|  |  |
| --- | --- |
| 3GPP TS 38.108 V0.0.1 (2022-01) | |
| Technical Specification | |
| 3rd Generation Partnership Project;  Technical Specification Group Radio Access Network;  NR;  Satellite Access Node radio transmission and reception (Release 17) | |
|  | |
| *5G-logo_175px* | 3GPP-logo_web |
|  | |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification. Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. | |

|  |
| --- |
|  |
| ***3GPP***  Postal address  3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
| ***Copyright Notification***  No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.  © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  GSM® and the GSM logo are registered and owned by the GSM Association |

Contents

Foreword 5

1 Scope 7

2 References 7

3 Definitions, symbols and abbreviations 7

3.1 Definitions 7

3.2 Symbols 7

3.3 Abbreviations 8

4 General 8

4.1 Relationship with other core specifications 8

4.2 Relationship between minimum requirements and test requirements 8

4.3 Requirement reference points 8

4.4 Satellite Access Node classes 8

4.5 Regional requirements 8

4.6 Applicability of minimum requirements 8

5 Operating bands and channel arrangement 9

5.1 General 9

5.2 Operating bands 9

5.3 Satellite Access Node channel bandwidth 9

5.4 Channel arrangement 9

5.4.1 Channel spacing 9

5.4.2 Channel raster 9

5.4.3 Synchronization raster 9

6 Conducted transmitter characteristics 10

6.1 General 10

6.2 Satellite Access Node output power 10

6.3 Output power dynamics 10

6.3.1 General 10

6.3.2 RE power control dynamic range 10

6.3.3 Total power dynamic range 10

6.4 Transmit ON/OFF power 10

6.5 Transmitted signal quality 10

6.5.1 Frequency error 10

6.5.2 Modulation quality 10

6.5.3 Time alignment error 10

6.6 Unwanted emissions 11

6.6.1 General 11

6.6.2 Occupied bandwidth 11

6.6.2.1 General 11

6.6.2.2 Minimum requirement for Satellite Access Node 11

6.6.3 Adjacent Channel Leakage Power Ratio 11

6.6.3.1 General 11

6.6.4 Operating band unwanted emissions 11

6.6.4.1 General 11

6.6.5 Transmitter spurious emissions 11

6.6.5.1 General 11

6.6.5.2 Basic Limits 11

6.6.5.2.1 General transmitter spurious emissions requirements 11

6.6.5.2.2 Protection of the own Satellite Access Node receiver 11

6.6.5.2.3 Additional spurious emissions requirements 12

6.6.5.2.4 Co-location with other Satellite Access Nodes 12

6.6.5.3 Minimum requirement for Satellite Access Node 12

6.7 Transmitter intermodulation 12

7 Conducted receiver characteristics 13

7.1 General 13

7.2 Reference sensitivity level 13

7.2.1 General 13

7.2.2 Minimum requirements for Satellite Access Node 13

7.3 Dynamic range 13

7.3.1 General 13

7.3.2 Minimum requirements for Satellite Access Node 13

7.4 In-band selectivity and blocking 13

7.4.1 Adjacent Channel Selectivity (ACS) 13

7.4.1.1 General 13

7.4.1.2 Minimum requirements for Satellite Access Node 13

7.4.2 In-band blocking 13

7.4.2.1 General 13

7.4.2.2 Minimum requirements for Satellite Access Node 14

7.5 Out-of-band blocking 14

7.5.1 General 14

7.5.2 Minimum requirements for Satellite Access Node 14

7.6 Receiver spurious emissions 14

7.6.1 General 14

7.7 Receiver intermodulation 14

7.8 In-channel selectivity 14

7.8.1 General 14

7.8.2 Minimum requirements for Satellite Access Node 14

8 Conducted performance requirements 15

8.1 General 15

8.2 Performance requirements for PUSCH 15

8.3 Performance requirements for PUCCH 15

8.4 Performance requirements for PRACH 15

9 Radiated transmitter characteristics 16

9.1 General 16

9.2 Radiated transmit power 16

9.3 OTA Satellite Access Node output power 16

9.4 OTA output power dynamics 16

9.5 OTA transmit ON/OFF power 16

9.6 OTA transmitted signal quality 16

9.7 OTA unwanted emissions 16

9.8 OTA transmitter intermodulation 16

10 Radiated receiver characteristics 17

10.1 General 17

10.2 OTA sensitivity 17

10.3 OTA reference sensitivity level 17

10.4 OTA dynamic range 17

10.5 OTA in-band selectivity and blocking 17

10.6 OTA out-of-band blocking 17

10.7 OTA receiver spurious emissions 17

10.8 OTA receiver intermodulation 17

10.9 OTA in-channel selectivity 17

11 Radiated performance requirements 18

11.1 General 18

11.2 Performance requirements for PUSCH 18

11.3 Performance requirements for PUCCH 18

11.4 Performance requirements for PRACH 18

Annex A (normative): Reference measurement channels 19

Annex B (normative): Error Vector Magnitude (FR1) 20

Annex C (normative): Error Vector Magnitude (FR2) 21

Annex D (informative): Change history 22

For definitive guidance on drafting 3GPP TSs and TRs, see [3GPP TS 21.801](http://www.3gpp.org/DynaReport/21801.htm) supplemented by the 3GPP web page <http://www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec>.

Ensure all blue guidance text is removed before submitting the TS/TR to the TSG for approval.

# Foreword

This clause is mandatory; do not alter the text in any way other than to choose between "Specification" and "Report".

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 drafting the TS/TR, pay particular attention to the use of modal auxiliary verbs! TRs shall not contain any normative provisions.

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

This clause shall start on a new page.

The present document …

# 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".

…

[x] <doctype> <#>[ ([up to and including]{yyyy[-mm]|V<a[.b[.c]]>}[onwards])]: "<Title>".

It is preferred that the reference to 21.905 be the first in the list.

# 3 Definitions, symbols and abbreviations

This clause and its three subclauses are mandatory. The contents shall be shown as "void" if the TS/TR does not define any terms, symbols, or abbreviations.

## 3.1 Definitions

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].

Definition format (Normal)

**<defined term>:** <definition>.

**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 format (EW)

<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].

Abbreviation format (EW)

<ABBREVIATION> <Expansion>

# 4 General

The main text of the document should start here, after the above clauses have been added.

The following styles and editing techniques are aimed to help in the formatting of the document using the 3GPP Template: 3GPP\_70.dot, available from the 3GPP FTP site (<ftp://ftp.3gpp.org/Information>).

## 4.1 Relationship with other core specifications

<Text will be added.>

## 4.2 Relationship between minimum requirements and test requirements

<Text will be added.>

## 4.3 Requirement reference points

<Text will be added.>

## 4.4 Satellite Access Node classes

<Text will be added.>

## 4.5 Regional requirements

<Text will be added.>

## 4.6 Applicability of minimum requirements

<Text will be added.>

# 5 Operating bands and channel arrangement

## 5.1 General

<Text will be added.>

## 5.2 Operating bands

<Text will be added.>

## 5.3 Satellite Access Node channel bandwidth

<Text will be added.>

## 5.4 Channel arrangement

### 5.4.1 Channel spacing

<Text will be added.>

### 5.4.2 Channel raster

<Text will be added.>

### 5.4.3 Synchronization raster

<Text will be added.>

# 6 Conducted transmitter characteristics

## 6.1 General

<Text will be added.>

## 6.2 Satellite Access Node output power

<Text will be added.>

## 6.3 Output power dynamics

### 6.3.1 General

<Text will be added.>

### 6.3.2 RE power control dynamic range

<Text will be added.>

### 6.3.3 Total power dynamic range

<Text will be added.>

## 6.4 Transmit ON/OFF power

The requirement is not applicable in Release-17.

This requirement is not needed for Satellite Access Node due to FDD operation.

## 6.5 Transmitted signal quality

### 6.5.1 Frequency error

<Text will be added.>

### 6.5.2 Modulation quality

<Text will be added.>

### 6.5.3 Time alignment error

The requirement is not applicable in Release-17.

CA is confirmed to be out of Rel-17 NTN WI scope for RAN4 requirements. MIMO TAE requirement is not applicable as confirmed in Jan 2022 RAN4 meeting.

## 6.6 Unwanted emissions

### 6.6.1 General

<Text will be added.>

### 6.6.2 Occupied bandwidth

#### 6.6.2.1 General

<Text will be added.>

#### 6.6.2.2 Minimum requirement for Satellite Access Node

<Text will be added.>

### 6.6.3 Adjacent Channel Leakage Power Ratio

#### 6.6.3.1 General

<Text will be added.>

### 6.6.4 Operating band unwanted emissions

#### 6.6.4.1 General

<Text will be added.>

### 6.6.5 Transmitter spurious emissions

#### 6.6.5.1 General

<Text will be added.>

#### 6.6.5.2 Basic Limits

<Text will be added.>

##### 6.6.5.2.1 General transmitter spurious emissions requirements

<Text will be added.>

##### 6.6.5.2.2 Protection of the own Satellite Access Node receiver

<Text will be added.>

The protection of the Satellite Access Node receiver of different Satellite Access Node is not needed.

##### 6.6.5.2.3 Additional spurious emissions requirements

<Text will be added.>

##### 6.6.5.2.4 Co-location with other Satellite Access Nodes

The requirement is not applicable in Release-17.

This requirement is not needed since there is no co-location scenario foreseen for satellite.

#### 6.6.5.3 Minimum requirement for Satellite Access Node

<Text will be added.>

## 6.7 Transmitter intermodulation

The requirement is not applicable in Release-17.

This requirement is not needed since there is no nearby interfering signal reaching the transmitter unit via the antenna, RDN and antenna array.

# 7 Conducted receiver characteristics

## 7.1 General

<Text will be added.>

## 7.2 Reference sensitivity level

### 7.2.1 General

<Text will be added.>

### 7.2.2 Minimum requirements for Satellite Access Node

<Text will be added.>

## 7.3 Dynamic range

### 7.3.1 General

<Text will be added.>

### 7.3.2 Minimum requirements for Satellite Access Node

<Text will be added.>

## 7.4 In-band selectivity and blocking

### 7.4.1 Adjacent Channel Selectivity (ACS)

#### 7.4.1.1 General

<Text will be added.>

#### 7.4.1.2 Minimum requirements for Satellite Access Node

<Text will be added.>

### 7.4.2 In-band blocking

#### 7.4.2.1 General

<Text will be added.>

#### 7.4.2.2 Minimum requirements for Satellite Access Node

<Text will be added.>

## 7.5 Out-of-band blocking

### 7.5.1 General

<Text will be added.>

### 7.5.2 Minimum requirements for Satellite Access Node

<Text will be added.>

## 7.6 Receiver spurious emissions

### 7.6.1 General

<Text will be added.>

## 7.7 Receiver intermodulation

The requirement is not applicable in Release-17.

This requirement is not needed considering the scenario of satellite BS.

## 7.8 In-channel selectivity

### 7.8.1 General

<Text will be added.>

### 7.8.2 Minimum requirements for Satellite Access Node

<Text will be added.>

# 8 Conducted performance requirements

## 8.1 General

<Text will be added.>

## 8.2 Performance requirements for PUSCH

<Text will be added.>

## 8.3 Performance requirements for PUCCH

<Text will be added.>

## 8.4 Performance requirements for PRACH

<Text will be added.>

# 9 Radiated transmitter characteristics

## 9.1 General

<Text will be added.>

## 9.2 Radiated transmit power

<Text will be added.>

## 9.3 OTA Satellite Access Node output power

<Text will be added.>

## 9.4 OTA output power dynamics

<Text will be added.>

## 9.5 OTA transmit ON/OFF power

The requirement is not applicable in Release-17.

## 9.6 OTA transmitted signal quality

<Text will be added.>

## 9.7 OTA unwanted emissions

<Text will be added.>

## 9.8 OTA transmitter intermodulation

The requirement is not applicable in Release-17.

# 10 Radiated receiver characteristics

## 10.1 General

<Text will be added.>

## 10.2 OTA sensitivity

<Text will be added.>

## 10.3 OTA reference sensitivity level

<Text will be added.>

## 10.4 OTA dynamic range

<Text will be added.>

## 10.5 OTA in-band selectivity and blocking

<Text will be added.>

## 10.6 OTA out-of-band blocking

<Text will be added.>

## 10.7 OTA receiver spurious emissions

<Text will be added.>

## 10.8 OTA receiver intermodulation

The requirement is not applicable in Release-17.

## 10.9 OTA in-channel selectivity

<Text will be added.>

# 11 Radiated performance requirements

## 11.1 General

<Text will be added.>

## 11.2 Performance requirements for PUSCH

<Text will be added.>

## 11.3 Performance requirements for PUCCH

<Text will be added.>

## 11.4 Performance requirements for PRACH

<Text will be added.>

Annex A (normative):  
Reference measurement channels

<Text will be added.>

Annex B (normative):  
Error Vector Magnitude (FR1)

<Text will be added.>

Annex C (normative):  
Error Vector Magnitude (FR2)

The Annex C is not applicable in Release-17.

Annex D (informative):  
Change history

This is the last annex for TS/TSs which details the change history using the following table.  
This table is to be used for recording progress during the WG drafting process till TSG approval of this TS/TR.  
For TRs under change control, use one line per approved Change Request  
Date: use format YYYY-MM  
CR: four digits, leading zeros as necessary  
Rev: blank, or number (max two digits)  
Cat: use one of the letters A, B, C, D, F  
Subject/Comment: for TSs under change control, include full text of the subject field of the Change Request cover  
New vers: use format [n]n.[n]n.[n]n

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-01 | RAN4#101-bis-e | R4-2201830 |  |  |  | Initial Skeleton Revised in R4-2203087 | 0.0.1 |
| 2022-01 | RAN4#101-bis-e | R4-2203087 |  |  |  | Initial Skeleton | 0.0.1 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |