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LIAISON STATEMENT

For action to:	-
For comment to:	[redacted]
For information to:	IEEE 802.3 Working Group
Approval:	ITU-T Study Group 5 meeting, (Virtual, 10 December 2021)
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Abstract: This liaison reply concerns the IEEE 802.3 cover sheet comments approved on 22 July 2021.

This LS replies to IEEE802.3WorkingGroup-LS99[1]

ITU-T Study Group 5 would like to thank the IEEE 802.3 Ethernet Working Group for their comments on Recommendation ITU-T K.147. Please note that Recommendation ITU-T K.147 was published in September 2020 and republished in April 2021 to suppress IPR protected material (Annex A – IEEE 802.3 term glossary). This change occurred as the result of discussions between the IEEE SA and ITU-T on the non-publication of IEEE 802.3 terms and definitions in ITU-T K.147.

With reference to the points raised in the liaison statement from IEEE 802.3, please see below the following explanations:

Item 1 (that IEEE Std 802.3 is 100MB in size and 5600 pages long): This statement ignores the practicality of ITU-T Rec. A.5, section 6.1 where it states: "It is preferred that, rather than making reference to an entire document from an outside organization, reference be made to only the specific section(s) concerned."

[1] This LS replies to IEEE 802.3 Ethernet Working Group, dated 22 July 2021, which was discussed at ITU-T SG5 meeting (Virtual, 30 November–10 December 2021). The liaison contents were a cover sheet and two attachments. The content of the two attachments was effectively already being discussed in the ITU AAP process, which is a separate activity. The AAP discussions have taken place in the presence of the IEEE 802.3 to ITU-T SG5 Liaison Officer, as did the cover sheet discussions. This reply concerns the cover sheet.

Reply 1

In a prior liaison statement, the IEEE stated that the IEEE 802.3 standard should be referenced, and the ITU-T SG5 response was that it was not practical to reference the document in its entirety. Inspection of ITU-T K.147 shows that references are made to specific parts of the IEEE 802.3 standard to guide the reader wanting more information, such as "based on IEEE 802.3 Tables 33–1, 33–7, 33–11, 33–18, 145–16, 145–26, 145–27 and 145–29". ITU-T K.147 does contain a list of consolidated parameter values related to protection design so as not to disrupt a linear read of ITU-T K.147.

The Recommendation's intent was always to reference the original parameter source.

Item 2 (that IEEE 802.3 is in conflict with ITU-T test levels and test circuits): Please provide specific references for these conflicts so that they may be evaluated. We cannot properly evaluate this comment or take any action without specific references to the alleged conflicts.

Reply 2

There is a confusion between testing an isolating transformer and testing the entire equipment interface (port). The values used in Annex J could be used to test an isolating transformer. A manufacturer could choose a verification test that uses AC or DC, or pulsed test voltage. In practice, because test time costs money, the testing period would be much shorter.

Such a testing should not be applied to the equipment port, as the port circuitry contains more than just an isolating transformer. For example, the RJ45 terminal-to-screen voltage rating is often lower than the Annex J test levels when mounted on the printed circuit board (PCB). Voltage limiters are often used to control the maximum voltage applied to the transformer winding. As the test voltage options a) and b) have no prospective short-circuit limits, sufficient current could flow that would destroy the voltage limiter component. High-level AC and DC voltages and currents do not occur in the field, and these tests would give a false impression of the equipment's resistibility. Design techniques are available to make the port survive AC or DC testing; however, standards should not mandate a particular circuit design, only realistic testing requirements.

The IEC 60664-1: *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests* mainly uses a 1.2/50 voltage impulse to test insulation. Annex J test c) also specifies a 1.2/50 impulse test. However, like a) and b) tests, the prospective short-circuit of the stand-alone 1.2/50-8/20 generator is likely to be too high to represent field conditions. This is why the port test circuits in the equipment tests of Recommendations ITU-T K.20 "Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents", K.21 "Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents" and K.45 "Resistibility of telecommunication equipment installed in the access and trunk networks to overvoltages and overcurrents" use additional series resistance to reduce the prospective short-circuit current. Likewise, IEC 61000-4-5 also includes some series generator resistance for testing.

There should be no insulation breakdown during testing – voltage limiter operation is not an insulation breakdown but an intended function.

The IEEE 802.3cr test requirements impose unnecessary circuit design constraints and test conditions, and they do not specify the other equipment port terminations. As such, they are in conflict with the ITU-T Recommendation equipment-testing practice. The ITU-T is open to discuss this disparity further. A useful overview of port testing problems encountered, and their solutions is the ATIS PEG conference presentation "Protecting PoE PSE and Ethernet to the Latest International OSP Standards".

https://peg.atis.org/wp-content/uploads/sites/16/2018/08/protecting_poe-tardley.pdf

Item 3 (that IEEE 802.3 vocabulary differs from ITU protection vocabulary): The vocabulary of interoperability standards such as IEEE 802.3 is necessarily different from the vocabulary of protection recommendations. Understanding the vocabulary of both would be important and valuable to the practitioner.

Reply 3

There is a third networking vocabulary from ISO/IEC as defined by the JTC1/SC25 *Interconnection of information technology equipment group*. ITU-T works to harmonise its activities with those of ISO/IEC. The JTC1/SC25 vocabulary gives harmonisation of terms and definitions that are ISO/IEC Directive 2 compliant. In addition, IEEE has refused permission (07/04/2021) for ITU-T to reproduce IEEE 802.3 terms and definitions.

Item 4 (that ITU-T removed ITU generated informative figures): Not all are removed. Section 9.3 and Annex B still contain interpretations of IEEE Std 802.3 material which contain errors. Please refer to ITU-T SG5's original Recommendation (SG5-C745-R1) to remove the figures along with the tutorial material.

Reply 4

Where IEEE 802.3 WG detailed the errors, changes have been made. Annex B figures need to be retained as they use the JTC1/SC25 vocabulary to be consistent with the rest of ITU-T K.147 and hence are different to those of IEEE 802.3.

Item 5 (that IEEE 802.3 was missing important protection information): Circuit protection is an implementation problem, and IEEE Std 802.3 does not prescribe implementation, only behaviour with respect to interoperability. Some diagrams may imply implementation, but the designer is free to use any implementation that conforms to the prescribed behaviour necessary to achieve interoperability.

Reply 5

As pointed out in reply 2, Annex J does effectively dictate a particular equipment port interface design by not defining the test generator prospective short-circuit currents.

Item 6 Sections 6 and 7 of ITU-T K.147 will never provide the full requirements in just a few pages of what appears to be tutorial text. A reader of ITU-T K.147 should not be led to believe that they do not need to read the relevant clauses of IEEE Std 802.3 and rely exclusively on the tutorial material included in these sections of ITU-T K.147.

Reply 6

Agreed. A protection engineer cannot be trained in a few pages of a Recommendation. More information on protection technology parameters occurs in the normative and bibliographical references. The main purpose of these clauses is to create an awareness of the many threats that occur in network systems. How the engineer might mitigate those threats is system dependent. For Ethernet system electrical parameters in normal operation, we do indeed reference values from certain sections of IEEE 802.3.

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