



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**D.93**

(04/2000)

SERIES D: GENERAL TARIFF PRINCIPLES

General tariff principles – Charging and accounting in the  
mobile services

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**Charging and accounting in the international  
land mobile telephone service (provided via  
cellular radio systems)**

ITU-T Recommendation D.93

(Formerly CCITT Recommendation)

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## **ITU-T Recommendation D.93**

### **Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)**

#### **Summary**

In this Recommendation adopted in Melbourne (1988), it is recommended that the same collection charge and accounting rate is used when an international call from a fixed network terminates at fixed networks or mobile networks. However, taking into account that the cost of terminating traffic on fixed networks and on mobile networks may differ, it is now proposed to revise these principles so that different charging and accounting may be introduced according to the nature of the terminating network.

#### **Source**

ITU-T Recommendation D.93 was revised by ITU-T Study Group 3 (1997-2000) and approved under the WTSC Resolution 1 procedure on 18 April 2000.

## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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## **ITU-T Recommendation D.93**

### **Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)<sup>1</sup>**

#### **1 General considerations**

**1.1** In the land mobile telephony service, the Home Public Land Mobile Network (HPLMN) will know the location of all operational mobile stations for which it is the home registered network, when the station is operating within its HPLMN or has roamed in accordance with the principles contained in ITU-T Recommendations of the Q.1000 series.

**1.2** The Visited Public Land Mobile Network (VPLMN) will be able to access and record the necessary details of any mobile station which has roamed and registered with it, such that it can forward all necessary billing information to the HPLMN.

**1.3** Mobile stations will only be able to roam to another Public Land Mobile Network (PLMN):

- upon the conclusion of a bilateral agreement between PLMNs;
- upon the granting by the HPLMN of the option to roam to the mobile station.

**1.4** As part of the bilateral agreement, the HPLMN should undertake to pay the VPLMN the charges incurred by the HPLMN registered mobile subscribers.

**1.5** Examples of the application of the charging and accounting principles, set out below, for various call routing scenarios are given in Annex A.

#### **2 Principles for charging**

**2.1** The charge structure and level in any country is a national matter.

##### **2.2 HPLMN charging**

**2.2.1** The HPLMN is responsible for billing the mobile subscriber for all incurred charges.

**2.2.2** Charging structures should be as simple as possible.

**2.2.3** The charge would normally consist of two components:

- a network access component;
- a network utilization component.

**2.2.3.1** The network access component is intended to cover the cost of making the service available, such costs being independent of network utilization:

- initial registration charge (non-recurring);
- subscription or rental (periodic).

The network access component shall not be included in the international accounts.

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<sup>1</sup> Portugal has expressed reservation regarding the application of this Recommendation.

**2.2.3.2** The network utilization component is intended to cover the costs of the service which are dependent on network utilization:

- utilization charges (covering mobile, national/international elements as applicable);
- any supplementary service charges.

**2.2.4** The charges billed to the mobile subscriber should be such as to cover the payments due to the VPLMN plus any handling charges which may also be raised.

### **2.3 VPLMN charging**

The charges raised by a VPLMN against the HPLMN should normally include one or more of the following:

- roaming registration fee (non-recurring);
- roaming subscription (periodic);
- utilization charges (covering mobile, national/international elements as applicable);
- any supplementary service charges.

### **2.4 Fixed station charges**

In the case of a fixed station to mobile station international call, the charge to the calling station should be:

- a) the appropriate fixed station to fixed station charge; or
- b) where 3.2 b) below applies, a separately established charge to reflect the different cost associated with call delivery *may be applied*.

### **2.5 Mobile station to mobile station charges**

In the case of a mobile station to mobile station international call, the charge to the calling station should be:

- a) the appropriate mobile station to fixed station charge; or
- b) where 3.2 b) below applies, a separately established charge to reflect the different costs associated with call delivery *may be applied*.

## **3 Principles for accounting**

**3.1** International traffic originating or terminating at a mobile station will always be routed via the fixed networks of the countries concerned. The Administration of the country where the call originates should therefore include all such traffic in its regular international traffic accounts.

**3.2** International traffic terminating at a mobile network will be accounted for either:

- a) at the normal IDD rate for the relation concerned<sup>2</sup>; or
- b) in relationships where cost orientated rates have been agreed, and where costs for terminating at a mobile network differ from those of terminating at a fixed network, a separate rate may be bilaterally agreed for traffic terminating at a mobile network. In each case both the rates for fixed and mobile traffic need to be cost-orientated based on the costs of terminating that traffic. The difference between the two rates should be as small as possible.

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<sup>2</sup> In this case the rate should be cost-oriented based on blended cost between the cost terminating at the fixed station and the mobile station.

**3.3** In a case where 3.2 b) is applied, suitable means need to be established by bilateral agreement to enable the administration of origin to separately identify this traffic, for both charging and accounting purposes.

**3.4** Where 3.2 b) applies, subject to bilateral agreement, the mobile terminating traffic will have to be separately identified in the traffic accounts.

**3.5** Where 3.2 b) would be applicable but traffic terminating at mobile network is more or less in balance in both directions of the relationship and costs are similar, the administrations concerned may agree not to account separately for this traffic while it remains more or less in balance.

#### **4 Principles for settlements between PLMNs**

**4.1** The VPLMN should prepare a statement of the charges payable by the HPLMN for its registered mobile subscribers. The format and frequency of dispatch should be agreed between the two parties. This statement should show the total charge expressed in SDRs or another agreed accounting currency, together with the conversion rate.

**4.2** To ensure that the HPLMN has sufficient information for billing purposes, individual statements should be prepared for each registered subscriber. These statements should include the following information:

- a) The period covered by the statement.
- b) The subscriber identity in the HPLMN.
- c) For each call:
  - i) the date and start time;
  - ii) number called and area code;
  - iii) destination country;
  - iv) duration in minutes and seconds;
  - v) any supplementary services used.

**4.3** In the absence of alternative settlement procedures agreed between the PLMNs concerned, settlement of balances shall be effected in accordance with the provisions of the Administrative Regulations [1].

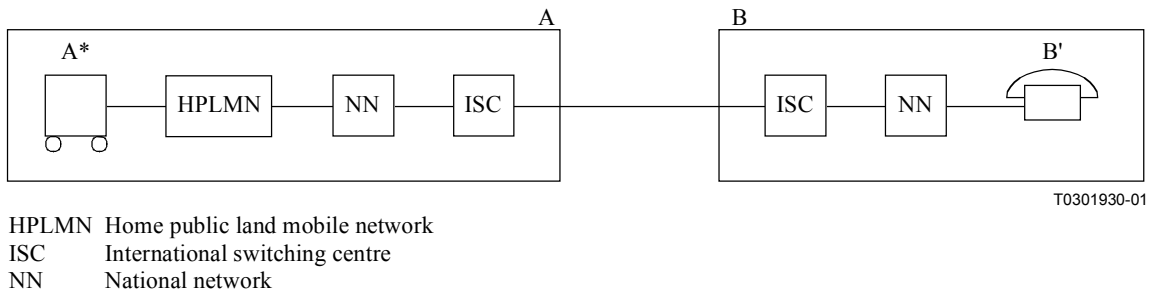


## ANNEX A

### Applications of charging and accounting principles for various call routing scenarios

#### A.1 Case 1 – Mobile station to a fixed station

In this case mobile station A\* is in its home PLMN (country A), makes an international (non-roaming) call to a fixed station B' in country B (see Figure A.1).

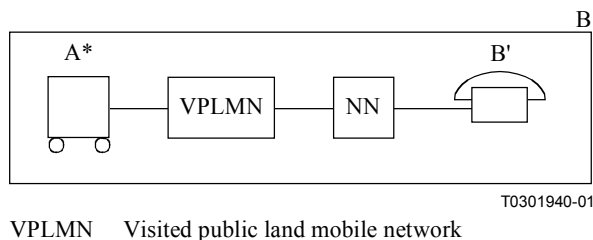


**Figure A.1/D.93 – Case 1 configuration**

Charging: A\* will be billed by its HPLMN for call to country B.  
Inter PLMN settlement: Not applicable.  
Traffic accounting: The call from A to B is included in A's outgoing traffic account.

#### A.2 Case 2 – Roamed mobile station to a fixed station

Mobile station A\* has roamed to PLMN in country B and makes a national call to a fixed station (see Figure A.2).



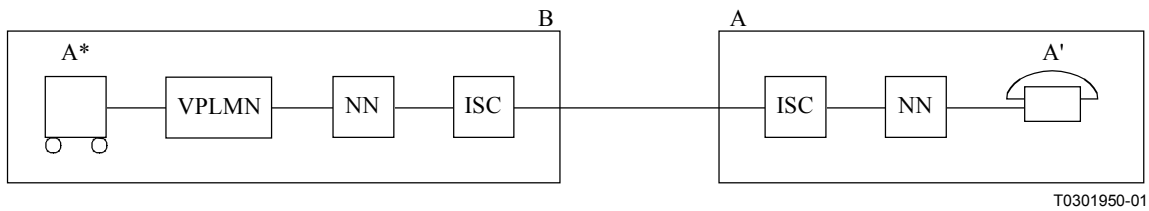
**Figure A.2/D.93 – Case 2 configuration**

Charging: A\* will be billed by its HPLMN based on data provided by the VPLMN.  
Inter PLMN settlement: The HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.  
Traffic accounting: Not applicable.

#### A.3 Case 3 – Roamed mobile station to fixed station

Mobile station A\* has roamed to a PLMN in country B and makes an international call.

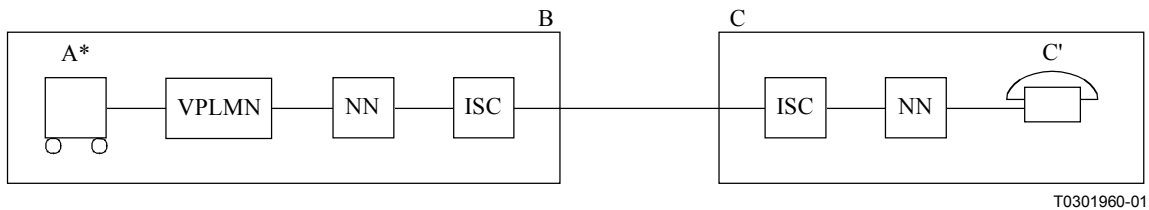
### A.3.1 Case 3A – Call to the home country (see Figure A.3)



**Figure A.3/D.93 – Case 3A configuration**

- Charging:** As for Case 2: A\* will be billed by its HPLMN based on data provided by the VPLMN.
- Inter PLMN settlement:** As for Case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.
- Traffic accounting:** The call from B to A is included in the normal international telephone traffic account of B.

### A.3.2 Case 3B – Call to a third country, C (see Figure A.4)



**Figure A.4/D.93 – Case 3B configuration**

- Charging:** As for Case 2: A\* will be billed by its HPLMN based on data provided by the VPLMN.
- Inter PLMN settlement:** As for Case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.
- Traffic accounting:** The call from B to C is included in the normal telephone traffic account of B.

#### A.4 Case 4 – Fixed station to mobile station

Fixed station A' makes an international call to mobile station B\* in country B (home PLMN) (see Figure A.5).

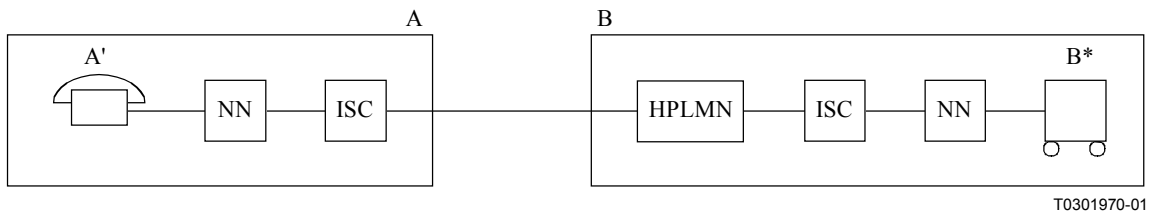


Figure A.5/D.93 – Case 4 configuration

Charging: Appropriate fixed station to fixed station international telephone charges apply.

Inter PLMN settlement: Not applicable.

Traffic accounting: The call from A to B is included in A's outgoing traffic account.

#### A.5 Case 5 – Fixed station to roamed mobile station

Fixed station A' calls mobile station A\* which has roamed to country B.

**A.5.1 Case 5A** – A' is provided with a recorded announcement saying A\* is not available on this PLMN, call is not forwarded (see Figure A.6).

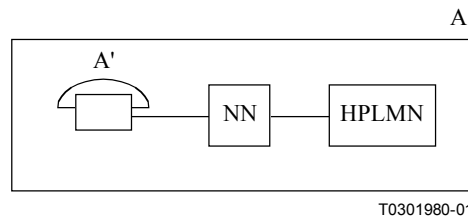


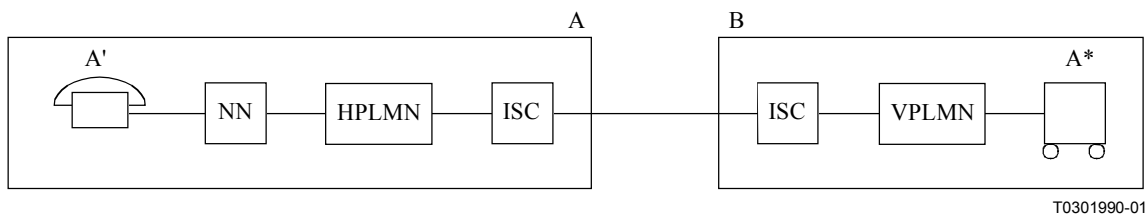
Figure A.6/D.93 – Case 5A configuration

Charging: The fixed station may be charged for accessing the recorded announcement.

Inter PLMN settlement: Not applicable.

Traffic accounting: Not applicable.

**A.5.2 Case 5B** – The call is automatically forwarded to the mobile network in country B. A' is not made aware (see Figure A.7).



**Figure A.7/D.93 – Case 5B configuration**

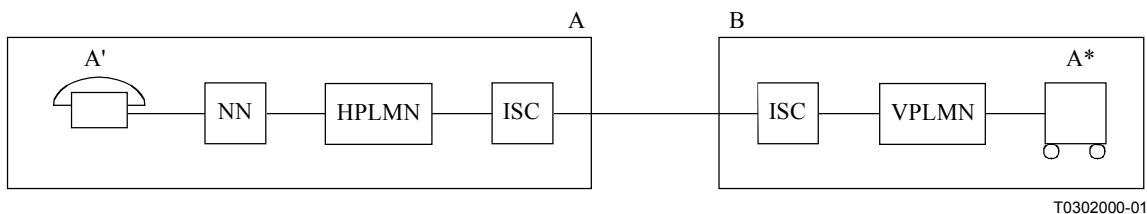
Charging:

- Fixed station is charged for the national call dialed.
- The HPLMN "A" may raise a charge against A\* for the forwarded element of the call.
- A\* may be billed by its HPLMN for charges which may be raised by the VPLMN for the roamer's use of its network to receive the call, based on the data provided by the VPLMN "B".

Inter PLMN settlement: As for Case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.

Traffic accounting: The call from A to B is included in A's outgoing traffic account.

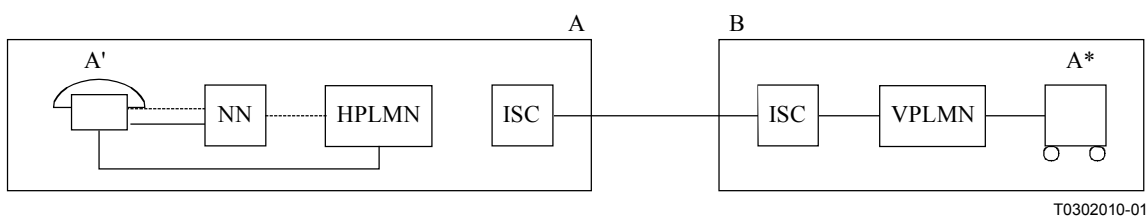
**A.5.3 Case 5C** – Fixed station advised that the mobile station has roamed and given option of completing call at appropriate charge or cancelling (see Figure A.8).



**Figure A.8/D.93 – Case 5C configuration**

NOTE – Not yet technically possible – for further study.

**A.5.4 Case 5D** – Fixed station knows the roamer's temporary number in VPLMN (see Figure A.9).



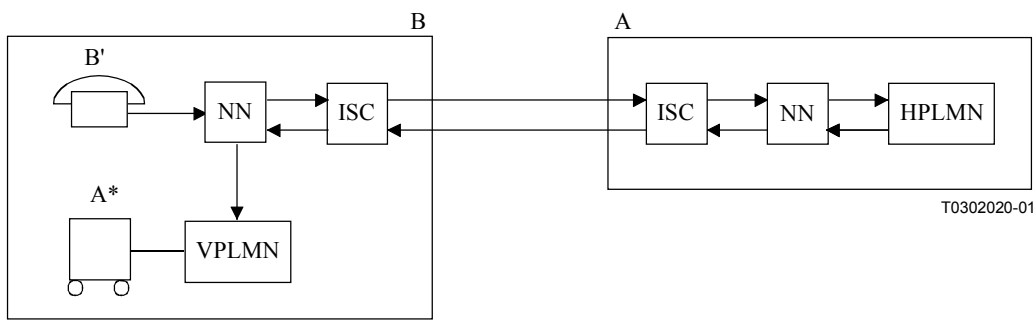
**Figure A.9/D.93 – Case 5D configuration**

- Charging:
- As for case 4: appropriate fixed station to fixed station international telephone charges apply.
  - A\* may be billed by its HPLMN for charges which may be raised by the VPLMN "B" for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.
- Inter PLMN settlement: As for case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.
- Traffic accounting: As for case 4: the call from A to B is included in A's outgoing traffic account.

### A.6 Case 6 – Fixed station to roamed mobile station

Fixed station B' makes an international call to mobile A\* in country A which has roamed to country B. B' is not made aware.

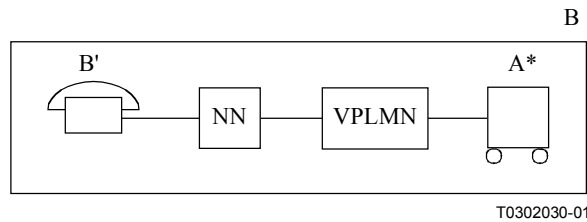
#### A.6.1 Case 6A – Call is automatically forwarded to country B (see Figure A.10).



**Figure A.10/D.93 – Case 6A configuration**

- Charging:
- As for case 5B: fixed station is charged for the international call dialled.
  - The HPLMN may raise a charge against A\* for the forwarded element of the call.
  - A\* may be billed by its HPLMN for charges which may be raised by the VPLMN "B" for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.
- Inter PLMN settlement: As for case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.
- Traffic accounting:
- The call from B to A is included in B's outgoing traffic account.
  - The call from A to B is included in A's outgoing traffic account.

#### A.6.2 Case 6B – Fixed station B' knows roamed station A\*'s temporary number in country B (see Figure A.11).



**Figure A.11/D.93 – Case 6B configuration**

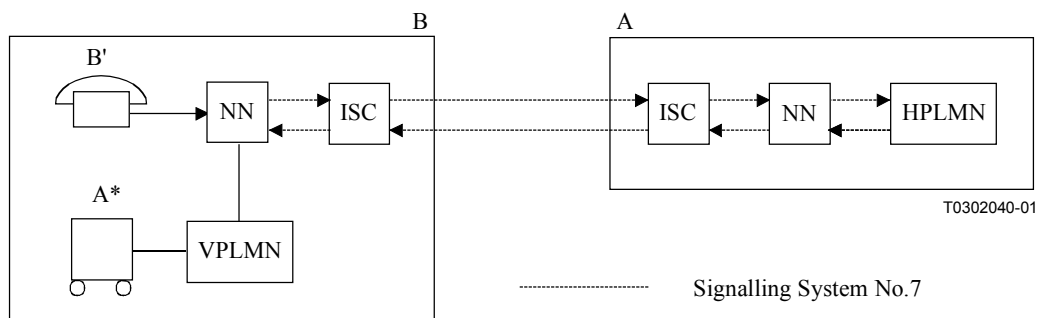
Charging:

- As for case 4: appropriate national telephone charges apply.
- A\* may be billed by its HPLMN for charges which may be raised by the VPLMN "B" for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.

Inter PLMN settlement: As for case 2: the HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.

Traffic accounting: Not applicable.

**A.6.3 Case 6C –** Using Signalling System No. 7, the mobile switching centre in country A signals to the national network (NN) in B that A\* is now in country B and the call is automatically forwarded via the mobile switching centre in country B (see Figure A.12).



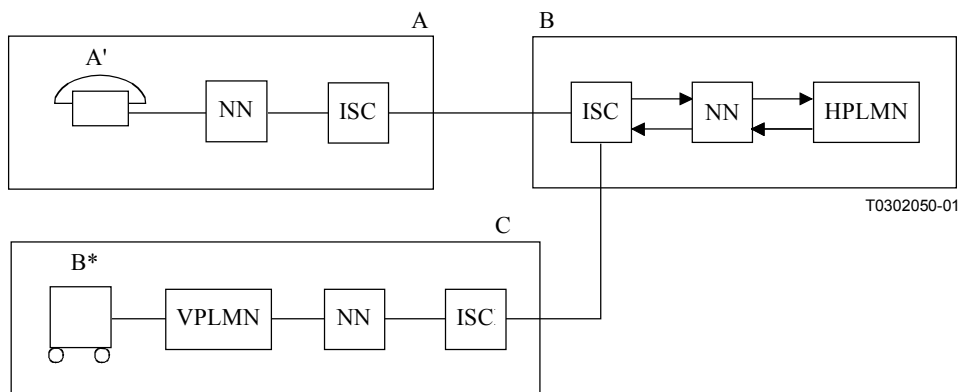
**Figure A.12/D.93 – Case 6C configuration**

NOTE – Not yet technically possible – for further study.

**A.7 Case 7 – Fixed station to roamed mobile station**

Fixed station A' calls mobile station B\* which has roamed to country C. A' is not aware.

**A.7.1 Case 7A –** Call is automatically forwarded to country C (see Figure A.13).



**Figure A.13/D.93 – Case 7A configuration**

Charging:

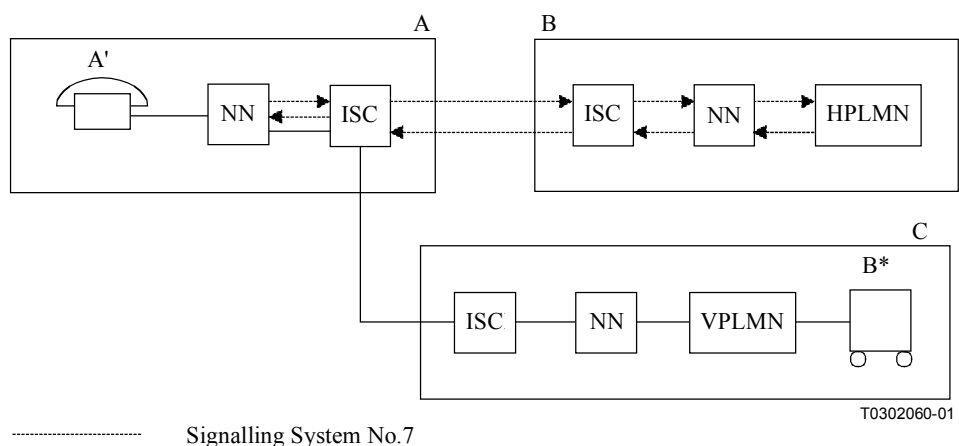
- As for case 6A: fixed station is charged for the international call dialled.
- HPLMN "B" may raise a charge against B\* for the forwarded element of the call.
- B\* may be billed by its HPLMN for charges which may be raised by the VPLMN for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.

Inter PLMN settlement: As for case 2: The HPLMN "B" will reimburse the VPLMN "C" for the charges incurred by the roamer.

Traffic accounting:

- The call from A to B is included in A's outgoing traffic account.
- The call from B to C is included in B's outgoing traffic account.

**A.7.2 Case 7B** – Using C7, the MSC/NN in country B signals to NN that B\* is now in country C. Call is automatically forwarded to PLMN in country C (see Figure A.14).

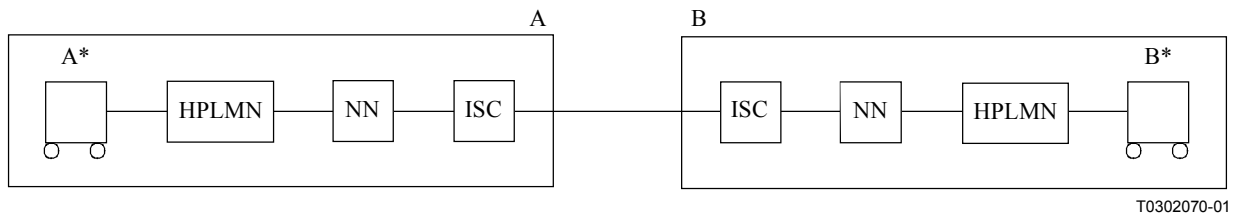


**Figure A.14/D.93 – Case 7B configuration**

NOTE – Not yet technically possible – for further study.

### A.8 Case 8 – Mobile station to mobile station

In this case the mobile station A\* is in its HPLMN and makes an international (non-roaming) call to mobile station B\* its home PLMN (see Figure A.15).

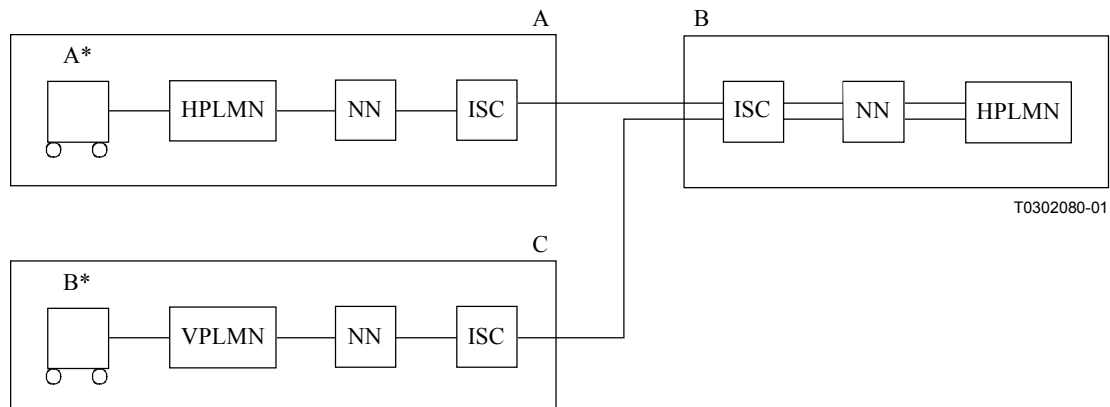


**Figure A.15/D.93 – Case 8 configuration**

- Charging: A\* will be billed by its HPLMN for call to country B.
- Inter PLMN settlement: Not applicable.
- Traffic accounting: The call from A to B is included in A's outgoing traffic account.

### A.9 Case 9 – Mobile station to roamed mobile station

In this case mobile station A\* is in its HPLMN and makes a call to mobile station B\* which has roamed to country C (see Figure A.16).



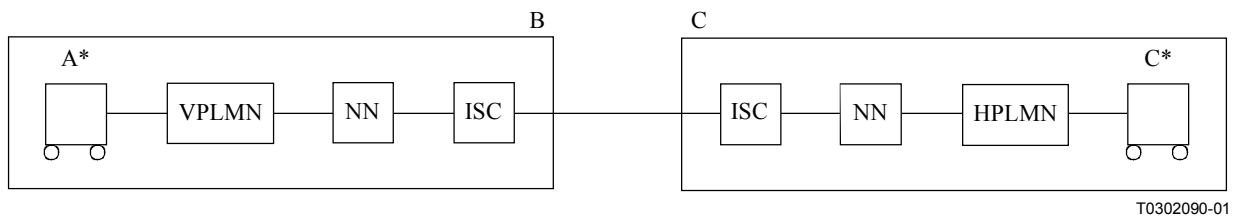
**Figure A.16/D.93 – Case 9 configuration**

- Charging:
- Mobile station A\* is charged for the international call dialled.
  - B\*'s HPLMN may raise a charge for the forwarded element of the call.
  - B\* may be billed by its HPLMN for charges which may be raised by the VPLMN "C" for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.
- Inter PLMN settlement: The HPLMN "B" will reimburse the VPLMN "C" for the charges incurred by the roamer.
- Traffic accounting:
- The call from A to B is included in A's outgoing traffic account.
  - The call from B to C is included in B's outgoing traffic account.



### A.10 Case 10 – Roamed mobile station to mobile station

In this case roamed mobile station A\* has roamed to a PLMN in country B and makes an international call to mobile C\* operating in its HPLMN (see Figure A.17).

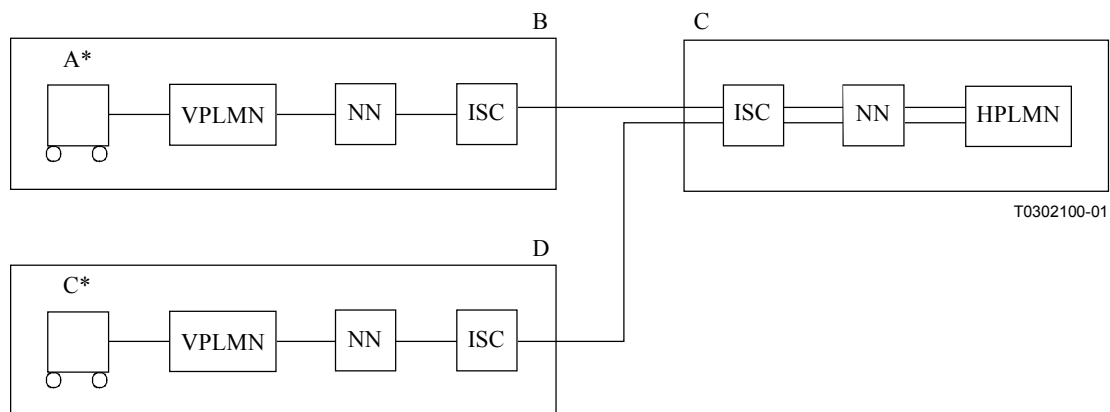


**Figure A.17/D.93 – Case 10 configuration**

- Charging: A\* will be billed by its HPLMN based on data provided by the VPLMN.
- Inter PLMN settlement: The HPLMN "A" will reimburse the VPLMN "B" for the charges incurred by the roamer.
- Traffic accounting: The call from B to C is included in the normal international telephone traffic account of B.

### A.11 Case 11 – Roamed mobile station to roamed mobile station

In this case roamed mobile station A\* makes an international call to roamed mobile station C\* operating in country D (see Figure A.18).



**Figure A.18/D.93 – Case 11 configuration**

- Charging: A\* will be billed by the HPLMN based on data provided by the VPLMN.
- Inter PLMN settlement:
- For A\*, its HPLMN will reimburse the VPLMN "B" for charges incurred by A\*'s roaming in country B.
  - For C\*, its HPLMN may raise a charge for the forwarded element of the call.
  - C\* may be billed by its HPLMN for the charges which may be raised by the VPLMN "D" for the roamer's use of its network to receive the call, based on the data provided by the VPLMN.

- Traffic accounting:
- The call from B to C is included in B's outgoing traffic account.
  - The call from C to D is included in C's outgoing traffic account.

### **Reference**

- [1] *Final Acts of the World Administrative Telegraph and Telephone Conference, Telegraph Regulations, Telephone Regulations*, ITU, Geneva, 1973. (See also the Preliminary Note No. 3, page XIV.)

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