Draft Regulation Lot 7

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Current Regulation

- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2019.272.01.0095.01.ENG&toc=OJ%3AL%3A2019%3A272%3ATOC

2.   This Regulation shall not apply to:

(a) voltage converters;

(b) uninterruptible power supplies;

(c) battery chargers without power supply function;

(d) lighting converters;

(e) external power supplies for medical devices;

(f) active power over Ethernet injectors;

(g) docking stations for autonomous appliances;

(h) external power supplies placed on the market before 1 April 2025 solely as a service part or spare part for replacing an identical external power supply placed on the market before 1 April 2020, under the condition that the service part or spare part, or its packaging, clearly indicate 'External power supply to be used exclusively as spare part for' and the primary load product(s) it is intended to be used with.

Impact Assessment

- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52019SC0345

Scope coverage: Power over Ethernet (PoE) injectors: The industry requests to clarify if PoE injectors (also called "PoE adaptors") are in scope of the regulation. Power over Ethernet is a technology for wired Ethernet local area networks that allows the electrical current necessary for the operation of device connected to the network to be delivered by the same Ethernet cables that transport the data rather than by separate power cords (minimising the number of wires and AC mains sockets required to install the network).

Conclusion: The current regulation does not specify which type of cable should connect the EPS to the primary load device. Therefore, an EPS that connects to a primary load product via an Ethernet cable should still be considered in the scope. The US DOE provides a similar interpretation of PoE injectors 6 .

However, PoE injectors with built-in circuitry for data switching, which is additional to the power injection to an Ethernet network, are considered not to be in the scope. This is because they could supply power to several devices and because the injector would also be a primary load built in the EPS. In cases where a separate EPS is delivering power to a detachable PoE injector, that EPS would be in the scope (because in such cases the PoE injector is considered a primary load device like any other device connected to an EPS).

Draft Regulation (PoE now gone)

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13351-External-power-supplies-ecodesign-information-requirements-review-_en

This Regulation shall not apply to:

(a) uninterruptible power supplies, meaning devices that automatically provide backup power from storage when the electrical power from the mains power source drops to an unacceptable voltage level;

(b) separate control gears for lighting applications, as defined in Article 2, first paragraph, point (3), of Commission Regulation (EU) 2019/2020 (9), with the exception of separate control gears in battery-operated products, as referred to in point 2(c) of Annex III to that Regulation;

(c) EPS for medical devices;

(d) docking stations for autonomous appliances, meaning devices in which a battery-operated appliance that executes tasks requiring the appliance to move without any user intervention places itself for charging, and which also fulfill other functions than charging;

(e) EPS specifically designed to be used only with means of transport for persons or goods;

(f) battery chargers for battery packs, as defined in Article 3(1), point (2), of Regulation (EU) 2023/1542;

(g) devices for which the primary load of the converted voltage within the device is not delivered to a separate end-use product.

Only conclusion is that active PoE injectors are no longer exempt, and therefore in scope.

Draft info

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13351-External-power-supplies-ecodesign-information-requirements-review-_en

Draft act

FEEDBACK: OPEN

Feedback period

18 November 2024 - 16 December 2024 (midnight Brussels time)

The Commission would like to hear your views.

This draft act is open for feedback for **4 weeks**. Feedback will be taken into account for finalising this initiative. Feedback received will be published on this site and therefore must adhere to the feedback rules.

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Draft regulation - Ares(2024)8172699
English (537 KB - PDF - 12 pages)

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Annex - Ares(2024)8172699
English (754.7 KB - PDF - 17 pages)

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Including PoE Midspans

- Efficiency of the power subsystem is a noble idea, but USBC devices are very different from PoE devices

- The biggest problem is the no load restrictions

- Multiport injectors are mentioned, do injectors get a per port allowance? (i.e. 0,075 or 0,15 times number of ports)

- Is the power allowed a peak or averaged over time?

- Assume this ignores in-rush/start up power

- Efficiency measured from the IEC jack to the RJ45 output

PoE is "Cold Power"

- IEEE 802.3 compliant PoE is required to detect a PD before applying power
  - This ensures an Ethernet device not design to withstand power at the Ethernet port doesn't get damaged
- This requires a midspan PSE to perform detection, which requires a state machine (typically a digital core)
- PSE ICs have not been architected for absolute lowest power consumption, but instead for performance (no-load fast detection upon connection)
  - It's likely no existing PSE IC architecture will allow a no-load power of 0,075 W or even 0,15 W

Multiport

- If a multiport midspan is not allowed a per port no-load allowance, guaranteed that nothing in existence will comply.

Re-architecture

- PoE PSEs are allowed to supply from 44 V to 57 V

- Most midspans target a 55 V system voltage

- All PSE ICs the author is aware of run directly from the 55 V source

- To meet the power requirements, the IC will have to be redesigned to have a low voltage core (say 5-10 V) and stagger the detection probes to meet the no-load power limits (slowing down detection)

- This is likely a 4-year effort from start of IC design to shipping products

No-load exemption

- PoE midspans aren't typically bought to plug in and not have a PD connected
  - For nearly all PoE applications, the load is present 24/7, as such no standby condition as envisioned by the EPS regulation occurs
- Midspans are typically installed in conjunction with a PD, and then uninstalled when the PD is replaced (assuming it can't supply the new PD) or when they fail
- The amount of power saved by requiring no-load efficiency is a negligible addition to the TWh savings predicted by this effort

PoE midspans should be exempt from the no-load requirements

Unintended Consequences

- If the requirements on midspans are too onerous, you will force users to install PoE switches instead of midspans for small PoE installs

- This is counter to the desired energy savings, as a switch powering a few PoE loads may be in an inefficient operating mode, more inefficient than the midspan designed to target the application

- Or this will force people to non-802.3 compliant midspans (meaning always on)

Other exemptions

- Injectors need to be exempt from the requirement of a USBC port
  - They use the "RJ45" connector for 99% of the products on the market
- Injectors need to be exempt from the interoperability marking requirements as those apply to the USBC connector
  - They have interoperability requirements as defined by IEEE 802.3

Drafted response text for another group (1)

DIGITALEUROPE would like to resolve any potentially vague language regarding Power over Ethernet (PoE) in the scope of the revised regulation. The draft regulation provides a definition of active PoE injectors, but it doesn't specify if any requirements apply to them (See Article 2, Definition (16)). Further, the regulation does not have a clear definition of "Primary Load" in the context of PoE equipment.

The draft regulation is silent on PoE switches. DIGITALEUROPE requests that the regulation clearly state that a PoE switch's data capabilities are its primary load and thus PoE switches are out of scope for this regulation. This appears to be aligned with the current regulation's intent but should be stated explicitly to ensure consistent enforcement of this regulation.

The use cases for USB-PD and PoE are very different. PoE is designed to supply isolated DC power to devices via permanently installed building wiring up to 100 m in length. USB-PD lacks the isolation, distance capability, and permanent cabling interoperability to be considered a valid substitute. Thus, DIGITALEUROPE urges any regulation revisions to explicitly exempt PoE from any dependency on compliance with the USB-PD specification as it is in conflict with the IEEE 802.3 Power over Ethernet standard.

Drafted response text for another group (2)

IEEE 802.3 compliant PoE (referred to as "Active PoE" elsewhere) requires that power is not supplied to the load until a detection and classification process has completed. Available power from an injector is in the range of 150mW before a device is detected, but the circuitry required to actively detect devices typically consumes more power than is allowed by the no-load condition criteria. This detection power is specifically tailored to discover the qualified loads. This PoE "cold power" methodology was necessary as power was being added to existing networks where devices may not have been designed to withstand power applied at the port. "Passive PoE" injectors do not have these features and are not compliant in any way with the IEEE 802.3 PoE standard.

Active PoE injectors are typically bought with the Powered Device (PD) and installed as a pair when a multi-port PoE capable switch is unavailable, or where the existing PoE is insufficient for a new device. While injectors are a universal power supply for compliant PoE devices, the use case isn't one where PDs are continually swapped out like one might find with a USB-PD EPS. Most PoE PDs fall into three categories: IP Phones, Wireless Access Points, and Security Cameras. All these devices are expected to work 24/7. Thus, an Active PoE injector spends very little time in a no-load condition, and the savings from improved no-load efficiencies would be greatly outweighed by the costs imposed on the industry. Therefore, DIGITALEUROPE would request that if active PoE injectors are indeed in scope of the Lot 7 EPS requirements, that they are made exempt from the no-load efficiency requirements.

Drafted response text for another group (3)

If injectors are not exempted from the no-load requirements, PoE Power Sourcing Equipment (PSE)s controller ICs would need to be significantly redesigned to add additional circuitry to meet the no-load requirements, something that would need to include multiple years for silicon redesign and subsequent product requalification. A conservative estimate is 4 years from the start of the IC design for new products to be released to the market, which extends beyond the compliance deadlines proposed for this regulation. Additionally, if injectors remain subject to no-load requirements, multiport injectors will need this allowance per port. DIGITALEUROPE requests this is made clear in the regulation text.

Finally, DIGITALEUROPE would oppose a requirement driving injectors to become two-piece solutions, one-part USB-PD power supply, and one part PSE. Injectors are designed as part of the IT network and have taken on form factors that facilitate those installs. The two-piece solution will inevitably be more expensive for the consumer, with no added benefit. A two-piece solution will also lower system efficiency. As stated above, a typical injector operates from an *isolated* DC output from the power supply. The DC output voltage depends on the Type of PSE but the minimum supply voltage can be as high as 52 V DC, higher than the highest voltage supported by the USB-PD specification, which is currently 48V. If an injector is forced to use a USB-PD power supply, the first thing the injector would do is transform the non-isolated USB-PD voltage to an IEEE 802.3 compliant isolated voltage. This would result in an at least 5% efficiency hit in this DC/DC conversion stage. Active PoE injectors are typically designed with an IEC mains connection and an "RJ45" power+data output as this is the best solution for the application, both in terms of efficiency and manufacturing materials.

Backup

- Need to respond to this:

  - Mandatory externalization of power supplies for active PoE injectors
    - Exemption: wall-socket type PoEs
    - No USB-PD compliance required

  - Active PoE injector with internal power supply as unit subject to efficiency requirement?
    - Producers claim compliance with DoE and (EU) 2019/1782
    - Examples of level VI PoE injectors available on internet