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Technical Specification

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Stage 1
(3G TS 22.135 version 3.1.0 Release 1999)**



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Foreword

This Technical Specification has been produced by the 3GPP.

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1 Scope

The present document presents multical scenarios and requirements for UMTS phase 1 release '99.

Multicall feature specifies functionality and interactions related to usage of several simultaneous bearers between a terminal and a network. Multicall features allows both circuit switched call(s) and packet session(s) to exist simultaneously.

The case of an individual call with multiple bearers is out of the scope of this document and release '99.

Implementation of multicall is an optional service for both mobile terminal and network.

2 References

2.1 Normative references

- [1] TS 22.100 UMTS Phase 1
- [2] TS 22.129 Handover Requirements between UMTS and GSM or other Radio Systems
- [3] TS 22.060 General Packet Radio Service (GPRS); service description, stage 1.

2.2 Informative references

- [4] GSM 02.01 Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)
-

3 Definitions, symbols and abbreviations

3.1 Definitions

CS Call: Circuit switched call. A call routed through CS domain. CS call can be for example a speech call, fax call or data call. One call shall only use one bearer at the time.

Multiparty call: GSM Supplementary Service for speech conference service.

PS Session: Packet switched session. A logical connection set by PDP context between terminal and PS domain for delivering data packets.

N_{cs} : maximum number of simultaneous CS calls.

4 Description

4.1 Description of multicall

Multicall feature specifies functionality and interactions related to usage of several simultaneous bearers between a terminal and a network. Multicall features allows both circuit switched call(s) and packet session(s) to exist simultaneously.

Note: The protocol architecture in GSM allows several parallel CS calls, the limitation being that there is only one traffic channel, which the different CS calls share. This is facilitated by e.g. the Call Waiting, Call Hold, Call Transfer and Multiparty SSs. Call configurations related to GSM supplementary services are not considered as Multicall. See section 6 for interworking.

It shall be possible for each CS call / PS session to have independent traffic and performance characteristics. It shall be possible that each active CS call and PS session shall be terminated individually.

It shall be also possible that each of the CS calls and PS sessions have different priorities.

Note: Priority mechanism for CS calls and PS sessions at release 1999 is for further study.

The basic idea with CS multicall is that each CS call may have one dedicated bearer, i.e. it is possible that each new call (MO and MT) generate a new bearer.

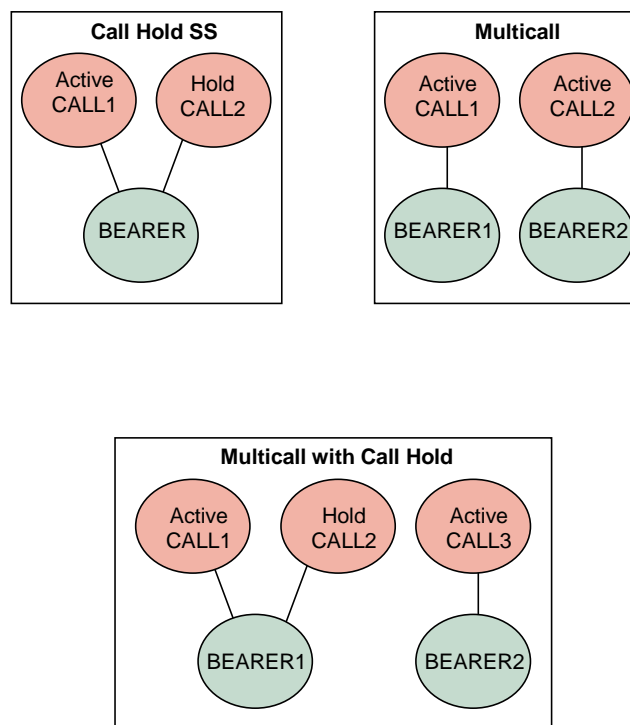


Figure 1: Multicall concept

It is a requirement, that the current GSM supplementary services are preserved when suitable. Support of UMTS-GSM interworking and handovers, GSM evolution, GSM user conventions etc. are reasons for this requirement.

4.2 Multicall service scenarios

4.2.1 Terminating CS call

The indication of terminating CS call to mobile terminal will be done until the maximum number of total CS calls (N_{cs}) has been reached.

If the maximum number to total CS call has been reached an additional terminating call ($N_{cs}+1$) will be only indicated to the user if the user have the SS Call Waiting active. (N_{cs} is specified in chapter 5.2.) See chapter 6.4.2 for interworking with Call Waiting SS. The maximum value for $N_{cs}=7$ and no more calls may be supported, irrespective of whether the SS Call Waiting is active or not, once this has been reached.

If the N_{cs} is not been reached and a terminating call is indicated to the user she may reacted in the following way:

- a) accepting the terminating call
 - the user/user applications shall have the possibility to allocate a new bearer for the terminating call

- the user/user applications shall have the possibility to reuse/share an already established bearer (e.g. release existing calls or put an speech on hold and accept the terminating call.

b) rejecting the terminating call

If the user/user application rejects the terminating call the call shall be released in a normal way

c) ignoring the incoming call

If the user/user application ignores the indication of the terminating call (i.e. not accepts nor rejects) the terminating call the normal call handling shall apply, e.g.. after the Alerting Timer expires the call will be released.

4.2.2 Originating CS call

If the N_{cs} is not reached already and the user/user application wants to establish a new originating CS call she may act in the following way:

- a) allocate a new bearer for the originating call
- b) reuse/share an already established bearer (e.g. to put an speech on hold and set-up a new call.

4.2.3 PS sessions

It shall be possible to have several PS sessions active simultaneously. See TS22.060 for further details.

PS sessions shall be handled independently of any CS calls.

Note: There are no new PS related requirements from TS 22.060 point of view but there might be issues related to stage 2 and stage 3 that need to be considered.

4.2.4 Connectionless traffic

Multicall shall not impact the usage of SMS-PP, SMS-CB and USSD.

4.4 Charging aspects

It shall be possible to charge each call / session independently.

5 Functional requirements

5.1 Provision and withdrawal

5.1.1 Provision

The provision of multicall is provided by prior arrangement with home environment. If the multicall service is provisioned the limits for N_{cs} and N_{ps} shall be set as subscription options. . N_{cs} is equal to the number of bearers that a user is allowed when Call Hold or Call Waiting are not invoked.

5.1.2 Withdrawal

The multicall service subscription will be withdrawn on subscribers request or at administrative reasons.

5.2 Limiting the number of multicalls

Regarding CS Domain, it should be possible for the number of active calls supported simultaneously to be restricted and selected by network operator, by the capabilities of the used terminal, by user subscription. It shall be possible to have one or more CS calls simultaneously with one or more parallel PS sessions.

Standard shall be able to support up to 7 simultaneous CS Calls (N_{cs}). This is equal to the number of bearers when the Call Hold or Call Waiting are not invoked.

Terminals and networks may support any number of CS calls within this limit.

It shall be possible to limit the maximum number of simultaneous bearers for CS calls to one, at this case GSM rel'98 functionality shall be shall provided.

The value of the maximum number of active speech calls is 1. Network shall not allow more than bearers allocated for speech.

5.7 Busy Definition

NDUB (Network Determined User Busy) occurs when:

1. The maximum number of calls has been reached. In the case where Call Waiting or Call Hold are not subscribed to, this is equal to maximum number of bearers. In the case with Multiparty this can occur even if bearers are still available.
2. In the case where Call Waiting or Call Hold are subscribed to, the maximum number of bearers is reached, and the maximum number of both waiting and held calls has been reached.

NOTE: This implies that CFB according to NDUB will only be invoked if the maximum number of CS calls is reached.

For User Determined User Busy (UDUB) condition see GSM 02.01 Annex C.

5.8 Exceptional procedures or unsuccessful outcome

Roaming into networks not supporting multicall shall be possible and at this case GSM rel'98 functionality shall apply .

In case there is a difference between the maximum numbers (N_{cs}) , supported by the serving network, by the capabilities of the used terminal and/or by the user subscription options, the smallest value should be applied as the maximum number.

6 Interaction with other services

6.1 General on Supplementary Services

Relation between multicall and supplementary services are considered only for CS calls. .

6.2 Line Identification

6.2.1 Calling Line Identification Presentation (CLIP)

No impact, i.e. CLIP shall be provided with all calls.

6.2.2 Calling Line Identification Restriction (CLIR)

No impact, i.e. CLIR shall be provided with all calls.

6.2.3 Connected Line Identification Presentation (COLP)

No impact, i.e. COLP shall be provided with all calls.

6.2.4 Connected Line Identification Restriction (COLR)

No impact, i.e. COLR shall be provided with all calls.

6.3 Call Forwarding

6.3.1 Call Forwarding Unconditional (CFU)

No impact.

6.3.2 Call Forwarding on Busy (CFB)

No impact.

6.3.3 Call Forwarding on No Reply (CFNRy)

No impact.

6.3.4 Call Forwarding on Not Reachable (CFNRc)

No impact.

6.4 Call Completion

6.4.1 Call Hold (CH)

No impact, i.e. it shall be possible to put an established speech call on hold.

6.4.2 Call Waiting (CW)

The indication of a terminating CS call within the maximum number of calls is done by multicall feature; whereas the indication of a terminating call to the user / terminal by Call Waiting function is done when multicall limit (N_{cs}) has been reached and the subscriber has CW active.

When the supplementary service "Call Waiting" is applicable the maximum number of calls is $M + N_{cs}$, where M is maximum number of waiting calls, which is specified in 22.083.

NOTE: Due to that there is no change to the maximum number of waiting calls required from the multicall service the maximum number of waiting calls is still 1.

6.5 Multi Party (MPTY)

No Impact.

The number of MPTY member may be limited because of number of existing CS calls.

6.6 Closed User Group (CUG)

No impact.

6.7 Advice of Charge (AoC)

It shall be possible for network to indicate the AoC parameters for each CS call.

It shall be possible for mobile terminal to count each CS Call charges respectively and to have overall ACM (Accumulated Call Meter as defined in 22.024) for all the calls.

6.8 Call Barring

No impact.

6.8.1 Barring of all outgoing calls

No impact.

6.8.2 Barring of outgoing international calls

No impact.

6.8.3 Barring of outgoing international calls except those directed to the HPLMN country

No impact.

6.8.4 Barring of all incoming calls

No impact.

6.8.5 Barring of incoming calls when roaming

No impact.

6.9 Explicit Call Transfer (ECT)

No impact.

6.10 Completion of Call to Busy Subscriber (CCBS)

No impact.

6.11 Multiple Subscriber Profile (MSP)

No impact.

6.12 Calling Name Presentation (CNAP)

No impact.

6.13 User-to-User Signalling (UUS)

No Impact

6.14 enhanced Multi-Level Precedence and Pre-emption service (eMLPP)

No impact.

6.15 Call Deflection (CD)

No impact.

6.16 CAMEL

No impact.

6.17 IST

No impact.

7 Cross Phase Compatibility for R99

This section details the cross phase compatibility requirements relating to the service requirements in this document.

Note: when a change is introduced which affects the 3GPP specifications, it is said to be 'backward compatible' if existing equipment can continue to operate and perform correctly with equipment that conforms to the new implementation.

7.1 Compatibility With Existing Standards

Where the service and operational requirements in this document relate to a core network functionality, compatibility is required.

Multicall mechanisms is not applicable for GSM BSS.

7.2 Compatibility With Future Releases

It is envisaged that 3GPP standards will evolve beyond R99, for example with the addition of new service requirements. The standards which define the technical implementation of R99 should be developed in such a way that it is practical to add the requirements in this section in a backward compatible manner.

Following chapters include requirements that are foreseen for future release.

7.2.1 Multicall configuration

When having one active CS call and one held call on the same bearer. It shall be possible to create a new CS bearer and to move one of the calls to the new bearer, resulting both calls being active within the limits set by the operator/user and within the capability of the terminal. See figure 2: Split of bearer.

When having two calls (multicall) on the separate bearers. It shall be possible to join both calls to one of the two bearers, put the one of the calls to hold and to release unused CS bearer. It shall be possible to select which call to put on hold. See figure 2: Combination of bearers. (*Note: there is no clear end-user service requirement for this feature at time being.*)

NOTE: Due to that only speech calls can be put on hold, so one of the two active Cs calls has to be a speech call

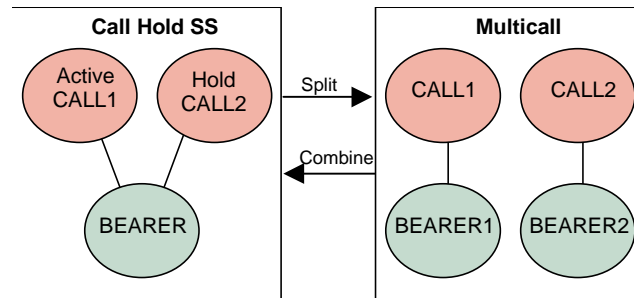


Figure2: Illustration for split of bearer and combination of bearers.

7.2.2 Several simultaneous speech calls / bearers

Key requirements for multicall is to allow several simultaneous CS call. The most important usage scenario is to allow several CS data bearers to be bind at application level resulting to higher than 64kbits/s data rates. Other important feature is just general flexibility allowing e.g. simultaneous speech and data call. It's been also required to have several simultaneous active speech calls.

It's been proposed that the multicall feature could be introduced in a phased manner, meaning that in the first phase, i.e. UMTS phase 1, release 99 only one active speech call would be supported. However, Call control should not prohibit a complete set of multiple speech bearer services in future releases and UTRAN shall be designed in a flexible way to support multiple speech bearers. In Release 99, GSM SS Call Wait, Multiparty and Call Hold are used to offer simultaneous speech calls to user.

If multiple simultaneous voice calls are supported then the Call Hold service shall be used to reconfigure the number of bearers supporting voice calls if required during handover. e.g. in the case of handover to GSM where only one voice call can be active at a time. This requirement is dependent on the user subscribing to Call Hold.

7.2.3 CCBS

At release 1999 CCBS no enhancements for CCBS is required.

In the future releases the definition of IDLE state of subscriber A and destination B should be modified in away that the IDLE state is reach even if there are active CS calls but the maximum limit of CS calls is not reached.

7.2.4 Registration

User shall be able to modify the maximum number of CS calls within the limitations set at provision of the service.

If the subscriber requests to set the limits of N_{cs} to higher values as allowed according to the provision (subscription option), this request shall be rejected and the subscriber shall be informed on the unsuccessful outcome of the request.

7.2.5 Interrogation

User shall be able to interrogate the maximum number of CS calls set by user.

User shall be able to interrogate the maximum number of CS calls supported by serving network.

Annex A (informative) : Change history

Change history					
SMG No. / TSG SA#	TDoc. No.	CR. No.	Section affected	New version	Subject/Comments
TSG SA#5	SP99-433			Version 3.0.0	Approved
TSGT SA#6	SP99-523	001	5.6	Version 3.1.0	Transfer of Handover chapter to 22.129
TSGT SA#6	SP99-523	002	4.2.1, 5.1.1, 5.4, 5.7, 7.2.2	Version 3.1.0	Clarification on handling of multiple bearers
TSGT SA#6	SP99-554	003	3, 5, 7	Version 3.1.0	Registration, Interrogation and Restriction of Packet Domain

History

Document history		
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