Super-PON Reflectance

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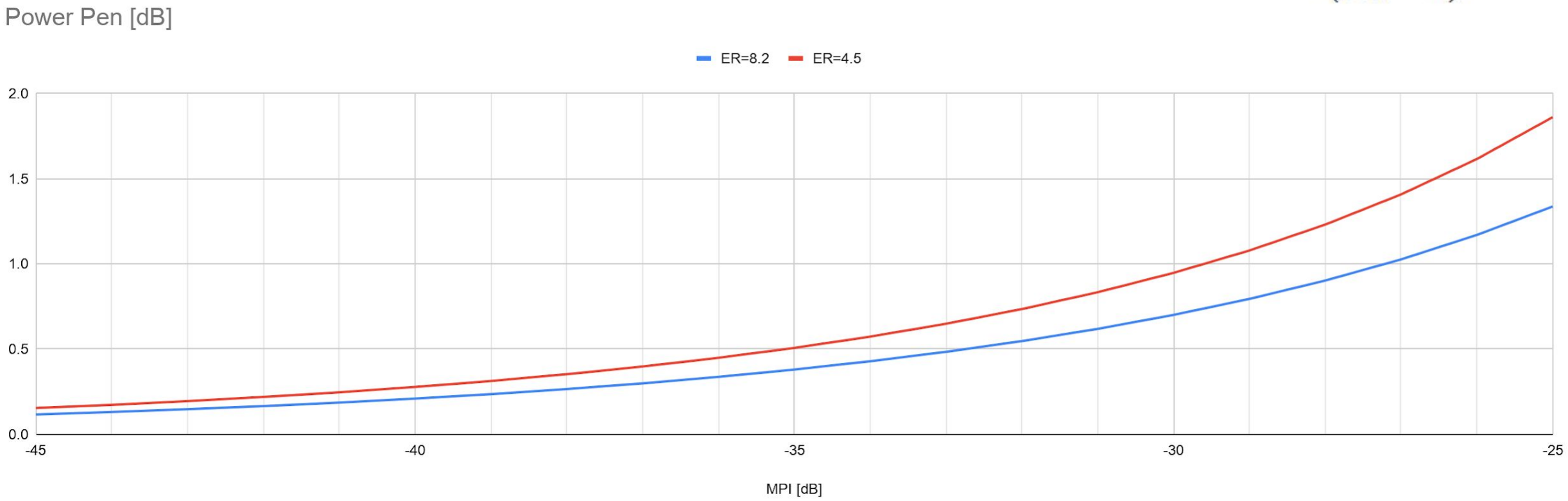
Overview

- Present penalty vs MPI
- ITU-T assumptions for XGS-PON and NG-PON2
- IEEE assumptions in 25/50G EPON (IEEE 802.3ca)
- Recommendations for Super-PON (IEEE 802.3cs)

Power penalty for MPI

$$P_{MPI}\,(dB) = 10\log_{10}\left[1/\left(1-\gamma\right)\right]$$

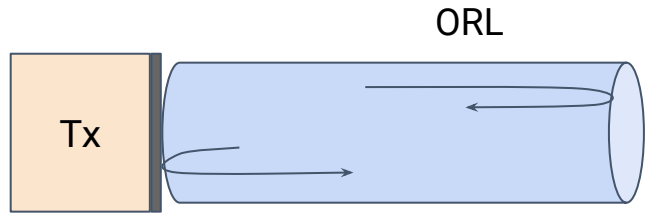
$$\gamma \cong 4\left(m-1\right)\sqrt{MPI}\left(\frac{ER}{ER-1}\right)$$



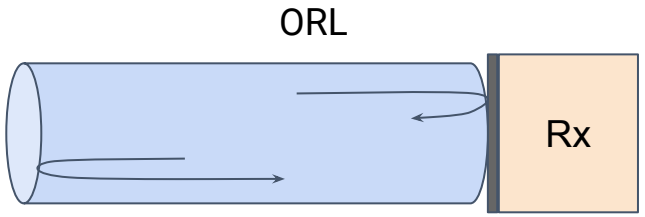
Comparing other standards

		XGS-PON	NG-PON2 (10G)	IEEE802.3ca
Downstream	Minimum extinction ratio	8.2	8.2	8
	Maximum reflectance of equipment at S/R, measured at transmitter wavelength	N/A	N/A	-10
	Maximum reflectance of equipment at R/S, measured at receiver wavelength	-20	-20	-12
	Transmitter tolerance to reflected optical power	-15	-15	-15
	Minimum ORL of ODN (passive ODN)	32	32	15
Upstream	Minimum extinction ratio	6	6	5
	Maximum reflectance of equipment at R/S, measured at transmitter wavelength	-10	-6	-10
	Maximum reflectance of equipment at S/R, measured at receiver wavelength	-12	-20	-12
	Tolerance to reflected optical power	-15	-15	-15
	Minimum ORL of ODN (passive ODN)	32	32	15

Max NPI from Tx reflectance

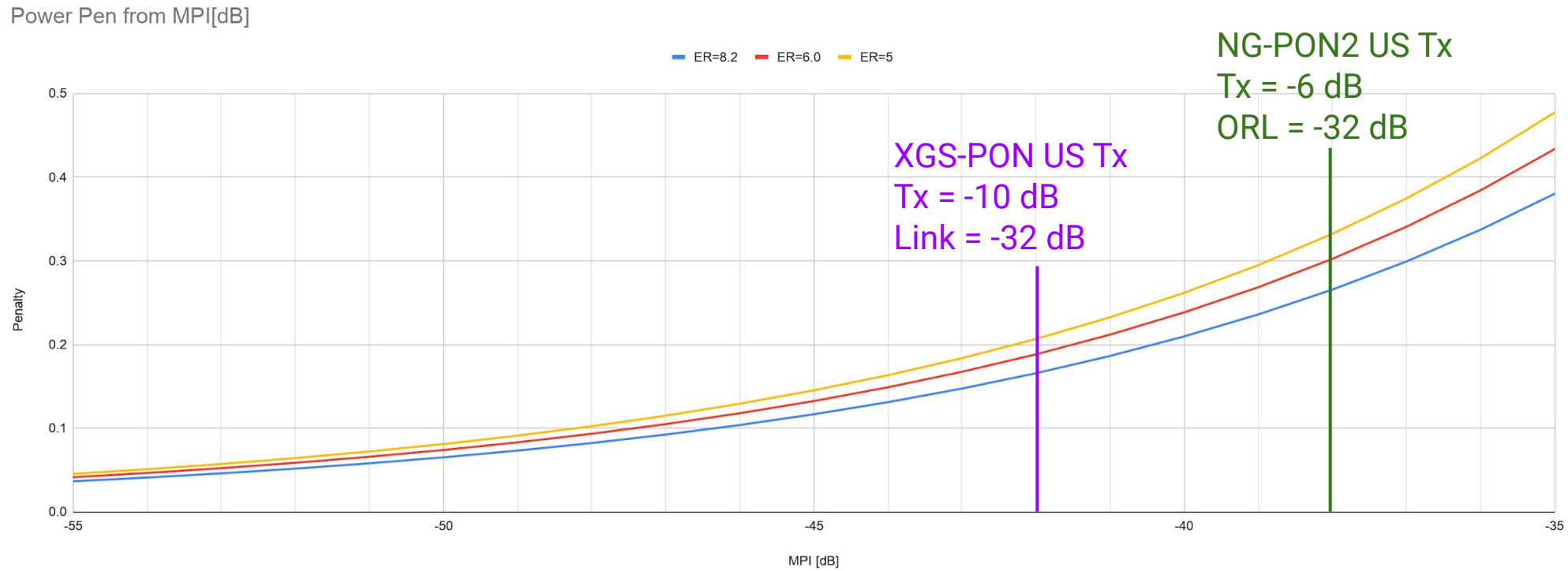


Max NPI from Rx reflectance



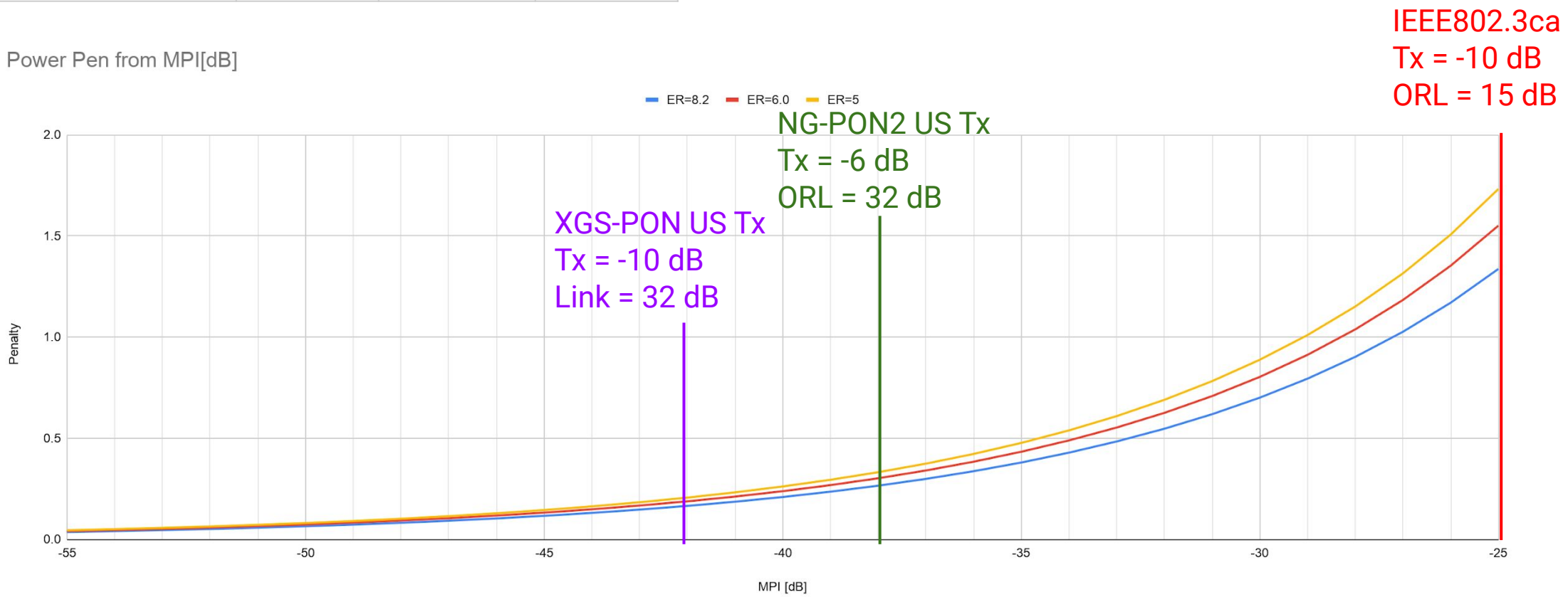
NPI from Tx/Rx and ORL

	XGS-PON	NG-PON2 (10G)	IEEE802.3ca
NPI for DS from Tx	N/A	N/A	-25
NPI for DS from Rx	-52	-52	-27
NPI for US from Tx	-42	-38	-25
NPI for US from Rx	-44	-52	-27



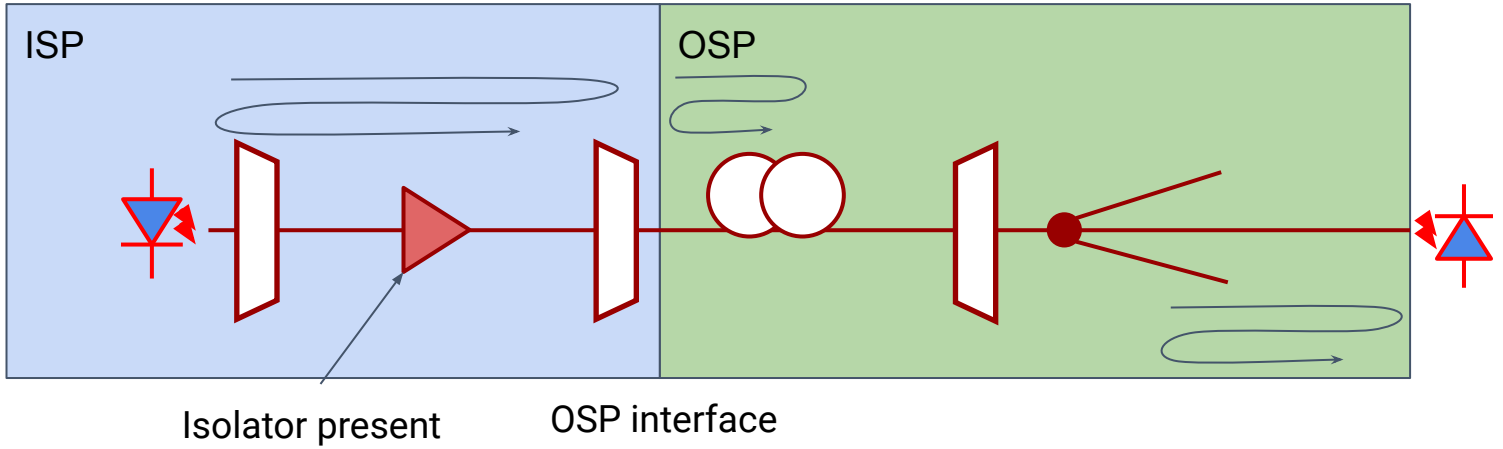
NPI from Tx/Rx and ORL

	XGS-PON	NG-PON2 (10G)	IEEE802.3ca
NPI for DS from Tx	N/A	N/A	-25
NPI for DS from Rx	-52	-52	-27
NPI for US from Tx	-42	-38	-25
NPI for US from Rx	-44	-52	-27

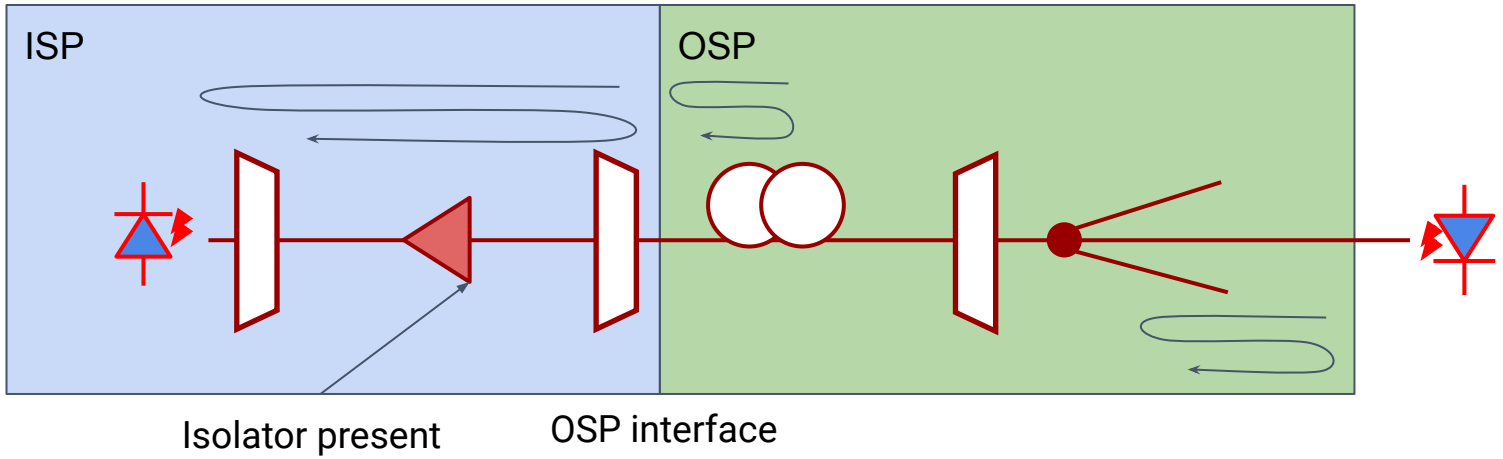


IEEE 802.3cs reflection diagram

Downstream



Upstream

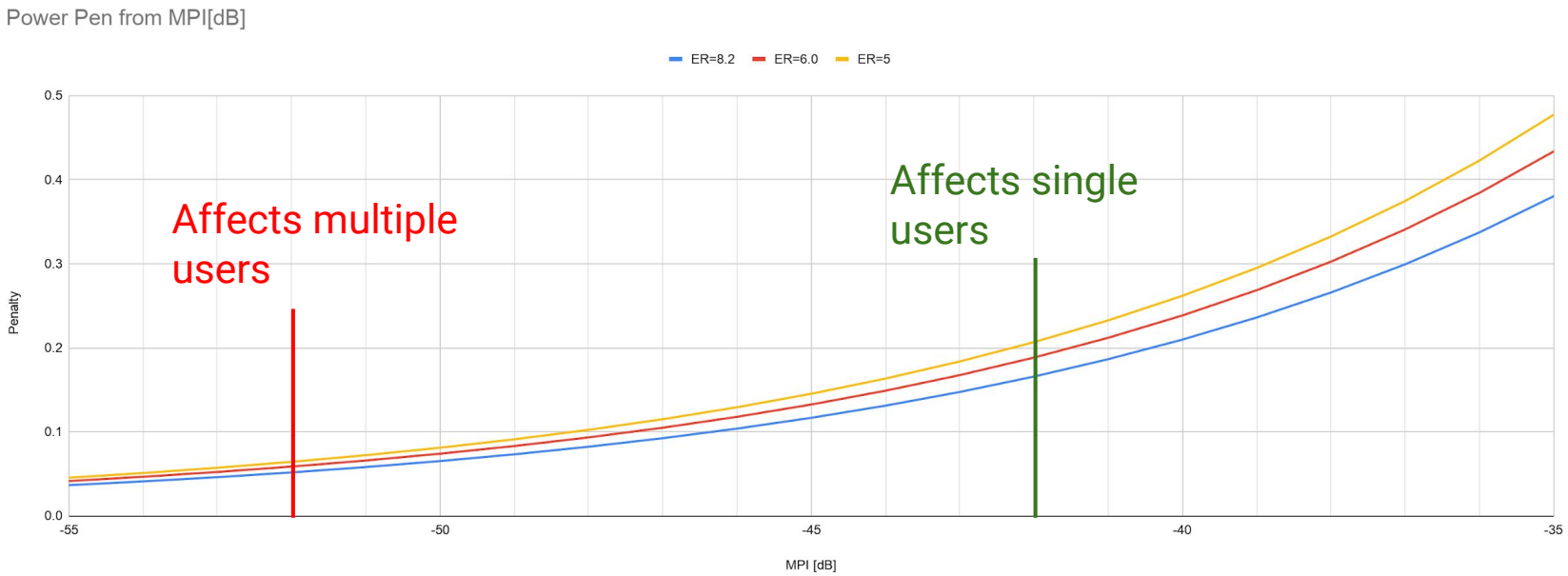


Proposal for 802.3cs

		XGS-PON	NG-PON2 (10G)	IEEE802.3ca	IEEE802.3cs
Downstream	Minimum extinction ratio	8.2	8.2	8	8.2
	Maximum reflectance of equipment at S/R, measured at transmitter wavelength	N/A	N/A	-10	-10
	Maximum reflectance of equipment at R/S, measured at receiver wavelength	-20	-20	-12	-12
	Transmitter tolerance to reflected optical power	-15	-15	-15	-15
	Minimum ORL of ODN (passive ODN)	32	32	15	
	Minimum ORL of ODN (OLT to OSP interface)				42
	Minimum ORL of ODN (of OSP)				32
	Maximum reflectance at OSP interface in DS wavelength band				-20
Upstream	Minimum extinction ratio	6	6	5	6
	Maximum reflectance of equipment at R/S, measured at transmitter wavelength	-10	-6	-10	-10
	Maximum reflectance of equipment at S/R, measured at receiver wavelength	-12	-20	-12	-12
	Tolerance to reflected optical power	-15	-15	-15	-15
	Minimum ORL of ODN (passive ODN)	32	32	15	
	Minimum ORL of ODN (OLT to OSP interface)				42
	Minimum ORL of ODN (of OSP)				32
	Maximum reflectance at OSP interface in US wavelength band				-20

NPI for 802.3cs

	XGS-PON	NG-PON2 (10G)	IEEE802.3ca	IEEE802.3cs
NPI for DS from Tx (passive)	N/A	N/A	-25	
NPI for DS from Tx: OLT to OSP interface				-52
NPI for DS from Tx: OSP interface to ONU				-52
NPI for DS from Rx	-52	-52	-27	-44
NPI for US from Tx	-42	-38	-25	-42
NPI for US from Rx (passive)	-44	-52	-27	
NPI for DS from Rx: OLT to OSP interface				-54
NPI for DS from Rx: OSP interface to ONU				-52



Thank you