

Technical Specification Group Services and System Aspects **TSGS#19(03)0086**
Meeting #19, Birmingham, UK, 17 - 20 March 2003

Source: TSG-SA WG4

Title: CR to TS 26.093 - Handling of FACCH and RATSCCH during AMR DTX (Release 6)

Document for: Approval

Agenda Item: 7.4.3

The following CR, agreed at the TSG-SA WG4 meeting #25bis, is presented to TSG SA #19 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.093	011		Rel-6	Handling of FACCH and RATSCCH during AMR DTX	F	5.2.0	S4	TSG-SA WG4#25bis	S4-030142

CHANGE REQUEST

⌘ **26.093 CR 011** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Handling of FACCH and RATSCCH during AMR DTX ⌘		
Source:	⌘ TSG SA WG4 ⌘		
Work item code:	⌘ TEI-6 ⌘	Date:	⌘ 19/03/2003 ⌘
Category:	⌘ F ⌘	Release:	⌘ Rel-6 ⌘
	Use <u>one</u> 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 <u>one</u> 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:	⌘ Handling of FACCH and RATSCCH during AMR DTX is unclear: Text 'FACCH should be handled in the same way as a RATSCCH, i.e. like a short speech burst' in clause A.5.1.2.4 is incorrect. i) FACCH unlike RATSCCH is not necessarily framed by ONSET and SID_FIRST; ii) SID_FIRST/SID_UPDATE rescheduling not applicable in a speech burst. Procedure for when a SID_UPDATE is stolen could affect the occurrence of a SPEECH_GOOD or another SID_UPDATE frame. Text 'SPEECH frames shall override possible SID_FIRST or SID_UPDATE frames in exceptional cases' is redundant. SPEECH_GOOD is given precedence over SID_FIRST or SID_UPDATE in the corrections given for the items above. Statement 'SID_UPDATE frame shall be re-scheduled for transmission immediately after the RATSCCH signalling' in clause A.5.1.2.4 is unclear. 'Immediately' could mean after SID_FIRST_P1 has been sent, or after both SID_FIRST_P1 and SID_FIRST_P2 have been sent.
Summary of change:	⌘ Specify that FACCH frames shall be framed by ONSET and SID_FIRST in order to fill that part of the burst which would otherwise be undefined. Specify that RATSCCH should be handled in the same way as a FACCH. Remove from A.5.1.2.4 'i.e. like a short speech burst'. Specify that SID_UPDATE should be rescheduled, unless rescheduling would steal a frame of TX_TYPE="SPEECH_GOOD", or if a frame of TX_TYPE="SID_UPDATE" has been received before the rescheduling could take place.

Removal of the text 'SPEECH frames shall override possible SID_FIRST or SID_UPDATE frames in exceptional cases'.

Specify that SID_UPDATE, when stolen, shall be re-scheduled after both SID_FIRST_P1 and SID_FIRST_P2 has been sent.

Consequences if not approved: ⌘ Unclear handling of FACCH and RATSCCH during AMR DTX

Clauses affected: ⌘ A.5.1.2.1, A.5.1.2.2 and A.5.1.2.4

Other specs affected:	⌘	Y	N	Other core specifications	⌘	
			N			Test specifications
			N			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.

A.5.1.2 Functions of the TX Radio Subsystem

The TX Radio Subsystem has the following overall functionality. The radio transmission is cut after the transmission of a SID_FIRST frame when the speaker stops talking. During speech pauses the transmission is resumed at regular intervals for transmission of one SID_UPDATE frame, in order to update the generated comfort noise on the RX side (and to improve the measurement of the link quality by the RSS). Note that the transcoder knows what frames to send. In the case when nothing is to be transmitted it outputs frames marked with TX_TYPE = "NO_DATA".

Within the TX Radio Subsystem the TX_TYPE Monitoring unit controls the operation of the Channel Encoder (as specified in 3GPP TS 25.003) and the Transmission of the frame. Control input to the TX_TYPE Monitoring unit is the TX_TYPE. Control output and input to the Channel Encoder are indicators specifying the frame format. These frame format indicators are defined in 3GPP TS 25.003, they are different for TCH/AFS and TCH/AHS.

A.5.1.2.1 Functions of the TX Radio Subsystem for TCH/AFS

The TX Radio Subsystem operates in the following way regarding DTX (without TFO):

all frames marked with TX_TYPE = " SPEECH_GOOD " are scheduled for normal channel coding and transmission. The frame format for CHE operation shall be SPEECH. If, however, the previous frame was not of TX_TYPE = "SPEECH_GOOD", an ONSET frame format followed by SPEECH_GOOD shall be signalled to the CHE;

for frames marked with TX_TYPE = "SID_FIRST" a SID_FIRST frame format is signalled to the CHE;

frames marked with TX_TYPE = "SID_UPDATE" are scheduled for SID_UPDATE frame channel coding and transmission. The frame format signalled to CHE is SID_UPDATE;

for frames marked with TX_TYPE = "NO_DATA" no processing or transmission is carried out.

If a FACCH needs to be sent during a speech pause, and:

if the frame preceding the FACCH is not of TX_TYPE="SPEECH_GOOD", then an ONSET frame shall be signalled to the CHE, followed by the FACCH frame(s);

if the frame following the FACCH frame is not of TX_TYPE="SPEECH_GOOD", then a SID_FIRST shall be signalled to the CHE.

~~If a SID_FIRST frame or a SID_UPDATE frame is stolen for Fast Associated Control Channel (FACCH) signalling purposes, then the subsequent frame shall be scheduled for transmission of the SID_FIRST or SID_UPDATE frame (whichever applies) instead.~~ A stolen SID_UPDATE should be rescheduled on the frame subsequent to the SID_FIRST marker that follows the FACCH frame(s) (when that marker exists), unless that rescheduling would steal a frame of TX_TYPE="SPEECH_GOOD", or if a frame of TX_TYPE="SID_UPDATE" has been received before the rescheduling could take place. This rescheduling shall not affect the timing of subsequent SID_UPDATE frames.

Note: ~~a SID_FIRST or a SID_UPDATE frame is considered as stolen when this frame must be replaced by a FACCH frame, or by a RATSCCH frame, or when this frame is replaced by another re-scheduled SID_FIRST frame.~~

~~SPEECH frames shall override possible SID_FIRST or SID_UPDATE frames in exceptional cases.~~

At handover, TX/RX DTX handler synchronisation shall be initiated. At the time instant before the MS starts sending to the new base station, a message shall be sent to the uplink TX DTX handler with the parameter NSYNC = 12.

A.5.1.2.2 Functions of the TX Radio Subsystem for TCH/AHS

The TX Radio Subsystem operates in the following way regarding DTX:

all frames marked with TX_TYPE = " SPEECH_GOOD " are scheduled for normal channel coding and transmission. The frame format for CHE operation shall be SPEECH. However, if the previous frame was of TX_TYPE = "SID_FIRST", a SID_FIRST_INH frame format followed by SPEECH_GOOD shall be signalled to the CHE. If the previous frame was of TX_TYPE = "SID_UPDATE", a SID_UPDATE_INH frame format followed by SPEECH_GOOD shall be signalled to the CHE. If the previous frame was of TX_TYPE "NO_DATA", an ONSET frame format followed by SPEECH_GOOD shall be signalled to the CHE;

for frames marked with TX_TYPE = "SID_FIRST" a SID_FIRST_P1 frame format is signalled to the CHE. Note: All 4 TDMA frames carrying the bits of this frame shall be transmitted. The Mode Indication received with the frame is stored for potential use in the next frame;

for frames marked with TX_TYPE = "SID_UPDATE" a SID_UPDATE frame format is signalled to the CHE. All 4 TDMA frames carrying the bits of this frame shall be transmitted;

for frames marked with TX_TYPE = "NO_DATA", no processing or transmission is carried out. However, if the preceding frame was marked with TX_TYPE = "SID_FIRST", a SID_FIRST_P2 frame format is signalled to CHE. Note: The 2 TDMA frames carrying bits of this frame shall be transmitted. If, depending on the current frame number, the Mode Indication is to be transmitted with these TDMA frames, the Mode Indication shall be used that was stored during the processing of the preceding SID_FIRST frame.

If a FACCH needs to be sent during a speech pause, and:

if the frame preceding the FACCH is of TX_TYPE="SID_FIRST", then a SID_FIRST_INH frame format followed by the FACCH shall be signalled to the CHE;

if the frame preceding the FACCH is of TX_TYPE="SID_UPDATE", then a SID_UPDATE_INH frame format followed by the FACCH shall be signalled to the CHE;

if the frame preceding the FACCH is of TX_TYPE="NO_DATA", then an ONSET frame format followed by the FACCH shall be signalled to the CHE;

if the frame following the FACCH is not of TX_TYPE="SPEECH_GOOD", then a SID_FIRST shall be signalled to the CHE. Both SID_FIRST_P1 and SID_FIRST_P2 frame formats shall be consecutively signalled to CHE.

~~If a SID_FIRST frame or a SID_UPDATE frame is affected by Fast Associated Control Channel (FACCH) signalling purposes, then the SID_FIRST or SID_UPDATE frame (whichever applies) shall be re-scheduled for transmission immediately after the FACCH signalling.~~ A stolen SID_UPDATE should be rescheduled on the frame subsequent to the SID_FIRST_P1 and SID_FIRST_P2 markers that follow the FACCH frame(s) (when these markers exist), unless that rescheduling would steal a frame of TX_TYPE="SPEECH_GOOD", or if a frame of TX_TYPE="SID_UPDATE" has been received before the rescheduling could take place. This rescheduling shall not affect the timing of subsequent SID_UPDATE frames.

Note: a SID_UPDATE frame is considered as stolen when this frame must be replaced by a FACCH frame.

~~SPEECH frames shall override possible SID_FIRST or SID_UPDATE frames in exceptional cases.~~

At handover, TX/RX DTX handler synchronisation shall be initiated. At the time instant before the MS starts sending to the new base station, a message shall be sent to the uplink TX DTX handler with the parameter NSYNC = 12.

A.5.1.2.3 Functions of the Downlink TX Radio Subsystem for TFO

The TX Radio Subsystem in the BTS shall in addition operate in the following way regarding DTX, if TFO is ongoing (see 3GPP TS 28.062):

- Frames with TX_TYPE = SPEECH_GOOD, SID_FIRST and SID_UPDATE shall be handled as usual in DTX, regardless whether DTX in downlink is requested or not. Also NO_DATA shall be handled as usual, if DTX is requested.
- Frames with TX_TYPE = NO_DATA shall be replaced by SID_FILLER frames, if DTX in downlink is not requested. By this the radio transmission continues in downlink, although no parameters are transmitted in speech pauses on the Abis interface. The MS generates Comfort Noise in these speech pauses.
- Frames with TX_TYPE = SPEECH_DEGRADED shall be handled exactly like SPEECH_GOOD frames.
- For frame with TX_TYPE = SPEECH_BAD and SID_BAD the CHE shall perform its regular processing, but then shall invert the six, respectively 14 CRC bits before convolutional encoding and transmitting the frames on the air interface. By this the error concealment mechanism in the MS is triggered to handle these corrupted frames.
- ONSET frames may be ignored by the TX Radio Subsystem and need not to be processed.

Definition: SID_FILLER frames are like SID_BAD frames, but with all information bits set to “1”. The 14 CRC bits shall artificially be inverted by the CHE before convolutional encoding and transmission.

A.5.1.2.4 Functions of the TX Radio Subsystem for RATSCCH

During regular speech transmission (in the middle of a speech burst) RATSCCH replaces (steals) one (TCH/AFS) respectively two (TCH/AHS) speech frames (see 3GPP TS 25.009). Also in all non speech cases the RATSCCH shall be handled like speech. The respective RATSCCH frame formats (RATSCCH in case of TCH/AFS, respectively RATSCCH_MARKER and RATSCCH_DATA in case of TCH/AHS) shall be signalled to the CHE.

~~If RATSCCH has to be sent during a speech pause in DTX, then first an ONSET frame shall be signalled to the CHE, followed by the RATSCCH frame(s) and finally by the respective SID_FIRST frame(s).~~

~~If a SID_UPDATE frame is affected by RATSCCH signalling, then the SID_UPDATE frame shall be re-scheduled for transmission immediately after the RATSCCH signalling.~~

~~FACCH-RATSCCH should be handled in the same way as a RATSCCH-FACCH, i.e. like a short speech burst.~~