

Technical Note

Clarification of the cabling requirements of IEEE 802.3af and IEEE 802.3at (Power over Ethernet)



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Overview

Since the launch of Power over Ethernet in 2003 and then the further development of Enhanced POE in 2009, there has been some confusion about what Class or Category of cabling that is required.

This confusion has been caused or exploited by a small number of structured cabling vendors who have implied that by having independent testing carried out specifically related to POE, that their system is better than anyone else's.

This note sets out to clarify the requirements as outlined within IEEE 802.3at. and prove that this form of testing is not only misguided, it is also unnecessary.

Standards Requirements

It is actually very simple; to gain general and wide spread acceptance regarding Power over Ethernet. The IEEE has developed the above standard to utilise 'Standards Compliant' structured cabling and not have any special requirements that would limit its adoption.

This can be fully understood by reading the cabling requirements section of the standard. For information 'Type 2' relates to the higher Power Enhanced POE or POE+

'33.1.4.1 Type 2 cabling requirement

Type 2 operation requires Class D, or better, cabling as specified in ISO/IEC 11801:1995 with the additional requirement that channel DC loop resistance shall be 25Ω or less. These requirements are also met by Category 5e or better cable and components as specified in ANSI/TIA/EIA-568-B.2, ANSI/TIA/EIA-568-B.2-1, and ANSI/TIA/EIA-568-B.2-10; or Category 5 cable and components as specified in ANSI/TIA/EIA-568-A-1995.'

There is one sentence in this requirement that could have caused the confusion which some may have tried to exploit.

This is the line which states: 'with the additional requirement that channel DC loop resistance shall be 25Ω or less' which was written in 1995. With the amendments made to the 2002 edition of ISO 11801 this is not an additional requirement, it is part of the stated limits for a Class D channel as can be seen in the following table from the 2002 edition of this Standard.

'6.4.7 Direct current (d.c.) loop resistance

The d.c. loop resistance of each pair of a channel shall meet the requirements in Table 16.

When required, the d.c. loop resistance shall be measured according to IEC 61935-1.'

Table 16 - Direct Current (d.c) loop resistance for channel

Maximum d.c. loop resistance Ω					
Class A	Class B	Class C	Class D	Class E	Class F
560	170	40	25	25	25

This table has been further updated in subsequent editions of ISO 11801 and All Classes of Channel above Class D have a limit of 25 Ω

Conclusions

With the IEEE writing the standard in the way they have, they have looked to exploit Generic, Standards Compliant Structured cabling systems to support Power over Ethernet. This ensures there are no limitations to the adoption or use of this important technology. Having any special requirements is totally against the purpose of 802.3at.

If certain vendors wish to carry out additional testing to prove their product can support POE it is their prerogative, but it is not necessary as the standard demonstrates the suitability of the products.

If the system has been independently tested to meet or exceed ISO 11801 Ed 2.2: 2010 that is all the IEEE require.

This Technical Note has been produced by Paul Cave, Technical Manager – Infrastructure, on behalf of Excel

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