- **Summary of PSE and PD power supplies port requirements.**

- **Includes all last decisions from May/June 2001.**

- **Includes proposal for missing numbers and definitions**

- **Numbers and text that where not voted yet are marked with red color.**

- **Follows Tables 5,10 in Draft 1.2**

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PSE Output Port Electrical requirements - Table 5

Item	Parameter	Sym	Unit	Min	Max	Notes
1	Output voltage	Vport	Vdc	44	57	Inclusive of line, load, temperature variations.
2	a) Load Regulation, Dynamic		%		±5%	From 0.44W to 15.4W load step. Load rate of change 35mA/us max
	b) Settling Time		mSec		See note	From system point of view, I don't see a reason to specify short Settling Time (ms range) due to the fact that the PSE port output voltage allowed to changed between 44V to 57V and at the far end we have the DC/DC converter that should handle these variations. According to the above assumptions we can loosen the requirements. Max settling time = 1000ms max for 1% of the steady state value.
	c) PSE power supply output impedance		Ω		0.3	From DC to 100KHz at I5.4W load. For P<15.4W, Zout max = 0.3x15.4/ P. Note that it is not a requirement for PSE output port. It is a requirement for PSE power supply output.
3a	**Feeding through data pairs**					
	Ripple and noise, f < 500Hz.		Vpp		0.5	Common Mode Noise values. Differential noise limits can be 50% higher than the common mode noise values for frequencies above 2KHz.
	Ripple and noise, 20KHz - 150kHz.		Vpp		0.2	
	Ripple and noise, 150KHz-500KHz.		Vpp		0.15	
	Ripple and noise, 500KHz-5MHz.		Vpp		0.03	1. Applicable when feeding through signal carrying pairs.
	Ripple and noise, 5MHz-30MHz.		Vpp		0.015	2. The limits meant to ensure data integrity. To meet EMI standards, lower values may be needed.
	Ripple and noise, 30MHz-100MHz.		Vpp		0.015	
3b	**Feeding through non-data pairs**					
	Ripple and noise, 0 < f < 500Hz.		Vpp		0.5	Common Mode Noise values. Differential noise limits can be 50% higher than the common mode noise values for frequencies above 2KHz.
	Ripple and noise, 20KHz - 150kHz.		Vpp		0.5	
	Ripple and noise, 150KHz-500KHz.		Vpp		0.25	
	Ripple and noise, 500KHz-5MHz.		Vpp		0.25	1. Applicable when feeding through Non-signal carrying pairs.
	Ripple and noise, 5MHz-30MHz.		Vpp		0.25	2. The limits meant to ensure data integrity. To meet EMI standards, lower values may be needed.
	Ripple and noise, 30MHz-100MHz.		Vpp		0.05	
4	Port Capacitance During Detection	C_{port}	nF		530	
5	Output current- Normal Powering Mode at PSE min output voltage.	Iport	mAdc	10	350	1. Max current for PSE output voltage higher than 44V will be equal to 15.4W/Vport for Vport>44V. 2. Ripple current content (Iac) superimposed on the dc current level (Idc) is allowed if the total current (Irms) is 350mA max for a total input power of 15.4W. 3. The PSE should support the following ac current wave form parameters: Ip=0.4A for 50mSec and 5% duty cycle. The Rms, DC and ripple current are bounded by the following equation: $Irms^2 = Idc^2 + Iac^2$
6	Output current range - Startup Mode	Iinrush	mA	400	450	For duration of 50ms min, Duty cycle = 5% min.
7	a) Power Removal mode1	P_{MIN1}	mW	0	220	must remove power for t > T_{UDL}
	b) Power Removal mode2	P_{MIN2}	mW	220	440	may or may not disconnect for t > T_{UDL}
8	Under load time limit	T_{UDL}	mSec	300	400	The PSE will not remove power if the total power is less than 0.44W for less than 300ms duration. If an Under Load condition has detected, the PSE shall remove power within 400ms max.
9	Overload Current detection range	Icut	mA	350	400	A definition for Over Load conditions in which after time duration of Tovld the PSE shall disconnect the power from the port.
10	Overload time limit	Tovld	ms	50	70	If 350mA < Iovld <400mA for 50ms < Tovld < 70ms the PSE will disconnect the port.
11	Output current – at short load condition	I_{LIM}	mA	400	450	Max. value of the port current during short load condition. The power must disconnected from the power within T_{LIM}
12	Short load duration	T_{LIM}	ms	50	70	If fault condition is detected, the power will be disconnected from the port within $T_{LIM.}$
13	Turn on time after successful detection	T_{ON}	mSec		400	After successful detection and (optional) classification
14	Turn on rise time	T_{RISE}	uS	15		From 10% to 90% of Vport
15	Turn Off time	Toff	mSec		500	From Vport to 5Vdc
16	Continuous Average Output Power	Pport	Watts	15.4		Over the range of output voltage
	Isolation					
17	Port to Port		Vacrms		NA	ENV A
18	Port to Port		Vacrms		1500	ENV B
19	Port to chassis ground, PHY circuits		Vacrms		1500	ENV A,B

PD Input Port Electrical requirements - Table 10

Item	Parameter	Sym	Unit	Min	Max	Notes
1	Input voltage	Vport	Vdc	36	57	Inclusive of line, load, temperature variations.
2	a) Input average Power	P_{PORT}	Watts	0.44	12.95	For $C_{port < 180uF}$
	b) Input average Power	P_{PORT}	Watts	$P_{PORT}1$	12.95	For $C_{port > 180uF}$, $P_{PORT}1=0.44W* C_{port}$ [uF]/180
3	a) Port Capacitance During Detection	C_{port}	nF	50	110	
	b) Port Capacitance During Operation	C_{port}	uF	5	570	
	c) PD power supply input impedance from DC to f>fbw	Zin	Ω	30		Measured at the PD DC/DC converter input at load equivalent to 12.95W at PD power supply input. For P< 12.95W the max PD power supply input impedance will be limit to Zin=30x12.95/P The PD power supply input impedance is not including any circuitry between PD input to PD DC/DC converter input (EMI filter or PD power supply input capacitor effect etc.) Fbw is the crossover frequency of the DC/DC converter transfer function.
4	**Feeding through data pairs**					
	Ripple and noise, f < 500Hz.		Vpp		0.5	Common Mode Noise values. Differential noise limits can be 50% higher than the common mode noise values for frequencies above 2KHz.
	Ripple and noise, 20KHz - 150kHz.		Vpp		0.2	
	Ripple and noise, 150KHz-500KHz.		Vpp		0.15	
	Ripple and noise, 500KHz-5MHz.		Vpp		0.03	1. Applicable when feeding through signal carrying pairs.
	Ripple and noise, 5MHz-30MHz.		Vpp		0.015	2. The limits meant to ensure data integrity. To meet EMI standards, lower values may be needed.
	Ripple and noise, 30MHz-100MHz.		Vpp		0.015	
5	a) Input current- Normal Powering Mode at PD min input voltage.	Iport	mAdc	10	350	1. Max current for PD input voltage higher than 37V will be equal to 12.95W/Vport for Vport>37V. 2. Ripple current content (Iac) superimposed on the dc current level (Idc) is allowed if the total current (Irms) is 350mA max for a total input power of 12.95W. 3. The ac current wave form parameters is limited to the following numbers: Ip=0.4A max for 50mSec max and 5% duty cycle max. The Rms, DC and ripple current are bounded by the following equation: $Irms^2 = Idc^2 + Iac^2$.
	b) Input current range - Startup Mode	Iinrush1	mA	400	450	Limited by the PSE if For duration of 50ms min 70mS max if C_{port} < 180uF
	c) Input current range - Startup Mode	Iinrush2	mA		400	For duration of 50ms max if C_{port} > 180uF
6	a) PD Power supply turn on voltage	Von	Vdc	40	44	
	b) PD power supply turn off voltage	Voff	Vdc	30	33	