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| 3GPP TR 38.871 V0.0.1 (2022-08) | |
| Technical Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Radio Access Network;  NR;  Study on NR frequency range 2 (FR2) Over-the-Air (OTA) testing enhancements;  (Release 18) | |
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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 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 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

The objectives for FR2-1 OTA testing for UEs with multi-panel reception and 4DL layer are as follows.

* Define a test methodology for RF/RRM/Demodulation requirements testing for devices that can receive simultaneously from multiple Angle of Arrival (AoA)
  + The multiple AoA test setup should enable testing of up to 2 DL Layers with dual polarization for each angle
  + For RRM, the target should be to allow testing of 4 AoAs with 2 simultaneously active AoAs
  + Define a test methodology for up to 4 DL MIMO layer demodulation testing
* Smartphone form factor should be the first priority, other UE types should also be discussed as 2nd priority
* Develop the related preliminary uncertainty assessments for the test methodologies
* The tests shall take the test system reuse, test system complexity and test time into account to keep the whole test costs within a reasonable level.

# 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 38.101-2: "User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".

[3] 3GPP TR 38.810: "Study on test methods".

[4] 3GPP TR 38.884: " Study on enhanced test methods for FR2 NR UEs".

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

# 3 Definitions of terms, symbols and abbreviations

<Editor’s note: 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 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].

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

<Editor’s note: general aspects related to the scope of the study or common study outcomes can be captured in this clause>

# 5 UE RF testing methodology for multi-panel reception

## 5.1 General

<Editor’s note: general aspects related to the UE RF testing methodology for multi-panel reception can be captured in this clause>

## 5.2 Measurement setup

<Editor’s note: outcome of measurement setup for UE RF testing can be captured in this clause>

# 6 UE RRM testing methodology for multi-panel reception

## 6.1 General

<Editor’s note: general aspects related to the UE RRM testing methodology for multi-panel reception can be captured in this clause>

## 6.2 Measurement setup

*<Editor’s note: outcome of measurement setup for UE RF testing can be captured in this clause>*

# 6 UE demodulation and CSI testing methodology for multi-panel reception

## 6.1 General

<Editor’s note: general aspects related to the UE RRM testing methodology for multi-panel reception can be captured in this clause>

## 6.2 Measurement setup

*<Editor’s note: outcome of measurement setup for UE RF testing can be captured in this clause>*

Annex A:  
Measurement uncertainty

# A.1 Measurement uncertainty budget for UE RF testing methodology

<Editor’s note: the outcome of MU budget for UE RF testing methodology can be captured in this clause>

# A.2 Measurement uncertainty budget for UE RRM testing methodology

<Editor’s note: the outcome of MU budget for UE RRM testing methodology can be captured in this clause>

# A.3 Measurement uncertainty budget for UE demodulation testing methodology

<Editor’s note: the outcome of MU budget for UE demodulation testing methodology can be captured in this clause>

Annex <X>:  
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

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| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-08 | R4#104e | R4-2213182 |  |  |  | Initial skeleton | 0.0.1 |