**3GPP TSG-RAN WG4 Meeting #99-e *R4-2110375***

**Electronic Meeting, May. 19-27, 2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.133** | **CR** | **7101** | **rev** | **-** | **Current version:** | **16.9.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Clarification on asynchronous DAPS handover | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_feMob-Core | | | | |  | ***Date:*** | | | 2021-5-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For FR1 DAPS hadover, the synchronous conditions are defined with adding 3 notes. In current specification, Notes 2/3 clairfies to leave enough time for UE performing DL-to-UL and UL-to-DL switching only from single cell perspective. However, the UE shall be allowed to switching time between both source cell and target cell. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Correct note 2, 3 in Table 5.7.1-1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The specification is incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS36.533 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

----------------------------------------------------- Beginning of Change 1 ------------------------------------------------------------

## 5.7 E-UTRAN DAPS Handover

### 5.7.1 Introduction

The purpose of DAPS handover is to change the PCell to another cell.

A DAPS handover is synchronous if it meets the conditions in Table 5.7.1-1, otherwise it is asynchronous.

Table 5.7.1-1: Synchronous conditions for DAPS handover

|  |  |  |
| --- | --- | --- |
| Type of handover | Maximum receive timing difference between source and target cells (µs) for sync DAPS handover | Maximum transmit timing difference between source and target cells (µs) for sync DAPS handover |
| Intra-frequencyNote 1,2,3 | 6µs | 8.21 µs |
| Intra-band inter-frequency Note 1,2,3 | 6µs | 8.21 µs |
| Inter-band inter-frequency | 33 µs | 35.21 µs |
| Note 1: For synchronous DAPS handover, if the receive time difference exceeds the cyclic prefix length, demodulation performance degradation is expected for the first symbol of the slot. For asynchronous DAPS handover, if the receive time difference exceeds the cyclic prefix length, interruptions may occur depending on UE implementation. The duration and frequency of occurrence of such interruptions is not specified.  Note 2: For DAPS handover on a TDD band, a UE is not expected to transmit in the uplink to source or target cell earlier than 20usafter the end of the last received downlink symbol from source or target cell in the same TDD band.  Note 3: For DAPS handover on a TDD band, a UE is not expected to receive in the downlink from source or target cell earlier than 20us after the end of the last transmitted uplink symbol toward source or target cell in the same TDD band. | | |

### 5.7.2 Requirements

#### 5.7.2.1 E-UTRAN FDD – FDD

The requirements in this clause are applicable to both intra-frequency and inter-frequency DAPS handovers.

##### 5.7.2.1.1 DAPS Handover delay

Procedure delays for the procedure that can command a DAPS handover are specified in TS 36.331 [2]. DAPS delay is comprised of Dhandover1 and Dhandover2.

When the UE receives an RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover1 seconds from the end of the last TTI containing the RRC command when UE is configured with dual active protocol stack handover.

Dhandover1 = TRRC\_procedure+ Tsearch + TIU + 20 ms

Where

TRRC\_procedure is the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2].

Tsearch is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then Tsearch = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then Tsearch = 80 ms. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to 30 ms.

NOTE: The actual value of TIU shall depend upon the PRACH configuration used in the target cell.

A cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.1 (FDD) and Clause 8.1.2.2.2 (TDD) for intra-frequency handover and Clause 8.1.2.3.1 (FDD) and Clause 8.1.2.3.2 (TDD) for inter-frequency handover.

After successful RACH procedure of the target cell, when the UE receives an RRC message implying source cell release command, the UE shall accomplish the release actions specified in TS 38.331 [2] within Dhandover2.

Dhandover2 = TRRC\_procedure+ Tinterrupt2

Where:

TRRC\_procedure is the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2].

Tinterrupt2 is defined in clause 5.7.2.1.2.

##### 5.7.2.1.2 Interruption time

During Dhandover1 the UE is allowed an interruption of up to Tinterrupt1 on source cell:

- Tinterrupt1 is 1 ms for synchronous intra-frequency DAPS handover and 2ms for asynchronous intra-frequency DAPS handover, when the bandwidth of target cell is no larger than the bandwidth of source cell,

- Tinterrupt1 is 2ms for synchronous intra-frequency DAPS handover and 3ms for asynchronous intra-frequency DAPS handover, when the bandwidth of target cell is larger than the bandwidth of source cell,

- Tinterrupt1 is 5 ms for synchronous intra-band inter-frequency DAPS handover and 6 ms for asynchronous intra-band inter-frequency DAPS handover

- Tinterrupt1 is 1 ms for synchronous inter-band inter-frequency DAPS handover and 2 ms for asynchronous inter-band inter-frequency DAPS handover.

During Dhandover2 the UE is allowed an interruption of up to Tinterrupt2 on target cell:

- Tinterrupt2 is 2 ms for synchronous intra-frequency DAPS handover and 3 ms for asynchronous intra-frequency DAPS handover, when the bandwidth of target cell is smaller than the bandwidth of source cell.

- Tinterrupt2 is 1 ms for synchronous intra-frequency DAPS handover and 2 ms for asynchronous intra-frequency DAPS handover, when the bandwidth of target cell is not smaller than the bandwidth of source cell- Tinterrupt2 is 5 ms for synchronous intra-band inter-frequency DAPS handover and 6 ms for asynchronous intra-band inter-frequency DAPS handover.

- Tinterrupt2 is 1 ms for synchronous inter-band inter-frequency DAPS handover and 2ms for asynchronous inter-band inter-frequency DAPS handover.

#### 5.7.2.2 E-UTRAN FDD – TDD

The requirements in this clause are applicable to DAPS handover from FDD to TDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.7.2.1 apply for this section.

#### 5.7.2.3 E-UTRAN TDD – FDD

The requirements in this clause are applicable to DAPS handover from TDD to FDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.7.2.1 apply for this section.

#### 5.7.2.4 E-UTRAN TDD – TDD

The requirements in this clause are applicable to DAPS handover from TDD to TDD. The requirements in this clause shall apply to UE supporting TDD.

The requirements in clause 5.7.2.1 apply for this section.

------------------------------------------------------------- End of change 1 ------------------------------------------------------------