Wavelength plan proposal

DS wavelength allocation:

center wavelength and pass band

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Supporters

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Discussion

Issues at July meeting

We proposed that only feasible DS wavelength band for co-existence is 6nm wide centered around 1577nm. However there was an opinion that more relaxed pass band such as 20nm by using uncooled LD for PX10/20 should be considered.

Point of discussion

(1)Should DS wavelength of PX10/20/B++ be common or different?

What are benefits of common wavelength?

■Commonization of OLT may be possible over different CIL of ODN.

=>There are several benefits for system and component venders

■Future bandwidth allocation seems to be easy if considering migration scenario between Co-existence and Greenfield deployment.

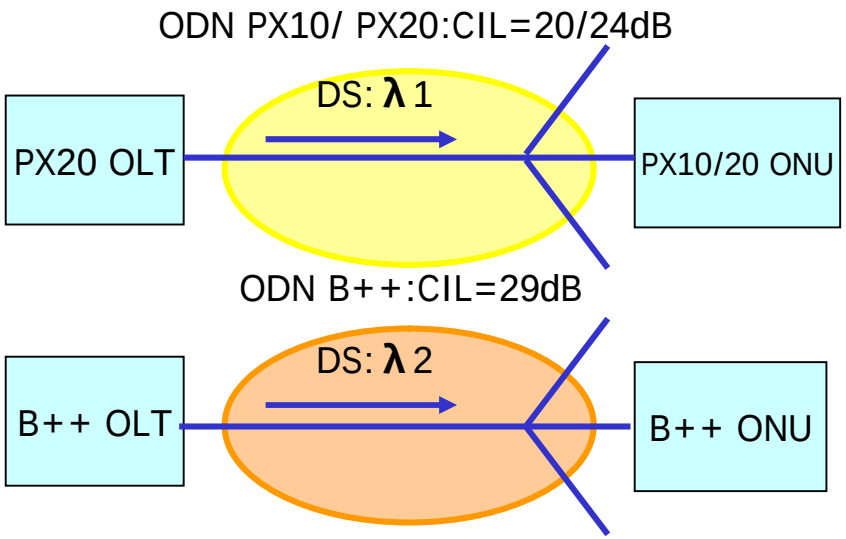
■Harmonization with ITU-T may be preferable in order to minimize types of optical component production

(2) Is it necessary to consider the wavelength width that assumed an Uncooled LD?

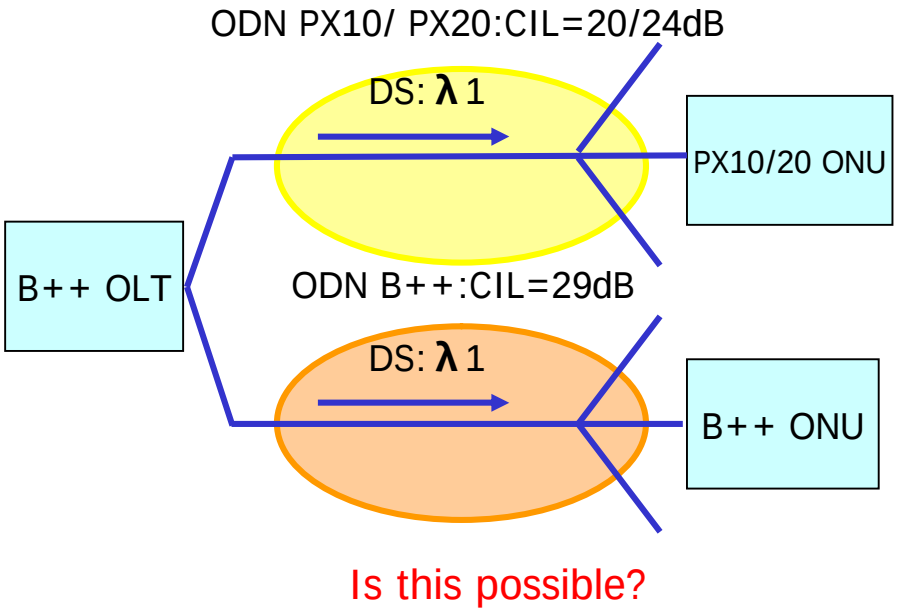
Majority of Japanese vender's opinion is negative concerning about productivity associated with output power and extinction ratio.

Common wavelength for all PMD's

<< Different DS wavelength>>



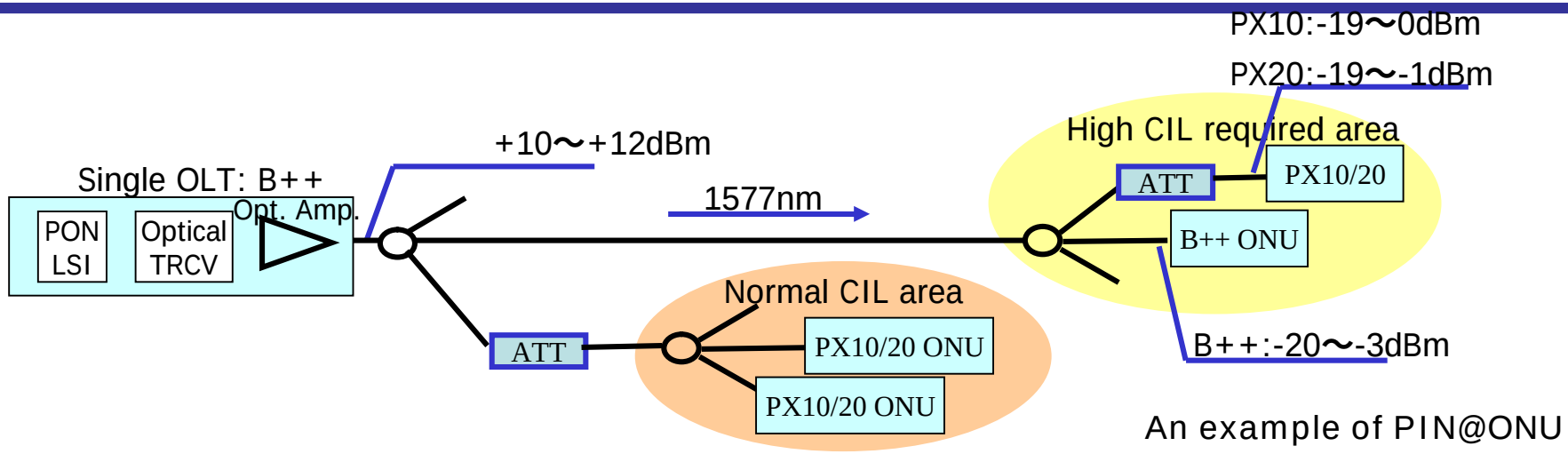
<< Common DS wavelength>>



Is this possible?

- Common DS wavelength allows single type of OLT can connect with all PMD types of ONU over deferent CIL of ODN.
- In fact , majorities of operators and system venders select single OLT solution in GE-PON deployment.

Possible Network configuration: Single OLT



An example of PIN@ONU

ODN CIL (dB)			ATT for ONU compatibility (dB)		
Class	min	max		PIN@ONU	APD@ONU
PX10	5	20	PX10	7	7
			PX20	8	8
			B++	10	10
PX20	10	24	PX10	2	2
			PX20	3	3
			PX30	5	5
B++	15	29	PX10	Unnecessary	N.A.
			PX20		
			PX30		Unnecessary

Current power budget specification can support different types of ONU installed over same ODN if the same wavelength applying for all PMDs. It can be achieved by installing attenuator into household or center office.

Benefits of single OLT using common wavelength

<< System vender's benefit>>

-Reduces the product cost of OLT by means of volume production.

-Reduces the investment cost for test equipment.

-Reduces the procurement cost of component.

-Reduces the cost of spare parts for operators.

-Reduces the maintenance cost for both operators and venders.

-Reduces the training cost for craft person.

<< Component vender's benefit>>

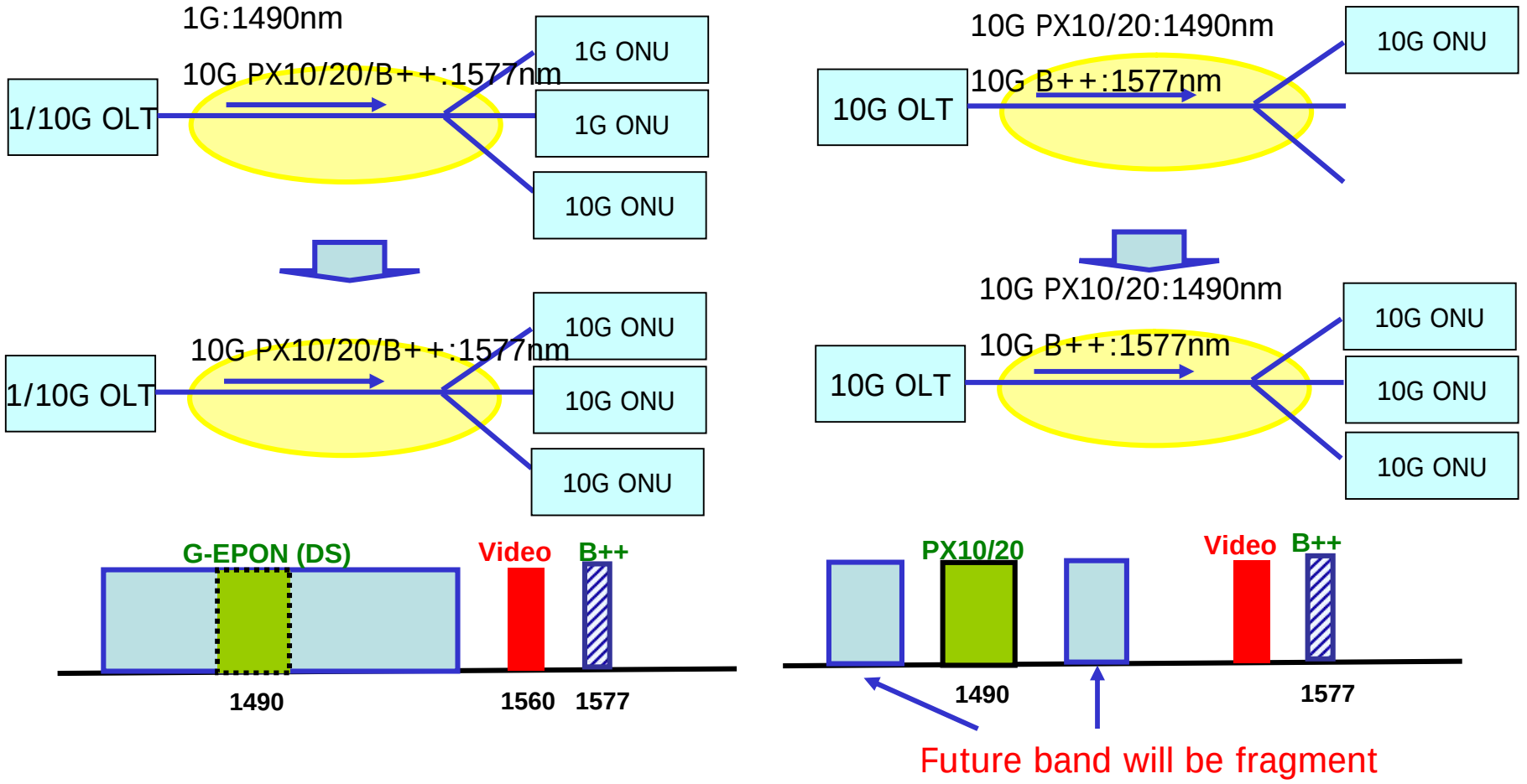
-Reduces the product cost of TOSA and LD chip by means of volume production.

-Reduces the R&D cost of LD chips by applying same design of grating and wavelength detuning.

Only one wavelength, 1574nm-1580nm , should be specified.

Migration scenario: co-existence and green field

<< Co-existence: Common DS Wavelength>><<Green field: Different DS wavelength>>



After 1G to 10G migration will be done, in case that only 10G-EPON existing on the field, common wavelength allocation between co-existence and green field would be preferable in order to avoid a fragment of future band resources.

Harmonization with G.984.5

G.984.5 Wavelength

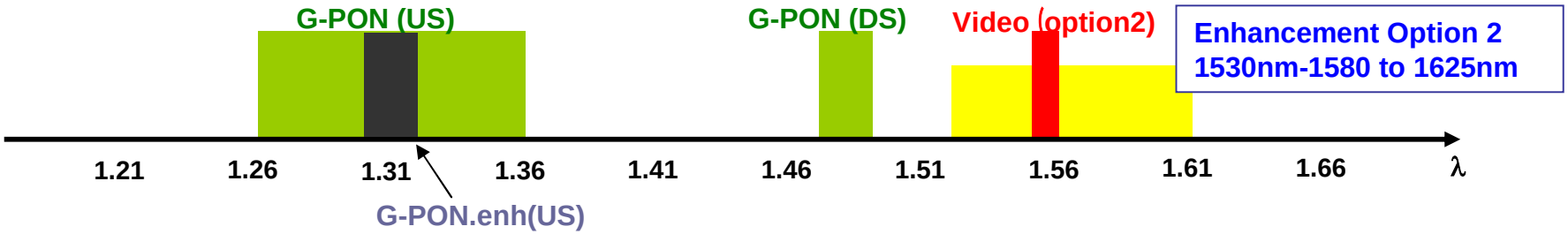
■G.984.5(Enhancement band for Gigabit capable Optical Access Networks) has been consent at ITU-T meeting on June 2007.

■Enhancement band option2 for Nest Generation Access is allocated.

- ■1530nm-1580 to 1625nm: upper limit value is determined as an operator choice.

■Narrower US wavelength of existing G-PON is determined for future uses.

- ■40nm, 1290nm-1310nm:　20nm, 1300nm- 1320nm



If considering harmonization with ITU-T Next Generation Access system, DS wavelength may need to be allocated on longer than 1530nm.

•Possibility of same optical component such as laser source, wavelength blocking filters etc. to be applied for both 10G-EPON and NGA system.

Summary

DS wavelength

- Common wavelength should be specified for all PMD classes.
- Proposed wavelength：1574nm-1580nm for PX10/20/B++

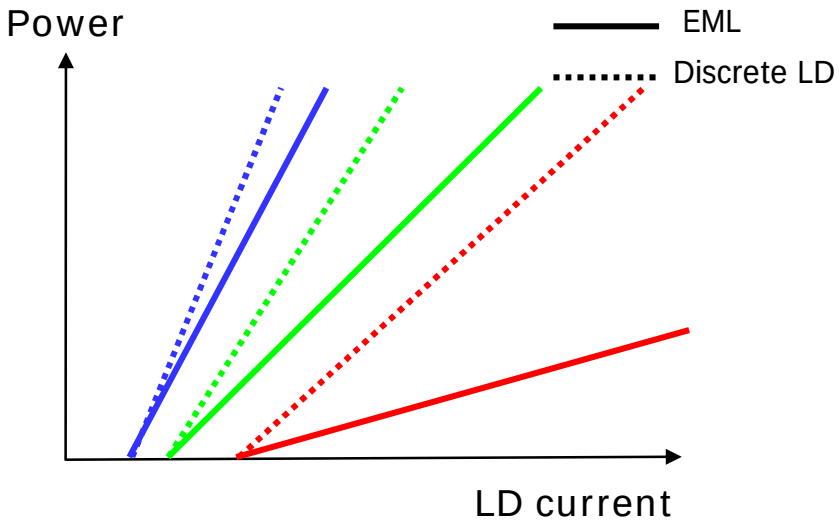
Appendix: Issues of Appling uncooled EML

■Large temperature dependency of output power

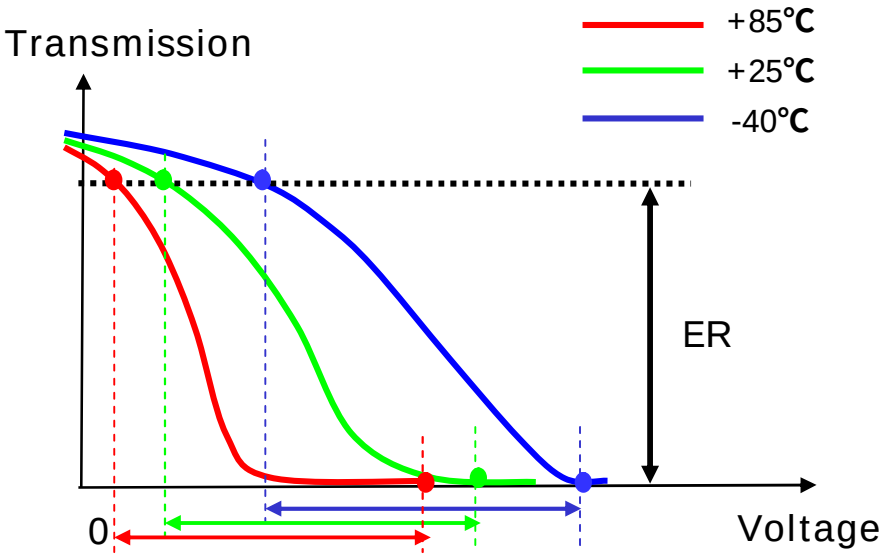
Output power at high temperature is lower than one of discrete LD due to additional loss caused by EA temperature dependency.

■Difficulty of maintain high Extinction ratio

It seems difficult to maintain 9dB extinction ratio at high temperature since optical transmittance falls suddenly.



<<Power: EML vs. Discrete LD>>



<<Transmission: EML vs. Discrete LD>>

It is questionable to apply uncooled EML especially for high temperature application.