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Lawful Interception (LI);
Handover Interface and
Service-Specific Details (SSD) for IP delivery;
Part 1: Handover specification for IP delivery

Reference
RTS/LI-00179-1

Keywords
handover, IP, lawful interception, security

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Lawful Interception (LI).

The present document is part 1 of a multi-part deliverable covering the Handover Interface and Service-Specific Details (SSD) for IP delivery, as identified below:

Part 1: "Handover specification for IP delivery";

Part 2: "Service-specific details for messaging services";

Part 3: "Service-specific details for internet access services";

Part 4: "Service-specific details for Layer 2 services";

Part 5: "Service-specific details for IP Multimedia Services";

Part 6: "Service-specific details for PSTN/ISDN services";

Part 7: "Service-specific details for Mobile Services".

The ASN.1 module is also available as an electronic attachment to the original document from the ETSI site (see clause A.2 for more details).

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Introduction

The objective of the present document is to form the basis for a standardized handover interface for use by both telecommunications service providers and network operators, including Internet Service Providers that will deliver the interception information required by Law Enforcement Authorities under various European treaties and national regulations.

The present document describes how to handover intercepted information via IP-based networks from a CSP to an LEMF. The present document covers the transportation of traffic, but does not specify functionality within CSPs or LEMF (see clause 4.1). The present document handles the transportation of intercepted Content of Communication (CC), Intercept-Related Information (IRI), Transport Related Information (TRI) and HI1 notification information. The tasking and management of Lawful Interception via the HI1 interface is outside the scope of the present document.

The present document is intended to be general enough to be used in a variety of situations: it is not focused on a particular IP-based service. The present document therefore provides information that is not dependent on the type of service being intercepted. In particular the present document describes delivery mechanisms (clause 6), and the structure and header details (clause 5) for both HI2 and HI3 information.

References within the main body of the present document are made if applicable to the 3GPP specification number with in square brackets the reference number as listed in clause 2. In clause 2 "References" the corresponding ETSI specification number is indicated with a reference to the 3GPP specification number. 3GPP specifications are available faster than the equivalent ETSI specifications.

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1 Scope

The present document specifies the general aspects of HI2 and HI3 interfaces for handover via IP based networks.

The present document:

- specifies the modular approach used for specifying IP based handover interfaces;
- specifies the header(s) to be added to IRI and CC sent over the HI2 and HI3 interfaces respectively;
- specifies protocols for the transfer of IRI and CC across the handover interfaces;
- specifies protocol profiles for the handover interface.

The present document is designed to be used where appropriate in conjunction with other deliverables that define the service-specific IRI data formats (including ETSI TS 102 227 [i.1], ETSI TS 101 909-20-1 [33], ETSI TS 101 909-20-2 [34], ETSI TS 102 232-2 [5], ETSI TS 102 232-3 [6], ETSI TS 102 232-4 [32], ETSI TS 102 232-5 [37], ETSI TS 102 232-6 [36] and ETSI TS 102 232-7 [38]). Where possible, the present document aligns with ETSI TS 133 108 [9] and ETSI TS 101 671 [4] and supports the requirements and capabilities defined in ETSI TS 101 331 [1] and ETSI TR 101 944 [i.4].

For the handover of intercepted data within GSM/UMTS PS and CS domains, the present document does not override or supersede any specifications or requirements in ETSI TS 133 108 [9] and ETSI TS 101 671 [4].

For the handover of services defined in ETSI TS 133 128 [46], in the event of conflict between the present document and ETSI TS 133 128 [46], the terms of ETSI TS 133 128 [46] apply.

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2 References

2.1 Normative references

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

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

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

[3] Void.

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

NOTE: ETSI TS 101 671 is in status "historical" and is not maintained.

[5] 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".

[6] 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".

[7] Void.

[8] Void.

[9] ETSI TS 133 108: "Universal Mobile Telecommunications System (UMTS); LTE; Digital cellular telecommunications system (Phase 2+) (GSM); 3G security; Handover interface for Lawful Interception (LI) (3GPP TS 33.108)".

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

[11] Recommendation ITU-T X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

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

[13] Void.

[14] IETF RFC 791: "Internet Protocol".

[15] IETF RFC 792: "Internet Control Message Protocol".

[16] IETF RFC 793: "Transmission Control Protocol".

[17] IETF RFC 1122: "Requirements for Internet Hosts - Communication Layers".

[18] IETF RFC 7323: "TCP Extensions for High Performance".

[19] IETF RFC 1191: "Path MTU discovery".

[20] IETF RFC 2018: "TCP Selective Acknowledgement Options".

[21] IETF RFC 5246: "The Transport Layer Security (TLS) Protocol Version 1.2".

NOTE 1: IETF RFC 5246 obsoletes IETF RFC 4346: "The Transport Layer Security (TLS) Protocol Version 1.1" and IETF RFC 3268: "Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)" which was referenced until ETSI TS 102 232-1 (V2.6.1).

NOTE 2: IETF RFC 4346 obsoletes IETF RFC 2246: "The TLS Protocol Version 1.0".

[22] IETF RFC 8200: "Internet Protocol, Version 6 (IPv6) Specification".

[23] IETF RFC 5681: "TCP Congestion Control".

NOTE: IETF RFC 5681 obsoletes IETF RFC 2581: "TCP Congestion Control".

[24] IETF RFC 5321: "Simple Mail Transfer Protocol".

NOTE: IETF RFC 5321 obsoletes IETF RFC 2821: "Simple Mail Transfer Protocol".

[25] IETF RFC 6854: "Update to Internet Message Format to Allow Group Syntax in the "From:" and "Sender:" Header Fields".

NOTE: IETF RFC 6854 obsoletes IETF RFC 5322: "Internet Message Format".

[26] IETF RFC 2923: "TCP Problems with Path MTU Discovery".

[27] IETF RFC 6298: "Computing TCP's Retransmission Timer".

NOTE: IETF RFC 6298 obsoletes IETF RFC 2988: "Computing TCP's Retransmission Timer".

[28] Void.

[29] Void.

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[30] IETF RFC 6818: "Updates to the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".

NOTE: IETF RFC 6818 obsoletes IETF RFC 5280: "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".

[31] ISO/IEC TR 10000-1: "Information technology -- Framework and taxonomy of International Standardized Profiles -- Part 1: General principles and documentation framework".

[32] 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".

[33] ETSI TS 101 909-20-1: "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 20: Lawful Interception; Sub-part 1: CMS based Voice Telephony Services".

[34] ETSI TS 101 909-20-2: "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 20: Lawful Interception; Sub-part 2: Streamed multimedia services".

[35] Void.

[36] 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".

[37] 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".

[38] 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".

[39] ANSI/J-STD-025-B: "Lawfully Authorized Electronic Surveillance", (July 2006) as amended by ANSI/J-STD-025-B-1: "Lawfully Authorized Electronic Surveillance (LAES) Addendum 1 - Addition of Mobile Equipment IDentifier (MEID)" (September 2006) and by ANSI/J-STD-025-B-2: "Lawfully Authorized Electronic Surveillance (LAES) - Addendum 2 - Support for Carrier Identity" (April 2007) - Published by TIA/ATIS.

[40] FIPS PUB 186-4: "Digital Signature Standard (DSS)".

[41] IETF RFC 7525: "Recommendations for Secure Use of Transport Layer Security (TLS) and Datagram Transport Layer Security (DTLS)".

[42] FIPS PUB 180-4: "Secure Hash Standard (SHS)".

[43] IETF RFC 3279: "Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".

[44] ETSI TS 103 280: "Lawful Interception (LI); Dictionary for common parameters".

[45] ETSI TS 103 462: "Lawful Interception (LI); Inter LEMF Handover Interface".

[46] ETSI TS 133 128: "LTE; 5G; Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Security; Protocol and procedures for Lawful Interception (LI); Stage 3 (3GPP TS 33.128)".

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2.2 Informative 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 referenced document (including any amendments) applies.

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

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] ETSI TS 102 227: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Functional Entities, Information Flow and Reference Point Definitions; Lawful Interception".

[i.2] Library of Congress document Z39.50.

NOTE: Available at http://www.loc.gov/z3950/agency/.

[i.3] ETSI TS 123 107: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Quality of Service (QoS) concept and architecture (3GPP TS 23.107)".

[i.4] ETSI TR 101 944: "Telecommunications security; Lawful Interception (LI); Issues on IP Interception".

[i.5] ETSI TR 102 503: "Lawful Interception (LI); ASN.1 Object Identifiers in Lawful Interception and Retained data handling Specifications".

[i.6] ETSI ETR 232: "Security Techniques Advisory Group (STAG); Glossary of security terminology".

[i.7] ETSI TS 102 232 series: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery".

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3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 101 671 [4], ETSI ES 201 158 [2], ETSI TS 101 331 [1] and the following apply:

Communications Service Provider (CSP): organizations (e.g. Service Providers (SvP), Network Operators (NWO) or Access Providers (AP)) who are obliged by law to provide interception

international standardized profile: internationally agreed-to, harmonised document which describes one or more profiles

profile: set of one or more base standards and/or international standardized profiles, and, where applicable, the identification of chosen classes, conforming subsets, options and parameters of those base standards or International Standardized Profiles necessary to accomplish a particular function

Transport Related Information (TRI): information which is sent across a Handover Interface in order to maintain, test or secure the interface

NOTE: It does not include any CC or IRI.

3.2 Symbols

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

<parameter>	parameters are indicated by angle brackets
kB	Kilobyte

3.3 Abbreviations

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

3GPP	Third Generation Partnership Project
AP	Access Provider
ASCII	American Standard Code for Information Interchange
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
BER	Basic Encoding Rules
CBC	Cipher-Block Chaining
CC	Content of Communication
CID	Communication IDentifier
CIN	Communication Identity Number
CMS	Call Management Service
CR	Change Request
CS	Circuit Switched
CSP	Communications Service Provider
DCC	Delivery Country Code
DER	Distinguished Encoding Rules
DF	Delivery Function
DSA	Digital Signature Algorithm
DSL	Digital Subscriber Line
DSS	Digital Signature Standard
EPS	Evolved Packet System
FIFO	First-In-First-Out
FIPS	Federal Information Processing Standards
GCSE	Group Communications System Enablers
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communications
HI1	Handover Interface 1 (for Administrative Information)
HI2	Handover Interface 2 (for Intercept Related Information)
HI3	Handover Interface 3 (for Content of Communication)
HM	Handover Manager
HO	HandOver
ICMP	Internet Control Message Protocol
ILHI	Inter LEMF Handover Interface
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPSec	IP Security
IRI	Intercept Related Information
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
IV	Initialization Vector
KPN	Koninklÿke PTT Nederland
LEA	Law Enforcement Agency
LEMF	Law Enforcement Monitoring Facility
LGW	Law enforcement monitoring facility GateWay
LI	Lawful Interception
LIID	Lawful Interception IDentifier
MD	Mediation Device
MF	Mediation Function (at CSP)

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MPLS	Multi-Protocol Label Switching
MSS	Maximum Segment Size
MTU	Maximum Transmission Unit
NEID	Network Element IDentifier
NID	Network IDentifier
NIST	National Institute of Standards and Technology
NTP	Network Time Protocol
NWO	NetWork Operator
OID	Object IDentifier
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
PROSE	PROximity SErvices
PS	Packet Switched
PSTN	Public Switched Telephone Network
PUB	PUBlication
resLEMF	responding LEMF
RFC	Request For Comments
RTT	Round Trip Time
SACK	Selective ACKnowledgement
SHA	Secure Hash Algorithm
SSD	Service-Specific Details
SvP	Service Provider
TC	Technical Committee
TCP	Transmission Control Protocol
TIPHON	Telecommunication and Internet Protocol Harmonization Over Networks
TLS	Transport Layer Security
TLV	Type Length Value element
TRI	Transport Related Information
UDP	User Datagram Protocol
UK	United Kingdom
ULIC	UMTS LI Correlation
UMTS	Universal Mobile Telecommunications System
VOIP	Voice Over Internet Protocol
VPN	Virtual Private Network
WLAN	Wireless Local Area Network

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4 General

4.1 Functionality

Figure 1 shows the stages in the interception chain.

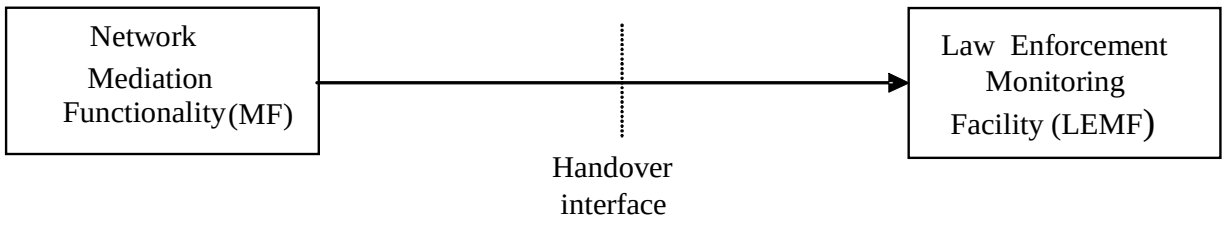

Figure 1: Stages of the interception chain

The first stage includes the creation or separation of intercepted data from the target network or target service, and the creation of IRI data. It is typically the responsibility of the CSP and is outside the scope of the present document.