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| *Title:* | HDR CE2: Report of CE2.a-3, CE2.c and CE2.d experiments (for reshaping setting 2) | | |
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# Abstract

This document reports the results of experiments for CE2.a-3 in conjunction with encoding optimization [1] techniques which have been studied under CE2.c and CE2.d categories. The combined experiment was conducted to measure the performance of an alternative transfer function (instead of conventional PQ TF) as well as joint optimization of the reshaper and encoder, specifically when the reshaping setting is in mode 2. Informal subjective evaluations were conducted for both the reconstructed SDR and HDR sequences. It is asserted that compared to the version 3.2 of anchor, the proposed approach provides similar perceptual quality of the reconstructed HDR signal while supporting SDR backward compatibility.

# Introduction

In this proposal, an alternative transfer function is investigated in combination with joint optimization of the reshaper and encoder. Subjective evaluation based on both SDR and HDR videos indicates that compared to anchor v3.2, the proposed approach provides similar perceptual quality while providing additional support for SDR backward compatibility.

# CE subtests description

## CE2.a-3: adaptive transfer function

Compared to the reshaping setting 2 of the ETM, in this work, a power function is applied to RGB samples, prior to application of SMPTE-2084 (PQ), in order to achieve better SDR quality at the output of the reshaper on the encoder side. As noted in ETM, the PQ TF is approximated by a power function, e.g. with a power constant of 0.25. In our investigation, a power constant of 1.2 is applied to the RGB signals. This makes the approximated power constant of the overall TF to be 0.3 (=1.2\*0.25) which results in a more suitable SDR quality in the reshaping setting 2 case.

Following the ETM optimization scheme, the luma reshaping parameters are automatically derived and updated based on the characteristics of each frame. Upon the availability of reshaped luma values, the chroma samples are also reshaped based on the collocated luma sample to match the color of the SDR backward compatible signal.

## Joint optimization of reshaper and encoder

In the encoding optimization stage, the DeltaQP adjustment is based on the similar algorithm in CE1 [2]. However, since the reshaper and application of the power function prior to the PQ TF tested in this work change the distribution of code levels compared to anchor data, a new mapping table is derived by taking the reshaper and the fixed power function (1.2) parameters into consideration.

# Simulation results and analysis

Table 1. Simulation result of CE2.a-3 with encoding optimization vs Anchor 3.2



The simulation result is shown in Table 1. Subjective evaluation based on both SDR and HDR videos indicates that compared to anchor v3.2, the proposed approach provides similar perceptual quality while supporting SDR backward compatibility.

# Conclusion

# In this document, the performance of an alternative transfer function as well as joint optimization of the reshaper and encoder is investigated. Subjective viewing indicates that the proposed approach achieves similar perceptual quality for the reconstructed HDR signal, comparable to the anchor v3.2, while supporting SDR backward compatibility.

# References

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# Patent rights declaration(s)

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