

# IEEE P802.3dj Package Next Steps

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1p0

# Supporters and Contributions

## Supporters

- Jim Weaver, Arista
- Rick Rabinovich, Keysight
- Jason Chan, Arista
- Howard Heck, Intel
- Tobey P.-R. Li, MediaTek
- Mike Dudek, Marvell

# Problem Statement - Recap

- Device packages are projected to consume a considerably larger portion of the die-to-die loss budget at 200 Gbps/lane
- Two different (opposing) approaches:
  - **Loss optimized:**
    - E.g.  
[https://www.ieee802.org/3/dj/public/23\\_0720/lim\\_3\\_dj\\_02a\\_2307.pdf](https://www.ieee802.org/3/dj/public/23_0720/lim_3_dj_02a_2307.pdf)
  - **Radix optimized:**
    - E.g.  
[https://www.ieee802.org/3/dj/public/23\\_07/benartsi\\_3dj\\_02\\_2307.pdf](https://www.ieee802.org/3/dj/public/23_07/benartsi_3dj_02_2307.pdf)
- There was strong consensus in September 2023 to support the following proposal (slide 4 & 7)
  - No motion was taken; Straw Poll only

## Straw Poll #1:

I would support the package direction proposed in lusted\_3dj\_04\_2309 slide #4 and #7

Results (all): Y: 58, N: 4, A: 39

[https://www.ieee802.org/3/dj/public/23\\_09/motions\\_3cwdfdj\\_2309.pdf](https://www.ieee802.org/3/dj/public/23_09/motions_3cwdfdj_2309.pdf)

# Proposed Path - Recap

- Define two classes of packages
  - Both the Class A “loss optimized” and Class B “radix optimized” approaches are supported
- Create two sets of transmitter and receiver specifications, one for each package class
  - TX Class A (common die model + Class A package)
  - TX Class B (common die model + Class B package)
  - RX Class A (common die model + Class A package)
  - RX Class B (common die model + Class B package)
  - Choose the reference package model that is applicable
- Package-to-Package (TP0-TP5) channel compliance using COM with a specific reference package on each end
- Apply to backplane PHYs, AUI C2C interfaces
  - Look at CR and C2M later

# Transmitter and Receiver Compliance Direction - Recap

- Define multiple reference package models differentiated at first order by a maximum insertion loss allocation e.g., ...

Transmitter or receiver	Maximum package IL allocation [1], dB
Class A (e.g. “loss optimized”)	TBD = 6
Class B (e.g. “radix optimized”)	TBD = 9

[1] From TP0d to TP0 for transmitters and from TP5 to TP5d for receivers.

- All transmitters and receivers must meet Class B requirements. Some may meet Class A requirements.
- TX/RX compliance to Class A and/or Class B is demonstrated using existing compliance test methods with the reference package model that reflects the corresponding limit on insertion loss

Note: values in magenta are placeholders, not a baseline proposal

## Some Future Work Items - Recap

- Test cases of different trace lengths for each package needs consideration
- A separate minimum package loss test case may also be included
- Package-to-package channel classification, if needed
- Parameters and values for Class A and Class B packages
- Consider package choices for CR and C2M interfaces

# Example KR Channel Matrix (IL ≤ 40 dB die-die) - Recap

## Example compliance test requirements

Reference package models for COM		KR Channel IL (ball-ball)
Transmitter	Receiver	
Class A (6 dB)	Class A (6 dB)	28 dB
Class A (6 dB)	Class B (9 dB)	25 dB
Class B (9 dB)	Class A (6 dB)	
Class B (9 dB)	Class B (9 dB)	22 dB

Co-design of channel with targeted package and vice versa

\*C2C channel class loss will be adjusted after agreement on max bump-bump loss.

## Example compatibility matrix

KR Channel IL (ball-ball)		Receiver class	
		Class A	Class B
Transmitter class	Class A	28, 25, 22 dB	25, 22 dB
	Class B	25, 22 dB	22 dB

Note: values in magenta are placeholders, not a baseline proposal

# Summary

- We should set the direction in November 2023:
  - Specifying two package classes
    - Each package class is optimized for a different approach
  - Creating two sets of transmitter and receiver specifications for backplane and AUI C2C, one for each package class
    - Choose the reference package model that is applicable
  - Channel compliance using COM with a specific reference package on each end
  - Apply to backplane PHYs, AUI C2C interfaces
  
- A straw poll and motion was requested



**BACKUP**