Source:	**TSG-S4 (Codec Working Group) Chairman**
Title:	**Status Report at TSG-SA#8**
Document for:	**Information and Decision**
Agenda Item:	**6.4.1**

TSG-S4 Codec Working Group Status Report

Executive Summary

TSG-S4 (Codec Working Group) held one plenary since TSG-SA#7 (in Versailles, France on June 5-9,2000) and three Ad Hoc meetings on TFO, TFO/TrFO Harmonization and Terminal Acoustic Test Specifications.

The key activity during that period was the completion of the AMR wideband qualification phase. In addition, two out of the three remaining release 99 pending items were also completed.

The Terminal Acoustic Test Specification (3G TS 26.132) and the AMR Floating Point C-Code specification (3G TS 26.104) are presented as version 1.0.0, but are considered sufficiently stable for a direct approval by TSG-SA#8.

The work is also progressing on the last release 99 open item, i.e. the AMR Characterization in 3G Channels. The test plan should be finalized in July and the corresponding tests performed soon after. The results are expected for 4Q00.

The AMR TFO definition and specification was further discussed in two separate drafting sessions, but it was not possible to finalize a draft specification TS 28.062 for TSG-SA#8 as initially expected. The new target date is September 2000. The key point still to be defined is related to the rules applicable in case of Active Codec Set mismatch at both ends of an MS-MS call configuration.

The AMR Wideband Qualification Phase was completed and the results analyzed in TSG-S4#11. Following this analysis, two proponents withdrew their proposals. The remaining candidates will participate to and fund the selection phase scheduled for completion by October 2000. The related results and codec specifications for the selected solution will be presented for approval at TSG-SA#10 in December 2000.
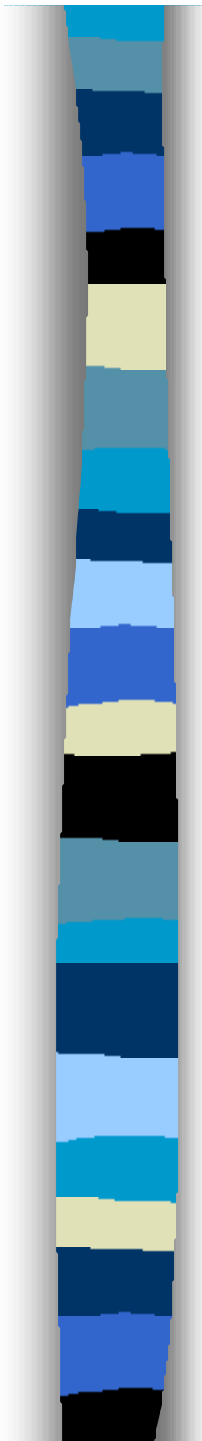
The results of the qualification are very encouraging. The three best candidates did not present any major failure. There is good hope that it will be possible to find a solution meeting the full set of requirements.

TSG-S4 proposes a new Work Item for approval to TSG-SA#8. The objective of this work item is to standardize mobile streaming protocols and codecs in the scope of Release 2000.

Mr. Kari Jarvinen, Nokia, already SMG11 Chairman was elected as new Chairman of TSG-S4. He will take office after TSG-SA#8.

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

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TSG-S4 CODEC Working Group

Status Report

**TSG-SA#8
June 26-28, 2000
Dusseldorf, Germany**

*Alain Ohana
TSG-S4 Chairman
BellSouth Mobility DCS &
GSM North America Alliance*

3GPP TSG-S4

TSG-S4 Documents

- SP-000258 TSG-S4 Status Report

- SP-000259 AMR Wideband Qualification Phase Report
- SP-000260 3G TS 26.132 v1.0.0 (Terminal Acoustic Test Req.)
- SP-000261 3G TS 26.104 v1.0.0 (AMR Floating-Point C-Code)

- SP-000262 2 CRs on AMR
- SP-000263 1 CR on TS 26.111 (Modifications to H.324)
- SP-000264 4 CRs on TS 26.131 (Terminal Acoustic Perf. Req.)

- SP-000265 New Work Item Proposal (PS Streaming Application)

3GPP TSG-S4

Meetings Schedule

- 1 Plenary and 3 Ad Hoc since TSG-SA#7
  - Terminal Acoustic Tests Drafting Session: May 3, London, UK hosted by BT
  - Joint S2, N4, R3 S4 meeting on TrFO/TFO harmonization: May 8, Stockholm, Sweden hosted by Ericsson
  - TFO Drafting Session: May 17-19, Bolingbrook, IL-USA hosted by Tellabs
  - TSG-S4#11: June 5-9, Versailles, France hosted by Alcatel, France Telecom and Nortel Networks
- Meeting Schedule
  - TSG-S4#12: September 4-8   Bethesda, MD-USA
  - TSG-S4#13: October 23-27   Potential host identified
  - TSG-S4#14: November 20-24   Host needed
- Meeting Statistics
  - ~50 Participants, 1 week, >100 Documents

3GPP TSG-S4

Highlights

Release 99: 3 Pending items

■ AMR 3G Characterization Report (expected for 10/2000)

   – Test plan under preparation

   – To be completed 3-4Q00

■ AMR Floating Point C-Code (expected for 6/2000)

   – Verification Completed

   – Specification presented for approval at TSG-SA#8

■ 3G Acoustic Terminal Test Specification (expected for 6/2000)

   – Specification presented for approval at TSG-SA#8

Release 00:

■ AMR Wideband Qualification Phase Completed (SP-000259)

■ Some progress on AMR TFO (now expected for 9/2000)

3GPP TSG-S4

Release 99: AMR Speech Codec

- **AMR Specifications are stable**
- **1 CR (R98 & R99) presented for approval at TSG-SA#8**
  - GSM RATSCCH/DTX related
- **AMR 3G Characterization Report**
  - Two organizations (NTT DoCoMo & Nortel Networks) to provide Error Patterns
    - Final agreement on Error Conditions expected for July 2000
  - Agreement reached on Test Plan design
    - Maximum number of Error Conditions tested
    - 3 Experiments in clean speech, 1 Experiment in car noise
    - 4 different languages used (including Korean). No test repeated
    - Test Plan to be finalized in July/August 2000
    - Tests to be performed in September-October 2000
- <u>Note</u>: EFR CRs making the AMR12.2 mode an authorized alternative implementation of EFR approved by SMG

3GPP TSG-S4

Release 99: AMR Floating Point C-Code

- C-Code Targeting PC based Multimedia applications
- Verification and Evaluation completed
  - Evaluation performed by: BT, Ericsson, France Telecom, Motorola, Nokia, Nortel Networks, Siemens and Texas Instruments
  - Test Results show that the AMR Floating Point Code provides a speech quality at least equivalent to the Fixed Point version...
  - ….and a significant improvement in processing speed
  - Interoperability between Fixed Point and Floating Point provided by bit-exactness of Floating Point decoder
    - Floating Point Decoder is actually an optimized version of the Fixed Point Decoder
- Because of the sensitivity of the performances to the compiler parameters (vendor, options…), it was decided that the only the Codec and options defined in TS 26.104 would be authorized for implementation in Terminals and Network Equipment
- Specification 3G TS 26.104 presented for approval (as v1.0.0)
  - Identical version presented in TSG-SA#7 as version 0.3.0 (w/o the C-Code)
  - Evaluation Test Results to be included in the AMR Characterization Report (TR 26.975) or in a new report (Editorial work required)

3GPP TSG-S4

3G Terminal Acoustic Characteristics

- 3G TS 26.132 Terminal Acoustic Characteristics for Telephony - Test Specification completed and presented to TSG-SA#8 for approval
  - Prepared with significant involvement of ETSI STQ members
- 4 CRs on the Requirement Specification (3G TS 26.131)
- Work Item now complete

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	-	Presented for approval at TSG-SA#8

3GPP TSG-S4

Release 2000: AMR TFO

- 2 Drafting Sessions to progress AMR TFO implementation
- 1 Joint session with S2, R3, N4 on Harmonization with TrFO
- A number of items finalized (TFO)
  - Message Structure
  - TFO Functional Description
  - TFO State Machine
  - TFO Protocol
- Pending issues:
  - Codec Mode Mismatch resolution (different Active Codec Sets at call set up at both ends of the call)
  - Editorial work to transfer and update the content of the GSM 08.62 to create an acceptable 3G TS 28.062
- First version of TS 28.062 now expected for 09/2000

3GPP TSG-S4

Release 2000: AMR Wideband Speech Codec

- Qualification Phase Report provided in SP-000259
- Selection Phase scheduled for July-October time-frame
  - 5 Candidates
  - Test Plan to be finalized by July 16th
  - Executables to be delivered to ETSI by August 6th
    - VAD to be provided with Speech Codec
  - Listening Test planned for August-September 2000
  - Test results analyzed and solution selected in TSG-S4#13 (October 23-27, 2000)
  - Verification Phase and preparation of Codec Specifications over October-November time-frame
  - Approval of selection results and codec specifications in **TSG-SA#10**

3GPP TSG-S4

New S4 Leadership

- New S4 Chairman elected at the last plenary:
  - Kari Jarvinen, Nokia, SMG11 Chairman

- Hiroyuki Yamaguchi, NTT DoCoMo, Vice-Chairman
- One Vice-Chairmanship position vacant

3GPP TSG-S4

Documents Presented for Approval

Document	Specification	Version	Title
SP-000260	3G TS 26.132	1.0.0	Terminal Acoustic Characteristics for Telephony – Test Requirements (R 99)
SP-000261	3G TS 26.104	1.0.0	ANSI-C code for the Floating-Point AMR Speech Codec (R 99)

Document	Title
SP-000265	New WI Proposal on Packet Switched Mobile Streaming Application

3GPP TSG-S4

New Work Item Proposal:
PS Streaming Applications

- Audio and Video Streaming are already very popular applications on the Internet, but operating under multiple proprietary protocols

  - <u>Consequence</u>: Need to install multiple streaming clients in Terminal

- Because of the mobile environment (channel errors and limited size and capabilities in Handset), it would be beneficial to limit the number of software plug-ins, select a default set of streaming protocols and codecs if possible and evaluate their performances in a 3G environment

- Work Item Objectives:
  - Standardization of components for mobile streaming applications
  - Harmonization with other multimedia services
  - Create a reference Mobile Streaming specification for content providers
  - Release 2000

3GPP TSG-S4

Change Requests Presented for Approval

SP-00262: 2 CRs on AMR

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000259	06.93	7.3.0	A008		C	R98	CR to GSM 06.93 A008 on Re-scheduling of stolen SID_UPDATE Frames for AMR (R98)
S4-000260	26.093	3.1.0	002		A	R99	CR to 3G TS 26.093 002 on Re-scheduling of stolen SID_UPDATE Frames for AMR (R99)

SP-000263: 1CR on TS 26.111 Codec(s) for H.324 Based CS Multimedia Telephony – Modifications to H.324

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000230R	26.111	3.1.0	004		F	R99	Changes to editorial notes

SP-00264: 4 CRs to TS 26.131 Terminal Acoustic Performances Requirements

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000335	26.131	3.0.0	001	2	B	R99	CR on Addition of a chapter pointing to ITU-T Recommendations for extended parameters
S4-000292	26.131	3.0.0	002		C	R99	CR on Listener side tone (LSTR) and talker side tone (STMR) requirements
S4-000310	26.131	3.0.0	003	1	F	R99	CR on Change of Handset and headset UE receiving sensitivity/frequency characteristic mask
S4-000311	26.131	3.0.0	004	1	F	R99	CR on Acoustic requirements for Handheld-type hands-free user equipment

3GPP TSG-S4

1. Introduction

The 3GPP Codec Working Group held one plenary and three Ad Hoc meetings since the last TSG-SA#7. TSG-S4#10 took place on June 5-9, 2000 in Versailles, France hosted by Alcatel, France Telecom and Nortel Networks. As before, this S4 plenary meeting was held jointly with an SMG11 plenary.

Meetings held:

Terminal Acoustic Tests Drafting Session:

	May 3	hosted by BT in London, UK
Joint S2, N4, R3 S4 meeting on TrFO/TFO harmonization:		
	May 8,	hosted by Ericsson in Stockholm, Sweden
TFO Drafting Session:	May 17-19	hosted by Tellabs in Bolingbrook, IL-USA
TSG-S4#11/SMG11#16:	June 5-9,	hosted by Alcatel, France Telecom and Nortel Networks in Versailles, France

Next Plenary Meetings calendar

TSG-S4#12/SMG11#16:	September 4-8	Bethesda, MD-USA
TSG-S4#13/SMG11#17:	October 23-27	Potential host identified
TSG-S4#14/SMG11#18:	November 20-24	host needed

As a reminder, three Release 99 open items under S4 responsibility were still open after the last TSG-SA plenary:

- AMR 3G Characterization (expected to be completed for 4Q00)
- AMR Floating Point C-Code (expected to be completed for June 2000)
- 3G TS 26.132: 3G Acoustic Test Specifications (expected completion for June 2000)

The two last items were completed at the last TSG-SA#11 plenary.

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#8.

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, under change control and considered stable. 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. A preliminary version of this report derived from the GSM equivalent (06.75) is available though. It contains AMR Quality performance diagrams as a function of the Frame Erasure Rate and Residual Bit Error Rate considered applicable to 3G systems.

Two organizations (NTT DoCoMo and Nortel Networks) have indicated that they would be ready to provide 3G soft Error Patterns once a list of Error Conditions are agreed. Consequently, the work on the AMR 3G Characterization is expected to progress significantly in the next months. S4 agreed on a preliminary design of the Characterization Tests. These tests will focus on the measurements of the AMR speech Codec in 3G Error Conditions. Three experiments will be performed in clean speech and one in stationary background noise (car noise). At least one experiment will be performed in Korean Language as agreed by the PCG. The final list of channel Error Conditions should be agreed by the end of July 2000. The test plan is expected to be finalized in the same timeframe. The test results are expected to be available for S4#13 (October 2000).

For information, the Change Requests on the EFR specifications (GSM 06.51 and 06.54) defining the AMR12.2 mode as an acceptable alternative implementation for he EFR speech codec were approved at the last S4/SMG11 plenary and forwarded to SMG#32 for approval.

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	Approved
TS 26.073	AMR Speech Codec; ANSI C-Code	3.0.0	Stable. Presented for approval at TSG-SA#6	Approved
TS 26.074	AMR Speech Codec; Test Sequences	3.0.1	Stable. Presented for approval at TSG-SA#6	Approved
TS 26.090	AMR Speech Codec; Transcoding functions	3.1.0	Stable. Presented for approval at TSG-SA#4	Approved
TS 26.091	AMR Speech Codec; Error Concealment of lost frames	3.1.0	Stable. Presented for approval at TSG-SA#4	Approved
TS 26.092	AMR Speech Codec; Comfort noise aspects	3.0.1	Stable. Presented for approval at TSG-SA#4	Approved
TS 26.093	AMR Speech Codec Source Controlled Rate operation	3.1.0	Stable. Presented for approval at TSG-SA#4	Approved
TS 26.094	AMR Speech Codec Voice Activity Detector	3.0.0	Stable. Presented for approval at TSG-SA#5	Approved
TS 26.101	AMR Speech Codec Frame Structure	3.1.0	Stable. Presented for approval at TSG-SA#6	Approved
TS 26.102	AMR Speech Codec Interface to Iu and Uu	3.1.0	Stable. Presented for approval at TSG-SA#6	Approved
TS 26.103	Speech Codec List for GSM and UMTS	3.0.0	Stable. Presented for approval at TSG-SA#6	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

2 Change Requests on GSM 06.93 (R98) and 3G TS 26.093 (R99) included in **SP-000262** are presented to TSG-SA for approval (see list below). These Change Requests apply to a GSM implementation of AMR and more specifically in case of simultaneous activation of Discontinuous Transmission and a RATSCCH (Robust AMR Traffic Synchronized Control Channel) procedure.

Table 2.2: List of AMR CRs presented at TSG-SA#8

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000259	06.93	7.3.0	A008		C	R98	Re-scheduling of stolen SID_UPDATE Frames for AMR (R98)
S4-000260	26.093	3.1.0	002		C	R99	Re-scheduling of stolen SID_UPDATE Frames for AMR (R99)

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. Only one Change Request to 3G TS26.111 included in **SP-000263** is presented for approval at TSG-SA#8. This CR proposes to remove an obsolete information note regarding the determination of the AMR Point Codes for H.245. These were approved at the last ITU-T plenary.

The verification and evaluation of the Floating-Point version of the AMR C-Code was completed with the review of the last test results.

The flowing organizations participated to the evaluation/verification effort: BT, Ericsson, France Telecom R&D, Motorola, Nokia, Nortel Networks, Siemens and Texas Instruments. The results confirmed the significant improvement in execution speed obtained with this new version of the code, and the overall quality performances found at least equivalent to the Fixed-Point version. Note that the interoperability with the Fixed-Point version was not directly tested, but is provided by the bit-exactness of the Floating-Point decoder. The Floating-Point decoder is actually an optimized version of the Fixed-Point version.

Consequently, TSG-S4 decided to forward the related specification (3G TS 26.104) as version 1.0.0 for direct

approval by TSG-SA#8. Note that the text of the specification was not modified compared to the version 0.3.0 presented (without the code) for information at TSG-SA#7.

Finally, it is important to note that the codec quality performances were found quite sensitive to the options activated during the compilation. Consequently, it was agreed only this C-Code version and the compilation options referenced in the 3G TS 26.104 would be authorized in 3G/GSM implementations.

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	Approved
TS 26.111	Codec(s) for Circuit Switched Multimedia Telephony Service Modifications to H.324	3.1.0	Stable Presented for approval at TSG-SA#4	Approved
TR 26.911	Codec(s) for Circuit Switched Multimedia Telephony Service Terminal Implementor's Guide	3.2.0	Stable Presented for approval at TSG-SA#4	Approved
TS 26.104	AMR Speech Codec; Floating Point C-Code	1.0.0	Evaluation and Verification completed Test Results to be included in AMR Characterization report or other report Presented for approval in Tdoc **SP-00261**	TSG-SA#8

Table 3.2: List of Codec for CS Multimedia CRs presented at TSG-SA#8

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000230R	26.111	3.1.0	004		F	R99	Change to Editorial Note

4.Release 99: QoS for Audio and Multimedia Codecs

The complete list of deliverables for this work item is provided below. All Release 99 deliverables are under change control and considered stable. No new development to report on this Work Item.

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	3.0.0	Completed Presented for approval at TSG-SA#7	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	3.0.0	Completed Presented for approval at TSG-SA#7	TSG-SA#7

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

The updated list of deliverables for this work item is provided in the following table.

The Terminal Acoustic Test Requirements specification (TS 26.132) was finalized during a dedicated Ad Hoc Session on May 3 and is presented for direct approval to TSG-SA#8 as version 1.0.0 in **SP-000259**. TSG-S4 believes that this specification, prepared with a significant involvement of ETSI STQ members, is stable at more than 90%.

In the process of preparing the Test Specification, it was necessary to update the requirements specification (3G TS 26.131) and 4 Change Requests included in **SP-000264** are presented to TSG-SA#8 for approval for that purpose.

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	TSG-SA#6
TS 26.132	Terminal Acoustic Characteristics for Telephony; Test Specifications	-	Completed. Presented for approval in Tdoc **SP-000260**	TSG-SA#8

Table 5.2: List of Terminal Acoustic Performances CRs presented at TSG-SA#8

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-00335	26.131	3.0.0	001	2	B	R99	Addition of a chapter pointing to ITU-T Recommendations for extended parameters
S4-000292	26.131	3.0.0	002		C	R99	Listener side-tone (LSTR) and talker side-tone (STMR) requirements
S4-000310	26.131	3.0.0	003	1	F	R99	Change of Handset and headset UE receiving sensitivity/frequency characteristic mask
S4-000311	26.131	3.0.0	004		F	R99	New hands-free equipment categories; requirements for hands-free categories

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

The AMR TFO specification was progressed in a dedicated Ad Hoc session on May 17-19 and during the last S4 plenary. The full protocol and functional architecture was reviewed and updated to reflect the agreements reached during these meetings. A large portion of the specification can now be considered agreed in S4. This includes the message structure, the functional architecture, the state machine and the protocol itself. However it was not possible to finalize the section related to the Codec Mode Mismatch resolution (set of rules to follow in case of mismatch between the Active Codec Sets at call set-up). In addition, a significant editorial work is still required to transfer the content of the GS 08.62 into a 3G specification (TS 28.062). As a result, it is not possible to present this specification to TSG-SA#8, as initially expected.

A new drafting session is planned on July 19-21, 2000, with the objective to finalize a draft TS 28.062 for September 2000.

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	-	To be derived from GSM 08.62 (R98) once finalized for AMR.	First version now expected for TSG-SA#9 (September 2000)

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

The AMR Wideband Speech Codec Qualification Phase was completed and the test results analyzed in TSG-S4#11. A related report is provided in **SP-000259**. Each of the six candidates (Ericsson, FDN consortium including France Telecom, Nortel Networks and T-Nova Deutsche Telekom, Matsushita, Motorola, Nokia Siemens and Texas Instruments) tested his codec and 2 other codecs in 3 experiments (one experiment in clean speech and 2 experiments in background noise). The candidate performances were tested in a GSM Full Rate channel with Soft Error Patterns and with residual Error Patterns corresponding to

a 3G radio channel.

All candidates were found to comply with all design constraints and only one candidate was found to fail the 'soft' eliminating rules. This candidate was withdrawn.

Among the remaining candidates, 3 were found to provide equivalent overall Figures of Merit but with strong performances in different conditions (Ericsson candidate in clean speech, FDN candidate in street noise and Nokia candidate in car noise).

The overall performance level was found very encouraging. The three best candidates did not present any significant failure.

No solution was formally eliminated since the remaining number of candidates is within the acceptable limits to carry out a comprehensive Selection Phase. Nonetheless, the proponents were given until June 16 to voluntary withdraw their candidate. Only one organization decided to do so.

Consequently the candidates qualified for the Selection Phase are from Ericsson, FDN, Motorola, Nokia and Texas Instruments. They will share the cost of the selection and characterization phase up to 150 kEuros each.

The planning of the Selection Phase was reviewed and agreed during TSG-S4#11. All permanent documents were updated in preparation of the selection phase. The Design Constraints, the Performances Requirements and the Selection deliverables were approved and the last two are provided for information as soft attachments to this report (Tdoc **S4-000321** and **S4-000339**). Similarly, a preliminary draft of the selection rules and the list of experiments and test conditions for the selection phase were also agreed. The corresponding documents must be finalized by correspondence in the weeks to come.

Note that contrary to the AMR-NB selection phase, each candidate is supposed to provide a VAD solution that will be selected at the same time as the speech codec.

The following impairment conditions not included in the Qualification Phase will be tested in the Selection Phase, on top of a those already tested in the qualification also repeated to directly compare the performances of all candidates in the same experiments.

> -Performances with EDGE Full Rate and Half Rate Error Patterns
> - Influence of the input level
> - Self-Tandem and Tandem with narrowband codecs (G.711 and EFR)
> - Performances in Dynamic conditions
> - Performances in DTX conditions (with each candidate's own VAD)

The key milestones of the Selection Phase are:

> - Finalization of the Test Plan by mid-July
> - Delivery of the Executable and Start of the processing phase by early August
> - Subjective Listening tests in August-September time frame
> - Test results analyzed and choice of a solution in TSG-S4#14 in October 23-27
> - Verification and Preparation of the Codec Specifications in November
> - Presentation of the Selection Phase outcome and approval of the specifications in TSG-SA#10

8. Miscellaneous

TSG-S approved a new Release 2000 Work Item related to Packet Switched Mobile Streaming applications.

Audio and video streaming applications are already very popular on the internet but using a multitude of proprietary and non compatible solutions, requiring to implement and update a number of streaming clients in a terminal.

For mobile streaming applications, it is necessary to limit the number of software plug-ins, address the question of the coupling between the browser and the streaming client and define a default set of streaming protocols and codecs if possible. The overall service quality in error prone conditions should also be addressed.

The objectives of this Work Item are to standardize the components of a mobile streaming service, including streaming protocols, media transport protocols and multimedia codecs. Harmonization with existing and emerging 3GPP multimedia applications will be considered whenever possible.

TSG-SA is kindly asked to approve this new Work Item.

9. New Leadership

Kari Jarvinen, Nokia was elected by acclamations as new S4 Chairman. Kari Jarvinen is the active SMG11 Chairman and was already S4 Vice-Chairman. No candidature was received to take over the newly vacant vice-chairmanship position.

Consequently, the new S4 leadership after TSG-SA#8 will be:

> Kari Jarvinen, Nokia, Chairman
> Hiroyuki Yamaguchi, NTT DoCoMo, Vice-Chairman
> One Vice-Chairmanship position open

Source:	**Editor**
Title:	**AMR wideband performance requirements (WB-3) version 2.2~~10~~**
Document for:	**Review**
Agenda Item:	**7**

Introduction

This document contains the performance requirements for the AMR WB speech coder.

The performance requirements are defined for static and dynamic error conditions as well as speaker dependency, tandeming and input level dependency.

The requirements define the minimum acceptable performance of the candidate algorithm. Candidates are expected to pass all of the requirements. Objectives identify areas where particular emphasis should be placed by candidate developers who have met the requirements.

1.   Definitions

The following systems/applications have been identified:

> A   GSM full-rate traffic channel (22.8 kbit/s gross bit-rate) with an additional constraint of 16 kbit/s A-ter sub-multiplexing

> B   GSM full-rate traffic channel (22.8 kbit/s gross bit-rate)

> C   EDGE phase II channels

> D   ~~GSM multi-slot traffic channels (n*22.8 kbit/s)~~Deleted

> E   3G UTRAN channels

Unless otherwise stated, the performance requirements and objectives shall be interpreted as "not worse than" the performance of the reference codec. The conditions "not worse than" and "better than" shall be determined statistically at the 95% confidence interval.

2.   Requirements and Objectives for Applications A and B

2.1.   Static conditions

Static conditions refer to channel cases where there is no shadowing. The speech quality of the codec modes applicable to the TCH-FS channel will be assessed over a range of C/I and background noise conditions to provide a 'family' of performance curves.

Requirements and objectives are specified for clean speech and background noise. The requirements and objectives for the TCH-FS traffic channels under static test conditions are specified in Table 1.

	Application A		Application B	
C/I	Performance requirement	Performance objective	Performance requirement	Performance objective
no errors	better than G.722-48k	G.722-56k	G.722-56k	G.722-64k
19 dB	better than G.722-48k		G.722-56k	
16 dB	G.722-48k		G.722-48k	
13 dB	G.722-48k		G.722-48k	
< 13dB	See Note 1		See Note 1	

Table 1a: Clean speech requirements under static test conditions for Applications A and B.

	Application A		Application B	
C/I	Performance requirement (see Note 2)	Performance objective	Performance requirement (see Note 2)	Performance objective
no errors	G.722-48k with 10% PoW	G.722-56k	G.722-56k with 10% PoW	G.722-64k
19 dB	G.722-48k with 10% PoW		G.722-48k with 10% PoW	
16 dB	G.722-48k with 10% PoW		G.722-48k with 10% PoW	
13 dB	G.722-48k with 10% PoW		G.722-48k with 10% PoW	
< 13dB	See Note 1		See Note 1	

Table 1b: Background noise requirements under static test conditions for Applications A and B.

Notes to Tables 1a and 1b:

Note 1: The AMR WB performance requirement for C/I values below 13dB is the following for Applications A and B: the degradation in subjective performance shall not be greater than the degradation in subjective performance demonstrated by EFR over the same C/I interval. The specific intervals of interest are 13dB to 10dB, 13dB to 7dB, and 13dB to 4dB.

Note 2: "with 10% PoW" shall be interpreted as no more than 10 additional percentage points of annoying degradation, in terms of annoying or very annoying (i.e. 1+2 votes), with respect to the reference codec. For example, consider a data set where we see that the reference codec has 12 of 344 votes in the annoying or very annoying categories. Thus, the observed proportion of annoying degradation is 0.03, leading to a criterion of a proportion of no more than 0.13 for the codec under test. Suitable statistical methods will be employed. Note that the average DMOS score is not part of this requirement.

2.2. Dynamic conditions

Dynamic conditions refer to channel cases where shadowing is present. Specifically derived channel profiles

with varying C/I or C/N will be used.

The requirements for the TCH-FS 22.8 kbit/s traffic channels (applications A and B) under dynamic test conditions are specified in Table 2.

TCH-FS Full-Rate Channel	
Requirement for typical C/I conditions	Better than the EFR under the same conditions
Requirement for difficult C/I conditions ([typical conditions -6dB])	Same or better than the EFR under the same conditions

Table 2: Requirements under dynamic test conditions for Applications A and B

2.3. Additional speech codec performance requirements and objectives

The reference speech codecs for Applications A and B under tandeming, talker dependency, level dependency and language dependency conditions are specified in Table 3.

Tandeming performance and level dependency will be evaluated in the selection phase. It is anticipated that the other additional requirements will be evaluated in the characterisation phase.

Condition	Application A		Application B	
	Performance requirement	Performance objective	Performance requirement	Performance objective
Tandeming for clean speech signals (2 asynchronous encodings)	G.722-48k with 2 asynchronous encodings	G.722-56k with 2 asynchronous encodings	G.722-56k with 2 asynchronous encodings	G.722-64k with 2 asynchronous encodings
Low level input speech (-36dBov nominal input level)	better than G.722-48k with -36dBov nominal input level	G.722-56k with -36dBov nominal input level	G.722-56k with -36dBov nominal input level	G.722-64k with -36dBov nominal input level
High level input speech (-16dBov nominal input level)	better than G.722-48k with -26dBov nominal input level	G.722-56k with -26dBov nominal input level	G.722-56k with -26dBov nominal input level	G.722-64k with -26dBov nominal input level
Talker dependency	G.722-48k		G.722-56k	
Language dependency	G.722-48k		G.722-56k	

Table 3a: Additional performance requirements for clean speech signals for Applications A and B

Condition	Application A		Application B	
	Performance requirement	Performance objective	Performance requirement	Performance objective
Tandeming for speech signals with background noise (2 asynchronous encodings)	G.722-48k with 2 asynchronous encodings	G.722-56k with 2 asynchronous encodings	G.722-56k with 2 asynchronous encodings	G.722-64k with 2 asynchronous encodings

Table 3b: Additional performance requirements for speech signals with background noise for Applications A and B

Condition	Application A		Application B	
	Performance requirement	Performance objective	Performance requirement	Performance objective
Tandem with G.711	GSM EFR	Better than GSM EFR	GSM EFR	Better than GSM EFR
Tandem with GSM EFR	GSM EFR with 2 asynchronous encodings	Better than GSM EFR with 2 asynchronous encodings	GSM EFR with 2 asynchronous encodings	Better than GSM EFR with 2 asynchronous encodings

Table 3c: Additional performance requirements for tandeming with a narrowband system for Applications A and B

Notes to Table 3c:

Note 1: These conditions will be tested for both tandem configurations, i.e. the narrowband codec preceding the wideband codec and *vice versa*.

Note 2: An appropriate testing methodology for these conditions is to be determined. One option is to include them in a narrowband-only experiment in the selection tests, which may already be needed for testing reference coders for low C/I ratios. At the very least, codec proponents may be asked to include these conditions in demo material to be submitted as part of the stage 2 deliverables.

3.   Requirements and Objectives for Applications C, D and E

3.1.   Performance with channel errors

The performance requirements and objectives for Applications C and D with channel errors are specified in Table 4; the performance requirements and objectives for Application E with channel errors are specified in Table 5. The performance requirements for music are provided in Table 6.

	Application C (Half-Rate Circuit Switched EDGE channel)		Application C (Full-Rate Circuit Switched EDGE channel)	
__C/I__	__Performance requirement__	__Performance objective__	__Performance requirement__	__Performance objective__
~~no errors~~	[G.722-56k]	[G.722-64k]	[G.722-64k]	
25~~19~~ dB	[G.722-56k]			
22~~16~~ dB	[G.722-48~~48~~k]		[G.722-56k]	
19~~13~~ dB	[G.722-48~~48~~k]		[G.722-48k]	
16~~< 13~~dB			[G.722-48k]	

Table 4a: Clean speech requirements under static test conditions for Applications C ~~and D~~. ~~Application D assumes n=2 (i.e. 45.6 kbps)~~

	Application C (Half-Rate Circuit Switched EDGE channel)		Application C (Full-Rate Circuit Switched EDGE channel)	
__C/I__	__Performance requirement__	__Performance objective__	__Performance requirement__	__Performance objective__
~~no errors~~	~~[G.722-56k]~~	~~[G.722-64k]~~	~~[G.722-56k]~~	
25~~19~~ dB	[G.722-56~~48~~k]			
22~~16~~ dB	[G.722-48k]		[G.722-56k]	
19~~3~~ dB	[G.722-48k]		[G.722-48k]	
~~<~~16 ~~3~~dB			[G.722-48k]	

Table 4b: Background noise requirements under static test conditions for Applications C ~~and D~~. ~~Application D assumes n=2 (i.e. 45.6 kbps)~~

~~[Notes to Tables 4a and 4b:~~

~~Note: The AMR WB performance requirement for C/I values below 13dB is the following for Applications C and D: the degradation in subjective performance shall not be greater than the degradation in subjective performance demonstrated by EFR over the same C/I interval. The specific intervals of interest are 13dB to 10dB, 13dB to 7dB, and 13dB to 4dB.]~~

EC / [FER, RBER] (see note 2)	Application E (see note 1)	
	Performance requirement	Performance objective
No errors (see note 3)	G.722-64k	
{0.5%, -},	G.722-56k	
{1.0%, 0.1%}, note 4, UL	G.722-48k	
{1.0%, 0.1%}, note 4 , DL	G.722-48k	
{1.0%, 0.1%} note 5, UL		G.722-48k

Table 5a: Clean speech under channel errors for Application E.

EC / [FER, RBER] (see Note 2)	Application E (see note 1)	
	Performance requirement	Performance objective
No errors (see note 3)	G.722-64k	
{0.5%, -},	G.722-56k	
{1.0%, 0.1%}, note 4, UL	G.722-48k	
{1.0%, 0.1%}, note 4 , DL	G.722-48k	
{1.0%, 0.1%} note 5, UL		G.722-48k

Table 5b: Background noise requirements under channel errors for Application E.

Notes to table 5a and 5b:

Note 1: Application E includes all bit rates. The requirements are however only tested for the highest modes.

Note 2: The error performance for Application E is specified and evaluated using error protection schemes from the UTRAN toolbox. Each error condition (EC) is defined using two error profiles, one FER profile (single indicator per frame) and one residual BER profile (bit-level residual error channel).

Note 3: The requirement for the no error case applies to modes with higher bit rates, i.e. not tested in applications A and B

Note 4: The least significant bits shall be subjected to the residual error profile. The number of bits in

this class shall be <u>25%</u> of the total bits per frame.

Note 5: The least significant bits shall be subjected to the residual error profile. The number of bits in this class shall be <u>50%</u> of the total bits per frame.

Condition	Requirement	Objective
Music	No annoying effects	G.722-56k

Table 6: Requirements and objectives with music for Applications C, ~~D~~ and E

3.2. *Additional speech codec performance requirements and objectives*

The reference speech codecs for Applications C, ~~D~~ and E under tandeming, talker dependency, level dependency and language dependency conditions are specified in Table 7.

	Applications C, ~~D~~ and E	
Condition	**Performance requirement**	**Performance objective**
Tandeming for clean speech signals (2 asynchronous encodings)	G.722-64k with 2 asynchronous encodings	
Low level input speech (-36dBov nominal input level)	G.722-64k with -36dBov nominal input level	
High level input speech (-16dBov nominal input level)	G.722-64k with <u>-26dBov</u> nominal input level	
Talker dependency	G.722-64k	
Language dependency	G.722-64k	

Table 7a: Additional performance requirements for clean speech in Applications C, ~~D~~ and E

	Applications C, ~~D~~ and E	
Condition	**Performance requirement**	**Performance objective**
Tandeming for speech signals with background noise (2 asynchronous encodings)	G.722-56k with 2 asynchronous encodings	

Table 7b: Additional performance requirements for speech with background noise in Applications C, ~~D~~ and E

4. *Requirements and Objectives for All Applications*

The performance requirements and objectives under bit-rate switching and DTX are specified in Table 8; the performance requirements and objectives for DTMF, information tones and idle noise are specified in Table 9.

Condition	Requirement	Objective
Switching between different AMR-WB bit-rates	No annoying artefacts	
Clean speech with DTX enabled	Performance with DTX disabled	
Speech and background noise with DTX enabled	Performance with DTX disabled	

Table 8: Additional performance requirements for speech signals (all applications)

Condition	Requirement	Objective
DTMF		Transparent transmission of DTMF.
Information tones	Recognisable as given information tone.	
Idle noise	-66dBm0 (unweighted)	

Table 9: Requirements and objectives for speech codec performance with non-speech inputs

5. Open Issues

This section lists open issues currently under discussion.

- Performance in tandem with other standards:
  - G.722 (~~selection and/~~for characterisation phase)
  - Other WB standards (possibly for characterisation phase)
- Performance under mode switching between NB and WB AMR (possibly for characterisation phase)
- ~~Performance definition and testing for application E (and during which phases these are to be addressed)~~

Document History

Version	Date	Comment
0.1	October 1999	Initial version
0.2	October 1999	ETSI-SMG11#12/3GPP-SA4#7
0.3	December 1999	ETSI-SMG11#13/3GPP-SA4#8
1.0	December 1999	3GPP-SA
1.1	January 2000	ETSI-SMG11#14/3GPP-SA4#9
2.0	February 2000	ETSI-SMG11#15/3GPP-SA4#10
2.1	June 2000	ETSI-SMG11#16/3GPP-SA4#11

Title:	**AMR Wideband Codec Development Project Deliverables for the Selection Test (WB-6b)**
Version:	**1.00.~~3~~2**
Source:	**Editor**
Editor:	**Steve Aftelak**

This document lists the deliverables for the selection phase. The deliverables are all items the candidates must provide in order to be entered into the selection contest

Section 1 lists the major schedule assumptions relevant for the definition of selection deliverables. The deliverables are listed in section 2.

1. Schedule assumptions:

The delivery dates for all selection deliverables are based the following assumptions (see also the action table and Annex A containing the detailed schedule of the selection phase taken from WB-2):

1. The list of candidates for the selection tests is identified ~~identified during [SMG11#16/S4#11, 5-9 June 2000] or shortly thereafter~~by 16 June 2000.

2. All NDAs required adre completed by [TBD]. These may include some or all of the following.

   - NDAs between candidates and listening labs

   - NDAs between candidates and the host lab

   - NDAs between candidates

   - NDAs between candidates and ETSI

   - NDAs between host and listening labs

~~2~~3. The Host Lab and Test Houses must ~~will~~ be identified by July 16ᵗʰ and the relevant contracts finalised by [July 31st~~TBD~~]. The test plan for the selection phase is finalised by [July 16ᵗʰ ~~23rdt~~~~TBD~~]. The Processing Procedures document must also be complete by this date. The host lab is able to start the pre-processing of the speech samples by ~~[TBD]~~July 31st

~~3~~4. ~~The host lab completes the pre-processing of the speech samples as defined in [1] by [August 6th~~TBD~~].~~

~~4~~5. The candidates are responsible for the pre-processing and the processing of the speech samples with their solution. To receive the speech samples, the candidates must have delivered copies of their executables to ETSI by [~~July 31ˢᵗ or~~ August 6ᵗʰ?~~TBD~~]. The common processing scripts to be used by the candidates are ready by this same date. The ~~pre-processed~~ speech samples will only be delivered to the candidates once copies of the executables have been received by ETSI. The speech samples should be available in encrypted format between July 31ˢᵗ and August 6ᵗʰ and the the encryption key should be delivered by the host lab immediately after August 6ᵗʰ.

~~5~~6. The candidates send the remaining deliverables to the ETSI secretary office so that they are received by [October 8th~~TBD~~].

6~~7~~. The processing is completed by August 16th and verified by [August 18th~~TBD~~]. The candidates send their processed speech samples to the host lab and the cross-checking laboratories by ~~this date~~August 16th. ~~This should ensure that the host labs receive the samples by [TBD+3 days]~~.

7~~8~~. The host laboratory prepares the speech samples for the blind test and delivers the material to the test houses by [August 21st~~0th~~~~TBD~~] providing that there are no problems with the cross-checking. ~~This should mean that the test houses should receive the material by [TBD+3 days]~~.

8~~9~~. The listening tests are performed by [September 24th~~TBD~~] .

9~~10~~.The test results are delivered to ETSI not later than [September 24th~~TBD~~]. The combined test results are forwarded on the Email reflector by [October 1st~~TBD~~].

10~~11~~. The results are presented and analysed during [SMG11#18~~/7/~~3GPP TSG SA4#13~~2~~ (23-27 October)~~TBD~~].

11~~12~~. The results are pre-approved in [SMG11#18~~7~~/3GPP TSG SA4#13~~2~~~~TBD~~] and a consensus is reached around a solution.

14. The final solution is endorsed by the following TSG SA#10 meeting [3GPP TSG SA#10 (13-15 December)~~TBD~~].

The following table lists the corresponding deadlines:

Actions for the Selection Contest

Responsible	Action Description	Deadline
Test houses	Delivery of the speech samples to the host lab	[July 31st]
Candidates	Receipt of executables for AMR/WB solution by ETSI	[July 31st or August 6th?]
Candidates	Send ex~~ece~~ecutables, processed material etc to crosschecking candidate and to the host lab (without the executable).	[August 16~~2~~th]
Candidates	Completion of processing and Verification. ~~Sending of processed samples to host lab for preparation of blind test~~	[August 18th]
~~Host lab~~	~~Sending of first set of speech material to test houses~~	
Host Lab	Sending of final set of speech material to test houses	[August 21st~~20~~th]
Candidates	Delivery of all remaining Selection Deliverables to ETSI	[October 8th]
Candidates	Delivery of complete IPR declaration to ETSI	[October 8th]
Test Houses	End of listening tests	[September 24th]
Test Houses	Delivery of test results report to ETSI and Coordinator	[September 24th]
Coordinator?	Preparation and delivery of test results summary	[October 1st]
SMG11/S4	SMG11/S4: Review of the selection test results	[23-27 October]

2. List of Deliverables:

The candidates participating to the selection phase must provide the following deliverables:

- Letter of Intenet for the funding of the Selection and Characterisation Phases

- Executable(s)

- Processed speech samples

- Cross checking

- Technical description

- Report covering the design constraints

- Fixed point C-code

- Final IPR declaration

- Optional additional information

Each item is described in the following sections:

2.1 Letter of Intent for the funding of the Selection and Characterisation Phases:

The candidates must commit to funding the selection and characterisation phases by 31st May 2000, on the basis that payment is only required from candidates if they enter the selection contest.

2.2 Executable:

The candidates will be responsible for the processing of the speech samples. However, before receiving the pre-processed speech samples from the host lab, they must deliver to ETSI copies of their executable.

The executables delivered to ETSI shall be obtained from a fixed-point implementation of the candidate solution. It should be possible to re-generate a bit exact version of the processed speech samples using the pre-processed samples, the delivered executable programs (for Speech Encoding, Speech Decoding, [adaptation], and the Error Patterns identified in [1]). To that purpose, the candidates must also deliver instructions on how to generate the processed samples from these components.
The candidates cannot change the behaviour of their solution once they have received the speech samples.

The executables must be received at ETSI by ~~[July 31st or~~ August 6th~~?TBD]~~. It is the responsibility of the candidates to be sure that the executable will effectively be delivered by the due date. ETSI will register the executable delivery date for each candidate and will report the effective delivery date to SMG11/S4. ETSI will not check the correct operation of the files delivered.

The executables will be used after the end of the selection to verify that the selected candidate solution is able to regenerate the processed speech samples used during the selection tests.

2.3 Processed speech samples:

The candidates must pre-process and process the ~~pre-processed~~ speech samples received from the host lab.

2.4 Cross Checking:

Candidates must then deliver the processed samples, the executables already delivered to ETSI and any relevant instructions to another candidate so that the processing can be checked. The complete data base of processed speech samples, the executables and the instructions to produce the required scripts must be sent to the crosschecking candidate by ~~[August 16~~2th~~TBD] so that it is received by [TBD]~~. The candidate must assist the other candidate in the process of the verification of the processing. Once the verification is completed, the candidates must send the speech samples to the host labs by ~~[August 18th~~TBD ~~] so that they are received by [TBD]~~.

The candidates must exchange their speech samples and executables for cross-checking according to the following rule:

Candidate A>Candidate B>.....>Candidate A

Where X>Y means that candidate X must provide its data for crosschecking to candidate Y.

The processing should be checked on the same platform as the platform used by the candidate. The platforms used by each candidate are listed in Annex B (to be added).

It will not be required to verify all speech samples, but only a subset randomly selected. At least one talker per processing table and test condition must be checked. All talkers must be checked at least once per experiment. The purpose of the crosschecking is to be sure that the candidates used the correct Error Patterns and processing functions as defined in [1]. The crosschecking is not intended to check that the candidate has complied with the design constraints [3].

The crosschecking candidate must inform the originating candidate of the preliminary results of the checking within 48 hours of receiving the database. The candidates must inform SMG11/S4

over the Email reflectors of any expected delay in the completion of the crosschecking or the availability of the processed speech samples.

After completing the verification procedure on another candidate's processing material, each candidate must deliver over the Email reflector a report assessing the integrity of the speech samples used for the selection phase.

2.5 Technical description:

The candidates must provide by [October 8th~~TBD~~] a technical description of their solution. The description should contain sufficient detail to allow analysis of the solution.

In addition, each proponent shall have developed a complete detailed description following the format of a 3GPP Specification, including equations, parameter bit-allocations, etc. This latter description should be produced so that it can be integrated to a new recommendation, but is not a required deliverable before selection. Immediately following the selection of a candidate, that candidate must publish this detailed description by providing a soft copy of the document to the SMG11/S4 secretary, who will make it available to meeting delegates and upload it onto the ETSI and 3GPP FTP sites.

Each candidate shall also provide a report showing that the proposal fulfills all design constraints. This includes a complexity evaluation based on the fixed-point code: Worst Observed Frame for the speech codec, worst observed WMOPs for the channel codec, memory (scratchpad RAM, static RAM and data ROM) and Program ROM estimates based on the fixed-point implementation. The Worst Observed Frame figure must be computed from the complete database of speech material used for the selection phase. ~~This report should also record the Figures of Merit (FOMs) agreed for complexity and delay.~~

These documents must be sent by email to Mr Paolo Usai at the following address: paolo.usai@etsi.fr

The deliverables will then be put on the ETSI and 3GPPservers.

2.6 Fixed point C-code:

The candidates must deliver to ETSI a disk containing a copy of their fixed point ANSI C-Code used for the processing of the speech samples so that it arrives at ETSI by [October 8th~~TBD~~].

The compiled versions of the C-Code and the executables delivered to ETSI should give identical and bit-exact versions of all speech samples used for the selection phase. This version of the code should allow a third party to re-process the speech samples in order to check the integrity of the material used for the selection tests.

This C-code will be used to check the complexity estimates of the proposal. To that purpose, the candidate must also provide the following information for the solution:

1) Data RAM
   - For each source file, enumeration of static variables, types (16 or 32 bits) and their associated length;
   - Function call path leading to largest scratch RAM usage and list of temporary variables active in that case

2) Data ROM
   - for each source file, enumeration of tables, types (16 or 32 bits) and their associated length

3) Program ROM
   - list of source files (.c, .h)
   - number of pure instruction C lines for each .c file

4) wMOPS
   - The C source code should contain counters for basic operations, data move, logical operations and arithmetic tests.
   - Speech sample and experiment condition that produced the highest wMOPS figure

-

2.7 IPR Declaration:

The candidates must provide by [October 8th~~TBD~~] a mutually acceptable declaration of IPR. Candidates are advised to discuss the form of this IPR statement with the ETSI Legal Adviser (see below) well in advance of this date, to define what is mutually acceptable.

> Mr. Stephane Tronchon
> ETSI Legal Adviser
> ETSI ∕ PT SMG
> 650 Route des Lucioles
> 06921 Sophia Antipolis Cedex
> France
> Email: stephane.tronchon@etsi.fr

The written statement can also be sent by Fax before the deadline.

A copy of the statement must be sent to Mr. Paolo Usai at the following address: paolo.usai@etsi.fr

2.8 Optional additional information:

> The candidates are free to provide any additional information likely to help in the evaluation of their proposal.

3. References

> [1]: Processing Functions (WB-7). Latest version.
> [2]: Performance Requirement (WB-3). Latest Version.
> [3]: Design Constraints (WB-4). Latest Version.

Annex A: Project Schedule

Week / Month	Date, Activity	Meeting
June 2000	***Presentation of Qualification Test results for approval.***	SMG#32 (26-28 June) 3GPP TSG SA#9 (21-23 June)
July 2000	Preparation of fixed point executables of the AMR-WB candidate for Selection Tests. Preparation of Selection Deliverables.	
jul 03 - jul 09		
jul 10 - jul 16	Finalisation of Selection Phase test plan Assignment of Experiments to Listening Labs	
jul 17 - jul 23	~~Finalisation of Selection Phase test plan~~ ~~Assignment of Experiments to Listening Labs~~	
jul 24 - jul 30	delivery of scripts for preprocessing, processing and postprocessing to processing labs and candidates	
jul 31 - aug 06	August 6th ~~jul 31~~: submission of fixed point codec to ETSI noise lab: • delivery of background noise files to processing lab Listening lab: • delivery of unprocessed speech material to processing lab Processing lab: • delivery of background noise files and unprocessed speech material to the candidates ~~pre-processing of speech samples~~ [delivery ~~of pre-processed samples~~ via FTP]	
aug 07 - aug 13	~~Processing lab or~~ candidates: • ~~[downloading of pre-processed via FTP]~~ • main processing of codec candidates Processing lab: • processing of references	
aug 14 - aug 20	• end main processing of codec candidates • ~~post-processing of processed speech samples~~ • ~~blinding and~~ delivery from candidate to host lab • host lab blinding and delivery to listening labs via FTP Listening lab: • preparation of listening test / Invitation of listeners	
aug 21 - aug 27	Listening lab: • downloading of post-processed speech files via FTP	

	• preparation and start of listening test	
aug 28 - sep 03	Listening lab: • listening tests	
sep 04 - sept 08	~~Meeting: discussion and approval of~~ • ~~Selection rules~~ • ~~Identificaton of independent Lab for complexity evaluation~~ Listening lab: • listening tests	SMG11#16 / 3GPP TSG SA4#11 (4-8 September)
sep 11 - sep 17	Listening lab: • listening tests	
sep 18 - sep 24	listening lab: • listening test • delivery of results to global analysis lab (+ ITU-T 4kbit/s selection test)	
sep 25 - oct 01	(+ ITU-T 4kbit/s selection test) Global analysis lab: • analysis of results	3GPP TSG SA#9 (25-29 September)
oct 02 - oct 08	candidates prepare deliverable documents (e.g. low level description instead of draft specification, detailed complexity analysis) (+ ITU-T 4kbit/s selection test)	
oct 09 - oct 15	(+ ITU-T 4kbit/s selection test)	
oct 16 - oct 22		
oct 23 - oct 29	**Selection test results presentation and analysis** **Selection of AMR-WB codec**	SMG11#17 / 3GPP TSG SA4#12 (23-27 October)
oct 30 - nov 05	start of preparation of specification AMR-WB verification phase	
nov 06 - nov 12	~~Meeting: Presentation of selection test results and selected coder~~ AMR-WB verification phase **Meeting: ITU-T SG16 Meeting: Presentation of results**	~~SMG#33 (6-10 November)~~ ITU-T SG16 Meeting
nov 13 - nov 19	**Meeting: ITU-T SG16 Meeting: Presentation of results** AMR-WB verification phase (for bit exactness)	ITU-T SG16 Meeting
nov 20 - nov 26	**Meeting: Presentation and approval of** • **Verification results,**	SMG 11# 18 / 3GPP STG SA4#13 (nov 20-24)

	• **Results of verification phase**	
nov 27 - dec 03		
dec 04 - dec 10		
dec 11 - dec 17	**SA approval of AMR-WB codec selection and of all specifications**	3GPP TSG SA#10 (13-15 December)
dec 18 - dec 24		
dec 25 - dec 31		
January 2001	AMR-WB characterisation phase	
February 2001	AMR-WB characterisation phase	SMG#34?
March 2001	**Meeting: Approval of AMR-WB for R2000characterisation phase results**	3GPP TSG SA#11?

Annex B: Platforms used to create the executable for crosschecking

Candidate	Platform used to create executable for crosschecking

End of Document

Source:	**TSG-S4**
Title:	**Updated List of Deliverables at TSG-SA#8**
Document for:	**Information**

This annex contains in Tables B1 (R99) and B2 (R00) an updated list of TSG-S4 deliverables following TSG-S4#, (June 5-9, 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#8 plenary.

Table B1: List of Release 99 TSG-S4 Deliverables: **Version: 0.8, 2000-06-26**

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 26.073	AMR Speech Codec; ANSI C-Code	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#6		Version 3.1.0 following TSG-SA#7
TS 26.074	AMR Speech Codec; Test Sequences	No Open Issue	Erik Ekudden Ericsson	Approved at TSG-SA#6		==Version 3.0.1== as approved by TSG-SA#6 in Tdoc SP-99559
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 26.091	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. 1 CR presented to TSG-SA#8 in Tdoc **SP-000262**
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 3.1.0 following TSG-SA#7
TS 26.102	AMR Speech Codec Interface to Iu and Uu	No Open Issue	Frederic Gabin Nortel Networks	Approved at TSG-SA#6		Version 3. 1.0 following TSG-SA#7
TR 26.975	AMR Speech Codec Performances Characterization	Preparation of test plan for Characterization in 3G Channels, identification of Host and Listen. Labs 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#9 **(September 2000)**		55kEuro Funding accepted by PCG Preparation of Test Plan in SMG11/S4 SQ Sub-group. Actual Tests still expected for 2H00 Version 1.1.0 based on latest version of GSM 06.75, 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	Evaluation and Verification completed Test Results to be included in AMR Characterization report or other report.	Petri Haavisto Nokia	Presented for approval at TSG-SA#8	Low Bit Rate Codec for Multimedia Barry Aronson Toshiba	Version 1.0.0 presented for direct approval at TSG-SA#8 in Tdoc **SP-000261**
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. 1 CR presented to TSG-SA#8 in Todc **SP-000263**
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

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	No Open Issue	Olle Franceschi, Ericsson	Approved at TSG-SA#7	QoS for Speech and Multimedia Coecs Harri Honko Nokia	Version 3.0.0 as approved by TSG-SA#7 in Tdoc SP-00019
TR 26.915	Echo Control For Speech and Multi-Media Services	No Open Issue	Ian Goetz Tellabs	Approved at TSG-SA#7		Version 3.0.0 as approved by TSG-SA#7 in Tdoc SP-00020
TS 26.131	Terminal Acoustic Characteristics for Telephony; Requirements	DAI References stilll 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. 4 CRs presented to TSG-SA#8 in Tdoc **SP-000264**
TS 26.132	Terminal Acoustic Characteristics for Telephony; Test Specifications	Completed.	Ian Goetz Tellabs	Presented for approval at TSG-SA#8		Version 1.0.0 presented for direct approval at TSG-SA#8 in Tdoc **SP-000260**

Work Items:

WI-S4-1: Release 99: Mandatory Speech Codec for Narrow band Speech Telephony Service/AMR
Work Item completed except for 3G Characterization

WI-S4-2: Release 99: Codec for Low bit rate Multimedia Telephony Service
Work Item completed for CS H.324 Based Multimedia part

WI-S4-3: Release 99/00: QoS for Speech and Multimedia Codec
Work Item completed fr Release 99

WI-S4-4: Release 99: 3G Audio-Visual Terminal Characteristics
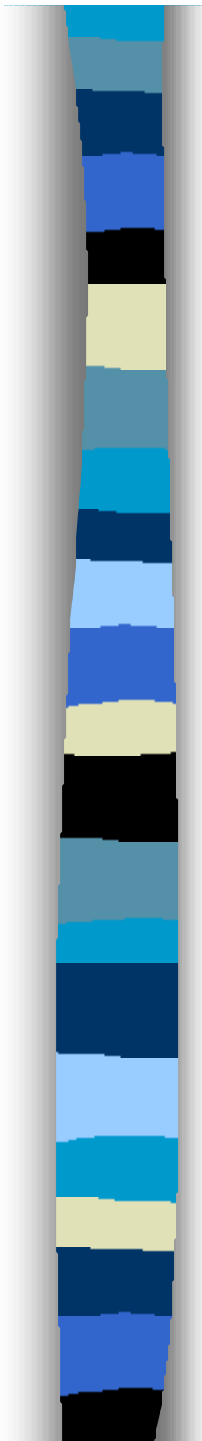Work Item completed

Deliverable	Title	Features completed/under study	Editor	Date for approval	WI/Rapporteur	Comment/Status
TR 26.901	AMR Wideband Speech Codec Feasibility Study Report	No Open Issue	No Editor Identified	Presented at TSG-SA#7	AMR Wideband Speech Codec Imre Varga Siemens	Version 4.0.0 as approved by TSG-SA#7 in Tdoc SP-000024
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	Codec for Multimedia Barry Aronson Toshiba	No significant inputs received so far. Version 0.0.1 reviewed in TSG-S4#5 (S4-99160)
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 9/2000

Work Items:

WI-S4-5: Release 00: Codec(s) for Wideband Telephony Services
　　　Project Plan Version 0.2 available in Tdoc S4-99488R
WI-S4-6: Release 00: 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)

TSG-S4 CODEC Working Group

Status Report

**TSG-SA#8
June 26-28, 2000
Dusseldorf, Germany**

*Alain Ohana
TSG-S4 Chairman
BellSouth Mobility DCS &
GSM North America Alliance*

3GPP TSG-S4

TSG-S4 Documents

- SP-000258 TSG-S4 Status Report

- SP-000259 AMR Wideband Qualification Phase Report
- SP-000260 3G TS 26.132 v1.0.0 (Terminal Acoustic Test Req.)
- SP-000261 3G TS 26.104 v1.0.0 (AMR Floating-Point C-Code)

- SP-000262 2 CRs on AMR
- SP-000263 1 CR on TS 26.111 (Modifications to H.324)
- SP-000264 4 CRs on TS 26.131 (Terminal Acoustic Perf. Req.)

- SP-000265 New Work Item Proposal (PS Streaming Application)

3GPP TSG-S4

Meetings Schedule

- **1 Plenary and 3 Ad Hoc since TSG-SA#7**
  - Terminal Acoustic Tests Drafting Session: May 3, London, UK hosted by BT
  - Joint S2, N4, R3 S4 meeting on TrFO/TFO harmonization: May 8, Stockholm, Sweden hosted by Ericsson
  - TFO Drafting Session: May 17-19, Bolingbrook, IL-USA hosted by Tellabs
  - TSG-S4#11: June 5-9, Versailles, France hosted by Alcatel, France Telecom and Nortel Networks
- **Meeting Schedule**
  - TSG-S4#12: September 4-8   Bethesda, MD-USA
  - TSG-S4#13: October 23-27   Potential host identified
  - TSG-S4#14: November 20-24   Host needed
- **Meeting Statistics**
  - ~50 Participants, 1 week, >100 Documents

3GPP TSG-S4

Highlights

<u>Release 99</u>: 3 Pending items

■ AMR 3G Characterization Report (expected for 10/2000)

– Test plan under preparation

– To be completed 3-4Q00

■ AMR Floating Point C-Code (expected for 6/2000)

– Verification Completed

– Specification presented for approval at TSG-SA#8

■ 3G Acoustic Terminal Test Specification (expected for 6/2000)

– Specification presented for approval at TSG-SA#8

<u>Release 00</u>:

■ AMR Wideband Qualification Phase Completed (SP-000259)

■ Some progress on AMR TFO (now expected for 9/2000)

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Release 99: AMR Speech Codec

- ■ AMR Specifications are stable
- ■ 1 CR (R98 & R99) presented for approval at TSG-SA#8
  - – GSM RATSCCH/DTX related
- ■ AMR 3G Characterization Report
  - – Two organizations (NTT DoCoMo & Nortel Networks) to provide Error Patterns
    - • Final agreement on Error Conditions expected for July 2000
  - – Agreement reached on Test Plan design
    - • Maximum number of Error Conditions tested
    - • 3 Experiments in clean speech, 1 Experiment in car noise
    - • 4 different languages used (including Korean). No test repeated
    - • Test Plan to be finalized in July/August 2000
    - • Tests to be performed in September-October 2000
- ■ <u>Note</u>: EFR CRs making the AMR12.2 mode an authorized alternative implementation of EFR approved by SMG

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Release 99: AMR Floating Point C-Code

■ C-Code Targeting PC based Multimedia applications

■ Verification and Evaluation completed

– Evaluation performed by: BT, Ericsson, France Telecom, Motorola, Nokia, Nortel Networks, Siemens and Texas Instruments

– Test Results show that the AMR Floating Point Code provides a speech quality at least equivalent to the Fixed Point version...

– ….and a significant improvement in processing speed

– Interoperability between Fixed Point and Floating Point provided by bit-exactness of Floating Point decoder

  • Floating Point Decoder is actually an optimized version of the Fixed Point Decoder

■ Because of the sensitivity of the performances to the compiler parameters (vendor, options…), it was decided that the only the Codec and options defined in TS 26.104 would be authorized for implementation in Terminals and Network Equipment

■ Specification 3G TS 26.104 presented for approval (as v1.0.0)

– Identical version presented in TSG-SA#7 as version 0.3.0 (w/o the C-Code)

– Evaluation Test Results to be included in the AMR Characterization Report (TR 26.975) or in a new report (Editorial work required)

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3G Terminal Acoustic Characteristics

- 3G TS 26.132 Terminal Acoustic Characteristics for Telephony - Test Specification completed and presented to TSG-SA#8 for approval
  - Prepared with significant involvement of ETSI STQ members
- 4 CRs on the Requirement Specification (3G TS 26.131)
- Work Item now complete

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	-	Presented for approval at TSG-SA#8

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Release 2000: AMR TFO

- ■ 2 Drafting Sessions to progress AMR TFO implementation
- ■ 1 Joint session with S2, R3, N4 on Harmonization with TrFO
- ■ A number of items finalized (TFO)
  - – Message Structure
  - – TFO Functional Description
  - – TFO State Machine
  - – TFO Protocol
- ■ Pending issues:
  - – Codec Mode Mismatch resolution (different Active Codec Sets at call set up at both ends of the call)
  - – Editorial work to transfer and update the content of the GSM 08.62 to create an acceptable 3G TS 28.062
- ■ First version of TS 28.062 now expected for 09/2000

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Release 2000: AMR Wideband Speech Codec

- Qualification Phase Report provided in SP-000259
- Selection Phase scheduled for July-October time-frame
  - 5 Candidates
  - Test Plan to be finalized by July 16th
  - Executables to be delivered to ETSI by August 6th
    - VAD to be provided with Speech Codec
  - Listening Test planned for August-September 2000
  - Test results analyzed and solution selected in TSG-S4#13 (October 23-27, 2000)
  - Verification Phase and preparation of Codec Specifications over October-November time-frame
  - Approval of selection results and codec specifications in **TSG-SA#10**

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New S4 Leadership

- New S4 Chairman elected at the last plenary:
  - Kari Jarvinen, Nokia, SMG11 Chairman

- Hiroyuki Yamaguchi, NTT DoCoMo, Vice-Chairman
- One Vice-Chairmanship position vacant

3GPP TSG-S4

Documents Presented for Approval

Document	Specification	Version	Title
SP-000260	3G TS 26.132	1.0.0	Terminal Acoustic Characteristics for Telephony – Test Requirements (R 99)
SP-000261	3G TS 26.104	1.0.0	ANSI-C code for the Floating-Point AMR Speech Codec (R 99)

Document	Title
SP-000265	New WI Proposal on Packet Switched Mobile Streaming Application

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New Work Item Proposal:
PS Streaming Applications

- Audio and Video Streaming are already very popular applications on the Internet, but operating under multiple proprietary protocols

  - <u>Consequence</u>: Need to install multiple streaming clients in Terminal

- Because of the mobile environment (channel errors and limited size and capabilities in Handset), it would be beneficial to limit the number of software plug-ins, select a default set of streaming protocols and codecs if possible and evaluate their performances in a 3G environment

- Work Item Objectives:

  - Standardization of components for mobile streaming applications
  - Harmonization with other multimedia services
  - Create a reference Mobile Streaming specification for content providers
  - Release 2000

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Change Requests Presented for Approval

SP-00262: 2 CRs on AMR

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000259	06.93	7.3.0	A008		C	R98	CR to GSM 06.93 A008 on Re-scheduling of stolen SID_UPDATE Frames for AMR (R98)
S4-000260	26.093	3.1.0	002		A	R99	CR to 3G TS 26.093 002 on Re-scheduling of stolen SID_UPDATE Frames for AMR (R99)

SP-000263: 1CR on TS 26.111 Codec(s) for H.324 Based CS Multimedia Telephony – Modifications to H.324

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000230R	26.111	3.1.0	004		F	R99	Changes to editorial notes

SP-00264: 4 CRs to TS 26.131 Terminal Acoustic Performances Requirements

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000335	26.131	3.0.0	001	2	B	R99	CR on Addition of a chapter pointing to ITU-T Recommendations for extended parameters
S4-000292	26.131	3.0.0	002		C	R99	CR on Listener side tone (LSTR) and talker side tone (STMR) requirements
S4-000310	26.131	3.0.0	003	1	F	R99	CR on Change of Handset and headset UE receiving sensitivity/frequency characteristic mask
S4-000311	26.131	3.0.0	004	1	F	R99	CR on Acoustic requirements for Handheld-type hands-free user equipment

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