**3GPP TSG-RAN WG4 Meeting #100-eR4-21xxxxx**

**Electronic Meeting, 16 – 27 August, 2021**

**Agenda item:** 5.1.7

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [100-e][201] NR\_RRM\_maintenance\_R15\_Core

**Document for:** Information

# Introduction

The scope of this email discussion includes the following agenda items:

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| 5.1.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core] |

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# Topic #1: Rel-15 NR RRM core requirements

## Companies’ contributions summary

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| **T-doc** | **Company** | **Proposals / Observations** |
| [**R4-2111967**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2111967.zip) | CATT | CRAdd Ceil function to resolve the unclear behavior. |
| [**R4-2112084**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112084.zip) | Apple | **Proposal 1: existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.****Proposal 2: clarify that interruption on PCell and other serving cells are allowed. Requirements for interruption due to PSCell addition/release defined in TS38.133 clause 8.2 can be reused.** |
| [**R4-2112085**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112085.zip) | Apple | CR for R4-2112084 |
| [**R4-2112111**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112111.zip) | Apple | CRAdd the minimum requirement at transitions for BFD. |
| [**R4-2112953**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112953.zip) | LG Electronics UK | CRRemove sentence since the same sentence is repeated. |
| **R4-2112955** | LG Electronics UK | N/A |
| [**R4-2113537**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113537.zip) | vivo | CRUse NSCC\_SSB for defining CSSF outside gap, NSCC\_SSB is the the number of configured SCell(s) measured outside gaps with only SSB based L3 measurement configured. |
| **R4-2113538** | vivo | N/A |
| **R4-2113539** | vivo | N/A |
| [**R4-2113632**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113632.zip) | Ericsson | CRDelete the related capability wordings and add the wording for effective MGRP related to inter-frequency measurement without gap. |
| [**R4-2113633**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113633.zip) | Ericsson | CRAdd the wording for effective MGRP related to inter-frequency measurement without gap. |
| [**R4-2114092**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114092.zip) | Huawei, Hisilicon | CR for 36133Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. |
| [**R4-2114095**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114095.zip) | Huawei, Hisilicon | CR for 38133Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. |
| [**R4-2114155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114155.zip) | MediaTek inc. | CRTo clarify in Clauses 9.2.5.1, 9.2.5.2, 9.2.6.2 and 9.2.6.3 the applicable DRX cycle in NR SA, EN-DC, NE-DC, and NR-DC |
| [**R4-2114252**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114252.zip) | Huawei, HiSilicon | CR for 381331. Clarify that Kp calculation is based on smtc1 no matter if dual SMTC is configured or not.2. Add to the FR1 known condition that the report has to be with SSB index.3. Update the definition of “reference point” in clause 7.1.2 based on arrival time. |
| [**R4-2114255**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114255.zip) | Huawei, HiSilicon | CR for 36133When UE is configured with inter-RAT NR measurement, the requirements defined for LTE inter-frequency RSTD measurement for EN-DC would apply. |
| [**R4-2114447**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114447.zip) | Ericsson, Nokia Shanghai Bell, Intel | CRThe definition of the reference point for the UE initial transmit timing control requirement is clarified. |

## Open issues summary

### Sub-topic 1-1: Measurement requirements

#### Issue 1-1-1: CSSF for SCell measurements outside gaps

* Proposals
	+ Option 1 (vivo)
		- Reason for change
			* Based on agreements in RAN4 #98e-bis, the interpretation of current R15/R16 spec is that NSCC\_SSB includes the number of configured SCell(s) measured both outside gaps and within gaps. In other word, the SCells measured within gap are counted twice, i.e. counted in CSSFoutside\_gap,i and CSSFwithin\_gap,i
		- Summary of Changes
			* Update the CSSF outside gap, replacing “Number of configured SCell(s)” to NSCC\_SSB, which is the number of configured SCell(s) measured outside gaps with only SSB based L3 measurement configured.
		- Related changes are as shown in R4-2113537 (vivo)
* Recommended WF
	+ Further discuss if option 1 agreeable.

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| **Company** | **Comments**  |
| Apple | We understood the motivation. However, we prefer not to change R15 spec unless critical issue. This can be considered as some relaxation, as mentioned by some company during previous RAN4 meeting discussion. On the other hand, RAN4 requirements are just minimum requirements, which don’t preclude UE from measuring faster (with shorter measurement period) |
| Ericsson | We share the same view as Apple. We would like to avoid non-critical changes to Rel-15. |
| QC | Issue discussed in thread 217, suggest not to repeat the discussion. |
| vivo | We prefer to revise the R15 spec if there is no strong concern. If there is no revision in R15 spec, companies may still need to discuss whether to enhance/revise this in future release, which may need potential new UE feature, or may even be under certain scenarios. This is not preferred in our view. According to R15 spec, we see quite many companies interpret this scaling factor as the number of cells to be measured without gaps (which seems the correct understanding technically), and there could be actually no backward compatibility issue.To Apple, if it is relaxation then there could be no technical justification for such relaxation. It is more like some mistakes that we need to correct during maintenance phase.We are also fine to follow conclusion from email thread 217. For now, it seems companies are fine that NSCC\_SSB clarification/correction should cover non-HST as well as HST, i.e., unified NSCC\_SSB design for both HST and non-HST.  |
| Huawei | We do not support option 1.The issue has been discussed for HST in previous meeting, and RAN4 has reached common understanding about the current non-HST requirements as captured WF R4-2105793. We prefer to stick to this common understanding and avoid changes to Rel-15. |
| OPPO | Agree with the observation from vivo. We are ok with such an update.  |
| Nokia | Share same view that this is not an essential correction. One could assume that a good UE implementation would account this and perform better. |

#### Issue 1-1-2: Calculation of Kp factor in case of dual SMTC

* Proposals
	+ Option 1 (HW)
		- Reason for change
			* Current requirements assume smtc2 is used when dual SMTC is configured. This means when smtc1=40ms, smtc2=20ms and MGRP=80ms, Kp=1.33 based on smtc2, but for smtc1 the MG punctures half of the SMTC windows, so Kp should be calculated based on smtc 1 and thus equals to 2
		- Summary of Changes
			* Clarify that Kp calculation is based on smtc1 no matter if dual SMTC is configured or not
		- Related changes are as shown in Change#1 in R4-2114252 (HW)
* Recommended WF
	+ Further discuss if option 1 is agreeable.

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | We think the Kp calculation for target cell identification/measurement is based on the smtc which is used by target cell. |
| Ericsson | We are fine with Option 1. However, we have some comments on the wording in the CR.We would like the following added sentence "For calculation of Kp, the SMTC period corresponds to the value of higher layer parameter smtc1 no matter if high layer in TS 38.331 [2] signalling of smtc2 is configured or not." to be modified into: "For calculation of Kp, the SMTC period corresponds to the value of higher layer parameter smtc1 no matter whether smtc2 is configured or not.” |
| vivo | In the time period requirements table for PSS/SSS detection, the SMTC period is the one used by the cell being identified.If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedWe think Kp should follow the same rule. Otherwise, the time period requirements for PSS/SSS detection may need further discussion. |
| Huawei | We are fine with Apple and vivo’s comment, and a new TP is provided as follows which is based on the existing wording in Note 1 of Table 9.2.5.1-1. We look forward to further comments from companies on the new TP. For calculation of Kp, if different SMTC periodicities are configured for different cells, the SMTC period corresponds to the one used by the cell being identified/measured. |
| OPPO | Fine with the revised text proposal above from HW. SMTC should be selected based on the cell being identified/ measured |
| Nokia | Option 1 is agreeable.For the actual TP in the CR we would suggest a rewording:*For calculation of Kp, the SMTC period corresponds to the value of higher layer parameter smtc1 no matter if high layer in TS 38.331 [2] signalling of smtc2 is configured or not*to:where, the SMTC period correspond to the higher layer parameter *smtc1.* |

#### Issue 1-1-3: Condition for MG-less inter-frequency measurement

* Proposals
	+ Option 1 (Ericsson)
		- Reason for change
			* The spec. specifies the capability for inter-frequency without gaps, but no such capability was introduced in Rel-15 for inter-frequency measurements.
			* The effective MGRP scenario isn’t covered for UE measurement capability:
		- Summary of Changes
			* For Rel-15: delete the capability wordings related to inter-frequency without gaps, and add the wording for effective MGRP scenario.
			* Rel-16: add the wording for effective MGRP scenario
		- Related changes are as shown in R4-2113632 (Rel-15) and R4-2113633 (Rel-16) (Ericsson)
* Recommended WF
	+ Further discuss if option 1 is agreeable.

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | We have comment on R15 revision of effective MGRP: in R15 NR-DC, only FR1+FR2 NR-DC is assumed, and therefore the effective MGRP cannot be used in this NR-DC since the serving cells are always in both FR1 and FR2. |
| Ericsson | Could Apple further clarify why effective MGRP cannot be applied in R15 NR-DC? We think the effective MGRP can be applied when MN configures FR2 MOs during the transition period for FR2 PSCell addition in SN. In current specification, it is clearly indicated that effective MGRP will be applied in NR-DC.

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| For per-FR measurement gap capable UE in NR standalone operation (with single carrier, NR CA and NR-DC configuration), for per-FR gap based measurement, when there is no serving cell in a particular FR, where measurement objects are configured, regardless if explicit per-FR measurement gap is configured in this FR, the effective MGRP in this FR is used to determine requirements;- 20 ms for FR2 NR measurements- 40 ms for FR1 NR measurements- 40 ms for LTE measurements- 40 ms for FR1+LTE measurements |

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| QC | Whether effective MGRP is applicable to NR-DC depends on whether serving cells are always in “both” FR1 and FR2. Our understanding is it’s not necessary true since in PSCell change, the source and target cells can be in different FRs, which implies that NR-DC can have CGs in the same FR.  |
| Apple2 | To Ericsson, the effective MGRP only applies when UE support per-FR MG and UE doesn’t have serving cell in the specific FR where MO is configured. However, in R15 NR-DC, the PCell and PSCell is in FR1 and FR2 respectively, so it’s not a valid case to apply effective MGRP. The excerpt Ericsson used may also need to be revised for R15.To QC, regarding this PSCell change for R15 NR-DC, if PCell is in FR1, how can PSCell change from FR2 to FR1 for R15? Since R15 UE only supports FR1 PCell+FR2 PSCell NR-DC. |
| Huawei  | We are fine with option 1.On NR-DC, we have same understanding as Apple that in Rel-15 we only have BC for FR1+FR2 NR-DC, so we do not need the change to the NR-DC section 9.1.3.1c in the CR otherwise it is a bit confusing. The general requirements in 9.1.2 do not need to be changed because it is clearly mentioned that effective MGRP is used “when there is no serving cell in a particular FR”. |
| OPPO | Agree with only NR-DC for FR1+FR2 in R15. The revision should base on the assumption that effective MGRP is used “when there is no serving cell in a particular FR”. |
| Nokia | This would need more offline discussion as it is not clear what the intention with the CR is.in 9.1.2 we have what is also copied above:‘For per-FR measurement gap capable UE in NR standalone operation … when there is no serving cell in a particular FR, where measurement objects are configured, regardless if explicit per-FR measurement gap is configured in this FR, the effective MGRP in this FR is used to determine requirements’And this together with the original ext (now removed) in our understanding cover what this change aims at. |

#### Issue 1-1-4: Applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC

* Proposals
	+ Option 1 (MTK)
		- Reason for change
			* It was agreed in R4-1816115 that SCG DRX cycle shall apply for the infra-frequency measurement requirement when SCG DRX is in use. In that time only EN-DC mode was considered and NR was always SCG. However, in NR SA, NE-DC, and NR-DC, NR could also be MCG, and thus when MCG DRX is in use, it is unclear which DRX cycle shall apply for infra-frequency measurement requirement.
		- Summary of Changes
			* If MCG DRX is in use, requirements for intra-frequency in MCG shall depend on the MCG DRX cycle.
			* If SCG DRX is in use, requirements for intra-frequency in SCG shall depend on the SCG DRX cycle.
			* Otherwise, the requirements for when DRX is not in use shall apply
		- Related changes are as shown in R4-2114155 (MTK)
* Recommended WF
	+ Further discuss if option 1 is agreeable.

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | Fine with option 1. |
| Ericsson | We are fine with Option 1. |
| vivo | Fine with option 1. |
| Huawei | Fine with option 1. |
| OPPO | Fine with option 1. |
| Nokia | The principles of Option 1 are correct and agreeable. However, it applies not only to intra-frequency measurements, but any measurements configured by the MCG/SCG (e.g. inter-frequency as well).We are as such fine with clarifying this but instead of having to update all places in the specification we are wondering if this can be done in high level? E.g.:‘The DRX to be applied for the DRX related requirements in this specification, is the DRX cycle in use in the MCG (PCell) or SCG (PSCell) of the cell’ |

#### Issue 1-1-5: Collision between inter-frequency RSTD and inter-RAT NR measurement in LTE SA

* Proposals
	+ Option 1 (HW)
		- Reason for change
			* When PRS for LTE RSTD measurement and SMTC window for NR measurement collide, the two measurements compete MG as defined in the CSSF within gap. On the requirement side, when UE is configured with EN-DC, both the LTE-NR inter-RAT measurement (section 8.17.4) and the LTE inter-frequency RSTD measurement (section 8.17.15) are defined based on CSSF, which is correct. However, when UE is in LTE SA, the LTE inter-frequency RSTD measurement (section 8.1.2.6) are not scaled with CSSF, so the time sharing with inter-RAT NR measurement is not accounted.
		- Summary of Changes
			* Clarify in section 8.1.2.6 of 36133 for LTE SA that when UE is configured with inter-RAT NR measurement, the requirements defined for LTE inter-frequency RSTD measurement for EN-DC (section 8.17.15 of 36133, scaled with CSSF) would apply.
		- Related changes are as shown in R4-2114255 (HW)
* Recommended WF
	+ Further discuss if option 1 is agreeable.

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | Fine with option 1. |
| Ericsson | We disagree with Option 1. RSTD inter-freq measurement is always done in gaps as PRS has long periodicity. UE can be configured with inter-RAT NR when RSTD inter-freq measurement is configured. Section 8.17.15 is RSTD inter-freq measurement when EN-DC is configured. It is NOT inter-RAT NR. |
| Huawei | To Ericsson,We agree that RSTD inter-freq measurement is always done in gaps, and we also agree that UE can be configured with inter-RAT NR when RSTD inter-freq measurement is configured. The only problem is that when both inter-RAT NR and inter-freq RSTD measurements are configured, UE needs to share the gap between the two measurements, and this is same when UE is LTE SA and in EN-DC. Currently the gap sharing between the two measurements is already accounted in CSSF definition, and the inter-freq RSTD requirements for EN-DC in clause 8.17.15 is also scaled with CSSF, so we suggest that the inter-freq RSTD for LTE SA would apply the same requirements as inter-freq RSTD requirements for EN-DC. We are not proposing to change the requirement for inter-RAT NR measurement in LTE SA. |
| Nokia | The change is not clear regarding:‘All inter-frequency RSTD measurement requirements specified in Sections 8.7.15.1-8.7.15.4 shall apply’Latest version of 36.133 Rel-15 does not have such sections? |
| Ericsson2 | To Huawei,Thank you for the further explanation. However, we still do not agree to this change. The reason is that for LTE SA, it is clearly defined already how gaps are shared among carriers and radio access technologies. Particularly, sharing is based on parameter Nfreq and not on CSSF. CSSF is only used when UE is configured with LTE PCell in EN-DC operation. It is not used when LTE PCell is stand alone. Hence referring to 8.17.5.x for LTE SA requirements is not correct.36.133:8.1.2.1.1              Monitoring of multiple layers using gapsWhen monitoring of multiple inter-frequency E-UTRAN and inter-RAT (UTRAN, GSM, NR) using gaps (or without using gaps provided the UE supports such capability) is configured, the UE shall be capable of performing one measurement of the configured measurement type (RSRP, RSRQ, RSTD, UTRAN TDD P-CCPCH RSCP, UTRAN FDD CPICH measurements, GSM carrier RSSI, NR SS-RSRP, NR SS-RSRQ, NR SS-SINR, etc.) of detected cells on all the layersThe effective total number of frequencies excluding the frequencies of the PCell, SCells, and PSCell being monitored is Nfreq, which is defined as:Nfreq = Nfreq, E-UTRA + Nfreq, UTRA + Mgsm + Nfreq, cdma2000 + Nfreq, HRPD + Nfreq, NRwhereNfreq, E-UTRA is the number of E-UTRA carriers being monitored (FDD and TDD)Nfreq, UTRA is the number of UTRA carriers being monitored (FDD and TDD)MGSM is an integer which is a function of the number of GSM carriers on which measurements are being performed. MGSM is equal to 0 if no GSM carrier is being monitored. For a MGRP of 40 ms, MGSM is equal to 1 if cells on up to 32 GSM carriers are being measured. For a MGRP of 80 ms, MGSM is equal to ceil(Ncarriers,GSM /20) where Ncarriers,GSM is the number of GSM carriers on which cells are being measured.Nfreq, cdma2000 is the number of cdma2000 1x carriers being monitored.Nfreq, HRPD is the number of HRPD carriers being monitored.Nfreq, NR is the number of NR inter-RAT carriers being monitored.8.1.2.3            E-UTRAN inter frequency measurementsThe UE shall be able to identify new inter-frequency cells and perform RSRP, RSRQ, and RS-SINR measurements of identified inter-frequency cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided.The requirements in this section shall also appy, when the UE is configured to perform SRS carrier based switching and using measurement gaps.8.1.2.3.1              E-UTRAN FDD – FDD inter frequency measurements8.1.2.3.1.1                  E-UTRAN FDD – FDD inter frequency measurements when no DRX is usedWhen measurement gaps other than nonUniform1 – nonUniform4 are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency within TIdentify\_Inter according to the following expression:(normal performance) and(reduced performance)Where:TBasic\_Identify\_Inter = 480 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new FDD inter-frequency cell is defined.Nfreq,n Nfreq,r Kn and Kr are defined in clause 8.1.2.1.1 and Tinter1 is defined in clause 8.1.2.18.17.15.1       E-UTRAN FDD-FDD Inter-Frequency RSTD measurements when configured with E-UTRA-NR Dual ConnectivityThe requirements for inter-frequency RSTD measurements in clause 8.1.2.6.1 shall apply, except that the number of PRS positioning occasions within measurement period of TRSTD InterFreqFDD, EN-DC is as specified in Table 8.17.15.1-1:**Table 8.17.15.1-1: Number of PRS positioning occasions within TRSTD InterFreqFDD, EN-DC**

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| **Positioning subframe configuration period TPRS** | **Number of PRS positioning occasions M** |
| **f2 Note1** | **f1 and f2 Note2** |
| 160 ms | 16 × CSSFinterFreq | 32 ×CSSFinterFreq |
| >160 ms | 8 ×CSSFinterFreq | 16 ×CSSFinterFreq |
| NOTE 1:   When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the FDD inter-frequency carrier frequency f2.NOTE 2:   When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving FDD carrier frequency f1 and the FDD inter-frequency carrier frequency f2 respectively. |

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### Sub-topic 1-2: Signaling characteristic related requirements

#### Issue 1-2-1: Clarification to the PSCell change requirements

* Proposals
	+ Option 1 (Apple)
		- Reason for change
			* existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.
			* clarify that interruption on PCell and other serving cells are allowed. Requirements for interruption due to PSCell addition/release defined in TS38.133 clause 8.2 can be reused.
		- Summary of Changes
			* Update the applicability such that existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.
			* Clarify interruption requirements.
		- Related changes is as shown in R4-2112085 (Apple)
* Recommended WF
	+ Further discuss if option 1 is agreeable

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | We support these two changes.  |
| Ericsson | We are fine with Option 1. |
| Huawei | We are fine with Option 1. |
| OPPO | Fine with Option 1 |
| Nokia | Option 1 is agreeable |

#### Issue 1-2-2: Minimum requirement at transitions for BFD

* Proposals
	+ Option 1 (Apple)
		- Reason for change
			* minimum requirement at transitions for BFD is missing
		- Summary of Changes
			* Add the minimum requirement at transitions for BFD, similar as minimum requirement at transitions for RLM
		- Related changes is as shown in R4-2112111 (Apple)
* Recommended WF
	+ Further discuss is option 1 is agreeable

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | Support option 1. |
| Ericsson | We are fine with Option 1. |
| Huawei | We are fine with Option 1. |
| OPPO | Fine with Option 1 |
| ZTE | OK with the CR. |
| Nokia | Option 1 is agreeable. |

#### Issue 1-2-3: SMTC configuration determination in DC

* Proposals
	+ Option 1 (HW)
		- Reason for change
			* Capture the following agreement from RAN4#99-e

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| * When SMTC configuration is not provided within the corresponding command (e.g. Handover, RRC release with redirection, SCell activation and PSCell addition/change), and MN and SN configure measObjectNR having same SSB frequency and subcarrier spacing but with different SMTC configurations,
	+ It is up to UE implementation which SMTC configuration to use
	+ UE requirements will be based on the SMTC configuration used by the UE
 |

* + - Summary of Changes
			* Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation.
		- Related changes is as shown in R4-2114092 (36133) and R4-2114095 (38188) (HW)
* Recommended WF
	+ Further discuss is option 1 is agreeable

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | In general, we support option 1. However, we would like clarify that we don’t have such problem in PSCell addition.  |
| Ericsson | We are fine with Option 1. |
| Huawei | We agree with Apple's comments that the issue may not exist in PSCell addition. But currently PSCell change requirements are directly referred to PSCell addition. One solution is to remove the change in PSCell addition and add the clarification in PSCell change only. |
| OPPO | Fine with Option 1 for PSCell change only |
| Nokia | This change is not essential.This is a nice clarification, but we do not see this as being really essential. In general, if we do not have any requirements related to this it is not specified and it is up to UE implementation.Hence, if we do not have this CR the outcome is the same. There is no UE requirements and UE behavior is left for UE implementation. In fact, this CR is not introducing any new requirements but only clarifies.  |

#### Issue 1-2-4: Known condition for FR1 SCell activation

* Proposals
	+ Option 1 (HW)
		- Reason for change
			* FR1 SCell activation, for known case it was considered that NW would know the Tx beam to use because there is L3 report. However, unlike FR2 known condition, in the FR1 known condition, the report of SSB index is not required. In this case, even the FR1 SCell is known, NW may still have no idea which Tx beam to use for scheduling the UE in the SCell.
		- Summary of Changes
			* Add to the FR1 known condition that the report has to be with SSB index
		- Related changes is as shown in Change#2 in R4-2114252 (HW)
* Recommended WF
	+ Further discuss is option 1 is agreeable

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| **Company** | **Comments**  |
| MTK | Fine with Option 1.  |
| Apple | We have some comments:* For FR1 SCell activation, if network is not using Tx beamforming or single TCI is configured, the SSB reporting without SSB index can still be used as known condition
* When network have multiple TCI configuration to UE, then it could be understood as associated SSB is used to determine the TCI, and therefore SSB reporting with SSB index can be used as known condition.
 |
| Ericsson | We disagree with Option 1 in its current form. The reason is that beam index reporting is only needed when multiple beam indexes are used in the cell. This proposal is de facto making beam index reporting mandatory. Hence the condition needs to be updated to indicate that SSB index is needed only in cases where multiple SSBs are transmitted in the cell. |
| Huawei | We are fine with the comments from Apple and Ericsson, and based on the comments, we suggest a new TP as followsFor SCell in FR1, if ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted or a single TCI state is configured in tci-StateToAddModList, it is known if it has been meeting the following conditions:[existing condition on valid report, can be with or without SSB index]For SCell in FR1, if ‘ssb-PositionInBurst’ indicates multiple SSBs are being actually transmitted and multiple TCI states are configured in tci-StateToAddModList, it is known if it has been meeting the following conditions:[updated condition on valid report, with SSB index]We look forward to further comments from companies on the new TP. |
| ZTE | Similar concern as Ericsson that this change might mean mandating a feature that was not discussed before. |
| Nokia | We do not agree to option 1.Agree with Ericsson and then in addition this is for FR1 and we have not assumed Index reporting in FR1. The principle followed in FR1 is same as for LTE (and assuming omnidirectional reception on UE side) |

### Sub-topic 1-3: Others

#### Issue 1-3-1: Update definition of ’reference point’ in UL timing requirements

* Proposals
	+ Option 1 (HW, Ericsson, Nokia, Intel)
		- Update the definition of ’reference point’ as follows
		- Related changes is as shown in R4-2114447 (Ericsson, Nokia, Intel) and Change#3 in R4-2114252 (HW)

|  |
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| The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus . The downlink timing is defined as the time when the first path (in time) of the corresponding downlink frame from the reference cell arrives at the UE antenna. *N*TA for PRACH is defined as 0. |

* Recommended WF
	+ Same as in RAN4#99-e, moderator suggests to treat the issue in Rel-17 URLLC WI, under email #239, so no technical discussion is expected in this email thread.

|  |  |
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| **Company** | **Comments**  |
| Moderator | No technical discussion is expected here. |
|  |  |

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

***No need to repeat the comments if you have already provided comments to the related open issue in section 1.2. Comments on the exact wording can be provided here, if any.***

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| **CR/TP number** | **Comments collection** |
| R4-2112953 (LGE) | Moderator: this CR is not for open issues listed in section 1.2, so please provide your comments to the CR directly here, if any. |
| Apple: fine with CR |
| Ericsson: OK |
| Huawei: OK |
| Nokia: OK |
| R4-2111967 (CATT) | Moderator: this CR is not for open issues listed in section 1.2, so please provide your comments to the CR directly here, if any. |
| Apple: fine with CR |
| Ericsson: OK |
| Huawei: OK |
| Nokia: OK |
| R4-2112085 (Apple) | Moderator: Related to 1-2-1 |
| Ericsson: OK |
| Nokia: OK |
| R4-2112111 (Apple) | Moderator: Related to 1-2-2 |
| Ericsson: OK |
| Nokia: OK |
| R4-2113537 (vivo) | Moderator: Related to 1-1-1 |
| Apple: depends on outcome of 1-1-1 |
| Ericsson: Would like to avoid non-critical changes to Rel-15, hence do not support this CR. See our comment to 1-1-1. |
| vivo: In email thread 217, Ericsson commented that ‘But we have not strong view on which release should take clarification/correction’. We think E/// would be fine if the change is from Rel-15. In general, we can follow conclusion of email thread 217.  |
| Nokia: We do not see this change essential for R15 |
| R4-2113632 (Ericsson) | Moderator: Related to 1-1-3, Rel-15 |
| Nokia: More discussion needed. In our view the intention of this change is not clear and would already be covered by the text removed. |
|  |
| R4-2113633 (Ericsson) | Moderator: Related to 1-1-3, Rel-16 |
| Nokia: More discussion needed. In our view the intention of this change is not clear and would already be covered by the text removed. |
|  |
| R4-2114092 (HW, 36) | Moderator: Related to 1-2-3 |
| Apple: in general, we support the CR. One comment regarding change 2: is this clarification needed in PSCell addition? |
| Ericsson: OK |
| Huawei: To Apple, we have provided some reply for Issue 1-2-3, and we are open to further discussions. |
| Nokia: This change is not essential.If we do not have this CR the outcome is the same. There is no UE requirements and UE behavior is left for UE implementation. |
| R4-2114095 (HW, 38) | Moderator: Related to 1-2-3 |
| Apple: in general, we support the CR. One comment regarding change 4: is this clarification needed in PSCell addition? In our view the issue may exist in PSCell change but not PSCell addition. |
| Ericsson: OK |
| Huawei: To Apple, we have provided some reply for Issue 1-2-3, and we are open to further discussions. |
| Nokia: This change is not essential.If we do not have this CR the outcome is the same. There is no UE requirements and UE behavior is left for UE implementation. |
| R4-2114155 (MTK) | Moderator: Related to 1-1-4 |
| Ericsson: OK |
| vivo: In general okay. Minor change as follows.If MCG DRX is in use, cell identification requirements for intra-frequency measurement in MCG, cell identification requirements for intra-frequency measurement in SCG |
| Nokia: The principles of Option 1 are correct and agreeable. However, it applies not only to intra-frequency measurements, but any measurements configured by the MCG/SCG (e.g. inter-frequency as well).We should cover all needed changes in one CR. We suggest that maybe RAN4 can capture the proposal as a generic principle (which it is) e.g. in section 3. |
| R4-2114255 (HW, 36) | Moderator: Related to 1-1-5 |
| typo on All inter-frequency RSTD measurement requirements specified in Sections 8.7.15.1-8.7.15.4 shall apply, provided that- the UE is capable of inter-frequency RSTD measurements for OTDOA [24], andIt should to be 8.17.15.1- 8.17.15.4 |
| Ericsson: The CR is not agreeable to us. RSTD inter-freq measurement is always done in gaps as PRS has long periodicity. UE can be configured with inter-RAT NR when RSTD inter-freq measurement is configured. Section 8.17.15 is RSTD inter-freq measurement when EN-DC is configured. It is NOT inter-RAT NR. |
| Huawei:To MTK, thanks for pointing out, we will correct the typo in the updated versionTo Ericsson, we provided some feedback to Issue 1-1-5, and we are open to further discussions. |
| Nokia: Same Typo comment as MTK above |
| R4-2114252 (HW, 38) | Moderator: Related to 1-1-2, 1-2-4Moderator: No discussion on change #3 expected, this change is handled in email #239 |
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| R4-2111313 (Ericsson, Nokia, Intel) | Moderator: No discussion expected, this CR is handled in email #239 |
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## Summary for 1st round

### Open issues

#### Sub-topic 1-1: Measurement requirements

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| Issue 1-1-1: CSSF for SCell measurements outside gaps *Summary of the status:*No clear consensus on whether the proposed changes to Rel-15 spec are needed or not.*Candidate options:** + Option 1 (vivo, OPPO)
		- Update the CSSF outside gap, replacing “Number of configured SCell(s)” to NSCC\_SSB, which is the number of configured SCell(s) measured outside gaps with only SSB based L3 measurement configured.
	+ Option 2 (Apple, Ericsson, QC, HW, Nokia)
		- No change to Rel-15 requirements

*Recommendations for 2nd round:*Further discuss based on the CR between the two options |
| Issue 1-1-2: Calculation of Kp factor in case of dual SMTC *Summary of the status:*All companies agree that some clarification on Kp calculation regarding dual SMTC is needed. Some companies are fine with the original option 1 (Kp based on smtc1) with wording refinement, while 3 companies suggest to base Kp on smtc1 or smtc2 as used for the target cell measurement. *Candidate options:** + Option 1 (HW, MTK, Ericsson, Nokia)
		- Kp calculation is based on smtc1 no matter if dual SMTC is configured or not
	+ Option 2 (Apple, vivo, OPPO, HW)
		- Kp calculation is based on the SMTC period corresponds to the one used by the cell being identified/measured

*Recommendations for 2nd round:*As option 2 is tighter than option 1, it is suggested to further discuss based on the CR e.g. if the following TP provided by the proponent based on option 2 is agreeable or not.*For calculation of Kp, if different SMTC periodicities are configured for different cells, the SMTC period corresponds to the one used by the cell being identified/measured.* |
| Issue 1-1-3: Condition for MG-less inter-frequency measurement *Summary of the status:*Most companies are fine with the proposed changes, and one company questions the need of the changes. In addition, one company raised the issue about whether effective MGRP is applicable to Rel-15 NR-DC.*Candidate options:** + Option 1 (Ericsson, MTK, QC)
		- delete the capability wordings related to inter-frequency without gaps, and add the wording for effective MGRP scenario.
	+ Option 1a (Apple, HW, OPPO)
		- Option 1 is fine, but description of effective MGRP should not be added for NR-DC
	+ Option 2 (Nokia)
		- Changes are not needed, existing descriptions are sufficient

*Recommendations for 2nd round:*Further discuss based on the CR1. whether the changes on condition for MG-less measurement in option 1 are needed at least for scenarios other than NR-DC
2. whether any change on the applicability of effective MGRP is needed
 |
| Issue 1-1-4: Applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC *Summary of the status:*All companies are fine with the proposed changes, but one company commented that the clarification may be also needed for inter-frequency measurement, so clarification on a higher level is preferable. *Candidate options:*None*Recommendations for 2nd round:*Further discuss based on the CR how to capture the applicable DRX cycle for intra-frequency and inter-frequency measurement.  |
| Issue 1-1-5: Collision between inter-frequency RSTD and inter-RAT NR measurement in LTE SA*Summary of the status:*Most companies are fine with the changes with the typo correction, but one company raises the issue that for LTE SA MG sharing is based on parameter Nfreq and not on CSSF.*Candidate options:*None*Recommendations for 2nd round:*Further discuss based on the CR how to capture the MG sharing for LTE inter-frequency RSTD for LTE SA. |

#### Sub-topic 1-2: Signaling characteristic related requirements

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| Issue 1-2-1: Clarification to the PSCell change requirements*Summary of the status:*All companies agree with the changes, so the CR R4-2112085 is agreeable*Candidate options:*None*Recommendations for 2nd round:*None |
| Issue 1-2-2: Minimum requirement at transitions for BFD*Summary of the status:*All companies agree with the changes, so the CR R4-2112111 is agreeable*Candidate options:*None*Recommendations for 2nd round:*None |
| Issue 1-2-3: SMTC configuration determination in DC *Summary of the status:*5 companies support the proposed changes, and 1 company questions the need of the changes. In addition, one company raises the issue about how to define the clarification for PSCell addition and PSCell change*Candidate options:** + Option 1 (HW, MTK, Ericsson, OPPO)
		- Clarify that if such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation.
	+ Option 1a (Apple)
		- Option 1 is fine, but the change to PSCell addition is not needed
	+ Option 2 (Nokia)
		- Changes are not needed, they are not essential

*Recommendations for 2nd round:*Further discuss based on the CR1. whether the changes on SMTC configuration clarification in option 1 are needed at least for scenarios other than PSCell addition
2. how to define the clarification for PSCell addition and PSCell change
 |
| Issue 1-2-4: Known condition for FR1 SCell activation *Summary of the status:*Most companies are fine to consider the SSB index reporting in the known condition for FR1, but several companies comment that it should be considered in some but not all cases. One companies do not think consideration of SSB index reporting is needed in the FR1 known condition.*Candidate options:** + Option 1 (HW, MTK, Apple, Ericsson, ZTE)
		- if network is not using Tx beamforming or single TCI is configured, the SSB reporting without SSB index can still be used as known condition
		- When network have multiple TCI configuration to UE, SSB reporting with SSB index can be used as known condition
	+ Option 2 (Nokia)
		- Changes are not needed, no need to consider SSB index reporting in the FR1 known condition

*Recommendations for 2nd round:*Further discuss based on the CR between the two options. |

## Discussion on 2nd round (if applicable)

### Sub-topic 1-1: Measurement requirements

#### Issue 1-1-1: CSSF for SCell measurements outside gaps

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| **Company** | **Comments**  |
| vivo | This is to kick-off the email discussion on the CR for NSCC\_SSB for CSSF when intra-freq. measurements are done outside gaps. The draft CR is now provided in the draft folder as follows. No updates from the previous one. [draft\_R4-2113537 draft CR on CSSF for SCell measurements outside gaps in R15.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_100-e/Inbox/Drafts/%5B100-e%5D%5B201%5D%20NR_RRM_maintenance_R15_Core/Documents/draft_R4-2113537%20draft%20CR%20on%20CSSF%20for%20SCell%20measurements%20outside%20gaps%20in%20R15.docx)Note that in Thread [217], the following is being discussed.**Issue 1-1: NSCC\_SSB for CSSFoutside\_gap,i** ·        Agreementso   NSCC\_SSB clarification/correction should cover both non-HST and HST, i.e. unified NSCC\_SSB design for both HST and non-HST. FFS from which release to have NSCC\_SSB clarification/correction.·        Open issueso   Continue to discuss from which release to have NSCC\_SSB clarification/correction:§  Option 1: from Rel-15§  Option 2: from Rel-17Actually the same issue is discussed. **Therefore, companies are suggested to focus on issue 1-1 in Thread [217] first.** |
| Nokia | We understand that this should be discussed in [217] HST thread, which is also fine. Although our initial response was that this change is maybe not essential (for a Rel-15 change) and hence should not be a Rel-15 CR, we think that the clarification is beneficial. And we’re wondering why below Rel-16 option is not considered?Usually, if there are some clarifications to an earlier release, which is not seen as essential (e.g. to be included in Rel-15) but are seen as useful clarifications, such clarifications can be included in a later release (e.g. Rel-16) and companies can read such clarifications and get guidance from there. |
| Ericsson | We are fine with including the clarification in Rel-16 or later, as suggested by Nokia. |
| Huawei | As there is ongoing discussion in email 217, we suggest to wait for the conclusion from there to avoid parallel discussions.  |

#### Issue 1-1-2: Calculation of Kp factor in case of dual SMTC

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| **Company** | **Comments**  |
| Huawei | Following the recommendation for 2nd round, we revised CR based to capture the following texts. Companies are welcomed to comment whether the updated wording is agreeable or not.*For calculation of Kp, if different SMTC periodicities are configured for different cells, the SMTC period corresponds to the one used by the cell being identified/measured.* |
| Apple |  Agree with the above recommended wording. |
| Ericsson |  We are fine with the recommended TP. |
| Nokia |  We could agree to the originally proposed principle and revised wording. However, this new wording is not clear and is not accurate about this addressing the case when ‘smtc1’ and ‘smtc2’ are used. Neither is it specific about which to use for deriving the requirement. It is not clear to us what ‘*the one used by the cell being identified/measured*’ as it does not state any requirement which of smtc1 or smtc2 to use.Our understanding of the smtc1 and smtc2 configuration:38.331, 5.5.2.10: ‘If *smtc2* is present, for cells indicated in the *pci-List* parameter in *smtc2* in the same *MeasObjectNR*, the UE shall setup an additional SS/PBCH block measurement timing configuration (SMTC) in accordance with the received *periodicity* parameter in the *smtc2* configuration’ and‘Secondary measurement timing configuration for SS corresponding to this *MeasObjectNR* with PCI listed in *pci-List*. For these SS, the periodicity is indicated by *periodicity* in *smtc2* and the timing offset is equal to the offset indicated in *periodicityAndOffset* modulo *periodicity*. *periodicity* in smtc2 can only be set to a value strictly shorter than the periodicity indicated by *periodicityAndOffset* in *smtc1*’Hence, the smtc2 is in addition to smtc1.We prefer being more specific in the requirements:*For calculation of Kp, if different SMTC periodicities are configured for a cell, the SMTC period corresponds to the stricter one used by the cell.*or something similar. |
| Huawei | To Nokia, it seems all companies are on the same page, and we are open to further clarify the wording if the it is considered as not clear enough, so new TP is suggested as follows*For calculation of Kp, if the high layer in TS 38.331 [2] signalling of smtc2 is configured, for cells indicated in the pci-List parameter in smtc2, the SMTC periodicity corresponds to the value of higher layer parameter smtc2; for the other cells, the SMTC periodicity corresponds to the value of higher layer parameter smtc1*We understand this part should be same as what Nokia suggested above. Could Nokia please check if this new wording is fine? The CR is updated based on this new wording. |

#### Issue 1-1-3: Condition for MG-less inter-frequency measurement

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| **Company** | **Comments**  |
| Ericsson | We have further discussed with Apple, and we’re fine with the option 1a which delete the effective MGRP in Rel-15 NR-DC.To Nokia,From our understanding, no any gapless UE capability introduced in Rel-15. If there is any UE capability, it shall clearly capture in TS 38.306.Current spec. will result in a misunderstanding on UE’s capability in Rel-15.In Rel-15, effective MGRP is a special application case for per-FR gap capable UE.(There is no gap needed for one FR since no serving cell in this FR.).In Rel-16, 3GPP introduced two UE capabilities for gapless: ***interFrequencyMeas-NoGap-r16***and ***nr-NeedForGap-Reporting-r16***In Rel-17, RAN4 will further introduce NCSG capability.Spec. should clarify all above scenarios in each release, otherwise, some engineers who aren’t familiar with spec. will confuse/misunderstand the Rel-15 UE capabilities. |
| Apple |  Fine with this version |
| Nokia | To Ericsson: ‘From our understanding, no any gapless UE capability introduced in Rel-15’ Our understanding is that if the UE needs gaps to perform certain measurements this is indicated by the UE to network. If the UE does not need gap assistance it will not indicate any need for gaps. Currently 38.133 states:‘If the UE requires measurement gaps to identify and measure intra-frequency cells and/or inter-frequency cells and/or inter-RAT E-UTRAN cells, and the UE does not support independent measurement gap patterns for different frequency ranges as specified in Table 5.1-1 in [18, 19, 20], in order for the requirements in the following clauses to apply the network must provide a single per-UE measurement gap pattern for concurrent monitoring of all frequency layers’The current proposed change is removing the requirements for the UE which may be able to perform measurements without gap assistance. And that is not agreeable to us. We can discuss how to address the your concern, but the current addition: ‘or without using gaps provided the effective MGRP is applied for per-FR measurement gap capable UE’ seems to us to be covered by: ’ For per-FR measurement gap capable UE in NR standalone operation (with single carrier, NR CA and NR-DC configuration), for per-FR gap based measurement, when there is no serving cell in a particular FR, where measurement objects are configured, regardless if explicit per-FR measurement gap is configured in this FR, the effective MGRP in this FR is used to determine requirements’One option is to keep both as both may be possible. We can work on this but current CR is not readily agreeable. |
| Ericsson | Considering Nokia’s further concern on such possible UEs which even don’t need any gap without capability, we can compromise to keep current ‘without using gap provided the UE supports such capability’ wording unchanged in R15 and add ‘effect MGRP’ case.Please check our further update CR as follow.[draft\_R4-2115233\_revised draftCR on inter-frequency without gaps - r15 v1](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_100-e/Inbox/Drafts/%5B100-e%5D%5B201%5D%20NR_RRM_maintenance_R15_Core/Documents/draft_R4-2115233_revised%20draftCR%20on%20inter-frequency%20without%20gaps%20-%20r15%20v1.docx) |

#### Issue 1-1-4: Applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC

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| **Company** | **Comments**  |
| MTK | Regarding Nokia’s comment:

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| Nokia: The principles of Option 1 are correct and agreeable. However, it applies not only to intra-frequency measurements, but any measurements configured by the MCG/SCG (e.g. inter-frequency as well).We should cover all needed changes in one CR. We suggest that maybe RAN4 can capture the proposal as a generic principle (which it is) e.g. in section 3. |

We are afraid of we don’t have clear idea on how to apply it to inter-frequency. The justification is provided below,  and sorry for the long justification. For **intra-frequency** measurement, where MO is configured by the same MG where the measurement is performed, the rule is relative simple.* For measurement in MCG --> apply MCG DRX
* For measurement in SCG --> apply SCG DRX

 For **inter-frequency/inter-RAT** measurement, where MO could be configured by the different MG where the measurement is performed,  then RAN4 may need to clarify which DRX shall be used. * In EN-DC, further clarification is not needed. RAN4 has discussed in RAN4#89 Meeting (report R4-1900002) , and achieved the consensus as in the abstract on the cover page of CR R4-1816115:

|  |  |  |
| --- | --- | --- |
|  Rel-15 ENDC |   | Applicable DRX |
| Measurement objects configured by MN   | Inter-frequency LTE | Follow MCG DRX configuration and state |
|   | Inter-RAT NR (36.133 8.17.4) | Follow SCG DRX configuration and state |
|   | Inter-RAT UTRA/ GSM | Follow MCG DRX configuration and state |
| Measurement objects configured by SN | Inter-frequency NR(38.133 9.3) | Follow SCG DRX configuration and state |

* Unfortunately, for the following cases, which is not yet discussed in RANT4, we are not very sure the principle in EN-DC can also apply to all cases.
* NR-DC: (FR1 PCell and FR2 PScell)

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| --- | --- | --- |
| NR-DC FR1-FR2 |   | Applicable DRX |
| Measurement objects configured by MN | Inter-RAT LTE | MCG or SCG DRX? |
|   | Inter-frequency NR FR1 | MCG or SCG DRX? |
|   | Inter-frequency NR FR2 | MCG or SCG DRX? |
| Measurement objects configured by SN | Inter-RAT LTE | MCG or SCG DRX? |
|   | Inter-frequency NR FR1 | MCG or SCG DRX? |
|   | Inter-frequency NR FR2 | MCG or SCG DRX? |

 * NE-DC:
	+ NR with FR1 only CA:

E.g. in NE-DC with NR FR1, MCG configures a LTE inter-RAT, should MCG DRX or SCG DRX to be applied? * NR with FR2 only intra band CA
* NR with FR2 only inter band CA
* NR with FR1 +FR2 CA (FR1 PCell)

Currently, we don't have a quick solution to cover all cases of inter-frequency measurement. Thus, we would like to complete intra-frequency in this meeting and leave other parts FFS.  |
| QC | We share the same view as MediaTek that we can leave inter-frequency/inter-RAT measurement cases open in this meeting and clarify the identified intra-frequency measurement case. We have a quick question about the wording “in use” in “If MCG DRX is in use” and “If SCG DRX is in use”. Do you think “in use” may need to be further clarified from Rel-16 spec because of dual DRX group. As Rel-16 ‘dual CDRX’ groups share the same DRX cycle, if I’m not wrong, perhaps the current wording may not cause any ambiguity. Is there any different opinion on that? |
| MTK | We share the same understanding on the R16 dual CDRX for CA within one CG, where dual CDRX share the same periodicity, thus it seems no ambiguity to us. |
| Nokia | Thank you very much for the detailed additional explanation on the issue and addressing our comment.In general, we do understand the problem raised and RAN4 should also address it. Although we initially proposed to address this for all scenarios we also realise that this may not be that simple. As the intra-frequency case important it is good to get this scenario clarified and we fine to agree on the intra-frequency CR in this meeting and then continue the further discussion regarding the other cases later.  |

#### Issue 1-1-5: Collision between inter-frequency RSTD and inter-RAT NR measurement in LTE SA

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| **Company** | **Comments**  |
| Huawei | Based on the 1st round comments from Ericsson, the CR is revised where the LTE inter-frequency RSTD requirements are scaled with Nfreq (same as inter-RAT NR measurements) instead of CSSF. |
| Ericsson | Thank you for the revision. It seems in the current revision, the RSTD measurement delay becomes too large. The reason is that Nfreq is not only accounting for NR inter-RAT carriers, but also for other inter-RAT and inter-frequency carriers.We agree with the observed issue i.e. that when NR is configured with SMTC 160ms, and RSTD measurements are configured (160ms periodicity of PRS), RSTD might block NR measurements completely. Hence we understand the reason for scaling the RSTD measurement delay. However, we think this scaling should only be k=2 when both NR inter-RAT measurement and inter-frequency RSTD measurements are configured.Hence we propose something like:[…]When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, within *k* \*  ms as given below:       ,where*~~k~~* ~~= N~~~~freq~~ *k* = 2 as defined in clause 8.1.2.1.1 if the UE is configured with inter-RAT measurement on one or more NR carriers, *k* = 1 otherwise,[…]The following note can be found in 36.133 8.1.2, which somewhat loosely says “configure GP0 but account for GP1”, since here it is already specified that “Gap pattern 0” is the only option:NOTE 1: When inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, only Gap Pattern 0 can be used. For defining the inter-frequency and inter-RAT requirements Tinter1=30ms shall be assumed. [Comment: Tinter1 30ms  GP1 (80ms,6ms)]Moreover, the following NR inter-frequency measurement requirement (one example) can be found in 36.133 8.1.2.4.21:Table 8.1.2.4.21.1.1-1: Time period for PSS/SSS detection (Frequency range FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_irat |
| No DRX | Max(600ms, 8  Max(MGRP, SMTC period))  Nfreq |
| DRX cycle ≤ 320ms | Max(600ms, Ceil(81.5)  Max(MGRP, SMTC period, DRX cycle))  Nfreq |
| DRX cycle > 320ms | 8  DRX cycle  Nfreq |
| NOTE 1:   DRX or non DRX requirements apply according to the conditions described in section 3.6.1 of TS 38.133 [50].NOTE 2:   In EN-DC operation, the parameters, timers and scheduling requests referred to in section 3.6.1 of TS 38.133 [50] are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group. |
|  |

It can be seen that NR inter-RAT measurement delay requirements scale by MGRP. One problem here is that NOTE 1 from 8.1.2 above only talks about accounting for Tinter1 =30ms (instead of 60ms which is what one gets for GP0), and does not mention MGRP, although since GP0 is configured, reducing Tinter1 by 50% corresponds to increasing MGRP by 100%. We can therefore consider adding a note stating that when RSTD inter-frequency measurements are configured, NR inter-RAT measurement delay requirements assume that MGRP 80ms is used.So to summarize we propose the following updates:* Modify wording from k=Nfreq to k=2,

Consider adding a note to EUTRA – NR inter-RAT measurement requirements that when inter-frequency RSTD measurements are configured, requirements assume MGRP 80ms to be used.  |
| Huawei | To Ericsson,1. On value of k, we are fine to consider a smaller value, but k=2 may not be always sufficient. For example, when there are 2 NR inter-RAT carriers to measure and each with 160ms SMTC period, then k=3 would be needed. Therefore, to address the concern that “Nfreq is not only accounting for NR inter-RAT carriers, but also for other inter-RAT and inter-frequency carriers” and also to make sure the requirements can be met for all cases, we suggest to define k= Nfreq, NR + 1, so it accounts for inter-RAT NR and inter-freq RSTD measurement. Could Ericsson please check if this is acceptable as a compromise?
2. On the note to NR inter-RAT measurement requirements, we are fine to add it. The suggested TP is

NOTE: When inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, the requirements in this clause assume MGRP=80ms is used.Both changes are reflected in the updated CR |
| Ericsson | To Huawei,Regarding the value of k, changing it to larger than k=2 would be too drastic change for the RSTD measurements, which up until now has not had to share gaps with other kinds of measurements. By introducing k=2, we are allowing NR measurements not to get completely blocked out. We think any change beyond this needs to be thoroughly analyzed from RSTD measurement point of view. |
| Huawei | To Ericsson,We can take k=2 as a compromise, although we think in some certain cases e.g. multiple inter-RAT NR carriers with 160ms SMTC period, k=2 is not enough, but anyway we can further check whether and how to address such cases in next meeting. The CR has been updated with k=2. Hopefully this version is agreeable. |
| Ericsson | Thank you for addressing our comment. We are fine with the revision. |

### Sub-topic 1-2: Signaling characteristic related requirements

#### Issue 1-2-3: SMTC configuration determination in DC

|  |  |
| --- | --- |
| **Company** | **Comments**  |
| Huawei | Response to Apple’s comments:The changes on PSCell addition is removed. The specific clarification is added in PSCell change section. Response to Nokia’s comments:We believe there is difference between the proposed changes and no UE requirements. In the last meeting, companies had concerns on no requirements for this cases. It means if NW configures difference SMTCs on the same frequency layer which is possible, then UE’s behavior is unpredictable and UE may take this as an error case. Then companies agreed that UE could choose one SMTC which is left for implementation but the requirements shall be derived based on one of them. |
| QC |  Okay with the revised versions. |
| Nokia | Thank you Huawei for the clarification. We understand the reason for the change and we only question whether it is essential correction. We do not necessarily see it as an essential clarification maybe also because the problem addressed seems a bit like a corner case. As we see the addition ‘If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation’ clarifies that the UE shall use either of them but not which. So we do not see that the UE requirement is different from if tis change is not added. We are fine to have this clarification from Rel-16. One question regarding the wording ‘If such measObjectNRs.…’ – the word ‘such’ is not clear but we assume it refers to the target? ‘If the measObjectNRs of the target NR cell configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation’ |
| Ericsson | We are fine with the revisions. |
| Huawei | Thanks for all comments.Response to Nokia’s comments. Regarding the wording “such measObjectNRs”, it means measObjectNRs having the same SSB frequency and subcarrier spacing as the target cell. We rephrase the wording in v02 version as follow to make it clearer:If the measObjectNRs having the same SSB frequency and subcarrier spacing configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation.Regarding the “essential” issue, it seems no technical issues now as this is only to capture the agreements in last meeting, question is whether to have this in Rel-15 spec. We can further check more views from companies in GTW on this.   |
|  | GTW agreement* + Clarify that if such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation.
	+ Introduce the changes starting from Rel-15 specifications
 |

#### Issue 1-2-4: Known condition for FR1 SCell activation

|  |  |
| --- | --- |
| **Company** | **Comments**  |
| Huawei | Support to update the FR1 known condition based on option 1.Response to 1st round comment from Nokia, we agree that FR1 is assumed to receive omni-directionally, but the concern is about NW Tx beam, i.e. when NW is using multiple Tx beams, it needs to know which Tx beam to use for scheduling the UE. For this reason, it was agreed that for unknown case, there is no requirement when SCell has multiple SSB but NW does not include TCI indication in the activation command.  For known case it was considered that NW would know the Tx beam to use because there is L3 report. However, in current FR1 known condition, the report of SSB index is not required. In this case,  even the FR1 SCell is known, NW may still have no idea which Tx beam to use for scheduling the UE in the SCell.It is noted that based on 1st round comments from Apple/Ericsson/ZTE, in the revised CR, the report with SSB index is only considered in known condition when NW is using multiple Tx beams, otherwise the existing known condition is used. |
| QC | We agree with the principle of Option 1 and Huawei’s comment in the first round summary (excerpted below). As the spec should be written from UE perspective, the text in the revised CR shouldn’t be based on whether Tx beamforming is applied or not. Instead, relevant RRC parameters and/or MAC CE need to be referred to, e.g. *ssb-PositionInBurst*, *tci-StateToAddModList*, TCI indication provided in same MAC PDU with SCell activation, etc.Huawei’s first round comment:*For SCell in FR1, if ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted or a single TCI state is configured in tci-StateToAddModList, it is known if it has been meeting the following conditions:**[existing condition on valid report, can be with or without SSB index]**For SCell in FR1, if ‘ssb-PositionInBurst’ indicates multiple SSBs are being actually transmitted and multiple TCI states are configured in tci-StateToAddModList, it is known if it has been meeting the following conditions:**[updated condition on valid report, with SSB index]* |
| Apple |  Agree with option 1. And also agree with QC’s comments, the spec wording shall be defined based  on corresponding signaling indications. |
| Ericsson | We are fine with Option 1 and further agree with QC’s comment.  |
| Nokia | Thank you for the clarifications.Some additional clarifications from our side:1. ‘when NW is using multiple Tx beams, it needs to know which Tx beam to use for scheduling the UE’ Assuming UE omni-directional reception this is not strictly necessary as we see it. If the cell is known and network transmits to the omni-directional Rx UE, the UE should receive the signal interpedently from the used DL. Assumption is that the cell is detectable (known) and that all DL transmission (in one or more beams) originate from same location.
2. ‘it was agreed that for unknown case, there is no requirement when SCell has multiple SSB but NW does not include TCI indication in the activation command’ we understand this as the UE need to have knowledge which TCI state is being used by the network for scheduling. Our understanding is that if this is not given to the UE this causes some potential suboptimal reception by the UE. But since we assume UE is receiving omni-directional in FR1.
3. One question for clarification: If multiple SSBs are transmitted in the cell is it then required from UE side to know which SSB to use for tracking even when all SSBs are transmitted from same source (and hence there is no transmit time difference besides the SSBs being transmitted in TD manner?

We are open to discuss this change but we want to have a clear discussion about the assumption used in Rel-15 remain, namely that in FR1 omni-directional reception at the UE side is assumed. And this is still the basic assumption. |
| Huawei | To QC, Apple, Ericsson: option 1 is only listed as a general principle, and the wording in the CR is based on corresponding signaling indications as in our first round comments.To Nokia: We agree that FR1 UE is assumed with omni-directional reception, so it may be able to receive the DL even without knowing which Tx beam is used for the transmission. However, for the unknown case, we already agreed that the requirements apply provided that NW is using single Tx beam or NW has indicated TCI to the UE, so the assumption is that both UE and NW need to know the Tx beam information for the activation. This CR is just aligning the assumption between unknown and known cases, otherwise there would be an inconsistence in the spec.We understand UE needs to know the SSB index in order to do fine time tracking, and this was one of the reasons why we agreed on the above assumption, but we are also open to hear other companies’ view.Finally, we do not see any reason to change the assumption that in FR1 omni-directional reception at the UE side is assumed, but on the other hand we do not see a clear conflict with the above assumption for SCell activation.   |
|  | GTW agreement* + No changes will be introduced in Rel-15.
 |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
|  |  |  |
|  |  |  |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| [R4-2111967](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2111967.zip) | Draft CR on CSI-RS based beam failure detection requirements | CATT | Agreeable | 　 |
| [R4-2112085](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112085.zip) | CR for PSCell change requirements (R15) | Apple | Agreeable | 　 |
| [R4-2112111](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112111.zip) | Draft CR for minimum requirement at transitions for BFD R15 | Apple | Agreeable | 　 |
| [R4-2112953](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112953.zip) | Draft CR for editorial modification 38.133 | LG Electronics UK | Agreeable | 　 |
| [R4-2113537](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113537.zip) | draft CR on CSSF for SCell measurements outside gaps in R15 | vivo | Revised | 　 |
| [R4-2113632](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113632.zip) | draftCR on TS38.133 inter-frequency without gaps - r15 | Ericsson | Revised | 　 |
| [R4-2113633](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113633.zip) | draftCR on TS38.133 inter-frequency without gap -r16 | Ericsson | Revised | 　 |
| [R4-2114092](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114092.zip) | CR on clarification on SMTC determination in DC 36133 R15 | Huawei, Hisilicon | Revised | 　 |
| [R4-2114095](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114095.zip) | CR on clarification on SMTC determination in DC 38133 R15 | Huawei, Hisilicon | Revised | 　 |
| [R4-2114155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114155.zip) | CR on TS38.133 for applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC | MediaTek inc. | Revised | 　 |
| [R4-2114252](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114252.zip) | CR on measurement requirements, SCell activation and definition of reference point for UL timing 38133 | Huawei, HiSilicon | Revised | 　 |
| [R4-2114255](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114255.zip) | CR on RSTD measurement requirements 36133 | Huawei, HiSilicon | Revised | 　 |
| [R4-2114447](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114447.zip) | Correction to reference point defintion for UE timing in TS 38.133 | Ericsson, Nokia Shanghai Bell, Intel | Not treated | 　 |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2115232 | draft CR on CSSF for SCell measurements outside gaps in R15 | vivo | Return to  | *Wait for conclusion on Issue 1-1-1 from email #217* |
| R4-2115233 | draftCR on TS38.133 inter-frequency without gaps - r15 | Ericsson | Agreeable  |  |
| R4-2115234 | draftCR on TS38.133 inter-frequency without gap -r16 | Ericsson | Withdraw | *Original version R4-2113633 is agreeable* |
| [R4-2113633](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113633.zip) | draftCR on TS38.133 inter-frequency without gap -r16 | Ericsson | Agreeable |  |
| [R4-2114092](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114092.zip) | CR on clarification on SMTC determination in DC 36133 R15 | Huawei, Hisilicon | Agreeable |  |
| [R4-2114095](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114095.zip) | CR on clarification on SMTC determination in DC 38133 R15 | Huawei, Hisilicon | Agreeable |  |
| [R4-2114155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114155.zip) | CR on TS38.133 for applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC | MediaTek inc. | Agreeable |  |
| [R4-2114252](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114252.zip) | CR on measurement requirements, SCell activation and definition of reference point for UL timing 38133 | Huawei, HiSilicon | Agreeable |  |
| [R4-2114255](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114255.zip) | CR on RSTD measurement requirements 36133 | Huawei, HiSilicon | Agreeable |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

Annex

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|  |  |  |
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1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)