

**3GPP TSG CN Plenary Meeting #14
Kyoto, JAPAN, 12th-14th December 2001**

NP-010675

Source: TSG CN WG4
Title: CR on Rel-4 Bearer Independent architecture
Agenda item: 8.3
Document for: APPROVAL

Introduction:

This document contains 1 CR on Rel-4 Work Item "CSSPLIT", that has been agreed by TSG CN WG4, and is forwarded to TSG CN Plenary meeting #14 for approval.

| Spec | CR | Rev | Doc-2nd-Level | Phase | Subject | Cat | Ver_C |
|-------------|-----------|------------|----------------------|--------------|--|------------|--------------|
| 23.205 | 010 | | N4-011077 | Rel-4 | Correction of Bearer Modification Handling | F | 4.2.0 |

CHANGE REQUEST

⌘ **23.205 CR CR-010** ⌘ rev **-** ⌘ Current version: **4.2.0** ⌘

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

| | | | |
|------------------------|---|-----------------|--|
| Title: | ⌘ Correction of Bearer Modification Handling | | |
| Source: | ⌘ L.M. Ericsson | | |
| Work item code: | ⌘ CSSPLIT | Date: | ⌘ 8 th October 2001 |
| Category: | ⌘ F (Essential) | Release: | ⌘ REL-4 |
| | <p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p> | | <p>Use <u>one</u> of the following releases:</p> <p>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p> |

| | |
|--------------------------------------|--|
| Reason for change: | ⌘ The current handling of RAB Assignment Modification is faulty when AAL2 CS2 not supporting MSLC (Modify Support For Link Characteristics) or AAL2 CS1 is applied on the lu user plane. If MSLC is not supported and a RAB Modification is requested then the Transport would be released and then re-seized. This does not allow coordination between the change of the transport connection and the Bearer Properties of the MGW termination. It is desired to be able in such case to reserve a new termination prior to RAB Modification and request that the transport is moved to this new termination. |
| Summary of change: | ⌘ Modification to the procedures describing RAB Assignment Modification. RAB Assignment Response (from Establish) includes new information element to indicate support of modification of link characteristics (MSLC). For modification of the access bearer when MSLC is not supported by the current AAL2 link, the MSC server shall use a new access bearer termination in the existing MGW. The existing text for call hold, call waiting and Alternate Speech/Fax is modified to refer to the amended Bearer Modification subclause. |
| Consequences if not approved: | ⌘ Faulty RAB Assignment Modification when MSLC not supported for AAL2 CS2 or AAL2 CS1 is applied on the lu user plane. |

| | | | |
|------------------------------|--|---------------------|--|
| Clauses affected: | ⌘ 2, 6.1.1, 6.1.2, 13.5, 13.6, 13.17, 13.18.1 | | |
| Other specs affected: | <input checked="" type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications | ⌘ TS 25.413 v 4.2.0 | |
| Other comments: | ⌘ Backward compatibility to R99 is such that only Q.AAL2 CS1 is supported, which would be assumed by the lack of presence of the new parameter in the initial RAB Assignment Response. | | |

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

| |
|-------------------------------|
| First modified section |
|-------------------------------|

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

:

:

| | |
|-------|---|
| [x26] | 3GPP TS 25.413- v. 4.1.0 : "UTRAN Iu Interface RANAP Signalling" |
|-------|---|

| | |
|-------|--|
| [y27] | 3GPP TS 48.008: "3 rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification (Release 4)" |
|-------|--|

| |
|------------------------------|
| Next modified section |
|------------------------------|

6.1.1 Forward bearer establishment

The mobile originating call shall be established in accordance with 3GPP TS 23.108 [17]. The following paragraphs describe the additional requirements for the bearer independent CS core network. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

MGW selection

The MSC server shall select an MGW for the bearer connection before it performs the access bearer assignment or the network side bearer establishment. This may happen either before sending the IAM or after receiving the Bearer Information message. In the latter case, the MGW selection may be based on a possibly received MGW-id from the succeeding node (bullet 1 or bullet 2 in figure 6.2).

Initial addressing

The MSC server shall indicate in the IAM that forward bearer establishment is to be used. If access bearer assignment has not been completed, the MSC server shall indicate that the Continuity message will follow. However, if late access bearer assignment (assignment after alerting or answer) is used the MSC server shall not indicate that the Continuity message will follow. The MSC server provides the bearer characteristics to the succeeding node in the IAM. If the MGW is selected at an earlier stage the MGW-id may also be provided in the IAM (bullet 1 in figure 6.2).

Network side bearer establishment

The MSC server shall either select bearer characteristics or requests the MGW to select and provide the bearer characteristics for the network side bearer connection before sending the IAM. In the latter case the MSC server uses the Prepare Bearer procedure to request the MGW to select the bearer characteristics. After the succeeding node has provided a bearer address and a binding reference in the Bearer Information message the MSC server uses the Establish Bearer procedure to request the MGW to establish a bearer towards the destination MGW. The MSC server provides the MGW with the bearer address, the binding reference and the bearer characteristics (bullet 2 in figure 6.2).

Access bearer assignment

The MSC server shall select bearer characteristics for the access bearer.

For UTRAN, before the MSC server starts the access bearer assignment, the MSC server requests the MGW to prepare for the access bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address and a binding reference, and provides the MGW with the bearer characteristics-. For speech calls, the MSC server shall provide the MGW with the speech coding information for the bearer. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4]. After the MGW has replied with the bearer address and the binding reference the MSC server requests access bearer assignment using the provided bearer address and binding reference (bullet 3 in figure 6.2) in accordance with [x26]. In the response, the MSC may receive an indication that the existing link characteristics of access bearer can be modified at a later stage, see subclause 13.18.1.

For GERAN, before the MSC server starts the access bearer assignment, the MSC server uses the Reserve Circuit procedure to seize a TDM circuit. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4] and a GSM channel coding. After the MGW has replied to the TDM circuit seizure, the MSC server requests access bearer assignment (bullet 4 in figure 6.2) in accordance with [x27].

Next modified section

6.1.2 Backward bearer establishment

The basic mobile originating call shall be established in accordance with 3GPP TS 23.108 [17]. The following paragraphs describe the additional requirements for the bearer independent CS core network. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

MGW selection

The MSC server shall select an MGW for the bearer connection before it performs the access bearer assignment or the network side bearer establishment. This happens before sending the IAM (bullet 1 or 2 in figure 6.4).

Network side bearer establishment

The MSC server shall either select preferred bearer characteristics or requests the MGW to select and provide the bearer characteristics for the network side bearer connection before sending the IAM. The MSC server requests the MGW to prepare for the network side bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address and a binding reference, and provides the MGW with the preferred bearer characteristics or requests the MGW to select and provide the bearer characteristics (bullet 3 in figure 6.4). After the MGW has replied with the bearer address, the binding reference and the bearer characteristics (if requested), the MSC server sends the IAM to the succeeding node.

Initial addressing

The MSC server shall indicate in the IAM that backward bearer establishment is to be used. If access bearer assignment has not been completed, the MSC server shall indicate that the Continuity message will follow. However, if late access bearer assignment (assignment after alerting or answer) is used the MSC server shall not indicate that the Continuity message will follow. The MSC server provides the bearer characteristics, the bearer address and the binding reference to the succeeding node in the IAM. The MSC server may also provide the MGW-id in the IAM (bullet 4 in figure 6.4).

Access bearer assignment

The MSC server shall select bearer characteristics for the access bearer.

For UTRAN, before the MSC server starts the access bearer assignment, the MSC server requests the MGW to prepare for the access bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address and a binding reference, and provides the MGW with the bearer characteristics. For speech calls, the MSC server shall provide the MGW with the speech coding information for the bearer. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4]. After the MGW has replied with the bearer address and the binding reference the MSC server requests access bearer assignment using the provided bearer address and binding reference (bullet 1 in figure 6.4) in accordance with [x26]. In the response, the MSC may receive an indication that the existing link characteristics of access bearer can be modified at a later stage, see subclause 13.18.1.

For GERAN, before the MSC server starts the access bearer assignment, the MSC server uses the Reserve Circuit procedure to seize a TDM circuit. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4] and a GSM channel coding. After the MGW has replied the TDM circuit seizure the MSC server requests access bearer assignment (bullet 2 in figure 6.4) in accordance with [y27].

| |
|------------------------------|
| Next modified section |
|------------------------------|

6.2 Basic Mobile Terminating Call

6.2.1 Forward bearer establishment

The basic mobile terminating call shall be established in accordance with 3GPP TS 23.108 [18]. The following paragraphs describe the additional requirements for the bearer independent CS core network. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

:
:

6.2.1.2 MSC server

Call setup

The MSC server indicates to the UE in the SETUP message that early access bearer assignment is used in order to establish the bearer end-to-end before the UE starts alerting. The MSC server indicates to the UE in SETUP message that early access bearer assignment is used if either of the following conditions is satisfied before sending the SETUP message (bullet 2 in figure 6.6):

1. The incoming IAM indicated that the Continuity message will follow, but no Continuity message has been received;
2. A notification of successful bearer establishment in the network side has not been received from the MGW.

MGW selection

The MSC server shall select an MGW for the bearer connection before it performs the network side bearer establishment or the access bearer assignment. This happens at latest after the UE has sent the Call Confirmed message. If the MSC server received an MGW-id from the preceding node, it may use this for the MGW selection (bullet 3 in figure 6.6).

Network side bearer establishment

The MSC server requests the MGW to prepare for the network side bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address, a binding reference and to notify when the bearer is established (bullet 3 in figure 6.6). The MSC server also provides the MGW with the bearer characteristics that was received from the preceding node in the IAM. After the MGW has replied with the bearer address and the binding reference, the MSC server provides the Bearer Information message to the preceding node. The MSC server may also provide the MGW-id in the Bearer Information message.

Access bearer assignment

The access bearer assignment may be started when both of the following conditions are satisfied:

1. Either:
 - a. The incoming IAM indicated that the Continuity message will follow, and a Continuity message has been received from the preceding node, or
 - b. The incoming IAM did not indicate that the Continuity message will follow;

2. A notification of successful bearer establishment in the network side has been received from the MGW (bullet 6 in figure 6.6).

The MSC server shall select bearer characteristics for the access bearer. For the access bearer assignment in UTRAN the MSC server requests the MGW to prepare for the access bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address and a binding reference, and provides the MGW with the bearer characteristics. For speech calls, the MSC server shall provide the MGW with the speech coding information for the bearer. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4]. After the MGW has replied with the bearer address and the binding reference the MSC server requests the access bearer assignment using the provided bearer address and the binding reference (bullet 9 in figure 6.6) in accordance with [x26]. In the response, the MSC may receive an indication that the existing link characteristics of access bearer can be modified at a later stage, see subclause 13.18.1.

For GERAN, before the MSC server starts the access bearer assignment, the MSC server uses the Reserve Circuit procedure to seize a TDM circuit. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4] and a GSM channel coding. After the MGW has replied the TDM circuit seizure the MSC server requests access bearer assignment (bullet 10 in figure 6.6) in accordance with [y27].

| |
|------------------------------|
| Next modified section |
|------------------------------|

6.2.2 Backward bearer establishment

The basic mobile terminating call shall be established in accordance with 3GPP TS 23.108 [4]. The following paragraphs describe the additional requirements for the bearer independent CS core network. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

:
:

6.2.2.2 MSC server

Call setup

The MSC server indicates to the UE in the SETUP message that early access bearer assignment is used in order to establish the bearer end-to-end before the UE starts alerting. The MSC server indicates to the UE in the SETUP message that early access bearer assignment is used, if and only if, either of the following conditions are satisfied before sending the SETUP message (bullet 5 in figure 6.8):

1. If the IAM indicated that the Continuity message will follow, but no Continuity message has been received.
2. A notification of successful bearer establishment in the network side has not been received from the MGW.

MGW selection

The MSC server shall select an MGW for the bearer connection before it performs the network side bearer establishment or the access bearer assignment. This happens at latest after the UE has sent the Call Confirmed message. If the MSC server received an MGW-id from the preceding node, it may use this for the MGW selection (bullet 6 in figure 6.8).

Network side bearer establishment

The MSC server requests the MGW to establish a bearer to the given destination MGW and to notify when the bearer is established using the Establish Bearer procedure. The MSC server provides the MGW with the bearer address, the binding reference and the bearer characteristics that were received from the preceding node in the IAM (bullet 6 in figure 6.8).

Access bearer assignment

The access bearer assignment may be started when both of the following conditions are satisfied:

1. Either:
 - a. The incoming IAM indicated that the Continuity message will follow, and a Continuity message has been received from the preceding node, or
 - b. The incoming IAM did not indicate that the Continuity message will follow;
2. A notification of successful bearer establishment in the network side has been received from the MGW (bullet 7 in figure 6.8).

The MSC server shall select bearer characteristics for the access bearer.

For the access bearer assignment in UTRAN the MSC server requests the MGW to prepare for the access bearer establishment using the Prepare Bearer procedure. The MSC server requests the MGW to provide a bearer address and a binding reference and provides the MGW with the bearer characteristics. For speech calls, the MSC server shall provide the MGW with the speech coding information for the bearer. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4]. After the MGW has replied with the bearer address and the binding reference the MSC server requests the access bearer assignment using the provided bearer address and the binding reference (bullet 8 in figure 6.8) in accordance with [∗26]. In the response, the MSC may receive an indication that the existing link characteristics of access bearer can be modified at a later stage, see subclause 13.18.1.

For GERAN, before the MSC server starts the access bearer assignment, the MSC server uses the Reserve Circuit procedure to seize a TDM circuit. For a non-speech call the MSC server also provides the MGW with a PLMN Bearer Capability [4] and a GSM channel coding. After the MGW has replied the TDM circuit seizure the MSC server requests access bearer assignment (bullet 9 in figure 6.8) in accordance with [∗27].

Next modified section

13.5 Call Waiting (CW)

The procedures specified in 3GPP TS 23.083 [13] for the Call Waiting supplementary service shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Call confirmation to the waiting call

The MSC server shall, on reception of the call confirmation, select the MGW that will be used for the waiting call. The MSC server should select the MGW which is already in use for the active call. If out-of-band transcoder control is applied for the waiting speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

Existing call on hold

The paragraph 'Hold request' in subclause 13.6 applies.

Existing call released

If the active call is disconnected while another call is waiting, the bearer termination towards the waiting party (C) as well as to the called party (A) is not removed.

Acceptance of waiting call

If the mobile subscriber decides to accept the waiting call, it handles (according to 3GPP TS 23.083~~2~~ [12]) the existing call as described in subclause 13.5 (i.e. it either puts the call on hold or the call is released). When the MSC server receives the connect indication from subscriber A, if required the MSC server shall modify the access bearer as described in subclause 13.18.1, it modifies the existing access side bearer if required. If the existing access side bearer needs to be modified, either the existing bearer termination is modified using the Modify Bearer Characteristics procedure or a new access side bearer termination is created. In both cases, the MSC server shall initiate the access bearer modification using either the existing bearer address and binding reference or the new bearer address and binding reference. Finally, the MSC server shall connect the access side bearer termination to the previously created bearer

termination of the remote party in the waiting call and modify the waiting call's bearer termination so that it is both-way through-connected.

If a different MGW is selected for the incoming call, then a bearer from the new MGW (MGW2) shall be connected towards the old MGW (MGW1) before offering the call to the subscriber A.

If out-of-band transcoder control is applied for the waiting speech call, it shall be performed in accordance with 3GPP TS 23.153[3].

Waiting call released by calling subscriber (subscriber C)

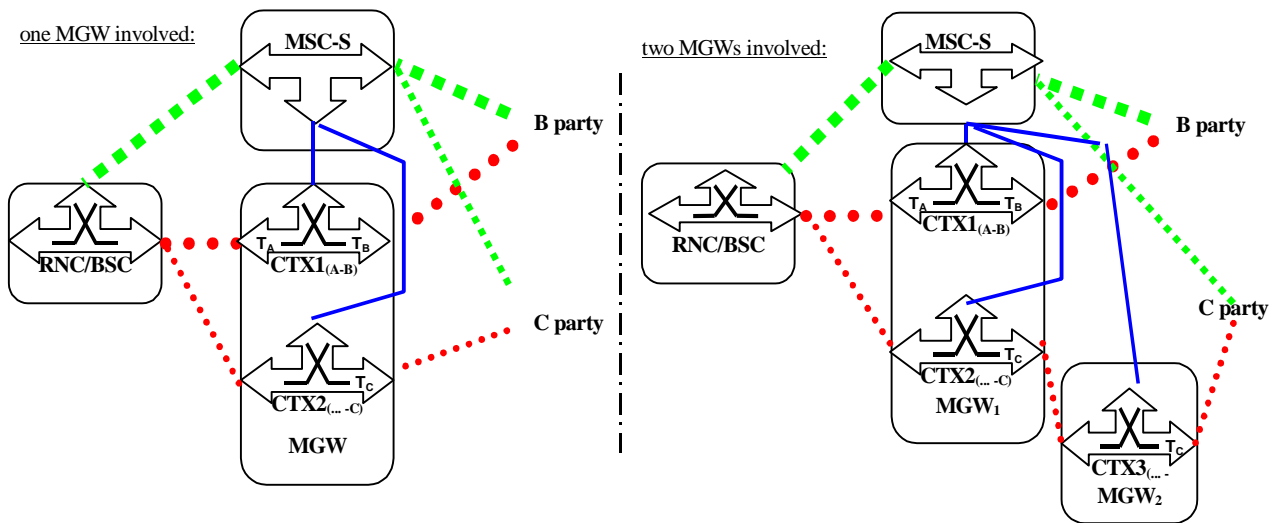
The respective resources already allocated at the selected MGW for the waiting call shall be released.

Example

Figure 13.13 shows the network model for a waiting call at the serving MSC server/MGW. The 'thick, squared' line represents the call control signalling for the existing call and, on the Iu interface, the already existing control plane toward the serving RNC. The 'thin, squared' line represents the call control signalling for the waiting call. The 'thick, dotted' line represents the bearer control signalling and the bearer for the existing call, whereas the 'thin, dotted' line represents the ones for the waiting call. Note that for a TDM access there is no separation of call and bearer control signalling.

Note that there shall be only one instance of bearer resource/bearer control signalling on the radio side.

If the CW condition applies, the MSC server seizes a new context with one bearer termination, T_C, in the MGW. T_A and T_B are the terminations of the already existing call.



Next modified section

13.6 Call Hold (CH)

The procedures specified in 3GPP TS 23.083 [13] for the Call Hold supplementary service shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Hold request

When the UE makes a request for the hold function the MSC server requests the MGW to interrupt the communication on the bearer by changing the through-connection of the bearer termination towards the served mobile subscriber to 'not through-connected'. Announcements may be applied to the held party as described in subclause 14.6.

Retrieval request

When the UE makes a request to retrieve a held call the MSC server requests the MGW to re-establish communication to the held party by changing the through-connection of the bearer termination towards the served mobile subscriber to be both-way through-connected.

Setting up another call

The call towards the C party is established as described for the mobile originating call. A new MGW may be selected in the course of setting up the new call. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3]. ~~If required, the MSC server shall modify the access bearer for the new call as described in subclause 13.18.1. If the existing access side bearer needs to be modified for the new call, either the existing bearer termination is modified using the Modify Bearer Characteristics procedure or a new access side bearer termination is created. In both cases when setting up the new call, the MSC server shall initiate the access bearer modification using either the existing bearer address and binding reference or the new bearer address and binding reference.~~ The MSC server will request the MGW to connect the access side bearer termination to the bearer termination of the remote party.

Alternate from one call to the other

When the hold request for the active call is immediately followed by a retrieve request for the held call the MSC server shall request the MGW to connect the bearer termination of the served mobile subscriber to the bearer termination of the held party. The MSC server also requests the MGW to both-way through-connect the bearer for the previously held call.

| |
|------------------------------|
| Next modified section |
|------------------------------|

13.17 Alternate Speech/Fax

The procedures for facsimile group 3 transparent/non-transparent shall be followed in accordance with GSM TS 03.45 [24] and 3GPP TS 23.146 [25]. The following paragraphs describe the additional requirements for the bearer independent CS core network. If out-of-band transcoder control is applied for a speech call, it shall be performed in accordance with 3GPP TS 23.153 [3].

Call and bearer establishment shall be handled as described in the Call Establishment clause. In order to change from speech to fax (or vice versa), ~~the MSC server shall modify the access bearer as described in subclause 13.18.1. the MSC server shall request the MGW either to modify the existing access side bearer termination using the Modify Bearer Characteristics procedure, or to create a new access side bearer termination. In both cases the MSC server will initiate an access bearer modification using either the existing bearer address and binding reference or the new bearer address and binding reference.~~

If the MGW responds with an error to any of the procedures initiated by the MSC server, or the MSC server receives a Bearer Failure procedure from the MGW, the MSC server may either clear the call or reject the change from speech to fax (or vice versa).

After this possible modification, the MGW shall seize an interworking function if a PLMN Bearer Capability [4] has been supplied to the access side bearer termination. When the MSC server receives an answer indication, it shall request activation of the interworking function using the Activate Interworking Function procedure.

| |
|------------------------------|
| Next modified section |
|------------------------------|

13.18 Modification of the Access Bearer

13.18.1 Modification of Bearer Characteristics

The modification of the access bearer is possible during a call establishment and during an active call. If the MSC server needs to modify the access bearer, the existing access side bearer termination in the MGW is modified or a new access side bearer termination is created. ~~using the Modify Bearer Characteristics procedure before the access bearer~~

~~modification is initiated towards the UTRAN/GERAN. The MGW is provided with the new characteristics for the access bearer. The modification of the access bearer shall be performed in accordance with [26] or [27].~~

UTRAN

If the link characteristics for the existing access bearer need to be changed and the MSC server received an indication during the initial access bearer establishment that modification of link characteristics of the current transport connection is supported, see [26], the MSC server shall use the Modify Bearer Characteristics procedure to provide the MGW with the new bearer characteristics for the existing access side bearer termination. After the MGW has replied, the MSC server shall initiate the access bearer modification towards UTRAN.

If the MSC server has not previously received an indication that modification of existing link characteristics is supported, the MSC server shall use the Prepare Bearer procedure to request the MGW to add a new context and a new access side bearer termination, and to provide a bearer address and a binding reference. After the MGW has replied, the MSC server shall initiate the access bearer modification towards UTRAN using the provided bearer address and the binding reference. Upon successful access bearer modification, the MSC server shall connect the new access side bearer termination to the old context and release the old access side bearer termination.

If the user plane mode of the modified access bearer is 'Support Mode', the Iu UP will also be re-initialised as defined in [20].

GERAN

The MSC server shall use the Modify Bearer Characteristics procedure to the MGW to provide the new bearer characteristics for the existing access side bearer termination. After the MGW has replied, the MSC server shall initiate the access bearer modification towards GERAN.

End modified section