3GPP RAN WG2 Meeting #113bis-e R2-2104396

eMeeting April 12th – April 20th, 2021

Title: [Draft] LS to SA3 on Small data transmissions

Release: Release 17

Source: InterDigital [to be RAN2]

To: SA3, RAN3

CC:

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Attachments: None

**1. Overall Description:**

RAN2 has been discussing RRC-based small data transmission (SDT), where UE in INACTIVE state initiates a SDT session by transmitting *RRCResumeRequest* along with small data in first UL transmission. Upon initiating the resume procedure during SDT initiation, the UE re-establishes PDCP entities and applies the security keys for sending the data in SDT-DRBs and/or SRBs securely and the UE resumes only RBs configured for SDT. After initial UL transmission, multiple UL/DL packets can be transmitted/received during the same SDT session while remaining in RRC INACTIVE state. RAN2 design assumes SDT session, including subsequent SDT transmissions, is terminated upon reception of *RRCRelease*.

**Reusing NCC and I-RNTI for RRC Resume procedure in the same cell:**

One issue discussed in RAN2 is how to notify the network about data arrival from DRBs not configured for SDT during an SDT session, since non-SDT DRBs are not resumed upon SDT initiating and thus are not reflected in buffer status reports. One option to notify the network is to transmit another CCCH message (i.e. RRC ResumeRequest). Per legacy procedure, the UE initiates an RRCResume procedure upon data arrival. However, if an RRCResume procedure has already been initiated for SDT, this second ResumeRequest can repeat the I-RNTI and resumeMAC-I in the same cell. It has been noted in RAN2 that this can already happen in Rel-15/16 after reception of a RRC Reject message.

***Question 1:*** *Can a second CCCH message repeating the I-RNTI and resumeMAC-I be transmitted again in the same cell after SDT initiation to indicate data arrival from non-SDT DRBs to the network, and to list possible security impacts (if identified).*

**Reusing NCC and I-RNTI for RRC Resume procedure in different cells:**

According to Rel-16, if UE transmits *RRCResumeRequest* and performs cell re-selection before receiving RRC response message (e.g. *RRCRelease or RRCResume*), UE transitions to IDLE. However, this may result in data loss if RRCResume procedure was used to initiate a SDT session since UE may transmit/receive multiple packets before an RRC response message is received.

An alternative solution is for UE to remain in INACTIVE and attempt a new SDT session in new cell. However, per TS 33.501 UE is provided with updated I-RNTI and NCC in subsequent *RRCRelease* with *suspendConfig* messages. If UE attempts the new SDT session before completion of the first, it will not have received updated I-RNTI and NCC. One potential solution discussed in RAN2 is to temporarily allow re-use of the NCC and I-RNTI from the former cell to initiate SDT session by sending another CCCH message in the new cell.

***Question 2:*** *Can NCC and I-RNTI from a former cell in which an SDT session was initiated be re-used to initiate an new SDT session in a new cell, and to list possible security impacts (if identified).*

*Question 3 (to RAN3): In case of anchor relocation, can RAN3 signalling support the old anchor gNB receiving the second CCCH message.*

**2. Actions:**

**To** **SA WG3**

**ACTION:** RAN2 kindly asks SA WG3:

1) whether a second CCCH message repeating the I-RNTI and *resumeMAC-I* can be transmitted again in the same cell after SDT initiation to indicate data arrival from non-SDT DRBs to the network, and to list possible security impacts (if identified).

2) whether NCC and I-RNTI from a former cell *in which an SDT session was initiated* can be re-used to initiate an new SDT session in a new cell, and to list possible security impacts (if identified).

**ACTION:** RAN2 kindly asks RAN WG3:

3) Whether RAN3 signalling can support the old anchor gNB receiving the second CCCH message in case cell reselection during SDT

**3. Date of Next RAN2 Meetings:**

TSG-RAN WG2#114- e May 19th – 27th, 2020 Online meeting