

# *Location Services for ANSI-41*

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# *Overview*

Scope

Positioning Technologies

PQoS and Security

Scenarios

PN-4747/X.P0002 Signaling Messages

Limitations & Future Work

# *Scope*

- To make the position of cellular phones accessible to external LCS Clients.
- Applications include corporate (e.g. tracking assets) and consumer (e.g. 'presence' services).
- Air interface modifications defined in 3GPP2 C.S0022/TIA IS-801. Revision 0 is published, Revision A under development.
- Network modifications defined in 3GPP2 X.P0002/TIA PN-4747 (IS-881). Revision 0 is in V&V.

# *Positioning Technologies*

PN-4747/X.P0002 supports both GPS-assisted positioning and network based positioning (e.g. TDOA - Time Difference of Arrival).

GPS-Assisted positioning is only supported for CDMA.

‘Coarse’ positioning, based on the serving cell id, is also supported.

# *Position Quality of Service (PQoS)*

PQoS describes the desired characteristics of any obtained position, including:

- Accuracy.
- Inclusion of altitude, velocity and other options.
- Timing Requirements.

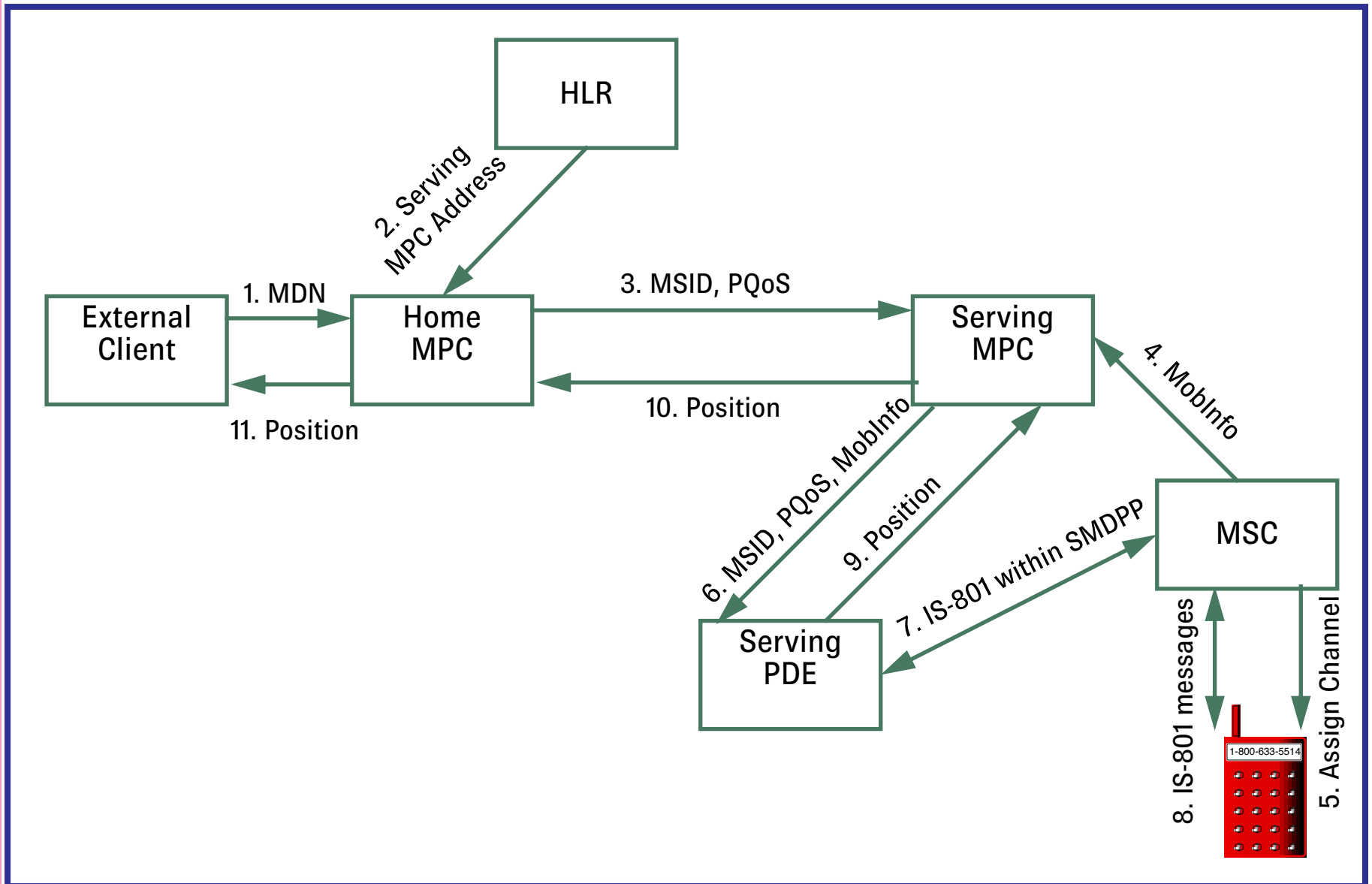
If the network can determine ahead of time that PQoS cannot be met the positioning attempt will be rejected. If positioning is initiated, the position will be returned even if it does not meet PQoS.

# *Security and Privacy*

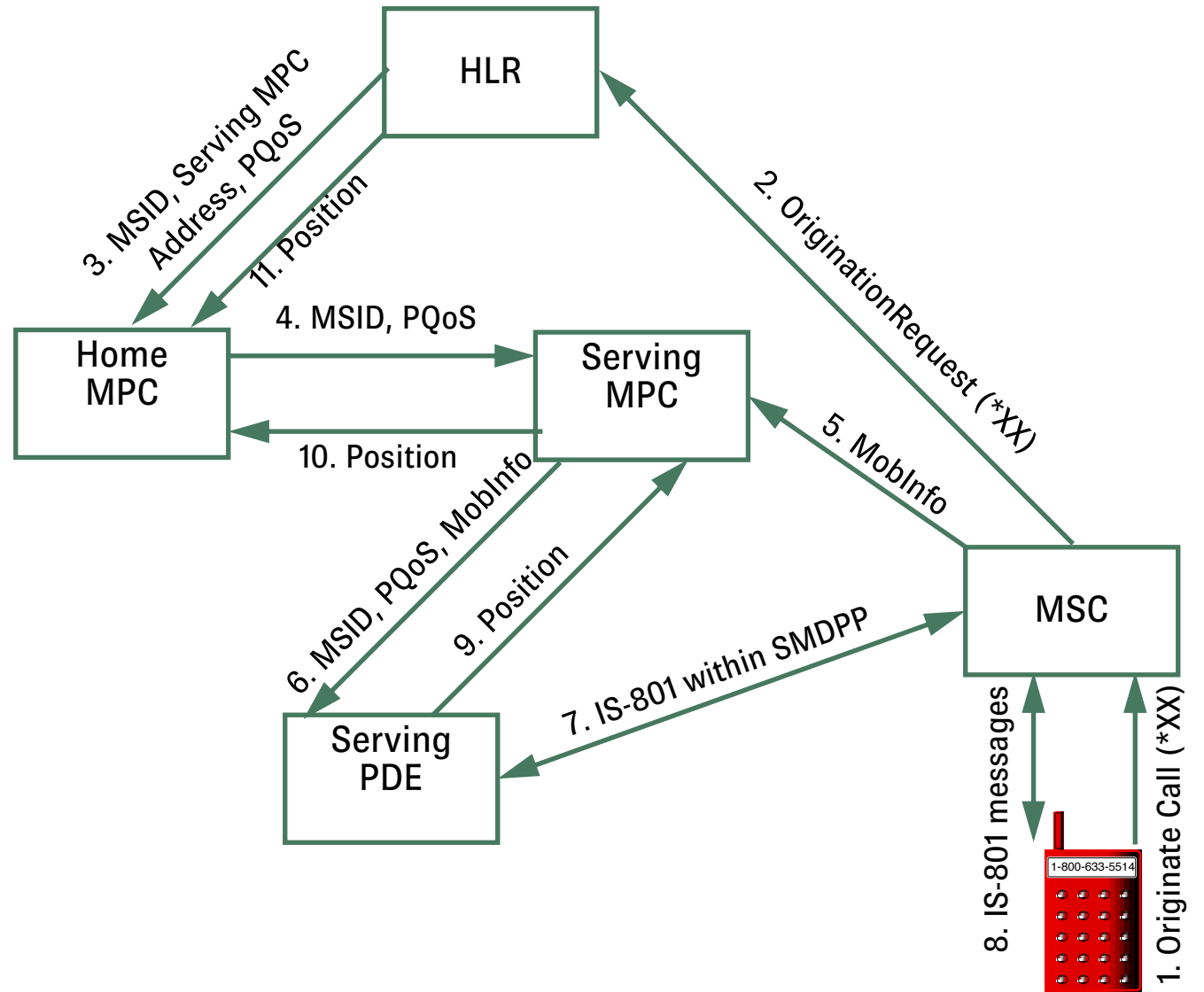
A person's position is important personal information. The position of corporate assets may be of great interest to competitors. This information must be protected.

- The Home MPC will validate all external client requests.
- Location Information Restriction (LIR Mode) will be transferred to the serving system, but this only provides generic information about security. It can, for example, allow a subscriber to initiate services without allowing other local services.

# Client-Initiated Positioning



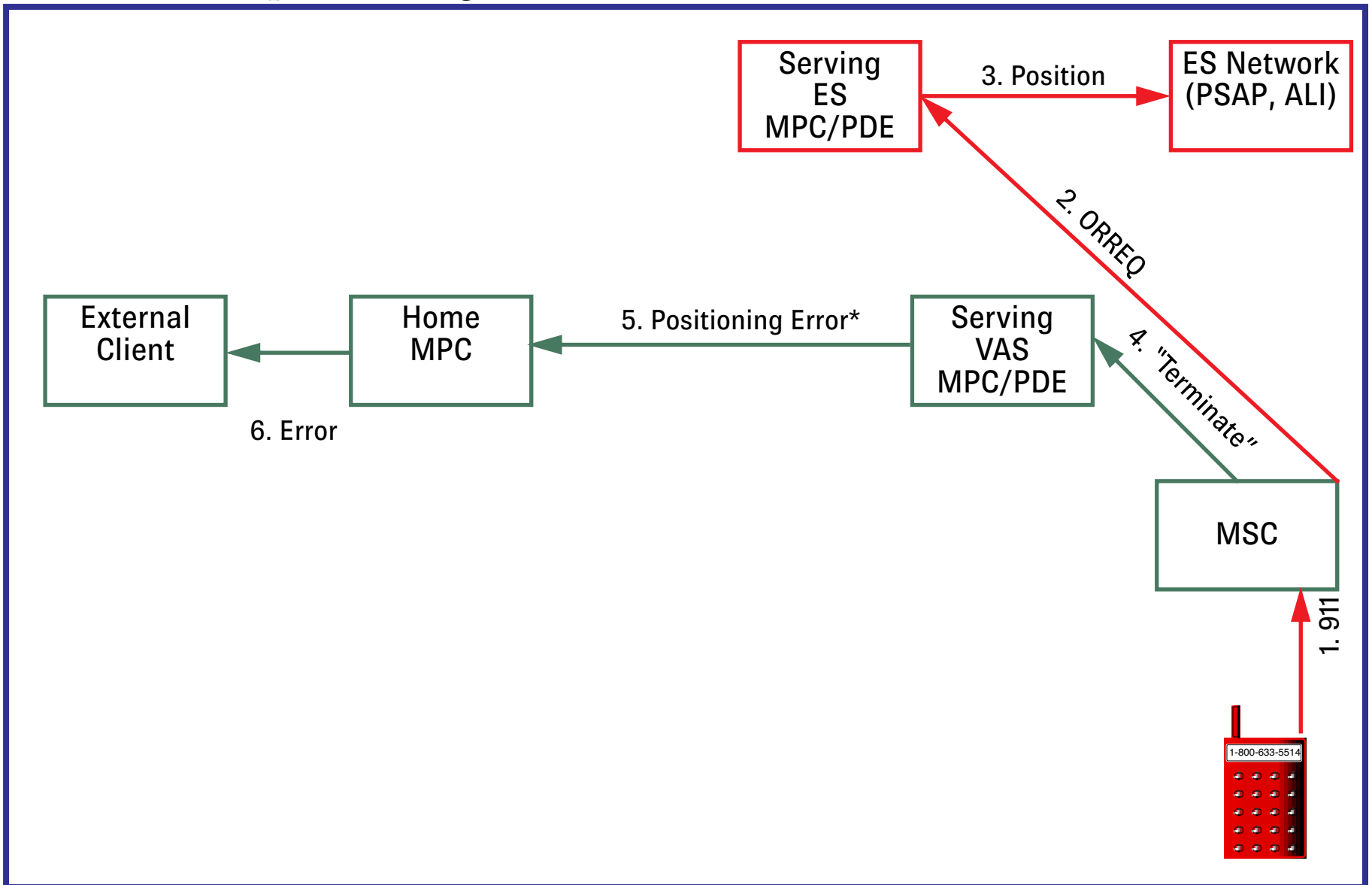
# Mobile-Initiated Positioning





# Emergency Call Interactions

Value-Added positioning is current underway...



# *PN-4747/X.P0002 Signaling Messages*

<b>Message</b>	<b>Purpose</b>
GPOSREQ	Tell PDE to initiate positioning.
ISPOSREQ	Request position from MPC or positioning-related information from MSC.
ISPOSREQFWD	Forward positioning information along the handoff chain.
LPREQ (new)	Request Serving MPC Address and other information from HLR.
PEN (new)	Report positioning event (usually requiring termination of positioning, or temporary suspension).
REGNOT	Supply Serving MPC Address to HLR.
SMDPP	Carry IS-801 information from PDE to MSC (and vice-versa).

## *Limitations and Future Work*

- Definition of external interface (probably OMA/LIF MLP).
- Origination of a call during positioning ends the positioning session.
- Release of a call, even if not related to the positioning, ends the positioning session.
- Tracking (one request, multiple responses).
- Privacy Notification (allowing the user to reject the positioning attempt).
- Autonomous Positioning (MS obtains acquisition data from network, but calculates position itself).
- IP-based positioning.

# *Conclusions*

- PN-4747/X.P0002 will make positioning for commercial services possible in CDMA networks in a standardized fashion.
- This should reduce costs and opens up the possibility of roaming.
- Services will evolve once the infrastructure is in place.
- More and more mobiles are GPS-enabled, allowing cost-effective and highly accurate positioning services.