



IPMX JPEG-XS Video Profile Requirements



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1. Introduction (Informative)

This document defines the requirements for the **IPMX JPEG-XS Video Profile**, establishing consistent, interoperable behavior across IPMX devices that implement constant bit-rate compressed video using the JPEG-XS codec.

This profile builds upon:

- The IPMX baseline requirements, including NMOS requirements, branding, and certification rules found in the IPMX Product Qualification and Certification Requirements (PQCR) document.
- The relevant VSF TR-10 Technical Recommendations for compressed video and JPEG-XS.

It does not restate those specifications or redefine their behavior. Instead, it:

- References the applicable TR-10 specifications.
- Defines the specific JPEG-XS format combinations required for IPMX compliance.
- Specifies sender and receiver requirements particular to this profile.
- Defines NMOS signaling expectations needed for interoperability.

Where helpful, short informative explanations are included. All uses of shall, should, and may follow [RFC 2119](#) conventions and form the normative portion of the profile.

2. Scope (Normative)

This profile defines:

- The required JPEG-XS compressed video formats for IPMX devices implementing this profile.
- Sender-specific requirements.
- Receiver-specific requirements.
- Optional features that vendors may implement (if any).
- NMOS signaling requirements specific to this profile.

Anything not defined here or in the applicable TR-10 documents is outside this profile's scope.

3. Normative References (Normative)

Devices conforming to this profile shall comply with:

- [VSF TR-10-1](#): System Timing and Definitions
- [VSF TR-10-11](#): Internet Protocol Media Experience (IPMX) — Constant Bit-Rate Compressed Video
- [ISO/IEC 21122-1](#) — JPEG XS Core Coding System
- [ISO/IEC 21122-2](#) — JPEG XS Profiles and Levels
- [VSF TR-08:2022](#) — Transport of JPEG XS Video in ST 2110-22 Flows
 - Devices shall conform to the encoder and decoder configuration rules defined in Section 8.1 of TR-08.
- [VSF TR-10-8](#): NMOS Requirements, referencing:
 - [NMOS IS-04](#) Discovery and Registration
 - [AMWA NMOS IS-05](#) Connection Management.
- [AMWA BCP-006-01](#): NMOS with JPEG-XS
- [AMWA NMOS IS-11](#): NMOS Stream Compatibility Management
- [AMWA BCP-004-01](#): NMOS Receiver Capabilities (required for devices that implement a Receiver)
- [AMWA BCP-004-02](#): NMOS Sender Capabilities (required for devices that implement a Sender)
- [IPMX Product Qualification and Certification Requirements \(PQCR\)](#): IPMX Baseline Requirements, including NMOS requirements, branding, and certification rules.

Note on Future TR-10-15 Reference:

A forthcoming document, VSF TR-10-15 (JPEG-XS Codec Requirements for IPMX), is expected to consolidate JPEG-XS usage guidance for IPMX. Because TR-10-15 is not yet published, this profile references ISO/IEC 21122 and VSF TR-08:2022 Section 8.1 instead. A future revision of this profile may replace these references with TR-10-15 once available.

In addition, where implemented, devices shall comply with the following AMWA specifications, as already referenced by PQCR:

- [AMWA BCP-005-01](#): EDID to Receiver Capabilities (where applicable)

Where this profile refers to NMOS parameter names or capability identifiers, it uses the NMOS Parameter Registers:

- [AMWA NMOS Parameter Registers – Formats](#)

- [AMWA NMOS Parameter Registers – Capabilities](#)

This profile does not redefine concepts such as packet pacing, network timing, SDP structures, or Info Blocks already defined elsewhere.

4. Terms and Definitions (Informative)

The terms used in this document are as defined in:

- VSF TR-10-1
- VSF TR-10-11
- VSF TR-10-15

This profile introduces no additional terms.

5. General Provisions (Normative)

Parameter	Requirement
Essence Type	JPEG-XS Compressed Video
Codec	JPEG-XS as defined in TR-10-15
Transport Class	Constant Bit-Rate Compressed Video (TR-10-11)
Required Formats (TX)	At least one of Format A or Format B (defined Section 6.1.1)

Parameter	Requirement
Required Formats (RX)	Both Format A and Format B (defined Section 6.1.2)
Resolution	Undefined / Any (as supported and signaled by the device)
Frame Rate	Undefined / Any (as supported and signaled by the device)

A sender **may** support additional JPEG-XS profiles, color samplings, and bit depths beyond these minimum requirements, as permitted by TR-10-11 and TR-10-15.

6. Profile Format Requirements (Normative)

The media essence for this profile shall be JPEG-XS compressed video as defined in TR-10-11 and TR-10-15.

This profile introduces no additional essence-level constraints beyond those specified below.

6.1 Required Sender Behavior

A device declaring support for this profile as a **sender** shall implement all requirements in this section.

6.1.1 Required Sender Format Combinations

1. The sender shall encode JPEG-XS video in accordance with TR-10-11 and TR-10-15.
2. At minimum, the sender shall support **at least one** of the following format combinations:
 - **Format A — RGB 4:4:4 8-bit**
 - JPEG-XS profile: High444.12

- Color representation: RGB
- Sampling: 4:4:4
- Bit depth: 8-bit per component
- **Format B — YUV 4:2:2 10-bit**
 - JPEG-XS profile: High444.12
 - Color representation: YUV (YCbCr)
 - Sampling: 4:2:2
 - Bit depth: 10-bit per component
- 3. For the purposes of this profile:
 - Resolution is **Undefined / Any**.
 - Frame rate is **Undefined / Any**.

A sender may support additional JPEG-XS profiles, color samplings, and bit depths beyond these minimum requirements, as permitted by TR-10-11 and TR-10-15.

6.1.2 Additional Sender Format Requirements (Bit-Rate & Sublevel)

1. The sender shall comply with the constant bit-rate behavior defined in TR-10-11 Section 7.
2. The sender shall comply with the JPEG-XS sublevel rules defined in ISO/IEC 21122-2 and the encoder/decoder configuration rules in VSF TR-08:2022 Section 8.1.
3. Support for JPEG-XS sublevels above 4 bits per pixel (bpp) is optional. Where such sublevels are supported, the sender shall signal them consistently using the JPEG-XS Media Info Block defined in TR-10-11.

6.1.3 Transport & Timing Requirements

1. The sender shall use RTP transport and system timing as defined in TR-10-11 Section 9 in combination with TR-10-1.
2. All packet pacing, RTP timestamping, and media-clock behavior shall follow TR-10-11 and TR-10-1.

6.1.4 Required Sender Signaling (Media Info Block & SDP)

1. The sender shall populate the JPEG-XS Media Info Block (type 0x0003) as defined in TR-10-11 Section 12, including:
 - transmode
 - packetmode

- profile
 - level
 - sublevel
 - fbblevel (where applicable)
2. Reserved fields defined in TR-8 Section 8.2.1.4 shall be set to zero unless otherwise specified.
 3. The sender shall populate the associated SDP fields required by TR-10-11, ensuring that:
 - SDP, the Media Info Block, and the actual JPEG-XS stream are consistent in resolution, frame rate, color sampling, bit depth, profile, level, and sublevel.

6.2 Required Receiver Behavior

A device declaring support for this profile as a receiver shall implement all requirements in this section.

6.2.1 Required Receiver Format Combinations

1. The receiver shall decode JPEG-XS video in accordance with TR-10-11 and TR-10-15.
2. The receiver shall support **both** of the following JPEG-XS format combinations:
 - **Format A — RGB 4:4:4 8-bit**
 - JPEG-XS profile: High444.12
 - Color representation: RGB
 - Sampling: 4:4:4
 - Bit depth: 8-bit per component
 - **Format B — YUV 4:2:2 10-bit**
 - JPEG-XS profile: High444.12
 - Color representation: YUV (YCbCr)
 - Sampling: 4:2:2
 - Bit depth: 10-bit per component
3. For the purposes of this profile:
 - Resolution is Undefined / Any.
 - Frame rate is Undefined / Any.

Any JPEG-XS stream conforming to TR-10-11 and TR-08 using either Format A or Format B shall be consumable by a receiver that claims conformance with this profile, subject to the receiver's advertised capabilities (e.g., maximum resolution, frame rate).

6.2.2 Additional Receiver Format Requirements

1. The receiver shall comply with the receiver conformance behavior for constant bit-rate JPEG-XS video as defined in TR-10-11, and with the JPEG-XS usage and configuration rules defined in VSF TR-08 section 8.1 together with the relevant parts of ISO/IEC 21122 (JPEG-XS).
2. A receiver may support additional JPEG-XS profiles, color samplings, bit depths, or sublevels beyond those required above; where it does so, these capabilities shall be accurately represented in signaling (TR-10-11 / VSF TR-08 / ISO/IEC 21122 and NMOS).

6.2.3 Interpretation of Transport & Signaling

1. The receiver shall interpret RTP transport and system timing as defined in **TR-10-11 §4** and **TR-10-1**.
2. The receiver shall correctly interpret the JPEG-XS Media Info Block (type 0x0008) as defined in TR-10-11 Section 12, including all required fields.
3. The receiver shall ignore reserved bits in the Media Info Block, as specified in TR-10-15.
4. The receiver shall interpret SDP signaling consistently with TR-10-11 and TR-10-15, ensuring that the received stream is validated against:
 - Resolution
 - Frame rate (grain rate)
 - Color sampling
 - Component depth
 - JPEG-XS profile, level, and sublevel

7. NMOS Representation (Normative)

Devices claiming support for this profile shall model and advertise their JPEG-XS media resources through NMOS in a manner consistent with:

- TR-10-8
- The IPMX PQCR NMOS Baseline Requirements
- The required format combinations defined in Section 6 of this document

Only profile-specific NMOS constraints appear in this section.

7.1 Sender NMOS Representation

A device acting as a sender for this profile shall model its NMOS resources as follows.

7.1.1 Flow Format & Media Type

1. The Flow's format attribute shall be:
 - `urn:x-nmos:format:video`
2. The Flow's media type (encoding) shall indicate JPEG-XS, for example:
 - `video/jxsv`
as defined in BCP-006-01 and TR-10-11.

7.1.2 Transport Requirements

1. Sender resources shall use an RTP-based NMOS transport URN, such as:
 - `urn:x-nmos:transport:rtp` or
 - `urn:x-nmos:transport:rtp.mcast`
as required by TR-10-8, TR-10-11, and BCP-006-01.
2. Transport parameters exposed through NMOS (destination address, source port, packetization parameters, etc.) shall match the actual TR-10-11 behavior and SDP.

7.1.3 Sender Capabilities (BCP-004-02)

1. The sender shall expose Sender Capabilities accurately describing which required format combination(s) it supports (Format A, Format B, or both) as defined in Section 6.
2. Capabilities shall use appropriate NMOS Parameter Register identifiers to describe:
 - Frame width / height
 - Grain rate (frame rate)
 - Color sampling
 - Component depth
 - JPEG-XS profile / level / sublevel (where exposed through capabilities).

7.1.4 IS-11 Behavior

1. IS-11 Stream Compatibility resources for senders shall reflect exactly the JPEG-XS format combinations supported under this profile.

- IS-11 signaling shall not contradict TR-10-11 signaling or the format combinations required by this profile.

7.2 Receiver NMOS Representation

A device acting as a receiver for this profile shall model its NMOS resources as follows.

7.2.1 Receiver Format Support

- Receiver resources shall indicate support for:
 - `urn:x-nmos:format:video`
- Receiver media type declarations shall indicate support for JPEG-XS (e.g., `video/jxsv`) consistent with BCP-006-01 and TR-10-11.

7.2.2 Receiver Capabilities (BCP-004-01)

- A receiver shall expose Constraint Sets permitting **both** required JPEG-XS format combinations defined in Section 6:
 - High444.12 RGB 4:4:4 8-bit
 - High444.12 YUV 4:2:2 10-bit
- Constraint Sets shall use NMOS Parameter Register identifiers relevant to JPEG-XS compressed video, including:
 - `urn:x-nmos:cap:format:frame_width`
 - `urn:x-nmos:cap:format:frame_height`
 - `urn:x-nmos:cap:format:grain_rate`
 - `urn:x-nmos:cap:format:color_sampling`
 - `urn:x-nmos:cap:format:component_depth`

7.2.3 IS-11 Behavior

- IS-11 compatibility resources shall describe the receiver's true decoding capabilities for JPEG-XS.
- IS-11 data shall not restrict or redefine any format combination that is mandatory under Section 6.

7.2.4 Alignment With TR-10-11 Signaling

1. All NMOS properties including width, height, grain rate, color sampling, bit depth, and JPEG-XS-specific transport parameters shall be consistent with:
 - the JPEG-XS Media Info Block, and
 - the SDP signaling required by TR-10-11 and TR-10-15.

7.2.5 EDID-Derived Behavior (BCP-005-01)

1. If the device exposes EDID or EDID-derived capabilities, it shall implement BCP-005-01.
2. The derived NMOS Receiver Capabilities shall continue to permit both required combinations (High444.12 RGB 4:4:4 8-bit and High444.12 YUV 4:2:2 10-bit), subject to the device's actual display and processing limits (e.g., maximum resolution / frame rate).

8. Optional Features (Normative)

No additional profile-specific optional features are defined for the IPMX JPEG-XS Video Profile in this version of the document.

9. Interoperability Notes (Informative)

This section provides context on how the IPMX JPEG-XS Video Profile relates to ST 2110-22 and other ecosystems. These are not additional requirements.

9.1 Resolution and Frame Rate

This profile intentionally does not define a baseline resolution or frame rate. Instead:

- It requires support for the two JPEG-XS format combinations (High444.12 RGB 4:4:4 8-bit and High444.12 YUV 4:2:2 10-bit).
- It leaves resolution and frame rate to be determined by the implementation and target market.

Vendors are responsible for:

- Supporting the resolutions and frame rates appropriate to their application domains (e.g., HD, UHD, DCinema, LED walls).
- Signaling these accurately via TR-10-11 and NMOS.

9.2 Relationship to SMPTE ST 2110-22

By relying on TR-10-11 and TR-10-15, this profile is compatible with ST 2110-22-based systems and workflows that support the same JPEG-XS format combinations.

Key points for implementers:

- IPMX receivers that implement this profile can consume ST 2110-22 JPEG-XS streams that match the required format combinations and timing assumptions of TR-10-11 / TR-10-15.
- ST 2110-22 receivers typically expect PTP-synchronous, constant bit-rate JPEG-XS flows. IPMX senders targeting 2110-22 receivers must ensure their clocking, bitrate, and JPEG-XS configuration meet those expectations.
- Many existing ST 2110-22 receivers in broadcast environments primarily support YUV 4:2:2 10-bit video. Support for RGB 4:4:4 8-bit is less common.
 - IPMX senders that implement only Format A (RGB 4:4:4 8-bit) may find limited interoperability with such receivers.
 - Implementers targeting traditional broadcast 2110-22 systems should strongly consider supporting Format B (YUV 4:2:2 10-bit).

Market expectations, interoperability marks (such as CEA/CTA format specifications, UHD Alliance, and similar programs), and the requirements of a vendor's specific vertical are generally better tools for determining which resolutions, frame rates, and color formats to support than any single fixed baseline defined here.

Appendix A: Revision History (Informative)

Version	Date	Summary of Changes
1.1	2025-12-05	Fixed incorrect CBR Media Infoblock type.
1.0	2025-12-01	Public Release
0.2	11/30	Revised version with new format

Version	Date	Summary of Changes
0.1	11/19	Initial Draft