NG-EPON Coexistence scenarios and wavelength plan

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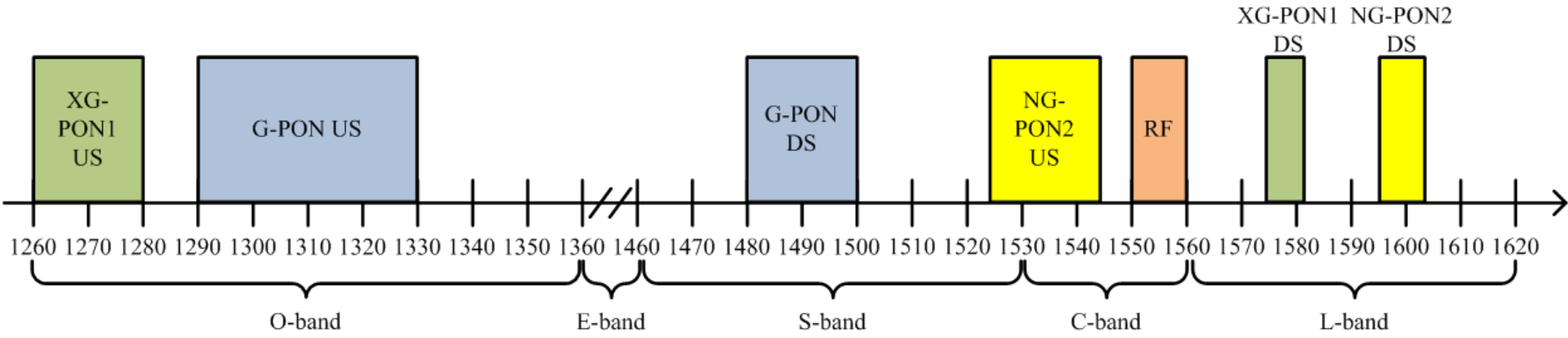
content

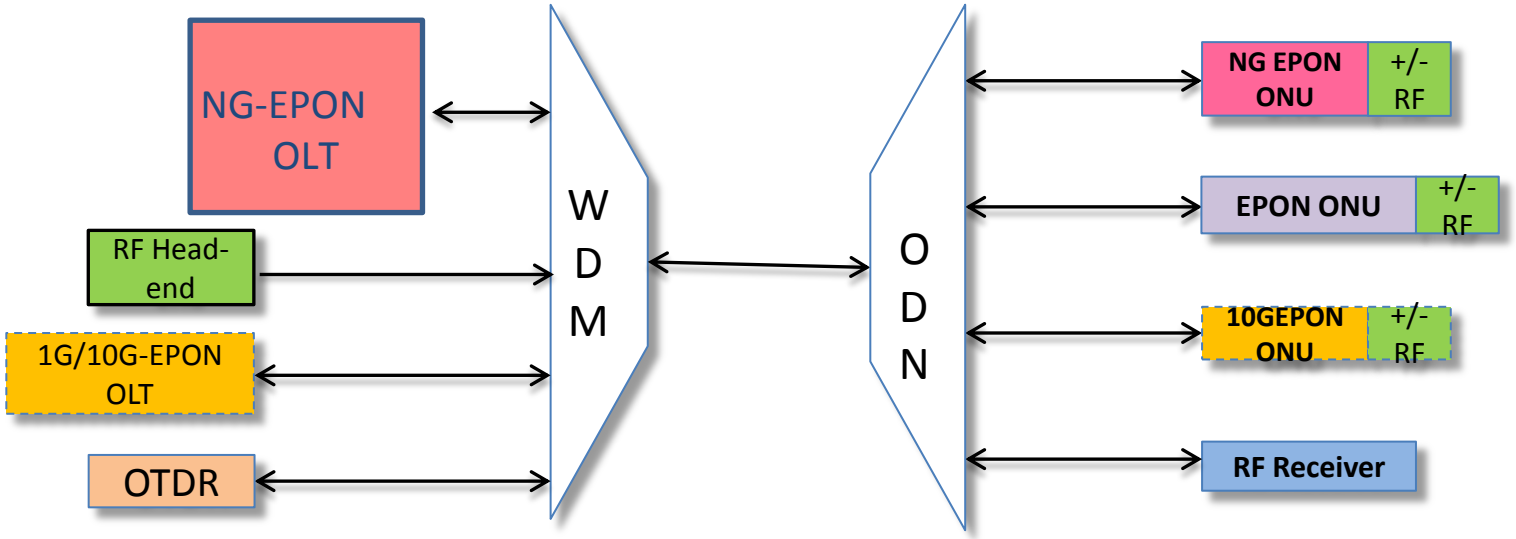
- FASN NG-PON2 Wavelength Band
- NG-EPON Coexistence scenarios
- summary

FSAN NG-PON2 Wavelength Band



- In order to achieve co-existence with existing systems, (e.g., G-PON, XG-PON1, RF, etc), and meet 40km distance requirement, NG-PON2 uses
  - C- band (1524nm – 1544nm) for upstream
    - Wide range: 1524nm – 1544nm
    - Narrow range: 1524nm - 1540nm
  - L+ band (1596nm – 1603nm) for downstream
- Cons:
  - Downstream wavelength dispersion is higher, sensitive for fiber bend.
  - Raman crosstalk between RF video and NGPON2 DS, two alternative linecode schemes proposed for NG-PON2(8B10, Miller code).
  - lack of available optical component for L+ band(laser,OA) for Downstream, Supply chain is not mature

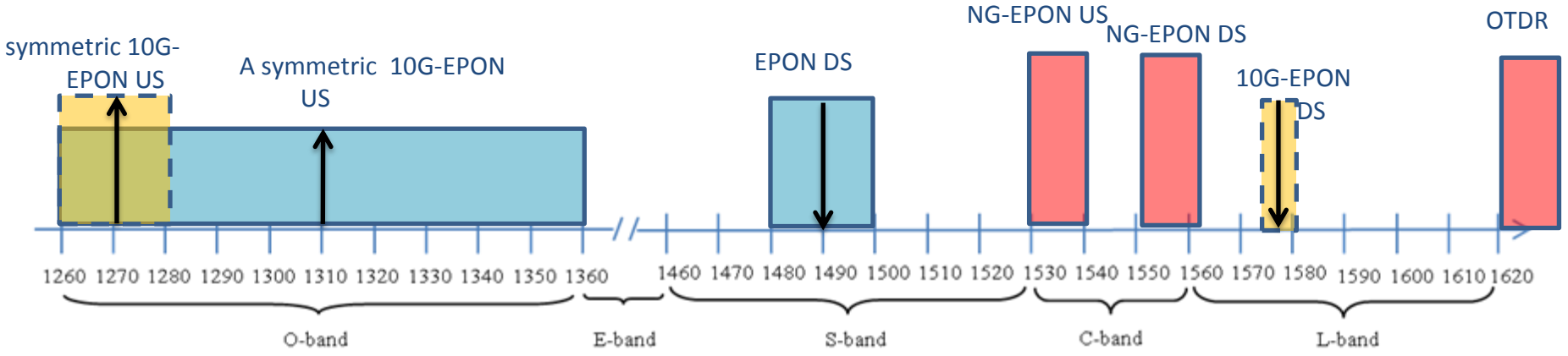
NG-EPON Co-existence scenarios analysis



- Co-existence
  - Different operators can have their own choice based on their network
  - Possible co-existence scenarios
    - E-PON + 10G-EPON + NG-EPON
    - 10G-EPON + RF Video + NG-EPON
    - E-PON + 10G-EPON + NG-EPON+RF Video
- Key points to be considered for wavelength plan
  - Though there are several co-existence scenarios, it's not good choice to have multiple wavelength plans
  - How many channels and channel spacing could be assigned in band range?
  - Cost of optical components.
  - Raman crosstalk and deployed WBF(wavelength blocking filter) of EPON/10G EPON.

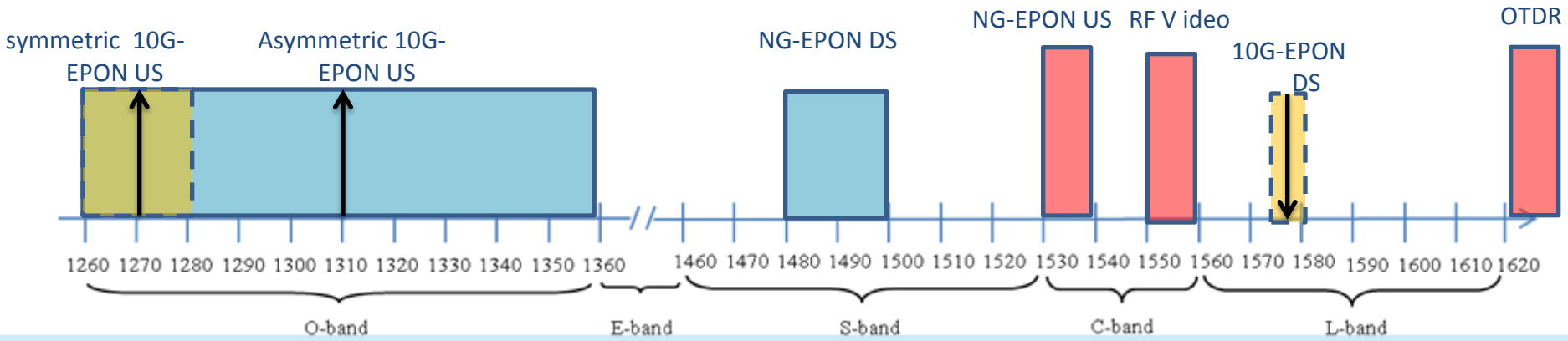
Co-existence scenario 1: E-PON + 10G-EPON + NG-EPON

- C- band for NG-EPON Upstream, up to 10 channels(100GHz)
- C+ band for NG-EPON Downstream, up to10 channels(100GHz)
- C band optic component Industry chain is mature, achieve a good compromise for cost/performance
- Dispersion penalty is larger in c band than O band, the EML TX shall be used. But some vendors have announced low cost DML production for c band.



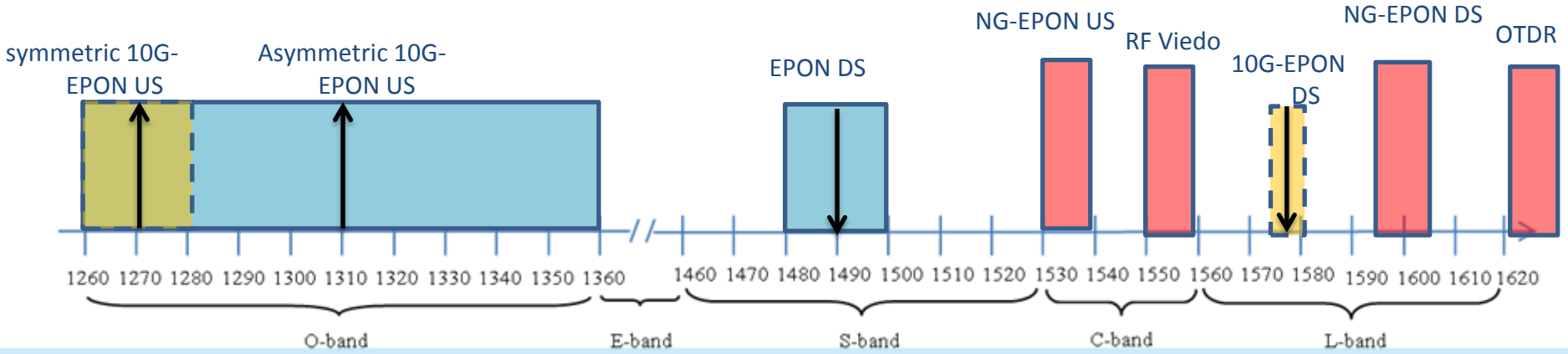
Co-existence scenario 2: 10G-EPON + RF Video+NG-EPON

- C- band for NG-EPON Upstream,up to 10 channels
- NG-EPON DS reused EPON DS wavelength,1480-1500nm ,up to10 channels
- S&C- band optic component Industry chain is mature, achieve a good compromise for cost/performance
- Co-propagation Raman impact between NG-EPON/10G EPON DS and RF should be considered
- DS can use low cost DML TX
- Dispersion penalty is larger in c band than O band, the EML TX shall be used. But some vendors have announced low cost DML production for c band.



Co-existence scenario 3:E-PON + 10G-EPON + NG-EPON+RF Video

- C- band for NG-EPON Upstream, up to 10 channels
- L+ band for NG-EPON Downstream, up to10 channels
- Same as NG PON2 wavelength band, the Economical Efficiency Of Scale for optics is good.
- C- band optic component is mature, achieving a good compromise for cost and performance, but lack of available optical component for L+ band(laser,OA) for Downstream.
- Co-propagation Raman crosstalk between NG-EPON/10G EPON DS and RF should be considered
- Dispersion penalty is larger in C- band than O band, the EML TX shall be used. But some vendors have announced low cost DML production for c band.
- Dispersion penalty is larger in L+ band, the high cost EML TX is required now.



summary

Option	1	2	3
Down (nm)	C+	S	L+
Up (nm)	C-	C-	C-
Max channels	10	10	10
WDM overlay filter in OLT	Y	Y	Y
DS Dispersion	High(EML/DML TX)	Low(DML TX)	High(EML only)
US Dispersion	moderate(DML TX)	moderate(DML TX)	moderate(DML TX)
Raman impact to RF	No RF	Y	Y
The maturity of optics	High	High	Low(DS)
Cost of Laser	Moderate	Low	High
Coexistence with 10GEPON	Y	Y	Y
Compatibility with OTDR @1625nm	Y	Y	Y
Coexistence with EPON	Y	N	Y
Coexistence with RF	N	Y	Y

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Thanks!