



3GPP TS RAN4 Meeting #82bis
Spokane, US, 3-7 April 2017

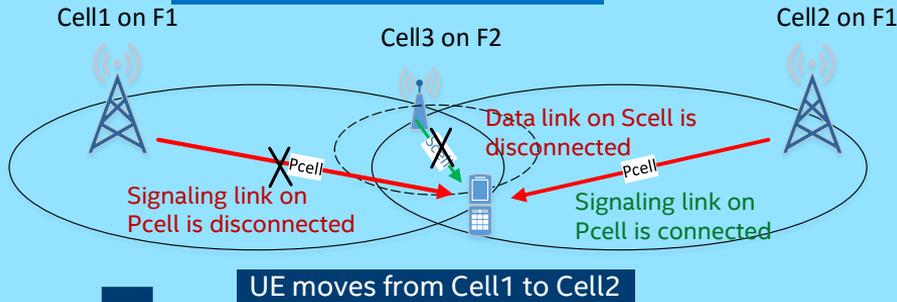
R4-1702972

Motivation for the new SI on Enhanced Carrier Aggregation Mobility

Intel Corporation

Justification: Legacy CA Mobility

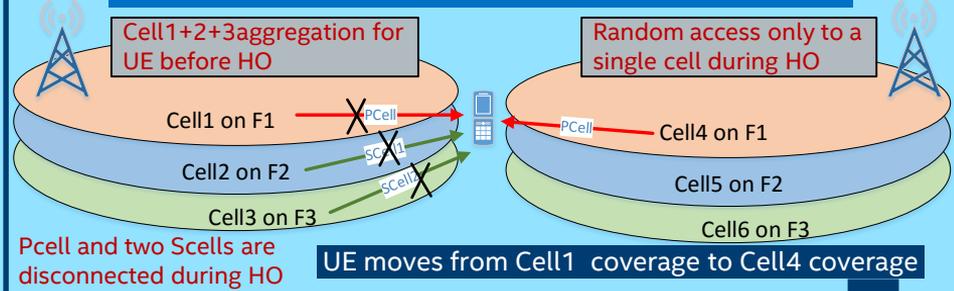
Scenario1: Macro + RRH



Legacy HO procedure for CA:

- 1) UE is served by cell1+ cell3 aggregation
 - 2) Based on measurement, HO from cell1 to cell2
 - 3) UE disconnected from cell1 and cell3
 - 4) UE access to cell2
- The data traffic on cell3 cannot be maintained in this legacy case
 - Cell3 needs to be configured/activated once more if CA is needed for high data

Scenarios 2: Same coverage cells aggregation

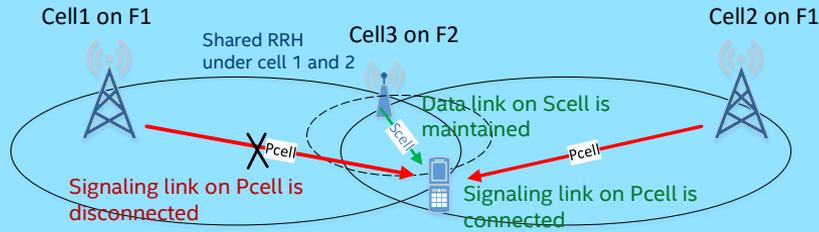


Legacy HO procedure for CA:

- 1) UE is served by cell1+ 2+ 3 aggregation
 - 2) Based on measurement, HO from cell1 to cell4
 - 3) UE disconnected from cell1, 2 and 3
 - 4) UE access to cell4, if needed, NW will configure new cells as Scells after HO, and then activate Scells
- The HO is conducted from multiple connections (cell1,2,3 in source) to single connection (only cell 4 in target)
 - The activation delay will be big if more Scells need to be activated for high data

SI Justification: Enhanced CA mobility & Benefits

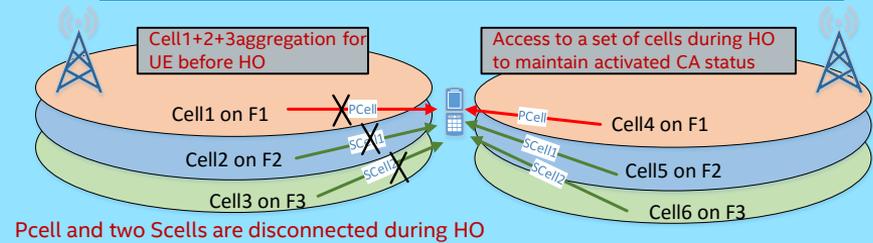
Enh. 1: Pcell-only HO enhancement



UE moves from Cell1 to Cell2

- New HO procedure for CA UE:
 - 1) UE is served by cell1+ cell3 aggregation
 - 2) Based on measurement, HO from cell1 to cell2
 - 3) UE disconnected from cell1 only
 - 4) UE access to cell2 but maintain connection with cell3
- The data traffic on cell3 can be maintained
- Based on MBB scheme, the interruption of PDCCH of PCell can be only up to 5ms

Enh.2 :Multiple connections/carriers based mobility



UE moves from Cell1 coverage to Cell4 coverage

- New HO procedure for CA UE:
 - 1) UE is served by cell1+ 2+ 3 aggregation
 - 2) Based on measurement, HO from cell1 to cell4
 - 3) UE disconnected from cell1, 2 and 3
 - 4) UE simultaneously access to cell4, 5 and 6, and cell4,5,6 are still CA for high data usage
- The HO is conducted from multiple connections (cell1,2,3 in source) to multiple connections (cell4,5,6 in source)
- The high data rate of UE could be maintained during HO

Benefits from this enhancement

Enhanced CA mobility	Interruption or data loss duration(ms)	
	Enh. Case	R14 legacy case
Enh. 1	$5ms * N_{scell}$	$164ms * N_{scell}$
Enh. 2	$5ms * (1 + N_{scell})$	$164ms * N_{scell} + 130ms$

- 5ms is the HO interruption under make before break.
- 164ms is sum of HO delay(130ms) and Scell activation time(34ms)
- N_{scell} is the amount of Scell
- $(1 + N_{scell})$ is the amount of Scell and Pcell

Objectives

Enhancement 1: Pcell-only HO for CA

- **Identify the deployment CA scenarios for these enhancements, e.g. RRH Scell shared by two Macro cells**
- **Investigate the feasibility of mobility enhancement, especially for handover procedures**
 - Investigate the feasibility of enhanced UE/NW behavior in Pcell-only handover
 - keeps SCell connection during Pcell changing
 - conduct make-before-break on Pcell during handover
 - Investigate the procedure change for Pcell-only handover
- **Evaluate the gain from Pcell-only HO, e.g. throughput, interruption or handover delay**

Objectives

Enhancement 2: Multiple carriers based HO for CA

- **Identify the deployment CA scenarios for these enhancements, e.g. UE move from a multiple aggregated cells coverage to another**
- **Investigate the feasibility of mobility enhancement, especially for handover procedures**
 - Investigate the feasibility of enhanced UE/NW behavior in multiple carriers based handover
 - Make the default status of target Scells as "activated" immediately after handover
 - Conduct make-before-break on Pcell/SCell during handover
 - Investigate the procedure change for multiple carriers based handover
- **Evaluate the gain from multiple carriers based handover, e.g. throughput, interruption or handover delay**

