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| Technical Specification |
| 3rd Generation Partnership Project;Technical Specification Group Services and System Aspects;5G Security Assurance Specification (SCAS); Split gNB product classes (Release 18) |
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# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

# 1 Scope

The present document contains objectives, requirements and test cases that are specific to the various split gNB network product classes. The gNB can be deployed as more than one entity by splitting the gNB into gNB-CU and gNB-DU(s) and possibly further splitting the gNB-CU into gNB-CU-CP and gNB-CU-UP(s) (see TS 38.401 [5]). Test cases for such deployments are provided. The present document refers to the Catalogue of General Security Assurance Requirements (see TS 33.117 [2]) and formulates specific adaptions of the requirements and test cases given there, as well as specifying requirements and test cases unique to the various split gNB network product class.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 33.117: "Catalogue of general security assurance requirements".

[3] 3GPP TS 33.501 (Release 15): "Security architecture and procedures for 5G system".

[4] 3GPP TR 33.926: "Security Assurance Specification (SCAS) threats and critical assets in 3GPP network product classes".

[5] 3GPP TS 38.401: "NG-RAN; Architecture description".

[6] 3GPP TS 33.511: "Security Assurance Specification (SCAS) for the next generation Node B (gNodeB) network product class".

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

gNB-CU as defined in TS 38.401 [5]

gNB-CU-CP as defined in TS 38.401 [5]

gNB-CU-UP as defined in TS 38.401 [5]

gNB-DU as defined in TS 38.401 [5]

# 4 gNB-CU-specific security requirements and related test cases

## 4.1 Introduction

gNB-CU specific security requirements include both requirements derived from gNB-CU-specific security functional requirements as well as security requirements derived from threats specific to gNB-CU as described in TR 33.926 [4]. Generic security requirements and test cases common to other network product classes have been captured in TS 33.117 [2] and are not repeated in the present document.

## 4.2 Security functional adaptations of requirements and related test cases

### 4.2.1 Introduction

The present clause contains gNB-CU-specific security functional adaptations of requirements and related test cases. Many of the security functional requirements are directly inherited from the gNB product class.

### 4.2.2 Requirements and test cases deriving from 3GPP specifications

#### 4.2.2.1 Security functional requirements on the gNB-CU deriving from 3GPP specifications – TS 33.501 [3]

##### 4.2.2.1.1 Security functional requirements inherited from gNB

The following security functional requirements in clause 4.2.2.1 of TS 33.511 [6] apply to the gNB-CU by changing the gNB to gNB-CU for the entity under test in the test cases and with the below change to threat references:

4.2.2.1.1 Integrity protection of RRC-signalling

*Threat References:* TR 33.926 [4], clause W.2.2.2 – Control plane data integrity protection.

4.2.2.1.2 Integrity protection of user data between the UE and the gNB

*Threat References*: TR 33.926 [4], clause W.2.2.4 – User plane data integrity protection.

4.2.2.1.4 RRC integrity check failure

*Threat References*: TR 33.926 [4], clause W.2.2.2 – Control plane data integrity protection.

4.2.2.1.5 UP integrity check failure

*Threat References*: TR 33.926 [4], clause W.2.2.4 – User plane data integrity protection.

4.2.2.1.6 Ciphering of RRC-signalling

*Threat References:* TR 33.926 [4], clause W.2.2.1 – Control plane data confidentiality protection.

4.2.2.1.7 Ciphering of user data between the UE and the gNB

*Threat References:* TR 33.926 [4], clause W.2.2.3 – User plane data confidentiality protection at gNB.

4.2.2.1.8 Replay protection of user data between the UE and the gNB

*Threat References:* TR 33.926 [4], clause W.2.2.4 – User plane data integrity protection.

4.2.2.1.9 Replay protection of RRC-signalling

*Threat References:* TR 33.926 [4], clause W.2.2.2 – Control plane data integrity protection.

4.2.2.1.10 Ciphering of user data based on the security policy sent by the SMF

*Threat References:* TR 33.926 [4], clause W.2.2.8 – Security Policy Enforcement.

4.2.2.1.11 Integrity of user data based on the security policy sent by the SMF

*Threat References:* TR 33.926 [4], clause W.2.2.8 – Security Policy Enforcement.

4.2.2.1.12 AS algorithms selection

*Threat References*: TR 33.926 [4], clause W.2.2.5 – AS algorithm selection and use.

4.2.2.1.13 Key refresh at the gNB

*Threat References*: TR 33.926 [4], clause W.2.2.7 – Key Reuse.

4.2.2.1.14 Bidding down prevention in Xn-handovers

*Threat References*: TR 33.926 [4], clause W.2.2.6 – Bidding Down on Xn-Handover.

4.2.2.1.15 AS protection algorithm selection in gNB change

*Threat References*: TR 33.926 [4], clause W.2.2.5 – AS algorithm selection and use.

4.2.2.1.18 Key update at the gNB on dual connectivity

*Threat References*: TR 33.926 [4], clause W.2.2.7 – Key Reuse.

4.2.2.1.19 UP security activation in Inactive scenario

*Threat Reference*: TR 33.926 [4], clause W.2.2.9 – State transition from inactive state to connected state.

##### 4.2.2.1.2 Control plane data confidentiality protection over N2/Xn/F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.16 of TS 33.511 [6] but modified as the gNB-CU supports the F1 interface.

*Requirement Name:* Control plane data confidentiality protection over N2/Xn/F1 interface

*Requirement Reference:* TS 33.501 [3], clauses 5.3.9, 9.2 and 9.4.

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection."*, *"The transport of control plane data over N2 shall be integrity, confidentiality and replay-protected." "The transport of control plane data and user data over Xn shall be integrity, confidentiality and replay-protected."* as specified in TS 33.501 [3], clauses 5.3.9, 9.2 and 9.4.

*Threat References:* TR 33.926 [4], clause W.2.2.1 – Control plane data confidentiality protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2]

##### 4.2.2.1.3 Control plane data integrity protection over N2/Xn/F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.17 of TS 33.511 [6] but modified as the gNB-CU supports the F1 interface.

*Requirement Name:* Control plane data integrity protection over N2/Xn/F1 interface

*Requirement Reference*: TS 33.501 [3], clauses 5.3.9, 9.2 and 9.4.

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection.",* *"The transport of control plane data over N2 shall be integrity, confidentiality and replay-protected." "The transport of control plane data and user data over Xn shall be integrity, confidentiality and replay-protected."* as specified in TS 33.501 [3], clauses 5.3.9, 9.2 and 9.4.

*Threat References:* TR 33.926 [4], clause W.2.2.2 – Control plane data integrity protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2].

Editor’s note: The user plane over network interface cases need to be added.

### 4.2.3 Technical Baseline

The baseline technical requirements are identical to the ones for the gNB product class given in clause 4.2.3 of TS 33.511 [6].

### 4.2.4 Operating systems

There are no gNB-CU-specific additions to clause 4.2.4 of TS 33.117 [2].

NOTE: The ICMP changes applied for a gNB only apply for a DU. In a split deployment where the CU(-CP/UP) is deployed in a data center, the CU(-CP/UP) should be treated as any other IP nodes (e.g., UPF) as the data center nodes are assumed to have connectivity to IP networks whereas DU can be considered like a gNB from ICMP threat perspective.

### 4.2.5 Web servers

There are no gNB-CU-specific additions to clause 4.2.5 of TS 33.117 [2].

### 4.2.6 Network devices

These requirements are identical to the ones for the gNB product class given in clause 4.2.6 of TS 33.511 [6].

## 4.3 Adaptations of hardening requirements and related test cases

These requirements are identical to the ones for the gNB product class given in clause 4.3 of TS 33.511 [6].

## 4.4 Adaptations of basic vulnerability testing requirements and related test cases

There are no gNB-CU-specific additions to clause 4.4 of TS 33.117 [2].

# 5 gNB-CU-CP-specific security requirements and related test cases

## 5.1 Introduction

gNB-CU-CP specific security requirements include both requirements derived from gNB-CU-CP-specific security functional requirements as well as security requirements derived from threats specific to gNB-CU-CP as described in TR 33.926 [4]. Generic security requirements and test cases common to other network product classes have been captured in TS 33.117 [2] and are not repeated in the present document.

## 5.2 Security functional adaptations of requirements and related test cases

### 5.2.1 Introduction

The present clause contains gNB-CU-CP-specific security functional adaptations of requirements and related test cases. Many of the security functional requirements are directly inherited from the gNB product class.

### 5.2.2 Requirements and test cases deriving from 3GPP specifications

#### 5.2.2.1 Security functional requirements on the gNB-CU-CP deriving from 3GPP specifications – TS 33.501 [3]

##### 5.2.2.1.1 Security functional requirements inherited from gNB

The following security functional requirements from clause 4.2.2.1 of TS 33.511 [6] apply to the gNB-CU-CP by changing the gNB to gNB-CU-CP for the entity under test in the test cases and with the below changes of threat reference:

4.2.2.1.1 Integrity protection of RRC-signalling

*Threat References:* TR 33.926 [4], clause X.2.2.2 – Control plane data integrity protection.

4.2.2.1.4 RRC integrity check failure

*Threat References*: TR 33.926 [4], clause X.2.2.2 – Control plane data integrity protection.

4.2.2.1.6 Ciphering of RRC-signalling

*Threat References:* TR 33.926 [4], clause X.2.2.1 – Control plane data confidentiality protection.

4.2.2.1.9 Replay protection of RRC-signalling

*Threat References:* TR 33.926 [4], clause X.2.2.2 – Control plane data integrity protection.

4.2.2.1.12 AS algorithms selection

*Threat References*: TR 33.926 [4], clause X.2.2.3 – AS algorithm selection and use.

4.2.2.1.13 Key refresh at the gNB

*Threat References*: TR 33.926 [4], clause X.2.2.5 – Key Reuse.

4.2.2.1.14 Bidding down prevention in Xn-handovers

*Threat References*: TR 33.926 [4], clause X.2.2.4 – Bidding Down on Xn-Handover.

4.2.2.1.15 AS protection algorithm selection in gNB change

*Threat References*: TR 33.926 [4], clause X.2.2.3 – AS algorithm selection and use.

4.2.2.1.18 Key update at the gNB on dual connectivity

*Threat References*: TR 33.926 [4], clause X.2.2.5 – Key Reuse.

4.2.2.1.19 UP security activation in Inactive scenario

*Threat Reference*: TR 33.926 [4], clause X.2.2.7 – State transition from inactive state to connected state.

##### 5.2.2.1.2 Control plane data confidentiality protection over N2/Xn/F1/E1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.16 of TS 33.511 [6] but modified as the gNB-CU-CP supports the F1 and E1 interfaces.

*Requirement Name:* Control plane data confidentiality protection over N2/Xn/F1/E1 interface.

*Requirement Reference:* TS 33.501 [3], clauses 5.3.9, 5.3.10, 9.2 and 9.4

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection."*, *"The E1 interface between CU-CP and CU-UP shall be confidentiality, integrity and replay protected."*, *"The transport of control plane data over N2 shall be integrity, confidentiality and replay-protected." and "The transport of control plane data and user data over Xn shall be integrity, confidentiality and replay-protected." as specified in TS 33.501 [3], clauses 5.3.9, 5.3.10, 9.2 and 9.4.*

*Threat References:* TR 33.926 [4], clause X.2.2.1 – Control plane data confidentiality protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2]

##### 5.2.2.1.3 Control plane data integrity protection over N2/Xn/F1/E1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.17 of TS 33.511 [6] but modified as the CU-CP supports the F1 and E1 interfaces.

*Requirement Name:* Control plane data integrity protection over N2/Xn/F1/E1 interface.

*Requirement Reference*: TS 33.501 [3], clauses 5.3.9, 5.3.10, 9.2 and 9.4.

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection.",* *"The E1 interface between CU-CP and CU-UP shall be confidentiality, integrity and replay protected."*, *"The transport of control plane data over N2 shall be integrity, confidentiality and replay-protected." "The transport of control plane data and user data over Xn shall be integrity, confidentiality and replay-protected."* as specified in TS 33.501 [3], clauses 5.3.9, 5.3.10, 9.2 and 9.4.

*Threat References:* TR 33.926 [4], clause X.2.2.2 – Control plane data integrity protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2].

##### 5.2.2.1.4 Ciphering of user data based on the security policy sent by the SMF

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.10 of TS 33.511 [6] but modified as the gNB-CU-CP informs both the gNB-CU-UP and UE whether to use a non-NULL ciphering algorithm or not.

*Requirement Name:* Ciphering of user data based on the security policy sent by the SMF.

*Requirement Reference:* TS 33.501 [3], clause 5.3.2.

*Requirement Description: "The gNB shall activate ciphering of user data based on the security policy sent by the SMF"* as specified in TS 33.501 [3], clause 5.3.2.

*Threat References:* TR 33.926 [4], clause X.2.2.6 – Security Policy Enforcement.

***Test Case****:*

**Test Name:** TC-UP-DATA-CIP-SMF\_gNB-CU-CP

**Purpose:** Toverify that the user data packets are confidentiality protected based on the security policy sent by the SMF via AMF

**Pre-Condition:**

- The gNB-CU-CP network product shall be connected in emulated/real network environments. The UE and the 5GC may be simulated.

- The tester shall have access to the NG RAN air interface.

- The tester shall have knowledge of the RRC and UP ciphering algorithm and protection keys and of the security keys etc needed to decrypt the messages on the E1 interface.

- RRC ciphering is already activated at the gNB.

**Execution Steps:**

1. The tester triggers PDU session establishment procedure by sending PDU session establishment request message.

2. Tester shall trigger the SMF to send the UP security policy with ciphering protection "required" or "not needed" to the gNB-CU-CP.

3. The tester shall capture the Bearer Context Setup Request message sent to the gNB-CU-UP over the E1 interface.

4. The tester shall decrypt the Bearer Context Setup Request message.

5. The tester shall capture the RRC connection reconfiguration procedure between gNB-CU-CP to UE over NG RAN air interface. And filter the RRC connection reconfiguration message sent by gNB-CU-CP to UE.

6. The tester shall decrypt the RRC connection Reconfiguration message and retrieve the UP ciphering protection indication presenting in the decrypted message.

7. The tester shall verify if the UP ciphering policy received at gNB-CU-CP is same as the UP ciphering protection indication notified by the gNB-CU-CP to the UE in the RRC connection Reconfiguration message and the gNB-CU-UP in the Bearer Context Setup Request message.

**Expected Results:**

Both the messages indicate that ciphering is to be used inline with the received policy.

**Expected format of evidence:**

Evidence suitable for the interface, e.g. Screenshot containing the operational results.

##### 5.2.2.1.5 Integrity of user data based on the security policy sent by the SMF

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.11 of TS 33.511 [6] but modified as the gNB-CU-CP informs both the gNB-CU-UP and UE whether to use a non-NULL integrity algorithm or not.

*Requirement Name:* Integrity of user data based on the security policy sent by the SMF.

*Requirement Reference:* TS 33.501 [3], clause 5.3.2.

*Requirement Description:* *"The gNB shall provide integrity protection of user data based on the security policy sent by the SMF"* as specified in TS 33.501 [3], clause 5.3.2.

*Threat References:* TR 33.926 [4], clause X.2.2.6 – Security Policy Enforcement.

***Test Case****:*

**Test Name:** TC-UP-DATA-INT-SMF\_gNB-CU-CP

**Purpose:** Toverify that the user data packets are integrity protected based on the security policy sent by the SMF.

**Pre-Condition:**

- The gNB-CU-CP network product shall be connected in emulated/real network environments. The UE and the 5GC may be simulated.

- The tester shall have access to the NG RAN air interface.

- The tester shall have knowledge of the integrity algorithm and protection keys and of the security keys etc needed to decrypt the messages on the E1 interface.

- RRC integrity and cipher are already activated at the gNB.

**Execution Steps:**

1. The tester triggers PDU session establishment procedure by sending PDU session establishment request message.

2. Tester shall trigger the SMF to send the UP security policy with integrity protection is "required" or "not needed" to the gNB.

3. The tester shall capture the Bearer Context Setup Request message sent to the gNB-CU-UP over the E1 interface.

4. The tester shall decrypt the Bearer Context Setup Request message.

5. The tester shall capture the RRC connection reconfiguration message sent by gNB to UE over NG RAN air interface.

6. The tester shall decrypt the RRC connection reconfiguration message and retrieve the UP integrity protection indication presenting in the decrypted message.

7. Tester shall check whether UP integrity policy received at gNB-CU-UP is same as the UP integrity protection indication notified by the gNB-CU-CP to the UE in the RRC connection reconfiguration message and the gNB-CU-UP in the Bearer Context Setup Request message.

**Expected Results:**

Both the messages indicate that integrity is to be used inline with the received policy.

**Expected format of evidence:**

Evidence suitable for the interface, e.g. Screenshot containing the operational results.

### 5.2.3 Technical Baseline

### 5.2.4 Operating systems

### 5.2.5 Web servers

### 5.2.6 Network devices

## 5.3 Adaptations of hardening requirements and related test cases

### 5.3.1 Introduction

### 5.3.2 Technical Baseline

### 5.3.3 Operating Systems

### 5.3.4 Web Servers

### 5.3.5 Network Devices

### 5.3.6 Network Functions in service-based architecture

The requirements and test cases in clause 4.3.6 of TS 33.117 [2] are not applicable to the gNB-CU-CP network products.

## 5.4 Adaptations of basic vulnerability testing requirements and related test cases

# 6 gNB-CU-UP-specific security requirements and related test cases

## 6.1 Introduction

gNB-CU-UP specific security requirements include both requirements derived from gNB-CU-UP-specific security functional requirements as well as security requirements derived from threats specific to gNB-CU-UP as described in TR 33.926 [4]. Generic security requirements and test cases common to other network product classes have been captured in TS 33.117 [2] and are not repeated in the present document.

### 6.2 Security functional adaptations of requirements and related test cases6.2.1 Introduction

The present clause contains gNB-CU-UP-specific security functional adaptations of requirements and related test cases. Many of the security functional requirements are directly inherited from the gNB product class.

### 6.2.2 Requirements and test cases deriving from 3GPP specifications

#### 6.2.2.1 Security functional requirements on the gNB-CU-UP deriving from 3GPP specifications – TS 33.501 [3]

##### 6.2.2.1.1 Security functional requirements inherited from gNB

The following security functional requirements from clause 4.2.2.1 of TS 33.511 [6] apply to the gNB-CU-UP by changing the gNB to gNB-CU-UP for the entity under test in the test cases and with the below changes of threat reference:

4.2.2.1.5 UP integrity check failure

*Threat References*: TR 33.926 [4], clause Y.2.2.4 – User plane data integrity protection.

4.2.2.1.8 Replay protection of user data between the UE and the gNB

*Threat References:* TR 33.926 [4], clause Y.2.2.4 – User plane data integrity protection.

##### 6.2.2.1.2 Control plane data confidentiality protection over E1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.16 of TS 33.511 [6] but modified as the gNB-CU-UP only supports the E1 interface.

*Requirement Name:* Control plane data confidentiality protection over E1 interface

*Requirement Reference:* TS 33.501 [3], clauses 5.3.10.

*Requirement Description:* *"* *The E1 interface between CU-CP and CU-UP shall be confidentiality, integrity and replay protected."* as specified in TS 33.501 [3], clauses 5.3.10.

*Threat References:* TR 33.926 [4], clause Y.2.2.1 – Control plane data confidentiality protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2].

##### 6.2.2.1.3 Control plane data integrity protection over E1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.17 of TS 33.511 [6] but modified as the gNB-CU-UP only supports the E1 interface.

*Requirement Name:* Control plane data integrity protection over E1 interface

*Requirement Reference*: TS 33.501 [3], clauses 5.3.10.

*Requirement Description:* *"* *The E1 interface between CU-CP and CU-UP shall be confidentiality, integrity and replay protected."* as specified in TS 33.501 [3], clauses 5.3.10.

*Threat References:* TR 33.926 [4], clause Y.2.2.2 – Control plane data integrity protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2].

Editor’s note: The user plane over network interface cases need to be added.

### 6.2.3 Technical Baseline

### 6.2.4 Operating systems

### 6.2.5 Web servers

### 6.2.6 Network devices

## 6.3 Adaptations of hardening requirements and related test cases

### 6.3.1 Introduction

### 6.3.2 Technical Baseline

### 6.3.3 Operating Systems

### 6.3.4 Web Servers

### 6.3.5 Network Devices

### 6.3.6 Network Functions in service-based architecture

The requirements and test cases in clause 4.3.6 of TS 33.117 [2] are not applicable to the gNB-CU-UP network products.

## 6.4 Adaptations of basic vulnerability testing requirements and related test cases

# 7 gNB-DU-specific security requirements and related test cases

## 7.1 Introduction

gNB-DU specific security requirements include both requirements derived from gNB-DU-specific security functional requirements as well as security requirements derived from threats specific to gNB-DU as described in TR 33.926 [4]. Generic security requirements and test cases common to other network product classes have been captured in TS 33.117 [2] and are not repeated in the present document.

## 7.2 Security functional adaptations of requirements and related test cases

### 7.2.1 Introduction

The present clause contains gNB-DU-specific security functional adaptations of requirements and related test cases.

### 7.2.2 Requirements and test cases deriving from 3GPP specifications

#### 7.2.2.1 Security functional requirements on the gNB-DU deriving from 3GPP specifications – TS 33.501 [3]

##### 7.2.2.1.1 Control plane data confidentiality protection over F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.16 of TS 33.511 [6] but modified as the gNB-DU only supports the F1 interface.

*Requirement Name:* Control plane data confidentiality protection over F1 interface

*Requirement Reference:* TS 33.501 [3], clauses 5.3.9.

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection."* as specified in TS 33.501 [3], clauses 5.3.9.

*Threat References:* TR 33.926 [4], clause Z.2.2.1 – Control plane data confidentiality protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2]

##### 7.2.2.1.2 Control plane data integrity protection over F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.17 of TS 33.511 [6] but modified as the gNB-DU only supports the F1 interface.

*Requirement Name:* Control plane data integrity protection over F1 interface

*Requirement Reference*: TS 33.501 [3], clauses 5.3.9.

*Requirement Description:* *"F1-C interface shall support confidentiality, integrity and replay protection."* as specified in TS 33.501 [3], clauses 5.3.9.

*Threat References:* TR 33.926 [4], clause Z.2.2.2 – Control plane data integrity protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [2].

##### 7.2.2.1.3 User plane data confidentiality protection over F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.R of TS 33.511 [6] but modified as the gNB-DU only supports the F1 interface.

*Requirement Name:* User plane data confidentiality protection over F1 interface.

*Requirement Reference:* TS 33.501 [2], clauses 5.3.9.

*Requirement Description:* "*The gNB shall support confidentiality, integrity and replay protection on the gNB DU-CU F1-U interface [33] for user plane"* as specified in TS 33.501 [2], clauses 5.3.9.

*Threat References:* TR 33.926 [4], clause Z.2.2.3 – User plane data confidentiality protection at gNB.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [3].

##### 7.2.2.1.4 User plane data integrity protection over F1 interface

NOTE 1: This is based on the security functional requirement on the gNB given in 4.2.2.1.S of TS 33.511 [6] but modified as the gNB-DU only supports the F1 interface.

*Requirement Name:* User plane data integrity protection over F1 interface.

*Requirement Reference*: TS 33.501[2], clauses 5.3.9.

*Requirement Description:* *"The gNB shall support confidentiality, integrity and replay protection on the gNB DU-CU F1-U interface [33] for user plane"* as specified in TS 33.501 [2], clauses 5.3.9.

*Threat References:* TR 33.926 [4], clause Z.2.2.4 – User plane data integrity protection.

*Test Case:* the test case in subclause 4.2.3.2.4 of TS 33.117 [3].

### 7.2.3 Technical Baseline

### 7.2.4 Operating systems

### 7.2.5 Web servers

### 7.2.6 Network devices

## 7.3 Adaptations of hardening requirements and related test cases

### 7.3.1 Introduction

### 7.3.2 Technical Baseline

### 7.3.3 Operating Systems

### 7.3.4 Web Servers

### 7.3.5 Network Devices

### 7.3.6 Network Functions in service-based architecture

The requirements and test cases in clause 4.3.6 of TS 33.117 [2] are not applicable to the gNB-DU network products.

## 7.4 Adaptations of basic vulnerability testing requirements and related test cases

Annex <A> (normative):
<Normative annex for a Technical Specification>

Annex <B> (informative):
<Informative annex for a Technical Specification>

# B.1 Heading levels in an annex

Heading levels within an annex are used as in the main document, but for Heading level selection, the "A.", "B.", etc. are ignored. e.g. **B.1.2** is formatted using ***Heading 2*** style.

Annex <X> (informative):
Change history

|  |
| --- |
| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-05 | SA3#107-e | S3-221201 |  |  |  | Skeleton (S3-221196) plus S3-0989 | 0.1.0 |
| 2022-09 | SA3#108-e | S3-222321 |  |  |  | Incorporating S3-221824, S3-222309. S3-221310, S3-222312 and S3-222313 | 0.2.0 |
| 2022-11 | SA3#109 | S3-224103 |  |  |  | Incorporating S3-223346, S3-223348. S3-223349, S3-223350, S3-223352, S3-223353 and S3-223354 | 0.3.0 |
| 2023-01 | SA3#110  | S3-23AAA1 |  |  |  | Changing the TS number from TS 33.742 to TS 33.523 due to mis- allocated specification number | 0.4.0 |