

# Speaking terms

Lisa Schwartz of AEM explains the meaning of verification, qualification and certification, and why understanding the differences between them is vital when testing copper cabling systems

**▶** In the world of structured cabling, terms like verification, qualification, certification and the emerging category of qualification+ are frequently encountered. Unfortunately, many don't fully understand the differences between each cable test category, which can lead to lost time and money on a job if the right type of testing isn't performed. Whether you're a cable contractor or a network operator in need of cabling installation, it is imperative to comprehend these distinctions and when to apply them.

## CABLE VERIFICATION

When a cabling project undergoes verification by an installer or network support operator, this represents the most basic level of cable assurance testing. The tests conducted aim to confirm that the cables are correctly connected from one

end to the other. This entails verifying that all the wires in a copper cable have been properly punched down or crimped to their

designated termination points, and that the overall length of the cable run falls within acceptable limits.

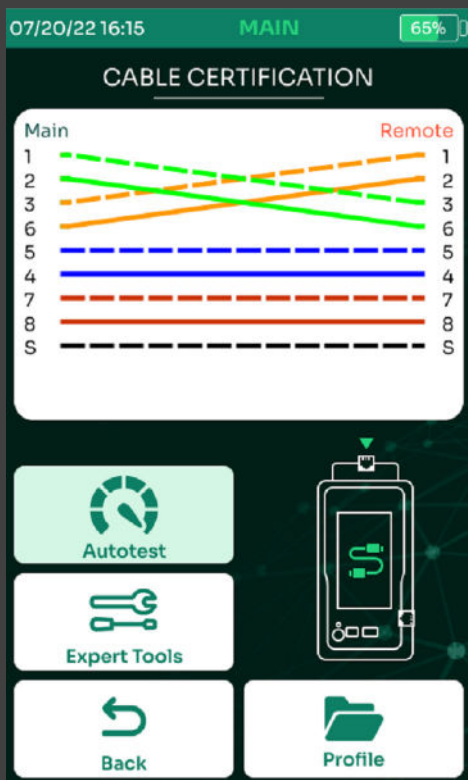
Common issues identified during cable verification tests include incorrectly terminated wires, cable breaks or shorts, and cable lengths that exceed specified maximums. However, in most instances, simple verification tests do not suffice to deem the cabling as production ready and would not qualify for any warranty offered by the cable manufacturer.

## CABLE QUALIFICATION

The next cable validation category is qualification. This level of testing

performs all the basics performed when verifying cables – and expands on them with additional tests.

The purpose for the additional series of tests is to confirm that the cables will operate properly when running at certain speeds or when transporting time sensitive data such as streaming video. These tests may

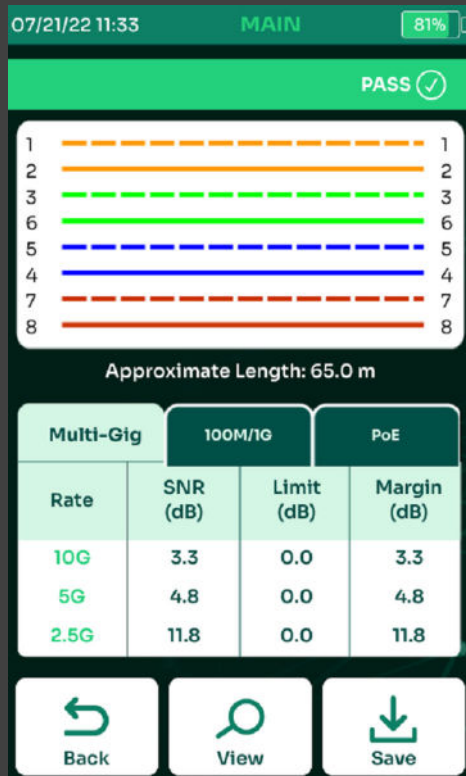


include validation of throughput capacity up to multigigabit speeds, streaming data performance and power over Ethernet (PoE) detection. Potential cabling issues that can be discovered during qualification testing include duplex mismatches, crosstalk, noise and basic PoE issues. Most qualification testers will be able to test Ethernet links at 10Mb/s, 100Mb/s and 1Gb/s.

While cable qualification tests can be used as a lower cost method for non-critical cable installations, they will not meet the test standards required to apply a cabling manufacturer's warranty to the job. That's why most cabling projects include full cable certification testing as part of the plant install process. Instead, qualification level tests are more applicable when troubleshooting existing cabling.

### CABLE QUALIFICATION+

A relatively new cable test category is called qualification+. Testers that are qualification+ capable are a bit different from other test tools. These should be thought of as hybrid tools that bridge the gap between network connectivity and standards based testing tools. This is because the added features of a qualification+ tester are primarily geared



toward IT shops that require a tool for in-depth troubleshooting – or to verify that next generation PoE and multigigabit projects will operate correctly on existing cable runs.

A qualification+ test tool provides ANSI/TIA 1152-A compliant single ended test results that are close to what full cable certification testers can provide. Additionally, as businesses evolve and begin adding various smart building/ internet of things (IoT) capabilities on to their networks, a qualification+ tester

helps ensure these high bandwidth, high PoE consumption devices will operate on existing cable runs. These types of tests will help assure the success of new IoT or smart building projects.

### CABLE CERTIFICATION

At the top of the cable test validation category list from a cable installer perspective are tests that guarantee all installed cabling and terminations meet the cabling manufacturer's strict specifications. Doing so will grant the customer a manufacturer's warranty for the newly completed plant.

Certification test tools not only give you all the testing and troubleshooting features found in cable verification and qualification

‘Certification test tools not only give you all the testing and troubleshooting features found in cable verification and qualification tools, but they also add sophisticated RF measurement tests that ensure cabling meets industry and manufacturer standards for multiple types of deployments.’

tools, but they also add sophisticated radio frequency (RF) measurement tests that ensure cabling meets industry and manufacturer standards for multiple types of deployments. All certification test results can be saved and shared with the manufacturer and customer for their records. These test results can also be submitted to the cabling manufacturer for review and warranty.

## BENEFITS AND DRAWBACKS

For professional cable installers, a certification test tool is by far the most obvious choice when looking at the various cable test categories. Certification tests are required to satisfy the manufacturer’s cable warranty from an installation perspective. But for those that only install a handful of cables per year, a validation or qualification test tool may be a more economical option.

Finally, when it comes to IT shops that are seeking a tool for troubleshooting and/or network performance planning purposes, verification testers perform very basic troubleshooting tests, while qualification and qualification+ testers offer additional troubleshooting, PoE/multigigabit performance validation and detailed standards compliant measurements.

## PREMISES CABLING STANDARDS

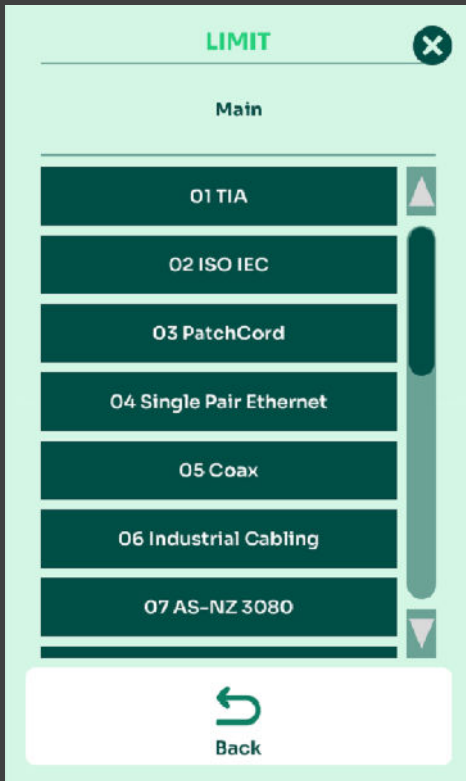
In most parts of the world, four pair twisted pair copper cabling for telecommunications and data networks follows either the TIA-568.2-D or ISO/

IEC 11801-1 specifications. These standards define the requirements for structured cabling systems including the electrical and performance characteristics of the cabling components. These standards are essential for maintaining the quality and compatibility of cabling systems in a rapidly evolving technological landscape. They are a cornerstone for businesses and organisations seeking to implement or upgrade network infrastructure, particularly in the context of smart buildings and emerging technologies.

The inclusion of both required and optional test parameters in standards like TIA-568.2-D and ISO/IEC 11801-1 is crucial for addressing the evolving needs of modern network infrastructures, particularly in the context of smart building applications. Here’s a more detailed explanation of the significance of these test parameters and why you should include both the required and optional test parameters as part of your documented certification testing:

### • Required test parameters

These are the essential parameters that must be tested and met to ensure the basic functionality and performance of the cabling system. They are the minimum criteria that the cabling must meet to be considered compliant with the standard. Required test parameters typically include factors like signal attenuation, near end crosstalk (NEXT) and return loss, among



others. Meeting these parameters ensures the cabling's ability to transmit data with reliability.

#### • Optional test parameters

As technology and applications evolve, optional test parameters are introduced to address specific demands and challenges that may arise in advanced use cases. In the context of smart building applications such as digital lighting, security systems, wireless access points and IoT technologies, optional parameters become particularly relevant. These parameters may include characteristics like power delivery, resistance to interference and compatibility with PoE. Ensuring that cabling meets these optional parameters is essential for guaranteeing its ability to support these

advanced applications effectively and without performance degradation.

#### SUPPORT STRUCTURE

Including both required and optional test parameters ensures that cabling can serve a broad range of applications – from basic data transmission to power delivery for devices like IP cameras, access points and lighting systems. This adaptability is critical in the dynamic landscape of modern smart buildings, where a single network infrastructure supports a diverse array of services and technologies. ■



#### LISA SCHWARTZ

Lisa Schwartz is director of product marketing at AEM. She has worked in the test and measurement industry for 31 years, spanning five major brands of test equipment for cable certification and network connectivity testing. The primary capacities Schwartz has served in have been product management, business development and marketing. In her current role at AEM, she oversees product marketing, working closely with sales and engineering to ensure AEM's test solutions are competitive and innovative.