Downstream PMD Tables for 10GEPON

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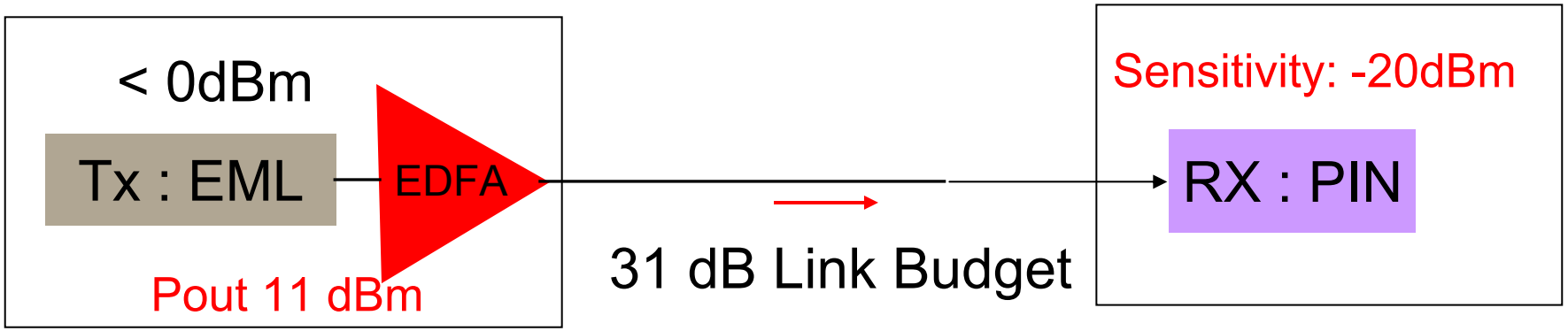
Downstream PMD Channel (with FEC)



- Highest quality & performance OLT with EML+EDFA transmitter
- Lowest cost & reliable ONU with PIN receiver

10GBASE-PX20-D transmit characteristics (FEC)

Description	10GBASE-PX20-D	1000BASE-PX20-U	Unit
Nominal transmitter type[1]	Longwave Laser	Longwave Laser	
Signaling speed (range)	10.3125 ± 100 ppm	10.3125 ± 100 ppm	GBd
Wavelength[2] (range)	1555 to 1565		nm
RMS spectral width (max) [3]	0.1		nm
Average launch power (max)	15		dBm
Average launch power (min)	11		dBm
Average launch power of OFF transmitter (max)	-30		dBm
Extinction ratio (min)	8.2		dB
$RIN_{15}OMA$ (max)	-128		dB/Hz
Launch OMA (min)	12.7		dBm
t_r, t_f (max, 20-80%)	40		ps

[1] The nominal device type is not intended to be a requirement on the source type, and any device meeting the transmitter characteristics specified may be substituted for the nominal device type
[2] This represents the range of center wavelength $\pm 1\sigma$ of the rms spectral width
[3] Dithering technology is applied to increase SBS threshold

10GBASE-PX20-D receive characteristics (FEC)

Description	10GBASE-PX20-D	10GBASE-PX20-U	Unit
Signaling speed (range)	10.3125 ± 100 ppm	10.3125 ± 100 ppm	GBd
Wavelength (range)	1555 to 1565		nm
Bit error ratio (max)	10^{-12}		
Average receive power (max)	-1		dBm
Damage threshold (max)	4		dBm
Receive sensitivity (max)	-20		dBm
Receiver sensitivity OMA (max)	-18.3		dBm

Source dithering to suppress SBS

• The SBS threshold is 9~13dBm in single mode fibers for typical amplitude modulated sources. The threshold increases roughly linearly with the source linewidth.

P_{thr} ~ Constant * (1+ W_s/W_b)
W_s = Source Linewidth
W_b = Brilloiun Gain Bandwidth (≤ 100MHz)

• To increase the SBS threshold, one can frequency-modulate the laser source to increase its linewidth. For a typical laser, the FM efficiency is ≥100MHz/mA. So a dither amplitude of a few milliamps superimposed on the laser DC bias will be sufficient to suppress SBS.

• The dither frequency needs to be high enough to ensure coverage over the effective fiber interaction length (i.e., f > c/(n*Le)=10kHz, Le~20km at 1550nm), while low enough to be outside the receiver bandwidth (~50kHz).

Dither implementation