3GPP TSG CN Plenary Meeting #23 **NP-040053**
10th – 12th March 2004 Phoenix, USA.

Source: TSG CN WG4

Title: Corrections on TEI5 TrFO

Agenda item: 8.8

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.002	669	3	N4-040192	Rel-5	Correction of Inter-MSC SRSN Relocation procedure	F	5.8.0
29.002	670	2	N4-040193	Rel-6	Correction of Inter-MSC SRSN Relocation procedure	A	6.4.0
23.153	069	4	N4-040304	Rel-5	Correction of Inter-MSC SRSN Relocation procedure	F	5.6.0
29.002	667	4	N4-040309	Rel-5	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation	F	5.8.0
29.002	668	3	N4-040310	Rel-6	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation	A	6.4.0
23.153	068	5	N4-040361	Rel-5	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation	F	5.6.0

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040192
(rev of N4-031042)

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **669** ⌘ **rev** **3** ⌘ Current version: **5.8.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of Inter-MSC SRSN Relocation procedure
Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	03/02/2004
Category:	⌘	**F**
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)*
Rel-6 *(Release 6)*

Reason for change:	⌘	Essential correction For mid-call codec modification after inter-MSC SRNS relocation, the anchor MSC needs to know which codecs are available at the Iu-interface in the target MSC-B.
Summary of change:	⌘	Inclusion of a parameter 'Available Codecs List' in MAP Prepare Handover Response.
Consequences if not approved:	⌘	Mid-call codec modification after inter-MSC SRNS relocation does not work properly, since the MSC-A does not know whether MSC-A' supports the new codec to be used and there is no appropriate reject cause, if MSC-B does not support this new codec.

Clauses affected:	⌘	2, 7.6.6.16, 7.6.6.17, 7.6.6.17A(new), 7.6.6.18, 8.4.1.2, 8.4.1.3, 17.7.1			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	23.153 069
		X /	Test specifications		
		/ X	O&M Specifications		
Other comments:	⌘				

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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

….

[XX] 3GPP TS 26.103: "Speech codec list for GSM and UMTS".

/**********next modified section**********/

7.6.6.16 Iu-Currently Used Codec

This parameter indicates the ~~currently used~~ codec used at the Iu interface before handover~~in MSC-A~~.

7.6.6.17 Iu-Supported~~Available~~ Codecs List

This parameter indicates the ~~available~~ codecs supported by the UE and by~~in~~ MSC-A and the associated modes in priority order (the first entry being the highest priority codec). MSC-B uses this information to select the associated transcoder resources.

7.6.6.17A Iu-Available Codecs List

This parameter indicates the codecs available at the Iu interface in MSC-B and the associated modes. MSC-A uses this information to decide whether a change to a different codec at the Iu interface is possible.

7.6.6.18 Iu-Selected Codec

When sent by MSC-B, ~~T~~this parameter indicates the codec selected by MSC-B for the Iu interface.

/**********next modified section**********/

8.4.1.2 Service primitives

Table 8.4/1: MAP_PREPARE_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
HO-NumberNotRequired	C	C(=)		
IMSI	C	C(=)		
Integrity Protection Information	C	C(=)		
Encryption Information	C	C(=)		
Radio Resource Information	C	C(=)		
AN-APDU	C	C(=)	C	C(=)
Allowed GSM Algorithms	C	C(=)		
Allowed UMTS Algorithms	C	C(=)		
Radio Resource List	C	C(=)		
RAB ID	C	C(=)		

GERAN Classmark	C	C(=)		
BSSMAP Service Handover	C	C(=)		
BSSMAP Service Handover List	C	C(=)		
RANAP Service Handover	C	C(=)		
Iu-Currently Used Codec	C	C(=)		
Iu-Supported ~~Available~~ Codecs List	C	C(=)		
RAB Configuration Indicator	C	C(=)		
ASCI Call Reference	C	C(=)		
UESBI	C	C(=)		
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
Selected UMTS Algorithms			C	C(=)
Chosen Radio Resource Information			C	C(=)
Iu-Selected Codec			C	C(=)
Iu-Available Codecs List			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 Parameter use

Invoke Id

For definition of this parameter see clause 7.6.1.

Target Cell Id

For definition of this parameter see clause 7.6.2. This parameter is only included if the service is not in an ongoing transaction. This parameter shall also be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

Target RNC Id

For definition of this parameter see clause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

HO-Number Not Required

For definition of this parameter see clause 7.6.6.

IMSI

For definition of this parameter see clause 7.6.2. This UMTS parameter shall be included if:

- available and
- if the access network protocol is BSSAP and
- there is an indication that the MS also supports UMTS.

Integrity Protection Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Encryption Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Radio Resource Information

For definition of this parameter see clause 7.6.6. This GSM parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. If the parameter Radio Resource List is sent , the parameter Radio Resource Information shall not be sent.

AN-APDU

For definition of this parameter see clause 7.6.9.

Allowed GSM Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes allowed GSM algorithms. This GSM parameter shall be included if:

- the service is a part of the Inter-MSC SRNS Relocation procedure and
- Ciphering or Security Mode Setting procedure has been performed.and
- there is an indication that the UE also supports GSM.

Allowed UMTS Algorithms

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if all of the following conditions apply:

- access network protocol is BSSAP and
- Integrity Protection Information and Encryption Information are not available and

Ciphering or Security Mode Setting procedure has been performed.

Radio Resource List

For definition of this parameter see clause 7.6.6. This parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter Radio Resource Information is sent , the parameter Radio Resource List shall not be sent.

RAB ID

For definition of this parameter see subclause 7.6.2. This parameter shall be included when MSC-A supports multiple bearers and access network protocol is BSSAP and the RAB ID has a value other than 1.

GERAN Classmark

For definition of this parameter see subclause 7.6.6 This parameter shall be included if available.

BSSMAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. If the parameter BSSMAP Service Handover List is sent, the parameter BSSMAP Service Handover shall not be sent.

BSSMAP Service Handover List

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter BSSMAP Service Handover is sent, the parameter BSSMAP Service Handover List shall not be sent.

RANAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

Iu-Currently Used Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the handover ~~call~~ is requested for a speech bearer~~call~~ and the MS is in UMTS or GERAN Iu-mode access. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

Iu-Supported~~Available~~ Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by MSC-A, if the handover ~~call~~ is requested for a speech bearer~~call~~.

RAB Configuration Indicator

For definition of this parameter see subclause 7.6.6. This parameter may be included if the ~~call~~ handover is requested for a speech bearer~~call~~ and MSC-A knows by means of configuration information that MSC-B supports the use of the Iu-Supported~~Available~~ Codecs List parameter. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

ASCI Call Reference

This parameter contains either the broadcast call reference or group call reference. It shall be included if a subscriber is undergoing Signalling Only handover during a VGCS or VBS call, where MSC-B already has a Bearer established, so that MSC-B can determine the Group or Broadcast Call to which it shall attach the subscriber, see 3GPP TS 48.008 [49].

UESBI

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

Handover Number

For definition of this parameter see clause 7.6.2. This parameter shall be returned at handover, unless the parameter HO-NumberNotRequired is sent. If the parameter Handover Number is returned, the parameter Relocation Number List shall not be returned.

Relocation Number List

For definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation, unless the parameter HO-NumberNotRequired is sent. If the parameter Relocation Number List is returned, the parameter Handover Number shall not be returned.

Multicall Bearer Information

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation in the case that MSC-B supports multiple bearers.

Multiple Bearer Requested

For a definition of this parameter see clause 7.6.2. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B.

Multiple Bearer Not Supported

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation when MSC-B receives Multiple Bearer Requested parameter and MSC-B does not support multiple bearers.

Selected UMTS Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes the UMTS integrity and optionally encryption algorithms selected by RNC under the control of MSC-B. This UMTS parameter shall be included if the service is a part of the inter MSC inter system handover from GSM to UMTS.

Chosen Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be returned at relocation if the encapsulated PDU is RANAP RAB Assignment Response and MS is in GSM access.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included ~~always~~ if an Iu-Supported Codecs List was received in the service request and MSC-B supports the selection of codec based on the Iu-Supported~~Available~~ Codecs List, even if the Iu-Selected Codec is equal to the Iu-Currently Used Codec received in the service request. This parameter shall not be included if the Iu-Supported ~~Available~~ Codecs List was not received in the service request.

Iu-Available Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by an MSC-B supporting TrFO, if the Iu-Supported Codecs List was included by MSC-A and the target radio access is UMTS or GERAN Iu-mode.

User error

For definition of this parameter see clause 7.6.1. The following errors defined in clause 7.6.1 may be used, depending on the nature of the fault:

- No handover number available.
- Target cell outside group call area;
- System failure.
- Unexpected data value.
- Data Missing.

Provider error

See definition of provider errors in clause 7.6.1.

/**********Last modified section**********/

17.7 MAP constants and data types

17.7.1 Mobile Service data types

text removed for clarity

….

```
PrepareHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                    OPTIONAL,
    ho-NumberNotRequired                NULL                                OPTIONAL,
    targetRNCId                         [1] RNCId                           OPTIONAL,
    an-APDU                             [2] AccessNetworkSignalInfo         OPTIONAL,
    multipleBearerRequested             [3] NULL                            OPTIONAL,
    imsi                                [4] IMSI                            OPTIONAL,
    integrityProtectionInfo             [5] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                      [6] EncryptionInformation           OPTIONAL,
    radioResourceInformation            [7] RadioResourceInformation        OPTIONAL,
    allowedGSM-Algorithms               [9]  AllowedGSM-Algorithms          OPTIONAL,
    allowedUMTS-Algorithms              [10] AllowedUMTS-Algorithms         OPTIONAL,
    radioResourceList                   [11] RadioResourceList              OPTIONAL,
    extensionContainer                  [8] ExtensionContainer              OPTIONAL,
    ... ,
    rab-Id                              [12] RAB-Id                         OPTIONAL,
    bssmap-ServiceHandover              [13] BSSMAP-ServiceHandover         OPTIONAL,
    ranap-ServiceHandover               [14] RANAP-ServiceHandover          OPTIONAL,
    bssmap-ServiceHandoverList          [15] BSSMAP-ServiceHandoverList     OPTIONAL,
    asciCallReference                   [20] ASCI-CallReference             OPTIONAL,
    geran-classmark                     [16] GERAN-Classmark                OPTIONAL,
    iuCcurrentlyUsedCodec               [17] Codec                          OPTIONAL,
    iuSupportedavailableCodecsList      [18] AvailableSupportedCodecsList   OPTIONAL,
    rab-ConfigurationIndicator          [19] NULL                           OPTIONAL,
    uesbi                               [21] UESBI                          OPTIONAL    }
```

```
BSSMAP-ServiceHandoverList ::= SEQUENCE SIZE (1.. maxNumOfServiceHandovers) OF
                                    BSSMAP-ServiceHandoverInfo
```

```
BSSMAP-ServiceHandoverInfo ::= SEQUENCE {
    bssmap-ServiceHandover              BSSMAP-ServiceHandover,
    rab-Id                              RAB-Id,
    -- RAB Identity is needed to relate the service handovers with the radio access bearers.
    ...}
```

```
maxNumOfServiceHandovers  INTEGER ::= 7
```

```
BSSMAP-ServiceHandover ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Service Handover information element in
    -- 3GPP TS 48.008.
```

```
RANAP-ServiceHandover ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete Service-Handover data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
RadioResourceList ::= SEQUENCE SIZE (1.. maxNumOfRadioResources) OF
                                    RadioResource
```

```
RadioResource ::= SEQUENCE {
    radioResourceInformation            RadioResourceInformation,
    rab-Id                              RAB-Id,
    -- RAB Identity is needed to relate the radio resources with the radio access bearers.
    ...}
```

```
maxNumOfRadioResources  INTEGER ::= 7
```

```
PrepareHO-Res ::= [3] SEQUENCE {
    handoverNumber                      [0] ISDN-AddressString              OPTIONAL,
    relocationNumberList                [1]  RelocationNumberList           OPTIONAL,
    an-APDU                             [2]  AccessNetworkSignalInfo        OPTIONAL,
    multicallBearerInfo                 [3]  MulticallBearerInfo            OPTIONAL,
    multipleBearerNotSupported          NULL                                OPTIONAL,
    selectedUMTS-Algorithms             [5]  SelectedUMTS-Algorithms        OPTIONAL,
    chosenRadioResourceInformation      [6] ChosenRadioResourceInformation  OPTIONAL,
    extensionContainer                  [4]  ExtensionContainer             OPTIONAL,
    ...,
    iuSselectedCodec                    [7] Codec                           OPTIONAL,
    iuAvailableCodecsList               [x] CodecList                       OPTIONAL }
```

```
SelectedUMTS-Algorithms ::= SEQUENCE {
    integrityProtectionAlgorithm        [0]  ChosenIntegrityProtectionAlgorithm   OPTIONAL,
    encryptionAlgorithm                 [1]  ChosenEncryptionAlgorithm     OPTIONAL,
    extensionContainer                  [2]  ExtensionContainer            OPTIONAL,
    ...}
```

```
ChosenIntegrityProtectionAlgorithm ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete IntegrityProtectionAlgorithm data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
ChosenEncryptionAlgorithm ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete EncryptionAlgorithm data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
ChosenRadioResourceInformation ::= SEQUENCE {
    chosenChannelInfo                   [0] ChosenChannelInfo              OPTIONAL,
    chosenSpeechVersion                 [1] ChosenSpeechVersion            OPTIONAL,
    ...}
```

```
ChosenChannelInfo ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Chosen Channel information element in 3GPP TS 48.008
```

```
ChosenSpeechVersion ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Speech Version (chosen) information element in 3GPP TS
    -- 48.008
```

```
PrepareSubsequentHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                   OPTIONAL,
    targetMSC-Number                    [1] ISDN-AddressString,
    targetRNCId                         [2] RNCId                          OPTIONAL,
    an-APDU                             [3]  AccessNetworkSignalInfo       OPTIONAL,
    selectedRab-Id                      [4]  RAB-Id                        OPTIONAL,
    extensionContainer                  [5]  ExtensionContainer            OPTIONAL,
    ...,
    geran-classmark                     [6] GERAN-Classmark                OPTIONAL,
    rab-ConfigurationIndicator          [7] NULL                           OPTIONAL }
```

```
PrepareSubsequentHO-Res ::= [3] SEQUENCE {
    an-APDU                             AccessNetworkSignalInfo,
    extensionContainer                  [0]  ExtensionContainer            OPTIONAL,
    ...}
```

```
ProcessAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                             AccessNetworkSignalInfo,
    selectedUMTS-Algorithms             [1]  SelectedUMTS-Algorithms       OPTIONAL,
    selectedGSM-Algorithm               [2]  SelectedGSM-Algorithm         OPTIONAL,
    chosenRadioResourceInformation      [3] ChosenRadioResourceInformation OPTIONAL,
    selectedRab-Id                      [4] RAB-Id                         OPTIONAL,
    extensionContainer                  [0]  ExtensionContainer            OPTIONAL,
    ...,
    selectedCodec                       [5] Codec                          OPTIONAL }
```

```
~~Available~~Supported~~CodecsList ::= SEQUENCE {
    utranCodecList                      [0] CodecList                      OPTIONAL,
    geranCodecList                      [1] CodecList                      OPTIONAL,
    extensionContainer                  [2] ExtensionContainer             OPTIONAL,
    ...}
```

```
CodecList ::= SEQUENCE {
     codec1                              [1] Codec,
     codec2                              [2] Codec                       OPTIONAL,
     codec3                              [3] Codec                       OPTIONAL,
     codec4                              [4] Codec                       OPTIONAL,
     codec5                              [5] Codec                       OPTIONAL,
     codec6                              [6] Codec                       OPTIONAL,
     codec7                              [7] Codec                       OPTIONAL,
     codec8                              [8] Codec                       OPTIONAL,
     extensionContainer                  [9] ExtensionContainer          OPTIONAL,
     ...}
     -- Codecs are sent in priority order where codec1 has highest priority
```

```
Codec ::= OCTET STRING (SIZE (1..4))

     -- The internal structure is defined as follows:
     -- octet 1                          Coded as Codec Identification code in 3GPP TS 26.103
     -- octets 2,3,4                     Parameters for the Codec as defined in 3GPP TS
     --                                  26.103, if available, length depending on the codec
```

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040193
(rev of N4-031026)

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **670** ⌘ **rev** **2** ⌘ Current version: **6.4.0** ⌘

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Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	03/02/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

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Reason for change:	⌘	For mid-call codec modification after inter-MSC SRNS relocation, the anchor MSC needs to know which codecs are available at the Iu-interface in the target MSC-B.
Summary of change:	⌘	Inclusion of a parameter 'Available Codecs List' in MAP Prepare Handover Response.
Consequences if not approved:	⌘	Mid-call codec modification after inter-MSC SRNS relocation does not work properly, since the MSC-A does not know whether MSC-A' supports the new codec to be used and there is no appropriate reject cause, if MSC-B does not support this new codec.

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Other specs affected:	Y	N			
⌘	X		Other core specifications	⌘	23.153 069
		X	Test specifications		
		X	O&M Specifications		

Other comments:	⌘	

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Radio Resource Information	C	C(=)		
AN-APDU	C	C(=)	C	C(=)
Allowed GSM Algorithms	C	C(=)		
Allowed UMTS Algorithms	C	C(=)		
Radio Resource List	C	C(=)		
RAB ID	C	C(=)		
GERAN Classmark	C	C(=)		
BSSMAP Service Handover	C	C(=)		

BSSMAP Service Handover List	C	C(=)		
RANAP Service Handover	C	C(=)		
Iu-Currently Used Codec	C	C(=)		
~~Available~~ Iu-Supported Codecs List	C	C(=)		
RAB Configuration Indicator	C	C(=)		
ASCI Call Reference	C	C(=)		
UESBI	C	C(=)		
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
Selected UMTS Algorithms			C	C(=)
Chosen Radio Resource Information			C	C(=)
Iu-Selected Codec			C	C(=)
Iu-Available Codecs List			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 Parameter use

Invoke Id

For definition of this parameter see clause 7.6.1.

Target Cell Id

For definition of this parameter see clause 7.6.2. This parameter is only included if the service is not in an ongoing transaction. This parameter shall also be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

Target RNC Id

For definition of this parameter see clause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

HO-Number Not Required

For definition of this parameter see clause 7.6.6.

IMSI

For definition of this parameter see clause 7.6.2. This UMTS parameter shall be included if:

- available and
- if the access network protocol is BSSAP and
- there is an indication that the MS also supports UMTS.

Integrity Protection Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Encryption Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Radio Resource Information

For definition of this parameter see clause 7.6.6. This GSM parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. If the parameter Radio Resource List is sent , the parameter Radio Resource Information shall not be sent.

AN-APDU

For definition of this parameter see clause 7.6.9.

Allowed GSM Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes allowed GSM algorithms. This GSM parameter shall be included if:

- the service is a part of the Inter-MSC SRNS Relocation procedure and
- Ciphering or Security Mode Setting procedure has been performed.and
- there is an indication that the UE also supports GSM.

Allowed UMTS Algorithms

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if all of the following conditions apply:

- access network protocol is BSSAP and
- Integrity Protection Information and Encryption Information are not available and

Ciphering or Security Mode Setting procedure has been performed.

Radio Resource List

For definition of this parameter see clause 7.6.6. This parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter Radio Resource Information is sent , the parameter Radio Resource List shall not be sent.

RAB ID

For definition of this parameter see subclause 7.6.2. This parameter shall be included when MSC-A supports multiple bearers and access network protocol is BSSAP and the RAB ID has a value other than 1.

GERAN Classmark

For definition of this parameter see subclause 7.6.6 This parameter shall be included if available.

BSSMAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. If the parameter BSSMAP Service Handover List is sent, the parameter BSSMAP Service Handover shall not be sent.

BSSMAP Service Handover List

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter BSSMAP Service Handover is sent, the parameter BSSMAP Service Handover List shall not be sent.

RANAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

Iu-Currently Used Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the handover~~call~~ is requested for a speech bearer~~call~~ and the MS is in UMTS or GERAN Iu-mode access. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

Iu-Supported~~Available~~ Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by MSC-A, if the handover~~call~~ is requested for a speech bearer~~call~~.

RAB Configuration Indicator

For definition of this parameter see subclause 7.6.6. This parameter may be included if the handover~~call~~ is requested for a speech bearer~~call~~ and MSC-A knows by means of configuration information that MSC-B supports the use of the Iu-Supported~~Available~~ Codecs List parameter. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

ASCI Call Reference

This parameter contains either the broadcast call reference or group call reference. It shall be included if a subscriber is undergoing handover during a VGCS or VBS call, where MSC-B already has a Bearer established, so that MSC-B can determine the Group or Broadcast Call to which it shall attach the subscriber, see 3GPP TS 48.008 [49].

UESBI

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

Handover Number

For definition of this parameter see clause 7.6.2. This parameter shall be returned at handover, unless the parameter HO-NumberNotRequired is sent. If the parameter Handover Number is returned, the parameter Relocation Number List shall not be returned.

Relocation Number List

For definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation, unless the parameter HO-NumberNotRequired is sent. If the parameter Relocation Number List is returned, the parameter Handover Number shall not be returned.

Multicall Bearer Information

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation in the case that MSC-B supports multiple bearers.

Multiple Bearer Requested

For a definition of this parameter see clause 7.6.2. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B.

Multiple Bearer Not Supported

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation when MSC-B receives Multiple Bearer Requested parameter and MSC-B does not support multiple bearers.

Selected UMTS Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes the UMTS integrity and optionally encryption algorithms selected by RNC under the control of MSC-B. This UMTS parameter shall be included if the service is a part of the inter MSC inter system handover from GSM to UMTS.

Chosen Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be returned at relocation if the encapsulated PDU is RANAP RAB Assignment Response and MS is in GSM access.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included ~~always~~ if an Iu-Supported Codecs List was received in the service request and MSC-B supports the selection of codec based on the Iu-Supported~~Available~~ Codecs List, even if the Iu-Selected Codec is equal to the Iu-Currently Used Codec received in the service request. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List was not received in the service request.

Iu-Available Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by an MSC-B supporting TrFO, if the Iu-Supported Codecs List was included by MSC-A and the target radio access is UMTS or GERAN Iu-mode.

User error

For definition of this parameter see clause 7.6.1. The following errors defined in clause 7.6.1 may be used, depending on the nature of the fault:

- No handover number available.
- Target cell outside group call area;
- System failure.
- Unexpected data value.
- Data Missing.

Provider error

See definition of provider errors in clause 7.6.1.

/**********Last modified section**********/

17.7 MAP constants and data types

17.7.1 Mobile Service data types

text removed for clarity

….

```
PrepareHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                    OPTIONAL,
    ho-NumberNotRequired                NULL                                OPTIONAL,
    targetRNCId                         [1] RNCId                           OPTIONAL,
    an-APDU                             [2] AccessNetworkSignalInfo         OPTIONAL,
    multipleBearerRequested             [3] NULL                            OPTIONAL,
    imsi                                [4] IMSI                            OPTIONAL,
    integrityProtectionInfo             [5] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                      [6] EncryptionInformation           OPTIONAL,
    radioResourceInformation            [7] RadioResourceInformation        OPTIONAL,
    allowedGSM-Algorithms               [9]  AllowedGSM-Algorithms          OPTIONAL,
    allowedUMTS-Algorithms              [10] AllowedUMTS-Algorithms         OPTIONAL,
    radioResourceList                   [11] RadioResourceList              OPTIONAL,
    extensionContainer                  [8] ExtensionContainer              OPTIONAL,
    ... ,
    rab-Id                              [12] RAB-Id                         OPTIONAL,
    bssmap-ServiceHandover              [13] BSSMAP-ServiceHandover         OPTIONAL,
    ranap-ServiceHandover               [14] RANAP-ServiceHandover          OPTIONAL,
    bssmap-ServiceHandoverList          [15] BSSMAP-ServiceHandoverList     OPTIONAL,
    asciCallReference                   [20] ASCI-CallReference             OPTIONAL,
    geran-classmark                     [16] GERAN-Classmark                OPTIONAL,
    iuCcurrentlyUsedCodec               [17] Codec                          OPTIONAL,
    iuSupportedavailableCodecsList      [18] SupportedAvailableCodecsList   OPTIONAL,
    rab-ConfigurationIndicator          [19] NULL                           OPTIONAL,
    uesbi                               [21] UESBI                          OPTIONAL    }
```

```
BSSMAP-ServiceHandoverList ::= SEQUENCE SIZE (1.. maxNumOfServiceHandovers) OF
                                    BSSMAP-ServiceHandoverInfo
```

```
BSSMAP-ServiceHandoverInfo ::= SEQUENCE {
    bssmap-ServiceHandover              BSSMAP-ServiceHandover,
    rab-Id                              RAB-Id,
    -- RAB Identity is needed to relate the service handovers with the radio access bearers.
    ...}
```

```
maxNumOfServiceHandovers  INTEGER ::= 7
```

```
BSSMAP-ServiceHandover ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Service Handover information element in
    -- 3GPP TS 48.008.
```

```
RANAP-ServiceHandover ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete Service-Handover data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
RadioResourceList ::= SEQUENCE SIZE (1.. maxNumOfRadioResources) OF
                                    RadioResource
```

```
RadioResource ::= SEQUENCE {
    radioResourceInformation            RadioResourceInformation,
    rab-Id                              RAB-Id,
    -- RAB Identity is needed to relate the radio resources with the radio access bearers.
    ...}
```

```
maxNumOfRadioResources  INTEGER ::= 7
```

```
PrepareHO-Res ::= [3] SEQUENCE {
    handoverNumber                      [0] ISDN-AddressString              OPTIONAL,
    relocationNumberList                [1]  RelocationNumberList           OPTIONAL,
    an-APDU                             [2]  AccessNetworkSignalInfo        OPTIONAL,
    multicallBearerInfo                 [3]  MulticallBearerInfo            OPTIONAL,
    multipleBearerNotSupported          NULL                                OPTIONAL,
    selectedUMTS-Algorithms             [5]  SelectedUMTS-Algorithms        OPTIONAL,
    chosenRadioResourceInformation      [6] ChosenRadioResourceInformation  OPTIONAL,
    extensionContainer                  [4]  ExtensionContainer             OPTIONAL,
    ...,
    iuSselectedCodec                    [7] Codec                           OPTIONAL,
    iuAvailableCodecsList               [x] CodecList                       OPTIONAL }
```

```
SelectedUMTS-Algorithms ::= SEQUENCE {
    integrityProtectionAlgorithm        [0]  ChosenIntegrityProtectionAlgorithm   OPTIONAL,
    encryptionAlgorithm                 [1]  ChosenEncryptionAlgorithm     OPTIONAL,
    extensionContainer                  [2]  ExtensionContainer            OPTIONAL,
    ...}
```

```
ChosenIntegrityProtectionAlgorithm ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete IntegrityProtectionAlgorithm data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
ChosenEncryptionAlgorithm ::= OCTET STRING (SIZE (1))
    -- Octet contains a complete EncryptionAlgorithm data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included in the least significant bits.
```

```
ChosenRadioResourceInformation ::= SEQUENCE {
    chosenChannelInfo                   [0] ChosenChannelInfo              OPTIONAL,
    chosenSpeechVersion                 [1] ChosenSpeechVersion            OPTIONAL,
    ...}
```

```
ChosenChannelInfo ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Chosen Channel information element in 3GPP TS 48.008
```

```
ChosenSpeechVersion ::= OCTET STRING (SIZE (1))
    -- Octets are coded according the Speech Version (chosen) information element in 3GPP TS
    -- 48.008
```

```
PrepareSubsequentHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                   OPTIONAL,
    targetMSC-Number                    [1] ISDN-AddressString,
    targetRNCId                         [2] RNCId                          OPTIONAL,
    an-APDU                             [3]  AccessNetworkSignalInfo       OPTIONAL,
    selectedRab-Id                      [4]  RAB-Id                        OPTIONAL,
    extensionContainer                  [5]  ExtensionContainer            OPTIONAL,
    ...,
    geran-classmark                     [6] GERAN-Classmark                OPTIONAL,
    rab-ConfigurationIndicator          [7] NULL                           OPTIONAL }
```

```
PrepareSubsequentHO-Res ::= [3] SEQUENCE {
    an-APDU                             AccessNetworkSignalInfo,
    extensionContainer                  [0]  ExtensionContainer            OPTIONAL,
    ...}
```

```
ProcessAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                             AccessNetworkSignalInfo,
    selectedUMTS-Algorithms             [1]  SelectedUMTS-Algorithms       OPTIONAL,
    selectedGSM-Algorithm               [2]  SelectedGSM-Algorithm         OPTIONAL,
    chosenRadioResourceInformation      [3] ChosenRadioResourceInformation OPTIONAL,
    selectedRab-Id                      [4] RAB-Id                         OPTIONAL,
    extensionContainer                  [0]  ExtensionContainer            OPTIONAL,
    ...,
    selectedCodec                       [5] Codec                          OPTIONAL }
```

```
SupportedAvailableCodecsList ::= SEQUENCE {
    utranCodecList                      [0] CodecList                      OPTIONAL,
    geranCodecList                      [1] CodecList                      OPTIONAL,
    extensionContainer                  [2] ExtensionContainer             OPTIONAL,
    ...}
```

```
CodecList ::= SEQUENCE {
    codec1                              [1] Codec,
    codec2                              [2] Codec                          OPTIONAL,
    codec3                              [3] Codec                          OPTIONAL,
    codec4                              [4] Codec                          OPTIONAL,
    codec5                              [5] Codec                          OPTIONAL,
    codec6                              [6] Codec                          OPTIONAL,
    codec7                              [7] Codec                          OPTIONAL,
    codec8                              [8] Codec                          OPTIONAL,
    extensionContainer                  [9] ExtensionContainer             OPTIONAL,
    ...}
    -- Codecs are sent in priority order where codec1 has highest priority
```

```
Codec ::= OCTET STRING (SIZE (1..4))

    -- The internal structure is defined as follows:
    -- octet 1                          Coded as Codec Identification code in 3GPP TS 26.103
    -- octets 2,3,4                     Parameters for the Codec as defined in 3GPP TS
    --                                  26.103, if available, length depending on the codec
```

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040304
(rev of N4-040277)

CR-Form-v7

CHANGE REQUEST

⌘ **23.153** **CR** **069** ⌘ **rev** **4** ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of Inter-MSC SRSN Relocation procedure
Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	19/02/2004
Category:	⌘	**F**
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)*
Rel-6 *(Release 6)*

Reason for change:	⌘	For codec modification after inter-MSC SRNS relocation, the anchor MSC needs to know which codecs are available at the Iu-interface in the target MSC-A'. Because of SCUDIF, the Supported Codecs List sent by MSC-A to MSC-A' via BICC signalling to establish the bearer between MGW-A and MGW-A' needs to be enhanced. The handling of the codec lists for inter-MSC handover is not described in detail.
Summary of change:	⌘	Inclusion of a new parameter 'Iu-Available Codecs List' in MAP Prepare Handover Response. The name of the Available Codecs List included in MAP Prepare Handover Request is changed to 'Iu-Supported Codecs List' in order to to avoid confusion with the 'Iu-Available Codecs List' returned in MAP Prepare Handover Response. Inclusion of additional codecs in the Supported Codecs List sent by MSC-A to MSC-A' via BICC signalling. Clarification of the codec list names and codec names in section 6.10. The handling of the codec lists for inter-MSC handover is clarified.
Consequences if not approved:	⌘	Codec modification after inter-MSC SRNS relocation does not work properly, since the MSC-A does not know whether MSC-A' supports the new codec to be used and there is no appropriate reject cause, if MSC-A' does not support this new codec.

	The bearer between MSC-A and MSC-A' cannot be modified via BICC codec modification from speech to multimedia or vice versa, since with the current wording it is not possible to include both a speech codec and the multimedia codec, if MSC-A' returned a speech codec in MAP Prepare Handover response. The handling of the codec lists for inter-MSC handover remains as an open issue.

Clauses affected:	⌘	2, 3.1, 6.2.2, 6.10, 6.11 (new)				
		Y	**N**			
Other specs	⌘	**X**		Other core specifications	⌘	29.002: 667, 669; 23.153 068; 23.009 102
affected:			**X**	Test specifications		
			X	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.

********** 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*.

[1] 3GPP TS 23.107: "QoS Concept and Architecture".

[2] 3GPP TS 24.008: "Mobile radio interface layer 3 specification Core Network Protocols –Stage 3".

[3] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".

[4] 3GPP TS 25.415: "UTRAN Iu Interface User Plane Protocols".

[5] 3GPP TS 26.103: "Speech codec list for GSM and UMTS".

[6] 3GPP TS 29.205: "3rd Generation Partnership Project; Technical Specification Group CoreNetwork; Application of Q.1900 series to Bearer Independent circuit-switched core Network architecture; Stage 3".

[7] ITU-T Reccomendation Q.765.5: "Signalling system No. 7; Application transport mechanism: Bearer Independent Call Control (BICC)".

[8] 3GPP TS 23.205: "Bearer-independent CS Core Network.".

[9] 3GPP TS 33.106: "3GPP Security; Lawful Interception Requirements".

[10] 3GPP TS 28.062: "Inband Tandem Free Operation (TFO) of Speech Codecs; Service Description; Stage 3".

[11] 3GPP TS 23.009: "Handover Procedures".

[12] 3GPP TS 29.232: "Media Gateway Controller (MGC) – Media Gateway (MGW) interface; Stage 3".

[13] ITU-T H.248: "Gateway Control Protocol".

[14] 3GPP TS 29.415: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) specification".

[15] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".

[16] 3GPP TS 43.051: "Technical Specification Group GSM/EDGE; Radio Access Network; Overall description - Stage 2;".

[17] 3GPP TS 23.172: "Technical realization of Circuit Switched (CS) multimedia service; UDI/RDI fallback and service modification - Stage 2".

********** NEXT MODIFIED SECTION **********

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definition apply:

Codec: device to encode information from its original representation into an encoded form and to decode encoded information into its original representation

Codec Lists, Selected Codecs: The OoBTC procedures pass a number of codec lists created by comparing the capabilities of the different nodes or equipment involved. For the different interfaces involved during call setup, handover, and relocation, the following codec lists and selected codecs need to be distinguished:

i) Supported Codecs List (DTAP) – this is the list of codecs supported by the UE. It is subdivided into codecs supported for the currently used radio access and codecs that can be used for other radio accesses supported by the UE. The list contains only the codec types, but not the individual configuration, as the UE is mandated to support all configurations for a given codec type.

ii) Supported Codecs List (BICC) – this list is used on NNI (BICC) OoBTC signalling. At call setup it is sent forward by the node originating the OoBTC signalling and contains the default PCM codec and a set of codecs that is common to the nodes and the equipment involved in setting up the call. For a mobile originating call, these are the UE and the MGWs involved in the connection and, for UTRAN and GERAN Iu-mode, also the originating radio access. At inter-MSC relocation and inter-MSC handover, the Supported Codecs List (BICC) is sent forward by the anchor MSC towards the target MSC and contains the default PCM codec and a set of codecs that is common to the anchor MSC and the nodes involved in setting up the new call leg towards the target MSC. For UDI/RDI multimedia calls with fallback and service change according to 3GPP TS 23.172 [17], the multimedia dummy codec will be included (see 3GPP TS 26.103 [5]).

iii) Available Codecs Lists (BICC) – this is the list of codecs available for the NNI connection. It is returned in the backward signalling to the node that originated the OoBTC and is a subset of the Supported Codecs List (BICC) sent forward. At call setup the Available Codecs Lists (BICC) contains the default PCM codec and a common set of codecs that can be supported by all nodes and, if Transcoder Free Operation has been achieved end-to-end, also by the UEs and the radio access networks that are involved in the call. At inter-MSC relocation and inter-MSC handover to UMTS, the Available Codecs List (BICC) contains the default PCM codec and a set of codecs that can be supported by all nodes involved in setting up the new call leg towards the target MSC and, if Transcoder Free Operation can be maintained end-to-end after the handover or relocation, also by the UE and the target radio access network.

iv) Selected Codec (BICC) – this is the codec selected to be used on the NNI connection. It is one of the codecs contained in the Available Codecs Lists (BICC) and may be different from the codec that is used on the radio interface, but if end-to-end Transcoder Free Operation has been achieved, this will be the common codec for all nodes, the UEs, and the radio accesses.

v) Iu-Supported Codecs List (MAP) – this list is used for MAP signalling from the anchor MSC to the target MSC. It is subdivided into lists for UTRAN and GERAN Iu-mode and contains the codecs common to the UE and to the anchor MGW for each radio access supported by the UE. The codec capabilities of the serving radio access, i.e. the radio access used prior to the inter-MSC handover or relocation, are not taken into account. Codecs that are only applicable to the NNI, e.g. the default PCM codec or the multimedia dummy codec (see 3GPP TS 26.103 [5]), are not included.

vi) Iu-Available Codecs List (MAP) – this is the list of codecs available for the target Iu interface. When returned by the target MSC to the anchor MSC in response to an initial Prepare Handover message it is the Iu-Supported Codecs List (MAP) reduced according to the capabilites of the target MGW and the target radio access. After a subsequent intra-MSC handover or relocation, the target MSC may update the Iu-Available Codecs List (MAP) according to the capabilites of its associated MGW and the new target radio access, if necessary.

vii) Iu-Selected Codec (MAP) – this is the codec selected for the target Iu interface. It is one of the codecs contained in the Iu-Available Codecs Lists (MAP). In response to a Prepare Handover request message this is the codec selected by the target MSC and indicated back to the anchor MSC. When sent from the anchor MSC in a Forward Access Signalling request message during a codec modification, it contains the codec type and configuration chosen by the anchor MSC.

viii) Iu-Currently Used Codec (MAP) – this is the codec in use on the serving Iu interface prior to an inter-MSC handover.

For the codecs in the Supported Codecs List (DTAP), no order of priority is defined. Within each of the other lists, the codecs are ordered in decreasing order of priority, the first entry in the list being the highest priority codec.

Tandem Free Operation: configuration of a connection with two transcoders that support TFO protocol and whose external coding schemes are compatible, thus enabling compressed speech to pass between them

NOTE 1: When the TFO protocol is not supported by both transcoders or the coding schemes are not compatible then normal "Tandem" operation occurs and PCM encoded speech is passed between them.

Transcoder: device to change the encoding of information from one particular encoding scheme to a different one, most commonly to/from a compressed speech algorithm from/to PCM.

Transcoder Free Operation: configuration of a speech or multimedia call for which no transcoder device is physically present in the communication path and hence no control or conversion or other functions can be associated with it

Out of Band Transcoder Control: capability of a system to negotiate the types of codecs and codec modes on a call per call basis through out-of-band signalling, required to establish Transcoder Free Operation.

Default PCM Codec: network default 64kb/s codec for speech in PCM domain

NOTE 2: For example ITU G.711 A-law.

Transcoding free link (TrFL): bearer link, where compressed voice is being carried between bearer endpoints

NOTE 3: Within the UMTS network, the compressed voice is transmitted in Iu/ Nb User Plane format, depending on the related interface.

Tandem free link (TFOL): bearer link between transcoders that are operating in Tandem Free Operation mode, i.e. bypassing the transcoding functions

NOTE 4: The involved transcoders can be a UMTS transcoder or a GSM TRAU with TFO functionality.

Transcoder free operation (TrFO): calls that have no transcoders involved in the connection between the source codecs

NOTE 5: For mobile to mobile calls this is UE to UE, although the connection could be UE to another type of terminal. TrFO operation is considered a concatenation of TrFLs between RNCs.

NOTE 6: In case of mobile to fixed network calls the term "Transcoder free operation" is applicable for the TrFLs carrying compressed speech. The TrFO usually ends at the Gateway to the PSTN where the speech is transcoded e.g. to G.711.

Tandem free and Transcoding free operation (TaTrFO): concatenation of "transcoding free links" and "tandem free links"

Iu Framing: framing protocol used for the speech packets on both the Iu User Plane interface and the Nb User Plane interface

NOTE 7: The Iu framing protocol is specified by [4].

********** NEXT MODIFIED SECTION **********

6.2.2 Inter-MSC SRNS Relocation

The following figures are describing inter-MSC SRNS relocation. The figures are a combination of figure 6.2/1 for intra-MSC SRNS relocation and of figures 8.4/1 and 8.4/2 in 3GPP TS 23.205 [8].

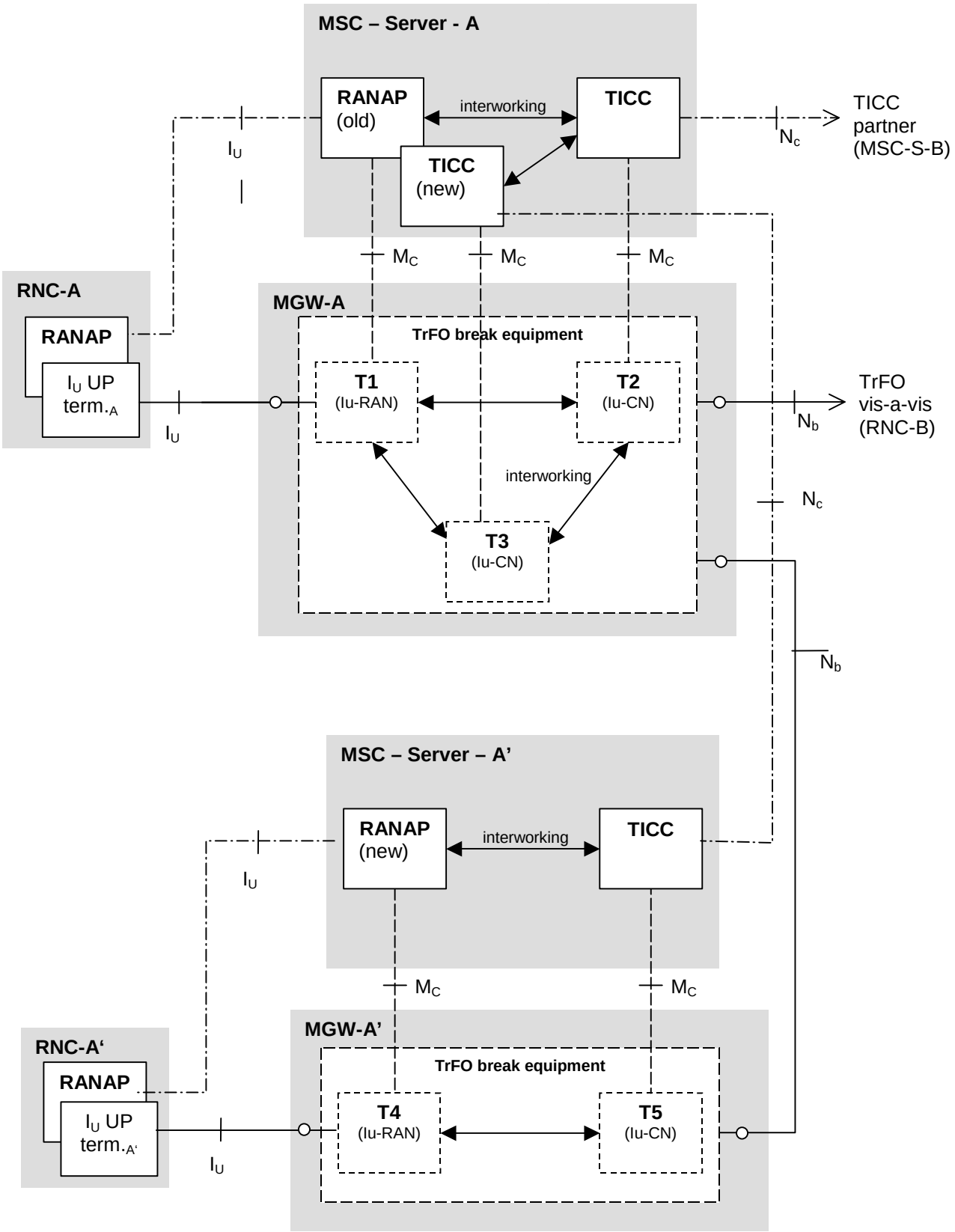


Figure 6.2/4: Configuration during inter-MSC SRNS Relocation

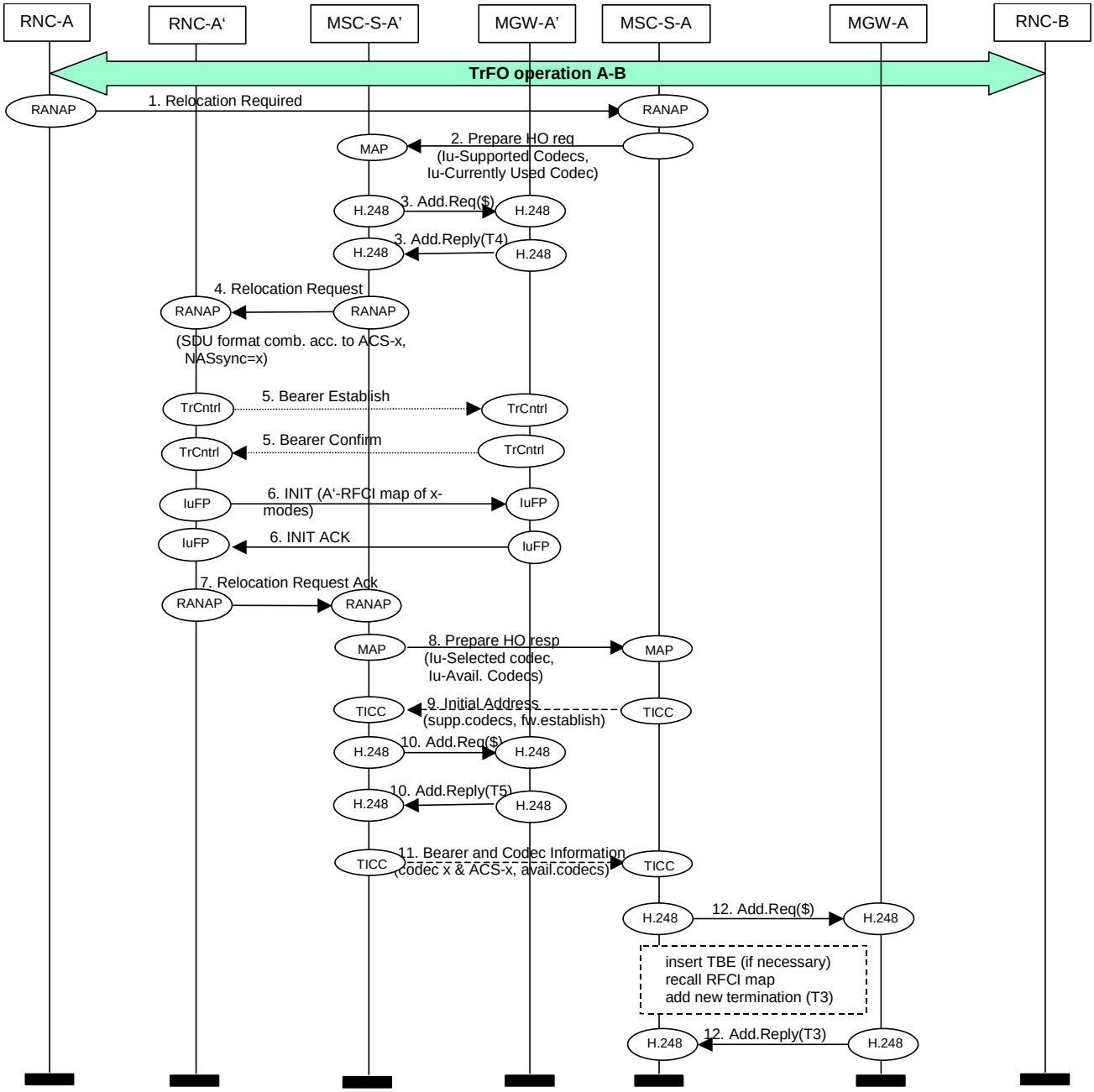
Figure 6.2/4 shows the configuration during inter-MSC SRNS relocation. After setting up the new I_U interface (towards RNC-A') until releasing the old one, the original TrFO relation (A⇔B) and the target TrFO relation (A'⇔B) exist in parallel. Within the respective contexts (TBE) interworking between T4and T5 at MGW-A' and T1, T2 and T3 at MGW-A are necessary:

T3 (MGW-A) shall perform initialisation towards MGW-A'.

T4 (MGW-A') will receive initialisation from RNC-A'.

T5 (MGW-A') shall hide initialisation performed on $I_{U,A'}$ from MGW-A and RNC-B.

If the option to remove the TBE was applied in MGW-A after call setup, the whole context (TBE) needs to be inserted prior to performing inter-MSC SRNS Relocation. Initialisation data need to be available within MGW-A. After Relocation, the context (TBE) may be removed again.



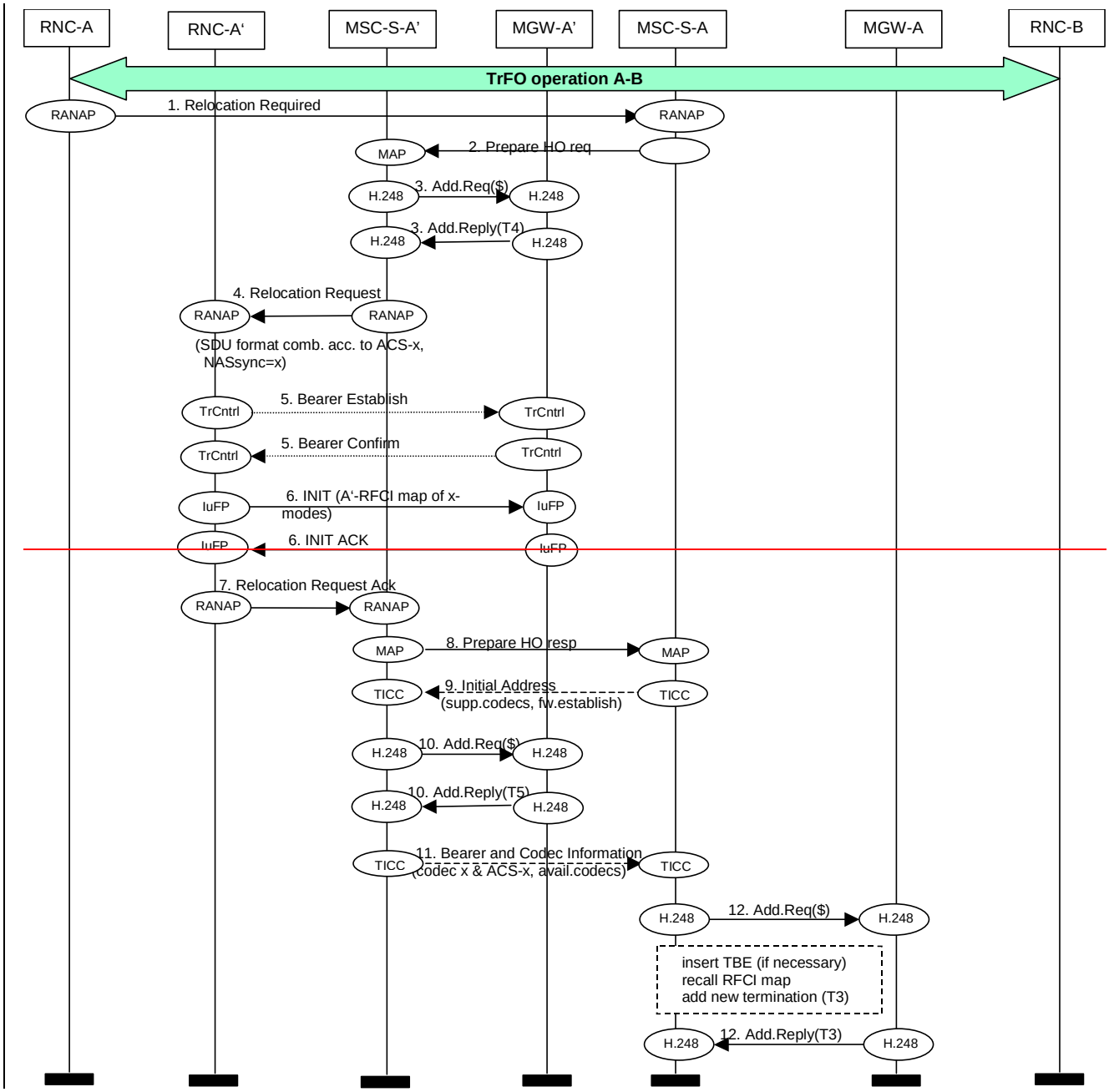
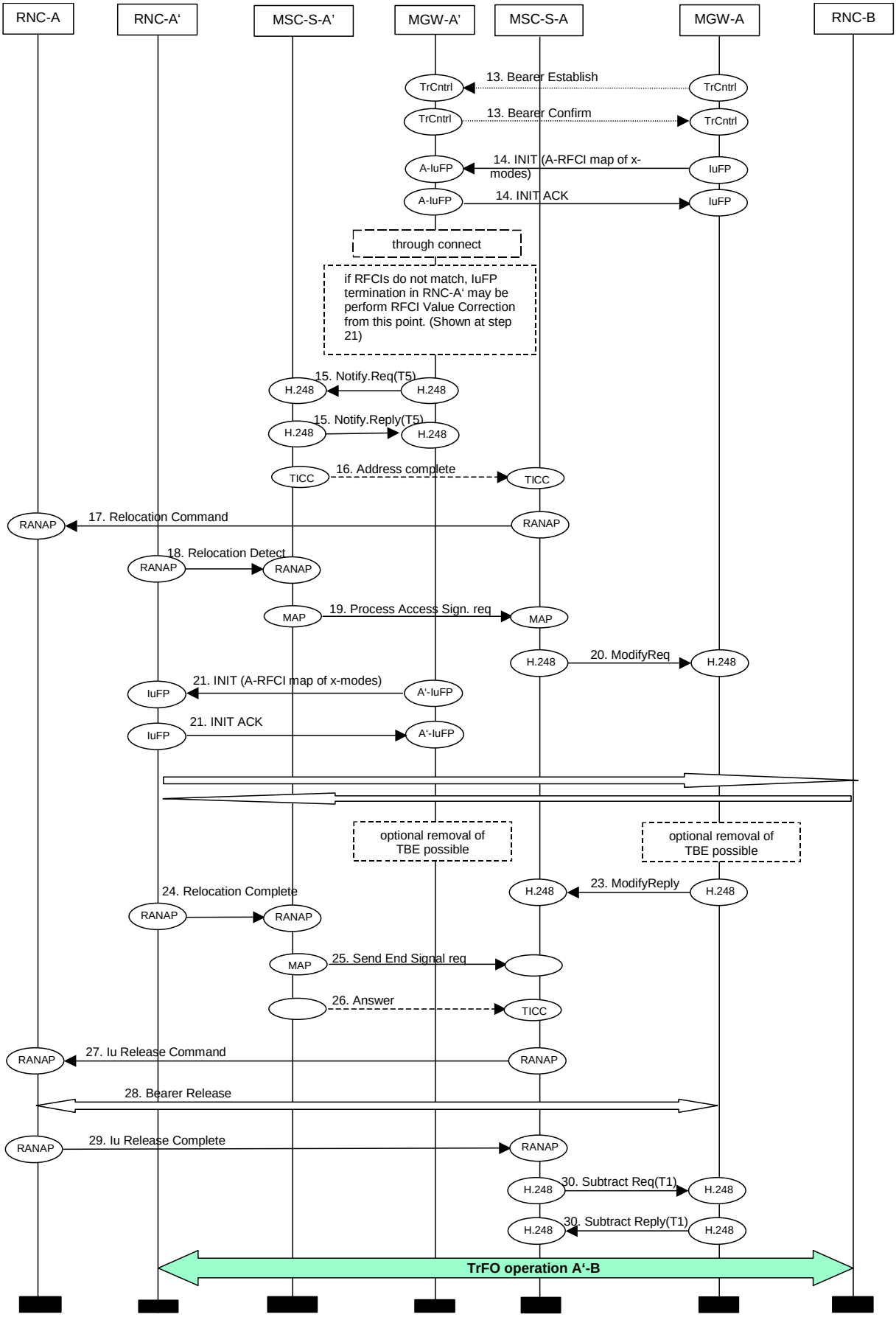


Figure 6.2/5: Inter-MSC SRNS Relocation and TrFO. Flow chart part 1



Note: There can be interim network transit nodes between MSC-A and MSC-A'

Figure 6.2/6: Inter-MSC SRNS Relocation and TrFO. Flow chart part 2

RAB Assignment on the new Iu leg:

A RAN side termination with IuFP property (T4 (MSC-A')) has to be seized (step 3.) before sending Relocation Request (4.), that contains all the RAB parameters already applied on the Iu leg towards RNC-A.

MAP signalling for handover and codec negotiation

The MSC-A server shall include an Iu-Supported Codecs List and an Iu-Currently Used Codec in the MAP Prepare Handover request. When selecting the order of priority for the codecs within the Iu-Supported Codecs List, MSC-A shall take the Available Codecs List (BICC) negotiated with the far end party into account.

MSC-A' shall include in the MAP Prepare Handover response the Iu-Selected codec and the Iu-Available Codecs List, i.e. the list of codecs available at the Iu interface in MSC-A' after handover.

Network side bearer establishment and codec handling

The handling of the bearer establishment between MSC-A and MSC-A' shall be performed as for a normal call with OoBTC. For a speech bearer, t~~T~~he MSC-A server shall perform a call set-up with codec negotiation towards the MSC-A' server, using a Supported Codec List (BICC) containing

~~-~~a) optionally, the ~~currently used~~ Selected codec (BICC), previously selected for the leg towards the far end party, as the preferred codec;

NOTE: this codec is included to cover the case where the codec negotiation is terminated prior to reaching the target MSC. Then the best codec to be selected is the one also used towards the far end party – in order to avoid the need for a codec modification or additional transcoding in MSC-A If MSC-A knows by means of configuration information that all nodes of the network support TrFO/TFO interworking and TFO, including codec mismatch resolution, this codec may be omitted from the list.

~~-~~b) the Iu-S~~s~~elected codec (MAP) (negotiated with MSC-A' during the MAP E-interface signalling), if it is not already included according to list item a;~~different from the currently used codec; and~~

~~-~~c) the default PCM codec; and

d) optionally, further codecs from the Iu-Supported Codecs List (MAP) that are applicable to the target radio access.

For UDI/RDI multimedia calls with fallback and service change according to 3GPP TS 23.172 [17], the Supported Codecs List (BICC) shall contain the multimedia dummy codec and the Available Codecs List (BICC) can contain this codec (see [17], subclause 4.3.7). If the MSC-A server wants to establish a bearer for the multimedia dummy codec, it shall include this codec as the preferred codec.

If MSC-A' receives a Supported Codec List (BICC) with the IAM message, MSC-A' shall select from this list

- the multimedia dummy codec, if it is the preferred codec;
- the Iu-S~~s~~elected codec, if it is contained in the list; or
- the default PCM codec.

If MSC-A' selects the default PCM codec, or if MSC-A' receives an IAM message without a Supported Codec List (BICC), MSC-A'~~'~~ shall insert a transcoder in MGW-A'.

MSC-A/MSC-A' shall request seizure of network side bearer terminations with IuFP properties (see steps 10. and 12.). MSC-A' shall send the Address Complete message only after MGW-A' has indicated the successful initialisation of the IuFP (step 15.).

Additionally, when the bearer between MGW-A and MGW-A' was established successfully, ~~if the selected codec is different from the currently used codec,~~ MSC-A may initiate a ~~modify~~ codec modification or mid-call codec negotiation as described in Annex A.~~procedure on the leg towards the far end party.~~

UP initialisation

RNC-A' shall accept the requested set of codec modes and is not allowed to puncture out any negotiated mode. The INIT frames shall be according to the RAB parameters received.

MSC-A' shall request seizure of network side bearer terminations with IuFP properties.

At reception of an INIT frame from the new RNC, the termination at MGW-A' shall not perform forwarding of the IuFP initialisation. When the NbFP has been initialised from MGW-A towards MGW-A', the MGW-A' shall check whether the received RFCI allocations match the stored RFCI allocation. If it does not match, the MGW-A' may re-initialise the IuFP towards RNC-A' at this point in time.

Removal of TrFO Break Equipment (TBE)

If the MGW-A supports the removal of TBEs, it shall insert the TBE before seizing the additional termination. It may again remove the TBE after through-connection of the new termination and the termination to the far end party.

If the MGW-A' supports the removal of TBEs, it may remove the TBE after performing RFCI matching and through-connection of the terminations.

********** NEXT MODIFIED SECTION **********

6.10 Relocation during TrFO towards GERAN Iu-mode

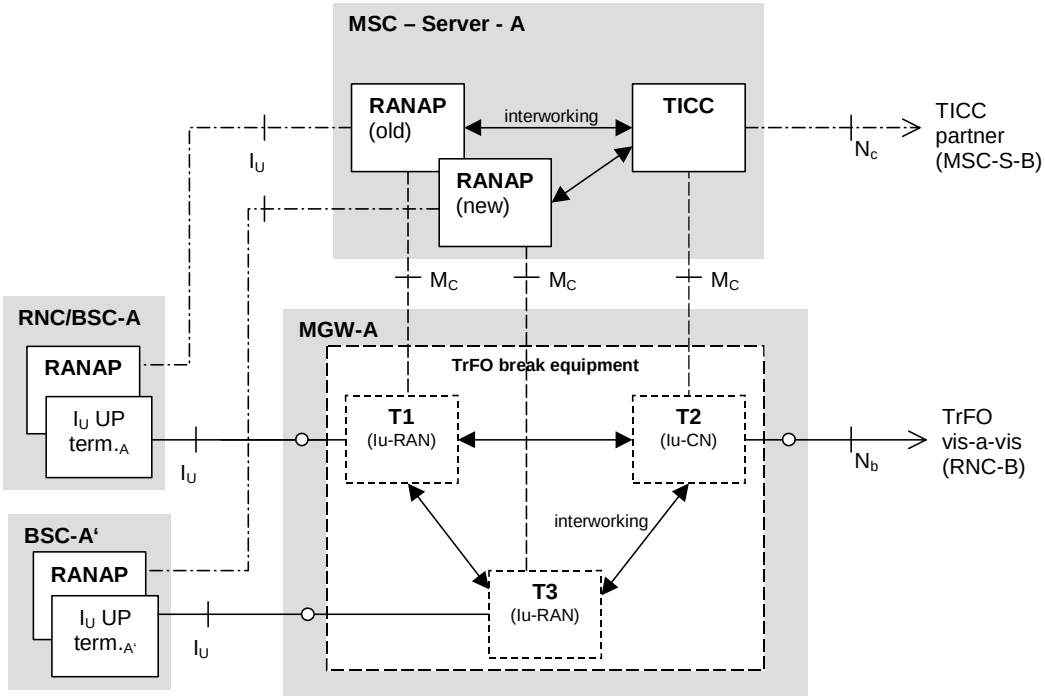


Figure 6.10/1: Configuration during intra-MSC SRNS Relocation towards GERAN Iu-mode

The description of Figure 6.2/1 (Configuration during intra-MSC SRNS Relocation) within clause 6.2 applies for the network and protocol entities involved in the Relocation towards GERAN Iu-mode scenario with following modifications:

RAN node A either is a RNC or a BSC. In the latter case BSC-A acts as a RNC-A.

BSC-A' acts as a RNC-A'.

Therefore Figures 6.2/2 to 6.2/3. (the respective message flows for SRNS Relocation and TrFO) apply as well with the appropriate modifications outlined below:

Relocation Initiation

If the MSC-Server-A received the GERAN capabilities of the target cell within the RANAP Relocation Required message (for details when the capabilities are included see [16]), MSC-Server-A shall compare these capabilities with the current Selected Codec (BICC) and the Available Codecs List (BICC), taking into account Supported Codec Set and Active Codec Set for adaptive multimode codecs. If the GERAN capabilities in terms of codec types and modes for

adaptive multimode codecs do not include all codes types and modes in the Available Codecs List (BICC) and all modes and the type of the Selected Codec (BICC), MSC Server A shall invoke the appropriate of the modification procedures in Section 5.8. Criteria for the selection of the appropriate procedure are given in Section 5.8. Upon completion of this procedure, or if no modification procedure is required, MSC server A shall proceed with the Relocation procedure as described in Figure 6.2/2 to 6.2/3 (Step 2. to 17.).

RAB Assignment on the new Iu leg:

RAB Assignment on the new Iu leg shall be performed as described in clause 6.2 with following modifications:

The Relocation Request (Step 3.) contains possibly new RAB parameters depending on the actions executed as outlined above during the Relocation Initiation phase according to the decision on the selected codec as well as on the selected codec modes (for an adaptive multi-rate codec type). In addition, the MSC-Server-A shall include the selected codec type within Relocation Request message. For definition of list of supported codec type see [15].

6.11 Inter-MSC Handover during TrFO

6.11.1 Inter-MSC Handover

In order to enable the use of Tandem free and Transcoder free operation after inter-MSC handover, the procedures specified in 3GPP TS 23.205 [8] and 3GPP TS 23.009 [11] for "Inter-MSC Handover" shall be followed. For the handling of the codec lists and selected codecs the following rules apply:

The Prepare Handover request message shall include the Iu-Supported Codecs List (MAP).

If the serving radio access is UTRAN or GERAN Iu-mode, the Prepare Handover request message shall contain the Iu-Currently Used Codec (MAP). Otherwise, if the serving radio access is A/Gb mode, the currently used codec is indicated by the Speech Version (Chosen) in the BSSMAP Handover Request message included in the Prepare Handover request message.

If the target radio access is UTRAN or GERAN Iu-mode, the Prepare Handover response message shall contain the Iu-Selected Codec (MAP) and the Iu-Available Codecs List (MAP). Otherwise, if the target radio access is A/Gb mode, the selected codec is indicated by the Speech Version (Chosen) in the BSSMAP Handover Request Ack message included in the Prepare Handover response message.

For a speech bearer, the MSC-A server shall perform a call set-up with codec negotiation towards the MSC-A' server, using a Supported Codec List (BICC) containing

If the target radio access is GERAN A/Gb mode, then for a speech bearer the anchor MSC shall perform a call set-up with codec negotiation towards the target MSC, using a Supported Codec List (BICC) containing:

a) optionally, the Selected codec (BICC), previously selected for the leg towards the far end party, as the preferred codec;

NOTE: this codec is included to cover the case where the codec negotiation is terminated prior to reaching the target MSC. Then the best codec to be selected is the one also used towards the far end party – in order to avoid the need for a codec modification or additional transcoding in MSC-A. If MSC-A knows by means of configuration information that all nodes of the network support TrFO/TFO interworking and TFO, including codec mismatch resolution, this codec may be omitted from the list.

b) the GSM codec indicated by the serving MSC during the MAP E-interface signalling as Speech Version (Chosen), if it is not already included according to list item a;

c) the default PCM codec; and

d) optionally, further GSM codecs that are supported by its associated MGW.

For UDI/RDI multimedia calls with fallback and service change according to 3GPP TS 23.172 [17], the Supported Codecs List (BICC) shall contain the multimedia dummy codec and the Available Codecs List (BICC) can contain this codec (see [17], subclause 4.3.7). If the MSC-A server wants to establish a bearer for the multimedia dummy codec, it shall include this codec as the preferred codec.

If MSC-A' receives a Supported Codec List (BICC) with the IAM message, MSC-A' shall select from this list

- the multimedia dummy codec, if it is the preferred codec;
- the GSM codec corresponding to the Speech Version (Chosen), if it is contained in the list; or
- the default PCM codec.

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040309
(rev of N4-040189)

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **667** ⌘ **rev** **4** ⌘ Current version: **5.8.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation
Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	19/02/2004
Category:	⌘	**F**
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)*
Rel-6 *(Release 6)*

Reason for change:	⌘	Essential correction 1) To support codec modification/mid-call codec negotiation after inter-MSC SRNS relocation, process access signalling has to transport the list of codecs available at the Iu-interface from serving MSC to the anchor MSC. 2) The Iu-Currently used codec and the Iu-Available codecs list need to be included in forward access signalling also if the encapsulated PDU is a BSSMAP Assignment Request. (This is needed e.g. if the serving cell is UMTS, but encapsulated BSSMAP is used via the E-interface.) 3) To support Codec modification/ mid-call codec negotiation after inter-MSC SRNS relocation, either the Iu-Currently used codec and the Iu-Supported codecs list or the Iu-Selected Codec need to be included in forward access signalling if the bearer described in the RANAP RAB Assignment Request or BSSMAP Assignment Request is a speech bearer.
Summary of change:	⌘	1) Parameter Iu-Available codecs list is added to process access signalling. 2+3) The condition for the inclusion of the Iu-Supported codecs list in forward access signalling is corrected. 3) Parameter Iu-Selected codec is added to forward access signalling.
Consequences if not approved:	⌘	1) Anchor MSC may not receive information about codecs available on Iu-interface at the serving MSC that is needed for codec modification and mid-call codec negotiation. 2) The serving MSC may not receive information about the Iu-Currently used codec and the Iu-Available codecs if encapsulated BSSMAP is used via the E-interface.

	3) The serving MSC may not receive information about the Iu-Currently used codec and the Iu-Supported codecs or about the codec selected by MSC-A for the Iu interface. This information is needed for codec modification and mid-call codec negotiation.

Clauses affected:	⌘	7.6.6.18, 8.4.3.2, 8.4.3.3, 8.4.4.2, 8.4.4.3, 17.7.1				
		Y	**N**			
Other specs	⌘	**X**		Other core specifications	⌘	23.153: 068, 069; 23.009 102; 29.002 669
affected:			**X**	Test specifications		
			X	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.

/**********first modified section**********/

7.6.6.18 Iu-Selected Codec

This parameter indicates the codec selected by MSC-B. When sent by MSC-A, this parameter indicates the codec to be used by MSC-B at the Iu interface.

/**********next modified section**********/

8.4.3 MAP_PROCESS_ACCESS_SIGNALLING service

8.4.3.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to pass information received on the A-interface or Iu-interface in MSC-B to MSC-A.

The MAP_PROCESS_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/3.

8.4.3.2 Service primitives

Table 8.4/3: MAP_PROCESS_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
AN-APDU	M	M(=)
Selected GSM Algorithm	C	C(=)
Selected UMTS Algorithms	C	C(=)
Chosen Radio Resource Information	C	C(=)
Selected RAB id	C	C(=)
Iu-Selected Codec	C	C(=)
Iu-Available Codecs List	C	C(=)

8.4.3.3 Parameter use

Invoke Id

For definition of this parameter see clause 7.6.1.

AN-APDU

For definition of this parameter see clause 7.6.9.

Selected GSM algorithm

For definition of this parameter see clause 7.6.6. This parameter shall be present if the encapsulated PDU is Security Mode Complete and MS is in GSM access.

Selected UMTS Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes the UMTS integrity and optionally encryption algorithms selected by RNC under the control of MSC-B. This UMTS parameter shall be included if the encapsulated PDU is BSSMAP Cipher Mode Complete and the MS is in UMTS, or an interystem handover to UMTS is performed in MSC-B, or in the case of intra MSC-B intra UMTS relocation.

Chosen Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Response and MS is in GSM access.

Selected RAB ID

The selected radio access bearer that was kept at subsequent intra-MSC handover from UMTS to GSM after multiple bearers were used.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included

- if MSC-B changes the selected codec;
- if ~~or in case of~~ intersystem handover to UMTS or GERAN Iu-mode is performed in MSC-B; or
- if MSC-B received a Forward Access Signalling service request including an Iu-Supported Codecs List and the MS is in UMTS or GERAN Iu-mode access.

This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List was not received either in the Prepare Handover service request or in the Forward Access Signalling service request.

Iu-Available Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by an MSC-B supporting TrFO

- if the Iu-Available Codecs List has changed in MSC-B;
- if intersystem handover to UMTS or GERAN Iu-mode is performed in MSC-B; or
- if MSC-B received a Forward Access Signalling service request including an Iu-Supported Codecs List and the MS is in UMTS or GERAN Iu-mode access.

8.4.4 MAP_FORWARD_ACCESS_SIGNALLING service

8.4.4.1 Definition

This service is used between MSC-A and MSC-B (E-interface) to pass information to be forwarded to the A-interface or Iu-interface of MSC-B.

The MAP_FORWARD_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/4.

8.4.4.2 Service primitives

Table 8.4/4: MAP_FORWARD_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
Integrity Protection Information	C	C(=)
Encryption Information	C	C(=)
Key Status	C	C(=)
AN-APDU	M	M(=)
Allowed GSM Algorithms	C	C(=)
Allowed UMTS Algorithms	C	C(=)
Radio Resource Information	C	C(=)
Radio Resource List	C	C(=)
BSSMAP Service Handover	C	C(=)
BSSMAP Service Handover List	C	C(=)
RANAP Service Handover	C	C(=)
Iu-Currently Used Codec	C	C(=)
Iu-Supported~~Available~~ Codecs List	C	C(=)

RAB Configuration Indicator	C	C(=)
Iu-Selected Codec	C	C(=)

8.4.4.3 Parameter use

For the definition and use of all parameters and errors, see clause 7.6.1.

Invoke Id

For definition of this parameter see clause 7.6.1.

Integrity Protection Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

Encryption Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

Key Status

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

AN-APDU

For definition of this parameter see clause 7.6.9.

Allowed GSM Algorithms

This parameters includes allowed GSM algorithms. This GSM parameter shall be included if the encapsulated PDU is RANAP Security Mode Command and there is an indication that the UE also supports GSM.

Allowed UMTS Algorithms

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if Integrity Protection Information and Encryption Information are not available and the encapsulated PDU is BSSMAP Cipher Mode Command.

Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Request. If the parameter Radio Resource List is sent, the parameter Radio Resource Information shall not be sent.

Radio Resource List

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Request and MSC-A requests modification of multiple bearers. If the parameter Radio Resource Information is sent, the parameter Radio Resource List shall not be sent.

BSSMAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the encapsulated PDU is RANAP RAB Assignment Request. If the parameter BSSMAP Service Handover List is sent, the parameter BSSMAP Service Handover shall not be sent.

BSSMAP Service Handover List

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the encapsulated PDU is RANAP RAB Assignment Request and MSC-A requests modification of multiple bearers. If the parameter BSSMAP Service Handover is sent, the parameter BSSMAP Service Handover List shall not be sent.

RANAP Service Handover

For definition of this parameter see clause 7.6.6.. It shall be present if it is available and the encapsulated PDU is BSSMAP Assignment Request.

Iu-Currently Used Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request for a speech bearer and the MS is in UMTS or GERAN Iu-mode access ~~and the bearer is modified from data to speech~~. This parameter shall not be included if the Iu-Supported ~~Available~~ Codecs List is not included.

Iu-Supported ~~Available~~ Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request and

- a new bearer is allocated for speech;
- an existing ~~the~~ bearer is modified from data to speech; or
- for an existing speech bearer the order of priority in the Iu-Supported Codecs List needs to be modified.

This parameter shall not be included if the Iu-Selected Codec is included.

RAB Configuration Indicator

For definition of this parameter see subclause 7.6.6. This parameter may be included if the encapsulated PDU is a RANAP RAB Assignment Request for a speech bearer ~~, the bearer is modified from data to speech~~ and MSC-A knows by means of configuration information that MSC-B supports the use of Iu-Supported ~~Available~~ Codecs List parameter. This parameter shall not be included if the Iu-Supported ~~Available~~ Codecs List is not included.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if

- the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request for an existing speech bearer;
- the MS is in UMTS or GERAN Iu-mode access; and
- an Iu-Available Codecs List was received by MSC-A for this speech bearer before, either in the Prepare Handover service response or in the Process Access Signalling service request.

This parameter shall not be included if the Iu-Supported Codecs List is included.

/**********Last modified section**********/

17.7 MAP constants and data types

17.7.1 Mobile Service data types

text removed for clarity

….

```
….ForwardAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                       AccessNetworkSignalInfo,
    integrityProtectionInfo       [0] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                [1] EncryptionInformation           OPTIONAL,
    keyStatus                     [2]  KeyStatus                    OPTIONAL,
    allowedGSM-Algorithms         [4]  AllowedGSM-Algorithms        OPTIONAL,
```

```
    allowedUMTS-Algorithms              [5]  AllowedUMTS-Algorithms       OPTIONAL,
    radioResourceInformation            [6] RadioResourceInformation      OPTIONAL,
    extensionContainer                  [3]  ExtensionContainer           OPTIONAL,
    ...,
    radioResourceList                   [7]  RadioResourceList            OPTIONAL,
    bssmap-ServiceHandover              [9]  BSSMAP-ServiceHandover       OPTIONAL,
    ranap-ServiceHandover               [8]  RANAP-ServiceHandover        OPTIONAL,
    bssmap-ServiceHandoverList          [10] BSSMAP-ServiceHandoverList   OPTIONAL,
    currentlyUsedCodec                  [11] Codec                        OPTIONAL,
    iuSupportedavailableCodecsList      [12] SupportedAvailableCodecsList OPTIONAL,
    rab-ConfigurationIndicator          [13] NULL                         OPTIONAL,
    iuSelectedCodec                     [x]  Codec                        OPTIONAL }
```

….
text removed for clarity

….

```
ProcessAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                             AccessNetworkSignalInfo,
    selectedUMTS-Algorithms             [1]  SelectedUMTS-Algorithms      OPTIONAL,
    selectedGSM-Algorithm               [2]  SelectedGSM-Algorithm        OPTIONAL,
    chosenRadioResourceInformation      [3] ChosenRadioResourceInformation OPTIONAL,
    selectedRab-Id                      [4] RAB-Id                        OPTIONAL,
    extensionContainer                  [0]  ExtensionContainer           OPTIONAL,
    ...,
    iuSselectedCodec                    [5] Codec                         OPTIONAL,
    iuAvailableCodecsList               [x] CodecList                     OPTIONAL }
```

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040310
(rev of N4-040190)

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **668** ⌘ **rev** **3** ⌘ Current version: **6.4.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation
Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	19/02/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

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)*
Rel-6 *(Release 6)*

Reason for change: ⌘

1) To support codec modification/mid-call codec negotiation after inter-MSC SRNS relocation, process access signalling has to transport the list of codecs available at the Iu-interface from serving MSC to the anchor MSC.

2) The Iu-Currently used codec and the Iu-Available codecs list need to be included in forward access signalling also if the encapsulated PDU is a BSSMAP Assignment Request. (This is needed e.g. if the serving cell is UMTS, but encapsulated BSSMAP is used via the E-interface.)

3) To support Codec modification/ mid-call codec negotiation after inter-MSC SRNS relocation, either the Iu-Currently used codec and the Iu-Supported codecs list or the Iu-Selected Codec need to be included in forward access signalling if the bearer described in the RANAP RAB Assignment Request or BSSMAP Assignment Request is a speech bearer.

Summary of change: ⌘

1) Parameter Iu-Available codecs list is added to process access signalling.
2+3) The condition for the inclusion of the Iu-Supported codecs list in forward access signalling is corrected.
3) Parameter Iu-Selected codec is added to forward access signalling.

Consequences if not approved: ⌘

1) Anchor MSC may not receive information about codecs available on Iu-interface at the serving MSC that is needed for codec modification and mid-call codec negotiation.
2) The serving MSC may not receive information about the Iu-Currently used codec and the Iu-Available codecs if encapsulated BSSMAP is used via the E-interface.
3) The serving MSC may not receive information about the Iu-Currently used codec and the Iu-Supported codecs or about the codec selected by MSC-A for

	the Iu interface. This information is needed for codec modification and mid-call codec negotiation.

Clauses affected:	⌘	7.6.6.18, 8.4.3.2, 8.4.3.3, 8.4.4.2, 8.4.4.3, 17.7.1				
		Y	**N**			
Other specs	⌘	**X**		Other core specifications	⌘	23.153: 068, 069; 23.009 102; 29.002 670
affected:			**X**	Test specifications		
			X	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.

/**********first modified section**********/

7.6.6.18 Iu-Selected Codec

This parameter indicates the codec selected by MSC-B. When sent by MSC-A, this parameter indicates the codec to be used by MSC-B at the Iu interface.

/**********next modified section**********/

8.4.3 MAP_PROCESS_ACCESS_SIGNALLING service

8.4.3.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to pass information received on the A-interface or Iu-interface in MSC-B to MSC-A.

The MAP_PROCESS_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/3.

8.4.3.2 Service primitives

Table 8.4/3: MAP_PROCESS_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
AN-APDU	M	M(=)
Selected GSM Algorithm	C	C(=)
Selected UMTS Algorithms	C	C(=)
Chosen Radio Resource Information	C	C(=)
Selected RAB id	C	C(=)
Iu-Selected Codec	C	C(=)
Iu-Available Codecs List	C	C(=)

8.4.3.3 Parameter use

Invoke Id

For definition of this parameter see clause 7.6.1.

AN-APDU

For definition of this parameter see clause 7.6.9.

Selected GSM algorithm

For definition of this parameter see clause 7.6.6. This parameter shall be present if the encapsulated PDU is Security Mode Complete and MS is in GSM access.

Selected UMTS Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes the UMTS integrity and optionally encryption algorithms selected by RNC under the control of MSC-B. This UMTS parameter shall be included if the encapsulated PDU is BSSMAP Cipher Mode Complete and the MS is in UMTS, or an interystem handover to UMTS is performed in MSC-B, or in the case of intra MSC-B intra UMTS relocation.

Chosen Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Response and MS is in GSM access.

Selected RAB ID

The selected radio access bearer that was kept at subsequent intra-MSC handover from UMTS to GSM after multiple bearers were used.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included

- if MSC-B changes the selected codec;
- if ~~or in case of~~ intersystem handover to UMTS or GERAN Iu-mode is performed in MSC-B; or
- if MSC-B received a Forward Access Signalling service request including an Iu-Supported Codecs List and the MS is in UMTS or GERAN Iu-mode access.

This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List was not received either in the Prepare Handover service request or in the Forward Access Signalling service request.

Iu-Available Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by an MSC-B supporting TrFO

- if the Iu-Available Codecs List has changed in MSC-B;
- if intersystem handover to UMTS or GERAN Iu-mode is performed in MSC-B; or
- if MSC-B received a Forward Access Signalling service request including an Iu-Supported Codecs List and the MS is in UMTS or GERAN Iu-mode access.

8.4.4 MAP_FORWARD_ACCESS_SIGNALLING service

8.4.4.1 Definition

This service is used between MSC-A and MSC-B (E-interface) to pass information to be forwarded to the A-interface or Iu-interface of MSC-B.

The MAP_FORWARD_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/4.

8.4.4.2 Service primitives

Table 8.4/4: MAP_FORWARD_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
Integrity Protection Information	C	C(=)
Encryption Information	C	C(=)
Key Status	C	C(=)
AN-APDU	M	M(=)
Allowed GSM Algorithms	C	C(=)
Allowed UMTS Algorithms	C	C(=)
Radio Resource Information	C	C(=)
Radio Resource List	C	C(=)
BSSMAP Service Handover	C	C(=)
BSSMAP Service Handover List	C	C(=)
RANAP Service Handover	C	C(=)
Iu-Currently Used Codec	C	C(=)
Iu-Supported~~Available~~ Codecs List	C	C(=)

RAB Configuration Indicator	C	C(=)
Iu-Selected Codec	C	C(=)

8.4.4.3 Parameter use

For the definition and use of all parameters and errors, see clause 7.6.1.

Invoke Id

For definition of this parameter see clause 7.6.1.

Integrity Protection Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

Encryption Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

Key Status

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the encapsulated PDU is BSSMAP Cipher Mode Command.

AN-APDU

For definition of this parameter see clause 7.6.9.

Allowed GSM Algorithms

This parameters includes allowed GSM algorithms. This GSM parameter shall be included if the encapsulated PDU is RANAP Security Mode Command and there is an indication that the UE also supports GSM.

Allowed UMTS Algorithms

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if Integrity Protection Information and Encryption Information are not available and the encapsulated PDU is BSSMAP Cipher Mode Command.

Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Request. If the parameter Radio Resource List is sent, the parameter Radio Resource Information shall not be sent.

Radio Resource List

For definition of this parameter see clause 7.6.6. This parameter shall be sent if the encapsulated PDU is RANAP RAB Assignment Request and MSC-A requests modification of multiple bearers. If the parameter Radio Resource Information is sent, the parameter Radio Resource List shall not be sent.

BSSMAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the encapsulated PDU is RANAP RAB Assignment Request. If the parameter BSSMAP Service Handover List is sent, the parameter BSSMAP Service Handover shall not be sent.

BSSMAP Service Handover List

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the encapsulated PDU is RANAP RAB Assignment Request and MSC-A requests modification of multiple bearers. If the parameter BSSMAP Service Handover is sent, the parameter BSSMAP Service Handover List shall not be sent.

RANAP Service Handover

For definition of this parameter see clause 7.6.6.. It shall be present if it is available and the encapsulated PDU is BSSMAP Assignment Request.

Iu-Currently Used Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request for a speech bearer and the MS is in UMTS or GERAN Iu-mode access~~and the bearer is modified from data to speech~~. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

Iu-Supported~~Available~~ Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request and

- a new bearer is allocated for speech;
- an existing~~the~~ bearer is modified from data to speech; or
- for an existing speech bearer the order of priority in the Iu-Supported Codecs List needs to be modified.

This parameter shall not be included if the Iu-Selected Codec is included.

RAB Configuration Indicator

For definition of this parameter see subclause 7.6.6. This parameter may be included if the encapsulated PDU is a RANAP RAB Assignment Request for a speech bearer~~, the bearer is modified from data to speech~~ and MSC-A knows by means of configuration information that MSC-B supports the use of the Iu-Supported~~Available~~ Codecs List parameter. This parameter shall not be included if the Iu-Supported~~Available~~ Codecs List is not included.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if

- the encapsulated PDU is a RANAP RAB Assignment Request or BSSMAP Assignment Request for an existing speech bearer;
- the MS is in UMTS or GERAN Iu-mode access; and
- an Iu-Available Codecs List was received by MSC-A for this speech bearer before, either in the Prepare Handover service response or in the Process Access Signalling service request.

This parameter shall not be included if the Iu-Supported Codecs List is included.

/**********Last modified section**********/

17.7 MAP constants and data types

17.7.1 Mobile Service data types

text removed for clarity

….

```
-- handover types

ForwardAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                          AccessNetworkSignalInfo,
    integrityProtectionInfo          [0] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                   [1] EncryptionInformation           OPTIONAL,
    keyStatus                        [2]  KeyStatus                      OPTIONAL,
    allowedGSM-Algorithms            [4]  AllowedGSM-Algorithms          OPTIONAL,
    allowedUMTS-Algorithms           [5]  AllowedUMTS-Algorithms         OPTIONAL,
    radioResourceInformation         [6] RadioResourceInformation        OPTIONAL,
    extensionContainer               [3]  ExtensionContainer             OPTIONAL,
    ...,
    radioResourceList                [7]  RadioResourceList              OPTIONAL,
    bssmap-ServiceHandover           [9]  BSSMAP-ServiceHandover         OPTIONAL,
    ranap-ServiceHandover            [8]  RANAP-ServiceHandover          OPTIONAL,
    bssmap-ServiceHandoverList       [10] BSSMAP-ServiceHandoverList     OPTIONAL,
    currentlyUsedCodec               [11] Codec                          OPTIONAL,
    iuSupportedavailableCodecsList   [12] SupportedAvailableCodecsList   OPTIONAL,
    rab-ConfigurationIndicator       [13] NULL                           OPTIONAL,
    iuSelectedCodec                  [x]  Codec                          OPTIONAL }
```

text removed for clarity

....

```
ProcessAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                          AccessNetworkSignalInfo,
    selectedUMTS-Algorithms          [1]  SelectedUMTS-Algorithms       OPTIONAL,
    selectedGSM-Algorithm            [2]  SelectedGSM-Algorithm         OPTIONAL,
    chosenRadioResourceInformation   [3] ChosenRadioResourceInformation OPTIONAL,
    selectedRab-Id                   [4] RAB-Id                         OPTIONAL,
    extensionContainer               [0]  ExtensionContainer            OPTIONAL,
    ...,
    iuSselectedCodec                 [5] Codec                          OPTIONAL,
    iuAvailableCodecsList            [x] CodecList                      OPTIONAL }
```

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040361
(rev of N4-040308)

CR-Form-v7

CHANGE REQUEST

⌘ **23.153** **CR** **068** ⌘ **rev** **5** ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Codec Modification/ Mid-Call Codec Negotiation after Inter-MSC Relocation
Source:	⌘	CN4
Work item code:	⌘	OoBTC
Date:	⌘	19/02/2004
Category:	⌘	**F**
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Codec modification/ mid-call codec negotiation after inter-MSC SRNS relocation is currently mentioned as for further study. The handling of codec modification/ mid-call codec negotiation after inter-MSC handover is missing.
Summary of change:	⌘	Codec modification/ mid-call codec negotiation after inter-MSC SRNS relocation and inter-MSC handover is described.
Consequences if not approved:	⌘	Codec modification/ mid-call codec negotiation after inter-MSC SRNS relocation and inter-MSC handover remain as an open issue.

Clauses affected:	⌘	6.2.3, 6.2.3.1 (new), 6.2.3.2 (new), 6.2.3.3 (new), 6.11.2 (new)

Other specs affected:	⌘	Y	N		⌘	
		X		Other core specifications		29.002: 667, 669; 23.153 069;
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

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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.

**** modified section*****

6.2.3 ~~Mid-Call~~ Codec Modification/Mid-Call Codec Negotiation after Inter-MSC Relocation

~~This procedure is for further study.~~

6.2.3.1 Codec Modification Initiated by the Far End Side

Modification of Available Codec List

If after inter-MSC SRNS relocation the anchor MSC (MSC-S-A) receives a "Modification of Available Codec List" procedure from the far end side as described in section 5.8.2, i.e. the Available Codecs List (BICC) is reduced, the anchor MSC may terminate the procedure at that point or forward the "Modification of Available Codec List" procedure to the serving MSC (MSC-S-A'). I.e. for a modification of the Available Codec List (BICC) without modification of the Selected codec, no MAP signalling is used.

Modification of Selected Codec

If after inter-MSC SRNS relocation the anchor MSC (MSC-S-A) receives a "Modification of Selected Codec" procedure from the far end side as described in section 5.8.1, and both the old and the new Selected Codec (BICC) are speech codecs, the anchor MSC may terminate the codec modification procedure, inserting a transcoder if required. Alternatively, the anchor MSC may forward the request to modify the codec to the serving MSC (MSC-S-A'), using the procedure described below.

NOTE: The anchor MSC may decide to forward the request to the serving MSC (MSC-S-A'), e.g. when the new Selected Codec (BICC) for the call leg between the anchor MSC and the far end side was included in the Iu-Available Codec List previously received from the serving MSC, and it is possible to (re-)establish TrFO end-to-end from the far end side up to the serving MSC.

If the anchor MSC (MSC-S-A) receives a "Modification of Selected Codec" procedure from the far end side as described in section 5.8.1, and either the old or the new Selected Codec (BICC) is the multimedia dummy codec, i.e. the far end side requests a service change between speech and multimedia, and the Available Codecs List (BICC) previously negotiated between the anchor MSC and the serving MSC (MSC-S-A') indicates that the service change is supported end-to-end, the anchor MSC shall forward the request to modify the radio access bearer to the serving MSC (MSC-S-A') and then perform a codec modification procedure for the Nb/Nc interface towards the serving MSC (MSC-S-A'). If the service change cannot be performed successfully, the anchor MSC shall reject the request for codec modification towards the far end party.

An example call sequence for the modification of the selected speech codec is shown in figures 6.2/7 and 6.2/8. The configuration depicted in figure 6.2/4 applies.

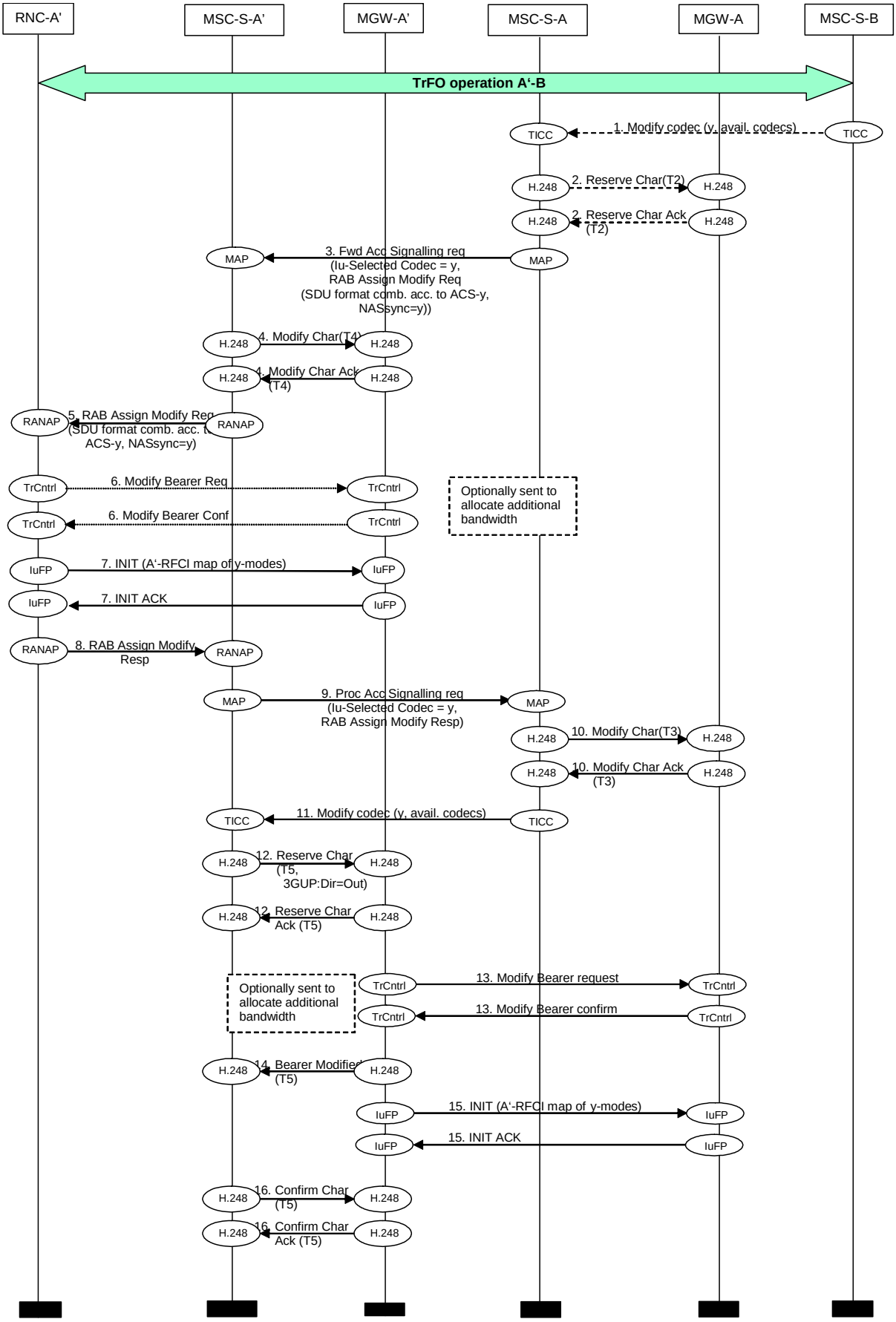
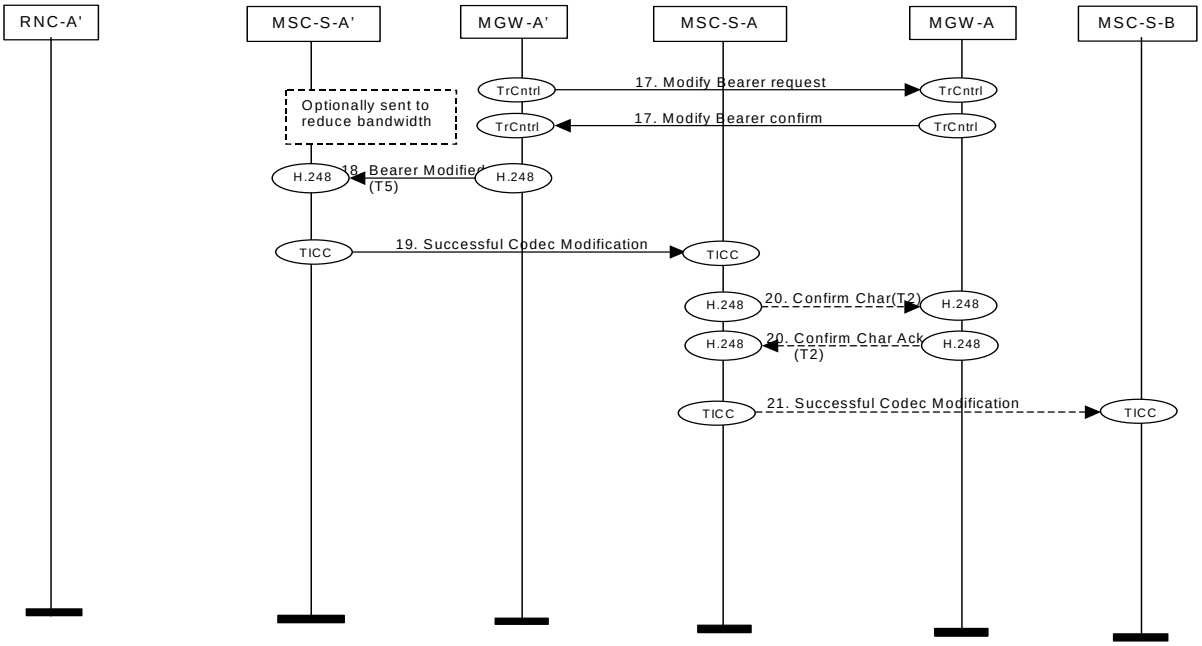


Figure 6.2/7: Codec modification after Inter-MSC SRNS Relocation. Flow Chart Part 1.



Note: There can be interim network transit nodes between MSC-A and MSC-A'

Figure 6.2/8: Codec modification after Inter-MSC SRNS Relocation. Flow Chart Part 2.

If the anchor MSC (MSC-S-A) wants to forward the modification of the codec used towards the UE and the serving MSC (MSC-S-A') from one speech codec to another speech codec within the Iu-Available Codecs List, it shall apply the following procedure:

The anchor MSC shall send a MAP Forward Access Signalling request (3) containing the new Iu-Selected Codec and the corresponding RAB Assign Modify Request message to the serving MSC (MSC-S-A').

On reception of the MAP Forward Access Signalling request (3) the serving MSC (MSC-S-A') shall configure the attached MGW-A' for the new codec and trigger the "RAB Assign Modify" procedure (5-8) towards the RNC-A'. When the serving MSC receives the RAB Assign Modify Response message (8), it shall send a MAP Process Access Signalling Request (9) containing the RAB Assign Modify Response and the Iu-Selected codec to the anchor MSC (MSC-S-A).

When the anchor MSC (MSC-S-A) receives the MAP Process Access Signalling Request (9), it shall start the codec modification procedure (11-19) for the Nb/Nc interface towards the serving MSC (MSC-S-A'), as described in section 5.8.1. If the anchor MSC needs to change also the Available Codecs List (BICC), it shall additionally initiate a procedure as described in section 5.8.2.

When receiving the "Modify Codec" request (11), the serving MSC (MSC-S-A') shall not reconfigure the RAN and shall configure the attached MGW-A' to initate an Nb framing protocol initiation towards MGW-A.

If the anchor MSC (MSC-S-A) needs to perform a service change from multimedia to speech, it shall send a MAP Forward Access Signalling request (3) containing the Iu-Supported Codecs List and the corresponding RAB Assign Modify Request message to the serving MSC (MSC-S-A'). After successful modification of the RAB, on reception of the MAP Process Access Signalling Request (9) the anchor MSC (MSC-S-A) shall start the codec modification procedure (11-19) for the Nb/Nc interface towards the serving MSC (MSC-S-A'), as described in section 5.8.1.

If the anchor MSC (MSC-S-A) needs to perform a service change from speech to multimedia, it shall send a MAP Forward Access Signalling request (3) containing the corresponding RAB Assign Modify Request message for a data bearer, but no Iu-Selected Codec to the serving MSC (MSC-S-A'). After successful modification of the RAB, on reception of the MAP Process Access Signalling Request (9) the anchor MSC (MSC-S-A) shall start the codec

modification procedure (11-19) for the Nb/Nc interface towards the serving MSC (MSC-S-A'), as described in section 5.8.1.

Unsuccessful Codec Modification in the Serving MSC

After receipt of MAP Forward Access Signalling request (3), if the modification to the new Iu-Selected codec is not possible, e.g. because necessary resources are temporarily unavailable in the serving cell or in MGW-A', or the RAN does not support the "RAB Assign Modify" procedure, the serving MSC (MSC-S-A') shall keep the old codec and the corresponding RAB configuration and shall send a MAP Process Access Signalling request, containing a RAB Assign Modify Response ("failed to modify") message, to the anchor MSC (MSC-S-A). If the anchor MSC detects that the RAB modification failed, it shall abort the codec modification procedure towards the serving MSC and shall complete the codec modification procedure towards the far end side.

Unsuccessful BICC Codec Modification between Anchor MSC and Serving MSC

After receipt of a MAP Process Access Signalling Request, containing a RAB Assign Modify Response ("success") message, if the subsequent BICC codec modification procedure between anchor MSC and serving MSC fails due to a MGW rejecting a request to reserve the resources or a server rejecting the request to modify the codec, the anchor MSC shall change the codec used at the Iu interface back by sending a MAP Forward Access Signalling request containing the previous Iu-Selected Codec to the serving MSC (MSC-S-A'). After receipt of the confirmation that the previous codec has been restored at the Iu interface, the anchor MSC shall complete the codec modification procedure towards the far end side.

6.2.3.2 Mid-Call Codec Negotiation Initiated by the Far End Side

If after inter-MSC SRNS relocation the anchor MSC receives a "Mid-call Codec Negotiation" procedure from the far end side as described in section 5.8.3, and both the old and the new Selected Codec (BICC) are speech codecs, the anchor MSC may terminate the mid-call codec negotiation procedure, inserting a transcoder if required. Alternatively, if the new Selected Codec (BICC) was included in the last Iu-Available Codec List sent by the serving MSC (MSC-S-A') the anchor MSC may forward the request to the serving MSC (MSC-S-A'), using the procedure described below.

If the anchor MSC (MSC-S-A) receives a "Mid-call Codec Negotiation" procedure from the far end side as described in section 5.8.3, and either the old or the new Selected Codec (BICC) is the multimedia dummy codec, i.e. the far end side requests a service change between speech and multimedia, and the Available Codecs List (BICC) previously negotiated between the anchor MSC and the serving MSC (MSC-S-A') indicates that the service change is supported end-to-end, the anchor MSC shall forward the request to modify the radio access bearer to the serving MSC (MSC-S-A') and then perform a mid-call codec negotiation procedure for the Nb/Nc interface towards the serving MSC (MSC-S-A'). If the service change between speech and multimedia cannot be performed successfully, the anchor MSC shall reject the request for mid-call codec negotiation towards the far end party.

An example call sequence for the mid-call codec negotiation of speech codecs is shown in figures 6.2/9 and 6.2/10. The configuration depicted in figure 6.2/4 applies.

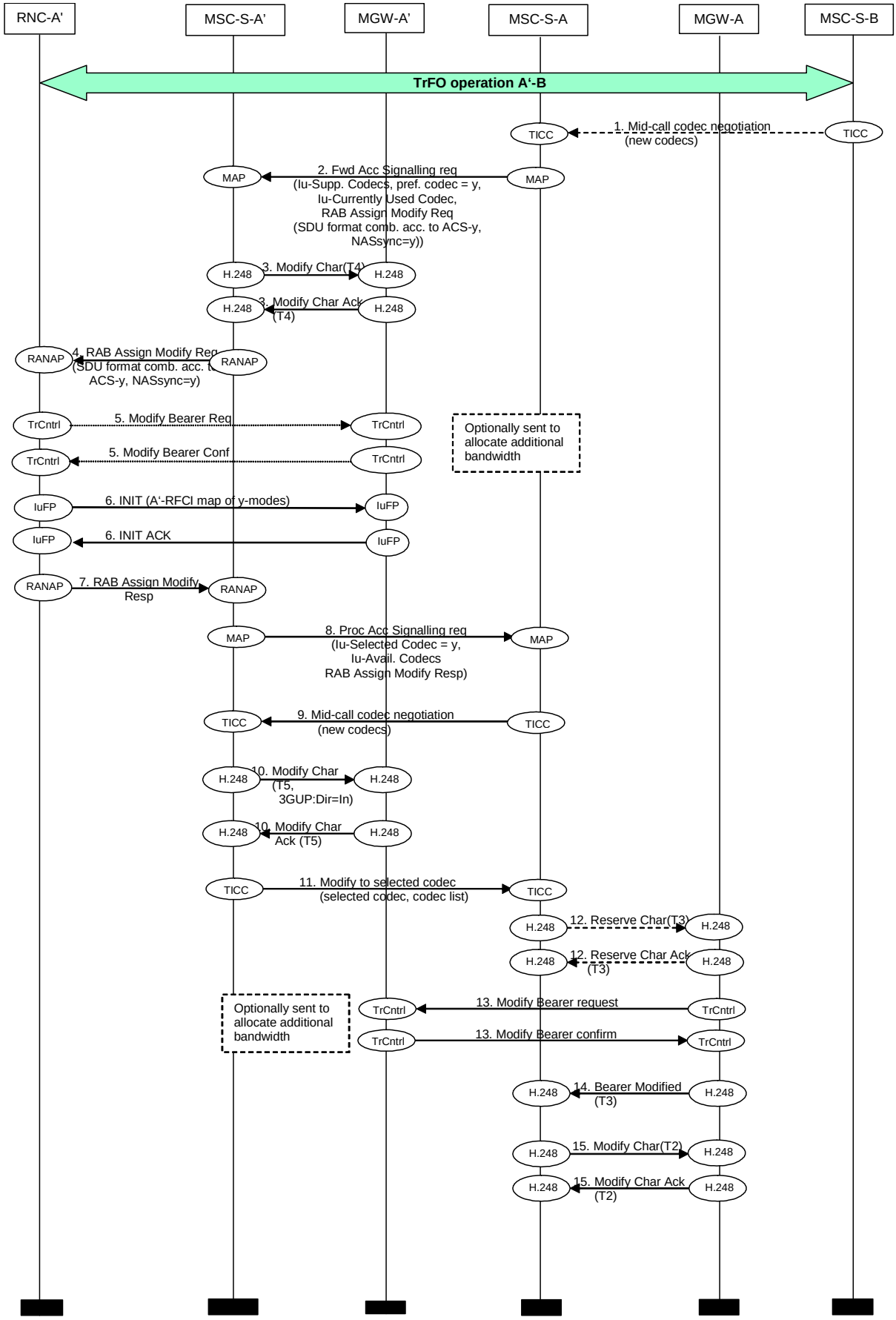
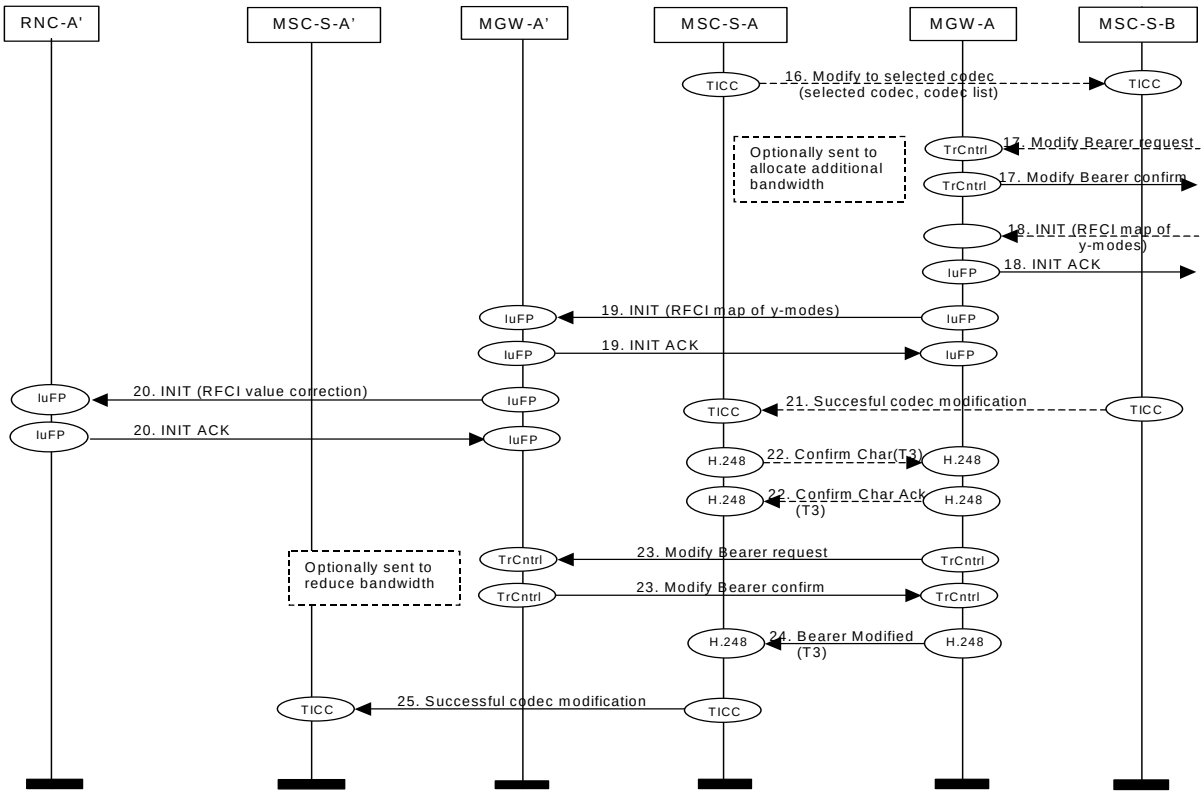


Figure 6.2/9: Mid-call codec negotiation after Inter-MSC SRNS Relocation. Flow Chart Part 1.



Note: There can be interim network transit nodes between MSC-A and MSC-A'

Figure 6.2/10: Mid-call codec negotation after Inter-MSC SRNS Relocation. Flow Chart Part 2.

If the anchor MSC (MSC-S-A) wants to forward the (re-)negotiation of the selected codec and the Available Codecs List (BICC) towards the UE and the serving MSC (MSC-S-A'), it shall apply the following procedure:

The anchor MSC shall send a MAP Forward Access Signalling request (2) containing the new Iu-Supported Codecs List and the corresponding RAB Assign Modify Request to the current serving MSC (MSC-S-A'). When selecting the order of priority for the codecs within the new Iu-Supported Codecs List, the anchor MSC shall take the new Available Codecs List (BICC) negotiated with the far end party into account.

On reception of the MAP Forward Access Signalling request (2) the serving MSC (MSC-S-A') shall select a codec from the Iu-Supported Codecs List, configure the attached MGW-A' for the new codec, and trigger the "RAB Assign Modify" procedure (4-7) towards the RNC-A'. For details concerning the handling of the RAB Assign Modify Request message by MSC-S-A' see 3GPP TS 23.009 [11], subclause 13.4.1. When the serving MSC receives the RAB Assign Modify Response message (7), it shall send a MAP Process Access Signalling Request (10) containing the RAB Assign Modify Response, the Iu-Selected codec, and the Iu-Available Codecs List to the anchor MSC (MSC-S-A).

When the anchor MSC (MSC-S-A) receives the MAP Process Access Signalling Request (8), it shall start the mid-call codec negotiation procedure (9-25) for the Nb/Nc interface towards the serving MSC (MSC-S-A'), as described in Section 5.8.

When receiving the "Mid-call codec negotiation" procedure (9), the serving MSC (MSC-S-A') shall not reconfigure the RAN and shall configure the attached MGW-A' to wait for an Nb framing protocol initiation from MGW-A.

Unsuccessful Codec Modification in the Serving MSC

After receipt of MAP Forward Access Signalling request (3), if the modification to the new Iu-Selected codec is not possible, e.g. because necessary resources are temporarily unavailable in the serving cell or in MGW-A', or the RAN does not support the "RAB Assign Modify" procedure, the serving MSC (MSC-S-A') shall keep the old codec and the corresponding RAB configuration and shall send a MAP Process Access Signalling request, containing a RAB Assign

Modify Response ("failed to modify") message, to the anchor MSC (MSC-S-A). If the anchor MSC detects that the RAB modification failed, it shall abort the mid-call codec negotiation procedure towards the serving MSC and complete the mid-call codec negotiation procedure towards the far end side.

Unsuccessful BICC Mid-call Codec Negotiation between Anchor MSC and Serving MSC

If after a successful modification of the Iu-Selected Codec (MAP) the subsequent BICC codec mid-call codec negotiation procedure between anchor MSC and serving MSC fails due to a MGW rejecting a request to reserve the resources or a server rejecting the request to (re-)negotiate the codecs, the anchor MSC shall change the codec used at the Iu interface back by sending a MAP Forward Access Signalling request containing the previous Iu-Selected Codec to the serving MSC (MSC-S-A'). After receipt of the confirmation that the previous codec has been restored at the Iu interface, the anchor MSC shall complete the mid-call codec negotiation procedure towards the far end side.

6.2.3.3 Modification Procedure after Codec Change in the Serving MSC

According to 3GPP TS 23.009 [11], subclause 4.4.1, the serving MSC (MSC-S-A') will inform the anchor MSC (MSC-S-A) when the Iu-Selected codec was changed during a subsequent intra-MSC handover/relocation by sending a MAP Process Access Signalling request. If the Iu-Available Codecs List was changed during the handover/relocation, the serving MSC shall send a MAP Process Access Signalling request including the new Iu-Available Codecs List.

On reception of the MAP Process Access Signalling request the anchor MSC may initiate one of the modification procedures as described in sections 5.8.1, 5.8.2, and 5.8.3 towards the serving MSC and/or towards the far end side. I.e. towards the serving MSC no MAP signalling is used. Besides, towards the serving MSC (MSC-A') the procedures described in sections 5.8.1, 5.8.2, and 5.8.3 are applicable with the modification that the serving MSC shall not modify the radio access bearer.

********** NEXT MODIFIED SECTION **********

6.11.2 Codec Modification/Mid-Call Codec Negotiation after Inter-MSC Handover

6.11.2.1 Codec Modification/Mid-Call Codec Negotiation Initiated by the Far End Side

If the serving radio access after inter-MSC handover is GERAN A/Gb mode, and the anchor MSC (MSC-S-A) receives a "Modification of Selected Codec" procedure or a "Mid-Call Codec Negotiation" procedure from the far end side the MAP signalling between the anchor MSC (MSC-S-A) and the serving MSC (MSC-S-A') shall be performed only, if the old or the new Selected Codec (BICC) is the multimedia dummy codec.

If both the old and the new Selected Codec (BICC) are speech codecs, the anchor MSC may terminate the codec modification or mid-call negotiation procedure, inserting a transcoder if required. Alternatively, the anchor MSC may forward the request to the serving MSC (MSC-S-A'), using the procedures as described in section 5.8.

NOTE: The anchor MSC may decide to forward the request to the serving MSC (MSC-S-A'), e.g. when it is possible to (re-)establish Tandem free and Transcoder free operation end-to-end from the far end side up to the serving TRAU.

If either the old or the new Selected Codec (BICC) is the multimedia dummy codec, i.e. the far end side requests a service change between speech and multimedia, and the Available Codecs List (BICC) previously negotiated between the anchor MSC and the serving MSC (MSC-S-A') indicates that the service change is supported end-to-end, the anchor MSC shall forward the request to modify the radio access bearer to the serving MSC (MSC-S-A') and then perform a codec modification or mid-call negotiation for the Nb/Nc interface towards the serving MSC (MSC-S-A'), using the procedures as described in section 5.8. If the service change between speech and multimedia cannot be performed successfully, the anchor MSC shall reject the request for codec modification or mid-call negotiation towards the far end party.

6.11.2.2 TFO Codec Mismatch Resolution in the Serving MSC

If the serving radio access after inter-MSC handover is GERAN A/Gb mode, and TrFO has been established between the anchor MSC and the serving MSC, the serving MSC may detect a TFO codec mismatch between the Selected Codec (BICC) used on the TrFO link and the GSM speech codec chosen by the serving BSC.

If the serving MSC supports the codec mismatch resolution procedure (see 3GPP TS 28.062 [10], subclause 6.3) and wants to change the Selected Codec (BICC) due to this procedure, the serving MSC shall initiate a codec modification or mid-call codec negotiation procedure towards the anchor MSC as described in sections 5.8.1, 5.8.2 and 5.8.3.

In the event of a collision of codec modification/mid-call codec negotiation procedures initiated by the anchor MSC and the serving MSC, the procedures described in Q.1902.4, subclause 10.4.7.5 [6] shall apply, with the following modification of the first sentence in subclause 10.4.7.5 [6], list item 2:

Codec modification/mid-call codec negotiation requests initiated in the direction towards the serving MSC shall take precedence over codec modification/mid-call codec negotiation requests initiated in the direction towards the anchor MSC.

6.11.2.3 Modification Procedure after Codec Change in the Serving MSC

The procedures as specified in section 6.2.3.3 apply.