EFM Copper

PHY Control

Document Structure and G.994 Operation

Supplement to the 802.3ah Copper Baseline

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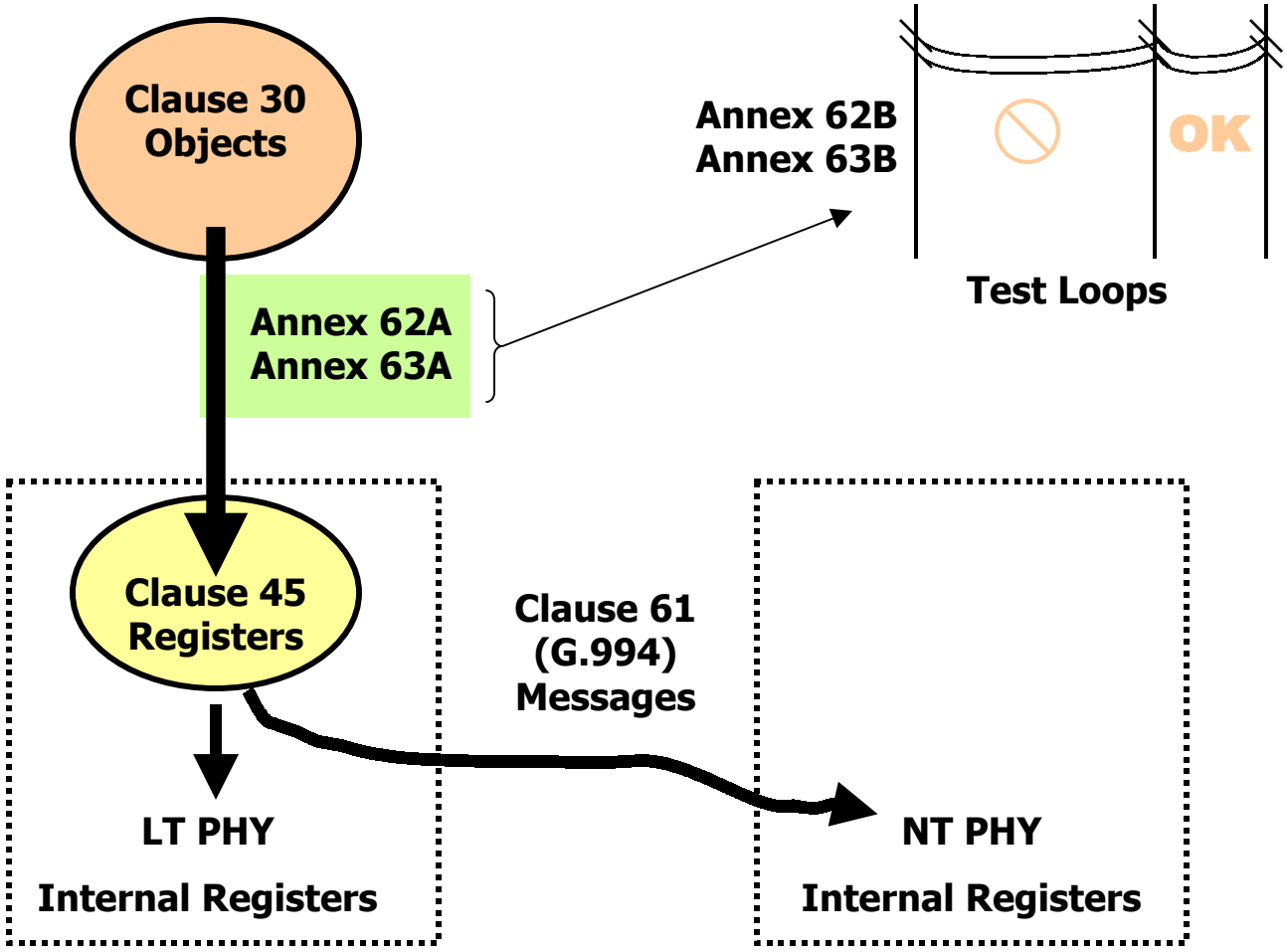
Goals

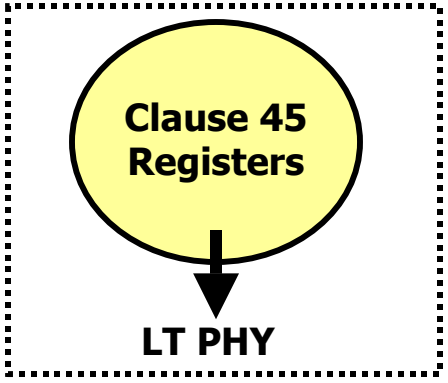
- **Find a place in the draft for certain unresolved issues**
  - **Bandplan support**
  - **Performance compliance**
  - **Link control**
  - **Link initialization**
- **Guarantee specific modes of operation AND maintain PHY flexibility**
- **Manage each PHY type consistently**
- **Logically incorporate G.994 for link initialization**

Document Structure



Role of Clause 45

- **Clause 45 registers allow explicit control of PMD parameters**
  - **Examples:**
    - **SCM Carrier 1 Symbol Rate Register sets any symbol rate from 0 to ~4200 kbaud/sec.**
    - **MCM Tone Group Register allows any group of tones to be assigned an arbitrary SNR margin**
- **Allows maximum system flexibility**
  - **Vendors can program their PHY to whatever mode they wish**
    - **private installations, unforeseen regional regulations, etc.**
  - **But. . .**



Role of Clause 30

- **Clause 30 *attributes* define profiles that combine PMD parameters into discreet modes**

Examples:

30.X.Y.Z aPhyProfile10PASS-TS

ATTRIBUTE

APPROPRIATE SYNTAX

An ENUMERATED VALUE that has one of the following entries:

998-16/3	**Bandplan 998. DS Rate = 16Mb/s, US Rate = 3Mb/s**
998-22/16	**Bandplan 998. DS Rate = 22Mb/s, US Rate = 16Mb/s**
997-10/10	**Bandplan 997. DS Rate = 12Mb/s, US Rate = 12Mb/s**
. . .	
user-defined	**PHY link parameters are set to values that don't correspond to an above profile**

30.X.Y.Z aPhyProfile2BASE-TL

ATTRIBUTE

APPROPRIATE SYNTAX

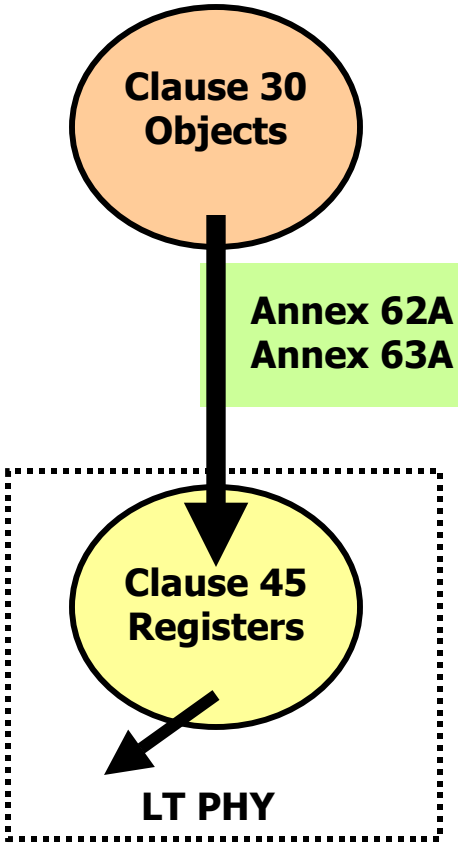
An ENUMERATED VALUE that has one of the following entries:

E-1	**European PSD mask. Bitrate = 1Mb/s**
NA-2	**North American PSD mask. Bitrate = 2Mb/s**

- **Interleaving, notches, etc. may handled in a separate attribute, or added to the profile definition**
- **Creates completely specified modes of operation that all compliant PHYs shall support**

Clause 30 Objects

Role of Annexes 62A and 63A



- **Add Annexes 62A and 63A to map the Clause 30 profile settings to Clause 45 register settings**

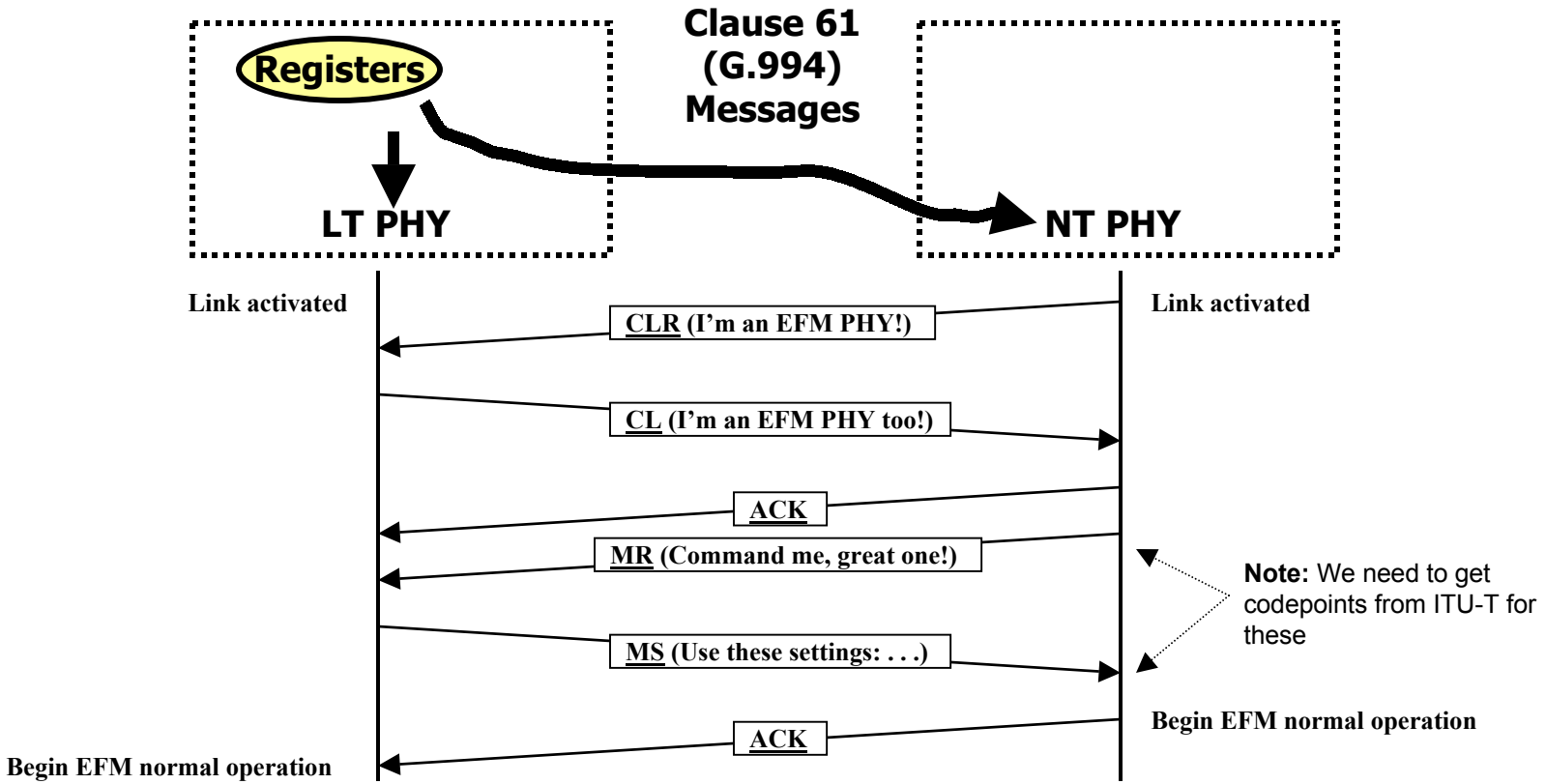
Example:

Clause 30 Profile	Clause 45 Register			
	1.23 DS Constellation	1.24 US Constellation	1.26 DS Symbol Rate	1.28 US Symbol Rate
998-22/16	0x0cad	0x1123	0x1231	0x3829
997-10/10	0x0e72	0x12bc	0x23b0	0x3f9e

Note: All values are for example only.

Role of Clause 61 G.994

- **At link startup, the G.994 transaction configures the NT PHY according to the registers in the LT PHY.**



Role of Annexes 62B and 63B

- **Annexes 62B and 63B to specify performance requirements for each PMD**
- **Each annex is mostly comprised of two tables**

  The Loop Table specifies various test scenarios. For example:

  Loop 1: 24AWG, 24 self-disturbers, x-talk model: F(x) = duke ellington / mark spitz

  Loop 2: 26AWG, 24 ADSL disturbers, x-talk model: F(x) = smoked ham * can openers

  etc.

  The Test Table specifies the required performance for each Clause 30 profile for each entry in the Loop Table. For example:

Clause 30 Profile	Reach @ min BER			
	Loop 1	Loop 2	Loop 3	Loop 4
998-16/3	1500m	1000m	1200m	800m
998-22/16	500m	400m	425m	300m
997-10/10	1000m	750m	800m	400m

Note: All values are for example only.

- **Guarantees that all PHYs will behave the same for all specified profiles**

Summary

- **Sections are added or modified:**

Clause 30	specify attributes	(add text)
Clause 45	PHY registers for LT and NT	(modify text)
Clause 61	specify G.994 operations for config of NT	(modify text)
Annex 62A	profile definition and attribute to register contents for 10PASS-TS	(TBD)
Annex 63A	profile definition and attribute to register contents for 2BASE-TL / 2PASS-TL	(TBD)
Annex 62B	test loops and reach tables for 10PASS-TS	(TBD)
Annex 63B	test loops and reach tables for 2BASE-TL / 2PASS-TL	(TBD)

- **Separation of parameters and profiles allows deployment flexibility while guaranteeing specific modes of operation**
- **G.994 is used to identify the PHY to the network and to set parameters on the NT**
  - **no handshaking or negotiation**
  - **Clause 62 and 63 PHYs are both configured via the same mechanism**

Discussion

Motion. . .

. . . to adopt presentation simon_1_0902.pdf as a basis to change the document structure for the 802.3ah draft regarding the copper objectives.

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Y:25 N:0