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CODING OF MOVING PICTURES AND AUDIO

Source	Video
Title	**Description of Testing in Wavelet Video Coding**
Status	Approved
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The provided testing scenario is intended to be used for evaluation of the coding performance of the JSVM coding scheme provided by JVT, with respect to the Exploration Wavelet Video Coding platform. The reference conditions have been derived from the JSVM testing conditions document JVT-P205 produced at the 16th JVT meeting in Poznan. Further details on JSVM configuration can be found in such document.

The rate points to be used in all tests are derived from the combined scalability test sets. The applicable set of rate points is similar to the rate points originally applied in the Munich and Palma testing conditions. The target rates are arranged in a systematic manner.

For each spatio-temporal resolution, the rate triples from the lowest rate point to the highest rate point.

The settings are chosen such that an AVC compatible base layer <u>can</u> be provided for the base layer of combined and spatial scalability and for the QCIF sequences in the SNR scalability scenario.

The encoder will generate embedded bit-streams. To extract the various bit-rates, frame-rates and resolutions specified in the tables below from the embedded bit-stream, an extractor shall be used. No transcoding is allowed for performing the decoding at the various bit-rates, frame-rates and resolutions.

In the combined scalability settings, the testing addresses a broad range scalability and is motivated by the requirements of applications such as surveillance, broadcast and storage systems. This scenario is represented by the test sequences CITY, CREW, HARBOUR and SOCCER.

Visual tests shall take place for the rates shown in green in the tables below for each spatial resolution, and for the Palma test at the rate points tested at Palma. PSNR curves will have to be provided for all other rate points.

1 SNR Scalability (SNR)

For evaluation of SNR scalability functionality, no spatial scalability is included. A single spatial layer is encoded in the bit stream. For the QCIF layers, this configuration corresponds to the lowest layer of the combined scalability test.

Extraction Paths

The extraction paths for SNR scalability are straight forward. The rates for a single spatial resolution are successively extracted. The extraction paths for SNR scalability are shown in Figure 1 below.
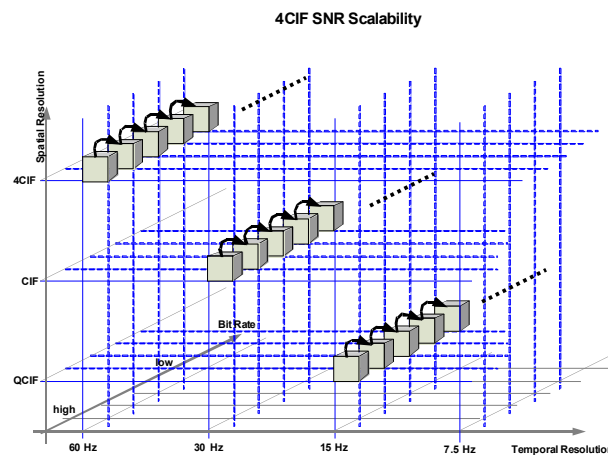
Figure 1: 4CIF extraction path for SNR scalability.

Rate Points

In the SNR scalability testing scenario, the extracted streams are required not to exceed the target rate points.

Sequence	Format	Bit rates (kbit/sec)						
City	QCIF 15Hz	64	80	96	120	144	168	192
	CIF 30Hz	256	320	384	480	576	672	768
	4CIF 60Hz	672	848	1024	1280	1536	1792	2048
Crew, Harbour, Soccer	QCIF 15Hz	96	120	144	180	216	252	288
	CIF 30Hz	384	480	576	720	864	1024	1152
	4CIF 60Hz	1024	1280	1536	1920	2304	2688	3072

2 Spatial Scalability (SPA)

In order to generate rate/distortion plots, three separate streams are encoded including three spatial layers for the 4CIF sequences.

Extraction Paths

The extraction paths for spatial scalability are straight forward. The bit stream includes each spatial layer at a single fixed target rate. The extraction paths for spatial scalability are shown in Figure 2 below.
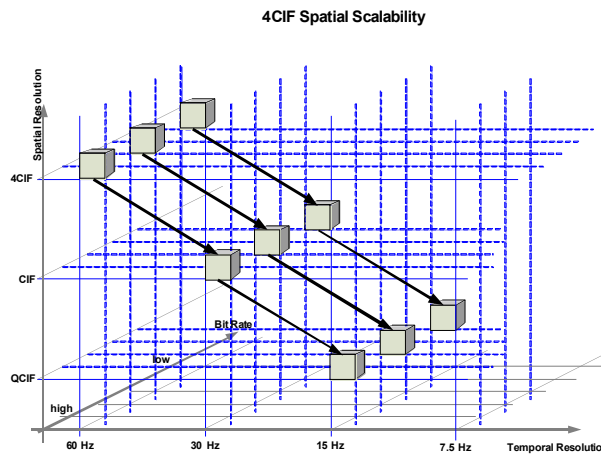

Figure 2: 4CIF extraction paths for spatial scalability.

Rate Points

In the spatial scalability testing scenario, the extracted streams are required not to exceed the target rate points by more than 2%.

Sequence	Format	Bit rates (kbit/sec)		
	-	-	-	-
City	CIF 30Hz	192	384	576
	4CIF 60Hz	576	1152	1728
Crew, Harbour, Soccer	-	-	-	-
	CIF 30Hz	384	576	768
	4CIF 60Hz	1536	1728	2304

3 Combined Scalability (CMB)

The Palma test conditions and rate points are used for this test.

4 Extended Scalability Performance (EXT)

This will not be necessary part of any visual performance evaluation at the Montreux meeting, but can be a basis for further study.

In this combined extended scalability scenario, extraction from an upper spatial resolution higher temporal rate to the next lower temporal /spatial resolution is performed from ~2/3 more than the CIF spatial resolution max rate point, as indicated in the last table and figure, to investigate a precise application scenario where a provider could be interested in delivering content at various resolutions (4CIF, CIF, QCIF) by buying it at a max predefined rate.

Extraction Paths

The applicable extraction paths are depicted below. The main extraction path is along the spatial layers. Temporal scalability is achieved by extraction from the rate points of the highest temporal resolution for each spatial layer.
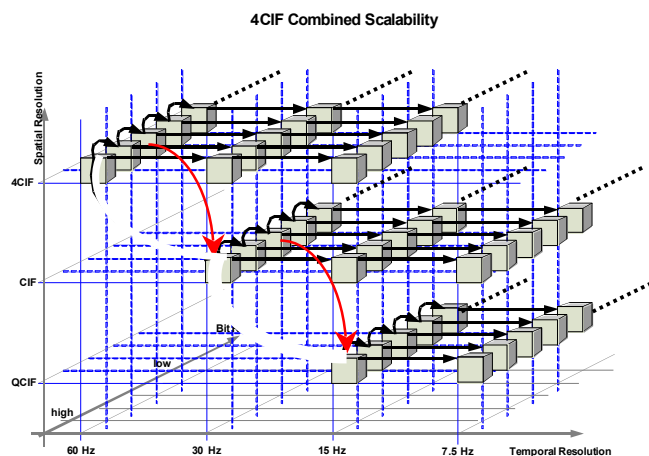
Figure 3: 4CIF extraction paths for combined scalability.

The extraction paths as provided in the extraction scripts for combined scalability are shown in Figure 3. To preserve the embeddedness of the bit stream the following rule is defined: For each extraction point in the spatio-temporal-quality cube, it is required to allow the extraction of extraction points of lower or equal spatial or temporal resolution and equal or lower rate point index.

Rate Points

The rate points for lower temporal resolutions are defined through the extraction path: The corresponding stream of the higher temporal resolution is temporally sub-sampled.

In the combined scalability testing scenario, the extracted streams are required not to exceed the target rate points.

Sequence	Format	Bit rates (kbit/sec)						
City	QCIF 15Hz	64	80	96	120	144	168	192
	CIF 30Hz	256	320	384	480	576	672	768
	4CIF 60Hz	672	848	1024	1280	1536	1792	2048
Harbour, Soccer	QCIF 15Hz	96	120	144	180	216	252	288
	CIF 30Hz	384	480	576	720	864	1008	1152
	4CIF 60Hz	1024	1280	1536	1920	2304	2688	3072
Crew	QCIF 15 Hz	120	180	240	270	300	330	360
	CIF 30 Hz	480	600	720	900	1080	1260	1440
	4CIF 60 Hz	1280	1650	1920	2400	2880	3360	3840

The rate points marked in red indicate the extraction points for the lower spatial/temporal resolution max points (e.g., for City 1280kbit/s represents the 4CIF 60Hz rate from which to extract a 768 kbit/s max CIF 30Hz stream). The green background shows the test points at which visual testing will be performed.

For all other points PSNR curves shall be plotted. PSNR curves should also be plotted to generate 4CIF and CIF data at subsampled rates (30 and 15 Hz for 4CIF, 15 Hz for CIF).

Additionally the AhG on Wavelet Video Coding Exploration will look on how to incorporate higher resolution material for performance evaluation, by defining appropriate test sequences and testing conditions by the next meeting.

5 Timeline

Visual tests with JSVM will be planned Apr. 1st or 2nd in Geneva or Montreux. YUV files should be available for this by Monday, Mar. 27th, 2005.