

**Fort Lauderdale, USA  
1-4 March 1999**

**Source : CN TSG**

Title: Development of a 3G Call Control model & protocol(s) to standardize the interaction of a 3G MS with a 3G network subsystem

While discussing a number of proposed CN TSG WG1, WG2 call control related work items (e.g. Multicall, Bearer & Teleservice negotiation within call setup<sup>1</sup>), it was suggested that the proposed collection of work items should be replaced by a general 3G call control work item. The purpose of a general 3G call control work item would be to ensure 3G architectural integrity across TSGs, i.e. a “top down” approach, and avoid a “bottom up” approach.

This discussion then evolved into a clear point of principle regarding the process for defining the 3GPP standard. The crux of the discussion rested on the trade-off between the standards making process and the pressing issue of defining 3G specifications for release 99.

The main argument against defining a general 3G call control work item that would absorb the proposed work items was as follows:

- Focusing on narrowly defined work items would help achieve the completion of the 99 release. Specifications would be available sooner if the process of standards making was as follows; the SA TSG WG1 defines services and CN TSG WGs would implement these services. Implied in this is that the CN TSG WGs may make architectural decisions without the involvement of the SA TSG WG2.

The main argument for defining a general 3G call control work item that would absorb the proposed work items was as follows:

- The process of the SA TSG WG1 defining services, the SA TSG WG2 defining the system architecture to support these services, and then the elaboration of stage 3 work in the CN TSG WGs is the speediest and fairest process and shouldn't be sacrificed.

A possible way forward is to maintain the integrity of the 3G standards making process and ensure the completion of the process within a strictly defined timetable that is endorsed by the CN TSG and the SA TSG. The scope of the work and the work timetable is given in the attached work item description sheet, “Definition of 3G call control model and protocol(s)”.

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<sup>1</sup> See ANNEX A

**WI No.X Definition of 3G call control model and protocol(s)**

**X Definition of 3G call control model and protocol(s)**

**X.1 TSG Project**

X	Terminal
	Radio
X	Core Network
X	System

**x.2 Linked Work Items**

End-to-end QoS  
Others: to be identified.

**x.3 Justification**

One of the factors that made GSM a success was the existence of a multi-vendor Mobile Station / Network Subsystem environment through the definition of GSM 04.08, which includes a call control protocol. It is vital that a multi-vendor environment continues to exist in 3G and that proprietary signaling between a 3G Mobile Station and any Network System, for basic communication features, is avoided. This can only be done through the specification of an appropriate 3G call control mechanism(s).

Therefore, in order to ensure a multi-vendor Mobile Station / Network Subsystem environment in 3G, a 3G call control model and protocol(s) shall be defined.

It is essential for the consistent development of the 3G system, as the work passes through the TSGs and their WGs, that the general architectural call control model is firmly established by the SA TSG WG2 in a timely manner. This will avoid a fragmented approach to the development of the system.

**x.4 Service Aspects**

The 3G call control model and protocol(s) shall support a 3G Mobile Station's interaction with the "Circuit-switched" network domain and the "Packet-switched" network domain (see UMTS 23.20 for a definition of these terms).

The 3G call control mechanism, or mechanisms, shall support the setup, negotiation and modification of the services defined in UMTS 22.05 (e.g. multical).

**x.5 MMI Aspects**

None

**x.6 Charging Aspects**

There will be impacts, but as yet these have not been specifically defined.

**x.7 Security Aspects**

There will be impacts, but as yet these have not been specifically defined.

**x.8 Impacts**

<b>Affects:</b>	<b>Terminal</b>	<b>Radio</b>	<b>CN</b>	<b>Others</b>
<b>Yes</b>	X		X	
<b>No</b>		X		
<b>Don't know</b>				

**x.9 Expected Output and Time scales**

Completion of Stage 2: TSG\_SA\_WG2 (April 99)

Completion of Stage 3 CRs  
and new specifications when identified: TSG\_N\_WG1 (December 99)  
TSG\_N\_WG2 (December 99)  
TSG\_N\_WG3 (December 99)

**x.10 Work Item rapporteurs**

**x.11 Supporting Companies**

## ANNEX A

WIs No.4, 5,7 are extracted from TSG-N#2(99)022

### WI No.4 Bearer services and teleservices negotiation

#### x Bearer services and teleservices negotiation

##### x.1 TSG Project

	Terminal
	Radio
X	Core Network
	System

##### x.2 Linked Work Items

'Out-of-band transcoder bypass' and 'bearer service and teleservice modification during a call' are linked with this work item.

##### x.3 Justification

It is necessary to support bearer service and teleservice negotiation procedures in the out-of band signaling between MT-MT and MT-NW during the establishment phase of the call and during the bearer modification phase. This requirement is included in ITU-T draft recommendation Q.1701 and the document of 'GSM evolved network requirement' of TTC. TTC had input the document to TSG SA. UMTS 22.05 also includes this requirement in section 5.2.

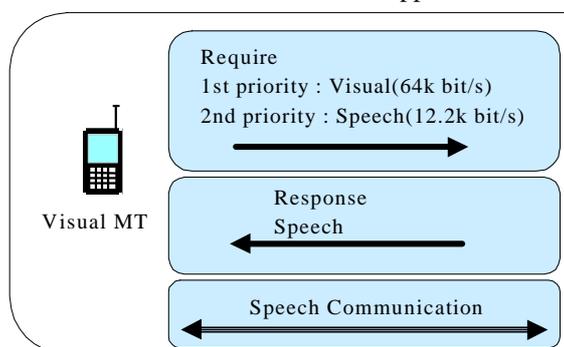
##### x.4 Service Aspects

By having the bearer service and teleservice negotiation between MT and MT, the following points can be realized.

- Having the bearer service and teleservice negotiation, it improves the call completion. This process eliminates a call release caused by the service type disagreement. (In the 3G NW, it is expected having large service disagreements because it offers various services.)

The CODEC bypass will be realized by the negotiation of bearer service (by the negotiation of CODEC types) between MT-MT. (But, additional procedure for control of CODEC equipment in the network is needed.)

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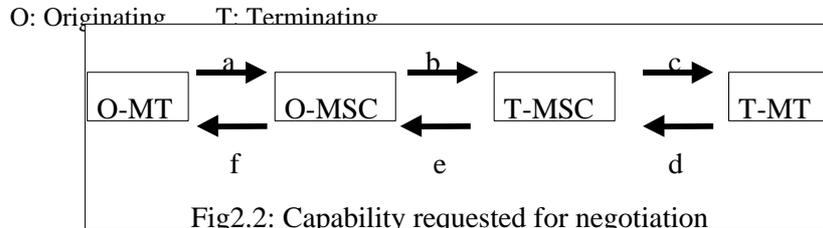


Speech MT supports only speech communication. Therefore, speech MT select speech communication.

Fig2.1 : Bearer service and teleservice negotiation

ired.

- a) O-MT notifies OMSC of various services
- b) O-MSC notifies T-MSC of services required by OMT
- c) T-MSC notifies T-MT of services required by O-MT
- d) T-MT notifies T-MSC of services selected by T-MT or T-User
- e) T-MSC notifies O-MSC of services selected by T-side
- f) O-MSC notifies O-MT of services selected by T-side



In the capability of a, c, d, and f, the expansion of the CC will be required. In the capability of b, and e, the expansion of the MAP, ISUP or B-ISUP will be required.

[Note: Although the expansion of ISUP and B-ISUP may be required, it is not clarified which group in 3GPP will discuss the expansion.]

**x.5                    MMI Aspects**

None

**x.6                    Charging Aspects**

None

**x.7                    Security Aspects**

None

**x.8                    Impacts**

<b>Affects:</b>	<b>Terminal</b>	<b>Radio</b>	<b>CN</b>	<b>Others</b>
<b>Yes</b>	X		X	
<b>No</b>		X		X
<b>Don't know</b>				

**x.9                    Expected Output and Time scales**

- Approval of WI:                                    TSG CN WG2 (February 99)
- Start of Report                                    TSG CN WG2 ( February 99)
- Scope and first draft                            TSG CN WG2 (March 99)
- Approval of deliverable by TSG                TSG CN WG2 ( May 99)

**x.10**                    **Work Item rapporteurs**  
NEC

**x.11**                    **Supporting Companies**  
FUJITSU LIMITED, NIPPON TELECOMMUNICATIONS CONSULTING CO.,LTD., NIPPON  
TELEGRAPH AND TELEPHONE CORPORATION, NTT COMMUNICATION WARE  
CORPORATION, NTT Mobile Communications Network Inc., NTT Software Corporation, NEC  
Corporation

**x.12**                    **Responsible STC(s)**  
  
Primary Responsibility    TSG-CN WG2  
  
Secondary Responsibility TSG-CN WG1

**x.13**                    **Others**

**WI No.5      Bearer Services and Teleservices modification during a call**

**x      Bearer Services and Teleservices modification during a call**

**x.1      TSG Project**

	Terminal
	Radio
X	Core Network
	System

**x.2      Linked Work Items**

Work item of 'Bearer Services and Teleservices negotiation' is linked with this work item, because the procedure is similar to each other.

**x.3      Justification**

Bearer service and teleservice modification procedures are required in the MT-MT and MT-NW. This modification is triggered from a user during a call. The modification is that, for example, when a user enjoys 32kbit/s data communication, the user modifies the call as a 16kbit/s voice. This requirement is included in ITU-T draft recommendation Q.1701 as fallback procedures and "GSM evolved network requirement" of TTC. TTC input the document to TSG SA. UMTS 22.05 also includes this requirement in section 5.2.

**x.4      Service Aspects**

If a user can modify basic service during a call, it enables to switch the types of the services during the connection among the speech, FAX, and Modem as they are supported in the 2G system. In addition, when a user enjoys 32kbit/s data communication and a voice call is incoming to the user, if the user changes the first call into 9.6kbit/s data communication, the second voice call is able to connect.

It requires the following capabilities in the MT-MT.

a) Requesting MT request to modify service to Requesting MSC.

- Modification of service may contain only modification of bearer or modification of bearer and teleservice.

b? Requesting MSC notifies Requested MSC of the request to modify service.

c? Requested MSC requests to modify service to Requested MT.

d) Requested MT notifies Requested MSC of modification result .

e? Requested MSC notifies Requesting MSC of the modification result.

f? Requesting MSC notifies Requesting MT of the modification result.

↑

In the capability of a, c, d, and f, the expansion of the CC will be required. In the capability of b, and e, the expansion of the MAP, ISUP or B-ISUP will be required.

[Note: Although the expansion of ISUP and B-ISUP may be required, it is not clarified which group in 3GPP will discuss the expansion.]

**x.5      MMI Aspects**

None

**x.6      Charging Aspects**

None

**x.7      Security Aspects**

None

**x.8 Impacts**

<b>Affects:</b>	<b>Terminal</b>	<b>Radio</b>	<b>CN</b>	<b>Others</b>
<b>Yes</b>	X		X	
<b>No</b>		X		X
<b>Don't know</b>				

**x.9 Expected Output and Time scales**

Approval of WI: TSG CN WG2 (February 99)

Start of Report TSG CN WG2 (February 99)

Scope and first draft TSG CN WG2 (March 99)

Approval of deliverable by TSG TSG CN WG2 (May 99)

**x.10 Work Item rapporteurs**

NEC

**x.11 Supporting Companies**

FUJITSU LIMITED, NIPPON TELECOMMUNICATIONS CONSULTING CO.,LTD., NIPPON TELEGRAPH AND TELEPHONE CORPORATION, NTT COMMUNICATION WARE CORPORATION, NTT Mobile Communications Network Inc., NTT Software Corporation, NEC Corporation

**x.12 Responsible STC(s)**

Primary Responsibility TSG-CN WG2

Secondary Responsibility TSG-CN WG1

**x.13 Others**

**WI No.7 Maximum Call Number of Multiple Call**

**x Maximum Call Number of Multiple Call**

This contribution proposes to restrict the number of simultaneous active calls and sessions. The maximum call number and the maximum session number are offered to the user by the operator. The maximum call number is a limit for CS simultaneous active calls. The maximum session number is a limit for PS simultaneous active sessions. When the number of simultaneous active calls or sessions has reached to the maximum call number or maximum session number, new outgoing call/session and new mobile originated call/session is ignored.

**x.1 TSG Project**

	Terminal
	Radio
X	Core Network
	System

**x.2 Linked Work Items**

None

**x.3 Justification**

Circuit switched call and packet session can be held in a MT simultaneously and independently. In addition, multiple CS calls and multiple packet sessions can also be held in a MT.

The number of simultaneous active call that is offered to the user shall be limited. However, operators should be able to freely set the number of simultaneous active calls. In other words, the number of maximum bearer can be set by the operators' choice. When an operator wish to offer a single call service, they just set the limit of the maximum number of bearer (call) is one.

**In order to modify to support Maximum call number and Maximum session number, it would be necessary to raise change requests on at least the following GSM standards:**

GSM 09.02      MAP  
GSM 03.18      Basic Call – stage2  
GSM 03.60      GPRS?stage2

**x.4 Service Aspects**

None

**x.5 MMI Aspects**

None

**x.6 Charging Aspects**

None

**x.7 Security Aspects**

None

**x.8 Impacts**

<b>Affects:</b>	<b>Terminal</b>	<b>Radio</b>	<b>CN</b>	<b>Others</b>
<b>Yes</b>			X	
<b>No</b>	X	X		X
<b>Don't know</b>				

**x.9 Expected Output and Time scales**

Approval of WI: TSG\_N\_WG2 (February 99)  
Start of Report TSG\_N\_WG2 (February 99)  
Scope and first draft TSG\_N\_WG2 (March 99)  
Approval of deliverable by TSG TSG\_N\_WG2 (May 99)

**x.10 Work Item rapporteurs**

**x.11 Supporting Companies**

NTT Software

**x.12 Responsible STC(s)**

Primary Responsibility TSG-CN WG3

Secondary Responsibility ??

**x.13 Others**

Technical Specification Group –Core Network **TSG-N#2(99)029**  
Meeting #2, Fort Lauderdale, 2-4 March 1999

<b>Doc For</b>	<b>PCG</b>	<b>TSG SA</b>	<b>TSG CN</b>	<b>TSG RAN</b>	<b>TSG T</b>
<b>Decision</b>			<b>X</b>		
<b>Discussion</b>			<b>X</b>		
<b>Information</b>					<b>X</b>

**Source:** Fujitsu, Nokia, BT, NTT DoCoMo, NEC

**Subject:** Multicall WI description

The document contains a proposed Work Item Description for Multicall in UMTS. This work Item was tentatively agreed during the ad-hoc meeting in Heathrow (18-19 February 99) pending the formal agreement of TSG-N.

## A.1 WI description

### x **Multicall**

#### x.1 **TSG Project**

X	Terminal
	Radio
X	Core Network
	System

#### x.2 **Linked Work Items**

The impact of the End to End UMTS QoS Management work item should be considered.

#### x.3 **Justification**

Multicall, i.e. the capability of a terminal to have several parallel independent calls/transactions, is one of the important novelties of UMTS. It can be anticipated that for the end user it will be one of the most visible enhancements from 2G to 3G.

#### x.4 **Service Aspects**

Multi call is the feature that provides multiple active connections simultaneously in a mobile terminal. Multi call needs multiple bearers (Channels) used by several CM-layer connections. The CM-layer connections may use circuit switched or packet switched bearers.

The user should be able to select the initiating service whether as “Multi call” or as “Shared bearer” at the call origination or the call termination. If the multiple bearers are to be established in one mobile terminal, the user should be able to select one bearer for shared bearer services.

It should be possible for the number of active connections supported simultaneously to be restricted and selected by network operator. The number of active connections may be limited also by the capabilities of the used terminal or the available radio resources. It shall be possible to have one or more circuit switched connections simultaneously with one or more parallel packet connections.

The work item should consider of following aspects:

1. Control of the use of several radio bearers for CM-layer connections. Generic mechanisms for allocating multiple bearers for both circuit and/or packet connections.
2. Linkage mechanism for associating several bearer with the corresponding CM-layer entities.
3. The use of multiple bearers to maintain QoS of the allocated bearer (e.g for speech) in the presence on significant parallel signalling from the CM-layer connections (e.g. for transferring User to User Signalling, USSD, etc)
4. Interactions with all impacted Supplementary Services (e.g. CW, CH, MPTY, CCBS, CFB etc)

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

There could be 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.

**x.5 MMI Aspects**

There may be some impact to the MMI associated with the supplementary services.

**x.6 Charging Aspects**

FFS

**x.7 Security Aspects**

None

**x.8 Impacts**

<b>Affects:</b>	<b>Terminal</b>	<b>Radio</b>	<b>CN</b>	<b>Others</b>
<b>Yes</b>	X	X	x	
<b>No</b>				X
<b>Don't know</b>				

**x.9 Expected Output and Time scales**

Approval of WI: TSG-CN#2 (March 99)

Start of Report TSG # ( )

Scope and first draft TSG # ( )

Approval of deliverable by TSG TSG # ( )

**x.10 Work Item rapporteurs**

Mr Yahagi (NEC)

**x.11 Supporting Companies**

NTT DoCoMo, Fujitsu, NEC, T-Modus, Nokia, BT

**x.12 Responsible STC(s)**

Primary Responsibility TSG CN WG1

Secondary Responsibility TSG CN WG2

**x.13 Others**