Technical Specification Group Services and System Aspects
Meeting #18, New Orleans, USA, 9-12 December 2002

**TSGS#18(02)0681**

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| **Source:** | **TSG-SA WG4 Chairman** |
| **Title:** | **TSG-SA WG4 Status Report at TSG-SA#18** |
| **Document for:** | **Information** |
| **Agenda Item:** | **7.4.1** |

**Executive Summary**

Since TSG-SA#17, TSG-SA WG4 (SA4) has held two meetings: SA4#23 (September 30 – October 4) and SA4#24 (November 11-15).

**Release 5**

**TR 26.976 "Performance characterisation of the AMR-WB speech codec"** is brought for approval. The TR has been completed by including performance results for EDGE 8-PSK channels.

**Informative mapping of SDP parameters to UMTS QoS parameters for conversational PS applications** has been completed into TS 26.236. CR on this is brought for approval.

**TR 26.937 "RTP usage model"** is presented for information. The TR is expected for approval at TSG-SA#19. After TSG-SA#18, completion of this TR is the only remaining Rel-5 work in SA4.

**Release 6**

**Performance characterisation of default codecs for PS conversational multimedia applications:** 3GPP PCG has allocated up to 160 kEuro for the characterisation tests enabling the work to go on. (In addition, the contingency of 34 kEuro left from the AMR-WB Characterisation Phase could be available for the testing, if found agreeable by the contributors.) Test plan and related methodology have been discussed in SA4. Interest has been indicated by companies for contributing to the work by either providing channel simulation patterns or carrying out subjective tests (the latter on commercial basis).

**New Work Items (all for Rel-6)**:

**1) Packet Switched Streaming (PSS):** WID has been finalised (in collaboration with relevant WGs) and is brought for approval. The WID covers SA4 work on codecs, formats and related issues, as well as update of the 3GPP TS 26.233 on general description of PSS. SA1 responsibility for Stage 1 (and SA2 for possible Stage 2 on any non-transparent aspects) are included in the WID. The work is linked to many related Rel-6 WIs in other WGs (IMS, MMS, End-to-end QoS, MBMS, GUP, Charging, DRM). In many of these, PSS is recognised either as linked work or included as part of the work. The linked WIs may result in new content for PSS in Rel-6 (e.g., inclusion of charging and/or DRM, alignment to IMS).

**2) Extended AMR-WB codec (AMR-WB+) targeted for PS streaming and messaging services:** Existing codecs have difficulties in performing consistently well for both speech and music at bit-rates well below 32 kbit/s. AMR-WB speech codec has reasonable performance for music but it is not comparable to generic audio codecs. To develop new audio modes for AMR-WB to enhance its music performance has been identified as a promising approach to provide consistent good quality for generic audio signals (speech, music and mixed content) at low bit-rates. These modes are targeted for PS streaming and messaging (not for speech telephony). The extended codec will be considered as one candidate for audio coding at low bit-rate range for PSS and MMS in Rel-6 (under the SA4 PSS and MMS codec work).

**3) Codec Work to Support Speech Recognition Framework for Automated Voice Services:** SA1 has requested SA4 to analyse and recommend codec(s) to be used in speech recognition for speech enabled services. Preparatory steps and planning of the work have already been taken in SA4 as a response to the SA1 request. SA4 brings a WID covering the SA4 work for approval.

**4) Enhanced TFO:** Enhancements are brought to the TFO standard for use in packet networks to provide transmission savings. The existing TFO was designed for TDM networks and it requires 64 kbit/s G.711 PCM signal in between TRAU/TCs independently of the transport network. However, for packet networks it is advantageous to relay packetised speech frames in compressed format.

**Maintenance of releases (Release 5 and rearlier)**

CRs are presented for the following TSs: 26.093 (Rel-5), 26.102 (Rel-5), 26.103 (Rel-5), 26.140 (Rel-5), 26.173 (Rel-5), 26.174 (Rel-5), 26.234 (Rel-4, Rel-5), 26.236 (Rel-5) and 28.062 (Rel-4, Rel-5).

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

## 1. General issues

### 1.1 Officials

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

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|---|---|---|
| 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 except that due to finalisation of the Tandem Free Operation protocol, the TFO SWG likely needs not to meet anymore (and is not included in the above list). With some final maintenance work at SA4#23, the TFO standard is stable and can be considered now well completed. After SA4#23, TFO SWG Chairman Mr. Clemens Suerbaum (Siemens/ETSI) also stepped down from his position as chairman of the TFO SWG. SA4 thanks Mr. Clemens Suerbaum for the excellent work leading into the finalisation of the TFO standard.

### 1.2 Meetings

Since TSG-SA#17, SA4 has held two plenary meetings. Altogether six SA4 meetings are scheduled for 2003.

**Meetings held:**

| | | |
|---|---|---|
| SA4#23: | Sept 30 - Oct 4, 2002 | Host: VoiceAge, Venue: Montreal, Canada |
| SA4#24: | Nov 11-15, 2002 | Host: Microsoft, Venue: Redmond, WA, USA |

**Calendar of future meetings:**

| | | |
|---|---|---|
| SA4#25: | Jan 20-24, 2003 | Host: AT&T Wireless Services, Venue: San Francisco, USA |
| SA4#25bis: | Feb 24 – 28, 2003 | Host: tbd, Venue: tbd |
| SA4#26: | May 05 – 09, 2003 | Host: tbd, Venue: tbd |
| SA4#27: | July 07 – 11, 2003 | Host: tbd, Venue: tbd |
| SA4#28: | Sept 01 – 05, 2003 | Host: tbd, Venue: tbd |
| SA4#29: | Nov 24 – 28, 2003 | Host: tbd, Venue; tbd |

During the SA4#23 meeting, the PSM, SQ and TFO SWGs met. About 55 delegates participated in the meeting and around 130 documents were covered. The meeting received 26 incoming LSs and 14 outgoing LSs were prepared. During SA4#24, the PSM and SQ SWGs met. About 45 delegates participated in the meeting and around 115 documents were covered. The meeting received 14 incoming LSs and 6 outgoing LSs were prepared.

Annex A of this document contains a list of all SA4 input documents to TSG-SA#18. The input documents from SA4 are contained in Tdocs SP-020681 until SP-020696. Annex B (in a separate file) of this document contains a copy of the slides presentation of SA4 progress report at TSG-SA#18.

## 2. Remaining Release 5 work

Since TSG-SA#17, some (non-critical) Rel-5 work remained in SA4: finalisation of 2 informative TRs and completion of one informative annex of a TS.

- TR 26.976 ”Performance characterisation of the AMR-WB speech codec” has been now finalised and is brought for approval in Tdoc SP-020682. Version 1.0.0 was presented for information at TSG-SA#17. The TR has been completed by including results for EDGE 8-PSK channels from GERAN (contributions by individual companies) into the TR. Also some minor revisions have been made. The TR contains test results characterising the speech quality performance of the codec, as well as other information of the codec (e.g., assessment of implementation complexity). This TR is part of feature “Wideband Telephony Service – AMR”.

- TR 26.937 “RTP usage model” (v1.2.0) is presented for information in Tdoc SP-020683. This TR is currently under review in relevant WGs (SA1, SA2, RAN2 and GERAN), and is expected to be finalised in time for approval at TSG-SA#19. The TR contains additional information and characterisation of the

PSS service. This work is part of feature “Extended Transparent End-to-end Packet Switched Streaming Service”.

- In the work task “definition of QoS parameter values for various media types” belonging to feature “Provisioning of IP Based Multimedia Services”, SA4 is defining informative mapping of SDP parameters to UMTS QoS parameters for PS conversational applications. The work has been now finalised and the mapping in TS 26.236 (in informative Annex B) is completed. A CR on this is brought for approval in Tdoc SP-020695. (Preliminary version of the mapping table was defined already by TSG-SA#15 and has been included in TS 26.236 since then.)

The only remaining Rel-5 work after TSG-SA#18 is the finalisation of TR 26.937 “RTP usage model”.

## 3. Release 6

### 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”). Testing of AMR-WB codec in PS conversational applications, intended originally as part of Rel-5 TR 26.976 ”Performance characterisation of the AMR-WB speech codec” was moved to be carried out within this work (as agreed at TSG-SA#17).

The need for funding the required subjective testing (performed typically on commercial basis by professional listening laboratories) was raised at TSG-SA#17. The availablility of funding remained open. After TSG-SA#17, 3GPP PCG has allocated up to 160 kEuro for the characterisation work. In addition, the contingency of 34 kEuro left from the AMR-WB Characterisation Phase may be available for the testing (if found agreeable by the contributor companies). This funding can be assumed to sufficiently cover the costs of testing. The exact amount of needed funding depends on the test plan, which is under preparation in SA4.

Conversational (bi-directional) testing is planned to be used for the characterisation 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). Test plan and the related test methodology have been discussed in SA4 in detail, but further contributions and work is needed. Companies in SA4 have shown interest in contributing to the work, e.g., by providing channel simulation patterns and/or carrying out conversational subjective tests (the latter on commercial basis). Interested testing laboratories were invited to raise their interest in the work by SA4#25 meeting (20-24 January, 2003).

### 3.2 Other Release 6 issues

WID for PS Streaming for Rel-6 has been now finalised, in collaboration with relevant WGs, and is presented for approval. (See Section 4.1 for details.)

Consideration of introduction of new codecs and formats for PSS and MMS has been preliminarily discussed within the PSM SWG of SA4. PSM SWG reached an agreement during SA4#24 that the selection of a default codec for audio for PSS and MMS (and MBMS ffs) is desirable in Rel-6. It was acknowledged that:

1) In the lower bit-rate audio range (12 kbit/s to <32 kbit/s), there are two contenders being presented, namely MPEG-4 aacPlus and a proposed 3GPP AMR-WB Extension. (The latter was presented as a new WI at SA4#24 - see Section 4.2 for details.)
2) In the higher bit-rate audio range (≥32 kbit/s), MPEG-4 aacPlus and MPEG-4 AAC appear to be the contenders.

The decisions for introduction of new codecs will be done within the PSS and MMS codec work in SA4.

SA1 has requested SA4 to analyse and recommend codec(s) to be used in speech recognition for speech enabled services. Preparatory steps for the work have already been taken in SA4 as a response to the SA1 request (received at SA4#23). SA4 is bringing WID of the SA4 part for approval. (See Section 4.3 for details.)

Discussion on codecs for MBMS has been postponed until the SA2 MBMS work will become more completed.

## 4. Proposed new Work Items (Release 6)

Altogether four new WIDs (all for Release 6) are brought for approval.

- Enhanced Tandem Free Operation in Tdoc SP-020684.
- Packet Switched Streaming in Tdoc SP-020685.
- Extended AMR-WB codec (AMR-WB+) targeted for packet-switched streaming and messaging services in Tdoc SP-020686.
- Codec Work to Support Speech Recognition Framework for Automated Voice Services in Tdoc SP-020687.

### 4.1 Packet Switched Streaming

As explained at TSG-SA#17, WID for PSS Rel-6 has been under finalisation with relevant WGs (SA1, SA2, SA3, SA5, T2). A draft WID has been reviewed by these WGs, and was also presented at TSG-SA#17 for information as part of the SA4 progress report. The comments received have been incorporated into the WID presented now for approval in Tdoc SP-020685.

The WID concerns the SA4 work for PSS. The SA4 work consists of codecs and formats and related issues, and also covers updating of the general description of PSS. SA4 has responsibility for two TSs: 26.233 "General description" and 26.234 "Codecs and formats". The SA1 part for Stage 1 (TS 22.233) is also included in the WID. (SA2 responsibility for possible Stage 2 is acknowledged; covering any non-transparent aspects in Rel-6 requiring SA2 involvement.)

The WI covers the following specific SA4 aspects:

1) Support for service adaptation (Enabling adaptation based on capability exchange, including user preferences; Support adaptation to varying network conditions; Adaptation to network capabilities and characteristics for GERAN, UTRAN and WLAN).
2) Consideration of introduction of new codecs and formats.
3) Harmonized streaming support for MMS.
4) Consideration of introduction of a server file format and a file format for progressive download.
5) Real time monitoring of application level QoS.

The work is linked to many related Rel-6 WIs in other WGs (IMS, MMS, End-to-end QoS, MBMS, GUP, Charging, DRM). In many of these, PSS is recognised either as linked work or included as part of the work itself. The technical work carried out by the other WGs (under their respective WIs) could result in new content for PSS in Rel-6, e.g., inclusion of charging and/or DRM.

The specific PSS work to be done by other WGs is described in their related WIs, e.g: 1) PSS alignment to IMS (to provide any architecture and Stage 2 specification necessary to support the reuse of IMS elements for PSS support) is covered in SA2 WI on "IMS Stage-2 Enhancements" (approved at TGS-SA#17), and 2) consideration of charging for PSS will be included in new SA5 Rel-6 WI on "Charging Management" (planned to be presented for approval at TSG-SA#18).

Especially the following issues (under the responsibility of other WGs) are acknowledged as related to the SA4 work and may impact it:

- DRM specific impacts on PSS, if any. (Technical work likely carried out within OMA.)
- IMS specific impacts on PSS, if any. (Covered by SA2 WI on "IMS Stage-2 Enhancements".)
- MBMS specific impacts on PSS, if any. (Covered by WIDs in CN, RAN, GERAN and SA.)
- Charging specific impacts on PSS, if any. (To be covered by new SA5 WI on "Charging Management".)

Some updates (CRs) for Stage 1 in Rel-6 were approved already at TSG-SA#17, e.g., addition of requirement for definition of a server file format (to provide easy interoperability between Content Creators and Service Providers). This is in-line with the targets of the proposed WI.

For Rel-6, SA4 is considering to reorganise TS 26.234, which currently is of considerable size, by dividing the content into three separate TSs: Protocols and codecs, 3GPP file format, and Timed text. This would provide better clarity of content and would also make referencing of the specific parts easier in other TSs.

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

Existing codecs have difficulties in performing consistently well for both speech and music at bit-rates well below 32 kbit/s. The AMR-WB speech codec is targeted for wideband speech applications. The codec has reasonable performance also for music but it is not comparable to generic audio codecs. To develop new audio modes for AMR-WB to enhance its music performance has been identified as a promising approach to provide consistent good quality for generic audio signals (speech, music and mixed content) at low bit-rates. In-house test results for an experimental version of extended AMR-WB codec have been presented in SA4.

A WID on extended AMR-WB codec (new audio modes) is brought for approval in Tdoc SP-020686. The new modes are targeted for PS streaming and messaging services (and not to be used for speech telephony service). Especially for PSS and MMS, it is felt desirable to have an audio codec that performs consistently well for both speech and music and can also operate at rather low bit-rates. The extended AMR-WB codec will be considered as a candidate for low bit-rate audio range for PSS and MMS services in 3GPP Rel-6 (under the relevant PSS and MMS codec work in SA4), as explained in Section 3.2.

Specific targets for the audio extension are:

- The AMR-WB extension is realised as new modes to the existing standard AMR-WB codec.
- High perceptual quality with speech, music and mixed content.
- The music performance should be comparable to the quality of state-of-the-art audio codecs.
- The speech performance should be at least as good as that of AMR-WB.
- Target is to use similar bit-rates as the AMR-WB codec in order to ensure efficient use of radio resources.
- The codec should support mono and stereo coding.
- Low complexity decoder for the streaming client.
- For streaming and messaging applications, AMR-WB delay requirements can be relaxed for the extended AMR-WB to enable new coding technologies.
- Normative fixed-point source code for both encoder and decoder to enable fast and wide adoption of the codec and to guarantee known audio quality.
- Seamless switching between the modes of the extended AMR-WB codec should be supported.

The work item does not introduce any new services. It extends the AMR-WB codec (new modes) targeting for use in PS streaming and messaging services. As the work item brings additional modes to the existing AMR-WB codec for use in PSS and MMS for the existing media type “Audio”, no service or architectural impacts are foreseen.

### 4.3 Codec Work to Support Speech Recognition Framework for Automated Voice Services

SA1 has requested SA4 to analyse and recommend codec(s) to be used in speech recognition for speech enabled services. This work is to support the codec aspects for speech enabled services as specified in TS 22.243 (“Speech Recognition Framework for Automated Voice Services; Stage 1). SA4 is bringing WID of the SA4 part for approval in Tdoc SP-020687. This work is part of the SA1 led work on Speech Enabled Services. The work concerns PS network configurations (both UTRAN and GERAN).

The objective of the SA4 work is to review and recommend codec(s) to support Speech Enabled Services and include these in relevant SA4 specifications (TS 26.235 “Packet Switched Conversational Multimedia Applications; Default Codecs” and TS 26.236 “Packet Switched Conversational Multimedia Applications; Transport Protocols”). Potential codecs to be considered are the existing 3GPP speech codecs (e.g. AMR, AMR-WB) and DSR optimized codecs. DSR Optimised Codecs include ones developed in ETSI AURORA.

Preparatory steps for the work have already been taken in SA4 as a response to the SA1 request (received at SA4#23). Discussion has been ongoing in SA4 on codec “Design Constraints” (e.g., complexity limits), “Test and Processing Plan” (to be used to compare codecs) and “Recommendation Criteria” (based on which the codec recommendation is to be carried out). Preparation of SA4 internal project documents on the three above issues is ongoing in SA4. All are targeted to be finalised at SA4#25 (January 2003). Testing of codecs (basically AMR vs. DSR optimised codecs) would be carried out after SA4#25. Results are targeted to be available at SA4#25bis (February 2003) enabling SA4 to make then a recommendation with regard to the codecs.

Codec evaluation will be based on a framework which includes databases, codecs and speech recognizers. Speech recognizers and databases to be used for testing are under study in SA4. Tests will be run for both the AMR codec and the DSR optimised codec(s). Some immediate dead-lines to progress the work were agreed at SA4#24: Full specification of databases to be proposed for the codec testing (as part of test and processing plan) must be sent on SA4 reflector by December 31, 2002. Any company which would like to submit a candidate will also need to indicate this before December 31, 2002. (Later indications will not be considered.)

### 4.4 Enhanced TFO

Enhanced TFO (eTFO) improves Tandem Free Operation (TFO) for use in packet networks by providing transmission savings. The TFO standard (defined in TS 28.062) was originally designed for TDM networks and it uses a 64 kbit/s G.711 PCM signal in between TRAU/TCs independently of the transport network. However, in case of packet networks it is advantageous to relay packetised speech frames without generating the G.711 PCM signal. This will result in considerable bandwidth savings. eTFO will start as TFO using 64 kbit/s G.711 and then, as soon as possible, will switch to use a compressed format.

The current TFO can be applied to transport networks other than those based on TDM, but this is not very efficient nor straightforward. eTFO would enable efficient management not only for TDM (like the current TFO protocol) but also for ATM and IP and any topology of networks mixing any of these.

eTFO will be defined in a new Rel-6 specification. In addition, CRs are needed to several TSs, including TFO Stage 1 and 2 (TSs 22.053 and 23.053) for which SA4 is the owner. eTFO is not expected to have any significant impact for the service or architecture; draft versions of CRs to Stage 1 and 2 were already presented for information at SA4#24. The work impacts also some CN3 and CN4 specifications. The eTFO WID has therefore been presented for information and discussed at last CN4 and CN3 meetings, and was then updated based on the received comments.

The eTFO WID is presented for approval in Tdoc SP-020684.

**5. Maintenance of releases (Change Requests)**

CRs are presented to the following TSs: 26.093 (Rel-5), 26.102 (Rel-5), 26.103 (Rel-5), 26.140 (Rel-5), 26.173 (Rel-5), 26.174 (Rel-5), 26.234 (Rel-4, Rel-5), 26.236 (Rel-5) and 28.062 (Rel-4, Rel-5).

The CRs are contained in Tdocs Tdoc SP-020688 until Tdoc SP-020696.

**6. New TR for information (Release 5)**

TR 26.937 “RTP usage model” v1.2.0 (Release 5) is presented for information in Tdoc SP-020683.

The TR has been sent in LS for review to relevant WGs (SA1, SA2, RAN2 and GERAN), and is expected to be finalised in time for approval at TSG-SA#19.

The objective of the TR is to characterise the 3GPP PS Streaming Service (PSS) (e.g., give statistics of traffic characteristics such as packet sizes and bit-rates) and also give 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).

The document discusses, e.g., the following issues:

- Trade-off between radio usage efficiency and streaming QoS
- Feedback of network conditions and adaptation of stream and/or the transmission of the stream
- Optimal packetisation of the media stream in line with the segmentation within the transport mechanism
- Error robustness mechanisms (such as retransmission)
- Client buffering to ease the QoS requirements on the network and enable more flexibility in how the network transport resources are applied

As the TR is related to the area of other WGs, review by the relevant WGs (as response to the SA4 LS) is especially important to complete and finalise the TR.

## 7. Approval requested

SA4 requests TSG-SA#18 to approve the following:

**Specifications:**

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|---|---|
| Tdoc SP-020682 | 3GPP TR 26.976 "AMR-WB Speech Codec Performance Characterization" (Release 5) version 2.0.0 |

**Work Item Descriptions:**

| | |
|---|---|
| Tdoc SP-020684 | Work Item Description on Enhanced Tandem Free Operation (Release 6) |
| Tdoc SP-020685 | Work Item Description on Packet Switched Streaming Services (Release 6) |
| Tdoc SP-020686 | Work Item Description on AMR-WB extension for high audio quality (Release 6) |
| Tdoc SP-020687 | Work Item Description on Codec Work to Support Speech Recognition Framework for Automated Voice Services (Release 6) |

**Change Requests:**

| | |
|---|---|
| Tdoc SP-020688 | CR to TS 26.093 - Correction of uplink SCR operation activation for UMTS AMR (Release 5) |
| Tdoc SP-020689 | CR to TS 26.102 - Correction of RAB parameter assignment for AMR (Release 5) |
| Tdoc SP-020690 | CRs to TS 26.103 Corrections (Release 5) |
| Tdoc SP-020691 | CRs to TS 26.140 - Corrections (Release 5) |
| Tdoc SP-020692 | CR to TS 26.173 Correction of ambiguous expression in the AMR-WB C-Code (Release 5) |
| Tdoc SP-020693 | CR to TS 26.174 - Correction in frame syncronisation sequence (Release 5) |
| Tdoc SP-020694 | CRs to TS 26.234 - Corrections (Release 4 and Release 5) |
| Tdoc SP-020695 | CRs to TS 26.236 - Corrections (Release 5) |
| Tdoc SP-020696 | CRs to TS 28.062 - Corrections (Release 4 and Release 5) |

## ANNEX A: List of input documents to TSG-SA#18 from SA4

| Tdoc | Title | Source | Agenda item | Document for |
|---|---|---|---|---|
| SP-020681 | TSG S4 Status Report at TSG-SA#18 | SA WG4 Chairman | 7.4.1 | Information |
| SP-020682 | 3GPP TR 26.976 "AMR-WB Speech Codec Performance Characterization" (Release 5) version 2.0.0 | SA WG4 | 7.4.3 | Approval |
| SP-020683 | TR 26.937 "RTP Usage Model" (Release 5) v. 1.2.0 | SA WG4 | 7.4.3 | Information |
| SP-020684 | Work Item Description on Enhanced Tandem Free Operation (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020685 | Work Item Description on Packet Switched Streaming Services (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020686 | Work Item Description on AMR-WB extension for high audio quality (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020687 | Work Item Description on Codec Work to Support Speech Recognition Framework for Automated Voice Services (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020688 | CR to TS 26.093 - Correction of uplink SCR operation activation for UMTS AMR (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020689 | CR to TS 26.102 - Correction of RAB parameter assignment for AMR (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020690 | CRs to TS 26.103 Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020691 | CRs to TS 26.140 - Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020692 | CR to TS 26.173 Correction of ambiguous expression in the AMR-WB C-Code (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020693 | CR to TS 26.174 - Correction in frame syncronisation sequence (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020694 | CRs to TS 26.234 - Corrections (Release 4 and Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020695 | CRs to TS 26.236 - Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020696 | CRs to TS 28.062 - Corrections (Release 4 and Release 5) | SA WG4 | 7.4.3 | Approval |

## ANNEX B: Slides presentation of the SA4 status report at TSG-SA#18

(Included in separate file: “SP-020681 Annex B – Slides presentation.ppt”)

# *TSG-SA WG4 (SA4) - CODEC*

# *Status Report at TSG-SA#18*

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

*These slides: Annex B of the report (Tdoc SP-020681)*

# *Content*

- **General issues**
- **Review of SA4 work progress (Rel-5, Rel-6)**
- **Documents for information**
- **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)**

- Due to finalisation of the TFO (Tandem Free Operation) algorithm, the TFO SWG likely needs not to meet anymore after SA4#23 (October 2002). Also, TFO SWG Chairman Mr. Clemens Suerbaum (Siemens / ETSI) stepped down from his position. SA4 thanks Clemens for the excellent work leading into the finalisation of the TFO standard!

# General: SA4 meetings

- **Meetings held:**

| | | |
|---|---|---|
| SA4#23: | Sept 30 - Oct 4, 2002 | Host: VoiceAge, Venue: Montreal, Canada |
| SA4#24: | Nov 11-15, 2002 | Host: Microsoft, Venue: Redmond, WA, USA |

- **Future meetings:**

| | | |
|---|---|---|
| SA4#25: | Jan 20-24, 2003 | Host: AT&T Wireless Services, Venue: San Francisco, USA |
| SA4#25bis: | Feb 24 – 28, 2003 | Host: tbd, Venue: tbd |
| SA4#26: | May 05 – 09, 2003 | Host: tbd, Venue: tbd |
| SA4#27: | July 07 – 11, 2003 | Host: tbd, Venue: tbd |
| SA4#28: | Sept 01 – 05, 2003 | Host: tbd, Venue: tbd |
| SA4#29: | Nov 24 – 28, 2003 | Host: tbd, Venue; tbd |

- **Meeting statistics:**
  - SA4#23: ~55 participants; ~130 Tdocs; PSM, SQ & TFO SWGs; 26 input LSs; 14 output LSs
  - SA4#24: ~45 participants; ~115 Tdocs; PSM & SQ SWGs; 14 input LSs; 6 output LSs

# General: Input documents

| Tdoc | Title | Source | Agenda item | Document for |
|---|---|---|---|---|
| SP-020681 | TSG S4 Status Report at TSG-SA#18 | SA WG4 Chairman | 7.4.1 | Information |
| SP-020682 | 3GPP TR 26.976 "AMR-WB Speech Codec Performance Characterization" (Release 5) version 2.0.0 | SA WG4 | 7.4.3 | Approval |
| SP-020683 | TR 26.937 "RTP Usage Model" (Release 5) v. 1.2.0 | SA WG4 | 7.4.3 | Information |
| SP-020684 | Work Item Description on Enhance Tandem Free Operation (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020685 | Work Item Description on Packet Switched Streaming Services (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020686 | Work Item Description on AMR-WB extension for high audio quality (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020687 | Work Item Description on Codec Work to Support Speech Recognition Framework for Automated Voice Services (Release 6) | SA WG4 | 7.4.3 | Approval |
| SP-020688 | CR to TS 26.093 - Correction of uplink SCR operation activation for UMTS AMR (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020689 | CR to TS 26.102 - Correction of RAB parameter assignment for AMR (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020690 | CRs to TS 26.103 Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020691 | CRs to TS 26.140 - Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020692 | CR to TS 26.173 Correction of ambiguous expression in the AMR-WB C-Code (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020693 | CR to TS 26.174 - Correction in frame syncronisation sequence (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020694 | CRs to TS 26.234 - Corrections (Release 4 and Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020695 | CRs to TS 26.236 - Corrections (Release 5) | SA WG4 | 7.4.3 | Approval |
| SP-020696 | CRs to TS 28.062 - Corrections (Release 4 and Release 5) | SA WG4 | 7.4.3 | Approval |

# General: Tdoc highlights

- **TR for approval (Rel-5):**
  - TR 26.976 ”Performance characterisation of the AMR-WB speech codec” (part of feature “Wideband Telephony Service - AMR”) in Tdoc SP-020682
- **TR for information (Rel-5):**
  - TR 26.937 “RTP usage model” (part of feature “Extended Transparent End-to-end PS Streaming”) in Tdoc SP-020683
- **New WIDs for approval (all for Rel-6):**
  - “Enhanced TFO” in Tdoc SP-020684
  - “PS Streaming” in Tdoc SP-020685
  - “Extended AMR-WB codec (AMR-WB+) targeted for PS streaming and messaging services” in Tdoc SP-020686
  - “Codec Work to Support Speech Recognition Framework for Automated Voice Services” in Tdoc SP-020687
- **CRs (Rel-5, Rel-4):**
  - To TSs: 26.093 (Rel-5), 26.102 (Rel-5), 26.103 (Rel-5), 26.140 (Rel-5), 26.173 (Rel-5), 26.174 (Rel-5), 26.234 (Rel-4, Rel-5), 26.236 (Rel-5) and 28.062 (Rel-4, Rel-5) in Tdocs SP-020688 until SP-020696

# *Content*

- **General issues**
- **Review of SA4 work progress (Rel-5, Rel-6)** 
- **Documents for information**
- **Approval requested**

# Release 5

# Remaining Rel-5 work

- **Finalisation of two non-critical TRs and completion of informative QoS mapping table:**

  1) **TR 26.976 "Performance characterisation of the AMR-WB speech codec"** (part of feature "Wideband Telephony Service - AMR")
     - TR finalised and is brought for approval.
     - Results for EDGE 8-PSK channels from GERAN (contributions by individual companies) included. Also some minor revisions made. (V 1.0.0 was presented for information at TSG-SA#17.)
     - TR contains test results characterising the speech quality performance of the codec, as well as other information (e.g., assessment of implementation complexity).

  2) **TR 26.937 "RTP usage model"** (part of feature "Extended Transparent End-to-end Packet Switched Streaming Service")
     - TR is presented for information. It is under review in relevant WGs (SA1, SA2, RAN2 and GERAN), and is expected to be finalised in time for approval at TSG-SA#19.
     - TR gives additional information and characterisation of the PS Streaming services.

  3) **Informative mapping of SDP parameters to UMTS QoS parameters for PS conversational applications** (part of feature "Provisioning of IP Based MM Services")
     - The mapping is now completed through CR into TS 26.236 (into informative Annex B).
     - Preliminary version of the mapping table was defined already by TSG-SA#15 and has been included in TS 26.236 since then.

☞ **After TSG-SA#18, TR 26.937 is the only remaining Rel-5 work in SA4.**

# Release 6

# *Performance characterisation of default codecs for PS conversational multimedia applications (Rel-6)*

- The objective is to characterize the performance of default codecs for PS conversational multimedia applications (as defined in TS 26.235 “Default Codecs”).
- The need of funding for subjective testing (performed typically on commercial basis by professional listening laboratories) was raised at TSG-SA#17 and remained open.
- PCG has allocated up to 160 kEuro for the characterisation work enabling the work to go on. The funding can be assumed to sufficiently cover the costs of testing. (In addition, the contingency of 34 kEuro left from the AMR-WB Characterisation Phase may be available for the testing, if found agreeable by the contributor companies.)
- Preparation of test plan and testing methodologies is ongoing in SA4.
- Conversational (bi-directional) testing is planned to be used for the characterisation to realistically capture the quality (and degradations) experienced during conversations via PS domain. (Uni-directional listening tests have been used in previous codec characterisations; described in the existing codec performance characterisation TRs of 26-series).
- Companies have shown interest in contributing to the work, e.g., by providing channel simulation patterns and/or carrying out conversational subjective tests (the latter on commercial basis).
- Interested testing laboratories have been invited to raise their interest in the work by SA4#25 meeting (20-24 January, 2003).

# *Other Release 6 issues*

- **WID for PSS finalised in collaboration with relevant WGs**
  - Draft WID reviewed by relevant WGs and comments incorporated into WID. WID is brought for approval.
- **Audio coding for PSS and MMS has been discussed in PSM SWG**
  - Selection of a default codec would be desirable in Rel-6:
    - In the lower bit-rate audio range (12 kbit/s to <32 kbit/s), there are two contenders being presented, MPEG-4 aacPlus and 3GPP AMR-WB Extension (a new work item proposed at SA4#24).
    - In the higher bit-rate audio range (≥ 32 kbit/s), MPEG-4 aacPlus and MPEG-4 AAC appear to be the contenders.
  - The decisions for introduction of new codecs will be done during the PSS and MMS work in SA4, as covered, e.g., in proposed PSS Rel-6 WI (under "consideration of introduction of new codecs and formats")
  - A proposed new WID on "Extended AMR-WB codec (AMR-WB+) targeted for PS streaming and messaging services" targets for developing the AMR-WB Extension.
- **SA1 has requested SA4 to analyse and recommend codec(s) to be used in speech recognition for speech enabled services**
  - SA4 is bringing WID of the SA4 work. Preliminary steps for the work already taken in SA4.
- **Discussion on codecs for MBMS postponed until the SA2 work will become more completed.**

# New Work Items (Release 6)

# *Packet Switched Streaming Rel-6*

- WID has been under finalisation with relevant WGs (SA1, SA2, SA3, SA5, T2). Comments received have been incorporated into the WID presented for approval in Tdoc SP-020685.
- WID covers SA4 work (with links to related work in other WGs). SA4 work is on codecs, formats and related issues; as well as updating the general description of PSS. SA4 has responsibility for TSs 26.233 “General description” and 26.234 “Codecs and formats”.
- Also, SA1 responsibility for Stage 1 (and SA2 for possible Stage 2 on any non-transparent aspects) are included in the WID.
- Specific aspects of the SA4 work:
  - Support for service adaptation (Enabling adaptation based on capability exchange, including user preferences; Support adaptation to varying network conditions; Adaptation to network capabilities and characteristics for GERAN, UTRAN and WLAN).
  - Consideration of introduction of new codecs and formats.
  - Harmonized streaming support for MMS.
  - Consideration of introduction of a server file format and a file format for progressive download.
  - Real time monitoring of application level QoS.
- The SA4 work is linked to many related Rel-6 WIs in other WGs (IMS, MMS, End-to-end QoS, MBMS, GUP, Charging, DRM). In many of these, PSS is recognised either as linked work or included as part of the work itself. The technical work carried out by the other WGs under their related WIs could result in new content for PSS in Rel-6 (e.g., inclusion of charging and/or DRM, and alignment to IMS).

# *Packet Switched Streaming Rel-6*

***(continued)***

- The PSS work to be done by other WG is described in their related WIs, e.g.,
  - PSS alignment to IMS (to provide any architecture and Stage 2 specification necessary to support the reuse of IMS elements for PSS support) is covered in SA2 WI on "IMS Stage-2 Enhancements" (approved at TGS-SA#17)
  - Consideration of charging for PSS is planned to be included in new SA5 Rel-6 WI on "Charging Management" (to be presented for approval at TSG-SA#18)
- Especially the following issues (under the responsibility of other WGs) are acknowledged as related to the SA4 work and may impact it:
  - DRM specific impacts on PSS, if any. (DRM work will likely be carried out within OMA.)
  - IMS specific impacts on PSS, if any. (Covered by SA2 WI on "IMS Stage-2 Enhancements".)
  - MBMS specific impacts on PSS, if any. (MBMS covered by several WIDs.)
  - Charging specific impacts on PSS, if any. (To be covered by SA5 WI on "Charging Management".)
- Some updates (CRs) for Stage 1 in Rel-6 were approved already at TSG-SA#17, e.g., addition of requirement for definition of a server file format (to provide easy interoperability between Content Creators and Service Providers). This is in-line with the targets of the proposed WI.
- For Rel-6, SA4 is considering to reorganise TS 26.234, which currently is of considerable size, by dividing the content into three separate TSs: Protocols and codecs, 3GPP file format, and timed text. (This would provide better clarity of content and would also make referencing of the specific parts easier in other TSs.)

# *Extended AMR-WB codec (AMR-WB+) targeted for PS streaming and messaging services*

- Existing codecs have difficulties in performing consistently well for both speech and music at bit-rates well below 32 kbit/s.
- The AMR-WB speech codec is targeted for wideband speech applications. The codec has reasonable performance also for music but it is not comparable to generic audio codecs. To develop new audio modes for AMR-WB to enhance its music performance has been identified as a promising approach to provide consistent good quality for all generic audio signals (speech, music and mixed content) at low bit-rates. In-house test results for an experimental version of extended AMR-WB codec have been presented in SA4.
- The new modes are targeted for PS streaming and messaging services (and not to be used for speech telephony).
- The extended AMR-WB codec will be considered as a candidate for PSS and MMS services in 3GPP Rel-6 (under the relevant PSS and MMS codec work in SA4) for the low audio bit-rate range (<32 kbit/s).
- The WI does not introduce any new services. It extends the AMR-WB codec (with new modes) targeting their use in PS streaming and messaging services under the existing Audio media-type.
- WID is brought for approval in Tdoc SP-020686.

# *Codec Work to Support Speech Recognition Framework for Automated Voice Services*

- SA1 has requested SA4 to analyse and recommend codec(s) to be used in speech recognition for speech enabled services.
- This work is to support the codec aspects for speech enabled services (as specified in TS 22.243 “Speech Recognition Framework for Automated Voice Services; Stage 1). The work concerns PS network configurations (both UTRAN and GERAN).
- SA4 is bringing WID of the SA4 part for approval in Tdoc SP-020687. This work is part of the SA1 led feature on Speech Enabled Services.
- The objective of the SA4 work is to review and recommend codec(s) to support Speech Enabled Services and include these in relevant SA4 specifications (TS 26.235 “Packet Switched Conversational Multimedia Applications; Default Codecs” TS 26.236 on “Packet Switched Conversational Multimedia Applications; Transport Protocols”).
- SA4 will recommend a codec to be supported by default to deploy the service for 3GPP speech recognition framework. Potential codecs to be considered are the existing 3GPP speech codecs (e.g. AMR, AMR-WB) or DSR optimized codecs. DSR Optimised Codecs include ones developed in ETSI AURORA

# *Codec Work to Support Speech Recognition Framework for Automated Voice Services*

***(continued)***

- Preparatory steps for the work have already been taken in SA4 as a response to the SA1 request (received at SA4#23).
- "Design Constraints" (e.g., complexity limits), "Test and Processing Plan" (to be used to compare codec solutions) and "Recommendation Criteria" are under preparation. All these are targeted to be finalised at SA4#25 (January 2003).
- Testing of codecs (basically: AMR codec vs. DSR optimised codec(s)) will be carried out after SA4#25. Results would be available at SA4#25bis (February 2003) enabling SA4 to make then a recommendation with regard to the codecs.
- Codec evaluation will be based on a framework which includes databases, codecs and speech recognizers. Speech recognizers and databases to be used for the testing are under study in SA4.
- Some immediate dead-lines to progress the work were agreed at SA4#24:
  - Full specification of databases to be proposed for the codec testing (as part of test and processing plan) must be sent on SA4 reflector by December 31, 2002.
  - Any company which would like to submit a candidate will also need to indicate this before December 31, 2002. (Later indications will not be considered.)

# *Enhanced TFO (eTFO)*

- TFO standard (TS 28.062) was originally designed for TDM networks and it requires a 64 kbit/s G.711 PCM signal in between TRAU/TCs independently of the transport network.
- However, in case of packet networks it is advantageous to relay packetised speech frames without generating the G.711 PCM signal. This will result in considerable bandwidth savings. eTFO will start as TFO using 64 kbit/s G.711 and then as soon as possible switch into a more efficient compressed format.
- eTFO enables efficient management not only for TDM (like the current TFO protocol) but also for ATM and IP and any topology of networks mixing any of these.
- eTFO will be described in a new Rel-6 specification. In addition, CRs are needed to several specifications, including TFO Stage 1 and 2 (TSs 22.053 and 23.053). SA4 is owner of Stage 1 and 2 for TFO and the extension to eTFO is not expected to have any significant impact to the service or architecture. (Draft versions of CRs to Stage 1 and 2 were already presented for information at SA4#24.)
- The work impacts also some CN3 and CN4 specifications. The WID has therefore been presented at last CN4 and CN3 meetings for information. Comments from there are included in the WID.
- The eTFO WID is presented for approval in Tdoc SP-020684.

# *Content*

- **General issues**
- **Review of SA4 work progress (Rel-5, Rel-6)**
- **Documents for information** 
- **Approval requested**

# *New TR for information*

- **TR 26.937 "RTP usage model" (Rel-5)**
  - v1.2.0 is presented for information in Tdoc SP-020683.
  - The TR has been sent in LS for review to the relevant WGs (SA1, SA2, RAN2 and GERAN), and is expected to be finalised in time for approval at TSG-SA#19.
  - The objective of the TR is to give **characterisation** of the PS Streaming Service (e.g., give statistics of traffic characteristics such as packet sizes and bit-rates) and also give useful **information** of issues that service providers and manufacturers should be aware of (e.g., implications of different RTP packet sizes and impact of different rate control strategies for video streaming).
  - The document discusses, e.g., following issues:
    - Trade-off between radio usage efficiency and streaming QoS
    - Feedback of network conditions and adaptation of stream and/or the transmission of the stream
    - Optimal packetisation of the media stream in line with the segmentation within the transport mechanism
    - Error robustness mechanisms (such as retransmission)
    - Client buffering to ease the QoS requirements on the network and enable more flexibility in how the network transport resources are applied
  - As the TR is related to the areas of other WGs, review by the relevant WGs (as response to the SA4 LS) is especially important to complete and finalise the TR.

# *Content*

- **General issues**
- **Review of SA4 work progress (Rel-5, Rel-6)**
- **Documents for information**
- **Approval requested**

# *Approval Requested*

## Specifications

**Tdoc SP-020682: TR 26.976 "AMR-WB Speech Codec Performance Characterization" (Release 5), version 2.0.0**

- The TR provides information on the AMR Wideband (AMR-WB) codec Selection, Verification and Characterisation Phases. Speech quality test results illustrate the AMR-WB codec performance in different scenarios. Additional information is provided, e.g. on implementation complexity of the AMR-WB codec.
- Presented for information at TSG-SA#17. Since then results for EDGE 8-PSK channels from GERAN (contributions by individual companies) included. Also some minor revisions have been made.

# *Approval Requested*

**Work Item Descriptions:**

**Tdoc SP-020684 Work Item Description on Enhanced Tandem Free Operation (Release 6)**

**Tdoc SP-020685 Work Item Description on Packet Switched Streaming Services (Release 6)**

**Tdoc SP-020686 Work Item Description on AMR-WB extension for high audio quality (Release 6)**

**Tdoc SP-020687 Work Item Description on Codec Work to Support Speech Recognition Framework for Automated Voice Services (Release 6)**

# *Approval Requested*

## Change Requests:

### Tdoc SP-020688 CR to TS 26.093 "AMR speech Codec; Source Controlled Rate operation" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.093 | 010 | 3 | Rel-5 | Correction of uplink SCR operation activation for UMTS AMR | F | 5.1.0 | S4 | TSG-SA WG4#23 | S4-020623 |

### Tdoc SP-020689 CR to TS 26.102 - "AMR speech Codec; Interface to Iu, Uu and Nb" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.102 | 012 | 2 | Rel-5 | Correction of RAB parameter assignment for AMR | F | 5.0.0 | S4 | TSG-SA WG4#23 | S4-020624 |

### Tdoc SP-020690 CRs to TS 26.103 "Codec List" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.103 | 021 | 1 | Rel-5 | Correction of uplink SCR activation for UMTS AMR | F | 5.3.0 | S4 | TSG-SA WG4#23 | S4-020625 |
| 26.103 | 022 | | Rel-5 | Correction to the Codec ID Table | F | 5.3.0 | S4 | TSG-SA WG4#23 | S4-020597 |

# *Approval Requested*

## Tdoc SP-020691 CRs to TS 26.140 "MMS: Media Formats and Codecs" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.140 | 002 | | Rel-5 | Code points for H.263 | F | 5.1.0 | S4 | TSG-SA WG4#23 | S4-020540 |
| 26.140 | 003 | 1 | Rel-5 | File Format name change from MP4 to 3GP | F | 5.1.0 | S4 | TSG-SA WG4#23 | S4-020609 |

## Tdoc SP-020692 CR to TS 26.173 "AMR-WB: ANSI C-code" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.173 | 014 | | Rel-5 | Correction of ambiguous expression in the AMR-WB C-Code | F | 5.4.0 | S4 | TSG-SA WG4#23 | S4-020533 |

## Tdoc SP-020693 CR to TS 26.174 "AMR-WB: Test Sequences" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.174 | 005 | | Rel-5 | Correction in frame syncronisation sequence | F | 5.3.0 | S4 | TSG-SA WG4#23 | S4-020545 |

# *Approval Requested*

## Tdoc SP-020694 CRs to TS 26.234 "End-to-end transparent streaming service; Protocols and codecs" (Release 4 and Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.234 | 040 | | Rel-5 | Code points for H.263 | F | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020539 |
| 26.234 | 041 | 2 | Rel-5 | File format 3GP based on ISO and not MP4 | F | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020589 |
| 26.234 | 042 | 2 | Rel-4 | Addition regarding IPv6 support in SDP | F | 4.4.0 | S4 | TSG-SA WG4#23 | S4-020626 |
| 26.234 | 039 | 2 | Rel-5 | Addition regarding IPv6 support in SDP | A | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020627 |
| 26.234 | 045 | 1 | Rel-5 | Client usage of bandwidth parameter at the media level in SDP | F | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020588 |
| 26.234 | 043 | 2 | Rel-4 | SMIL authoring instructions | F | 4.4.0 | S4 | TSG-SA WG4#24 | S4-020723 |
| 26.234 | 044 | 1 | Rel-5 | SMIL authoring instructions | A | 5.2.0 | S4 | TSG-SA WG4#24 | S4-020634 |
| 26.234 | 046 | 1 | Rel-4 | SMIL Language Profile | F | 4.4.0 | S4 | TSG-SA WG4#24 | S4-020699 |
| 26.234 | 047 | 1 | Rel-5 | SMIL Language Profile | A | 5.2.0 | S4 | TSG-SA WG4#24 | S4-020700 |
| 26.234 | 050 | 1 | Rel-5 | Usage of Multiple Media Sample Entries in Media Tracks of 3GP files | F | 5.2.0 | S4 | TSG-SA WG4#24 | S4-020724 |
| 26.234 | 051 | 1 | Rel-5 | Progressive download of 3GP files | F | 5.2.0 | S4 | TSG-SA WG4#24 | S4-020712 |

## Tdoc SP-020695 CRs to TS 26.236 "Packet switched conversational multimedia applications; Transport protocols" (Release 5)

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.236 | 001 | 2 | Rel-5 | QoS profile parameters for conversational multimedia applications | F | 5.0.0 | S4 | TSG-SA WG4#24 | S4-020725 |
| 26.236 | 002 | 1 | Rel-5 | Clarification on SDP session bandwidth parameter | F | 5.0.0 | S4 | TSG-SA WG4#24 | S4-020711 |

# *Approval Requested*

**Tdoc SP-020696** **CRs to TS 28.062 "Inband Tandem Free Operation (TFO) of speech codecs; Service description; Stage 3" (Release 4 and Release 5)**

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 28.062 | 035 | 1 | Rel-4 | Correction to TFO_Term state description | F | 4.4.0 | S4 | TSG-SA WG4#23 | S4-020571 |
| 28.062 | 036 | 1 | Rel-5 | Correction to TFO_Term state description | A | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020572 |
| 28.062 | 037 | 1 | Rel-5 | TFO version handling | F | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020573 |
| 28.062 | 038 | 1 | Rel-5 | Corrections to the TFO standard (wrong specification references) | F | 5.2.0 | S4 | TSG-SA WG4#23 | S4-020574 |
| 28.062 | 039 | 1 | Rel-5 | Correction of TFO_REQ message for AMR-WB | F | 5.2.0 | S4 | TSG-SA WG4#24 | S4-020722 |

**(end of presentation)**