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(54) Title: MEDIA SERVER SELECTION FOR LAWFUL INTERCEPTION WITHIN A CALL CONTROL SYSTEM

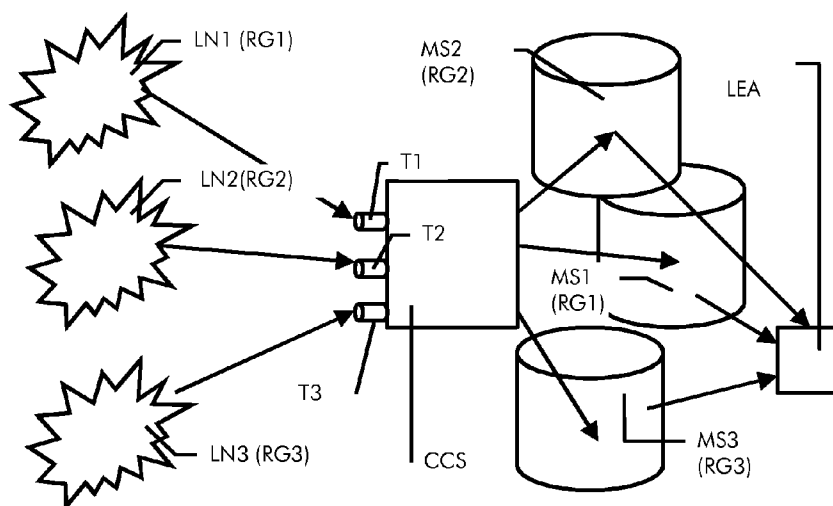


FIG1

(57) Abstract: The present invention relates to a control system (CCS) having trunks to receive setup signaling messages for setting up call sessions in a communication network, means to detect that a setup signaling message corresponds to a service requiring a duplication to be happened to the originator of said setup signaling message and/or to the called subscriber/user, and a media server (MS) to duplicate and forward the content of said call session to a duplication destination (LEA) according to said duplication service detection. This call control system further comprises means for determining said media server (MS) according to the geographical region of said media server (MS), said geographical region being determined at least from a key verification relative to said setup signaling message.

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Media server selection for lawful interception within a call control system

5 The present invention relates to packet duplication in packet based telecommunications networks, and particularly to Internet Protocol (IP) based. In particular, the present invention relates to a media server for lawful interception in IP telecommunications networks.

 Lawful interception (LI) is the legally sanctioned official access to
10 communications, such as telephone calls or e-mail messages, of a user under surveillance. LI is defined as the method of tracking the activities of a person who can be termed legally not good.

 The term "media server" (MS) as used herein preferably connotes any entity which copies communication content for duplication. For example, a
15 media server might be a media gateway, a media server or any communication content copy function CCCF.

 Classically, LI is played using a media resource function server comprising a media server MS and a media gateway controller (MGC). The communication content (CC) is duplicated in the MS and forwarded to a
20 duplication destination, for example a law enforcement agency (LEA).

 Since the number of intercepted subscriber is going on in the increase and not decreasing, the total successful calls in a large network with higher number of targets will go down and it becomes highly desirable to duplicate from the nearest media server MS relative to the geographical region of the
25 called subscriber/user.

 This is of particularly higher importance where the NGN network covers Intelligent Networks (IN) and local traffic as well, as the quantum of interception to be happened per day/hour would be significantly higher.

Furthermore, the Applicant set itself the problem of providing a call control system enabling to have the nearest media server selected to have the duplication of all types and for all purposes.

The aim of the invention is to solve these issues.

5 It relates to a call control system having trunks to receive setup signaling messages for setting up call sessions in a communication network, means to detect that a setup signaling message corresponds to a service requiring a duplication to be happened to the originator of said setup signaling message and/or to the called subscriber/user, and a media server to
10 duplicate and forward the content of said call session to a duplication destination according to said duplication service detection.

According to a general definition of the invention, said call control system further comprises means for determining said media server according to the geographical region of said media server, said geographical region
15 being determined at least from a key verification relative to said setup signaling message.

According to embodiments of the invention, this determination of said geographical region of said media server depends on a Calling Line Identity, contained in said setup signaling message, or on the identifier of the trunk
20 from which said setup signaling message has arrived, or on the number of the called party, or on the trunk for which said signaling message is destined.

The call control system may comprise matching table for mapping values of said media servers and said geographical regions.

The call control system may comprise also matching table for
25 mapping values of said geographical regions and said Calling line identities and/or said identifiers of trunks and/or said Called numbers.

The invention consists also on a communication network comprising such a call control system.

At last, another object of the invention is a method for controlling calls
30 comprising a step of transmitting setup signaling message to a call control

system for setting up call sessions in a communication network, a step of detection that a setup signaling message corresponds to a service requiring a duplication to be happened to the originator of said setup signaling message and/or to the called subscriber/user, and a step implemented in a media
5 server for duplicating and forwarding the content of said call session to a duplication destination in response to the detection step.

This method is characterized in that it further comprises a step of determining said media server according to the geographical region of said media server, said geographical region being determined at least from a key
10 verification relative to said setup signaling message.

The invention would be more clearly explained in the following description, with the help of the annexed figures.

The **figure 1** illustrates a communication network comprising a call control system according to the invention.

15 The **figure 2** is a flowchart illustrating the steps relative to the determination of the nearest media server, according to the invention.

In the **figure 1**, the communication network CN comprises a call control system CCS. This call control system can receive setup signaling
20 message from various calling devices (telephone, IP terminals, etc.), T1, T2, T3, located in several geographical areas or regions RG1, RG2, RG3 corresponding to local communication networks, LN1, LN2, LN3, respectively.

Typically, these setup signaling messages may be compliant with the SIP protocol ("Session Initiation Protocol") as defined by the RFC 3261 of the
25 IETF (Internet Engineering Task Force). In case of a converged call control system, like a media gateway control (MGC), the setup signaling messages can arrive from plain-old telecommunication networks (POTN) and be compliant with the ISUP protocol ("ISDN User Part").

The aim of the setup signaling messages (e.g. the "Invite" message of the SIP protocol) is to set up a call session between the calling device and a called device (not shown in the figure).

As said previously, Lawful Interception LI is played using a media
5 resource function server comprising a media server MS and a media gateway
controller MGC or call control system CCS . The communication content CC is
duplicated in the MS and forwarded to a duplication destination, for example
a law enforcement agency LEA. In such a situation, it is the responsibility of the
call control system CCS to trigger the duplication of the communication
10 content of the call session.

Typically again, the duplication is realized in a least one media server
MS, separated from the call control system itself.

The communication between the call control server CCS and a media
server MS could be based on existing control or signaling protocols, e.g.
15 H.248; SIP or the HTTP protocol (HyperText Transfer Protocol). The destination
address of the duplication destination LEA could be a Directory number or an
URL (Uniform Resource Locator). Typically, the communication content CC is
sent via a mediation function from the media server MS to the LEA. However,
it can be sent optionally also directly to the LEA.

20 Knowing the destination address of the duplication destination LEA, or
the mediation function, respectively, the call control server CCS can order the
media server MS to forward the duplicated communication content of the
calling party that has emitted the setup signaling message to the mediation
function or directly to the LEA.

25 In practice, the entire country is divided into regions RG, and for each
region RG a least one corresponding media server MS is associated.

For example, the media server MS1 corresponds to region RG1.

The determination of the nearest media server able to duplicate and
forward the communication content to the duplication destination LEA

depends on the region corresponding to the setup signaling message (i.e. requested by the calling party and/or the called party).

In practice, the call center system CCS uses information relatives to the setup signaling message and extracts the region RG in which the
5 duplication is to be happened. A free media server MS within the identified region RG is then selected and the duplication is triggered.

As shown in the **figure 1**, trunk T1 links the call control system CCS to the local communication network LN1 belonging to region RG1; the trunk T2 links it to the local communication network LN2 belonging to region RG2;
10 and the trunk T3 links it to the local communication network LN3 belonging to region RG3.

According to the trunk identifier, the call control server CCS can determine which media server MS is present within the region RG corresponding to the local communication network LN.

15 For instance, if the media server MS1 is located in a region RG1 where the local communication network LN1 is identified by the trunk identifier, then the media server MS1 would be chosen.

The Calling Line Identity (CLI) could also be used for selecting the media server. This Calling Line Identity CLI is typically the number of the party
20 initiating the call, as defined by the recommendation E.164 of the ITU-T (International Telecommunication Union). This number is made of several parts as defined by the numbering plan. The prefix of the Calling Line identity CLI represents the region (geographical area). Using this prefix, the call control system CCS can therefore determine the media server.

25 However, this calling line identity CLI is not mandatory and could be not present in the setup signaling message.

With reference to **figure 2**, a flowchart has been represented illustrating the selection of the appropriate media server.

At step S01, during the active phase of the call, the calling line identity
30 CLI is examined.

If received, the CLI is extracted to find out the region identifier RG id of the region it belongs to (step S02).

In practice, CLI is the key to a table (for example called "TRANSLAREACOD") used for translation of received CLI (area code) into the
5 corresponding region identifier RG id.

In case the CLI is not present, the unique trunk group identity (trunkgroup id) is used to obtain the region identifier RG id (step S03).

In practice, trunkgroup id is the key to a table (for example called "TKGIDLANID") used for translation of received trunkgroup identifier into the
10 corresponding region identifier.

At step S04, the region identifier RG id thus obtained is processed.

If the region identifier RG id thus obtained is found in a table (called "Media server table") for mapping of region id to media server id (step S05), said corresponding media server identifier MS id is used (step S06) to select
15 the appropriate media server (step S07).

In case the region identifier RG id is not present in the media server table or in case the media server is not found, any media server would be selected (step S08).

In practice, each time the media server table is accessed, first a check
20 is performed on whether the media server is active, enabled, etc. before a comparison is made on the required region identifier RG id and the region identifier RG id entry provided for the media server entry accessed in the table. After the entire table is scanned, if no match is found, then any found valid media server (for example, the last or the first active, enabled, etc. media
25 server that is found) is selected.

In a variant, in case there is no media server found within the desired region, instead of selecting any media server, a solution is to select a media server from the neighboring region.

For duplication to be provided on called subscriber communication
30 content CC, the called number or outgoing trunkgroup identifier can be used

to access the tables to obtain the region identifier id. The region identifier to media server identifier mapping is the same as that for the CLI case. The tables themselves can be generic, and do not distinguish between CLI/called number or incoming/outgoing trunkgroup id. In other words, the present invention is similar when duplication have to be happened on called party communication content ("CLI" replaced by called number, "incoming trunk id" replaced by "outgoing trunk id").

According to one embodiment of the invention, the Calling Line identity is used when it is present. When it is not, then the trunk identifier is used instead for determining which media server to select.

According to the invention, the call control system CCS contains means to match with each possibility of value for the calling line identity CLI and/or trunk identifiers, an address to the appropriate media server. These means could for instance be a simple matching table (s).

It is therefore quite easy for the operator of the system to modify this table in order to change a region to another, to add a new media server etc.

The present invention provides tremendous savings for both the network operator as well as the LEA.

For network operator, savings in usage of expensive network resources (especially in large countries), both in term of number as well as the duration of use, no loss of LI content communication call data which is very much important for the LEA and hence reducing the risk of threats in the country.

For transmission delay, the present invention avoids delay of the original conversation.

For the LEA, basically all information is always available to the LEA and hence the network becomes more reliable for the Law enforcement agency.

Furthermore, cost savings are also obtained in case of optical fiber connections to the distant media server.

CLAIMS

- 5 **1)** Call control system (CCS) having trunks to receive setup signaling
messages for setting up call sessions in a communication network,
means to detect that a setup signaling message corresponds to a
service requiring an interception to be happened to the originator
of said setup signaling message and/or to the called
10 subscriber/user, and means to duplicate and route the content of
said call session to a third party (LEA) via a media server (MS)
according to said interception service, characterized in that it
further comprises means for determining said media server (MS)
according to the geographical region of said media server (MS),
15 said geographical region being determined at least from a key
verification relative to said setup signaling message.
- 2)** Call control system according to claim 1, in which said the
determination of said geographical region (RG) of said media
20 server (MS) depends on a Calling Line Identity (CLI), contained in
said setup signaling message.
- 3)** Call control system according to claim 2, in which said
determination of said geographical region (RG) of said media
25 server (MS) depends on the identifier of the trunk from which said
setup signaling message has arrived, when the Calling Line
Identity (CLI) is not available.

- 4) Call control system according to claim 1, in which said determination of said geographical region of said media server (MS) depends on the number of the called party.
- 5 5) Call control system according to claim 4, in which said determination of said geographical region of said media server (MS) depends on the trunk for which said signaling message is destined, when the called number is not present.
- 10 6) Call control system according to one of the previous claims, further comprising a matching table, mapping values of said media servers and said geographical regions.
- 15 7) Call control system according to claim 2, further comprising a matching table, mapping values of said geographical regions and said Calling line identities.
- 20 8) Call control system according to claim 3 or claim 5, further comprising a matching table, mapping values of said geographical regions and said identifiers of trunks.
- 25 9) Call control system according to claim 4, further comprising a matching table, mapping values of said geographical regions and said Called numbers.
- 30 10) Communication network comprising a call control system according to one of the previous claims.
- 11) Method for controlling calls comprising a step of transmitting setup signaling message to a call control system (CCS) for setting

up call sessions in a communication network, a step of detection that a setup signaling message corresponds to a service requiring an interception to be happened to the originator of said setup signaling message and/or to the called subscriber/user, and a step for duplicate and route the content of said call session to a third party (LEA) via a media server (MS) according to said interception service, characterized in that it further comprises a step of determining said media server (MS) according to the geographical region of said media server (MS), said geographical region being determined at least from a key verification relative to said setup signaling message.

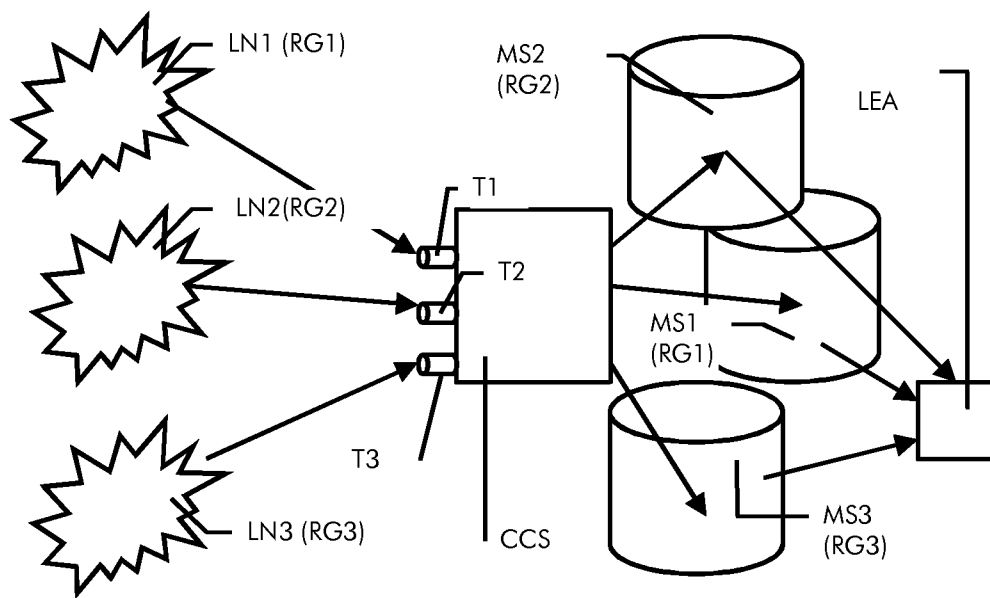
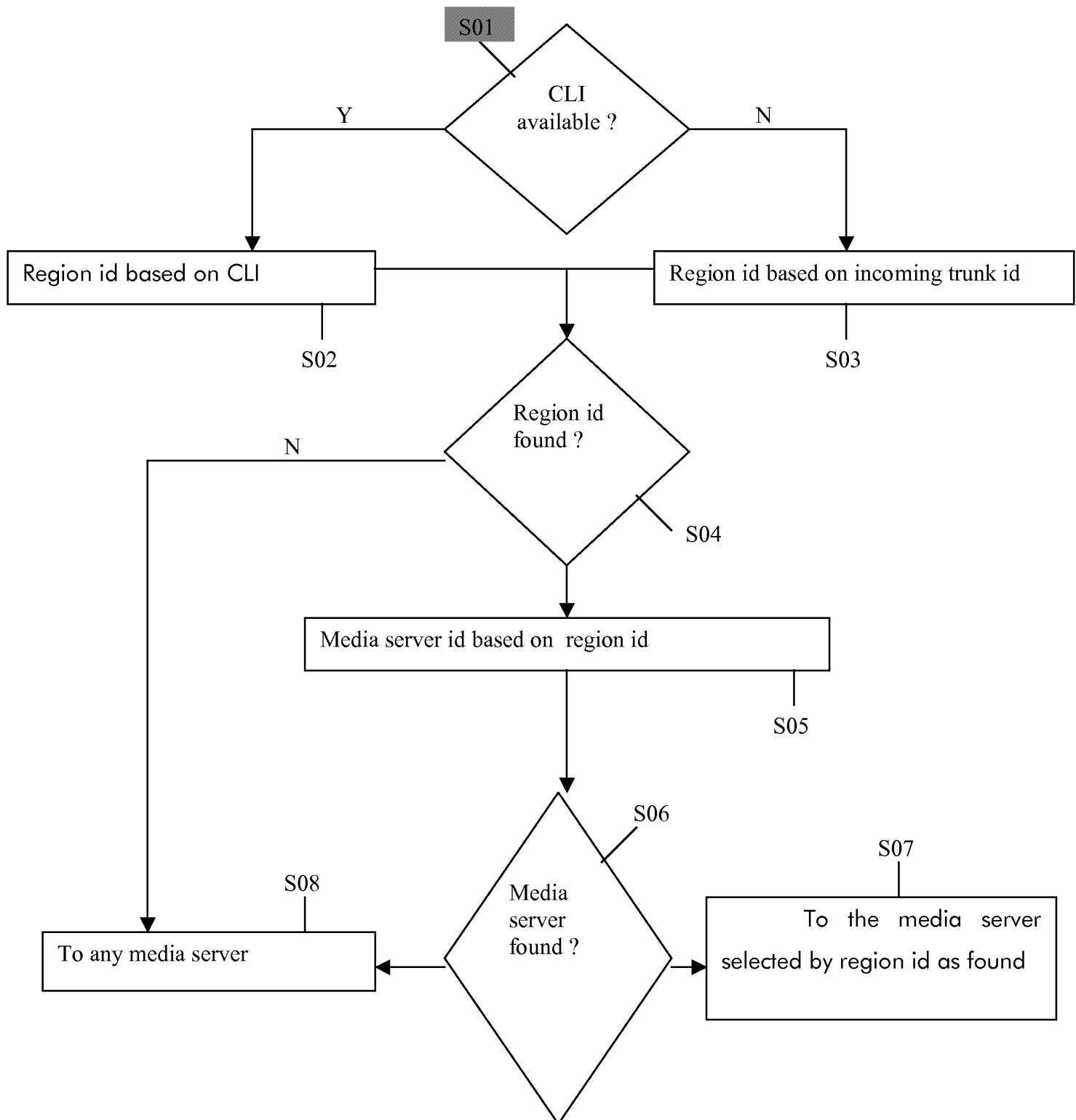
**FIG1**

FIG2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2007/053440

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L29/06 H04M3/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/27716 A (ERICSSON GE MOBILE INC [US]) 3 June 1999 (1999-06-03) abstract page 4, line 1 - page 5, line 17 page 6, line 8 - line 10 page 6, line 21 - line 29 page 7, line 18 - line 27 page 8, line 7 - page 11, line 4 figure 7 ----- -/--	1-11

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2007/053440

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/161446 A1 (DAMMROSE J MARK [US]) 28 August 2003 (2003-08-28) abstract paragraph [0002] paragraph [0004] paragraph [0007] - paragraph [0012] paragraph [0025] - paragraph [0027] paragraph [0031] paragraph [0035] - paragraph [0036] paragraph [0089] paragraph [0094] paragraph [0108]	1-11
A	ALBRECHT SCHWARZ ALCATEL GERMANY ET AL: "A Minimum, Network-access agnostic H.248 Profile for Lawful Interception in VoIP NGNs - Requirements, Motivation and AVD-2616 Update" ITU-T DRAFT STUDY PERIOD 2005-2008, INTERNATIONAL TELECOMMUNICATION UNION, GENEVA, CH, vol. STUDY GROUP 16, 26 July 2005 (2005-07-26), pages 1-5, XP017407990 page 2 - page 3	1-11
A	EP 1 780 945 A (SIEMENS AG [DE]) 2 May 2007 (2007-05-02) abstract paragraph [0005] - paragraph [0009]	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2007/053440

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9927716	A	03-06-1999	AU	1600299 A	15-06-1999
US 2003161446	A1	28-08-2003	US	2006227962 A1	12-10-2006
EP 1780945	A	02-05-2007	AT	394848 T	15-05-2008
			WO	2007048684 A1	03-05-2007