



CDMA User Plane LBS IS801-1 Call flows

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Revision History

Date	Version	Description
11 April 2005	0.94	Preliminary draft.
17 May 2005	0.95	Added updates based on conference call with Nokia. Added references to Doc 98 and 101. Removed section 2.2.
09 June 2005	0.96	Added PD_MSG_TYPE value of 11000000 and RESP_TYPE value of 0010 in system parameters message.
22 August 2005	1.0	Final approved version



1. Introduction

1.1 Scope

This document provides a summary of the mobile originated (MO), IS-801 call flows that can be used by a carrier in their User Plane deployment. All the call flows are based upon [9].

NOTE IS-801-1 is not backwards compatible with IS-801. As a result, this document only discusses the IS-801-1 standard.

1.2 Organization

This document describes the LBS requirements that a current CDMA mobile should support. This document is organized in sections.

Section 1 defines the scope of this document,
Section 2 is defines the IS-801-1 call flows,
Section 3 describes system parameters message.

1.3 Reference Documents

3GPP2 reference documents can be found at
http://www.3gpp2.org/Public_html/specs/index.cfm.

CDG reference documents can be found at <http://www.cdg.org>.

QUALCOMM reference documents can be found at <http://www.cdg.org>.

BREW related documents can be found at
<http://brew.qualcomm.com/brew/en/developer/resources/ds/okb.html>.

Java API related documents can be found at www.jcp.org.

Ref	Document Title	Author	Version	Date
1.	Mobile Station - Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular		TIA/EIA/IS-95-A	

	System			
2.	Mobile Station - Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System		TIA/EIA/IS-95-B	
3.	cdma2000 High Rate Packet Data Air Interface Specification- (TIA/EIA/IS-856-2)		3GPP2, C.S0024-2	March 2004
4.	Data Service Options for Spread Spectrum Systems- addendum 2(TIA/EIA/IS-707-A-2)		3GPP2, C.S00017-0-2	March 2001
5.	Data Service Options for Spread Spectrum Systems: addendum 3, high speed packet data service option 33. (TIA/EIA/IS-707-A-3)		3GPP2, C.S00017-0-3	February 2003
6.	Short Message Services for Wideband Spread Spectrum Cellular Systems(TIA/EIA/IS-637-A)		3GPP2, C.S0015-A	September 1999
7.	Over-the-Air Service Provisioning of Mobile Stations in Wideband Spectrum Cellular Systems (TIA-683-C)		3GPP2, C.S0016-B	March 2003
8.	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations.(TIA-98-E)		3GPP2, C.S0011-B	February 2003
9.	Position Determination Service Standards for Dual Mode Spread Spectrum Systems, Addendum 1(TIA/EIA/IS-801-1)		3GPP2, C.S0022-0-1	February 2001
10.	Recommended Minimum Performance Specification for C.S0022-0 Spread Spectrum Mobile Stations Release 0. (TIA-916)		3GPP2 C.S0036-0 v1.0	March 2002
11.	Wireless Enhanced Emergency Services, Phase II		TIA/EIA J-STD-036-B	2005
12.	Location Services Enhancements (TIA-881)		3GPP2, X.S0002	March 2004
13.	TIA/EIA-41-D Enhancements for Circuit-Switched Call Precedence Over CDMA Packet Data Session (CPOP)		TIA-935	June 2003
14.	OMA Mobile Location Protocol (MLP)		3.0.0	April 2002
15.	SMPP protocol specification		Ver.3.4	October 1999
16.	JAVA specification, Location API for J2ME		JSR 179	September 2003

17.	gpsOne™ Mobile Station Sensor Interface Application TCP/IP Wrapper Interface Specification	Qualcomm1	CL93-V2246-1 Rev B	
18.	gpsOne™ User Plane MS-MPC Protocol Specification	Qualcomm	80-V5456-1NP F	
19.	gpsOne™ User Plane MS-MPC Protocol Specification	Qualcomm	80-V5456-2NP C	
20.	Location-Based Services System Specification (V1)	Qualcomm	80-V6410-1NP D	
21.	Location-Based Services System Specification (V2)	Qualcomm	80-V6410-2NP F	
22.	gpsOne™ User Plane E5' Protocol Specification(V1)	Qualcomm	80-V5458-1NP E	
23.	gpsOne™ User Plane E5' Protocol Specification(V2)	Qualcomm	80-V5458-2NP E	
24.	gpsOne™ User Plane Handset Specification(V1)	Qualcomm	80-V6114-1NP Rev D	
25.	gpsOne™ User Plane Handset Specification(V2)	Qualcomm	80-V6114-2NP B	
26.	Location Based Services Roaming Support (Non-proprietary)	Qualcomm	80-V8470-1NP B	
27.	Location Based Services V2 Roaming Support (Non-proprietary)	Qualcomm	80-V8470-2NP A	
28.	Mobile Positioning Center (MPC) V1, (Non-proprietary)	Qualcomm	80-V6195-1NP B	
29.	Mobile Positioning Center (MPC) V2, (Non-proprietary)	Qualcomm	80-V6195-2NP B	
30.	BREW developers guide for LBS IPOSDet API	Qualcomm		
31.	DNS RFC		RFC 1035	
32.	CDMA mobile station LBS requirements V1		CDG 98	
33.	CDMA mobile station LBS requirements V2		CDG 101	

1.4 Acronyms and Abbreviations

Table 1-1: Acronyms and Abbreviations

Acronym / Abbreviation	Description
AFLT	Advanced Forward-Link Trilateration
A-GPS	Assisted GPS
ANSI	American National Standards Institute
API	Applications Programming Interface
BS/BTS	Base Station
BSC	Base Station Controller
CDMA	Code Division Multiple Access
GPS	Global Positioning System
IMSI	International Mobile Subscriber Identity
IWF	Interworking Function
LBS	Location Based Services
LCS	Location Services
MO	Mobile originated
MS	Mobile Station
MSC	Mobile-Switching Center
MSTO	Mobile station time offset
MSID	Mobile Station Identifier
PDE	Position Determination Entity
PPM	Pilot Phase Measurement
SA	Sensitivity Assistance



2. IS-801-1 Call Flows

This section describes the call flows that the mobile supports for obtaining a position fix. All the call flows are based upon [Error! Reference source not found.9].

Both MS-assisted and MS-based call flows are supported. For MS-based, the call flows can serve the purpose of deriving an immediate fix or just the download of assistance data.

2.1 MS-assisted

2.1.1 Immediate AA and SA

In this call flow, shown in Figure 2–1, the MS provides pilot phase measurement data to the position determination entity (PDE) and requests global positioning system (GPS) acquisition assistance (AA), and GPS sensitivity assistance (SA) immediately.

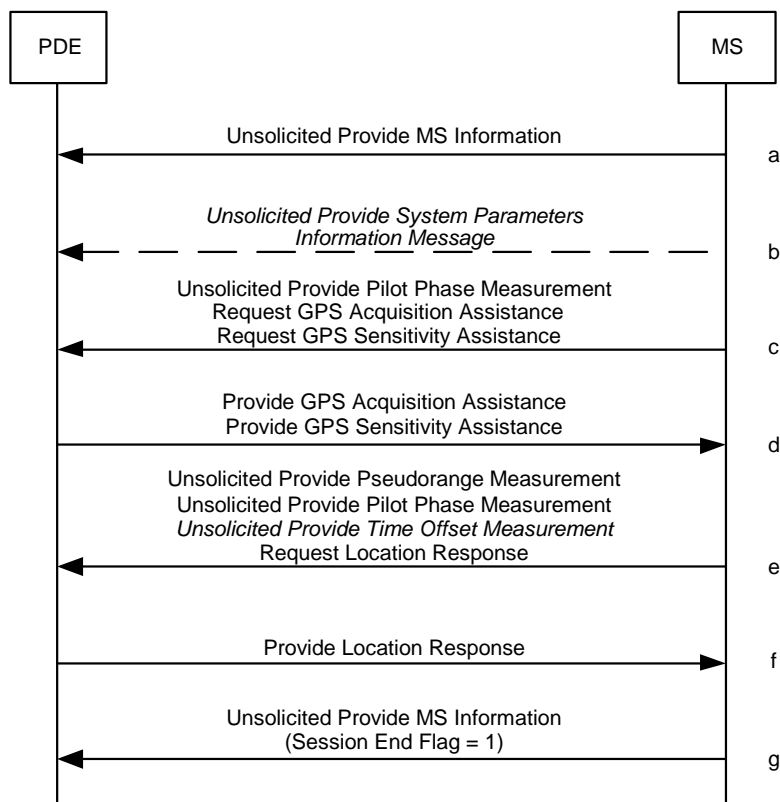
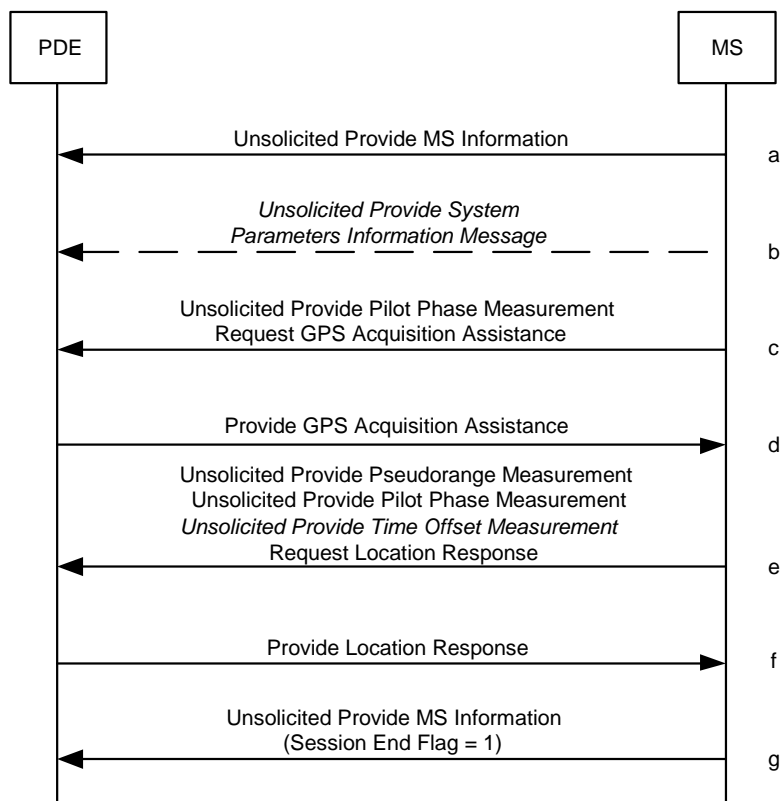


Figure 2–1 MS-assisted immediate AA and SA**2.1.2 Immediate AA only**

In this call flow, shown in Figure 2–2, the MS provides pilot phase measurement data to the PDE and only requests GPS AA. There is no request for GPS SA.

**Figure 2–2 MS-assisted immediate AA only**

2.1.3 Sequential AA and then SA

In this call flow, shown in Figure 2–3, the MS provides pilot phase measurement data to the PDE; it requests GPS AA first and then requests GPS SA in a later message.

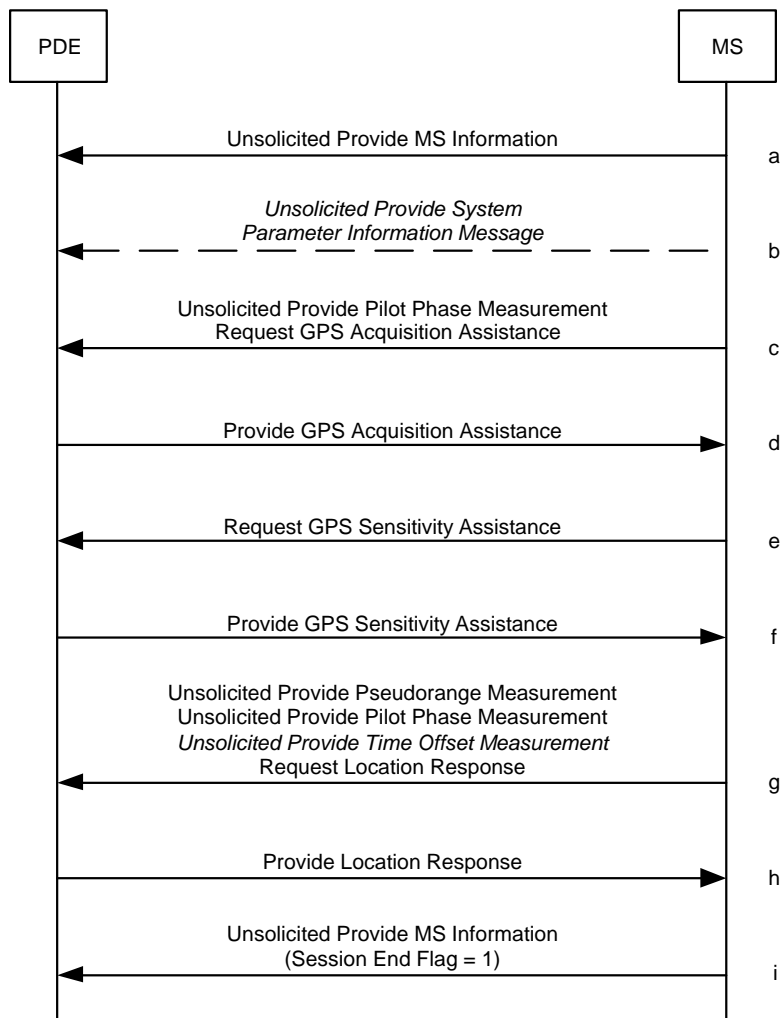


Figure 2–3 MS-assisted sequential AA and then SA

2.1.4 AFLT-only

In this call flow, shown in Figure 2–4, the MS provides pilot phase measurement data to the PDE and indicates that it is only capable of AFLT.

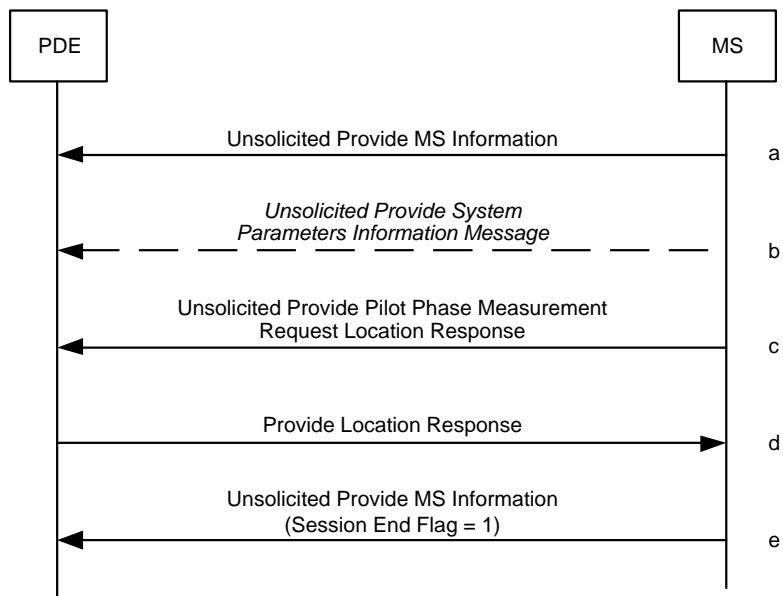


Figure 2–4 MS-assisted AFLT-only

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2.1.5 Sequential AA and then SA

In this call flow, shown in Figure 2–5, the MS provides the pilot phase measurement data to the PDE requests GPS AA first, and then requests GPS SA in a later message. The MS provides a position estimate back to the PDE.

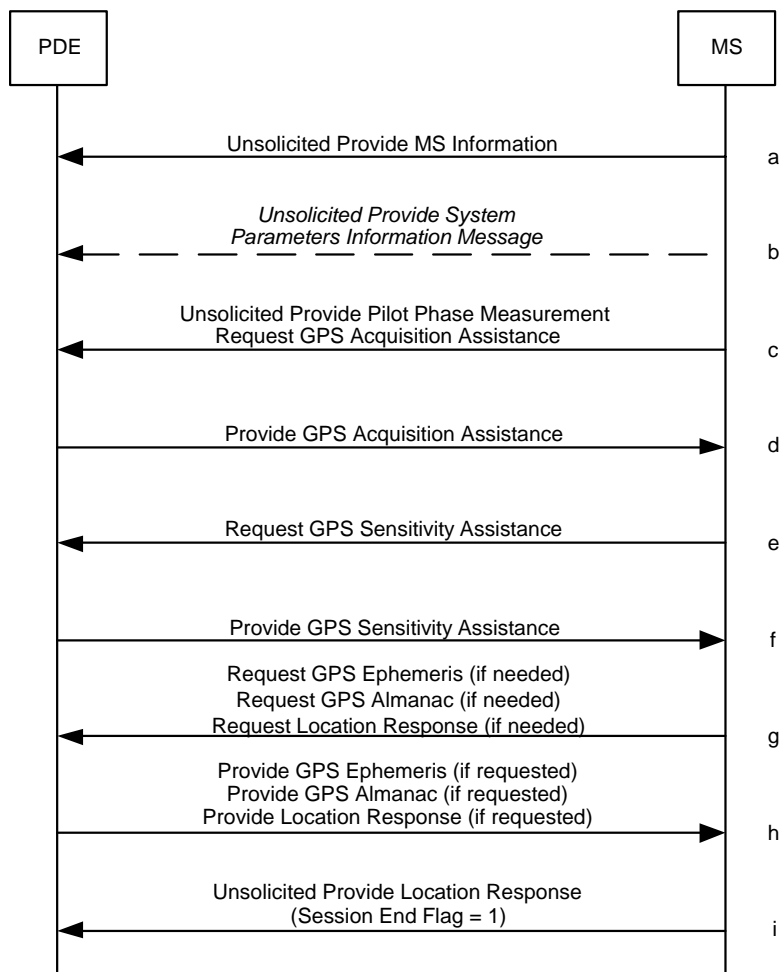


Figure 2–5 MS-based sequential AA and then SA

2.2 MS-based assistance data only

In this type of call flow, the MS just downloads the assistance data.

2.2.1 Ephemeris and initial position

In this call flow, shown in Figure 2–6, the MS provides pilot phase measurement data to the PDE and receives a location response along with ephemeris and/or almanac data in return.

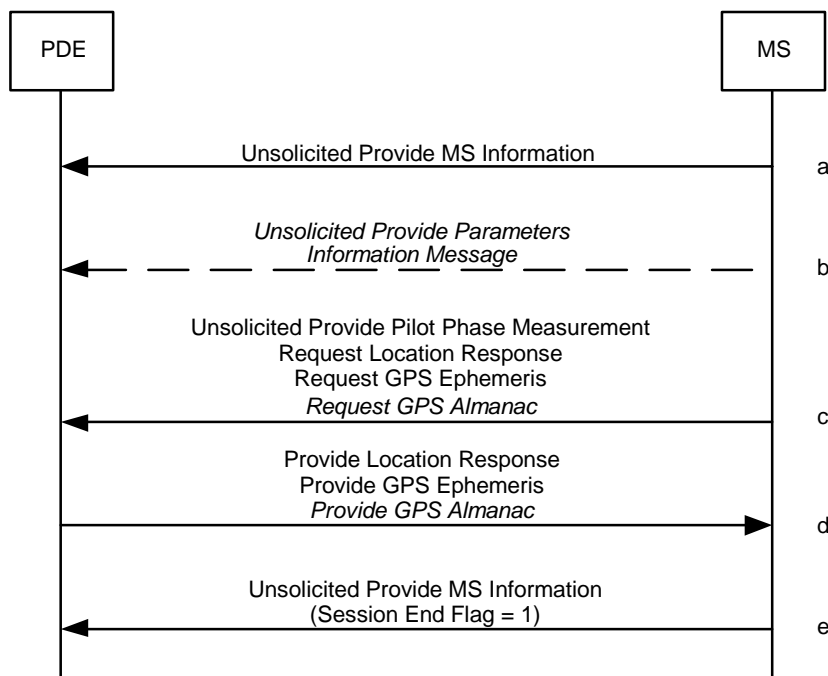


Figure 2–6 MS-based ephemeris and initial position

2.2.2 Ephemeris based on PPM

In this call flow, shown in Figure 2–7, the MS provides pilot phase measurement data to the PDE and receives ephemeris and/or almanac data.

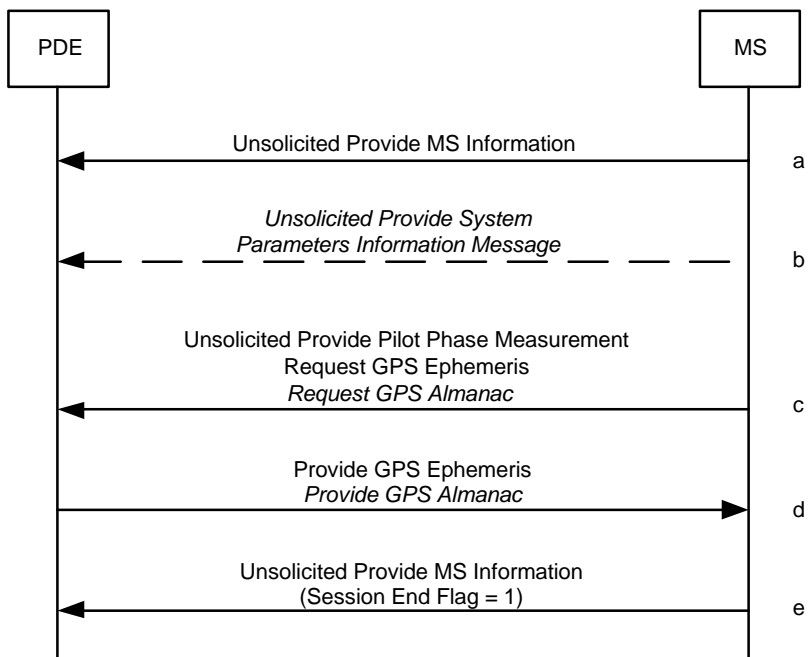


Figure 2–7 MS-based ephemeris based on PPM

2.2.3 Generic ephemeris

In this call flow, shown in Figure 2–8, the MS receives ephemeris and/or almanac data from the PDE that is not a function of its position.

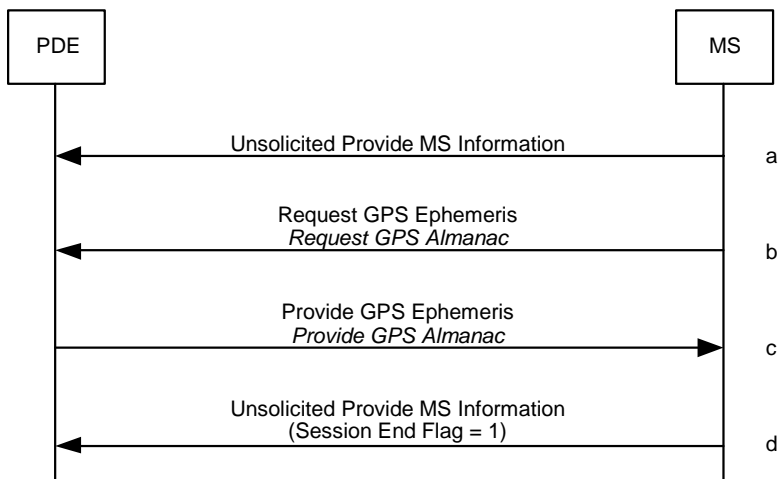


Figure 2–8 MS-based generic ephemeris

2.2.4 Initial position

In this call flow, shown in Figure 2–9, the MS provides pilot phase measurement data to the PDE and receives a location response in return.

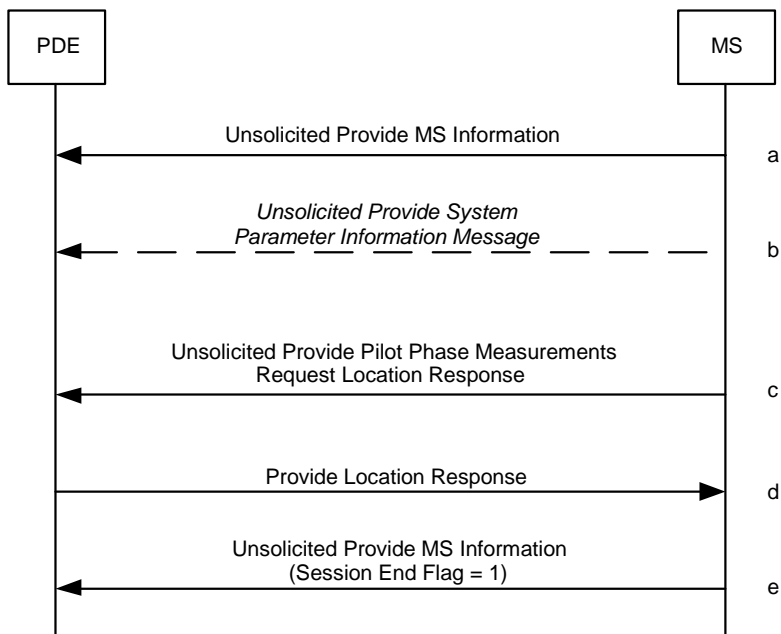


Figure 2–9 MS-based initial position

2.2.5 Ephemeris based on position

In this call flow, shown in Figure 2–10, the MS provides location response data to the PDE and receives ephemeris and/or almanac data in return.

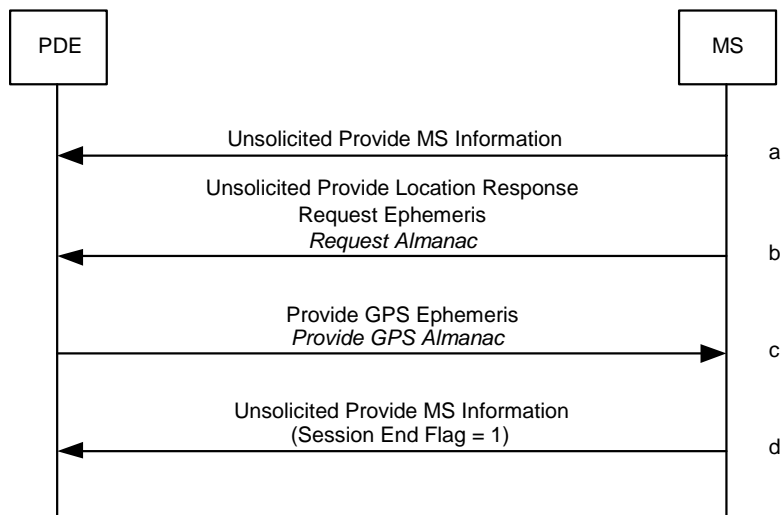


Figure 2–10 MS-based ephemeris based on position



3. System Parameters

3.1 System parameters information

This proprietary IS-801 message is described as follows and may be enabled at the discretion of operators in their handset specification.

3.1.1 Request

There is no request element.

3.1.2 Response

The message format shall be in accordance with [Error! Reference source not found.9]. PD_MSG_TYPE shall be set to binary '11000000'. RESP_TYPE shall be set to binary '0010' (Provide System Parameters Info).

RESP_PAR_RECORD shall include the following record:

<i>Field</i>	<i>Length (bits)</i>
TIME_REF_CDMA	14
STILL_ACTIVE	1
BAND_CLASS	5
CDMA_FREQ	11
PILOT_PN	9
SID	15
NID	16
BASE_ID	16
BASE_LAT	22
BASE_LONG	23
RESERVED	4

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Field definitions

- TIME_REF_CDMA – CDMA system time at the time the coarse location is valid – the base station shall set this field to $(t/50 \bmod 16384)$, where t is the CDMA system time in frames, as defined in 1.2 of TIA/EIA-95B, at the time the coarse location is valid. This is the time at which the values of the parameters reported in this response element parameter record are valid.
- STILL_ACTIVE – If the serving base station at TIME_REF_CDMA has dropped out of the active set, this field shall be set to '0'; otherwise this field shall be set to '1'.
- BAND_CLASS – Band class – the mobile station shall set this field to the CDMA band class, as specified in TSB58-B, at the time the coarse location is valid.
- CDMA_FREQ – Frequency assignment – the mobile station shall set this field to the CDMA channel number, in the specified CDMA band class, as specified in 6.1.1.1 of TIA/EIA-95B, at the time the coarse location is valid.
- PILOT_PN – Pilot PN sequence offset index – if the mobile station is on the Paging Channel, the mobile station shall set this field to the Pilot PN sequence offset index obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the Pilot PN sequence offset index obtained from the Paging Channel that the mobile station last demodulated.
- SID – System identification – if the mobile station is on the Paging Channel, the mobile station shall set this field to the system identification number obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the system identification number obtained from the Paging Channel that the mobile station last demodulated.
- NID – Network identification – if the mobile station is on the Paging Channel, the mobile station shall set this field to the network identification number obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the network identification number obtained from the Paging Channel that the mobile station last demodulated.
- BASE_ID – Base station identification – if the mobile station is on the Paging Channel, the mobile station shall set this field to the base station identification number obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the base station identification number obtained from the Paging Channel that the mobile station last demodulated.
- BASE_LAT – Base station latitude – if the mobile station is on the Paging Channel, the mobile station shall set this field to the base station latitude obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the base station latitude obtained from the Paging Channel that the mobile station last demodulated.
- BASE_LONG – Base station longitude – if the mobile station is on the Paging Channel, the mobile station shall set this field to the base station longitude obtained from the Paging Channel that the mobile station is demodulating; otherwise, the mobile station shall set this field to the base station longitude obtained from the Paging Channel that the mobile station last demodulated.

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