Source:	TSG SA WG4 Chairman ¹
Title:	TSG SA WG4 Status Report at TSG SA#28
Document for:	Information
Agenda Item:	7.4.1

Executive Summary

Since TSG SA#27, TSG SA WG4 (SA4) has met once on 9-13 May, 2005 (SA4#35). In addition, joint RAN4-SA4 session on MBMS took place during RAN4 ad-hoc meeting on 4-5 April, 2005. Also, SA4 PSM SWG met on 6-8 April, 2005.

Release 6

Audio codecs (Enhanced aacPlus and Extended AMR-WB)

Conformance TSs for Enhanced aacPlus and Extended AMR-WB (TSs 26.406 and 26.274) have been finalised and are brought for approval. Phase 1 of audio codec performance characterisation testing (Characterization of the codecs across various bit rates in error-free scenarios) has been completed. The Phase 1 reports from individual laboratories are presented for approval in order to authorize ETSI to proceed with the payment of the involved laboratories. Approval of test plan for characterisation Phase 2 (Characterization of the codecs across packet loss rates) is requested to authorize ETSI to initiate the contracting of involved laboratories. Preparation of TR 26.936 (Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs) is pending on finalisation of Phase 2 tests. The TR is expected for information at SA#29 and for approval at SA#30. TS 26.412 (Source code for 3GP file format) - relevant also for other media types than audio - has been finalised and is brought for approval.

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

SA4 has agreed on Raptor as the single mandatory MBMS FEC (Forward Error Correction) scheme. SA4 recommends to SA#28 the adoption of Raptor for MBMS; the corresponding CR to TS 26.346 (MBMS Protocols and Codecs) is brought for approval. A detailed status report on FEC selection is brought for information. The remaining features in MBMS User Services have been finalised and are brought into TS 26.346 through CRs. TR 26.946 (MBMS User Service Guidelines) has been progressed. The TR is expected for information at SA#29 and for approval at SA#30.

Release 6 work status

SA4 Rel-6 work is now completed except the two "non-critical" TRs: TR 26.936 (Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs) and TR 26.946 (MBMS User Service Guidelines). Both are expected for information at SA#29 and for approval at SA#30.

Release 7

Video Codec Performance Requirements

The specification of minimum performance requirements and quality metrics has been further discussed. A set of objective metrics were agreed to be included into minimum performance requirements. Video bitstream restrictions (to ensure consistent user experience between terminals of different manufacturers) were agreed to be considered for ReI-7; the exact restrictions need more consideration. Also, the detailed standardization methodology and details of the specification style need further discussion. A living document on "Database for Video Codec Evaluation" to contain collection of valuable data and tools to be used within the WI was started.

Performance Characterization of VoIMS over HSDPA\EUL channels

Initial proposal for test plan was discussed. This contains still a lot of open issues, especially for the RAN simulator. The interested companies should address the open issues directly in the relevant WGs. Participating companies also need to develop the real-time simulator implementation and define the appropriate parameter settings to be used in the testing. Being a proprietary device, the simulator used for conversational tests in SA4 in the past may not be available for the tests.

Combinational Services: Stage 3 for codec aspects

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In combined CS and IMS services (CSI), the terminal capabilities (expressed in SDP) may not be valid for certain combinations of codecs and media types between the CS and PS domains. Due to conflicts in terminal capabilities, not all the codecs and media types may be used simultaneously. SA4 has discussed how to ensure interoperability and avoid conflicts and has agreed, as a way forward, to define some informative guidelines on codec combinations for typical use cases for CSI. The issues in capability exchange are not CSI specific but concern also IMS in general. Therefore, SA4 plans to initiate a more thorough work aiming at defining terminal capability exchange for IMS (to express constraints in capabilities better than can currently be done within SDP, e.g., by adding extensions to SDP). SA4 has also discussed a proposal for end-to-end signalling of QoS parameters for IMS multimedia sessions in combinational services and agreed on it as a starting point, but needing further consideration and refinement.

Dynamic and interactive multimedia scenes (DIMS)

SA#27 asked SA4 to provide information on how the DIMS work "relates to other work in SA4 and OMA". Consequently, SA4#35 sent LS to OMA-BAC-MAE (and to SA1) to give information of this new SA4 work and to request any relevant input on use cases and requirements to be considered in the SA4 work. SA4 also asked OMA's view on responsibilities with regard to the related work in OMA and 3GPP, and offered to take the responsibility for the technical specifications. SA4#35 noted that no overlap exists at present with the DIMS work and any other SA4 WIs already opened for Rel-7. On the request of MPEG, SA4#35 reviewed the latest version of LASeR (Lightweight Applications Scene Representation) standard from MPEG and provided detailed feedback to MPEG. LS was sent also to W3C CDF and SVG Working Groups with regard to their ongoing work on SVG 1.2 requesting information on any recent changes to the SVG (Scalable Vector Graphics) specifications and information on any work relevant to DIMS. In the DIMS work, SA4 will be first defining detailed technical requirements for acceptable solution; initial sketch of the technical requirements was prepared at SA4#35.

Proposed new Work Items

A new Rel-7 WI "3G-324M video telephony Call Setup Times Improvements" is presented for approval.

Maintenance of releases

CRs have been agreed to TSs 26.190 (Rel-6), 26.234 (Rel-6), 26.236 (Rel-5, Rel-6), 26.273 (Rel-6), 26.290 (Rel-6), 26.304 (Rel-6), 26.346 (Rel-6), 26.410 (Rel-6) and 26.411 (Rel-6).

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1. General issues

This document presents the status report of TSG SA WG4 (SA4) at TSG SA#28. Slides presentation of the report is given in Annex B "SP-050241 Annex B - Slides presentation.ppt" (attached in the zip-file of this report).

1.1 Officials

The SA4 officials are:

Chairman:	Kari Järvinen (Nokia, ETSI)		
Vice-Chairpersons:	Catherine Quinquis (Orange, ETSI) and Frédéric 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 Chain	men:		
	Video Codec Ad-Hoc	Thomas Stockhammer (Siemens, ETSI)	

Frédéric Gabin (NEC Technologies, ETSI) kindly chaired the PSM SWG sessions during SA4#35 since Igor Curcio was not able to attend the meeting. Nikolaus Färber (Fraunhofer Gesellschaft, ETSI) had stepped down after SA4#34 from being Video codec ad-hoc group chairman and Thomas Stockhammer (Siemens, ETSI) took this task from SA4#35.

The period of both SA4 Vice-Chairpersons will end at next SA4 meeting (SA4#36 in September) and SA4 Vice-Chairman elections will take place there.

1.2 Meetings

Since TSG SA#27, SA4 has met once on 9-13 May, 2005 (during SA4#35). A joint RAN4-SA4 session on MBMS took place during RAN4 ad-hoc meeting on MBMS and EDCH on 4-5 April, 2005. Also, SA4 PSM SWG met on 6-8 April, 2005 (PSM ad-hoc meting #7).

The next SA4 meeting will be held in September 2005 (SA4#36). Still before that the following teleconferences have been scheduled:

- SA4 SQ SWG teleconference on audio codec characterisation (on 7th June 2005)
- SA4 video codec ad-hoc group teleconference (on 15th June 2005)
- Teleconference on Work Item "Dynamic and interactive multimedia scenes (DIMS)" (on 29th June 2005)

Meetings held (since SA#27):		
Joint RAN4-SA4 session on MBMS	4-5 April, 2005	Host: ETSI; Venue: Sophia Antipolis, France
SA4 PSM SWG #7	6-8 April, 2005	Host: ETSI; Venue: Sophia Antipolis, France
SA4#35	9-13 May, 2005	Host: QUALCOMM; Venue: San Diego, CA, USA
Calendar of future meetings:		
SA4 SQ SWG on audio codec characterisation	7 June, 2005	Teleconference
SA4 video codec ad-hoc group	15 June, 2005	Teleconference
Ad-hoc meeting on DIMS WI	29 June, 2005	Teleconference
SA4#36	5-9 September, 2005	Host: NEC, Streamezzo, Toshiba; Venue: Paris, France
SA4#37	14-18 November, 2005	Host: EF3; Venue: Bordeaux, France

During SA4#35, all SA4 SWGs and ad-hoc groups met. Table 1 gives overall statistics from SA4#35 (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#31	168	57	26	7
SA4#32	235	64	17	9
SA4#33	265	55	32	14
SA4#34	254	52	22	12
SA4#35	192	48	17	12

 Table 1: Statistics from SA4#35 (and from some past SA4 meetings for comparison)

1.3 Input documents from SA4 to TSG SA#28

Table 2 gives a complete list of input documents from SA4 to TSG SA#28.

Approval is requested for three new Rel-6 TSs, for one new Rel-7 Work Item and for a number of CRs (Rel-5 and Rel-6). SA4 recommends the adoption of Raptor as the only mandatory FEC for MBMS User Service and asks TSG SA to approve the corresponding CR (Rel-6). Report of MBMS FEC Status in SA4 is brought for information. Relating to PSS-MMS-MBMS audio codec performance characterisation, several documents are brought for approval. Approval of reports of listening laboratories and global analysis laboratory from Phase 1 of testing is requested in order to authorize ETSI to proceed with the payment of the laboratories that performed Phase 1. Approval of the test plan for Phase 2 is requested in order to authorize ETSI to initiate the contracting of the laboratories for Phase 2 (listening laboratories and global analysis laboratory). LS on "speech codecs for PoC" is brought to TSG SA for information.

Tdoc	Title	Source	Agenda Item	Document for
SP-050206	Reply LS on speech codecs for PoC (sent to 3GPP2 TSG-C and as "Cc" to OMA POC WG, 3GPP TSG SA, 3GPP TSG SA2, 3GPP TSG CT1, and 3GPP2 TSG-S)	SA WG4	7.4.3	Information
SP-050241	TSG S4 Status Report at TSG-SA#28	SA WG4 Chairman	7.4.1	Information
SP-050242	3GPP TS 26.406: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-050243	3GPP TS 26.274 "Audio codec processing functions, Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Conformance testing" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-050244	3GPP TS 26.412 "Source code for 3GP file format" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-050245	New WID on 3G-324M Video Telephony Call Setup Times Improvements (Release 7)	SA WG4	7.4.3	Approval
SP-050246	Report of MBMS FEC Status in SA4	SA WG4	7.4.3	Information
SP-050247	CR TS 26.190 on Correction to text and some equations (Release 6)	SA WG4	7.4.3	Approval
SP-050248	CR TS 26.234 on Correction to QoE metrics specification for (Extended) PSS (Release 6)	SA WG4	7.4.3	Approval
SP-050249	CRs TS 26.236 on Clarification to the Introduction of AMR SDP parameters (Releases 5 and 6)	SA WG4	7.4.3	Approval
SP-050250	CRs TS 26.346 on MBMS (Release 6)	SA WG4	7.4.3	Approval
SP-050251	CRs TS 26.410 & TS 26.411 on Corrections to Enhanced aacPlus codec specifications (Release 6)	SA WG4	7.4.3	Approval
SP-050252	CRs TS 26.290 & TS 26.304 & TS 26.273 on Corrections to Extended AMR-WB codec specifications (Release 6)	SA WG4	7.4.3	Approval
SP-050253	Reports of Listening / Global Analysis Laboratories related to Audio Codec Performance Characterisation (Phase 1)	SA WG4	7.4.3	Approval
SP-050254	PSS-MMS-MBMS Audio Codec Performance Characterization Test Plan (extension to Phase 2)	SA WG4	7.4.3	Approval

Table 2: List of input documents from SA4 to TSG SA#28

2. Maintenance of Releases

CRs have been agreed to the following TSs:

- TS 26.190 "Speech codec speech processing functions; Adaptive Multi-Rate Wideband (AMR-WB) speech codec; Transcoding functions" (Rel-6),
- TS 26.234 "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs" (ReI-6),
- TS 26.236 "PS conversational multimedia applications; Transport protocols" (Rel-5, Rel-6),
- TS 26.273 "ANSI-C code for the fixed-point Extended Adaptive Multi-Rate Wideband (AMR-WB+) speech codec" (ReI-6),
- TS 26.290 "Audio codec processing functions; Extended Adaptive Multi-Rate Wideband (AMR-WB+) codec; Transcoding functions" (Rel-6),
- TS 26.304 "Extended Adaptive Multi-Rate Wideband (AMR-WB+) codec; Floating-point ANSI-C code" (ReI-6),
- TS 26.346 "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs" (Rel-6),
- TS 26.410 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Floating-point ANSI-C code" (Rel-6) and
- TS 26.411 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Fixed-point ANSI-C code" (ReI-6).

The CRs bring corrections to several TSs and also add some missing features into MBMS User Services (into TS 26.346). The CRs are for Rel-6 except one Rel-5 to TS 26.236.

The CRs are found in Tdocs SP-050247 until SP-050252.

3. Remaining release 6 Work

The remaining issues in Rel-6 SA4 TSs (relating to Audio codecs and MBMS User Services) have been completed since SA#27. All Rel-6 work is now completed except two "non-critical" TRs: TR 26.936 (Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs) and TR 26.946 (MBMS User Service Guidelines). Both are expected for information at SA#29 and for approval at SA#30.

The Rel-6 status for each specification (new specifications and CRs) is explained in detail in Annex A.

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

3.1.1 Codec conformance

Conformance TSs for Enhanced aacPlus and Extended AMR-WB (TSs 26.406 and 26.274) have been finalised and are brought for approval in Tdocs SP-050242 and SP-050243. Conformance testing is an important tool to verify that implementations of the codecs match the relevant specifications. It is also helpful in verifying the proper use of the reference source codes included in the specifications. Conformance to the codec standard is obtained by meeting the conformance criteria defined in these TSs. The conformance TSs cover both fixed-point and floating-point codec versions. Since presenting the TSs for information at SA#27, the TSs have been finalised for approval.

The general framework for audio codec conformance is:

- Fixed-point encoder and decoder conformance can be met by showing either bit-exactness to the fixed-point reference C-code or by meeting a set of objective performance requirements. (The bit-exact approach should be preferred over applying objective measures if it can be achieved without undue penalty on computational complexity.)
- Floating-point encoder and decoder conformance can be met by utilizing (compiling) the reference floating-point source code in specifications and either showing bit-exact behaviour to the reference code or by meeting a set of objective performance requirements. For encoder, this is only recommended unless it is used in terminal equipment (MMS use case).

The specifications also allow conformance testing alternatively by using subjective tests, in which performance not worse than that of the reference codec must be achieved. (The subjective tests cover the configurations tested in characterisation tests.) For Enhanced aacPlus this is allowed only for encoder, while for AMR-WB+ also for decoder.

3.1.2 Performance characterisation

The PSS-MMS-MBMS audio codec characterisation tests are divided into two phases:

- Phase 1: Characterization of the codecs across various bit rates in error-free scenarios
 - Experiment 1: Mono signal with bit rates of 10 kbit/s, 16 kbit/s and 20 kbit/s; no

transmission errors

- Experiment 2: Stereo signal with bit-rates of 14 kbit/s, 21 kbit/s, 28 kbit/s; no transmission errors
- Phase 2: Characterization of the codecs across Packet Loss Rates (PLR)
 - Experiment 1: EGPRS (0%, 1%, 6% and 10% PLRs) mono bit-rates: 16 (AMR-WB+) and 20 kbit/s (Enhanced aacPlus)
 - Experiment 2: EGPRS (0%, 1%, 6% and 10% PLRs) stereo bit-rate: 24 kbit/s (AMR-WB+ and Enhanced aacPlus)
 - Experiment 3: UTRAN (0%, 1% and 5% PLRs) stereo bit-rates: 20 (AMR-WB+) and 32 kbit/s (Enhanced aacPlus)
 - Experiment 4: UTRAN (0%, 1% and 5% PLRs) stereo bit-rate: 40 kbit/s (AMR-WB+ and Enhanced aacPlus)

Phase 1 tests have now been completed. Dynastat, France Telecom R&D, Ericsson and Coding Technologies acted as Listening Laboratories (LL) and Dynastat acted as Global Analysis Laboratory (GAL) to combine and analyse the results. Each experiment was carried out twice, by two listening laboratories. Ericsson and Coding Technologies kindly volunteered to act (without compensation) as host laboratories (HL) to perform processing of samples and also as mirror laboratories to cross-check the processing. The reports of the listening laboratories and global analysis laboratory related to Phase 1 are found in Tdoc SP-050253. Approval of these reports is requested in order to authorize ETSI to proceed with the payment of the laboratories that performed Phase 1. Each listening test experiment will be compensated by 9 kEuros and the global analysis by 4.5 kEuros. The funding for characterisation (85.5 kEuro covering both phases) is available from the overall funding (487.5 kEuros) collected earlier from the audio codec proponents.

The Phase 1 results cover transmission without packet losses. Bit-rates not tested during the selection phase were used to complement the overall testing of the two codecs. Figure 1 shows extracts from both experiments from Phase 1: a) Experiment 1 (mono conditions) and b) Experiment 2 (stereo conditions). For details on the analysis of Phase 1 results, see Tdoc S4-050428 "Global Analysis Laboratory Report for Phase 1" attached into Tdoc SP-050253.



Figure 1a: MUSHRA Scores for Experiment 1 - Interaction of Codec x Bit-rate by LL



Figure 1b: MUSHRA Scores for Experiment 2 - Interaction of Codecs x Bit-rates x Audio Content

Phase 2 test plan has been completed and is brought for approval. It is contained in the overall test plan in Tdoc SP-050254. Approval of the Phase 2 part is needed to authorize ETSI to initiate the contracting of the involved laboratories. (The Phase 1 part was approved already at SA#27.) Fraunhofer Institute, NTT-AT, Nokia and T-Systems will act as the listening laboratories in Phase 2. Dynastat will again take care of the global analysis (and will also draft the TR 26.936 - Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs). The processing of samples and cross-checking is to be carried out by Nokia and Coding Technologies, again without compensation. Also for Phase 2, each listening test experiment will be compensated by 9 kEuros and the global analysis and drafting of TR 26.936 by 9 kEuros. Ericsson will provide error patterns for EGPRS and Qualcomm for UTRAN (both without compensation). SQ SWG conference call will be held on June 7th to finalise mapping of PDU into frames for the tests.

Table 3 shows the detailed schedule for the characterisation tests (all dates in 2005).

Schedule of tasks for the Phase 1 Experiments		
Mar.16	Codec proponents deliver executables to HL's	
Mar.16	Selection of test items (subset of items used in the Selection Test)	
Mar.16-Apr.4	Host Labs perform HL/Cross-check functions	
Apr.4	HL's delivers processed materials to LL's	
Apr.4-Apr.25	MUSHRA Listening tests (LL's)	
Apr.25	LL's deliver raw voting data to GAL	
Apr.25-May 6	GAL and draft TR preparation	
May 9-May 13	Phase 1 results and draft TR presented at SA4#35	
Schedule of tasks for the Phase 2 Experiments		
Jun. 7	Conference call to specify mapping of PDU into frames	
Jun.14	Error patterns delivered to HL	
Jun.14-Jul.12	Host Lab and mirror lab perform HL/Cross-check functions	
Jul.12	HL's deliver processed materials to LL's	
Jul.11-Aug.8	MUSHRA Listening tests (LL's)	
Aug.8	LL's deliver raw voting data to GAL	
Aug.8–Aug.27	GAL and final TR preparation	
Aug.27-Sep.2	Review of results and TR	
Sep.5-9	Phase 2 results and final TR presented at SA4#36	

Besides the PSS-MMS-MBMS characterisation tests described above, volunteering companies will carry out complementing verification testing on specific issues. Tests items such as frequency response, switching performance between different bit-rates, detailed complexity analysis and delay analysis are included in the testing. Some tests (like frequency response) have already been completed, many are currently ongoing, but some are still pending for companies to volunteer. <u>Volunteering organisations for the remaining tasks should indicate their interest by SA4#36.</u>

Preparation of TR 26.936 (Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs) is pending on finalisation of Phase 2 tests. The TR is expected to be presented for information at SA#29 and for approval at SA#30. The TR will contain results from the PSS-MMS-MBMS characterisation tests and from the complementing verification testing carried out by volunteering organisations. Also, the relevant selection phase results will be included into the TR. SA4 is intending to include in the TR also some relevant results from ITU-T G.722.1 Annex C characterisation tests where Enhanced aacPlus and Extended AMR-WB have been used as reference codecs. SA4 has requested from ITU-T Q.10/16 (through ITU-T input document by France Telecom) granting the right to include a minimum set of results into TR 26.936.

3.1.3 Other issues

A number of CRs on corrections are brought for approval on both codecs in Tdocs S4-050251 (Enhanced aacPlus) and S4-050252 (Extended AMR-WB).

TS 26.412 (Source code for 3GP file format) has been finalised and is brought for approval in Tdoc SP-050244. There are no changes from the version presented for information at SA#27. TS 26.412 contains a pointer to the reference 3GPP file format '3GP' software. The definition of the 3GPP file format is derived from the ISO Base Media File Format and the reference software for the file format is therefore maintained by ISO/IEC. Since the file format source code is reference software in MPEG, Copyright cannot easily be transferred to 3GPP partners. However, it does assist users if there is a visible specification which documents how to access the source code. This also provides a single 'indirection point' for other 3GPP specifications that wish to refer to it. In the future it may be possible to provide a copy of the source code also within the TS. Now the TS includes a compiled library with headers for use on Windows platform. This TS is relevant also for other media types than audio.

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

3.2.1 MBMS FEC

A joint RAN4-SA4 session on MBMS took place during RAN4 ad-hoc meeting on MBMS and EDCH on 4-5 April, 2005 to identify appropriate testing conditions for MBMS FEC. The subsequent SA4 PSM SWG meeting on 6-8 April, 2005 (PSM ad-hoc meting #7) further exchanged LSs with GERAN on the simulation assumptions for the GERAN case. The simulations were then carried out by SA4 and RAN4. The simulation assumptions and results from the simulations are presented in Tdoc SP-050246.

At SA#27 there were two remaining candidate FEC codes, Raptor codes and a proposal based on Reed-Solomon codes. Immediately before SA4#35, the Reed-Solomon proposal was withdrawn.

Based on the simulation results SA4#35 agreed on Raptor as the single mandatory MBMS FEC (Forward Error Correction) scheme. SA4 recommends to SA#28 the adoption of Raptor as the only mandatory FEC for MBMS: "*The MBMS UE shall support a decoder for the 'MBMS FEC scheme'*." The corresponding CR to TS 26.346 (MBMS Protocols and Codecs) bringing Raptor FEC to MBMS is brought for approval in Tdoc SP-050250 (CR 13 "Specification of Raptor Forward Error Correction and Streaming User Service bundling ").

The simulation results show that for resource usage, Raptor code performance in all cases is close to the ideal $code^2$.

- Download: For the agreed simulation assumptions, Raptor codes required transmission resources within 1% of the theoretical minimum.
- Streaming: For the agreed simulation assumptions, Raptor codes support media rates at the agreed target reliability level which are typically within 1% and at worst within 2.5% of the theoretical maximum rate.

The computational complexity of Raptor remains low; the total weighted operations per symbol word is 36.7 k. For example, the number of operations required to decode a 3 MB file is under 29 million and the number of operations required to decode 5 seconds of a 256 kbit/s stream is under 1.5 million operations.

For further details on the performance and characteristics of Raptor, see the detailed status report on FEC selection in Tdoc SP-050246. The report explains the agreed simulation conditions, gives the results for each condition and discusses the key aspects and performance of Raptor.

3.2.2 Other remaining work

In addition to MBMS FEC, some other features in MBMS User Services remained unfinished at SA#27, e.g.:

- Service announcements over interactive bearers: although service announcement messages can currently be transmitted via any bearer, only transmission via MBMS has been defined. The use of additional bearers (SMS and HTTP push bearer) is specified to obtain interoperable use.
- Session identity definition: the general principle of identity of the MBMS sessions is introduced and the usage is defined. (The MBMS session id concept is already specified by GERAN and RAN.)
- Using 2 TMGIs (Temporary Mobile Group Identity) for several access networks: announcement of the usage of separate MBMS bearers for 2G and 3G transmissions of the same MBMS User Service.
- Stream bundling (multiple RTP streams to be protected together for FEC purposes included) and other FEC related updates:
 - The User Service description XML is updated to allow for bundling of streaming user services.
 - The service protection description is updated to indicate if the key management stream is FEC protected.
 - o A new FEC protection stream description is included.
 - The Session Description is updated to describe the presence of the FEC in combination with the source stream and its parameter.
 - The streaming FEC framework is changed to support the bundling of streams. This includes changes to source, repair packets, and the source block format. Needed SDP modifications and additions are introduced. The IANA registration information is also changed to specify SDP protocol identifiers instead of media types.

All these have now been completed and are brought through CRs into TS 26.346.

Also, for some media types the status of the codecs remained still open at SA#27 (default vs. recommended, i.e., "shall be supported" vs. "should be supported"). These have now been defined; all these are aligned with

² "Ideal FEC code" can recover all missing source symbols from any K of the received encoding symbols, K being the number of source symbols. This is the theoretical minimum.

codec definitions in PSS Rel-6.

The CRs on the above issues are brought for approval in Tdoc SP-050250. They contain also several correction CRs.

3.2.3 TR on MBMS User Service guidelines

TR 26.946 (MBMS User Service Guidelines) has been progressed but more time is needed for its completion. Draft version 0.0.5 of the TR exists in SA4. The TR is expected to be presented for information at SA#29 and for approval at SA#30. The TR will give guidance on issues such as Description of User Service Procedures, Delivery methods, Usage Scenarios, and Codecs and Formats.

4. Release 7

The work for Video Codec Performance Requirements was continued; the work for the other WIs (approved at SA#27) was started at SA4#35.

4.1 Video Codec Performance Requirements

This WI targets specification of video codecs for 3GPP services by creating detailed encoder and decoder specifications.

Discussions on minimum requirements and quality metrics have been continued; a set of objective metrics (average PSNR, standard deviation of PSNR, error propagation duration) were agreed to be included into minimum performance requirements. Video bitstream restrictions to ensure a consistent user experience between terminals of different manufacturers (e.g. for Picture Size and Pixel Aspect Ratio) were discussed at SA4#35 and it was agreed that such restrictions should be considered for ReI-7; the exact procedures for restrictions need more consideration.

SA4 also agreed to start a living document on Database for Video Codec Evaluation to contain collection of valuable data and tools to be used within the WI. The document will serve as a collection of different auxiliary tools which are helpful for the evaluation of video codec performance in 3GPP environment. Companies contributing to this work item can reference specific tools or metrics in this document such that the simulations are well defined. In subsequent work, specific test conditions for different applications will be generated which reference tools and features in this document.

The detailed standardization methodology and details of the specification style need further discussion. Some discussion took place at SA4#35 with reference to input document to previous SA4 meeting, against which some concerns were expressed (e.g. against the definition of a normative video decoder). Further discussion is needed.

Teleconference of the video ad-hoc group will be held on June 15th to progress the WI before SA4#36.

4.2 Performance Characterization of VoIMS over HSDPA\EUL channels

Initial proposal for test plan was presented at SA4#35. The plan still contains a lot of open issues for the use of HSDPA\EUL channels for VoIP, especially for the RAN simulator (e.g. method of modelling of block error event and block delay event, the principle of the Node B packet scheduler, service and traffic pattern per user and among the population of the mobiles in the network, simulator components, use of RoHC). The interested companies were requested to address the open issues directly in the relevant WGs, e.g. description of appropriate RABs and other RAN issues that are necessary to realise the proposed services (in RAN), any relevant service and service requirement issues for the work (in SA1), and any architectural issues that may have impact into the characterisation test system (in SA2).

A real-time simulator implementation also needs to be developed for the conversational tests and the appropriate parameter settings for the testing need to be defined. (Being a proprietary device the simulator used for the tests performed in SA4 in the past may not be available.)

A phased approach in which DCH channels would be used for uplink instead of EUL (EDCH) channels in the first phase was proposed to start the characterisation work early, but concerns were expressed to this approach as being outside the scope of the WI.

4.3 Combinational Services: Stage 3 for codec aspects

It has been pointed out that in combined CS and IMS services (CSI), the terminal capabilities (expressed in SDP) may not be valid for certain combinations of codecs and media types between the CS and PS domains; not all the codecs and media types may be used simultaneously due to conflicts in terminal capabilities. One use case seen important to ensure is CSI session with CS voice call during which the users share personal content via IMS media types. At PSM ad-hoc meeting #7 in early April, a minimal set of interoperability points (codec combinations) was proposed to be defined for CSI in order to solve any capability conflicts and guarantee interoperability. However, rather than defining a set of codecs to solve an immediate problem, the

group expressed a wish for having a more flexible solution based on individual UE capabilities.

SA4#35 discussed further the ways to ensure interoperability and avoid conflicts for codecs and media types. SA4 agreed as a way forward to define some informative guidelines on codec combinations for typical use cases for CSI (into TS 26.141 "IMS Messaging and Presence; Media formats and codecs" and TS 26.235 "PS conversational multimedia applications; Default codecs"). The issues in capability exchange are not CSI specific but concern IMS in general. Therefore, SA4 plans to initiate a more thorough work (with relevant WIs) aiming at defining terminal capability exchange for IMS (to express constraints in capabilities better than can currently be done within SDP e.g. by adding extensions to SDP).

Proposal for end-to-end signalling of QoS parameters for IMS multimedia sessions in combinational services was also discussed and was agreed as a starting point (consisting of signalling Guaranteed Bitrate, MaxBitrate and Granted-Delay as SDP attributes during the session set up phase). However, further consideration and refinement is needed.

4.4 Dynamic and interactive multimedia scenes (DIMS)

This WI covers specification of the dynamic and interactive multimedia scenes of PSS, MMS and MBMS services relative to SA4 specifications (bearer dependant aspects of service enablers).

At SA#27 it was noted that OMA has a related WI on "Rich-Media Environment" with goal to define Rich-Media use cases and requirements for the OMA service enablers. SA#27 further asked SA4 to provide information on how the DIMS work "relates to other work in SA4 and OMA". Consequently, SA4#35 sent LS to OMA-BAC-MAE (and to SA1) to give information of the new SA4 DIMS work (WID sent for information) and requesting any relevant input on use cases and requirements they think as relevant to be considered in the work. Comments were especially requested from OMA-BAC-MAE on the best way this work may be progressed together in the related WIs, especially on the responsibilities of OMA-BAC-MAE and of SA4 during this work. SA4 offered to take the responsibility for the technical specifications. A teleconference to progress the WI will be held on June 29th, and by then a response from OMA-BAC-MAE is expected available to be taken into account in the work.

SA4#35 also noted that no overlap exists at present with other SA4 WIs already opened for ReI-7. In current ReI-6 SA4 specifications for PSS, MMS and MBMS an ad-hoc protocol to communicate scene modification from the server to the client can be utilised using SVG Tiny 1.2 vector graphics + Ecmascript, SMIL scene description + Ecmascript or XHTML-MP + Ecmascript. However, improvement in ReI-7 is sought in terms of interoperability, ease of authoring, and performance.

On the request from MPEG (ISO/IEC/JTC1/SC29/WG11), SA4#35 reviewed the latest version of LASeR (Lightweight Applications Scene Representation) standard from MPEG and provided feedback. LASeR is one potential candidate to be considered in the SA4 DIMS WI. Current SA4 specifications support Scalable Vector Graphics (SVG) in the existing specifications for PSS, MMS, MBMS, where SVG Tiny 1.2 and ECMAScript are the default coding method ("shall be supported") for vector graphics media type. Considering that 3GPP already supports SVG in existing specifications, concern was expressed that LASeR introduces what appears to be incompatibility in the SVG rendering model. A number of detailed comments and concerns on LASeR were sent to MPEG to clarify these points. SA4 also sent information of the new DIMS work to MPEG. LS was sent also to W3C CDF and SVG Working Groups with regard to their ongoing work on SVG 1.2 requesting information on any recent changes to the SVG specifications and on any W3C work (deliverables, schedules etc.) they consider relevant for the SA4 DIMS work.

As described above, SA4 is gathering use cases from various sources, and based on them will be defining technical requirements on the solution and then choosing a solution for the relevant 3GPP services (PSS, MMS and MBMS). The technical requirements may consider such issues as compatibility, performance, and integration with existing capability etc. SA4#35 already started drafting a document on "DIMS technical requirements" for the algorithms to be considered for DIMS. This document will be progressed in the teleconference on 29th June based on the input received by then.

5. New Work Item Descriptions

5.1 3G-324M video telephony Call Setup Times Improvements (ReI-7)

Video telephony is important for the successful adoption of UMTS. 3G-324M, the basis for 3GPP CS multimedia calls, was based on H.324 and has been evolving since its first introduction into 3GPP specifications in Rel-99. As part of this evolution, new codecs have been proposed and adopted in 3GPP to improve the quality of service. These evolutions have been focusing so far on the media quality and not on other aspects such as call set-up time, which also greatly affects user experience. The time taken to set up a 3G-324M call is currently significantly longer than that taken to set up a voice call. This quality of experience is broadly acceptable to early UMTS adopters. However, as adoption becomes broader, this tolerance will decrease. In the interest of facilitating broader adoption of UMTS and mobile video telephony, further solutions should be identified to accelerate 3G-324M.

The objective of this proposed work item is to reduce 3G-324M call set-up time to the equivalent of a voice call. Since methods to achieve this goal have already been proposed and adopted in other standards bodies, the work is started by investigating and reusing as much as is relevant of the existing solutions. Therefore a phased approach is adopted.

- Phase 1 (December 2005): Adopt one of the currently available and stable technologies (e.g. the WNSRP proposal in ITU-T). The likely output of this phase would be a CR.
- Phase 2 (December 2006): Assess the output of Phase 1 against the defined requirements. In the event of further development being needed, SA4 shall open a selection process for innovative technical proposals. Input from other standards bodies (ITU-T, TISPAN, 3GPP2 etc.) will be invited. Any selected solution shall be backward compatible or agnostic to the Phase 1 solution.

SA4 will liase to SA1 to get requirements for this work (and will liase also with GERAN depending on the output on the Feasibility Study on Enhanced Support of Video Telephony).

The WID is presented for approval in Tdoc SP-050245.

6. Miscellaneous issues

6.1 PoC codecs

As explained at SA#27, a LS from 3GPP2 TSG-C was received at SA4#34 proposing that in order to minimize transcoding for PoC services:

- a) 3GPP should consider adoption of EVRC (Enhanced Variable Rate Codec) as an optional codec for 3GPP PoC services, and
- b) 3GPP2 should consider adoption of AMR as an optional codec for 3GPP2 PoC services.

SA4#34 agreed that before further actions the impact of AMR transcoding with EVRC in PoC should be studied and the impact of AMR/EVRC co-existence in terminals analysed. Also, the adoption of only decoders was proposed as a potential way forward. Companies were asked to study the issue further in order to respond at SA4#35. Work plan (including use cases) was asked to be produced to the purpose of the foreseen investigation.

At SA4#35, the issue was discussed further in light of PoC use cases considering speech quality, transcoding requirements and terminal implementation costs. For the decoder only adoption, concerns were expressed based on that the PoC offer/answer process may not be able to negotiate complete set of codecs between each user (end-to-end) for multi user PoC call (more than 2 participants).

SA4 sees that defining a single codec for all PoC terminals would completely avoid the need for transcoding. Defining multiple optional codec support would reduce the need for transcoding but not remove this need in all use cases. One way to improve quality when doing AMR to/from EVRC transcoding is to use higher speech coding rates. SA4 also recognises that the current PS Conversational specification (TS 26.235) does not prevent the use of other media codecs in addition to the default media codecs. PoC terminals use SDP to exchange their media codecs capabilities and SA4 believes that signalling of EVRC is possible. Therefore, SA4 explains that the support of EVRC in 3GPP PoC terminals is already possible with current specifications.

LS on the outcome of SA4#35 PoC codec discussions was sent to 3GPP2 TSG-C and is Cc'd also for the information of TSG SA in Tdoc SP-050206.

7. 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 TSG SA#27.

Tdoc no.	Title	Intended for	Copy to
S4-050375	Communication on interoperability of WNSRP (endorsed)	ITU-T Q.1/16	
S4-050399	Reply LS on bit rate/delay requirements in the GERAN for an MBMS session	GERAN WG2	TSG SA WG2, TSG SA WG1, TSG RAN WG2, TSG RAN WG3, TSG CN WG1, TSG CN WG3, TSG CN WG4
S4-050384	Reply LS on SA4 FEC simulation Assumption for GERAN	TSG GERAN	
S4-050435	Reply LS on security of stream bundling solutions	TSG SA WG3	
S4-050412	Liaison Statement response on IP packet sizes for MBMS	TSG RAN WG2	GERAN WG2, TSG RAN WG4
S4-050408	Communication on Audio codecs (endorsed)	ITU-T Q.10/16 and Q.23/16	
S4-050436	Communication on Interoperability Problems of Recorded Sounds and VEDs (endorsed)	ITU-T Q.16/16 and Q. 18/16	
S4-050437	Reply LS on speech codecs for PoC	3GPP2 TSG-C	OMA POC WG, 3GPP TSG SA, 3GPP TSG SA2, 3GPP TSG CT1, 3GPP2 TSG-S
S4-050427	LS on MBMS Session Identity, Session Identity Expiration time and Session Identity Repetition Number	GERAN WG2, TSG SA WG2, TSG RAN WG2, TSG RAN WG3, TSG CT WG1, TSG CT WG3, TSG CT WG4	TSG SA WG1
S4-050441	Reply Liaison Statement on LASeR	OMA-BAC-MAE, SG SA WG1	
S4-050421	Reply Liaison Statement on LASeR	W3C SVG and CDF	
S4-050420	Reply Liaison Statement on LASeR	ISO/IEC/JTC1/SC 29/WG 11	

Table 4: SA4 LSs sent out since TSG SA#27

The main issues in the LSs are:

• Tdoc S4-050375	A way to reduce the call start-up time required by NSRP mode used in H.324 is proposed to ITU-T Q.1/16 through company contribution (content endorsed by SA4#35). The proposal is Windowed NSRP with some amendments from SA4. This is a response to request from ITU-T Q.1/16 for comments on proposed solutions for shortening the call start-up time.
• Tdoc S4-050399	GERAN2 had suggested to always associate the Streaming traffic class parameters to any MBMS service type when the MBMS service has to be provided over the GERAN. SA4 explains that it is assuming that the default bearer class for the streaming and download delivery methods is the streaming bearer class. SA4 sees that the final decision on recommending the use of the streaming bearer class for all SA4 delivery methods (or even the removal of the background bearer class from TS 23.246) is not in scope of SA4.
• Tdoc S4-050384	SA4 responds to TSG GERAN that the GERAN agreed simulation parameters for FEC simulations of MBMS services over GERAN have been adopted for the simulations. Based on the results SA4 sees that there is still potential to improve the overall system performance for MBMS over GERAN by carefully selecting GERAN MBMS parameters (RLC PDU repetition, CS and MCS selection) and parameters for application layer FEC. SA4 asks TSG GERAN to take the simulation results into consideration for the GERAN system design.
• Tdoc S4-050435	SA4 informs SA3 that SA4 has taken a decision on the stream bundling proposals and explains how the chosen solution is implemented into TS 26.346.
• Tdoc S4-050412	SA4 responds to RAN2 for their liaison on IP packet sizes for MBMS and the possibilities to optimise UTRAN layer 2 parameterisation. SA4 agrees that such an optimisation would be of value. SA4's view is that as a default, the RAN should be able to support all IP packet sizes up to the maximum SDU size for the bearer. Thus, an optimisation of the kind considered should

	be an optional feature that can be requested by those MBMS applications which are adapted to that mode of operation.
• Tdoc S4-050408	SA4 provides, through a company contribution, ITU-T Q.23/16 with requested information on complexity, bit-rates, sampling frequency, bandwidth of the 3GPP audio codecs (Enhanced aacPlus and Extended AMR-WB). SA4 also thanks ITU-T Q.10/16 for the information on Characterisation test results of G.722.1 Annex C and kindly requests granting the right to include minimum set of the results into 3GPP TR 26.936 (Performance characterization of audio codecs).
• Tdoc S4-050436	SA4 responds, through a company contribution, to ITU-T Q16/16 and Q18/16 for their LS on Interoperability Problems of Recorded Sounds and VEDs (Voice Enhancement Devices) explaining that no protocol to control VEDs has been developed in 3GPP. SA4 points out that noise suppressors that have been endorsed by 3GPP can be inhibited by the network, but this feature is not mandatory for other noise suppressors.
• Tdoc S4-050437	This LS is Cc'd to SA#28 in Tdoc SP-050206. (See Section 6.1 for details.)
• Tdoc S4-050427	SA4 thanks GERAN2 and RAN2 for their LSs on MBMS Session Repetition and informs them and other relevant WGs about the decisions made during SA4#35 on MBMS Session Identity and on their inclusion into TS 26.346.
• Tdoc S4-050441	For the SA4 DIMS (Dynamic and interactive multimedia scenes) work, SA4 is gathering use cases from various sources, and based on them will be developing technical requirements on the solution and choosing a solution for the relevant 3GPP services (PSS, MMS and MBMS). SA4 asks feedback from OMA BAC-MAE and SA1 on any work they have under way that is relevant to the DIMS WI, and any input they may have for SA4 on use cases to consider, and technical requirements they believe that should be met. Furthermore, comments from OMA BAC-MAE are requested on the way this work (with related WIs in OMA and SA4) might be progressed together, especially related to the responsibilities of OMA-BAC-MAE and of 3GPP SA4 in this work.
• Tdoc S4-050421	W3C CDF and SVG working groups are informed on the new DIMS WI. SA4 would be pleased to hear comments for the new WI and on any work under way in W3C that is relevant to the new SA4 WI, its anticipated deliverables, and schedule (particularly of SVG Tiny 1.2, and CDF). SA4 would like to know of any recent changes to the SVG specifications that are relevant to SA4 specifications (including content creation guidelines), or concerns, and would be pleased to have the SVG working group's feedback on our existing specifications (including the SVG content creation guidelines).
• Tdoc S4-050420	On the request of MPEG, SA4 provides feedback to MPEG on the MPEG-4 Part 20 ("LASeR") specification and on the proposed profiling. Considering that 3GPP already supports SVG in existing specifications, SA4 expressed concern that LASeR introduces what appears to be incompatibility in the SVG rendering model.

8. Documents presented for information

Tdoc	Title	Source	Agenda Item	Document for
SP-050206	Reply LS on speech codecs for PoC (sent to 3GPP2 TSG-C and as "Cc" to OMA POC WG, 3GPP TSG SA, 3GPP TSG SA2, 3GPP TSG CT1, and 3GPP2 TSG-S)	SA WG4	7.4.1	Information
SP-050246	Report of MBMS FEC Status in SA4	SA WG4	7.4.3	Information

9. Approval requested

9.1 New specifications

Tdoc	Title	Source	Agenda Item	Document for
SP-050242	3GPP TS 26.406: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-050243	3GPP TS 26.274 "Audio codec processing functions, Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Conformance testing" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval
SP-050244	3GPP TS 26.412 "Source code for 3GP file format" Version 2.0.0 (Release 6)	SA WG4	7.4.3	Approval

9.2 New WIDs

Tdoc Title Source Agenda Document

			ltem	for
SP-050245	New WID on 3G-324M Video Telephony Call Setup Times Improvements (Release 7)	SA WG4	7.4.3	Approval

9.3 PSS-MMS-MBMS Audio Codec Performance Characterization

Tdoc	Title	Source	Agenda Item	Document for
SP-050253*	Reports of Listening / Global Analysis Laboratories related to Audio Codec Performance Characterisation (Phase 1)	SA WG4	7.4.3	Approval
SP-050254**	PSS-MMS-MBMS Audio Codec Performance Characterization Test Plan (extension to Phase 2)	SA WG4	7.4.3	Approval

*) Approval requested in order to authorize ETSI to proceed with the payment of the laboratories that performed Phase 1 of PSS-MMS-MBMS Audio Codec Characterization.

**) Approval requested in order to authorize ETSI to initiate the contracting of the laboratories (listening laboratories and global analysis laboratory) for carrying out the Phase 2 of PSS-MMS-MBMS Audio Codec Characterization.

9.4 CRs

Tdoc	Title	Source	Agenda Item	Document for
SP-050247	CR TS 26.190 on Correction to text and some equations (Release 6)	SA WG4	7.4.3	Approval
SP-050248	CR TS 26.234 on Correction to QoE metrics specification for (Extended) PSS (Release 6)	SA WG4	7.4.3	Approval
SP-050249	CRs TS 26.236 on Clarification to the Introduction of AMR SDP parameters (Releases 5 and 6)	SA WG4	7.4.3	Approval
SP-050250	CRs TS 26.346 on MBMS (Release 6)	SA WG4	7.4.3	Approval
SP-050251	CRs TS 26.410 & TS 26.411 on Corrections to Enhanced aacPlus codec specifications (Release 6)	SA WG4	7.4.3	Approval
SP-050252	CRs TS 26.290 & TS 26.304 & TS 26.273 on Corrections to Extended AMR-WB+ codec specifications (Release 6)	SA WG4	7.4.3	Approval

List of Annexes:

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

Annex B: "SP-050241 Annex B - Slides presentation.ppt" - see the attached separate file

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

(The specifications not completed by TSG SA#28 are highlighted with yellow shading.)

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Performanc	e characterisation of defa	ult codec	s for PS	S conversational multir	nedia applications
TR 26.935	Performance characterization of default codecs for PS conversational multimedia applications	SA4		APPROVED AT SA#24	
Packet Swite	ched Streaming Rel-6 (PS	S 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	APPROVED AT 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	APPROVED AT SA#26	
Media Code	cs and Formats for IMS M	essaging	and Pro	esence	
TS 26.141	IMS Messaging and Presence; Media formats and codecs	SA4	SA2, CN1	APPROVED AT SA#26	

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Audio codeo	S				
(AMR-WB wo PSS Rel-6 W	ork done under Extended I)	AMR-WB	WI and	I Enhanced aacPlus wo	ork done under
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		APPROVED 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		APPROVED AT SA#27	
CRs to 26.244	Transparent end-to-end PSS; File Format	SA4		APPROVED AT SA#25	
TS 26.406	General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing	SA4		Presented for information at SA#27.	SA#28
TS 26.274	Audio codec processing functions, Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Conformance testing	SA4		Presented for information at SA#27.	SA#28
TR 26.936	Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi- Rate - Wideband (AMR- WB+) audio codecs"	SA4		Phase 1 test plan was approved at SA#27. Phase 1 tests have been completed by SA#28. Phase 2 test plan approval requested at SA#28.	
TS 26.412	Source code for 3GP file format	SA4		Presented for information at SA#27.	SA#28

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Speech Rec	ognition Framework for A	utomated	d 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		APPROVED AT SA#26	
TR 26.943	Performance characterization of SES codecs	SA4		APPROVED AT 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 Im	provements				
TS 26.111	Codec for CS Multimedia Telephony Service; Modifications to H.324	SA4		APPROVED AT SA#26	
TR 26.911	Codec for CS Multimedia Telephony Service; Terminal Implementor's Guide	SA4		APPROVED AT SA#25 (adoption of H.264 (AVC) as recommended codec)	
PoC codec(s	3)				
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	APPROVED AT SA#26	
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	APPROVED AT SA#26	
MBMS user se Broadcast/Mu	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	APPROVED 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	Draft version 0.0.5 of the TR exists in SA4.	SA#30



TSG-SA WG4 (SA4) - CODEC Status Report at TSG-SA#28

> Kari Järvinen TSG-SA WG4 Chairman

SA4 status report in Tdoc SP-050241

^{These} slides are attached in Annex B (of Tdoc SP-050241)



Content

- General issues
- Maintenance of releases
- Release 6 work
- Release 7 work
- Miscellaneous
- Documents and issues for discussion, information and approval

3

Technical Specification Group Services and System Aspects Meeting #28, Quebec, Canada, 6-9 June, 2005

TSGS#28(05)0241

General: SA4 meetings

•	Meetings held		
	Joint RAN4-SA4 session on MBMS	4-5 April, 2005	Host: ETSI; Venue: Sophia Antipolis, France
	SA4 PSM SWG #7	6-8 April, 2005	Host: ETSI; Venue: Sophia Antipolis, France
	SA4#35	9-13 May, 2005	Host: QUALCOMM; Venue: San Diego, CA, USA
•	Planned meetings		
	SA4 SQ SWG on audio codec charact.	7 June, 2005	Teleconference
	SA4 video codec ad-hoc group	15 June, 2005	Teleconference
	Ad-hoc meeting on DIMS WI	29 June, 2005	Teleconference
	SA4#36	5-9 September, 2005	Host: NEC, Streamezzo, Toshiba; Venue: Paris, France
	SA4#37	14-18 November, 2005	Host: EF3; Venue: Bordeaux, France

Meeting statistics

Meeting	Number of (new) input documents	Number of participants	Number of incoming LSs	Number of outgoing LSs/communications
SA4#31	168	57	26	7
SA4#32	235	64	17	9
SA4#33	265	55	32	14
SA4#34	254	52	22	12
SA4#35	192	48	17	12



General: SA4 leadership and subgroups

- Chairman:
- Vice-Chairpersons:
- Secretary:

Kari Järvinen (Nokia, ETSI)

Catherine Quinquis (Orange, ETSI) and Frédéric Gabin (NEC Technologies, ETSI)

Paolo Usai (3GPP Support)

- Sub Working Groups / Ad-Hoc groups:
 - Speech Quality (SQ) SWG
 Paolo Usai (ETSI)
 - PS Multimedia (PSM) SWG
 - Video Codec Ad-Hoc group

Paolo Usai (ETSI)

(open) - Interim Chairman: Igor Curcio (Nokia, ATIS)

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Nikolaus Färber (Fraunhofer Gesellschaft, ETSI)

Frédéric Gabin (NEC Technologies, ETSI) chaired the PSM SWG sessions during SA4#35 since Igor Curcio was not able to attend the meeting.

Nikolaus Färber (Fraunhofer Gesellschaft, ETSI) had stepped down after SA4#34 from being SA4 video ad-hoc group chairman and Thomas Stockhammer (Siemens, ETSI) took this task from SA4#35.

The period of both SA4 Vice-Chairpersons will end at next SA4 meeting (SA4#36 in September) and SA4 Vice-Chairperson elections will take place there.



General: Progress overview

- Agreed 3 new Rel-6 TSs
- Agreed 41 Rel-6 CRs and 1 Rel-5 CR
- Agreed 1 new Rel-7 WI
- All Rel-6 work is completed by SA#28 except two "non-critical" TRs:
 - TR 26.936 (Performance characterization of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs)
 - TR 26.946 (MBMS User Service Guidelines)

Both are expected for information at SA#29 and for approval at SA#30.



General: Input documents

- For information:
 - SP-050206 Reply LS on speech codecs for PoC, Source: SA4
 - SP-050241 TSG S4 Status Report at TSG-SA#28, Source: SA4 Chairman
 - SP-050246 Report of MBMS FEC Status in SA4, Source: SA4

• For approval (all from SA4):

- SP-050242 3GPP TS 26.406: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing" Version 2.0.0 (Release 6)
- SP-050243 3GPP TS 26.274 "Audio codec processing functions, Extended Adaptive Multi-Rate -Wideband (AMR-WB+) codec; Conformance testing" Version 2.0.0 (Release 6)
- SP-050244 3GPP TS 26.412 "Source code for 3GP file format" Version 2.0.0 (Release 6)
- SP-050245 New WID on 3G-324M Video Telephony Call Setup Times Improvements (Release 7)
- SP-050247 CR TS 26.190 on Correction to text and some equations (Release 6)
- SP-050248 CR TS 26.234 on Correction to QoE metrics specification for (Extended) PSS (Release 6)
- SP-050249 CRs TS 26.236 on Clarification to the Introduction of AMR SDP parameters (Releases 5 and 6)
- SP-050250 CRs TS 26.346 on MBMS (Release 6)
- SP-050251 CRs TS 26.410 & TS 26.411 on Corrections to Enhanced aacPlus codec specifications (Release 6)
- SP-050252 CRs TS 26.290 & TS 26.304 & TS 26.273 on Corrections to Extended AMR-WB codec specifications (Release 6)
- SP-050253 Reports of Listening / Global Analysis Laboratories related to Audio Codec Performance Characterisation (Phase 1)
- SP-050254 PSS-MMS-MBMS Audio Codec Performance Characterization Test Plan (extension to Phase 2)



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- General issues
- Maintenance of releases
- Release 6 work
- Release 7 work
- Miscellaneous
- Documents and issues for discussion, information and approval

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Maintenance of releases

- CRs have been agreed to the following TSs:
 - TS 26.190 "AMR-WB speech codec; Transcoding functions" (Release 6)
 - TS 26.234 "PSS; Protocols and codecs" (Release 6)
 - TS 26.236 "PS conversational multimedia applications; Transport protocols" (Releases 5 and 6)
 - TS 26.346 "MBMS; Protocols and codecs" (Release 6)
 - TS 26.410 "Enhanced aacPlus general audio codec; Floating-point ANSI-C code" and TS 26.411 "Enhanced aacPlus general audio codec; Fixed-point ANSI-C code" (Release 6)
 - TS 26.290 "AMR-WB+ codec; Transcoding functions", TS 26.304 "AMR-WB+ codec; Floating-point ANSI-C code" and TS 26.273 "ANSI-C code for the fixed-point AMR-WB+ codec" (Release 6)



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- **Release 7 work**
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Audio codecs (Enhanced aacPlus and AMR-WB+) (1/4)

- Conformance TSs for Enhanced aacPlus and Extended AMR-WB (TSs 26.406 and 26. 274) have been finalised and are brought for approval.
 - Conformance testing is an important tool to verify that implementations of the codecs match the relevant specifications. It is also helpful in verifying the proper use of the reference source codes included in the specifications.
 - Conformance to the codec standard is obtained by meeting the criteria defined in these TSs (bit-exactness to test sequences, objective criteria, subjective testing). The TSs cover both the fixed-point and floating-point codec versions.
- Audio codec performance characterisation Phase 1 (Characterization of the codecs across various bit rates) has been completed.
 - Coding Technologies, Dynastat, Ericsson and France Telecom R&D acted as Listening Laboratories (LL). Dynastat acted as Global Analysis Laboratory (GAL) to combine and analyse the results. Coding Technologies and Ericsson acted as host laboratories (HL) to process the test samples and also as mirror laboratories to cross-check the processing.
 - Phase 1 reports from individual laboratories are brought for approval in order to authorize ETSI to proceed with the payment of the involved laboratories (LLs and GAL).
- Approval of characterisation Phase 2 (Characterization of the codecs across packet loss rates) test plan is requested to authorize ETSI to initiate the contracting of involved laboratories.
 - Fraunhofer Institute, Nokia, NTT-AT and T-Systems will act as listening laboratories.
 Dynastat will again take care of the global analysis. The processing of samples and crosschecking will be carried out by Coding Technologies and Nokia.



Audio codecs (2/4)

- Characterisation testing (PSS-MMS-MBMS)
 - Phase 1: Characterization of the codecs across various bit rates COMPLETED!
 - Experiment 1: Mono signal with bit rates of 10 kbit/s, 16 kbit/s and 20 kbit/s; no transmission errors
 - Experiment 2: Stereo signal with bit-rates of 14 kbit/s, 21 kbit/s, 28 kbit/s; no transmission errors
 - Phase 2: Characterization of the codecs across Packet Loss Rates (PLR)
 - Experiment 1: EGPRS (0%, 1%, 6% and 10% PLRs) mono bit-rates: 16 (AMR-WB+) and 20 kbit/s (Enhanced aacPlus)
 - Experiment 2: EGPRS (0%, 1%, 6% and 10% PLRs) stereo bit-rate: 24 kbit/s (AMR-WB+ and Enhanced aacPlus)
 - Experiment 3: UTRAN (0%, 1% and 5% PLRs) stereo bit-rates: 20 (AMR-WB+) and 32 kbit/s (Enhanced aacPlus)
 - Experiment 4: UTRAN (0%, 1% and 5% PLRs) stereo bit-rate: 40 kbit/s (AMR-WB+ and Enhanced aacPlus)

• Phase 2 will be carried out by SA#29

- Processing of samples by July 12
- Listening tests by August 8
- Analysis of results and TR preparation by August 27
- Phase 2 results and draft TR presented at SA4#36 on September 5-9

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Audio codecs (3/4)

• Extracts from both experiments from Phase 1: a) Experiment 1 (mono conditions) and b) Experiment 2 (stereo conditions).



- Global Analysis Laboratory Report for Phase 1 (Tdoc S4-050428) attached into Tdoc SP-050253.
- Preparation of TR 26.936 (Performance characterisation of the Enhanced aacPlus and Extended Adaptive Multi-Rate Wideband audio codecs) is pending on finalisation of Phase 2 tests
 - TR will contain full characterisaton of codec performance based on Selection Tests, Characterisation Tests and complementing verification testing on selected items
 - TR expected for information at SA#29 and for approval at SA#30



Audio codecs (4/4)

- Volunteers needed for some complementing verification items (for the floating- and fixed-point codec versions)
- Some CRs on corrections are brought for approval for both codecs
- TS 26.412 (Source code for 3GP file format) has been finalised and is brought for approval; relevant also for other media types than audio
 - TS contains a pointer to the reference 3GPP file format software (maintained by MPEG as part of overall file format software). Both audio codec reference software ANSI-C codes use the 3GPP input/output file format, but it is used also for all media types and is not limited to audio.



MBMS User Services: MBMS FEC (1/4)

- At SA#27 there were two remaining candidate FEC (Forward Error Correction) codes: Raptor codes and a proposal based on Reed-Solomon codes.
- Since SA#27, simulations carried out with guidance/collaboration from RAN4 and TSG GERAN (as guided by SA#27):
 - Joint RAN4-SA4 session on MBMS took place during RAN4 ad-hoc meeting on 4-5 April, 2005 to identify appropriate testing conditions for MBMS FEC.
 - SA4 PSM SWG meeting on 6-8 April, 2005 further exchanged LSs with GERAN on the simulation assumptions for the GERAN case.
 - The simulations were then carried out in collaboration with SA4 and RAN4.
- Immediately before SA4#35, the Reed-Solomon FEC proposal was withdrawn.
- Based on the simulation results SA4 has agreed on Raptor as the single mandatory MBMS FEC scheme. SA4 recommends to SA#28 the adoption of Raptor as the only mandatory FEC for MBMS. ("The MBMS UE shall support a decoder for the 'MBMS FEC scheme'.")
- Report of the status of FEC selection is given in Tdoc SP-050246. (Contains full set of results and explanation of the test conditions.)
- The corresponding CR to TS 26.346 (MBMS Protocols and Codecs) bringing Raptor FEC to MBMS is brought for approval in Tdoc SP-050250 (CR 13 "Specification of Raptor Forward Error Correction and Streaming User Service bundling ").



GLOBAL INITIATIVE MBMS User Services: MBMS FEC (2/4)

- Raptor FEC codes are systematic erasure codes*. The same code is used for both download and streaming cases.
- Summary of some key aspects of Raptor codes: ٠

Resource usages: Code performance in all cases is close to the ideal code.

- Download: For the agreed simulation assumptions, Raptor codes required transmission resources within 1% of the theoretical minimum**.
- Streaming: For the agreed simulation assumptions, Raptor codes support media rates at the agreed target reliability level which are typically within 1% and at worst within 2.5% of the theoretical maximum rate.

Computational complexity: The total weighted operations per symbol word is 36.7 k

For example, the number of operations required to decode a 3 MB file is under 29 million and the number of operations required to decode 5 seconds of a 256 kbit/s stream is under 1.5 million operations. (This can easily be achieved on current mobile phone platforms in less than a second using a fraction of the available computational resources.)

Memory consumption for file download:

The working memory requirement for Raptor codes is at most 512 KB for all file sizes.

Latency:

The duration of the protection period is operator selectable. The suitability of the Raptor codes has been verified by SA4 over a protection period range from 5 s to 20 s, but values outside this range may also be applicable.

Flexibility:

- Supports all presently identified MBMS requirements (e.g. those in Stage 1 TS.22.246) in terms of bearer rates, file sizes, loss rates, packet sizes, packet size variability and protection period for streaming.
- An (N,K) systematic FEC block code preserves the K source symbols and appends (N K) parity symbols.
- "Ideal FEC code" can recover all missing source symbols from any K of the received encoding symbols, K being the number of source symbols. 15 This is the theoretical minimum.



MBMS User Services: MBMS FEC (3/4)

• Extract from simulation results: FEC Overhead required for 99% probability of recovery at specific BLER points at 64kbit/s for UTRAN download

Error rates	Power required (G=-3dB ¹)	Power required (G=-6dB ²)	File size	ldeal (%)	Raptor (%)
Low (1% BLER)	2.0%	4.5%	Small (50KB)	7.0	8.0
			Medium (512KB)	3.3	3.6
			Large (3072KB)	2.4	2.6
Medium (5%	1.8%	3.9%	Small (50KB)	21.8	22
BLER)			Medium (512KB)	13.0	13.4
			Large (3072KB)	11.0	11.2
High (10% BLER)	1.7%	3.7%	Small (50KB)	39.0	39.0
			Medium (512KB)	25.8	26.0
			Large (3072KB)	22.6	22.8
15% BLER	n/a	n/a	Small (50KB)	56.0	56.0
			Medium (512KB)	40.5	41.0
			Large (3072KB)	36.0	37.0
20% BLER	n/a	n/a	Small (50KB)	76.0	76.0
			Medium (512KB)	57.0	57.0
			Large (3072KB)	52.0	52.0
30% BLER	n/a	n/a	Small (50KB)	130.0	130.0
			Medium (512KB)	100.0	100.0
			Large (3072KB)	92.0	92.0

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Notes:

1) This corresponds to ~90% of users assuming uniform distribution of users

2) This corresponds to ~99% of users assuming uniform distribution of users



MBMS User Services: MBMS FEC (4/4)

• Extract from simulation results: Maximum supported Media Rate for Mean Time Between FEC Block Loss of 1 hour (i.e., on the average only one lost FEC block in 1 hour) for GERAN streaming

Operation Points	Ideal	Raptor
Low Bitrate (CS3) (0.1% BLER) 28.8 kbit/s	5s: 24.9 kbit/s 20s: 26.6 kbit/s	5s: 24.4 kbit/s 20s:26.2 kbit/s
Medium Bitrate (MCS-6) (0.5% BLER) 59.2 kbit/s	5s: 51.1kbit/s 20s: 54.6 kbit/s	5s: 50.4 kbit/s 20s: 54.2 kbit/s
High Bitrate (MCS-9) (1% BLER) 118.4 kbit/s	5s: 99.5 kbit/s 20s: 104.5 kbit/s	5s: 98.2 kbit/s 20s: 104.2 kbit/s
High Bitrate and High Error Rate (MCS-6) 10% BLER, 146 byte packet payloads 118.4 kbit/s	5s: 66.5 kbit/s 20s: 72.5kbit/s	5s: 66.4 kbit/s 20s: 72.3 kbit/s



MBMS User Services: Other issues (1/2)

- In addition to MBMS FEC, some other features in MBMS User Services remained unfinished at SA#27, e.g.:
 - Service announcements over interactive bearers: Although service announcement messages can currently be transmitted via any bearer, only transmission via MBMS has been defined. The use of additional bearers (SMS and HTTP push bearer) is specified to obtain interoperable use.
 - Session identity definition: The general principle of identity of the MBMS sessions is introduced and the usage is defined. (The MBMS session id concept is already specified by GERAN and RAN.)
 - Using 2 TMGIs for several access networks: Announcement of the usage of separate MBMS bearers for 2G and 3G transmissions of the same MBMS User Service.
 - Stream bundling (multiple RTP streams to be protected together for FEC purposes included) and other FEC related updates
 - The User Service description XML is updated to allow for bundling of streaming user services.
 - The service protection description is updated to indicate if the key management stream is FEC protected.
 - A new FEC protection stream description is included.
 - The Session Description is updated to describe the presence of the FEC in combination with the source stream and its parameter.
 - The streaming FEC framework is changed to support the bundling of streams. This includes changes to source, repair packets, and the source block format. Needed SDP modifications and additions are introduced. The IANA registration information is also changed to specify SDP protocol identifiers instead of media types.

These have been now completed and the corresponding CRs are brought for approval.



MBMS User Services: Other issues (2/2)

- Also, for some media types the status of the codecs remained still open at SA#27 (default vs. recommended, i.e., "shall be supported" vs. "should be supported"). These have now been defined; all these are aligned with codec definitions in PSS Rel-6.
- All the FEC related CRs are included for clarity into single CR 13 "Specification of Raptor Forward Error Correction and Streaming User Service bundling " (in Tdoc SP-050250).
- Some correction CRs are brought for approval.
- TR 26.946 (MBMS User Service Guidelines) has been progressed but more time is needed for its completion. The TR is expected to be presented for information at SA#29 and for approval at SA#30.
 - Gives guidance on issues such as Description of User Service Procedures, Delivery methods, Usage Scenarios, and Codecs and Formats.



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Video Codec Performance Requirements

- WID approved at SA#26, work launched at SA4#34. The work is on specification of video codecs for 3GPP services by creating detailed encoder and decoder specifications.
- The specification of minimum requirements and quality metrics have been discussed further. A set of objective metrics (average PSNR, standard deviation of PSNR, error propagation duration) were agreed to be included into minimum performance requirements. Also, video bitstream restrictions (to ensure consistent user experience between terminals of different manufacturers) were agreed to be considered for Rel-7; the exact restrictions need more consideration.
- A living document "Database for Video Codec Evaluation" to contain collection of valuable data and tools to be used within the WI was started.
- The detailed standardization methodology and details of the specification style need further discussion.
- Teleconference of the video ad-hoc group will be held on June 15th to progress the WI before SA4#36.



Performance Characterization of VoIMS over HSDPA\EUL channels

- WID approved at SA#27, work launched at SA4#35.
- Initial proposal for test plan discussed at SA4#35. Contains a lot of open issues, especially for the RAN simulator (e.g., method of modelling of block error event and block delay event, the principle of the Node B packet scheduler, service and traffic pattern per user and among the population of the mobiles in the network, simulator components and use of RoHC).
- The interested companies were requested to address the open issues directly in the relevant WGs, e.g.,
 - description of appropriate RABs and other RAN issues (in RAN)
 - any relevant service and service requirement issues for the work (in SA1)
 - any architectural issues that may have impact into the characterisation test system (in SA2)
- The real-time simulator implementation needs to be developed and the approprite parameter settings used in the testing must be defined. (Simulator used for the tests performed in the past in SA4 may not be available for the tests; it being a proprietary device.)
- A phased approach in which DCH channels would be used for uplink instead of EUL (EDCH) channels in the first phase of the testing was proposed, but concerns expressed to this approach as being outside the scope of the WI.





Combinational Services: Stage 3 for codec aspects

- WID approved at SA#27, work launched at SA4#35.
- In combined CS and IMS services (CSI), the terminal capabilities (expressed in SDP) may
 not be valid for certain combinations of codecs and media types between the CS and PS
 domains. Hence, not all the codecs and media types may be used simultaneously due to
 conflicts in terminal capabilities. (One use case seen important to ensure is CSI session
 with CS voice call during which the users share personal content via IMS media types.)
- At PSM ad-hoc meeting #7 in early April, a minimal set of interoperability points (codec combinations) was proposed to be defined for CSI to solve any capability conflicts. However, rather than defining a set of codecs to solve an immediate problem, more flexible solution based on individual UE capabilities needed.
- SA4#35 discussed further the ways to ensure interoperability and to avoid conflicts and agreed as a way forward to define some informative guidelines on codec combinations for typical use cases for CSI.
- The issues in capability exchange are not CSI specific but relate to IMS in general. Therefore, SA4 plans to initiate a more thorough work aiming at defining terminal capability exchange for IMS (to express constraints in capabilities better than can currently be done within SDP e.g. by adding extentions to SDP).
- Proposal for end-to-end signalling of QoS parameters for IMS multimedia sessions in combinational services discussed and agreed as a starting point (consisting of signalling Guaranteed Bitrate, MaxBitrate and Granted-Delay as SDP attributes during the session set up phase). Further consideration is needed.

TSGS#28(05)0241

Dynamic and interactive multimedia closed initiative scenes (DIMS) (1/2)

- WID approved at SA#27, work launched at SA4#35.
- At SA#27 it was noted that OMA has a related WI on "Rich-Media Environment" with goal to define Rich-Media use cases and requirements for the OMA service enablers. SA#27 asked SA4 to provide information on how the DIMS work "relates to other work in SA4 and OMA".
 - SA4#35 sent LS to OMA-BAC-MAE (and to SA1) to give information of the new work and to request any relevant input on use cases and requirements to be considered in the SA4 work. Comments were especially requested from OMA-BAC-MAE on the best way this work may be progressed together in the related WIs, especially on the responsibilities of OMA-BAC-MAE and of SA4. SA4 offered to take the responsibility for technical specifications.
 - DIMS WID sent for information to OMA-BAC-MAE and SA1
 - SA4 noted that no overlap exists at present with the DIMS work and any other SA4 WIs already opened for Rel-7.

LS to MPEG on LASeR (Lightweight Applications Scene Representation)

- SA4 reviewed (on request) the latest version of LASeR standard from MPEG. Considering that 3GPP already supports SVG in existing specifications, concern expressed on LASeR introducing what appears to be incompatibility in the SVG rendering model. A number of comments and concerns were sent to MPEG for clarification.
- feedback given on the definition of profiles suitable for 3GPP use (where both bit-rate and complexity are restricted)
- DIMS WID sent for information
- LS to W3C CDF and SVG Working Groups
 - Request for information on any recent changes to the W3C SVG specifications and on any W3C work (deliverables, schedules etc.) they consider relevant for the SA4 DIMS work
 - DIMS WID sent for information

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Dynamic and interactive multimedia contactive scenes (DIMS) (2/2)

- SA4 will first define detailed technical requirements for the DIMS work and based on them will choose a solution suitable for the relevant 3GPP services (PSS, MMS and MBMS). Issues such as compatibility, performance, integration with existing capability etc. are to be covered in the technical requirements.
- Initial sketch of the technical requirements was prepared already at SA4#35.
- Teleconference on the WI will be held on June 29th to progress the work before SA4#36.



Proposed new WI

- 3G-324M video telephony Call Setup Times Improvements (Rel-7)
 - The time taken to set up a 3G-324M video telephony call is currently significantly longer than that taken to set up a voice call. The WI targets developing solutions to reduce 3G-324M call set-up time to the equivalent of a voice call.
 (See more information on slide 34.)



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Miscellaneous: LS on PoC codecs

- LS from 3GPP2 TSG-C received at SA4#34 proposing that in order to minimize transcoding for PoC services:
 - a) 3GPP should consider adoption of EVRC (Enhanced Variable Rate Codec) as an optional codec for 3GPP PoC services, and
 - b) 3GPP2 should consider adoption of AMR as an optional codec for 3GPP2 PoC services.
- SA4#34 agreed that before further actions the impact of AMR transcoding with EVRC in PoC should be studied and the impact of AMR/EVRC co-existence in terminals analysed. Also, the adoption of only decoders was considered as a potential way forward. Companies were asked to study the issue further in order to respond at SA4#35.
- At SA4#35, the issue was discussed further considering speech quality, transcoding requirements and terminal implementation costs. For the decoder only adoption, concerns were expressed based on that the PoC offer/answer process may not be able to negotiate complete set of codecs between each user (end-to-end) for multi user PoC call (more than 2 participants).
- LS sent to 3GPP2 (CC'd to SA#28 in Tdoc SP-050206) with conclusions:
 - Defining a single codec for all PoC terminals would completely avoid the need for transcoding
 - Defining multiple optional codec support would reduce the need for transcoding but not remove this need in all use cases.
 - One way to improve quality when doing AMR to/from EVRC transcoding is to use higher speech coding rates. This may require additional considerations for the OMA transcoding function.
 - Current 3GPP PS Conversational specification (TS 26.235) does not prevent the use of other media codecs in addition to the default media codecs. PoC terminals use SDP to exchange their media codecs capabilities and SA4 believes that signaling of EVRC is possible. The support of EVRC in 3GPP PoC terminals is possible.



Communication with other WGs/TSGs/groups

Tdoc no.	Title	Intended for	Copy to
S4-050375	Communication on interoperability of WNSRP (endorsed)	ITU-T Q.1/16	
S4-050399	Reply LS on bit rate/delay requirements in the GERAN for an MBMS session	GERAN WG2	TSG SA WG2, TSG SA WG1, TSG RAN WG2, TSG RAN WG3, TSG CN WG1, TSG CN WG3, TSG CN WG4
S4-050384	Reply LS on SA4 FEC simulation Assumption for GERAN	TSG GERAN	
S4-050435	Reply LS on security of stream bundling solutions	TSG SA WG3	
S4-050412	Liaison Statement response on IP packet sizes for MBMS	TSG RAN WG2	GERAN WG2, TSG RAN WG4
S4-050408	Communication on Audio codecs (endorsed)	ITU-T Q.10/16 and Q.23/16	
S4-050436	Communication on Interoperability Problems of Recorded Sounds and VEDs (endorsed)	ITU-T Q.16/16 and Q. 18/16	
S4-050437	Reply LS on speech codecs for PoC	3GPP2 TSG-C	OMA POC WG, 3GPP TSG SA, 3GPP TSG SA2, 3GPP TSG CT1, 3GPP2 TSG-S
S4-050427	LS on MBMS Session Identity, Session Identity Expiration time and Session Identity Repetition Number	GERAN WG2, TSG SA WG2, TSG RAN WG2, TSG RAN WG3, TSG CT WG1, TSG CT WG3, TSG CT WG4	TSG SA WG1
S4-050441	Reply Liaison Statement on LASeR	OMA-BAC-MAE, SG SA WG1	
S4-050421	Reply Liaison Statement on LASeR	W3C SVG and CDF	
S4-050420	Reply Liaison Statement on LASeR	ISO/IEC/JTC1/SC 29/WG 11	TAT

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Documents for information

- S4-050206: Reply LS on speech codecs for PoC (sent to 3GPP2 TSG-C and as "Cc" to OMA POC WG, 3GPP TSG SA, 3GPP TSG SA2, 3GPP TSG CT1, and 3GPP2 TSG-S)
 - Response LS to 3GPP2 TSG-C on minimizing transcoding for PoC services (see background on slide 28)
- S4-050246: Report of MBMS FEC Status in SA4
 - Describes the status of MBMS FEC selection in SA4
 - Explains the simulation conditions and assumptions
 - Presents results of the simulations
 - Discusses the key aspects and performance of Raptor
 - SA4 recommends the adoption of Raptor as the only mandatory FEC for MBMS: SA4 asks TSG SA to approve the corresponding CR in Tdoc SP-050250 (S4-050378).

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TSGS#28(05)0241



Documents for approval: Audio codec TSs

- SP-050242: TS 26.406 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing" Version 2.0.0 (Release 6), and
- SP-050243: TS 26.274 "Audio codec processing functions, Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Conformance testing" Version 2.0.0 (Release 6)
 - These TSs specify the digital test sequences and conformance criteria for the Enhanced aacPlus and Extended AMR-WB audio codecs.
 - The general framework for conformance is similar for both codecs:
 - Fixed-point encoder and decoder conformance can be met by showing either bitexactness to the fixed-point reference C-code or by meeting a set of objective performance requirements. (The bit-exact approach should be preferred over objective measures if it can be achieved without undue penalty on computational complexity.)
 - Floating-point encoder and decoder conformance can be met by utilizing (compiling) the reference floating-point source code in specifications and showing bit-exact behaviour to the reference code or by meeting a set of objective performance requirements. For encoder, this is only recommended unless it is used in terminal equipment (MMS use case).
 - Conformance testing is also allowed alternatively by using subjective tests, in which
 performance not worse than that of the reference codec must be achieved. (The
 subjective tests cover the configurations tested in characterisation tests.) For Enhanced
 aacPlus this is allowed only for encoder, while for AMR-WB+ also for decoder.



Documents for approval: TS on 3GPP file format software

- SP-050244: TS 26.412 "Source code for 3GP file format" Version 2.0.0 (Release 6)
 - The definition of the 3GPP file format is derived from the ISO Base Media File Format, as published by ISO/IEC in 14496-12. The reference software for the file format is also therefore maintained by ISO/IEC.
 - Users of 3GPP specifications have had difficulty in finding the reference code for the 3GPP file format. (E.g., the Enhanced aacPlus source code and the Extended AMR-WB source code both rely on use of the file-format for their file input/output.)
 - A new TS 26.412 was created to contain pointer to the reference 3GPP file format software (maintained by MPEG as part of their overall file format software).
 - Since this file format source code is reference software in MPEG, copyright cannot easily be assigned to 3GPP partners and the actual MPEG ANSI-C source code cannot be included into the 3GPP TS. However, it does assist users if there is a visible specification which documents how to access the source code. In the future, it may be possible to provide a copy of the source code in the TS. Currently, the TS includes a compiled library with headers for use on Windows.
 - Note that this TS is relevant for all media types and is not limited to audio.



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Documents for approval: new WID

- SP-050245: New WID on 3G-324M Video Telephony Call Setup Times Improvements (Release 7)
 - The time taken to set up a 3G-324M video telephony call is currently significantly longer than that taken to set up a voice call. This quality of experience is broadly acceptable to early UMTS adopters. However, as adoption becomes broader, this tolerance will decrease.
 - In the interest of facilitating broader adoption of UMTS and mobile video telephony, further solutions should be identified to reduce 3G-324M call set-up time to the equivalent of a voice call.
 - Two phase approach proposed:
 - Phase 1 (December 2005): Adopt one of the currently available and stable technologies (e.g. the WNSRP proposal in ITU-T).
 - Phase 2 (December 2006): Assess the output of Phase 1. In the event of further development being needed, a selection process for new solutions to be opened. (Any selected solution shall be backwardly compatible or agnostic to the Phase 1 solution.)
 - SA4 will liase to SA1 to get requirements for this work (and will liase also with GERAN depending on the output on the Feasibility Study on Enhanced Support of Video Telephony).



Documents for approval: Audio codec Activitative characterisation Phase 1 reports and Phase 2 plan

- SP-050253 Reports of Listening / Global Analysis Laboratories related to Audio Codec Performance Characterisation (Phase 1)
 - Listening Laboratory reports: Coding Technologies, Dynastat, Ericsson, France Telecom R&D
 - Global Analysis Laboratory report: Dynastat

Note: Approval requested in order to authorize ETSI to proceed with the payment of the laboratories that performed Phase 1 of PSS-MMS-MBMS Audio Codec Characterization.

 SP-050254 PSS-MMS-MBMS Audio Codec Performance Characterization Test Plan (extension to Phase 2)

Note: Approval for the Phase 2 part of the document requested in order to authorize ETSI to initiate the contracting of the laboratories (listening laboratories and global analysis laboratory) for carrying out the Phase 2 of PSS-MMS-MBMS Audio Codec Characterization.



Documents for approval: CRs

 SP-050247: CR TS 26.190 "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Transcoding functions" on Correction to text and some equations (Release 6)

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.190	002		Rel-6	Correction to text and some equations	F	6.0.0	S4	TSG-SA WG4#35	S4-050315

 SP-050248: CR TS 26.234 "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs" on Correction to QoE metrics specification for (Extended) PSS (Release 6)

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.234	085		Rel-6	Correction to QoE metrics specification for PSS	F	6.3.0	S4	TSG-SA WG4#35	S4-050288

 SP-050249: CRs TS 26.236 "PS conversational multimedia applications; Transport protocols" on Clarification to the Introduction of AMR SDP parameters (Releases 5 and 6)

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.236	016	1	Rel-5	Clarification to the Introduction of AMR SDP parameters	F	5.6.0	S4	TSG-SA WG4#35	S4-050425
26.236	017	1	Rel-6	Clarification to the Introduction of AMR SDP parameters	A	6.2.0	S4	TSG-SA WG4#35	S4-050426



Documents for approval: CRs

• SP-050250: CRs TS 26.346 "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs" on MBMS (Release 6)

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc	
26.346	001	1	Rel-6	Corrections to QoE metrics specification for MBMS	F	6.0.0	S4	TSG-SA WG4#35	S4-050393	
26.346	002	1	Rel-6	Using two TMGIs	F	6.0.0	S4	TSG-SA WG4#35	S4-050307	
26.346	003		Rel-6	MBMS Service Descriptions over HTTP	F	6.0.0	S4	TSG-SA WG4#35	S4-050290	
26.346	004	1	Rel-6	Corrections to the specification of Associated Delivery Procedures for MBMS	F	6.0.0	S4	TSG-SA WG4#35	S4-050392	
26.346	005	2	Rel-6	Usage of MBMS Session Identity	В	6.0.0	S4	TSG-SA WG4#35	S4-050383	
26.346	010	1	Rel-6	MBMS user service announcement via point-to- point push bearers	В	6.0.0	S4	TSG-SA WG4#35	S4-050406	
26.346	011		Rel-6	Removal of obsolete note	F	6.0.0	S4	TSG-SA WG4#35	S4-050387	
26.346	013		Rel-6	Specification of Raptor Forward Error Correction and Streaming User Service bundling	С	6.0.0	S4	TSG-SA WG4#35	S4-050378	Note: CR 13 brings Raptor
26.346	015		Rel-6	Clarification of Associated Delivery Procedure	F	6.0.0	S4	TSG-SA WG4#35	S4-050394	FEC into MBMS
26.346	016		Rel-6	Corrections of FLUTE Support Requirements	F	6.0.0	S4	TSG-SA WG4#35	S4-050395	
26.346	017		Rel-6	Corrections of the reference list	D	6.0.0	S4	TSG-SA WG4#35	S4-050396	
26.346	018		Rel-6	Definition of RTP Session	F	6.0.0	S4	TSG-SA WG4#35	S4-050397	
26.346	019		Rel-6	Corrections and editorial modifications to chapter 4	F	6.0.0	S4	TSG-SA WG4#35	S4-050398	
26.346	020		Rel-6	MBMS Repair	F	6.0.0	S4	TSG-SA WG4#35	S4-050431	
26.346	021		Rel-6	MBMS Media Codec Support	F	6.0.0	S4	TSG-SA WG4#35	S4-050434	



Documents for approval: CRs

• SP-050251: CRs to

1) TS 26.410 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Floating-point ANSI-C code", and

2) TS 26.411 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Fixed-point ANSI-C code"

on Corrections to Enhanced aacPlus codec specifications (Release 6)

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.410	023		Rel-6	Correction to C-code: 10 kbit/s mono encoding with stereo input files failed	F	6.2.0	S4	TSG-SA WG4#35	S4-050299
26.411	001		Rel-6	Correction to C-code: Corrections to ETSI operator usage	F	6.0.0	S4	TSG-SA WG4#35	S4-050300
26.411	002		Rel-6	Correction to C-code: Avoid reading of non- initialized variable	F	6.0.0	S4	TSG-SA WG4#35	S4-050355
26.411	003		Rel-6	Correction to C-code: fixes for error concealment	F	6.0.0	S4	TSG-SA WG4#35	S4-050386

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Documents for approval: CRs

 SP-050252: CRs to
 1) TS 26.290 "Audio codec processing functions; Extended Adaptive Multi-Rate
 Wideband (AMR-WB+) codec; Transcoding functions",
 2) TS 26.304 "Extended

Adaptive Multi-Rate -Wideband (AMR-WB+) codec; Floating-point ANSI-C code", and

3) TS 26.273 "ANSI-C code for the fixed-point Extended Adaptive Multi-Rate -Wideband (AMR-WB+) speech codec"

on Corrections to Extended AMR-WB codec specifications (Release 6)

CR Rev Phase Subject Cat Vers WG Meeting S4 doc Spec 26.273 001 Rel-6 Prevent an access outside F. 6.0.0 S4 TSG-SA WG4#35 S4-050277 a buffer when simulating frame erasures 26.273 002 1 Remove unused code TSG-SA WG4#35 S4-050417 Rel-6 F 6.0.0 S4 Remove IF2 header in 26.273 003 Rel-6 F 6.0.0 S4 TSG-SA WG4#35 S4-050279 AMR-WB bitstream 26.273 004 Rel-6 Prevent an access outside F 6.0.0 S4 TSG-SA WG4#35 S4-050280 a buffer in Reconst spect function 26.273 005 Rel-6 Decoder synchronization F 6.0.0 S4 TSG-SA WG4#35 S4-050281 after frame erasures TSG-SA WG4#35 26.273 006 Rel-6 Correction of mode F 6.0.0 S4 S4-050294 switching using configuration file 26.273 007 Rel-6 Prevent encoding end of F. 6.0.0 S4 TSG-SA WG4#35 S4-050295 wave file information 26.273 800 Correction of library F 6.0.0 **S**4 TSG-SA WG4#35 S4-050314 Rel-6 function for 3GP file format 26.273 009 Rel-6 Support for input files with F 6.0.0 S4 TSG-SA WG4#35 S4-050416 sampling frequency other than 48 kHz F S4 TSG-SA WG4#35 S4-050286 26.290 006 Rel-6 Correction of a value in 6.2.0 Table 21 TSG-SA WG4#35 26.304 026 Correction of DTX handling F 6.2.0 S4 S4-050274 Rel-6 in AMR-WB modes 027 TSG-SA WG4#35 26.304 Rel-6 Remove IF2 header in F 6.2.0 S4 S4-050275 AMR-WB bitstream 028 TSG-SA WG4#35 26.304 Rel-6 Decoder synchronization F. 6.2.0 S4 S4-050276 after frame erasures 26.304 029 Rel-6 Correction for buffer F 6.2.0 S4 TSG-SA WG4#35 S4-050284 reading in low complexity encoder 030 F TSG-SA WG4#35 26.304 Rel-6 Correction to a wrong 6.2.0 S4 S4-050291 function call 26.304 031 F 6.2.0 S4 TSG-SA WG4#35 S4-050292 Rel-6 Correction of mode switching using configuration file 26.304 032 Rel-6 Correction of information F 6.2.0 S4 TSG-SA WG4#35 S4-050293 printed by decoder in DTX frames TSG-SA WG4#35 26.304 033 Rel-6 Correction of library F 6.2.0 S4 S4-050313 function for 3GP file format 26.304 034 Rel-6 Support for input files with F 6.2.0 S4 TSG-SA WG4#35 S4-050415 sampling frequency other than 48 kHz



(end of presentation)