

IEEE P802.3bn Work Items for January 2014

Status: S = baseline starting point, B = baseline proposal, D = in draft, N/A = not applicable, <blank> = no status

Downstream PHY Layer

| Item | Status | Notes / Comment / References |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reconciliation | N/A | No changes |
| PCS: | | |
| <ul style="list-style-type: none"> • 64b/66b/65b Encoder / Decoder | D | TD#20 (65b); TD#46: hajduczenia 3bn 04 0513.pdf TD#50 (continuous vector, no split); |
| <ul style="list-style-type: none"> • FEC and Data Detector | | TD#4 (LDPC); TD#47: prodan 3bn 01 0513.pdf ; TD#94: hajduczenia 3bn 01a 0913.pdf |
| <ul style="list-style-type: none"> ○ FDD | D | TD#81: prodan 3bn 01a 0713.pdf ; TD#95 (FDD codes for Node+N, N≥0) |
| <ul style="list-style-type: none"> ○ TDD | | TD#96: pietsch 3bn 01a 0913.pdf |
| <ul style="list-style-type: none"> ○ MTTFPA | D | TD#82 (objective); TD#93: prodan 3bn 02a 0913.pdf |
| <ul style="list-style-type: none"> • Scrambler / Randomizer (Jin) | | |
| PMA: | | |
| <ul style="list-style-type: none"> • OFDM Numerology | B | TD#2 (OFDM); TD#6 (multiple modulation orders); TD#7 (192 MHz, 10.24 MHz); TD#9 (Scaling); TD#30 (granularity of Fc); TD#31 (upper bound to 5GHz) TD#35 (minimum contiguous 24 MHz); TD#72 (FDD RF Spectrum); TD#73 (TDD RF Spectrum); TD#74: rahman saif 3bn 01 0713.pdf ; TD#78: solomon 3bn 02b 0713.pdf ; TD#85 (TDD 10 to 277 MHz); TD#86 (TDD 750 to 1800 MHz); TD#89 (FDD 5 to 234 MHz); TD#90 (TDD 5 to 277 MHz, 750 to 1800 MHz); |
| <ul style="list-style-type: none"> • Symbol Mapper | S | TD#110: laubach 3bn 04c 1113.pdf |
| <ul style="list-style-type: none"> ○ Constellation Mapping | | TD#103: prodan 3bn 02 1113.pdf |
| <ul style="list-style-type: none"> • Interleaving <ul style="list-style-type: none"> ○ Time ○ Frequency (Rich, Avi) | S | TD#110: laubach 3bn 04c 1113.pdf T.B.D. for frequency interleaving |
| <ul style="list-style-type: none"> • Pilot Insertion (Avi, Christian, Jin) | S | TD#29: pietsch 3bn 01 0313.pdf , kliger 3bn 01 0313.pdf ; |
| <ul style="list-style-type: none"> ○ Continual pilot structure | | TD#60: kliger 3bn 02 0513.pdf pietsch 3bn 01 0313.pdf ; TD#67: kliger 3bn 02 0513.pdf ; TD#79: kliger 3bn 02a 0713.pdf |
| <ul style="list-style-type: none"> • IFFT / IDFT | S | TD#110: laubach 3bn 04c 1113.pdf |

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| <ul style="list-style-type: none"> • Cyclic Prefix and Windowing | S | TD#23: montreuil_01a_0113.pdf ; TD#63: pietsch_3bn_02_0313.pdf ; TD#110: laubach_3bn_04c_1113.pdf |
| <ul style="list-style-type: none"> • Subcarrier Configuration <ul style="list-style-type: none"> ○ QAM Mapping • Bit Loading | | ? |
| <ul style="list-style-type: none"> • Scattered Pilots / Map | | |
| <ul style="list-style-type: none"> • Exclusion Rules | S | TD#5 (exclusions); TD#14 (placement); TD#55 (m, m+1, ...); TD#56 (internal, band edge); TD#57 (2 band-edge); TD#58 (minimum internal 1MHz); TD#59 (fixed number internal in 192 MHz); TD#69 (start, integer number sub-carriers); TD#70 (mapping to sub-carriers); TD#71 (at most 16); TD#110: laubach_3bn_04c_1113.pdf |
| <ul style="list-style-type: none"> • TDD Markers at beginning of each profile <ul style="list-style-type: none"> ○ Start marker indicates profile ID | | TD#26 (start markers); TD#28 (marker definition) |
| <ul style="list-style-type: none"> • Burst Structure | | TD#27 (used profile indication) |
| <ul style="list-style-type: none"> • Multiple OFDM Channels (Mark, Avi, ...) | | NCP, coupled to PLC cycle |
| <ul style="list-style-type: none"> • TDD Burst Marker (Syed, Leo) | | TD#8 (higher capacity) |
| <ul style="list-style-type: none"> • TDD Burst Control / Local Gates | | TD#97: rahman_syed_3bn_01_0913.pdf |
| <ul style="list-style-type: none"> • TDD Burst Control / Local Gates | | ? in Andreas (baseline MPCP) |
| PMD: | | |
| <ul style="list-style-type: none"> • Electrical Input / Output | B | |
| <ul style="list-style-type: none"> • Fidelity | B | TD#104: rahman_saif_3bn_02_1113.pdf |
| <ul style="list-style-type: none"> • MDI | B | |
| Other: | | |
| <ul style="list-style-type: none"> • Channel Model | | TD#15: howald_01a_0113.pdf |
| <ul style="list-style-type: none"> • CNU and CLT Receive Direction: <ul style="list-style-type: none"> • Rx Idle Deletion | | TD#42 (Like 10G-EPON) |
| <ul style="list-style-type: none"> • Rx Idle Insertion | B | TD#43 (Like 10G-EPON with changes); TD#48: hajduczenia_3bn_01_0513.pdf |
| <ul style="list-style-type: none"> • CNU and CLT Transmit Direction: <ul style="list-style-type: none"> • Tx Idle Insertion | B | TD#44 (Like 10G-EPON with changes); TD#49: garavaglia_3bn_02a_0513.pdf |
| <ul style="list-style-type: none"> • Tx Idle Deletion | B | TD#45 (Like 10G-EPON with changes); TD#48: hajduczenia_3bn_01_0513.pdf |
| <ul style="list-style-type: none"> • Rx Idle Insertion | | |
| <ul style="list-style-type: none"> • Multiple Modulation Profiles: <ul style="list-style-type: none"> • FDD single | | |
| <ul style="list-style-type: none"> • TDD multiple | | TD#19 (MMP for TDD, Single profile for FDD) |
| <ul style="list-style-type: none"> • Downstream PHY Block Diagram | S | |
| <ul style="list-style-type: none"> • Subcarrier Clocking, Accuracy | S | TD#91: kliger_3bn_01a_0913.pdf |
| <ul style="list-style-type: none"> • Acquisition | S | TD#110: laubach_3bn_04c_1113.pdf |

Downstream MPCP / OAM

| Item | Status | Notes / Comment / References |
|--------------------------|---------------|-------------------------------------|
| MPCP: | | |
| • Rate Adaptation | | |
| • FEC Adaptation (Duane) | | |
| • TDD | | |
| OAM: | | |

Upstream PHY

| Item | Status | Notes / Comment / References |
|---------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upstream TX Block Diagram | B | TD#107: kliger 3bn 01a 1113.pdf |
| Reconciliation | N/A | No changes |
| 1.6 Gb/s at MAC / PLS service interface in 192 MHz, in baseline channel conditions | | TD#40: remein 3bn 07 0313.pdf |
| PCS: | | |
| <ul style="list-style-type: none"> • 64b/66b/65b Encoder / Decoder | D | TD#20 (65b); TD#46: hajduczenia 3bn 04 0513.pdf ; TD#50 (continuous vector, no split); |
| <ul style="list-style-type: none"> • FEC Codeword Builder and Data Detector: | | TD#47: prodan 3bn 01 0513.pdf |
| <ul style="list-style-type: none"> ○ FDD Active / Passive FEC Codewords | B | TD#81: prodan 3bn 01a 0713.pdf ; TD#92: shen 3bn 01 0913.pdf ; TD#95 (FDD codes for Node+N, N≥0) |
| <ul style="list-style-type: none"> ○ FDD Codeword Builder (Rich) | B | TD#103: prodan 3bn 01 1113.pdf |
| <ul style="list-style-type: none"> ○ TDD Passive FEC Codewords | B | TD#96: pietsch 3bn 01a 0913.pdf |
| <ul style="list-style-type: none"> ○ TDD Codeword Builder | | |
| <ul style="list-style-type: none"> ○ MTTFPA | D | TD#82 (objective); TD#93: prodan 3bn 02a 0913.pdf |
| <ul style="list-style-type: none"> • Scrambler / Randomizer | | |
| PMA: | | |
| <ul style="list-style-type: none"> • OFDM Numerology | B | TD#3 (OFDMA); TD#9 (scaling); TD#17 (25 kHz and 50 kHz spacing); TD#24 (192 MHz and exclusions); TD#30 (granularity of Fc); TD#31 (upper bound to 5GHz); TD#72 (FDD RF Spectrum); TD#73 (TDD RF Spectrum); TD#74: rahman saif 3bn 01 0713.pdf ; TD#78: solomon 3bn 02b 0713.pdf ; TD#85 (TDD 10 to 277 MHz); TD#86 (TDD 750 to 1800 MHz); TD#89 (FDD 5 to 234 MHz); TD#90 (TDD 5 to 277 MHz, 750 to 1800 MHz); TD#108 (TDD additional 2048, 4086 QAM) |
| <ul style="list-style-type: none"> • Symbol Mapper | | |
| <ul style="list-style-type: none"> ○ Markers | | ?remove? |
| <ul style="list-style-type: none"> ○ Constellation Mapping | B | TD#103: prodan 3bn 02 1113.pdf |
| <ul style="list-style-type: none"> • Interleaving and OFDM Framer | | |
| <ul style="list-style-type: none"> ○ Pilot Pattern (Avi, others) | S | TD#61: pietsch 3bn 01 0513.pdf kliger 3bn 01 0313.pdf pietsch 3bn 01 0513.pdf |
| <ul style="list-style-type: none"> ○ Probe Generator / Probing (Leo) | | ?same as wideband? Separate from Pilots |
| <ul style="list-style-type: none"> ○ Interleaver (Duane, Avi) | | |
| <ul style="list-style-type: none"> • IFFT / IDFT | | ?same as downstream? |
| <ul style="list-style-type: none"> • Pre-Equalization | | TD#64: montreuil 01 0512.pdf kliger 01a 0912.pdf |
| <ul style="list-style-type: none"> • Cyclic Prefix and Windowing | | TD#23: montreuil 01a 0113.pdf ; |
| <ul style="list-style-type: none"> • Subcarrier Configuration | | |
| <ul style="list-style-type: none"> ○ Bit Loading | | |

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| <ul style="list-style-type: none"> Burst Structure / Resource Blocks <ul style="list-style-type: none"> Single sub-carrier | S | TD#61: pietsch 3bn 01 0513.pdf kliger 3bn 01 0313.pdf pietsch 3bn 01 0513.pdf |
| <ul style="list-style-type: none"> Burst Markers <ul style="list-style-type: none"> Power Boosting | B | TD#25 (start / stop markers); TD#28 (marker definition); TD#97: rahman syed 3bn 01 0913.pdf ; TD#109: rahman syed 3bn 01 1113.pdf |
| <ul style="list-style-type: none"> Exclusion Rules | B | TD#109: T.B.D. |
| <ul style="list-style-type: none"> Multiple OFDM Channels (Mark, Avi, ...) | | TD#5 (exclusions); TD#14 (placement); TD#24 (192 MHz and exclusions); TD#55 (m, m+1, ...); TD#56 (internal, band edge); TD#57 (2 band-edge); TD#58 (minimum internal 1MHz); TD#59 (fixed number internal in 192 MHz); TD#69 (start, integer number sub-carriers); |
| <ul style="list-style-type: none"> 1D-to-2D subcarrier assignment, etc. | | TD#8 (higher capacity) |
| <ul style="list-style-type: none"> Upstream probing with option for sub-carrier skipping | | TD#98: rahman syed 3bn 01 0313.pdf |
| <ul style="list-style-type: none"> Wide Band Probing <ul style="list-style-type: none"> MPCP impact / coordination | B | TD#66: montreuil 3bn 01a 0513.pdf ; TD#106: rahman syed 3bn 02 1113.pdf |
| <ul style="list-style-type: none"> TDD Functionality ? | | |
| PMD: | | |
| <ul style="list-style-type: none"> Electrical Input / Output | | |
| <ul style="list-style-type: none"> Fidelity | | |
| <ul style="list-style-type: none"> MDI | | |
| Other: | | |
| <ul style="list-style-type: none"> Channel Model | | ?See TD#54, exempalar? |
| Multiple Modulation Profiles: | | |
| <ul style="list-style-type: none"> FDD and TDD multiple | | TD#19 (MMP upstream) |

Upstream MPCP / OAM

| Item | Status | Notes / Comment / References |
|-----------------------------------------------------------------------------------|--------|------------------------------|
| MPCP: | | |
| <ul style="list-style-type: none"> Rate Adaptation | | |
| <ul style="list-style-type: none"> FEC Adaptation / Impact (Duane) | | |
| <ul style="list-style-type: none"> TDD Augmentation | | |
| OAM: | | |

Downstream PHY Link

| Item | Status | Notes / Comment / References |
|---------------------------------------------------|--------|-------------------------------------------------------------|
| PLC Framing | | TD#38 (PLC link framing) |
| • Preamble | S | TD#76: montreuil_3bn_01_0713.pdf |
| • PLC Frame | | |
| PLC Messages: | | |
| • Content | S | TD#77: kliger_3bn_01b_0713.pdf |
| • Protocol | S | |
| NCP Generation | | |
| PLC Insertions: | | |
| • NCP | S | TD#51 (PLC Codeword Pointer) |
| • Timestamp MB | | |
| • EE MB | | |
| • Trigger MB | | |
| PLC Numerology: | | |
| • 16 QAM fixed | | TD#11 (16 QAM) |
| • CNU auto-detect CP | | TD#12 (CP) |
| • CNU auto-detect sub-carrier spacing | | TD#12 (sub-carrier spacing) |
| • CP and sub-carrier spacing same as data channel | | TD#13 (same CP/sub-carrier spacing) |
| • 400 KHz wide without continuous pilots. | | TD#39 (as described) |
| • PLC Placement 3MHz either side | | TD#62 (3 MHz either side) |
| FEC | B | TD#36 (ECC); TD#75: shen_3bn_01_0713.pdf |
| Scrambler | | |
| Time Interleaving | | |
| Symbol Mapper | S | |

Upstream PHY Link

| Item | Status | Notes / Comment / References |
|-------------------------|--------|-------------------------------------------------------------|
| PLC Messages: | | |
| • Content | S | TD#77: kliger_3bn_01b_0713.pdf |
| • Protocol | S | |
| FEC | B | TD#36 (ECC); TD#75: shen_3bn_01_0713.pdf |
| Scrambler | | |
| Symbol Mapper | | |
| Initial Ranging: | S | TD#65: montreuil_3bn_01a_0513.pdf |
| • FEC + CRC | S | TD#105: shen_3bn_01_1113.pdf |
| • Content | | |
| Fine Ranging: | | |
| • FEC | S | TD#105: shen_3bn_01_1113.pdf |
| • Content | | |
| PLC Preamble ? | | |

PHY Link Other

| Item | Status | Notes / Comment / References |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------|
| PLC Starting Point | S | TD#53: boyd_3bn_02_0513.pdf |
| PLC Baseline Work | B | TD#99: remein_3bn_03a_0913.pdf ; TD#113: remein_3bn_07_1113.pdf remein_3bn_08_1113.pdf |
| PLC Transparency, shall not add jitter or latency to the data | | TD#21 (transparency); |
| <ul style="list-style-type: none"> No additional buffering | | TD#37 (repeat of TD#21 with buffering) |
| PLC Placement | | Some content being merged as per TD#113 from laubach_3bn_04c_1113.pdf |
| PLC Structure | | |
| PHY Parameters carried by PLC | | |
| Mapping of Bytes to Bit Stream | | |
| Mapping to 16 QAM | | |
| PLC Timestamp Reference Point | | |
| PHY Link and procedures: (Avi, Duane, Jin) <ul style="list-style-type: none"> “Bring up” through auto-negotiation to Linked “Ranging” and symbol synchronization (Bill, Leo, Avi, Hesham) Includes periodic maintenance | | |
| PHY Link acquisition: <ul style="list-style-type: none"> “Lock” and “lost sync” procedures | | |

System Issues

| Item | Status | Notes / Comment / References |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------|
| FEC CRC-40 baseline text (Marek, Rich, BZ) | B | |
| Sublayer interfaces (Marek, Mark) | | |
| Clocking / jitter | | |
| Time Synchronization (Bill) | | |
| MDIO registers to report on subcarrier or subcarrier group, signal parameters including quality. | | TD#34 (MDIO registers to report...) |
| Exclusion Bands Configuration | | |
| <ul style="list-style-type: none"> By MDIO | | TD#32 (Exclusion bands configured by MDIO) |
| <ul style="list-style-type: none"> By PLC | | TD#33 (Exclusion bands configured by PLC) |
| MPCP Interoperation: | | |
| <ul style="list-style-type: none"> Gate / Report () | | |
| <ul style="list-style-type: none"> MAC Discovery and registration verification () | | |
| <ul style="list-style-type: none"> TDD Mode starting point | S | TD#16: garavaglia_02a_0113.pdf |
| <ul style="list-style-type: none"> TDD Mode baseline proposal | B | TD#22: garavaglia_3bn_02a_0313 |
| <ul style="list-style-type: none"> TDD Local Grant Identification | | TD#52: garavaglia_3bn_05_0513.pdf |
| <ul style="list-style-type: none"> TDD Guard Time | | TD#83 (integer multiples of 1.25 us) |
| <ul style="list-style-type: none"> TDD time windows | | TD#84 (integer multiple of symbol duration) |
| <ul style="list-style-type: none"> tqSize, OctetsRemaining, PHY_DATA_SIZE & PHY_OVERHEAD_SIZE, fecOffset, packet_initiate_delay, CheckGrantSize, PMD_OverheadT | B | TD#112: remein_3bn_06_1113.pdf |
| Performance: | | |
| <ul style="list-style-type: none"> Baseline Channel Conditions | B | TD#18: remein_3bn_07_0313.pdf |
| <ul style="list-style-type: none"> Exemplar Channel Conditions | | TD#54: howald_3bn_02_0313.pdf |
| <ul style="list-style-type: none"> EPoC Delay evaluation | | TD#41: garavaglia_02_0912.pdf |
| <ul style="list-style-type: none"> Error rates | | |
| <ul style="list-style-type: none"> Latency / Jitter | | |
| Proactive Network Management (PNM): | | |
| <ul style="list-style-type: none"> Add instrumentation / counters etc. to EPoC PHY receivers | | |
| <ul style="list-style-type: none"> OAM impact for IEEE? | | |
| Power Saving, study support for configurable mechanism | | TD#1: hajduczenia_05a_0912.pdf |

Objectives

Status: M = met in Task Force draft

| Item | Status | Notes / Comment / References |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------|
| Specify a PHY to support subscriber access networks capable of supporting burst mode and continuous mode operation using the EPON protocol and operating on point-to-multipoint RF distribution plants comprised of either amplified or passive coaxial media. | | Evaluate when TF draft is "complete". |
| Maintain compatibility with 1G-EPON and 10G-EPON, as currently defined in IEEE Std. 802.3 with minimal augmentation to MPCP and/or OAM if needed to support the new PHY. | | Evaluate when TF draft is "complete". |
| Define required plant configurations and conditions within an overall coaxial network operating model. | | DS electrical / fidelity and channel model done. Waiting on US for both. |
| Provide a physical layer specification that is capable of: | | |
| <ul style="list-style-type: none"> A baseline data rate of 1 Gb/s at the MAC/PLS service interface when transmitting in 120 MHz, or less, of assigned spectrum under defined baseline plant conditions; | M | |
| <ul style="list-style-type: none"> A data rate lower than the baseline data rate when transmitting in less than 120 MHz of assigned spectrum or under poorer than defined plant conditions; | M | |
| <ul style="list-style-type: none"> A data rate higher than the 1Gb/s baseline data rate and up to 10 Gb/s when transmitting in assigned spectrum and <i>in</i> channel conditions that permit. | | Waiting on multiple OFDM channel architecture. |
| PHY to support symmetric and asymmetric data rate operation. | M | |
| PHY to support symmetric and asymmetric spectrum assignment for bidirectional transmission. | M | |
| PHY to support independent configuration of upstream and downstream transmission operating parameters. | M | |
| PHY to operate in the cable spectrum assigned for its operation without causing harmful interference to any signals or services carried in the remainder of the cable spectrum. | | DS electrical / fidelity / spurious done. Waiting on US. |
| PHY to have: | | |
| <ul style="list-style-type: none"> a downstream frame error ratio better than 10^{-6} at the MAC/PLS service interface; | | Done with FEC analysis? |
| <ul style="list-style-type: none"> an upstream frame error ratio better than 5×10^{-5} at the MAC/PLS service interface. | | Done with FEC analysis? |
| Define Energy Efficient Ethernet operation for EPON Protocol over Coax PHYs. | | Awaiting any draft text on EEE or power saving options for EPoC. |
| Mean Time To False Packet Acceptance at least equal to 1.4×10^{10} years. | M | |

PAR

| Item | Status | Notes / Comment / References |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------|
| 5.2.b.: The project is to amend IEEE Std 802.3 to add physical layer specifications and management parameters for symmetric and/or asymmetric operation of up to 10 Gb/s on point-to-multipoint Radio Frequency (RF) distribution plants comprising either amplified or passive coaxial media. It also extends the operation of Ethernet Passive Optical Networks (EPON) protocols, such as MultiPoint Control Protocol (MPCP) and Operation Administration and Management (OAM). | | |
| 8.1: The amendment will comply with IEEE Std 802, IEEE Std 802.1D, and IEEE Std 802.1Q. | | |