

RECOMMENDATION 624*

**PUBLIC LAND MOBILE COMMUNICATION SYSTEMS
LOCATION REGISTRATION**

(Question 39/8)

(1986)

The CCIR,

CONSIDERING

- (a) that interconnection of a roaming mobile station with a public switched network involves a knowledge of the location of the mobile station, together with the means of registering this information, so that appropriate routing and charging can be applied;
- (b) that the connection of calls to a roaming mobile station from a public switched network requires that technical and operational procedures for location registration be agreed and that this agreement is essential for international service;
- (c) that standardized procedures for location registration can provide benefits, particularly for roaming mobile stations which need to operate in more than one service area;
- (d) that the roaming mobile station may best determine when its location status needs to be up-dated,

UNANIMOUSLY RECOMMENDS

- 1. that the definitions given in Annex I should be used in connection with location registration;
- 2. that allocation of identities to location areas for transmission to the mobile station should be as follows:

LAI	CI
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where:

LAI: identification of a location area;

CI: identification of a cell within the location area if required for other purposes than location registration.

The sequence LAI must also identify the country with which the location area is associated;

- 3. that a mobile station should initiate a location registration procedure only when the sequence LAI received differs from the actual LAI information stored in the mobile station;
- 4. that the location registration procedure should be initiated by the mobile station and considered successful only when the registration is confirmed by the mobile services switching centre (MSC);
- 5. that the general procedures in the mobile station for location registration should be as shown in Fig. 4.

* The Director, CCIR, is requested to bring this Recommendation to the attention of the CCITT.

For an extensive list of definitions to be used in connection with land mobile systems refer to CCITT Recommendation Q.70 (1984). In this Annex only definitions necessary for the understanding of the Recommendation are included.

1. Mobile services switching centre (MSC)

In an automatic system, the mobile services switching centre (MSC) constitutes the interface between the radio system and the public switched networks (PSTN, PDN, ISDN). The MSC performs all necessary signalling functions in order to establish calls to and from mobile stations. A mobile station is registered at one MSC which functions as its home centre for charging and billing purposes and for administering its subscriber parameters such as category.

In order to obtain radio coverage of a given geographical area, a number of base stations (radio transmitters/receivers) are normally required; i.e. each MSC would thus have to interface several base stations. In addition, several MSCs may be required in order to cover a country. The definition of the MSC may be prefixed by the term "land" or "maritime" if that is more suitable in a specific application.

2. Location register

To establish a call to a mobile station the network must know where this mobile station is located. This information is stored in a "location register".

3. Location area

The location area is defined as an area in which a mobile station may move freely without updating the location register. A location area may comprise several base stations.

4. Location registration

Location registration is defined as the procedure by which details of the location of a mobile station are entered into a location register.

The location register may be:

- centralized, i.e. there is one common register for several MSCs (see Fig. 1);
- distributed, i.e. there is a minimum of one location register assigned to each MSC (see Fig. 2);
- segmented, i.e. the precise location of the mobile station can only be known after concatenation of fractional information distributed in a set of "partial" location registers (e.g. in a "hierarchical distribution" of location information (see Fig. 3).

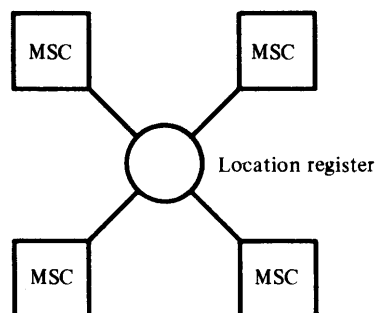


FIGURE 1 – Centralized register

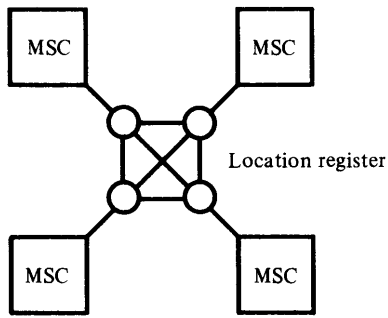


FIGURE 2 – Distributed system D02-sc

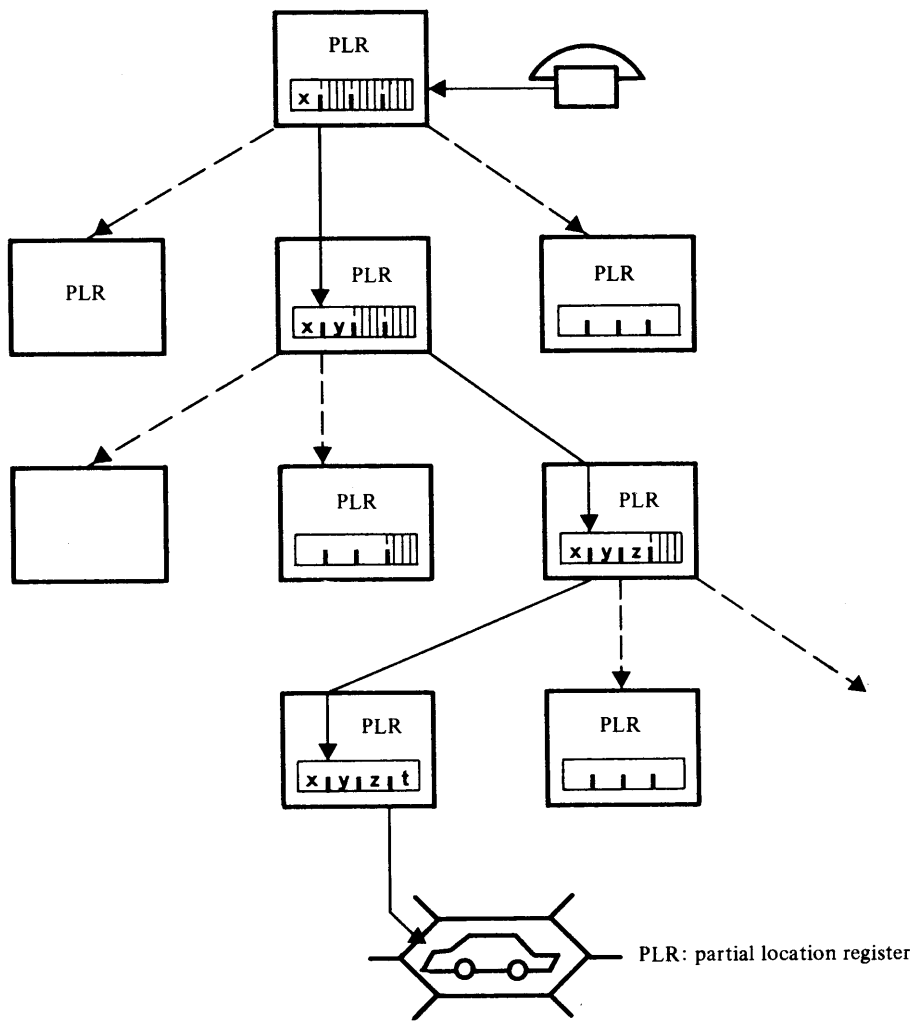


FIGURE 3 – Segmented location register

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5. Cell

The area covered by a base station or by a sub-system (sector antenna) of that base station corresponding to a specific logical identification on the radio path – whichever is smaller.

Every mobile station in a cell can be reached by the corresponding radio equipment of the base station.

6. Base station area

The area covered by all the cells served by a base station.

7. Service area

The service area is defined as an area in which a mobile station is obtainable by a fixed subscriber in the PSTN, PDN or ISDN without the subscriber's knowledge of the actual location of the mobile station within the area. A service area may consist of several public land mobile networks (PLMN, see CCITT Recommendation Q.70). One service area may consist of one country, be a part of a country or comprise several countries. The location registration system associated with each service area must thus contain a list of all mobile stations located within that service area.

Note 1. – This definition does not take into account any constraints on routing imposed by the international telephone network. Fixed subscribers located within one service area will, by definition, have access to all mobile stations within the area. However, for fixed subscribers located outside the area, such constraints may involve that the subscriber needs to know in which part of the service area the called mobile station is located, e.g. in which country, if the service area comprises more than one country.

Note 2. – The service area may vary for interconnection of land mobile stations with different networks such as PSTN, PDN and ISDN.

8. Hand-off

Hand-off is the action of switching a call in progress from one cell to another cell. Hand-off is used to allow established calls to continue when mobile stations move from one cell to another cell.

ANNEX II

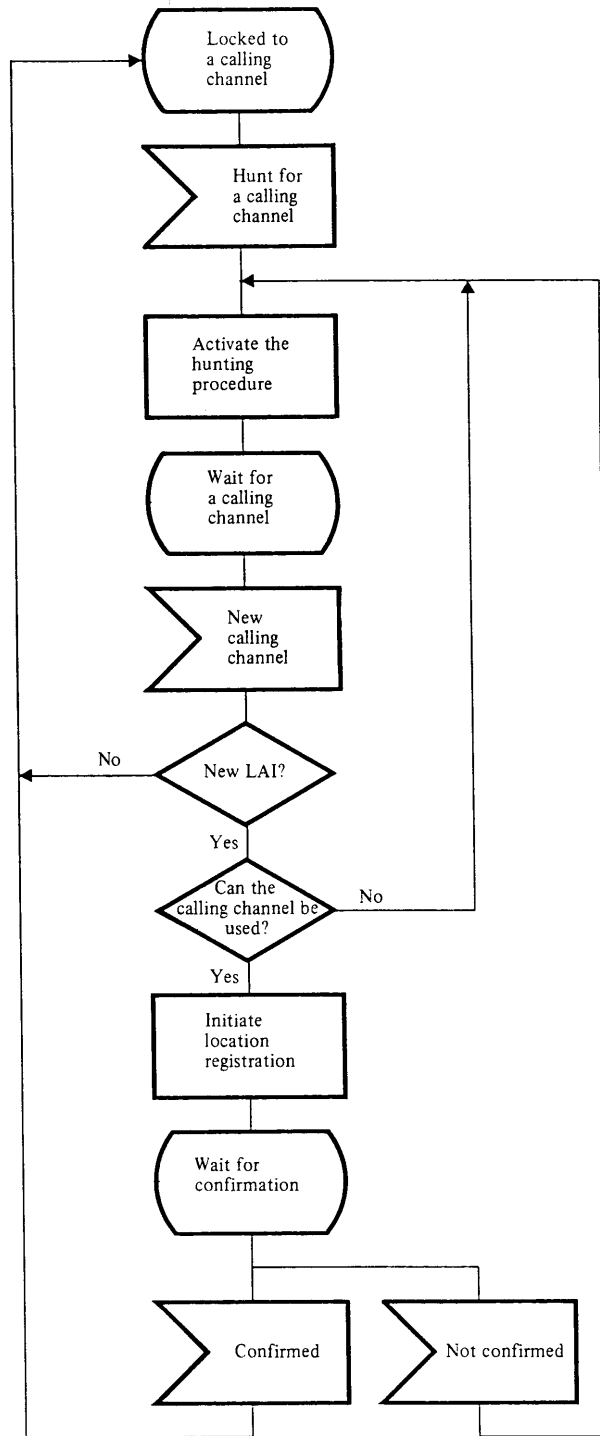


FIGURE 4 – General procedures at the mobile station related to location registration

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