

Proposed Detection Source Material
For inclusion in
Requirements for the Powered Device (PD)
To Receive IEEE 802.3 Standard Power over MDI

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1. Definitions

A **Powered Device** (PD) is an endpoint on a LAN that is capable of receiving power from a **Power Source Element** (PSE) via IEEE 802.3 Standard Power over MDI (**MDI Standard Power**).

A **Powered PD** is a PD that is receiving MDI Standard Power.

An **Unpowered PD** is a PD that is not receiving MDI Standard Power.

The **Detection Signature** is the electrical characteristic that is presented by an unpowered PD for the purposes of being discovered by a PSE and subsequently being provided MDI Standard Power. A detection signature is either the **Default Class** (Class I) or an **Optional Class** (Class II – V).

The **Nonvalid Detection Signature** is the electrical characteristic that is presented by an unpowered PD so that it will not be discovered by a PSE and hence not be provided MDI Standard Power.

The **Signal Pairs** are pairs (1-2) and (3-6), where pair (1-2) is negative with respect to pair (3-6). Each wire in a pair is at the same dc potential.

The **Spare Pairs** are pairs (4-5) and (7-8), where pair (7-8) is negative with respect to pair (4-5). Each wire in a pair is at the same dc potential.

2. Detection Signature Requirements

If an unpowered PD will accept MDI Standard Power, the unpowered PD shall present a detection signature both at the Signal Pairs and at the Spare Pairs.

If an unpowered PD will not accept MDI Standard Power, the unpowered PD shall present a nonvalid detection signature both at the Signal Pairs and at the Spare Pairs.

When a PD becomes a powered PD, it shall present a nonvalid detection signature at the set of pairs from which it is not drawing power.

A detection signature shall have the following characteristics when measured at the input to the PD.

A PSE may detect a PD by driving out a voltage and measuring a current, or by driving out a current and measuring a voltage

Detection Signature Characteristics					
Parameter	Conditions	Min	Typ	Max	Unit
V-I Slope (dc) (all Power Classes)	2.8V < V < 10V, 0 uA < I < 500 uA	23.75		26.25	kohm
Current (dc) for Class I (Default Class, PD power up to 12.95 W) Note: (may be achieved with 23.75 to 26.25 kohm resistor)	19V < V < 21V			1	mA
Current (dc) for Class II (Optional Class, PD power up to 10 W)	19V < V < 21V	2		3	mA
Current (dc) for Class III (Optional Class, PD power up to 7 W)	19V < V < 21V	4		5	mA
Current (dc) for Class IV (Optional Class, PD power up to 4 W)	19V < V < 21V	6		7	mA
Current (dc) for Class V (Optional Class, PD power up to 1 W)	19V < V < 21V	8		9	mA

Voltage (dc) for Class I (Default Class, PD power up to 12.95 W) Note: (may be achieved with 23.75 to 26.25 kohm resistor)	1.0 mA < I < 10.0 mA, Vmax = 30 V	21		30	V
Voltage (dc) for Class II (Optional Class, PD power up to 10 W)	0.5 mA < I < 2 mA	10		19	V
	3 mA < I < 10 mA, Vmax = 30 V	21		30	V
Voltage (dc) for Class III (Optional Class, PD power up to 7 W)	0.5 mA < I < 4 mA	10		19	V
	5 mA < I < 10 mA, Vmax = 30 V	21		30	V
Voltage (dc) for Class IV (Optional Class, PD power up to 4 W)	0.5 mA < I < 6 mA	10		19	V
	7 mA < I < 10 mA, Vmax = 30 V	21		30	V
Voltage (dc) for Class V (Optional Class, PD power up to 1 W)	0.5 mA < I < 8 mA	10		19	V
	9 mA < I < 10 mA, Vmax = 30 V	21		30	V
Input Capacitance	2.8V < V < 22.5V			0.1	uF
Input Inductance	2.8V < V < 22.5V			100 (Seeking verification)	uH

A nonvalid detection signature shall have one or both of the following characteristics (i.e., the V-I slope and/or the input capacitance) when measured at the input to the PD.

Nonvalid Detection Signature Characteristics			
Parameter	Conditions	Range of Permitted Values	Unit
V-I Slope (dc)	V < 30V, I < 500 uA	Either greater than 33 or less than 15	kohm
Input Capacitance	V < 30V	Greater than 10	uF