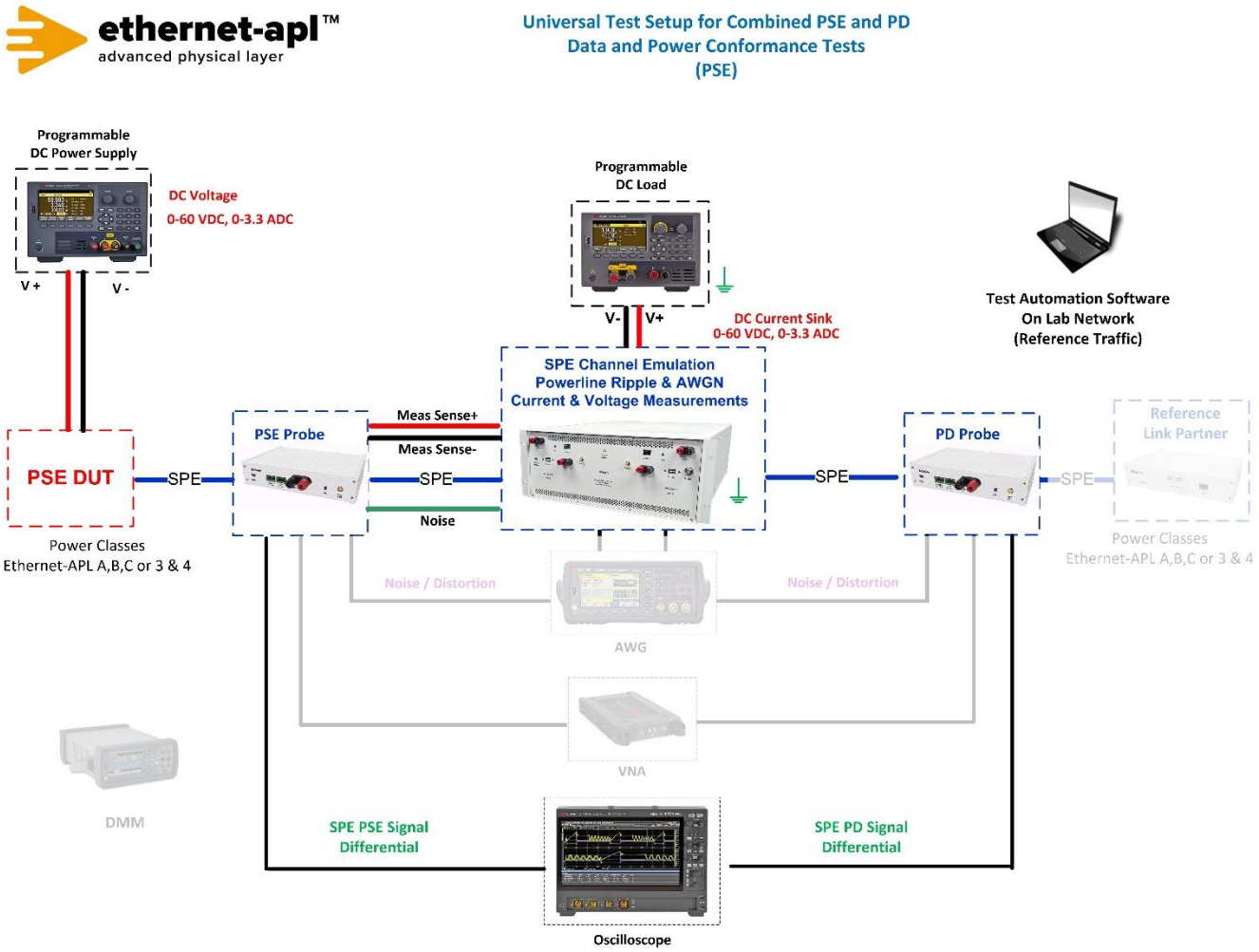
Test Type (Data or Power): Data
Test Name: 146.1.2 Transmitter Output Droop

Purpose/Description: To verify that the transmitter output level does not droop more than the maximum specified amount.

Required Test Equipment for PSE:

1. PD Probe
2. 4950 Channel Emulator (for current measurements)
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. Test Automation Software

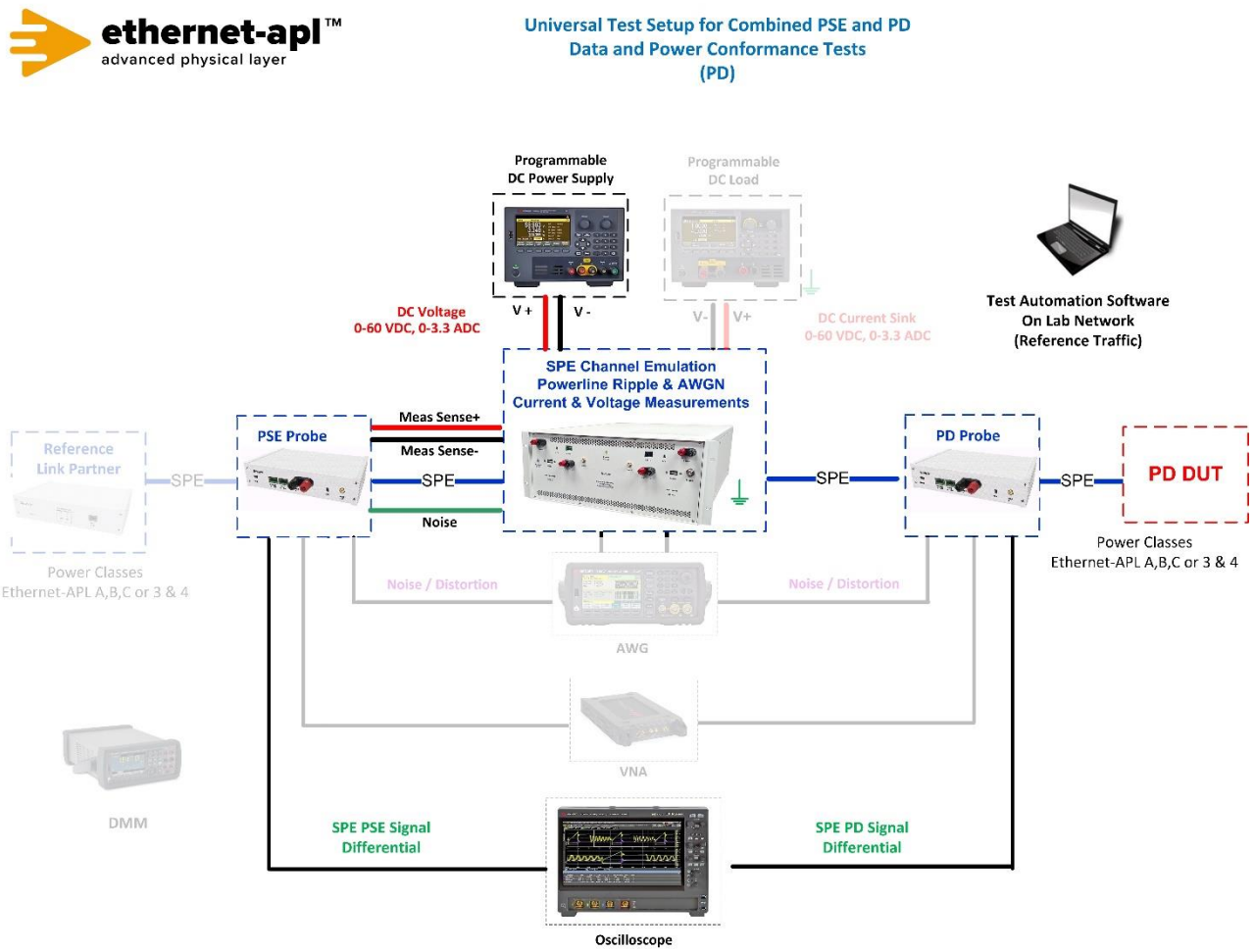
Test Setup / Connection Diagram (PSE):



Required Test Equipment for PD:

1. PD Probe
2. 4950 Channel Emulator (for current measurements)
3. PSE Probe
4. Programmable DC Power Supply (to power the PD Load DUT)
5. Oscilloscope
6. Test Automation Software with PCS Encoding and Decoding

Test Setup / Connection Diagram (PD):



Device Under Test Setup:

- Enter the Power Class for the Device Under Test (Trunk: Class 3 or 4, Spur: Class A, B or C) into the test automation software.

Expected Results (Pass/Fail Criteria):

Part A: Spur Source (1.0 Vpp operating mode) transmitter output droop

Step	Status	Description
A	N/A	The DUT is not a Spur Source port.
A:8	Fail	The magnitude of any positive droop (Dpos) is more than 10.0% or 15.0% when a power coupling network is involved for any of the ten 1 ms captures.
A:8	Fail	The magnitude of any negative droop (Dneg) is more than 10.0% or 15.0% when a power coupling network is involved for any of the ten 1 ms captures.
A:8	Pass	The magnitude of all the observed positive and negative droop is observed to be less than 10.0% or 15.0% when a power coupling network is involved for all of the ten 1 ms captures.

Part B: Trunk Source (2.4Vpp operating mode) transmitter output droop

Step	Status	Description
B	N/A	The DUT is not a Trunk Source port.
B:9	Fail	The magnitude of the positive droop is more than 10.0% or 15.0% when a power coupling network is involved for any of the ten 1 ms captures.
B:9	Fail	The magnitude of the negative droop is more than 10.0% or 15.0% when a power coupling network is involved for any of the ten 1 ms captures.
B:9	Pass	The magnitude of the positive and negative droop is observed to be less than 10.0% or 15.0% when a power coupling network is involved for all of the ten 1 ms captures.

Part C: Spur Load (1.0 Vpp operating mode) transmitter output droop

Step	Status	Description
C:8	N/A	The DUT is not a Spur Load port.
C:8	Fail	The magnitude of any positive droop (Dpos) is more than 15.0% for any of the ten 1 ms captures.
C:8	Fail	The magnitude of any negative droop (Dneg) is more than 15.0% for any of the ten 1 ms captures.
C:8	Pass	The magnitude of all the observed positive and negative droop is observed to be less than 15.0% for all of the ten 1 ms captures.

Part D: Trunk Load (2.4Vpp operating mode) transmitter output droop

Step	Status	Description
D:8	N/A	The DUT is not a Trunk Load port.
D:8	Fail	The magnitude of any positive droop (Dpos) is more than 15.0% for any of the ten 1 ms captures.
D:8	Fail	The magnitude of any negative droop (Dneg) is more than 15.0% for any of the ten 1 ms captures.
D:8	Pass	The magnitude of all the observed positive and negative droop is observed to be less than 15.0% for all of the ten 1 ms captures.

Notes:

References:

[1] IEEE Std. 802.3cg-2019, subclause 146.5.2 – Test modes
[2] Ibid., subclause 146.5.3 – Test Fixtures
[3] Ibid., section 146.5.4.2 – Transmitter Output Droop
[4] Test plan Appendix E – 10BASE-T1L Test Fixtures
[5] Ethernet–APL Port Profile Specification v1.2 – clause 4.1