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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  24th Meeting: Geneva, CH, 26 May – 1 June 2016 | Document: JCTVC-X0047 |

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| *Title:* | **Further ICtCp testing** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
| *Author(s) or Contact(s):* | Chad Fogg | Email: | chadfogg@gmail.com |
| *Source:* | Motion Picture Laboratories Inc. | | |

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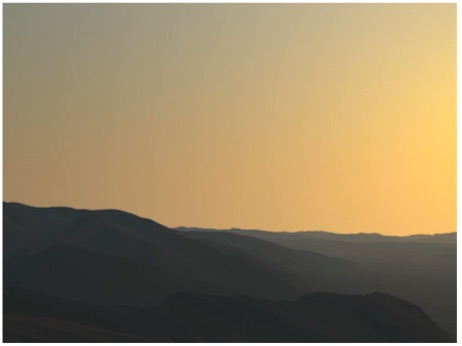
# Abstract

At the Geneva May 2016 meeting, experiments with ICtCp color space on test patterns and video blending (mixing) were reported. Two areas remain possibly unexplored by JCT: (1) posterization / banding performance of ICtCp (2) color volume mapping. It some patterns for (1) are presented, but many possible alternatives could be investigated. It is suggested that for (2), the existing color volume tools in HEVC such as CRI be applied to ICtCp. Early experiments with (1) indicated that test patterns generated in RGB-PQ or linear light domain perform better in coding in the Y’CbCr NCL 4:2:0 domain, while patterns generated in the intermediate LMS or final ICtCp space produce more efficient coding and less banding in tests prior to HEVC encoding (4:4:4 -> 4:2:0 -> 4:4:4) . Visual results were conducted on a 65” Samsung JS9500 consumer HDR monitor. Tests were inconclusive at this time, but it recommended that JCT investigate the naturally occurring image patterns that report the most issues in Y’CbCr NCL and see if ICtCp improves the artifacts.

# Introduction

Reports of artifacts in BD-ROM 3.1 titles (UltraHD BluRay) indicated that sunset or sunrise scenes exhibited the most visible problems, despite some titles coding up to100 mbps. Some issues were found to be the result of HDMI controllers actually passing 8-bit samples in a 10 or 12-bit mode. Other scenes were found to be the result of encoders that assume smooth ramps in pictures have low cost in RDO, and therefore do not assign enough bits (lower Qp) in these highly sensitive patterns. X265 AQ-mode 3 was added to help with such scenes.

A source code model [1] was used to generate sunset patterns, such as the image below. Simplified patters that approximated sunset scenery were generated with hue ramps.



# Simplified examples





# References

[1] A.J. Preetham, P. Shirley, B. Smits, “A practical model for Daylight” https://www.cs.utah.edu/~shirley/papers/sunsky/