**3GPP TSG- Meeting #116R4-2512150**

**Bengaluru, India, August 25th – 29th, 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  |
| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  | Draft CR to TS 38.133 on MRTD and interruption requirements for Rel-19 ATG  |
|  |  |
| ***Source to WG:*** | Intel Corporation |
| ***Source to TSG:*** | WG4 |
|  |  |
| ***Work item code:*** | NR\_ATG\_enh-Core |  | ***Date:*** | 2025-08-19 |
|  |  |  |  |  |
| ***Category:*** | ***B*** |  | ***Release:*** | *Rel-19* |
|  | *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 canbe 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | MRTD requirments for ATG UE when configured with DL CA are missing.Interruption requirements for ATG UE are missing. |
|  |  |
| ***Summary of change:*** | Introduce MRTD requirements for ATG UE when configured with DL CA.Introduce interruption requirements for ATG UE when configured with DL CA. |
|  |  |
| ***Consequences if not approved:*** | Requirements are missing. |
|  |  |
| ***Clauses affected:*** | New clauses 7.6D, 8.2D |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

### <<Start of Change1>>

7.6D Maximum Receive Timing Difference for ATG UE

7.6D.1 Introduction

An ATG UE shall be capable of handling a relative receive timing difference between the closest slot timing boundaries of different carriers in FR1 to be aggregated in NR carrier aggregation.

7.6D.2 Minimum requirements for NR Carrier Aggregation

The ATG UE shall be capable of handling at least a relative receive timing difference between slot timing of all pairs of carriers in FR1 to be aggregated at the ATG UE receiver as shown in table 7.6D.2-1 below.

**Table 7.6D.2-1: Maximum receive timing difference requirement for ATG UE in inter-band NR carrier aggregation**

|  |  |
| --- | --- |
| **Frequency Range of the pair of carriers** | **Maximum receive timing difference (µs)**  |
| FR1 | 33 |

### <<End of Change1>>

### <<Start of Change2>>

8.2D Interruption for ATG UE

8.2D.1 Interruptions with Standalone NR Carrier Aggregation

8.2D.1.1 Introduction

This clause contains the requirements related to the interruptions on PCell and activated SCell if configured to an ATG UE, when

- up to 7 DL SCells are configured, de-configured, activated or deactivated, or

- UL/DL BWP is switched on PCell or DL BWP is switched on SCell, or

- CGI reading of an NR neighbour cell with autonomous gaps, or

- UE-specific CBW is changed on PCell or SCell, or

- NR SRS antenna port switching on PCell, or

- SCell is activated based on aperiodic CSI-RS.

NOTE: interruptions at SCell addition/release, activation/deactivation and during measurements on SCC may not be required by all UEs.

The interruptions shall not interrupt RRC signalling or ACK/NACKs related to RRC reconfiguration procedure according to TS 38.331 [2] for SCell addition/release or MAC control signalling according to TS 37.340 [17] for SCell activation/deactivation command.

8.2D.1.2 Requirements

8.2D.1.2.1 Interruptions at SCell addition/release

When any number of DL SCells between one and 7 is added or released using the same *RRCConnectionReconfiguration* message as defined in TS 38.331 [2], the ATG UE is allowed an interruption on any active serving cell during the RRC reconfiguration based SCell addition/release procedures as follows:

- of up to the interruption length specified in table 8.2D.1.2.1-1, if the active serving cells are contiguous to any of the SCells being added or released in the same FR1 band, provided the cell specific reference signals from the active serving cells and the SCells being added or released are available in the same slot or,

- of up to the interruption length sepcified in table 8.2D.1.2.1-2, if the active serving cell and the SCell being added or released are in a FR1 band pair.

**Table 8.2D.1.2.1-1: Interruption length for SCell addition/release for ATG intra-band contiguous CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slots)** |
| 0 | 1 | 1 + TSMTC\_duration\_ATG \*  |
| 1 | 0.5 | 2 + TSMTC\_duration\_ATG \*  |
| NOTE 1: TSMTC\_duration\_ATG measured in subframes is - the longest SMTC duration among all above active serving cells and the SCell being added when one SCell is added. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being added, the SSB transmission periodicity is assumed to be 5ms and TSMTC\_duration\_ATG for the SCell being added is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being added. If neither SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being added, TSMTC\_duration\_ATG for the SCell being added is 0ms; - the longest SMTC duration among all active serving cells in the same band when one SCell is released. NOTE 2: is as defined in TS 38.211 [6]. |

**Table 8.2D.1.2.1-2: Interruption length for SCell addition/release for ATG inter-band CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length (slots)** |
| 0 | 1 | 1  |
| 1 | 0.5 | 2  |

8.2D.1.2.2 Interruptions at SCell activation/deactivation

When an SCell is activated or deactivated as defined in TS 37.340 [17], the ATG UE is allowed an interruption on any active serving cell:

- of up to the interruption length specified in table 8.2D.18.2D.1.2.2-2, if the active serving cell and the SCell being activated or deactivated are in a FR1 band pair.

**Table 8.2D.1.2.2-1: Interruption length for SCell activation/deactivation for ATG intra-band contiguous CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slots)** |
| 0 | 1 | 1 + TSMTC\_duration\_ATG \*  |
| 1 | 0.5 | 1 + TSMTC\_duration\_ATG \*  |
| NOTE 1: TSMTC\_duration\_ATG measured in subframes is - the longest SMTC duration among all above active serving cells and the SCell being activated when one SCell is activated. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being activated, the SSB transmission periodicity is assumed to be 5ms and TSMTC\_duration\_ATG for the SCell being activated is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being activated. If neither SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being activated, TSMTC\_duration\_ATG for the SCell being activated is 0ms; - the longest SMTC duration among all active serving cells in the same band when one SCell is deactivated.NOTE 2: is as defined in TS 38.211 [6]. |

**Table 8.2D.1.2.2-2: Interruption length for SCell activation/deactivation for ATG inter-band CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length (slots)** |
| 0 | 1 | 1  |
| 1 | 0.5 | 1  |

8.2D.1.2.3 Interruptions during measurements on deactivated SCC

Interruptions on PCell due to measurements when an SCell is deactivated are allowed for an ATG UE with up to 0.5 % probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer.

- If the PCell is not in the same band as the deactivated SCell, the ATG UE is only allowed to cause interruptions on PCell immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in table 8.2D.1.2.2-1 or,

- If the PCell is contiguous to the deactivated SCell in the same FR1 band, the ATG UE is allowed to cause an interruption on PCell no earlier than X slots before TSMTC\_duration\_ATG and no later than X slots after TSMTC\_duration\_ATG, provided the cell specific reference signals from the active serving cells and the deactivated SCell are available in the same slot, where X and TSMTC\_duration\_ATG are given by table 8.2D.1.2.3-1. The interruption shall not exceed requirements in table 8.2D.1.2.3-1.

**Table 8.2D.1.2.3-1: Interruption duration for measurement on deactivated SCell for intra-band CA**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NR Slot length (ms)** | **X (slots)** | **Interruption length (slots)** |
| 0 | 1 | 1 | 2 + TSMTC\_duration\_ATG \*  |
| 1 | 0.5 | 1 | 2 + TSMTC\_duration\_ATG \*  |
| NOTE 1: TSMTC\_duration\_ATG measured in subframes is the longest SMTC duration among all above active serving cells and the deactivated SCell to be measured;NOTE 2: is as defined in TS 38.211 [6]. |

8.2D.1.2.4 Interruptions at direct SCell activation

When one or multiple SCell(s) are directly activated at SCell addition, the ATG UE is allowed an interruption on any active serving cell:

- of up to the interruption length specified in table 8.2D.1.2.1-1, if the active serving cells are in the same band as the SCell being activated provided the cell specific reference signals from the active serving cells and the SCell being activated are available in the same slot or,

- of up to the interruption length specified in table 8.2D.1.2.1-2, if the active serving cell is not in the same band as the SCell being directly activated.

8.2D.1.2.5 Interruptions due to SCell dormancy

8.2D.1.2.5.1 Interruptions due to SCell dormancy switch

When one SCell in MCG is switched from dormancy to non-dormancy or from non-dormancy to dormancy [7] when ATG UE is in DRX active time,

- the ATG UE is allowed an interruption on active serving cell in MCG as defined in clause 8.2D.1.2.7, except that the interruption is allowed regardless of which parameters change between the dormant BWP and the non-dormant BWP and,

- The starting time of interruption shall be within the dormancy switching delay as defined in clause 8.6D.2.

8.2D.1.2.5.2 Interruptions due to CQI measurements during SCell dormancy

The requirements specified in clause 8.2.2.2.12.2 apply to ATG UE.

8.2D.1.2.5.3 Interruptions due to RRM measurements during SCell dormancy

The requirements specified in clause 8.2.2.2.12.3 apply to ATG UE.

8.2D.1.2.6 Interruptions at fast SCell activation

The requirements in this clause shall apply for the ATG UE configured with PCell and one SCell when aperiodic CSI-RS resources is configured for fast SCell activation.

When one SCell in MCG configured with aperiodic CSI-RS resources is configured for fast SCell activation is activated from deactivated, the ATG UE is allowed an interruption on any active serving cell:

- of up to the interruption length specified in table 8.2D.1.2.2-2, if the active serving cell and the SCell being activated are in a FR1 band pair.

or

- of up to A slots +TATRS\_duration\_ATG, if the active serving cells are in the same band as any of the SCells being activated, when

- SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is larger than 2400ms, or

- SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band.

or

- of up to A slots if the active serving cells are in the same band as any of the SCells being activated, when SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is equal to or smaller than 2400 ms.

Where:

- TATRS\_duration\_ATG is CSI-RS burst for SCell activation where the CSI-RS burst is defined as four CSI-RS resources in two consecutive slots on the being activated SCell.

- A is specified in table 8.2D.1.2.6-1.

**Table 8.2D.1.2.6-1: Interruption length A at SCell activation/deactivation for ATG UE**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length A (slots)** |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

8.2D.1.2.7 Interruptions due to Active BWP switching Requirement

The requirements for DCI-based BWP switch, timer-based BWP switch in this clause apply to the case that the BWP switch is performed on a single CC or multiple CCs.

When the DCI-based, timer-based or RRC-based downlink BWP switch occur on multiple CCs simultaneously or over partially overlapping period, the interruption requirements described in this clause apply for each BWP switch.

When ATG UE receives a DCI indicating UE to switch its active BWP involving changes in any of the parameters listed in table 8.2D.1.2.7-2, the ATG UE is allowed to cause interruption of up to X slots to other active serving cells. X is defined in table 8.2D.1.2.7-1. The starting time of interruption is only allowed within the BWP switching delay TBWPswitchDelay as defined in clause 8.6D.2 when BWP switch occurs on a single CC. The starting time of interruption caused by each BWP switch is only allowed within the BWP switch delay TMultipleBWPswitchDelay +Y as defined in clause 8.6D.2A.1 when BWP switch occurs on multiple CCs. Interruptions are not allowed during BWP switch involving any other parameter change.

When a BWP timer *bwp-InactivityTimer* defined in TS 38.331 [2] expires, the ATG UE is allowed to cause interruption of up to X slots to other active serving cells due to switching its active BWP involving changes in any of the parameters listed in table 8.2D.1.2.7-2. X is defined in table 8.2D.1.2.7-1. The starting time of interruption is only allowed within the BWP switching delay TBWPswitchDelay as defined in clause 8.6D.2 when BWP switch occurs on a single CC. The starting time of interruption caused by each BWP switch is only allowed within the BWP switch delay TMultipleBWPswitchDelay as defined in clause 8.6D.2B.1 when BWP switch occurs on multiple CCs simultaneously or TMultipleBWPswitchDelayTotal as defined in clause 8.6D.2B.2 when BWP switch occurs on multiple CCs over partially overlapping time period. Interruptions are not allowed during BWP switch involving any other parameter change.

When ATG UE receives an RRC reconfiguration that only requests UE to switch its active BWP on one single CC, the ATG UE is allowed to cause interruption of up to X slots to other active serving cells due to switching its active BWP involving changes in any of the parameters listed in table 8.2D.1.2.7-2. X is defined in table 8.2D.1.2.7-1. The interruption is only allowed within the delay TRRCprocessingDelay + TBWPswitchDelayRRC defined in clause 8.6D.3 when BWP switch occurs on a single CC. The interruption is only allowed within the delay TRRCprocessingDelay + TBWPswitchDelayRRC + DRRC\*(N-1) as defined in clause 8.6D.3A when BWP switch occurs on multiple CCs.

**Table 8.2D.1.2.7-1: Interruption length X**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot**  | **Interruption length X (slots)** |
|  | **length (ms)** |  |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

**Table 8.2D.1.2.7-2: Parameters which cause interruption other than SCS**

|  |  |
| --- | --- |
| **Parameters** | **Comment** |
| *locationAndBandwidth* | From TS 38.331 [2] |
| *nrofSRS-Ports* |  |
| *maxMIMO-Layers-r16* |  |

8.2D.1.2.8 Interruptions due to UE-specific CBW change

When an ATG UE receives an RRC reconfiguration that changes *offsetToCarrier* or *carrierBandwidth*, the ATG UE is allowed to cause interruption of up to X slots to other active serving cells due to switching its CBW. X is defined in table 8.2D.1.2.8-1. The interruption is only allowed within the delay TRRCprocessingDelay + TCBWchangeDelayRRC defined in clause 8.13D.

**Table 8.2D.1.2.8-1: interruption length X**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot**  | **Interruption length X (slots)** |
|  | **length (ms)** |  |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

8.2D.1.2.9 Interruptions when identifying CGI of an NR cell with autonomous gaps

When an ATG UE is identifying CGI of an NR cell with autonomous gaps, the ATG UE is allowed interruptions on PCell or any activated SCell:

- with up to K1 interruptions with interrupted slots up to interruption length X1 specified in table 8.2D.1.2.9-1 for each interruption during MIB decoding time period TMIB (ms) specified in clause 9.11D.

- with up to L1 interruptions with interrupted slots up to interruption length Y1 specified in table 8.2D.1.2.9-1 for each interruption during SIB1 decoding time period TSIB1 (ms) specified in clause 9.11D for SSB and CORESET for RMSI scheduling multiplexing patterns 1.

- with up to L2 interruptions with interrupted slots up to interruption length Y2 specified in table 8.2D.1.2.9-1 for each interruption during SIB1 decoding time period TSIB1 (ms) specified in clause 9.11D for SSB and CORESET for RMSI scheduling multiplexing patterns 2 and 3.

Where:

- K1 = 6 for the target cell carrier frequency on FR1, and

- L1 = TSIB1/20and

- L2 = TSIB1/TSMTC, where TSMTC is the periodicity of the SMTC occasion configured for the target cell carrier.

**Table 8.2D.1.2.9-1: Interruption length X1, Y1 and Y2 during measurements with autonomous gaps**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length X1 (slots)** | **Interruption length Y1 (slots)** | **Interruption length Y2 (slots)** |
| 0 | 1 | 6 | 7 | 6 |
| 1 | 0.5 | 12  | 13 | 10 |

8.2D.1.2.10 Interruptions at NR SRS antenna port switching

The requirements in this clause are applicable to ATG UE SRS antenna port switching on FR1 and SRS resource(s) is only configured within the last 6 symbols of a slot. For interruption caused by SRS antenna port switching, the victim cell is based on the entry number of the band indicated by *txSwitchImpactToRx*. DL interruption is allowed on any of the serving cells as indicated in *txSwitchImpactToRx*.

The ATG UE shall perform SRS antenna port switching only if the below conditions are met.

- the SRS switching is not colliding with any NR measurements (i.e. SSB/CSI-RS based L1/L3 measurements) and the measurements for RLM/BFD/CBD if the serving cell on which the NR measurements and the measurements for RLM/BFD/CBD is performed is a victim cell based on *txSwitchImpactToRx* or is the same carrier on which SRS is transmitted.

No requirements are defined for SRS antenna port switching if aperiodic SRS switching is colliding with aperiodic L1-RSRP/L1-SINR measurements and the serving cell on which the aperiodic L1-RSRP/L1-SINR measurement is configured is indicated in *txSwitchImpactToRx* or is the same carrier on which aperiodic SRS is scheduled/configured.

When 1 SRS symbol is configured in a slot for SRS antenna switching, the interruption requirement in table 8.2D.1.2.10-1 applies. For the rest of SRS configurations, the interruption requirement in table 8.2D.1.2.10-2 applies.

**Table 8.2D.1.2.10-1: Interruption length in symbols of victim CC when 1 SRS symbol is configured**

|  |  |
| --- | --- |
| **Victim cell SCS(kHz)** | **Aggressor cell SCS (kHz)** |
| **15**  | **30** |
| 15  | 3 | 2 |
| 30 | 4 | 3 |

**Table 8.2D.1.2.10-2: Interruption length in slots of victim CC for rest of the SRS configurations**

|  |  |
| --- | --- |
| **Victim cell SCS(kHz)** | **Aggressor cell SCS (kHz)** |
| **15**  | **30** |
| 15 | 2 | 2 |
| 30 | 2 | 2 |

<<End of Change2>>