

Terrestrial Trunked Radio (TETRA); Functional requirements for the TETRA ISI derived from Three-Country Pilot Scenarios



Reference

DTR/TETRA-01143

Keywords

TETRA, user

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2005.
All rights reserved.

DECT™, **PLUGTESTS™** and **UMTS™** are Trade Marks of ETSI registered for the benefit of its Members.
TIPHON™ and the **TIPHON logo** are Trade Marks currently being registered by ETSI for the benefit of its Members.
3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

Contents

Intellectual Property Rights	5
Foreword.....	5
Introduction	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	6
4 General connection requirements	7
4.1 ISI general topology	7
4.2 ISI bandwidth and points of connection	7
4.3 ISI security	7
4.4 ISI quantities	7
4.5 ISI configuration	8
4.6 ISI performance.....	8
4.6.1 Call setup delay.....	8
4.6.2 Audio delay.....	8
4.6.3 Migration	8
5 Mobility management requirements.....	8
5.1 Configuration of subscriber ids permitted to migrate.....	8
5.1.1 Pre-provisioning subscriber profiles	9
5.1.2 Migration approval upon registration request	9
5.1.3 Detachment	10
5.1.4 Restricted migration.....	10
5.1.5 Presentation of foreign users.....	10
5.1.6 Migration	10
5.1.6.1 Automatic migration	10
5.1.6.2 Manual migration.....	11
5.1.6.3 Preferred solution.....	11
5.2 Configuration of group ids	12
5.2.1 Pre-provisioning group profiles	12
5.2.2 Group attachment approval.....	12
5.2.3 Group detachment.....	13
6 Services across ISI	13
6.1 Possible mobile situations	13
6.2 Individual call, hook signalling	14
6.2.1 Individual call to a subscriber from the home SwMI (while migrated)	14
6.2.2 Individual call to a subscriber from the visited SwMI (while migrated)	15
6.2.3 Individual call to a subscriber from another SwMI (not a subscriber home nor current SwMI) (while migrated).....	16
6.2.4 Individual call to a subscriber (not migrated)	17
6.3 Group call.....	18
6.3.1 Group call when located in group home SwMI	18
6.3.2 Group call when not located in group home SwMI	19
6.4 Emergency call	19
6.5 Telephone call	19
6.5.1 Outgoing calls.....	19
6.5.2 Incoming calls.....	20
6.6 Status	20
6.7 SDS	20
6.8 Packet data.....	20
6.9 Supplementary Services	21

6.9.1	Calling line identification presentation	22
6.9.2	Talking party identification.....	22
6.9.3	Late entry	22
6.9.4	Pre-emptive priority call	22
6.9.5	Barring of outgoing calls	22
6.9.6	Barring of incoming calls	22
6.9.7	Individual DGNA	22
6.9.8	Enable/disable.....	22
6.9.9	Air-ground-air operation.....	22
7	Service importance	22
8	Security services.....	23
8.1	Authentication	23
8.2	Air Interface Encryption.....	23
8.3	End to end encryption.....	23
History	24

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Report (TR) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

Introduction

The present document is a minimally edited copy of a report of the Three-Country pilot project team (The Three-Country pilot is the operational Public Safety pilot in Belgium, Germany and the Netherlands which has been performed in 2003). The text of the present document captures the experiences made during the preparation and execution of the real life cross-border scenarios by translating them into functional requirements for the TETRA Inter System Interface.

It should be noted that the present document represents the view of the participating countries of the Three-Country pilot on Inter System Interface functionality.

1 Scope

The present document describes an example of the ISI requirements that are needed to connect public safety systems together. The example describes the result of the pilot between the Netherlands, Belgium and Germany.

NOTE: At the moment of writing Germany has not made a decision about their digital radio network.

The requirements cover the following functionality:

- Requirements for SwMI and mobile configuration prior to user migration across ISI.
- Characteristics of services available to migrating users.
- Characteristics of services available when calling users or groups in international cooperation.

The present document does not describe the technical solution to the ISI.

The focus of the present document is a solution where a fixed network topology as described in clause 6 is implemented. Future enhancements, although possible, are not described here.

2 References

For the purposes of this Technical Report (TR), the following references apply:

- [1] TETRA MoU: "Functional requirements for the TETRA ISI Derived from Three-Country Pilot Scenarios".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following term and definition applies:

Three-Country Pilot scenario: operational scenarios derived from international interoperability discussions between Belgium, Netherlands and Germany

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CCK	Common Cipher Key
DCK	Derived Cipher Key
DGNA	Dynamic Group Number Assignment
GCK	Group Cipher Key
IPI	IP Interworking
ISDN	Integrated Services Digital Network
ISI	Inter-System Interface
ISSI	Individual Short Subscriber Identity
KS	Session Key (also KS" as alternative session key)
MS	Mobile Station
MoU	Memorandum of Understanding
OTAR	Over The Air Rekeying
RS	Random Seed
SCK	Static Cipher Key
SDS	Short Data Service
SFPG	Security and Fraud Prevention Group

SwMI	Switching and Management Infrastructure
TETRA	TErrestrial Trunked RAdio
TL	Transport Layer
TPI	Talking Party Identity

4 General connection requirements

4.1 ISI general topology

The ISI between Public safety networks in Europe could potentially use a number of connection topologies:

- 1) Mesh of permanently leased lines.
- 2) Transit switched network, such as Private ISDN Network.
- 3) Packet switched intervening network, such as an Intranet.
- 4) Mesh of connections to other SwMIs, where other SwMIs perform transit-switching functions.

The second and third option require an intervening network, where the ownership, responsibilities and security details are not clear at this time. These options will therefore be discounted in this stage.

The fourth option, transit switching, is considered insecure, and will also be discounted.

Therefore the adopted option for connecting the networks of the Netherlands, Belgium and Germany will be the first, i.e. a leased line direct connection to each other SwMI where there is an ISI required.

4.2 ISI bandwidth and points of connection

An ISI connection between two networks could consist of one or more sets of connections. A single connection to another SwMI is the simplest possible solution. Two or more geographically separate connections between pairs of SwMIs could allow resilience, and could also reduce traffic backhauling requirements in some circumstances. However it would introduce additional complexity, especially when visitors roam in the visited SwMI between points of connection of ISI.

Therefore the connection between two SwMIs will be a single connection from a single interface point on one SwMI to a single interface point on the other SwMI.

The bandwidth of the connection will depend on the expected traffic load. The current circuit switched ISI limits one traffic connection to 64 kbps; i.e. each inter system call requires a 64 kbps connection.

The current assumption is that one E1 connection per connected network will be needed. It should be possible to increase the capacity of the connection. One E1 will support 30 simultaneous calls.

4.3 ISI security

It is necessary to provide both authenticity and confidentiality on the ISI. This will ensure that the other SwMI cannot be impersonated. It will also ensure that the link, which by its nature will be crossing an international border, and may be carried by a non-specific medium, cannot be intercepted.

The work to provide TETRA specific ISI security including SwMI authentication was not completed. The protection of the link will take place by the use of bulk encryption devices at both ends. The specification of these devices is outside the scope of the present document.

4.4 ISI quantities

As an initial assumption, it will be assumed that a maximum 5 separate ISI connections will be required per SwMI. A full mesh will be used to connect SwMIs. When more than 5 SwMIs are to be interconnected, a different topology will be considered.

4.5 ISI configuration

It will be necessary to configure each ISI connection independently, with details of the connected system, for example TETRA Mobile Network Code etc.

4.6 ISI performance

4.6.1 Call setup delay

Call setup delay is defined as the delay experienced by the transmitting party between pressing PTT and getting an audio indication for permission to talk.

For multi-SwMI group calls the call setup delay should be less than 1,0 seconds for:

- calls started in the group home SwMI
- calls started in a participating SwMI.

Conditions for measurement:

- Permission to talk should only be signalled if resources are checked to be available on all involved basestations in all participating SwMI's.
- The specified value is defined only for situations where there is good RF coverage and no queuing for ISI or basestation resources takes place.
- Mobiles to be used for the measurement are from the same manufacturer as the local infrastructure.
- 3 sites involved per infrastructure.
- 95 % of the setups should be within the specified time.

The evaluation of call-setup delay will be done by checking the time-difference between U-setup and D-connect-Ack in the basestation log (Measured value to be extended by 0,2 sec to represent the call setup delay experienced by the transmitting party).

4.6.2 Audio delay

The end-to-end audio delay experienced by the users for calls without end-to-end encryption over the ISI should not be higher than 0,7 seconds. A measurement method is to be agreed.

4.6.3 Migration

The initial migration registration procedure (including authentication) to a foreign network should not take more than 1,0 seconds longer than the first registration (including authentication) on the home network of a radio.

The evaluation of the migration registration performance will be done by checking the time-difference between U-location-update-demand and D-location- update-accept in the basestation log.

5 Mobility management requirements

5.1 Configuration of subscriber ids permitted to migrate

It is not considered safe for any subscriber claiming to originate from a connected SwMI to be allowed to migrate in without specific authorization.

It is not considered feasible to individually pre-provision each and every subscriber in each SwMI that a user may migrate to. This would create logistical problems, as it would be difficult to maintain an accurate database of all potential users from another system.

Therefore the visited network first checks if the visiting user fulfils basic migration requirements. The purpose of this check is to be able to refuse unwanted foreign users to avoid unnecessary signalling over ISI.

After this first, local check the home network of the subscriber is considered the main responsible party for providing up-to-date authorization for migration. This authorization is checked during authentication.

- For the first, local check blocks of permitted subscribers should be provisioned in each SwMI for every connected SwMI.

Whereas the functionality available to each subscriber whilst migrating will be defined in profiles, at the time of migration, the home SwMI should always be checked to ensure that the subscriber is permitted to migrate, and the subscriber should be authenticated based on security parameters obtained from the home system over the ISI.

NOTE: A MS will only be allowed to migrate to a SwMI that is directly connected to its home SwMI.

5.1.1 Pre-provisioning subscriber profiles

Local pre-defined migration profiles will be defined in connected SwMIs and migration profile exchange for subscribers over ISI is not supported. A pre-defined migration profile is supported in all connected SwMIs. Any migration request using a different pre-defined migration profile number will be rejected.

This provisioning within a SwMI will include the following functionality:

- Service/Feature availability for foreign subscribers. This should include:
 - Group call.
 - Individual call.
 - Telephone call.
 - Status.
 - SDS.
 - Packet data.

The ISI Mobility Management standard does not define the contents of pre-defined migration profiles, therefore as a minimum the pre-defined migration profiles should be based on the mandatory parameters defined in the subscriber migration profile that can be sent over ISI.

5.1.2 Migration approval upon registration request

When a visiting MS attempts to register on a foreign SwMI, the following steps should be taken:

- The foreign SwMI may check that the identity of the migrated subscriber is within one of the permitted blocks of identities.
- The (local) migration profile of the subscriber should be determined.
- The foreign SwMI should communicate with the home SwMI of the migrated subscriber to confirm that the MS is permitted to migrate to a foreign network.
- The authentication session key material should be received from the subscriber's home SwMI.
- The foreign SwMI should authenticate the migrated subscriber based on the authentication session key material received.
- Once migration has been successful the visited SwMI reports this to the home SwMI. Home SwMI and visited SwMI update their databases.

NOTE: Only when authentication has been approved will the migrated user be successfully registered to the foreign SwMI.

If any of the steps above fail, the subscriber registration will be rejected.

A migration request will always specify authentication being required, security parameters (RS, KS, KS' for use with authentication in the visited SwMI) will therefore always be received from the subscriber's home SwMI before migration acceptance is performed.

5.1.3 Detachment

When the MS detaches from the foreign SwMI, the foreign SwMI should inform the home SwMI of the detachment, and should immediately delete its record of the MS, including session keys held for that MS. The Home SwMI should mark the MS as 'not migrated' in its database.

If the MS attaches to its home SwMI, or to another foreign SwMI without detaching from the first visited SwMI, the home SwMI should inform the first visited SwMI that the MS is no longer migrated to that SwMI, and that first visited SwMI should delete its record of the MS, including session keys held for that MS.

5.1.4 Restricted migration

Restricted migration is the ability for a SwMI to allow subscribers that have not been configured in the foreign SwMI to make and receive emergency calls.

Restricted migration will not be supported in the networks due to the resulting security risk.

5.1.5 Presentation of foreign users

The SwMI should provide sufficient information (i.e. ITSI) for the dispatching or Command & Control system in order to enable accurate presentation of migrated subscriber identity. e.g. In the dispatch system visiting MSs should be presented with an alias revealing the network of origin and the original ISSI of the visiting user (e.g. "B 1234567" as alias on the Dutch network for a Belgian MS with Belgian ISSI 1234567).

5.1.6 Migration

This clause describes the requested radio behaviour during migration. The description is based on the behaviour of the radio. The supplier of the network and ISI is asked to supply the underlying mechanisms to support the described behaviour.

Two types of migration to another network can be distinguished:

- Automatic migration: Migration to the foreign network and back to the home network is done automatic by the radio without any action of the end-user.
- Manual migration: Migration to the foreign SwMI and back to the home SwMI is done after manual action of the end-user.

5.1.6.1 Automatic migration

Advantages:

The change from one network to another will be automatic and requires no action from the user.

Disadvantages:

It is difficult to predict the location where this will happen. (Even possible when the user is in his own country, this due to network coverage of the different networks).

5.1.6.2 Manual migration

Advantages:

The change from one network to another network will exactly be determined. (This in either direction).

Disadvantages:

The change from one network to another network will need an action from the user.

5.1.6.3 Preferred solution

Operational need:

- To be able to use services on the home network as much as possible, the radio should select the home network if available and it should stay on its home-network as long as possible.
- The changeover to another network should be automatic.
- The radio should clearly show which network is selected.

After evaluation of this operational need and the technical possibilities the following implementation was found to be both operationally acceptable and technically feasible.

When entering another network and losing coverage from the home network, the radio should automatically select the other network. During the network selection a short period where communications are not available (needed to authenticate the radio on the foreign network) is acceptable.

When coming back from the foreign network, the user should be able to switch over to the home network. Also during this switchover a short period where no communications are possible (needed to authenticate the radio on the network) is acceptable. When this manual action is not performed then the radio should automatically search for another network when the signal received from the foreign network is lost, and should select its home network (when available).

When switching on a radio, it should select the home network when available.

5.2 Configuration of group ids

Based on the Three-Country Pilot scenarios the following group attachment scenarios have been identified, see figure 1 (examples as seen from the Dutch point of view).

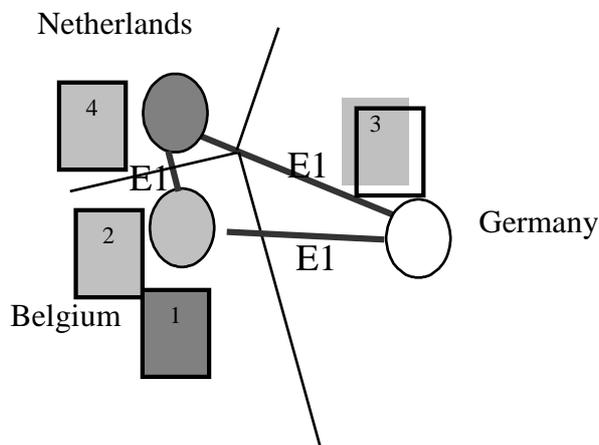


Figure 1: Group attachment scenarios

- 1) Attach to home group in foreign SwMI (use of a Dutch group while in Belgium).
- 2) Attach to a foreign group when registered in the same foreign SwMI (use of a Belgian group while in Belgium).
- 3) Attach to a foreign group when registered on a different foreign SwMI (use of a Belgian group while in Germany).
- 4) Attach to a foreign group when registered in home SwMI (use of a Belgian group while in the Netherlands).

When attaching to a foreign group, a subscriber could be "generically" permitted to attach to the foreign group, or could be permitted to join a group based on their SwMI of origin. Visitors from other connected SwMIs can attach to groups nominated for visitor attachment, as these will be specifically designated for interoperability.

NOTE: Attaching to a foreign group is currently not supported over ISI.

5.2.1 Pre-provisioning group profiles

As for subscriber migration profiles, local pre-defined migration profiles will be defined in connected SwMIs and migration profile exchange for groups over ISI is not supported. A single pre-defined migration profile is supported in all connected SwMIs. Any migration request using a different pre-defined migration profile number will be rejected.

NOTE: Neither group migration profile exchange over ISI or pre-defined group migration profiles are currently supported in the ISI-Mobility Management TIP.

The ISI Mobility Management standard does not define the contents of pre-defined migration profiles, therefore as a minimum the pre-defined migration profiles should be based on the mandatory parameters defined in the group migration profile that can be sent over ISI.

5.2.2 Group attachment approval

When an MS attaches to a group, the home SwMI of the group should be checked to see if group attachment is permitted in the foreign SwMI. There are no required security parameters associated with visiting groups.

The group home SwMI should always be checked for authorization of group attachment. The home SwMI should also be required to authorize all subsequent attachments by other MSs. One of the purposes is to allow the Group Home SwMI to maintain an updated list of users attached to the group in all SwMIs.

5.2.3 Group detachment

The home SwMI of the group will be informed when each subscriber detaches from the group. In particular, the last detachment will be specifically notified, as the group will no longer require inter-system services.

6 Services across ISI

The following level of services should be supported for a landmobile and air-mobile user that has migrated to a foreign SwMI. Migration with call restoration is not to be supported.

6.1 Possible mobile situations

Figure 2 visualizes the possible situations (positions) of radios involved in ISI communications.

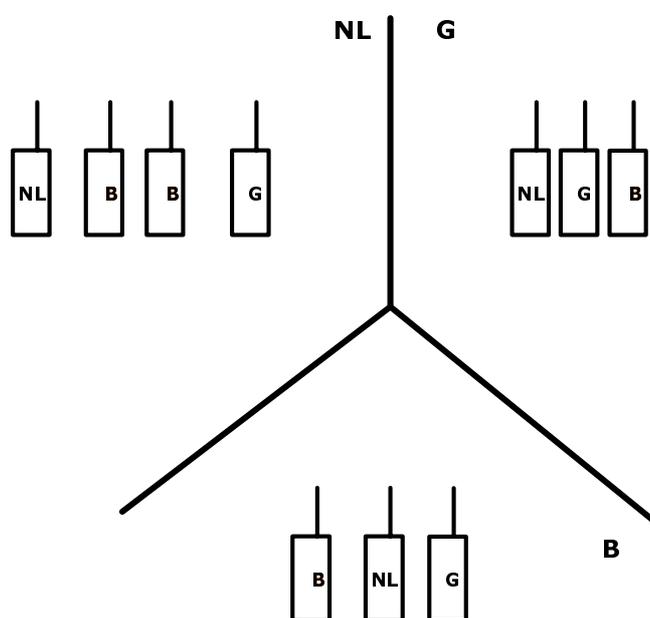


Figure 2: Radio positions in an ISI communication

6.2 Individual call, hook signalling

6.2.1 Individual call to a subscriber from the home SwMI (while migrated)

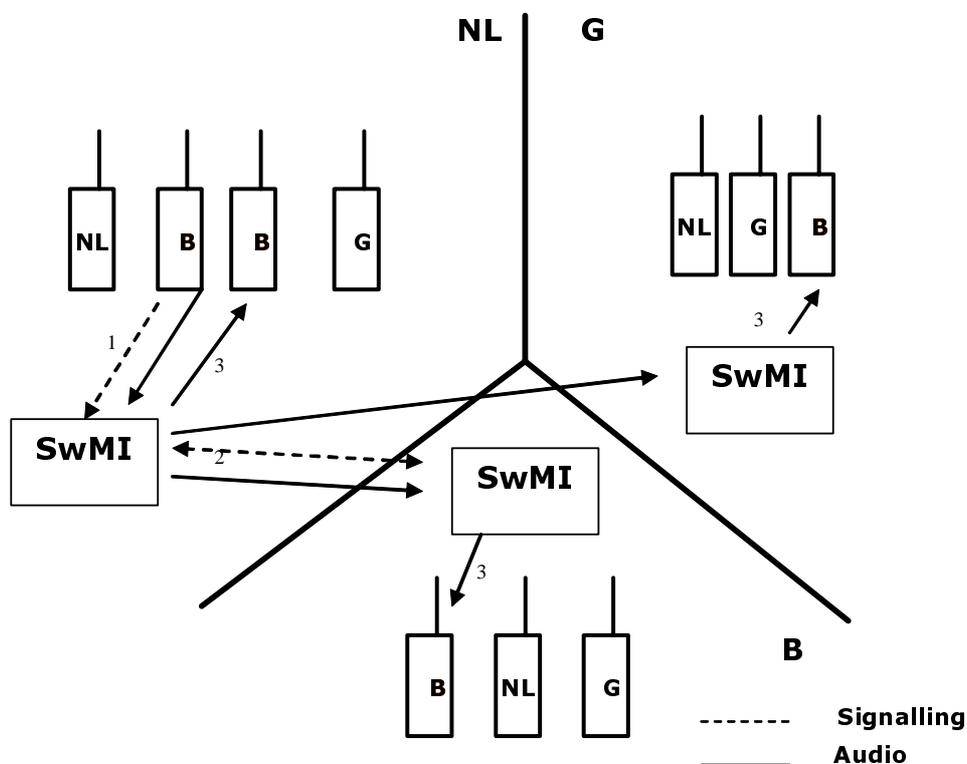


Figure 3: Individual call to a subscriber from the home SwMI

- Call Setup (1).
- Called party is also in the Visited SwMI.
 - Local Call (3).
- Called party is not in the Visited SwMI.
 - Visited SwMI will setup the call to the called party's Home SwMI (2).
 - Home SwMI of the called user reports that the user has migrated, identifying the visited SwMI.
 - Call will be made to the SwMI where the called party is located (3).

6.2.2 Individual call to a subscriber from the visited SwMI (while migrated)

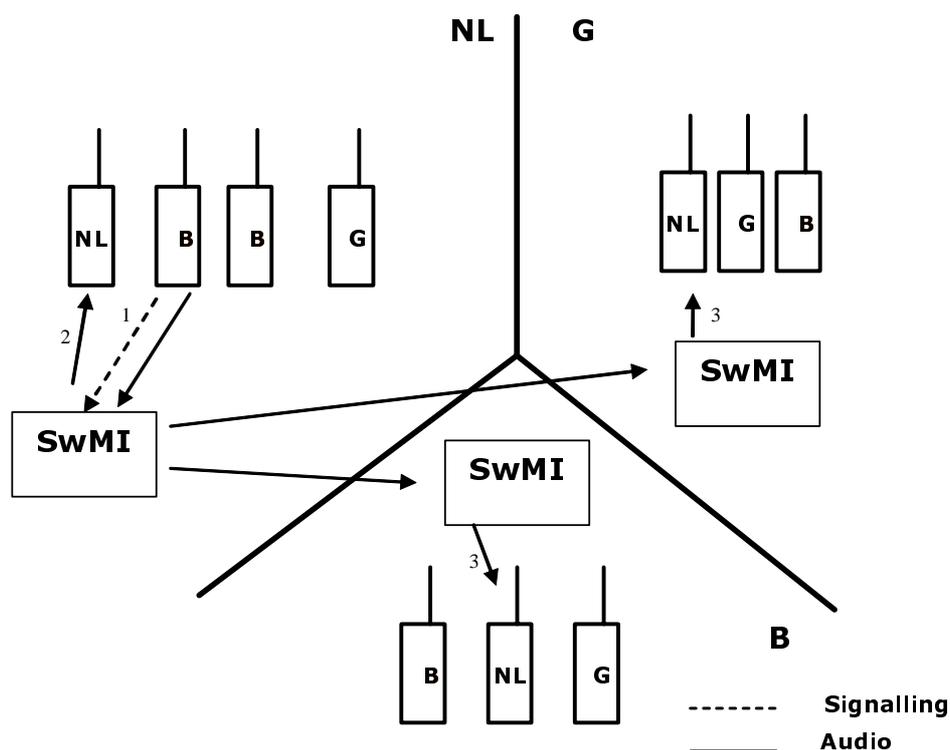


Figure 4: Individual call to a subscriber from the visited SwMI

- Call Setup (1).
- Called party is also in the Visited SwMI.
 - Local Call (2).
- Called party is not in the Visited SwMI.
 - The Visited SwMI knows the location of the called party and will transfer the call to the SwMI where the called party is currently located (3).

6.2.3 Individual call to a subscriber from another SwMI (not a subscriber home nor current SwMI) (while migrated)

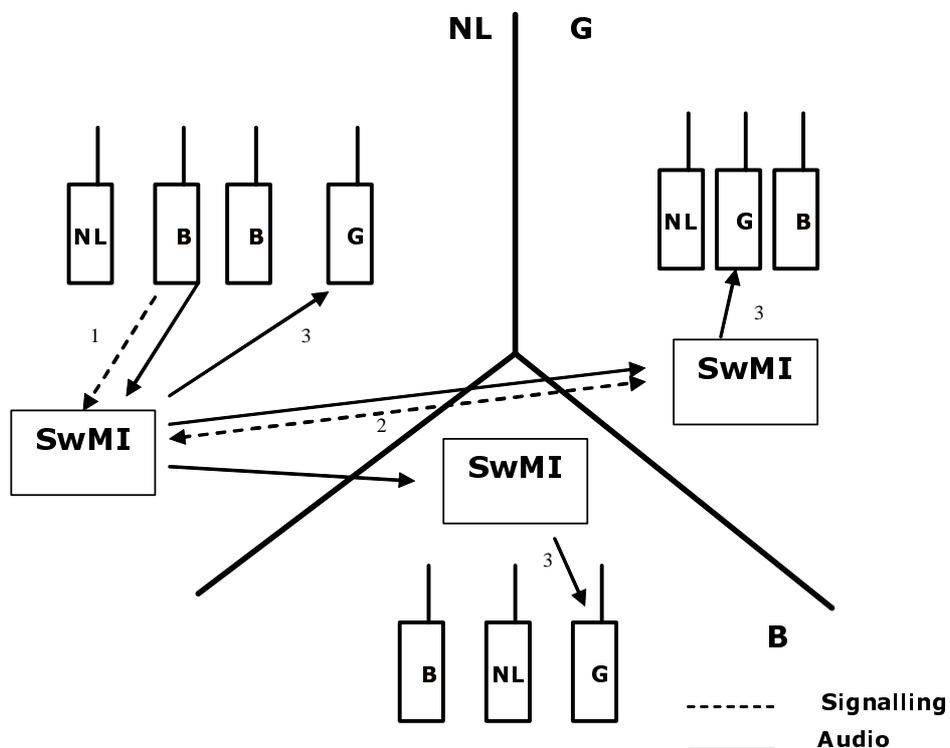


Figure 5: Individual call to a subscriber from another SwMI

- Call Setup (1).
- Called party is also in the Visited SwMI.
 - Local Call (3).
- Called party is not in the Visited SwMI.
 - Visited SwMI will setup a call to the Home SwMI of the called user (2).
 - Home SwMI of the called user reports that the user has migrated, identifying the visited SwMI.
 - Call will be made to the SwMI where the called party is located (3).

6.2.4 Individual call to a subscriber (not migrated)

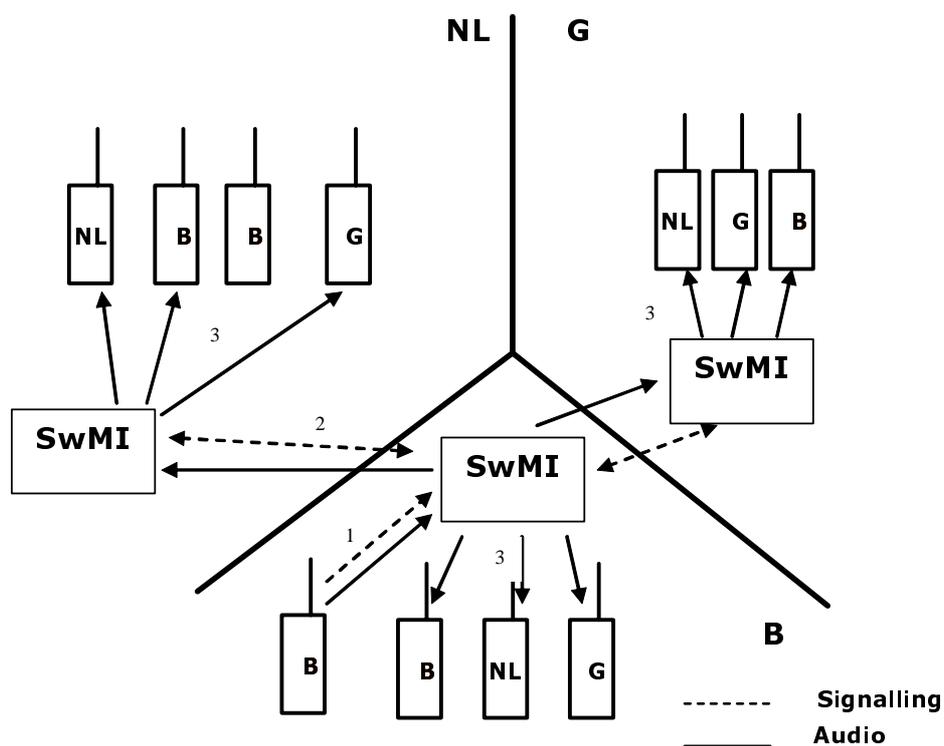


Figure 6: Individual call to a not migrated subscriber

- Call Setup (1).
- Called party is in the same network.
 - Local Call (3).
- Called party is not in the same network.
 - Visited SwMI will inquire the called party's location from its Home SwMI (2).
 - Call will be made to the SwMI where the called party is located (3).

6.3 Group call

The home SwMI of a group will always be the controlling SwMI for a group call. During group call set-up, the group home SwMI will inform each participating SwMI. It is up to the participating SwMI to connect the call to the attached users in that SwMI.

6.3.1 Group call when located in group home SwMI

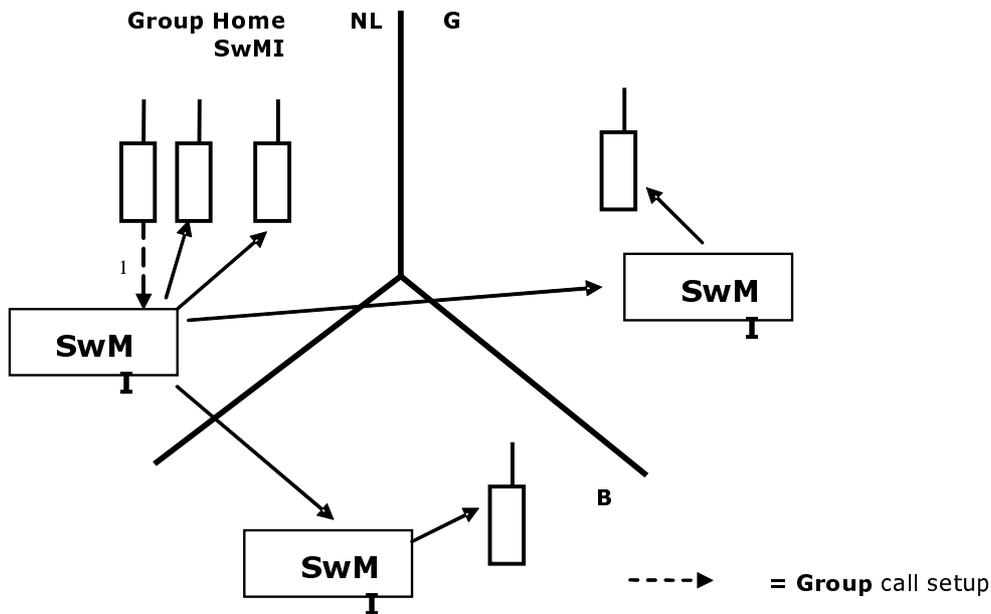


Figure 7: Group call when located in group home SwMI

- Group Call setup to network (1).
- The Group Home SwMI checks for attached members.
- The Group Home SwMI will connect the call to local attached members and will extend the call to any other SwMI with group members attached.

6.3.2 Group call when not located in group home SwMI

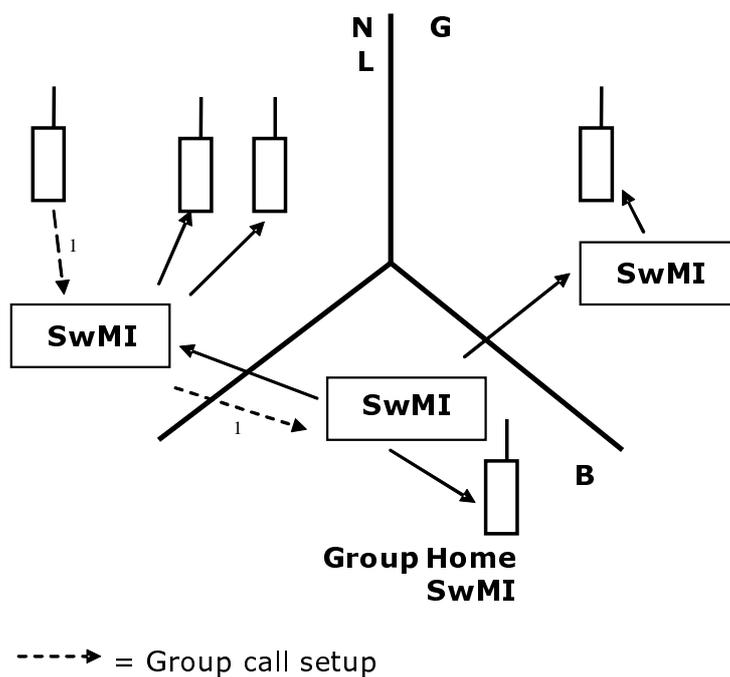


Figure 8: Group call when not located in group home SwMI

- Group Call setup to Group Home SwMI (1).
- The Group Home SwMI checks the member list for attached members.
- The Group Home SwMI will connect the call to local attached members and will transfer the call to any other SwMI with group members attached.

6.4 Emergency call

As described in clause 5.2 four different situations can be distinguished:

- 1) Emergency call to a home group while in a foreign SwMI.
 - 2) Emergency call to a foreign group when registered in the same foreign SwMI.
 - 3) Emergency call to a foreign group when registered on a different foreign SwMI.
 - 4) Emergency call to a foreign group when registered in home SwMI.
- Emergency calls should be presented and treated over the ISI maintaining the emergency priority.
 - In international talkgroups emergency calls should be presented to all involved dispatchers, all dispatchers having equal rights to handle this call.

6.5 Telephone call

6.5.1 Outgoing calls

Outgoing (MS to land) calls should be routed via the local gateway to the public telephone network.

6.5.2 Incoming calls

Incoming (land to MS) calls will be routed over the ISI to the destination subscriber when the call originates from the gateway in the home SwMI of the called MS.

6.6 Status

Group addressed status messages (situation indicators) should be routed to all dispatchers in the group. Emergency status may also be locally interpreted, if meaningful to the SwMI.

Status messages addressed to migrated subscribers are not supported.

6.7 SDS

Migrated subscribers should be able to send and receive SDS messages.

Only SDS type 4 with and without TL should be permitted over ISI.

SDS messages can only be sent to or received from the home system.

6.8 Packet data

Migrated users should be able to send and receive packet data to their home network. The present view is that packet data service will be implemented via a separate IP gateway.

Packet data may form part of an "IPI" rather than the TETRA voice service centric ISI. The only ISI involvement in packet data is the release of the packet data context after migrating away from the visited network.

6.9 Supplementary Services

Considering that:

- 1) not all TETRA Supplementary Services are supported in the connected networks;
- 2) rarely used Supplementary Services may be very complex to implement.

A careful evaluation has been done to select Supplementary Services which are essential for operational scenarios. As a result the TETRA supplementary services have been listed below and an indication as to whether or not they should be supported over the ISI has been given.

Supported Supplementary Services

Calling Line Identification Presentation (CLIP)

Talking Party Identification (TPI)

Late Entry (LE)

Pre-emptive Priority Call (PPC)

Barring of Outgoing Calls (BOC) based on locally provisioned profiles

Barring of Incoming Calls (BIC) based on locally provisioned profiles

Individual Dynamic Group Number Assignment (DGNA)

Air-Ground-Air operation (AGA)

Not supported Supplementary Services

Call Waiting (CW)

Call Report (CR)

Call Forwarding (CF)

List Search Call (LSC)

Call Authorized by Dispatcher (CAD)

Short Number Addressing (SNA)

Area Selection (AS)

Access Priority (AP)

Priority Call (PC) Call Hold (HOLD)

Call Completion to Busy Subscriber (CCBS)

Include Call (IC)

Discreet Listening (DL)

Ambience Listening (AL)

Call Completion on No Reply (CCNR)

Call Retention (CRT)

Calling Line Identification Restriction (CLIR)

COConnected Line identification Presentation (COLP)

COConnected Line identification Restriction (COLR)

Group addressed Dynamic Group Number Assignment (DGNA)

6.9.1 Calling line identification presentation

Calling Line Identification Presentation for telephone calls should be available for intersystem calls, depending on the capabilities of the connected SwMI.

6.9.2 Talking party identification

TPI should be available to intersystem calls with no change of characteristics.

6.9.3 Late entry

LE should be available to intersystem calls with no change of characteristics.

6.9.4 Pre-emptive priority call

The ISI should be considered a pre-emptable resource, and calls in progress will be dropped if necessary to set-up higher priority calls.

6.9.5 Barring of outgoing calls

Each SwMI can bar calls based on locally provisioned profiles.

6.9.6 Barring of incoming calls

Each SwMI can bar calls based on locally provisioned profiles.

6.9.7 Individual DGNA

Individual DGNA modifies the talkgroup list inside a radio by adding or removing groups. To allow flexibility in cross system operations, it is highly desirable to be able to use DGNA in cross border operations. Therefore the manufacturer is asked to make an optional offer for the following functionality:

An authorized dispatcher should be able to send talkgroups to both foreign and home MSs. Using DGNA over the ISI the dispatcher should be able to send groups to foreign MSs and migrated MSs of the own network. To maintain a clear responsibility for the talkgroups only the Group home SwMI should be able to DGNA a talkgroup to a radio.

Group addressed DGNA will not be supported for migrating MSs over the ISI.

6.9.8 Enable/disable

Enable and disable commands should be supported from the home system to its migrated MSs. Enable and disable should not be initiated by a user of the visited SwMI.

NOTE: Enable/disable is currently not supported over ISI.

6.9.9 Air-ground-air operation

Air-mobile users should have the same possibilities to migrate and communicate as landmobile users.

7 Service importance

The services are required to be developed in the following order of importance grouped in the phases according to user requirements as presented in tables 1 and 2.

Table 1: Teleservices

Teleservices		
Service number	Service	Phase
1	Group call	1
2	Emergency call	1
3	Individual call	2
4	Status	2
5	SDS-4	2
6	Telephone call	2
7	Packet data	3

Table 2: Supplementary services

Supplementary Services		
Service number	Service	Phase
1	Migration, Authentication, DCK encryption and local services	1
2	Talking Party Identity	1
3	Calling Line Identity	2
4	Individual DGNA	2
5	Pre-emptive Priority Call	2
6	Enable/Disable	2

8 Security services

8.1 Authentication

Migrated subscribers should be authenticated before receiving permission to operate on a foreign network. A SwMI should support sending and reception of session authentication keys (KS and KS') and a random seed (RS) over the ISI. Session authentication keys (KS and KS') are received from the visitors home SwMI over ISI during a migration request.

These Session authentication keys will be used for all further authentications in the visited SwMI during the validity period of the keys. New authentication keys are required when the former become invalid. RAND1 and RAND2 will not be passed over ISI.

8.2 Air Interface Encryption

Air Interface Encryption will be supported in a foreign SwMI, based on DCK derived during authentication as described in clause 6.1, and provisioning of CCK in that SwMI by OTAR. In the networks the TEA2 algorithm will be used for air interface encryption.

OTAR of CCK will not be supported across the ISI.

GCK will be supported for ISI connected groups. Using OTAR over the ISI the dispatcher should be able to provide SCK and GCK to migrated MSs of the own network.

8.3 End to end encryption

A SwMI should support transparent operation of end-to-end encryption compliant to MoU SFPG Recommendation 02. It should support transport of this over the ISI for calls either originated or terminated in the SwMI.

History

Document history		
V1.1.1	May 2005	Publication