

<b>ITU – Telecommunications Standardization Sector</b> STUDY GROUP 16 Question 6 <b>Video Coding Experts Group (VCEG)</b> <hr/> 53 <sup>rd</sup> Meeting: 20–26 February 2016, San Diego, US	Document VCEG-BA90
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	<b>International Telecommunication Union</b> <b>International Organization for Standardization</b> <b>International Electrotechnical Commission</b>
<b>Source:</b>	ITU-T Q6/16 <i>Visual Coding</i> (VCEG) and ISO/IEC JTC1/SC29/WG11 <i>Coding of Moving Pictures and Audio</i> (MPEG)
<b>Title:</b>	<b>Call for test materials for future video coding standardization</b>
<b>Status:</b>	Approved by ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q6 (San Diego, 26 February 2016) – developed as JVET-B1002 For public distribution to potential contributors
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## Abstract

This document provides a call for test materials intended for usage in future video coding standard development.

## 1 Introduction

VCEG and MPEG anticipate that video bit rate (when current compression technology is used) will go up faster than the network infrastructure will be able to carry economically in the future, both for wireless and wired networks. Reasons for this include the increases in fidelity, frame rate, and picture resolution for both stationary and mobile devices, the increasing number of users, the increased amount of video used by each user, and the increasing tendency towards individual use of download, upload, streaming, and security-related video services. Therefore, it is anticipated that a new generation of video compression technology will be needed by the beginning of the next decade that has sufficiently higher compression capability than the HEVC standard and can particularly support professional high quality and high resolution video as well as the user generated content.

In order to enable more rigorous evaluation of new compression technology, test material is sought that reflects the types of video that future compression technology will be required to process. In particular, camera technology has been rapidly developing that is capable of increasing resolution while reducing noise, and enhancing dynamic range and colour reproduction.

Owners of such test material are therefore kindly requested to consider providing their content to VCEG and MPEG for the purpose of development, testing and promulgation of video coding standards. Technical specifications of the materials that we are seeking are given in Section 2. If you are willing to provide such material, please refer to the logistics and ownership information given in Section 3.

### Timeline:

- Materials received between March 1, 2016 and May 16, 2016 will be reviewed during the May/June 2016 meetings of SG16 and MPEG.
- Further submissions of test materials are welcome after May 2016, provided that they provide further benefit beyond the materials selected by that time.
- Usage of these materials is expected in exploration experiments on future video coding technology conducted by VCEG and MPEG (and their Joint Video Exploration Team) and potentially in a future Call for Evidence and/or Call for Proposals, and potentially in subsequent standardization work on video coding technology.

## **2 Test material sought**

Suitable test materials for the development of video coding standards are sought. The following attributes are the main focus for the test material.

### ***2.1 Sequence formats and frame rates***

Test materials in the following sequence formats (picture resolutions) are sought.

- 8Kx4K
- 4Kx2K
- 1080p
- 720p

Portrait orientation of user generated test material is also sought.

Currently, many streaming applications use resolutions below 720p, however, such content is typically generated by downsampling higher resolution material. It is preferred that the licence terms allow downsampling, cropping, change of format, compression and other types of processing of the test material.

A wide range of frame rates such as 24/50/60/72/100/120 frames per second and beyond are sought. Preservation of native frame rates and picture resolutions is desirable. Raw (uncompressed) material is desirable, but material with a low amount of compression (visually lossless) is also acceptable.

### ***2.2 Colour spaces and colour sampling***

It is desirable that the test material be available in an RGB colour space in full-resolution colour sampling format (4:4:4). However, suitable test material in a YCC colour space and with a lower colour sampling format such as 4:2:2 and 4:2:0 will also be welcome.

### ***2.3 Bit depth***

Test material is desired to have a bit depth of 10 bits per component or higher, such as 12, 14 or 16 bits per component. Test material with bit depth of 8 bits per component is also sought.

### ***2.4 High dynamic range / wide colour gamut***

HDR and WCG test material (especially with 4K resolution and peak display brightness of 1000 nits or higher) is sought.

If HDR and/or WCG material is provided, additional information about peak brightness / dark level and colour gamut is requested as accompanying metadata. Such material may also be provided in a floating point representation. If the materials are "pre-encoded" in a particular format (e.g. TIFF), then the transfer function and the colour gamut they are packaged in is also important to be identified (e.g. PQ+P3D65, BT.2020, etc.).

## **2.5 Metadata**

Metadata that are available should be provided. This could include

- Information about camera type
- Extrinsic (position) and intrinsic camera parameters from calibration or external measurements
- Information about illumination / lighting conditions
- Information about lens focus and opening
- Information about any processing applied (e.g. colour grading)
- Information about chroma sample position (in YCC)

## **2.6 Scanning methods**

The test material must be progressively scanned (not interlace-scanned).

## **2.7 Sequence length**

The length of the test material should be at least 10 seconds long, and preferably longer.

## **2.8 Content quality**

The sequences should be captured with cameras that reflect the state of the art in the application domain that the sequences are intended for, e.g. in terms of low-noise properties.

## **2.9 Content diversity**

The test material should cover a large variety of characteristics and content types including content that is challenging for a typical video codec. The following are some possible examples of such characteristics:

- irregular camera motion, zoom, rotation, and change of camera viewpoint (pan, dolly etc.),
- non-rigid object motion, irregular motion trajectories,
- challenging texture structures,
- saturated colour,
- large contrast/dynamic range,
- slow illumination changes, as well as flash,
- different focus planes within the same picture,
- fades/cross fades,
- time lapse,
- unstable or stabilized camera motion,
- film grain and/or noise (from movie/TV/surveillance/watermarking typical content),
- wide field of view (fish-eye/360 degree video etc.),
- non-camera captured content (animation, gaming, screen content etc.)

Typical content from important use cases is also desired to cover wider range of sequence characteristics.

Content examples include sports (soccer, basketball), nature (falling snow, rain, moving plants and animals), people and faces, music video, performances, scenes from movies, video with scrolling text, gaming, user-generated content, panoramic video, VR, surveillance.

## ***2.10 Novel sources***

Test materials shot with novel types of cameras (panoramic cameras, plenoptic cameras, depth cameras, etc.) are welcome, as far as deemed relevant for future video compression applications.

## ***2.11 Film sources***

Test materials derived from 35 mm film scan at 4K resolution (4096 x 2048 pixels per frame @ 24 fps) are also desirable.

# **3 Logistics**

Prospective contributors of test sequences should refer to one of the following contacts:

Prof. Dr. Jens-Rainer Ohm  
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Email: [ohm@ient.rwth-aachen.de](mailto:ohm@ient.rwth-aachen.de)

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Various delivery formats can be negotiated.

Please consider clarifying conditions and copyrights under which the sequences can at least be used by members of MPEG and VCEG or by other standardization bodies that may cooperate with VCEG and MPEG during the development of standards. We would prefer allowance of usage in the context of our work that is as unlimited as possible (e.g. allowing cropping, resampling, format changes, re-hosting and redistribution, public demonstrations of technology, snapshots and test results in academic publications etc.) Allowance of usage beyond that purpose is desirable, but not mandatory. Please clarify any restrictions that may apply; these will be documented in MPEG and VCEG databases of test materials. If needed, the above contacts are able to provide you with example copyright agreements that have been used in similar cases in the past.