

Specific Recommended Channel Multipath Models for 802.16.1-with Some Implications for PHY Design

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Purpose: Aid in the PHY Task Group's preparation of a detailed evaluation table for performance of PHY layer air interface proposals

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Specific Recommended Channel Multipath Models for 802.16.1– with Some Implications for PHY Design

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Outline

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Introduction

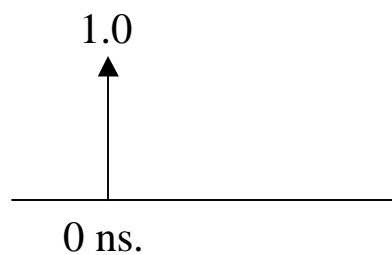
- Specific multipath models to meet the need for testing physical layer (PHY) solutions, on the basis of available measurements and models

Propagation environment: line-of-sight (LOS) paths, with highly directive subscriber antennas; delay spread < 50 ns

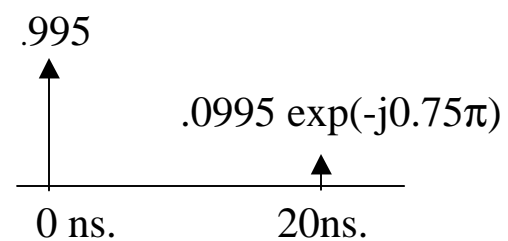
Models also account for some non LOS case, to provide varying degrees of “stress” for the evaluation of PHY proposals

Recommended Multipath Models

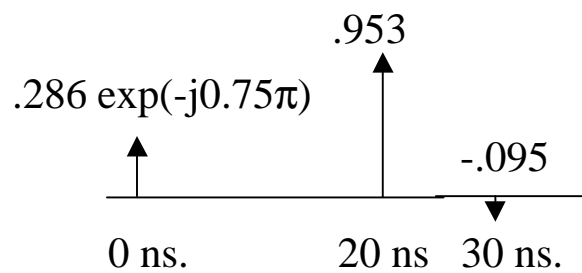
Model 0



Model 1



Model 2



Model 3

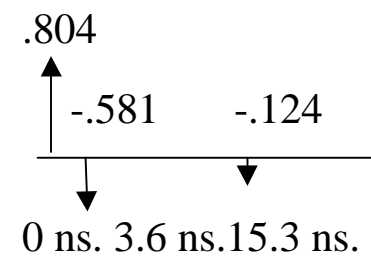


Table1: Recommended multipath channel models

Model index	Tap index	Delays (ns)	Tap gain (dB)	Phase factor
Model 0	0	0	0	1
Model 1	0	0	0	1
	1	20	-20	$\exp(-j0.75\pi)$
Model 2	0	0	-10.5	$\exp(-j0.75\pi)$
	1	20	0	1
	2	30	-20	-1
Model 3	0	0	0	1
	1	3.6	-2.8	-1
	2	15.3	-16.2	-1

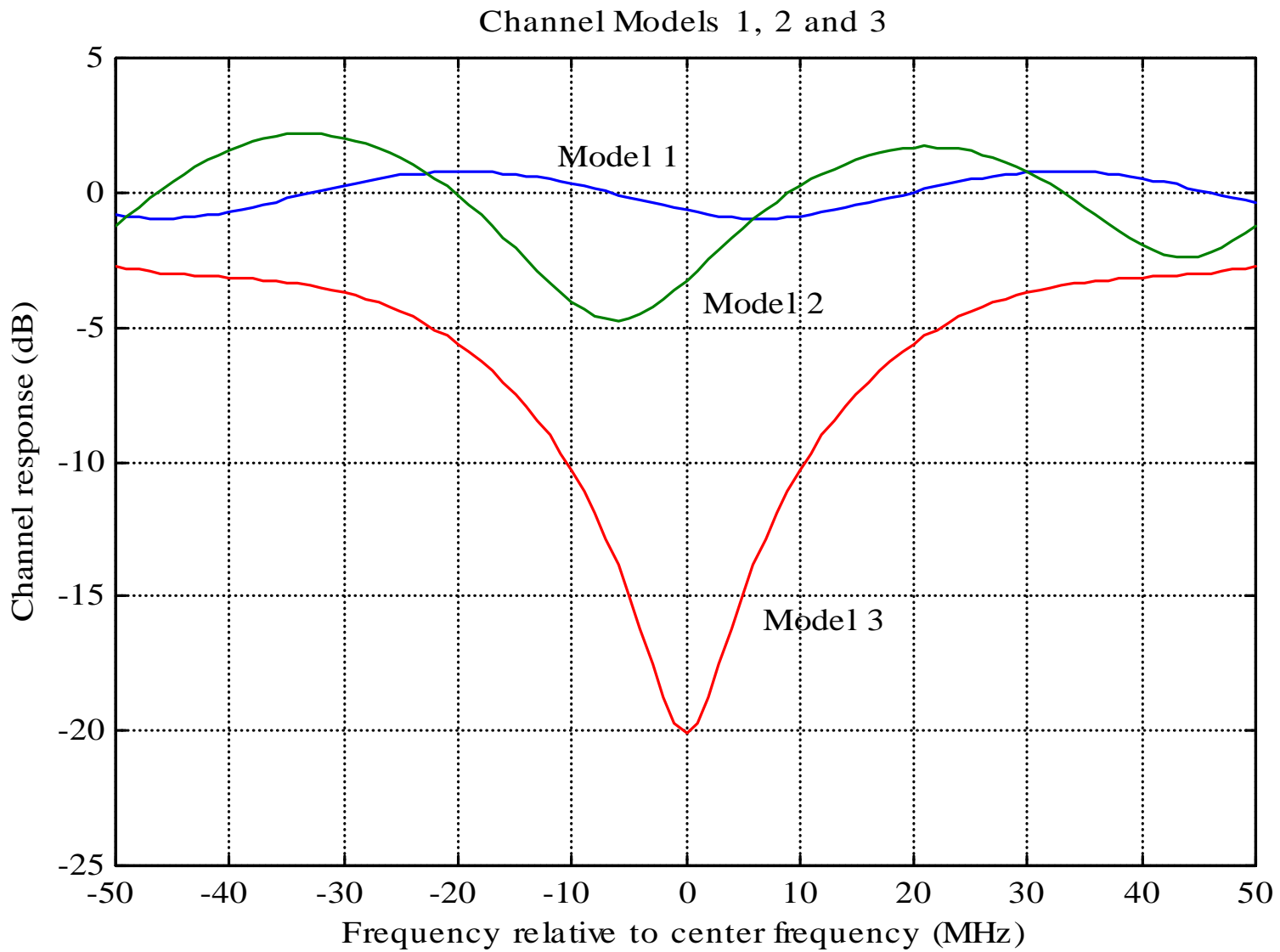


Fig.1. Frequency responses of models 1, 2, and 3.

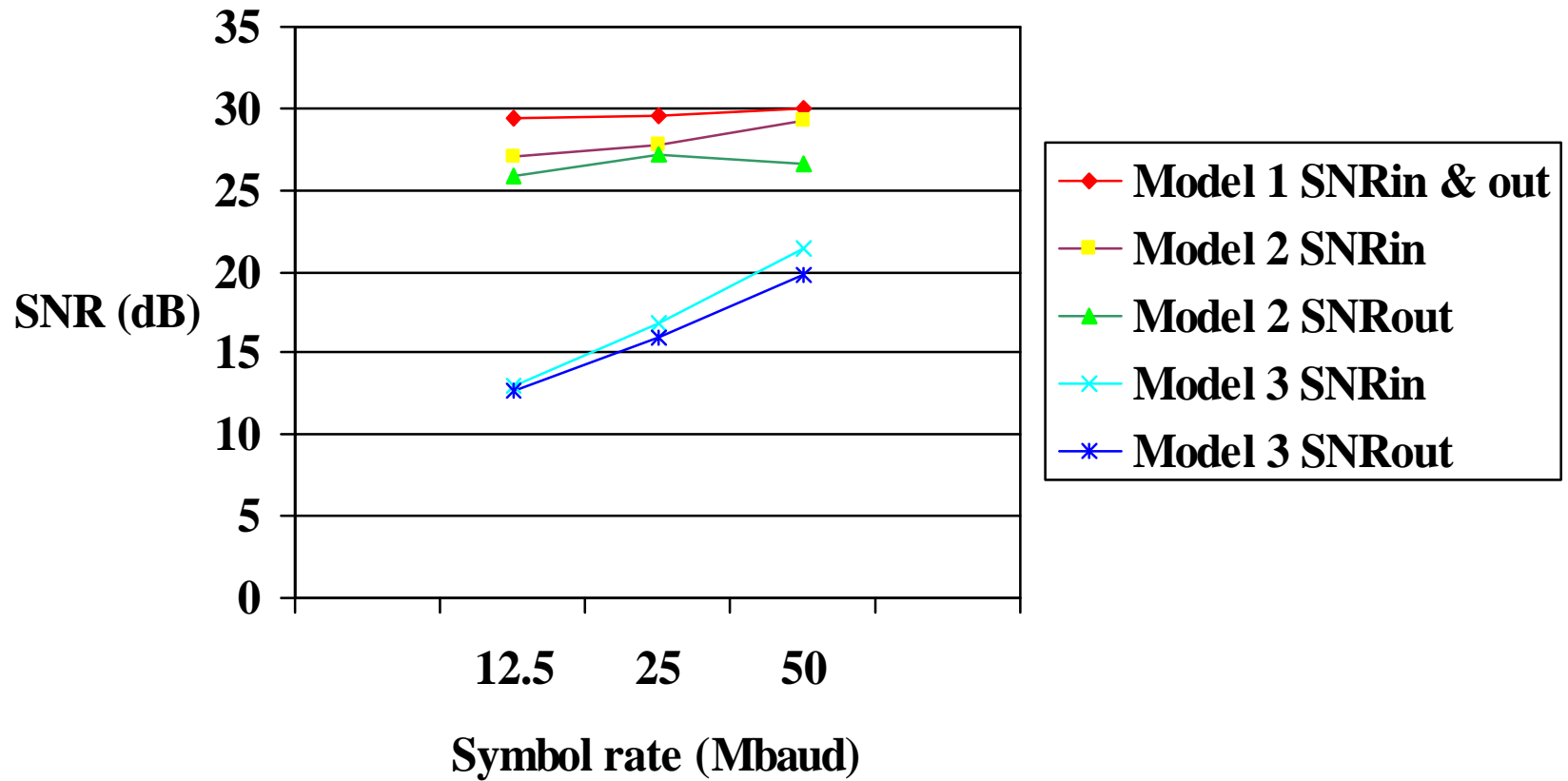


Fig. 2. SNR at receiver input after filtering, and at fractionally- spaced Decision Feedback Equalizer (DFE) output for models 1, 2, and 3.

Time Variability – and Implications for PHY Preambles

- Due to high symbol rate and relatively low Doppler frequency expected, channel dynamics and fast tracking requirements not major issues
- Periodic equalizer retraining and resynchronization at intervals of 100 μ s to 1 ms advisable: inserted preamble length to be 2 to 3 times the expected number of adaptive equalizer parameters, i.e., from 8 to 16 symbol intervals

Summary

- Multipath models recommended with specific parameters (including some non LOS case) for use in the evaluation of PHY proposals
- Examples of equalizer performance, not optimized
- Advised periodic equalizer retraining: equalizer training preambles of 8 to 16 symbols at intervals of 100 μ s to 1 ms