ENHANCEMENTS TO SYSTEM BROADCAST

BACKGROUND

- The amount of System Information has increased considerably during the past releases
- System Information may increase when the network introduces new features
- System Information may vary depending on, for example, the network deployment and business case
- The combination of a fixed bit rate and that system information increases (i.e. more bits to be transmitted) will result in larger transmission time (or longer time required by the UE to acquire all the system information).

BACKGROUND

- During the last Releases, RAN2 has done efforts to reduce the broadcasted information of new features.
  - Hence, RAN2 has already acknowledged the potential problems
- Some of the potential impacts of long SIB reading time are:
  - Longer call setup time
  - Voice interruption time
  - Unavailability to receive paging
  - User data interruption
- For more background, please see Tdoc R2-131992

IMPACTED USE CASES

- Impact on legacy UE
  - Increasing the repetition period for legacy SIBs to make room for new SIBs, or increasing the size of legacy SIBs increases the overall SIB acquisition time for legacy UEs.
- CS fallback from LTE
  - UEs which are re-directed from LTE to UTRA because of a CS voice call need to acquire the SIBs prior to starting the RRC Connection procedure in a UTRA cell.
- RRC Connection Reject/Release with redirection
  - Upon an RRC Connection Reject/Release with re-direction, the UE may need to read the system information of the new target cell before the call can be established.

IMPACTED USE CASES

- Cell Reselection
  - Upon reselecting to another cell (inter-frequency or inter-RAT), the UE is required to read the System Information before the new cell can be accessed.
- RRC state switch from CELL_DCH to CELL_FACH
  - This case is similar to cell re-selection, when the UE is reconfigured from CELL_DCH to CELL_FACH state, the UE may need to acquire the System Information.
- Call re-establishment
  - Upon a RL failure or RLC unrecoverable error in CELL_DCH state, the UE may also need to read the system information prior performing a cell update.

SIB SCHEDULING EXAMPLE

SIB type	Repetition Period	Nr of segments in 1.28 period
MIB+SIB7	80 ms	16
SB1	320 ms	6
SIB1+SIB2	640 ms	2
SIB3+SIB4	640 ms	4
SIB5	640 ms	10
SIB11	1280 ms	16
SIB12+SIB18	1280 ms	1
SIB19	640 ms	4
SIB21+SIB22	640 ms	4*
	Total	***63***

- Conclusions
  - 98% of SIB capacity is used (64 segments available)
  - Some additional optimizations may be achieved by further concatenation but:
    - concatenation means more overhead
    - IoT risk
  - In real deployments the nr of segments may be larger than shown in this example
    - The problem may be more severe than in this example

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