

3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; LTE Advanced Dual Uplink Inter-band Carrier Aggregation (Release 12)



Keywords

<keyword[, keyword]>

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Contents

Foreword	4
1 Scope	5
2 References.....	5
3 Definitions, symbols and abbreviations	5
3.1 Definitions	5
3.2 Symbols.....	5
3.3 Abbreviations.....	6
4 Background	6
4.1 TR Maintenance.....	6
5 Dual Uplink Inter-band Carrier Aggregation: CA classes general part.....	6
5.1 BS specific	6
5.2 UE specific	6
5.3 RRM specific	76
6 Class A1. Low-high band combination without harmonic relation between bands or intermodulation problem.....	7
6.1 Specific issue for dual uplink inter-band CA class A1	7
6.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 5.....	7
6.3 LTE-Advanced Carrier Aggregation of Band 3 and Band 20	7
6.4 LTE-Advanced Carrier Aggregation of Band 7 and Band 20	7
6.5 LTE-Advanced Carrier Aggregation of Band 1 and Band 19	7
7 Class A2. Low-high band combination with harmonic relation between bands	87
7.1 Specific issue for dual uplink inter-band CA class A2	87
7.2 LTE-Advanced Carrier Aggregation of Band 3 and Band 8.....	87
7.3 LTE-Advanced Carrier Aggregation of Band 4 and Band 12	8
7.4 LTE-Advanced Carrier Aggregation of Band 4 and Band 17	8
8 Class A3. Low-low or high-high band combinations	8
8.1 Specific issue for dual uplink inter-band CA class A3	8
8.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 7.....	8
8.3 LTE-Advanced Carrier Aggregation of Band 3 and Band 7.....	8
8.4 LTE-Advanced Carrier Aggregation of Band 4 and Band 7.....	98
8.5 LTE-Advanced Carrier Aggregation of Band 5 and Band 12	98
8.6 LTE-Advanced Carrier Aggregation of Band 5 and Band 17	98
9 Class A4. Low-low, low-high or high-high band combination with intermodulation problem (low order IM).....	9
9.1 Specific issue for dual uplink inter-band CA class A4	9
9.2 LTE-Advanced Carrier Aggregation of Band 3 and Band 5.....	9
10 Class A5. Combinations not classified in A1-A4	109
10.1 Specific issue for dual uplink inter-band CA class A5	109
10.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 21	109
Annex A: Change history.....	1140

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 for LTE Advanced Dual Uplink Inter-band Carrier Aggregation under Rel-12 time frame. The purpose is to gather the relevant background information and studies in order to address Dual Uplink Inter-band Carrier Aggregation requirements.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TR 30.007: "Guideline on WI/SI for new Operating Bands"
- [3] 3GPP TR 36.850: "Inter-band Carrier Aggregation Technical Report (Release 11)"
- [4] 3GPP TR 36.851: "Inter-band Carrier Aggregation Technical Report (Release 12)"

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].

Carrier aggregation: Aggregation of two or more component carriers in order to support wider transmission bandwidths.

Channel bandwidth: The RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell. The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

Inter-band carrier aggregation: Carrier aggregation of component carriers in different operating bands.

NOTE: Carriers aggregated in each band can be contiguous or non-contiguous.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

F_{DL_low}	The lowest frequency of the downlink operating band
F_{DL_high}	The highest frequency of the downlink operating band
F_{UL_low}	The lowest frequency of the uplink operating band
F_{UL_high}	The highest frequency of the uplink operating band

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

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 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].

A-MPR	Additional Maximum Power Reduction
BS	Base Station
CA	Carrier Aggregation
CA_X-Y	CA for band X and band Y where X and Y are the applicable E-UTRA operating band
CC	Component Carriers
DL	Downlink
E-UTRA	Evolved UMTS Terrestrial Radio Access
FDD	Frequency Division Duplex
PA	Power Amplifier
REFSENS	Reference Sensitivity power level
TDD	Time Division Duplex
UE	User Equipment
UL	Uplink

4 Background

The present document is a technical report for LTE Advanced Dual Uplink Inter-band Carrier Aggregation under Rel-12 time frame. It covers both the UE and BS side. The document is divided in two different parts:

- Common part: this part covers general BS and UE issues for all CA classes.
- CA class part: this part covers each CA class in parallel clauses. For each CA class, general part for this specific CA class and each band combination with specific issues will be structured in separate sub-clauses.

4.1 TR Maintenance

A single company is responsible for introducing all approved TPs in the current TR, TR editor. However, it is the responsibility of the rapporteur of each WI to ensure that the TPs related to the WI have been implemented.

5 Dual Uplink Inter-band Carrier Aggregation: CA classes general part

5.1 BS specific

<Text will be added.>

5.2 UE specific

<Text will be added.>

5.2.1 UE Coexistence requirements for Dual UL CA when the aggregated bands are from different regions

<Text will be added.>

5.3 RRM specific

<Text will be added.>

6 Class A1. Low-high band combination without harmonic relation between bands or intermodulation problem

6.1 Specific issue for dual uplink inter-band CA class A1

<Text will be added.>

~~6.2.1 Inter-region OOB requirements for Carrier Aggregation of Band 1 and Band 5~~

<Text will be added.>

6.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 5

<Text will be added.>

6.2.1 Inter-region OOB requirements for Carrier Aggregation of Band 1 and Band 5

<Text will be added.>

6.3 LTE-Advanced Carrier Aggregation of Band 3 and Band 20

<Text will be added.>

~~6.4 LTE-Advanced Carrier Aggregation of Band 7 and Band 20~~

<Text will be added.>

6.45 LTE-Advanced Carrier Aggregation of Band 1 and Band 19

<Text will be added.>

7 Class A2. Low-high band combination with harmonic relation between bands

7.1 Specific issue for dual uplink inter-band CA class A2

<Text will be added.>

7.2 LTE-Advanced Carrier Aggregation of Band 3 and Band 8

<Text will be added.>

7.3 LTE-Advanced Carrier Aggregation of Band 4 and Band 12

<Text will be added.>

7.4 LTE-Advanced Carrier Aggregation of Band 4 and Band 17

<Text will be added.>

8 Class A3. Low-low or high-high band combinations

8.1 Specific issue for dual uplink inter-band CA class A3

<Text will be added.>

8.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 7

<Text will be added.>

8.3 LTE-Advanced Carrier Aggregation of Band 3 and Band 7

<Text will be added.>

8.4 LTE-Advanced Carrier Aggregation of Band 4 and Band 7

<Text will be added.>

8.4.1 Inter-region OOBE requirements for Carrier Aggregation of Band 4 and Band 7

<Text will be added.>

8.5 LTE-Advanced Carrier Aggregation of Band 5 and Band 12

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8.6 LTE-Advanced Carrier Aggregation of Band 5 and Band 17

<Text will be added.>

9 Class A4. Low-low, low-high or high-high band combination with intermodulation problem (low order IM)

9.1 Specific issue for dual uplink inter-band CA class A4

<Text will be added.>

9.2 LTE-Advanced Carrier Aggregation of Band 3 and Band 5

<Text will be added.>

9.2.1 Inter-region OOBE requirements for Carrier Aggregation of Band 3 and Band 5

<Text will be added.>

9.3 LTE-Advanced Carrier Aggregation of Band 7 and Band 20

<Text will be added.>

10 Class A5. Combinations not classified in A1-A4

10.1 Specific issue for dual uplink inter-band CA class A5

<Text will be added.>

10.2 LTE-Advanced Carrier Aggregation of Band 1 and Band 21

<Text will be added.>

Annex A: Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2013-04	RAN4#66bis	R4-131085			Rel-12 LTE Advanced Dual Uplink Inter-band Carrier Aggregation Technical Report skeleton	N/A	0.0.1
<u>2013-04</u>	<u>RAN4#66bis</u>	<u>R4-131929</u>			<u>Editorial changes to the TR skeleton:</u> - <u>Change wrong placed sub-clause 6.2.1</u> - <u>Move sub-clause for CA 7-20 from Class A1 to Class A4</u>	<u>0.0.1</u>	<u>0.0.2</u>