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| 3GPP TR 26.819 V0.0.1 (2024-mm) |
| Technical Report |
| 3rd Generation Partnership Project;Technical Specification Group Services and System Aspects;Multimedia Codecs Systems and Services;Study on Spatial Computing for Augmented Reality (AR) Services(Release 19) |
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| ***3GPP***Postal address3GPP support office address650 Route des Lucioles - Sophia AntipolisValbonne - FRANCETel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16Internethttps://www.3gpp.org |
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# Foreword

This Technical Report 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.

# Introduction

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

# 1 Scope

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.

## 3.2 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 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 Introduction to spatial computing

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 (<https://www.3gpp.org/ftp/Information/All_Templates>).

[Editor’s note: The objectives of this study are:

* Study how spatial computing functions such as relocalization, mapping, and semantic perception are realized and identify the necessary set of spatial mapping information.
* Collect and document the different formats for spatial descriptions as well as interoperability requirements for such descriptions.
* Identify where spatial computing functions run and which media, metadata, and description formats are used for exchange between these elements based on the architecture defined in the TS 26.506, notably in split processing scenarios. And document relevant procedures, flows, configurations, QoE metrics, and transport protocols.
* Identify gaps in TS 26.119, TS 26.506, and TS 26.565 to support XR Spatial Description handling, with a focus on real-time scenario, based on relevant use cases from 3GPP SA1 TR 22.856 and SA4 TR 26.998.
* Study the interactions and cross-operation between a spatial computing service and other media service enablers and architectures, such as split rendering, as well as potential interactions with AI/ML architectures in TR 26.927.
* Identify and recommend potential areas for normative work as the next phase and communicate/align with other potential 3GPP WGs and external organizations on relevant aspects related to the study.]

## 4.1 Capture of real environments

[Editor’s note: Description of how real-world environments are captured (e.g., capture devices, types of sensors, captured signals, processing of captured data.]

## 4.2 Spatial computing functions

[Editor’s note: Document the main spatial computing functions. Examples: Localization, spatial mapping, semantic perception, etc.]

### 4.2.1 Localization

TBD

### 4.2.2 Spatial mapping

TBD

### 4.2.3 Semantic perception

[Editor’s note: AI/ML technologies for spatial computing (e.g., object detection and recognition, scene labelling).]

## 4.3 Spatial description formats

[Editor’s note: Collect and document relevant formats for spatial descriptions.]

## 4.4 Quality of experience (QoE) for spatial computing

[Editor’s note: Information on factors contributing to the QoE of spatial computing and relevant QoE metrics (with reference to those already defined in TR 26.812.]

# 5 Ongoing standardization work

[Editor’s note: 3GPP (e.g., SA6), ETSI, Open Spatial Computing]

# 6 Core use cases and scenarios

[Editor’s note: Document core use cases based on those documented in SA1 TR 22.856, SA4 TR 26.928 and TR 26.998.]

# 7 Mapping of spatial computing to 5G services

[Editor’s note: Architecture extensions, procedures, call flows, and configurations]

## 7.x Cross operation with other architectures and media service enablers

[Editor’s note: Document potential interactions with other architectures (e.g., TR 26.297) and media service enablers (e.g., TS 26.565) defined by SA4.]

# 8 Conclusions and proposed next steps

## 8.1 Conclusions

TBD

## 8.2 Proposed next steps

TBD

Annex A:
Spatial computing use cases

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.

# A.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>:
Bibliography

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 <C>:
Index

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 <F>:
Change history

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

This table is to be used for recording progress during the WG drafting process till TSG approval of this 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 |
|  |  |  |  |  |  | Initial draft of the TR | 0.1.0 |