

800G (4x200G-PAM4) Module Test Data with FECi and FECo

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I Supporters

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- Shuang Yin, Google
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I Overview

- Goal of this presentation is to show the FECi performance data measured on the actual 4x200G-PAM4 Optical Modules for field deployment and the benefit of FECi- providing additional Link budget margin required by the Network operators for their operational efficiency @ scale.

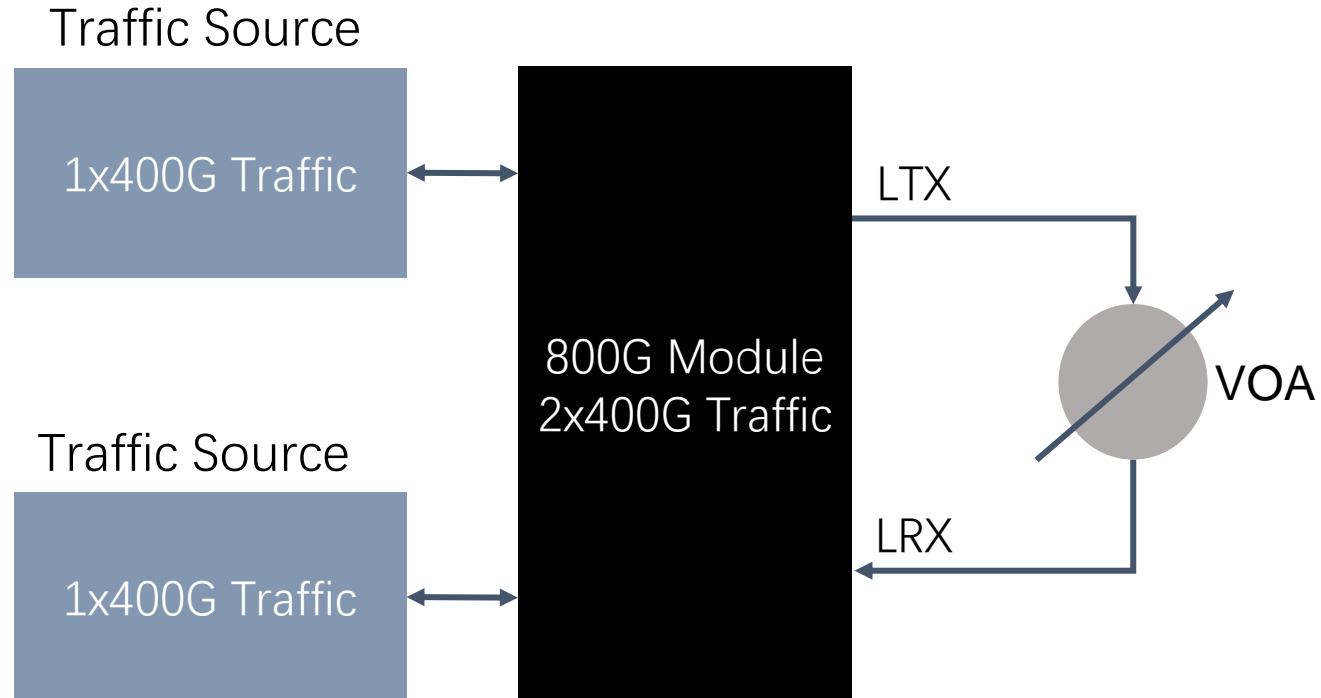
Agenda:

- Mission mode Traffic Data for 800G (4x200G-PAM4) Module
 - Pre-KP4 FEC BER with FECi Vs FECo
- Mission mode KP4 FEC bin statistics:
 - Performance measured over Temperature Ramp conditions over Long run
- Mission mode Stability Test
 - Pre FEC BER and FEC bin variation with FECi over multiple restarts of the Module
- Summary

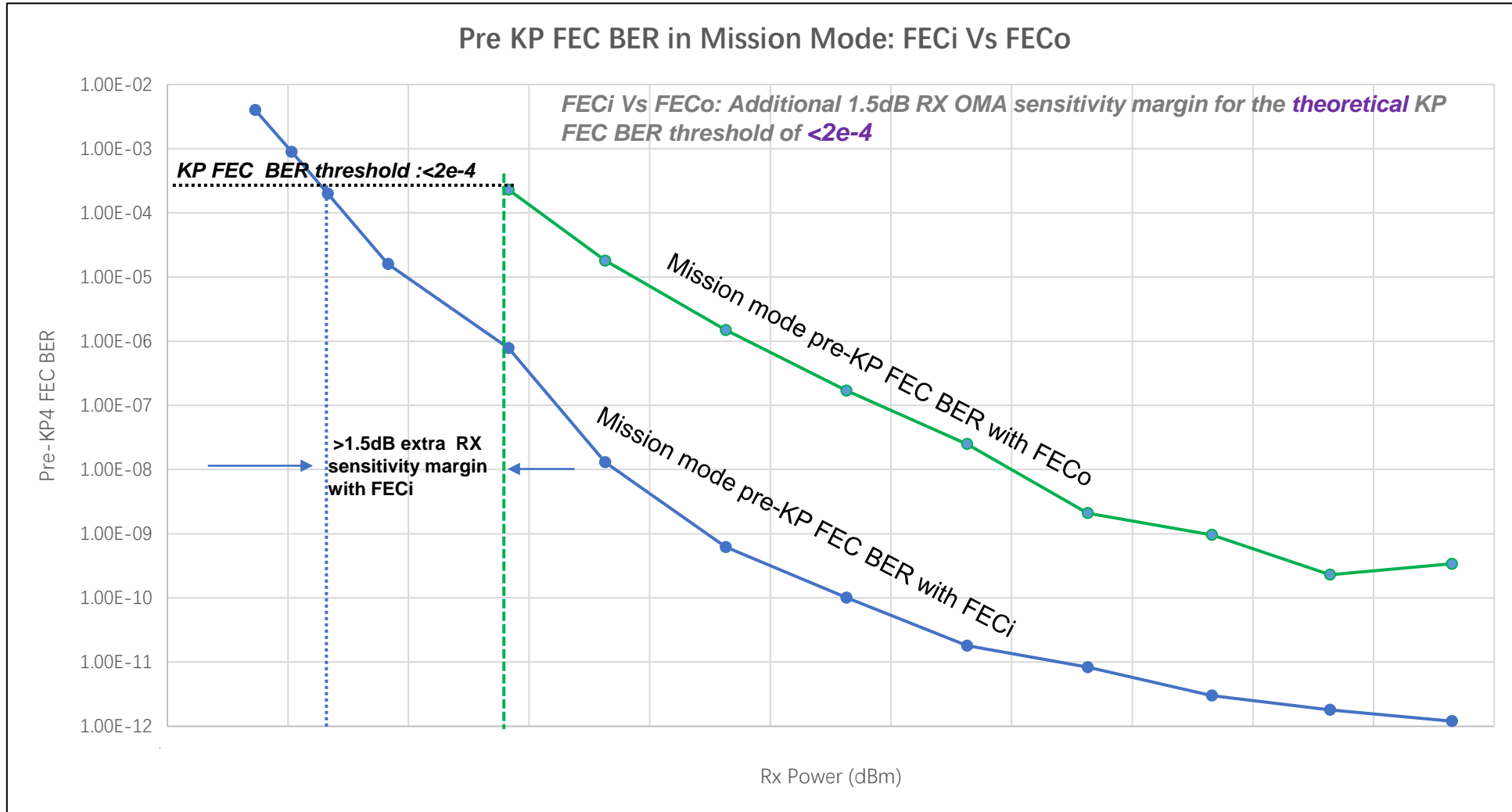
Mission Mode measurement Set Up

800G Optical Module:

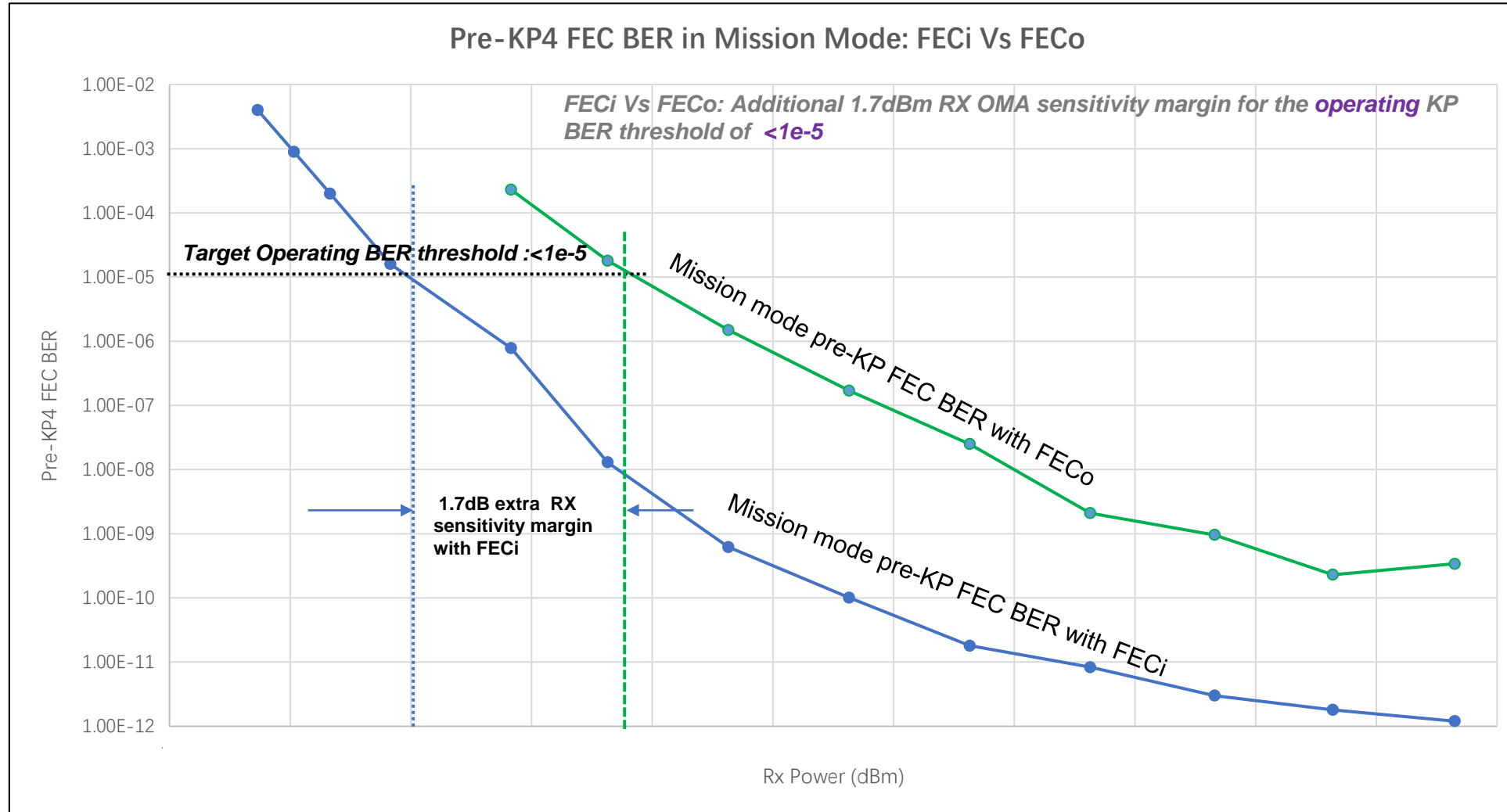
- 4x200G-PAM4 Optics
- DSP retimer can turn on FECi, or turn off FECi for FECo test



Mission Mode: FECi vs. FECo BER vs. Rx_OMA

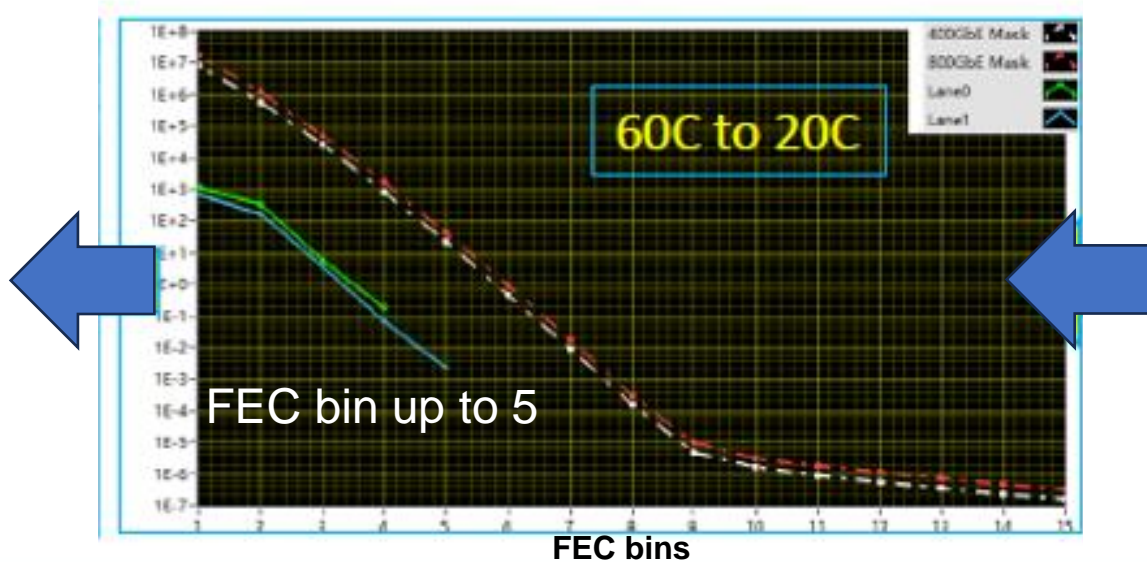
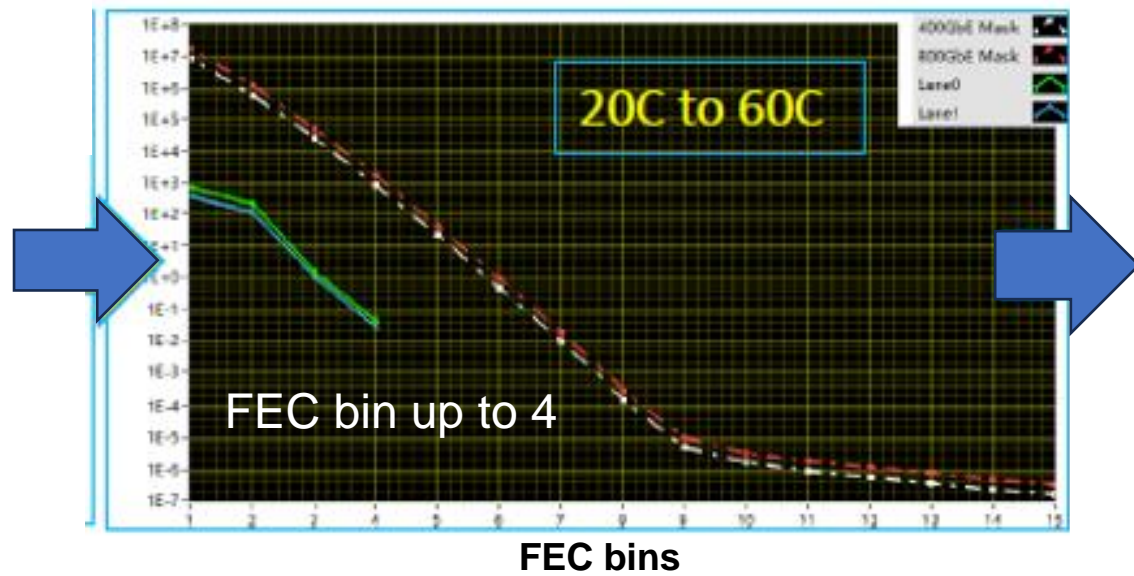


Mission Mode: FECi vs. FECo BER vs. Rx_OMA



- Operating KP FEC BER threshold is more realistic target
- FECi provides the margin needed to produce the modules @ scale for the data center operators

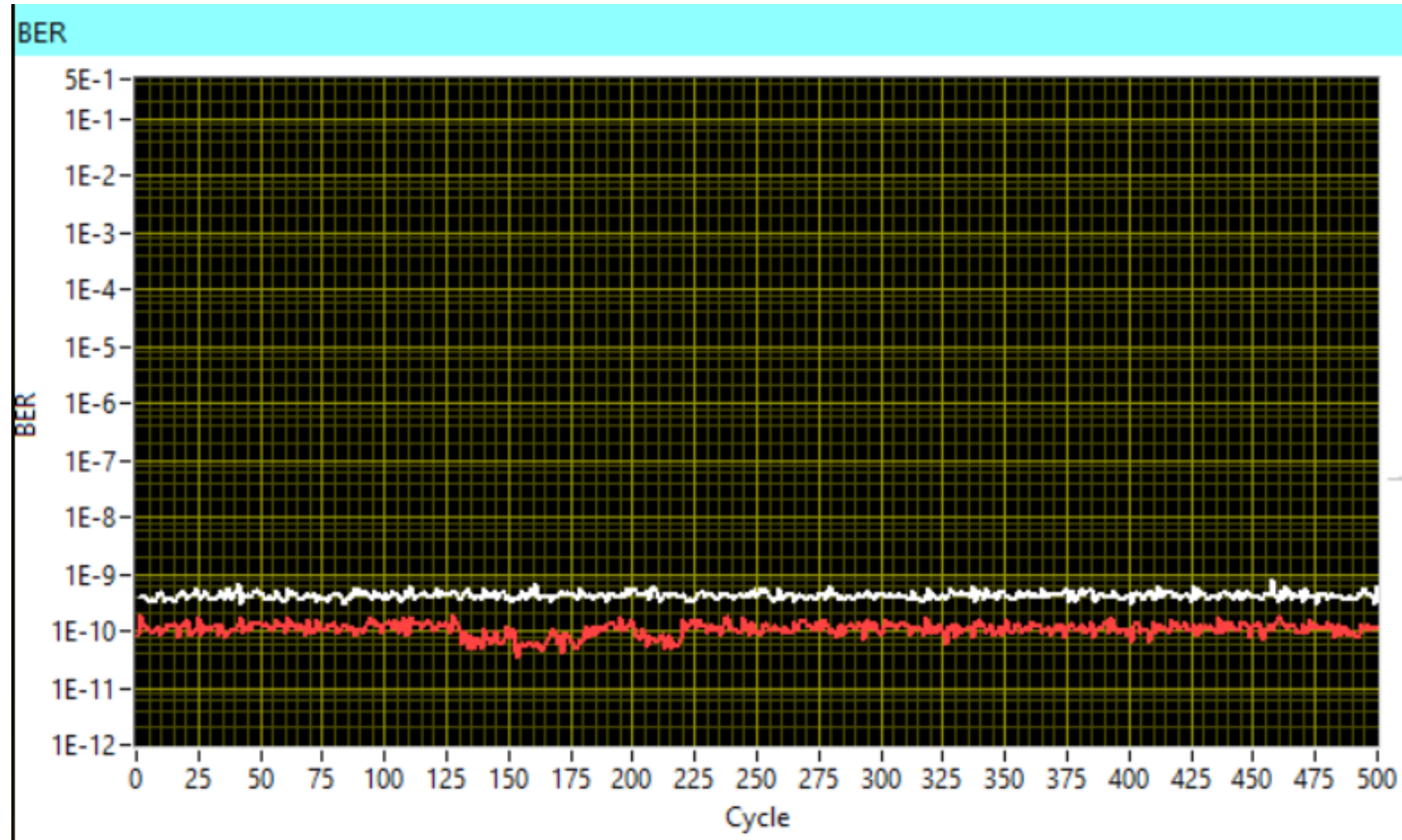
■ KP4 FEC Bin statistics in Mission Mode over Temperature Ramp with FECi



- FEC Bin statistics in Mission mode – Over 24 hours of run over Temperature Ramp condition : 20C to 60C with FECi
- Maximum bin: 4/5 both from Cold to Hot and Hot to Cold Temperature
- Significant margin with respect to IEEE FEC bins,

Mission Mode Stability Test Over Multiple module restarts

- 500 re-starts testing on DR4 module
- No Pre-FEC BER variation / No FEC tail jump issue observed



I Summary

- 800G (4x200G-PAM4) transceiver module, used for the data collection for FECi Vs FECo, is one of the actual module – for deployment in the hyperscale data centers.
- FECi mode shows significant Link budget improvement vs. FECo
 - ~1.5 to 1.7 dB Rx_OMA_sensitivity improvement at same operating conditions
 - Lower BER floor ~ 2 decades
- FECi mode shows the real stable KP4 FEC bin statistics (<5) over 24 hours of run across Temperature ramp conditions (Cold to Hot & Hot to Cold) with no signature of FEC tails.
- Additional Optical Link margin provided by FECi is needed by the network operators for their AI infrastructure for the operational efficiency @ scale.
- As adopted by IEEE - FR4/LR4 requires FECi support for extra link budget



Thank You!
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