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

Source:

David Falconer	Voice:	+1 613 520 5722
Department of Systems and Computer Engineering	Fax:	+1 613 520 5727
Carleton University	E-mail:	ddf@sce.carleton.ca
Ottawa, Ont., Canada K1S 5B6		
Wei Zhang and Nader Moayeri	Voice:	301 975 3443 and 301 975 3767
NIST	Fax:	301 590 0932
100 Bureau Drive, Stop 8920	E-mail:	wzhang@antd.nist.gov and moayeri@nist.gov
Gaithersburg, MD 20899-8920		

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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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David Falconer[1], Wei Zhang[2], and Nader Moayeri[2]

[1]Department of Systems and Computer Engineering
Carleton University, Ottawa, Ont., Canada K1S 5B6
[2]Wireless Communications Technologies Group
National Institute of Standards and Technology
Gaithersburg, MD 20899-8920, USA

Outline

Introduction

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Summary
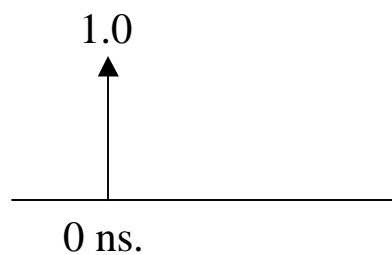
Introduction

- 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

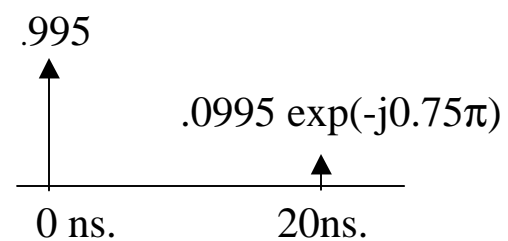 Models also account for some non LOS case, to provide varying degrees of "stress" for the evaluation of PHY proposals

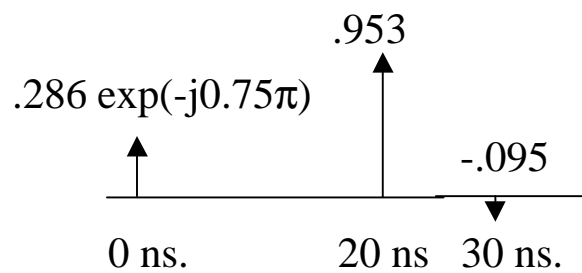# Recommended Multipath Models
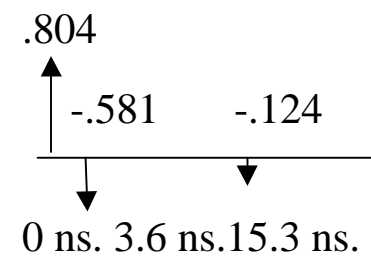
Model 0

1.0

0 ns.

Model 1

.995

.0995 exp(-j0.75π)

0 ns.   20ns.

Model 2

.953

.286 exp(-j0.75π)

-.095

0 ns.   20 ns.   30 ns.

Model 3

.804

-.581   -.124

0 ns. 3.6 ns.15.3 ns.

Table1: Recommended multipath channel models

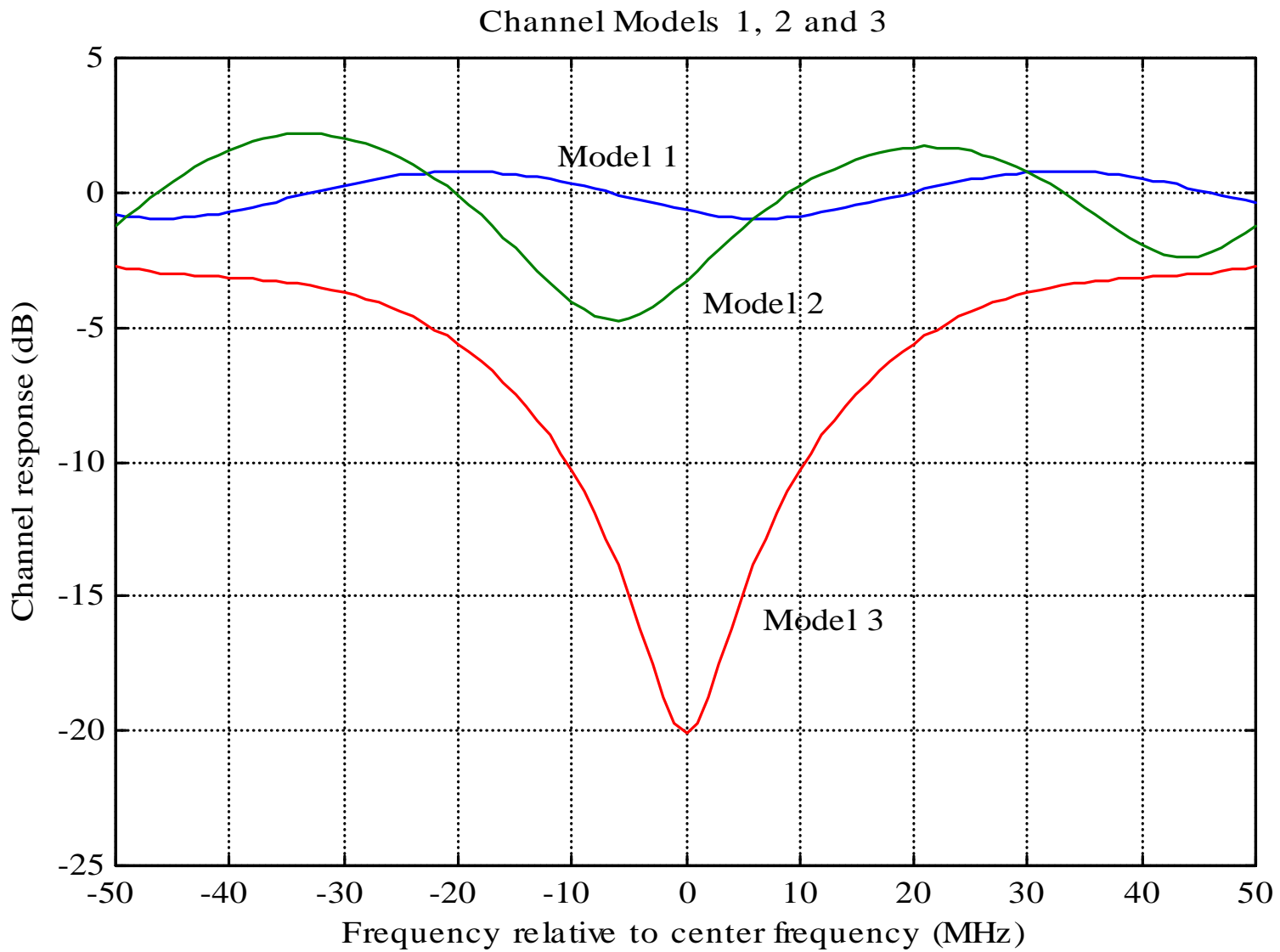| Model index	Tap index	Delays (ns)	Tap gain (dB)	Phase factor
Model 0	0	0	0	1
Model 1	0	0	0	1
	1	20	-20	exp(-j0.75π)
Model 2	0	0	-10.5	exp(-j0.75π)
	1	20	0	1
	2	30	-20	-1
Model 3	0	0	0	1
	1	3.6	-2.8	-1
	2	15.3	-16.2	-1

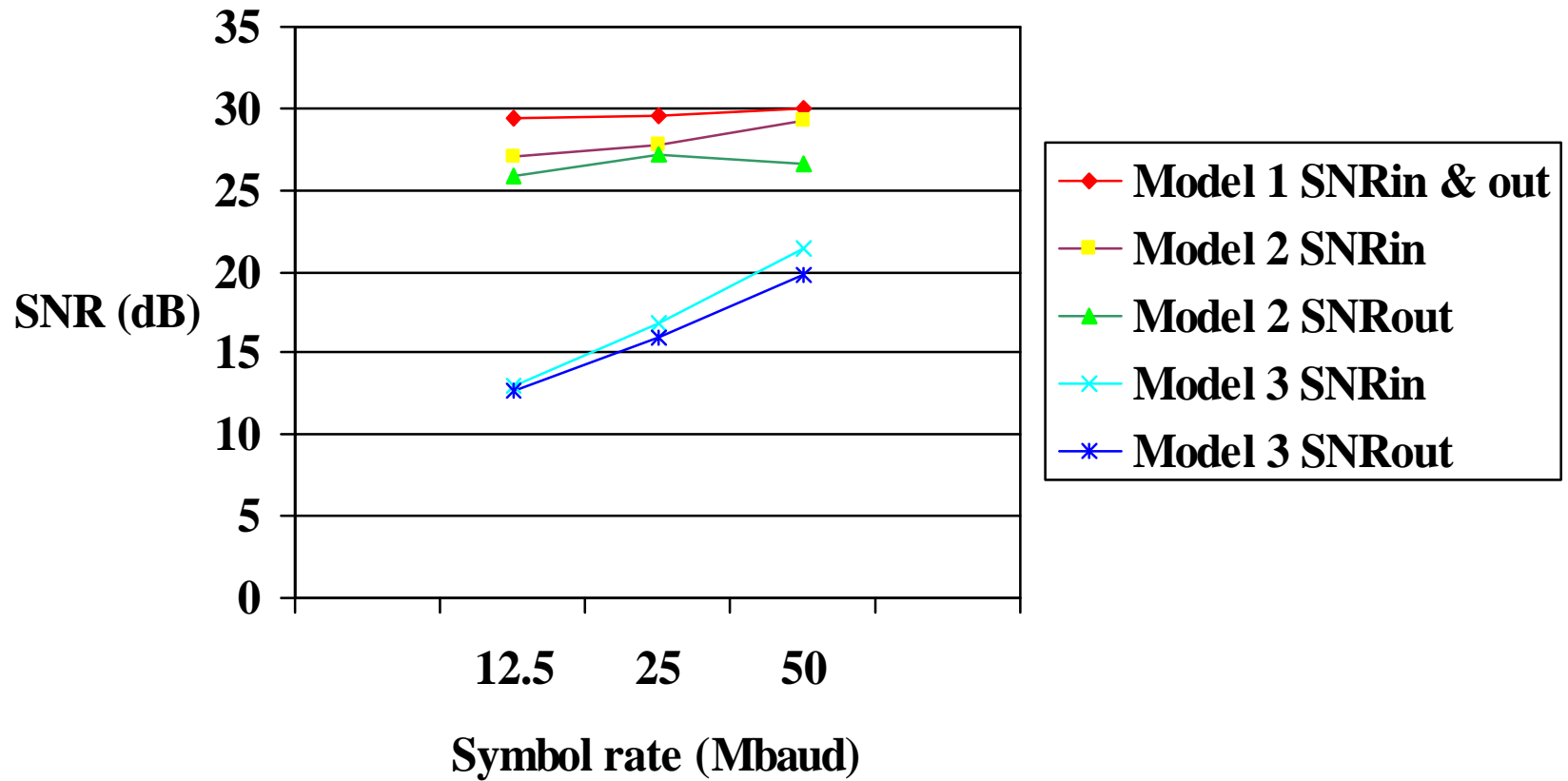Fig.1. Frequency responses of models 1, 2, and 3.

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 μs to 1 ms advisable: inserted preamble length to be 2 to 3 times the expected number of adaptive equalizer parameters, i.e., from 8 to16 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 to16 symbols at intervals of 100 μs to 1 ms