**3GPP TSG RAN WG1 #108-e R1-2nnnnn**

**e-Meeting, February 21st – March 3rd, 2022**

**Source: Ad-Hoc Chair (AT&T)**

**Title: Session Notes of AI 8.16.13**

**Agenda Item:** **8.16.13**

**Document for:** **Endorsement**



#### 8.16.13 UE features for DSS

*Including UE features for LTE\_NR\_DC\_enh2.*

[108-e-R17-UE-features-DSS-01] Email discussion on UE features for DSS – Ralf (AT&T)

* 1st check point: February 25
* Final check point: March 3

**Agreement: Adopt the following changes highlighted in chromatic fonts, while keeping the yellow highlighting, if any, as shown**

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| 34. NR\_DSS | 34-1 | Cross-carrier scheduling from SCell to PCell/PSCell ~~[~~with search space restrictions~~]~~ (Type A) | Support of Cross-carrier scheduling from sSCell to PCell/PSCell ~~[~~with search space restrictions~~]~~ (Type A)   1. Cross-carrier scheduling from sSCell to PCell/PSCell with CIF 2. Search space restrictions~~FFS~~: sSCell USS set(s) (for CCS from sSCell to PCell/PSCell) and at least following search space sets on PCell/PSCell can only be configured such that UE does not monitor them in ~~same~~ overlapping [slot/symbol] of PCell/PSCell and sSCell    * USS sets for DCI formats 0\_1,1\_1,0\_2,1\_2 ~~(if supported)~~    * USS sets for DCI formats 0\_0,1\_0    * Type3-CSS set(s) for DCI formats 1\_0/0\_0 with C-RNTI/CS-RNTI/MCS-C-RNTI 3. ~~FFS: BD limit handling and any configuration of associated parameters and UE reporting of any associated parameters~~ Configuration of scaling factor α for BD and CCE limit handling and PDCCH overbooking handling on P(S)Cell 4. ~~FFS:~~ The number of ~~#~~unicast DCI limits for PCell/PSCell scheduling    * Processing K1 ~~one~~ unicast DCI scheduling DL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s)    * Processing ~~one~~ K2 unicast DCI scheduling UL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) 5. FFS: N is based on pair of (PCell/PSCell SCS, sSCell SCS): N=1 for(15,15), (30,30), (60,60) and N=2 for (15,30), (30,60) and N=4 for (15, 60) 6. Same numerology between sSCell and P(S)Cell or sSCell SCS is larger than P(S)Cell SCS 7. ~~FFS:~~ USS set(s) for DCI format 0\_1,1\_1~~,0\_2,1\_2~~ configured on sSCell for CCS from sSCell to Pcell/PSCell and USS set(s) for DCI format 0\_2,1\_2 configured on sSCell for CCS from sSCell to PCell/PSCell if UE supports FG 11-1 (*dci-Format1-2And0-2-r16*) 8. ~~FFS:~~ sSCell USS set(s) (for CCS from sSCell to Pcell/PSCell) and Type0/0A/1/2 CSS sets on Pcell/PSCell can be configured so that the UE monitor them in overlapping [slot/symbol] of Pcell/PSCell and sSCell~~. FFS overlap handling~~    * no simultaneous monitoring between ‘USS sets (for P(S)Cell scheduling) on sSCell’ and ‘Type 0/0A/1/2/CSS sets on P(S)Cell for DCI formats with CRC scrambled by C-RNTI/MCS-C-RNTI/CS-RNTI’    * simultaneous monitoring of ‘USS sets (for P(S)Cell scheduling) on sSCell’ and ‘Type 0/0A/1/2/CSS sets on P(S)Cell for DCI formats with CRC not scrambled by C-RNTI/MCS-C-RNTI/CS-RNTI’ 9. FFS: Support of monitoring DCI formats 0\_1,1\_1,0\_2,1\_2 on PCell/PSCell USS set(s) 10. ~~FFS: Support of sSCell deactivation/activation when sSCell cross carrier scheduling to PCell/PSCell is configured~~ 11. ~~FFS: Support of sSCell dormancy when sSCell cross carrier scheduling to PCell/PSCell is configured~~ 12. ~~FFS:~~ PDCCH monitoring occasion(s) ~~is within the first 3 OFDM symbols of~~ ~~a PCell/PSCell slot~~ 13. ~~FFS: Numbers of CORESET configurations and search space sets on sSCell (for PCell/PSCell cross-carrier scheduling) per BWP are 1 and 3, respectively~~ 14. FFS: frame boundary alignment between PCell/PSCell and sSCell 15. ~~FFS: Precoder granularity of REG-bundle size when CCS from sSCell to PCell/PSCell is configured~~ | 6-5 | Yes |  |  | Per BC | No | Applicable to FR1 only |  | ~~[~~Candidate value set ~~1~~: One or more of supported SCS combinations ({P(S)Cell SCS in kHz, sSCell SCS in kHz}) from following set are indicated by the UE: {15,15}, {15,30}, (15, 60) ~~for N=4~~,[ {30,30}, {30,60},{60,60}])  [Candidate value set 2: frequency band pair(s) for {PCell/PSCell, sSCell}]  Component 4 candidate values: (K1, K2) = {(1,1) for FDD P(S)Cell; (K1, K2) = (1,2) for TDD P(S)Cell, [(K1, K2) = (2,2) for FDD P(S)Cell; (K1, K2) = (2,4) for TDD P(S)Cell]}  Component 12 candidate values: FFS  [Value 1: PDCCH monitoring occasion(s) on PCell/PSCell and on sSCell for cross-carrier scheduling to PCell/PSCell is within the first 3 OFDM symbols of a PCell/PSCell slot.  Value 2: PDCCH monitoring occasion(s) on PCell/PSCell and on sSCell for cross-carrier scheduling to PCell/PSCell is not restricted to the first 3 OFDM symbols of a PCell/PSCell slot]  Note: The CCS from sSCell to PCell is applicable to FR1 only but there can be other SCells in FR2 configured for the UE | Optional with capability signalling |

**Agreement: Adopt the following changes highlighted in chromatic fonts, while keeping the yellow highlighting, if any, as shown**

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| 34. NR\_DSS | 34-2 | Cross-carrier scheduling from SCell to PCell/PSCell (Type B) | ~~[~~Support of Cross-carrier scheduling (CCS) from sSCell to PCell/PSCell (Type B)~~]~~   1. Cross-carrier scheduling from sSCell to PCell/PSCell with CIF 2. sSCell USS set(s) (for CCS from sSCell to PCell/PSCell) and search space sets on PCell/PSCell can be configured so that the UE monitors them in overlapping [slot/symbol] of PCell/PSCell and sSCell 3. Configuration of scaling factor α for BD and CCE limit handling and PDCCH overbooking handling on P(S)Cell 4. ~~FFS:~~ The number of ~~#~~unicast DCI limits for PCell/PSCell scheduling  * Processing K1 ~~one~~ unicast DCI scheduling DL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * Processing K2 ~~one~~ unicast DCI scheduling UL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * FFS: N is based on pair of (PCell/PSCell SCS, sSCell SCS): N=1 for(15,15), (30,30), (60,60) and N=2 for (15,30), (30,60) and N=4 for (15, 60)  1. Same numerology between sSCell and P(S)Cell or sSCell SCS is larger than P(S)Cell SCS 2. ~~FFS:~~ USS set(s) for DCI format 0\_1,1\_1~~,0\_2,1\_2~~ configured on sSCell for CCS from sSCell to PCell/PSCell and USS set(s) for DCI format 0\_2,1\_2 configured on sSCell for CCS from sSCell to PCell/PSCell if UE supports FG 11-1 (*dci-Format1-2And0-2-r16*) 3. ~~FFS: Support of sSCell deactivation/activation when sSCell cross carrier scheduling to PCell/PSCell is configured~~ 4. ~~FFS: Support of sSCell dormancy when sSCell cross carrier scheduling to PCell/PSCell is configured~~ 5. ~~FFS:~~ PDCCH monitoring occasion(s) ~~is within the first 3 OFDM symbols of a PCell/PSCell slot~~ 6. ~~FFS: Numbers of CORESET configurations and search space sets on sSCell (for PCell/PSCell cross-carrier scheduling)~~ 7. FFS: frame boundary alignment between PCell/PSCell and sSCell 8. ~~FFS: Precoder granularity of REG-bundle size when CCS from sSCell to PCell/PSCell is configured~~   Note: The SCell configured with Cross-carrier scheduling to Pcell/PSCell is referred to as ‘sSCell’ | 6-5 ~~[, 34-1]~~ | Yes |  |  | Per BC | No | Applicable to FR1 only |  | ~~[~~Candidate value set ~~1~~: One or more of supported SCS combinations ({P(S)Cell SCS in kHz, sSCell SCS in kHz}) from following set are indicated by the UE: {15,15}, {15,30}, (15, 60) ~~for N=4~~, [{30,30}, {30,60},{60,60}]  [Candidate value set 2: frequency band pair(s) for {Pcell/PSCell, sSCell}]  Component 4 candidate values: (K1, K2) = {(1,1) for FDD P(S)Cell; (K1, K2) = (1,2) for TDD P(S)Cell}  Component 10 candidate values: FFS  [Value 1: PDCCH monitoring occasion(s) on PCell/PSCell and on sSCell for cross-carrier scheduling to PCell/PSCell is within the first 3 OFDM symbols of a PCell/PSCell slot.  Value 2: PDCCH monitoring occasion(s) on PCell/PSCell and on sSCell for cross-carrier scheduling to PCell/PSCell is not restricted to the first 3 OFDM symbols of a PCell/PSCell slot]  Note: The CCS from sSCell to Pcell is applicable to FR1 only but there can be other Scells in FR2 configured for the UE | Optional with capability signalling |

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| 35. LTE\_NR\_DC\_enh2 | 35-1 | Aperiodic ~~TRS~~ CSI-RS for tracking for fast SCell activation | 1. Aperiodic CSI-RS ~~TRS~~ for tracking for fast SCell activation is ~~aperiodic and~~ triggered by enhanced SCell activation/deactivation MAC Ces 2. ~~Temporary RS is based on aperiodic TRS~~ 3. ~~Temporary~~ Aperiodic CSI-RS for tracking for fast SCell activation is triggered within the BWP indicated by firstActiveDownlinkBWP-Id for the sSCell 4. ~~A P-TRS of the to-be-activated Scell is indicated as a QCL source for the temporary RS in case of known Scell same as existing specification~~ 5. ~~FFS:~~ Maximum number of ~~temporary~~ aperiodic CSI-RS resource sets for tracking for fast SCell activation that can be configured to UE per CC ~~{1 … 16}~~ 6. FFS: Maximum number of ~~temporary~~ aperiodic CSI-RS resource sets for tracking for fast SCell activation that can be configured to UE across CCs ~~{1 … 256}~~ 7. FFS: Maximum number of ~~triggering states for~~ ~~temporary~~ aperiodic CSI-RS resource sets for tracking for fast SCell activation ~~based Scell activation~~ by a MAC-CE ~~{1 … 64}~~ 8. ~~FFS: Maximum number of temporary RS resource sets that can be associated with a triggering state {1 … 16}~~ 9. ~~FFS: Support of temporary RS based SCell activation on one or more from {FR1 FDD, FR1 TDD, FR1 unlicensed, FR2}~~   ~~[Note: following are reported via the legacy feature, FG2-33~~   * ~~Maximum number of configured NZP-CSI-RS resources per CC~~ * ~~Maximum total number of simultaneous NZP-CSI-RS resources in active BWPs across all CCs~~ * ~~Maximum number simultaneous NZP-CSI-RS resources per CC~~ * ~~Maximum total number of CSI-RS ports in simultaneous NZP-CSI-RS resources in active BWPs across all CCs]~~ | 6-5 | Yes | N/A |  | [Per UE/Per BC/Per band] | [No/Yes] | [No/Yes] |  | Component 5 candidate values: FFS  Component 6 candidate values: FFS  Component 7 candidate values: FFS  ~~[~~The NZP-CSI-RS configured as temporary RS for fast SCell activation are not considered when counting the maximum NZP-CSI-RS configurations of FG2-33~~]~~ | Optional with capability signalling |

[R1-2200916](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2200916.zip) Rel-17 UE features for DSS and MR-DC Huawei, HiSilicon

[R1-2201129](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201129.zip) Discussion on UE features for DSS vivo

[R1-2201179](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201179.zip) Discussion on Rel-17 UE features for DSS ZTE

[R1-2201420](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201420.zip) On UE features for DSS and LTE NR DC enhancements Nokia, Nokia Shanghai Bell

[R1-2201725](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201725.zip) UE features for DSS Intel Corporation

[R1-2201801](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201801.zip) Views on Rel-17 DSS UE features Apple

[R1-2201889](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201889.zip) Discussion on UE features for DSS CMCC

[R1-2201938](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2201938.zip) Discussion on UE features for NR DSS Xiaomi

[R1-2202048](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2202048.zip) UE features for DSS Samsung

[R1-2202054](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2202054.zip) On UE features for DSS MediaTek Inc.

[R1-2202177](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2202177.zip) UE features for DSS and LTE\_NR\_DC\_enh2 Qualcomm Incorporated

[R1-2202225](file:///C:\Users\youns\OneDrive\Documents\3GPP\RAN1%20tdocs\TSGR1_108-e\Docs\R1-2202225.zip) UE features for DSS and CA enhancements Ericsson