

# Modes to support lower power operation

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# Supporting PHY operation at reduced power

- Define register bits in Clause 45 to allow PHYs to operate with lower power when link lengths are less than 100 m
- For the shorter reach modes, the PHY may power down components that are only needed to go further than the link length limits
  - Sample length break points
    - 100m (default setting)
    - 75m (should cover >95+% of all data centers)
    - 55m (should cover >80+ % of all data centers)
    - 30m (should cover small data centers)
- If the installation that the PHY is running on is a subset of the allowed media types, allow the PHY to turn off processing blocks that are not needed
  - Sample configurations
    - All media types allowed in 55.7 (default setting)
    - Screened cable (reduced alien crosstalk levels)
    - Cat 6A (reduced alien crosstalk levels and improved insertion loss)
    - Cat 7 (reduced alien crosstalk and reduced NEXT and FEXT)

# Operational savings possible

- With reduced length requirements
  - TX voltage can be lowered
  - RX sensitivity can be reduced
  - LDPC decoder performance can be relaxed
  - Canceller and equalizer performance requirements can be relaxed
- With restricted media types
  - Some media will provide higher SNR and this increase SNR can be used to relax requirements on various hardware blocks such as echo cancellers, LDPC decoders etc.
  - Some media will significantly reduce NEXT and FEXT and cancellers for these impairments may be disabled
  - Some media type will have better in-channel performance and equalizer and LDPC decoder requirements can be relaxed (similar to benefits from reduced length operation)

# Clause 45 changes to support the modes

- Page 63, insert rows above the row that starts on line 31 as shown in the table; insert text in 45.2.7.10 to describe these bits
- Change 7.32.11:3 to 7.32.7:3 in the row that is currently on line 31 to account for the fact that some of the bits that are “reserved” in draft 3.0 are now being assigned

Bit(s)	Name	Description	R/W
7.32.11:10	Max link length	00: Link lengths may be up to 100m (default setting) 01: Link lengths are $\leq$ 75 m 10: Link lengths are $\leq$ 55 m 11: Link lengths are $\leq$ 30 m	R/W
7.32.9:8	Restrictions on media type	00: All media types allowed in 55.7 (default setting) 01: Screened cabling with reduced alien crosstalk 10: Cat 6A only 11: Cat 7 only	R/W
7.32.11:3	Reserved	Ignore on read	RO

# Clause 55.5 changes to support the modes

- Qualify the Alien noise test currently in 55.5.4.4
  - Test shall be run over Cat 6A with the register bits
    - 7.32.11:10 set to “00”
    - 7.32.9:8 set to “10” (cat 6<sub>A</sub> media type)
- Add test over 100m of Cat 7 with the register bits
  - 7.32.11:10 set to “00”
  - 7.32.9:8 set to “11” (cat 7 media type)
- Add test over 30m of Cat 7 with the register bits 7.32.11:10 set to “11” and register bits
  - 7.32.11:10 set to “11”
  - 7.32.9:8 set to “11” (cat 7 media type)
- Add test over 30m of Cat 6<sub>A</sub> with the register bits
  - 7.32.11:10 set to “11”
  - 7.32.9:8 set to “10” (cat 6<sub>A</sub> media type)

# Optional: Management

- Expose the bits added in Clause 45 in the extended next pages for visibility to link partner for diagnostic purposes
- Page 135, insert rows below the row that starts on line 36 as
- Change U31:21 to U31:19 in the row that is currently on line 36 as these bits are now assigned

Extended Next Page (Unformatted Message Code Field)		
Bit	Name	Description
U31: <del>21</del> 17	Reserved, transmit as 0	
U21:U20	Max link length capability 00: Link lengths may be up to 100m (default setting) 01: Link lengths are $\leq$ 75 m 10: Link lengths are $\leq$ 55 m 11: Link lengths are $\leq$ 30 m	The capability is controlled by the register bits 7.32.11:10 defined in 45.2.10.?
U19:U18	Media type restriction 00: All media types covered in 55.7 01: PHY configured to operate over screened cable or better 10: PHY configured to operate over 6A or better 11: PHY configured to operate over Cat 7	The capability is controlled by the register bits 7.32.9:8 defined in 45.2.10.?