Security Level:

100G-EPON wavelength plan comparison Model Discussion and Optimization

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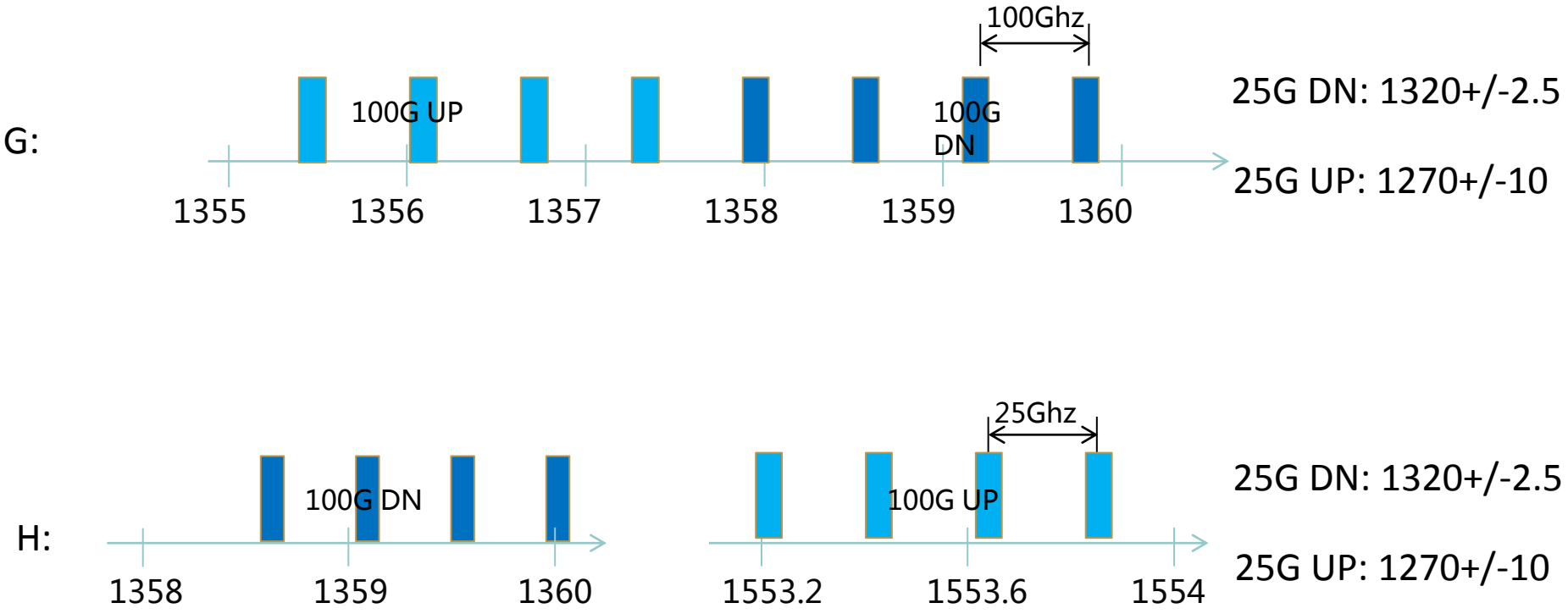
Background

- In Fort Worth meeting, Nokia provide a Model to compare different wavelength plan in harstead_3ca_4b_0916.pdf

Impacts on 25G EPON				Impacts on 100G EPON				
Leverages DC O-band laser tech.	Low cost ONU laser	WBF (DS0/DS1 gap)	Dispersion compensation?	Leverages DC O-band laser tech	Filters: uniform CS and width	SOA: narrow passband, spectrum	EDFA option	Dispersion compensation ?

- There are still some space to optimize on this model, in order to compare different plans more fairly .

Two hypothetical wavelength plan



Comparison scores with present model

	Impact on 25G					Impact on 100G					
	25G λ0 shared with 10G	Leverages DC O-band laser tech	Low cost ONU laser	Dispersion compensation ?	Leverages DC O-band laser tech	Filters: uniform CS and width	SOA: narrow passband, spectrum	EDFA option	OLT includes 10G Rx	Dispersion compensation	sum
plan A option 1	1	2	1	1	2	0	0	0	0	1	8
plan A	1	2	0	1	2	1	1	0	0	1	9
plan B	0	2	1	1	2	0	0	0	1	1	8
Plan C (TDM)	0	2	1	1	0	1	1	1	1	0	8
Plan C (WDM)	1	2	1	1	0	1	1	1	0	0	8
Plan D option 3	0	1	1	0	1	1	0	0	1	-1	4
Plan D	1	1	0	0	1	1	1	1	0	-1	5
Plan F	1	2	1	1	0	1	1	2	0	-1	8
Plan G	1	2	1	1	2	1	1	0	1	1	11
Plan H	1	2	1	1	1	1	1	1	1	0	10

Two most difficult plans (G & H) get the best scores!

Some suggestions on Comparison model

- Factors which have important impact on optics cost must be taken account in:
  - Transmitter type, optic bandwidth , channel spacing, laser wavelength accuracy tolerance, guard band width , DS/US separation…
- It would be better to separate ONU and OLT when comparison
  - The cost of ONU must be excessively considered
- Feasibility issue and requirement issue should be segregated
  - 1+3 vs 1+4
  - SOA narrow pass band spectrum or EDFA option
  - 25G λ0 shared with 10G and OLT including 10G Rx
- Items list for comparison should be in similar weight:
  - “Filters: uniform CS and width” is much less important than “Low cost ONU lasers”
  - The weight on cost impact should be differentiated : such as “Leverages DC O-band laser tech”, “Dispersion compensation”

One suggested new model(1)

25G Impact										
		Tx			Rx	TRx		Electronics complexity	Others	Rank
	item	Laser type	Laser wavelegnth accuracy tolerance	Launch power	Receiver Sensitivity	Guard band width	DS/US seperation	(EDC? EDB Decoding? Linear TIA?)		
Plan A	OLT									
	ONU									
Plan B	OLT									
	ONU									
Plan C	OLT									
	ONU									
Plan D	OLT									
	ONU									
Plan F	OLT									
	OLT									

One suggested new model(2)

100G Impact										
		Tx			Rx	TRx		Electronics complexity	Others	Rank
	item	Laser type	Laser wavelegnth accuracy tolerance	Launch power	Receiver Sensitivity	Guard band width	DS/US seperation	(EDC? EDB Decoding? Linear TIA?)		
Plan A	OLT									
	ONU									
Plan B	OLT									
	ONU									
Plan C	OLT									
	ONU									
Plan D	OLT									
	ONU									
Plan F	OLT									
	OLT									

Some further explanation:

- “SOA narrow pass band” or “EDFA” option are kind of technical feasibility issue, unfeasible solutions must be excluded first.
- “Filters: uniform CS and width” is a trivial item compared with others, so it’s dropped down.
- “Dispersion compensation” goes to the cost impact on electronics (EDB decode ? Or EDC ?)
- “Leverages DC O-band laser tech” goes into “others”
- “Low cost ONU laser” is the most important factor, has been divided into several items.

Thank you

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