ATIS-0700016

ATIS Standard on -

LAWFULLY AUTHORIZED ELECTRONIC SURVEILLANCE (LAES) CAPABILITIES FOR 3GPP IMS BASED PUSH TO TALK OVER CELLULAR (POC)

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ATIS-0700016, *Lawfully Authorized Electronic Surveillance (LAES) Capabilities for 3GPP IMS Based Push to talk over Cellular (PoC)*

Is an ATIS Standard developed by the **Lawful Intercept (LI)** Subcommittee under the **ATIS Wireless Technologies and Systems Committee (WTSC)**.

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ATIS Standard on

Lawfully Authorized Electronic Surveillance (LAES) Capabilities for 3GPP IMS Based Push to talk over Cellular (PoC)

Alliance for Telecommunications Industry Solutions

Approved January 2014

Abstract

This Alliance for Telecommunication Industry Solutions Standard specifies the capabilities for reporting Internet Protocol Multimedia Subsystem based Push to talk over Cellular for Lawfully Authorized Electronic Surveillance to law enforcement.

Foreword

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Wireless Technologies and Systems Committee (WTSC) develops and recommends standards and technical reports related to wireless and/or mobile services and systems, including service descriptions and wireless technologies. WTSC develops and recommends positions on related subjects under consideration in other North American, regional and international standards bodies.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes a optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, WTSC, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, WTSC, which was responsible for its development, had the following leadership:

P. Musgrove (AT&T), Chairman, WTSC LI

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M. Livingston (Department of Justice, Operational Technology Division), Editor

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Lawfully Authorized Electronic Surveillance (LAES) Capabilities for 3GPP IMS Based Push to talk over Cellular (PoC)

1 Scope, Purpose, & Application

This standard defines the lawfully authorized electronic surveillance (LAES) capabilities for 3GPP Internet Protocol (IP) Multimedia Subsystem (IMS)-based Push-to-Talk over Cellular (PoC) services. LAES capabilities described in this standard enable a PoC Telecommunication Service Provider (TSP) to deliver the intercepted communication content (e.g., voice) and communication-identifying information to an authorized Law Enforcement Agency (LEA). This standard is used to facilitate a TSP's compliance with the assistance capability requirements defined in Section 103 of the Communications Assistance for Law Enforcement Act [CALEA].

The PoC service description is defined in [OMA-PoC] and provided in a concise informative overview in Annex A.

1.1 Scope

The scope of this standard is LAES capabilities for 3GPP IMS-based PoC services

1.2 Purpose

The purpose of this standard is to define LAES capabilities that can be used to report intercepted communications for 3GPP IMS-based PoC services.

1.3 Application

This standard is applicable to 3GPP IMS-based service providers who implement *OMA Push to Talk over Cellular, V1.0* [OMA-PoC].

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this ATIS Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this ATIS Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

[3GPP-23.003]	3GPP TS 23.003, *Numbering, addressing and identification (Release 12)*.[1]
[3GPP-23.228]	3GPP TS 23.228, *IP Multimedia Subsystem (IMS) Stage 2 (Release 7*).[1]
[3GPP-29.002]	3GPP TS 29.002, *Mobile Application Part (MAP) specification (Release 12).*[1]
[3GPP-29.272]	3GPP TS 29.272, *Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol (Release 12)*.[1]

[1] This document is available from 3rd Generation Partnership Project (3GPP). < http://www.3gpp.org/ >

[3GPP-29.273]	3GPP TS 29.273, *Evolved Packet System (EPS); 3GPP EPS AAA interfaces (Release 12*).[1]
[CALEA]	Public Law 103-414, *Communications Assistance for Law Enforcement Act (CALEA)*; October 25, 1994.[4]
[OMA-PoC]	OMA PoC Enabler 1.0, *OMA Push to Talk over Cellular, V1.0.*[2]
[OMA-PoC-AD]	OMA PoC Enabler 1.0, *OMA Push to Talk over Cellular, Architecture Document, V1.0.2*; OMA-AD-PoC-V1_0_2-20070905-A.[2]
[OMA-PoC-CP]	OMA PoC Enabler 1.0, *OMA Push to Talk over Cellular, OMA PoC Control Plane, V1.0.2*; OMA-TS-PoC_ControlPlane-V1_0_2-20070905-A.[2]
[OMA-PoC-RD]	OMA PoC Enabler 1.0, *OMA Push to Talk over Cellular, Requirements Document, V1.0*; OMA-RD-PoC-V1_0-20060609-A.[2]
[OMA-PoC-UP]	OMA PoC Enabler 1.0, *OMA Push to Talk over Cellular , PoC User Plane Document, V.1.0.2*; OMA-TS-PoC_UserPlane-V1_0_2-20070905-A.[2]
[Presence AD]	*Presence SIMPLE Architecture Document*, Open Mobile Alliance™, OMA-AD-Presence_SIMPLE-V1_1[2].
[RFC 2396]	IETF RFC 2396, *Uniform Resource Identifiers (URI): Generic Syntax*; August 1998.[3]
[RFC 3261]	IETF RFC 3261, *SIP: Session Initiation Protocol*; June 2002.[3]
[RFC 4566]	IETF RFC 4566, *SDP: Session Description Protocol*; July 2006.[3]
[Title 18]	Title 18 of the United States Code, Chapter 119, Sections 2510 – 2522, *Wire and Electronic Communications Interception and Interception of Oral Communications*.[4]
[X-680]	ITU-T Recommendation X.680, *Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation*; November 2008.[5]

3 Definitions, Acronyms, & Abbreviations

3.1 Definitions

3.1.1 Abandoned: A call attempt that is released by the originating party before it is answered.

3.1.3 Access Control: PoC User-specified rules that restrict the set of other PoC Users that may establish PoC Sessions to the PoC User.

3.1.4 Ad Hoc PoC Group: A temporary PoC Group formed when a PoC Subscriber selects more than one person from his contact list, or one or more Pre-Arranged Groups, or any combination of individuals and Groups to be invited to a PoC Group Session. The Ad Hoc Group exists only for the duration of the particular PoC Session for which the group was formed.

3.1.5 Alert: See *Instant Personal Alert*.

3.1.6 Associate: A PoC Subscriber whose equipment, facilities, or services are communicating with the PoC Intercept Subject.

3.1.7 Authentication: The security measure used by a TSP to verify the identity of a PoC Intercept Subject.

3.1.8 Authorization: The mechanism used by a TSP to verify that a PoC subscriber is permitted access to features or services.

3.1.9 Buddy List: See *Contact List*.

[2] This document is available from the Open Mobile Alliance™. < http://www.openmobilealliance.org/ >

[3] This document is available from the Internet Engineering Task Force (IETF). < http://www.ietf.org >

[4] This document can be found from: < http://www.fcc.gov/ >

[5] This document is available from the International Telecommunications Union. < http://www.itu.int/ITU-T/ >

3.1.10 Called Party: The destination party of a call.

3.1.11 Calling Party: The originating party of a call.

3.1.12 Cell: The sub-area to which a set of radio resources is allocated.

3.1.13 Chat PoC Group: A Chat PoC Group is a persistent PoC Group in which a PoC Subscriber individually joins to have a PoC Session with other joined PoC Users, i.e., the establishment of a PoC Session to a Chat PoC Group does not result in other members of the Chat PoC Group being invited.

3.1.14 Collection Function: The location where lawfully authorized intercepted communications content and communication-identifying information is collected by an LEA.

3.1.15 Communications: Communication-Identifying Information (CII), Communication Content (CC), or both CII and CC.

3.1.16 Communication-Identifying Information (CII): Signaling information that identifies the origin, direction, destination, or termination of each communication generated or received by the PoC Intercept Subject by means of any equipment, facility, or service of a TSP.

3.1.17 Contents: Defined in [Title 18] § 2510 (8), when used with respect to any wire, oral, or electronic communication, includes any information concerning the substance, purport, or meaning of that communication.

3.1.18 Contact List: A PoC Subscriber's list of frequently-contacted individual PoC Subscribers or PoC Groups (i.e., a PoC Subscriber's "contact list" of other PoC Subscribers).

3.1.19 E-interface: The interface between a Delivery Function and a Collection Function.

3.1.20 Electronic Surveillance: The statutory-based legal authorization, process, and associated technical capabilities and activities of LEAs related to the interception of wire, oral, or electronic communications while in transmission as authorized under U.S. law. As used herein, also includes the acquisition of communication-identifying information. As used in this standard, *surveillance* refers to a single communication intercept, pen register, or trap and trace. Its usage in this standard does not include administrative subpoenas for obtaining a Subscriber's toll records and information about a Subscriber's service that an LEA may employ before the start of a communication intercept, pen register, or trap and trace. For the purposes of this document, Lawful Intercept (LI) and LAES are synonymous with electronic surveillance.

3.1.21 Floor Control: (1) The management mechanism that controls the sequence in which PoC participants speak. (2) The PoC participant who has the right to speak in a given PoC Session.

3.1.22 Functional Entity: A system or subsystem capable of providing a defined service. A functional entity may be implemented as a separate physical entity or it may be incorporated with other functional entities in a common physical entity.

3.1.23 Group: See *PoC Group*.

3.1.24 Group Advertisement: A feature that provides the capability to inform other PoC Users of the existence of a PoC Group.

3.1.25 Group List: A list of members in a Pre-Arranged or restricted Chat PoC Group. Each member is identified by a SIP URI or a TEL URI.

3.1.26 Half Duplex: A Half-Duplex media flow can only flow in one direction (e.g., between the network and the terminal) at a time. Hence, a Subscriber cannot speak and hear at the same time.

3.1.29 Host: A PoC participant, active in a Group Session, who can initiate and administrate an active Group Session (i.e., group administrative rights in a PoC Session are exercised in an "on-line" fashion).

3.1.30 Instant Personal Alert: A feature in which a PoC User sends a message to a PoC User requesting a One-to-One PoC Session. There is no voice communication content.

3.1.31 Intercept Access Point (IAP): A point within a telecommunication system where some of the communications content or communication-identifying information of the PoC Intercept Subject's equipment, facilities, and services are accessed.

3.1.32 PoC Intercept Subject: An IMS-based PoC telecommunication service subscriber whose communication-identifying information and communication content, or communication-identifying information only, have been

authorized by a court to be intercepted and delivered to an LEA. The identification of the PoC Intercept Subject is limited to identifiers used to access the particular equipment, facility, or communication service (e.g., network address, terminal identity, subscription identity, SIP-URI).

3.1.33 Intercept Subject: See *PoC Intercept Subject*.

3.1.35 Law Enforcement (LE): The collection of Law Enforcement Agencies.

3.1.36 Law Enforcement Agency (LEA): A government entity with the legal authority to conduct electronic surveillance (e.g., the Federal Bureau of Investigation, a local police department).

3.1.37 Lawful Intercept (LI): See *Electronic Surveillance*.

3.1.38 Lawfully Authorized Electronic Surveillance (LAES): See *Electronic Surveillance*.

3.1.39 Location Information: The identification of the cell site and sector that is accessed by the PoC Intercept Subject's Mobile Station (MS) relative to a PoC call (e.g., cell site and sector identifier, latitude and longitude).

3.1.41 Media: Forms of information that are exchanged between PoC Subscribers. Media may come in different forms, which are referred to as *Media Types*.

3.1.42 Media Burst: Flow of Media from a PoC Client that has permission to send Media to the receiving PoC Client(s).

3.1.43 Media Parameters: Information exchanged between the PoC Server and the PoC Client that specify the characteristics of the Media for a PoC Session being established or being modified.

3.1.44 Media Type: Session Description Protocol (SDP) media line that indicates the type of payload; examples of media types are "audio", "video", "application", "data", and "control". Media Types are either real-time or non-real-time.

3.1.45 Mobility: See *Terminal Mobility*.

3.1.46 Mobile Station (MS): A wireless terminal used by PoC Subscribers to access network services over a radio interface.

3.1.47 Multimedia: Multimedia is the simultaneous existence of multiple Media Types; for example, audiovisual or video plus subtitles. Multimedia from a single source that involves real-time media types are assumed to be synchronized.

3.1.48 Multiple Active Sessions: An enhancement of Simultaneous PoC Sessions that allows a PoC Client to have several PoC Sessions active at the same time without filtering of Media.

3.1.49 On-Demand Session: An On-Demand Session is a PoC Session set-up mechanism in which all media parameters are negotiated at PoC Session establishment.

3.1.50 One-to-Many PoC Session: A PoC Session with many Participants and in which all Participants can communicate with each other.

3.1.51 One-to-Many-to-One PoC Session: A PoC Group Session for a Pre-Arranged PoC Group in which one Participant is a PoC Dispatcher and each other Participant is a PoC Fleet member.

3.1.52 One-to-One PoC Session: A feature enabling a PoC User to establish a PoC Session with another PoC User.

3.1.53 Origination: An Initiation of a PoC Session by a PoC Subscriber.

3.1.54 Participant: A PoC User in a PoC Session.

3.1.55 Pen Register: Defined in [Title 18] § 3127 (3), to be "a device or process which records or decodes dialing, routing, addressing, or signaling information transmitted by an instrument or facility from which a wire or electronic communication is transmitted, provided, however, that such information shall not include the contents of any communication, but such term does not include any device or process used by a provider or customer of a wire or electronic communication service for billing, or recording as an incident to billing, for communications services provided by such provider or any device or process used by a provider or customer of a wire communication service for cost accounting or other like purposes in the ordinary course of its business".

3.1.56 PoC Address: A PoC Address identifies a PoC User. The PoC Address can be used by one PoC User to request communication with other PoC Users.

3.1.57 PoC Administrator: An entity that creates and maintains relevant aspects of PoC Service for a specific PoC Subscriber or group of PoC Subscribers. The PoC Service Provider is the default PoC Administrator. PoC administrative rights may be assigned to a representative of a group of PoC Subscribers (e.g., IT department of a corporation) for the purpose of administering a PoC Service within that group of PoC Subscribers.

3.1.58 PoC Client: A PoC functional entity that resides on the User Equipment supporting the PoC Service.

3.1.59 PoC Dispatcher: PoC Dispatcher is a Participant in a One-to-Many-to-One PoC Session that sends Media to all PoC Fleet Members and that receives Media from any PoC Fleet Member.

3.1.60 PoC External Entity: An entity connected to a PoC system, which provides supporting functionalities for Participants. Authorized Participants are able to control the PoC External Entities to realize the desired functionalities.

3.1.61 PoC Fleet Member: A Participant in a One-to-many-to-One PoC Session that is only able to send Media to the PoC Dispatcher and is likewise only able to receive Media from the PoC Dispatcher.

3.1.62 PoC Group: A predefined set of PoC Users together with its attributes. A PoC Group is identified by a SIP URI.

3.1.63 PoC Group Administrator: A person(s) or entity that has the authority to define, delete, or modify PoC Group memberships (i.e., administrative rights for group membership management are exercised in an “off-line” fashion). The PoC Service Provider has group administrative rights by default. PoC Group administrative rights may be assigned by the PoC Service Provider to a PoC Subscriber or his representative (e.g., IT department in a corporation) as part of the service provisioning or temporarily assigned by the PoC Session Owner to a Participant in a PoC Group Session. The PoC Group Administrator may be a Participant in all, some, or none of the PoC Group Sessions. PoC Group Administrator is a special case of PoC Administrator.

3.1.64 PoC Group Identity: The SIP URI of the Pre-Arranged PoC Group or Chat PoC Group.

3.1.65 PoC Group Member: A PoC User on the predefined list of those who are to be invited during initial PoC Session establishment (in the case of a Pre-Arranged PoC Group) or allowed to join the PoC Session (in the case of a Restricted Chat PoC Group).

3.1.66 PoC Group Session: A PoC Session involving a Pre-Arranged PoC Group, Ad Hoc PoC Group, or Chat PoC Group.

3.1.67 PoC Host: A PoC Participant who has authority to initiate and administrate an active PoC Group Session (i.e., group administrative rights in a PoC Session are exercised in an “on-line” fashion). The telecommunications service provider has PoC Host administrative rights by default, subject to applicable privacy rules.

3.1.68 PoC Network: A network comprised of a SIP/IP Core and PoC Server(s), which provide PoC capabilities to the associated PoC-capable User Equipment that are compliant with OMA PoC Service Enabler specifications.

3.1.69 PoC Participant: See *Participant*.

3.1.70 PoC Server: The PoC Server implements the 3GPP IMS [3GPP-23.228] application level network functionality for the PoC Service.

3.1.71 PoC Service Provider: A PoC Service Provider provides PoC Service – on its own or in conjunction with other Value Added Services – to the PoC Subscribers.

3.1.72 PoC Session: An established communication path using SIP (see *SIP Session*) between PoC Subscribers over which data can be exchanged.

3.1.73 PoC Session Owner: The PoC Session Owner in the case of One-to-One PoC Session and Ad Hoc PoC Group Session is the initiator of the PoC Session. In the case of a Chat PoC Group and a Pre-Arranged PoC Group Session, the PoC Session Owner is the creator of the PoC Group.

3.1.74 PoC Session Priority: The PoC Session Priority is determined based on the Service Provider Policy and the QoS profile associated to the PoC Session. It controls how the PoC Session is treated under competing situations with other PoC Sessions and may result in a preferred treatment for those PoC Sessions with a higher

PoC Session Priority. The definition of different levels to be applied for this feature is a decision that belongs to the PoC Service Provider.

3.1.75 PoC Subscriber: One whose service subscription includes the PoC Service.

3.1.76 PoC User: See *PoC Subscriber*.

3.1.77 Policy: A plan of action based on certain defined criteria for handling the PoC Service. A Policy is established by one or more roles of the PoC Service Enabler (the PoC Service Provider, PoC Subscriber, PoC User, or enterprise customer IT department on behalf of PoC Users) and may concern, for example, expel rights in PoC Groups, release of PoC Sessions, network privacy rules, user preferences, assignment of priority levels, etc. Policy may be applicable to different points in the end-to-end PoC Session – e.g., PoC Client, PoC Service entity, underlying network infrastructure.

3.1.78 Pre-Arranged Group: A persistent PoC Session Identity that has an associated set of PoC Group Members. The establishment of a PoC Session to a Pre-Arranged PoC Group results in all members being invited.

3.1.79 Pre-established PoC Session: A SIP Session established between the PoC Client and the PoC Server that performs the Participating PoC Function. The PoC Client establishes the Pre-established PoC Session prior to making requests for PoC Sessions to other PoC Users. To establish a PoC Session based on a SIP request from the PoC User, the PoC Server conferences other PoC Servers/Users to the Pre-established PoC Session so as to create an end-to-end connection.

3.1.80 Presence Source: An entity that provides (publishes) presence information to a Presence service.

3.1.81 Presentity: A logical entity that has Presence Information associated with it. This Presence Information may be composed from a multitude of Presence Sources. A Presentity is most commonly a reference for a person, although it may represent a role such as “help desk” or a resource such as “conference room #27”. Presentities are generally referenced by distinguished names, such as “dean.willis@softarmor.com” or by phone numbers like “+19724735455”.

3.1.82 Private Call: See *One-to-One PoC Session*.

3.1.83 Quality of Service: Quality specification of a telecommunications channel, system, virtual channel, computer-telecommunications Session, etc. Quality of service may be measured, for example, in terms of signal-to-noise ratio, bit error rate, message throughput rate, or call blocking probability.

3.1.84 Reject List: A list the PoC Subscriber maintains containing identities of other PoC Subscribers or PoC Groups from which the PoC Subscriber does not want to receive either incoming alerts or invitations. The Reject List is used to automatically reject alerts or PoC Session invitations received from any identity on the Reject List.

3.1.85 Restricted Chat PoC Group: A PoC Group in which participation is limited to specific PoC Subscribers.

3.1.86 Sender Identification: The procedure by which the current Media sender's PoC Address is determined and made known to the receiving Participants on the PoC Session.

3.1.87 Simultaneous PoC Sessions: When a PoC User is a participant in more than one PoC Session simultaneously using the same PoC Client.

3.1.88 SIP/IP Core: The SIP/IP Core includes a number of SIP proxies and SIP registrars. The SIP/IP Core architecture is specified in [3GPP-23.228].

3.1.89 SIP Session: A SIP dialog. From [RFC3261], a SIP dialog is defined as follows: “A dialog is a peer-to-peer SIP relationship between two user agent(s) (UAs) that persists for some time. A dialog is established by SIP messages, such as a 2xx response to an INVITE request. A dialog is identified by a call identifier, local tag, and a remote tag”.

3.1.90 SIP URI: From [RFC3261]: “A SIP or SIPS URI identifies a communications resource” and “follows the guidelines in [RFC2396]”. PoC uses SIP URI(s) to identify PoC Clients, PoC Servers, and PoC Sessions, resource lists that point to URI lists, etc.

3.1.91 Subject: See *PoC Intercept Subject*.

3.1.92 Surveillance: See *Electronic Surveillance*.

3.1.93 Talk Burst: The flow of media from a PoC Client that has the permission to send media.

3.1.94 Terminal Mobility: The ability of a terminal to access telecommunications services from different locations and while in motion, and the capability of the network to identify, locate, and communicate with that terminal.

3.1.95 Trap and Trace Device: Defined in [Title 18] § 3127(4), a device or process that captures the incoming electronic or other impulses that identify the originating number or other dialing, routing, addressing, and signaling information reasonably likely to identify the source of a wire of electronic communication, provided, however, that such information shall not include the contents of any communication.

3.1.96 Unobtrusive: Not readily or undesirably noticeable or blatant; inconspicuous.

3.1.97 Unrestricted Chat PoC Group: An established PoC Group in which membership is open to any PoC Subscriber, but its establishment does not result in other PoC Subscribers being invited.

3.1.98 Watcher: An entity that requests presence information about a Presentity, or Watcher Information about a Watcher, from the Presence service.

3.2 Acronyms & Abbreviations

AAA	Authentication, Authorization, and Accounting
AF	Access Function
ANSI	American National Standards Institute
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
AVP	Attribute-Value Pairs
CALEA	Communications Assistance for Law Enforcement Act of 1994
CC	Communication Content
CF	Collection Function
CII	Communication-Identifying Information
DF	Delivery Function
EPS	Evolved Packet System
FCC	Federal Communications Commission
GPRS	General Packet Radio Service
IAP	Intercept Access Point
ID	Identifier or Identity
IETF	Internet Engineering Task Force
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ISDN	Integrated Services Digital Network
LAES	Lawfully Authorized Electronic Surveillance
LE	Law Enforcement
LEA	Law Enforcement Agency
LI	Lawful Interception
MAP	Mobile Application Part
MEID	Mobile Equipment Identifier

MME	Mobility Management Entity
MS	Mobile Station
MSISDN	Mobile Station International ISDN Number
NAI	Network Access Identifier
OMA	Open Mobile Alliance
PoC	Push-to-Talk over Cellular
PTT	Push-to-Talk
QoS	Quality of Service
RAN	Radio Access Network
RFC	Request for Comment
RTP	Real-Time Transport Protocol
RTCP	RTP Control Protocol
SDP	Session Description Protocol
SGSN	Serving GPRS Support Node
SIP	Session Initiation Protocol
TBCP	Talk Burst Control Protocol
TSP	Telecommunication Service Provider
UA	User Agent
UDP	User Datagram Protocol
UE	User Equipment
URI	Uniform Resource Identifier
XCAP	Extensible Markup Language Configuration Access Protocol
XDMC	XML Document Management Client
XDMS	Shared XML Document Management Server
XML	Extensible Markup Language

4 Push-To-Talk over Cellular (PoC) Service Description

A PoC service is a voice service that enables a PoC Subscriber to connect to one or more users (e.g., friends or colleagues) subscribed to the same service with the push of a “button”. The PoC service provides PoC Subscribers with the ability to provision their “buddies” and “groups” of contacts without assistance from the TSP. The PoC functionality is defined by the OMA PoC Service Enabler described in [OMA-PoC]. A concise (informative) overview of the PoC service description is available in Annex A.

This standard supports the following types of PoC Sessions:

- One-to-One.
- One-to-Many:
    - Ad Hoc PoC Group;
    - Pre-Arranged PoC Group; and
    - Chat PoC Group (Restricted or Unrestricted);
- One-to-Many-to-One (Fleet management).
- Instant Personal Alert.

5 Electronic Surveillance Architecture for PoC

5.1 Electronic Surveillance Model

Lawful Interception (LI) is comprised of five major functions: service provider administration, access, delivery, collection, and law enforcement administration. These functions are discussed without regard to their implementation. The relationships between these functions are shown in Figure 5.1.

- *Service Provider Administration Function:* Controls the TSP's Access Function and Delivery Function (DF) by sending the information from the lawful authorization to the Intercept Access Point(s) (IAP) for identification of CC and CII and to the DF for identification and formatting of the events to be reported (CC, CII, or both).
- *Access Function (AF):* Consists of one or more IAP(s) that isolates the PoC Intercept Subject's PoC Session communications unobtrusively. An IAP is a point within a telecommunications system where CC or CII associated with the PoC Intercept Subject is accessed and then forwarded to the DF.
- *Delivery Function (DF):* Formats received CC, CII, or both from the IAP for delivery to one or more CF(s) based on information from the AF.
- *Collection Function (CF):* Responsible for collecting and analyzing intercepted communications. The CF receives the intercepted and formatted CC, CII, or both for use by LEAs. The CF is the responsibility of the LEA.
- *Law Enforcement Administration Function*: Responsible for controlling and configuring the LEA CF. The Law Enforcement Administration Function is the responsibility of the LEA.
- The *e-interface* is the interface between the DF and CF and is the only interface considered for standardization in this document.

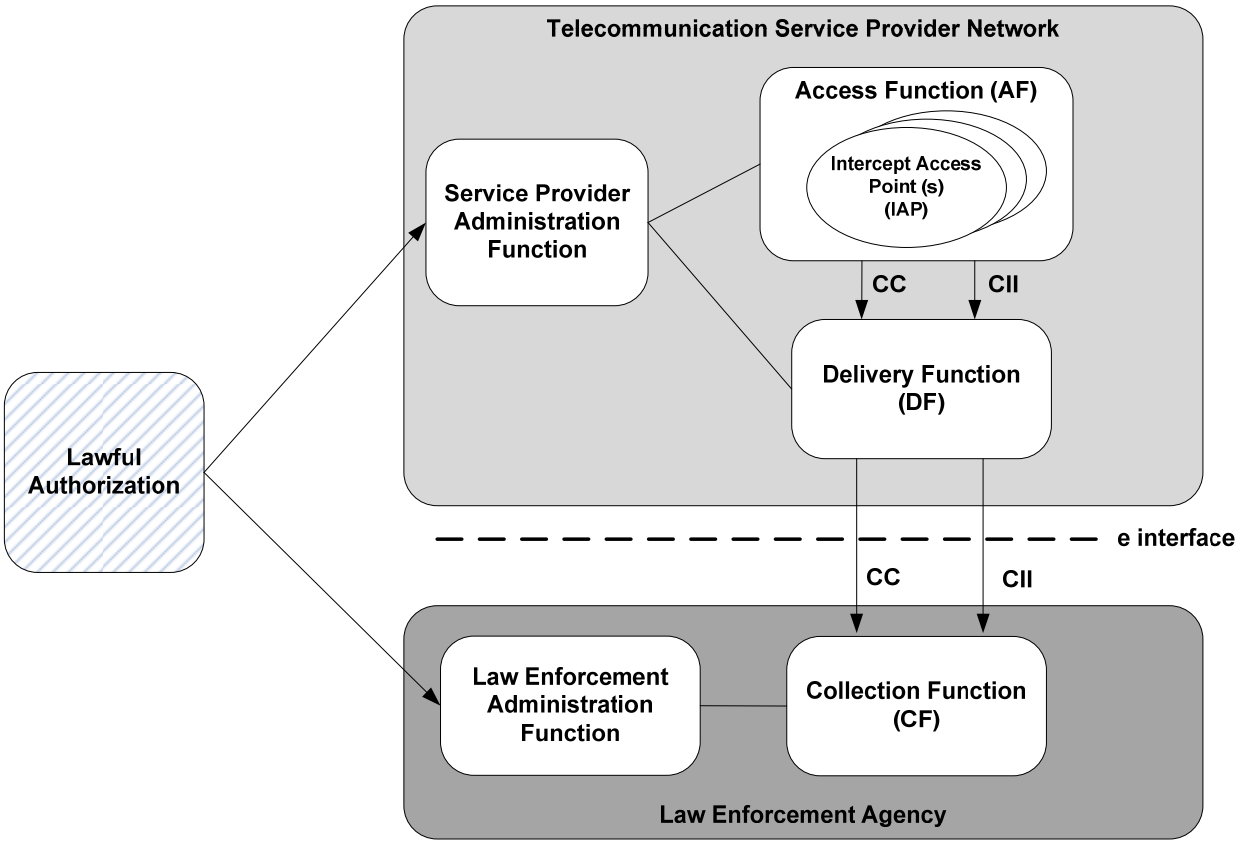

Figure 5.1: Electronic Surveillance Model

5.2 Electronic Surveillance Model & PoC Architecture

Figure 5.2 shows the electronic surveillance model with the PoC architecture. Figure 5.2 also shows some PoC reference points; however, not all of the functional entities and reference points of the PoC architecture are depicted in Figure 5.2. For a complete description of the PoC architecture, see [OMA-PoC-AD].

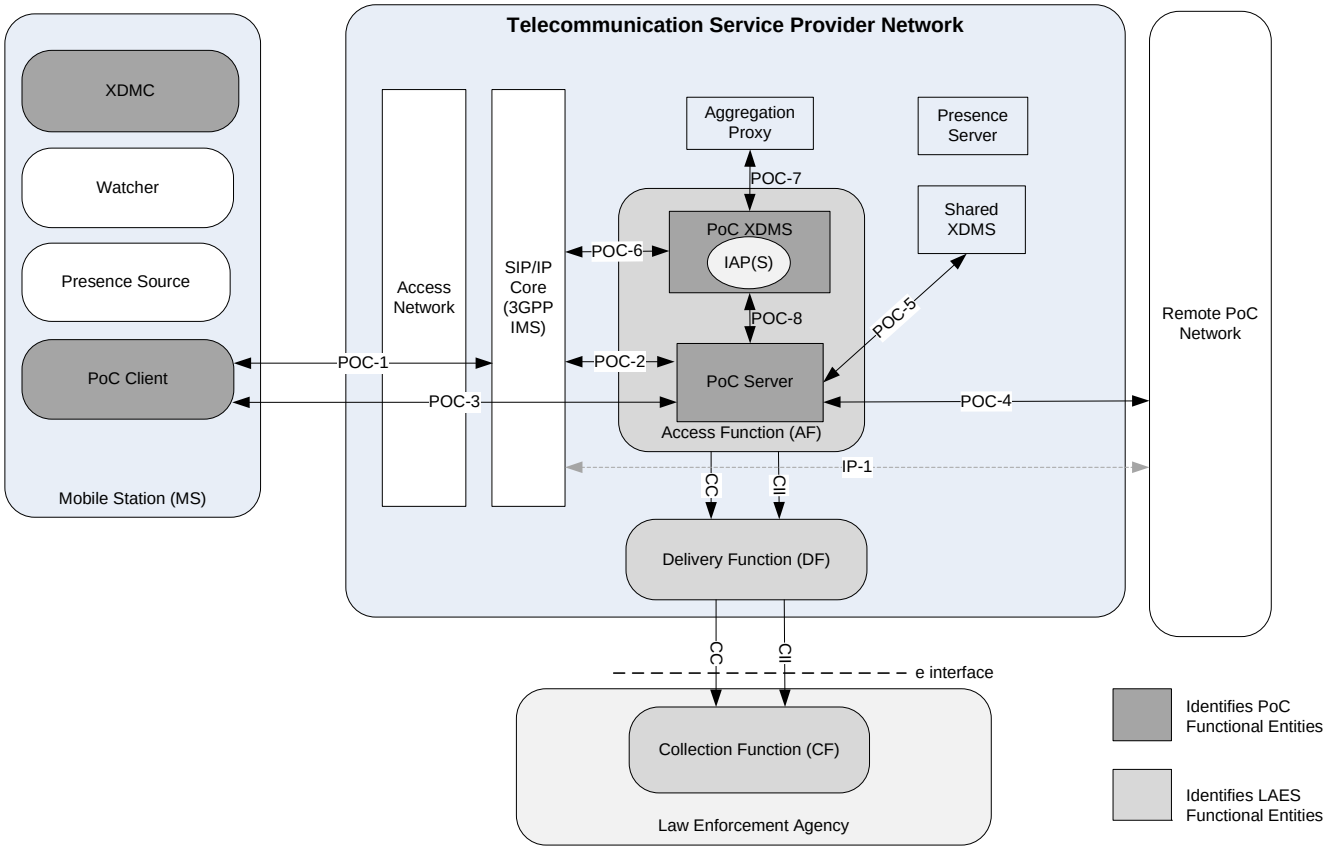

Figure 5.2: LAES and PoC Functional Entities and Reference Points

5.2.1 PoC Functional Entities

This clause summarizes the PoC functional entities and is provided for information. Not all functional entities are shown or described; for a complete detailed description of the PoC functional entities and capabilities, see [OMA-PoC-AD].

- *PoC Client:* Resides on the mobile station and is used to access the PoC service.
- *XML Document Management Client (XDMC):* Resides on the mobile station and is an XCAP client that manages XML documents stored in the network (e.g., PoC-specific documents in the PoC XDMS, URI lists used as Contact Lists in the Shared XDMS, etc.). Management operations include create, modify, retrieve, and delete. The XDMC is also able to subscribe to changes made to XML documents stored in the network, such that it will receive notifications when those documents change.
- *PoC Server:* Implements the application-level network functionality for the PoC service. The PoC Server can either be a Controlling PoC Function or Participating PoC Function, or both. The determination of the PoC Server role (Controlling PoC Function and Participating PoC Function) takes place during the PoC Session setup and lasts for the duration of the whole PoC Session. Figure 5.3 illustrates the relationship between Controlling PoC Function, Participating PoC Functions, and the PoC Clients. It shows the distribution of the functionality during a One-to-One PoC Session in a single network.

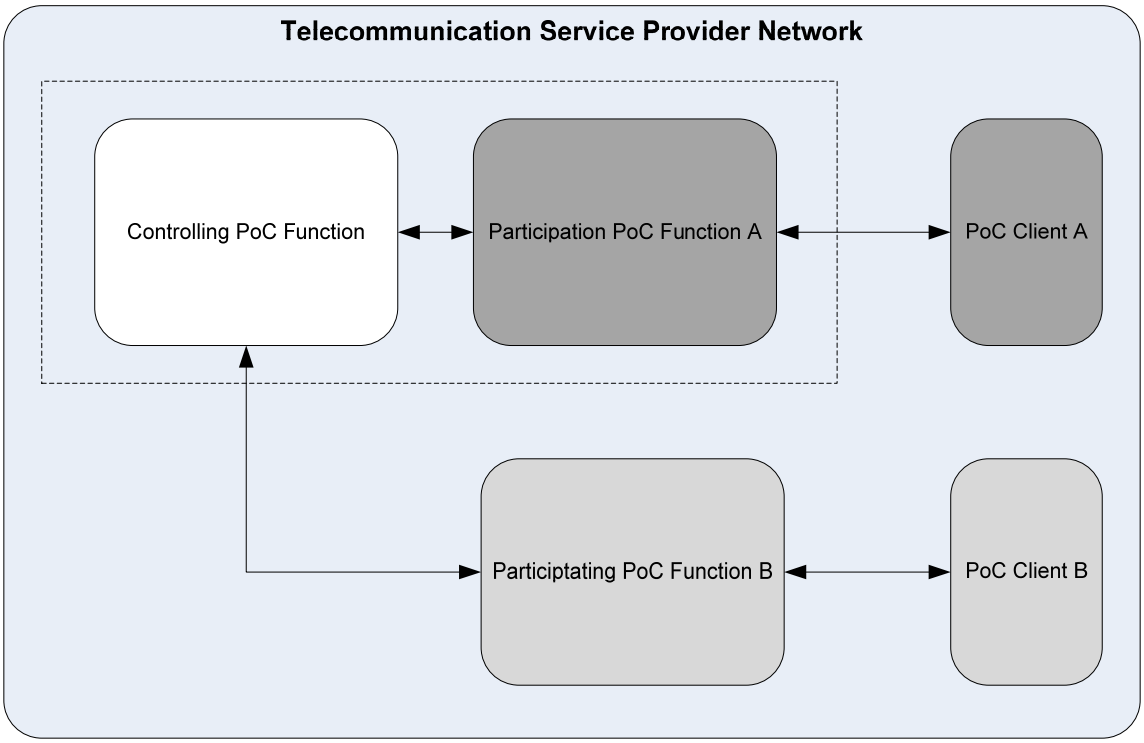

Figure 5.3: Relationship between Controlling PoC Function, Participating PoC Functions and the PoC Clients

For additional explanatory information on PoC Server capabilities, see Annex A or [OMA-PoC-AD].

- *PoC XML Document Management Server (XDMS):* An XCAP Server that manages XML documents (e.g., PoC Groups) that are specific to the PoC Service enabler. Management operations include create, modify, retrieve, and delete. The PoC XDMS is also able to accept subscriptions and notify Watchers of changes to the stored PoC-specific documents.

5.2.2 External Entities to the PoC Service

This clause summarizes the external functional entities that provide capabilities to a PoC Service enabler. This clause is provided for information. Not all external entities are shown in Figure 5.2 or are described below; for a complete detailed description of the external entities that provide capabilities to a PoC Service enabler, see [OMA-PoC-AD].

- *SIP/IP Core (3GPP IMS):* Includes a number of SIP proxies and SIP registrars. As defined in [OMA-PoC-AD], the SIP/IP Core performs the following functions that are needed in support of the PoC service:
  - Routes the SIP signaling between the PoC Client and the PoC Server;
  - Provides discovery and address resolution services, including E.164 address resolution;
  - Supports SIP compression;
  - Performs authentication and authorization of the PoC User at the PoC Client based on the PoC User's service profile;
  - Maintains the registration state;
  - Provides support for identity privacy on the Control Plane;
  - Provides charging information;
  - Provides capabilities to lawful interception.

  NOTE: the SIP/IP Core is based on capabilities from IMS as specified in 3GPP [3GPP-23.228].

- *Shared XML Document Management Server (XDMS)*: An XCAP server that manages XML documents (e.g., Contact Lists) that are needed for the PoC service, and which may be shared with other service enablers (e.g., Presence). Management operations include create, modify, retrieve, and delete. The Shared XDMS is also able to accept subscriptions and notify Watchers of changes to the stored shared documents.
- *Aggregation Proxy*: Acts as the single contact point for the XDMC. The Aggregation Proxy performs authentication of the XDMC and routes individual XCAP requests to the correct XDMS. The Aggregation Proxy *may* optionally support charging and compression of XML documents over the radio interface.
- *Presence Server:* An entity that accepts, stores, and distributes presence information about PoC Clients. The presence information *may* be published by the Presence Source in the MS or by the PoC Server on behalf of the PoC Client. The presence information *may* be fetched or subscribed to by the Watcher in the MS, or by the Watcher in PoC Server on behalf of the PoC Client. Note the address of the Presentity for PoC presence information needs to be the same as the PoC Address.
- *Presence Source*: An entity that provides (publishes) presence information to a Presence service.
- *Watcher:* An entity that requests presence information about a Presentity, or Watcher Information about a Watcher, from the Presence service.

5.2.3 PoC Reference Points

This clause summarizes the PoC Reference Points and is provided for information. Not all reference points are shown or described; for a complete detailed description of the reference points used for the PoC Service enabler, see [OMA-PoC-AD].

- *POC-1*: Supports the communication between the PoC Client and the SIP/IP Core, used for SIP signaling.
- *POC-2*: Supports the communication between the SIP/IP Core and the PoC Server for SIP Session control, used for SIP signaling.
- *POC-3*: Is between the PoC Client and the PoC Server, used for Media and Talk Burst Control.
- *POC-4*: Supports the User Plane communication between the PoC Servers.
- *POC-5*: Supports communication between the Shared XDMS and the PoC Server.
- *POC-6*: Supports communication between the PoC XDMS and the SIP/IP Core.
- *POC-7*: Supports communication between the Aggregation Proxy and the PoC XDMS.
- *POC-8*: Supports communication between the PoC Server and the PoC XDMS.

6 Stage 1 Description: User Perspective

6.1 Introduction

This clause describes an IMS-based PoC service from the LEA's perspective. This clause defines user requirements, general LAES capabilities, surveillance events, and intercept access points required to support LI. IMS-based PoC is a type of voice service that TSPs may utilize over their packet data network; however, it should be noted that voice terminology and concepts are primarily used to describe the user requirements within this clause.

The requirements apply to the following types of PoC Sessions:

- One-to-One.
- One-to-Many:
    - Ad Hoc PoC Group;
    - Pre-Arranged PoC Group; and
    - Chat PoC Group (Restricted or Unrestricted).
- One-to-Many-to-One (Fleet management).

- Instant Personal Alert.

The TSP is required to deliver the intercepted communications of PoC Sessions logically separate (e.g., different ports) from other services that may be under surveillance. When CC is intercepted and delivered, the CC *shall* be correlated to its associated CII. All requirements are applicable to simultaneous PoC Sessions and *shall* support the reporting of the use of multiple terminals.

The requirements described in this clause are pursuant to a lawful authorization for electronic surveillance. The capabilities defined in this standard are written from the perspective of the PoC Intercept Subject as a PoC Subscriber. However, the capabilities defined in this standard can also be used to intercept the following types of PoC Sessions established by the TSP with the following as the target of interception:

- Pre-Arranged PoC Group; or
- Chat PoC Group.

The following requirements apply to both cases, the PoC Intercept Subject as a PoC Subscriber and the PoC Intercept Subject as a Pre-Arranged PoC Group or Chat PoC Group, unless otherwise stated.

A TSP *shall* deliver the intercepted communications (e.g., communication content and communication-identifying information) to an authorized LEA.

If a TSP configures a PoC service offering that does not offer some of the service capabilities identified in [OMA-PoC], then the TSP *shall* provide LI support only for those service capabilities that are offered as part of its PoC service.

6.2 General Requirements

This clause describes the general LAES requirements for PoC LAES.

6.2.1 Interception of Subject Communications

a) The TSP *shall* expeditiously isolate and intercept the CII of the communications associated with PoC Intercept Subject using the TSP's equipment, facilities, or services that are reasonably available at an IAP, as specified by the lawful authorization and per the period of time as specified by the lawful authorization.

b) The TSP *shall* expeditiously isolate and intercept the CC of the communications associated with PoC Intercept Subject using the TSP's equipment, facilities, or services as specified by the lawful authorization and per the period of time as specified by the lawful authorization.

c) The TSP *shall* conduct the lawfully authorized interception in an unobtrusive manner (i.e., in a manner that prevents the PoC Intercept Subject or the PoC Intercept Subject's equipment, facilities, or services from readily noticing that an intercept is being conducted).

d) The TSP *shall* expeditiously isolate CII in a manner that allows it to be associated with the CC to which it pertains.

e) The TSP *shall* protect information regarding a lawful authorization. The TSP *shall* provide means to protect the confidentiality of LI activities and to safeguard against non-authorized persons from becoming aware of LI activities. This includes protecting LI information and activities from other LEAs.

f) The TSP *shall* facilitate authorized communications interceptions and access to CII with a minimum of interference with any Subscriber's telecommunications service and in a manner that protects the privacy and security of communications and CII not authorized to be intercepted.

g) The TSP *shall* support up to five separate LEAs for any single PoC Intercept Subject. The total intercept capacity and the number of CFs supported for each LEA is outside the scope of this standard.

h) If the TSP provides or controls the compression for the PoC Session and possesses the information necessary to decompress the communication or signaling, the TSP *shall* be responsible for

decompressing or ensuring the LEA's ability to decompress any compressed communication or signaling.

The TSP *shall* deliver to the LEA either:

i. Decompressed communication and signaling; or

ii. Information about how to decompress a communication or signaling (e.g., identifying the type of compression software used to compress the communication or signaling, or directing the LEA to the appropriate vendor that can provide decompression equipment).

If the communications are available at the IAP in both compressed and uncompressed form, the uncompressed form is the LEA-preferred method for delivery.

i) If the TSP provides or controls the encryption services for the PoC Session and possesses the information necessary to decrypt the communication or signaling, the TSP *shall* be responsible for decrypting or ensuring the LEA's ability to decrypt any encrypted communication or signaling.

The TSP *shall* deliver to the LEA either:

iii. The intercepted communications in unencrypted form, or

iv. Information about how to decrypt a communication or signaling (e.g., identifying the type of encryption software used to encrypt the communication or signaling, directing the LEA to the appropriate vendor that can provide decryption equipment, or providing the encryption key used to encrypt the communication or signaling).

If the communications are available at the IAP in both encrypted and unencrypted form, the unencrypted form is the LEA-preferred method for delivery.

6.2.2 Delivery of Intercepted Communications

a) The TSP *shall* have the capability to deliver intercepted CC and CII to LEAs, in a format such that this information may be transmitted by means of equipment, facilities, or services procured by the LEAs, at a location other than the premises of the TSP.

b) Each intercepted communication *shall* be delivered in a format that allows it to be identified and isolated from other intercepted and delivered communications (e.g., another simultaneous PoC Intercept Subject PoC communication). Methods include:

1) Correlating the CII to the associated CC when both CII and CC are delivered;

2) Delivering the CII and CC for each communication interception to different ports on the CF.

c) The intercepted CII and CC *shall* be delivered to only the authorized LEA(s).

d) Message integrity may be required on the DF-CF link to ensure that the message has not been altered in transmission. Message integrity is outside the scope of this standard and determined between TSP and LEA.

e) Message sender (i.e., TSP) authentication may be required to verify the identity of the message sender on the DF-CF link. Message sender authentication is outside the scope of this standard and determined between TSP and LEA.

f) The Quality of Service (QoS) used on the DF-CF link *should* be equal to or better than the QoS provided for the PoC Intercept Subject's PoC communication. DF-CF link QoS is outside the scope of this standard and determined between TSP and LEA.

6.2.3 Timing Information

Timing information includes two elements:

1. *Event Time-stamp:* Each surveillance message *shall* be time-stamped within a specific amount of time from when the event triggering the surveillance message was detected (i.e., the specific amount of time is the time difference between the time of detection of the CII triggering event and the time recorded in the time-stamp).

2. *Event Timing:* Surveillance messages *shall* be sent toward the LEA within a defined amount of time after the CII triggering event is detected at the IAP.

The following timing requirements *shall* apply to the delivery of CII:

- Each surveillance message *shall* be sent towards the CF within eight (8) seconds of detecting the CII triggering event at the IAP, at least 95% of the time. Each surveillance message *shall* contain a time-stamp with a time that is within 200 milliseconds from when the CII triggering event was detected at the IAP. The time-stamp *shall* report:
    - Coordinated universal time; or
    - Local time with the local time differential from coordinated universal time.

The following timing requirements apply to the delivery of intercepted content:

- Time-stamps *shall* be provided with encapsulated intercepted packets delivered to the CF, unless timing is provided by other means.
- Intercepted communications content *shall* be expeditiously transmitted by the IAP towards the DF with its interception. The timeliness of CC delivery from the DF to the CF is determined between the TSP and LEA.

6.3 User Requirements

This clause describes the user requirements for PoC LAES. The details of the functional requirements for PoC are described in [OMA PoC RD]. The LAES reporting occurs when the information is reasonably available for the PoC Intercept Subject's PoC service.

6.3.1 Location Information

When lawfully authorized, Location Information of the PoC Intercept Subject *shall* be provided to LEA as CII at the beginning and end of each PoC Session. The TSP *shall* provide to LEA all Location Information that is reasonably available at the IAP for the PoC Intercept Subject's PoC Service.

6.3.2 PoC Registration

These requirements are applicable to the PoC Intercept Subject's registration, authentication, authorization, and serving system change as it pertains to the PoC Service. The TSP's operational and administrative procedures for LAES are beyond the scope of this standard. It is assumed that the TSP has operations, procedures, and verification processes to ensure that LAES is performed per the lawful authorization (see also Clause 6.3.13, Security).

R-1. (Requirement) The TSP *shall* provide the required information when a registration request is received from the PoC Intercept Subject.

R-2. (Requirement) The TSP *shall* provide the required information when a re-registration request is received from the PoC Intercept Subject or from the network on behalf of the PoC Intercept Subject.

R-3. (Requirement) The TSP *shall* provide the required information when a de-registration request is received from the PoC Intercept Subject or from the network on behalf of the PoC Intercept Subject.

R-4. (Requirement) The TSP *shall* provide the required information when the network responds to any PoC registration request(s) (e.g., register, re-register, de-register) by the PoC Intercept Subject.

R-5. (Requirement) The TSP *shall* provide the required information when there is a change or an attempted change to the PoC Intercept Subject's access network service provider due to mobility.

6.3.3 Start of Interception

This requirement is applicable when the surveillance of the PoC Intercept Subject's communication begins and the PoC Intercept Subject is already a participant of on-going PoC Session(s). The following requirement applies only to the PoC Intercept Subject as a PoC Subscriber.

R-6. (Requirement) The TSP *shall* provide the required information of the PoC Intercept Subject's ongoing PoC Session(s) that is already in progress (e.g., the PoC Intercept Subject is a member of a Pre-Arranged PoC Group or Chat PoC Group), regardless of whether the PoC Intercept Subject is actively transmitting or receiving talk bursts.

6.3.4 PoC Session Control

These requirements describe origination and termination attempts for PoC Sessions, establishment and release of PoC Sessions, Instant Personal Alerts, and Group Advertisements.

R-7. (Requirement) The TSP *shall* provide the required information when any type of PoC Session is initiated by the PoC Intercept Subject or a request to join any type of PoC Session is received by the PoC Intercept Subject, regardless of the final disposition (e.g., abandoned, successful, or unsuccessful) of the initiation or the request.

R-8. (Requirement) The TSP *shall* provide the required information when Instant Personal Alert is initiated by the PoC Intercept Subject (i.e., a request to initiate a PoC Session at a later time is sent).

R-9. (Requirement) The TSP *shall* provide the required information when an Instant Personal Alert is sent to the PoC Intercept Subject.

R-10. (Requirement) The TSP *shall* provide the required information when Group Advertisement is initiated by the PoC Intercept Subject (i.e., a request to join a PoC Group is sent).

R-11. (Requirement) The TSP *shall* provide the required information when Group Advertisement is sent to the PoC Intercept Subject.

R-12. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject's initiation attempt is successful or a request to join any type of PoC Session received by the PoC Intercept Subject is successful (i.e., the PoC Session is established).

R-13. (Requirement) The TSP *shall* provide the required information when a PoC Session has been released (i.e., the PoC Session has ended). The PoC Session release policy is defined in [OMA-PoC-CP] clause 7.2.1.16.

6.3.5 PoC Session Communications

These requirements describe activities during on-going PoC Sessions.

R-14. (Requirement) The TSP *shall* provide the required information of the PoC Intercept Subject's ongoing PoC Sessions.

R-15. (Requirement) The TSP *shall* provide floor control information for all PoC Sessions, regardless of whether queuing of floor control information is supported.

R-16. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject is participating in a PoC Group Session and a participating PoC group member terminates their participation in the Group Session (i.e., a participating party drops).

R-17. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject joins or rejoins a PoC Session.

R-18. (Requirement) The TSP *shall* provide the required information when the associate joins or rejoins a PoC Session and the PoC Intercept Subject or PoC Intercept Subject's service is made aware of the action.

R-19. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject or an associate re-joins a PoC Session and the PoC Intercept Subject or PoC Intercept Subject's service is made aware of the action.

R-20. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject is placed on hold during a PoC Session (e.g., removed from a PoC Session).

R-21. (Requirement) The TSP *shall* provide the required information when an associate places himself on hold during a PoC Session and the PoC Intercept Subject's service is made aware of the action.

R-22. (Requirement) The TSP *shall* provide the required information when the PoC Intercept Subject returns to the PoC Session that was previously placed on hold (e.g., the PoC Intercept Subject's communication is "Retrieved").

R-23. (Requirement) The TSP *shall* provide the required information when any associate takes himself off hold and the PoC Intercept Subject's service is made aware of the action.

6.3.6 PoC Signaling Requirements

The following requirements are associated with signaling for the PoC Service.

R-24. (Requirement) The TSP *shall* provide the required information when there is a request for a modification of the media characteristics (e.g., media format) of an existing PoC Session in which the PoC Intercept Subject is participating.

R-25. (Requirement) The TSP *shall* provide the required information when there is a request for an addition or removal of a media stream for an existing PoC Session in which the PoC Intercept Subject is participating.

R-26. (Requirement) The TSP *shall* provide the identity of a PoC Host.

NOTE – Open PoC chat groups can be joined by any PoC subscribers and may not require a PoC Host.

6.3.7 PoC List Management

The PoC list management requirements focus on the PoC Intercept Subject's contact list (i.e., individuals) and PoC Group list (i.e., list of pre-identified individuals using a group identification).

R-27. (Requirement) The TSP *may* provide the required information when the PoC Intercept Subject's PoC Client requests changes to his contact list or PoC group list.

R-28. (Requirement) The TSP *may* provide the required information when the PoC Intercept Subject's PoC Client is notified of the changes made to his contact list, or PoC group list.

R-29. (Requirement) For PoC Groups in which the PoC Intercept Subject is a member, the TSP *may* provide the required information when the PoC Intercept Subject's PoC Client is notified of the changes made to a PoC Group list by another PoC User.

6.3.8 PoC Access Control Management

Access Control management allows a PoC Subscriber (i.e., the PoC Intercept Subject) to manipulate their PoC User access policy and PoC Group authorization rules located in the PoC XDMS. PoC User access policy may be used by the PoC Intercept Subject as a means of controlling the incoming PoC Session requests from other PoC Users or PoC Groups. The PoC User access policy may allow the PoC Intercept Subject to override the Manual Answer Mode setting and the PoC User access policy may also be applied on the delivery of the Instant Personal Alerts. The PoC Group owner (i.e., the PoC Intercept Subject) may use PoC Group authorization rules to control permissions to access pre-defined PoC Group(s). For a complete description of the PoC Access Control Management, see [OMA-PoC-AD].

For the PoC User access policy and PoC Group authorization rules, the TSP may provide information regarding:

- Queries by the PoC Intercept Subject for his PoC User access policy and PoC Group authorization rules;
- Modifications by the PoC Intercept Subject to his PoC User access policy and PoC Group authorization rules;

- Modifications to the PoC User permissions to access a PoC Group when the PoC Intercept Subject is the owner of a PoC Group (i.e., the creator of the Chat PoC Group or Pre-Arranged PoC Group).

6.3.9 Presence Information

The Presence enabler [Presence AD] is an optional functionality that may be supported by the PoC Service. If the PoC Service supports Presence, the requirements focus on either the PoC Intercept Subject's network presence information or the presence information the PoC Intercept Subject's PoC function receives about their contacts (including group lists). Presence information event messages may only be sent to the LEA when the PoC Server performing the Participating PoC Function acts as Presence Source and/or Watcher towards the Presence Server on behalf of the PoC Intercept Subject (i.e., PoC Client).

R-30. (Requirement) When the PoC Server assumes the role of a Presence Source, the TSP *shall* provide the required information to the LEA when the PoC Server publishes PoC-related presence information to the Presence service on behalf of PoC Intercept Subject (i.e., PoC Client).

R-31. (Requirement) When the PoC Server assumes the role of a Watcher on behalf of PoC Intercept Subject (i.e., PoC Client), the TSP *shall* provide the required information to the LEA when the PoC Server receives presence status notifications from the Presence Servers after having subscribed to the PoC presence status of other PoC Clients (i.e., associates to the PoC Intercept Subject). The TSP *shall* support the capability to activate/deactivate sending this information to the LEA (the default value is "activate").

6.3.10 PoC Content

This requirement ensures that the LEA receives the required content of all authorized PoC Sessions.

R-32. (Requirement) The TSP *shall* provide all communication content for the duration of a PoC Session.

6.3.11 Session Continuity

R-33. (Requirement) A TSP *shall* intercept and report CII, or CII and CC, for the PoC Intercept Subject's PoC Session that has continued while switching access network connections as long as the TSP continues to carry the communications.

6.3.12 Roaming

R-34. (Requirement) The TSP *shall* provide the required PoC Service information as specified by the lawful authorization and as available in the TSP's own network when the PoC Intercept Subject roams to a visited network.

6.3.13 Security

Security mechanisms provide protection to the PoC service environment. There are two aspects of security for the PoC service environment: SIP signaling security and User Plane security. These PoC security mechanisms are defined in [OMA-PoC-AD]. The mechanism(s) a TSP uses for security are beyond the scope of this standard.

6.3.13.1 Assumptions

1) The TSP authenticates the PoC Subscribers' access to the TSP's network and services to ensure that the intercepted communications is received from, or sent to, the PoC Intercept Subject's equipment, facilities, or services. The mechanism(s) a TSP uses for authentication is beyond the scope of this standard.
2) While an intercept is active, the intercepted communications delivered to the LEA are associated with

the PoC Intercept Subject's equipment, facilities, or services as a result of the authentication process. The mechanism(s) the TSP uses to isolate and associate the intercepted communications with the authenticated PoC Intercept Subject's equipment, facilities, or services is beyond the scope of this standard.

3) The TSP has operations, procedures, and verification processes to ensure the LAES is performed per the lawful authorization. The TSP's LAES operational and administrative procedures are beyond the scope of this standard.

6.4 Surveillance Events

This clause presents surveillance events that generate or represent communication-identifying information (CII) and communication content (CC) to be delivered to the LEA. These events convey the information for reporting the PoC Session so an LEA can accurately recreate, in real time, the PoC Intercept Subject's communication.

The following types of PoC Sessions apply to these surveillance events:

- One-to-One.
- One-to-Many
  - Ad Hoc PoC Group;
  - Pre-Arranged PoC Group; and
  - Chat PoC Group (either Restricted or Unrestricted).
- One-to-Many-to-One (e.g., Fleet management).
- Instant Personal Alert.

6.4.1 Communication-Identifying Information (CII) Events

These events are to be reported to the LEA when the information is reasonably available at the IAP. The events described in this clause are those that generate or represent communication-identifying information.

6.4.1.1 Registration Events

This clause describes the registration, re-registration, or de-registration events, successful or unsuccessful, for the PoC service. Registration events are reported only for the PoC Intercept Subject.

6.4.1.1.1 Registration

A Registration event occurs when the PoC Intercept Subject registers for PoC services. Reporting would also include additional PoC addresses registered during the SIP registration (i.e., implicit registration).

6.4.1.1.2 Re-registration

A Re-registration event occurs when the PoC Intercept Subject or a network, on behalf of the PoC Intercept Subject, re-registers for PoC services. Reporting may include additional PoC addresses registered during the SIP registration (i.e., implicit registration).

6.4.1.1.3 De-registration

A De-registration event occurs when the PoC Intercept Subject de-registers or the network de-registers the PoC Intercept Subject for PoC (e.g., based on registration timeout).

6.4.1.1.4 Authentication

See clause 6.3.13, Security.

6.4.1.1.5 Authorization

See clause 6.3.13, Security.

6.4.1.1.6 Serving System Change

A Serving System Change event occurs when there is a change or an attempted change to the TSP serving the PoC Intercept Subject's access network (i.e., for mobility).

6.4.1.2 Start of Interception Event

The Start of Interception event occurs when the surveillance of the PoC Intercept Subject's communication begins and the PoC Intercept Subject is a participant of on-going PoC Session(s) regardless of whether the PoC Intercept Subject is actively transmitting or receiving talk bursts. The Start of Interception event is not reported for an Instant Personal Alert type of PoC Session.

6.4.1.3 PoC Session Control Events

6.4.1.3.1 PoC Pre-Established Session

This event occurs when a SIP Session is established or released between the PoC Intercept Subject's PoC Client and the PoC Server that performs the Participating PoC Function. The PoC Client establishes the Pre-established Session prior to making requests for a PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) to other PoC Users.

The Pre-established Session provides a mechanism to negotiate media parameters such as IP address, ports, and codecs, which are used for sending the media and Talk Burst Control messages between the PoC Client and the PoC Server that performs the Participating PoC Function.

The mechanism allows the PoC Client to invite other PoC Clients or receive PoC Sessions without negotiating again the media parameters.

The Pre-established Session may be established after the initial PoC registration.

The state details of a Pre-Established Session are explained in [OMA-PoC-UP].

6.4.1.3.2 Initiation

This event occurs when the PoC Intercept Subject initiates any type of PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) or the PoC Intercept Subject receives an invitation to a PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) regardless of the success of the initiation or the final disposition of the invitation.

6.4.1.3.3 Initiation Abandoned

This event occurs when the PoC Intercept Subject initiates any type of PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) or the PoC Intercept Subject receives an invitation to a PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) and the request is abandoned before the PoC Session starts.

6.4.1.3.4 Instant Personal Alert

An Instant Personal Alert event occurs when an Instant Personal Alert (i.e., a request for one PoC subscriber to initiate a PoC Session at a later time) is initiated or sent to the PoC Intercept Subject.

6.4.1.3.5 PoC Group Advertisement

Group Advertisement is used to inform PoC Users about the existence and the membership of the Group. Group Advertisement is a feature that extends the basic PoC service functionality with an additional communication mode for providing operational Group-related information. When supported, Group Advertisement reuses PoC addressing. PoC Clients and PoC Servers supporting Group Advertisement indicate this operational capability as an additional communication mode when required, to indicate that the request is different from the basic PoC capability.

This event occurs when:

- The PoC Intercept Subject sends Group Advertisement information to a single PoC User, a list of PoC Users, or all members of the Group using the Group Identity.
- The PoC Intercept Subject receives Group Advertisement information from a single PoC User, a list of PoC Users, or all members of the Group using the Group Identity.

6.4.1.3.6 PoC Session Start

This event occurs when a PoC Session (e.g., One-to-One, One-to-Many, or One-to-Many-to-One) is answered, and voice communication begins. If CC delivery is authorized, delivery of intercepted content delivery is enabled.

6.4.1.3.7 PoC Session End

This event occurs when network resources are released for any reason (i.e., normal or abnormal release) and voice communications ends. If CC delivery is authorized, intercepted content delivery ends. The PoC Session release policy is defined in [OMA-PoC-CP].

Note that, in the case of a Pre-Established Session, the PoC client may maintain the pre-established session with the serving PoC Server even after a PoC session is released.

6.4.1.4 PoC Session Communication Events

These events occur during on-going PoC Sessions.

6.4.1.4.1 Floor Control

This event occurs when:

- The PoC Intercept Subject request to speak is received (e.g., when the PoC Intercept Subject presses the PTT).
- The PoC Intercept Subject is given permission to speak in response to a request (e.g., the network responds positively to the PoC Subscriber's request).
- The PoC Intercept Subject who initiates the PoC Session is given permission to speak automatically when the PoC session starts (i.e., if the service gives the initiating PoC participant the floor automatically and there is no request).
- The PoC Intercept Subject's request to speak is refused (e.g., the network responds negatively to the PoC Subscriber's request).
- The PoC Intercept Subject is finished speaking and the request to release the floor is received (e.g., the PoC Intercept Subject releases the PTT).

- The service revokes the PoC Intercept Subject's permission to speak (e.g., network response, possibly to time out or host's instructions).
- The floor becomes idle or open (i.e., no one has requested or has permission to speak).
- An associate (i.e., another member of the PoC Session other than the PoC Intercept Subject) is given permission to speak and the PoC Intercept Subject's service is aware of the request.

6.4.1.4.2 Queued Floor Control Events

If queued floor control is supported, this event occurs when:

- The PoC Intercept Subject's request to speak is queued.
- The PoC Intercept Subject's query for their own position in the floor-control-request queue is received.
- The position of the PoC Intercept Subject's request in the queue is changed.
- The PoC Intercept Subject's request to speak is de-queued and permission for the floor is granted (i.e., when the request to permission for the floor was previously queued).
- When the associate's request to permission for the floor is queued or de-queued (i.e., permission for the floor is granted) and the PoC Intercept Subject's service is aware of the event.
- The PoC Intercept Subject cancels the request to speak.

6.4.1.4.3 Party Hold

A Party Hold event occurs when the PoC Intercept Subject places himself on hold for any PoC Session or when a participant places himself on hold and the PoC Intercept Subject's service is notified of this action.

6.4.1.4.4 Party Retrieve

A Party Retrieve event occurs when the PoC Intercept Subject retrieves a PoC Session that was previously on hold, or when a participant takes himself off hold and the PoC Intercept Subject's service is notified of this action.

6.4.1.4.5 Party Join

A Party Join event is reported when:

- A PoC Intercept Subject joins or rejoins a PoC Session.
- An associate joins or rejoins a PoC Session and the PoC Intercept Subject or PoC Intercept Subject's service is made aware of the action.

6.4.1.4.6 Party Drop

A Party Drop event occurs when a participating member of a PoC Group Session finishes participating in the PoC Session in which the PoC Intercept Subject is also participating.

6.4.1.5 Media Reporting Event

A Media Reporting event occurs when there is a request for a modification of the media characteristics (e.g., media format) for an existing PoC Session involving the PoC Intercept Subject, or when there is a request for an addition or a removal of a media stream for an existing PoC Session involving the PoC Intercept Subject.

6.4.1.6 PoC List Management Information Events

6.4.1.6.1 PoC List Management Request

This event occurs when the PoC Intercept Subject's PoC Client requests changes to:

- His contact list; or
- His PoC Group list.

This event occurs if the change was *successful* or *unsuccessful*.

6.4.1.6.2 PoC List Management Result

This event occurs when the network notifies the PoC Intercept Subject's PoC Client of changes made to:

- His contact list; or
- His PoC Group list.

This event also occurs if the PoC Intercept Subject is a member of a PoC Group and another PoC User modifies that PoC Group list.

This event occurs if the change was *successful* or *unsuccessful*.

6.4.1.7 PoC Access Control Management Events

6.4.1.7.1 PoC User Access Policy Attempt

This event occurs when the PoC Intercept Subject updates their PoC User access policy and PoC Group authorization rules; for example:

- Allow/block PoC User and PoC Groups incoming PoC Session request.
- Allow PoC Users to be treated in automatic answer mode.
- Allow PoC Users to override manual answer mode setting.

6.4.1.7.2 PoC User Access Policy Query

This event occurs when the PoC Intercept Subject queries the network for his PoC User access policy and PoC Group authorization rules.

6.4.1.7.3 PoC User Access Policy Result

This event occurs when the PoC User access policy and PoC Group authorization rules query or update request was *successful* or *unsuccessful*.

6.4.1.7.4 Group Authorization Rules Attempt

This event occurs when the PoC Intercept Subject is the owner of a PoC Group (i.e., the creator of the Chat PoC Group or Pre-Arranged PoC Group) and modifies the PoC Group authorization rules to control permissions to access a PoC Group; for example:

- Allow/block PoC User initiating the PoC Session.
- Allow/block PoC User joining the PoC Session.

- Allow/block PoC User adding participants to the PoC Session.
- Allow/block subscription to the PoC Session state.
- Allow/forbid the anonymity of certain participants.

6.4.1.7.5 Group Authorization Rules Result

This event occurs when the PoC Group authorization rules update request was *successful* or *unsuccessful*.

6.4.1.8 Presence Information Events

6.4.1.8.1 PoC Intercept Subject's Presence

This event occurs when the PoC Server assumes the role of a Presence Source and publishes network presence information to the Presence service on behalf of PoC Intercept Subject (i.e., PoC Client).

6.4.1.8.2 PoC Associate's Presence

This event occurs when the PoC Server assumes the role of a Watcher on behalf of PoC Intercept Subject (i.e., PoC Client), and the PoC Server receives presence status notifications from the Presence Servers after having subscribed to the PoC presence status of other PoC Clients (i.e., Associates of the PoC Intercept Subject).

6.4.2 Communication Content (CC) Delivery

The TSP reports communication content for all talk bursts in a PoC Session.

The TSP does not provide this information when the LEA is only authorized to receive CII.

6.5 Intercept Access Points (IAPs)

Intercept Access Points (IAPs) are places in the network where lawfully authorized communication-identifying information (CII) and communication content (CC) are intercepted. IAPs are classified by the type of information that they intercept (i.e., CII or CC) and are associated with intercept functions that perform the actual interception of communication information and content. These functions access information from one or more network elements. CII and CC intercept functions may be co-located within the same network element or may be distributed among multiple network elements. There may be one or more IAPs in the network for CII and CC.

6.5.1 Communication-Identifying information (CII) IAPs

CII IAPs are those places in the network that intercept and send CII towards the DF.

6.5.2 Communication Content (CC) IAPs

CC IAPs intercept PoC Session content (i.e., talk bursts) between the PoC Intercept Subject and the associate(s). The CC IAPs intercept and send the PoC Session content towards the DF.

When an LEA is legally authorized to receive communication content for the PoC Intercept Subject, the TSP *shall* access and deliver communication content for the duration of all of the different types of PoC Sessions (e.g., Pre-Arranged PoC Group, PoC Chat Group, One-to-One, other Group Calls) that are originated by or terminated at the PoC Intercept Subject's equipment, facilities, or service.

7 Stage 2 Description: Network Perspective

This clause describes the events that trigger PoC CII surveillance messages and the PoC CC surveillance message(s). This clause also describes the application level CC delivery format and the associated delivery information.

Each message is described as consisting of a set of parameters. Each parameter is either:

Mandatory (M): Required for the message; or

Conditional (C): Required in situations where a condition (defined in the usage column) is met; or,

Optional (O): Provided at the discretion of the implementation.

The information to be carried by each parameter is identified. Both optional and conditional parameters in the Stage 2 are considered to be OPTIONAL syntactically in the Abstract Syntax Notation One (ASN.1) Stage 3 descriptions (see [X-680]).

7.1 PoC Surveillance Messages

Service providers *shall* provide discrete LAES messages to report PoC CII. When a LEA is only authorized to receive CII for the PoC Intercept Subject, only CII messages *shall* be reported.

7.1.1 PoC Service Registration Message

The PoC Service Registration message occurs when the PoC Intercept Subject registers, re-registers, or de-registers for the PoC service, regardless of whether it is successful or unsuccessful. Registration events are only reported when the PoC Intercept Subject is a PoC Subscriber.

The PoC Service Registration message is triggered when the network responds to a service registration request from the PoC Intercept Subject's MS.

The PoC Service Registration message is also triggered when the network on behalf of the PoC Intercept Subject attempts to re-register or de-register for the PoC Service, regardless of whether it is successful or unsuccessful.

The PoC Service Registration message includes the following parameters:

Table 7.1: PoC Service Registration Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
RegistrationRequest	M	Identifies the type of registration request (e.g., register, re-register, de-register).
RegistrationOutcome	M	Identifies success or failure of registration and the failure reason.

It is assumed that the TSP has operations, procedures, and verification processes to ensure the LAES is performed per the lawful authorization and the reporting of authentication and authorization events are beyond the scope of this standard (see clause 6.3.13, Security).

7.1.2 Serving System Message

A Serving System message is triggered when there is a change to the TSP serving the PoC Intercept Subject's access network (i.e., for mobility). The Serving System message is only reported when the PoC Intercept Subject is a PoC Subscriber, but not when the PoC Intercept Subject is a PoC Chatroom.

The Serving System message includes the following parameters:

Table 7.2: Serving System Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PartyIdentity	M	The identifier of the intercept subject's mobile device.
SystemIdentity	M	Identifies the serving system when the PoC Intercept Subject is authorized for access network service provided by the TSP.

7.1.3 PoC Start of Interception Message

The PoC Start of Interception message is triggered when the interception for the PoC Intercept Subject is started and the PoC Intercept Subject has at least one PoC Session active in progress. If multiple PoC Sessions are active at the start of the interception, a PoC Start of Interception message is generated for each active PoC Session and sent to the DF. The PoC Start of Interception message is not reported for an Instant Personal Alert type of PoC Session.

The PoC Start of Interception message includes the following parameters:

Table 7.3: PoC Start of Interception Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.

Parameter	MOC	Usage
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
PoCOriginatingId	C	Identifies the originating party. Provide when known.
PoCHost	C	Indentifies the PoC participant who has authority to initiate and administrate an active PoC Group Session. Provide when known.
PoCParticipants	C	Identifies the invited PoC participants, when known, if other than the PoC Intercept Subject.
BearerCapability	M	Identifies the re-negotiated media characteristics (e.g., SDP information, media format, vocoder type) for the PoC User.

7.1.4 PoC Session Initiation Message

The PoC Session Initiation message occurs when the PoC Intercept Subject initiates any type of PoC Session or the PoC Intercept Subject receives an invitation to join a PoC Session regardless of the success of the initiation or the final disposition of the invitation.

The PoC Session Initiation message is triggered when:

- The network receives an invitation from the PoC Intercept Subject to initiate a PoC Session.
- The network sends an invitation to the PoC Intercept Subject as an indication of incoming PoC Session initiation.

The PoC Session Initiation message includes the following parameters:

Table 7.4: PoC Session Initiation message parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
PoCOriginatingId	M	Identifies the originating party.
PoCHost	C	Indentifies the PoC participant who has authority to initiate and administrate an active PoC Group Session. Provide when known.
PoCParticipants	C	Identifies the invited PoC participants, when known, if other than the PoC Intercept Subject.

Parameter	MOC	Usage
AssociatePresence	C	Provides the Associate Presence Status. List of: • *PresenceID*: Identity of PoC Client(s)or PoC group, when known. • *PresenceType*: Identifies type of ID [PoC Client(s) or PoC group]. • *PresenceStatus*: Presence state of each ID. Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject.
Location	C	Report when a PoC Session is initiated by the intercept subject.This parameter is not reported when the PoC Intercept Subject receives an invitation to join a PoC Session; rather this information is reported by the PoC Session Start message (see PoC Session Start message for usage). Include when reporting of the PoC Intercept Subject's location information is authorized and known
InitiationCause	M	Identifies the reason for the generation of the PoC Session Initiated message (e.g., SIP INVITE).
BearerCapability	C	Identifies the re-negotiated media characteristics (e.g., SDP information, media format, vocoder type) for the PoC User., when known.

7.1.5 PoC Session Abandon Message

The PoC Session Abandon message is triggered when the PoC Session is not established and the request is abandoned before the PoC Session starts.

The PoC Session Abandon message includes the following parameters:

Table 7.5: PoC Session Abandon Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Location	C	Include when reporting of the PoC Intercept Subject's location information is authorized and known.
AbandonCause	M	Identifies the reason for the abandoned PoC Session.

7.1.6 PoC Session Start Message

The PoC Session Start message is triggered when the PoC Session is established.

The PoC Session Start message includes the following parameters:

Table 7.6: PoC Session Start Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The application identifier for the PoC Intercept Subject.
PoCHost	C	Indentifies the PoC participant who has authority to initiate and administrate an active PoC Group Session. Provide when known.
PoCOriginatingId	M	Identifies the originating party.
PoCParticipants	C	Identifies the PoC participants connected to the PoC Session, when known, if other than the PoC Intercept Subject.
AssociatePresence	C	Provides the Associate Presence Status. List of: • *PresenceID*: Identity of PoC Client(s)or PoC group, when known. • *PresenceType*: Identifies type of ID (PoC Client(s) or PoC group). • *PresenceStatus*: Presence state of each ID. Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject.
Location	C	Report when an incoming PoC Session is received by the PoC Intercept Subject (this is the earliest point at which it is available). Do not report if location information is already provided in the PoC Session Initiated message. Include when reporting of the PoC Intercept Subject's location information is authorized and known.
BearerCapability	M	Identifies the re-negotiated media characteristics (e.g., SDP information, media format, vocoder type) for the PoC Session.

7.1.7 PoC Session End Message

The PoC Session End message occurs when the PoC Session is released for any reason (i.e., normal or abnormal release) and voice communications ends.

Note that, in the case of a Pre-Established Session, the PoC Client remains connected to the participating PoC server.

The PoC Session End message is triggered when the network releases a PoC Session.

The PoC Session End message includes the following parameters:

Table 7.7: PoC Session End Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
PoCParticipants	C	Identifies the PoC participants, when known, that are in the PoC Session, other than the PoC Intercept Subject.
Location	C	Include when reporting of the PoC Intercept Subject's location information is authorized and known.
RelCause	C	Included to identify the signaling type in which the release event occurred and the cause of the PoC Session release, when known.

7.1.8 PoC Pre-Established Session Message

The PoC Pre-Established Session message occurs when a SIP Session is established, modified, or released between the PoC Intercept Subject's PoC Client and the PoC Server that performs the Participating PoC Function. It may be established after the initial PoC registration. The PoC Pre-Established Session message is only reported when the PoC Intercept Subject is a PoC Subscriber.

The PoC Pre-Established Session message is triggered when:

- The Participating PoC Server receives a request to establish *a* PoC Pre-established Session from the PoC Intercept Subject and the Participating PoC Server responds to the PoC Pre-established Session request from the PoC Intercept Subject.
- The Participating PoC Server responds to a request to modify a PoC Pre-established Session from the PoC Intercept Subject.
- The Participating PoC Server responds to the release request of a PoC Pre-established Session from the PoC Intercept Subject.

The PoC Pre-Established Session message includes the following parameters:

Table 7.8: PoC Pre-Established Session Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.

Parameter	MOC	Usage
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
PoC_Server_URI	M	Participating PoC Server URI of PoC Intercept Subject's PoC Client originating the PoC Pre-Established Session request.
RTP_Setting	M	The IP address and the port number at the PoC Server for the RTP Session.
PoC_Media_Capability	M	The codec(s) and Media Parameters selected by the PoC Server from those contained in the original SDP offer from the PoC Intercept Subject's PoC Client.
PreEstablishedSessionId	M	Identifies the PoC Pre-established Session.
PreEstablishedStatus	M	Indicates if the Pre-Established Session is established (setup completed), modified, or released.
TalkburstControl_Setting	C	The offered Talk Burst Control Protocol – e.g., Talk Burst parameter(s) and the port numbers. Provide when Pre-Established Session is established.
MediaStream_Availability	C	Indicates if the PoC Intercept Subject's PoC Client is not able or willing to receive media streams immediately. Provide when Pre-established Session is established.
Location	C	Include when reporting of the PoC Intercept Subject's location information is authorized and known. Do not include if the Pre-Established Session is modified.
Failure_Code	C	Provide when the Pre-Established Session cannot be established or modified.

7.1.9 PoC Instant Personal Alert Message

The PoC Instant Personal Alert message occurs when an Instant Personal Alert (i.e., a request for one PoC subscriber to initiate a PoC Session at a later time) is initiated from, or sent to, the PoC Intercept Subject.

The PoC Instant Personal Alert message is triggered when:

- The network sends an Instant Personal Alert on behalf of the PoC Intercept Subject;
- The network receives an Instant Personal Alert to the PoC Intercept Subject.

The PoC Instant Personal Alert message includes the following parameters:

Table 7.9: PoC Instant Personal Alert Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.

Parameter	MOC	Usage
IPAPartyIdentity	M	Identifies the party that receives the Instant Personal Alert from the PoC Intercept Subject or sends the Instant Personal Alert to the PoC Intercept Subject.
IPADirection	M	Identifies the direction (TO PoC Intercept Subject or FROM PoC Intercept Subject) of the Instant Personal Alert.

7.1.10 Party Join Message

A Party Join event occurs when a PoC User joins (or re-joins) a PoC Group Session (e.g., Pre-Arranged PoC Group, Ad Hoc PoC Group, or PoC Chat Group) already in progress. A Party Join message is triggered when:

- The PoC Intercept Subjectjoins (or re-joins) a PoC Session; or
- An associate joins (or re-joins) a PoC Session and the PoC Intercept Subject or PoC Intercept Subject's service is made aware of the action.

The Party Join message includes the following parameters:

Table 7.10: Party Join Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Inviting_PoC_User	C	The PoC User that invites a user to join the PoC Session. Report if known.
Join_PoC_User	M	The PoC User that joins the PoC Session.
AssociatePresence	C	Provides the Associate Presence Status. List of: • *PresenceID*: Identity of PoC Client(s)or PoC group, when known. • *PresenceType*: Identifies type of ID (PoC Client(s) or PoC group). • *PresenceStatus*: Presence state of each ID. Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject.
BearerCapability	M	Identifies the re-negotiated media characteristics (e.g., SDP information, media format, vocoder type) of the PoC User that joined.

7.1.11 Party Drop Message

A Party Drop event occurs when a participating member of a PoC Group Session leaves the PoC Session in which the PoC Intercept Subject is also participating.

A Party Drop message is triggered when the PoC Intercept Subject's service is notified:

- A PoC User(s) drops from a PoC Chat Group Session (Restricted or Unrestricted); or
- A PoC User(s) drops from a PoC Group Session (e.g., Pre-Arranged PoC Group, Ad Hoc PoC Group).

The Party Drop message includes the following parameters:

Table 7.11: Party Drop Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Party_Drop	M	Identifies the PoC User that has left the PoC Session.
AssociatePresence	C	Provides the Associate Presence Status. List of: • *PresenceID*: Identity of PoC Client(s)or PoC group, when known. • *PresenceType*: Identifies type of ID (PoC Client(s) or PoC group). • *PresenceStatus*: Presence state of each ID. Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject.

7.1.12 Party Hold_Retrieve Message

If the PoC Client supports "on-hold" procedures for PoC Sessions, a Party Hold_Retrieve event occurs when the PoC User places an ongoing PoC Session on hold or retrieves an ongoing PoC Session from hold.

A Party Hold_Retrieve message is triggered when the PoC Intercept Subject's service is notified that:

- A PoC Session is placed on hold; or
- A PoC Session is retrieved from hold.

The Party Hold_Retrieve message includes the following parameters:

Table 7.12: Party Hold_Retrieve Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Hold_ Retrieve_Indication	M	Identifies if the PoC Session is on hold or retrieved.
Hold_Retrieve_User	M	The PoC User that places the PoC Session on hold or retrieved the PoC Session.

7.1.13 Media Modification Message

During the PoC Session, a PoC Client *may* change the voice frame packetization or voice codec mode by out-of-band signaling using SDP payload within SIP messages.

The Media_Modification message is triggered when a re-negotiation of the media parameters occurs during a PoC Session involving the PoC Intercept Subject.

The Media_Modification message includes the following parameters:

Table 7.13: Media_Modification Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
BearerCapability	M	Identifies the re-negotiated media characteristics (e.g., SDP information, media format, vocoder type) for the PoC User.

7.1.14 Group Advertisement Message

The Group_Advertisement message is triggered when:

- The PoC Intercept Subject's PoC Client sends Group Advertisement information to a single PoC User, a list of PoC Users, or to all members of the Group using the Group Identity;

- The PoC Intercept Subject's PoC Client receives Group Advertisement information from a single PoC User, a list of PoC Users, or from all members of the Group using the Group Identity.

The Group_Advertisement message includes the following parameters:

Table 7.14: Group_Advertisement Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Group_Ad_Sender	C	Identifies the PoC User sending the Group Advertisement, other than the PoC Intercept Subject. Report if known.
Group_Ad_Receiver	C	Identifies the PoC User(s) to whom the the Group Advertisement is sent, other than the PoC Intercept Subject. Report if known.
PoCHost	C	Indentifies the PoC participant who has authority to initiate and administrate an active PoC Group Session. Provide when known.
Group_Characteristics	C	Identifies the PoC Group Identity, Nick Name, and description. Report if known.

7.1.15 Floor Control Message

Floor Control is a control mechanism that arbitrates requests from the PoC Clients for the right to send media (i.e., the right to speak). Talk Burst Control Protocol (TBCP) is a protocol for performing floor control, and aspects are defined in [OMA-PoC-AD] and [OMA-PoC-UP]. For the purposes of this document, the terms "Floor Control" and "Talk Burst Control" are interchangeable.

When the PoC Intercept Subject is participating in a PoC Session, a Floor Control message is triggered when:

- The PoC Intercept Subject request to speak is received (e.g., when the PoC Intercept Subject presses the PTT).
- The PoC Intercept Subject is given permission to speak in response to a request (e.g., the network responds positively to the PoC Subscriber's request).
- The PoC Intercept Subject who initiates a PoC session is given permission to speak automatically when the Poc session starts (i.e., if the service allows the initiating PoC participant the floor automatically and there is no request).
- The PoC Intercept Subject's request to speak is refused (e.g., the network responds negatively to the PoC Subscriber's request).
- The PoC Intercept Subject request to release the floor control is received (e.g., when the PoC Intercept Subject releases the PTT).
- The service revokes the PoC Intercept Subject's permission to speak (e.g., network response, possibly to time out or host's instructions).
- The floor becomes idle (i.e., no one has requested nor has permission to speak).
- An associate (i.e., another member of the PoC Session other than the PoC Intercept Subject) is given permission to speak and the PoC Intercept Subject's service is aware of the request.
- The PoC Intercept Subject cancels the request to speak.

- The PoC Intercept Subject's request to speak is queued.
- The PoC Intercept Subject's query to determine their position in the floor-control-request queue is received.
- The position of the PoC Intercept Subject's request in the queue is changed due to differing priority levels in the queue (see [OMA-PoC-AD]).
- The PoC Intercept Subject's request to speak is de-queued and permission to speak is granted (i.e., when the request to permission to speak was previously queued).
- When the associate's request to permission to speak is queued or de-queued (i.e., permission to speak is granted) and the PoC Intercept Subject's service is aware of the event.

The Floor Control message includes the following parameters:

Table 7.15: Floor Control Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time that the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject .
PocCorrelationId	M	Uniquely identifies the SIP Session, correlates CII messages, and correlates CII and CC messages.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
FloorActivity	M	Choice of: a) *TBCP_Request:* Used by the PoC Client to request permission from the PoC Server to send a Talk Burst. b) *TBCP_Granted*: Used by the PoC Server to notify the PoC Client that it has been granted permission to send a Talk Burst. c) *TBCP_Deny*: Used by the PoC Server to notify a PoC Client that it has been denied permission to send a Talk Burst. d) *TBCP_Idle*: Used by the PoC Server to notify all PoC Clients that no one has the permission to send a Talk Burst at the moment and that it may accept the TBCP Talk Burst Request message. e) *TBCP_Taken*: Used by the PoC Server to notify all PoC Clients, except the PoC Client that has been given permission to send a Talk Burst, that another PoC Client has been given permission to send a Talk Burst. f) *TBCP_Revoke*: Used by the PoC Server to revoke the media resource from a PoC Client and can be used for preemption functionality, but is also used by the system to prevent overly long use of the media resource. g) *TBCP_Queued*: Indicates the request to talk is queued, if queued floor control is supported. Include identification of the PoC Client that has the queued Talk Burst, if known. h) *TBCP_Release*: Indicates the request to talk has completed.
FloorSpeakerIdentity	C	Include identification of the PoC Client that has the Talk Burst, if known. Do not include if TBCP_Idle paramerter is present.
Queued_FloorControl	C	Indicates if queuing is supported by the PoC Server and the PoC Intercept Subject's PoC Client.
Queued_Position	C	If queued floor control is supported, indicates the queue position.

Parameter	MOC	Usage
Max_TB_Time	C	Include the maximum duration value for the Talk Burst before the permission is revoked. Provide when known.
Talk_burst_priority	C	If more than one level of priority is supported, indicates the Talk Burst priority level of the PoC Client (see [OMA-PoC-AD]).
Talk_burst_reason	C	The reason code for the denial or revoke of a Talk Burst. Provide if known.

Below are examples from [OMA-PoC-AD] that indicate why a Talk Burst may be denied or revoked:

- PoC Client already has been given permission to send a Talk Burst and no queuing of the request is allowed.
- The PoC Client is not allowed to request permission to send a Talk Burst at the moment because only one Participant is in the PoC Session.
- The Participant is not allowed to request permission to talk (Listen only).
- The Talk Burst has exceeded the maximum duration (Talk Burst too long).
- Talk Burst pre-empted.

Talk Burst request priority levels are defined in [OMA-PoC-AD] and are provided below for information.

- *Pre-emptive:* A request to talk from a participant with pre-emptive priority *shall* cause the current Talk Burst holder's permission to talk to be revoked immediately, unless the current Talk Burst holder also has pre-emptive priority. When the Talk Burst is released or revoked, participants with pre-emptive priority who have requested to talk *shall* be granted the Talk Burst in preference to participants with high or normal priority.
- *High priority:* When the Talk Burst is released or revoked, participants with high priority who have requested to talk *shall* be granted the Talk Burst in preference to participants with normal priority.
- *Normal priority:* When the Talk Burst is released or revoked, participants with normal priority who have requested to talk *shall* be granted the Talk Burst if and only if there are no outstanding requests from participants with higher priority.
- *Listen only:* A participant with this priority is only allowed to listen. A request to talk from a participant with listen only priority *shall* be rejected.

7.1.16 Subject Presence Message

Presence service is an optional functionality that may be supported by the PoC Service.

If the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of a Presence Source, the Subject Presence message is triggered when the PoC Server publishes network presence information to the Presence server on behalf of the PoC Intercept Subject.

Table 7.16: Subject Presence Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
SubjectPresence	M	PoC-related presence status of the PoC Intercept Subject.

7.1.17 Associate Presence Message

Presence service is an optional functionality that may be supported by the PoC Service.

If the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject, the Presence message is triggered when the PoC Server receives presence status notifications from the Presence Servers after having subscribed to the PoC presence status of other PoC Clients (i.e., Associates of the PoC Intercept Subject).

Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of the PoC Intercept Subject. An LEA may request that the Associate Presence message is provisioned to activate or deactivate. The default value of the Associate Presence message is "activate".

Table 7.17: Associate Presence Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
AssociatePresence	C	Provides the Associate Presence Status. List of: • *PresenceID*: Identity of PoC Client(s)or PoC group, when known. • *PresenceType*: Identifies type of ID (PoC Client(s) or PoC group). • *PresenceStatus*: Presence state of each ID. Report when the Presence functionality is supported by the PoC Server and the PoC Server assumes the role of the Watcher on behalf of PoC Intercept Subject.

7.1.18 List_Management Message Events

The List_Managment message is optional. It is reported when the PoC Intercept Subject's PoC Client attempts to change his contact list or PoC Group list(s). This message is also reported when the network notifies the PoC Intercept Subject's PoC Client of changes made to his PoC-specific documents stored in the network (i.e., contact lists or PoC Group lists).

The List_Managment message is triggered when:

- The PoC Intercept Subject's PoC Client attempts to change his contact list (e.g., create, modify, retrieve, delete);
- The PoC Intercept Subject's PoC Client attempts to change his PoC Group list (e.g., create, modify, retrieve, delete; or add or delete a contact from a PoC Group);
- The network notifies the PoC Intercept Subject's PoC Client of changes made to his contact list, or his PoC Group list; or
- If the PoC Intercept Subject is a member of a PoC Group and the network notifies the PoC Intercept Subject's PoC Client of changes made to that PoC Group List.

The List_Management message is triggered if the event is *successful* or *unsuccessful*.

The List_Managment message includes the following parameters:

Table 7.18: List_Management Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
ListManagementType Choice of: a) ContactListManagementAttempt b) GroupListManagementAttempt c) ContactListManagementResult d) GroupListManagementResult e) Request unsuccessful	C	The "List Management Attempts" identify the type of list being managed by the PoC Intercept Subject. For example, a) and b) are reported when PoC Clients attempt changes to his Contact List and his PoC Group List(s). The "List Management Results" identify the network response to a modification by the PoC Intercept Subject. For example, c), d), or e) is reported when the network notifies PoC Intercept Subject of changes to his Contact List or his PoC Group List(s).
ListManagmentAction Choice of: a) Create b) Modify c) Retrieve d) Delete e) Notify	C	Identifies the action requested by the PoC Intercept Subject to the Contact Lists or PoC Group List(s). Report when PoC Intercept Subject attempts changes to his Contact List or PoC Group List(s). Also report when a notification is sent to the PoC Intercept Subject due to changes occuring to his Contact List or PoC Group List(s).
Contact_Identity	C	Identity of the contact in the list. One contact per Contact List or PoC Group List. Report if known.
Group_Identity	C	Identifies the PoC Group Identity, Nick Name, and characteristics. Report if known.
PoCHost	C	Indentifies the PoC participant who has authority to initiate and administrate an active PoC Group Session. Provide when known.
List_ManagementFailure	C	Reports the error code or reason for failure. Report when List_Management request is unsuccessful.

7.1.19 Access Control Management

Access Control management allows a PoC Subscriber to manipulate the PoC User access policy and PoC Group authorization rules located in the PoC XDMS.

7.1.19.1 Access Policy Message

The Access_policy message is optional. The TSP may report the Access_policy message when the PoC Intercept Subject attempts to change the access control lists (e.g., PoC User access policy and PoC Group authorization rules). The Access_policy message may also be reported when the network responds to a modification or query by the PoC Intercept Subject to the access control lists (e.g., PoC User access policy and PoC Group authorization rules).

The Access_policy message is triggered when:

- The PoC Intercept Subject requests changes to the access control lists.
- The PoC Intercept Subject is the PoC Group owner and modifies the PoC User permissions to access a PoC Group.
- The PoC Intercept Subject attempts a change or queries the access control lists (e.g., PoC User access policy and PoC Group authorization rules) regardless if the change or query to the access control list was successful or unsuccessful.
- The PoC Intercept Subject is the owner of a PoC Group (i.e., the creator of the Chat PoC Group or Pre-Arranged PoC Group) and attempts a change or queries to the PoC Group authorization rules regardless if the request was successful or unsuccessful.
- The network responds to a change to the PoC Group authorization rules by the PoC Intercept Subject when the PoC Intercept Subject is the owner of a PoC Group (i.e., the creator of the Chat PoC Group or Pre-Arranged PoC Group), or the network responds to a query by the PoC Intercept Subject for his PoC user access policy and PoC group authorization rules.
- The network notifies the PoC Intercept Subject of changes to his access control lists (e.g., PoC User access policy and PoC Group authorization rules) regardless if the change to the access control list was *successful* or *unsuccessful*.

Table 7.19: Access_Policy Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
SubjectID	M	The PoC identifier for the PoC Intercept Subject.
Access_Policy_Type Choice of: a) PoCUserAccessPolicyAttempt b) GroupAuthorizationRulesAttempt c) PoCUserAccessPolicyQuery d) GroupAuthorizationRulesQuery e) PoCUserAccessPolicyResult f) GroupAuthorizationRulesResult g) Request unsuccessful	C	Identifies the type of Access Policy list being managed or queried by the PoC Intercept Subject. Report a), b), c), or d) when the PoC Intercept Subject attempts a change or queries the Access Control list(s). Report e), f), or g) when the network notifies the PoC Intercept Subject of changes to the Access Control list(s) or the request was unsucessful.
PoCUserAccessPolicy Choice of: a) Allow_Incoming_PoC_Session_request b) Block_Incoming_PoC_Session_request c) Allow_Auto_Answer_Mode d) Allow_Override_Manual_Answer_Mode	C	Identifies the action requested by the PoC Intercept Subject to the PoC User Access Policy. Report when action requested to the PoC User Access Policy. Report when the PoC Intercept Subject attempts a change or queries the Access Control list(s).

Parameter	MOC	Usage
GroupAuthorizationRules Choice of: a) Allow_Initiating_PocSession b) Block_Initiating_PocSession c) Allow_Joining_PocSession d) Block_Joining_PocSession e) Allow_Add_Participants f) Block_Add_Participants g) Allow_Subscription_PocSession_State h) Block_Subscription_PocSession_State i) Allow_Anonymity j) Forbid_Anonymity	C	Identifies the action requested by the PoC Intercept Subject to the PoC Group Authorization Rules. Report when action requested to the PoC Group Authorization Rules. Report when the PoC Intercept Subject attempts a change or queries the Access Control List(s).
Contact_Identity	C	Identity of the contact in any of the lists. One contact per Access Control list. Required for all contact requests. Report if known.
Group_Identity	C	Identifies the PoC Group Identity, Nick Name, and characteristics. Report if known.
PoCHost	C	Indentifies the PoC participant who has the authority to initiate and administrate an active PoC Group Session. Provide when known.
Access_PolicyFailure	C	Reports the error code or reason for failure when the Access Policy Request is unsuccessful.

7.2 Communication Content (CC) Delivery

7.2.1 General

When lawfully authorized, communication content (CC) delivery is accomplished through the delivery interface to provide packetized CC for the PoC Service under surveillance. The PoC_CC-Application Protocol Data Unit (APDU) message is used to encapsulate communications content packets for transfer over the CC delivery interface, in accordance with this standard.

7.2.2 PoC CC Delivery Protocols

The DF-CF link *shall* support the use of UDP/IP or TCP/IP.

7.2.3 PoC_CC-APDU Message

The RTP/UDP/IP protocol stack employed in the subject's communications *shall* be captured and encapsulated in a CC delivery message sent over the e-interface between a TSP and an LEA.

The PoC_CC-APDU message encapsulates an individual communications content packet (called the *payload*) from the packetized media related to a voice communication of a PoC Session for transfer to the LEA collection system on the delivery interface. The PoC_CC-APDU message is sent from the DF to the CF.

A PoC_CC-APDU message *shall* be triggered for each PoC Talkburst sent or received by the PoC Intercept Subject. If a PoC Intercept Subject establishes a Pre-Arranged PoC Group or a PoC Chat Group, a PoC_CC-APDU message *shall* be triggered for each PoC Talkburst, sent by a PoC user in the PoC Session regardless of the PoC Intercept Subject's participation in the PoC Session. When PoC Intercept Subject is a Pre-Arranged PoC Group or a PoC Chat Group, a PoC_CC-APDU message *shall* be triggered for each PoC Talkburst sent by a PoC user in the PoC Session. The PoC_CC-APDU Header contains a series of parameters that identifies the corresponding media stream, provides correlation to the CII, enables correlation of the PoC_CC-APDU message

associated with a media stream, and enables the LEA collection function to properly process the encapsulated payload.

The PoC_CC-APDU message contains the following parameters:

Table 7.20: PoC_CC-APDU Message Parameters

Parameter	MOC	Usage
CaseIdentity	M	Identifies the case associated with the lawful interception against the PoC Intercept Subject. Corresponds to the CaseIdentity parameter in the PoC Session Start message.
IAPSystemIdentity	C	Network identifier of the IAP when the underlying data carriage does not imply that system.
TimeStamp	M	Identifies the date and time the event was detected.
PoCSessionInfo	M	Provides PoC Session information such as PoC Session URI, PoC Session type, and Nickname.
PocCorrelationId	M	Uniquely identifies the SIP Session and correlates CII and CC.
Payload	M	Includes the intercepted Talk Burst communication encapsulated in the RTP packets with media specific RTP payload formats. The payload *shall* contain the media at the network layer and above (i.e., the RTP/UDP/IP datagrams for a PoC service).

8 Stage 3 Description: Implementation Perspective

The Stage 3 description for the PoC LAES messages is defined in the form of ASN.1 in this clause.

8.1 Object identifier Tree

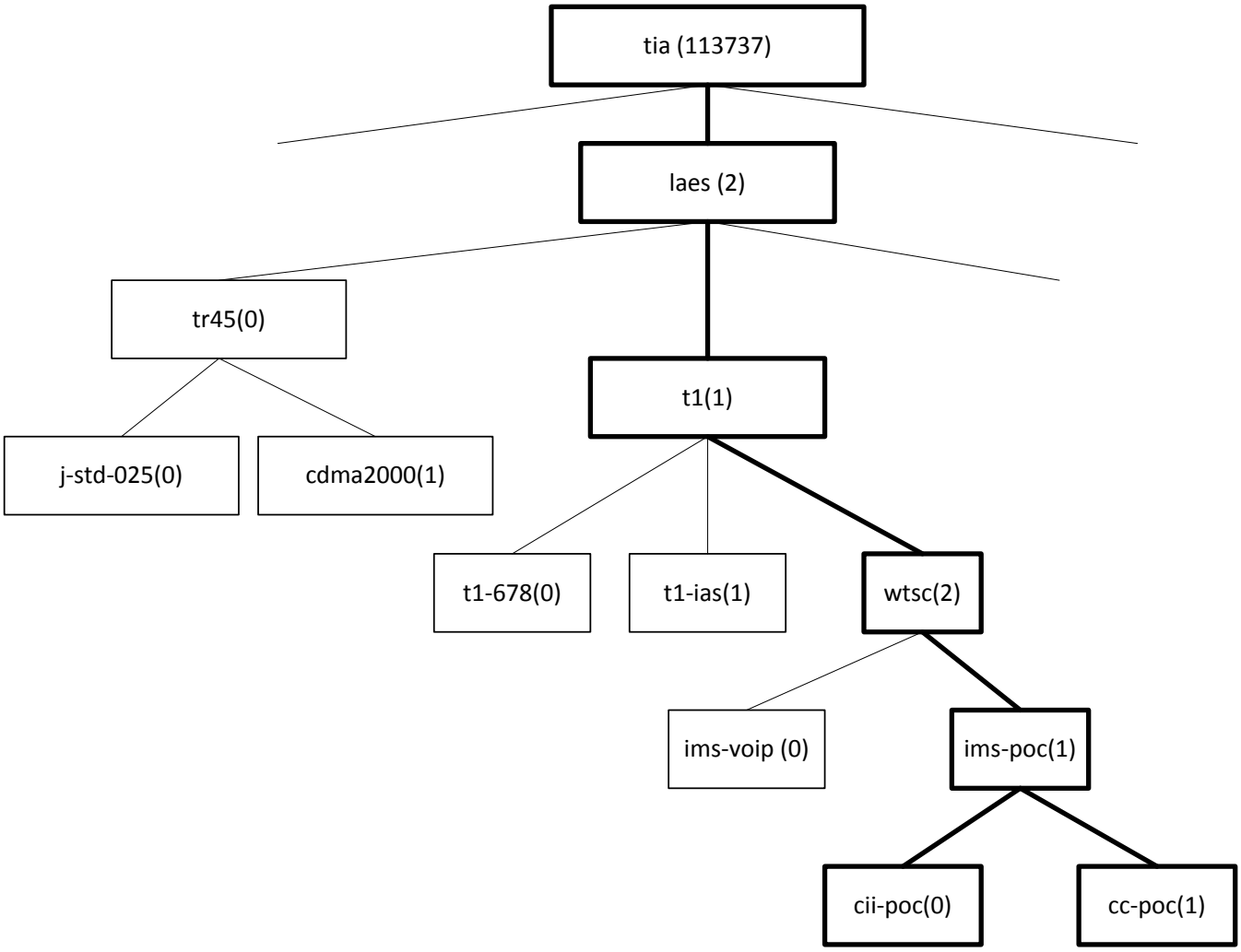

Figure 8.1: Object Identifier Tree

8.2 Abstract Syntax Modules

8.2.1 Abstract Syntax PoC CII Module

```
LAES-IMS-PoC-CII-Module
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc(2) ims-poc(1) cii-poc(0)
version-1(0)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS
CaseIdentity,
IAPSystemIdentity
FROM Laesp-j-std-025-b {iso(1) member-body(2) us(840) tia(113737) laes(2) tr45(0) j-std-
025(0) j-std-025-b(2) version-1(0)}
Location
FROM IMS-3GPP-VoIP-CII-Module
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc (2)  ims-voip(0) cii-voip(0)
version-2(1)}
```

```
IPAddress,
Timestamp
FROM UmtsHI2Operations {itu-t(0) identified-organization(4) etsi(0) securityDomain(2)
lawfulintercept(2) threeGPP(4) hi2(1) r12(12) version-0 (0)};
LAES-IMS-PoC-CII-Module-OID ::=  OBJECT IDENTIFIER
-- OID created for LAES-IMS-PoC-CII-Module Identifier
IMS-PoC-LAES-Protocol ::= SEQUENCE {
       protocolIdentifier        [0] OBJECT IDENTIFIER,
       pocLAESMessage            [1] PoCLAESMessage
}
PoCLAESMessage ::= CHOICE {
       iMSpocLAESMessage         [0] IMSpocLAESMessage,
       iMSpocOptionalLAESMessage [1] IMSpocOptionalLAESMessage
}
IMSpocLAESMessage ::= CHOICE {
       poCServiceRegistration    [0] PoCServiceRegistration,
       poCServingSystem          [1] PoCServingSystem,
       poCStartofInterception    [2] PoCStartofInterception,
poCSessionInitiation             [3] PoCSessionInitiation,
       poCSessionAbandon         [4] PoCSessionAbandon,
       poCSessionStart           [5] PoCSessionStart,
       poCSessionEnd             [6] PoCSessionEnd,
       poCPreEstablishedSession  [7] PoCPreEstablishedSession,
       poCInstantPersonalAlert   [8] PoCInstantPersonalAlert,
       poCPartyJoin              [9] PoCPartyJoin,
       poCPartyDrop              [10] PoCPartyDrop,
       poCPartyHoldRetrieve      [11] PoCPartyHoldRetrieve,
       poCMediaModification      [12] PoCMediaModification,
       poCGroupAdvertisement     [13] PoCGroupAdvertisement,
       poCFloorControl           [14] PoCFloorControl
}
IMSpocOptionalLAESMessage ::= CHOICE {
       poCSubjectPresence  [0] PoCSubjectPresence,
       poCAssociatePresence[1] PoCAssociatePresence,
       poCListManagement   [2] PoCListManagement,
       poCAccessPolicy     [3] PoCAccessPolicy
}
-- PoC Message Definitions
PoCServiceRegistration ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity     OPTIONAL,
        timestamp          [2] Timestamp,
        subjectID          [3] SubjectId,
        registrationRequest[4] RegistrationRequest,
        registrationOutcome[5] RegistrationOutcome
}
PoCServingSystem ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity     OPTIONAL,
        timestamp          [2] Timestamp,
        partyId            [3] PartyIdentity,
        systemId           [4] SystemIdentity
}
PoCStartofInterception  ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity     OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        pocOriginatingId   [6] PocAddress            OPTIONAL,
        pocHost            [7] PoCAddress            OPTIONAL,
        poCParticipants    [8] PoCParticipants       OPTIONAL,
        bearercapability   [9] BearerCapability
```

```
}
PoCSessionInitiation ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity      OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        pocOriginatingId   [6] PocAddress,
        pocHost            [7] PoCAddress             OPTIONAL,
        poCParticipants    [8] PoCParticipants        OPTIONAL,
        associatePresence  [9] AssociatePresence      OPTIONAL,
        location           [10] Location              OPTIONAL,
        initiationcause    [11] InitiationCause,
        bearercapability   [12] BearerCapability      OPTIONAL
}
PoCSessionAbandon ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity      OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        location           [6] Location               OPTIONAL,
        abandonCause             [7] UTF8String
--identifies the reason for the abandoned PoC Session
}
PoCSessionStart ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity      OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        pocHost            [6] PoCAddress             OPTIONAL,
        pocOriginatingId   [7] PocAddress,
        poCParticipants    [8] PoCParticipants        OPTIONAL,
        associatePresence  [9] AssociatePresence      OPTIONAL,
        location           [10] Location              OPTIONAL,
        bearercapability   [11] BearerCapability
}
PoCSessionEnd ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity      OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        poCParticipants    [6] PoCParticipants        OPTIONAL,
        location           [7] Location               OPTIONAL,
        relCause           [8] UTF8String             OPTIONAL
-- identifies the signaling type in which the release event
-- occurred and the cause of the PoC Session release
}
PoCPreEstablishedSession ::= SEQUENCE {
        caseId                   [0] CaseIdentity,
        iapId                    [1] IAPSystemIdentity      OPTIONAL,
        timestamp                [2] Timestamp,
        subjectID                [3] SubjectId,
        poC_Server_URI           [4] URI,
        rtp_setting              [5] RTP_Setting,
        poC_Media_Capability     [6] BearerCapability,
        preEstablishedSessionId  [7] URI,
        preEstablishedStatus     [8] PreEstablishedStatus,
```

```
        talkbusrtControl_Setting [9] TalkburstControl_Setting     OPTIONAL,
        mediaStream_Availability [10] MediaStreamAvailability     OPTIONAL,
        location                 [11] Location                    OPTIONAL,
        failure_code             [12] Failure_code                OPTIONAL
}
PoCInstantPersonalAlert ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity            OPTIONAL,
        timestamp          [2] Timestamp,
        subjectID          [3] SubjectId,
        iPApartyId         [4] PocAddress,
        iPADirection       [5] IPADirection
}
PoCPartyJoin ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity            OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        invitingPoCUser    [6] PocAddress                   OPTIONAL,
        joinPoCUser        [7] PocAddress,
        associatePresence  [8] AssociatePresence            OPTIONAL,
        bearercapability   [9] BearerCapability
}
PoCPartyDrop ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity            OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        party_Drop         [6] PocAddress,
        associatePresence  [7] AssociatePresence            OPTIONAL
}
PoCPartyHoldRetrieve ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity            OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        holdRetrieveIndication   [6] HoldRetrieveIndication,
        holdRetrieveUser   [7] PocAddress
}
PoCMediaModification ::= SEQUENCE {
        caseId             [0] CaseIdentity,
        iapId              [1] IAPSystemIdentity            OPTIONAL,
        timestamp          [2] Timestamp,
        pocCorrelationId   [3] PocCorrelationId,
        poCSessionInfo     [4] PoCSessionInfo,
        subjectID          [5] SubjectId,
        bearerCapability   [6] BearerCapability
}
PoCGroupAdvertisement ::= SEQUENCE {
        caseId                   [0] CaseIdentity,
        iapId                    [1] IAPSystemIdentity            OPTIONAL,
        timestamp                [2] Timestamp,
        subjectID                [3] SubjectId,
        group_Ad_Sender          [4] PoCAddress                   OPTIONAL,
        group_Ad_Receiver        [5] SET OF PoCAddress            OPTIONAL,
        pocHost                  [6] PoCAddress                   OPTIONAL,
        groupCharacteristics     [7] PocSessionId                 OPTIONAL
}
```

```
PoCFloorControl ::= SEQUENCE {
        caseId                  [0] CaseIdentity,
        iapId                   [1] IAPSystemIdentity           OPTIONAL,
        timestamp               [2] Timestamp,
        pocCorrelationId        [3] PocCorrelationId,
        pocSessionInfo          [4] PocSessionInfo,
        subjectID               [5] SubjectId,
        floorActivity           [6] FloorActivity,
        floorSpeakerId          [7] PoCAddress                  OPTIONAL,
        queued_FloorControl     [8] Queued_FloorControl         OPTIONAL,
        queued_Position         [9] Queued_Position             OPTIONAL,
        max_TB_Time             [10] Max_TB_Time                OPTIONAL,
        talk_burst_priority     [11] Priority_Level             OPTIONAL,
        talk_burst_reason       [12] Talk_burst_reason_code     OPTIONAL
        }
```

8.2.2 Optional PoC CII Messages

```
PoCSubjectPresence  ::= SEQUENCE {
       caseId             [0] CaseIdentity,
       iapId              [1] IAPSystemIdentity     OPTIONAL,
       timestamp          [2] Timestamp,
       subjectID          [3] SubjectId,
       subjectPresence    [4] Presence
       }

PoCAssociatePresence  ::= SEQUENCE {
        caseId            [0] CaseIdentity,
        iapId             [1] IAPSystemIdentity     OPTIONAL,
        timestamp         [2] Timestamp,
        subjectID         [3] SubjectId,
        associatePresence [4] AssociatePresence
}
PoCListManagement ::= SEQUENCE
{
       caseId                   [0] CaseIdentity,
       iapId                    [1] IAPSystemIdentity           OPTIONAL,
       timestamp                [2] Timestamp,
       subjectID                [3] SubjectId,
       listManagementType       [4] ListManagementType          OPTIONAL,
       listManagementAction     [5] ListManagementAction        OPTIONAL,
       contact_identity         [6] PoCAddress                  OPTIONAL,
       group_identity           [7] PoCAddress                  OPTIONAL,
       poc_host                 [8] PoCAddress                  OPTIONAL,
       list_ManagementFailure   [9] Failure_Code                OPTIONAL
       }
PoCAccessPolicy ::= SEQUENCE
{
       caseId              [0] CaseIdentity,
       iapId               [1] IAPSystemIdentity          OPTIONAL,
       timestamp           [2] Timestamp,
       subjectID           [3] SubjectId,
       access_Policy_Type  [4] Access_Policy_Type         OPTIONAL,
       poCUserAccessPolicy [5] PoCUserAccessPolicy        OPTIONAL,
       group_Auth_Rules    [6] Group_Auth_Rules           OPTIONAL,
       contact_identity    [7] PoCAddress                 OPTIONAL,
       group_identity      [8] PoCAddress                 OPTIONAL,
       poC_Host            [9] PoCAddress                 OPTIONAL,
       access_PolicyFailure [10] Failure_Code             OPTIONAL
}

-- PoC Parameter Definitions
```

```
Access_Policy_Type ::= ENUMERATED
{
       poCUserAccessPolicyAttempt       (0),
       groupAuthorizationRulesAttempt   (1),
       poCUserAccessPolicyQuery         (2),
       groupAuthorizationRulesQuery     (3),
       poCUserAccessPolicyResult        (4),
       groupAuthorizationRulesResult    (5),
       request_unsuccessful             (6)
}
---
AssociatePresence ::= SET OF Presence

---
BearerCapability ::= UTF8String   -- as defined in [RFC4566]
---
EvolvedPacketSystemID ::= SEQUENCE {
       servingMMEaddress   [0] OCTET STRING                OPTIONAL,
       -- Contains the data fields from the Diameter Origin-Host and Origin-Realm AVPs
       -- as received in the HSS from the MME according to the [3GPP 29.272].
       -- Only the data fields from the Diameter AVPs are provided concatenated
       -- with a semicolon to populate this field.
       visitedNetworkId    [1] UTF8String                  OPTIONAL
       -- contains the visited network identifier inside the EPS Serving System Update for
       -- non 3GPP access, coded according to [3GPP 29.273].
}
---
Failure_Code ::= VisibleString
--According to the rules and procedures defined in [OMA-PoC-CP]

FloorActivity ::= ENUMERATED
{
       TBCP_Request        (0),
       TBCP_Granted        (1),
       TBCP_Deny           (2),
       TBCP_Idle           (3),
       TBCP_Taken          (4),
       TBCP_Revoke         (5),
       TBCP_Queued         (6),
       TBCP_Release        (7)
}
---
Group_Auth_Rules ::= ENUMERATED
{
       allow_Initiating_PocSession             (0),
       block_Initiating_PocSession             (1),
       allow_Joining_PocSession                (2),
       block_Joining_PocSession                (3),
       allow_Add_Participants                  (4),
       block_Add_Participants                  (5),
       allow_Subscription_PocSession_State     (6),
       block_Subscription_PocSession_State     (7),
       allow_Anonymity                         (8),
       forbid_Anonymity                        (9)
}
---
HoldRetrieveIndication ::= ENUMERATED {
       hold         (0),
       retrieve     (1)
```

```
}
---
InitiationCause ::= UTF8String                -- e.g., SIP INVITE, SIP REFER
---
IPADirection ::= ENUMERATED
{
       sent_to_subject     (0),
       sent_from_subject   (1)
}
---ListManagementAction ::= ENUMERATED
{
       create              (0),
       modify              (1),
       retrieve            (2),
       delete              (3),
       notify              (4)
}
---
ListManagementType ::= ENUMERATED
{
       contactListManagementAttempt     (0),
       groupListManagementAttempt       (1),
       contactListManagementResult      (2),
       groupListManagmentResult         (3),
       request_unsuccessful             (4)
}

---
Max_TB_Time ::= VisibleString   -- Defined in seconds.
---
MediaStreamAvailability ::= BOOLEAN – Default TRUE
-- send FALSE if PoC Intercept Subject’s PoC Client is not able/willing to receive
-- media streams immediately.
---
Nickname ::= UTF8String
---

PacketDataSystemID ::= SEQUENCE {
       servingSGSN-number  [0] OCTET STRING (SIZE (1..20))         OPTIONAL,
       servingSGSN-address [1] OCTET STRING (SIZE (5..17))         OPTIONAL,
       -- Octets are coded according to [3GPP-23.003]
       servingS4-SGSN-address     [2] OCTET STRING                        OPTIONAL
       -- Diameter Origin-Host and Origin-Realm of the S4-SGSN based on the [3GPP-29.272].
       -- Only the data fields from the Diameter AVPs are provided concatenated with a
       -- semicolon to populate this field.
}
---
PartyIdentity ::= SEQUENCE {
       observedMSISDN             [0] OCTET STRING  (SIZE (1..9))         OPTIONAL,
       -- MSISDN of the target, encoded in the same format as the AddressString parameters
       -- defined in MAP format document [3GPP -29.002].
       observedIMSI        [1] VisibleString (SIZE (1..15))        OPTIONAL,
       observedMEID        [2] VisibleString                       OPTIONAL,
       observedIMEI        [3] VisibleString (SIZE (1..15))        OPTIONAL
       ...
}
---
PoCAddress ::= SEQUENCE  {
```

```
       uri                [0] UTF8String,
       -- The set of URIs defined in [RFC3261] and related SIP RFCs.
       privacy_setting    [1] BOOLEAN, -- Default FALSE, send TRUE if privacy is used.
       privacy_alias      [2] VisibleString   OPTIONAL,
       -- if privacy is used, the PoC Server creates an anonymous PoC Address of the form
       -- <sip:anonymous@anonymous.invalid>. In addition to  anonymity, the anonymous PoC
       -- Addresses SHALL be unique within PoC Session. In case more than one anonymous
       -- PoC Addresses are used in the same PoC Session, for the second Anonymous PoC
       -- Session and thereafter, the PoC Server SHOULD use  the form
       -- sip:anonymous-n@anonymous.invalid where n is an integer number.
       nickname           [3] Nickname  OPTIONAL
}
---
PocCorrelationId ::= OCTET STRING       -- e.g. SIP Session-ID could be used
---
PreEstablishedStatus ::= ENUMERATED
{
       pre-establishedSessionSetupComplete     (0),
       pre-establishedSessionModified          (1),
       pre-establishedSessionReleased          (2),
       pre-establishedSessionFailure           (3)
}
---
PoCParticipants ::= SET OF PoCAddress
---
PocSessionInfo ::= SEQUENCE  {
       pocSessionaddress   [0] UTF8String,  -- i.e., coded with a SIP URI as
       -- defined in [RFC 3261].
       pocSessiontype      [1] PocSessionType,
       pocgroupname        [2] Nickname  OPTIONAL
} -- The PoC Server SHALL identify the PoC Groups by SIP URI and MAY identify them
  -- by Nickname.
---
PocSessionType ::= ENUMERATED
{
       one_to_one                (0),
       one_to_many               (1),
       ad_hoc_group              (2),
       prearranged_group         (3),
       chat_group                (4)
}
---
PoCUserAccessPolicy ::= ENUMERATED
{
       allow_Incoming_PoC_Session_request      (0),
       block_Incoming_PoC_Session_request      (1),
       allow_Auto_Answer_Mode                  (2),
       allow_Overide_Manual_Answer_Mode        (3)
}
---
Port_Number ::= INTEGER
---
Presence ::= SEQUENCE  {
       presenceID          [0] PoCAddress,
-- Provide the identity of the PoC User or PoC Group, when known.
       presenceType        [1] PresenceType,
       presenceStatus      [2] PresenceStatus
}
---
PresenceStatus ::= UTF8String
---
PresenceType  ::= ENUMERATED  {
       poc_associate       (0),
       poc_group           (1)
```

```
}
---
Priority_Level ::= ENUMERATED
{
       pre_emptive         (0),
       high_priority       (1),
       normal_priority     (2),
       listen_only         (3)
}
---
Queued_FloorControl ::= BOOLEAN --Default FALSE,send TRUE if Queued floor control is used.
---
Queued_Position ::= VisibleString
---
RegistrationOutcome ::= CHOICE  {
       success             [0]    NULL,
       failure             [1]    UTF8String          -- failure code or reason
}
---
RegistrationRequest ::= ENUMERATED  {
       register            (0),
       re-register         (1),
       de-register         (2)
}
---
RTP_Setting  ::= SEQUENCE
{
       ip_address   [0] IPAddress,
       port_number  [1] Port_Number
       -- The IP address and port number at the PoC Server for the RTP Session
}
SubjectId ::= SEQUENCE {
       pocAddress          [0] PoCAddress,
       pocNetworkAddress   [1] IPAddress       OPTIONAL  -- If known, the external network
-- address assigned to the PoC Intercept Subject.
}
-- Include the identification elements necessary to uniquely identify the target.
-- At least one of the SubjectId parameters is required.
---
SystemIdentity ::= CHOICE {
       packetDataSystemID        [0] PacketDataSystemID,
       evolvedPacketSystemID     [1] EvolvedPacketSystemID
}
---
TalkburstControl_Setting ::= SEQUENCE
{
       talk_Burst_Control_Protocol      [0] VisibleString,
       talk_Burst_parameters            [1] SET OF VisibleString,
       -- selected by the PoC Server from those contained in the original SDP offer in the
       -- incoming SIP INVITE request from the PoC Client
       tBCP_PortNumber                  [2] Port_Number
       -- PoC Server's port number to be used for the Talk Burst Control Protocol
}
---
Talk_burst_reason_code ::= VisibleString
--Defined according to the rules and procedures in [OMA-PoC-AD]
---
URI ::= SET OF UTF8String
-- The set of URIs defined in [RFC3261] and related SIP RFCs
---

END    -- LAES-IMS-PoC-CII-Module
```

8.2.3 Abstract Syntax PoC CC Module

```
LAES-IMS-PoC-CC-Module
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc(2) ims-poc(1) cc-poc(1)
version-1(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN
IMPORTS
CaseIdentity,
IAPSystemIdentity,
Timestamp,
PocSessionInfo,
PocCorrelationId
FROM LAES-IMS-PoC-CII-Module
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc(2) ims-poc(1) cii-poc(0)
version-1(0)}

LAES-IMS-PoC-CC-Module-OID ::= OBJECT IDENTIFIER
-- OID created for LAES-IMS-PoC-CC-Module Identifier
IMS-PoC-LAES-CC-Protocol ::= SEQUENCE {
      cc_ProtocolIdentifier            [0] LAES-IMS-PoC-CC-Module-OID,
      cc_pocLAESMessage                [1] IMS_cc_pocLAESMessage
}
IMS_cc_pocLAESMessage ::=  PoC-CC-APDU

PoC-CC-APDU ::=  SEQUENCE {
       ccDeliveryHeader    [0] CCDeliveryHeader,
       payload             [1] OCTET STRING
}

CCDeliveryHeader ::= SEQUENCE {
       caseId              [0] CaseIdentity,
       iapId               [1] IAPSystemIdentity           OPTIONAL,
       timestamp           [2] Timestamp,
       poCSessionInfo      [3] PoCSessionInfo,
       pocCorrelationId    [4] PocCorrelationId
}

END -- of LAES-IMS-PoC-CC-Module
```

Annex A: PoC Service Description (Informative)

[OMA-PoC] provides the basis for this abbreviated service description in an effort to assist in a general understanding of the basic OMA PoC v1.0 service as well as to provide explanatory information on specific PoC features or capabilities that may be of interest to Law Enforcement.

A.1 General

PoC Service provides Subscribers the ability to communicate with other Subscribers in a half-duplex, arbitrated, walkie-talkie style speech communication. PoC is a subscription service; that is, participation in PoC Sessions is only permitted once the Subscriber has applied for and been granted a subscription to access the PoC Service. A PoC Subscriber becomes a PoC participant when he either accepts an invitation to a PoC Session or his request to participate in a PoC Session has been accepted. Only PoC participants can transmit and receive talk bursts in a PoC Session.

A PoC Subscriber's right to speak (i.e., floor control) is granted by the PoC Service. In the case that there is more than one request to speak, the requests are queued or denied. In the event the requests are queued, the PoC Service may prioritize the requests in the queue (see clause A.4, PoC Floor Control).

Prior to any PoC Sessions, the PoC Service and the PoC Subscriber are mutually authenticated. The speech communication and signaling in the PoC Sessions are transported in a secure manner. The PoC Service ensures the integrity of the PoC signaling.

PoC Subscribers may be members of more than one PoC Group at the same time. It is possible to form PoC Groups that include PoC Subscribers from different PoC service providers.

Multiple group operation is an optional feature. If implemented, the PoC Subscriber is able to participate in more than one PoC Group Session at a time. One PoC Group may be designated as the primary PoC Group and the rest are secondary PoC Groups. There are multiple group operations (e.g., how a PoC Subscriber selects or receives Talk Bursts and indications from the different PoC Groups) based upon the priority of PoC Groups. A concurrent but separate One-to-One PoC Session during other PoC Sessions is also an optional feature. In both cases, when a PoC Subscriber is active and talking in one Session, the other Sessions(s) are suspended (i.e., the subscriber does not hear any traffic from any of the other Sessions).

Concurrent service execution is supported (e.g., take a telephony call, put a PoC Session on hold) but may be limited by the capabilities of the supporting network or MS. PoC participants are able to receive notification of incoming requests for other services (e.g., an incoming voice call) during a PoC Session.

PoC Subscribers can be either pre- or post-paid Subscribers.

When a PoC Subscriber receives an incoming PoC Session invitation, he also receives the identity of the inviting PoC Subscriber in the form of user identity (e.g., TEL URI or SIP URI) and, if provided, the display name. If the PoC Subscriber's identity is restricted, it is not provided. The display name can be provided either by the inviting PoC Subscriber or by the PoC Service, which may replace the display name provided by the PoC Subscriber. The PoC group identity is also given to the invited PoC Subscriber.

PoC Sessions may be terminated for any one or more reasons from the following list:

- Termination by PoC Group Administrator.
- Termination upon the last PoC participant leaving the PoC Session.
- Termination upon the second-to-the-last PoC participant leaving the PoC Session.
- Termination upon the initiator leaving the PoC Session.
- Termination after a pre-defined time period.
- Termination after a pre-defined time period without any Talk Burst traffic in the PoC Session.

A.1.1 Interworking

PoC participants are able to seamlessly interact with each other within a PoC Session, regardless of their PoC service providers.

The PoC Service can interwork with fixed Internet Protocol (IP) network Instant Messaging (IM) services with enhanced streaming audio functionality. PoC interworking with traditional voice services (whether implemented on circuit switched or packet switched technology) is outside the scope of OMA PoC v1.0.

In the case where both PoC and circuit switched (CS) voice services are supported on the same MS, interworking between the two services is out of scope of OMA PoC v1.0. The PoC Subscribers should be able to switch between CS and PoC Sessions if needed, while maintaining Session context for the non-active call or PoC Session.

A.2 Types of PoC Sessions

PoC Subscribers may communicate in the following ways. The following provides an overview of these ways and identifies any special attributes.

A.2.1 One-to-One

A One-to-One PoC Session is between two PoC Subscribers. To begin, a PoC Subscriber selects the person to whom they wish to speak. The PoC service may provide an early start to speak indication to the calling party before the invited PoC Subscriber answers the invitation. The calling party may keep or discontinue with the PoC Session (e.g., reject the invited party's accept if he took too long to answer). Once the PoC Session is established, the participants use floor control for starting and ending the Talk Burst.

A.2.2 One-to-Many

Three types of groups make up the One-to-Many PoC communications: the Pre-Arranged mode, the Ad Hoc mode, and the Chat mode. Service providers can limit the number of participants allowed in any PoC Group. The maximum number of participants may vary by service provider and for each group. Each PoC Group has a unique alphanumeric identifier (e.g., SIP URI) and may have a display name.

A.2.2.1 Pre-Arranged PoC Groups

Pre-Arranged PoC groups have a fixed membership and can either be created by a PoC Subscriber or by the PoC service provider at the request of the PoC Subscriber or PoC Host. There is a fixed known identity for the group. Pre-Arranged PoC group Sessions are established when any individual member of the group invites the group. There is an option for service providers to restrict the origination of the Pre-Arranged PoC Group Session to the PoC group administrator. Invitations are sent to all accessible PoC Group members. The PoC service may provide an early start to speak indication to the calling party. The inviting PoC Subscriber may receive confirmations for those invited PoC Subscribers who accepted the invitation. The inviting PoC Subscriber receives a notification if none of the invited PoC Subscribers accept the invitation. Voice communication starts after the first invited member accepts the invitation and the initiator receives the right-to-speak indication. Members of the Pre-Arranged PoC Group can join an on-going PoC Session at any time (i.e., not restricted to at an initial invite period).

A.2.2.2 Ad Hoc PoC Groups

Ad Hoc PoC Groups have no fixed membership and exist only for the duration of the PoC Session. The Ad Hoc PoC Group Session is established when a PoC Subscriber selects and invites more than one other PoC Subscriber. Voice communication may start after the first PoC Subscriber accepts the invitation to participate in the Ad Hoc PoC Group Session and the Session initiator receives the right-to-speak indication. The inviting PoC Subscriber receives a notification if none of the invited PoC Subscribers accept the invitation. Any participant in an Ad Hoc PoC Group Session may invite other PoC Subscribers to join that PoC Session. However, any participant may rejoin an Ad Hoc PoC Group Session in which they had previously received an invitation without another (i.e., secondary) invitation.

A.2.2.3 Chat PoC Groups

Chat PoC Groups can either have closed (i.e., restricted) or open (i.e., unrestricted) memberships and can either be created by a PoC Subscriber or by the PoC service provider at the request of the PoC Subscriber or PoC Host. PoC Subscribers may join the Chat PoC Group, but no invitations are sent. Members join of their own volition. The PoC Service can reject a joining Subscriber for the following reasons:

- The PoC Subscriber is not a member of the restricted group;
- The maximum number of participants has already joined the chat group Session; and
- The requested Chat PoC Group does not exist.

The PoC Service provides a reject indication and a cause. The Chat PoC Group Session is established as soon as the first PoC Subscriber joins and, at this time, voice communication is possible. Any PoC Subscriber can join an open Chat PoC Group. Only members of a closed Chat PoC Group can join it (i.e., similar to the Pre-Arranged PoC group). A PoC Subscriber is not forced to reveal his identity to other participants in an open Chat PoC Group.

A.2.3 One-to-Many-to-One

This mode is similar to other PoC Group Sessions, but with the following main differences. The dispatcher is a distinguished participant with capabilities distinctly different from the rest of the PoC Group participants. All PoC participants can only hear the dispatcher, or, in a more sophisticated version where PoC and Location Services are both available, only PoC participants within a specified location will hear the dispatcher. The dispatcher hears individual PoC participants and may optionally be able to preempt a channel from a fleet PoC participant.

A.2.4 Instant Personal Alert

This PoC feature allows a PoC Subscriber to request another PoC Subscriber to initiate a One-to-One communication back to the originator. Instant Personal Alerts do not create PoC Sessions. Instant Personal Alerts may optionally carry text or other media from the originator to the called party. A PoC Subscriber may use a Reject List function to block Instant Personal Alerts. The Do-not-Disturb Presence feature does not apply to Instant Personal Alerts. PoC Subscribers participating in on-going PoC Sessions are able to send and receive Instant Personal Alerts.

A.3 PoC Subscriber Capabilities

The PoC service supports advanced Group Lists creation and management capabilities, and allows Subscribers to create and manage PoC Group Lists either using the mobile station (MS) or via a web page. The PoC Subscriber, in addition to creating and managing their address book (e.g., contact list), can create and manage Pre-Arranged PoC Group lists and their own Chat PoC Groups. PoC Subscribers can also create and manage personal Accept and Reject lists to automatically accept or block PoC Session invitations from specific PoC Subscribers and PoC Groups.

A PoC Subscriber can configure the MS to accept incoming requests in two modes: Automatic Answer or Manual Answer. In the Automatic Answer mode, voice reception is instantaneous; no action is required by the called party. In the manual answer mode, the called party must do something (e.g., press a button) before the called party's MS receives voice.

A PoC Subscriber can request PoC Session participant information in one of two ways. PoC participant information will be provided if requested and is not restricted. The two ways is a one-time query (i.e., "who is currently participating in the PoC Group Session at this time") or request continuous information on who is participating. If the request is for continuous information, then indications are sent when a PoC participant joins, is added, leaves, or is removed from the PoC Session. A PoC participant may also choose not to request any PoC Session participant information. All PoC participant information is subject to the service provider's support of privacy.

PoC Subscribers are only allowed to add new Subscriber(s) into the One-to-One, Pre-Arranged, and Ad Hoc PoC Group Sessions. The inviting PoC Subscriber and the PoC Host receive notification (e.g., accepted, rejected, invitee unavailable) of the result of each invitation.

PoC participants are able to leave any PoC Session at any time. The PoC Service is able to remove a PoC participant from a PoC Session.

A PoC Subscriber has the option to reject all new incoming PoC Session invites (i.e., Incoming Session Barring) or all new incoming Instant Personal Alerts (i.e., Instant Personal Alert Barring). In the case of Incoming Session Barring, this does not affect the PoC Subscriber's ability to transmit or receive Talk Bursts in the PoC Sessions in which he was currently participating. If Instant Personal Alert Barring is active, it does not affect the PoC Subscriber's ability to send or receive talk-bursts in PoC Session. A failure message is sent when either the invite or Instant Personal Alert is rejected due to one of these barrings.

A.4 PoC Floor Control

Floor control is the mechanism for the arbitration of the sequence of PoC participants to speak. The PoC Service provides floor control to the PoC Sessions. PoC Subscribers request the right to speak. The PoC Service provides indications to the requesting participant that he has permission to speak or that the right to speak has been denied. The PoC participant indicates to the PoC Service when they are finished speaking (e.g., by letting up on the "push to talk" button). The PoC Service can revoke or terminate any participant's right to speak and provides that indication to the speaker. The PoC Service also sends indications to all PoC Session participants that the PoC participant has finished speaking and the floor is idle as well as that the right to speak has been granted and therefore a PoC participant is about to speak.

The identity of the PoC participant who has been granted the floor is distributed to all other PoC participants in the PoC Session, unless the PoC Subscriber's identity is restricted.

Some PoC services may optionally support floor request queuing. In this case, the PoC Service will indicate to a PoC Subscriber that their request to speak has been queued. Queued PoC participants can also query to obtain their position in the floor request queue. A PoC participant who is queued can also cancel their request to speak. Some type of priority and pre-emption capability may exist in the floor request queue.

A.5 Privacy

The PoC Service enables a PoC participant to hide his identity from all the other PoC participants and may support the ability to hide his identify from specific PoC participants. However, the PoC Group Administrator may not accept unidentified participants into a PoC Session.

A PoC participant selects the identity that is displayed to other PoC participants. This may be in the nickname form, URI form, or MSISDN form.

The PoC Service provides secure storage for PoC Subscriber personal data (e.g., identity, subscribed-to groups).

A.6 Presence

A PoC Subscriber may have a set of Presence elements available to be published on his behalf. The PoC Subscriber is able to manipulate his presence settings in accordance with applicable and appropriate Presence Service standards. The PoC Subscriber may publish different presence information to other PoC Subscribers, as determined by their privacy preferences.

The PoC service may communicate one or more of the following presence states:

- *Do Not Disturb – New Incoming Session (Yes/No):* Indicates whether the PoC Subscriber is currently willing to accept new incoming PoC Sessions.
- *Do Not Disturb – Alerts (Yes/No):* Indicates whether the PoC Subscriber is currently willing to accept incoming Instant Personal Alerts.

- *Registered (True/False):* Indicates whether the PoC Subscriber is "registered" with the PoC Service. "True" means the PoC Subscriber's MS is registered with the PoC Service. "False" means the MS is no longer registered (e.g., through expiration or removal of the registration).
- *Able to accept new incoming PoC Session (True/False):* Indicates whether the PoC Subscriber is able to accept new incoming PoC Sessions. It would be set to "false" if for some reason the PoC Subscriber is unable to accept new incoming PoC Sessions (e.g., the limit of concurrent PoC Sessions is reached, terminal registration is removed).
- *Able to accept incoming Instant Personal Alerts (True/False):* Indicates whether the PoC Subscriber is able to accept incoming Instant Personal Alerts.
- *Currently in at least one PoC Session (True/False):* Indicates whether the PoC Subscriber is currently engaged in one or more PoC Sessions. When a PoC Subscriber's last PoC Session is terminated, this presence element is set to "false".

Additional presence states may also be communicated. The PoC Subscriber manages PoC Session treatment methods including Presence features, if supported.

A.6.1 Presence Source and LI Functions

A.6.1.1 User Equipment as the Presence Source

Figure A.1 shows an example where the UE provides the Presence Source functions. In this case, the Presence Source in the UE updates its Presence Server with its presence status using the SIP:PUBLISH message.

The presence status updates shown in this example are a generic function and hence cannot be isolated or related to the PoC service. Therefore, the requirements pertaining to the PoC Presence event reporting do not apply to this case. Any LI requirements on the generic Presence event reporting are outside the scope of this standard.

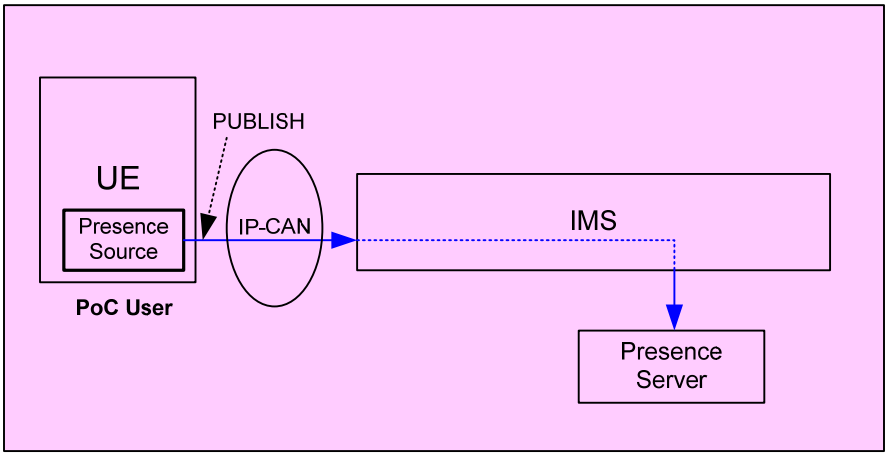

Figure A.1: Presence Source in the UE

A.6.1.2 PoC Server as the Presence Source

Figure A.2 shows an example where the PoC Server of a PoC User plays the role of Presence Source on behalf of that PoC User (in this example, that PoC User is the PoC Intercept Subject). The PoC Server, playing the role of the Presence Source on behalf of the PoC Intercept Subject (PoC User), updates its Presence Server with network presence status of the PoC Intercept Subject using the SIP:PUBLISH message.

Since the presence status updates shown in this example are reported by the PoC Server of the Intercept Subject, the presence-related events can be isolated and related to the PoC service, and therefore the requirements pertaining to the PoC Presence event reporting would apply.

The diagram shows the Presence event reporting via a MF/DF to the LEA. The diagram also shows the PoC Session-related event reporting, even though such event reporting is independent of Presence-related event reporting.

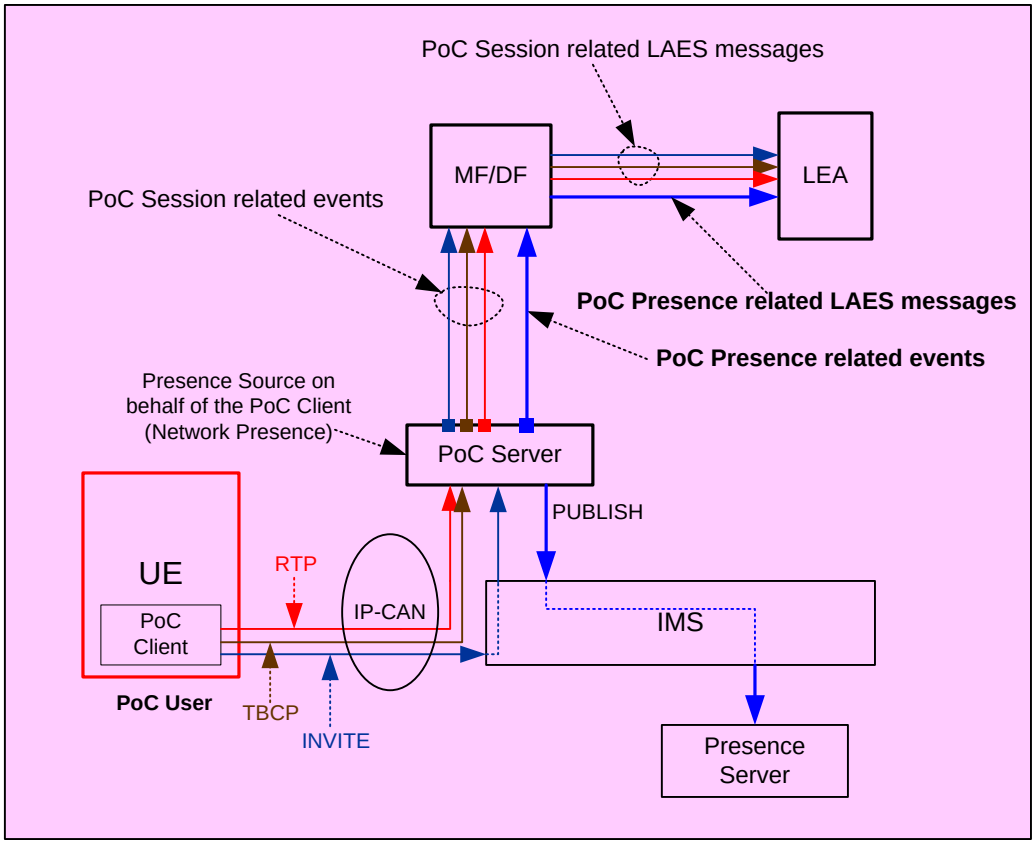

Figure A.2: Presence Source in the PoC Server

A.6.2 Watcher and LI Functions

A.6.2.1 UE as the Watcher

Figure A.3 shows two examples of the Watcher function inside the UE of a PoC User. In both examples, the Watcher inside the UE of PoC User A requests the presence status of PoC Users identified by a PoC Group (Ad Hoc, Pre-Arranged, or One-to-One) by sending a SIP:SUBSCRIBE message to the Resource List Server. The Resource List Server forwards the SIP:SUBSCRIBE to the Presence Servers of the PoC Users (Presentities) associated with the PoC Group. In these examples, only one Presentity (PoC User B) is shown. The Presence Server of PoC User B notifies the Resource List Server about the presence status of PoC User B using a SIP: NOTIFY message. The Resource List Server forwards the SIP:NOTIFY to the Watcher function residing inside the UE of PoC User A.

In the first example, the UE of PoC Server B has the Presence Source. In the second example, the PoC Server of B plays the role of Presence Source on behalf of the PoC User B. The presence event reporting for PoC User B (when PoC User B is the PoC Intercept Subject) is done as described in A.6.1.2 (not shown here), and such event reporting would apply to the second example and not the first example.

Since the Watcher function shown in these examples is a generic Presence function and cannot be isolated and related to a PoC Service, the requirements pertaining to the PoC Presence event reporting do not apply to this case. Any LI requirements on the generic Presence event reporting are outside the scope of this standard.

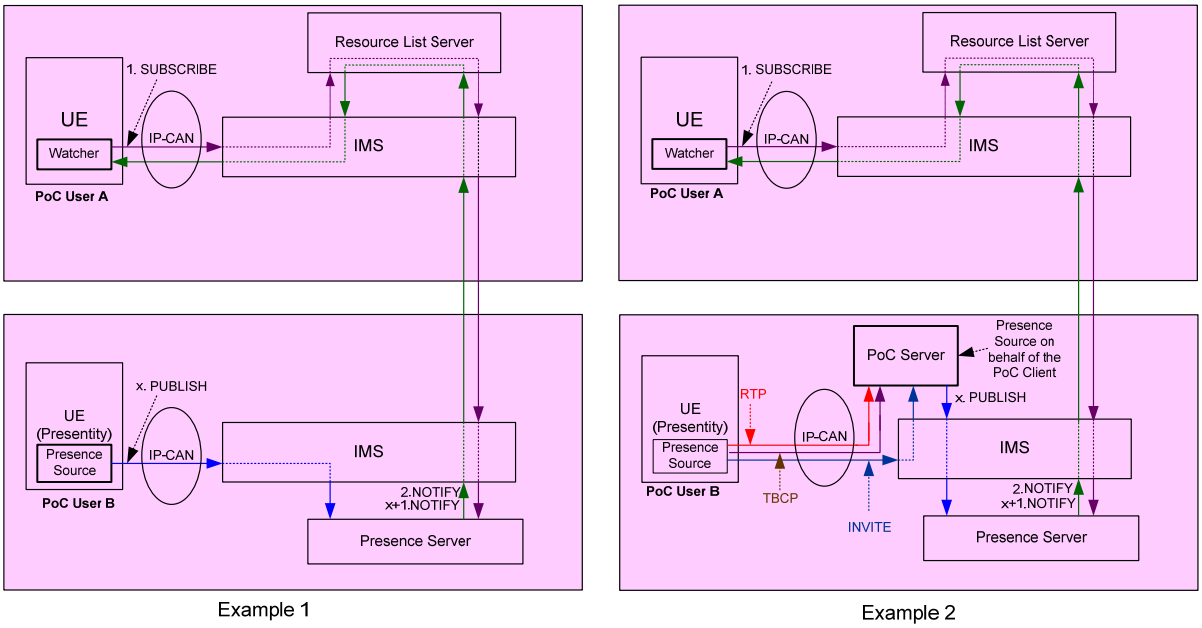

Figure A.3: Watcher inside the UE

A.6.2.2 PoC Server as the Watcher

Figure A.4 shows two examples where the PoC Server of PoC User A plays the role of a Watcher on behalf of PoC User A (in this example, PoC User A is the PoC Intercept Subject). The PoC Server, playing the role of Watcher on behalf of the PoC Intercept Subject (PoC User A), requests via the Resource List Server to get the presence status of PoC Users identified via a PoC Group (Ad Hoc, Pre-Arranged or One-to-One) using a SIP:SUBSCRIBE message. The Resource List Server forwards the SIP:SUBSCRIBE to the Presence Servers of the PoC Users (Presentities) associated with the PoC Group. In the examples, only one Presentity (PoC User B) is shown. The Presence Server of PoC User B notifies the Resource List Server about the presence status of PoC User B using a SIP:NOTIFY message. The Resource List Server forwards the SIP:NOTIFY to the PoC Server of the PoC Intercept Subject (PoC User A) playing the role of Watcher on behalf of the PoC Intercept Subject (PoC User A).

Since the Watcher function shown in this example is handled by the PoC Server of the PoC Intercept Subject, the presence-related events can be isolated and related to the PoC Service. Therefore, the requirements pertaining to the PoC Presence event reporting would apply.

The diagram shows the event reporting via an MF/DF to the LEA. The diagram also shows the PoC Session related event reporting, even though such event reporting is independent of Presence-related event reporting.

In the first example, the PoC Server of B plays the role of Presence Source on behalf of the PoC User B. In the second example, the UE of PoC Server B has the Presence Source. The presence event reporting for PoC User B (when PoC User B is the PoC Intercept Subject) is to be done as described in clause A.6.1.2 (not shown here) and such event reporting would apply to the first example and not the second example.

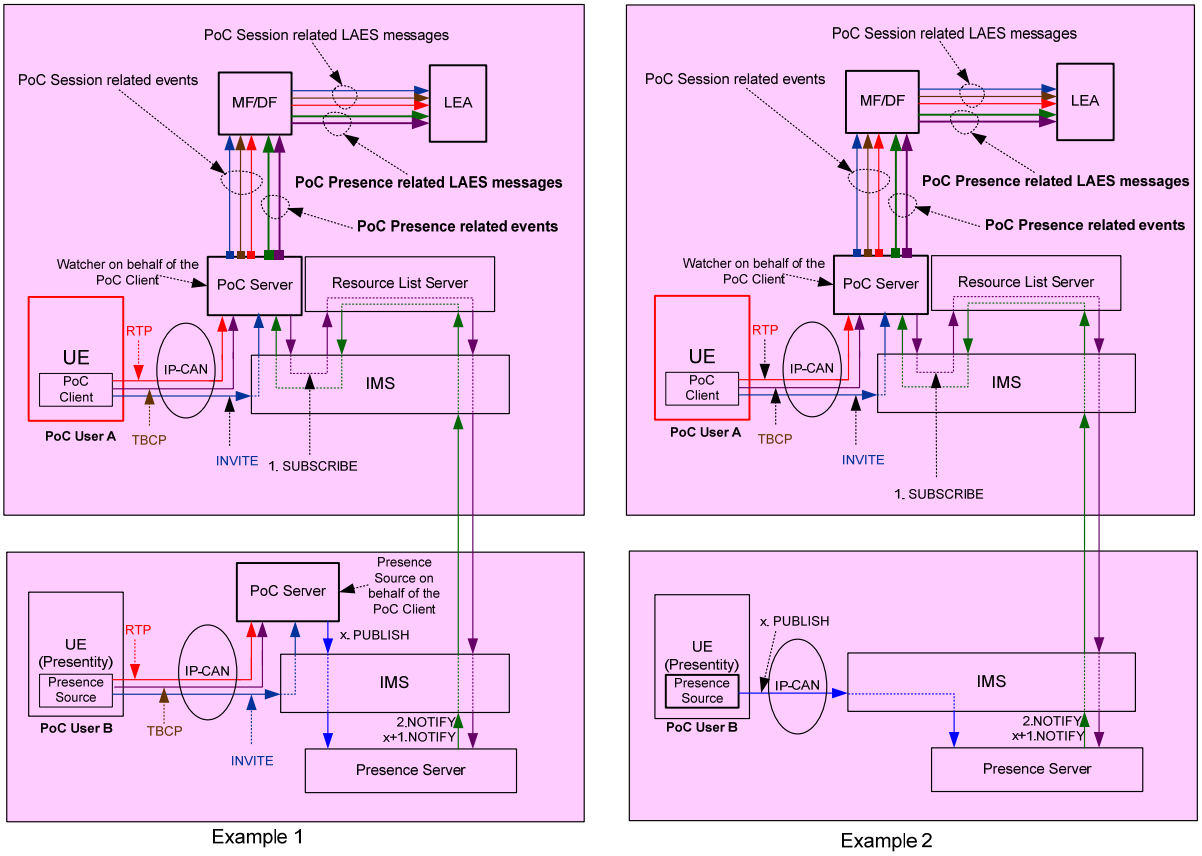

Figure A.4: Watcher inside the PoC Server

A.7 PoC Group Host and PoC Group Administrator

A PoC Group Administrator has the authority to define, delete, or modify PoC group memberships (i.e. administrative rights for group membership management are exercised in an “off-line” fashion). The PoC service provider has group administrative rights by default. PoC Group administrative rights may be assigned by the service provider to a PoC Subscriber or his representative (e.g., IT department in a corporation) as part of the service provisioning, or may be assigned by the PoC Host to a PoC Group Session participant temporarily. The PoC Group administrator may be a participant in all, some, or none of the PoC Group Sessions. PoC Group Administrator is a special case of PoC Administrator.

A PoC Host is a PoC participant who has authority to initiate and administrate an active PoC Group Session (i.e. group administrative rights in a PoC Session are exercised in an “on-line” fashion). The service provider has PoC Host administrative rights by default, subject to applicable privacy rules.

NOTE – Open PoC chat groups can be joined by any PoC Subscribers and may not require a PoC Host.

A.8 PoC Servers

The information provided in this sub-clause is from [OMA-PoC-AD], clause 6.1.3.

The PoC Server implements the application level network functionality for the PoC service.

The PoC Server performs a Controlling PoC Function and Participating PoC Function. The Controlling PoC Function and Participating PoC Function are different roles of the PoC Server. However, A PoC Server may also perform both a Controlling PoC Function and a Participating PoC Function at the same time.

In a PoC Session there is only one PoC Server performing the Controlling PoC Function.

There may be one or more PoC Servers performing the Participating PoC Function in the PoC Session.

The figures shown in this sub-clause show the flow of signaling traffic and media and media-related signaling traffic between Controlling PoC Function and Participating PoC Function in various configurations. Unless otherwise noted, the traffic flows shown in each figure apply to both signaling traffic and media and media-related signaling traffic in that configuration.

- For One-to-One PoC Sessions and Ad Hoc PoC Group Sessions, the PoC Server of the inviting User performs the Controlling PoC Function.

A Participating PoC Function always has a direct communication path with a PoC Client and a direct communication path with the Controlling PoC Function for PoC Session signaling.

Figure A.5 shows the relationship between the Controlling PoC Function, Participating PoC Function, and PoC Clients for One-to-One PoC Session and the distribution of the functionality during a One-to-One PoC Session in a multiple-network environment.

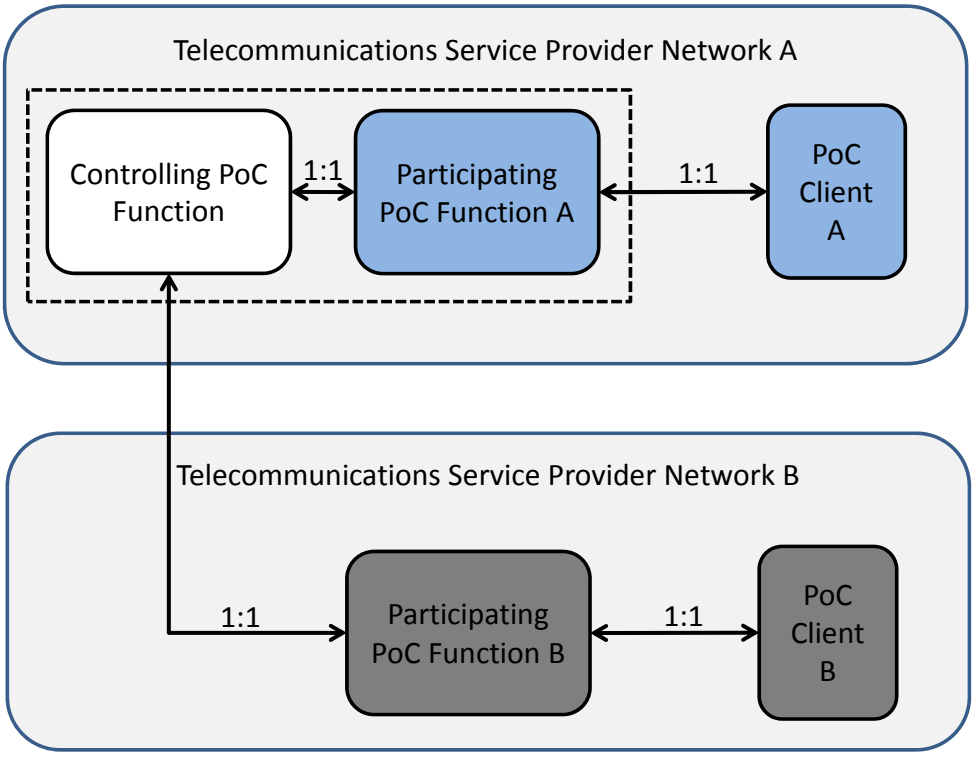

Figure A.5: Relationship between the Controlling PoC Function, Participating PoC Function, and PoC Clients for One-to-One PoC Session

For the Chat PoC Group and Pre-Arranged Group Sessions, the PoC Server owning or hosting the Group Identity performs the Controlling PoC Function. Figure A.6 depicts the relation between the Controlling PoC Function, Participating PoC Function, and the PoC Client in a multiple-network environment for a PoC Group Session.

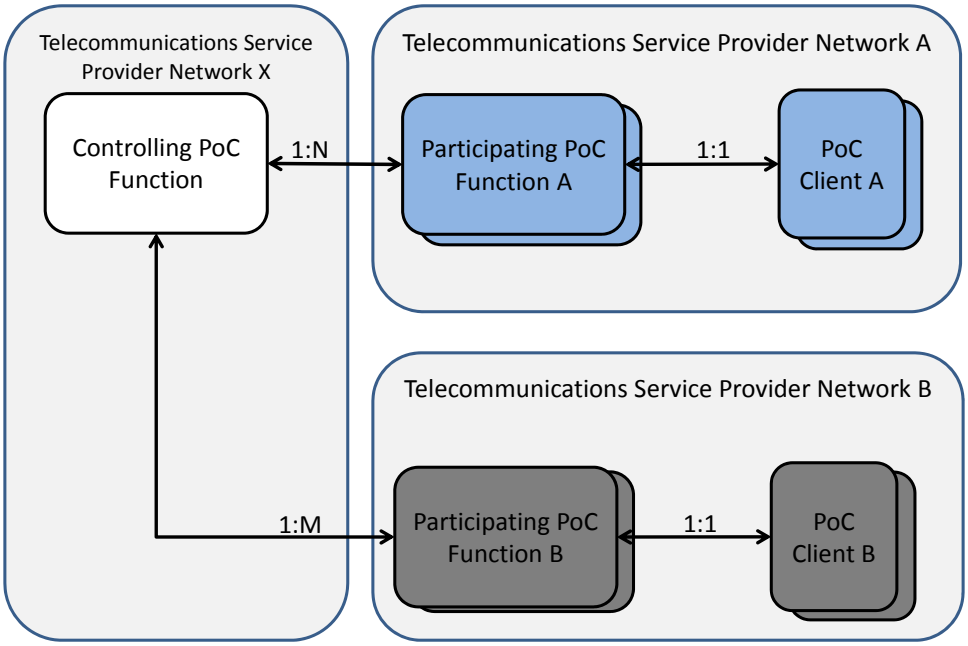

Figure A.6: Relationship between the Controlling PoC Function, Participating PoC Function and PoC Clients for PoC Group Session

The Controlling PoC Function has *N+M* number of SIP Sessions and media and Talk Burst Control communication paths in one PoC Session, where *N+M* is number of Participants in the PoC Session.

The PoC Controlling Function will have no direct communication to the PoC Client for PoC Session signaling, but will interact with the PoC Client via the Participating Functioning for the PoC Client. The Controlling PoC Function will normally route media and media-related signaling such as Talk Burst Control messages to the PoC Client via the Participating PoC Function for the PoC Client. However, local policy in the Participating PoC Function may allow the Controlling PoC Function to have a direct communication path for media and media-related signaling to each PoC Client. Figure A.7 shows the signaling and media paths in this configuration for a Controlling PoC Function, Participating PoC Function, and PoC Client served in the same network.

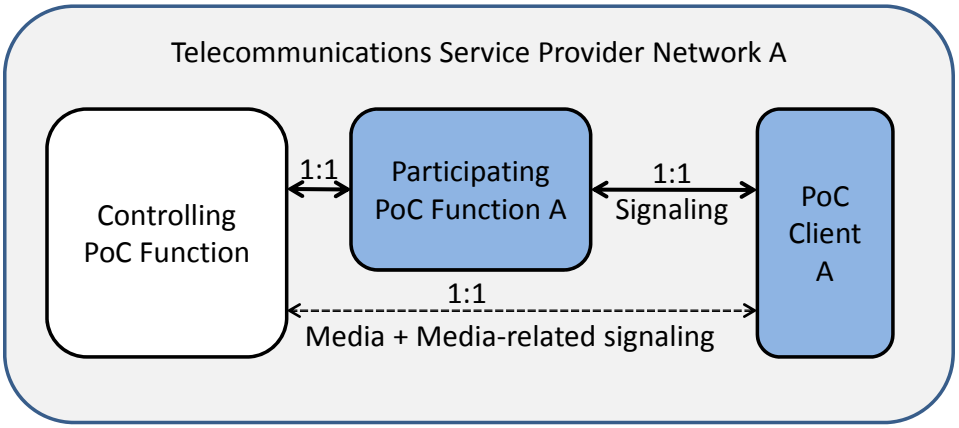

Figure A.7: Direct media flow between Controlling PoC Function and PoC Client

From the [OMA-PoC-UP], the following figure depicts the relationship amongst the entities in the User Plane.

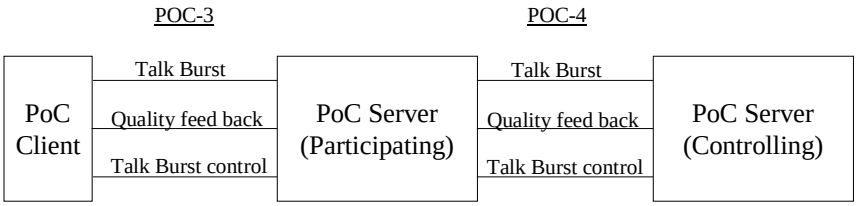

Figure A.8: Entities in the User Plane

All RTP media packets, RTCP packets, and TBCP messages flow through the PoC Server performing the Participating PoC function (if inserted in the transport path) and are terminated in the PoC Server performing the Controlling PoC Function.

Talk Burst Control Protocol (TBCP) messages are sent as RTCP APP packets and should be sent to the same UDP port as the other RTCP packets.

The Controlling PoC server is responsible for Talk Burst Control and RTP Media packet replication. The transport path between the PoC Client and the PoC Server performing the Controlling PoC Function is established on a per PoC Session basis.

When the PoC Session is established, the PoC Server performing the Participating PoC Function normally includes itself in the transport path to relay the RTP media packets, RTCP packets, and TBCP messages between the PoC Client and the PoC Server performing the Controlling PoC Function and to act as a translator.

A.9 Example Scenario

The figure below depicts an example of the PoC service, without implying any particular lawful interception related functions:

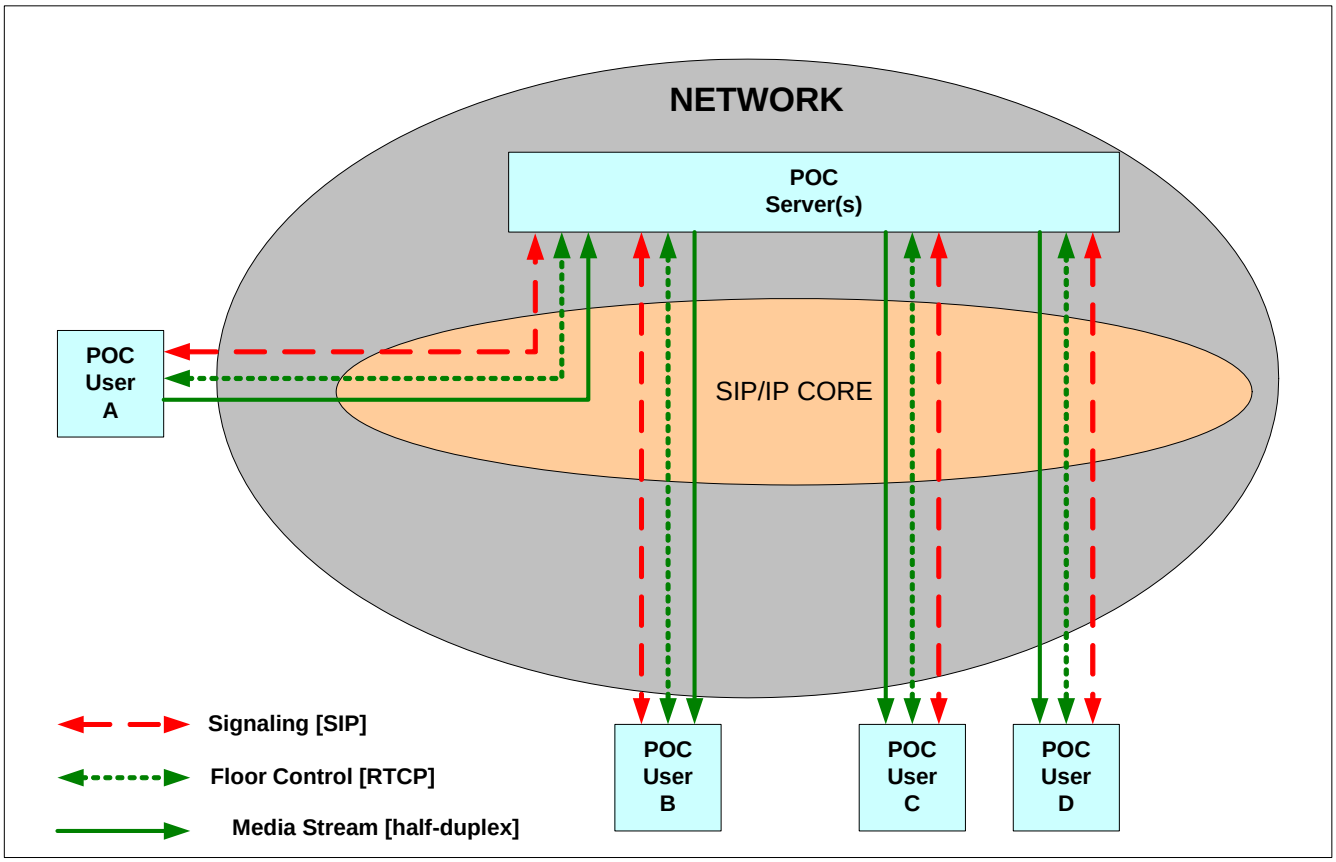

Figure A.9: A Generic PoC Service

The above figure shows a simplified example of four PoC users in some type of group call (e.g., ad hoc or Pre-Arranged). The PoC User A initiates a PoC service to three of the buddies shown within the figure as PoC User B, PoC User C, and PoC User D. PoC User A sends the PoC request to the PoC server. This request includes a request for the right to speak once the PoC Session is established. Within the network, there are two types of PoC servers: the Participating and the Controlling; for the purposes of this example, however, the roles of the two servers are not discussed in detail. For each PoC Session, there exists one PoC Controlling Server and one or more PoC Participating Servers, the latter being associated, logically, to one or more of the PoC Users. The PoC Server that receives the user requests identifies the buddies with which PoC User A is trying to establish the PoC Session and then initiate the Session establishment with those three buddies. The media (i.e., PoC User A's talk burst) is transmitted from PoC User A's device to the PoC Server, which in turn transmits the media to PoC User B, PoC User C, and PoC User D. Anyone in the group call can request the floor (i.e., right to speak) by sending a request to the PoC server. The Controlling PoC server arbitrates the requests and the media flow.

SIP is used to establish the PoC Sessions. Real-time Transport Protocol Control Protocol (RTCP) is used to establish the floor control. The media stream is carried using the Real-time Transport Protocol (RTP) streams. The PoC User does not send a continuous stream of RTP media packets. Instead, the media is sent in bursts, which are referred to as *Talk Bursts*. A Talk Burst consists of one or more RTP media packets. The Talk Burst starts when the PoC User sends the first RTP Media packet and it ends when the PoC User sends the last RTP Media packet.

Annex B: Call Flows related to the Floor Control Events (Informative)

When a PoC Client (user) has the Talk Burst Control, it means that user has the right to speak. Talk Burst Control is also referred to as *Floor Control*. The following messages are used between the PoC client and the PoC Server to establish floor control:

1. TBCP Talk Burst Request
   - Client to Controlling PoC Server – Request to gain the Talk Burst Control.
2. TBCP Talk Burst Granted
   - Controlling PoC Server to Client – The server grants the Talk Burst Control to a PoC Client.
3. TBCP Talk Burst Deny
   - Controlling PoC Server to Client – Server rejects the TBCP Talk Burst Request.
4. TBCP Talk Burst Taken
   - Controlling PoC Server to Client (s) – Server notifies the other clients that Talk Burst Control has been granted to a PoC Client.
5. TBCP Talk Burst Acknowledgement
   - Client (s) to Controlling to PoC Server – Client acknowledging the receipt of TBCP Talk Burst Taken, when the network indicates that such an acknowledgement is required. Also used to acknowledge the TBCP Connect when the network indicates that such an acknowledgement is required.
6. TBCP Talk Burst Release
   - Client to Controlling PoC Server – Client sends an indication to end the Talk Burst Control.
7. TBCP Talk Burst Idle
   - Controlling PoC Server to Client (s) – Server notifies clients that no one has Talk Burst Control.
8. TBCP Talk Burst Revoke
   - Controlling PoC Server to Client – Server forcibly ends a user's Talk Burst Control.
9. TBCP Connect
   - Participating PoC Server to Client that has Pre-Established PoC Session – Server notifying the client that it is connected to a PoC Session
10. TBCP Disconnect
    - Participating PoC Server to Client that has Pre-Established PoC Session – Server notifying the client that a PoC Session is released.
11. TBCP: Talk Burst Request Queue Position Status Response
    - Controlling PoC Server to Client – Server notifying that the request has been queued. Also used to respond to the Talk Burst Request Queue Position Request.
12. TBCP Talk Burst Request Queue Position Request
    - Client to Controlling PoC Server - Client is trying to find out the position in the queue.

Example 1: PoC User A initiates an On-Demand PoC Session

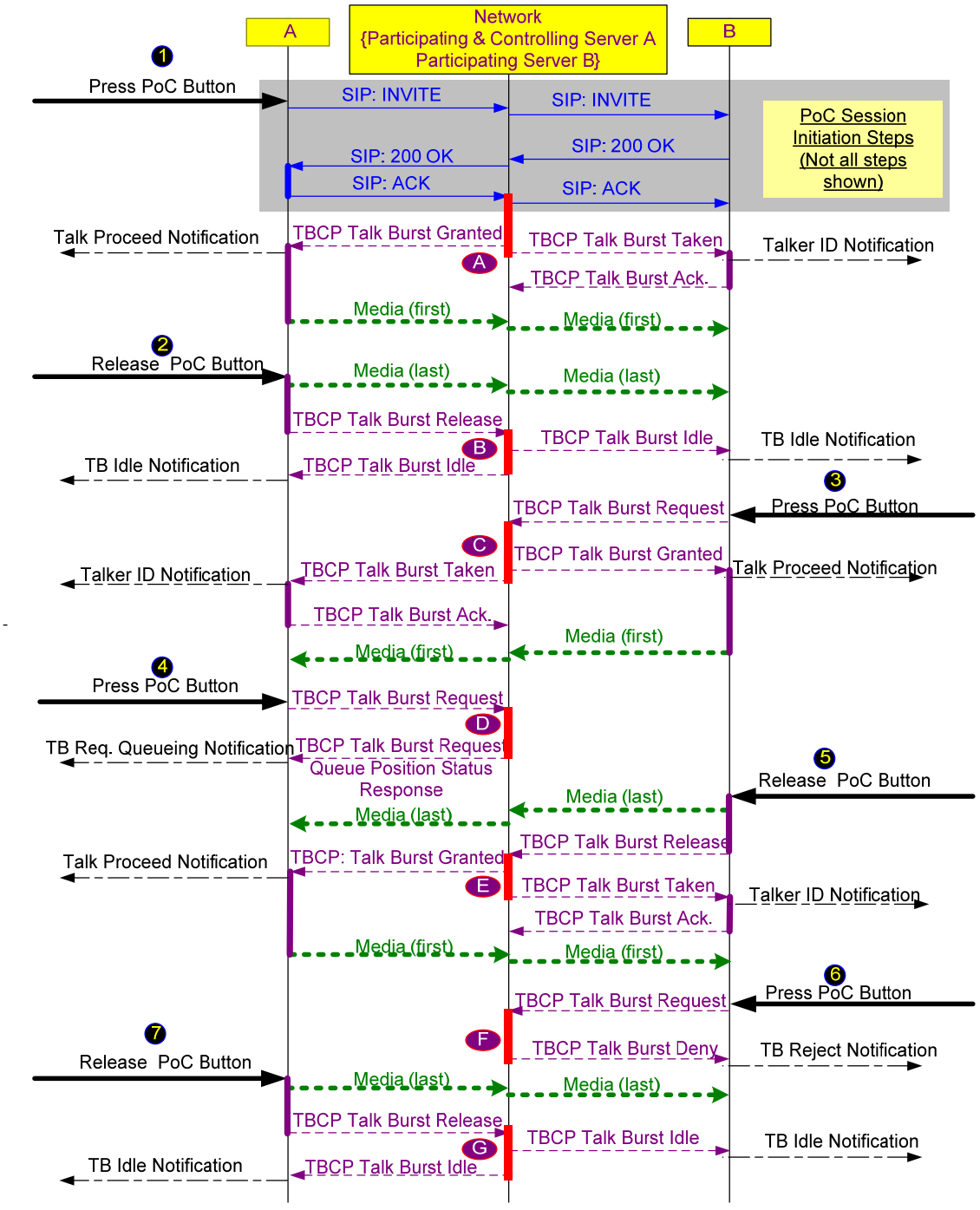

Figure B.1: User A Initiates an On-Demand PoC Session

The call flow shown in Figure B.1 shows six different scenarios (the term “network” refers to PoC Servers, both participating and controlling):

1) A PoC Client initiating an On-Demand PoC Session and the network automatically granting the Floor Control to that user when the Session is setup (i.e., one of the parties answers the Session).

2) A PoC Client sending a request for the Floor Control, and the network granting that request.
3) A PoC Client sending a request for the Floor Control while someone else has the floor, and the network queuing the request.
4) A PoC Client sending a request for the Floor Control while someone else has the floor, and the network denying the request.
5) A PoC Client releasing the Floor Control and the network automatically granting the floor control to the PoC Client whose request has been queued.
6) A POC Client releasing the Floor Control and the floor becoming idle (or Floor Open).

Call Flow Steps:

1) PoC User A invokes the On-Demand PoC Session, and the network grants the Floor Control once the PoC Session is setup.

    A. The network sends a TBCP Talk Burst Granted message to PoC User A and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. PoC User B sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

2) PoC User A releases the Floor Control; actually, the floor is open.

    B. PoC User A sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now.

3) PoC User B requests and gets the Floor Control.

    C. PoC User B sends a TBCP Talk Burst Request message to the network, and the network sends a TBCP Talk Burst Granted message to PoC User B and TBCP Talk Burst Taken message to PoC User A. At this time, PoC User B has the Floor Control. PoC User A sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

4) PoC User A requests the Floor Control, and the request is queued (since PoC User B has the Floor Control) – queuing is one of the alternatives for handling a Floor Control request when the floor is not open.

    D. While PoC User B has the Floor Control, PoC User A sends a TBCP Talk Burst Request message to the network. The network (in this scenario) queues the request and sends a TBCP Talk Burst Request Queue Position Status Response message to PoC User A, indicating that the request has been queued.

5) PoC User B releases the Floor Control, and the Floor Control is transferred to PoC User A (whose request was queued).

    E. PoC User B sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Granted message to PoC User A (since PoC User A's previous TBCP Talk Burst Request was queued) and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. PoC User B sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

6) PoC User B requests the Floor Control and gets rejected (since PoC User A has the Floor Control) – rejection is another alternative for handling a Floor Control request when the floor is not open.

    F. While PoC User A has the Floor Control, PoC User B sends a TBCP Talk Burst Request message to the network. The network (in this scenario) denies the request and sends a TBCP Talk Burst Deny message to PoC User B, indicating that the request has been denied.

7) PoC User A releases the Floor Control; actually, the floor is open.

    G. PoC User A sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now.

Example 2: PoC User A initiates an On-Demand PoC Session to PoC User B – Revoking Scenario

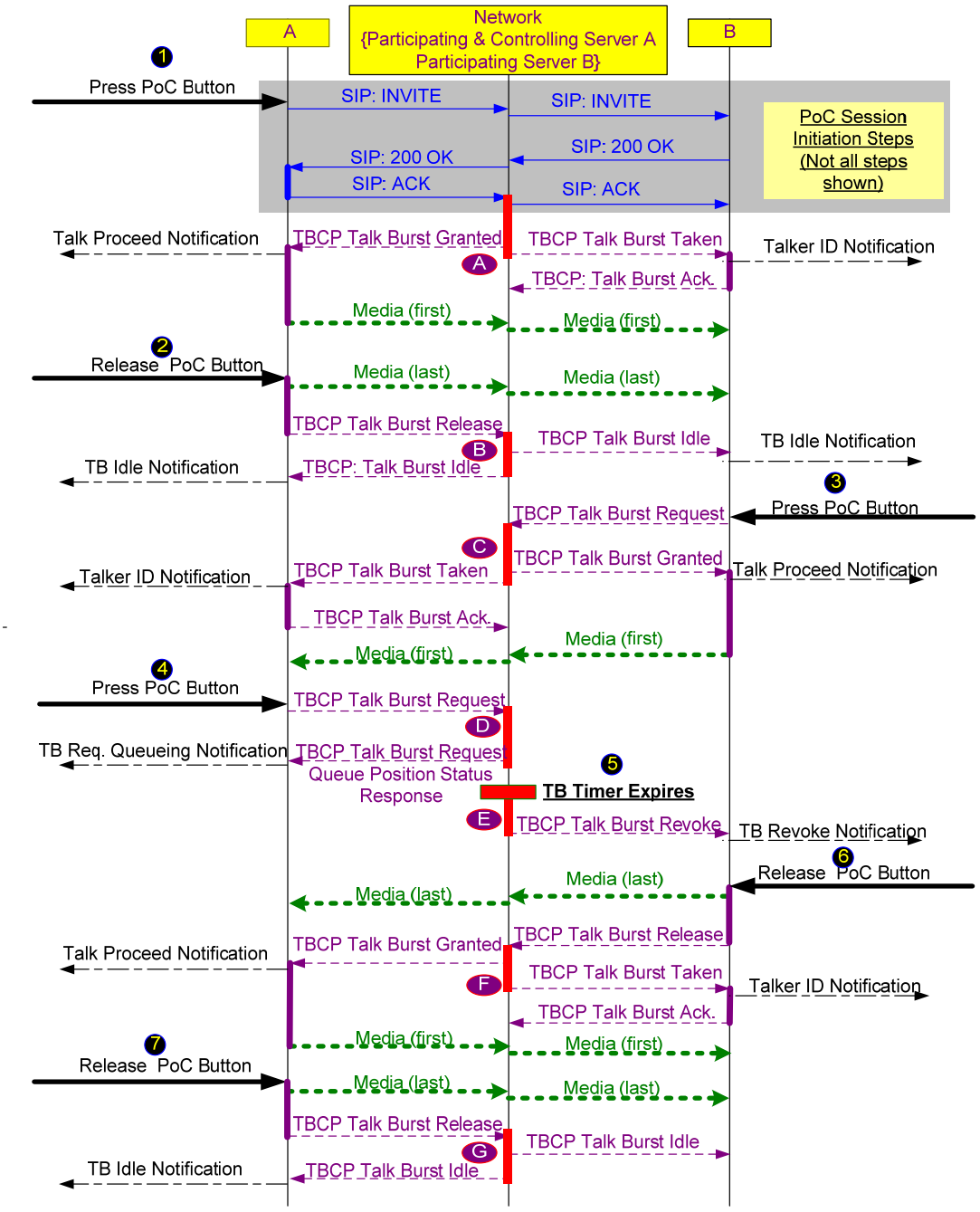

Figure B.2: PoC User A Initiates an On-Demand PoC Session – the Revoking Scenario

From the scenarios illustrated in example 1, this call flow shows the following additional scenario:

7) The Floor Control of a user is revoked.

Call Flow Steps:

1) PoC User A invokes the On-Demand PoC Session, and the network grants the Floor Control once the PoC Session is setup.

   A. The network sends a TBCP Talk Burst Granted message to PoC User A and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. PoC User B sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

2) PoC User A releases the Floor Control; actually, the floor is open.

   B. PoC User A sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now.

3) PoC User B requests and gets the Floor Control.

   C. PoC User B sends a TBCP Talk Burst Request message to the network and the network sends a TBCP Talk Burst Granted message to PoC User B and TBCP Talk Burst Taken message to PoC User A. At this time, PoC User B has the Floor Control. PoC User A sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

4) PoC User A requests the Floor Control, and the request is queued (since PoC User B has the Floor Control) – queuing is one of the alternatives for handling a Floor Control request when the floor is not open.

   D. While PoC User B has the Floor Control, PoC User A sends a TBCP Talk Burst Request message to the network. The network (in this scenario) queues the request and sends a TBCP Talk Burst Request Queue Position Status Response message to PoC User A, indicating that the request has been queued.

5) The network revokes PoC User B's Floor Control.

   E. The PoC User B's Floor Control is timed, and when that timer expires, the network sends a TBCP Talk Burst Revoke message to PoC User B.

6) PoC User B releases the Floor Control , the floor control is transferred to PoC User A (whose request was queued):

   F. PoC User B sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Granted message to PoC User A (since PoC User A's previous TBCP Talk Burst Request was queued) and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. The PoC User B sends a TBCP Talk Burst Ack to the network if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement.

7) PoC User A releases the Floor Control; actually, the floor is open.

   G. PoC User A sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now.

Example 3: Pre-established Sessions – Participating and Controlling PoC Servers are the same

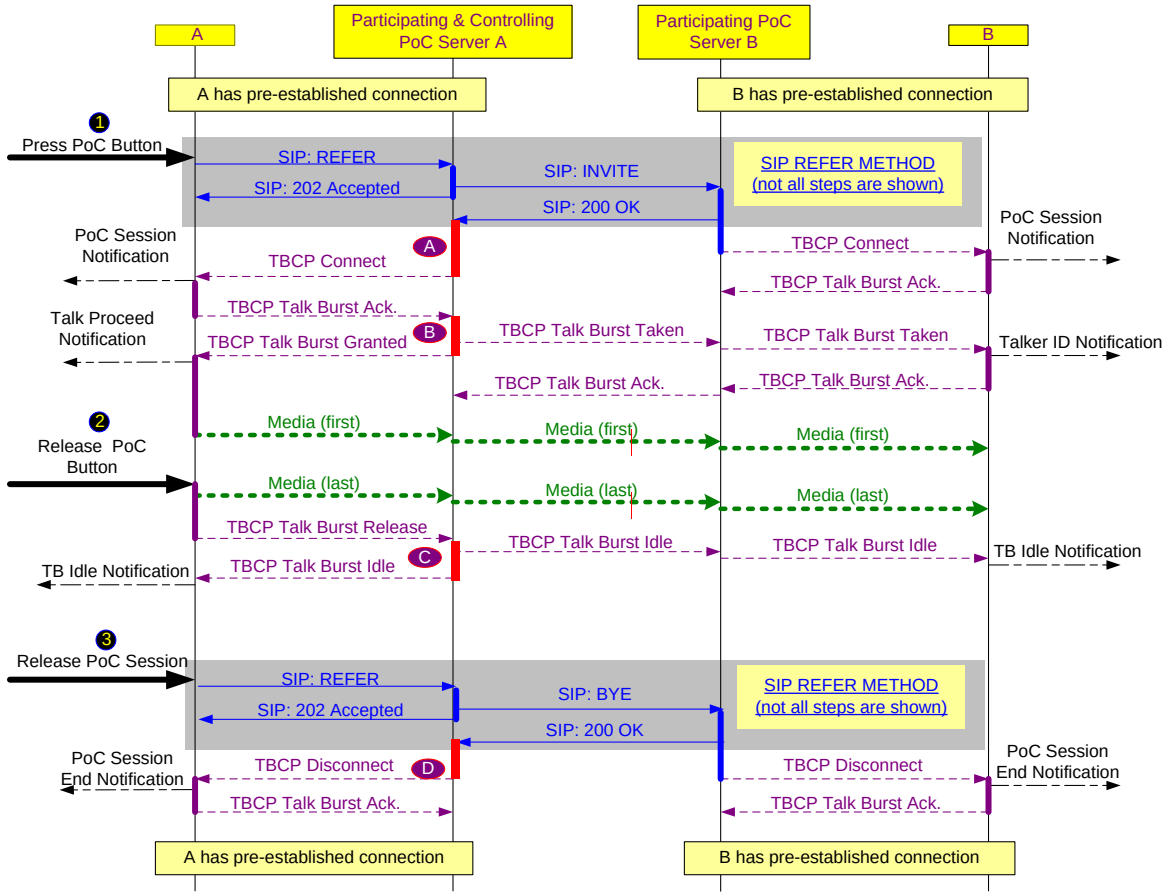

Figure B.3: Pre-established Scenario – Participating PoC Server is also the Controlling PoC Server

PoC User A and PoC User B have Pre-Established SIP Sessions to their respective Participating PoC Servers. When one of the PoC Users (in the example, it is PoC User A) who has such a Pre-Established Session attempts to initiate a PoC Session, the PoC Client on the user's device will send a SIP REFER message to the network. When the user releases the PoC Session, the PoC Client in the user's device will send a SIP REFER message so as to maintain the SIP Session to the Participating PoC Server.

Call Flow Steps

1) PoC User A initiates a PoC Session to PoC User B and gets the Floor Control.

   A. The Participating PoC Server of PoC User A sends the TBCP Connect message to PoC User A indicating that PoC User A is now connected to a PoC Session.

   B. The Participating PoC Server of PoC User B sends a TBCP Connect message to PoC User B, indicating that PoC User B is now connected to a PoC Session.

   C. The Controlling PoC Server sends a TBCP Talk Burst Granted message to PoC User A and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. The PoC User B returns a TBCP Talk Burst Ack if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement. Note that the TBCP Talk Burst Taken message (and the TBCP Talk Burst Ack message) passes thru the Participating PoC Server of PoC User B.

2) PoC User A releases the Floor Control; actually, the floor is open.

   D. PoC User A sends a TBCP Talk Burst Release message to the network. The network sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now. Note that TBCP Talk Burst Idle message sent to PoC User B passes thru the Participating PoC Server of PoC User B.

3) PoC User A releases the PoC Session; the Pre-Established Session remains.

   E. The Participating PoC Server of PoC User A sends a TBCP Disconnect message to PoC User A indicating that PoC User A is now disconnected from the PoC Session.

   F. The Participating PoC Server of PoC User B sends a TBCP Disconnect message to PoC User B indicating that PoC User B is now disconnected from the PoC Session.

Example 4: Pre-established Sessions – Participating and Controlling PoC Servers are different

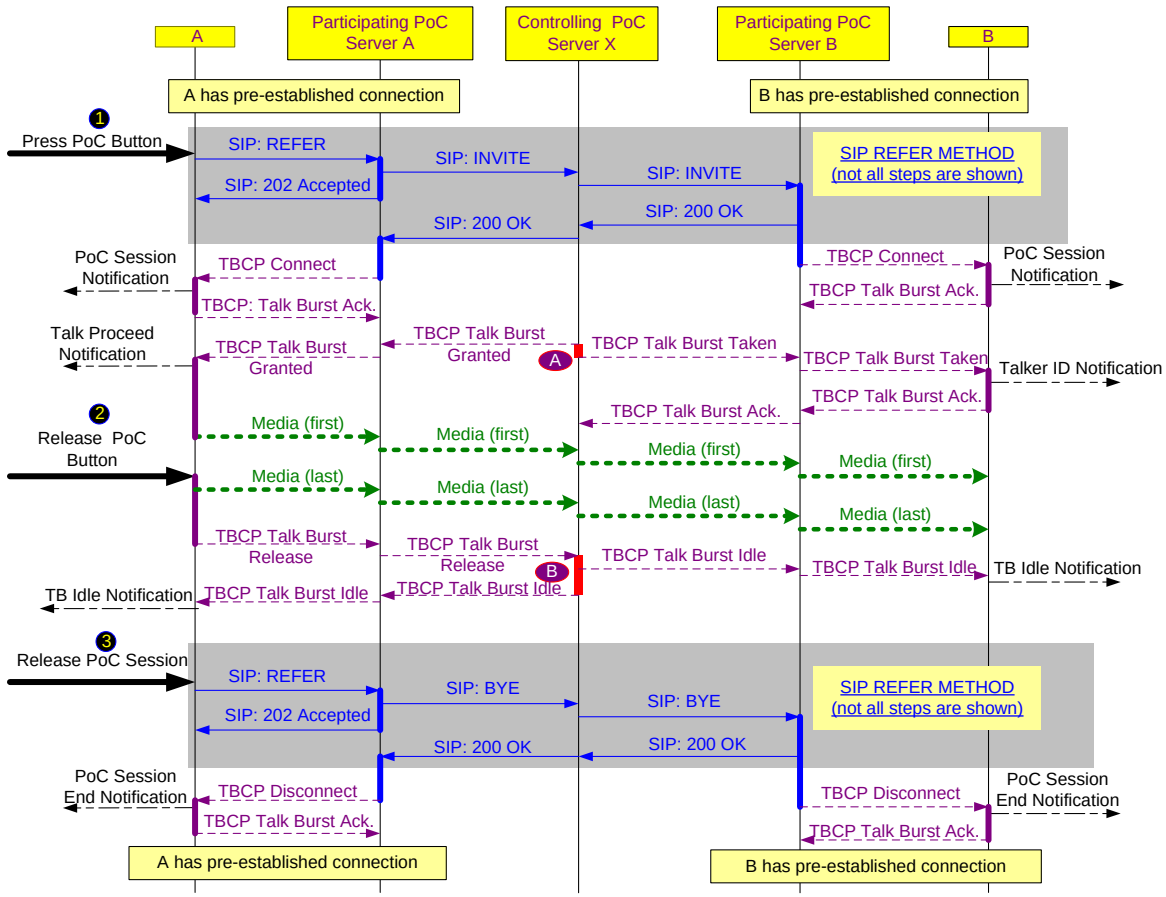

Figure B.4: Pre-established Scenario – Controlling PoC Server is different from the Participating PoC Server

PoC User A and PoC User B have Pre-Established SIP Sessions to their respective Participating PoC Servers. When one of the PoC Users (in the example, it is PoC User A) who has such a Pre-Established Session attempts to initiate a PoC Session, the PoC Client on the user's device will send a SIP REFER message to the network. When the user releases the PoC Session, the PoC Client in the user's device will send a SIP REFER message so as to maintain the SIP Session to the Participating PoC Server.

Call Flow Steps

1) PoC User A initiates a PoC Session to PoC User B, and gets the Floor Control.

   A. The Participating PoC Server of PoC User A sends a TBCP Connect message to PoC User A indicating that PoC User A is now connected to a PoC Session.

   B. The Participating PoC Server of PoC User B sends a TBCP Connect message to PoC User B, indicating that PoC User B is now connected to a PoC Session.

   C. The Controlling PoC Server sends a TBCP Talk Burst Granted message to PoC User A and TBCP Talk Burst Taken message to PoC User B. At this time, PoC User A has the Floor Control. The PoC User B returns a TBCP Talk Burst Ack if and only if the TBCP Talk Burst Taken message has an indication to have such an acknowledgement. Note that the TBCP Talk Burst Granted message sent to PoC User A passes thru the Participating PoC Server of PoC User A. Likewise, the TBCP Talk Burst Taken message (and the TBCP Talk Burst Ack message) passes thru the Participating PoC Server of PoC User B.

2) PoC User A releases the Floor Control; actually, the floor is open.

   D. PoC User A sends a TBCP Talk Burst Release message to the Controlling PoC Server. The Controlling PoC Server sends a TBCP Talk Burst Idle message to PoC Users A and B indicating that the floor is open (or idle) now. Note that TBCP Talk Burst Idle message sent to PoC Users A and B passes thru the respective Participating PoC Servers.

3) PoC User A releases the PoC Session; the Pre-Established Session remains.

   E. The Participating PoC Server of A sends a TBCP Disconnect message to PoC User A indicating that PoC User A is now disconnected from the PoC Session.

   F. The Participating PoC Server of PoC User B sends a TBCP Disconnect message to PoC User B, indicating that PoC User B is now disconnected from the PoC Session.

Annex C: Call Flows (Informative)

This informative Annex provides call flows to illustrate the LAES capabilities for few examples of PoC Sessions.

All of the flows show MF/DF (Mediation Function/Delivery Function) delivering the intercepted communications to the LEA in the format defined in this standard. The MF/DF that lies within the flows between the IAP and the LEA can also be integrated into the IAP (i.e., PoC Server), and as such the flows do not name the messages transported between the PoC Server and the MF/DF. In other words, this standard does not define the interface between the PoC Server and the MF/DF.

C.1 Subject-initiated On-Demand PoC Sessions

This Clause provides the informative call flows to illustrate examples of On-Demand PoC Sessions that are initiated by the PoC Intercept Subject [noted as “Subject (User S)” within the flow diagrams].

C.1.1 Ad Hoc Group and One-to-One PoC Sessions

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the PoC Intercept Subject would become the Controlling PoC Server and provide the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients PoC Intercept Subject S (originating) and PoC client B (terminating). In the example call flow, both PoC Intercept Subject S and PoC client B have On-Demand PoC clients.

The following two call flows are included:

1. Session Start Example
2. Session End Example

C.1.1.1 Subject-initiated PoC Session Start Example

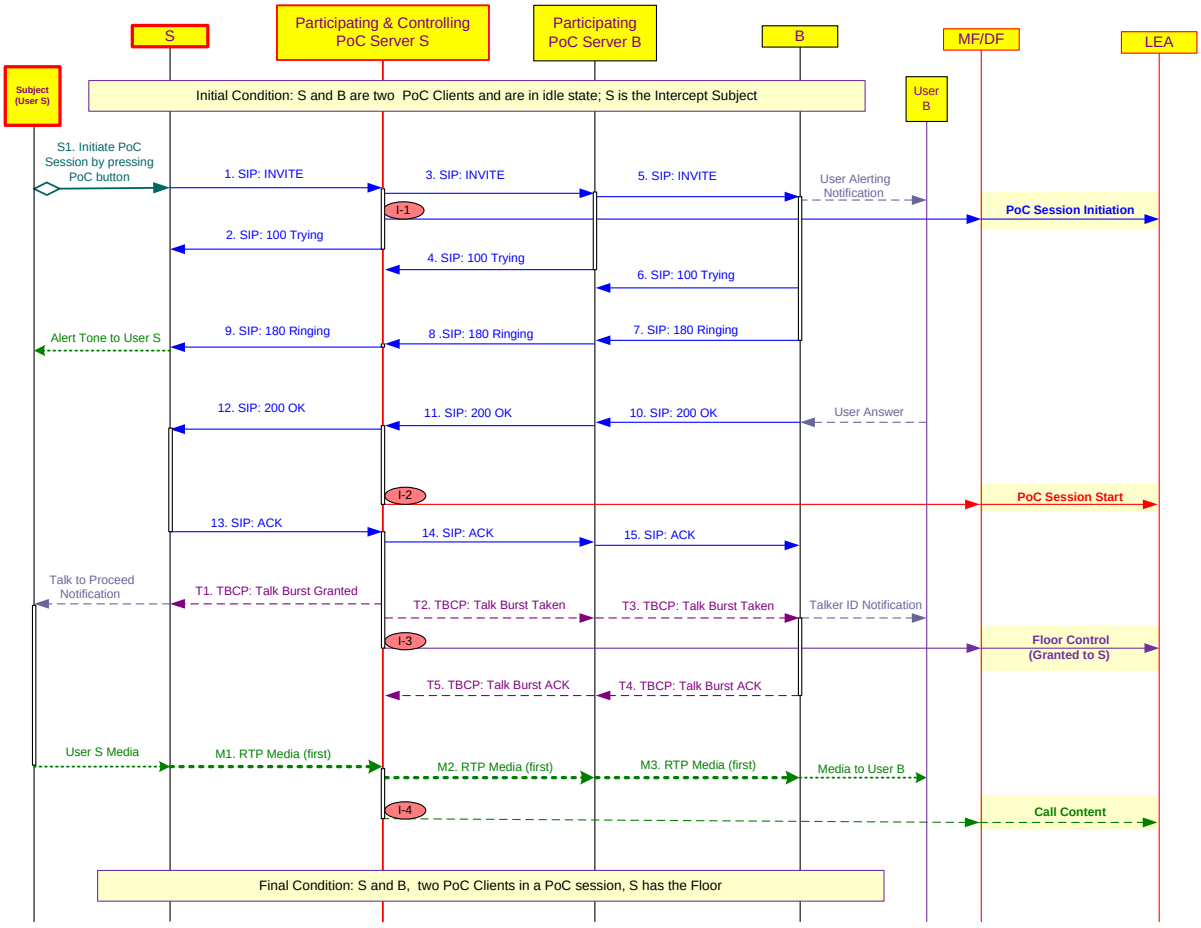

Figure C.1: PoC Intercept Subject S initiates an On-Demand PoC Session to PoC Client B

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] initiates an On-Demand PoC Session to a PoC Client B.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that one or more of the terminating users, instead, have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps 1 to 15 show the SIP signaling messages used to setup the On-Demand PoC Session.
- Steps T1 to T5 show the TBCP-related messages.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

S1: Subject (User S) initiates an On-Demand PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP INVITE to the associated Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 100 Trying to PoC Client S in response to the SIP INVITE.
3. The Participating PoC Server of S plays the role of Controlling PoC Server which, in turn, determines all the users to whom the PoC Session request has to be sent (i.e., Ad Hoc Group case). In the example, there is only one terminating user, PoC Client B. The Controlling PoC Server sends a SIP INVITE to the Participating PoC Server of B.

   I1: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

4. The Participating Server of B sends a SIP 100 Trying to the Controlling PoC Server in response to the SIP INVITE.
5. The Participating PoC Server of B sends a SIP INVITE to the PoC Client B. The mobile device that has the PoC Client notifies User B of the incoming call (i.e., PoC Session). In other words, the User B receives the alerting notification.
6. PoC Client B sends a SIP 100 Trying to the Participating Server of S in response to the SIP INVITE.
7. As User B is alerted, the PoC Client B sends the SIP 180 Ringing to the Participating PoC Server of B.
8. The Participating PoC Server of B forwards the SIP 180 Ringing to the Controlling PoC Server (which is also the Participating PoC Server of S).
9. The Participating PoC Server of S forwards the SIP 180 Ringing to the PoC Client S. Subject (User S) receives the alerting tone.
10. User B answers the incoming call (i.e., PoC Session). The PoC Client B sends a SIP 200 OK to the Participating PoC Server of B.
11. The Participating PoC Server of B forwards the SIP 200 OK to the Controlling PoC Server (which is also the Participating PoC Server of S).
12. The Participating PoC Server of S forwards the SIP 200 OK to the PoC Client S.

    I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

13. The PoC Client S sends a SIP ACK to the Participating PoC Server S (which is also the Controlling PoC Server).
14. The Controlling PoC Server forwards the SIP ACK to the Participating PoC Server of B.
15. The Participating PoC Server of B forwards the SIP ACK to the PoC Client B.

TBCP-related Steps

The following TBCP-related messages may begin when the Participating and Controlling PoC Server S sends a SIP 200 OK to the PoC Client S or when the Participating and Controlling PoC Server S receives the SIP ACK from the PoC Client S. For simplicity of drawing, the latter is shown in the call flow. The actual timing depends on the implementation.

T1. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Granted Message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can now proceed to talk.

   I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T2. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the Participating PoC Server of B.

T3. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client S or User S) to the User B.

T4. The PoC Client B sends the optional TBCP: Talk Burst Ack to the Participating PoC Server of B.

T5. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack to the Controlling PoC Server.

Media transfer related steps

The Subject (User S) may begin talking upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I4: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M3. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Session with PoC Client S having the Floor (i.e., speaking).

C.1.1.2 Subject-initiated PoC Session End Example

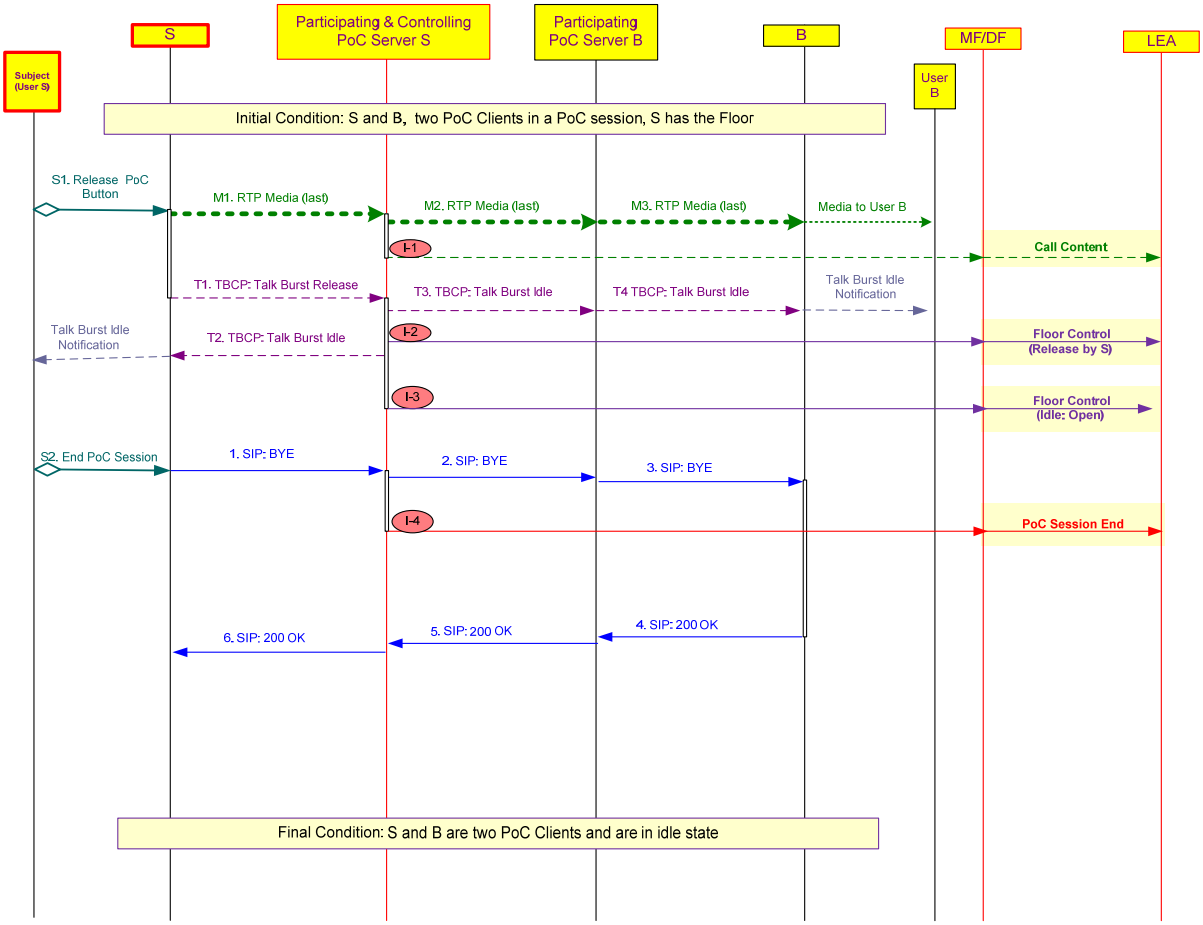

Figure C.2: PoC Intercept Subject S ends the On-Demand PoC Session to PoC Client B

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] has initiated an On-Demand PoC Session to a PoC Client B.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that one or more of the terminating users, instead, have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Description of the Steps:

In this call flow:

- S1 and S2 are the user actions.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps T1 to T4 show the TBCP-related messages.
- Steps 1 to 6 show the SIP signaling messages used to end an On-Demand PoC Session.
- Steps I1 to I4 illustrate the interception points.

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M1. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M2. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from S.

TBCP-related Steps

T1. When the Subject (User S) presses the Release PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of S (which is also the Controlling PoC Server).

I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T2. Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

PoC Session Ending

S2: Subject (User S) ends the On-Demand PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP BYE to the Participating PoC Server of S (which is also the Controlling PoC Server).

I4: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the intercepting LEA.

2. The Controlling PoC Server sends a SIP BYE to the Participating PoC Server of B.
3. The Participating PoC Server of B sends a SIP BYE to the PoC Client B.
4. The PoC Client B forwards the SIP 200 OK to the Participating PoC Server of B.
5. The Participating PoC Server of B forwards the SIP 200 OK to the Controlling PoC Server (which is also the Participating PoC Server of S).

6. The Participating PoC Server of S forwards the SIP 200 OK to the PoC Client S.

At the end of this flow, the PoC Client S and PoC Client B are in idle condition.

C.1.2 Pre-Arranged Group PoC Sessions

The flows illustrated here apply to Pre-Arranged Group PoC Sessions, where the Controlling PoC Server [noted as Controlling PoC Server (X) within the flow diagrams] can be different from the Participating PoC Server of the PoC Intercept Subject.

Note that to simplify the drawing, the flows include just two PoC clients: PoC Intercept Subject S (originating) and PoC client B (terminating). In the example call flow, both PoC Intercept Subject S and PoC client B have On-Demand PoC clients.

The following two call flows are included:

- Session Start Example.
- Session End Example.

C.1.2.1 Subject-initiated Pre-Arranged Group PoC Session Start Example

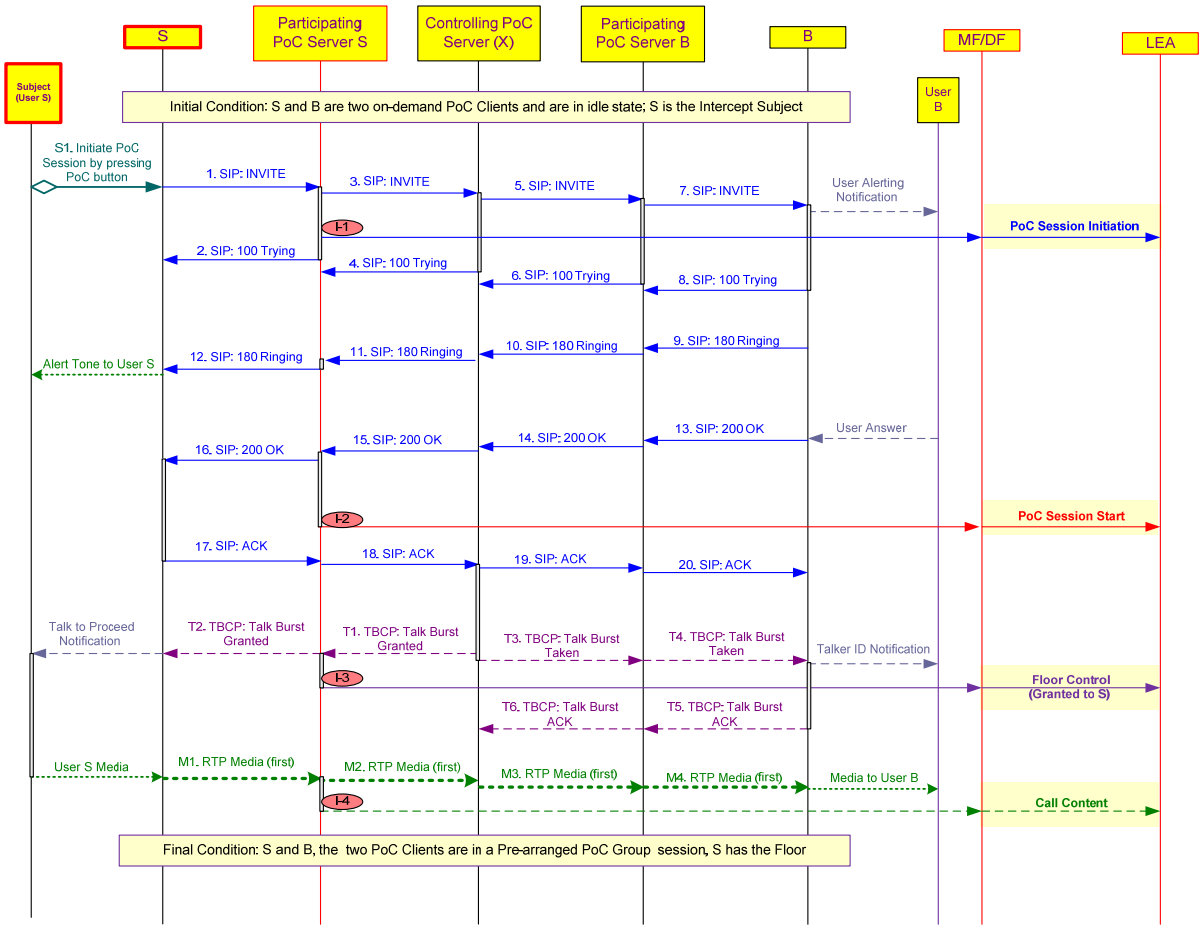

Figure C.3: PoC Intercept Subject S initiates an On-Demand Pre-Arranged Group PoC Session to PoC Client B

This flow illustrates an example where thePoC Intercept Subject S [shown as Subject (User S) in the flow] initiates an On-Demand PoC Session to a PoC Client B who is part of a Pre-Arranged PoC Group.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server (X) towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that one or more of the terminating users have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps 1 to 20 show the SIP signaling messages used to setup the On-Demand PoC Session.
- Steps T1 to T6 show the TBCP-related messages.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

S1: Subject (User S) initiates an On-Demand PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP INVITE to the associated Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 100 Trying to PoC Client S in response to the SIP INVITE.
3. The Participating PoC Server of S forwards the SIP INVITE to the Controlling PoC Server (X).

   I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

4. The Controlling PoC Server (X) sends a SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
5. The Controlling PoC Server (X) determines all the users in the Pre-Arranged PoC Group to whom the PoC Session request has to be sent. In the example, there is only one terminating user, PoC Client B. The Controlling PoC Server (X) sends a SIP INVITE to the Participating PoC Server of B.
6. The Participating Server of B sends a SIP 100 Trying to the Controlling PoC Server (X) in response to the SIP INVITE.
7. The Participating PoC Server of B sends a SIP INVITE to the PoC Client B. The mobile device that has the PoC Client notifies User B of the incoming call (i.e., PoC Session). In other words, the User B receives the alerting notification.
8. PoC Client B sends a SIP 100 Trying to the Participating Server of B in response to the SIP INVITE.
9. As User B is alerted, the PoC Client B sends a SIP 180 Ringing to the Participating PoC Server of B.
10. The Participating PoC Server of B forwards the SIP 180 Ringing to the Controlling PoC Server (X).
11. The Controlling PoC Server (X) forwards the SIP 180 Ringing to the Participating PoC Server of S.
12. The Participating PoC Server of S forwards the SIP 180 Ringing to the PoC Client S. Subject (User S) receives the alerting tone.
13. The User B answers the incoming call (i.e., PoC Session). The PoC Client B sends a SIP 200 OK to the Participating PoC Server of B.
14. The Participating PoC Server of B forwards the SIP 200 OK to the Controlling PoC Server (X).
15. The Controlling PoC Server (X) forwards the SIP 200 OK to the Participating PoC Server of S.

16. The Participating PoC Server of S forwards the SIP 200 OK to the PoC Client S.

    I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

17. The PoC Client S sends a SIP ACK to the Participating PoC Server of S.
18. The Participating PoC Server of S forwards the SIP ACK to the Controlling PoC Server (X).
19. The Controlling PoC Server (X) forwards the SIP ACK to the Participating PoC Server of B.
20. The Participating PoC Server of B forwards the SIP ACK to the PoC Client B.

TBCP-related Steps

The following TBCP-related messages may begin when the Controlling PoC Server (X) sends a SIP 200 OK to the Participating PoC Server of S or when the Controlling PoC Server (X) receives a SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where the TBCP: Talk Burst Granted message reaches the device before the SIP 200 OK, it is possible that some implementations may follow that approach.

T1. The Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating Server of S.
T2. The Participating Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can now proceed to talk.

    I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T3. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the Participating PoC Server of B.
T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client S or User S) to the User B.
T5. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.
T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

The Subject (User S) may begin talking upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

    I4: The Participating PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).
M3. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.
M4. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Session, with PoC Client S having the Floor (i.e., speaking).

C.1.2.2 Subject-initiated Pre-Arranged Group PoC Session End Example

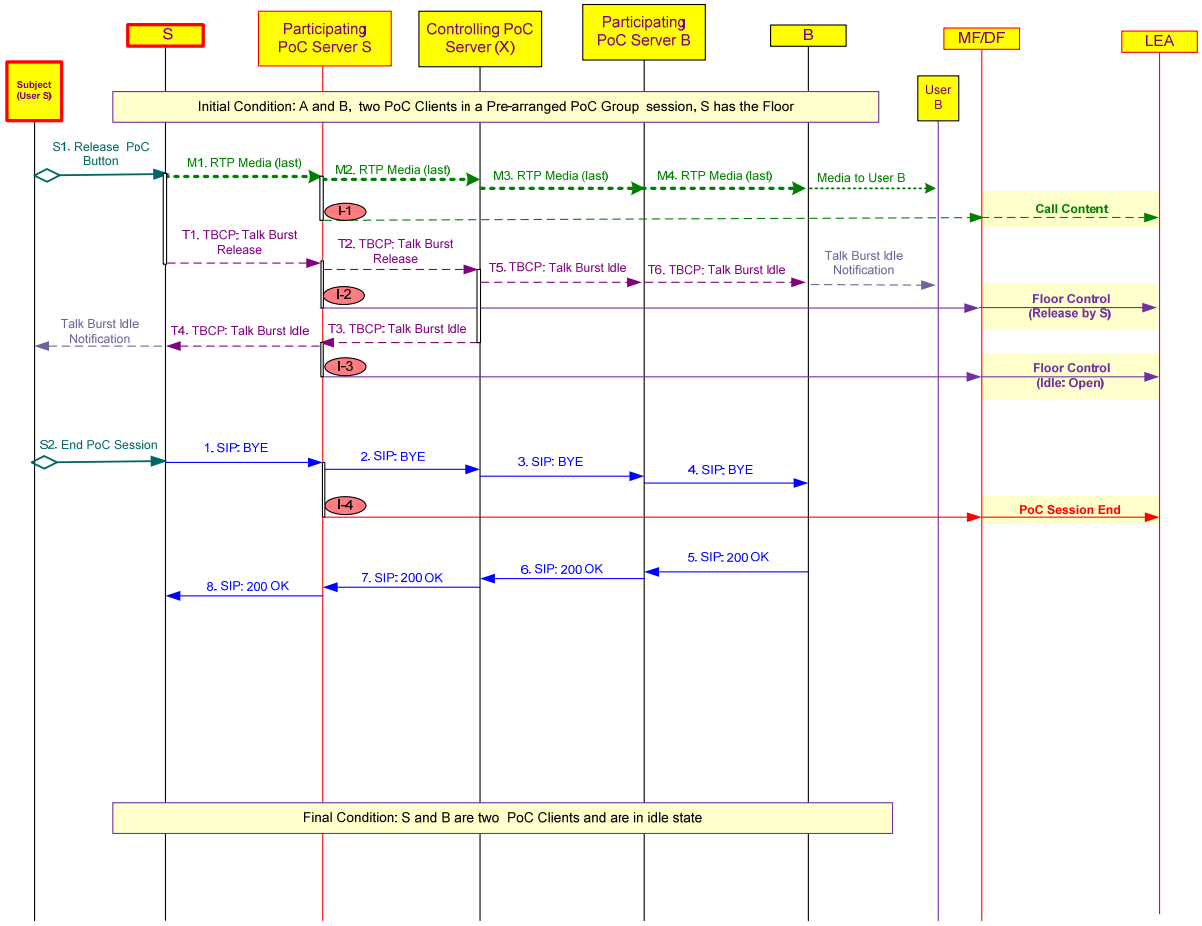

Figure C.4: PoC Intercept Subject S ends the On-Demand Pre-Arranged Group PoC Session to PoC Client B

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] initiates an On-Demand PoC Session to a PoC Client B who is part of a Pre-Arranged PoC Group.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server (X) towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that one or more of the terminating users have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Description of the Steps:

In this call flow:

- S1 and S2 are the user actions.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps T1 to T6 show the TBCP-related messages.
- Steps 1 to 8 show the SIP signaling messages used to end an On-Demand PoC Session.

- Steps I1 to I4 illustrate the interception points.

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M3. The Controlling PoC Server (X) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from S.

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

T3. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

PoC Session Ending

S2: The Subject (User S) ends the On-Demand PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. The PoC Client S sends a SIP BYE to the Participating PoC Server of S.

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the intercepting LEA.

2. The Participating PoC Server of S forwards the SIP BYE to the Controlling PoC Server (X).
3. The Controlling PoC Server (X) sends the SIP BYE to the Participating PoC Server of B.
4. The Participating PoC Server of B forwards the SIP BYE to the PoC Client B.
5. The PoC Client B sends the SIP 200 OK to the Participating PoC Server of B.
6. The Participating PoC Server of B forwards the SIP 200 OK to the Controlling PoC Server (X).
7. The Controlling PoC Server (X) forwards the SIP 200 OK to the Participating PoC Server of S.
8. The Participating PoC Server of S forwards the SIP 200 OK to the PoC Client S.

At the end of this flow, the PoC Client S and PoC Client B are in idle condition.

C.2 On-Demand PoC Sessions to PoC Intercept Subject

This Clause provides the informative call flows to illustrate examples of On-Demand PoC Sessions that are terminated at the PoC Intercept Subject.

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the originating PoC client would become the Controlling PoC Server. However, since the PoC Intercept Subject is a terminating PoC client, the Participating PoC Server of the PoC Intercept Subject would provide the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients – PoC client A (originating) and PoC Intercept Subject S (terminating). Both PoC client A and PoC Intercept Subject S have On-Demand PoC clients.

The following two call flows are included:

1. Session Start Example.
2. Session End Example.

C.2.1 PoC Session to the PoC Intercept Subject – Session Start Example

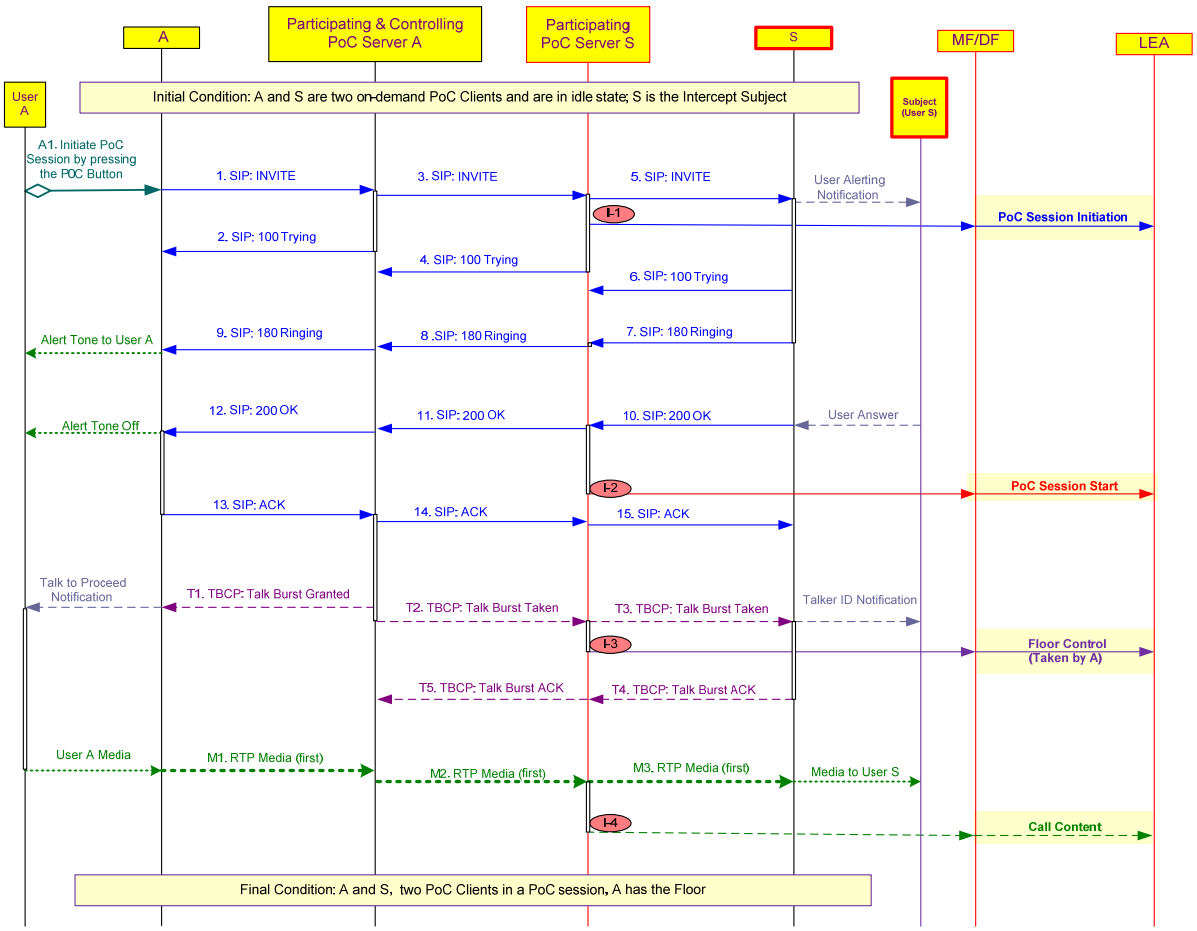

Figure C.5: PoC Intercept Subject S receives an On-Demand PoC Session from PoC Client A

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] receives an On-Demand PoC Session from another PoC Client A.

Even though the flow shows that Subject (User S) as the only one terminating PoC Client, the steps shown from the Controlling PoC Server towards the Subject (User S) would apply if more terminating PoC Clients were present in the PoC Session. Note that the other terminating PoC Clients may also be the targets of other independent lawful interception or just normal PoC Clients.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that the originating PoC Client and/or the other terminating users have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the originating side are shown in Annex D.4 and the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Furthermore, the steps shown from the Controlling PoC Server towards the Subject (User S) would also apply if the originating PoC Client A has initiated a PoC Session to a Pre-Arranged Group with Subject (User S) as one of the PoC Clients in that group. The only difference in that case is that the Controlling PoC Server (associated with the Pre-Arranged Group) can be different from the Participating Server of A.

Description of the Steps:

In this call flow:

- A1 is a user action.
- Steps 1 to 15 show the SIP signaling messages used to setup the On-Demand PoC Session.
- Steps T1 to T5 show the TBCP-related messages.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

A1: PoC Client A initiates an On-Demand PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP INVITE to the associated Participating PoC Server of A.
2. The Participating PoC Server A sends a SIP 100 Trying to PoC Client A in response to the SIP INVITE.
3. The Participating PoC Server of A plays the role of Controlling PoC Server which, in turn, determines all the users to whom the PoC Session request has to be sent (i.e., Ad Hoc Group case). In the example, there is only one terminating user, Subject (User S). The Controlling PoC Server sends the SIP INVITE to the Participating PoC Server of S.
4. The Participating Server of S sends a SIP 100 Trying to the Controlling PoC Server in response to the SIP INVITE.
5. The Participating PoC Server of S sends a SIP INVITE to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) of the incoming call (i.e., PoC Session). In other words, the Subject (User S) receives the alerting notification.

   I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends LAES PoC Session Initiation message to the LEA.

6. PoC Client S sends a SIP 100 Trying to the Participating Server of S in response to the SIP INVITE.
7. As Subject (User S) is alerted, the PoC Client S sends the SIP 180 Ringing to the Participating PoC Server of S.
8. The Participating PoC Server of S forwards the SIP 180 Ringing to the Controlling PoC Server (which is also the Participating PoC Server of A).
9. The Participating PoC Server of A forwards the SIP 180 Ringing to the PoC Client A. User A receives the alerting tone.
10. The Subject (User S) answers the incoming call (i.e., PoC Session). The PoC Client S sends a SIP 200 OK to the Participating PoC Server of S.
11. The Participating PoC Server of S forwards the SIP 200 OK to the Controlling PoC Server (which is also the Participating PoC Server of A).

    I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends LAES PoC Session Start message to the LEA.

12. The Participating PoC Server of A forwards the SIP 200 OK to the PoC Client A.
13. The PoC Client A sends a SIP ACK to the Participating PoC Server A (which is also the Controlling PoC Server).
14. The Controlling PoC Server forwards the SIP ACK to the Participating PoC Server of S.
15. The Participating PoC Server of S forwards the SIP ACK to the PoC Client S.

TBCP-related Steps

The following TBCP-related messages may begin when the Participating and Controlling PoC Server A sends a SIP 200 OK to PoC Client A or when the Participating and Controlling PoC Server A receives the SIP ACK from PoC Client A. For simplicity of drawing, the latter is shown in the call flow. The actual timing depends on the implementation.

T1. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Granted Message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the User A can now proceed to talk.

T2. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the Participating PoC Server of S.

T3. Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client A or User A) to the Subject (User S).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends in the LAES Floor Control (Taken by A) message to the LEA.

T4. The PoC Client S sends the optional TBCP: Talk Burst Ack to the Participating PoC Server of S.

T5. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack to the Controlling PoC Server.

Media transfer related steps

The User A may begin talking, upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the intercepting LEA.

At the end of this flow, the PoC Client A and PoC Client S are in a PoC Session with PoC Client A having the Floor (i.e., speaking).

C.2.2 PoC Session to the PoC Intercept Subject – Session End Example

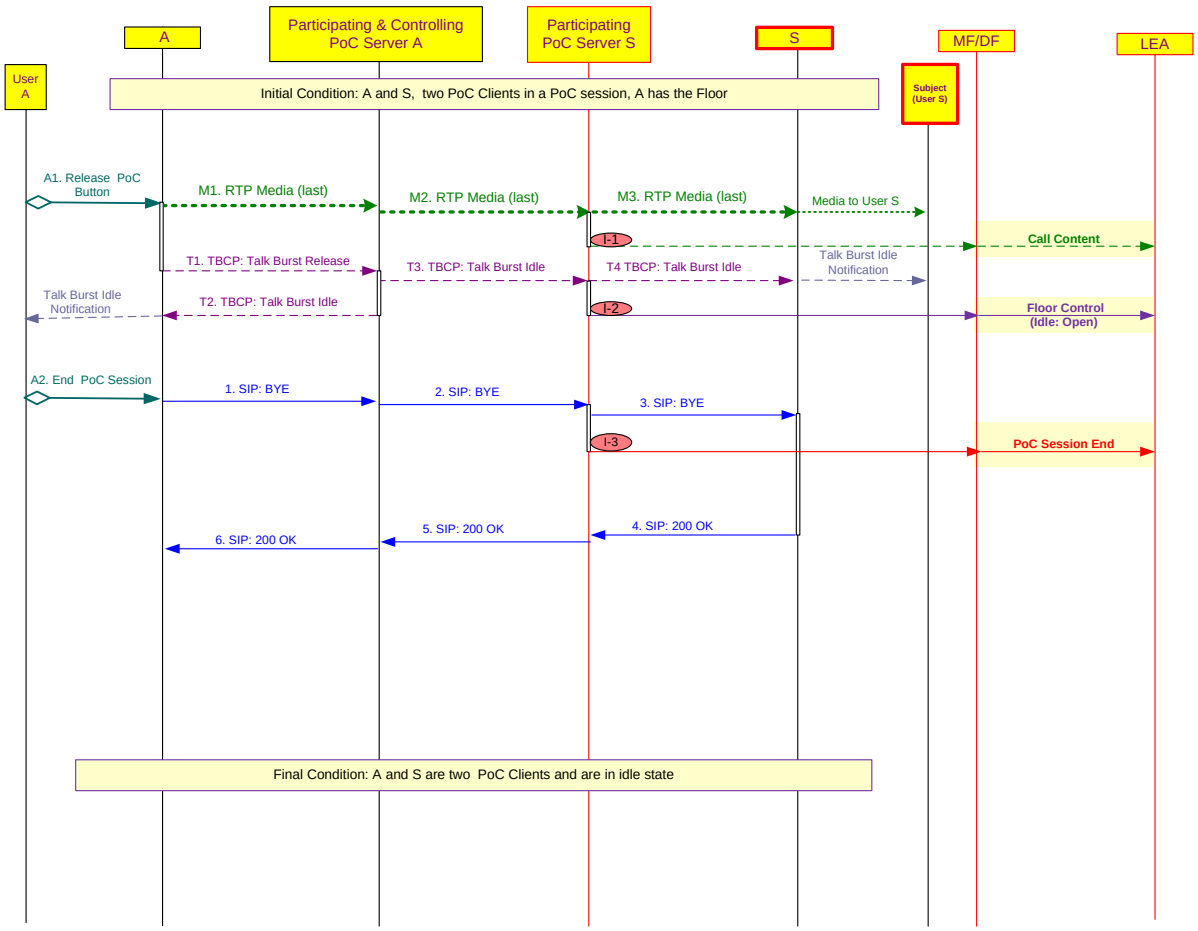

Figure C.6: PoC Client A ends the On-Demand PoC Session to PoC Intercept Subject S

This flow illustrates an example where PoC Client A initiated an On-Demand PoC Session with the PoC Intercept Subject S [shown as Subject (User S) in the flow].

Even though the flow shows the Subject (User S) as the only terminating PoC Client, the steps shown from the Controlling PoC Server towards the Subject (User S) would apply if more terminating PoC Clients were present in the PoC Session. Note that the other terminating PoC Clients may also be the targets of other independent lawful interception or just normal PoC Clients.

Furthermore, even though the flow presumes that both originating and terminating users have On-Demand PoC Clients, it is possible that the originating PoC Client and/or the other terminating users have Pre-Established PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients on the originating side are shown in Annex D.4 and the steps of Pre-Established PoC Clients on the terminating side are shown in Annex C.5.

Furthermore, the steps shown from the Controlling PoC Server towards the Subject (User S) would also apply if the originating PoC Client A had initiated a PoC Session with a Pre-Arranged Group with Subject (User S) as one of the PoC Clients in that group. The only difference in that case is that the Controlling PoC Server (associated with the Pre-Arranged Group) can be different from the Participating Server of A.

Description of the Steps:

In this call flow:

- A1 and A2 are the user actions.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps T1 to T4 show the TBCP-related messages.
- Steps 1 to 6 show the SIP signaling messages used to end an On-Demand PoC Session.
- Steps I1 to I4 illustrate the interception points.

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating Server of S forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User A.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the intercepting LEA.

TBCP-related Steps

T1. When User A presses the Release PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of A (which is also the Controlling PoC Server).

T2. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) of the Talk Burst Idle status (in other words, the floor is open).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

PoC Session Ending

A2: User A ends the On-Demand PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP BYE to the Participating PoC Server of A (which is also the Controlling PoC Server).
2. The Controlling PoC Server sends a SIP BYE to the Participating PoC Server of S.
3. The Participating PoC Server of S sends a SIP BYE to the PoC Client S.

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

4. The PoC Client S forwards the SIP 200 OK to the Participating PoC Server of S.
5. The Participating PoC Server of S forwards the SIP 200 OK to the Controlling PoC Server (which is also the Participating PoC Server of A).
6. The Participating PoC Server of A forwards the SIP 200 OK to the PoC Client A.

At the end of this flow, the PoC Client A and PoC Client S are in idle condition.

C.3 Pre-established Session Setup Procedures

This Clause provides the call flows that illustrate how LAES messages can be generated for Pre-Established Session setup and release procedures.

In this example, PoC client S is the PoC Intercept Subject and the respective Participating PoC Server provides the IAP function. The following call flows are included:

1. Pre-established Session Setup.
2. Pre-established Session Release.

C.3.1 Pre-established Session Setup

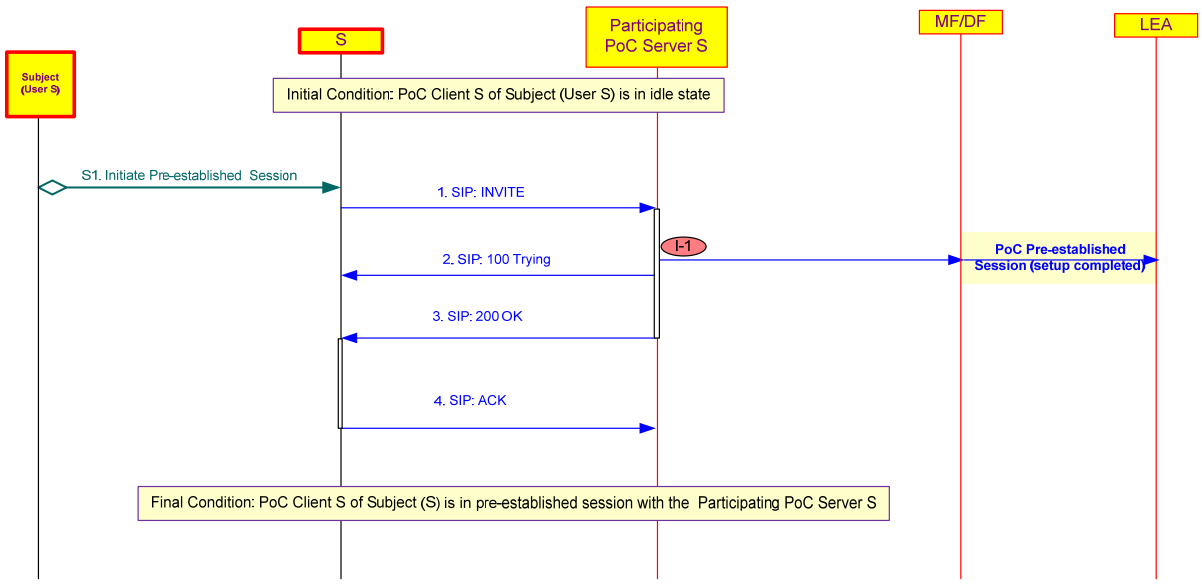

Figure C.7: PoC Pre-established Session setup for PoC Client S

This figure illustrates an example of the Pre-Established Session setup between the PoC Intercept Subject [shown as Subject (User S)] and the Participating PoC Server**.**

Note that, in subsequent Clauses that involve two PoC Clients (originating and terminating) with Pre-Established Sessions, the steps associated with the Pre-Established Session setups are exactly the same. A Pre-Established Session is not a PoC Session. A Pre-established Session is a Session establishment procedure between the PoC Client and the PoC Server to exchange necessary Media Parameters needed for setting up the media bearer. After the Pre-established Session is established, the PoC Client is able to activate the media bearer:

- Immediately after the Pre-established Session procedure; or,
- When the actual SIP signaling for the PoC Session is initiated.

Description of the Steps:

In this call flow:

- S1 represents the user action.
- Steps 1 to 4 show the SIP signaling messages used to setup the Pre-Established Sessions.
- Steps I1 to I2 illustrate the interception points.

Subject (User S) sets up Pre-Established Session

S1: Subject (User S) initiates a Pre-Established Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP INVITE to the associated Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 100 Trying to PoC Client S in response to the SIP INVITE.
3. The Participating PoC Server of S sends a SIP 200 OK to the PoC Client S.

   I1: The Participating PoC Server of S sends a notification to the MF/DF; the MF/DF sends the LAES PoC Pre-established Session (setup completed) message to the LEA.
4. The PoC Client S sends the SIP ACK to the Participating PoC Server S.

At the end of this flow, the PoC Client S has a Pre-Established Session with the Participating PoC Server of S.

C.3.2 Pre-established Session Release

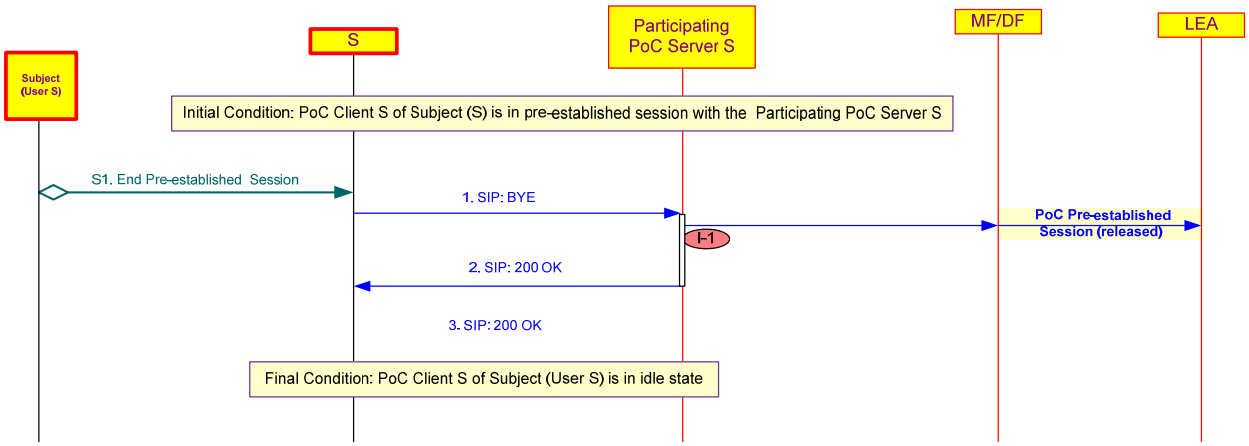

Figure C.8: The release of a Pre-Established Session

This flow illustrates an example of the release of a Pre-Established Session where the PoC Intercept Subject [shown as Subject (User S)] releases the Pre-Established Session to the Participating PoC Server.

In subsequent Clauses that involve two PoC Clients (originating and terminating) with Pre-Established Sessions, the steps associated with the Pre-Established Session releases are exactly the same.

Description of the Steps:

In this call flow:

- S1 represents user action.
- Steps 1 to 2 show the SIP signaling messages used to release the Pre-Established Sessions.
- Step I1 illustrates the interception point.

Subject (User S) releases the Pre-Established Session

S1: Subject (User S) ends the Pre-Established Session. The exact method used to end the Pre-Established Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP BYE to the associated Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 200 OK to the PoC Client S.

I1: The Participating PoC Server of S sends a notification to the MF/DF; the MF/DF sends the LAES PoC Pre-Established Session (released) message to the LEA.

At the end of this flow, the PoC Client S is in idle state.

C.4 Pre-established Subject-initiated PoC Sessions

This clause provides the informative call flows to illustrate examples of Pre-Established PoC Sessions that are initiated by the PoC Intercept Subject.

C.4.1 Ad Hoc Group and One-to-One PoC Sessions

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the PoC Intercept Subject would become the Controlling PoC Server and provide the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients – PoC Intercept Subject S (originating) and PoC client B (terminating). Both PoC Intercept Subject S and PoC client B have Pre-Established PoC clients.

The following two call flows are included:

1. Session Start Example.
2. Session End Example.

C.4.1.1 Subject-initiated PoC Session Start Example

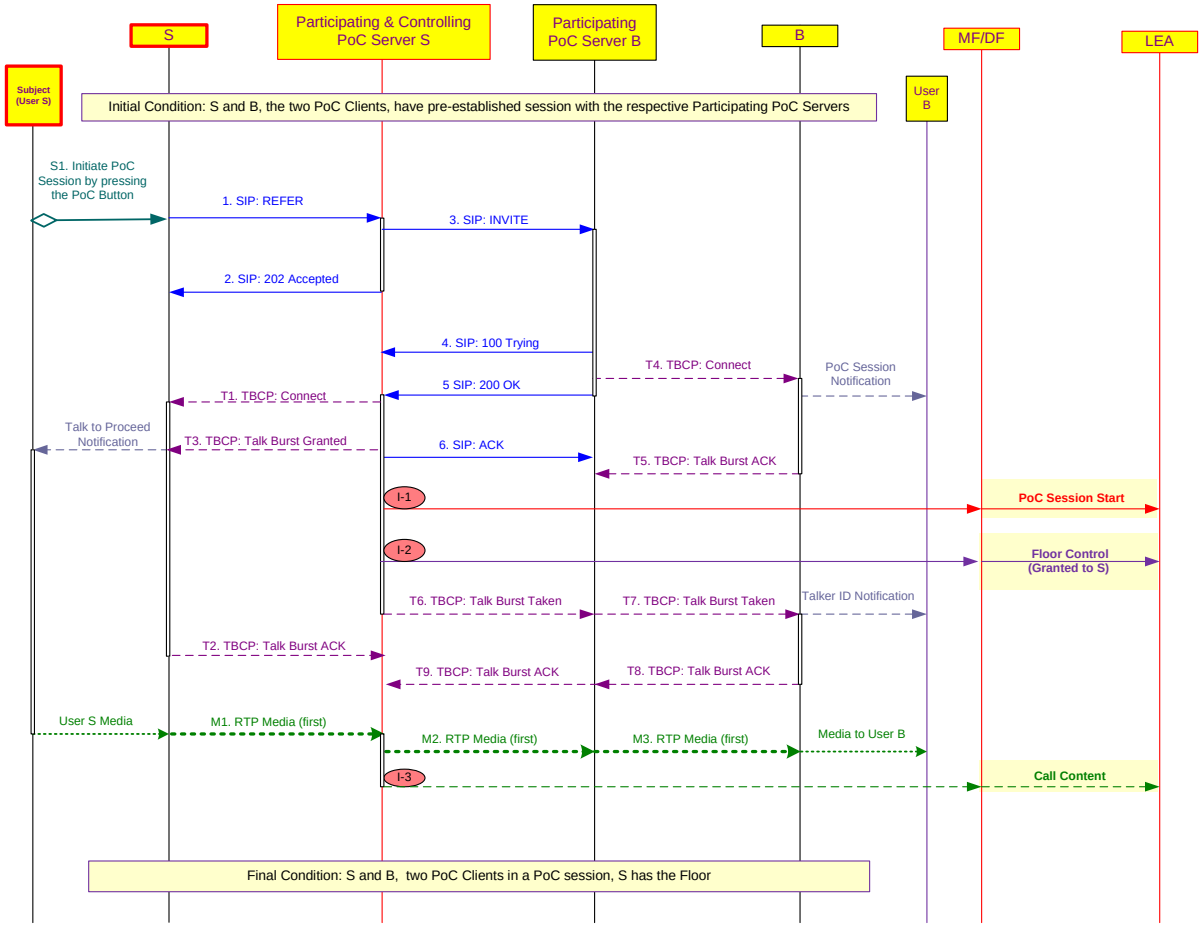

Figure C.9: PoC Intercept Subject S initiates a PoC Session to PoC Client B

This flow illustrates an example where PoC Intercept Subject S [shown as Subject (User S) in the flow] with a Pre-Established PoC Client initiates a PoC Session with PoC Client B, who also has a Pre-Established PoC Client. The flows illustrating the steps of the Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from the Controlling PoC Server towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that one or more of the terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the terminating side are shown in Annex C.2.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps 1 to 6 show the SIP signaling messages used to setup the PoC Session.
- Steps T1 to T9 show the TBCP-related messages.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

S1: Subject (User S) with a Pre-Established PoC Client S initiates a PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: INVITE) to the Participating PoC Server of S with which PoC Client S has a Pre-Established Session.
2. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Participating PoC Server of S plays the role of Controlling PoC Server which, in turn, determines all the users to whom the PoC Session request has to be sent (i.e., Ad Hoc Group case). In the example, there is only one terminating user, PoC Client B. The Controlling PoC Server sends the SIP INVITE to the Participating PoC Server of B.
4. The Participating Server of B sends a SIP 100 Trying to the Controlling PoC Server (which is also the Participating PoC Server of S) in response to the SIP INVITE.
5. The Participating PoC Server of B sends a SIP 200 OK to the Controlling PoC Server (which is also the Participating Server of S).
6. The Controlling PoC Server sends a SIP ACK to the Participating Server of B.

TBCP-related Steps

T1. The Participating PoC Server of S (which is also the Controlling PoC Server), upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client S.

I1: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

T2. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S (which is also the Controlling PoC Server).

T3. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Granted message to PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can now proceed to talk.

I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T4. The Participating PoC Server of B, upon sending the SIP 200 OK, sends a TBCP: Talk Burst Connect message to PoC Client B. The mobile device that has the PoC Client B notifies User B of the incoming PoC Session.

T5. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T6. The Controlling PoC Server (which is also the Participating PoC Server of S) sends a TBCP: Talk Burst Taken message to the Participating PoC Server of B.

T7. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies User B of the Talker ID [i.e., the identity of PoC Client S or Subject (User S)].

T8. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T9. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server.

Media transfer related steps

The Subject (User S) may begin talking upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I3: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M3. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Session with PoC Client S having the Floor (i.e., speaking).

C.4.1.2 Subject-initiated PoC Session End Example

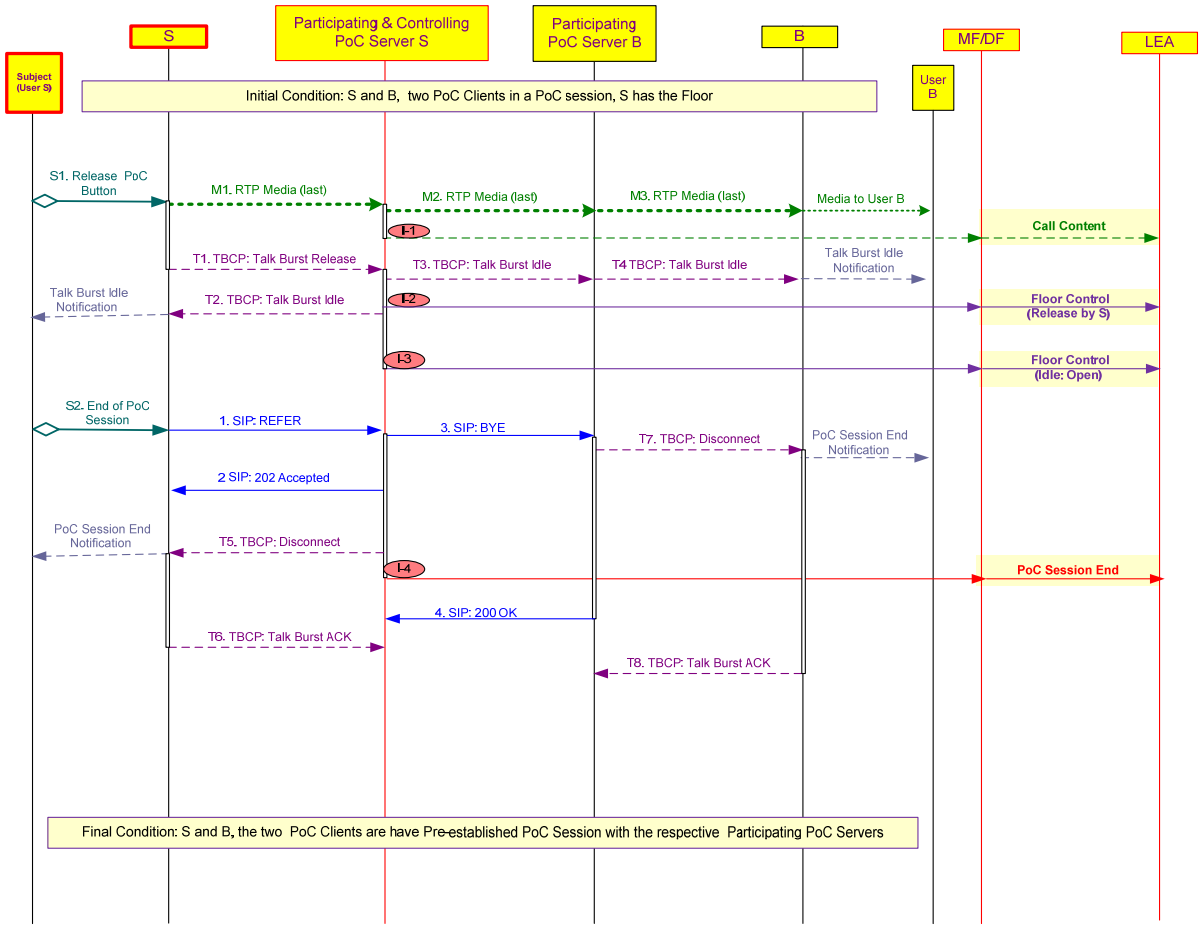

Figure C.10: PoC Intercept Subject S ends the PoC Session to PoC Client B

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] with a Pre-Established PoC Client ends a PoC Session with PoC Client B, who also has a Pre-Established PoC Client.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that one or more of the terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the terminating side are shown in Annex C.2.

Description of the Steps:

In this call flow:

- S1 and S2 are user actions.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps T1 to T8 show the TBCP-related messages.
- Steps 1 to 4 show the SIP signaling messages used to end the PoC Session.
- Steps I1 to I6 illustrate the interception points.

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M3. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from S.

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S (which is also the Controlling PoC Server).

I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T2. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies User B about the Talk Burst Idle status (in other words, the floor is open).

PoC Session Ending

S2: Subject (User S) ends the PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: BYE) to the Participating PoC Server of S (which is also the Controlling PoC Server).
2. The Participating PoC Server of S (which is also the Controlling PoC Server) sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Controlling PoC Server sends a SIP BYE to the Participating PoC Server of B.
4. The Participating PoC Server of B sends a SIP 200 OK to the Controlling PoC Server S.

2nd set of TBCP-related Steps

In the following steps, the Participating PoC Server & Controlling PoC Server S may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Participating PoC Server of B). The flow shows the former approach.

T5. The Participating PoC Server of S (which is also the Controlling PoC Server), upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the PoC Session has been ended.

I4: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

T6. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S (which is also the Controlling PoC Server).

T7. The Participating PoC Server of B, upon receiving the SIP BYE, sends a TBCP: Talk Burst Disconnect message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that the PoC Session has been ended.

T8. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

At the end of this flow, the PoC Client S and PoC Client B are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.4.2 Pre-Arranged Group PoC Sessions

The flows illustrated here apply to Pre-Arranged Group PoC Sessions, where the Controlling PoC Server [noted as Controlling PoC Server (X) within the flow diagrams] can be different from the Participating PoC Server of the PoC Intercept Subject.

Note that to simplify the drawing, the flows include just two PoC clients: PoC Intercept Subject S (originating) and PoC client B (terminating). In the example call flow, both PoC Intercept Subject S and PoC client B have Pre-Established PoC clients.

The following two call flows are included:

1. Session Start Example.
2. Session End Example.

C.4.2.1 Subject-initiated PoC Session Start Example

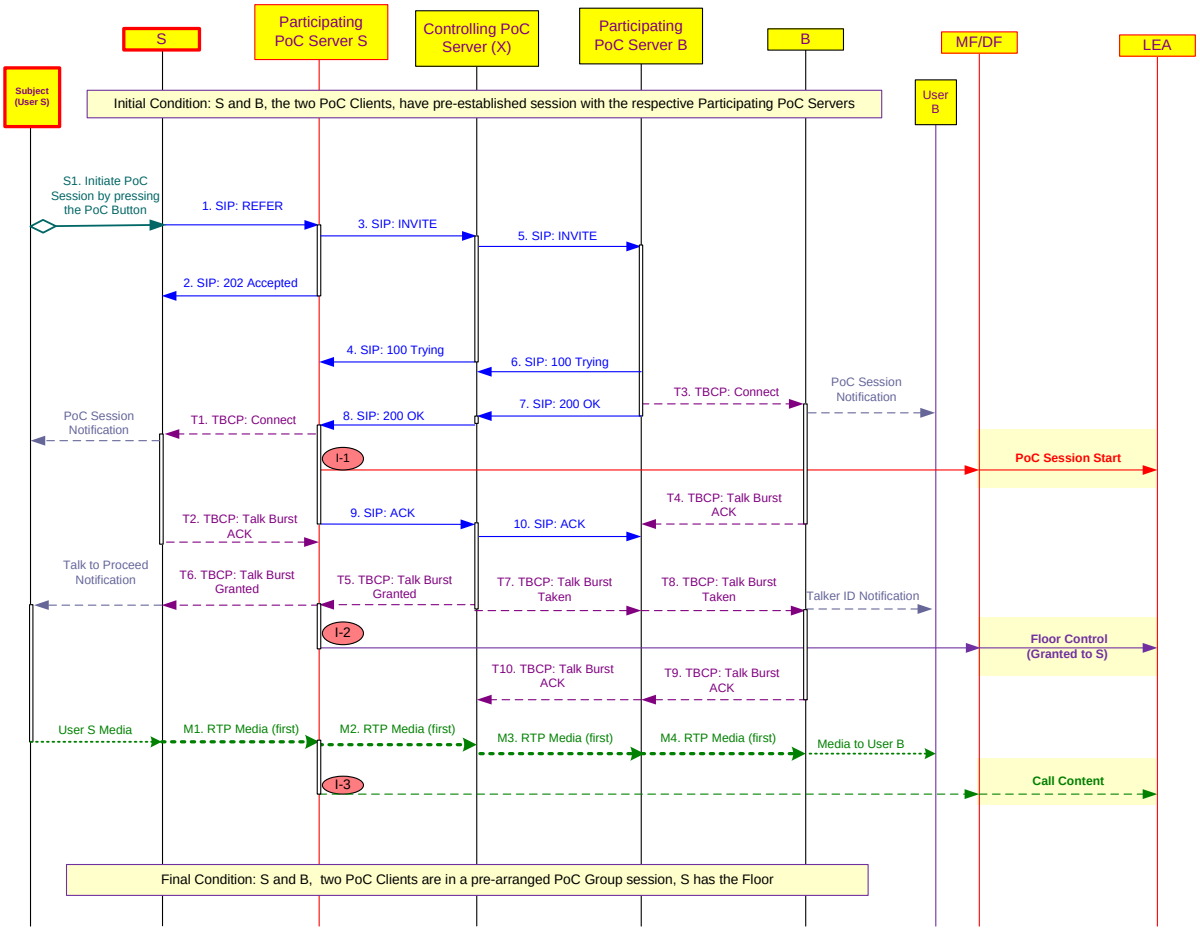

Figure C.11: PoC Intercept Subject S initiates a Pre-Arranged Group PoC Session to PoC Client B

This flow illustrates an example where PoC Intercept Subject S [shown as Subject (User S) in the flow] with a Pre-Established PoC Client initiates a PoC Session with a PoC Client B that also has a Pre-Established PoC Client. PoC Client B is part of a Pre-Arranged PoC Group.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server (X) towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that one or more of the terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the terminating side are shown in Annex D.2. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps 1 to 10 show the SIP signaling messages used to setup the PoC Session.
- Steps T1 to T10 show the TBCP-related messages.

- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

S1: Subject (User S) with a Pre-Established PoC Client S initiates a PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: INVITE) to the Participating PoC Server of S with which PoC Client S has a Pre-Established Session.
2. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Participating PoC Server of S sends a SIP INVITE to the Controlling PoC Server (X).
4. The Controlling PoC Server (X) sends a SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
5. The Controlling PoC Server (X) determines all the users in the Pre-Arranged PoC Group to whom the PoC Session request has to be sent. In the example, there is only one terminating user, PoC Client B. Controlling PoC Server (X) sends the SIP INVITE to the Participating PoC Server of B.
6. The Participating Server of B sends a SIP 100 Trying to the Controlling PoC Server (X).
7. The Participating PoC Server of B sends a SIP 200 OK to the Controlling PoC Server (X).
8. The Controlling PoC Server (X) forwards the SIP 200 OK to the Participating PoC Server of S.
9. The Participating PoC Server of S sends a SIP ACK to the Controlling PoC Server (X).
10. The Controlling PoC Server (X) forwards the SIP ACK to the Participating Server of B.

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (X) may generate the TBCP: Talk Burst Granted message and TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of S or when it receives the SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where TBCP: Talk Burst Granted message reaches the device before the TBC: Connect message, it is possible that some implementation may follow that approach.

T1. The Participating PoC Server of S, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client S.

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

T2. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T3. The Participating PoC Server of B, upon sending the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client B. The mobile device that has the PoC Client B notifies User B of the incoming PoC Session.

T4. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T6. The participating PoC Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can now proceed to talk.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T7. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the Participating PoC Server of B.

T8. Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client S or Subject (User S)) to the User B.

T9. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

The Subject (User S) may begin talking upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client S receives the user media from the Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

I3: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M3. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Session with PoC Client S having the Floor (i.e., speaking).

C.4.2.2 Subject-initiated PoC Session End Example

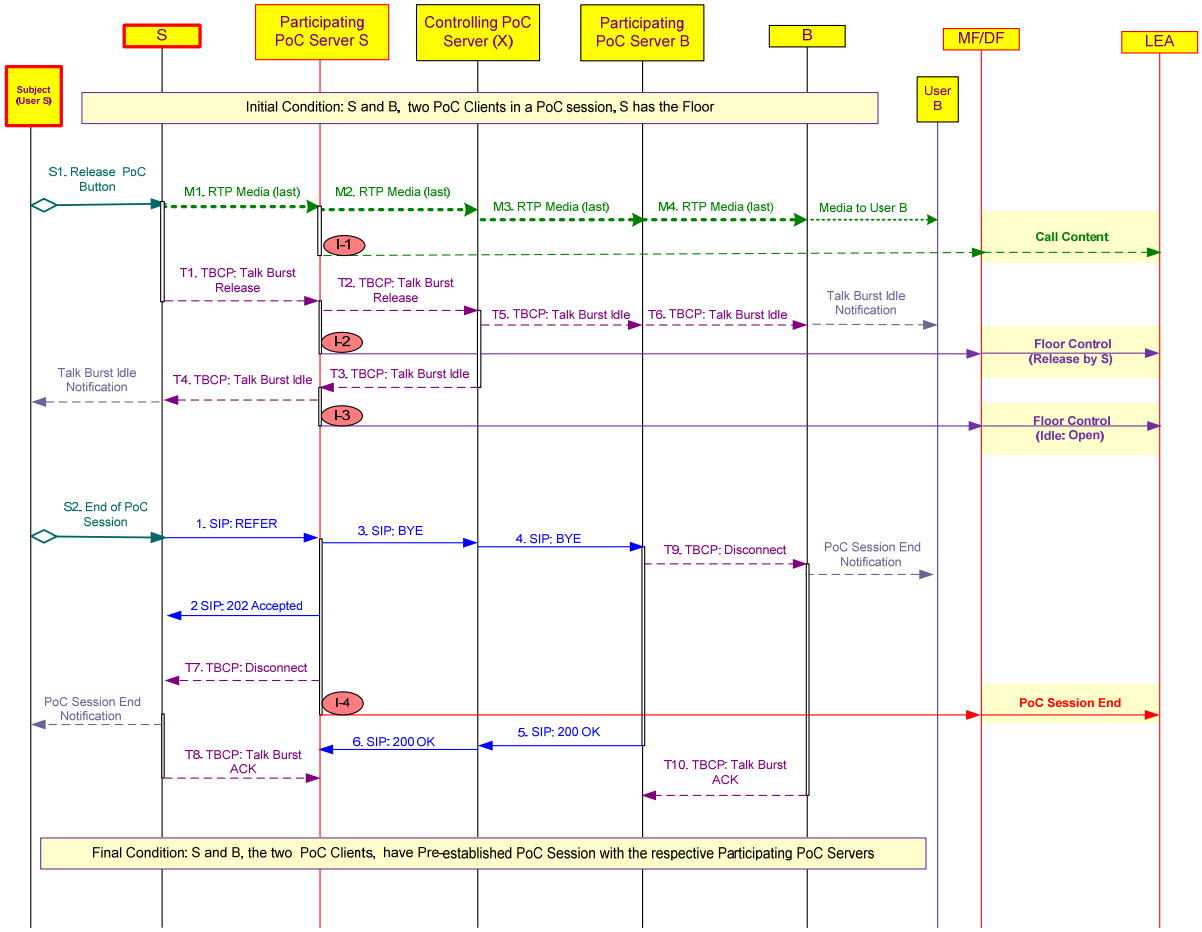

Figure C.12: PoC Intercept Subject S ends the Pre-Arranged Group PoC Session to PoC Client B

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] with a Pre-Established PoC Client ends a PoC Session with a PoC Client B that also has a Pre-Established PoC Client. The PoC Client B is part of a Pre-Arranged PoC Group.

Even though the flow shows only one terminating PoC Client (PoC Client B), the steps shown from Controlling PoC Server (X) towards PoC Client B would apply if more terminating PoC Clients were present in the PoC Session.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that one or more of the terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the terminating side are shown in Annex C.2.

Description of the Steps:

In this call flow:

- S1 and S2 are the user actions.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps T1 to T10 show the TBCP-related messages.
- Steps 1 to 6 show the SIP signaling messages used to end the PoC Session.

- Steps I1 to I6 illustrate the interception points.

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M3. The Controlling PoC Server (X) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from Subject (User S).

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) to the LEA.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

T3. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

PoC Session Ending

S2: Subject (User S) ends the PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: BYE) to the Participating PoC Server of S.

2. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Participating PoC Server of S sends a SIP BYE to the Controlling PoC Server (X).
4. The Controlling PoC Server (X) forwards the SIP BYE to the Participating PoC Server of B.
5. The Participating PoC Server of B sends a SIP 200 OK to the Controlling PoC Server (X).
6. The Controlling PoC Server (X) forwards the SIP 200 OK to the Participating PoC Server of S.

2nd set of TBCP-related Steps

In the following steps, the Participating PoC Server of S may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps [i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (X)]. The flow shows the former approach.

T7. The Participating PoC Server of S, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) PoC Session has been ended.

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

T8. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T9. The Participating PoC Server of B, upon receiving the SIP BYE, sends a TBCP: Talk Burst Disconnect message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that PoC Session has been ended.

T10. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

At the end of this flow, the PoC Client S and PoC Client B are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.5 PoC Sessions to Pre-established PoC Intercept Subject

This clause provides the informative call flows to illustrate examples of PoC Sessions that are terminated to the Pre-Established PoC Intercept Subject.

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the originating PoC client would become the Controlling PoC Server. However, since the PoC Intercept Subject is a terminating PoC client, the Participating PoC Server of the PoC Intercept Subject would provide the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients – PoC client A (originating) and PoC Intercept Subject S (terminating). Both PoC client A and PoC Intercept Subject S have Pre-Established PoC clients.

The following two call flows are included:

1. Session Start Example.
2. Session End Example.

C.5.1 PoC Session to PoC Intercept Subject – Session Start Example

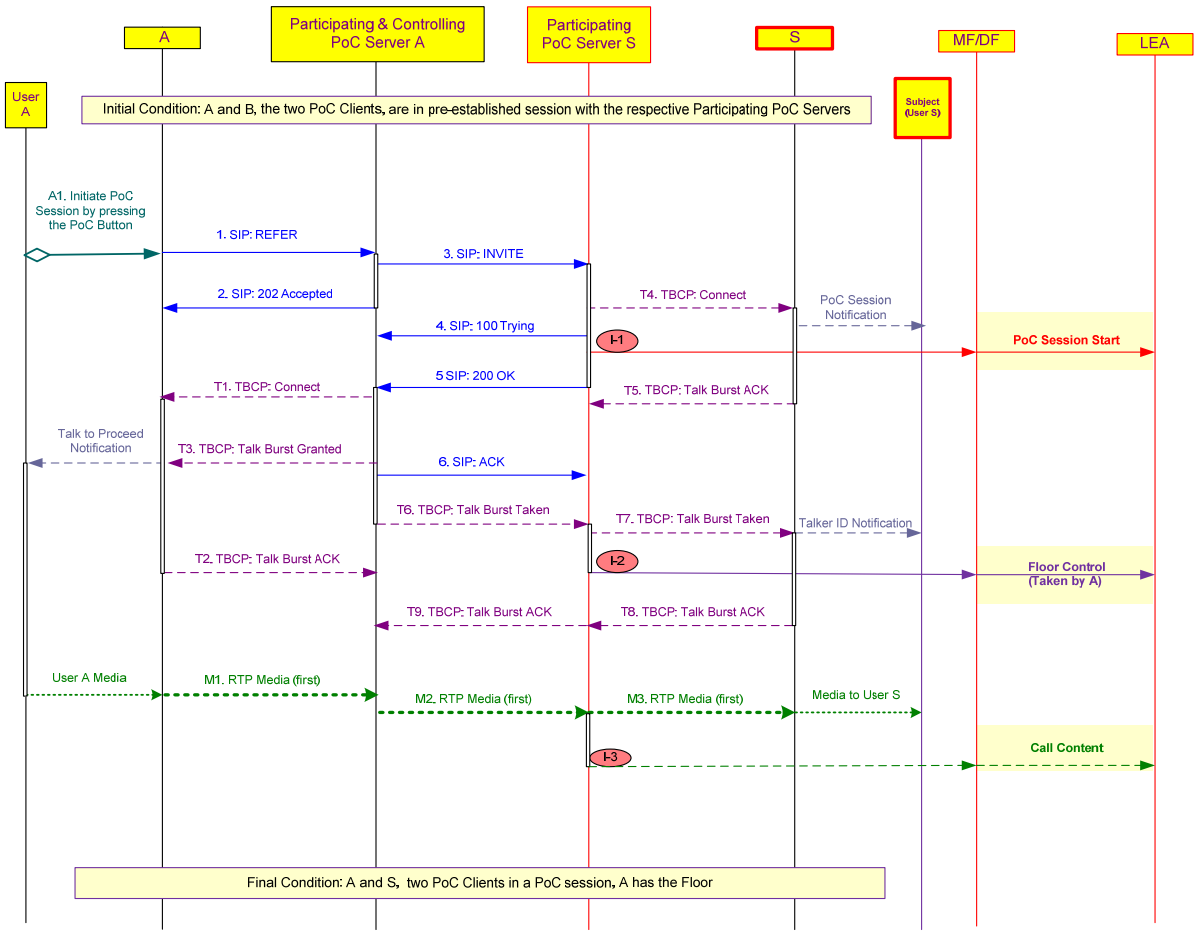

Figure C.13: PoC Intercept Subject S receives a PoC Session from PoC Client A

This flow illustrates an example where the PoC Intercept Subject S [shown as Subject (User S) in the flow] with a Pre-Established PoC Client receives a PoC Session from a PoC Client A which also has a Pre-Established PoC Client. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex D.3.

Even though the flow shows Subject (User S) as the only one terminating PoC Client, the steps shown from Controlling PoC Server towards Subject (User S) would apply if more terminating PoC Clients were present in the PoC Session. Note that the other terminating PoC Clients may also be the targets of other independent lawful interception or just normal PoC Clients.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that the originating PoC Client and/or the other terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the originating side are shown in Annex C.1 and the steps of On-Demand PoC Clients on the terminating side are shown in Annex C.2.

Furthermore, the steps shown from Controlling PoC Server towards the Subject (User S) would also apply if the originating PoC Client A has initiated a PoC Session to a Pre-Arranged PoC Group with Subject (User S) as one of the PoC Clients in that group. The only difference though in that case is that the Controlling PoC Server can be different from the Participating Server of A.

Description of the Steps:

In this call flow:

- A1 is a user action.
- Steps 1 to 6 show the SIP signaling messages used to setup the PoC Session from/to the Pre-Established PoC Clients.
- Steps T1 to T9 show the TBCP-related messages.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps I1 to I3 illustrate the interception points.

A1: User A with a Pre-Established PoC Client A initiates a PoC Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP REFER (type: INVITE) to the Participating PoC Server of A, with which PoC Client A has a Pre-Established Session.
2. The Participating PoC Server of A sends a SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Participating PoC Server of A plays the role of Controlling PoC Server which, in turn, determines all the users to whom the PoC Session request has to be sent (i.e., Ad Hoc Group case). In the example, there is only one terminating user, Subject (User S). The Controlling PoC Server sends the SIP INVITE to the Participating PoC Server of S.
4. The Participating Serer of S sends a SIP 100 Trying to the Controlling PoC Server (which is also the Participating PoC Server of A) in response to the SIP INVITE.
5. The Participating PoC Server of S sends a SIP 200 OK to the Controlling PoC Server (which is also the Participating Server of S).
6. The Controlling PoC Server sends a SIP ACK to the Participating Server of S.

TBCP-related Steps

T1. The Participating PoC Server of A (which is also the Controlling PoC Server), upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client A.

T2. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A (which is also the Controlling PoC Server).

T3. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the User A can now proceed to talk.

T4. The Participating PoC Server of S, upon sending the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client S. The mobile device that has the PoC Client S notifies the incoming PoC Session to the Subject (User S).

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

T5. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T6. The Controlling PoC Server (which is also the Participating PoC Server of A) sends a TBCP: Talk Burst Taken message to the Participating PoC Server of S.

T7. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID [i.e., the identity of PoC Client A or User A) to the Subject (User S)].

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by S) message to the LEA.

T8. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T9. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server.

Media transfer related steps

User A may begin talking upon receiving the Proceed to Talk notification.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

I3: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At the end of this flow, the PoC Client A and PoC Client S are in a PoC Session with PoC Client A having the Floor (i.e., speaking).

C.5.2 PoC Session to PoC Intercept Subject – Session End Example

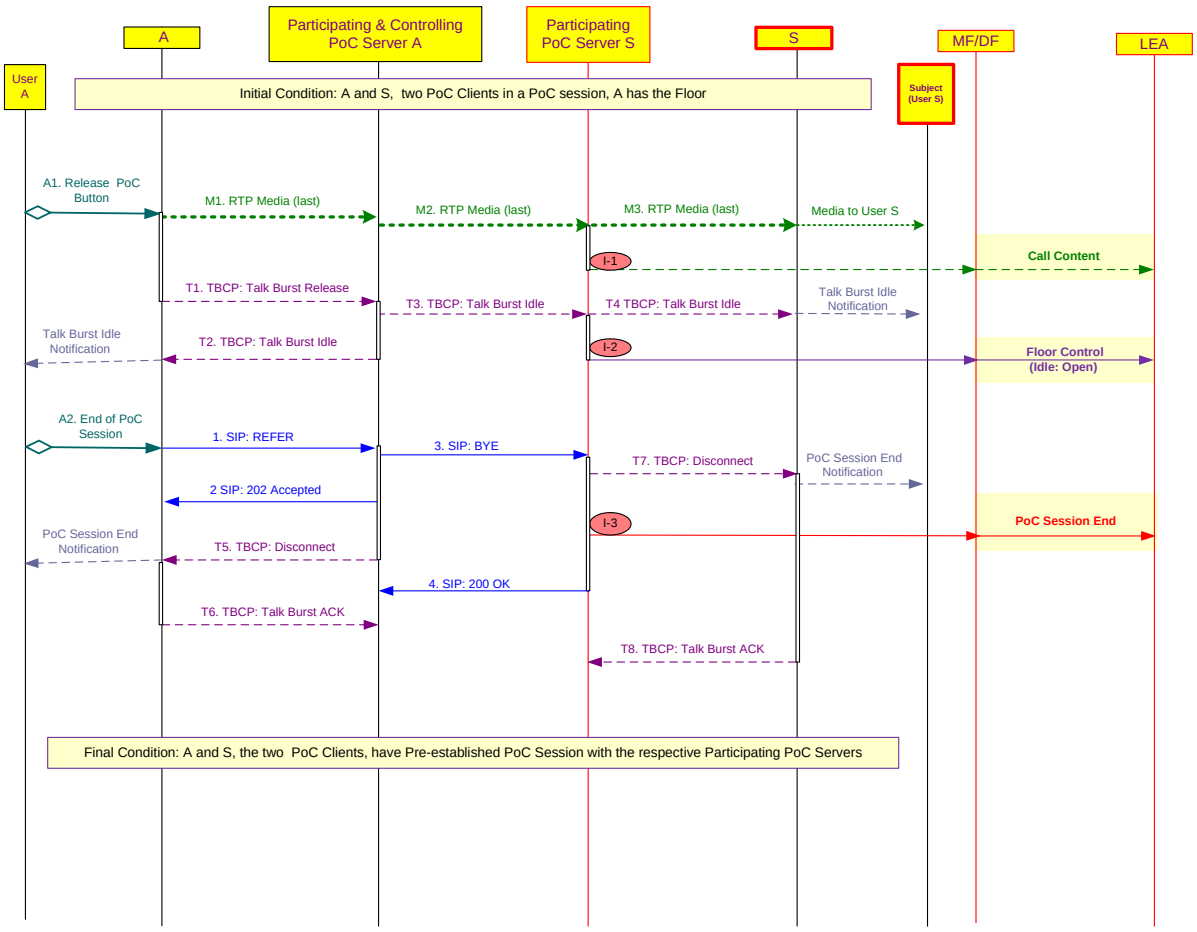

Figure C.14: PoC Client A ends the PoC Session with the PoC Intercept Subject S

This flow illustrates an example where a User A with a Pre-Established PoC Client, A, ends a PoC Session to the PoC Intercept Subject [shown as Subject (User A) in the flow] who also has a Pre-Established PoC Client, S. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow shows Subject (User S) as the only one terminating PoC Client, the steps shown from Controlling PoC Server towards Subject (User S) would apply if more terminating PoC Clients were present in the PoC Session. Note that the other terminating PoC Clients may also be the targets of other independent lawful interception or just the normal PoC Clients.

Furthermore, even though the flow presumes that both originating and terminating users have PoC Clients with Pre-Established Sessions, it is possible that originating PoC Client and/or the other terminating users have On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients on the originating side are shown in Annex C.1 and the steps of On-Demand PoC Clients on the terminating side are shown in Annex C.2.

Furthermore, the steps shown from Controlling PoC Server towards the Subject (User S) would also apply if the originating PoC Client A has initiated a PoC Session to a Pre-Arranged PoC Group with Subject (User S) as one of the PoC Clients in that group. The only difference though in that case is that the Controlling PoC Server can be different from the Participating Server of A.

Description of the Steps:

In this call flow:

- A1 and A2 are the user actions.
- Steps M1 to M3 illustrate the RTP media flow between two points.
- Steps T1 to T8 show the TBCP-related messages.
- Steps 1 to 4 show the SIP signaling messages used to end the PoC Session.
- Steps I1 to I3 illustrate the interception points.

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating Server of S forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User A.

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of A (which is also the Controlling PoC Server).

T2. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

PoC Session Ending

A2: User A ends the PoC Session. The exact method used to end such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP REFER (type: BYE) to the Participating PoC Server of A (which is also the Controlling PoC Server).
2. The Participating PoC Server of A (which is also the Controlling PoC Server) sends a SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Controlling PoC Server sends a SIP BYE to the Participating PoC Server of S.

4. The Participating PoC Server of S sends a SIP 200 OK to the Controlling PoC Server.

2nd set of TBCP-related Steps

In the following steps, the Participating PoC Server and Controlling PoC Server A may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Participating PoC Server of S). The flow shows the former approach.

T5. The Participating PoC Server of A (which is also the Controlling PoC Server), upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the PoC Session has been ended.

T6. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A (which is also the Controlling PoC Server).

T7. The Participating PoC Server of S, upon receiving the SIP BYE, sends a TBCP: Talk Burst Disconnect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that PoC Session has been ended.

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

T8. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

At the end of this flow, the PoC Client A and PoC Client S are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.6 Subject-initiated PoC Session Flow Control Examples

This clause provides the informative call flows to illustrate flow control examples for On-Demand or Pre-Established PoC Sessions that are initiated by the PoC Intercept Subject.

C.6.1 Ad Hoc Group and One-to-One PoC Sessions

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the PoC Intercept Subject becomes the Controlling PoC Server and provides the IAP functions.

Note that to simplify the drawing, all the flows include just two PoC clients – PoC Intercept Subject S (originating) and PoC client B (terminating). The PoC Intercept Subject S and PoC client B have On-Demand or Pre-Established PoC clients. The same call flows apply to both On-Demand and Pre-Established PoC clients.

The following call flows are included:

1. Flow Control Example.
2. Queued Flow Control Example.
3. Denied Flow Control Example.
4. Revoked Flow Control Example.

C.6.1.1 Subject-initiated PoC Session – Floor Control Example

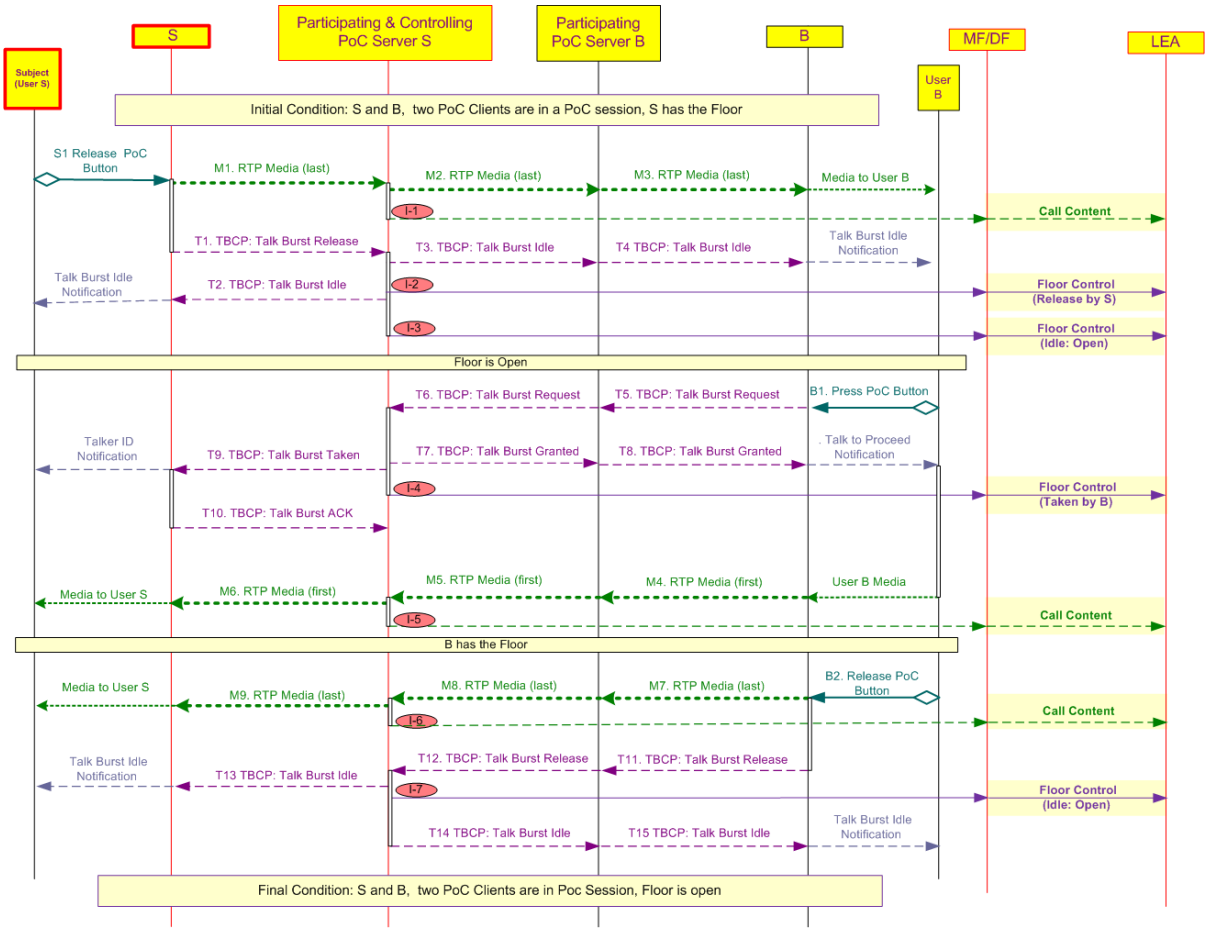

Figure C.15: Subject-initiated PoC Session to PoC Client B – Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session can either be One-to-One PoC Session or to an Ad Hoc Group PoC Session. The flow illustrates the examples of normal Floor Control scenarios.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1, B1, and B2 are user actions.
- Steps T1 to T15 show the TBCP-related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

Subject (User S) has the Floor; Subject (User S) relinquishes the Floor

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M3. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from Subject (User S).

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of S (which is also the Controlling PoC Server).

I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T2. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

User B acquires the Floor

B1: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T5. When the User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T7. The Controlling PoC Server sends a TBCP: Talk Burst Granted message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Granted message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the User B can proceed to speak.

T9. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client B or User B) to the Subject (User S).

I4: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by B) message to the LEA.

T10. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S (which is also the Controlling PoC Server).

Media transfer related steps

User B, who has the floor, will speak to Subject (User S).

M4. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M5. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M6. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User B.

I5: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time of the flow, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

User B has the Floor; User B relinquishes the Floor

B2: User B releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User B indicates the end of speaking, the last media is sent towards the listener.

M7. The mobile device that has the PoC Client B receives the user media from User B and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M8. The Participating PoC Server of B forwards this last Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M9. The Participating and Controlling PoC Server S forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User B.

I6: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T11. When the User B releases the PoC button, the PoC Client B, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of B.

T12. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T13. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I7: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T14. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T15. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

C.6.1.2 Subject-initiated PoC Session - Queued Flow Control Example

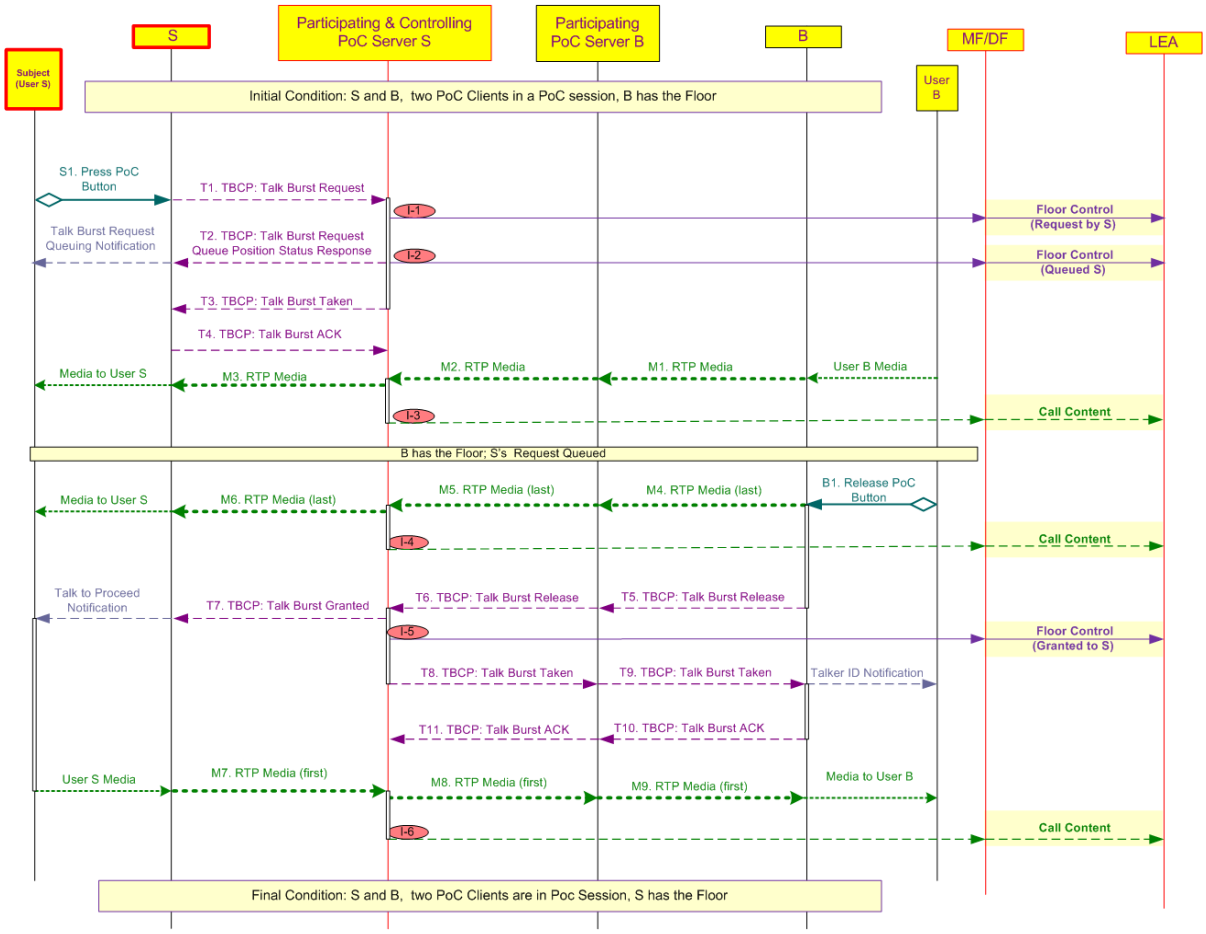

Figure C.16: Subject-initiated PoC Session to PoC Client B – Queued (S) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session can either be One-to-One PoC Session or to an Ad Hoc Group PoC Session. The flow illustrates an example of Floor Control where a request for a Floor (i.e., Talk Burst

Request) is queued. In this example, the Subject's (User S') request is queued as the request is sent while User B has the Floor.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1 and B1 are user actions.
- Steps T1 to T11 show the TBCP-related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I6 illustrate the interception points.

User B has the Floor; the Subject's (User S') request to acquire the Floor is queued

S1: Subject (User S) presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S (which is also the Controlling PoC Server).

I1: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T2. The Controlling PoC Server (which is also the Participating PoC Server of S) is aware that the Floor is not open, but the Subject (User S) request can be queued. And hence, the Participating and Controlling PoC Server S sends a TBCP: Talk Burst Request Queue Position Status Response message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Talk Burst Request has been queued.

I2: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Queued) message to the LEA.

T3. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Taken message to the PoC Client S.

T4. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S (which is also the Controlling PoC Server).

Media transfer related steps

User B, who has the floor, is still speaking to Subject (User S).

M1. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M2. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M3. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) continues to receive the media from User B.

I3: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time of the flow, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

User B has the Floor; User B relinquishes the Floor; Granting the Floor to Subject (User S)

B1: User B releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User B indicates the end of speaking, the last media is sent towards the listener.

M4. The mobile device that has the PoC Client B receives the user media from User B and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M5. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M6. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User B.

I4: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T5. When the User B releases the PoC button, the PoC Client B, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T7. The Controlling PoC Server (which is also the Participating PoC Server of S) is aware that a Talk Burst Request from the Subject (User S) has been queued. The queued Talk Burst Request is honored at this time and hence, the Participating and Controlling PoC Server S sends a TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can proceed to speak.

I5: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T8. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T9. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to the User B.

T10. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T11. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of S).

Media transfer related steps

M7. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends a Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I6: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M8. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M9. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At this time of the flow, the PoC Client S has the Floor (i.e., speaking to User B).

C.6.1.3 Subject-initiated PoC Session - Denied Flow Control Example

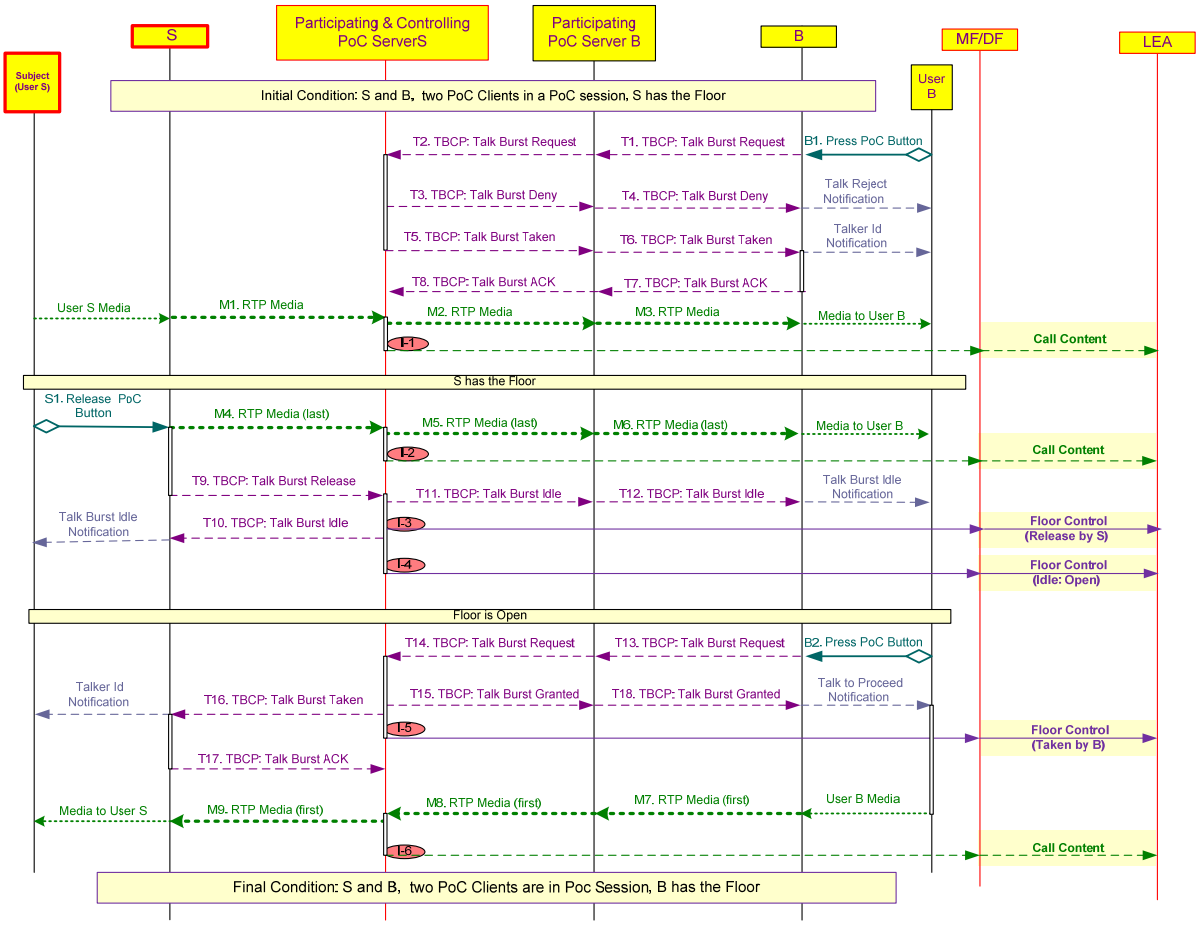

Figure C.17: Subject-initiated PoC Session to PoC Client B – Denied (B) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session can either be One-to-One PoC Session or an Ad Hoc Group PoC Session. The flow illustrates an example Floor Control where a request for Floor (i.e., Talk Burst Request) is rejected. In this example, User B's request is rejected as the request is sent while Subject (User S) has the Floor.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1, B1, and B2 are user actions.
- Steps T1 to T17 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I6 illustrate the interception points.

Subject (User S) has the Floor; User B's attempt to acquire the Floor is rejected

B1: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T2. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T3. The Controlling PoC Server (which is also the Participating PoC Server of S) is aware that the Floor is not open, and the User B request cannot be queued. Hence, the Controlling PoC Server sends a TBCP: Talk Burst Deny message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Deny message to PoC Client B. The mobile device that has PoC Client B notifies User B that the Talk Burst Request has been rejected.

T5. Since the Subject (User S) has the Floor, the Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to the User B.

T7. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of S).

Media transfer related steps

Subject (User S), who has the floor, is still speaking to User B.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M3. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B continues to receive the media from Subject (User S).

At this time, the PoC Client S still has the Floor (i.e., speaking to User B).

Subject (User S) has the Floor; Subject (User S) relinquishes the Floor

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M4. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I2: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M5. The Controlling PoC Server forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, User B receives the last of the media from Subject (User S).

TBCP-related Steps

T9. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of S (which is also the Controlling PoC Server).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T10. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T11. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T12. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

User B, whose previous attempt was rejected, acquires the Floor

B2: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T13. When the User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T14. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T15. The Controlling PoC Server sends a TBCP: Talk Burst Granted message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T16. The Participating PoC Server of B forwards the TBCP: Talk Burst Granted message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that he can proceed to speak.

T17. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client B or User B) to the Subject (User S).

I4: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by B) message to the LEA.

T18. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S (which is also the Controlling PoC Server).

Media transfer related steps

User B, who has the floor, will speak to Subject (User S).

M7. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M8. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M9. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User B.

I5: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time, PoC Client B has the Floor [i.e., speaking to Subject (User S)].

C.6.1.4 Subject-initiated PoC Session - Revoked Flow Control Example

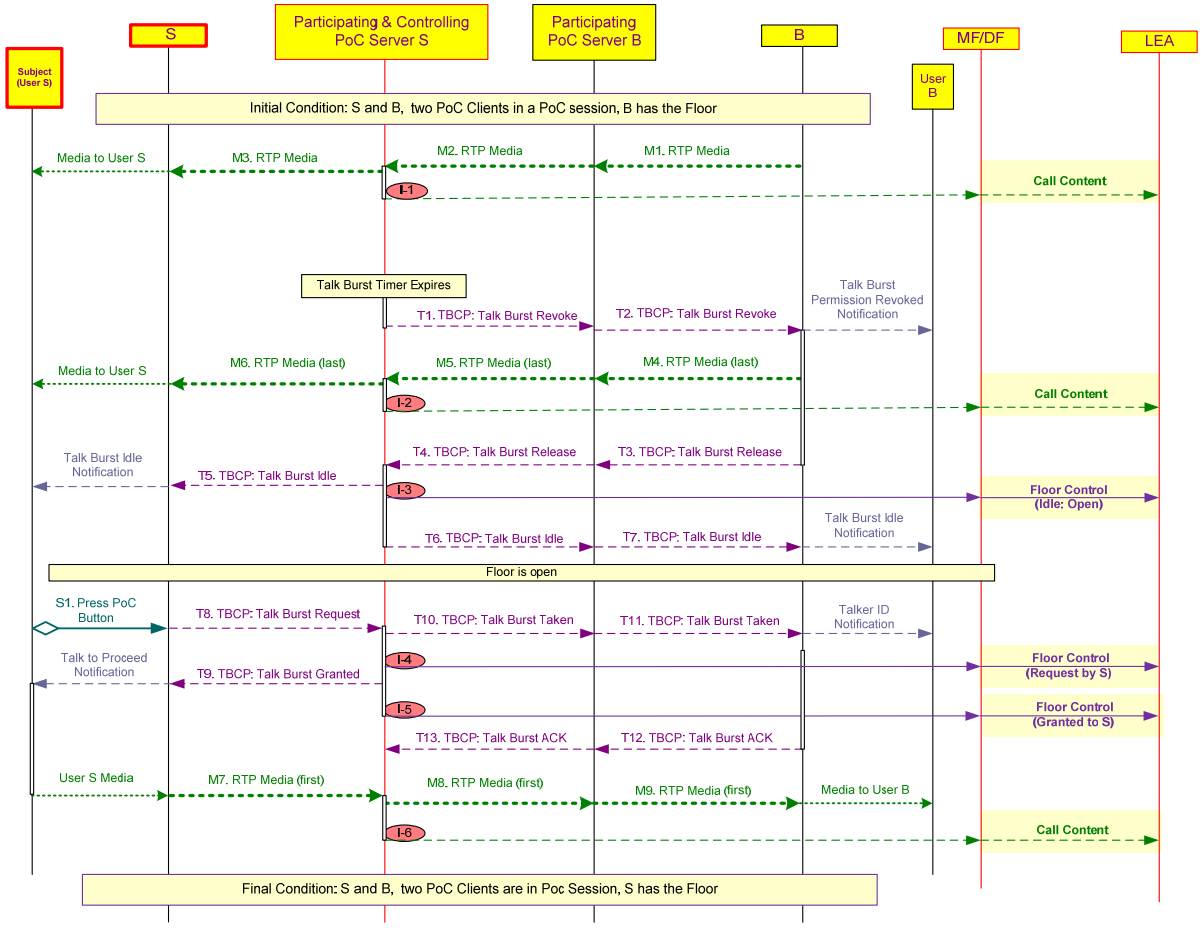

Figure C.18: Subject-initiated PoC Session to PoC Client B – Revoked (B) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session can either be One-to-One PoC Session or an Ad Hoc Group PoC Session. The flow illustrates an example of Floor Control where the Floor Control of a PoC Client is revoked. In this example, User B's Floor Control is revoked after a pre-determined timer is expired.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps T1 to T13 show the TBCP-related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I6 illustrate the interception points.

User B has the Floor; The Floor is revoked from User B

Media transfer related steps

User B, who has the floor, is speaking to Subject (User S).

M1. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M2. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M3. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) continues to receive the media from User B.

I1: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At this time, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

TBCP-related Steps

T1. The Controlling PoC Server is aware that User B has a timed permission to have the Floor. The timer used to manage this limit (shown as Talk Burst Timer) expires. The Controlling PoC Server sends TBCP: Talk Burst Revoke message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

T2. The Participating PoC Server of B forwards the TBCP: Talk Burst Revoke message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the User B's Talk Burst permission has been revoked (i.e., Floor has been revoked).

Media transfer related steps

PoC Client B, upon receiving the TBCP: Talk Burst Revoke message, prepares to relinquish the Floor. The last media stream is transferred from User B to the listener.

M4. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M5. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of S).

M6. The Participating and Controlling PoC Server S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User B.

I2: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T3. Upon transferring the last of the media to the listener, the PoC Client B sends TBCP: Talk Burst Release message to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of S).

T5. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T6. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T7. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

Floor is open; Subject (User S) acquires the Floor

S1: Subject (User S) presses the PoC button in order to acquire the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T8. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S (which is also the Controlling PoC Server).

I4: Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T9. The Participating and Controlling PoC Server S sends a TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can proceed to speak.

I5: The Participating and Controlling PoC Server S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T10. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T11. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S]) to User B.

T12. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T13. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of S).

Media transfer related steps

M7. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S (which is also the Controlling PoC Server).

I6: The Participating and Controlling PoC Server S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M8. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M9. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At this time, the PoC Client S has the Floor (i.e., speaking to User B).

C.6.2 Pre-Arranged Group PoC Sessions

The flows illustrated here apply to Pre-Arranged Group PoC Sessions, where the Controlling PoC Server [noted as Controlling PoC Server (X) within the flow diagrams] can be different from the Participating PoC Server of the PoC Intercept Subject.

Note that to simplify the drawing, all the flows include just two PoC clients – PoC Intercept Subject S (originating) and PoC client B (terminating). The PoC Intercept Subject S and PoC client B have On-Demand or Pre-Established PoC clients. The same call flows apply to both On-Demand and Pre-Established PoC clients.

The following call flows are included:

1. Flow Control Example.
2. Queued Flow Control Example.
3. Denied Flow Control Example.
4. Revoked Flow Control Example.

C.6.2.1 Subject-initiated Pre-Arranged Group PoC Session – Floor Control Example

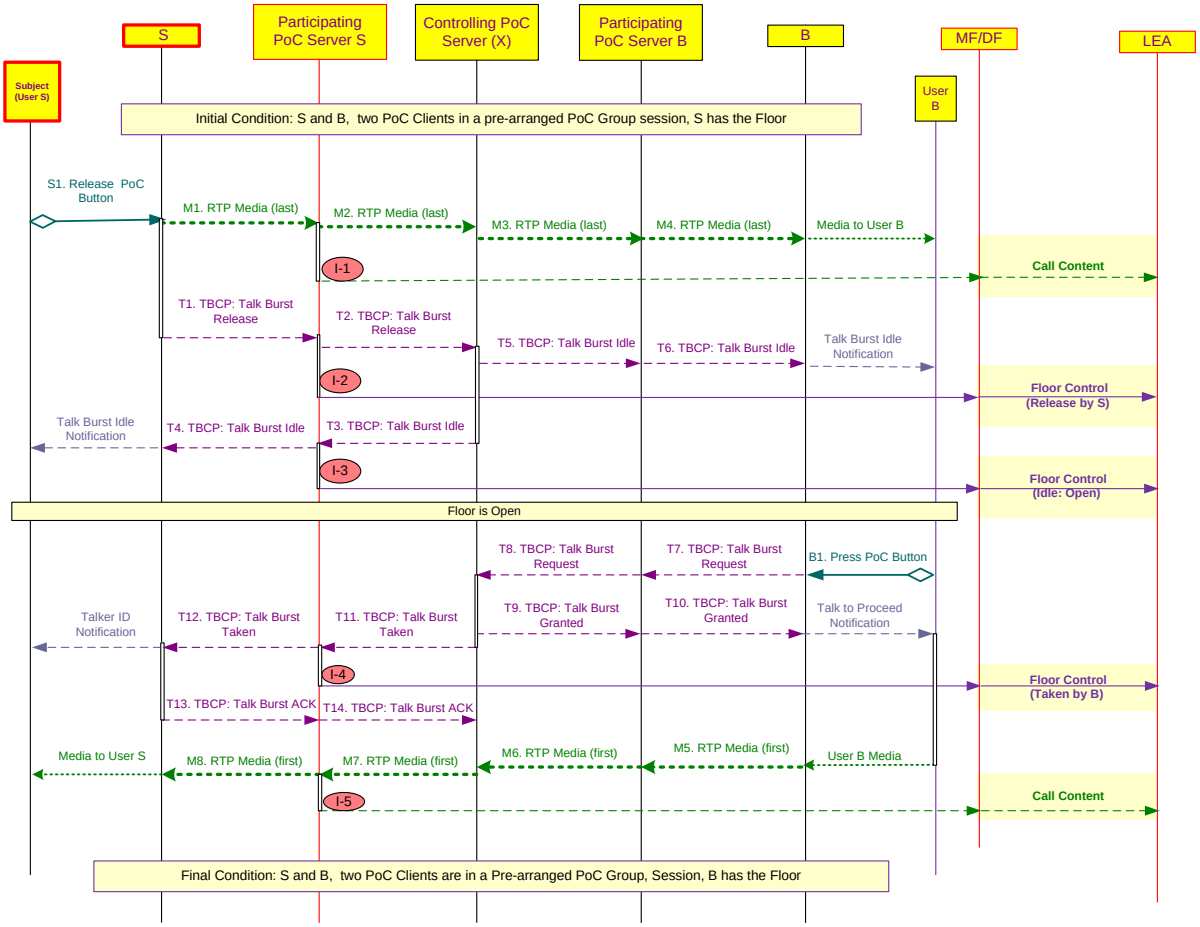

Figure C.19: Subject-initiated Pre-Arranged Group PoC Session to PoC Client B – Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session is to a Pre-Arranged Group. The flow illustrates the examples normal Floor Control scenarios.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1, B1, and B2 are user actions.
- Steps T1 to T14 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M8 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

Subject (User S) has the Floor; Subject (User S) relinquishes the Floor

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards this last Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M3. The Controlling PoC Server (X) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from Subject (User S).

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T3. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

User B acquires the Floor

B1: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T7. When the User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (X).

T9. The Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Granted message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the User B can proceed to speak.

T11. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T12. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client B or User B) to the Subject (User S).

I4: The Participating Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by B) message to the LEA.

T13. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T14. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

User B, who has the floor, will speak to Subject (User S).

M5. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M7. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M8. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User B.

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At this time, PoC Client B has the Floor [i.e., speaking to Subject (User S)].

C.6.2.2 Subject-initiated Pre-Arranged Group PoC Session - Queued Flow Control Example

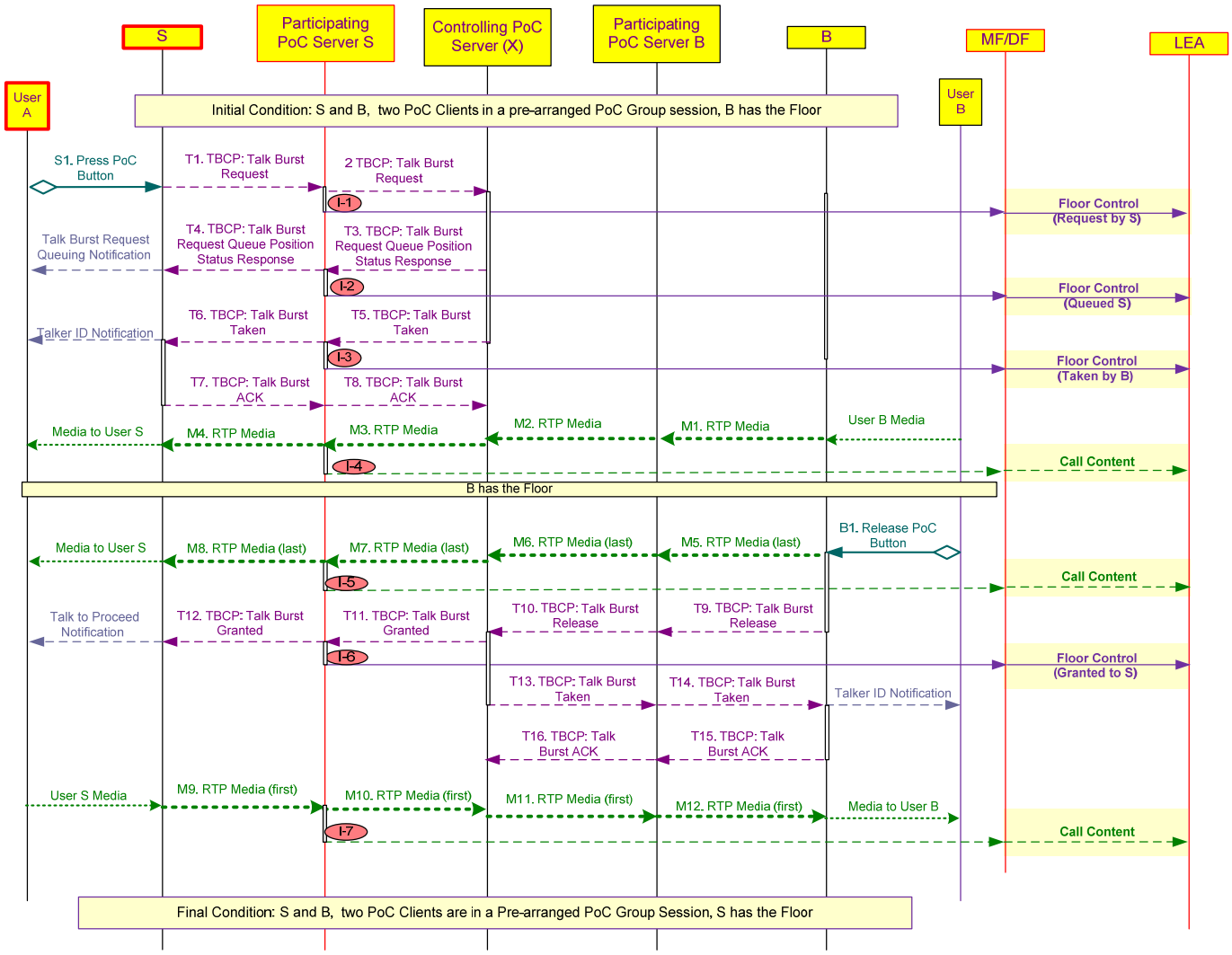

Figure C.20: Subject-initiated Pre-Arranged Group PoC Session to PoC Client B – Queued (S) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session is to a Pre-Arranged Group. The flow illustrates an example of Floor Control where a request for the Floor (i.e., Talk Burst Request) is queued. In this example, Subject's (User S') request is queued, as the request is sent while User B has the Floor.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1 and B1 are user actions.

- Steps T1 to T16 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M12 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

User B has the Floor; Subject's (User S') request to acquire the Floor is queued

S1: Subject (User S) presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (X).

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T3. The Controlling PoC Server (X) is aware that the Floor is not open, but the Subject (User S) request can be queued. Hence, the Controlling PoC Server (X) sends TBCP: Talk Burst Request Queue Position Status Response to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T4. The Participating PoC Server of S sends a TBCP: Talk Burst Request Queue Position Status Response message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Talk Burst Request has been queued.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Queued) message to the LEA.

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T6. The Participating PoC Server of S sends TBCP: Talk Burst Taken message to the PoC Client S.

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by B) message to the LEA.

T7. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T8. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

User B, who has the floor, is still speaking to Subject (User S).

M1. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M2. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M3. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M4. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User B.

I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At this time, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

User B has the Floor; User B relinquishes the Floor, granting the Floor to Subject (User S)

B1: User B releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User B indicates the end of speaking, the last media is sent towards the listener.

M5. The mobile device that has the PoC Client B receives the user media from User B and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M7. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M8. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User B.

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T9. When the User B releases the PoC button, the PoC Client B, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of B.

T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

T11. The Controlling PoC Server (X) is aware that a Talk Burst Request from the Subject (User S) has been queued. The queued Talk Burst Request is honored at this time and hence, the Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T12. The Participating PoC Server of S forwards TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can proceed to speak.

I6: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T13. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T14. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to the User B.

T15. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T16. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

M9. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M10. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

I7: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA

M11. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M12. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At this time, PoC Client S has the Floor (i.e., speaking to User B).

C.6.2.3 Subject-initiated Pre-Arranged Group PoC Session - Denied Flow Control Example

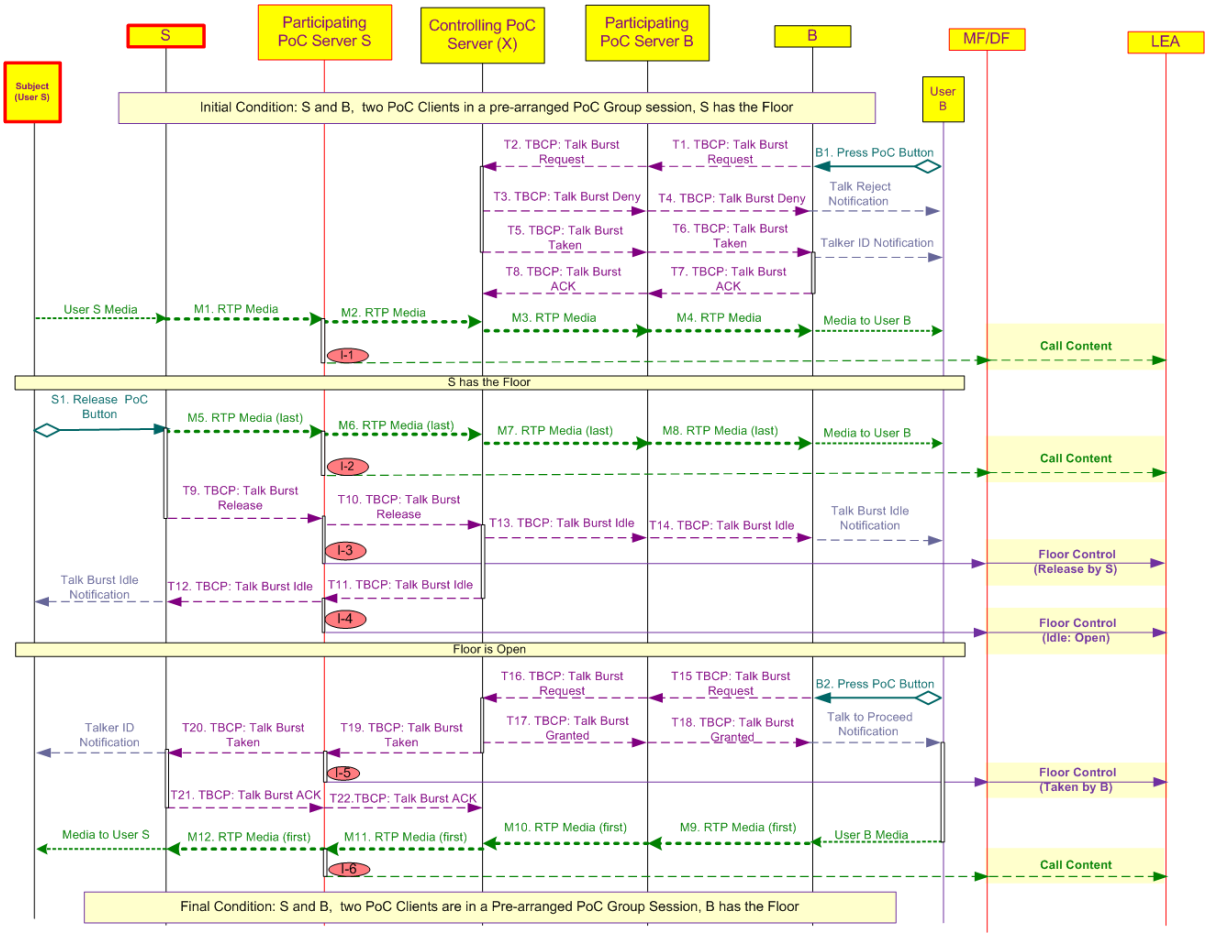

Figure C.21: Subject-initiated Pre-Arranged Group PoC Session to PoC Client B – Denied (B) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session is to a Pre-Arranged Group. The flow illustrates an example of

Floor Control where a request for the Floor (i.e., Talk Burst Request) is rejected. In this example, User B's request is rejected as the request is sent while Subject (User S) has the Floor.

Furthermore, it should be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1, B1, and B2 are user actions.
- Steps T1 to T22 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M12 illustrate the RTP media flow between two points.
- Steps I1 to I6 illustrate the interception points.

Subject (User S) has the Floor; User B's attempt to acquire the Floor is rejected

B1: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T2. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (X).

T3. The Controlling PoC Server (X) is aware that the Floor is not open, and the User B request cannot be queued. And hence, the Controlling PoC Server (X) sends a TBCP: Talk Burst Deny message to PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Deny message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that the Talk Burst Request has been rejected.

T5. Since the Subject (User S) has the Floor, the Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to the User B.

T7. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

Subject (User S), who has the floor, is still speaking to User B.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M3. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At this time, the PoC Client S still has the Floor (i.e., speaking to User B).

Subject (User S) has the Floor; Subject (User S) relinquishes the Floor

S1: The Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M5. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M6. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

I2: Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M7. The Controlling PoC Server (X) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M8. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from Subject (User S).

TBCP-related Steps

T9. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of S.

T10. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

I3: Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T11. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T12. T12: Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I4: Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T13. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T14. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

User B acquires the Floor

B2: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T15. When the User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T16. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (X).

T17. The Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T18. The Participating PoC Server of B forwards the TBCP: Talk Burst Granted message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that he can proceed to speak.

T19. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T20. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client B or User B) to the Subject (User S).

I5: The Participating Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by B) message to the LEA.

T21. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T22. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

User B, who has the floor, will speak to Subject (User S).

M9. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M10. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M11. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M12. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User B.

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

C.6.2.4 Subject-initiated Pre-Arranged Group PoC Session - Revoked Flow Control Example

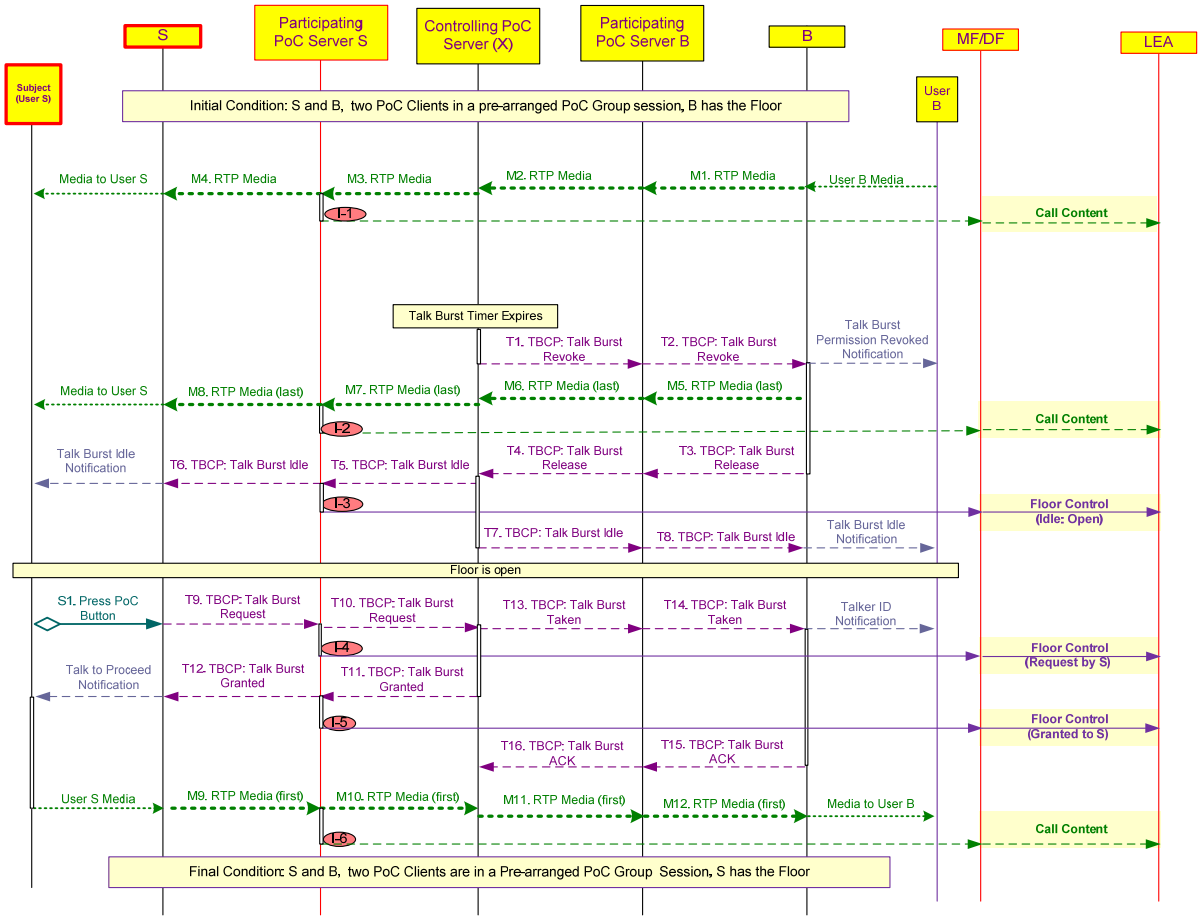

Figure C.22: Subject-initiated Pre-Arranged Group PoC Session to PoC Client B – Revoked (B) Floor Control Example

This flow is related to a PoC Session that has been initiated by the PoC Intercept Subject S [shown as Subject (User S) in the flow] to User B. The PoC Session is to a Pre-Arranged Group. The flow illustrates an example of Floor Control where the Floor Control of a PoC Client is revoked. In this example, User B's Floor Control is revoked after a pre-determined timer is expired.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- S1 is a user action.
- Steps T1 to T16 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M12 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

User B has the Floor; The Floor is revoked from User B

Media transfer related steps

User B, who has the floor, is speaking to Subject (User S).

M1. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M2. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M3. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M4. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) continues to receive the media from User B.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time, the PoC Client B has the Floor [i.e., speaking to Subject (User S)].

TBCP-related Steps

T1. The Controlling PoC Server (X) is aware that User B has a timed permission to have the Floor. The timer used to manage this limit (shown as Talk Burst Timer) expires. The Controlling PoC Server (X) sends a TBCP: Talk Burst Revoke message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

T2. The Participating PoC Server of B forwards the TBCP: Talk Burst Revoke message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the User B's Talk Burst permission has been revoked (i.e., Floor Control is revoked).

Media transfer related steps

PoC Client B, upon receiving the TBCP: Talk Burst Revoke message prepares to relinquish the Floor. Transfer the last media stream from User B to the listener.

M5. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

M7. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M8. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User B.

I2: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T3. Upon transferring the last of the media to the listener, the PoC Client B sends a TBCP: Talk Burst Release message to the Participating PoC Server of B.

T4. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (X).

T5. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T7. The Controlling PoC Server (X) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

Floor is open; Subject (User S) acquires the Floor

S1: Subject (User S) presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T9. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S.

T10. The Participating PoC Server of S forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (X).

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T11. The Controlling PoC Server (X) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T12. The Participating PoC Server of S sends TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that he can proceed to speak.

I5: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T13. The Controlling PoC Server (X) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T14. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client S or Subject (User S)) to the User B.

T15. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T16. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (X).

Media transfer related steps

M9. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M10. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (X).

I6: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M11. The Controlling PoC Server (X) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M12. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At this time, the PoC Client S has the Floor (i.e., speaking to User B).

C.7 PoC Sessions to PoC Intercept Subject – Flow Control Examples

This clause provides the informative call flows to illustrate flow control examples for On-Demand or Pre-Established PoC Sessions that are terminated to the PoC Intercept Subject.

The flows illustrated here apply to Ad Hoc Group (One-to-Many) and One-to-One (1:1) PoC Sessions, where the Participating PoC Server of the originating PoC client becomes the Controlling PoC Server. However, since the PoC Intercept Subject is a terminating PoC client, the Participating PoC Server of the PoC Intercept Subject provides the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients – PoC client A (originating) and PoC Intercept Subject S (terminating). The PoC client A and PoC Intercept Subject S have On-Demand or Pre-Established PoC clients. The same flow control call flows apply to both On-Demand and Pre-Established PoC clients.

The following call flows are included:

1. Flow Control Example.
2. Queued Flow Control Example.
3. Denied Flow Control Example.
4. Revoked Flow Control Example.

C.7.1 PoC Session to PoC Intercept Subject – Floor Control Example

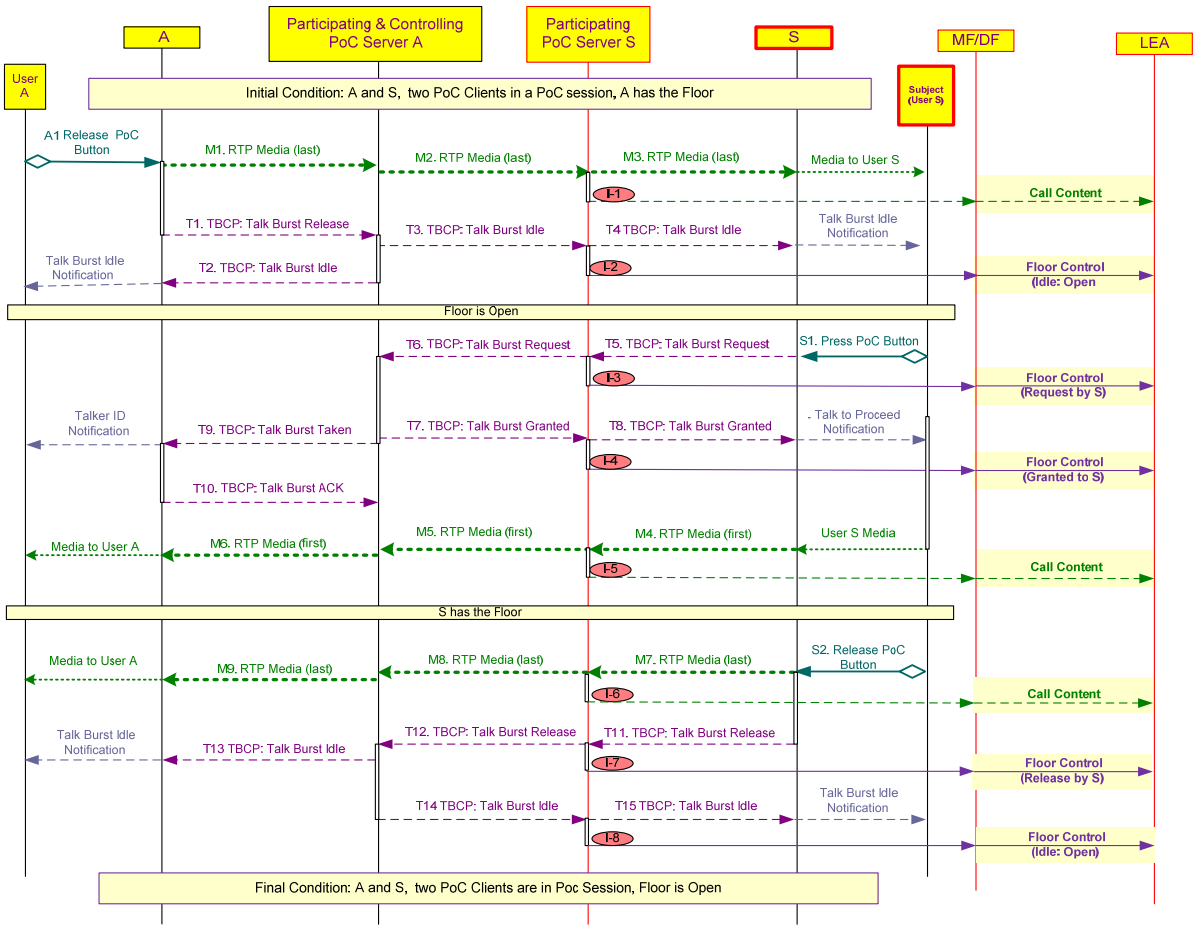

Figure C.23: PoC Session from PoC Client A to PoC Intercept Subject S – Floor Control Example

This flow is related to a PoC Session from User A terminated at PoC Intercept Subject S [shown as Subject (User S) in the flow]. The PoC Session can either be a One-to-One PoC Session, an Ad Hoc Group PoC Session, or a Pre-Arranged Group PoC Session. The flow illustrates the example normal Floor Control scenarios.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- A1, S1, and S2 are user actions.
- Steps T1 to T15 show the TBCP-related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I8 illustrate the interception points.

User A has the Floor; User A relinquishes the Floor

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from Subject (User S).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of A (which is also the Controlling PoC Server).

T2. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T3. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I2: Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

At this time, the Floor is open.

Subject (User S) acquires the Floor

S1: Subject (User S) presses the PoC button in order to acquire the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T5. When the Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S.

T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T7. The Controlling PoC Server sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T8. The Participating PoC Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can proceed to speak.

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T9. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Taken message to the PoC Client A. The mobile device that has the PoC Client A notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to the User A.

T10. The PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A (which is also the Controlling PoC Server).

Media transfer related steps

Subject (User S), who has the floor, speaks to User A.

M4. The mobile device that has the PoC Client S receives the user media from User S, sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M5. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M6. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the media from Subject (User S).

At the time of the flow, the PoC Client S has the Floor (i.e., speaking to User A).

Subject (User S) has the Floor, Subject (User S) relinquishes the Floor

S2: The Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M7. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M8. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I6: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M9. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the last of the media from Subject (User S).

TBCP-related Steps

T11. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

T12. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I7: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T13. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies User A about the Talk Burst Idle status (in other words, the floor is open).

T14. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T15. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I8: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

At this time, the Floor is open.

C.7.2 PoC Session to PoC Intercept Subject - Queued Flow Control Example

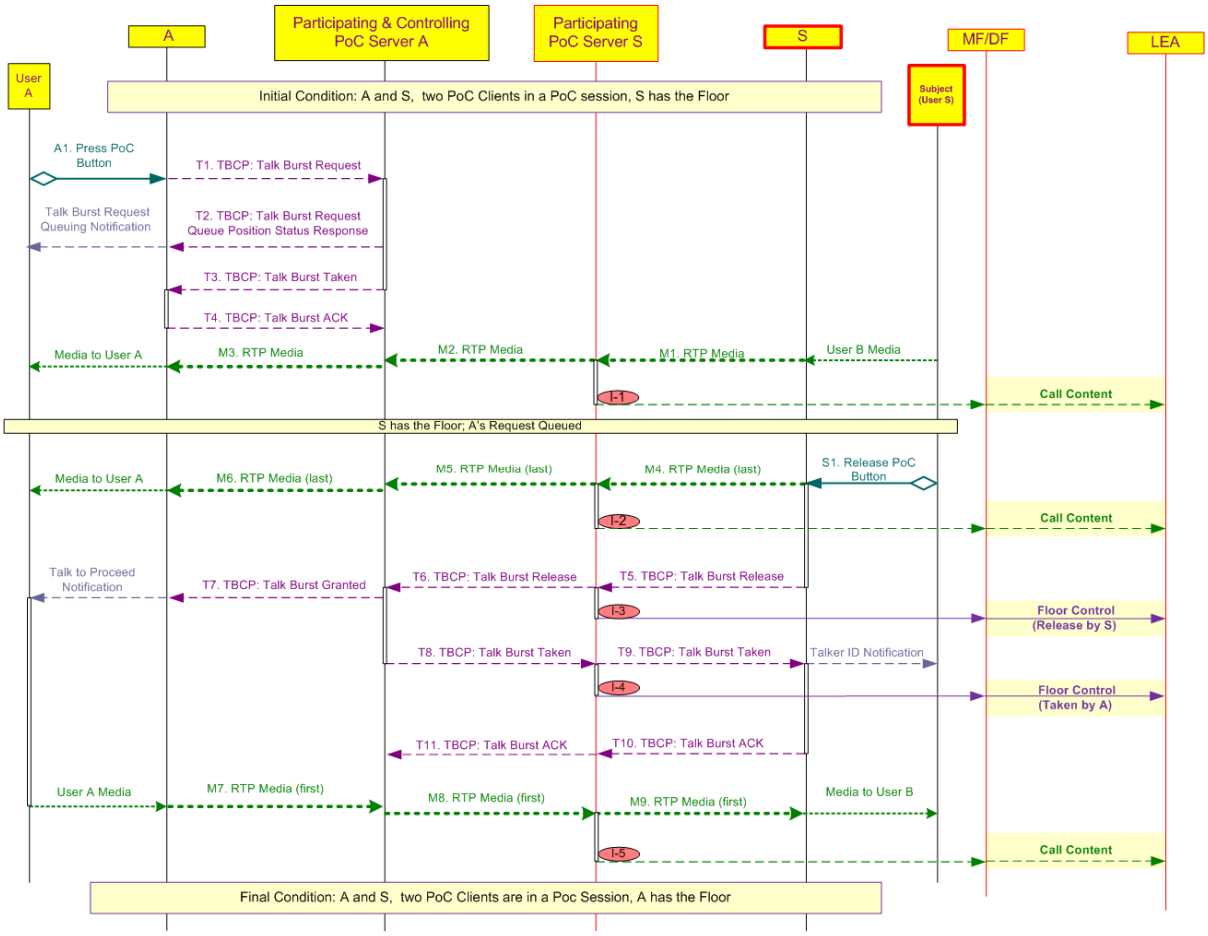

Figure C.24: PoC Session from PoC Client A to PoC Intercept Subject S – Queued (A) Floor Control Example

This flow is related to a PoC Session terminated at the PoC Intercept Subject S [shown as Subject (User S) in the flow] from User A. The PoC Session can either be a One-to-One PoC Session, an Ad Hoc Group PoC Session, or a Pre-Arranged Group PoC Session. The flow illustrates an example of Floor Control where a request for the Floor (i.e., Talk Burst Request) is queued. In this example, User A's request to speak is queued as the request is sent while Subject (User S) has the Floor.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- A1 and S1 are user actions.
- Steps T1 to T11 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

Subject (User S) has the Floor, User A's request for the Floor is queued

A1: User A presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When User A presses the PoC button, the PoC Client A sends TBCP: Talk Burst Request message to the Participating PoC Server of A (which is also the Controlling PoC Server).

T2. The Controlling PoC Server (which is also the Participating PoC Server of A) is aware that the Floor is not open, but User A's request can be queued. Hence, the Participating and Controlling PoC Server A sends TBCP: Talk Burst Request Queue Position Status Response message to the PoC Client A. The mobile device that has the PoC Client A notifies User A that the Talk Burst Request has been queued.

T3. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Taken message to PoC Client A.

T4. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A (which is also the Controlling PoC Server).

Media transfer related steps

Subject (User S), who has the floor, is still speaking to User A.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M3. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A continues to receive the media from Subject (User S).

At the time of the flow, the PoC Client S has the Floor (i.e., speaking to User A).

Subject (User S) has the Floor, Subject (User S) relinquishes the Floor; Granting the Floor to User A

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M4. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M5. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I2: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M6. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the last of the media from Subject (User S).

TBCP-related Steps

T5. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T7. The Controlling PoC Server (which is also the Participating PoC Server of A) is aware that a Talk Burst Request from User A has been queued. The queued Talk Burst Request is honored at this time and the Participating and Controlling PoC Server A sends a TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies User A that User A can proceed to speak.

T8. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T9. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client A) to Subject (User S).

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T10. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T11. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of A).

Media transfer related steps

M7. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M8. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M9. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At the time of the flow, the PoC Client A has the Floor [i.e., speaking to Subject (User S)].

C.7.3 PoC Session to PoC Intercept Subject - Denied Flow Control Example

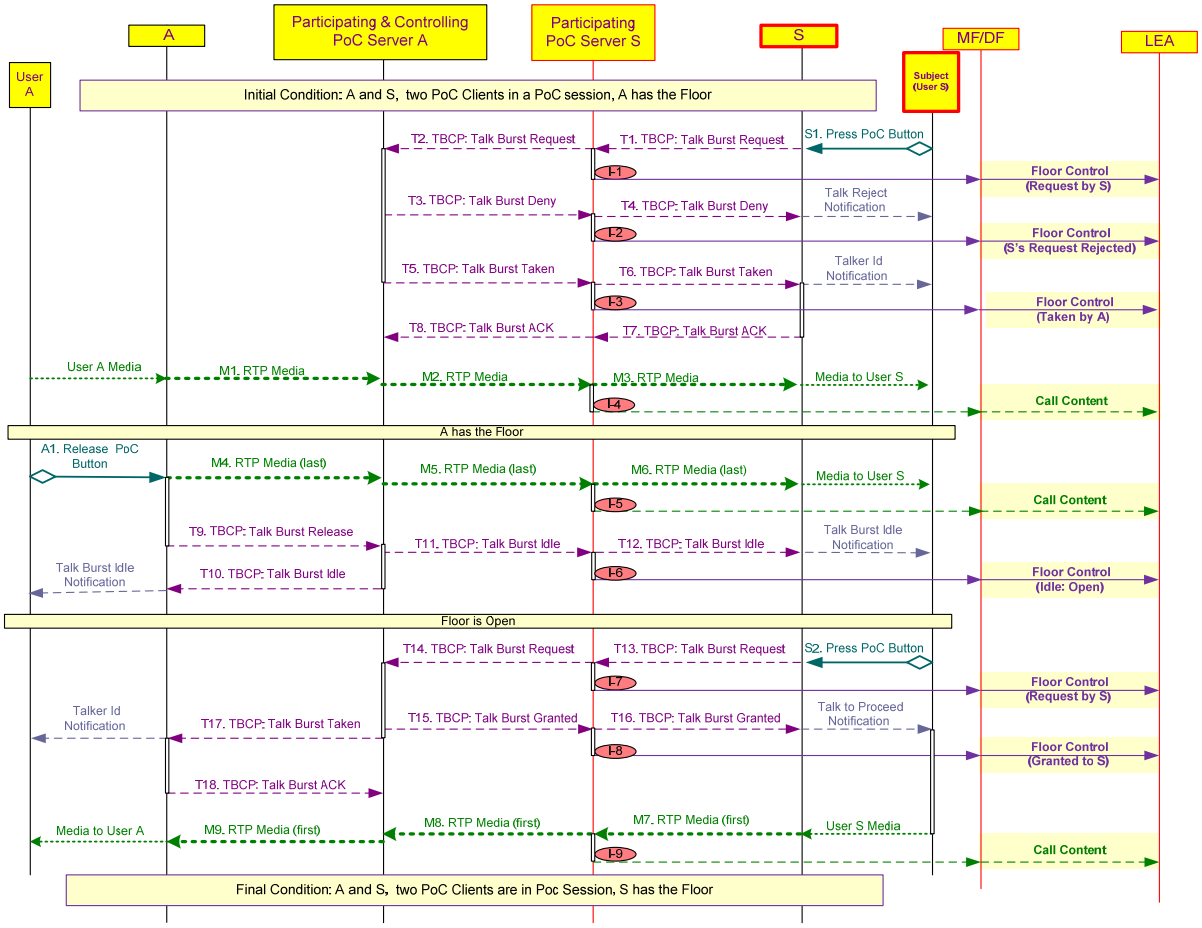

Figure C.25: PoC Session from PoC Client A to PoC Intercept Subject S – Denied (S) Floor Control Example

This flow is related to a PoC Session terminated at the PoC Intercept Subject S [shown as Subject (User S) in the flow] from User A. The PoC Session can either be a One-to-One PoC Session, an Ad Hoc Group PoC Session, or a Pre-Arranged Group PoC Session. The flow illustrates an example of Floor Control where a request for the Floor (i.e., Talk Burst Request) is rejected. In this example, Subject's (User S') request is rejected as the request is sent while User A has the Floor.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- A1, S1 and S2 are user actions.
- Steps T1 to T18 show the TBCP-related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I9 illustrate the interception points.

User A has the Floor. The Subject's (User S's) attempt to acquire the Floor is rejected

S1: Subject (User S) presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T1. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T3. The Controlling PoC Server (which is also the Participating PoC Server of A) is aware that the Floor is not open, and the Subject (User S) request cannot be queued. And hence, the Controlling PoC Server sends TBCP: Talk Burst Deny message to PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Deny message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Talk Burst Request has been rejected.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (S' Request Rejected) message to the LEA.

T5. Since User A has the Floor, the Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client A) to the Subject (User S).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T7. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T8. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of A).

Media transfer related steps

User A, who has the floor, is still speaking to Subject (User S).

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M2. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M3. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) continues to receive the media from User A.

I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At this time of the flow, the PoC Client A still has the Floor [i.e., speaking to Subject (User S)].

User A has the Floor; User A relinquishes the Floor

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As User A indicates the end of speaking, the last media is sent towards the listener.

M4. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M5. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M6. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User A.

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T9. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release to the Participating PoC Server of A (which is also the Controlling PoC Server).

T10. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T11. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the Participating PoC Server of S.

T12. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I6: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

At this time, the Floor is open.

Subject (User S), whose previous attempt was rejected, acquires the Floor

S2: The Subject (User S) presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T13. When Subject (User S) presses the PoC button, the PoC Client S sends a TBCP: Talk Burst Request message to the Participating PoC Server of S.

T14. The Participating PoC Server of S forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I7: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Request by S) message to the LEA.

T15. The Controlling PoC Server sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T16. The Participating PoC Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can proceed to speak.

I8: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

T17. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Taken message to the PoC Client A. The mobile device that has the PoC Client A notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to User A.

T18. The PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A (which is also the Controlling PoC Server).

Media transfer related steps

Subject (User S), who has the floor, will speak to User A.

M7. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M8. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I9: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M9. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, User A receives the media from Subject (User S).

At the time of the flow, PoC Client S has the Floor (i.e., speaking to User A).

C.7.4 PoC Session to PoC Intercept Subject - Revoked Flow Control Example

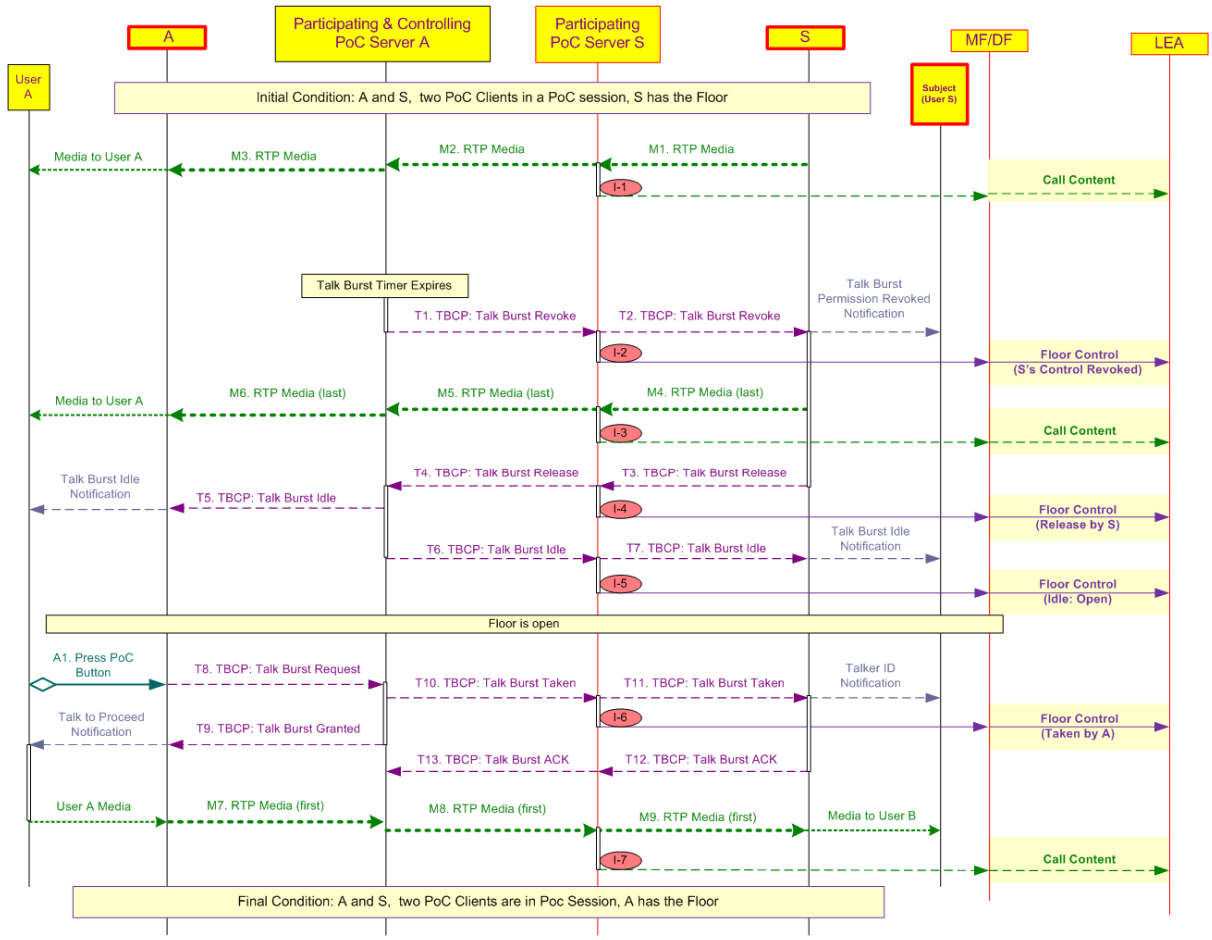

Figure C.26: PoC Session from PoC Client A to PoC Intercept Subject S – Denied (S) Floor Control Example

This flow is related to a PoC Session terminated to the PoC Intercept Subject S [shown as Subject (User S) in the flow] from User A. The PoC Session can either be a One-to-One PoC Session, an Ad Hoc Group PoC Session, or a Pre-Arranged Group PoC Session. The flow illustrates an example of Floor Control where the Floor Control of a PoC Client is revoked. In this example, Subject's (User S') Floor Control is revoked after a pre-determined timer is expired.

It has to be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- A1 is a user action.
- Steps T1 to T13 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M9 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

Subject (User S) has the Floor; the Floor is revoked from Subject (User S)

Media transfer related steps

Subject (User S), who has the floor, is speaking to User A.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M3. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, User A continues to receive the media from Subject (User S).

At this time of the flow, the PoC Client S has the Floor (i.e., speaking to User A).

TBCP-related Steps

T1. The Controlling PoC Server is aware that the Subject (User S) has a timed permission to have the Floor. The timer used to manage this limit (shown as Talk Burst Timer) expires. The Controlling PoC Server sends a TBCP: Talk Burst Revoke message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Revoke message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject's (User S') Talk Burst permission has been revoked (i.e., Floor has been revoked).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (S' Control Revoked) message to the LEA.

Media transfer related steps

PoC Client S, upon receiving the TBCP: Talk Burst Revoke message prepares to relinquish the Floor. Transfer the last media stream from Subject (User S) to the listener.

M4. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M5. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (which is also the Participating PoC Server of A).

I3: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M6. The Participating and Controlling PoC Server A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the last of the media from Subject (User S).

TBCP-related Steps

T3. Upon transferring the last of the media to the listener, the PoC Client S sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (which is also the Participating PoC Server of A).

I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T5. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T6. The Controlling PoC Server sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T7. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I5: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

At this time, the Floor is open.

Floor is open, User A acquiring the Floor

A1: User A presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T8. When User A presses the PoC button, the PoC Client A sends a TBCP: Talk Burst Request message to the Participating PoC Server of A (which is also the Controlling PoC Server).

T9. The Participating and Controlling PoC Server A sends a TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the User A can proceed to speak.

T10. The Controlling PoC Server sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T11. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client A or User A) to the Subject (User S).

I6: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T12. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T13. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (which is also the Participating PoC Server of A).

Media transfer related steps

M7. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A (which is also the Controlling PoC Server).

M8. The Controlling PoC Server forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M9. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

I7: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At this time of the flow, the PoC Client A has the Floor [i.e., speaking to Subject (User S)].

C.8 PoC Chat Group is the target of interception

This Clause provides the call flows that illustrate how the LAES messages can be generated for PoC Chat Group related Sessions when a PoC Chat Group is the target of interception.

Note that to simplify the drawing, the flows include just two PoC clients – PoC client A (who initiates the PoC Chat Group Session) and PoC client B (who joins the PoC Chat Group Session).

The following call flows are included:

1. PoC Chat Group Session Start Example – Pre-established PoC Clients.
2. PoC Chat Group Session End Example – Pre-established PoC Clients.
3. PoC Chat Group Session Start Example – On-Demand PoC Clients.
4. PoC Chat Group Session Start Example – On-Demand PoC Clients.
5. PoC Chat Group Floor Control Examples.

C.8.1 PoC Chat Group Session Start Example – Pre-established PoC Clients

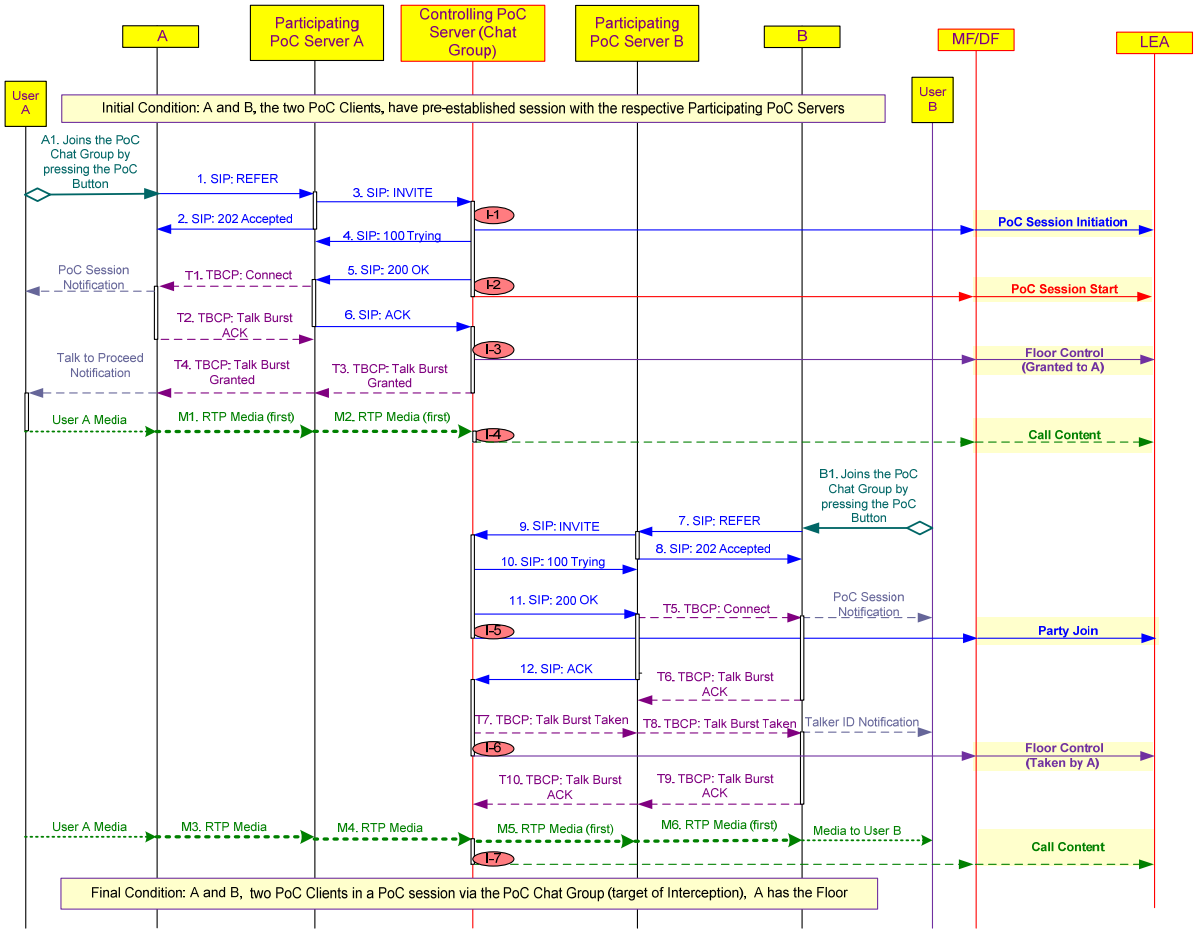

Figure C.27: Two Pre-Established PoC Clients enter into a PoC Chat Group (target of interception) Session

This flow illustrates an example where two PoC Clients (A and B) with Pre-Established Sessions join a PoC Chat Group that is the target of a lawful interception. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have Pre-Established Sessions, it is possible that either of them may have On-Demand PoC Clients. In other words, the users joining a PoC Chat Group Session may have either PoC Clients with Pre-Established Sessions and/or On-Demand PoC Clients. The flow illustrating the steps of On-Demand PoC Clients joining a PoC Chat Group Session is shown in Annex C.8.3.

Description of the Steps:

In this call flow:

- A1 and B1 are user actions.
- Steps 1 to 12 show the SIP signaling messages used while joining the PoC Session.
- Steps T1 to T10 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

User A joins (first party) the PoC Chat Group Session

A1: User A with a Pre-Established PoC Client A joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP REFER (type: INVITE) to the Participating PoC Server of A with which PoC Client A has a Pre-Established Session.
2. The Participating PoC Server of A sends the SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Participating PoC Server of A sends the SIP INVITE to the Controlling PoC Server (Chat Group). User A is the first user joining the PoC Chat Group.
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of A in response to the SIP INVITE.

   I1: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

5. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of A.

   I2: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

6. The Participating PoC Server of A sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of A or when it receives the SIP ACK from the Participating PoC Server of A. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where the TBCP: Talk Burst Granted message reaches the device before the TBCP: Connect message, it is possible that some implementation may follow that approach.

T1. The Participating PoC Server of A, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to PoC Client A. The mobile device that has the PoC Client A notifies User A that he is in a PoC Session.

T2. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server of A.

I3: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to A) message to the LEA.

T4. The participating PoC Server of A forwards the TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies User A that he can now proceed to talk.

Media transfer related steps

The User A may begin talking upon receiving the Proceed to Talk notification. However, note that User A is the only user on the PoC Chat Group Session.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I4: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

User B joins (as a subsequent party) the PoC Chat Group Session

B1: User B with a Pre-Established PoC Client B joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

7. PoC Client B sends a SIP REFER (type: INVITE) to the Participating PoC Server of B with which PoC Client B has a Pre-Established Session.
8. The Participating PoC Server of B sends a SIP 202 Accepted to PoC Client B in response to the SIP REFER.
9. The Participating PoC Server of B sends the SIP INVITE to the Controlling PoC Server (Chat Group). User B is the second user joining the PoC Chat Group.
10. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of B in response to the SIP INVITE.
11. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of B.

I5: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Party Join message to the LEA.

12. The Participating PoC Server of B sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of B or when it receives the SIP ACK from the Participating PoC Server of B. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where the TBCP: Talk Burst Granted

message reaches the device before the TBCP: Connect message, it is possible that some implementation may follow that approach.

T5. The Participating PoC Server of B, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that she is in a PoC Session.

T6. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T7. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

I6: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T8. The participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client A or User A) to User B.

T9. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

Now that the two users are in the PoC Chat Group Session, User A, who has the floor, will speak to User B.

M3. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M4. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

I7: Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M6. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from User A.

At the end of this flow, the PoC Client A and PoC Client B are in a PoC Chat Group Session with PoC Client A having the Floor (i.e., speaking).

C.8.2 PoC Chat Group Session End Example – Pre-established PoC Clients

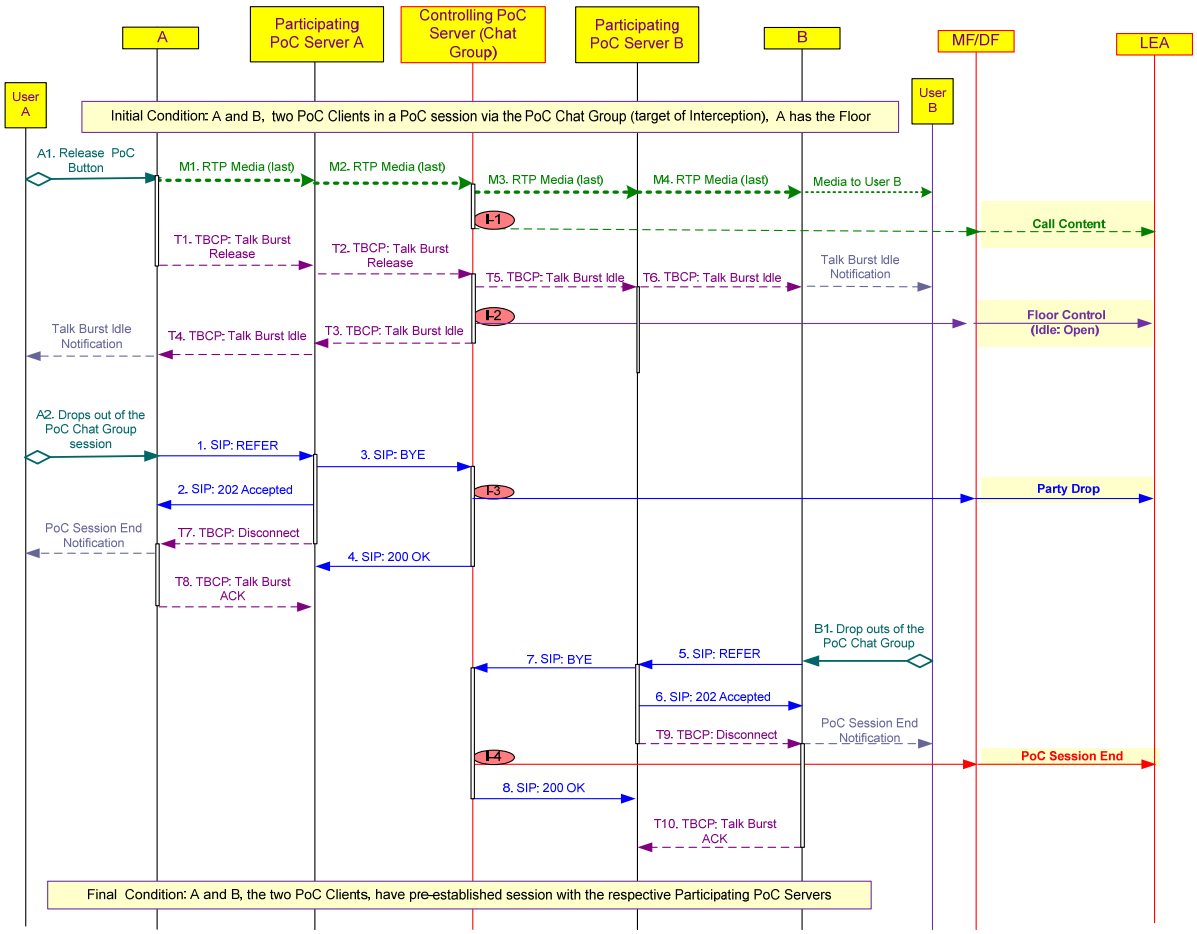

Figure C.28: Two Pre-established PoC Clients end the PoC Chat Group (target of interception) Session

This flow illustrates an example where two PoC Clients (A and B) with Pre-Established Sessions drop out of a PoC Chat Group (that is the target of a lawful interception) Session. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow presumes that both PoC Clients leaving the PoC Chat Group Session have Pre-Established Session, it is possible that either of them may have On-Demand PoC Clients. In other words, the users on a PoC Chat Group Session may have either the PoC Clients with Pre-Established Session and/or the On-Demand PoC Clients. The flow illustrating the steps of On-Demand PoC Clients dropping out of a PoC Chat Group Session is shown in Annex C.8.4.

Description of the Steps:

In this call flow:

- A1, A2 and B1 are the user actions.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps T1 to T10 show the Talk Burst Control Protocol related messages.
- Steps 1 to 8 show the SIP signaling messages used to end the PoC Session.
- Steps I1 to I4 illustrate the interception points.

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M3. The Controlling PoC Server (Chat Group) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

I1: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from User A.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of A.

T2. The Participating PoC Server of A forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.

I2: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T4. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to PoC Client A. The mobile device that has the PoC Client A notifies User A about the Talk Burst Idle status (in other words, the floor is open).

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

User A drops out of the PoC Chat Group Session

A2: User A drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends the SIP REFER (type: BYE) to the Participating PoC Server of A.
2. The Participating PoC Server of A sends the SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Participating PoC Server of A sends the SIP BYE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends the SIP 200 OK to the Participating PoC Server A.

I3: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Party Drop message to the LEA.

TBCP-related Steps

In the following steps, the Participating PoC Server of A may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)). The flow shows the former approach.

T7. The Participating PoC Server of A, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the PoC Session has been ended.

T8. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A.

User B drops out of the PoC Chat Group Session

B1: User B drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client B sends a SIP REFER (type: BYE) to the Participating PoC Server of B.
6. The Participating PoC Server of B sends a SIP 202 Accepted to PoC Client B in response to the SIP REFER.
7. The Participating PoC Server of B sends a SIP BYE to the Controlling PoC Server (Chat Group). User B is the last party to leave the PoC Chat Group Session.
8. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server B.

I4: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

TBCP-related Steps

In the following steps, the Participating PoC Server of B may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)). The flow shows the former approach.

T9. The Participating PoC Server of B, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the PoC Session has been ended.

T10. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

At the end of this flow, the PoC Client A and PoC Client B are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.8.3 PoC Chat Group Session Start Example – On-Demand PoC Clients

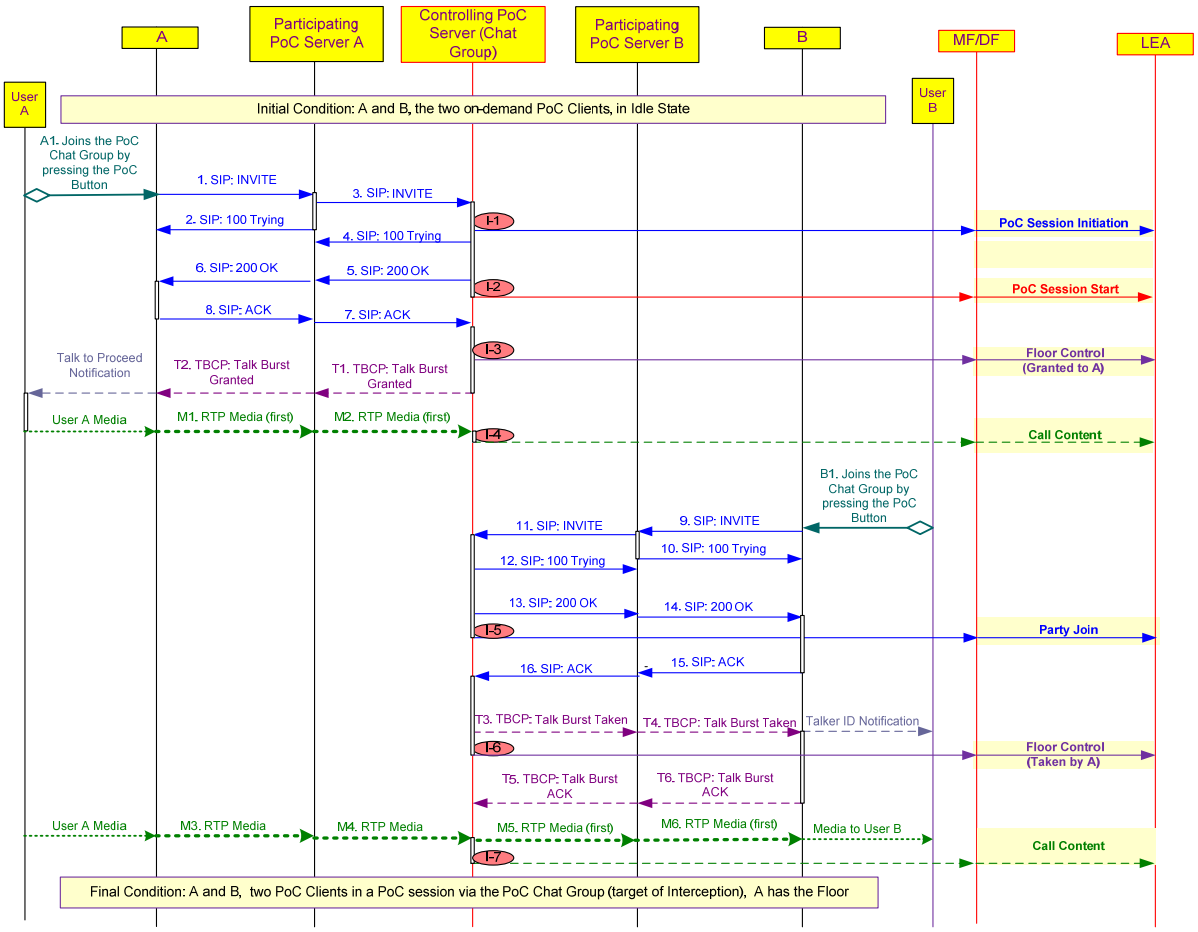

Figure C.29: Two On-Demand PoC Clients start a PoC Chat Group (target of interception) Session

This flow illustrates an example where two PoC Clients (A and B) with On-Demand PoC Clients joining a PoC Chat Group that is the target of a lawful interception.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have On-Demand PoC Clients, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users joining a PoC Chat Group Session may have either PoC Clients with Pre-Established Session and/or On-Demand PoC Clients. The flow illustrating the steps of users with PoC Clients having Pre-Established Sessions joining a PoC Chat Group Session is shown in Annex C.8.1.

Description of the Steps:

In this call flow:

- A1 and B1 are user actions.
- Steps 1 to 16 show the SIP signaling messages used while joining the PoC Session.
- Steps T1 to T6 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.
- Steps I1 to I7 illustrate the interception points.

User A joins (as a first party) the PoC Chat Group Session

A1: User A with an On-Demand PoC Client A joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP INVITE to the Participating PoC Server of A.
2. The Participating PoC Server of A sends a SIP 100 Trying to PoC Client A in response to the SIP INVITE.
3. The Participating PoC Server of A forwards the SIP INVITE to the Controlling PoC Server (Chat Group). User A is the first user joining the PoC Chat Group.
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of A in response to the SIP INVITE.

   I1: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

5. The Controlling PoC Server (Chat Group) sends the SIP 200 OK to the Participating PoC Server of A.

   I2: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

6. The Participating PoC Server of A forwards the SIP 200 OK to the PoC Client A.
7. PoC Client A sends a SIP ACK to the Participating PoC Server of A.
8. The Participating PoC Server of A forwards the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate a TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of A or when it receives the SIP ACK from the Participating PoC Server of A. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where the TBCP: Talk Burst Granted message reaches the device before the SIP 200 OK, it is possible that some implementation may follow that approach.

T1. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server of A.

   I3: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to A) message to the LEA.

T2. The participating PoC Server of A forwards the TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies User A that he can now proceed to talk.

Media transfer related steps

The User A may begin talking upon receiving the Proceed to Talk notification. However, note that one user is on PoC Chat Group Session.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

   I4: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

User B (as a subsequent party) joins the PoC Chat Group Session

B1: User B with an On-Demand PoC Client B joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

9. PoC Client B sends a SIP INVITE to the Participating PoC Server of B.
10. The Participating PoC Server of B sends a SIP 100 Trying to PoC Client B in response to the SIP INVITE.
11. The Participating PoC Server of B forwards the SIP INVITE to the Controlling PoC Server (Chat Group). The User B is the second user joining the PoC Chat Group.
12. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of B in response to the SIP INVITE.
13. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of B.

    I5: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Party Join message to the LEA.

14. The Participating PoC Server of B forwards the SIP 200 OK to the PoC Client B.
15. PoC Client B sends a SIP ACK to the Participating PoC Server of B.
16. The Participating PoC Server of B sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of B or when it receives the SIP ACK from the Participating PoC Server of B. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition, where the TBCP: Talk Burst Granted message reaches the device before the SIP 200 OK, it is possible that some implementation may follow that approach.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

    I6: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T4. The participating PoC Server of B forwards the TBCP: Talk Burst Taken message to PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID (i.e., the identity of PoC Client A or User A) to User B.
T5. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.
T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

User A, who has the floor, will speak to User B.

M3. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.
M4. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).
M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

I7: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M6. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from User A.

At the end of this flow, the PoC Client A and PoC Client B are in a PoC Chat Group Session with PoC Client A having the Floor (i.e., speaking).

C.8.4 PoC Chat Group Session End Example – On-Demand PoC Clients

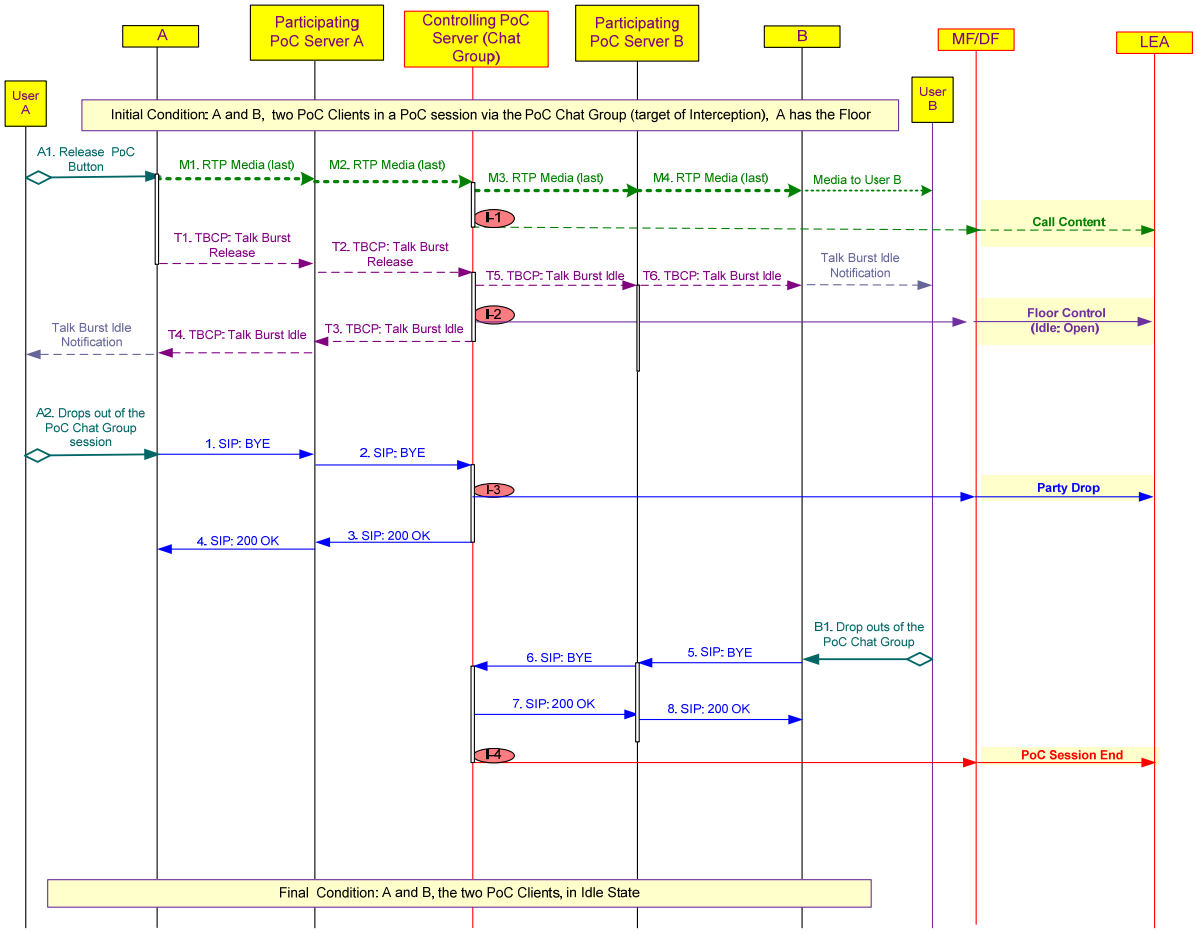

Figure C.30: Two On-Demand PoC Clients end the PoC Chat Group (target of interception) Session

This flow illustrates an example where two PoC Clients (A and B) with On-Demand PoC Clients drop out of a PoC Chat Group (that is the target of a lawful interception) Session.

Even though the flow presumes that both PoC Clients leaving the PoC Chat Group Session have On-Demand PoC Clients, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users who are on a PoC Chat Group Session may have either PoC Clients with Pre-Established Session and/or On-Demand PoC Clients. The flow illustrating the steps of users with PoC Clients having Pre-Established Sessions leaving a PoC Chat Group Session is shown in Annex D-8.2.

Description of the Steps:

In this call flow:

- A1, A2 and B1 are the user actions.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps T1 to T6 show the Talk Burst Control Protocol related messages.
- Steps 1 to 8 show the SIP signaling messages used to end the PoC Session.
- Steps I1 to I4 illustrate the interception points.

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I1: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M3. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from User A.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of A.

T2. The Participating PoC Server of A forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.

I2: Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T4. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

User A drops out of the PoC Chat Group Session

A2: User A drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP BYE to the Participating PoC Server of A.
2. The Participating PoC Server of A forwards the SIP BYE to the Controlling PoC Server (Chat Group).
3. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server A.

   I3: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Party Drop message to the LEA.

4. The Participating PoC Server of A sends a SIP 200 OK to PoC Client A.

User B drops out of the PoC Chat Group Session

B1: User B drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client B sends a SIP BYE to the Participating PoC Server of B.
6. The Participating PoC Server of B sends a SIP BYE to the Controlling PoC Server (Chat Group).
7. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server B. User B is the last party to leave the PoC Chat Group Session.

   I4: Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

8. Participating PoC Server of B sends a SIP 200 OK to PoC Client B.

At the end of this flow, the PoC Client A and PoC Client B are in idle condition.

C.8.5 PoC Chat Group Floor Control Examples

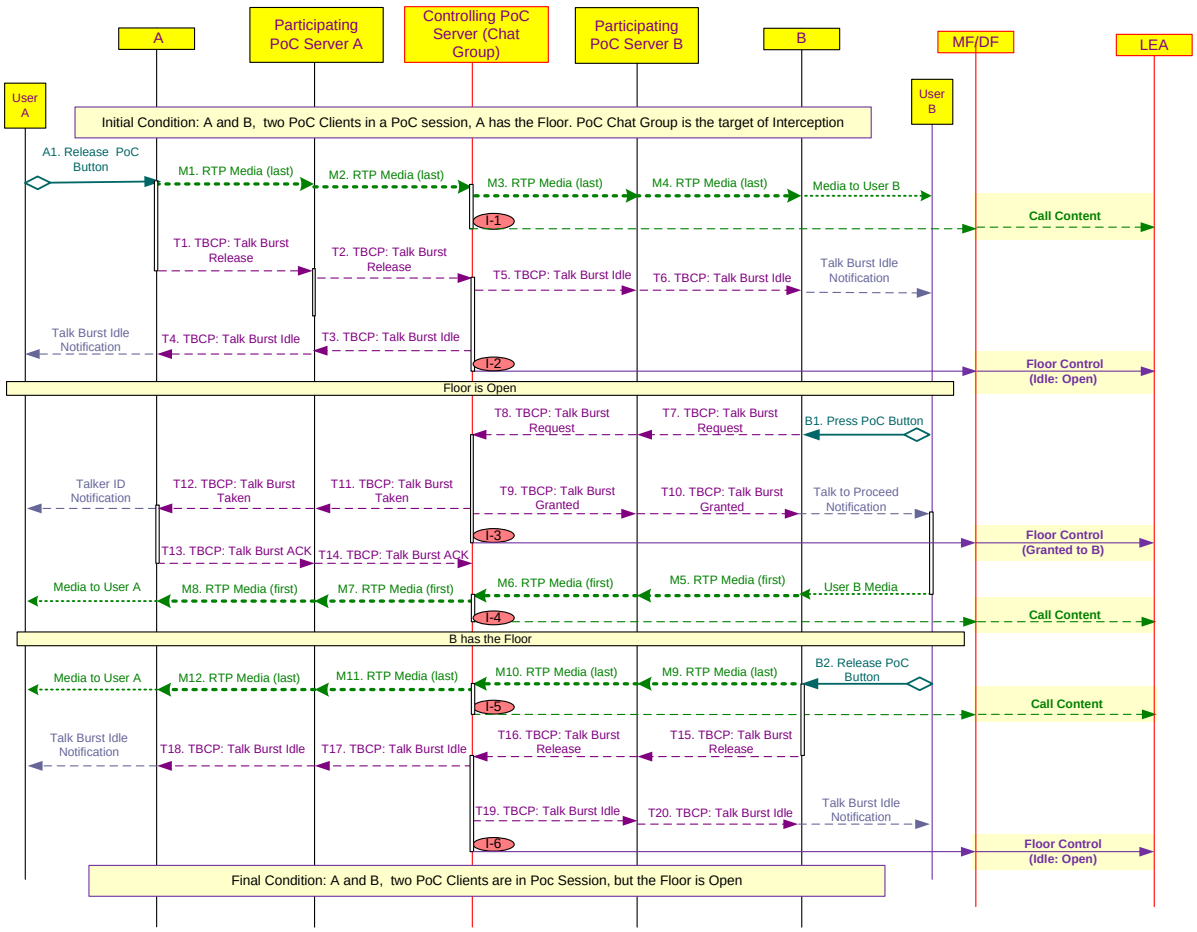

Figure C.31: Floor Control Examples – PoC Chat Group is the Target of Interception

This flow illustrates the Floor Control examples where two PoC Clients (A and B) have joined a PoC Chat Group that is the target of a lawful interception.

It should be noted that the Floor Control mechanism is independent of whether the users have On-Demand PoC Clients or PoC Clients with Pre-Established PoC Sessions.

Description of the Steps:

In this call flow:

- A1, B1, and B2 are user actions.
- Steps T1 to T20 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M12 illustrate the RTP media flow between two points.
- Steps I1 to I8 illustrate the interception points.

User A has the Floor, User A relinquishes the Floor

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M3. The Controlling PoC Server (Chat Group) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

I1: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from User A.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of A.

T2. The Participating PoC Server of A forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.

I2: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T4. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

User B acquires the Floor

B1: User B presses the PoC button in order to get the Floor and begin speaking. The exact method used for this action can vary depending on the mobile device that has the PoC Client.

TBCP-related Steps

T7. When the User B presses the PoC button, the PoC Client B sends a TBCP: Talk Burst Request message to the Participating PoC Server of B.

T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Request message to the Controlling PoC Server (Chat Group).

T9. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

I3: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to B) message to the LEA.

T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Granted message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the User B can proceed to speak.

T11. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server of A.

T12. The Participating PoC Server of A forwards the TBCP: Talk Burst Taken message to the PoC Client A. The mobile device that has the PoC Client A notifies the Talker ID (i.e., the identity of PoC Client B or User B) to the User A.

T13. The PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A.

T14. The Participating PoC Server of A forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

User B, who has the floor, will speak to User A.

M5. The mobile device that has the PoC Client B receives the user media from User B and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M7. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

I4: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M8. The Participating Server of A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the media from User B.

At this time of the flow, the PoC Client B has the Floor (i.e., speaking to User A).

User B has the Floor, User B relinquishes the Floor

B2: User B releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User B indicates the end of speaking, the last media is sent towards the listener.

M9. The mobile device that has the PoC Client B receives the user media from User B and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M10. The Participating PoC Server of B forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M11. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

I5: The Controlling PoC Server (Chat Group) forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M12. The Participating Server of A forwards the Talk Burst in the form of an RTP Media stream to the PoC Client A. Thus, the User A receives the last of the media from User B.

TBCP-related Steps

T15. When the User B releases the PoC button, the PoC Client B, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of B.

T16. The Participating PoC Server of B forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

T17. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.

I6: The Controlling PoC Server (Chat Group) sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T18. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T19. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server B.

T20. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

At this time, the Floor is open.

C.9 PoC Chat Group Sessions – PoC Client as the PoC Intercept Subject

This clause provides the call flows that illustrate how LAES messages can be generated for PoC Chat Group-related Sessions when one of the PoC clients happen to be the PoC Intercept Subject. In all these cases, the Participating PoC Server of the PoC Intercept Subject would provide the IAP functions.

Note that to simplify the drawing, the flows include just two PoC clients – PoC Intercept Subject S (who initiates the PoC Chat Group Session) and PoC client B (who joins the PoC Chat Group Session) or PoC client A (who initiates the PoC Chat Group Session) and the PoC Intercept Subject S (who joins the PoC Chat Group Session). PoC clients A, B, or the PoC Intercept Subject S may have Pre-Established or On-Demand PoC clients.

The following call flows are included:

- PoC Chat Group Session Start Example - Pre-established PoC Clients
  - Subject initiates the Session.
  - Subject joins Session.
- PoC Chat Group Session Start Example - On-Demand PoC Clients
  - Subject initiates the Session.
  - Subject joins Session.
- PoC Chat Group Session End Example - Pre-established PoC Clients
  - Subject had initiated Session.
  - Subject had joined the Session.
- PoC Chat Group Session End Example - On-Demand PoC Clients
  - Subject had initiated Session.
  - Subject had joined the Session.

C.9.1 PoC Chat Group Session Start Example – Pre-established PoC Intercept Subject Initiates the Session

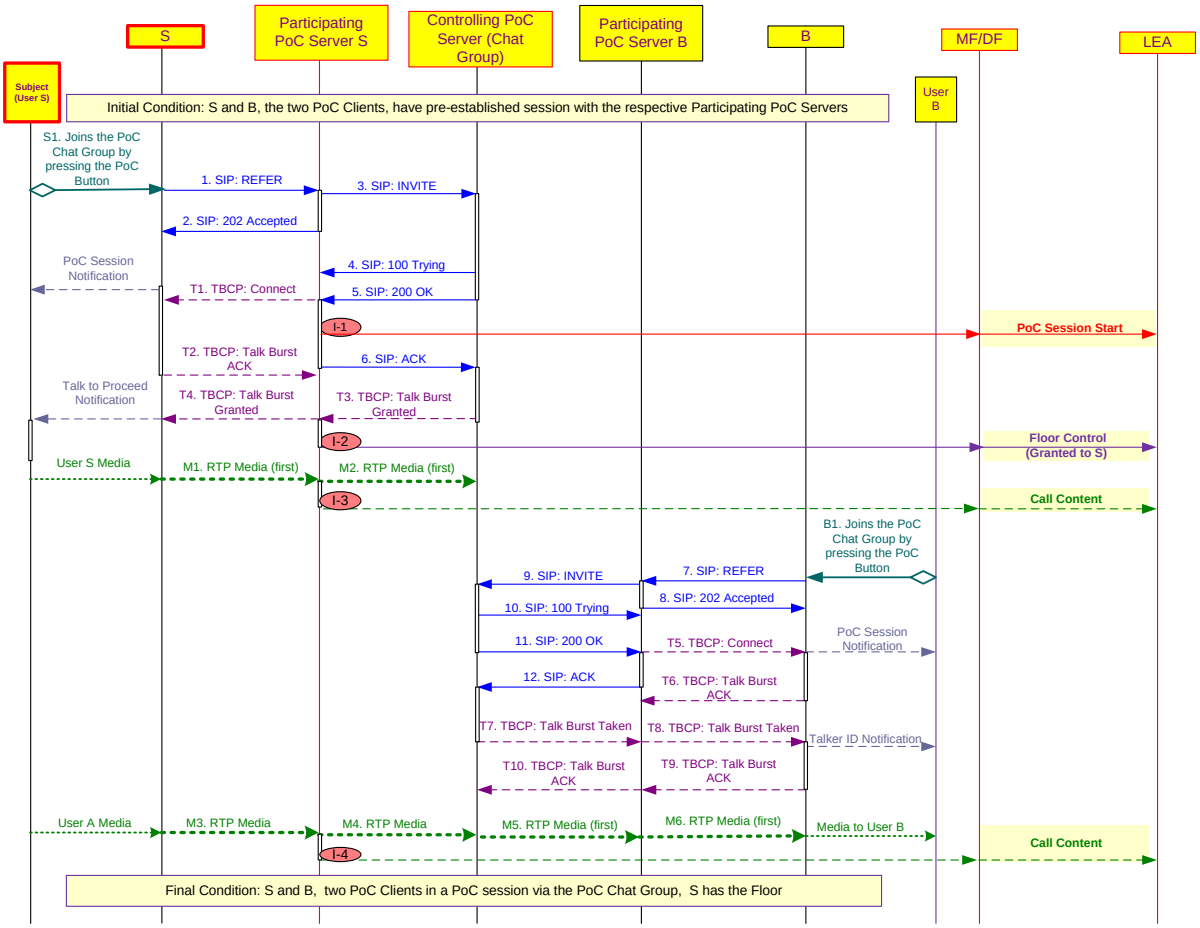

Figure C.32: PoC Chat Group Session Start Example – Pre-established PoC Intercept Subject initiates the Session

This flow illustrates an example where the PoC Intercept Subject [shown as Subject (User S)] initiates a PoC Chat Group Session. The Subject (User S) is the first party joining the PoC Chat Group Session. User B joins the PoC Chat Group Session as a subsequent party. Both the Subject (User S) and User B have PoC Clients with Pre-Established Sessions. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex D.3.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have Pre-Established Sessions, it is possible that either of them may have On-Demand PoC Clients. In other words, the users joining a PoC Chat Group Session may have either the PoC Clients with Pre-Established Sessions and/or the On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients joining a PoC Chat Group Session are shown in Annex C.9.3 and C.9.4.

Description of the Steps:

In this call flow:

- S1 and B1 are user actions.
- Steps 1 to 12 show the SIP signaling messages used while joining the PoC Session.

- Steps T1 to T10 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.
- Steps I1 to I6 illustrate the interception points.

Subject (User S) initiates the PoC Chat Group Session

S1: Subject (User S) with a Pre-Established PoC Client S initiates a PoC Chat Group Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: INVITE) to the Participating PoC Server of S with which PoC Client S has a Pre-Established Session.
2. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Participating PoC Server of S sends a SIP INVITE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
5. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of S.
6. The Participating PoC Server of S sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate a TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of S or when it receives the SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (TBCP: Talk Burst Granted message reaching the device before the TBCP: Connect message), it is possible that some implementation may follow that approach.

T1. The Participating PoC Server of S, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that Subject (User S) is on a PoC Session.

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

T2. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T4. The participating PoC Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the Subject (User S) can now proceed to talk.

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

Media transfer related steps

The User S may begin talking upon receiving the Proceed to Talk notification. However, note that Subject (User S) is the only user is on PoC Chat Group Session.

M1. The mobile device that has the PoC Client S receives the user media from User S, sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I3: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

User B joins the PoC Chat Group Session

B1: User B with a Pre-Established PoC Client B joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

7. PoC Client B sends a SIP REFER (type: INVITE) to the Participating PoC Server of B with which PoC Client B has a Pre-Established Session.
8. The Participating PoC Server of B sends a SIP 202 Accepted to PoC Client B in response to the SIP REFER.
9. The Participating PoC Server of B sends a SIP INVITE to the Controlling PoC Server (Chat Group).
10. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of B in response to the SIP INVITE.
11. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of B.
12. The Participating PoC Server of B sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of B or when it receives the SIP ACK from the Participating PoC Server of B. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (TBCP: Talk Burst Taken message reaching the device before the TBCP: Connect message), it is possible that some implementation may follow that approach.

T5. The Participating PoC Server of B, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client B. The mobile device that has the PoC Client B notifies User B that User B is on a PoC Session.
T6. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.
T7. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.
T8. The Participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to User B.
T9. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.
T10. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

Subject (User S), who has the floor, will speak to User B.

M3. The mobile device that has the PoC Client S receives the user media from User S and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.
M4. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Chat Group Session with PoC Client S (i.e., Subject or User S) having the Floor (i.e., speaking).

C.9.2 PoC Chat Group Session Start Example – Pre-established PoC Intercept Subject Joins the Session

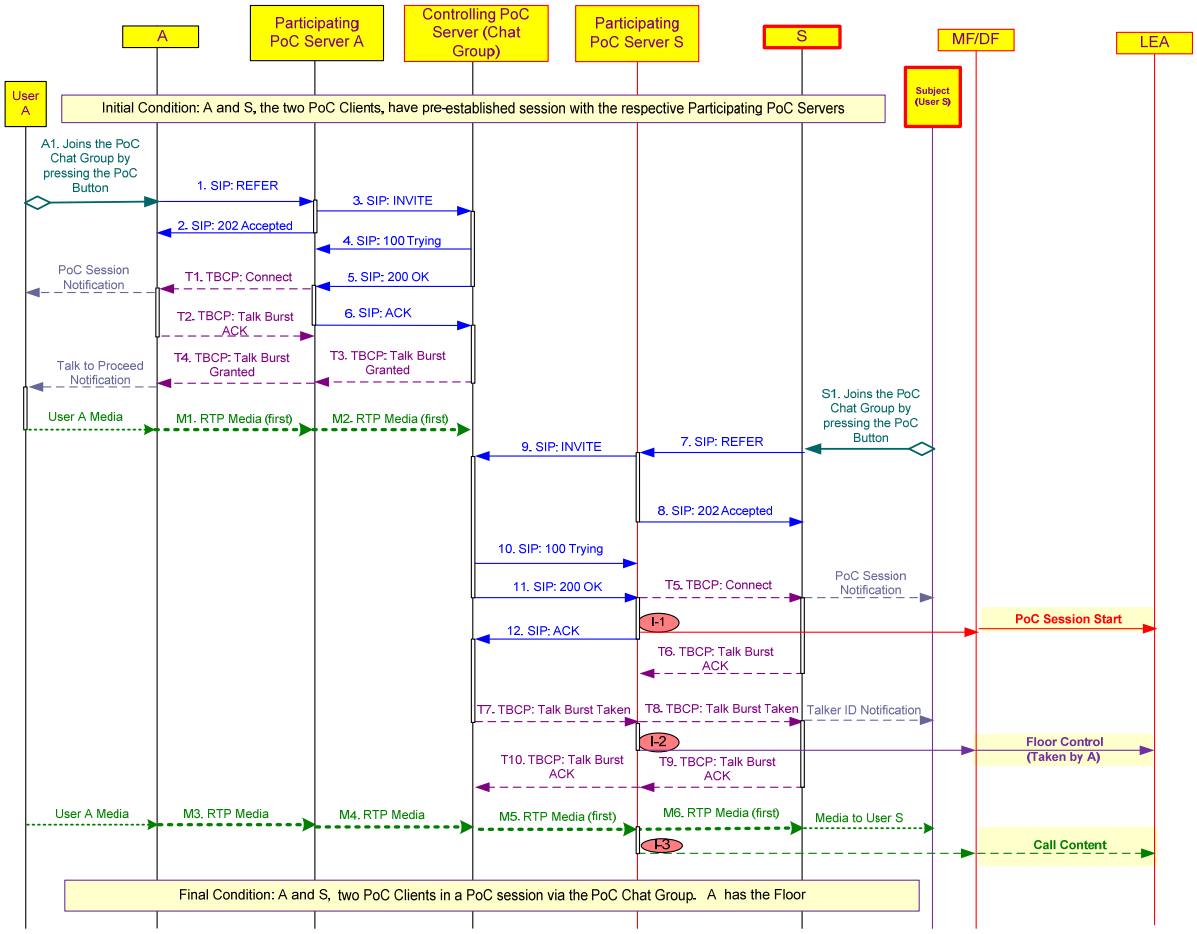

Figure C.33: PoC Chat Group Session Start Example – Pre-established PoC Intercept Subject joins the Session

This flow illustrates an example where the PoC Intercept Subject [shown as Subject (User S)] joins a PoC Chat Group Session which is initiated by another user (User A). The Subject is basically joining the Session as a subsequent party. Both User A and the Subject (User S) have PoC Clients with Pre-Established Session. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have Pre-Established Session, it is possible that either of them may have On-Demand PoC Clients. In other words, the users joining a PoC Chat Group Session may have either the PoC Clients with Pre-Established Session and/or the On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients joining a PoC Chat Group Session are shown in Annex C.9.3 and C.9.4.

Description of the Steps:

In this call flow:

- A1 and S1 are user actions.
- Steps 1 to 12 show the SIP signaling messages used while joining the PoC Session.
- Steps T1 to T10 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

User A initiates the PoC Chat Group Session

A1: User A with a Pre-Established PoC Client A initiates a PoC Chat Group Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP REFER (type: INVITE) to the Participating PoC Server of A with which PoC Client A has a Pre-Established Session.
2. The Participating PoC Server of A sends a SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Participating PoC Server of A sends a SIP INVITE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of A in response to the SIP INVITE.
5. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of A.
6. The Participating PoC Server of A sends a SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of A or when it receives the SIP ACK from the Participating PoC Server of A. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (the TBCP: Talk Burst Granted message reaching the device before the TBCP: Connect message), it is possible that some implementation may follow that approach.

T1. The Participating PoC Server of A, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client A. The mobile device that has the PoC Client A notifies User A that User A is on a PoC Session.

T2. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server of A.

T4. The participating PoC Server of A forwards the TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the User A can now proceed to talk.

Media transfer related steps

User A may begin talking upon receiving the Proceed to Talk notification. However, note that User A is the only user on the PoC Chat Group Session.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

Subject (User S) joins (as a subsequent party) the PoC Chat Group Session

S1: Subject (User S) with a Pre-Established PoC Client S joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

7. PoC Client S sends the SIP REFER (type: INVITE) to the Participating PoC Server of S with which PoC Client S has a Pre-Established Session.
8. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
9. The Participating PoC Server of S sends the SIP INVITE to the Controlling PoC Server (Chat Group).
10. The Controlling PoC Server (Chat Group) sends the SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
11. The Controlling PoC Server (Chat Group) sends the SIP 200 OK to the Participating PoC Server of S.
12. The Participating PoC Server of S sends the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate a TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of S or when it receives the SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (with the TBCP: Talk Burst Taken message reaching the device before the TBCP: Connect message), it is possible that some implementation may follow that approach.

T5. The Participating PoC Server of S, upon receiving the SIP 200 OK, sends a TBCP: Talk Burst Connect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that Subject (User S) is on a PoC Session.

I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

T6. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T7. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T8. The participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID (i.e., the identity of PoC Client A or User A) to the Subject (User S).

I2: Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T9. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

T10. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

User A, who has the floor, will speak to Subject (User S).

M3. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M4. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M6. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

I3: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

At the end of this flow, PoC Client A and PoC Client S are in a PoC Chat Group Session with PoC Client A (i.e., User A) having the Floor (i.e., speaking).

C.9.3 PoC Chat Group Session Start Example – PoC Intercept Subject Initiates the On-Demand Session

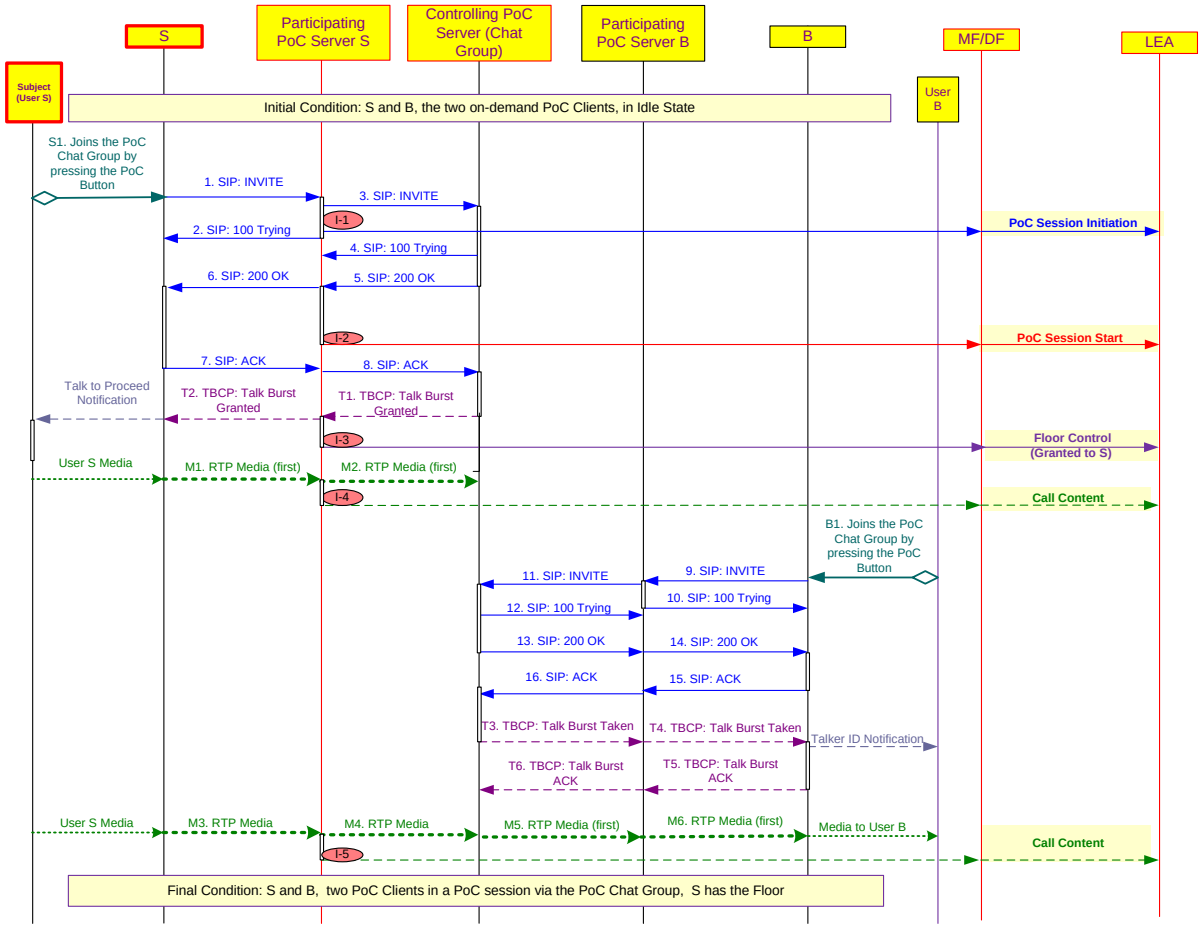

Figure C.34: PoC Chat Group Session Start Example –PoC Intercept Subject initiates the On-Demand Session

This flow illustrates an example where the PoC Intercept Subject [shown as Subject (User S)] initiates a PoC Chat Group Session. Subject (User S) is the first party joining the PoC Chat Group Session. User B joins the PoC Chat Group Session as a subsequent party. Both Subject (User S) and User B have On-Demand PoC Clients.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have On-Demand PoC Clients, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users joining a PoC Chat Group Session may have either PoC Clients with Pre-Established Sessions and/or On-Demand PoC Clients. The flow illustrating the steps of users with PoC Clients having Pre-Established Sessions joining a PoC Chat Group Session is shown in Annex C.9.1 and C.9.2.

Description of the Steps:

In this call flow:

- S1 and B1 are user actions.
- Steps 1 to 16 show the SIP signaling messages used while joining the PoC Session.
- Steps T1 to T6 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.

- Steps I1 to I5 illustrate the interception points.

Subject (User S) initiates the PoC Chat Group Session

S1: Subject (User S) with an On-Demand PoC Client S initiates a PoC Chat Group Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP INVITE to the Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 100 Trying to PoC Client S in response to the SIP INVITE.

   I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

3. The Participating PoC Server of S forwards the SIP INVITE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
5. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of S.
6. The Participating PoC Server of S forwards a SIP 200 OK to the PoC Client S.

   I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

7. PoC Client S sends a SIP ACK to the Participating PoC Server of S.
8. The Participating PoC Server of S forwards the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate a TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of S or when it receives the SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (with the TBCP: Talk Burst Granted message reaching the device before the SIP 200 OK), it is possible that some implementation may follow that approach.

T1. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.

T2. The participating PoC Server of S forwards the TBCP: Talk Burst Granted message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that he can now proceed to talk.

   I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Granted to S) message to the LEA.

Media transfer related steps

The Subject (User S) may begin talking upon receiving the Proceed to Talk notification. However, note that Subject (User S) is the only user on the PoC Chat Group Session.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends a Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

   I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

User B joins the PoC Chat Group Session

B1: User B with an On-Demand PoC Client B joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

9. PoC Client B sends a SIP INVITE to the Participating PoC Server of B.
10. The Participating PoC Server of B sends a SIP 100 Trying to PoC Client B in response to the SIP INVITE.
11. The Participating PoC Server of B forwards the SIP INVITE to the Controlling PoC Server (Chat Group).
12. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of B in response to the SIP INVITE.
13. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of B.
14. The Participating PoC Server of B forwards the SIP 200 OK to the PoC Client B.
15. PoC Client B sends a SIP ACK to the Participating PoC Server of B.
16. The Participating PoC Server of B forwards the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of B or when it receives the SIP ACK from the Participating PoC Server of B. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (TBCP: Talk Burst Taken message reaching the device before the SIP 200 OK), it is possible that some implementation may follow that approach.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client B via the Participating PoC Server of B. In this step, the message is sent to the Participating PoC Server of B.

T4. The participating PoC Server of B forwards the TBCP: Talk Burst Taken message to the PoC Client B. The mobile device that has the PoC Client B notifies the Talker ID [i.e., the identity of PoC Client S or Subject (User S)] to User B.

T5. The PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

Subject (User S), who has the floor, will speak to User B.

M3. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M4. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I5: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M6. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the media from Subject (User S).

At the end of this flow, the PoC Client S and PoC Client B are in a PoC Chat Group Session with PoC Client S (i.e., Subject or User S) having the Floor (i.e., speaking).

C.9.4 PoC Chat Group Session Start Example –PoC Intercept Subject Joins the Session (On-Demand)

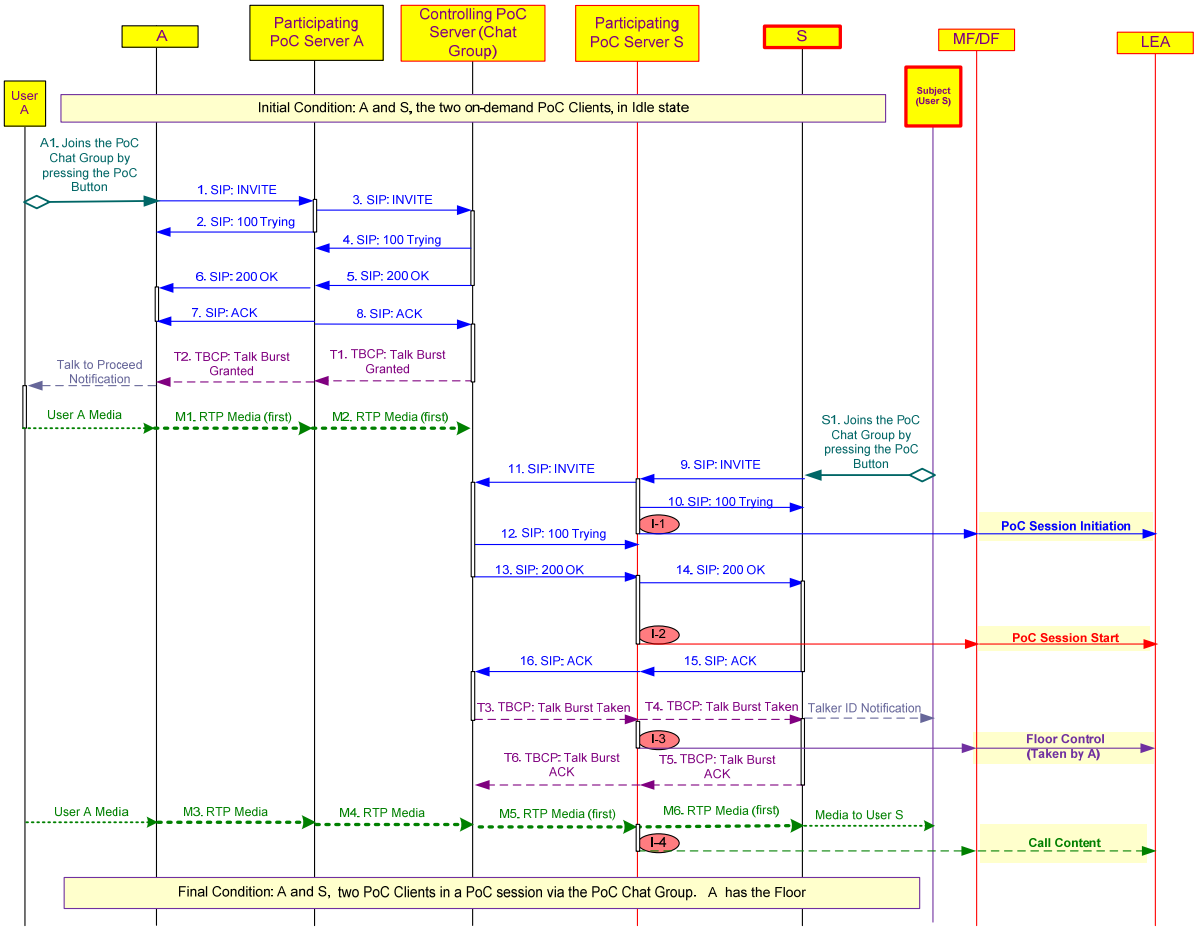

Figure C.35: PoC Chat Group Session Start Example – PoC Intercept Subject joins the Session (On-Demand)

This flow illustrates an example where the PoC Intercept Subject [shown as Subject (User S)] joins a PoC Chat Group Session which is initiated by another user (User A). The Subject is basically joining the Session as a subsequent party. Both User A and the Subject (User S) have On-Demand PoC Clients.

Even though the flow presumes that both PoC Clients joining the PoC Chat Group Session have On-Demand PoC Clients, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users joining a PoC Chat Group Session may have either a PoC Client with a Pre-Established Session or an On-Demand PoC Client. The flow illustrating the steps of users with PoC Clients having Pre-Established Sessions joining a PoC Chat Group Session is shown in Annex C.9.1 and C.9.2.

Description of the Steps:

In this call flow:

- A1 and S1 are user actions.
- Steps 1 to 16 show the SIP signaling messages used while joining the PoC Session.
- Steps T1 to T6 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M6 illustrate the RTP media flow between two points.
- Steps I1 to I4 illustrate the interception points.

User A initiates the PoC Chat Group Session

A1: User A with an On-Demand PoC Client A initiates a PoC Chat Group Session. The exact method used to initiate such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP INVITE to the Participating PoC Server of A.
2. The Participating PoC Server of A sends a SIP 100 Trying to PoC Client A in response to the SIP INVITE.
3. The Participating PoC Server of A forwards the SIP INVITE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of A in response to the SIP INVITE.
5. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of A.
6. The Participating PoC Server of A forwards the SIP 200 OK to the PoC Client A.
7. PoC Client A sends a SIP ACK to the Participating PoC Server of A.
8. The Participating PoC Server of A forwards the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate the TBCP: Talk Burst Granted message when it sends the SIP 200 OK to the Participating PoC Server of A or when it receives the SIP ACK from the Participating PoC Server of A. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (TBCP: Talk Burst Granted message reaching the device before the SIP 200 OK), it is possible that some implementation may follow that approach.

T1. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Granted message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server of A.

T2. The participating PoC Server of A forwards the TBCP: Talk Burst Granted message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that she can now proceed to talk.

Media transfer related steps

The User A may begin talking upon receiving the Proceed to Talk notification. However, note that User A is the only user on the PoC Chat Group Session.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

Subject (User S) joins (as a subsequent party) the PoC Chat Group Session

S1: Subject (User S) with an On-Demand PoC Client S joins a PoC Chat Group. The exact method used to join such a Session can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

9. PoC Client S sends the SIP INVITE to the Participating PoC Server of S.
10. The Participating PoC Server of S sends the SIP 100 Trying to PoC Client S in response to the SIP INVITE.

    I1: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Initiation message to the LEA.

11. The Participating PoC Server of S forwards the SIP INVITE to the Controlling PoC Server (Chat Group).
12. The Controlling PoC Server (Chat Group) sends a SIP 100 Trying to the Participating PoC Server of S in response to the SIP INVITE.
13. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server of S.
14. The Participating PoC Server of S forwards the SIP 200 OK to the PoC Client S.

    I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session Start message to the LEA.

15. PoC Client S sends a SIP ACK to the Participating PoC Server of S.
16. The Participating PoC Server of S forwards the SIP ACK to the Controlling PoC Server (Chat Group).

TBCP-related Steps

In the descriptions given below, the Controlling PoC Server (Chat Group) may generate a TBCP: Talk Burst Taken message when it sends the SIP 200 OK to the Participating PoC Server of S or when it receives the SIP ACK from the Participating PoC Server of S. For simplicity of drawing, the latter is shown in the call flow. Even though the former approach could lead to a message race condition (with the TBCP: Talk Burst Taken message reaching the device before the SIP 200 OK), it is possible that some implementation may follow that approach.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Taken message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server of S.
T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Taken message to the PoC Client S. The mobile device that has the PoC Client S notifies the Talker ID [i.e., the identity of PoC Client A (or User A) to the Subject (User S)].

    I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Taken by A) message to the LEA.

T5. The PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.
T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Ack message to the Controlling PoC Server (Chat Group).

Media transfer related steps

User A, who has the floor, will speak to Subject (User S).

M3. The mobile device that has the PoC Client A receives the user media from User A and sends the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.
M4. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).
M5. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.
M6. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the media from User A.

    I4: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

At the end of this flow, the PoC Client A and PoC Client S are in a PoC Chat Group Session with PoC Client A (i.e., User A) having the Floor (i.e., speaking).

C.9.5 PoC Chat Group Session End Example – Pre-established PoC Intercept Subject Initiated the Session

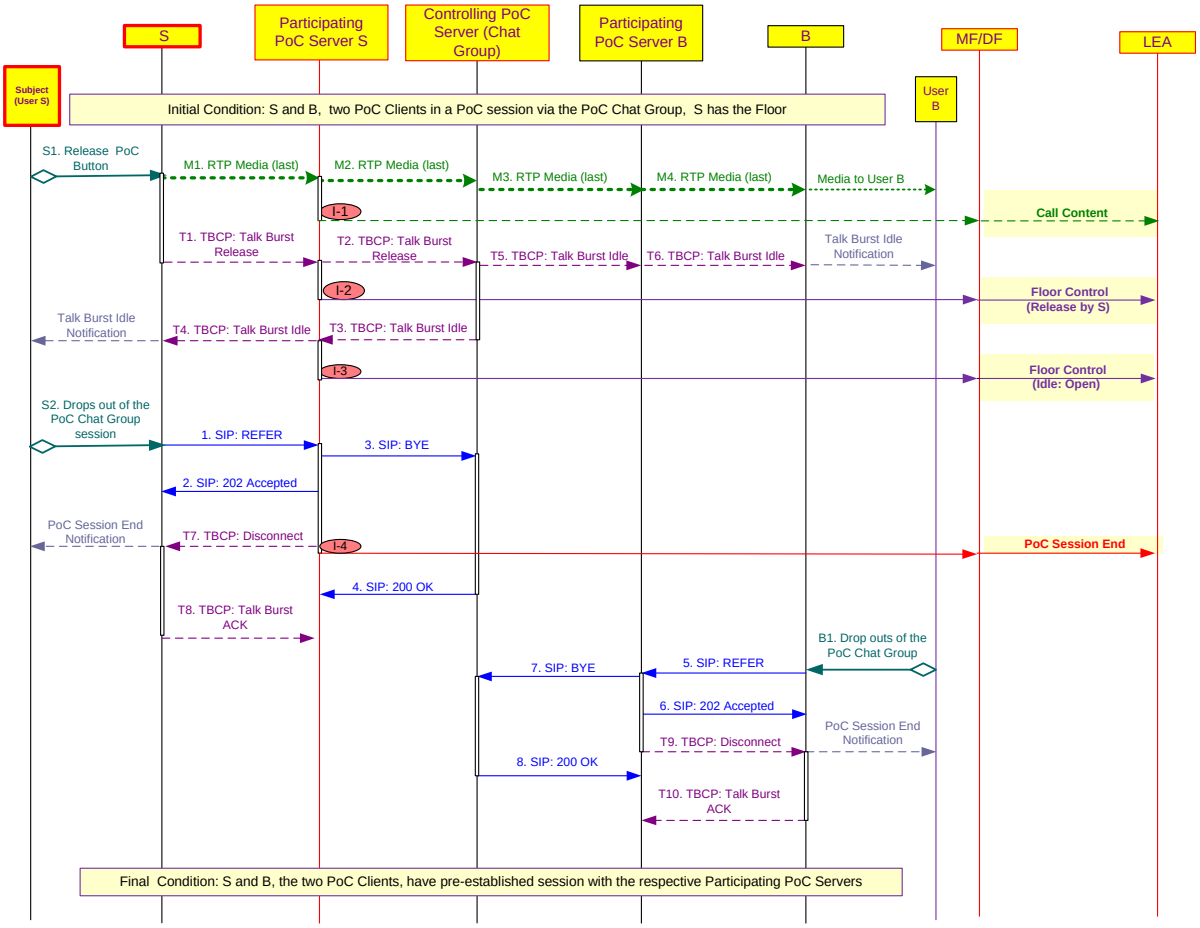

Figure C.36: PoC Chat Group Session End Example – Pre-established PoC Intercept Subject had initiated the Session

This flow illustrates an example, where a PoC Chat Group Session ends. The PoC Chat Group Session was initiated by the PoC Intercept Subject [shown as Subject (User S)] and was joined by another user (User B). Both Subject and User B have PoC Clients with Pre-Established Session. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow presumes that both PoC Clients who joined the PoC Chat Group Session have Pre-Established Sessions, it is possible that either of them may have On-Demand PoC Clients. In other words, the users joining a PoC Chat Group Session may have either the PoC Clients with Pre-Established Session and/or the On-Demand PoC Clients. The flows illustrating the steps of On-Demand PoC Clients dropping out of a PoC Chat Group Session are shown in Annex C.9.7 and C.9.8.

Description of the Steps:

In this call flow:

- S1, S2, and B1 are user actions.
- Steps 1 to 8 show the SIP signaling messages used while dropping out of the PoC Chat Group Session.
- Steps T1 to T10 show the Talk Burst Control Protocol (TBCP) related messages.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

Subject relinquishes the Floor in a PoC Chat Group Session

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

M3. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards the Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, the User B receives the last of the media from User A.

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

Subject (User S) drops out of the PoC Chat Group Session

S2: Subject (User S) drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP REFER (type: BYE) to the Participating PoC Server of S.
2. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
3. The Participating PoC Server of S sends a SIP BYE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server S.

TBCP-related Steps

In the following steps, the Participating PoC Server of S may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)). The flow shows the former approach.

T7. The Participating PoC Server of S, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the PoC Session has been ended.

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

T8. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

User B drops out of the PoC Chat Group Session

B1: User B drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client B sends a SIP REFER (type: BYE) to the Participating PoC Server of B.
6. The Participating PoC Server of B sends a SIP 202 Accepted to PoC Client B in response to the SIP REFER.
7. The Participating PoC Server of B sends a SIP BYE to the Controlling PoC Server (Chat Group).
8. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server B.

TBCP-related Steps

In the following steps, the Participating PoC Server of B may send a TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps [i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)]. The flow shows the former approach.

T9. The Participating PoC Server of B, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B that the PoC Session has been ended.

T10. PoC Client B sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of B.

At the end of this flow, the PoC Client S and PoC Client B are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.9.6 PoC Chat Group Session End Example – Pre-established PoC Intercept Subject Joined the Session

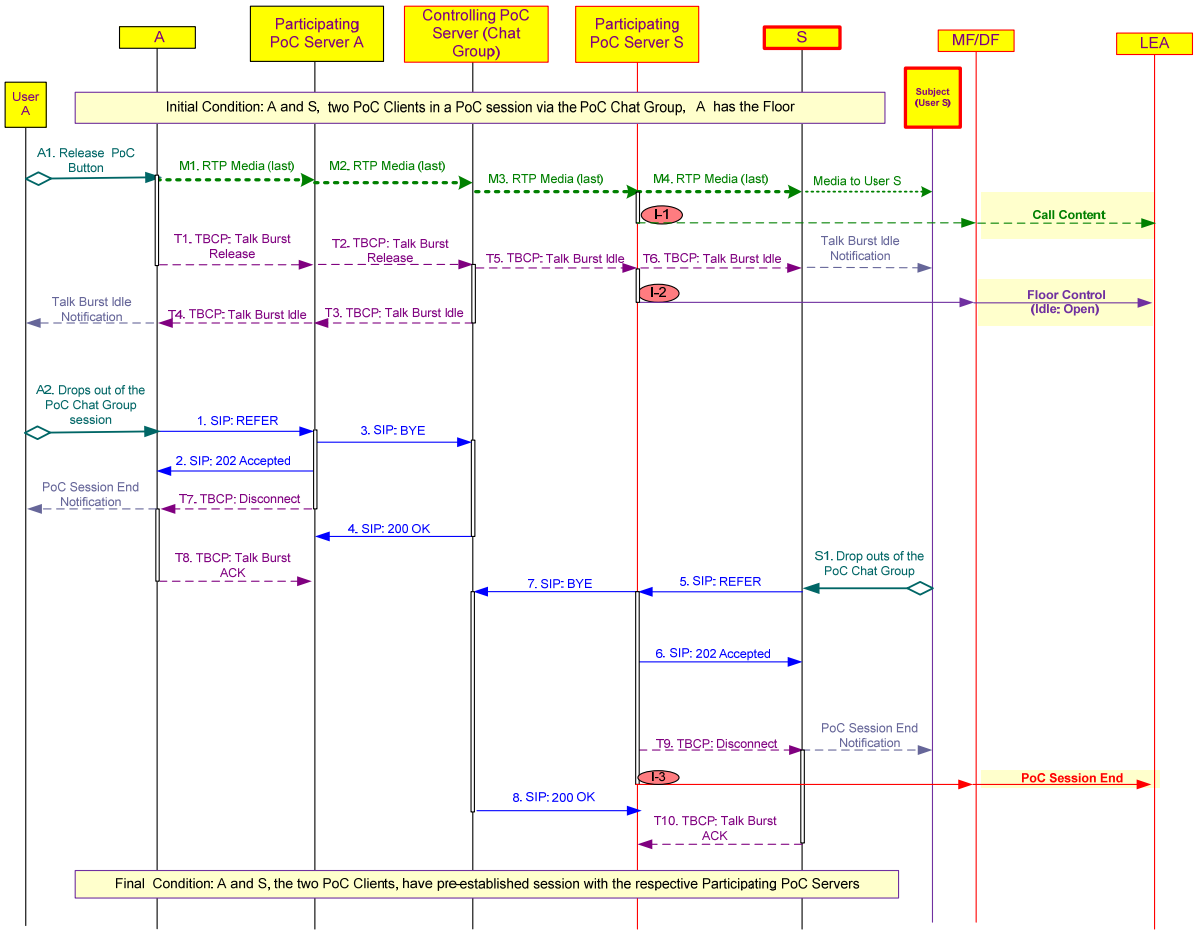

Figure C.37: PoC Chat Group Session End Example – Pre-established PoC Intercept Subject joined the Session

This flow illustrates an example where a PoC Chat Group Session ends. The PoC Chat Group Session was initiated by User A and the PoC Intercept Subject [shown as Subject (User S)] joined the Session as a subsequent party. In the flow, the Subject (User S) is the last party to leave the PoC Chat Group Session. Both Subject and User B have PoC Clients with Pre-Established Sessions. The flows illustrating the steps of Pre-Established Session setup and release are illustrated in Annex C.3.

Even though the flow presumes that both PoC Clients who joined the PoC Chat Group Session have Pre-Established Sessions, it is possible that either of them may have On-Demand PoC Clients. In other words, the users joining a PoC Chat Group Session may have either a PoC Client with a Pre-Established Session or an On-Demand PoC Client. The flows illustrating the steps of On-Demand PoC Clients dropping out of a PoC Chat Group Session are shown in Annexes C.9.7 and C.9.8.

Description of the Steps:

In this call flow:

- A1, A2, and S1 are user actions.

- Steps 1 to 8 show the SIP signaling messages used while the users drop out of the PoC Chat Group Session.
- Steps T1 to T10 show the TBCP-related messages.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I5 illustrate the interception points.

User A relinquishes the Floor Control in a PoC Chat Group Session

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.

M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

M3. The Controlling PoC Server (Chat Group) forwards the Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M4. The Participating Server of S forwards the Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User A.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T1. When User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of A.

T2. The Participating PoC Server of A forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.

T4. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

User A drops out of the PoC Chat Group Session

A2: User A drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP REFER (type: BYE) to the Participating PoC Server of A.
2. The Participating PoC Server of A sends a SIP 202 Accepted to PoC Client A in response to the SIP REFER.
3. The Participating PoC Server of A sends a SIP BYE to the Controlling PoC Server (Chat Group).
4. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server A.

TBCP-related Steps

In the following steps, the Participating PoC Server of A may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps (i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)). The flow shows the former approach.

T7. The Participating PoC Server of A, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A that the PoC Session has been ended.

T8. PoC Client A sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of A.

Subject (User S) drops out of the PoC Chat Group Session

S1: Subject (User S) drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client S sends a SIP REFER (type: BYE) to the Participating PoC Server of S.
6. The Participating PoC Server of S sends a SIP 202 Accepted to PoC Client S in response to the SIP REFER.
7. The Participating PoC Server of S sends a SIP BYE to the Controlling PoC Server (Chat Group).
8. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server S.

TBCP-related Steps

In the following steps, the Participating PoC Server of S may send the TBCP: Disconnect message either at the beginning of the releasing steps (i.e., when it receives the REFER message) or at the end of the releasing steps [i.e., when it receives a SIP 200 OK in response to the SIP BYE from the Controlling PoC Server (Chat Group)]. The flow shows the former approach.

T9. The Participating PoC Server of S, upon receiving the SIP REFER message, sends a TBCP: Talk Burst Disconnect message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) that the PoC Session has been ended.

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

T10. PoC Client S sends the optional TBCP: Talk Burst Ack message to the Participating PoC Server of S.

At the end of this flow, the PoC Client A and PoC Client S are not in any PoC Session, but still maintain their Pre-Established Sessions with the respective Participating PoC Servers.

C.9.7 PoC Chat Group Session End Example – PoC Intercept Subject Initiated the On-Demand Session

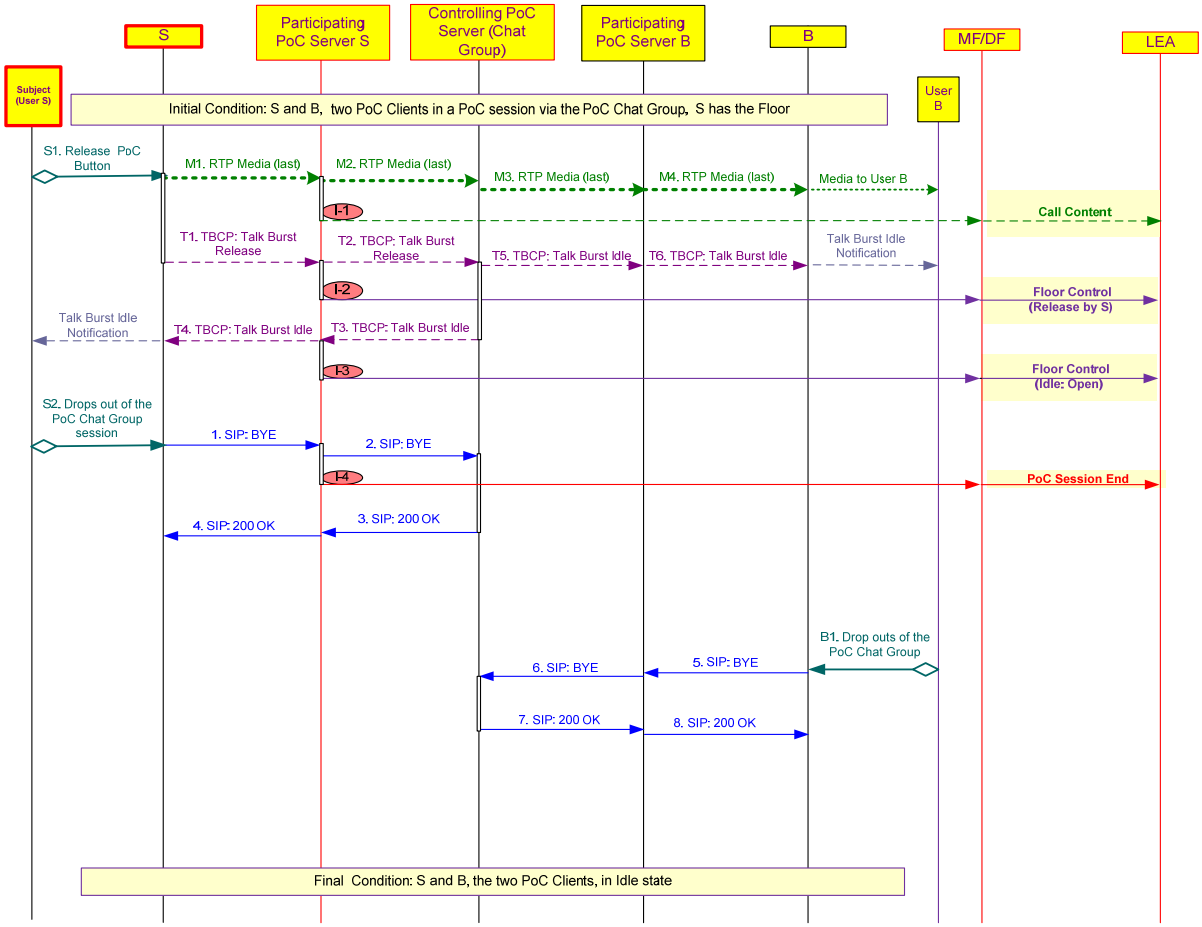

Figure C.38: PoC Chat Group Session End Example – PoC Intercept Subject initiated the On-Demand Session

This flow illustrates an example where a PoC Chat Group Session ends. The PoC Chat Group Session was initiated by the PoC Intercept Subject [shown as Subject (User S)] and was joined by another user (User B). Both Subject and User B have On-Demand PoC Clients.

Even though the flow presumes that both PoC Clients who joined the PoC Chat Group Session have On-Demand Sessions, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users joining a PoC Chat Group Session may have PoC Clients with Pre-Established Sessions and/or On-Demand PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients dropping out of a PoC Chat Group Session are shown in Annex C.9.5 and C.9.6.

Description of the Steps:

In this call flow:

- S1, S2, and B1 are user actions.
- Steps 1 to 8 show the SIP signaling messages used while the users drop out of the PoC Chat Group Session.
- Steps T1 to T6 show the Talk Burst Control Protocol (TBCP) related messages.

- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I4 illustrate the interception points.

Subject relinquishes the Floor Control in a PoC Chat Group Session

S1: Subject (User S) releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the Subject (User S) indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client S receives the user media from Subject (User S) and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.

M2. The Participating PoC Server of S forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF which in turn sends the received packet as Call Content to the LEA.

M3. The Controlling PoC Server (Chat Group) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of B.

M4. The Participating Server of B forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client B. Thus, User B receives the last of the media from Subject (User S).

TBCP-related Steps

T1. When the Subject (User S) releases the PoC button, the PoC Client S, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of S.

T2. The Participating PoC Server of S forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Release by S) message to the LEA.

T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.

T4. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I3: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the Participating PoC Server of B.

T6. The Participating PoC Server of B forwards the TBCP: Talk Burst Idle message to the PoC Client B. The mobile device that has the PoC Client B notifies the User B about the Talk Burst Idle status (in other words, the floor is open).

Subject (User S) drops out of the PoC Chat Group Session

S2: Subject (User S) drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client S sends a SIP BYE to the Participating PoC Server of S.
2. The Participating PoC Server of S forwards the SIP BYE to the Controlling PoC Server (Chat Group).

   I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

3. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server S.
4. The Participating PoC Server of S sends a SIP 200 OK to PoC Client S.

User B dropping out of the PoC Chat Group Session

B1: User B drops out of the PoC Chat Group Session. The exact method used to end the Session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client B sends a SIP BYE to the Participating PoC Server of B.
6. The Participating PoC Server of B sends a SIP BYE to the Controlling PoC Server (Chat Group).
7. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server B.
8. The Participating PoC Server of B sends a SIP 200 OK to PoC Client B.

At the end of this flow, the PoC Client S and PoC Client B are in idle condition.

C.9.8 PoC Chat Group Session End Example – PoC Intercept Subject Joined the Session (On-Demand)

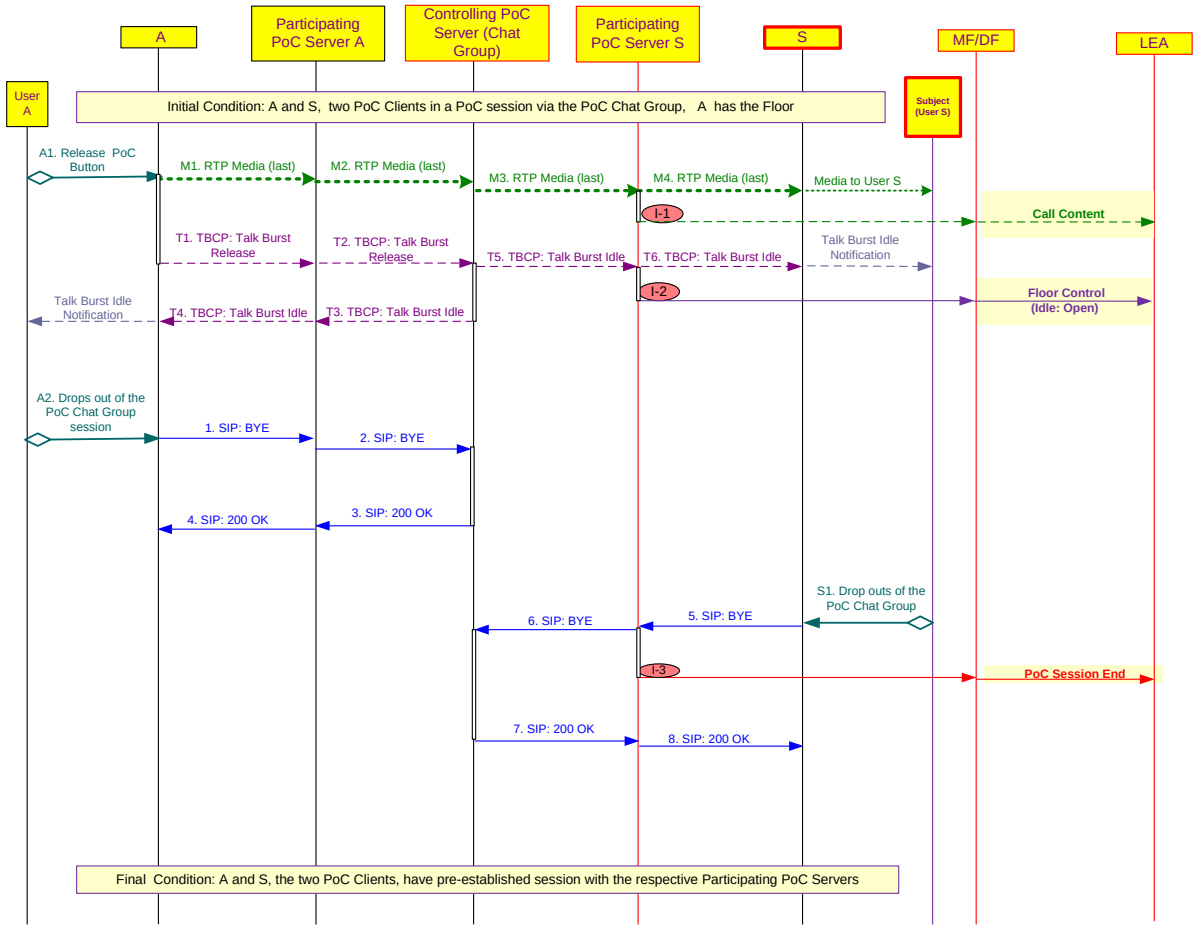

Figure C.39: PoC Chat Group Session End Example – PoC Intercept Subject joined the Session (On-Demand)

This flow illustrates an example where a PoC Chat Group Session ends. The PoC Chat Group Session was initiated by User A and PoC Intercept Subject [shown as Subject (User S)] joined the Session as a subsequent party. In the flow, the Subject (User S) is the last party to leave the PoC Chat Group Session. Both User A and Subject have On-Demand PoC Clients.

Even though the flow presumes that both PoC Clients who joined the PoC Chat Group Session have On-Demand Sessions, it is possible that either of them may have Pre-Established PoC Clients. In other words, the users joining a PoC Chat Group Session may have PoC Clients with Pre-Established Sessions and/or On-Demand PoC Clients. The flows illustrating the steps of Pre-Established PoC Clients dropping out of a PoC Chat Group Session are shown in Annexes C.9.5 and C.9.6.

Description of the Steps:

In this call flow:

- A1, A2, and S1 are user actions.
- Steps 1 to 8 show the SIP signaling messages used while the users drop out of the PoC Chat Group Session.

- Steps T1 to T6 show the TBCP-related messages.
- Steps M1 to M4 illustrate the RTP media flow between two points.
- Steps I1 to I4 illustrate the interception points.

User A relinquishes the Floor Control in a PoC Chat Group Session

A1: User A releases the PoC button and thus stops speaking. The exact method used to perform such a step can vary depending on the mobile device that has the PoC Client.

Media transfer related steps

As the User A indicates the end of speaking, the last media is sent towards the listener.

M1. The mobile device that has the PoC Client A receives the user media from User A and sends this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of A.
M2. The Participating PoC Server of A forwards the Talk Burst in the form of an RTP Media stream to the Controlling PoC Server (Chat Group).
M3. The Controlling PoC Server (Chat Group) forwards this last Talk Burst in the form of an RTP Media stream to the Participating PoC Server of S.
M4. The Participating Server of S forwards this last Talk Burst in the form of an RTP Media stream to the PoC Client S. Thus, the Subject (User S) receives the last of the media from User A.

I1: The Participating PoC Server of S forwards the packet that carries the RTP media stream to the MF/DF, which in turn sends the received packet as Call Content to the LEA.

TBCP-related Steps

T1. When the User A releases the PoC button, the PoC Client A, after sending the last of the media, sends a TBCP: Talk Burst Release message to the Participating PoC Server of A.
T2. The Participating PoC Server of A forwards the TBCP: Talk Burst Release message to the Controlling PoC Server (Chat Group).
T3. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client A via the Participating PoC Server of A. In this step, the message is sent to the Participating PoC Server A.
T4. The Participating PoC Server of A forwards the TBCP: Talk Burst Idle message to the PoC Client A. The mobile device that has the PoC Client A notifies the User A about the Talk Burst Idle status (in other words, the floor is open).
T5. The Controlling PoC Server (Chat Group) sends a TBCP: Talk Burst Idle message to the PoC Client S via the Participating PoC Server of S. In this step, the message is sent to the Participating PoC Server S.
T6. The Participating PoC Server of S forwards the TBCP: Talk Burst Idle message to the PoC Client S. The mobile device that has the PoC Client S notifies the Subject (User S) about the Talk Burst Idle status (in other words, the floor is open).

I2: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES Floor Control (Idle or Open) message to the LEA.

User A drops out of the PoC Chat Group Session

A2: User A drops out of the PoC Chat Group Session. The exact method used to end the session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

1. PoC Client A sends a SIP BYE to the Participating PoC Server of A.
2. The Participating PoC Server of A forwards the SIP BYE to the Controlling PoC Server (Chat Group).

3. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server A.
4. The Participating PoC Server of A sends a SIP 200 OK to PoC Client A.

Subject (User S) drops out of the PoC Chat Group Session as the last party

S1: The Subject (User S) drops out of the PoC Chat Group Session. The exact method used to end the session this way can vary depending on the mobile device that has the PoC Client.

SIP Signaling Steps

5. PoC Client S sends a SIP BYE to the Participating PoC Server of S.
6. The Participating PoC Server of S sends the SIP BYE to the Controlling PoC Server (Chat Group).

   I4: The Participating PoC Server of S sends a message to the MF/DF; the MF/DF sends the LAES PoC Session End message to the LEA.

7. The Controlling PoC Server (Chat Group) sends a SIP 200 OK to the Participating PoC Server S.
8. The Participating PoC Server of S sends a SIP 200 OK to PoC Client S.

At the end of this flow, the PoC Client A and PoC Client S are in idle condition.