

# Comparison of transmitter metrics for 100GBASE-SR4 (continued)

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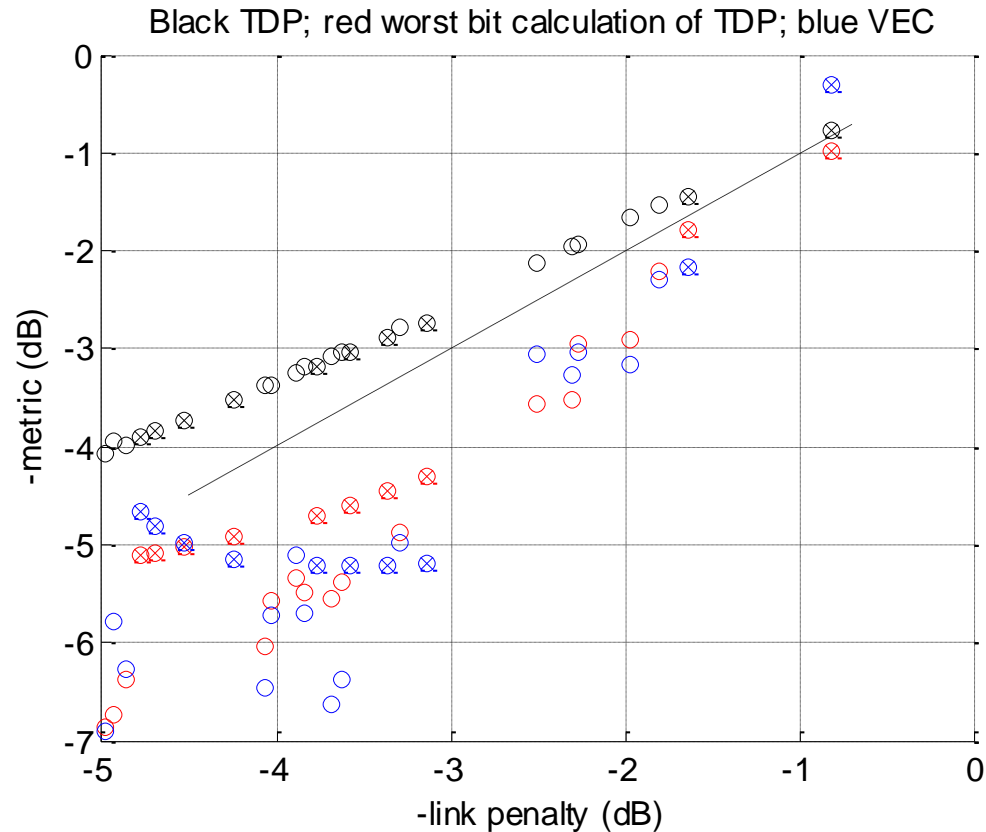
# Introduction

- Last week I showed that TDP correlates very well to link penalty
- This week I look more closely at the scatter in VEC and Tx penalty and look for mitigations

# TDP, VEC, Tx penalty

- Traditionally TDP is defined with a reference Tx and reference Rx, with scope and power meter for finding OMA
  - For BER =  $5e-5$ , reference Rx could be a scope
  - Well chosen reference Rx BW means TDP correlates to link penalty
  - Sensitivity method does the error statistics correctly
- VEC is defined with scope
  - Need to find OMA anyway
  - Scope BW taken as the default *Cause of error*
  - Need to choose the "all but" level correctly to have even poor correlation to link penalty *Cause of error*
- Tx penalty (aka TP2 penalty) could be defined with a reference Tx and reference Rx, with scope and power meter for finding OMA
  - For BER =  $5e-5$ , reference Rx can be the scope
  - Reference BW is the default *Cause of error*
  - Sensitivity method does the error statistics correctly

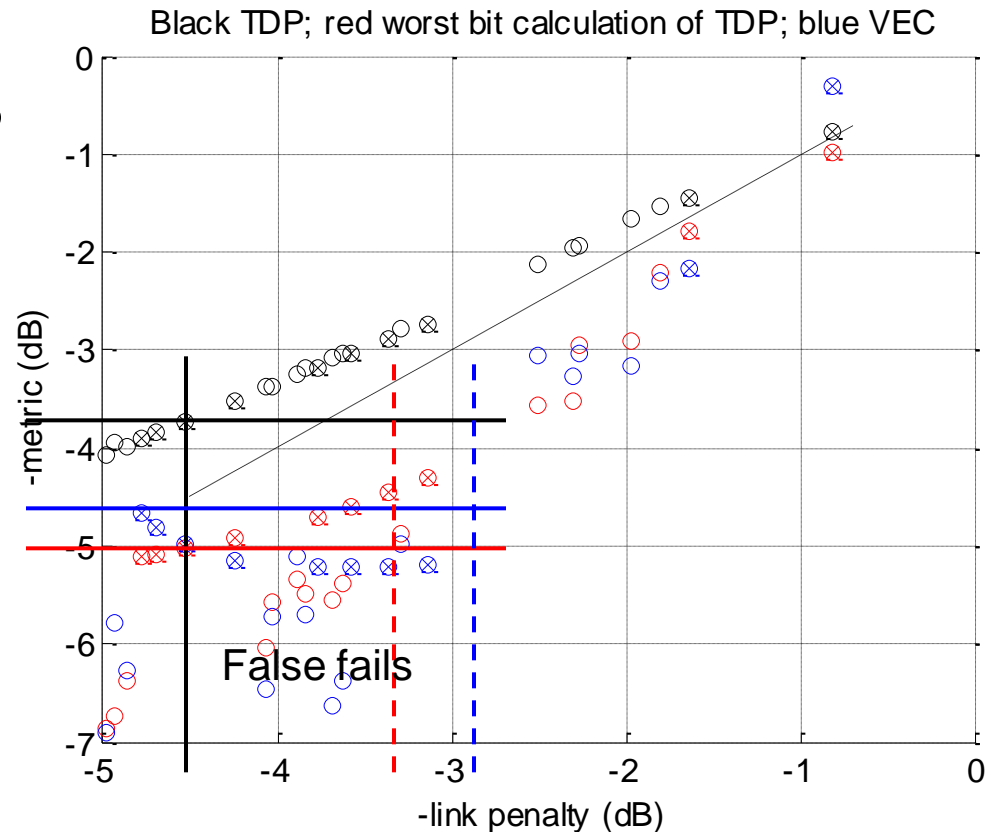
# Three metrics for predicting link penalty



- Gaussian (x) and laser-like waveforms
- TDP correlates well to link penalty
- Worst bit calculation of TDP not well
- VEC badly

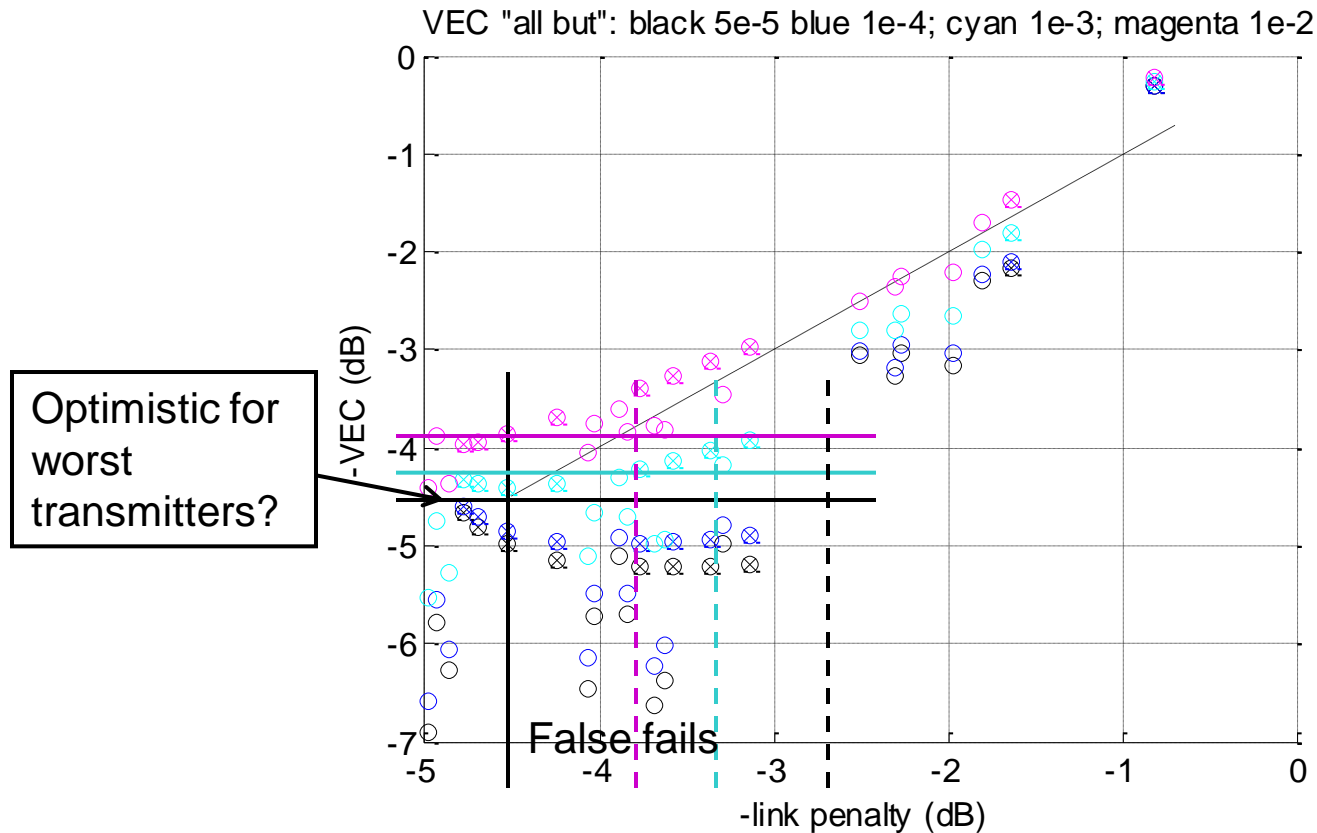
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# Three metrics



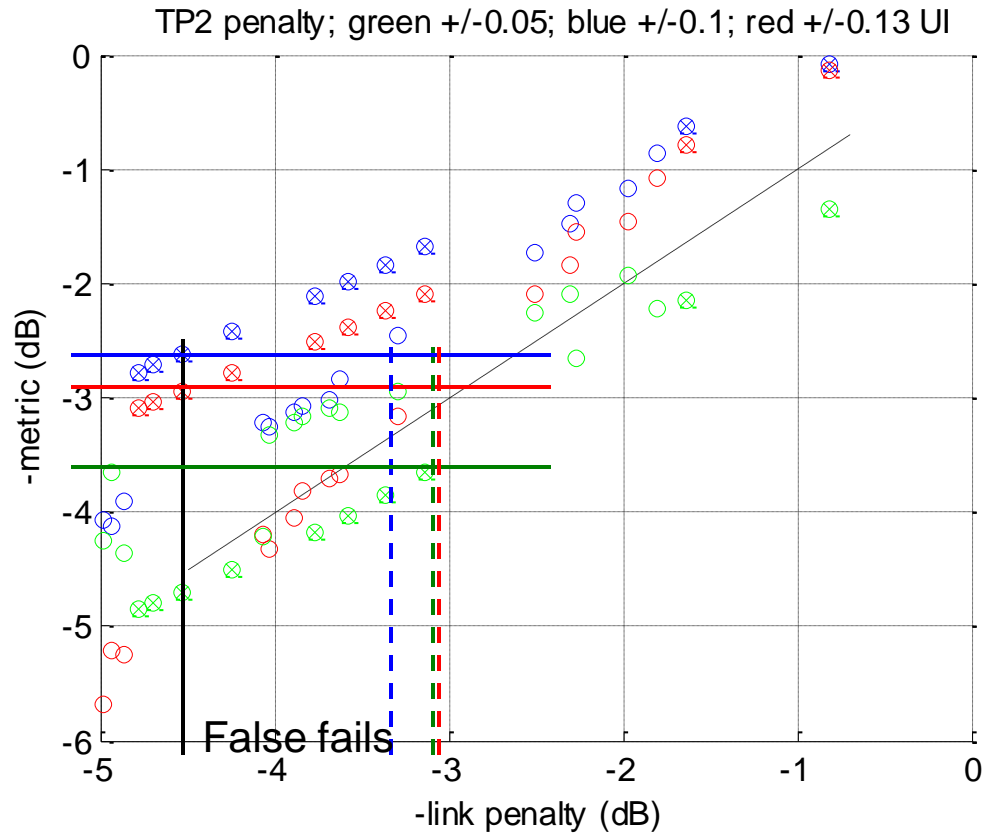
- If we wanted to reject transmitters with more than 4.5 dB link penalty
- With TDP, correlation is good: practical calibration issues dominate
  - A gradient just less than 1 is ideal
- With this VEC metric, we would have to set the bar around -4.6 dB on the vertical scale, rejecting some transmitters with 3 to 4 dB penalty
- i.e. building around 1.5 dB of inaccuracy
- Can we do better?

# Setting the "all but" value in VEC



- Setting the "all but" value better improves correlation and reduces the range of false fails significantly

# Tx penalty

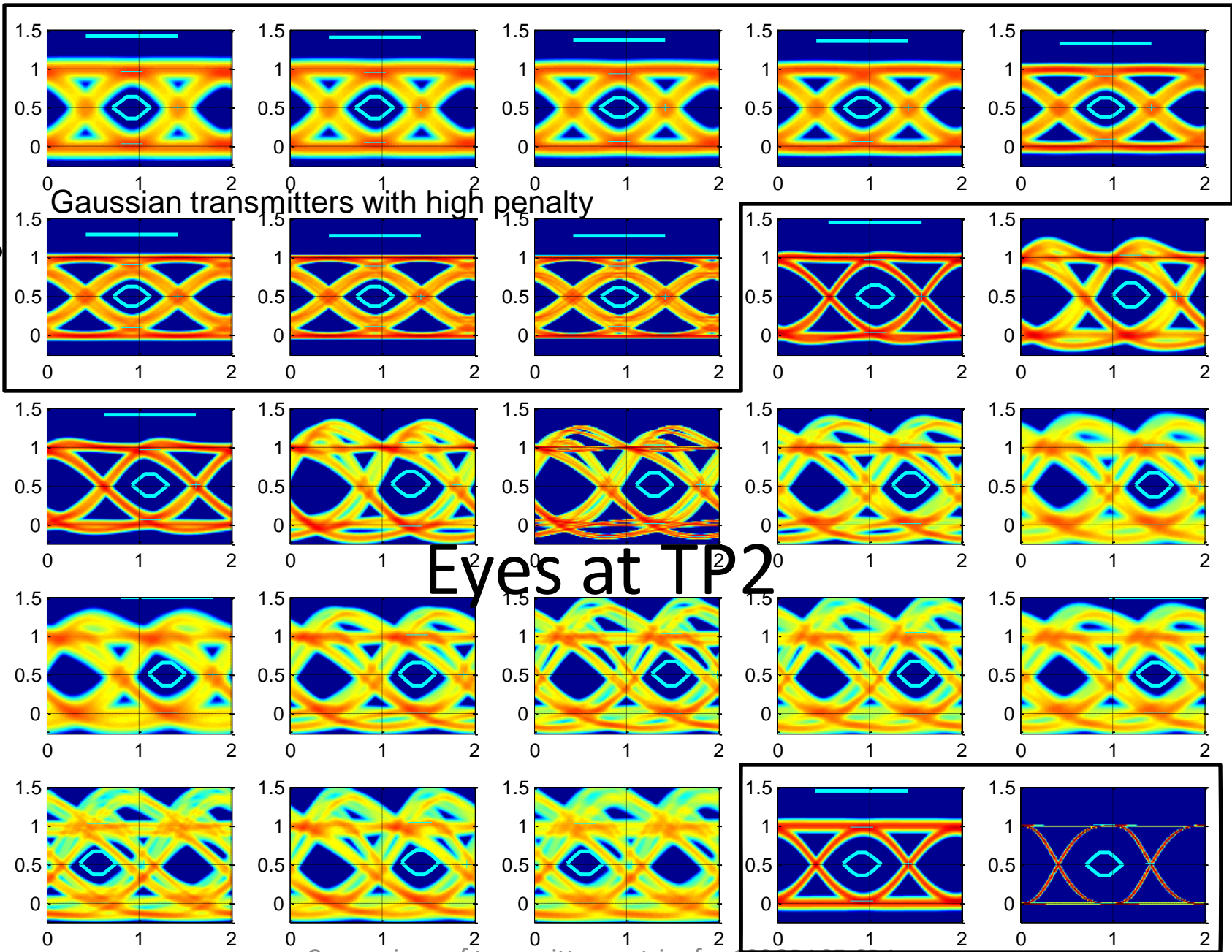


- Scatter caused by non-optimum Rx BW

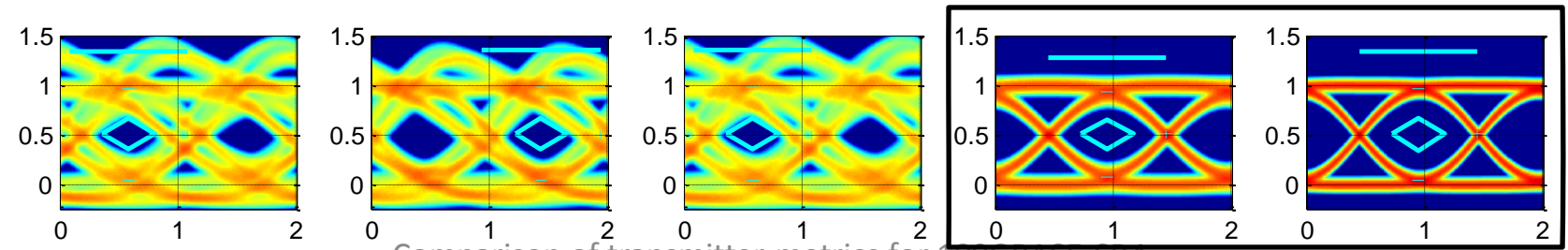
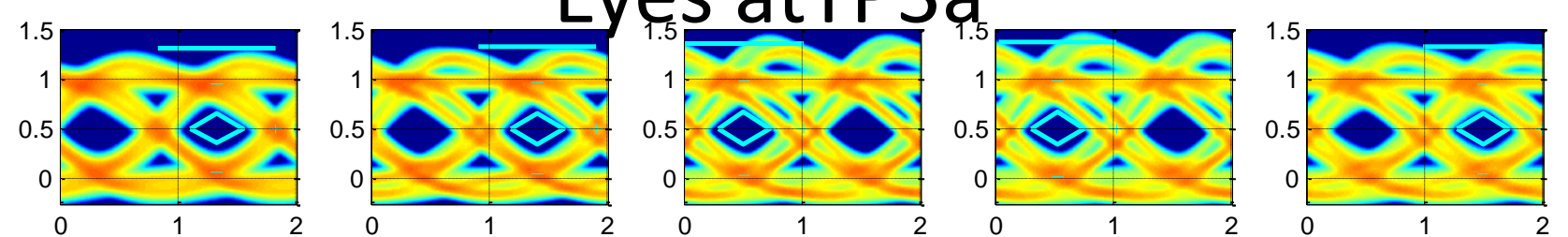
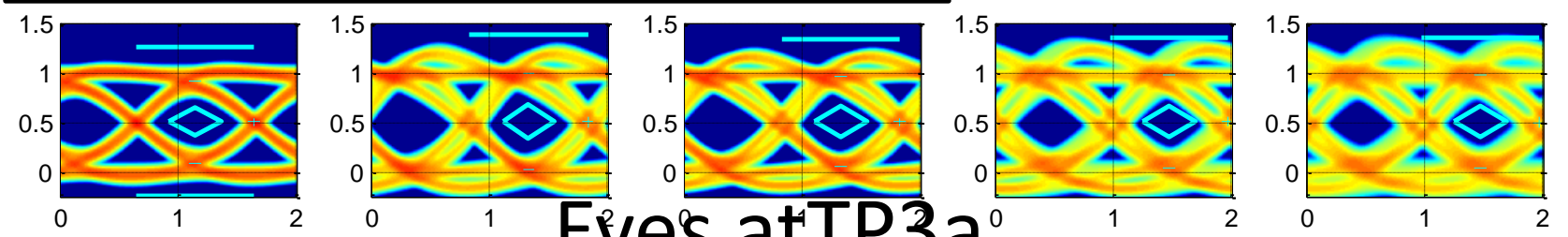
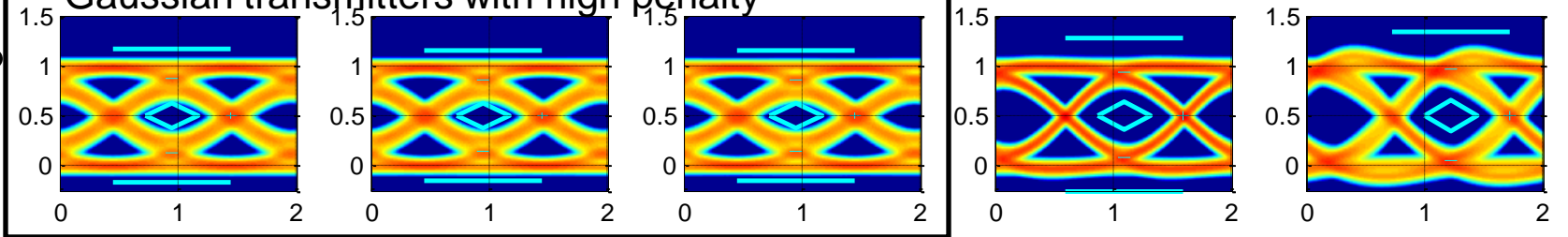
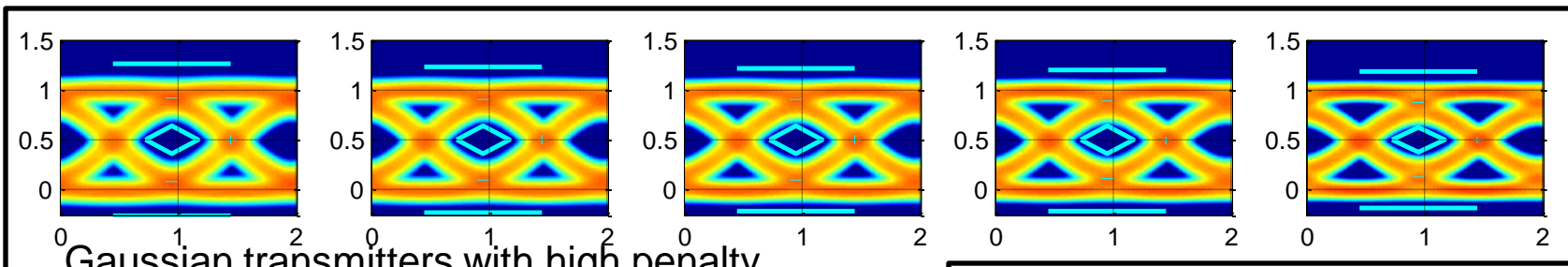
# Eye examples

- In the next two slides there are:
- 8 Gaussian transmitters arranged in order of increasing link penalty (not the same DJ as the previous set)
- 10 laser-like transmitters arranged in order of increasing link penalty
- 2 Gaussian reference transmitters
- Waveforms seem to pass or are close to limit for Tx mask at TP2
- All seem to pass the SRS mask at TP3a





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(continued)



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Gaussian reference transmitters 10