**3GPP TSG-SA WG4 #126 S4-232018**

**Chicago, USA, 13-17 November 2023**

**Source: Dolby Laboratories, Inc. (Rapporteur)**

**Title: [FS\_FGS] Updated Time and Work Plan**

**Version: 0.6**

**Agenda Item: 9.9**

**Document for: Discussion and Agreement**

1. Introduction

During SA4#124, the New Feasibility Study Item on “Film Grain Synthesis” in S4-231073 was agreed and afterwards approved in by SA#100 in SP-230539.

The objective of this study item are primarily to update the SA4 Study on 5G Video Codec Characteristics (FS\_5Gvideo) with useful features that have been made available elsewhere. In particular, public source code for use of film grain technologies for various use cases and video codecs, including HEVC, has been made available recently from several sources. Also, ISO/IEC and ITU-T have been documenting use of film grain technologies to improve compression efficiency of coded bitstreams (including HEVC) and have already performed preliminary subjective tests to quantify visual quality improvements attributable to film grain synthesis. See [JVET Film grain synthesis technology for video applications (Draft 4).](https://jvet-experts.org/doc_end_user/documents/29_Teleconference/wg11/JVET-AC2020-v2.zip)

The concrete objectives are as follows:

1. Define motivating use cases and scenarios for the use of Film Grain synthesis in 5G video video services.
2. Document relevant existing Film Grain Synthesis technologies that are not included in 3GPP today.
3. Provide evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios.
4. Use the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results.
5. Study and identify relevant UE requirements for consistent usability of the technology.
6. Collaborate with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems.
7. Identify relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
8. Identify if any new normative work would be justified and if so, provide relevant conclusions.
9. Updated Time and Work Plan

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| **Meeting** | **Feasibility Study on Film Grain Synthesis**  |
| **SA4#124 (22 – 26 May 2023, Berlin, Germany)** | * Agree New Study Item “Feasibility Study on Film Grain Synthesis” in S4-231073
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| **SA #100 (12 – 16 June 2023, Taipei, Taiwan)** | * Approve New Study Item “Feasibility Study on Film Grain Synthesis” in SP-230539
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| **Post 124 Telco 1 (20 June 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Agree initial Work Plan (this document)
* Initiate work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
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| **Post 124 Telco 2 (27 June 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
* Initiate work on:
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially suppot Film Grain Synthesis
	+ Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
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| **MPEG/JVET #143 Meeting (12-21 July 2023, Geneva Switzerland)**  |   |
| **Post 124 Telco 3 (25 July 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Agree Specification skeleton CR for TR 26.955
* Initiate work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially suppot Film Grain Synthesis
	+ Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
 |
| **SA4 #125 (21-25 August 2023, Gothenburg, Sweden)** | * Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
	+ Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
 |
| **Post SA4 #125**  | * Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
	+ Send an LS to MPEG/JVET to inform them of this FS\_FGS status & request any feedback
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| **Post 125 Telco 1 (10 Oct. 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Progress work on:
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Send LS to MPEG/JVET (#144 Meeting 11-20 October, 2023 in Hannover, Germany) to inform them of this FS\_FGS status & request any feedback, with power granted to send the LS
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| **MPEG/JVET #144 Meeting (11-20 October 2023, Hannover Germany)** |  |
| **Post 125 Telco 2 (24 Oct. 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
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| **Post 125 Telco 3 (31 Oct. 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Progress work on:
	+ Definition of use cases & scenarios for using Film Grain Synthesis in 5G Video services
	+ Documenting relevant existing Film Grain Synthesis technologies that are not included in 3GPP today
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
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| **SA4 #126 (13-17 Nov. 2023, Chicago, USA)** | * Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Document the agreements into the FS\_FGS Permanent Document
* Communicate with other 3GPP working groups and external organizations, if necessary
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| **Post #126 Telco 1 (28 Nov. 2023, 15:00-17:00 CET, host: Qualcomm)** | * Progress work on:
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results. Use newly contributed test sequences that include a wide range of film grain noise variants.
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| **Post #126 Telco 2 (5 Dec. 2023, 15:00-17:00 CEST, host: Qualcomm)** | * Progress work on:
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
 |
| **Post #126 Telco 3 (16 Jan. 2024, 15:00-17:00 CET, host: Qualcomm)** | * Progress work on:
	+ Studying and identifying relevant UE requirements for consistent usability of the technology
	+ Identifying relevant interoperability and system level aspects to potentially support Film Grain Synthesis.
* Progress work on:
	+ Providing evaluation using HEVC of the benefits/drawbacks of corresponding solutions, including film grain characteristics SEI message (ITU-T H.274) including performance results, complexity and implementation aspects, interoperability, system integration, etc. following the example in TR26.955 based on selected scenarios
	+ Using the characterization framework in TR26.955 when possible and extend it when necessary, i.e. with subjective tests results
* Collaboration with MPEG/JVET and other organizations to ensure broad interoperability across different ecosystems
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| **SA4 #127 (29 Jan. – 2 Feb. 2024, Sophia-Antipolis, France)** | * Complete all remaining open issues raised for completion of CR to TR 26.955
* Document the agreements into the draft CR to TR26.955
* Communicate with other 3GPP working groups and external organizations, if necessary
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| **SA #103 (19-22 Mar. 2024, Maastricht, Netherlands)** | * Present CR to TR 26.955 for approval
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1. Proposal

It is proposed to agree on the work plan as updated in clause 2.