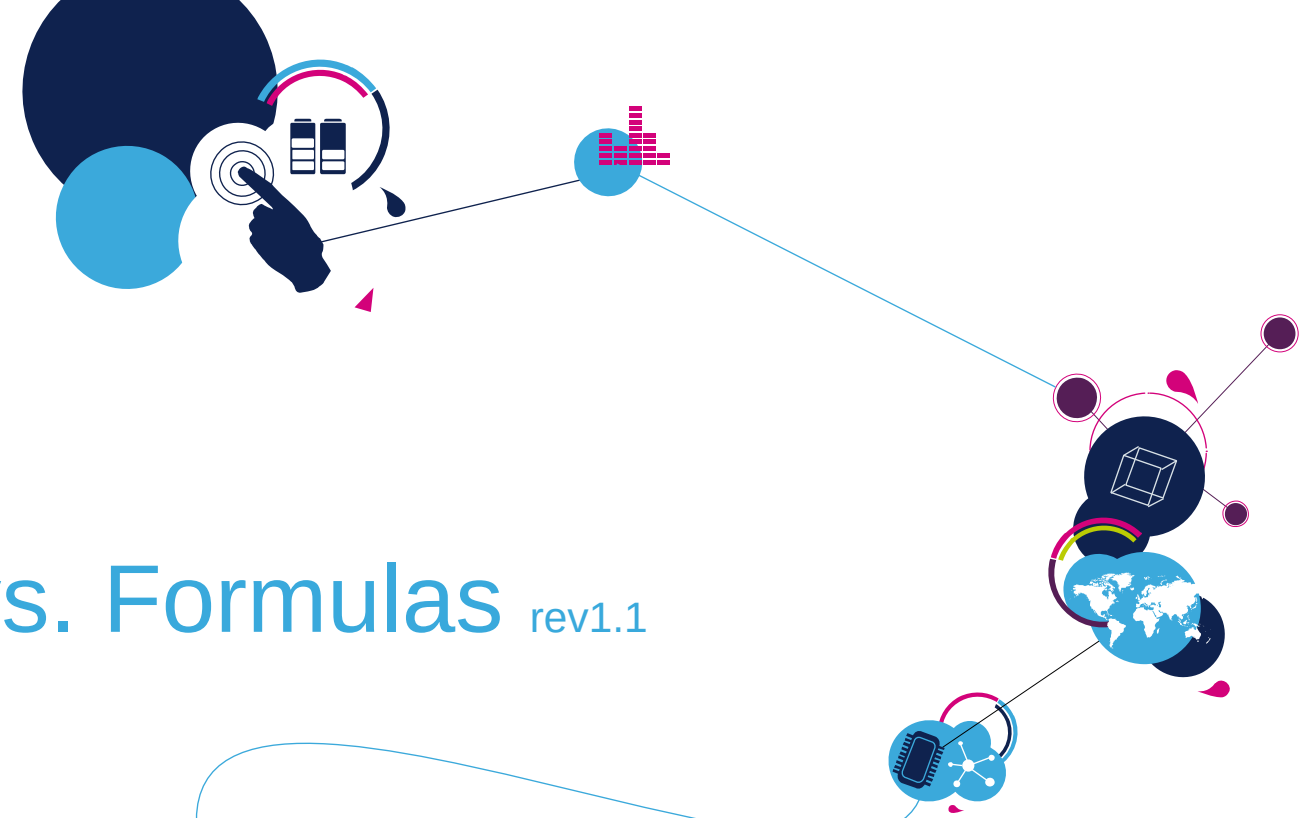

Number vs. Formulas rev1.1

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Introduction

- In several places of clause 33 the requirements are written as a formula instead of having a fixed number.
- This makes the standard hard to understand to unexperienced people, but somewhat inconvenient also to experts.
- Moreover formulas leaves room to interpretation, while numbers ensures a clear requirements.
- I understand that some formulas were chosen to leave flexibility to the implementer, but those cases has to be minimized in order to have a simple, clear and therefore strong standard.
- In particular, formulas are better placed into the clause text, while tables should be filled by numbers

Example 1 - Ptype - Table 33-11

- PSE Type power (Ptype) min value is defined in table 33-11 as a formula, depending on Icable and Vport_PSE-2P_min.

Symbol	Unit	Min	Max	PSE Type	Additional information
P_{Type}	W	$I_{Cable} \times (V_{Port\_PSE\text{-}2P}\ min)$		1, 2	15.4W for Type1 30.0W for Type2
		$I_{Cable} \times (V_{Port\_PSE\text{-}2P}\ min)$		3[1]	30.0W See 33.1.4, 33.2.7.11a
		$2 \times I_{Cable} \times (V_{Port\_PSE\text{-}2P}\ min)$		3	60.0W
		90	99.9	4	

- Both Icable and Vport_PSE-2P_min are fixed values defined for each Type on Table 33-1 and 33-11

- So switching from formulas to numbers is easy, and introduces no changes to the requirement.

Example 2 - Pclass - Table 33-7

- Table 33-7 defines Pclass depending on class and number of class events, but the definition is also depending on Ptype

Class	Number of Classification Events	Minimum supported power levels at output of PSE (P_{Class})	Ptype=
4	2 or 3	30W or P_{Type} as defined in Table 33–11, whichever is lower	30.0W
5	4	45W or P_{Type} as defined in Table 33–11, whichever is lower	60.0W
6	4	60W or P_{Type} as defined in Table 33–11, whichever is lower	60.0W
7	5	75W or P_{Type} as defined in Table 33–11, whichever is lower	90.0W

- Ptype, as just calculated, is always higher than Pclass as long as the PSE is performing the number of classification events defined in the second column, so the reference to Ptype may be removed.

- The behavior of a PSE connected to a higher Type PD is not really described. The sentence in the third column does not help.

Example 2 - Pclass - new Table 33-7

- If the PSE cannot supply the PD requested class, it will perform a lower number of classification events.

- A clear and easy way to describe this behavior is to list the cases of classes with a number of class events lower than expected

Requested Class	Number of Classification Events	Minimum supported power levels at output of PSE (P_{Class})	
4 to 8	2 or 3	30W or P_{Type} as defined in Table 33–11, whichever is lower	→30W
5	4	45W or P_{Type} as defined in Table 33–11, whichever is lower	→45W
6 to 8	4	60W or P_{Type} as defined in Table 33–11, whichever is lower	→60W
7	5	75W or P_{Type} as defined in Table 33–11, whichever is lower	→75W
8	5	P_{Type} as defined in Table 33–11	→90W

Example 3 - Icut-2P - Table 33-11

- Icut-2P min value is defined by a formula

$I_{CUT\text{-}2P}$	A	$P_{Class} / V_{Port\_PSE\text{-}2P}$	$I_{LIM\text{-}2P}$	1,2	Optional limit; see 33.2.7.6, Table 33–7.
		$K\_I_{cut} \times P_{Class} / V_{Port\_PSE\text{-}2P}$		3, 4	K_I_{cut} = 0.596 for Class 5 K_I_{cut} = 0.557 for Class 6 K_I_{cut} = 0.539 for Class 7 K_I_{cut} = 0.535 for Class 8

- In this case, this is necessary because it depends on the actual value of Vport_PSE_2P, and this gives flexibility to the PSE vendor to adjust the Icut depending on the output voltage

- So, it is ok to leave it unchanged, but the advantage to have a formula may be emphasized (In the additional information or in 33.2.7.6)

Conclusion

- Some definition, including Ptype, Pclass and Ilim-2P, which are described by a formula, can be replaced with numbers with no change to the requirement
- Some others, e.g. Icut-2P, cannot be replaced by numbers because the formula includes variables.
- There are probably some other parameters where formulas can be replaced, simplified or better explained, if the groups thinks this is worthwhile.

Thanks!