Channel SNR
8in-3m-24m-3m-8in

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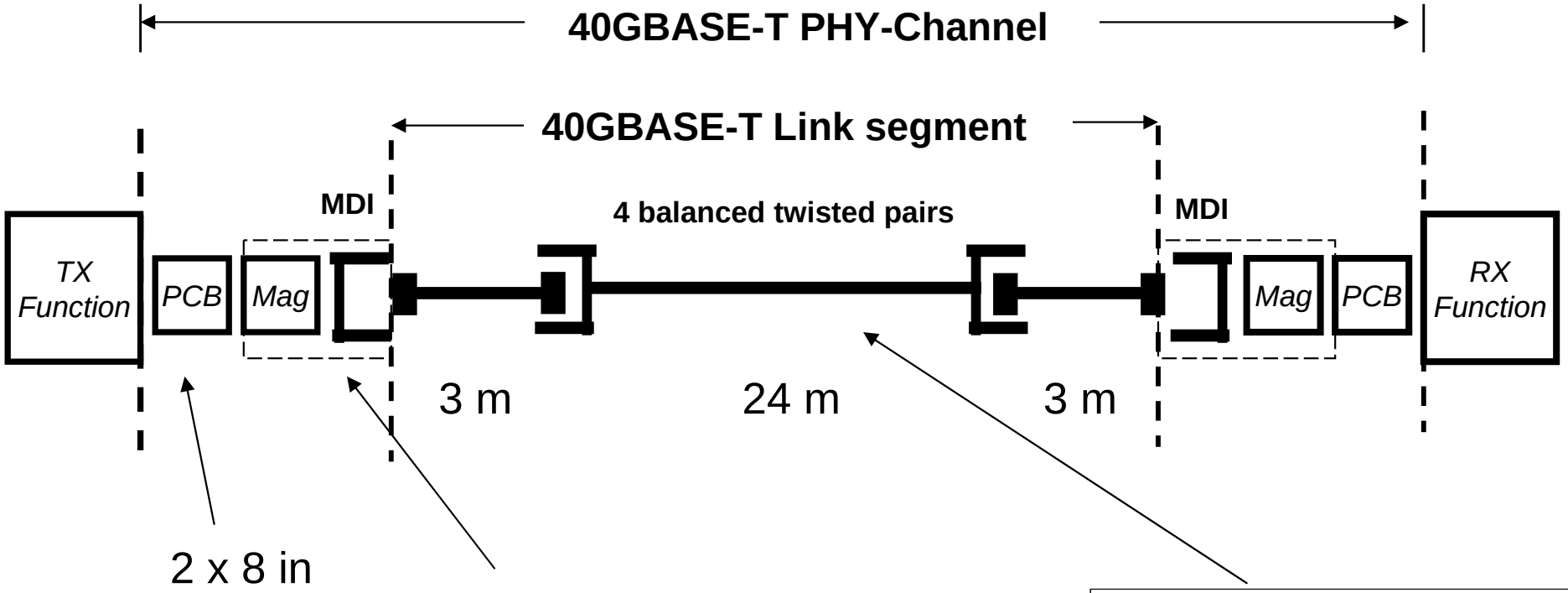
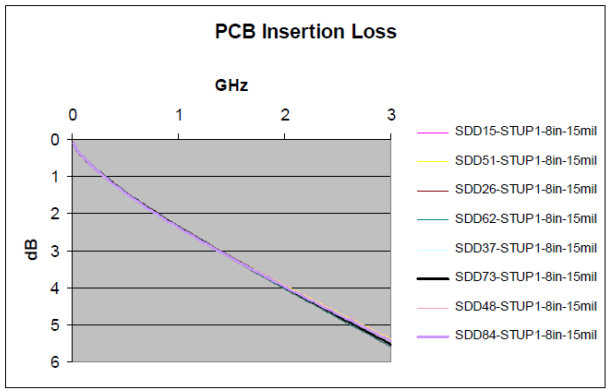
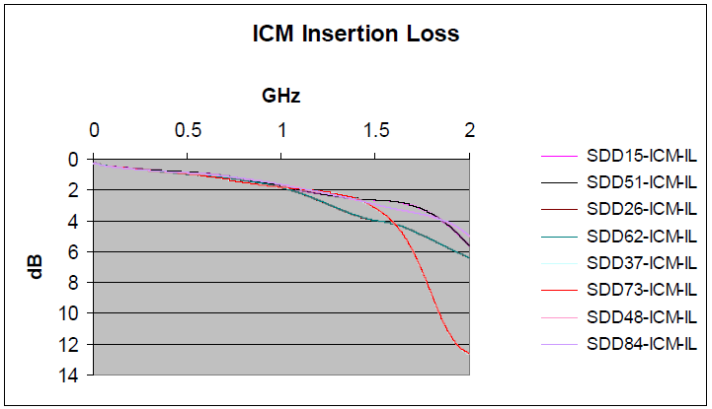
Background/Purpose

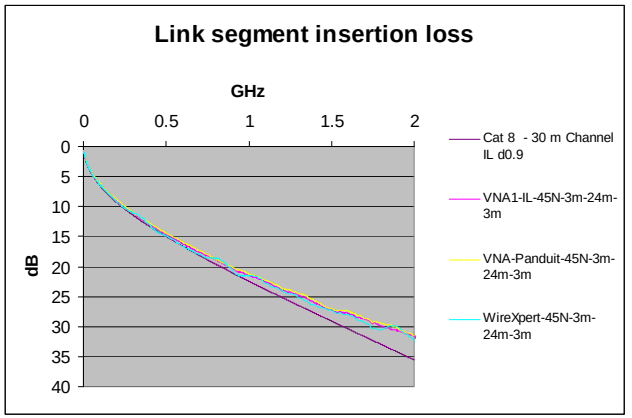
- 40GBASE-T PHY-channel models available
- Review of 40GBASE-T required SNR and margin
- Background noise assumptions necessary for PHY analysis

40GBASE-T PHY- Channel



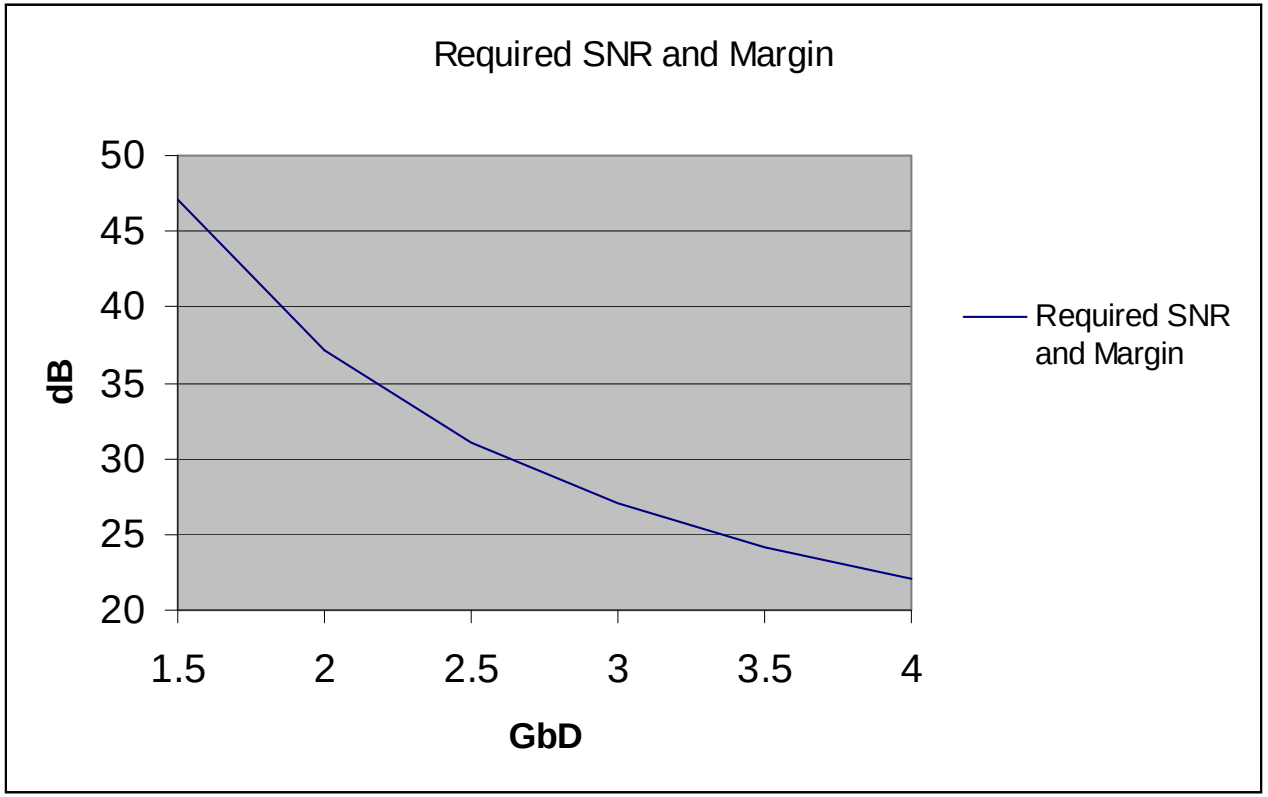






http://www.ieee802.org/3/bq/public/channeldata/index.html - S16P files available

Required SNR and Margin



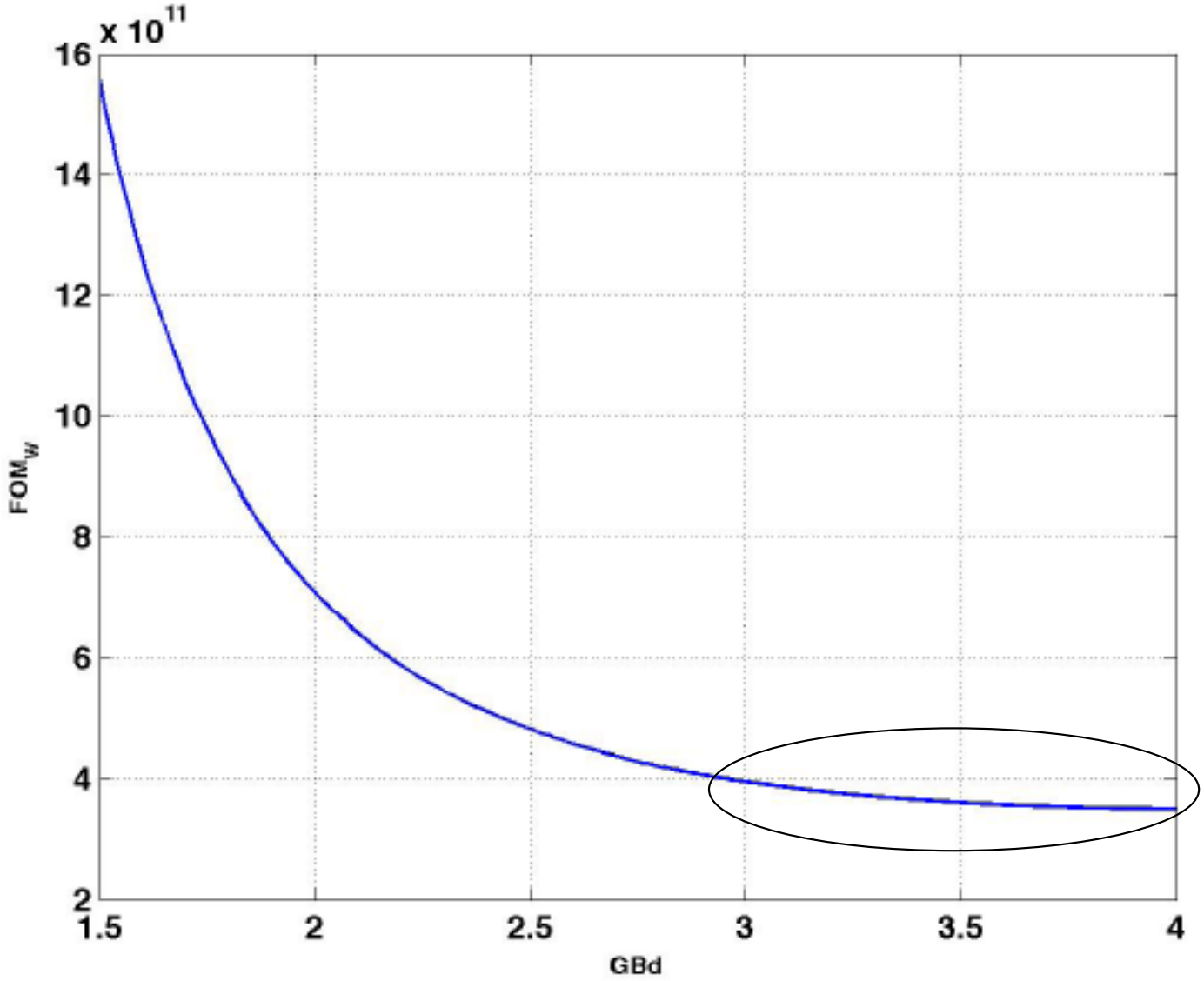
Combining the gap to capacity and the link margin in one variable, g, the required SNR is computed as:= g+10*LOG(2^(2*capacity(GbD)/GbD))

With gap to capacity = 4, Link margin = 3, g=7, capacity(GbD)=10

SNR Required = ~ 22 dB

The Estimated ADC Power

Figure: The Estimated ADC Power vs Symbol Rate for the Scaled 30m Cable



Cancellation of internal noise

Analog Receiver Parameters

Cat8 d0.5spec, Power factors are relative

10dB Margin Point

	25 meters					30 meters				
p_BAUD	Min of ADC_FOM _power	Min of p_RXENOB	Min of p_NEXT REDUX	Min of p_ECHO REDUX	Min of p_FEXT REDUX	Min of ADC_FOM_ power	Min of p_RXENOB	Min of p_NEXT REDUX	Min of p_ECHO REDUX	Min of p_FEXT REDUX
3200						6.55	10	50	100	100
3400						6.06	9.8	50	100	30
3600	3.69	9	100	100	100	5.59	9.6	50	50	30
3800	3.89	9	50	100	30	5.90	9.6	45	50	25
4000	3.57	8.8	50	50	30	5.40	9.4	50	50	25

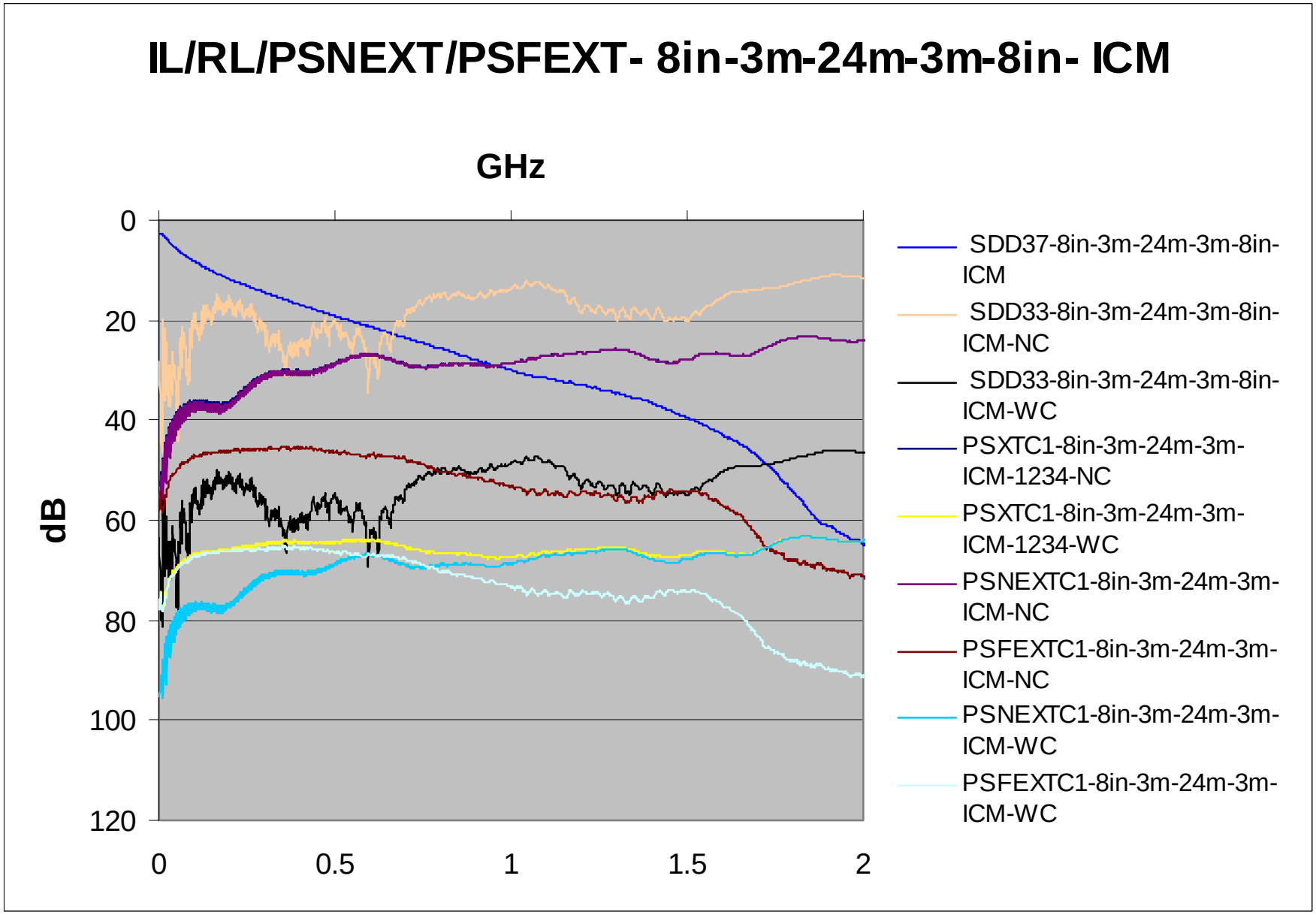
6 dB Margin Point

	25 meters					30 meters				
p_BAUD	Min of ADC_FOM _power	Min of p_RXENOB	Min of p_NEXT REDUX	Min of p_ECHO REDUX	Min of p_FEXT REDUX	Min of ADC_FOM_ power	Min of p_RXENOB	Min of p_NEXT REDUX	Min of p_ECHO REDUX	Min of p_FEXT REDUX
2400	2.46	9	45	100	100	3.24	9.4	40	50	25
2800	2.50	8.8	40	50	25	3.29	9.2	40	45	25
3200	2.48	8.6	35	45	25	3.28	9	40	45	20
3400	2.30	8.4	35	45	20	3.03	8.8	40	45	20
3600	2.12	8.2	35	40	20	3.21	8.8	40	45	20
3800	2.23	8.2	35	40	20	2.95	8.6	40	45	20
4000	2.05	8	35	40	20	3.10	8.6	40	45	20

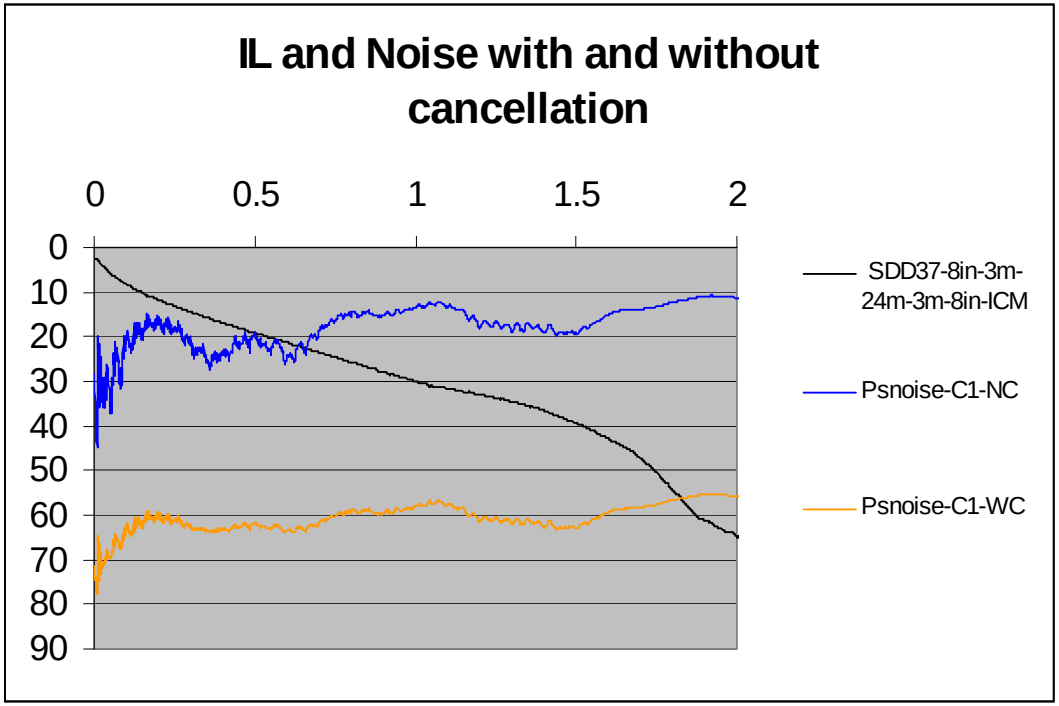
Min ADC Power factors: 25m = 3.57/2.05, 30m = 5.40/2.95,

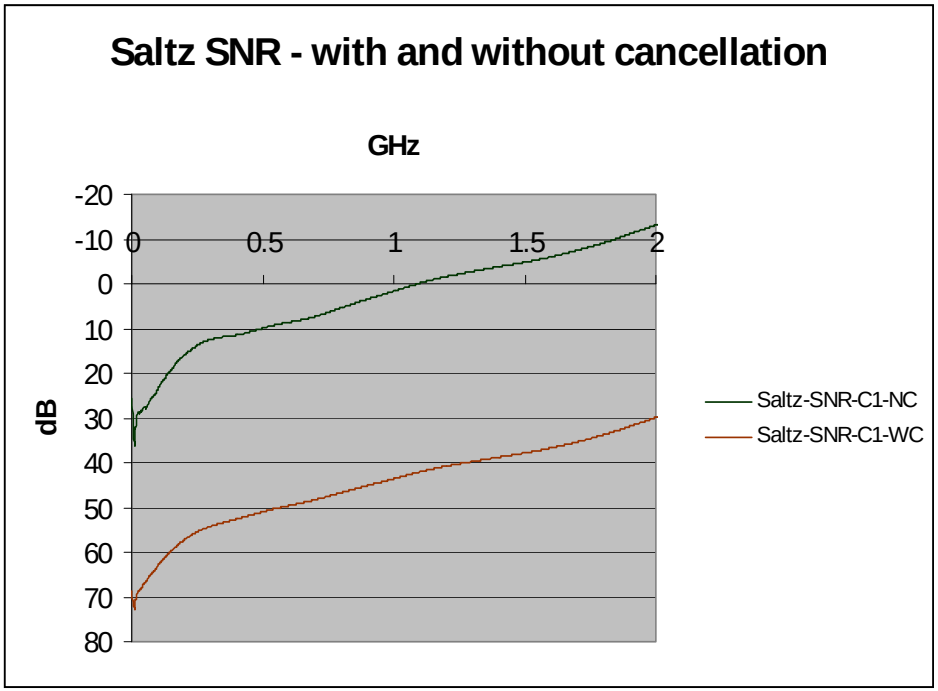
All PHY assumptions assume cancellation of internal noise

Impairments with and without cancellation



Salz SNR





~30 dB Salz @ 2 GHz with cancellation

- **RL = 45 dB**
- **PSNEXT = 40 dB**
- **PSFEXT = 20 dB**

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