**3GPP TSG-RAN WG4 Meeting # 108bis R4-23XXXX**

**Xiamen, China, October 09 - October 13, 2023**

**Agenda item:** 5.13.8

**Source:** Moderator (CMCC)

**Title:** Ad hoc minutes for [108bis][212] NR\_ATG

**Document for:** Approval

# Introduction

Summary of RRM core requirements maintenance and RRM performance requirements for Rel-18 NR ATG, including agenda 5.13.5 and 5.13.6 are in R4-2317204. The agreed way forward in previous meetings are R4-2314307, R4-2310159, R4-2306344, R4-2303226, R4-2220361, R4-2217256 and R4-2214737.

The adhoc session will focus on some maintenance issues first and then discuss issues of performance requirements.

# Maintainance

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| --- |
| Last meeting agreements for phase antenna array impact:**Issue 4-1-1: Phase antenna array impact for L3 measurements*** Do not introduce scaling factor N and the existing measurement requirements can be reused for ATG UEs [with omnidirectional antennas]
* Introduce scaling factor N for L3 measurements for ATG UEs with [antenna arrays]
	+ N = 3 for the case when network assistance on ATG cells reference locations is provided
	+ N = 4 otherwise

**Issue 4-1-2: Phase antenna array impact for L1measurements*** Do not introduce scaling factor N. Existing measurement requirements can be reused, provided that beam steering based on the positioning is capable for the ATG UE.
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## Issue 5-1: Phase antenna array impact for L3 measurements

* Proposals
	+ **For the applicability of scaling factor**
	+ Option 1: The scaling factor should be also applied for L3 measurements with MG. (CMCC)
	+ **For the specific value of scaling factor**
	+ Option 1: (CMCC, HW, ZTE)
		- For intra-frequency L3 measurements without MG of ATG UE with antenna array
			* N = 3 for the case when network assistance on ATG cells reference BS locations is provided
			* N = 4 otherwise
		- For inter-frequency L3 measurements (also for RRC IDLE/INACTIVE mode) of ATG UE with antenna array
			* N = 2 for the case when network assistance on ATG cells reference BS locations is provided
			* Option 1-1: N = 3 otherwise (CMCC, ZTE)
			* Option 1-2: N =4 otherwise (HW)
* Discussion
	+ CMCC: for inter-frequency, UE does not need to measure serving cell direction, N can reduce by 1.
	+ Qualcomm: UE can have neighbour cell with same serving cell direction.
	+ ZTE: same view as CMCC. For ATG deployment, since location of ATG cells are fixed. If UE does not need to measure neighbour cell, the scaling factor can be reduced.
	+ Qualcomm: same as FR2, sweeping beam is based on UE implementation.
	+ LGE: difference between ATG and FR2 UE is that network will provide neighbour BS reference locations.
	+ CMCC: ATG with extreme large ISD is difficult to have multiple neighbour cells for UE to monitor.
	+ ZTE: last meeting, N=3 comes from one beam of serving cell and two beams of neighbour cells. It is natural N=2 if neighbour BS location is provided.
* For further offline discussion during this week:
	+ - For inter-frequency L3 measurements (also for RRC IDLE/INACTIVE mode) of ATG UE with antenna array
			* N = 2 for the case when network assistance on ATG cells reference BS locations is provided
			* N= 4 otherwise

## Issue 2-2: Tsearch in HO requirements for UE with antenna array

* Proposals
	+ For HO requirements, when network assistance on ATG unknown target cell’s reference BS locations is provided,
		- Option 1-1: no need to scale the Tsearch (CMCC, ZTE)
	+ For HO requirements, when network assistance on ATG unknown target cell’s reference BS locations is not provided,
		- Option 1-2: the Tsearch should be scaled with scaling factor N=3. (CMCC)
		- Option 1-3: the Tsearch should be scaled with scaling factor N=[3 or 4]. (ZTE)
* Discussion
	+ Nokia: unknown cell means UE does not measure this cell before, it still needs to perform beam sweeping. Tsearch needs to be scaled.
	+ Qualcomm: agree with Nokia. Same scaling factor should be applied to HO Tsearch.
	+ ZTE: If BS location is provided, UE can perform beam steering. For unknown cell, UE perform beam steering instead of beam sweeping. No scaling is needed.
	+ CMCC: Same view as ZTE.
	+ Huawei: For the case location is provided, agree with N=1. For the case location is not provided, agree with N=4
	+ ZTE: For the case location is provided, N equals to the cell UE needs to measure. During HO, UE only needs to measure one target cell.
	+ Nokia: To compromise, for the case location is provided, N=2.
* Tentative Agreement:
	+ For HO requirements, when network assistance on ATG unknown target cell’s reference BS locations is provided,
		- the Tsearch should be scaled with scaling factor N= 2
	+ For HO requirements, when network assistance on ATG unknown target cell’s reference BS locations is not provided,
		- the Tsearch should be scaled with scaling factor N=4

## Issue 2-3: Tmeasure in CHO requirements for UE with antenna array (not discussed in adhoc session)

* Proposals
	+ Option 1: For intra-frequency CHO requirements, when network assistance on ATG cells reference BS locations is provided to UE with antenna array, the scaling factor of Tidentify intra with index or Tidentify\_intra\_without\_index should be decreased to N=2, and N=3 otherwise. (CMCC)
* Recommended WF
	+ To be discussed

## Issue 2-4: Requirement applicability for CHO requirement

* Proposals
	+ Option 1: For CHO requirements, it should be applicable even if UE doesn’t have the valid and applicable parameters of BS location information and Koffset for target NR cell. (CMCC)
* Discussion
	+ CMCC: in ATG, one is reference location for CHO, i.e. the cell centre, the other one is the BS reference location for neighbour cell assistance.
	+ Nokia: We agreed that for ATG BS location can be optionally provided. So even without BS location, CHO can still work with beam sweeping, i.e. scaling factor N.
* Tentative agreement:
	+ Agree with option 1 in principle and check CR for final agreement.

## Issue 2-5: Tidentify\_intra\_NR in RRC Re-establishment delay requirement for UE with antenna array

* Proposals
	+ Option 1: For UE with antenna array, the scaling factor should be considered for unknown cells of intra-frequency and inter-frequency in RRC Re-establishment delay requirement requirements. The scaling factor of L3 measurements should be used. (CMCC)
		- For intra-frequency, N = 3 for the case when network assistance on ATG cells reference BS locations is provided, N = 4 otherwise.
		- For inter-frequency, N = 2 for the case when network assistance on ATG cells reference BS locations is provided, N = 3 otherwise.
	+ Option 2: The consideration of phase array antenna should be extended to the requirement of Tidentify\_intra\_NR and Tidentify\_inter\_NR, i withinRRC re-establishment as: (ZTE)

Table 6.2X.1.2.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell

|  |  |  |
| --- | --- | --- |
| Serving cell  | FR of target NR  | Tidentify\_intra\_NR [ms] |
| SSB Ês/Iot (dB) | cell | Known NR cell | Unknown NR cell |
| ≥ -8 | FR1 | MAX (200 ms, 5 x N2 x TSMTC) | MAX (800 ms, 10 x N2 x TSMTC) |
| < -8 | FR1 | N/A | 800Note1 |
| Note 1: The UE is not required to successfullyidentify a cell on any NR frequency layer when TSMTC > 20 ms and serving cell SSB Ês/Iot < -8 dB.Note 2: If [omnidirectional antennas] is assumed at UE, N = 1.If [Phase antenna array] is assumed at UE, - When [network assistance on ATG cells reference location] of the target cell is provided to UE, N = 3;- Otherwise, N = [3 or 4]. |

Table 6.2X.1.2.1-2: Time to identify target NR cell for RRC connection re-establishment to NR inter-frequency cell

|  |  |  |
| --- | --- | --- |
| Serving cell SSB Ês/Iot (dB) | FR of target NR cell | Tidentify\_inter\_NR, i [ms] |
|  |  | Known NR cell | Unknown NR cell |
| ≥ -8 | FR1 | MAX (200 ms, 6 x N2 x TSMTC, i) | MAX (800 ms, 13 x N2 x TSMTC, i) |
| < -8 | FR1 | N/A | 800Note1 |
| Note 1: The UE is not required to successfully identify a cell on any NR frequency layer when TSMTC,i > 20 ms and serving cell SSB Ês/Iot < -8 dB.Note 2: If [omnidirectional antennas] is assumed at UE, N = 1.If [Phase antenna array] is assumed at UE, - When [network assistance on ATG cells reference location] of the target cell is provided to UE, N = 2;- Otherwise, N = [3 or 4]. |

* Recommended WF
	+ Firstly, for the UE with antenna array, discuss whether the scaling factor is needed for known NR cell and unknown NR cell separately
	+ Secondly, discuss the scaling number
* Discussion
	+ CMCC: for known cell, scaling factor is not needed.
	+ Ericsson: Same view as CMCC.
* Tentative agreement:
	+ Scaling factor is not needed for known cell
	+ FFS on scaling factor for unknown cell

## Issue 2-6: Tidentify\_NR in RRC connection release with redirection requirement for UE with antenna array (not discussed in adhoc session)

* Proposals
	+ Option 1: For UE with antenna array, the scaling factor of L3 inter-frequency measurements are suggested to be used. N = 2 for the case when network assistance on ATG cells reference BS locations is provided, N = 3 otherwise. (CMCC)
	+ Option 2: The consideration of phase array antenna should be extended to the requirement of Tidentify-NR within RRC connection release with redirection to NR as below: (ZTE)

 Table 6.2X.3.2.1-1: Time to identify target NR cell for RRC connection release with redirection to NR

|  |  |
| --- | --- |
| FR of target NR cell | Tidentify-NR |
| FR1 | MAX (680 ms, 11 x N2 x Trs) |
| Note 1: If the UE has been provided with higher layer signaling of *smtc2*specified in TS 38.331 [2] prior to the redirection command, Trs follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.Note 2: If [omnidirectional antennas] is assumed at UE, N = 1.If [Phase antenna array] is assumed at UE, - When [network assistance on ATG cells reference location] of the target cell is provided to UE, N = 2;- Otherwise, N = [3 or 4]. |

* Recommended WF
	+ Firstly, for the UE with antenna array, discuss whether the scaling factor is needed
	+ Secondly, discuss the scaling number

## Issue 3-1: validity timer for ATG

* Proposals
	+ Option 1: remove the brackets and keep the validity timer statement, since running validity timer for $N\_{TA,adj}^{UE}$ is a sign that the UE has received data in SIB regarding ATG gNB positions and is ready to transmit in UL. (Ericsson)

*The ATG UE shall meet the Te\_ATG requirement for an initial transmission provided that at least one SSB is available at the ATG UE during the last 160 ms. [and the ATG UE has a validity time running for NTA,UE-specific.] The reference point for the ATG UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus* $\left(N\_{TA}+N\_{TA-offset}+N\_{TA,adj}^{UE}\right)×T\_{c}$*.*

*The timing advance is initiated by ATG UE configured with only PCell [served by gNB upon initiating a validity timer for* $N\_{TA,adj}^{UE}$*. ] The timing advance can be adjusted with MAC message that implies the adjustment of the timing advance, as defined in clause 5.2 of TS 38.321 [7].*

* Discussion
	+ CMCC: not sure whether validity time will be introduced in RAN2 spec.
	+ Ericsson: OK to keep [] for now.
* Agreement:
	+ Keep [] for validity timer and wait for RAN2 conclusion.

## Issue 5-2: If any additional UE capability is needed for ATG UEs with [antenna arrays] (not discussed in adhoc session)

* Proposals
	+ Option 1: No capability is needed for ATG UE to support antenna arrays in FR1 4GHz. (Ericsson)
	+ Option 2: Define a UE capability to differentiate UE with [omnidirectional antennas] and UE with [antenna arrays]. (HW)
	+ Option 3: For the band n79 capable UE, it works with phase antenna array by default at band n79. (ZTE)
		- Regarding the antenna assumption, phase antenna array is tied with band n79, and omni-antenna is tied with other ATG bands.
* Recommended WF
	+ To be discussed

# Performance requirements

## Issue 6-1-1: Measurement accuracy

* Proposals
	+ Option 1: Reuse the Es/Iot side condition and measurement accuracy requirement of legacy TN network for ATG.(CMCC)
	+ Option 2: The accuracy requirement of L1 measurement should be identified for ATG. Regarding L3 measurement accuracy, reuse the accuracy requirement of legacy FR1 TN for the non-phase array antenna assumption; it is better to identify the accuracy requirement for the phase array antenna assumption. (ZTE)
* Recommended WF
	+ reuse the L3 and L1 accuracy requirement of legacy FR1 TN for the non-phase array antenna assumption
	+ Further discuss whether to identify the incremental accuracy requirement for the phase array antenna assumption
* Discussion
	+ ZTE: For phase array antenna, we consider possible different accuracy requirements.
	+ Ericsson: What is the expectation for different accuracy, tightened or what?
* Agreement:
	+ Reuse the L3 and L1 accuracy requirement of legacy FR1 TN

## Issue 6-2-1: General test configuration

* Proposals
	+ Option 1: (CMCC)
		- Configuration 1:15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, only for UE with omnidirectional antennas
		- Configuration 2: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, for both UE with omnidirectional antennas and for UE with antenna array
	+ Option 2: (ZTE)
		- Testing band:
			* Band n79 should be configured for the sake of phase array antenna relevant enhancements testing;
			* At least one band within {n1, n3, n34, n39, n41, n78} is considered to test other ATG enhancement besides the phase array antenna relevant enhancements testing;
		- Duplex:
			* Similar as in legacy, both FDD and TDD should be configured.
		- SCS:
			* Similar as in legacy, both 15kHz, 30kHz should be configured.
			* Not consider 60kHz since some RRM requirement is vacant for 60kHz.
		- TDD pattern:
			* TDD pattern ‘30D4S6U’, S=’14GP’ should be prioritized in the test.
	+ Option 3: RAN4 to discuss additional test cases considering the new TDD pattern for ATG (if agreed). (Ericsson)
* Discussion
	+ Qualcomm: proposal of testing band needs to be clarified.
	+ ZTE: the bands are intended to differentiate omnidirectional antenna and phase array antenna.
	+ Intel: what band is targeted for TDD with 20MHz
	+ Moderator: n34 (2000MHz) and n39 (1900MHz)
	+ Huawei: whether 20MHz is only specified for RedCap?
* Agreement:
	+ - Configuration 1:15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, only for UE with omnidirectional antennas
		- Configuration 2: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, for UE with antenna array
		- Configuration 3: 30 kHz SSB SCS, [20MHz] bandwidth, TDD duplex mode, for UE with omnidirectional antennas
		- FFS on TDD pattern

## Issue 6-2-2: Test scope

* Proposals
	+ Option 1: Only define test case for non-DRX mode in connected mode (HW, Ericsson)
	+ Option 2: Define test cases for both DRX mode and non-DRX mode. (CMCC)
	+ Option 3: RAN4 not to define test cases for SCC. (Ericsson)
	+ Option 4: A general principle is to only define the test cases for those requirements that are different from the TN deployment or not involved in the TN deployment. (ZTE)
* Discussion
	+ HW: DRX mode is for power saving, ATG is not sensitive to power.
	+ QC: How about the test case list? Do we repeat all the test cases?
	+ Ericsson: We can select some cases for requirements with scaling factor N.
	+ CMCC: prefer to pick some test cases for DRX configuration.
	+ HW: RRM test case is not for the purpose of DRX functionality.
	+ Nokia: UE can only be either omnidirectional or phase antenna array.
* Agreement
	+ RAN4 not to define test cases for SCC
	+ Only define test case for non-DRX mode in connected mode
	+ For requirements with scaling factor, consider to select some configurations for RRM test cases.

For information:

* + Companies can show your support in the table below

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| **Test scope****RRC\_IDLE state mobility** | **Test number** | **Supporter** |
| Cell reselection to intra-frequency neighbour cell | ATG 1-1 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson |
| Location based cell reselection to intra-frequency neighbour cell | ATG 1-2 | CMCC (Neighbour cell reference BS location is provided) |
| Cell reselection to inter-frequency neighbour cell | ATG 1-3 | CMCC (Neighbour cell reference BS location is not provided)HW, Ericsson |
| Cell reselection to inter-frequency NR cell for UE configured with [enhanced requirements] | ATG 1-4 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson, ZTE |
| Location based cell reselection to inter-frequency neighbour cell | ATG 1-5 | CMCC (Neighbour cell reference BS location is provided) |

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| **Test scope****RRC\_CONNECTED state mobility** | **Test number** | **Supporter** |
| Intra-frequency HO with known target cell | ATG 2-1 | CMCC, HW, Ericsson |
| Intra-frequency HO with unknown target cell | ATG 2-2 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson |
| Inter-frequency HO with known target cell | ATG 2-3 | CMCC, [HW] |
| Inter-frequency HO with unknown target cell | ATG 2-4 | CMCC (Neighbour cell reference BS location is not provided)HW, Ericsson |
| Intra-frequency location based CHO  | ATG 2-5 | CMCC (Neighbour cell reference BS location is not provided)HW, Ericsson |
| Inter-frequency location based CHO  | ATG 2-6 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson |
| Intra-frequency RRC Re-establishment with known target cell | ATG 2-7 | CMCCHW, Ericsson |
| Intra-frequency RRC Re-establishment with unknown target cell  | ATG 2-8 | CMCC (Neighbour cell reference BS location is not provided) |
| Inter-frequency RRC Re-establishment with known target cell | ATG 2-9 | CMCC |
| Inter-frequency RRC Re-establishment with unknown target cell  | ATG 2-10 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson |
| Inter-frequency RRC Re-establishment in FR1 without serving cell timing | ATG 2-11 | HW |
| 4-step RA type contention based random access test | ATG 2-12 | CMCC, HW, Ericsson |
| 4-step RA type Non-Contention based random access test | ATG 2-13 | CMCC, HW, Ericsson |
| 2-step RA type contention based random access test | ATG 2-14 | CMCC, Ericsson |
| 2-step RA type Non-Contention based random access test | ATG 2-15 | CMCC, Ericsson |
| RRC Connection Release with Redirection | ATG 2-16 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson |

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| **Test scope****Timing** | **Test number** | **Supporter** |
| UE transmit timing test | ATG 3-1 | CMCC, Ericsson, ZTE |
| Timing advance adjustment delay and accuracy | ATG 3-2 | CMCC, Ericsson, ZTE |

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| **Test scope****Signalling characteristics** | **Test number** | **Supporter** |
| Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode | ATG 4-1 | CMCC, HW, Ericsson |
| Radio Link Monitoring In-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode | ATG 4-2 | CMCC, HW, Ericsson |
| Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in DRX mode | ATG 4-3 | CMCC |
| Radio Link Monitoring In-sync Test for FR1 PCell configured with SSB-based RLM RS in DRX mode | ATG 4-4 | CMCC |
| Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in non-DRX mode | ATG 4-5 | CMCC, HW, Ericsson |
| Radio Link Monitoring In-sync Test for FR1 PCell configured with CSI-RS-based RLM in non-DRX mode | ATG 4-6 | CMCC, HW, Ericsson |
| Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode | ATG 4-7 | CMCC |
| Radio Link Monitoring In-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode | ATG 4-8 | CMCC |
| Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in non-DRX mode | ATG 4-9 | CMCC, HW, Ericsson |
| Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in DRX mode | ATG 4-10 | CMCC |
| Beam Failure Detection and Link Recovery Test for FR1 PCell configured with CSI-RS-based BFD and LR in non-DRX mode | ATG 4-11 | CMCC, HW, Ericsson |
| Beam Failure Detection and Link Recovery Test for FR1 PCell configured with CSI-RS-based BFD and LR in DRX mode | ATG 4-12 | CMCC |
| DCI-based and Timer-based Active BWP Switch | ATG 4-13 | CMCC, HW, Ericsson |
| RRC-based Active BWP Switch | ATG 4-14 | CMCC, HW, Ericsson |
| UE specific CBW change | ATG 4-15 | CMCC, HW, Ericsson |
| Pathloss reference signal switching delay | ATG 4-16 | CMCC |

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| **Test scope****Measurement procedure** | **Test number** | **Supporter** |
| Intra-frequency measurements event triggered reporting tests without gap under non-DRX | ATG 5-1 | CMCC (Neighbour cell reference BS location is provided)HW, Ericsson, ZTE (under phase antenna array assumption) |
| Intra-frequency measurements event triggered reporting tests without gap under DRX | ATG 5-2 | CMCC (Neighbour cell reference BS location is not provided), ZTE (under phase antenna array assumption) |
| Intra-frequency measurements event triggered reporting tests with per-UE gaps under non-DRX | ATG 5-3 | CMCC (Neighbour cell reference BS location is not provided)HW, Ericsson, ZTE (under phase antenna array assumption) |
| Intra-frequency measurements event triggered reporting tests with per-UE gaps under DRX | ATG 5-4 | CMCC (Neighbour cell reference BS location is provided), ZTE (under phase antenna array assumption) |
| Intra-frequency measurements event triggered reporting tests without gap under non-DRX with SSB index reading | ATG 5-5 | CMCC (Neighbour cell reference BS location is provided), ZTE (under phase antenna array assumption) |
| Intra-frequency measurements SA event triggered reporting tests with per-UE gaps under non-DRX with SSB index reading | ATG 5-6 | CMCC (Neighbour cell reference BS location is provided), ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 without SSB time index detection when DRX is not used | ATG 5-7 | CMCC (Neighbour cell reference BS location is not provided)HW, Ericsson, ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 without SSB time index detection when DRX is used | ATG 5-8 | CMCC (Neighbour cell reference BS location is provided), ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 with SSB time index detection when DRX is not used | ATG 5-9 | CMCC (Neighbour cell reference BS location is provided)HW, ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 with SSB time index detection when DRX is used | ATG 5-10 | CMCC (Neighbour cell reference BS location is not provided), ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 without gap when DRX is used | ATG 5-11 | CMCC (Neighbour cell reference BS location is provided), ZTE (under phase antenna array assumption) |
| Inter-frequency measurements event triggered reporting tests for FR1 without gap when DRX is not used | ATG 5-12 | CMCC (Neighbour cell reference BS location is provided)HW, ZTE (under phase antenna array assumption) |
| SSB based L1-RSRP measurement when DRX is not used | ATG 5-13 | CMCC, HW, Ericsson, ZTE (under phase antenna array assumption) |
| SSB based L1-RSRP measurement when DRX is used | ATG 5-14 | CMCC, ZTE (under phase antenna array assumption) |
| CSI-RS based L1-RSRP measurement when DRX is not used | ATG 5-15 | CMCC, HW, Ericsson, ZTE (under phase antenna array assumption) |
| CSI-RS based L1-RSRP measurement when DRX is used | ATG 5-16 | CMCC, ZTE (under phase antenna array assumption) |
| L1-SINR measurement with CSI-RS based CMR and no dedicated IMR configured when DRX is used | ATG 5-17 | CMCC, ZTE (under phase antenna array assumption) |
| L1-SINR measurement with SSB based CMR and dedicated IMR when DRX is not used | ATG 5-18 | CMCC, HW, ZTE (under phase antenna array assumption) |
| L1-SINR measurement with CSI-RS based CMR and dedicated IMR configured when DRX is not used | ATG 5-19 | CMCC, HW, ZTE (under phase antenna array assumption) |
| SA intra-frequency CGI identification of NR neighbor cell in FR1 | ATG 5-20 | CMCC |

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| **Test scope****Measurement Performance requirements** | **Test number** | **Supporter** |
| SS-RSRP intra-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-1 | CMCC, ZTE (under phase antenna array assumption) |
| SS-RSRP inter-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-2 | CMCC, ZTE (under phase antenna array assumption) |
| SS-RSRQ intra-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-3 | CMCC, ZTE (under phase antenna array assumption) |
| SS-RSRQ inter-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-4 | CMCC, ZTE (under phase antenna array assumption) |
| SS-SINR intra-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-5 | CMCC, ZTE (under phase antenna array assumption) |
| SS-SINR inter-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-6 | CMCC, ZTE (under phase antenna array assumption) |
| L1-RSRP measurement SSB based L1-RSRP measurement | ATG 6-7 | CMCC |
| L1-RSRP measurement CSI-RS based L1-RSRP measurement on resource set with repetition off | ATG 6-8 | CMCC |
| L1-SINR measurement with CSI-RS based CMR and no dedicated IMR configured and CSI-RS resource set with repetition off | ATG 6-9 | CMCC |
| L1-SINR measurement with SSB based CMR and dedicated IMR | ATG 6-10 | CMCC |
| L1-SINR measurement with CSI-RS based CMR and dedicated IMR | ATG 6-11 | CMCC |
| CSI-RSRP intra-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-12 | CMCC |
| CSI-RSRP inter-frequency case measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-13 | CMCC |
| CSI-RSRQ Intra-frequency measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-14 | CMCC |
| CSI-RSRQ Inter-frequency measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-15 | CMCC |
| CSI-SINR intra-frequency measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-16 | CMCC |
| CSI-SINR Inter-frequency measurement accuracy with FR1 serving cell and FR1 target cell | ATG 6-17 | CMCC |

## Issue 6-2-3: RMC (not discussed in adhoc session)

* Proposals
	+ Option 1: The legacy NR RMCs defined in section A.3.1 of TS 38.133 are reused for ATG test cases. (Ericsson)
* Recommended WF
	+ Option 1 can be the baseline

## Issue 6-2-4: OCNG (not discussed in adhoc session)

* Proposals
	+ Option 1: Following legacy NR OCNGs are reused for ATG test cases: (Ericsson)
		- Generic OCNG pattern for all unused REs defined in A.3.2.1.1 in TS 38.133.
		- Generic OCNG pattern for unused REs in the same bandwidth as CORESET defined in A.3.2.1.3 of TS 38.133.
		- Generic OCNG pattern for all unused REs outside SSB slot(s) defined in A.3.2.1.4 in TS 38.133
* Recommended WF
	+ Option 1 can be the baseline.

## Issue 6-2-5: Test method for UE with antenna array (not discussed in adhoc session)

* Proposals
	+ Option 1: RAN4 to discuss whether and how to define test cases for an ATG UE with antenna array (HW)
	+ Option 2: RAN4 to discuss how to model the L3 measurement test with beam sweeping in FR1 4GHz. (Ericsson)
* Recommended WF
	+ To be discussed

## Issue 6-2-6: whether to define test cases for TCI switching delay requirements (not discussed in adhoc session)

* Proposals
	+ Option 1: RAN4 to discuss the test cases for TCI switching delay requirements for MAC-, DCI and RRC-based TCI state switching delay requirements. (Ericsson)
* Recommended WF
	+ To be discussed

## Issue 6-2-7: GNSS setup (not discussed in adhoc session)

* Proposals
	+ Option 1: GNSS is viable via AT command for all test cases, and GNSS only changed during the test for location-based CHO. (HW)
* Recommended WF
	+ To be discussed

## Issue 6-2-8: UE mobility assumption (not discussed in adhoc session)

* Proposals
	+ Option 1: For the location-based cell re-selection tests, location-based CHO tests and UL transmit timing tests, the UE mobility should be assumed with 1200km/h. For the other tests, UE could be assumed with no mobility. (CMCC)
* Recommended WF
	+ To be discussed

## Issue 6-2-9: Neighbour cell configuration (not discussed in adhoc session)

* Proposals
	+ Option 1: For the FDD cell re-selection test and intra/inter-frequency measurement test for UE with omnidirectional antenna, configure 1 neighbour cell. For the TDD cell re-selection test and and intra/inter-frequency measurement test for UE with antenna array, choose some test cases to configure 2 neighbour cells. (CMCC)
* Recommended WF
	+ To be discussed

## Issue 6-2-10: Channel model (not discussed in adhoc session)

* Proposals
	+ Option 1: Use the AWGN with residual doppler channel model for RRM test cases. (CMCC)
* Recommended WF
	+ To be discussed