NGEABT Testing Challenges for the Installed Cabling Base

January 2015

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Abstract

- This is an attempt to define the problem space for qualification testing of the installed base of Cat5e/6 structured cabling for suitability to carry newly proposed BASE-T applications.
- It should serve as a ‘jumping off point’ for prioritizing the most sensitive parameters, design of experiments to identify practical test methods, and any data gathering needed to further the test definitions.

We've been here before.

- TIA TSB-155A is in force for the certification of Cat 6 cabling carrying 10GBASE-T signals.
- Includes expectations for extended frequency transmission performance.
- …and Alien-Crosstalk coupling limits.
- Something quite like this will answer the needs of NGEABT.

TIA TSB-155

	IL	NEXT/ PSNEXT	ACRF/ PSACRF	RL	Delay/ Delay Skew
Channels	✓	✓	✓	✓	✓
Perm. Links	✓	✓	✓	✓	✓

- Cabling meets performance specified in ANSI/TIA-568-C.2. (Soon to be 568.2-D.)
- Transmission performance to 10G media bandwidth is also specified.

TIA TSB-155

- PSANEXT and PSAACRF loss are length scaled for 10GBASE-T on Cat 6 cabling.
  - must be met for each disturbed pair
  - must also meet an average value
  - same limits for channel and PL
- ACMC allows relief for some media that doesn’t meet the requirements above.

NGEABT Concerns (non-concerns)

- The SG/TF will determine the tradeoffs between the signaling, modulation rate, and media bandwidth.
- Media bandwidth is extremely likely to fall between current *category* specifications and 10G requirements.
- Existing field test equipment already operate in this range.

NGEABT Concerns

- Will the new PHY enjoy 10GBase-T-like noise cancelation?
  - This leaves the usable bandwidth chiefly limited by cabling insertion loss and alien noise.

NGEABT Concerns

- Will new PHY rates have a crucial distaste for alien cross-talk noise?
  - AxT testing is historically difficult, and avoided in the field. (Leaving some 10G installations potentially vulnerable.)
  - The bulk of installed Cat 5e/6 cabling is UTP.
  - AxT performance is largely unknown for the installed base of Cat 5e & Cat 6.

For Further Study

- Examination of internal transmission parameters known to contribute to AxT noise mechanisms (ref. TIA TSB-1197).
  - Replacing AxT testing has the potential to remove a substantial barrier to field qualification of the installed base.
  - Modern laboratory instrumentation has made cross-modal measurements (TCL, LCL, CDNEXT/FEXT) much more efficient and repeatable.

For Further Study

- Relative volumes of global installed category cabling.
- Survey of field test data for passing margins and any extended BW testing.
- Laboratory reference measurements of extended frequency transmission performance and AxT [existing media].
- <*Your suggestions here*.>

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THANK YOU