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Video formats for 3GPP services
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Contents

| | |
|--|----|
| Intellectual Property Rights | 2 |
| Foreword..... | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 5 |
| 1 Scope | 6 |
| 2 References | 6 |
| 3 Definitions and abbreviations..... | 7 |
| 3.1 Definitions | 7 |
| 3.2 Abbreviations | 7 |
| 4 Background and Context | 8 |
| 4.1 Introduction | 8 |
| 4.2 Scenarios and Deployment Cases | 9 |
| 4.2.1 Scenario | 9 |
| 4.2.2 Media-Format Related Challenges | 10 |
| 4.2.3 Content Adaptation and Provisioning Functions | 11 |
| 5 Traditional Distribution Formats..... | 12 |
| 5.1 Overview | 12 |
| 5.2 Methodology | 12 |
| 5.3 Collected Information..... | 13 |
| 5.3.1 DVB..... | 13 |
| 5.3.1.1 Introduction | 13 |
| 5.3.1.2 Video codec profiles and levels | 13 |
| 5.3.1.3 Defined parameters for video profiles..... | 14 |
| 5.3.1.4 Video coding parameters for broadcast distribution | 15 |
| 5.3.1.5 Audio related Parameters | 15 |
| 5.3.1.6 Parameters for special services (supplementary streams, DASH sub-resolutions, etc.)..... | 18 |
| 5.3.1.7 Any implementation guidelines | 18 |
| 5.3.1.8 Deducted Information on Random Access Points | 18 |
| 5.3.2 ATSC | 18 |
| 5.3.2.1 Introduction..... | 18 |
| 5.3.2.2 Colorimetry aspects..... | 19 |
| 5.3.2.3 Frame rate aspects | 19 |
| 5.3.2.4 RAP period in ATSC | 19 |
| 5.3.3 DECE..... | 19 |
| 5.3.3.1 Introduction..... | 19 |
| 5.3.3.2 Colorimetry aspects..... | 19 |
| 5.3.3.3 Frame rate aspects | 20 |
| 5.3.3.4 RAP period in DECE | 20 |
| 5.3.4 Response from DASH-IF..... | 20 |
| 5.4 Summary | 20 |
| 5.4.1 Overview | 20 |
| 5.4.2 Spatial Resolution | 21 |
| 5.4.3 Frame Rates | 21 |
| 5.4.4 Colorimetry Formats | 22 |
| 5.4.5 Random Access | 23 |
| 5.4.6 Video Codecs and Other Video Parameters..... | 23 |
| 5.4.7 Non-Video Related Parameters..... | 24 |
| 6 Video Operation Point Parameters | 24 |
| 6.1 Video resolution | 24 |
| 6.1.1 Introduction..... | 24 |
| 6.1.2 Working assumptions | 24 |
| 6.1.3 Video profile resolution definition..... | 25 |

| | | |
|-----------------|---|-----------|
| 6.1.4 | Selection of video profile resolutions for operation points | 26 |
| 6.2 | Viewing Distance and Resolution | 26 |
| 6.2.1 | Introduction..... | 26 |
| 6.2.2 | Optimum Viewing Distance | 27 |
| 6.2.3 | Conclusions..... | 28 |
| 7 | Non-video related aspects | 28 |
| 8 | Enablers for different 3GPP services | 29 |
| 8.1 | Introduction | 29 |
| 8.2 | DASH Signalling Enablers..... | 29 |
| 8.2.1 | Relevant Signaling Parameters | 29 |
| 8.2.2 | DASH Signaling Background..... | 29 |
| 8.2.2.1 | Representations in one Adaptation Set..... | 29 |
| 8.2.2.2 | Receiver Processing Model..... | 30 |
| 8.2.2.3 | Signaling Framework and Options..... | 30 |
| 8.2.2.4 | Open Questions and Potential Answers | 32 |
| 8.2.2.5 | Gap Analysis on DASH-based signalling | 34 |
| 9 | Information from Example Deployments..... | 34 |
| 9.1 | Description of Linear / Live TV using MBMS | 34 |
| 10 | Conclusions and Recommendations..... | 35 |
| Annex A: | Change history | 39 |
| History | | 40 |

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1 Scope

The scope of the present document is to support the generation of a technical specification which defines a limited set of operation points for TV services in order to enable a consistent service offering within 3GPP. For this purpose the present document collects relevant information from other organizations and summarizes and consolidates these findings. Additional 3GPP specific aspects on TV profiles (such as existing and emerging UE capabilities, delivery enablers, or specific service aspects) are collected and put in context.

2 References

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- [1] 3GPP TR 21 905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 26.234: "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs".
- [3] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".
- [4] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".
- [5] DVB ETSI TS 101 154 v2.2.1 (2015-06): "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream".
- [6] ETSI TS 103 285 v1.1.1 (2015-05):: "Digital Video Broadcasting (DVB); MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks".
- [7] ETSI EN 300 468 V1.14.1 (2014-05): "Specification for Service Information (SI) in DVB systems".
- [8] ETSI EN 300 743 V1.5.1 (2014-01): "Digital Video Broadcasting (DVB); Subtitling systems"
- [9] ETSI TS 101 211 V1.12.1 (2013-12): "Guidelines on implementation and usage of Service Information (SI)"
- [10] DASH-IF, "Guidelines for Implementation: DASH-IF Interoperability Points", version 3.0.
- [11] ISO/IEC 23001-8:2013, "Information technology -- MPEG systems technologies -- Part 8: Coding-independent code points".
- [12] ISO/IEC 14496-12:2015: "Information technology -- Coding of audio-visual objects -- Part 12: ISO base media file format".
- [13] ITU-T Recommendation H.264 (01/2012): "Advanced video coding for generic audiovisual services" | ISO/IEC 14496-10:2010: "Information technology – Coding of audio-visual objects – Part 10: Advanced Video Coding".
- [14] ISO/IEC 14496-15:2014/Cor 1:2015: "Information technology -- Coding of audio-visual objects -- Part 15: Carriage of network abstraction layer (NAL) unit structured video in ISO base media file format".