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Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Lawful Interception; Stage 1 and Stage 2 definition

Reference

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

Introduction

The NGN is required to operate within a regulated environment and to comply to the privacy directive EC/2002/58 [i.1] which identifies in articles 5(2), and 15(1) the framework and obligation for CSPs to provide facilities for Lawful Interception and Data Retention. These obligations are further extended by the European Union Council Resolution COM 96/C329/01 [15] along with the International User Requirement (IUR) [16], stating the obligations on member states to provide facilities for LI. These documents and the requirements in them are respected in a balanced way in the present document.

1 Scope

The present document specifies the stage 2 model for Lawful Interception (LI) of TISPAN NGN services as specified by TR 180 001 [i.3].

The requirement for provision of lawful interception for all Communication Service Providers (CSP) is described in TS 101 331 [3] and the present document gives the stage 1 and stage 2 definition for provision of an interception capability in for the NGN as specified by TISPAN.

The provisions in the present document apply only when the target of interception is an NGN user identified as specified in TS 184 002 [7], and when the network supplying services on behalf of the CSP is an NGN as specified by TISPAN in TR 180 001 [i.3] and where the NGN architecture is as specified in ES 282 001 [1]. The present document takes account of the requirement to support dynamic triggering of interception.

A guide to the application of the handover specifications is given in informative annexes.

NOTE 1: Handover aspects are not specified in the present document but are described in TS 133 108 [9], TS 101 671 [2] and TS 102 232-1 [4], TS 102 232-5 [5], and TS 102 232-6 [6].

NOTE 2: The present document assumes that the LEA/LEMF receiving intercept related information records from the NGN is able to decode NGN signalling streams and thus there is no definition in the present document of how to present NGN data in non-NGN formats.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture".

[2] ETSI TS 101 671: "Lawful Interception (LI); Handover interface for the lawful interception of telecommunications traffic".

[3] ETSI TS 101 331: "Lawful Interception (LI); Requirements of Law Enforcement Agencies".

[4] ETSI TS 102 232-1: " Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 1: Handover specification for IP delivery".

[5] ETSI TS 102 232-5: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 5: Service-specific details for IP Multimedia Services".

[6] ETSI TS 102 232-6: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 6: Service-specific details for PSTN/ISDN services".

[7] ETSI TS 184 002: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Identifiers (IDs) for NGN".

[8] ETSI TS 133 107: "Universal Mobile Telecommunications System (UMTS); LTE; 3G security; Lawful interception architecture and functions (3GPP TS 33.107)".

[9] ETSI TS 133 108: "Universal Mobile Telecommunications System (UMTS); LTE; 3G security; Handover interface for Lawful Interception (LI) (3GPP TS 33.108)".

[10] ETSI ES 282 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation Sub-system (PES); Functional architecture".

[11] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".

[12] ETSI TS 182 012: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based PSTN/ISDN Emulation Sub-system (PES); Functional architecture".

[13] ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[14] ETSI ES 201 158: "Telecommunications security; Lawful Interception (LI); Requirements for network functions".

[15] European Union Council Resolution COM 96/C329/01 of 17 January 1995 on the Lawful Interception of Telecommunications.

[16] International User Requirement (IUR).

NOTE: The IUR was provided as an annex to [15].

[17] ETSI TS 133 210: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; 3G security; Network Domain Security (NDS); IP network layer security (3GPP TS 33.210)".

[18] ETSI TS 181 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Service and Capability Requirements".

[19] ETSI TS 187 016: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Security; Identity Protection (Protection Profile)".

[20] ETSI TS 102 232-2: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 2: Service-specific details for messaging services".

[21] ETSI TS 102 232-3: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 3: Service-specific details for internet access services".

[22] ETSI TS 102 232-4: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 4: Service-specific details for Layer 2 services".

[23] ETSI TS 102 232-7: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 7: Service-specific details for Mobile Services".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Directive 2002/58/EC of the European Parliament and of the council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications).

[i.2] Void.

[i.3] ETSI TR 180 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Release 1; Release definition".

[i.4] ETSI TR 102 528: "Lawful Interception (LI); Interception domain Architecture for IP networks".

[i.5] Void.

[i.6] ETSI TR 102 661: "Lawful Interception (LI); Security framework in Lawful Interception and Retained Data environment".

[i.7] Directive 2002/21/EC of the European Parliament and of the council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 101 671 [2] and the following apply:

Content of Communication (CC): information exchanged between two or more users of a telecommunications service, excluding intercept related information

NOTE: This includes information which may, as part of some telecommunications service, be stored by one user for subsequent retrieval by another.

corresponding party: correspondent of the target

Handover Interface (HI): physical and logical interface across which the interception measures are requested from Communications Service Provider (CSP), and the results of interception are delivered from a CSP to a law enforcement monitoring facility

interception: action (based on the law), performed by a CSP, of making available certain information and providing that information to a law enforcement monitoring facility

interception interface: physical and logical locations within the CSP telecommunications facilities where access to the content of communication and intercept related information is provided

NOTE: The interception interface is not necessarily a single, fixed point.

Intercept Related Information (IRI): collection of information or data associated with telecommunication services involving the target identity, specifically communication associated information or data (e.g. unsuccessful communication attempts), service associated information or data and location information

Internal Network Interface (INI): network's internal interface between the Internal Intercepting Function (IIF) and a mediation device

Law Enforcement Agency (LEA): organization authorized by a lawful authorization based on a national law to request interception measures and to receive the results of telecommunications interceptions

Law Enforcement Monitoring Facility (LEMF): law enforcement facility designated as the transmission destination for the results of interception relating to a particular interception subject

mediation device: equipment, which realizes the mediation function

Mediation Function (MF): mechanism which passes information between a network operator, an access provider or service provider and a handover interface, and information between the internal network interface and the handover interface

Point of Interception (PoI): functional entity in the NGN that hosts the CC-IIF or IRI-IIF

target: interception subject

target identity: technical identity (e.g. the interception's subject directory number), which uniquely identifies a target of interception

NOTE: One target may have one or several target identities.

3.2 Abbreviations

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

ADMF	ADMinistration Function
AF	Administration Function
AGCF	Access Gateway Control Function
A-MGF	Access Media Gateway Function
ASF	Application Server Function
ASN.1	Abstract Syntax Notation 1
C-BGF	Core Border Gateway Function
CC	Content of Communication
CCCI	Content of Communication Control Interface
CCTF	Content of Communication Trigger Function
CCTI	Content of Communication Trigger Interface
CP	Content Provider
CR	Change Request
CS	Circuit Switched
CSP	Communications Service Provider
DF	Delivery Function
FE	Functional Entity
GPRS	General Packet Radio Service
HI	Handover Interface
HI1	Handover Interface Port 1 (for Administrative Information)
HI2	Handover Interface Port 2 (for Intercept Related Information)
HI3	Handover Interface Port 3 (for Content of Communication)
IBCF	Interconnection Border Control Function
I-BGF	Interconnection Border Gateway Function
ID	IDentity
IIF	Internal Interception Function
IMS	IP Multimedia core network Subsystem
INI	Internal Network Interface
IP	Internet Protocol
IPTV	Internet Protocol Television
IRI	Intercept Related Information
ISDN	Integrated Services Digital Network
IUR	International User Requirement
LEA	Law Enforcement Agency
LEMF	Law Enforcement Monitoring Facility
LI	Lawful Interception
LIAF	Lawful Interception Administration Function
MF	Mediation Function
MGCF	Media Gateway Control Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
NGN	Next Generation Network
P-CSCF	Proxy Call Session Control Function
PES	PSTN/ISDN Emulation Subsystem
PoI	Point of Interception
PSTN	Public Switched Telephone Network
PSS	PSTN Simulation Service
RTCP	Real-time Transport Control Protocol
RTP	Real Time Protocol
S-CSCF	Serving Call Session Control Function
SDL	Specification and Description Language
SDP	Session Description Protocol

SIP	Session Initiation Protocol
SPDF	Service based Policy Decision Function
TDM	Time Division Multiplexing
T-MGF	Trunking Media Gateway Function
UPSF	User Profile Server Function

4 Interception in the NGN

4.0 Structure of analysis

The analysis presented in the present document is based on the recommendations for stage 2 of the method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN defined in ITU-T Recommendation I.130 [13]. The steps in expanding a stage 2 specifications are listed below:

- Step 2.1: Derivation of a functional model from requirements stated in stage 1.
- Step 2.2: Information flow diagrams.
- Step 2.3: SDL diagrams for functional entities.
- Step 2.4: Functional entity actions.
- Step 2.5: Does not apply (see note).

NOTE: Step 2.5 in ITU-T Recommendation I.130 [13] addresses the ISDN environment. The NGN specifications do not describe physical locations, but NGN Functional Entities (NGN-Fes). The present document gives examples of the allocation of Lawful Interception Functional Entities (LI-Fes) to NGN-Fes.

The primary points of the stage 1 requirements are stated in clause 4.0.1 as a starting point for the further development of stage 2.

The structure for LI within the NGN should be mapped to the structure for handover of telecommunications defined in ES 201 158 [14] and provisioned by each of TS 101 671 [2], TS 133 108 [9] and TS 102 232-1 [4].

4.0.1 Review of stage 1 requirements

The stage 1 analysis approach is defined in ITU-T Recommendation I.130 [13] and consists of the following steps:

- Step 1.1: Service prose definition and description.
- Step 1.2: Static description of the service using attributes.
- Step 1.3: Dynamic description of the service using graphic means.

For the purposes of the present document only step 1.1 is summarized.

4.0.1.1 Provision/withdrawal

The LI service shall always be provided.

4.0.1.2 Activation/deactivation

The LI service shall be activated upon issue of a valid interception warrant from an LEA. The LI service shall be deactivated when the interception warrant expires or as defined by the LEA.

4.0.1.3 Invocation and operation

The LI service shall be invoked on any communication from or to the target visible to the network.

4.0.1.4 Interrogation

Interrogation shall be possible only from an authorized user. Where audit records are maintained for the service (required by the IUR [16]) access shall be possible only from an authorized user.

An authorized user for the purposes of interrogation is one who is allowed and authorised by both LEA and the CSP to administer the LI interface.

4.0.1.5 Interaction with other services

There shall be no interaction.

NOTE: This means that the invocation of LI is not intended to alter the operation of any service and any resulting modification implies non compliance to the requirements of the present document.

4.1 LI architecture model

The architecture for lawful interception consists of a Point of Interception (PoI) for each of the signalling plane and the transport plane, collocated with an NGN Functional Entity (NGN FE) (the specific NGN FE varies with the service being intercepted), that delivers intercepted material to a Mediation Function (MF). The MF acts to mediate between the nationally specified handover interface and the internal interception interface of the NGN as specified in the present document.

The target is a specialist NGN user that receives service from the NGN.

NOTE 1: A service offered to the NGN user may invoke many NGN-Fes.

NOTE 2: There are a number of terms used across ETSI to refer to the various functions outlined in the first paragraph of this clause (4.1). The MF is also known as a Delivery Function (DF) in 3GPP documents, the Internal Network Interception interfaces are also referred to in 3GPP as X interfaces.

The LI capability in the NGN shall always be available and shall be invoked on receipt of instruction from the Law Enforcement Agency or its authorizing agency. The functions of the LI capability shall only be visible to, and their operation shall only be invoked by, authorized parties within the NGN and shall not alter or be impacted by the operation of any other functional entity in the NGN.

4.2 LI reference model

The NGN LI architecture model overlays the TISPAN NGN architecture described in ES 282 001 [1] (shown in figure 1) which has been designed to support the NGN services defined in TS 181 005 [18].

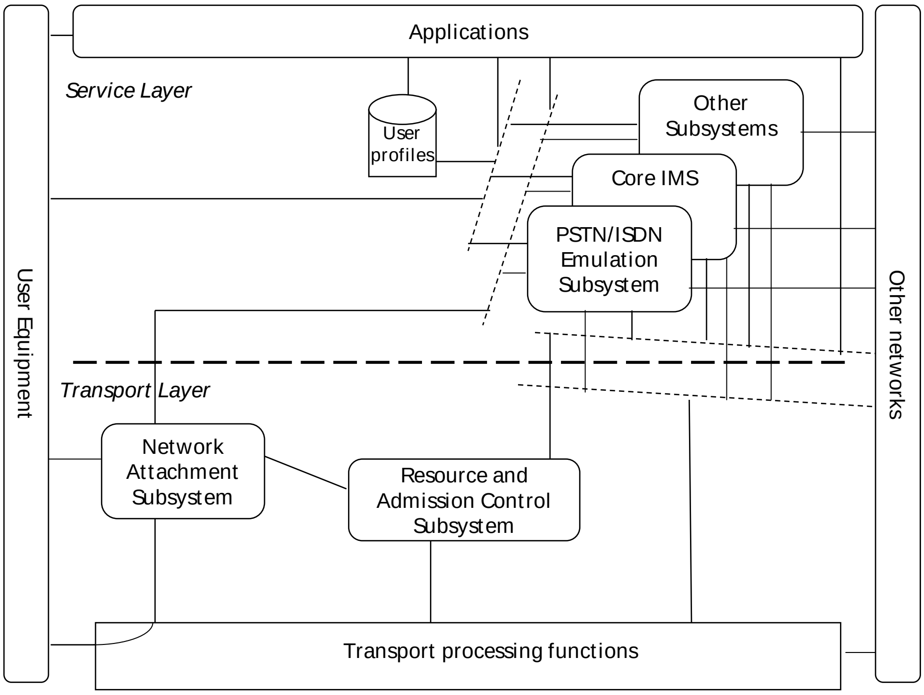

Applications
Service Layer
User profiles
Other Subsystems
Core IMS
PSTN/ISDN Emulation Subsystem
User Equipment
Other networks
Transport Layer
Network Attachment Subsystem
Resource and Admission Control Subsystem
Transport processing functions

Figure 4.1: TISPAN NGN overall architecture

As noted in ES 282 001 the functional entities that make up a subsystem may be distributed over many CSP domains (see figure 2) consistent with the Framework Directive [i.7].

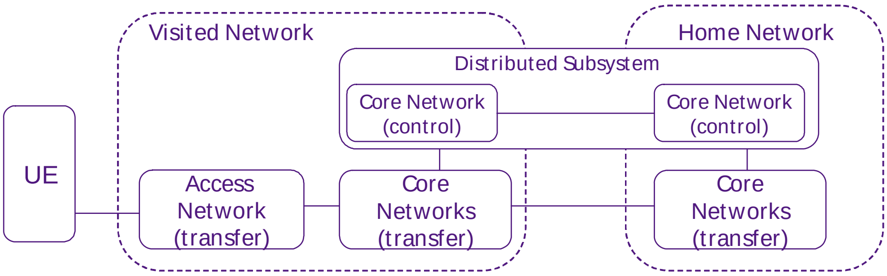


Figure 4.2: Distributed subsystems

The present document adopts the generic reference model for the interception domain from TR 102 528 [i.4], its internal intercept functions, IRI-IIF, CCTF, and CC-IIF, and the internal interfaces INI1, INI2, INI3, CCTI and CCCI as shown in Figure 3 and maps them in clause 5.0 to the NGN functional architecture defined in ES 282 001 [1].

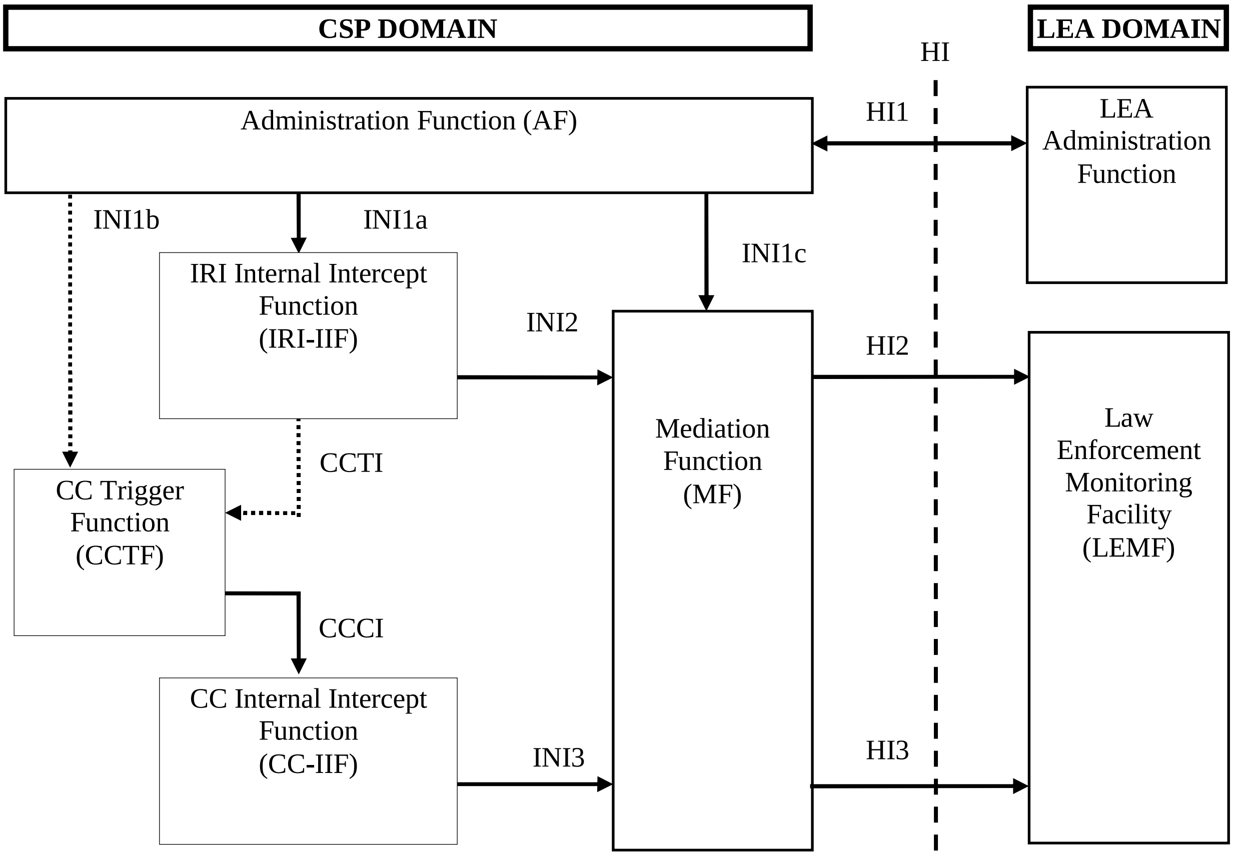

CSP DOMAIN
LEA DOMAIN
HI
Administration Function (AF)
HI1
LEA Administration Function
INI1b
INI1a
INI1c
IRI Internal Intercept Function (IRI-IIF)
INI2
HI2
Mediation Function (MF)
Law Enforcement Monitoring Facility (LEMF)
CCTI
CC Trigger Function (CCTF)
CCCI
CC Internal Intercept Function (CC-IIF)
INI3
HI3

Figure 4.3: Reference Model for Lawful Interception from TR 102 528 [i.4]

The reference model depicts the following functions and interfaces:

- Intercept Related Information Internal Intercept Function (IRI-IIF) generates signalling intercept material.

NOTE 1: The IRI-IIF is also described as the Triggering Origination Function.

- Content of Communication Internal Intercept Function (CC-IIF) generates content intercept material.

NOTE 2: The CC-IIF is also described as the Triggering Receiving Function.

- Content of Communication Trigger Function (CCTF) controls the CC-IIF and is considered in the present document as a specialisation of the NGN LI Administration Function.

NOTE 3: The CCTF is also described as the Triggering Control Function.

- Internal interface INI1 carries provisioning information from the Lawful Interception Administration Function (AF) to the Internal Intercept Functions (IIF).

- Internal interface INI2 carries Intercept Related Information (IRI) from the IRI-IIF to the MF.

- Internal interface INI3 carries Content of Communication (CC) information from the CC-IIF to the MF.

- Content of Communication Trigger Interface (CCTI) carries trigger information from the IRI-IIF to the CCTF and is considered in the present document as a specialisation of INI1.

- Content of Communication Control Interface (CCCI) carries controls information from the CCTF to the CC-IIF and is considered in the present document as a specialisation of INI1.

- The Mediation Function (MF) acts as the gateway between INI2 and HI2, and between INI3 and HI3. A single instance of the MF may be used by more than one CSP, or by more than one domain in a single CSP and shall be identified in the initialisation of the IRI-IIF and the CC-IIF.

The reference model introduces the CCTF FE that may be used to in a number of configurations to allow for the provisioning of CC-IIF in an IP network. The physical location of the CCTF is not defined in the present document as there are many configuration options available that include the following:

- CCTF co-located with the LIAF: INI1b is internal to the AF and CCTF.
- CCTF co-located with the IRI-IIF: CCTI is internal to the IRI-IIF and CCTF.
- CCTF co-located with the IRI-IIF and CC-IIF: CCTI and CCCI are internal to the IRI-IIF, CCTF and CC-IIF.
- CCTF co-located with the MF: CCTI is merged with INI2.
- A stand alone CCTF: Both CCTI and CCCI are external interfaces.

A complete explanation of the functions and interface is found in clause 4 of TR 102 528 [i.4].

4.2.1 Features of NGN LI Administration function

NOTE: The NGN-LI-AF can be further decomposed but has not been in the present document as it may preclude optimisations at stage 3.

Within the CSP domain the NGN LI Administration Function (NGN-LI-AF) terminates the signalling from HI1 and controls the activation and deactivation of the Internal Interception Functions for each of Signalling and Content of Communication (IRI-IIF and CC-IIF respectively). The Content of Communication Trigger Function (CCTF) is a sub-element of the NGN LI AF that is used to specifically control the CC-IIF when the specific CC-IIF entity is known only in the course of an intercepted signalling exchange (this is often referred to as Dynamic Triggering (DT) of interception).

The NGN-LI-AF shall be maintained in a separate security domain from any other NGN Administration or Management function.

Where NGN user privacy services as defined in TS 187 016 [19] are implemented the NGN-LI-AF shall interact with the NGN Identity Provider and NGN Service Authorisation Server entities to identify the current service authorisation tickets issued to the target.

4.2.2 LI in multiple CSP domains

The present document defines the role of a single CSP in providing LI where LI of the communication cannot rely on a fixed, or a priori known relationship between identifiers used in different domains (e.g. service and transport domain), for determination of the traffic to be intercepted within each domain (i.e. traffic to be delivered as Intercept Related Information (IRI) across Handover Interface port 2 (HI2) and traffic to be delivered as Content of Communication (CC) across Handover Interface port 3 (HI3)).

The necessary information flows to support Dynamic Triggering in the NGN are described in clause 5A of the present document and provide support of the Gateway Triggering Origination (GTO) and Gateway Triggering Receiving (GTR) functional elements described in current work in ETSI TC LI as specialisations of the NGN LI AF, and the reference points DT1, DT2, DT3, DT4 and DT5 as specialisations of the INI1 reference point.

The NGNLIAdmin function shall generate a Dynamic Triggering Correlation Number (DTCN) as a specialisation of the Correlation and interception instance identifier that is present in the information flows defined in clause 5A of the present document.

4.3 Result of interception

The CSP at the point of interception shall, in relation to each target service:

a) provide the content of communication;

b) remove any service coding or encryption which has been applied to the content of communication and the intercept related information at the instigation of the network operator/service provider;

NOTE 1: If coding/encryption cannot be removed through means which are available to the CSP for the given communication the content is provided as received.

c) provide the LEA with any other decryption keys whose uses include encryption of the content of communication, where such keys are available;

d) intercept related information shall be provided:

1) when communication is attempted;

2) when communication is established;

3) when no successful communication is established;

4) on change of status (e.g. in the access network);

5) on change of service or service parameter;

6) on change of location (this can be related or unrelated to the communication or at all times when the apparatus is switched on); and

7) when a successful communication is terminated;

NOTE 2: In the present document, service should be taken to include supplementary services.

NOTE 3: For those protocols identified of type Representational State Transfer (e.g. SIP, HTTP) each transaction is considered as unique unless the signalling itself contains a means to link signals (e.g. session identity).

e) intercept related information shall contain:

1) the identities that have attempted telecommunications with the target identity, successful or not;

2) the identities which the target has attempted telecommunications with, successful or not;

3) identities used by or associated with the target identity;

4) details of services used and their associated parameters;

5) information relating to status;

6) time stamps;

f) the conditions mentioned above also apply to multi-party or multi-way telecommunication if and as long as the target is known to participate.

NOTE 4: Where the user has initiated and applied end to end encryption, the content is provided as received.

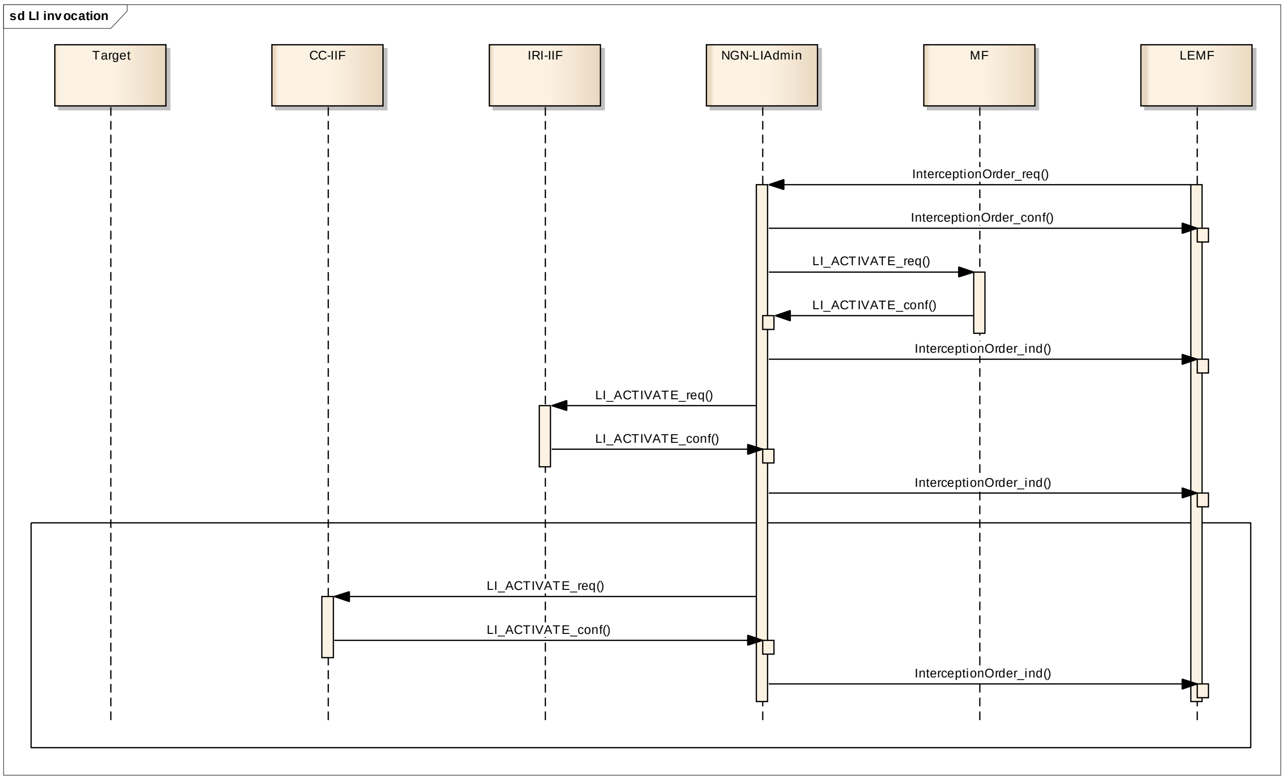
5A Stage 2 description of NGN LI

5A.1 Information flow sequences

5A.1.1 LEA control interactions and information flows

NOTE: The information flows described in this clause do not infer an implementation method. The related external interface (HI1 from TS 101 671 [2]) may be manual.

Figure 5A.1 shows the stimuli from the LEA and the responses from the NGN that are translated by the mediation function.



NOTE 1: The brackets indicated in each information flow indicate that parameters are contained in the message but are not expanded in the figure.

NOTE 2: The activation of the CC-IIF (shown boxed in the figure) may take place within a single activation phase or may be distributed in time in accordance with the Dynamic Triggering of Interception model

Figure 5A.1: External stimuli and information flow sequences for NGN LI

The LI_ACTIVATE_req information flow shall contain sufficient data to allow the NGN Internal Intercept Function to validate the request and to make the required target activity data available to the MF. The returned information flow (LI_ACTIVATE_conf) shall contain a unique identifier for the interception applied within the network. Any subsequent information flows (e.g. LI_MODIFY_req/conf) shall refer to this unique identifier.

The Interception Order received from the LEA may result in the NGN LI AF making many activations of IRI-IIF and CC-IIF during the lifetime of the Interception Order. This shall especially apply in models of the NGN where signalling and content processing entities are allocated to the NGN user on demand (i.e. dynamically).

5A.1.1.1 LI_ACTIVATE_req

This information flow is sent from the Administrative function internally to the NGN functional entities (the PoIs) to request interception of traffic and its copy to be sent in T_TRAFFIC_ind (for the target) and CP_TRAFFIC_ind (for the correspondent of the target if available and relevant), information flows and interception of signalling and a copy to be sent in TARGET_ACTIVITY_MONITOR_ind and TARGET_COMMS_MONITOR_ind information flows to the MF.

Table 5A.1: LI Activate request information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Invocation identifier	M	Used to allow the CSP to correlate the invocation of PoIs to the requested interception order.
Target identity	M	Uniquely identifies the target that the interception shall be invoked against. It shall be an identifier defined in TS 184 002 [7] and used in the serving NGN, or shall be an anonymous authorisation assertion ticket reference issued by the NGN to the target.
Services to be intercepted (see note)	M	A list of the specific services that are to be intercepted. By default all services offered to the target at the PoI shall be intercepted.
MF details	M	Details of the MF to where intercepted information shall be sent.
Activation Authorisation Credentials	M	Credentials that when verified by the receiving PoI give assurance that the request to provide the interception service is lawful.
NOTE: The NGN, in particular the IMS platform, does not offer specific services.		

Protocol constraints:

Response to = None.

Response expected = LI_ACTIVATE_conf.

5A.1.1.2 LI_ACTIVATE_conf

If the request is successful the Result element of the information flow shall be set to TRUE and the Correlation and interception instance identifier set. The Correlation and interception instance identifier shall thereafter be used as the NGN specific pointer to the interception. If the request is unsuccessful the Result element shall be set to FALSE and the Correlation and interception instance identifier shall not be returned. (i.e. the presence of the Correlation and interception instance identifier is conditional on the value of Result.)

Table 5A.2: LI Activate confirmation information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Invocation identifier	M	
Result	M	Indicates the success or failure of the activation.
Result Additional Information	O	Gives additional information for the reason for failure in case of failure.
Correlation and interception instance identifier	C	Provided if the interception invocation result is positive and allows the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.

Protocol constraints:

Response to = LI_ACTIVATE_req.

Response expected = None.

5A.1.1.3 LI_MODIFY_req

An interception may be modified many times in its life. Each modification is addressed using the reference identity (Correlation and interception instance identifier) and a sequential ModificationNumber. The modification may be one of a selection as shown in table 5A.3.

Table 5A.3: LI modify request information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Modification number	M	Sequential count of the modification at the particular PoI.
Modification type	M	Identifies the form of the modification, may be one of halt, reset, modification of expiry time and others.

Protocol constraints:

Response to = None.

Response expected = LI_MODIFY_conf.

5A.1.1.4 LI_MODIFY_conf

If the modification request is successful then Result shall be set to TRUE, else it shall be set to FALSE. If the result is FALSE the affected PoI may provide additional information to the requesting party indicating the reason for failure.

Table 5A.4: LI modify confirmation information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Modification number	M	Sequential count of the modification at the particular PoI.
Result	M	Indicates the success or failure of the modification.
Result Additional Information	O	Gives additional information for the reason for failure in case of failure.

Protocol constraints:

Response to = LI_MODIFY_req.

Response expected = None.

5A.1.1.5 LI_STATUS_ind

This information flow from the NGN PoIs to the administrative function reports changes in the status of the NGN PoI. This may indicate for example problems in the ability to provide interception.

Table 5A.5: LI status indication information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
System status	M	Identifies the current status of the invocation at the PoI.

Protocol constraints:

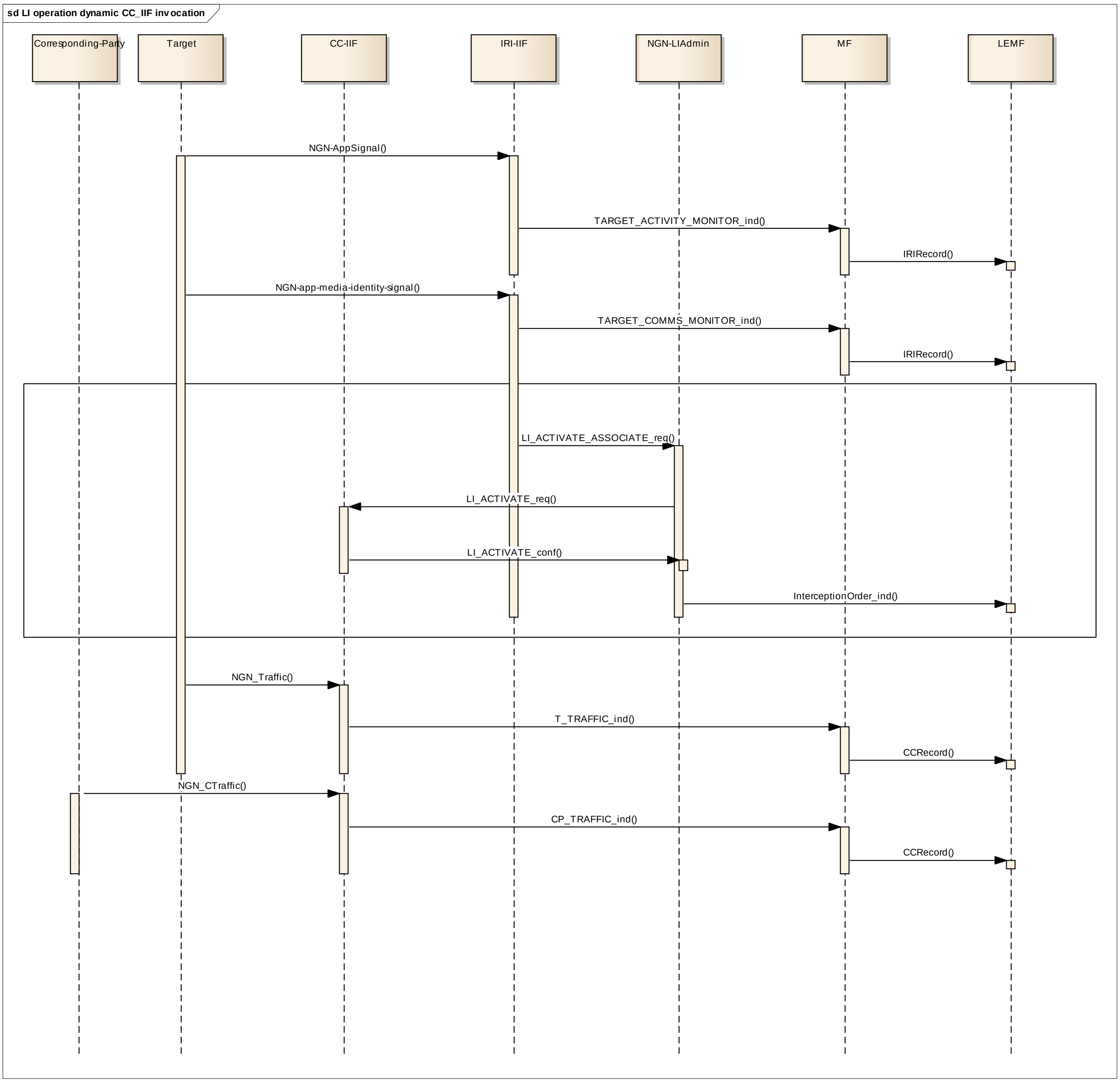
Response to = None.

Response expected = None.

5A.1.1.6 LI_ACTIVATE_ASSOCIATE_ind

NOTE: This information flow is applicable only to those networks that support Dynamic Triggering.

This information flow is sent from the IRI-IIF internally to the NGN functional entities (the PoIs) to indicate to the NGN-LIAdmin that the target has moved from a signalling (where IRI-IIF is active) phase of a session to a media phase of a session (where a CC-IIF has to be made active). If the indicated media entity has not been activated as CC-IIF the NGN-LIAdmin may activate the appropriate CC-IIF using the LI_ACTIVATE_req information flow described in clause 5A.1.1.1.



NOTE 1: The brackets indicated in each information flow indicate that parameters are contained in the message but are not expanded in the figure.

NOTE 2: The activation of the CC-IIF (shown boxed in the figure) may take place within a single activation phase or may be distributed in time in accordance with the Dynamic Triggering of Interception model.

Figure 5A.1a: External stimuli and information flow sequences for NGN LI for dynamic invocation of interception

Table 5A.5a: LI Activate Association request information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Target CC details	M	Information as contained in the SDP (for SIP signalling) that defines the media stream component (e.g. RTP/RTCP). In addition this shall contain the identity of the CC-IIF for the target communication.
Corresponding party CC details	C	Information as contained in the SDP (for SIP signalling) that defines the media stream component (e.g. RTP/RTCP). In addition this shall contain the identity of the CC-IIF for the corresponding party communication. This is mandatory when sending the information flow for 200 OK responses.

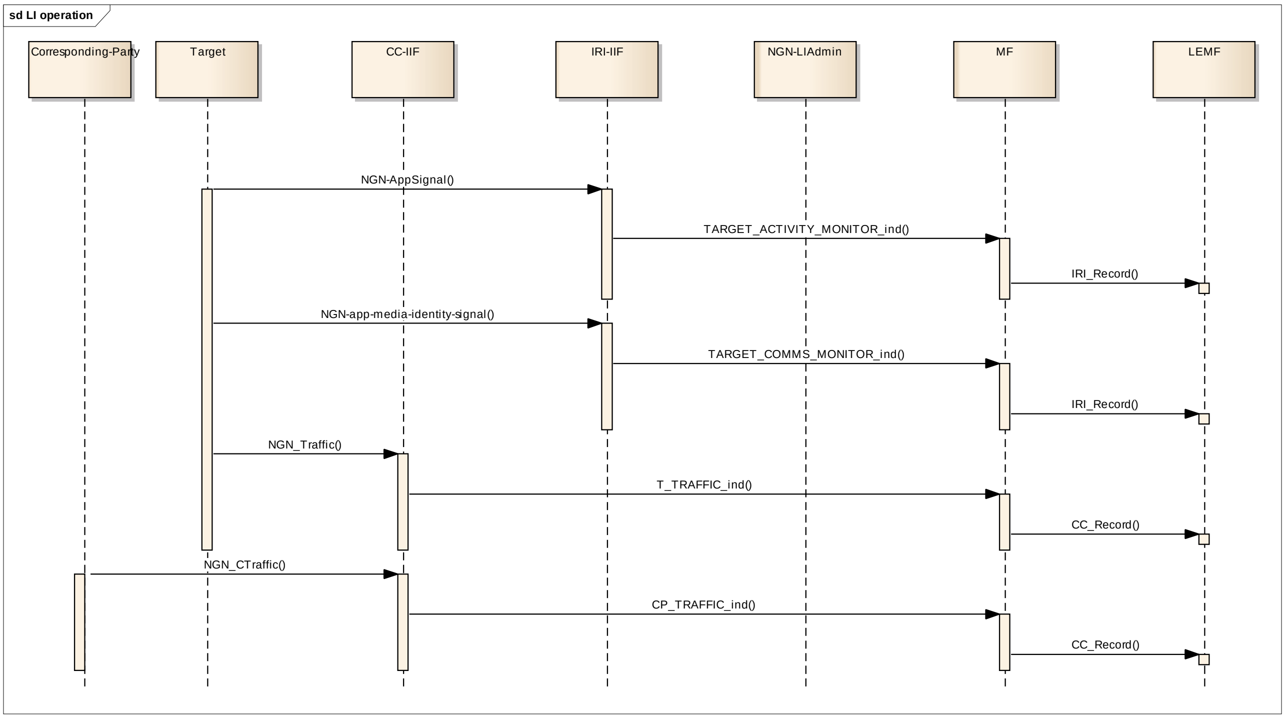
Protocol constraints:

Response to = None.

Response expected = LI_ACTIVATE_conf or NONE.

5A.1.2 Target signalling and traffic interactions and information flows

Figure 5A.2 shows an example of the transmission of traffic from the target connected to NGN. The principle captured applies to all target activity such as registration.



NOTE: The brackets indicated in each information flow indicate that parameters are contained in the message but are not expanded in the figure.

Figure 5A.2: Principle of interception information flow

The information flows that indicate the activity of the target (signalling or traffic) are described below.

5A.1.2.1 TARGET_ACTIVITY_MONITOR_ind

This information flow shall provide in summary form the activity of the target on the NGN to the MF. It shall have a header section indicating who, when and where, with a body section indicating the what of the target activity.

Table 5A.6: Target activity monitor indication information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Target location	M	The geographic or logical location of the target at the time of the activity being intercepted.
Target NGN public ID	M	
Target action	M	The actual activity of the target, including the content of any signalling information from the target.
Corresponding party information	C	If the activity of the target is sent to a known correspondent this information element contains the information about the correspondent known to the CSP.
Corresponding party NGN public ID	C	
NOTE: "Corresponding party information" and "Corresponding party NGN public ID" may be present multiple times.		

Protocol constraints:

Response to = None.

Response expected = None.

5A.1.2.1.1 Relation to Handover

The TARGET_ACTIVITY_MONITOR_ind information flow shall be delivered in the payload of an IRI-Record type across HI2.

5A.1.2.2 T_TRAFFIC_ind

This information flow carries an NGN traffic packet of the target to the MF.

Table 5A.7: Target traffic indication information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Traffic packet	M	A bit exact copy of the traffic sent by the target captured at the PoI.

Protocol constraints:

Response to = None.

Response expected = None.

5A.1.2.2.1 Relation to Handover

The T_TRAFFIC_ind information flow shall be delivered in the payload of a CC-Record type across HI3.

5A.1.2.3 CP_TRAFFIC_ind

This information flow carries a traffic packet of the corresponding party to the MF.

Table 5A.8: Corresponding party traffic indication information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Traffic packet	M	A bit exact copy of the traffic sent by the target's correspondent captured at the PoI.

Protocol constraints:

Response to = None.

Response expected = None.

5A.1.2.3.1 Relation to Handover

The CP_TRAFFIC_ind information flow shall be delivered in the payload of a CC-Record type across HI3.

5A.1.2.4 TARGET_COMMS_MONITOR_ind

This information flow is used to indicate the location and format of the communication content media flow. In the NGN the information leading to the delivery of the information flow may be carried in the SIP-INVITE as part of the session description and confirmed in the 200 OK response. It identifies the logical location (by RTP/RTCP data) of the T_TRAFFIC_ind and CP_TRAFFIC_ind information flows. This information flow is sent on receipt of the SIP-INVITE containing the session description for the initiating party and on receipt of the 200 OK response for the receiving party and on any change of the media requested by either party.

NOTE: A single instance of interception may result in multiple TARGET COMMS MONITOR ind information flows being sent.

Table 5A.9: Target comms monitor indication information flow content

Information element	M/O/C	Description
Timestamp	M	Indicates the time at which the message was sent.
Correlation and interception instance identifier	M	Identifier to allow the LEA and CSP to uniquely identify the correlation of the point of interception and the invocation identifier.
Target CC details	M	Information as contained in the SDP (for SIP signalling) that defines the media stream component (e.g. RTP/RTCP). In addition this shall contain the identity of the CC-IIF for the target communication.
Corresponding party CC details	C	Information as contained in the SDP (for SIP signalling) that defines the media stream component (e.g. RTP/RTCP). In addition this shall contain the identity of the CC-IIF for the corresponding party communication. This is mandatory when sending the information flow for 200 OK responses.

Protocol constraints:

Response to = None.

Response expected = None.

5A.1.2.4.1 Relation to Handover

The TARGET_COMMS_MONITOR_ind information flow shall be delivered in the payload of an IRI-Record type across HI2.

5A.2 Data provision and encoding

5A.2.1 Identification of result of interception (Correlation and interception instance identifier)

The result of interception provided by the NGN shall be given a unique tag that shall allow identification of the LEA, the target, network operator/service provider and the warrant reference. This tag shall be first returned in the LI_ACTIVATE_conf information flow and used by the NGN-LI-AF in mapping to the Invocation identifier used to allow the CSP to correlate the invocation of PoIs to the requested interception order. The Correlation and interception instance identifier then forms part of the subsequent header data in TARGET_ACTIVITY_MONITOR_ind and TARGET_COMMS_MONITOR_ind information flows from each PoI, as well as being used in the LI_MODIFY information flows.

5A.2.2 Provision of identities/addresses

All identities used by the target or corresponding party in communication, successful or unsuccessful, shall be identified in the TARGET_ACTIVITY_MONITOR_ind information flow.

5A.2.3 Provision of details of services used and their associated parameters

The activity of the target shall be given in the TARGET_ACTIVITY_MONITOR_ind. The information element shall indicate the following:

- Relationship to a call or session:
  - Beginning of a call or session (e.g. Call Setup message).
  - Ending of a call or session (e.g. Call cleardown message).
  - Call or session related signalling (e.g. Call proceeding message).
  - Not related to call or session (e.g. Registration request).
- Direction of the information flow:
  - To the Target.
  - From the Target.
- Scope or topology of the call or session.
  - Point to Point call or session (e.g. individual voice call).
  - Point to MultiPoint call or session (e.g. multicast data transfer).
  - Broadcast call or session (e.g. IPTV broadcast).

5A.2.4 Provision of those signals emitted by the target invoking additional or modified services

Signals that modify or invoke non-call related services shall be given in the same form as for services described in clause 5A.2.3 in the TARGET_ACTIVITY_MONITOR_ind data structure.

5A.2.5 Provision of time-stamps for identifying the beginning, end and duration of the connection

The header of TARGET_ACTIVITY_MONITOR_ind information flow shall contain a timestamp information element. This element shall be of a type recognized in the country or legislative area in which the interception is performed and which is available in the CSP domain.

5A.2.6 Provision of actual source, destination and intermediate public IDs in case of communication diversion

The following requirements apply to networks that support the communication diversion services.

The NGN public ID (as defined in TS 184 002 [7]) used by the NGN in communicating with the target shall be provided in the Target NGN public ID element, and if communication diversion is applicable, the NGN public ID(s) of the correspondent(s) of the target shall be provided in the Corresponding party NGN public ID element(s), if supported by the implementation of the protocol and the security and/or privacy and/or policy requirements of the involved NGN(s), of the TARGET_ACTIVITY_MONITOR_ind information flow.

The following scenarios are possible:

1) Communication Diversion by target.

EXAMPLE 1: If the NGN communicates with the target (Party-(x)) and the target has invoked communication diversion to Party-(x+1) then the interception record shall contain the public IDs of both Party-(x) and Party-(x+1). Similarly if Party-(x+1) has also invoked communication diversion to Party-(x+2) the interception record shall contain the public IDs of Party-(x), Party-(x+1) and Party-(x+2), if supported by the implementation of the protocols and the security and/or privacy and/or policy requirements of the involved NGN(s), and so on.

2) Forwarded communication terminated at target.

EXAMPLE 2: If the NGN communicates with the target (Party-(x)) and the communication has been previously diverted before reaching the target, then the interception record shall contain the public IDs of both Party-(x) and Party-(x-1), if supported by the implementation of the protocols and the security and/or privacy and/or policy requirements of the involved NGN(s). Similarly if the communication has been diverted before reaching Party-(x-1), then the interception record shall contain the public IDs of Party-(x), Party-(x-1) and Party-(x-2), if supported by the implementation of the protocols and the security and/or privacy and/or policy requirements of the involved NGN(s), and so on.

3) Communication from target forwarded.

EXAMPLE 3: If the NGN communicates with the target (Party-(x)) and the Party-(x+1) is diverting the communication, then the interception record shall contain the public IDs of both Party-(x) and Party-(x+1), if supported by the implementation of the protocols and the security and/or privacy and/or policy requirements of the involved NGN(s). Similarly if Party-(x+1) has also invoked communication transfer to Party-(x+2), the interception record shall contain the public IDs of Party-(x), Party-(x+1) and Party-(x+2), if supported by the implementation of the protocols and the security and/or privacy and/or policy requirements of the involved NGN(s), and so on.

5A.2.7 Provision of location information

Location information relating to the target should be provided in the header of every TARGET_ACTIVITY_MONITOR_ind information flow.

5 Interception in NGN subsystems

5.0 Allocation of LI-FEs to NGN-FEs

The Point of Interception shall be at premises of the CSP, i.e. IRI-IIF and CC-IIF shall reside in equipment under full control (physical access, etc.) of the CSP or CSPs (see note). The point of interception (as defined in clause 4) with respect to IRI, the IRI-IIF, should be implemented in the NGN-FE that hosts the service state machine. The point of interception (as defined in clause 4) with respect to CC, the CC-IIF, should be implemented in a mediastream entity.

NOTE 1: There may be separate CSPs for each of IRI-IIF and CC-IIF. This release does not specify the correlation of IRI-IIF and CC-IIF at the CCTF.

The following example scenarios (not exhaustive) are considered for deployment of LI in the NGN. All these examples assume that the target is subscribed to services offered by the CSP performing the interception. In particular, for the transit cases, the target has an account in a domain operated by the CSP performing the interception:

- Scenario 1: Interception at edge of NGN.
- Scenario 2: Interception at edge of NGN (alternative).
- Scenario 3: Interception in core of NGN.
- Scenario 4: Transit communication, IP case.
- Scenario 5: Transit communication, TDM case.

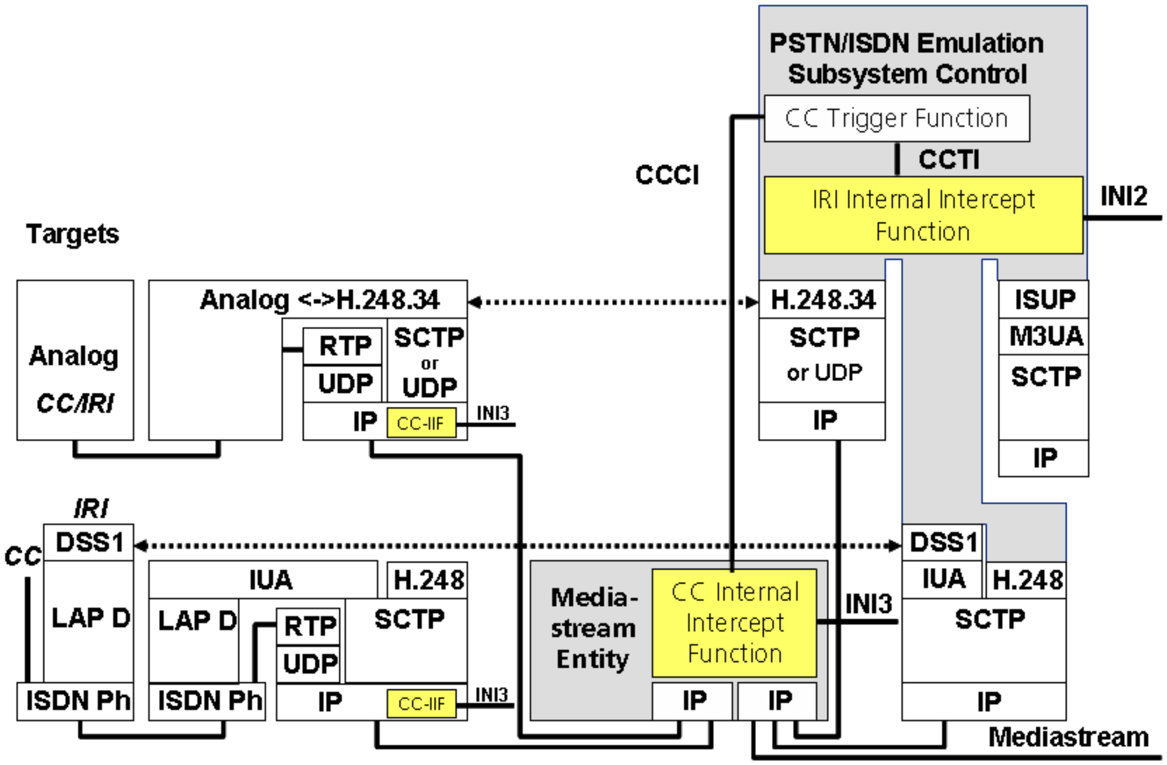
NOTE 2: In practical implementations several scenarios may need to be active at the same time. The combination of PoIs in multiple scenarios is not described in the present document.

Table 5.1: Examples of allocation of LI-FEs to NGN-Fes

LI-FE	Scenario 1	Scenario 2 (see note 3)	Scenario 3	Scenario 4	Scenario 5
LI-FE1, IRI-IIF	P-CSCF, AGCF (see note 2)	AGCF	S-CSCF	IBCF	MGCF
LI-FE2, CC-IIF	C-BGF	A-MGF	MRFP	I-BGF	T-MGF
LI-FE3, CCTF	SPDF	--	UPSF, ASF, MRFC	SPDF	--
LI-FE4, AF	ADMF	ADMF	ADMF	ADMF	ADMF
NOTE 1: The allocations of the LI-FEs to the NGN-FEs given in this table are examples and their choice is subject to implementation. LI-FEs could also be allocated to other NGN-Fes, and not all possible options need to be implemented. These scenarios are not exhaustive. NOTE 2: The use of the AGCF as a PoI for IRI is only valid for PES applications. NOTE 3: This scenario is PES specific.					

5.1 Architecture for interception of PES

The specific provision of the CC-IIF and IRI-IIF in the NGN for PES services where the NGN architecture conforms to ES 282 002 [10] is as shown in figure 2.



NOTE: Location of CC-IIF is subject to implementation and not all possible options need to be implemented.

Figure 5.1: Reference architecture for interception in the PES environment

5.2 Architecture for interception of IMS

The specific provision of the CC-IIF and IRI-IIF in the NGN for the IMS subsystem as described in ES 282 007 [11] and TS 182 012 [12] offering IMS services is as shown in figure 3.

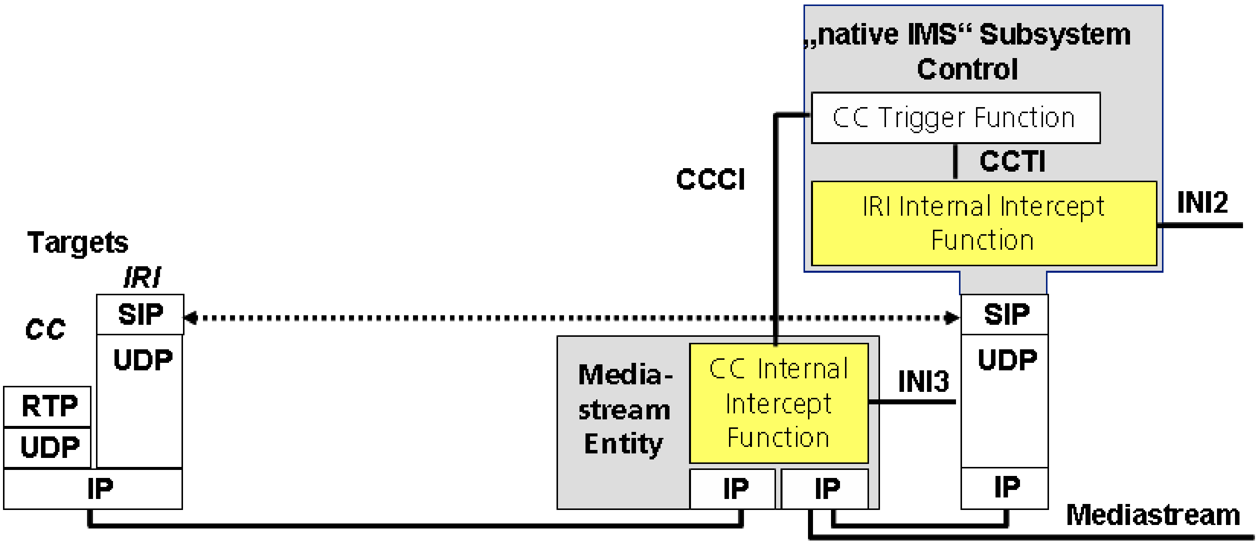


Figure 5.2: Reference architecture for interception in the IMS environment

5.3 Intercept Related Information (PoI IRI-IIF)

Communications to or from a targeted subscriber and communications initiated on behalf of a targeted subscriber are intercepted at the P-CSCF or S-CSCF as described in TS 133 107 [8].

NOTE 1: When IMS is providing a PES service the interception service identified above and defined in TS 133 107 [8] still applies. In addition, the AGCF may be used as an alternative point of interception.

NOTE 2: If the IMS is used for the support of transit communication and national LI requires their interception then the interception of communications in transit may take place at the IBCF or MGCF depending on the characteristics of the interconnected networks involved in the communication.

5.4 Content of Communication (PoI CC-IIF)

Interception of the content of communications takes place at transport processing functional entities identified in the TISPAN NGN architecture (ES 282 001 [1] and ES 282 002 [10]). Transport processing entities that may provide the CC-IIF are:

- An Access Media Gateway Function (A-MGF).
- A Core Border Gateway Function (C-BGF).
- An Interconnect Border Gateway Function (I-BGF).
- A Trunking Media Gateway Function (T-MGF).
- A Multimedia Resource Function Processor (MRFP).

NOTE 1: Interception may take place at an A-MGF, C-BGF or MRFP when the target of interception is a subscriber of the IMS or PES.

NOTE 2: If the IMS is used for the support of transit communication and national LI requires their interception then the interception of communications in transit may take place at the I-BGF or T-MGF depending on the characteristics of the interconnected networks involved in the communication.

NOTE 3: The use of MRFP as interception point only for those services already including it in the normal traffic path (e.g. call conferencing, messaging services, multimedia announcements) assures the security (especially confidentiality) requirements of LI as defined in TS 101 331 [3] and in TR 102 661 [i.6].

When the interception of communication contents takes place at a C-BGF or I-BGF, interactions between the IRI-IIF and the CC-IIF takes place through the SPDF or the MF. The SPDF or the MF plays the role of a CCTF as identified in clause 4.3.

When the interception of communication contents takes place at an A-MGF or T-MGF, the AGCF or MGCF plays the role of the IRI-IIF, and the CCTF (as identified in clause 4.3) is located in the AGCF, MGCF or MF.

When the interception of communication contents takes place at an MRFP, the associated MRFC and an Application Server Function collectively, or the MF, play the role of a CCTF. The ASF controls the MRFC via the S-CSCF. In order to ensure that the Application Server gets involved in the communications subject to interception, the Administration Function (ADMF) provisions the S-CSCF with the address of the Application Server or creates an appropriate Initial Filter Criteria in the targeted subscriber's profile in the UPSF.

6 Identification of target of interception

6.1 ISDN/PSTN services

In the context of PSTN/ISDN emulation and services, the target shall be identified in the service domain by a globally unique E.164 identity. The LI_ACTIVATE_req information flow shall provide the E.164 identifier of the target in the "target identity" information element where the PoI is a PES or PSS service node.

NOTE: The PES offers seamless ISDN/PSTN service to existing core network customers who will remain identified by their E.164 identity that may be mapped to a system unique SIP-identity.

6.2 IMS services

IMS service users shall be identified by either a SIP-uri or a tel-uri [7]. The LI_ACTIVATE_req information flow shall provide the SIP-uri or tel-uri of the target in the "target identity" information element where the PoI is a IMS service node.

6.3 Identification of target when identity protection is enabled

The identity protection methods described in TS 187 016 [19] provide anonymity of the user at point of service use, thus the PoI does not have access to the true identity of the target but is provided with an anonymous authorisation assertion ticket by the entity invoking the service offered by the PoI. The NGN-LI-AF shall determine the anonymous authorisation assertion tickets issued to the target from the Identity Provider and Service Authorisation Server. The LI_ACTIVATE_req information flow shall provide the anonymous authorisation assertion ticket identifier in the "target identity" information element.

7 Security considerations

The security guidelines for assurance of the CSP environment in intercepting target signalling and traffic and its handover given in TS 101 331 [3] should be followed.

The PoI and MF shall establish a security association to ensure the integrity, confidentiality and end point identification. The methods described for Network Domain Security (NDS) in TS 133 210 [17] shall be deployed. As communication is uni-directional from the PoI to the MF the PoI shall always discard messages coming from the MF.

In the NGN in its dynamic configuration mode it is unlikely that the security association can be established a priori thus there may be a short delay between activation of the PoI and activation of a secure path to the MF. In such cases the PoI should buffer intercepted material and only release it onto the secured internal interface after establishment of the relevant Za/Zb interface. The CSP should make every effort to minimise the establishment time of the Za/Zb interface and thus minimise any buffering introduced.

NOTE: It is assumed that the transfer of IRI and CC from PoI to MF is in the CSP domain (i.e. the MF is in the CSP domain).

Annex A:
Void

Annex B: Void

Annex C:
Void

Annex D:
Void

Annex E (informative): ISDN/PSTN LI reference configurations

The figures contained in this annex identify a number of reference configurations for lawful interception in TISPAN NGN networks. Interception configurations for communications to or from a targeted TISPAN NGN subscriber are shown in figures E.1, E.2 and E.3. Interceptions of communications in transit are shown in figures E.4 and E.5.

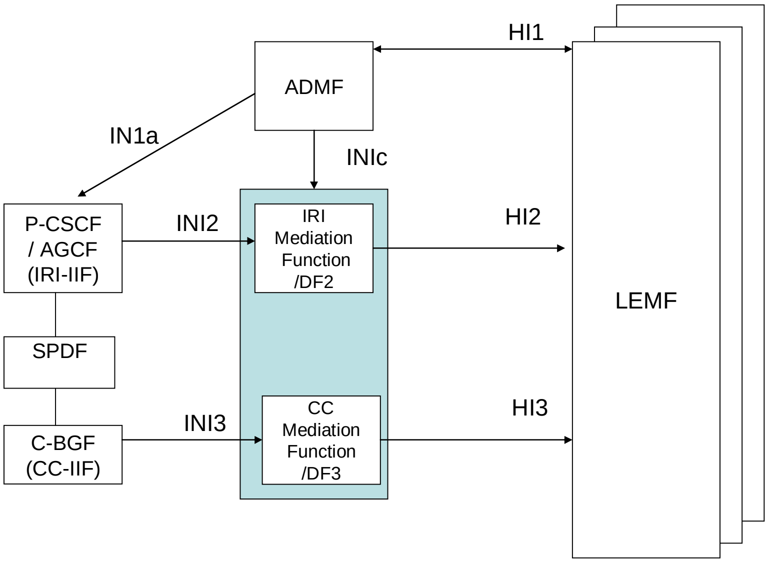


Figure E.1: Interception at the edge (case 1)

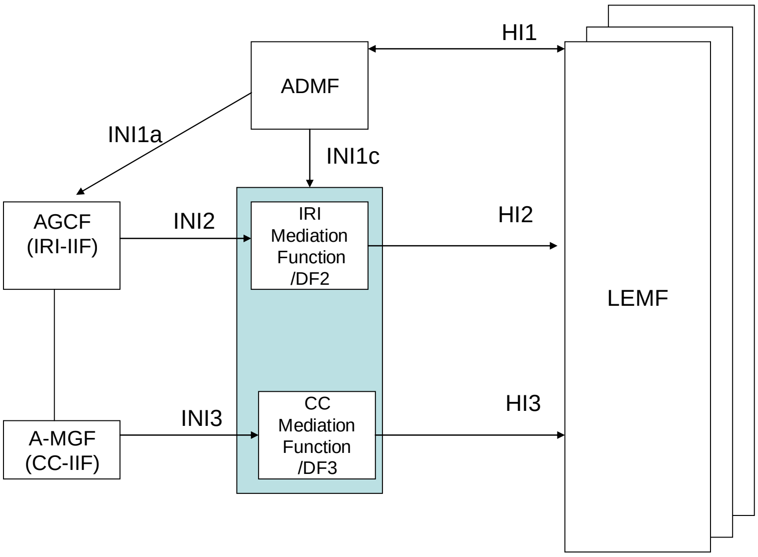


Figure E.2: Interception at the edge (case 2)

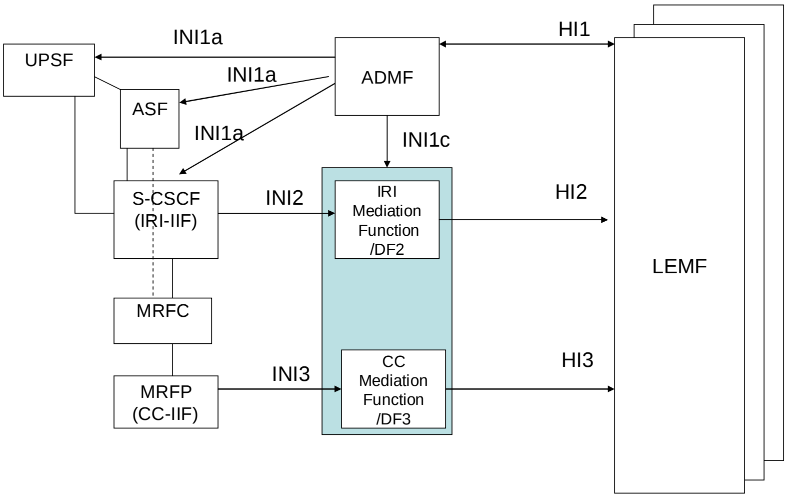


Figure E.3: Interception in the core

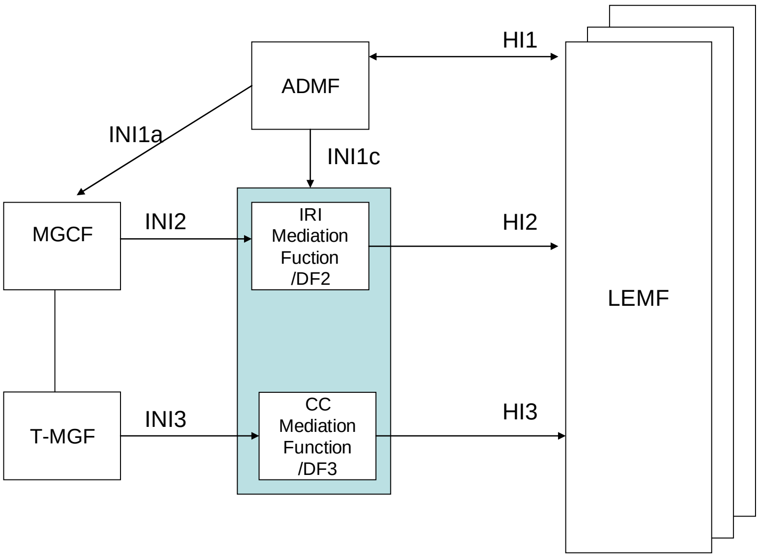


Figure E.4: Interception of communications in transit (TDM case)

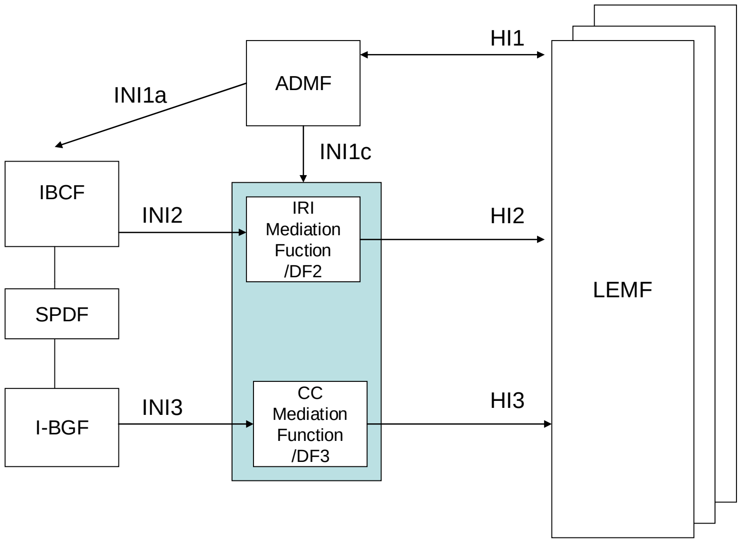


Figure E.5: Interception of communications in transit (IP case)

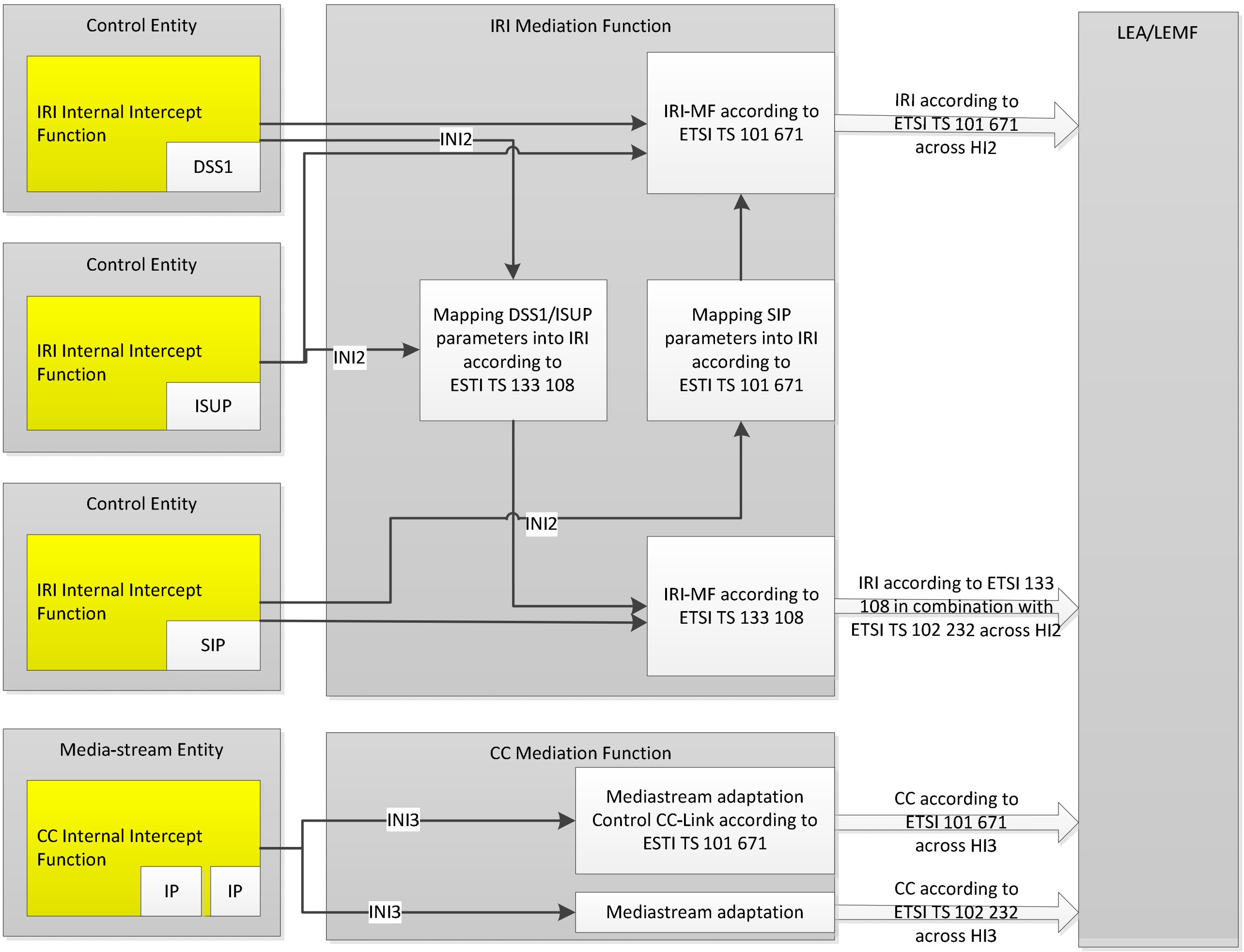
Annex F (informative): Selection of handover interface

Handover of intercepted material should be made by reference to one or more of the following specifications:

- ETSI TS 101 671 [2]: Handover Interface for the lawful interception of telecommunications traffic.
- ETSI TS 133 108 [9]: Handover interface for Lawful Interception.
- ETSI TS 102 232-1 [4]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 1: Handover specification for IP delivery
- ETSI TS 102 232-2 [20]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 2: Service-specific details for E-mail services
- ETSI TS 102 232-3 [21]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 3: Service-specific details for internet access services
- ETSI TS 102 232-4 [22]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 4: Service-specific details for Layer 2 services
- ETSI TS 102 232-5 [5]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 5: Service-specific details for IP Multimedia Services
- ETSI TS 102 232-6 [6]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 6: Service-specific details for PSTN/ISDN services
- ETSI TS 102 232-7 [23]: Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 7: Service-specific details for Mobile Services

NOTE: National specifications may be used instead of any of the ETSI specifications cited above.

Figure F.1 illustrates configurations of mediation function to map the Handover Interface to the intercepted data that are subject to bilateral agreement between Network Provider and LEA.


Control Entity
IRI Internal Intercept Function
DSS1
Control Entity
IRI Internal Intercept Function
ISUP
Control Entity
IRI Internal Intercept Function
SIP
Media-stream Entity
CC Internal Intercept Function
IP
IP
IRI Mediation Function
INI2
INI2
INI2
IRI-MF according to ETSI TS 101 671
Mapping DSS1/ISUP parameters into IRI according to ESTI TS 133 108
Mapping SIP parameters into IRI according to ESTI TS 101 671
IRI-MF according to ETSI TS 133 108
CC Mediation Function
INI3
INI3
Mediastream adaptation Control CC-Link according to ESTI TS 101 671
Mediastream adaptation
IRI according to ETSI TS 101 671 across HI2
IRI according to ETSI 133 108 in combination with ETSI TS 102 232 across HI2
CC according to ETSI 101 671 across HI3
CC according to ETSI TS 102 232 across HI3
LEA/LEMF

NOTE 1: CS interception formats from the NGN may map to CS capabilities in TS 133 108 [9] but there may be a requirement for extensions to TS 133 108 [9] in some instances.

NOTE 2: IMS interception formats from the NGN may map to IMS capabilities in TS 133 108 [9] but there may be a requirement for extensions to TS 133 108 [9] in some instances.

NOTE 3: SIP interception formats from the NGN map to IMS capabilities in TS 133 108 [9] but there may be a requirement for extensions to TS 133 108 [9] in some instances.

Figure F.1: Reference Model for LI Mediation Function

Annex G (informative): Bibliography

G.1 ETSI Specifications

[A] ETSI EN 300 356 (all parts): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface".

[B] ETSI EN 300 403-1 (V1.3.2): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[C] ETSI ES 201 158: "Telecommunications security; Lawful Interception (LI); Requirements for network functions".

[D] ETSI ETR 330: "Security Techniques Advisory Group (STAG); A guide to legislative and regulatory environment".

[E] ETSI SR 002 211 (V1.1.1): "Electronic communications networks and services; Candidate list of standards and/or specifications in accordance with Article 17 of Directive 2002/21/EC".

[F] ETSI TS 101 671: "Handover Interface for the lawful interception of telecommunications traffic".

[G] ETSI ES 283 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); H.248 Profile for controlling Access and Residential Gateways".

G.2 3GPP specifications

[H] 3GPP TS 29.002: "3rd Generation Partnership Project; Technical Specification Group Core Network; Mobile Application Part (MAP) specification".

[I] 3GPP TS 23.003: "3rd Generation Partnership Project; Technical Specification Group Core Network; Numbering, addressing, and identification".

[J] 3GPP TS 23.107: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Quality of Service QoS concepts and architecture".

[K] 3GPP TS 23.228: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; IP Multimedia Subsystem (IMS); Stage 2".

[L] 3GPP TS 24.008: "3GPP Technical Specification Group Core Network; Mobile radio interface Layer 3 specification, Core network protocol; Stage 3".

[M] 3GPP TS 29.060: "3rd Generation Partnership Project; Technical Specification Group Core Network; General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[N] 3GPP TS 32.215: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication Management; Charging Management; Charging data description for the Packet Switched (PS) domain)".

[O] 3GPP TS 33.106: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; 3G Security; Lawful Interception Requirements".

[P] 3GPP TS 23.032: "3rd Generation Partnership Project; Technical Specification Group Core Network; Universal Geographical Area Description (GAD)".

[Q] 3GPP TR 21.905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications".

G.3 ITU-T specifications

[R] ITU-T Recommendation Q.763: "Signalling System No. 7 – ISDN User Part formats and codes".

[S] ITU-T Recommendation Q.931: "ISDN user-network interface layer 3 specification for basic call control".

[T] ITU-T Recommendation X.680: "Abstract Syntax Notation One (ASN.1): Specification of Basic Notation".

[U] ITU-T Recommendation X.681: "Abstract Syntax Notation One (ASN.1): Information Object Specification".

[V] ITU-T Recommendation X.682: "Abstract Syntax Notation One (ASN.1): Constraint Specification".

[W] ITU-T Recommendation X.683: "Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 Specifications".

[X] ITU-T Recommendation X.690: "ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

[Y] ITU-T Recommendation X.880: "Information technology – Remote Operations: Concepts, model and notation".

[Z] ITU-T Recommendation X.882: "Information technology – Remote Operations: OSI realizations – Remote Operations Service Element (ROSE) protocol specification".

G.4 IETF specifications

[AA] IETF STD 0005 (RFC 0791): "Internet Protocol".

[AB] IETF STD 0007 (RFC 0793): "Transmission Control Protocol".

[AC] IETF STD 0009 (RFC 0959): "File Transfer Protocol (FTP)".

[AD] IETF RFC 1006: "ISO Transport Service on top of the TCP".

[AE] IETF RFC 2126: "ISO Transport Service on top of TCP (ITOT)".

[AF] IETF RFC 2806: "URLs for Telephone Calls".

[AG] IETF RFC 3261: "SIP: Session Initiation Protocol".

G.5 ISO specifications

[AH] ISO 3166-1: "Codes for the representation of names of countries and their subdivisions – Part 1: Country codes".

G.6 ANSI specifications

[AI] ANSI/J-STD-025-A: "Lawfully Authorized Electronic Surveillance".

Annex H (informative): Change history

Date	WG Doc.	CR	Rev	CAT	Title / Comment	Current Version	New Version
23-9-08	18bTD019r1	1	-	C	Result of interception in clause 4.3	2.0.7	2.0.8
23-9-08	18bTD303r1	2	-	D	Removal of annex H	2.0.7	2.0.8
5-11-08	19WTD133r1	3	-	C	Change of data definitions from ASN.1 to tables and short textual descriptions	2.0.7	2.0.8
5-11-08	19WTD134r1	4	-	C	MSC changes	2.0.7	2.0.8
5-11-08	19WTD136r1	5	-	C	Annex scenario changes	2.0.7	2.0.8
5-11-08	19WTD207r1	6	-	C	Changes agreed in principle by joint meeting of WG7 and SA3-LI in August 2008	2.0.7	2.0.8
5-11-08	19WTD224	7	-	D	Tidying of references and editorial spell checks	2.0.7	2.0.8
5-11-08	19tTD241r1	8	-	D	Cleanup the wording, references and remove duplications	2.0.8	2.0.9
24-3-09	WG7-05-004 21WTD291	9	-	F	The "physical locations" in the draft have to be replaced by "NGN-Fes", and in the scenarios, the allocations of LI-Fes to NGN-Fes have to be marked as examples	2.0.9	2.0.10
24-3-09	WG7-05-005	10	-	F	Editorial consistency	2.0.9	2.0.10
24-3-09	WG7-05-006r1	11	-	D	Adoption of term "corresponding party" instead of "co-target"	2.0.9	2.0.11
24-3-09	WG7-05-007	12	-	D	Clarification of intercept material handed over in IRI payload	2.0.9	2.0.11
18-3-09	WG7-05-029	13	-	F	Inclusion of End Session IRI event as Result of Interception	2.0.10	2.0.11
					Publication	2.0.11	2.1.1
6-4-10	TISPAN07(10)0044	101		D	Updates to clarify the intent of clause 4	2.1.1	3.0.2
6-4-10	TISPAN07(10)0045	102		B	Refinement of clause 5 to address dynamic trigerring	2.1.1	3.0.2
2-11-11	TISPAN07(11)0090		-	F	Changes arising from email dated July 15th 2011 to TISPAN_GEN	3.0.7	3.0.8
2-11-11	TISPAN07(11)0091			B	Extension of Dynamic Triggering of interception	3.0.7	3.0.8
29-11-11	TISPAN07(11)0097r1			B		3.0.7	3.0.8

History

Document history		
V1.1.1	December 2006	Publication
V2.1.1	September 2009	Publication
V3.1.1	June 2012	Publication