

IEEE P802.3bn Work Items for ~~January~~ February 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:		
64b/66b/65b Encoder / Decoder	D	TD#20 (65b); TD#46: hajduczenia 3bn 04 0513.pdf TD#50 (continuous vector, no split);
FEC and Data Detector		TD#4 (LDPC); TD#47: prodan 3bn 01 0513.pdf ; TD#94: hajduczenia 3bn 01a 0913.pdf
o FDD	D	TD#81: prodan 3bn 01a 0713.pdf ; TD#95 (FDD codes for Node+N, N≥0)
o TDD		TD#96: pietsch 3bn 01a 0913.pdf
o MTTFPA	D	TD#82 (objective); TD#93: prodan 3bn 02a 0913.pdf
Scrambler / Randomizer (Jin)		
<u>Gearbox</u>	<u>S</u>	TD#117 (boyd 3bn 03 0114.pdf)
<u>IDLE Delete</u>	<u>S</u>	TD#118 (boyd 3bn 03 0114.pdf)
PMA:		
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);
Symbol Mapper	S	TD#110: laubach 3bn 04c 1113.pdf
o Constellation Mapping		TD#103: prodan 3bn 02 1113.pdf
- Interleaving - o Time - o Frequency (Rich, Avi)	S	TD#110: laubach 3bn 04c 1113.pdf T.B.D. for frequency interleaving
Pilot Insertion (Avi, Christian, Jin)	S	TD#29: pietsch 3bn 01 0313.pdf , kliger 3bn 01 0313.pdf ;

o 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
• IFFT / IDFT	S	TD#110: laubach 3bn 04c 1113.pdf
• 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
• Subcarrier Configuration o QAM Mapping	<u>S</u>	?
• Bit Loading		
• Scattered Pilots / Map		
• 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
• TDD Markers at beginning of each profile		TD#26 (start markers); TD#28 (marker definition)
o Start marker indicates profile ID		TD#27 (used profile indication)
• Burst Structure		NCP, coupled to PLC cycle
• Multiple OFDM Channels (Mark, Avi, ...)		TD#8 (higher capacity)
• TDD Burst Marker (Syed, Leo)		TD#97: rahman syed 3bn 01 0913.pdf
• TDD Burst Control / Local Gates		? in Andreas (baseline MPCR)
PMD:		
• Electrical Input / Output	B	TD#104: rahman saif 3bn 02 1113.pdf
• Fidelity	B	
• MDI	B	
Other:		
• Channel Model		TD#15: howald 01a 0113.pdf
• CNU and CLT Receive Direction:		
• Rx Idle Deletion		TD#42 (Like 10G-EPON)
• Rx Idle Insertion	B	TD#43 (Like 10G-EPON with changes); TD#48: hajduczenia 3bn 01 0513.pdf
• CNU and CLT Transmit Direction:		
• Tx Idle Insertion	B	TD#44 (Like 10G-EPON with changes); TD#49: garavaglia 3bn 02a 0513.pdf
• Tx Idle Deletion	B	TD#45 (Like 10G-EPON with changes); TD#48: hajduczenia 3bn 01 0513.pdf
• Rx Idle Insertion		
• Multiple Modulation Profiles:		
• FDD single		TD#19 (MMP for TDD , Single profile for FDD)
• TDD multiple		
• Downstream PHY Block Diagram	S	TD#91: kliger 3bn 01a 0913.pdf

• Subcarrier Clocking, Accuracy	S	TD#110: laubach_3bn_04c_1113.pdf
• Acquisition	S	

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:		
64b/66b/65b Encoder / Decoder	D	TD#20 (65b); TD#46: hajduczenia 3bn 04 0513.pdf ; TD#50 (continuous vector, no split);
FEC Codeword Builder and Data Detector:		TD#47: prodan 3bn 01 0513.pdf
o 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)
o FDD Codeword Builder (Rich)	B	TD#103: prodan 3bn 01 1113.pdf
o TDD Passive FEC Codewords	B	TD#96: pietsch 3bn 01a 0913.pdf
o TDD Codeword Builder		
o MTTFPA	D	TD#82 (objective); TD#93: prodan 3bn 02a 0913.pdf
Scrambler / Randomizer		
PMA:		
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)
Symbol Mapper		
o Markers		?remove?
o Constellation Mapping	B	TD#103: prodan 3bn 02 1113.pdf
Interleaving and OFDM Framer		
o Pilot Pattern (Avi, others)	S	TD#61: pietsch 3bn 01 0513.pdf kliger 3bn 01 0313.pdf pietsch 3bn 01 0513.pdf
o Probe Generator / Probing (Leo)		?same as wideband? Separate from Pilots
o Interleaver (Duane, Avi)		
IFFT / IDFT		?same as downstream?
Pre-Equalization		TD#64: montreuil 01 0512.pdf kliger 01a 0912.pdf
Cyclic Prefix and Windowing		TD#23: montreuil 01a 0113.pdf ;
Subcarrier Configuration		
o Bit Loading		

• Burst Structure / Resource Blocks	S	TD#61: pietsch 3bn 01 0513.pdf kliger 3bn 01 0313.pdf pietsch 3bn 01 0513.pdf TD#124 (8, 12, and 16 symbols)
o Single sub-carrier		TD#80: kliger 3bn 03 0713.pdf
• Burst Markers	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
o Power Boosting	B	TD#109: T.B.D.
• Exclusion Rules		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);
• Multiple OFDM Channels (Mark, Avi, ...)		TD#8 (higher capacity)
• 1D-to-2D subcarrier assignment, etc.	<u>S</u>	TD#121 (boyd 3bn 02 0114.pdf)
• Upstream probing with option for sub-carrier skipping		TD#98: rahman syed 3bn 01 0313.pdf
• Wide Band Probing	B	TD#66: montreuil 3bn 01a 0513.pdf ; TD#106: rahman syed 3bn 02 1113.pdf
o MPCP impact / coordination		
• TDD Functionality?		
PMD:		
• Electrical Input / Output		
• Fidelity		
• MDI		
Other:		
• Channel Model		?See TD#54, exempalar?
Multiple Modulation Profiles:		
• FDD and TDD multiple		TD#19 (MMP upstream)

Upstream MPCP / OAM

Item	Status	Notes / Comment / References
MPCP:		
• Rate Adaptation		
• FEC Adaptation / Impact (Duane)		
• 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 and Protocol:		
• Content	S	TD#77: kliger 3bn 01b 0713.pdf
• Protocol	S	
• <u>PHY Discovery</u>	<u>S</u>	<u>TD#119 (remein 3bn 05 0114.pdf)</u>
• <u>Initial / Fine ranging signals</u>	<u>S</u>	<u>TD#120 (shen 3bn 01 0114.docx)</u>
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/ <u>S</u>	TD#36 (ECC); TD#75: shen 3bn 01 0713.pdf <u>TD#120 (shen 3bn 01 0114.docx)</u>
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);
• 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)		
• “Bring up” through auto-negotiation to Linked	<u>S</u>	
• “Ranging” and symbol synchronization (Bill, Leo, Avi, Hesham)		
• Includes periodic maintenance		
PHY Link acquisition:		
• “Lock” and “lost sync” procedures		

System Issues

Item	Status	Notes / Comment / References
Clocking / jitter		
Time Synchronization (Bill)		
MDIO registers to report on subcarrier or subcarrier group, signal parameters including quality.	<u>B</u>	TD#34 (MDIO registers to report...) TD#116 (MIDO register baseline material)
Exclusion Bands Configuration		
• By MDIO		TD#32 (Exclusion bands configured by MDIO)
• By PLC		TD#33 (Exclusion bands configured by PLC)
MPCP Interoperation:		
• Gate / Report ()		
• MAC Discovery and registration verification ()		
• TDD Mode starting point	S	TD#16: garavaglia_02a_0113.pdf
• TDD Mode baseline proposal	B	TD#22: garavaglia_3bn_02a_0313
• TDD Local Grant Identification		TD#52: garavaglia_3bn_05_0513.pdf
• TDD Guard Time		TD#83 (integer multiples of 1.25 us)
• TDD time windows		TD#84 (integer multiple of symbol duration)
• tqSize, OctetsRemaining, PHY_DATA_SIZE & PHY_OVERHEAD_SIZE, fecOffset, packet_initiate_delay, CheckGrantSize, PMD_OverheadT	B	TD#112: remein_3bn_06_1113.pdf
Performance:		
• Baseline Channel Conditions	B	TD#18: remein_3bn_07_0313.pdf
• Exemplar Channel Conditions		TD#54: howald_3bn_02_0313.pdf
• EPoC Delay evaluation		TD#41: garavaglia_02_0912.pdf
• Error rates		
• Latency / Jitter		
Proactive Network Management (PNM):		
• Add instrumentation / counters etc. to EPoC PHY receivers		
• 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". <u>Note: continuous mode for downstream, burst mode upstream, no changes should be needed.</u>
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:		
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	
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	
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:		
a downstream frame error ratio better than 10^{-6} at the MAC/PLS service interface;		Done with FEC analysis?
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.		