

CHANGE REQUEST

36.321 CR CRNum rev - Current version: 12.6.0

For **HELP** on using this form: comprehensive instructions can be found at
<http://www.3gpp.org/Change-Requests>.

Proposed change affects: UICC apps ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	Skipping uplink transmission with no data to transmit	
Source to WG:	Samsung	
Source to TSG:	R2	
Work item code:	FS_LTE_LATRED	Date: 2015-08-24
Category:	F	Release: Rel-13
	Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:
	F (correction)	Rel-8 (Release 8)
	A (mirror corresponding to a change in an earlier release)	Rel-9 (Release 9)
	B (addition of feature),	Rel-10 (Release 10)
	C (functional modification of feature)	Rel-11 (Release 11)
	D (editorial modification)	Rel-12 (Release 12)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-13 (Release 13)
		Rel-14 (Release 14)

Reason for change:	Uplink latency can be reduced by pre-scheduling, which drains UE battery due to the constraints that when uplink resource is granted UE shall transmit UL-SCH even it does not have any data to send. It may obstruct the wide usage of pre-scheduling mechanism.
Summary of change:	UE initiates UL-SCH transmission only when it has a valid uplink grant. To not initiate UL -SCH transmission when UE does not have data to transmit, UE behaviour is updated such that UE does not consider itself having a valid uplink grant if there is no data available for transmission.
Consequences if not approved:	Pre-scheduling remains impractical solution due to excessive UE battery waste

Clauses affected:	5.4.1					
	<table><tr><td>Y</td><td>N</td></tr><tr><td>☒</td><td>☒</td></tr></table>	Y	N	☒	☒	
Y	N					
☒	☒					
Other specs affected:	☒ Other core specifications	TS/TR ... CR ...				
(show related CRs)	☒ Test specifications	TS/TR ... CR ...				
	☒ O&M Specifications	TS/TR ... CR ...				
Other comments:						

<Start of 1st modified part>

5.4.1 UL Grant reception

In order to transmit on the UL-SCH the MAC entity must have a valid uplink grant (except for non-adaptive HARQ retransmissions) which it may receive dynamically on the PDCCH or in a Random Access Response or which may be configured semi-persistently. If *SkipUplinkTransmission* is configured, MAC entity considers itself having a valid uplink grant only if there is data available for transmission. To perform requested transmissions, the MAC layer receives HARQ information from lower layers. When the physical layer is configured for uplink spatial multiplexing, the MAC layer can receive up to two grants (one per HARQ process) for the same TTI from lower layers.

If the MAC entity has a C-RNTI, a Semi-Persistent Scheduling C-RNTI, or a Temporary C-RNTI, the MAC entity shall for each TTI and for each Serving Cell belonging to a TAG that has a running *timeAlignmentTimer* and for each grant received for this TTI:

- if an uplink grant for this TTI and this Serving Cell has been received on the PDCCH for the MAC entity's C-RNTI or Temporary C-RNTI; or
- if an uplink grant for this TTI has been received in a Random Access Response:
 - if the uplink grant is for MAC entity's C-RNTI and if the previous uplink grant delivered to the HARQ entity for the same HARQ process was either an uplink grant received for the MAC entity's Semi-Persistent Scheduling C-RNTI or a configured uplink grant:
 - consider the NDI to have been toggled for the corresponding HARQ process regardless of the value of the NDI.
 - deliver the uplink grant and the associated HARQ information to the HARQ entity for this TTI.
- else, if this Serving Cell is the SpCell and if an uplink grant for this TTI has been received for the SpCell on the PDCCH of the SpCell for the MAC entity's Semi-Persistent Scheduling C-RNTI:
 - if the NDI in the received HARQ information is 1:
 - consider the NDI for the corresponding HARQ process not to have been toggled;
 - deliver the uplink grant and the associated HARQ information to the HARQ entity for this TTI.
 - else if the NDI in the received HARQ information is 0:
 - if PDCCH contents indicate SPS release:
 - clear the configured uplink grant (if any).
 - else:
 - store the uplink grant and the associated HARQ information as configured uplink grant;
 - initialise (if not active) or re-initialise (if already active) the configured uplink grant to start in this TTI and to recur according to rules in subclause 5.10.2;
 - consider the NDI bit for the corresponding HARQ process to have been toggled;
 - deliver the configured uplink grant and the associated HARQ information to the HARQ entity for this TTI.
- else, if this Serving Cell is the SpCell and an uplink grant for this TTI has been configured for the SpCell:
 - consider the NDI bit for the corresponding HARQ process to have been toggled;
 - deliver the configured uplink grant, and the associated HARQ information to the HARQ entity for this TTI.

NOTE: The period of configured uplink grants is expressed in TTIs.

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NOTE: If the MAC entity receives both a grant in a Random Access Response and a grant for its C-RNTI or Semi persistent scheduling C-RNTI requiring transmissions on the SpCell in the same UL subframe, the MAC entity may choose to continue with either the grant for its RA-RNTI or the grant for its C-RNTI or Semi persistent scheduling C-RNTI.

NOTE: When a configured uplink grant is indicated during a measurement gap and indicates an UL-SCH transmission during a measurement gap, the MAC entity processes the grant but does not transmit on UL-SCH.