

Improved TX-PSD Mask for PAM3 Modulation

Norfolk, VA

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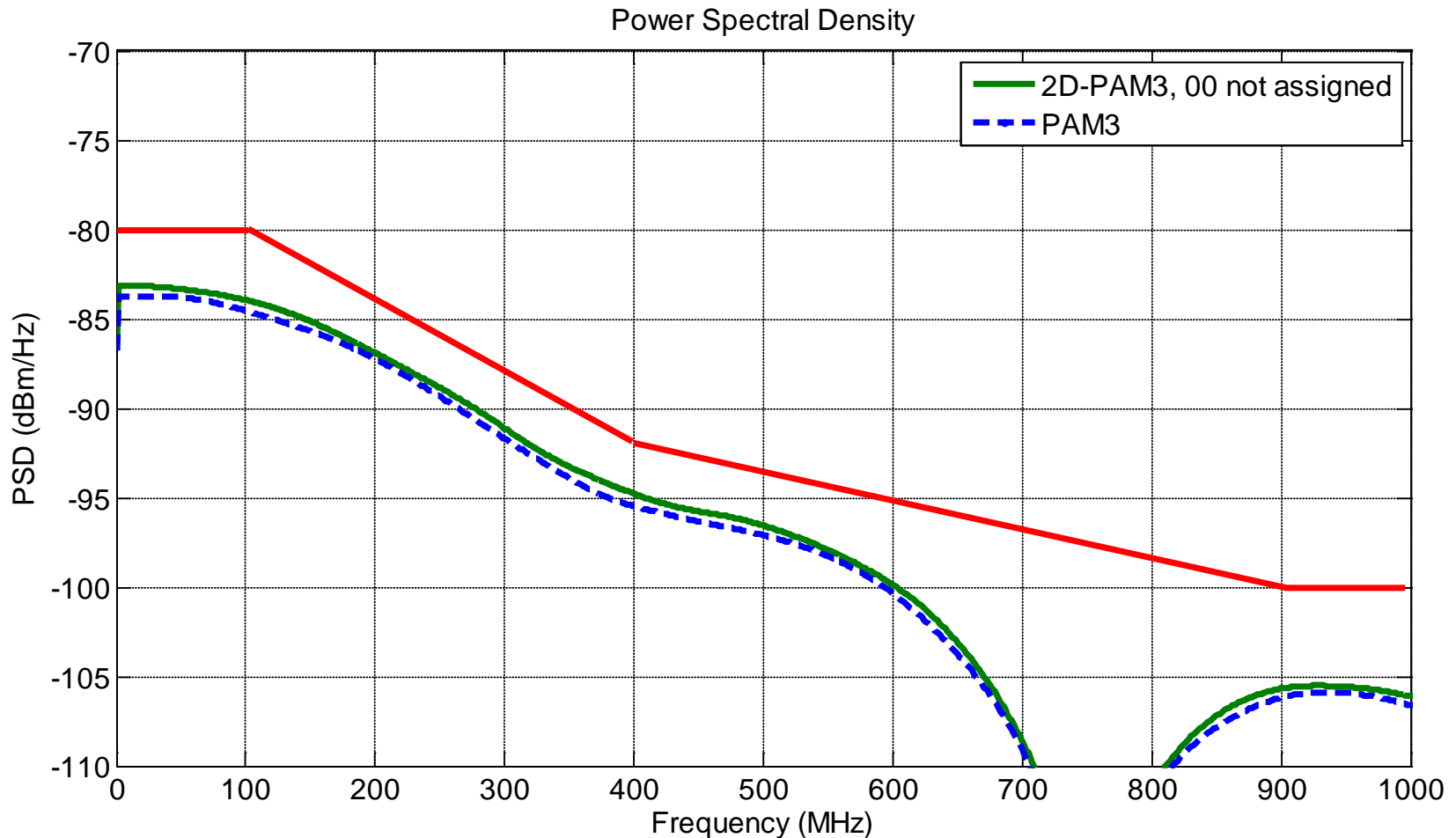
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Foreword

- New TXPSD MASK is suggested for 1000BASE-T1 given PAM3 modulation is approved.
- The new MASK requires less harsh shaping of PSD, resulting in significantly smaller DFE coefficients and lower error propagation.
- The new MASK correlates with PRF shaping specified in clause **40.6.1.2.3 Differential output templates** of IEEE 802.3. For TX Voltage of up to 1Vpp, the specified PSD shape passes the original PSD MASK.
- The new MASK relaxes the requirement by up to 2dB in 100MHz to 400MHz range. This allows TX Voltage increase of up to 35% using same PSD shaping and therefore same increase in noise immunity. The increased TX level however is subject to emission tests for a given DUT and a particular cable assembly.
- The new MASK tightens the original MASK for frequencies below 100MHz and above 600MHz. The tighter MASK should help with more uniform design and interoperability across industry.

TXPSD MASK for PAM3 modulation



Used PRF ($0.75+0.25Z^{-1}$) specified in 1000BASE-T and 1st order 600MHz LPF, 1Vpp at MDI. The plots are for example symbol rate of 750MHz.

Suggested Upper PSD MASK Definition

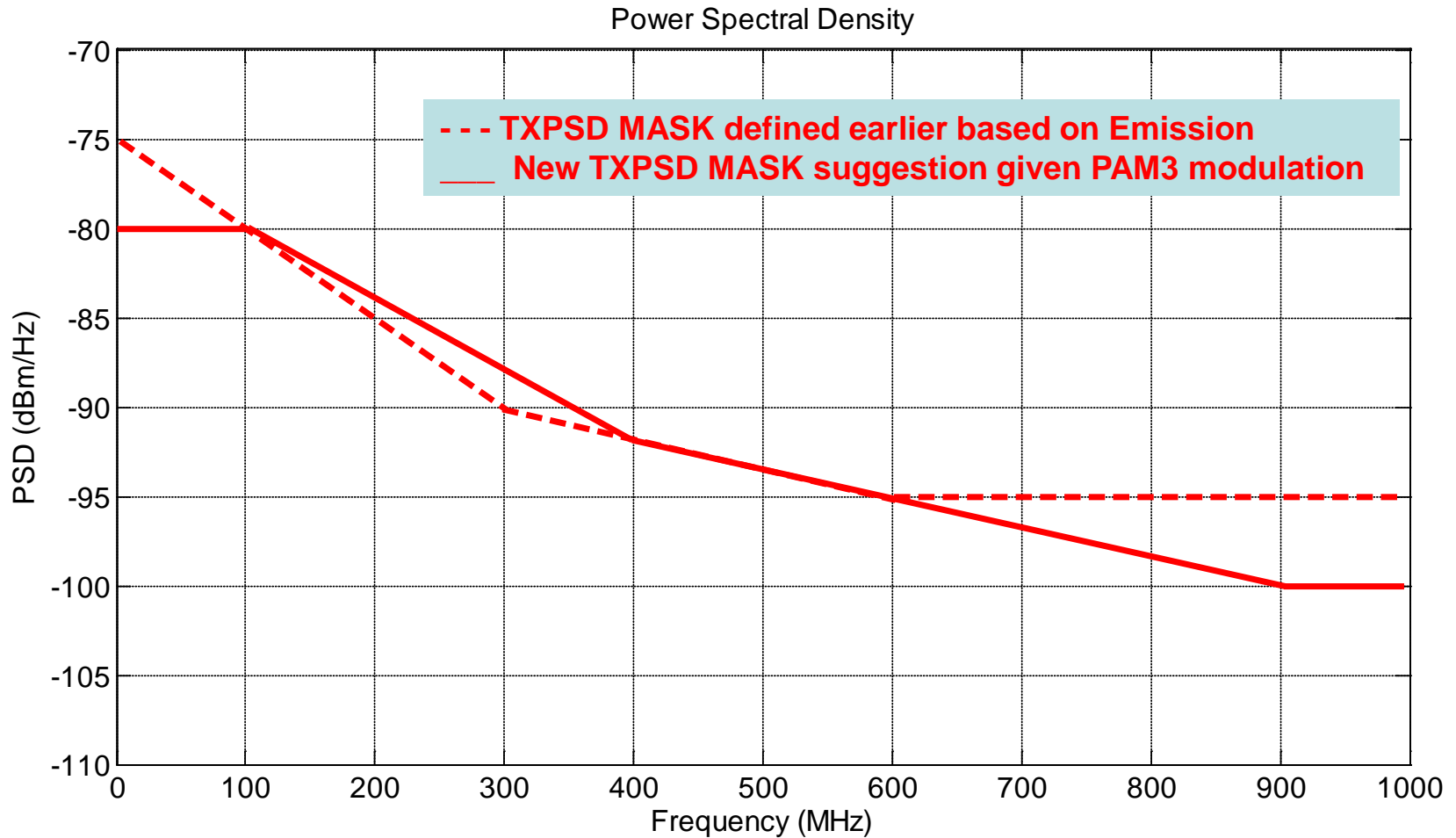
-80	dBm/Hz	$0 < f_{\text{MHz}} < 100$
$(-76 - f_{\text{MHz}}/25)$	dBm/Hz	$100 < f_{\text{MHz}} < 400$
$(-85.6 - f_{\text{MHz}}/62.5)$	dBm/Hz	$400 < f_{\text{MHz}} < 900$
-100	dBm/Hz	$900 < f_{\text{MHz}} < 1000$

- A Lower PSD MASK may be defined as;

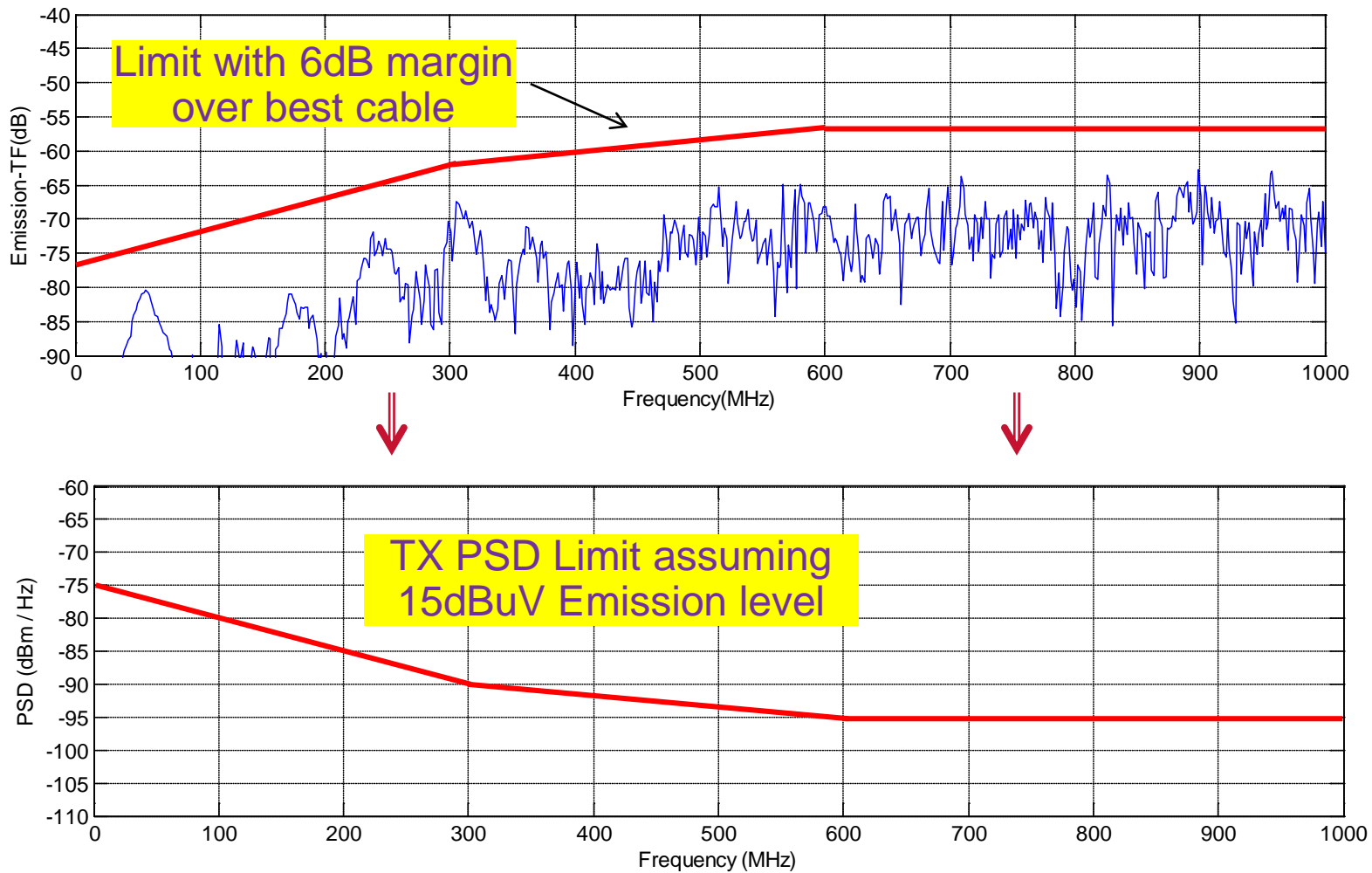
$$\text{Upper PSD MASK - 6dB} \quad 0 < f_{\text{MHz}} < 500$$

Appendix

TXPSD MASK for PAM3 versus original TXPSD MASK



TXPSD MASK derived earlier for Emission compliance



- **CM termination not used in shown measurements, should help reduce resonances near 300MHz.**