Agenda Item: **7.4.1**

Source: **NTT DoCoMo**

Title: **Multicall Stage1 document**

Document for: **Discussion**

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This document explains the items of Multicall Stage1 which is modified and added. We proposes that the attached changes to 22.135 are adopted by TSG-S1.

4.3.1   Terminating CS call
Call control should be based on GSM call control and GSM will be the case the maximum number is one. Therefore, the sentence "All terminating CS calls are always indicated to the users to select the action to be taken." should be changed to "Any additional terminating CS call will be indicated to the user / terminal until it reaches the maximum number of simultaneous calls set in the network. On the other hand, any additional terminating CS call which is beyond the maximum number of simultaneous calls will be indicated when the user has activated supplementary service.

4.3.2   PS sessions
Multicall of PS sessions should be described more detail. The following sentences should be added.
"Packet bearer has been allocated
-   allocate a new bearer, if possible
-   multiplexed on the same packet bearer
For all terminating cases it shall be possible to release any of allocated sessions / bearers and then accept the incoming session. In all cases it shall be possible to reject the incoming sessions.
For all originating cases it shall be possible to release any of the allocated sessions / bearers and then set up the session.
Note: Limitation pointed out at this section is described in detail at section 5.2."

5.2   Limiting the number of Multicalls
The limitation by the available radio resources is not specific to the multicall, therefore, it's better delete the words.
In case there is a difference between the maximum number of Multicalls by network operator, by the capabilities of the used terminal, by user subscription and / or user setting, the minimum value should be applied as the maximum number.
To describe more detail, the following sentences should be added.
"It should be possible to support the following functions for user setting. Each function is defined for (i) setting the number of multicalls, (ii) checking the number set by the user and (iii) checking the number of such calls set by the network.

5.6   Busy definition
Busy definition is not the outstanding issues any more. Therefore, this clause should be placed in the body of the document.
The NDUB (Network Determined User Busy) occurs, when a call is about to be offered, if the traffic channel is busy and the maximum number of total calls has been reached. The maximum number of calls depends on the limitation for multicall.

5.7   Status of the user
Currently, Idle and Busy status are defined for the user state. In UMTS/IMT2000, by supporting multicall feature, the following state will be needed to invoke supplementary services (SS) and operator specific services (OSS).
(1) Idle status and the status with the exception of Idle
(2) Busy status and the status with the exception of Busy

Therefore, the status of the user shall be extended, i.e. addition of the Active status. The status of Idle / Active / Busy shall be returned to the network as follows.
- Idle   : there is no ongoing call
- Active : 1~N-1 calls are ongoing
- Busy   : N calls are ongoing
The status of Idle and Busy exist when N=1.
Where N represents the maximum number of simultaneous calls.
The status of the user shall be referred from the Home Environment.

6.4.2   Call Waiting (CW)
We propose that the following sentence should be added for detail explanation.
"The indication of a terminating 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 the number of calls is maximised to number of calls+1."

6.7   Advice of Charge (AoC)
We propose that the following sentence should be added for detail explanation.
"It shall indicate as per individual call charge from the network."

6.10   Completion of Call to Busy Subscriber (CCBS)
To describe more detail, the following sentences should be added.
"It shall be set when the called party is in the state Busy, and it shall be activated when the state of called party become Idle (in case the called party is in the UMTS/IMT2000, it shall be activated when the state of called party become Idle or Active).

A.2   Charging Aspects
We propose that the following sentence should be added for detail explanation.
"It shall be possible to charge each call / session independently."

4.3 Multicall service scenarios

4.3.1 Terminating CS call

Terminating speech call

a) Speech bearer has been allocated
   -existing bearer shall be shared (Evolution for future releases seen)

b) No speech bearer has been allocated
   -allocate a new bearer, if possible

Terminating non-speech call

a) Speech bearer has been allocated
   -allocate a new bearer, if possible, or
   -existing bearer shall be shared

b) No speech bearer has been allocated
   allocate a new bearer, if possible

~~All terminating CS calls are always indicated to the users to select the action to be taken.~~

Any additional terminating CS call will be indicated to the user / terminal until it reaches the maximum number of simultaneous calls set in the network. On the other hand, any additional terminating CS call which is beyond the maximum number of simultaneous calls will be indicated when the user has activated supplementary service.

For all terminating cases it shall be possible to release any of the allocated calls/bearers and then accept the incoming call. In all above cases it shall be possible to reject the incoming call.

Note: Limitations pointed out at this section is described in detail at section 5.2.

4.3.2 Originating CS call

Originated speech call

a) speech bearer has been allocated
   -existing bearer shall be shared (Evolution for future releases seen)

b) No speech bearer has been allocated
   -allocate a new bearer, if possible

Originating non-speech call

a) speech bearer has been allocated
   -allocate a new bearer, if possible, or
   -existing bearer shall be shared

b) no speech bearer has been allocated
   -allocate a new bearer, if possible

For all originating cases it shall be possible to release any of the allocated calls/bearers and then set up the call.

Note: Limitations pointed out at this section is described in detail at section 6.

4.3.3 PS sessions

PS sessions shall be handled independently of any CS calls.

Editors note: GPRS Class A kind of behaviour is assumed. More detailed requirements FFS.

Packet bearer has been allocated
- allocate a new bearer, if possible
- multiplexed on the same packet bearer

For all terminating cases it shall be possible to release any of allocated sessions / bearers and then accept the incoming session. In all cases it shall be possible to reject the incoming sessions.

For all originating cases it shall be possible to release any of the allocated sessions / bearers and then set up the session.

Note: Limitation pointed out at this section is described in detail at section 5.2."

5 Normal procedures

5.1 Provision

The provision of multicall is provided by prior arrangement with home environment.

It shall be possible to set subscriber dependent limits for multicall.

5.2 Limiting the number of multicalls

It should be possible for the number of active calls or sessions supported simultaneously to be restricted and selected by network operator, by the capabilities of the used terminal, the available radio resources, by user subscription and/or user setting. The maximum number of CS calls and PS sessions should be set respectively. It shall be possible to have one or more CS calls simultaneously with one or more parallel PS sessions.

In case there is a difference between the maximum number of Multicalls by network operator, by the capabilities of the used terminal, by user subscription and / or user setting, the minimum value should be applied as the maximum number.

It should be possible to support the following functions for user setting. Each function is defined for (i) setting the number of multicalls, (ii) checking the number set by the user and (iii) checking the number of such calls set by the network.

Editors Note: More detailed requirements FFS.

5.3 Multicall Reconfiguration

It shall be possible for an active multicall to be re-configured within the limits set by the operator/user and within the capability of the terminal by:

- Adding a new CS calls or PS session

- Subtracting an active CS calls or PS sessions

- Suspending and resume a PS session

- Put an active CS speech call on hold and retrieve it

5.4 Handover

It shall be possible to re-configure the bearers automatically due to a change in the availability of suitable radio resources (Note 1). It shall be possible for the network operator to set the priority of active connections and this priority may influence the automatic re-configuration process. If supported by the terminal, it shall be possible for the user to set the priority of active connections and this priority shall influence the automatic re-configuration process.

Note 1: A change in the availability of suitable radio resources may also occur for other reasons in addition to handover.

For further handover requirements please refer to TS 22.29.

5.5 Multicall Termination

The following options for terminating a multicall shall be provided:

- Termination of active CS calls and PS sessions individually

- FFS

5.6 Busy Definition

The NDUB (Network Determined User Busy) occurs, when a call is about to be offered, if the traffic channel is busy and the maximum number of total calls has been reached. The maximum number of calls depends on the limitation for multicall.

5.7 Status of the user

By supporting multicall feature, the status of the user shall be extended, i.e. addition of the Active status. The status of Idle / Active / Busy shall be returned to the network as follows.
- Idle   : there is no ongoing call
- Active : 1~N-1 calls are ongoing
- Busy   : N calls are ongoing
The status of Idle and Busy exist when N=1.
Where N represents the maximum number of simultaneous calls.
The status of the user shall be referred from the Home Environment.

6 Interaction with other services

6.1 General on Supplementary Services

Relation between multicall and supplementary services are considered only in circuit switched connection.

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)

Call hold is applicable to the speech call only.

6.4.2 Call Waiting (CW)

FFS

The indication of a terminating 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 the number of calls is maximised to number of calls+1.

6.5 Multi Party (MPTY)

Multi Party is applicable to the speech call only.

6.6 Closed User Group (CUG)

No impact.

6.7 Advice of Charge (AoC)

FFS

It shall indicate as per individual call charge from the network.

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)

ECT is applicable to the speech call only.

6.10 Completion of Call to Busy Subscriber (CCBS)

~~FFS~~

It shall be set when the called party is in the Busy state, and it shall be activated when the state of called party become Idle (in case the called party is in the UMTS/IMT2000, it shall be activated when the state of called party become Idle or Active).

6.11 Multiple Subscriber Profile (MSP)

FFS

6.12 Calling Name Presentation (CNAP)

No impact.

6.13 User-to-User Signalling (UUS)

FFS

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

FFS

6.15 CAMEL

FFS

Annex A (Informative): Outstanding issues

A.1 Evolution towards several speech bearers

Due to problems foreseen in the interaction of multicall and existing services, the multicall feature is be introduced in a phased manner, meaning that in the first phase, i.e. Release 99.

There is a need to limit the number of parallel circuit switched speech calls to one to avoid potential interactions with supplementary services e.g detection of the user busy condition for supplementary services i.e. CH, CW and MPTY. The need for this limitation needs to be studied further.

UTRAN shall be designed in a flexible way to support multiple speech bearers.

A.2 ~~Busy definition~~

~~Main assumption is that it shall be possible to offer all calls to the user. It seen that user may want to set busy status to serving network due to charging or other reasons. This new alternative functionality needs to be further studied. Also the existing Call Waiting SS need to be reviewed.~~

~~For GSM busy definition see 02.01 Annex C.~~

~~From NTT DoCoMo: The NDUB (Network Determined User Busy) occurs, when a call is about to be offered, if the traffic channel is busy and the maximum number of total calls has been reached. The maximum number of calls depends on the limitation for multicall.~~

~~Separation of Speech and Non-speech?~~

A.2 Charging aspects

~~tbd~~

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

A.3 Security Aspects

tbd