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**3RD GENERATION
PARTNERSHIP
PROJECT 2
"3GPP2"**

Roamer Database Verification

Revision: 0

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Revision History

Revision		Date
Rev. 0	Initial Publication	January 2001

Note

This specification is an extract of TIA TR-45.2 IS-847.

ROAMER DATABASE VERIFICATION

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REVISION HISTORY

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INTRODUCTION

This document presents a recommended plan for the implementation of Roamer Database Verification (RDV) for use in the Wireless Radiotelephone Service. RDV enables a home system to verify that a roaming partner's VLR database is correctly loaded for the MSID number ranges that "belong" to the home service provider. At the request of the HLR, the VLR examines its roamer database to verify that subscribers within the requested MSID range are allowed to roam in the visited system.

RDV provides a tool to assist in resolving problems experienced by home system subscribers when roaming in the visited system.

1 GENERAL

This document describes the RDV network capability and the intersystem operations to enable a wireless system to use RDV.

2 OBJECTIVE

The purpose of this document is to describe the RDV network capability and to specify the operation of RDV so that wireless systems can use RDV.

3 REFERENCES

This Interim Standard builds on the following standards:

- *ANSI/TIA/EIA-664*, Cellular Features Description; Telecommunications Industry Association; June 1996
- *ANSI/TIA/EIA-41-D*, Cellular Radiotelecommunications Intersystem Operations; Telecommunications Industry Association; 1997
- *TIA/EIA/IS-751*, *TIA/EIA-41-D* Modifications to Support IMSI; Telecommunications Industry Association; February 1998

4 ORGANIZATION

This document is organized as follows:

- Section 2 provides the modifications and additions to *TIA/EIA-664* "Cellular Features Description" for RDV.
- Section 3 provides the modifications and additions to *TIA/EIA-41-D* Chapter 1 "Functional Overview" for RDV.
- Section 4 provides the modifications and additions to *TIA/EIA-41-D* Chapter 3 "Automatic Roaming Information Flows" for RDV.
- Section 5 provides the modifications and additions to *TIA/EIA-41-D* Chapter 5 "Signaling Protocol" for the RDV.
- Section 6 provides the modifications and additions to *TIA/EIA-41-D* Chapter 6 "Signaling Procedures" for RDV.

TIA/EIA-664 Modifications

This section provides wireless features descriptions for Roamer Database Verification (RDV) according to the structure of *TIA/EIA-664*.

Y NETWORK CAPABILITIES

Y.1 Roamer Database Verification (RDV)

(New Section for TIA/EIA-664)

Roamer Database Verification (RDV) enables a home system to verify that a roaming partner's VLR database is correctly loaded for the MSID number ranges that "belong" to the home service provider. At the request of the HLR, the VLR examines its roamer database to verify that subscribers within the requested MSID range are allowed to roam in the visited system.

RDV provides a tool to assist in resolving problems experienced by home system subscribers when roaming in the visited system.

Applicability to Network Configurations

RDV is applicable to all network configurations.

Y.1.1 Normal Operation

Invocation

RDV is initiated by an HLR query to a VLR. The HLR requests the VLR to examine its roamer database and to verify that the data stored for the indicated MSID range enables roaming subscribers from the requesting service provider's system to obtain wireless telecommunications service. The HLR can request that a range from one to 10,000 contiguous MSID entries be examined by the VLR.

Normal Operation With Successful Outcome

When an RDV query is received by a VLR, the VLR authorizes the HLR request. If the HLR is authorized, the VLR examines its roamer database for MSIDs in the range indicated by the HLR to verify that roaming subscribers from the requesting service provider's system can obtain service. The VLR responds with a positive confirmation if every MSID in the range is populated for the requesting HLR, or if an MSID entry is not populated, global title addressing is used for communication with the roaming subscriber's HLR.

Call Detail Record

RDV does not require call detail information to be recorded.

TIA/EIA-41.1-D Modifications

This section provides modifications and additions to TIA/EIA-41-D Chapter 1 needed for Roamer Database Verification.

4 SYMBOLS AND ABBREVIATIONS

<u>RANGE</u>	<u>Range parameter</u>
<u>RDV</u>	<u>Roamer Database Verification</u>
<u>RDVREQ</u>	<u>RoamerDatabaseVerificationRequest INVOKE</u>
<u>rdvreq</u>	<u>RoamerDatabaseVerificationRequest RETURN RESULT</u>
<u>RDVRT</u>	<u>Roamer Database Verification Request Timer</u>

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Y.2 RDV Query: MSID Range Not in VLR Database

This scenario describes an RDV query when the MSID range indicated by the HLR is not associated with that HLR.

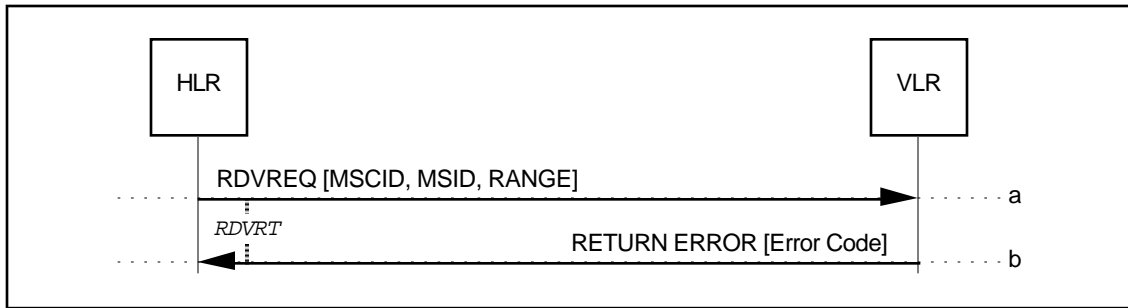


Figure 2 RDV Query: MSID Range Not in VLR Database

- a. The HLR determines that an RDV query shall be initiated to a VLR. The HLR sends an RDVREQ to the VLR.

Parameters	Usage	Type
MSCID	HLR MSCID.	R
MSID	MSID to examine.	R
RANGE	Range of MSIDs to examine (1 to 10,000).	R

- b. The VLR examines its roamer database and determines that the entire MSID range or any part of the MSID range is not associated with the requesting HLR. The VLR sends a RETURN ERROR to the HLR with the Error Code set to indicate *MSID/HLRMismatch*.

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TIA/EIA-41.5-D Modifications

This section provides modifications and additions to *TIA/EIA-41-D* Chapter 5 needed for Roamer Database Verification.

5 DATA TRANSFER SERVICES

5.1 SS7-BASED DATA TRANSFER SERVICES

5.1.1 Message Transfer Part

(TIA/EIA-41.5-D, page 5-6)

Table 1 MTP Message Priority Values for TIA/EIA-41 Operations

TIA/EIA-41 Operation	MTP Message Priority
RoamerDatabaseVerificationRequest	0

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Roamer Database Verification

6 APPLICATION SERVICES

6.4 MAP OPERATIONS

6.4.1 General

6.4.1.2 Operation Specifiers

(TIA/EIA-41.5-D, page 5-24)

Table 8 TIA/EIA-41 MAP Operation Specifiers

Operation Name	Operation Specifier								Decimal
	H	G	F	E	D	C	B	A	
RoamerDatabaseVerificationRequest	0	1	1	0	0	0	1	0	98

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6.4.2 Operation Definitions

(TIA/EIA-41.5-D, page 5-27)

Table 10 Summary of MAP Operations

Operation	Reference
RoamerDatabaseVerificationRequest	6.4.2.aq

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6.4.2.aq RoamerDatabaseVerificationRequest

(New for TIA/EIA-41.5-D Section 6.4.2)

The RoamerDatabaseVerificationRequest (RDVREQ) operation is used by an HLR to verify that a roaming partner's VLR database is correctly loaded for the MSID number range associated with the home service provider.

The RoamerDatabaseVerificationRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

RoamerDatabaseVerificationRequest INVOKE Parameters				Timer: RDVRT	
Field	Value	Type	Reference	Notes	
Identifier	SET [NATIONAL 18]	M	6.3.2.1		
Length	variable octets	M	6.3.2.1		
Comments					
MSCID (HLR)		O	6.5.2.82	a	
MSID		O	6.5.2.bv	b	
Range		O	6.5.2.gj	c, d	

Notes:

- a. Include to indicate HLR's MSCID.
- b. Include to indicate the starting point of the range of MSIDs to examine.
- c. Include to indicate the number of MSIDs to examine (1 to 10,000).
- d. If this parameter is not included, one MSID number shall be examined.

The RoamerDatabaseVerificationRequest operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

RoamerDatabaseVerificationRequest RETURN RESULT Parameters				
Field	Value	Type	Reference	Notes
Identifier	SET [NATIONAL 18]	M	6.3.2.2	
Length	variable octets	M	6.3.2.2	
Comments				
TransactionCapability		O	6.5.2.160	a

Notes:

- a. Include if the TransactionCapability parameter is included in all the RegistrationNotification INVOKE operations sent for MSIDs in the specified Range. (The parameter value shall be set to the value used for all the RegistrationNotification INVOKE operations.)

6.5 MAP PARAMETERS

6.5.1 General

6.5.1.2 Parameter Identifiers

(TIA/EIA-41.5-D, page 5-119)

Table 112 TIA/EIA-41 MAP Parameter Identifiers

Parameter Identifier Name	Parameter Identifier Code								Reference
	H	G	F	E	D	C	B	A	
Range	1	0	0	1	1	1	1	1	6.5.2.gj
	1	0	0	0	0	0	1	0	
	0	1	1	0	0	0	0	1	

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6.5.2 Parameter Definitions

6.5.2.gj Range

(New for TIA/EIA-41.5-D Section 6.5.2)

The Range (RANGE) parameter is used to specify the length of a range of consecutive numbers.

Field	Value	Type	Reference	Notes					
Identifier	Range IMPLICIT Unsigned Integer	M	6.5.1.2						
	variable octets	M	6.5.1.1						
Comments									
H	G	F	E	D	C	B	A	Octet	Notes
MSB								1	a
Range								...	
LSB								n	

Notes:

- a. The length of the range is the value indicated.

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TIA/EIA-41.6-D MODIFICATIONS

This section provides the additions to *TIA/EIA-41-D* Chapter 6 needed for Roamer Database Verification.

4 INTERSYSTEM PROCEDURES

4.ZZ Roamer Database Verification Request

(new for TIA/EIA-41.6-D Section 4)

4.ZZ.1 HLR Initiating a Roamer Database Verification Request

When an HLR determines that an MSID range at a VLR database shall be verified, it shall perform the following:

- 1 Include the MSCID parameter set to the HLR identity.
- 2 Include the MSID parameter set to the MSID to examine.
- 3 Include the Range parameter set to the MSID range to examine, if applicable.
- 4 Send a RoamerDatabaseVerificationRequest INVOKE to the VLR.
- 5 Start the Roamer Database Verification Request Timer (RDVRT).
- 6 WAIT for a Roamer Database Verification Request response.
- 7 WHEN a RETURN RESULT is received:
 - 7-1 Stop the timer (RDVRT).
 - 7-2 IF the message cannot be processed:
 - 7-2-1 Execute the “Local Recovery Procedures” task (see 3.5.1).
 - 7-3 ENDIF.
- 8 WHEN a RETURN ERROR or REJECT is received
 - 8-1 Stop the timer (RDVRT).
 - 8-2 Execute the “Local Recovery Procedures” task (see 3.5.1).
- 9 WHEN the timer (RDVRT) expires:
 - 9-1 Execute the “Local Recovery Procedures” task (see 3.5.1).
- 10 ENDWAIT.
- 11 Exit this task.

4.ZZ.2 VLR Receiving RoamerDatabaseVerificationRequest INVOKE

When a VLR receives a RoamerDatabaseVerificationRequest INVOKE, it shall perform the following:

- 1 IF the received message can be processed:
 - 1-1 IF any part of the received MSID range is not associated with the requesting HLR:

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- 1-1-1 Send a RETURN ERROR with the Error Code set to indicate *MSID/HLRmismatch* to the requesting HLR.
- 1-2 ELSE:
 - 1-2-1 Include applicable parameters.
 - 1-2-2 Send a RETURN RESULT to the requesting HLR.
- 1-3 ENDIF.
- 2 ELSE (the received message cannot be processed):
 - 2-1 Send a RETURN ERROR with a proper Error Code value (see the following table) to the requesting HLR.
- 3 ENDIF.
- 4 Exit this task.

Table ZZ VLR RoamerDatabaseVerificationRequest Response

Problem Detection and Recommended Response from VLR to HLR	
RETURN ERROR Error Code	Problem Definition
<i>MSID/HLRMismatch</i>	All or part of the received MSID range is not associated with the requesting HLR.
<i>ResourceShortage</i>	A required VLR resource (e.g., internal memory record, VLR is fully occupied) is temporarily not available (e.g., congestion).
<i>OperationNotSupported</i>	The requested MAP operation is recognized, but not supported, by the receiving VLR, or the requesting HLR is not authorized.
<i>ParameterError</i>	A supplied parameter has an encoding problem.
<i>SystemFailure</i>	A required resource (e.g., data base access, functional entity) is not presently accessible due to a failure. Human intervention may be required for resolution.
<i>UnrecognizedParameterValue</i>	A supplied parameter value is unrecognized or has nonstandard values (e.g., Range=0, Range>10,000).

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8 OPERATION TIMER VALUES

(see for TIA/EIA-41.6-D, page 6-400)

Table 63 Operation Timer Values

Timer	Default (sec.)	Started when	Normally stopped when	Action when timer expires
RDVRT Roamer Database Verification Request Timer	6	RoamerDatabase-VerificationRequest INVOKE is sent	RoamerDatabase-VerificationRequest RETURN RESULT or RETURN ERROR is received	Execute recovery procedures

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