

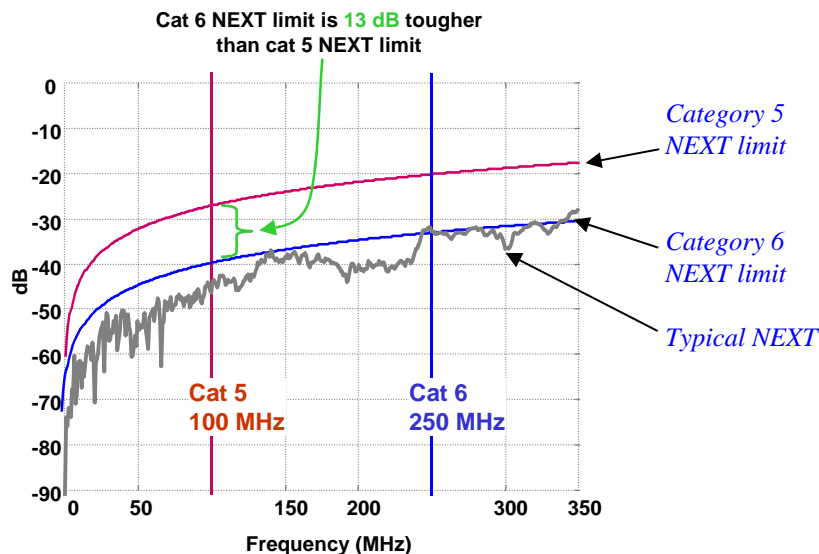


## Category 6 – The Ultimate Challenge

By Fanny Mlinarsky

Life was easy back in the category 5 days, although many of us did not think so back then. Today, faced with the challenges of category 6, all of us can appreciate the good old days. Why is certifying category 6 so much harder than certifying category 5? The simple answer is – the test limits got significantly stricter but the cabling technology is still catching up to these limits. The result? High failure rate on category 6 installations.

The limit for Near End Crosstalk (NEXT) is 13 dB tougher for category 6 than for category 5 (see figure).



*The NEXT limit for category 6 is 13 dB tougher than the NEXT limit for category 5. However NEXT itself is far from being 13 dB better. What's sacrificed is the certification margin, resulting in an increased rate of failures.*

The aggressive drive to raise the bar on category 6 test limits has sidetracked the fact that we are still using telephone style modular connectors originally designed for 4 kHz voice transmission. The geometry of these connectors makes it difficult to achieve 13 dB of improvement in the NEXT performance.

What's sacrificed is the test margin. In the good old days of category 5, most installations exhibited at least 10 dB of margin. With so much margin, it was hard to get a failing result – one had to really try. Installers used to tie knots in the cable and then wonder why links would still pass. Today, no one ties knots in category 6 cabling where typical margins are only 3 dB. Instead, we worry about bending the test cords, matching the test cords to the connecting hardware under test, carefully selecting components and tools, developing new installation rules, etc. And still, the failure rate is considerable – 10% to 20% on typical category 6 installations compared to less than 1% on typical category 5 installations.

On the surface, a 10% to 20% failure rate sounds like a significant problem. In all fairness, though, category 6 is a new draft specification that is still maturing. The margins on category 6 installations are steadily improving and the test methodology is evolving to solve common problems. Test tools, such as the WireScope 350, are also adapting improved measurement methodology. For example, the WireScope 350 now implements the new 3dB rule recently adapted by TIA and ISO (see the Agilent technology brief, "3dB Rule"). The 3dB rule makes it easier to pass category 6 installations because failures in the frequency range where attenuation is less than 3dB are not considered in the final test result. Furthermore, because the WireScope 350 saves plots, existing test records can be recertified with the 3dB rule, turning some failing links into passing links.

As many new technologies, category 6 will mature and stabilize over time. And then we will all be ready for new challenges of category 7 and will be fondly remembering the good old days of category 6.

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