Inconsistent expansion of PHY

IEEE 802.3

Maintenance Task Force

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Problem summary

- IEEE Std 802.3 usage of “PHY” is “Physical Layer device (PHY)”
- This is inconsistent with 1.4 Definitions and 1.5 Acronyms:

1.4.391 Physical Layer entity (PHY): Within IEEE 802.3, the portion of the Physical Layer between the Medium Dependent Interface (MDI) and the Media Independent Interface (MII), Gigabit Media Indepen-dent Interface (GMII) or 10 Gigabit Media Independent Interface (XGMII), consisting of the Physical Coding Sublayer (PCS), the Physical Medium Attachment (PMA), and, if present, the WAN Interface Sublayer (WIS) and Physical Medium Dependent (PMD) sublayers. The PHY contains the functions that transmit, receive, and manage the encoded signals that are impressed on and recovered from the physical medium. (For example, See IEEE Std 802.3, Clauses 23 to 26, Clause 32, Clause 36, Clause 40, Clauses 48 to 54, Clauses 58 to 63, Clause 65, Clause 66, Clauses 82 to 89, and Clause 96.)

1.5 Acronyms

PHY	Physical Layer entity

- The above definition is inconsistent with IEEE Std 802 for other WGs, 802.3 definition has special case recognition in Std 802

PHY usage confusion

- Three expansions:
  - “Physical Layer entity (PHY)”
  - “Physical Layer device (PHY)”
  - “Physical Layer (PHY)”
- IEEE Std 802.3 diverged from its early expansion of PHY
  - 802.3-1985 had ISO layers, with Physical Layer going from bottom of MAC to top of medium; and no acronym of “PHY”
  - 802.3u-1995 (100 Mb/s, Fast Ethernet) has all three expansions, and PHY being less than the Physical Layer
- Current work continues dominant usage of “Physical Layer device (PHY)”, but more frequently includes “Physical Layer (PHY)”

Option 1

- Go with the dominant usage (Physical Layer device)
- Smallest amount of work
  - Approximately 25 occurrences of “Physical Layer entity/entities”
  - Approximately 200 occurrences of Physical Layer device/devices
- Fix inconsistencies
  - Leave all capitals found in many figures
  - Make capitalization in text consistent (recommend Physical Layer device)
  - Fix residuals of Physical Layer entity once being a sublayer when updating text
  - Remove PHY type list in definition, it’s too long yet still very incomplete
  - Remove “PHY” as an expansion for “Physical Layer”

Option 2

- Go with Physical Layer entity as envisioned decades ago
- Why do it if it is more work?
  - In 1995 there was probably a close correlation between a PHY chip implementation and ”Physical Layer device” which no longer holds
  - Entity is a more accurate word choice
- Fix inconsistencies
  - Leave all capitals found in many figures
  - Make capitalization in text consistent (recommend Physical Layer entity)
  - Fix residuals of Physical Layer entity once being a sublayer when updating text
  - Remove PHY type list in definition, it’s too long yet still very incomplete
  - Remove “PHY” as an expansion for “Physical Layer”

Option 3

- Use “PHY” only as an expansion for Physical Layer
  - It is more consistent with industry usage
- Major amount of work
  - Probably need new acronym for Physical Layer entity/device
  - Only use one of two terms (i.e., entity or device)
  - Fix inconsistencies per Option 1 or Option 2
  - Greatest probability for creating significant errors not found with key word searches
- Would require amendment/revision of IEEE Std 802 to get rid of the special case for IEEE Std 802.3

Option 4

- This really doesn’t matter. Leave as is…a charming inconsistency.
- Optionally fix capitalization

Recommendation

- I personally think Physical Layer (PHY) is the best choice for usage by the world at large
  - Other than 802.3 most use PHY to map to the ISO reference model Physical Layer
  - Option 3 though is very high risk for creating problems:
    - A quick search produces thousands of hits on “PHY”
    - Related nearby text (to the search hit) may miss being updated
- That said, practical considerations makes my ranking of options:
  - Option 2 – Physical Layer entity (PHY)
  - Option 1 – Physical Layer device (PHY)
  - Option 4 – Status quo
  - Option 3 – Physical Layer (PHY)