# High K signal

## P802.3db Draft 3.0 comment 36

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# Introduction

- While OMA-TECQ-loss and OMA-TDECQ-loss protect the budget so that the receiver has enough signal,

- K' and K, with the overshoot spec, protect the receiver from a signal that is too bad even when equalised

- K' = TECQ - Ceq', K = TDECQ – Ceq (all in dB)

- In Draft 3.0,

- as Ceq' and Ceq >= ~-0.8 dB, and TECQ, TDECQ <= 4.4 dB,

- K', K <= 4.4 + 0.8 = 5.4 dB = very bad

- Is such a bad signal possible, considering the constraints such as the overshoot limit?
  - Yes

- Is allowing such a signal useful to the transmitter?
  - No

# The comment

- *Cl* **167** *SC* **167.7.1** *P* **52** *L* **29** # I-36        *Comment Type* **TR**
- In VR, the difference between TP2 and TP3 in VR is small so an unfortunately set-up VR transmitter can be in the top left corner of the TDECQ map while still meeting the TDECQ and overshoot specs. With the extra taps and threshold adjust range in this clause's TDECQ it would be well equalised, so there won't be so much padding, conservatism and need for measurement margin vs. TDECQ and TECQ as in earlier clauses, so signals near the nominal spec limits are a concern.
- This bad signal has high K' and high but legal overshoot, a bad combination for receivers.
- Yet the point of a separate VR spec was to allow slower transmitters than are needed for SR, so VR transmitters should not be in this corner.
- This is worse at TP2 than after a minimum-bandwidth optical channel at TP3.
- The K' limit is similar to VEC in C2M and EVM in coherent: a screen for signals that are bad after equalisation. As it is a free by-product of the TECQ measurement, we can add it to exclude these untypical signals that don't benefit transmitter makers but are bad for receivers.
- *SuggestedRemedy*
- For VR, insert a row for K'=TECQ-10.log10(Ceq'), limit 4.4 dB, same as the TECQ limit. K' and Ceq' are the two parts of TECQ as K and Ceq are the two parts of TDECQ.
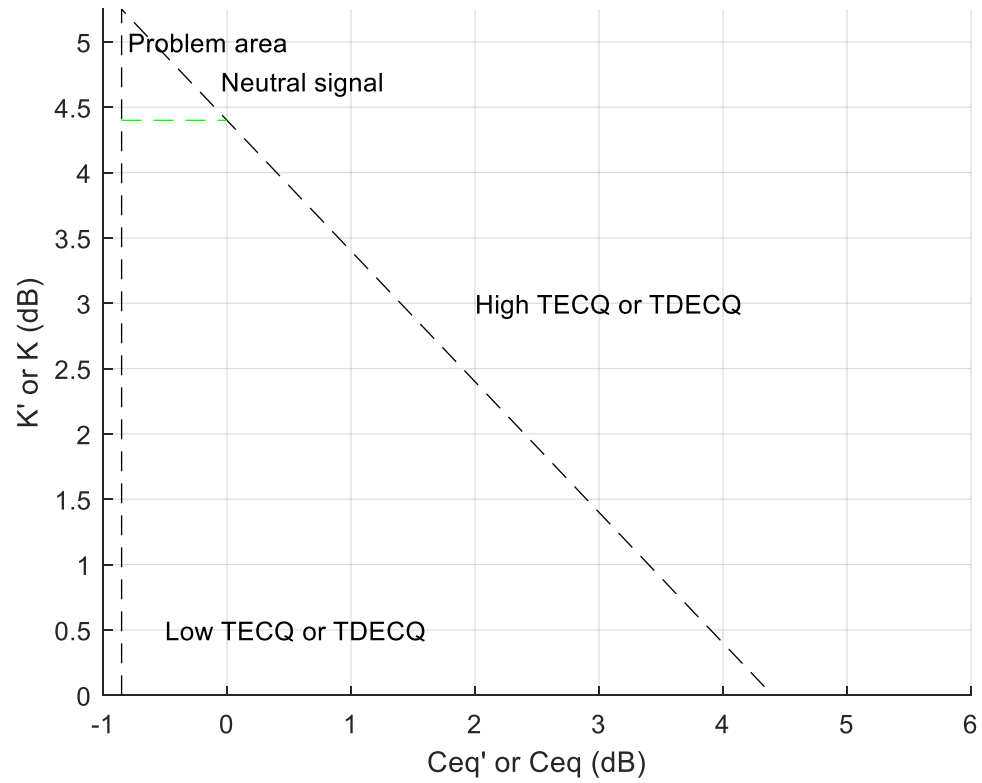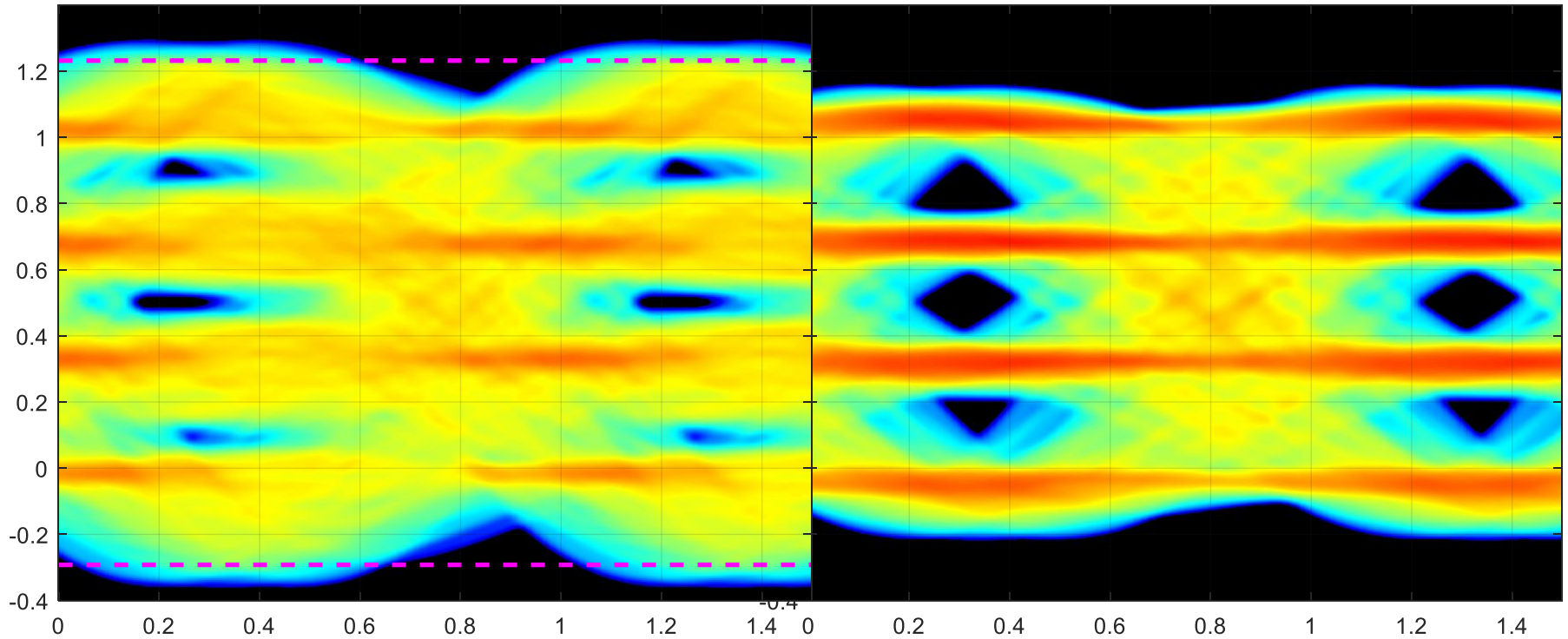
High K signal

# Typical

Unequalised eye, overshoot 21.4%
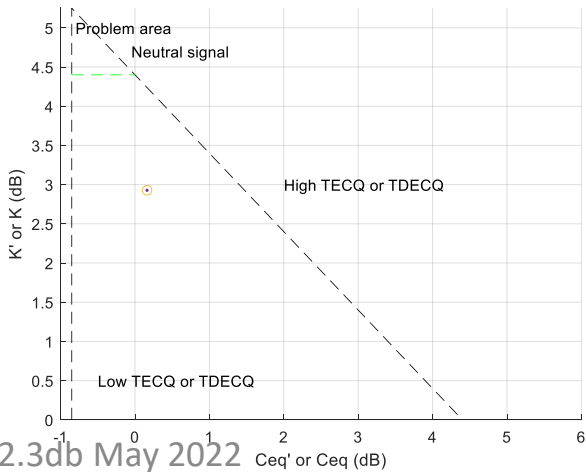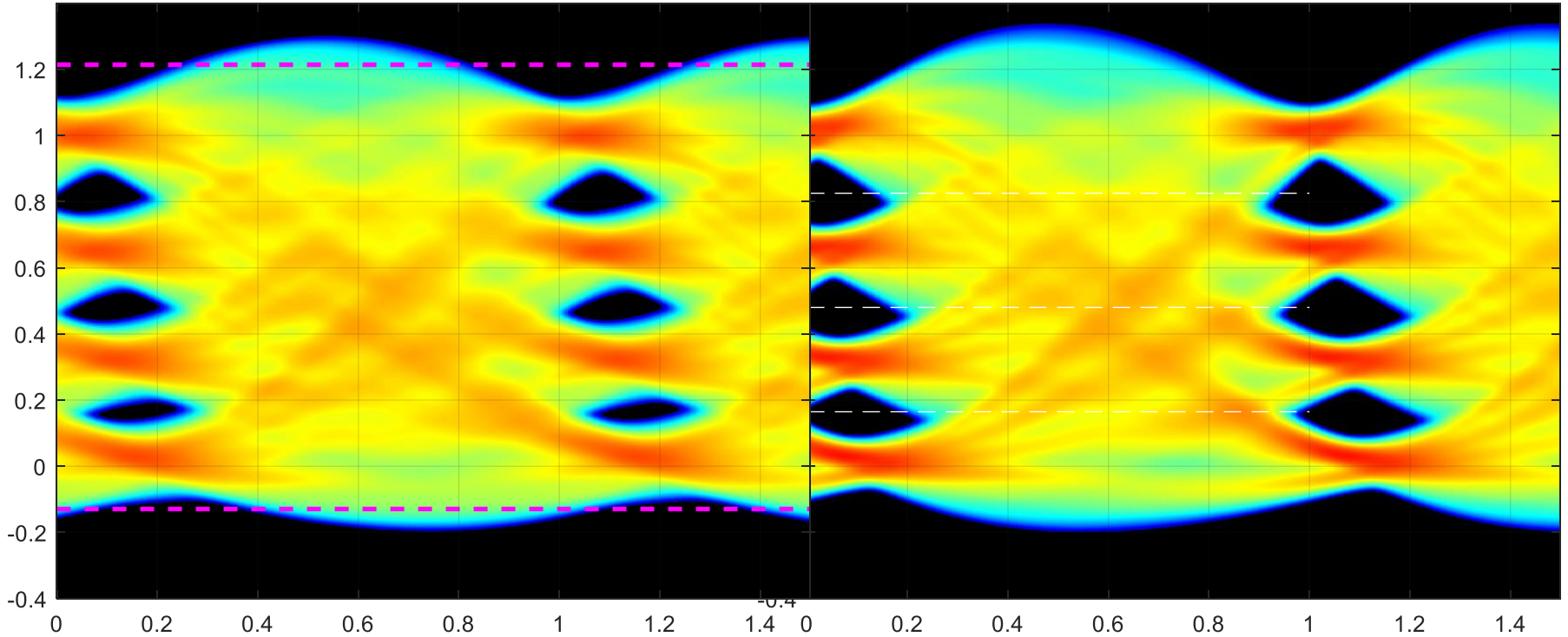


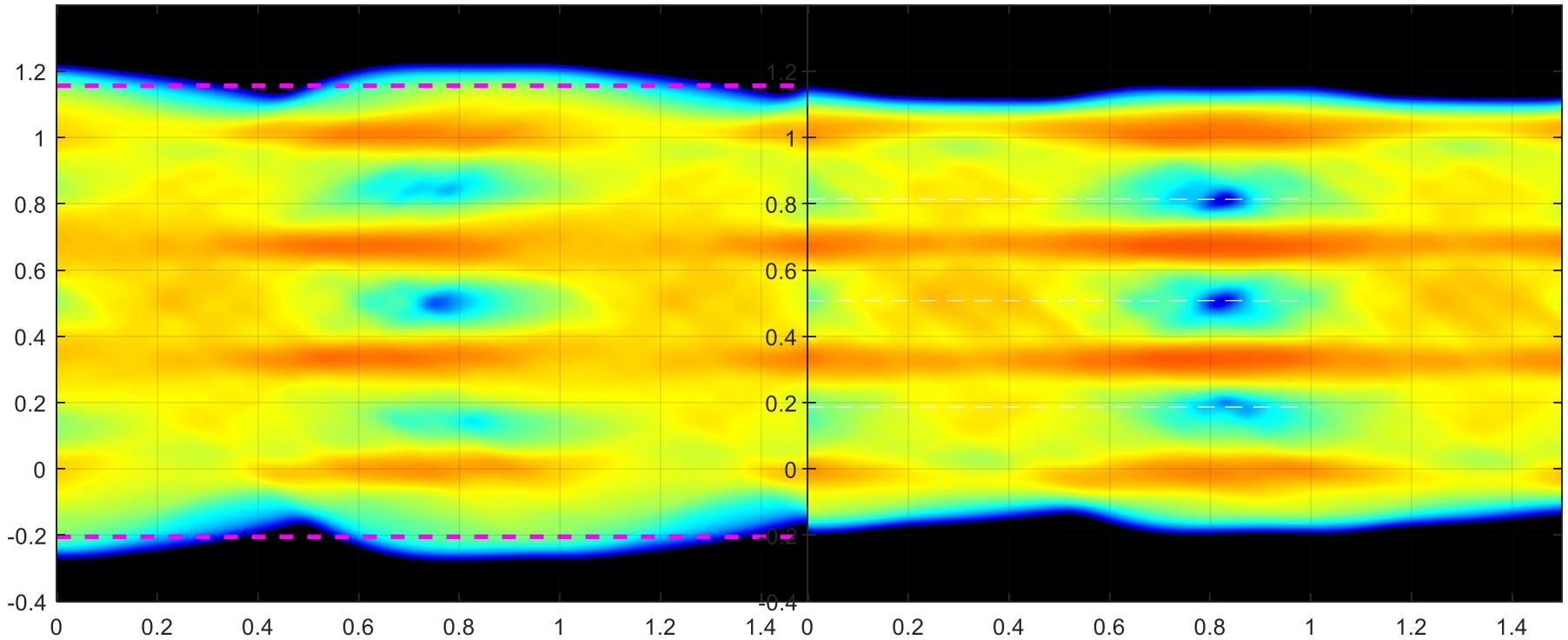High K signal

# Troublesome signal at TP2

**Unequalised eye, overshoot 29.2%**



$dbCeq = -0.26$
$dbK = 4.25$
$dbTdecq = 3.99$

# Same troublesome signal at TP3

**Unequalised eye at TP3**



- TDECQ solver missed the solution?

*dbCeq = -0.15*
*dbK = ?*
*dbTdecq = ?*

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