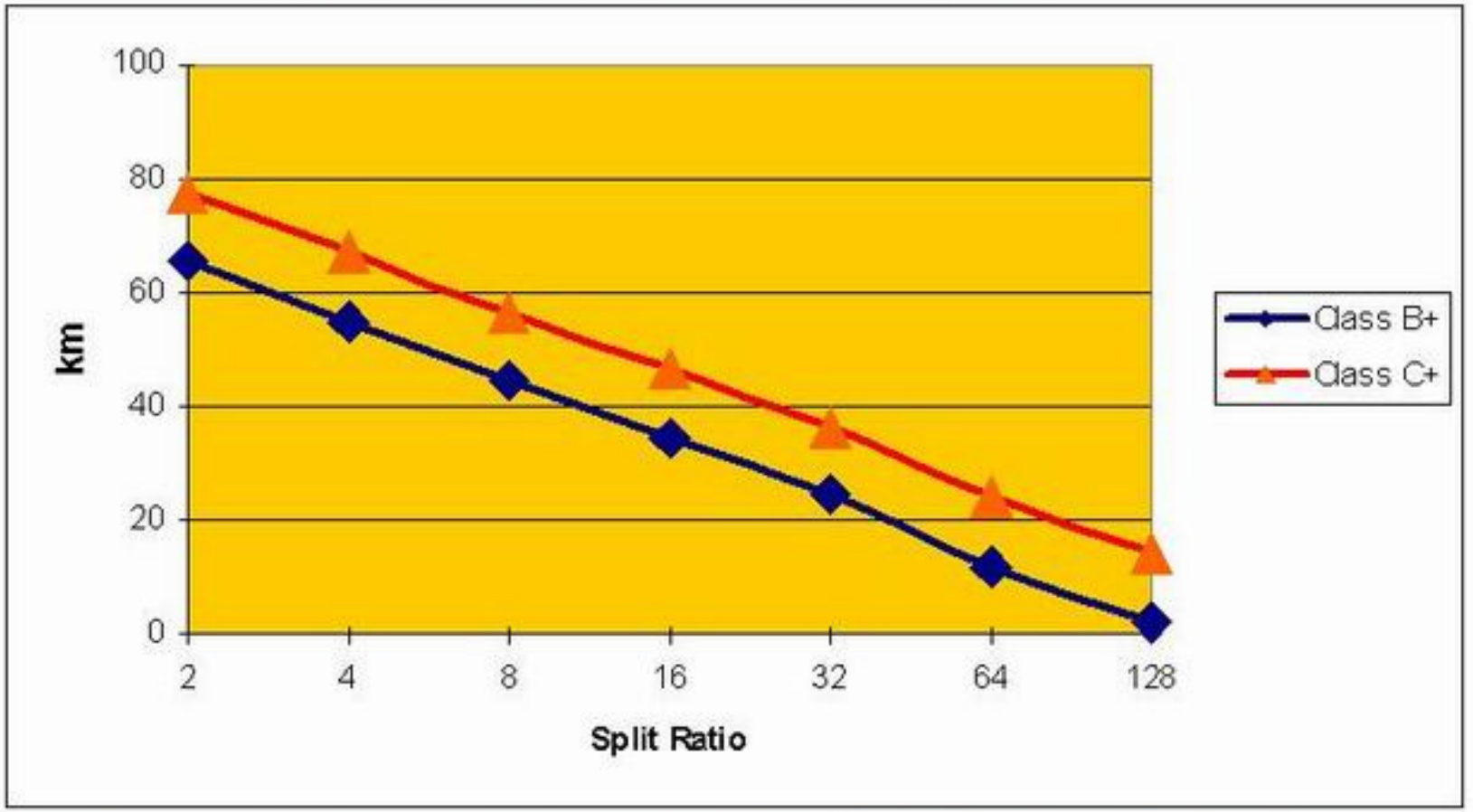
OLT Higher optical Budget



Higher Optical Budget allowes more flexibility in installation design

More Splices

Longer Ducts

1:16 split ratio – 34km for B+ TRX , 47km for C+ TRX

1:32 split ratio – 24km for B+ TRX , 37km for C+ TRX

Agenda

- Trends in PON OLT design
- Trends in PON ONU design
  - Integration
  - Power Consumption
  - Processing Power
  - Silicon Geometry
- GPON WW Acceptance
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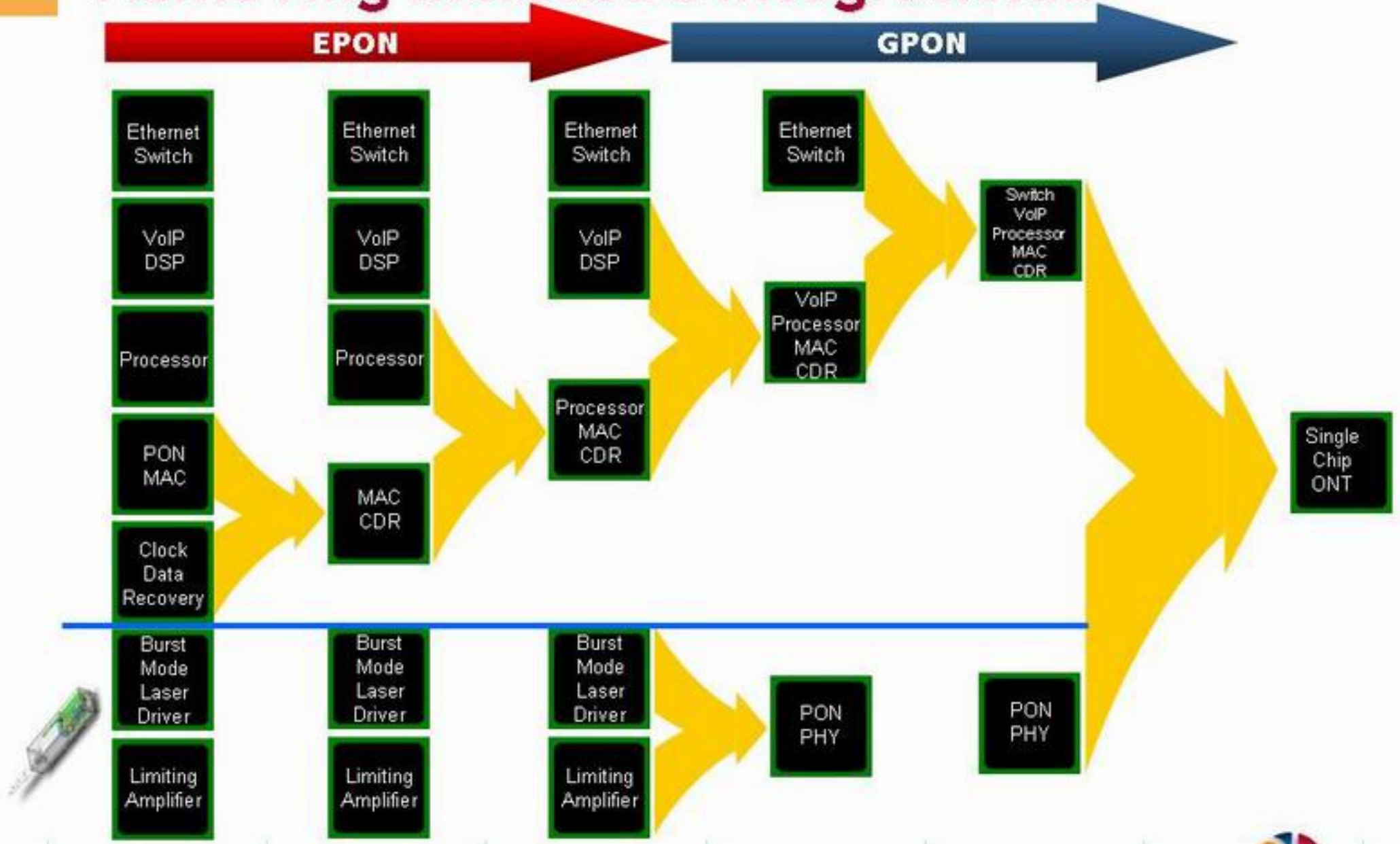
Achieving Increased Integration...



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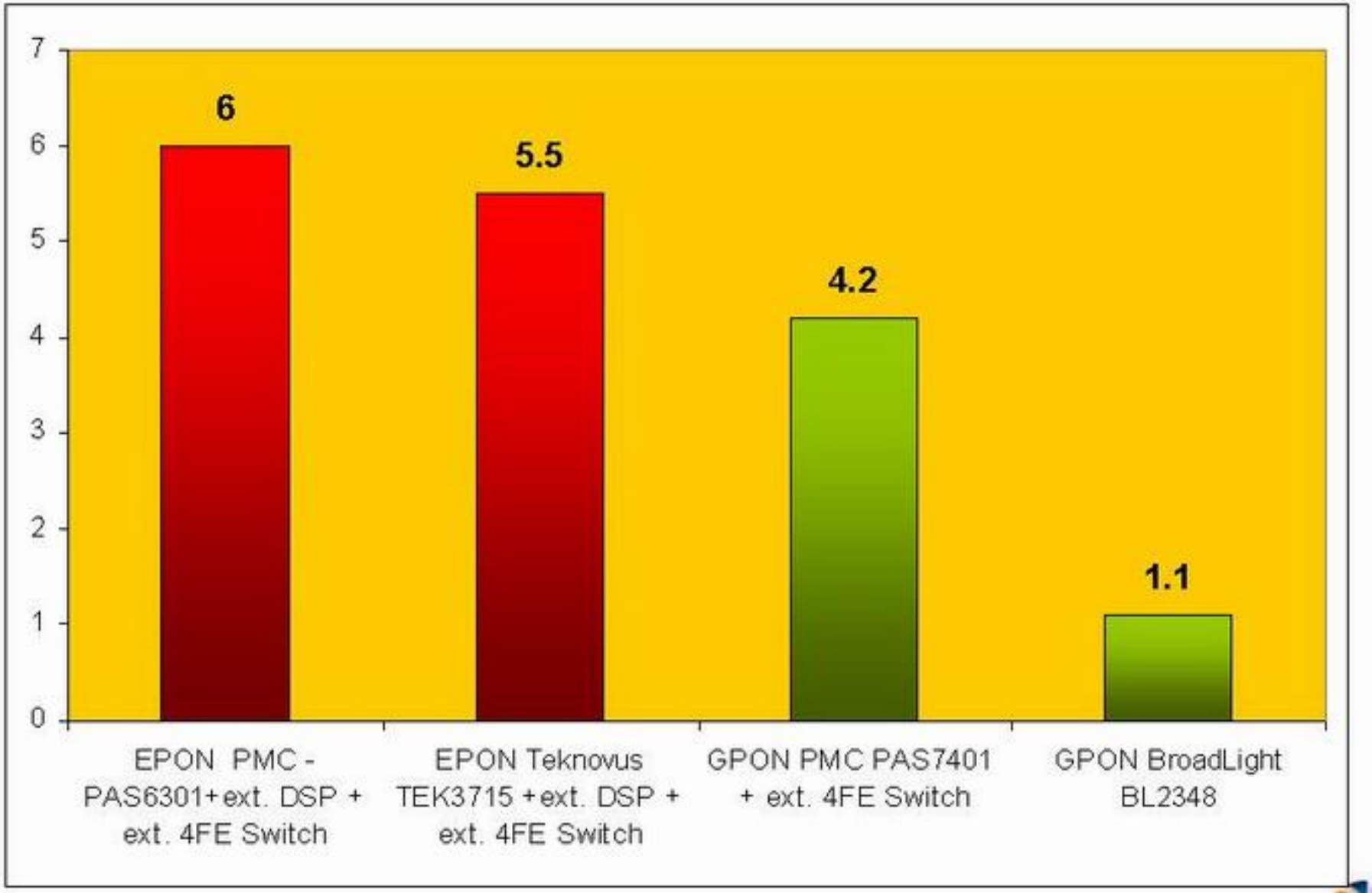
GPON - Green PON
Significant Lower Power Consumption



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ONU ASIC: GPON vs. EPON

Vendors	Model	GPON MAC	Eth MAC	HG CPU	VoIP DSP
Broadlight	BL2345	■	2xGMII	■	
Broadlight	BL2348	■	2xGMII	■	4xPOTS
Freescale	MSC7104	■	2xGMII		
Freescale	MSC7120	■	2xGMII		2xPOTS
Marvell	iSN1000	■	2xGMII		2xPOTS
HiSilicon		■	4xFMII		2xPOTS
PMC-Sierra	PAS7401	■	2xGMII		2xPOTS
PMC-Sierra	PAS7162	■	2xGMII	■	2xPOTS
Broadcom	BCM68xx	■	4xGMII	■	2xPOTS
Ikanos	CX95202	■	3xGMII+2xMII		
Infineon		■	4xMII		2xPOTS

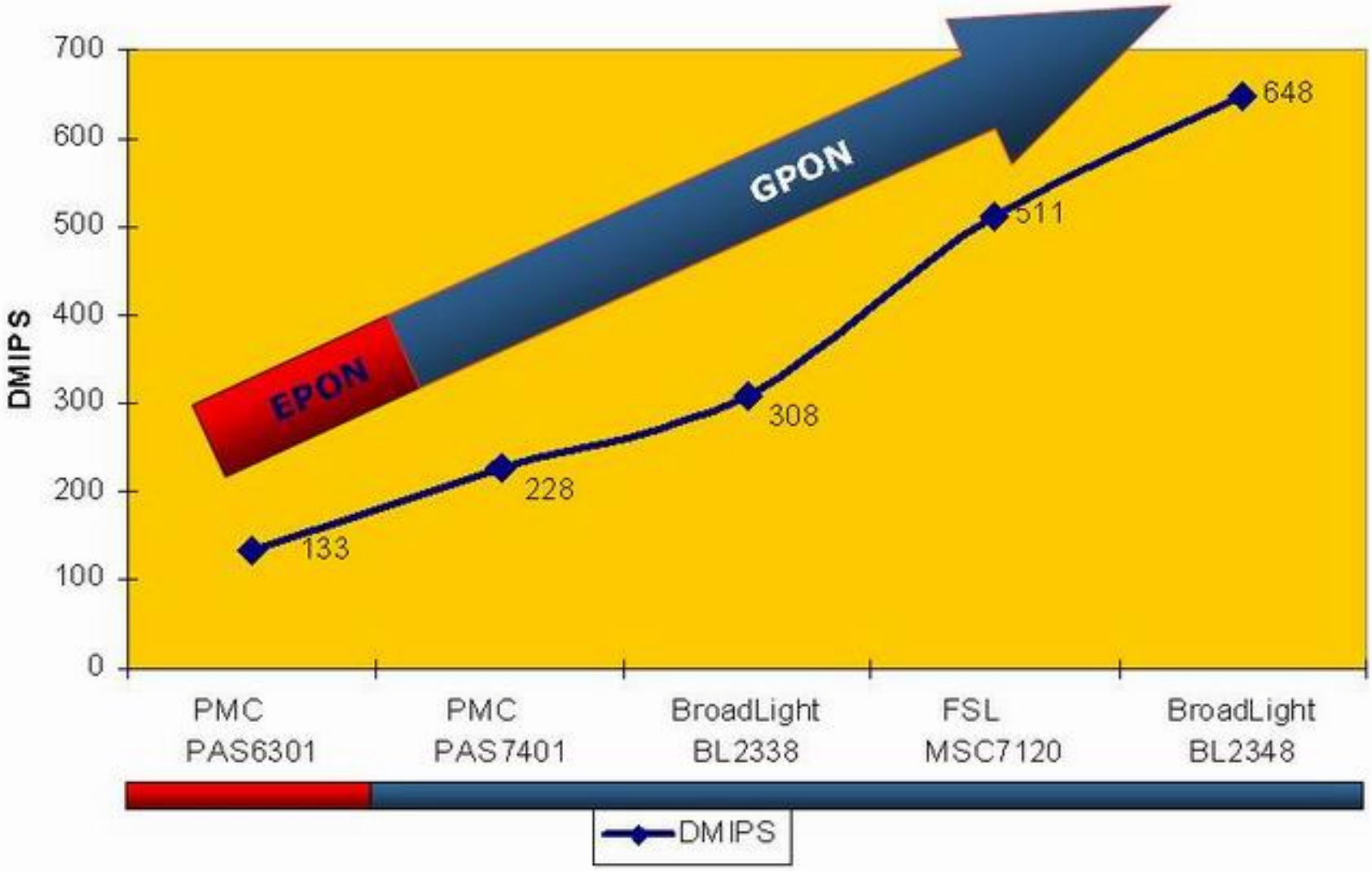
GPON

Vendors	Model	EPON MAC	Eth MAC	HG CPU	VoIP DSP
PMC-Serria	PAS6301	■	1xGMII+1xMII		
Teknovus	TK3713/14	■	1xGMII+1xMII		
Teknovus	TK3715	■	1xGMII+1xMII		
Cortinia	CS8015/16	■	1xGMII		

EPON

Higher integration → Lower ONU cost

GPON – Stronger processing power



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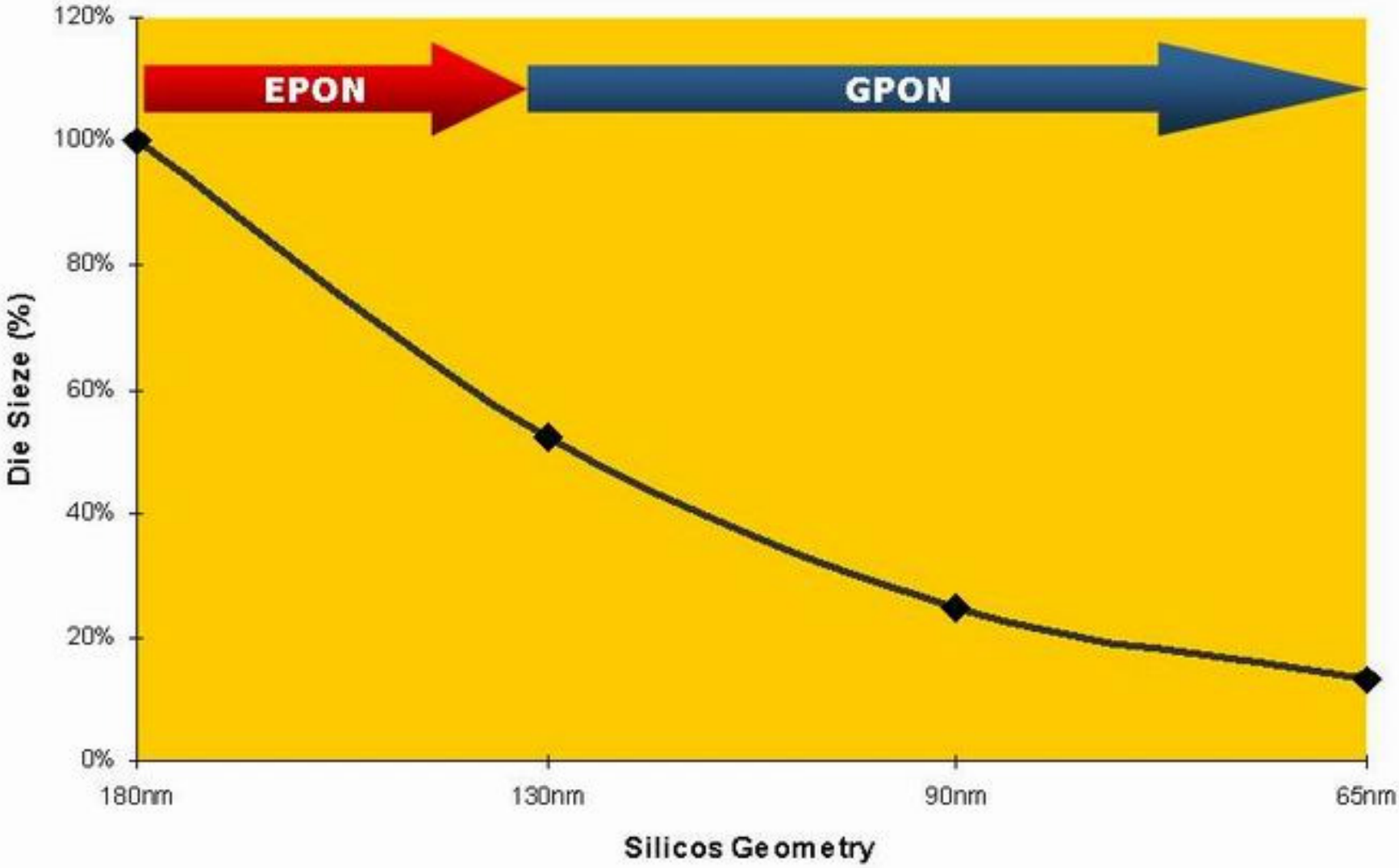
GPON is using advanced Silicon Geometry



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Fiber-Access xPON Technologies Spread

GPON	**North America:** USA, Canada **Asia Pacific:** India, Singapore	**Europe:** France, Italy, Germany, Norway, Sweden, Demark, Russia, Spain **Latin America:** Brazil, Argentina
GPON+EPON	China, Hong Kong, Taiwan, Korea	
EPON	Japan	

Top 10 Wireline Carriers' Choice

	Carrier	Employee	Market Cap	GPON	EPON
❶	NTT	205,000	$3,071B		■
❷	AT&T	310,000	$152.57B	■	
❸	Verizon	224,000	$89.19B	■	
❹	Telefonica	250,000	$88.63B	■	
❺	France Telecom	185,000	$62.58B	■	
❻	Deutsche Telekom	230,000	$55.19B	■	
❼	China Telecom	285,000	$31.05B	■	■
❽	Telecom Italia	80,000	$18.94B	■	
❾	China Unicom	200,000	$13.83B	■	■
❿	British Telecom	112,000	$12.40B	■	

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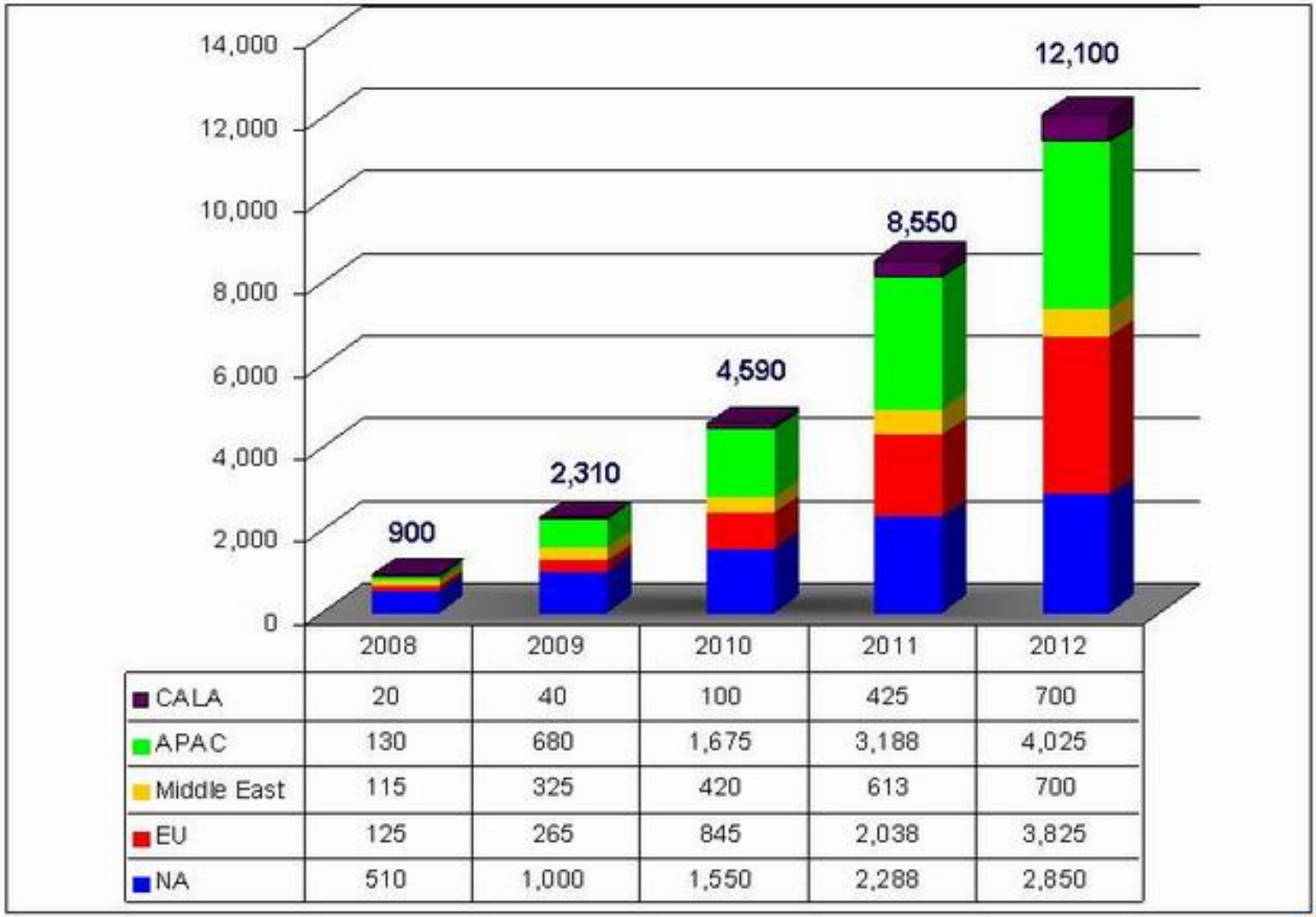
GPON TAM Growth Projections



	2008	2009	2010	2011	2012
CALA	20	40	100	425	700
APAC	130	680	1,675	3,188	4,025
Middle East	115	325	420	613	700
EU	125	265	845	2,038	3,825
NA	510	1,000	1,550	2,288	2,850

BL Analysis, in K units

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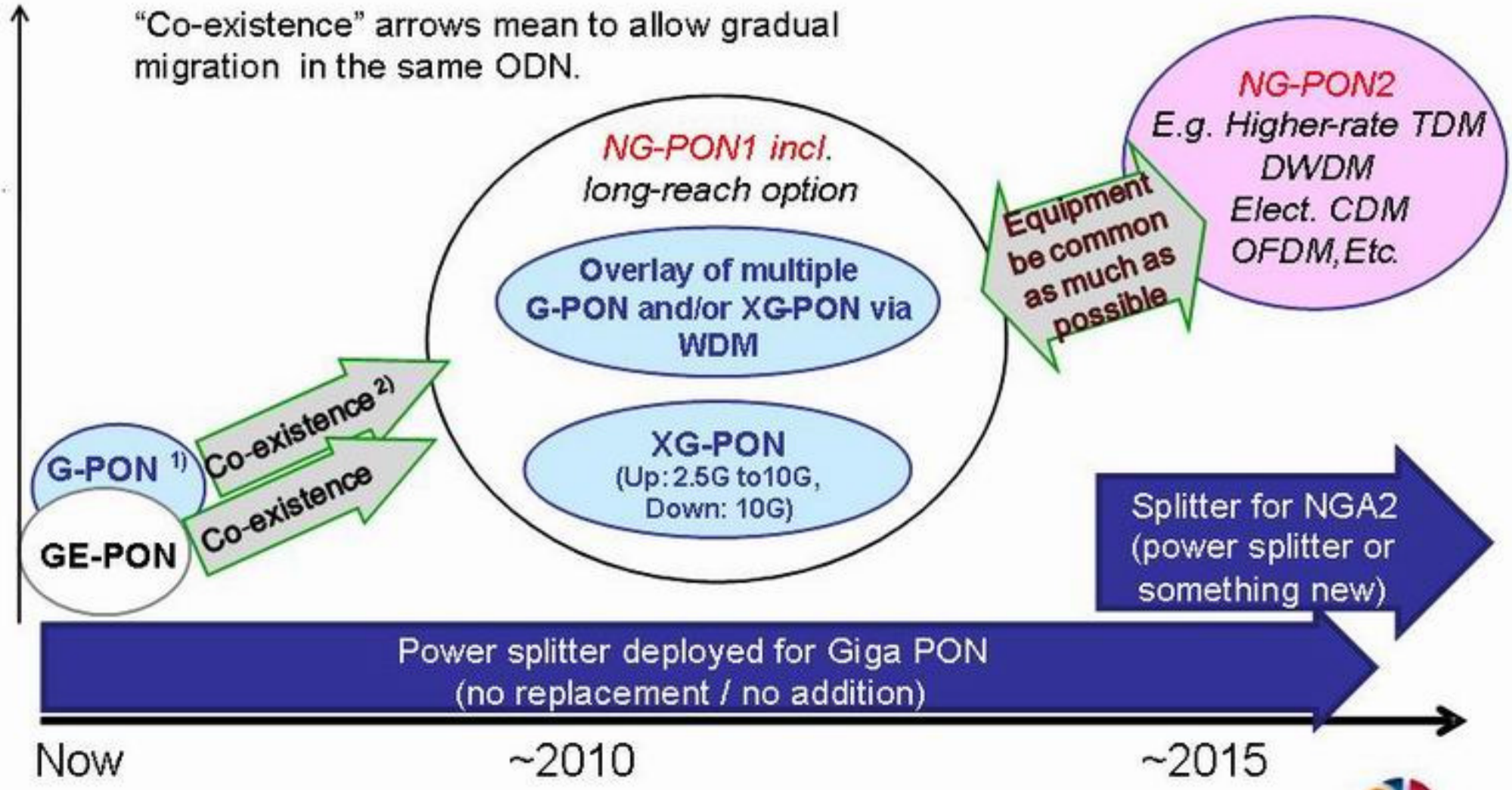
FSAN NG PON Roadmap



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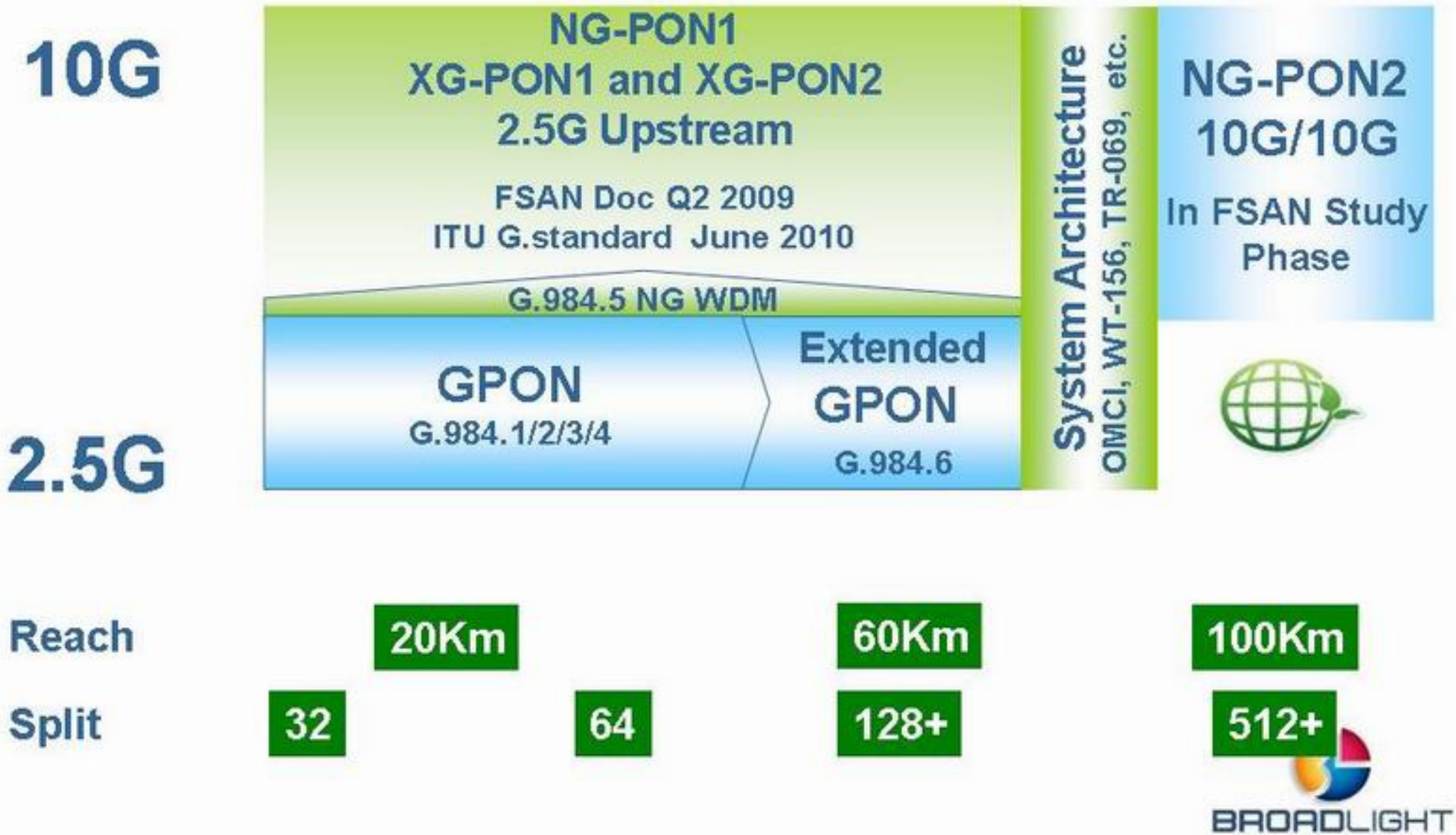
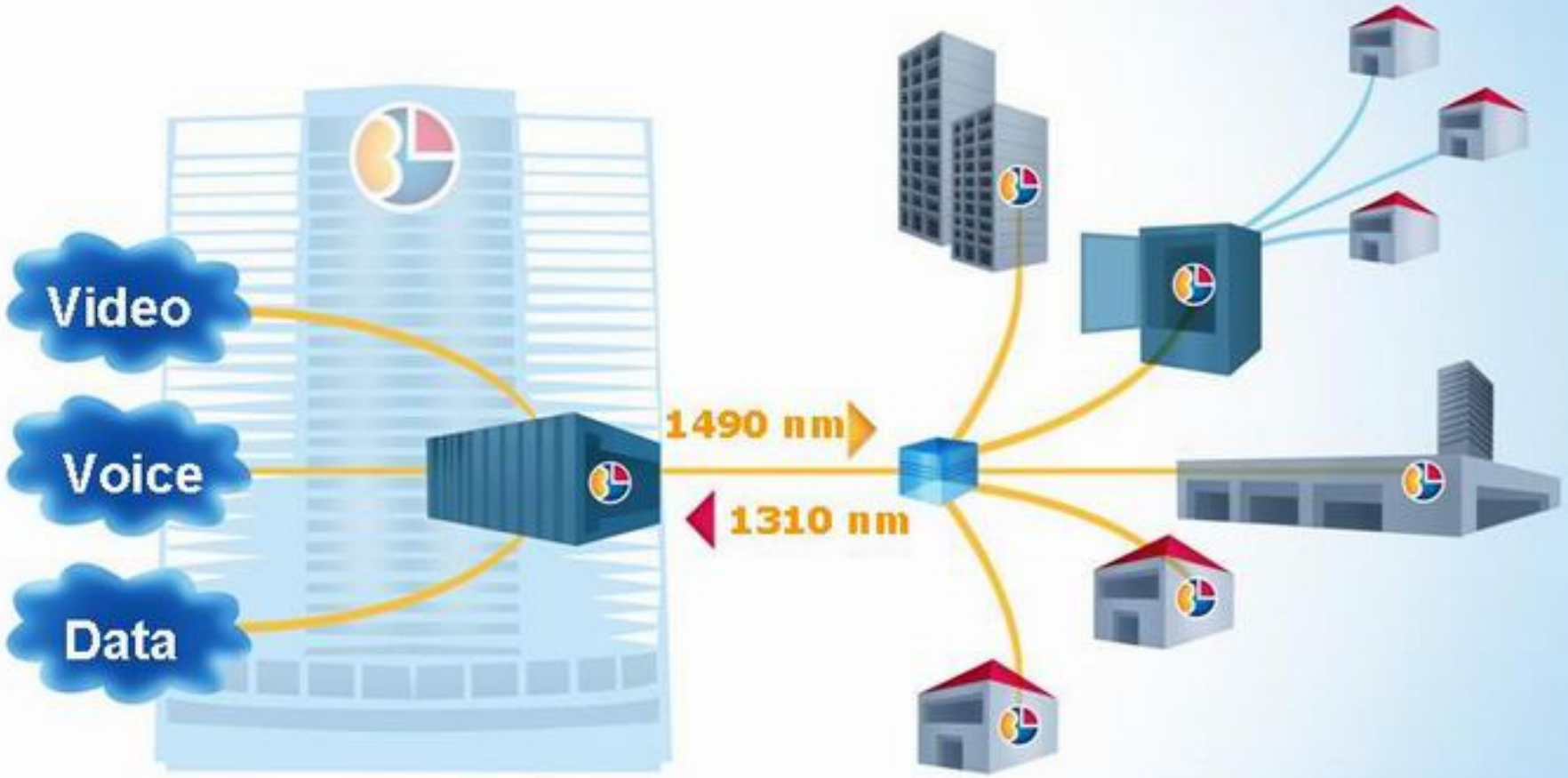
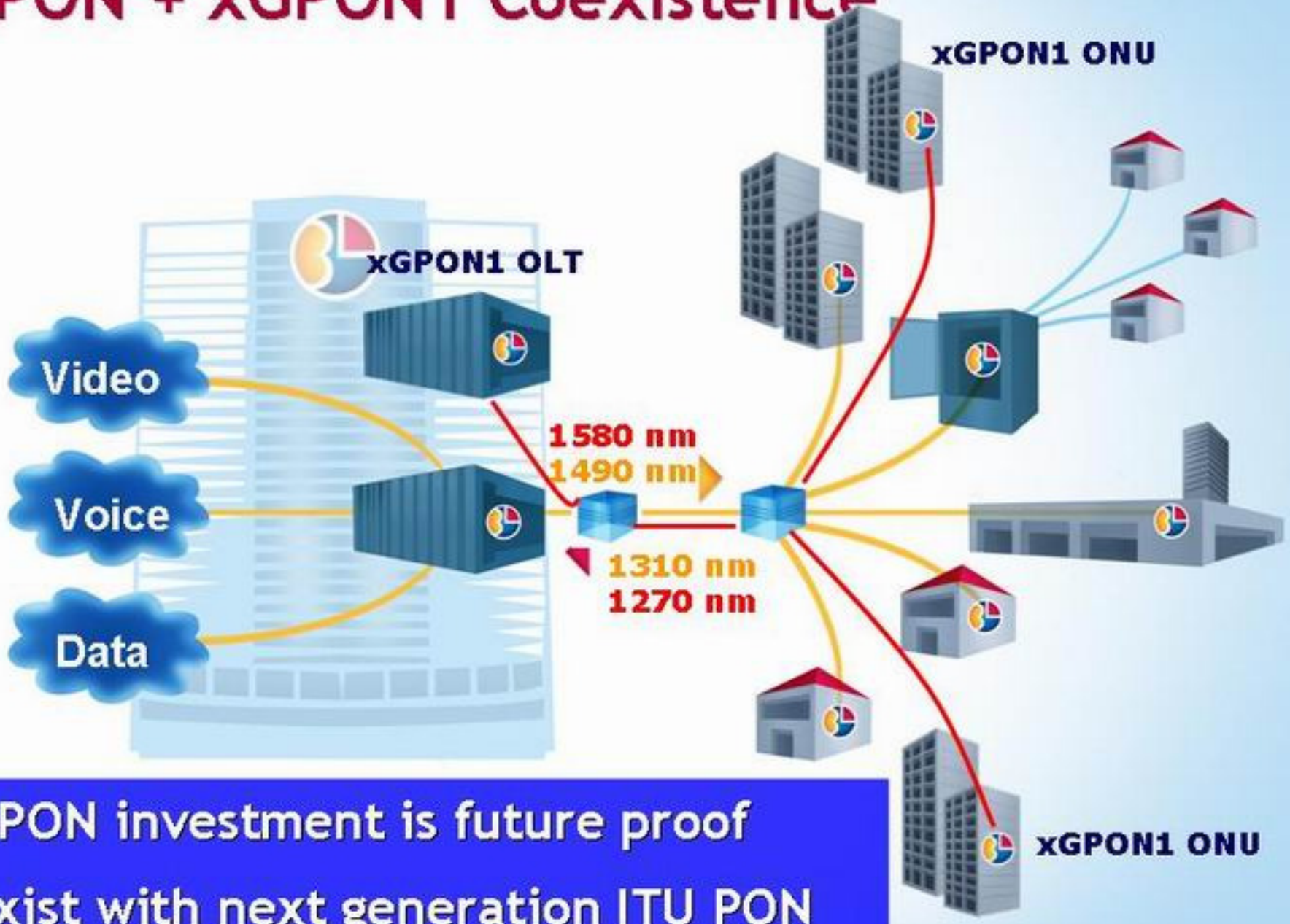
NG PON Activity Roadmap



Basic GPON network



GPON + xGPON1 Coexistence



GPON investment is future proof

Coexist with next generation ITU PON

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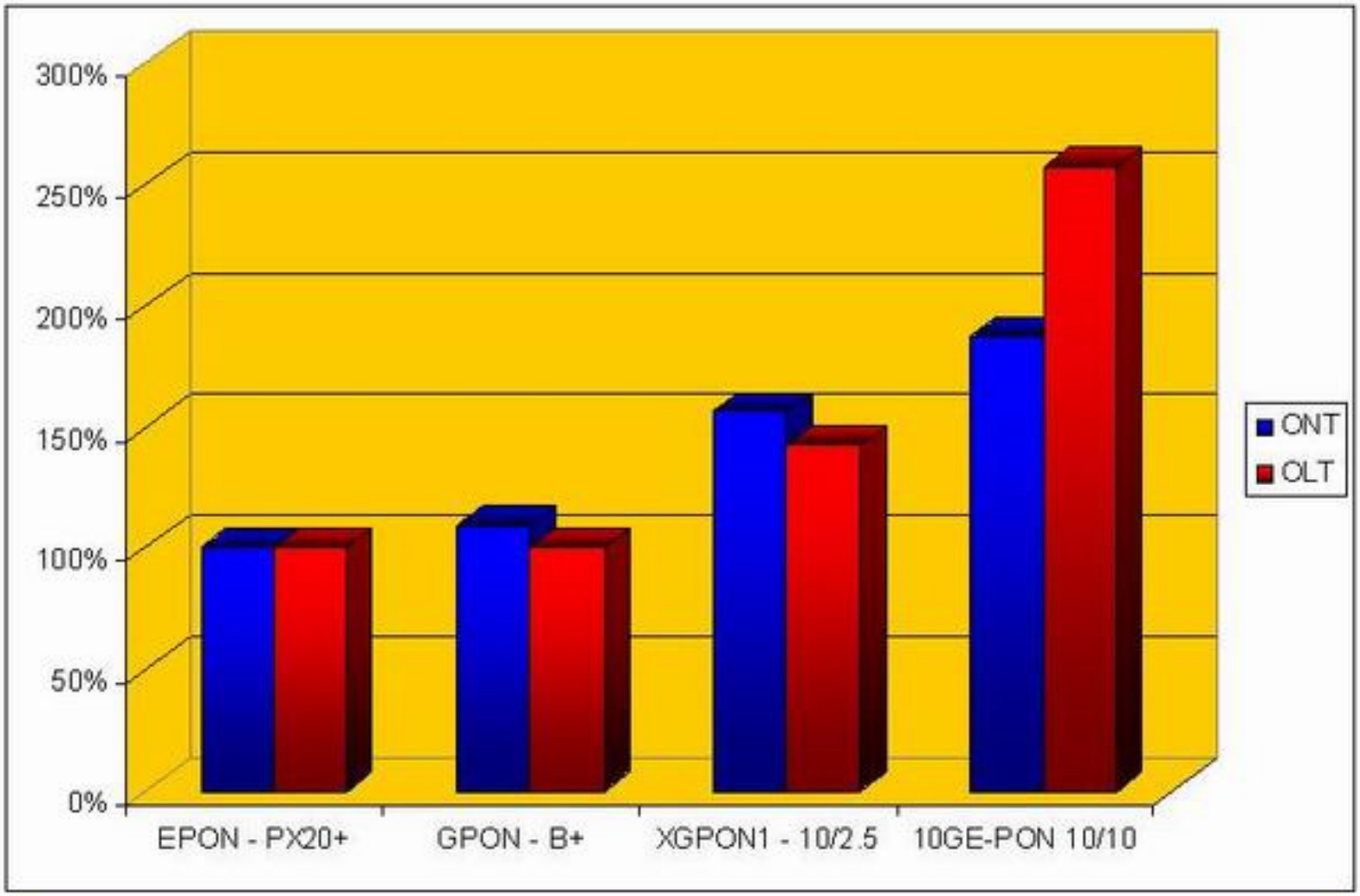
PON Optics cost (2012 industry estimate)



10GE-PON Optics will be too expansive

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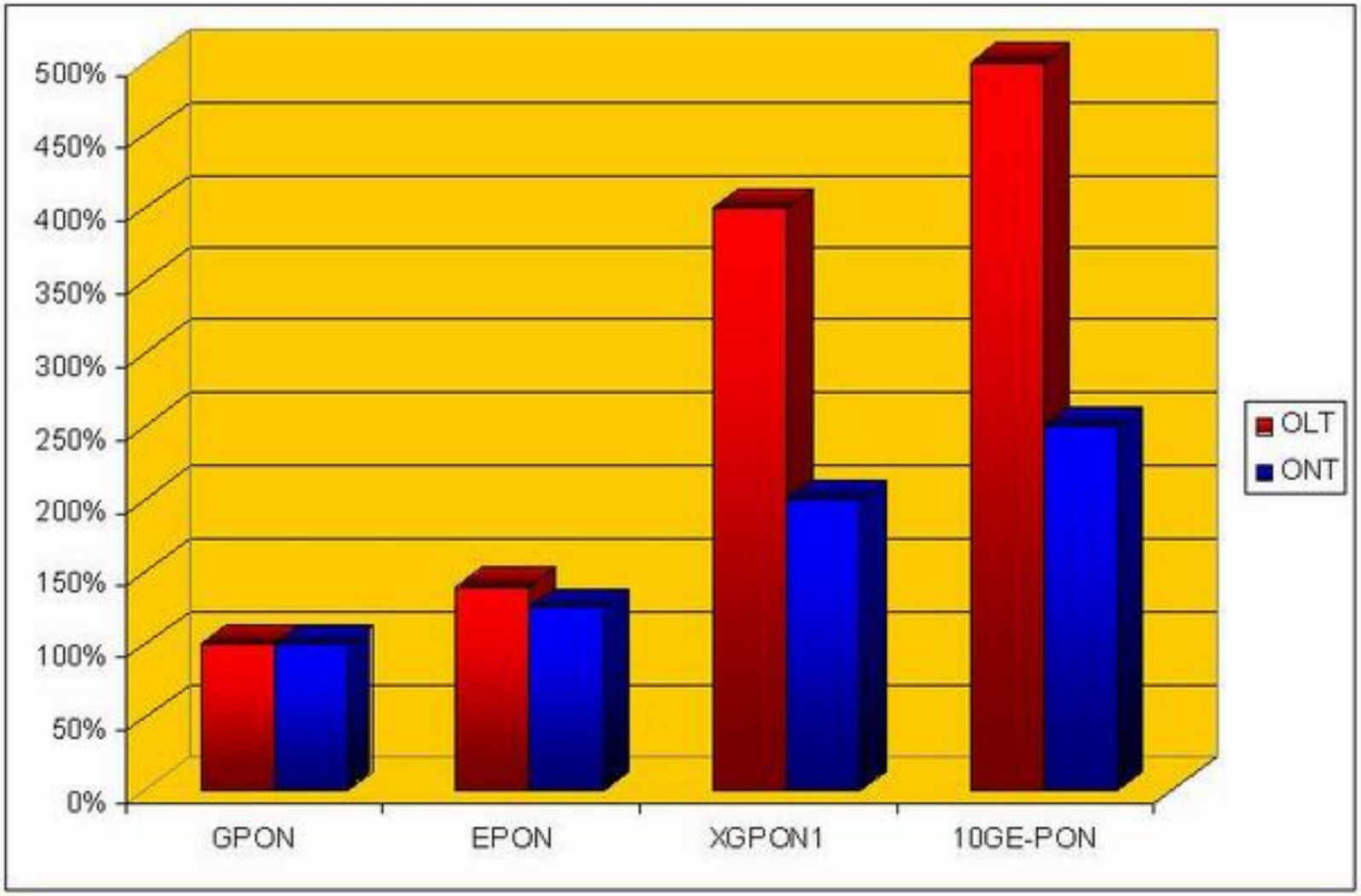
PON SoC cost (2012 BL estimate)



xGPON1 Si will be cheaper than 10GE-PON

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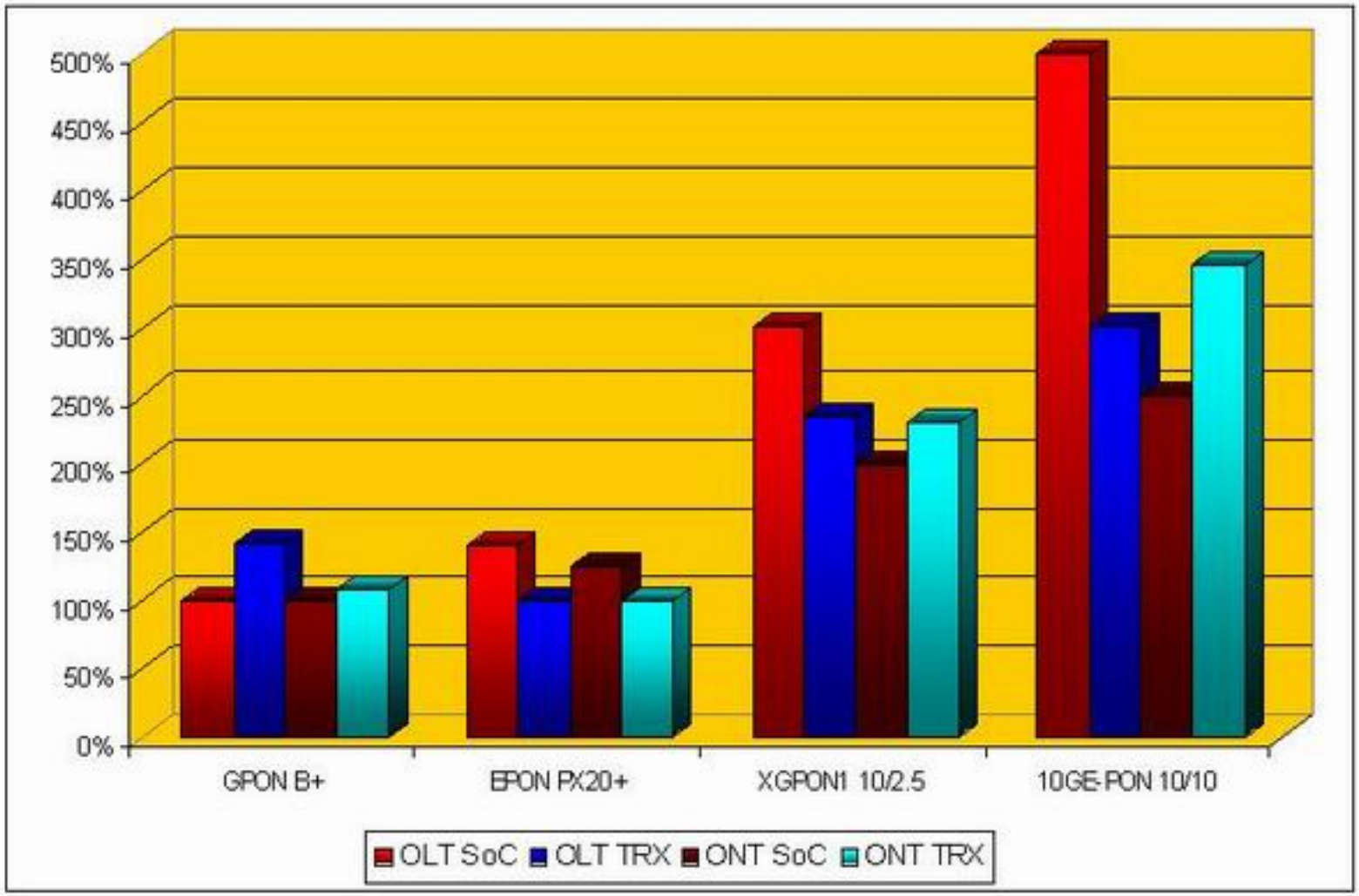
PON technology Cost Comparison



PON Co-Existence is the Only economical upgrade Scenario

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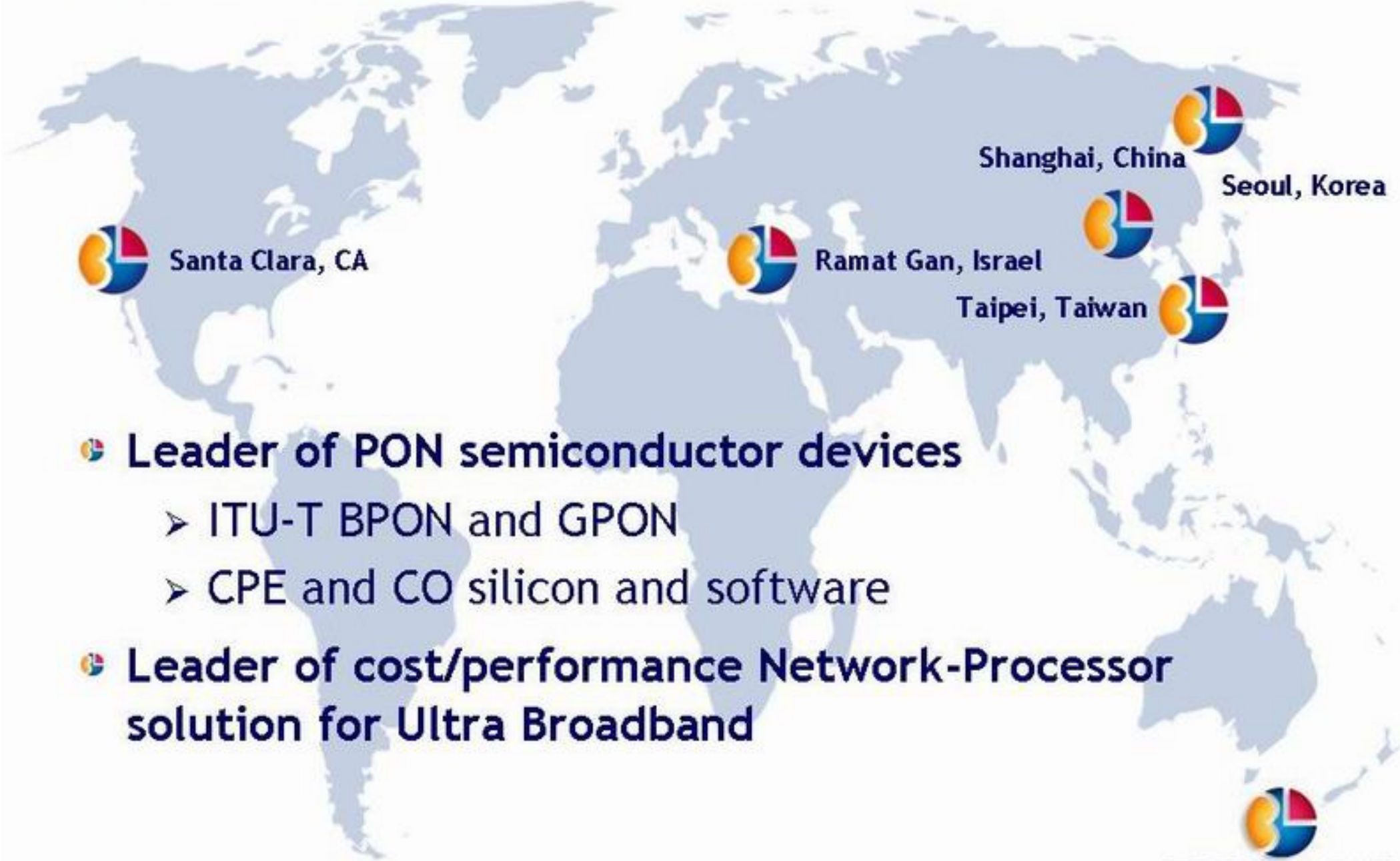
BroadLight Company Profile



- **Leader of PON semiconductor devices**
  - ITU-T BPON and GPON
  - CPE and CO silicon and software
- **Leader of cost/performance Network-Processor solution for Ultra Broadband**

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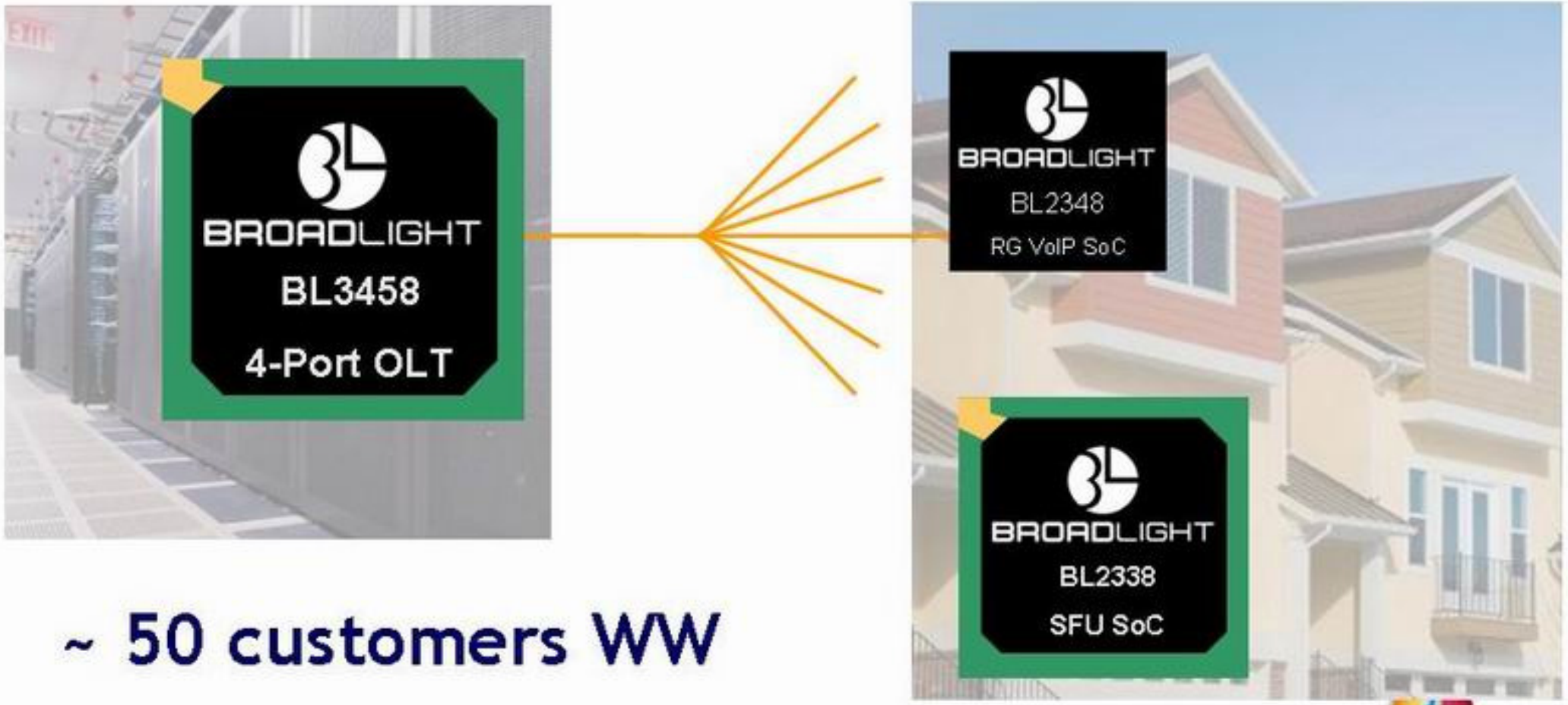
End to End GPON by BroadLight

Central Office

Customer Premise



~ 50 customers WW

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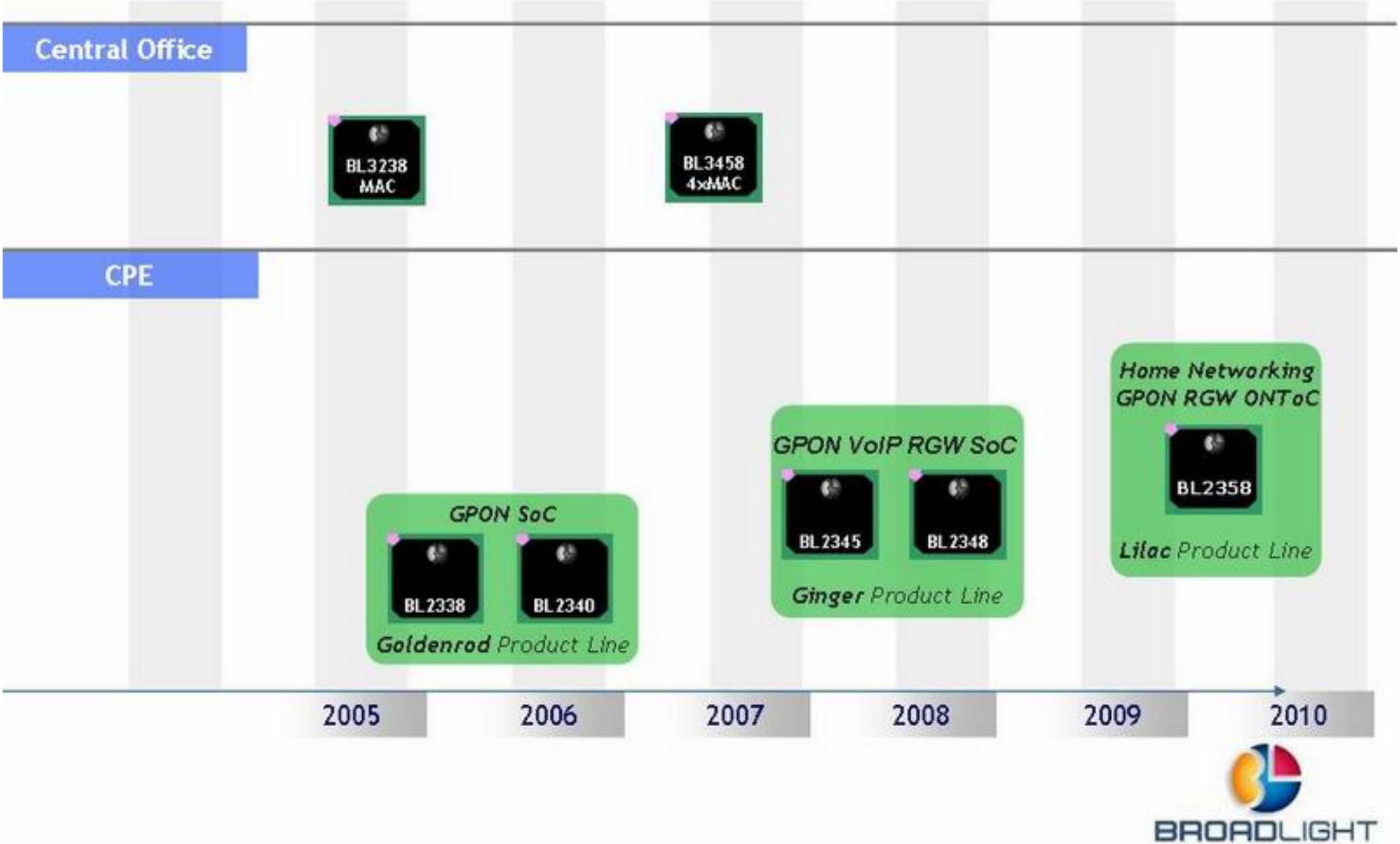
BroadLight GPON Product Roadmap



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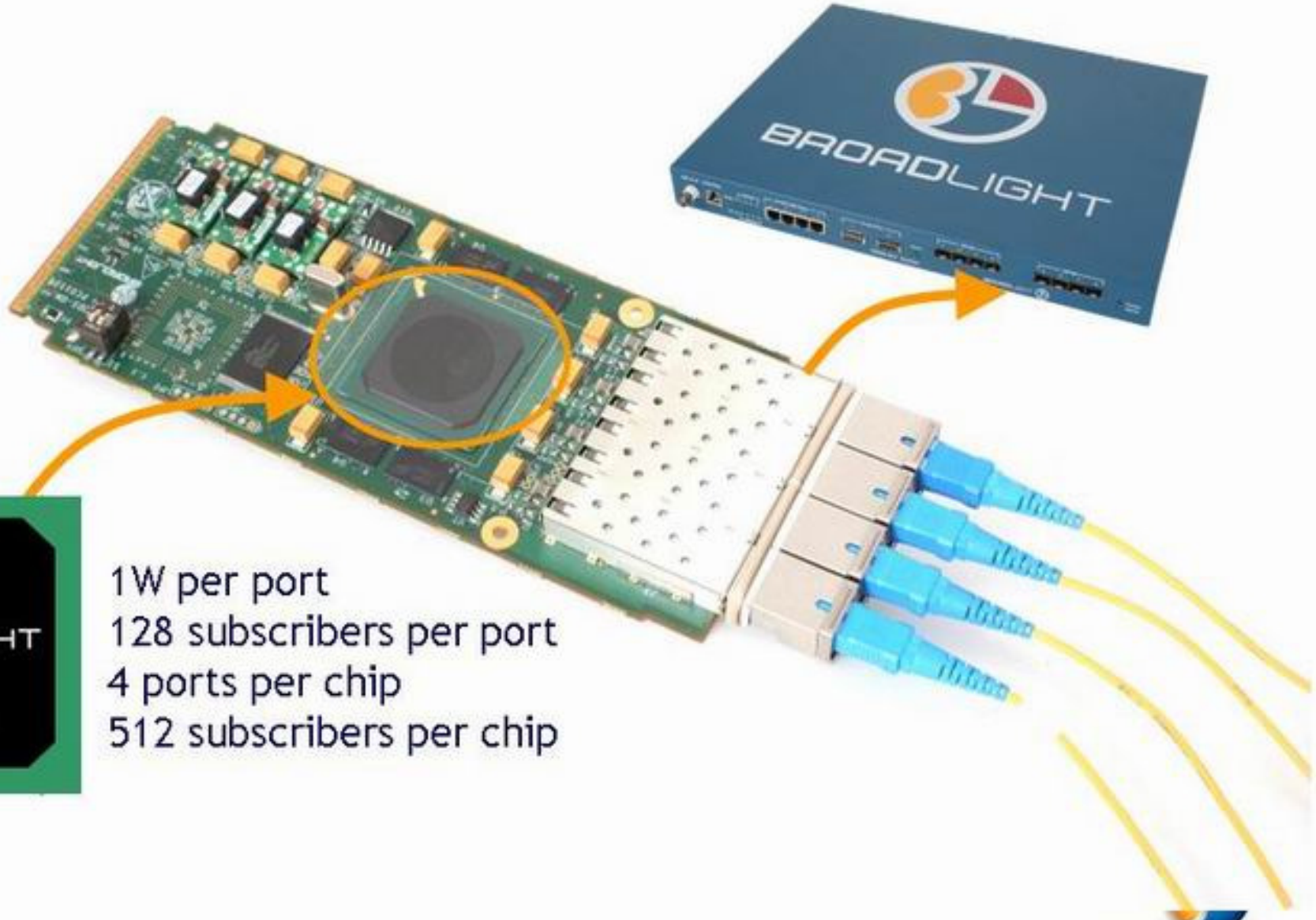
Low-Power, High-Density GPON OLT



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BL3458
Quad OLT

1W per port
128 subscribers per port
4 ports per chip
512 subscribers per chip

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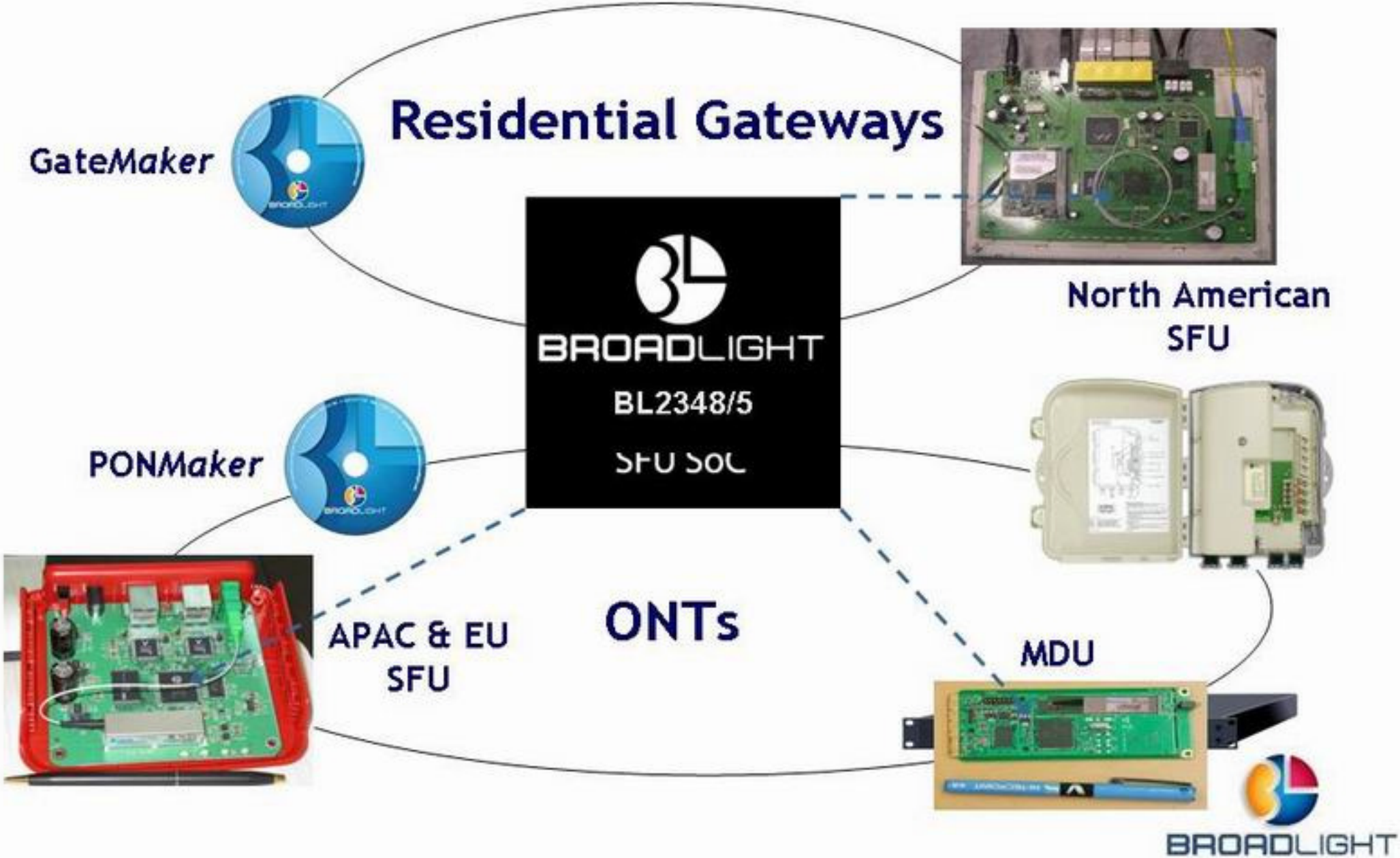
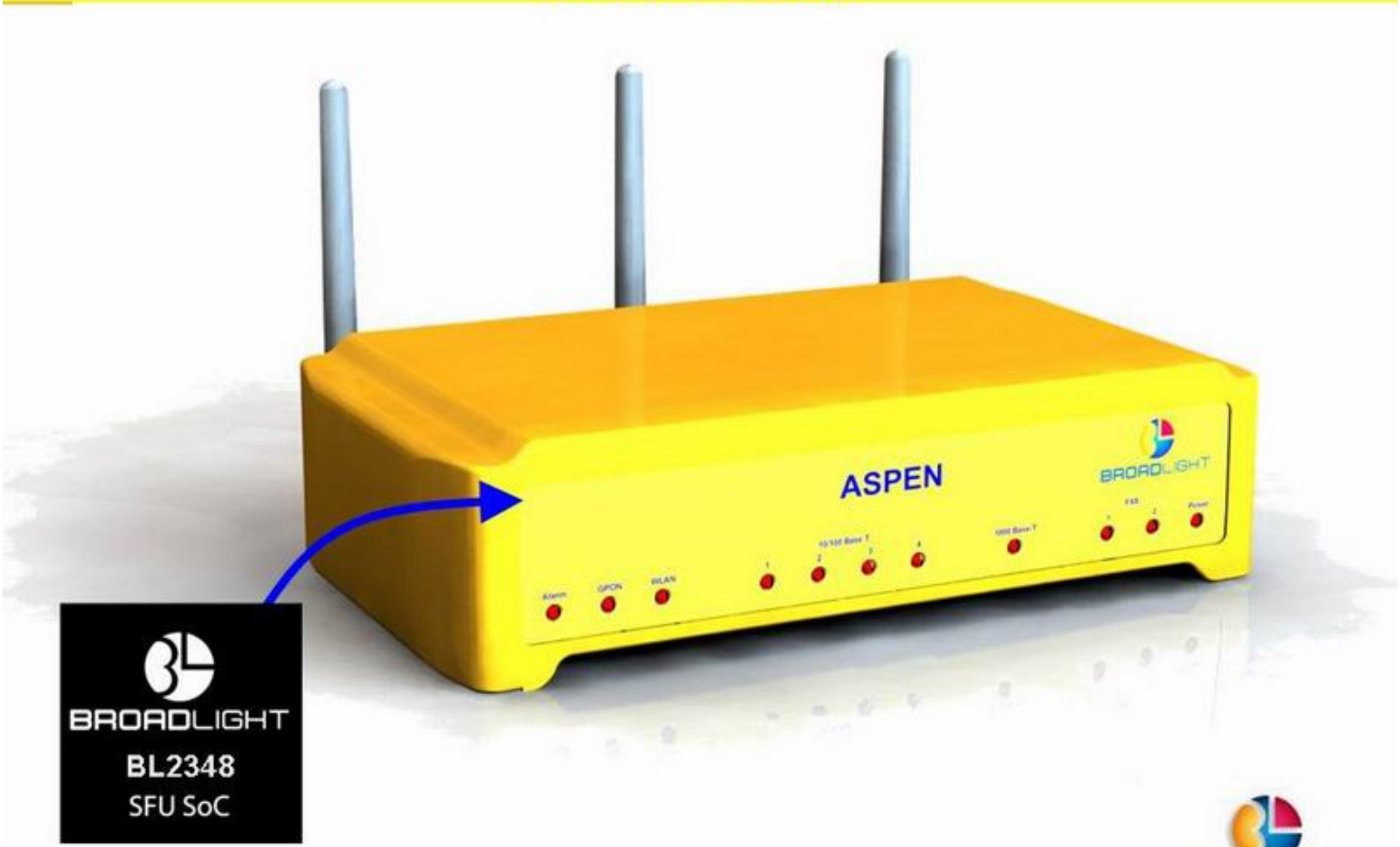
Single IC for GPON CPE



Cost optimized Wi-Fi enabled GPON Gateway

Reference design



Thank You

谢谢

www.broadlight.com

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