P802.3bs optical reflection limits

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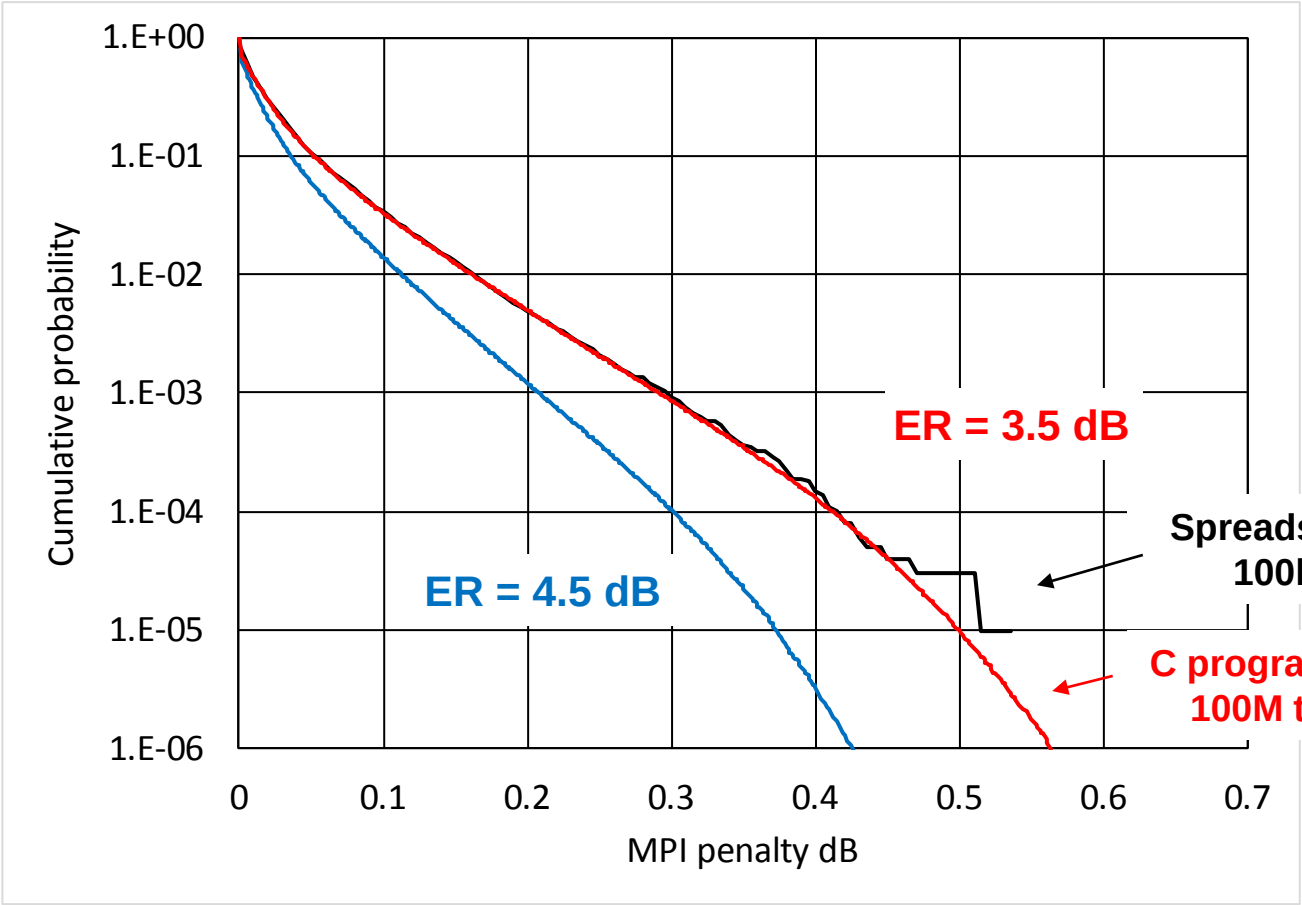
Introduction

Comments r01-19, r01-45, r01-52, and r01-53 against IEEE P802.3bs D3.1 propose changing the extinction ratio specification for the optical PMDs to 3.5 dB

This presentation looks at the impact on MPI penalty that this would have using a C program based on the calculations in the spreadsheet in king_02a_0116_smf.7z in order to extend the Monte Carlo analysis to a larger number of samples.

LR4, LR8 6 x -35 dB, Tx & Rx -26 dB

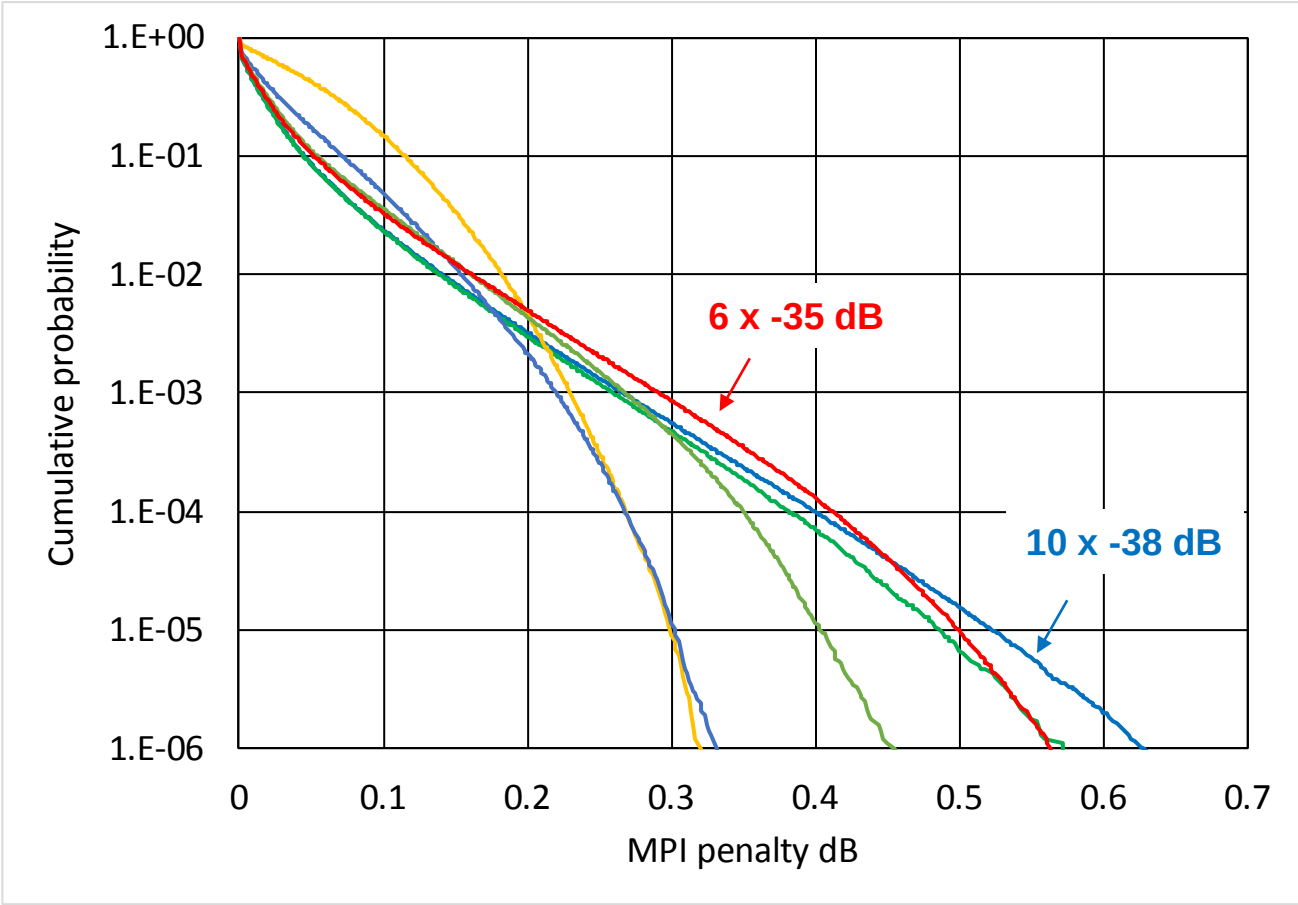
BER 2.4E-4												
-26	-35	-55	-55	-35	-35	-35	-35	-55	-55	-35	6.3	-26



LR4, LR8 0.6 dB penalty , 3.5 dB ER

BER 2.4E-4
ER 3.5 dB

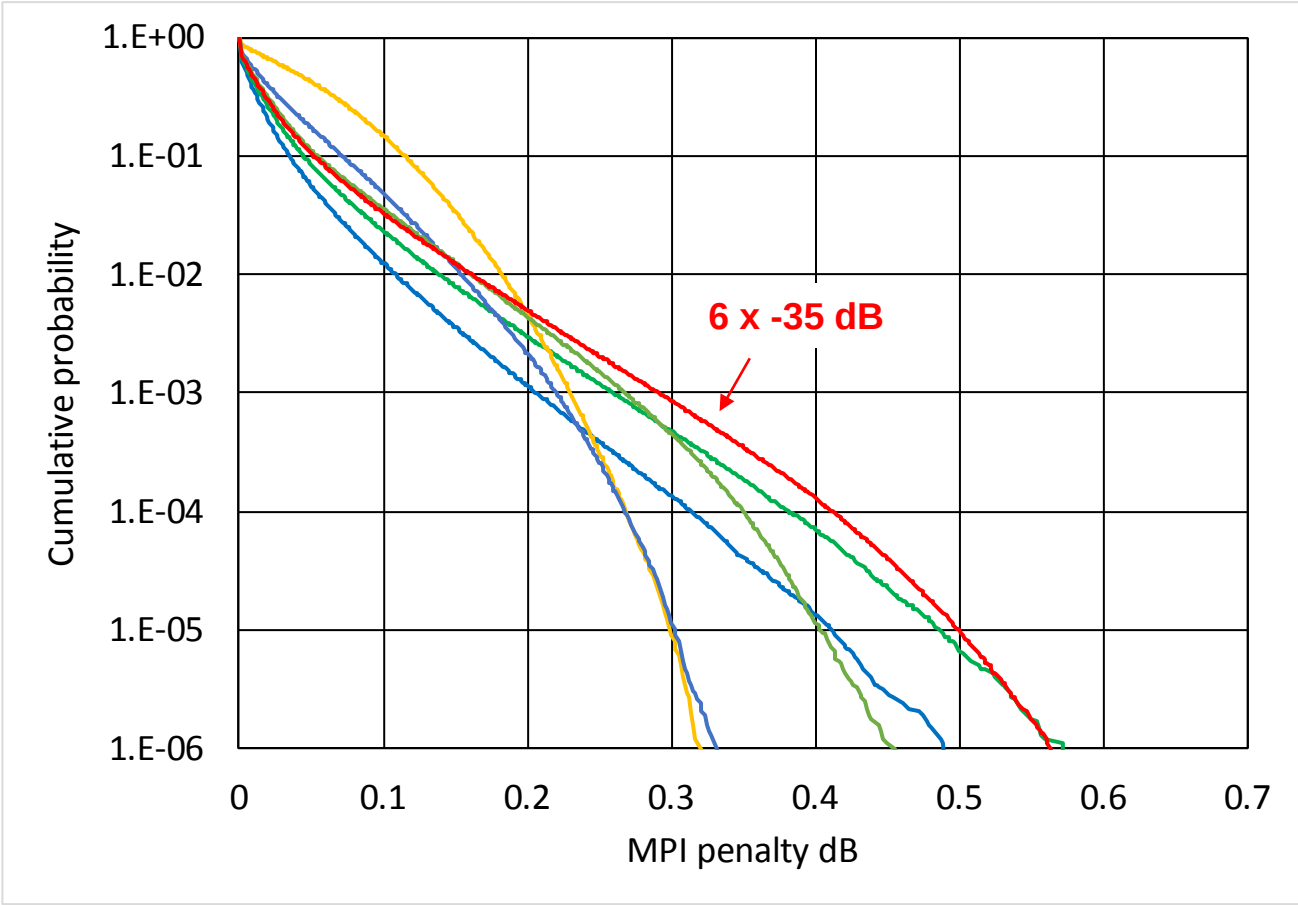
-26	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	6.3	-26
-26	-37	-37	-55	-37	-37	-37	-37	-55	-37	-37	6.3	-26
-26	-35	-55	-55	-35	-35	-35	-35	-55	-55	-35	6.3	-26
-26	-33	-55	-55	-55	-33	-33	-55	-55	-55	-33	6.3	-26
-26	-29	-55	-55	-55	-55	-55	-55	-55	-55	-29	6.3	-26
-26	-55	-55	-55	-55	-55	-22	-55	-55	-55	-55	6.3	-26



LR4, LR8 0.6 dB penalty , 3.5 dB ER

BER 2.4E-4
ER 3.5 dB

-26	-39	-39	-39	-39	-39	-39	-39	-39	-39	-39	6.3	-26
-26	-37	-37	-55	-37	-37	-37	-37	-55	-37	-37	6.3	-26
-26	-35	-55	-55	-35	-35	-35	-35	-55	-55	-35	6.3	-26
-26	-33	-55	-55	-55	-33	-33	-55	-55	-55	-33	6.3	-26
-26	-29	-55	-55	-55	-55	-55	-55	-55	-55	-29	6.3	-26
-26	-55	-55	-55	-55	-55	-22	-55	-55	-55	-55	6.3	-26



LR4, LR8 consequences

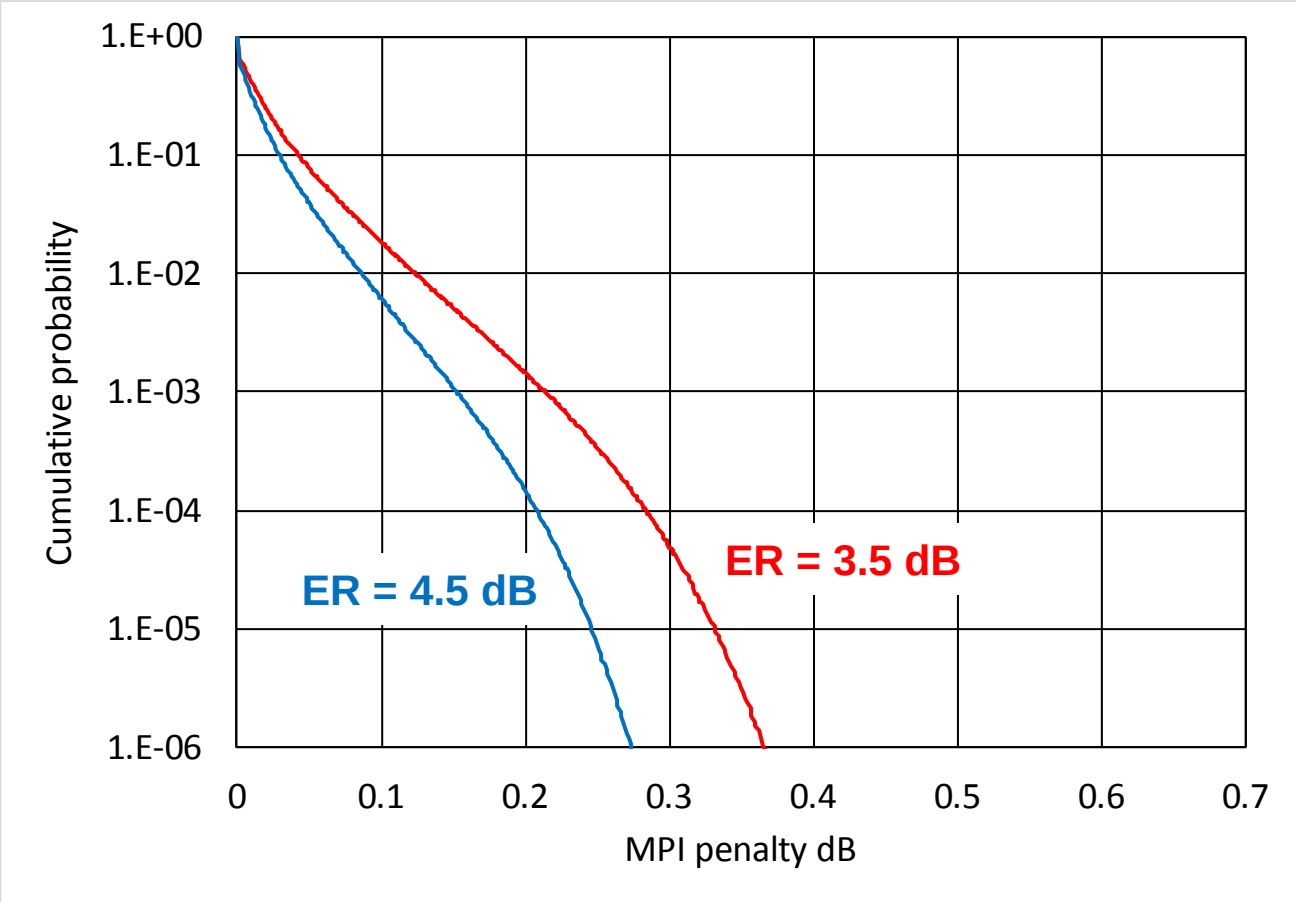
200GBASE-LR4 and 400GBASE-LR8 currently have an allocation of 0.5 dB for MPI.

Changing the ER to 3.5 dB would require an increase of this allocation to about 0.6 dB if the ability to accommodate 6 x –35 dB + 4 x –55 dB reflections is retained.

Proposals to make this change would have to include details of how the budget should be modified to accommodate the increased MPI penalty. If this is done, then the reflections given in Table 122-19 for 200GBASE-LR4 or 400GBASE-LR8 can still be supported with the exception that the value for 10 reflectances should be changed from -38 dB to -39 dB.

FR4, FR8 4 x -35 dB, Tx & Rx -26 dB

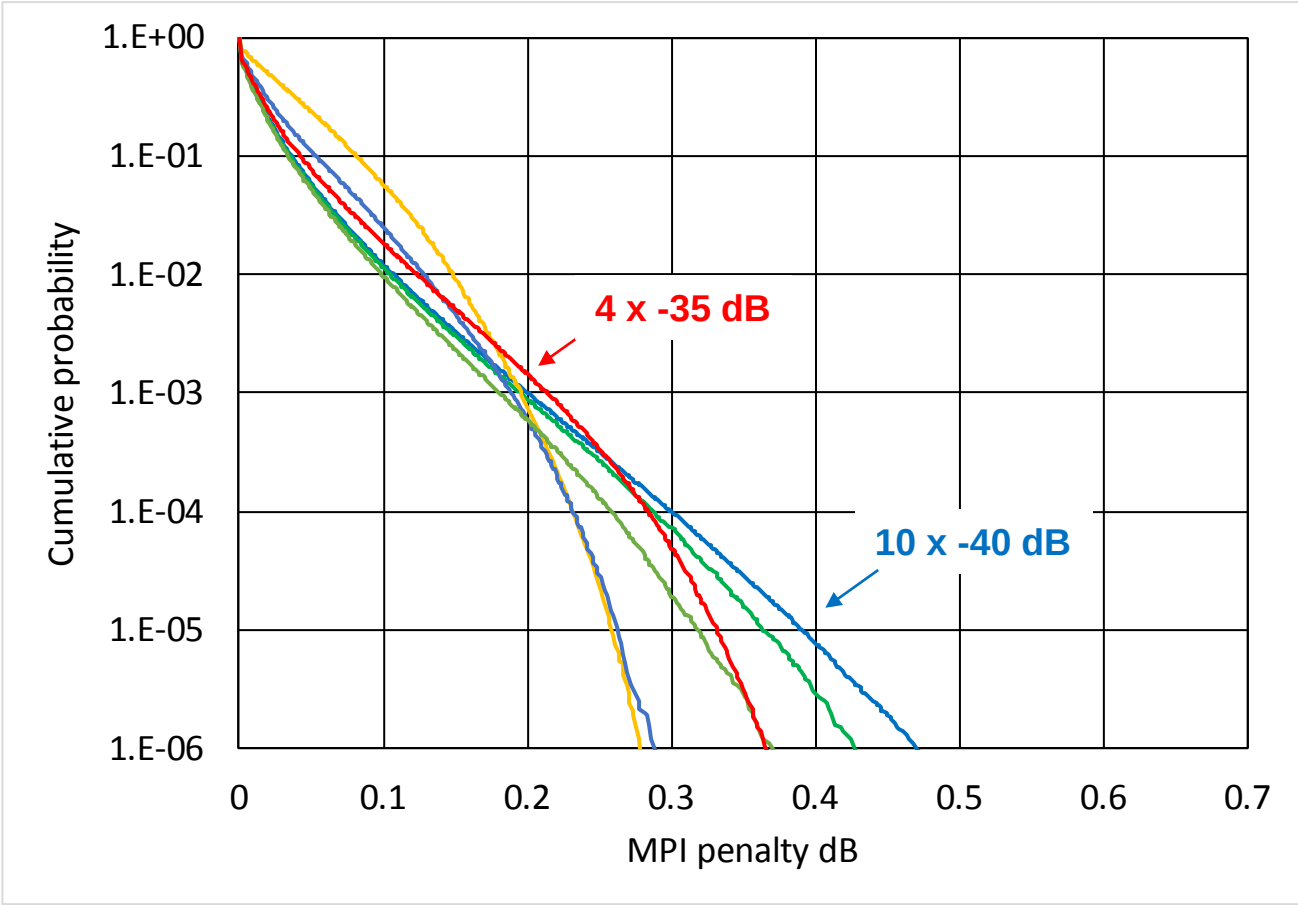
BER 2.4E-4												
-26	-35	-55	-55	-55	-35	-35	-55	-55	-55	-35	4.0	-26



FR4, FR8 0.4 dB penalty , 3.5 dB ER

BER 2.4E-4
ER 3.5 dB

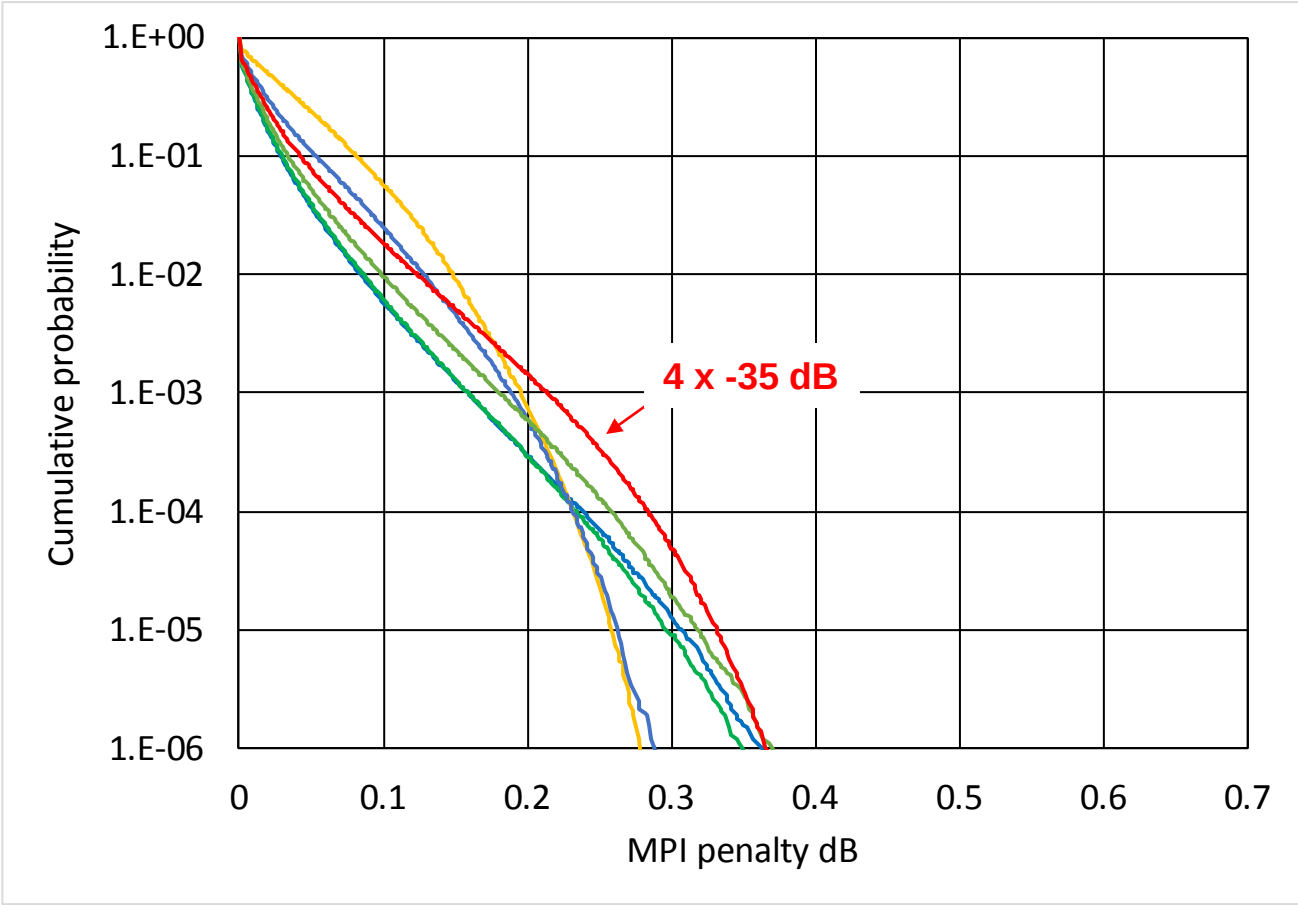
-26	-40	-40	-40	-40	-40	-40	-40	-40	-40	4.0	-26
-26	-39	-39	-55	-39	-39	-39	-39	-55	-39	4.0	-26
-26	-38	-55	-55	-38	-38	-38	-38	-55	-55	4.0	-26
-26	-35	-55	-55	-55	-35	-35	-55	-55	-55	4.0	-26
-26	-31	-55	-55	-55	-55	-55	-55	-55	-55	4.0	-26
-26	-55	-55	-55	-55	-55	-25	-55	-55	-55	4.0	-26



FR4, FR8 0.4 dB penalty , 3.5 dB ER

BER 2.4E-4
ER 3.5 dB

-26	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41	4.0	-26
-26	-40	-40	-55	-40	-40	-40	-40	-55	-40	-40	4.0	-26
-26	-38	-55	-55	-38	-38	-38	-38	-55	-55	-38	4.0	-26
-26	-35	-55	-55	-55	-35	-35	-55	-55	-55	-35	4.0	-26
-26	-31	-55	-55	-55	-55	-55	-55	-55	-55	-31	4.0	-26
-26	-55	-55	-55	-55	-55	-25	-55	-55	-55	-55	4.0	-26



FR4, FR8 consequences

200GBASE-FR4 and 400GBASE-FR8 currently have an allocation of 0.3 dB for MPI.

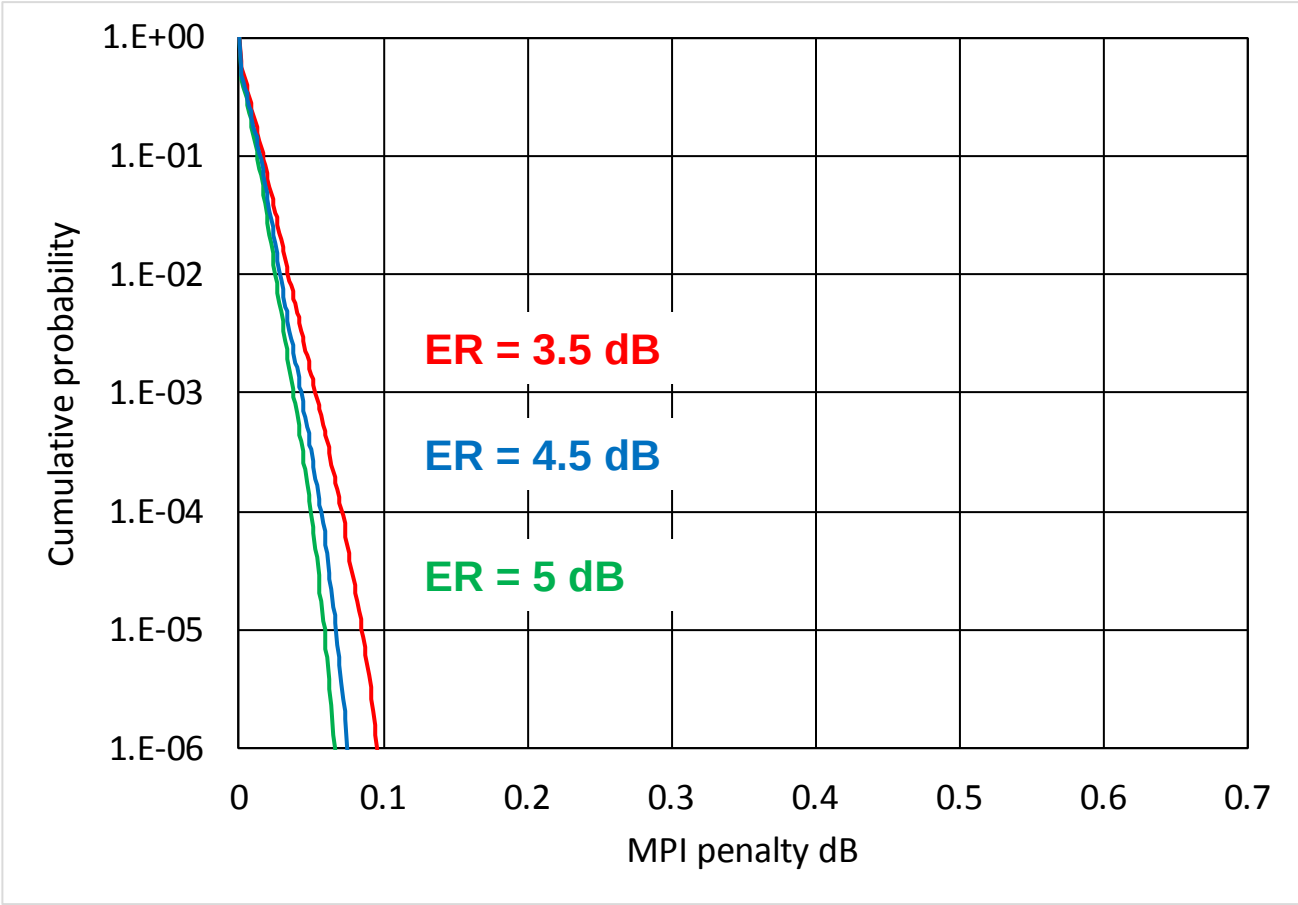
Changing the ER to 3.5 dB would require an increase of this allocation to about 0.4 dB if the ability to accommodate 4 x –35 dB + 6 x –55 dB reflections is retained.

Proposals to make this change would have to include details of how the budget should be modified to accommodate the increased MPI penalty. If this is done, then the reflections given in Table 122-19 for 200GBASE-FR4 or 400GBASE-FR8 can still be supported with the exceptions that the value for 10 reflectances should be changed from -40 dB to -41 dB and the value for 8 reflectances should be changed from -39 dB to -40 dB.

DR4, DR4 4 x -45 dB, Tx & Rx -26 dB

BER 2.4E-4

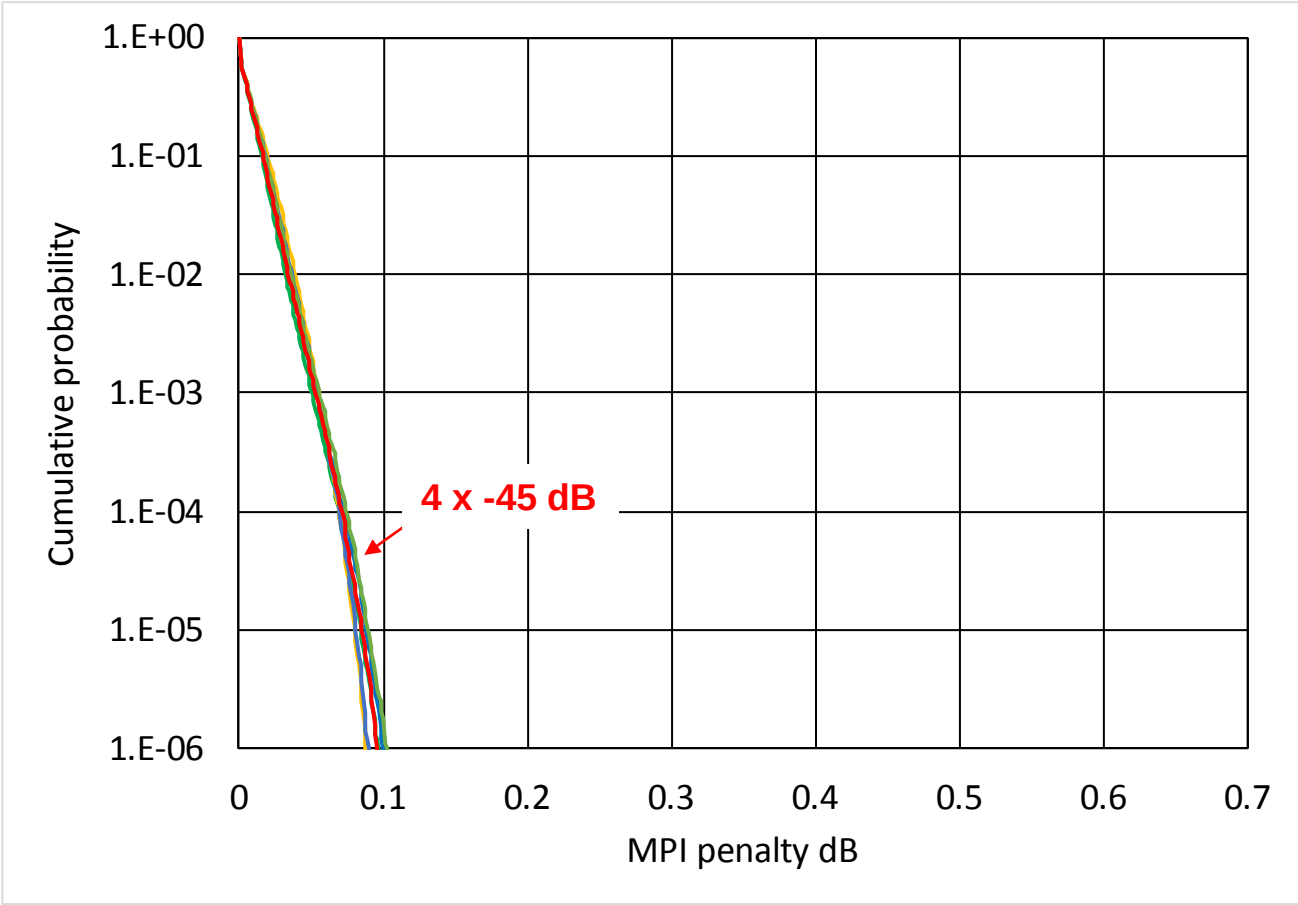
-26	-45	-55	-55	-55	-45	-45	-55	-55	-55	-45	3.0	-26



DR4, DR4 0.1 dB penalty, 3.5 dB ER

BER 2.4E-4
ER 3.5 dB

-26	-49	-49	-49	-49	-49	-49	-49	-49	-49	-49	3.0	-26
-26	-48	-48	-55	-48	-48	-48	-48	-55	-48	-48	3.0	-26
-26	-47	-55	-55	-47	-47	-47	-47	-55	-55	-47	3.0	-26
-26	-45	-55	-55	-55	-45	-45	-55	-55	-55	-45	3.0	-26
-26	-42	-55	-55	-55	-55	-55	-55	-55	-55	-42	3.0	-26
-26	-55	-55	-55	-55	-55	-37	-55	-55	-55	-55	3.0	-26



DR4, DR4 consequences

200GBASE-DR4 and 400GBASE-DR4 currently have an allocation of 0.1 dB for MPI.

As can be seen from the previous slides, changing the ER to 3.5 dB would not require an increase of this allocation if the ability to accommodate 4 x –45 dB + 6 x –55 dB reflections is retained.

Also, the reflections given in Table 121-15 for 200GBASE-DR4 or Table 124-13 for 400GBASE-DR4 can still be supported.

Thanks!