TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) **TSGR2#2(99)075**

Stockholm 8th to 11th March 1999

Agenda Item: 8.1.2

Source: LG Information & Communications, Ltd. KOREA

Title: Definitions of Multicast service and requirements

Document for: FYI

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0. References:

[1] GSM 01.60 Version 6.0.0 Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Requirements specification of GPRS

[2] GSM 02.60 Version 7.0.0 Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Service Description; Stage 1

[3] GSM 03.61 Version 0.7.1 Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2

1. Multicast Service Description

1.1 Multicast Service Definition

According to the current GPRS specification, multicast service is defined as follows:

Multicast service is an unidirectional Point-to-Multipoint service in which a message is transmitted from a single source entity to all subscribers currently located within a geographical area. The message contains a group identifier indicating whether the message is of interest to all subscribers or to only the subset of subscribers belonging to a specific multicast group [1][2][3]. Multicast data transmission is performed within the specified delay, over one or more geographical areas as defined by the service requester. Repeated transmission are performed where applicable according to the schedule as defined/negotiated by the service requester. No knowledge of the instantaneous, actual “receive group” present within the given area at any point in time is available within the network.

The service requester is charged depending on the followings:

- Quality of Service and
- the size of the geographical area

1.2 Multicast Service Characteristics

Multicast service has the following service characteristics as defined in [2] and [3].

1. Point to Multipoint
2. Recipients are an identified subset of all service subscribers

3. No authentication
4. No ciphering
5. Restricted service area
6. No acknowledgement within RTT
8. No signalling for group identification
9. Identity: Group Identity: IMGI (International Group Mobile Identity)
10. Addressing mechanism based on specified geographical area and specified group of recipients
11. Delivery time is determined based on scheduling
12. Unidirectional
13. Non-reliable delivery
14. Reliable delivery may be provided as a QoS option and achieved by repeated transmission (ffs)
15. Message reception is anonymous
16. Transmission shall be performed within the specified delay, over one or more, geographical areas as defined by the service requester
17. Geographical routing capability
18. Scheduled delivery capability

Among the characteristics described above several changes are considered for UMTS multicast service as described below:

3. Possibility of authentication
4. Possibility of ciphering
8. Signalling for group identification

Additionally, some new characteristics for UMTS multicast service are being considered, which are as follows:

19. Delay non-sensitive
20. Idle mode procedure (Connected mode is FFS.)
21. Possibility of low data rate, small amount of data
22. Possibility of high data rate, large amount of data
23. Possibility of data rate change

1.3 Comparison between Multicast, Broadcast and Short Message Service

	Broadcast	Multicast	Singlecast (SMS)
Recipient	All service subscribers	Identified subset of all service subscribers	Unique subscriber
Authentication	No	Yes	Yes
Ciphering	No	Yes	Yes
Coverage area	All	Limited	All
Acknowledgement	No	No	Yes
Signalling for User Identification(recipient)	No	No	Yes
Signalling for Group Identification(recipient)	Not available	Yes	Not available
Group Identity	No	Yes	No
User Identity	Yes	Yes	Yes

2. Multicast Addressing

Two forms of addressing are used: geographical addressing and receiver group addressing. The geographical area describes the surface over which the multicast data will be transmitted. Whereas, the receiver group may be all MSs or an identified sub-group of MSs. A multicast group is identified by the International Mobile Group Identity (IMGI) which shall support two levels of identification: a service provider level and an application level.

3. Multicast Service Examples

Examples may include the followings:

- Distribution services such as news, weather and traffic reports, as well as product or service advertisements
- Multimedia service such as audio, video, and data
- On demand based High quality audio
- On demand based Video streamline
- Remote downloading (O&M)

4. Requirements

4.1 Higher Layers beyond RRC

a. Signalling for user identification (Group identification)

b. Ciphering

c. Authentication

4.2 RRC Layer

a. Variable Rate Support

b. Dynamic Code usage

c. Dynamic Scheduling

d. QoS Support (e.g., repetition time)

4.3 RLC Layer

a. Unacknowledged multicast data transfer

b. Multicast delivery

4.4 MAC Layer

a. Support of multiple logical multicast channels

b. Mapping and multiplexing/demultiplexing between logical multicast channel and transport multicast channels

c. Scheduling among logical multicast channels

d. Support of dynamic rate change using TFCS

4.5 Physical Layer

a. Transmission of Message containing multicast data to specific groups of mobile stations. This service includes provision of the location function necessary to deliver multicast messages to a mobile, which is in idle or slotted more.

b. DTX (discontinuous transmission)

c. DRX (discontinuous reception)

d. Support of multicast data transmission with multi-code