

NOKIA

**Release 4
Nokia Lawful Interception Gateway**

Installation Guide

User Guide

The information in this document is subject to change without notice and describes only the product defined in the introduction of this documentation. This document is intended for the use of Nokia's customers only for the purposes of the agreement under which the document is submitted, and no part of it may be reproduced or transmitted in any form or means without the prior written permission of Nokia. The document has been prepared to be used by professional and properly trained personnel, and the customer assumes full responsibility when using it. Nokia welcomes customer comments as part of the process of continuous development and improvement of the documentation.

The information or statements given in this document concerning the suitability, capacity, or performance of the mentioned hardware or software products cannot be considered binding but shall be defined in the agreement made between Nokia and the customer. However, Nokia has made all reasonable efforts to ensure that the instructions contained in the document are adequate and free of material errors and omissions. Nokia will, if necessary, explain issues which may not be covered by the document.

Nokia's liability for any errors in the document is limited to the documentary correction of errors. **NOKIA WILL NOT BE RESPONSIBLE IN ANY EVENT FOR ERRORS IN THIS DOCUMENT OR FOR ANY DAMAGES, INCIDENTAL OR CONSEQUENTIAL (INCLUDING MONETARY LOSSES)**, that might arise from the use of this document or the information in it.

This document and the product it describes are considered protected by copyright according to the applicable laws.

NOKIA logo is a registered trademark of Nokia Corporation.

Other product names mentioned in this document may be trademarks of their respective companies, and they are mentioned for identification purposes only.

Copyright © Nokia Corporation 2006. All rights reserved.

Contents

	Summary of changes	4
1	Introduction to LIG installation	5
1.1	Installation phases.....	5
1.2	Product collection and disposal within the European Union.....	6
1.3	Software delivery content.....	7
2	Installing LIG	9
2.1	Before installing.....	9
2.2	Installing the new IPSO image.....	10
2.3	Installing the LIC software.....	11
2.4	Installing the LIB software.....	13
2.5	Installing the LIG online documentation.....	15
2.6	Secure Shell (SSH) installation.....	17
2.7	Upgrading LIG.....	17
2.8	Installing the LIG license.....	17
2.9	Installing optional customisation files.....	19
3	LIG 4 features	21
4	Software limitations	23
4.1	LIC Release 4.....	23
4.2	LIB Release 4.....	23
5	Troubleshooting	25
	Appendix: Installing the new IPSO image	31
	References	39
	Glossary	40

Summary of changes

Changes between releases 4 and 3

The LIG Release 4 delivery is available both in NOLS and on CD-ROM. The delivery content is the same for both.

Supported platforms: IP1260 (RoHS compliant), IP1260 (non-RoHS compliant), and IP740. 2GB of memory is required for the platform.

IPSO 3.8NET is supported.

IPSO fresh install and IPSO upgrade are supported.

IPSO online documentation is not supported anymore.

Manual SSH installation and configuration are not required.

The LIG license is supported.

Changes in documentation

The following chapters have been updated:

- Introduction to LIG installation
- Before installing
- Installing the new IPSO image. (The installation example has been moved to the Appendix.)
- Secure Shell (SSH) installation
- LIG features
- Software limitations
- Troubleshooting
- References, Glossary

The following chapters have been added:

- Installing LIG license
- Installing optional `liIri.conf` file
- Appendix: Installing the new IPSO image. The content has been moved here from Chapter *Installing the new IPSO image*.

Chapter *Installing the IPSO online documentation* has been removed.

1 Introduction to LIG installation

The Nokia Lawful Interception Gateway (LIG) Release 4 contains the software and documentation for the Lawful Interception Controller (LIC) and Lawful Interception Browser (LIB) network elements. This document describes the installation of these software and document packages for LIC and LIB network elements.

Nokia products Gateway GPRS Support Node (GGSN), Serving GPRS Support Node (SGSN), Connection Processing Server (CPS), and Flexi ISN include the Lawful Interception Extension (LIE) software module communicating with the LIG. LI support starts with GGSN Release 1.3, 2G SGSN Release 2.0, 3G SGSN Release 1.0, Nokia IMS Release 2.0 CPS network element, and Flexi ISN Release 2.0. The installation and configuration of the LIE modules is described in the respective product documentatation.

1.1 Installation phases

LIG installation contains four main phases:

1. Hardware (HW) installation.

The supported HW platforms for LIG Release 4 are IP1260 (RoHS compliant), IP1260 (non-RoHS compliant), and IP740. The LIG can be the first application installed on the given HW, or the LIG can be installed after previous applications have been uninstalled.

LIG Release 4 requires that the HW has 2GB memory installed.

2. IPSO Operating System (OS) installation.

The supported OS version for LIG Release 4 is IPSO 3.8NET. IPSO can be fresh installed or upgraded from previous versions.

3. LIG application software (SW) installation.

LIG release 4 LIC/LIB application SW can be installed on top of the correct IPSO version after other applications have been removed. If the application SW type changes (for example, from GGSN to LIC), a fresh

installation of IPSO is recommended. After the application SW has been installed, the initial configuration of the LIC/LIB can be performed or the configuration can be upgraded from the previous LIG release.

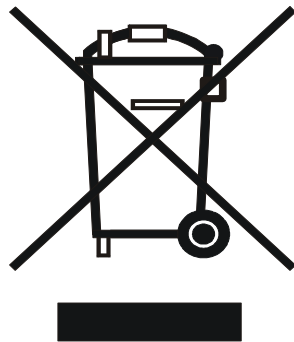
4. Other installation.
 - Installation of LIG online documentation.
 - Installation of LIG license.
 - Installation of optional customisation files.
 - Installation of SSH.

First install the hardware, then the new IPSO image, and after that the required software package (licontroller or librowser). Finally, you can install documentation package, licenses, and optional customisation files.

1.2 Product collection and disposal within the European Union

Guidelines for product collection and safe disposal of the equipment are indicated with a sticker placed on the equipment, shown in the figure below.

Product collection and disposal within the European Union



Do not dispose of the product as unsorted municipal waste. The crossed-out wheeled bin means that at the end of the product's life it must be taken to separate collection.

Note: this is applicable only within the European Union (see WEEE Directive 2002/96/EC)

DN0577953

Figure 1. Product collection and disposal within the European Union

1.3 Software delivery content

LIG Release 4 software, including the IPSO operating system, is available as a LIG4 CD and downloadable from the NOLS software download section.

LIG Release 4 customer documentation is downloadable from NOLS, it is delivered along with the LIG software CD, and it can be ordered as a separate LIG4 customer documentation CD.

The following tables list the content of the LIG software delivery.

Table 1. Software files

File name	Required in LIC / LIB	Type	Description
licontroller.tgz	LIC	software package	application SW for LIC features
librowser.tgz	LIB	software package	application SW for LIB features
ipso.tgz	LIC, LIB	operating system image	IPSO 3.8NET
leaViewer.tgz	-	archived source code files	The source code for the LeaViewer tool. For more information, see <i>Nokia LIG Release 4 Product Documentation: LeaViewer Guide</i> .
conf.tgz	LIB	archived customisation files	Country-specific optional customisation files according to national legislation.

Table 2. Documentation files

File name	Required in LIC / LIB	Type	Description
ligdoc.tgz	LIC, LIB	documentation package	LIG online documentation
LIG4_documents.zip	-	archived documents	Release Notes, etc.
LIG4_customer_documents.zip	-	archived documents	LIG 4 application software and IPSO OS customer documents in PDF format
md5.txt	-	text file	md5 checksums

2 Installing LIG

2.1 Before installing

The installation packages (`ipso.tgz`, `licontroller.tgz`, `librowser.tgz`, `ligdoc.tgz`) must be copied to a local FTP server. The files have been compressed to save space and to speed up the download. Make sure that there is enough free disk space available on the local FTP server, the required amount is approximately 40 MB.

If you have a previous Nokia Lawful Interception Gateway (LIG) release, make backup copies of the files listed in the table below on your local FTP server. You need these files to restore the previous LIG software release if the installation fails.

For more detailed information about upgrading and the preparations for upgrading, see *Upgrade instructions for LIG from Release 3 to Release 4*.

Table 3. Files to back up for LIG Release 3

File	Description
<code>/image/current/ipso.tgz</code>	previous IPSO image
<code>/opt/packages/*.tgz</code>	current packages
<code>/var/ligdb</code>	LIG database files. This is done via the LIC/LIB backup web interface. This operation is explained in <i>Nokia LIG Release 3 Product Documentation: Reference Guide</i> .
<code>/var/etc/ssh*</code> and <code>/var/admin/.ssh/*</code>	SSH configuration parameters

2.2 Installing the new IPSO image

The Nokia (Ipsilon) Router Operating System (IPSO) image is the `ipso.tgz` file. Both the Lawful Interception Controller (LIC) and Lawful Interception Browser (LIB) network elements require the same IPSO image. The supported version of the image is IPSO 3.8NET.

The IPSO image can be fresh installed or upgraded from earlier IPSO versions. This is always needed when the IPSO device is taken into use.

Note

New IP1260s are pre-installed with NIC IPSO. If you are installing NET IPSO for the first time to the IP1260, you need to answer **nocompat** to the following question.

```
BOOTMGR[1]> install
##### IPSO Full Installation #####
You will need to supply the following information:
Client IP address/netmask, FTP server IP address and filename,
system serial number, and other license information.
This process will DESTROY any extant files and data on your disk.
#####
Continue? (y/n) [n] nocompat
```

This disables the IPSO compatibility check. This is needed because the originally installed IPSO would not otherwise allow the installation of NET IPSO.

Additionally, an IPSO image fresh installation is also necessary if the disk contents or configuration become corrupted, since it clears all the disks.

The IPSO image is fresh installed using the IPSO device console, or the IPSO image can be upgraded using the Web interface. Once the IPSO image `ipso.tgz` is available on the FTP server, you can perform the image installation.

Detailed information about the IPSO installation and configuration is available in *Nokia IP1200 Series Installation Guide* or *Nokia IP700 Series Installation Guide*, depending on the hardware used.

Note

An example of the IPSO installation is presented in the Appendix of this document.

After installing the IPSO image, continue by installing the required application SW and document packages, according to the instructions in the following chapters.

Note

Disk mirroring on LIC/LIB is not enabled by default, it requires both hardware and software configuration in order to be enabled.

Depending on the hardware you are using, follow the one of the following procedures to enable disk mirroring on your LIC/LIB.

For IP740:

1. Make sure there are two hard disks installed. This can be easily seen from the front of the chassis; there is a 'status' LED and a 'disk hot swap' button on the side of each hard disk.
2. Press the 'disk hot swap' button for each hard disk. Make sure the 'status' LED blinks green for both hard disks.
3. Go to Voyager's *Disk Mirroring Configuration* page, and create disk mirrors according to the IPSO configuration instructions.

For IP1260:

1. Make sure there are two hard disks installed on the left-hand side of the front chassis; each hard disk should be labeled as 20GB. There is a 'status' LED and a 'disk hot swap' button on the front side of each hard disk.
2. Press the 'disk hot swap' button for each hard disk. Make sure the 'status' LED blinks green for both hard disks.

Go to Voyager's *Disk Mirroring Configuration* page, and create disk mirrors according to the IPSO configuration instructions.

2.3 Installing the LIC software

The Lawful Interception Controller (LIC) software is the `licontroller.tgz` package, which must be installed by the system administrator to all LIC network elements. After installation, you should find a new **Lawful Interception Controller** link on the IPSO configuration page (click the **Config** button on the initial page to get to the configuration page). By clicking that link you obtain LIC-specific features.

You can check the version of the software package by clicking the **Manage Installed Packages** link on the configuration page. If the package 'Lawful Interception Controller, version 4.0' is visible on the page, you have the correct release. Otherwise, you must upgrade to the new software release.

Note

If you have an older LIC release installed and want to install LIC Release 4, you should reinstall the IPSO image in addition to the new LIC package. For more information, see Chapters 1.1, *Installation phases*, and 2.7, *Upgrading LIG*.

The package contains a build number which specifies the LIC software version. This information should be included in the troubleshooting note.

The following procedure demonstrates how to install the `licontroller.tgz` package:

**To install the licontroller.tgz package**

1. Log into the element as an administrator using the Web interface.
2. Click the **Config** button on the home page.
3. Click the **Manage Installed Packages** link in the **System Configuration** section.
4. Click the **FTP and Install packages** link.
5. Enter the FTP site name or IP address in the **FTP site** edit box.
6. Enter the FTP directory in the **FTP dir** edit box.
7. Enter the FTP username in the **FTP user** edit box.
8. Enter the FTP password in the **FTP password** edit box.
9. Click the **Apply** button. The file name `licontroller.tgz` appears in the **Site listing** box.

Now you are ready to unpack the compressed file and install the LIC software. Use the following procedure.

**To install the LIC software**

1. In the **Site listing** box, click on `licontroller.tgz` and then click the **Apply** button. The name of the new package appears in the **Select a package to unpack** box.
2. Click the `licontroller.tgz` package in the **Select a package to unpack** box, and then press the **Apply** button. Information about the unpacked package box appears at the bottom of the page.
3. Click the **Click here to install/upgrade /opt/packages/licontroller.tgz** link at the bottom of the page.
4. On the **Package Installation and Upgrade** page, select the **Yes** radio button on the **install** line in the table with the options **Install and Upgrade**. Do not use the **Upgrade** radio button.

5. Click the **Apply** button.
6. The text *Apply successful* appears on the page.
7. Click the **Save** button.

To activate the new package, you must reboot the system. Repeat the following procedure.



To reboot the system

1. Click the **Top** button.
2. Click the **Reboot, Shut Down System** link.
3. Click the **Reboot** button.

While booting up, IPSO checks the installed packages. Now that `licontroller.tgz` has been installed, the required processes are enabled and the default configuration variables are set. After the package installation, you should find a new **Lawful Interception Controller** link on the IPSO main configuration page under the **Security and Access Configuration** section.

Note

Further configuring of LIC network element is documented in *Nokia LIG Release 4 Product Documentation: Reference Guide*.

2.4 Installing the LIB software

The Lawful Interception Browser (LIB) software is the `libbrowser.tgz` package, which must be installed by the system administrator to all LIB network elements. After installation, you should find a new **Lawful Interception Browser** link on the IPSO configuration page (click the **Config** button on the initial page to get to the configuration page). By clicking that link you can obtain the LIB-specific features.

You can check the version of the software package by clicking the **Manage Installed Packages** link on the configuration page. If the package 'Lawful Interception Browser, version 4.0' is visible on the page, you have the right release. Otherwise, you must upgrade to the new release.

Note

If you have an older LIB release installed and want to install LIB Release 4, you should reinstall the IPSO image in addition to the new LIB package. See Chapters 1.1, *Installation phases*, and 2.7, *Upgrading LIG*.

The package information contains a build number, which specifies the LIB software version. This information should be included in the troubleshooting note.

The following procedure demonstrates how to install the `libbrowser.tgz` package:



To install the `libbrowser.tgz` package

1. Log into the network element as an administrator using the Web interface.
2. Click the **Config** button on the home page.
3. Click the **Manage Installed Packages** link in the **System Configuration** section.
4. Click the **FTP and Install packages** link.
5. Enter the FTP site name or IP address in the **FTP site** edit box.
6. Enter the FTP directory in the **FTP dir** edit box.
7. Enter the FTP username in the **FTP user** edit box.
8. Enter the FTP password in the **FTP password** edit box.
9. Click the **Apply** button. The file name `libbrowser.tgz` appears in the **Site listing** box.

Now you are ready to unpack the compressed file and install the LIB software. Use the following procedure.



To install the LIB software

1. In the **Site listing** box, click on `libbrowser.tgz` and then click the **Apply** button. The name of the new package appears in the **Select a package to unpack** box.
2. Click the `libbrowser.tgz` package in the **Select a package to unpack** box, and then press the **Apply** button. Information about the unpacked package box appears at the bottom of the page.
3. Click the **Click here to install/upgrade /opt/libbrowser/libbrowser.tgz** link at the bottom of the page.
4. On the **Package Installation and Upgrade** page, select the **Yes** radio button on the install line in the table with the options **Install and Upgrade**. Do not use the **Upgrade** radio button.
5. Click the **Apply** button.
6. The text 'Apply successful' appears on the page.
7. Click the **Save** button.

8. Before rebooting, please wait at least one minute to ensure that the installation scripts have ended before rebooting.

Note

Waiting at this point is crucial to the installation success. Otherwise it is possible that the installation has failed and you have to reinstall the software.

You can ensure that the scripts have finished by studying a log file. After finishing the `/var/log/messages` file contains the text

```
k_install_libbrowser.sh : saved the configuration, exiting with a current time stamp.
```

To activate the new package, you must reboot the system. Please repeat the following procedure.

**To reboot the system**

1. Click the **Top** button.
2. Click the **Reboot, Shut Down System** link.
3. Click the **Reboot** button.

While booting up, IPSO checks the installed packages. Now that `libbrowser.tgz` has been installed, the required processes are enabled and the default configuration variables are set. After the package installation, you should find a new **Lawful Interception Browser** link on the IPSO main configuration page under the **Security and Access Configuration** section.

Note

Further configuring of the LIB network element is documented in *Nokia LIG Release 4 Product Documentation: Reference Guide*.

2.5 Installing the LIG online documentation

The LIG online documentation is the `ligdoc.tgz` package that can be installed by the system administrator to all LIC and LIB network elements. The package contains the LIG Reference Guide in PDF format. After installing it you should find the new **Doc** and **Support** buttons on the Lawful Interception Controller and Lawful Interception Browser pages. You can view the LIG online documentation by clicking the **Doc** button. Click the **Support** button to get contact information for further support.

You can check the version of the software package by clicking the **Manage Installed Packages** link on the configuration page. If the package 'External

Documentation for LIG 4' is visible on the page, you have the right release. Otherwise, you should upgrade to the new release.

The following procedure defines how to install a `ligdoc.tgz` package:



To install the `ligdoc.tgz` package

1. Log into the network element as an administrator using the Web interface.
2. Click the **Config** button on the home page.
3. Click the **Manage Installed Packages** link in the **System Configuration** section.
4. Click the **FTP and Install packages** link.
5. Enter the FTP site name or IP address in the **FTP site** edit box.
6. Enter the FTP directory in the **FTP dir** edit box.
7. Enter the FTP username in the **FTP user** edit box.
8. Enter the FTP password in the **FTP password** edit box.
9. Click the **Apply** button. The file name `ligdoc.tgz` appears in the **Site listing** box.

Now you are ready to unpack the compressed file and install the online documentation. Use the following procedure.



To install the LIG documentation

1. In the **Site listing** box, click on `ligdoc.tgz` and then click the **Apply** button. The name of the new package appears in the **Select a package to unpack** box.
2. Click the `ligdoc.tgz` package in the **Select a package to unpack** box, and then press the **Apply** button. The information of the unpacked package box appears at the bottom of the page.
3. Click the **Click here to install/upgrade /opt/packages/ligdoc.tgz** link at the bottom of the page.
4. On the **Package Installation and Upgrade** page, select the **Yes** radio button on the install line in the table with the options **Install and Upgrade**. Do not use the **Upgrade** radio button.
5. Click the **Apply** button.
6. The text 'Apply successful' appears on the page.
7. Click the **Save** button.

You should now be able to find the new **Doc** and **Support** buttons on the LIG applications and on network element's initial web pages.

2.6 Secure Shell (SSH) installation

Unlike in previous LIG releases, **SSH configuration is not needed during the LIG Release 4 installation.** This is because the LIG Release 4 applications act only in Secure Shell (SSH) client mode, which can be done even if the SSH daemon is not enabled at all.

The IPSO admin user keys required for file transfer from the LIG to users are generated automatically by the LIC and LIB at their main process startup. The user should not regenerate the IPSO admin user keys. The generated keys are shown in all the user interface places where the SCP configurations can be defined.

Using IPSO in the SSH server mode is supported by the platform but there is no LIG application SW functionality which utilises it. For more information about SSH server mode configuration, refer to IPSO documentation.

2.7 Upgrading LIG

The LIG application configuration can be upgraded to the LIG release 4 level from release 3. Upgrading from earlier releases has to be done through release 3 and release 2.

The upgrade from LIG Release 3 to LIG Release 4 is done using the LIG Release 3 backup files. The backup and restore procedures are described in *Nokia LIG Release 3 Product Documentation: Reference Guide*. The upgrade procedure is described in the document *Upgrade instructions for LIG from Release 3 to Release 4*.

The upgrade from LIG Release 2 to LIG Release 3 is done using the LIG Release 2 backup files. The backup and restore procedures are described in *Nokia LIG Release 2 Product Documentation: Reference Guide*. The upgrade procedure is described in the document *Upgrade instructions for LIG from Release 2 to Release 3*.

Upgrading the LIG from Release 1.0 or Release 1.1 to Release 2 requires LIG database conversions, upgrading the IPSO image, and installing Lawful Interception Gateway (Lawful Interception Controller or Lawful Interception Browser) Release 2 software. Upgrading is described in *Upgrade Instructions LIC Rel1 to Rel2* and in *Upgrade Instructions LIB Rel1 to Rel2*.

2.8 Installing the LIG license

LIG release 4 contains a new licensing feature. Licensed parameters are the number of active interceptions and the number of Lawful Interception

Extensions (LIE). If a valid license is not available, the default values of 10 active interceptions and an unlimited amount of LIE connections are used.



Acquiring the license file

The license file is delivered by Nokia according to the customer's LIG order.



Installing the license file

The LIG license needs to be installed on the LIC. At the earliest, the license can be installed after the IPSO image installation has been finished, and then any time after that.

1. Establish telnet/console access to the LIC.
2. Create the directory `/var/etc/license` if it does not exist yet (the LIC application SW creates the directory upon installation).
3. Establish an FTP connection to the LIC.
4. Transfer the license file into the LIC directory `/var/etc/license`. The directory can contain any amount of license files.
5. Set the license file access rights using the command `chmod 644 <filename>`.



Activating the license file

LIG license activation can be performed after the LIC application SW and the license file have been installed in the LIC.

1. Log into the LIC as an administrator using the Web interface.
2. Click the **Config** button on the home page.
3. Click the **Lawful Interception Controller** link on the configuration page.
4. On the LIC main page, click the **Manage License** link.
5. Select the preferred license key file from the list of available licenses on the **License file list** pull-down menu.
6. Enter the License expiry warning time (days) in the corresponding text box.
7. Click **Save**. Any previous existing values are overwritten when activating a new license.

The content of activated license is now shown on the **View license** table on the lower side of the page.

2.9 Installing optional customisation files

The country-specific customisation file `liIRI.conf` is delivered inside the `conf.tgz` package. `liIRI.conf` defines which IRI events are sent from the LIB to the LEA, and which parameters are included in each sent IRI event. If the file is not installed (the normal case), then LIG release 4 default definitions are used. For more information, refer to *LIG Release 4 Product Documentation: LEA Interface Guide*.



To install `liIri.conf` file

The file can be installed after the LIB application has been installed.

1. In your own working directory, unpack the `conf.tgz` package using the command `tar -xzf conf.tgz`. The unpacked package structure is `/conf/<country>/liIri.conf`.
2. Using the LIB web admin interface, disable the `libMain` and `libFwd` LIB processes.
3. Establish an FTP connection to the LIB.
4. Transfer the `liIri.conf` file for the appropriate country to the LIB as `/var/ligdb/liIri.conf`.

Note

The existing `liIri.conf` is overwritten.

The `liIri.conf` from previous LIG releases cannot be used as file has a different content in LIG 4.

5. Enable the LIG processes through the Web interface. The new configuration has now been taken into use. This can be verified from the LIB system log:

```
000394 2005-08-04 03:56:36, severity 3,pid 06276,uid 00000,libFwd,  
IRI FILTERING configuration loaded OK.
```

```
000396 2005-08-04 03:56:37, severity 3,pid 06283,uid 00000,libMain,  
IRI FILTERING configuration loaded OK.
```


3

LIG 4 features

LIG release 4 contains the following new features:

Application features:

- Tornado Phase Architecture
- Support for Flexi ISN LIE
- QoS parameters in IRI events
- LIG Aided Authorisation Practice (LAAP)
- LIPSec
- LIG volume control license
- LIB Enhancements
- MultiSIM
- SNMP admin alarm
- LI Support for CPS
- Full IPv6 support
- Web interface usability improvements
- CLI Admin commands
- ASN.1 notifications for proprietary IRI events
- Customisation improvements
- Enhanced Location Dependent Interception (LDI)

Platform features:

- IPSec & COPS IPv6
- IPR5 HW platform support

Non-functional features:

- 3GPP Baseline upgrade
- Bug fixes

- Upgrade

For more information about LIG functionality and the features, refer to *Nokia LIG Release 4 Product documentation: Product description* and *Nokia LIG Release 4 Product documentation: Reference Guide*.

For more information about IPSO features, refer to IPSO documentation.

4 Software limitations

4.1 LIC Release 4

The maximum number of simultaneous active interceptions is 50 000.

When the total number of active interceptions is reached, any additional interceptions entered into the Lawful Interception Controller (LIC) are rejected.

The maximum number of simultaneous LIE connections and simultaneous active interceptions may be restricted because of the license.

If the appropriate license has not been activated, the LIC allows a maximum of 10 active interceptions. No new interceptions can be activated.

If the appropriate license has been activated, the LIC allows the number of active interceptions and number of LIE connections that are stated in the license. After reaching the license limit for active interceptions no new interceptions can be activated. After reaching the license limit for LIE connections no new LIE connections can be activated.

The maximum number of simultaneous TCP connections to LIE or LIB is 2048.

When the total number of Transport Control Protocol (TCP) connections has been reached, any additional connections to the LIC are refused.

4.2 LIB Release 4

The maximum number of simultaneous interceptions is 5000 (1000 + 4000).

The LIB accepts up to 1000 interceptions using 'FTP / SCP / ULIC / browsing only' as the file transfer protocol. In addition, the LIB accepts up to 4000 interceptions using 'streaming FTP' as the file transfer protocol.

After reaching either limit, any additional interceptions using the given transfer type are rejected.

The maximum number of simultaneous File Transfer Configurations (FTCs) is 2000.

The LIB accepts up to 2000 different FTCs to be active simultaneously. After reaching the limit, any additional FTCs in the LIB are rejected.

The maximum number of simultaneous LEA users using Streaming FTP (strFTP) is 50.

The LIB accepts strFTP resource reservations for up to 50 LEA users. When the total number of LEA users has been reached, any interception activation using strFTP by any other LEA user is rejected.

The maximum number of simultaneous TCP connections to LIE or LIC is 2048.

When the total number of TCP connections has been reached, any additional connections to the LIB are rejected.

5 Troubleshooting

If malfunctioning is observed in the Lawful Interception Gateway (LIG) system, the Administrator must immediately perform the actions specified below. Timing is crucial to collect all necessary troubleshooting information because the log files have a limited lifetime in the network element.

For each LIC network element, perform the following actions:

1. Execute the following commands from the Lawful Interception Controller (LIC) console:

```
licTroubleShoot.sh  
  
mv /var/admin/lic.tgz  
/var/admin/lic<ipAddressOfLic>.tgz
```
2. Transfer the `/var/admin/lic<ipAddressOfLic>.tgz` file to a local FTP server.

For each LIB network element, perform the following actions:

1. Execute the following commands from the Lawful Interception Browser (LIB) console:

```
libTroubleShoot.sh  
  
mv /var/admin/lib.tgz  
/var/admin/lib<ipAddressOfLib>.tgz
```
2. Transfer the `/var/admin/lib<ipAddressOfLib>.tgz` file to a local FTP server.

Monitoring of network traffic:

Monitorings of the actual network traffic are often needed to solve the problem. The monitorings are collected using `tcpdump`, which is available in the LIC and LIB.

The monitoring collection place and need varies according to the problem in question.

In the LIC, usually the TCP connections towards the LIB and LIE are monitored. In the LIB, usually the TCP connections towards the LIEs are monitored.

Execute the following commands at the LIC or LIB console:

1. Check the interfaces that are used for LI connections:

```
ifconfig -a
```

Monitoring is needed for each <interface> that is used for LI connections.
2. Start monitoring, using <NE type>_<IP address>_<interface>.dump as the filename:

```
tcpdump -i <interface> -x -w <filename> -s 1500
```

For example:

```
tcpdump -i eth1c0 -x -w lic_10.20.30.40_eth1c0.dump -s 1500
```
3. Perform the action to be monitored.
4. Stop the ongoing monitoring with CTRL-C.
5. To be able to read the monitorings efficiently, the following information is required separately for each monitoring collected in step 2.
Attach the information into separate files named <filename>.txt:
 - the output of command `ifconfig -a`
 - the output of command `netstat -na`
 - the command used for collecting the monitoring in step 2.

For each GGSN in the network, perform the following actions:

1. Execute the following command from the Gateway GPRS Support Node (GGSN) console:

```
tar -cvz -f lie<ipAddressOfGgsn>.tgz /var/log/* /config /var/tmp
```
2. Transfer the generated `lie<ipAddressOfGgsn>.tgz` file to a local FTP server.

For each alarm destination address and directory, perform the following actions (if possible):

1. Execute the following command in the alarm destination directory (if you are not using a UNIX computer, use the available archiving and compression tools):

```
tar -cvz -f li<UserName>.tgz alarm* cancel* *log
```
2. Transfer the generated `li<UserName>.tgz` file to a local FTP server.

General

Attach all the `lic<ipAddressOfLic>.tgz`, `lib<ipAddressOfLib>.tgz`, `lie<ipAddressOfGgsn>.tgz`, `li<UserName>.tgz`, and `tcpdump` files to the troubleshooting note.

Each `lic<ipAddressOfLic>.tgz` file contains the files and directories (if they exist) listed in the following table.

Table 4. `lic<ipAddressOfLic>.tgz` file contents

File/Directory	Content
<code>lic.netstat</code>	network connections
<code>lic.ps</code>	processes in execution
<code>lic.ipstl</code>	kernel information
<code>Ifconfig.stat</code>	network interface information
<code>lic.df</code>	free disk space available
<code>lic.dmesg</code>	system messages
<code>lic.route</code>	contents of the routing table
<code>lic.uptime</code>	system uptime
<code>lic.mount</code>	file system information
<code>lic_ligdb.dir</code>	list of <code>/var/ligdb/</code> directory content
<code>lic_ligft.dir</code>	list of <code>/var/ligft/</code> directory content
<code>lic_crash.dir</code>	list of <code>/var/crash/</code> directory content
<code>lic_tmp.dir</code>	list of <code>/var/tmp/</code> directory content
<code>/image/current/</code>	version of IPSO info
<code>/var/tmp/</code>	temporary files (such as core dumps)
<code>/var/log/</code>	IPSO log files
<code>/var/audit/</code>	LIG log files
<code>/var/admin/</code>	LIG log files
<code>/var/aa/</code>	AA log files
<code>/var/lea/</code>	LEA log files
<code>/var/ligft/</code>	temporary alarm files; file transfer directories (alarms, logs, and so on) included in user-specific subdirectories
<code>/config/</code>	current configuration

File/Directory	Content
/var/etc/	IPSO configuration files, LIC license directory
/var/lirecovery/	LIC recovery database
/var/ligdb/	databases
/var/crash/	temporary files (such as core dumps)
/etc/	system configuration files and scripts
/opt/	LIC binaries and packages
/var/cron/	crontab files

The lib<ipAddressOfLib>.tgz file contains the files and directories (if they exist) listed in the following table.

Table 5. lib<ipAddressOfLib>.tgz file contents

File/Directory	Content
lib.ps	processes in execution
lib.netstat	network connections
lib.ipstcl	kernel information
ifconfig.stat	network interface information
lib.df	free disk space available
lib.dmesg	system messages
lib_ligdb.dir	list of /var/ligdb/ directory content
lib_ligft.dir	list of /var/ligft/ directory content
lib_mfs_forward.dir	list of /var/mfs_forward/ directory content
lib_ufs_forward.dir	list of /var/ufs_forward/ directory content
lib_browse.dir	list of /var/browse/ directory content
lib_tmp.dir	list of /var/tmp/ directory content
lib_crash.dir	list of /var/crash/ directory content
/var/tmp/	temporary files (such as core dumps)
/var/log/	IPSO log files
/var/admin/	LIG log files
/config/active	current configuration

File/Directory	Content
/var/etc/	temporary files
/var/mfs_forward/	temporary (interception) files
/var/ufs_forward/	temporary (interception) files
/var/browse/	temporary (interception) files
/var/ligdb/	databases

The `lie<ipAddressOfGgsn>.tgz` file contains the files or directories (if they exist) listed in the following table.

Table 6. `lie<ipAddressOfGgsn>.tgz` file contents

File/Directory	Content
/var/log/fmErrors.log	fault management error log
/var/log/ggsncls.log	GGSN log
/var/log/fmSystem.log	fault management system log
/var/log/ggsntunnel.log	GGSN tunnel process log
/var/log/fmTraps.log	sent alarms and cancels
/var/log/lie.d.log	LIE daemon log
/var/log/ggsn-install	GGSN install log
/var/log/messages	IPSO system log
/var/log/*	other IPSO log files
/config/	current configuration
/var/tmp/	temporary files (such as core dumps)

The `li<UserName>.tgz` file contains the following files:

- `alarm_X.X` (alarm received)
- `cancel_X.X` (cancel received)
- `X.log` (log files)

To unpack the troubleshooting files in a remote machine, for example, for a back-up file named `lie01.20.30.40.tgz`, use the following commands:

```
gunzip lie01.20.30.40.tgz
```

```
tar xf lie01.20.30.40.tar
```

Appendix: Installing the new IPSO image

Below is an example of a real IPSO image installation (the default values appear in square brackets). The example starts after the 'reboot' command has been given from the IPSO console.

IPSO image installation part 1: downloading IPSO image:

```
Starting bootmgr
Loading boot manager..
Boot manager loaded.
Entering autoboot mode.
Type any character to enter command mode. (HIT A KEY!)
BOOTMGR[1]> install

##### IPSO Full Installation #####
You will need to supply the following information:
  Client IP address/netmask, FTP server IP address and filename,
  system serial number, and other license information.
This process will DESTROY any extant files and data on your disk.
#####
Continue? (y/n) [n] y

Motherboard serial number is IUJN02005304.

The chassis serial number can be found on a
sticker on the back of the unit with the letters
S/N in front of the serial number.
Please enter the serial number: 123456

Please answer the following licensing questions.

Will this node be using IGRP ? [y] n

Will this node be using BGP ? [y] n

1. Install from anonymous FTP server.
2. Install from FTP server with user and password.
```

```
Choose an installation method (1-2): 2
Enter IP address of this client (0.0.0.0/24): 192.168.182.179/27
Enter IP address of FTP server (0.0.0.0): 192.168.182.187
Enter IP address of the default gateway (0.0.0.0): 192.168.182.161

Choose an interface from the following list:
1) eth-s1p1
2) eth-s1p2
3) eth-s1p3
4) eth-s1p4
5) eth-s2p1
6) eth-s2p2
7) eth-s2p3
8) eth-s2p4
Enter a number [1-8]: 1
Would you like to use 100 Mb speed for eth-s1p1? [n] y
Half or full duplex? [h/f] [h] h
Enter user name: admin
Enter password for "admin":
Enter path to ipso image on FTP server [~]: ./fcs10
Enter ipso image filename on FTP server [ipso.tgz]:

1. Retrieve all valid packages, with no further prompting.
2. Retrieve packages one-by-one, prompting for each.
3. Retrieve no packages.
Enter choice [1-3] [1]: 1

Client IP address = 192.168.182.179/27
Server IP address = 192.168.182.187
Default gateway IP address = 192.168.182.161
Network Interface = eth-s1p1, speed = 100M, half-duplex
Server download path = [./fcs10/]
Package install type = all
Mirror set creation = no

Are these values correct? [y] y
Checking what packages are available on 192.168.182.187.
Hash mark printing on (1048576 bytes/hash mark).
Interactive mode off.
#
```

The following packages are available:

ipso.tgz

Building filesystems...done.

Making initial links...done.

Downloading compressed tarfile(s) from 192.168.182.187.

Hash mark printing on (1048576 bytes/hash mark).

Interactive mode off.

100% 32591 KB 00:00 ETA

Checking validity of image...(no system signature file found, continuing)...done.

No packages found in ./fcs10, continuing.

Installing image...done.

Image version tag: IPSO-3.6NET-FCS10-09.26.2002-021200-1063.

Checking if bootmgr upgrade is needed...

No need to upgrade bootmgr.

Do you want to upgrade bootmgr anyway? [n] **n**

Installation completed.

Reset system or hit <Enter> to reboot. **(HIT A KEY!)**

IPSO image installation part 2: rebooting:

Starting reboot...

/

Starting bootmgr

Loading boot manager..

Boot manager loaded.

Entering autoboot mode.

Type any character to enter command mode.

Booting /dev/wd0f:/image/IPSO-3.6NET-FCS10-09.26.2002-021200-1063/kernel

[kernel] symtab c0569000, sym_start c0569004, sym_end c05a6870

[kernel] sym_size 5209, str_size 58fa8

[preserving 0x96818 bytes of kernel symbol table]

Copyright (c) 1982, 1986, 1989, 1991, 1993

The Regents of the University of California. All rights reserved.

Resizing packet buffers: mbufs 15360 clusters 14000

netrel 1063 09.26.2002-021200

```
CPU: 448-MHz Pentium-II (686-class CPU)
real memory = 268435456 (256M bytes)
avail memory = 252710912 (241M bytes)
chip0 <Intel 82443BX (PAC) PCI/Memory Controller > rev 3 on pci0:0:0
piix0 <Intel 82371AB (PIIX4) PCI to ISA bridge> rev 2 on pci0:7:0
piix1 <Intel 82371AB (PIIX4) PCI to ISA bridge Function> rev 1 on
pci0:7:1
Probing for devices on the ISA bus:
sio0 at 0x3f8-0x3ff irq 4 on isa
<5>sio0: type 16550A
wdc0 at 0x1f0-0x1f7 irq 14 on isa
wdc0: unit 0 (wd0): <SunDisk SDTB-32>, LBA
wd0: 4MB (7872 sectors), LBA geometry: 7 cyls, 16 heads, 63 S/T
wd0: Physical geometry: 123 cyls, 2 heads, 32 S/T
npx0 on motherboard
npx0: INT 16 interface
hotswap0 at 0x340 irq 9 maddr 0xcc000 msize 4096 on isa
piix2 <Intel 82371AB (PIIX4) PCI to ISA bridge Function> rev 1 on
pci0:7:2
piix3 <Intel 82371AB (PIIX4) PCI to ISA bridge Function> rev 2 on
pci0:7:3
chip1 <Intel 82443BX (PAC) AGP Controller > rev 3 on pci0:1:0
vga0 <VGA-compatible display device> rev 92 on pci1:0:0
pcidec0 <DEC 21152 PCI-PCI bridge> rev 3 on pci0:20:0
pcidec1 <DEC 21152 PCI-PCI bridge> rev 3 slot 1
tulip0 <Digital DC21143 Fast Ethernet> rev 65 int b irq 11 slot 1 port 1
netlog:eth-s1p1 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d0
netlog:eth-s1p1 .. enabling 10baseT/UTP port in half duplex mode
tulip1 <Digital DC21143 Fast Ethernet> rev 65 int c irq 12 slot 1 port 2
netlog:eth-s1p2 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d1
netlog:eth-s1p2 .. enabling 10baseT/UTP port in half duplex mode
tulip2 <Digital DC21143 Fast Ethernet> rev 65 int d irq 15 slot 1 port 3
netlog:eth-s1p3 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d2
netlog:eth-s1p3 .. enabling 10baseT/UTP port in half duplex mode
tulip3 <Digital DC21143 Fast Ethernet> rev 65 int a irq 10 slot 1 port 4
netlog:eth-s1p4 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d3
netlog:eth-s1p4 .. enabling 10baseT/UTP port in half duplex mode
pcidec2 <DEC 21152 PCI-PCI bridge> rev 3 slot 2
tulip4 <Digital DC21143 Fast Ethernet> rev 65 int c irq 12 slot 2 port 1
netlog:eth-s2p1 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d4
netlog:eth-s2p1 .. enabling 10baseT/UTP port in half duplex mode
tulip5 <Digital DC21143 Fast Ethernet> rev 65 int d irq 15 slot 2 port 2
```

```
netlog:eth-s2p2 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d5
netlog:eth-s2p2 .. enabling 10baseT/UTP port in half duplex mode
tulip6 <Digital DC21143 Fast Ethernet> rev 65 int a irq 10 slot 2 port 3
netlog:eth-s2p3 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d6
netlog:eth-s2p3 .. enabling 10baseT/UTP port in half duplex mode
tulip7 <Digital DC21143 Fast Ethernet> rev 65 int b irq 11 slot 2 port 4
netlog:eth-s2p4 .. ZNYX ZX414 DC21143 pass 4.1 -- 00:a0:8e:0b:1a:d7
netlog:eth-s2p4 .. enabling 10baseT/UTP port in half duplex mode
pci_wdc0 <CMD646U2:IDE Mass Storage Device Controller> rev 7 int d irq 15
slot 3
pci_wdc0: slot 3 channel 0 drv 0 (wd1): <IBM-DARA-206000>, LBA, DMA
wd1: 6007MB (11733120 sectors), LBA geometry: 730 cyls, 255 heads, 63
S/T, 512 B/S
wd1: Physical geometry: 12416 cyls, 15 heads, 63 S/T
pcidec3 <DEC 21152 PCI-PCI bridge> rev 3 on pci0:18:0
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
net_softcall: not inited
changing root device to wd0f
swapon: adding /dev/wd0b as swap device
Automatic reboot in progress...
/dev/rwd0f: clean, 280009 free (769 frags, 34905 blocks, 0.2%
fragmentation)
/dev/rwd0a: clean, 38192 free (16 frags, 4772 blocks, 0.0% fragmentation)
/dev/rwd0d: clean, 3574850 free (90 frags, 446845 blocks, 0.0%
fragmentation)
/dev/rwd0e: clean, 662246 free (30 frags, 82777 blocks, 0.0%
fragmentation)
clearing /tmp
checking for core dump...savecore: no core dump
recording kernel -c changes
starting system daemons: syslogd done.
Oct  4 07:00:48 [LOG_NOTICE] kernel: sio0: type 16550A
```

IPSO image installation part 3: configuration of IPSO:

Please choose the host name for this system. This name will be used

in messages and usually corresponds with one of the network hostnames for the system. Note that only letters, numbers, dashes, and dots (.) are permitted in a hostname.

Hostname? **lic-1**

Hostname set to "lic-1", OK? [y] **y**

Please enter password for user admin:

Please re-enter password for confirmation:

You can configure your system in two ways:

- 1) configure an interface and use our Web-based Voyager via a remote browser
- 2) VT100-based Lynx browser

Please enter a choice [1-2, q]: **1**

Select an interface from the following for configuration:

- 1) eth-s1p1
- 2) eth-s1p2
- 3) eth-s1p3
- 4) eth-s1p4
- 5) eth-s2p1
- 6) eth-s2p2
- 7) eth-s2p3
- 8) eth-s2p4
- 9) quit this menu

Enter choice [1-9]: **1**

Enter the IP address to be used for eth-s1p1: **192.168.182.179**

Enter the masklength: **27**

Do you wish to set the default route [y] ? **y**

Enter the default router to use with eth-slp1: **192.168.182.161**

This interface is configured as 10 mbs by default.

Do you wish to configure this interface for 100 mbs [n] ? **y**

This interface is configured as half duplex by default.

Do you wish to configure this interface as full duplex [n] ? **n**

You have entered the following parameters for the eth-slp1 interface:

```
IP address: 192.168.182.179
masklength: 27
Default route: 192.168.182.161
Speed: 100M
Duplex: half
```

Is this information correct [y] ? **y**

Do you want to configure Vlan for this interface[n] ? **n**

You may now configure your interfaces with the Web-based Voyager by typing in the IP address "192.168.182.179" at a remote browser.

Generating config files for lic-1: ipsrd hosts password group resolver snmp inetd ttys tz ntp ssmtp skey arp ndp aggrclass acl ddr ef syslog autosupport httpd lynx modem cron archive ipsec fmd AAA cluster ssh done.

ifm done.

```
netlog:eth-slp3 .. enabling 10baseT/UTP port in half duplex mode
netlog:eth-s2p4 .. enabling 10baseT/UTP port in half duplex mode
netlog:eth-s2p1 .. enabling 10baseT/UTP port in half duplex mode
netlog:eth-slp1 .. enabling 100baseTX/UTP port in half duplex mode
netlog:eth-slp4 .. enabling 10baseT/UTP port in half duplex mode
Oct  4 07:02:33 [LOG_INFO] kernel: netlog:eth-slp3 .. enabling
10baseT/UTP port in half duplex mode
nOct  4 07:02:33 [LOG_INFO] kernel: netlog:eth-s2p4 .. enabling
10baseT/UTP port in half duplex mode
Oct  4 07:02:33 [LOG_INFO] kernel: netlog:eth-s2p1 .. enabling
10baseT/UTP port in half duplex mode
Oct  4 07:02:33 [LOG_INFO] kernel: netlog:eth-slp1 .. enabling
100baseTX/UTP port in half duplex mode
```

```
Oct  4 07:02:33 [LOG_INFO] kernel: netlog:eth-s1p4 .. enabling
10baseT/UTP port in half duplex mode
log:eth-s2p2 .. enabling 10baseT/UTP port in half duplex mode
netlog:eth-s1p2 .. enabling 10baseT/UTP port in half duplex mode
netlog:eth-s2p3 .. enabling 10baseT/UTP port in half duplex mode
Oct  4 07:02:34 [LOG_INFO] kernel: netlog:eth-s2p2 .. enabling
10baseT/UTP port in half duplex mode
Oct  4 07:02:35 [LOG_INFO] kernel: netlog:eth-s1p2 .. enabling
10baseT/UTP port in half duplex mode
Oct  4 07:02:35 [LOG_INFO] kernel: netlog:eth-s2p3 .. enabling
10baseT/UTP port in half duplex mode
Oct  4 07:02:37 [LOG_ERR] ipsopmd: Couldn't open result file
/var/ne3suser/ipsopmd_results.conf
Fri Oct  4 07:02:26 GMT 2002
      IPSO (lic-1) (ttyd0)

login: admin
Password:
Oct  4 07:02:51 [LOG_INFO] login: DIALUP ttyd0, admin
Oct  4 07:02:51 [LOG_NOTICE] login: ROOT LOGIN (admin) ON ttyd0
Oct  4 07:02:51 [LOG_NOTICE] login: ROOT LOGIN (admin) ON ttyd0
Oct  4 07:02:51 [LOG_INFO] login: login on ttyd0 as admin
IPSO 3.6NET-FCS10 #1063: 09.26.2002 021200
Terminal type? [vt100]
lic-1[admin]#
```

References

1. IP1200 Series Installation Guide
2. IP700 Series Installation Guide
3. Nokia LIG Release 4 Product Documentation: LeaViewer Guide
4. Nokia LIG Release 4 Product Documentation: Reference Guide
5. Nokia LIG Release 4 Product Documentation: Product Description
6. Nokia LIG Release 3 Product Documentation: Reference Guide
7. Nokia LIG Release 2 Product Documentation: Reference Guide
8. Upgrade instructions for LIG from Release 3 to Release 4
9. Upgrade instructions for LIG from Release 2 to Release 3
10. Upgrade instructions LIC Rel1 to Rel2
11. Upgrade instructions LIB Rel1 to Rel2

Glossary

2G SGSN	2G Serving GPRS Support Node
3G SGSN	Serving GPRS Support Node (SGSN) for 3rd Generation Mobile Networks
3GPP	3rd Generation Partnership Project
AA	Authorising Authority
ASN.1	Abstract Syntax Notation one
CD	Compact Disk
CLI	Command Line Interface
COPS	Common Open Policy Service Protocol
CPS	Connection Processing Server
Flexi ISN	Nokia Flexi Intelligent Service Node
FTC	File Transfer Configuration
FTP	File Transfer Protocol
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
HW	Hardware
IMS	IP multimedia subsystem
IP	Internet Protocol
IPSO	Nokia (Ipsilon) Router Operating System
IPv6	Internet Protocol version 6
IRI	Interception-Related Information
ISN	Intelligent Service Node
LAAP	LIG Aided Authorisation Practise

LDI	Location Dependent Interception
LEA	Law Enforcement Agency
LI	Lawful Interception
LIB	Lawful Interception Browser
LIC	Lawful Interception Controller
LIE	Lawful Interception Extension
LIG	Lawful Interception Gateway
md5	Message Digest Algorithm Version 5
NOLS	Nokia Online Services
OS	Operating System
PDF	Portable Document Format
RoHS	Restriction on the use of certain Hazardous Substances
QoS	Quality of Service
SCP	Secure Copy
SGSN	Serving GPRS Support Node
SNMP	Simple Network Management Protocol
SSH	Secure Shell
strFTP	Streaming FTP
SW	Software
TCP	Transport Control Protocol
ULIC	UMTS LI Correlation Header
UMTS	Universal Mobile Telecommunications System