

Grid Summary Update

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The Role of the Chair

- Per the IEEE 802.3 Ethernet WG Operations Manual (http://www.ieee802.org/3/rules/P802_3_rules.pdf)
 - The operation of the TF has to be balanced between democratic procedures that reflect the desires of the TF members and the TF Chair's responsibility to produce a draft standard, recommended practice, or guideline in a reasonable amount of time for review and approval by the WG. Robert's Rules of Order shall be used in combination with these operating rules to achieve this balance.
 - The full responsibilities of the chair are specified in 3.4.3 Task Force Chair's Responsibilities.
- Reminder - individual standards activities within the WG are, at the discretion of the WG, carried out by Task Forces (TF) operating under, and reporting to, the WG.

Summary of IEEE P802.3ct Approved Motions

Motion #	Mtg	
4	Nov 18	<p>Move to adopt the following nomenclature</p> <ul style="list-style-type: none"> • 50GBASE-ER 50 Gb/s operation over at least 40 km of SMF • 200GBASE-ER4 200 Gb/s operation over four wavelengths capable of at least 40 km of SMF • 400GBASE-ER8 400 Gb/s operation over eight wavelengths capable of at least 40 km of SMF • 100GBASE-ZR -100 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system • 400GBASE-ZR -400 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system
8	Nov 18	I support adopting DP-16QAM modulation format for the 400 GbE80km objective
9	Nov 18	I support adopting the FEC proposal made in lyubomirsky_3cn_02a_1118 (CFEC) for 400GbE 80km Objective
6	Jan 19	Move to adopt the baseline proposal for 400GBASE-ZR PCS/PMA described in lyubomirsky_3cn_01b_0119
7	Jan 19	Move to adopt DP-DQPSK modulation format for the 100 GbE80km objective
8	Jan 19	Move to adopt the FEC and frame format defined on slides 9 -16 in trowbridge_3cn_01a_0119 for 100GbE 80km Objective
9	Jan 19	Move to adopt the project timeline specified on Slide #5 of dambrosia_3cn_03a_0119.pdf for IEEE P802.3ct, pending approval of PAR by IEEE-SA Std Board.
4	Mar 19	Move to approve all motions noted on Slide #3 of motions_3ct_0319 (all motions noted above)
5	Mar 19	Move to adopt the Inverse RS-FEC sublayer baseline as proposed in slide 7 of nicholl_3ct_01a_0319
6	Mar 19	Move to adopt 100 GHz channel spacing for 100 GbE and 400 GbE 80 km objectives

Review of Channel Frequency Ranges*

	OIF 400ZR		ITU-T G.698.1	ITU.T G.698.2	Cablelabs	Open ROADM
Spacing (GHz)	75	100	100	100	100	50
Min ch (THz)	191.375	191.4	191.5	191.5	191.3	191.35
Max ch (THz)	196.1	196.1	196.2	196.2	196.2	196.1
Channel Count	64	48	48	48	50	96

- Motion #6, Mar 2019 – 100 GHz spacing selected for 100 GbE and 400 GbE objectives - Approved
- Strawpoll #1 ,Mar 2019 – Support for 191.3 /196.1 – Y: 12 N: 1 Need info: 17 Abstain: 5
- Strawpoll #2, Mar 2019 - Support for 191.5 / 196.1 - Y: 11 N: 0 Need info: 10 Abstain: 9
- Strawpoll #7 Nov 2018 – For the 400 GbE – 80km objective I would support the following channel spacing (Chicago Rules):
 75GHz – 0 100 GHz – 51 Need more information – 4 Abstain – 9
- Strawpoll #8 Nov 2018 – For 100 GbE 80km objectives I would support the following channel spacing (Chicago Rules):
 50GHz – 6 75GHz – 0 100GHz – 37 Need more information – 11 Abstain - 9

* Data for ITU-T G.698.1, ITU-T G.698.2, Cablelabs, and Open ROADM per deandrea_3ct_01a_0319.
 Data for OIF 400ZR from OIF 5/19/19 Liaison to IEEE 802.3

Questions

- What is the grid range?
- Assuming a common grid range – will 100GbE and 400GbE co-exist?
- Specification(s) (assuming matched between Tx/channel/Rx) –
 - Devices support a single frequency (wavelength, channel)?
 - Devices support a subset of frequencies (wavelengths, channels)?
 - Devices support the entire range of frequencies (wavelengths, channels)?
 - Any of the above?
- Is this one PHY specification or more?
- Add registers to Clause 45 to indicate operation frequency (wavelength, channel)?
- Ethernet Plug-n-play?

Observations

- For DWDM links these are the three key characteristics that need to match:
 - Transmit Frequency (wavelength, channel)
 - Rx Oscillator Frequency (wavelength, channel)
 - Ports on Mux (i.e. link wavelength)
- My impression of group discussions is the desire for a single specification, i.e. PHY, for each rate.
- Auto-negotiation- there is no optical auto-negotiation specified in IEEE 802.3
 - Limited auto-negotiation in today's DWDM systems
- An “engineered link” has been typically used with 40km links where the fiber needs to meet the channel characteristics, i.e. measured
- DWDM links have been traditionally user configured
- The perspective of the IEEE 802.3 Ethernet WG in moving away from traditional “Ethernet plug-n-play” will need to be considered and addressed.

My Assumptions

- Based on my discussions and observations –
 - Use of the full frequency (wavelength, channel) range
 - One single PHY specification for each rate that covers operation on any individual frequency (wavelength, channel)
 - Add registers
 - No auto-negotiation
 - DWDM links need to be configured by user to match these characteristics
 - Tx Frequency (wavelength, channel)
 - Rx Oscillator Frequency (wavelength, channel)
 - Ports on Mux (i.e. link frequency, wavelength)

DWDM Link Types and Terminology

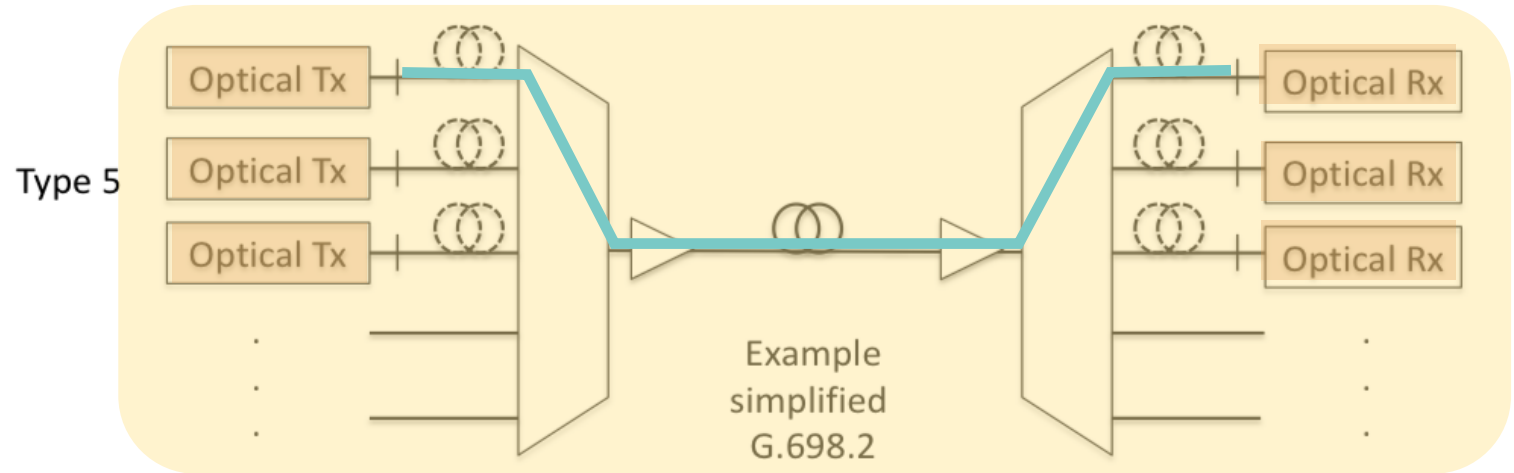
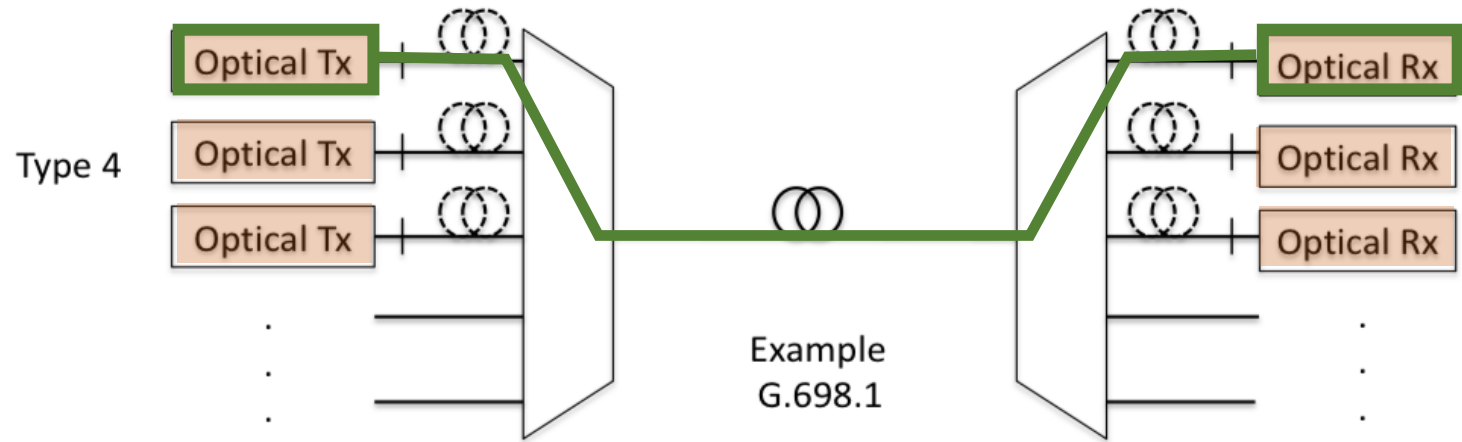
DWDM PHY:

DWDM Channel:

DWDM Link:

DWDM System:

Optical link types 4 and 5



4

Source: nowell_b10k_02_180227

http://www.ieee802.org/3/B10K/public/18_01/anslow_b10k_01_0118.pdf

Definitions

- **From Terminology Ad hoc**

- **DWDM System:** An aggregate of DWDM links over either a single optical fiber or a single optical fiber per direction.
- **DWDM PHY:** An Ethernet PHY that operates at a single wavelength on a defined frequency grid and is capable of running over a DWDM system
- **DWDM Channel:** The transmission path between a DWDM PHY transmitting to another DWDM PHY
- **DWDM Link:** One DWDM PHY transmitting to one other DWDM PHY through the transmission path between them

- **Proposed (Strawman)**

- **User Configured DWDM Link** – a DWDM Link configured by the user to match the Optical Tx and Optical RX of the DWDM PHY to the DWDM Channel

Simple Approach Forward

- Develop single PHY specification with table of frequencies (wavelengths, channels) for each rate of operation
- No Auto-negotiation
- Add appropriate registers to Clause 45
 - Channels Supported
 - Define “User Configured” Tx / Rx Wavelength
- Develop concept of User Configured DWDM Link
- Present “User Configured DWDM Link” concept to IEEE 802.3 Ethernet Working Group as soon as possible
- Plan for 802.3 Tutorial prior to proceeding to WG Ballot