Security Level:

The cross-generational optical level issues in 1+3 Architecture

Dekun Liu

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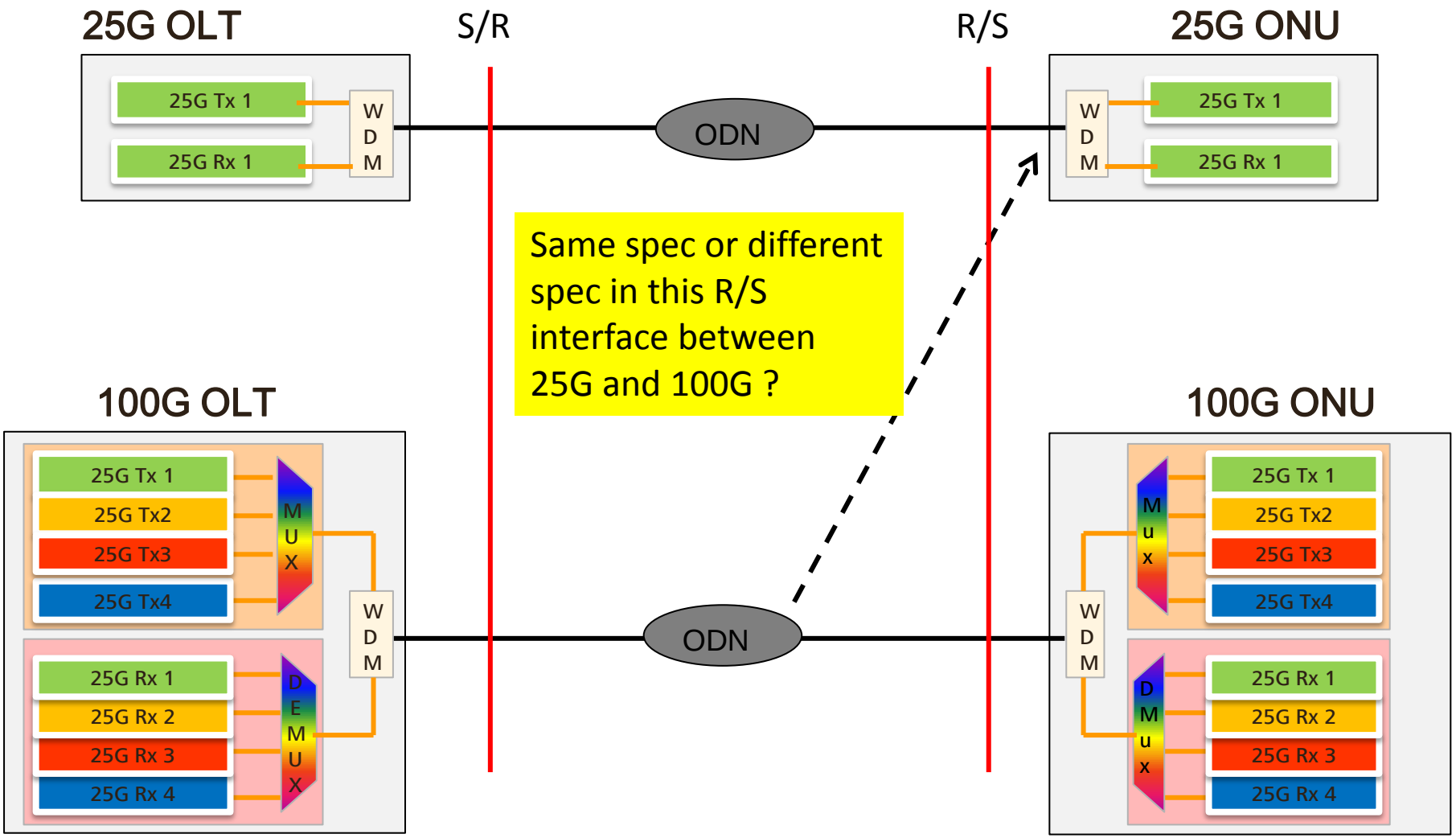
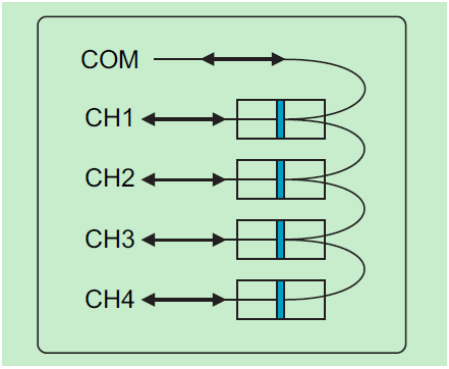
The cross-generational optical level issues in 1+3 Architecture



The insertion loss of mux/demux

Based on TFF mux/demux, the insertion loss is ~0.5dB/channel
For 50G PON(2 channel) : 1dB
For 100G PON(4 channel) : 2dB

Vendor 1



Channel ITU Wavelength	CH1	λi	1294.53	1295.56	1296.59	nm
	CH2		1299.02	1300.05	1301.09	
	CH3		1303.54	1304.58	1305.63	
	CH4		1308.09	1309.14	1310.19	
Insertion Loss	Premium Grade	IL			1.5	dB
	Standard Grade				1.9	dB

Vendor 2

(single channel)

1. Product Info: LAN-WDM TFF block
2. Specifications:

注明：以下指标为TFF在block上安装完成之后的指标

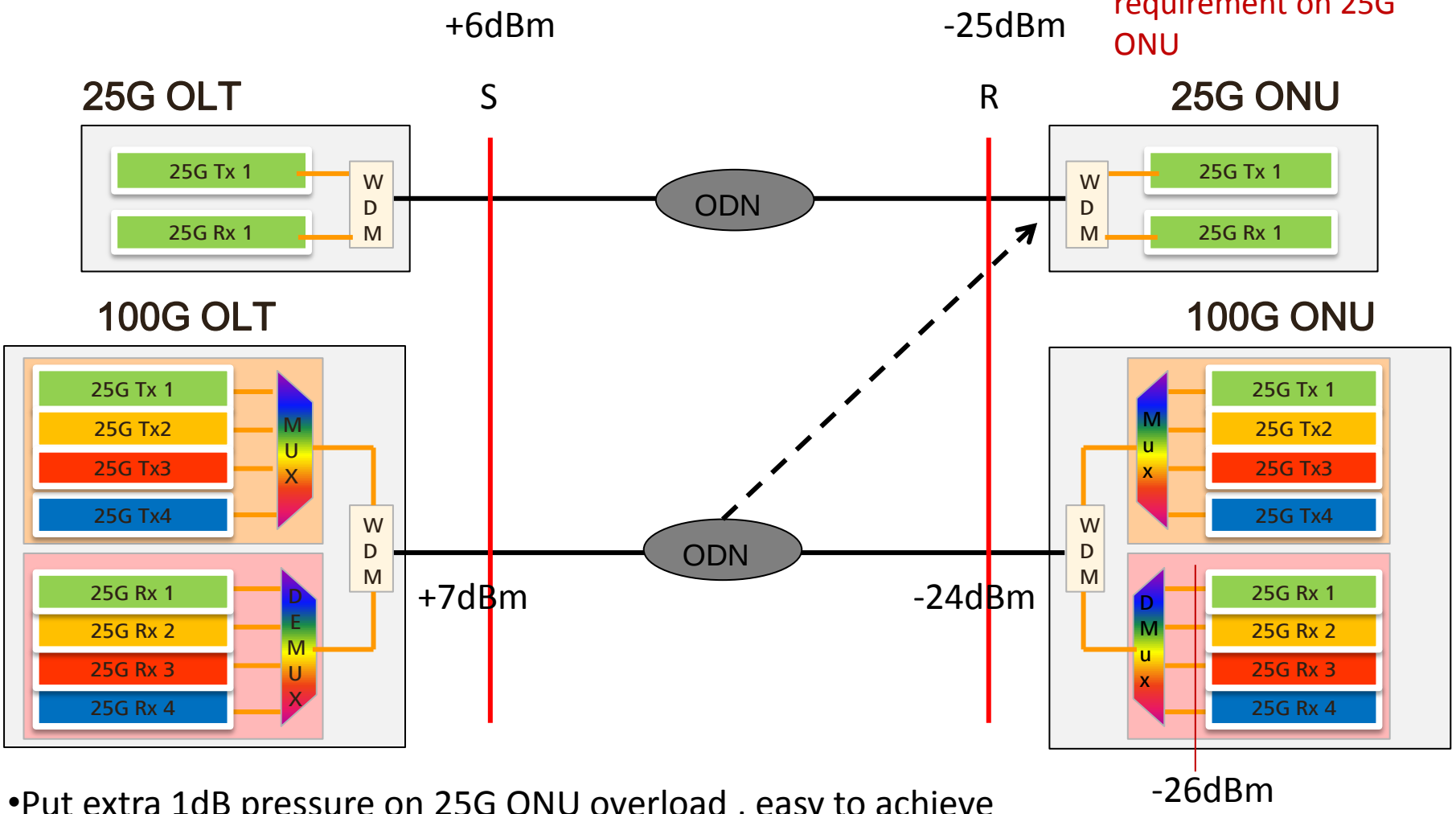
parameter	unit				
Optical Operation wavelength Range	nm	1285~1320			
Center wavelength	nm	1295.56	1300.06	1304.56	1309.14
Passband(0.5 dB)	nm	λc+1nm			
Max insertion loss@passband	dB	<0.5			

Assumption:

- 100G Mux/demux insertion loss : 2dB
- The typical sensitivity of 25G receiver is R_0 = **-25dBm** (just for example)
- TDP is assumed to be ~2dB
- 100G EPON will be deployed 3~5 years later than 25G EPON.

DS Option 1:

1 more dB overload requirement on 25G ONU

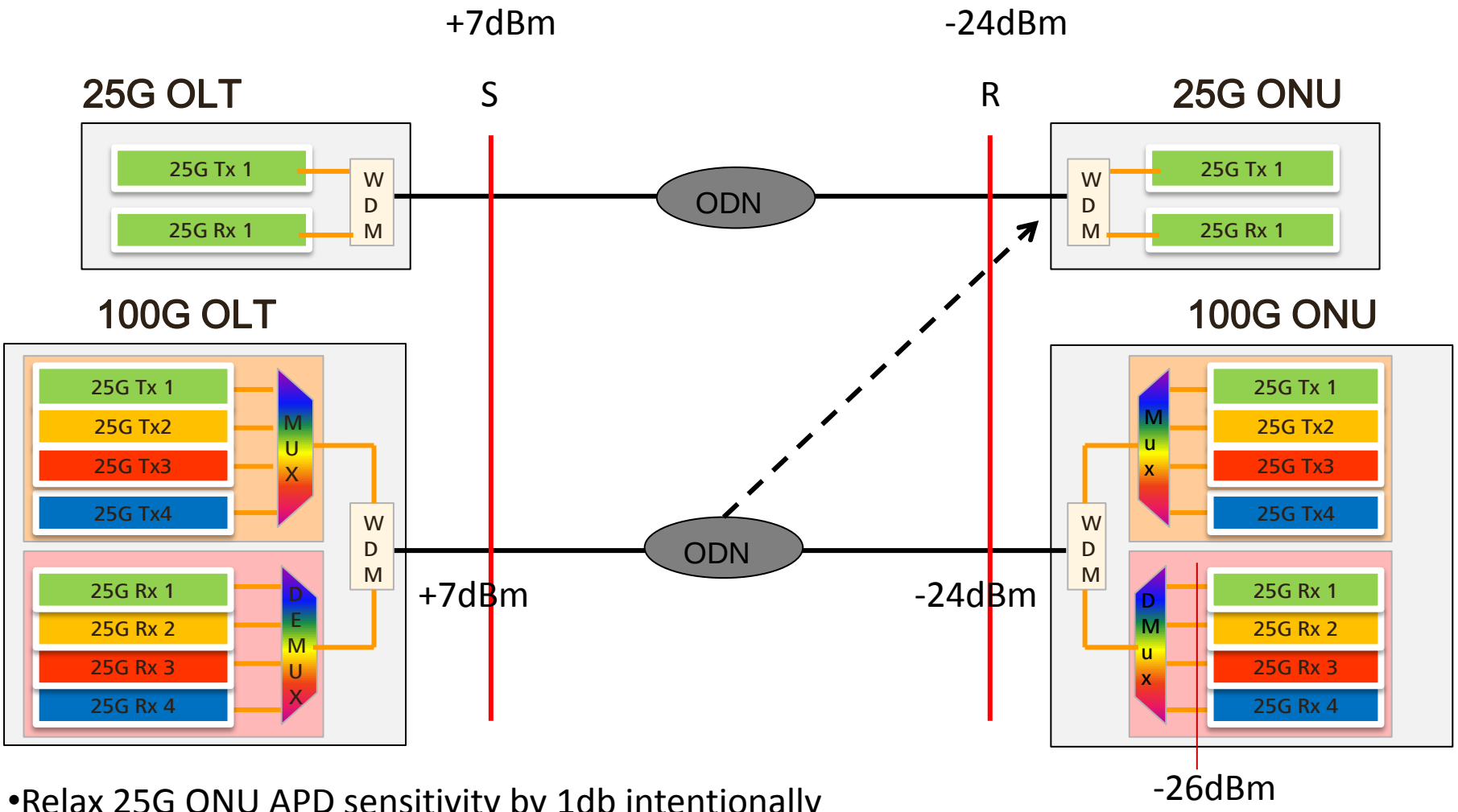


- Put extra 1dB pressure on 25G ONU overload , easy to achieve
- Assume APD sensitivity improvement by 1dB when 100G EPON are deployed.

1 more dB sensitivity requirement on 100G ONU

DS Option 2:

Relax 1dB for 25G ONU for low cost

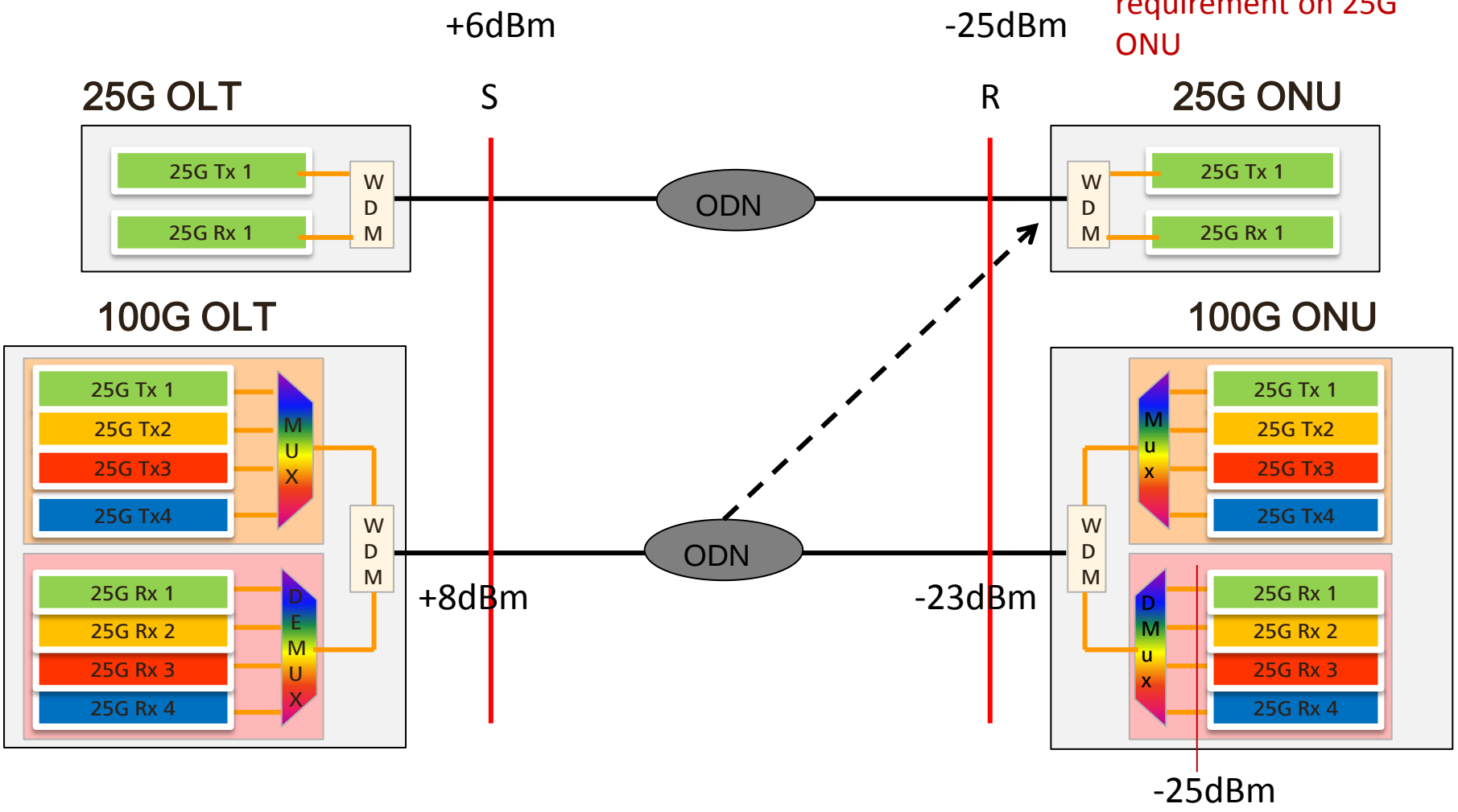


- Relax 25G ONU APD sensitivity by 1db intentionally
- Put another 1dB sensitivity pressure on 100G EPON ONUs.

1 more dB sensitivity requirement on 100G ONU

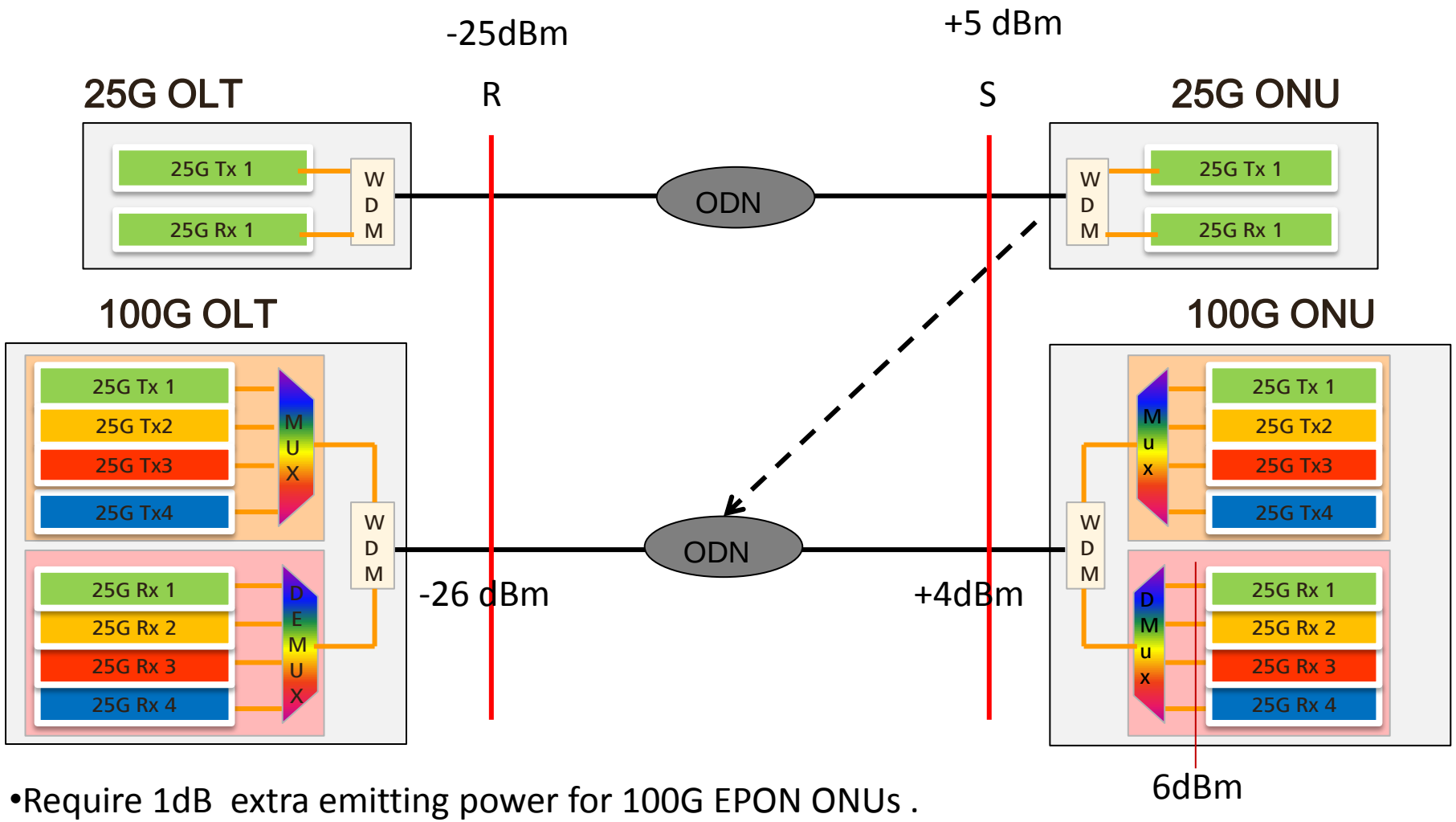
DS Option 3:

2 more dB overload requirement on 25G ONU



•Put extra 2dB overload requirement on 25G ONU

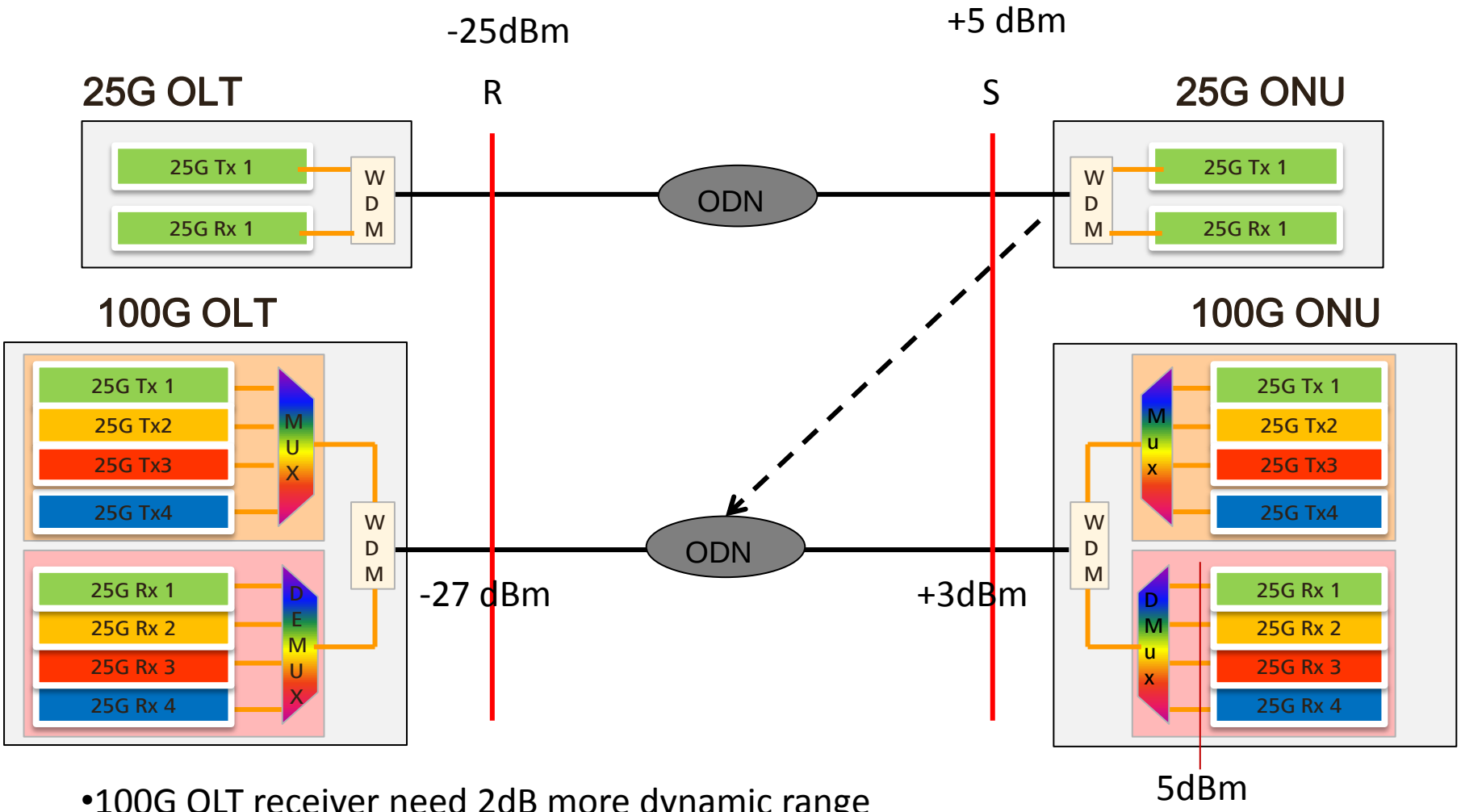
US Option 1:



- Require 1dB extra emitting power for 100G EPON ONUs .
- 100G OLT receiver need 1dB more dynamic range

1 more dB launch power compared with 25G lasers

US Option 2:



- 100G OLT receiver need 2dB more dynamic range
- Put all the pressure on the OLT receiver side.

Summary :

- 100G EPON power levels need to consider both 25G and 100G, and consequently the cross-generational optical levels .
- Some solutions are proposed to solve the cross-generational optical levels issues, most of them are doable.
- 1+3 architecture can overcome the cross-generational optical levels issues easily .

Thank you

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