Reducing the PMD Types of Downstream

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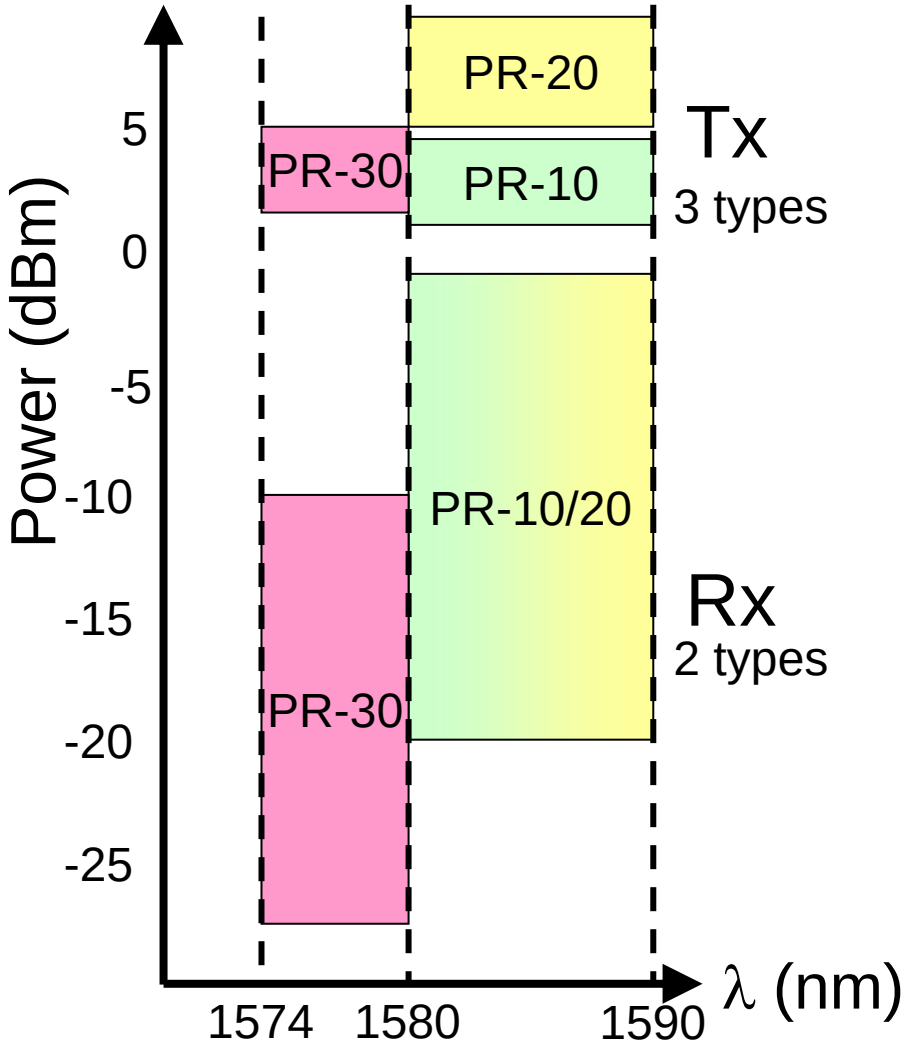
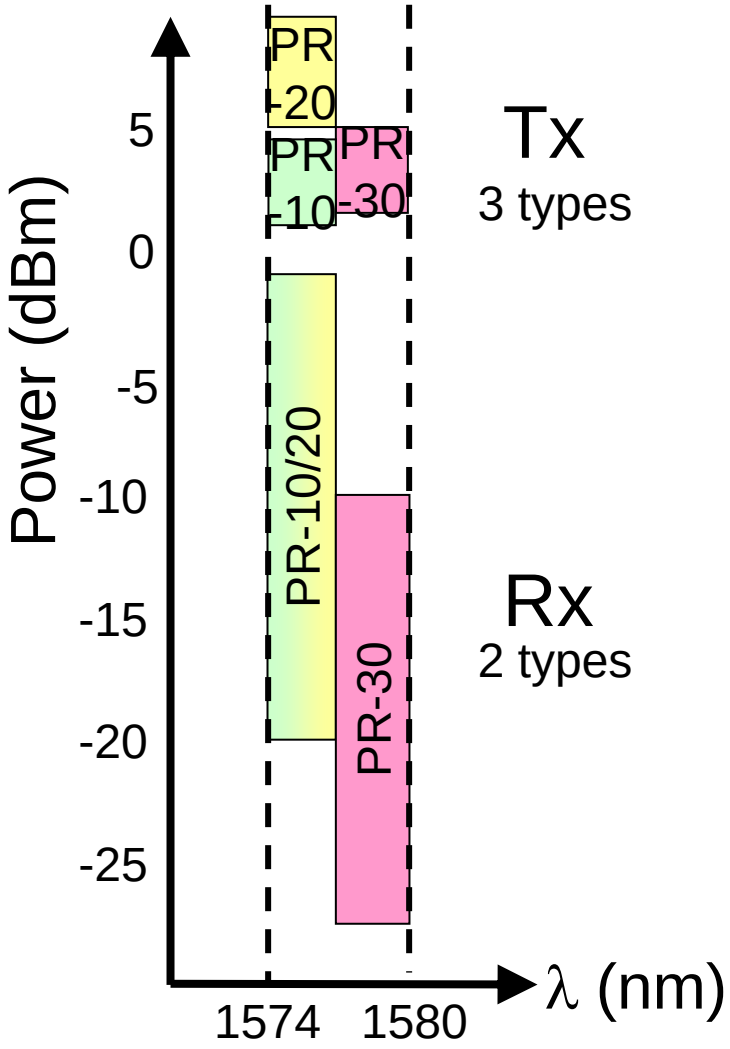
Overview

- In the September meeting at Seoul, the downstream wavelength ranges were unified to 1577 +/- 3 nm.
- The power budgets of the downstream should be reconsider on this occasion.
- Current draft specifies 3 types of transmitter and 2 types of receiver in downstream.
  - DS Tx
    1. 10GBASE–PR–D1 (EML)
    2. 10GBASE–PR–D2 (EML + Optical Amplifier)
    3. 10GBASE–PR–D3 (EML)
  - DS Rx
    1. 10GBASE–PR–U1 (PIN)
    2. 10GBASE–PR–U3 (APD)
- In order to realize low-cost PMDs, the types of PMD should be reduced.

Power and Wavelength Range (D2.0 and 2.1)

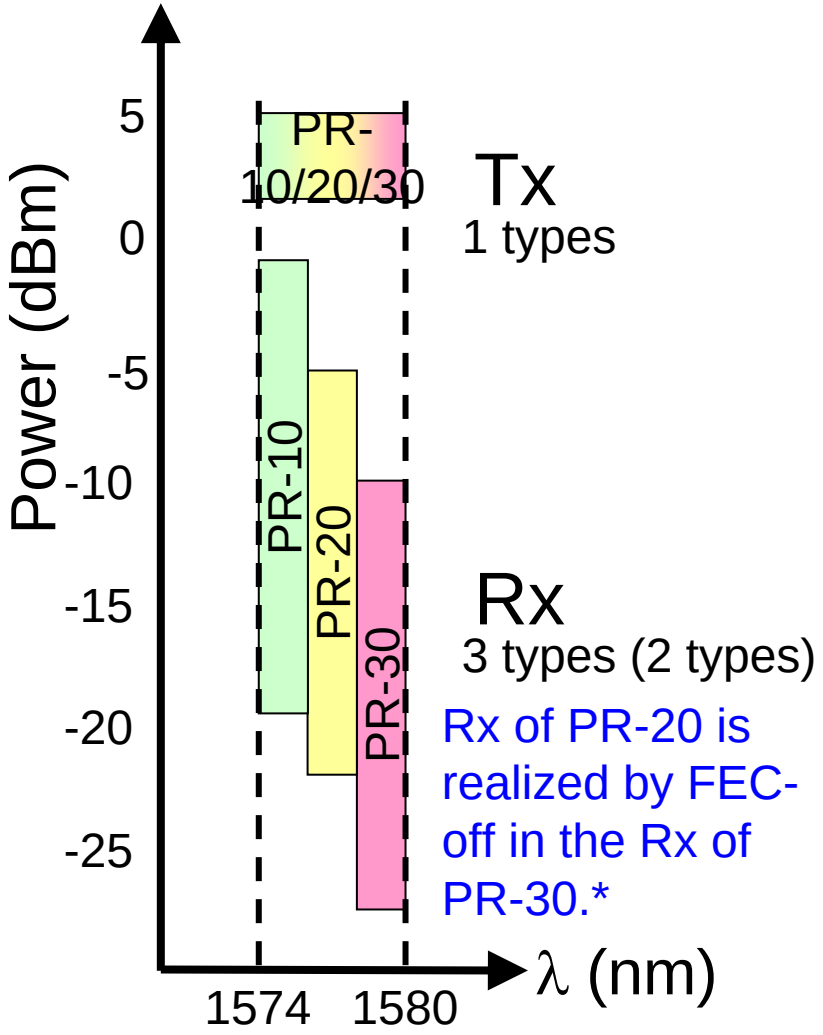


Draft 2.0

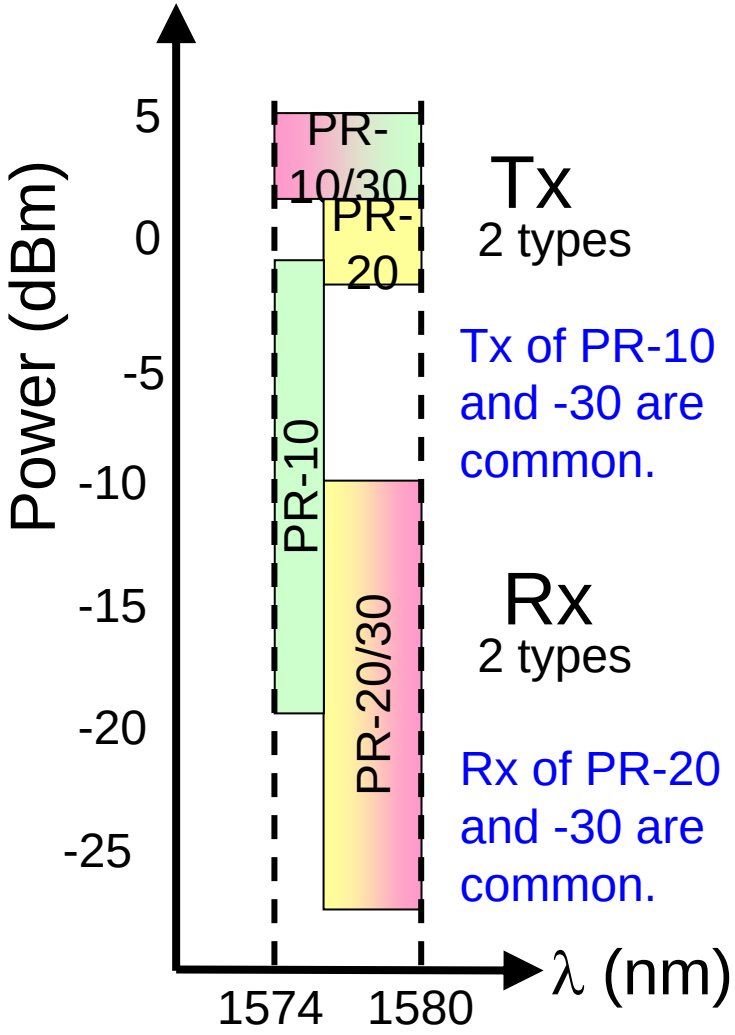


Draft 2.1

Power and Wavelength Range (Proposal)



Proposal 1 (Single Tx)



Proposal 2 (Low-power Tx)

Power Budget (Proposal 1)

Red characters are change from D2.1

	PR-10	PR-20	PR-30	Unit
OLT PMD transmit characteristic (excerpt from Table 75-5)				
Average launch power (max)	5	5	5	dBm
Average launch power (min)	2	2	2	dBm
Launch OMA (min)	3.91 (2.46)	3.91 (2.46)	3.91 (2.46)	dBm (mW)
ONU PMD receive characteristic (excerpt from Table 75-11)				
Average receive power (max)	0	-5	-10	dBm
Damage threshold (max)	1	-4	-9	dBm
Receiver sensitivity (max)	-19.5	-23.5	-28.5	dBm
Receiver sensitivity OMA (max)	-17.59 (17.42)	-21.59 (6.93)	-26.59 (2.19)	dBm (uW)
Stressed receive sensitivity (max)	-18	-22	-27	dBm
Stressed receive sensitivity OMA (max)	-16.09 (24.60)	-20.09 (9.79)	-25.09 (3.10)	dBm (uW)

Power Budget (Proposal 2)

Red characters are change from D2.1

	PR-10	PR-20	PR-30	Unit
OLT PMD transmit characteristic (excerpt from Table 75-5)				
Average launch power (max)	5	0	5	dBm
Average launch power (min)	2	-3	2	dBm
Launch OMA (min)	3.91 (2.46)	-1.09 (0.78)	3.91 (2.46)	dBm (mW)
ONU PMD receive characteristic (excerpt from Table 75-11)				
Average receive power (max)	0	-10	-10	dBm
Damage threshold (max)	1	-9	-9	dBm
Receiver sensitivity (max)	-19.5	-28.5	-28.5	dBm
Receiver sensitivity OMA (max)	-17.59 (17.42)	-26.59 (2.19)	-26.59 (2.19)	dBm (uW)
Stressed receive sensitivity (max)	-18	-27	-27	dBm
Stressed receive sensitivity OMA (max)	-16.09 (24.60)	-25.09 (3.10)	-25.09 (3.10)	dBm (uW)

Pros & Cons

	Pros	Cons
Draft 2.0		•High-power optical amplifier is required only for PR-20 •Two wavelength ranges
Draft 2.1	•Single wavelength range	•High-power optical amplifier is required only for PR-20.
Reducing PMD Proposal 1	•Single wavelength range •Single Tx type •No need for high-power optical amplifier •Power-saving possibility without FEC decoding •Low cost	•FEC off (neglect parity) function is required in ONU. •High-power EML is required for PR-20 •Overload •BER of 10^{-12} should be specified.
Reducing PMD Proposal 2	•Single wavelength range •No need for high-power optical amplifier •High-power EML is not required for PR-20 •Low cost	

Summary

- The power budgets of the downstream were reconsidered in order to reduce the PMD types.
- Two sets of power budgets were considered.
  - Single Tx
  - Low power Tx
- Common PMDs between other classes will suppress the cost through the mass production effect.