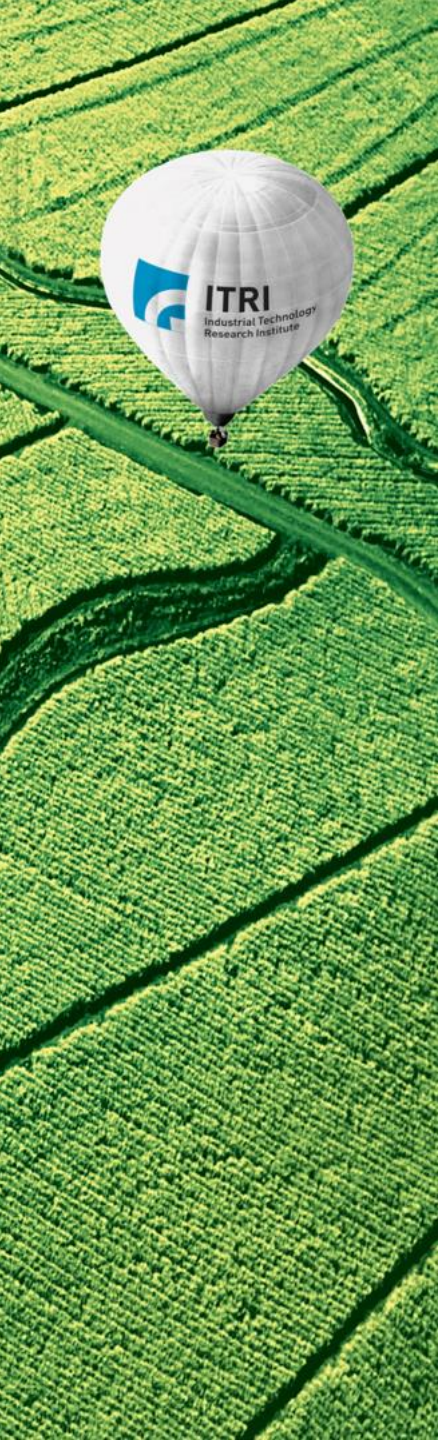
ITRI
Industrial Technology
Research Institute

MPEG 標準進程

ITRI ICL V200　Ching-Chieh Lin

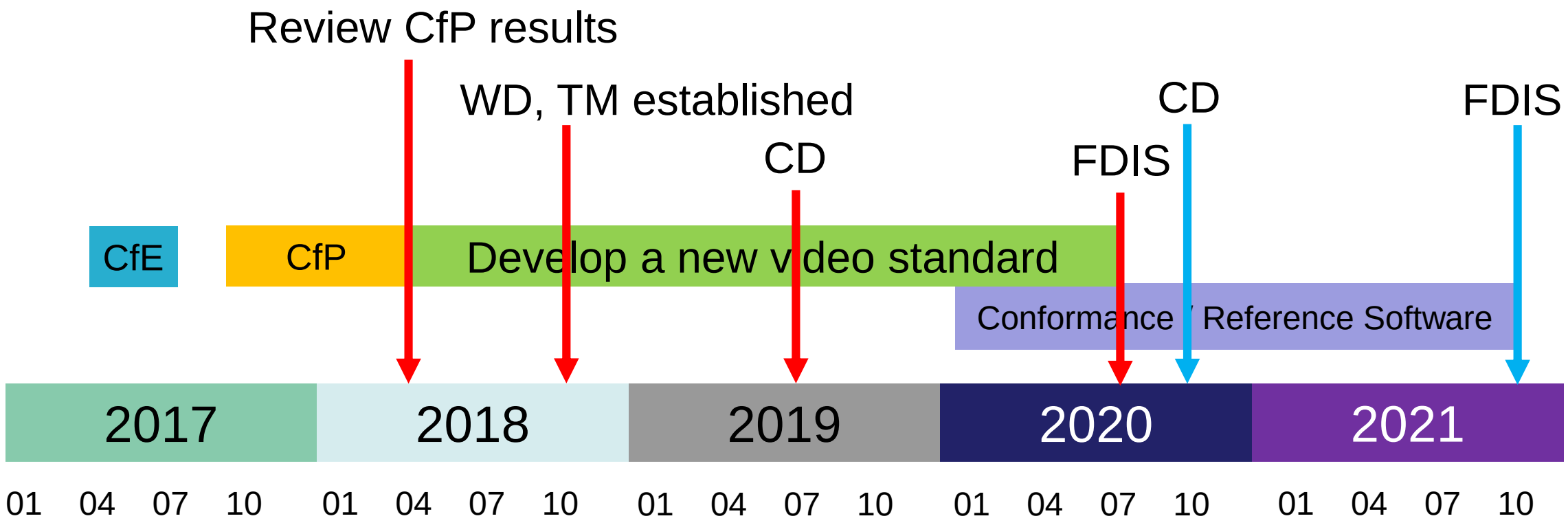
2020/07/15



Outline

- VVC/H.266
  - H.266 timeline and status
  - H.266 Adoptions
  - H.266 Performance
- Schedule of future meetings

H.266 Timeline



*WD : Working Draft
*TM : Test Model
*CD : Committee Draft
*FDIS: Final Draft International Standard

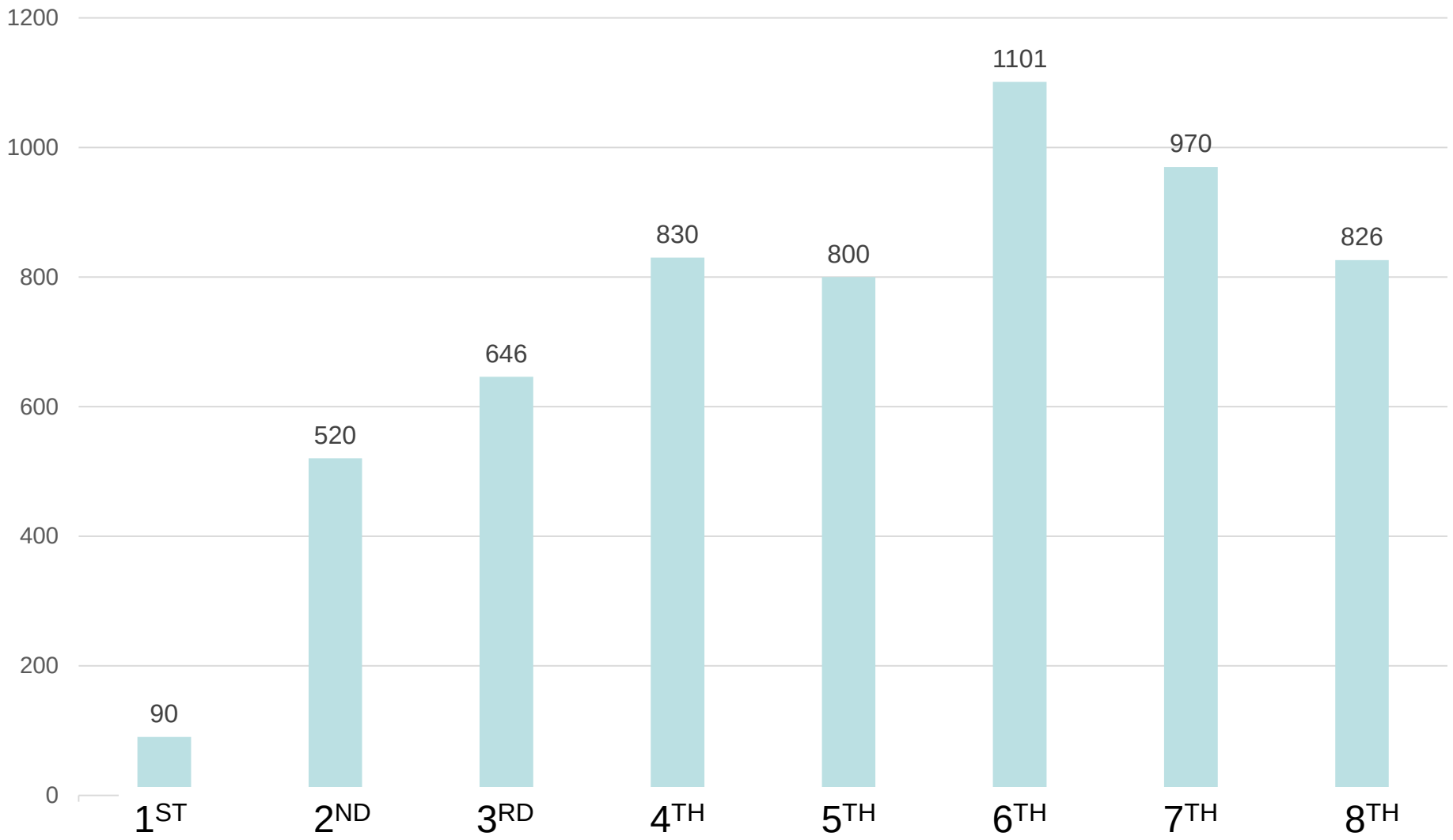
Status of VVC

- VVC spec is in DIS
  - (N18692 | JVET-Q2001: Versatile Video Coding specification text (Draft 8))
- Supplemental enhancement information messages for coded video bitstreams
  - "Independent" SEI messages, specification not needed for core decoding process
- Test Model 8 of Versatile Video Coding (VTM 8)
- Preliminary draft 2 of VVC conformance testing
  - (N19123 | JVET-Q2008)
  - Including initial list of bitstreams and responsibilities
  - Becoming more complete on low-level tools, HLS added

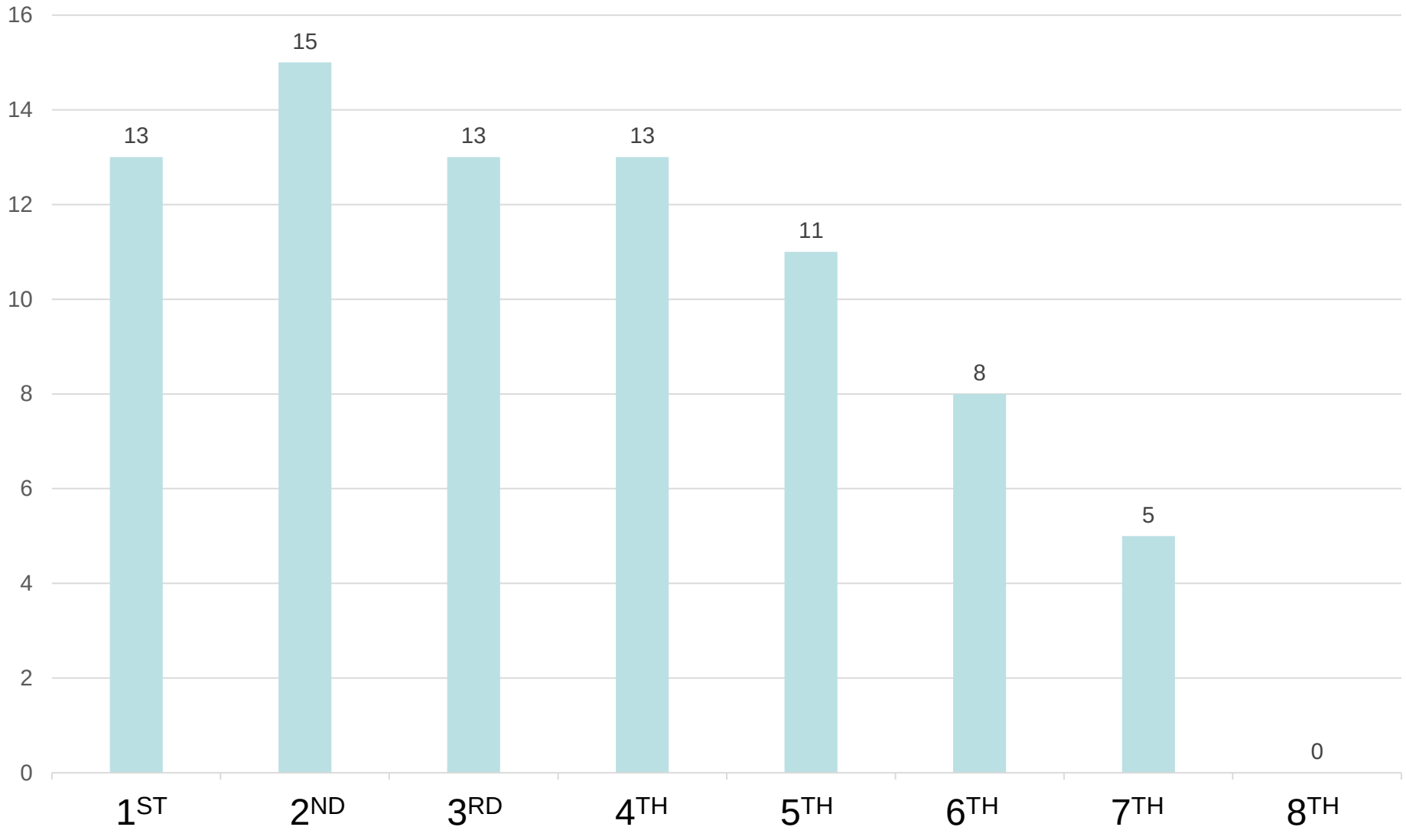
ITRI Industrial Technology Research Institute

4

Number of JVET contributions



Number of Core Experiments



Important aspects (1/2)

- Low level coding tools
  - Various cleanups, simplifications, bug fixes, editorial improvements
  - Adaptive color transform improvements
  - Geometric partitioning
    - generalizing triangle partitioning mode
  - Cross component ALF
    - improving chroma part of ALF
  - Deblocking & ALF enhancements for subjective quality
  - Lossless coding improvements, incl. 4:4:4
    - better than HEVC RExt now
  - RPR improved filters
  - BDPCM and palette mode support for 4:2:0 colour sampling

ITRI
Industrial Technology Research Institute

Important aspects (2/2)

- Various high-level syntax improvements in aspects of
  - Slices, tiles, subpictures, coded picture regions
  - Picture header, SPS/PPS and slice header signalling
  - Reference picture signalling and buffer management
  - Access mechanisms (including layers), capability for partial decoding, bitstream extraction and merging (a.k.a. BEAM), and scalability
  - Decoder capability signalling (DPS)

- Profile/level definition and signalling:
  - **Only two profiles**: Main 10 (4:2:0) and Main 4:4:4 10
  - No need to define special profiles for higher ranges, scalability, multi-view, screen content, etc.

ITRI
Industrial Technology Research Institute

Experiments

- *No CE!* - a clear indication of improved stability

- Testing conditions for experimentation cases not covered in previous CTC
  - JVET common test conditions and software reference configurations for non-4:2:0 colour formats
  - JVET common test conditions and software reference configurations for lossless, near lossless, and mixed lossy/lossless coding
  - JVET functionality confirmation test conditions for reference picture resampling

ITRI
Industrial Technology Research Institute

Experiments

- Preliminary plan for VVC verification testing
  - Testing VVC VTM vs. HEVC HM
  - Near-term priorities: SDR HD, SDR UHD, HDR HD, HDR UHD, 360° (extracted viewport)
  - Longer-term: Screen content (perhaps with 2 HEVC anchors – Main 10 and SCC profiles), Scalability, 4:4:4
- Considerations to work out:
  - Test sequences (need additional non-CTC sequences)
  - Test cases to match quality, measuring bit rate savings
  - Test methodology
- Expert viewing performed at this meeting for initial identification of reasonable test cases

ITRI
Industrial Technology Research Institute

AHGs

- Project Management (AHG1)
- Draft text and test model algorithm description editing (AHG2)
- Test model software development (AHG3)
- Test material and visual assessment (AHG4)
- Conformance testing (AHG5)
- 360° video coding tools, software and test conditions (AHG6)
- Coding of HDR/WCG material (AHG7)
- Layered coding and resolution adaptivity (AHG8)
- High-level syntax (AHG9)
- Encoding algorithm optimizations (AHG10)

ITRI
Industrial Technology Research Institute

AHGs

- Screen content coding (AHG11)
- High-level parallelism and coded picture regions (AHG12)
- Tool reporting procedure (AHG13)
- Lossless and near-lossless coding (AHG14)
- Quantization control (AHG15)
- Implementation studies (AHG16)
- Film grain synthesis (AHG17)

ITRI
Industrial Technology Research Institute

Performance comparison(1/2)

- PSNR-based Common Test Conditions BD-Rate savings relative to HEVC reference software (10 bit)

vs HM	AI			RA		
	gain	Enc.	Dec.	gain	Enc.	Dec.
VTM 1.0	4%	9.6X	1.1X	8%	2.2X	0.8X
VTM 2.0	18%	18X	1.6X	23%	3.7X	1.3X
VTM 3.0	19%	19X	1.6X	27%	5.3X	1.3X
VTM 4.0	21%	22X	1.7X	32%	8X	1.5X
VTM 5.0	23%	34X	1.9X	33%	10X	1.9X
VTM 6.0	24%	27X	2.0X	35%	10X	1.9X
VTM 7.0	24%	27X	1.8X	35%	9.5X	1.8X
VTM 8.0	24%	30.7X	.2.2X	35%	10.7X	2X

ITRI Industrial Technology Research Institute

Performance comparison(2/2)

- PSNR-based Common Test Conditions BD-Rate savings relative to HEVC reference software (10 bit)

	All Intra Over HM-16.20				
	Y	U	V	EncT	DecT
Class A1	-27.89%	-39.05%	-39.30%	1865%	221%
Class A2	-27.49%	-29.04%	-26.48%	2997%	238%
Class B	-20.99%	-32.87%	-37.24%	3361%	227%
Class C	-21.74%	-25.20%	-28.82%	4692%	224%
Class E	-25.16%	-31.46%	-30.65%	2667%	206%
Overall	-24.09%	-31.32%	-32.82%	3097%	224%
Class D	-17.64%	-19.95%	-20.14%	5303%	217%
Class F	-38.68%	-43.85%	-46.26%	5898%	215%

	Random Access Over HM-16.20				
	Y	U	V	EncT	DecT
Class A1	-37.28%	-44.18%	-49.59%	951%	204%
Class A2	-41.45%	-46.23%	-44.78%	1080%	222%
Class B	-34.02%	-53.72%	-51.85%	991%	192%
Class C	-29.08%	-38.81%	-40.31%	1280%	200%
Class E					
Overall	-34.84%	-46.33%	-46.91%	1070%	202%
Class D	-26.89%	-35.50%	-34.96%	1411%	203%
Class F	-40.62%	-49.10%	-50.32%	789%	167%

ITRI Industrial Technology Research Institute

Future meetings

#	City	Country	Year	Month
128	Geneva	CH	19	10
129	Brussels	BE	20	01
130	Alpbach	AT	20	04
131	Geneva	CH	20	07
132	Rennes	FR	20	10
133	Capetown	ZA	21	01
134	Geneva	CH	21	03
135	Prague	CZ	21	07
136	???	???	21	10
137	Geneva	CH	22	01

Virtual Meeting

ITRI Industrial Technology Research Institute

Thank You!

ITRI
Industrial Technology Research Institute