Power Backoff Consideration in Clause 55.7.3.3 May Lead to Wrong Result on AxTalk

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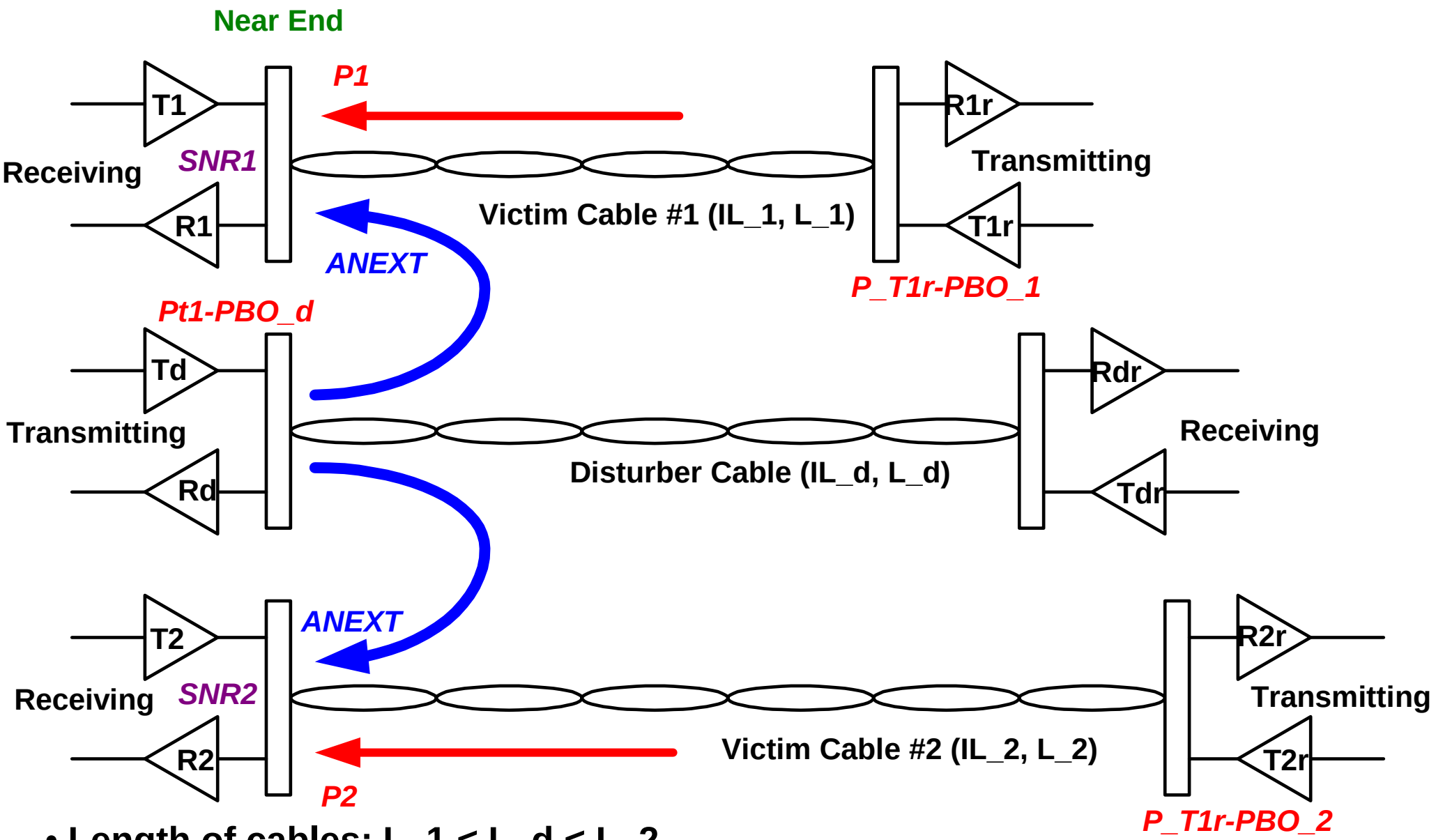

- **Length of cables: L_1 < L_d < L_2**
- **Insertion loss of cables: IL_1 < IL_d < IL_2**
- **Received Power at near end: P1, P2 (= Txr_power – back_off - insertion loss)**

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Item	Case 1: disturber cable --> Victim Cable #1	Case 2 disturber cable --> Victim Cable #2	Comment
Measured Insertion Loss	IL_1, IL_d (where IL_1 < IL_d)	IL_2, IL_d (where IL_d < IL_2)	
Derived cable length	L_1, L_d (where L_1 < L_d)	L_2, L_d (where L_d < L_2)	
Power backoff for disturber and victim cables	PBO_1, PBO_d (where PBO_1 > PBO_d)	PBO_2, PBO_d (where PBO_d > PBO_2)	
Td Power	Pt1 - PBO_d	Pt1 - PBO_d	same
Received power at near end	P1 = P_T1r - IL_1 - PBO_1	P2 = P_T2r - IL_2 - PBO_2	P1 = P2
IL_bof	IL_bof1 = PBO_d - PBO_1	IL_bof2 = PBO_d - PBO_2	IL_bof1 < IL_bof2
Actual ANEXT at one victim pair from each pair i of disturber	AN_i	AN_i	suppose AN_i=AN_i
Actual PSANEXT	PSANEXT_1 = AN_1+AN_2+AN_3+AN_4	PSANEXT_2 = AN_1+AN_2+AN_3+AN_4	PSANEXT_1 **equal to** PSANEXT_2
Received power to PSANEXT noise ratio	SNR1 = P1 / PSANEXT_1	SNR2 = P2 / PSANEXT_2	SNR1 **equal to** SNR2
Computed PSANEXT with power backoff compensation: Pp159, Clause 55.7.3.3, Formula (55-36)	PSANEXT_1' = (AN_1+IL_bof1)+(AN_2+IL_bof1) + (AN_3+IL_bof1)+(AN_4+IL_bof1)	PSANEXT_2' = (AN_1+IL_bof2)+(AN_2+IL_bof2) + (AN_3+IL_bof2)+(AN_4+IL_bof2)	PSANEXT_1' **not equal to** PSANEXT_2
Received power to Computed PSANEXT noise ratio	SNR1' = P1 / PSANEXT_1'	SNR2' = P2 / PSANEXT_2'	SNR1' **not equal to** SNR2'

	Case 1	Case 2	comments
Measured Insertion Loss (dB)	27.1	23.1	
Derived disturbed cable length(meter)	75.1	64.0	
Power back-off	0.0	4.0	
Txr power at far end	P_T1r	P_T1r-4.0	
Received Power at near end (= tx power - back-off - insertion loss)	P_T1r-27.1	P_T1r-27.1	same for both setup (P1=P2)
Actual PSANEXT power (raw magnitude)	Paxt	Paxt	assume same for both setup
Received power to Actual PSANEXT noise ratio	(P_T1r-27.1)/Paxt	(P_T1r-27.1)/Paxt	***same for both setup***
IL_bof	0	-4	assume min_PBO_disturbinglink=0
Computed PSANEXT' based on IL_bof	-Paxt	-(Paxt-4)	***different***
Received power to Computed PSANEXT' noise ratio	(P_T1r-27.1)/Paxt	(P_T1r-27.1)/(Paxt-4)	***different***

Conclusion: power back-off considerations will cause different measurement results for the channels experiencing same noise and having same received power

Conclusion:

The power backoff compensation proposed in Clause 55.7.3 may lead to difference between the actual and computed PSANEXT.