

Transition Time Filter Impact on COM and RITT (Comment i-49 and i-50)

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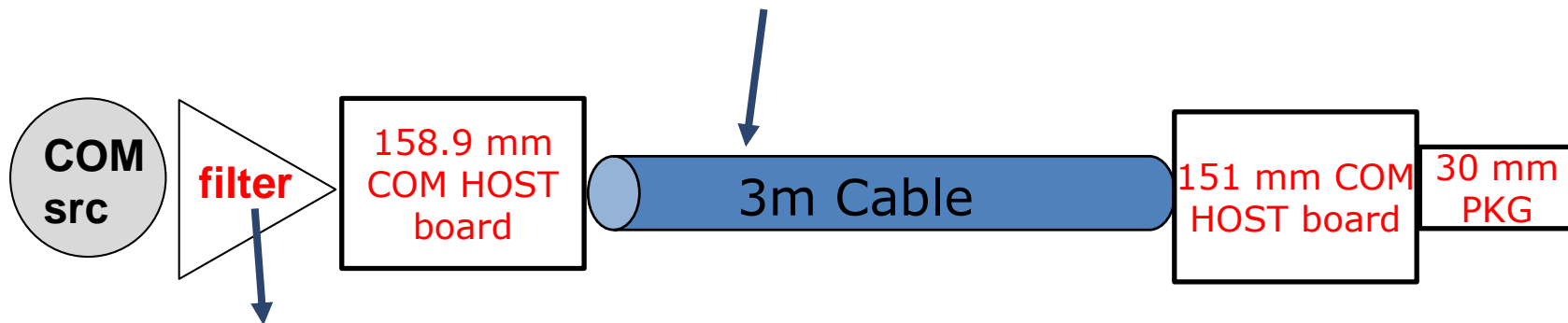
IEEE 802.3 25 Gb/s Ethernet Task Force, January 2016, Atlanta GA



COM 3 m cable (no-FEC) RITT channel setup

2.2dB COM limit for DER0=1e-12

TE_QSFP_QSFP_3m_26AWG_MaxLossExample_15p96dB

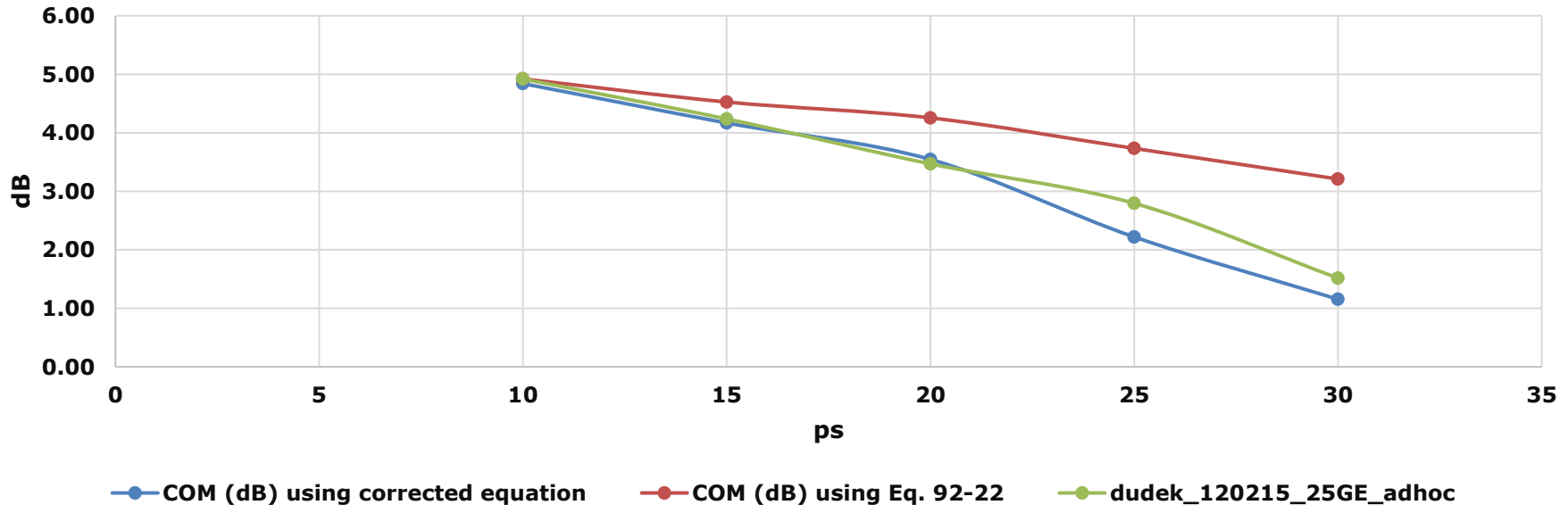


Equation 92-22	Causality error(dB) 2dB	$H_t(f) = \exp(-(\pi f T_r / 1.6832)^2)$
Corrected causal Gaussian filter.	Causality error(dB) 50 dB	$H_t(f) = \exp(-2(\pi f T_r / 1.6832)^2) \exp(-j * 2\pi f T_r * 3)$
dudek_120215_25GE_a dhoc, Bessel Thompson (BT) filter	Causality error(dB) 50 dB	$H_t(f) = \frac{105}{(fkT_r)^4 - j10(fkT_r)^3 - 45(fkT_r)^2 + j105fkT_r + 105}$ $k = 8.937 - 8 * 10^{-9} * (t_r * 1000)^4$

Impact on COM for test channel is large for slow transition times

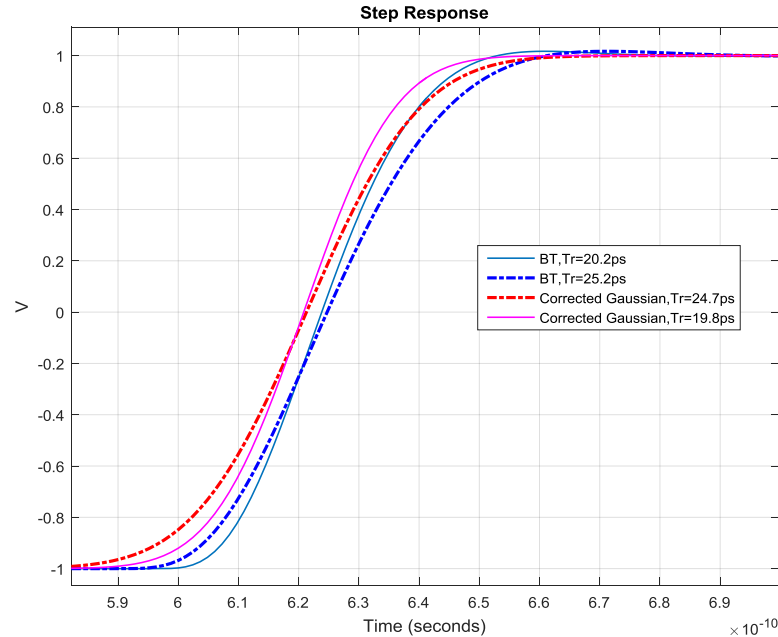
COM computed with SNR_{Tx}=100 (no added noise) and "ideal termination"

COM vs Measured Transition Time



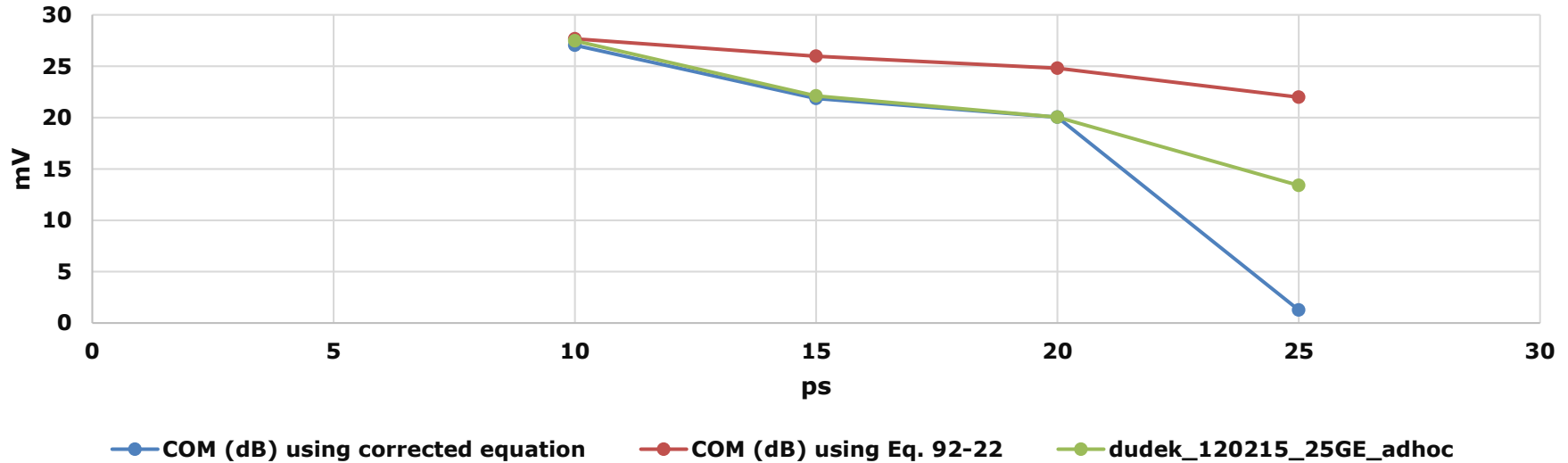
No Causality Correction performed

Tr 20ps and 25ps BT and Corrected Gaussian responses look similar



Original equation requires much more BBN noise for RITT

Added BBN vs Transition Time



Corrected Gaussian and dudek_120215_25GE_adhoc have same BBN for transition times 20 ps and lower

No Causality Correction performed

Recommendation

- **Use corrected causal Gaussian filter cable RITT**
- **T_r_filter_type = 1 in COM version 162a**
 - T_r_filter_type = 0 or unspecified is backwards compatible