Technical Specification Group Services and System Aspects   **TSGS#22(03)0671**
Meeting #22, Maui, Hawaii, USA, 15-18 December 2003

Source:	**TSG-SA WG4 Chairman**
Title:	**TSG-SA WG4 Status Report at TSG-SA#22**
Document for:	**Information**
Agenda Item:	**7.4.1**

Executive Summary

Since TSG-SA#21, TSG-SA WG4 (SA4) has met once at SA4#29 in November. In addition two ad-hoc meetings, one on PSS/MMS audio codecs (in the form of conference call) and one on PSS/MMS video codecs, were held prior to SA4#29.

Release 6

Performance characterisation of default codecs for PS conversational multimedia applications: Phase 1 testing (AMR-NB and AMR-WB codecs) has been completed. Host laboratory work (France Telecom R&D) and test results from the participating subjective testing laboratories (ARCON, France Telecom R&D and NTT-AT) are brought for approval. Phase 2 (Comparison of quality offered by different speech coders) tests plan and plan for global analysis of results are also brought for approval. Phase 2 testing and analysis of results are expected to be completed by TSG-SA#23, and TR on Performance Characterisation to be brought for information at TSG-SA#23.

PS Streaming Rel-6: Draft versions of Release 6 TSs 26.244 "3GPP file format (3GP)" and 26.246 "3GPP SMIL Language Profile" are brought for information. Two PSS/MMS video codec proponents declared (by the deadline of October 3rd) their intention to submit a codec candidate. One candidate was later withdrawn and MPEG AVC (ITU-T H.264) remains the only candidate under consideration. Selection process for PSS/MMS audio codecs is also underway (see next section for details). For both PSS/MMS audio and video codecs, the codec selection is expected to take place at next SA4 meeting (SA4#30 in February 2004) and to be brought for TSG-SA#23 approval in March 2004. DRM related streaming issues have been progressed jointly with OMA DLDRM and SA3.

Audio codecs (PSS/MMS default audio codecs, extended AMR-WB codec): Codec Selection Rules have been completed and are brought for approval. (The decision from TSG-SA#21 on availability of C-code has been taken into account.) Selection tests are currently ongoing and test results will be available for codec selection at SA4#30. Verification phase will start immediately after SA4#30 (e.g. to check codec complexity). Codec selection and the codec specifications are expected for approval at TSG-SA#23.

Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services: SES codec selection tests have been delayed and codec selection has been postponed until SA4#30. The delay is mainly due to the test laboratories not getting all the required databases in time. Both SES codec candidates (AMR/AMR-WB and DSR Extended Advanced front-end candidate (ETSI Standard 202 212)) have been agreed as meeting the SES codec design constraints (e.g. complexity). A request for updating the executable of the DSR candidate under test (by correcting 6 lines of floating-point code to fixed-point) was not agreed; however, the change in performance was claimed to be very small (to be eventually thoroughly checked during the verification phase). Workplan has been updated by including speech reconstruction quality test results to be produced by SA4#30 (for informative purposes) and verification phase to be carried out after SA4#30. Codec selection is scheduled for SA4#30, and the codec selection and specifications are expected for approval at TSG-SA#23.

Media Codecs and Formats for IMS Messaging and Presence: There has been no input and no progress. Finalising specifications by TSG-SA#23 as scheduled is therefore challenging.

Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS): SA4 has begun work on the issues identified for SA4 in the joint SA/RAN/GERAN MBMS meeting in mid-October. Forward Error Correction (FEC) studies have been started with several methods proposed, but no conclusion was reached yet during SA4#29. SA4 sees that different solutions must be developed for MBMS download and MBMS streaming as the cases are inherently different. IETF FLUTE is the current working assumption for MBMS download protocol. SA4 would like to get information from both RAN and GERAN on what are the typical ranges of SDU error rates anticipated in the access network and on other channel characteristics, and a LS was sent out to the relevant WGs commenting the SA4 view on open issues as identified in the joint meeting.

WIDs: The WID on "Definition of MBMS user services" has been updated (on the request of T3) by including T3 in the list of WGs to be kept informed on this work.

Maintenance of releases: Two CRs to TSs 26.104 (Rel-5 and Rel-6) are brought for approval.

TSG-SA WG4 Status Report at TSG-SA#22 - Table of Contents

1. General issues

This document presents the status report of TSG-SA WG4 (SA4) at TSG-SA#22.

Slides presentation of the report is found in a separate file attached to this status report: "Annex 1 - SA4 Slides Presentation at TSG-SA#22.ppt".

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) Rolf Hakenberg (Panasonic / ETSI)
	SQ (Speech Quality) Paolo Usai (ETSI)
Ad-hoc group chairmen:	
	Audio Codec Ad-Hoc Imre Varga (Siemens / ETSI)
	Video Codec Ad-Hoc Nikolaus Färber (Fraunhofer Gesellschaft / ETSI)

After TSG-SA#21, Mr. Nikolaus Färber (Fraunhofer Gesellschaft / ETSI) has kindly taken up the task of chairing the Video Codec Ad-Hoc group. This ad-hoc group takes care of the detailed issues for considering new video codecs for PSS/MMS services.

1.2 Meetings

Since TSG-SA#21, SA4 has held one plenary meeting SA4#29 (in November). Prior to SA4#29, both SA4 Audio Codec Ad-Hoc group (in the form of conference call) and SA4 Video Codec Ad-Hoc group held one meeting. Also, MBMS Joint Meeting of SA/RAN/GERAN WGs has taken place since TSG-SA#21 (October 13-14, 2003 in Baden, Austria).

Meetings held:

SA4 Audio Codec Ad-Hoc (conf. call)	7 October, 2003	(took place as conference call)
SA4 Video Codec Ad-Hoc	27-29 October, 2003	Host: Ericsson; Venue: Lund, Sweden
SA4#29	24-28 November, 2003	Host: Nokia; Venue: Tampere, Finland

Calendar of future meetings:

MBMS Ad-Hoc (tbd[1])	26-27 January, 2004	Host: tbd; Venue: tbd
SA4 Video Codec Ad-Hoc (tbd[2])	28-30 January, 2004	Host: tbd; Venue: tbd
SA4#30	23 - 27 February, 2004	Host: ETSI; Venue: Sophia Antipolis (Venue could change due to the area problems to book hotels during the GSM World Congress 2004)
SA4 Audio Codec Ad-Hoc (tbd)	March, 2004	Host: tbd; Venue: tbd
SA4 PSM Ad-Hoc (tbd)	5-8 April, 2004	Host: tbd; Venue: tbd
SA4#31	17 - 21 May, 2004	Host: tbd; Venue: tbd
SA4#32	16 - 20 August, 2004	Host: tbd; Venue: tbd
SA4#33	22 - 26 November, 2004	Host: EF3; Venue: Helsinki, Finland

During SA4#29, the PSM and SQ SWGs and the audio and video codec ad-hoc groups met. Table 1 gives overall statistics from SA4#29 (including also statistics from previous SA4 meetings in 2003 for comparison).

Meeting	Number of (new) input documents	Number of participants	Number of incoming LSs	Number of outgoing LSs/communications
SA4#25	115	55	13	9
SA4#25bis	164	50	14	11
SA4#26	171	55	18	17

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[1] If the meeting is needed depends on the decision at TSG-SA#22 on Release 6 time frame: the meeting will be held if TSG-SA#23 is defined as the completion date for Release 6.

[2] The decision on if the meeting is needed is based on the amount of controversy on the AVC levels/profiles raised over SA4 reflector (by 9 January 2004) and on the decision at TSG-SA#22 on the Release 6 time frame.

SA4#27	142	65	19	14
SA4#28	128	55	18	9
SA4#29	**167**	**53**	**18**	**8**

Table 1: Statistics of recent SA4 meetings

1.3 Input documents from SA4 to TSG-SA#22

Table 2 gives a complete list of SA4 input documents to TSG-SA#22. Two draft Rel-6 TSs on PS Streaming Services (PSS) are brought for information in Tdocs SP-030672 and SP-030673. An updated WID on "MBMS user service" is presented for approval in Tdoc SP-030674. Tdoc SP-030675 contains the PSS/MMS Audio Codec and Extended AMR-WB Selection Rules for approval. A number of documents on PS conversational testing (Phase 1 test result documents from the involved host and test laboratories, plans for Phase 2 tests, and global analysis of results) are presented for approval in Tdocs SP-030676 through SP-030680. (TSG-SA approval is required in formal contracts stipulated by ETSI for the involved laboratories to get the payment for the host and testing work completed in Phase 1.) Finally, two CRs to TS 26.104 (ANSI-C code for the floating-point AMR speech codec) are brought for approval in Tdocs SP-030681 and SP-030682.

Tdoc	Title	Source	Agenda Item	Document for
SP-030671	TSG S4 Status Report at TSG-SA#22	SA WG4 Chairman	7.4.1	Information
SP-030672	3GPP TS 26.244 Transparent end-to-end packet switched streaming service (PSS);"3GPP file format (3GP)" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Information
SP-030673	3GPP TS 26.246 Transparent end-to-end packet switched streaming service (PSS);"3GPP SMIL Language Profile" Version 1.0.0 (Release 6)	SA WG4	7.4.3	Information
SP-030674	Updated Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS) (Release 6)	SA WG4	7.43	Approval
SP-030675	PSS/MMS Audio Codec and Extended AMR-WB, Selection Rules Version 2.0	SA WG4	7.4.3	Approval
SP-030676	3G PS conversation tests (AMR NB and AMR WB) : Report from FT R&D for Host Lab and Subjective Testing Lab functions	SA WG4	7.4.3	Approval
SP-030677	3G PS conversation tests (AMR NB and AMR WB) : Report from NTT-AT for Subjective Testing Lab function	SA WG4	7.4.3	Approval
SP-030678	3G PS conversation tests (AMR NB and AMR WB) : Report from ARCON for Subjective Testing Lab function	SA WG4	7.4.3	Approval
SP-030679	Test plan for 3G packet switched conversation tests - Phase 2: Comparison of quality offered by different speech coders	SA WG4	7.4.3	Approval
SP-030680	Test plan for 3G packet swicthed conversation tests: Global Analysis of Phase 1 & Phase 2 Conversation Test results	SA WG4	7.4.3	Approval
SP-030681	CR 26.104 029 rev 1 Correction on the implementation of the interface of decoder.c (Release 5)	SA WG4	7.4.3	Approval
SP-030682	CR 26.104 030 rev 1 Correction on the default behaviour of the unix makefile (Release 6)	SA WG4	7.4.3	Approval

Table 2: List of input documents to TSG-SA#22 from SA4

2. Release 6 Work Items

2.1 Performance Characterisation of Default Codecs for PS Conversational Multimedia Applications

Phase 1 of testing (AMR Narrowband and AMR Wideband codecs) has been completed by the host laboratory (France Telecom R&D) and subjective testing laboratories: ARCON (North American English language), France Telecom R&D (French) and NTT-AT (Japanese). The test reports from these three laboratories have been approved by SA4 and are brought for approval also to TSG-SA in Tdocs SP-030676 through SP-030678. (Payment to the involved subjective testing laboratories require TSG-SA level approval.) Global analysis of the results is still to be done in SA4, and it is foreseen to be completed during Phase 2.

Phase 1 tests consisted of altogether 24 test conditions both for the AMR codec (modes 6.7 and 12.2 kbit/s) and the AMR-WB codec (modes 12.65 and 15.85 kbit/s) with error conditions covering both IP packet loss of 0% and 3% and radio conditions with 10^{-2} ,10^{-3} and 5 10^{-4} BLER (block error rates). End-to-end delays of

300 and 500 ms were included. Robust Header Compression (RoCH), an optional UMTS functionality, was included for some test cases for AMR-WB. Three types of background noise were used: car, street and cafeteria. IPv6 was employed in the testing. (IPv6 is simulated fully over the radio interface. The CN simulator employs IPv4 but since the only impact is a marginal difference in the end-to-end delay, of the order of ~16 μs, the use of a particular IP-version in CN part has no impact on the performance results.) The real-time test bed (UMTS simulator) used in the tests has been developed by Siemens and France Telecom R&D. Performance evaluation consisted of assessment of 5 aspects: 1) voice quality, 2) difficulty of understanding words, 3) quality of interaction, 4) degree of impairments, and 5) global communication quality. A 5-category rating scale was used for each aspect. (Test plans for Phase 1 were presented to TSG-SA#21 in Tdocs SP-030435 and SP-030436.)

Since TSG-SA#21, SA4 has received authorisation from all the companies (that participated in the financing of AMR-WB characterisation tests) to use the contingency of 34 kEuro for a further experiment to evaluate the performance of quality offered by a variety of speech codecs in PS conversational applications. This will be carried out as Phase 2 of the testing: Comparison of quality offered by different speech coders.

The following codecs will be covered in Phase 2: AMR-NB (modes 6.7 kbit/s and 12.2 kbit/s), AMR-WB (modes 12.65 kbit/s and 15.85 kbit/s), ITU-T G.723.1 (mode 6.4 kbit/s), ITU-T G.729 (mode 8 kbit/s), ITU-T G.722 (mode 64 kbit/s) and ITU-T G.711 (64 kbit/s). Transmission error conditions cover IP packet loss of 0% and 3%. All the Phase 2 testing will be carried out by France Telecom R&D. Two languages are foreseen to be used (French and Arabic). Global analysis will be performed by Dynastat. Global analysis brings together the results from the different listening labs/languages (Phase 1 and 2), combines them and draws conclusions. Phase 2 tests plan and plan for global analysis of results are brought for approval in Tdocs SP-030679 and SP-030680. Phase 2 is scheduled to be completed by SA4#30.

Test results from Phase 1 and 2 will be contained in TR on "Performance characterization of default codecs for PS conversational multimedia applications". This will be prepared after Phase 2 testing and global analysis have been carried out. Draft TR is expected for information at TSG-SA#23 and for approval at TSG-SA#24.

Table 3 lists the output specification for this WI (one TR).

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TR 26.9yz	Performance characterization of default codecs for PS conversational multimedia applications	SA4	-	TR preparation is pending on the testing. Phase 1 tests completed. Phase 2 tests and global analysis to be done.	TSG-SA#24 (June 2004)

Table 3: Status list of output TSs/TRs/CRs for Performance characterisation of default codecs for PS conversational multimedia applications

2.2   Packet Switched Streaming Rel-6 (excluding consideration of new PSS/MMS audio codecs)

2.2.1   General

Rel-6 streaming has been discussed further with most debate on streaming service quality metrics (for servers to receive information from the handset to provide the service providers means to evaluate the end user experience), on DRM-related issues such as consideration of protection of PSS streams related to TS 26.234 (Codecs and Formats) and TS 26.244 (File Format), and on consideration of new PSS/MMS codecs for video and audio.

For streaming service quality metrics, updates have been agreed on the protocol definition (to send the quality metrics using RTSP). For PSS/MMS video codecs, one candidate codec is under consideration. For PSS/MMS audio codecs, selection tests between several candidate codecs are ongoing. Among other developments, inclusion of streaming for timed text was agreed for Rel-6. (In the current releases of PSS, timed text may only be downloaded.) Also, use of RTCP will be mandated for all PSS media transport sessions using RTP e.g. to ensure up to date synchronisation and that servers know that the client is still alive through the reporting. TR 26.937 on RTP Usage Model will be updated for Rel-6 by including validation results of rate adaptation (appropriate CRs expected to be be provided at TSG-SA#23).

The Rel-6 PSS specifications have been progressed and two specifications are now brought for information to TSG-SA#22: TS 26.244 "PSS: 3GPP file format (3GP)" Version 1.0.0 and TS 26.246 "PSS; 3GPP SMIL Language Profile" Version 1.0.0. These are contained in Tdocs SP-030672 and SP-030673.

2.2.2   Consideration of enhanced video codecs

Two PSS/MMS video codec proponents declared their intention to submit a candidate by the deadline of

October 3rd. (Such declaration was required for SA4 to be aware the maximum number of candidates beforehand in order to plan the selection process.) The two declared candidates were:

1) MPEG-4 AVC (ITU-T H.264) - proposed by Nokia
2) WMV9 - proposed by Microsoft

The required codec qualification material (demonstrating compliance to the qualification criteria in terms of quality and complexity) was provided to SA4#29 only for the MPEG-4 AVC codec. The other candidate announced their withdrawal. AVC therefore remains the only candidate codec for consideration to Release 6. With only one candidate, the selection process has reduced into considering the performance and suitability of one candidate codec instead of comparing several candidates. The C-code of the AVC codec for both the encoder and decoder will be available as part of the MPEG/ITU-T specifications.

In order to progress the work, the interested companies must submit proposals on AVC profiles/levels (to be adopted for each particular 3GPP service) to SA4-reflector by January 9, 2004 (already before the next SA4 meeting). Also, SA4 Video Codec ad-hoc meeting is preliminarily scheduled on January 28-30, 2004. The decision on if the meeting will be held is based on the amount of controversy in the levels/profiles raised over SA4 reflector, and on the decision during TSG-SA#22 on the Release 6 time frame. The ad-hoc meeting in January, if needed, will aim for finding a working assumption on the levels and profiles of AVC. The final decision on adopting AVC for 3GPP use (including definition of levels and profiles, and the status of the codec in the 3GPP specifications for the services i.e. default vs. recommended/optional codec) will be made during SA4#30.

2.2.3 DRM related issues (impact to 3GPP file format and streaming protocols)

Dialogue on DRM for PSS (and MBMS) with OMA DLDRM and SA3 has continued. OMA has already earlier adopted the 3GPP file format for continuous media. 3GPP will define the protected file format (and the streaming mechanisms for protected PSS media) while the key management is handled by OMA. Now OMA DLDRM has provided their DRM Content Format (DCF) draft specification to SA4 and SA3 for review. OMA requested from SA4 early finalisation of the 3GPP file format specification TS 26.244 to enable referencing it (by OMA February meeting). SA4 explained to OMA that TS 26.234 is expected for TSG-SA approval only in March 2004. OMA also requested some additions for signalling DRM support of PSS clients and SA4 agreed to do this.

SA4#29 also discussed the RTP payload and associated signalling, and arrived to the working assumption that the DRM protection of Release 6 PSS streams shall be based on an "encrypted RTP wrapper" payload format, without mandatory requirements on the underlying RTP profiles. The wrapper payload format shall be used in all RTP profiles transporting DRM protected content. The file format and RTP payload format shall be pre-packetized and encrypted as required by OMA DLDRM.

On integrity protection of streamed content (data not altered or destroyed in an unauthorised manner), SA4 agrees with OMA DLDRM that having the feature separated from DRM is a feasible solution, as it is not an OMA DRM requirement and could benefit unprotected streaming as well. SA4 has agreed on a high-level working assumption to define an optional (to use and to implement) integrity protection mechanism for PSS using standard IETF SRTP (Secure RTP) protocol, which shall utilize the same pre-encrypted wrapper payload format as the normal DRM protected RTP streaming case. Inclusion of optional integrity protection should not place additional requirements to the OMA DRM key management or architecture.

DRM issues will be continued to progressed jointly with OMA DLDRM and SA3.

Table 4 lists the intended PSS Rel-6 output specifications (including Stage 1 and Stage 2 since also these are covered in the SA4 lead PSS Rel-6 Work Item).

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.233	Transparent end-to-end PSS; General description	SA4	SA2	To be updated based on the content of PSS Rel-6.	TSG-SA#23 (March 2004)
CRs to TS 26.234	Transparent end-to-end PSS; Protocol and codecs	SA4	SA2	Working draft (v.0.3.2) of the CR(s) exists in SA4.	TSG-SA#23 (March 2004)
TS 26.244	Transparent end-to-end PSS; File Format	SA4	SA2	Version 1.0.0 to be presented for information at TSG-SA#22.	TSG-SA#23 (March 2004)
TS 26.245	Transparent end-to-end PSS; Timed Text Format	SA4	SA2	Working draft (v.0.1.7) exists in SA4.	TSG-SA#23 (March 2004)
TS 26.246	Transparent end-to-end PSS; SMIL Language Profile	SA4	SA2	Version 1.0.0 to be presented for information at TSG-SA#22.	TSG-SA#23 (March 2004)
CRs to TR 26.937	Transparent end-to-end PSS; RTP Usage Model	SA4		To be updated based on the content of PSS Rel-6. (Validation results of the signalling for rate adaptation planned to be included)	TSG-SA#23 (March 2004)
CRs to TS 22.233	Stage 1	SA1		Under SA1 responsibility.	
Possible new TS	Stage2 (non-transparent aspects)	SA2		To be produced by SA2, if needed.	

Table 4: Status list of output TSs/TRs/CRs for Packet Switched Streaming Rel-6

2.3 PSS/MMS Audio Codecs (Work Items "PSS Rel-6" and "Extended AMR-WB codec") [3]

PSS/MMS Audio Codec and Extended AMR-WB Selection Rules have been completed and are brought for approval in Tdoc SP-030675. The decision from TSG-SA#21 on the availability of the ANSI-C code has been taken into account. The selection rules state that the format of the specification is such that it contains the ANSI-C source code of the tested encoder and decoder – see Section 2.3 of Annex A. Some minor revisions and corrections have been made for the selection test and processing plans.

Selection Rules contain three rules for the low and high bit-rates. (The low bit-rate audio range (12 kbit/s to < 32 kbit/s) and the high bit-rate audio range are tested in separate experiments.) Rule 1 requires the codec candidates to fulfil the Design Constraints (e.g. implementation complexity). Rule 2 requires the candidates to meet the Performance Requirements (quality as demonstrated in the selection tests). Rule 3 gives a set of Figures of Merit (FoM) that will be used to analyse and compare the performances of codec candidates in the selection discussion in SA4.

The selection tests are ongoing. Executables of candidate codecs were sent to the custody of ETSI by 30th October (to "freeze" codec development before speech and music samples for testing were selected and become known). Selection of the samples was done by France Telecom and the processing of samples through codec candidates has been done by the processing laboratory T-Systems and, for cross checking, by mirror processing laboratory Audio Research Laboratories.

Subjective testing is currently ongoing in the eight involved listening laboratories (T-Systems, NTT-AT, France Telecom R&D, Dynastat, Nokia, Ericsson, Coding Technologies, and Fraunhofer Institute). Each test condition will be tested twice by two different laboratories. (Test plans were presented to TSG-SA#21 in Tdocs SP-030437 and SP-030438.) The tests are funded by the codec proponents with total funding of 400 kEuro for the AMR-WB+ and PSS/MMS Low-Rate tests and 87.5 kEuro for the PSS/MMS High-Rate tests, as explained at TSG-SA#21. Test results will be available for codec selection at SA4#30. Codec selection and the codec specifications are expected for approval at TSG-SA#23.

Tables 5a and 5b give a summary of the codec candidates in the tests. (There are no changes from TSG-SA#21.) The codecs are tested as floating-point versions. Fixed-point version will be produced after SA4#30 upon codec selection.

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[3] Note: This section reports jointly the related audio codec work done within Work Item "PSS Rel-6" (consideration of new audio codecs for PSS and MMS) and within Work Item "Extended AMR-WB codec" (development of AMR-WB+ codec, a candidate codec for PSS/MMS audio). The work in both WIs is very related as the AMR-WB+ codec is considered as one candidate for PSS/MMS default audio codec, and the testing of codec candidates for both WIs will be carried out as combined testing. (The detailed audio codec work for both WIs has been progressed jointly by SA4 audio codec ad-hoc group.)

#	Candidate Codec	AMR-WB+ candidate	PSS/MMS low-rate audio candidate	Supporting Organization(s)
1	MPEG4 HE-AAC codec ("aacPlus")	No	Yes	Coding Technologies, NEC, Panasonic
2	AMR-WB+ candidate codec	Yes	Yes	Ericsson, Nokia, VoiceAge
3	CT codec ("Enhanced aacPlus")	No	Yes	Coding Technologies

Table 5a: Candidate codecs for AMR-WB+ and PSS/MMS Low-Rate testing

#	Candidate Codec	Supporting organization(s)
1	MPEG4 HE-AAC codec ("aacPlus")	Coding Technologies, NEC, Panasonic
2	CT codec ("Enhanced aacPlus")	Coding Technologies

Table 5b: Candidate codecs for PSS/MMS High-Rate testing

During SA4#29, verification phase was planned with a list of potential items identified. Prior to TSG-SA#23, a number of critical verification items need to be completed considering the winning codec(s): 1) Verification of bit-exactness: the compiled version of the source C-Code, the executable delivered to ETSI (for "freezing") and the executable used for processing must give identical and bit-exact versions of samples, 2) Complexity verification: verify independently the complexity estimates provided by the codec proponent, and 3) Review of draft specifications. Further post-selection verification items are planned. All verification items will be performed by volunteering companies.

At SA4#29 further details on the specification of the codec by ANSI C-Code were discussed, including normativeness of the C-code and testing for compliance: is bit-exactness required or can some relaxed criteria be used (the latter could enable implementation more flexibly across various platforms). This will be discussed further during SA4#30.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to 26-series AMR-WB TSs/TRs	(Relevant AMR-WB specifications of 26 –series)	SA4	-	Drafts to be prepared by candidates for the codec selection meeting (SA4#30).	TSG-SA#23 (March 2004)
New audio codec TS(s)		SA4	-	Drafts to be prepared by the candidates for the codec selection meeting (SA4#30)..	TSG-SA#23 (March 2004)
CRs to TS 26.234	Transparent end-to-end PSS; Protocols and codecs	SA4	SA2	Default codec definition for the audio media type needs to be updated based on the selection of new audio codec(s).	TSG-SA#23 (March 2004)

Table 6: List of output TSs/TRs/CRs for audio codecs (for WIs "PSS Rel-6" and "Extended AMR-WB codec")

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

SES codec selection was scheduled to take place already during the SA4#29 meeting. However, due to delays in the two testing laboratories (IBM and, in part, Scansoft) results are not yet available and the selection is postponed until SA4#30. The reason for delays in testing is mainly the late availability of some databases needed for the testing. The results for recognition tests are now expected to be available in January 2004.

There are two candidate SES codecs 1) AMR/AMR-WB and 2) ETSI DSR Extended Advanced Front-End (ES 202 212). The proponents of both candidates delivered the required deliverables for the selection as required by October 31st: a) fixed point complexity assessment (codecs are tested in fixed-point code), b) justification document of having met the Design Constraints and c) draft specifications of the candidate codec.

The DSR codec proponents had notified over the SA4 reflector (on 21st November) that when reviewing the bit-exact implementation of their candidate they had discovered a minor error: 6 lines of code were

overlooked in the conversion from floating point to fixed point in the 16 kHz section of the software. They asked whether it could be possible to replace the executable by the corrected one for the selection testing.

At SA4#29, the deliverables from codec proponents were investigated and the AMR/AMR-WB codec candidate was agreed having provided the required documentation and meeting the SES codec design constraints. For the DSR candidate codec further clarification was requested on the proposed codec software changes and their impact in terms of performance and complexity. This was left to be dealt by correspondence on the week following SA4#29 (by December 5th). The required clarifications were then given and with these the deliverables for complexity evaluation and design constraints were found acceptable. Also the DSR codec candidate meets the SES codec design constraints. A requested replacement of the executable of the DSR candidate in test (to correct the 6 lines of floating-point code into fixed-point) was however not agreed by correspondence due to two objections (that expressed e.g. concern on this possibly delaying the testing further). Since the change in performance was claimed to be very small, the evaluation will take place by using the executable of the DSR candidate previously made available to IBM and Scansoft (the actual impact of the correction to be eventually thoroughly checked during the verification phase).

SES codec workplan was updated by including testing of reconstruction quality by SA4#30 (for informative purposes). Codec selection is now re-scheduled for SA4#30, and the codec selection and related specifications are expected for approval at TSG-SA#23. A verification phase for critical items will be carried out by TSG-SA#23 by volunteering companies: 1) verification of the bit-exactness of the codec (to be included in specifications) to the one used in testing, and 2) verification of implementation complexity. Verification test plan will be progressed further by correspondence (to be agreed by 19th December). Correction to the C-code of the DSR codec and a check that there is negligible performance difference between the "not fully fixed-point" and the "fixed-point" DSR codec versions could take place as one verification task.

Table 7 lists the intended output specifications and their status.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	To be prepared based on the codec selection.	TSG-SA#23 (March 2004)
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	To be prepared based on the codec selection	TSG-SA#23 (March 2004)
Possible new TSs	Codec specification	SA4		To be prepared, if needed.	TSG-SA#23 (March 2004)

Table 7: Status list of output TSs/TRs/CRs for Codec Work to Support Speech Recognition Framework for Automated Voice Services

TSG-GERAN has requested information (in LS) from SA4 and SA2 on SA2-proposed functionality for improving speech recognition performance as described in draft TR 23.877(v.0.1.0). SA4 sees that such information should be given by SA2 as owner of the TR and the respective WI. SA4 has no data available currently to quantify the potential improvement by the SA2-proposed methods; this would require further investigation, which is not currently on-going in SA4. SA4 further explained the work on SES codecs for PS domain which is expected to provide some generic indications of the factors that determine speech recognition performance. SA4 will keep SA2 (and GERAN) informed on the results of this work if relevant for the speech recognition performance in CS domain.

2.5 Media Codecs and Formats for IMS Messaging and Presence

A first "skeleton" working draft of TS 26.141 "IMS Messaging and Presence; Media Formats and Codecs" was prepared at SA4#28. There were no contributions or progress at SA4#29. Also, editor for the TS has not yet been identified. As a result of this low activity, it is challenging to complete the work in time for TSG-SA#23.

Table 8 lists the status of the output specification.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TS 26.141	IMS Messaging and Presence; Media formats and codecs	SA4	SA2, CN1	First skeleton working draft prepared at SA4#28. No progress at SA4#29.	TSG-SA#23 (March 2004) seems unrealistic

Table 8: Status list of output TSs/TRs/CRs for Media Codecs and Formats for IMS Messaging and Presence

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

SA4 has begun work on the open issues identified in the joint SA/RAN/GERAN MBMS meeting on October 13-14 2003. Among these, forward error correction (FEC) studies have been started with several methods proposed during SA4#29. These include outer coding, rateless codes and RTP-level FEC. No scheme could yet be agreed at SA4#29 as further consideration is needed. Performance measures were agreed for the further evaluation. SA4 also agreed that different solutions must be developed for MBMS download and MBMS streaming as the cases are inherently different. IETF FLUTE protocol for MBMS download was agreed as working assumption.

SA4 would like to get information from both RAN and GERAN on what are the typical ranges of SDU error rates anticipated in the access network and on other channel characteristics, and a LS was sent out to the relevant WGs commenting the SA4 view on open issues as identified in the joint meeting. (From the SA4 point of view the QoS information for PSS listed in TR 26.937 is considered valid as target also for MBMS services.)

The WID was updated (on the request of T3) to include T3 in the list of WGs to be kept informed on this work.

Table 9 lists the status of the output specification. A lot of work still needs to be done (as identified in the joint MBMS meeting) and therefore SA4 has not yet been able to provide a draft TS on MBMS Protocols and Codecs for information to TSG-SA#22 (as planned). In the light of the needed overall work, the approval target at TSG-SA#23 is also challenging. In case Rel-6 deadline will be set for TSG-SA#23, an additional SA4 ad-hoc meeting on MBMS will be held in January 2004 to progress the work as much as possible.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TS 26.x.y.z	MBMS Protocols and Codecs	SA4	SA2, SA3	First skeleton working draft prepared. Studies in progress in SA4.	TSG-SA#23 (March 2004)

Table 9: Status list of output TSs/TRs/CRs for Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)

3. Work Item Descriptions

The joint SA4/SA1 WID on "Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)" has been updated (on the request of T3) by including T3 in the list of WGs to be kept informed of this work The revised WID is brought for approval in Tdoc SP-030674.

4. Communication with other WGs/TSGs/groups

Table 10 gives a complete list of the LSs sent out (to other WGs/TSGs and 3GPP external groups) from SA4#29.

Tdoc no.	Title	Intended for	Copy to
TD S4-030838	Reply to LS on Speech Enabled Services Impacts for GERAN (S4-030792)	TSG GERAN, GERAN WG2	TSG SA WG2
TD S4-030845	Liaison Statement on Timed Text	3GPP2	
TD S4-030847	LS on Multiple MBMS Issues	TSG RAN, TSG RAN WG1, TSG RAN WG2, TSG RAN WG3, TSG RAN WG4, TSG GERAN GERAN WG1, GERAN WG2	TSG SA WG1, TSG SA WG2
TD S4-030805	Liaison to MPEG on the RTP Transport of Timed Text	ISO/IEC SC29 WG11 (MPEG)	
TD S4-030800	Response LS on Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)	TSG T WG3	
TD S4-030846	Reply LS on issues on DRM for PSS and MBMS streams	OMA-BAC DL+DRM	OMA-SEC, TSG SA WG3
TD S4-030841	Reply LS on support of hyperlinks in MMS	TSG T WG2	
TD S4-030843	Reply to LS on Protection of MBMS and DRM Streaming Services	TSG SA WG3	OMA DLDRM, SAGE, TSG SA WG1

Table 10: SA4 LSs sent out since TSG-SA#21

The main issues in the LSs are:

- TSG-GERAN requested information from SA4 and SA2 on SA2-proposed functionality for improving speech recognition performance as described in draft TR 23.877(v.0.1.0). SA4 sees that the information should be given by SA2 as the owner of the TR and the WI. (SA4 has no data available currently to quantify the potential improvement by the SA2-proposed methods. This would require further investigation, which is not currently on-going in SA4.)

- 3GPP2 TSG-C has expressed interested in referring to Rel-6 specification on Timed Text (TS 26.245). In order to make the referencing easier, SA4 has agreed to include "text wrap" functionality used in 3GPP2 as optional functionality in the TS. To inform 3GPP2 on this, a draft version of TS 26.245 was sent to 3GPP2 for information.

- SA4 reviewed Tdoc MBMS-030032 of the joint MBMS meeting as requested. SA4 responses and comments were sent in LS to the involved WGs.

- T3 requested to be added in the SA4/SA1 MBMS User Service WID as one WG that would be informed on the work progress. The WID was updated and T3 was informed on this. (The updated WID is for approval at TSG-SA#22.)

- T2 informed SA4 on new Release 6 requirements for MMS Stage 1 (TS 22.140) for the support of hyperlinks in a multimedia message. SA4 answered that the new requirements are met with the present definition of 3GPP SMIL.

- Dialogue on DRM for PSS (and MBMS) with OMA DLDRM and SA3 has continued. OMA DLDRM provided their DRM Content Format (DCF) draft specification to SA4 and SA3 for review. OMA has adopted 3GPP file format and requested early finalisation of the file format specification to enable OMA referenceing it. SA4 explained to OMA that TS 26.234 is expected for TSG-SA approval only in March 2004. SA4 agreed on OMA request for DRM support of PSS clients to be signalled in the User Agent Profile signalling. On integrity protection SA4 agrees with OMA that having such a feature separated from DRM is a feasible solution. The working assumption in SA4 is that an optional integrity protection mechanism in PSS will use standard IETF SRTP, and that the protection is based on payload format wrapper enabling "pre-encryption".

- LS was sent to SA3 as a response to give requested feedback on if SRTP is suitable and feasible mechanism for securing MBMS streaming. Here SA4 needs more time to consider IETF SRTP and a modified SRTP.

- On LS from ITU-T SG16 on basic operators library, SA4 has noted that active discussion is ongoing in ITU-T SG16 reflector and has evolved there (several proposals are currently on the table). Therefore, individual companies were encouraged to contribute directly over the ITU-T SG16 reflector as the best way to proceed. (This LS Tdoc SP-030363 was presented for information at TSG-SA#21 where SA4 were noted already dealing with this liaison.)

5.   Maintenance of Releases

Two CRs to TSs 26.104 "ANSI-C code for the floating-point AMR speech codec" are brought for approval. These are contained in Tdocs SP-030681 and SP-030682.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	029	1	Rel-5	Correction on the implementation of the interface of decoder.c	F	5.2.0	S4	TSG-SA WG4#29	S4-030850

- On a linux plateform, the reference C-code does not compile when the MMS-like bitstream is activated because the storage size of "dec_mode" is not known in decoder.c. The CR corrects this compilation bug by bringing the file "sp_dec.h" in "decoder.c". This file defines the necessary prototypes so that the source file compiles properly.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	030	1	Rel-6	Correction on the default behaviour of the unix makefile	D	5.2.0	S4	TSG-SA WG4#29	S4-030851

- The makefile for unix platforms is aligned to the other makefiles and to the readmefile so that the same output format is produced by default in all platforms.

6.   Miscellaneous

- SA4#29 considered favorably a request from France Telecom R&D to use 3GPP subjective scores from earlier AMR testing. These will be used to improve the ITU-T Recommendation G.107 (E-Model).

- SA4 has received from SA2 a request to provide feedback on different solutions for Optimisation of Voice over IMS (to reduce the bandwith required for IMS voice calls). The issue was debated at SA4#29 with support given for optimisation through negotiating turning off RTCP but also for using speech inactivity to send RTCP packets while at the same time limiting RTCP packet size. A solution incorporating both of these approaches seems viable. However, further discussion is needed and the issue will be debated at SA4#30.

7.   Documents presented for information

Draft versions of two Rel-6 TSs are brought for information: TS 26.244 "PSS: 3GPP file format (3GP)" and TS 26.246 "PSS; 3GPP SMIL Language Profile". The 3GPP file format and SMIL language profile are not new issues brought for Release 6 but they are contained already in Rel-5 as part of TS 26.234 "Protocols and codecs". They are separated (with some enhancements) in Rel-6 into own TSs. This enables easier referencing to these specific functionalities which are used for several services (PSS and MMS), and are also referenced outside 3GPP (e.g. 3GPP file format in OMA)

- SP-030672 3GPP TS 26.244 Transparent end-to-end packet switched streaming service (PSS);"3GPP file format (3GP)" Version 1.0.0 (Release 6)

  This document defines the 3GPP file format (3GP). It is structurally based on the ISO base media file format, but there are some constraints and additions to the ISO file format. The 3GP file format contains data in a structured way and can contain timing, structure and media data for multimedia streams. The 3GP file format is used for timed visual and aural multimedia by the MMS and PSS, services but is not restricted to be used with only these services.

  The 3GPP File Format for Rel-6 defines several file profiles for different usage scenarios and also gives possibility to include assets information (such as genre, location data, etc) and pre-decoder buffer related information structure (for video media tracks).

- SP-030673 3GPP TS 26.246 Transparent end-to-end packet switched streaming service (PSS);"3GPP SMIL Language Profile" Version 1.0.0 (Release 6)

  This document contains the specification of the 3GPP SMIL (Synchronized Integrated Multimedia Language) Language Profile. SMIL is used for the description of the spatial layout and temporal behaviour of a presentation. The 3GPP SMIL Language Profile is a markup language based on SMIL 2.0 Basic and SMIL Scalability Framework [from W3C]. It is a subset of SMIL 2.0 Full profile and a superset of SMIL 2.0 Basic. The 3GPP SMIL Language Profile is used by the PSS and MMS services, but is not restricted to be used with only these services.

  Compared to SMIL in Rel-5, the set of high-level features remains unchanged. The main

additions for Rel-6 are in the details as listed below:

- Media Parameters module from SMIL 2.0 and specification how to use it,
- more details on how to use systemCaption attribute of SMIL 2.0 BasicContentControl module, and
- new URIs to check for 3GPP Rel 6 document conformance and SMIL player conformance.

8.   Approval requested

SA4 requests TSG-SA#22 to approve the following:

Work Item Descriptions:

Tdoc SP-030674   Updated Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS) (Release 6)

PSS/MMS Audio Codec and Extended AMR-WB Selection Rules:

Tdoc SP-030675   PSS/MMS Audio Codec and Extended AMR-WB, Selection Rules Version 2.0

PS conversation testing (Phase 1 test result documents and plans for Phase 2):

Tdoc SP-030676   3G PS conversation tests (AMR NB and AMR WB) : Report from FT R&D for Host Lab and Subjective Testing Lab functions

Tdoc SP-030677   3G PS conversation tests (AMR NB and AMR WB) : Report from NTT-AT for Subjective Testing Lab function

Tdoc SP-030678   3G PS conversation tests (AMR NB and AMR WB) : Report from ARCON for Subjective Testing Lab function

Tdoc SP-030679   Test plan for 3G packet switched conversation tests - Phase 2: Comparison of quality offered by different speech coders

Tdoc SP-030680   Test plan for 3G packet switched conversation tests: Global Analysis of Phase 1 & Phase 2 Conversation Test results

Change Requests:

Tdoc SP-030681   CR 26.104 029 rev 1 Correction on the implementation of the interface of decoder.c (Release 5)

Tdoc SP-030682   CR 26.104 030 rev 1 Correction on the default behaviour of the unix makefile (Release 6)

TSG-SA WG4 (SA4) - CODEC Status Report at TSG-SA#22

Kari Järvinen
TSG-SA WG4 Chairman

☞ *SA4 status report in Tdoc SP-030671*

☞ *These slides in separate .ppt file in Annex 1 of Tdoc SP-030671*

1

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

- **Documents for approval**

General: SA4 officials

- **Chairman:**   **Kari Järvinen (Nokia / ETSI)**

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

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

- **Sub Working Groups / Ad-Hoc groups:**
  - **Speech Quality (SQ) SWG**   **Paolo Usai (ETSI)**
  - **PS Multimedia (PSM) SWG**   **Rolf Hakenberg (Panasonic / ETSI)**
  - **Audio Codec Ad-Hoc group**   **Imre Varga (Siemens / ETSI)**
  - **Video Codec Ad-Hoc group**   **Nikolaus Färber (Fraunhofer Gesellschaft / ETSI)** NEW!

3

General: SA4 meetings

- **Meetings held**
  - SA4 Audio Codec Ad-Hoc   7 October, 2003   (conference call)
  - SA4 Video Codec Ad-Hoc   27-29 October, 2003   Host: Ericsson; Venue: Lund, Sweden
  - SA4#29   24-28 November, 2003   Host: Nokia; Venue: Tampere, Finland

- **Future meetings**
  - SA4 MBMS Ad-Hoc (tbd [1])   26-27 January, 2004   Host: tbd; Venue: tbd
  - SA4 Video Codec Ad-Hoc (tbd [2]) 28-30 January, 2004   Host: tbd; Venue:tbd
  - SA4#30   23 - 27 February, 2004   Host: ETSI; Venue: Sophia Antipolis (tbd [3])
  - SA4 Audio Codec Ad-Hoc (tbd)   March, 2004   Host: tbd; Venue: tbd
  - SA4#31   17 - 21 May, 2004   Host: tbd; Venue: tbd
  - SA4#32   16 - 20 August, 2004   Host: tbd; Venue: tbd
  - SA4#33   22 - 26 November, 2004   Host: EF3; Venue: Helsinki, Finland

    [1] The meeting will be held if TSG-SA#23 is defined as the completion date for Rel-6
    [2] Depends on the amount of controversy on the AVC levels/profiles raised over SA4 reflector (by 9 January 2004) and on the decision at TSG-SA#22 on the Rel-6 time frame
    [3] Venue may change due to area problems to book hotels during the GSM World Congress 2004

- **Meeting statistics**

Meeting	Number of (new) input documents	Number of participants	Number of incoming LSs	Number of outgoing LSs/communications
SA4#25	115	55	13	9
SA4#25bis	164	50	14	11
SA4#26	171	55	18	17
SA4#27	142	65	19	14
SA4#28	128	55	18	9
SA4#29	**167**	**53**	**18**	**8**

4

General: Input documents

- SP-030671:   "TSG S4 Status Report at TSG-SA#22", SA WG4 Chairman, 7.4.1, Information
- SP-030672:   "3GPP TS 26.244 Transparent end-to-end packet switched streaming service (PSS); 3GPP file format (3GP)", Version 1.0.0 (Release 6), SA WG4, 7.4.3, Information
- SP-030673:   "3GPP TS 26.246 Transparent end-to-end packet switched streaming service (PSS);3GPP SMIL Language Profile", Version 1.0.0 (Release 6), SA WG4, 7.4.3, Information
- SP-030674:   "Updated Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS) (Release 6)", SA WG4, 7.43, Approval
- SP-030675:   "PSS/MMS Audio Codec and Extended AMR-WB, Selection Rules Version 2.0", SA WG4, 7.4.3, Approval
- SP-030676:   "3G PS conversation tests (AMR NB and AMR WB): Report from FT R&D for Host Lab and Subjective Testing Lab functions", SA WG4, 7.4.3, Approval
- SP-030677:   "3G PS conversation tests (AMR NB and AMR WB): Report from NTT-AT for Subjective Testing Lab function", SA WG4, 7.4.3, Approval
- SP-030678:   "3G PS conversation tests (AMR NB and AMR WB): Report from ARCON for Subjective Testing Lab function", SA WG4, 7.4.3, Approval
- SP-030679:   "Test plan for 3G packet switched conversation tests - Phase 2: Comparison of quality offered by different speech coders", SA WG4, 7.4.3, Approval
- SP-030680:   "Test plan for 3G packet swicthed conversation tests: Global Analysis of Phase 1 & Phase 2 Conversation Test results", SA WG4, 7.4.3, Approval
- SP-030681:   "CR 26.104 029 rev 1 Correction on the implementation of the interface of decoder.c (Release 5)", SA WG4, 7.4.3, Approval
- SP-030682:   "CR 26.104 030 rev 1 Correction on the default behaviour of the unix makefile (Release 6)", SA WG4, 7.4.3, Approval

5

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

- **Documents for approval**

SA4 Release 6 WIs

- **Performance Characterisation of Default Codecs for PS Conversational Multimedia Applications**

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

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

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

- **Media Codecs and Formats for IMS Messaging and Presence**

- **Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)**
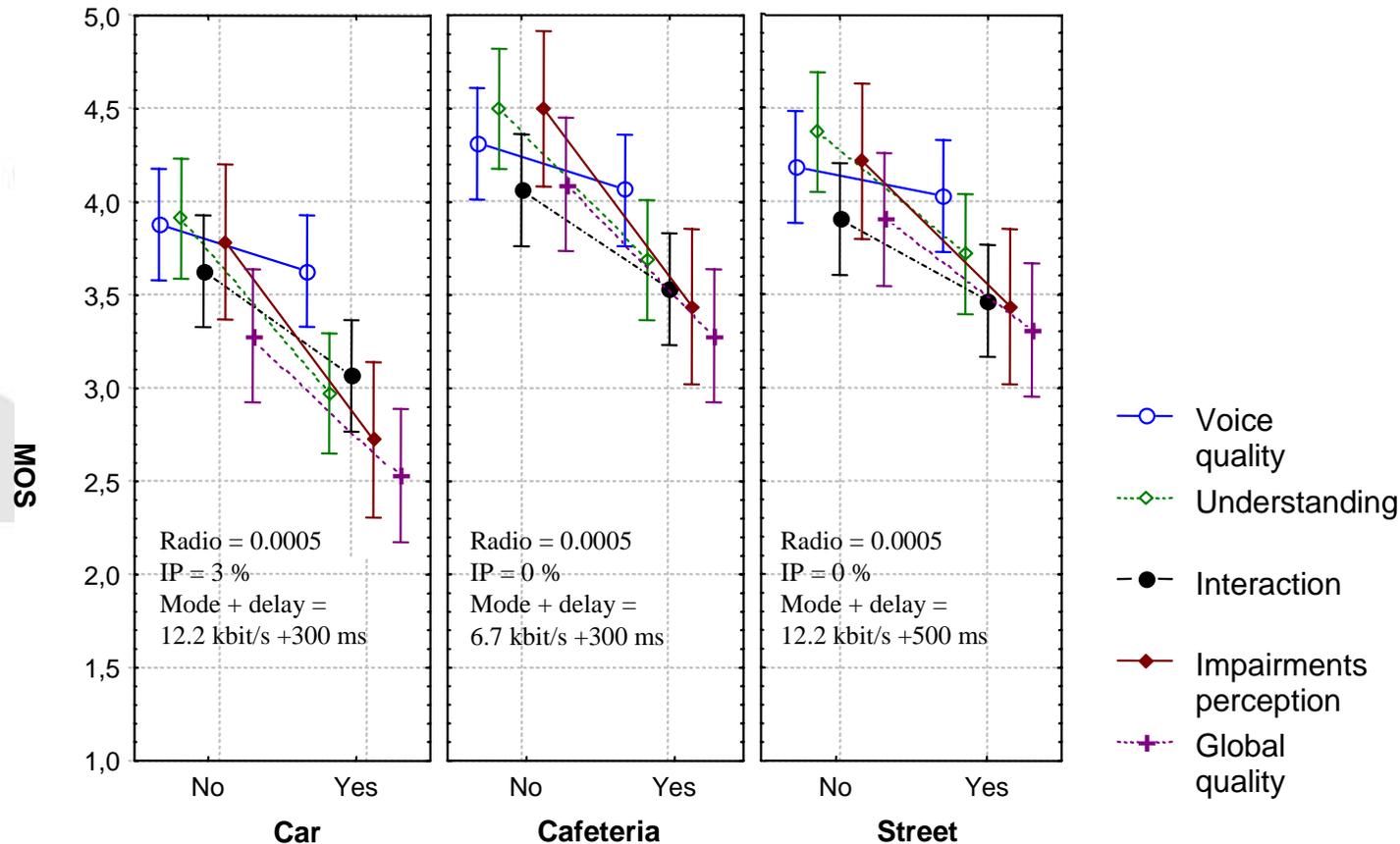
Performance Characterisation of Default Codecs for PS Conversational Multimedia applications

- **The objective is to characterize the performance of default codecs for PS conversational multimedia applications (as defined in TS 26.235 "Default Codecs")**

- **Phase 1 of testing (AMR-NB and AMR-WB) completed**
  - AMR codec modes 6.7 and 12.2 kbit/s, and AMR-WB codec modes 12.65 and 15.85 kbit/s
  - Real-time conversations with assessment of 5 aspects: 1) voice quality, 2) difficulty of understanding words, 3) quality of interaction, 4) degree of impairments, 5) global communication quality. (5-category rating scale used for each aspect)
  - 24 test conditions for both codecs
  - Error conditions with IP packet loss of 0% and 3% and radio transmission BLER of $10^{-2}, 10^{-3}$ and $5\ 10^{-4}$
  - Different end-to-end delays (300 and 500 ms)
  - Three types of background noise: car, street and cafeteria
  - Three languages: North American English, French, Japanese
  - Robust Header Compression (RoHC), an optional UMTS functionality, included for some test cases for AMR-WB tests
  - The real-time test bed (UMTS simulator) provided by Siemens and France Telecom R&D. IPv6 is used in the characterisation. (IPv6 is simulated fully over the radio interface. The CN simulator employs IPv4, but since the only impact is a marginal difference in the end-to-end delay, the use of particular IP-version in CN part has no impact on the performance results.)

- **Host lab work (France Telecom R&D) and test results from the participating subjective testing laboratories (ARCON, France Telecom R&D and NTT-AT) are brought for approval. (TSG-SA approval is required in formal contracts for the involved laboratories to get the payment for the host and testing work completed in Phase 1.)**

8

Performance Characterisation of Default Codecs for PS Conversational Multimedia applications
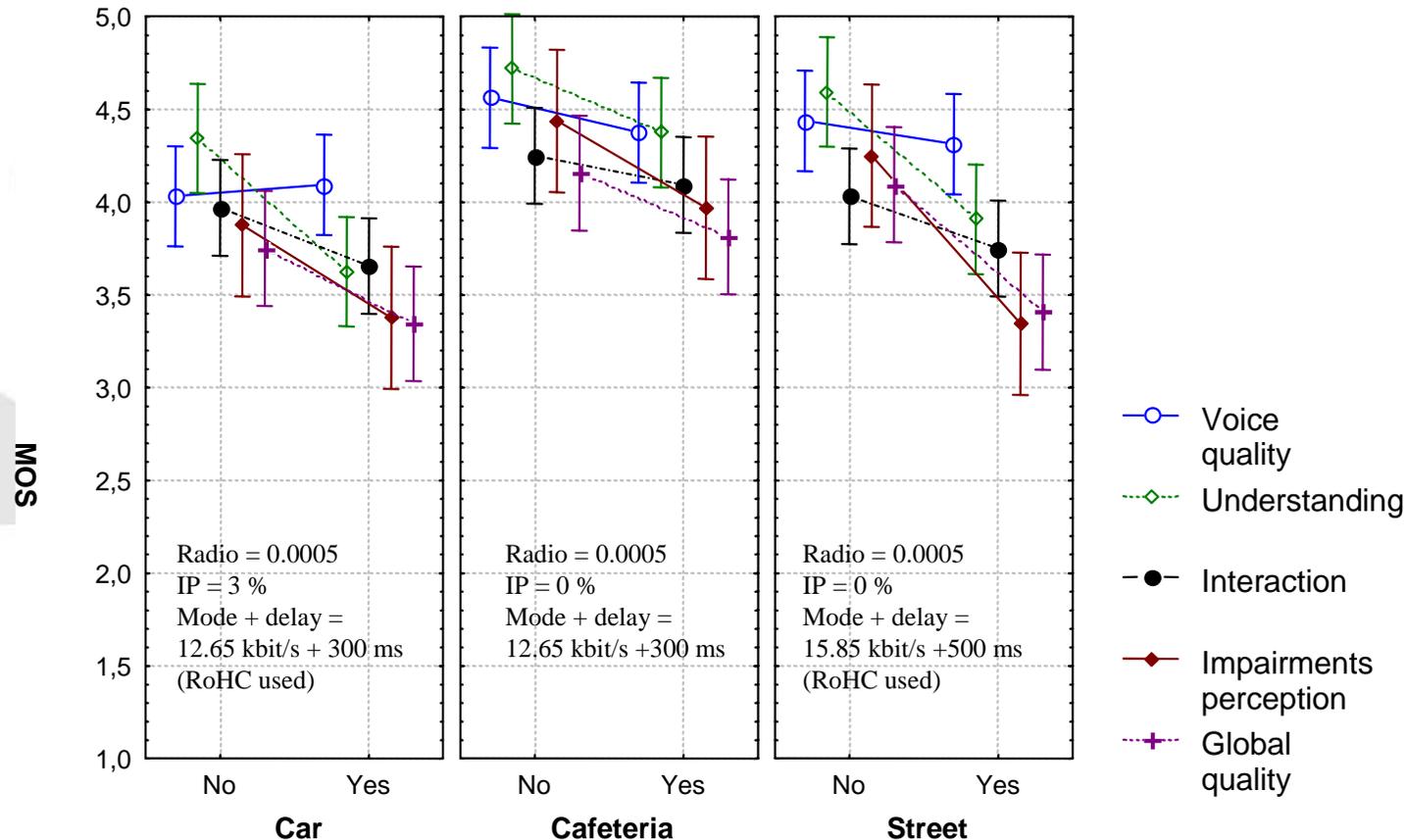
- **Examples of results:** AMR-NB (modes 12.2 and 6.7 kbit/s) - MOS for background noise conditions with IP packet loss and radio transmission errors. [France Telecom R&D results]

Performance Characterisation of Default Codecs for PS Conversational Multimedia applications

- **Examples of results:** AMR-WB (modes 12.65 and 15.85 kbit/s): MOS for background noise conditions with IP packet loss and radio transmission errors. [France Telecom R&D results]

Car:
Radio = 0.0005
IP = 3 %
Mode + delay =
12.65 kbit/s + 300 ms
(RoHC used)

Cafeteria:
Radio = 0.0005
IP = 0 %
Mode + delay =
12.65 kbit/s +300 ms
(RoHC used)

Street:
Radio = 0.0005
IP = 0 %
Mode + delay =
15.85 kbit/s +500 ms
(RoHC used)

Legend:
- Voice quality
- Understanding
- Interaction
- Impairments perception
- Global quality

Performance Characterisation of Default Codecs for PS Conversational Multimedia applications

- **Contingency of 34 kEuro from AMR-WB characterisation tests to be used for a further experiment (Phase 2): Comparison of quality offered by different speech coders**
  - AMR-NB (modes 6.7 and 12.2 kbit/s), AMR-WB (modes 12.65 and 15.85 kbit/s), ITU-T G.723.1 (mode 6.4 kbit/s), ITU-T G.729 (mode 8 kbit/s), ITU-T G.722 (mode 64 kbit/s) and ITU-T G.711 (64 kbit/s).
  - Transmission error conditions cover IP packet loss of 0% and 3%
  - Two languages (French and Arabic)
  - To be carried out by France Telecom R&D by SA4#30

- **Phase 2 Test Plan and Plan for Global Analysis of Results brought for approval**

- **Global analysis brings together the results from the different listening labs/languages (Phase 1 and 2), combines them, and draws conclusions.**
  - Preparation of Excel-spreadsheet to individual subjective test laboratories for raw ratings
  - Analysis by MANOVA (Multivariate Analysis of Variance) and ANOVA (Analysis of Variance)
  - To be carried out by Dynastat by SA4#30

- **TR expected for information at TSG-SA#23 and for approval at TSG-SA#24**

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TR 26.9yz	Performance characterization of default codecs for PS conversational multimedia applications	SA4	-	TR preparation is pending on the testing. Phase 1 tests completed. Phase 2 tests and global analysis to be done.	TSG-SA#24 (June 2004)

Packet Switched Streaming (PSS) Rel-6: General

- **Rel-6 streaming issues progressed**

  - **Consideration of new PSS/MMS codecs:**

    - Selection testing is ongoing for PSS/MMS audio codec candidates

    - One codec candidate under consideration for PSS/MMS video codecs

  - **Quality metrics** (for servers to receive from handset to provide service providers means for evaluating the end user experience): updates agreed on protocol definition to send the quality metrics using RTSP.

  - **Impact of DRM (to streaming protocols and 3GPP file format):** Dialogue continued with OMA DLDRM and SA3. OMA has adopted earlier the 3GPP file format for continuous media. (SA4 will define, in co-operation, the protected file format and the streaming mechanisms.)

    - OMA provided DRM Content Format draft specification for review and requested early finalisation of TS 26.244 (3GPP file format) to reference it. (Expected for TSG-SA approval in March.)

    - OMA requested some additions for signalling DRM support of PSS clients and SA4 agreed to do this.

    - Some SA4 working assumptions agreed on payload formats ("encrypted RTP wrapper" payload format which can be used to protect any standard RTP payload) and on optional integrity protection (IETF Secure RTP).

  - **Other developments:**

    - Inclusion of streaming for timed text was agreed for Rel-6. (In the current releases of PSS, timed text may only be downloaded.)

    - Use of RTCP mandated for all PSS media transport sessions using RTP (e.g. to ensure up to date synchronisation and that servers know that the client is still alive through the reporting).

    - TR on RTP Usage Model (TR 26.937) will be updated for Rel-6 by including test results for rate adaptation.

PSS Rel-6: Specifications

- **Rel-6 specifications have been progressed. Two TSs are brought for information:**
  - **TS 26.244 "PSS: 3GPP file format (3GP)" Version 1.0.0**
  - **TS 26.246 "PSS; 3GPP SMIL Language Profile" Version 1.0.0.**

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.233	Transparent end-to-end PSS; General description	SA4	SA2	To be updated based on the content of PSS Rel-6.	TSG-SA#23 (March 2004)
CRs to TS 26.234	Transparent end-to-end PSS; Protocol and codecs	SA4	SA2	Working draft (v.0.3.2) of the CR(s) exists in SA4.	TSG-SA#23 (March 2004)
TS 26.244	Transparent end-to-end PSS; File Format	SA4	SA2	Version 1.0.0 to be presented for information at TSG-SA#22.	TSG-SA#23 (March 2004)
TS 26.245	Transparent end-to-end PSS; Timed Text Format	SA4	SA2	Working draft (v.0.1.7) exists in SA4.	TSG-SA#23 (March 2004)
TS 26.246	Transparent end-to-end PSS; SMIL Language Profile	SA4	SA2	Version 1.0.0 to be presented for information at TSG-SA#22.	TSG-SA#23 (March 2004)
CRs to TR 26.937	Transparent end-to-end PSS; RTP Usage Model	SA4		To be updated based on the content of PSS Rel-6. (Validation results of the signalling for rate adaptation planned to be included)	TSG-SA#23 (March 2004)
CRs to TS 22.233	Stage 1	SA1		Under SA1 responsibility.	
Possible new TS	Stage2 (non-transparent aspects)	SA2		To be produced by SA2, if needed.	

13

PSS Rel-6: PSS/MMS video codecs

- **Two PSS/MMS video codec candidates (declared by the deadline of October 3rd):**

  1) **MPEG-4 AVC (ITU-T H.264) - proposed by Nokia**

  2) **WMV9 - proposed by Microsoft.**

- **Codec qualification material (demonstrating compliance to the qualification criteria in terms of quality and complexity) was provided to SA4#29 only for the MPEG-4 AVC codec. WMV9 was withdrawn.**

- **AVC remains the only candidate codec for consideration to Rel-6. Proposals on AVC profiles and levels to be debated on SA4-reflector already before the next SA4 meeting (by January 9, 2004).**

- **The C-code of the AVC codec for both the encoder and decoder will be available as part of the MPEG/ITU-T specifications.**

- **SA4 Video Codec ad-hoc meeting preliminarily scheduled for January 28-30. (Aims for finding a working assumption on the levels and profiles of AVC.)**

- **Decision on adopting AVC for 3GPP (including definition of levels and profiles, and the status for the services, i.e., default vs. recommended codec) to be made during SA4#30.**

14

*PSS/MMS audio codecs (PSS/MMS audio codecs, extended AMR-WB codec)**

- **Codec Selection Rules completed and brought for approval.**
  - Design Constraints and Performance Requirements have to be met. Figures of merit are given for codec comparison.
    - **Rule 1**: candidates must fulfill the Design Constraints (e.g. implementation complexity)
    - **Rule 2**: candidates must meet the Performance Requirements (quality as demonstrated in selection tests)
    - **Rule 3:** gives a set of Figures of Merit to be used to analyse and compare the performances of codecs candidates
  - The decision from TSG-SA#21 on availability of C-code taken into account: the format of the specification is such that it contains the ANSI-C source code of the tested encoder and decoder.
  - Annex A contains a list of required deliverables from codec proponents

- **Minor revisions and corrections done for the Selection Test and Processing Plans**

- **Selection testing ongoing**
  - Executables of candidate codecs sent to the custody of ETSI by 30th October (to "freeze" codec development before speech and music samples for testing were selected and become known).
  - Selection of the samples done by France Telecom and the processing of samples through codec candidates by the processing laboratory T-Systems and, for cross checking, by mirror processing laboratory Audio Research Laboratories.
  - Subjective testing is currently starting in the eight involved listening laboratories (T-Systems, NTT-AT, France Telecom R&D, Dynastat, Nokia, Ericsson, Coding Technologies, and Fraunhofer Institute).
  - The tests are funded by the codec proponents.

- **Test results available for codec selection at SA4#30**

- **Codec selection and the codec specifications expected for approval at TSG-SA#23**

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*)   This part reports jointly the audio codec work done in WIs "PSS Rel-6" and "Extended AMR-WB codec". (These WIs are related as AMR-WB+ codec is considered as one candidate for PSS/MMS default audio codec and testing will be carried out as combined testing.)

15

PSS/MMS audio codecs (PSS/MMS audio codecs, extended AMR-WB codec)

- **Prior to TSG-SA#23, critical verification needs to be completed (for the "winning codec"):**
  1) Verification of bit-exactness: the compiled version of the source C-Code (for specifications), the executable delivered to ETSI (for "freezing"), and the executable used for processing must give identical samples
  2) Complexity verification: verify independently the complexity estimates provided by the codec proponent
  3) Review of draft specifications

- **List of candidate codecs unchanged**

  - Candidates for PSS/MMS Low Bit-Rates (12 kbit/s to < 32 kbit/s)
    - MPEG4 HE-AAC codec ("aacPlus") - supported by Coding Technologies, NEC and Panasonic
    - AMR-WB+ candidate codec - supported by Ericsson, Nokia and VoiceAge
    - CT codec ("Enhanced aacPlus") - supported by Coding Technologies
  - Candidates for PSS/MMS High Bit-Rates:
    - MPEG4 HE-AAC codec ("aacPlus") - supported by Coding Technologies, NEC and Panasonic
    - CT codec ("Enhanced aacPlus") - supported by Coding Technologies

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to 26-series AMR-WB TSs/TRs	(Relevant AMR-WB specifications of 26 –series)	SA4	-	Drafts to be prepared by candidates for the codec selection meeting (SA4#30).	TSG-SA#23 (March 2004)
New audio codec TS(s)		SA4	-	Drafts to be prepared by the candidates for the codec selection meeting (SA4#30)..	TSG-SA#23 (March 2004)
CRs to TS 26.234	Transparent end-to-end PSS; Protocols and codecs	SA4	SA2	Default codec definition for the audio media type needs to be updated based on the selection of new audio codec(s).	TSG-SA#23 (March 2004)

16

Codec Work to Support Speech Recognition Framework for Automated Voice Services

- **SES codec selection tests (recognition tests) delayed in the two testing laboratories (IBM and Scansoft) - mainly due to late availability of some databases**

- **Consequently, SES codec selection postponed from SA4#29 to SA4#30 (February).**

- **Both candidates (AMR/AMR-WB and ETSI DSR Extended Advanced Front-End (ES 202 212)) have provided, as required:**
    - **a) fixed point complexity assessment**
    - **b) justification document of having met the Design Constraints**
    - **c) draft specifications of the candidate codec**

- **SA4 agreed that both codec candidates meet the SES codec design constraints (implementation complexity, algorithmic delay, data rates)**

- **The DSR codec proponents notified SA4 (on 21st November) of a minor error: 6 lines of code were overlooked in conversion from floating point to fixed point. Updating the SW for tests was not agreed (e.g. concern on further delays).**

- **Since the change appears very small, the selection testing will use the executable of the DSR candidate previously made available to IBM and Scansoft (and the correction to be made and the impact thoroughly checked during verification phase).**

17

Codec Work to Support Speech Recognition Framework for Automated Voice Services

- **Workplan updated by including testing of reconstruction quality (for informative purposes) by SA4#30**

- **Verification phase for critical items (for the "winning codec") to be done by TSG-SA#23:**
  1) verification of the bit-exactness of the C-code for specifications to the one used in testing
  2) verification of complexity

- **Codec selection and related specifications expected for approval at TSG-SA#23**

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.235	PS Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2	To be prepared based on the codec selection.	TSG-SA#23 (March 2004)
CRs to TS 26.236	PS Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2	To be prepared based on the codec selection	TSG-SA#23 (March 2004)
Possible new TSs	Codec specification	SA4		To be prepared, if needed.	TSG-SA#23 (March 2004)

Media Codecs and Formats for IMS Messaging and Presence

- **A "skeleton" working draft of TS 26.141 "IMS Messaging and Presence; Media formats and codecs" prepared earlier.**

- **No contributions at SA4#29. (Also, no editor for the TS has yet been identified.)**

- **As a result of the low activity, it is challenging to complete the work in time for TSG-SA#23.**

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TS 26.141	IMS Messaging and Presence; Media formats and codecs	SA4	SA2, CN1	First skeleton working draft prepared at SA4#28. No progress at SA4#29.	TSG-SA#23 (March 2004) seems unrealistic

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

- **Work begun on the issues identified for SA4 in the joint SA/RAN/GERAN MBMS meeting (on October 13-14 2003)**

- **Forward error correction (FEC) studies ongoing**
  - Several methods proposed including outer coding, rateless codes and RTP-level FEC. No scheme yet agreed at SA4#29. Performance measures agreed for further evaluation.
  - SA4 sees that different solutions must be developed for MBMS download and MBMS streaming as the cases are inherently different.

- **IETF FLUTE protocol for MBMS download was agreed as working assumption.**

- **SA4 would like to get information from both RAN and GERAN on what are the typical ranges of SDU error rates anticipated in the access network and on other channel characteristics. LS was sent out to the relevant WGs commenting the SA4 view on open issues as identified in the joint meeting.**

- **From SA4 point of view the QoS information for PSS listed in TR 26.937 is considered valid as target also for MBMS services.**

- **The WID was updated (on the request of T3) to include T3 in the list of WGs to be kept informed on this work.**

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

- **Much work still to be done**
  - Draft TS on MBMS Protocols and Codecs not yet provided for information (as was planned). The approval target at TSG-SA#23 is challenging.
  - In case Rel-6 deadline will be set for TSG-SA#23, an additional SA4 ad-hoc meeting on MBMS will be held in January 2004 to progress the work as much as possible.

- **Status of specifications**

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
TS 26.x.y.z	MBMS Protocols and Codecs	SA4	SA2, SA3	First skeleton working draft prepared. Studies in progress in SA4.	TSG-SA#23 (March 2004)

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

- **Documents for approval**

Maintenance of releases

- **Two CRs to TSs 26.104 (ANSI-C code for the floating-point AMR speech codec) are brought for approval (Rel-5 and Rel-6) .**

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

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Communication with other WGs/TSGs/groups

Tdoc no.	Title	Intended for	Copy to
TD S4-030838	Reply to LS on Speech Enabled Services Impacts for GERAN (S4-030792)	TSG GERAN, GERAN WG2	TSG SA WG2
TD S4-030845	Liaison Statement on Timed Text	3GPP2	
TD S4-030847	LS on Multiple MBMS Issues	TSG RAN, TSG RAN WG1, TSG RAN WG2, TSG RAN WG3, TSG RAN WG4, TSG GERAN GERAN WG1, GERAN WG2	TSG SA WG1, TSG SA WG2
TD S4-030805	Liaison to MPEG on the RTP Transport of Timed Text	ISO/IEC SC29 WG11 (MPEG)	
TD S4-030800	Response LS on Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS)	TSG T WG3	
TD S4-030846	Reply LS on issues on DRM for PSS and MBMS streams	OMA-BAC DL+DRM	OMA-SEC, TSG SA WG3
TD S4-030841	Reply LS on support of hyperlinks in MMS	TSG T WG2	
TD S4-030843	Reply to LS on Protection of MBMS and DRM Streaming Services	TSG SA WG3	OMA DLDRM, SAGE, TSG SA WG1

25

Miscellaneous

- SA4#29 considered favorably a request from France Telecom R&D to use 3GPP subjective scores from earlier AMR testing. These will be used to improve the ITU-T Recommendation G.107 (E-Model).

- SA4 has received from SA2 a request to provide feedback on different solutions for Optimisation of Voice over IMS (to reduce the bandwith required for IMS voice calls). The issue was debated at SA4#29 with support given for optimisation through negotiating turning off RTCP but also for using speech inactivity to send RTCP packets while at the same time limiting RTCP packet size. A solution incorporating both of these approaches seems viable. However, further discussion is needed and the issue will be debated at SA4#30.

- TSG-GERAN has requested information from SA4 and SA2 on SA2-proposed functionality for improving speech recognition performance as described in draft TR 23.877(v.0.1.0). SA4 sees that the information should be given by SA2 as owner of the TR and the respective WI. SA4 has no data available currently to quantify the potential improvement by the SA2-proposed methods; this would require further investigation, which is not currently on-going in SA4.
    - Work is ongoing in SA4 on SES codecs for PS domain which is expected to provide some generic indications of the factors that determine speech recognition performance. SA4 will keep SA2 (and GERAN) informed on the results of this work if relevant for the speech recognition performance in CS domain.

26

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

- **Documents for approval**

Documents for information

- **Draft versions of two Release TSs are brought for information:**
  - These are not new Rel-6 topics but contained already in Rel-5 as part of TS 26.234 "Protocols and codecs"
  - Separated in Rel-6 into own TSs enabling easier referencing for various services (PSS and MMS) and also outside 3GPP (e.g. 3GPP file format TS 26.244 in OMA)

- **Tdoc SP-030672: 3GPP TS 26.244 "PSS: 3GPP file format (3GP)", Version 1.0.0 (Release 6)**
  - 3GPP file format (3GP) is structurally based on the ISO media file format, but there are some constraints and additions.
  - Used by the PSS and MMS services, but is not restricted to be used with only these services.
  - Rel-6 defines several new file profiles for different usage scenarios, and gives possibility to include assets information (such as genre, location data, etc) and pre-decoder buffer related information structure (for video media tracks).

- **Tdoc SP-030673: 3GPP TS 26.246 "PSS: 3GPP SMIL Language Profile", Version 1.0.0 (Release 6)**
  - The 3GPP SMIL Language Profile is a markup language based on SMIL 2.0 Basic and SMIL Scalability Framework [from W3C]. It is a subset of SMIL 2.0 Full profile and a superset of SMIL 2.0 Basic.
  - Used for scene description (description of spatial layout and temporal behaviour of presentation).
  - Used by the PSS and MMS services, but is not restricted to be used with only these services.
  - Compared to SMIL in Rel-5, the set of high-level features remains unchanged. The main additions for Rel-6 are in the details: Media Parameters module from SMIL 2.0 and specification how to use it, more details on how to use systemCaption attribute of SMIL 2.0 BasicContentControl module, and new URIs to check for 3GPP Rel-6 document conformance and SMIL player conformance.

Content

- **General issues**

- **Review of SA4 work progress for Release 6**

- **Maintenance of releases**

- **Miscellaneous**

- **Documents for information**

- **Documents for approval**

Documents for approval

- **Work Item Descriptions:**
  - Tdoc SP-030674   Updated Work Item Description on Definition of MBMS user services, media codecs, formats and transport/application protocols using Multimedia Broadcast/Multicast Service (MBMS) (Release 6)

- **PSS/MMS Audio Codec and Extended AMR-WB Selection Rules:**
  - Tdoc SP-030675   PSS/MMS Audio Codec and Extended AMR-WB, Selection Rules Version 2.0 (Slide 15)

- **PS conversation testing (Phase 1 test result documents and plans for Phase 2):**
  - Tdoc SP-030676   3G PS conversation tests (AMR-NB and AMR-WB): Report from FT R&D for Host Lab and Subjective Testing Lab functions (Slides 8 -10)
  - Tdoc SP-030677   3G PS conversation tests (AMR-NB and AMR-WB): Report from NTT-AT for Subjective Testing Lab function (Slides 8 -10)
  - Tdoc SP-030678   3G PS conversation tests (AMR-NB and AMR-WB): Report from ARCON for Subjective Testing Lab function (Slides 8 - 10)
  - Tdoc SP-030679   Test plan for 3G packet switched conversation tests - Phase 2: Comparison of quality offered by different speech coders (Slide 11)
  - Tdoc SP-030680   Test plan for 3G packet switched conversation tests: Global Analysis of Phase 1 & Phase 2 Conversation Test results (Slide 11)

Documents for approval (continued)

- **Change Requests:**
  - Two CRs to TSs 26.104 "ANSI-C code for the floating-point AMR speech codec"

    1) Tdoc SP-030681

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	029	1	Rel-5	Correction on the implementation of the interface of decoder.c	F	5.2.0	S4	TSG-SA WG4#29	S4-030850

- On a linux plateform, the reference C-code does not compile when the MMS-like bitstream is activated because the storage size of "dec_mode" is not known in decoder.c. The CR corrects this compilation bug by bringing the file "sp_dec.h" in "decoder.c". This file defines the necessary prototypes so that the source file compiles properly.

    2) Tdoc SP-030682

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	030	1	Rel-6	Correction on the default behaviour of the unix makefile	D	5.2.0	S4	TSG-SA WG4#29	S4-030851

- The makefile for unix platforms is aligned to the other makefiles and to the readmefile so that the same output format is produced by default in all platforms.

(end of presentation)