

# NG-EPON wavelength plan

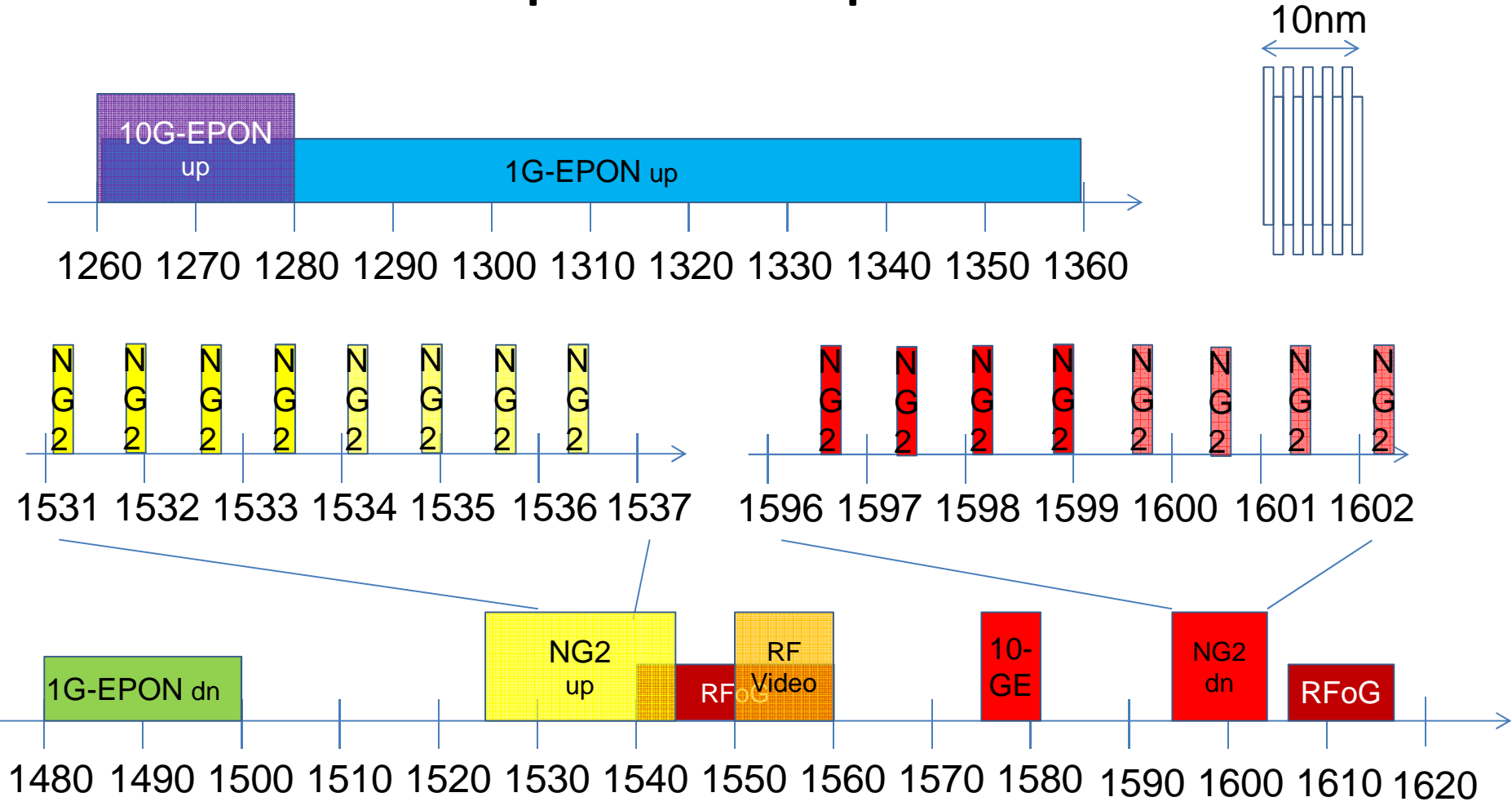
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# Motivating factors

- Need to coexist with as many previous systems as possible
  - If a system has to go, that should be 1G-EPON
- The 25G single lane system should be as cheap as possible
  - This system is likely the only one that would be suitable for FTTH use
- 100G system might be at a premium

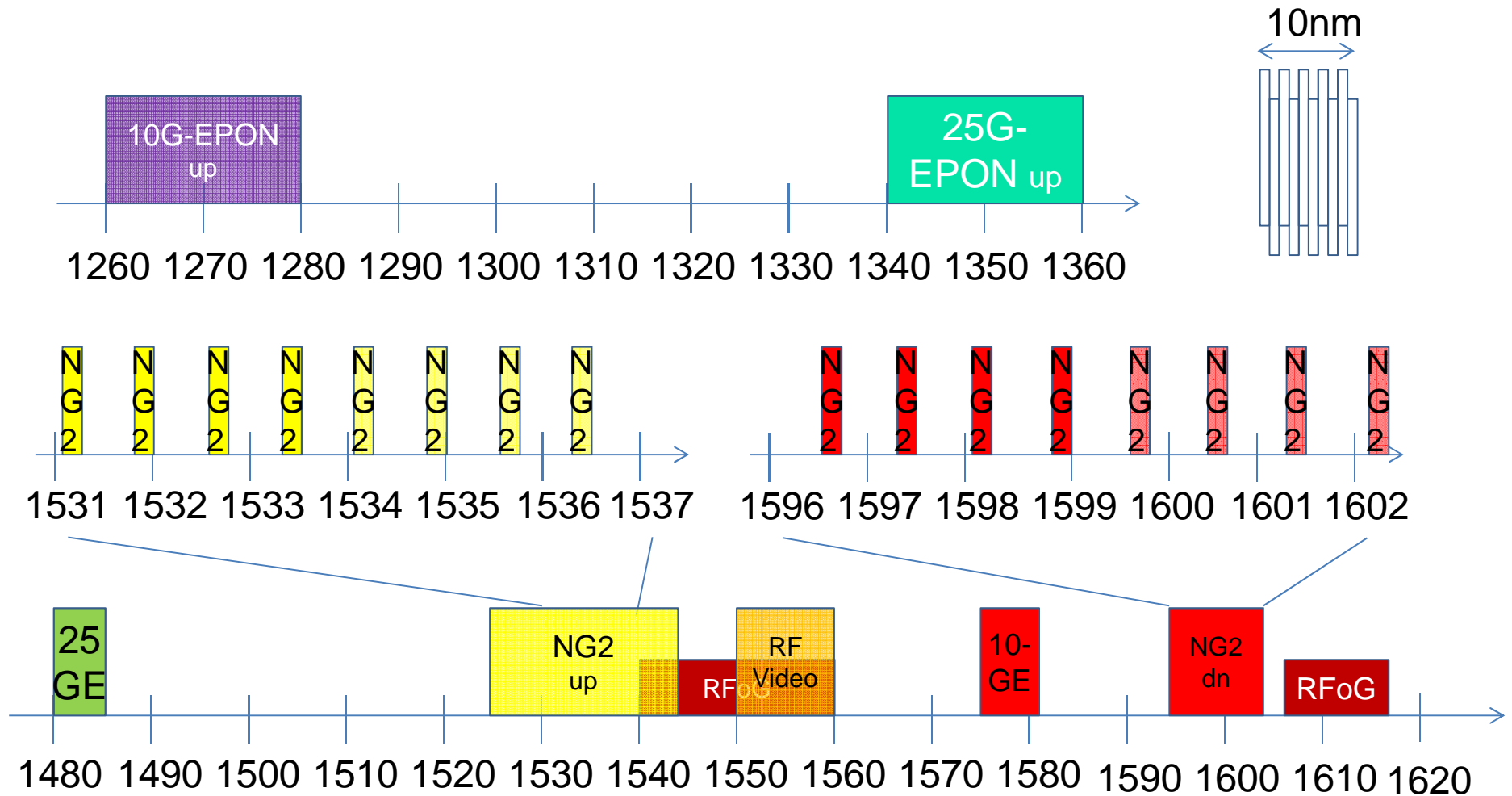
# Existing optical access network spectrum plan



# Cost-effective 25G design parameters

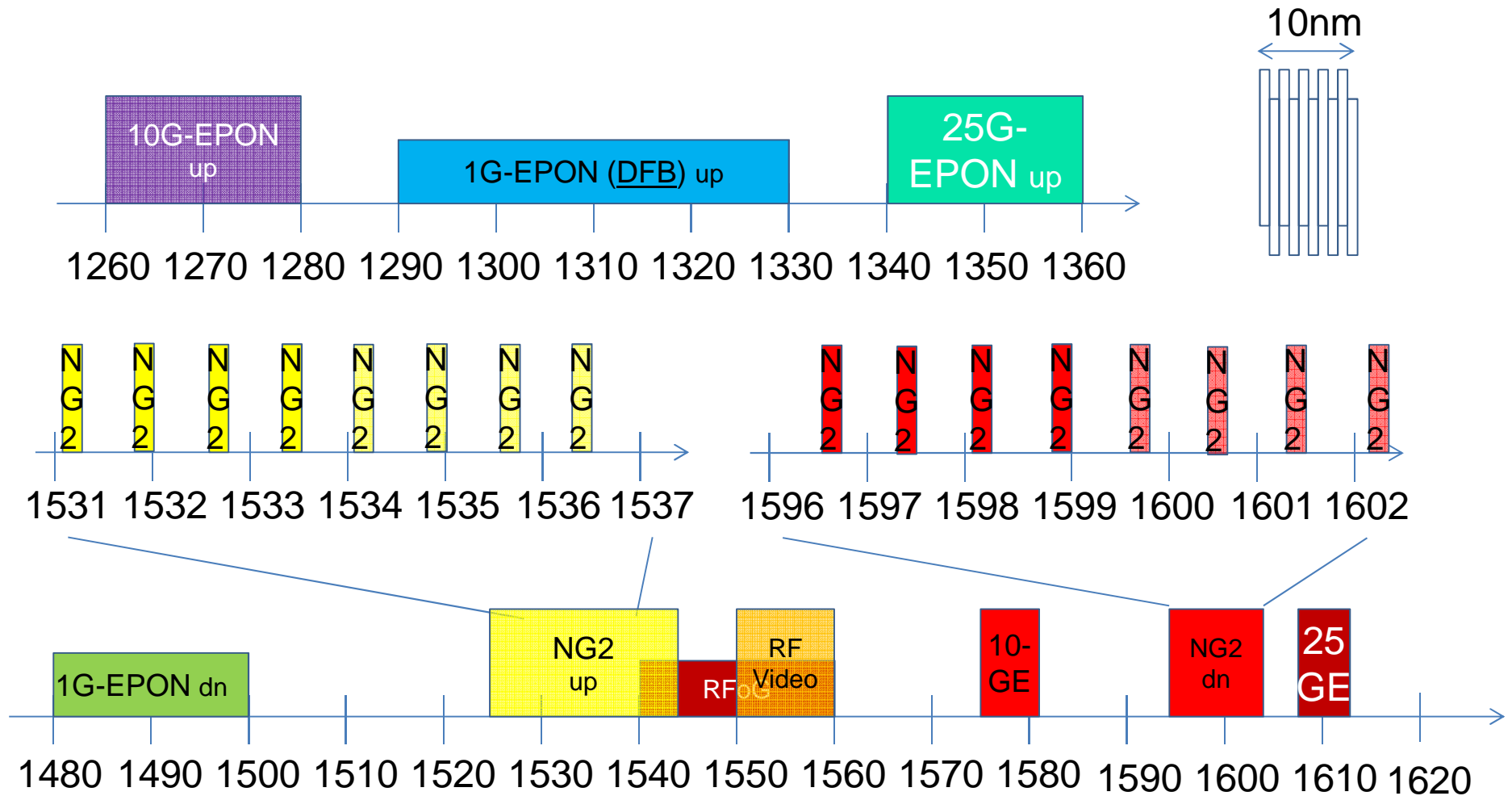
- Wavelength band of 20nm upstream
  - As used in 10G-EPON (and 1G-EPON in many places)
  - This allows uncooled operation in outdoor temperature range with good yield
- Upstream/downstream separated by ~35nm
  - Makes 45 degree diplexer feasible
- 25G single channel system
  - Upstream: O+ band (only 20nm space left!)
  - Downstream option 1: 1480-1485nm
  - Downstream option 2: 1608-1613nm

# 25G single channel, Option 1



Coexists with 10G-EPON, RFoG, and NG-PON2

# 25G single channel, Option 2

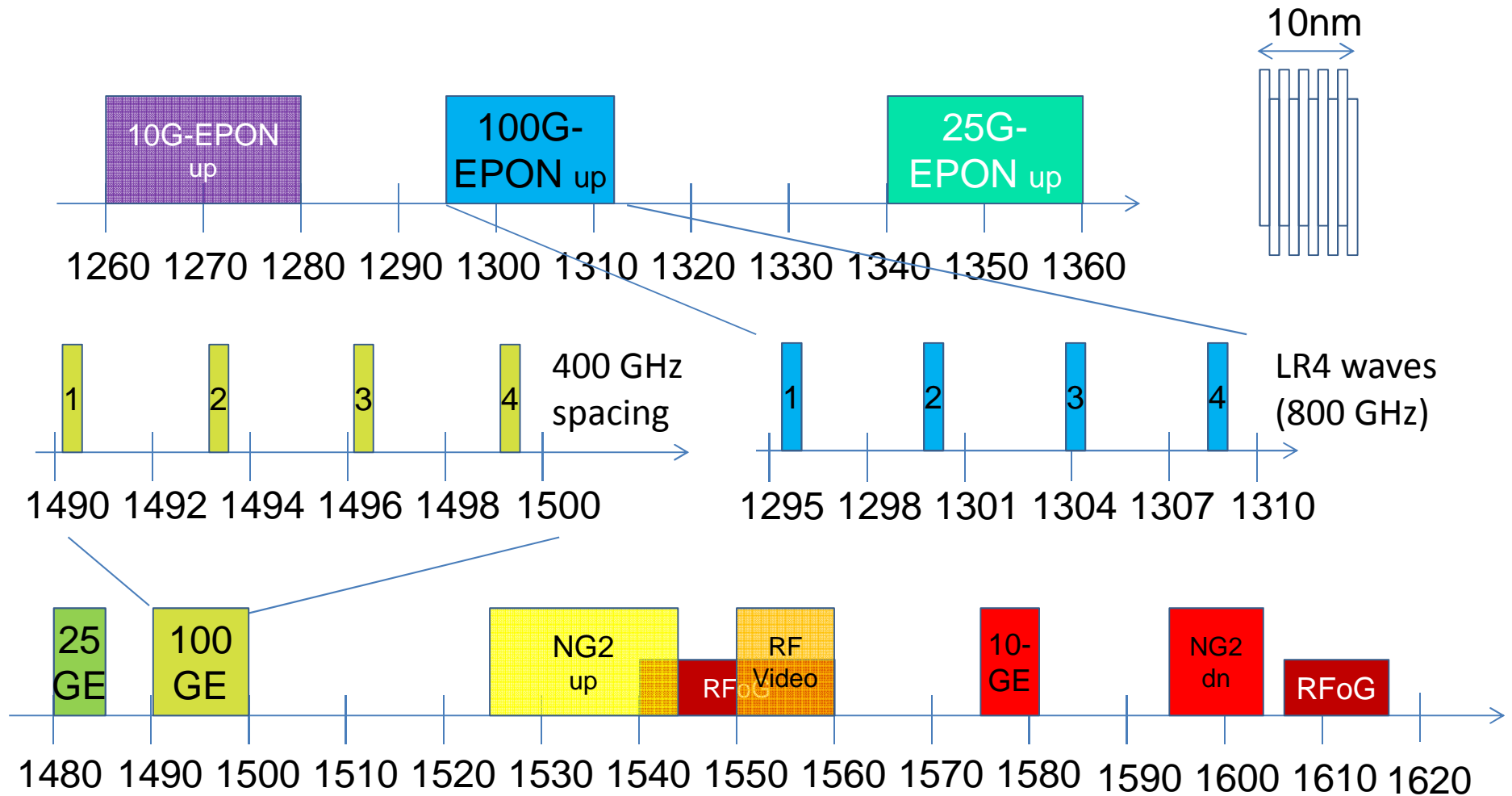


Coexists with 1G-EPON (DFB), 10G-EPON, RF Video, and TWDM

# 100G system considerations

- Need four channels
- No spectrum for 20nm wide channel plan
  - This means that 100G is separate from 25G
- For integrated optics, smaller channel spacing is better, since parameter variation is reduced
  - It is possible to make a monolithic DWDM array
  - Important if main application of 100G is 100G ONUs
- Channel spacings of 200 to 800 GHz are ok
  - Requires imprecise cooling

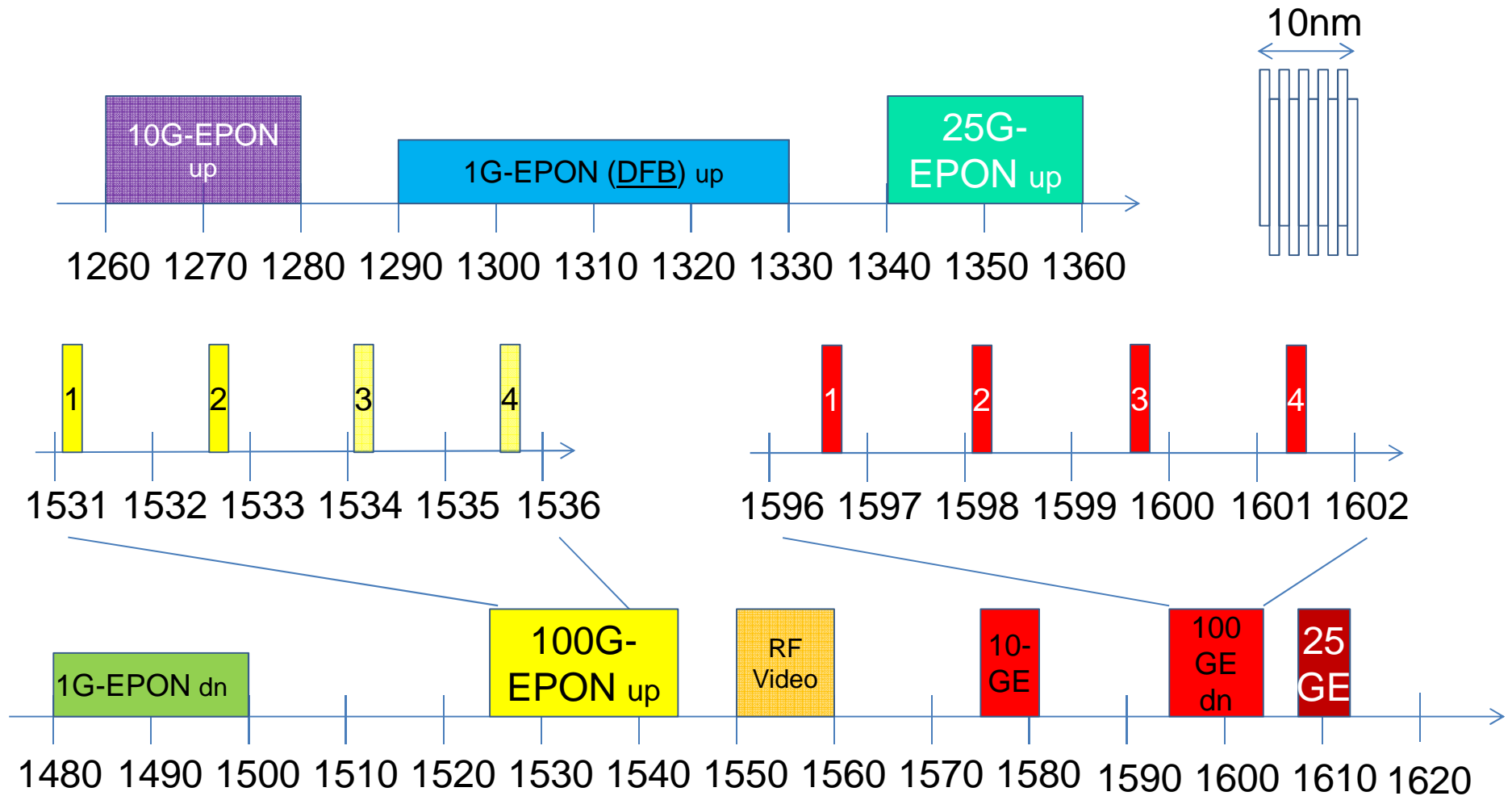
# 100G four channel, Option 1



Coexists with 10G-EPON, RFoG, RF Video, 25G-EPON, and NG-PON2



# 100G four channel, Option 2

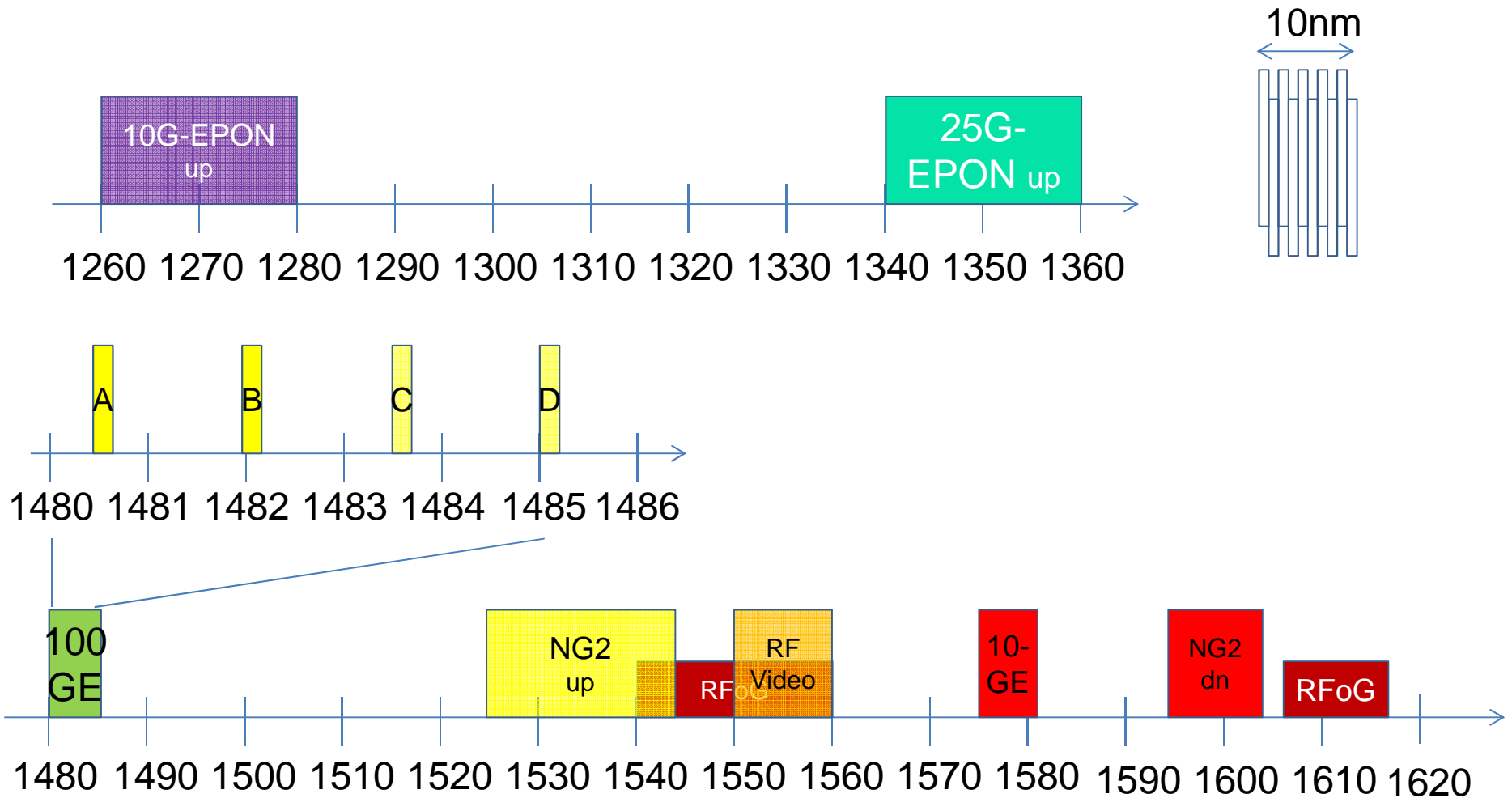


Coexists with 1G-EPON (DFB), 10G-EPON, RF Video, and 25G-EPON

# Discussion

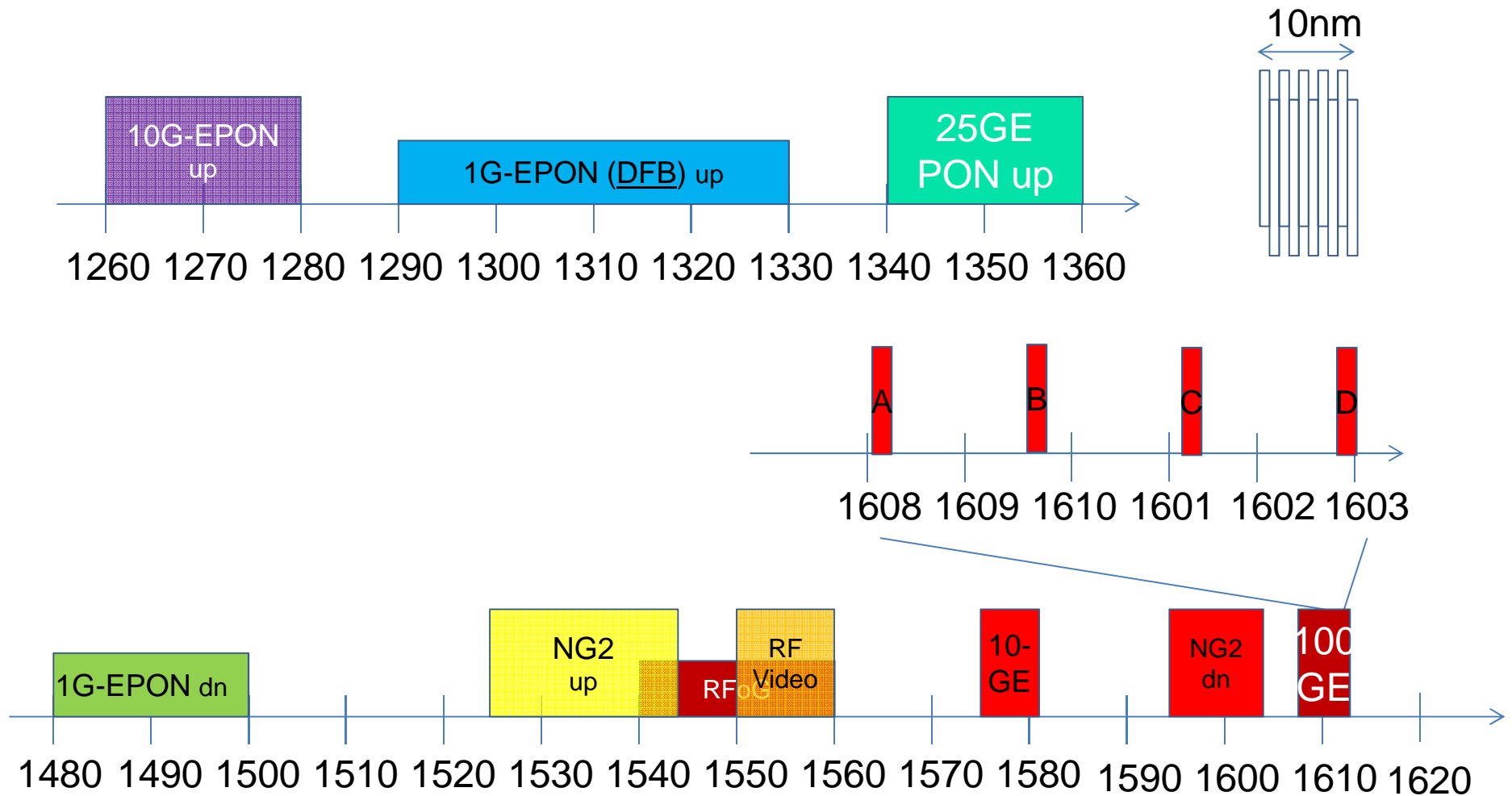
- These are systems with 5 channels
  - One cheap channel
  - Four luxury lanes
- The 25G system is independent of the 100G system
  - Much like XG-PON was independent of TWDM-PON
- Many were envisioning 25G would be a subset of 100G... maybe this was wrong?
  - It certainly would simplify the granting in 100G
  - But what about 50G?
- The asymmetric system could be of interest
  - Filtering at the node allows ONU to stay the same
  - Downstream of 25G could be sub-channelized

# 100/25G, Option 1



Coexists with 10G-EPON, RFoG, RF Video and NG-PON2

# 100/25G, Option 2

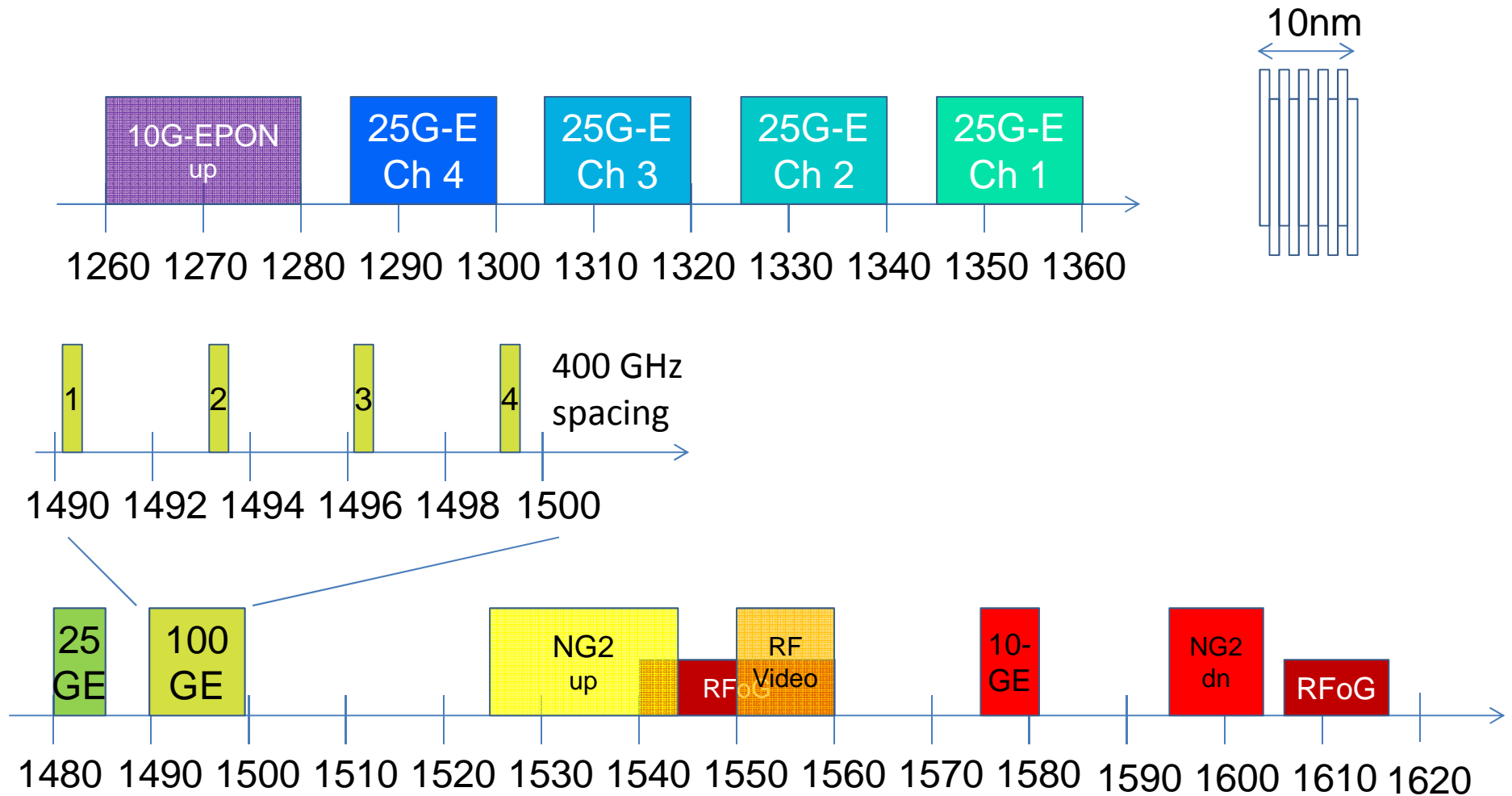


Coexists with 1G-EPON (DFB), 10G-EPON, RF Video, and TWDM

# Alternative 4 channel CWDM upstream plan

- If the main application of 100G system is to support 4 colors of 25G ONUs, then a CWDM plan could be lowest cost
- There is no room for four 20nm bands, so we must squeeze every parameter
  - Temperature range: -40 to +85 = 12.5nm
  - Manufacturing range: 3.5nm
  - Guardband / passband: 25%
  - Passband: 16nm, Guardband: 4nm

# 100G four CWDM channel



Coexists with 10G-EPON, RFoG, RF Video, 25G-EPON, and NG-PON2