

AVC coding of HDR/WCG

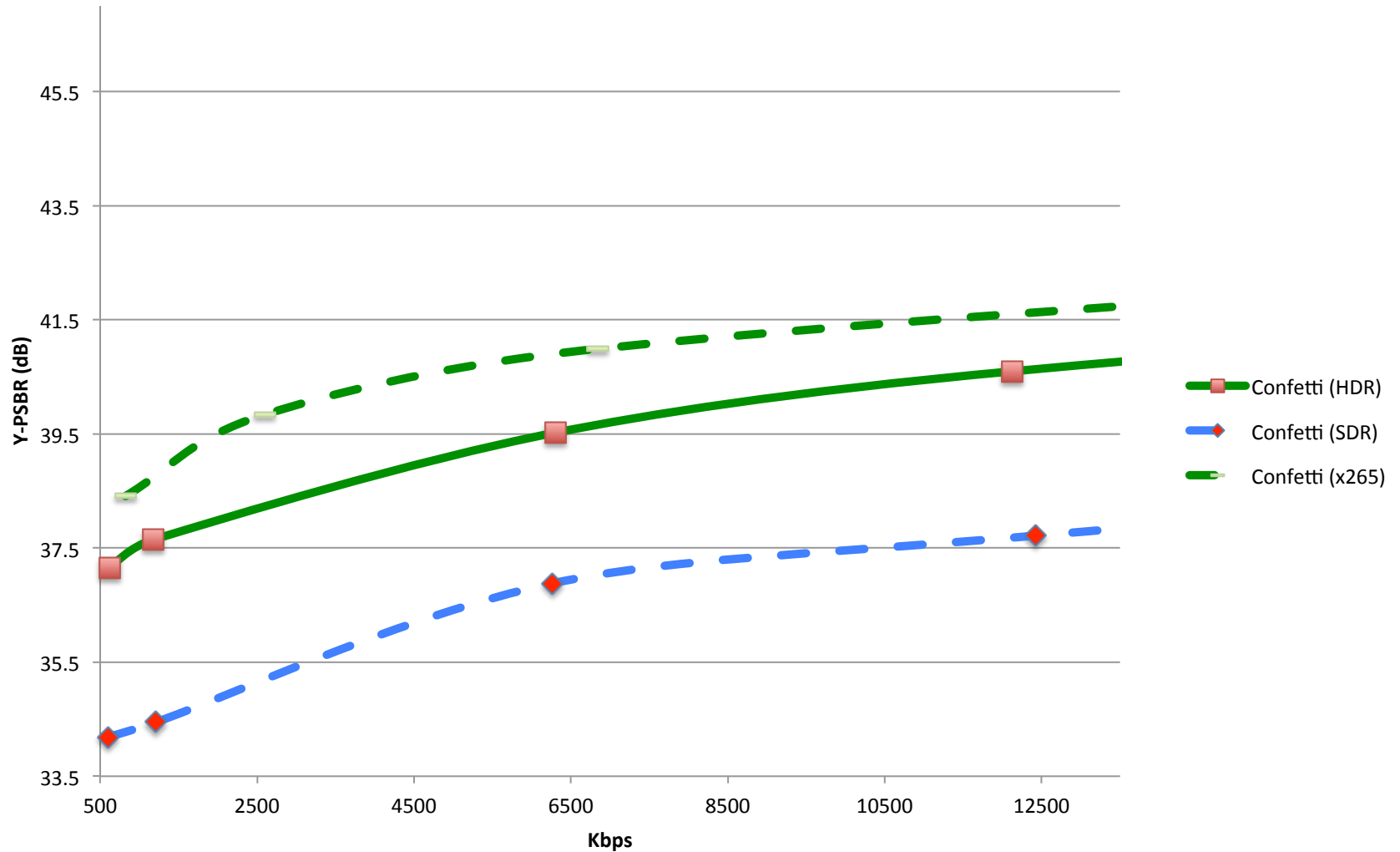
M33857

R0216

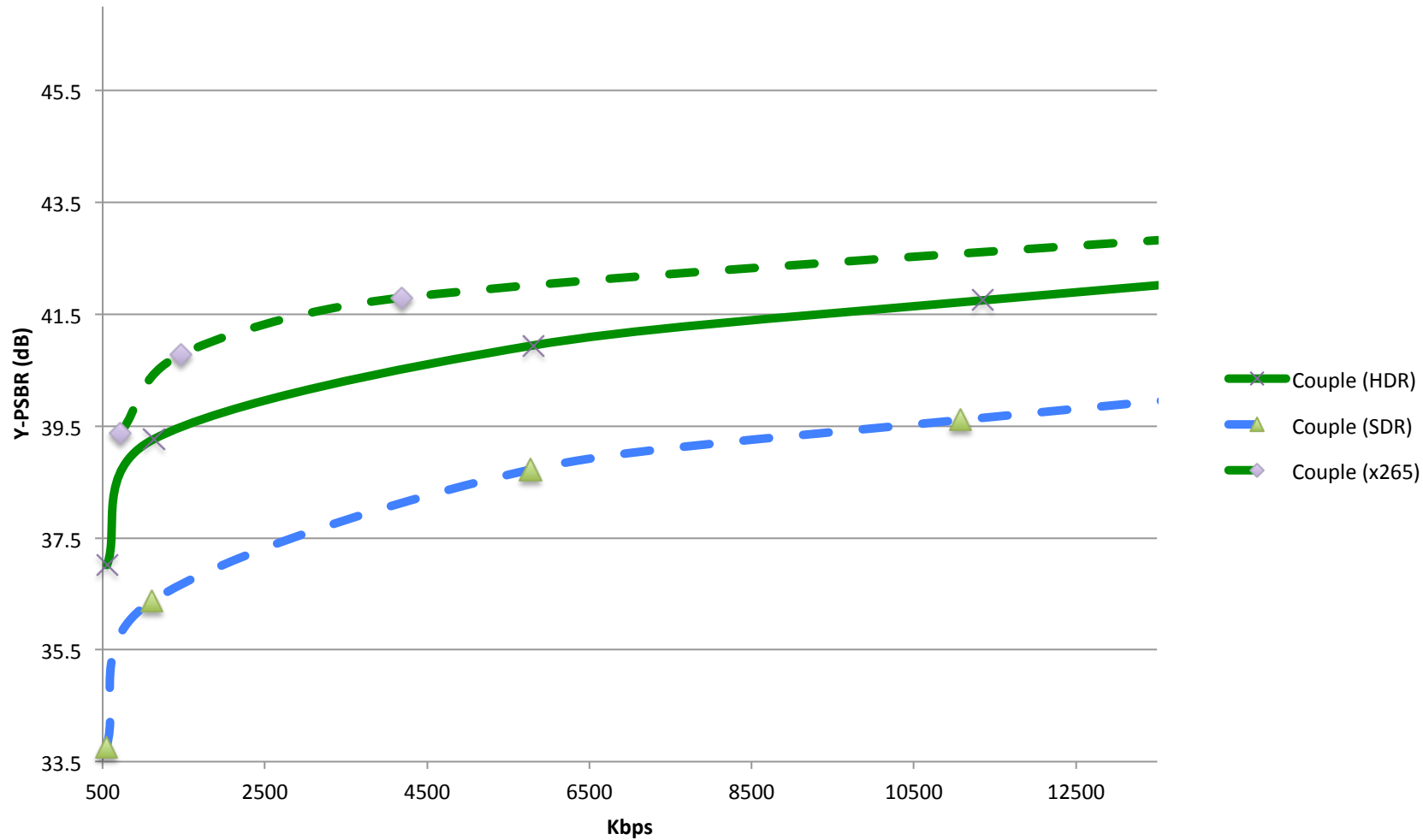
Testing setup

- Source clips: 1080p HDR-graded StEM scans (25 Feb. 2014 6k-nits)
 - Problem: few clips are in both HDR and SDR grades
- x264 blu-ray style encode used in some title authoring:
 - 2-pass ABR (also fixed-Qp (cc-style) & CRF/VBR)
 - Very-slow preset; 1 sec. open-GoP;
 - Adaptive quantization
 - Compared with x265 and HM: -2dB and -3dB
- R/D plots to study behavior

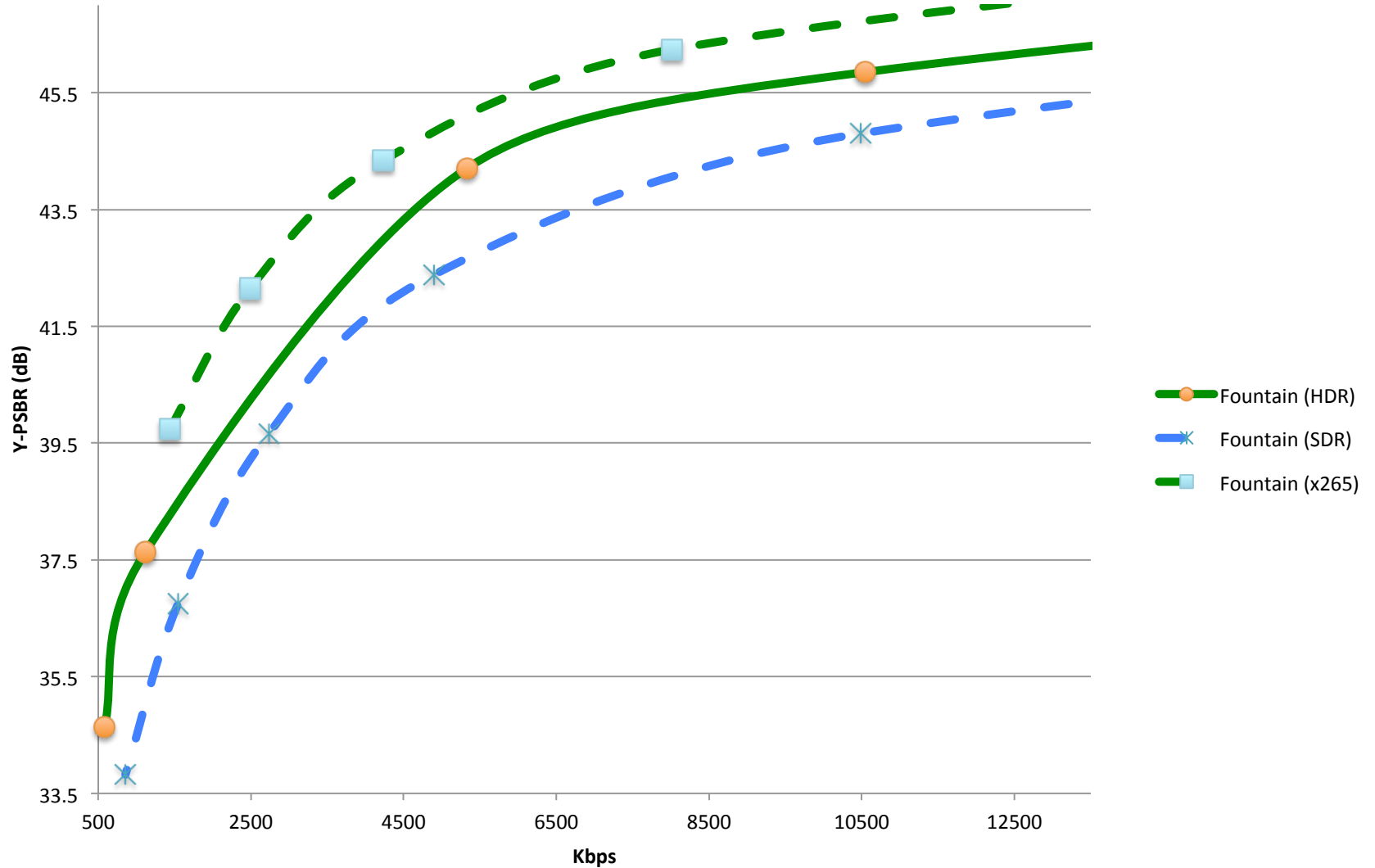
Confetti



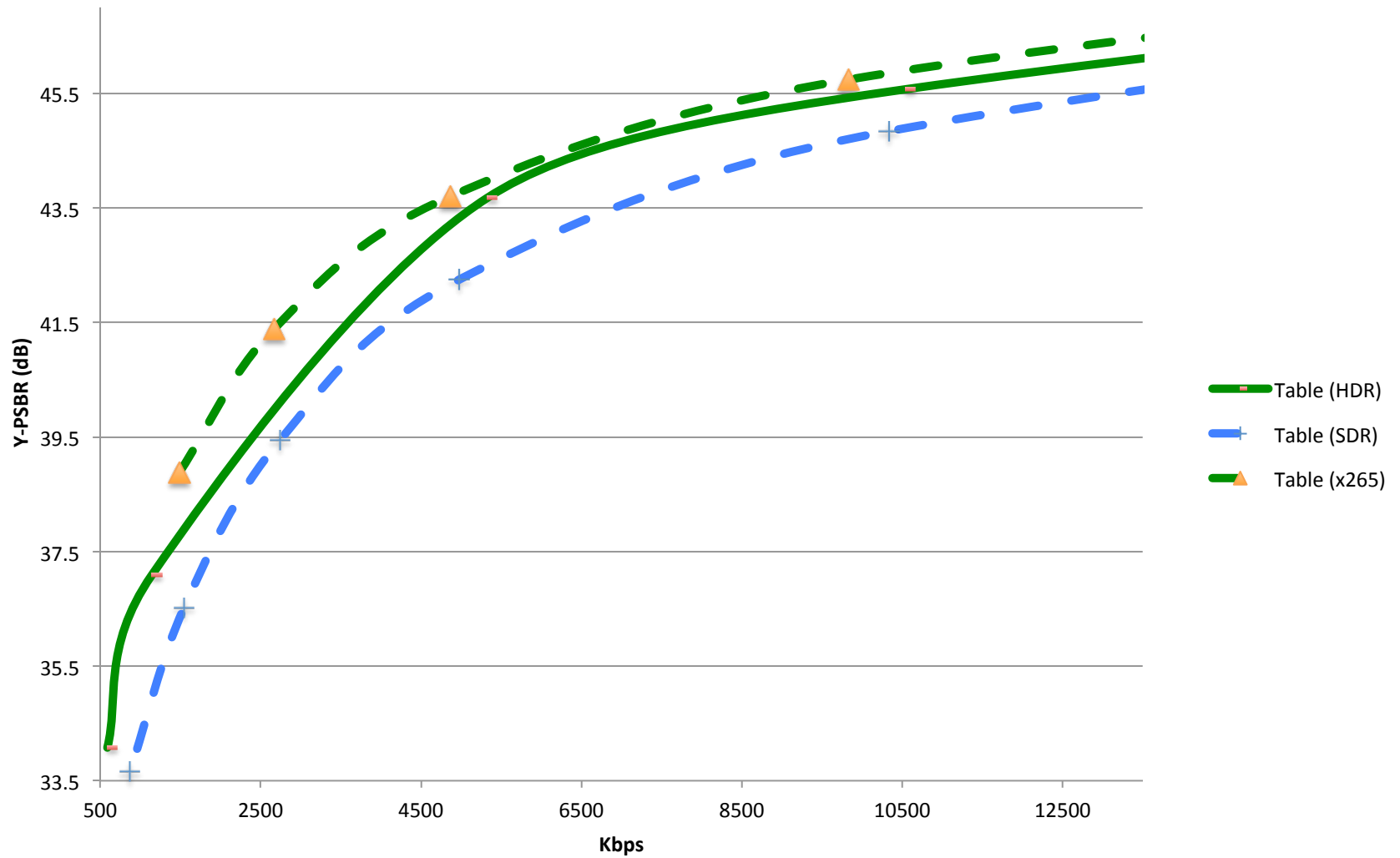
Couple



Fountain



Table

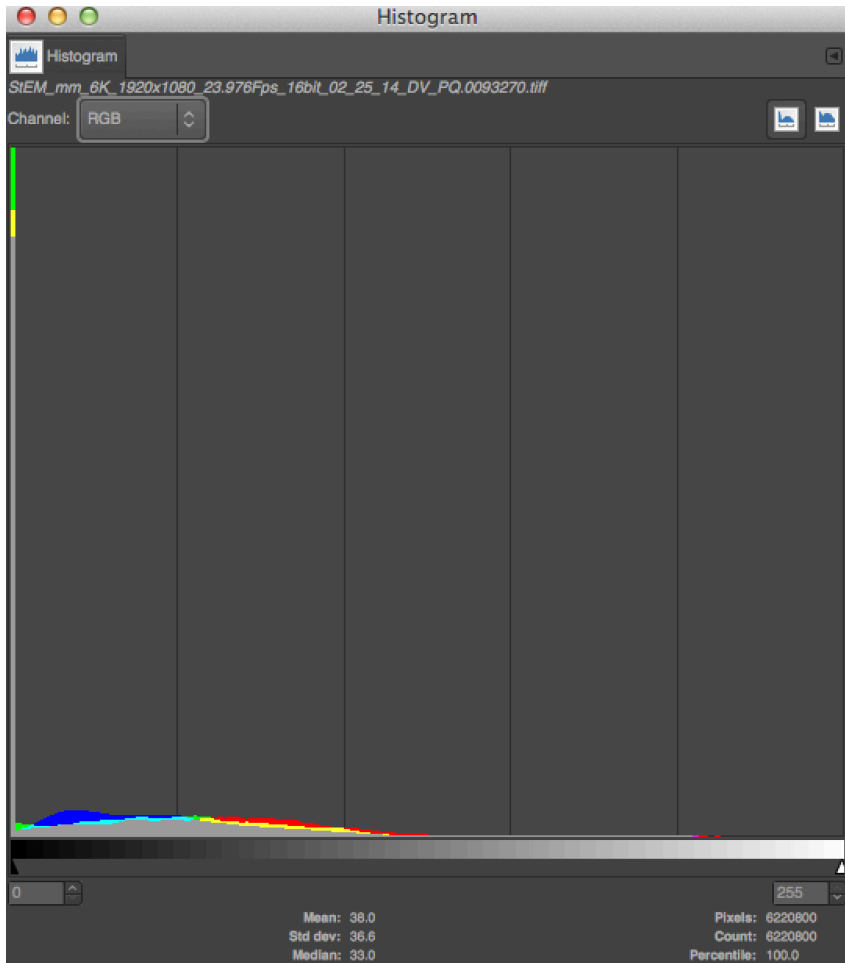


Correlation between histogram and coding performance

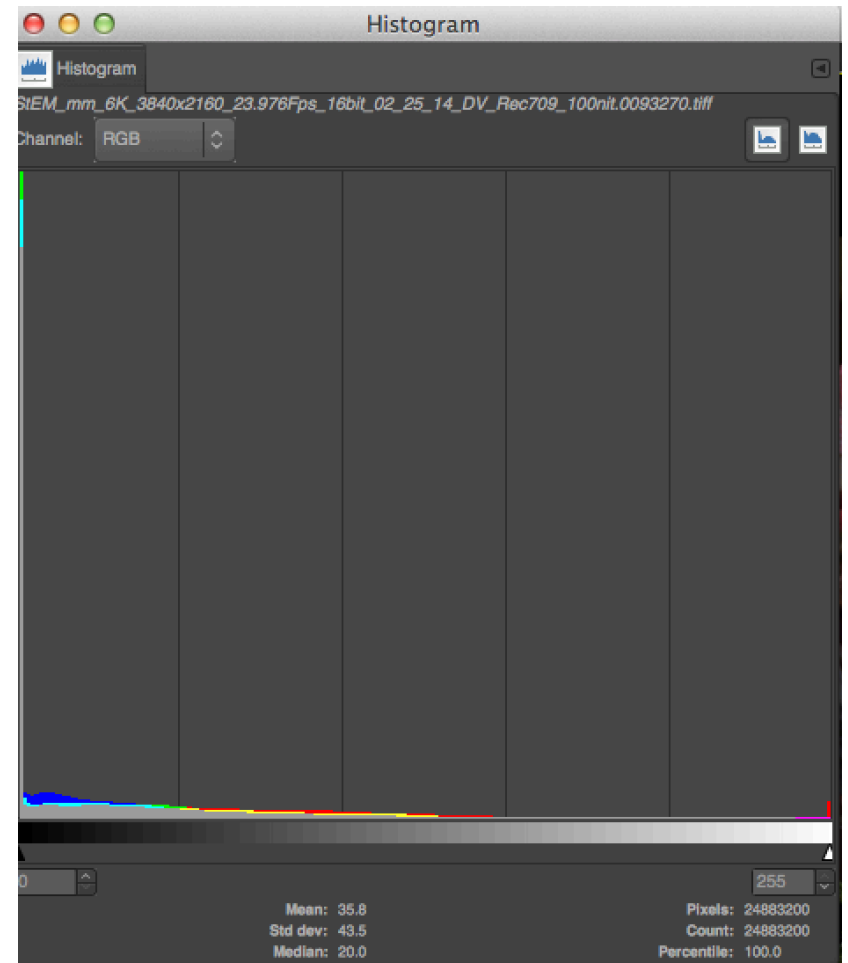
Possible explanation why HDR grades sometimes out-perform SDR grades of the same content, at the same bit-depth:

- Gratings with more balanced histograms show better R/D performance
- SDR grades tend to be crunched in the dark and bright ends of the spectrum, and have more concentrated energy into fewer code words.
- HDR grades have histograms that are more spread out. Pixel surfaces are also smoother in ramps and transients.

“Table” histogram

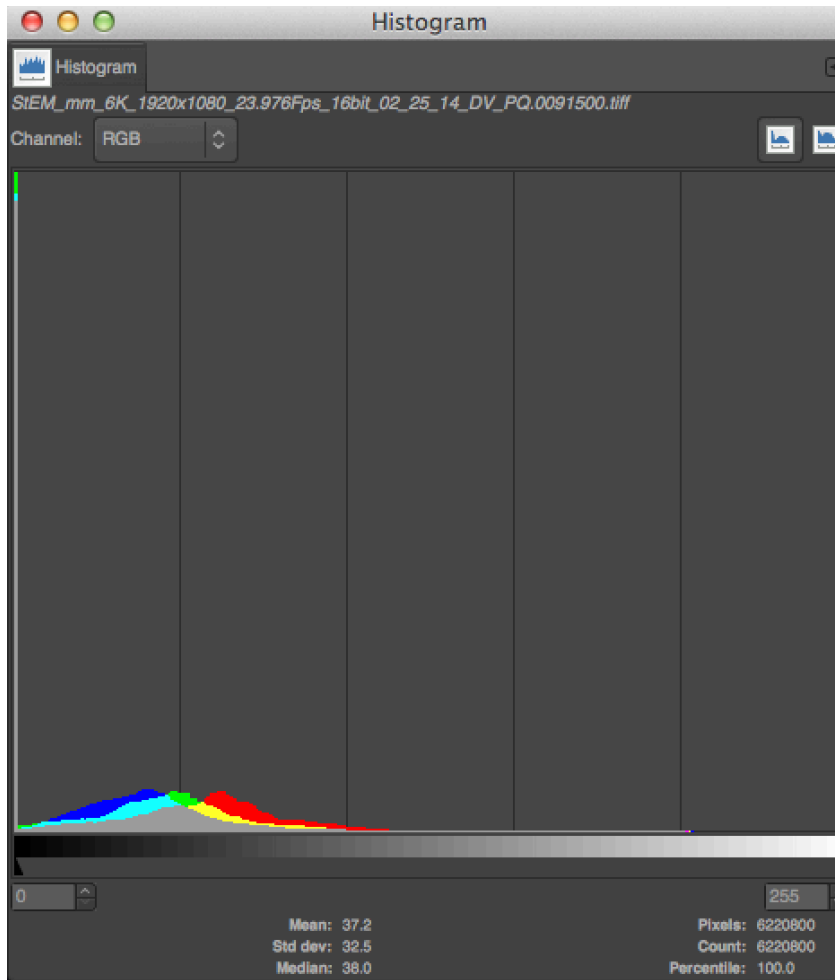


HDR grade (10-bit PQ 2020)

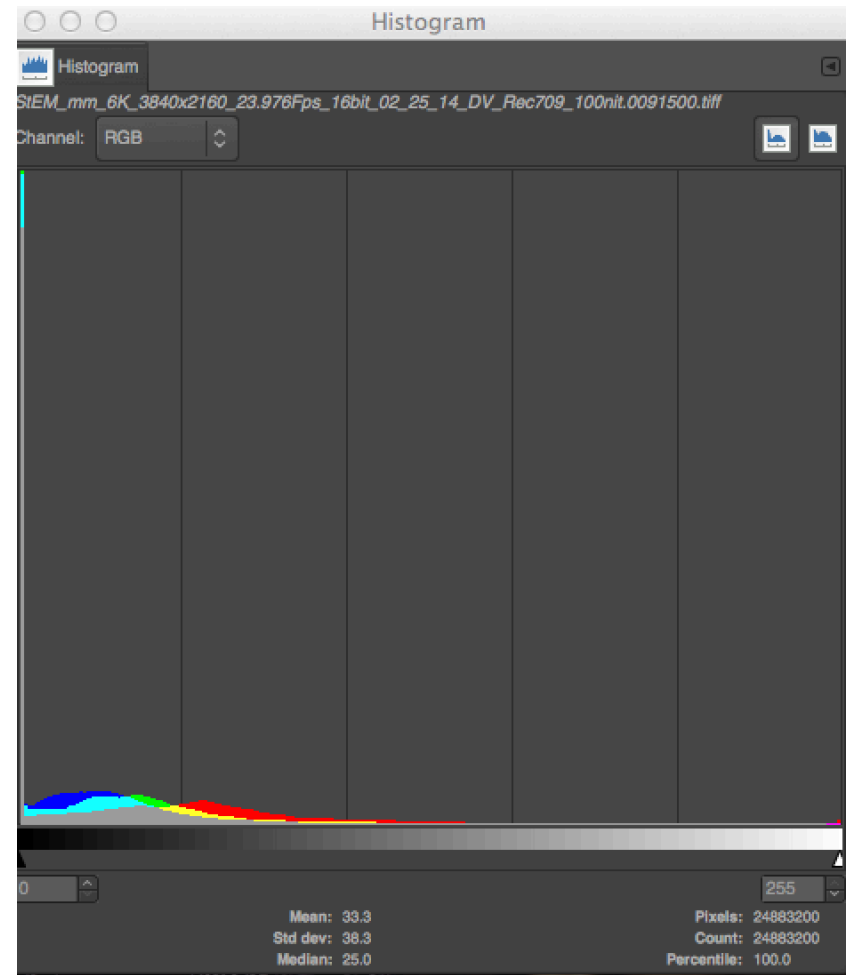


SDR grade (10-bit Bt.709)

“Fountain” histogram

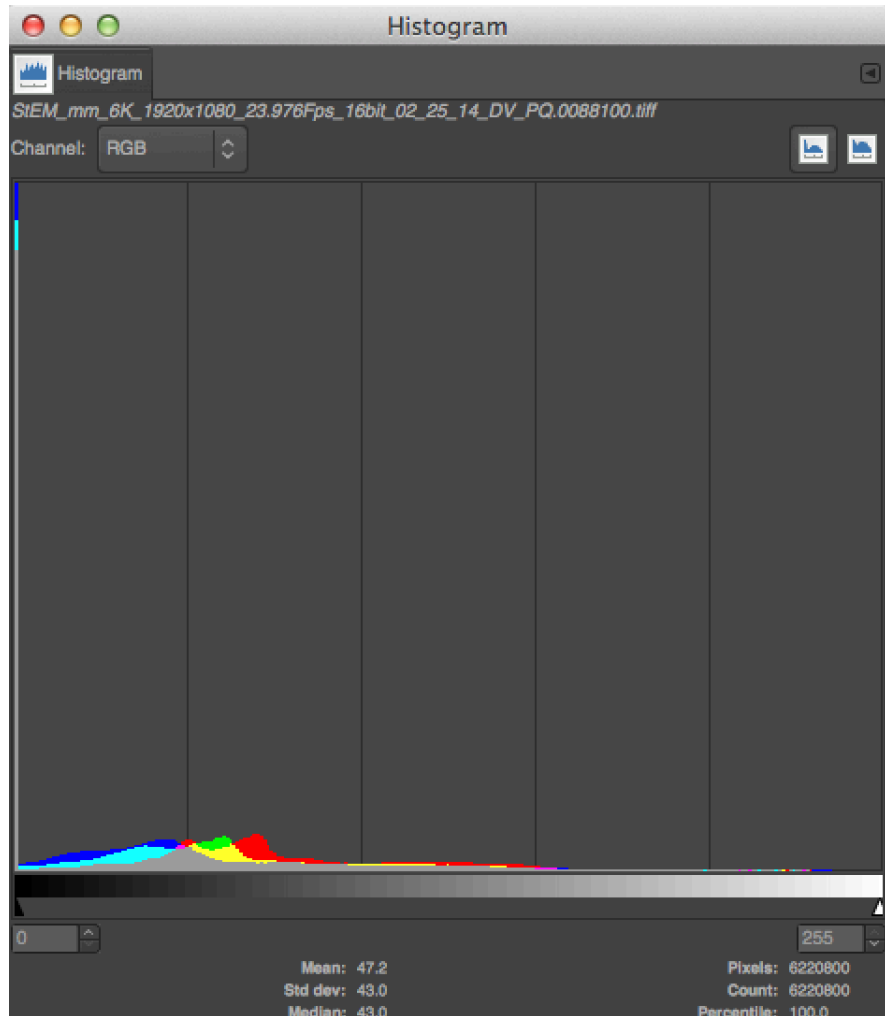


HDR grade (10-bit PQ 2020)

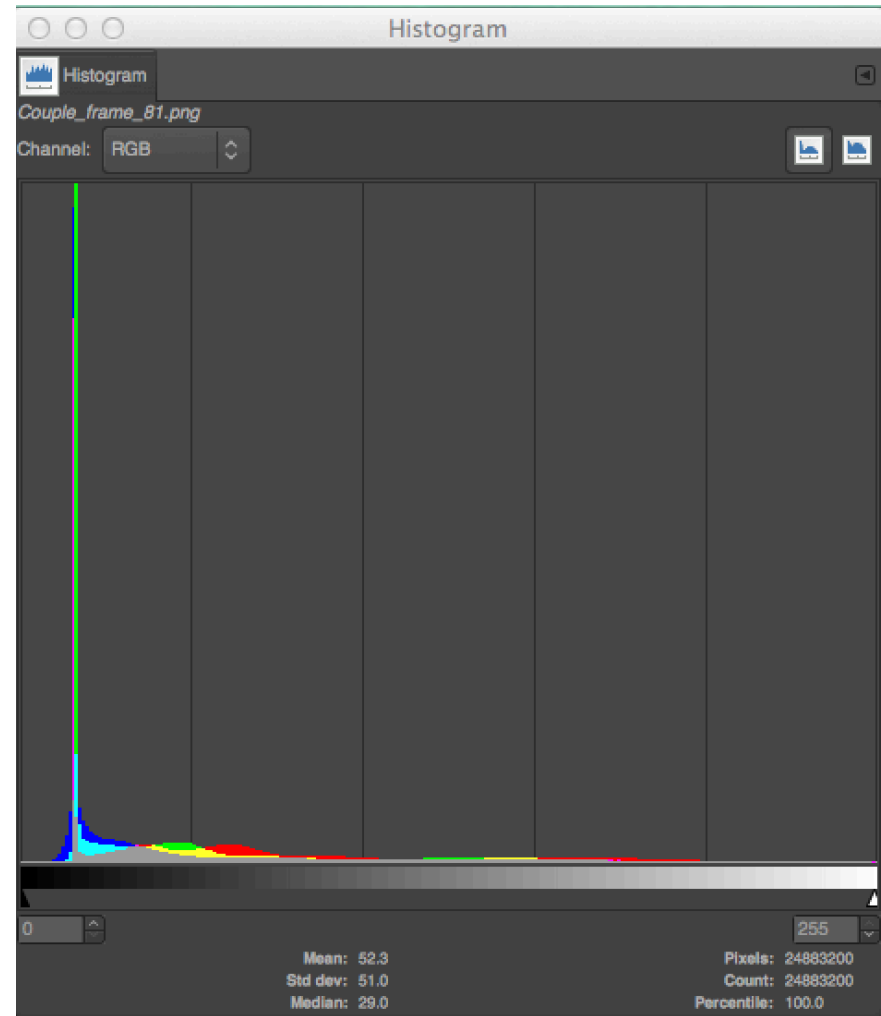


SDR grade (10-bit Bt.709)

“Couple”



HDR grade (10-bit PQ 2020)



SDR grade (10-bit Bt.709)

Signaling HDR/WCG in AVC spec.

- Pre-processing workflow identical to HEVC
- Same code points and syntax as HEVC
 - ST. 2086 VUI code point 16 (“PQ”) for table E-4 transfer_characteristics
 - ST. 2084 SEI message for display color volume (to convey, e.g. P3 or Bt.709 display used for grading)

FYI: AVC High10 SDR 100 nit Bt.709

1080p (HD) SVT , 4Ever, StEM (x264 2-pass ABR Blu-ray style coding)

