

Source: TSG CN WG 1
Title: CR to Rel-5 on Work Item SCUDIF towards 24.008
Agenda item: 8.7
Document for: APPROVAL

Introduction:

This document contains 1 CR on **Rel-5 on** Work Item "SCUDIF", that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.008	551	3	Rel-5	Service change and fallback for UDI/RDI multimedia multimediacalls	C	5.3.0	5.4.0	N1-23	N1-020748

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CHANGE REQUEST

⌘ **24.008** **CR 551** ⌘ rev **3** ⌘ Current version: **5.3.0** ⌘

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

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

Title:	⌘ Service change and fallback for UDI/RDI multimedia calls		
Source:	⌘ Ericsson		
Work item code:	⌘ SCUDIF	Date:	⌘ 2002-03-25
Category:	⌘ C	Release:	⌘ REL-5
	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)

Reason for change:	⌘ Allow service change and fallback for UDI/RDI 3G.324M multimedia calls.		
Summary of change:	⌘ The support for multimedia calls is updated : <ul style="list-style-type: none"> A service change and fallback procedure between UDI/RDI multimedia and speech is added; In order to avoid an unsuccess call setup for the mobiles without service change/fallback capability, a new Repeat Indicator value is needed; For the backwards compatibility with pre-Release 99 mobile, the STATUS message handling with the cause #100 "conditional IE error" is specified; The reference of new TS "UDI/RDI Fallback and Service Modification; Stage 2" is needed. Additionally, the sections 5.3.6.3.1, 5.3.6.3.2, 5.3.6.3.3, 5.3.6.3.3.1 and 5.3.6.3.3.2 were removed as they are redundant with the "changing the call mode" procedure in 5.3.4.3.		
Consequences if not approved:	⌘ Limited CS multimedia functionality		

Clauses affected:	⌘ 5.3.6.1, 5.3.6.2.1, 5.3.6.2.1.1, 5.3.6.2.2, 5.3.6.2.2.1, 5.3.6.3, 5.3.6.3.1, 5.3.6.3.2, 5.3.6.3.3, 5.3.6.3.3.1, 5.3.6.3.3.2, 5.5.3.2.2, 10.5.4.22		
Other specs affected:	⌘ <input checked="" type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ TS 29.007, TS 27.001, TS ab.cde	
Other comments:	⌘ The behaviour when a SETUP message is sent to an older CC entity has been clarified, in ch. 5.5.3.2.2.		

*** Start of 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*.

[...]

- [79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".
- [80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".
- [81] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".
- [82] 3GPP TS 43.022: " Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [83] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [84] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".
- [85] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".
- [86] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [87] 3GPP TS 43.055: "Dual Transfer Mode (DTM); Stage 2".
- [88] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2"
- [89] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ), Stage 1".
- [90] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".
- [91] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), (Phase 1) CTS Radio Interface Layer 3 Specification".
- [92] 3GPP TS 23.226: "Global Text Telephony; Stage 2 "
- [93] 3GPP TS 26.226: "Cellular Text Telephone Modem (CTM), General Description "
- [94] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"
- [95] 3GPP TS 24.229: "3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia Call Control Protocol based on SIP and SDP"
- [96] 3GPP TS 23.172: "UDI/RDI Fallback and Service Modification; Stage 2"

*** Next Modified Section ***

5.3.6 Support of multimedia calls

5.3.6.1 Service description

The GSM-UMTS circuit-switched multimedia call is based on the 3G-324M [26.111], which is a 3GPP-variant of the ITU-T H.324 recommendation. CS Multimedia telephony is a Bearer Service, which utilizes the Synchronous Transparent Data service (BS30) [3].

At the multimedia call setup the required call type, 3G-324M, is indicated, for the network to be able to invoke appropriate interworking functionality. In the peer end the H.324 information is used to invoke the terminal application. In addition to H.324 indication the terminal must select Information Transfer Capability (ITC) for the multimedia call. The 'correct' ITC depends on the peer end and the transporting networks; an all-ISDN call is a UDI/RDI call, and a call, which involves PSTN, is an analog '3.1 kHz audio' call.

For the case when the setup of a multimedia call is not successful, fallback to speech is specified.

Users may also request a service change between UDI/RDI multimedia and speech modes during a call (see 3GPP TS ab.cde [96]).

5.3.6.2 Call establishment

For both mobile originating and mobile terminating calls, the normal call establishment procedures apply, with the exceptions specified in the following sections.

For further description of the function of MSC/IWF in the following sections, see 3GPP TS 29.007 [38].

5.3.6.2.1 Mobile originated multimedia call establishment

At call setup the required call type, 3G-324M, is indicated by the originating MS in the SETUP message, with the *bearer capability IE* parameter Other Rate Adaptation set to 'H.223 and H.245'.

For analogue multimedia, the support of a fallback to speech is requested by including also *two bearer capability IEs, 2 with speech indication*, multimedia first and speech as the second BC in the SETUP message. The MS shall indicate fallback to speech by these two BC IEs and the associated Repeat Indicator set to "support of fallback".

For UDI/RDI multimedia, the support of a fallback and service change is requested by including *two bearer capability IEs*, with the first BC as the preferred service in the SETUP message. The MS shall indicate service change and fallback by these two BC IEs and the associated Repeat Indicator set to "support of service change and fallback".

The bearer compatibility checking in the network is according to 5.3.4.2.1.

~~The network shall examine each mode described in the *bearer capability IEs* included in the SETUP message by performing compatibility checking as defined in Annex B. If as a result of this compatibility checking the network decides to reject the call, then the network shall initiate call clearing as specified in section 5.4 with the following causes:~~

- ~~a) #57 "bearer capability not authorized"~~
- ~~b) #58 "bearer capability not presently available"~~
- ~~e) #65 "bearer service not implemented"~~
- ~~d) #70 "only restricted digital information bearer capability is available"~~

The originating user shall determine (possibly by pre-configuration of the terminal) whether a digital connection is required or if the call will be an analog modem call. If the call is expected to be digital the multimedia bearer capability IE parameter ITC is set to UDI/RDI. In an analog call the multimedia bearer capability IE parameter ITC is set to '3.1kHz audio ex PLMN'. Additionally required modem type is indicated (Other Modem Type = V.34).

5.3.6.2.1.1 ~~Fallback to speech~~

If the network, during ~~the~~ setup of an ~~analogue~~ H.324 call, detects that ~~the transit network or~~ the called end does not support an H.324 call (*e.g.* because of a failure in the modem handshaking in case of an analogue multimedia call), then ~~the~~ network initiates the in-call modification procedure (see section 5.3.4.3) towards the MS to modify the call mode to speech, if the MS had included a speech *bearer capability IE* in the SETUP message.

In case of a UDI/RDI multimedia call with service change and fallback, if the network detects that the called end does not support speech, then it initiates an in-call modification procedure towards the MS to modify the call mode to multimedia, if the first *bearer capability IE* was for a speech call.

NOTE — : ~~fallback from digital (UDI) H.324 call to speech is not supported.~~

5.3.6.2.2 Mobile terminating multimedia call

At call setup the required call type, 3G-324M, is indicated by the network in the SETUP message, with the *bearer capability IE* parameter Other Rate Adaptation set to 'H.223 and H.245'. ITC is either '3.1kHz audio ex PLMN' or 'UDI/RDI'.

For analogue multimedia, if the network supports fallback to speech, and if the subscriber has subscription to speech, at two *bearer capability IEs*, with multimedia first and speech as the second BC are indication is included in the SETUP message. The network shall indicate fallback to speech by these two BC IEs and the associated Repeat Indicator set to "support of fallback".

For UDI/RDI multimedia, if the network supports fallback and service change, and the subscriber has subscription to speech, two *bearer capability IEs*, with the first BC as the preferred service are included in the SETUP message. The network shall indicate service change and fallback by these two BC IEs and the associated Repeat Indicator set to "service change and fallback".

~~The *bearer capability IE(s)* may (in the case of the single numbering scheme) be missing from the SETUP message.~~

~~The *bearer compatibility checking* in the MS is according to 5.3.4.2.2. The MS shall perform the compatibility checking as defined in Annex B for the required mode(s) if indicated in the SETUP message. If as a result of compatibility checking the MS decides to reject the call, the MS shall initiate call clearing according to the procedure of section 5.4 with one of the following causes:~~

- a) #57 "bearer capability not authorized"
- b) #58 "bearer capability not presently available"
- e) #65 "bearer service not implemented"
- d) #88 "incompatible destination"

The MS shall indicate the supported call type(s) in the CALL_CONFIRMED message, which is the acknowledgement to SETUP. The MS has following options for the inclusion of *bearer capability IE* in the CALL_CONFIRMED message:

- if the MS/user accepts the offered multimedia call, and supports ~~speech~~ fallback (analogue) or service change (UDI/RDI), none or both multimedia and speech *bearer capability IEs* shall be included. In the case of UDI/RDI, the order of the BC IEs determines the preferred service
- if the MS/user accepts the offered multimedia call, but does not support ~~speech~~ fallback or service change, only a multimedia *bearer capability IE* shall be included
- if the MS/user wishes a speech (only) call a speech *bearer capability IE* is included
- if the MS/user accepts the offered speech call in case of a UDI/RDI multimedia call, and supports service change, none or both speech and multimedia *bearer capability IEs* shall be included. The order of the BC IEs determines the preferred service

If the SETUP contained no *bearer capability IE* the network shall perform compatibility checking of the CALL_CONFIRMED message in the same way as the compatibility checking of the SETUP message in the mobile originating call case, described in section 5.3.6.2.1.

5.3.6.2.2.1 Fallback to speech

If modem handshaking fails (in a modem call), the call mode will be modified to speech if a speech bearer capability IE was included. The modem signalling is inband, so the call must have reached the active state, when these conclusions about the presence of modems can be done. The call modifications are realized through the in-call modification procedure, by which the network requests the MS to modify the call mode (see section 5.3.4.3).

NOTE: Fallback from digital (UDI) H.324-call to speech after call setup is not supported a valid case at the terminating side.

5.3.6.3 In-call modification in the "active" state

The in-call modification procedure as described in chapter 5.3.4.3 shall be used to:

- trigger a service change between speech and UDI/RDI multimedia modes, when service change has been agreed at call setup, or
- In order to change modify the multimedia bearer capability for an analogue multimedia call (restricted to the network initiated in-call modification only), the following in-call modification procedure shall be used. In this case, the network shall send a MODIFY message including immediate modification indicator IE and the new Bearer Capability to be changed to. The following bearer capability parameters can be modified with the procedure (see 3GPP TS 29.007 [38]):
 - Fixed Network User Rate (analogue multimedia calls only)

Only network side of the radio interface may act as the requesting user to invoke the in-call modification.

5.3.6.3.1 VoidInitiation of in-call modification

The procedure is initiated by the network in the "active" state of the call. The network shall send a MODIFY message including *Immediate modification indicator IE* and the new bearer capability to be changed to; start timer T323; and enter the "mobile terminating modify" state. Any internal resources necessary to support the new bearer capability shall be reserved. The detailed operation of the MODIFY originating side is described in 3GPP TS 29.007.

Upon receipt of the MODIFY message with *Immediate modification indicator IE*, the MS shall check to ensure that the requested bearer capability can be supported and if so, it shall initiate the reservation of any resources necessary to support the new bearer capability and enter the "mobile terminating modify" state.

5.3.6.3.2 VoidSuccessful completion of in-call modification

If the MS can support the requested bearer capability the MS shall perform actions defined in 3GPP TS 27.001 [37]. After successful modifications defined in 3GPP TS 27.001 [37] the MS shall send a MODIFY COMPLETE message with the new bearer capability included and enter the "active" state.

Upon receipt of the MODIFY COMPLETE message the network shall: initiate the alternation to those resources necessary to support the new bearer capability; stop timer T323; and enter the "active" state.

5.3.6.3.3 VoidFailure of in-call modification

5.3.6.3.3.1 VoidMS rejection of in-call modification

If the MS cannot support the requested bearer capability, the MS shall: release any resources which had been reserved for the modification; send a MODIFY REJECT message with the old bearer capability and cause # 58 "bearer capability not presently available", and enter the "active" state.

Upon receipt of the MODIFY REJECT message the network shall: stop timer T323, release any resources which had been reserved for the modification, enter the "active" state and perform activities defined in 3GPP TS 29.007 [38].

5.3.6.3.3.2 VoidTime-out recovery

Upon expiration of T323 in the network the procedures for call clearing shall be initiated with cause # 102 "recovery on timer expiry".

*** Next Modified Section ***

5.5.3.2 Reception of a STATUS message by a CC entity

5.5.3.2.1 STATUS message with incompatible state

On receipt of a STATUS message reporting an incompatible call control state, the receiving entity shall clear the call by sending a RELEASE COMPLETE message with cause # 101 "message not compatible with protocol state". The reported call control state is incompatible if the combination of call control states at the sender and receiver side cannot occur, do not match or cannot be aligned by actions of the receiver; the exact definition is implementation dependent.

5.5.3.2.2 STATUS message with compatible state

A STATUS message may be received indicating a compatible call state but containing one of the following causes:

- # 95 "semantically incorrect message"; or
- # 96 "invalid mandatory information"; or
- # 97 "message type non-existent or not implemented"; or
- # 98 "message type not compatible with protocol state"; or
- # 99 "information element non-existent or not implemented"; or
- # 100 "conditional IE error",

This indicates that the transmitter of the STATUS message was unable to accept some information sent by the recipient of the STATUS message. This allow the recipient to retransmit some or all of the information. Other actions are possible and are implementation dependent; they may include releasing the call.

In the case the MS receives a STATUS message with the cause #100 due to the presence of a Repeat Indicator with the value "service change and fallback" in a SETUP message, it may then resend a new SETUP message with a single BC-IE (no Repeat Indicator is included). The actual behaviour is dependent on the implementation.

In the case the network receives a STATUS message with the cause #100 due to the presence of a Repeat Indicator with the value "service change and fallback" in a SETUP message, it shall then resend a new SETUP message, with either the BC-IE of the preferred service or the speech BC-IE (fallback to speech) as the only BC (no Repeat Indicator is included). The preferred behaviour is decided by configuration.

*** Next Modified Section ***

10.5.4.22 Repeat indicator

The purpose of the repeat indicator information element is to indicate how the associated repeated information elements shall be interpreted, when included in a message. The repeat indicator information element is included immediately before the first occurrence of the associated information element which will be repeated in a message. "Mode 1" refers to the first occurrence of that information element, "mode 2" refers to the second occurrence of that information element in the same message.

The repeat indicator information element is coded as shown in figure 10.5.109/3GPP TS 24.008 and table 10.5.129/3GPP TS 24.008.

The repeat indicator is a type 1 information element.

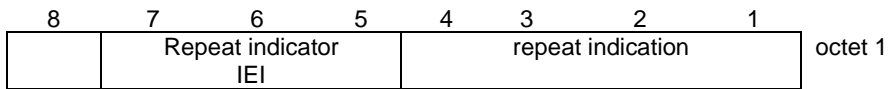


Figure 10.5.109/3GPP TS 24.008 Repeat indicator information element

Table 10.5.129/3GPP TS 24.008: Repeat indicator information element

Repeat indication (octet 1)				
Bits				
4	3	2	1	
0	0	0	1	Circular for successive selection "mode 1 alternate mode 2"
0	0	1	0	Support of fallback – mode 1 preferred, mode 2 selected if setup of mode 1 fails
0	0	1	1	reserved: was allocated in earlier phases of the protocol
<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>Service change and fallback – mode 1 alternate mode 2, mode 1 preferred</u>

*** End of Modified Section ***