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# Modifications for PoDL with NGAUTO

GITESH BHAGWAT

SANTA BARBARA DESIGN CENTER



Number of Occupants: 3-4  
Occupancy Level: 12%

NE

70°F  
21°C

CO <sub>2</sub>	VOC
540	0.6
PPM	PPM

# Presentation Outline

- ▶ Suggest Baseline text changes to add Type F system for NGAUTO
  - Clause 104 Modifications
  - Clause 45 Modifications
  - Other modifications
  
- ▶ Suggest MDI Return Loss Mask
  - Previous references: [bhagwat\\_3ch\\_02a\\_0718.pdf](#) and [bhagwat\\_3ch\\_01a\\_0918.pdf](#)
  - References in this meeting: [DenBesten\\_3ch\\_01\\_1118.pdf](#)

# Modify 104.1.3 and 104.4.1

- ▶ Add the following text (in red) after the existing text:

## 104.1.3 PoDL system types

A PoDL system consists of a PSE, a link segment, and a PD. A Type A or Type C PSE and Type A or Type C PD is compatible with 100BASE-T1 PHYs. A Type B or Type C PSE and Type B or Type C PD is compatible with 1000BASE-T1 PHYs. A Type C PSE and Type C PD is compatible with both 100BASE-T1 and 1000BASE-T1 PHYs. Type D PSEs and Type D PDs may be incompatible with IEEE 802.3 PHYs and may lack a data entity. **A Type F PSE and Type F PD is compatible with 2.5GBASE-T1, 5GBASE-T1 and 10GBASE-T1 PHYs.**

## 104.4.1 PSE Types

For PoDL systems there are multiple types of PSEs—Type A, Type B, Type C, ~~and~~ Type D and **Type F** consistent with 104.1.3.

# Modify Table 104-4

- ▶ 2.5GBASE-T1, 5GBASE-T1 and 10GBASE-T1 PSE requirements are kept same as 1000BASE-T1 systems
- ▶ Add the following text (in red) as shown below:

Item	Parameter	Symbol	Unit	Min	Max	Class	PD Type	Additional Information
...	...	...	...	...	...	...	...	...
3	Output slew rate dV/dt		V/ms	-	22	All	A,C	...
				-	40	All	A,C	...
				-	200	All	B,F	...
...	...	...	...	...	...	...	...	...

## Modify 104.4.6.3

- ▶ Add the following text (in red) after the existing text:

### 104.4.6.3 Power feeding ripple and transients

...

When measuring the ripple voltage for a Type A or Type C PSE as specified by Table 104–4 item (4a),  $f_1 = 31.8 \text{ kHz} \pm 1\%$ . When measuring the ripple voltage for a Type B **or Type F** PSE as specified in Table 104–4 item (4a),  $f_1 = 318 \text{ kHz} \pm 1\%$ .

...

When measuring the ripple voltages for a Type B **or Type F** PSE as specified by Table 104–4 item (4b), the voltage observed at the MDI/PI with the differential probe where  $f_1 = 318 \text{ kHz} \pm 1\%$  is post-processed with transfer function  $H_2(f)$  specified in Equation (104–3) where  $f_2 = 10 \text{ MHz} \pm 1\%$ .

# Modify 104.5.1 and 104.6.2

- ▶ Add the following text (in red) after the existing text:

## 104.5.1 PD types

For PoDL systems there are ~~four~~ **five** types of PDs—Type A, Type B, Type C, ~~and~~ Type D **and Type F** consistent with

## 104.6.2 Fault tolerance

The PI for Type A, Type B, ~~and~~ Type C **and Type F** PSEs and PDs shall meet the fault tolerance requirements as specified in 96.8.3.104.1.3.

# Modify 104.5.6.4

- ▶ Add the following text (in red) after the existing text:

## 104.5.6.4 PD ripple and transients

The ripple and transient specifications for a Type A or Type C PD shall be met for all operating voltages in the range of VPD sourced through a dc bias coupling network with MDI return loss as specified by Equation (96–11a), and over the range of PPD. The ripple and transient specifications for a Type B **or Type F** PD shall be met for all operating voltages in the range of VPD sourced through a dc bias coupling network with MDI return loss as specified by Clause 97, and over the range of PPD.

A digital oscilloscope or data acquisition module with a differential probe is used to observe the voltage at the MDI/PI. The input impedance,  $Z_{in}(f)$ , and transfer function,  $H1(f)$ , of the differential probe are specified by Equation (104–1) and Equation (104–2), respectively. When measuring the ripple voltage for a Type A or Type C PD as specified by Table 104–7 item (3a),  $f1 = 31.8 \text{ kHz} \pm 1\%$ . When measuring the ripple voltage for a Type B **or Type F** PD as specified by Table 104–7 item (3a),  $f1 = 318 \text{ kHz} \pm 1\%$ .

When measuring the ripple voltages for a Type A or Type C PD as specified by Table 104–7 item (3b), the voltage observed at the MDI/PI with the differential probe where  $f1 = 31.8 \text{ kHz} \pm 1\%$  shall be post-processed with transfer function  $H2(f)$  specified in Equation (104–3) where  $f2 = 1 \text{ MHz} \pm 1\%$ . When measuring the ripple voltages for a Type B **or Type F** PD as specified by Table 104–7 item (3b), the voltage observed at the MDI/PI with the differential probe where  $f1 = 318 \text{ kHz} \pm 1\%$  shall be post-processed with transfer function  $H2(f)$  specified in Equation (104–3) where  $f2 = 10 \text{ MHz} \pm 1\%$ .

# Modify Table 104-9

► Modify Table 104-9 as shown below:

Table 104-9- CLASS_TYPE_INFO Register Table											
Bit(s)	Name	Description								R/W	
b[15:12]	Type	15	14	13	12						RO
		1	1	1	0				= Type A		
		1	1	0	1				= Type B		
		1	0	1	1				= Type C		
		0	1	1	1				= Type D		
		0	0	1	1				= Type F		
...	..	...								...	

# Modify Table 45-211r

- Modify PoDL PSE Status 1 register bit definitions as shown below:

Bit(s)	Name	Description	R/W
..		...	...
13.2.2:0	PD Type	2 1 0	RO
		1 1 1 = Unknown	
		1 1 0 = Reserved	
		1 0 <del>Reserved</del> ×1 Type F PD	
		0 1 1 = Type D PD	
		0 1 0 = Type C PD	
		0 0 1 = Type B PD	
		0 0 0 = Type A PD	

Note: 0b100 is Type E (802.3cg)

# Modify Table 45-211s

- Modify PoDL PSE Status 2 register bit definitions as shown below:

Table 45–211s—PoDL PSE Status 2 register bit definitions					
Bit(s)	Name	Description			R/W
13.2.15	Invalid Class	1 = Invalid PD class detected 0 = No invalid PD class detected			RO/LH
...		...			...
13.2.2:0	PD Type	2	1	0	RO
		1	1	1 = Unknown	
		1	1	0 = Reserved	
				<del>Reserved</del>	
		1	0	×1 Type F PD	
		0	1	1 = Type D PD	
		0	1	0 = Type C PD	
		0	0	1 = Type B PD	
0	0	0 = Type A PD			

Note: 0b100 is Type E (802.3cg)

## Modify 45.2.7b.2.7

- ▶ Add the following text (in red) after the existing text:

### 45.2.7b.2.7 PSE Type (13.1.9:7)

Bits 13.1.9:7 report the PSE Type of the PSE as specified in 104.4.1. When read as 000, bits 13.1.9:7 indicate a Type A PSE, when read as 001 a Type B PSE is indicated, and when read as 010 a Type C PSE is indicated. and when read as 011 a Type D PSE is indicated, **and when read as 101 a Type F PSE is indicated.** Value of **110 is** reserved.

## Modify 45.2.7b.3.2

- ▶ Add the following text (in red) after the existing text:

### 45.2.7b.3.2 PD Type (13.2.2:0)

Bits 13.2.2:0 report a value of 111 until a valid classification has taken place, or if no PD is present. A value of 111 indicates that the PSE has not performed classification and therefore cannot indicate the proper value for the PD Type. Once a valid classification has occurred, the value of these bits reflect the PD Type of an attached PD as specified in 104.5.1. When read as 000, bits 13.2.2:0 indicate a Type A PD; when read as 001, a Type B PD is indicated; when read as 010, a Type C PD is indicated; **and**, when read as 011, a Type D PD is indicated, **and when read as 101, a Type F PD is indicated.** Values of ~~10x and~~ 110 **are is** reserved.

# Modify 1.4.415

- ▶ Add the following text (in red) after the existing text:

...

**1.4.418d Type D PoDL System:** A PoDL PSE, link section, and PD that lack a data entity or are incompatible with IEEE 802.3 PHYs.

**1.4.418f Type F PoDL System:** A system comprising a PoDL PSE, link section, and PD that are compatible with 2.5GBASE-T1, 5GBASE-T1 and 10GBASE-T1 PHYs.

# Modify 30.15.1.1.4 and 30.15.1.1.5

- ▶ Add the following text (in red) after the existing text:

typeA	Type A PoDL PSE
typeB	Type B PoDL PSE
typeC	Type C PoDL PSE
typeD	Type D PoDL PSE
typeF	Type F PoDL PSE

- ▶ Add the following text (in red) after the existing text:

typeA	Type A PoDL PD
typeB	Type B PoDL PD
typeC	Type C PoDL PD
typeD	Type D PoDL PD
typeF	Type F PoDL PD

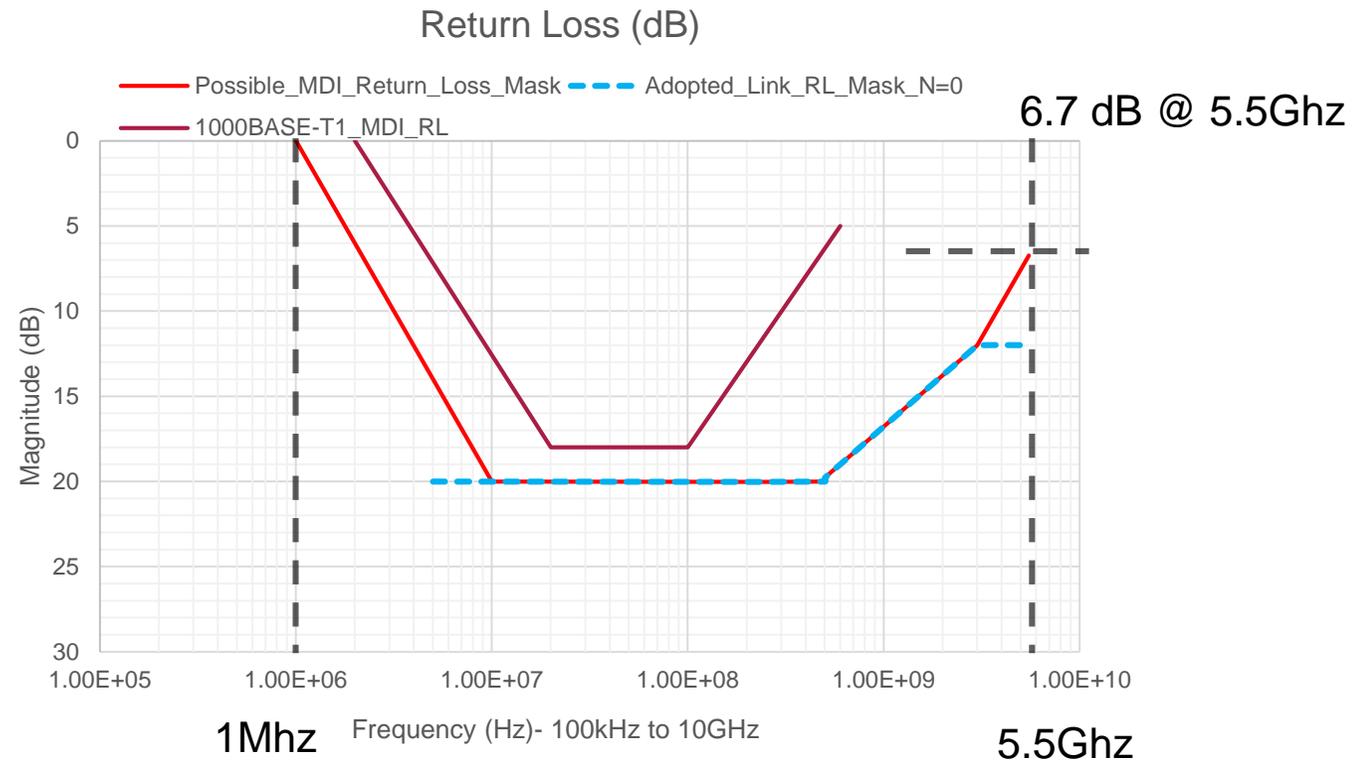
# MDI Return Loss

- ▶ References: [bhagwat 3ch 02a 0718.pdf](#) , [bhagwat 3ch 01a 0918.pdf](#) and [DenBesten 3ch 01 1118.pdf](#)
- ▶ 1000BASE-T1 MDI Return Loss shown for reference
- ▶ Low Frequency for NGAUTO extended to 1Mhz

## Return Loss $\geq$

- $20 - 20 \times \text{Log}_{10}\left(\frac{10}{f}\right)$  for  $1 \leq f \leq 10$
- 20 for  $10 \leq f \leq 500$
- $12 - 10 \times \text{Log}_{10}\left(\frac{f}{3000}\right)$  for  $500 \leq f \leq 3000$
- $12 - 20 \times \text{Log}_{10}\left(\frac{f}{3000}\right)$  for  $3000 \leq f \leq 5500$

where  $f$  is frequency in MHz



# Thank You!

QUESTIONS? FEEDBACK?