NEXT can be Mitigated

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A reasonable worst case channel configuration for NEXT is with four connectors, four 1-meter patch cords (or zone wiring cords), and 15 meters of horizontal cabling. This brings the four connectors quite close to the near end. Although shorter patch cords, and shorter horizontal channels, are allowed, they are of limited utility, and also likely can be mitigated. The mitigation of this channel configuration provides evidence that longer channels can also be mitigated.

A model to predict channel NEXT from component NEXT has been developed by Henri Koeman. Industry experts have measured existing category 6 connectors, and developed a worst case performance guideline. Industry experts have used this worst case performance guideline, and the prediction model, to develop the NEXT relaxation proposal. The extrapolated and worst case connector performance, the cable requirement, and the extrapolated and relaxed NEXT, are shown in figure 1.

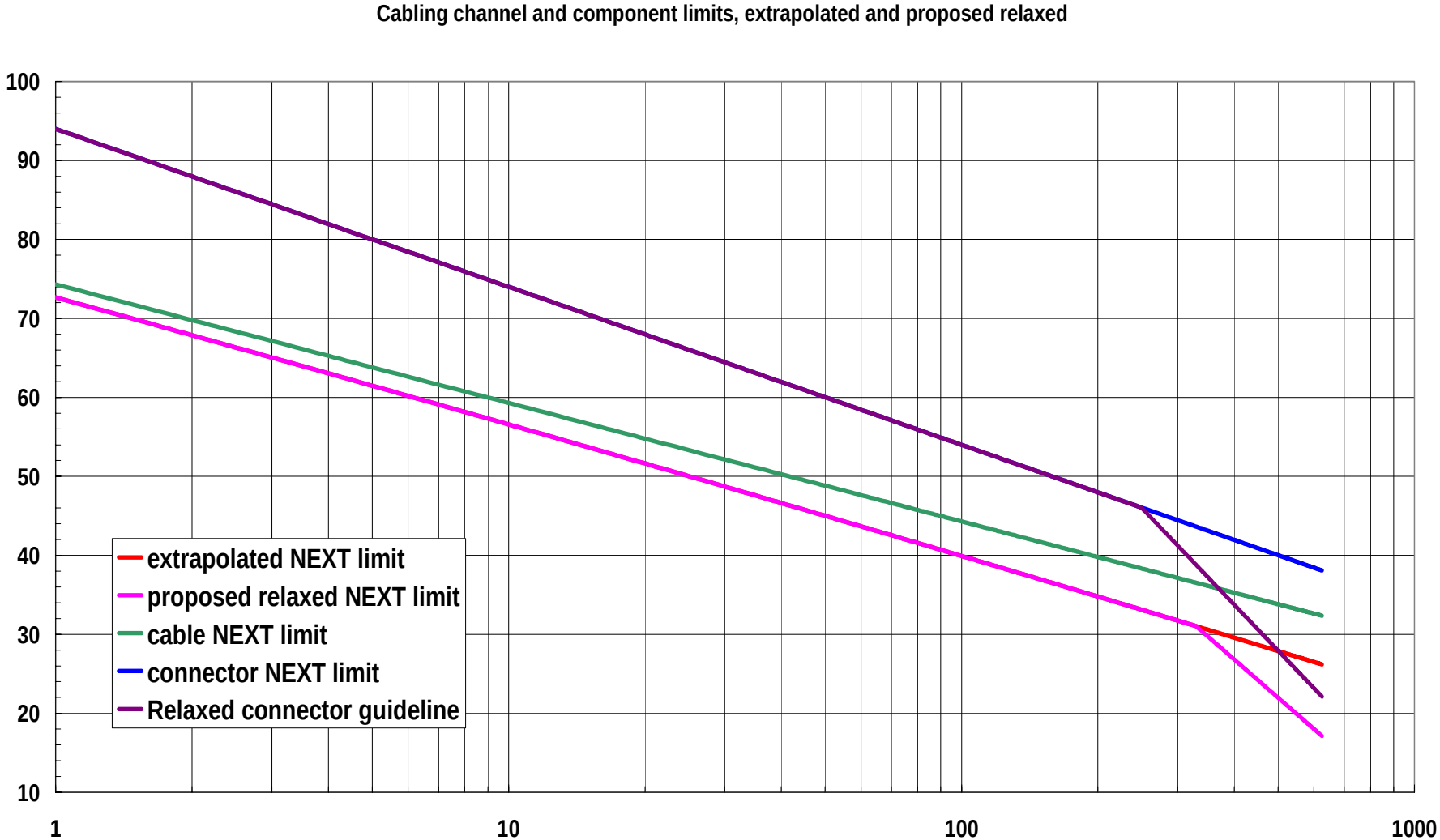

Figure 1: Channel and component NEXT requirements and proposals

The author used the accepted model to predict the worst case channel NEXT performance that would occur with the worst case channel configuration, with cable at the performance limit, and connectors at the worst case performance guideline. The results are just slightly better than the relaxed channel requirement proposal, which validates the technical work behind this proposal.

Then, the model was used to predict the performance if one connector and patch cord at each end were removed. This could be easily done by replacing the cross connect with an interconnect. The result was improved, but still short of the extrapolated NEXT limit. Finally, the model was used to predict the performance if the 1-meter patch cords were replaced by 5-meter patch cords at each end. In this case, the channel will pass the extrapolated limit. This result is shown in figure 2, with a close-up of the high frequency region in figure 3.

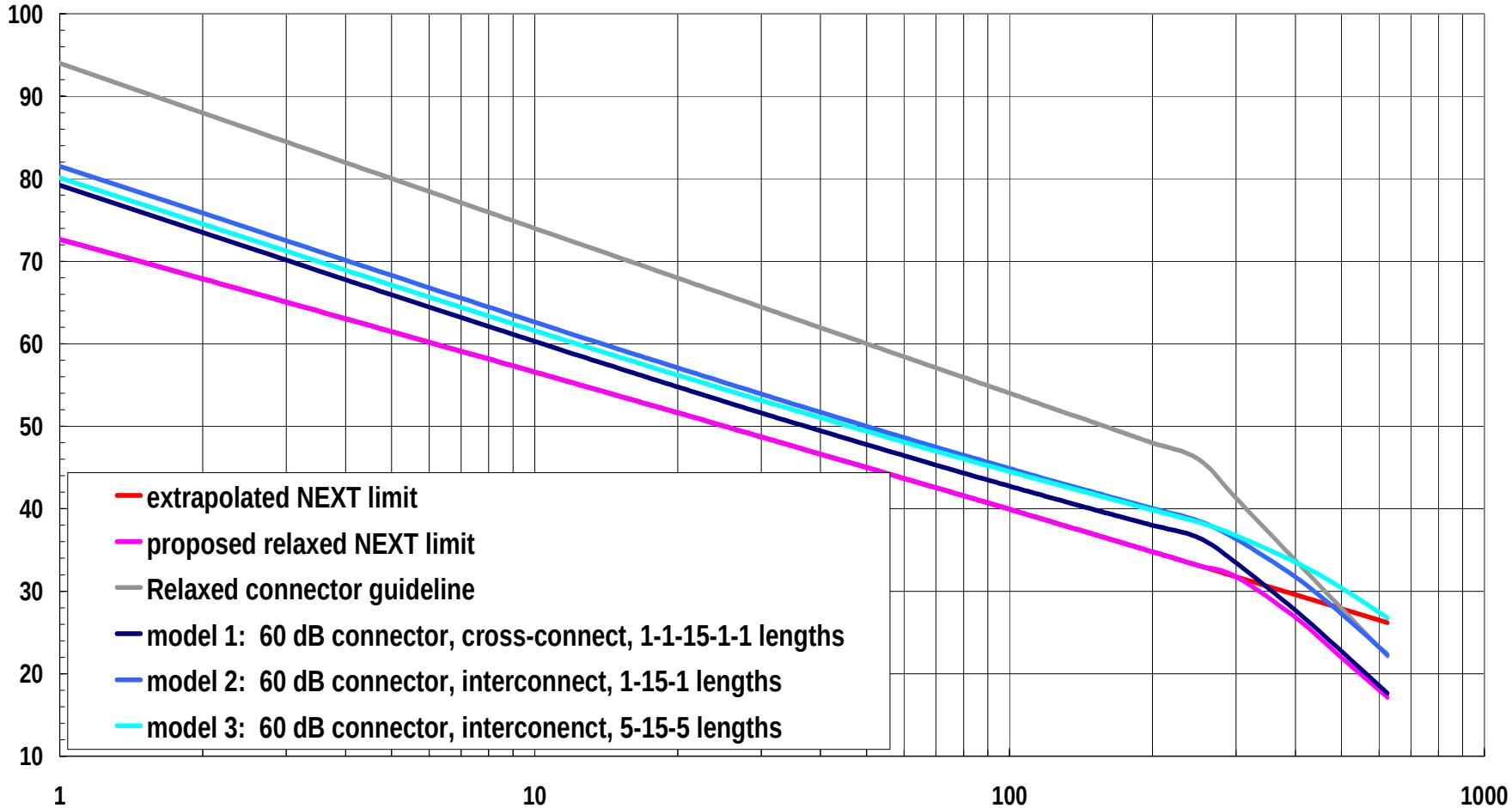

Figure 2: Modelling of NEXT mitigation

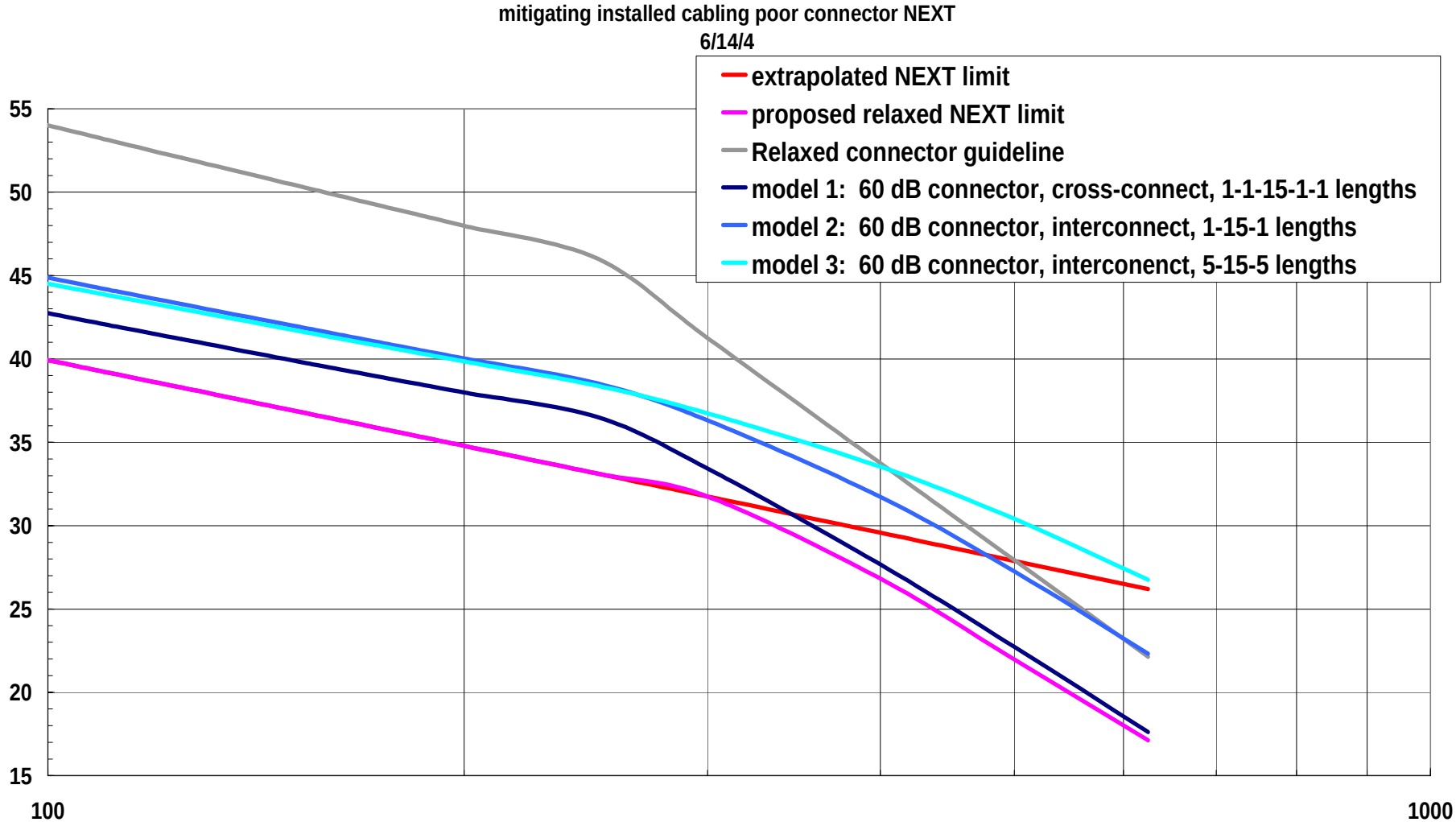

Figure 3: Modelling of NEXT mitigation

Next, channels were constructed according to these models. It was easy to find commercially available connectors that were similar to the worst case connector guideline. Most cable available seems to be quite a bit better than the minimum cable performance requirement. The data from the components used, along with the limit and guidelines, are shown in figure 4.

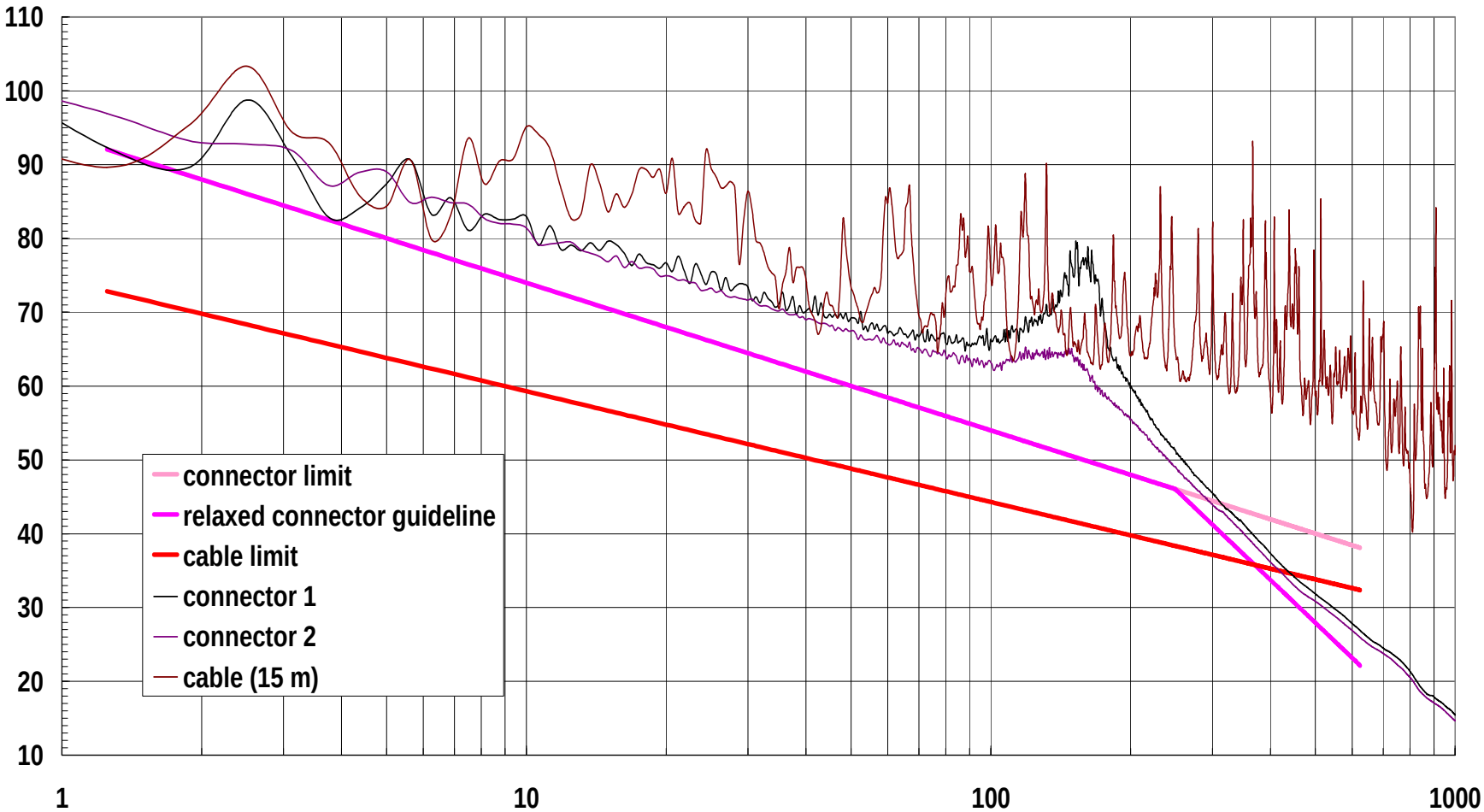

Figure 4: NEXT data on components used in mitigation experiment

Finally, these components were built into the three channel configurations that were modelled: A four connector channel with 15 meters of horizontal cable and 1 meter patch cords, a two connector channel as above, and a two connector channel as above but with 5 meter patch cords. The results are shown in figures 5 and 6.

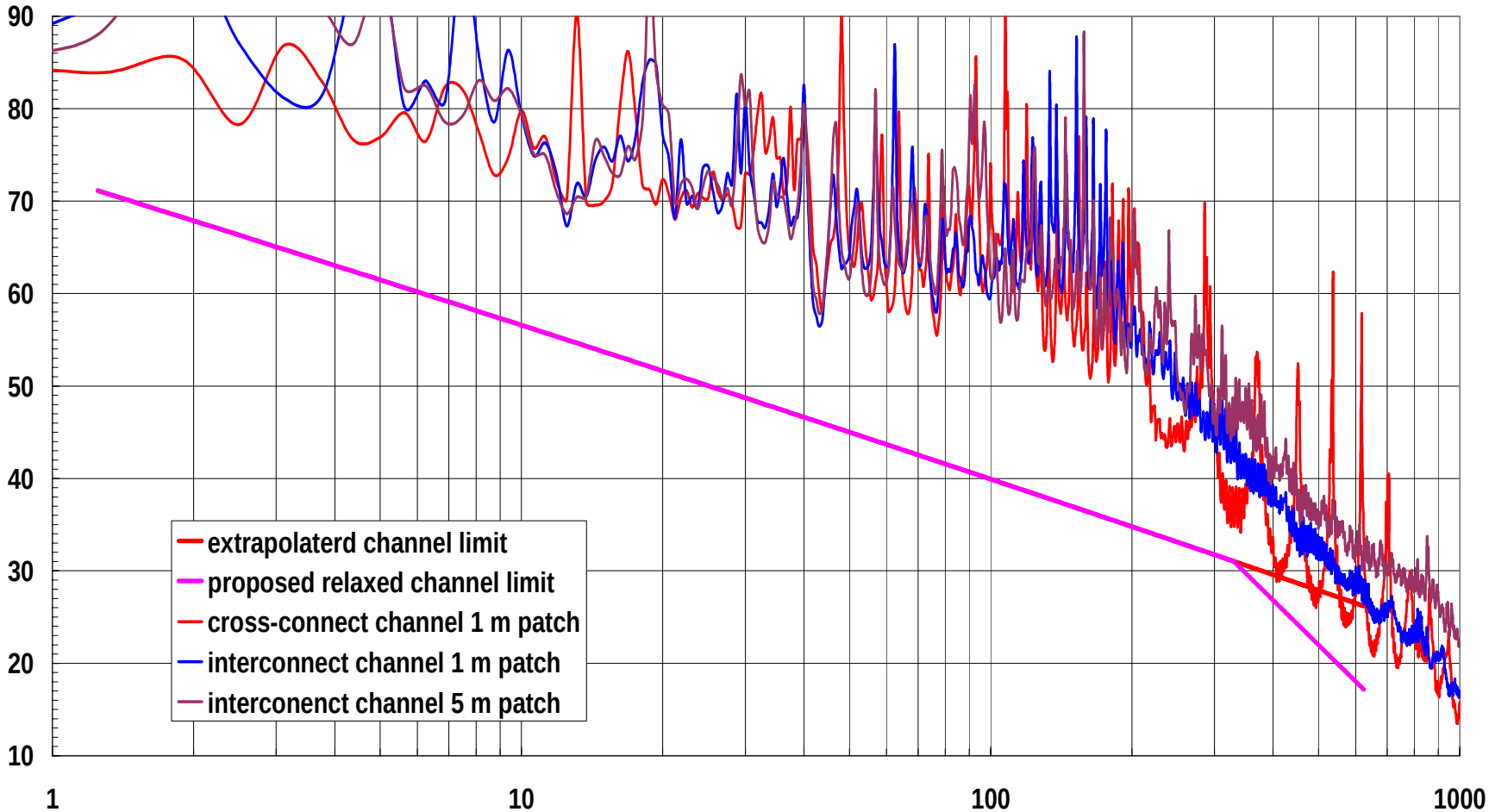

Figure 5: Channel data showing mitigation of poor NEXT

channel data, showing poor NEXT at high frequencies being mitigated

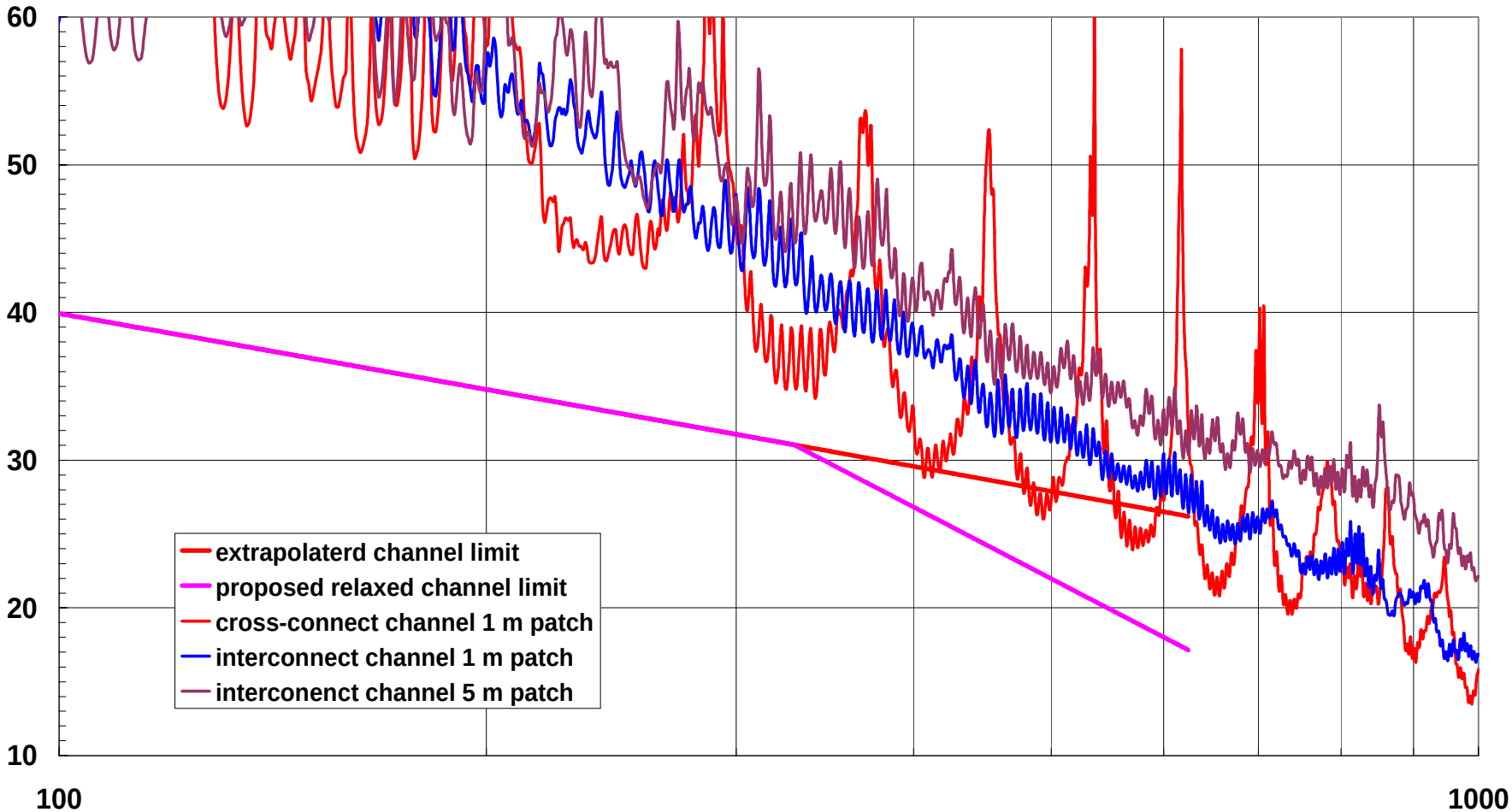

Figure 6: Channel data showing mitigation of poor NEXT

The performance is slightly better than predicted, likely due to the connectors being slightly better, and the cable being significantly better. But the trends are exactly as predicted by the modelling. In this case, the channel passes the extrapolated limit, with very little margin, after the cross connect is replaced with an interconnect. The longer patch cords cause the channel to pass with comfortable margin.

CONCLUSION

This particular case, poorly performing NEXT at high frequencies due to poorly performing connector NEXT at high frequencies, can be mitigated. It is likely that all poor performance conditions that will arise can be mitigated. The cabling industry should work together to find these poorly performing circumstances, and develop mitigation guidelines.

Cabling Summary

		TIA	ISO
Existing cabling	NEXT	Relaxed	Relaxed
	Insertion loss	Existing Class E	Existing Class E
	Return loss	Extrapolated with 6 dB trough	Extrapolated with 6 dB trough
New cabling	NEXT	Being worked	Extrapolated
	Insertion loss	Existing Class F	Existing Class F
	Return loss	Extrapolated with 6 dB trough	Extrapolated with 8 dB trough

Although I believe NEXT can be mitigated,
I think the ISO proposal should be adopted.