A CommScope Solution

Uniprise™

Strength through integration

Total Solutions Verification

3rd Party Electrical Performance Testing

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Uniprise Solutions

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CommScope has always designed cables with connectivity in mind. Our engineers fully realize that cable is just one part of a total communications system, and that cable and connectivity components must fit and work well together to deliver on the promise of a high-bandwidth data communications system. This is why CommScope® cables (and their high margins in performance) bring out the best in many connectivity components. This is especially true for our Uniprise connectivity solutions.

Our stated aim is to produce solutions that exceed the operating standards for which they are designed. To accomplish this, our design engineers work closely with component manufacturers and installers and actively use their feedback in our product design and manufacturing.

Testing to exceed the standard

Popular standards (such as the EIA/TIA categories of twisted pair cable and components) define performance baselines, which are confirmed by independent testing firms such as Intertek ETL SEMKO or Underwriters Laboratories (UL). However, CommScope has developed test procedures that go well beyond the industry standards. For instance, industry standards require that every batch of cable be tested and the size of a batch cannot exceed 250,000 ft; CommScope tests in much smaller batches (about 1/5th of the industry standard maximum).

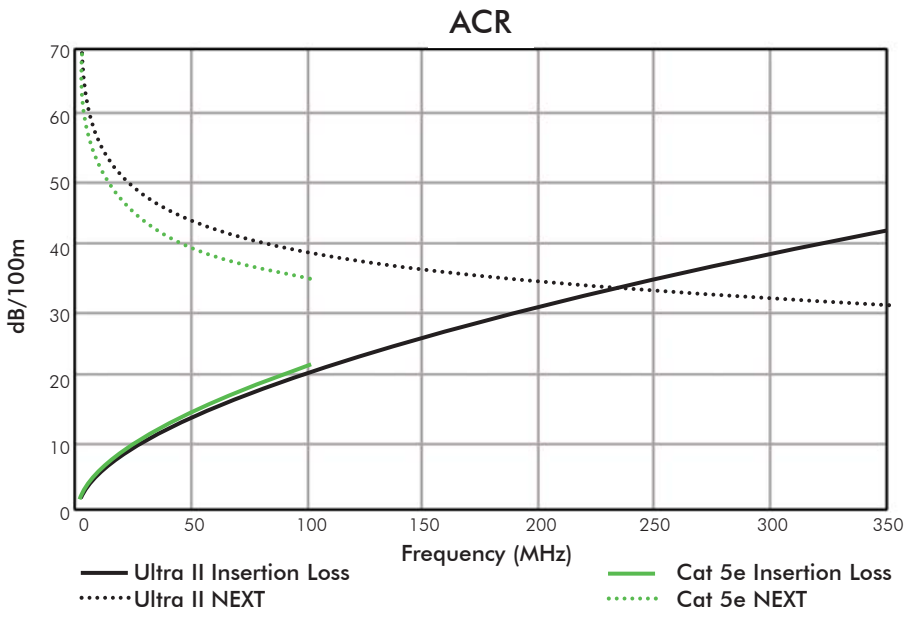
By using proprietary tools such as a customized SAS database that allows us to track and predict manufacturing trends, we continually improve our manufacturing processes so as to make a superior product every time. The WebTrak™ test reports we provide for our UTP products are a byproduct of this system.

WebTrak™ permits on-line access to detailed test data for most CommScope UTP cables. WebTrak identification numbers are printed on the jacket so they cannot be lost or misplaced. CommScope provides this as a free service; most other manufacturers, if they offer it at all, charge a fee for test reports.

Living up to the promise

Any cable manufacturer can claim that their products meet or exceed a standard, but CommScope was the first to prove it using 3rd party testing. In 2001, we created the "Cable Only Verification" program and contracted noted independent testing firm ETL SEMKO to verify that our cables meet not just standards, but advertised performance levels.

For example, our Ultra II® cable (part number 5504M/55N4R) is advertised as a Category 5e "plus" product with a bandwidth of 350 MHz. "Cable Only" Verification means that the cable is tested for attenuation (insertion loss), crosstalk (near end and far end, both pair-to-pair and powersum), and return loss, etc. up to 350 MHz, which is well above the 100 MHz standard.



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3rd Party Tested vs. 3rd Party Verified - What's the difference?

The term "3rd party" simply means someone other than the manufacturer or customer has evaluated the product. Technically, anyone with the right test equipment can test a cable or solution. However, preferred practice is to use a recognized testing laboratory such as ETL SEMKO or UL for 3rd party testing. Both ETL SEMKO and UL are certified by OSHA and are Nationally Recognized Test Laboratories (NRTLs).

There is, however, a very big difference between 3rd party tested and 3rd party verified. While 3rd party testing sounds like a thorough and independent evaluation, it is not as strict or as thorough as it sounds.

In 3rd party testing, the manufacturer selects the sample - *they* choose the product(s) (cable, connectors, or solution) to be tested, the size of the test sample and the specifications for which the product(s) will be tested. In the majority of cases, a product that is 3rd party tested is a single sample. Also, the test is performed once; there is no follow-up to see if the results are the same a few months later or even for a different 'batch.'

CommScope submits its solutions (cable and connectivity) for 3rd party verification. We call our version of this 'Total Solutions Verification' (TSV) and it is a much more stringent process than 3rd party testing, as noted in the table below.

Important facts to understand about products advertised as 3rd party tested:

- This is a One time test
- Sample selection criteria dictated by the manufacturer
- Sample size dictated by the manufacturer
- Test specification dictated by the manufacturer

Important facts to understand about products advertised as 3rd party verified:

- It is a Continuous Program
- Initial test samples may be supplied by the manufacturer
- Sample size dictated by the program (Total Solutions Verification (TSV) is 3 samples minimum)
- Test specification are dictated by the program (TSV uses the advertised Uniprise™ performance specifications)
- Audit of Manufacturing facility required
- Final testing is a repeat of the initial testing where all samples are independently selected
- Follow-up testing as dictated by the program (TSV is quarterly)
- Verification Certificates are only issued for products that pass all the testing criteria
- Use of Verified Logo is authorized for products or solutions that are issued a verification certificate.

The details of Total Solutions Verification

In TSV, the manufacturer may supply initial test samples, but ALL of the samples in the final testing will be randomly selected. TSV also dictates sample size and quantity (a minimum of three samples) and the test criteria (in the case of the CommScope Uniprise TSV the solutions are tested to the advertised Uniprise performance specifications).

Another important aspect of TSV is that it is ongoing. Along with an audit of the manufacturing facility, TSV calls for quarterly follow-up testing.

A verified solution is issued a verification certificate upon successful completion of both initial and final testing. Only solutions that are in a verification program are issued a certificate of conformance. ETL SEMKO, which performs verification for Uniprise solutions for CommScope, lists verification certificates in a product directory. Verification certificates may be found at the ETL SEMKO website at:

http://www.intertek-etlsemko.com/portal/page?_pageid=34,61337&_dad=cust_portal&_schema=CUST_PORTAL

The Uniprise TSV program is considered by many to be the most comprehensive 3rd party verification program in the industry today. This is because the TSV goes beyond testing the cable; it evaluates ten different "solutions" with material from no less than three different batches.

These solutions include two permanent link configurations:
2 Connector (TIA Permanent Link ISO/IEC CP) and
3 Connector (ISO/IEC Permanent Link)

and three channel configurations:
3 Connector,
4 Connector and
6 Connector

Each configuration is tested in a 'short' version (Approximately 30 meters) and a 'long' version (90 meters for permanent link and approximately 100 meters for channel). For a total of ten tested configurations.

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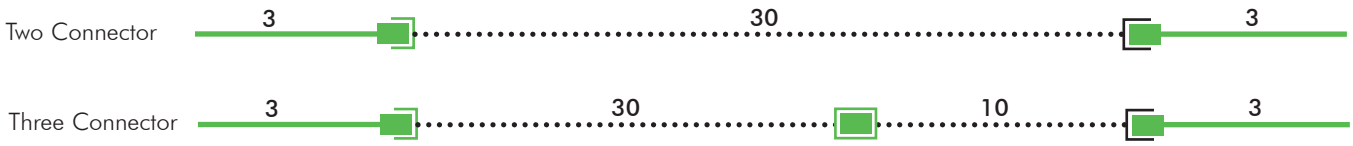
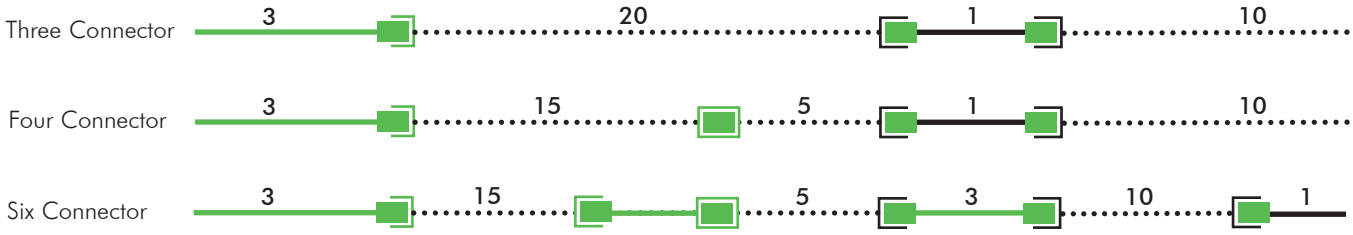
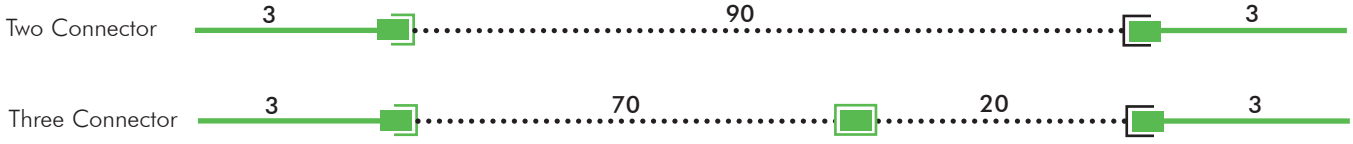
Short Permanent Link Configurations



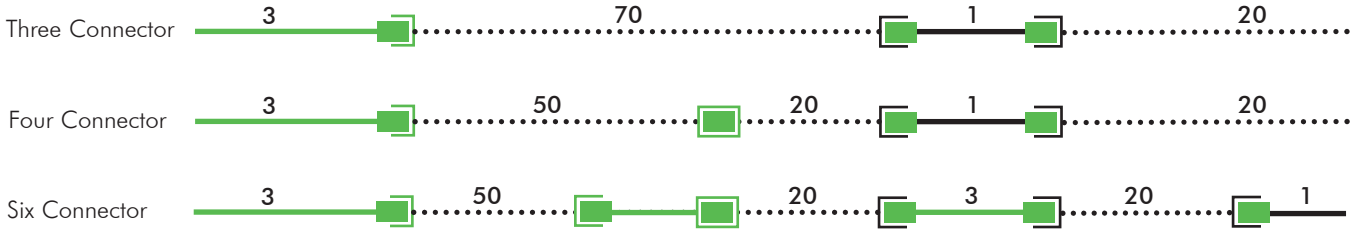
Short Channel Configurations



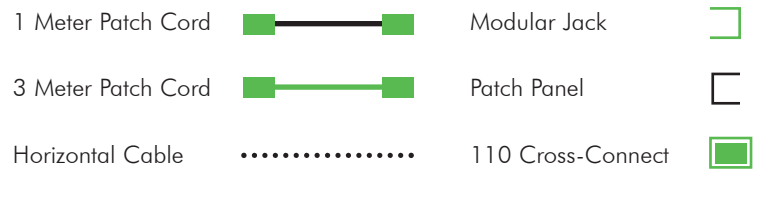
Long Permanent Link Configurations



Long Channel Configurations



Legend



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Thus, for a single product to be listed within the Uniprise TSV program, a total of 60 different tests (30 initial, 30 final) must be completed successfully. Additionally, to maintain a solution within the TSV program, ongoing quarterly testing is required.

In the initial testing phase, CommScope sends samples to ETL SEMKO for testing according to the CommScope Program Procedural Guide and reports the results to CommScope.

But in the final and quarterly testing phases, ETL SEMKO randomly selects the samples from either CommScope manufacturing facilities or their distributors and tests them according to the CommScope Program Procedural Guide. ETL SEMKO then reports the results to CommScope.

TSV Procedure

Initial Testing

- This is a One time test
- CommScope Sends Samples to ETL SEMKO for Testing
- ETL SEMKO Tests Samples according to the CommScope Program Procedural Guide
- ETL SEMKO Reports Back to CommScope Pass/Fail

Final & Quarterly Testing

- ETL SEMKO Selects Samples Independently From either CommScope facilities or distribution and Isolates them
- ETL SEMKO Sends Samples Back to The Lab
- ETL SEMKO Tests Samples according to the CommScope Program Procedural Guide
- ETL SEMKO Reports Back to CommScope Pass/Fail

Category 5e Solutions

DataPipe™ Category 5e Solution
Category 5e was developed for simultaneous bi-directional transmission over 4-pairs. Improvements to Category 5 were made and additional electrical requirements such as power sum NEXT, equal level far-end crosstalk, power sum equal level far-end crosstalk, and return loss were added to create the 5e specification. Typical applications include encoding schemes such as 10BaseT and 100BaseT

DataPipe

	100 MHz	Margin to Cat 5e
Insertion Loss	23.5 dB	2%
NEXT	32.1 dB	2.0 dB
Power Sum NEXT	29.1 dB	2.0 dB
ACR	8.6 dB	2.5 dB
Power Sum ACR	5.6 dB	2.5 dB
ELFEXT	19.4 dB	2.0 dB
Power Sum ELFEXT	16.4 dB	2.0 dB
Return Loss	12.0 dB	2.0 dB

Ultra II™ Category 5e "PLUS" Solution
The Ultra II family was designed with the future in mind. An Enhanced Category 5e UTP solution that provides guaranteed "headroom" over today's current 5e standards. Ultra II incorporated superior isolation and return loss with low insertion loss and <15ns in Delay Skew. Typical applications include high-speed digital voice and data such as gigabit Ethernet and 155/622 Mb/s ATM.

Ultra II

	100 MHz	155 MHz	Margin to Cat 5e
Insertion Loss	22.1 dB	28.2 dB	8%
NEXT	34.1 dB	30.8 dB	4.0 dB
Power Sum NEXT	32.6 dB	29.3 dB	5.5 dB
ACR	12.0 dB	2.6 dB	5.9 dB
Power Sum ACR	10.5 dB	1.1 dB	7.4 dB
ELFEXT	22.9 dB	19.1 dB	5.5 dB
Power Sum ELFEXT	19.9 dB	16.1 dB	5.5 dB
Return Loss	13.0 dB	11.1 dB	3.0 dB

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Category 6 Solutions

UltraMedia™ Category 6e Solution
UltraMedia is designed to exceed all Category 6 requirements for high-speed, full-duplex parallel transmission protocols. The revolutionary patented IsolatorTM maximizes pair separation and minimizes pair motion resulting in superior NEXT, ELFEXT, and RL performance. Typical applications include high-speed digital voice, video and data, such as 3D imaging, broadband video, gigabit Ethernet, and 155/622Mb/s ATM.

UltraPipe™ Category 6E Solution
UltraPipe is the next evolution in unshielded twisted pair products and exceeds Category 6 specifications. UltraPipe provides superior bandwidth performance to support broadband video, high-speed, full duplex transmission protocols, 3D imaging, gigabit Ethernet, and 155/622Mb/s ATM.

UltraMedia

	100 MHz	200 MHz	250 MHz	Margin to Cat 6
Insertion Loss	20.2 dB	29.9 dB	34.1 dB	5%
NEXT	41.9 dB	36.8 dB	35.1 dB	2.0 dB
Power Sum NEXT	41.1 dB	35.9 dB	34.2 dB	4.0 dB
ACR	21.7 dB	6.9 dB	1.0 dB	3.8 dB
Power Sum ACR	20.9 dB	6.0 dB	0.1 dB	5.8 dB
ELFEXT	27.3 dB	21.2 dB	19.3 dB	4.0 dB
Power Sum ELFEXT	27.3 dB	21.2 dB	19.3 dB	7.0 dB
Return Loss	15.0 dB	12.0 dB	11.0 dB	3.0 dB

UltraPipe

	100 MHz	200 MHz	250 MHz	Margin to Cat 6
Insertion Loss	19.6 dB	29.0 dB	33.0 dB	8%
NEXT	42.9 dB	37.8 dB	36.1 dB	3.0 dB
Power Sum NEXT	42.1 dB	36.9 dB	35.2 dB	5.0 dB
ACR	23.3 dB	8.8 dB	3.1 dB	5.9 dB
Power Sum ACR	22.5 dB	7.9 dB	2.2 dB	7.9 dB
ELFEXT	29.3 dB	23.2 dB	21.3 dB	6.0 dB
Power Sum ELFEXT	27.3 dB	21.2 dB	19.3 dB	7.0 dB
Return Loss	16.0 dB	13.0 dB	12.0 dB	4.0 dB

04/05