Mobile Positioning Protocol

Version 3.0

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Contents

1 Introduction

The Mobile Positioning Protocol is used to interface the Mobile Positioning Centre. With this protocol it is possible to request the position of mobile phones.

This document forms a base for developers of Location Applications interfacing the Mobile Positioning Centre using the Mobile Positioning Protocol version 3.0. A working knowledge of HTTP and XML is assumed throughout the specification.

The Mobile Positioning Protocol (MPP) is an application-level protocol for GSM based positioning. The MPP serves as an interface between the Mobile Positioning Centre (MPC) and theLocation Application which will be referred to as the Location Service client (LCS client).

The MPC hides the underlying technology that is used when retrieving the position of an MS. The only thing that an application needs to manage is the Mobile Positioning Protocol (MPP).

Note: This protocol is currently Ericsson proprietary. As the standards for Location Services within European Telecommunications Standards Institute (ETSI) will become more firm, this protocol may be changed to meet the standardized interface.

1.1 References

The user documentation for MPC 3.0 includes the following documents:

[1] Mobile Positioning Protocol, Version 3.0, System Interface 15510-CNH 160 230 Uen

[2] Mobile Positioning Protocol, Version 1.1, System Interface 155 10-CXC 132 325 Uen

[3] Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface 1/155 10-CNH 160 230 Uen

[4] MPC 3.0, Hardware Specification 1301-CNH 160 230 Uen

2 Syntax Notation

The following rules are used throughout this specification to describe basic parsing constructs. The US-ASCII coded character set is defined by ANSI x3.4-1986.

CR= US-ASCII CR, Carriage Return (13).
LF= US-ASCII LF, Line Feed (10).
SP= US-ASCII SP, SPace (32).

A set of characters enclosed in brackets “[]” is a one-character expression that matches any of the characters in that set. For example, “[mpc]” matches either an “m”, “p”, or “c”. A range of characters is indicated with a dash.
For example, “[a-z]” matches any lower-case letter.

The one-character expression can be followed by an interval operator, for example [a-zA-Z]{min,max} in which case the one-character expression is repeated at least min and at most max times. For example, “[a-zA-Z]{2,4}” matches the strings “at”, “Good”, and “biG”.

2.1 DTD Syntax Notation

Character	**Meaning**
+	One or more occurrence
*	Zero or more occurrences
?	Optional
()	A group of expressions to be matched together
|	OR...as in, “this or that”
,	Strictly ordered. Like an AND
SP	Not ordered. Like an AND.

3 Protocol Bearer

MPP 3.0 is implemented on top of HTTP 1.0. HTTP is a request/response type of protocol involving a server and a client. In this context the client is referred to as the LCS client and the server as the MPC.
For more information about HTTP, see http://www.w3.org.

The MPC provides two URLs for operation, one for SSL encryption and one for insecure communication.

Host and port are set by the operator.

4 Request Overview

An LCS client requests location information by issuing a POST request towards the MPC.

The request must include the entity-header Content-length field as part of the request. The message body of the request should include the XML formatted request and should have the length specified by the LCS client in the Content-length field.

The request for location information is posted to the same URL. The URL is shown below.
http://host:port/newRequest/

The MPC 3.0 supports one type of request:

LIR- Location Immediate Request. A LIR should be used when the LCS client wants to receive the answer as the result of the request over a persistent connection.
The answer is a Location Immediate Answer (LIA)

5 Position Request

The parameters are described in more detail in Table2, page9.

When a position request is sent to the MPC, the MPC responds with either an error message or with the answer to a successful request. Since the protocol is based on HTTP, the user of MPP must be prepared for errors related to HTTP as well as to MPP 3.0.

5.1 Request DTD

Table1 Request DTD

```
<!ATTLIST REQ ver CDATA     #FIXED “3.00”>
<!ELEMENT CLIENT            (ID PWD)>
<!ELEMENT ID                (#PCDATA)>
<!ELEMENT PWD               (#PCDATA)>
<!ELEMENT REQ               (CLIENT (LIR))>

<!ELEMENT LIR               (MSIDS QoS? GEO_INFO?)>



<!ELEMENT MSIDS             ((MSID | MSID_RANGE)+ MSID_TYPE?)>
<!ELEMENT MSID              (#PCDATA)>
<!ELEMENT MSID_RANGE        (START_MSID STOP_MSID)>
<!ELEMENT START_MSID        (#PCDATA)>
<!ELEMENT STOP_MSID         (#PCDATA)>
<!ELEMENT MSID_TYPE         (#PCDATA)>

<!ELEMENT GEO_INFO          (COORD_SYS? DATUM? FORMAT?)>
<!ELEMENT COORD_SYS         (#PCDATA)>
<!ELEMENT DATUM             (#PCDATA)>
<!ELEMENT FORMAT            (#PCDATA)>

<!ELEMENT QoS               (MAX_DEL?)
<!ELEMENT MAX_DEL           (#PCDATA)>
```

5.2 Element Description

Table2 Element Description, Request

Element	Description	
REQ	Description: Format: Example:	Defines the content of the positioning request - -
REQ ver	Description: Format: Example:	Specifies the version of MPP used by the application. The value is fixed to "3.00". Char String 3.00
CLIENT	Description: Format: Example:	Specifies the LCS client that sends the request. A client is identified by and ID and a PWD which must be registered in the MPC. - -
ID	Description: Format: Example:	Unique identifier for an LCS client. Char String {4,15} MPC_User
PWD	Description: Format: Example:	Specifies the password to authorize the client Char String {4,10} TheP5w
LIR	Description: Format: Example:	Specifies that the request is a Location Immediate Request. - -
MSID_TYPE	Description: Format: Example:	An MS can be specified by several different identifiers. This version of the MPP supports only MSISDN and the parameter is for future use. Char String -
MSIDS	Description: Format: Example:	Defines which MSIDs that shall be positioned. MSIDS can be specified as single items with element MSID or as a number range with element MSID_RANGE - -
MSID	Description: Format: Example:	Defines a single MSID [0-9]+ 46555123456
MSID_RANGE	Description: Format: Example:	Defines a range of MSIDs. All MSIDs from START_MSID to STOP_MSID shall be positioned. - START_MSID=46555123344 and STOP_MSID=46555123346 Result in that MSID=46555123344, 46555123345 and 46555123346 will be positioned.
START_MSID	Description: Format: Example:	Defines the first MSID in an MSID_RANGE that shall be positioned. [0-9]+ 46555123344

Element	Description	
STOP_MSID	Description: Format: Example:	Defines the last MSID in an MSID_RANGE that shall be positioned. [0-9]+ 46555123346
GEO_INFO	Description: Format: Example: Default:	This element specifies in which format the geographical data in the answer shall be returned. All supported values can be found in *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*. NOTE that only certain combinations of geodetic datum, coordinate system and format are valid. The MPC does not check the validity of a requested combination. - - If this element is not specified, the default geodetic information for the LCS client in the MPC is used. If no default value is set for the LCS client the configurable system default value is used.
COORD_SYS	Description: Format: Example: Default:	This element specifies in which coordinate system the geographical data in the answer shall be returned. see *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface* for more information. LL If this element is not specified, the default coordinate system specified for the LCS client in the MPC is used. If no default value is set for the LCS client the configurable system default value is used.
DATUM	Description: Format: Example: Default:	This element specifies in which geodetic datum the geographical data in the answer shall be returned. Allowed values: see *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*. WGS-84. If this element is not specified, the default geodetic datum specified for the LCS client in the MPC is used. If no default value is set for the LCS client the configurable system default value is used.
FORMAT	Description: Format: Example: Default:	This element specifies in which format the geographical data in the answer shall be returned. Allowed values: see Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface. IDMS0 IDMS0
QoS	Description: Format: Example: Default:	The Quality of Service is defined by one element, MAX_DELAY. - - If the element is not specified, LCS client default values is used. If the LCS client does not carry a default value the configurable system default value is used.
MAX_DEL	Description: Format: Example: Default:	Maximum delay, specifies for how long, in seconds, the LCS client accepts to wait for the positioning to start executing in the MPC. Network time is not included in the delay. Average time in network is 2 sec. [0-9]+ 10 If the element is not specified, LCS client default values is used. If the LCS client does not carry a default value the configurable system default value is used.

5.3 Request Example

```
<?xml version= ‘1.0’ encoding=’ISO-8859-1’ standalone=’yes’?>
<!DOCTYPE REQ>
<REQ ver=”3.00”>
    <CLIENT>
        <ID>TheUser</ID>
        <PWD>The5PW</PWD>
    </CLIENT>
    <LIR>
        <GEO_INFO>
            <COORD_SYS>LL</COORD_SYS>
            <DATUM>WGS-84</DATUM>
            <FORMAT>IDMS0</FORMAT>
        </GEO_INFO>
        <MSIDS>
            <MSID>461011334411</MSID>
            <MSID>461011334414</MSID>
            <MSID_RANGE>
                <START_MSID>461011334500</START_MSID>
                <STOP_MSID>461011334599</STOP_MSID>
            </MSID_RANGE>
        </MSIDS>
        <QoS>
            <MAX_DEL>0030</MAX_DEL>
        </QoS>
    </LIR>
</REQ>
```

In this example the client ‘TheUser’ sends a Location Immediate Request (LIR). The MSIDs to be positioned are:
461011334411
461011334414
461011334500
:
461011334599

The QoS-parameter, specified as the accepted delay time is 30 seconds. If the MPC is not able to perform the position within 30 seconds, the positioning will not be performed and the answer will be an error message.

The application also requests the geographical data to be presented in WGS-84 and Latitude/Longitude with the format=IDMS0. For more information on supported formats, see *Reference [3] -Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*.

6 Successful Response

A response is successful if the position request has correct syntax and passes the authority checks. However, under specific circumstances, the positioning process itself may fail due to other reasons, for example due to problems in the Public Land Mobile Network (PLMN). This means that the *positioning* fails, but the *response* to the request is still considered to be successful, since the request has correct syntax and has passed the authority check.

Since a position request may contain more than one MS to position, the response may contain positionings for many MS. In that case the position parameters POS (see *Reference Table3 - Answer DTD*) are repeated. Successful positionings may be mixed with unsuccessful positionings in the answer.

6.1 Position Answer DTD

Table3 Answer DTD

```
<!ATTLIST ANS ver CDATA          #FIXED "3.00">
<!ELEMENT ANS                    (LIA)>

<!ELEMENT LIA                    (POS+ GMT_OFF | ERROR)>

<!ELEMENT OK>

<!ELEMENT POS                    (PD+ | ERROR)>
<!ATTLIST POS msid CDATA         #REQUIRED>
<!ELEMENT PD                     (TIME ARC LEV_CONF?)>
<!ELEMENT TIME                   (#PCDATA)>
<!ELEMENT ARC                    ((LL_POINT | UTM_POINT | XY_POINT) IN_RAD OUT_RAD
                                 START_ANGLE STOP_ANGLE)>
<!ELEMENT LL_POINT               (LAT LONG)>
<!ELEMENT LAT                    (#PCDATA)>
<!ELEMENT LONG                   (#PCDATA)>
<!ELEMENT UTM_POINT              (EASTING NORTHING ZONE ZONE_DES)>
<!ELEMENT EASTING                (#PCDATA)>
<!ELEMENT NORTHING               (#PCDATA)>
<!ELEMENT ZONE                   (#PCDATA)>
<!ELEMENT ZONE_DES               (#PCDATA)>
<!ELEMENT XY_POINT               (X Y)
<!ELEMENT X                      (#PCDATA)>
<!ELEMENT Y                      (#PCDATA)>
<!ELEMENT IN_RAD                 (#PCDATA)>
<!ELEMENT OUT_RAD                (#PCDATA)>
<!ELEMENT START_ANGLE            (#PCDATA)>
<!ELEMENT STOP_ANGLE             (#PCDATA)>
<!ELEMENT LEV_CONF               (#PCDATA)>

<!ELEMENT ERROR                  (DESCR?)>
<!ATTLIST ERROR errorid CDATA    #REQUIRED>
<!ELEMENT DESCR                  (#PCDATA)>

<!ELEMENT GMT_OFF                (#PCDATA)>
```

6.2 Element Description

Table4 Element Description, Answer

Element	Description	
ANS ver	Description: Format: Example:	Defines that this is an answer to a request and the version of the MPP used. Char String 3.00
LIA	Description: Format: Example:	Defines that this is an answer for a LIR, Location Immediate Request. - -
POS	Description: Format: Example:	This element indicates that positioning information follows for the specified MSID. If no positioning information is available this is indicated by an error.For more information on error codes see Section8, page20. Positioning information can contain one or more positioning data, PD. [0-9]+ 46777100009
PD	Description: Format: Example:	The element contains the positioning area as an arc and the time when the area was calculated. - -
TIME	Description: Format: Example:	The element defines the time when the positioning information for this position data was collected by the MPC. YYYYMMDDHHMMSS 19991204122030
ARC	Description: Format: Example:	The element specifies the position area as an arc. The area is described by a - point - inner/outer radius - start/stop angle For more information see Section7, page18. - -
LL_POINT	Description: Format: Example:	The element defines a point of origin as Latitude and Longitude. The format of the point data is dependant on the requested coordinate system. Available coordinate systems are described in *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*. - -
LAT	Description: Format: Example:	The latitude for LL_POINT Char String N301630.3
LONG	Description: Format: Example:	The longitude for a LL_POINT Char String W974450.2

Table4 Element Description, Answer

Element	Description	
UTM_POINT	Description:	The element defines a point of origin described in UTM coordinates with - Easting - Northing - Zone - Zone Designator The format of the point data is dependant on the requested coordinate system. Available coordinate systems are described in *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*.
	Format:	-
	Example:	-
EASTING	Description:	The easting for a UTM_POINT, in meters.
	Format:	[0-11000]
	Example:	1124
NORTHING	Description:	The northing for a UTM_POINT, in meters.
	Format:	[0-15000]
	Example:	20300.5
ZONE	Description:	The zone for a UTM_POINT
	Format:	[0-60]
	Example:	34
ZONE_DES	Description:	The zone designator for a UTM_POINT
	Format:	[C-W]
	Example:	
XY_POINT	Description:	The element defines a point of origin in x/y coordinates.The format of the point data is dependant on the requested coordinate system. Available coordinate systems are described in *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*.
	Format:	-
	Example:	-
X	Description:	The x distance for a XY_POINT
	Format:	Char String
	Example:	5700.5
Y	Description:	The y distance for a XY_POINT
	Format:	Char String
	Example:	2100.3
IN_RAD	Description:	Defines the inner distance, in meters, from the point of origin. For more information see Section7, page18.
	Format:	[0-65000]
	Example:	1100
OUT_RAD	Description:	Defines the outer distance, in meters, from the point of origin. For more information see Section7, page18.
	Format:	[0-65000]
	Example:	2200

Table4 Element Description, Answer

Element	Description	
START_ANGLE	Description: Format: Example:	Defines the start angle, in degrees, for the ARC. For more information see Section7, page18. [0-360] 60
STOP_ANGLE	Description: Format:	Defines the stop angle, in degrees, for the ARC. For more information see Section7, page18. [0-360]Example:180
LEV_CONF	Description: Format: Example:	This parameter is for future use only and should be ignored 0-100 100
ERROR	Description: Format: Example:	An unsuccessful positioning results in an answer indicating the cause of error. The error is described with an error code and an optional error description. For more information, see Section8, page20. [0-9999] 201
DESCR	Description: Format: Example:	Defines a text describing the cause of error, only for syntachtical errors. Char String The element CLIENT is erroneously defined or missing in the request.
GMT_OFF	Description: Format: Example:	The GMT offset, in hours, for the MPC server itself. If the client resides in a different time zone than the MPC, this element must be taken into account when using the time parameter supplied in an answer. A difference west of Greenwich has a negative (-) value. A difference east of Greenwich has a positive (+) value. -HHMM to HHMM (-1200 to 1200) 0100 this is Central European Time (GMT+1)

6.3 Answer Example

6.3.1 LIA - Location Immediate Answer

```
<?xml version= ‘1.0’ encoding=’ISO-8859-1’ standalone=’yes’?>
<!DOCTYPE ANS>
<ANS ver=”3.00”>
    <LIA>
        <GMT_OFF> +0100 </GMT_OFF>
        <POS msid=”1234512345”>
            <PD>
                <TIME> 20000626171825 </TIME>
                <ARC>
                    <LL_POINT>
                        <LAT> N301628.3 </LAT>
                        <LONG> W974425.2 </LONG>
                    </LL_POINT>
                    <IN_RAD> 1100 </IN_RAD>
                    <OUT_RAD> 1650 </OUT_RAD>
```

```
                    <START_ANGLE> 120 </START_ANGLE>
                    <STOP_ANGLE> 240 </STOP_ANGLE>
                </ARC>
            </PD
        </POS>
        <POS msid=”1234512346”>
            <PD>
                <TIME> 20000626171825 </TIME>
                <ARC>
                    <LL_POINT>
                        <LAT> N301630.3 </LAT>
                        <LONG> W974450.2 </LONG>
                    </LL_POINT>
                    <IN_RAD> 0 </IN_RAD>
                    <OUT_RAD> 1650 </OUT_RAD>
                    <START_ANGLE> 120 </START_ANGLE>
                    <STOP_ANGLE> 240 </STOP_ANGLE>
                </ARC>
            </PD>
        </POS>
    </LIA>
</ANS>
```

This Location Immediate Answer contains the positioning information (POS) for MSs 1234512345 and 1234512346.
Each POS contains a set of positioning data (PD): The positioning time and the position described as an arc and its point of origin. For more information of the arc and the point see Section7, page18.

6.4 Unsuccessful Positioning

An unsuccessful positioning results in the same response above, with the exception that the position data (element PD) within element POS are missing.

Example:

```
<?xml version= ‘1.0’ encoding=’ISO-8859-1’ standalone=’yes’?>
<!DOCTYPE ANS>
<ANS ver=”3.00”>
    <LIA>
        <GMT_OFF> +0100 </GMT_OFF>
        <POS msid=”1234512345”>
            <ERROR errorid=”601”>
            </ERROR>
        </POS>
        <POS msid=”1234512346”>
            <PD>
                <LEV_CONF> 100 </LEV_CONF>
                <TIME> 19980626171825 </TIME>
                <ARC>
                    <LL_POINT>
                        <LAT> N301630.3 </LAT>
                        <LONG> W974450.2 </LONG>
                    </LL_POINT>
                    <IN_RAD> 0 </IN_RAD>
                    <OUT_RAD> 1650 </OUT_RAD>
                    <START_ANGLE> 120 </START_ANGLE>
                    <STOP_ANGLE> 240 </STOP_ANGLE>
                </ARC>
            </PD>
        </POS>
    </LIA>
</ANS>
```

In this example the client receives a LIA. It contains results from two positioning attempts. For MSID=1234512345 the positioning was unsuccessful. The MS is not reachable at the moment. This occurs for example when the MS is detached.
The positioning for MSID=1234512346 was successful and positioning data is returned in the LIA.

6.5 Unsuccessful Answer

A response to a position request is unsuccessful if the request is rejected by the MPC. A request is rejected if it doesn't have correct syntax or if it does not pass the authority or authentication check.

Example:

```
<?xml version= '1.0' encoding='ISO-8859-1' standalone='yes'?>
<!DOCTYPE ANS>
<ANS ver="3.00">
    <LIA>
        <ERROR errorid="300">
        </ERROR>
    </LIA>
</ANS>
```

The client is not allowed to send a LIR request. For more information on Error codes see Section8, page20.

7 Position areas

7.1 Point

The Point is used to describe a point of origin. It is a part of the shape that is used in the MPC for the description of the positioning areas.

The format of the point data is dependant on the requested coordinate system. Available coordinate systems are described in *Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*.

As an example, a point could be described as follows according to the LL (Latitude, Longitude) coordinate system.

```
<ARC>
    <LL_POINT>
        <LAT> N301628.3 </LAT>
        <LONG> W974425.2 </LONG>
    </LL_POINT>

        :

        :
</ARC>
```

7.2 Arc

An arc is defined by a point of origin, one start angle and one stop angle plus one inner radius and one outer radius. In this case the filled area describes the actual arc area. The smaller circle defines the inner radius and the outer circle defines the outer radius. Degrees are always counted clockwise.

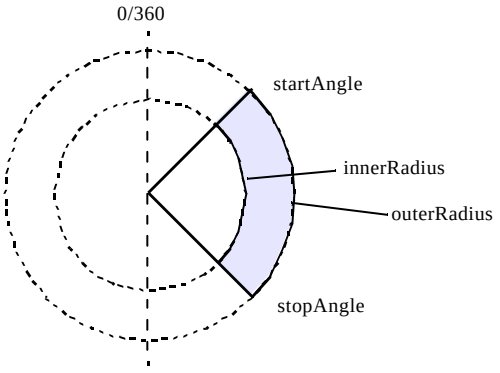

Figure 1 Arc

```
<ARC>
    <LL_POINT>
        <LAT> N301628.3 </LAT>
```

```
        <LONG> W974425.2 </LONG>
    </LL_POINT>
    <IN_RAD> 1100 </IN_RAD>
    <OUT_RAD> 1650 </OUT_RAD>
    <START_ANGLE> 120 </START_ANGLE>
    <STOP_ANGLE> 240 </STOP_ANGLE>
</ARC>
```

InnerRadius and OuterRadius (in meters) are in the range 0-65000 meters. StartAngle and StopAngle are in the range 0-360 degrees.

7.3 Positioning Result

A Position in an answer can contain one or two sets of Position Data (PD). How many PDs the answer contains depends on the positioning procedure used in the mobile network.

In earlier versions of the MPS the positioning procedure was not able to measure the Timing Advance value (TA-value) in all situations. For a mobile is in a busy mode and having done a hand over, no TA-value is available. In that case the coverage for the serving cell is presented as the position area. For convenience the serving cell area is distributed at every position answer. Such an area has the Level of confidence=100, meaning that MS is definitely located in the cell. The area is in most cases much larger (less accurate) than an area based on TA-value.
For this reason, depending if TA-value is available or not, the answer may contain one or two sets of PD. One area, with lower accuracy, always has the element LEV_CONF included with the value 100.

8 Error Codes

The following tables describe the error codes that can be returned from the MPC as response to requests.

Table5 Overview

Error Code	Description
0	No error.
200-299	Syntax error.
300-399	Authentication error.
400-499	Authorization error.
500-599	Positioning error.
600-699	Network error.
9999	Internal MPC error.

Table6 Error codes, syntax errors

Error code	Description
200-299	Syntax error. Syntax error is always described with a textslogan.

Table7 Error codes, Authentication error

Error Code	Description
300	Access denied. Invalid Password or Client Id or the LCS client is not activated.
399	Authentication error, other.

Table8 Error codes, Authority error

Error Code	Description
400	Request type not allowed for client.
401	MSID specified in the request not allowed to be positioned by the client.

Table8 Error codes, Authority error

Error Code	Description
402	Too many positioning items. The number of MSIDs defined in the request is too large.
499	Authority error, other.

Table9 Error codes, Positioning error

Error Code	Description
503	Congestion. It is not possible to execute the positioning request at the requested time or times due to heavy usage of the MPC. This can be overcome by increasing the allowed position delay (MAX_DEL).
504	Conversion to correct geodetic datum failed. This can be due to erroneous parameters specified in the request for the elements COORD_SYS or DATUM or FORMAT. For available parameters see [*Reference [3] - Mobile Positioning Protocol, Geodetic datum and Coordinate systems, System Interface*].
505	Positioning of the MS failed, probably due to missing cell data.
506	Positioning of the specified MSID is not allowed at the moment.
599	Positioning error, other.

Table10 Error codes, network error

Error Code	Description
600	The specified MSID in not known to the network.
601	The specified MSID is not available for positioning. This occurs for example if the MS is detached.
602	The specified MSID is not reachable for positioning at the moment. This occurs for example if the MS out of radio coverage.
603	Positing failed due to network reasons.
699	Network error, other.

9 Glossary

9.1 Abbreviations

ETSI	European Telecommunications Standards Institute
GMT	Greenwich Mean Time
HTTP	HyperText Transfer Protocol
HTTPS	HTTP Secure
LA	Location Application
LCS	Location Service
LIA	Location Immediate Answer
LIR	Location Immediate Request
MPC	Mobile Positioning Centre
MPP	Mobile Positioning Protocol
MS	Mobile Station
PD	Positioning Data
PLMN	Public Land Mobile Network
PP	Positioning Procedure This is the function in the PLMN that the MPC communicates with in order to collect position data for a MS.
SSL	Secure Socket Layer
TA	Timing Advance
URL	Uniform Resource Locator

9.2 Terminology

Timing Advance	The timing advance value is used to synchronize the communication between the mobile station and the base station. The value depends on the distance between the mobile station and the base station.
MS in idle mode	The mobile station is ON but not in conversation.
MS in busy mode	The mobile station is ON and in conversation.
MS detached	The mobile station is OFF.
Hand over	Since the MS can change its position during a call it might be necessary to switch to a cell with better signal strength. Changing cell during a call is called hand over.

10 Revision history

Rev	Date	Prepared	Description
A	2000-09-18	EPKASST	First version.
B	2000-10-05	EPKASST	Element Error in Answer DTD has optional description text.
C	2000-10-05	EPKASST	Correction of description for Element Error in Answer DTD.
D	2000-10-24	EPKMAMI	Correction of DOCTYPE tags in examples.
E	2000-12-14	EPKPESW	Correction of protocol bearer from “HTTP 1.1” to “HTTP 1.0”
F	2001-04-18	EPKJEWA	Correction of QoS element.