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| Technical Report |
| 3rd Generation Partnership Project;Technical Specification Group Radio Access Network;Study on NR mmWave MB-BS(Release 18 ) |
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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.

# 1 Scope

The present document is the Technical Report for the Study Item on BS RF requirement evolutiondealing with FR2 multi-band BS deployments.

# 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>".

# 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 General

## 4.1 Study item objective

Study the following aspects for FR2 multi-band BS:

* + - Example bands:
			* 26+28 GHz: n258 + n261
			* 28+39 GHz: n257/n261 + n260
			* 26+40 GHz: n258 + n259/n262
			* 28+40 GHz: n257/n261 + n259/n262
		- Investigate the feasibility and performance of wideband RF and antenna architectures covering multiple FR2 bands
		- Investigate if FR1 multi-band methods are re-usable for FR2, and (if so) agree on the appropriate inter-RF BW gaps
		- Investigate if FR1 exceptions are acceptable for FR2
		- Investigate whether a generic solution for all combinations within FR2-1 is possible and/or a solution for all or a part of the frequency range should be targeted
			* Frequency range 24-29 GHz which includes n257/n258/n261
			* Frequency range 37-48 GHz which includes n260/n259/n262
		- Study the definition of FR2 multi-band BS

## 4.2 Deployment scenarios

# 5 Feasibility study

## 5.1 General

## 5.2 Wideband RF architectures

## 5.3 Wideband antenna architectures

# 6 Study on RF requirements

## 6.1 Definition of FR2 multi-band BS

## 6.2 Re-using FR1 multi-band methods

## 6.3 Re-using FR1 exceptions

## 6.4 FR2 specific multi-band requirements

Annex <A> (informative):
Change history

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| Change history |
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2022-08 | RAN4#104-e | R4-22 |  |  |  | TR skeleton | 0.0.1 |