Draft 1.3 Comment details

IEEE P802.3an Task Force
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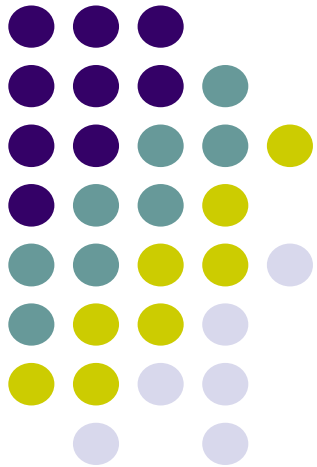
Jose Tellado

Teranetics, Inc



Draft THP Proposal

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1. There shall be 15 THP settings designated by a 4 bit number ranging in value from 0 to15.
2. Setting 0 is mandatory and means no precoding.
3. Settings 1 through 9 form Set A and will be identified as A(n) where n is between 1 and 9. Each element of set A is specified in FIR form with 16 taps with 8 bits per tap. There will be 3 sets of FIR threesomes.
4. Settings 10 through 15 form Set B and will be identified as B(n) where n is between 1 and 6. B(n) is n+9. Each setting in set B is specified in IIR form by providing the coefficients of the polynominal: (1-D)(1+alpha*D) / (1+a1*D^1+a2*D^2+a3*D^3+a4*D^4). There will be two sets of IIR threesomes. For the first set alpha has the value 1, and for the second set alpha has the value 0. The denominator coefficients are specified by 9 bit values.
5. A compliant transmitter shall implement setting 0 and either all elements of Set A or all elements of Set B. The details of the implementation technique are not specified.
6. Each set has a threesome which holds 3 settings that are intended for SHORT, MEDIUM, and LONG cables, respectively. A(1,4,7) and B(1,4) are for LONG, A(2,5,8) and B(2,5) are for MEDIUM and A(3,6,9) and B(3,6) are for SHORT.
7. Meanings: SHORT: < 45m Cat6e (approx. <40m Class E), MEDIUM: 45-80m Cat6e (including 55m Class E), LONG: 80-100m Cat6e (including 100m Class F).
8. During autoneg, the receiver will send information to the transmitter to down select to 1+3 THPs (1st is setting 0)
9. During start-up, receiving entities request from transmitting entities a precoder setting among the 1+3 identified in previous step.
10. The FIR precoding responses for settings A(1), A(2) and A(3) shall be as in vareljian_1_0105.pdf, slide 3 (PROVISIONALLY AGREED).
11. The IIR precoding responses for settings B(1), B(2) and B(3) shall be as in as in ungerboeck_1_0105, #1 (100m), #2 (70m), #3 (40m) (PROVISIONALLY AGREED).

Above, the concept of PROVISIONAL AGREEMENT is used. If by the next meeting, no technical objection and proposed solution is raised, the coefficients and methods become part of the text. If a technical objection is raised at the next meeting, and a solution is proposed, no preference is given to the provisional agreement; either the proposal above or the new proposal must achieve a 75% technical vote to get into Draft 1.3,

Start-up sequence

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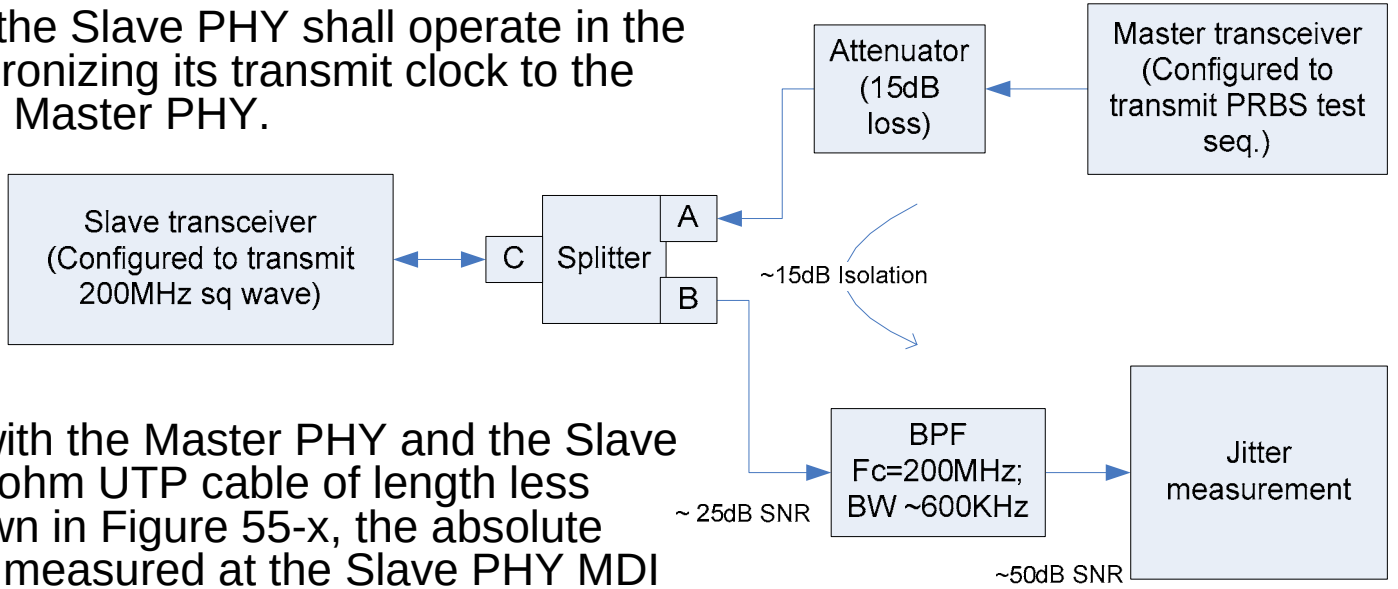
	MASTER State	Questions/Comments	Duration (ms)		SLAVE State	Questions/Comments	Duration (ms)
1	Master starts transmitting PAM2+IF(m) with (THP= 0m, PBO= -14dB, timer count), if no response from Slave after timer expiration increase settings to (THPShort~35m, -10dB) and maybe (THPMedium~65, -6).	The THP and PBO setting must 'increase' if Slave not responding. Must dwell for some time in this state before increasing. The THP and PBO must be upperbounded to avoid too much AFEXT. Probably max THP is short or medium setting. THP~50m, PBO~-8dB	Multiples of timer of ~100ms to allow Slave to acquire agc, timing, prbs state and some EQ FFE refinement	1	Slave silent. Master transmitting PAM2, if low signal wait for Master to increase settings to (Short, -10dB) and maybe (Medium, -6)		Multiple of Master tx dwell time.
2	Converge EC/NXC	No need for accurate cancellation since will change later with Phase recovery	~10-100	2	Estimate cable length for THP and rx signal power for PBO settings	Slave can estimate what PBO setting the Master is using. If the power is too low the slave should wait for the Master in increase PBO and THP	~1-10
3				3	Timing/phase recovery.		~1-10
4				4	Get PMA PRBS state from pair A	IF(m) can be decoded	~1
5				5	Converge EQ/FXC and compensate for delay skew		~10
6	Phase recovery		~1-10	6	Slave starts transmitting PAM2 with final THP and PBO (based on cable length and power estimates above)		
7	Get PMA PRBS state from pair A. Decode IF(s)(THP,PBO, frame count) and apply to local tx after count frames. Indicate with IF(m) that Master will switch to final THP		~1-10	7	Request Master with IFs for same THP/PBO settings after 'count frame' time (to converge local EC/NXC)	Assumption channel is symmetric and same THP can be used for both ends	
8	Converge EQ/FXC, compensate for delay skew and reconverge EC/NXC.	Final convergence (specially FFE) requires most time	~500	8	Converge EC/NXC/EQ/FXC. Anounce transition to PCS data mode in IF	Final convergence (specially FFE) requires most time	~500
9	Announce ready for data mode (PCS) in IF			9	Announce transition to data mode after 'count frame' time in IFs		

Jitter Measurement

- When in Test Mode x, the Master PHY shall transmit the PMA training pattern (PRBS 33) to the Slave PHY as shown in the figure below and the Slave PHY shall transmit a 200 MHz square wave to the Master PHY at full power. In Test Mode x, the Slave PHY shall operate in the loop-timed mode, synchronizing its transmit clock to the signal received from the Master PHY.



- When in Test Mode x, with the Master PHY and the Slave PHY connected by 100 ohm UTP cable of length less than 10 meters, as shown in Figure 55-x, the absolute (i.e., accumulated) jitter measured at the Slave PHY MDI output shall be less than 4 ps RMS. The absolute jitter shall be measured over an integration time interval of 1 msec +-10%.

Note: 4 ps RMS jitter corresponds to an SNDR of 46 dB at 200 MHz.

Band pass filter

- For reference: here is a sample SAW band pass filter:
  - http://www.rfm.com/products/data/sf1092a.pdf