Comment (#140, 412, #413, #414,#415, #416, #417):

1. TDL #275 and #276 D2.1 (comments: #108, #420, #421, #281 D2.2) was not fully implemented.
2. In addition, editor has noted that due to comment #452 D2.2 (removal of PPort_PD) we can't use the term PPort_PD. 33A.1 was written to address Type 1 PSE and PD. It is still relevant for Type 2 PSE. It was updated not to address Type 3 and Type 3 system therefore it should be limited for clause 33 only. As a result, Pport_PD term can be use.
3. To move this material to clause 33 and file maintenance request.

Proposed Remedy:

Make the following changes:

PSE-PD stability

33A.1 Recommended PSE design guidelines and test setup

In order to prevent potential oscillations between the PSE and PD, the sum of the PSE port output impedance (Zo_pse), the cable impedance (Zc), the PD input port circuitry impedance (Zcir_pd) and the PD EMI output filter impedance (Z_emi) should be lower than the PD power supply input impedance (Zin_ps_pd). All the above impedances are converted to the equivalent series impedance form as described by Figure 33A-1.

PSE PI output impedance consists of two parts:

— PSE power supply output impedance (Zo_ps), which is a function of the load at the PSE PI, and
— the series elements (Z_ser) that connect the PSE power supply output to the PSE PI.

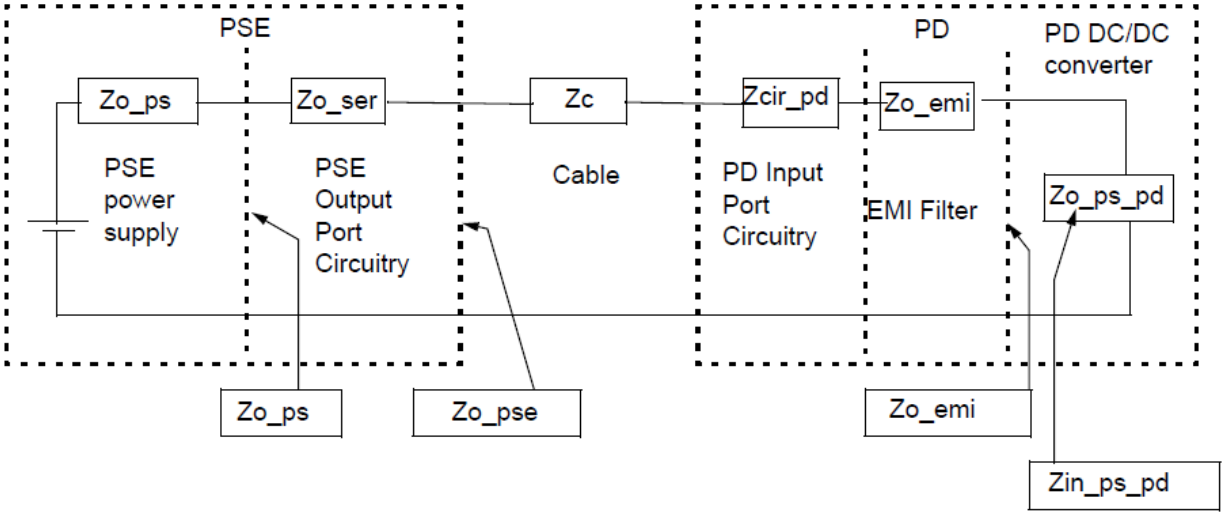
Therefore, the PSE PI output impedance during normal powering mode is Zo_pse=Zo_ps+Z_ser.

In order to maintain PSE-PD stability, the following guidelines apply:
— Zo_ps max = 0.3 Ω~~.~~ at frequencies up to 100 kHz at the highest output power level that the PSE supports, as defined in Table ~~33–13~~33-7 At lower power Ppse_actual, Zout_ps_max =0.3Ω x PClass / Ppse_actual. Ppse_actual is the actual power that the PSE support below PClass. Zo_ps can be extracted from Zo_port by measuring VPort_PSE~~-2P-~~/ IPort (with an external power dynamic analyzer system) as a function of frequency and subtracting from Zo_port the value of ~~Zser~~Zo_ser which is limited by the value of Zo_ser at DC (low frequency).
~~— If Zo_ps < Zo_ser and VPort-2P is kept to VPort-2P min and VPort-2P max as defined in Table 33-17 during dynamic load changes from 10 Hz to 100 kHz, then the value of Zo_ps is not limited.~~
— The value of Zo_ps is not limited if the following conditions are met simultaneously:

1) Zo_ps < Zo_ser
2) Vpse is kept in the range of VPort_PSE ~~-2P~~ as defined in Table ~~33–17~~ 33-11 during dynamic load changes from 10 Hz to 100 kHz.

Verification of these guidelines can be made by measuring the PSE PI output impedance from 10 Hz to 100 kHz at the highest output power level that the PSE supports, as defined in Table 33-7 ~~with the maximum load per the PSEs assigned Class, as defined in Table 33–13~~ at short cable length, or by performing simulations.

See Figure 33A–1 for the PSE-PD system impedance allocation.



33A.2 Recommended PD design guidelines

PD PI input impedance consists of the following two parts:

— PD PI input circuits Zcir_pd and the EMI filter ~~Z_emi~~ Zo_emi,

— PD power supply input impedance Zin_ps_pd.

In order to maintain stability with the PSE, the PD power supply input impedance Zin_ps_pd should be higher than the output impedance of the total network that precedes it (Zo_emi+Zcir_pd+Zc+Zo_pse).

The worst-case scenario is when the channel length is zero (in terms of lower damping factor).

Access to the PD input power supply is not possible through the PD port for evaluating the various impedances in the PD and derivation of the above individual impedances. The following guidelines are recommended when measuring the PD input impedance:

— The PD power supply input impedance (Zin_ps_pd) at ~~Pclass_PD~~ PClass_PD as defined in Table ~~33-30~~ 33-18 should be higher than 30 Ω at any frequency up to the PD power supply crossover closed loop

frequency. If the PD power supply is consuming less than PClass_PD_max, as defined in Table 33-3033-18 i.e. Ppd_actual, then Zin_ps_pd min = 30 x Pport_PD_max PClass_PD /Pport_PD. PPort_PD is the actual power consumed by the PD below PClass_PD.

Comment D2.2/#452 removed PPort_PD. Replacing the above by PClass_PD would be incorrect. Solution needed.

— The PD power supply EMI filter output impedance should be Zo_emi = 2.7 Ω max. If the PD power supply is consuming less than PClass_PD, then Zo_emi = 2.7 x PPort_PD max PClass_PD / PPort_PD .

See Figure 33A–1 for the PSE-PD system impedance allocation.

End of Baseline