Consensus proposal for AUI error requirements

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Goals

- Propose a value for the COM parameter **DER_0** to enable progress on AUI specifications
  - With examples of measured BER
- Summarize the results presented in previous presentations

Two different views:

2e-5 per host	**5e-5 per host**

- ran_3dj_01_2305 (slide 14): "Random BER of 2e-5 for AUIs within each host"

- ghiasi_3dj_02_2305 (slide 9): "Recommend to allocate 5E-5 per host PHY"
  - The electrical adhoc can take the 5E-5 decide how to divide between C2C and C2M
  - Starting point could be by allocating pre-FEC BER of 4E-5 for C2M and 1E-5 to C2C

- patra_3dj_01a_2305 (slide 13): C2C BER 1e-5, C2M BER 4e-5 (total 5e-5)

What is the real difference?

- Let's look at the total "BER" without dividing it between C2M and C2C
- The 2e-5 proposal is for Random BER
  - Translated to DER0=2.67e−5
  - ran_3dj_01_2305: "Specifications will be in terms of FLR or similar… details TBDL"
- The 5e-5 proposal is for Measured BER with precoding
  - patra_3dj_01a_2305: "All the BER limit described in this table represent Worse case BER with DFE alpha 0.75 to represent Burst error events"
  - Due to precoding, the measured BER will be 2x the random BER
  - This proposal assumes a random BER of 5e-5/2=2.5e-5
- So the difference is 2e-5 vs 2.5e-5

What does it mean?

If we allocate all the error budget to a single AUI per host:

Host Random BER		2e-5	2.5e-5
COM parameter DER_0		2.67e-5	3.33e-5
Measured average BER	Without precoding, no error propagation (a=0)	2e-5	2.5e-5
	Without precoding, medium error propagation (a=0.35)	3.1e-5	3.9e-5
	Without precoding, maximum error propagation (a=0.75)	8e-5	1e-4
	With precoding	4e-5	5e-5

If we divide the error budget between two AUIs, all numbers scale accordingly

Due to symbol muxing, the effect of correlated errors on RS-FEC performance and FLR is small, despite the large differences in measured average BER

For example, the last two rows have a factor of 2 in measured BER but yield almost the same performance

Alternatives to average BER measurement should be considered

Proposal

- Adopt DER0 value of 2.67e-5, equivalent to measured BER of 4e-5 with precoding ON, for higher-loss AUIs within a PHY
  - Division between C2C and C2M to be determined
  - Measurement method for compliance to be determined