ERICSSON

Cross-DU Carrier Aggregation Support

Feature Description

210/221 04-LZA 701 6014/1 Uen N4B

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Contents

1 Cross-DU Carrier Aggregation Support Overview

Access Type:	LTE
Feature Identity:	FAJ 121 3080
Value Package Name:	Site Configurations for CA
Value Package Identity:	FAJ 801 0404
Node Type:	DU Radio Node
Licensing:	Licensed feature. One license per node.

Summary

The Cross-DU Carrier Aggregation Support feature allows carrier aggregation to be used with multi-DU eNodeB configurations where the primary and secondary cells are terminated on different DUs. This can be used to support carrier pooling deployments. Some carriers are terminated on one DU and other carriers on a second DU in a multi-DU configuration, without losing support for carrier aggregation.

2 Dependencies of Cross-DU Carrier Aggregation Support

Table 1 Feature Dependencies

Feature	Relationship	Description
Carrier Aggregation(FAJ 121 3046)	Prerequisite	—If the Cross-DU Carrier Aggregation Support license is not enabled, a CA capable UE is not configured with a SCell on a different DU than the PCell. —Any UEs already configured with an SCell on a different DU from the PCell keeps the SCell configured. This occurs even if the Cross-DU Carrier Aggregation Support license becomes disabled but the Carrier Aggregation license is still enabled. Any new SCell configurations done only consider SCells on the same DU as the PCell. —If the Carrier Aggregation license is disabled, any UEs already configured with an SCell keep the SCell configured. Any new SCell configurations are not configured.
Multiple Digital Units(FAJ 121 3038)	Prerequisite	This feature implements the functionality needed to add one DU to the eNodeB using IDL2 to increase the capacity with full O&M support. It also covers startup of the IDL2 link, supervision, and fault handling of the IDL2 link.
3CC DL Carrier Aggregation Extension(FAJ 121 3084)	Related	The concurrency of the 3CC DL Carrier Aggregation extension feature and the Cross-DU Carrier Aggregation feature is not supported.
Dynamic SCell Selection for Carrier Aggregation(FAJ 121 3063)	Related	This feature expands the applicability of Carrier Aggregation. In this feature, coverage measurement reports are introduced, allowing activation of SCells only while covered. Further, multiple PCell to SCell relationships are supported, so

Feature	Relationship	Description
		that the best SCell among several can be chosen, configured, and activated at the appropriate moment
Supplemental Downlink for Carrier Aggregation(FAJ 121 3068)	Related	FDD only: This feature introduces the capability of utilizing a carrier designated as downlink only, for a secondary cell with Carrier Aggregation.
3CC DL Carrier Aggregation Extension(FAJ 121 3084)	Related	FDD only: The UE is configured to use three carrier components. One carrier component is a primary cell (PCell) and the other two are secondary cells (SCell). The PCell is the cell where the UE is connected and established the Radio Resource Control (RRC) connection, and operating on the primary frequency. The SCells operate on secondary frequencies and are configured once the RRC connection is established.
Carrier Aggregation-Aware IFLB(FAJ 121 3075)	Related	UEs must be moved, based on UE capability and load situation, to a carrier where they best can utilize Carrier Aggregation.
13-18 Cell Support(FAJ 121 4242)	Related	Up to 18 cells can be used if this feature is activated.
Carrier Aggregation FDD-TDD(FAJ 121 4252)	Related	In sites where operators have access to both FDD and TDD spectra, the Carrier Aggregation FDD-TDD feature enables both spectrum resources to be used. The use of both spectrum resources improves system performance and end-user experience.

Hardware

No special hardware requirement is expected for this feature.

Limitations

No limitations for this feature.

Network Requirements

This is a licensed feature. This means that for the feature to be operational, a valid license key must be installed and the feature must be explicitly activated by setting a MOM attribute.

3 Feature Operation

This section describes the Cross-DU Carrier Aggregation Support feature in more detail, including network configuration requirements and operation flows.

3.1 DU Configurations

— Required configurations are two IDL2 connected DUS 41 or two DUS 31. No mix of DU types is supported.

For more information about DU hardware configurations, see RBS Configurations, Non-RF Connections, and Antenna and RF Connections.

4 Parameters

This section describes parameters introduced by the Cross-DU Carrier Aggregation Support feature and parameters affected by activating the feature.

4.1 Feature Configuration Parameters

This feature introduces no new parameters.

4.2 Affected Parameters

The implementation of this feature affects no parameters.

5 Network Impact

This section describes how the Cross-DU Carrier Aggregation Support feature impacts the network functions and capabilities.

5.1 Capacity and Throughput

This section provides information on the impact of the feature on network capacity.

— Maximum 18 cells per eNodeB can be supported.

— The maximum number of component carriers for Carrier Aggregation (CA) is the following:

  • FDD only: Three component carriers.

  • TDD only: Two component carriers.

  • FDD-TDD: Three component carriers.

— The maximum antenna bandwidth per DU is the same as for the single DU case.

— TDD only: Maximum four antennas per cell per direction are supported.

— The maximum cross-DU data rate through IDL2 link for carrier aggregation per direction is 250 Mbps.

— The maximum number of configured SCells is controlled by Carrier Aggregation MOM parameters `caUsageLimit` and `caPreemptionThreshold` . These parameters are per DU.

— There is a limitation for the available connected UE resources per eNodeB. The maximum number of the connected UEs is the same as for the single DU case. This limitation is 3000 UEs per eNodeB.

— A UE configured with Carrier Aggregation consumes one connected UE resource per aggregated cell. An example of this is one resource for the PCell, and then one extra resource per configured SCell.

— In a multi-DU deployment, a CA-capable UE consumes connected UE resources only on the DU where the PCell is located. This applies whether the Cross-DU Carrier Aggregation Support feature is activated and enabled or not.

— The throughput when performing carrier aggregation between cells on different DUs must be the same as when performing carrier aggregation

between cells on the same DU. The throughput could be about 700 Mbps per eNodeB.

— No effect on the UL attributes.

6 Performance

This section describes performance indicators, counters, and events associated with the Cross-DU Carrier Aggregation Support feature.

6.1 KPIs

This feature has no associated Key Performance Indicators (KPIs).

6.2 Counters

This feature has no directly associated counters.

6.3 Events

This feature has no associated events.

7 Activate Cross-DU Carrier Aggregation Support

Prerequisites

— The license key is installed in the node.

— Continuous Cell Trace Recording (CCTR) is activated since at least one week. This ensures there is troubleshooting data available if something goes wrong.

Steps

1. Set the attribute `featureState` to ACTIVATED in the applicable MO instance, depending on node type:

Node Type	License Control MO
DU Radio Node	`OptionalFeatureLicense=CrossDUCarrierAggregation`
Baseband-based Node	`N.A.`

After This Task

Let the CCTR be active for one week, for continued collection of troubleshooting data.

8 Deactivate Cross-DU Carrier Aggregation Support

Prerequisites

Continuous Cell Trace Recording (CCTR) is activated since at least one week. This ensures there is troubleshooting data available if something goes wrong.

Steps

1. Set the attribute `featureState` to DEACTIVATED in the applicable MO instance, depending on node type:

Node Type	License Control MO
DU Radio Node	`OptionalFeatureLicense=CrossDUCarrierAggregation`
Baseband-based	`N.A.`

After This Task

Let the CCTR be active for one week, for continued collection of troubleshooting data.