

# ITU-T SG5 WP1 May 2018 Meeting proposed changes on Insulation/Isolation

802.3 Isolation Ad Hoc Meeting  
ITU-T Recommendation proposed  
insulation/isolation changes  
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ITU-T insulation/isolation contribution

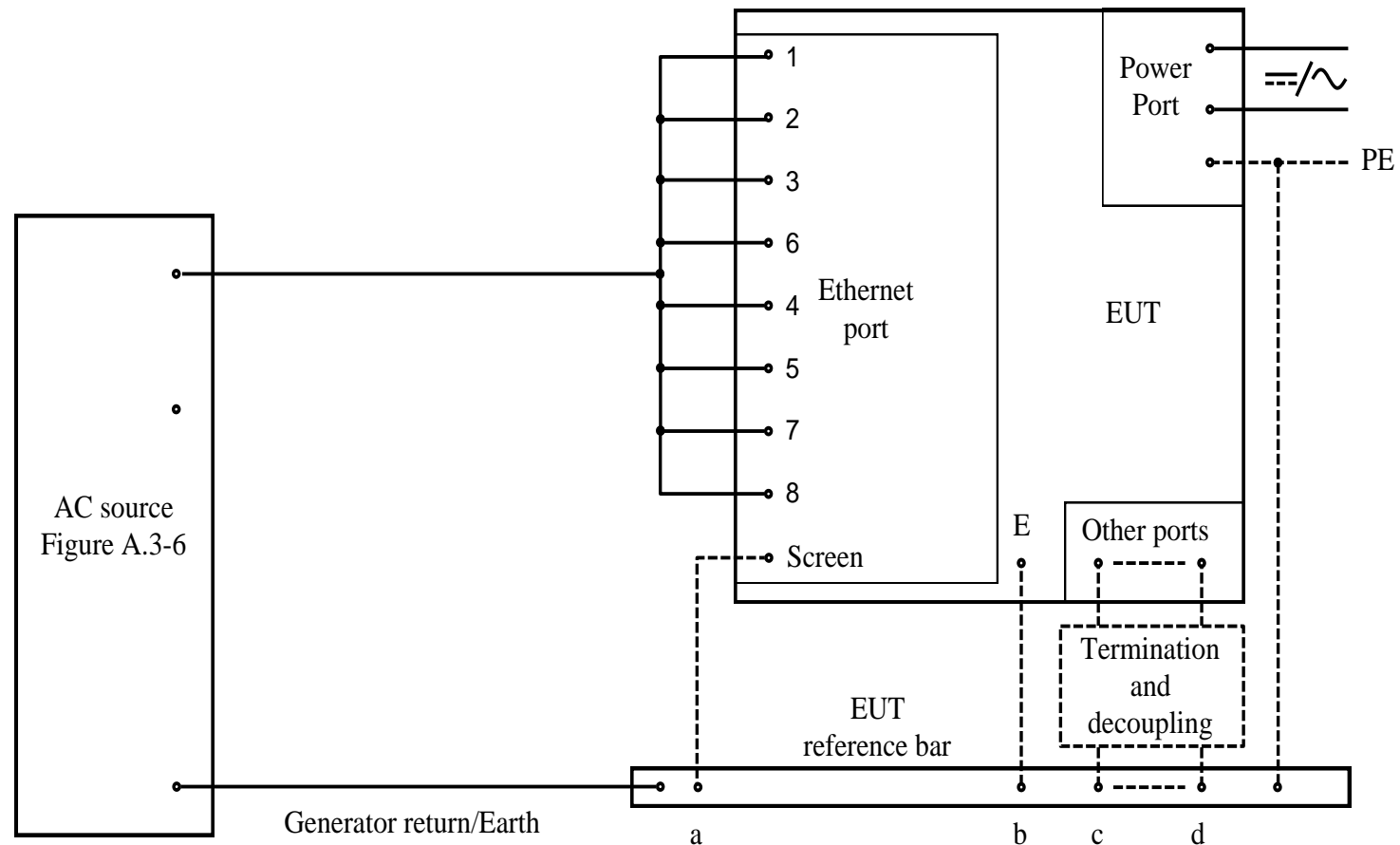
# Introduction

- ITU-T has four recommendations concerning equipment resistibility to lightning events and power (50 Hz/60 Hz) faults.
  - K.20 is for central office locations. The wiring environment is controlled as usually the service provider oversees the installation.
  - K.21 is for customer premise locations. Once passed the customer demarcation point the wiring environment is uncontrolled and the K.21 tests are the most severe.
  - K.45 is for all the equipment access locations (US – Outside plant) between those of K.20 and K.21. The wiring environment is semi-controlled as the service provider often subcontracts this work.
  - K.44 is the overview Recommendation for K.20, K.21 and K.45. Most importantly this Recommendation contains the test circuits referenced in K.20, K.21 and K.45.
- The ITU-T meeting consented a proposal for testing AC mains power contact to Ethernet ports of certain types.

# AC mains power contact to Ethernet proposal — Part 1: Overview

- Huawei proposed AC mains power contact testing for ports feeding outdoor (external) Ethernet cables — SG5-TD556
- Power contact testing only applies to the following:
  - K.20, K.21 and K.45 equipment external (outdoor) cable Ethernet ports where Ethernet and AC mains cables run in close proximity e.g. aerial link from the house to the yard shed/workshop/garage.
  - K.21 Ethernet ports that fail the 500 V d.c. insulation resistance test per IEEE 802.3. The rationale is that if the port cannot withstand 500 V d.c. it may suffer a hazardous event if an AC power cross occurs (325 V peak).

# AC mains power contact to Ethernet proposal — Part 2: Test circuit



# AC mains power contact to Ethernet proposal — Part 3: K.20, K.21 and K.45 test conditions

Test description	Test circuit	Basic test levels	Enhanced test levels	Number of tests	Acceptance criteria	Comments
Mains power contact, inherent, port to earth	See Test Figure	$U_{a.c.} = 230 \text{ V}$ Frequency = 50 Hz t = 15 min for each test resistor R = 10, 20, 40, 80, 160, 300, 600 and 1000 $\Omega$	$U_{a.c.} = 230 \text{ V}$ Frequency = 50 Hz t = 15 min for each test resistor R = 10, 20, 40, 80, 160, 300, 600 and 1000 $\Omega$	1	For basic level: criterion B. For enhanced level: criterion A for test resistors 160, 300, 600, and 1000; criterion B for the other resistor values.	This test only applies for external Ethernet port connected to the aerial Ethernet cable which are in parallel the aerial mains power cables <b>For K.21 Only: If Ethernet port that fails the 500 V d.c. insulation test.</b>

## What next?

- The proposal was “consented” by the ITU-T meeting and is currently in the 2 month National Committees approval period.
- If approved the K.21 and K.45 Recommendations will be updated and published.

# Comments

- An IEEE 802.3 500 V d.c. insulation test failure has become a key criteria for an Ethernet port to be subjected to an AC mains power cross test.
- The ITU-T does not allow the removal of any overvoltage protection components for the insulation test.
  - Component removal is something that is not clearly defined in the IEEE 802.3 referenced IEC safety standards.
  - Equipment manufacturers have used this situation to remove overvoltage protection components and so pass the 500 V d.c. insulation test.
- Many existing Ethernet equipment ports, power injector ports and surge protective devices (SPDs) are likely to fail the AC mains power cross test, because the limiting voltage of the overvoltage protection is too low, possibly with hazardous events.
- In short, the introduction of the ITU-T AC mains power cross test for Ethernet ports will police the IEEE 802.3 500 V d.c. insulation test .