

Ethernet-APL Test Guide

Test Type (Data or Power): Data

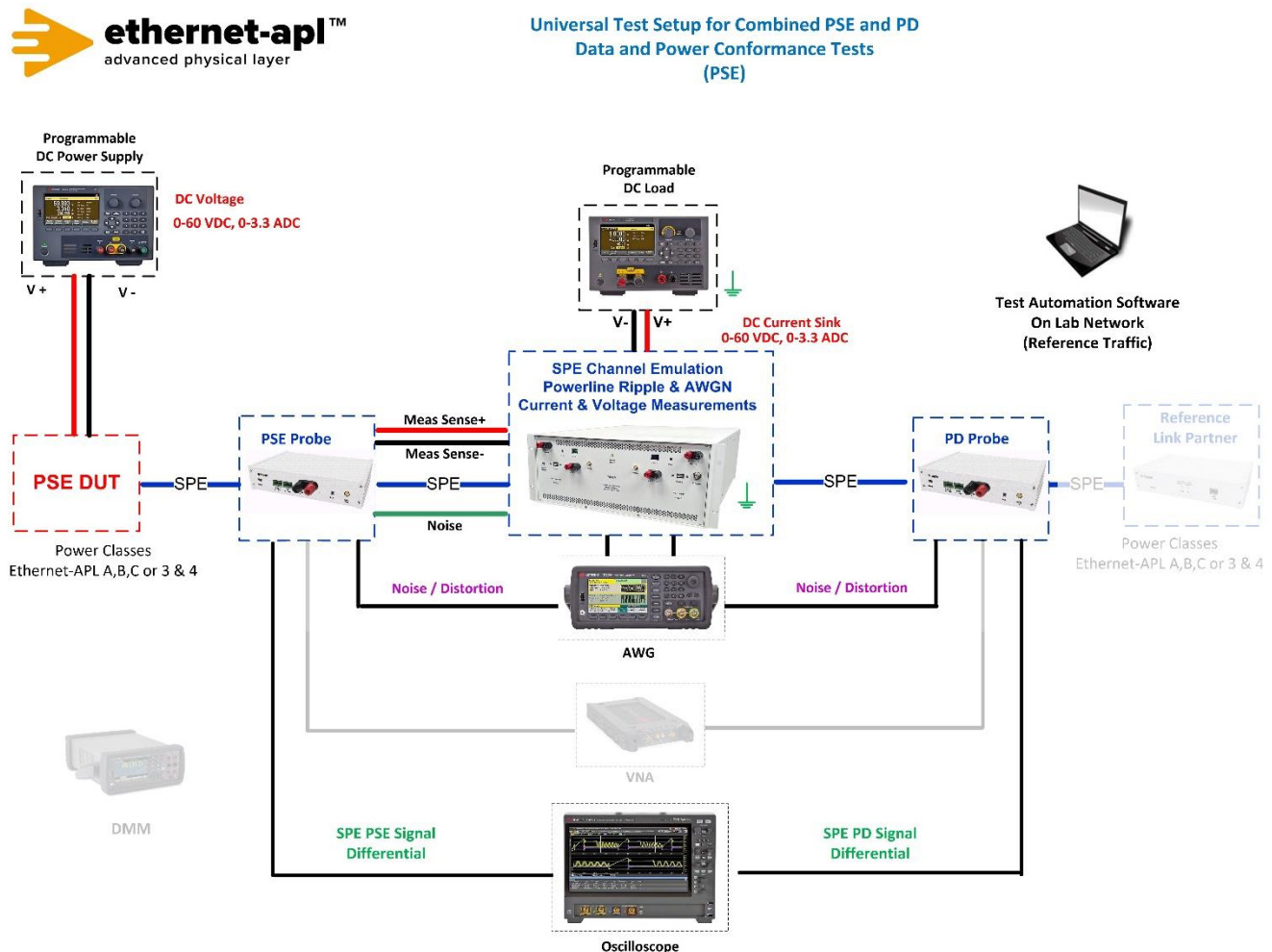
Test Name: 146.2.1 Receive Packet Error Rate Stress Test

Purpose/Description: To verify that the DUT can maintain a bit error rate of less than 10^{-9} in the presence of a noise source, power ripple (if applicable), and worst case (IL) test channel from remote PHY.

Required Test Equipment for PSE:

1. PD Probe
2. 4950 Channel Emulator (for current measurements, AWGN and Ripple Noise)
3. PSE Probe
4. Programmable DC Power Supply (to power the PSE DUT)
5. Programmable DC Load (to draw current from PSE DUT)
6. Oscilloscope
7. AWG (Optional if you want to add Impulsive Noise or Alien Crosstalk for Interoperability Test)
8. Test Automation Software

Test Setup / Connection Diagram (PSE):



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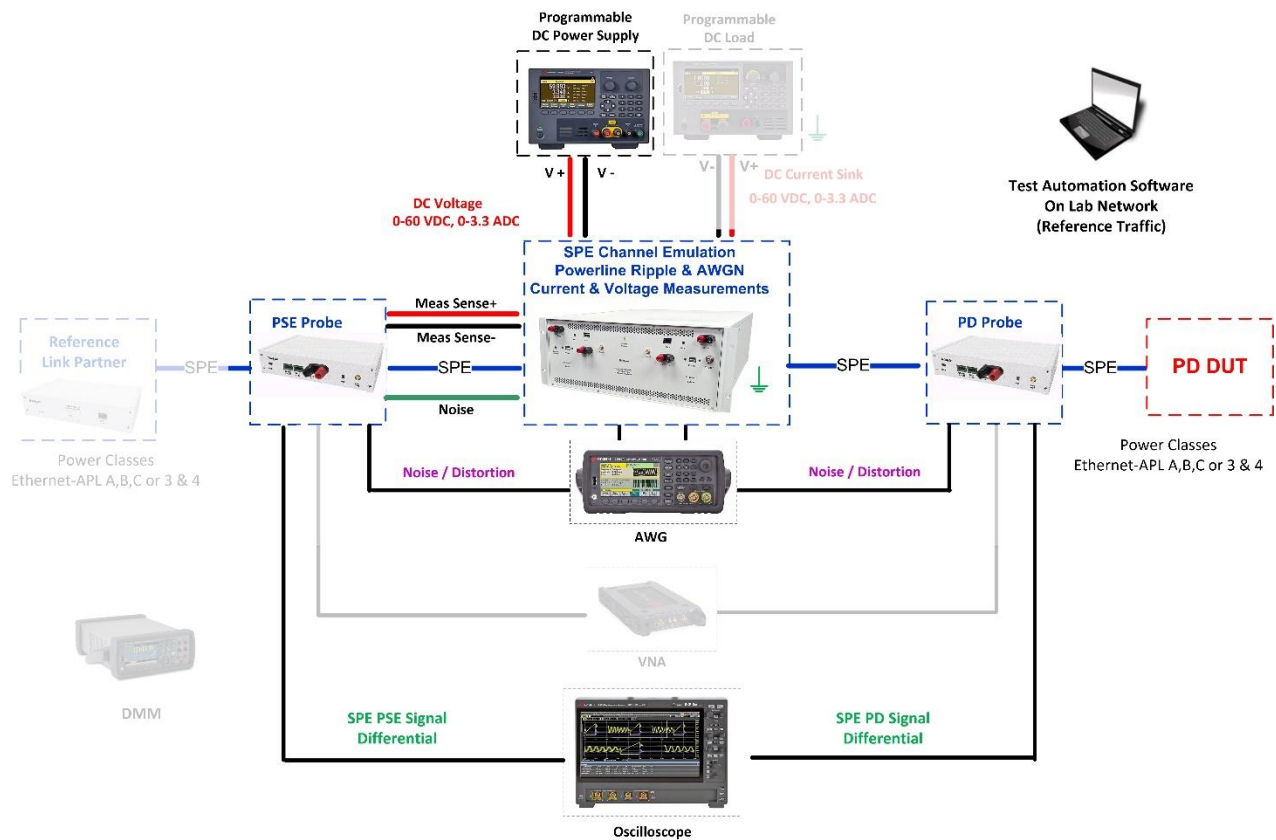
Required Test Equipment for PD:

1. PD Probe
2. 4950 Channel Emulator (for current measurements, AWGN and Ripple Noise)
3. PSE Probe
4. Programmable DC Power Supply (to power the PD Load DUT)
5. Oscilloscope
6. AWG (Optional if you want to add Impulsive Noise or Alien Crosstalk for Interoperability Test)
7. Test Automation Software

Test Setup / Connection Diagram (PD):



Universal Test Setup for Combined PSE and PD Data and Power Conformance Tests (PD)



Device Under Test Setup:

- Enter the Type of Device: Trunk Source, Trunk Load, Spur Source or Spur Load and Power Class for the Device Under Test (Trunk: Class 3 or 4, Spur: Class A, B or C) into the test automation software DUT Information.

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Expected Results (Pass/Fail Criteria):

Part A: Spur (1.0 Vpp): SLAVE DUT tolerance to worst-cast alien crosstalk noise and high IL channel.

Step	Status	Description
A:7,8	Fail	The DUT's BER is observed to exceed 10^{-9} observed by seeing 7 or more Test Packets sent without responses received by the monitor.
A:7,9	Warn	1 to 6 Test Packets were sent without responses received by the monitor. As bit errors are allowed, no definitive statement can be made that the BER has been violated; however, as greater than zero Test Packets were lost, we cannot state that the target BER was met with 95% confidence. As bit errors are allowed, we cannot conclude this to be a failure, but it may be an indication that the target BER is not being met.
A:7,8	Pass	The DUT maintained a BER of less than 10^{-9}

Part B: Trunk (2.4 Vpp): SLAVE DUT tolerance to worst-cast alien crosstalk noise and high IL channel.

Step	Status	Description
B: 7,8	Fail	The DUT's BER is observed to exceed 10^{-9} observed by seeing 7 or more Test Packets sent without responses received by the monitor.
B: 7,8	Warn	1 to 6 Test Packets were sent without responses received by the monitor. As bit errors are allowed, no definitive statement can be made that the BER has been violated; however, as greater than zero Test Packets were lost, we cannot state that the target BER was met with 95% confidence. As bit errors are allowed, we cannot conclude this to be a failure, but it may be an indication that the target BER is not being met.
B: 7,8	Pass	The DUT maintained a BER of less than 10^{-9} .

Notes:

References:

- [1] IEEE Std. 802.3cg-2019, subclause 146.5.5.1 – Receiver Differential Input Signals
- [2] Ibid., subclause 146.5.5.3 – Alien Crosstalk Noise Rejection
- [3] Ibid., subclause 146.7 – Link segment characteristics
- [4] IOL TP-PMD Test Plan Appendix 25.D
- [5] Test plan Appendix E – 10BASE-T1L Test Fixtures
- [6] Test plan Appendix F – 10BASE-T1L Cabling for Receiver Testing