

VSF JPEG XS Technical Recommendations and File Exchange Report

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Presentation Outline



1. TR Objective/Output Review
2. Liaison & Industry Standards
3. File Exchange Status
4. Document Status
5. Next Steps



1. Objective/Output Review



- Create a technical recommendation primarily focused on WAN applications which utilizes JPEG XS coding and MPEG2TS/SMPTE 2022-2 Encapsulation (TR-07)
- Create technical recommendation focused on LAN/WAN applications for JPEG XS coding utilizing SMPTE 2110-22 Encapsulation (TR-08)

1. Objective/Output Review



- Develop interoperable capability sets which include multiple interoperability points for specific target applications/conformance levels
 - Applications/conformance levels include typical broadcast 2K formats, frame rates, sampling
 - Applications/conformance levels for 4K & 8K resolutions inc. WCG and HDR
 - Applications/conformance levels for multi-media extensions including RGB, 4:4:4 sampling, 8bit and 12bit depth
- Includes applicable recommendations for a complete system including video, audio ancillary data, and robust transmission
- Liaise with other organizations as needed
- Organize file exchange online workshop

2. Liaison & Industry Standards



Collaborate Liaison with other standards organizations to support the work

- IETF for the JPEG XS RTP Specification
“RTP Payload Format for ISO/IEC 21122 (JPEG XS)” moved to a standard RFC, which is **RFC-9134**
- ISO/IEC for JPEG XS Level/SubLevel
Request specific level for 720p; **1K-1**, also sublevel of **4bpp** and allow **4:2:0 in High444.12 Level**
- ISO/IEC for MPEG2TS Clarifications
Some clarifications at the MPEG2TS layer for header boxes

Coordinate with other VSF Activity Groups via participation

3. File Exchange Status



TR-07 File Exchange and TR-08 File Exchange has been completed

- 1080p & 1080i JPEG XS Encoded streams were provided
- Files were posted to a common area and other participants were able to review and analyze the files
- The file exchange activity is complete
- Input from reviewer's comments has been considered for TR revisions

3. File Exchange Status



TR-07 File Exchange has 6 participants with 90% of the file reviews completed

Participating: Appear, Artel, Evertz, Media Links, Net Insight, Riedel

Most files were capable of being analyzed with decodable JPEG XS Codestreams

Some header inconsistencies

- Most files (almost all) were capable of being analyzed and had decodable JPEG XS Codestreams
- Would judge file exchange as a success
- Revisions of TR-08 to address referenced documents conflicting input on field/frame RTP timestamping
- Revisions of TR-07 & TR-08 should help to address header issues with more clarity around header definition and reference to updated MPEG and JPEG documents

3. File Exchange Status



TR-08 File Exchange has 9 participants with 76% of the file reviews completed

Participating: Appear, AWS/Elemental, Evertz, Imagine, IntoPix, Media Links, Nevion, Riedel, Sumavision

- Most files (almost all) were capable of being analyzed and had decodable JPEG XS Codestreams
- Would judge file exchange as a success
- Some Timestamping inconsistencies
- Some header inconsistencies

4. Document Status



TR-07 & TR-08

- 2022 Revisions of TR-07 and TR-08 have been completed and published on VSF's web site

4. Document Status



TR-07 2022 Revision Highlights

- ISO/IEC 21122-1:**2019** "Information technology — JPEG XS Low-latency Lightweight Image Coding System — Part 1, Part 2, Part 3" moved to **2022** revised document
- Amongst other items there will now be a 4bpp sublevel
- Color Specification & Dynamic Range table now includes examples of Wide Color Gamut
- Implementers should note that table 2-132 of Rec. ITU-T H.222.0 defining the JXS_video_descriptor contains an error. This error will be addressed in ISO/IEC 13818-1 (2021)/AMD1 by removing the descriptor_tag and descriptor_length fields from the table. We anticipate AMD1 will be published in 2022.

4. Document Status



TR-08 2022 Revision Highlights

- ISO/IEC 21122-1:2019 "Information technology — JPEG XS Low-latency Lightweight Image Coding System — Part 1, Part 2, Part 3" moved to **2022** revised document
- Amongst other items there will now be a High 4:2:0 profile and 4bpp sublevel
- Color Specification & Dynamic Range table now includes examples of Wide Color Gamut
- New wording: For interlaced signals, the Interlace_Mode of the frat field of all JPEG XS picture segments shall be set to '1' (note: indicating that the first picture of a frame is the first video field, and the second picture of a frame is the second video field). For progressive signals, the Interlace_Mode of the frat field shall be set to '0'
- Appendix A, SDP Example was corrected for prior rate error

5. Next Steps



1. 2022 Revisions of TR-07 & TR-08 Published on VSF web site
2. Live Interop Demonstrations at Video Service Forum planned for VidTrans 2022 in June
2. Potential SDP File Exchange and NMOS Workshops

Thank You

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IP SHOWCASE

X. JPEG XS Overview



JPEG XS is ISO/IEC standard, 21122, (JPEG XS), designed for latency-critical real time applications and offering near lossless and visually lossless quality with low complexity

- Applicable to SD, HD, UHD, and HDR/WCG content
- 1.4-4 bpp compression (7:1 - 2.5:1)
- Robust over multiple coding cycles
- Low power consumption (less processing and memory needed)
- Both Ground and Cloud Friendly (ground thrower/cloud catcher)