3GPP TR 36.716-03-01 V16.0.0 (2020-06)

Technical Report

3rd Generation Partnership Project;

Technical Specification Group Radio Access Networks;

LTE inter-band CA for 3 bands DL with 1 band UL

(Release 16)



The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP.  
The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented.  
This Report is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification.  
Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices.

Keywords

<keyword[, keyword]>

***3GPP***

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis

Valbonne - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

http://www.3gpp.org

***Copyright Notification***

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© 2020, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC).

All rights reserved.

UMTS™ is a Trade Mark of ETSI registered for the benefit of its members

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  
LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners

GSM® and the GSM logo are registered and owned by the GSM Association

Contents

Foreword 7

1 Scope 8

2 References 9

3 Definitions, symbols and abbreviations 9

3.1 Definitions 9

3.2 Symbols 9

3.3 Abbreviations 9

4 Background 9

4.1 TR Maintenance 9

5 3 Band Carrier Aggregation with Single UL: Specific Band Combination Part 10

5.1 CA\_3-18-42 10

5.1.1 Channel bandwidths per operating band for CA 10

5.1.2 ∆TIB and ∆RIB values 10

5.1.3 REFSENS requirements 10

5.2 CA\_2-7-46 12

5.2.1 Channel bandwidths per operating band for CA 12

5.2.2 ∆TIB and ∆RIB values 13

5.2.3 REFSENS requirements 13

5.3 CA\_7-28-40 14

5.3.1 Channel bandwidths per operating band for CA 14

5.3.2 ∆TIB and ∆RIB values 14

5.3.3 REFSENS requirements 15

5.4 CA\_1-28-40 16

5.4.1 Channel bandwidths per operating band for CA 16

5.4.2 ∆TIB and ∆RIB values 17

5.4.3 REFSENS requirements 17

5.5 CA\_1-3-46 18

5.5.1 Channel bandwidths per operating band for CA 18

5.5.2 ∆TIB and ∆RIB values 19

5.5.3 REFSENS requirements 19

5.6 CA\_1-18-42 20

5.6.1 Channel bandwidths per operating band for CA 20

5.6.2 ∆TIB and ∆RIB values 20

5.6.3 REFSENS requirements 20

5.7 CA\_1-7-28 21

5.7.1 Channel bandwidths per operating band for CA 21

5.7.2 ∆TIB and ∆RIB values 21

5.7.3 REFSENS requirements 21

5.8 CA\_3-5-28 22

5.8.1 Channel bandwidths per operating band for CA 22

5.8.2 ∆TIB and ∆RIB values 22

5.8.3 REFSENS requirements 22

5.9 CA\_3-7-28 23

5.9.1 Channel bandwidths per operating band for CA 23

5.9.2 ∆TIB and ∆RIB values 23

5.9.3 REFSENS requirements 23

5.10 CA\_1-3-28 24

5.10.1 Channel bandwidths per operating band for CA 24

5.10.2 ∆TIB and ∆RIB values 24

5.10.3 REFSENS requirements 25

5.11 CA\_3-32-46 25

5.11.1 Channel bandwidths per operating band for CA 25

5.11.2 ∆TIB and ∆RIB values 26

5.11.3 REFSENS requirements 26

5.12 CA\_7-32-46 26

5.12.1 Channel bandwidths per operating band for CA 26

5.12.2 ∆TIB and ∆RIB values 27

5.12.3 REFSENS requirements 27

5.13 CA\_1-3-28 28

5.13.1 Channel bandwidths per operating band for CA 28

5.13.2 ∆TIB and ∆RIB values 28

5.13.3 REFSENS requirements 28

5.14 CA\_1-7-38 30

5.14.1 Channel bandwidths per operating band for CA 30

5.14.2 ∆TIB and ∆RIB values 30

5.14.3 REFSENS requirements 30

5.15 CA\_5-48-66 31

5.15.1 Channel bandwidths per operating band for CA 31

5.15.2 ∆TIB and ∆RIB values 31

5.15.3 REFSENS requirements 32

5.16 CA\_7-29-66 33

5.16.1 Channel bandwidths per operating band for CA 33

5.16.2 ∆TIB and ∆RIB values 33

5.16.3 REFSENS requirements 34

5.17 CA\_2-48-66 34

5.17.1 Channel bandwidths per operating band for CA 34

5.17.2 ∆TIB and ∆RIB values 35

5.17.3 REFSENS requirements 35

5.18 CA\_1-3-46 36

5.18.1 Channel bandwidths per operating band for CA 36

5.18.2 ∆TIB and ∆RIB values 36

5.18.3 REFSENS requirements 36

5.19 CA\_1-7-46 37

5.19.1 Channel bandwidths per operating band for CA 37

5.19.2 ∆TIB and ∆RIB values 37

5.19.3 REFSENS requirements 38

5.20 CA\_2-7-66 38

5.20.1 Channel bandwidths per operating band for CA 38

5.20.2 ∆TIB and ∆RIB values 38

5.20.3 REFSENS requirements 39

5.21 CA\_2-5-46 39

5.21.1 Channel bandwidths per operating band for CA 39

5.21.2 ∆TIB and ∆RIB values 39

5.21.3 REFSENS requirements 40

5.22 CA\_13-48-66 40

5.22.1 Channel bandwidths per operating band for CA 40

5.22.2 ∆TIB and ∆RIB values 40

5.22.3 REFSENS requirements 40

5.23 CA\_2-46-66 41

5.23.1 Channel bandwidths per operating band for CA 41

5.23.2 ∆TIB and ∆RIB values 41

5.23.3 REFSENS requirements 42

5.24 CA\_5-46-66 42

5.24.1 Channel bandwidths per operating band for CA 42

5.24.2 ∆TIB and ∆RIB values 42

5.24.3 REFSENS requirements 43

5.25 CA\_13-48-66 43

5.25.1 Channel bandwidths per operating band for CA 43

5.25.2 ∆TIB and ∆RIB values 43

5.25.3 REFSENS requirements 44

5.26 CA\_1-3-7 45

5.26.1 Channel bandwidths per operating band for CA 45

5.26.2 ∆TIB and ∆RIB values 46

5.26.3 REFSENS requirements 46

5.27 CA\_3-5-28 47

5.27.1 Channel bandwidths per operating band for CA 47

5.27.2 ∆TIB and ∆RIB values 47

5.27.3 REFSENS requirements 47

5.28 CA\_5-7-28 48

5.28.1 Channel bandwidths per operating band for CA 48

5.28.2 ∆TIB and ∆RIB values 48

5.28.3 REFSENS requirements 48

5.29 CA\_3-7-46 49

5.29.1 Channel bandwidths per operating band for CA 49

5.29.2 ∆TIB and ∆RIB values 49

5.29.3 REFSENS requirements 49

5.30 CA\_5-7-66 50

5.30.1 Channel bandwidths per operating band for CA 50

5.30.2 ∆TIB and ∆RIB values 50

5.30.3 REFSENS requirements 51

5.31 CA\_3-5-7 51

5.31.1 Channel bandwidths per operating band for CA 51

5.31.2 ∆TIB and ∆RIB values 51

5.31.3 REFSENS requirements 52

5.32 CA\_2-7-28 52

5.32.1 Channel bandwidths per operating band for CA 52

5.32.2 ∆TIB and ∆RIB values 52

5.32.3 REFSENS requirements 52

5.33 CA\_1-8-42 53

5.33.1 Channel bandwidths per operating band for CA 53

5.33.2 ∆TIB and ∆RIB values 53

5.33.3 REFSENS requirements 53

5.34 CA\_3-8-42 54

5.34.1 Channel bandwidths per operating band for CA 54

5.34.2 ∆TIB and ∆RIB values 55

5.34.3 REFSENS requirements 55

5.35 CA\_2-7-29 57

5.35.1 Channel bandwidths per operating band for CA 57

5.35.2 ∆TIB and ∆RIB values 57

5.35.3 REFSENS requirements 57

5.36 CA\_25-26-41 58

5.36.1 Channel bandwidths per operating band for CA 58

5.36.2 ∆TIB and ∆RIB values 59

5.36.3 REFSENS requirements 59

5.37 CA\_8-11-42 59

5.37.1 Channel bandwidths per operating band for CA 59

5.37.2 ∆TIB and ∆RIB values 60

5.37.3 REFSENS requirements 60

5.38 CA\_1-11-42 61

5.38.1 Channel bandwidths per operating band for CA 61

5.38.2 ∆TIB and ∆RIB values 61

5.38.3 REFSENS requirements 62

5.39 CA\_2-7-13 62

5.39.1 Channel bandwidths per operating band for CA 62

5.39.2 ∆TIB and ∆RIB values 62

5.39.3 REFSENS requirements 62

5.40 CA\_7-13-66 63

5.40.1 Channel bandwidths per operating band for CA 63

5.40.2 ∆TIB and ∆RIB values 63

5.40.3 REFSENS requirements 63

5.41 CA\_1-7-20 64

5.41.1 Channel bandwidths per operating band for CA 64

5.41.2 ∆TIB and ∆RIB values 64

5.41.3 REFSENS requirements 64

5.42 CA\_3-7-20 65

5.42.1 Channel bandwidths per operating band for CA 65

5.42.2 ∆TIB and ∆RIB values 65

5.42.3 REFSENS requirements 65

5.43 CA\_2-7-26 66

5.43.1 Channel bandwidths per operating band for CA 66

5.43.2 ∆TIB and ∆RIB values 66

5.43.3 REFSENS requirements 66

5.44 CA\_2-26-66 67

5.44.1 Channel bandwidths per operating band for CA 67

5.44.2 ∆TIB and ∆RIB values 67

5.44.3 REFSENS requirements 67

5.45 CA\_7-26-66 68

5.45.1 Channel bandwidths per operating band for CA 68

5.45.2 ∆TIB and ∆RIB values 68

5.45.3 REFSENS requirements 68

5.46 CA\_1-18-41 69

5.46.1 Channel bandwidths per operating band for CA 69

5.46.2 ∆TIB and ∆RIB values 69

5.46.3 REFSENS requirements 69

5.47 CA\_1-20-38 70

5.47.1 Channel bandwidths per operating band for CA 70

5.47.2 ∆TIB and ∆RIB values 70

5.47.3 REFSENS requirements 70

Annex A: Change history 71

# 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.

# 1 Scope

The present document is a technical report on inter-band CA for 3 bands DL with 1 band UL under Rel-16 time frame. The purpose is to gather the relevant background information and studies in order to address 3 bands DL/1 band UL Inter-band Carrier Aggregation requirements for the Rel-16 band combinations in Table 1-1.

Table 1-1: Release 16 3 bands DL/1 band UL inter-band carrier aggregation combinations

|  |  |
| --- | --- |
| CA combination | REL independent from |
| 3A-41A-42A-42A\_BCS0 | REL-12 |
| 3A-41A-42A-42C\_BCS0 | REL-12 |
| 3A-41A-42C-42C\_BCS0 | REL-15 |
| 3A-41A-42A-42C\_ UL\_42C\_BCS0 | REL-12 |
| 3A-7A-46E\_BSC0 | Rel-15 |
| 3A-32A-46E\_BSC0 | Rel-15 |
| 3A-32A-46D\_BSC0 | Rel-13 |
| 3A-32A-46C\_BSC0 | Rel-13 |
| 3A-32A-46A\_BSC0 | Rel-13 |
| 7A-32A-46E\_BSC0 | Rel-15 |
| CA\_7A-32A-46D\_BSC0 | Rel-13 |
| CA\_7A-32A-46C\_BSC0 | Rel-13 |
| CA\_7A-32A-46A\_BSC0 | Rel-13 |
| 2A-7A-7A-46A\_BCS0 | REL-13 |
| 2A-7A-46C\_BCS0 | REL-13 |
| 2A-7A-7A-46C\_BCS0 | REL-13 |
| 2A-7A-46D\_BCS0 | REL-13 |
| 2A-7A-7A-46D\_BCS0 | REL-13 |
| 2A-7A-46E\_BCS0 | REL-13 |
| 2A-7A-7A-46E\_BCS0 | REL-13 |
| 7A-28A-40A\_BCS0 | REL-12 |
| 7A-28A-40C\_BCS0 | REL-12 |
| 1A-28A-40A\_BCS0 | REL-12 |
| 1A-28A-40C\_BCS0 | REL-12 |
| 1A-3A-46A\_BCS0 | REL-12 |
| 1A-3A-46C\_BCS0 | REL-12 |
| 3A-7A-46C\_BCS0 | REL-12 |
| 3C-7A-28A\_2CC\_UL\_3C | Rel-11 |
| 1A-3C-28A\_2CC\_UL\_3C | Rel-11 |
| 3C-7C-28A\_2CC\_UL\_3C | Rel-12 |
| 3C-7C-28A\_2CC\_UL\_7C | Rel-12 |
| 1A-7A-7A-28A | Rel-11 |
| 3A-7A-7A-28A | Rel-11 |
| 3A-5A-28A | Rel-11 |
| 1A-3A-41C\_BCS0 | REL-12 |
| 1A-18A-42C\_BCS0 | REL-12 |
| 3A-18A-42C\_BCS0 | REL-12 |
| 1A-18A-42A\_BCS0 | REL-12 |
| 3A-18A-42A\_BCS0 | REL-12 |

This TR contains a band specific 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-181436, “New WID on Rel16 LTE inter-band CA for 3 bands DL with 1 band UL”, RAN#80.

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions 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].

## 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 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].

# 4 Background

The present document is a technical report for 3 bands DL/1 band UL Inter-band Carrier Aggregation under Rel-16 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 combination to ensure that the TPs related to the band combination have been implemented.

# 5 3 Band Carrier Aggregation with Single UL: Specific Band Combination Part

## 5.1 CA\_3-18-42

### 5.1.1 Channel bandwidths per operating band for CA

Table 5.1.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | | 3 MHz | | 5 MHz | | 10 MHz | | 15 MHz | 20 MHz | |
| CA\_3A-18A-42A | 3 |  |  | | Yes | | Yes | | Yes | | | Yes | 55 | 0 |
| 18 |  |  | | Yes | | Yes | | Yes | | |  |
| 42 |  |  | | Yes | | Yes | | Yes | | | Yes |

Table 5.1.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | | 3 MHz | | 5 MHz | | 10 MHz | | 15 MHz | 20 MHz | |
| CA\_3A-18A-42C | 3 |  |  | | Yes | | Yes | | Yes | | | Yes | 75 | 0 |
| 18 |  |  | | Yes | | Yes | | Yes | | |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 of TS36.101 | | | | | | | | | | |

### 5.1.2 ∆TIB and ∆RIB values

The same ∆TIB and ∆RIB values of CA\_3-19-42 specified in TS36.101 can be applied for CA\_3-18-42.

Table 5.1.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_3-18-42 | 3 | 0.6 |
| 18 | 0.3 |
| 42 | 0.8 |

Table 5.1.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_3-18-42 | 3 | 0.2 |
| 18 | 0 |
| 42 | 0.5 |

### 5.1.3 REFSENS requirements

REFSENS requirements of CA\_3A-19A-42A defined in TS36.101 can be applied for CA\_3A-18A-42A.

Table 5.1.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_3A-18A-42A9,10  CA\_3A-18A-42C9,10 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| 4233 |  |  | -71.7 | -71.7 | -71.7 | -71.7 | TDD |
| CA\_3A-18A-42A11  CA\_3A-18A-42C11 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| 4233 |  |  | -97.1 | -94.7 | -93.2 | -92.5 | TDD |
| NOTE 9: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range FHD above and below the edge of this downlink transmission bandwidth. The value FHD depends on the E-UTRA configuration: FHD = 10 MHz for CA\_3A-42A, CA\_3A-3A-42A, CA\_3A-42A-42A, CA\_1A-3A-20A-32A-42A, CA\_3A-42A-43A, CA\_3A-32A-42A-43A, CA\_1A-3A-42A, CA\_2A-13A-48A-66A, CA\_2A-48A, CA\_2A-48C, CA\_2A-48D, CA\_48A-66A, CA\_3A-7A-42A, CA\_3A-19A-42A, CA\_3A-20A-42A, CA\_3A-28A-42A, CA\_1A-3A-7A-42A, CA\_13A-48A-66A, CA\_13A-48A-66B, CA\_13A-48A-66C, CA\_13A-48A-48A-66A, CA\_13A-48C-66A, CA\_48A-66A-66A, CA\_48A-66B , CA\_48A-66C, CA\_48A-48A-66A, CA\_48C-66A, CA\_48A-48A-66A-66A, CA\_48A-48A-66B, CA\_48A-48A-66C, CA\_48C-66B, CA\_48C-66C, CA\_48E-66A, CA\_1A-3A-19A-42A, CA\_1A-3A-32A-42A, CA\_3A-7A-20A-42A, CA\_3A-20A-32A-42A, CA\_3A-28A-41A-42A, CA\_3A-18A-42A and CA\_3A-18A-42C. FHD = 0MHz for CA\_11A-28A, CA\_1A-11A-28A and CA\_3A-11A-28A.  NOTE 10: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 11: The requirements are only applicable to channel bandwidths with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.  NOTE 33: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 5.1.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_3A-18A-42A  CA\_3A-18A-42C | 3 |  |  | 12 | 25 | 36 | 50 | FDD |

## 5.2 CA\_2-7-46

### 5.2.1 Channel bandwidths per operating band for CA

Table 5.2.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 2 | 1850 MHz | – | 1910 MHz | 1930 MHz | – | 1990 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 46 | 5150 MHz | – | 5925 MHz | 5150 MHz | – | 5925 MHz | TDD |

Table 5.2.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA CA configuration / Bandwidth combination set** | | | | | | | | | | |
|
| **E-UTRA CA Configuration** | **Uplink CA configurations** | **E-UTRA Bands** | **1.4** | **3** | **5** | **10** | **15** | **20** | **Maximum aggregated bandwidth** | **Bandwidth combination set** |
| **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **[MHz]** |
| CA\_2A-7A-7A-46A | - | 2 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | |
| 46 |  |  |  |  |  | Yes |
| CA\_2A-7A-46C | - | 2 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |
| CA\_2A-7A-7A-46C | - | 2 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | |
| 46 | See CA\_46C Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |
| CA\_2A-7A-46D | - | 2 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46D Bandwidth Combination Set 0 in the Table 5.6A.1-1 | | | | | |
| CA\_2A-7A-7A-46D | - | 2 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | |
| 46 | See CA\_46D Bandwidth Combination Set 0 in the Table 5.6A.1-1 | | | | | |
| CA\_2A-7A-46E | - | 2 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See the CA\_46E Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |
| CA\_2A-7A-7A-46E | - | 2 |  |  | Yes | Yes | Yes | Yes | 140 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | |
| 46 | See the CA\_46E Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |

### 5.2.2 ∆TIB and ∆RIB values

For CA\_2-7-46, the ΔTIB,c and ΔRIB,c values are shown in table 5.2.3-1 and table 5.2.3-2, respectively.

Table 5.2.3-1: ΔTIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_2-7-46 | 2 | 0.5 |
| 7 | 0.5 |

Table 5.2.3-2: ΔRIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_2-7-46 | 2 | 0 |
| 7 | 0 |
| 46 | 0 |

### 5.2.3 REFSENS requirements

The REFSENS requirements for CA\_2-7-46 are shown in Table 5.x.4-1 with the uplink configuration specified in Table 7.3.1-2 of TS36.101, and the exclusion zones for band 46 due to harmonics are specified in Table 7.3.1A-0eC of TS36.101.

Table 5.2.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (CA with band 46)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_2A-7A-46A  CA\_2A-7A-7A-46A  CA\_2A-7A-46C  CA\_2A-7A-7A-46C  CA\_2A-7A-46D  CA\_2A-7A-7A-46D  CA\_2A-7A-46E  CA\_2A-7A-7A-46E | 2 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 7 |  |  | -98 | -95 | -93.2 | -92 |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.3 CA\_7-28-40

### 5.3.1 Channel bandwidths per operating band for CA

Table 5.3.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |
| 40 | 2300 MHz | – | 2400 MHz | 2300 MHz | – | 2400 MHz | TDD |

Table 5.3.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA CA configuration / Bandwidth combination set** | | | | | | | | | | |
|
| **E-UTRA CA Configuration** | **Uplink CA configurations** | **E-UTRA Bands** | **1.4** | **3** | **5** | **10** | **15** | **20** | **Maximum aggregated bandwidth** | **Bandwidth combination set** |
| **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **[MHz]** |
| CA\_7A-28A-40A | - | 7 |  |  | Yes | Yes | Yes | Yes | 60 | 0 |
| 28 |  |  | Yes | Yes | Yes | Yes |
| 40 |  |  | Yes | Yes | Yes | Yes |
| CA\_7A-28A-40C | - | 7 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 28 |  |  | Yes | Yes | Yes | Yes |
| 40 | See CA\_40C Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |

It can be seen from Table 5.3.2-1 that there is harmonic mixing issue between band 28 and 40.

### 5.3.2 ∆TIB and ∆RIB values

For CA\_7-28-40, the ΔTIB,c and ΔRIB,c values are shown in table 5.3.3-1 and table 5.3.3-2, respectively.

Table 5.3.3-1: ΔTIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_7-28-40 | 7 | 0.5 |
| 28 | 0.3 |
| 40 | 0.6 |

Table 5.3.3-2: ΔRIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_7-28-40 | 7 | 0 |
| 28 | 0 |
| 40 | 0.5 |

### 5.3.3 REFSENS requirements

REFSENS requirements for CA\_7-28-40 (exceptions due to harmonic issues) are defined in table 5.3.3-1 for inclusion in TS 36.101 table 7.3.1A-0a, and in table 5.3.3-2 for inclusion in TS 36.101 table 7.3.1A-0b.

Table 5.3.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_7A-28A-40A15,16  CA\_7A-28A-40C15,16 | 28 |  |  | -60.7 | -60.7 | -60.7 | -60.7 | FDD |
| NOTE 15: These requirements apply when there is at least one individual RE within the downlink transmission bandwidth of the victim (lower) band for which the 3rd harmonic is within the uplink transmission bandwidth or the uplink adjacent channel’s transmission bandwidth of an aggressor (higher) band.  NOTE 16: The requirements should be verified for UL EARFCN of the aggressor (higher) band (superscript HB) such that  in MHz and  with  the carrier frequency in the victim (lower) band and  the channel bandwidth configured in the higher band. | | | | | | | | |

Table 5.3.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_7A-28A-40A | 40 |  |  | 25 | 50 | 75 | 100 | TDD |

REFSENS requirements for CA\_7-28-40 (exceptions due to cross band isolation issues of TDD and FDD bands) are defined in table 5.x.4-3 for inclusion in TS 36.101 table 7.3.1A-0bE, and in table 5.3.3-4 for inclusion in TS 36.101 table 7.3.1A-0bF.

Table 5.3.3-3: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EUTRA CA Configuration | EUTRA band | Channel bandwidth | | | | | | Duplex mode | Applicable active UL band |
| 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) |
| CA\_7A-28A-40A  CA\_7A-28A-40C | 719 |  |  | -96.8 | -94 | -92.4 | -91.2 | FDD | 40 |
| 28 |  |  | -96.8 | -94.1 | -92.5 | -89.8 | FDD |
| CA\_7A-28A-40A  CA\_7A-28A-40C | 4019 |  |  | -96 | -93.3 | -91.7 | -90.6 | TDD | 7 |
| CA\_7A-28A-40A  CA\_7A-28A-40C | 4019 |  |  | -95.1 | -92.9 | -91.4 | -90.5 | TDD | 28 |
| NOTE 19: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | | |

Table 5.3.3-4: Uplink configuration for reference sensitivity (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| CA\_7A-28A-40A  CA\_7A-28A-40C | 7 |  |  | 25 | 50 | 75 | 751 | FDD |
| 28 |  |  | 25 | 251 | 251 | 251 | FDD |
| 40 |  |  | 25 | 50 | 75 | 100 | TDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1). | | | | | | | | |

## 5.4 CA\_1-28-40

### 5.4.1 Channel bandwidths per operating band for CA

Table 5.4.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |
| 40 | 2300 MHz | – | 2400 MHz | 2300 MHz | – | 2400 MHz | TDD |

Table 5.4.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA CA configuration / Bandwidth combination set** | | | | | | | | | | |
|
| **E-UTRA CA Configuration** | **Uplink CA configurations** | **E-UTRA Bands** | **1.4** | **3** | **5** | **10** | **15** | **20** | **Maximum aggregated bandwidth** | **Bandwidth combination set** |
| **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **MHz** | **[MHz]** |
| CA\_1A-28A-40A | - | 1 |  |  | Yes | Yes | Yes | Yes | 60 | 0 |
| 28 |  |  | Yes | Yes | Yes | Yes |
| 40 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-28A-40C | - | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 28 |  |  | Yes | Yes | Yes | Yes |
| 40 | See CA\_40C Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |

### 5.4.2 ∆TIB and ∆RIB values

For CA\_7-28-40, the ΔTIB,c and ΔRIB,c values are shown in table 5.4.3-1 and table 5.4.3-2, respectively.

Table 5.4.3-1: ΔTIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-28-40 | 1 | 0.6 |
| 28 | 0.3 |
| 40 | 0.5 |

Table 5.4.3-2: ΔRIB,c (three Bands)

| E-UTRA operating band combination | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-28-40 | 1 | 0 |
| 28 | 0.2 |
| 40 | 0 |

### 5.4.3 REFSENS requirements

REFSENS requirements for CA\_1-28-40 (exceptions due to harmonic issues) are defined in table 5.4.3-1 for inclusion in TS 36.101 table 7.3.1A-0a, and in table 5.4.3-2 for inclusion in TS 36.101 table 7.3.1A-0b.

Table 5.4.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_1A-28A-40A15,16  CA\_1A-28A-40C15,16 | 28 |  |  | -60.7 | -60.7 | -60.7 | -60.7 | FDD |
| CA\_1A-28A-40A5,6  CA\_1A-28A-40C5,6 | 133 |  |  | -89.8 | -89.4 | -89 | -88.7 | FDD |
| NOTE 5: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 3rd transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 6: The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band.  NOTE 15: These requirements apply when there is at least one individual RE within the downlink transmission bandwidth of the victim (lower) band for which the 3rd harmonic is within the uplink transmission bandwidth or the uplink adjacent channel’s transmission bandwidth of an aggressor (higher) band.  NOTE 16: The requirements should be verified for UL EARFCN of the aggressor (higher) band (superscript HB) such that  in MHz and  with  the carrier frequency in the victim (lower) band and  the channel bandwidth configured in the higher band.  NOTE 33: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 5.4.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_1A-28A-40A  CA\_1A-28A-40A | 40 |  |  | 25 | 50 | 75 | 100 | TDD |

REFSENS requirements for CA\_1-28-40 (exceptions due to cross band isolation issues of TDD and FDD bands) are defined in table 5.x.4-3 for inclusion in TS 36.101 table 7.3.1A-0bE, and in table 5.4.3-4 for inclusion in TS 36.101 table 7.3.1A-0bF.

Table 5.4.3-3: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EUTRA CA Configuration | EUTRA band | Channel bandwidth | | | | | | Duplex mode | Applicable active UL band |
| 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) |
| CA\_1A-28A-40A  CA\_1A-28A-40C | 119 |  |  | -91.7 | [-89.5] | [-87.9] | [-86.9] | FDD | 40 |
| 28 |  |  | -96.8 | -94.1 | -92.5 | -89.8 | FDD |
| CA\_1A-28A-40A  CA\_1A-28A-40C | 4019 |  |  | [-93.4] | -91.9 | -90.4 | -89.4 | TDD | 1 |
| CA\_1A-28A-40A  CA\_1A-28A-40C | 4019 |  |  | -95.1 | -92.9 | -91.4 | -90.5 | TDD | 28 |
| NOTE 19: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | | |

Table 5.4.3-4: Uplink configuration for reference sensitivity (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| CA\_1A-28A-40A  CA\_1A-28A-40C | 1 |  |  | 25 | 50 | 75 | 100 | FDD |
| 28 |  |  | 25 | 251 | 251 | 251 | FDD |
| 40 |  |  | 25 | 50 | 75 | 100 | TDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1). | | | | | | | | |

## 5.5 CA\_1-3-46

### 5.5.1 Channel bandwidths per operating band for CA

Table 5.5.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA Band | E-UTRA Band | Uplink (UL) operating band | | | Downlink (DL) operating band | | | Duplex Mode |
| BS receive / UE transmit | | | BS transmit / UE receive | | |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| CA\_1-3-46 | 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 3 | 1710 MHz | – | 1780 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 46 | 5150 MHz | – | 5925 MHz | 5150 MHz | – | 5925 MHz | TDD |

Table 5.5.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_1A-3A-46A | - | 1 |  |  | Yes | Yes | Yes | Yes | 60 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 |  |  |  | Yes |  | Yes |
| CA\_1A-3A-46C | - | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C Bandwidth Combination Set 1 in Table 5.6A.1-1 in TS 36.101 | | | | | |

### 5.5.2 ∆TIB and ∆RIB values

For CA\_1-3-46, the ΔTIB,c and ΔRIB,c values are shown in table 5.5.3-1 and in table 5.5.3-2.

**Table 5.5.3-1: ΔTIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-3-46 | 1 | 0.3 |
| 3 | 0.3 |

i

**Table 5.5.3-2: ΔRIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-3-46 | 1 | 0 |
| 3 | 0 |
| 46 | 0 |

### 5.5.3 REFSENS requirements

For band combination CA\_1-3-46, the requirements are specified in Table 5.5.3-1 for the uplink in any band other than band 46.

Table 5.5.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_1A-3A-46A  CA\_1A-3A-46C | 1 |  |  | -100 | -97 | -95.2 | -94 | FDD |
| 3 |  |  | -97 | -94 | -92.2 | -91 |
| 46 |  |  |  | -93 |  | -90 | TDD |

**Table 5.5.3-2: IMD exclusion frequency range**

IMD frequency range

|  |  |  |  |
| --- | --- | --- | --- |
| DL\_CA configuration | UL\_CA configuration | Exclusion zone center frequency | Exclusion zone BW |
| CA\_1A-3A-46A | CA\_1A-3A | 2\*fc\_1A + fc\_3A | 2\*BW\_1A + BW\_3A |
| CA\_1A-3A-46A | CA\_1A-3A | fc\_1A – 2\*fc\_3A | BW\_1A + 2\*BW\_3A |

The IMD frequency range table should be included in Table 7.3.1A-0eA under Note 12.

## 5.6 CA\_1-18-42

### 5.6.1 Channel bandwidths per operating band for CA

Table 5.6.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | | 3 MHz | | 5 MHz | | 10 MHz | | 15 MHz | 20 MHz | |
| CA\_1A-18A-42A | 1 |  |  | | Yes | | Yes | | Yes | | | Yes | 55 | 0 |
| 18 |  |  | | Yes | | Yes | | Yes | | |  |
| 42 |  |  | | Yes | | Yes | | Yes | | | Yes |

Table 5.6.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | | 3 MHz | | 5 MHz | | 10 MHz | | 15 MHz | 20 MHz | |
| CA\_1A-18A-42C | 1 |  |  | | Yes | | Yes | | Yes | | | Yes | 75 | 0 |
| 18 |  |  | | Yes | | Yes | | Yes | | |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 of TS36.101 | | | | | | | | | | |

### 5.6.2 ∆TIB and ∆RIB values

The same ∆TIB and ∆RIB values of CA\_1-19-42 specified in TS36.101 can be applied for CA\_1-18-42.

Table 5.6.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-18-42 | 1 | 0.3 |
| 18 | 0.3 |
| 42 | 0.8 |

Table 5.6.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-18-42 | 1 | 0 |
| 18 | 0 |
| 42 | 0.5 |

### 5.6.3 REFSENS requirements

There are no REFSENS requirements needed for CA\_1-18-42.

## 5.7 CA\_1-7-28

### 5.7.1 Channel bandwidths per operating band for CA

Table 5.7.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |

Table 5.7.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-7A-7A-28A | - | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 3 in Table 5.6A.1-3 | | | | | |
| 28 |  |  |  | Yes | Yes | Yes |

Table 5.7.1-3: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-1A-7A-28A | - | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 80 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 28 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-1A-7C-28A | CA\_7C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 7 | See CA\_7C Bandwidth combination set 2 in Table 5.6A.1-1 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

### 5.7.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for three band CA\_1A-7A-7A-28A are covered in TS 36.101 for existing combination CA\_1A-7A-28A.

The ΔTIB,c and ΔRIB,c values for three band CA\_1-7-28 are covered in TS 36.101 Table 6.2.5-3 (three bands) for ΔTIB,c and Table 7.3.1-1B (three bands) for ΔRIB,c.

### 5.7.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.8 CA\_3-5-28

### 5.8.1 Channel bandwidths per operating band for CA

Table 5.8.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 5 | 824 MHz | – | 849 MHz | 869 MHz | – | 894 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |

Table 5.8.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_3A-5A-28A | - | 3 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 5 |  |  | Yes | Yes |  |  |
| 28 |  |  |  | Yes | Yes | Yes |

### 5.8.2 ∆TIB and ∆RIB values

For the UE which supports CA\_3A-5A-28A the ΔTIB,c and ΔRIB,c are defined for applicable bands in Table 5.8.2-1 and 5.8.2-2 respectively. Values are derived from existing combinations CA\_3A-20A-28A which are also 2 low bands combined with band 3.

Table 5.8.2-1: ΔTIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| CA\_3A-5A-28A | 3 | 0.3 |
| 5 | 0.5 |
| 28 | 0.5 |

Table 5.8.2-2: ΔRIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔRIB,c [dB] |
| CA\_3A-5A-28A | 3 | 0 |
| 5 | 0.1 |
| 28 | 0.1 |

### 5.8.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.9 CA\_3-7-28

### 5.9.1 Channel bandwidths per operating band for CA

Table 5.9.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |

Table 5.9.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_3A-7A-7A-28A | - | 3 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 3 in Table 5.6A.1-3 | | | | | |
| 28 |  |  |  | Yes | Yes | Yes |
| CA\_3C-7A-28A | 3C | 3 | See CA\_3C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | | 80 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 28 |  |  | Yes | Yes | Yes | Yes |
| CA\_3C-7C-28A | 3C 7C | 3 | See CA\_3C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | | 100 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 28 |  |  |  | Yes | Yes | Yes |

Table 5.X.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_3A-3A-7C-28A | 7C | 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

### 5.9.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for these 3-7-28 combinations are covered in TS 36.101 for existing combination CA\_3A-7A-28A.

### 5.9.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.10 CA\_1-3-28

### 5.10.1 Channel bandwidths per operating band for CA

Table 5.10.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 28 | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | FDD |

Table 5.10.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| 1A-3C-28A | 3C | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 3 | See the CA\_3C Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

Table 5.10.1-3: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-1A-3A-28A | - | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 80 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 28 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-1A-3C-28A | CA\_3C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 3 | See CA\_3C Bandwidth combination set 0 in Table 5.6A.1-1 of 36.101 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

Table 5.10.1-4: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-1A-3A-3A-28A | - | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

### 5.10.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for 1A-3C-28A\_2CC\_UL\_3C are covered in TS 36.101 for existing combination CA\_1A-3C-28A.

The ΔTIB,c and ΔRIB,c values for three band CA\_1-3-28 are covered in TS 36.101 Table 6.2.5-3 (three bands) for ΔTIB,c and Table 7.3.1-1B (three bands) for ΔRIB,c.

### 5.10.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.11 CA\_3-32-46

### 5.11.1 Channel bandwidths per operating band for CA

Table 5.11.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 3A-32A-46A

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_3A-32A-46A | 3 |  |  | Yes | Yes | Yes | Yes | 60 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 |  |  |  |  |  | Yes |

Table 5.11.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 3A-32A-46C

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_3A-32A-46C | 3 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

Table 5.11.1-3: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 3A-32A-46D

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_3A-32A-46D | 3 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46D in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

Table 5.11.1-4: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 3A-32A-46E

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_3A-32A-46E | 3 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46E in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

### 5.11.2 ∆TIB and ∆RIB values

Table 5.11.2-1: ΔTIB,c due to CA (three bands)

|  |  |  |
| --- | --- | --- |
| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| CA\_3-32-46 | 3 | 0.5 |

**Table 5.11.2-2: ΔRIB,c due to CA (three bands)**

|  |  |  |
| --- | --- | --- |
| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB [dB]** |
| CA\_3-32-46 | 3 | 0 |
| 32 | 0 |

### 5.11.3 REFSENS requirements

Table 5.11.3: Reference sensitivity QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 3 |  |  | -97 | -94 | -92.2 | -91 | FDD |
| 32 |  |  | -100 | -97 | -95.2 | -94 | SDL |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.12 CA\_7-32-46

### 5.12.1 Channel bandwidths per operating band for CA

Table 5.12.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 7A-32A- 46A

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_7A-32A-46A | 7 |  |  |  | Yes | Yes | Yes | 60 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 |  |  |  |  |  | Yes |

Table 5.12.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 7A-32A-46C

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_7A-32A-46C | 7 |  |  |  | Yes | Yes | Yes | 80 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

Table 5.12.1-3: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 7A-32A-46D

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_7A-32A-46D | 7 |  |  |  | Yes | Yes | Yes | 100 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46D in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

Table 5.12.1-4: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA: 7A-32A-46E

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| E-UTRA CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_7A-32A-46E | 7 |  |  |  | Yes | Yes | Yes | 120 | 0 |
| 32 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46E in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

### 5.12.2 ∆TIB and ∆RIB values

Table 5.12.2-1: ΔTIB,c due to CA (three bands)

|  |  |  |
| --- | --- | --- |
| **Inter-band CA Configuration** | **E-UTRA and NR Band** | **ΔTIB,c [dB]** |
| CA\_7-32-46 | 7 | 0.7 |

**Table 5.12.2-2: ΔRIB,c due to CA (three bands)**

|  |  |  |
| --- | --- | --- |
| **Inter-band CA Configuration** | **E-UTRA and NR Band** | **ΔRIB [dB]** |
| CA\_7-32-46 | 7 | 0 |
| 32 | 0 |

### 5.12.3 REFSENS requirements

Table 5.12.3: Reference sensitivity QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 7 |  |  |  | -95 | -93.2 | -92 | FDD |
| 32 |  |  | -100 | -97 | -95.2 | -94 | SDL |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.13 CA\_1-3-28

### 5.13.1 Channel bandwidths per operating band for CA

Table 5.13.1-1: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-3C-38A | - | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 1. 3 | See CA\_3C Bandwidth combination set 0 in 36.101 Table 5.6A.1-1 | | | | | |
| 38 |  |  | Yes | Yes | Yes | Yes |

### 5.13.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for CA\_1-3-38 are already defined in the following tables in TS 36.101.

Table 5.13.2-1: ΔTIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_1-3-38 | 1 | 0.5 |
| 3 | 0.5 |
| 38 | 0.5 |

Table 5.13.2-2: ΔRIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_1-3-38 | 1 | 0 |
| 3 | 0 |
| 38 | 0 |

### 5.13.3 REFSENS requirements

The REFSENS requirements for CA\_1A-3A-38A are already defined in TS 36.101, and CA\_1A-3C-38A need to be added as in tables below

Table 5.13.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EUTRA CA Configuration | EUTRA band | Channel bandwidth | | | | | | Duplex mode | Applicable active UL band |
| 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) |
| CA\_1A-3A-38A12  CA\_1A-3C-38A12 | 319 |  |  | -94 | -91.5 | -90 | -89 | FDD | 1 |
| 38 |  |  | -97.1 | -94.4 | -92.8 | -91.7 | TDD |
| 38 |  |  | -97.1 | -94.4 | -92.8 | -91.7 | TDD | 3 |
| 119 |  |  | -98.1 | -95.1 | -93.3 | -92.1 | FDD | 38 |
| 319 |  |  | -95.1 | -92.1 | -90.3 | -89.1 |
| CA\_1A-3A-38A13  CA\_1A-3C-38A13 | 3 |  |  | -97 | -94 | -92.2 | -91 | FDD | 1 |
| 38 |  |  | -97.1 | -94.4 | -92.8 | -91.7 | TDD |
| 38 |  |  | -97.1 | -94.4 | -92.8 | -91.7 | TDD | 3 |
| 119 |  |  | -98.1 | -95.1 | -93.3 | -92.1 | FDD | 38 |
| 319 |  |  | -95.1 | -92.1 | -90.3 | -89.1 |
| NOTE 12: These requirements apply when the uplink is active in Band 1 and the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is < 60 MHz. For each channel bandwidth in Band 3 and Band 41, the requirement applies regardless of channel bandwidth in Band 1.  NOTE 13: These requirements apply when the uplink is active in Band 1 and the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is ≥ 60 MHz. For each channel bandwidth in Band 3 and Band 41, the requirement applies regardless of channel bandwidth in Band 1.  NOTE 19: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | | |

Table 5.13.3-2: Uplink configuration for reference sensitivity (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| CA\_1A-3A-38A CA\_1A-3C-38A | 11,3 |  |  | 25 | 25 | 25 | 25 | FDD |
| 11,4 |  |  | 25 | 45 | 45 | 45 | FDD |
| 3 |  |  | 25 | 50 | 501 | 501 | FDD |
| 38 |  |  | 25 | 50 | 75 | 100 | TDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1).  NOTE 3: UL allocation when the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is < 60 MHz.  NOTE 4: UL allocation when the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is ≥ 60 MHz. | | | | | | | | |

## 5.14 CA\_1-7-38

### 5.14.1 Channel bandwidths per operating band for CA

Table 5.14.1-1: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-7A-38A1 | - | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 1. 7 |  |  | Yes | Yes | Yes | Yes |
| 38 |  |  | Yes | Yes | Yes | Yes |
| NOTE 1: UL carrier shall be supported in Band 1 only. Power imbalance between downlink carriers on Band 7 and Band 38 is assumed to be within [6dB]. | | | | | | | | | | |

### 5.14.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values are derived from CA\_3-7-38 and need to be defined in the following tables in TS 36.101.

Table 5.14.2-1: ΔTIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_1-7-38 | 1 | 0.5 |

Table 5.14.2-2: ΔRIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_1-7-38 | 1 | 0 |
| 7 | 0 |
| 38 | 0.2 |

### 5.14.3 REFSENS requirements

The REFSENS requirements are defined in the following tables in TS 36.101.

Table 5.14.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EUTRA CA Configuration | EUTRA band | Channel bandwidth | | | | | | Duplex mode | Applicable active UL band |
| 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) |
| CA\_1A-7A-38A | 719 |  |  | -93.3 | -90.7 | -89.2 | -88.1 | FDD | 1 |
| 38 |  |  | -93.3 | -90.7 | -89.2 | -88.1 | TDD |
| NOTE 19: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | | |

Table 5.14.3-2: Uplink configuration for reference sensitivity (exceptions due to cross band isolation issues of TDD and FDD bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| CA\_1A-7A-38A | 1 |  |  | 25 | 45 | 451 | 451 | FDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1). | | | | | | | | |

## 5.15 CA\_5-48-66

### 5.15.1 Channel bandwidths per operating band for CA

Table 5.15.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 5 | 824 MHz | – | 849 MHz | 869 MHz | – | 894 MHz | FDD |
| 48 | 3550 MHz | – | 3700 MHz | 3550 MHz | – | 3700 MHz | TDD |
| 66 | 1710 MHz | – | 1780 MHz | 2110 MHz | – | 2200 MHz | FDD |

Table 5.15.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_5A-48A-66A | - | 5 |  |  | Yes | Yes |  |  | 50 | 0 |
| 48 |  |  | Yes | Yes | Yes | Yes |
| 66 |  |  | Yes | Yes | Yes | Yes |
| CA\_5A-48A-66A-66A | - | 5 |  |  | Yes | Yes |  |  | 70 | 0 |
| 48 |  |  | Yes | Yes | Yes | Yes |
| 66 | See CA\_66A-66A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |

### 5.15.2 ∆TIB and ∆RIB values

For the UE which supports CA\_5A-48A-66A the ΔTIB,c and ΔRIB,c are defined for applicable bands in Table 5.x.3-1 and 5.x.3-2 respectively. Values are derived from existing combinations CA\_13A-48A-66A.

Table 5.15.2-1: ΔTIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| CA\_5-48-66 | 5 | 0.3 |
| 48 | 0.8 |
| 66 | 0.6 |

Table 5.15.2-2: ΔRIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔRIB,c [dB] |
| CA\_5-48-66 | 5 | 0 |
| 48 | 0.5 |
| 66 | 0.2 |

### 5.15.3 REFSENS requirements

Based on he co-existence studies, REFSENS additions need to be made in the TS 36.101 tables below.Table 7.3.1A-0a: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_5A-48A-66A9,10  CA\_5A-48A-66A-66A9,10 | 4833 |  |  | -71.7 | -71.7 | -71.7 | -71.7 | TDD |
| CA\_5A-48A-66A11  CA\_5A-48A-66A-66A11 | 4833 |  |  | -97.1 | -94.7 | -93.2 | -92.5 | TDD |
| NOTE 9: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range FHD above and below the edge of this downlink transmission bandwidth. The value FHD depends on the E-UTRA configuration: FHD = 10 MHz for CA\_3A-42A, CA\_3A-3A-42A, CA\_3A-42A-42A, CA\_1A-3A-20A-32A-42A, CA\_3A-42A-43A, CA\_3A-32A-42A-43A, CA\_1A-3A-42A, CA\_2A-13A-48A-66A, CA\_2A-48A, CA\_2A-48C, CA\_2A-48D, CA\_48A-66A, CA\_3A-7A-42A, CA\_3A-19A-42A, CA\_3A-20A-42A, CA\_3A-28A-42A, CA\_1A-3A-7A-42A, CA\_5A-48A-66A, CA\_5A-48A-66A-66A, CA\_13A-48A-66A, CA\_13A-48A-66B, CA\_13A-48A-66C, CA\_13A-48A-48A-66A, CA\_13A-48C-66A, CA\_28A-32A, CA\_48A-66A-66A, CA\_48A-66B , CA\_48A-66C, CA\_48A-48A-66A, CA\_48C-66A, CA\_48A-48A-66A-66A, CA\_48A-48A-66B, CA\_48A-48A-66C, CA\_48C-66B, CA\_48C-66C, CA\_48E-66A, CA\_1A-3A-18A-42A, CA\_1A-3A-19A-42A, CA\_1A-3A-32A-42A, CA\_1A-3A-41A-42A, CA\_3A-7A-20A-42A, CA\_3A-20A-32A-42A, CA\_3A-28A-41A-42A, CA\_3A-18A-42A and CA\_3A-18A-42C. FHD = 0MHz for CA\_11A-28A, CA\_1A-11A-28A and CA\_3A-11A-28A.  NOTE 10: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 11: The requirements are only applicable to channel bandwidths with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.  NOTE 33: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 7.3.1A-0b: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_5A-48A-66A  CA\_5A-48A-66A-66A | 66 |  |  | 121 | 251 | 361 | 501 | FDD |
| NOTE 1: refers to the UL resource blocks, which shall be centred within the transmission bandwidth configuration for the channel bandwidth. | | | | | | | | |

## 5.16 CA\_7-29-66

### 5.16.1 Channel bandwidths per operating band for CA

Table 5.16.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 29 | N/A | – | N/A | 717 MHz | – | 728 MHz | FDD |
| 66 | 1710 MHz | – | 1780 MHz | 2110 MHz | – | 2200 MHz | FDD |

Table 5.16.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_7A-29A-66A | - | 7 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 29 |  |  | Yes | Yes |  |  |
| 66 |  |  | Yes | Yes | Yes | Yes |
| CA\_7A-7A-29A-66A | - | 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | | 70 | 0 |
| 29 |  |  | Yes | Yes |  |  |
| 66 |  |  | Yes | Yes | Yes | Yes |
| CA\_7C-29A-66A | - | 7 | See CA\_7C Bandwidth combination set 2 in table 5.6A.1-1 of 36.101 | | | | | | 70 | 0 |
| 29 |  |  | Yes | Yes |  |  |
| 66 |  |  | Yes | Yes | Yes | Yes |

### 5.16.2 ∆TIB and ∆RIB values

Table 5.16.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_7A-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_7A-7A-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_7C-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

Table 5.16.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_7A-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_7A-7A-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_7C-29A-66A | 7 | 0.5 |
| 29 | N/A |
| 66 | 0.5 |

### 5.16.3 REFSENS requirements

The REFSENS requirements CA\_7A-29A-66A\_BCS0; CA\_7A-7A-29A-66A\_BCS0 and CA\_7C-29A-66A\_BCS0 are shown in Table 5.X.4-1 with the uplink configuration specified in Table 7.3.1-2 of TS36.101.

Table 5.16.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Channel bandwidth** | | | | | | | | |
| **EUTRA CA Configuration** | **EUTRA band** | 1.4 MHz  **(dBm)** | 3 MHz  **(dBm)** | 5 MHz  **(dBm)** | 10 MHz  **(dBm)** | 15 MHz  **(dBm)** | 20 MHz  **(dBm)** | **Duplex mode** |
| CA\_7A-29A-66A | 7 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 29 |  |  | -97 | -94 |  |  |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 |
| CA\_7A-7A-29A-66A | 7 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 29 |  |  | -97 | -94 |  |  |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 |
| CA\_7C-29A-66A | 7 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 29 |  |  | -97 | -94 |  |  |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 |

## 5.17 CA\_2-48-66

### 5.17.1 Channel bandwidths per operating band for CA

Table 5.17.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_2A-48E-66A | 2 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 48 | See CA\_48E Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 |  |  | Yes | Yes | Yes | Yes |

### 5.17.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_2-48-66 is already specified in TS36.101.

### 5.17.3 REFSENS requirements

The refsens exception can be specified in the same way as the fallback CA\_2A-48D-66A.

Table 5.17.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issues in the combinations of intra-band and inter-band CA)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_2A-48E-66A8,9 | 48 |  |  | -71.7 | -71.7 | -71.7 | -71.7 | TDD |
| CA\_2A-48E-66A10 | 48 |  |  | -97.1 | -94.7 | -93.2 | -92.5 | TDD |
| NOTE 8: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range FHD above and below the edge of this downlink transmission bandwidth. The value FHD depends on the E-UTRA configuration: FHD = 10 MHz for CA\_3A-42C, CA\_3A-42D, CA\_3A-3A-42C, CA\_3A-42A-42C, CA\_3A-42C-42C, CA\_1A-3A-19A-42C, CA\_1A-3A-21A-42C, CA\_1A-3A-42C, CA\_3A-28A-42C, CA\_3A-28A-42D, CA\_3A-19A-42C, CA\_3A-19A-42D, CA\_3A-21A-42D, CA\_3A-28A-40C, CA\_3A-28A-40D, CA\_3A-28A-41A-42C, CA\_3A-28A-41C-42A, CA\_2A-48C-48C, CA\_2A-48A-48D, CA\_48A-48C-66C, CA\_48A-48C-66B, CA\_48A-48D-66A, CA\_48C-48C-66A, CA\_48D-66A, CA\_48A-48C-66A, CA\_2A-13A-48D, CA\_2A-13A-48A-48C, CA\_2A-13A-48C-66A, CA\_2A-13A-48A-48A-66A, CA\_2A-48D-66A, CA\_2A-48E-66A, CA\_2A-48A-48C-66A and CA\_2A-48E.  NOTE 9: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 10: The requirements are only applicable to channel bandwidths with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively. | | | | | | | | |

Table 5.17.3-2: Uplink configuration for the low band (exceptions due to harmonic issues in the combinations of intra-band and inter-band CA)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_2A-48E-66A | 2 |  |  | 25 | 50 | 501 | 501 | FDD |
| 66 |  |  | 121 | 251 | 361 | 501 | FDD |
| NOTE 1: refers to the UL resource blocks, which shall be centred within the transmission bandwidth configuration for the channel bandwidth. | | | | | | | | |

## 5.18 CA\_1-3-46

### 5.18.1 Channel bandwidths per operating band for CA

Table 5.18.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL~6DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_1A-3A-46A | 1 |  |  | Yes | Yes | Yes | Yes | 60 | 1 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 |  |  |  |  |  | Yes |
| CA\_1A-3A-46C | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 1 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |
| CA\_1A-3A-46D | 1 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46D in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |
| CA\_1A-3A-46E | 1 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46E in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

NOTE: For the UE that signals support of any bandwidth combination set for carrier aggregation, the UE shall support all single carrier bandwidths for the constituent bands as defined in Table 5.6.1-1 of TS 36.101 when operating in single carrier mode.

### 5.18.2 ∆TIB and ∆RIB values

For CA\_1-3-46, the ΔTIB,c and ΔRIB,c values are shown in table 5.x.2-1 and in table 5.x.2-2.

**Table 5.18.2-1: ΔTIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-3-46 | 1 | 0.3 |
| 3 | 0.3 |

i

**Table 5.18.2-2: ΔRIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-3-46 | 1 | 0 |
| 3 | 0 |
| 46 | 0 |

### 5.18.3 REFSENS requirements

For band combination CA\_1-3-46, the requirements are specified in Table 5.x.3-1 for the uplink in any band other than band 46.

Table 5.18.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_1A-3A-46D  CA\_1A-3A-46E | 1 |  |  | -100 | -97 | -95.2 | -94 | FDD |
| 3 |  |  | -97 | -94 | -92.2 | -91 |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.19 CA\_1-7-46

### 5.19.1 Channel bandwidths per operating band for CA

Table 5.19.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL~6DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| CA\_1A-7A-46A | 1 |  |  | Yes | Yes | Yes | Yes | 60 | 1 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 |  |  |  |  |  | Yes |
| CA\_1A-7A-46C | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 1 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46C in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |
| CA\_1A-7A-46D | 1 |  |  | Yes | Yes | Yes | Yes | 100 | 1 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46D in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |
| CA\_1A-7A-46E | 1 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 46 | See CA\_46E in Table 5.6A.1-1 of TS 36.101 Bandwidth Combination Set 0 | | | | | |

NOTE: For the UE that signals support of any bandwidth combination set for carrier aggregation, the UE shall support all single carrier bandwidths for the constituent bands as defined in Table 5.6.1-1 of TS 36.101 when operating in single carrier mode.

### 5.19.2 ∆TIB and ∆RIB values

For CA\_1-7-46, the ΔTIB,c and ΔRIB,c values are shown in table 5.19.2-1 and in table 5.19.2-2.

**Table 5.19.2-1: ΔTIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-7-46 | 1 | 0.5 |
| 7 | 0.8 |

i

**Table 5.19.2-2: ΔRIB,c**

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-7-46 | 1 | 0 |
| 7 | 0 |
| 46 | 0 |

### 5.19.3 REFSENS requirements

For band combination CA\_1-7-46, the requirements are specified in Table 5.19.3-1 for the uplink in any band other than band 46.

Table 5.19.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_1A-7A-46A  CA\_1A-7A-46C  CA\_1A-7A-46D  CA\_1A-7A-46E | 1 |  |  | -100 | -97 | -95.2 | -94 | FDD |
| 7 |  |  | -98 | -95 | -93.2 | -92 |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.20 CA\_2-7-66

### 5.20.1 Channel bandwidths per operating band for CA

Table 5.20.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 2 | 1850 MHz | – | 1910 MHz | 1930 MHz | – | 2170 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 66 | 1710 MHz | – | 1780 MHz | 2110 MHz | – | 2200 MHz | FDD |

Table 5.20.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_2A-7C—66A-66A |  | 2 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 7 | See CA\_7C Bandwidth combination set 2 in table 5.6A.1-1 of 36.101 | | | | | |
| 66 | See CA\_66A-66A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |
| CA\_2A-7A-7A-66A-66A | - | 2 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in table 5.6A.1-3 of 36.101 | | | | | |
| 66 | See CA\_66A-66A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |

### 5.20.2 ∆TIB and ∆RIB values

For CA\_2A-7A-7A-66A-66A and CA\_2A-7C-66A-66A, the ΔTIB,c and ΔRIB,c values are shown in table 5.20.2-1 and table 5.20.2-2, respectively.

Table 5.20.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_2A-7A-7A-66A-66A | 2 | 0.5 |
| 7 | 0.5 |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_2A-7C-66A-66A | 2 | 0.5 |
| 7 | 0.5 |
| 66 | 0.5 |

Table 5.20.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_2A-7A-7A-66A-66A | 2 | 0.3 |
| 7 | 0.5 |
| 66 | 0.5 |

|  |  |  |
| --- | --- | --- |
| CA\_2A-7C-66A-66A | 2 | 0.3 |
| 7 | 0.5 |
| 66 | 0.5 |

### 5.20.3 REFSENS requirements

There are no REFSENS requirements needed for CA\_2A-7A-7A-66A-66A and CA\_2A-7C-66A-66A

## 5.21 CA\_2-5-46

### 5.21.1 Channel bandwidths per operating band for CA

Table 5.21.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth Combination Set |
| CA\_2A-5A-46E | 2 |  |  | Yes | Yes | Yes | Yes | 110 | 0 |
| 5 |  |  | Yes | Yes |  |  |
| 46 | See CA\_46E Bandwidth combination set 0 in  Table 5.6A.1-1 of 36.101 | | | | | |

### 5.21.2 ∆TIB and ∆RIB values

∆TIB and ∆RIB values for CA\_2-5-46 are already specified in TS36.101

Table 5.21.2-1: ΔTIB,c for 3DL aggregation

| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_2-5-46 | 2 | 0.3 |
| 5 | 0.3 |

Table 5.21.2-2: ΔRIB,c for 3DL aggregation

| Inter-band CA Configuration | E-UTRA Band | ΔRIB,c [dB] |
| --- | --- | --- |
| CA\_2-5-46 | 2 | 0 |
| 5 | 0 |

### 5.21.3 REFSENS requirements

REFSENS requirements of 2A-5A-46A is defined in TS36.101 and can be applied for 2A-5A-46E.

Table 5.21.3-1: Table 7.3.1A-0eA Reference sensitivity QPSK PREFSENS (CA with band 46 or Band 49)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_2A-5A-46E | 2 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 5 |  |  | -98 | -95 |  |  |  |
| 46 |  |  |  |  |  | -90 |  |

## 5.22 CA\_13-48-66

### 5.22.1 Channel bandwidths per operating band for CA

Table 5.22.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 13 | 777 MHz | – | 787 MHz | 746 MHz | – | 756 MHz | FDD |
| 48 | 3550 MHz | – | 3700 MHz | 3550 MHz | – | 3700 MHz | TDD |
| 66 | 1710 MHz | – | 1780 MHz | 2110 MHz | – | 2200 MHz | FDD |

Table 5.22.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_13A-48E-66A | - | 13 |  |  | Yes | Yes |  |  | 110 | 0 |
| 48 | See CA\_48E Bandwidth combination set 0 in Table 5.6A.1-1 of 36.101 | | | | | |
| 66 |  |  | Yes | Yes | Yes | Yes |

### 5.22.2 ∆TIB and ∆RIB values

The same ΔTIB,c and ΔRIB,c values of CA\_13A-48A-66A specified in TS36.101 can be applied for CA\_13A-48E-66A.

### 5.22.3 REFSENS requirements

The same REFSENS requirements of CA\_13A-48A-66A specified in TS36.101 can be applied for CA\_13A-48E-66A.

## 5.23 CA\_2-46-66

### 5.23.1 Channel bandwidths per operating band for CA

Table 5.23.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_2A-46A-66A-66A | 2 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 46 |  |  |  |  |  | Yes |
| 66 | See the CA\_66A-66A Bandwidth combination set 0 in the Table 5.6A.1-3 | | | | | |
| CA\_2A-46C-66A-66A | 2 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 46 | See the CA\_46C Bandwidth combination set 0 in the Table 5.6A.1-1 | | | | | |
| 66 | See the CA\_66A-66A Bandwidth combination set 0 in the Table 5.6A.1-3 | | | | | |
| CA\_2A-46D-66A-66A | 2 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 46 | See the CA\_46D Bandwidth combination set 0 in the Table 5.6A.1-1 | | | | | |
| 66 | See the CA\_66A-66A Bandwidth combination set 0 in the Table 5.6A.1-3 | | | | | |
| CA\_2A-46E-66A-66A | 2 |  |  | Yes | Yes | Yes | Yes | 140 | 0 |
| 46 | See the CA\_46E Bandwidth combination set 0 in the Table 5.6A.1-1 | | | | | |
| 66 | See the CA\_66A-66A Bandwidth combination set 0 in the Table 5.6A.1-3 | | | | | |

### 5.23.2 ∆TIB and ∆RIB values

The same ∆TIB and ∆RIB values of CA\_2-46-66 specified in TS36.101 can be applied to CA\_2-46-66-66.

Table 5.23.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_2-46-66-66 | 2 | 0.5 |
| 66 | 0.5 |

Table 5.23.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_2-46-66-66 | 2 | 0 |
| 66 | 0 |

### 5.23.3 REFSENS requirements

REFSENS requirements of CA\_2A-46A-66A defined in TS36.101 can be applied for CA\_2A-46A-66A-66A, CA\_2A-46C-66A-66A, CA\_2A-46D-66A-66A, and CA\_2A-46E-66A-66A..

Table 5.23.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46 or Band 49)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_2A-46A-66A-66A, CA\_2A-46C-66A-66A, CA\_2A-46D-66A-66A, CA\_2A-46E-66A-66A | 2 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 46 |  |  |  |  |  | -90 | TDD |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 | FDD |

## 5.24 CA\_5-46-66

### 5.24.1 Channel bandwidths per operating band for CA

Table 5.24.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_5A-46E-66A | 5 |  |  | Yes | Yes |  |  | 110 | 0 |
| 46 | See CA\_46E Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 |  |  | Yes | Yes | Yes | Yes |
| CA\_5A-46A-66A-66A | 5 |  |  | Yes | Yes |  |  | 70 | 0 |
| 46 |  |  |  |  |  | Yes |
| 66 | See CA\_66A-66A Bandwidth combination set 0 in Table 5.6A.1-3 | | | | | |
| CA\_5A-46C-66A-66A | 5 |  |  | Yes | Yes |  |  | 90 | 0 |
| 46 | See CA\_46C Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 | See CA\_66A-66A Bandwidth combination set 0 in Table 5.6A.1-3 | | | | | |
| CA\_5A-46D-66A-66A | 5 |  |  | Yes | Yes |  |  | 110 | 0 |
| 46 | See CA\_46D Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 | See CA\_66A-66A Bandwidth combination set 0 in Table 5.6A.1-3 | | | | | |
| CA\_5A-46E-66A-66A | 5 |  |  | Yes | Yes |  |  | 130 | 0 |
| 46 | See CA\_46E Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 | See CA\_66A-66A Bandwidth combination set 0 in Table 5.6A.1-3 | | | | | |

### 5.24.2 ∆TIB and ∆RIB values

The same ∆TIB and ∆RIB values of CA\_5-46-66 specified in TS36.101 can be applied to CA\_5-46-66-66.

Table 5.24.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_5-46-66, CA\_5-46-66-66 | 5 | 0.3 |
| 66 | 0.3 |

Table 5.24.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_5-46-66, CA\_5-46-66-66 | 5 | 0 |
| 66 | 0 |

### 5.24.3 REFSENS requirements

REFSENS requirements of CA\_5A-46A-66A defined in TS36.101 can be applied for CA\_5A-46E-66A, CA\_5A-46A-66A-66A, CA\_5A-46C-66A-66A, CA\_5A-46D-66A-66A, and CA\_5A-46E-66A-66A.

Table 5.24.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46 or Band 49)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_5A-46E-66A, CA\_5A-46A-66A-66A, CA\_5A-46C-66A-66A, CA\_5A-46D-66A-66A, CA\_5A-46E-66A-66A | 5 |  |  | -98 | -95 |  |  | FDD |
| 46 |  |  |  |  |  | -90 | TDD |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 | FDD |

## 5.25 CA\_13-48-66

### 5.25.1 Channel bandwidths per operating band for CA

Table 5.25.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_13A-48E-66A | 13 |  |  | Yes | Yes |  |  | 110 | 0 |
| 48 | See CA\_48E Bandwidth combination set 0 in  Table 5.6A.1-1 | | | | | |
| 66 |  |  | Yes | Yes | Yes | Yes |

### 5.25.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_13-48-66 is already specified in TS36.101.

### 5.25.3 REFSENS requirements

REFSENS requirements of CA\_13A-46A-66A defined in TS36.101 can be applied for CA\_13A-46E-66A.

Table 5.25.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46 or Band 49)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_13A-46A-66A | 13 |  |  | -97 | -94 |  |  | FDD |
| 46 |  |  |  |  |  | -90 | TDD |
| 66 |  |  | -99.5 | -96.5 | -94.7 | -93.5 | FDD |

## 5.26 CA\_1-3-7

### 5.26.1 Channel bandwidths per operating band for CA

Table 5.26.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |

Table 5.26.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-3A-3A-7C | 7C | 1 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |
| 7 | See CA\_7C in Table 5.6A.1-1 of 36.101 Bandwidth combination set 2 | | | | | |

Table 5.26.1-3: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-1A-3A-7C | CA\_7C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 3 |  |  | Yes | Yes | Yes | Yes |
| 7 | See CA\_7C Bandwidth combination set 2 in Table 5.6A.1-1 of 36.101 | | | | | |
| CA\_1A-1A-3C-7A | CA\_3C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 100 | 0 |
| 3 | See CA\_3C Bandwidth combination set 0 in Table 5.6A.1-1 of 36.101 | | | | | |
| 7 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-1A-3C-7C | CA\_3C CA\_7C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 120 | 0 |
| 3 | See CA\_3C Bandwidth combination set 0 in Table 5.6A.1-1 of 36.101 | | | | | |
| 7 | See CA\_7C Bandwidth combination set 2 in Table 5.6A.1-1 of 36.101 | | | | | |

Table 5.26.1-4: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-1A-3A-3A-7C | CA\_7C | 1 | See CA\_1A-1A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 120 | 0 |
| 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | |
| 7 | See CA\_7C Bandwidth combination set 2 in Table 5.6A.1-1 of 36.101 | | | | | |

### 5.26.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for three band CA\_1-3-7 are covered in TS 36.101 Table 6.2.5-3 (three bands) for ΔTIB,c and Table 7.3.1-1B (three bands) for ΔRIB,c.

### 5.26.3 REFSENS requirements

Reference sensitivity requirements needed will be specified in TS 36.101.

Table 7.3.1A-0bC: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions for three bands due to close proximity of UL to DL channel)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_1A-3A-3A-7C9 | 312 |  |  | -94 | -91.5 | -90 | -89 | FDD |
| CA\_1A-3A-3A-7C10 | 3 |  |  | -97 | -94 | -92.2 | -91 | FDD |
| NOTE 9: These requirements apply when the uplink is active in Band 1 and the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is < 60 MHz. For each channel bandwidth in Band 3 and Band 7, the requirement applies regardless of channel bandwidth in Band 1.  NOTE 10: These requirements apply when the uplink is active in Band 1 and the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is ≥ 60 MHz. For each channel bandwidth in Band 3 and Band 7, the requirement applies regardless of channel bandwidth in Band 1.  NOTE 12: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 7.3.1A-0bD: Uplink configuration for the uplink band (exceptions for three bands due to close proximity of UL to DL channel)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_1A-3A-3A-7C1, 2 | 1 |  |  | 25 | 25 | 25 | 25 | FDD |
| CA\_1A-3A-3A-7C1, 3 | 1 |  |  | 25 | 45 | 45 | 45 | FDD |
| NOTE 1: refers to the UL resource blocks shall be located as close as possible to the downlink channel in Band 3 but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1) in the uplink channel in Band 1.  NOTE 2: UL allocation when the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is < 60 MHz  NOTE 3: UL allocation when the separation between the lower edge of the uplink channel in Band 1 and the upper edge of the downlink channel in Band 3 is ≥ 60 MHz. | | | | | | | | |

## 5.27 CA\_3-5-28

### 5.27.1 Channel bandwidths per operating band for CA

Table 5.27-1: Inter-band CA operating bands (three bands)

|  |  |
| --- | --- |
| E-UTRA CA Band | E-UTRA Band  (Table 5.5.1) |
| CA\_3-3-5-28 | 3, 5, 28 |
| NOTE: The frequency range in band 28 is restricted for this CA band combination to 718-748 MHz for the UL and 773-803 MHz for the DL | |

Table 5.27.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA Configuration | Uplink CA configurations | | E-UTRA Bands | 1.4 | 3 | 5 | 10 | 15 | | 20 | Maximum aggregated bandwidth | | | Bandwidth combination set |
|  |  | |  | MHz | MHz | MHz | MHz | MHz | | MHz | [MHz] | | |  |
| CA\_3A-3A-5A-28A | | - | 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | | | 70 | 0 | |
| 5 |  |  | Yes | Yes |  |  | | |
| 28 |  |  | Yes | Yes | Yes | Yes | | |

### 5.27.2 ∆TIB and ∆RIB values

dTib and dRib values for CA\_3-5-28 can be re-used

Table 5.27.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_3-3-5-28 | 3 | 0.3 |
| 5 | 0.5 |
| 28 | 0.5 |

Table 5.27.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_3-3-5-28 | 3 | 0 |
| 5 | 0 |
| 28 | 0 |

### 5.27.3 REFSENS requirements

Band 5 receiver 2nd harmonic overlaps band 3 Tx but no MSD is specified for fallback CA\_3A-5A

## 5.28 CA\_5-7-28

### 5.28.1 Channel bandwidths per operating band for CA

Table 5.28-1: Inter-band CA operating bands (three bands)

|  |  |
| --- | --- |
| E-UTRA CA Band | E-UTRA Band  (Table 5.5.1) |
| CA\_5-7-28 | 5, 7, 28 |
| NOTE: The frequency range in band 28 is restricted for this CA band combination to 718-748 MHz for the UL and 773-803 MHz for the DL | |

Table 5.28.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 | 3 | 5 | 10 | 15 | 20 | Maximum aggregated bandwidth | Bandwidth combination set |
|  |  |  | MHz | MHz | MHz | MHz | MHz | MHz | [MHz] |  |
| CA\_5A-7C-28A | - | 5 |  |  | Yes | Yes |  |  | 70 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

### 5.28.2 ∆TIB and ∆RIB values

dTib and dRib have been already specfied.

Table 5.28.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_5-7-28 | 5 | 0.5 |
| 7 | 0.3 |
| 28 | 0.5 |

Table 5.28.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_5-7-28 | 5 | 0 |
| 7 | 0 |
| 28 | 0 |

### 5.28.3 REFSENS requirements

No MSD is necessary.

## 5.29 CA\_3-7-46

### 5.29.1 Channel bandwidths per operating band for CA

Table 5.29.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| 46 | 5150 MHz | – | 5925 MHz | 5150 MHz | – | 5925 MHz | TDD |

Table 5.29.1-2: Supported E-UTRA bandwidths per CA configuration for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_3A-7C-46A | - | 3 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 46 |  |  |  |  |  | Yes |
| CA\_3A-7C-46C | - | 3 |  |  | Yes | Yes | Yes | Yes | 100 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 46 | See CA\_46C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |
| CA\_3A-7C-46D | - | 3 |  |  | Yes | Yes | Yes | Yes | 120 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 46 | See CA\_46D Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |
| CA\_3A-7C-46E | - | 3 |  |  | Yes | Yes | Yes | Yes | 140 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 2 in Table 5.6A.1-1 | | | | | |
| 46 | See CA\_46E Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |

### 5.29.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values for three band CA\_3-7-46 are already specified in TS 36.101 Table 6.2.5-3 (three bands) for ΔTIB,c and Table 7.3.1-1B (three bands) for ΔRIB,c.

### 5.29.3 REFSENS requirements

Reference sensitivity requirements shall be specified in TS 36.101 Table 7.3.1A-0eA according to Table 5.X.3-1 below.

Table 5.29.3-1: Reference sensitivity QPSK PREFSENS (CA with band 46 or Band 49)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz  (dBm) | 3 MHz  (dBm) | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | Duplex mode |
| CA\_3A-7A-46A, CA\_3A-7C-46A, CA\_3A-7C-46C, CA\_3A-7C-46D, CA\_3A-7C-46E | 3 |  |  | -97 | -94 | -92.2 | -91 | FDD |
| 7 |  |  | -98 | -95 | -93.2 | -92 |
| 46 |  |  |  |  |  | -90 | TDD |

## 5.30 CA\_5-7-66

### 5.30.1 Channel bandwidths per operating band for CA

Table 5.30.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA\_5A-7C-66A-66A | - | 5 |  |  | | Yes | | Yes | |  | |  | | 90 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | | | | | | |
| 66 | See CA\_66A-66A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | | | | | |
| CA\_5A-7C-66A | - | 5 |  | |  | | Yes | | Yes | |  | |  | 70 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | | | | | | |
| 66 |  | |  | | Yes | | Yes | | Yes | | Yes |
| CA\_5A-7A-66A-66A | - | 5 |  | |  | | Yes | | Yes | |  | |  | 70 | 0 |
| 7 |  | |  | |  | | Yes | | Yes | | Yes |
| 66 | See CA\_66A-66A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | | | | | |
| CA\_5A-7A-66A | - | 5 |  | |  | | Yes | | Yes | |  | |  | 50 | 0 |
| 7 |  | |  | |  | | Yes | | Yes | | Yes |
| 66 |  | |  | | Yes | | Yes | | Yes | | Yes |

### 5.30.2 ∆TIB and ∆RIB values

CA\_5-7 and CA\_5-66 has dTib=0.3 and dRib=0 for both bands. CA\_7-66 has dTib and dRib=0.5 for both bands.

Table 5.30.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_5-7-66  CA\_5-7-66-66 | 5 | 0.3 |
| 7 | 0.5 |
| 66 | 0.5 |

Table 5.30.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_5-7-66  CA\_5-7-66-66 | 5 | 0 |
| 7 | 0.5 |
| 66 | 0.5 |

### 5.30.3 REFSENS requirements

There is receiver 2nd harmonic mixing for band 5 from band 66 uplink but it has not been specified for 5+66 fallback hence it is not necessary to be specified for 5-7-66.

## 5.31 CA\_3-5-7

### 5.31.1 Channel bandwidths per operating band for CA

able 5.31.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA\_3A-3A-5A-7A | - | 3 | See CA\_3A-3A Bandwidth Combination Set 0 in Table 5.6A.1-3 | | | | | | 70 | 0 |
| 5 |  |  | Yes | Yes |  |  |
| 7 |  |  |  | Yes | Yes | Yes |
| CA\_3A-5A-7A | - | 3 |  |  | Yes | Yes | Yes | Yes | 50 | 1 |
| 5 |  |  | Yes | Yes |  |  |
| 7 |  |  |  | Yes | Yes | Yes |
| CA\_3A-5A-7C | - | 3 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 5 |  |  | Yes | Yes |  |  |
| 7 | See CA\_7C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | |

### 5.31.2 ∆TIB and ∆RIB values

dTib and dRib have been already specified

Table 5.31.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_3-5-7, CA\_3-3-5-7 | 3 | 0.5 |
| 5 | 0.3 |
| 7 | 0.5 |

Table 5.31.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_3-5-7, CA\_3-3-5-7 | 3 | 0 |
| 5 | 0 |
| 7 | 0 |

### 5.31.3 REFSENS requirements

No MSD is necessary.

## 5.32 CA\_2-7-28

### 5.32.1 Channel bandwidths per operating band for CA

Table 5.32.1-1: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 | 3 | 5 | 10 | 15 | 20 | Maximum aggregated bandwidth | Bandwidth combination set |
|  |  |  | MHz | MHz | MHz | MHz | MHz | MHz | [MHz] |  |
| CA\_2A-7C-28A | - | 2 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | |
| 28 |  |  | Yes | Yes | Yes | Yes |

### 5.32.2 ∆TIB and ∆RIB values

dTib and dRib have been already specfied.

Table 5.32.2-1: IB,c

|  |  |  |
| --- | --- | --- |
| CA\_2-7-28 | 2 | 0.5 |
| 7 | 0.5 |
| 28 | 0.3 |

Table 5.32.2-2: R IB,c

|  |  |  |
| --- | --- | --- |
| CA\_2-7-28 | 2 | 0 |
| 7 | 0 |
| 28 | 0 |

### 5.32.3 REFSENS requirements

No MSD is necessary.

## 5.33 CA\_1-8-42

### 5.33.1 Channel bandwidths per operating band for CA

Table 5.33.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 8 | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | FDD |
| 42 | 3400 MHz | – | 3600 MHz | 3400 MHz | – | 3600 MHz | TDD |

Table 5.33.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-8A-42A | - | 1 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 8 |  |  | Yes | Yes |  |  |
| 42 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-8A-42C | - | 1 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 8 |  |  | Yes | Yes |  |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |

### 5.33.2 ∆TIB and ∆RIB values

For CA\_1-8-42, the ΔTIB,c and ΔRIB,c values are given in the tables below.

Table 5.33.2-1: ΔTIB,c

| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_1-8-42 | 1 | 0.3 |
| 8 | 0.6 |
| 42 | 0.8 |

Table 5.33.2-2: ΔRIB

| Inter-band CA Configuration | E-UTRA Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_1-8-42 | 1 | 0 |
| 8 | 0.2 |
| 42 | 0.5 |

### 5.33.3 REFSENS requirements

REFSENS requirements for CA\_1-8-42 (exceptions due to harmonic issues) are defined in table 5.X.3-1 for inclusion in TS 36.101 table 7.3.1A-0a, and in table 5.X.3-2 for inclusion in TS 36.101 table 7.3.1A-0b.

Table 5.33.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_1A-8A-42A12,13  CA\_1A-8A-42C12,13 | 4233 |  |  | -84.8 | -84.7 | -84.6 | -84.5 | TDD |
| NOTE 12: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 13: The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band.  NOTE 33: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 5.33.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_1A-8A-42A  CA\_1A-8A-42C | 8 |  |  | 8 | 16 | 25 | 25 | FDD |

## 5.34 CA\_3-8-42

### 5.34.1 Channel bandwidths per operating band for CA

Table 5.34.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 3 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | FDD |
| 8 | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | FDD |
| 42 | 3400 MHz | – | 3600 MHz | 3400 MHz | – | 3600 MHz | TDD |

Table 5.34.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_3A-8A-42A | - | 3 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 8 |  |  | Yes | Yes |  |  |
| 42 |  |  | Yes | Yes | Yes | Yes |
| CA\_3A-8A-42C | - | 3 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 8 |  |  | Yes | Yes |  |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |

### 5.34.2 ∆TIB and ∆RIB values

For CA\_3-8-42, the ΔTIB,c and ΔRIB,c values are given in the tables below.

Table 5.34.2-1: ΔTIB,c

| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_3-8-42 | 3 | 0.6 |
| 8 | 0.6 |
| 42 | 0.8 |

Table 5.34.2-2: ΔRIB

| Inter-band CA Configuration | E-UTRA Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_3-8-42 | 3 | 0.2 |
| 8 | 0.2 |
| 42 | 0.5 |

### 5.34.3 REFSENS requirements

REFSENS requirements for CA\_3-8-42 (exceptions due to harmonic issues) are defined in table 5.34.3-1 for inclusion in TS 36.101 table 7.3.1A-0a, and in table 5.34.3-2 for inclusion in TS 36.101 table 7.3.1A-0b.

Table 5.34.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_3A-8A-42A4  CA\_3A-8A-42C4 | 3 |  |  | N/A | N/A | N/A | N/A | FDD |
| CA\_3A-8A-42A9,10  CA\_3A-8A-42C9,10 | 4233 |  |  | -71.7 | -71.7 | -71.7 | -71.7 | TDD |
| CA\_3A-8A-42A11  CA\_3A-8A-42C11 | 4233 |  |  | -97.1 | -94.7 | -93.2 | -92.5 | TDD |
| CA\_3A-8A-42A12,13  CA\_3A-8A-42C12,13 | 4233 |  |  | -84.8 | -84.7 | -84.6 | -84.5 | TDD |
| NOTE 4: No requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the low band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of the high band. The reference sensitivity for all active downlink component carriers is only verified when this is not the case (the requirements specified in clause 7.3.1 apply unless otherwise specified).  NOTE 9: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range FHD above and below the edge of this downlink transmission bandwidth. The value FHD depends on the E-UTRA configuration: FHD = 10 MHz for CA\_3A-42A, CA\_3A-3A-42A, CA\_3A-42A-42A, CA\_1A-3A-20A-32A-42A, CA\_3A-42A-43A, CA\_3A-32A-42A-43A, CA\_1A-3A-42A, CA\_2A-13A-48A-66A, CA\_2A-48A, CA\_2A-48C, CA\_2A-48D, CA\_48A-66A, CA\_3A-7A-42A, CA\_3A-19A-42A, CA\_3A-20A-42A, CA\_3A-28A-42A, CA\_1A-3A-7A-42A, CA\_5A-48A-66A, CA\_5A-48A-66A-66A, CA\_13A-48A-66A, CA\_13A-48A-66A-66A, CA\_13A-48A-66B, CA\_13A-48A-66C, CA\_13A-48A-48A-66A, CA\_13A-48C-66A, CA\_13A-48D-66A, CA\_13A-48A-48C-66A, CA\_28A-32A, CA\_48A-66A-66A, CA\_48A-66B , CA\_48A-66C, CA\_48A-48A-66A, CA\_48C-66A, CA\_48A-48A-66A-66A, CA\_48A-48A-66B, CA\_48A-48A-66C, CA\_48C-66B, CA\_48C-66C, CA\_48E-66A, CA\_1A-3A-18A-42A, CA\_1A-3A-19A-42A, CA\_1A-3A-32A-42A, CA\_1A-3A-41A-42A, CA\_3A-7A-20A-42A, CA\_3A-20A-32A-42A, CA\_3A-28A-41A-42A, CA\_3A-18A-42A, CA\_3A-18A-42C, CA\_3A-8A-42A and CA\_3A-8A-42C. FHD = 0MHz for CA\_11A-28A, CA\_1A-11A-28A and CA\_3A-11A-28A.  NOTE 10: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 11: The requirements are only applicable to channel bandwidths with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.  NOTE 12: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 13: The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band.  NOTE 33: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured. | | | | | | | | |

Table 5.34.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_3A-8A-42A  CA\_3A-8A-42C | 3 |  |  | 12 | 25 | 36 | 50 | FDD |
| CA\_3A-8A-42A  CA\_3A-8A-42C | 8 |  |  | 8 | 16 | 25 | 25 | FDD |

## 5.35 CA\_2-7-29

### 5.35.1 Channel bandwidths per operating band for CA

Table 5.35.1-1: Supported E-UTRA bandwidths per CA configuration for 4DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_2A-7A-29A | - | 2 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 7 |  |  |  | Yes | Yes | Yes |
| 29 |  |  | Yes | Yes |  |  |
| CA\_2A-7C-29A | - | 2 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 1. 7 | See CA\_7C Bandwidth combination set 1 in Table 5.6A.1-1 | | | | | |
| 29 |  |  | Yes | Yes |  |  |
| CA\_2A-7A-7A-29A | - | 2 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in Table 5.6A.1-3 | | | | | |
| 29 |  |  | Yes | Yes |  |  |
|  | | | | | | | | | | |

### 5.35.2 ∆TIB and ∆RIB values

ΔRIB,c values for CA\_2-7-29 are derived from CA\_2-7, CA\_2-29 and CA 7-29. For the ΔTIB,c the values from CA\_2-7 are used. Values will be defined in the following tables in TS 36.101.

Table 5.35.2-1: ΔTIB,c (four bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_2-7-29, CA\_2-7-7-29 | 2 | 0.5 |
| 7 | 0.5 |

Table 5.35.2-2: ΔRIB,c (four bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_2-7-29, CA\_2-7-7-29 | 2 | 0 |
| 7 | 0 |

### 5.35.3 REFSENS requirements

The REFSENS requirements for CA\_2A-7A-29A, CA\_2A-7C-29A and CA\_2A-7A-7A-29A need to be added in TS 36.101 as in tables below:

Table 7.3.1A-0d: Reference sensitivity QPSK PREFSENS (CA with a SDL band)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EUTRA CA Configuration | EUTRA band | Channel bandwidth | | | | | | Duplex mode |
| 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) |
| CA\_2A-7A-29A  CA\_2A-7C-29A | 2 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 7 |  |  |  | -95 | -93.2 | -92 |
| 29 |  |  | -97 | -94 |  |  |
| CA\_2A-7A-7A-29A | 2 |  |  | -98 | -95 | -93.2 | -92 | FDD |
| 7 |  |  | -98 | -95 | -93.2 | -92 |
| 29 |  |  | -97 | -94 |  |  |

## 5.36 CA\_25-26-41

### 5.36.1 Channel bandwidths per operating band for CA

Table 5.36.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 25 | 1850 MHz | – | 1915 MHz | 1930 MHz | – | 1995 MHz | FDD |
| 26 | 814 MHz | – | 849 MHz | 859 MHz | – | 894 MHz | FDD |
| 41 | 2496 MHz | – | 2690 MHz | 2496 MHz | – | 2690 MHz | TDD |

Table 5.36.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA CA configuration / Bandwidth combination set** | | | | | | | | | | | | | | | | | | | |
|
| **E-UTRA CA Configuration** | | **Uplink CA configurations** | | **E-UTRA Bands** | | **1.4** | | **3** | | **5** | | **10** | | **15** | | **20** | **Maximum aggregated bandwidth** | | **Bandwidth combination set** |
| **MHz** | | **MHz** | | **MHz** | | **MHz** | | **MHz** | | **MHz** | **[MHz]** | |
| CA\_25A-25A-26A-41D | | - | | 25 | | See CA\_25A-25A Bandwidth Combination Set 1 in Table 5.6A.1-3 | | | | | | | | | | | | 105 | 0 | | |
| 26 | |  | | yes | | yes | |  | |  | |  | |
| 41 | | See CA\_41D Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | | | | | | | |
| CA\_25A-25A-26A-41E | | - | | 25 | | See CA\_25A-25A Bandwidth Combination Set 1 in Table 5.6A.1-3 | | | | | | | | | | | | 125 | 0 | | |
| 26 | |  | | yes | | yes | |  | |  | |  | |
| 41 | | See CA\_41E Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | | | | | | | |
| CA\_25A-25A-26A-41F | | - | | 25 | | See CA\_25A-25A Bandwidth Combination Set 1 in Table 5.6A.1-3 | | | | | | | | | | | | 145 | 0 | | |
| 26 | |  | | yes | | yes | |  | |  | |  | |
| 41 | | See CA\_41F Bandwidth combination set 0 in Table 5.6A.1-1 | | | | | | | | | | | |

### 5.36.2 ∆TIB and ∆RIB values

For CA\_25-25-26-41, the ΔTIB,c and ΔRIB,c values are the same as for existing CA-25-26-41 combinations in TS 36.101.

### 5.36.3 REFSENS requirements

The REFSENS requirements for CA\_25A-25A-26A-41D/E/F are the same as for existing CA combinations CA\_25A-25A-26A-41A/C in TS 36.101.

## 5.37 CA\_8-11-42

### 5.37.1 Channel bandwidths per operating band for CA

Table 5.37.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 8 | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | FDD |
| 11 | 1427.9 MHz | – | 1447.9 MHz | 1475.9 MHz | – | 1495.9 MHz | FDD |
| 42 | 3400 MHz | – | 3600 MHz | 3400 MHz | – | 3600 MHz | TDD |

Table 5.37.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_8A-11A-42A | - | 8 |  |  | Yes | Yes |  |  | 40 | 0 |
| 11 |  |  | Yes | Yes |  |  |
| 42 |  |  | Yes | Yes | Yes | Yes |
| CA\_8A-11A-42C | - | 8 |  |  | Yes | Yes |  |  | 60 | 0 |
| 11 |  |  | Yes | Yes |  |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |

### 5.37.2 ∆TIB and ∆RIB values

For CA\_8-11-42, the ΔTIB,c and ΔRIB,c values are given in the tables below.

Table 5.37.2-1: ΔTIB,c

| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_8-11-42 | 8 | 0.6 |
| 11 | 0.4 |
| 42 | 0.8 |

Table 5.37.2-2: ΔRIB

| Inter-band CA Configuration | E-UTRA Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_8-11-42 | 8 | 0.2 |
| 11 | 0 |
| 42 | 0.5 |

### 5.37.3 REFSENS requirements

REFSENS requirements for CA\_8-11-42 (exceptions due to harmonic issues) are defined in table 5.37.3-1 for inclusion in TS 36.101 table 7.3.1A-0a, and in table 5.37.3-2 for inclusion in TS 36.101 table 7.3.1A-0b.

Table 5.37.3-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | | |
| EUTRA CA Configuration | EUTRA band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex mode |
| CA\_8A\_11A\_42A12, 13  CA\_8A\_11A\_42C12, 13 | 4233 |  |  | -84.8 | -84.7 | -84.6 | -84.5 | TDD |
| NOTE 12: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 13: The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band. | | | | | | | | |

Table 5.37.3-2: Uplink configuration for the low band (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode | | | | | | | | |
| EUTRA CA Configuration | UL band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex mode |
| CA\_8A\_11A\_42A  CA\_8A\_11A\_42C | 8 |  |  | 8 | 16 | 25 | 25 | FDD |

## 5.38 CA\_1-11-42

### 5.38.1 Channel bandwidths per operating band for CA

Table 5.38.1-1: Inter-band CA operating bands

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| 1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| 11 | 1427.9 MHz | – | 1447.9 MHz | 1475.9 MHz | – | 1495.9 MHz | FDD |
| 42 | 3400 MHz | – | 3600 MHz | 3400 MHz | – | 3600 MHz | TDD |

Table 5.38.1-2: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-11A-42A | - | 1 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 11 |  |  | Yes | Yes |  |  |
| 42 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-11A-42C | - | 1 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 11 |  |  | Yes | Yes |  |  |
| 42 | See CA\_42C Bandwidth Combination Set 0 in Table 5.6A.1-1 | | | | | |

### 5.38.2 ∆TIB and ∆RIB values

For CA\_1-11-42, the ΔTIB,c and ΔRIB,c values are given in the tables below.

Table 5.38.2-1: ΔTIB,c

| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_1-11-42 | 1 | 0.3 |
| 11 | 0.4 |
| 42 | 0.8 |

Table 5.38.2-2: ΔRIB

| Inter-band CA Configuration | E-UTRA Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_1-11-42 | 1 | 0 |
| 11 | 0 |
| 42 | 0.5 |

### 5.38.3 REFSENS requirements

## 5.39 CA\_2-7-13

### 5.39.1 Channel bandwidths per operating band for CA

Table 5.39.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_2A-7A-13A | - | 2 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 13 |  |  | Yes | Yes |  |  |
| CA\_2A-7C-13A | - | 2 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 7 | See CA\_7C Bandwidth combination set 1 in Table 5.6A.1-1 | | | | | |
| 13 |  |  | Yes | Yes |  |  |
| CA\_2A-7A-7A-13A | - | 2 |  |  | Yes | Yes | Yes | Yes | 70 | 0 |
| 7 | See CA\_7A-7A Bandwidth combination set 1 in Table 5.6A.1-3 | | | | | |
| 13 |  |  | Yes | Yes |  |  |
|  | | | | | | | | | | |

### 5.39.2 ∆TIB and ∆RIB values

ΔRIB,c values for CA\_2-7-13 are derived from CA\_2-7-28. For the ΔTIB,c the values from CA\_2-7-28 are reused. Values will be defined in the following tables in TS 36.101.

Table 5.39.2-1: ΔTIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_2-7-13, CA\_2-7-7-13 | 2 | 0.5 |
| 7 | 0.5 |
| 13 | 0.3 |

Table 5.39.2-2: ΔRIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_2-7-13, CA\_2-7-7-13 | 2 | 0 |
| 7 | 0 |
| 13 | 0 |

### 5.39.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.40 CA\_7-13-66

### 5.40.1 Channel bandwidths per operating band for CA

Table 5.40.1-1: Supported E-UTRA bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_7A-13A-66A | - | 7 |  |  | Yes | Yes | Yes | Yes | 50 | 0 |
| 13 |  |  | Yes | Yes |  |  |
| 66 |  |  | Yes | Yes | Yes | Yes |
| CA\_7C-13A-66A | - | 7 | See CA\_7C Bandwidth combination set 1 in Table 5.6A.1-1 | | | | | | 70 | 0 |
| 13 |  |  | Yes | Yes |  |  |
| 66 |  |  | Yes | Yes | Yes | Yes |
|  | | | | | | | | | | |

### 5.40.2 ∆TIB and ∆RIB values

ΔRIB,c values for CA\_7-13-66 are derived from CA\_7-66 and CA\_13-66. For the ΔTIB,c the values which derived from CA\_7-66 and CA\_13-66 are reused. Values will be defined in the following tables in TS 36.101.

Table 5.40.2-1: ΔTIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_7-13-66 | 7 | 0.5 |
| 13 | 0.3 |
| 66 | 0.5 |

Table 5.40.2-2: ΔRIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_7-13-66 | 7 | 0.5 |
| 13 | 0 |
| 66 | 0.5 |

### 5.40.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.41 CA\_1-7-20

### 5.41.1 Channel bandwidths per operating band for CA

Table 5.41.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_1A-7A-7A-20A | 1 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7A-7A Bandwidth Combination Set 3 in Table 5.6A.1-3 | | | | | |
| 20 |  |  | Yes | Yes | Yes | Yes |

### 5.41.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_1-7-7-20 is proposed to be the same as CA\_1-7-20 already specified in TS 36.101.

Table 5.41.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_1-7-7-20 | 1 | 0.5 |
| 7 | 0.6 |
| 20 | 0.3 |

Table 5.41.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_1-7-7-20 | 1 | 0 |
| 7 | 0 |
| 20 | 0 |

### 5.41.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.42 CA\_3-7-20

### 5.42.1 Channel bandwidths per operating band for CA

Table 5.42.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_3A-7A-7A-20A | 3 |  |  | Yes | Yes | Yes | Yes | 80 | 0 |
| 7 | See CA\_7A-7A Bandwidth Combination Set 3 in Table 5.6A.1-3 | | | | | |
| 20 |  |  | Yes | Yes | Yes | Yes |

### 5.42.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_3-7-7-20 is proposed to be the same as CA\_3-7-20 already specified in TS 36.101.

Table 5.42.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_3-7-7-20 | 3 | 0.5 |
| 7 | 0.5 |
| 20 | 0.3 |

Table 5.42.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_3-7-7-20 | 3 | 0 |
| 7 | 0 |
| 20 | 0 |

### 5.42.3 REFSENS requirements

There are no reference sensitivity requirements needed.

## 5.43 CA\_2-7-26

### 5.43.1 Channel bandwidths per operating band for CA

Table 5.43.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_2A-7A-26A | 2 |  | Yes | Yes | Yes | Yes | Yes | 55 | 0 |
| 7 |  |  | Yes | Yes | Yes | Yes |
| 26 |  | Yes | Yes | Yes | Yes |  |

### 5.43.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_2-7-26 is proposed to be based on the high-low band diplexer combining CA\_2-7 quadplexer and band 26 chain.

Table 5.43.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_2-7-26 | 2 | 0.5 |
| 7 | 0.5 |
| 26 | 0.3 |

Table 5.43.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_2-7-26 | 2 | 0 |
| 7 | 0 |
| 26 | 0 |

### 5.43.3 REFSENS requirements

There is no REFSENS exception for CA\_2A-7A-26A.

## 5.44 CA\_2-26-66

### 5.44.1 Channel bandwidths per operating band for CA

Table 5.44.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_2A-26A-66A | 2 |  | Yes | Yes | Yes | Yes | Yes | 55 | 0 |
| 26 |  | Yes | Yes | Yes | Yes |  |
| 66 |  | Yes | Yes | Yes | Yes | Yes |

### 5.44.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_2-26-66 is proposed to be based on the diplexer combining CA\_2-66 quadplexer and band 26 chain.

Table 5.44.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_2-26-66 | 2 | 0.5 |
| 26 | 0.3 |
| 66 | 0.5 |

Table 544.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_2-26-66 | 2 | 0 |
| 26 | 0 |
| 66 | 0 |

### 5.44.3 REFSENS requirements

There is no REFSENS exception for CA\_2A-26A-66A.

## 5.45 CA\_7-26-66

### 5.45.1 Channel bandwidths per operating band for CA

Table 5.45.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CA operating / Channel bandwidth | | | | | | | | | |
| CA Configuration | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | **Maximum aggregated bandwidth**  [MHz] | Bandwidth Combination Set |
| CA\_7A-26A-66A | 7 |  |  | Yes | Yes | Yes | Yes | 55 | 0 |
| 26 |  | Yes | Yes | Yes | Yes |  |
| 66 |  | Yes | Yes | Yes | Yes | Yes |

### 5.45.2 ∆TIB and ∆RIB values

The ∆TIB and ∆RIB values of CA\_7-26-66 is proposed to be based on the diplexer combining CA\_7-66 quadplexer and band 26 chain.

Table 5.45.2-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_7-26-66 | 7 | 0.5 |
| 26 | 0.3 |
| 66 | 0.5 |

Table 5.45.2-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **E-UTRA Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_7-26-66 | 7 | 0 |
| 26 | 0 |
| 66 | 0 |

### 5.45.3 REFSENS requirements

There is no REFSENS exception for CA\_7A-26A-66A.

## 5.46 CA\_1-18-41

### 5.46.1 Channel bandwidths per operating band for CA

Table 5.46.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-18A-41A |  | 1 |  |  | Yes | Yes | Yes | Yes | 55 | 0 |
| 18 |  |  | Yes | Yes | Yes |  |
| 41 |  |  | Yes | Yes | Yes | Yes |
| CA\_1A-18A-41C | CA\_41C | 1 |  |  | Yes | Yes | Yes | Yes | 75 | 0 |
| 18 |  |  | Yes | Yes | Yes |  |
| 41 | See CA\_41C Bandwidth Combination Set 1 in Table 5.6A.1-1 | | | | | |

### 5.46.2 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB,c values of CA\_1-18\_41 are given in the tables below, based on the values of its consistent 2 Bands fallback mode.

Table 5.46.2-1: ΔTIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔTIB,c [dB] |
| CA\_1-18-41 | 1 | 0.5 |
| 18 | 0.3 |
| 41 | 0.5 |

Table 5.46.2-2: ΔRIB,c for 3DLs aggregation

|  |  |  |
| --- | --- | --- |
| Inter-band CA Configuration | E-UTRA Band | ΔRIB,c [dB] |
| CA\_1-18-41 | 1 | 0 |
| 18 | 0 |
| 41 | 0 |

### 5.46.3 REFSENS requirements

There is no REFSENS exception for CA\_1A-18A-41A and CA\_1A-18A-41C.

## 5.47 CA\_1-20-38

### 5.47.1 Channel bandwidths per operating band for CA

Table 5.47.1-1: Supported E-UTRA bandwidths per CA configuration for 3-band DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA CA configuration / Bandwidth combination set | | | | | | | | | | |
| E-UTRA CA Configuration | Uplink CA configurations | E-UTRA Bands | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Maximum aggregated bandwidth  [MHz] | Bandwidth combination set |
| CA\_1A-20A-38A | - | 1 |  |  | Yes | Yes | Yes | Yes | 60 | 0 |
| 20 |  |  | Yes | Yes | Yes | Yes |
| 38 |  |  | Yes | Yes | Yes | Yes |

### 5.47.2 ∆TIB and ∆RIB values

For CA\_1A-20A-38A, the ΔTIB,c and ΔRIB,c values are shown in table 5.x.2-1 and table 5.x.2-2, respectively.

Table 5.47.2-1: ΔTIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔTIB,c [dB] |
| CA\_1-20-38 | 1 | 0.5 |
| 20 | 0.3 |
| 38 | 0.5 |

Table 5.47.2-2: ΔRIB,c (three bands)

|  |  |  |
| --- | --- | --- |
| E-UTRA operating band combination | E-UTRA Band | ΔRIB,c [dB] |
| CA\_1-20-38 | 1 | 0 |
| 20 | 0 |
| 38 | 0 |

### 5.47.3 REFSENS requirements

There is no REFSENS exception for CA\_1A-20A-38A.

# Annex A: Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Old** | **New** |
| 2018-08 | 3GPP RAN4#88 |  |  |  | Initial TR skeleton |  | 0.0.1 |
| 2018-09 | 3GPP  RAN4#88bis |  |  |  | Implemented TPs from RAN4 #88:  R4-1809716 TP for TR 36.716-03-01: CA\_3-18-42 R4-1811479 TP for TR 36.716-03-01: CA\_2-7-46 R4-1810570 TP for TR 36.716-03-01: CA\_7-28-40  R4-1810571 TP for TR 36.716-03-01: CA\_1-28-40  R4-1811480 TP for TR 36.716-03-01: CA\_1A-3A-46A and CA\_1A-3A-46C R4-1809717 TP for TR 36.716-03-01: CA\_1-18-42 R4-1810401 TP to 36.716-03-01, CA\_1-7-7-28  R4-1810402 TP to 36.716-03-01, CA\_3-5-28  R4-1810405 TP to 36.716-03-01, four 3-7-28 LTE CA combinations  R4-1810406 TP to 36.716-03-01, 1A-3C-28A\_2CC\_UL\_3C |  | 0.1.0 |
| 2018-11 | 3GPP  RAN4#89 |  |  |  | Implemented TPs from RAN4 #88bis:  R4-1813783 **TP to TR 36.716-03-01: CA\_3-32-46**  R4-1813783 **TP to TR 36.716-03-01: CA\_7-32-46** |  | 0.2.0 |
| 2019-04 | 3GPP RAN4#90bis |  |  |  | Implemented TPs from RAN4 #90:  R4-1902114 TP for TR 36.716-03-01 for CA\_1A-3C-38A\_BCS0, CA\_1A-7A-38A\_BCS0  R4-1902117 TP for TR 36.716-03-01 to introduce 5A-48A-66A and 5A-48A-66A-66A  R4-1902210 TP to TR 36.716-02-01: 7A-29A-66A\_BCS0; 7A-7A-29A-66A\_BCS0 and 7C-29A-66A\_BCS0 R4-1900591 TP to TR 36.716-03-01: CA\_2-48-66 R4-1902125 TP to TR 36.716-03-01: UE co-existence studies and requirements for CA\_1A-3A-46A to CA\_1A-3A-46E R4-1902126 TP to TR 36.716-03-01: UE co-existence studies and requirements for CA\_1A-7A-46A to CA\_1A-7A-46E R4-1902208 TP to TR 36.716-03-01: CA 2A-7C-66A-66A\_BCS0, and, CA 2A-7A-7A-66A-66A\_BCS0 R4-1900070 TP to TR 36.716-03-01: CA\_2A-5A-46E\_BCS0  R4-1900291 TP for TR 36.716-03-01 addition of CA\_2A-48E-66A R4-1900292 TP for TR 36.716-03-01 addition of CA\_13A-48E-66A R4-1900590 TP to TR 36.716-03-01: CA\_2-46-66 R4-1900592 TP to TR 36.716-03-01: CA\_5-46-66 R4-1900593 TP to TR 36.716-03-01: CA\_13-48-66 R4-1901464 TP for 36.716-03-01 to include CA\_3A-3A-7C-28A R4-1901465 TP for 36.716-03-01 to include CA\_1A-3A-3A-7C |  | 0.3.0 |
| 2019.05 | 3GPP RAN4 #91 |  |  |  | R4-1904922 AMX TP to TR 36.716-03-01: 3A-3A-5A-28A\_BCS0 R4-1904984 AMX TP to TR 36.716-03-01: 5A-7C-28A\_BCS0  R4-1903001 TP for TR 36.716-03-01 Introduction of CA\_3-7-46  R4-1903535 AMX TP to TR 36.716-03-01: 5-7-66 and 5-7-66-66  R4-1903536 AMX TP to TR 36.716-03-01: 3-5-7 and 3-3-5-7 R4-1903539 AMX TP to TR 36.716-03-01: 2A-7C-28A\_BCS0 |  | 0.4.0 |
| 2019.11 | 3GPP RAN4 #92 and 92bis |  |  |  | RAN4 #92:  R4-1908598 TP for TR 36.716-03-01: LTE CA\_1-8-42  R4-1908599 TP for TR 36.716-03-01: LTE CA\_3-8-42 R4-1910211 TP for TR 36.716-03-01: CA\_2-7-29  R4-1909229 Draft CR to TS 36.101: Correction of CA\_2-7-66 R4-1909842 TP for TR 36.716-03-01 to include CA configurations for 1-3-28, 1-7-28, 1-3-7, 1-7-28  RAN4 #92bis:  [R4-1910744](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1910744.zip) TP for TR 36.716-03-01: LTE CA\_25-25-26-41 [R4-1911156](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911156.zip) TP for TR 36.716-03-01: LTE CA\_8-11-42 [R4-1911152](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911152.zip) TP for TR 36.716-03-01: LTE CA\_1-11-42 [R4-1911464](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911464.zip) TP for TR 36.716-03-01: CA\_2A-7A-13A, CA\_2A-7C-13A, CA\_2A-7A-7A-13A [R4-1911465](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911465.zip) TP for TR 36.716-03-01: CA\_7A-13A-66A, CA\_7C-13A-66A [R4-1911585](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911585.zip) TP to TR 36.716-03-01: CA\_1-7-7-20 [R4-1911586](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1911586.zip) TP to TR 36.716-03-01: CA\_3-7-7-20 [R4-1912276](file:///D:\RAN4\TSGRAN4_92bis\Docs\R4-1912276.zip) TP for 36.716-03-01 to include CA configurations for 1-3-28, 1-3-7 |  |  |
| 2020.06 | 3GPP RAN4 #94-e and 94bis-e |  |  |  | R4-2002566 TP to TR 36.716-03-01: CA\_2-7-26  R4-2002567 TP to TR 36.716-03-01: CA\_2-26-66  R4-2002633 TP to TR 36.716-03-01: CA\_7-26-66  R4-2003115 TP for TR 36.716-03-01: CA\_1A-18A-41A and CA\_1A-18A-41C  R4-2003791 TP for TR 36.716-03-01: CA\_1-20-38 |  | 0.5.0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2020-06 | RAN#88 |  |  |  |  | Approved by plenary – Rel-16 spec under change control | 16.0.0 |