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25G power budget: 2nd iteration, downstream

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10G EPON PR30 downstream (from harstead_3ca_1a_0516.pdf)

AVP_{min} = 2 dBm
OMA_{min} = 3.91 dBm

Loss budget = 29 dB

Receiver sensitivity specified at ER=9 dB

Rx $Sens_{max}$ = -28.5 dBm
OMA Rx $Sens_{max}$ = -26.59 dBm

TDP = 1.5 dB

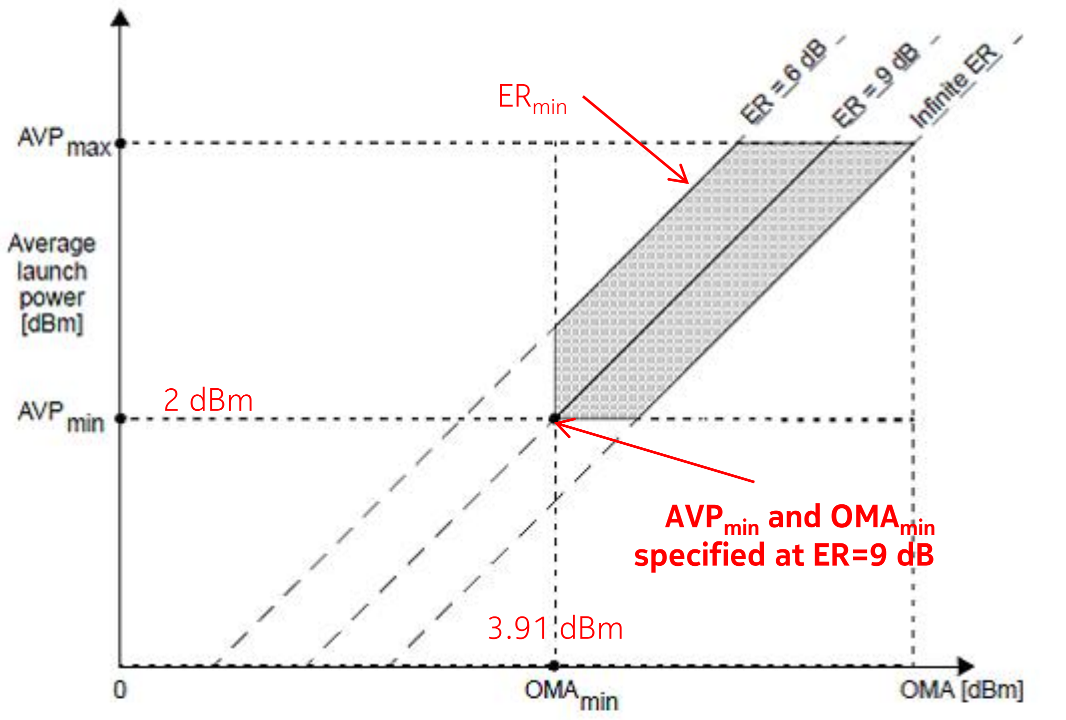

Figure 75–4—Graphical representation of region of PR–D type transmitter compliance

Preliminary values for 25G EPON AVP_{min} and ER

- Summary of vendor input on 25G EML and DML performance (harstead_3ca_1_0716)

AVPmin (dBm)	number	mean	σ
EML	6	4.5	0.8
cooled DML	8	7.0	1.2
uncooled DML	6	4.7	1.5
ER (dB)			
EML	6	7.5	0.8
cooled DML	8	5.3	0.9
uncooled DML	6	4.7	1.0

(mostly conservative values)

- Proposed values, mean + one σ, rounded to nearest dB.

	AVP_{min} (dBm)	ER (dB)	OMA_{min}(dBm)
EML	5	8	6.62
cooled DML	8	6	8.78
uncooled DML	6	6	6.78

➢ Note: the cooled DML has the best OMA performance, followed by the EML and uncooled DML, both about 2 dB worse.

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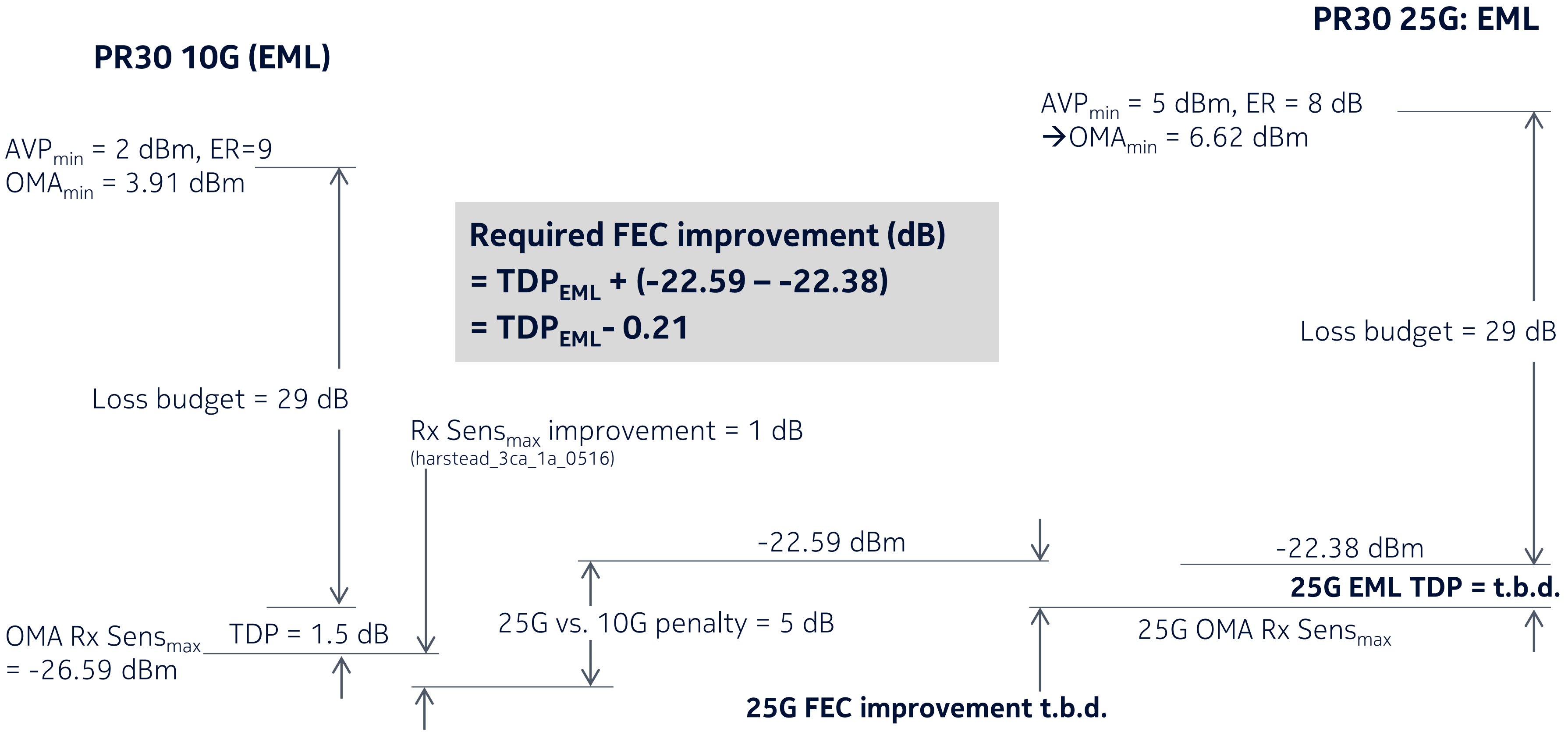
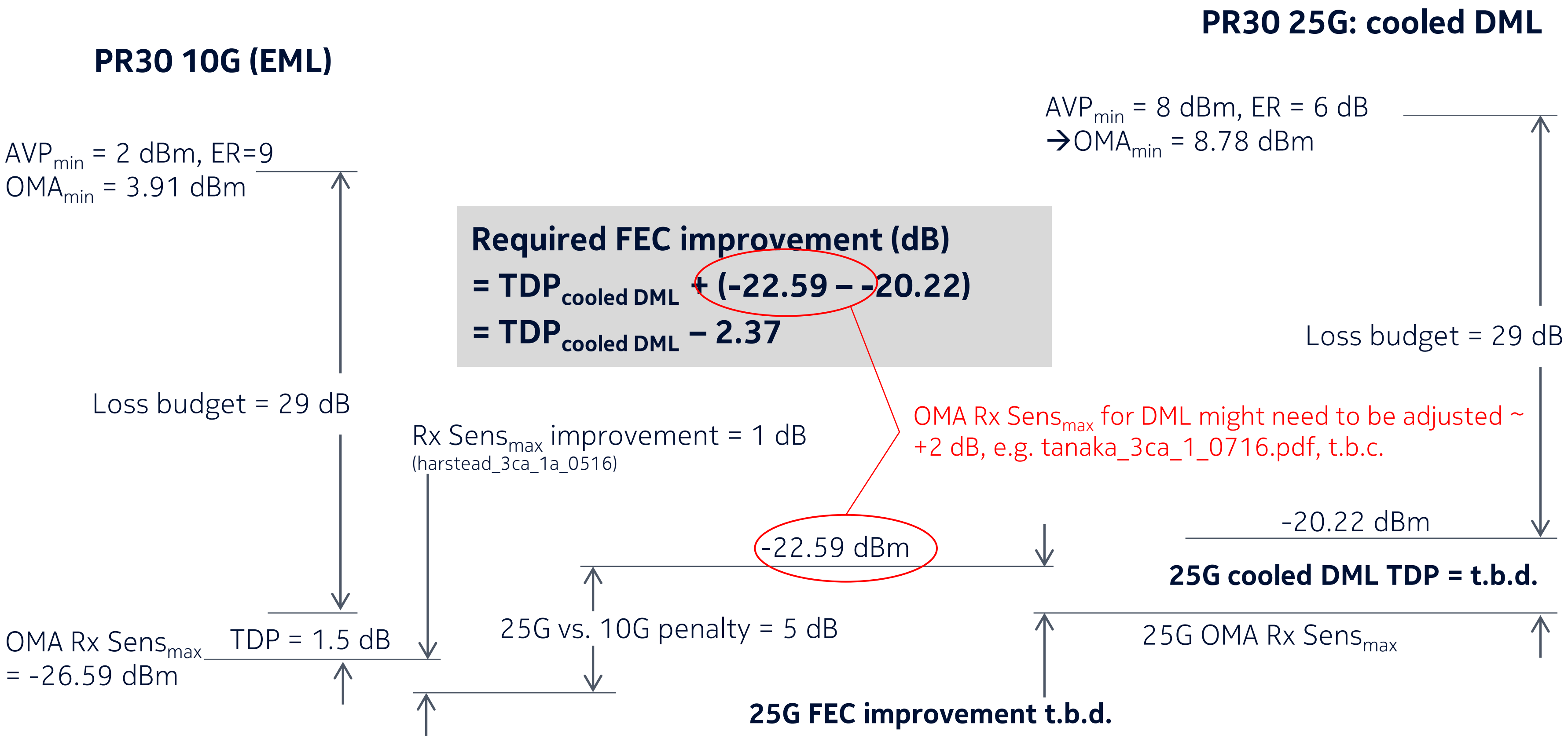
25G EPON PR30 downstream: EML



25G EPON PR30 downstream: cooled DML



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Conclusions

- Based on vendor input, preliminary unamplified launch power and extinction ratio values are proposed for EML and cooled DML transmitters in the OLT.
- Next step: the 25G downstream wavelength needs to be selected before the downstream TDP can be quantified.
- The value of the TDP will then drive the amount of FEC coding gain improvement required.
- Or conversely, the realizable FEC improvement can quantified, and then a downstream wavelength selected with a supportable TDP.
- The relationships between required FEC improvement and TDP are:

Required FEC improvement (dB) = $\mathbf{TDP_{EML} - 0.21}$

Required FEC improvement (dB) = $\mathbf{TDP_{cooled\ DML} - 2.37}$ Might need to be adjust ~2 dB less, t.b.c.

- The same process needs to be replicated for upstream, with the possible inclusion of an uncooled DML ONU transmitter.

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