



Impact of Channel Configuration to RL

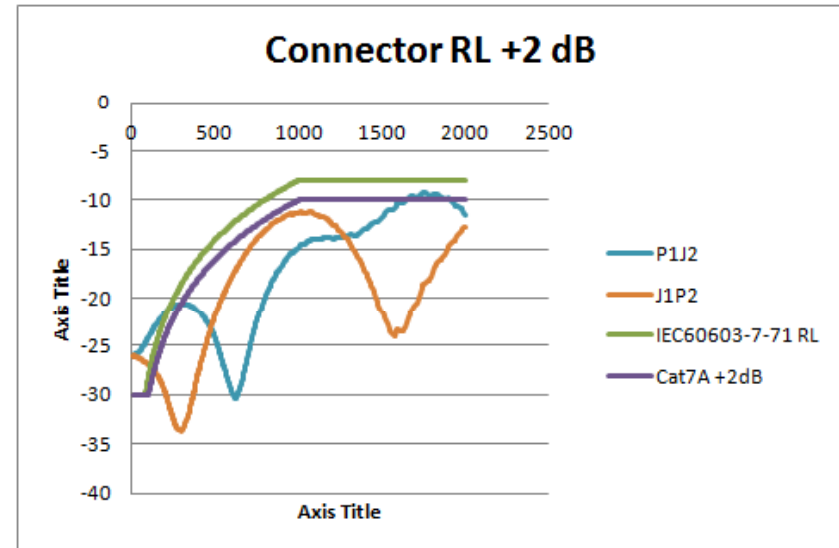
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IEEE P802.3bq 40GBASE-T Task Force
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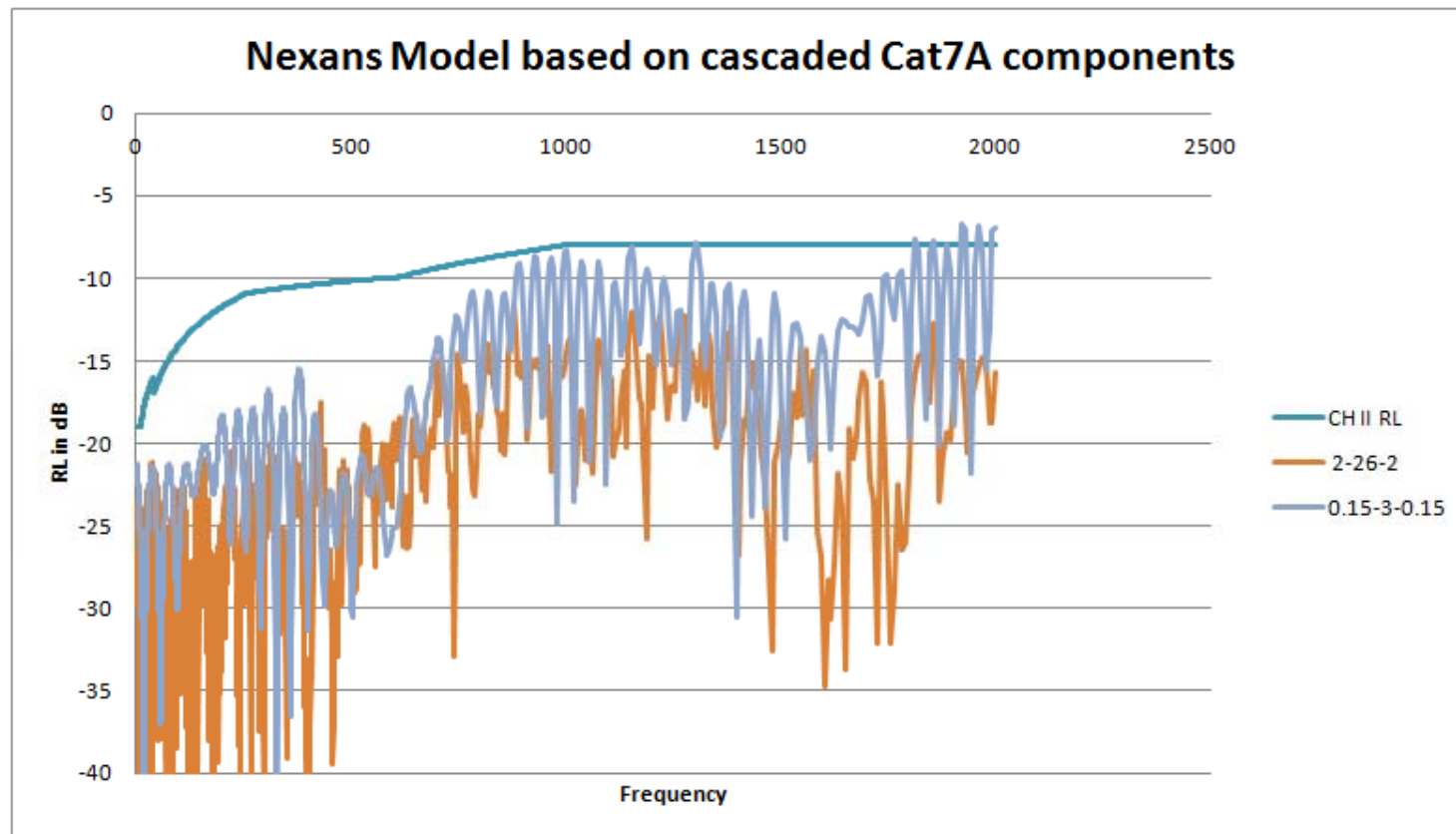
This presentation refers to proposed configurations of the cabling channel and the intended use of patch cords <1m. It will show that the use of short cords contradicts the target to improve channel RL and in opposite, with using longer cords there is an opportunity to increase RL specs > 8dB

- Modeling Results for various cord length
- Considerations about Cordage Length in DC and LAN
- Summary and Conclusion

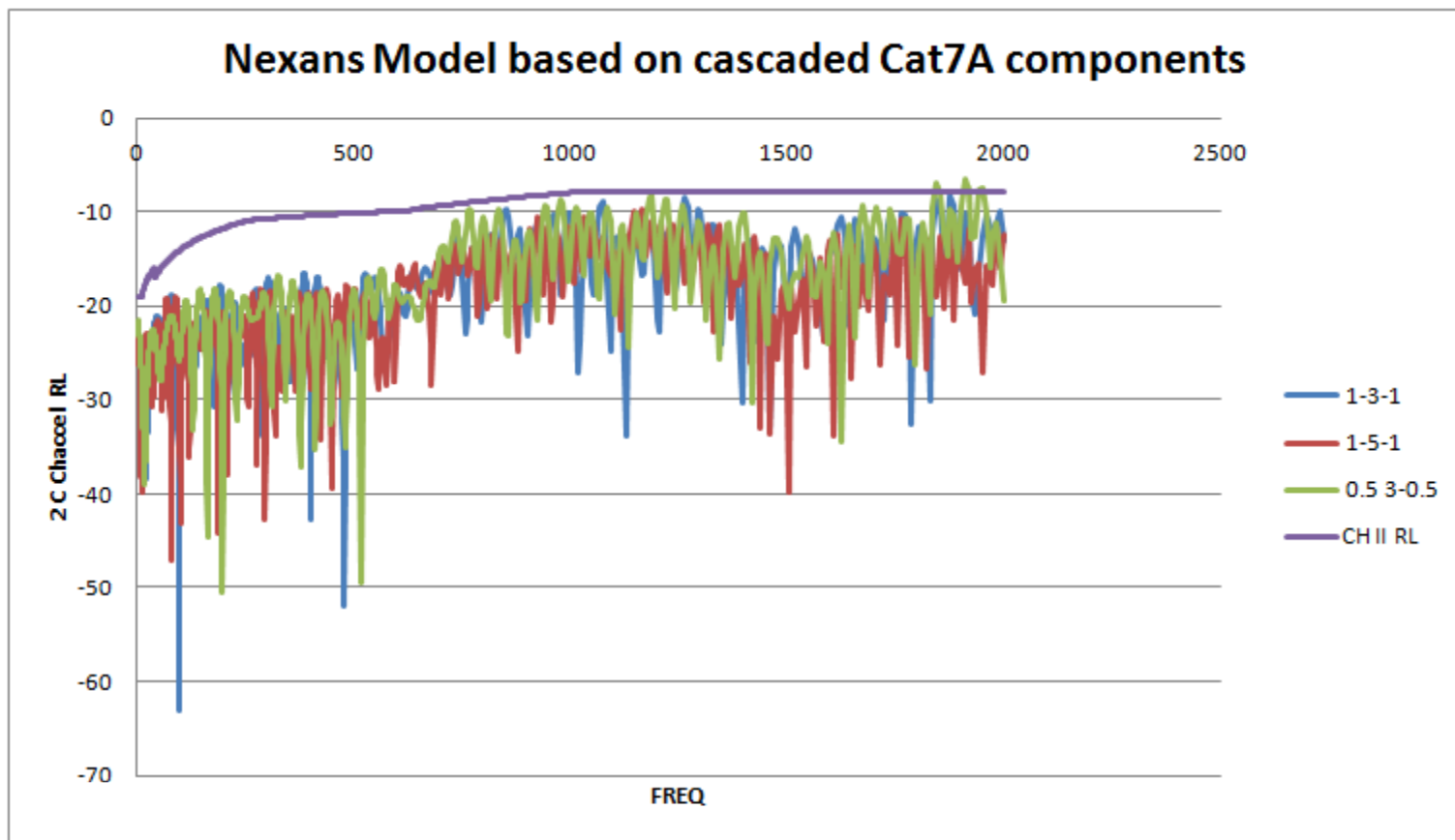
- Chained T-matrix model
 - w based on fitted Z_0 , propagation constant with cable in approx 2 cm elements with statistical Z_0 variation to match measured SRL
 - w measured differential mode IL/RL T-matrix for mated connector
 - w Horizontal cable : SFTP AWG22 1800 MHz rated
 - w Patch cable : SFTP 1500 MHz rated
 - w Slightly Improved Connector
 - Inline with recent TIA proposals for Cat.8 connector („10dB Connector“)



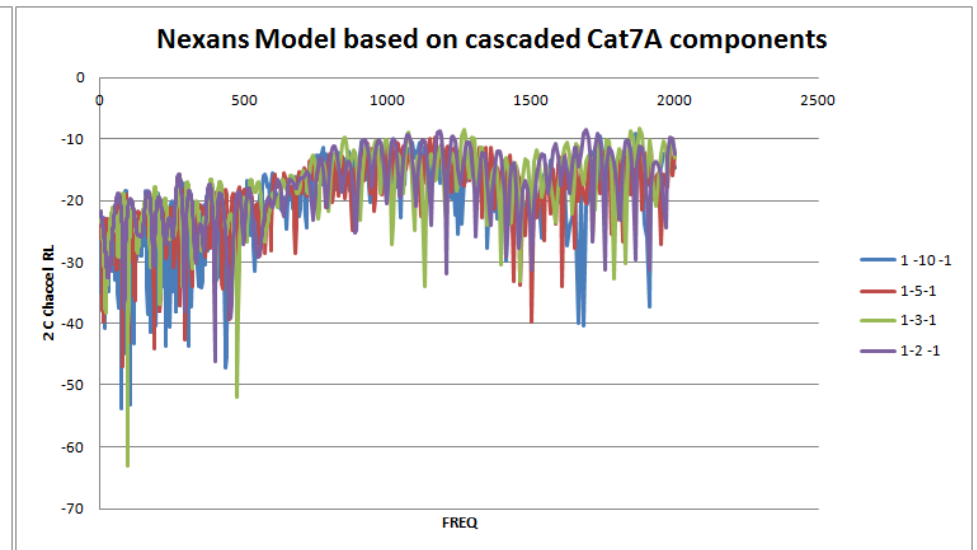
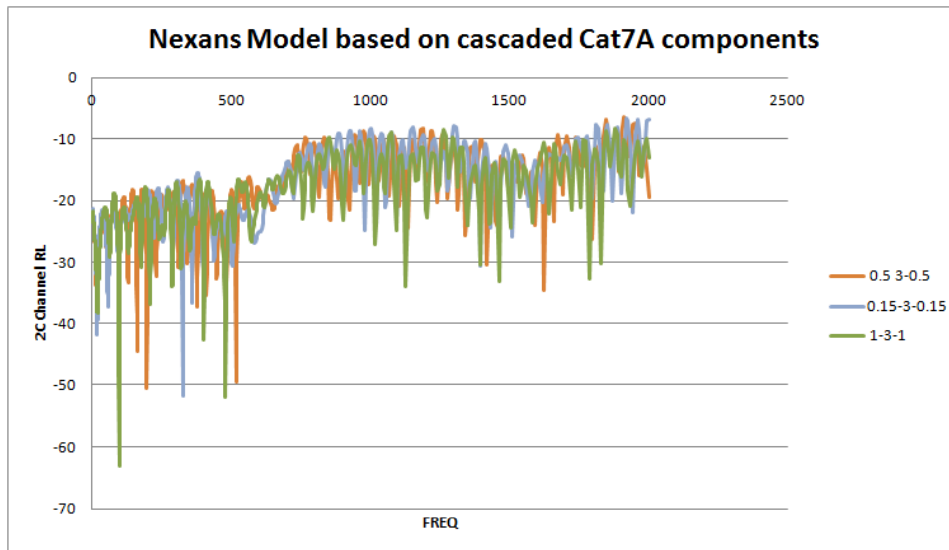
- Modeling shows large Spread (~ 3 dB) of Channel RL depending on Channel Configuration



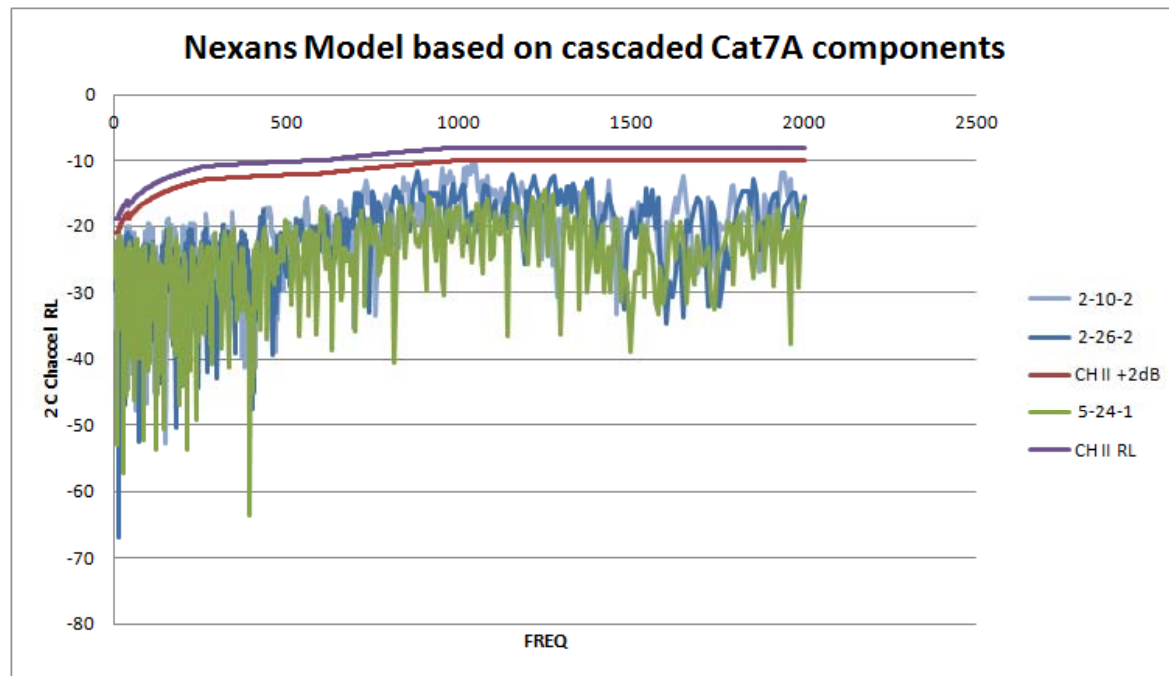
- Shorter Links with 1m cords pass
- Shorter Links with 0,5 meter cords slightly fail



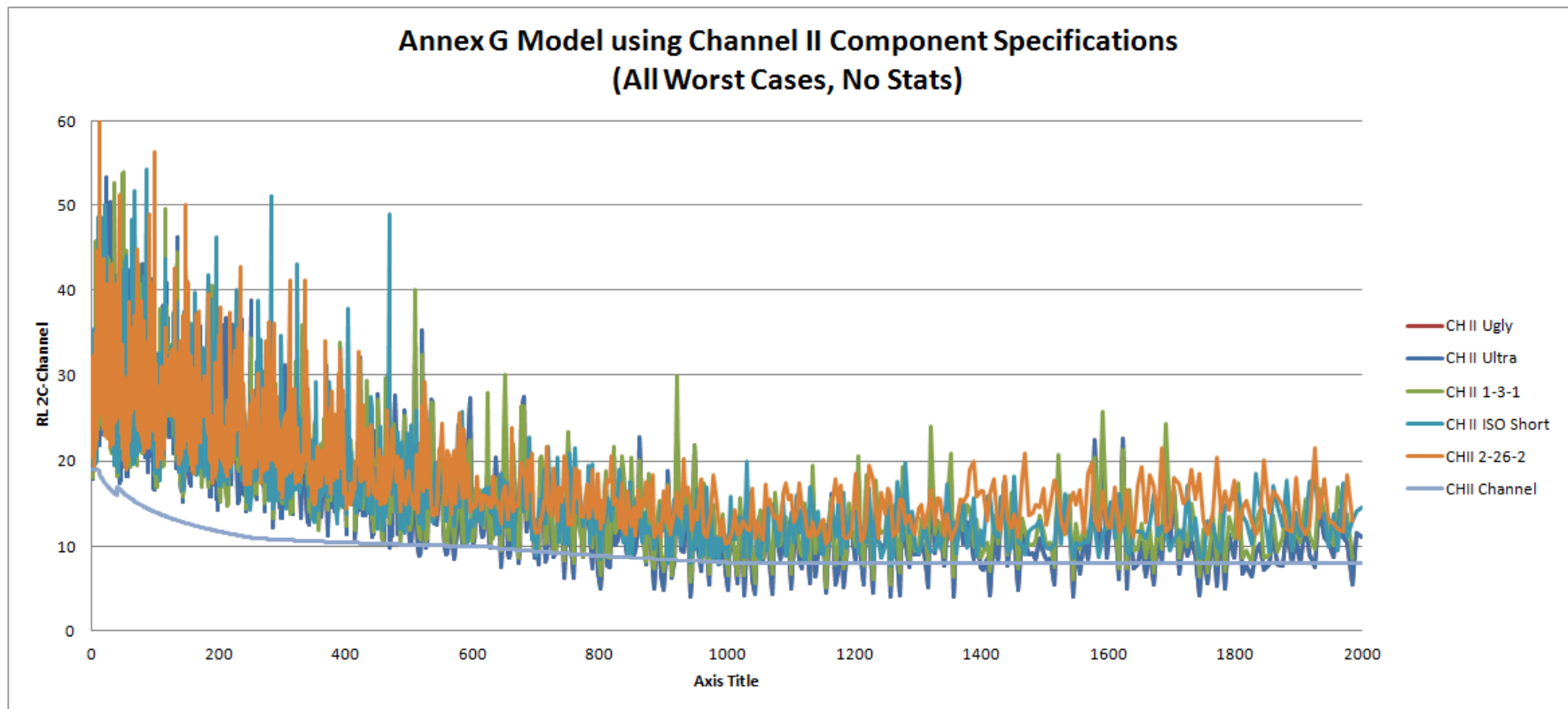
- Shorter Cords more difficult than shorter links
 - ✓ - 1 dB with very short links
 - ✓ - 2 dB with very short cords
 - ✓ Inline with former results shown during adhoc meetings



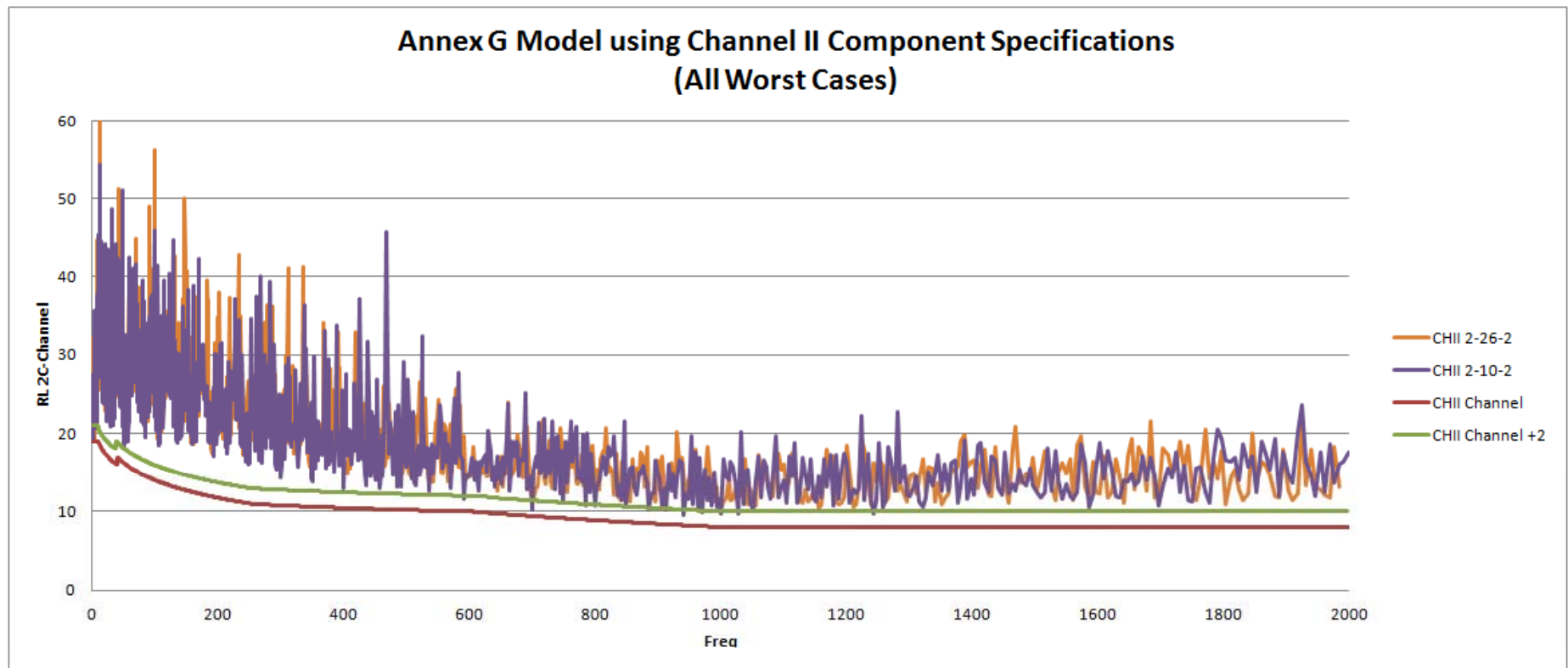
- Configuration Dependency works also in the other direction
- Increase of 2dB Channel RL possible if minimum length of cords is set to 2m



- Results from Matrix Model of Joint Modeling Task Group from ISO/IEC
- 1-10-1 OK to current spec, Shorter Links or shorter cords cause potential failures



- Confirms that + 2 dB in Channel RL feasible with a 10dB Connector

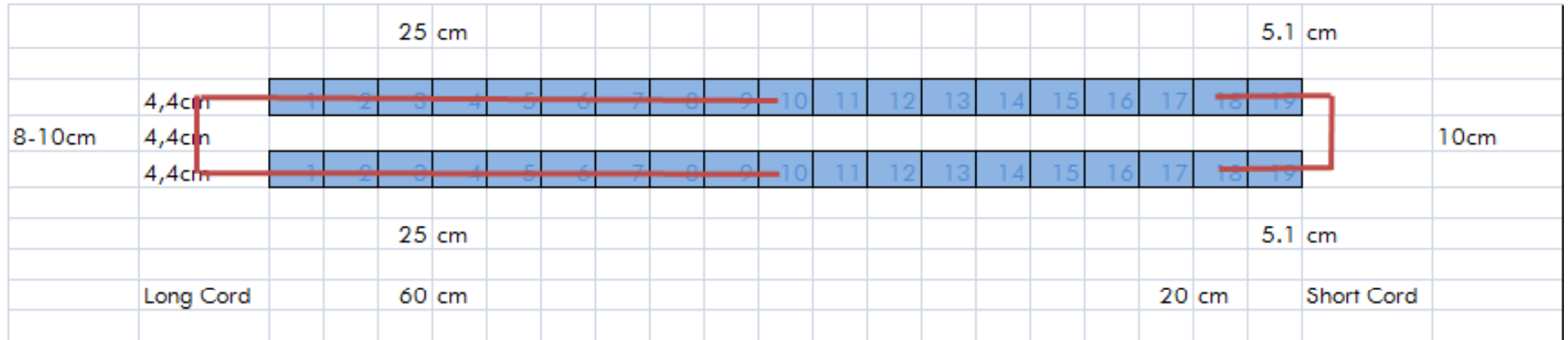


Improved „10dB connector“ allows to either

Use of short patch cords
in 2C Channels

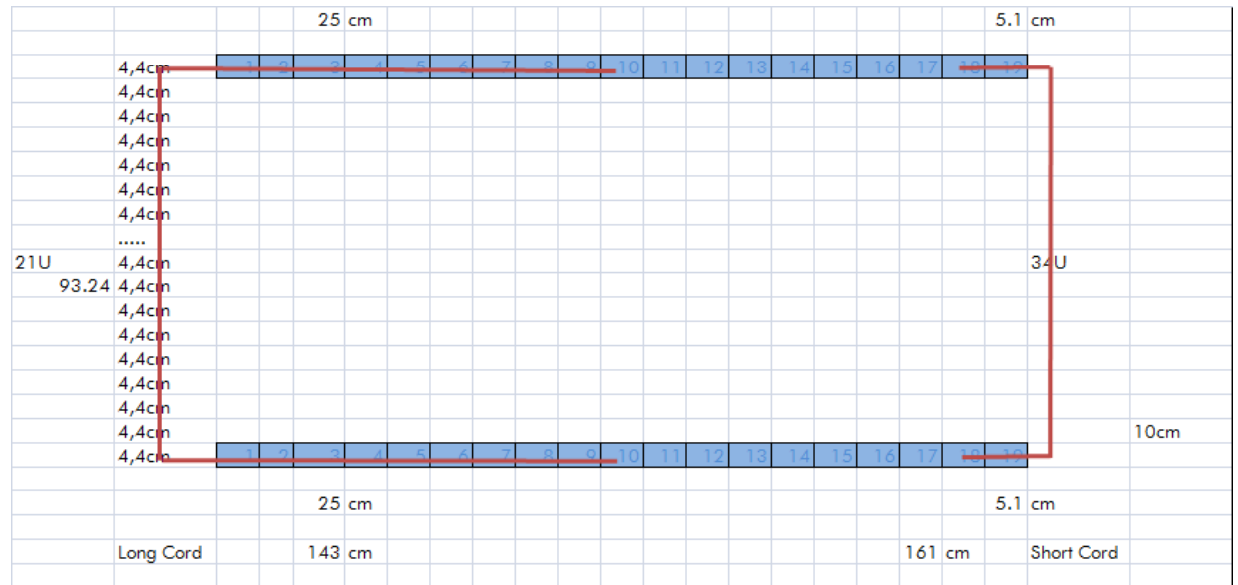
Increase of Channel RL by +2dB

- A 10dB Channel RL seems to be within reach for TIA Cat.8 / ISO Cat8.1 and ISO Cat.82 if no short cords are mandatory
- Can we mandate a „long“ 2m cord instead ?

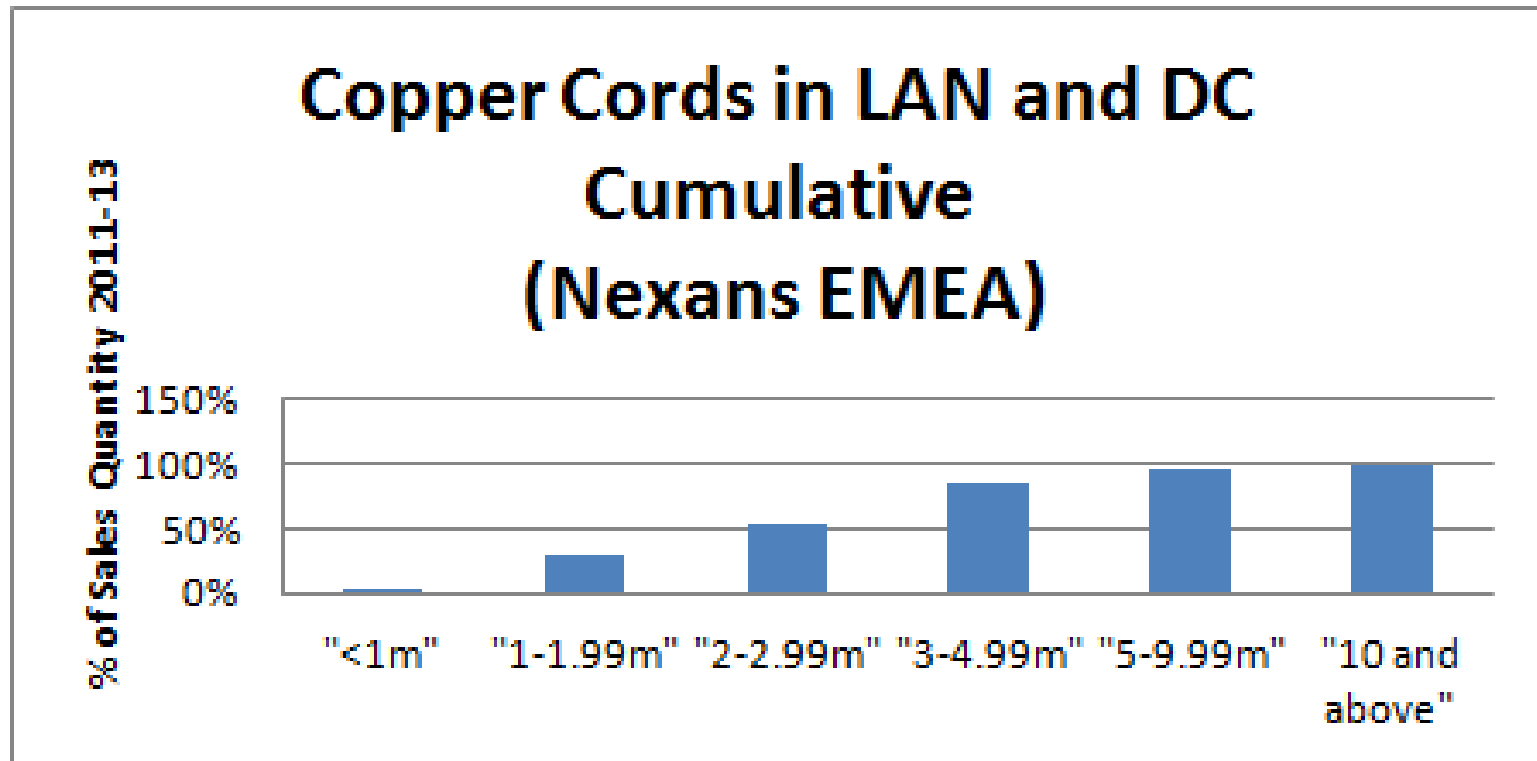


- Needed for patching „Top to Top“ or „Bottom to bottom“ inside one Rack

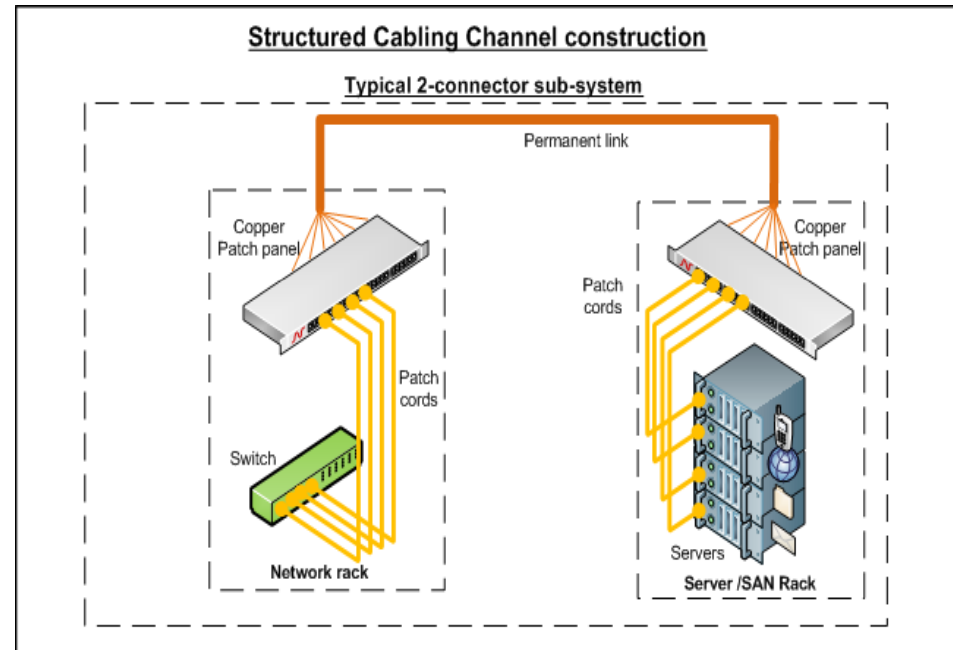
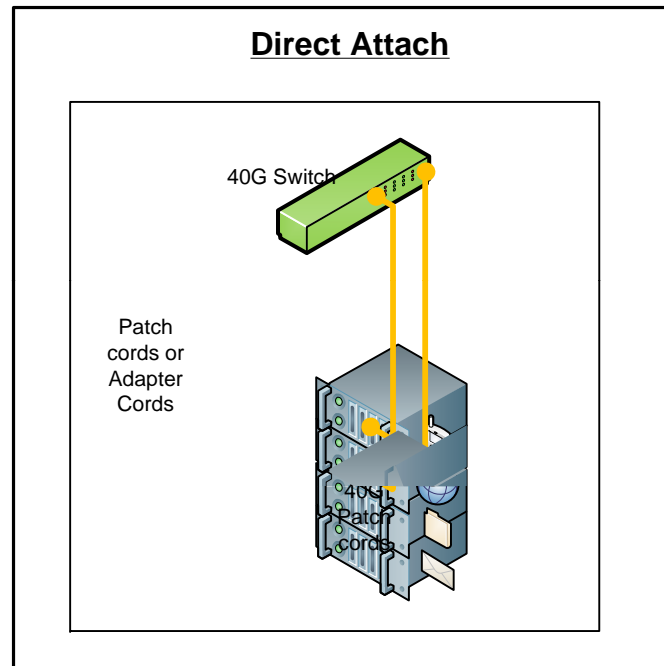
- ,Top to Middle‘ patching needs 1,5m



- ,Top to Bottom‘ patching in one rack needs 2m+ cords
- Common practise of inter-rack patching and ,Over Top of Rack‘ routing adds cord length



- „Direct Attach“ not included



- Short cords likely
- -20% of TOR market > 1m (see flatman_01a_1112.pdf)

- Usually longer cords in combination with cable mgt to cabinet side

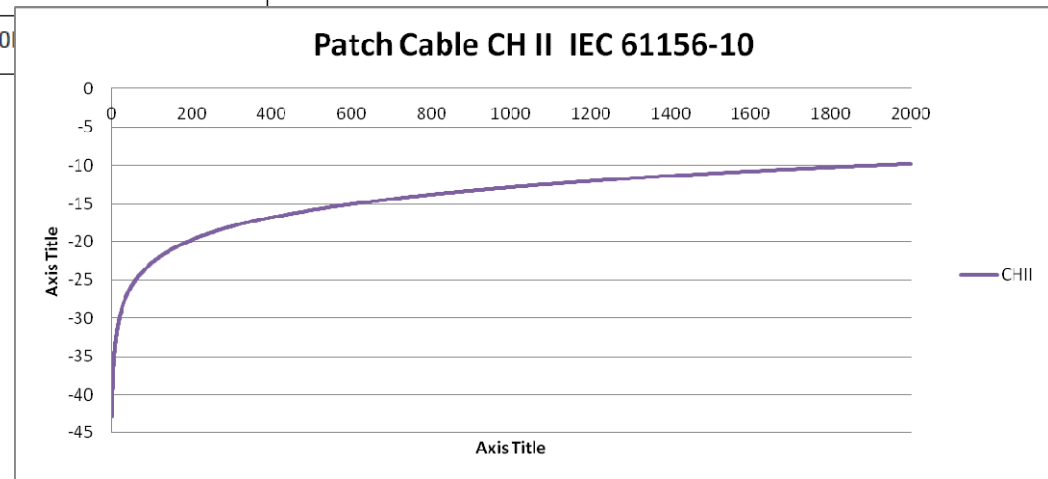
- Link segment consists of patch cable + MDI connection
- Return loss of cable better than 2 Connector Channel spec

6.3.11 Return loss (RL)

The minimum return loss of any pair in the frequency range indicated in Table 10 shall not be less than the values in Table 10 for the respective cable type.

Table 10 – RL requirements

Cable designation	Frequency range MHz	Requirement dB
Ca-I	500 – 1 600 (2 000 ffs.)	$25 - 7\log_{10}(f/40)$; f in MHz
Ca-II	1 000 – 1 600 (2 000 ffs.)	15.6 – 10



- RL less problematic for Direct Attach
 - w Top to Top patching could be addressed with direct attach only
- More Data needed about Cord Length Distribution within structured cabling in DC
- Get input on patch cord routing practices in DC
- Consider Technology Life cycle
 - w Using longer cords in beginning has already happened in Cat6 and Cat6A
 - w As technology matures, cordage length went down

- Decide first about required RL Performance to fully exploit energy savings and then decide about cord length supported
- Consider a minimum of 10dB Channel RL spec for the Link segment for PHY development
- Include 2-5-2 and 2-10-2 in configurations to be measured