Updates for P802.3 dm TDD Proposal

IEEE P802.3 *dm Asymmetric Automotive Ethernet Task Force*

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Introduction

- This presentation provides update to the TDD based 802.3 dm text proposal presented in May 2025.
  - Previous Text Proposal: https://ieee802.org/3/dm/public/0525/Baseline_Text_for_TDD_PHY_V1_050925.pdf
  - Previous Presentation: https://ieee802.org/3/dm/public/0525/Baseline_Text_TDD_051125.pdf
- The updated text proposal adds new texts to the following Clauses/Sub-Clauses
  - 200.8.2.4 Transmitter power spectral density (PSD) and power level
  - 200.10.1.1.1 Insertion loss for 100M_MultiGBASE-V1 and MultiG+100MBASE-V1 PHY
  - 200.10.1.3.1 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 link segment return loss
- The updated text proposal can be found in the following document
  - Baseline_Text_for_TDD_PHY_V1.1_07_14_25.pdf

Addition to Clause 200.8.2.4 Transmitter Power Level

- Transmit power measured in test mode 5(TBD), shall be in the range specified in the Table 200-12. The calculation is based on original presentation here:https://www.ieee802.org/3/dm/public/0125/Chini_3dm_03a_0125.pdf
- The proposed text is copied below

200.8.2.4 Transmitter power spectral density (PSD) and power level

In test mode 5(TBD), the transmit signal on the MDI is as in the normal mode but it is continuous with no quiet gap and refresh period. the Transmit power measured in the test mode 5, shall be in the range specified in the table 200-12 (TBD).

	STP		Coax	
	Min	Max	Min	Max
2.5G/100M	0	2	-3	-1
5G	2	4	-1	1
10G	0	2	-3	-1

Table 200-12 – Power Levels

Addition to Clause 200.8.2.4 Transmitter PSD for –T1 PHY

- The power spectral density of 100M+MultiGBASE-T1 and MultiG+100MBASE-T1 shall be between the upper and lower masks specified in Equation 200-14 and Equation 200-15. The original presentation is here: https://www.ieee802.org/3/dm/public/0125/Chini_3dm_03a_0125.pdf
- The definition of R (Tx symbol Rate Scaling factor) is shown in Table-200-13 and PSD mask factor K is shown in Table 200-14

$$UPSD(f) \begin{cases} -89 - K & \text{dBm/Hz} & 40 < f < 1200 \times R \\ -87 - K - f / (600 \times R) & \text{dBm/Hz} & 1200 \times R < f < 3000 \times R \\ -80 - K - f / (250 \times R) & \text{dBm/Hz} & 3000 \times R < f < 5000 \times R \end{cases}$$

Equation: 200-14

PHY type	R
100M+MultiG BASE-T1/V1	0.5
2.5G+100M BASE-T1/V1	0.5
5G+100M BASE-T1/V1	1
10G+100M BASE-T1/V1	1

Table 200-13 – Tx Symbol Rate Scaling factor

$$LPSD(f) \begin{cases} -93 - K & \text{dBm/Hz} & 40 < f < 600 \times R \\ -92 - K - f / (600 \times R) & \text{dBm/Hz} & 600 \times R < f < 2400 \times R \\ -86.4 - K - f / (250 \times R) & \text{dBm/Hz} & 2400 \times R < f < 3500 \times R \end{cases}$$

Equation: 200-15

Where f is the frequency in MHz

PHY type	K
100M+MultiG BASE-T1/V1	0
2.5G+MultiG BASE-T1/V1	0
5G+MultiG BASE-T1/V1	0
10G+MulitG BASE-T1/V1	2

Table 200-14 – PSD mask K factor

Addition to Clause 200.8.2.4 Transmitter PSD for –T1 PHY

- The power spectral density (T1 PHY) upper and lower masks are shown in Figure 200-34, 200-35 and 200-36.

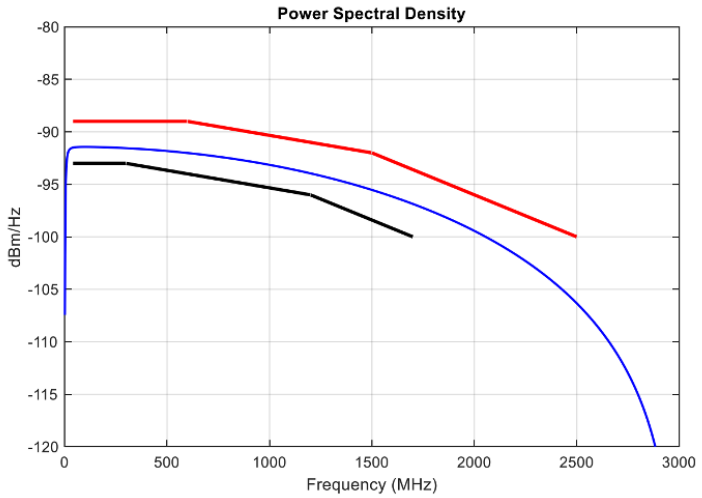

Figure: 200-34(TBD) Transmitter Power Spectral Density for 100M+MultiGBASE-T1 or 2.5G+100MBASE-T1, upper and lower masks

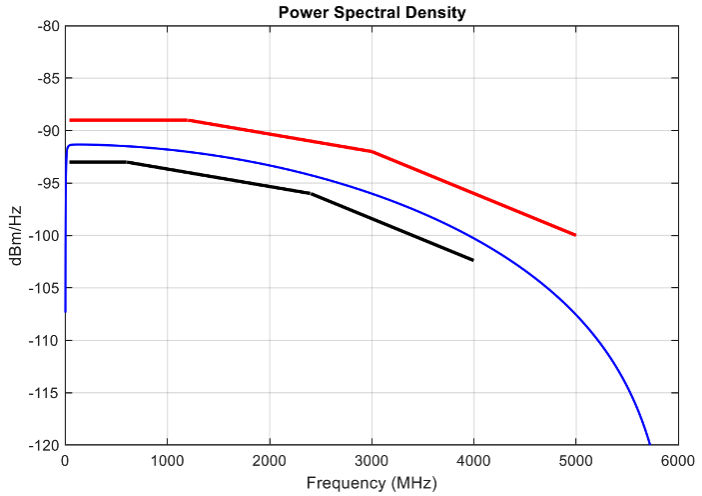

Figure: 200-35(TBD) Transmitter Power Spectral Density for 5G+100MBASE-T1, upper and lower masks

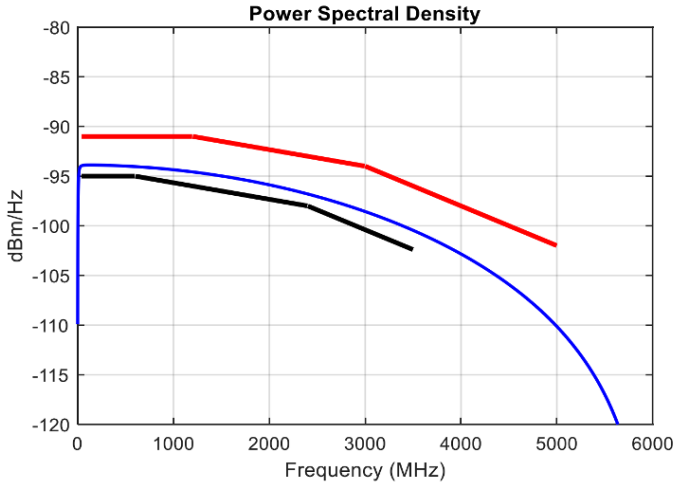

Figure: 200-36(TBD) Transmitter Power Spectral Density for 10G+100MBASE-T1, upper and lower masks

Addition to Clause 200.8.2.4 Transmitter PSD for -V1 PHY

- The power spectral density for 100M+MultiGBASE-V1 or MultiG+100MBASE-V1 PHY upper and lower masks are specified as following text:

For PHY types 100M+MultiGBASE-V1 or MultiG+100MBASE-V1, with Single Ended termination of 50 ohm, both upper and lower PSD Masks are lower by 3dB from Equation 200-14, Equation 200-15, Figure 200-34, Figure 200-35 and Figure 200-36.

Addition to Clause 200.10.1.1 Insertion Loss

- 200.10.1.1.1 Insertion loss for 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 PHY
- The original presentation is here: https://www.ieee802.org/3/dm/public/0724/Zerna_802.3dm_01b_240717_IL_RL_Limits.pdf
- The new texts are copied below:

200.10.1.1.1 Insertion loss for 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 PHY

The link-segment insertion loss for 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 link segment shall meet the values determined using Equation 200-16

$$IL \leq 15\left(0.000055f + 0.023\sqrt{f} + \frac{0.032}{\sqrt{f}} + 0.02\right) - 0.05\sqrt{f}$$

$$f \text{ in } MHz, f \geq 10\ MHz$$

Equation: 200-16

Addition to Clause 200.10.1.1 Insertion Loss

- The insertion loss for –V1 PHY is illustrated in Figure 200-38
- The insertion loss for –T1 PHY is TBD

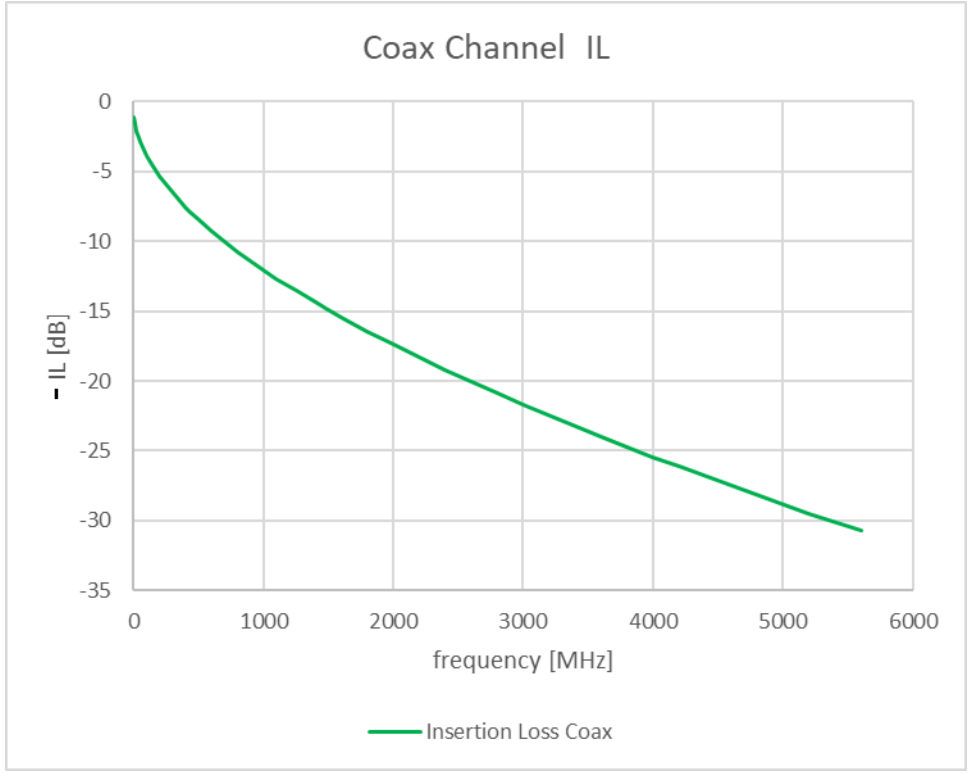

Figure: 200-38(TBD) Insertion loss calculated using Equation 200-16

Addition to Clause 200.10.1.3 Return Loss

- 200.10.1.3.1 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 link segment return loss
- The original presentation is here: https://www.ieee802.org/3/dm/public/0724/Zerna_802.3dm_01b_240717_IL_RL_Limits.pdf
- The new texts are copied below:

200.10.1.3.1 100M+MultiGBASE-V1 and MultiG+100MBASE-V1 link segment return loss

The link segment return loss shall meet the values determined by using Equation (200- 17) at all frequencies from 10MHz to 5GHz. The reference impedance for the return loss specification is 50 ohm.

$$RL \geq \begin{cases} 12.5 & 10\ MHz \leq f < 500\ MHz \\ 12.5 - 3\frac{f-500}{1500} & 500\ MHz \leq f < 2000\ MHz \\ 9.5 - 3\frac{f-2000}{2500} & 2000\ MHz \leq f < 4500\ MHz \\ 6.5 & 4500\ MHz \leq f \leq 5000\ MHz \end{cases} \text{dB}$$

Equation: 200-17

Where f is the frequency in MHz;

Addition to Clause 200.10.1.3 Return Loss

- The return loss for –V1 PHY is illustrated in Figure 200-39
- The return loss for –T1 PHY is TBD

Figure: 200-39 Return loss calculated using Equation 200-17

Thank You!