



ITU-T G.9806AM3 UPDATE

IEEE 802.3 WORKING GROUP

TASK FORCE: GREATER THAN 50 GB/S BIDIRECTIONAL OPTICAL ACCESS PHYS

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Background

- 100G-BiDi ad hoc group formed for G.9806Am3 is progressing discussion
 - Monthly meeting
 - Target time of consent of class S(0-15 dB) is the next ITU-T SG15 plenary on April 2023
 - Target time of consent of class B-(10-23 dB) is ITU-T SG15 plenary on November 2023
- This contribution shares strawman PMD parameters agreed by 100G-BiDi ad hoc meeting
 - Wavelength, transmitter launch power, receiver sensitivity, TDECQ, TECQ
 - Line code, FEC, S/X, Pulse mask, test pattern

Strawman PMD parameters for G.9806Am3

Items	Unit	Specification	Reference
Modulation format		PAM4	IEEE plenary meeting, Jan. 2023 "ITU-T G.9806AM3 UPDATE" https://www.ieee802.org/3/dk/public/2301/3dk_Johnson_2301_1.pdf
Nominal modulation rate	Gbit/s	53.125	IEEE plenary meeting, Jan. 2023. "ITU-T G.9806AM3 UPDATE" https://www.ieee802.org/3/dk/public/2301/3dk_Johnson_2301_1.pdf
Wavelengths	nm	1304.6 ±1 nm, 1309.1 ±1 nm	IEEE plenary meeting, Jan. 2023. "ITU-T G.9806AM3 UPDATE" https://www.ieee802.org/3/dk/public/2301/3dk_Johnson_2301_1.pdf
Mean launch power MAX	dBm (AVP)	TBD	+3.6 dBm for 50G-BiDi in "G.9806 Corr.1" https://www.itu.int/rec/T-REC-G.9806-202202-II/Cor1
Launch power in OMA _{outer} (min) - For TDECQ < 1.6 dB - For 1.6 dB < TDECQ < 3.6 dB	dBm	+3.0 +3.0 + TDECQ	ITU-T 6 th 100G-BiDi ad hoc meeting, Feb. 2023. "20230209_011_contribution_NTT" and "20230209_012_contribution_Huawei"
Launch power in OMA _{outer} minus TDECQ (min)	dBm	1.4	ITU-T 6 th 100G-BiDi ad hoc meeting, Feb. 2023. "20230209_011_contribution_NTT" and "20230209_012_contribution_Huawei" * subject to minimum TDECQ of 1.6dB
Transmitter and dispersion eye closure for PAM4 (TDECQ) MAX	dB	3.6	+3.2 dB for 50G-BiDi in "G.9806 Corr.1" https://www.itu.int/rec/T-REC-G.9806-202202-II/Cor1
Receiver sensitivity (OMA) - For TECQ < 1.6 dB - For 1.6 dB < TECQ < 3.6 dB	dBm	-12.5 -12.5 + TECQ	ITU-T 6 th 100G-BiDi ad hoc meeting, Feb. 2023. "20230209_011_contribution_NTT" and "20230209_012_contribution_Huawei"
Damage threshold MAX	dBm	TBD	

Strawman PMD parameters for G.9806Am3

Items	Unit	Specification	Reference
TDECQ – TECQ (max)	dB	2.5	ITU-T 6 th 100G-BiDi ad hoc meeting, Feb. 2023. “20230209_011_contribution_NTT” and “20230209_012_contribution_Huawei”
Optical path penalty MAX (Informative)	dB	2.5	ITU-T 6 th 100G-BiDi ad hoc meeting, Feb. 2023. “20230209_011_contribution_NTT” and “20230209_012_contribution_Huawei”
Extinction ratio MIN (Note 3)	dB	5.0	IEEE plenary meeting, Jan. 2023 “ITU-T G.9806AM3 UPDATE” https://www.ieee802.org/3/dk/public/2301/3dk_Johnson_2301_1.pdf
Bit error ratio		Less than 2.4×10^{-4}	Specification of 50G-BiDi in “G.9806 Corr.1” https://www.itu.int/rec/T-REC-G.9806-202202-1/Cor1

Additional Reference:

Strawman values in the table above are very similar to those in the 100G Lambda MSA 100G-ER1-30, which also has 15dB optical loss (but higher max penalties).

<https://100glambda.com/specifications/download/2-specifications/11-100g-lr1-20-er1-30-er1-40-technical-specs-rev-1p1>.

100G-LR1-20 is in the same document, but specifies 9.8dB loss and a PIN Rx.

Strawman PMD parameters for G.9806Am3

Coding: 64B66B, IEEE 802.3-2022 Clause 140.1.1

FEC: RS(544,514), IEEE 802.3-2022 Clause 140.1.1

Pulse mask: Not apply to 100 Gbit/s

S/X: follow 50Gb/s specification(G.9806 amd.2)

Test pattern: IEEE 802.3-2022 Clause 140.7.1

Open topics under discussion for class B-

- Strawman PMD parameters for class B-
- Impacts of fiber non-linearity (based on VPI simulations):
 - SPM in the fiber has a significant impact on the 40km 100G PAM4 link performance
 - High TDECQ values induced by high launch OMA. Especially raised cosine shaped signals from transmitter can have high TDECQ values (e.g. 16dB)
 - CD limits: Can a statistical CD value be used as each link typically consists of multiple independent fiber spans? Operators' inputs needed.
 - Impact from SBS needs to be studied
 - Evaluation of simulation results by using commercially available components is needed
- For Class B-, further study to compare the pros and cons between 1x100G vs 2x50G is needed
 - Size(form factor), power consumption, cost(components, implementation)

100G BiDi PtP adhoc group -time plan-

Ad hoc meeting is held once a month at 14:00- 15:00 CEST (Geneva Time).

7th : 2023.3.2 (Thu.)

8th : 2023.4.13 (Thu.)

9th : 2023.5.11 (Thu.)

Now
▼

	Oct.	Nov.	Dec.	Jan. 2023	Feb.	Mar.	Apr.	May
ITU-T	▲ ITU interim 10/25-27	▲ ITU interim 11/29-12/1	▲ ITU interim 12/6-12/8	▲ ITU interim 1/17-18	▲ ITU interim 2/21-23	▲ ITU interim 3/21-23	▲ ITU Plenary 4/24-27	
IEEE		▲ Plenary 11/14-18		▲ Interim 1/16		▲ Plenary 2 nd week in Mar.		▲ Interim 2 nd week in May
100G Bidi adhoc	▲ 2nd 10/13	▲ 3rd 11/22	▲ 4th 12/9	▲ 5th 1/12	▲ 6th 2/9	▲ 7th 3/2	▲ 8th 4/13	▲ 9th 5/11

Summary

- ITU-T G.9806Am3 project are developing specifications based on technologies well-supported by industry
- Specification alignment between ITU-T and IEEE is essential for the ecosystem
- Class S in G.9806Am3 target consent in the April 2023 ITU-T SG15 Plenary
The adhoc group must conclude its work and reach consensus by March 9
- Requests to IEEE 802.3 participants
 - Feedback of strawman PMD parameters to the ITU-T 100G BiDi PtP adhoc group
 - Inputs of open topics from IEEE members will be appreciated
 - IEEE 802.3 participants are encouraged to join the ITU-T 100G BiDi PtP adhoc group.
Contact to its co-chairs;
Dr. Hirotaka Nakamura hirotaka.nakamura.by@hco.ntt.co.jp
Dr. Derek Nessel derek.nessel@huawei.com

Straw Poll

- I support the specification of 100G PAM4 modulation format using wavelengths $1304.6 \pm 1\text{nm}$ and $1309.1 \pm 1\text{nm}$ for the 100G BiDi 10km and 20km PMD objectives.
 - Yes:
 - No:
 - Need more information:



THANK YOU