Source:	**TSG SA WG4 Chairman**[1]
Title:	**TSG SA WG4 Status Report at TSG SA#26**
Document for:	**Information**
Agenda Item:	**7.4.1**

Executive Summary

Since TSG SA#25, TSG SA WG4 (SA4) has met once on 22-26 November, 2004 (SA4#33). In addition, an ad-hoc meeting of SA4 PSM SWG took place on 11-13 October 2004.

Release 6 work

PS Streaming (PSS) Rel-6

Scalable Vector Graphics Tiny 1.2 has been adopted into PSS as the default format (ìshall be supportedî)[2] for Vector Graphics. The work is completed except some remaining audio codec issues.

MMS Enhancements: MMS formats and codecs

Scalable Vector Graphics Tiny 1.2 has been adopted into MMS similarily as for PSS. Also, EXIF compressed still image file format (widely used in digital photography) has been added as a recommended format. The work is completed except some remaining audio codec issues.

Media Codecs and Formats for IMS Messaging and Presence

TS 26.141 ìIMS Messaging and Presence; Media formats and codecsî has been finalised and is brought for approval. The codecs are harmonised with those defined for MMS. The work is completed except some remaining audio codec issues.

Audio codecs (Enhanced aacPlus and AMR-WB+)

Several CRs have been agreed for both codecs bringing foremost bug-corrections to the floating-point reference C-codes. Finalisation of the remaining fixed-point reference codes and related TSs is still ongoing for both codecs. Codec conformance requirements (with respect to the reference C-codes e.g. test sequences) are also still under finalisation. The fixed point codes and conformance are anticipated ready by SA#27. Test plan for post-selection audio codec characterisation tests has been progressed and is aimed to be finalised at next SA4 meeting (February 2005), provided that guidance and error patterns for MBMS streaming simulations are received from RAN and GERAN.

Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services

The remaining specifications have been finalised and are brought for approval: TR 26.943 on codec performance evaluations and TS 26.177 on test sequences. Also, some correction CRs are brought for approval. These complete the work under this WI.

3G-324M Improvements (CS multimedia telephony service)

Signalling capabilities for the support of ASO/FMO features in ITU-T H.264 (MPEG-4 AVC) video codec have been included into 3G-324M. This completes the work under this WI.

Codec Enhancements for Packet Switched Conversational Multimedia Applications

The signalling of ASO/FMO for H.264 already exists for PS conversational applications. No need for additional clarifications for the signalling has been raised in SA4 after SA#25. The work under this WI is now completed.

Selection of codec(s) for PoC

The IMS default codecs AMR and AMR-WB have been defined also for PoC use. Less restrictive payload format use is allowed for PoC. CRs to relevant TSs are brought for approval. This completes the SA4 PoC work.

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[2] The naming convention "default / recommended" refers to codecs that "shall / should be supported" for a particular media type. The default codecs must be supported for the media type they are defined for. However, the support of each media type (e.g., speech, audio, video) within a service is typically optional.

Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)

TS 26.346 ìMBMS Protocols and codecsî v1.5.0 is presented for information. The TS is fairly stable and close to finalisation (75% complete). Quality of Experience (QoE) metrics, forward error correction (FEC) buffering and payload were agreed at SA4#33. The remaining open issues include the actual FEC method and agreement on the audio and video codec status (default vs. recommended). The Enhanced aacPlus and AMR-WB+ audio codecs were agreed for MBMS audio; both to be either recommended (ìshould be supportedî) or default (ìshall be supportedî). Decision is foreseen to be made at SA4#34 (formal voting to be prepared for to ensure decision). Working assumption on video codecs is that H.264 is recommended and H.263 Baseline ìmay be supportedî. It is left for further consideration if any video codec may be raised to default codec status. FEC proposals (Reed-Solomon, LDPC, Raptor) were debated at SA4#33. Five companies supported Reed-Solomon solution, one company supported LDPC and one company Raptor code solution. NEC supported LDPC but also stated that they were willing to accept RS if a consensus at SA4#33 around RS was found. However, consensus could not be reached. Several companies asked for more time to consider their company position. Consequently, decision was postponed until SA4#34 based on further analysis.

Release 7 work

New WID on Video Codec Performance Requirements is brought for approval.

Maintenance of releases

CRs have been agreed to TSs 26.103 (Rel-4, Rel-5 and Rel-6), 26.111 (Rel-6), 26.140 (Rel-6), 26.173 (Rel-5 and Rel-6), 26.204 (Rel-5 and Rel-6), 26.234 (Rel-6), 26.235 (Rel-6), 26.236 (Rel-6), 26.243 (Rel-6), 26.244 (Rel-6), 26.245 (Rel-6), 26.290 (Rel-6), 26.304 (Rel-6), 26.401 (Rel-6), 26.410 (Rel-6) and 28.062 (Rel-4, Rel-5 and Rel-6).

Release 6 work status

Rel-6 work in SA4 is now completed except:

1) MBMS User Service work (main remaining issues are codec definitions and FEC selection)

2) Finalisation of Enhanced aacPlus and AMR-WB+ audio codec specifications (fixed-point reference codec TSs, conformance TS(s), TR on performance characterisation). Note: the remaining audio codec work impacts the work completion for the services using the new Rel-6 audio codecs: PSS, MMS, IMS Messaging and Presence.

The remaining work on MBMS User Service and audio codecs can be anticipated ready by SA#27 (except for two ìnon-criticalî TRs on audio codec characterisation and MBMS user service guidelines).

TSG-SA WG4 Status Report at TSG SA#26 - Table of Contents

1. General issues

This document presents the status report of TSG SA WG4 (SA4) at TSG SA#26. Slides presentation of the report is given in Annex A ìSP-040831 Annex A - Slides presentation.pptî (attached in the zip-file).

1.1 Officials

The SA4 officials are:

Chairman: Kari J‰rvinen (Nokia, ETSI)
Vice Chairpersons: Catherine Quinquis (Orange, ETSI) and FrÈdÈric Gabin (NEC Technologies, ETSI)
Secretary: Paolo Usai (3GPP Support)
SWG Chairmen:

    PSM (Packet Switched Multimedia)   (open) - Interim Chairman: Igor Curcio (Nokia, ATIS)
    SQ (Speech Quality)   Paolo Usai (ETSI)

Ad-hoc group Chairmen:

    Audio Codec Ad-Hoc   Imre Varga (Siemens, ETSI)
    Video Codec Ad-Hoc   Nikolaus F‰rber (Fraunhofer Gesellschaft, ETSI)

There are no changes in the above since TSG SA#25. Igor Curcio was able to act still at SA4#33 as Interim Chairman of PSM SWG.

1.2 Meetings

Since TSG SA#25, SA4 has held one plenary meeting (SA4#33 in November). In addition, an ad-hoc meeting of SA4 PSM SWG took place on 11-13 October 2004. The ad-hoc meeting was focused on MBMS User Service work.

Next SA4 meeting will be held in February 2005. To progress the remaining audio codec issues already before it, a teleconference call will be held on 17th December. Also, a joint meeting of SA4 audio codec ad-hoc group and SQ SWG may be held on the first week of February 2005 (dates tbd) depending on the need. Furthermore, a meeting of SA4 video codec ad-hoc group will be held in January 2005 (proposed dates 10-11 January) to progress video codec requirements for MBMS. To ensure decision on MBMS audio codecs at SA4#34 (default vs. recommended), formal voting will be eventually prepared for.

Meetings held (since SA#25):

PSM SWG ad-hoc	October 11-13, 2004	Host: Vodafone; Venue: Newbury, England
SA4#33	November 22 - 26, 2004	Host: The European Friends of 3GPP; Venue: Helsinki, Finland

Calendar of future meetings:

Audio codec conference call	December 17th, 2004	[teleconference call (2 hours)]
Video codec ad-hoc[3]	January 2005 (10-11, dates tbc)	Host and venue tbd
Joint audio codec ad-hoc and SQ	1st week of February (tbc, dates tbd)	Host: Coding Technologies; Venue: tbd
SA4#34	February 21-25, 2005	Host: EF3; Venue: Lisbon
SA4#35	May 9-13, 2005	Host and venue tbd
SA4#36	September, 5-9 2005	Host and venue tbd
SA4#37	November, 14-18 2005	Host and venue tbd

During SA4#33, all SA4 SWGs and ad-hoc groups met. Table 1 gives overall statistics from SA4#33 (including also statistics from some previous SA4 meetings for comparison).

Meeting	Number of (new) input documents	Number of participants	Number of incoming LSs	Number of outgoing LSs/communications
SA4#29	167	53	18	8
SA4#30	215	74	27	9
SA4#31	168	57	26	7
SA4#32	235	64	17	9
SA4#33	**265**	**55**	**32**	**14**

Table 1: Statistics from SA4#33 (and from some past SA4 meetings for comparison)

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[3] SA4#33 gave the video codec ad-hoc meeting decision powers to approve (on behalf of SA4) the requirements for video codec to become a default codec for MBMS (ìshall be supportedî) and also to approve LSs on video codecs, if needed.

1.3 Input documents from SA4 to TSG SA#26

Table 2 gives a complete list of input documents from SA4 to TSG SA#26.

Three new Rel-6 specifications are brought for approval: TS 26.177 ìSpeech Enabled Services; DSR Extended Advanced Front-end Test Sequencesî (Tdoc SP-040833), TR 26.943 ìRecognition Performance Evaluations of Codecs for Speech Enabled Servicesî (Tdoc SP-040834), and TS 26.141 ìIMS Messaging and Presence; Media formats and codecsî (Tdoc SP-040835). A new Rel-7 WID on ìVideo Codec Performance Requirementsî is brought for approval (Tdoc SP-040836). TS 26.346 ìMBMS Protocols and codecsî (v1.5.0) is presented for information (Tdoc SP-040832). LS response to OMA POC WG on ìSpeech codec for PoCí is Ccíd to TSG SA for information (Tdoc SP-040721). In addition to the above, a number of CRs (Rel-6 work output and corrections) are presented for approval (Tdocs SP-040837 until Tdoc SP-040847).

Tdoc	Title	Source	Agenda Item	Document for
SP-040721	LS reply about speech codecs for PoC	SA WG4	7.4.1	Information
SP-040831	TSG S4 Status Report at TSG-SA#26	SA WG4 Chairman	7.4.1	Information
SP-040832	3GPP TS 26.346 "Multimedia Broadcast/Multicast Service; Protocols and Codecs" Version 1.5.0 (Release 6)	SA WG4	7.4.3	Information
SP-040833	3GPP TS 26.177 "Speech Enabled Services; DSR Extended Advanced Front-end Test Sequences" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-040834	3GPP TR 26.943 "Recognition performance evaluations of codecs for Speech Enabled Services (SES)" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-040835	3GPP TS 26.141 "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-040836	WID on Video Codec Performance Requirements (Release 7)	SA WG4	7.4.3	Approval
SP-040837	CRs TS 26.243 and TS 26.235 on Speech Enabled Services (Release 6)	SA WG4	7.4.3	Approval
SP-040838	CRs TS 26.140 on MMS (Release 6)	SA WG4	7.4.3	Approval
SP-040839	CRs TS 26.234, TS 26.244 and TS 26.245 on PSS (Release 6)	SA WG4	7.4.3	Approval
SP-040840	CRs TS 26.401 and TS 26.410 on aacPlus codec (Release 6)	SA WG4	7.4.3	Approval
SP-040841	CRs TS 26.290 and TS 26.304 on AMR-WB+ codec (Release 6)	SA WG4	7.4.3	Approval
SP-040842	CRs TS 26.111 on 3G-324M Improvements (Release 6)	SA WG4	7.4.3	Approval
SP-040843	CRs TS 26.235 and TS 26.236 on Push to Talk over Cellular (PoC) codecs (Release 6)	SA WG4	7.4.3	Approval
SP-040844	CRs TS 26.173 and TS 26.204 on AMR-WB codec : Incorrect definition of vector nb_of_bits (Release 5 and Release 6)	SA WG4	7.4.3	Approval
SP-040845	CRs TS 26.103 and TS 28.062 on Tandem Free Operation / Transcoder Free Operation (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval
SP-040846	CRs TS 28.062 on Operator guidelines for UMTS_AMR (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval
SP-040847	CRs TS 26.103 on Clarifications on AMR (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval

Table 2: List of input documents from SA4 to TSG SA#26

2. Release 6 Work

Rel-6 work progress in SA4 is described below. The specification status (new specifications and CRs) is summarised in Annex B.

2.1 Packet Switched Streaming Rel-6

Scalable Vector Graphics Tiny 1.2 has been adopted into PSS as the default format to be supported (ìshall be supportedî) for Vector Graphics media type. ECMAScript is defined as the scripting language. Also, content creation guidelines for SVG Tiny 1.2 are included as an informative Annex. CRs to TS 26.234 ìTransparent end-to-end PSS; Protocols and codecsî are brought for approval in Tdoc SP-040839. This Tdoc

contains also some correction CRs to TS 26.244 ìTransparent end-to-end PSS; File Formatî and TS 26.245 ìTransparent end-to-end PSS; Timed-Text Formatî.

The work is completed except some remaining audio codec specification issues for Enhanced aacPlus and AMR-WB+ codecs (recommended in Rel-6 PSS) - see Section 2.4.

2.2 MMS Enhancements: MMS formats and codecs

Scalable Vector Graphics Tiny 1.2 has been adopted into MMS similarily as for PSS. Also, EXIF compressed still image file format (widely used in digital photography) has been added as a recommended format to be supported for JPEG compressed still images. CRs on these are brought for approval in Tdoc SP-040838.

The work is completed except some remaining audio codec specification issues for Enhanced aacPlus and AMR-WB+ codecs (recommended in Rel-6 PSS) - see Section 2.4.

2.3 Media Codecs and Formats for IMS Messaging and Presence

TS 26.141 ìIMS Messaging and Presence; Media formats and codecsî has been finalised and is brought for approval in Tdoc SP-040835. The TS specifies the basic media formats and codecs to be used in the IMS Messaging and Presence services. The codecs are harmonised with the codecs and media formats defined for MMS in Rel-6.

The work is completed except some remaining audio codec specification issues for Enhanced aacPlus and AMR-WB+ codecs (recommended in Rel-6 for IMS Messaging and Presence) - see Section 2.4.

2.4 Audio codecs (Enhanced aacPlus and Extended AMR-WB)

The remaining audio codec work after TSG SA#25 was:
1) Fixed-point reference C-code versions and related TSs
2) Conformance requirements (e.g. test sequences) and relevant TS(s)
3) Characterisation testing and performance characterisation TR

Since TSG SA#25, several CRs have been agreed to Enhanced aacPlus and AMR-WB+ audio codecs and these are brought for approval in Tdocs SP-040840 and SP-040841. These CRs bring foremost bug-corrections to the floating-point reference C-codes. (The floating-point codec TSs were approved at SA#25 as part of the two sets of codec specifications.) A CR to TS 26.234 on ìIntegration of alternative RTP packetization for Enhanced aacPlus codecî was presented for information at SA4#33 and a finalised version may be brought to SA#26 directly as company contribution.

Finalisation of the remaining fixed-point reference C-codes and related TSs is still ongoing for both codecs. Updated draft TSs (without the C-codes) were prepared for SA4#33. Ericsson, Nokia and VoiceAge clarified that both encoder and decoder C-codes are ready and available for verification purposes. Coding Technologies clarified that they are currently working on the fixed-point implementation of Enhanced aacPlus encoder. The fixed-point Enhanced aacPlus decoder is ready. Codec conformance requirements (with respect to the reference C-codes e.g. test sequences) and related TSs for both codecs are also still under finalisation. The fixed-point code versions and the conformance TSs can be anticipated ready by SA#27.

Test plan for the post-selection audio codec characterisation has been progressed and a draft version has been prepared. Four listening test experiments are planned: 1) Mono (without transmission errors), 2) Stereo (without transmission errors), 3) GPRS error conditions and 4) UTRAN error conditions. The allocation of laboratories and the associated funding was agreed at SA4#33. Dynastat, NTT-AT, Nokia, France Telecom R&D, T-Systems, Ericsson, Coding Technologies and Fraunhofer IIS will act as Listening Laboratories; Dynastat will also act as Global Analysis Laboratory (GAL) to combine and analyse the results. Each listening test experiment will be compensated by 9 kEuros and the global analysis by 13.5 kEuros. The funding for characterisation (85.5 kEuro) is available from the overall funding collected earlier from the audio codec proponents. The processing and cross-checking tasks will be carried out by Ericsson, Nokia, and Coding Technologies on voluntary basis.

The characterisation test plan is aimed to be finalised at next SA4 meeting in February, provided that guidance and error patterns for MBMS streaming simulations are received from RAN and GERAN. After that, the characterisation testing will be carried out, the results analysed and the TR prepared. Due to the testing and results analysis work, the TR will be ready only sometime after TSG SA#26, but as informative TR it is ìnon-criticalî for the completion of the Rel-6 WI. The TR will contain results from the Characterisation Tests complemented by results from the earlier codec Selection Tests and from additional Characterisation Testing (carried out by interested companies).

For the characterisation work, SA4 would need support to obtain suitable channel error patters and also guidance how to setup realistic simulation chains. A LS was sent to TSG RAN and TSG GERAN to make the relevant groups (and also 3GPP member companies) immediately aware of this SA4 request.

In order to progress the remaining audio codec issues (fixed-point C-code versions, conformance,

characterisation) already before SA4#34, a teleconference call will be held on 17th December and a joint meeting of SA4 audio codec ad-hoc group and SQ SWG may be eventually held on the first week of February 2005.

Note that the remaining audio codec work impacts the work completion for the services using the new audio codecs: PSS, MMS, IMS Messaging and Presence.

2.5 Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services

The remaining specifications have been finalised and are brought for approval: TS 26.177 ìSpeech Enabled Services; DSR Extended Advanced Front-end Test Sequencesî (Tdoc SP-040833) and TR 26.943 ìRecognition Performance Evaluations of Codecs for Speech Enabled Servicesî (Tdoc SP-040834).

TS 26.177 specifies the digital test sequences for the DSR Extended Advanced Front-end speech codec. These sequences can be used to test for a bit-exact implementation of the DSR Advanced Front-end codec and quantization.

TR 26.943 provides information on the recognition performance of the DSR Extended Advanced Front End and AMR/AMR-WB codecs from the Speech Enabled Services codec selection phase (conducted by two speech recognition vendors IBM and Scansoft). The results of the Selection Phase have been reported earlier to TSG SA.

Some correction CRs are brought to TS 26.243 ìSoftware documentation for fixed-point DSR Extended Advanced Front-endì. Informative Annex containing performance results from SES codec selection is removed from TS 26.235 ìPS Conversational Multimedia Applications; Default Codecsî since the performance results are now available in detail in the dedicated TR. These CRs are contained in Tdoc SP-040837.

The work under this WI is now completed.

2.6 3G-324M (CS Multimedia Telephony Service Terminal) Improvements

The decoder capability signalling of Arbitrary Slice Ordering/Flexible Macroblock Ordering (ASO/FMO) coding tool for ITU-T H.264 (MPEG-4 AVC) video codec is enabled through a CR to TS 26.111 ìCodec for CS Multimedia Telephony Service; Modifications to H.324î. The CR is found in Tdoc SP-040842.

The work under this WI is now completed.

2.7 Codec Enhancements for Packet Switched Conversational Multimedia Applications

The signalling of ASO/FMO tool for ITU-T H.264 (MPEG-4 AVC) already exists for PS conversational applications. The only remaining issue after SA#25 was if the use of the signalling should be clarified for PS conversational applications. No need for additional clarifications for the signalling has been raised in SA4 after SA#25.

The work under this WI is now completed.

2.8 Selection of codec(s) for PoC

The IMS default codecs AMR and AMR-WB have been found suitable also for PoC use. An informative annex on AMR and AMR-WB use in PoC was included into TS 26.235 ìPS Conversational Multimedia Applications; Default Codecsî. The annex gives guidance on selecting speech codec bit-rates and transport formats considering the available transmission bandwidth and the allowable transport delay. Bandwidth restrictions may imply that only the lowest AMR/AMR-WB modes can be used for PoC. In order to maximize speech quality, it is recommended to use the respective highest possible bit-rate. A CR of this is brought for approval in Tdoc SP-040843.

Less restrictive AMR and AMR-WB RTP payload format use is allowed for PoC (where only one user can communicate at a time) than for the other conversational applications using IMS. The number of speech frames encapsulated in each RTP packet is recommended not to exceed 20 and interleaving not to be used. For other conversational applications the more strict requirements for delay minimisation still apply (only one speech frame shall be encapsulated in each RTP packet, interleaving shall not be used). A CR to TS 26.236 ìPS Conversational Multimedia Applications; Transport Protocolsî is included in Tdoc SP-040843.

This completes the SA4 PoC work

2.9 Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)

2.9.1 General

TS 26.346 ìMBMS Protocols and codecsî has been progressed and v1.5.0 is presented for information in Tdoc SP-040832. The TS is fairly stable and close to finalisation (75% completed).

At SA4#33, the main progress was achieved in agreeing on Quality of Experience (QoE) protocols and metrics, forward error correction (FEC) buffering and FEC format for RTP. Due to the backchannel limitations of MBMS and the point-to-multipoint nature of the MBMS service, some QoE protocol modifications were needed (from those used in PSS). The QoE metrics in MBMS are a subset of the metrics defined earlier for PSS in TS 26.234. FEC decoding requires initial buffering in the receiving terminal (over the FEC block length) before the FEC decoding can be performed, and a method for this buffering was agreed. Also, FEC format for the RTP packets is now agreed. In addition to the above, a number of refinements in the definition of both streaming and download delivery methods were done and are included in the updated draft TS.

Draft version 1.0.0 of TS 26.346 was presented for information at TSG SA#25. The main updates since presentation at SA#25 are:

- Description of functional entities to support MBMS user service included (network architecture and Broadcast-Multicast Service Center sub-functional structure)
- MBMS User service procedures and protocol descriptions expanded (e.g. on service announcement)
- MBMS User Service Initiation/Termination and MBMS data transfer descriptions updated
- SDP for download and streaming delivery method description expanded
- The generic FEC mechanism for RTP (independent of the FEC scheme) included
- The file repair procedure over ptp bearers defined in detail
- The Reception Reporting Procedure included
- Agreement on audio codecs included

The main open issues include definition of the actual FEC method as well as codec definitions. The current status with regard to these is explained in detail in the below sub-sections. (Note that for MBMS only decoders are needed in terminals, and hence the requirements are set only for decoder support.)

Work on MBMS security is progressing with SA3, and the SA4 support/participation has been coordinated with SA3. Several LSs have been exchanged on MBMS work with the relevant WGs to progress the remaining issues (see Section 5). The latest draft TS has been sent to the relevant WGs for review and feedback (e.g. to SA2, SA3 and CN1).

2.9.2 Codecs

2.9.2.1. Audio codecs

Enhanced aacPlus and AMR-WB+ codecs have performances complementing each other like has been found out earlier (in selecting audio codecs for PSS and MMS). The broad range of potential MBMS content and applications cannot be well covered by a single audio codec. SA4 therefore agreed that both decoders should be defined for MBMS; either both decoders to be recommended (ìshould be supportedî) or both decoders to become default (ìshall be supportedî).

There was no consensus found at SA4#33 between these two options, and several companies requested not to have a decision at SA4#33 meeting but to allow more time for companies to consider. Decision on ìshall/shouldî is therefore to be made at SA4#34 (February 2005). If consensus is not reached at SA4#34, it was agreed that there will be a formal vote at SA4#34 to ensure decision.

2.9.2.2. Video codecs

On video codecs the main debate was on ITU-T H.264 (MPEG AVC) which was proposed to become the default (ìshall be supportedî) video decoder for MBMS. This was supported by many companies. However, many companies felt that, for specifying H.264 as the default decoder, the presented test results were not adequate to prove the error resilience performance of the codec and that this issue would still need to be covered.

As outcome of the discussion, the following working assumption was agreed: H.264 (AVC) Baseline Profile Level 1b decoder is to be recommended (ìshould be supportedî) and H.263 Baseline profile Level 45 to be defined as ìmay be supportedî. However, a decoder can still be raised to become default (ìshall be supportedî) at SA4#34 based on further consideration.

SA4 video codec ad-hoc meeting will be held on 10-11 January 2005 (dates tbc) to set the specific requirements for a video decoder to become default (ìshall be supportedî) for MBMS services.

The decision on MBMS video codecs will then be made at SA4#34 in February.

2.9.2.3 Other codecs

For speech media type, the working assumption is that AMR and AMR-WB are default decoders, and for timed text the 3GPP format defined in TS 26.245 "Timed text format" is the default format. Other media types and codecs need further discussion. The codecs are expected to be harmonised with the codecs defined for other services (e.g. for PSS), with the main issue to decide on the status of the particular decoders for MBMS use (default vs. recommended).

2.9.3 FEC method

The forward error correction code (FEC) mechanism is used at the application layer to allow MBMS receivers to recover lost SDUs. In the SA4 PSM ad-hoc meeting in October, altogether five distinct FEC-proposals were presented. For the SA4#33 meeting, the proposals were reduced into the following three:

- Reed-Solomon codes (proposed by Nokia, Siemens, Ericsson and Bamboo MediaCasting)
- LDPC (Low Density Parity Check) Copper codes (proposed by NEC)
- Raptor codes (proposed by Digital Fountain)

These proposals were discussed and debated based on simulation results and other information on the algorithms. Simulation guidelines for the evaluation and comparison of FEC methods had been agreed earlier. These define the parameters to be used in the simulations (e.g. SDU sizes, file sizes, data rates, packet loss ratios) for streaming and downloading cases over UTRAN and GERAN channels.

The simulation results and additional algorithm information (e.g. complexity) from the proponents were discussed and debated at SA4#33. Five companies supported Reed-Solomon solution, one company supported LDPC and one company Raptor code solution. NEC supported LDPC but also stated that they were willing to accept RS if a consensus at SA4#33 around RS was found. This increased the companies supporting RS to 5 against 1 supporting Raptor codes. Several companies requested more time to consider the proposals and felt more evidence of the pros/cons of the proposed solutions needed before they can express preference.

The conclusion was that selection was not possible yet at SA4#33 and more time is needed for companies to fully assess the proposals. Further comparison of the proposals, e.g. a comparative document, was requested for basis of decision but this was not possible to produce during SA4#33 hence leaving the decision on the actual FEC method for SA4#34. Since consensus could not be reached at SA4#33, the LDPC Copper code proposal for MBMS FEC is also still valid

2.9.4 Other remaining work

The remaining work consists of finalising codec definitions (mainly question of decoder status: default vs. recommended) and selection of the FEC method. Some issues on security from SA3 still need to be updated into TS 26.346 (security description metadata, HTTP procedure to request keys or key-updates). Some refinement is expected also for SDP definition, file repair procedures and reception reporting. Also, (ìnon-criticalî) TR 26.946 ìMBMS user service guidelinesî remains to be prepared.

The main remaining work consists of:

- Deciding on required media types and finalizing codec definitions
- Deciding on the FEC method and finalisation of the associated buffering
- Some security issues also still need to be updated into TS 26.346 (security description metadata, HTTP procedure to request keys or key-updates).
- Finalizing the SDP for download (FLUTE) session and for Streaming (RTP) session
- Introducing the agreed QoE metrics into the reception reporting procedures
- Introducing ptm repair into the file repair procedure
- Potential alternative delivery methods for service announcement

2.10 Rel-6 work status

Rel-6 work in SA4 is now completed except:

- MBMS User Service work (main remaining issues are codec definitions and FEC selection)
- Finalisation of Enhanced aacPlus and AMR-WB+ audio codec specifications (fixed-point reference codec TSs, conformance TS(s), TR on performance characterisation). Note: the remaining audio codec work impacts the work completion for the services using the new audio codecs: PSS, MMS, IMS Messaging and Presence.

The remaining work on MBMS User Service and audio codecs can be anticipated ready by SA#27 (except for two ìnon-criticalî TRs on audio codec characterisation and MBMS user service guidelines).

Estimated completion percentages for SA4 work are shown in Table 3 (based on input from SA4 officials).

Work Item	Completion-% at SA#26	Remaining issues (after SA#26)
Performance characterisation of default codecs for PS conv. multimedia applications	100	(none)
Codec Work to Support Speech Recognition Framework for Automated Voice Services	100	(none)
Codec Enhancements for Packet Switched Conversational Multimedia Applications	100	(none)
3G-324M Improvements	100	(none)
PoC codecs	100	(none)
PSS Rel-6	95	Finalisation of some Enhanced aacPlus and AMR-WB+ specifications: 1) fixed-point reference codec TSs 2) conformance TS(s) 3) TR on performance characterisation
MMS formats and codecs	95	Same as for PSS above.
Media Codecs and Formats for IMS Messaging and Presence	95	Same as for PSS above.
AMR-WB extension for high audio quality	95	Same as for PSS above.
Definition of MBMS user services; media codecs, formats and transport/application protocols using MBMS	75	Finalisation of TS 26.346 (MBMS Protocols and Codecs) and TR 26.946 (MBMS user service guidelines). Main open issues: codec selection, FEC selection

Table 3: Completion of SA4 work at TSG SA#26

3.   Maintenance of Releases

CRs have been agreed to TSs 26.103 (Rel-4, Rel-5 and Rel-6), 26.111 (Rel-6), 26.140 (Rel-6), 26.173 (Rel-5 and Rel-6), 26.204 (Rel-5 and Rel-6), 26.234 (Rel-6), 26.235 (Rel-6), 26.236 (Rel-6), 26.243 (Rel-6), 26.244 (Rel-6), 26.245 (Rel-6), 26.290 (Rel-6), 26.304 (Rel-6), 26.401 (Rel-6), 26.410 (Rel-6) and 28.062 (Rel-4, Rel-5 and Rel-6). These contain output from Rel-6 WIs and corrections (to Rel-4, Rel-5 and Rel-6). The CRs are found in Tdocs SP-040837 until SP-040848.

The two CRs from Rel-5 onwards are on bug correction to AMR-WB C-code. The four CRs from Rel-4 onwards are explained in the below sub-sections.

3.1 TrFO/TFO compatibility for UMTS_AMR

CN4 requested SA4 to study the problem caused by incompatibility between the UMTS_AMR and the FR_AMR codec in certain TFO-TrFO-TFO interworking scenarios. CN4 had discussed the problem and had agreed on a solution that UMTS_AMR and UMTS_AMR_2 shall only be considered as TFO- and TrFO-compatible when used in a single mode configuration with the same mode - and had approved CR to TS 23.153 ìOut of Band Transcoder Control; Stage 2î from Release 4 onwards. CN4 requested SA4 to agree on the necessary corresponding CRs to the specifications under SA4 control. SA4#33 found the solution proposed by CN4 to be suitable and agreed on corresponding CRs to TS 26.103 ìSpeech Codec List for GSM and UMTSî and TS 28.062 ìInband Tandem Free Operation (TFO)î. The CRs (Rel-4, Rel-5, and Rel-6) are brought for approval in Tdocs SP-040845 and SP-040846. These CRs are needed to overcome interoperability problems in TFO/TrFO for UMTS_AMR codec type.

3.2 Clarifications for AMR on optional information elements in out-of-band transcoder control

CN4 had discussed how optional octets of the Single Codec IE for AMR shall be treated. CN4 preferred a solution (to TS 26.103) which is not backward compatible but was considered more efficient (allows a shorter coding for OoBTC) than an alternative solution providing backwards compatibility. CN4 asked SA4 to study the issue and agree on the necessary CRs to TS 26.103. SA4#33 studied the issue and the two alternative solutions. SA4, however, did not follow the preference of CN4, but agreed on the other solution for the sake of backwards compatibility. The SA4 agreed CRs (Rel-4, Rel-5, and Rel-6) are brought for approval in Tdoc SP-040847. The CRs are needed to ensure implementations to be fully compatible.

4.   New Work Item Descriptions

4.1   Video Codec Performance Requirements

At the TSG SA#25 meeting, SA plenary asked SA4 to investigate specification of encoders for video in 3GPP. As a response to fully address the request, SA4 is proposing a new Work Item to address specification of video encoders (and decoders) for 3GPP services. The output specifications of this work will include minimum performance requirements and reference implementations.

The work consists of creating detailed encoder specifications (including a reference encoder implementation and generating valid bitstreams that under the constraint of average and peak bitrates achieve specified video quality) and decoder specifications (including a reference decoder implementation, capability to detect packet losses and ability to perform minimal concealment for video regions in error).

The WID is brought for approval in Tdoc SP-040836. If approved by TSG SA, it will be the first SA4 Rel-7 WI.

A specific response to SA#25 on video encoders is contained in Section 6 of this report.

5.   Communication with other WGs/TSGs/groups

Table 4 gives a complete list of the LSs sent out (to other 3GPP WGs/TSGs and 3GPP external groups) after SA#25.

Tdoc no.	Title	Intended for	Copy to
TD S4-040631*	Liaison Statement on Reception Acknowledgement for MBMS	SA WG3, SA WG5, SA WG2	SA WG1
TD S4-040632*	Reply LS on Optimisation of Voice over IMS	RAN WG2	SA WG2
TD S4-040633*	Liaison Statement on MBMS User Service architecture	SA WG2	SA WG3, SA WG5, RAN WG2, RAN WG3, GERAN WG2, CN WG1, CN WG3
TD S4-040756	Reply to LS on Optimisation of Voice over IMS	CN WG1	RAN WG2
TD S4-040759**	Communication on Interoperability of WNSRP	ITU-T Q. 1/16	
TD S4-040831**	Communication to ITU-T SG 16 on H.264 level 1b signalling in H.241	ITU-T SG 16	
TD S4-040832**	Communication on Clarification on Maximum CCSRL-SDU Size	ITU-T Q. 1/16	
TD S4-040833	LS on Clarification on Maximum CCSRL-SDU Size	IMTC ñ 3G-324M Activity Group	
TD S4-040829	Reply to Liaison Statement on LASeR: Lightweight Application Scene Representation	ISO/IEC JTC1/SC29/WG11	
TD S4-040839	LS on adoption of SVG Tiny 1.2	W3C SVG Working Group	
TD S4-040815	Liaison Statement on updates to the 3GP file format	OMA-BAC DL+DRM	
TD S4-040845	LS on Clarifications on AMR	CN WG4	
TD S4-040760	LS reply on MBMS security finalisation	SA WG3, CN WG1	SA WG2
TD S4-040841	LS on Session Repetition	SA WG2, GERAN WG2, RAN WG3	CN WG1, CN WG3, CN WG4, RAN WG2, SA WG1
TD S4-040771	LS reply on MBMS Service Priority Handling	SA WG2	TSG RAN WG2
TD S4-040857	LS reply about speech codecs for PoC	OMA POC WG	SA, SA WG2, 3GPP2-C, 3GPP2-S
TD S4-040861	LS on guidance and error patterns for MBMS streaming simulations	TSG RAN, TSG GERAN	

*) prepared by PSM ad-hoc meeting #6, agreed by SA4 by correspodence (prior to SA4#33)
**) not LSs but company contributions to ITU-T with content agreed at SA4#33

Table 4: SA4 LSs sent out since TSG SA#25

The main issues in the LSs are:
- TD S4-040631:   SA4 asks comments on planned reception reporting mechanism for acknowledging reception of file-objects over MBMS.
- TD S4-040632:   RAN2 proposed RTP/RTCP flow differentiation mechanism (based on the PT field in the RTP/RTCP header) is not seen feasible by SA4 as it does not fully guarantee identification of RTP or RTCP packets.
- TD S4-040633:   Draft TS 26.346 is sent for feedback to SA2. Feedback is requested especially on the MBMS User Service architecture and procedures description.
- TD S4-040756:   CN1 has raised some potential issues in following the SA4#32 (May 2004) agreed recommendation that clients should not use RTCP for a point to point voice only service. SA4 sees

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no problematic issues (UEs conforming to TS 26.236 will implement RFC 3556 correctly and no RTP stack implementation impact is seen) and provides clarifications on this back to CN1.

- SA4#33 agreed on the content of three communications to ITU-T Q.1/16 (via company contributions to ITU-T) :
  - TD S4-040759: SA4 sees the work in ITU-T SG16 for reducing the start-up time of H.324 valuable, but to avoid any interoperability problems would like more time allowed for manufacturers to consider WNSRP and other proposed methods.
  - TD S4-040831: ITU-T SG16 is informed that the new release of 3GPP CS multimedia telephony service 3G-324M includes ITU-T H.264 Baseline Profile Level 1 as a recommended video codec and that it uses H.241 for signalling related to H.264. ITU-T is requested to enable signalling of H.264 Level 1b capability in H.241.
  - TD S4-040832: SA4 has not identified any implementation issues arising from the proposed clarification of the maximum CCSRL-SDU Size in Annex C/H.324. (Sent also to IMTC ñ 3G-324M Activity Group as ordinary LS in TD S4-040833.)

- TD S4-040829: SA4 thanks MPEG for their LS explaining the ongoing work on ISO/IEC 14496-20 on lightweight application scene representation (LASER) and informs MPEG that it has selected SVG Tiny 1.2 for the 3GPP Release 6.

- TD S4-040839: SA4 explains to W3C SVG Working Group that it has agreed to adopt SVG Tiny 1.2 for PSS and MMS in Release 6.

- TD S4-040815: SA4 informs OMA-BAC DL+DRM on corrections in the 3GPP file format (3GP) specification.

- TD S4-040845: SA4 informs CN4 on the agreed CRs to TS 26.103 on Clarifications for AMR on optional information elements in out-of-band transcoder control (SA4 not following CN4 preferred solution).

- TD S4-040760: SA4 agrees with SA3 on the MBMS security worksplit and sends draft TS 26.346 to SA3 for comments.

- TD S4-040841: As response on MBMS session repetition, SA4 explains its view of the use of Transmission Session Identifier. As requested, SA4 will include a definition of transport session identifier format in TS 26.346, but is not able to give a definite answer yet on the required size needed for a session_id.

- TD S4-040771: SA4 responds to SA2 request to explain reasons for the application layer to instruct the UE-AS to discontinue MBMS reception.

- TD S4-040857: Response was sent to OMA POC WG (Ccíd to TSG-SA) on progress in defining codecs for POC in 3GPP. (This LS is Ccíd to SA, like the LS from OMA POC WG was.)

- TD S4-040861: For the audio codec characterisation work, SA4 would need support to obtain suitable channel error patters and also guidance how to setup realistic simulation chains. A LS was sent to TSG RAN and TSG GERAN to make the relevant groups (and also 3GPP member companies) immediately aware of the SA4 request. (See more details in section 2.4)

6. Miscellaneous

- At TSG SA#25, it was noted that video codecs are traditionally not fully specified since only the decoding process, bit-stream syntax, bit-stream semantics and constraints on bit-streams are specified. At TSG SA#25 it was also stated that the encoder specification is missing for ITU-T H.264 (as for ITU-T H.263) and QoS cannot therefore be guaranteed - in contrast to the 3GPP speech/audio codecs where both encoder and decoder are specified in detail. Consequently, SA4 was asked to consider corresponding encoders for the next TSG SA meeting.

  SA4 has studied the issue and states the following:
  - In general, it is desirable to set a quality threshold for video encoders. The question, however, is how this can be achieved with **reasonable effort**. It was noted that it seems that no such work has been performed before for video. Hence, the effort should be reasonable and match the needs of the industry.
  - One of the challenging tasks for providing video encoder specifications is the definition of a commonly accepted video quality measure.
  - It was agreed that **bit-exactness** as the only means to meet an encoder specification is not desirable for various reasons. However, bit-exactness as an alternative of meeting specified video quality requirements according to a quality measure is a reasonable approach. The remaining problem is the specification and/or selection of a suitable video quality measure.
  - **Subjective testing** (though providing relevant data if done carefully) results in a very high effort for vendors and also poses a high risk when the results of an external test lab are required. Hence, it was agreed that subjective testing should not be used to decide if an implementation conforms to an encoder specification.
  - It was noted that work is ongoing in the ITU-T related to objective video quality measurement in co-operation with the **Video Quality Expert Group.** VQEG is in the initial stages of investigating objective quality assessment of multimedia services accessed from mobile devices. The recommendation by VQEG and standardization process within the relevant bodies, ITU-T SG 12/SG 9, could potentially last until 2006.

- SA4#33 prepared a WID on **Video Codec Performance Requirements.**

- SA4#33 agreed that all specifications under SA4 responsibility will be upgraded to Rel-6. (Many Rel-6 specifications contain new content introduced through CRs as outcome of SA4 Rel-6 work. The rest of the specifications will be upgraded to version 6.0.0 without technical changes.)

- WID on ìPerformance Characterization of VoIP over HSDPA channelsî was proposed at SA4#33 (WID prepared during SA4#33), but could not be agreed by SA4 since more time (until SA4#34) was requested to review the proposed WID. During the discussion NEC felt that mobility and QoS issues should be taken into consideration to improve the WID. NEC also pointed out that VoIMS over HSDPA may actually address the basic speech service requirements and this may need to be addressed to SA1. (E.g., do Stage 1 requirements for speech service over HSDPA exist?)

7. Documents presented for information

Tdoc	Title	Source	Agenda Item	Document for
SP-040721	LS reply about speech codecs for PoC	SA WG4	7.4.1	Information
SP-040832	3GPP TS 26.346 "Multimedia Broadcast/Multicast Service; Protocols and Codecs" Version 1.5.0 (Release 6)	SA WG4	7.4.3	Information

8. Approval requested

8.1 New specifications

Tdoc	Title	Source	Agenda Item	Document for
SP-040833	3GPP TS 26.177 "Speech Enabled Services; DSR Extended Advanced Front-end Test Sequences" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-040834	3GPP TR 26.943 "Recognition performance evaluations of codecs for Speech Enabled Services (SES)" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-040835	3GPP TS 26.141 "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Approval

8.2 New WID

Tdoc	Title	Source	Agenda Item	Document for
SP-040836	WID on Video Codec Performance Requirements (Release 7)	SA WG4	7.4.3	Approval

8.3 CRs as output from SA4 Rel-6 work

Tdoc	Title	Source	Agenda Item	Document for
SP-040837	CRs TS 26.243 and TS 26.235 on Speech Enabled Services (Release 6)	SA WG4	7.4.3	Approval
SP-040838	CRs TS 26.140 on MMS (Release 6)	SA WG4	7.4.3	Approval
SP-040839	CRs TS 26.234, TS 26.244 and TS 26.245 on PSS (Release 6)	SA WG4	7.4.3	Approval
SP-040840	CRs TS 26.401 and TS 26.410 on aacPlus codec (Release 6)	SA WG4	7.4.3	Approval
SP-040841	CRs TS 26.290 and TS 26.304 on AMR-WB+ codec (Release 6)	SA WG4	7.4.3	Approval
SP-040842	CRs TS 26.111 on 3G-324M Improvements (Release 6)	SA WG4	7.4.3	Approval
SP-040843	CRs TS 26.235 and TS 26.236 on Push to Talk over Cellular (PoC) codecs (Release 6)	SA WG4	7.4.3	Approval

8.4 Other CRs

Tdoc	Title	Source	Agenda Item	Document for
SP-040844	CRs TS 26.173 and TS 26.204 on AMR-WB codec : Incorrect definition of vector nb_of_bits (Release 5 and Release 6)	SA WG4	7.4.3	Approval
SP-040845	CRs TS 26.103 and TS 28.062 on Tandem Free Operation / Transcoder Free Operation (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval
SP-040846	CRs TS 28.062 on Operator guidelines for UMTS_AMR (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval
SP-040847	CRs TS 26.103 on Clarifications on AMR (Releases 4, 5 and 6)	SA WG4	7.4.3	Approval

List of Annexes:

Annex A: ìSP-040831 Annex A - Slides presentation.pptî - see the attached separate file

Annex B: Status of Rel-6 specifications for each SA4 Rel-6 Work Item

Annex B: Status of Rel-6 specifications for each SA4 Rel-6 Work Item

(Specifications not completed by SA#26 are highlighted with yellow shading.)

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Performance characterisation of default codecs for PS conversational multimedia applications					
TR 26.935	Performance characterization of default codecs for PS conversational multimedia applications	SA4		**APPROVED AT SA#24**	
Packet Switched Streaming Rel-6					
CRs to TS 26.233	Transparent end-to-end PSS; General description	SA4	SA2	**APPROVED AT SA#25**	
CRs to TS 26.234	Transparent end-to-end PSS; Protocols and codecs	SA4	SA2	Completed at SA#25 except inclusion of SVG Tiny 1.2	**SA#26**
TS 26.244	Transparent end-to-end PSS; File Format	SA4	SA2	**APPROVED AT SA#25**	
TS 26.245	Transparent end-to-end PSS; Timed Text Format	SA4	SA2	**APPROVED AT SA#24**	
TS 26.246	Transparent end-to-end PSS; SMIL Language Profile	SA4	SA2	**APPROVED AT SA#24**	
CRs to TR 26.937	Transparent end-to-end PSS; RTP Usage Model	SA4		**APPROVED AT SA#24**	
CRs to TS 22.233	Stage 1	SA1		Under SA1 responsibility. Has been updated through CRs in SA1.	
Possible new TS	Stage2 (non-transparent aspects)	SA2		To be produced by SA2, if needed.	
MMS Rel-6					
CRs to TS 26.140	MMS; Media formats and codecs	SA4	SA2, T2	Completed at SA#25 except inclusion of SVG Tiny 1.2	**SA#26**
Media Codecs and Formats for IMS Messaging and Presence					
TS 26.141	IMS Messaging and Presence; Media formats and codecs	SA4	SA2, CN1	Presented straight for approval. Codecs harmonised with MMS (Rel-6).	**SA#26**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Audio codecs (including output of Extended AMR-WB WI)					
TS 26.401	Enhanced aacPlus General Audio Codec; General Description	SA4		**APPROVED AT SA#25**	
TS 26.402	Enhanced aacPlus General Audio Codec; Additional Decoder Tools	SA4		**APPROVED AT SA#25**	
TS 26.403	Enhanced aacPlus General Audio Codec; Encoder Specification Advanced Audio Coding (AAC) part	SA4		**APPROVED AT SA#25**	
TS 26.404	Enhanced aacPlus General Audio Codec; Enhanced aacPlus encoder Spectral Band Replication (SBR) part	SA4		**APPROVED AT SA#25**	
TS 26.405	Enhanced aacPlus General Audio Codec; Encoder Specification Parametric Stereo part	SA4		**APPROVED AT SA#25**	
TS 26.410	Enhanced aacPlus General Audio Codec; Floating-point ANSI-C code	SA4		**APPROVED AT SA#25**	
TS 26.411	Enhanced aacPlus General Audio Codec; Fixed-point ANSI-C code	SA4		Contained in TS 26.410 presented for information at SA#24. Has been now extracted into itís own TS.	**ONGOING; FORESEEN TO BE COMPLETED AT SA#27**
TS 26.290	Extended AMR Wideband codec; Transcoding functions	SA4		**APPROVED AT SA#25**	
TS 26.304	ANSI-C code for the Floating-point; Extended AMR Wideband codec	SA4		**APPROVED AT SA#25**	
TS 26.273	ANSI-C code for the Fixed-point; Extended AMR Wideband codec	SA4		Presented for information at SA#24.	**ONGOING; FORESEEN TO BE COMPLETED AT SA#27**
CRs to 26.244	Transparent end-to-end PSS; File Format	SA4		**APPROVED AT SA#25**	
TS 26.xyz	3GPP audio codecs; Conformance	SA4		There may be own TS for both codecs instead of a common one.	**ONGOING; FORESEEN TO BE COMPLETED AT SA#27**
TR 26.9xy	Performance characterization of audio codecs	SA4		Characterisation test plan drafting ongoing in SA4.	**ONGOING; COMPLETION DATE TBD. (NOTE: THIS IS NON-CRITICAL TR.)**
Speech Recognition Framework for Automated Voice Services					
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	**APPROVED AT SA#24**	
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	**APPROVED AT SA#24**	

TS 26.243	Software documentation for fixed-point DSR Extended Advanced Front-end	SA4		**APPROVED AT SA#24**	
TS 26.177	DSR Extended Advanced Front-endf Test Sequences	SA4		Presented straight for approval.	**SA#26**
TR 26.943	Performance characterization of SES codecs	SA4		Prepared based on selection and verification tests. Presented straight for approval.	**SA#26**
Packet Switched Conversational Multimedia Applications					
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	**APPROVED AT SA#25** (adoption of H.264 (AVC) as recommended codec)	
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	(no changes needed)	
3G-324M Improvements					
TS 26.111	Codec for CS Multimedia Telephony Service; Modifications to H.324	SA4		Adoption of H.264 (AVC) as recommended codec approved at SA#25. Signalling of ASO/FMO remained to be included later.	**SA#26**
TR 26.911	Codec for CS Multimedia Telephony Service; Terminal Implementorís Guide	SA4		**APPROVED AT SA#25** (adoption of H.264 (AVC) as recommended codec)	
PoC codec(s)					
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	AMR and AMR-WB defined for PoC.	**SA#26**
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	Relaxed RTP payload use allowed for PoC.	**SA#26**
MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)					
TS 26.346	MBMS Protocols and Codecs	SA4	SA2, SA3		**ONGOING; FORESEEN TO BE COMPLETED AT SA#27**
TS 22.246	MBMS user services; Stage 1	SA1		Prepared by SA1. **APPROVED AT SA#22**	
TR 26.946	Multimedia Broadcast/Multicast Service (MBMS) user service guidelines	SA4	SA2, SA3		**ONGOING; COMPLETION DATE TBD. (NOTE: THIS IS NON-CRITICAL TR.)**

TSG-SA WG4 (SA4) - CODEC Status Report at TSG-SA#26

Kari Järvinen
TSG-SA WG4 Chairman

☞ *SA4 status report in Tdoc SP-040831*

☞ *These slides are attached in Annex A (of Tdoc SP-040831)*

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Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

- **Release 7 work**

- **Miscellaneous**

- **Documents and issues for discussion, information and approval**

General: SA4 meetings

- **Meetings held**
  - ñ **PSM SWG ad-hoc**   **October 11-13, 2004**   **Host: Vodafone; Venue: Newbury, England**
  - ñ **SA4#33**   **November 22 - 26, 2004**   **Host: EF3; Venue: Helsinki, Finland**

- **Planned meetings**
  - ñ **Audio codec conference call**   **December 17th, 2004**   **[teleconference call]**
  - ñ **Video codec ad-hoc**   **January 2005 (10-11 dates tbc)** **Host and venue tbd**
  - ñ **Joint audio codec ad-hoc and SQ** **First week of February (tbc, dates tbd)** **Host: CT; Venue tbd**
  - ñ **SA4#34**   **February 21-25, 2005**   **Host: EF3; Venue: Lisbon, Portugal**
  - ñ **SA4#35**   **May 9-13, 2005**   **Host and venue tbd**
  - ñ **SA4#36**   **September, 5-9 2005**   **Host and venue tbd**
  - ñ **SA4#37**   **November, 14-18 2005**   **Host and venue tbd**

- **Meeting statistics**

Meeting	Number of (new) input documents	Number of participants	Number of incoming LSs	Number of outgoing LSs/communications
SA4#29	167	53	18	8
SA4#30	215	74	27	9
SA4#31	168	57	26	7
SA4#32	235	64	17	9
SA4#33	**265**	**55**	**32**	**14**

General: SA4 Leadership and subgroups

- **Chairman:**   **Kari J%rvinen (Nokia, ETSI)**

- **Vice Chairpersons:**   **Catherine Quinquis (Orange, ETSI) and
                                                      FrÈdÈric Gabin (NEC Technologies, ETSI)**

- **Secretary:**   **Paolo Usai (3GPP Support)**

- **Sub Working Groups / Ad-Hoc groups:**
  - ñ **Speech Quality (SQ) SWG   Paolo Usai (ETSI)**
  - ñ **PS Multimedia (PSM) SWG   (open) - Interim Chairman: Igor Curcio (Nokia, ATIS)**
  - ñ **Audio Codec Ad-Hoc group   Imre Varga (Siemens, ETSI)**
  - ñ **Video Codec Ad-Hoc group   Nikolaus F%rber (Fraunhofer Gesellschaft, ETSI)**

There are no changes.

Igor Curcio acted as Interim PSM SWG Chairman still during SA4#33.

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General: Progress overview

- **Rel-6 work completed by SA#26 except MBMS User Service and some remaining Rel-6 audio codec specifications (for Enhanced aacPlus and AMR-WB+)**

- **Agreed 2 new TSs and one new TR**

- **Agreed 58 Rel-6 CRs, 6 Rel-5 CRs and 4 Rel-4 CRs**

- **One Rel-7 WI agreed (first one in SA4) on ì Video Codec Performance Requirementsî**

- **Action from SA#25 regarding video encoder specifications fulfilled**

General: Input documents

- **For information:**

  - ñ **SP-040831: SA4 Status Report at TSG SA#26; Source: SA4 Chairman**

  - ñ **SP-040832: TS 26.346 ì MBMS Protocols and codecsî version 1.5.0; Source: SA4**

  - ñ **SP-040721: LS reply about speech codecs for PoC; Source: SA4**

- **For approval:**

  - ñ **SP-040833: TS 26.177 Speech Enabled Services; DSR Extended Advanced Front-end Test Sequences (Release 6) v. 1.0.0; Source: SA4**

  - ñ **SP-040834: TR 26.943 Recognition Performance Evaluations of Codecs for Speech Enabled Services v. 1.0.0 (Release 6); Source: SA4**

  - ñ **SP-040835: TS 26.141 IMS Messaging and Presence. Media formats and codecs v. 1.0.0 (Release 6); Source: SA4**

  - ñ **SP-040836: WID on Video Codec Performance Requirements (Release 7) ; Source: SA4**

  - ñ **SP-040837 to SP-040847: Change Requests (Releases 4, 5 and 6); Source: SA4**

Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

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- **Miscellaneous**

- **Documents and issues for discussion, information and approval**

Maintenance of releases

- **CRs have been agreed to TSs 26.103 (Rel-4, Rel-5 and Rel-6), 26.111 (Rel-6), 26.140 (Rel-6), 26.173 (Rel-5 and Rel-6), 26.204 (Rel-5 and Rel-6), 26.234 (Rel-6), 26.235 (Rel-6), 26.236 (Rel-6), 26.243 (Rel-6), 26.244 (Rel-6), 26.245 (Rel-6), 26.290 (Rel-6), 26.304 (Rel-6), 26.401 (Rel-6), 26.410 (Rel-6) and 28.062 (Rel-4, Rel-5 and Rel-6).**

- **These contain output from Rel-6 WIs and corrections (to Rel-4, Rel-5 and Rel-6).**

- **The 4 Rel-4 CRs (and corresponding CRs to later releases) are on**
  - ñ **TrFO/TFO compatibility:** needed to overcome interoperability problems in TFO/TrFO with UMTS_AMR codec type
  - ñ **Clarifications for AMR on optional information elements in out-of-band transcoder control:** needed to ensure implementations to be fully compatible

- **The (other) 2 Rel-5 CRs (and corresponding CRs to Rel-6) are on bug correction to AMR-WB C-code.**

Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

- **Release 7 work**

- **Miscellaneous**

- **Documents and issues for discussion, information and approval**

Release 6 WIs

1. **Performance Characterisation of Default Codecs for PS Conversational Multimedia Applications** **(100% completed at SA#24)**

2. **Packet Switched Streaming (PSS) Rel-6**

3. **MMS Enhancements: MMS codecs and formats**

4. **Media Codecs and Formats for IMS Messaging and Presence**

5. **Extended AMR-WB Codec (AMR-WB+) Targeted for PS Streaming and Messaging Services**

6. **Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services**

7. **3G-324M Improvements (CS Multimedia Telephony Service Terminal)**

8. **Codec Enhancements for Packet Switched Conversational Multimedia Applications**

9. **Selection of codec(s) for PoC**

10. **MBMS User Services: Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)**

Packet Switched Streaming (PSS) Rel-6

- **Scalable Vector Graphics Tiny 1.2 adopted as the default* format to be supported (ì shall be supportedî) for Vector Graphics; content creation guidelines also included. CRs to TS 26.234 (Protocols and Codecs).**

- **Some Rel-6 correction CRs also to TSs 26.234 (Protocols and Codecs), 26.244 (File Format) and 26.245 (Timed-text Format)**

- **STATUS: Work completed except that some issues in the new Release 6 audio codecs (Enhanced aacPlus and AMR-WB+) remain to be finalised.**

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*) The naming convention "default / recommended" refers to codecs that "shall / should be supported" for a particular media type. The default codecs must be supported for the media type they are defined for. However, the support of each media type (e.g., speech, audio, video) within a service is typically optional.

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MMS Enhancements: MMS media formats and codecs

- **Scalable Vector Graphics Tiny 1.2 adopted like for PSS. EXIF compressed still image file format (widely used in digital photography) added as a recommended format for JPEG compressed still images. CRs to TS 26.140 (Media formats and codecs).**

- **STATUS: Work completed except that some issues in the new Release 6 audio codecs (Enhanced aacPlus and AMR-WB+) remain to be finalised.**

Media Codecs and Formats for IMS Messaging and Presence

- **TS 26.141 ì IMS Messaging and Presence; Media formats and codecsî finalised and brought for approval**

- **The TS specifies the basic media formats and codecs to be used in the IMS Messaging and Presence services. The codecs are harmonised with the codecs and media formats defined for MMS in Rel-6.**

- **STATUS: Work completed except that some issues in the new Release 6 audio codecs (Enhanced aacPlus and AMR-WB+) remain to be finalised.**

Audio codec work (for Enhanced aacPlus and AMR-WB+) (1/2)

- **Some specification work remaining after SA#25:**
    1. **Fixed-point reference C-code versions and related TSs**
    2. **Conformance requirements (e.g. test sequences) and relevant TS(s)**
    3. **Characterisation testing and performance characterisation TR**

- **Finalisation of fixed-point reference C-codes and TSs still ongoing for both codecs**
    - ñ   AMR-WB+ fixed-point encoder and decoder ready.
    - ñ   Enhanced aacPlus fixed-point decoder is ready, and the fixed-point encoder is under finalisation.

- **Codec conformance requirements (with respect to the reference C-codes e.g. test sequences) are under preparation.**

- **Test plan for the post-selection audio codec characterisation has been progressed and draft version prepared.**

- **The fixed-point C-code TSs and conformance TS(s) are anticipated ready by SA#27. The characterisation test plan is aimed to be finalised at next SA4 meeting (February), and the TR later (after testing)**

- **Several bug-correction CRs to Enhanced aacPlus and AMR-WB+ brought for approval.**

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Audio codec work (for Enhanced aacPlus and AMR-WB+) (2/2)

- **Characterisation testing:**
  - ñ Four experiments planned: 1) Mono (without transmission errors), 2) Stereo (without transmission errors), 3) GPRS error conditions and 4) UTRAN error conditions.
  - ñ Allocation of laboratories and funding agreed at SA4#33
    - ï Listening laboratories: Dynastat, NTT-AT, Nokia, France Telecom R&D, T-Systems, Ericsson, Coding Technologies and Fraunhofer IIS. Test results will be combined, analysed and TR drafted by the Global Analysis Laboratory (GAL) Dynastat. The processing and cross-check functions will be done by Ericsson, Nokia, and Coding Technologies.
    - ï Each listening test experiment will be compensated by 9 kEuros and GAL by 13.5 kEuros. (The total funding of 85.5 kEuros is available from the overall funding collected from audio codec proponents.)
  - ñ The TR on audio codec performance characterisation will contain results from the Characterisation Tests complemented by results from the earlier codec Selection Tests and from additional Characterisation Testing (carried out by interested companies).

- **For the characterisation work, SA4 would need support to obtain suitable channel error patterns and also guidance on how to setup realistic simulation chains.**
  - ñ A LS sent to TSG RAN and TSG GERAN to make the relevant groups (and also 3GPP member companies) immediately aware of the SA4 request.

- **To progress the remaining audio codec issues already before SA4#34, a teleconference call will take place on 17th December. In addition, a joint meeting of SA4 audio codec ad-hoc group and SQ SWG may take place on the 1st week of February 2005.**

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Extended AMR-WB codec (AMR-WB+) Targeted for PS Streaming and Messaging Services

- **STATUS: Work completed except for fixed-point reference C-code TS, conformance TS and characterisation TR.**

Codec Work to Support Speech Recognition Framework for Automated Voice Services (SES codecs)

- **The remaining specifications have been finalised and are brought for approval.**

- **TR 26.943 ì Recognition Performance Evaluations of Codecs for Speech Enabled Servicesî provides information on the recognition performance from the SES codec selection phase.**

- **TS 26.177 ì Speech Enabled Services; DSR Extended Advanced Front-end Test Sequencesî specifies digital test sequences for the DSR Extended Advanced Front-end speech codec.**

- **Also, some correction CRs are brought for approval on SES codec TSs.**

- **STATUS: completed**

3G-324M Improvements (CS Multimedia Telephony Service Terminal)

- **The decoder capability signalling of Arbitrary Slice Ordering/Flexible Macroblock Ordering (ASO/FMO) coding tool for ITU-T H.264 (MPEG-4 AVC) video codec is enabled through a CR.**

- **The signalling exists already for PS conversational applications.**

- **STATUS: completed**

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Codec Enhancements for PS Conversational Multimedia Applications

- **The signalling of ASO/FMO tool for ITU-T H.264 (MPEG-4 AVC) already exists for PS conversational applications.**

- **The only remaining issue after SA#25 was if the use of the signalling should be clarified for PS conversational applications. No need for any additional clarifications for the signalling has been raised in SA4 since SA#25.**

- **STATUS: completed**

Selection of codec(s) for PoC

- **The IMS default codecs AMR and AMR-WB have been found suitable also for PoC use.**

- **Codec definition and informative annex on AMR and AMR-WB use in PoC included into TS 26.235 (PS Conversational Multimedia Applications; Default Codecs).**
  - ñ   Defines codecs and gives guidance on selecting speech codec bit-rates and transport formats.

- **Less restrictive RTP payload format use allowed for PoC - where only one user can communicate at a time. CR to TS 26.236 (PS Conversational Multimedia Applications; Transport Protocols)**
  - ñ   The number of speech frames encapsulated in each RTP packet is recommended not to exceed 20 and interleaving not to be used.
  - ñ   For other conversational applications the existing more strict requirements for delay minimisation still apply (only one speech frame shall be encapsulated in each RTP packet, interleaving shall not be used).

- **Response LS sent to OMA POC WG (Ccíd to TSG SA) on the work progress.**

- **STATUS: completed**

MBMS User Services: General

- **TS 26.346 ì MBMS Protocols and codecsî v1.5.0 presented for information. The TS is fairly stable and close to finalisation (75% completion).**

- **At SA4#33, Quality of Experience (QoE) protocol and metrics and forward error correction (FEC) buffering were agreed.**

- **The main updates included in TS 26.346 since SA#25 are:**
  - ñ Description of functional entities to support MBMS user service included (network architecture and Broadcast-Multicast Service Center sub-functional structure)
  - ñ MBMS User service procedures and protocol descriptions expanded (e.g on service announcement)
  - ñ MBMS User Service Initiation/Termination and MBMS data transfer descriptions expanded
  - ñ SDP for download and streaming delivery method description expanded
  - ñ The generic FEC mechanism for RTP (independent of the FEC scheme) included
  - ñ The file repair procedure over ptp bearers defined in detail
  - ñ The Reception Reporting Procedure included
  - ñ Agreement on audio codecs included

- **The main open issues are agreement on the actual FEC coding method as well as the audio and video codec status (recommended vs. default).**

- **Work on MBMS security is progressing with SA3. The detailed worksplit has been agreed and the SA4 support/participation coordinated with SA3.**

- **Several LSs have been exchanged on MBMS with the relevant WGs to finalise the remaining issues. Draft TR sent for review to many WGs (e.g. SA2, SA3, CN1).**

MBMS User Services: Audio codecs

- **Note that for MBMS only decoders are needed in terminals, and hence the requirements are set only for decoder support.**

- **Enhanced aacPlus and AMR-WB+ codecs have performances complementing each other - like has been found earlier (in selecting audio codecs for PSS and MMS). The broad range of potential MBMS content and applications cannot be covered well by a single audio codec.**

- **Therefore, both codecs were agreed for MBMS audio: either both decoders to be recommended (ì should be supportedî) or both decoders to become default (ì shall be supportedî).**

- **No consensus found at SA4#33 between these two options. Several companies requested not to have a decision at SA4#33 meeting but to allow more time for companies to consider.**

- **Decision on decoder status (recommended vs. default) to be made at SA4#34 (February 2005). Formal voting to be prepared for to ensure decision.**

MBMS User Services: Video codecs

- **ITU-T H.264 (MPEG AVC) was proposed to become the default video decoder for MBMS (ì shall be supportedî). This was supported by many companies.**

- **However, many companies felt the presented test results do not adequately prove the error resilience performance of the codec and that this would still need to be covered.**

- **Working assumption agreed: H.264 (AVC) Baseline Profile Level 1b decoder recommended (ì should be supportedî) and H.263 Baseline profile Level 45 ì may be supportedî . However, a decoder may still be raised to become default (ì shall be supportedî) at SA4#34 based on further consideration.**

- **SA4 video codec ad-hoc meeting is planned for January to set requirements for a video decoder to become default for MBMS services.**

MBMS User Services: Other codecs

- **For speech media type, the working assumption is that AMR and AMR-WB are default decoders, and for timed text the 3GPP format defined in TS 26.245 "Timed text format" is the default format.**

- **Other media types and codecs need further discussion. To be harmonised with codecs in other services (e.g. for PSS). The main issue is to decide on if the particular decoders should become default or recommended for MBMS.**

MBMS User Services: FEC method

- The forward error correction code (FEC) mechanism is used at the application layer to allow MBMS receivers to recover lost SDUs.

- In October PSM ad-hoc, five FEC-proposals were presented. For SA4#33, the proposals were reduced into the following three:
  1. Reed-Solomon (RS) codes (proposed by Nokia, Siemens, Ericsson and Bamboo MediaCasting)
  2. LDPC (Low Density Parity Check) Copper codes (proposed by NEC)
  3. Raptor codes (proposed by Digital Fountain)

- These proposals were debated based on simulation results and other information on the algorithms. Simulation guidelines had been agreed earlier.

- In order to finalize MBMS for Rel-6 in December 2004, NEC stated they were willing to accept RS if a consensus at SA4#33 around RS was found. This increased the companies supporting RS to 5 against 1 supporting Raptor codes. However, further consensus could not be reached between RS and Raptor codes. Hence, also the LDPC Copper code proposal for MBMS FEC is still valid.

- Several companies requested more time to consider the proposals and felt more evidence of the pros/cons of the proposed solutions needed.

- The conclusion was that selection was not possible yet at SA4#33. More time is needed for companies to assess the proposals. Further comparison, e.g. a comparative document, was requested for basis of decision but this was not possible to produce during SA4#33, hence leaving the decision for SA4#34 based on further analysis.

MBMS User Services: Remaining work

- **The main remaining work consists of finalising codec definitions and selection of the FEC method.**

- **The main remaining work consists of**
  - ñ Deciding on required media types and finalizing codec definitions
  - ñ Deciding on the FEC method and finalisation of the associated buffering
  - ñ Some security issues to be updated into TS 26.346 (security description metadata, HTTP procedure to request keys or key-updates).
  - ñ Finalizing the SDP for download (FLUTE) session and for Streaming (RTP) session
  - ñ Introducing the agreed QoE metrics into the reception reporting procedures
  - ñ Introducing ptm repair into the file repair procedure
  - ñ Potential alternative delivery methods for service announcement

- **Also, (ì non-criticalî) TR 26.946 ì MBMS user service guidelinesî remains to be prepared.**

- **STATUS: work not completed ñ TS nevertheless fairly stable and close to finalization (75% complete).**

Rel-6 work overall status (1/2)

- **Rel-6 work in SA4 is now completed except:**

  1. **MBMS User Service work (main remaining issues are codec definitions and FEC selection)**

  2. **Finalisation of Enhanced aacPlus and AMR-WB+ audio codec specifications**
     - ñ Fixed-point reference C-code versions and related TSs
     - ñ Conformance requirements (e.g. test sequences) and relevant TS(s)
     - ñ Characterisation testing and performance characterisation TR

- **The remaining work on MBMS User Service and audio codecs can be anticipated ready by SA#27 (except for two ì non-criticalî TRs on audio codec characterisation and MBMS user service guidelines).**

- **Note: the remaining audio codec work impacts the work completion for the services using the new audio codecs: PSS, MMS, IMS Messaging and Presence**

Rel-6 work overall status (2/2)

Work Item	Completion-% at SA#26	Remaining issues (after SA#26)
Performance characterisation of default codecs for PS conv. multimedia applications	100	(none)
Codec Work to Support Speech Recognition Framework for Automated Voice Services	100	(none)
Codec Enhancements for Packet Switched Conversational Multimedia Applications	100	(none)
3G-324M Improvements	100	(none)
PoC codecs	100	(none)
PSS Rel-6	95	Finalisation of some Enhanced aacPlus and AMR-WB+ specifications: 1) fixed-point reference codec TSs 2) conformance TS(s) 3) TR on performance characterisation
MMS formats and codecs	95	Same as for PSS above.
Media Codecs and Formats for IMS Messaging and Presence	95	Same as for PSS above.
AMR-WB extension for high audio quality	95	Same as for PSS above.
Definition of MBMS user services; media codecs, formats and transport/application protocols using MBMS	75	Finalisation of TS 26.346 (MBMS Protocols and Codecs) and TR 26.946 (MBMS user service guidelines). Main open issues: codec selection, FEC selection

Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

- **Release 7 work**

- **Miscellaneous**

- **Documents and issues for discussion, information and approval**

Rel-7 work: Proposed new WI

- **New WI agreed to address the specification of video encoders and decoders for 3GPP services ì Video Codec Performance Requirementsî . The WI addresses creating detailed specification of video encoders and decoders for 3GPP services.**

- **Proposed new WID on ì Performance Characterization of VoIP over HSDPA channelsî not agreed by SA4#33 since some companies requested more time to review it.**
    - ñ   NEC felt that mobility and QoS issues should be taken into consideration to improve the WID. NEC also pointed out that VoIMS over HSDPA may actually address the basic speech service requirements and this may need to be addressed to SA1. (E.g., do Stage 1 requirements for speech service over HSDPA exist?)

Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

- **Release 7 work**

- **Miscellaneous**

- **Documents and issues for discussion, information and approval**

Miscellaneous: Video encoder specifications (1/2)

- **At TSG SA#25, it was noted that video codecs are traditionally not fully specified since only the decoding process, bit-stream syntax, bit-stream semantics and constraints on bit-streams are defined.**

- **It was stated that the encoder specification is missing for ITU-T H.264 (as for ITU-T H.263) and therefore QoS cannot be guaranteed - in contrast to the 3GPP audio codecs where both encoder and decoder are specified in detail.**

- **Consequently, SA4 was asked to consider corresponding encoders for the next TSG SA meeting.**

Miscellaneous: Video encoder specifications (2/2)

- **As a response SA4 states the following (text agreed at SA4#33):**

  - ñ In general, it is desirable to set a quality threshold for video encoders. The question, however, is how this can be achieved with **reasonable effort**. It was noted that it seems that no such work has been performed before for video. Hence, the effort should be reasonable and match the needs of the industry.

  - ñ One of the challenging tasks for providing video encoder specifications is the definition of a commonly accepted video quality measure.

  - ñ It was agreed that bit-exactness as the only means to meet an encoder specification is not desirable for various reasons. However, **bit-exactness** as an alternative of meeting specified video quality requirements according to a quality measure is a reasonable approach. The remaining problem is the specification and/or selection of a suitable video quality measure.

  - ñ **Subjective testing** (though providing relevant data if done carefully) results in a very high effort for vendors and also poses a high risk when the results of an external test lab are required. Hence, it was agreed that subjective testing should not be used to decide if an implementation conforms to an encoder specification.

  - ñ It was noted that work is ongoing in the ITU-T related to objective video quality measurement in co-operation with the **Video Quality Expert Group**. VQEG is in the initial stages of investigating objective quality assessment of multimedia services accessed from mobile devices. The recommendation by VQEG and standardization process within the relevant bodies, ITU-T SG 12/SG 9, could potentially last until 2006.

  - ñ SA4#33 prepared a WID on **Video Codec Performance Requirements**.

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Miscellaneous: Communication with other WGs/TSGs/groups

Tdoc no.	Title	Intended for	Copy to
TD S4-040631*	Liaison Statement on Reception Acknowledgement for MBMS	SA WG3, SA WG5, SA WG2	SA WG1
TD S4-040632*	Reply LS on Optimisation of Voice over IMS	RAN WG2	SA WG2
TD S4-040633*	Liaison Statement on MBMS User Service architecture	SA WG2	SA WG3, SA WG5, RAN WG2, RAN WG3, GERAN WG2, CN WG1, CN WG3
TD S4-040756	Reply to LS on Optimisation of Voice over IMS	CN WG1	RAN WG2
TD S4-040759**	Communication on Interoperability of WNSRP	ITU-T Q. 1/16	
TD S4-040831**	Communication to ITU-T SG 16 on H.264 level 1b signalling in H.241	ITU-T SG 16	
TD S4-040832**	Communication on Clarification on Maximum CCSRL-SDU Size	ITU-T Q. 1/16	
TD S4-040833	LS on Clarification on Maximum CCSRL-SDU Size	IMTC ñ 3G-324M Activity Group	
TD S4-040829	Reply to Liaison Statement on LASeR: Lightweight Application Scene Representation	ISO/IEC JTC1/SC29/WG11	
TD S4-040839	LS on adoption of SVG Tiny 1.2	W3C SVG Working Group	
TD S4-040815	Liaison Statement on updates to the 3GP file format	OMA-BAC DL+DRM	
TD S4-040845	LS on Clarifications on AMR	CN WG4	
TD S4-040760	LS reply on MBMS security finalisation	SA WG3, CN WG1	SA WG2
TD S4-040841	LS on Session Repetition	SA WG2, GERAN WG2, RAN WG3	CN WG1, CN WG3, CN WG4, RAN WG2, SA WG1
TD S4-040771	LS reply on MBMS Service Priority Handling	SA WG2	TSG RAN WG2
TD S4-040857	LS reply about speech codecs for PoC	OMA POC WG	SA, SA WG2, 3GPP2-C, 3GPP2-S
TD S4-040861	LS on guidance and error patterns for MBMS streaming simulations	TSG RAN, TSG GERAN	

*) prepared by PSM ad-hoc meeting #6, agreed by SA4 by correspodence (prior to SA4#33)
**) not LSs but company contributions to ITU-T with content agreed at SA4#33

Content

- **General issues**

- **Maintenance of releases**

- **Release 6 work**

- **Release 7 work**

- **Miscellaneous**

- **Documents and issues for discussion,
  information and approval**

Documents for information

- **SP-040721: LS reply about speech codecs for PoC**

  This Tdoc contains response to OMA POC WG on progress in codec definition for PoC in 3GPP. It is Ccíd to TSG SA since the earlier LS from OMA POC WG on PoC work was Ccíd to SA as well.

- **SP-040832: TS 26.346 ì MBMS; Protocols and Codecs" Version 1.5.0 (Release 6)**

  The TS defines a set of media codecs, formats and transport/application protocols to enable the deployment of MBMS user services over the MBMS bearer service within the 3GPP system. MBMS download and streaming delivery methods are covered.

  Main content:
  1. MBMS system description (e.g. functional layers, user service entities and service architecture)
  2. Procedures and protocols overview (service announcements, service initiation/termination, protocols)
  3. Definition of delivery methods:
     - ï Download delivery based on IETF FLUTE
     - ï Streaming delivery based on RTP (without RTCP in uplink to avoid channel congestion); use of SRTP under study with SA3
     - ï Associated delivery procedures:
        - ñ File repair (repair lost or corrupted file fragments in download delivery): currently defined for ptp; a scalable solution to handle congestion and server overload, file repair requests and responses take place in a single TCP session using HTTP-protocol
        - ñ Reception reporting procedure (to report complete reception of file(s) in download delivery, to report statistics in streaming delivery)
  4. Definition of media codecs and formats
  5. Specification of FEC

  For the remaining work on the TS, see slide 26.

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Documents for approval: New TSs and TRs

- **SP-040833: TS 26.177 "Speech Enabled Services; DSR Extended Advanced Front-end Test Sequences" Version 1.0.0 (Release 6)**

  - ñ   Specifies the digital test sequences for the DSR Extended Advanced Front-end speech codec to be used to test for a bit exact implementation of the DSR Advanced Front-end codec and quantization (TS 26.243).

  - ñ   Presented for the first time to TSG SA. No outstanding or contentious issues.

- **SP-040834: TR 26.943 "Recognition performance evaluations of codecs for Speech Enabled Services (SES)" Version 1.0.0 (Release 6)**

  - ñ   Provides information on the recognition performance of the DSR Extended Advanced Front End and AMR-NB/AMR-WB (based on tests conducted for the selection of SES codec).

  - ñ   Results have been presented to TSG SA earlier (during the codec selection phase), and have also been included as informative Annex in TS 26.235.

  - ñ   Presented for the first time to TSG SA. No outstanding or contentious issues.

- **SP-040835: TS 26.141 "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs" Version 1.0.0 (Release 6)**

  - ñ   Defines codecs and media formats for IMS Messaging and Presence. The codecs are harmonised with those used for MMS Rel-6.

  - ñ   Presented for the first time to TSG SA. No outstanding or contentious issues.

Documents for approval: New WID

- **SP-040836: WID on Video Codec Performance Requirements (Release 7)**

    - ñ SA4 is proposing a new Work Item to address specification of video encoders (and decoders) for 3GPP services.

    - ñ The work consists of creating detailed encoder specifications (including a reference encoder implementation and generating valid bitstreams that under the constraint of average and peak bitrates achieve specified video quality) and decoder specifications (including a reference decoder implementation, capability to detect packet losses and ability to perform minimal concealment for video regions in error).

Documents for approval: CRs as output from SA4 Rel-6 work

- **SP-040837: CRs to TS 26.243 and TS 26.235 on Speech Enabled Services (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.235	011		Rel-6	Add reference to TR 26.943	D	6.2.0	S4	TSG-SA WG4#33	S4-040814
26.243	001	1	Rel-6	Software bug correction: Removal of Basicops simulation of ìCî shift operator	F	6.0.0	S4	TSG-SA WG4#33	S4-040804
26.243	002	1	Rel-6	Software bug correction: Initialization of the variables lwc and i2aScale	F	6.0.0	S4	TSG-SA WG4#33	S4-040805
26.243	003	1	Rel-6	Software bug correction: Wrong assignment of the variables *piReliableFlag and *pcQPIndex	F	6.0.0	S4	TSG-SA WG4#33	S4-040806
26.243	004	2	Rel-6	Software bug correction: Use of incorrect variable fRefPeriod instead of iRefPeriod	F	6.0.0	S4	TSG-SA WG4#33	S4-040823
26.243	005		Rel-6	Add reference to test sequences document	D	6.0.0	S4	TSG-SA WG4#33	S4-040813

- **SP-040838: CRs to TS 26.140 on MMS (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.140	009	1	Rel-6	Support for EXIF in MMS	B	6.0.0	S4	TSG-SA WG4#33	S4-040852
26.140	010		Rel-6	Adoption of SVG Tiny 1.2 for MMS	B	6.0.0	S4	TSG-SA WG4#33	S4-040788

Documents for approval: CRs as output from SA4 Rel-6 work

- **SP-040839: CRs to TS 26.234, TS 26.244 and TS 26.245 on PSS (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.234	076		Rel-6	Correction of RDF schema for PSS capability vocabulary	F	6.1.0	S4	TSG-SA WG4#33	S4-040693
26.234	077		Rel-6	Transport-independent SDP bandwidth modifiers for PSS	F	6.1.0	S4	TSG-SA WG4#33	S4-040694
26.234	078		Rel-6	Correction of MIME type definition for DRM protected content	F	6.1.0	S4	TSG-SA WG4#33	S4-040695
26.234	079	1	Rel-6	Adoption of SVG Tiny 1.2 for PSS	B	6.1.0	S4	TSG-SA WG4#33	S4-040838
26.244	006	1	Rel-6	Correction of syntax of encryption boxes and outdated references	F	6.1.0	S4	TSG-SA WG4#33	S4-040858
26.244	007		Rel-6	Correction of sample structure for AMR-WB+ in 3GP files	F	6.1.0	S4	TSG-SA WG4#33	S4-040697
26.245	001	1	Rel-6	Removal of incorrect statement in Scope section of Rel-6 Timed Text	F	6.0.0	S4	TSG-SA WG4#33	S4-040848

Documents for approval: CRs as output from SA4 Rel-6 work

- **SP-040840:
  CRs to TS 26.401 and
  TS 26.410 on
  Enhanced aacPlus
  codec (Release 6)**

- A CR to TS 26.234 on
  ìIntegration of alternative
  RTP packetization for
  Enhanced aacPlus codecî
  was presented for
  information at SA4#33 and
  a finalised version may be
  brought directly to SA#26
  as company contribution.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.401	001	1	Rel-6	Alignment with C-code: Clarification on SBR mode to be used for mono only capable decoders	F	6.0.0	S4	TSG-SA WG4#33	S4-040776
26.410	001		Rel-6	Correction to C-code to increase error robustness	F	6.0.0	S4	TSG-SA WG4#33	S4-040642
26.410	002		Rel-6	Correction to C-code: Missing memory re-initialization	F	6.0.0	S4	TSG-SA WG4#33	S4-040643
26.410	003		Rel-6	Correction to C-code: Memory initialization added	F	6.0.0	S4	TSG-SA WG4#33	S4-040644
26.410	004		Rel-6	Correction to C-code: Wrong calculation of sine levels	F	6.0.0	S4	TSG-SA WG4#33	S4-040645
26.410	005		Rel-6	Correction to C-code: Prevent multiple reading of bitstream elements	F	6.0.0	S4	TSG-SA WG4#33	S4-040646
26.410	006	2	Rel-6	Correction to C-code: Corrected wrong table values	F	6.0.0	S4	TSG-SA WG4#33	S4-040828
26.410	007		Rel-6	Correction to C-code: Modify instrumentation	F	6.0.0	S4	TSG-SA WG4#33	S4-040657
26.410	008	1	Rel-6	Correction of C-code: Output data was copied into wrong array	F	6.0.0	S4	TSG-SA WG4#33	S4-040770
26.410	009	1	Rel-6	Correction to C-code: Bug in resampler	F	6.0.0	S4	TSG-SA WG4#33	S4-040775
26.410	010	1	Rel-6	Correction to C-code: Modify data types for FFT	F	6.0.0	S4	TSG-SA WG4#33	S4-040777
26.410	011	1	Rel-6	Correction to decoder C-Code: Alignment with MPEG specification	C	6.0.0	S4	TSG-SA WG4#33	S4-040778
26.410	012		Rel-6	Correction to C-code: Reset of Missing Harmonics flags during concealment added	F	6.0.0	S4	TSG-SA WG4#33	S4-040679
26.410	013		Rel-6	Removal of Complexity counters	F	6.0.0	S4	TSG-SA WG4#33	S4-040830

Documents for approval: CRs as output from SA4 Rel-6 work

- **SP-040841:
  CRs to TS 26.290 and
  TS 26.304 on AMR-WB+
  codec (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.290	001		Rel-6	Correction of stereo bit allocation tables	F	6.0.0	S4	TSG-SA WG4#33	S4-040711
26.290	002		Rel-6	Correction of storage format for AMR-WB+	F	6.0.0	S4	TSG-SA WG4#33	S4-040712
26.290	003	1	Rel-6	Editorial changes	D	6.0.0	S4	TSG-SA WG4#33	S4-040763
26.304	001		Rel-6	Incorrect definition of mode index for SID frames	F	6.0.0	S4	TSG-SA WG4#33	S4-040684
26.304	002		Rel-6	Correction of TCX coding selection for MMS encoder	F	6.0.0	S4	TSG-SA WG4#33	S4-040685
26.304	003		Rel-6	Misread of energy buffer in coding mode selection in MMS encoder. Correction of energy buffer initialisation	F	6.0.0	S4	TSG-SA WG4#33	S4-040686
26.304	004		Rel-6	Correction of stereo bit allocation tables	F	6.0.0	S4	TSG-SA WG4#33	S4-040713
26.304	005	1	Rel-6	Optimization of error concealment operation	F	6.0.0	S4	TSG-SA WG4#33	S4-040764
26.304	006	1	Rel-6	Stereo operation of pre-echo mode, saturation of gain_shape	F	6.0.0	S4	TSG-SA WG4#33	S4-040765
26.304	007		Rel-6	Stereo operation of pre-echo mode, alignement of encoder and decoder	F	6.0.0	S4	TSG-SA WG4#33	S4-040716
26.304	008	1	Rel-6	Addition of support for file formats and improved command line	D	6.0.0	S4	TSG-SA WG4#33	S4-040768
26.304	009	1	Rel-6	Source code editorial changes	D	6.0.0	S4	TSG-SA WG4#33	S4-040767
26.304	010		Rel-6	Removal of complexity counters	D	6.0.0	S4	TSG-SA WG4#33	S4-040719
26.304	011	1	Rel-6	Editorial changes	D	6.0.0	S4	TSG-SA WG4#33	S4-040780
26.304	012		Rel-6	Editorial changes	D	6.0.0	S4	TSG-SA WG4#33	S4-040722
26.304	013		Rel-6	Removal of the eid tool	D	6.0.0	S4	TSG-SA WG4#33	S4-040723
26.304	014	1	Rel-6	Addition of frame erasures simulation at the decoder	D	6.0.0	S4	TSG-SA WG4#33	S4-040766
26.304	015		Rel-6	Removal of two unused stereo rate	D	6.0.0	S4	TSG-SA WG4#33	S4-040725
26.304	016		Rel-6	Source code editorial changes	D	6.0.0	S4	TSG-SA WG4#33	S4-040726

Documents for approval: CRs as output from SA4 Rel-6 work

- **SP-040842: CRs to TS 26.111 on 3G-324M Improvements (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.111	012	1	Rel-6	Addition of the missing signalling of H.264 decoder capabilities	B	6.0.0	S4	TSG-SA WG4#33	S4-040786
26.111	013	1	Rel-6	Reference Corrections	F	6.0.0	S4	TSG-SA WG4#33	S4-040817

- **SP-040843: CRs to TS 26.235 and TS 26.236 on Push to Talk over Cellular (PoC) codecs (Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.235	010	1	Rel-6	Inclusion of PoC support	B	6.2.0	S4	TSG-SA WG4#33	S4-040849
26.236	013	1	Rel-6	Inclusion of PoC support	B	6.0.0	S4	TSG-SA WG4#33	S4-040850

Documents for approval: Other CRs

- **SP-040844: CRs to TS 26.173 and TS 26.204 on AMR-WB codec: Incorrect definition of vector nb_of_bits (Release 5 and Release 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.173	021		Rel-5	Incorrect definition of vector nb_of_bits	F	5.8.0	S4	TSG-SA WG4#33	S4-040745
26.173	020	1	Rel-6	Incorrect definition of vector nb_of_bits	A	5.8.0	S4	TSG-SA WG4#33	S4-040746
26.204	010		Rel-5	Incorrect definition of vector nb_of_bits	F	5.2.0	S4	TSG-SA WG4#33	S4-040747
26.204	009	1	Rel-6	Incorrect definition of vector nb_of_bits	A	5.2.0	S4	TSG-SA WG4#33	S4-040748

- **SP-040845: CRs to TS 26.103 and TS 28.062 on Tandem Free Operation / Transcoder Free Operation (Releases 4, 5 and 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.103	030		Rel-4	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	F	4.3.0	S4	TSG-SA WG4#33	S4-040616
26.103	031		Rel-5	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	A	5.5.0	S4	TSG-SA WG4#33	S4-040617
26.103	032		Rel-6	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	A	6.0.0	S4	TSG-SA WG4#33	S4-040618
28.062	042		Rel-4	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	F	4.5.0	S4	TSG-SA WG4#33	S4-040619
28.062	043		Rel-5	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	A	5.4.0	S4	TSG-SA WG4#33	S4-040620
28.062	044		Rel-6	TFO/TrFO Compatibility of UMTS_AMR and UMTS_AMR2	A	6.0.0	S4	TSG-SA WG4#33	S4-040621

- ñ These CRs are needed to overcome interoperability problems in TFO/TrFO for UMTS_AMR: UMTS_AMR and UMTS_AMR_2 shall be considered as TFO- and TrFO- compatible only when used in a single mode configuration with the same mode.
- ñ CN4 has approved corresponding CRs to TS 23.153 from Rel-4 onwards.

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Documents for approval: Other CRs

- **SP-040846: CRs to TS 28.062 on Operator guidelines for UMTS_AMR (Releases 4, 5 and 6)**

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
28.062	045		Rel-4		F	4.5.0	S4	TSG-SA WG4#33	S4-040628
28.062	046		Rel-5		A	5.4.0	S4	TSG-SA WG4#33	S4-040629
28.062	047		Rel-6		F	6.0.0	S4	TSG-SA WG4#33	S4-040630

  - ñ   The CRs are needed to overcome interoperability problems inTFO/TrFO for UMTS_AMR

- **SP-040847: CRs to TS 26.103 on Clarifications on AMR (Releases 4, 5 and 6)**

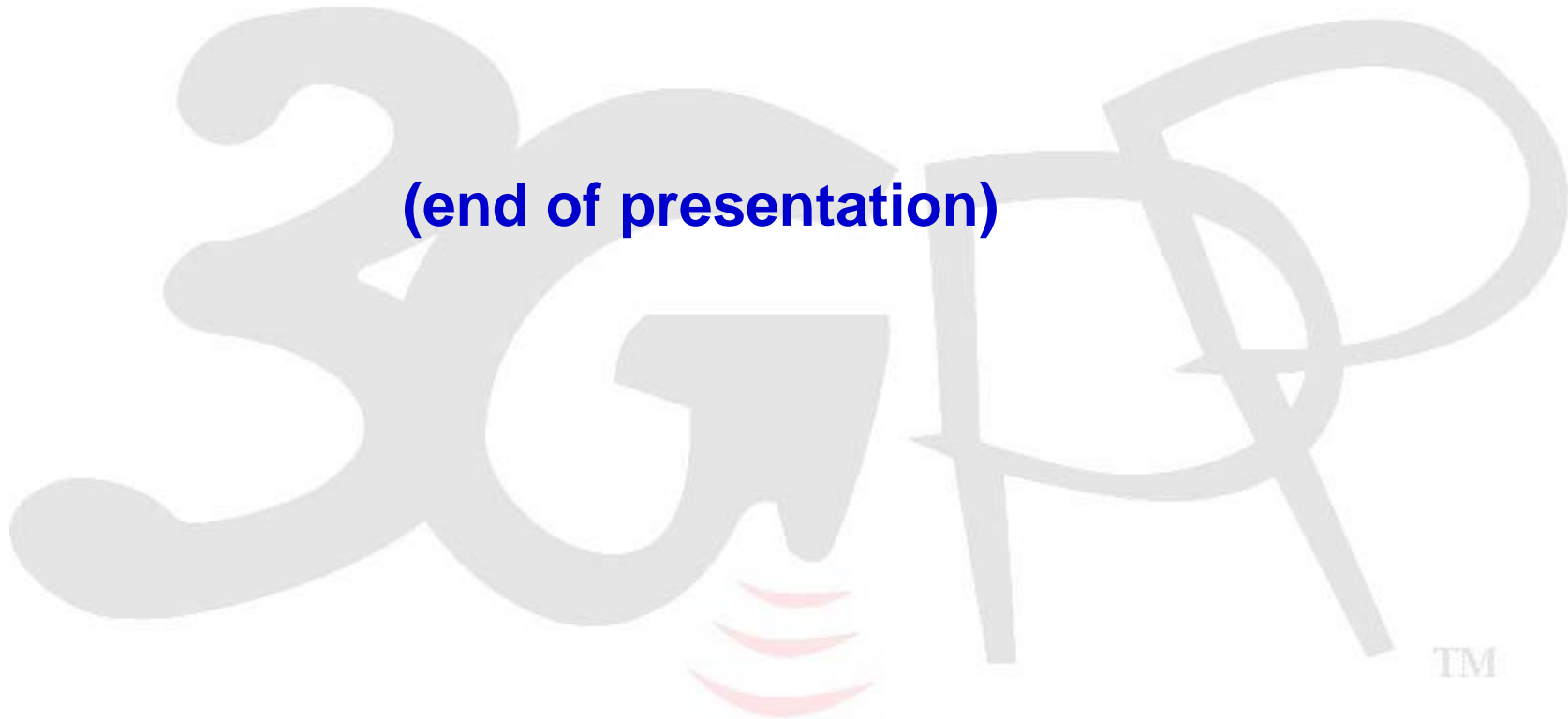| Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.103	033	1	Rel-4	Clarifications for AMR	F	4.3.0	S4	TSG-SA WG4#33	S4-040842
26.103	035	1	Rel-5	Clarifications for AMR	A	5.5.0	S4	TSG-SA WG4#33	S4-040843
26.103	036	1	Rel-6	Clarifications for AMR	A	6.0.0	S4	TSG-SA WG4#33	S4-040844

  - ñ   The CRs are needed to ensure different implementations to be fully compatible.

  - ñ   CN4 had preferred a solution which is not backward compatible but is more efficient (e.g. allows a shorter coding for OoBTC) than this alternative solution providing backwards compatibility.

  - ñ   SA4#33 studied the issue and the two alternative solutions. SA4, however, did not follow the preference of CN4, but accepted the other solution for the sake of backwards compatibility which is considered important in SA4.

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(end of presentation)