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| 3GPP TS 23.abc V0.0.0 (2025-01) | |
| Technical Specification  In the document, delete either "TS" and "Specification" or "TR" and "Report" as applicable. These instances are shown with yellow highlighting. Also ensure the copyright date, version, spec number, title and Release (also highlighted) are correct. Below, replace <TSG name> by the [appropriate text](#tsgNames). | |
| 3rd Generation Partnership Project;  Technical Specification Group Services and System Aspects;  Architecture support for  Ambient power-enabled Internet of Things;  Stage 2  (Release 19) | |
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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.

# Introduction

This clause is optional. If it exists, it shall be the second unnumbered clause.

# 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 TR 21.905 be the first in the list.

# 3 Definitions of terms, symbols and abbreviations

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

## 3.1 Terms

For the purposes of the present document, the terms given in 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 TR 21.905 [1].

Definition format (Normal)

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

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

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

Abbreviation format (EW)

<ABBREVIATION> <Expansion>

# 4 Architecture model and concepts

## 4.1 General concept

## 4.2 Architecture

### 4.2.1 Overview

### 4.2.2 Architecture for AIoT RAN Readers

#### 4.2.2.1 Overview

For non-roaming?

#### 4.2.2.2 Direct interface

#### 4.2.2.3 Indirect interface

## 4.3 Reference points

## 4.4 Service-based interfaces

## 4.5 Functional Entities

### 4.5.1 Ambient IoT Device

### 4.5.2 AIoT Readers

4.5.2.1 Overview / General

#### 4.5.2.2 RAN reader

### 4.5.3 AIOTF

### 4.5.4 NEF

### 4.5.5 AF

### 4.5.6 NRF

### 4.5.7 AMF

## 4.6 Protocol Stacks

### 4.6.1 Overview/General

### 4.6.2 Protocol Stack between Ambient IoT Device and AIOTF

#### (option 1) 4.6.2.1 Protocol Stack between Ambient IoT Device and AIOTF via RAN reader

### (option 2) 4.6.2 Protocol Stack between Ambient IoT Device and AIOTF via RAN reader

Consideration of the heading of 4.6.2: protocol stack will include NEF, AF

## 4.7 Identifiers -> clause 5

### 4.7.1 Overview

### 4.7.2 Ambient IoT Device Permanent Identifier

# 5 High level functionality and features

## 5.1 Overview

## 5.2 Ambient IoT Services

## 5.3 AIoT Reader Selection

## 5.4 Assistance Information used by AIoT Reader -> AIOT RAN

## 5.5 AIoT Device Information Management

## 5.6 AF authorization to the Ambient IoT Services

# 6 Ambient IoT Procedures

## 6.1 Overview/General

## 6.2 Procedure for Inventory

## 6.3 Procedure for Command

# 7 Network Functions Services

## 7.1 Overview

## 7.2 AIOTF services

## 7.3 AMF services

Notes of discussion:

1. only to specify new services for AIOT here
2. add reference in 501/502 to AIOT TS

## 7.4 NEF services

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

Start each annex on a new page.

Annexes are labelled A, B, C, etc. and designated either "normative" or "informative" depending on their content.

Normative annexes only to appear in Technical Specifications. Use style "Heading 8".

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

Informative annexes may appear in both Technical Specifications and Technical Reports. Use style "Heading 8" for use in TSs.

Informative annexes shall not contain requirements for the implementation of the 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 <B>:  
<Informative annex title for a Technical Report>

Informative annexes in Technical Reports do not use "(informative") in the title, since all annexes in TRs are informative. Use style "Heading 9" in TRs.

Annex <C> (informative):  
Bibliography

Use style "Heading 8" in TSs and "Heading 9" in TRs. Do not use "informative" in the title in TRs.

The Bibliography is optional. If it exists, it shall follow the last technical annex in the document.

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

Bibliography format

<Publication>: "<Title>".

Annex <D> (informative):  
Index

Use style "Heading 8" in TSs and "Heading 9" in TRs. Do not use "informative" in the title in TRs.

The Index is optional. If it exists, it shall immediately precede the Changes history annex.

Generate the index using MS Word's index field feature.

Annex <X> (informative):  
Change history

Use style "Heading 8" in TSs and "Heading 9" in TRs. Do not use "informative" in the title in TRs.

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

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| Change history | | | | | | | |
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
|  |  |  |  |  |  |  |  |

Change history of this template:

|  |  |  |
| --- | --- | --- |
| 2001-07 | Copyright date changed to 2001; space character added before TTC in copyright notification; space character before first reference deleted. | 1.3.3 |
| 2002-01 | Copyright date changed to 2002. | 1.3.4 |
| 2002-07 | Extra Releases added to title area. | 1.3.5 |
| 2002-12 | "TM" added to 3GPP logo. | 1.3.6 |
| 2003-02 | Copyright date changed to 2003. | 1.3.7 |
| 2003-12 | Copyright date changed to 2004. Chinese OP changed from CWTS to CCSA | 14.0 |
| 2004-04 | North American OP changed from T1 to ATIS | 1.5.0 |
| 2005-11 | Stock text of clause 3 includes reference to 21.905. | 1.6.0 |
| 2005-11 | Caters for new TSG structure. Minor corrections. | 1.6.1 |
| 2006-01 | Revision marks removed. | 1.6.2 |
| 2008-11 | LTE logo line added, © date changed to 2008, guidance on keywords modified; acknowledgement of trade marks; sundry editorial corrections and cosmetic improvements | 1.7.0 |
| 2010-02 | 3GPP logo changed for cleaner version, with tag line; LTE-Advanced logo line added;  © date changed to 2010; editorial change to cover page footnote text; trade marks acknowledgement text modified; additional Releases added on cover page; proforma copyright release text block modified | 1.8.0 |
| 2010-02 | Smaller 3GPP logo file used. | 1.8.1 |
| 2010-07 | Guidance note concerning use of LTE-Advanced logo added. | 1.8.2 |
| 2011-04-01 | Guidance of use of logos on cover page modified; copyright year modified. | 1.8.3 |
| 2013-05-15 | Changed File Properties to MCC macro default.  Removed R99, added Rel-12/13.  Modified Copyright year.  Guidance on annex X Change history. | 1.8.4 |
| 2014-10-27 | Updated Release selection on cover. In clause 3, added "3GPP" to TR 21.905. | 1.8.5 |
| 2015-01-06 | New Organizational Partner TSDSI added to copyright block. Old Releases removed. | 1.9.0 |
| 2015-12-03 | Provision for LTE Advanced Pro logo  Update copyright year to 2016 | 1.10.0 |
| 2016-03-08 | Standarization of the layout of the Change History table in the last annex.(Unreleased) | 1.11.0 |
| 2016-06-15 | Minor adjustment to Change History table heading | 1.11.1 |
| 2017-03-13 | Adds option for 5G logo on cover | 1.12.0 |
| 2017-05-03 | Smaller 5G logo to reduce file size | 1.12.1 |
| 2019-02-25 | Replacement of frames on cover pages by in-line text.  Clarification of help text on when to use 5G logo. Removal of defunct keywords frame on page 2. Add Rel-16, Rel-17 options, eliminated earlier, frozen, Releases (cover page, below title) Corrections to some guidance text, addition of guidance text concerning automatic page headers under Word 2016 ff. Use of modal auxiliary verbs added to Foreword. More explicit guidance on Bibliography and Index annexes. Converted to .docx format. | 1.13.0 |
| 2019-09-12 | Cover page table outline shown dotted for ease of logo selection. (Author to hide outline after logo selection.) User now needs to delete whole table rows instead of individual cells, which proved to be tricky.  Change of style for "notes" in the Foreword to normal paragraphs.  Insertion of new bookmarks, correction of location of existing bookmarks. (To improve navigation.)  Improvements to guidance text. | 1.13.1 |
| 2021-06-18 | Provision for 5G Advanced logo  Update copyright year to 2021 Additional guidance on the use of Heading 8/9 in annexes C, D and X. | 1.14.0 |
| 2022-04-01 | Correction of table formatting Update copyright year to 2022 | 1.15.0 |