Ethernet Alliance Gen 2 PoE Certification

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Executive Summary

The newest IEEE Power over Ethernet (PoE) standard—IEEE 802.3bt™, *IEEE Standard for Ethernet - Amendment 2: Power over Ethernet over 4 Pairs*—substantially increased the robustness and efficiency of the technique for passing electrical power along with data on Ethernet cabling. All four pairs in the specified structured wiring plant are utilized in IEEE 802.3bt, delivering the boost in maximum power. Plus, a host of inventive features are introduced by the standard, achieving key gains in efficiency. In addition, more Classes and Types of power sourcing equipment (PSE), such as the switches and hubs which provide power, and powered devices (PDs), such as end stations which consume it, are defined.

The combination of enhancements greatly expands the potential PoE application space, and, indeed, a slew of new products are arriving on the market. Because the market impact is so profound and because the standard introduces so many new features and capabilities (and was ratified only last year), the Ethernet ecosystem urgently needs a dependable, globally respected testing resource to help eliminate market confusion between IEEE 802.3-based PoE solutions and proprietary powering systems, minimize interoperability issues and fuel a positive user experience.

The Ethernet Alliance is introducing the Ethernet Alliance Gen 2 PoE Certification (https://ethernetalliance.org/poecert) program based on a test plan developed by many of the same individuals who helped write the IEEE 802.3bt standard itself. The Ethernet Alliance program has been engineered to clearly identify those products that will successfully work together and dependably deliver the differentiating power and efficiency benefits promised by standardized IEEE 802.3 PoE.

About the Ethernet Alliance
The Ethernet Alliance is a global consortium that includes system and component vendors, industry experts, and university and government professionals who are committed to the continued success and expansion of Ethernet technology. The Ethernet Alliance takes Ethernet standards to market by supporting activities that span from incubation of new Ethernet technologies to interoperability demonstrations and education. For information on becoming an Ethernet Alliance member, please visit http://bit.ly/EAHSN3-Membership. For more information about the Ethernet Alliance, please visit http://www.ethernetalliance.org, follow @EthernetAllianc on Twitter, visit its Facebook page, or follow its LinkedIn company page.

Innovation of IEEE 802.3 PoE

IEEE 802.3 PoE standards have been refined over years to improve the usefulness and flexibility of the standardized power overlay to Ethernet data communications:

- IEEE 802.3af™, published in 2003, provided 15.4 W and 13 W for Type 1 PSE and PDs, respectively.
- IEEE 802.3at™, published in 2009, provided 30 W and 25.5 W for Type 2 PSE and PDs.
- IEEE 802.3bt, ratified in 2018, introduced two new Types and four new Classes of devices, increasing power support to 60 W and 51 W for Type 3 PSE and PDs and 90 W and 71.3 W for Type 4 PSE and PDs.

This brings us to the four Types and eight Classes of IEEE 802.3 PoE devices. All of these products must interoperate—PSE devices must support PD devices of equivalent or lower class, as well as PDs must interoperate with PSEs of all Classes and Types.

IEEE 802.3bt, furthermore, introduced an array of new features, among them:

- Short MPS, which reduces the duty cycle and how long a power signature must be generated to maintain a power connection (enhancing the minimum standby power by a factor of between 10 and 20);
- Autoclass, measuring the actual power draw with a PD in a known maximum power draw state, allowing the PSE to allocate the precise amount of power needed by the PD and, thereby, optimizing the power budget by taking all system parameters into account including cable loss and aging margin;
- Connection Check, a mechanism utilized by a four-pair-capable PSE to probe the PD and determine whether it's a single-signature configuration, dual-signature configuration, or invalid PD, and
- Channel definition for 2.5G/5G/10Gbps PoE operation.

All of the enhancements introduced by IEEE 802.3bt rendered the standard eagerly anticipated by a PoE market seeking both higher power and more efficient standardized delivery systems. Today, a range of high-powered PoE products are reaching the

marketplace, across and beyond application spaces such as network-attached storage, building automation, LED lighting, power gateways, industrial controls, various entertainment services, and access control. "(D)emand for PoE-enabled switch ports is expected to surge to new heights, with 900 million ports expected to ship during the next five years," Tam Dell'Oro, founder and CEO, Dell'Oro Group, Inc., said in an October 2019 *Intertraffic World* article.[1] "With the increase in its power delivery capacities, combined with its cost-efficiency, flexibility, and scalability, PoE has evolved as a competitive solution for the enterprise and consumers alike."

An Ethernet Alliance™ white paper written by two of IEEE 802.3bt's editors and reviewed by other Task Force members is intended as a handbook to the standard for PSE or PD designers. The white paper is available at https://ethernetalliance.org/wp-content/uploads/2018/04/WP_EA_Overview8023bt_FINAL.pdf.

Avoiding Market Confusion

With so many PoE products coming to market and IEEE 802.3bt introducing so many new nuances to standardized PoE, users need a way to sort out which PoE products correctly implement the standard and will successfully interoperate with one another. Similarly, manufacturers of IEEE 802.3-based PoE solutions need a way to clear market confusion and ensure a positive customer experience.

Ethernet Alliance PoE Certification is an open, simple program that is proven to differentiate products that align with IEEE 802.3 PoE from other products that market themselves as Power over Ethernet. It is intended to provide an easy way to identify products—either by the EA CERTIFIED™ Mark or the online registry listing of certified products—that have been tested for compatibility with IEEE 802.3 standards and validated as conforming with the Ethernet Alliance Certification Test Plan. When the Ethernet Alliance logo indicates a PSE class greater than or equal to the PD class, users know the PSE will fully power the PD and interoperate.

In creating its Gen 2 PoE Certification test plan, the Ethernet Alliance relied on many of the same individuals who helped craft IEEE 802.3bt. The result is a certification test plan that is grounded in an indisputably sound understanding of the specification itself. In addition, it's a robust enough plan—including about three times as many tests for PSEs

[1] Retrieved from http://journal-download.co.uk/digitalmagazines/ITW/ITW01NOV2019/page_93.html, 17 December 2019.

and twice as many tests for PDs as previously defined—to accommodate all of the new IEEE 802.3 PoE application spaces and products reaching the market.

This means that manufacturers who pursue and achieve Ethernet Alliance Gen 2 PoE Certification can count on a positive return on that investment. There are substantial savings to be realized via Ethernet Alliance Gen 2 PoE Certification, in areas such as simplified and shortened installation, reduced customer-service and debugging burden, lessened evaluation costs and avoided field recalls and internal development cycles related to complex test procedures. And perhaps the most valuable benefit for providers of IEEE 802.3 PoE solutions? Buyers know to look for the Ethernet Alliance certification as a mark of superior user experience and confidence in interoperability. Manufacturers who attain Ethernet Alliance Gen 2 PoE Certification will heighten trust with their customers.

An Open, Simple Program

The Ethernet Alliance PoE Certification Program is open to alliance members and non-members alike, and participation is easy. Vendors complete a Certification Mark License Agreement (CMLA), and then they receive the Ethernet Alliance Gen 2 PoE Certification test plan. Testing for the Ethernet Alliance Gen 2 PoE Certification is available at the University of New Hampshire InterOperability Laboratory (UNH-IOL), which serves as a data warehouse for certification test results. Certification applications of any devices meeting the Ethernet Alliance Certification Test Plan are forwarded to the alliance, and then the Ethernet Alliance awards program logos for certified products.

Vendors successfully completing testing can apply the Ethernet Alliance logo to their certified products, which also are listed in the Ethernet Alliance PoE Certified Products Registry online. The public registry not only empowers users to quickly research and identify IEEE 802.3 PoE products but also facilitates potential business partnerships for rollout of total solutions to the broadening PoE market.

For more information on the Ethernet Alliance PoE Certification Program, please visit http://ethernetalliance.org/poecert/or contact the Ethernet Alliance at PoE_Certification@ethernetalliance.org.