

Simplified classification in the State Diagram II v121

Info (not part of baseline)

This baseline is the follow up to [yesebootd_01_1116_simpleclass.pdf](#). Aims are as follows:

1. The current D2.2 state diagram uses a complex combination of `class_num_events` and `pse_avail_pwr` to control the classification flow. A further problem is that in the D2.1 text several permutations that should be possible are not (eg. A Type 4 PSE can only have `pse_avail_pwr = 7` or `8`) This baseline simplifies this by removing `class_num_events` and only work with `pse_avail_pwr`.
2. The variables `pd_req_power` and `pd_allocated_power` are currently returned by a function. The assignment of those variables is however complex (due to power demotion) and should be done explicitly by the SD, rather than ‘magically’ get filled out by a function.
3. An open ticket on the TDL is to implement improved discovery for the PD’s requested Class, even for PSEs that have `pse_power_available ≤ 3`. This is implemented through a function `do_class_probe` (which allows flexible implementation) in the new states `CLASS_PROBE` and `CLASS_RESET`.
4. There are several ‘shalls’ in the Type 3/4 variable list. These are moved to the appropriate sections and struck from the variable list.

33.2.5.9 Type 3 and Type 4 variables

Add the following variables:

`option_classprobe`

This variable indicates if the PSE should determine the requested Class of the PD when `pse_avail_pwr` is less than 3. When set to `TRUE`, the PSE will issue 3 class events to determine the requested Class, perform a classification reset by applying V_{Reset} for at least T_{Reset} to the PI (see Table 33–17), followed by a normal classification procedure.
Values:

FALSE: The PSE will not probe for the PD requested Class

TRUE: The PSE probes for the PD requested Class

`pd_allocated_pwr`

A variable that indicates the Class that has been assigned to the PD.

Values:

- 1: Class 1
- 2: Class 2
- 3: Class 3
- 4: Class 4
- 5: Class 5
- 6: Class 6
- 7: Class 7
- 8: Class 8

Info (not part of baseline)

The `pd_req_pwr` variable (returned by `do_classification`) had a shall in it and a may. Both of these have been moved to the classification section. The original text was:

`pd_req_pwr`: This variable indicates the power class requested by the PD. When a PD requests a higher class than a PSE can support, the PSE shall assign the PD Class 3, 4, or 6, whichever is the highest that it can support. For Type 3 and Type 4 PSEs, when connected to a single-signature PD, operating over 4-pairs, classification events may appear on one or both pairsets. See 33.2.7.

pd_req_pwr

The variable indicates the power class requested by the PD. When a PD requests a higher Class than a PSE can support, the PSE assigns the PD to Class 3, Class 4, or Class 6, whichever is the highest Class it can support.

Option 1: If pse_avail_pwr is less than 5, this variable may not contain the actual requested Class by the PSE; see pd_req_pwr_probe.

Option 2: If pse_avail_pwr is less than 4, this variable may not contain the actual requested Class by the PSE; see pd_req_pwr_probe.

Values:

- 0: Class 0
- 1: Class 1
- 2: Class 2
- 3: Class 3
- 4: Class 4
- 5: Class 5
- 6: Class 6
- 7: Class 7
- 8: Class 8

Info (not part of baseline)

We can now remove Table 33-7 (which ties PSE Type to class_num_events) and Table 33-8 (which ties class_num_events to pse_avail_power). This is then replaced by a Table that links PSE Type to the allowed values of pse_avail_power.

Change text on page 85 as follows:

~~Type 3 and Type 4 PSEs shall meet at least one of the allowable variable definition permutations described in Table 33-7 and Table 33-8.~~

Type 3 and Type 4 PSEs shall set pse_avail_pwr, pse_avail_pwr_pri, and pse_avail_pwr_sec from the range in Table 33-7.

Remove Table 33-7 and 33-8.

Insert a new Table as follows:

Table 33-7 — Allowed Type 3 and Type 4 values for pse_avail_pwr, pse_avail_pwr_pri, and pse_avail_pwr_sec.

PSE Type	pse_avail_pwr	pse_avail_pwr_pri, pse_avail_pwr_sec
Type 3	1 to 6	1 to 4
Type 4	1 to 8	1 to 5

33.2.5.11 Type 3 and Type 4 functions

Remove variables pd_req_pwr and pd_allocated_pwr from the do_classification function.

Rename variables as follows:

Old name	New name
pd_class_detected	pd_class_sig
pd_class_detected_pri	pd_class_sig_pri
pd_class_detected_sec	pd_class_sig_sec

Add a new function do_class_probe as follows:

Info (not part of baseline)

Should we be more specific when defining HOW do_class_probe works ? For example:

This function discovers the requested PD Class by producing a number of classification events. This function follows the logic beginning at CLASS_EV1_LCE and ending either at MARK_EV3, MARK_EV_LAST, or IDLE.

do_class_probe

This functions discovers the requested Class of the PD by producing a number of classification events. This function returns the following variables:

pd_req_pwr_probe: This variable contains the requested Class of the PD.

Values:

- 0: Class 0
- 1: Class 1
- 2: Class 2
- 3: Class 3
- 4: Class 4
- 5: Class 5
- 6: Class 6
- 7: Class 7
- 8: Class 8

Change `do_classification_pri` (and `do_classification_sec` in similar manner) as follows:

`do_classification_pri`

This function returns the following variables for the Primary Alternative:

`pd_req_pwr_pri`: This variable indicates the power class requested by the PD. When a PD requests a higher class than a PSE can support, the PSE ~~shall~~ assigns the PD Class 3 or 4, whichever is the highest that it can support. See 33.2.7.

Values:

- 1: Class 1
- 2: Class 2
- 3: ~~Class 0~~ or Class 3
- 4: Class 4
- 5: Class 5 (pd_class_detected_pri will have a value of 4 for the first two class events and a value of ~~0~~ 3 for any subsequent class events.)

`pd_allocated_pwr_pri`: this variable indicates the Class assigned to the PD for the Primary Alternative.

Values:

- 1: Class 1
- 2: Class 2
- 3: Class 3
- 4: Class 4
- 5: Class 5

`pd_class_detected_sig_pri`: The PD classification signature seen during the most recent classification event; see Table 33–13 and 33.2.7. Primary Alternative.

Values:

- 0: Class 0
- 1: Class 1
- 2: Class 2
- 3: Class 3
- 4: Class 4
- 5: Class 5

33.2.5.12 Type 3 and Type 4 state diagrams

Change the arcs going from `DETECT_EVAL` and `CXN_CHK_DETECT_EVAL` to `CLASS_EV1_LCE` to go to `CLASSIFICATION` in stead.

Remove the `CLASS_EVAL` state from page 95.

Info (not part of baseline)

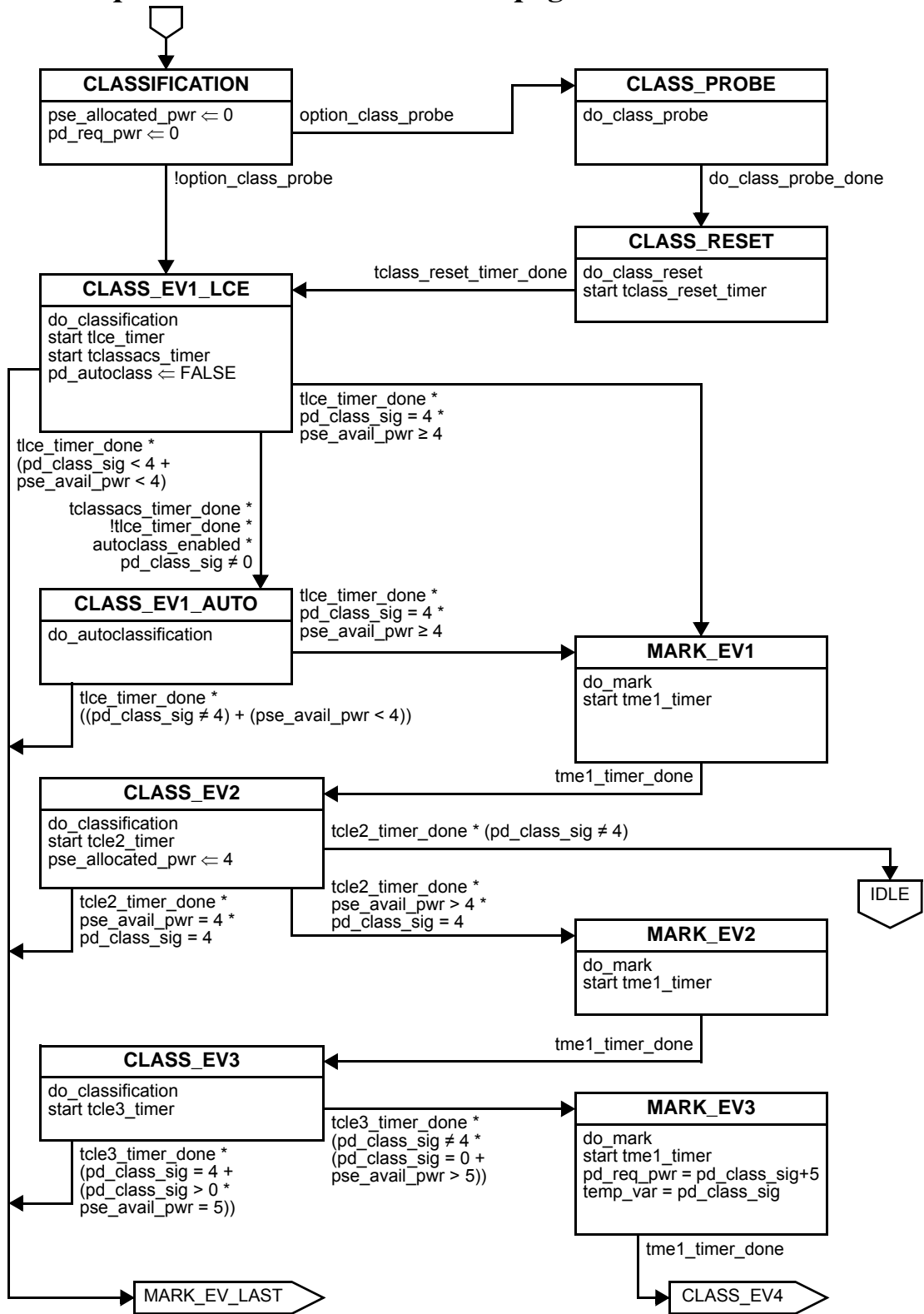
OPTION 1

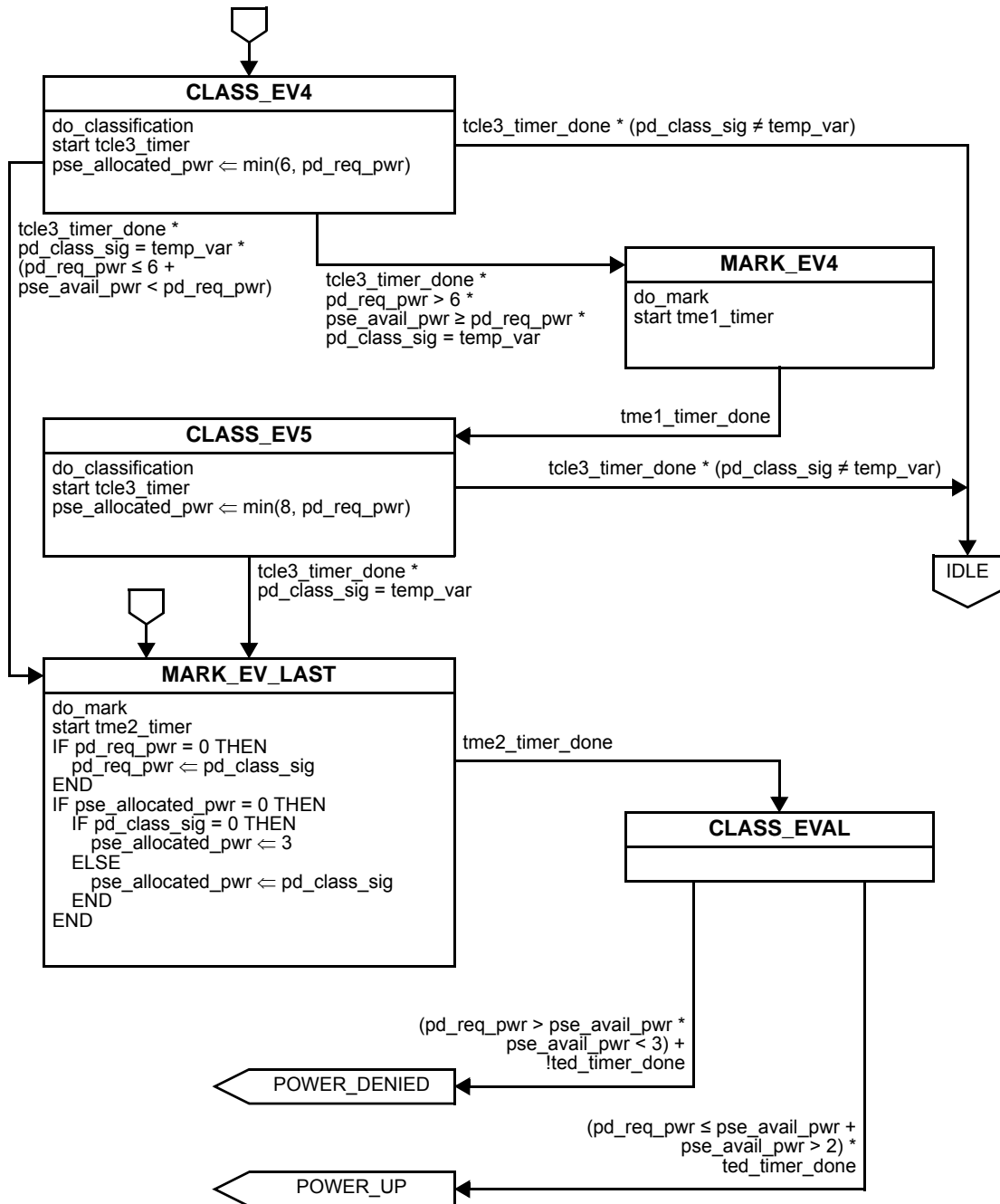
With option 1, if the PSE has `pse_avail_pwr=4` it will stop after 2 class events and will not know the PDs requested Class for sure. The `option_class_probe` (if enabled) can still find out the requested class, but that would cost a redundant class reset for this particular case.

OPTION 2

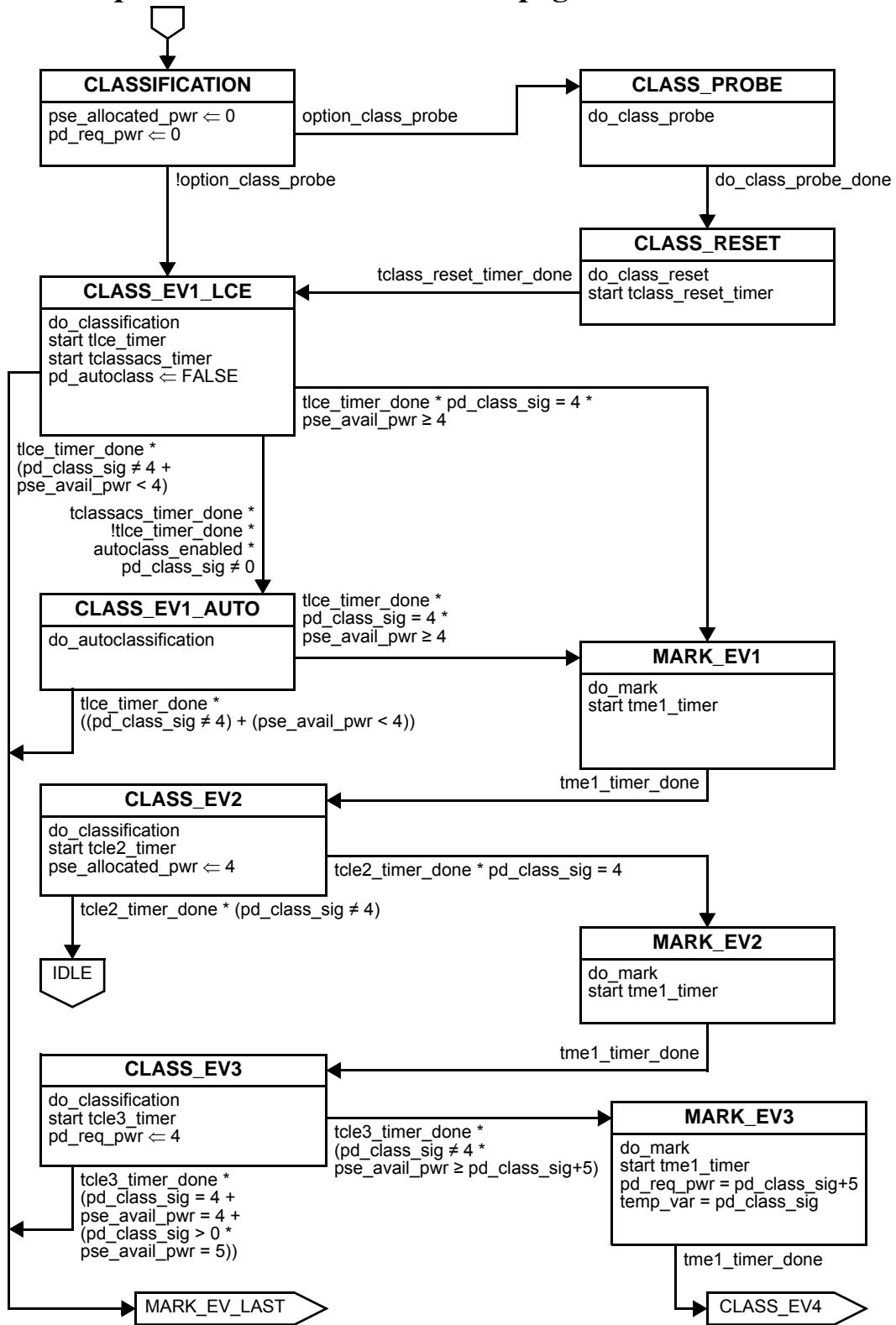
With option 2, the PSE will always produce at least 3 class events if it has `pse_avail_pwr=4` to determine the requested Class of the PD.

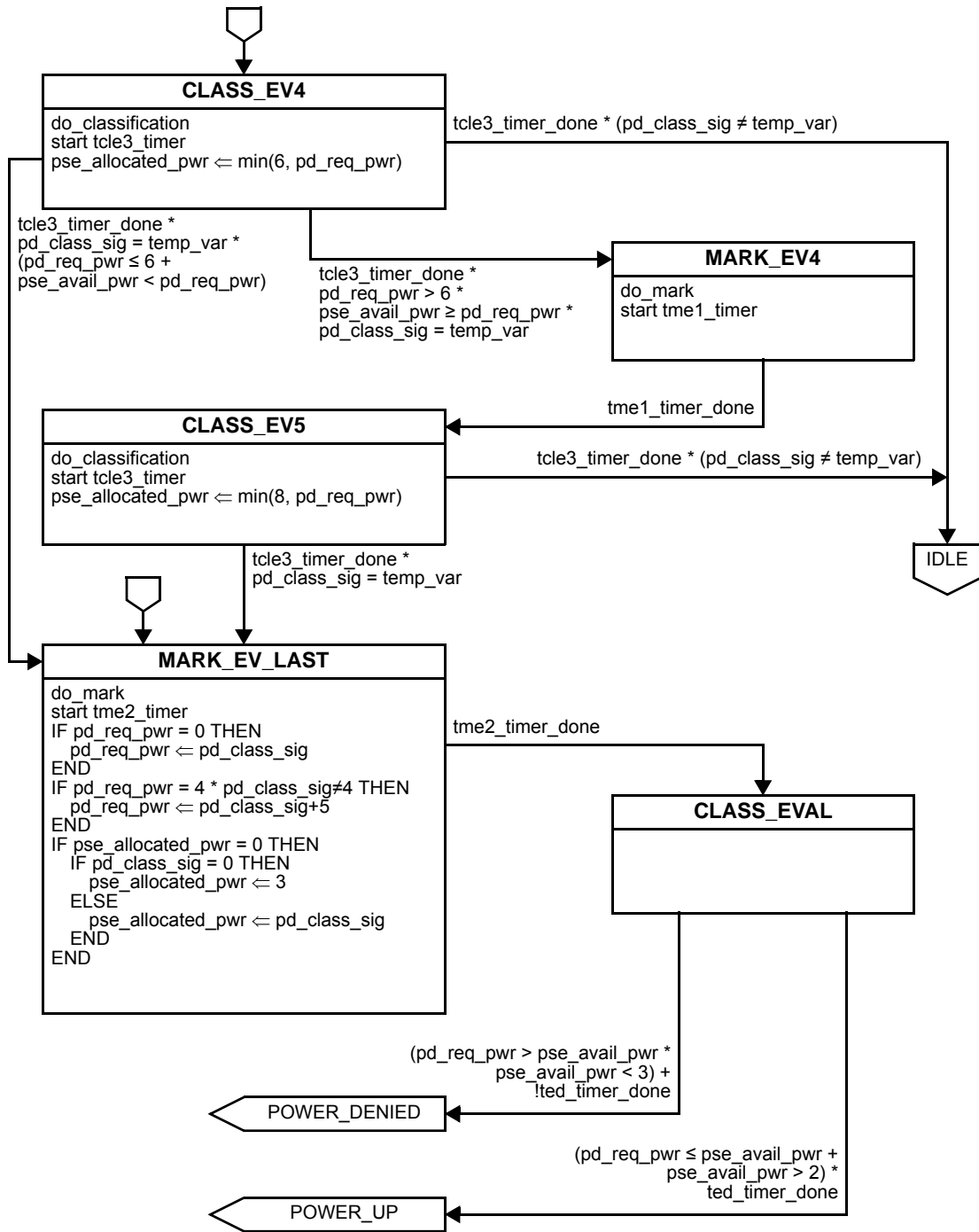
OPTION 1: Replace the classification SD on page 97 as follows:





OPTION 2: Replace the classification SD on page 97 as follows:





Below are the 'shall' statements currently still in the variable list implemented in the text below.

33.2.7 PSE classification of PDs and mutual identification

Change the text on page 106, line 5 as follows:

Physical Layer classification occurs before a PSE supplies power to a PD, when the PSE asserts a voltage in the range of V_{Class} as defined in Table 33–17 onto one or both pairsets. This is called a class event. The PD responds to each class event with a current representing one of a limited number of classification signatures.

The assigned Class is the result of the PDs requested Class and the number of class events produced by the PSE as shown in Table 33–13 and Table 33–14. See 33.3.6 for PD classification behavior. When a single- signature PD requests a higher Class than a Type 3 or Type 4 PSE can support, the PSE **shall** assign the PD to Class 3, 4, or 6, whichever is the highest that it can support. When a dual-signature PD requests a higher Class than a Type 3 or Type 4 PSE can support, the PSE **shall** assign ~~the PD that pairset~~ Class 3 or 4, whichever is the highest that it can support.

33.2.7.2 PSE Multiple-Event Physical Layer classification

Make changes to 33.2.7.2 as follows:

Type 2 PSEs shall provide a maximum of two class events and two mark events. ~~Type 3 and Type 4 PSEs that require more class events for mutual identification than the available power allows may issue a class reset event after performing mutual identification.~~

Type 3 PSEs

— shall ...

Type 4 PSEs

— shall ...

~~Type 3 and Type 4 PSEs that require more class events for mutual identification, or to discover the requested Class of the PD, than the available power allows may issue a class reset event after performing mutual identification or classification.~~

...

All class event voltages and mark event voltages shall have the same polarity as defined for V_{Port_PSE-2P} in 33.2.4. ~~Type 3 and Type 4 PSEs may issue classification events on one or both pairsets, when connected to a single-signature PD and operating over 4-pairs.~~

The PSE shall complete Multiple-Event Physical Layer classification and transition to the POWER_ON, POWER_ON_PRI, or POWER_ON_SEC state without allowing the voltage at the PI or pairset to go below V_{Mark} min, unless in the CLASS_RESET, CLASS_RESET_PRI, or CLASS_RESET_SEC states. If the PSE returns to the IDLE state, it shall maintain the PI voltage at V_{Reset} for a period of at least T_{Reset} min before starting a new detection cycle. If the PSE is in the CLASS_RESET, CLASS_RESET_PRI, or CLASS_RESET_SEC state it shall maintain the PI or pairset voltage at V_{Reset} for a period of at least T_{Reset} min.