

Two module electrical output
settings means four spec
conditions, C2M eye mask

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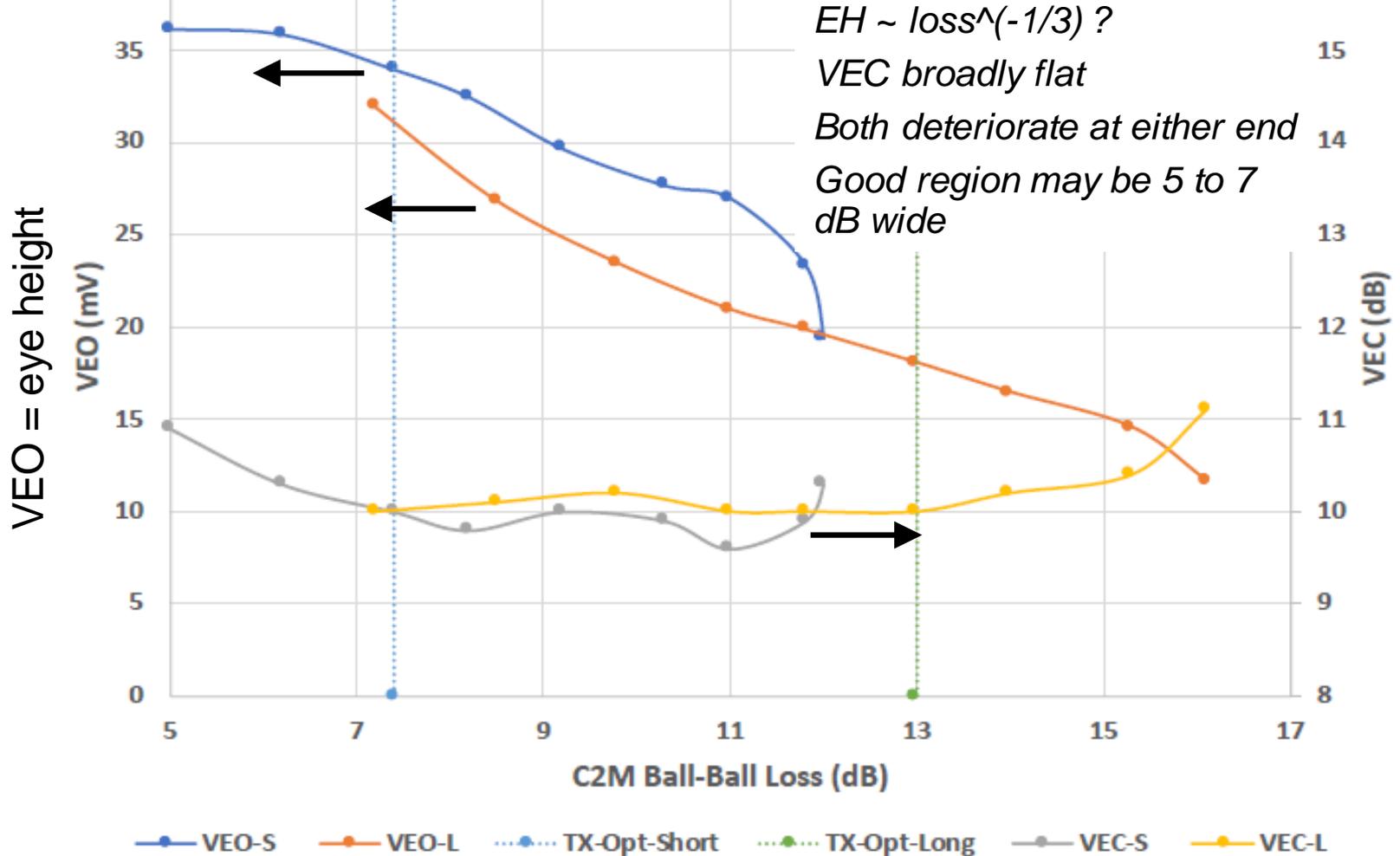
Part 1

- Two module electrical output settings means four spec conditions

Comment 146, there should be 4 EH-VEC limit pairs

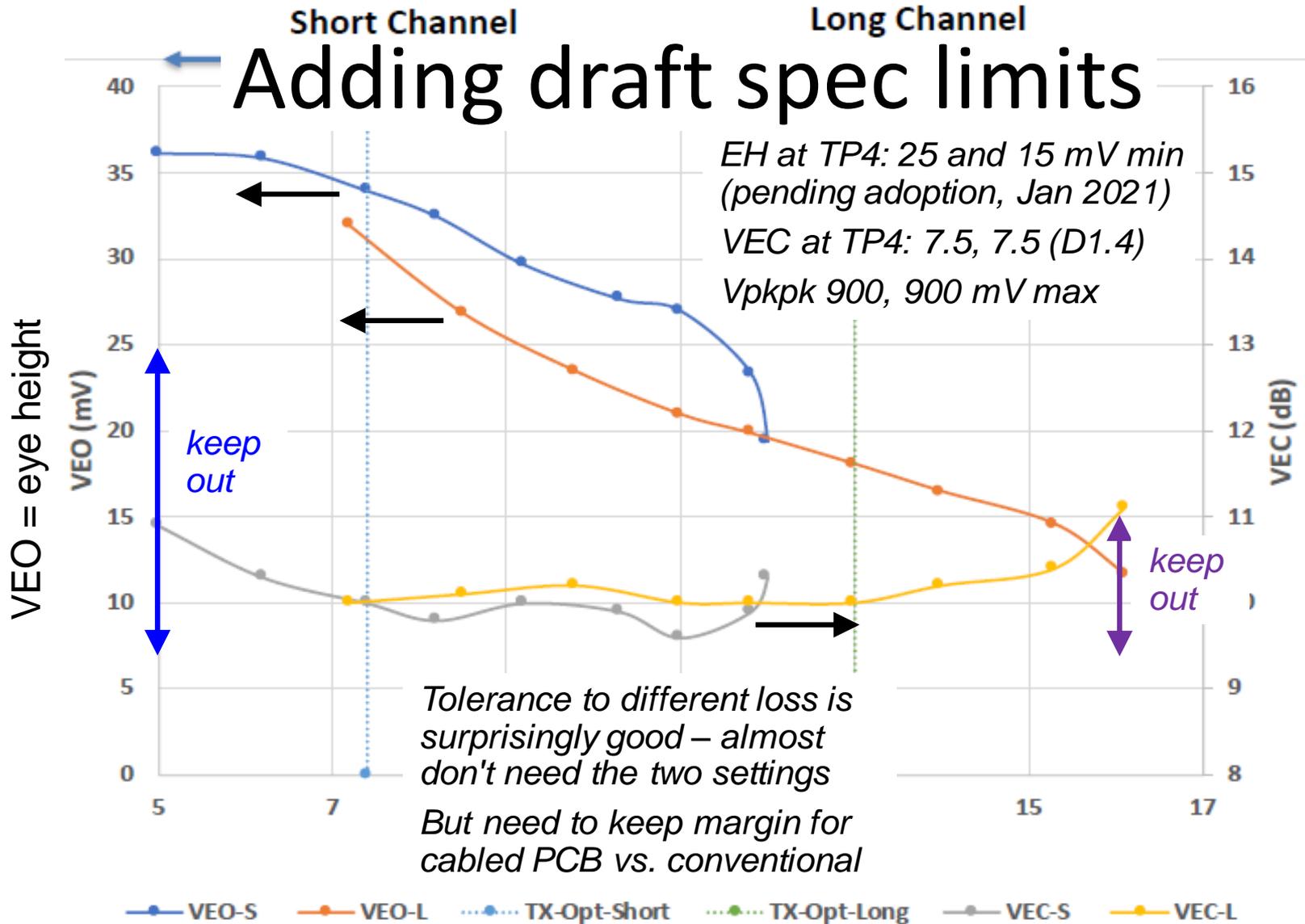
- **CI 120G SC 120G.3.2 P 234 L 14 # 146 TR**
- As already discussed, the 2-settings method with only two compliance losses doesn't work. If the module is set to the short setting, and the host receiver isn't that near, the eye it is offered is smaller than 24 mV because of loss, and out of tune as well. If the module is set to the long setting and the host isn't that long, the eye is also out of tune. There's no guarantee that either setting is usable.
- *Suggested Remedy*
- There should be 4 EH-VEC limit pairs: short near and far, and long near and far, in Table 120G. In 120G.3.2.2.1, give the four zp values: for short, 0 (as at present) and 184, for long, 61 and 244.7 (as at present).

Example of a well-tuned module



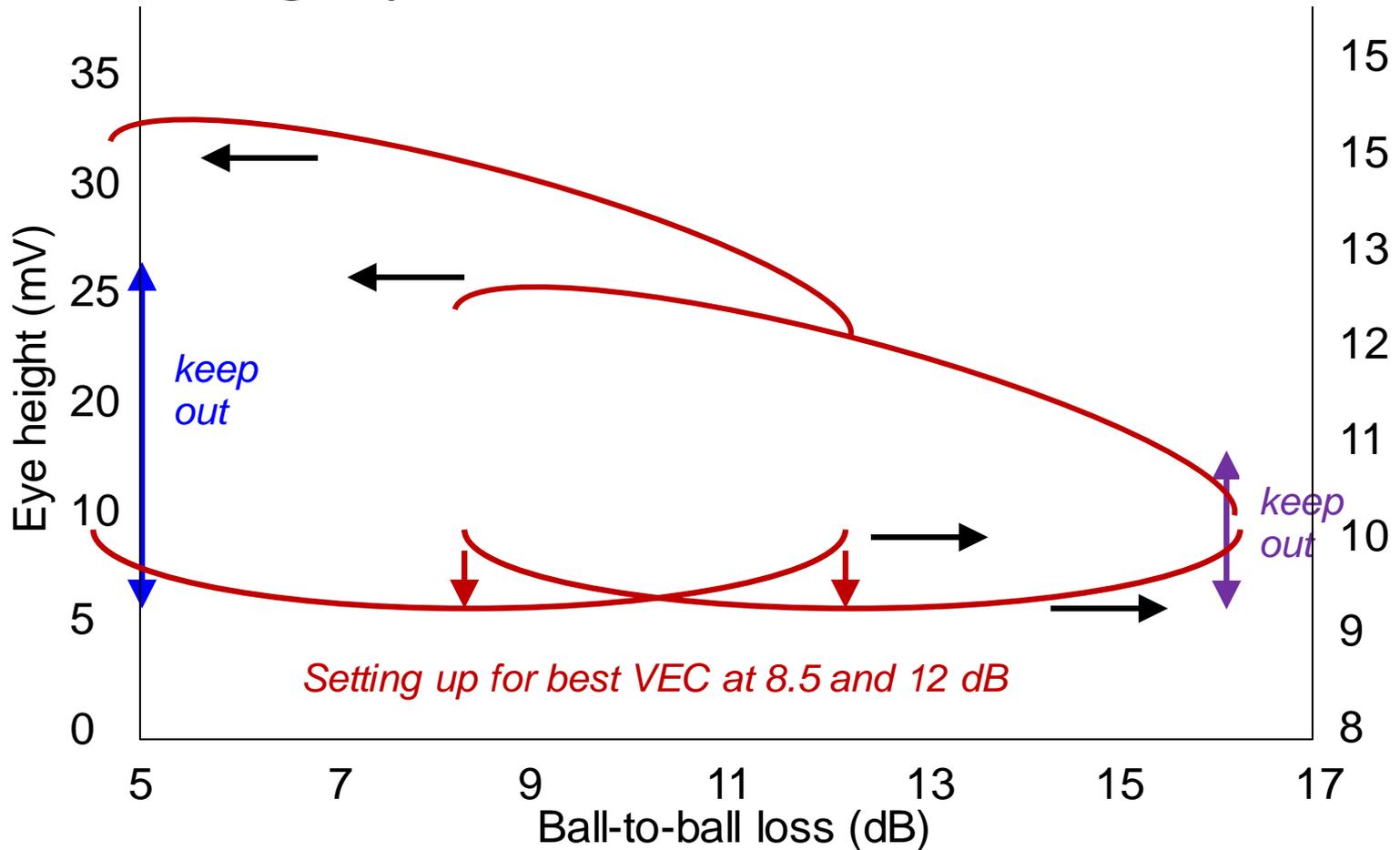
- From ghiasi_3ck_adhoc_01_011321.pdf

Adding draft spec limits



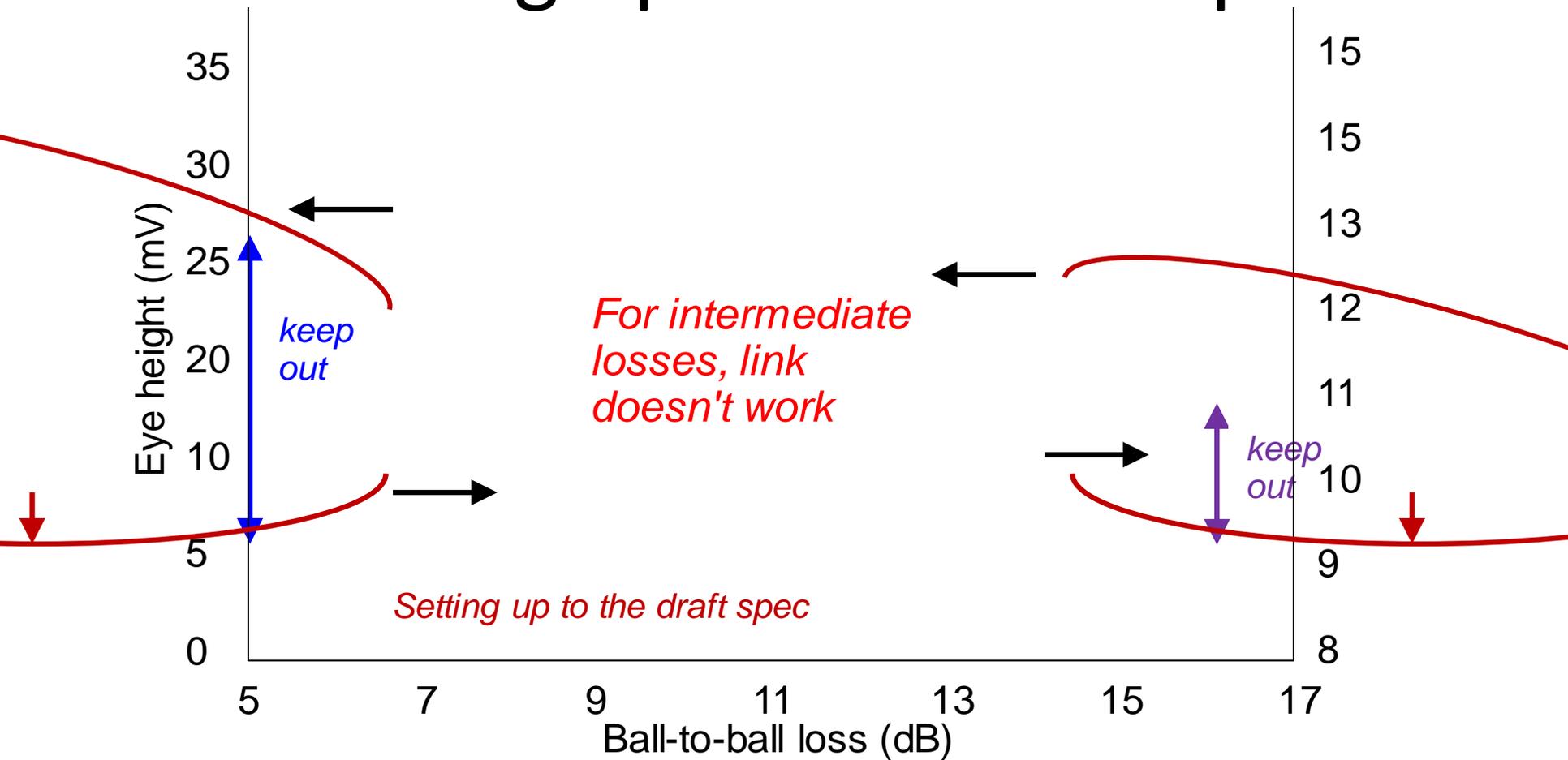
- Tolerance to different loss is surprisingly good – almost don't need the two settings
- But need to keep margin for cabled PCB vs. conventional

If setting up for best VEC at 8.5 and 12 dB



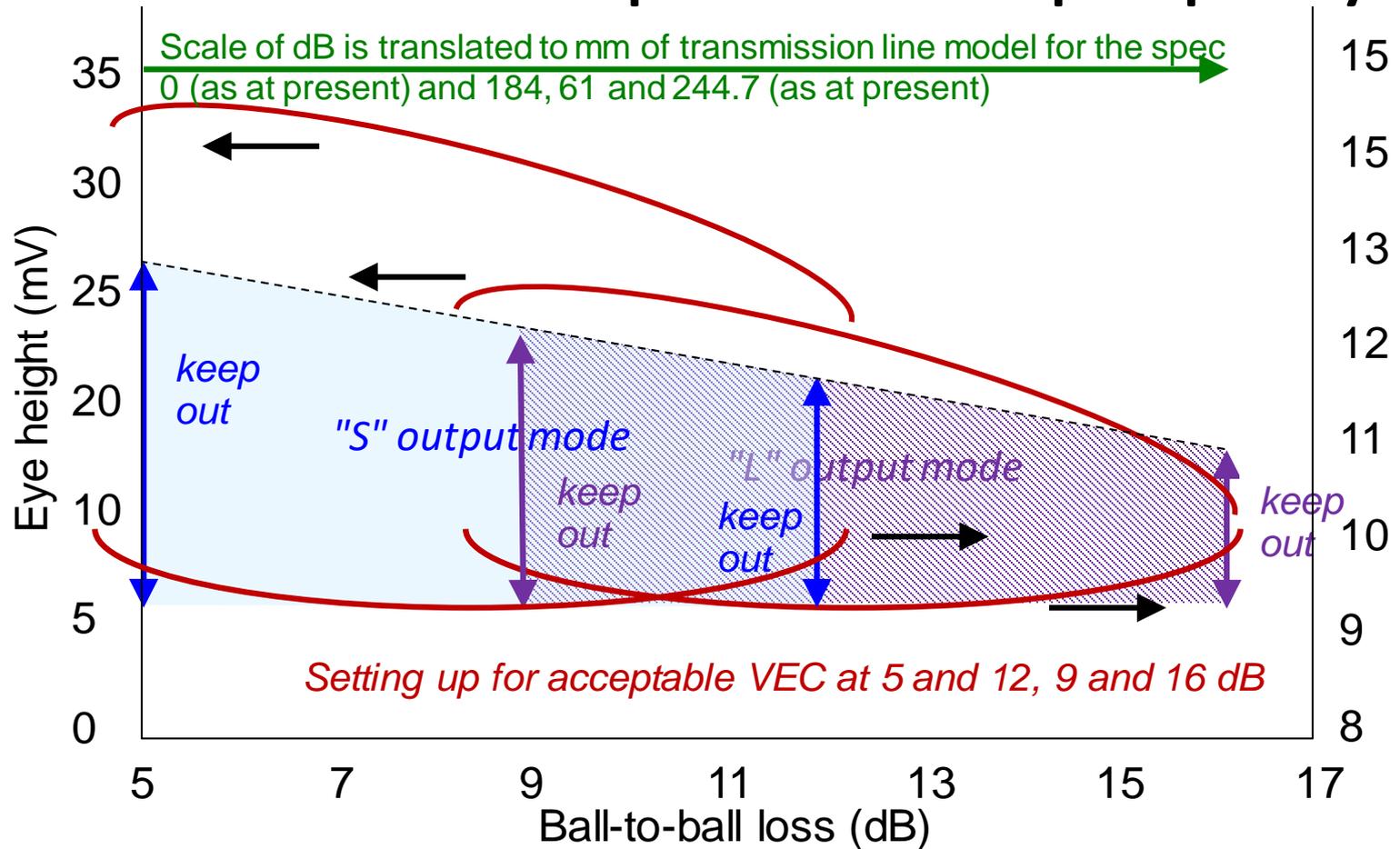
- Module could be set up well but draft spec does not require it

If setting up to the draft spec



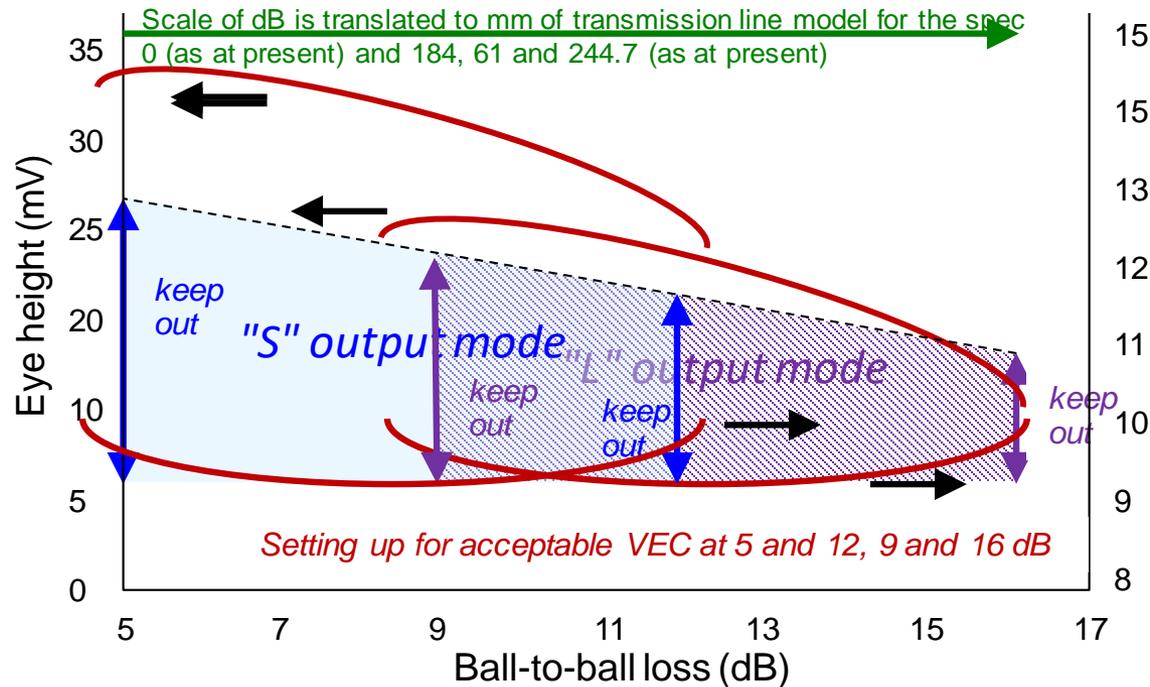
- This setup is has more margin to spec than previous one, but is useless

EH and VEC specs done properly



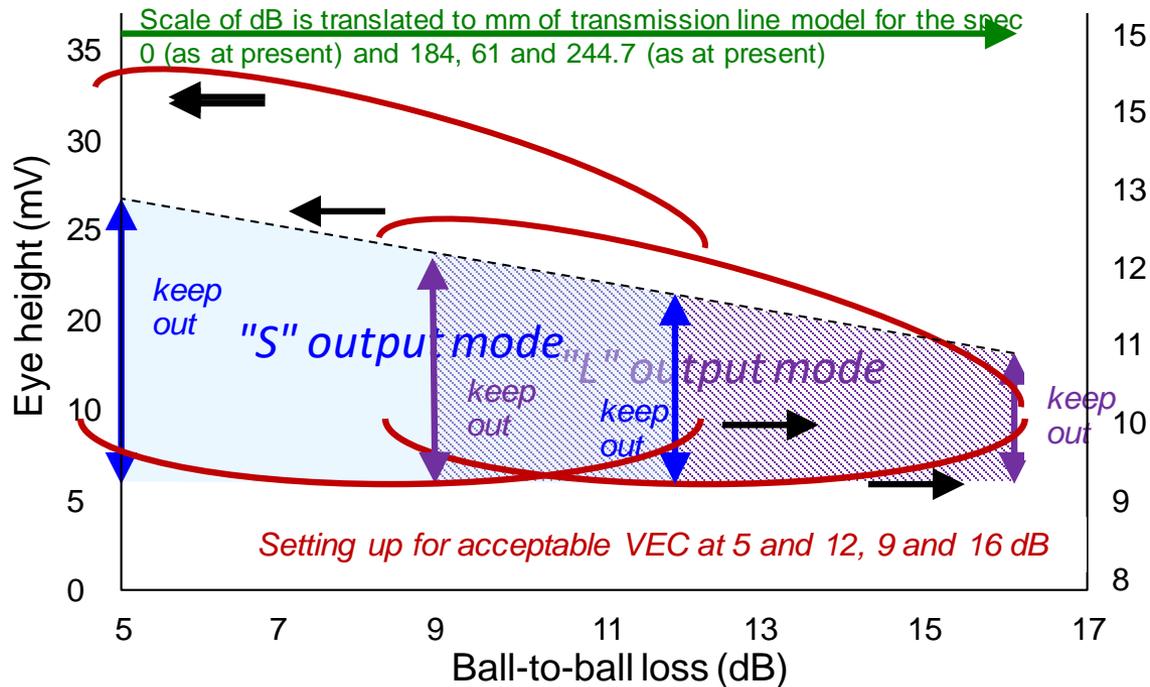
- 4 corners each for S and L ensure usable regions between (shaded, stripes)

EH and VEC specs done properly



- Host does not know its loss exactly
 - It's not a normative part of the spec anyway
- Different receivers have different abilities at the extremes of signal shape
 - Remember, the receiver can't tweak it as in backplane
- Need a generous overlap between S and L

Terminology



- Two observations of a single module output signal: near-end eye and far-end eye
 - As in Annex 120E
- Two output modes: short and long ("S" and "L" in Table 120G–4)
 - New in Annex 120G
- Therefore, four in all (blue and purple arrows in figure)
- In Table 120G–7, Host stressed input parameters, the two eyes will become S and L. Proposing to stay with a single stress signal per module setting, similar to 120E

Part 2

- Better C2M eye mask

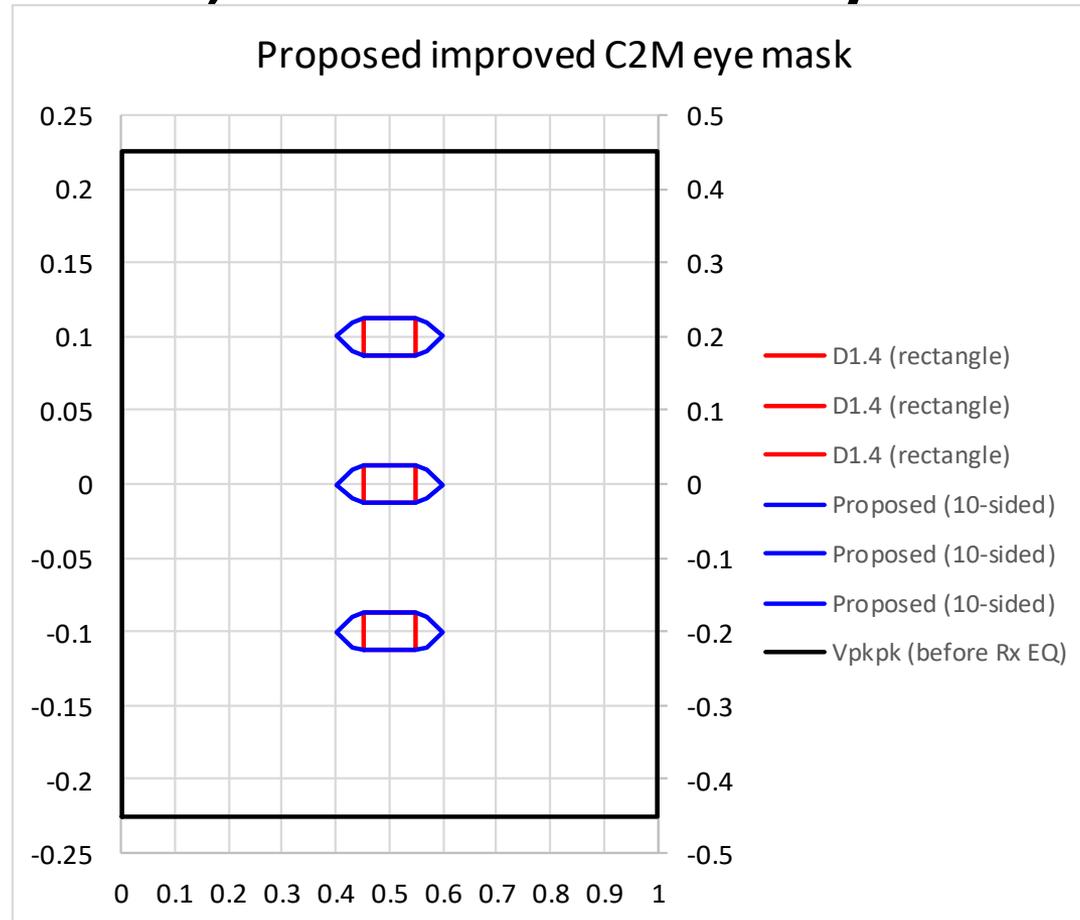
Comment 154, better C2M eye mask

- **CI 120G SC 120G.5.2 P 246 L 23 # 154 TR**
- Of all the options in daw_3ck_01a_1020, this draft has the most primitive (rectangular eye mask) although it is described as a histogram. It's an inefficient/inaccurate way of measuring a signal and provides weak and uncertain protection against too much jitter.
- This will get worse if we relax the VEC limits, and is a particular concern for very short host channels (see Mike Dudek's work).
- *SuggestedRemedy*
- Change from a 4-cornered mask with corners at $t = t_s \pm 0.05$, $V = \pm H_{min}/2$ to a 10-cornered mask with corners at $t = t_s \pm 0.05$, $t_s \pm 0.07$, $t_s \pm 0.1$, $V = \pm H_{min}/2$, $\pm H_{min} * 0.4$, ± 0 .
- (In case it's not clear, H_{min} , already specified, is the greater of EH and Eye Amplitude - VEC. There will be discussion about changing those limits from other comments, but this is a simple scalable method that can remain as the EH and VEC limits are revised.)

Comment 154, better C2M eye mask

$$H_{\min} = \max(EH, EA \cdot 10^{(-VEC/20)})$$

Both relative and absolute masks in one measurement



- Need to do something like this to control signal jitter
- This also gives a faster, more accurate measurement because the mask has sides that are close to parallel to the eye rather than sharp corners pointing into it