**3GPP TSG RAN meeting #88-e RP-200xxx**

**June 29th – July 3rd, 2020**

## Status Report to TSG

**Agenda item:** 9.3.3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WI / SI Name** | NR-based Access to Unlicensed Spectrum | | | | |
| included in this status report | Study Item:  No | Core part:  Yes | Performance part:  Yes | | Testing part:  No |
| **Acronym** | NR\_unlic | | | | |
| **Unique ID** | 820067 | | | | |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-191575 | | | | |
| **Target Completion Date**  **(indicate if changed)** | Study Item:  xx/xxxx | Core part: 09/2020 (from 06/2020) | Performance part: 12/2020 (from 09/2020) | Testing part: mm/yyyy | |
| **Overall Completion level** | Study Item:  Xx% | Core part:  95% | Performance Part: 10% | Testing part: xx% | |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |  |
| --- | --- | --- |
| **Leading WG** | | TSG RAN1 |
| **Rapporteur** | **Name** | Jing Sun |
| **Company** | Qualcomm |
| **Email** | jingsun@qti.qualcomm.com |

## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | Yes |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.  
 One time unit (TU) corresponds to ~ 2 hours in the meeting.  
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.  
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

**Agreements in RAN1 #100b-e**

[100b-e-NR-unlic-NRU-InitSignalChannel-01] Email discussion/approval on k\_SSB indication in PBCH for SSB on sync raster and off-sync raster by 4/22; if necessary, followed by endorsing the corresponding TP by 4/28 – Jing (Qualcomm)

Agreement:

Adopt the following text proposal for Section 7.4.3.1 of TS 38.211:

------------------------------------TP for 38.211, 7.4.3.1----------------------------------

7.4.3.1 Time-frequency structure of an SS/PBCH block

In the time domain, an SS/PBCH block consists of 4 OFDM symbols, numbered in increasing order from 0 to 3 within the SS/PBCH block, where PSS, SSS, and PBCH with associated DM-RS are mapped to symbols as given by Table 7.4.3.1-1.

In the frequency domain, an SS/PBCH block consists of 240 contiguous subcarriers with the subcarriers numbered in increasing order from 0 to 239 within the SS/PBCH block. The quantities  and  represent the frequency and time indices, respectively, within one SS/PBCH block. The UE may assume that the complex-valued symbols corresponding to resource elements denoted as 'Set to 0' in Table 7.4.3.1-1 are set to zero. The quantity  in Table 7.4.3.1-1 is given by *v*=NIDcell mod 4. The quantity  is the subcarrier offset from subcarrier 0 in common resource block  *N*CRBSSB to subcarrier 0 of the SS/PBCH block, where *N*CRBSSB is obtained from the higher-layer parameter *offsetToPointA* and the 4 least significant bits of  are given by the higher-layer parameter *ssb-SubcarrierOffset* and for SS/PBCH block type A the most significant bit of  is given by  in the PBCH payload as defined in clause 7.1.1 of [4, TS 38.212]. For operation with shared spectrum channel access, 4 least significant bits of  are given by the higher-layer parameter *ssb-SubcarrierOffset* and the most significant bit of  is given by  in the PBCH payload as defined in clause 7.1.1 of [4, TS 38.212]. If , ; otherwise, . If *ssb-SubcarrierOffset* is not provided,  is derived from the frequency difference between the SS/PBCH block and Point A.

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Agreement:

Adopt the following text proposal for Section 4.1 of TS 38.213

------------------------------------ Text Proposal for 38.213, Section 4.1----------------------------

\*\*\* Unchanged text omitted \*\*\*

is either provided by *ssbPositionQCL-Relationship-r16* or, if *ssbPositionQCL-Relationship-r16* is not provided,obtained from a *MIB* provided by a SS/PBCH block according to Table 4-1 with <24 as defined in clause 7.4.3.1 of [4, 38.211].

\*\*\* Unchanged text omitted \*\*\*

-------------------------------------- End Text Proposal --------------------------------------

Note: For operation with shared spectrum channel access, k\_SSB of the SSB for CGI purpose is an even number, and the corresponding ssbFrequency cannot be (2k+1)\*15 kHz shift from the synchronization raster

* Send LS to RAN2 to provide the above information

[**R1-2002997**](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002997.zip) draft LS to RAN2 on NR-U ARFCN restriction for CGI reading Qualcomm Incorporated

Final LS for draft LS in [R1-2002997](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002997.zip) approved in [R1-2003032](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003032.zip)

[100b-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-01] Email discussion/approval on processing time for switching and default SS group, including BWP switching by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/30 – Alex (Lenovo)

Agreement:

* Define two capabilities of P values
  + SSSG switching Capability-1: P=25 symbols for µ = 0/1/2 SCS
  + SSSG switching Capability-2: P=10/12/22 symbols for µ = 0/1/2 SCS
  + Introduce a UE capability to signal support of SSSG switching Capability-2 in addition to SSSG switching Capability-1
* Introduce a RRC configuration parameter to indicate the P value to be applied by a UE for SSSG switching (no lower than the reported capability by the UE).

Agreement:

The smallest subcarrier spacing of the corresponding active BWP across CCs within a CC group and the CC in which a DCI format 2\_0 triggering group switching is detected, if any, is used to determine the first slot of search space set group switching for all CCs within a CC-group.

Agreement:

SS set group 0, if configured, is applicable for a UE at least after RRC (re)configuration of SS set group by *searchSpaceGroupIdList-r16*.

Agreement:

Adopt the text proposal in [R1-2003042](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003042.zip) for Section 10.4 of TS 38.213v16.1.0.

[100b-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-02] Email discussion/approval on special states/indications in “available RB set indication” and COT duration indication/determination by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/29 – Alex (Lenovo)

Agreement:

The text proposal in [R1-2003041](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003041.zip) for TS 38.213v16.1.0, clause 11.1.1, is agreed

[100b-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-03] Email discussion/approval on CSI-RS measurements including validity/presence of periodic/semi-persistent CSI-RS by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/30 – Alex (Lenovo)

Agreement:

RAN1 to decide in RAN#101e whether R16 supports the case where UE is not configured with SFI-index field but configured with any of the following:  CO-duration, SS-switching trigger and RB-sets indication  in DCI format 2\_0

[100b-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-04] Email discussion/approval on the following from prior meetings by 4/23 – Alex (Lenovo)

* Capture "For search space switching, limit the switching to USS and Type-3 CSS."
* Align the terminology on the RB set indicator/Available RB set Indicator in TS38.213 and TS38.212.
* Align RRC parameter list with TS38.213:
  + Configurations of availableRB-SetPerCell-r16, CO-DurationPerCell-r16 and SearchSpaceSwitchTrigger-r16 should be added in SlotFormatCombinationsPerCell,
  + Propose to RAN2 to discard the “groupId” parameter defined under searchSpaceSwitchTrigger-r16, and remove the CHOICE structure

Agreement:

Recommend to RAN2 to discard the “groupId” parameter defined under *searchSpaceSwitchTrigger-r16,* and remove the *CHOICE* structure*.*

Agreement:

Draft LS in [R1-2003039](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003039.zip) is agreed with the final LS in [R1-2003040](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003040.zip)

Agreement:

Adopt the following TP for Section 10.4 of TS 38.213, included in [R1-2003042](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003042.zip):

“A UE can be provided a group index for a respective Type3-PDCCH common search space set or a UE specific search space set by *searchSpaceGroupIdList-r16* for PDCCH monitoring on a serving cell.”

[100b-e-NR-unlic-NRU-ULSignalsChannels-01] Email discussion/approval on the following issues

by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/29 – Steve (Ericsson)

* Finalize design for FDRA field of DCI 0\_0 for UL resource allocation Type 2
* Editorial correction on interlace configuration

Agreement:

* For PUSCH scheduled by DCI 0\_0 received in a CSS when UL resource allocation Type 2 is configured, PUSCH is allocated to the RB set of the active UL BWP that intersects the RB set of the active DL BWP in which DCI 0\_0 is received. If there is no intersection, PUSCH is allocated to RB Set 0 of the active UL BWP.
* FFS1: PUSCH allocation within the active UL BWP corresponding to an UL carrier without intra-cell guard bands
* FFS2: Whether or not the first bullet is modified to “…the active DL BWP in which the first REG of the received DCI 0\_0 is located,” in order to facilitate a CORESET not confined to a single RB set.

Agreement:

Adopt TP#1 in Section 2.2 of [R1-2002912](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002912.zip) for TS 38.211, Section 4.4.4.6

Agreement:

* For PUSCH scheduled by DCI 0\_0 received in a USS when UL resource allocation Type 2 is configured, PUSCH is allocated to the RB set(s) of the active UL bandwidth part indicated by the Y bits in the FDRA field of DCI 0\_0.

Agreement:

Adopt TP#2 in Section 3.1 of [R1-2003055](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003055.zip) for TS 38.212, Section 7.3.1.1.1

Agreement:

Adopt TP#3 in Section 3.1 of [R1-2003055](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003055.zip) for TS 38.214, Section 6.1.2.2.3

[100b-e-NR-unlic-NRU-ULSignalsChannels-02] Email discussion/approval on the following issues

by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/30 – Steve (Ericsson)

* Capture UE procedure related to FDRA field in RAR UL grant
* Editorial correction on SRS

Agreement:

Adopt TP#1 in [R1-2002913](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002913.zip) for 38.213 Section 8.3 and TP#2 for 38.214 Section 6.1.2.2.3 where the last bullet of TP#1 is modified as follows:

* ~~The UE assumes the RB set allocation in the active UL BWP for a PUSCH scheduled by the RAR UL grant is given by [FFS: rule for for RB set allocation]~~
* FFS: PUSCH allocation rule within the interlaces indicated by the frequency domain resource allocation field

Agreement:

To resolve the FFS in TP#1, support one of the following two alternatives for the PUSCH allocation rule.

* When UL resource allocation Type 2 is configured, the UE assumes that PUSCH is allocated as follows:
  + Alt-1: PUSCH is allocated to the RB set of the active UL BWP that intersects the RB set of the active DL BWP in which the DCI 0\_1 that schedules the PDSCH containing the RAR UL grant is received. If there is no intersection, PUSCH is allocated to RB Set 0 of the active UL BWP.
  + Alt-2: PUSCH is allocated to the initial UL BWP if the active UL BWP fully overlaps the initial UL BWP, otherwise PUSCH is allocated to RB Set 0 of the active UL BWP.
* FFS: Rule for PUSCH allocation for an UL carrier without intra-cell guard bands.

Agreement:

Adopt TP#3 in [R1-2002913](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002913.zip) for 38.214 Section 6.2.1

Agreement:

Adopt TP#1 (supersedes TP#1 from [R1-2002913](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002913.zip)) and TP#2 in Section 2.1 of [R1-2003056](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003056.zip) for TS 38.213, Section 8.3 and TS 38.214, Section 6.1.2.2.3 respectively

[100b-e-NR-unlic-NRU-ULSignalsChannels-03] Email discussion/approval on the following issues

by 4/22; if necessary, followed by endorsing the corresponding TPs by 4/28 – Steve (Ericsson)

* Rule for interlaced PUCCH allocation for a carrier without guard bands
* Editorial (but critical) corrections on PUCCH

Agreement:

Adopt TP#2 in [R1-2002914](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002914.zip) for 38.212 Section 6.3.1.6

Agreement:

Adopt TP#3 in [R1-2002914](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002914.zip) for 38.213 Section 9.2.2

Agreement:

Adopt TP#4,5,6,7 in [R1-2002914](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002914.zip) for 38.211,212,213,214 respectively

Agreement:

Adopt TP#1v1 and TP#8v1 in [R1-2003057](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003057.zip) for 38.213, Section 9.2.1

[100b-e-NR-unlic-NRU-ChAcc-01] Email discussion/approval on clarifications to LBT with consecutive UL transmissions by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/28 – Timo (Nokia)

Agreement:

For LBT type and CP extension, after failing to transmit first PUSCH(s) of a set scheduled by a single UL grant,

* If a UE fails to access the channel with UL Type 2B channel access, Type 2A UL channel access shall be used for the following consecutively scheduled transmissions.
* If a UE fails to access the channel prior to the first of the consecutive UL transmissions, it shall use “0” CP extension for the subsequent UL transmissions irrespective of the CP extension indicated in the scheduling grant.

Agreement:

Back-to-back transmission of GC-PUSCH and dynamically scheduled PUSCH is supported in NR-U with restrictions similar to those in LTE LAA.

Agreement:

Adopt TP #2.1 and TP#2.2 in [R1-2003062](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003062.zip) for TS 37.213, Section 4.2.1.0.1

[100b-e-NR-unlic-NRU-ChAcc-02] Email discussion/approval on clarifications to UL to DL COT sharing by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/29 – Timo (Nokia)

Agreement:

For at least PUSCH transmissions with configured grants, a UE is allowed to choose between the ED threshold given by ul-toDL-CO-SharingED-Threshold-r16 and the default one. Whether a spec change is required needs further discussion. Discuss and decide the possible TPs in the next meeting.

Agreement:

Adopt TP#2.3-1 in [R1-2003063](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003063.zip) (cover sheet information in Section 3) for Section 4.2.1 of TS 37.213

Agreement:

Adopt TP#2.3-2 in [R1-2003063](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003063.zip) (cover sheet information in Section 3) for Section 4.1.3 of TS 37.213

Agreement:

Adopt TP#2.4 in [R1-2003063](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003063.zip) (cover sheet information in Section 3) for Section 4.1.3 of TS 37.213

[100b-e-NR-unlic-NRU-InitAccessProc-01] Email discussion/approval on following issues related to SS/PBCH blocks by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/29 – Amitav (Charter)

* Finalize remaining details of parameter Q signalling and interpretation
* Correct the citation of TS 38.104 in TS 38.213 Subclause 4.1 in relation to the definition of L\_max

Agreement

* For RRM measurement configuration from *MeasObjectNR* and *SIB2/SIB4*, network always provides a common Q value (*ssb-PositionQCL-Common-r16*) per frequency to UE.
* For SCell addition, SCG addition, and reconfiguration with sync, the Q value of the cell to be added is always provided to UE via dedicated RRC signaling, i.e. ssb-PositionQCL-r16 in *ServingCellConfigCommon*.
* An LS is to be sent to RAN2 and RAN4 for the above.

Agreement:

LS on Signaling of Q Parameter for NR-U agreed in [R1-2003044](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003044.zip)

Agreement:

Send an LS to RAN4 asking them to remove the word “candidate” in TS 38.133 V16.0.0 subclause 8.1.1.

Agreement:

LS on removing the word “candidate” in Subclause 8.1.1 of TS 38.133 v16.3.0 approved in [R1-2002992](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002992.zip)

Agreement:

TP1 in [R1-2002849](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002849.zip) is agreed for TS 38.213

Agreement:

Adopt the following text proposal for TS 38.213 (correction of TP2 in [R1-2002849](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002849.zip))

======================= Start of TP2 for Clause 4.1 of TS 38.213 =================

============================ Unchanged Text Omitted ========================

~~The UE assumes that within a discovery burst transmission window, a number of transmitted SS/PBCH blocks on a serving cell is not larger than .~~ The UE can determine an SS/PBCH block index according to , or according to  where is the candidate SS/PBCH block index. The UE assumes that within a discovery burst transmission window, a number of transmitted SS/PBCH blocks on a serving cell is not larger than  and a number of transmitted SS/PBCH blocks with the same SS/PBCH block index is at most one.

=========================== Unchanged Text Omitted ========================

======================= End of TP2 for Clause 4.1 of TS 38.213 ==================

Agreement:

TP4 in [R1-2002849](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002849.zip) is agreed for TS 38.213

[100b-e-NR-unlic-NRU-InitAccessProc-02] Email discussion/approval on following issues related to RA procedure by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/29 – Amitav (Charter)

* MsgA PRACH-PUSCH gap for NR-U
* Remaining details of RACH occasion validation for FBE access

Agreement:

* Update TS 38.213 for RACH occasion validation in FBE mode to also cover the cases when UE is not provided tdd-UL-DL-ConfigurationCommon, and for Type-2 RA procedure.
* Use the TP in TP7 of [R1-2001706](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2001706.zip) as the starting point for further refinement.

Agreement:

Adopt the following text proposal for TS 38.213

------------------------------------------------- < Start of text proposal for 38.213> ------------------------------------------------

8.1       Random access preamble

< Unchanged parts are omitted >

For unpaired spectrum,

-  if a UE is not provided *tdd-UL-DL-ConfigurationCommon*, a PRACH occasion in a PRACH slot is valid if it does not precede a SS/PBCH block in the PRACH slot and starts at least *N*gap symbols after a last SS/PBCH block reception symbol, where *N*gap is provided in Table 8.1-2, and if *ChannelAccessMode-r16* = *semistatic* is provided, does not overlap with a set of consecutive symbols before the start of a next channel occupancy time where there shall not be any transmissions, as described in [15, TS 37.213].

-  the index of the SS/PBCH block is provided by *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*

- If a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PRACH occasion in a PRACH slot is valid if

-  it is within UL symbols, or

-  it does not precede a SS/PBCH block in the PRACH slot and starts at least *N*gap symbols after a last downlink symbol and at least *N*gap symbols after a last SS/PBCH block symbol, where *N*gap is provided in Table 8.1-2, and if *ChannelAccessMode-r16* = *semistatic* is provided, does not overlap with a set of consecutive symbols before the start of a next channel occupancy time where there shall not be any transmissions, as described in [15, TS 37.213]

-  the index of the SS/PBCH block is provided by *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*.

< Unchanged parts are omitted >

8.1A     PUSCH for Type-2 random access procedure

< Unchanged parts are omitted >

A PUSCH occasion is valid if it does not overlap in time and frequency with any PRACH occasion associated with either a Type-1 random access procedure or a Type-2 random access procedure. Additionally, if a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PUSCH occasion is valid if

- it is within UL symbols, or

- it does not precede a SS/PBCH block in the PUSCH slot and starts at least *N*gap symbols after a last downlink symbol and at least  *N*gap symbols after a last SS/PBCH block symbol, where  *N*gap is provided in Table 8.1-2, and if *ChannelAccessMode-r16* = *semistatic* is provided, does not overlap with a set of consecutive symbols before the start of a next channel occupancy time where there shall not be any transmissions, as described in [15, TS 37.213].

< Unchanged parts are omitted >

------------------------------------------------------- < End of text proposal> --------------------------------------------------------

Conclusion:

A UE can transmit in a PRACH resource in the channel occupancy of a Fixed Frame Period only if a UE detects any DL transmission in the serving cell before the PRACH resource in the same FFP.

Note: TS 37.213 editor to check if this is already covered

[100b-e-NR-unlic-NRU-InitAccessProc-03] Email discussion/approval on following issues related to RRM/RLM by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/28 – Amitav (Charter)

* TP to 38.215 for RSSI definition
* Finalize the number of OFDM symbols for RSSI measurement duration configuration

Agreement:

* 1 symbol duration is included for each numerology (approx. 71 us, 35 us, 17 us respectively).
  + This is a natural consequence of previous agreement: The L1 averaging duration of RSSI measurements (within a configured measurement duration) is limited to 1 OFDM symbol of a configured reference subcarrier spacing.
* Retain LTE LAA values {sym1, sym14, sym28, sym42, sym70} at least for 15 kHz numerology
* Measurement duration can be no more than 5 ms for each numerology (requires sym70, sym140, sym280/sym240 respectively)

Agreement:

Adopt the following text proposal for TS 38.215.

============================== Start of TP for TS 38.215 ==============================

5.1.21     Received Signal Strength Indicator (RSSI)

|  |  |
| --- | --- |
| **Definition** | Received Signal Strength Indicator (RSSI), comprises the linear average of the total received power (in [W]) observed only ~~in~~ per configured OFDM symbol~~s~~ and in the ~~configured~~ measurement bandwidth ~~over~~ *~~N~~* ~~number of resource blocks~~ corresponding to ~~LBT~~ the channel bandwidth [TS 37.213 §4.0] where the channel has ~~with~~ the center frequency ~~of~~ configured by *ARFCN-valueNR*~~ARFCN~~, by the UE from all sources, including co-channel serving and non-serving cells, adjacent channel interference, thermal noise etc.  Higher layers configure the *ARFCN-valueNR*, the reference numerology, and ~~the measurement bandwidth,~~ the measurement duration i.e., ~~and~~ which OFDM symbol(s) should be measured by the UE.  For frequency range 1, the reference point for the RSSI shall be the antenna connector of the UE. If receiver diversity is in use by the UE, the reported RSSI value shall not be lower than the corresponding RSSI of any of the individual receiver branches. |
| **Applicable for** | RRC\_CONNECTED intra-frequency,  RRC\_CONNECTED inter-frequency |

============================== End of TP for TS 38.215 ==============================

[100b-e-NR-unlic-NRU-InitAccessProc-04] Email approval of the reply LS for [R1-2001237](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2001237.zip) by 4/23 - Zhipeng (Ericsson)

Agreement:

Respond to the LS from RAN2 in [R1-2001237](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2001237.zip) with the following action:

* RAN1 respectfully requests that RAN2 reflect in their specifications that the two new PRACH root sequences (of length 571 and 1151) are supported in 2-step RA with shared spectrum channel access.

[**R1-2002853**](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002853.zip) [DRAFT] LS Response on NR-U PRACH root sequence for 2-step RA Ericsson

Final LS agreed in [R1-2002853](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002853.zip)

[100b-e-NR-unlic-NRU-InitAccessProc-05] Email approval of the corresponding TP to address LS from RAN2 in [R1-2001506](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2001506.zip) by 4/23 - Jing (Qualcomm)

Agreement:

Adopt the text proposal in Section 2.1 of [R1-2002996](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002996.zip) for Section 4.2.1 of TS 37.213

Agreement:

Adopt TP2 in Section 2.2 of [R1-2002996](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002996.zip) for 38.212, Section 7.3.1.2.1

[100b-e-NR-unlic-NRU-HARQ-01] Email discussion/approval on following issues related to Type-3 HARQ-ACK codebook by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/29 – David (Huawei)

* Remaining details on triggering Type-3 HARQ-ACK codebook feedback with a DCI that does not schedule a PDSCH
* Clarification to remove unintended limitations on Type-3 HARQ-ACK codebook usage (when no NNK1 value was received, when the UE is configured with semi-static codebook)
* Clarification that Type-3 HARQ-ACK codebook feedback should be generated for all configured serving cells

Agreement:

* No new DCI field is introduced for requesting Type-3 HARQ-ACK feedback without scheduling a PDSCH
* For DCI Format 1\_1:
  + To signal Type-3 HARQ-ACK codebook request without scheduling PDSCH with one-shot HARQ-ACK request field with value 1 in DCI Format 1\_1 with CRC scrambled by C-RNTI or MCS-C-RNTI, use all ‘0’ FDRA for resourceAllocationType0 and all ‘1’ FDRA for resourceAllocationType 1 if resourceAllocation = dynamicSwitch is not provided, or use all “0” or all “1” FDRA if resourceAllocation = dynamicSwitch is provided. In this case, the UE does not consider the DCI format as indicating an active DL BWP provided by dormant-BWP or by first-non-dormant-BWP-ID-for-DCI-inside-active-time, if any.
  + FFS: When DCI Format 1\_1 is scrambled by CS-RNTI

Agreement:

Approve the TP#1 and TP#2-Alt2 in [R1-2003029](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003029.zip) for TS 38.213

Agreement:

The slot where the PDCCH/DCI is transmitted/received is taken as a reference for K1

Agreement:

For a DCI requesting one-shot HARQ-ACK feedback without scheduling PDSCH, reuse the minimum processing latency for SPS release DCI

* FFS: whether to specify the processing time for 120 kHz SCS, considering NR-U UE feature groups discussion and possible extension of type-3 HARQ-ACK codebook to licensed bands operation (FR1 or FR2 or both).

Agreement:

Adopt TP#1 in [R1-2003028](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003028.zip) for 38.212, clause 7.3.1.2.2

Agreement:

Adopt TP#2 in [R1-2003028](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003028.zip) for 38.213, clauses 9.1.4, 9.2.3 and 10.3

Agreement:

Adopt the following TP for TS 38.213 Clause 9.1.4 with the reason for change as given below

* Reason for change: missing implementation of agreement that the UE reports HARQ-ACK information for all configured serving cells in Type-3 HARQ-ACK codebook, otherwise a UE may only report HARQ-ACK information for activated serving cells with ambiguity during cell activation/deactivation periods.

================== Beginning of text proposal ===================

**9.1.4 Type-3 HARQ-ACK codebook determination**

If a UE is provided *pdsch-HARQ-ACK-OneShotFeedback-r16*, the UE determines a Type-3 HARQ-ACK codebook according to the following procedure.

Set *N*cellsDL to the number of serving cells configured to the UE.

================== End of text proposal ===================

[100b-e-NR-unlic-NRU-HARQ-02] Email discussion/approval on following issues related to Type-2 enhanced HARQ-ACK codebook by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/30 – David (Huawei)

* How to determine NFI, number of requested groups and PUCCH occasions i(g) and i((g+1) mod 2) when multiple DCIs provide these values
* How is T-DAI interpreted in DCI 1\_1 for the non-scheduled group when two sub-codebooks (for TB and CBG) are configured
* Second HARQ-ACK information generation in case of toggled NFI for the non-scheduled group in a DCI scheduling PDSCH for another group

Agreement:

Adopt the following TP for TS 38.213 Clause 9.1.3.3 with the reason for change given below

* Reason for change: for second HARQ-ACK information generation in case of toggled NFI for the non-scheduled group in a DCI scheduling PDSCH for another group, it is unclear which PDCCH monitoring occasion corresponds to m=0, which could result in HARQ-ACK codebook size mismatch between gNB and UE.

**TP for TS 38.213 Clause 9.1.3.3**

============= Unchanged part omitted =============

….. generate second HARQ-ACK information, as described in Clause 9.1.3.1, by setting ~~ for all c~~ ~~and all~~ *~~m~~* *M* = 0 and, after the completion of the c and *m* loops for the pseudo-code for the second HARQ-ACK codebook generation in Clause 9.1.3.1, …...

============= Unchanged part omitted =============

Agreement:

* The 1 MSB bit is the NFI for the scheduled PDSCH group, and the 1 LSB bit is the NFI for the non-scheduled PDSCH group.

Agreement:

* It is not expected to receive DCIs with q=0 pointing to the same PUCCH transmission occasion for different PDSCH groups

Conclusion:

It is not expected to receive a DCI with q=0 after receiving a DCI with q=1 pointing to the same PUCCH transmission occasion.

* No TP needed

Conclusion:

It is not expected to receive DCIs on different cells in the same monitoring occasion if the DCI formats indicate the same PDSCH group and different values of h(g). It is not expected to receive DCIs on different cells in the same monitoring occasion if the DCI formats indicate different values of q.

* No TP needed

Agreement:

If a first DCI format scheduling PDSCH reception and providing the first indication for a PUCCH transmission occasion in a slot does not include a New\_Feedback indicator field, the value of h(g) for this PDSCH reception is set only if h(g) is provided by another DCI format providing a value of h(g), and the same value of g and a value of k indicating the same PUCCH transmission occasion in the slot. This first DCI determines m=0.

Agreement:

Clarify that g (scheduled group) and q (number of requested groups) are obtained from the last non-fallback DCI format 1\_1 providing these values for a PUCCH transmission occasion

Agreement:

Adopt TP#1 in [R1-2003030](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003030.zip) for TS 38.212 v16.1.10

Agreement:

Adopt TP#2 in [R1-2003030](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003030.zip) for TS 38.213 v16.1.10

[100b-e-NR-unlic-NRU-HARQ-03] Email discussion/approval on handling of SPS with enhanced dynamic codebook and with NNK1 by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/30 – David (Huawei)

Agreement:

The HARQ-ACK bit(s) corresponding to SPS PDSCH is(are) appended to the end of a dynamic HARQ-ACK codebook with PDSCH grouping, without belonging to any group.

Agreement:

It is clarified that in a DCI activating SPS PDSCH, the NFI, DAI, q fields are only interpreted for the PDSCH scheduled by the DCI and are not interpreted for the SPS PDSCHs.

* No TP is needed

Agreement:

* DCI format 1\_1 should not simultaneously indicate a NNK1 value and activate a SPS configuration (CRC scrambled with CS-RNTI and NDI=0)
* DCI format 1\_1 should not simultaneously indicate a NNK1 value and request feedback of Type-3 HARQ-ACK codebook (one-shot HARQ-ACK request field with value 1)
* FFS: DCI format 1\_1 should not simultaneously indicate a NNK1 value and indicate Scell dormancy
* FFS: DCI format 1\_1 should not simultaneously indicate a NNK1 value and indicate SPS release

Agreement:

Adopt TP#1 in [R1-2003031](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003031.zip) for TS 38.213

Agreement:

Adopt TP#2 in [R1-2003031](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2003031.zip) for TS 38.213 with the modification of a sub-bullet to “the PDSCH-to-HARQ\_feedback timing indicator field, if present, does not provide an inapplicable value from dl-DataToUL-ACK”

[R1-2002984](C:\\Users\\wanshic\\OneDrive - Qualcomm\\Documents\\Standards\\3GPP Standards\\Meeting Documents\\TSGR1_100b\\Docs\\R1-2002984.zip) Editorial corrections on NRU-CG to 38.213 Moderator (Vivo)

[100b-e-NR-unlic-NRU-CG-01] Email discussion/approval on following issues by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/28 – Rakesh (Vivo)

* RRC value ranges for RRC parameters
* Correction related to semiPersistentOnPUSCH
* Clarification on offset-r16
* TP on CG-UCI transmission

Agreement:

Adopt the text proposals in Section 1.1 of [R1-2002982](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002982.zip) for TS 38.211 and TS38.214

Agreement:

For sharing of channel occupancy from UL to DL

* For the value of X, follow the same value range as for O and D with the step size of [14] symbols
* The maximum value of O and D is 39 slots
* “no COT sharing” is indicated by a specific row in the table, e.g. index 0

Agreement:

Adopt the text proposal in Section 1.3 of [R1-2002982](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002982.zip) for TS 38.213

Agreement:

Adopt the text proposal in Section 1.4 of [R1-2002982](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002982.zip) for TS 37.213

Agreement:

Adopt the text proposal in Section 1.5 of [R1-2002982](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002982.zip) for TS 38.213

Agreement:

Adopt the text proposal in Section 1.6 of [R1-2002982](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002982.zip) for TS 38.213

[100b-e-NR-unlic-NRU-CG-02] Email discussion/approval on following issues by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/29 – Rakesh (Vivo)

* PUSCH repetition transmission related issues for NRU configured grant
* RV determination for CG repetition

Agreement:

Adopt the text proposal in Section 1.2 of [R1-2002983](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002983.zip) for TS 38.214

Agreement:

Adopt the text proposal in Section 1.3 of [R1-2002983](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002983.zip) for TS 38.214

LS to RAN2 on clarification of RVID for the first transmission for CG-PUSCH agreed in R1-2003074

[100b-e-NR-unlic-NRU-WB-01] Email discussion/approval on following issues related to RB set and intra-cell guard band configuration by 4/23; if necessary, followed by endorsing the corresponding TPs by 4/28 – Seonwook (LGE)

* Corrections based on RAN1 and RAN2 agreements, and for RB set index within a BWP
* Handling of the case where “no guard band” is configured, without considering signaling aspects

Agreement:

Adopt “updated TP#1” in Section 4 of [R1-2002754](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002754.zip) for Section 12 of TS 38.213

Agreement:

Adopt “updated TP#2” in Section 4 of [R1-2002754](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002754.zip) for Section 6.1.2.2.3 of TS 38.214

Agreement:

Adopt “further updated TP#3” in Section 4 of [R1-2002754](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002754.zip) for Section 7 of TS 38.214

Agreement:

[R1-2002908](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002908.zip) LS on intra-cell guard band configuration for NR-U LG ELectronics

Agreement:

For a DL cell without intra-cell guard bands

* The bit-width of available RB-set indicator (if configured) in DCI format 2\_0 is equal to 1
* UE does not expect to be configured with search space with *freqMonitorLocations-r16*

Agreement:

Adopt updated TP#1 in Section 4 of [R1-2002955](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002955.zip) for Section 11.1.1 of TS 38.213

Agreement:

Adopt TP#2 in Section 4 of [R1-2002955](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002955.zip) for Section 10.1 of TS 38.213

Agreement:

To support UL bandwidth part wider than 20 MHz with no intra-cell guard band, UE can be configured with zero GBs by setting GB width to 0 when configuring intraCellGuardBandUL-r16 (e.g., such gNB creates 4 RB-sets in 80MHz UL carrier).

* Inform RAN2 of this agreement

Agreement:

For an UL carrier without intra-cell guard bands when the parameter *useInterlacePUCCH-PUCCH* is configured in any of *BWP-UplinkCommon* and *BWP-UplinkDedicated*:

* The UL carrier can be configured with non-overlapping RB set(s)
* For each RB set except for RB set 0, the starting CRB index is given by *startCRB-r16*
  + For RB set 0, the starting CRB index is given by 
* The UE expects *nrofCRBs-r16* set to 0 for all GBs between two adjacent RB sets within the UL carrier.
* The UE expects N RBs contained in each interlace of each RB set, wherein 10 <= N <= 11.
  + For 30 kHz SCS, the number of RBs within any RB set is between 50 and 55, and for 15 kHz SCS, the number of RBs within any RB set is between 100 and 110
* Note: This configuration may be used for the case where transmission only occurs in a BWP if LBT is successful in all RB sets within the BWP (from RAN1#99 agreement)
* Note: It’s up to gNB’s configuration to fulfill RAN4 requirement with  e.g., on maximum transmission bandwidth configuration, spectral emission mask, and so on.
* Note: In order to reuse existing PUCCH/PUSCH resource allocation mechanisms, this proposal applies to all supported carrier bandwidths except 10 MHz
* FFS: Whether BWP can be configured to be partially overlapping with a RB set

[100b-e-NR-unlic-NRU-WB-02] Email discussion/approval on following issues related to CORESET and search space configuration by 4/24; if necessary, followed by endorsing the corresponding TPs by 4/29 – Seonwook (LGE)

* PDCCH candidate and CCE mapping for search space configured with *freqMonitorLocations-r16* (Note: Discussion on PDCCH dropping rule is deprioritized)
* Corrections for CORESET and search space configured with *freqMonitorLocations-r16*

Agreement:

Adopt the text proposal in Section 4 of [R1-2002755](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002755.zip) for Section 10.1 of TS 38.213

Agreement:

The number of PDCCH candidates per aggregation level configured by *nrofCandidates* or *nrofCandidates-SFI* within a *SearchSpace* IE applies to each of RB sets configured by *freqMonitorLocations-r16*.

* *nrofCandidates-SFI* is 1 for a search space configured with freqMonitorLocations-r16

Agreement:

Adopt the text proposal in Section 3 of [R1-2002956](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_100b/Docs/R1-2002956.zip) for Section 10.1 of TS 38.213.

**Agreements in RAN1 #101-e**

[101-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-01] Email discussion/approval on Search Space including the following issues from R1-2004503 until 5/29; if necessary, endorse associated TPs by 6/4 – Alex (Lenovo)

* Switching timer (A2)
* Default SS group, incl. BWP switching (A4)
* Search space set switching behaviour (A5)
* Number of cell groups in *searchSpaceSwitchingGroupList-r16* (A7)

Agreement:

The number of cell groups that can be configured for search space switching in higher layer parameter *searchSpaceSwitchingGroupList-r16* is 1, 2, 3 or 4. Inform RAN2 of this decision.

Agreement:

TS 38.213 should be updated so that the timer provided by *searchSpaceSwitchingTimer-r16* is decremented even if the UE is not configured to monitor DCI format 2\_0.

Agreement:

* searchSpaceSwitchingTimer-r16 is configured per Cell, or per Cell group if Cell group is configured
* The timer value is configured and decremented in units of a reference SCS
  + FFS: Whether reference SCS is the minimum SCS across all configured BWPs in the Cell, or Cell group if configured

Agreement:

Adopt TP#1 in Section 5 of [R1-2005011](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005011.zip) for Clause 10.4 of TS 38.213

[101-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-02] Email discussion/approval on DCI format 2\_0, COT indication and RB set indication including the following issues from R1-2004503 until 5/28; if necessary, endorse associated TPs by 6/3 – Alex (Lenovo)

* SFI (+other fields) presence configurability in DCI format 2\_0 (B5)
* Channel occupancy in FBE (semi-static channel access) (B7)

Agreement:

The presence of the SFI field can be configured in DCI 2\_0

* FFS: Conditions under which SFI field must be present depending on what other fields are configured. Example: Available RB-set indicator is configured but COT duration indicator is not configured.

Agreement:

Adopt TP#1 in Section 5 of [R1-2005012](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005012.zip) for Clause 7.3.1.3.1 of TS 38.212

[101-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-03] Email discussion/approval on CSI-RS and tightly related PDSCH and SSB issues including the following from R1-2004503 until 5/29; if necessary, endorse associated TPs by 6/4 – Alex (Lenovo)

* CSI-RS transmission power, measurements, validity/presence of periodic/semi-persistent CSI-RS (D1)

               (Note: this also includes CSI-RS validation in DRS – Issue 3.2 in AI 7.2.2.1.1)

* CG PDSCH presence/dropping (C2)
* SSB transmission power for SSB-based RRM measurements (F1)

Conclusion:

When SFI reception is configured but CO-duration is not configured to the UE, no new CSI-RS cancellation conditions are introduced in Rel-16.

Agreement:

When DCI 2\_0 contains COT duration, but not SFI, UE cancels the reception of CSI-RS configured by higher layers at least on flexible symbols (including the case where no semi-static TDD configuration is provided to the UE) if the CSI-RS location is outside the CO duration indicated by the COT duration field.

Agreement:

Modify the previous agreement as below:

When DCI 2\_0 contains COT duration, but not SFI, UE cancels the reception of periodic or semi-persistent CSI-RS configured by higher layers ~~at least~~ on downlink and flexible symbols (including the case where no semi-static TDD configuration is provided to the UE) if the periodic or semi-persistent CSI-RS location is outside the CO duration indicated by the COT duration field.

Agreement:

A new RRC parameter can be used to determine reception/cancellation behaviour for CSI-RS configured by higher layers at least for the following cases:

* Reception of DCI 2\_0 is not configured to the UE
* Reception of DCI 2\_0 is configured to the UE, but both SFI and CO-duration are not configured

Agreement:

* For operation with shared spectrum channel access, the new RRC parameter (as in previous agreement) is used to determine the UE behavior at least when UE is not configured with CO-duration and not configured with SFI as follows:
* If the RRC parameter is configured, when the UE is configured by higher layers to receive periodic and semi-persistent CSI-RS in a set of symbols in a slot, the UE cancels the higher-layer configured periodic and semi-persistent CSI-RS reception in the set of symbols in the slot if:
* The UE does not detect a DCI format indicating to the UE to receive aperiodic CSI-RS or PDSCH in the set of symbols
* If the parameter is not configured, the UE cancels/receives the higher-layer configured periodic and semi-persistent CSI-RS reception according to current Clause 11.1 of TS38.213 and agreements we reached so far
* Note: Other rules in the specification apply for cancellation/reception in addition to the what is described in this agreement

Agreement:

Adopt TP#1 in Section 5 of [R1-2005013](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005013.zip) for Clauses 11.1 and 11.1.1 of TS38.213

[101-e-NR-unlic-NRU-DL\_Signals\_and\_Channels-04] Email discussion/approval of TPs to capture earlier agreements and align specifications on PDCCH monitoring switching (timer, processing time, behaviour, configuration, …) until 5/28 – Alex (Lenovo)

Agreement:

Adopt the TP in Section 3.4 of [R1-2005014](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005014.zip) for Clause 10.4 of TS38.213

[101-e-NR-unlic-NRU-ULSignalsChannels-01] Email discussion/approval on the following from [R1-2003842](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003842.zip) until 5/29; if necessary, endorse associated TPs by 6/4 – Steve (Ericsson)

* Issue #1: RB set allocation when interlaced transmission is configured for PUSCH scheduled by RAR UL grant, PUSCH scheduled by DCI 0\_0 addressed to TC\_RNTI, and cell-specific PUCCH
* Issue #2: RB set allocation for PUSCH scheduled by DCI 0\_0 in a CSS to accomodate CORESET bandwidth spanning more than one UL RB set

Agreement:

* As per prior agreement, initial UL BWP is 20 MHz
  + FFS: The case of SUL in licensed band
* For PUSCH scheduled by a RAR UL Grant (e.g., Msg3) or by DCI 0\_0 addressed to TC-RNTI (Msg3 re-transmission) when UL Resource Allocation Type 2 is configured, the PUSCH is transmitted as follows:
  + PUSCH is transmitted in the same UL RB set of the active UL BWP as PRACH (Msg1)
* FFS: The case where PRACH is configured in more than one RB set

Agreement:

* For PUSCH with UL resource allocation Type 2 scheduled by DCI 0\_0 with CRC scrambled by C-RNTI / CS-RNTI / MCS-RNTI received in a CSS, PUSCH is allocated to a single UL RB set in the active UL BWP where the UL RB set is the lowest indexed one amongst UL RB set(s) that intersects the lowest indexed CCE of the PDCCH in the active DL BWP in which the UE detects the DCI.
* If there is no intersection, PUSCH is allocated to RB set 0 of the active UL BWP.

Agreement:

* Adopt TP#a and TP#b in [R1-2004996](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004996.zip) (FL summary)
* Send the LS to RAN2 capturing the configuration restrictions on the initial UL BWP.

[**R1-2004998**](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004998.zip) [Draft] LS to RAN2 on initial BWP for NR-U Ericsson

Final LS agreed in [R1-2005016](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005016.zip)

Agreement:

Adopt TP#3 in [R1-2004996](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004996.zip) (FL summary)

[101-e-NR-unlic-NRU-ULSignalsChannels-02] Email discussion/approval on the following from [R1-2003842](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003842.zip) until 5/28 – Steve (Ericsson)

* Issue #8: Clarifications on UCI multiplexing in PUSCH accounting for LBT outcome
* Editorial issues #6, #7 and #11 (moderator to draft TPs for quick approval in Week #1):

Agreement:

Adopt TP#1 and TP#3 in [R1-2004884](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004884.zip) for Clause 6.1.2.2.3 of TS38.214

Agreement:

Adopt TP#2a in [R1-2004884](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004884.zip) for Clause 9.2.1 of TS38.213

[101-e-NR-unlic-NRU-ChAcc-01] Email discussion/approval on the following from [R1-2004539](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004539.zip) by 5/29; if necessary, endorse associated TPs by 6/4 – Timo (Nokia)

* Issue#1: Indication of LBT type, CP extension and CAPC; N1 timeline for UL transmissions with CP extension
* Issue#2: Clarifications to LBT with consecutive UL transmissions

Agreement:

Adopt TP2 and TP3 in Section 4 of [R1-2004858](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004858.zip) for TS 38.214.

Agreement:

*ChannelAccess-CPext-CAPC* and *ChannelAccess-CPext* fields are applicable for DCI 0\_1 and 1\_1 respectively for FBE as well, though some combinations may not be valid for FBE and the UE does not expect to be configured with those combinations.

* Discuss the need for related TPs in RAN1#102-e

Agreement:

When Aperiodic SRS is triggered with a DCI (0\_1, 1\_1) that also includes indication of CP extension, the CP extension applies to SRS as well.

Agreement:

Adopt Text Proposal 9 in Section 4 of [R1-2004858](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004858.zip) for TS 37.213.

Agreement:

Adopt TP #1 in Section 2 of [R1-2004995](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004995.zip) on other CP extension / LBT type indication related issues for Clause 4.2.1 of TS 37.213

Agreement:

Adopt TP #2 in Section 2 of [R1-2004995](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004995.zip) on applicability of CP extension for SRS for Clause 5.3.1 of TS 38.211

Agreement:

Adopt TP #3 in Section 2 of [R1-2004995](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004995.zip) on CG UL transmission cancellation for Clause 4.2.1.0.1 of TS 37.213

Agreement:

Adopt TP #4 in Section 2 of [R1-2004995](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004995.zip) on UL transmission in a contiguous UL transmission burst for Clause 4.2.1.0.1 of TS 37.213

[101-e-NR-unlic-NRU-ChAcc-02] Email discussion/approval on the following from [R1-2004539](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004539.zip) by 5/28; if necessary, endorse associated TPs by 6/3 – Timo (Nokia)

* Related to Issue #3 on clarifications to UL to DL COT sharing, decide whether a spec change is needed in relation to the following agreement from 100bis-e:
  + Agreement:
  + For at least PUSCH transmissions with configured grants, a UE is allowed to choose between the ED threshold given by ul-toDL-CO-SharingED-Threshold-r16 and the default one. Whether a spec change is required needs further discussion. Discuss and decide the possible TPs in the next meeting.
* Issue #9: LS on LBT failure detection mechanism
* Editorial correction related to proposal 9 in [R1-2003450](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003450.zip)

[R1-2004859](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004859.zip) Feature lead summary#1 on email discussion [101-e-NR-unlic-NRU-ChAcc-02] Moderator (Nokia)

Agreement:

Adopt the Text Proposal 1 for issue #9 in Section 5 of [R1-2004859](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004859.zip) related to LS on UL LBT failure detection for TS 37.213

Agreement:

Adopt the Text Proposal 2 for Editorial corrections in Section 5 of [R1-2004859](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004859.zip) related to presence of ChanneAccess-CPext-CAPC and ChanneAccess-CPext in DCI formats 0\_1 and 1\_1 for TS 38.212

Agreement:

* For Dynamic grants, UE follows the ul-toDL-CO-SharingED-Threshold-r16***,*** if provided. If this parameter is not provided, the X\_thres\_max is calculated as in earlier part of Section 4.2.3 of TS37.213
* For Configured grants, no further changes are made to UE operation on top of what has been agreed already in RAN1#100bis-e: “For at least PUSCH transmissions with configured grants, a UE is allowed to choose between the ED threshold given by ul-toDL-CO-SharingED-Threshold-r16 and the default one”

[101-e-NR-unlic-NRU-InitAccessProc-01] Email discussion/approval on the following issues from [R1-2003306](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003306.zip) until 5/29; if necessary endorse associated TPs by 6/4 – Amitav (Charter)

* (#2.1, #2.3, #2.4, #2.5) Remaining corrections for cell search in TS 38.213.
* (#2.2, #2.6) Clarifications on PDSCH rate-matching around a given SSB index.

Agreement:

Adopt TP#1, #2, #3, #4, #5, #6, #7, #8, #9, #10, #11, #12 in [R1-2005015](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005015.zip)

[101-e-NR-unlic-NRU-InitAccessProc-02] Email discussion/approval on the following issues from [R1-2003306](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003306.zip) until 5/29; if necessary endorse associated TPs by 6/4 – Amitav (Charter)

* (#3.2) For the minimum value N of the MsgA PRACH-PUSCH gap in NR-U, select one of the alternatives in RAN1 #101-e:
  + Alt 1: N=2 (same as licensed operation)
  + Alt 2: N can be smaller than 2 for identified cases, and N=2 for the rest
    - For example, N = [0 or 1] when MsgA PUSCH has the same SCS and bandwith as MsgA PRACH
    - Note: it can be further discussed whether existing CP extension scheme can be applicable for the identified cases

Conclusion:

The minimum value N of the MsgA PRACH-PUSCH gap is N =2 for operation with shared spectrum access (no specification changes are needed).

Agreement:

Adopt the TP in Section 2 of [R1-2004776](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004776.zip) for Clause 8.1A of TS38.213

[101-e-NR-unlic-NRU-InitAccessProc-03] Email discussion/approval on the following issue from [R1-2003306](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003306.zip) until 5/29 – Amitav (Charter)

* (#4.4) Choose between following alternatives for RSSI measurement duration in RAN1#101-e:
  + Alt 1: {sym1, sym14or28or56or48, sym28or56or112or96, sym42or84or168or144, sym70or140or280or240}
    - “sym14or28or56or48” refers to 14 symbols for 15 kHz SCS, 28 symbols for 30 kHz SCS, 56 symbols for 60 kHz SCS with NCP, and 48 symbols for 60 kHz SCS with ECP, respectively, and so on
    - Inform RAN2 of this decision (can be within updated RRC parameter spread sheet that we send to RAN2, not necessarily a separate LS)
  + Alt 2: {sym1, sym14or12, sym28or24, sym42or36, sym70or60}
    - “sym14or12” refers to 14 symbols for NCP and 12 symbols for ECP, respectively, and so on
    - Inform RAN2 of this decision (can be within updated RRC parameter spread sheet that we send to RAN2, not necessarily a separate LS)

Note 1: If measured bandwidth of RSSI overlaps with the active DL BWP, UE performs RSSI measurement with the SCS of the active DL bandwidth part during the measurement duration derived from combination of measDuration-r16 and rmtc-ref-SCS-CP.

Note 2: The UE expects an integer number of symbol(s) with respect to the SCS of the active DL BWP to be configured for RSSI measurement.

Agreement:

The set of values for the parameter *measDuration-r16* is {sym1, sym14or12, sym28or24, sym42or36, sym70or60} which is in units of the reference numerology configured by *ref-SCS-CP-r16*

* “sym14or12” refers to 14 symbols of the reference numerology for NCP and 12 symbols for ECP, respectively, and so on
* Notes (Can be captured in specifications as needed):
  + The UE derives the RSSI measurement duration from a combination of *measDuration-r16* and *ref-SCS-CP-r16*
  + At least for RSSI measurement confined within the active DL BWP, UE performs RSSI measurement using the numerology of the active DL bandwidth part during the derived measurement duration. Otherwise, the numerology used by the UE for measurements is up to UE implementation.
  + For RSSI measurements within the active DL BWP, t~~T~~he UE does not expect a non-integer number of symbol(s) with respect to the numerology of the active DL BWP.
* Inform RAN2 of this decision and cc RAN4

[R1-2004914](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004914.zip) [DRAFT] LS to RAN2 on NR-U RSSI Measurement Duration Charter Communications

Final LS agreed in [R1-2004915](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004915.zip)

[101-e-NR-unlic-NRU-InitAccessProc-04] Email discussion/approval of the following from [R1-2003306](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003306.zip) until 5/27 – Amitav (Charter)

* (#3.4) Clarify and correct capturing the validation of SFN LSBs in Section 8.2 and 8.2A of TS 38.213, respectively and consider some special cases, e.g., RAR window size of <=10ms and contention-free random access (CFRA).

Note: this is a continuation of email discussion [100b-e-NR-unlic-NRU-InitAccessProc-05] Email approval of the corresponding TP to address LS from RAN2 in R1-2001506 by 4/23 - Jing (Qualcomm)

Agreement:

Adopt the TP in Section 2 of [R1-2004913](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004913.zip) for Clauses 8.2 and 8.2A in TS 38.213.

[101-e-NR-unlic-NRU-InitAccessProc-05] Email discussion/approval for a potential reply LS to [R1-2003271](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003271.zip) by 5/28. To be managed under 7.2.2.2.2 – Steve (Ericsson)

Conclusion:

Do not send LS to RAN4. Wait for RAN2 decision, and update RAN1 specs (if needed) after RAN2 decides.

[101-e-NR-unlic-NRU-InitAccessProc-06] Email approval for a reply LS to [R1-2003273](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003273.zip) by 5/28. To be managed under 7.2.2.2.2 – Jiayin (Huawei)

Agreement:

UE can assume that NZP CSI-RS or SS/PBCH block (for L1-RSRP, RLM, BFD, CBD and RRM) is transmitted with the same transmit power across different occasions during the measurement period, as in Rel-15.

[R1-2004903](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004903.zip) [DRAFT] Reply LS on transmit power of CSI-RS across different occasions Huawei

Final LS agreed in [R1-2004949](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004949.zip)

[101-e-NR-unlic-NRU-InitAccessProc-07] Email approval of reply LS to [R1-2003274](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003274.zip) by 5/28, to be managed under 7.2.2.2 – Michel (Nokia)

Agreement:

RAN4 should not define UE capabilities as indicated in [R1-2003274](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003274.zip).

Final LS agreed in [R1-2004992](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004992.zip)

[101-e-NR-unlic-NRU-HARQ-01] Email discussion/approval on issues A5, A18 and A7 (limited to clarification of “if any”) from [R1-2004692](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004692.zip) until 5/29; if necessary, endorse associated TPs by 6/4 – David (Huawei)

Agreement:

Adopt TP1 and TP2 in [R1-2004744](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004744.zip) for Clause 9.1.3.3 of TS38.213 v16.1.10

Agreement:

Adopt TP3 in [R1-2004744](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004744.zip) which is written on top of R1-2003180 endorsed CR\_38.213\_NRU\_post RAN1#100b-e, for Clause 9.1.3.3 of TS38.213 v16.1.10

[101-e-NR-unlic-NRU-HARQ-02] Email discussion/approval on issues B2, B6 and B11 from [R1-2004692](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004692.zip) until 5/29; if necessary, endorse associated TPs by 6/4 – David (Huawei)

Agreement:

* UE is not expected to be configured simultaneously with Type-3 HARQ-ACK codebook, spatial bundling and CBG-based HARQ
* If spatial bundling is configured and CBG-based HARQ is not configured
  + spatial bundling is applied if NDI reporting is not configured in type-3 HARQ-ACK codebook,
  + otherwise, spatial bundling is not applied.

Agreement:

Adopt TP for Alt-5 in Section 5 of [R1-2004963](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004963.zip) for Clause 9.1.4 of TS 38.213

Agreement:

Adopt TP3 in Section 5 of [R1-2004963](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004963.zip) for Clause 9 of TS 38.213

Conclusion:

No corrections for joint configurations of eURLLC features and NR-U for issues B6 in [R1-2004745](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004745.zip) and C2 in [R1-2004746](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004746.zip) (no TPs for these issues) in Rel-16 (Note: Joint configurations of eURLLC and NR-U is supported)

Conclusion:

In Rel-16, reporting HARQ-ACK for SPS PDSCH Release in Type 3 codebook is not supported

[101-e-NR-unlic-NRU-HARQ-03] Email discussion/approval on issues C1, C2 and C3 from [R1-2004692](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004692.zip) until 5/28; if necessary, endorse associated TPs by 6/3 – David (Huawei)

Agreement:

Allow DCI format 1\_1 to simultaneously indicate a NNK1 value and indicate Scell dormancy or SPS release, for reporting in Type-2 or enhanced Type-2 HARQ-ACK codebook.

* Note: The UE is not expected to be indicated with an NNK1 value simultaneously with SCell dormancy or SPS release reporting in a Type 1 codebook.

Agreement:

Adopt TP#2 in [R1-2004964](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004964.zip) for TS 38.213

Observations:

Examples of joint configurations/signaling for eURLLC and NR-U that can work in Rel-16:

* Example 1: Handling of NNK1 value (dl-DataToUL-ACK-r1 with value -1) with Type-2 HARQ-ACK codebook and two HARQ-ACK codebook priorities (when UE is provided with PDSCH-HARQ-ACK-CodebookList-r16), using DCI format 1\_1 and/or DCI format 1\_2, when the NNK1 value is signaled in DCI format 1\_1.

Examples of joint configurations/signaling for eURLLC and NR-U that cannot work in Rel-16:

* Example 2: Joint configuration of Enhanced Type-2 HARQ-ACK codebook and two HARQ-ACK codebook priorities (when UE is provided with PDSCH-HARQ-ACK-CodebookList-r16)
  + RAN1’s understanding is that the RRC parameter PDSCH-HARQ-ACK-CodebookList-r16 cannot configure the UE with Enhanced Type-2 HARQ-ACK codebook, although RAN1 specifications can support reporting with Enhanced Type-2 HARQ-ACK codebook when two HARQ-ACK codebook priorities can be indicated using DCI format 1\_1/1\_0, and can also support handling of NNK1 value in this case
* Example 3: Reporting Type-3 HARQ-ACK codebook when different HARQ processes have been scheduled with different PUCCH priorities (when UE is provided with PDSCH-HARQ-ACK-CodebookList-r16)

[101-e-NR-unlic-NRU-CG-01] Email discussion/approval on issues 2, 3, 6, 8 and 13 from [R1-2003375](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2003375.zip) until 5/28; if necessary, endorse any associated TPs by 6/3 – Rakesh (Vivo)

Agreement:

* Value range of the RRC parameter cg-COT-SharingList-r16 is 1709
* The value range of the RRC parameters *cg-StartingFullBW-InsideCOT-r16, cg-StartingFullBW-OutsideCOT-r16* is 7
  + cg-StartingFullBW-InsideCOT-r16 SEQUENCE (SIZE (1..7)) OF INTEGER (0..6)
  + cg-StartingFullBW-OutsideCOT-r16 SEQUENCE (SIZE (1..7)) OF INTEGER (0..6)
* The value range of the RRC parameter cg-COT-SharingOffset-r16 has been agreed in RAN1#100b-e, it is confirmed that the step size is 14 symbols.

Agreement:

The maximum configurable value for *cg-nrofPUSCH-InSlot-r16* can be set as 7

Agreement:

For a given shared COT, UE should provide consistent COT sharing information in multiple consecutive PUSCHs in the same UE-initiated COT.

Agreement:

Adopt TP#1 in [R1-2005002](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005002.zip) (FL summary) for TS 38.212

Agreement:

Adopt TP#2 in [R1-2005002](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005002.zip) (FL summary) for TS 38.213

Agreement:

Adopt TP#3 in [R1-2005002](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2005002.zip) (FL summary) for TS 37.213

[101-e-NR-unlic-NRU-WB-01] Email discussion on DL/UL cell without intra-cell guard bands (Issue A1+A2 in [R1-2004018](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004018.zip)) focusing on the following until 5/29; if necessary, endorse associated TPs by 6/4 – Seonwook (LGE)

* How to set RRC parameters and whether/how to define RB set for DL cell with no GB
* Resolution of FFS from RAN1#100bis-e on BWP configuration for UL cell with no GB

Agreement:

RRC parameters *intraCellGuardBandDL-r16* and *intraCellGuardBandUL-r16* can be configured at least as UE-specific, per cell per numerology.

Agreement:

For a DL carrier where no intra-cell guard bands are configured with *intraCellGuardBandDL-r16*,

* The DL carrier can be configured with non-overlapping RB set(s).



* For each RB set except for RB set 0, the starting CRB index is given by *startCRB-r16* and



* + For RB set 0, the starting CRB index is given by



* The UE expects nrofCRBs-r16 set to 0 for all guard bands between two adjacent RB sets within the DL carrier.
* For 30 kHz SCS, the number of RBs within any RB set is between 50 and 55, and for 15 kHz SCS, the number of RBs within any RB set is between 100 and 110
  + For 30 kHz SCS, the UE may be configured with *intraCellGuardBandDL-r16* such that one of the RB sets contain 56 PRBs

Agreement:

For an UL carrier without intra-cell guard bands when the parameter *useInterlacePUCCH-PUCCH* is configured in any of *BWP-UplinkCommon* and *BWP-UplinkDedicated*,

* The UE does not expect that UL BWP within the UL carrier is configured to include parts of an RB set.
* For 30 kHz SCS, the UE may be configured with *intraCellGuardBandUL-r16* such that one of the RB sets contain 56 PRBs
  + Note: the number of RBs for the other RB sets is between 50 and 55 as previously agreed
* The UL carrier can be configured with non-overlapping RB set(s) if *intraCellGuardBandUL-r16* is provided.



* This agreement and the corresponding agreement from RAN1#100bis-e also apply to the case when *useInterlacePUCCH-PUCCH* is not configured in either of *BWP-UplinkCommon* and *BWP-UplinkDedicated*

Agreement:

Adopt TP in Section 2 of [R1-2004983](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004983.zip) for Clause 7 of TS 38.214

[101-e-NR-unlic-NRU-WB-02] Email discussion on RB set and CORESET configuration focusing on the following from [R1-2004018](file:///C:/Users/wanshic/OneDrive%20-%20Qualcomm/Documents/Standards/3GPP%20Standards/Meeting%20Documents/TSGR1_101/Docs/R1-2004018.zip) until 5/28; if necessary, endorse associated TPs by 6/3 – Seonwook (LGE)

* Value ranges of IntraCellGuardBand-r16, startCRB-r16, and nrofCRBs-r16, including discussion on potential UE capability of whether to support non-zero GB size smaller than default GB defined in RAN4 spec (Issue A3+A4)
  + Note: Whether to add *intraCellGuardBandUL-r16* or *intraCellGuardBandDL-r16* to *ServingCellConfig* IE (or possibly other IE) is left to RAN2.
* Following miscellaneous issues on RB set for 20 MHz cell and CORESET configuration
  + (From issue A1) For 20 MHz DL (or UL) cell not configured with *intraCellGuardBandDL-r16* (or *intraCellGuardBandUL-r16*), single RB set is defined.
  + (From issue B2) Discuss proposed conclusion: When a configured RB set contains different size of RBs than RB set 0, UE does not expect a CORESET configuration which has CORESET resource not confined within any of the configured RB set in *freqMonitorLocations-r16*

Agreement:

For *IntraCellGuardBand-r16*, the number of entries of *GuardBand-r16* is from 1 to 4.

Agreement:

For *GuardBand-r16*, the value range of *startCRB-r16* is from 0 to 274.

* Note: This requires the change from and to and , respectively, in TS 38.214 Section 7.



Agreement:

For *GuardBand-r16*, the value range of *nrofCRBs-r16* is from 0 to 15.

* UE does not expect that *nrofCRBs-r16* is configured with non-zero value smaller than the default guard band size defined in RAN4 specifications.

Agreement:

When *intraCellGuardBandUL-r16/intraCellGuardBandDL-r16* is absent for an UL/DL carrier and the default configuration in 38.101-1 indicates that there are no intra-cell guard bands for the carrier (i.e., 20 MHz carrier), then the number of RB sets for the carrier is 1 with index 0. When interlacing is configured for the UL carrier, the BWP spans the whole carrier, and the RB set index is 0 within the UL BWP.

Conclusion:

When a configured RB set contains different size of RBs than RB set 0 within the active DL BWP, UE does not expect a CORESET configuration which has CORESET resource not confined within any of the RB set indicated by *freqMonitorLocations-r16*.

#### 2.1.2 Remaining Open issues

The objectives from WID related to RAN1 are as follows:

- Physical layer aspects including [RAN1]:

- Frame structure including single and multiple DL to UL and UL to DL switching points within a shared COT with associated identified LBT requirements (TR Section 7.2.1.3.1).

- NR-U supports a mode of operation where for a carrier and at least for intra-band CA on serving cells on unlicensed bands, all DL channels / signals can be operated with the same numerology, and all UL channels / signals can be operated with the same numerology.

- Subcarrier spacing for control and data channels supporting 15kHz, 30kHz, and 60kHz (air-interface perspective; optionality to be discussed separately).

- Wide band operation (in integer multiples of 20MHz) for DL and UL for NR-U supported with multiple serving cells, and wideband operation (in integer multiples of 20MHz) for DL and UL for NR-U supported with one serving cell with bandwidth > 20MHz with potential scheduling constraint subject to input from RAN2 and RAN4 on feasibility of operating the wideband carrier when LBT is unsuccessful in one or more LBT subbands within the wideband carrier. For all wide-band operation cases, CCA is performed in units of 20MHz (at least for 5GHz).

- 10MHz operation for 5GHz band via NR-U/NR-U CA or NR/NR-U CA without air-interface optimizations specific to 10MHz.

NOTE:

- 10MHz Pcell or SpCell is not supported in NR-U.

- The absence of WiFi channels should be guaranteed.

- NR-U Discovery Reference Signal (DRS) containing at least SS/PBCH block burst set transmission and possibly CSI-RS, RMSI-CORESET(s)+PDSCH(s), OSI and paging with properties and extensions from NR Rel-15 in line with the agreements during the study phase (TR 38.889, Section 7.2.1.2). 60kHz based SSB/PBCH block is outside the scope of the WI.

- PRACH including possible extension of PRACH format(s) in line with agreements during the SI phase (TR 38.889, Section 7.2.1.2) to support minimum bandwidth requirement given by regulation. Determine the applicability of Rel-15 NR formats to NR-U operation.RAN1 should decide whether 60 kHz subcarrier spacing for PRACH is supported, based on a unified design with 15 kHz and 30 kHz PRACH for meeting occupied channel bandwidth (OCB) requirements.

- UL control including extension of PUCCH format(s) to support PRB-based frequency block-interlaced transmission and use of Rel-15 NR PUCCH formats 2 and 3 for NR-U operation. Applicability of sub-PRB frequency block-interlaced transmission for 60kHz to be decided by RAN1.

- UL data channel including extension of PUSCH to support PRB-based frequency block-interlaced transmission; support of multiple PUSCH(s) starting positions in one or multiple slot(s) depending on the LBT outcome with the understanding that the ending position is indicated by the UL grant; design not requiring the UE to change a granted TBS for a PUSCH transmission depending on the LBT outcome. The necessary PUSCH enhancements based on CP-OFDM. Applicability of sub-PRB frequency block-interlaced transmission for 60kHz to be decided by RAN1.

- SRS including the introduction of additional flexibility in configuring/triggering SRS in line with agreements during the study phase.

- For DL data channel, support of multiple PDSCH starting positions.

- Mechanism to detect a gNB’s transmission burst in line with the TR 38.889, Section 7.2.1.2 related to UE power consumption.

- DL control in line with the agreements during the study phase (TR 38.889, Section 7.2.1.2) including extensions allowing dynamic change of the time domain instances in which the UE is expected to receive PDCCH, modifications enabling DRS transmissions without gaps in the time-domain, and indication of time domain COT structure;

- Physical layer procedure(s) including [RAN1, RAN2]:

- For LBE, channel access mechanism in line with agreements from the NR-U study item (TR 38.889, Section 7.2.1.3.1). Specification work to be performed by RAN1.

- For FBE, channel access mechanism in line with agreements from the NR-U study item (TR 38.889, Section 7.2.1.3.1). FBE is intended for environments where the absence of Wi-Fi is guaranteed (e.g., by level of regulations, private premises policies, etc. Further, the targeted scenario is limited to a single NR-U network (i.e. single operator) in the operating band and geographic area. Specification work to be performed by RAN1.

- Initial access: specify required NR modifications to increase the maximum number of candidate SS/PBCH block positions within the DRS transmission window; to handle reduced SS/PBCH block and RMSI transmission opportunities due to LBT failure; to determine frame timing and QCL assumptions from the detected SS/PBCH block; single SS/PBCH block numerology assumed per band for Pcells in unlicensed spectrum. (RAN1)

- Random access: specify required NR modifications to enhance RACH procedure in line with the agreements during the study phase, including 4-step RACH modifications to handle reduced Msg 1/2/3/4 transmission opportunities due to LBT failure (RAN1/RAN2); LBT for 2-step RACH and application of PRACH and PUSCH format improvements for NR-U to 2-step RACH. (RAN1

- Scheduling request: specify required NR modifications due to LBT failure in line with agreements during the study phase. (RAN1/RAN2)

- RLM/RRM extensions for NR-U operation due to uncertain and reduced transmission opportunities for DL signals and channels due to LBT failure in line with agreements during the study phase (NR-U TR section 7.2.1.3.2), including configuring different DRS Measurement Time Configuration (DMTCs) for RRM and RLM respectively, identifying the set of RLM-RSs to measure, which set(s) are used for in-sync, out-of-sync evaluations, potential definition of a metric to accurately identify unsuccessful detection of RLM-RS. Support RSSI reporting. Define a metric to measure channel occupancy or medium contention and its corresponding reporting. (RAN1/RAN2)

- HARQ operation: NR HARQ feedback mechanisms are the baseline for NR-U operation with extensions in line with agreements during the study phase (NR-U TR section 7.2.1.3.3), including immediate transmission of HARQ A/N for the corresponding data in the same shared COT as well as transmission of HARQ A/N in a subsequent COT. Potentially support mechanisms to provide multiple and/or supplemental time and/or frequency domain transmission opportunities. (RAN1)

- Scheduling multiple TTIs for PUSCH in-line with agreements from the study phase (TR 38.889, Section 7.2.1.3.3). (RAN1)

- Configured Grant operation: NR Type-1 and Type-2 configured grant mechanisms are the baseline for NR-U operation with modifications in line with agreements during the study phase (NR-U TR section 7.2.1.3.4). (RAN1)

- CSI: NR Rel-15 CSI feedback mechanism is the baseline for NR-U operation. Enhancements can be considered in line with agreements from the NR-U study item (e.g., TR 38.889, Section 7.2.1.3.1). (RAN1)

- Data multiplexing aspects (for both UL and DL) considering LBT and channel access priorities. (RAN1/RAN2)

No remaining open issues in RAN1. RAN1 completion rate is 100%.

## 2.2 RAN2

#### 2.2.1 Agreements

**RAN2#109bis-e agreements:**

**Agreements**

1 An indication from PHY to MAC on LBT failure or success should be supported by all NR-U UEs. How this can be grouped with other essential PHY layer NR-U capabilities can be discussed after RAN1 progress on those.

2 Detecting consistent LBT failure and recovery is optional and as a baseline the UE capability is per UE. Whether the signalling is per band will depend on RAN1 discussion.

3 As a baseline, the capability for LBT detection and recovery capability applies to all cells (SpCell and SCells).

4 RAN2 should not further discuss the granularity of RSSI/CO measurements until RAN1 discussion concludes.

5 RAN2 should not further discuss the granularity of configured grant autonomous transmission support until RAN1 discussion concludes.

6 As a baseline, no separate capability is needed for sharing of HARQ processes among multiple configured grants with retransmission timer.

7 As baseline, it is mandatory to support monitoring the last two bits of SFN for RACH operation in shared spectrum.

8 When msg2 on shared spectrum and msgB, the gNB signals the last 2 bits of SFN

10 Multiple PDCCH monitoring occasions for PO is only used for NR operation with shared spectrum channel access.

11 As a baseline, white lists for neighbour cells broadcast in SIB are only applicable to NR operation with shared spectrum channel access.

12 From RAN2 point of view, retransmission timer for configured grant is used for only NR operation with shared spectrum channel access.

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| **Agreements**  **1:** Remove the addition of a third type of retransmissions for Type 1 and Type 2 configured grant when cg\_RetransmissionTimer is configured in the first paragraph of 5.8.2.  **2:** Change the last paragraph in 5.8.2 from  Retransmissions are done by:  -    repetition of configured uplink grants; or  -    receiving uplink grants addressed to CS-RNTI; or  -    retransmission on configured uplink grants.  To:  Retransmissions use:  -    repetition of configured uplink grants; or  -    received uplink grants addressed to CS-RNTI; or  -    configured uplink grants with *cg-RetransmissionTimer* configured.  **3:** Remove “the active UL BWP of” and add “if” in 5.21.2  1> if consistent LBT failure is triggered and not cancelled in the active UL BWP of the SpCell; and  1> if the Random Access procedure is considered successfully completed (see clause 5.1) in the SpCell:  **4:** Reset the *LBT\_COUNTER* when a consistent LBT failure is cancelled in 5.21.2.  **5:** Consistent LBT failure is cancelled if lbt-FailureRecoveryConfig IE is reconfigured.  **6:** FFS to be moved to email discussion - The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for consistent LBT failure, which has no valid PUCCH resources configured, for the Serving Cell that triggered the consistent LBT failure, if:   * an RRC (re-)configuration for BWP switching is received for this Serving Cell; or * a PDCCH for BWP switching is received for this Serving Cell; or * this Serving Cell is an SCell that is deactivated (see clause 5.9); or * a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response, regardless of LBT failure indication from lower layers, and the MAC PDU includes an LBT failure MAC CE that indicates consistent LBT failure for this Serving Cell. |

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| **Agreements**  1 UE PHY provides LBT failure indications for all uplink transmissions when lbt-FailureRecoveryConfig is not configured (same behavior as when it is configured). Include this in the reply LS to RAN1  2 Change the modeling of capturing LBT failure indication in TS 38.321 per draft CR [R2-2003050](file:///C:/Users/panidx/Documents/RAN2_109bis/Docs/R2-2003050.zip), by removing “regardless of LBT failure indication from lower layers” and not tying “transmission” to LBT success.  3 LCID set1 (below 64) is used for LBT failure MAC CE.  4 The UE behavior for type-2 configured grant activation/deactivation agreed for IIoT - including joint de-activation- to is extended for NR-U UEs.  5 Reply to RAN4 that UL LBT failure detection/recovery is applicable per current specifications to RA in R15-based handover, R15 SN addition/change, and PSCell addition, given the UE is in connected mode. LBT failure detection/recovery is not applicable per current specifications in RRC setup, resume, re-establishment, or release with redirection, as the UE does not have lbt-FailureRecoveryConfig during those procedures  6 Reply to RAN4 that no enhancements are planned in R-16 for UL LBT failure detection and recovery during handover, RRC setup, resume, re-establishment, or release with redirection. However, RAN2 will check if there is any technical issues with DAPS and CHO.  7 Update the agreement on incrementing the preamble counter to: The PREAMBLE\_TRANSMISSION\_COUNTER is not increased if the preamble is not transmitted due to LBT failure and lbt-FailureRecoveryConfig is configured, otherwise it is increased. Sam applies for 2-step RA.  8 Update the agreement on incrementing the SR counter to: The SR\_COUNTER is not increased if the SR is not transmitted due to LBT failure and lbt-FailureRecoveryConfig is configured, otherwise it is increased  9 The MAC entity may stop an ongoing Random Access procedure initiated by a pending SR triggered by consistent LBT failure on at least one Scell, if:   * The SCell(s) that triggered the corresponding SR are deactivated (see clause 5.9); or * a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response, and the PDU includes an LBT failure MAC CE that indicates consistent LBT failure for the Serving Cell that triggered the SR.   *Note: it is up to the NR-U TS 38.321 rapporteur how to capture this, considering exact wording and the outcome of [AT109bis-e][060][NR16] RACH stopping.*  10 We keep ASN.1 as is, capture in TS 38.331 that harq-ProcID-Offset2 and cg-RetransmissionTimer should not be configured simultaneously for a certain configured grant. |

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| **Agreements**  1 Introduce the field descriptions communicated by RAN1 with the following changes:   * Use *inOneGroup* instead of *mediumBitmap* in *ServingCellConfigCommonSIB [verify this]* * Include the statement in “The UE expects that a bit at position k > ssb-PositionQCL-Relationship-16 is 0, and the number of actually transmitted SS/PBCH blocks is not larger the number of 1’s in the bitmap.” in SSB-ToMeasure * Use “For operation in licensed spectrum” instead of “without shared spectrum channel access” * Use “leftmost” instead of “MSB”   2: No other changes are introduced to RRC to address the recommendations and agreements in RAN1 LS ([R2-2001357](file:///C:/Users/panidx/Documents/RAN2_109bis/Docs/R2-2001357.zip)).  3. Introduce the following changes:   * Replace ffsValue with 64 in:   + 1. co-DurationList-r16 SEQUENCE (SIZE(1..ffsValue)) OF CO-Duration-r16 -- FFS size upper limit 64 * Replace ffsValue below with 1120 to support 20ms duration (the new upper limit is changed from 560 to 1120 as it is needed for SCS 60Khz):   + 1. CO-Duration-r16 ::= INTEGER (0..ffsValue) -- FFS upper limit 560   The structure discussion and possible unification is moved to ASN.1 discussion. Capture this as open issue.   * Add field description for *CO-Duration*   4. Introduce the following changes:   1. Replace ffsValue below with 80 (maximum needed for 20ms with SCS of 60khz):    * 1. searchSpaceSwitchingTimer-r16 INTEGER (1..ffsValue) 2. Put in the field description of *searchSpaceSwitchingTimer* that “For 15 kHz SCS, {1..20} are valid. For 30 kHz SCS, {1..40} are valid. For 60kHz SCS, {1..80} are valid. Note that this is in slots as used in 38.213.   5 Introduce the following in the field description of *cp-ExtensionC2, cp-ExtensionC3:*  Configures the cyclic prefix (CP) extension (see TS 38.211 [16], clause 5.3.1). For 15 kHz SCS, {1..28} are valid for both *cp-ExtensionC2* and *cp-ExtensionC3*. For 30 kHz SCS, {1..28} are valid for *cp-ExtensionC2* and {2..28} are valid for *cp-ExtensionC3.* For 60 kHz SCS, {2..28} are valid for *cp-ExtensionC2* and {3..28} are valid for *cp-ExtensionC3*.  6 Introduce the following changes to RRC:   1. Introduce a new IE in RMTC-Config called *ref-SCS-CP* with the values of {15 kHz, 30 kHz, 60 kHz-NCP, 60 kHz-ECP} 2. Remove the Editor’s Note on L3 filtering for RSSI 3. Wait for RAN4 conclusion on actual values for *rssi-Result-r16* and *channelOccupancyThreshold-r16* before introducing the indices corresponding to RAN4 table   7: Introduce the following changes in RRC:   1. Change the value range for *cg-nrofSlots-r16* to {1,2, ..., 40} 2. Change the value range for *cg-minDFIDelay-r16* to ENUMERATED {sym7, sym1x14, sym2x14, sym3x14, sym4x14, sym5x14, sym6x14, sym7x14, sym8x14, sym9x14, sym10x14, sym11x14, sym12x14, sym13x14, sym14x14, sym15x14, sym16x14} and introduce additional text in the field description as:   ***cg-minDFIDelay***  Indicates the minimum duration (in unit of symbols) from the ending symbol of the CG-PUSCH to the starting symbol of the DFI carrying HARQ-ACK for that PUSCH. UE assumes HARQ-ACK is valid only for PUSCH transmissions ending before n - cg-minDFIDelay-r16, where n is the time corresponding to the beginning of the start symbol of the DFI (see TS 38.213 [13], clause 10.3).  The following minimum delay values are supported depending on the configured subcarrier spacing [symbols]:  15 kHz: 7, m\*14, where m={1, 2, 3, 4}  30 kHz: 7, m\*14, where m={1, 2, 3, 4, 5, 6, 7, 8}  60 kHz: 7, m\*14, where m={1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16}   1. Change the value ranges as follows:   *cg-StartingPartialBW-InsideCOT-r16* and *cg-StartingPartialBW-OutsideCOT-r16* to to INTEGER (0..6)  *cg-StartingFullBW-InsideCOT-r16* and *cg-StartingFullBW-OutsideCOT-r16*r to SEQUENCE (SIZE (1..ffsValue)) OF INTEGER (0..6)   1. Change the ffsValue in *betaOffsetCG-UCI-r16* value range to 31   8: For signalling of intra-cell guard bands, an explicit IE is used for “default” case and no guard bands are used if signaling is absent.  9: Add the following ASN.1 to introduce multiple uplink grants:  In PUSCH-Config:  pusch-TimeDomainAllocationList-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }  The new PUSCH-TimeDomainResourceAllocationList-r16:  PUSCH-TimeDomainResourceAllocationList-r16 ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation-r16  PUSCH-TimeDomainResourceAllocation-r16 ::=  SEQUENCE {     k2-r16                                              INTEGER (0..32)                                    OPTIONAL,   -- Need S     multiplePUSCH-Allocations-r16             SEQUENCE (SIZE(2..maxNrofMultiplePUSCHs-r16)) OF SinglePUSCH-TimeDomainResourceAllocation-r16  }  SinglePUSCH-TimeDomainResourceAllocation-r16 ::= SEQUENCE {  mappingType ENUMERATED {typeA, typeB},  startSymbolAndLength INTEGER (0..127)  }  10: Add to section 6.5 the UE may stop monitoring the PDCCH occasions for paging when this bit is set as defined in 304.  11: No additional values are introduced for *nrofPDCCHMonitoringOccasionPerSSB-r16* and the Editor’s Note on this can be removed.  12: The following additional values are introduced for *lbt-FailureInstanceMaxCount-r16:* 64 and 128. No additional values are added for *lbt-FailureDectectionTimer-r16* and the Editor’s Note on this can be removed. Check with ASN.1 rapporteur. |

**Agreements:**

1. close U521

2. close U522 – the name will remain as is

3. rapporteur will check 523 and correct accordingly

4. U527 can be closed and RAN1 can check and tell us if there is something wrong

5. U540 and U541 can be closed

6. U518 is closed

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| **Agreements**   1. (Issue U506 and U557) Extend RSSI/CO measurements to inter-frequency (as in LTE LAA). The IE rmtc-SubframeOffset-r16 is optional for inter-frequency (as in LTE LAA). 2. (Issue U510) Keep the ASN.1 for useInterlacePUCCH-PUSCH-r16 as ENUMERATED {true} with Need M. No changes to the 38.331 is needed. 3. FFS pending RAN1 agreements (Issue U515) The IE for signaling of Q in measurement object is kept Optional. It is added to the field description that the UE applies default value 8 when not signaled. 4. (Issue U528) No changes to the field description of ra-ResponseWindow is needed. 5. (Issue U538) Move the IEs searchSpaceGroupIdList-r16 and freqMonitorLocations-r16 from SearchSpace to SearchSpace-v16xy in order to allow search space switching for Type-3 CSS. 6. (Issue U544) Proposal 6b: If Proposal 6 is not agreed, introduce the following changes in order to address U544:  * For *ServingCellConfigCommon, a*dd “If *ssb-PositionQCL* is configured”in the field description of *ssb-PositionsInBurst* before *“*the UE expects that a bit at position k > *ssb-PositionQCL* is 0” * For *ServingCellConfigCommonSIB*, modify field description of *ssb-PositionsInBurst* as follows: “The UE assumes that a bit at position k > is 0, where is obtained from MIB as specified in TS 38.213 [13], clause 4.1”  1. (Issue U548) No changes are made to the field description of measRSSI-ReportConfig 2. (Issue U555) Introduce text for setting failureType as scg-lbtFailure in 5.7.3.5 (corresponding to NR-NRU DC) 3. (Issue 558) No changes are made to betaOffsetCG-UCI-r16 since it can already be configured dynamically. 4. (Issue 559) The IE ChannelAccessMode is kept in ServingCellConfigCommon without any changes. 5. (Issue 561) No changes are made to the structure of IE searchSpaceGroupIdList-r16 6. Agree to the editorial changes suggested in:   U563: Change “neighbour” to “this serving cell” for field description of ssb-PositionQCL in ServingCellConfigCommon  U564: Change semistatic to semiStatic  13 [RAN2 will capture the RAN1 agreement] (Issue 560) The UE applies default guard band when signalling is absent and no guard band is signalled by explicit IE [CB to this if there is a technical issue that companies agree with] |

**Agreements**

1: Introduce RSSI/CO measurement and reporting of NR-U frequencies in E-UTRAN in order to improve E-UTRAN to NR-U handover (depending on whether inter-freq measurements are agreed)

2: Introduce white-list of neighbour NR-U cells in E-UTRAN (SIB24) – 16 NR-U cells just like in NR.

3: Introduce a new cause value scg-lbtFailureNR in SCGFailureInformationNR in 36.331.

4: FFS based on NR discussion – whether Per-cell Q value can be broadcasted in LTE SIB24 for NR-U neighbour cells.

**RAN2#110e agreements:**

**Agreements**

From RAN2 point of view the NR-U WI is considered complete

=> NR Rel-15 BFD and BFR mechanism are enough to handle RRC based TCI state switching failure caused by DL LBT failures. No additional enhancement is needed for Rel-16.

**Agreements**

1 UE implementation select the redundancy version to use for all CG transmissions and CG retransmissions when cg-RetransmissionTimer is configured, including when repK>1. This reverts the agreement to use RV zero for initial transmission on configured grants.

2 Reply to RAN1 informing that for Q1: RAN2 did not consider repK>1 when agreeing to use RV zero for initial transmissions.

3 Reply to RAN1 informing that for Q2: RAN2 has agreed to let UE implementation select the RVID for all CG transmissions when cg-RetransmissionTimer is configured.

4 Reply to RAN1 informing that Q3: RAN2 agrees to remove the text in square brackets, and leave RVID choice to the UE implementation if transmitting on CG when cg-RetransmissionTimer is configured.

**Agreements:**

1. keep the current specified behaviour, i.e. UE in connected mode monitors PDCCH addressed to C-RNTI for RAR (and other purposes) in addition to the MsgB-RNTI, if LBT fails for the payload part of MsgA (i.e. no changes to specs)

2 Legacy LBT failure detection and recovery procedure is performed at source cell for DAPS HO, i.e. no change of specification required.

3 For DAPS HO, upon indication of consistent uplink LBT failures from source MCG MAC UE declares RLF, i.e. the UE should suspend all DRBs in the source and release the source connection (source RLF).

4 UL LBT failure and recovery mechanism can be supported in CHO and CPC without additional specification change

5 UE shall report MCG failure instead of performing RRC re-establishment upon detecting consistent UL LBT failures for cases when fast MCG link recovery is configured.

6 Specify conditions when UE uses the one-octet LBT failure MAC CE or the four-octet LBT failure MAC CE, i.e. one-octet format is used when the highest ServCellIndex of this MAC entity's SCell for which LBT failure is detected is less than 8, otherwise four-octet format is used.

7 Confirm that LBT\_COUNTER is per serving cell. Clarify this in MAC specification.

8 UPDATE – LBT failure recovery IE would be configured per BWP UL dedicated

10 All HARQ processes associated with a Configured grant shall be considered as “not pending” upon activation/configuration of the Configured grant.

11 See if a small clarification in MAC spec is needed (via email discussion) for the initial status [pending/not pending] of a HARQ process associated with a configured grant.

12 The following is agreed for UL LBT failures detected at the target cell for DAPS and non-DAPS HO. Option 2: UE doesn’t consider RLF to be detected upon detection of consistent UL LBT failures at the target cell, i.e. rely on T304 timer

**Agreements:**

Suggested editorial corrections for the following issues:

• U601, U602: LBT failure indication in procedural text

• U603: Replace PO with “paging occasion”

• U606: Change the name of SSB-PositionQCL-Relationship-r16 to SSB-PositionQCL-Relation-r16

• U616: Add “s” in Guard Band IEs after “band”

• U620: Change “are applied to “shall apply” in field description of channelAccessMode

• U622: Add hyphen in nrofPDCCH-MonitoringOccasionPerSSB-InPO-r16

• U623: Add CAPC related text in the field description of ul-dci-triggered-UL-ChannelAccess-CPext-CAPC-List

• U631: Remove “set” in the field description of searchSpaceGroupIdList

Agree to the solutions suggested in the report for following issues:

• U540: For RSSI/CO reporting, adds “…reports on the configured resources”.

• U551, U552: Move cell-specific and common Q to SSB-ConfigMobility

• U554, U556: Correction to the field description of cg-minDFI-Delay-r16

• U562: Change minimum list size from 2 to 1 for multiplePUSCH-Allocations-r16

• U567: Clarification of CAPC in field description of ChannelAccessPriority and in 38.300

• U604: Change Need N to Need R for enableConfiguredUL

• U605: Change Need M to Need R for new NR-U IEs in PhysicalCellGroupConfig with ENUMERATED {true}

• U607: Use SetupRelease for lbt-FailureRecoveryConfig

• U608: Change to Need R for schedulingRequestID-LBT-SCell-r16

• U609: Delete groupID in searchSpaceSwitchTrigger-r16

• U610: Make searchSpaceSwitchTrigger-r16 a list and use AddModList

• U611: User AddModList for co-DurationPerCellList

• U613: Correction to the field description of searchSpaceSwitchingTriggerList

• U614: Delete “determined by UE randomly” in 5.5.2.10a.

• U617: Change “BWP” to “cell” in field description of intra-cell guard bands.

• U618: Add overall description in the field description of channelAccessMode

• U619, U621: Make channelAccessMode conditional mandatory for NR-U

• U625: replace the ffsvalue in cg-StartingFullBW-InsideCOT, cg-StartingFullBW-OutsideCOT, cg-StartingPartialBW-InsideCOT with 5,7,2 respectively

• U626: replace the ffsvalue of duration and offset both with 39 in CG-COT-Sharing

• U630: Add field descriptions of positionInDCI and servingCellId in SearchSpaceSwitchingTrigger

* U624: change searchspaceswitchinggrouplist to cellgroupsforswitchinglist
* U628: repK-RV is not configured when cg-RetransmissionTimer is configured (based on outcome of the related discussion in User Plane).
* U615: Add intra-cell guard band IEs to servingCellConfig
* U801 (LTE): Move frequency specific Q in measurement object to RS-ConfigSSB-NR-r15
* U802 (LTE): keep Broadcast per-frequency specific Q in SIB24 (i.e. no change to current spec)

**Agreements**

1: Agree to the suggested proposals in the following issues (which were also submitted to RIL discussion):

* U653 (RIL S053): Change the need code to “Need R” for useInterlacePUCCH-PUSCH
* U656 (RIL N005): Add a reference to 37.213 in the field description of subCarrierSpacingCommon in MIB to describe the meaning of “shared spectrum channel access”
* U657 (RIL I806): Use SetupRelease for dl-DataToUL-ACK-r16
* U658 (RIL I807): Use SetupRelease for ul-dci-triggered-UL-ChannelAccess-CPext-CAPC-List-r16
* U659 (RIL I813): Use SetupRelease for channelAccessConfig-r16
* U660 (RIL I814): Change need code to “Need R” for discoveryBurstWindowLength-r16
* U661 (RIL E257): Change the name of channelAccessConfigListForDCI-Format1-1-r16 to ul-AccessConfigListForDCI-1-1-r16
* U662 (RIL E258): Change the name of channelAccessConfigListForDCI-Format0-1-r16 to ul-AccessConfigListForDCI-0-1-r16
* U664 (RIL I818): Change need code to “Need R” for channelAccessMode-r16 and discoveryBurstWindowLength-r16

2: For resolution of U652, confirm that LCP restrictions configured by allowedCG-List is only applicable to first transmission on CG grants.

3: The issues U655 (S055, discussed before) and U665 (already resolved) do not need to be considered further.

4: For resolution of U627 (RIL H547), change the text in the field descriptions of “cg-Starting{Full, Partial}BW-{Inside, Outside}COT” to “set of configured grant PUSCH transmission starting offset indices to indicate the length of a CP…” and add reference to Table 5.3.1-2 is defined in 38.211. Note that it will be a single “index” for the “Partial” IEs.

5: For resolution of U549 (i.e. first transmission in periodical reporting), adopt the TP in R2-2005699 by LG.

6: For resolution of U612, adopt the RAN1 agreement and signal “no COT sharing” separate IE that is a choice between that IE signaling (e.g. zero) and the list. This can be revised if RAN1 makes a new agreement.

7:For resolution of U615 (RIL E251), remove the IEs intraCellGuardBandUL-r16 and intraCellGuardBandDL-r16 from servingCellConfigCommon (RAN2 already agreed to put them in servingCellConfig).

8: For resolution of U629, remove the legacy values of ra-ResponseWindow from ra-ResponseWindow-r16.

9: To address R2-2004622, 2 LSBs of SFN is signaled in MSG2 or MSGB only when RAR window is above 10ms (signaled in either ra-ResponseWindow or ra-ResponseWindow-r16). This reverts the previous agreement in RAN2#109bis-e. Send an LS to RAN1, indicating that this is RAN2 preference and let RAN2 know if there is any concerns.

10: For resolution of U651, add in the field description of searchSpaceSwitchingGroupList that a serving cell can only belong to one searchSpaceSwitchingGroup

11: For resolution of U654 (RIL S054), the IEs “cg-Starting{Full, Partial}BW-{Inside, Outside}COT” will be grouped together.

=> No UE capability it required and all NR-U capable and 2step RA UEs should support extended RAR

#### 2.2.2 Remaining Open issues

No open issues. RAN2 100% complete.

## 2.3 RAN3

#### 2.3.1 Agreements

#### 2.3.2 Remaining Open issues

## 2.4 RAN4

#### 2.4.1 Agreements

##### RF:

From RAN4 #94-bis-e

R4-2005221 WF on NR-U UE Tx requirements

Agreement on the NR general requirements that also apply to NR-U

Power class and tolerance, EVM, transmitter impairments, occupied bandwidth

It was agreed that NR-U SEM applies as the general requirement

PC5 ACLR agreed to be 27 dB

Allocation of EVM to PA agreed for the purpose of simulation study of MPR

PC5 maximum output power agreed at 20 dBm +2/-3

PC3 maximum output power agreed at 23 dBm +2/-3 if developed. Rel-16 assumes two PC5 paths in UL MIMO or TxDiv while other implementations (i.e., single PC3 PA) are not precluded

Baseline waveform and reference MPR is agreed. 1 dB MPR for PC5 and DFT-s-OFDM QPSK 100RB3 20 MHz waveform.

Various TP’s on intra-band CA, inter-band CA and DC were agreed

Includes parameters for DL intra-band CA, CA\_n46B, C, D, E, G, H, and I, inter-band CA\_n46A-n66A, CA\_n25A-n46A, CA\_n48-n46, and DC\_48\_n46, DC\_2A\_n46A, DC\_66A\_n46A

R4-2005478 WF on BS receiver requirements for NR-U

Tabulates SNR simulation results from multiple companies for the agreed FRC’s. It was agreed to take the average value to derive NR-U BS receiver requirements.

For 60 kHz SCS due to the lack of interlace signal design, it was agreed to adopt legacy NR requirements for refsens, in-channel selectivity, and dynamic range. For 15 kHz and 30 kHz, averaged simulation results would be used to derive refsens, in-channel selectivity, and dynamic range.

From RAN4 #95-e

R4-2008428 Draft CR on Guardband design for NR-U

The draft CR defines specific intra-cell guardbands for wideband operation for 15 kHz and 30 kHz SCS. There is still ongoing discussion on usable RB’s and guardband definition for 60 kHz SCS

Draft CR’s for NR-U CA and DC combinations

Includes agreed specifications for CA\_n25-n46, CA\_n46-n66, CA\_n46-n48 for 38.101-1 and DC\_2\_n46, DC\_48\_n46, and DC\_66\_n46 for 38.101-3.

R4-2009165 WF on NR-U PC3 ACLR and in-band emissions

PC3 ACLR was not agreed yet, but is either 28 dB or 30 dB. The in-band emissions mask is agreed to be leveraged from eLAA about a single interlace waveform where RIV=1 and RIV=5 waveforms have been considered. It is assumed that TE can calculate the location of RB’s for LO and IQ image exception based on reported DC location, or assumed location if 3300 or 3301 values are reported.

R4-2008435 WF on NR-U ACS and blocking requirements

Receiver ACS value could not be agreed as there are still different views from companies, although compromises have been proposed and the companies do seem to be converging. However, it was agreed to specify ACS and blocking with fixed 20 MHz interfererer and scale the requirement according to bandwidth. In the case of intra-band contiguous carrier aggregation, the scaling is agreed to be with respect to the actual configured aggregeted bandwidth. Baseline in-band blocking was agreed at REFSENS+9 for 20 MHz channel and out-of-band blocking exception of -20 dBm was agreed to apply for frequencies greater than 4200 MHz.

R4-2008436 WF on NR-U MPR

The format of the MPR requirement was agreed with values dependent upon DFT-s-OFDM vs. CP-OFDM, modulation, and full RB allocation vs. partial RB allocation. The MPR is independent of channel bandwidth, SCS. For wideband operation, further study is needed and possible adjustment for regions where ACLR and IQ image overlap in non-transmitted sub-bands. Tentative values have been agreed for PC5 MPR.

For PC3, some parameters and assumptions for simulations were agreed including SEM, in-band emissions, and EVM. Both PC5+PC5 and PC3 PA configurations were agreed to be considered, but it was not decided whether a single requirement for the worst case would be specified or whether two sets of requirements would be specified with signaling to distinguish which one should apply. It was also noted that PC5+PC5 relies upon agreements in the ongoing Rel-16 TxDiv and UL MIMO discussions.

R4-2008438 NR-U - Capturing Spectral Emission Mask in Specification

Formal terminology for the specification as “operation with shared spectrum channel access” was agreed to align with RAN1 terminology rather than the colloquial “NR-U” designation. A TP for the NR-U general SEM for single carrier, wideband, and wideband with non-transmitted sub-bands where all transmitted sub-bands are contiguous was agreed. Clarification on measurement bandwidth and scaling of the dBr requirement is also included in the agreed text.

R4-2008766 WF on NR-U BS OBUE

The SEM mask is agreed to be converted from relative mask to absolute mask based on a scaling of BWChannel relative to 100 kHz MBW. Absolute SEM is also defined for one interior non-transmitted channel within a 60 and 80 MHz wideband channel, two interior non-transmitted channels within an 80 MHz wideband channel, as well as non-transmitteed channels on the edge of a 40, 60, or 80 MHz wideband channel.

Revision of R4-2009175 running draft CR for 38.101-1 was presented for email approval to capture agreements to date.

R4-2008763 running CR for 38.104, R4-2008765 running CR for 37.107, R4-2008764 for 37.104, R4-2008763 for 36.104 were postponed.

##### RRM:

From RAN4#94-e-Bis:

General:

* Assume by default that requirements do not apply to NR-U unless explicitly stated
* Further focus on Option 2b: no applicability section, exclude the applicability to NR-U by default, unless explicitly stated and:
  + the meaning of “for NR-U”/”to NR-U” is clearly defined, e.g. NR-U serving cell, NR-U neighbour cell, relevance for different NR-U scenarios A-C, etc.

Cell Reselection:

* Do not specify the maximum number of times when any of Md,max, Mm,max, and Me,max is exceeded before the UE initiates cell selection procedures for the selected PLMN
* Paging interruption time shall not exceed TSI,CCA + 2\*[Ttarget\_cell\_SMTC\_period]ms. TSI,CCA is the time required to acquire the SI when the operating carrier is subject to CCA failures. FFS how to address unavailable SMTC occasion at UE in Ttarget\_cell\_SMTC\_period
  + FFS if there is any impact on Ttarget\_cell\_SMTC\_period
* FFS: clarification of unavailable SMTC
* Postpone the side condition discussion to performance part
* For a cell that is already identified, after N unsuccessful measurement attempts due to exceeding the max number of unavailable SMTC occasions, UE needs to detect the cell again. FFS the value N and the target cell/carrier to initiate the cell detection procedure
* Replace Kcarrier \* Tdetect,NR\_Inter by *Kcarrier \* Tdetect,NR\_Inter + Kcarrier\_CCA \* Tdetect,NR\_Inter\_CCA*

Handover:

* Draft CRs:
  + Further discuss the draft CRs to 36.133 and 38.133 provided in RAN4#94-e-Bis, considering the necessary revision
  + Upon receiving a response LS from RAN2, RAN4 can discuss whether further clarification is needed in the HO requirements in 36.133 and 38.133, if the RAN2 LS indicates that the requirements are impacted by consistent UL LBT failure detection/recovery

SCell activation/deactivation:

* Definition of channel access category 1
  + Type 2C UL channel access [TS 37.213]
* UE behavior and the SCell activation delay extension due to any LBT failures when sCellDeactivationTimer is not configured
  + Option 1: the SCell activation requirements do not apply when the sCellDeactivationTimer is not configured
  + Option 2: If the timer is not configured, the NR-U UE assumes the largest timer value and applies the corresponding behaviour, to avoid being locked down in SCell activation for too long
  + Option 3: Do not specify UE behaviour if the timer is not configured, the requirements apply regardless whether sCellDeactivationTimer is configured or not
* SCell activation delay, condition on HARQ delay
  + Option 1: For a known SCell:
    - TFirstSSB+ Trs \*L1+ 5ms, if the SCell measurement cycle is ≤160ms and **ΔHARQ≤K ms**.
    - (TSMTC\_MAX + Trs )\*(1+L2)+ 5ms, if the SCell measurement cycle is >160ms or **ΔHARQ>K ms**,
    - where **ΔHARQ** is the total time by which THARQ was extended (with all its HARQ transmissions and retransmissions in the configured UL resources) due to UL LBT failures according to the agreement in RAN4#94-e, K=TBD
  + Option 2: Option 1 without the condition on **ΔHARQ**
* Lmax-values in SCell activation requirements
  + L1,max = [2] if Trs 40ms and L1,max = [1] if Trs 40ms
  + L2,1,max = [2] if TSMTC\_max  40ms and L2,1,max = [1] if TSMTC\_max  40ms
  + L2,2,max = [2] if Trs 40ms and L2,2,max = [1] if Trs 40ms
  + L3,1,max = TBD if TSMTC\_max  40ms and L2,1,max = TBD if TSMTC\_max  40ms
  + L3,2,max = TBD if Trs 40ms and L3,2,max = TBD if Trs 40ms
  + L4,max = [2] for TCSI-RS 40ms and L4,max = [1] for TCSI-RS 40ms
* Interruption window at SCell activation/deactivation
  + Postpone to RAN4#95
  + In RAN4#95:
    - If a change agreed for the related Rel-15 requirements, it needs to be taken into account also in NR-U interruption requirements
    - Otherwise, proceed based on the latest version of Rel-15 requirements

Active TCI state switching:

* UE behaviour
  + RRC-based
    - Known & unknown states:
      * Send LS to RAN1 and RAN2
  + MAC-CE based
    - Alignment with Rel-15 MAC-CE based active TCI state switching requirements
    - In RAN4#94-e-Bis:
      * further wait for further clarifications in Rel-15 (i.e., Option 1)
    - In RAN4#95:
      * proceed with NR-U requirements, based on the current Rel-15 agreements, but update upon the need if Rel-15 requirements changes, if the corresponding proposed by the proponents change to Rel-15 is again not agreed in RAN4#94-e-Bis, or
    - consider the agreed change to Rel-15, if such a change is agreed in RAN4#94-e-Bis
* Definition of Tfirst-SSB
  + Option 1: time to first SSB instance (which may or may not be transmitted)
  + Option 2: time to the first SSB transmission occasion (“occasion” means the transmission is configured but may or may not come)

Active BWP switching:

* The UL BWP switching delay upon detection of consistent UL LBT failure is the same as the delay of DCI and timer based BWP switching
* The interruption requirement (starting time and duration) of UL BWP switching upon detection of consistent UL LBT failure follow existing interruption requirements for DCI and timer based BWP switch
* Upon detecting consistent UL LBT failure at slot#n when UE detects *lbt-FailureInstanceMaxCount* number ofLBT failure within *lbt-FailureDetectionTimer*, UE starts UL BWP switch at slot#n+1
* The ending point of UL BWP switching delay upon detection of consistent UL LBT failure
  + Option 1: UE transmits RACH
  + Option 2: UE is ready to transmit RACH
* FFS whether to add the condition about the relative frequency locations for the old and new UL BWPs

RLM/LR:

* The set of SSBs that UE is required to monitor
  + Define the following UE capabilities
    - For RLM/BFD/CBD UE is required to monitor at least **N1** candidate SSB positions from the set of SSBs that are QCLed with each other within the set of configured resources
    - For intra and inter-frequency measurements UE is required to monitor at least **N2** candidate SSB positions from the set of SSBs that are QCLed with each other within SMTC
      * FFS for the case Q is not provided to the UE
      * FFS how to handle IDLE mode capabilities
    - Candidate N1 and N2 values are [1, 2, …]
    - FFS whether N1 = N2
    - FFS whether to have different capabilities for FBE and LBE modes
  + Send LS to RAN1 to ask for feedback on candidate values N1 and N2 taking into account impact on the overall system performance
    - Further discuss other cases
  + For both LBE and FBE, RLM requirements shall not rely on COT
* OOS evaluation period for SSB-based RLM
  + Option 2: OOS evaluation is based on Lout, where Lout ≤Lout,max is the number of SSBs not available at the UE during TEvaluate\_out\_SSB
  + Option 3: The evaluation period is scaled by a fixed scaler
    - FFS: **excluding** samples whose SNR is higher than X dB
  + Whether UE can expect gNB to transmit RLM-RS with same transmit power across different occasions
    - Send LS to RAN1 in RAN4#95-e meeting about the observation from RAN4 perspective about concern on transmit power of RS
  + In RAN4#95-e meeting, RAN4 decides whether to keep working on CSI-RS based RLM requirement in Rel-16
  + CBD requirement: Take the proposal for SSB-based CBD in [R4-2004032](file:///D:/docs/R4-2004032.zip) as the starting point. FFS the exact numbers

Timing:

* If the UE uses a reference cell on a carrier frequency subject to CCA for deriving the UE transmit timing, then the UE shall meet all the transmit timing requirements provided that
  + Option 1: at least N SSB are available at the UE during the last 160 ms
    - N=TBD
    - Definition of available cell/SSB is pending on RAN1 feedback to LS R4-2005418  on the number of candidate SSB positions from the set of SSBs to be monitored

Measurements:

* SFTD measurements:
  + UE behavior when reaching the maximum extension of the SFTD measurement
    - UE behavior upon exceeding Tmeasure\_SFTD\_LBT\_max: UE shall stop the search and stop performing the related measurement.
* Remaining issues in intra-frequency and inter-frequency measurement:
* Define the following UE capabilities
  + For RLM/BFD/CBD UE is required to monitor at least **N1** candidate SSB positions from the set of SSBs that are QCLed with each other within the set of configured resources
  + For intra and inter-frequency measurements UE is required to monitor at least **N2** candidate SSB positions from the set of SSBs that are QCLed with each other within SMTC
  + FFS for the case Q is not provided to the UE
  + FFS how to handle IDLE mode capabilities
  + Candidate N1 and N2 values are [1, 2, …]
  + FFS whether N1 = N2
  + FFS whether to have different capabilities for FBE and LBE modes
  + Send LS to RAN1 to ask for feedback on candidate values N1 and N2 taking into account impact on the overall system performance
  + Further discuss other cases
* Additional requirements on consecutively missing SSBs during the measurement period
  + No additional requirement is specified on consecutively missing SSBs
* Lmax for the intra-frequency PSS/SSS detection period
  + Following values for intra-frequency:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Procedure** | **Rel-15 samples** | **Maximum number of DL LBT failures** | | |
| Parameter name | Parameter value | Condition |
| **PSS/SSS detection, no gaps** | 5 | LPSS/SSS,max | 7 | Max(TDRX,TSMTC)≤40 |
| 5 | 40<Max(TDRX,TSMTC)≤320 |
| 3 | TDRX>320 |
| **PSS/SSS detection for deactivated SCell, no gaps** | 5 | LPSS/SSS,deact,max | 7 | Max(TDRX, measCycleSCell)≤40 |
| 5 | 40< Max(TDRX, measCycleSCell)≤320 |
| 3 | TDRX>320 |
| **PSS/SSS detection, with gaps** | 5 | LPSS/SSS,gaps,max | 7 | Max(TDRX,TSMTC, MGRP)≤40 |
| 5 | 40<Max(TDRX,TSMTC, MGRP)≤320 |
| 3 | TDRX>320 |

* Following values for inter-frequency:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Procedure** | **Rel-15 samples** | **Maximum number of DL LBT failures** | | |
| Parameter name | Parameter value | Condition |
| **PSS/SSS detection, with gaps** | 8 | LPSS/SSS,gaps,max | 12 | Max(TDRX,TSMTC, MGRP)≤40 |
| 8 | 40<Max(TDRX,TSMTC, MGRP)≤320 |
| 5 | TDRX>320 |

* Requirements when reaching the maximum extension of the detection period
  + Upon exceeding LPSS/SSS,max, the UE is not required to meet the corresponding intra-frequency or inter-frequency PSS/SSS detection requirement.
* RSSI and CO measurements:
  + Normalization of the RSSI measurement report
    - UE shall not normalize RSSI measurements for reporting purpose
  + RSSI measurement report mapping
    - Same RSSI measurement report mapping as in NR-U
* Need for new measurement gap patterns
  + No new measurement gap pattern to be defined for RSSI Measurements in NR-U. No requirement for RMTC with duration larger than 5ms
* Interruption
  + RAN4 to define interruption requirements on SCells that are deactivated when RMTC or measurement cycles are long. LTE LAA requirements in clauses 7.8.2.11 and 7.8.2.12 of TS 36.133 can be used as a starting point.

From RAN4#95-e:

General:

* Remaining sections not covered by other technical CRs
  + For TS 38.133 – no CR with blank sections is needed
  + For TS 36.133 – no CR with blank sections is needed
* Further clarification on the terminology for occasions unavailable at the UE
  + Use in the requirements a short term “X not available at the UE”, where X is:
    - RLM-RS in RLM requirements,
    - SMTC in measurement requirements other than RSSI requirements,
    - SSB in TCI state switching requirements,
    - SMTC in SCell activation, PSCell addition/release, HO, RRC re-establishment, RRC release with redirection requirements, etc.
  + “X not available at the UE” is further clarified in one place, for each X (e.g., where X is configured by the network, X may not be received at the UE during the corresponding period due to the absence of the necessary radio signals from the cell or DL CCA failure, etc.)
    - FFS: whether/how to capture in this clarification the number of candidate resources to monitor
    - Wait for RAN1 LS response on the number of monitored candidate resources
* Further clarification on the terminology for missed transmissions
  + The short term “Y unavailable for transmission” is used in the requirements and further clarified in one place (FFS: e.g., Y is configured by the network, UE is unable to transmit due to UL CCA failure, etc.), where the transmission is e.g. PRACH or HARQ feedback.

Cell reselection:

* Definition of unavailable SMTC/SSB
  + Wait for RAN1 feedback
* Definition of Ms
  + Wait for RAN1 feedback
* Max number of unavailable SMTC occasions during measurement before UE detects the cell again
  + For a cell that is already identified, after N unsuccessful measurement attempts due to exceeding the max number of unavailable SMTC occasions, UE needs to detect the cell again.
    - N = 2 or 3
* Whether to consider LBT failure in Ttarget\_cell\_SMTC\_period in the paging interruption requirements
  + Ttarget\_cell\_SMTC\_period dose not consider LBT failure
* R4-2008568: CR on introduction of RRC\_IDLE state moblity requirements for NR-U; technically endorsed
* R4-2008569: CR on introduction of RRC\_INACTIVE state mobility requirements for NR-U; agreed.
* R4-2008570: UE behaviour after measurement failure due to LBT for RRC\_IDLE state inter-RAT mobility requirements for NR-U; technically endorsed

Handover:

* At least when the UE is not configured with *both* the UL BWP with PRACH occasion on the target cell and UL LBT failure detection/recovery, the handover interruption time considering the potential extensions caused by L1,L1´, L2 and L3 is limited only by the T304 timer
* For the case when the UE is configured with *both* the UL BWP with PRACH occasion on the target cell and UL LBT failure detection/recovery, do not specify the exact requirements, only clarify that that the interruption can be longer for such UE
* R4-2008559: CR to TS 36.133 adding handover to NR-U agreed.
* R4-2009138: CR to TS 38.133 adding handover to NR-U agreed.

RRC re-establishment:

* The impact of UL LBT failure detection procedure impact on RRC re-establishment requirements
  + No new UE behavior needs to be defined due to consistent LBT failures under any stage of the RRC connection re-establishment procedure. The existing UE behaviour upon expiry of T311 defined in 38.331 shall apply under consistent LBT failures experienced by the UE over the RRC connection re-establishment delay
    - L\*,max values for RRC connection re-establishment
  + Previous agreement from RAN4#94-e (in R4-2002336) related to RRC connection re-establishment requirements is still valid, i.e., K1,max, K2i,max, KSI,max and K3,max are not needed in the requirements
* R4-2008561 CR to TS 38.133: RRC re-estabishment with CCA: technically endorsed.

RRC release with redirection:

* The need for L2,max and clarification of the UE behaviour upon exceeding L2,max
  + RAN4 will not define L2,max
* Existing UE behavior when exceeding *preambleTransMax* applies to RRC release with redirection
* R4-2008562 RRC release with redirection requirements in NR-U in TS 38.133: agreed
* R4-2008563 RRC release with redirection requirements in NR-U in TS 36.133: agreed

SCell activation:

* Interruption window
  + FFS: Interruption window length at SCell activation does not depend on LBT failures
    - AGC issue is taken into account in the definition of the interruption window location for NR-U
  + FFS: The interruption window location, considering the LBT impact on AGC and multiple interruption windows
* Gain resetting upon delay of HARQ transmissions/retransmissions due to UL LBT failures and the need for compensation in SCell activation delay
  + No consensus in RAN4 on this issue. No need to further discuss
* Parameter setting in Tactivation
  + L3,1,max = [2] if TSMTC\_max ≤ 40ms and L2,1,max = [1] if TSMTC\_max  > 40ms
  + L3,2,max = [2] if Trs ≤ 40ms and L3,2,max = [1] if Trs > 40ms
* The SCell activation requirements apply when SCell being activated is on a carrier frequency with CCA in
  + Intra-band scenarios where all of the SCell being activated and all active serving cells are within the same band, or
  + Inter-band scenarios where at least one of the SCell being activated and active serving cells is in a band different than the band(s) of other active serving cells
* TFirstSSB\_MAX
  + Is the time to first configured SSB indicated by the SMTC after slot n + THARQ+3ms, when
    - all active serving cells and SCells being activated or released have configured SSB bursts in the same slot, for intra-band scenario, or
    - the SCell being activated has configured SSB burst, for inter-band scenario
* Applicability of SCell activation requirements when sCellDeactivationTimer is not configured
  + FFS: The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured
* The term “not available at the UE” is to be addressed under issue 1-2-1/slide 4
* For known Scell activation and if the SCell measurement cycle <= 160ms
  + Tactivation\_time as agreed in R4-1915777 (TFirstSSB + (L1)\* Trs + 5ms)
  + L1 is the number of configured SMTC SSB transmission occasions not available at the UE (reference TBD)
    - TBD refers to the definition of “not available at the UE” which is a common issue for NR-U (see also issue 1-2-1/slide4)
* For known Scell activation and if the SCell measurement cycle > 160ms
  + Tactivation\_time = TFirstSSB\_MAX + L2,1\* TSMTC\_MAX + (1 + L2,2)\* Trs + 5ms
    - L2,1 (L2,1 L2,1,max) is the number of configured SMTC occasions not available at the UE
      * in the SCell being activated, for inter-band scenario, or
      * in any of the SCells already activated or being activated provided their cell specific reference signals are configured in the same slot, for intra-band scenario
    - L2,2 (L2,2 L2,2,max) is the number of configured SMTC occasions not available at the UE in the SCell being activated
* Unknown cell
  + Tactivation\_time = TFirstSSB\_MAX + (1+L3,1)\* TSMTC\_MAX + (2 + L3,2)\* Trs + 5ms, provided the SCell can be successfully detected in one attempt
  + L3,1 (L3,1 L3,1,max) is the number of configured SMTC occasions not available at the UE
    - in the SCell being activated, for inter-band scenario, or
    - in any of the SCells already activated or being activated provided their cell specific reference signals are configured in the same slot, for intra-band scenario
  + L3,2 (L3,2 L3,2,max) is the number of configured SMTC occasions not available at the UE in the SCell being activated

SCell deactivation:

* Interruption window
  + Interruption window length at SCell deactivation does not depend on LBT failures
  + The starting point of deactivation interruption on PCell or PSCell or any activated SCell shall not occur before slot n+1+THARQ/*NR\_slot\_length* and not occur after slot n+1+(THARQ +3ms)/ *NR\_slot\_length*, where THARQ is as agreed in RAN4#94-e (R4-2002336)
* Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is not configured
  + FFS: The SCell deactivation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured

PSCell addition/release:

* UE behavior related to L1,max and L2,max
  + Do not define L1,max and L2,max and the corresponding UE behavior
* PRACH in other candidate UL BWPs
  + Define requirements for UE which is not configured with *both* UL BWP with PRACH occasion on the target cell and UL LBT failure detection/recovery. When the UE is configured with *both* UL BWP with PRACH occasion on the target cell and UL LBT failure detection/recovery, clarify that the delay can be longer
* Requirements applicability when UE is not provided with SMTC configuration or measurement object on this frequency
  + If UE is not provided SMTC configuration or measurement object on this frequency: the requirement in this clause is applied with Trs =5 ms assuming the SSB transmission periodicity is 5ms; there is no requirement if the SSB transmission periodicity is not 5ms
* R4-2009252 Introduction of addition and release of NR PSCell operating with CCA in EN-DC: agreed.

Active TCI state switching:

* UE behavior
  + RRC-based active TCI state switching
    - FFS: UE declares beam failure upon exceeding LRRC,known,max (for known state) and L1RRC,unknown,max or L2RRC,unknown,max (for unknown state)
    - Wait for the response to RAN4 LS (R4-2005365)
  + MAC-CE based active TCI state switching
    - Confirm that the UE shall stay in the old state upon exceeding LMAC,known,max (for known state) and upon exceeding L1MAC,unknown,max or L2MAC,unknown,max (for unknown state)
      * Note 1: if Rel-15 behavior is modified then the agreement can be updated
      * Note 2: the UE shall also stop the active TCI state switching procedure (as agreed in RAN4#93)
    - FFS: CSI-RS based L1-RSRP in MAC-CE based active TCI state switching requirements
* Definitions
  + Tfirst-SSB is the time to the first SSB transmission occasion (“occasion” means the transmission is configured but may or may not come)
* R4-2008566 CR on introduction of active TCI state switching delay with CCA requirements for NR-U: agreed.

Active BWP switching:

* The ending point of UL BWP switching delay upon detection of consistent UL LBT failure
  + Option 1: UE is ready to transmit RACH
  + Option 2: UE transmits RACH
  + Option 3: The UE shall be able to transmit PRACH on the new UL BWP of the SpCell on the first available UL slot occurs right after slot n+TBWPswitchDelay +1, where TBWPswitchDelay is defined in Table 8.6.2-1
* Whether to introduce any non-overlapping condition for the old and new UL BWPs
  + No condition to be added on the relative frequency location of new UL BWP when UE is performing UL BWP switching upon detection of consistent UL LBT failure.
* R4-2008571: CR on introduction of Active BWP switching delay requirements for NR-U; technically endorsed
* R4-2007984: BWP switching interruption requirement due to consistent UL failure in 38.133; agreed.
* R4-2007985: Interruption due to BWP switching at consistent UL failure in 36.133; agreed.

RLM and link recovery procedures:

* The set of SSBs that UE is required to monitor
  + Wait for RAN1 feedback
* Whether UE is able to distinguish the unavailable RLM-RS in low SNR in NR-U
  + Option 1: UE is not able to distinguish the unavailable RLM-RS for Es/Iot ≤ -7dB in NR-U
  + Option 2: UE is not able to distinguish the unavailable RLM-RS for Es/Iot ≤ -XdB in NR-U. X is FFS based on simulation results.
* Availability of Q factor
  + Except for initial access, Q factor is always known to UE.
* CSI-RS based CBD requirement
  + RAN4 start to discuss CSI-RS based BFD requirement after RAN1 conclude on CSI-RS validation
* SSB-based OOS evaluation period
  + For SINREST ≤ X dB the OOS evaluation period
    - Option 1: Keep unchanged
    - Option 2: Fixed extension of number of samples as follows:
      * L = TBD for max(TSSB, TDRX) ≤ 40,
      * L = TBD for 40 <Max(TDRX, TSSB)≤320
      * L = TBD for TDRX >320
  + For SINREST > X dB the OOS evaluation period is FFS
  + X = [-7dB]
  + SINREST is the estimated SINR at the UE side
    - Option 1: Filtered SINR estimate over evaluation period
    - Option 2: Current SSB SINR estimate
    - Option 3: last available SSB SINR
    - Other options are not precluded
* CSI-RS based RLM requirement
  + Continue discussion in #96e meeting
* SSB based BFD requirement
  + Wait for the conclusion of SSB based OOS requirement
* CSI-RS based BFD requirement
  + RAN4 start to discuss CSI-RS based BFD requirement after RAN1 conclude on CSI-RS validation.
* CSI-RS based CBD requirement
  + RAN4 start to discuss CSI-RS based BFD requirement after RAN1 conclude on CSI-RS validation.
* SSB based CBD requirement
  + Set the SSB based CBD evaluation period for NR-U as follows

|  |  |
| --- | --- |
| Configuration | TEvaluate\_CBD\_CBD (ms) |
| non-DRX, DRX cycle ≤ 320ms | Max(25, ceil((3+LCBD)\*P) \* TSSB) |
| DRX cycle > 320ms | ceil((3+LCBD) \*P) \* TDRX |
| Note 1: TDRS is the periodicity of DRS in the set . TDRX is the DRX cycle length.  Note 2: LCBD is the number of SSBs not available at the UE during TEvaluate\_CBD\_SSB where LCBD ≤ LCBD\_max.  Note 3: LCBD,max=7 for Max(TDRX,TSSB) ≤ 40ms where TDRX=0 for non-DRX, LCBD\_max=5 for 40ms < Max(TDRX, TSSB) ≤ 320ms, and LCBD\_max=3 for TDRX > 320ms. | |

* + If LCBD > LCBD,max, UE behavior is same as the case UE cannot find any candidates.
* R4-2008572: Introduction of link recovery requirements with CCA; technically endorsed
* R4-2008573: Introduction of RLM requirements for NR-U; technically endorsed

Measurements:

Remaining issues in intra-frequency and inter-frequency measurements:

* Assumption of Q in PBCH reading
  + Except for initial access, Q can be assumed to be always known at the UE
* To define scheduling restrictions during SS-RSRP, SS-SINR and SS-RSRQ measurement
  + RAN4 to define scheduling restrictions during SS-RSRP, SS-SINR and SS-RSRQ measurements in NR-U
* L1-RSRP reporting delay for semi-persistent CSI reporting with PUSCH
* For semi-persistent CSI (L1-RSRP) reporting, reuse the Rel-15 reporting delay
* Event triggered reporting delay and Event triggered periodic, and periodic reporting delay
* Reuse Rel-15 delay, clarifying that this measurement reporting delay excludes a delay, which is caused by no UL resources being available for UE to send the measurement report on, and all delays due to UL LBT failures until the successful transmission of the report.
* Value of N
* N is not specified explicitly but determined by the existing procedures, e.g., the UE can reattempt the measurements until the earlier agreed 8 seconds limit (during which the undetectable cell can remain known) expires
* Different scheduling restriction when *deriveSSB\_IndexFromCell* is enabled, or not enabled, during SS-RSRQ, SS-RSRP, and SS-SINR measurements.
* Different scheduling restriction when *deriveSSB\_IndexFromCell* is enabled during SS-RSRP and SS-SINR measurements
* In NR-U, scheduling restriction should depend on the signaling of *deriveSSB\_IndexFromCell*
* Scheduling restriction of UE performing measurements with a different subcarrier spacing than PDSCH/PDCCH.
* In NR-U, the scheduling restriction of UE performing measurements with a different subcarrier spacing than PDSCH/PDCCH (clause 9.2.5.3.2 in TS 38.133) is applicable.
* FFS: scheduling restriction to intra-band and inter-band CA.

RSSI and CO measurements:

* Intra-frequency and inter-frequency RSSI definition
  + An intra-frequency RSSI measurement is defined when:
    - RSSI channel BW is contained within the channel/carrier BW of the UE.
* Further study whether to include SCS conditions into the definition and how to handle RSSI measurements under assumption of different SCS in RSSI, active BWP, etc.
* Options discussed in RAN4 95:
  + Option 2a: RMTC configured SCS is the same as the SCS of active BWP
  + Option 2b: the SCS of the RSSI measurement is the same as the SCS of an intra-frequency SSB or CSI-RS
  + Option 2c: No additional condition is needed.
  + Option 2d: the SCS configured for the RSSI measurement is the same as the SCS of a serving cell, where the SCS of a serving cell is FFS.
* RAN4 requirements will be defined for all RMTC configurations.
* CSSF definition
  + At least for CSSF within measurement gaps, CSSF needs to be adapted for NR-U to account for RSSI measurements in RMTC in addition to other NR-U measurements in SMTC.
  + FFS: whether CSSF needs to be adapted for CSSF outside measurement gaps.
* Need of measurement Gaps during RSSI measurements
  + Measurement gaps are needed at least when:
    - RSSI BW is not fully within the active BWP of the UE.
  + FFS: if another condition is needed.
* RSSI Reporting criteria
  + With Ecat=1, 1 report for RSSI and channel occupancy measurements is capable of 1 RSSI measurement and 1 channel occupancy measurement over a channel [TS 37.213] with CCA.

SFTD measurements:

* Maximum scaling of inter-RAT SFTD measurements
  + Candidate options:
    - Option 1: k = 3
    - Option 2: k = 4
* R4-2009101 CR to address NR-U in inter-RAT SFTD measurements in 36.133; agreed
* R4-2009102 CR to address NR-U in EN-DC SFTD measurements in 36.133; agreed
* R4-2008577 CR to TS 38.133: adding NR-U inter-frequency measurements; technically endorsed
* R4-2008578 CR to TS 36.133: adding inter-RAT NR-U measurements; technically endorsed
* R4-2008580 CR: Introduction of L1-RSRP measurement requirements with CCA; agreed
* R4-2008581 CR on introduction of intra-frequency measurements requirements for NR-U; technically endorsed
* R4-2006183 CR on UE measurements capability and reporting criteria for NR-U; technically endorsed
* R4-2009255 CR on introduction of reporting criteria for NR-U; agreed

Timing:

* Definition of “reference cell is available”
  + Wait for RAN1 feedback
* If a reference cell on a carrier frequency belonging to the PTAG/STAG, which is subject to CCA, is unavailable at the UE for more than 160 ms then the UE is allowed to use any of available activated SCell(s) at the UE in PTAG/STAG as a new reference cell
* R4-2008574: CR for timing requirement for NR-U; technically endorsed

#### 2.4.2 Remaining Open issues

RF Open issues in RAN4 are

* If and how to introduce 6 GHz band (5925 – 7125 MHz or variation thereof) for NR-U
* Whether to include 100 MHz channel bandwidth, channel raster, intra-cell guard band sizes
* Number of usable RB’s and intra-cell guard band sizes for 60 kHz SCS
* UE power class 3 requirements including assumed PA architecture, requirements for TxDIV and UL MIMO if PC5+PC5 is to be specified, and how to define requirements whether they are separate for two architectural alternatives or whether there is a single requirement that applies to both
* Verification and any necessary modification to general MPR for PC5
* A-MPR for PC5 and PC3 for Band n46 corresponding to NS\_28, NS\_29, NS\_30, and NS\_31
* UE coexistence spurious emission requirements
* Inter-band UL CA requirements
* EN-DC Tx and Rx requirements
* Tx time masks
* ACS, in-band blocking, out-of-band blocking, spurious response
* Intra-band DL CA receiver requirements
* Inter-band DL CA receiver requirements
* 10 MHz channel bandwidth requirements when used as SCell in CA

RRM Open issues in RAN4 are

* Remaining issues in cell reselection regarding definition of unavailable SMTC, definition of Ms, and max number of unavailable SMTC before UE starts cell detection again
* Remaining issues in SCell activation interruption window specification; activation/deactivation requirements when *ScellDeactivationTimer* is not configured
* Remaining issues in Active TCI state switching: UE behavior in RRC-based TCI state switching in persistent LBT failure
* Remaining issues in RLM and LR:
  + OOS requirements for SSB-based RLM
  + the set of SSB’s UE is required to monitor
  + BFD requirements
  + CSI-RS based RLM/LR
* Remaining issues in Measurements:
  + UE behaviour in case of successively exceeding the maximum number of DL LBT failure during measurements
  + UE behaviour in RRC\_CONNECTED mode when the serving cell is unavailable for consecutive SSB bursts
  + Applicability of the signaling of SMTC2 to NR-U
  + Scheduling restriction during RSSI/CO measurements
  + UE behavior when receiving the MAC CE deactivation command for semi-persistent CSI reporting, in case of UL LBT failure for sending the ACK
  + L1-RSRP reporting delay for semi-persistent CSI reporting with PUCCH
  + CSI-RS based L1-RSRP measurement
  + RSSI measurement period
  + Different requirements for LBE (dynamic channel access) and FBE (semi static channel access)
  + Number of candidate SSBs the UE is required to monitor during intra and inter-frequency measurements and cell detection
  + RSSI measurement bandwidth

RAN4 core completion is at 80% and performance completion is at 10%.

## 2.5 RAN5

#### 2.5.1 Agreements

#### 2.5.2 Remaining Open issues

#### 2.5.3 Remaining Open issues with cross-WG dependencies

## 2.6 RAN6

#### 2.6.1 Agreements

#### 2.6.2 Remaining Open issues

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

v04.81 31.07.2018 simplification of template and addition of cross-TSG aspects

v04.80 21.05.2018 minor adaptations for RAN #80

v04.79 26.02.2018 minor adaptations for RAN #79

v04.78 18.11.2017 minor adaptations for RAN #78

v04.77 06.08.2017 minor adaptations for RAN #77

v04.76 15.05.2017 minor adaptations for RAN #76

v04.75 31.01.2017 minor adaptations for RAN #75

v04.74 28.10.2016 minor adaptations for RAN #74

v04.73 01.09.2016 adaptations for RAN #73 (time units in extra Excel table, RAN6 reporting included)

v04.72 26.05.2016 adaptations for RAN #72 (introduction of NR & GERAN TUs)

v04.71 10.02.2016 minor adaptations for RAN #71

v04.70 30.10.2015 minor adaptations for RAN #70

v04.69 12.08.2015 minor adaptations for RAN #69

v04.68 21.05.2015 minor adaptations for RAN #68

v04.67 01.02.2015 minor adaptations for RAN #67

v04.66 16.11.2014 minor adaptations for RAN #66

v04.65 16.08.2014 minor adaptations for RAN #65

v04.64 22.05.2014 minor adaptations for RAN #64

v04.63 24.01.2014 restructuring for RAN #63 to cover Core & Perf. in one doc file

v03.62 11.11.2013 section 1.2.3 adapted for RAN #62

v03 11.08.2013 section 1.2.3 added on time budget

v02 07.05.2010 history added, some spelling corrections

v01 13.11.2009 First version of the template