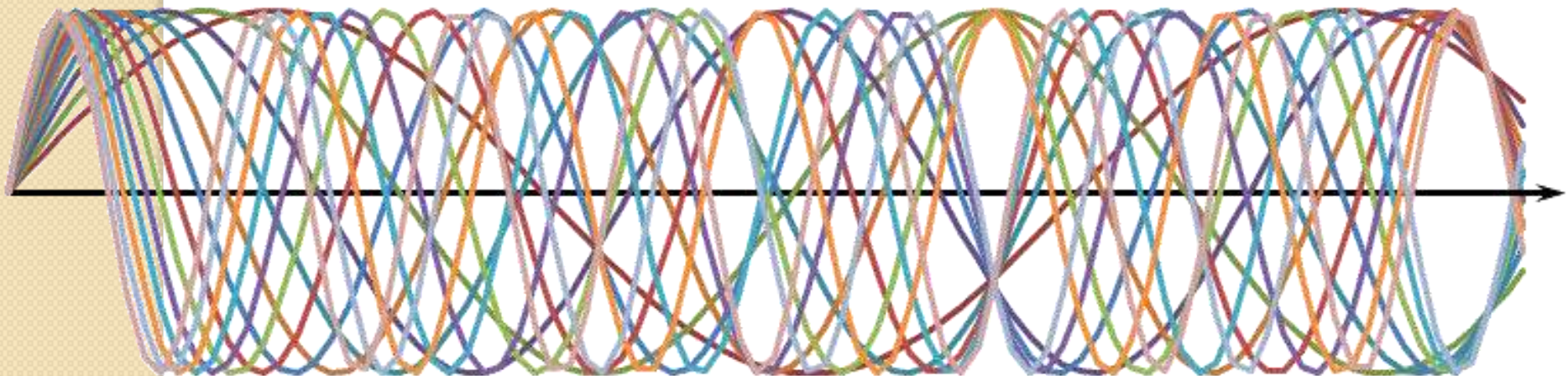


Channel Model Ad Hoc

Report

Presented by Duane Remein (Huawei)

C h a n n e l M o d e l A d H o c

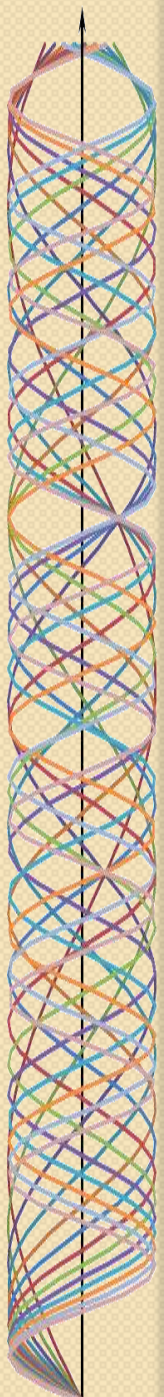


Activities

- Held 7 Teleconferences since San Antonio meeting
 - Scheduled on Thursdays 5:30 PM (EST)
 - Average 8 attendees
- Discussion focused on
 - Parameter List (introduced in San Antonio)
 - Topology models

Parameter List

- Significant progress on DS tables
 - Most parameters defined
- Good progress on US tables
 - Most significant parameters defined
 - Some outstanding work on newer parameters (such as Amplitude variation)
 - Getting input from operators, these parameters are somewhat unique to a given plant



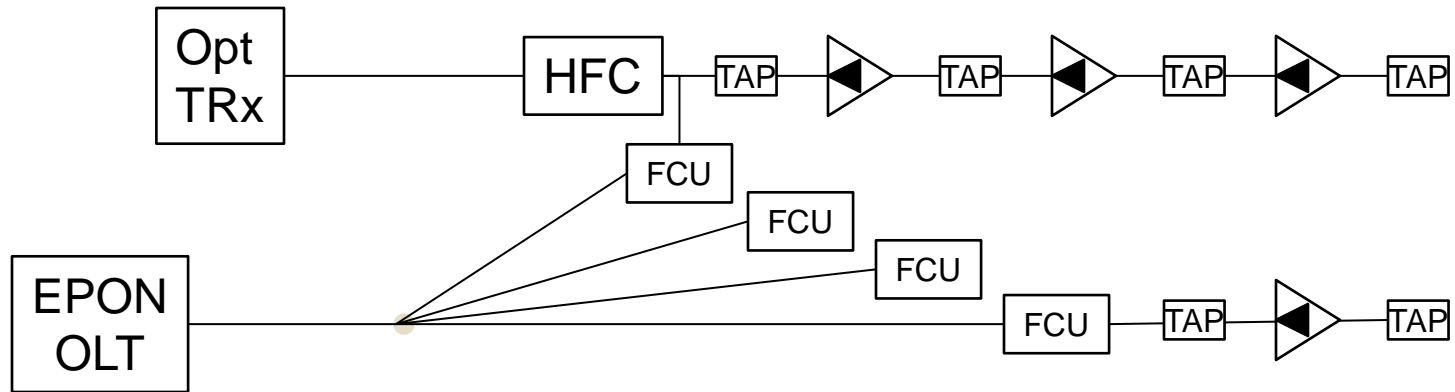
Topologies

- Several defined
 - Each paired with a parameter table
 - Some may be associated with the same parameter table

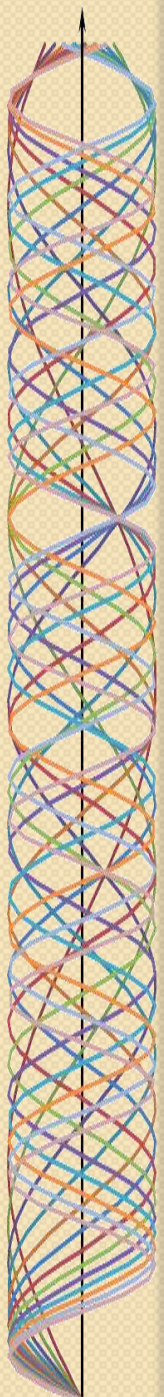
Priority	Topology	Para Table
High	Node +3 (digital EPON distribution)	A
Med	Node +0 (Last Amp)	B
Low	Node +0 (All Passive)	B
Low	Node +3 (analog EPoC distribution)	C
Info	EPoC Only (no HFC)	D

Topology Example

Node +3 (digital EPON distribution)



- Variations
 - Node +1 (single amp)
 - Node +2 (not shown)
- Do we need to define a “Node+N” topology?
 - How big is N?
- Details needed:
 - Diplexer connecting EPoC to COAX
- Topology parameters needed:
 1. Optical reach of HFC networks
 2. Optical reach of EPON networks
 3. Channel loading of HFC networks (can all digital be assumed?)
 4. Amplifier spacing; typical and max.
ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
 5. Feeder cable types
 6. Drop Cable types & reach

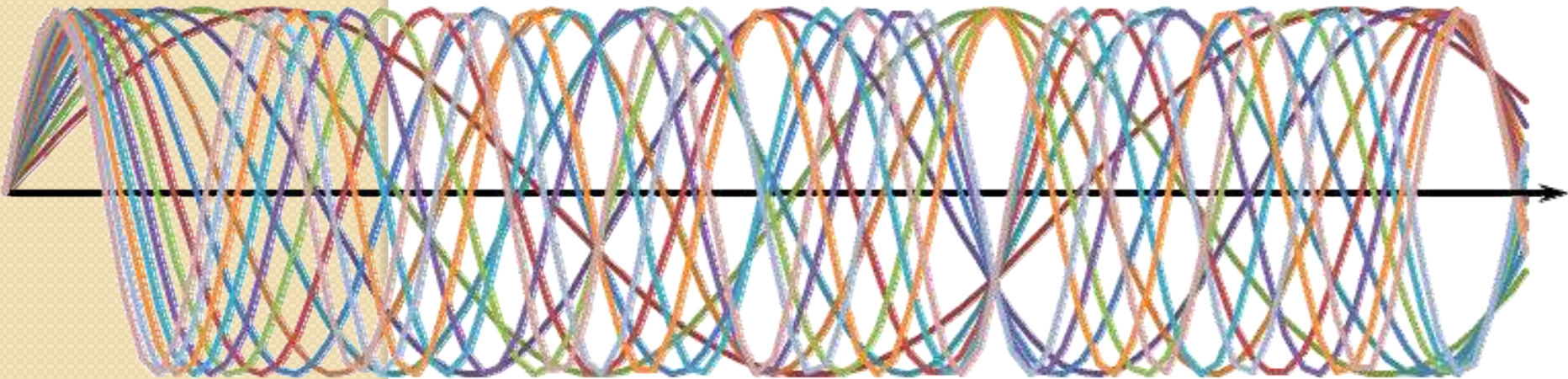


Plans

- Complete parameter lists
- Finalize Topology models to be addressed
- Complete definition list of all terms in parameter list

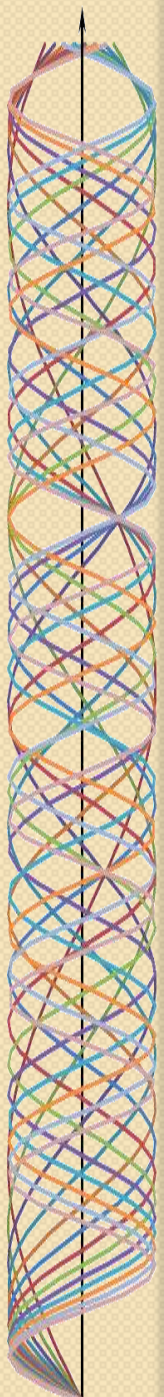
THANK YOU

C h a n n e l M o d e l A d H o c



Ad Hoc Purpose & Scope

- Channel Model Purpose
 - Purpose 1: To facilitate the evaluation of multiple PHY modulation proposals for use in 802.3bn
 - Purpose 2: To facilitate the selection of a range of PHY parameters within the selected PHY proposal to allow adaption to changing PHY conditions within the coax environment
- Channel Model Scope
 - Model should be limited to the minimum set of critical parameters necessary for above purposes.



Tools

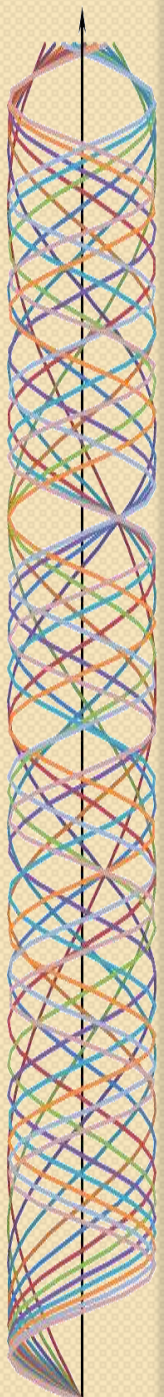
- Discussed Tools
 - Excel – for input and “static modeling”
 - Parametric data tables
 - Quick check tool to assess proposals
 - GNU Octave – if we need to adopt a simulator
 - Results from other tools OK if input consistent with parametric data tables

Presented in San Antonio

Parameter List

(1 of 2)

C h a n n e l M o d e l A n d H o c



Channel Param	DS			US			Units	Notes
	Min	Max	Nom	Min	Max	Nom		
Noise Power Ratio								Parameters affected: QAM Level and dB/dB dynamic range
Composite Channel Noise								details tbd
Microreflections								Parameters affected: Cyclic Prefix duration, Subcarrier Bandwidth
≤ 0.5 μsec							dBc	sub-parameter limits tbd, 4 buckets OK
≤ 1.0 μsec							dBc	
≤ 1.5 μsec							dBc	
> 1.5 μsec							dBc	
Group Delay Ripple								Parameters affected: Cyclic Prefix duration, Subcarrier Bandwidth
@ lower channel							ns/MHz	
@ center Channel							ns/MHz	Should be frequency dependent, 2-3 frequency ranges, relative to channel size
@ high Channel							ns/MHz	
Impulse Noise								Wide band, intermittent in time
duration							ns	Parameters affected: FEC Overhead, Interleaver?
amplitude							dBc	exact sub-parameters/units tbd
periodicity							kHz(?)	
Burst Noise								Narrow band noise, intermittent in time
duration							ns	exact sub-parameters/units tbd
amplitude							dBc	
periodicity							kHz(?)	
frequency band							MHz	such as LTE

Presented in San Antonio

Parameter List

(2 of 2)

Channel Param	DS			US			Units	Notes
	Min	Max	Nom	Min	Max	Nom		
Sub-Carrier to Discrete Interference								This parameter needs more detail, i.e. how many sub-carriers below XdB CIR? See channel parameters sent Nov 2nd, 2:06pm Central Time to reflector. This parameter is open to discussion. exact number of sub-parameters tbd
Percent S-Cs with 0dBc < SIR < 5dBc							%	
Percent S-Cs with 5dBc < SIR < 10dBc							%	
Percent S-Cs with 10dBc < SIR < 15dBc							%	
Percent S-Cs with 15dBc < SIR < 20dBc							%	
Percent S-Cs with 20dBc < SIR < 25dBc							%	
Amplitude Ripple							dB/MHz	Should subcarriers have different QAM? This parameter is likely be expanded into 3-4 entries
Carrier Hum Modulation							dBc	Should be added to CPL, can sub-carrier tracking loops follow 60/120 Hz hum? Defines short term variations due to active elements in the channel (e.g., amplifiers), may or may not be included
Transit Delay							us	Both upstream and downstream
Channel Loading (outside EPOC channel)								Multiple tables may need to be generated based on the specific topology.

Notes

Phase Noise limites are included in the transmitter and receiver specifications.

Shaded cell to remain empty (not needed)

Empty columns to be removed prior to baseline

Presented in San Antonio