3GPP TSG CN Plenary Meeting #15 **NP-020097**
6th – 8th March 2002. Jeju, Korea.

Source:	**Nokia**
Title:	**DISC, AMR-WB WI discussion**
Agenda item:	**9.6**
Document for:	**APPROVAL**

Introduction

In the CN4#12 meeting Nokia submitted contribution N4-020027 “Completing AMR-WB WI” (also included in the zip-file for your convenience). In that document the CN WI on AMR-WB (NP-010538: WID for Introduction of AMR-WB speech service in 3GPP Standards Release 5 – Core Network Aspects, approved at CN#13) was evaluated. N4-020027 was approved in CN4#12 meeting. Nokia also provided a CR on Codec fallback in TrFO Call Establishment to External Network (in N4-020028 revised in N4-020271) to complete TrFO signaling. That CR was approved by CN4#12. It is included in NP-020066 for this meeting.

CN1 has completed it’s tasks on AMR-WB.

Discussion

All of the aspects in the CN WI on AMR-WB were considered in N4-020027 and completed with an explanation, correcting CR, or restriction in Rel5, except Lawful interception. Some of the CN4 meeting delegates felt that there might be some Lawful interception impact due to introduction of AMR-WB. This question was forwarded to SA3-LI group to answer. Unfortunately, there has been no answer from that group on this topic.

Proposal

Since only one of the 12 aspects in the CN WI on AMR-WB still needs verification/action before completing the task, we feel that the WI is almost completed. We propose to mark the CN WI on AMR-WB in 3GPP work plan as 95% completed and to keep it in Rel-5.

3GPP TSG CN WG4 Meeting #12 ***N4-020027***
Sophia Antipolis, FRANCE, 28th Jan. – 1st Feb. 2002

Agenda Item: 6.2
WI / Topic: AMR Wideband
Source: Nokia
Title: Completing AMR-WB WI
Document for: Discussion and Approval
Date: 2002-01-17

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1. Introduction

The purpose of this document is to complete the AMR-WB work item (Tdoc NP-010538: WID for Introduction of AMR-WB speech service in 3GPP Standards Release 5 – Core Network Aspects). Other 3GPP WGs such as SA4 and CN1 have completed their work on AMR-WI and it is essential to complete the work also for CN4 to avoid the huge task of removing ARM-WB from specifications prepared by other working groups.

Basic assumption for AMR-WB is the following: AMR-WB codec is selected only for end to end connections which are provided by TFO and TrFO operations. In TrFO call establishment to external network no transcoding from wideband speech to narrowband speech is done; in that case a codec fallback procedure is used to select a narrowband codec on the originating side. For that purpose Nokia has prepared a CR to introduce this feature to TS 23.153 Rel-5.

2. Discussion

In the following, the bullet points of the AMR-WB WID paragraph 4 are discussed:

- ***End to end bandwidth support for AMR-WB;***

End to end bandwidth support for wideband speech is provided by TFO and TrFO operations.

- ***Codec selection and GSM-UTRAN interworking:***

WG CN1 has completed the work on Codec selection and GSM-UTRAN interworking.

- ***TFO and TrFO signalling;***

TFO signalling:

AMR-WB TFO is under development in SA4 TFO sub working group. This is rather straightforward work based on AMR TFO. (For 3G applications the mode-set of AMR-WB has one more mode than AMR and this should be taken into account.) AMR-WB TFO signalling is defined in in-band TFO specification TS 28.062.

AMR-WB codec is already included in the codec list specification TS 26.103. Also, the Interface to Iu, Uu and Nb have been specified for AMR-WB in TS 26.202.

TrFO signalling:

Bearer Independent Call Control (BICC) protocol used in Nc-interface also refers to codec specification in order to enable codec negotiation between two end users. ITU-T Q.765.5 specification refers to the 3GPP TS 26.103.

Transcoder Free Operation (TrFO) which relies on the out-of-band signalling procedures to a) negotiate same codec for both ends b) carry some information, normally carried in-band such as DTMF and tones. Basic TrFO behavior does not require any modifications in order to successfully adapt WB AMR into it. However for sake of better end-user experience, it is seen as necessary to enhance TrFO by introducing the so called codec fallback procedure. Nokia has prepared a CR to introduce this feature to TS 23.153 Rel-5.

- ***AMR-WB and narrowband interworking;***

Basic assumption for AMR-WB is the following: AMR-WB codec is selected only for end to end connections which are provided by TFO and TrFO operations. In TrFO call establishment to external network no transcoding from wideband speech to narrowband speech is done; in that case a codec fallback procedure is used to select a narrowband codec on the originating side.

Should interoperability to narrowband codecs be required (e.g. during TFO establishment), AMR-WB is fully capable of the interworking. The interoperability of AMR-WB codec to narrowband and other wideband codecs has been tested during the AMR-WB characterisation phase 1a. These tests verified the good interworking performance (Tdoc SP-010692: Draft 3GPP TR 26.976 version 0.6.0 on AMR-WB Speech Codec Performance Characterization).

- ***Radio Access Bearer optimisation:***

Actually the RAN does not have the direct knowledge of used codec. RNC and involved Node Bs have in-direct knowledge through the parameters of used Radio Access Bearer. These parameters or formally called as attributes, are always given by core network i.e. MSC Server controlling the call and having the knowledge of selected codec.

- ***Radio Access Bearer renegotiation (impact at least on 23.018)***

Serving RNC will receive RAB parameters from the core network in the RAB Assignment procedure/message. This procedure may be invoked by core network in order to establish new connection (new call) or to modify existing call (in-call modification). More detailed description of procedure can be found from the 3GPP TS 25.413.

- ***Interworking with fixed broadband networks:***

From S1-011328:

- ***Interworking with Fixed Network Wideband Legacy Codecs:***
  The higher terminal exchange rate in mobile networks (every 2-3 years a new up-to-date and trendy mobile) can lead to a widespread support of AMR-WB in mobile networks. This imbalance justifies no need for interworking with the virtually unused G.722 wireline WB codec and allows to save the enormous effort (e.g. transcoding) which would be needed otherwise.
  Low-complexity interworking (i.e. without the need of transcoding) with future wireline

WB codec is given, because ITU-T SG 16 has chosen AMR-WB itself as this wireline WB codec (G722.2).
=> ***Interworking with the existing fixed network wideband codec G.722 is not required****.*

- ***Tones and announcements***

From S1-011328:

- **Tones & Announcements**
  From a user perspective tones are not needed to be wideband, even for a wideband call. I.e. transcoding/down-and-up sampling to a narrow-band signal is acceptable. SA1 is not aware if there is any impact to announcements due to introduction of WB AMR speech coding. However, SA1 doesn't see that additional work would be justified at this stage to support wideband announcements.
  => ***AMR-WB tones are not required, and AMR-WB announcements are required as a very low priority item (if at all).***

- ***Billing, accounting and call detail record aspects;***

From S1-011328:

- ***Charging***
  While SA1 did not express a strong preference it was felt that ***Charging AMR-WB usage per AMR-WB air time*** *should be an option in case of out-band codec negotiation…SA1 has no requirements for user to select speech codec, and thus they have no control to the charging applied.*

To include information of the usage of a wideband codec to post-paid CDRs, it can be done as follows:

- ✓ In GSM/EDGE the information of the usage of a wideband codec is carried in the optional "speech version" data (please look TS 48.008 and TS 24.008).

- ✓ In UMTS the information of the usage of a wideband codec must be added to the CDR specification. The work item is ongoing in SA5. Nokia is willing to produce the required CRs.

For prepaid services it is proposed, that the indication of the usage of a WB codec is not included in Rel-5 / Camel4 specifications. To find out if this is an operator need in the Rel-6 timescale, it is proposed that a LS is sent to SA1 to define these requirements and to CN2 and SA5 to include this to Rel6 specifications after SA1 guidance.

- ***WB Conferencing and WB Voice Group calls;***

From S1-011328::

- **Wideband Conferencing**
  At present the mobile network is not used very much for conference calls as most people use the fixed phone on their desk. A high quality conferencing feature might well be of high interest for business users, but could be realised at a later time. Also it is SA1's

understanding that current solutions for MPTY would allow each participant to have speech codec allocated individually and independently.
=> ***Wideband conferencing is not required***

Voice Group calls:

If and when voice group calls are supported in Bearer independent architecture, the addition of a new voice codec does not produce any changes to the specifications.

- ***Adaptation of subscriber data in HLR/VLR;***

According to SA plenary #13 AMR-WB is a speech service, and it should be treated as the old TS11. All that applies to TS11, applies also to AMR-WB. So there is no effect to 3GPP core network standards and no actions are needed.

- ***Lawful interception:***

CS side:

For the Lawful interception user plane connection the MGW decodes the encoded speech in both TFO and TrFO case to G.711 PCM speech, and this is also done for WB speech by the MGW. The MGW just needs one new decoder. In spec 23.153 it is stated:

4.3 Lawful interception

The TrFO shall be maintained if the interception is made due to the lawful interception. Two decoders are needed to monitor the TrFO call.

Lawful interception shall not have any influence on the establishment or maintenance of the TrFO connection in order to avoid any audible effect in speech quality or noticeable effect in speech delay to the end users.

The addition of one new codec does not affect the functionality of Lawful interception.

PS side:

Lawful interception user plane connection receives all IP packets, so one new codec does not affect 3GPP core network standards and no actions are needed.

It is proposed than a LS is sent to SA3 LI group to clarify the situation.

3. Proposal

It is proposed that the AMR-WB work item is decided to be completed for Rel-5 with those restrictions mentioned above.