3GPP TSG CN Plenary Meeting #27 **NP-050053**
9th – 11th March 2005 Tokyo, JAPAN.

Source: TSG CN WG4

Title: Corrections on OoBTC/TrFO

Agenda item: 9.21

Document for: APPROVAL

Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Ver_C
N4-050414	29.232	138	1	Rel-6	New 'TFO status' event	F	6.0.0
N4-050470	23.153	085	2	Rel-6	New 'TFO status' event	F	6.0.0

3GPP TSG-CN WG4 Meeting #26 **N4-050414**
Sydney, AUSTRALIA. 14th to 18th February 2005. *Revision of N4-050099*

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.232** **CR** **138** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	New 'TFO status' event
Source:	⌘	CN4
Work item code:	⌘	TEI6
Date:	⌘	24/01/2005
Category:	⌘	**F**
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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	3GPP TS 28.062, section D.5.1, requires that the MGW informs the MSC Server of whether TFO is established or not. "The TC shall inform the MSC Server of its status with two messages: *TFO_Off* TFO is not established. *TFO_On* TFO is established and ongoing." However no procedure has been defined yet in TS 29.232 to enable such reporting.
Summary of change:	⌘	A new event 'TFO_status' is added in the TFO package. This event may be used for statistical accounting or to warn the MSC-S that it should avoid modifying the codec configuration not to break an established TFO link. The support of the event remains optional for both MGC and MG, as no scenario has been identified so far that would not work without that event.
Consequences if not approved:	⌘	3GPP TS 28.062 and TS 29.232 remain inconsistent.

Clauses affected:	⌘	14.2, New sub-clauses 14.2.xx, modified sub-clause 15.1.3				
Other specs	⌘	**Y** ☒	**N** ☐	Other core specifications	⌘	TS 23.153-085

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.

14.2 Call related H.248 transactions

Table 3 shows the relationship between each call-related procedure in ITU-T Recommendation Q.1950 [23] (see 3GPP TS 29.205 [7]) and the corresponding stage 2 procedure defined in 3GPP TS 23.205 [2].

Table 3: Correspondence between ITU-T Recommendation Q.1950 [23] call-related transactions and 3GPP TS 23.205 [2] and 3GPP TS 23.153 [1] procedures

Transaction used in ITU-T Recommendation Q.1950 [23]	Procedure defined in 3GPP TS 23.205 [2] and 3GPP TS 23.153 [1]	Comments
Change_Topology	Change Flow Direction	
Join	Join Bearer Termination	
Isolate	Isolate Bearer Termination	
Establish_BNC_Notify+(tunnel)	Establish Bearer	
Prepare_BNC_Notify+(tunnel)	Prepare Bearer	
Cut_Through	Change Through-Connection	
Not defined in Q.1950	Activate Interworking Function	
Cut_BNC (include several procedures).	Release Bearer (Release Bearer and Release termination)	
BNC Established	Bearer Established	
BNC Release	Bearer Released	
Insert_Tone	Send Tone	
Insert_Annoucement	Play Announcement	
Signal Completion	Announcement Completed	
Detect_Digit	Detect DTMF	
Insert_Digit	Send DTMF	
Detected digit(BIWF)	Report DTMF	
Confirm_Char	Confirm Char	
Modify_ Char	Modify Char	
Reserve_Char_Notify	Reserve Char	
BNC Modified	Bearer Modified	
Echo Canceller	Activate Voice Processing Function	
BNC Connected	**[Editors note: No definition yet]**	
BNC Modification failure	Bearer Modified Failed	
Tunnel (MGC-MGW)	Tunnel Information Down	
Tunnel (MGW-MGC)	Tunnel Information Up	
Insert Tone	Stop Tone	
Insert Announcement	Stop Announcement	
Detect Digits	Stop DTMF Detection	
Insert Digit	Stop DTMF	
Signal.Completion	Tone Completed	
Not defined	Reserve Circuit	
Not defined	Command Rejected	
Not defined	TFO Activation	
Not defined	Codec_Modify	
Not defined	Optimal Codec and Distant List_Notify	
Not defined	Distant Codec List	
Not defined	TFO status Notify	
Not defined	TFO status	
Modify Char	Modify Bearer Characteristics	
Not defined	IWF Protocol Indication	
Not defined	Bearer Modification Support	
Not defined	CTM repor	
Not defined	Prepare IP transport	
Not defined	Modify IP transport address	
NOTE: A procedure defined in table 3 can be combined with another procedure in the same action. This means that they can share the same contextID and termination ID(s).		

14.2.xx TFO status Notify

When the procedure "TFO status notify" is required the following procedure is initiated:

The MGC sends a ADD.req, MOD.req or MOV req. command with the following information.

1 ADD.req/MOD.req/MOV.req (TFO status) MGC to MGW

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 Termination ID = bearer1 NotificationRequested (Event ID = x, "TFO Status")	

The support of the TFO status notification is optional in the TFO package. If supported, when the processing of command (1) is complete, the MGW initiates the following procedure.

2 ADD.resp/MOD.resp/MOV.resp (TFO status) MGW to MGC

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 TerminationID= bearer1	

Otherwise it returns an error codec to the MGC indicating that the requested event is unsupported or unknown., as specified in ITU-T Recommendation H.248.8 [14].

14.2.xx TFO Status

When the procedure "TFO Status" is required the following procedure is initiated:

The MGW sends a NOT.req command with the following information.

1 NOT.req (TFO Status) MGW to MGC

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 Termination ID = bearer1 Event_ID (Event ID = x, "TFO Status")	

When the processing of command (1) is complete, the MGW initiates the following procedure.

2 NOT.resp (TFO Status) MGC to MGW

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 Termination ID = bearer1	

15.1.3 TFO package

The addition of text encoding for the TFO codec list is for further study.

PackageID: threegtfoc (0x0031)

Version: ~~1~~2

Extends: None

This package defines events and properties for Tandem Free Operation (TFO) control. TFO uses inband signalling and procedures for Transcoders to enable compressed speech to be maintained between a tandem pair of transcoders. This package allows an MGW which has inserted a transcoder to support TFO.

15.1.3.1 Properties

TFO Activity Control:

PropertyID: tfoenable (0x0001).

Description: Defines if TFO is enabled or not.

Type: Enumeration.

Possible Values:

- "On" (0x0001): TFO is enabled, TFO protocol is supported.
- "Off" (0x0002): TFO is not enabled, TFO protocol is not initiated or terminated.

Defined in: Local Control descriptor.

Characteristics: Read/Write.

TFO Codec List:

PropertyID: codeclist (0x0002).

Description: List of codecs for use in TFO protocol, the Local Used Codec (see 3GPP TS 28.062 [5]) is always the first entry in the list.

Type: Octet string.

Possible Values:

- List of codec types; each entry:
  - As defined in ITU-T Recommendation Q.765.5 [24], for single codec information (figure 14/Q.765.5), where the Codec Information is defined either in ITU-T Recommendation Q.765.5 [24] or in another specification for the given Organization Identifier. For 3GPP codecs these are defined in 3GPP TS 26.103 [16].

Defined in: Local Control descriptor.

Characteristics: Read/Write.

15.1.3.2 Events

Optimal Codec Event:

EventID: codec_modify (0x0010).

Description: The event is used to notify the MGC that TFO negotiation has resulted in an optimal codec type being proposed.

EventsDescriptor Parameters: None.

ObservedEventsDescriptor Parameters:

- Optimal Codec Type.
  - ParameterID: optimalcodec (0x0011).
  - Description: indicates which is the proposed codec type for TFO.
  - Type: Octet string.

- Possible Values:

o Codec Type: As defined in ITU-T Recommendation Q.765.5 [24], for single codec information (figure 14/Q.765.5), where the Codec Information is defined either in ITU-T Recommendation Q.765.5 [24] or in another specification for the given Organization Identifier. For 3GPP codecs these are defined in 3GPP TS 26.103 [16].

Codec List Event:

EventID: distant codec_list (0x0012).

Description: The event is used to notify the MGC of the distant TFO partner's supported codec list.

EventsDescriptor Parameters: None.

ObservedEventsDescriptor Parameters:

- Distant Codec List:

- ParameterID: distlist(0x0013).
- Description: indicates the codec list for TFO.
- Type: Octet string.
- Possible Values:

o List of codecs of type Codec Type: As defined in ITU-T Recommendation Q.765.5 [24], for single codec information (figure 14/Q.765.5), where the Codec Information is defined either in ITU-T Recommendation Q.765.5 [24] or in another specification for the given Organization Identifier. For 3GPP codecs these are defined in 3GPP TS 26.103 [16].

- The first Codec Type in the list is the Distant Used Codec, received from the distant TFO partner (see 3GPP TS 28.062 [5]).

TFO Status Event:

EventID: TFO_status (0x0014).

Description: The event is used to notify the MGC that a TFO link has been established or broken.

EventsDescriptor Parameters: None.

ObservedEventsDescriptor Parameters:

- TFO Status:

- ParameterId: tfostatus (0x0015).
- Description: reports whether TFO has been established or broken. Upon TFO activation, no notification is sent if TFO has not been established. A TFO_Off notification is only reported when a TFO link previously established is broken. The MGW should not report transient TFO status change.
- Type: Boolean
- Possible Values:

o "TFO_On" : TFO has been established.

o "TFO_Off" : TFO is no more established.

15.1.3.3 Signals

None.

15.1.3.4 Statistics

None.

15.1.3.5 Procedures

For the procedures for TFO see 3GPP TS 28.062 [5].

The use of the properties in this package is applicable only when the MGW Termination to which the package properties are applied has the media stream property for Codec Type set to ITU-T Recommendation G.711 [25] (see annex C of ITU-T Recommendation H.248 [10]). Furthermore, the package properties are applicable only if the Codec Type property of the media stream at the opposing MGW Termination is not set to ITU-T Recommendation G.711 [25].

3GPP TSG-CN WG4 Meeting #26 **N4-050470**
Sydney, AUSTRALIA. 14th to 18th February 2005. *Revision of N4-050415*

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.153** **CR** **085** ⌘ **rev** **2** ⌘ Current version: **6.0.0** ⌘

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

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

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Source:	⌘	CN4
Work item code:	⌘	TEI6
Date:	⌘	24/01/2005
Category:	⌘	**F**
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Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	3GPP TS 28.062, section D.5.1, requires that the MGW informs the MSC Server of whether TFO is established or not. "The TC shall inform the MSC Server of its status with two messages: *TFO_Off* TFO is not established. *TFO_On* TFO is established and ongoing." However no procedure has been defined yet in TS 23.153 to enable such reporting.
Summary of change:	⌘	A new event 'TFO_status' is added in the TFO package. This event may be used for statistical accounting or to warn the MSC-S that it should avoid modifying the codec configuration not to break an established TFO link. The support of the event remains optional for both MGC and MG, as no scenario has been identified so far that would not work without that event.
Consequences if not approved:	⌘	3GPP TS 28.062 and TS 23.153 remain inconsistent.

Clauses affected:	⌘	5.5				
Other specs	⌘	Y: X / N: ☐	Other core specifications	⌘	TS 29.232-138	

affected:	X	Test specifications
	X	O&M Specifications
Other comments: ⌘		

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5.5 TrFO/TFO Codec Negotiation Harmonisation

When OoBTC procedures are initiated to a node where compressed voice cannot be supported (either at the node or to the preceding node) then a transcoder is inserted. This can be due to the transport technology (e.g. TDM) or due to the access technology (e.g. GSM). The OoBTC procedures can result in the following call scenarios:

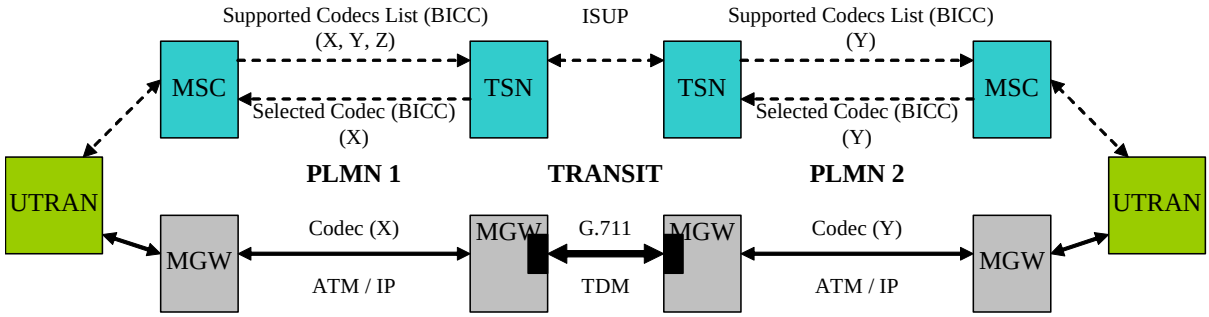

Figure 5.5/1: Cascaded TrFO & Transcoding

In Figure 5.5/ 1 the OoBTC cannot proceed as the call crosses a transit network that does not support compressed voice. The same could occur if the transit network did not support out of band codec negotiation (Support in BICC is optional).

In Figure 5.5/2 the OoBTC procedures result in the call terminating to a GSM access. As the GSM radio access transcodes to default PCM codec, the OoBTC results in default PCM being the only codec that can be selected. The reply is passed back to the originating network, which then inserts a transcoder from default PCM to AMR for the UMTS radio access.

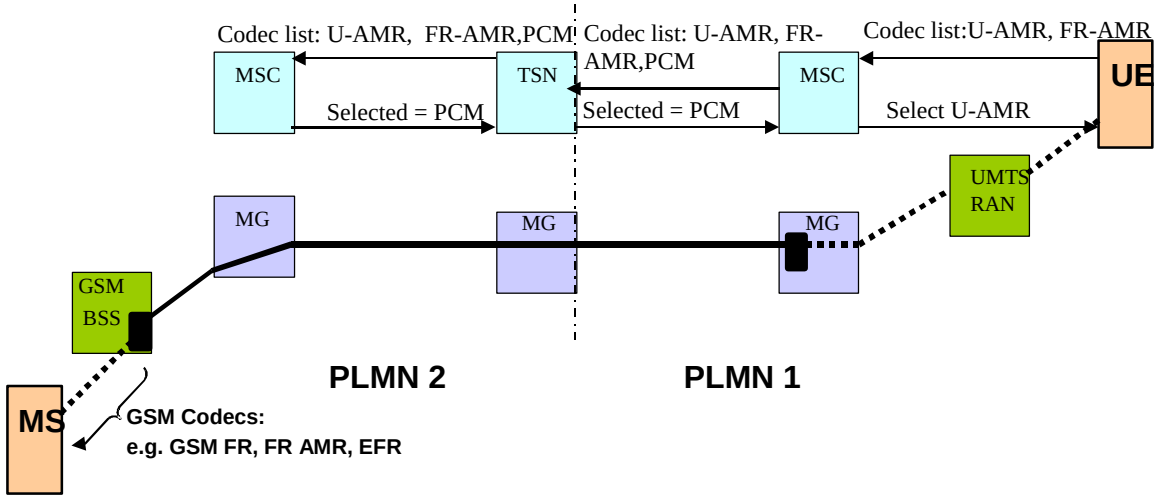

Figure 5.5/2: UMTS to GSM interworking

For TFO to establish between the transcoders in the above scenarios, each TRAU must send a codec list inband after the call has been established. If a common codec type is available (determined by pre-defined rules, described in TFO specification [10]) then the OoBTC procedures need to be informed so that a codec modification can be performed. This is shown in Figure 5.5/3. Note – a modification could also be required when a common codec type has been selected but the ACS is not common.

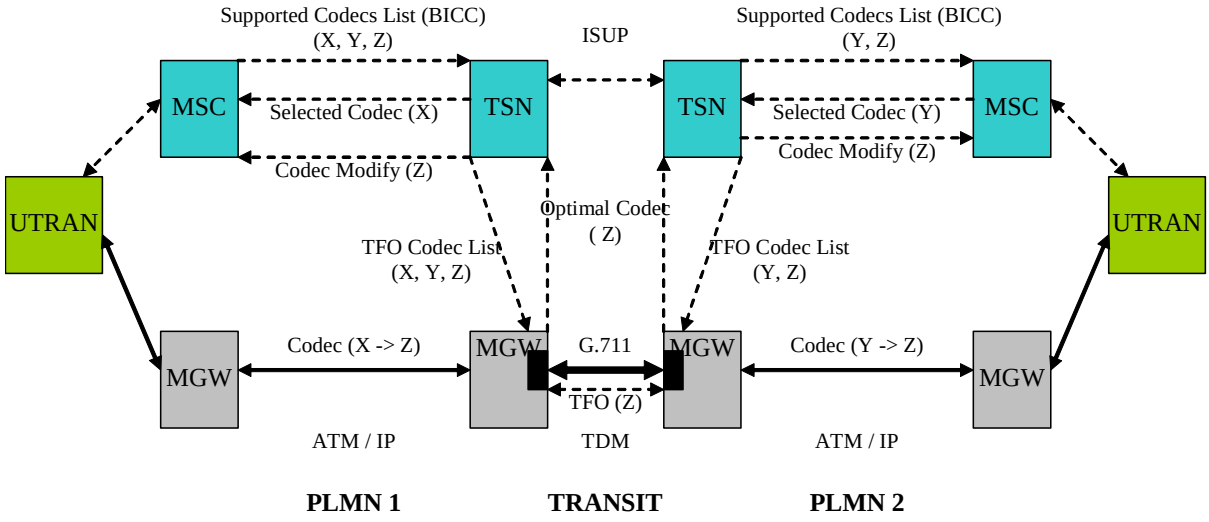

Figure 5.5/3: TFO support by OoBTC signalling

In H.248, the vertical MG control protocol, the coding types are specified by Media Stream Property, as defined by Annex C of H.248 specification. A specific package is used for TFO (see [12]).

The basic requirements are listed below:

i) Property for TFO Codec List (same format as for [5])

ii) Event for Optimal Codec, as determined by TFO in-band protocol

iii) Event for Distant Codec List sent by the distant TFO partner

iv) Event for TFO status

~~i~~v) Procedures to define and enable TFO

The TFO package allows the Server to request the MGW to initiate the TFO in-band protocol towards a far end transcoder. The package includes a property to turn on/off the TFO (tfoenable); this may be required prior to TrFO break situations such as handover.

The TFO Codec List (H.248) is passed via the Mc interface from the Server to the MGW. The first entry of the TFO Codec List (H.248) shall be used by the MGW as the 'Local Used Codec'. The other entries of the TFO Codec List (H.248) shall be used by the MGW as Local Codec List in the TFO in-band negotiation (see [10]). For adaptive multi-rate codecs (AMR and AMR-WB codecs) some control of the level of negotiation is performed by the "Optimization Mode" parameter in the respective Single Codec information element in the TFO Codec List (H.248) (see [5] and [12]). This allows a node to indicate if the offered ACS may be modified or not during TFO procedures, and this is mapped to the appropriate parameter in the TFO protocol by the MGW. If for a Single Codec information element in the TFO Package from the Server to the MGW the OM is set to "Optimization of the ACS not supported", then the TFO Negotiation shall not change the offered ACS of the respective Single Codec information element.

The MGW returns Notification Events for the Distant Codec List sent by the far end and the Optimal Codec Type as selected by the Codec Selection mechanism in TFO. The first entry of the Distant Codec List (H.248) is the 'Distant Used Codec' as received by the MGW during TFO in-band negotiations. The other entries of the Distant Codec List (H.248) are the entries of the Distant Codec List as received by the MGW from the distant TFO Partner (see [10]). The Server then compares the Distant Codec List (H.248) with its previously negotiated Available Codec List (BICC). If the lists are not the same then an OoBTCCodec List Modification or Mid-call Codec Negotiation may be performed. If for a Single Codec information element in the TFO Package from the MGW to the Server the OM is set to "Optimization of the ACS not supported", then the offered ACS of the respective Single Codec information element shall not be changed during OoBTC procedures.

If the TFO Status event is supported by the MGW and has been configured by the MSC Server, the MGW shall return notification indicating whether a TFO link has been established or broken. The MGW should not report transient TFO status change.