SP-000018

Source: TSG-S4 (Codec Working Group) Chairman

Title: Status Report at TSG-SA#7

Document for: Information and Decision

Agenda Item: 5.4.1

TSG-S4 Codec Working Group Status Report

Executive Summary

TSG-S4 (Codec Working Group) held two plenary since TSG-SA#6 (in Puerto Vallarta, Mexico in January 2000 and Helsinki, Finland in March 2000).

In this timeframe, S4 focused its activity on the completion of the Release 99 open issues under its responsibility while progressing the key Release 2000 work items.

The Technical Reports providing Quantitative Performance Evaluation of H.324 Annex C over 3G (3G TR 26.912 version 2.0.0) and Echo Control for Speech and Multimedia services (3G TR 26.915 version 1.0.0) were completed and are presented to TSG-SA#7 for approval.

On the other hand, the AMR Characterization in 3G Channels will not be completed before the second half of 2000. S4 is still missing representative 3G Error Patterns to complete this task. Few organizations have indicated their intent to provide such Error Patterns by June 2000. In the meantime, the existing GSM AMR Characterization Report was completed with Performance Data as a function of FER/RBER. These results are considered applicable to 3G as well.

Similarly, the verification and evaluation of the Floating-Point AMR C-Code, intended for Multimedia applications running on PC-like platform, is still ongoing. S4 expect to complete this task by June 2000 and would prefer to keep this item in Release 99 for completeness of the set of codec specifications for the support of Circuit Switched H.324 Based Multimedia services.

One ‘strategic’ Change Request to correct a problem on the AMR5.9 mode is presented for approval.

SA is also kindly requested to endorse a proposal to allow using AMR12.2 as an alternative EFR implementation. This proposal would facilitate dual mode GSM/3G AMR/EFR implementations but will also introduce 5ms of additional one-way transmission delay for this EFR implementation compared to the existing EFR.

The preparation of the 3G Terminal Acoustic Test Specification (3G TS 26.132) is progressing well. S4 expect to present the corresponding specification at TSG-SA#8.

The participation to the TFO sub-group sessions is increasing. A new CR on the GSM 08.62 (R98) is presented to TSG-SA#7 for approval. This CR provides the necessary TFO Messages extensibility to support codecs with complex configuration parameter sets like AMR. The TFO sub-group continued to discuss the support of AMR. It was agreed to include a simplifying option or shortcut in the specification for network supporting all 8 codec modes. The group is still targeting June 2000 to complete this task.

The development of the AMR Wideband Speech Codec is progressing according to schedule. Th project plan is still targeting a completion by December 2000. A number of project documents were prepared and reviewed and should be approved by March 17. The Performance Requirements and the Design Constraints are forwarded to TSG-SA for approval. The qualification tests involving 8 candidates are scheduled for April-May 2000. The Qualification results should be presented at the next TSG-SA plenary.

TSG-S4 received three new communications from ITU-T SG16 and has already answered to a previous communication on a possible collaboration on the development of the wideband speech codec.

The S4 Chairman indicated that he will not be able to assume this position after TSG-SA#8 (June 2000). Consequently a new S4 Chairman will be elected at the next S4 plenary (S4#11 June 5-8, 2000).

Annex B contains a copy of the slides presented to TSG-SA#7. Annex B contains an updated status list of TSG-S4 deliverables. == = =

1. Introduction

The 3GPP Codec Working Group held two plenary meetings since the last TSG-SA#6. TSG-S4#8 took place on January 24-28, 2000 in Puerto Vallarta, Mexico hosted by AT&T, BellSouth Cellular, Ericsson and Nokia. TSG-S4#9 took place on February 28-March 3 in Helsinki, Finland hosted by Nokia. As before, these S4 plenary meetings were held simultaneously with SMG11 plenary.

Meetings held:

TSG-S4#9/SMG11#14:	January 24-28	hosted by AT&T, BellSouth Cellular, Ericsson and Nokia in Puerto Vallarta, Mexico.
TSG-S4#10/SMG11#15:	February 28-March 3	hosted by Nokia in Helsinki, Finland

Next Meetings calendar (slightly revised since the last report)**:**

TSG-S4#11/SMG11#15:	June 5-9	Potential Host identified
TSG-S4#12/SMG11#16:	September 4-8	host needed
TSG-S4#13/SMG11#17:	October 23-27	host needed
TSG-S4#14/SMG11#18:	November 20-24	host needed

As a reminder, five Release 99 open items under S4 responsibility were identified at the last TSG-SA plenary:

- AMR 3G Characterization (expected to be completed for March 2000)
- AMR Floating Point C-Code (expected to be completed for March 2000)
- 3G TR 26.912: Quantitative Performance Evaluation of H.324 Annex C over 3G (expected completion for 3/2000)
- 3G TR 26.915: Transmission Network Planning for 3G services (expected completion for March 2000)
- 3G TS 26.132: 3G Acoustic Test Specifications (expected completion for June 2000)

The other key S4 Release 2000 work items include:

- AMR TFO for GSM and 3G
- AMR Wideband Speech Codec

Annex A contains a copy of the slides presented at TSG-SA#7.

Annex B contains an updated list of TSG-S4 deliverables providing status information and target approval dates for each specification.

2. Release 99: Mandatory Speech Codec - AMR

The complete status list of the R99 AMR specifications is provided in the following table. All Technical Specifications are now approved and under change control. The only missing deliverable is the Technical Report 3G TR 26.975 containing the Characterization Report of the AMR Speech Codec in the GSM and 3G channels.

It was not possible to complete the AMR 3G Characterization Phase for March 2000, as initially expected. The key reason for this delay is that we are still missing representative Error Patterns and a final agreement on which Channel Error conditions to include in the subjective listening tests. On top of that, it does not appear that the funding for this task (55 kEuros approved ‘in principle’ by the PCG) has been released so far.

Few organizations have proposed to contribute to the preparation of representative Error Patterns but not before June 2000. Consequently, the corresponding tests should be performed sometimes in the second half of 2000.

As a temporary solution, the existing GSM Characterization Report (GSM 06.75) was completed with AMR Performance data (in Mean Opinion Score) as a function of FER/RBER. Although these results are derived from the tests performed in a GSM channel, they provide a good overview of the sensitivity of the different codec modes to channel errors and are considered applicable to 3G networks.

The draft AMR 3G Characterization Report (3G TR 26.975) was updated accordingly (new version 1.1.0) and is once again presented for information to TSG-SA#7 in Tdoc **SP-000021**.

Table 2.1: Status List of AMR R99 specifications

Deliverable	Title	Latest version	Comment/Status	Approval
TS 26.071	AMR Speech Codec; General Description	3.0.1	Stable. Presented for approval at TSG-SA#4 in Tdoc SP-99244	Approved
TS 26.090	AMR Speech Codec; Transcoding functions	3.1.0	Stable. Presented for approval at TSG-SA#4 in Tdoc SP-99245	Approved
TS 26.073	AMR Speech Codec; ANSI C-Code	3.0.0	Stable. Presented for approval at TSG-SA#6 in Tdoc SP-99560	Approved
TS 26.074	AMR Speech Codec; Test Sequences	3.0.0	Stable. Presented for approval at TSG-SA#6 in Tdoc SP-99559	Approved
TS 26.091	AMR Speech Codec; Error Concealment of lost frames	3.1.0	Stable. Presented for approval at TSG-SA#4 in Tdoc SP-99246	Approved
TS 26.092	AMR Speech Codec; Comfort noise aspects	3.0.1	Stable. Presented for approval at TSG-SA#4 in Tdoc SP-99247	Approved
TS 26.093	AMR Speech Codec Source Controlled Rate operation	3.1.0	Stable. Presented for approval at TSG-SA#4 in Tdoc SP-99248	Approved
TS 26.094	AMR Speech Codec Voice Activity Detector	3.0.0	Stable. Presented for approval at TSG-SA#5 in Tdoc SP-99353	Approved
TS 26.101	AMR Speech Codec Frame Structure	3.0.0	Stable. Presented for approval at TSG-SA#6 in Tdoc SP-99562	Approved
TS 26.102	AMR Speech Codec Interface to Iu and Uu	3.0.0	Stable. Presented for approval at TSG-SA#6 in Tdoc SP-99563	Approved
TS 26.103	Speech Codec List for GSM and UMTS	3.0.0	Stable. Presented for approval at TSG-SA#6 in Tdoc SP-99564	Approved
TR 26.975	AMR Speech Codec Performances Characterization	1.1.0	Funding approved by PCG. Preparation of Test plan under way. Pending agreement on representative Test Conditions and Error Patterns. Tests to be performed in 2H00 Version 1.1.0 based on latest version GSM 06.75 presented for information to SG-SA#6 in **SP-000021**	Delayed

11 Change Requests on AMR specifications, included in **SP-000025** are presented to TSG-SA for approval (see list below). 7 Change Requests include corrections or clarifications of the 3G Technical specifications 3G TS 26.101 (Frame Structure) and 3G TS 26.102 (Interface to Iu and Uu). 2 Changes Requests on the GSM 06.75 complete the report with additional information or performance results.

One strategic CR on the AMR C-Code (GSM 06.73 and 3G TS 26.07) is presented for approval to correct a problem on the AMR5.9 mode. This problem was unfortunately introduced by another recently approved CR. The problem was considered serious enough (especially in Half Rate) to introduce this new correction. With this new modification, the AMR5.9 mode is put back in the state in which it was characterized.

Table 2.2: List of AMR CR presented at TSG-SA#7

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000023	06.73	7.3.0	A021		F	R98	Avoidance of pulse cancellation in FCB excitation
S4-000032	26.073	3.0.0	001		F	R99	Avoidance of pulse cancellation in FCB excitation
S4-000006	06.75	7.1.0	A002		D	R98	Threshold and Hysteresis for Exp. 4a and 4b
S4-000007	06.75	7.1.0	A003		D	R98	Introduction of Annex D (AMR Performances as a function of FER/RBER)
S4-000139	26.101	3.0.0	001		F	R99	Correction of indices in Annex B table
S4-000140	26.101	3.0.0	002		F	R99	Addition of comfort noise bit ordering
S4-000141	26.101	3.0.0	003		F	R99	Correction of table indexing for AMR Core Frame class division
S4-000168	26.101	3.0.0	004		F	R99	Clarification of bit transmission order for AMR frame structure parameters for AMR IF1
S4-000193	26.102	3.0.0	001	3	C	R99	Introduction of QoS parameters used at RAB assignment
S4-000067	26.102	3.0.0	002		C	R99	Introduction of different RFCS set on Iu User Plane
S4-000177	26.102	3.0.0	003	2	B	R99	Introduction of Time Alignment

Finally TSG-S4 has endorsed a proposal to use the AMR12.2 mode as an alternative EFR implementation. As a reminder, there are few difference between the AMR 12.2 mode and the EFR speech codec although both codec are fully inter-operable, not considering discontinuous transmission operation. The key differences between AMR12.2 and the EFR were introduced by the instability protection included in all AMR

modes and to correct few known bugs on the EFR codes. The most significant difference was introduced by the dummy look-ahead delay introduced in the AMR12.2 to allow seamless switching with the other codec modes, which operate with a 5ms look-ahead. The other main difference comes from the coding and repetition rate of the comfort noise parameters. As a consequence, the AMR12.2 mode does not pass the EFR Test Vectors. In order to facilitate the implementation of dual mode GSM/3G handsets, S4 propose to define the AMR12.2 as another allowed EFR implementation. This means that:

- The AMR12.2 Test Vectors would be used as EFR Test vectors as well
- In this implementation, EFR would present an additional 5ms one-way transmission delay, equivalent to the normal Transmission delay of the AMR12.2 mode
- For obvious backward compatibility reasons, the existing EFR comfort noise encoding would remain the only allowed implementation for this part of the code.

S4 kindly ask SA to endorse this proposal. S4 will then prepare the corresponding CRs to the EFR specifications for the upcoming SA plenary.

3. Release 99: Codec for Circuit Switched H.324 Based Multimedia Telephony Service

An updated status list of all deliverables for this work item is provided below.

All S4 specifications on the support of Circuit Switched H.324M Based Multimedia Telephony service are under change control and considered stable. No new CR is presented at this plenary.

The preparation, verification and evaluation of the Floating Point version of the AMR C-Code is progressing well, but this task is not advanced enough to present the corresponding deliverable (3G TS 26.104) for approval at TSG-SA#7, as initially expected.

The code is now available and under evaluation in all organizations participating to this activity: BT, Ericsson, France Telecom R&D, Motorola, Nokia, Nortel Networks, Siemens and Texas Instruments. These organizations have committed to verify the code and/or perform quality evaluation of the code in different conditions. Preliminary results are confirming the significant improvement in execution speed obtained with this new version of the code. Other results are showing that this version of the code performs at lest as well as the fixed-point version included in 3G TS 26.073.

However, this verification phase is still ongoing and these results must be confirmed to consider the code stable enough for presentation to TSG-SA. A draft version of the related specification (3G TS 26.104 version 0.3.0) included in SP-000021 is presented to TSG-SA#7 for information.

Since this version of the code targets Multimedia applications for PC platforms and the other related codec specifications (3G TS 26.110, 3G TS 26.111 and3G TR 26.911) are already under change control, S4 would rather keep this item as part of Release 99. SA is asked to comment and possibly confirm this proposal.

Table 3.1: Status List for Multimedia H.324 Based Codec Specifications

Deliverable	Title	Latest Version	Comment/Status	Approval
TS 26.110	Codec(s) for Circuit Switched Multimedia Telephony Service General Description	3.0.1	Stable Presented for approval at TSG-SA#4 in Tdoc SP-99249	Approved
TS 26.111	Codec(s) for Circuit Switched Multimedia Telephony Service Modifications to H.324	3.0.1	Stable Presented for information at TSG-SA#4 in Tdoc SP-99250	Approved
TR 26.911	Codec(s) for Circuit Switched Multimedia Telephony Service Terminal Implementor's Guide	3.0.1	Stable Presented for approval at TSG-SA#4 in Tdoc SP-99251	Approved
TS 26.104	AMR Speech Codec; Floating Point C-Code	0.3.0	Software available under verification. Version 0.3.0 presented for approval at TSG-SA#4 in Tdoc **SP-000022**	Completion now planned for TSG-SA#8 (June 2000)

4.Release 99: QoS for Audio and Multimedia Codecs

The complete list of deliverables for this work item is provided below.

Table 4.1: Status List for QoS for Audio and Multimedia Codec Specifications

Deliverable	Title	Latest Version	Comment/Status	Approval
TR 26.912	Quantitative performance evaluation of H.324 Annex C over 3G	2.0.0	Completed with AMR speech Codec Performance Data. Presented for approval at TSG-SA#7 in Tdoc **SP-00019**	TSG-SA#7
TR 26.913	Quantitative performance evaluation of real-time packet switched multimedia services over 3G	0.0.1	Reviewed in TSG-S4#5 Inputs expected for next TSG-S4 meetings	Release 2000
TR 26.915	Echo Control For Speech and Multi-Media Services	1.0.0	Completed. Presented for approval at TSG-SA#7 in Tdoc **SP-00020**	TSG-SA#7

The only deliverables for this Work Item are Technical Reports providing performances data and considering typical network configurations for the 3G services and especially the speech service.

The technical reports 3G TS 26.912 (Quantitative performance evaluation of H.324 Annex C over 3G) and 3G TS 26.915 (Echo Control For Speech and Multi-Media Services) were completed and are presented for approval to TSG-SA#7.

3G TS 26.912 version 2.0.0 is included in Tdoc **SP-000019**. It was completed with AMR speech codec performance data extracted from the AMR Characterization Report (GSM 06.75).

3G Ts 26.915 version 1.0.0 is presented for the first time to TSG-SA. It contains a recommendation to use Echo Cancellation devices in 3G networks for the narrowband speech service when interconnecting with conventional PSTN. Note that this recommendation was also included in the GSM 03.50. All Terminal Acoustic Performance and Test requirements also included in the GSM 03.50 were reported in the 3G TS 26.131 and 3G TS 26.132.

5. Release 99: 3G Audio-Visual Terminal Characteristics

The updated list of deliverables for this work item is provided in the following table. No document or change request is presented to TSG-SA#7 in relation to this work item.

Preliminary drafts of the 3G Terminal Acoustic Test specification (3G TS 26.132) were discussed during the past S4 plenary. An Ad Hoc drafting session is planned in the April-May time frame to complete this specification before the next SA plenary.

S4 also noted that, contrary to GSM Terminals, T1 did not plan to include specifications for a Digital Audio Interface for 3G Terminals. This means that most Acoustic Tests must be performed through the Air Interface. S4 is working on the Acoustic Test Requirements under this assumption.

Table 5.1: Status List for 3G Terminal Acoustic Specifications

Deliverable	Title	Latest Version	Comment/Status	Approval
TS 26.131	Terminal Acoustic Characteristics for Telephony; Requirements	3.0.0	Stable, but references to DAI must be removed. Presented for approval at TSG-SA#6 in Tdoc SP-99565	TSG-SA#6
TS 26.132	Terminal Acoustic Characteristics for Telephony; Test Specifications	-	Latest draft contained in S4-000081 as reviewed in TSG-S4#9. New version expected for TSG-S4#11 (June 2000)	Approval Delayed to TSG-SA#8 (June 2000)

6. Tandem Free Operation in 3G systems and between 2G and 3G systems

Following the TSG-SA#6 decision to postpone AMR TFO to Release 2000, a new CR on the TFO specification (GSM 08.62 R98) is presented for approval to TSG-SA#7 to replace the CR rejected by TSG-SA#6. This Change Request provides the necessary Message Extensibility to prepare the TFO protocol to

support future codecs with complex configuration data set, lie AMR.

The TFO sub-group is reviewing the AMR TFO specifications with the objective to prepare a first acceptable specification by June 2000. In addition to reviewing the text of the specification already prepared and included in the CR rejected at TSG-SA#6, the group also decided to include a new option (or shortcut) to simplify TFO implementation when the network supports all 8 AMR codec modes and up to 4 modes in the Active Codec Set. Note that this option would be directly applicable to 3G implementations. Under these circumstances, the decision to activate TFO and the selection of the common Active Codec Set are significantly simplified. Other protocol simplifications are also under review.

An additional drafting session is planned on May 17-19, 2000 to progress with work.

Table 5.1: Status List for Release 2000 TFO Specifications

Deliverable	Title	Latest Version	Comment/Status	Approval
TS 22.053	Tandem Free Operation of speech codecs; Stage 1 service description	0.1.1	Evolution of GSM 02.53 Sent to TSG-S1 for review	tbd
TR 26.920	Architectural Model for the 3G Transcoders	0.1.1	Sent to TSG-S2 for comments. Necessity of this report still tbd	tbd
TS 28.062	Technical Specification for Tandem Free Operation of 2G and 3G networks	-	Do be derived from GSM 08.62 (R98) once finalized for AMR.	Approval Expected TSG-SA#8 (June 2000)

One Change Request on GSM 08.62 (R98) in included in **SP-000026**.

Table 6.2: List of TFO CRs presented at TSG-SA#7

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000050	08.62	7.0.0	A002	1	C	R98	TFO Message Extensibility

7. Release 2000: Codec(s) for Wideband Telephony services

The development and selection of the AMR Wideband speech codec is according to schedule. The project is still targeting Release 2000 for the approval of the core AMR-WB speech codec specifications.

A complete set of Permanent Project Documents was prepared and reviewed in the past S4 plenary and must be approved by March 17, 2000.

The Performance Requirements (v2.0) included in Tdoc **SP-000027** and the Design Constraints (v1.0) included in Tdoc **SP-000028** are presented to TSG-SA for approval.

Other Permanent Documents contain the agreed Qualification Rules, Qualification Deliverables, the Qualification Test Plan and Processing Functions for the Qualification Phase.

The procedure for the qualification phase was agreed and the subjective listening tests should be performed in the April-May timeframe. 8 candidates are supposed to participate to the qualification phase: France Telecom R&D, Ericsson, Matsushita, Motorola, Nokia, Siemens, Texas Instruments and T-Nova Deutsche Telekom.

The Qualification Tests are under the responsibility of the candidates. However, for every experiment he will perform, each candidate will be required to test two other candidates in addition to its own solution.

The candidates were also requested to provide a statement committing to share the cost of the selection and characterization phase if they were qualified.

The test results of the qualification phase will be reviewed in TSG-S4#11 in June 2000 and presented to TSGSA#9 for approval.

The Project Plan is still considered very aggressive. The following milestones are:

- Completion of the selection phase by September 2000
- Approval of the specifications in December 2000

TSG-S4 sent a liaison to ITU-T SG16 Q20/16 in response to their communication, welcoming the collaboration proposed by SG16 on our respective Wideband Speech Codec development project. TSG-S4 proposed that to exchange information with SG16 to align the to project requirements as far as possible with the objective to converge on a single solution.

Since then, TSG-S4/SMG11 received three other communication form SG16 on diverse subjects: Wideband Codec, Basic set of operations for complexity computation and an information request in relation to the development of a variable bit rate codec. TSG-S4/SMG11 is expected to answer before the next ITU meeting in November 2000. S4 would however appreciate some clarifications from SA on the conditions for exchanging communications or liaisons with ITU-T.

8. Miscellaneous

In order to complete two old SMG action points, S4 has prepared two reports containing the AMR Narrowband Study Phase report (GSM 06.76 contained in Tdoc **SP-000023**) and the AMR-Wideband Feasibility Report (TS 26.901 contained in Tdoc **SP-000024**). These two reports were approved some time ago by SMG (1997 for AMR-NB and 1999 for AMR-WB).

The S4 Chairman has indicated that he will not able to assume this function after TSG-SA#8 (June 2000). Consequenty, S4 will need to elect a new Chairman at their next plenary (TSG-S4#11) in June 2000.

TSG-S4 CODEC Working Group

Status Report

TSG-SA#7
March 15-17, 2000
Madrid, Spain

Alain Ohana
TSG-S4 Chairman
BellSouth Mobility DCS, T1

TSG-S4 Documents

- SP-000018 TSG-S4 Status Report

- SP-000019 3G TR 26.912 v2.0.0 (Evaluation of H.324M over 3G)
- SP-000020 3G TR 26.915 v1.0.0 (Network Echo Control)
- SP-000021 3G TR 26.975 v1.1.0 (AMR Characterization Report)
- SP-000022 3G TS 26.104 v0.3.0 (AMR Floating-Point C-Code)
- SP-000023 GSM TR 06.76 v2.0.0 (AMR-NS Study Phase Report)
- SP-000024 3G TR 26.901 v2.0.0 (AMR-WB Feasibility Report)
- SP-000025 11 CRs on AMR
- SP-000026 1 CR on TFO (R98)
- SP-000027 AMR-WB Performance Requirements v2.0
- SP-000028 AMR-WB Design Constraints v1.0

Meetings Schedule

- 2 Meetings since TSG-SA#6
  - TSG-S4#9: January 24-28, Puerto Vallarta, Mexico hosted by AT&T, BellSouth Cellular, Ericsson and Nokia
  - TSG-S4#10: February 28-March 3, Helsinki, Finland hosted by Nokia
- Meeting Schedule
  - TSG-S4#11: June 5-9 — Potential host identified
  - TSG-S4#12: September 4-8 — Host needed
  - TSG-S4#13: October 23-27 — Host needed
  - TSG-S4#14: November 20-24 — Host needed
- Meeting Statistics
  - ~50 Participants, 1 week, >100 Documents

Highlights (1)

Release 99: Five Pending items

- Quantitative Evaluation of H.324M over 3G, and...
- Transmission Planning (Echo Control) in 3G networks
  - Technical Reports presented for approval at TSG-SA#7
- AMR 3G Characterization Report (expected for 3/2000)
  - Still missing Error Patterns and Error Conditions
  - Will not be completed before 2H00
- AMR Floating Point C-Code (expected for 3/2000)
  - C-Code available, under review and evaluation
  - Verification expected to be completed by June 2000
- 3G Acoustic Terminal Test Specification (expected for 6/2000)
  - Draft specification available, under discussion

Highlights (2)

Release 2000:

- AMR TFO
  - Increased participation to TFO Ad Hoc
  - Introduction of option with reduced complexity
- AMR Wideband Speech Codec
  - Performance Requirements and Design Constraints presented for approval at TSG-SA#7
  - Qualification Tests planned for 2Q00 with 8 candidates
  - Qualification Results expected for TSG-SA#8

Release 99: AMR Speech Codec

- 11 CRs presented for approval at TSG-SA#7
  - Mostly Corrections or Clarifications on 3G specifications (TS 26.101 and TS 26.102) and in the Characterization Report (GSM 06.75)
  - 1 '**Strategic**' CR on the C-Code (GSM 06.73 & 3G TS 26.073) required to correct a problem on the 5.9kbit/s mode….. previously introduced by another CR. This last CR will put the 5.9 mode back in the state in which it was characterized
- AMR 3G Characterization Report
  - No agreement yet on the most appropriate Error Conditions and for the production of the required Error Patterns
  - Multiple organizations have offered to provide Error Patterns, but not before June 2000
  - Release of funding still unclear (55kEuros)
  - AMR Characterization Report (GSM 06.75 and Draft 3G TS 26.975) completed with performance data (MOS) as a function of FER/RBER considered to be also applicable to 3G environment

Release 99: AMR Speech Codec

Specification	Title	Last Version	Status
3G TS 26.071	General Description	3.0.1	Ö
3G TS 26.090	Transcoding Functions	3.1.0	Ö
3G TS 26.073	ANSI C-Code	3.0.0	Ö
3G TS 26.074	Test Sequences	3.0.0	Ö
3G TS 26.091	Error Concealment of lost frames	3.1.0	Ö
3G TS 26.092	Comfort Noise Aspects	3.0.1	Ö
3G TS 26.093	Source Controlled Rate Operation	3.1.0	Ö
3G TS 26.094	Voice Activity Detection	3.0.0	Ö
3G TS 26.101	Frame Structure	3.0.0	Ö
3G TS 26.102	Interface to Iu	3.0.0	Ö
3G TS 26.103	Codec List for GSM & UMTS	3.0.0	Ö
3G TR 26.075	Characterization Phase Report	1.1.0	SP-000021 Completion ?

Work Item still almost Completed

Release 99: AMR Floating Point C-Code

- C-Code intended for PC based Multimedia applications
- C-Code now available, under Verification and Evaluation
  - NDA process longer than expected
  - Multiple organizations involved: BT, Ericsson, France Telecom R&D, Motorola, Nokia, Nortel Networks, Siemens and Texas Instruments
  - Preliminary results show:
    - Significant speed improvement
    - Quality at least as good as Fixed-Point version
  - Additional tests planned for 2Q00
  - Too early to present the specification for approval
- S4 proposes to keep this item as part of Release 99:
  - All other codec specifications/report for CS Multimedia Telephony Service (H.324 based) completed well before 12/99
  - AMR Floating Point C-Code provides an option for an easier implementation of the related services on PC platforms

Release 99: QoS for Speech and Multimedia Codec

- 3G TR 26.912: Quantitative Performance Evaluation of H.324 Annex C over 3G
  - Completed with typical AMR Speech Codec Performance Data (as a function of FER/RBER)
  - Presented for approval in SP-000019
  - Action completed
- 3G TR 26.915: Echo Control For Speech and Multimedia Services
  - New Technical Report including a recommendation to use Echo Cancellation Devices in the network for the Narrowband Speech service when interconnecting with the PSTN
  - Presented for approval in SP-000020
  - Action completed

Release 99: Codec for Multimedia Telephony Service & QoS for Speech and Multimedia Codec

Specification	Title	Last Version	Status
Codec for CS Multimedia Telephony Service:			
3G TS 26.110	General Description	3.0.1	Ö
3G TS 26.111	Modifications to H.324	3.1.0	Ö
3G TR 26.911	Implementor's Guide	3.2.0	Ö
3G TS 26.104	AMR Floating Point C-Code	0.3.0	SP-000023 Approval TSG-SA#8
QoS for Speech and Multimedia Codec:			
3G TR 26.912	Quantitative Performance Evaluation of H.324 Annex C over 3G	2.0.0	SP-000019
3G TR 26.913	Quantitative Evaluation of Real-Time Packet Multimedia services over 3G	-	Release 2000
3G TR 26.915	Echo Control For Speech and Multi-Media Services	1.0.0	SP-000020

No critical item missing

3G Terminal Acoustic Characteristics

- Noted the suppression of the DAI (Digital Audio Interface-13 bits uniform PCM interface) by T1
  - All tests must be performed through the Air Interface
- Draft Test Specification available and under review
  - To be presented at TSG-SA#8 (6/2000)

Specification	Title	Last Version	Status
3G TS 26.131	Terminal Acoustics Characteristics for Telephony; Requirements	3.0.0	Ö
3G TS 26.132	Terminal Acoustics Characteristics for Telephony; Tests Specification	-	Approval delayed to TSG-SA#8

Release 2000: AMR TFO

- New version of CR on GSM 08.62 TFO specification (R98) to replace CR rejected at TSG-SA#6
  - Provide Required Message Extensibility for compatibility with future codecs with complex configuration data set, like AMR
- Release 2000 work now focused on:
  - Verification, simplification and completion of core AMR TFO support
  - Introduction of option (shortcut) for simplified implementation
    - The network must support all modes (8)
    - The network must support up to 4 codec modes in the active set
    - Simplification in the TFO decision process and determination of the common Active Codec Set
  - Editorial modifications to make the specification applicable to GSM and 3G (Transformation in 3G TS 28.062)
  - Target completion date: June 2000

Release 2000: AMR Wideband Speech Codec

- Preparation of the Qualification Phase almost completed
  - 8 Candidates
  - Subjective listening tests planned for 2Q00
  - In-house testing of own solution and two other candidates for each experiment
  - Qualification Results to be presented at TSG-SA#8
- Permanent Project Documents to be approved by March 17
  - Performance Requirements (presented for approval in SP-000027)
  - Design Constraints (presented for approval in SP-000028)
  - Qualification Deliverables (S4 internal approval)
  - Qualification Rules (S4 internal approval)
  - Qualification Test Plan (S4 internal approval)
  - Processing Functions (S4 internal approval)

Questions for Advice and Decisions

- Keep AMR Floating-Point C-code in Release 99
- Using AMR 12.2 as a possible implementation of EFR
  - AMR12.2 is slightly different from EFR (bug correction, instability protection, comfort noise…)
  - Key difference in 5ms dummy look-ahead for seamless switching with other modes
  - AMR12.2 is still compatible (inter-operable) with EFR
  - But does not pass the EFR Test Vectors
  - For easier implementation, S4 propose to make AMR12.2 an allowed EFR implementation (except for comfort noise encoding)
  - Key consequence: Additional 5ms on one way EFR transmission delay (same as AMR delay)
  - SA asked to endorse this proposal
    S4 will then prepare the related EFR CRs for TSG-SA#8
- SA asked to clarify conditions of communication with ITU
  - Exchanged one Liaison with ITU SG16 Q20/16 on wideband speech codec
  - Received 3 new communications from ITU

Documents Presented for Approval

Document	Specification	Version	Title
SP-000019	3G TR 26.912	2.0.0	Quantitative performance evaluation of H.324 Annex C over 3G (R 99)
SP-000020	3G TR 26.915	1.0.0	Echo Control For Speech and Multi-Media Services

New Technical Reports for AMR-NB and AMR-WB Feasibility Reports:

-Already approved by SMG

-Completion of old SMG action

Document	Specification	Version	Title
SP-000023	GSM TR 06.76	2.0.0	Adaptive Multi-Rate (AMR) Speech Codec; Study Phase Report (R 98)
SP-000024	3G TR 26.901	2.0.0	AMR Wideband Speech Codec Feasibility Study Report (R 00)

Document	Title	Version
SP-000027	AMR Wideband Permanent project document WB-3: Performance Requirements v2.0	2.0
SP-000028	AMR Wideband Permanent project document WB-4: Design Constraints v1.0	1.0

Change Requests Presented for Approval

SP-00025: 11 CRs on AMR

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000023	06.73	7.3.0	A021		F	R98	Avoidance of pulse cancellation in FCB excitation
S4-000032	26.073	3.0.0	001		F	R99	Avoidance of pulse cancellation in FCB excitation
S4-000006	06.75	7.1.0	A002		D	R98	Threshold and Hysteresis for Exp. 4a and 4b
S4-000007	06.75	7.1.0	A003		D	R98	Introduction of Annex D (AMR Performances as a function of FER/RBER)
S4-000139	26.101	3.0.0	001		F	R99	Correction of indices in Annex B table
S4-000140	26.101	3.0.0	002		F	R99	Addition of comfort noise bit ordering
S4-000141	26.101	3.0.0	003		F	R99	Correction of table indexing for AMR Core Frame class division
S4-000168	26.101	3.0.0	004		F	R99	Clarification of bit transmission order for AMR frame structure parameters for AMR IF1
S4-000193	26.102	3.0.0	001	3	C	R99	Introduction of QoS parameters used at RAB assignment
S4-000067	26.102	3.0.0	002		C	R99	Introduction of different RFCS set on Iu User Plane
S4-000177	26.102	3.0.0	003	2	B	R99	Introduction of Time Alignment

SP-000026: 1CR on TFO (R98)

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000050	08.62	7.0.0	A002	1	C	R98	TFO Message Extensibility

Documents Presented for Information

Document	Spec.	Ver.	Title
SP-000021	TR 26.975	1.1.0	AMR Speech Codec: Characterization Report
SP-000022	TS 26.104	0.3.0	ANSI-C code for the Floating-Point AMR Speech Codec

Source:	**TSG-S4**
Title:	**Updated List of Deliverables at TSG-SA#7**
Document for:	**Information**

This document contains in Table B1 an updated list of TSG-S4 deliverables following TSG-S4#10 (February 28-March 3, 2000).

The list is updated before each TSG-SA meeting to take into account any progress in the production of the specifications and/or newly identified deliverables.

Bold Tdoc numbers refer to documents presented to the TSG-SA#7 plenary.

Table B1: List of TSG-S4 Deliverables: Version: 0.7, 2000-03-03

Deliverable	Title	Features completed/under study	Editor	Date for approval	WI/Rapporteur	Comment/Status
TS 26.071	AMR Speech Codec; General Description	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#4	AMR Erik Ekudden Ericsson	Version 3.0.1 as approved by TSG-SA#4 in Tdoc SP-99244
TS 26.090	AMR Speech Codec; Transcoding functions	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#4		Version 3.1.0 following TSG-SA#6
TS 26.073	AMR Speech Codec; ANSI C-Code	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#6		Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99560. 1 CR presented to TSG-SA#7 in **SP-000025**
TS 26.074	AMR Speech Codec; Test Sequences	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#6		Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99559
TS 26.091	AMR Speech Codec; Error Concealment of lost frames	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#4		Version 3.1.0 following TSG-SA#6
TS 26.092	AMR Speech Codec; Comfort noise aspects	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#4		Version 3.0.1 as approved by TSG-SA#4 in Tdoc SP-99247
TS 26.093	AMR Speech Codec Source Controlled Rate operation	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#4		Version 3.1.0 following TSG-SA#6
TS 26.094	AMR Speech Codec Voice Activity Detector	No Open Issue	Jari Hagqvist Nokia	Approved at TSG-SA#5		Version 3.0.0 as approved by TSG-SA#5 in Tdoc SP-99353.
TS 26.101	AMR Speech Codec Frame Structure	No Open Issue	Jari Hagqvist Nokia	Approved at TSG-SA#6		Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99562. 4 CRs presented to TSG-SA#7 in **SP-000025**
TS 26.102	AMR Speech Codec Interface to Iu and Uu	SDU Error Ratio and RBER values to be aligned with TS 23.107	Frederic Gabin Nortel Networks	Approved at TSG-SA#6		Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99563 3 CRs presented to TSG-SA#7 in **SP-000025**
TR 26.975	AMR Speech Codec Performances Characterization	Preparation of test plan for Characterization in 3G Channels, identification of Host and Listen. Labs Dependency: Agreement on Channel conditions to test and production of Error Patterns	Alain Ohana BellSouth Mobility DCS	Release 99, but approval now proposed for TSG-SA#8 **(June 2000)**		55kEuro Funding accepted by PCG Preparation of Test Plan in SMG11/S4 SQ Sub-group. Actual Tests now expected for 2H00 Version 1.1.0 based on latest version of GSM 06.75 and approved CRs, presented for information at TSG-SA#6 in Tdoc **SP-000021**
TS 26.103	Speech Codec List for GSM and UMTS	No Open Issue	Karl Hellwig Ericsson	Approved at TSG-SA#6	TrFO/OoBC TSG-N2 Work Item	Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99564
TS 26.104	AMR Speech Codec; Floating Point C-Code	New deliverable for PC and Multimedia application (WI-2). Software available, under verification and evaluation	Petri Haavisto Nokia	Release 99, but approval now proposed for TSG-SA#8 **(June 2000)**	Low Bit Rate Codec for Multimedia Barry Aronson Toshiba	Draft version 0.3.0 presented for information at TSG-SA#7 in **SP-000022**
TS 26.110	Codec(s) for Circuit Switched Multimedia Telephony Service General Description	No Open Issue	Barry Aronson Toshiba	Approved at TSG-SA#4		Version 3.0.1 as approved by TSG-SA#4 in Tdoc SP-99249
TS 26.111	Codec(s) for Circuit Switched Multimedia Telephony Service Modifications to H.324	No Open Issue	Hirokazu Tanaka Toshiba	Approved at TSG-SA#4		Version 3.1.0 following TSG-SA#6.
TR 26.911	Codec(s) for Circuit Switched Multimedia Telephony Service Terminal Implementor's Guide	No Open Issue	Petri Haavisto Nokia	Approved at TSG-SA#4		Version 3.2.0 following TSG-SA#6

Table B1: List of TSG-S4 Deliverables: **Version: 0.7, 2000-03-03**

Deliverable	Title	Features completed/under study	Editor	Date for approval	WI/Rapporteur	Comment/Status
TR 26.912	Quantitative performance evaluation of H.324 Annex C over 3G	Now completed	Olle Franceschi, Ericsson	Release 99, but approval postponed TSG-SA#7 **(March 2000)**	QoS for Speech and Multimedia Coecs Harri Honko Nokia	Version 2.0.0 presented for approval at TSG-SA#7 in Tdoc **SP-00019**
TR 26.913	Quantitative performance evaluation of real-time packet switched multimedia services over 3G	Evaluation Test Results to be provided.	Harri Honko Nokia	Release 2000: TSG-SA#10		No significant inputs received so far. Version 0.0.1 reviewed in TSG-S4#5 (S4-99160)
TR 26.915	Echo Control For Speech and Multi-Media Services	Include a recommendation to use Echo Cancellers for the Narrowband Speech service	Ian Goetz Tellabs	Release 99, but approval postponed TSG-SA#7 **(March 2000)**		Version 1.0.0 presented for approval at TSG-SA#7 in Tdoc **SP-00020**
TS 26.131	Terminal Acoustic Characteristics for Telephony; Requirements	DAI References to be removed.	Paul Barrett BT	Approved at TSG-SA#6	3G Terminal Acoustic Characteristics Goetz Tellabs	Version 3.0.0 as approved by TSG-SA#6 in Tdoc SP-99565
TS 26.132	Terminal Acoustic Characteristics for Telephony; Test Specifications	Agreement on most appropriate Test Procedures	Ian Goetz Tellabs	Release 99, but approval postponed to TSG-SA#8 **(June 2000)**		Latest draft contained in S4-000081 as reviewed in TSG-S4#9. New version expected for TSG-S4#11 (June 2000)
TS 22.053	Tandem Free Operation of speech codecs; Stage 1 service description	Evolution of GSM 02.53 Sent to TSG-S1 for review	No Editor Identified	Release 2000: TSG-SA#10	TFO No Rapporteur Identified	Version 0.1.1 reviewed in TSG-S4#4 (S4-99138)
TR 26.920	Architectural Model for the 3G Transcoders	Version 0.1.1 sent to TSG-S2 for comments. Necessity of this report still pending	No Editor Identified	Release 2000: TSG-SA#10		Version 0.1.1 reviewed in TSG-S4#4 (S4-99147)
TS 28.062	Technical Specification for Tandem Free Operation of 2G and 3G networks	Do be derived from GSM 08.62 (R98) once finalized for AMR.	Clemens Suerbaum Siemens AG	Release 2000: TSG-SA#10		First draft now expected for 6/2000

Work Programs:

WI-S4-1: Mandatory Speech Codec for Narrow band Speech Telephony Service/AMR
Work Item completed except for 3G Characterization

WI-S4-2: Codec for Low bit rate Multimedia Telephony Service
Work Item completed

WI-S4-3: QoS for Speech and Multimedia Codec
Work Program version 0.2.0 presented for information at TSG-SA#3 (Tdoc SP-99130)
Technical Report for H.323 Evaluation reported to Release 2000.

WI-S4-4: 3G Audio-Visual Terminal Characteristics
No Work Program

WI-S4-5: Codec(s) for Wideband Telephony Services
Project Plan Version 0.2 available in Tdoc S4-99488R

WI-S4-6: Tandem Free Operation in 3G systems and between 2G and 3G systems
Work Program version 0.3.0 reviewed in TSG-S4#5 (Tdoc S4-99174)