

Semiconductor Manufacturing North China (Beijing) Corp.

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1. SST Introduction

The SST describes security features of the site and defines the scope of the site. This chapter is divided into two sections “SST reference and Site reference” and “Site description”.

1.1 SST Reference and Site Reference

1.1.1 SST Reference

Title: Site Security Target Lite of Semiconductor Manufacturing North China (Beijing) Corporation

Site: Semiconductor Manufacturing North China (Beijing) Corporation

Product type: Wafer Foundry

EAL-level: The site supports product assessment up to EAL6

Author: Lizzy Xu

Version: 2.0

Publication Date: 2021/04/12

1.1.2 Site Reference

Name of the site: Semiconductor Manufacturing North China (Beijing) Corporation

Location of the site: No.18 Wenchang Road, Beijing Development Area, Beijing, People Republic of China

1.2 Site Description

1.2.1 Physical Scope of the Site

The Fab2 P2 is mainly for wafer manufacturing and the related security areas are located as below floors/ rooms of buildings.

- The clean room is on the 2nd and 3rd floor of P2A and P2B building.
- The RE Lab #2 (Room 1062) is on the 1st floor of P2B building.
- The FGWH #1 (Room 1001) is on the 1st floor of P2A building.
- The FGWH #2 (Room 1038) is on the 1st floor of P2B building.
- The IT office (Room 2020) is on the 2nd floor of BO2 building.
- The IT server room (Room 2007) is on the 2nd floor of BO2 building.
- The security control center (Room 1051) is on the 1st floor of BO2 building.

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The Fab2 P1 includes the Design Rule Check Room, the Labs, the Mask shop and the Mask bank. The related security areas are located as below floors/ rooms of buildings.

- The Design Rule Check Room (Room 6085) is on the 6th floor of BO1 building.
- The FA lab (Room 6129) and RE Lab #1 (Room 6128) are on the 1st floor of PIC building
- The Mask Shop is on the 3rd floor of PIC building.
- The Mask Bank is on the 3rd floor of PIC building.
- The IT office (Room 1M28) is on the 1M floor of BO1 building.
- The Security control center (Room 1014) is on the 1st floor of BO1 building.

Access control and surveillance are adopted to the plants and the buildings.

1.2.2 Logical Scope of the Site

The site adopts advanced 12-inch process technology to make it ideal for a broad range of applications such as computing, communications, and consumer electronics. The site provides the services and/or processes covered in the scope of the site evaluation process as follows.

- Mask inspection
- Security mask management
- Security wafer manufacturing
- Security wafer management
- Mask/wafer scrap management/destruction
- Return mask back to mask operation for repair/remount
- Receipt of wafers from clients
- Security wafer shipment

The activities of Fab2 P2 include wafer manufacturing, WAT (Wafer Acceptance Test), OQA (Outgoing Quality Assurance), wafer reliability test, wafer warehousing, wafer dispatch, receiving

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and scrapping. The scrap wafer and mask will be destroyed on the site. The activities of Fab2 P1 include mask inspection, mask management, wafer reliability test and fault analysis and DRC.

The site performs the secure shipment to the client. It only refers to the internal shipments and/or shipments between sites and not to shipment to customer or end user. Therefore, ALC_DEL is not scope of the site.

A part of Life cycle phase 3: IC Manufacturer (according to the Protection Profile [6]) is subject of the SST.

2. Conformance Claims

This section describes how the Site Security Target conforms to the Common Criteria.

The evaluation is based on Common Criteria Version 3.1, revision 5

- Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and General Model, Version 3.1, Revision 5, April 2017 [1]
- Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements, Version 3.1, Revision 5, April 2017 [2]

This SST is CC Part3 conformant.

The evaluation follows below methodology.

- Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology, Version 3.1, Revision 5, April 2017 [3]
- Supporting Document, Site Certification, Version 1.0, Revision 1, CCDB-2007-11-001, October 2007 [4]
- JIL-Minimum Site Security Requirements v3.0, February 2020 [5]

The evaluation of the site comprises the following assurance components:

ALC_CMC.5, ALC_CMS.5, ALC_DVS.2 and ALC_LCD.1

The assurance level chosen for the SST is compliant to the Protection Profile (PP) [6] and therefore suitable for Security ICs.

The chosen assurance components are derived from the assurance level EAL6 of the assurance class "Life-cycle Support". For the assessment of the security measures attackers with high attack potential are assumed. Therefore this site supports product evaluations up to EAL6.

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The site does not directly contribute to the development of the TOE and the shipment to the end user. Therefore, ALC_DEL.1 and ALC_TAT.3 are not applicable to the site.

3. Security Problem Definition

The Security Problem Definition comprises security problems derived from threats against the assets handled by the site and security problems derived from the configuration management requirements. The configuration management covers the integrity of the TOE and the security management of the site. The goal is to achieve and hold a high security level to counter attacks with high attack potential at the site.

3.1 Asset

Security is concerned with the protection of assets. Internal documentation and data at this site are relevant to maintain the confidentiality and integrity of an intended TOE, including site security concepts and the associated security measures. These items are not explicitly listed in the list of assets below.

The assets are related to the production of security wafers as follows.

- Security masks
- Security wafers
- Scrap security masks and wafers
- Tamper-proof tapes and labels
- Specifications related to the product and the definition of the wafers as well as the detailed production process including optional processes and parameter

3.2 Threats

The threats at this site are considered as follows

T.Accident-Change Defines that an employee or contractor may exchange products of different production lots or different clients during production by accident.

T.Attack-Transport defines that an attacker might try to get data, specifications or products during the internal shipment. The target is to compromise confidential information or violate the integrity of the products during the stated internal shipment to allow a modification, cloning or the retrieval of confidential information.

T.Computer-Net defines that a hacker with substantial expertise, standard equipment, who may be paid to attempt to remotely access sensitive network segments to get data such as sensitive production data or modify the testing or production process at the site.

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T.Rugged-Theft defines that an experienced thief with specialized equipment for burglary, who may be paid to perform the attack, tries to access sensitive areas and manipulate or steal sensitive assets.

T.Smart-Theft defines that an attacker tries to access sensitive areas of the site for manipulation or theft of sensitive assets. The attacker has sufficient time to investigate the site outside the controlled boundary. For the attack the use of standard equipment for burglary is considered. In addition the attacker may be able to use specific working clothes of the site to camouflage the intention.

T.Staff-Collusion defines that an attacker tries to get access to material processed at the site. The attacker tries to get support from one or more employees through an attempted extortion or an attempt at bribery.

T.Unauthorized-Staff defines that employees or subcontractors who are not authorized to get access to assets or affect production or configuration systems to violate the confidentiality and/or the integrity of the product.

3.3 Organizational Security Policies

This section describes the organizational security policies that are to be enforced by this site. The organizational security policies in Table 3.1 are introduced by the requirements of the assurance components of ALC for the assurance level EAL6. The chosen policies support the understanding of the production flow and the security measures of the site. In addition, they allow an appropriate mapping to the Security Assurance Requirements (SAR).

The documentation of the site is under configuration management. This comprises all procedures regarding the evaluated production flow and the security measures that are needed to ensure the security of the site.

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Table 3.1 OSP addressed by the Site

| Policy | Description |
|----------------------------|---|
| P.Accept-Product | The quality control of the site ensures that the released products comply with the specification agreed with the client. The acceptance process is supported by automated measures. Records are generated for the acceptance process of the finished products |
| P.Config-Control | The procedures for setting up the production process for a new product as well as the procedure that allows changes of the initial setup for a product shall only be applied by authorized personnel. Automated systems shall support the configuration management and ensure access control or interactive acceptance measures for set up and changes. The procedure for the initial set up of a production process ensures that sufficient information is provided by the client. |
| P.Config-Items | The configuration management system shall be able to uniquely identify assets. This includes the unique identification of items that are used for production as well as that are produced at the site. |
| P.Config-Process | The services and/or processes provided by the site are controlled in the configuration management plan. This comprises incoming items and tools used for the production of the product, the management of flaws and optimizations of the process flow as well as the documentation that describes the services and/or processes provided by a site. |
| P.Product-Transport | Technical and organizational measures shall ensure the correct labeling of the product. A controlled internal shipment shall be applied. The transport supports traceability up to the acceptor. If applicable or required this policy shall include measures for packing if required to protect the product during transport. |
| P.Reception-Control | The inspection of incoming items done at the site ensures that the received assets comply with the properties stated by the client. Furthermore, it is verified that the items can be identified and assigned to a specific product. |
| P.Scrap-Product | If the inspection of the wafer failed, the wafer is registered as a scrap. The wafer scrap will be destructed by the site regularly. Or scrap wafer will be shipped to client for final destruction based on the requirement of the client. |
| P.Transfer-Data | Any data classified as sensitive or higher security level by the client is encrypted to ensure confidentiality of the data. |
| P.Zero-Balance | The site ensures that all sensitive items (security relevant parts of the intended TOEs of different clients) are separated and traced until shipment or destroyed. For each hand over, either an automated or a double check is applied for functional and defect assets. |

3.4 Assumptions

This section describes the assumptions that are made on the operational environment in order to be able to provide security functionalities. The site is operating in a production flow and must rely on

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preconditions provided by the previous site. So each site relies on the materials and information received by the previous site/client.

This is reflected by the assumptions which are to be fulfilled by the client. The assumptions for the client are described in Table 3.2.

Table 3.2 Assumptions for the Client

| Assumption | Description |
|------------------------------|--|
| A.Item-Identification | Each asset received by the site is appropriately labelled to ensure the identification of the asset. |
| A.Internal-Shipment | The recipient of the transferred assets (finished wafers) is defined by the client. The client provides the address and shipping information via secure channel to the site. |
| A.Prod-Specification | The client must provide the masks and appropriate information (e.g. specifications) consistent to the released process technology in order to ensure an appropriate processing and wafer production process. The provided information includes the classification of the documents and product |
| A.Product-Test | The client is responsible for the CP testing of the finished devices on the wafer. Further the masks include appropriate test structure to support the parameter testing of the finished wafers. |

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The assumptions are outside the range of the site and provide the basis for an appropriate production process, to assign the product to the released production process and to ensure the proper handling, storage and destruction of all assets related to the intended TOE.

Note that the assumptions of the SST cannot be used to cover any threat or OSP of the site. They are seen as pre-conditions fulfilled either by the site providing the sensitive assets or by the site receiving the sensitive assets. Therefore, they do not contribute to the security of the site under evaluation.

4. Security Objectives

This section describes the security objectives that are a concise and abstract statement of the intended solution to the problem defined by the security problem definition in Section 3.

4.1 Security Objective Definition

The Security Objectives describes the physical, technical and organizational security measures, the configuration management as well as the internal shipment at this site in order to provide the developed TOE assurance will work correctly. The security objectives for the site are described in Table 4.1.

Table 4.1 Security Objectives for the Site

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| Objective | Description |
|----------------------------|---|
| O.Acceptance-Test | The site delivers wafers that fulfil the properties guaranteed by the Fab. Parameter tests and optical checks are performed to ensure the compliance with the specification. The test results are logged to support tracing and the identification of systematic failures. |
| O.Alarm-Response | The technical and organizational security measures ensure that an alarm is generated before an unauthorized person gets access to sensitive asset. After the alarm is triggered the unauthorized person still has to overcome further security measures. The reaction time of the staff or guards is short enough to prevent a successful attack. |
| O.Config-Control | The site applies a release procedure for the setup of the production process for each new product. In addition, the site has a change management for changes requested by the client as well as internal changes within the production process for released products. Internal changes are classified and minor ones are handled by the site, major changes must be acknowledged by the client. A designated team is responsible for the release of new products and for the management of changes and their release. This team comprises specialists for all aspects of the services and/or processes. The services and/or processes can be introduced or changed by authorized personnel only. Automated systems support configuration management and production control. |
| O.Config-Items | The site has a configuration management system that manages different mask sets for different products and clients. A unique internal identification is assigned to each product to uniquely identify assets and allow an assignment to a client. Also the internal procedures and guidance are covered by the configuration management. |
| O.Config-Process | The site controls its services and/or processes using a configuration management plan. The configuration management is controlled by tools and procedures for the production of wafers for the management of flaws and optimizations of the process flow as well as for the documentation that describes the services and/or processes provided by a site. |
| O.Control-Scrap | The site has measures in place to destroy sensitive documentation, erase electronic media and destroy sensitive assets so that they do not support an attacker. |
| O.Internal-Shipment | The recipient of finished wafers and defect masks are identified by the assigned address. is identified by the assigned Fab address which maintained by CE in RTR tooling, and are delivered by qualified forwarder. An appropriate internal shipment procedure is applied for both assets. The address for shipment can only be changed by a controlled process. The packaging is part of the defined process and applied as agreed with the client. The forwarder supports the tracing of assets during internal shipment. For every sensitive asset, the protection measures against manipulation are defined. |
| O.Internal-Monitor | The site performs security management meetings at least once a year. The security management meetings are used to review security incidences, to verify that maintenance measures are applied and to reconsider the assessment of risks and security measures. Furthermore, an internal audit is performed every year to control the application of the security measures. Sensitive processes are controlled within a shorter time frame to ensure a sufficient control and appropriate protection. |

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|----------------------------|---|
| O.Logical-Access | <p>The site enforces a logical separation between the internal network and the internet including a firewall. The security measures ensure that only defined services and defined connections are accepted on the internal network. The internal network is appropriately separated to prevent interference between the production and the office environment.</p> <p>Additional specific networks for production and configuration are separated from any internal network to enforce access control. Access to the production network and associated systems is restricted to authorized employees working in the related area or involved in the configuration tasks of the production systems. Every user of an IT system has his/her own user account and password. An authentication using user account and password is enforced by all computer systems.</p> |
| O.Logical-Operation | <p>Network segments and computer systems are kept up-to-date (software updates, security patches, virus protection, spyware protection), especially those with an external interface. The backup of security relevant logs is applied according to the classification of the stored data. Access to the backup is also restricted to authorized person only.</p> |
| O.Maintain-Security | <p>Technical security measures are maintained regularly to ensure correct operation. The logging of sensitive systems is checked regularly. This comprises the access control system to ensure that only authorized employees have access to sensitive areas as well as computer/network systems to ensure that they are configured as required to ensure the protection of the networks and computer systems.</p> |
| O.Physical-Access | <p>The combination of physical partitioning of the different access control levels together with technical and organizational security measures allow a sufficient separation of employees to enforce the “need to know” principle. The access control supports the limitation of access to these areas including the identification and rejection of unauthorized people. The access control measures ensure that only registered employee or vendor can access restricted areas. Sensitive products are handled in restricted areas only.</p> |
| O.Reception-Control | <p>Upon reception of masks an immediate incoming inspection is performed. The inspection comprises the received amount of masks and the identification and assignment of the product to a related internal production process.</p> |
| O.Security-Control | <p>Assigned personnel of the site or guards operate the security systems like access control and surveillance and respond to alarms. Technical security measures like video control, motion sensors and similar kind of sensors support the enforcement of the access control. These personnel are also responsible for registering and ensuring escort of visitors, contractors and suppliers.</p> |
| O.Staff-Engagement | <p>All employees who have access to sensitive assets and who can move parts of the product out of the defined production flow are checked regarding security concerns and have to sign a non-disclosure agreement. Furthermore, all employees are trained and qualified for their job.</p> |

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| | |
|------------------------|---|
| O.Transfer-Data | Sensitive electronic assets (data or documents in electronic form) are protected with cryptographic algorithms to ensure confidentiality and integrity. The associated keys must be assigned to individuals to ensure that only authorized employees are able to ex-tract the sensitive electronic asset. The keys are ex-changed based on secure measures and they are sufficiently protected. |
| O.Zero-Balance | The site ensures that all wafers and masks (intended TOE of different clients) are separated and traced by respectively. Automated control and/or two employees acknowledgement during hand over is applied for functional and defective masks. According to the agreed production flow the defect masks are either destroyed at the site or sent to the client. |

4.2 Security Objectives Rationale

Security Objectives Rationale contains two divisions. The first division describes a tracing which shows how the threats and OSPs are covered by the Security Objectives. The second division describes a justification that shows that all threats and OSPs are effectively addressed by the Security Objectives, and the rationale is also contained in chapter 7.3.

The mapping of security objectives is described in Table 4.2.

Table 4.2 Mapping Security Objectives

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| Threat and OSP | Security Objective | Justification |
|---------------------------|--|---|
| T.Accident-Change | <ul style="list-style-type: none"> O.Logical-Access O.Logical-Operation O.Config-Items O.Config-Control O.Config-Process O.Staff-Engagement O.Zero-Balance O.Acceptance-Test | The logical access control and configuration management together with organizational measures detect the accident change to the TOE and allow for appropriate response on the threat. |
| T.Attack-Transport | <ul style="list-style-type: none"> O.Transfer-Data O.Internal-Shipments | The shipment method and the organizational measures ensure that integrity changes of shipped objects are detected and appropriately responded upon. |
| T.Computer-Net | <ul style="list-style-type: none"> O.Internal-Monitor O.Maintain-Security O.Logical-Access O.Logical-Operation O.Staff-Engagement | The technical and organizational measures prevent unauthorized access to internal network. |
| T.Rugged-Theft | <ul style="list-style-type: none"> O.Physical-Access O.Security-Control O.Alarm-Response O.Internal-Monitor O.Maintain-Security | The combination of structural, technical and organizational measures detects unauthorized access and allows for appropriate response on the threat. |
| T.Smart-Theft | <ul style="list-style-type: none"> O.Physical-Access O.Security-Control O.Alarm-Response O.Internal-Monitor O.Maintain-Security | The combination of structural, technical and organizational measures detects unauthorized access and allows for appropriate response on the threat. |

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| T.Staff-Collusion | <ul style="list-style-type: none"> O.Internal-Monitor O.Maintain-Security O.Staff-Engagement O.Zero-Balance O.Control-Scrap O.Transfer-Data | The application of internal security measures combined with the hiring policies that restrict hiring to trustworthy employees limits unauthorized access to assets. |
| T.Unauthorized-Staff | <ul style="list-style-type: none"> O.Physical-Access O.Security-Control O.Alarm-Response O.Internal-Monitor O.Maintain-Security O.Logical-Access O.Logical-Operation O.Staff-Engagement O.Zero-Balance O.Control-Scrap | Physical and logical access control prohibits access to assets. Both scraps and normal products are under control. |
| P.Accept-Product | <ul style="list-style-type: none"> O.Config-Control O.Config-Process O.Acceptance-Test | The PCM and quality control of the site ensures that the released products comply with the specification agreed with the client. |
| P.Config-Control | <ul style="list-style-type: none"> O.Config-Items O.Config-Control O.Logical-Access | The site has a configuration management system that assigns a unique internal identification to each product to uniquely identify assets and allow an assignment to the client. |
| P.Config-Items | <ul style="list-style-type: none"> O.Config-Items O.Reception-Control | The site has a configuration management system that assigns a unique internal identification to each product to uniquely identify assets and allow an assignment to the client. |
| P.Config-Process | <ul style="list-style-type: none"> O.Config-Process | The site controls its services and/or processes using a configuration management plan. The configuration management is controlled by tools and procedures for the protection of wafers |

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| | | |
|----------------------------|---------------------|---|
| P.Product-Transport | O.Config-Items | The internal shipment procedure is applied to the asset. |
| | O.Config-Process | The forwarder supports the tracing of assets during internal shipment. For every sensitive asset, the protection measures against manipulation are defined. |
| | O.Internal-Shipment | |
| P.Reception-Control | O.Reception-Control | The inspection of incoming items done at the site ensures that the received assets comply with the properties stated by the client. |
| P.Scrap-Product | O.Control-Scrap | Both scraps and normal products are under control |
| P.Transfer-Data | O.Transfer-Data | Sensitive electronic assets (data or documents in electronic form) are protected with cryptographic algorithms to ensure confidentiality and integrity. |
| P.Zero-Balance | O.Internal-Monitor | The site ensures that all security products (intended TOE of different clients) are separated and traced on a device basis |
| | O.Staff-Engagement | |
| | O.Zero-Balance | |
| | O.Control-Scrap | |

5. Extended Components Definition

No extended components are currently defined in this SST.

6. Security Assurance Requirements

This section describes a set of Security Assurance Requirements to be adopted to evaluate the TOE. Clients using this Site Security Target require an evaluation against evaluation assurance level EAL6. This evaluation assurance level requires the Security Assurance Requirement ALC_DVS.2. The Security Assurance Requirement (SAR) is also included in the Security IC Platform Protection Profile [6].

The Security Assurance Requirements (SAR) are chosen from the class ALC (Lifecycle support) as defined in [2]:

- CM capabilities (ALC_CMC.5)
- CM scope (ALC_CMS.5)
- Development security (ALC_DVS.2)
- Life-cycle definition (ALC_LCD.1)

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The Security Assurance Requirements listed above fulfil the requirements of [4] because hierarchically higher components are used in this SST. In addition, the minimum set of SARs is extended by SAR of the assurance components for "Life-cycle definition" (ALC_LCD.1).

6.1 Application Notes and Refinements

The description of the site certification process [4] includes specific application notes. The main item is that a product that is considered as intended TOE (e.g. any TOE type) is not available during the evaluation. Since the term "TOE" is not applicable in the SST the associated processes for the handling of products are in the focus and described in this SST. These processes are subject of the evaluation of the site.

6.1.1 Overview and Refinements regarding CM Capabilities (ALC_CMC)

A Manufacturing Execution System is used to assure the traceability and completeness of different production lots. The number of wafers is tracked by this system. Appropriate administration procedures are implemented for managing wafers. It is ensured, that wafers removed from the production stage and returned to the production stage are identified in the production control system.

According to [4] the processes rather than a TOE are in the focus of the CMC examination. The changed content elements are presented below. The application notes in [4] are defined for ALC_CMC.5. The configuration control and a defined change process for the procedures and descriptions of the site under evaluation are mandatory. The control process must include all procedures that have an impact on the evaluated production processes as well as on the site security measures.

The life-cycle described in [6] is a complex production process. Only parts of this production process are provided by a specific site in SMNC. In such a case the control of the product, during such a production process must include sufficient verification steps to ensure the specified and expected result. Inspection procedures, verification procedures and the associated expected results must be under configuration management for these cases.

The configuration items for the considered product type are listed in section 3.1. The CM documentation of the site is able to maintain the items listed for the relevant lifecycle step and the CM system is able to track the configuration items. A CM system has to be employed to guarantee the traceability and completeness of different production charges or lots. Appropriate administration procedures have to be provided in order to maintain the integrity and confidentiality of the configuration items.

6.1.2 Overview and Refinements regarding CM Scope (ALC_CMS)

The scope of the configuration list for a site certification process is limited to the documentation relevant for the SAR claimed in the Site Security Target and the configuration items handled at the site.

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In the particular case for the production of the security wafers, the scope of the configuration management includes a number of configuration items. The configuration items already defined in section 3.1 are considered as “TOE implementation representation”

In addition, process control data and related procedures and programs are in the scope of the configuration management.

6.1.3 Overview and Refinements regarding Development Security (ALC_DVS)

The CC assurance components of family ALC_DVS refer to (i) the “development environment”, (ii) to the “TOE” or “TOE” design and implementation”. The component ALC_DVS.2 “Sufficiency of security measures” requires additional evidence for the suitability of the security measures.

The TOE Manufacturer must ensure that the development and production of the TOE is secure so that no information is unintentionally made available for the operational phase of the TOE. The confidentiality and integrity of design information, inspection data, configuration data and pre-personalization data must be guaranteed, access to any kind of samples (client specific samples or open samples) development tools and other material must be restricted to authorized persons only, and scrap must be controlled and destroyed.

Based on these requirements the physical security as well as the logical security of the site is in the focus of the evaluation. Beside the pure implementation of the security measures also the control and the maintenance of the security measures must be considered

If the transfer of configuration items between two sites involved in the production flow is included in the scope of the evaluation (life-cycle covered by the product evaluation) this is considered as internal shipment. In general, the security requirements for confidentiality and integrity are the same but it must be clearly distinguished to ensure the correct subject of the evaluation.

6.1.4 Overview and Refinements regarding Life-Cycle Definition (ALC_LCD)

The site is not equal to the entire development environment. Therefore, the ALC_LCD criteria are interpreted in a way that only those life-cycle phases have to be evaluated which are in the scope of the site. The PP [6] provides a life-cycle description and there are specific life-cycles steps can be assigned to the tasks at site. This may comprise a change of the life-cycle state if e.g. testing or initialization is performed at the site or not.

The PP [6] does not include any refinements for ALC_LCD. The site does not initiate a life cycle change of the intended TOE. The security wafers are produced and delivered to the specific address required by the client. And the scrap masks and wafers are destructed in the site. After destructing the scrap masks and wafers, the destructed result will be checked again by conducted staff. If there is any suspicious remain, the destruct process will be conducted again till it fulfils the destruct requirements.

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6.2 Security Assurance Rationale

The dependencies of the assurance requirements are as followed:

- CM capabilities (ALC_CMC.5): ALC_CMS.1, ALC_DVS.2, ALC_LCD.1
- CM scope (ALC_CMS.5): None
- Development security (ALC_DVS.2): None
- Life-cycle definition (ALC_LCD.1): None

Some of the dependencies are not (completely) fulfilled:

ALC_LCD.1 is only partially fulfilled as the site does not represent the entire development environment. This is in-line with and further explained in [4] 5.1 ‘Application Notes for ALC_CMC’.

The Security Assurance Rationale maps the content elements of the selected assurance components of [2] to the Security Objectives defined in this SST. The refinements described above are considered.

Table 6.1 Security Assurance Rationale

| SARs | Objectives | Rationale |
|---|--|--|
| <p>ALC_CMC.5.1C</p> <p>ALC_CMC.5.1C: The CM documentation shall show that a process is in place to ensure an appropriate and consistent labelling.</p> | <p>O.Reception-Control</p> <p>O.Config-Control</p> <p>O.Config-Items</p> <p>O.Config-Process</p> | <p>O.Reception-Control ensures product identification and the associated labeling. This labeling is mapped to the internal identification as defined by O.Config-Items. This ensures the unique identification of security products.</p> <p>O.Config-Control ensures that each client product ID is setup and release based on a define process. This comprises also changes related to a client product ID. The configurations can only be done by authorized staff.</p> <p>O.Config-Process provides a configured and controlled production process.</p> |
| <p>ALC_CMC.5.2C</p> <p>The CM documentation shall describe the method used to uniquely identify the configuration items.</p> | <p>O.Reception-Control</p> <p>O.Config-Control</p> <p>O.Config-Items</p> <p>O.Config-Process</p> | <p>Incoming inspection according O.Reception-Control ensures product identification and the associated labeling. This labeling is mapped to the internal identification as defined by O.Config-Items. This ensures the unique identification of security products.</p> <p>O.Config-Control ensures that each client part ID is setup and released based on a defined process. This comprises also changes related to a client part ID. The configurations can only be done by authorised</p> |

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| | | staff. O.Config-Process provides a configured and controlled production process. |
| ALC_CMC.5.3C The CM documentation shall justify that the acceptance procedures provide for an adequate and appropriate review of changes to all configuration items. | O.Reception-Control O.Config-Items O.Config-Control | O.Reception-Control comprises the incoming labeling and the mapping to internal identifications. O.Config-Items and O.Config-Control ensures the changes to both the internal and external configuration items are recorded and reviewed. O.Config-Process ensures that only authorised staff can apply changes. This comprises changes related to process flows, procedures and items of clients. Teams are defined to assess and release changes. |
| ALC_CMC.5.4C The CM system shall uniquely identify all configuration items. | O.Config-Items O.Config-Control O.Reception-Control | O.Reception-Control comprises the incoming labeling and the mapping to internal identifications. O.Config-Items comprise the internal unique identification of all items that belong to a client part ID. Each product is setup according to O.Config-Control comprising all necessary items. |
| ALC_CMC.5.5C The CM system shall provide automated measures such that only authorized changes are made to the configuration items. | O.Config-Control O.Config-Process O.Logical-Access O.Logical-Operation | O.Config-Control assigns the setup including processes and items for the production of each client part ID. O.Config-Process comprises the control of the production processes. O.Logical-Access and O.Logical-Operation support the control by limiting the access and ensuring the correct operation for all tasks to authorized staff. |
| ALC_CMC.5.6C The CM system shall support the production of the product by automated means. | O.Config-Process O.Zero-Balance O.Acceptance-Test | O.Config-Process comprises the automated management of the production processes O.Zero-Balance ensures the control of wafers during production. O.Acceptance-Test provides an automated electrical testing of the wafer quality and supports the tracing. |
| ALC_CMC.5.7C The CM system shall ensure that the person responsible for accepting a configuration item into CM is not the person who developed it. | O.Reception-Control O.Logical-Access O.Config-Process | O.Reception-Control ensures the reception procedure of the logical assets from the client. The person responsible for accepting the logical assets cannot be the developer. O.Logical-Access ensures the configuration item developer cannot accept the configuration items in the CM system. |

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| | | O.Config-Process ensures the procedure of the CM plan. It is required in the procedure that the CM manager is not the CM developer. |
| ALC_CMC.5.8C The CM system shall clearly identify the configuration items that comprise the TSF. | N/A | The site is for wafer manufacturing and only receive the complete masks from the client. Therefore, it is not allowed to separate or to identify any parts that comprise the TSF. |
| ALC_CMC.5.9C The CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail. | O.Config-Items O.Config-Control O.Config-Process O.Acceptance-Test | The automated production control covered by O.Config-Control comprises the logging of all production steps and thereby includes the required audit trail including the originator, date and time. O.Config-items ensures the changes of the configuration items are recorded. O.Config-Process ensures that the changes from the production steps are recorded automatically by the CM system. O.Acceptance-Test provides an automated electrical testing of the wafer quality and supports the tracing. |
| ALC_CMC.5.10C The CM system shall provide an automated means to identify all other configuration items that are affected by the change of a given configuration item. | O.Config-Control O.Config-Process | O.Config-Control describes the management of the client part IDs at the site. According to O.Config-Process the CM plans describe the services provided by the site. |
| ALC_CMC.5.11C The CM system shall be able to identify the version of the implementation representation from which the TOE is generated. | O.Reception-Control O.Config-Items O.Config-Control O.Config-Process | O.Reception-Control comprises the incoming labeling and the mapping to internal identifications. O.Config-Items and O.Config-Control cover the unique labelling and management of the client configuration items. O.Config-Process ensures that only controlled changes are applied. |
| ALC_CMC.5.12C The CM documentation shall include a CM plan. | O.Config-Control O.Config-Process | O.Config-Control describes the management of the client part ID sat the site. According to O.Config-Process the CM plans describe the services provided by the site. |
| ALC_CMC.5.13C The CM plan shall describe How the CM system is used for the development of the TOE. | O.Config-Control O.Config-Process | O.Config-Control describes the management of the client part IDs at the site. According to O.Config-Process the CM plans describe the services provided by the site. |

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| <p>ALC_CMC.5.14C</p> <p>The CM plan shall describe the procedures used to accept modified or newly created configuration items as part of the product.</p> | <p>O.Reception-Control</p> <p>O.Config-Items</p> <p>O.Config-Control</p> <p>O.Config-Process</p> | <p>O.Reception-Control supports the identification of configuration items at SMNC</p> <p>O.Config-Items ensure the unique identification of each product produces at SMNC by the client part ID.</p> <p>O.Config-Control ensures a release for each new or changed client part ID.</p> <p>O.Config-Process ensures the automated control of released products.</p> |
| <p>ALC_CMC.5.15C</p> <p>The evidence shall demonstrate that all configuration items have been and are being maintained under the CM system.</p> | <p>O.Reception-Control</p> <p>O.Config-Control</p> <p>O.Config-Process</p> <p>O.Zero-Balance</p> <p>O.Internal-Shipment</p> | <p>The objectives O.Reception-Control, O.Config-Control, O.Config-Process ensure that only released client part IDs are produced.</p> <p>This is supported by O.Zero-Balance ensuring the tracing of all security products.</p> <p>O.Internal-Shipment includes the packing requirements, the reports, logs and notifications including the required evidence.</p> |
| <p>ALC_CMC.5.16C</p> <p>The evidence shall demonstrate that the CM system is being operated in accordance with the CM plan.</p> | <p>O.Config-Control</p> <p>O.Config-Process</p> | <p>O.Config-Control comprises a release procedure as evidence.</p> <p>O.Config-Process ensures the compliance of the process.</p> |
| <p>ALC_CMS.5.1C</p> <p>The configuration list includes the following: clear instructions how to consider these items in the list; the evaluation evidence required by the SARs of the life-cycle; development and production tools; security flaw; and development tools and related information.</p> | <p>O.Config-Items</p> <p>O.Config-Control</p> <p>O.Config-Process</p> | <p>Since the process is subject of the evaluation no products are part of the configuration list.</p> <p>O.Config-Items ensure unique part IDs including a list of all items and processes for this part.</p> <p>O.Config-Control describes the release process for each client part ID.</p> <p>O.Config-Process defined the configuration control including part IDs procedures and processes.</p> |
| <p>ALC_CMS.5.2C</p> <p>The configuration list shall Uniquely identify the configuration items.</p> | <p>O.Config-Items</p> <p>O.Config-Control</p> <p>O.Config-Process</p> <p>O.Reception-Control</p> <p>O.Internal-Shipment</p> | <p>Items, products and processes are uniquely identified by the database system according to O.Config-Items.</p> <p>Within the production process the unique identification is supported by automated tools according to O.Config-Control and O.Config-Process. The identification of received products is defined by O.Reception-Control. The labeling and preparation for the transport is defined by O.Internal-Shipment.</p> |

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| <p>ALC_CMS.5.3C</p> <p>For each][configuration item, the configuration list shall indicate the developer/subcontractor of the item.</p> <p>][is indicated that “TSF relevant” has been deleted.</p> | <p>O.Config-Items</p> | <p>According to O.Config-Items all configuration items for security products are identified.</p> |
| <p>ALC_DVS.2.1C</p> <p>The development security documentation shall describe all the physical, procedural, personnel, and other security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development environment.</p> | <p>O.Physical-Access</p> <p>O.Security-Control</p> <p>O.Alarm-Response</p> <p>O.Logical-Access</p> <p>O.Logical-Operation</p> <p>O.Staff-Engagement</p> <p>O.Maintain-Security</p> <p>O.Control-Scrap</p> <p>O.Zero-Balance</p> | <p>The physical protection is provided by O.Physical-Access, supported by O.Security-Control, O.Alarm-Response, and O.Maintain-Security. The logical protection of data and the configuration management is provided by O.Logical-Access and O.Logical-Operation. The personnel security measures. Are provided by O.Staff- Engagement. Any scrap that may support an attacker is controlled according to O.Control-Scrap. O.Zero-Balance ensures the tracing of all security products.</p> |
| <p>ALC_DVS.2.2C</p> <p>The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product.</p> | <p>O.Internal-Monitor</p> <p>O.Logical-Operation</p> <p>O.Maintain-Security</p> <p>O.Zero-Balance</p> <p>O.Reception-Control</p> <p>O.Internal-Shipment</p> <p>O.Transfer-Data</p> | <p>The security measures descry-bed above under ALC_DVS.2.1C are commonly regarded as effective protection if they are correctly implemented and enforced. The associated control and continuous justification is subject of the objectives</p> <p>O.Internal-Monitor, O.Logical-Operation and O.Maintain-Security. All devices including functional And nonfunctional are traced according to O.Zero-Balance.</p> <p>The reception and incoming inspection supports the detection of attacks during the transport of the security products to SMNC according to O.Reception-Control.</p> <p>The delivery to the client is protected by similar measures according to the requirements of the client based on O.Internal-Shipment.</p> <p>Sensitive data received and send by SMNC are both encrypted according O.Transfer-Data to ensure access by authorized recipients only.</p> |

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| ALC_LCD.1.1C The life-cycle definition documentation shall describe the model used to develop and maintain the TOE. | O.Config-Control O.Config-Process | The processes used for identification and manufacturing are covered by O.Config-Control and O.Config-Process. |
| ALC_LCD.1.2C The life-cycle model shall provide for the necessary control over the development and maintenance of the TOE. | O.Config-Process O.Zero-Balance O.Acceptance-Test | The site does not perform development tasks. The applied production process is controlled according to O.Config-Process. The finished products are tested and traced according to O.Acceptance-Test. All security products are traced according O.Zero-Balance. |

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Since this SST references the PP [6], the life-cycle module used in this PP includes also the processes provided by this site. Therefore the life-cycle module described in the PP [6] is considered to be applicable for this site. The performed production steps do not involve source code, design tools, compilers or other tools used to build the security product (in-tended TOE). Therefore, ALC_TAT is not applicable for the site. In addition, there is no delivery of security products directly to the consumer regarding the next life cycle step. Therefore the transport of security products is always considered as internal transport and ALC_DEL is not applicable for the site.

7. Site Summary Specification

7.1 Preconditions Required by the Site

The site provides mask and wafer services to manufacture wafers for the client requirements. In order to perform the aforementioned services, the client of the site requires fulfil the preconditions. The following paragraphs describe preconditions of the client.

For the setup and control of the production process, the client requires provide the appropriate specification and relative production information. Specific requirements for classified design data must also be defined and uniquely identified.

In addition, the wafer must include process control modules that allow the electrical testing of the finished wafer by the wafer Fab.

For the shipment of security product, the recipient of the finished wafers are identified by the address of the respective site. The packing of finished wafers and preparation of the shipment adhere to the standard procedure of the site, unless the specific requirement from the client. The client is responsible for the selection of the forwarder and the provision of data for the verification of the transport order.

The release process comprises a verification of the finalized products by the client. The protection is based on the classification agreed with the client or printed on the received item or document.

The client must perform the appropriate functional testing of the finished wafer. The testing of the finished wafer at the site is restricted to the testing of the process control modules that are added on the wafer.

7.2 Services of the Site

The site can perform the following secure production activities related in accordance with client instructions:

- Security mask Inspection and management

The quality of the mask is verified after reception. The failed mask is returned to the mask foundry for repair or re-tape out. The mask is under the control of the configuration management system. The qualified mask is stored in the mask stocker. Only the authorized person can access to the mask.

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➤ Security wafer manufacturing

The wafer is produced based on the production specification. After production, the wafer is tested to ensure the guaranteed semiconductor properties. Each product gets a unique ID when set up at the site. It is also linked to the wafers with security ICs and could also be traced.

➤ Security wafer management

All finished security wafers are recorded in MES and SAP systems and securely stored in the FGWH.

➤ Scrap management/destruction

The mask/wafer scrap is stored in the FGWH. The scrap is destroyed regularly based on the requirement from the client. The destruction report is sent to the client afterward.

➤ Receipt of wafers from clients

The wafer is securely returned to the site for fault analysis or reimbursement. The site has a standard procedure of receiving the wafer from the client. The wafer is logged in the system after the reception.

➤ Security wafer shipment

The finished wafer is securely shipped to the specific address required by the client. The site has a standard secure procedure for packing of finished products and preparation of shipment. If special packing requirements are provided by the client they are included in the process setup.

7.3 Objectives Rationale

Table 7.1 provides an overview for the correspondence between Security objectives of the TOE/environment listed in section 4.1 and 4.2 to the threats and OSPs identified in section 3.2 and 3.3, and demonstrating that all threats and OSP are mapped to at least one security objective. The more detailed explanation of this mapping is as follows.

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Table 7.1 Mappings Among the Security Objectives, and Threats / OSPs

| Threats / OSPs | Security Objectives | | | | | | | | | | | | | | | | |
|----------------------|---------------------|------------------|------------------|----------------|------------------|-----------------|--------------------|---------------------|------------------|---------------------|---------------------|-------------------|---------------------|--------------------|--------------------|-----------------|----------------|
| | O.Acceptance-Test | O.Alarm-Response | O.Config-Control | O.Config-Items | O.Config-Process | O.Control-Scrap | O.Internal-Monitor | O.Internal-Shipment | O.Logical-Access | O.Logical-Operation | O.Maintain-Security | O.Physical-Access | O.Reception-Control | O.Security-Control | O.Staff-Engagement | O.Transfer-Data | O.Zero-Balance |
| T.Accident-Change | X | | X | X | X | | | | X | X | | | | | X | | X |
| T.Attack-Transport | | | | | | | | X | | | | | | | | X | |
| T.Computer-Net | | | | | | | X | | X | X | X | | | | X | | |
| T.Rugged-Theft | | X | | | | | X | | | | X | X | | X | | | |
| T.Smart-Theft | | X | | | | | X | | | | X | X | | X | | | |
| T.Staff-Collusion | | | | | | X | X | | | | X | | | | X | X | X |
| T.Unauthorized-Staff | | X | | | | X | X | | X | X | X | X | | X | X | | X |
| P.Accept-Product | X | | X | | X | | | | | | | | | | | | |
| P.Config-Control | | | X | X | | | | | X | | | | | | | | |
| P.Config-Items | | | | X | | | | | | | | | X | | | | |
| P.Config-Process | | | | | X | | | | | | | | | | | | |
| P.Product-Transport | | | | X | X | | | X | | | | | | | | | |
| P.Reception-Control | | | | | | | | | | | | | X | | | | |
| P.Scrap-Product | | | | | | X | | | | | | | | | | | |
| P.Transfer-Data | | | | | | | | | | | | | | | | X | |
| P.Zero-Balance | | | | | | X | X | | | | | | | | X | | X |

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The following rationale provides a justification that shows all threats and OSP are effectively addressed by the Security Objectives.

➤ O.Acceptance-Test

Wafer production quality and acceptance tests are introduced and released based on the elated specifications. The tools, specifications and procedures for these tests are controlled by the means of O.Config-Items and O.Config-Control.

This addresses the threat T.Accident-Change and the OSP P.Accept-Product.

➤ O.Alarm-Response

The alarm system is connected to the central command center that is manned 7/24. Additional patrolling and the CCTV system support the alarm respond. Additionally, the employees are responding the alarm system during working hours. O.Physical-Access requires certain time to overcome the different level of access control. The response time of the guard and the physical resistance match to provide an effective alarm response.

This addresses the threats T.Smart-Theft, T.Rugged-Theft and T.Unauthorized-Staff.

➤ O.Config-Control

Procedures arrange for a formal release of configuration documents and specifications for set-up of wafer production. The information is also stored in the configuration database. Engineering Change Procedures are in place to classify and introduce changes. The system tool requires personalized access controlled by passwords. Each user has access rights limited to the needs of his function. Thereby only authorized changes are possible.

This addresses the threat T.Accident-Change and the OSP P.Config-Control.

➤ O.Config-Items

All product configuration information is stored in the database. The information stored is covering used materials, process specifications, acceptance test instructions and specifications. Products are identified by unique client part IDs which are linked to the unique ID of the associated configuration items. Set-up a new production is performed by the responsible manager using automated tools

This addresses the threat T.Accident-Change and the OSP P.Config-Items, P.Config-Control and P.Product-Transport.

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➤ O.Config-Process

The control of the released production process and the controlled introduction of changes ensure a reproducible and consistent production. Procedures for setting up the production process as well as changes to the released processes and documents are in place. Changes can on be done by authorized personnel.

This addresses the threat T.Accident-Change and the OSP P.Config-Process and P.Product-Transport.

➤ O.Control-Scrap

Scrap masks and wafers are stored internally in a secure location. Scrap masks and wafers are destructed in a controlled and documented way. The destruction of scrap masks and wafers is done under supervision of a qualified employee in collaboration with the subcontractors or employees.

Supported by O.Physical-Access, O.Reception-Control, and O.Staff-Engagement this addresses the threats T.Unauthorized-Staff and T.Staff-Collusion and the OSP P.Zero-Balance and P.Scrap-Product.

➤ O.Internal-Monitor

Regular security management meetings are implemented to monitor security incidences as well as changes or updates of security relevant systems and processes. This comprises also logs and security events of security relevant systems like physical security access control system, firewall, and virus protection. Major changes of security systems and security procedures are reviewed and approved by the responsible security managers. Upon introduction of a new process a formal review and release for mass production is made before being generally introduced.

This addresses T.Smart-Theft, T.Rugged-Theft, T.Computer-Net, T.Unauthorized-Staff, T.Staff-Collusion and the OSP P.Zero-Balance.

➤ O.Internal-Shipment

The recipient of a production lot is linked to production system and can be modified by authorized users. Packing procedures are documented in the product configuration. This includes specific requirement of the client. This security objective is supported by O.Staff-Engagement and O.Config-Items.

The threat T.Attack-Transport and the OSP P.Product-Transport are addressed by the internal shipment.

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➤ O.Logical-Access

The internal network (intranet) is separated from the internet with a firewall. The intranet is further separated by authentication measures for critical data. Each user logs into the system with his user ID and password. The objective is supported by O.Internal-Monitor based on the checks of the logging regarding security relevant events.

The individual accounts are addressing T.Computer-Net. All configuration is stored in the database of the system.

Supported by O.Config-Items this addresses the threats T.Accident-Change and T.Unauthorized-Staff and the OSP P.Config-Control.

➤ O.Logical-Operation

All logical protection measures are regularly maintained and updated as required. Critical items such as virus scanners are updated daily. The backup of security relevant logs is applied according to the classification of the stored data. Access to the backup is also restricted to authorized person only.

This addresses the threats T.Computer-Net, T.Accident-Change and T.Unauthorized-Staff.

➤ O.Maintain-Security

The security relevant systems enforcing or supporting O.Physical-Access, O.Security-Control and O.Logical-Access are checked and maintained regularly. In addition the configuration is updated as required either by employees (for the access control system) of the supplier. Logging files are checked regularly for technical problems and specific maintenance requests.

This addresses T.Smart-Theft, T.Rugged-Theft, T.Computer-Net, T.Unauthorized-Staff and T.Staff-Collusion.

➤ O.Physical-Access

The premier of plant is monitored by CCTV. The access to the building is only possible via access controlled doors. The locking of the gate, the enabling of the alarm system and the additional external control are graduated according to the running operation at the site. This considers the manpower per shift as well as the operational needs regarding receipt and delivery of goods. The physical, technical and organizational security measures ensure at least two security levels of sensitive areas. The access control ensures that only registered and authorized persons can access sensitive areas or related assets. This is supported by O.Security-Control that includes the maintenance of the access control and the control of visitors. The physical security measures are supported by O.Alarm-Response providing an

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alarm system.

Thereby the threats T.Smart-Theft and T.Rugged-Theft can be prevented. The physical security measures provided by O.Security-Control enforce the recording of all actions.

Thereby also T.Unauthorized-Staff is addressed.

➤ O.Reception-Control

At reception, assets including masks are identified by the shipping documents, labels and information in the system supported by O.Config-Items. Inspection at reception is counting the amount of boxes and checking the shipping list if applicable. Thereby only correctly identified masks are accepted for production.

The OSP P.Config-Items and P.Reception-Control are addressed by the reception control.

➤ O.Security-Control

The security guards are monitoring the site and the surveillance system 7/24. According to the security level the areas are patrolled by the guards frequently. The alarm system and the CCTV system support the security control. Further on the security control is supported by O.Physical-Access requiring different level of access control for the access to the related assets during operation as well as during off-hours.

This addresses the threats T.Smart-Theft and T.Rugged-Theft. Supported by O.Maintain-Security and O.Physical-Access also an internal attacker triggers the security measures implemented by O.Security-Control. Therefore the Threat T.Unauthorized-Staff is also addressed.

➤ O.Staff-Engagement

All employees are interviewed before hiring. They must sign an NDA (Non-Disclosure Agreement), which is integrated in the employee-contracts, and a code of conduct for the use of computers before they start working in the company. The formal training and qualification include security relevant subjects and the principles of handling and storage of security products. The security objectives O.Physical-Access, O.Logical-Access and O.Config-Items support the engagement of the staff.

This addresses the threats T.Computer-Net, T.Accident-Change, T.Unauthorized-Staff, T.Staff-Collusion and the OSP P.Zero-Balance.

➤ O.Transfer-Data

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The integrity of the data transfer from/to the site and within the site is ensured by appropriate secure measures.

Supported by O.Logical-Access and O.Staff-Engagement this addresses the threats T.Staff-Collusion and T.Attack-Transport as well as the OSP P.Transfer-Data.

➤ O.Zero-Balance

Automated tracking within the process flow and the application of a 4-eyes-principle outside the process flow ensures a continuous tracking of sensitive items. This security objective is supported by O.Physical-Access, O.Config-Items and O.Staff-Engagement.

This addresses the threats T.Accident-Change, T.Unauthorized-Staff, T.Staff-Collusion and the OSP P.Zero-Balance.

7.4 Security Assurance Requirements Rationale

The Security Assurance Rationale is given in section 6.2. This rationale addresses all content elements and thereby also implicitly all the developer action elements defined in [2]. Therefore the following Security Assurance Requirements rationale provides the justification for the selected Security Assurance Requirements. In general the selected Security Assurance Requirements fulfil the needs derived from the Protection Profile [6]. Because they are compliant with the Evaluation Assurance Level EAL6 all derived dependencies are fulfilled. The Security Assurance Requirements (SARs) are:

Class ALC: Life-cycle support

- Configuration management capabilities (ALC_CMC.5)
- Configuration management scope (ALC_CMS.5)
- Development security (ALC_DVS.2)
- Life-cycle definition (ALC_LCD.1)

7.4.1 ALC_CMC.5

Content and presentation elements:

- ALC_CMC.5.1C The CM documentation shall show that a process is in place to ensure an appropriate and consistent labelling.
- ALC_CMC.5.2C The CM documentation shall describe the method used to uniquely identify the configuration items.

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- ALC_CMC.5.3C The CM documentation shall justify that the acceptance procedures provide for an adequate and appropriate review of changes to all configuration items.
- ALC_CMC.5.4C The CM system shall uniquely identify all configuration items.
- ALC_CMC.5.5C The CM system shall provide automated measures such that only authorized changes are made to the configuration items.
- ALC_CMC.5.6C The CM system shall support the production of the product by automated means.
- ALC_CMC.5.7C The CM system shall ensure that the person responsible for accepting a configuration item into CM is not the person who developed it.
- ALC_CMC.5.8C The CM system shall clearly identify the configuration items that comprise the TSF.
- ALC_CMC.5.9C The CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail.
- ALC_CMC.5.10C The CM system shall provide an automated means to identify all other configuration items that are affected by the change of a given configuration item.
- ALC_CMC.5.11C The CM system shall be able to identify the version of the implementation representation from which and the TOE is generated.
- ALC_CMC.5.12C The CM documentation shall include a CM plan.
- ALC_CMC.5.13C The CM plan shall describe how the CM system is used for the development of the TOE.
- ALC_CMC.5.14C The CM plan shall describe the procedures used to accept modified or newly created configuration items as part of the product.
- ALC_CMC.5.15C The evidence shall demonstrate that all configuration items have been and are being maintained under the CM system.
- ALC_CMC.5.16C The evidence shall demonstrate that the CM system is being operated in accordance with the CM plan.

7.4.2 ALC_CMS.5

Content and presentation elements:

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- ALC_CMS.5.1C The configuration list includes the following: clear instructions how to consider these items in the list; the evaluation evidence required by the SARs of the life-cycle; development and production tools; security flaw; and development tools and related information.
- ALC_CMS.5.2C The configuration list shall uniquely identify the configuration items.
- ALC_CMS.5.3C For each configuration item, the configuration list shall indicate the developer/subcontractor of the item.

The chosen assurance level ALC_CMS.5 of the assurance family "CM scope" supports the control of the production and test environment. This includes product related documentation and data as well as the documentation for the configuration management and the site security measures. Since the site certification process focuses on the processes based on the absence of a concrete TOE these security assurance requirements are considered to be suitable.

7.4.3 ALC_DVS.2

Content and presentation elements:

- ALC_DVS.2.1C The development security documentation shall describe all the physical, procedural, personnel, and other security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development environment.
- ALC_DVS.2.2C The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product.

The chosen assurance level ALC_DVS.2 of the assurance family "Development security" is required since a high attack potential is assumed for potential attackers. The configuration items and information handled at the site during production, assembly and testing of the product can be used by potential attackers for the development of attacks. Therefore the handling and storage of these items must be sufficiently protected. Further on the Protection Profile [6] requires this protection for sites involved in the life-cycle of Security ICs development and production.

7.4.4 ALC_LCD.1

Content and presentation elements:

- ALC_LCD.1.1C The life-cycle definition documentation shall describe the model used to develop and maintain the TOE.
- ALC_LCD.1.2C The life-cycle model shall provide for the necessary control over the

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development and maintenance of the TOE.

The chosen assurance level ALC_LCD.1 of the assurance family "Life-cycle definition" is suitable to support the controlled development and production process. This includes the documentation of these processes and the procedures for the configuration management. Because the site provides only a limited support of the described life-cycle for the development and production of Security ICs the focus is limited to this site. However the assurance requirements are considered to be suitable to support the application of the site evaluation results for the evaluation of an intended TOE.

7.5 Assurance Measure Rationale

➤ O.Acceptance-Test

The testing of the processed control module of the products is considered as automated procedure as require by ALC_CMC.5.6C. ALC_CMC.5.9C requires the CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail. In addition, ALC_LCD.1.2C requires control over the development and maintenance of the TOE. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Alarm-Response

ALC_DVS.2.1C requires that the developer shall describe all personnel, procedural and other security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation including the initialization in its development and production environment. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Config-Control

ALC_CMC.5.1C requires a documented process ensuring an appropriate and consistent labeling of the products. ALC_CMC.5.2C requires a CM documentation that describes the method used to uniquely identify the configuration items. ALC_CMC.5.3C requires an adequate and appropriate review of changes to all configuration items. ALC_CMC.5.4C requires a unique identification of all configuration items by the CM system. ALC_CMC.5.5C requires that the CM system provides automated measures so that only authorized changes are made to the configuration items. ALC_CMC.5.9C requires the CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail. ALC_CMC.5.10C requires the CM system shall provide an automated means to identify all other configuration items that are affected by the change of a given configuration item. ALC_CMC.5.11C requires the CM system shall be able to identify the version of the implementation representation from which the wafers are generated. ALC_CMC.5.12C requires a CM documentation that includes a CM plan. ALC_CMC.5.13C requires that the CM plan describes how the CM system is used for the development of the TOE. ALC_CMC.5.14C requires the description

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of the procedures used to accept modified or newly created configuration items as part of the product. ALC_CMC.5.15C requests evidence demonstrating that all configuration items have been and are being maintained under the CM system. ALC_CMC.5.16C requires that the evidence shall demonstrate that the CM system is being operated in accordance with the CM plan. The configuration list required by ALC_CMS.5.1C shall include the evaluation evidence for the fulfilment of the SARs, development tools and related information. ALC_CMS.5.2C addresses the same requirement as ALC_CMC.5.4C. In addition, ALC_LCD.1.1C requires that the life-cycle definition documentation describes the model used to develop and maintain the products.

➤ O.Config-Items

ALC_CMC.5.1C requires a documented process ensuring an appropriate and consistent labeling of the products. A method used to uniquely identify the configuration items is required by ALC_CMC.5.2C. ALC_CMC.5.3C requires an adequate and appropriate review of changes to all configuration items. In addition ALC_CMC.5.4C requires that the CM system uniquely identifies all configuration items. ALC_CMC.5.9C requires the CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail. ALC_CMC.5.11C requires the CM system shall be able to identify the version of the implementation representation from which the wafers are generated. ALC_CMC.5.14C requires that the CM plan describes the procedures used to accept modified or newly created configuration items as part of the product. The configuration list required by ALC_CMS.5.1C shall include the evaluation evidence for the fulfilment of the SARs, development tools and related information. ALC_CMS.5.2C addresses the same requirement as ALC_CMC.5.4C. ALC_CMS.5.3C requires that the developer of each configuration item is indicated in the configuration list. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Config-Process

ALC_CMC.5.1C requires a documented process ensuring an appropriate and consistent labeling of the products. ALC_CMC.5.2C requires a CM documentation that describes the method used to uniquely identify the configuration items. The provision of automated measures such that only authorized changes is made to the configuration items as required by ALC_CMC.5.5C. ALC_CMC.5.6C requires that the CM system supports the production by automated means. ALC_CMC.5.7C requires the CM system shall ensure that the person responsible for accepting a con-figuration item into CM is not the person who developed it. ALC_CMC.5.9C requires the CM system shall support the audit of all changes to the CM items by automated means, including the originator, date, and time in the audit trail. ALC_CMC.5.10C requires the CM system shall provide an automated means to identify all other configuration items that are affected by the change of a given configuration item. ALC_CMC.5.11C requires the CM system shall be able to identify the version of the implementation representation from which the wafers are generated. ALC_CMC.5.12C requires that the CM documentation includes a CM plan. ALC_CMC.5.13C requires that the CM plan describe how the CM system is used for the

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development of the TOE. ALC_CMC.5.14C requires the description of the procedures used to accept modified or newly created configuration items as part of the product. ALC_CMC.5.15C requests evidence showing that all configuration items have been and are being maintained under the CM system. ALC_CMC.5.16C requires that the evidence shall demonstrate that the CM system is being operated in accordance with the CM plan. The configuration list required by ALC_CMS.5.1C shall include the evaluation evidence for the fulfilment of the SARs, development tools and related information. ALC_CMS.5.2C addresses the same requirement as ALC_CMC.5.4C. ALC_LCD.1.1C requires that the life-cycle definition documentation describes the model used to develop and maintain the products. ALC_LCD.1.2C requires control over the development and maintenance of the TOE.

➤ O.Control-Scrap

ALC_DVS.2.1C requires that physical, procedural, personnel, and other security measures that are implemented to protect the confidentiality and integrity of the TOE design and implementation. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Internal-Monitor

ALC_DVS.2.2C requires that the development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Internal-Shipment

ALC_DVS.2.2C requires that the development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product. This includes also the protection during the transport between production sides. ALC_CMC.5.15C requests evidence to demonstrate that all configuration items have been and are being maintained under the CM system. ALC_CMS.5.2C according the unique identification of the packing as configuration item. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Logical-Access

ALC_DVS.2.1C requires that the developer shall describe all personnel, procedural and other security measures that are necessary to protect the confidentiality and integrity of the TOE design, implementation and in its development and production environment. Thereby this Security Assurance Requirement is suitable to meet the security objective. ALC_CMC.5.5C requires that the CM system provides automated measures so that only authorized changes are made to the configuration items. ALC_CMC.5.7C requires the CM

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system shall ensure that the person responsible for accepting a con-figuration item into CM is not the person who developed it. Thereby this Security Assurance Requirement is suitable to meet the security objective. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Logical-Operation

ALC_DVS.2.1C: requires that the developer shall describe all personnel, procedural and other security measures that are necessary to protect the confidentiality and integrity of the TOE design, implementation and in its development and production environment. Thereby this Security Assurance Requirement is suitable to meet the security objective. ALC_DVS.2.2C: The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product. Thereby this Security Assurance Requirement is suitable to meet the security objective. ALC_CMC.5.5C requires that the CM system provides automated measures so that only authorized changes are made to the configuration items. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Maintain-Security

ALC_DVS.2.1C: requires that the developer shall describe all personnel, procedural and other security measures that are necessary to protect the confidentiality and integrity of the TOE design, implementation and in its development and production environment. Thereby this Security Assurance Requirement is suitable to meet the security objective. ALC_DVS.2.2C: The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Physical-Access

ALC_DVS.2.1C requires that the developer shall describe all physical security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development environment. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Reception-Control

ALC_CMC.5.1C requires a documented process ensuring an appropriate and consistent labeling of the products. ALC_CMC.5.2C requires a CM documentation that describes the method used to uniquely identify the configuration items. ALC_CMC.5.3C requires an adequate and appropriate review of changes to all configuration items. ALC_CMC.5.4C requires a unique identification of all configuration items by the CM system. ALC_CMC.5.7C requires the CM system shall ensure that the person responsible for

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accepting a configuration item into CM is not the person who developed it. ALC_CMC.5.11C requires the CM system shall be able to identify the version of the implementation representation from which the wafers are generated. Thereby, this Security Assurance Requirement is suitable to meet the security objective. ALC_CMC.5.14C requires the description of the procedures used to accept modified or newly created configuration items as part of the product. ALC_CMC.5.15C requests evidence to demonstrate that all configuration items have been and are being maintained under the CM system. ALC_CMS.5.2C addresses the same requirement as ALC_CMC.5.4C. ALC_DVS.2.2C requires security measures to protect the confidentiality and integrity of the product during the transfer between sites. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Security-Control

ALC_DVS.2.1C requires that the developer shall describe all personnel, procedural and other security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development and production environment. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Staff-Engagement

ALC_DVS.2.1C requires the description of personnel security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development environment. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Transfer-Data

ALC_DVS.2.2C: The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the product. This includes also the protection during the transport between production sides. Thereby this Security Assurance Requirement is suitable to meet the security objective.

➤ O.Zero-Balance

ALC_CMC.5.6C requires that the CM system supports the production of the TOE by automated means. ALC_CMC.5.15C requires evidence demonstrating that all configuration items have been and are being maintained under the CM system. ALC_DVS.2.2C requires security measures that are necessary to protect the confidentiality and integrity of the product. ALC_LCD.1.2C requires control over the development and maintenance of the TOE. Thereby this Security Assurance Requirement is suitable to meet the security objective.

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7.6 Mapping of the Evaluation Documentation

The scope of the evaluation according to the assurance class ALC comprises the processing and handling of security products and the complete documentation of the site provided for the evaluation.

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8. Reference

8.1 Literature

The following documentation was used to prepare this SST:

[1] Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and General Model, Version 3.1, Revision 5, April 2017

[2] Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements, Version 3.1, Revision 5, April 2017

[3] Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology, Version 3.1, Revision 5, April 2017

[4] Supporting Document, Site Certification, Version 1.0, Revision 1, CCDB-2007-11-001, October 2007

[5] JIL-Minimum Site Security Requirements version 3.0, February, 2020

[6] Security IC Platform Protection Profile with Augmentation Packages Version 1.0, BSI-PP-0084-2014, January 13, 2014

[7] Eurosmart Site Security Template, version 1.0, 21 June 2009

8.2 Definitions

Client: The word “client” is used here instead of “customer” since the words “customer” and “consumer” are reserved in Common Criteria.

8.3 Abbreviations

The abbreviations table are described in Table 8.1.

Table 8.1 Abbreviations Table

| Abbreviation | Definition |
|--------------|------------------------------|
| BOA | Background Quality Assurance |

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| CC | Common Criteria |
| CE | Customer Engineer |
| CTM | Customer |
| CP | Chip Probe |
| CS | Customer Service |
| Div | Division |
| DRC | Design Rule Check |
| EAL | Evaluation Assurance Level |
| EBO | E-Beam Operation |
| Diff | Diffusion |
| Etch | Etching |
| FA | Failure Analysis |
| FG | Finish Goods |
| FTP | File Transfer Protocol |
| GDS | Graphic Database System |
| IC | Integrated Circuit |
| IT | Information Technology |
| JDV | Job Deck View |
| Litho | Lithography |

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| MES | Manufacturing Execution System |
| MFG | Manufacturing |
| OPC | Optical Proximity Correction |
| OQA | Outgoing Quality Assurance |
| OSP | Organizational Security Policy |
| PP | Protection Profile |
| PE | Process Engineer |
| PC | Production Control Planner |
| PIE | Process Integration Engineer |
| ROM | Read Only Memory |
| RTR | Reticle Tooling Request |
| SAR | Security Assurance Requirement |
| SST | Site Security Target |
| TF | Thin Film |
| TOE | Target of Evaluation |
| TSF | TOE Security Functions |
| WAT | Wafer Acceptance Test |
| WH | Warehouse |