3GPP TR 38.717-05-01 V0.1.0 (2020-08)

Technical Report

3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; NR inter-band CA for 5 bands DL with x bands UL (x=1, 2) (Release 17)

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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.

1 Scope

The present document is a technical report on inter-band CA for 5 bands DL with x bands UL (x=1, 2) under Rel-17 time frame. The purpose is to gather the relevant background information and studies in order to address 5 bands DL/ x bands UL (x=1, 2) Inter-band Carrier Aggregation requirements for the Rel-17 band combinations in Table 1-1 and Table 1-2.

Table 1-1: Release 17 5 bands DL/ x bands UL (x=1, 2) inter-band carrier aggregation combinations involving FR1

CA combinations

Table 1-2: Release 17 5 bands DL/ x bands UL (x=1, 2) inter-band carrier aggregation combinations between FR1 and FR2

CA combinations

This TR contains a general part and specific band combination part. The actual requirements are added to the corresponding technical specifications.

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-201026, " New WID on Rel-17 Band combinations for SA NR Supplementary uplink (SUL), NSA NR SUL, NSA NR SUL with UL sharing from the UE perspective (ULSUP)", RAN#88

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].

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>
$\Delta R_{IB,c}$	Allowed reference sensitivity relaxation due to support for inter-band CA operation, for serving cell *c*.
$\Delta T_{IB,c}$	Allowed maximum configured output power relaxation due to support for inter-band CA operation, for serving cell *c*.

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>	<Expansion>
BS	Base Station
BCS	Bandwidth Combination Set
CA	Carrier Aggregation
CC	Component Carriers
DC	Dual Connectivity
DL	Downlink
E-UTRA	Evolved UMTS Terrestrial Radio Access
FDD	Frequency Division Duplex
MPR	Allowed maximum power reduction
MSD	Maximum Sensitivity Degradation
NR	New Radio
REFSENS	Reference Sensitivity power level
SCS	Subcarrier spacing
TDD	Time Division Duplex
UE	User Equipment
UL	Uplink

4 Background

The present document is a technical report for 4 bands DL/ x bands UL (x=1, 2) Inter-band Carrier Aggregation under Rel-17 timeframe. The document covers each band combination specific issues (i.e. one sub-clause defined per band combination)

4.1 TR Maintenance

A single company is responsible for introducing all approved TPs in the current TR, i.e. TR editor. However, it is the responsibility of the contact person of each band/band combination to ensure that the TPs related to the band/band combination have been implemented.

5 Five bands inter-band CA involving FR1

5.Y CA_nX-nY-nZ-nW-nV

5.Y.1 Operating bands for CA

Table 5.Y.1-1: Inter-band CA operating bands of CA_nX-nY-nZ-nW-nV

NR Band	Uplink (UL) band	Downlink (DL) band	Duplex mode
	BS receive / UE transmit	BS transmit / UE receive	
	F_{UL_low} – F_{UL_high}	F_{DL_low} – F_{DL_high}	
nX	–	–	
nY	–	–	
nZ	–	–	
nW	–	–	
nV	–	–	

5.Y.2 Configurations for inter-band CA

Table 5.Y.2-1: Supported channel bandwidths per CA configuration for CA_nX-nY-nZ-nW-nV

NR CA Configuration	UL Config	NR Band	SCS [kHz]	5	10	15	20	25	30	40	50	60	70	80	90	100	Bandwidth combination set
CA_nX-nY-nZ-nW-nV	-	nX	15														0
			30														
			60														
		nY	15														
			30														
			60														
		nZ	15														
			30														
			60														
		nW	15														
			30														
			60														
		nV	15														
			30														
			60														

5.Y.3 ΔT_{IB} and ΔR_{IB} values

For CA_nX-nY-nZ-nW-nV , the $\Delta T_{IB,c}$ and $\Delta R_{IB,c}$ values are given in the tables below.

Table 5.Y.3-1: $\Delta T_{IB,c}$

Inter-band CA Configuration	NR Band	$\Delta T_{IB,c}$ [dB]
CA_nX-nY-nZ-nW-nV	nX	
	nY	
	nZ	
	nW	
	nV	

Table 5.Y.3-2: $\Delta R_{IB,c}$

Inter-band CA Configuration	NR Band	$\Delta R_{IB,c}$ [dB]
CA_nX-nY-nZ-nW-nV	nX	
	nY	
	nZ	
	nW	
	nV	

6 Five bands inter-band CA between FR1 and FR2

6.Y CA_nX-nY-nZ-nW-nV

6.Y.1 Operating bands for CA

Table 6.Y.1-1: Inter-band CA operating bands of CA_nX-nY-nZ-nW-nV

NR Band	Uplink (UL) band	Downlink (DL) band	Duplex mode
	BS receive / UE transmit	BS transmit / UE receive	
	F_{UL_low} – F_{UL_high}	F_{DL_low} – F_{DL_high}	
nX	–	–	
nY	–	–	
nZ	–	–	
nW	–	–	
nV	–	–	

6.Y.2 Configurations for inter-band CA

Table 6.Y.2-1: Supported channel bandwidths per CA configuration for CA_nX-nY-nZ-nW-nV

NR CA Configuration	UL Config	NR Band	SCS [kHz]	5	10	15	20	25	30	40	50	60	80	90	100	200	400	Bandwidth combination set
CA_nX-nY-nZ-nW-nV	-	nX	15															0
			30															
			60															
		nY	15															
			30															
			60															
		nZ	15															
			30															
			60															
		nW	15															
			30															
			60															
		nV	60															
			120															

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2020-08	3GPP RAN4#96-e	R4-2011228				Initial TR skeleton	0.0.1
2020-08	3GPP RAN4#96-e	R4-2011229				TR 38.717-05-01	0.1.0