Start-up Training Sequence Proposal

November 7, 2005   T10/05-397r0

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Infineon

Never stop thinking

- DFE receivers may require training before speed negotiation takes place.
- Applying a known pattern for training greatly improves time required for training.
- Ensure backwards compatibility.
- Use current protocol.
- Introduce training sequence only where needed.
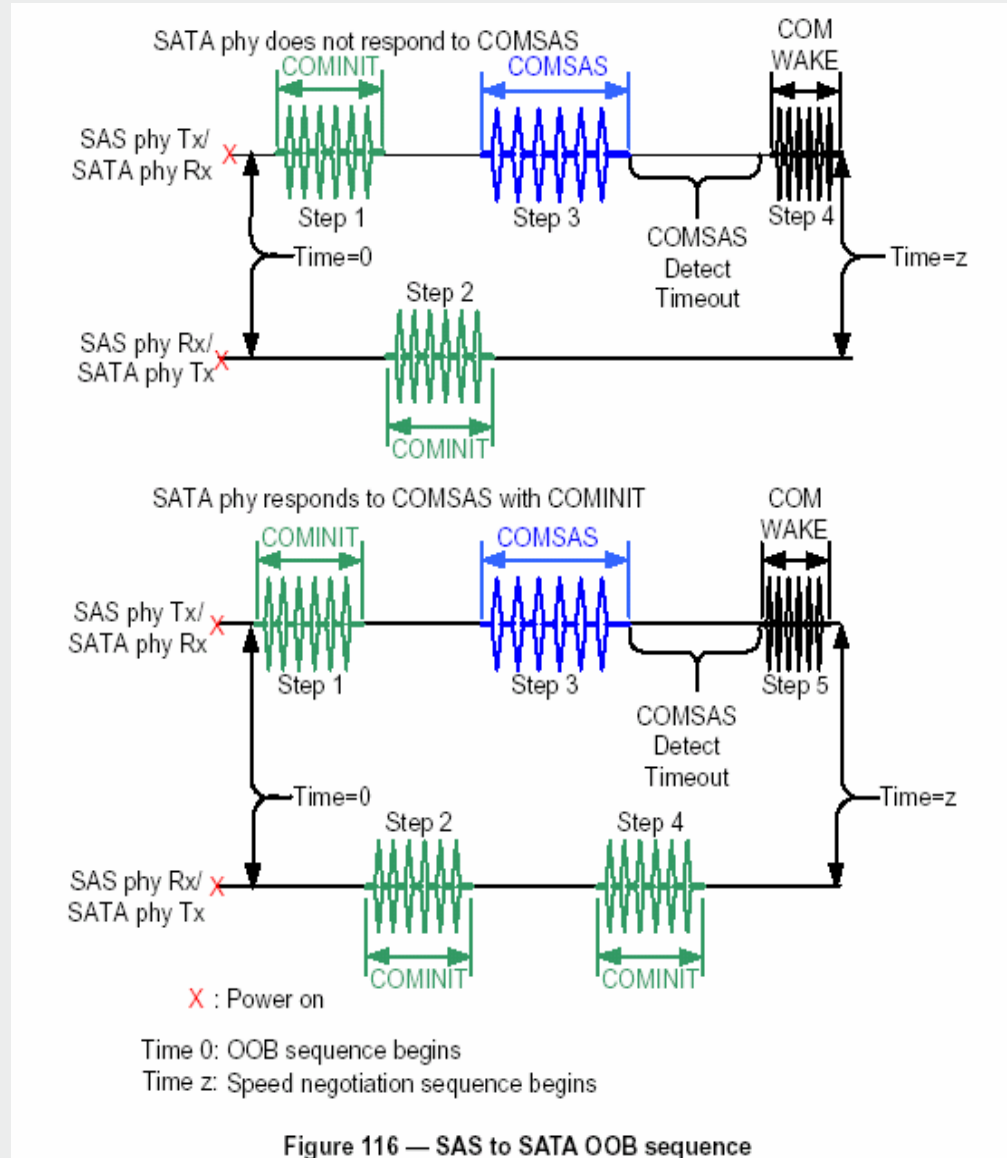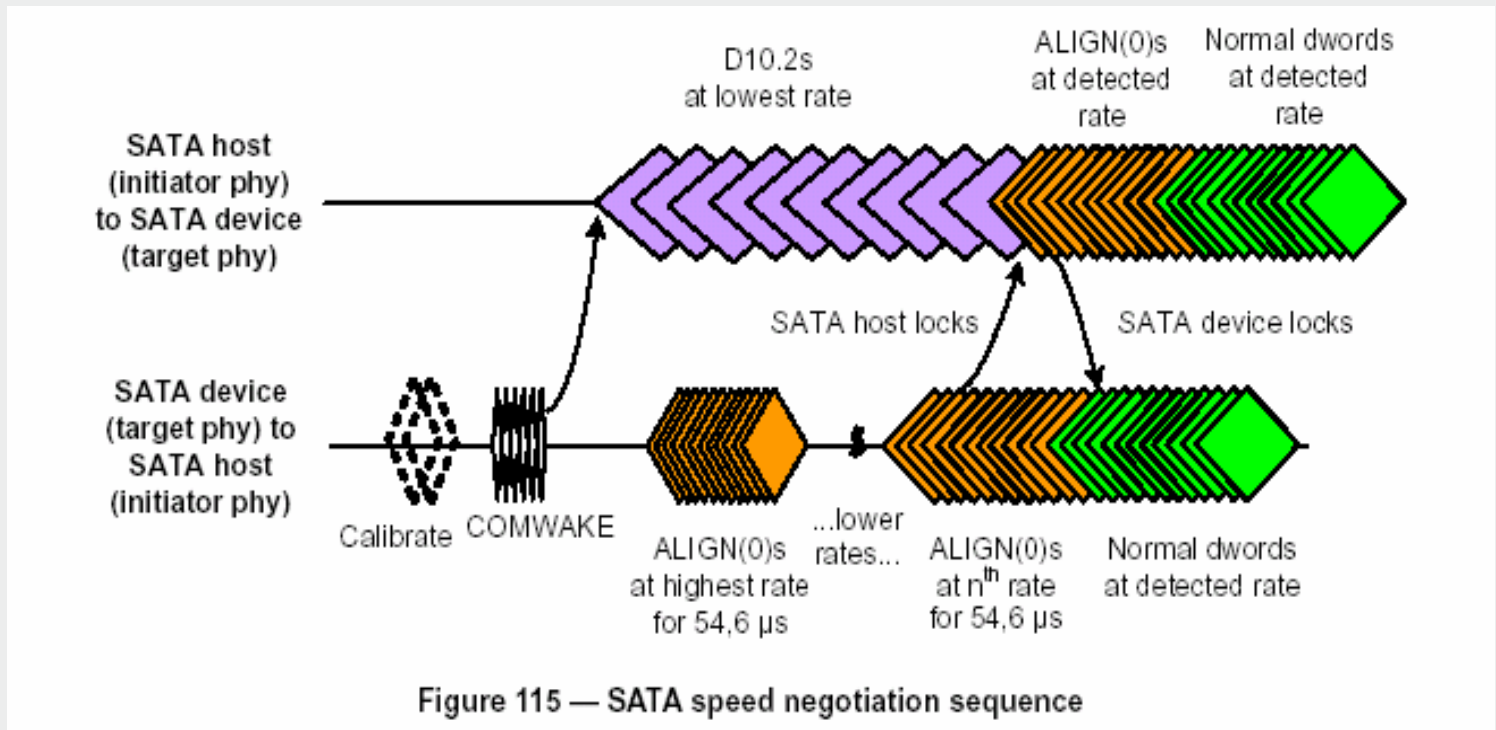- Leverage off existing spec based on DFE architecture.

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Figure 116 — SAS to SATA OOB sequence

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Figure 115 — SATA speed negotiation sequence

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Figure 118 — SAS speed negotiation window

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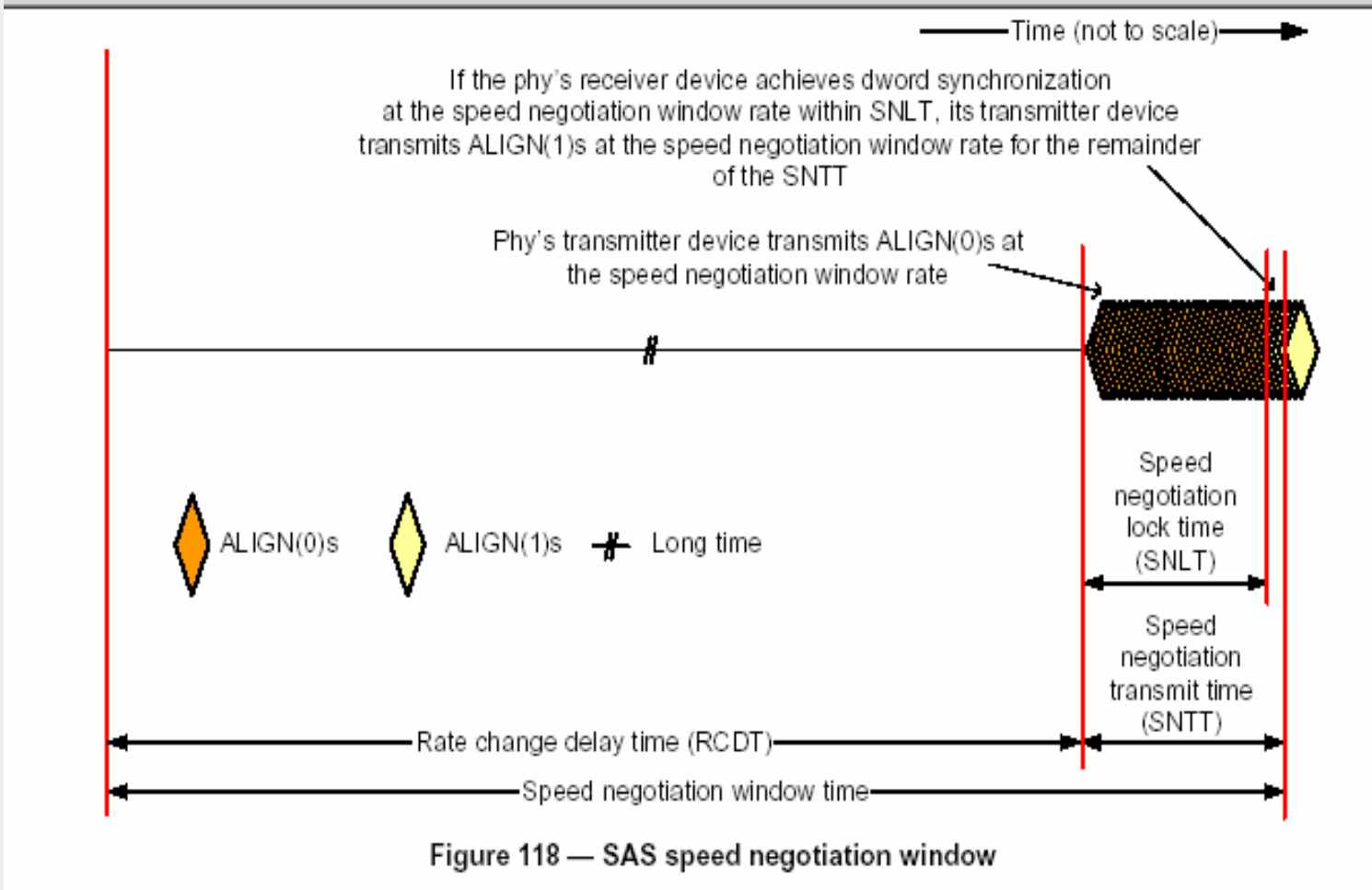
Table 66 defines the timing specifications for the SAS speed negotiation sequence.

Table 66 — SAS speed negotiation sequence timing specifications

Parameter	Time	Comments	
Rate change delay time (RCDT)	750 000 OOBI	The time the transmitter device shall transmit D.C. idle between rates during speed negotiation.	500µs
Speed negotiation transmit time (SNTT)	163 840 OOBI	The time during which ALIGN (0) or ALIGN (1) is transmitted at each physical link rate during the speed negotiation sequence. Derived from: OOBI x 4 096 x 40.	109µs
Speed negotiation lock time (SNLT)	153 600 OOBI	The maximum time during the speed negotiation window for a transmitter device to reply with ALIGN (1). Derived from: OOBI x 3 840 x 40	102µs
Speed negotiation window time	913 840 OOBI	The duration of a speed negotiation window. Derived from: RCDT + SNTT.	609µs

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Figure 119 — SAS speed negotiation sequence (phy A: G1, G2, G3, phy B: G2 only)

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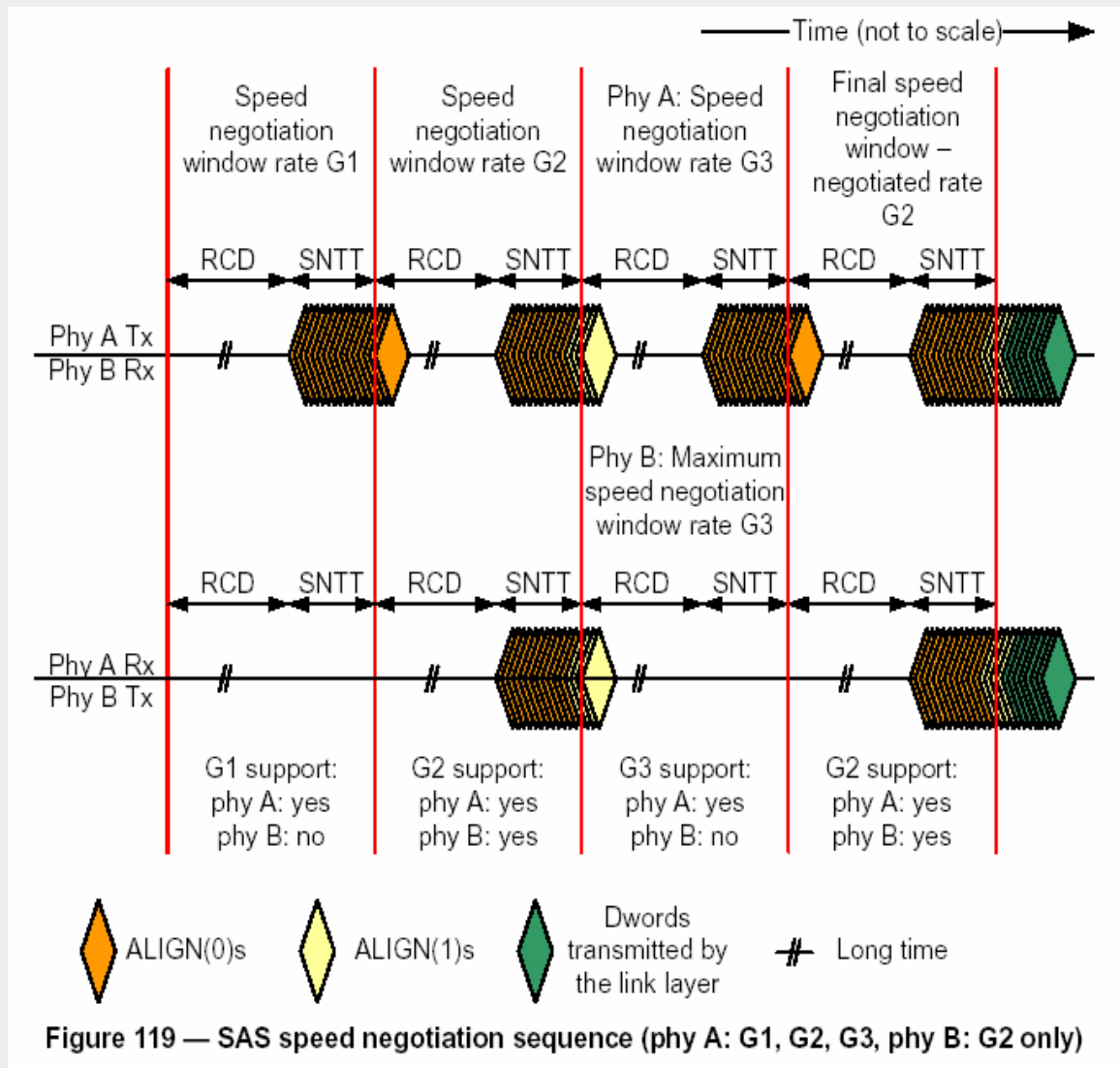
Table 7-6. CEI-6G-LR Training Pattern

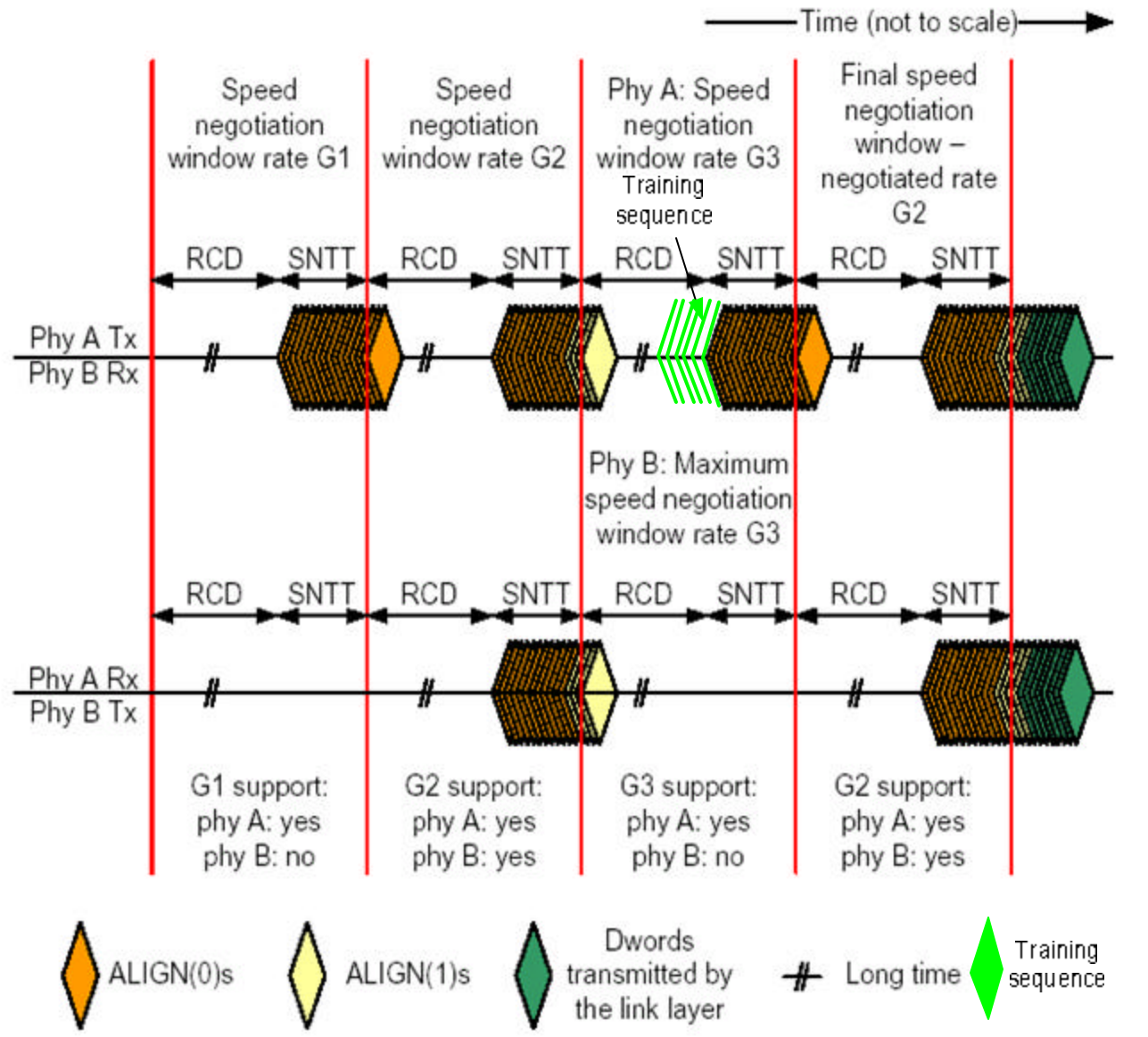| Pattern (in Hex)	Purpose
00 FF 00 FF 00 FF	48 bits - f/16 square wave
00 80 00	24 bits - positive impulse with 12 leading and trailing zeros
55 55 55 55 55 55	48 bits - f/2 square wave
FF EF FF	24 bits - negative impulse with 12 leading and trailing ones
00 FF 00 FF 00 FF	48 bits - f/16 square wave
At least 192 random or pseudo-random bits	Approximation of normal randomized data patterns (see 3.2.1)

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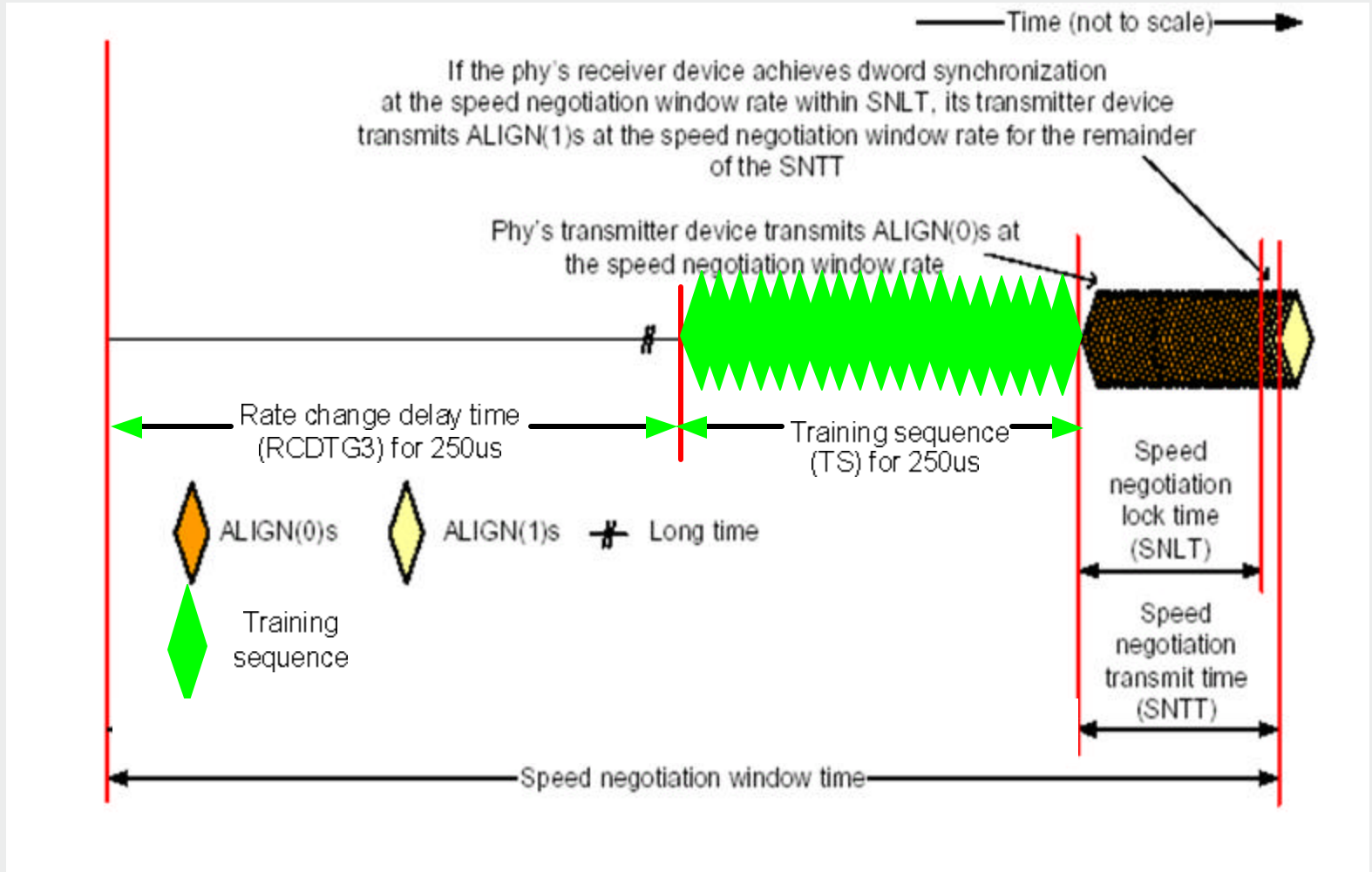
Parameter	Time	Comments
Rate change delay time G3 (RCDTG3)	375 000 OOBI	The time the transmitter device shall transmit D.C. idle between rates during speed negotiation.
Speed negotiation transmit time (SNTT)	163 840 OOBI	The time during which ALIGN (0) or ALIGN (1) is transmitted at each physical link rate during the speed negotiation sequence. Derived from: OOBI x 4 096 x 40.
Speed negotiation lock time (SNLT)	153 600 OOBI	The maximum time during the speed negotiation window for a transmitter device to reply with ALIGN (1). Derived from: OOBI x 3 840 x 40
Speed negotiation window time	913 840 OOBI	The duration of a speed negotiation window. Derived from: RCDT + SNTT.
Training sequence (TS)	375 000 OOBI	Training sequence.

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