Source:	TSG CN WG4
Title:	CR on Rel-5 AMRWB
Agenda item:	7.13
Document for:	APPROVAL

Introduction:

This document contains a CR on Rel-5 Work Item "AMRWB", that have been agreed by TSG CN WG4, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
23.153	33	2	N4-020702	Rel-5	Introduction of AMR-WB	B	5.0.0

CR-Form-v5.1

CHANGE REQUEST

| ⌘ | **23.153** CR **033** | ⌘rev | **2** | ⌘ | Current version: | **5.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Introduction of AMR-WB	
Source: ⌘	CN4	
Work item code: ⌘	AMR-WB	***Date:*** ⌘ 13rd of May 2002
Category: ⌘ **B**		***Release:*** ⌘ REL-5

Use *one* of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature)*,
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use *one* of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change: ⌘	Introduction of wideband speech service
Summary of change: ⌘	New Appendix added to describe AMR-WB specifics
Consequences if not approved: ⌘	AMR-WB WI not complete

Clauses affected: ⌘	6.8, Appendix

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

| ***Other comments:*** ⌘ | |

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

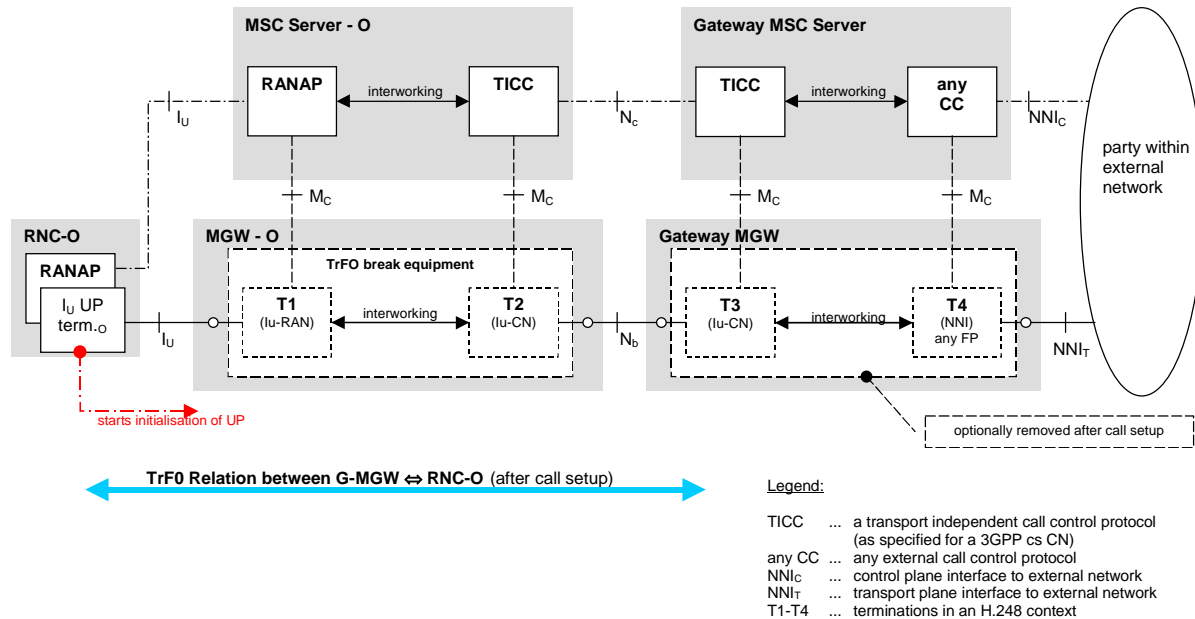## 6.8 Mobile to External Network TrFO Call Establishment

Figure 6.8/1. Configuration during Call Setup of a Mobile to External Network Call

The description of Figure 6.1/1 (Configuration during Call Setup of a Mobile to Mobile Call) within clause 6.1 applies for the network and protocol entities involved in the External Network to Mobile Call scenario with following modifications:

No RNC-T is present – a party served by an external network is the terminating side of the call instead.

The terminating side CN nodes are Gateway nodes (Gateway MSC Server/Gateway MGW).

The Gateway MGW call context is no TrFO break equipment in general, i.e. T4 in general do not support the IuFP framing protocol. Appropriate interworking (in some cases transcoding) has to be performed between T3 and T4.

Therefore Figures 6.1/2 to 6.1/4. (the respective message flows for mobile to mobile call setup) apply in principle as well with appropriate modifications outlined below:

Codec negotiation

Step 1. Until 6., that give the codec negotiation phase in Figure 6.1/2, shall be applied with following modifications:

There is no terminating UE involved in this negotiation phase.

If the succeeding node of the Gateway MSC-Server doesn"t support OoBTC procedures for compressed voice types, the Gateway MSC-Server terminates the OoBTC procedures in order to enable transcoders placement at the edge gateway node. ~~When the Gateway MSC-Server terminates the OoBTC procedures it should not select a wideband voice codec to be used in the mobile originating side of the call.~~

The edge gateway node <u>should</u>~~shall~~ accept the ~~narrowband voice~~ <u>C</u>~~c~~odec <u>Type</u> MSC-O prefers and <u>should</u>~~shall~~ not puncture out any <u>C</u>~~c~~odec <u>M</u>~~m~~ode. <u>If TFO is to be supported then the Gateway MSC-Server shall supply the MGW with the</u> ~~available~~ codec list <u>and the selected</u> <u>C</u>~~c~~odec <u>Type in order that inband TFO negotiation may be performed. For further details see chapter 5.5.</u>

Annex X (normative): Wideband Speech Service

Support Of WB speech service

Several compatible Codec Types to enable wideband (WB) speech service are defined in 3G TS 26.103 v.5.0.0. Support of these Ceodec Typess by a UE is indicated to the MSC by inclusion in the Supported Codecs IE. Note, for GERAN there is also a specific classmark, which includes the radio access' support of WB Ceodec Typess. Normal TrFO signalling shall apply, where wideband eCodec Types maywill be given preference in the codec list if the wideband service is available to that user.

Call Establishment

Where end-to-end TrFO cannot be achieved (e.,g. the external network does not support OoBTC procedures) a decision whether to accept the WB codec type at the interworking point and transcode to default- narrowband PCM (G.711) or to remove the wideband codec type from the codec list and only allow narrowband service to continue shallhas to -be made. The decision making factors are:

i) Is TFO supported? TFO shall-allows the WB service to be negotiated inband and if successful allow end-to-end WB speech.

ii) If TFO is supported then a NB speech Codec Type may be selected as the initial codec type. If the TFO inband protocol resolves that end-to-end WB speech is possible then mid-call codec negotiation/modification procedures shall be employed to switch to WB service. Alternatively if AMR-WB is proposed then codec modification will be required if TFO can be successful in NB but cannot be successful in WB. The decision on which Type to select initially should be based on the probability of acceptance of the service.

iii) Which WB Codec Mmodes shall be permitted? AMR-WB has 3 mandatory modes for all RANs (6.60, 8.85, 12.65) and 2 optional modes for UTRAN & GERAN-8PSK_FR (15.85, 23.85). If transcoding from a WB mode to G.711 then only narrowband speech quality will result. Therefore no gain is obtained by allowing the higher modes whereas additional radio access bandwidth is used.

iv) Decision rules for codec type selection and AMR-WB codec mode selection are described in TFO protocolspecification TS 28.062.

v) If TFO is supported NB speech may be selected as the initial codec and if end-to-end WB speech is possible then mid-call codec negotiation/modification procedures may be employed to switch to WB service.

vi) Is charging applied to use of higher modes-?

Note: Transcoding between WB source encoding and default PCM/G.711 provides similar quality (but no better) as would be achieved by NB source encoding. Thus in many cases avoiding modification back to NB codec (when TrFO cannot be achieved) is preferred. On the other hand the WB Codec Types require slightly higher bit rates and thus are slightly less error robust.

Handover between WB and NB speech

Handover of a successfully established WB speech call to a radio access that cannot guarantee the support of WB speech shall-again requires a decsion whether to transcode or modify.

If the call has been established end-to-end in WB TrFO, or end-to-end in WB quality including TFO links, then a modification to NB speech on the TrFO link shall occurmay be preferrable – to avoid inserting of 2 transcoders (one transcoding between WB speech and NB speech). This depends on the estimated likelihood how long the call will stay on that NB radio access. It also-depends on the possibility to get WB TFO support on that NB radio access. In general the same decisieon rules apply as for call establishment described above.

If the call has been established end-to-end WB but includes TFO (e.g. transit network or GSM access) then as WB cannot be maintained for the call after handover modification of the far end source encoder is dependent on the same decisions for call establishment as described above.

Interworking with external networks (PSTN/ISDN)

In ITU-T a WB speech codecalgorithm is defined based on the 3GPP AMR-WB codec algorithm:, G.722.2.

Note: It is desired that thisall Codec Types codec isbased on that WB algorithm are exactly compatible with the 3GPP AMR-WB Codec Types to enable end-to-end WB speech between fixed and mobile. This means that all configuration parameters must be compatible, for example codec mode change in sending direction (encoder side) should adhere to the 40ms interval required for GERANSM system radios access.

Provided that G.722.2 is directly compatible interworking to external networks should indicate support for this codec type in the Supported Codec List when AMR-WB codec is received from the UE. Receipt of G.722.2 from an external network shall be translated to support of AMR-WB by the PLMN nodes.

Multi-party Calls

A decision whether to modify any WB legs to NB source encoding may be made based on similar decisions as for the call establishment when TrFO is not successful.

Note: The conference bridge is assumed to convert any WB call leg into NB speech. Calls established in WB that result in subsequent parties being joined in conference or calls being established toward a specific conference bridge will under the existing conferencing technology result in NB speech quality.

Lawful Interception

Lawful Interception of AMR WB speech service shall be in accordance with clause 4.3.