



# SOA Booster for PX-30

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# Why SOA?



- Cost-efficient: SOA~DFB
- Reliable: GR-468
- Deployed:
  - Discrete:
    - Test& Measurement (2000-2007)
    - Sensor Networks (2003-2007)
    - Telecom (2005-2007)
  - Integrated (DFB+EAM+SOA) :
    - Telecom (2004-2007)
- SOA Vendors: 5+

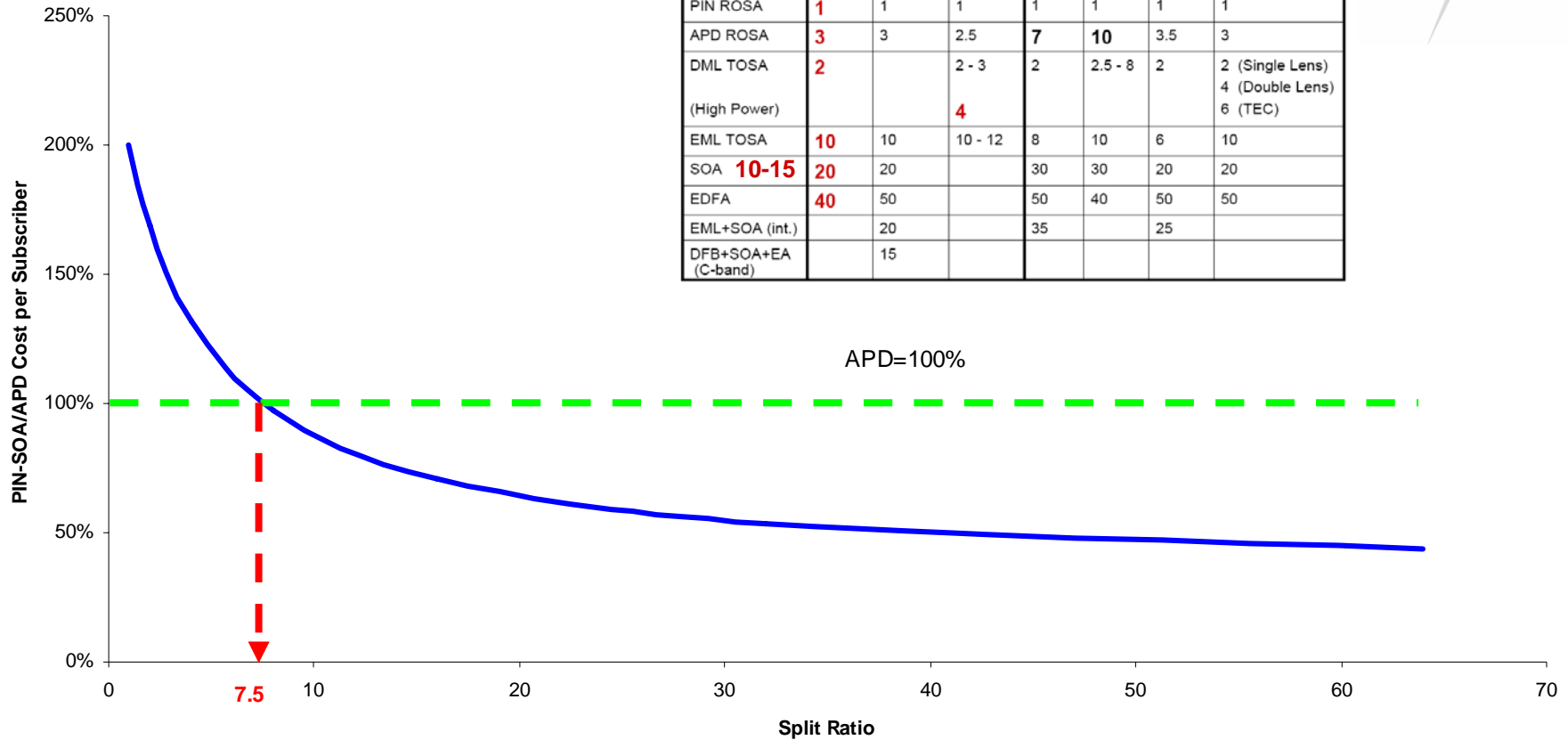
- Meets the performance targets for PIN Rx, even with conservative PIN

Parameter	PX-30
Power budget	29 dB
Path penalty	1 dB
ONT sensitivity	-20 dBm
OLT launch (min)	+10 dBm
OLT launch (max)	+12 dBm
Wavelength	13xx, 14xx,15xx nm

# D/S SOA-PIN vs. APD Cost



	Lee	Gokhale	Schrans (Note)	A	B	C	D
PIN ROSA	<b>1</b>	1	1	1	1	1	1
APD ROSA	<b>3</b>	3	2.5	<b>7</b>	<b>10</b>	3.5	3
DML TOSA (High Power)	<b>2</b>		2 - 3 <b>4</b>	2	2.5 - 8	2	2 (Single Lens) 4 (Double Lens) 6 (TEC)
EML TOSA	<b>10</b>	10	10 - 12	8	10	6	10
SOA <b>10-15</b>	<b>20</b>	20		30	30	20	20
EDFA	<b>40</b>	50		50	40	50	50
EML+SOA (int.)		20		35		25	
DFB+SOA+EA (C-band)		15					



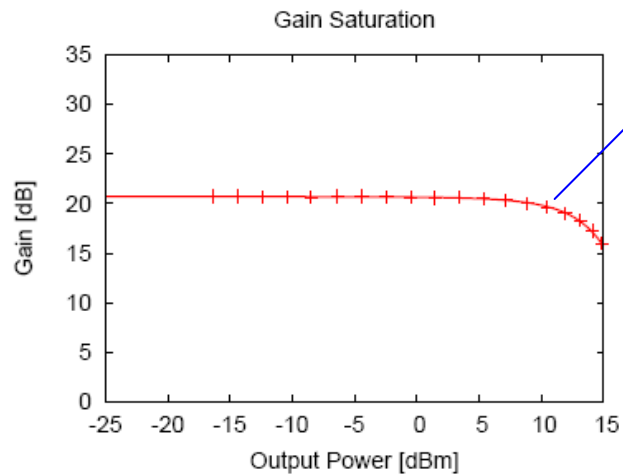
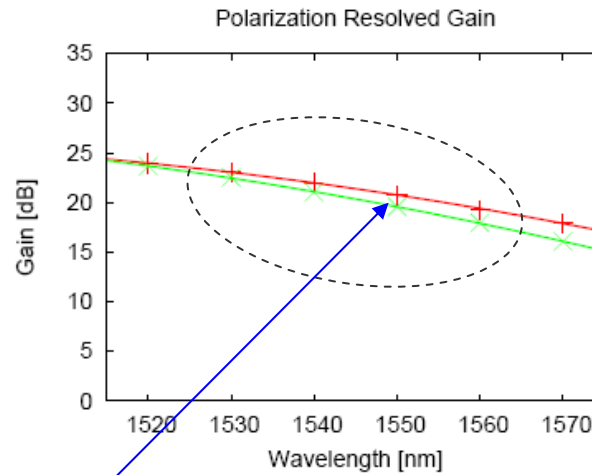
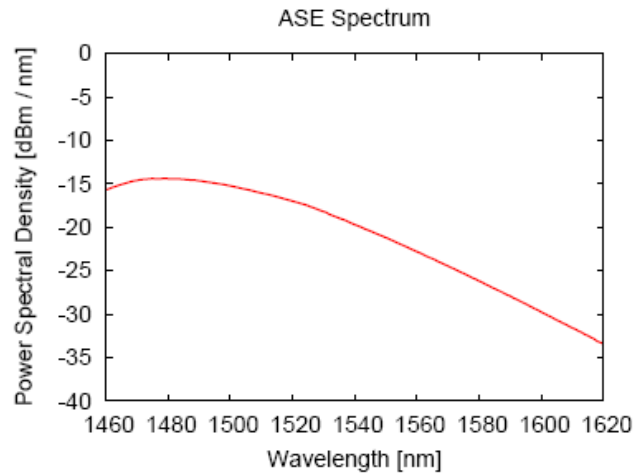
# Optimization Opportunities

The logo for Alphion, featuring a stylized grey 'A' shape with a blue diagonal line and the word 'Alphion' in gold text.

Alphion

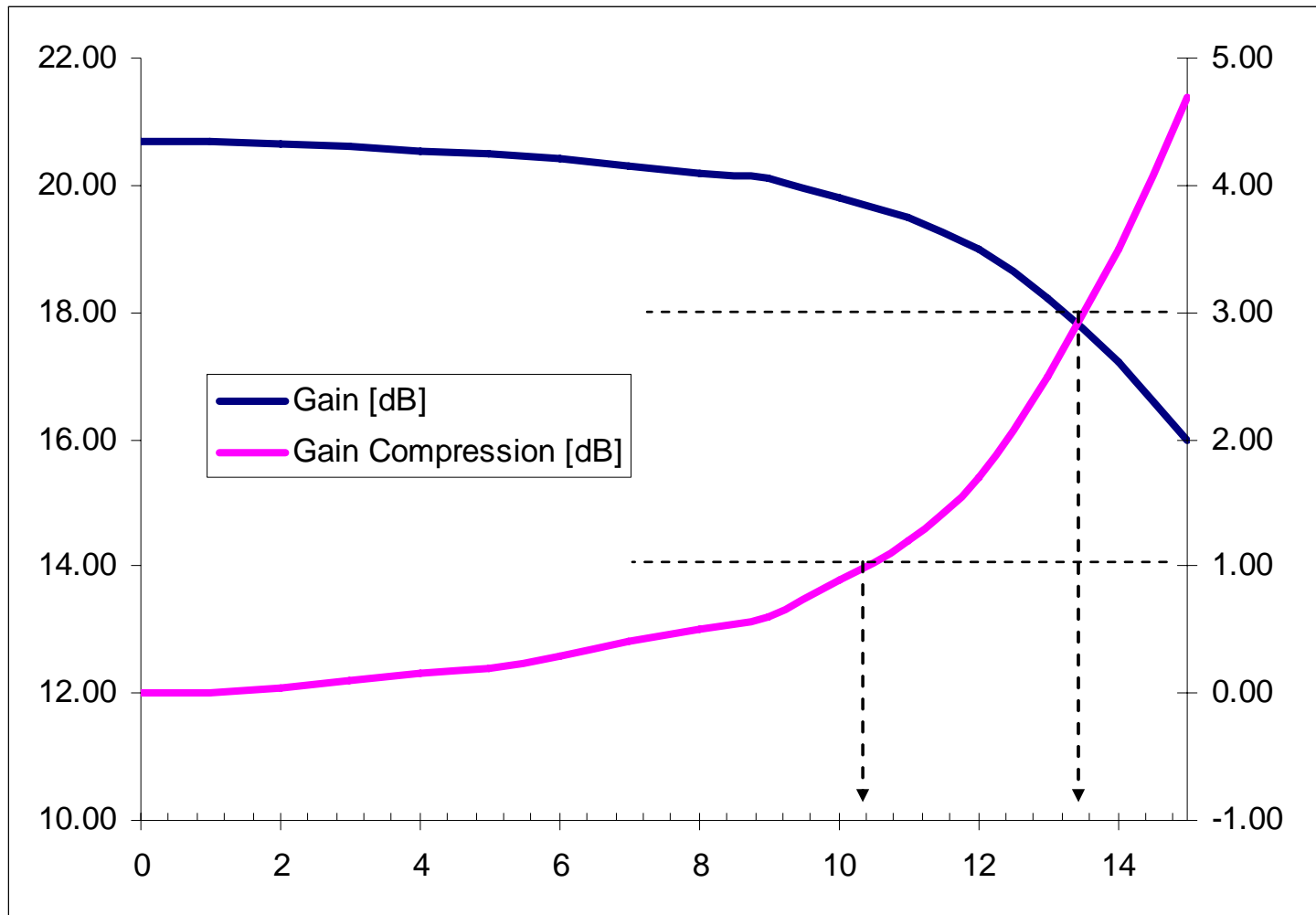
- SOA in the following slides is optimized for in-line applications, covering a wide wavelength range and random polarization
- An SOA that is packaged with the transmitter can be optimized in several ways
  - Polarization will always be aligned
  - Wavelength range is much narrower
  - Temperature drifts are matched
- All of these will produce at least 3 dB improvement in performance

# Gain Saturation Example

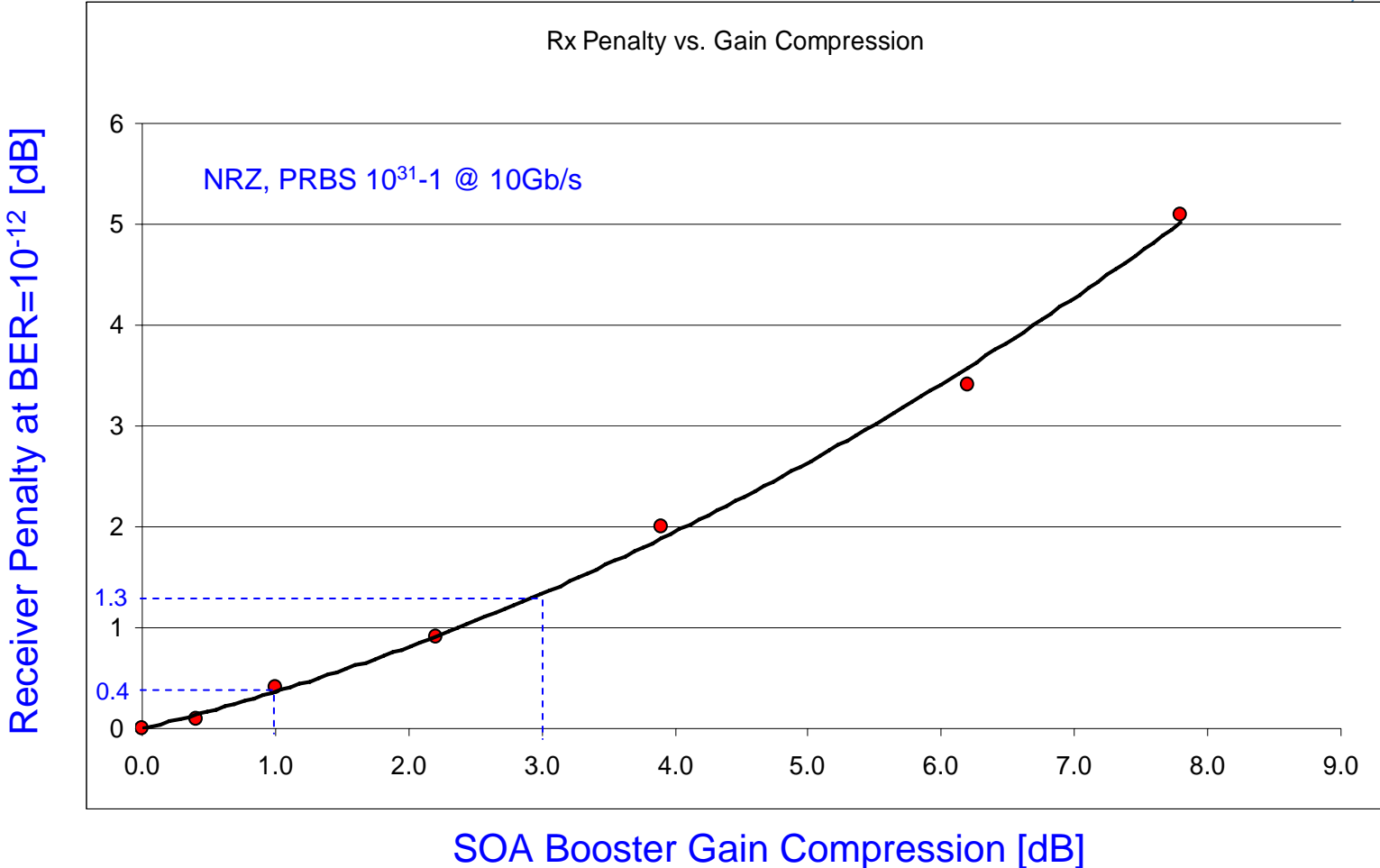


I	360 mA
T chip	25 °C
P ase,out	4.3 dBm
P ase,in	4.1 dBm
Peak wl	1481 nm
BW ase,fwhm	73.8 nm
Peak gain	23.0 dB
Max PDG	1.3 dB
Avg NF	6.5 dB
P sat,3dB	+13.7 dBm
ASE ripl	0.2 dB

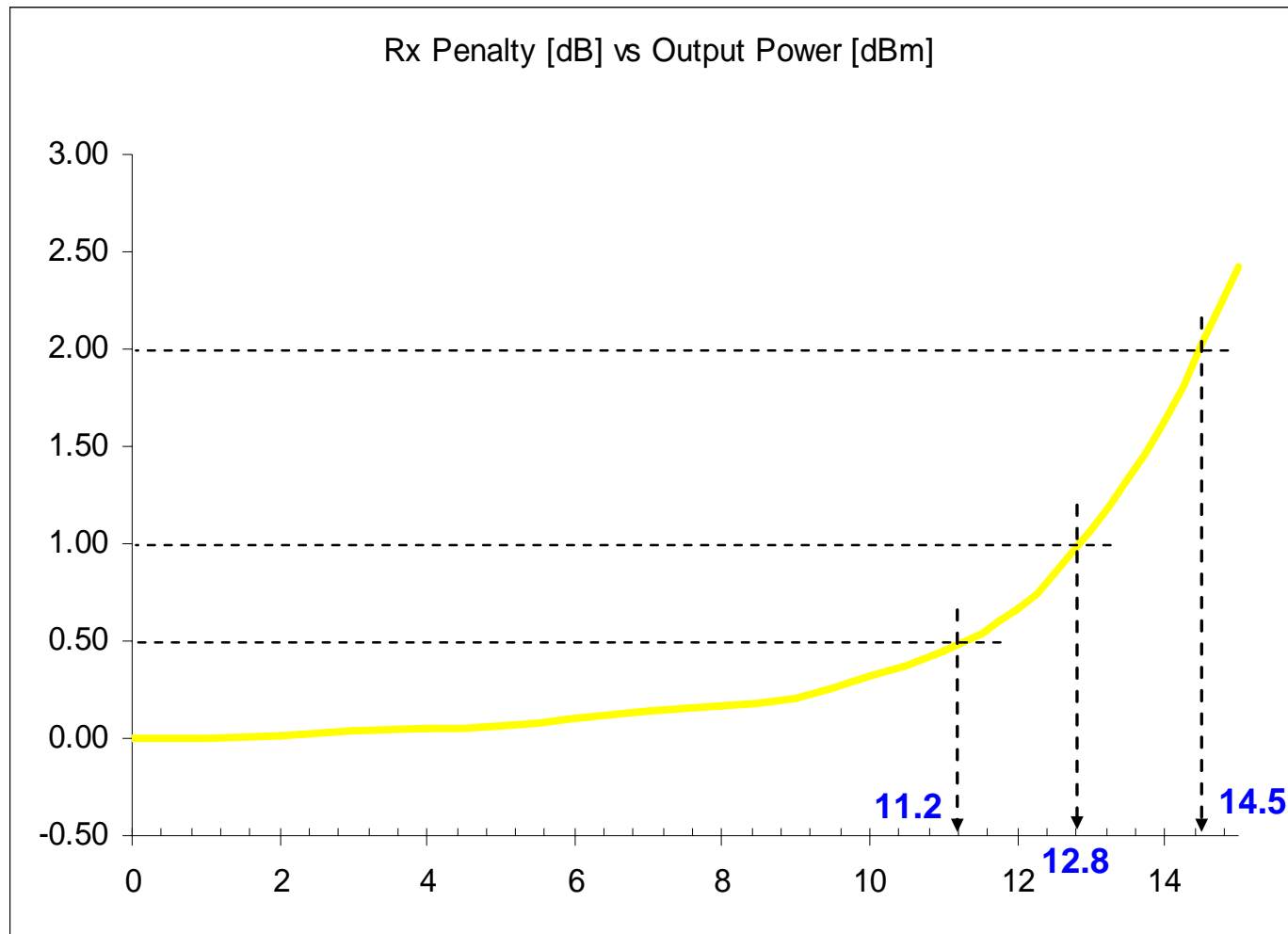
# SOA Gain Compression



# SOA Booster: Receiver Penalty



# SOA Booster Output





# Conclusions



- SOA is an excellent option for achieving the PX-30 budget today
  - meets performance targets with PIN Rx
  - can reach more aggressive specifications with APD
  - cost-effective at typical deployment scenarios
  - available, reliable, and already deployed
  - can be applied to any wavelength plan
- PIN/APD compromise proposal

# Straw Poll



1. I support a D/S PR-30 power budget based on +10 to +13 dBm transmit power to meet the 29+ dB insertion loss.
2. I support a D/S PR-30 power budget based on +2 to +5 dBm transmit power to meet the 29+ dB insertion loss.

FOR Option 1:15

FOR Option 2: 22

NONE:9