

CR-Form-v3

CHANGE REQUEST

⌘ **23.271 CR 075** ⌘ rev **4** ⌘ Current version: **5.1.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Deferred Location Request with Change of Area Event		
Source:	⌘ Nokia, NEC		
Work item code:	⌘ LCS	Date:	⌘ 2002-Mar-08
Category:	⌘ B	Release:	⌘ Rel-5
Use <u>one</u> of the following categories: F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)	

Reason for change:	⌘ Currently LCS provides only stand-alone or periodic location reporting alternatives. There is no possibility to request LDR with any other event than 'UE available'. A new LDR event, which allows triggered location reporting based on MS/UE changing its location, is needed. This CR presents deferred and very lightweight method for location reporting utilizing RANAP Location reporting in lu_ps interface (already existing functionality). In addition, the service can be offered to a large number of subscribers because of its very light functionality and because existing core network information is used in the location reporting.
Summary of change:	⌘ A new LDR event "Change of Area" is proposed to be added. The proposed functionality allows SGSN to report subscriber location in triggered fashion.
Consequences if not approved:	⌘ Corresponding information would have to be generated in RAN and in the Core Network, e.g. by using heavy periodic LCS positioning methods.

Clauses affected:	⌘ 3.1 4.4.2.1 New 9.1.8.3 9.1.8.4 10.1		
Other specs Affected:	⌘ <input checked="" type="checkbox"/> Other core specifications	⌘ 29.002	
	<input type="checkbox"/> Test specifications		
	<input type="checkbox"/> O&M Specifications		
Other comments:	⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☒ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://www.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request

<< First changed clause >>

3.1 Definitions

Deferred location request: location request where the location response (responses) is (are) required after a specific event has occurred. The event may or may not occur immediately. In addition the event may occur many times.

<< Next Changed clause >>

4.4.2.1 Types of event

- a) UE available: Any event in which the MSC/SGSN has established a contact with the UE. Note, this event is considered to be applicable when the UE is temporarily unavailable due to inaction by the UE user, temporarily loss of radio connectivity or IMSI detach and so on. Note that IMSI detach is only applicable in the case UE has previously been registered and information is still kept in the node.
- b) Change of Area: when the mobiles moves to another area, the network is required to report the location of the target mobile in a triggered fashion. The new location may be noticed during certain area change e.g. a cell change, service area change, routing area change or RNC reallocation. Reporting the change of Area event is for further study in the CS-domain. When event is triggered the SGSN should perform Privacy Check for UE according to the subscription information. Service cancellation is done by LCS Client, GMLC or SGSN. Service cancellation by the target UE is FFS.
- c) Other events are FFS (Release 65)

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7.1.1 Core network Location Request

The core network request for a location estimate of a target UE shall contain sufficient information to enable location of the Target UE according to the required QoS using any positioning method supported by the PLMN and, where necessary, UE. For location services the core network may request the geographical co-ordinates of the Target UE.

In Iu-modeUMTS the core network may also request in which Service Area the Target UE is located. The Service Area information may be used for routing of corresponding Emergency calls, or for CAMEL services. (The MSC Server or SGSN shall not send the Service Area Identity to GMLC). In GSM this corresponds to the usage of Cell ID in the core network.

It should be noted that the Service Area concept is different from the Localized Service Area concept used for SoLSA services.

When the location of a Target UE in Idle Mode is requested, the core network shall determine which RAN entity is associated with the Target UE.

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9.1.8 Mobile Terminating Deferred Location Request

Figure 9.6a illustrates the procedures for a Deferred Location Request, where the Location Report is returned based on the event UE available.

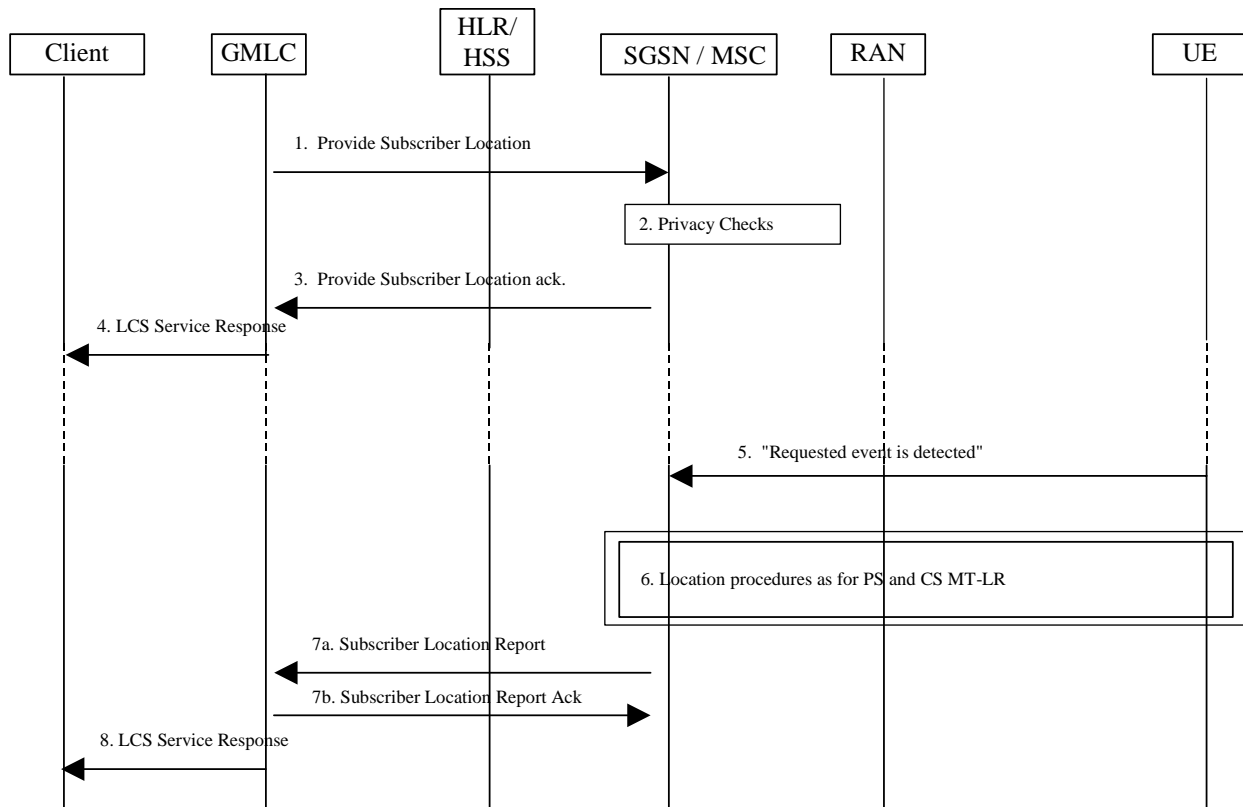


Figure 9.6a: General Network Positioning for a Deferred MT-LR

9.1.8.1 Deferred Location Request Procedure when UE gets available event

- 1) Provide Subscriber Location is received in SGSN/MSC as described in 9.1.2/9.1.6. In addition, the Deferred Location Request includes the event that shall trigger the sending of Location Report.
- 2) If the SGSN/MSC cannot support the deferred location request for the specified event (for temporary or permanent reasons), a Provide Subscriber Location return error shall be returned in step 3 with a suitable cause. The SGSN/MSC verifies that the LCS client is allowed to position the requested UE according to subscription information (no interaction at this stage with the UE). If not, a Provide Subscriber Location return error is returned in step 3.
- 3) If the SGSN/MSC can support the deferred location request for the specified event and the privacy checks in step 2 are satisfied, a Provide Subscriber Location ack. shall be returned to the GMLC without a location estimate. The GMLC will at this stage not return any response to the LCS Client. It will instead due to the Deferred Location Request wait for a Subscriber Location Report message from SGSN/MSC.
- 4) The GMLC then returns the LCS Service Response to the LCS Client to notify whether the request was successfully accepted or not.

9.1.8.2 Location Report Procedure

- 5) Immediately following step 3, the SGSN/MSC shall verify if the requested event is already satisfied (e.g. UE available inferred from a current transaction) or can be invoked immediately (e.g. by paging the UE and receiving a page response). If requested event is not existing the SGSN/MSC waits until it has occurred or until some maximum time has expired.

=> In case the SGSN/MSC receives an indication that the UE has moved to another SGSN/MSC while it is waiting for the requested event to happen, a Subscriber Location Report is directly sent to the GMLC with the information that MT-LR must be re-initiated against the new SGSN/MSC. The address of the new SGSN/MSC is included in Subscriber Location Report if available. (If new SGSN/MSC address was included, the GMLC continues at step 1 above, otherwise it continues with an interrogation against HLR as described in 9.1.1.)
- 6) When the requested event is detected, the SGSN/MSC will proceed with the location request as described in 9.1.2/9.1.6.

If either security or privacy checks fails, a Subscriber Location Report is returned with appropriate error cause indicating termination of the deferred location request.

- 7) When location information has been obtained from the RAN, the SGSN/MSC returns the Subscriber Location Report. Included in the report is an indication that this is a response to a previously sent deferred location request.

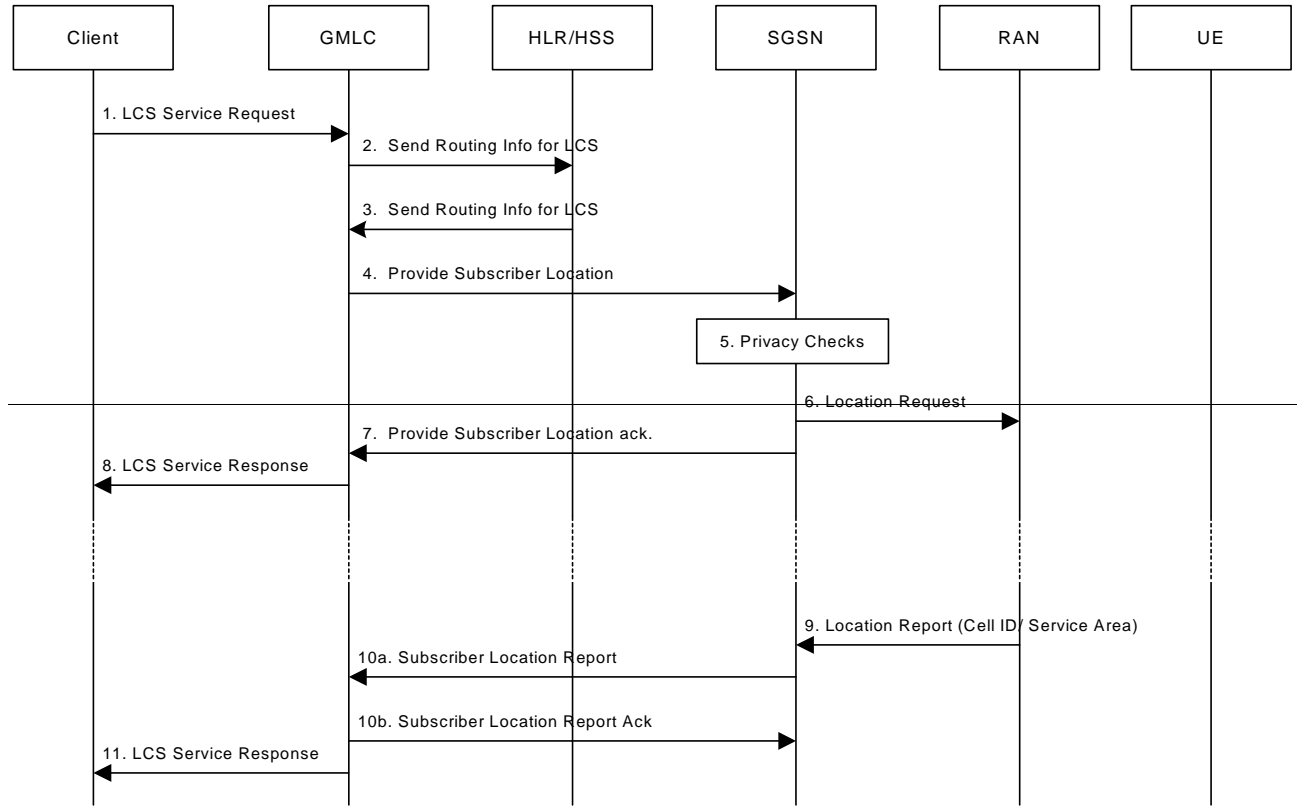
If the location information could not be obtained, or the SGSN/MSC for some other reason decides to not wait any longer for the requested event to occur (ex. timer expires), the Subscriber Location Report will be returned with an appropriate error cause indicating termination of the deferred location request.

- 8) GMLC then returns the LCS Service Response to the LCS Client as in 9.1.2/9.1.6.

<< Added clause >>

9.1.8.3 Deferred Location Request with Change of Area Event

Figure 9.6b illustrates the deferred MT-LR for the event Change of Area.



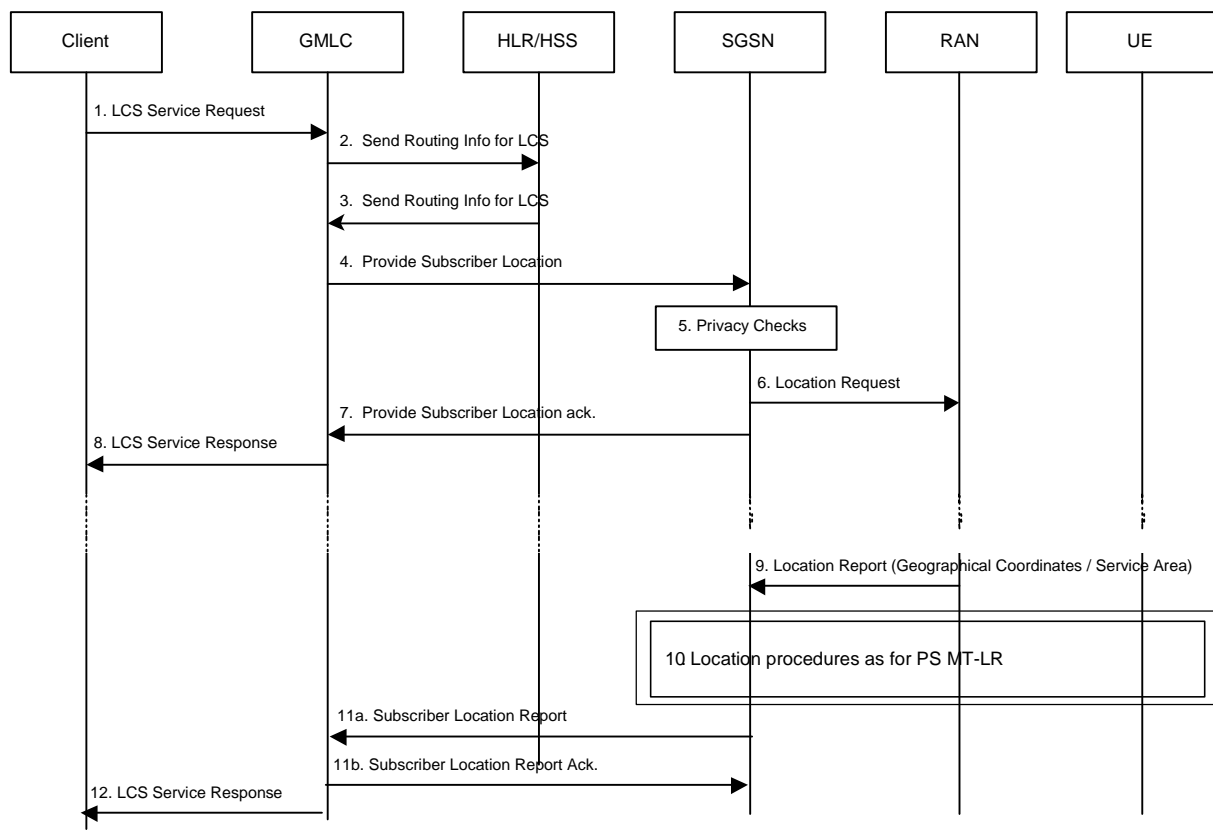


Figure 9.6b: Deferred LCS with Change of Area Event for a MT-LR

Before the LCS client issues the LCS Service Request, the UE might have established a connection with the LCS client. The LCS Client may support a location based service and may request the location of the target mobile immediately as the subscriber starts to use the service.

- 1) The LCS client sends a LCS service request to GMLC and the common CS and PS MT-LR procedures as described in 9.1.1 are performed. The LCS Service request in this case contains the Start Deferred LCS (with Change of Area Event) information. [Note: In this message also the location information from the normal LCS positioning could be send.]
- 2) GMLC sends routing request to HLR/HSS (part of common CS and PS MT-LR procedure as described in 9.1.1.)
- 3) HLR/HSS sends routing information to GMLC (part of common CS and PS MT-LR procedure as described in 9.1.1.).
- 4) GMLC sends a Provide Subscriber Location request to SGSN as described in 9.1.6, which in this case is a Deferred Location Request, that includes information about the event that shall trigger the sending of Location Report. The event in this case is "Change of Area". The request shall contain the information if the location information is reported in every SAI/CGI change, RA change, or RNC reallocation.
- 5) If the SGSN cannot support the deferred location request with the event "change of area" (for temporary or permanent reasons), a Provide Subscriber Location return error shall be returned in step 7 with a corresponding cause.

-Privacy check is performed for the UE according to subscription information (according to UE subscription profile the LCS Location Notification Invoke message is sent to the target UE). Location reporting will be continued until the request is cancelled by the GMLC or SGSN. Service cancellation by the UE and other aspects of service cancellation are for further study.

Otherwise, in case no notification is needed and if the UE is in idle mode, the SGSN performs paging. The paging procedures are defined in TS 23.060[15].

- 6) If deferred location request with the event “change of area” is wanted in every SAI/CGI change 3G-SGSN sends the location request to RAN and in that request the 3G-SGSN should indicate location reports are required at every SAI change. In this request, the requested QoS may also be included.

If 2G-SGSN receives the request with every SAI/CGI change, or if the deferred location request with the event “change of area” is wanted in every RA change or RNC relocation, SGSN does not send the request to RAN and waits the event occurrence.

LCS positioning shall be done here as presented in 9.1.6 (steps 3-7). Positioning shall be done to retrieve the exact position of the UE at the start of the deferred request in the SGSN and thereafter only the "Change of Area" events and the new location information is reported.

- 7) If SGSN supports the deferred location request for the specified event and the privacy checks in step 5 are satisfied, SGSN sends a confirmative acknowledgement to GMLC. In this message also the location information that is obtained in step 6 shall be sent.
- 8) GMLC returns a LCS Service Response to the LCS Client to notify whether the request was successfully accepted or not.
- 9) In the case that the requested “change of area” event is SAI/CGI change and 3G-SGSN sends the location request to RAN in step 6, RAN sends a location report containing information about the new geographical coordinates of the requested target mobile to the SGSN when the target mobile has moved to another service area. When mobile moves to idle mode only the Location Area changes or RAU initiates location reports.

=> In case the SGSN receives an indication that the UE has moved to another SGSN while it is waiting for the requested event to happen, a Subscriber Location Report is directly sent to the GMLC with the information that MT-LR must be re-initiated against the new SGSN. The address of the new SGSN is included in Subscriber Location Report, if available. (If new SGSN address was included, the GMLC continues at step 4 above, otherwise it continues with an interrogation against HLR in step 2.

- 10) When the requested event is detected, the SGSN will proceed with the location request as described in 9.1.6. If the requested “change of area” event (in step 4) is SAI/CGI change and the SGSN is 3G-SGSN, then only the privacy check procedures are needed in this step.

If either security or privacy checks fails, a Subscriber Location Report is returned with appropriate error cause indicating termination of the deferred location request.

- ~~10~~11) When location information in the geographical coordinates has been obtained from the RAN, the SGSN returns the Subscriber Location Report to the GMLC with the location information. The report contains an indication that this is a response to a previously sent deferred location request with the event “change of area”. If the location information could not be obtained, or the SGSN for some other reason decides not to wait any longer for the requested event to occur (ex. timer expires), the Subscriber Location Report will be returned with an appropriate error cause indicating termination of the deferred location request with event “change of area”.

- ~~11~~12) GMLC returns the LCS Service Response to the LCS Client.

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9.1.8.34 Cancellation of a Deferred Location Request

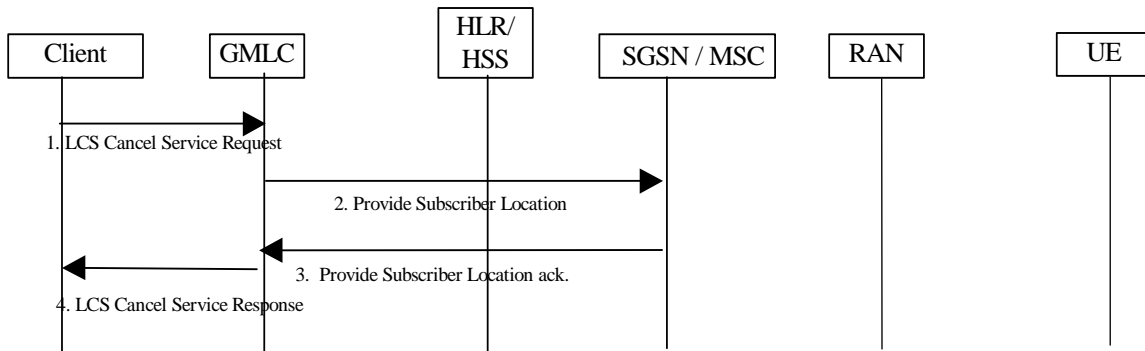


Figure 9.6cb: Cancellation of a Deferred MT-LR procedure

- 1) The LCS Client requests the cancellation of a previously requested Deferred Location Request. The cancellation could be initiated by the GMLC itself for some reasons (e.g. implementation dependent timer in the GMLC expired). The event type to cancel must be indicated in the Cancellation procedure.
- 2) The GMLC will indicate this cancellation request in the Provide Subscriber Location towards the SGSN/ MSC. In case of LDR only the requested event is cancelled.- SGSN may cancel the deferred location request with RNC and indicate which specific event is cancelled, such as the event “change of area”.
- 2) When the SGSN/ MSC completes the cancellation procedure, it notifies it to the GMLC in the Provide Subscriber Location Ack (with no location estimate included).
- 3) 4) The GMLC informs the LCS Client that the cancellation procedure has been successfully completed.

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10.1 Charging

Charging Information collected by the PLMN serving the LCS Client.

The following charging information shall be collected by the PLMN serving the LCS Client:

- Type and Identity of the LCS Client;
- Identity of the target UE;
- Results (e.g. success/failure, method used if known, response time, accuracy) - to be repeated for each instance of positioning for a deferred location request;
- Identity of the visited PLMN;
- LCS request type (i.e. LDR or LIR);
- State;
- Event (applicable to LDR requests only);
- Time Stamp;
- Type of co-ordinate system used.

- In addition LDR (Event "Change of Area") may also be charged based on every Location Report instance. However this should be optional, since most likely it is enough that only LDR (Change of Area) start and cancel times are recorded. In practice only time based charging of LDR (Event "Change of Area") seems reasonable because of the big number of Location Reports. Also charging based on Location Report instances is not reasonable for the service because the movement of the subscriber cannot be controlled.