3GPP TR 38.844 V0.0.2 (2021-01)

Technical Report

3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
NR;
Study on Efficient utilization of licensed spectrum that is not aligned with existing NR channel bandwidths

(Release 17)

3GPP

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Contents

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

One of the aims of 5G is providing bandwidth flexibility. Although this is achieved in general, but for some spectrum allocations the ability to achieve such flexibility needs further study.

1 Scope

The present document is the Technical Report of the Study Item on Efficient utilization of licensed spectrum that is not aligned with existing NR channel bandwidths, approved at TSG RAN #89-e [2]. The purpose of this document is to capture and document the outcome of the objectives stated in the SID.

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] RP-202103: SID “Study on Efficient utilization of licensed spectrum that is not aligned with existing NR channel bandwidths”

3 Definitions of terms, symbols and 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].

TDB

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> <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].

ACLR	Adjacent Channel Leakage Ratio
ACS	Adjacent Channel Selectivity
BS	Base Station
BW	Bandwidth
FR1	Frequency Range 1
RF	Radio Frequency

UE User Equipment

4 Background

One of the aims of 5G is providing bandwidth flexibility. Although this is achieved in general, but for some spectrum allocations the ability to achieve such flexibility needs further study.

Solutions for the following spectrum allocations have been requested so far:

Table 4-1: Summary of operators' input for irregular channel bandwidth

Band (s)	Channel Bandwidth(s)
n5	7, 11, 12.5 MHz
n12	6, 12 MHz
n26	7 MHz
n28	13, 33 MHz
n29	6, 11 MHz

Some techniques have been suggested for re-using existing channel bandwidths which can include but not limited to overlapping UE channel bandwidths, and/or using larger bandwidths than operator licensed bandwidth. This Study Item is needed to evaluate where existing techniques can be used to efficiently utilize operator spectrum allocations, and whether and how new channel bandwidths should be created. The Study shall also analyse if a proprietary solution(s) is sufficient

4.1 Objectives

The following objectives are listed in the SID [2]

1) Identify operator licensed channel bandwidths in FR1 that do not align with existing NR channel bandwidths.

   - Only licensed spectrum wider than 5 MHz to be considered in this SID.

   - Spectrum block of 33MHz in n28 require further investigation since there is dual duplexer assumption (2x30MHz) for this band.

2) Evaluate the potential use of larger channel bandwidths than operator licensed bandwidth, including the impacts on regulatory emission requirements/UE output power implications and UE ACS/blocking impacts depending on the guard band and the SCS.

3) Study the use of overlapping UE channel bandwidths (from both UE and network perspective) to cover operator's license spectrum for both UL and DL, and if new gNB channel bandwidths are needed.

NOTE: For all considered solutions, new (dedicated) channel filters (e.g. non-integer-multiples of 5MHz) are not considered for the UE and not prioritized for the gNB.

4) Identify operator licensed bandwidths that are not compatible with the use of techniques like overlapping UE channel bandwidths. Every proposed method shall be summarized with respect to whether all considered spectrum scenarios are supported or whether there are specific limitations. Some limitations for a specific method shall not disqualify such method if there is a trade-off between flexibility and implementation challenges.

5) Study the complexity and efficiency of adding new channel bandwidths vs. using other including testing aspects.

6) Generic solution(s) should be intended as much as possible, with priority should be given to approaches that avoid the introduction of new channel BWs on the UE side. Proprietary solutions if proven relevant should not

be precluded. Spectrally efficient methods providing a fine channel bandwidth granularity as well as low to moderate guard band width and signalling overhead should be preferred

7) Impact on RAN1 and RAN2 should be considered and minimized

8) For any considered solution, UEs not supporting such solution (both legacy and new UEs) should be able to use the next lower supported channel bandwidth in the UL and DL without implications.

9) Impact (if any) on RAN4 requirements should be identified for the preferred solutions.

5 Result, Analysis outcome

5.1 Study of larger Channel BW than licenced BW

Placeholder for 2nd objective analysis

5.2 Study of overlapping UE channel bandwidths

Placeholder for 3rd objective study

5.3 Complexity and efficiency study

Placeholder for 5th objective study

5.4 Generic solutions guidance

N/A

NOTE: The 6th objective is not an analysis/study but a guidance on solutions. A comparison of the proposed solutions with respect to the criteria in the 6th objective should be included in this clause.

5.5 RAN1 and RAN2 impact

Placeholder for 7th objective study

5.6 Legacy UE impact

N/A

NOTE: The 8th objective is not an analysis/study but a guidance on solutions

5.7 RAN4 standard impact identification

Placeholder for 9th objective study

6 Conclusion

TBD

Page setup parameters

This clause defines the margin parameters and the header to be used (implemented in the macros).

Title page (= title section)

A4 portrait, Top: 4 cm, Bottom: 19 cm, Left: 1,5 cm, Right: 1,5 cm, Gutter: 0 cm, Header: 0 cm, Footer: 0 cm.

Portrait sections

A4 portrait, Top: 2.5 cm, Bottom: 2 cm, Left: 2 cm, Right: 2 cm, Gutter: 0 cm, Header: 1,5 cm, Footer: 0,6 cm.

Landscape sections

A4 landscape, Top: 2 cm, Bottom: 2 cm, Left: 2 cm, Right: 2,5 cm, Gutter: 0 cm, Header: 1,5 cm, Footer: 0,6 cm.

Headers and footers

Header

The following contains the master location for all headers (except for the title section). These paragraphs contain framed fields which will result in one header line and are bookmarked "header".

The left-most entry contains a possible additional document reference, e.g. " Release 17", identified on the title page by the use of the ZGSM character style.

Release 17

The centre entry is the page number.

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The right-most entry repeats the title page information, identified by the use of the ZA paragraph style.

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NOTE: For documents which are split into more than one file, the possible additional document reference and the title page information need to be hardcoded in all files except the one containing the title section.

*NOTE: It has been found that opening very long documents with MS Word 2016 onwards (including versions of Word packaged in MS Office 365) can take a very long time, as can navigating around the document. This applies both in draft view and in print layout view. To solve this problem, the page header **for each section** of the document may be hard-coded, replicating the text which would otherwise have been automated via the use of ZGSM and ZA styles.*

Footer

The footer contains always "3GPP" (except for the title page).

3GPP

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

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

Annex <X> (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