Security Target of
Huawei 3900 Series LTE eNodeB Software

Version: 0.24
Last Update: 2017-06-20
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Changes control

Version	Date	**Author**	Changes to previous version
V0.10	2016-06-06	Dong Changcong	---
V0.20	2017-02-28	Dong Changcong	Modified 5.1.4.4 and 5.1.4.7 according to “ATE-IND Results” issue in “Testing issues LTE 1 3”
V0.21	2017-03-08	Dong Changcong	Modified Table 12 according to expert advice in “Testing issues LTE 1 5”
V0.22	2017-03-15	Dong Changcong	Modified Table 12 according to AGD_PRE
V0.23	2017-05-22	Dong Changcong	Modified Table 12 according to expert advice
V0.24	2017-06-20	Dong Changcong	Update version information

1. Introduction

1 This Security Target is for the CC evaluation of Huawei 3900 Series LTE (Long Term Evolution) eNodeB Software, the TOE Version is V100R011C10SPC112T and is based on Huawei HERT-BBU (Huawei Enhanced Radio Technology-Base Band Unit) V300R006C10.

1.1. ST Reference

Title	Security Target of Huawei 3900 Series LTE eNodeB Software
Version	v0.24
Author	Dong Changcong
Publication Date	2017-06-20

1.2. TOE Reference

TOE Name	Huawei 3900 Series LTE eNodeB Software (a.k.a. eNodeB)
TOE Version	V100R011C10SPC112T
TOE Developer	Huawei

1.3. Product Overview

2 3GPP Long Term Evolution (LTE), is the latest standard in the mobile network technology tree that produced the GSM/EDGE and UMTS/HSDPA network technologies. It is a project of the 3rd Generation Partnership Project (3GPP), operating under a name trademarked by one of the associations within the partnership, the European Telecommunications Standards Institute.

3 Although LTE is often marketed as 4G, first-release LTE does not fully comply with the IMT Advanced 4G requirements. The pre-4G standard is a step toward LTE Advanced, a 4th generation standard (4G) of radio technologies designed to increase the capacity and speed of mobile telephone networks. LTE Advanced is backwards compatible with LTE and uses the same frequency bands, while LTE is not backwards compatible with 3G systems.

4 Huawei 3900 series LTE eNodeB is the base station in LTE radio networks. Its coverage and capacity are expanded through multi-antenna technologies, its maintainability and testability are improved,

and thus it provides subscribers with the wireless broadband access services of large capacity and high quality.

1.4. TOE Overview

5 The TOE is the Software component of Huawei 3900 series LTE eNodeB. The ST contains a description of the security objectives and the requirements, as well as the necessary functional and assurance measures provided by the TOE. The ST provides the basis for the evaluation of the TOE according to the Common Criteria for Information Technology Security Evaluations (CC).

1.4.1. TOE usage

6 The TOE can be widely used to support the broadband wireless access of home and enterprise users. Besides, it is used to support mobile broadband access. In Huawei LTE solution, the TOE adopts a star topology, in which the transmission equipment is directly connected to the BS through FE or GE ports. The TOE networking supports various access modes, including the FE, GE, optical fibber, x digital subscriber line (xDSL), passive optical network (PON), microwave access, and satellite.

7 The TOE possesses the following features:

1. On an all-IP platform, thus supporting smooth upgrade;
2. Industry-leading technologies, delivering excellent performance;
3. Easy maintenance; Flexible networking.

1.4.2. TOE major security features

8 The major security features implemented by the TOE and subject to evaluation are:

A. Identification and Authentication (Management network)

9 Operators using local access to the TOE (This refers to local users accessing the TOE through the integrated port) in order to execute device management functions are identified by individual user names and authenticated by passwords.

10 Domain users are users that created and managed by the U2000 (Formerly known as M2000). Information of domain users is stored on the U2000. The users will login the TOE through the integrated port, but authentication is performed by the U2000 which will send the result of

the authentication procedure to the TOE so it can grant the accessing or deny it.

11 EMSCOMM users (including emscomm, emscommneteco and emscommts. The identification and authentication procedure of these 3 users are the same, thus EMSCOMM is used to refer to these 3 users in the following sections of this document) accessed through the integrated port is enforced using a password based challenge-response protocol at the application layer.

12 Note：Different accounts are used for different OSS logic modules. Emscomm is used for eNodeB connection management, security management and performance management. Emscommts is used for eNodeB call history log report. Emscommneteco is used for energy management.

B. Access control (Management network)

13 The TOE implements role-based access control, limiting access to different management functionality to different roles as defined in administrator-defined access control associations. This feature is implemented only for the access through the U2000 or the integrated port.

C. Management Interfaces protection (Management network)

14 The TOE offers SSL/TLS channels for FTP, MML (man-machine language, which is a kind of Command Line Interface), and BIN (Huawei's private binary message protocol) access to the TOE.

15 The TOE establishes a **trusted** channel for the communications with the U2000 through the "Integrated Port" interface providing the following secure features:

- Integrity
- Confidentiality
- Authentication

16 For the remainder communications through the "Integrated Port" interface (i.e. for local and domain user communications), the TOE provides the following **secure** features:

- Integrity
- Confidentiality

17 On the other hand, the TOE establishes a **secure** channel for the FTPS communications providing the following secure features:

– Integrity

– Confidentiality

– Authentication

D. UU Interface protection (radio network)

18 The TOE air interface support AES, SNOW 3G and ZUC algorithms for RRC signal encryption and integrity, it also supports AES, SNOW 3G and ZUC for service data encryption. Both ensure the privacy of user session.

E. Backhaul Interface protection (telecom network)

19 IPsec is used in the backhaul interfaces to protect the traffic between the TOE and other network elements such as neighbouring eNodeB (X2) or security gateway (S1).

20 The TOE establishes a **secure** channel for the IPsec communications between itself and peer IPsec entity (security gateway or neighbouring eNodeB). providing the following secure features:

– Integrity

– Confidentiality

– Authentication

F. Resource management

21 VLAN (Virtual Local Area Network) are implemented to separate the traffic from different flow planes, which reduce traffic storms and avoid resource overhead.

22 The TOE can limit the user access to the TOE device or application using the ACL (Access Control List) feature by matching information contained in the headers of connection-oriented or connectionless IP packets against ACL rules specified.

23 ACL (Access Control List) implements packet filtering features to restrict resource use via IP address, ports, etc. Those features protect the TOE against various unauthorized access from unauthorized NEs.

G. Security function management

24 The following means are provided by the TOE for management of security functionality:

- User and group management

- Access control management (by means of defining command groups, and association of users with particular command groups)

H. Digital signature

25 Software package and patches integrity are protected by a digital signature scheme (message digest and signature) which is verified by the TOE before loading it.

I. Auditing

26 There exist two kinds of audit files, the operation log and the security log.

1. Security log: Records user operations related to the system security, including user behaviour and configuration commands, for example, account locking due to consecutive login failure and updating the security policy

2. Operation log: Records the operational commands run by users.

27 Audit records are created for security-relevant events related to the use of the TOE.

- The TOE provides the capability to read all the information from the audit records.

- The TOE protects the audit records from unauthorized deletion.

1.4.3. TOE type

28 The TOE is the software that is deployed into a LTE eNodeB base station, which is the wireless access node in LTE/SAE system.

29 It complies with 3GPP standards. A LTE/SAE system consists of the EPC Network/Backhaul Network/Radio Network/Terminal Network. The LTE eNodeB provides subscribers with wireless broadband access services of large capacity and high quality.

30 Figure 1 shows the position of the TOE in a LTE/SAE network.

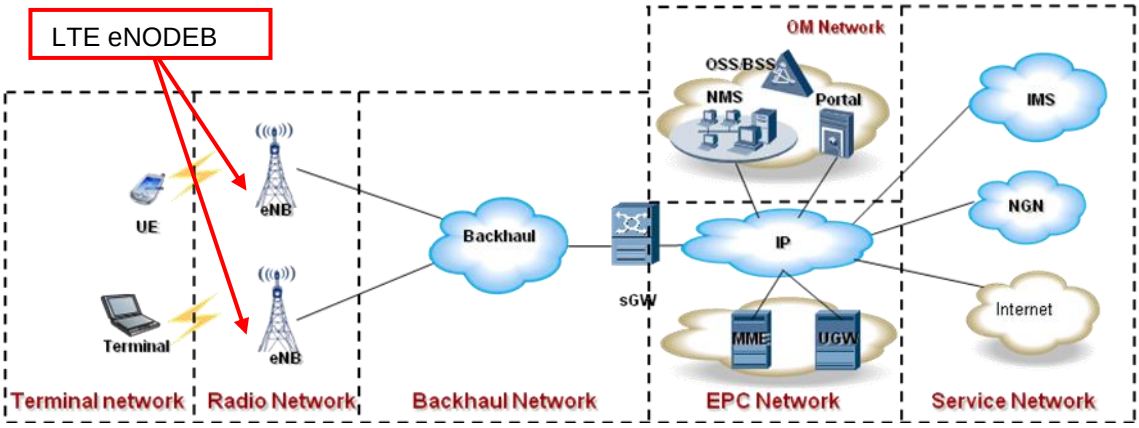


Figure 1 *LTE/SAE network*

31 The UE/Terminal is the subscriber terminal in the LTE network. With the UE/Terminal, the subscriber gains access to the services provided by the operator and Service Network.

32 The eNB is LTE eNodeB, which provides wireless access service for the UE/Terminal.

33 The EPC network is the Evolved Packet Core network and consists of the MME (Mobility Management Entity), the SGW (Service Gateway) and UGW (User plane Gateway). It performs functions such as mobility management, IP connection, QoS management, and billing management.

34 The NMS is Network Management System, which provides network management to LTE eNodeB.

1.4.4. Non TOE Hardware and Software

35 The TOE runs into the BBU3900 or BBU 3910 subrack. The structure of BBU3900/BBU3910 is shown in the following figure:

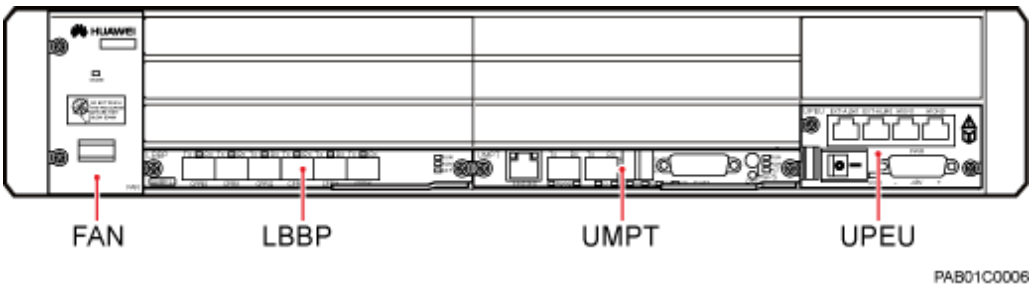


Figure 2 *BBU3900/BBU3910 subrack*

36 The BBU subrack contains, at least, the following mandatory boards:

- The LTE Baseband Processing and radio Interface Unit (LBBP), whose purpose is to provide an interface between BBU and Radio Remote Unit (RRU).

- The Main Processes and Transmission unit (UMPT), which is the main board of BBU. It controls and manages the entire BS system, provides clock synchronization signals for the BS system and provides the S1/X2/OM interface for transmission.

- The Universal Power and Environment Interface Unit (UPEU), whose purpose is providing power to the whole BBU subrack.

- The FAN unit of the BBU controls the fan speed, monitors the temperature of the FAN unit, and dissipates the heat from the BBU.

37 The TOE is parts of LTE eNodeB software packages. It is deployed on the boards of base band unit (BBU). These hardware boards are TOE environment. The OS and part of BS software which is provided by Huawei's particular products is also TOE environment.

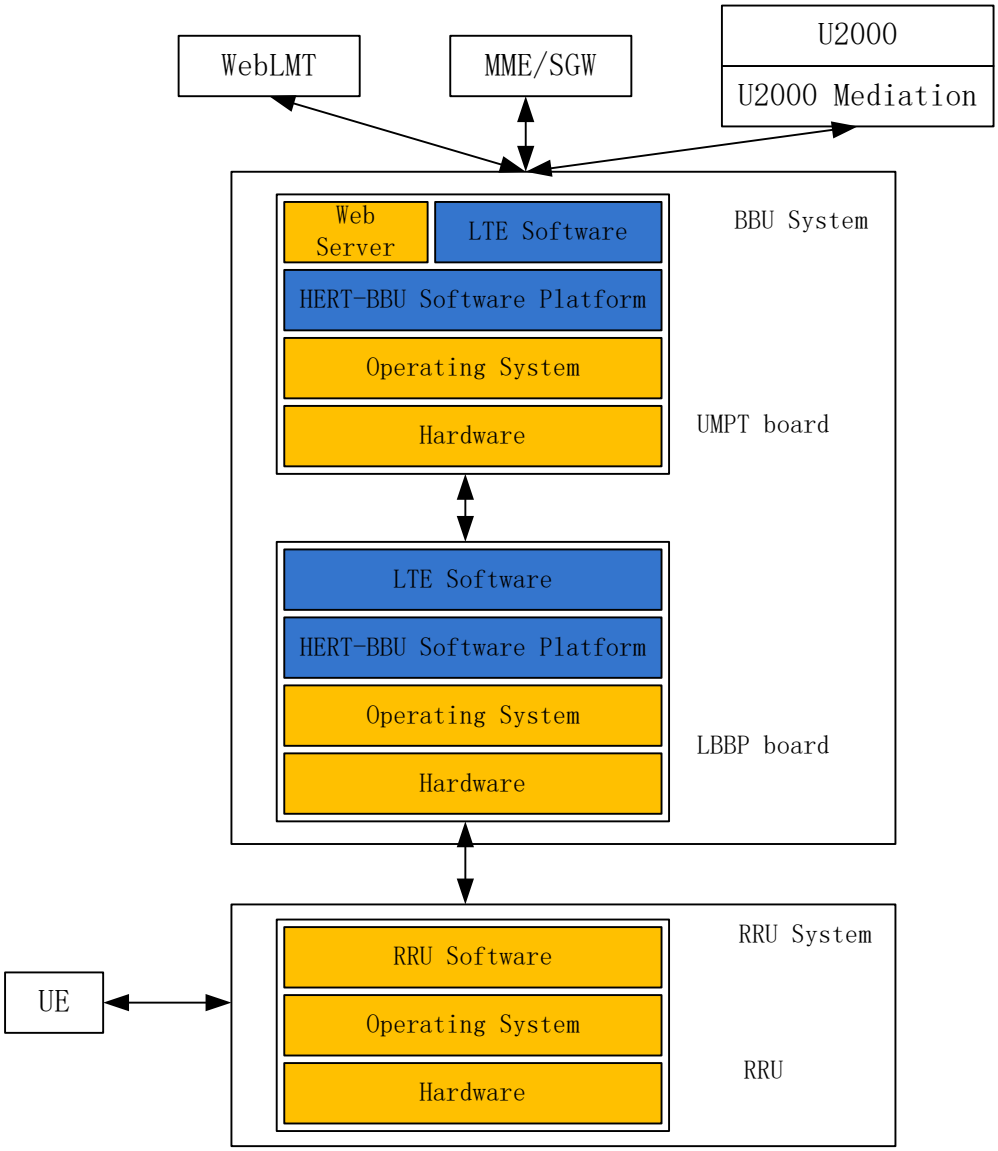


Figure 3 *Non TOE hardware and software environment*

38 In the above diagram, the blue box area belongs to the TOE while the orange box area belongs to the TOE environment.

39 The components of the TOE environment are the following:

40 Note：The TOE environment components are not evaluated given that they are not part of the TOE and therefore there is no assurance regarding these components.

- Physical networks, such as Ethernet subnets, interconnecting various networking devices.
- LTE eNodeB Operating System: RTOS V100R005C00
- Web Server (aka WebLMT), local users login Web Server through Web Client to manage and maintain an eNodeB.

- An U2000 server providing access to the management functions of the TOE via SSL. U2000 version must be iManager U2000 V200R016C10.

- U2000 Mediation Software: The U2000 server software consists of the main version software and mediation software. The main version software implements system functions, and the mediation software is used for the adaptation of different NE interfaces. The U2000 can manage new NEs after the corresponding mediation software is installed.

- The physical structure of LTE eNodeB includes BBU subrack and RRU. BBU subrack is based on HERT hardware platform. HERT BBU is a common platform for wireless multiple products, different boards can be configured according to each product. Beside the hardware support platform subsystem, in most cases only need to configure the Main Processes and Transmission board (UMPT) and LTE BaseBand processing (LBBP)

- S-GW: Serving Gateway, Within the EPC the S-GW is responsible for tunnelling user plane traffic between the eNB and the PDN-GW. To do this its role includes acting as the mobility anchor point for the User Plane during handovers between eNB as well as data buffering when traffic arrives for a mobile in the LTE Idle state. Other functions performed by the S-GW include routing, Lawful Interception and billing.

- MME: Mobility Management Entity terminates the control plane with the mobile device.

- UE: User Equipment, by air interface data encryption, can share the wireless access through LTE network.

- RRU: The RRU is the remote radio unit (RRU) for Huawei Worldwide Interoperability for LTE eNodeB. The RRU mainly performs the following functions:

    - Amplifies weak signals from the antenna system, down-converting the signals to intermediate frequency (IF) signals, performing analog-to-digital conversion, digital down-conversion, filtering, and AGC on the IF signals, and transmitting these signals to the baseband unit (BBU) through the high-speed transmission link.

    - Receives the downlink baseband digital signals from the BBU, performing matched filtering, digital up-conversion, clipping on the signals, modulating the output I/Q

differential signals to required TX signals, amplifying the signals, and transmitting them through antennas.

41 The TOE can be deployed in one of the following physical configurations with no changes in the functionality, or in the installation procedures to be followed:

- DBS3900 LTE FDD: Distributed base station. The DBS3900 LTE FDD is characterized by its small footprint, easy installation, and low power consumption. Therefore, the DBS3900 LTE FDD can be easily installed in a spare space at an existing site. The RRU is also compact and light. It can be installed close to the antenna to reduce feeder loss and to improve system coverage. With these characteristics, the DBS3900 LTE FDD fully addresses operators' concern over site acquisition and reduces network deployment time. Therefore, the DBS3900 LTE FDD enables operators to efficiently deploy a high-performance LTE network with a low Total Cost of Ownership (TCO) by minimizing the investment in electricity, space, and manpower.

  The DBS3900 LTE FDD has flexible applications to meet the requirement of fast network deployment in different scenarios.

  Note: The configuration used during the evaluation is the DBS3900 LTE FDD.

- DBS3900 LTE TDD: Distributed base station. The DBS3900 LTE TDD, a future-oriented E-UTRAN NodeB (eNodeB) product launched by Huawei, is a distributed eNodeB supporting TDD. The DBS3900 LTE TDD fully exploits Huawei platform resources and uses a variety of technologies.

  The DBS3900 LTE TDD is characterized by its small footprint, easy installation, and low power consumption. Therefore, the DBS3900 LTE TDD can be easily installed in a spare space at an existing site. The RRU is also compact and light. It can be installed close to the antenna to reduce feeder loss and to improve system coverage. With these characteristics, the DBS3900 LTE TDD fully addresses operators' concern over site acquisition and reduces network deployment time. Thus, the DBS3900 LTE TDD enables operators to efficiently deploy a high-performance LTE network with a low Total Cost of Ownership (TCO) by minimizing the investment in electricity, space, and manpower.

  The DBS3900 LTE TDD has flexible applications to meet the requirement of fast network deployment in different scenarios.

- BTS3900 LTE: Indoor cabinet macro base station. The BTS3900 LTE is a compact indoor macro eNodeB. It applies to the scenarios of centralized installation and replacement of traditional macro base stations.

  The BTS3900 LTE provides the following features:

  - The BBU and RFUs are installed in the BTS3900 LTE in centralized mode. This helps to reduce the cost of maintenance on the tower.
  - The BTS3900 LTE provides compact size, low weight, large space, and excellent scalability, and it supports stack installation and combined installation of two BTS3900s.
  - The BTS3900 LTE, BTS3900 GSM, and BTS3900 UMTS can share one indoor macro cabinet. This saves installation space and facilitates smooth evolution.

- BTS3900A LTE: Outdoor cabinet macro base station. The BTS3900A LTE is a compact outdoor macro eNodeB. It applies to the scenarios of centralized installation and replacement of traditional macro base stations.

  The BTS3900A LTE provides the following features:

  - The BBU and RFUs are installed in the BTS3900A LTE in centralized mode. This helps to reduce the cost of maintenance on the tower.
  - The BTS3900A LTE supports stack installation. This reduces the weight of a single cabinet and facilitates transportation.
  - The BTS3900A LTE, BTS3900A GSM, and BTS3900A UMTS can share RFCs. This saves installation space and facilitates smooth evolution.

- BTS3900L LTE: Large indoor cabinet macro base station. The BTS3900L LTE is a compact indoor macro eNodeB. It applies to the scenarios of centralized installation and replacement of traditional macro base stations.

  The BTS3900L LTE has the following features:

- The BBU and RFUs are installed in the BTS3900L LTE in centralized mode. This helps to reduce the cost of maintenance on the tower.
- The BTS3900L LTE provides compact size, low weight, large space, and excellent scalability, and it supports combined installation of two BTS3900Ls.
- The BTS3900L LTE, BTS3900L GSM, and BTS3900 UMTS can share one indoor macro cabinet. This saves installation space and facilitates smooth evolution.

1.5. TOE Description

1.5.1. Logical Scope

42 This section will define the logical scope of the TOE. The software architecture of the TOE is indicated in the following figure:

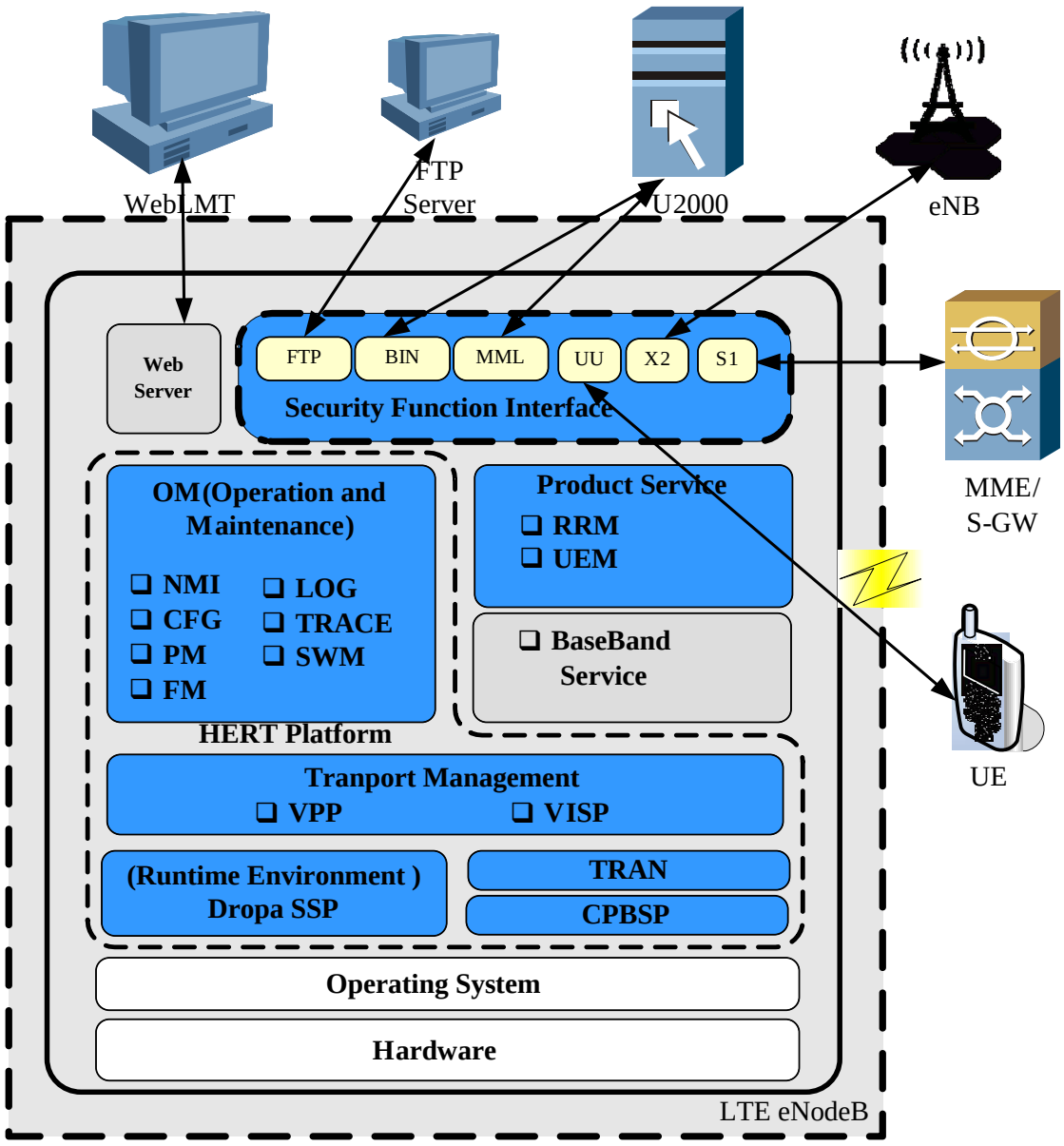


Figure 4 *Software architecture*

43 An explanation of each identified part is described below.

44 From the Logical point of view, the following figure includes the TOE Logical Scope, where all the connections to the TOE are indicated, and also the way the TOE is deployed in the different boards of the product.

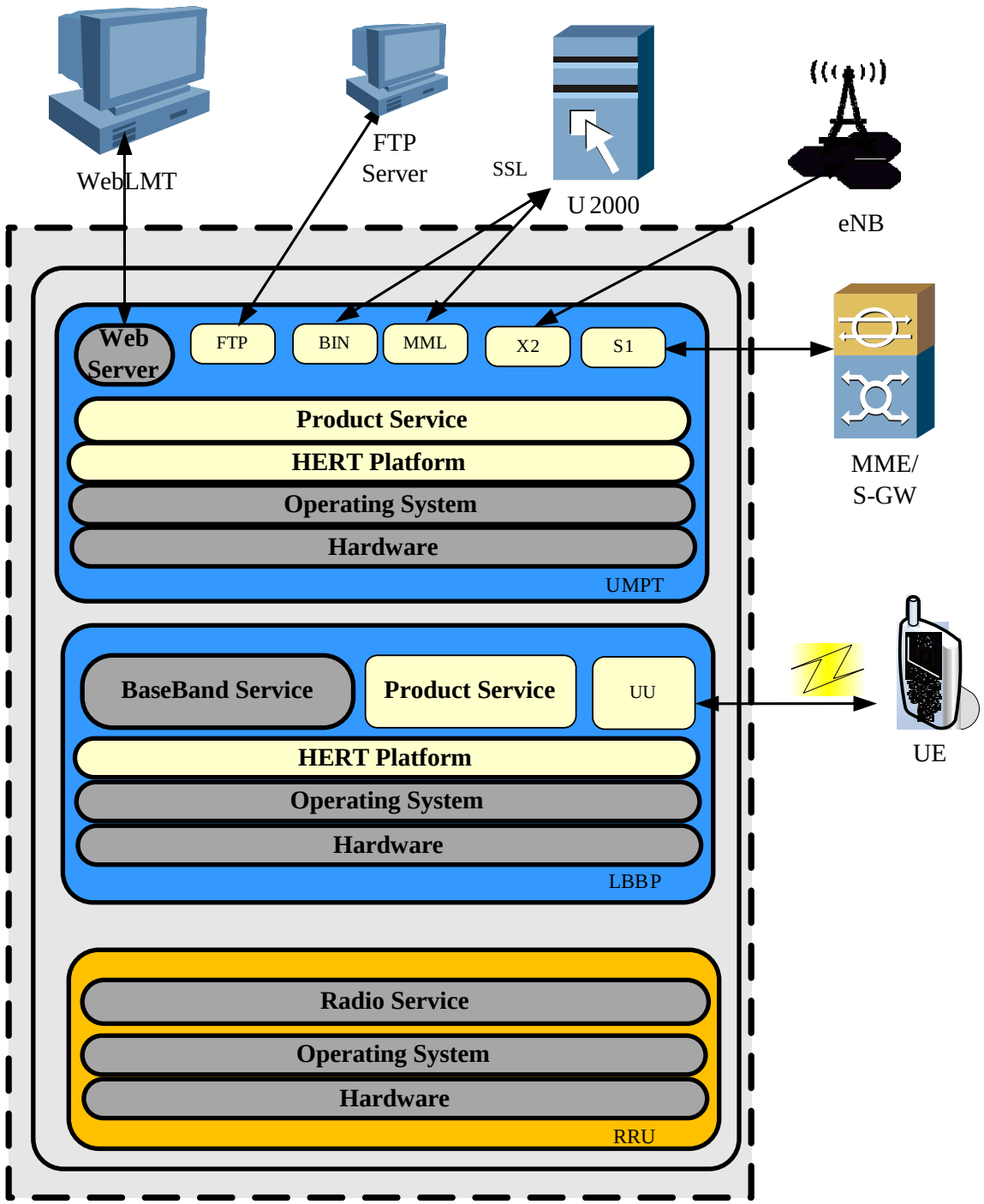


Figure 5 *TOE Logical Scope*

45 The TOE is pure software. OS and other software provided by particular products is TOE environment. In the above diagrams, the content of the blue areas (excluding the grey boxes) are parts of the TOE. The TOE includes Product Service and HERT platform.

46 The TOE security functionality, as stated in the section **1.3 TOE Overview** is:

- Management network:
    - Identification and Authentication.
    - Access control.
    - Management interfaces protection
- Radio network: UU interface protection
- Telecom network: Backhaul interface protection
- Resource management
- Security function management
- Digital signature
- Auditing.

47 As shown in ***Figure 4*** *Software Architecture*, the TOE is entirely composed by software. The Operating System, and other software provided by particular products belong to the TOE environment. The TOE itself includes OM, Product Service, Transport Management, TRAN, CPBSP and Dopra SSP.

48 For each of the identified parts of the TOE, a correspondence between them and the TOE security functionality can be achieved. That way, for each part, the appropriate security associated functionality is indicated in the following table:

Element	**Part**	**Associated security functionality**
Security Function Interface	All the interfaces	Resource management
	UU: interface with the User Equipment	UU interface protection
	S1: Interface with the S-GW	Backhaul interface protection
	X2: Interface with other eNodeBs.	Backhaul interface protection
	Communications through the following protocols:	Identification & Authentication

	BIN: Huawei's private binary message protocol. MML: Man-Machine Language. FTP: File transmission Protocol	Management interfaces protection Access control
Operation and Maintenance (OM)	NMI: network management interface: which is the interface for external element	Authentication Access control
	CFG: Configuration Management, responsible for the managed element configuration.	Security functionality management
	PM: Performance management, responsible for the calculation of performance data and the storage of it.	NA
	FM: Fault management, which include fault and alarm monitoring.	NA
	SWM: Software management, responsible for software upgrade and rollback.	Digital signature
	LOG: Responsible for the audit and storage of security log and operational log.	Auditing
	TRACE: Responsible for the trace messages which show the state of the eNodeB and UE within the LTE network.	NA
HERT Platform Transport Management (TM)	VPP: Voice Protocol Platform, which is composed of voice and signal processing component, such as XML Parser, Stream Control Transmission Protocol (SCTP) and Signaling ATM Adaptation Layer (SAAL). VISP: Versatile IP and Security Platform, which provides TCP / IP protocol stack management interface.	Backhaul interface protection
HERT Platform TRAN	Huawei's wireless transmission platform, which provide hardware driver management interface.	Backhaul interface protection
HERT Platform Dopra SSP (Runtime	Provide Operating System mid-ware layer. It function includes: Operation System Adapter, Memory management, Timer management, etc.	NA

Environment)		
CPBSP	Provide a standard API interface for the hardware.	NA
Product Service	Radio resource management (RRM): Responsible for the management of all wireless resources, such as site, sector, carrier frequency, etc., including the establishment, monitoring, modify, and delete	NA
	User entity management (UEM): Deal with the user call control management and signal processes in control plane, such as network entrance signal flow, traffic and connection management, security, end-state machine, etc.	NA

- System control and security management are performed on UMPT board via a secure channel enforcing SSL. The management of the functionality of the TOE can be done through BIN/MML services using an U2000 server providing management functions to the TOE.

1.5.2. Physical Scope

49 The release packages for LTE eNodeB are composed of software and documents. The LTE eNodeB software packages are in the form of binary compressed files.

50 The LTE eNodeB software packages can be downloaded and stored in the UMPT board, and then, they will be checked up, unpacked, and then distributed to each board module.

51 The list of the files and documents required for the products is the following, both the software and documents are available on Huawei support website(support.huawei.com):

Software and Documents	**Description**	**Remark**
Software.csp	Board software package (In the form of binary compressed files)	The software packages which are the TOE will be digitally signed to ensure their legitimacy and integrity.

Software and Documents	Description	Remark
Firmware.csp	BootROM package (In the form of binary compressed files)	
The install guide, commissioning and maintenance documents of eNodeB	Including the documents listed in the following table (*).	The guidance documents of LTE eNodeB Software

Table 1 *Physical Scope*

(*) List of documents considered as guidance:

Document
Security Management Guide of Huawei 3900 series LTE eNodeB Software, v0.6, Jun 2017
Installation Guide of Huawei 3900 Series LTE eNodeB (AGD_PRE) v0.7, Jun 2017
ADV_FSP Functional Specification of Huawei 3900 Series LTE eNodeB Software V0.46, Jun 2017
macro_en.ini, November 2016

2. Conformance claim

52 This ST is CC Part 2 conformant [CC] and CC Part 3 conformant [CC], no extended. The CC version of [CC] is Version 3.1Revision 4.

53 This ST is EAL4 conformant as defined in [CC] Part 3, with the assurance level of EAL4 Augmented with ALC_FLR.1.

54 The methodology to be used for evaluation is CEM3.1 R4

55 No conformance to a Protection Profile is claimed.

3. Security Problem Definition

3.1. TOE Assets

56 The following table includes the assets that have been considered for the TOE:

Asset	Description
A1.Software and patches	The integrity and confidentiality of the system software and the patches when in transit across the management network should be protected from modification and disclosure.
A2.Stored configuration data	The integrity and confidentiality of the stored configuration data should be protected. Configuration data includes the security related parameters under the control of the TOE (such as user account information and passwords, audit records, etc).
A3. In transit configuration data	The integrity and confidentiality of the configuration data when travelling in the management network.
A4. User Traffic	The user traffic includes the user data packets transferred upon the S1/X2 interface (telecom network). Confidentiality and integrity of the user traffic in the telecom network are protected by security functions implemented by the TOE.
A5. Service	Recoverability in terms of the capacity of recovery in case of denial of service.

Table 2 *TOE assets*

3.2. Threats

57 This section of the security problem definition shows the threats to be countered by the TOE, its operational environment, or a combination of both. The threat agents can be categorized as either:

Agent	Description
Telecommunication network attacker	An attacker from the telecommunication network who can connect to the TOE through S1/X2 interface is able to intercept, and potentially modify or re-use the data that is being sent to the TOE.

Management network attacker	An unauthorized agent who is connected to the management network.
Restricted authorized user	An authorized user of the TOE who belongs to the management network and has been granted authority to access certain information and perform certain actions.

Table 3 *Threats agents*

3.2.1. Threats by Management Network Attacker

Threat: T1.InTransitConfiguration	
Attack	An attacker in the management network succeeds in accessing the content of the BS file while transferring, violating its confidentiality or integrity.
Asset	A3.In transit configuration data
Agent	Management Network Attacker

Threat: T2. InTransitSoftware	
Attack	An attacker in the management network succeeds in accessing the content of the BS software/patches while transferring, violating its confidentiality or integrity.
Asset	A1.Software and patches;
Agent	Management Network Attacker

Threat: T3.UnauthenticatedAccess	
Attack	An attacker in the management network gains access to the TOE disclosing or modifying the configuration data stored in the TOE in a way that is not detected.
Asset	A2.Stored configuration data
Agent	Management Network Attacker

Threat: T4.UnwantedNetworkTraffic_M	
Attack	Unwanted network traffic sent to the TOE from management network will cause the TOE's processing capacity for incoming network traffic to be consumed thus failing to process legitimate traffic. This may further causes the TOE fails to respond to system control and security management operations. The TOE will be able to recover from this kind of situations.
Asset	A5. Service

Agent	Management Network Attacker

3.2.2. Threats by Telecommunication Network Attacker

Threat: T5.UnwantedNetworkTraffic_T	
Attack	Unwanted network traffic sent to the TOE from telecommunication network (S1 and X2 interfaces) also cause the TOE's processing capacity for incoming network traffic to be consumed thus failing to process legitimate traffic. This may further causes the TOE fails to respond to system control and security management operations. The TOE will be able to recover from this kind of situations.
Asset	A5. Service
Agent	Telecommunication Network Attacker

Threat: T6. UserTraffic	
Attack	An attacker who is able to modifying/reading external network traffic and thereby gain unauthorized knowledge about the user data transferring between TOE and SGW (S1) and other eNodeB (X2).
Asset	A4.User Traffic;
Agent	Telecommunication Network Attacker

3.2.3. Threats by restricted authorized user

Threat: T7.UnauthorizedAccess	
Attack	A user of the TOE accessing through the management network who is authorized to perform certain actions and access certain information gains access to commands or information he is not authorized for.
Asset	A2.Stored configuration data
Agent	Restricted authorized user

3.3. Organizational Policies

3.3.1. P1.Audit

58 The TOE shall provide audit functionality:

- Generation of audit information.
- Storage of audit log.
- Review of audit records.

3.3.2. P2. RoleManagement

59 Different People access the TSF needs to be divided according to different roles with different permissions, as far as possible the user has the minimum required permissions.

3.3.3. P3.UU_Secure channel

60 The TOE shall encrypt/decrypt the data exchanged over the UU interface. Integrity of the RRC signal exchanged over this interface shall also be guaranteed.

3.4. Assumptions

3.4.1. Physical

A.PhysicalProtection

61 It is assumed that the TOE is protected against unauthorized physical access.

3.4.2. Personnel

A.TrustworthyUsers

62 It is assumed that the organization responsible for the TOE and its operational environment has measures in place to establish trust into and train users of the TOE commensurate with the extent of authorization that these users are given on the TOE. (For example, super users and users that are assigned similar privileges are assumed to be fully trustworthy and capable of operating the TOE in a secure manner abiding by the guidance provided to them.)

3.4.3. Connectivity

A.NetworkSegregation

63 It is assumed that the management network, the telecom network and the signal network are separated between each other.

64 **Note**:

- The **management network** is accessible through the integrated port & FTP interfaces. SSL channels are implemented.

- The **telecom network** is accessible through the S1 and X2 interfaces. IPSEC channels are implemented.

- The **radio network** is accessible through the UU interface.

A.TrustNetwork

65 It is assumed that the **telecom network** between security gateway and EPC(S-GW/MME) is secure and trusted. Security is implemented from the TOE to the gateway.

3.4.4. Support

A.Support

66 The operational environment must provide the following supporting mechanisms to the TOE: Reliable time stamps for the generation of audit records.

3.4.5. SecurePKI

A.SecurePKI

67 There exists a well managed protected public key infrastructure. The certificates used by the TOE and its clients are managed by the PKI.

4. Security Objectives

4.1. Security Objectives for the TOE

NOTE:

For the access control, the following logical interfaces have been taken into account:

- Local ➔ local users accessing through the integrated port
- Domain ➔ for the users accessing through this logical interface, I&A is managed by the U2000.
- EMSCOMM ➔ users belonging to the EMSCOMM U2000 role accessing through the integrated port
- SEP ➔ logical interface for session establishment control for S1, X2 and management network (integrated port & FTP).

68 The following objectives must be met by the TOE:

O.Authentication

69 The TOE must authenticate users and control the session establishment. The I&A mechanism shall be implemented in the following logical interfaces: Local, EMSCOMM.

70 The TOE shall implement a session establishment mechanism restricting the local users to access the TOE based on time.

O.Authorization

71 The TOE shall implement different authorization levels that can be assigned to administrators in order to restrict the functionality that is available to individual local users. This access control mechanism shall be implemented for the following logical interfaces: Local, Domain and EMSCOMM.

O.SecureCommunication

The TOE shall provide a secure remote communication channels via SSL within the management network and IPSEC within the telecom network.

72 The TOE establishes a **trusted** channel for the communications with the U2000 through the “Integrated Port” interface (management network) providing the following secure features:

– Integrity

– Confidentiality

– Authentication

73 For all other communication through these networks (i.e., the remainder “Integrated Port” communication (for local and domain user communications), FTPS communication) the TOE provides the following secure features:

– Integrity

– Confidentiality

O. SoftwareIntegrity

74 The TOE must provide functionality to verify the integrity of the received software patches.

O.Resources

75 The TOE shall implement a session establishment mechanism (SEP) controlled by IP, port, protocol and VLAN id for telecom (S1, X2) and management network (integrated port & FTP) allowing VLAN separation and IP based ACLs to avoid resource overhead.

O.Audit

76 The TOE shall provide audit functionality:

- Generation of audit information.
- Storage of audit log.
- Review of audit records.

O.UserTrafficProtection

77 The TOE shall provide integrity and encryption protection for the data exchanged over the radio network (UU interface).

4.2. Security Objectives for the Operational Environment

OE. PhysicalProtection

78 The TOE (i.e., the complete system including attached interfaces) shall be protected against unauthorized physical access.

OE.TrustworthyUsers

79 Those responsible for the operation of the TOE and its operational environment must be trustworthy, and trained such that they are capable of securely managing the TOE and following the provided guidance.

OE.NetworkSegregation

80 The TOE environment shall assure that the management network, the telecom network and the signal network are separated between each other.

OE. TrustNetwork

81 The telecom network between security gateway and EPC(S-GW/MME) is trusted and secure.

OE.Support

82 Those responsible for the operation of the TOE and its operational environment must ensure that the operational environment provides the following supporting mechanisms to the TOE: Reliable time stamps for the generation of audit records.

OE. SecurePKI

83 A well-managed protected public key infrastructure is implemented in the operational environment. The certificates used by the TOE and its client are managed by the PKI.

4.3. Security Objectives rationale

4.3.1. Coverage

84 The following tables provide a mapping of security objectives to the environment defined by the threats, policies and assumptions, illustrating that each security objective covers at least one threat and that each threat is countered by at least one objective, assumption or policy.

	T1.InTransitConfiguration	T2.InTransitSoftware	T3.UnauthenticatedAccess	T4.UnwantedNetworkTraffic_M	T5.UnwantedNetworkTraffic_T	T6. UserTraffic	T7.UnauthorizedAccess	A.PhysicalProtection	A.TrustworthyUsers	A.NetworkSegregation	A.TrustNetwork	A.Support	A. SecurePKI	P1.Audit	P2.RoleManagement	P3.UU_Secure channel
O.Authentication			X				X									
O.Authorization			X				X								X	
O.SecureCommunication	X	X	X			X	X									

O.SoftwareIntegrity		X														
O.Resources				X	X											
O.Audit														X		
O.UserTrafficProtection																X
OE.PhysicalProtection								X								
OE.TrustworthyUsers									X							
OE.NetworkSegregation										X						
OE.TrustNetwork						X					X					
OE.Support												X				
OE.SecurePKI	X	X	X			X	X						X			

Table 4 *Mapping of security objectives*

4.3.2. Sufficiency

85 The following rationale provides justification that the security objectives are suitable to counter each individual threat and that each security objective tracing back to a threat, when achieved, actually contributes to the removal, diminishing or mitigation of that threat:

Threat	Rationale for security objectives
T1.InTransitConfiguration	The threat T1.InTransitConfiguration is countered by requiring communications security via SSL for network communication between entities in the management network and the TOE (O.SecureCommunication). A secure PKI will be needed to assure the validity of the used certificates. (OE.SecurePKI)
T2. InTransitSoftware	The threat T2.InTransitSoftware is countered by O.SoftwareIntegrity: when a software package is loaded, its message digest and signature are verified.

	O.SecureCommunication contributes also as a secure communication channel between the TOE and external entities in the management network is established. A secure PKI will be needed to assure the validity of the used certificates. (OE.SecurePKI)
T3.UnauthenticatedAccess	The threat T3.UnauthenticatedAccess is countered by the security objective for the TOE O.Authentication which requires the TOE to implement an authentication mechanism for the local users together with O.Authorization which requires the TOE to implement an access control mechanism for the users in the management network. A secure PKI will be needed to assure the validity of the used certificates. (OE.SecurePKI)
T4.UnwantedNetworkTraffic_M	The threat T4.UnwantedNetworkTraffic_M is directly counteracted by the security objective for the TOE O.Resources.
T5.UnwantedNetworkTraffic_T	The threat T5.UnwantedNetworkTraffic_T is also directly counteracted by the security objective for the TOE O.Resources.
T6.UserTraffic	The Threat T6.UserTraffic is countered by the security objective for the TOE (O.SecureCommunication). This provides secure channels for X2 interface traffic between eNodeBs, and S1 interface traffic between eNodeB and security gateway by implement IPsec. The S1 interface traffic between security gateway and MME/SGW is protected by OE.TrustNetwork A secure PKI will be needed to assure the validity of the used certificates. (OE.SecurePKI)
T7.UnauthorizedAccess	The threat T7.UnauthorizedAccess is countered by by the security objective for the TOE O.Authentication which requires the TOE to implement an authentication mechanism for the local users together with O.Authorization which requires the TOE to implement an access control

	mechanism for the users in the management network. It is also countered by requiring communications security via SSL for network communication between entities in the management network and the TOE (O.SecureCommunication). A secure PKI will be needed to assure the validity of the used certificates. (OE.SecurePKI)

Table 5 *Sufficiency analysis for threats*

Assumption	Rationale for security objectives
A.PhysicalProtection	This assumption is directly implemented by the security objective for the environment OE.PhysicalProtection.
A.TrustworthyUsers	This assumption is directly implemented by the security objective for the environment OE.TrustworthyUsers.
A.NetworkSegregation	This assumption is directly implemented by the security objective for the environment OE.NetworkSegregation.
A.TrustNetwork	This assumption is directly implemented by the security objective for the environment OE.TrustNetwork.
A.Support	This assumption is directly implemented by the security objective for the environment OE.Support.
A. SecurePKI	This assumption is directly implemented by the security objective for the environment. OE. SecurePKI

Table 6 *Sufficiency analysis for assumptions*

Policy	Rationale for security objectives
P1.Audit	This policy is directly implemented by the security objective for the TOE O.Audit
P2.RoleManagement	This policy is directly implemented by the security objective for the TOE O.Authorization
P3.UU_Secure channel	This policy is directly implemented by the security objective for the TOE O.UserTrafficProtection

Table 7 *Sufficiency analysis for organizational security policy*

5. Security Requirements for the TOE

5.1. Security Requirements

5.1.1. Security Audit (FAU)

5.1.1.1. FAU_GEN.1 Audit data generation

FAU_GEN.1.1 The TSF shall be able to generate an audit record of the following auditable events:

a) Start-up and shutdown of the audit functions;
b) All auditable events for the [selection: *not specified*] level of audit; and
c) [assignment: *The following auditable events:*

i. user activity

1. login, logout (SEC)

2. operation requests that triggered by manual operation. (OPE)

ii. user management

1. add, delete, modify (SEC & OPE)

2. password change through GUI (SEC)

3. password change through MML (MOD OP) (SEC & OPE)

4. authorization modification (SEC & OPE)

iii. Locking, unlocking (manual or automatic) (SEC)

1. Locking (automatic) (SEC)

2. Locking (manual: through SET OPLOCK) (SEC & OPE)

3. unlocking (automatic) (SEC)

4. unlocking (manual: through ULK USR) (SEC & OPE)

iv. Command group management

1. Add/ delete commands into/from command group (SEC & OPE)

2. Modify name of command group name (SEC &OPE)

]

Application note: because domain users are managed by U2000, so change password of domain user through GUI will not logged in SECLOG.

FAU_GEN.1.2 The TSF shall record within each audit record at least the following information:

a) **Date and time of the event, type of event, subject identity (if applicable), and the outcome (success or failure) of the event; and**
b) **For each audit event type, based on the auditable event definitions of the functional components included in the PP/ST. [assignment: *workstation IP (if applicable), user (if applicable), and command name (if applicable).*]**

Application note: There are two kinds of log files, security log file and operation log file. For details about the logging option about the BIN and MML commands, please refer to the attached excel: “BIN&MML Command Group Right.xlsx” in ADV_FSP document.

5.1.1.2. FAU_GEN.2 User identity association

FAU_GEN.2.1 For audit events resulting from actions of identified users, the TSF shall be able to associate each auditable event with the identity of the user that caused the event.

5.1.1.3. FAU_SAR.1 Audit review

FAU_SAR.1.1 The TSF shall provide [assignment: *users with audit review rights*] with the capability to read [assignment: *all information*] from the audit records.

FAU_SAR.1.2 The TSF shall provide the audit records in a manner suitable for the user to interpret the information.

Application note: This SFR can be observed through “Integrated Port” interface.

5.1.1.4. FAU_SAR.3 Selectable Audit review

FAU_SAR.3.1 The TSF shall provide the ability to apply [assignment: *selection*] of audit data based on [assignment: *date and time range, user name, terminal type, and/or result*.]

Application note: This SFR can be observed through “Integrated Port” interface.

5.1.1.5. FAU_STG.1 Protected audit trail storage

FAU_STG.1.1 The TSF shall protect the stored audit records in the audit trail from unauthorized deletion.

FAU_STG.1.2 The TSF shall be able to [selection: *prevent*] unauthorized modifications to the stored audit records in the audit trail.

5.1.1.6. FAU_STG.3 Action in case of possible audit data loss

FAU_STG.3.1 The TSF shall [assignment: *delete the oldest files*] if the audit trail exceeds [assignment: *the pre-defined limited size of 2Mbyte*].

Application note: For each kind of log file, there are two audit files, when the new file is full, the old one is deleted.

5.1.2. Cryptographic Support (FCS)

5.1.2.1. FCS_COP.1/Sign Cryptographic operation

FCS_COP.1.1 The TSF shall perform [assignment: *digital signature verification*] in accordance with a specified cryptographic algorithm [assignment: *RSA with underlying SHA-256*] and cryptographic key sizes [assignment: *1024bits*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the digital signature verification of the remote loaded software packages.

5.1.2.2. FCS_COP.1/SSL Cryptographic operation

FCS_COP.1.1 The TSF shall perform [assignment: *encryption, decryption, cryptographic checksum generation for integrity and verification of checksum on TOE access channels*] in accordance with a specified cryptographic algorithm [assignment: *algorithms supported by SSL/TLS*] and cryptographic key sizes [assignment: *key sizes supported by SSL/TLS*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the encryption of the communication through the integrated port, or with the FTP servers. The supported SSL cipher suites are defined in the section 6 TOE Summary Specification.

5.1.2.3. FCS_COP.1/UU Cryptographic operation

FCS_COP.1.1 The TSF shall perform [assignment: *ciphering and integrity protection of TOE communication with the UE*] in accordance with a specified

cryptographic algorithm [assignment: *EEA1/EIA1 – based on SNOW 3G or EEA2/EIA2 – based on AES-128 or EEA3/EIA3 – based on ZUC*] and cryptographic key sizes [assignment: *128 bits*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the protection of the channel with the UE.

5.1.2.4. FCS_COP.1/IPsec Cryptographic operation

FCS_COP.1.1 The TSF shall perform [assignment: *encryption, decryption, cryptographic checksum generation for integrity, verification of checksum and cryptographic key agreement of TOE communication with the ike peer*] in accordance with a specified cryptographic algorithm [assignment: *algorithms supported by IPSec/IKE*] and cryptographic key sizes [assignment: *key sizes supported by IPSec/IKE*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the protection of the channel with the security gateway (S1) and neighbouring eNodeB (X2). The supported IPsec version is defined in the section 6 TOE Summary Specification.

5.1.2.5. FCS_CKM.1/SSL Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm [assignment: *cryptographic key generation methods supported by SSL/TLS*] and cryptographic key sizes [assignment: *key sizes supported by SSL/TLS*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the key generation for the encryption of the communication through the integrated port, or with the FTP servers.

5.1.2.6. FCS_CKM.1/UU Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm [assignment: *AKA protocol*] and cryptographic key sizes [assignment: *128 bits*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the key generation for the protection of the channel with the UE.

5.1.2.7. FCS_CKM.1/IPsec Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm [assignment: *cryptographic key generation methods supported by IPSec/IKE*] and cryptographic key sizes [assignment: *key sizes supported by IPSec/IKE*] that meet the following: [assignment: *none*]

Application note: This requirement addresses the key generation for the protection of the channel with the security gateway/neighbouring eNodeB.

5.1.3. User Data Protection (FDP)

5.1.3.1. FDP_ACC.1/Local Subset access control

FDP_ACC.1.1 The TSF shall enforce the [assignment: *Local access control policy*] on [assignment: *local users as subjects, commands as objects, and execution of commands by local users*].

Application note: This requirement implements the local users' access control policy. It can be observed through the MML/BIN interface.

5.1.3.2. FDP_ACF.1/Local Security attribute based access control

FDP_ACF.1.1 The TSF shall enforce the [assignment: *Local access control policy*] to objects based on the following:

[assignment:

a) local users and their following security attributes:
   i. user name
   ii. user group (role)
b) commands and their following security attributes:
   i. command name
   ii. command groups.]

FDP_ACF.1.2 The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

[assignment:

if the user belongs to a user group that is assigned to a command group that includes the controlled command, then access is granted.

If the user belongs to the custom user group, and he is associated to the command group that includes the controlled command, then access is granted]

FDP_ACF.1.3 The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: [assignment: *If the user name is admin, access is always granted*]

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the following additional rules: [assignment: *None*]

Application note: This requirement implements the local users' access control policy. It can be observed through the MML/BIN interface).

5.1.3.3. FDP_ACC.1/Domain Subset access control

FDP_ACC.1.1 The TSF shall enforce the [assignment: *Domain access control policy*] **on [assignment:** *domain users as subjects, commands as objects, and execution of commands by domain users*]**.**

Application note: This requirement implements the domain users' access control policy. The users will login through the TOE but authentication is performed by an external entity which will send the operational rights to the TOE so it can exercise the access control policy.

5.1.3.4. FDP_ACF.1/Domain Security attribute based access control

FDP_ACF.1.1 The TSF shall enforce the [assignment: *Domain access control policy*] **to objects based on the following:**

[assignment:

a) domain users and their following security attributes:
   i. user name
b) commands and their following security attributes:
   ii. command name]

FDP_ACF.1.2 The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

[assignment: *if the user is assigned to the requested commands, then access is granted.*]

FDP_ACF.1.3 The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: [assignment: *If the user group assigned to the user in the U2000 is Administrators, access is always granted*]

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the following additional rules: [assignment: *None*]

Application note: This requirement implements the domain users' access control policy. The users will login through the TOE but authentication is performed by an external entity which will send the operational rights to the TOE so it can exercise the access control policy.

5.1.3.5. FDP_ACC.1/EMSCOMM Subset access control

FDP_ACC.1.1 The TSF shall enforce the [assignment: *EMSCOMM access control policy*] on [assignment: *EMSCOMM user as subject, commands as objects, and execution of commands by the EMSCOMM user*].

Application note: This requirement implements the U2000 access control policy, and it can be observed through the NMI interface.

5.1.3.6. FDP_ACF.1/EMSCOMM Security attribute based access control

FDP_ACF.1.1 The TSF shall enforce the [assignment: *EMSCOMM access control policy*] to objects based on the following:

[assignment:

a) EMSCOMM user and its following security attributes:
   i. user name
b) commands and their following security attributes:
   ii. command name]

FDP_ACF.1.2 The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

[assignment:

a) *emscomm will always have execution permission of the targeted command.*

emscommts will always have execution permission of the base command(G_0).

emscommneteco will always have execution permission of the base command(G_0) and energy management commands. **]**

FDP_ACF.1.3 The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: [assignment: *None*]

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the following additional rules: [assignment: *None*]

Application note: This requirement implements the U2000 access control policy, and it can be observed through the NMI interface.

5.1.4. Identification and Authentication (FIA)

5.1.4.1. FIA_AFL.1 Authentication failure handling

FIA_AFL.1.1 The TSF shall detect when [selection: *an administrator configurable positive integer within [assignment: 1 and 255]*] unsuccessful authentication attempts occur related to [assignment: *authentication of local users since the last successful authentication of the user and before the counter for these attempts is reset after an administrator configurable time frame either between 1 and 60 minutes*].

FIA_AFL.1.2 When the defined number of unsuccessful authentication attempts has been [selection: *surpassed*], the TSF shall [assignment: *lockout the account for an administrator configurable duration either between 1 and 65535 minutes*]

Application note: Only local users are taken into account in this requirement.

The EMSCOMM user is not considered in this requirement. The EMSCOMM user is authenticated in the TOE by automatic method. Domain users are authenticated in the U2000 element of the TOE environment, so they are also not considered in this requirement neither by the TOE authentication functionality.

5.1.4.2. FIA_ATD.1 User attribute definition

FIA_ATD.1.1 The TSF shall maintain the following list of security attributes belonging to individual users:

[assignment:

a) User name
b) User group
c) Password
d) Number of unsuccessful authentication attempts since last successful authentication attempt
e) Login allowed start time
f) Login allowed end time
*g) Lock status***]**

Application note: Only local users are taken into account in this requirement. The EMSCOMM user is not considered in this requirement. The EMSCOMM user is authenticated in the TOE by automatic method. Domain users are authenticated in the U2000 element of the TOE environment, so they are not considered in this requirement neither by the TOE authentication functionality.

5.1.4.3. FIA_SOS.1 Verification of secrets

FIA_SOS.1.1 The TSF shall provide a mechanism to verify that secrets meet:
[assignment:

a) an administrator configurable minimum length between 6 and 32 characters,
b) an administrator configurable combination of the following:

i. at least one lower-case alphanumerical character,

ii. at least one upper-case alphanumerical character,

iii. at least one numerical character,

iv. at least one special character.

c) that they are different from an administrator configurable number between 1 to 10 previous used passwords **]**

Application note: Only local users are taken into account in this requirement.

5.1.4.4. FIA_UAU.1/Local Timing of authentication

FIA_UAU.1.1 the TSF shall allow [assignment:

a) Handshake command (SHK HAND)

b) Parameter negotiation (NEG OPT, used to negotiate language information; Base Site Information: LTE/UMTS/GSM/Multimode)

c) Login request (LGI REQUEST, used to request public key before login)

d) Confirm user type (CFM IDENTITY, used to confirm user type is local LMT or U2000, only used in UMTS)

e) Logout (LGO, used to logout)

On behalf of the user to be performed before the user is authenticated.

FIA_UAU.1.2 the TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

5.1.4.5. FIA_UAU.2/EMSCOMM User authentication before any action

FIA_UAU.2.1 the TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

5.1.4.6. FIA_UAU.5 Multiple authentication mechanisms

FIA_UAU.5.1 The TSF shall provide [assignment:

a) Authentication for Local Users

b) Authentication for EMSCOMM user

] to support user authentication.

FIA_UAU.5.2 The TSF shall authenticate any user's claimed identity according to the [assignment:

a) Local users are authenticated in the TOE by username and password stored in the TOE.

b) EMSCOMM user is authenticated in the TOE by a password based challenge-response protocol.

]

5.1.4.7. FIA_UID.1/Local Timing of identification

FIA_UID.1.1 The TSF shall allow [assignment:

a) Handshake command (SHK HAND)

b) Parameter negotiation (NEG OPT, used to negotiate language information; Base Site Information: LTE/UMTS/GSM/Multimode)

c) Confirm user type (CFM IDENTITY, used to confirm user type is local LMT or U2000, only used in UMTS)

d) Logout (LGO, used to logout)

on behalf of the user to be performed before the user is identified.

FIA_UID.1.2 the TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

5.1.4.8. FIA_UID2/ EMSCOMM User identification before any action

The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

5.1.5. Security Management (FMT)

5.1.5.1. FMT_MSA.1 Management of security attributes

FMT_MSA.1.1 The TSF shall enforce the [assignment: *Local access control policy*] to restrict the ability to [selection: *query and modify*] the security attributes [assignment:

a) Command groups
b) User groups]

to [assignment: *users with the appropriate rights*].

5.1.5.2. FMT_MSA.3 Static attribute initialization

FMT_MSA.3.1 The TSF shall enforce the [assignment: *Local access control policy*] to provide [selection: *permissive*] default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2 The TSF shall allow the [assignment: *administrator defined roles with the appropriate rights*] to specify alternative initial values to override the default values when an object or information is created.

5.1.5.3. FMT_SMF.1 Specification of Management Functions

FMT_SMF.1.1 The TSF shall be capable of performing the following management functions: [assignment:

a) Local User management
b) Command group management (creation, deletion, modification, commands membership)
c) Local users authorization management (User group authorization on Command groups)
d) Configuration of SSL (Certificates and auth mode)
e) Configuration of IPSec
f) Configuration of ACL
g) Configuration of VLAN
h) Configuration of UU interface
i) FIA_SOS.1.1 configurable values (Password policy)
j) FIA_AFL.1.1 configurable values (Authentication failure handling)]

Application note: The TOE includes default users whose associated parameters (but the password) cannot be modified. These users are *admin* and *guest*.

5.1.5.4. FMT_SMR.1 Security roles

FMT_SMR.1.1 The TSF shall maintain the roles: [assignment: *Administrator, User, Operator, Guest, and Custom*]

FMT_SMR.1.2 The TSF shall be able to associate users with roles.

Application note: These roles are only applicable to the local users. The domain users are not maintained in the TOE, no role neither user group is assigned to a domain user. Also, the EMSCOMM user can not be assigned to any role.

Application note: The custom user group means that the command groups are directly assigned to the user. The domain users are not maintained by the TOE, no role neither user group is assigned to a domain user.

5.1.6. TOE access (FTA)

5.1.6.1. FTA_TSE.1/SEP TOE session establishment

FTA_TSE.1.1 The TSF shall be able to deny session establishment based on [assignment:

a) Protocol type (IP, ICMP, TCP, UDP or SCTP)
b) Source IP address and mask
c) Source port range
d) Destination IP address and mask
e) Destination port range
f) DSCP value
***g) VLAN id*]**

Application note: This requirement addresses the VLAN separation and VLAN/IP based ACLs to avoid resource overhead in the S1/X2 interface and in the management network.

5.1.6.2. FTA_TSE.1/Local TOE session establishment

FTA_TSE.1.1 The TSF shall be able to deny session establishment based on [assignment:

a) Login allowed start time
b) Login allowed end time
c) Account status.]

Application note: Only local users are taken into account in this requirement. The EMSCOMM user is not considered in this requirement. The EMSCOMM user is authenticated in the TOE by automatic method. Domain users are authenticated in the U2000 element of the TOE environment, so they are not considered in this requirement neither by the TOE authentication functionality.

5.1.7. Trusted Path/Channels (FTP)

5.1.7.1. FTP_ITC.1/IntegratedPort Inter-TSF trusted channel

FTP_ITC.1.1 The TSF shall provide a communication channel between itself and another trusted IT product that is logically distinct from other communication channels and provides assured identification of its end points and protection of the channel data from modification or disclosure.

FTP_ITC.1.2 The TSF shall permit [selection: *U2000*] to initiate communication via the trusted channel.

FTP_ITC.1.3 The TSF shall initiate communication via the trusted channel for [assignment: *execution of MML/BIN commands*].

Application note: Assured identification between both parties is achieved thanks to the SSL server and peer bi directional authentication. This requirement only applies to the communication with the U2000.

5.2. Security Functional Requirements Rationale

5.2.1. Coverage

86 The following table provides a mapping of SFR to the security objectives, showing that each security functional requirement addresses at least one security objective.

	O.Audit	O.Authentication	O.Authorization	O.SecureCommunication	O.Resources	O.SoftwareIntegrity	O.UserTrafficProtection

FAU_GEN.1	×						
FAU_GEN.2	×						
FAU_SAR.1	×						
FAU_SAR.3	×						
FAU_STG.1	×						
FAU_STG.3	×						
FDP_ACC.1/Local			×				
FDP_ACF.1/Local			×				
FDP_ACC.1/Domain			×				
FDP_ACF.1/Domain			×				
FDP_ACC.1/EMSCOMM			×				
FDP_ACF.1/EMSCOMM			×				
FIA_AFL.1		×					
FIA_ATD.1		×					
FIA_UAU.1/Local		×	×				
FIA_UAU.2/EMSCOMM		×	×				
FIA_UAU.5		×	×				
FIA_UID.1/Local	×	×	×				
FIA_UID.2/EMSCOMM	×	×	×				
FIA_SOS.1		×					
FMT_MSA.1			×				
FMT_MSA.3			×				
FMT_SMF.1		×	×	×	×		×
FMT_SMR.1			×				
FTA_TSE.1/SEP					×		
FTA_TSE.1/Local		×					
FCS_COP.1/SSL				×			
FCS_CKM.1/SSL				×			
FCS_COP.1/UU							×
FCS_CKM.1/UU							×
FCS_COP.1/IPsec							×
FCS_CKM.1/IPsec							×
FCS_COP.1/Sign						×	

FTP_ITC.1/IntegratedPort				x			

Table 8 *Mapping SFRs to objectives*

5.2.2. Sufficiency

87 The following rationale provides justification for each security objective for the TOE, showing that the security functional requirements are suitable.

Security objectives	Rationale
O.Audit	The generation of audit records is implemented by FAU_GEN.1. Audit records are supposed to include user identities (FAU_GEN.2) where applicable, which are supplied by the identification mechanism (FIA_UID.1). Functionality is provisioned to read these records (FAU_SAR.1, FAU_SAR.3). The protection of the stored audit records is implemented in FAU_STG.1. Functionality to prevent audit data loss is provided by FAU_STG.3.
O.Authentication	Local user authentication is implemented by FIA_UAU.1/Local, EMSCOMM user authentication is implemented by FIA_UAU.2/EMSCOMM. FIA_UAU.5 is implemented for multi-user authentication. Individual user identification is implemented in FIA_UID.1/Local and FIA_UID.2/EMSCOMM. The necessary user attributes are spelled out in FIA_ATD.1. The authentication mechanism supports authentication failure handling (FIA_AFL.1), and a password policy (FIA_SOS.1), restrictions as to the validity of accounts for logon (FTA_TSE.1/Local). Management functionality is provided in FMT_SMF.1.
O.Authorization	Local user authentication is implemented by FIA_UAU.1/Local, EMSCOMM user authentication is implemented by FIA_UAU.2/EMSCOMM. FIA_UAU.5 is implemented for multi-user authentication. Individual user identification is implemented in FIA_UID.1/Local and FIA_UID.2/EMSCOMM. The requirements for the local users' access control policy are modelled in FDP_ACC.1/Local, FDP_ACF.1/Local, FMT_MSA.1 and FMT_MSA.3. This access control is based on the definition of roles (FMT_SMR.1). Management functionality for this access control policy is provided in FMT_SMF.1. The domain users' access control policy is modelled in FDP_ACC.1/Domain and FDP_ACF.1/Domain.

	The EMSCOMM access control policy is modelled in FDP_ACC.1/EMSCOMM and FDP_ACF.1/EMSCOMM.
O.SecureCommunication	Communications security is implemented using encryption for the communication with the U2000 through the integration port interface and in the communication with the FTP servers. The keys used for the channels are generated as part of the SSL connection establishment process. (FCS_COP.1/SSL, FCS_CKM.1/SSL) A trusted channel is provided for the use of the TOE through the Integrated Port interface (FTP_ITC.1/IntegratedPort) Management functionality to enable these mechanisms is provided in FMT_SMF.1.
O.UserTrafficProtection	Ciphering and integrity protection is implemented to protect the data transferred between the TOE and the UE. The keys used for ciphering and integrity protection are generated using AKA (FCS_COP.1/UU, FCS_CKM.1/UU) Management functionality to configure the channel is provided in FMT_SMF.1. Encryption over the S1/X2 interface is addressed ciphering the channel between the TOE and peer NE (security gateway or neighbouring eNodeB). The keys used for the channels are generated as part of the IPSec connection establishment process using Diffie-Hellman. (FCS_COP.1/IPsec, FCS_CKM.1/IPsec) Management functionality to configure the channel is provided in FMT_SMF.1.
O.Resource	FTA_TSE.1/SEP implements the separation of traffic based on VLANs and the IP based ACL to avoid resource overhead. Management functionality to configure the ACL and the VLANs is provided in FMT_SMF.1.
O.SoftwareIntegrity	The software integrity objective is directly implemented with FCS_COP.1/Sign so the TOE performs digital signature verification over the software patches.

Table 9 *SFR sufficiency analysis*

5.2.3. Security Requirements Dependency Rationale

88 The security functional requirements in this Security Target do not introduce dependencies on any security assurance requirement; neither do the security assurance requirements in this Security Target introduce dependencies on any security functional requirement.

89 The following table demonstrates the dependencies of SFRs modelled in CC Part 2 and how the SFRs for the TOE resolve those dependencies:

Security Functional Requirement	Dependencies	Resolution
FAU_GEN.1	FPT_STM.1	Not resolved. The system hardware or an external time source using NTP protocol will provide a reliable time.
FAU_GEN.2	FAU_GEN.1	FAU_GEN.1
	FIA_UID.1	FIA_UID.1
FAU_SAR.1	FAU_GEN.1	FAU_GEN.1
FAU_SAR.3	FAU_SAR.1	FAU_SAR.1
FAU_STG.1	FAU_GEN.1	FAU_GEN.1
FAU_STG.3	FAU_STG.1	FAU_STG.1
FCS_COP.1/Sign	[FDP_ITC.1 | FDP_ITC.2 | FCS_CKM.1]	Not resolved. The digital certificate used for signature verification is loaded as part of the manufacture process.
	FCS_CKM.4	Not resolved. The digital certificate used for signature verification is loaded as part of the manufacture process and are never destructed.
FDP_ACC.1/Local	FDP_ACF.1	FDP_ACF.1/Local
FDP_ACF.1/Local	FDP_ACC.1 FMT_MSA.3	FDP_ACC.1/Local FMT_MSA.3
FDP_ACC.1/Domain	FDP_ACF.1	FDP_ACF.1/Domain
FDP_ACF.1/Domain	FDP_ACC.1	FDP_ACC.1/Domain
	FMT_MSA.3	Not resolved. The dependency with FMT_MSA.3 is not resolved because the attributes of the access control policy are not under the control of the TOE.

FDP_ACC.1/EMSCOMM	FDP_ACF.1	FDP_ACF.1/ EMSCOMM
FDP_ACF.1/EMSCOMM	FDP_ACC.1	FDP_ACC.1/ EMSCOMM
	FMT_MSA.3	Not resolved. The dependency with FMT_MSA.3 is not resolved because the attributes of the access control policy are not under the control of the TOE.
FIA_AFL.1	FIA_UAU.1	FIA_UAU.1
FIA_ATD.1	None	
FIA_UAU.1/Local	FIA_UID.1/Local	FIA_UID.1/Local
FIA_UAU.2/EMSCOMM	FIA_UID.2/EMSCOMM	FIA_UID.2/EMSCOMM
FIA_UAU.5	None	
FIA_UID.1/Local	None	
FIA_UID.2/EMSCOMM	None	
FIA_SOS.1	None	
FMT_MSA.1	[FDP_ACC.1 | FDP_IFC.1]	FDP_ACC.1
	FMT_SMR.1	FMT_SMR.1
	FMT_SMF.1	FMT_SMF.1
FMT_MSA.3	FMT_MSA.1	FMT_MSA.1
	FMT_SMR.1	FMT_SMR.1
FMT_SMF.1	None	
FMT_SMR.1	FIA_UID.1	FIA_UID.1
FTA_TSE.1/SEP	None	
FTA_TSE.1/Local	None	
FCS_COP.1/SSL	[FDP_ITC.1 | FDP_ITC.2 | FCS_CKM.1]	FCS_CKM.1/SSL
	FCS_CKM.4	Not resolved. The generated keys are not externally accessible so they do not need to be securely removed.
FCS_COP.1/UU	[FDP_ITC.1 | FDP_ITC.2 | FCS_CKM.1]	FCS_CKM.1/UU
	FCS_CKM.4	Not resolved. The generated keys are not externally accessible so they do not

		need to be securely removed.
FCS_CKM.1/UU	[FCS_CKM.2 | FCS_COP.1]	FCS_COP.1/UU
	FCS_CKM.4	Not resolved. The generated keys are not externally accessible so they do not need to be securely removed.
FCS_COP.1/IPsec	[FDP_ITC.1 | FDP_ITC.2 | FCS_CKM.1]	FCS_CKM.1/IPsec
	FCS_CKM.4	Not resolved. The generated keys are not externally accessible so they do not need to be securely removed.
FCS_CKM.1/IPsec	[FCS_CKM.2 | FCS_COP.1]	FCS_COP.1/IPsec
	FCS_CKM.4	Not resolved. The generated keys are not externally accessible so they do not need to be securely removed.
FTP_ITC.1/IntegratedPort	None	

Table 10 *Dependencies between TOE Security Functional Requirements*

5.3. Security Assurance Requirements

90 The security assurance requirements for the TOE are the Evaluation Assurance Level 4 components as specified in [CC] Part 3, augmented with ALC_FLR.1. No operations are applied to the assurance components.

Assurance class	Assurance Family	Assurance Components by Evaluation Assurance Level
Development	ADV_ARC	1
	ADV_FSP	4
	ADV_IMP	1
	ADV_INT	NA
	ADV_SPM	NA
	ADV_TDS	3
Guidance documents	AGD_OPE	1
	AGD_PRE	1

Life-cycle support	ALC_CMC	4
	ALC_CMS	4
	ALC_DEL	1
	ALC_DVS	1
	ALC_FLR	1
	ALC_LCD	1
	ALC_TAT	1
Security Target evaluation	ASE_CCL	1
	ASE_ECD	1
	ASE_INT	1
	ASE_OBJ	2
	ASE_REQ	2
	ASE_SPD	1
	ASE_TSS	1
Tests	ATE_COV	2
	ATE_DPT	1
	ATE_FUN	1
	ATE_IND	2
Vulnerability assessment	AVA_VAN	3

Table 11 Security Assurance Requirements

5.4. Security Assurance Requirements Rationale

91 The evaluation assurance level has been chosen commensurate with the threat environment that is experienced by typical consumers of the TOE.

6. TOE Summary Specification

6.1. TOE Security Functionality

6.1.1. Authentication

92 The TOE offers the enforcement of timer-based account lockouts: administrators can specify after how many consecutive failed authentication attempts an account will be temporarily locked, and whether the counter for failed attempts will be reset automatically after a certain amount of minutes. (FIA_AFL.1) This functionality only applies to the local users.

93 The TOE authenticates the local users based on individual user IDs and passwords. User IDs are unique within the TOE and stored together with associated passwords and other security attributes in the TOE's configuration database. Those attributes can be configured by users with the appropriate rights. (FIA_ATD.1, FMT_SMF.1)

94 The TOE can identify local users in the management network by a unique ID and enforces their authentication before granting them access to the TSF management interfaces. Warning of "error username or password" will be prompted when the user fails to provide a correct username or password. Some not security related actions can be performed before identification and authentication (FIA_UID.1/Local,FIA_UAU.1/Local)

95 The TOE can identify EMSCOMM users in the management network by their unique ID and enforces authentication before granting it access to the TSF management interfaces. (FIA_UID.2/EMSCOMM, FIA_UAU.2/EMSCOMM)

96 Several authentication mechanisms are provided for the different available users:

1. Local users
2. EMSCOMM

97 This functionality implements FIA_UAU.5.

98 If applicable, i.e., if an administrator has specified values for these parameters for a specific user, the TOE will deny authentication of the user if the user tries to authenticate in a timeframe that lies outside of the "login start time" and "login end time" specified for the user. (FMT_SMF.1, FTA_TSE.1/Local)

99 The TOE also provide login time control mechanism: Each account can be configured with the login time segment, including the valid date range, time segment, and week restriction. Any login is prohibited beyond the configured time segment. (FMT_SMF.1, FTA_TSE.1/Local)

6.1.2. Access control

100 The Local access control policy is enforced in the following way:

1. The system sorts users with the same operation rights into a group to facilitate authorization and user management of the administrator. The TOE supports five predefined user groups (Administrator, Operator, User, Guest and Custom). The TOE grants default command group rights to Administrator, Operator, User and Guest which can't be modified. (FMT_SMR.1)

2. The TOE divides the system commands to different groups which is called command groups according to different functions. LTE eNodeB creates 22 default command groups in which the commands are preconfigured and can't be modified by user. And it provides 10 non-default command groups to which user adds or removes commands. (FDP_ACF.1/Local)

3. User groups are allowed to access one or more command groups. (FDP_ACF.1/Local)

4. The users that have a custom user group are directly related to the command groups accessible by them.

5. Therefore, a user has access to a command if its user group is associated with a command group that contains the command the user wants to access. (FDP_ACC.1/Local)

6. This access control policy is used to restrict the ability to modify the users and commands relationship. (FMT_MSA.1, FMT_MSA.3)

7. If the user is the admin special user, access is always granted regardless the command group.

101 To allow the customization of the product, ten configurable commands groups and one configurable user group exist. (FMT_SMF.1)

102 The domain access control policy allows users managed by the U2000 to execute commands in the TOE. The management of the security attributes of this access control policy is out of the scope of the TOE. Each time a domain user logs in the TOE (through the integration port), the TOE send the used user and password to the U2000 which performs user authentication and return to the user the commands that the user

can execute. If the U2000 user belongs to the Administrator group, access to all functionality is always granted. (FDP_ACC.1/Domain, FDP_ACF.1/Domain).

103 The EMSCOMM users are built-in users that are used by the U2000 to operate the TOE. This user has permission to execute all the commands of the TOE and cannot be modified neither deleted. This user can only be implicitly accessed through the integration port. (FDP_ACC.1/EMSCOMM, FDP_ACF.1/EMSCOMM).

104 Note that some MML commands can only be executed through the appropriate interface.

6.1.3. Auditing

105 Removing the logs is always forbidden (FAU_STG.1)

106 There exist two kinds of audit files, the operation log and the security log.

1. Security log: Records user operations related to the system security, including user behaviour and configuration commands, for example, account locking due to consecutive login failure and updating the security policy

2. Operation log: Records all MML commands run by users.

107 For each of these kinds there exist two files that are rotated in the following way: if total size exceeds 2MB, the oldest file is deleted and a new one is created. (FAU_STG.3)

108 The auditing functionality of the TOE cannot be started or stopped independently from the operational TOE. The TOE generates audit records for the start and shutdown of base station, and for several auditable events, storing the audit data in the appropriate file (FAU_GEN.1)

109 Where available, the data recorded with each audit record includes the unique user ID associated with a subject during authentication. (FAU_GEN.2)

110 Users with the appropriate rights can review the audit records available in the database. The TOE offers search functionality based on time intervals, user IDs, interface, and/or result. (FAU_SAR.1, FAU_SAR.3)

6.1.4. Communications security

111 The TOE provides communications security for network connections to the MPT. This includes connections via the following interfaces:

- Connections to the integrated port (MML/BIN/ALARM) using SSL/TLS.
    - The SSL connection with the M200 must include client authentication, this way, a trusted channel is established (FTP_ITC.1/IntegratedPort)
    - The SSL connection with the Local and Domain users must include integrity and confidentiality, this way, a secure channel is established (FCS_COP.1/SSL).
- The TOE includes a FTPS client which can establish secure connection with a FTP server. The connection parameters include the username and password and the IP address of the FTP server, which can be configured. SSL/TLS is used in this connection.

112 The following table shows the TLS cipher suites supported by the TOE:

Cipher suite	TLS1.2
TLS_RSA_WITH_AES_256_CBC_SHA	X
TLS_RSA_WITH_AES_128_CBC_SHA	X
TLS_DHE_RSA_WITH_AES_256_CBC_SHA	X
TLS_DHE_DSS_WITH_AES_128_CBC_SHA	X
TLS_DHE_RSA_WITH_AES_128_CBC_SHA	X
TLS_DHE_DSS_WITH_AES_128_CBC_SHA256	X
TLS_DHE_RSA_WITH_AES_128_CBC_SHA256	X
TLS_DHE_RSA_WITH_AES_256_CBC_SHA256	X
TLS_RSA_WITH_AES_128_CBC_SHA256	X
TLS_RSA_WITH_AES_256_CBC_SHA256	X

Table 12 Supported SSL/TLS cipher suites

113 This functionality is implemented through FCS_COP.1/SSL and FCS_CKM.1/SSL.

114 This functionality is configurable. (FMT_SMF.1)

6.1.5. UU interface Protection

115 LTE eNodeB air interface channel refers to and wireless channel between the eNodeB and UE. It uses EEA1/EIA1 – based on SNOW 3G or EEA2/EIA2 – based on AES-128 or EEA3/EIA3 – based on ZUC cipher/integrity protection to prevent unauthorized access to communications content. These functions are performed in the PDCP

layer and can be activated by RRC message between UE and eNodeB. (FCS_COP.1/UU)

116 Keys are generated using the AKA protocol (FCS_CKM.1/UU)

117 This functionality is configurable. (FMT_SMF.1)

6.1.6. Backhaul Interface Protection

118 The TOE provides secure communication protocols for the S1 interface (only the segment between eNodeB and security gateway) and X2 interface, using IPSec/IKE. (FCS_COP.1/IPSEC)

119 The keys are generated according to the IPSec/IKEv2 protocol (FCS_CKM.1/IPSEC)

	IKEv2
RFC Document	RFC 4306
Protocol messages	4 messages for initial exchanges
Authentication type	Digital Signature or Pre-shared key
SA negotiation	Responder's selection for initiator's proposal
Identity Hiding	Always
Perfect Forward Secrecy	Yes (optional)
Anti-Dos	Yes (optional)
Input of HASH	All messages
Reliability	Reliable
Backward compatibility	Yes
Remote address acquisition	CP payload

120 This functionality is configurable. (FMT_SMF.1)

6.1.7. Resource management

121 The TOE provides VLAN to separate the traffic from different flow planes, which reduce traffic storms and avoid resource overhead.

122 The TOE support VLAN division based on flows such as signalling flows, media flows, or management flows. In other words, different VLAN tags are marked on the three types of flows passing the BS and they are separate from each other.

123 The TOE supports IP-based and VLAN-based Access Control List (ACL) to filter traffic destined to TOE which might cause system overload and service interruption.

124 The ACL provides a simple security policy that controls the incoming and outgoing data of unauthorized users. The ACL determines what data is

allowed to enter the transmission port and what data is not allowed to enter the transmission port. In this way, the ACL filters the illegitimate data.

125 The ACL controls the network access, preventing the network attacks. In addition, the ACL filters out illegitimate data flows, improving the network performance.

126 The ACL consists of multiple rules. Each VLAN-based rule contains 2 conditions: VLAN range and ACL Action. Each IP-based rule contains the following filtering conditions:

1. Protocol type (IP, ICMP, TCP, UDP, and SCTP)
2. Source IP address and mask
3. Source port range
4. Destination IP address and mask
5. Destination port range
6. Differentiated Services Code Point (DSCP) value
7. ACL Action (Deny, Permit)

127 The ACL rules can be preset in the S1/X2 network interfaces, and the ACL Action can be designated in advance. In this way, the communication flows can be permitted or denied, and the illegitimate data can be filtered. This method effectively prevents illegitimate intrusions and malicious packet attacks, ensuring the security of network devices. (FMT_SMF.1, FTA_TSE.1/SEP).

6.1.8. Security function management

128 The TOE offers management functionality for its security functions, where appropriate. This is partially already addressed in more detail in the previous sections of the TSS, but includes:

1. User management, including User Group memberships, passwords, account lockout, validity periods for an account and/or password, etc. Verification of the password policy is performed when creating or modifying users (FIA_SOS.1). This functionality only applies to the local users. For authentication failure handling values are configurable (FIA_AFL.1).
2. Access control management, including the definition of Command Groups, and the association of users and User Groups with Command Groups.

3. Configuration of SSL for the communication between U2000 and the TOE.

4. Configuration of IPSec for the communication between eNodeB and IKE Peer.

5. Configuration of VLAN for the different plane between the TOE environment and the TOE.

6. Configuration of ACL for the communication between the TOE environment and the TOE.

7. Configuration of the Air interface.

8. Authorized administrators are able to configure a system-wide password policy that is then enforced by the TOE. Besides the minimum length of the password, which can be set to be between 6 and 32 characters, administrator has the option to enforce the use of specific characters (numeric, alphanumeric low or capital, and special characters).

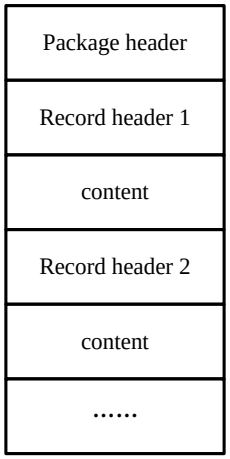
129 All these management options are available. (FMT_SMF.1)

6.1.9. Digital Signature

130 To address security issues, digital signature mechanism to ensure the legitimacy and integrity of the software packages are provided.

131 The TOE automatically checks the digital signature of the software when the user runs the ACT SOFTWARE command to active the software. This way exercise the digital signature mechanism implemented in the TOE (FCS_COP.1/Sign).

132 In the following image the CSP structure is depicted:



133 This way, a directory structure is stored in the CSP file. This structure is expected to contain some important files:

134 VERDES.SGN contains the signature of the VERDES.XML file. This way, the TOE will verify the signature stored in VERDES.SGN to ensure that the file VERDES.XML has not been tampered. And then hash and CRC value of each of the files will be verified by the TOE using the VERDES.XML file.

135 This way, the integrity chain is warrantee.

7. Abbreviations, Terminology and References

7.1. Abbreviations

Abbreviations	Full Spelling
ACL	Access Control List
AKA	Authentication and Key Agreement
ASPF	Application Specific Packet Filter
BS	Base Station
BIN	Huawei's binary interface
CC	Common Criteria
CPBSP	Common Platform Board Support Package
CPRI	Common Public Radio Interface
DSCP	Differentiated Services Code Point
EMS/U2000	Element Management System(U2000)
ETH	Ethernet
FE	Fast Ethernet
FTP	File Transfer Protocol
FTPS	FTP-over-SSL
SCTP	Stream Control Transport Protocol
GE	Gigabit Ethernet
GSM	Global System for Mobile Communications
ICMP	Internet Control Message Protocol
IKE	Internet Key Exchange
IP	Internet Protocol
HERT	Huawei Enhanced Radio Technology
HERT -BBU	Huawei Enhanced Radio Technology-Base Band Unit
IPSec	IP Security Protocol
LTE	Long term evolution

NE	Network Element
NMS	Network Management System
NTP	The Network Time Protocol
MAC	Medium Access Control
MML	Man-Machine Language
MPT	Main Processing&Transmission unit
BBI	Base-Band Interface board
OAM (OM)	Operation Administration and Maintenance
OSS	Operations Support System
RRM	Radio Resource Management
SEC	Operator Security management
SFP	Small form-factor pluggable
SFR	Security Functional Requirement
SSL	Security Socket Layer
ST	Security Target
SWM	Software management
TCP	Transfer Control Protocol
TLS	Transport Layer Security
TOE	Target of Evaluation
TSF	TOE Security Functions
TR	Transfers Management
TRAN	Transport of Radio Access Network
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial BUS
VISP	Versatile IP and Security Platform
VLAN	Virtual Local Area Network
VPP	Voice Protocol Platform

7.2. Terminology

136 This section contains definitions of technical terms that are used with a meaning specific to this document. Terms defined in the [CC] are not reiterated here, unless stated otherwise.

137 **Administrator or Admin**: A user of the TOE who may have been assigned specific administrative privileges within the TOE. This ST may use the term admin or administrator occasionally in an informal context for both cases the meaning is the same, and not in order to refer to a specific role definition – from the TOE's point of view, an administrator/admin is simply a user who is authorized to perform certain administrative actions on the TOE and the objects managed by the TOE.

138 **Operator:** See User.

139 **User:** A user is a human or a product/application using the TOE.

7.3. References

140 [CC] Common Criteria for Information Technology Security Evaluation. Part 1-3. September 2012. Version 3.1 Revision 4.

141 [CEM] Common Methodology for Information Technology Security Evaluation. September 2012. Version 3.1 Revision 4.