Overview of D1.4 TBDs

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IEEE P802.3cw, 14 March 2022
Plenary Teleconference Meeting
Updated per task force discussions on March 14 and April 4.

Delay Constraints

- 116.4/155.6

Table 116–6—Sublayer delay constraints (400GBASE)

Sublayer	Maximum (bit time)[a]	Maximum (pause_quanta)[b]	Maximum (ns)	Notes[c]
…				
400GBASE-ZR PCS and PMA	TBD	TBD	TBD	
400GBASE-ZR PMD	8 192	16	20.48	Includes 2 m of fiber. See 156.3.1.

[a] For 400GBASE-R, 1 bit time (BT) is equal to 2.5 ps. (See 1.4.160 for the definition of bit time.)
[b] For 400GBASE-R, 1 pause_quantum is equal to 1.28 ns. (See 31B.2 for the definition of pause_quanta.)
[c] Should there be a discrepancy between this table and the delay requirements of the relevant sublayer clause, the sublayer clause prevails.

155.6 Delay constraints

The maximum delay contributed by the 400GBASE-ZR PCS and PMA (sum of transmit and receive delays at one end of the link) shall be no more than *TBD* BT (*TBD* pause_quanta or *TBD* ns). A description of overall system delay constraints and the definitions for bit times and pause_quanta can be found in 116.4 and its references.

Delay Constraints – Updated per Task Force Discussion

- Maximum (bit time) – 2 400 000
- Maximum (pause quanta) - 4688
- Maximum (ns) – 6000

State Variables

- 155.4.2.1

faw_valid

A boolean variable that is set to true if the received 22-symbol block is a valid FAW. The FAW consists of one of the sequences listed in Table 155–3. The sequence is considered to be valid if at least TBD symbols match the known bits of the pattern described in 155.3.3.3.1.

amp_valid

A boolean variable that is set to true if the received 1920-bit block is a valid alignment marker (AM) sequence as described in 155.2.4.4.1. The sequence is considered to be valid if at least TBD bits match the known bits of the pattern described in 155.2.4.4.1.

State Variables –Task Force Discussion

- Symbols match -
- Bits match -

Transmit Characteristics

- 156.7.1 – Table 156-6

Out-of-band OSNR (min)	TBD	dB

- Out-of-band OSNR
  - See comments 20 & 42

Receive Characteristics

- 156.7.2 – Table 156-7

Damage threshold[a]	TBD	dBm
Receiver OSNR (min)	TBD	dB (12.5 GHz)

- Damage threshold
  - See comment 24
- Receiver OSNR
  - See comments 23 & 44

DWDM black link characteristics

- 156.8 – Table 156-8

Ripple (max)[a]	TBD	dB
Average output power at TP3 (min): for OSNR at TP3 (12.5 GHz)	TBD	dBm
OSNR at TP3 (min)	TBD	dB (12.5 GHz)
Interferometric crosstalk at TP3 (max)[d]	TBD	dB

- Ripple
  - See comment 26
- Average output power at TP3
  - See comment 27
- OSNR at TP3
  - See comment 28
- Interferometric cross talk
  - See comment 29

Receiver OSNR tolerance

- 156.9.17

Table 156–9—Adjacent channel isolation

Frequency offset	Isolation	Unit
0 GHz	TBD	dB
+/-15 GHz	TBD	dB
+/-20 GHz	TBD	dB
+/-25 GHz	TBD	dB
+/-30 GHz	TBD	dB
+/-35 GHz	TBD	dB
+/-40 GHz	TBD	dB
+/-45 GHz	TBD	dB
+/-50 GHz	TBD	dB
+/-55 GHz	TBD	dB
+/-60 GHz	TBD	dB
+/-65 GHz	TBD	dB
+/-70 GHz	TBD	dB
+/-75 GHz	TBD	dB

Adjacent channel isolation – Task Force Discussion

- 0 GHz
- +/- 15 Ghz
- +/- 20 Ghz
- +/- 25 Ghz
- +/- 30 Ghz
- +/- 35 Ghz
- +/- 40 Ghz
- +/- 45 Ghz
- +/- 50 GHz
- +/- 55 Ghz
- +/- 60 Ghz
- +/- 65 Ghz
- +/- 70 GHz
- +/- 75 Ghz

Receiver OSNR tolerance

- 156.9.17

156.9.17 Receiver OSNR tolerance

Receiver OSNR tolerance is specified in Table 156–7. Receiver OSNR tolerance is defined as TBD, with the exception that it is valid for all frequencies, due to the definition of a measurement bandwidth of 12.5 GHz instead of 0.1 nm in Recommendation ITU-T G.698.2.

- "as defined by"
  - See comment 47

EVM

- 156.7.1 – Table 156-6

Error vector magnitude (max)	TBD	%

- 156.10.1
  - Calibrated coherent receiver

A block diagram for the calibrated coherent receiver is shown in Figure 156–7. The coherent receiver generates four digitized data streams representing the baseband of two orthogonal polarizations of the optical input signal. The frontend correction removes impairments of the realized hardware implementation of the coherent receiver. The coherent receiver should have a bandwidth of at least TBD GHz. The ENOB and sampling rate of the digitizers should be at least TBD bits and TBD(1) times the symbol rate.

- EVM
  - See comment 30
- Calibrated coherent receiver
  - Bandwidth
    - See comment 48
  - ENOB
    - See comment 49
  - Sampling rate
    - See comment 50

EVM

- 156.10.1.2.2
  - Clock and frequency offset recovery

A clock recovery with a corner frequency of TBD Mhz and a slope of TBD dB/decade is applied on a fixed block length of 1000 symbols. The frequency difference between the transmit laser and the local oscillator used to generate the signals in the coherent receiver is estimated and compensated on a fixed block length of 1000 symbols.

- 156.10.1.2.4
  - Receive filtering

The signal is filtered using a TBD filter with TBD roll-off.

- 156.10.1.2.6
  - Equalizer

The signal is equalized using an FIR filter with TBD TBD taps. The coefficients of the equalizer are searched that minimize the EVMmax value using the signal with additive white Gaussian noise considering the Receiver OSNR(min).

EVM – Updated per Task Force Discussion

- Clock and frequency offset recovery
  - Frequency – 3 MHz
  - Slope – 20 dB
- Receive filtering
  - Filter
  - Roll-off
- Equalizer
  - Number of taps
  - Tap type

Thanks!