3GPP TSG-N Meeting#2 **Tdoc 3GPP NP-99022**
Fort Lauderdale, USA
1-4 March 1999

Source : TSG-N WG2 Conviners
Title: Work Item List and Deadline for Other WIs

Work Items

Following is the work items which were agreed in 1st TSG_N WG2 meeting in Sophia Antipolis during 16-18 February, 1999.

No.	Title	Remarks
1	The Gateway Location Register	
2	Pre-Paging for GSM R99	
3	Variation of authentication parameter length	Request detail stage 1 description from TSG SA. (Liaison statement Tdoc 044)
4	Bearer services and teleservices negotiation	Start with study of stage 2.
5	Bearer Services and Teleservices modification during a call	Start with study of stage 2.
6	Out-of-band Transcoder Control	Start with feasibility study
7	Maximum Call Number of Multiple call	Request detail stage 1 description from TSG SA. (Liaison statement Tdoc 046)
8	QoS Control for asymmetric bearer for packet services	Request detail stage 1 description from TSG SA. (Liaison statement Tdoc 047)

Deadline of Other Wis

During the WG2 meeting, there was a discussion on the deadline of other WIs to be specified by the end of this year. WG2 agreed that ***the deadline is TSG-N WG2 Meeting #3 during 17 – 21 May, in Edinburgh, Scotland (Nortel Networks)***

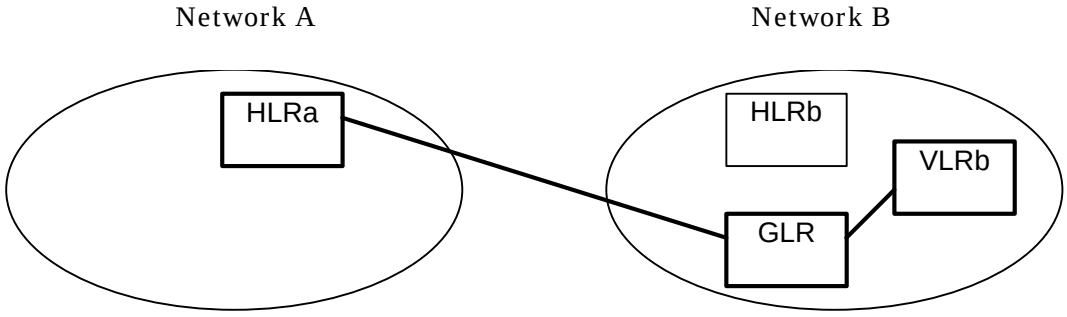
WI No.1 Gateway Location Register

x Gateway Location Register

UMTS will build on the success of GSM and is likely to become even more widespread. IMT-2000 networks based on GSM evolution are planned for Europe, Japan, USA, Korea. Coupled with steadily increasing rates of international travel for business and leisure, this means a significant increase in the number of roaming users needing to be supported. This will lead to increased signalling traffic on "short -haul" and "long-haul" international links. The introduction of CAMEL Phase 3 for UMTS will add CAP signalling to these international links, leading to a further signalling load increase over present day levels.

This work item is to prepare a technical report describing the use of a Gateway Location Register within the UMTS Core Network as a means of reducing the amount of MAP signalling traffic carried over international signalling links for roaming users.

The GLR is a node between the VLR and the HLR, which may be used to optimize the handling of subscriber profile data across network boundaries. The GLR is functionally part of the roaming subscriber's Home Environment. When a subscriber is roaming the GLR plays the role of the HLR towards the VLR in the visited network, and the role of the VLR towards the HLR in the home network. The GLR handles any location change between different VLR service areas in the visited network without involving the HLR. The GLR is an optional entity within the VPLMN operator's network.



Subjects for investigation by this report will include at least the following points:

- Roaming scenarios in which the GLR will be of benefit
- Estimations on the level of MAP traffic optimisation achievable by the GLR
- Delegation of HLR service logic to the GLR
- A functional description of the GLR
- Impact of the GLR on GSM/UMTS standards (i.e. for PS, CS and SMS services).
- Data integrity
- Security impact
- Fault recovery procedures
- Other benefits of the GLR (e.g. support for VHE, support of regional signalling variations, CAP optimisation etc.)

x.1 SMG Project

	UMTS Radio Access

	GSM Radio Access
x	GSM-UMTS Core Network
	UMTS Services

x.2 Linked Work Items

None

x.3 Justification

TTC (Japan) has made a preliminary study of the IMT-2000 requirement for MAP optimisation and has reached the following conclusions:

- there **is** a need to optimise MAP traffic between IMT-2000 regions
- the best architecture to achieve MAP optimisation is the Gateway Location Register (GLR).

This work item proposes that a detailed study is now made on signalling traffic optimisation which the GLR could offer.

x.4 Service Aspects

None

x.5 MMI Aspects

None

x.6 Charging Aspects

None

x.7 Security Aspects

None.

x.8 Impacts

Affects:	USIM	ME	NW	Others
Yes			X	
No	x	x		
Don't know				

x.9 Expected Output and Timescales (to be updated at each plenary)

Approval of WI:	February 99
Start of Report	February 99
Scope and first draft	March 99

Approval of report by WG2 May 99

Approval ofreport by TSG CN June 99

x.10 Work Item rapporteurs

NEC Technologies

x.11 Supporting Companies

NEC Technologies, BT, Cellnet, Fujitsu Telecom (Europe), NTT DoCoMo
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 SA WG2

x.13 Others

WI No.2 Pre Paging

x Pre-Paging

In third generation networks, a significant number of mobiles will frequently move in and out of radio coverage. This will be due to a number of reasons, i.e.:

- The commencement of service and the need to build coverage.
- The operating environment in some metropolitan areas, i.e. small cell sizes, high speed trains, subway tunnels etc.

The result is that a proportion of mobile terminated calls may fail to be delivered because the mobile is not reachable.

The current GSM specifications can result in a call path being set up between the caller and the visited MSC before the terminating mobile has responded to the paging message. A possible enhancement to GSM/UMTS would be to reduce the effect of absent/not reachable terminals on the usage of network resources.

The enhancement could be achieved by "pre-paging". This requires that the call path between the caller and visited MSC should not be set up until after the called mobile has responded to paging. In other words the VLR should not return the MSRN until the roaming Mobile Station has issued its Page Response. This solution should studied to be available as an option to GSM/UMTS Phase 1 network operators.

x.1 SMG Project

	UMTS Radio Access
	GSM Radio Access
x	GSM-UMTS Core Network
	UMTS Services

x.2 Linked Work Items

None

x.3 Justification

The impact on the current GSM/GPRS standards needs to be assessed. The impact of Pre-Paging on the Optimal Routing for Late Call Forwarding service needs further study. It is possible that Pre-Paging may make some cases of OR-LCF redundant. But Pre-Paging will not replace OR-LCF for (CFNRy) Call Forwarding on No Reply.

In addition, Pre-Paging could also be used as a basis for the following additional functions in GSM/UMTS:

1. Signalling of terminal capabilities to the GMSC in Mobile Terminated calls
2. Signalling of current radio environment related capabilities (i.e. GSM, UTRAN coverage area) to the GMSC.
3. Support of active location information retrieval for the CAMEL Any Time Interrogation (ATI) service

4. Extension of the scope of Early Call Forwarding on:
   - not reachable (mobile not responding)
   - subscriber busy
5. Support of SIM roaming, where a subscriber's terminal capabilities could change between calls.

This Work Item proposes that a technical report be written, studying the benefits of pre-paging to GSM/UMTS, and the impact on the GSM/UMTS standards.

The work carried out by SMG2 and SMG3 on Classmarks for UMTS (i.e. Service Classmark and Terminal classmark) should be considered in the pre-paging technical report.

The pre-paging technical report will be structured such that there is a clear separation between the justification for pre-paging due to:

a) The commencement of service and the need to build coverage.
b) Incomplete coverage due to the local radio environment

x.4 Service Aspects

Service aspects are for further study.

x.5 MMI Aspects

None

x.6 Charging Aspects

None

x.7 Security Aspects

Security aspects are for further study.

x.8 Impacts

Affects:	USIM	ME	NW	Others
Yes		x	x	
No				
Don't know	x			

x.9 Expected Output and Timescales (to be updated at each plenary)

Approval of WI:	February 99
Start of Report	February 99
Scope and first draft of report	March 99

Approval ofreport by CN WG2 May 99

Approval ofreport by TSG CN June 99

x.10 Work Item rapporteurs

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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 SA WG2

x.13 Others

WI No.3 Variation of authentication parameter length

X Variation of authentication parameter length

X.1 TSG Project

	Terminal
	Radio
X	Core Network
	System

x.2 Linked Work Items

None

x.3 Justification

Authentication scheme*1 of GSM, unique challenge scheme, is an efficient procedure. RAND and SRES are sent to VLR from HLR, and VLR send RAND to MS, MS calculates and send back SRES, then VLR compares SRES from MS with SRES from HLR. However, the lengths of RAND and SRES are fixed. It will restrict possibility of enhancement of authentication algorithm that requires longer RAND and SRES. Moreover, if these parameters are defined as variable length, operators can select the authentication algorithms and distinguish from other operator by using higher security level. This requirement has already come to an agreement in TTC.

If we will not make the variation in first phase, many UMTS/IMT-2000 MT and MSC that can handle only authentication parameters as fixed length are came onto the market, and it's too difficult to extend authentication scheme. So, introduction of variable length of authentication parameters in first phase is necessary.

It is expected that we should define these parameters in MAP operation and MM message as variable length parameter. Moreover, we should discuss this issue with the consideration of backward compatibility.

*1: Authentication scheme means a procedure which is performed using an authentication algorithm and authentication parameters.

x.4 Service Aspects

If RAND and SRES are defined as variable length, operators can select the authentication algorithms and distinguish from other operator by using higher security level.
Of course, we can use GSM A3 algorithm as usual, a operator who wants to introduce new algorithm without no limitation of authentication parameter length can use the algorithm.

x.5 MMI Aspects

None

x.6 Charging Aspects

None

x.7 Security Aspects

GSM is a system with high security level, but we suppose that in future other authentication algorithms with higher security level than GSM will be developed. It is expected that UMTS/IMT-2000 will be used for a long time, so it's very effective that authentication scheme is applicable to any authentication algorithms.

Each operator requires different levels of security. In order to allow different levels of security, The present GSM authentication scheme can allow some range of security levels, but authentication scheme which uses authentication parameters with variable length will be applicable to more levels of authentication algorithms.
The following gives an example that GSM and PDC authentication schemes need different authentication parameter length.

	GSM	PDC
RAND	16	8
SRES	4	8

As stated above, it's expected that variable length is needed according to authentication algorithms. It is better for us if operators can use the most suitable authentication algorithm for each requirement.

x.8 Impacts

Affects:	Terminal	Radio	CN	Others
Yes	X		X	
No		X		
Don't know				

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

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x.11 Supporting Companies

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NTT COMMUNICATION WARE CORPORATION
NTT Mobile Communications Network Inc.
NTT Software Corporation
NEC Corporation

x.12 Responsible STC(s)

Primary Responsibility TSG-CN

Secondary Responsibility ??

x.13 Others

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

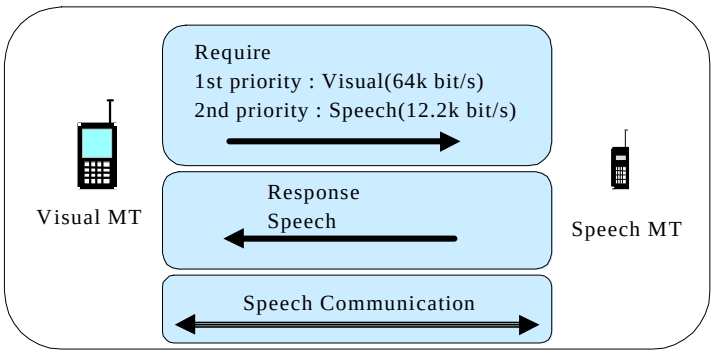
It is necessary to support bearer service and teleservice negotiation procedures in the out-of band signaling between MT-MT and MT-NW during the establishment phase of the call and during the bearer modification phase. This requirement is included in ITU-T draft recommendation Q.1701 and the document 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.•j



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

Fig2.1 : Bearerservice and teleservice negotiation

In order to support the bearer negotiation, the following capabilities are required.

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

O: Originating T: Terminating

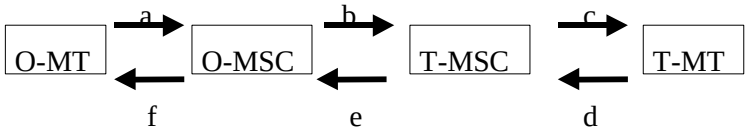


Fig2.2: Capability requested for negotiation

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 requied, 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

Affects:	Terminal	Radio	CN	Others
Yes	X		X	
No		X		X
Don't know				

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.j Requesting MSC notifies Requested MSC of the request to modify service.
c.jRequested MSC requests to modify service to Requested MT.
d) Requested MT notifies Requested MSC of modification result .
e.j Requested MSC notifies Requesting MSC of the modification result.
f.j Requesting MSC notifies Requesting MT of the modification result.

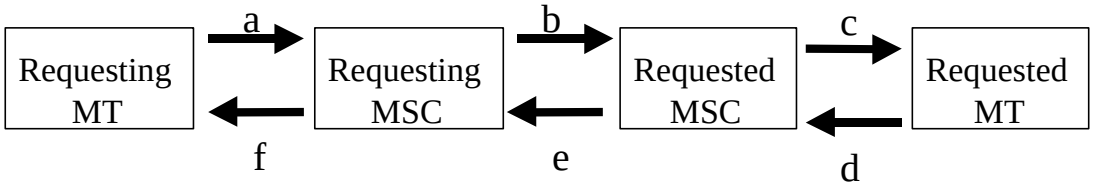


Fig3.1 Requested capability for modification

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 requied, 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

Affects:	Terminal	Radio	CN	Others
Yes	X		X	
No		X		X
Don't know				

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.6 Out-of-band Transcoder Control

X Out-of-band Transcoder Control

In order to improve voice quality for mobile-to-mobile calls (MS-MS calls) in GSM Phase 2+ networks, Tandem Free Operation (TFO) using in-band signaling has been specified. The equivalent function in Japan's PDC (Personal Digital Cellular) network is known as Transcoder Bypass, which has been specified to make use of out-of-band signaling control (i.e. by the PDC-MAP protocol).

The UMTS Phase 1 network operator should have the option to implement Transcoder Control by making use of either TFO, Transcoder Bypass or both.

x.x.1 Purpose of Transcoder Control

Low bit rate coding (e.g. 8kbps or 16kbps) has been adopted for voice coding in the GSM (and PDC) BSS to make efficient use of radio resources. However, the GSM (and PDC) core networks transcodes this traffic to 64kbps PCM in preparation for switching and interconnection with external networks. This transcoding function can lead to a degradation of speech quality. The purpose of Transcoder Control is to improve the speech quality for mobile-to-mobile calls by removing unnecessary transcoding.

x.x.2 Requirements for Transcoder Control

The requirements for Transcoder Control are as follows:

- The negotiation procedure should be applied both for speech codecs and *multimedia codecs*. The procedure should have flexibility for future enhancements of codec types.
- The negotiation and control procedures for Transcoder Control should be independent of the transcoder location in the network, i.e. Core Network (e.g. MSC) or Radio Access Network (e.g. RNC).
- The negotiation and control procedures for Transcoder Control should be independent of the transport layer (e.g. STM or ATM) of both Core Networks and Radio Access Networks.
- The negotiation and control procedures for Transcoder Control should not cause a significant delay in establishing a through connection in mobile-to-mobile calls. Nor should they cause a significant delay when modifying the communication mode between bypass mode and normal mode (e.g. in support of services such as Multiparty Call).
- Transcoder Control communication should be maintained even if the mobile terminal (MT) executes handover.
- Transcoder control communication should be realized in the case of inter-network connections that have different PCM coding standards(i.e. A/μ-law) in the through connection if possible.
- The mobile terminal (MT) may support multiple codec types. Negotiation procedures between the originating MT (or TRAU) and the terminating MT (or TRAU) are required to select a common codec type for Transcoder Control communication in mobile-to-mobile calls.
- The originating MT (or TRAU) may transmit a list of preferred codec types to the terminating MT (or TRAU) during the negotiation process.
- The terminating MT (or TRAU) should select one codec type from this preferred codec list during Transcoder Control negotiation.

x.1 TSG Project

	Terminal

	Radio
X	Core Network
	System

x.2 Linked Work Items

Work item of "Bearer Services and Teleservices modification during a call", "Bearer Services and Teleservices negotiation", and "Bearer Capability allocation between UMTS/IMT-2000 and other networks" is linked with this work item.

x.3 Justification

In order to improve voice quality for mobile-to-mobile calls (MS-MS calls) in GSM Phase 2+ networks, Tandem Free Operation (TFO) using in-band signaling has been specified. The equivalent function in Japan's PDC (Personal Digital Cellular) network is known as Transcoder Bypass, which has been specified to make use of out-of-band signaling control (i.e. by the PDC-MAP protocol).

The UMTS Phase 1 network operator should have the option to implement Transcoder Control by making use of either TFO, Transcoder Bypass or both.

x.4 Service Aspects

None

x.5 MMI Aspects

None

x.6 Charging Aspects

None

x.7 Security Aspects

None

x.8 Impacts

Affects:	Terminal	Radio	CN	Others
Yes			X	
No	X	X		
Don't know				

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

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x.11 Supporting Companies

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NTT COMMUNICATION WARE CORPORATION
NTT Mobile Communications Network Inc
NTT Software Corporation
NEC Corporation

x.12 Responsible STC(s)

Primary Responsibility CN TSG

Secondary Responsibility SA TSG

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

Affects:	Terminal	Radio	CN	Others
Yes			X	

No	X	X		X
Don't know				

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

WI No.8 QoS Control for asymmetric bearer for packet services

x QoS Control for asymmetric bearer for packet services

x.1 TSG Project

	Terminal
	Radio
X	Core Network
	System

x.2 Linked Work Items

This work item should be based on QoS Requirement from TSG SA.

x.3 Justification

IMT-2000 system will support various type of Multi-media Communications. Most of the multi-media traffic have the nature of the asymmetric communication. According to this point, it is necessary for IMT-2000 system packet services to support asymmetric bearer.

To support asymmetric bearer, core NW packet logical nodes (i.e. SGSN and GGSN) are necessary to know user's bearer capabilities for both directions. On the other hand current GPRS only defines peak throughput and mean throughput, which may be carried on the GTP and MAP messages, as common parameters for both directions. So IMT-2000 specification need to define these two parameters as separate parameters for two directions as evolution point.

Therefore, it is expected that the format of QoS profile in the GTP and MAP should be extended.

x.4 Service Aspects

Not to be mentioned specially.

x.5 MMI Aspects

Not relevant

x.6 Charging Aspects

Not relevant

x.7 Security Aspects

Not relevant

x.8 Impacts

Affects:	Terminal	Radio	CN	Others
Yes			X	
No	X	X		X
Don't know				

x.9 Expected Output and Time scales

Approval of WI:	TSG CN WG2	(Febuary 99)
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NTT COMMUNICATION WARE CORPORATION
NTT Mobile Communications Network Inc.
NTT Software Corporation
NEC Corporation

x.12 Responsible STC(s)

Primary Responsibility	CN TSG WG2
Secondary Responsibility	CN TSG WG1

x.13 Others