

# Budgeting a Bump to Bump Loss for Interoperability

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# Background and Current Status

## Status

- Multiple presentations showed the ability to handle a bump to bump loss of around 40dB for 802.3dj's "KR"
- Knowing each section loss allowance is extensively influenced by other sections (with emphasis on the influence of package loss), an overall bump to bump budget was pursued and demonstrated. In some cases, leaving for the package the residual loss between interconnect and max agreed → **How do we fix that?!**
- Package loss was shown to be as high as, or close to 10dB at 53GHz for the "long" high radix trace case. Is it feasible that each of the KR interconnects will need to meet this high package loss case?

# Meeting Future Targets - Looking Forward into Budgeting the Loss

- Conventional budget was historically done at a very early phase to:
  - Tx side Package loss
  - TP0-TP5 Interconnect budget including:
    - Tx side line card loss
    - BP loss
    - Rx side line card loss
  - Rx side package loss

## Targets to be met by suggested methodology

- Having a bump to bump loss objective (regardless of its value) overlooks at this phase multiple targets. The suggested method will meet:
  1. Avoid having an engineered link per case
  2. Having a method that will assure interoperability between devices
  3. Having an agreed Tx compliance methodology (TP0v)
  4. Having an agreed Rx stressed signal methodology (testing at TP5v)
  5. Having an agreed COM methodology for channel validation without the need for a specific device package model supplied by an ASIC vendor
  6. Have agreed package model(s)

# Suggested Methodology for Budgeting

Below is one option to budget an overall loss and obtain the targets:

- Use COM the way we are used to doing
- Specify two packages (two max allowed losses) in COM, Let's call them case **L** (Long) and case **S** (Short)  
Possible loss examples:
  - Case **L** would be for high loss. Example: up to around 10dB for case2 and 6dB for case1
  - Case **S** would be for "small" lower loss packages. Example: up to around 5dB for case2 and 2.5dB for case1
- While running COM to check an interconnect compliance to the spec, one needs to specify what packages reside on each side (Tx and Rx); are they L? S?....
- → 4 (or three) cases of runs and every interconnect may comply with one or more of these four cases:
  - Tx=**L** ; Rx=**L** → **Interconnect**
  - Tx=**L** ; Rx=**S** → **Interconnect**
  - Tx=**S** ; Rx=**L** → **Interconnect**
  - Tx=**S** ; Rx=**S** → **Interconnect**

Once you have specified it the following way:

- ✓ TPOV method remains valid, All you need to do is specify whether your Tx package complies with type\_L or type\_S and run the TPOV code
- ✓ Rx testing methodology also remains valid once you specify what type of package your Rx side is... The interconnect to be used for testing a device in the lab can be fully defined once one specifies what type of package resides on the Rx end
- ✓ The interconnect now complies with specified attached devices and thus achieves interoperability
- ✓ All 6 target bullets from the former slide were achieved

# Next Steps

- Refine and agree on a budgeting methodology concept
- Adopt package material properties, geometries, models...
- Discuss and come to final agreement on actual loss cases of Tx and Rx types L&S (while examining which interconnect complies with any of the four cases)

# Thank You!