

PHY Link Synchronization (SEND_S) Modification Proposal for Multi-Giga PHY

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Summary : PHY Link Synchronization- SEND_S

- Specified at 802.3bp
 - **97.4.2.6 PHY Link Synchronization**
- Decided at 802.3ch to adopt the scheme
 - http://www.ieee802.org/3/ch/public/jul18/tu_3ch_02_0718.pdf
 - Motion #7 – passed
- Proposed modifications:
 - Same scheme used for all speeds with the same pulse width for SEND_S signaling of 1.4222ns
 - Use 703.125Mhz as Symbol rate
 - Same MASTER/SLAVE PN sequence
 - Same PHY link Synchronization State machine
 - Basic Pulse with is width of 1.4222ns
 - Symbol rate (5625MHz/4/2 -> 703.125MHz)

Reasons for the modifications

- Insertion loss increased with the symbol rates for the speeds if pulse width scales

Schemes Nyquist frequency (MHz)	8023bp	802.3CH 2.5GT1	802.3CH 5GT1	802.3CH 10GT1	Proposed Scheme
	375Mhz	703.125	1406.25	2812.5	351.56
IL(dB)	12.30	13.37	19.71	29.51	9.2

- The period to finish PHY synchronization is less than 1ms. It is not significant if it runs at lower rate
- The wider pulse offer better signal margin – all study done at 802.3bp will be valid (http://www.ieee802.org/3/bp/public/nov14/wang_3bp_01_1114.pdf)
- extra margin for Reduction of match filter receiver design
- Requirement to design Detection block on SEND_S signal for Sleep/Wake schemes will be relaxed or with higher fidelity.

Change List :

Clause 149.4.2.6 and Clause 150.4.2.6 at D0p5

- Add a paragraph at the two sections describing the SEND_S signaling with the working frequency of 703.125MHz. (Page 74, line 27 and Page 123, Line 27)
- At page 76, line 2, D0p5
 - Change “The bit $S_n[0]$ is mapped to the transmit symbol T_n as follows: if $S_n[0] = 0$ then $T_n = +1$, if $S_n[0] = 1$ then $T_n = -1$.” to “ The bit $S_n[0]$ is mapped to the transmit symbol T_n as follows: if $S_n[0] = 0$ then $T_n = +1 +1$, if $S_n[0] = 1$ then $T_n = -1 -1$ ”
- At page 124, line 2, D0p5
 - Change “The bit $S_n[0]$ is mapped to the transmit symbol T_n as follows: if $S_n[0] = 0$ then $T_n = +1$, if $S_n[0] = 1$ then $T_n = -1$.” to “ The bit $S_n[0]$ is mapped to the transmit symbol T_n as follows: if $S_n[0] = 0$ then $T_n = +1,+1,+1,+1$ if $S_n[0] = 1$ then $T_n = -1 -1 -1 -1$ ” at 5GBASET1. And if $S_n[0] = 0$ then $T_n = +1,+1,+1,+1 +1 +1 +1 +1$ if $S_n[0] = 1$ then $T_n = -1 -1 -1 -1 -1 -1 -1 -1$ ” at 10GBASET1.
- xx.4.2.6.2 State diagram timers (Page 77, line 40 and 44 Page 125, line 40 and 44)
 - send_s_timer expiration changed to “1.25us±0.05us “
 - sigdet_wait_timer expiration changed to “5.0us±0.15us”