
Source: TSG-SA WG4 Chairman
Title: TSG-SA WG4 Status Report at TSG-SA#19
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Agenda Item: 7.4.1

Executive Summary

SA4 has held two meetings since TSG-SA#18: SA4#25 (January 20-24) and SA4#25bis (February 24-28).

Release 5

TR 26.937 "RTP Usage model" is being finalised based on comments received from other WGs. This non-critical TR brings additional information to characterise the PS Streaming Service.

Release 6

Performance characterisation of default codecs for PS conversational multimedia applications: Air interface and network simulations as well as conversational test methodology have been further progressed. Interest to take part in the characterisation (either by providing simulators or carrying out listening tests) has been communicated from several companies. Budget "up to 194 kEuro" is allocated for this exercise (160 kEuro by 3GPP PCG and the contingency of 34 kEuro left from the AMR-WB Characterisation Phase). A number of open issues still remain related to interfaces of simulators, audio parts used in the testing, what experimental conditions and ranges of delay and packet losses should be tested, and what radio bearers are most appropriate for the testing. The open issues on end-to-end ranges of delay and packet loss to be included in the conversational tests have been addressed by liaising with the relevant TSGs and WGs (i.e., RAN2, TSG-RAN, TSG-CN and GERAN2).

Packet Switched Streaming Rel-6: Rel-6 enhancements have been discussed, e.g., quality metrics server file formats, bit-rate adaptation, robust handover mechanism, reliable streaming and audio codecs. On audio codecs, selection criteria and test outline are under discussion. Testing is planned to take place from May until September, and codec selection to be made by TSG-SA#21. The candidates put forward by TSG-SA#18 were 1) MPEG-4 AAC, 2) MPEG-4 aacPlus and 3) AMR-WB+ (to be developed under own WID). At SA4#25bis, the list of proposed audio codecs under PSS Rel-6 WID was scheduled to be closed, and still one new audio candidate codec, for the higher bitrates, i.e. 4) by Dolby Laboratories, was put forward. Since PSS Rel-6 WID is on service level enhancements (without new codec development explicitly mentioned, e.g., not containing new codec TSs as output), SA4 felt a supporting WID needed (as was done in case of AMR-WB+). A Building Block WID on Higher Bitrate Audio Codec to complement the PSS Rel-6 Feature was therefore prepared and discussed at SA4#25bis. (A deadline for candidates under the proposed new Higher Bitrate Audio Codec WID, if approved, to express their willingness to submit a candidate was set at midnight (CET) of 28th April, 2003.) After having considered the workplan for this proposed WI some members of SA4 expressed concerns that the workplan of the new WID does not fit into the overall PSS Rel-6 workplan and therefore raised concerns against the proposed new WI. The new WID was left for approval by correspondence but did not obtain full consensus, as two companies confirmed their formal objection. Advice is requested to TSG-SA#19 plenary on how to best proceed.

Extended AMR-WB codec ("AMR-WB+"): A specific AMR-WB+ ad-hoc group has been established for the detailed technical development with Mr. Imre Varga (Siemens / ETSI) chosen as Chairman. Design constraints, performance requirements and test plan have been discussed and progressed. Combined testing effort for the AMR-WB+ candidates and other candidate codecs for PSS/MMS audio is planned. AMR-WB+ performance requirements have been aligned with PSS/MMS performance requirements making joint testing sensible. This will save resources and enables extensive and thorough testing. SA4#25bis set also a new deadline, i.e., a non-binding list of candidates for AMR-WB+ to be frozen at midnight (CET) of 31st March, 2003.

Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services: Codec design constraints have now been finalised and agreed. However, more work is needed to finalise test and processing plan and recommendation criteria. The list of SES candidate codecs (non-binding indication) is: 1) AMR and AMR-WB, 2) ETSI DSR standard ES 202 050 and its extension, 3) Candidate codec from Siemens. Testing is scheduled to start in May and results, enabling selection of the SES codec, to be available in September 2003. Two speech recognition vendors have shown interest to carry out the testing under guidance from SA4. SA4 also sees

it useful to modify TS 22.243 (Stage 1) to extend SES from Conversational to Streaming and Interactive QoS classes as this would enable improved robustness against packet losses with limited and still acceptable increase in delay (LS has been sent to SA1).

WIDs for approval: 1) Updated WID on Extended AMR-WB with clarified objectives, and 2) WID on Enhanced Tandem Free Operation (conditional to SA2 study report on eTFO)

Maintenance of releases:

CRs to TSs/TRs: 26.073 (Rel-5), 26.093 (Rel-6), 26.102 (R99, Rel-4, Rel-5), 26.104 (R99, Rel-4, Rel-5), 26.173 (Rel-5) and 26.204 (Rel-5), 26.234 (Rel-5), 26.236 (Rel-5) and 26.911 (R99, Rel-4, Rel-5)

Note: Annex B (in separate zipped file) contains slides presentation of the status report.

1. General issues

1.1 Officials

The TSG-SA WG4 (SA4) officials are as follows:

Chairman: Kari Järvinen (Nokia / ETSI)
Vice Chairman: Tomoyuki Ohya (NTT DoCoMo / ARIB)
Secretary: Paolo Usai (3GPP Support)
SWG Chairmen:
SQ (Speech Quality): Paolo Usai (ETSI)
PSM (Packet Switched Multimedia): Rolf Hakenberg (Panasonic / ETSI)

There are no changes in the above.

At SA4#25 (January 2003), an ad-hoc group was established to progress the detailed work in the Rel-6 WI Extended AMR-WB codec ("AMR-WB+"). Imre Varga (Siemens / ETSI) was chosen as Chairman for the ad-hoc group. The group met both during SA4#25 and SA4#25bis.

1.2 Meetings

Since TSG-SA#18, SA4 has held two plenary meetings. Altogether four more SA4 meetings are scheduled for 2003. In addition, two SWG/ad-hoc meetings are scheduled to progress the audio codec work and the codec work to support speech recognition framework for automated voice services ("Speech Enabled Services (SES) codecs"). These are aimed especially to progress SA4 permanent project documents¹ used to guide the development and selection of codecs inside SA4.

The meetings are listed below.

Meetings held:

SA4#25	Jan 20-24	Host: AWS and Rogers Wireless; Venue: San Francisco, USA
SA4#25bis	Feb 24-28	Host: EF3; Venue: Berlin, Germany

Calendar of future meetings:

SQ SWG meeting on SES Codecs ²	April 1-2	Host: Motorola; Venue: Basingstoke, UK.
Ad-hoc meeting on Audio Codecs ³	April 7-9	Host: Ericsson; Venue: Kista, Sweden
SA4#26	May 5 – 9	Host: tbd; Venue: tbd
SA4#27	July 7 – 11	Host: Siemens; Venue: Munich, Germany
SA4#28	Sept 1 – 5	Host: tbd; Venue: tbd
SA4#29	Nov 24 – 28	Host: tbd; Venue: tbd

During the SA4#25 and SA4#25bis meetings, the PSM and SQ SWGs and the AMR-WB+ ad-hoc group met. During SA4#25bis, joint SWG/ad-hoc meetings were held to progress the audio coding issues for Rel-6. Table 1 illustrates the statistics from SA4#25 and SA4#25bis.

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

Table 1: Statistics of SA4#25 and SA4#25bis.

¹ These are documents used within SA4 to guide the development and selection of codecs, e.g., to define codec selection test plan, design constraints (limits for implementation complexity etc.) and performance requirements.

² with SA4#25bis agreed decision power to approve the finalised versions of SES codec permanent project documents.

³ with SA4#25bis agreed decision power to approve the finalised versions of the AMR-WB+ and PSS/MMS Audio Codec permanent project documents.

Annex A of this document contains a list of all SA4 input documents to TSG-SA#19. The input documents from SA4 are contained in [Tdocs SP-030081 until SP-030093 \(excluding SP-030084 - WITHDRAWN\)](#).

Annex B (in a separate file) of this document contains a copy of the slides presentation of SA4 progress report at TSG-SA#19.

2. Remaining Release 5 work

TR 26.937 "RTP usage model" is the only remaining Rel-5 specification to be produced in SA4. The TR brings additional information to characterise the PS Streaming Service (e.g., give statistics of traffic characteristics such as packet sizes and bit-rates) and also gives useful information on issues that service providers and manufacturers should be aware of (e.g., implications of chosen RTP packet sizes and impact of different rate control strategies for video streaming). Version 1.2.0 of the TR was presented for information at TSG-SA#18 (in [Tdoc SP-020683](#)). It (or later versions) has been sent for review to relevant WGs. Latest version in SA4 in v.1.4.0. Although intended for approval at TSG-SA#19, SA4 prefers to complement the TR based on comments that are now being received from the other WGs before it is brought for approval to TSG-SA. A finalised version could be expected for approval at one of the next TSG-SA meetings.

3. Release 6 Work Items

Most of the SA4 Rel-6 Work Items were launched at TSG-SA#18, and planning and scheduling the work has had a central focus in the past two SA4 meetings.

3.1 Performance characterisation of default codecs for PS conversational multimedia applications

The objective of this Work Item, launched at TSG-SA#17, is to characterize the performance of default codecs for PS conversational multimedia applications. The codecs are defined in TS 26.235 ("Packet Switched Conversational Multimedia Applications; Default Codecs"). Budget "up to 194 kEuro" has been allocated for this exercise (160 kEuro allocated by 3GPP PCG and the contingency of 34 kEuro left from the AMR-WB Characterisation Phase). The exact amount of needed funding depends on the test plan, which is under preparation in SA4. Conversational (bi-directional) testing will be used to realistically capture the quality (and degradations) experienced during conversations via the PS domain. Uni-directional listening-only tests have been used in previous codec characterisations (described in the existing codec performance characterisation TRs of 26-series).

At SA4#25 and SA4#25bis, the air interface and network simulations for the testing were further discussed and debated. The simulators will be provided by interested companies. (Siemens would provide an air interface simulator for end-to-end mobile-to-mobile conversation in collaboration with France Telecom. France Telecom would provide the core network simulator.) Interest to take part in the testing exercise either by providing simulators or carrying out listening tests (the latter on commercial basis) has been communicated from ARCON, France Telecom, Nokia, NTT-AT, Siemens. The budget to test the AMR narrowband codec has been provisionally quantified within 80 kEuro, and the remaining sum would be used for the AMR-WB part. Further contributions are needed on preparation of the test plan and the design of the test experiments.

A number of open issues still remain to be solved related to interfaces of the simulators and definition of audio parts to be used in the testing, what experimental conditions and what ranges of delay and packet losses should be adopted, what bearers are appropriate for the testing etc. Also the temporary transfer of the same proprietary simulator(s) to all the testing laboratories involved (e.g., signature of a legal Non Disclosure Agreement between the involved parties) was anticipated possibly presenting difficulties and unpredictable delays to the start of the actual phase of conversational testing. To progress the technical issues, a LS was sent to RAN2, TSG-RAN and TSG-CN (and copy to GERAN2), to ask guidance about the use of appropriate RABs and RAB parameters, ranges of packet loss and delay values to be employed for the end-to-end conversational tests in simulated PS networks.

It should be remarked that there are only few input Tdoc contributions on this topic in SA4 (only one input Tdoc in both SA4#25 and SA4#25bis). Nevertheless, as explained earlier, several companies have shown interest in participating in the work, including up to 4 testing laboratories on commercial basis.

Table 2 lists the output specifications (one characterisation TR).

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
New TR 26.9yz	Performance characterization of default codecs for PS conversational multimedia applications	SA4	-	Development of test plan and definition of experimental conditions ongoing.	TSG-SA#21 (22-25 Sept)

Table 2: Status list of output TSs/TRs/CRs for Performance characterisation of default codecs for PS conversational multimedia applications.

3.2 Packet Switched Streaming Rel-6

3.2.1 General issues and PSS beyond audio codecs

SA4 has discussed enhancements for Rel-6 streaming: e.g., quality metrics (for servers to receive from the handset), server file formats, bit-rate adaptation (e.g., for network bandwidth variability and service interruptions), robust handover mechanisms, reliable streaming (e.g., transmitting using TCP (RTP/TCP) instead of UDP (RTP/UDP) protocol), and audio codecs. On some of these, like for server file format and bit-rate adaptation, a working assumption has been agreed.

On quality metrics, a solution has been presented and debated in SA4 but it needs further elaboration and contributions. Anyway, there is a general understanding in SA4 that quality metrics are useful and needed. On robust handover management, implementation guidelines could be added into TR 26.937. Also here further work is needed. Many contributions have been submitted on bit-rate adaptation. After debating different solutions, there seems to be agreement on the way to go and a working assumption on the basic signalling has been agreed. This is not the full solution yet, but the complementing parts are currently under discussion and refinement. Reliable streaming has been discussed in the past two SA4 meetings. However, there is currently not much progress on this topic, as it is not clear at the moment what type of reliable streaming is really needed in PSS (as there are many different solutions in TCP to provide reliable streaming). The topic will continue to be discussed in future meetings. Signaling of packet rate limitation has also been discussed. This would avoid that mobile stations with low processing capability could not be able to start PSS sessions due to server transmitting too high packet rate not sustainable by the PSS client.

Restructuring of TS 26.234 "PSS: Protocols and Codecs" will be done to split it into four dedicated PSS TSs: TSs 26.234 "Protocols and codecs", 26.244 "File format", 26.245 "Timed text format" and 26.246 "SMIL (Synchronised Multimedia Integration Language) Profile". This will make the structure of PSS specifications more clear and allows easier referencing to the specific parts in other specifications. The intention is to finalise the specifications by TSG-SA#22.

Table 3 lists the PSS output specifications.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.233	Transparent end-to-end packet switched streaming service; General description (PSS)	SA4	SA2		by TSG-SA#22 (15-18 Dec)
CRs to TS 26.234	Transparent end-to-end packet switched streaming service; Protocol and codecs (PSS)	SA4	SA2	Will be split into four dedicated PSS TSs: TSs 26.234 "Protocols and codecs", 26.244 "File format", 26.245 "Timed text format" and 26.246 "SMIL Profile".	by TSG-SA#22 (15-18 Dec)
CRs to TS 22.233	Stage 1, streaming	SA1		Under SA1 responsibility.	
Possible new TS	Stage2, streaming (non-transparent aspects) , if needed produced in SA2	SA2		To be produced by SA2, if needed.	

Table 3: Status list of output TSs/TRs/CRs for Packet Switched Streaming Rel-6.

3.2.2 Audio codecs for PSS (and MMS)

Much of the work for PSS has been devoted to audio codecs. The same audio codec(s) are intended to be defined also for MMS to keep PSS and MMS codecs harmonised and aligned like in Release 5. To guide the work, a permanent project document will be prepared on selection and testing. This is under drafting in SA4. In addition, a Time Plan for the Rel-6 work has been produced:

- PSS/MMS Audio Codec Selection Criteria and Test Outline
- PSS Time Plan (to be updated at every SA4 meeting)

Audio codec selection criteria and test plan are currently debated in SA4. Audio codec testing is planned to take place from May until September. Codec testing is divided into lower bit-rates (from 12 to < 32 kbit/s) and higher bit-rates. Codec selection for higher rates is scheduled to take place in July (SA4#27) and for lower rates in September (SA4#28). The performance requirements for AMR-WB+ codec are being aligned with the requirements of audio coding in PSS/MMS, and a joint testing for the PSS/MMS candidate codecs (including also all AMR-WB+ candidate codecs) is planned. This combined testing will save resources and enables accurate and extensive testing for each codec candidate. The PSS specification TS 26.234 "Protocols and Codecs" will be finalised through CRs by TSG-SA#22. (TS 26.234 defines media codecs to be supported for each particular media type for PSS. Rel-5 and earlier releases define only a recommended codec for audio media type.)

To progress the PSS audio codec work, an ad-hoc meeting on Rel-6 Audio Coding is scheduled for April 7-9 already before the next SA4 meeting. The target is to progress and finalise audio coding permanent project documents. SA4 gave the meeting decision powers to finalise and approve the finalised versions of permanent project document "PSS/MMS Audio Codec Selection Criteria and Test Outline" (as well as the permanent project documents for Extended AMR-WB codec – see section 3.3).

The main milestones for PSS/MMS audio codec definition are given in Table 4.

Date	Action	SA4 meetings	TSG-SA meetings
April	• Progress/finalise permanent project document "PSS/MMS Audio Codec Selection Criteria and Test Outline"	Audio Codec Ad-Hoc (7-9 April)	
May	• Selection Criteria and Test Outline for PSS/MMS available • Codec testing (AMR-WB+ and PSS/MMS, in combination) starts; in both low bit rates (12 kbit/s to < 32 kbit/s) and high bit rates	SA4#26 (5 - 9 May)	
July	• Selection of "high bit rate" audio codec for PSS/MMS.	SA4#27 (7 - 11 Jul)	
September	• Selection of "low bit rate" audio codec for PSS/MMS	SA4#28 (1-5 Sept)	TSG-SA#21 (22-25 Sept)
November	• Finalisation of CRs to PSS/MMS specs	SA4#29	

	(TSs 26.234 and 26.140)	(24-28 Nov)	
December	<ul style="list-style-type: none"> • Presentation of CRs to PSS/MMS specs (TSs 26.234 and 26.140) for approval at TSG-SA#22 		TSG-SA#22 (15-18 Dec)

Table 4: Summary of the main milestones for audio codec selection for PSS/MMS.

As explained to TSG-SA#18, during SA4#24 the SA4 PSM SWG reached an agreement that the selection of a mandatory (default) codec for audio in PSS and MMS is seen desirable in Rel-6. The developments in audio coding technology also give good prospects for achieving this for Rel-6. It was acknowledged that in the lower bit-rate audio range (12 kbit/s to < 32 kbit/s) there were two contenders: MPEG-4 aacPlus and the Extended AMR-WB (the latter presented as a new work item). In the higher bit-rate audio range, MPEG-4 aacPlus and MPEG-4 AAC were seen as the contenders. At SA4#25, SA4 further agreed to close the list of contenders for the audio codec selection for PSS in Rel-6 by the SA4#25bis meeting.

Hence, the candidates put forward by TSG-SA#18 were:

- 1) MPEG-4 AAC
- 2) MPEG-4 aacPlus
- 3) AMR-WB+ (to be developed under own WI, to be considered for the lower bit-rates).

According to the PSS Time Plan (v1.0 in [Tdoc S4-030098](#)) as agreed at SA4#25, the list of proposed audio codecs, was to be closed at SA4#25bis, and still one new candidate codec was put forward at SA4#25bis:

- 4) Codec proposal from Dolby Laboratories (to be considered for the higher bit-rates)

The SA4 PSS Rel-6 Work Item ([Tdoc SP-020685](#)) covers "consideration of introduction of new codecs and formats" but without any new codec development explicitly indicated as part of the WID. The WID lists as Expected Output, the affected streaming specifications (TSs 22.233, 26.233 and 26.234) but no new 3GPP specifications (e.g., for new codecs) to be produced. It was stated by several companies at SA4#25bis that under the PSS Rel-6 WI the work is to select codecs among existing state of the art standards. Therefore, SA4#25bis agreed that a codec development WID is needed and should be the channel for new proprietary codec proposals to become a part of the list of codecs to be considered for PSS Rel-6 (i.e., through a specific new WI on new codec development).

For these reasons, a Building Block -level WID to complement the Feature-level PSS Rel-6 WID was felt needed for the new candidate codec proposal, and was prepared, presented and discussed at SA4#25bis (WID for Higher Bitrate Audio Codec, [Tdoc S4-030193](#)). The issue was discussed extensively during SA4#25bis covering several supporting documents for the proposed WID and trying to accommodate the proposed work within the PSS Rel-6 Time Plan. After having discussed and considered the workplan for the proposed new WI, some members of SA4 expressed concerns that the workplan of the WID does not fit into the overall PSS Rel-6 workplan and therefore raised some concerns against this proposed WI.

The SA4 PSS Rel-6 WID may have been somewhat unclear/ambiguous, since some companies had understood that a proprietary (non-standardised) codec could be proposed under the PSS Rel-6 WID. Proposing a proprietary codec at this latest possible date at SA4#25bis (and launching a WID on new codec development) was seen in comments in SA4#25bis to cause a conflict with the schedule of the PSS Rel-6 WID under the current PSS Rel-6 Time Plan. The PSS Rel-6 Time Plan document allowing list of codecs to be closed still at SA4#25bis did not unfortunately foresee a case where a proprietary codec (with supporting WID needed for the new codec development) would still be proposed at SA4#25bis.

Conditional to the approval of the proposed new WID on Higher Bitrate Audio Codec; 1) an ad-hoc meeting on this WID was scheduled for April 10-11, 2003 and also 2) a deadline was set by which the candidates for this WID must express their willingness to submit a candidate. The deadline is midnight (CET) of 28th April, 2003. (Early notice of the maximum number of candidates is needed for scheduling and designing the testing. Similarly to what was agreed at TSG-SA#18 Plenary for the SES codec exercise, companies are allowed to consider whether to actually submit a candidate only after the related set of Design Constraints, Selection Criteria and Test and processing plan are clearly defined and agreed in SA4.)

As a result of all comments given during SA4#25bis (24-28 February), due to the concerns raised during the discussion, the proposed new WID could not finally be agreed during SA4#25bis meeting and it was left for approval by correspondence after the meeting. In the subsequent e-mail approval (by 7th March), reservations against the proposed WID were expressed by two companies, e.g., on the new work seen as extension of AAC (a non-3GPP codec), on the tight schedule starting a new WI now and the risk to delay the overall PSS Rel-6 work, and on lacking consistent evidence backing the proposal. Specific concerns included the following:

- A separate WID to support PSS Rel-6 work is needed for any PSS new codec development (not

available as standardised codecs) as was done for AMR-WB+. However, to develop an extension on AAC within 3GPP this need for a new WID is not seen justified (as it would end up in increasing the proliferation of codecs and overlap with the work already conducted by MPEG on AAC extension).

- Concern was expressed on that approving the WID today would put at risk the completion of PSS Rel-6 in time, and would delay not only standards but implementations. Deciding now to start a competition on a new codec and expecting its selection by the end of the year is too optimistic.
- The WID objectives were seen not to be consistent with the justification documents, and the test methodology used in the documents was criticised.

Advice on how to proceed is requested to TSG-SA#19 Plenary.

3.3 Extended AMR-WB codec (AMR-WB+) targeted for packet-switched streaming and messaging services

The objective of the work is to enhance the current AMR-WB codec for audio by developing an audio extension. The AMR-WB codec based audio extension will be introduced as new audio modes. The extended codec is targeted for use in packet-switched streaming and messaging services.

Work Item Description on Extended AMR-WB codec for high audio quality was approved at TSG-SA#18 (in [Tdoc SP-020686](#)). SA4 was however asked to bring an updated WID version with clarified objectives to the next TSG-SA meeting. Updated WID with clarified objectives has been prepared and is presented for approval in [Tdoc SP-030083](#).

A specific ad-hoc group was established in SA4#25 for the detailed AMR-WB+ codec development, and to work under guidance from SA4 PSM SWG. Mr. Imre Varga (Siemens / ETSI) was chosen as Chairman for the ad-hoc group. The ad-hoc group met both during SA4#25 and SA4#25bis.

A set of AMR-WB+ permanent project documents is under preparation. These will be used to guide the codec development:

- Design Constraints
- Performance Requirements
- Test Plan
- Recommendation Criteria
- Workplan (to be updated at every SA4 meeting)

As the AMR-WB+ codec is targeted for use in PSS and MMS, the following use cases have been identified: A) High quality, high complexity encoding for downlink streaming and messaging; and B) Good quality, moderate complexity encoding for uplink messaging (and streaming). The decoder will be common for both use cases. (The streaming client would contain only the AMR-WB+ decoder, but for MMS the mobile terminal could contain the use case B encoder with moderate complexity.) The detailed complexity limits for both use cases are under discussion in SA4 and will form part of design constraints. The codec will operate at 16 and 24 or 32 kHz. The maximum algorithmic delay of the codec is provisionally set to 200 ms.

The extended AMR-WB is based on the AMR-WB codec. In order to reuse AMR-WB parts, AMR-WB+ will use the same sub-sampling as AMR-WB (12.8 kHz) for the lowest frequencies in all sampling frequencies. Modes 0 – 9 are bit-exact AMR-WB modes containing the AMR-WB core for 0 – 6.4 kHz audio band and the AMR-WB artificial high band regeneration for 6.4 – 7 kHz. New modes (10 – 13) contain extended AMR-WB core and improved coding for the higher audio bandwidth(s) 6.4 – 8/12/16 kHz. The AMR-WB VAD and DTX will be part of the AMR-WB+ codec.

Quality requirements are set for stereo at 18 and 24 kbit/s, and for mono at 14, 18 and 24 kbit/s. The detailed quality requirements (for speech and audio content) are under discussion in SA4. As explained in Section 3.2, combined testing effort for the candidates for the PSS/MMS audio codec and all AMR-WB+ codec candidates is planned. This is seen feasible since the performance requirements for AMR-WB+ are quite well aligned with the requirements for PSS/MMS. Combined testing will save resources and enables detailed and through testing. The testing will be carried out within the period of May-September.

An ad-hoc meeting on Rel-6 Audio Coding issues is scheduled for April 7-9 to progress/finalise the AMR-WB+ (and PSS/MMS Audio Codec) permanent project documents. SA4#25bis agreed to give decision power to the ad-hoc meeting for approving the final versions of AMR-WB+ permanent project documents (and also "PSS/MMS Audio Codec Selection Criteria and Test Outline" permanent document).

The list of AMR-WB+ candidate codecs was scheduled to be closed at SA4#25bis. As the permanent project documents were not yet finalised in SA4 and, similarly to what was agreed at TSG-SA#18 Plenary for the

SES codec exercise, companies should be allowed to consider whether to propose a candidate only after the set of permanent project documents are clearly defined and agreed in SA4. On the other hand, an early notice of the maximum number of candidates is needed for scheduling and designing the testing. A proposal was raised that non-binding candidatures could be raised, waiting for the finalisation of the permanent project documents. Finally, it was agreed that a non-binding list of candidates for AMR-WB+ will be frozen at midnight (CET) of 31st March, one week prior to the Ad-Hoc meeting. Proponents must express their intention to submit a candidate codec by this deadline.

The main milestones for AMR-WB+ development are shown in Table 5. The output in terms of specifications is summarised in Table 6.

Date	Action	SA4 meetings	TSG-SA meetings
April	<ul style="list-style-type: none"> Reach agreement on AMR-WB+ permanent documents 	Audio codec Ad-Hoc (7 - 9 April)	
May	<ul style="list-style-type: none"> AMR-WB+ selection criteria available. AMR-WB+ candidate codec floating point implementation complexity figures available 	SA4#26 (5 - 9 May)	
May-September	(Codec testing ongoing)		TSG-SA#20 (9-12 June)
September	<ul style="list-style-type: none"> AMR-WB+ test results available Consideration of AMR-WB+ codec (candidates) for being adopted for use in PSS/MMS Draft AMR-WB+ codec specs available and disclosed if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec for Rel-6 Verification of AMR-WB+ fixed-point implementation started after SA4#28 if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 	SA4#28 (1-5 Sept)	TSG-SA#21 (22-25 Sept)
November	<ul style="list-style-type: none"> AMR-WB+ verification results available if AMR-WB+ is selected as PSS (and MMS) lower bit-rate audio codec Finalisation of CRs adding AMR-WB+ into AMR-WB specifications, if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 	SA4#29 (24-28 Nov)	
December	<ul style="list-style-type: none"> Presentation of CRs to AMR-WB+ specifications for approval at TSG-SA#22, if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 		TSG-SA#22 (15-18 Dec)

Table 5: Summary of the main milestones for Extended AMR-WB (AMR-WB+) codec development.

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	-	Codec specifications will be produced only if AMR-WB+ will be defined for use in PSS/MMS.	TSG-SA#22 (15-18 Dec)

Table 6: List of output TSs/TRs/CRs for Extended AMR-WB (AMR-WB+) codec.

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

A set of permanent project documents to guide the codec development and selection have been progressed:

- Design Constraints
- Test and Processing Plan

- Recommendation Criteria
- Workplan (to be updated at every SA4 meeting)

Design constraints document was finalised and approved at SA4#25bis. This document defines the design requirements that a candidate must fulfil in order to be considered in the selection. The codec is required to support sampling rates of both 8 and 16 kHz. The terminal side processing of the codec has to be implementable within the resources of a typical mobile phone terminal: complexity requirements based on AMR and AMR-WB codecs with some margin were agreed (e.g., 25 and 39 Weighted MOPS for 8 and 16 kHz operation, respectively). The maximum algorithmic delay introduced by the codec is 200ms, with the objective of 50 ms. Maximum source coding data rates have been set for the intended channels (UTRAN and GERAN PS channels). For conversational class of service, these are 5.6 kbit/s for GPRS single slot uplink (Coding scheme CS-1), 6.4 kbit/s for EGPRS single slot uplink (Coding scheme MCS -1) and 24 kbit/s for UTRAN packet data channel. For streaming and interactive class of service, the maximum source coding rates are 8 kbit/s for GPRS / EGPRS single slot uplink channel (assuming 10 frames per IP packet) and 7.5 kbit/sec (assuming 5 frames per IP packet), and 24 kbit/s for UTRAN.

Test and processing plan and recommendation criteria still require work to finalise them. Especially for the recommendation criteria very little progress has been obtained due to lack of agreements in SA4. This has already delayed the internal schedule of SA4 on when the testing will be carried out. Testing codecs for speech recognition is a new area in SA4 and agreeing on databases, test methodology and recommendation criteria (to select the codec) has taken time and effort; and more effort is still required to finalise the two remaining documents. To resolve the remaining issues, a specific SQ SWG meeting on SES codecs will be held on 1-2 April, still before the next SA4 meeting. SA4#25bis agreed to give decision power to the SQ SWG meeting to approve the final versions of the permanent documents, enabling the documents to be finalised already in the April meeting.

The list of codecs announced for the selection (non-binding indication) is:

- 1) AMR and AMR-WB
- 2) ETSI DSR standard ES 202 050 and its extension
- 3) Candidate codec from Siemens

A number of Automatic Speech Recognition (ASR) vendors have been contacted and two have shown interest in participating into testing of the codecs: IBM and SpeechWorks. Databases to be used in the testing include the ones developed in ETSI Aurora, ones from companies in SA4 and proprietary ones from ASR vendors. The databases contain connected digits, names, street names, organization names, commands and tonality confusability database (Mandarin Chinese names). Several languages will be covered, including e.g. English, German, Japanese, Mandarin Chinese and Spanish. Testing will be done in error-free channel as well as under packet loss situations. The testing will be carried out by the two ASR vendors and is scheduled to start in May. Results enabling selection of the codec would be sent to an ETSI representative (under NDA safeguarding the identity of the two ASR sources), and made available in SA4 in September.

Table 7 gives the main milestones for the work.

SA4 meeting / month	Expected results
SA4 SQ SES ad-hoc (1-2 April 2003)	<ul style="list-style-type: none"> • Reach agreement on the remaining permanent documents.
Deadline for delivery of candidate codec software and algorithm descriptions	<ul style="list-style-type: none"> • In May 2003 (date tbd)
SA4#26 (5-9 May 2003)	<ul style="list-style-type: none"> • Permanent documents approved. Planning of the further work.
May 2003	<ul style="list-style-type: none"> • ASR vendor evaluations start. • [Common test databases to be provided to ASR vendors by April] • Codec executables to be provided to ASR vendors by May. • ASR vendors start tests. 3 months to complete evaluations by 20th August
20 August 2003	<ul style="list-style-type: none"> • Completion of ASR vendor evaluations • Results from ASR vendor evaluations to ETSI representative
SA4#28 (1-5 Sept 2003)	<ul style="list-style-type: none"> • Results from evaluator tests available • Fixed point complexity assessment available • Make recommendation • Prepare TSs for approval @ SA#21 • Prepare CRs for approval @ SA#21
TSG-SA#21 (22-25 Sept 2003)	<ul style="list-style-type: none"> • TSs for approval • CRs for approval

Table 7: The main milestones for SES Codec Work to Support Speech Recognition Framework for Automated Voice Services.

SA1 has defined in TS 22.243 (Stage 1) the Speech Recognition Framework for Automated Voice Services to use only conversational QoS. Based on considerations on latency (delay) still acceptable for speech enabled services for speech recognition, SA4 sees that it would be valuable to extend this service also to streaming and interactive class of Quality of Service. (The possible use of streaming and interactive class was noted by TSG-GERAN in their LS reply to SA4 on transmission aspects of channels.) The advantages from including streaming and interactive class into are in the opinion of SA4 that this extends the range of applicable voice services and allows different tradeoffs between latency (delay) and performance (i.e., significantly improved robustness against packet loss through allowing higher, but still affordable latency in the automated voice services). As a result, SA4 asks in LS to SA1 the Stage 1 to be extended to include also streaming and interactive QoS.

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Possible new TSs	Codec specification	SA4		Required if a new codec (i.e., the candidate codec from Siemens) will become chosen. (For AMR/AMR-WB and ES 202 050, the existing specifications could be referred.)	TSG-SA#22 (15-18 Dec) (for information at TSG-SA#21)
CRs to TS 26.235	Packet Switched Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2		TSG-SA#21 (22-25 Sept)
CRs to TS 26.236	Packet Switched Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2		TSG-SA#21 (22-25 Sept)

Table 8: Status list of output TSs/TRs/CRs for Codec Work to Support Speech Recognition Framework for Automated Voice Services.

4. New/Updated Work Items

4.1 Updated Work Item Description on Enhanced Tandem Free Operation (Release 6)

At TSG-SA#18, Work Item Description on Enhanced Tandem Free Operation (Release 6) was proposed by SA4 in [Tdoc SP-020684](#). The WID could not be agreed due to concerns that there are system aspects and impacts of eTFO that would need to be studied first by SA2. Also, some parts of the proposed WID were requested to be revised. TSG-SA#18 agreed that SA2 will provide a study report at TSG-SA#19, and the eTFO WID should be re-submitted at TSG-SA#19, if it is still supported, taking the SA2 report then into account.

At SA4#25bis, an updated version of the WID was approved and this is presented for approval at TSG-SA#19 in [Tdoc SP-030082](#). This version takes into account the comments expressed at TSG-SA#18. The WID is proposed for approval depending on the SA2 report on eTFO and on subsequent TSG-SA#19 conclusions drawn from the SA2 report.

During the co-located meetings in January in San Francisco, SA2 kindly organised joint SA2/SA4 sessions/discussions on eTFO.

4.2 Updated Work Item Description on AMR-WB extension for high audio quality (Release 6)

Work Item Description on AMR-WB extension for high audio quality (Release 6) in [Tdoc SP-020686](#) was presented for approval by SA4 at TSG-SA#18. The WI was approved but SA4 was asked to bring an updated version with clarified objectives to the next TSG-SA meeting. The updated WID is now brought for approval in [Tdoc SP-030083](#).

5. Miscellaneous

- On "Additional Release 5 work needed for Policy Control and Subscription Control of Media" sent to SA4 among other WGs from TSG-SA#18 (in Tdoc SP-020839), SA4 has not so far identified any essential changes needed to SA4 specifications. The specification TS 26.235 "Packet Switched Conversational Multimedia Applications; Default Codecs (Release 5)" defines the default multimedia codecs to be used within 3GPP specified IP Multimedia Subsystem. This TS defines the set of default codecs for packet switched conversational multimedia. AMR is the mandatory codec to be supported for audio media type in all IMS UEs. (UEs offering audio communication shall support AMR narrowband speech codec.) Also, for other media types, a default codec is defined (e.g. UE offering conversational packet video shall support H.263 baseline codec). SA4 will study the issues in the LS still at next SA4 meeting, if any additions into SA4 specifications would be needed.

- SA4 has discussed MBMS codecs in the context of a significant number of received new LSs on MBMS codecs (in particular from RAN2/RAN3 joint MBMS ad-hoc). The aim of SA4 to reuse codecs from MMS and PSS as much as possible is still valid; however more consideration of particular implications of the MBMS system on codecs is still needed.

Due to LS on MBMS codec requirements (from RAN2/RAN3 joint MBMS ad-hoc), SA4#25bis requests further clarification on application level signalling and transport protocol definition as well as use cases from the relevant other WGs (in LS sent to SA1, SA2, RAN2, RAN3). Also, clarification from SA2 and SA1 was felt needed on the overall scope and ownership with respect to MBMS protocols and applications, and what work is expected from SA4.

At SA4#25bis, several contributions on MBMS topics were received (session description and control protocols, scalable service, protocols for static media delivery and scene description language) and were discussed. On many of these issues, clarification on the expected SA4 work was felt needed, and this is addressed in the above mentioned LS.

Depending on the amount of work requested to SA4 and the timescale agreed at TSG#19 meetings for this important feature, a new WID could be opened for a Work Task by SA4.

A joint session on common MBMS LSs (received from RAN2/RAN3, e.g. on RTCP signalling) was held with SA2 during the co-located WG meetings in January in San Francisco.

- [TD SP-020635](#) "LS to multiple SDOs requesting input for "Media Coding Summary Database" project and [TD SP-020636](#) "LS on New Video Coding Standard H.264/AVC" (both from ITU-T SG16) were received at TSG-SA#18 and were given for SA4 to provide input to ITU-T. SA4 has discussed both and a furthermore request from ITU-T to provide comments to draft terms of reference for planned Variable Bit Rate coding development. Response text to ITU-T on the Media Coding Summary Database and on Variable Bit Rate coding was agreed at SA4#25bis, and both will be presented to ITU-T in individual company contributions. SA4 felt no reply was needed to [TD SP-020636](#).
- SA2 requested SA4 to define codecs for IMS Presence and Messaging. SA4#25 agreed on the proposal, and proposed to SA2 to establish a new SA4 specification "IMS Presence and Messaging: media formats and codecs" for the purpose.

6. Maintenance of Releases

CRs are presented for the following TSs/TRs: 26.073 (Rel-5), 26.093 (Rel-6), 26.102 (R99, Rel-4, Rel-5), 26.104 (R99, Rel-4, Rel-5), 26.173 (Rel-5) and 26.204 (Rel-5), 26.234 (Rel-5), 26.236 (Rel-5) and 26.911 (R99, Rel-4, Rel-5). The CRs are contained in [Tdocs SP-030085 until SP-030093](#).

Most of the CRs are for Rel-5. There are some CRs concerning also the earlier releases R99 and Rel-4, and these are needed to ensure correct and faultless operation:

- CRs to TS 26.102 (in [Tdoc SP-030087](#)): Details of AMR rate adaptation for UE are not described in any specification and therefore need to be added. Incorrect implementation of AMR rate adaptation may occur leading to improper operation in the network and speech quality degradation. This CR is a result of requests from RAN2 and RAN4 to add this into SA4 specifications. The CRs have been reviewed and agreed by both RAN2 and RAN4.
- CRs to TS 26.104 (in [Tdoc SP-030088](#)): Bug correction is brought to the floating-point code of AMR.
- CRs to TR 26.911 (in [Tdoc SP-030093](#)): This CR brings clarification of bit-order handling for 3G-324M terminals. During interoperability tests carried out by IMTC, it was found that some current tested implementations do not correctly implement the bit order of H.223 streams when transmitting over UTRAN network. This CR clarifies the correct usage of the bit order by referencing to the appropriate technical specifications. Although this is a clarification for a TR, if this CR is not agreed then there is potentially a high risk that implementations will not be 3GPP compliant and

interoperability problems will occur. The existence of this risk has been well demonstrated in the interoperability tests in IMTC.

The following tables summarise the content of the CR Tdocs:

Tdoc SP-030085 CR to TS 26.073 “ANSI-C code for the Adaptive Multi Rate (AMR) speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.073	017		Rel-5	MMS compatible input/output option	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030141

Tdoc SP-030086 CR to TS 26.093 “Adaptive Multi-Rate (AMR) speech codec; Source controlled rate operation”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.093	011		Rel-6	Handling of FACCH and RATSCCH during AMR DTX	F	5.2.0	S4	TSG-SA WG4#25bis	S4-030142

Tdoc SP-030087 CRs to TS 26.102 “Adaptive Multi-Rate (AMR) speech codec; Interface to lu, Uu and Nb”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.102	013	2	R99	AMR Rate Adaptation of R'99	F	3.3.0	S4	TSG-SA WG4#25bis	S4-030068
26.102	014	3	Rel-4	AMR Rate Adaptation of Rel-4	A	4.0.0	S4	TSG-SA WG4#25bis	S4-030245
26.102	015	2	Rel-5	AMR Rate Adaptation of Rel-5	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030070

Tdoc SP-030088 CRs to TS 26.104 “ANSI-C code for the floating-point AMR speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	021	1	Rel-5	MMS compatible i/o format	F	5.0.0	S4	TSG-SA WG4#25	S4-030086
26.104	022		R99	Correction to floating-point implementation of sp_dec.c	F	3.4.0	S4	TSG-SA WG4#25	S4-030037
26.104	023		Rel-4	Correction to floating-point implementation of sp_dec.c	A	4.3.0	S4	TSG-SA WG4#25	S4-030038
26.104	024		Rel-5	Correction to floating-point implementation of sp_dec.c	A	5.0.0	S4	TSG-SA WG4#25	S4-030039

Tdoc SP-030089 CRs to TS 26.173 “ANSI-C code for the Adaptive Multi Rate (AMR) Wideband speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.173	015	2	Rel-5	Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes	F	5.5.0	S4	TSG-SA WG4#25	S4-030027
26.173	016		Rel-5	Correction for handling of RX_NO_DATA frames	F	5.5.0	S4	TSG-SA WG4#25bis	S4-030143

Tdoc SP-030090 CR to TS 26.204 “ANSI-C code for the Floating-point Adaptive Multi-Rate Wideband (AMR-WB) speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.204	001	1	Rel-5	Correction to log(0) error in VAD decision with low SNR input signals	F	5.0.0	S4	TSG-SA WG4#25	S4-030085
26.204	002	1	Rel-5	Correction to decoder with input of long sequence of NO_DATA frames	F	5.0.0	S4	TSG-SA WG4#25	S4-030084
26.204	003	1	Rel-5	Correction to "D_UTIL_pow2" function to be bitexact with TS26.173 counterpart	F	5.0.0	S4	TSG-SA WG4#25	S4-030087
26.204	004	1	Rel-5	MMS compatible i/o format option	F	5.0.0	S4	TSG-SA WG4#25	S4-030088
26.204	005		Rel-5	Correction for handling of RX_NO_DATA frames	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030144

26.204	006	1	Rel-5	Ambiguous expressions in the AMR-WB Floating-point C-Code	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030174
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Tdoc SP-030091 CRs to TS 26.234 “PSS; Protocols and codecs”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.234	052	1	Rel-5	SDP bandwidth modifier for RTCP bandwidth	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030227
26.234	053		Rel-5	Specification of stream control URLs in SDP files	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030125
26.234	054		Rel-5	Clarification of multiple modifiers for timed text	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030134
26.234	056	4	Rel-5	Correction of wrong references	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030258
26.234	057	2	Rel-5	Correction of signalling frame size for H.263 in SDP	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030229

Tdoc SP-030092 CRs to TS 26.236 “Packet switched conversational multimedia applications; Transport protocols”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.236	003	2	Rel-5	SDP bandwidth modifier for RTCP bandwidth	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030259
26.236	004		Rel-5	Correction on QoS profile parameters for conversational multimedia applications	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030186

Tdoc SP-030093 CRs to TR 26.911 “Codec(s) for Circuit Switched Multimedia Telephony Service; Terminal Implementor’s Guide “

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.911	011		R99	Clarification of bit-order handling for 3G-324M terminals	F	3.3.0	S4	TSG-SA WG4#25bis	S4-030220
26.911	012		Rel-4	Clarification of bit-order handling for 3G-324M terminals	A	4.1.0	S4	TSG-SA WG4#25bis	S4-030221
26.911	013		Rel-5	Clarification of bit-order handling for 3G-324M terminals	A	5.0.0	S4	TSG-SA WG4#25bis	S4-030222

7. Approval requested

SA4 requests TSG-SA#19 to approve the following:

Work Item Descriptions:

- [Tdoc SP-030082](#) Updated WID on Enhanced Tandem Free Operation (Release 6). Note: The WID is presented for approval conditionally depending on SA2 study on eTFO (expected for TSG-SA#19) and the resulting TSG-SA#19 conclusions on eTFO.
- [Tdoc SP-030083](#) Updated WID on AMR-WB extension for high audio quality (Release 6) .

Change Requests:

- [Tdoc SP-030085](#) CR to TS 26.073 - MMS compatible input/output option (Release 5)
- [Tdoc SP-030086](#) CR to TS 26.093 - Handling of FACCH and RATSCCH during AMR DTX (Release 6)
- [Tdoc SP-030087](#) CRs to TS 26.102 - AMR rate adaptation (R99, Release 4 and Release 5)
- [Tdoc SP-030088](#) CRs to TS 26.104 - Correction to floating-point implementation for AMR (R99, Rel4 and Rel 5), and MMS compatible input/output option (Rel 5)
- [Tdoc SP-030089](#) CRs to TS 26.173 Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes, and Correction for handling of RX_NO_DATA frames (Release 5)
- [Tdoc SP-030090](#) CR to TS 26.204 - Corrections (Release 5)
- [Tdoc SP-030091](#) CRs to TS 26.234 - Corrections (Release 5)
- [Tdoc SP-030092](#) CRs to TS 26.236 - Corrections (Release 5)
- [Tdoc SP-030093](#) CRs to TR 26.911 - Clarification of bit-order handling for 3G-324M terminals (R99, Release 4 and Release 5)

ANNEX A: List of input documents to TSG-SA#19 from SA4

Tdoc	Title	Source	Agenda item	Document for
SP-030081	TSG S4 Status Report at TSG-SA#19	SA WG4 Chairman	7.4.1	Information
SP-030082	Updated Work Item Description on Enhanced Tandem Free Operation (Release 6)	SA WG4	7.4.3	Approval
SP-030083	Updated Work Item Description on AMR-WB extension for high audio quality (Release 6)	SA WG4	7.4.3	Approval
SP-030085	CR to TS 26.073 - MMS compatible input/output option (Release 5)	SA WG4	7.4.3	Approval
SP-030086	CR to TS 26.093 - Handling of FACCH and RATSCCH during AMR DTX (Release 6)	SA WG4	7.4.3	Approval
SP-030087	CRs to TS 26.102 - AMR rate adaptation (R99, Release 4 and Release 5)	SA WG4	7.4.3	Approval
SP-030088	CRs to TS 26.104 - Correction to floating-point implementation for AMR (R99, Rel4 and Rel 5), and MMS compatible input/output option (Rel 5)	SA WG4	7.4.3	Approval
SP-030089	CRs to TS 26.173 Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes, and Correction for handling of RX_NO_DATA frames (Release 5)	SA WG4	7.4.3	Approval
SP-030090	CR to TS 26.204 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030091	CRs to TS 26.234 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030092	CRs to TS 26.236 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030093	CRs to TR 26.911 - Clarification of bit-order handling for 3G-324M terminals (R99, Release 4 and Release 5)	SA WG4	7.4.3	Approval

ANNEX B: Slides presentation of the SA4 status report at TSG-SA#19

(Included in separate file: "SP-030081 Slides presentation (Annex B).ppt")



TSG-SA WG4 (SA4) - CODEC Status Report at TSG-SA#19


***Kari Järvinen
TSG-SA WG4 Chairman***

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These slides: Annex B of the report (Tdoc SP-030081)

Content

- General issues 
- Review of SA4 work progress
 - Release 5
 - Release 6
 - New Work Items
 - Other issues
- Approval requested



General: SA4 officials

- **Chairman:** Kari Järvinen (Nokia / ETSI)
- **Vice Chairman:** Tomoyuki Ohya (NTT DoCoMo / ARIB)
- **Secretary:** Paolo Usai (3GPP Support)
- **Sub Working Groups:**
 - Speech Quality (SQ): Paolo Usai (ETSI)
 - Packet Switched Multimedia (PSM): Rolf Hakenberg (Panasonic / ETSI)
- At SA4#25 (January 2003), an ad-hoc group was established to progress the detailed work in the Rel-6 WI Extended AMR-WB codec (“AMR-WB+”). Imre Varga (Siemens / ETSI) was chosen as Chairman for the ad-hoc group:
 - AMR-WB+ ad-hoc: Imre Varge (Siemens / ETSI)



General: SA4 meetings

- **Meetings held**

- SA4#25 Jan 20-24 Host: AWS and Rogers Wireless; Venue: San Francisco, USA
- SA4#25bis Feb 24-28 Host: EF3; Venue: Berlin, Germany

- **Calendar of future meetings**

- SQ SWG on SES Codecs April 1-2 Host: Motorola; Venue: Basingstoke, UK
- Ad-hoc on Audio Codecs April 7-9 Host: Ericsson; Venue: Kista, Sweden
- SA4#26 May 5-9 Host: tbd; Venue: tbd
- SA4#27 July 7-11 Host: Siemens; Venue: Munich, Germany
- SA4#28 Sept 1-5 Host: tbd; Venue: tbd
- SA4#29 Nov 24-28 Host: tbd; Venue: tbd

- **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

General: Input documents

Tdoc	Title	Source	Agenda item	Document for
SP-030081	TSG S4 Status Report at TSG-SA#19	SA WG4 Chairman	7.4.1	Information
SP-030082	Updated Work Item Description on Enhanced Tandem Free Operation (Release 6)	SA WG4	7.4.3	Approval
SP-030083	Updated Work Item Description on AMR-WB extension for high audio quality (Release 6)	SA WG4	7.4.3	Approval
SP-030085	CR to TS 26.073 - MMS compatible input/output option (Release 5)	SA WG4	7.4.3	Approval
SP-030086	CR to TS 26.093 - Handling of FACCH and RATSCCH during AMR DTX (Release 6)	SA WG4	7.4.3	Approval
SP-030087	CRs to TS 26.102 - AMR rate adaptation (R99, Release 4 and Release 5)	SA WG4	7.4.3	Approval
SP-030088	CRs to TS 26.104 - Correction to floating-point implementation for AMR (R99, Rel4 and Rel 5), and MMS compatible input/output option (Rel 5)	SA WG4	7.4.3	Approval
SP-030089	CRs to TS 26.173 Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes, and Correction for handling of RX_NO_DATA frames (Release 5)	SA WG4	7.4.3	Approval
SP-030090	CR to TS 26.204 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030091	CRs to TS 26.234 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030092	CRs to TS 26.236 - Corrections (Release 5)	SA WG4	7.4.3	Approval
SP-030093	CRs to TR 26.911 - Clarification of bit-order handling for 3G-324M terminals (R99, Release 4 and Release 5)	SA WG4	7.4.3	Approval

Content

- **General issues**
- **Review of SA4 work progress**
 - **Release 5**
 - **Release 6**
 - **New Work Items**
 - **Other issues**
- **Approval requested**





Release 5



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Remaining Rel-5 work

- TR 26.937 “RTP usage model” is the only remaining Rel-5 specification
 - Brings additional information to characterise the PSS (e.g., statistics of traffic characteristics such as packet sizes and bit-rates) and gives useful information on issues that service providers and manufacturers should be aware of (e.g., implications of chosen RTP packet sizes and impact of different rate control strategies for video streaming).
 - Version 1.2.0 presented for information at TSG-SA#18.
 - Draft versions under review in other WGs
 - Although intended for approval at TSG-SA#19, SA4 prefers to complement the TR based on comments that are now being received from the other WGs before it is brought for approval to TSG-SA.
 - A finalised version could be expected for approval at one of the next TSG-SA meetings.

Release 6

Work Items:

Performance characterisation of default codecs for PS conversational multimedia applications

Packet Switched Streaming Rel-6

Extended AMR-WB codec (“AMR-WB+”) targeted for packet-switched streaming and messaging services

Speech Recognition and Speech Enabled Services: Codec Work to Support Speech Recognition Framework for Automated Voice Services (“SES Codecs”)

Most of the SA4 Rel-6 Work Items were launched at TSG-SA#18, and planning and scheduling the work has had a central focus in the past two SA4 meetings.



Performance characterisation of default codecs for PS conversational multimedia applications

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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”).
- Budget "up to 194 kEuro" allocated (160 kEuro allocated by 3GPP PCG and the contingency of 34 kEuro left from the AMR-WB Characterisation). The exact amount of needed funding depends on the test plan - under preparation in SA4.
- Conversational (bi-directional) testing will be used to realistically capture the quality (and degradations) experienced during conversations. Uni-directional listening-only tests used in previous codec characterisations (in the 26-series TRs).
- At SA4#25 and SA4#25bis, the air interface and network simulations for the testing were further discussed and debated. The simulators will be provided by interested companies. Interest to take part in the testing exercise either by providing simulators or carrying out listening tests (the latter on commercial basis) has been communicated from ARCON, France Telecom, Nokia, NTT-AT, Siemens.
- A number of open issues still remain to be solved related to interfaces of the simulators and definition of audio parts to be used in the testing, what experimental conditions and what ranges of delay and packet losses should be adopted, what bearers are appropriate for the testing etc.
- Also the temporary transfer of the same proprietary simulator(s) to all the testing laboratories involved (e.g., signature of a legal Non Disclosure Agreement between the involved parties) was anticipated possibly presenting difficulties and unpredictable delays to the start of the actual phase of conversational testing.



Performance characterisation of default codecs for PS conversational multimedia applications

- To progress the technical issues, a LS was sent to RAN2, TSG-RAN and TSG-CN (and copy to GERAN2), to ask guidance about the use of appropriate RABs and RAB parameters, ranges of packet loss and delay values to be employed for the end-to-end conversational tests in simulated PS networks.
- There are only few input Tdoc contributions on this topic in SA4 (only one input Tdoc in both SA4#25 and SA4#25bis). Nevertheless, several companies - including up to 4 testing laboratories on commercial basis - have shown interest in participating in the work.
- Output specifications

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
New TR 26.9yz	Performance characterization of default codecs for PS conversational multimedia applications	SA4	-	Development of test plan and definition of experimental conditions ongoing.	TSG-SA#21 (22-25 Sept)



Packet Switched Streaming Rel-6



A GLOBAL INITIATIVE

Packet Switched Streaming Rel-6: General issues and PSS beyond audio codecs

- Addresses more advanced PSS aspects (over Rel-5 Streaming). SA4 has discussed and debated the enhancements e.g:
 - quality metrics (for servers to receive from the handset)
 - server file formats
 - bit-rate adaptation (e.g., for network bandwidth variability and service interruptions)
 - robust handover mechanisms
 - reliable streaming (e.g., transmitting using TCP (RTP/TCP) instead of UDP (RTP/UDP) protocol)
 - audio codecs

On some, like for server file format and bit-rate adaptation, a working assumption has been agreed.

For audio codecs, candidates have been declared, and the testing is under planning.

- Restructuring of TS 26.234 “PSS: Protocols and Codecs” into 4 TSs has been agreed. The structure will become more clear and will allow easier referencing to the specific parts in other specifications.
- The intention is to finalise specifications by TSG-SA#22



Packet Switched Streaming Rel-6: General issues and PSS beyond audio codecs

- Output specifications

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
CRs to TS 26.233	Transparent end-to-end packet switched streaming service; General description (PSS)	SA4	SA2		by TSG-SA#22 (15-18 Dec)
CRs to TS 26.234	Transparent end-to-end packet switched streaming service; Protocol and codecs (PSS)	SA4	SA2	Will be split into four dedicated PSS TSs: TSs 26.234 "Protocols and codecs", 26.244 "File format", 26.245 "Timed text format" and 26.246 "SMIL Profile".	by TSG-SA#22 (15-18 Dec)
CRs to TS 22.233	Stage 1, streaming	SA1		Under SA1 responsibility.	
Possible new TS	Stage2, streaming (non-transparent aspects) , if needed produced in SA2	SA2		To be produced by SA2, if needed.	

Packet Switched Streaming Rel-6: Audio codecs - general

- Consideration of introduction of new codecs and formats for Rel-6 PSS (and also for MMS to keep codecs aligned like in Rel-5).
- TS 26.234 “PSS; Protocols and Codecs” defines media codecs to be supported for each particular media type for PSS. (Rel-5 and earlier releases define only a recommended codec for audio media type.)
- To guide the work, permanent project documents are being finalised:
 - PSS/MMS Audio Codec Selection Criteria and Test Outline
 - PSS Time Plan (to be updated at every SA4 meeting)
- Audio codec selection criteria and test plan debated in SA4. Codec testing is divided into lower bit-rates (from 12 to < 32 kbit/s) and higher bit-rates tests. Testing from May until September. Codec selection for higher rates in July (SA4#27) and for lower rates in September (SA4#28).
- Performance requirements for AMR-WB+ codec are aligned with the requirements for audio coding in PSS/MMS, and a joint testing for the PSS/MMS candidate codecs (including also all AMR-WB+ candidate codecs) is planned. This combined testing will save resources and enables accurate and extensive testing for each codec candidate.
- TS 26.234 will be finalised through CRs by TSG-SA#22. To progress the PSS audio codec work, an ad-hoc meeting on Rel-6 Audio Coding is scheduled for April 7-9 already before the next SA4 meeting.



Packet Switched Streaming Rel-6: Audio codecs - schedule

- Time Plan for PSS/MMS Audio Codec selection

Date	Action	SA4 meetings	TSG-SA meetings
April	<ul style="list-style-type: none"> • Progress/finalise permanent project document "PSS/MMS Audio Codec Selection Criteria and Test Outline" 	Audio Codec Ad-Hoc (7-9 April)	
May	<ul style="list-style-type: none"> • Selection Criteria and Test Outline for PSS/MMS available • Codec testing (AMR-WB+ and PSS/MMS, in combination) starts; in both low bit rates (12 kbit/s to < 32 kbit/s) and high bit rates 	SA4#26 (5 - 9 May)	
July	<ul style="list-style-type: none"> • Selection of "high bit rate" audio codec for PSS/MMS. 	SA4#27 (7 - 11 Jul)	
September	<ul style="list-style-type: none"> • Selection of "low bit rate" audio codec for PSS/MMS 	SA4#28 (1-5 Sept)	TSG-SA#21 (22-25 Sept)
November	<ul style="list-style-type: none"> • Finalisation of CRs to PSS/MMS specs (TSs 26.234 and 26.140) 	SA4#29 (24-28 Nov)	
December	<ul style="list-style-type: none"> • Presentation of CRs to PSS/MMS specs (TSs 26.234 and 26.140) for approval at TSG-SA#22 		TSG-SA#22 (15-18 Dec)

Packet Switched Streaming Rel-6: Audio codecs - candidates

- As reported to TSG-SA#18, SA4#24 agreed that default audio codec (mandatory to be supported for audio media type) in PSS and MMS is desirable in Rel-6:
 - In the lower bit-rate audio range (12 kbit/s to < 32 kbit/s), there were two contenders: MPEG-4 aacPlus and the Extended AMR-WB
 - In the higher bit-rate audio range, MPEG-4 aacPlus and MPEG-4 AAC were the contenders.
- SA4#25 agreed to close the list of codecs at the SA4#25bis meeting.
- The candidates put forward by TSG-SA#18 were:
 - 1) **MPEG-4 AAC**
 - 2) **MPEG-4 aacPlus**
 - 3) **AMR-WB+**
 - covers the lower bit-rates
 - to be developed under own WI, where a non-binding list of AMR-WB+ codec candidates will be frozen at midnight (CET) of 31st March
- At SA4#25bis, one new candidate codec was put forward:
 - 4) **Codec proposal from Dolby Laboratories (for the higher bit-rates)**



Packet Switched Streaming Rel-6: Audio codecs - proposed new WID in SA4

- The SA4 Rel-6 PSS Work Item covers “consideration of introduction of new codecs and formats” but without any new codec development explicitly indicated as part of the WID. The WID lists as Expected Output, the affected streaming specifications (TSs 22.233, 26.233 and 26.234) but no new 3GPP specifications (e.g., for new codecs) to be produced.
- It was stated by several companies at SA4#25bis that under the PSS Rel-6 WI the work is to select codecs among existing state of the art standards.
- Therefore, SA4#25bis agreed that a supporting codec development WID is needed and should be the channel for new proprietary codec proposals to become a part of the list of codecs to be considered for PSS Rel-6 (i.e., through a specific new WI on new codec development - like was done for AMR-WB+).
- A Building Block -level WID (“Higher Bitrate Audio Codec”) to complement the Feature-level PSS Rel-6 WID was felt needed, and was prepared and discussed at SA4#25bis. The issue was discussed extensively during SA4#25bis covering several supporting documents for the proposed WID and trying to accommodate the proposed work within the PSS Rel-6 Time Plan.
- Conditional to the approval of the proposed new WID on Higher Bitrate Audio Codec;
 - 1) an ad-hoc meeting on this WID was scheduled for April 10-11, 2003 and also
 - 2) a deadline was set by which the candidates for this WID must express their willingness to submit a candidate, by midnight (CET) of 28th April, 2003.
- The SA4 PSS Rel-6 WID may have been somewhat unclear/ambiguous, since some companies had understood that a proprietary (non-standardised) codec could be proposed under the PSS Rel-6 WID.

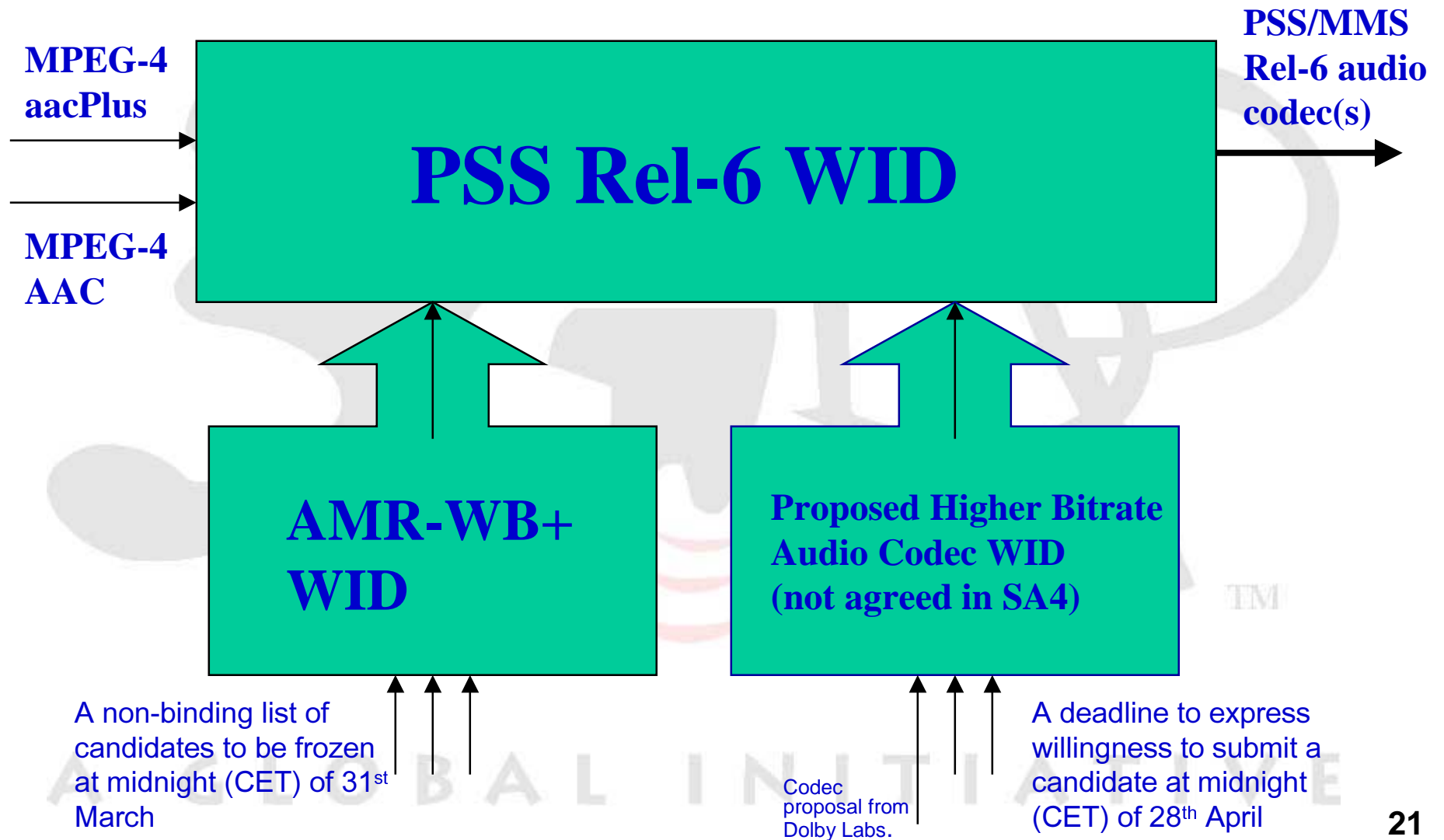


Packet Switched Streaming Rel-6: Audio codecs - discussion

- After having discussed and considered the workplan for the proposed new WI, some members of SA4 expressed concerns that the workplan of the proposed WID does not fit into the overall PSS Rel-6 workplan and therefore raised some concerns against this proposed WI. (The PSS Rel-6 Time Plan allowing list of codecs to be closed still at SA4#25bis did not unfortunately foresee a case where a proprietary codec (with supporting WID needed for the new codec development) would still be proposed at SA4#25bis.)
- As a result, the proposed new WID could not finally be agreed during SA4#25bis meeting (24-28 February) and was left for approval by correspondence after the meeting.
- In the subsequent e-mail approval (by 7th March), reservations against the proposed WID were expressed by two companies, with the following specific concerns expressed:
 - A separate WID to support PSS Rel-6 work is needed for any PSS new codec development (not available as standardised codecs) as was done for AMR-WB+. However, to develop an extension on AAC within 3GPP this need for a new WID is not seen justified (as it would end up in increasing the proliferation of codecs and overlap with the work already conducted by MPEG on AAC extension).
 - Concern was expressed on that approving the WID today would put at risk the completion of PSS Rel-6 in time, and would delay not only standards but implementations. Deciding now to start competition on a new codec and expecting its selection by the end of the year is too optimistic.
 - The WID objectives were seen not to be consistent with the justification documents, and the test methodology used in the documents was criticised.
- The sequence of events is brought for information to TSG-SA#19. Advice on how to proceed is requested.



Packet Switched Streaming Rel-6: Audio codecs - the related WIDs





**Extended AMR-WB codec (AMR-WB+)
targeted for packet-switched streaming
and messaging services**

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Extended AMR-WB codec (AMR-WB+) targeted for packet-switched streaming and messaging services

- The objective is to enhance AMR-WB by developing an audio extension based on the AMR-WB codec. The audio extension will be introduced as new audio modes. The extended codec is targeted for use in PSS and MMS in Rel-6.
- WID approved at TSG-SA#18. SA4 was however asked to bring an updated WID version with clarified objectives to TSG-SA#19 (in Tdoc SP-030083).
- A specific ad-hoc group established: met both during SA4#25 and SA4#25bis.
- A set of permanent AMR-WB+ permanent project documents is under preparation. These will be used to guide the codec development:
 - Design Constraints
 - Performance Requirements
 - Test Plan
 - Recommendation Criteria
 - Workplan (to be updated at every SA4 meeting)
- As the AMR-WB+ codec is targeted for use in PSS and MMS, the following use cases have been identified:
 - A) High quality, high complexity encoding for downlink streaming and messaging
 - B) Good quality, moderate complexity encoding for uplink messaging (and streaming)The decoder will be common for both use cases. The streaming client would contain only the AMR-WB+ decoder, but for MMS the mobile terminal could contain the encoder with moderate complexity.



Extended AMR-WB codec (AMR-WB+) targeted for packet-switched streaming and messaging services

- Combined testing effort for the candidates for the PSS/MMS audio codec and all AMR-WB+ codec candidates is planned. The testing will be carried out within the period of May-September.
- An ad-hoc meeting on Rel-6 Audio Coding issues is scheduled for April 7-9 to progress and aim to finalise the AMR-WB+ (and PSS/MMS Audio Codec) permanent project documents.
- A non-binding list of candidates for AMR-WB+ will be frozen at midnight (CET) of 31st March, one week prior to the Ad-Hoc meeting. Candidate codecs must be indicated by the deadline.
- Output 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	-	Codec specifications will be produced only if AMR-WB+ will be defined for use in PSS/MMS.	TSG-SA#22 (15-18 Dec)



Extended AMR-WB codec (AMR-WB+) targeted for packet-switched streaming and messaging services

- Schedule

Date	Action	SA4 meetings	TSG-SA meetings
April	<ul style="list-style-type: none"> Reach agreement on AMR-WB+ permanent documents 	Audio codec Ad-Hoc (7 - 9 April)	
May	<ul style="list-style-type: none"> AMR-WB+ selection criteria available. AMR-WB+ candidate codec floating point implementation complexity figures available 	SA4#26 (5 - 9 May)	
May-September	(Codec testing ongoing)		TSG-SA#20 (9-12 June)
September	<ul style="list-style-type: none"> AMR-WB+ test results available Consideration of AMR-WB+ codec (candidates) for being adopted for use in PSS/MMS Draft AMR-WB+ codec specs available and disclosed if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec for Rel-6 Verification of AMR-WB+ fixed-point implementation started after SA4#28 if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 	SA4#28 (1-5 Sept)	TSG-SA#21 (22-25 Sept)
November	<ul style="list-style-type: none"> AMR-WB+ verification results available if AMR-WB+ is selected as PSS (and MMS) lower bit-rate audio codec Finalisation of CRs adding AMR-WB+ into AMR-WB specifications, if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 	SA4#29 (24-28 Nov)	
December	<ul style="list-style-type: none"> Presentation of CRs to AMR-WB+ specifications for approval at TSG-SA#22, if AMR-WB+ is selected as PSS/MMS lower bit-rate audio codec 		TSG-SA#22 (15-18 Dec)



**Speech Recognition and Speech Enabled Services:
Codec Work to Support Speech Recognition
Framework for Automated Voice Services
("SES Codecs")**

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Codec Work to Support Speech Recognition Framework for Automated Voice Services

- The list of codecs (non-binding indication):
 - 1) AMR and AMR-WB
 - 2) ETSI DSR standard ES 202 050 and its extension
 - 3) Candidate codec from Siemens
- Design constraints now finalised and approved at SA4#25bis
 - Sampling rates of both 8 and 16kHz to be supported.
 - Terminal side processing of the codec has to be implementable within resources of a typical mobile phone terminal: complexity requirements based on AMR and AMR-WB codecs with some margin (25 and 39 Weighted MOPS for 8 and 16 kHz operation, respectively).
 - The maximum codec latency requirement is 200ms (algorithmic delay introduced by the codec), with the objective of 50 ms.
 - Maximum source coding data rates defined for GERAN and UTRAN PS channels.
- Test and processing plan and recommendation criteria still require work
 - Especially for the recommendation criteria very little progress has been obtained due to lack of agreements in SA4. This has already delayed the internal schedule of SA4 on when the testing will be carried out.
 - Testing codecs for speech recognition is a new area in SA4 and agreeing on databases, test methodology and recommendation criteria (to select the codec) has taken time and effort; and more effort is still required to finalise the two remaining documents.
- To resolve the remaining issues, specific SQ SWG meeting on SES codecs will be held on 1-2 April, still before the next SA4 meeting.



Codec Work to Support Speech Recognition Framework for Automated Voice Services

- Two Automatic Speech Recognition (ASR) vendors will carry out tests: IBM and SpeechWorks. Scheduled to start in May and results enabling selection of the codec would be available in September.
- Databases from ETSI Aurora, companies in SA4 and from participating ASR vendors:
 - connected digits, names, street names, organization names, commands and tonality confusability database (Mandarin Chinese names).
 - Several languages: e.g., English, German, Japanese, Mandarin Chinese and Spanish.
- Output specifications

Deliverable	Title	Prime resp. WG	2nd resp. WG	Comment/Status	TSG-SA approval target
Possible new TSs	Codec specification	SA4		Required if a new codec (i.e., the candidate codec from Siemens) will become chosen. (For AMR/AMR-WB and ES 202 050, the existing specifications could be referred.)	TSG-SA#22 (15-18 Dec) (for information at TSG-SA#21)
CRs to TS 26.235	Packet Switched Conversational Multimedia Applications; Default Codecs	SA4	SA2, T2		TSG-SA#21 (22-25 Sept)
CRs to TS 26.236	Packet Switched Conversational Multimedia Applications; Transport Protocols	SA4	SA2, T2		TSG-SA#21 (22-25 Sept)



Codec Work to Support Speech Recognition Framework for Automated Voice Services

- Schedule

SA4 meeting / month	Expected results
SA4 SQ SES ad-hoc (1-2 April 2003)	<ul style="list-style-type: none"> Reach agreement on permanent documents.
Deadline for delivery of candidate codec software and algorithm descriptions	<ul style="list-style-type: none"> In May 2003 (date tbd)
SA4 #26 (5-9 May 2003)	<ul style="list-style-type: none"> Permanent documents approved. Planning of the further work.
May 2003	<ul style="list-style-type: none"> ASR vendor evaluations start. [Common test databases to be provided to ASR vendors by April] Codec executables to be provided to ASR vendors by May. ASR vendors start tests. 3 months to complete evaluations by 20th August
20 August 2003	<ul style="list-style-type: none"> Completion of ASR vendor evaluations Results from ASR vendor evaluations to ETSI representative
SA4 #28 (1-5 Sept 2003)	<ul style="list-style-type: none"> Results from evaluator tests available Fixed point complexity assessment available Make recommendation Prepare TSs for approval @ SA#21 Prepare CRs for approval @ SA#21
SA #21 (22-25 Sept 2003)	<ul style="list-style-type: none"> TSs for approval CRs for approval

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Proposed New Work Items (Rel-6)

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New WIDs

1) Updated WID on Enhanced Tandem Free Operation

The WID has been updated based on the comments expressed at TSG-SA#18.

Note: The WID is presented for approval conditionally depending on SA2 report on eTFO (expected for TSG-SA#19) and the resulting TSG-SA#19 conclusions on eTFO.

2) Updated WID on AMR-WB extension for high audio quality

The WI was approved at TSG-SA#18 but SA4 was asked to bring an updated WID version with clarified objectives to the next TSG-SA meeting.



Other issues



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Other issues

- On "Additional Release 5 work needed for Policy Control and Subscription Control of Media" LS sent from TSG-SA#18, SA4 has not so far identified any essential changes needed to SA4 specifications.
 - TS 26.235 "Packet Switched Conversational Multimedia Applications; Default Codecs (Release 5)" defines the default multimedia codecs to be used within 3GPP specified IP Multimedia Subsystem. It defines the set of default codecs for packet switched conversational multimedia.
 - AMR is the mandatory codec to be supported for audio media type in all IMS UEs. (UEs offering audio communication shall support AMR narrowband speech codec.) Also, for other media types, a default codec is defined (e.g. UE offering conversational packet video shall support H.263 baseline codec).

SA4 will still study the issue at next SA4 meeting, if any additions to SA4 specifications would be needed.

- SA4 has discussed MBMS codecs in the context of received LSs (e.g. from RAN2/RAN3 joint MBMS ad-hoc). The aim of SA4 to reuse codecs from MMS and PSS as much as possible is still valid; however more consideration of particular implications of the MBMS system on codecs is still needed.
 - Joint session was held during SA4#25 (in co-located WG meetings in San Francisco) with SA2 MBMS ad-hoc to discuss MBMS LSs addressed to both groups
 - As a response to LS on MBMS codec requirements (from RAN2/RAN3 joint MBMS ad-hoc), SA4#25bis requests further clarification on application level signalling and transport protocol definition as well as use cases from the relevant other WGs. Also, clarification from SA2 and SA1 was felt needed on the overall scope and ownership with respect to MBMS protocols and applications, and what work is expected from SA4. (=>LS sent to SA1, SA2, RAN2, RAN3)
 - Contributions on MBMS topics such as session description and control protocols, scalable service, protocols for static media delivery and scene description language were received at SA4#25bis.
 - Depending on the amount of work requested to SA4 and the timescale agreed at TSG#19 meetings for this feature, a new WID could be opened for this Work Task by SA4.

Content

- **General issues**
- **Review of SA4 work progress**
 - **Release 5**
 - **Release 6**
 - **New Work Items**
 - **Other issues**
- **Approval requested** 

List of documents for approval

- **New WIDs:**

Tdoc SP-030082 Updated WID on Enhanced Tandem Free Operation (Rel-6)
Note: This WID is presented for approval conditionally depending on SA2 report on eTFO (expected for TSG-SA#19) and the resulting TSG-SA#19 conclusions on eTFO.

Tdoc SP-030083 Updated WID on AMR-WB extension for high audio quality (Rel-6)

- **Change Requests:**

Tdoc SP-030085 CR to TS 26.073 - MMS compatible input/output option (Release 5)

Tdoc SP-030086 CR to TS 26.093 - Handling of FACCH and RATSCCH during AMR DTX (Release 6)

Tdoc SP-030087 CRs to TS 26.102 - AMR rate adaptation (R99, Release 4 and Release 5)

Tdoc SP-030088 CRs to TS 26.104 - Correction to floating-point implementation for AMR (R99, Release 4 and Release 5), and MMS compatible input/output option (Release 5)

Tdoc SP-030089 CRs to TS 26.173 Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes, and Correction for handling of RX_NO_DATA frames (Release 5)

Tdoc SP-030090 CR to TS 26.204 - Corrections (Release 5)

Tdoc SP-030091 CRs to TS 26.234 - Corrections (Release 5)

Tdoc SP-030092 CRs to TS 26.236 - Corrections (Release 5)

Tdoc SP-030093 CRs to TR 26.911 - Clarification of bit-order handling for 3G-324M terminals (R99, Release 4 and Release 5)

Approval Requested

- **Tdoc SP-030082: Updated WID on Enhanced Tandem Free Operation (Release 6)**

- At TSG-SA#18, Work Item Description on Enhanced Tandem Free Operation (Release 6) was proposed by SA4 in Tdoc SP-020684.
- The WID could not be agreed due to concerns that there are system aspects and impacts of eTFO that would need to be studied first by SA2. Also, some parts of the proposed WID were requested to be revised.
- TSG-SA#18 agreed that SA2 will provide a study report at TSG-SA#19, and the eTFO WID should be re-submitted at TSG-SA#19, if it is still supported, taking the SA2 report then into account.
- The WID has been updated based on the comments expressed at TSG-SA#18.

Note: This WID is presented for approval conditionally depending on SA2 report on eTFO (expected for TSG-SA#19) and the resulting TSG-SA#19 conclusions on eTFO.

- **Tdoc SP-030083: Updated WID on AMR-WB extension for high audio quality (Release 6)**

- Work Item Description on AMR-WB extension for high audio quality (Release 6) in Tdoc SP-020686 was presented for approval by SA4 at TSG-SA#18.
- The WI was approved but SA4 was asked to bring an updated version with clarified objectives to the next TSG-SA meeting. The updated WID is brought for approval in Tdoc SP-030083.
 - E.g. an ambiguous/incorrect bullet point referring to “enabling new coding technologies” has been corrected.

About R99/Rel-4 CRs

- **CRs to TS 26.102 (in Tdoc SP-030087):**
 - Details of AMR rate adaptation for UE are not described precisely in any specification and therefore need to be added. Incorrect implementation of AMR rate adaptation may occur leading to improper operation in the network and speech quality degradation. This CR is a result from requests by RAN2 and RAN4 to add this into SA4 specifications. The CRs have been reviewed and agreed by both RAN2 and RAN4.
- **CRs to TS 26.104 (in Tdoc SP-030088):**
 - Bug correction is brought to the floating-point code of AMR.
- **CRs to TR 26.911 (in Tdoc SP-030093):**
 - This CR brings clarification of bit-order handling for 3G-324M terminals. During interoperability tests carried out by IMTC, it was found that some current tested implementations do not correctly implement the bit order of H.223 streams when transmitting over UTRAN network. This CR clarifies the correct usage of the bit order by referencing to the appropriate technical specifications. Although this is a clarification for a TR, if this CR is not agreed then there is potentially a high risk that implementations will not be 3GPP compliant and interoperability problems will occur. The existence of this risk has been well demonstrated in the interoperability tests in IMTC.



Approval Requested – Change Requests

Tdoc SP-030085 CR to TS 26.073 “ANSI-C code for the Adaptive Multi Rate (AMR) speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.073	017		Rel-5	MMS compatible input/output option	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030141

Tdoc SP-030086 CR to TS 26.093 “Adaptive Multi-Rate (AMR) speech codec; Source controlled rate operation”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.093	011		Rel-6	Handling of FACCH and RATSCCH during AMR DTX	F	5.2.0	S4	TSG-SA WG4#25bis	S4-030142

Tdoc SP-030087 CRs to TS 26.102 “Adaptive Multi-Rate (AMR) speech codec; Interface to Iu, Uu and Nb”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.102	013	2	R99	AMR Rate Adaptation of R'99	F	3.3.0	S4	TSG-SA WG4#25bis	S4-030068
26.102	014	3	Rel-4	AMR Rate Adaptation of Rel-4	A	4.0.0	S4	TSG-SA WG4#25bis	S4-030245
26.102	015	2	Rel-5	AMR Rate Adaptation of Rel-5	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030070

Approval Requested – Change Requests

Tdoc SP-030088 CRs to TS 26.104 “ANSI-C code for the floating-point AMR speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.104	021	1	Rel-5	MMS compatible i/o format	F	5.0.0	S4	TSG-SA WG4#25	S4-030086
26.104	022		R99	Correction to floating-point implementation of sp_dec.c	F	3.4.0	S4	TSG-SA WG4#25	S4-030037
26.104	023		Rel-4	Correction to floating-point implementation of sp_dec.c	A	4.3.0	S4	TSG-SA WG4#25	S4-030038
26.104	024		Rel-5	Correction to floating-point implementation of sp_dec.c	A	5.0.0	S4	TSG-SA WG4#25	S4-030039

Tdoc SP-030089 CRs to TS 26.173 “ANSI-C code for the Adaptive Multi Rate (AMR) Wideband speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.173	015	2	Rel-5	Harmonization of 3GPP TS 26.173 and ITU-T G.722.2 C-codes	F	5.5.0	S4	TSG-SA WG4#25	S4-030027
26.173	016		Rel-5	Correction for handling of RX_NO_DATA frames	F	5.5.0	S4	TSG-SA WG4#25bis	S4-030143

Tdoc SP-030090 CR to TS 26.204 “ANSI-C code for the Floating-point Adaptive Multi-Rate Wideband (AMR-WB) speech codec”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.204	001	1	Rel-5	Correction to log(0) error in VAD decision with low SNR input signals	F	5.0.0	S4	TSG-SA WG4#25	S4-030085
26.204	002	1	Rel-5	Correction to decoder with input of long sequence of NO_DATA frames	F	5.0.0	S4	TSG-SA WG4#25	S4-030084
26.204	003	1	Rel-5	Correction to "D_UTIL_pow2" function to be bitexact with TS26.173 counterpart	F	5.0.0	S4	TSG-SA WG4#25	S4-030087
26.204	004	1	Rel-5	MMS compatible i/o format option	F	5.0.0	S4	TSG-SA WG4#25	S4-030088
26.204	005		Rel-5	Correction for handling of RX_NO_DATA frames	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030144
26.204	006	1	Rel-5	Ambiguous expressions in the AMR-WB Floating-point C-Code	F	5.0.0	S4	TSG-SA WG4#25bis	S4-030174

Approval Requested – Change Requests

Tdoc SP-030091 CRs to TS 26.234 “PSS; Protocols and codecs”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.234	052	1	Rel-5	SDP bandwidth modifier for RTCP bandwidth	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030227
26.234	053		Rel-5	Specification of stream control URLs in SDP files	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030125
26.234	054		Rel-5	Clarification of multiple modifiers for timed text	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030134
26.234	056	4	Rel-5	Correction of wrong references	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030258
26.234	057	2	Rel-5	Correction of signalling frame size for H.263 in SDP	F	5.3.0	S4	TSG-SA WG4#25bis	S4-030229

Tdoc SP-030092 CRs to TS 26.236 “Packet switched conversational multimedia applications; Transport protocols”

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.236	003	2	Rel-5	SDP bandwidth modifier for RTCP bandwidth	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030259
26.236	004		Rel-5	Correction on QoS profile parameters for conversational multimedia applications	F	5.1.0	S4	TSG-SA WG4#25bis	S4-030186

Tdoc SP-030093 CRs to TR 26.911 “Codec(s) for Circuit Switched Multimedia Telephony Service; Terminal Implementor's Guide “

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.911	011		R99	Clarification of bit-order handling for 3G-324M terminals	F	3.3.0	S4	TSG-SA WG4#25bis	S4-030220
26.911	012		Rel-4	Clarification of bit-order handling for 3G-324M terminals	A	4.1.0	S4	TSG-SA WG4#25bis	S4-030221
26.911	013		Rel-5	Clarification of bit-order handling for 3G-324M terminals	A	5.0.0	S4	TSG-SA WG4#25bis	S4-030222



(end of presentation)



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