

Ethernet Phys for Copper Subscriber Loop

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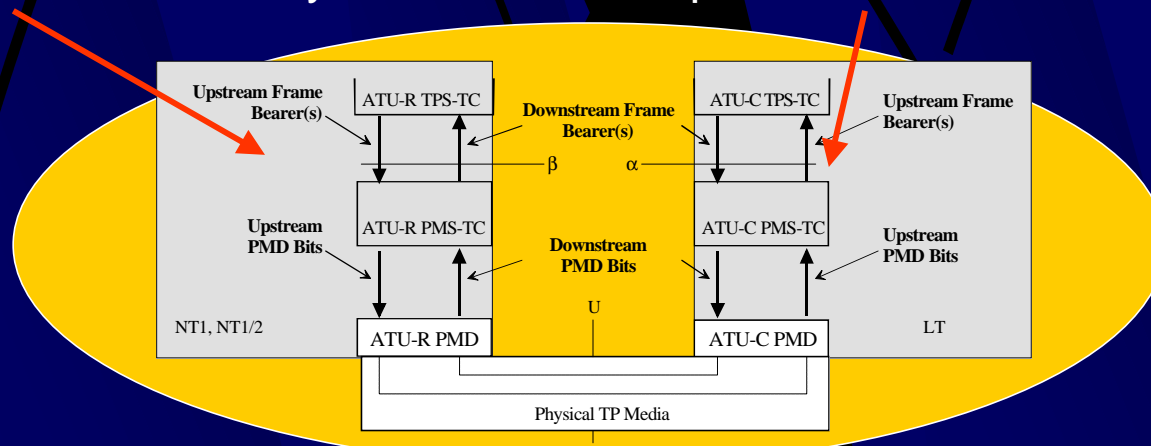
Elements Required for a Phy Standard

- Line code and the spectral composition of the signals transmitted by both ATU-C and ATU-R
- A specification of the transmit signals at both the ATU-C and ATU-R
- A description of how data is organized into transmitted and received data frames
- A definition of the functions of the operation channel for maintenance and control

Existing Standards

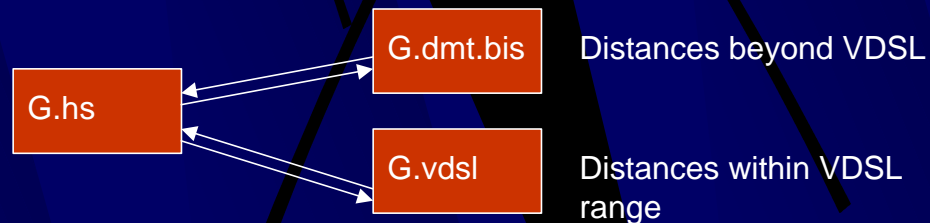
The G.dmt-bis draft has provision for an Ethernet Interface

Ethernet TC may be inserted at Alpha, Beta Interface



Use Installed Standards

- ITU-T Recommendations provide a foundation for an Ethernet Phy



Handshake → Connection

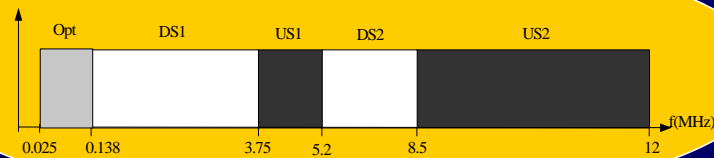
Benefits of using existing work

- Internationally accepted standards
- Acceptable PSD
- Meets Spectrum Compatibility requirements
- G.hs Handshake compatible with VDSL, ADSL and SHDSL and can be used to interoperate between ADSL and VDSL
- Compatibility with installed base of ADSL modems is maintained
- No defined line code for VDSL
- Recommendations, at the Alpha Beta Interface, can be used to implement Ethernet

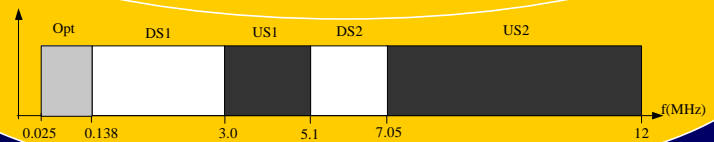
Are three bandplans required to be international?

- How do we implement multiple bandplans?

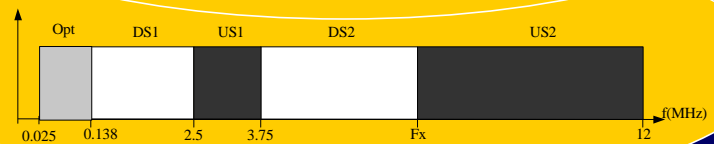
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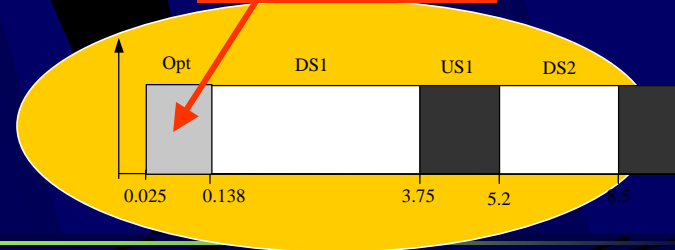


What other work is required?

- How do we aggregate multiple Phy channels into one datastream?
- Specify how ADSL is to work at 10 Mbit
 - Current recommendations specify only up to 8 Mbit, as we need 10 Mbit at 12,500 on 24 AWG
- Flow control between the Phy and MAC
- How can a single Phy specify multiple band-plans for International acceptance?

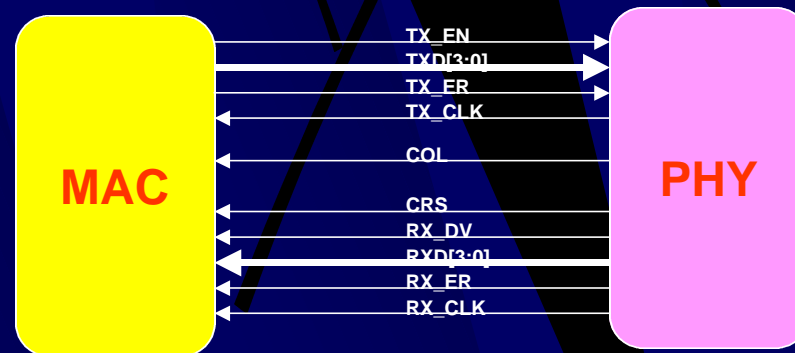
Not enough bandwidth in the optional band

- The optional band could provide an additional 1 Mbit in the upstream direction for symmetry
 - There is no international agreement for use of the optional band
 - The filter is not easy to build
 - Is the extra 1 Mbit worth the effort?
 - We should not pursue use on the optional band



MII Interface

- Is Tx-Enable and Rx-Data Available enough to implement flow control between the MAC and Phy?



Proposal

- Adopt and modify the ITU-T recommendation to use the Alpha, Beta interface for ADSL and VDSL using G.hs to specify a single Phy for Ethernet
 - The crossover point from VDSL to ADSL should be negotiated during the connect and is up to the implementer
- Specify a flow-control interface between the MAC and the Phy to maximize bandwidth
 - Use existing MII flow controls where possible
- This proposal provides the shortest path to a IEEE standard where international acceptance is assured