# Upstream power budget proposal for PRX30

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# Consideration of upstream power budget for PRX30

- NTT has already proposed IEEE_Rx_Str_Sen_OMA as **-27.6 dBm**.  So I think we should use this value.

- If PRX_U3 use a DFB-LD, optical path penalty is estimated as 0.5 dB that is the same as that of Class B+.  Therefore, TDP and ECP (eye closure penalty) should be small compared with those of PR20 (1.8 dB and 1.9 dB).  So I think TDP and ECP should be reduced to **1.4 dB** (~ ECP_PR20-(OPP_PR20-OPP_PRX30)).

- If the sensitivity difference between 10G and 1G is less than 6.8 dB, we can use the APD parallel technology as a dual rate receiver.  In my proposal, the sensitivity (IEEE_Rx_Sen_OMA (Ideal sensitivity)) difference between 1G and 10G is 6.8 dB.

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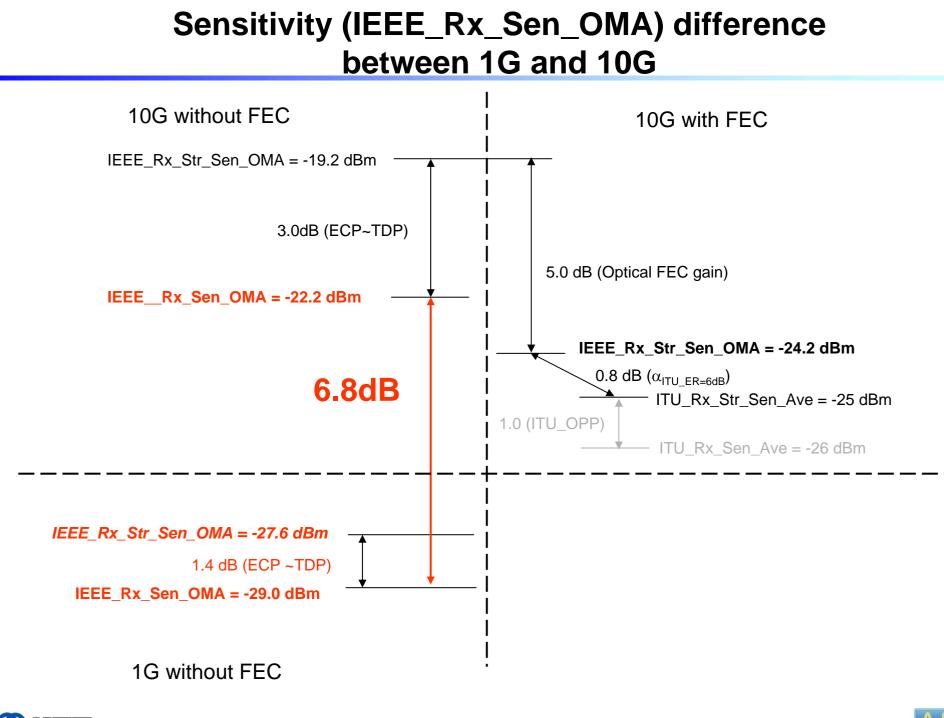| No. | Description | PRX_U3 (ONU) | PRX_D3 (OLT) |
|-----|-------------|--------------|--------------|
| 1 | Minimum extinction ratio (ITU_ER) | 6 dB | - |
| 2 | Eye closure penalty (ECP)(Note 1) | - | **1.4 dB** |
| 3 | TDP (Note 1) | *TBD (or 1.4 dB)* | - |
| 4 | Ch.loss_Min - Ch.loss_Max | 15 - 29 dB | |
| 5 | Power_range | 5 dB | - |
| 6 | **IEEE_Rx_Str_Sen_OMA** | - | **-27.6 dBm** |
| 7 | IEEE_Rx_Sen_OMA (IEEE_Rx_Str_Sen_OMA –ECP) | - | -29.0 dBm |
| 8 | IEEE_Tx_OMA_min ( = IEEE_Rx_Str_Sen_OMA + Ch.loss_Max) | 1.4 dB | - |
| 9 | IEEE_Tx_OMA_max ( = IEEE_Tx_OMA_min + Power_range) | 6.4 dBm | - |
| 10 | Overload ( = ITU_Tx_max –Ch.loss_min )(Note 2) | - | -9.4 dBm |

(Note 1) Sensitivity difference between IEEE_Rx_Str_Sen_OMA and IEE._Rx_Sen_OMA(Ideal) that nearly equals to TDP value.

(Note 2) ITU_Tx_max(= IEEE_Tx_OMA_max − $\alpha_{ITU\_ER=6dB}$), $\alpha_{ITU\_ER=6dB}$ = 0.8 dB

# Sensitivity (IEEE_Rx_Sen_OMA) difference between 1G and 10G

10G without FEC

10G with FEC

IEEE_Rx_Str_Sen_OMA = -19.2 dBm

3.0dB (ECP~TDP)

5.0 dB (Optical FEC gain)

IEEE__Rx_Sen_OMA = -22.2 dBm

**IEEE_Rx_Str_Sen_OMA = -24.2 dBm**

0.8 dB ($\alpha_{ITU\_ER=6dB}$)

ITU_Rx_Str_Sen_Ave = -25 dBm

1.0 (ITU_OPP)

ITU_Rx_Sen_Ave = -26 dBm

**6.8dB**

*IEEE_Rx_Str_Sen_OMA = -27.6 dBm*

1.4 dB (ECP ~TDP)

**IEEE_Rx_Sen_OMA = -29.0 dBm**

1G without FEC