**3GPP TSG RAN WG1 #115 R1-23nnnnn**

**Chicago, USA, November 13th – November 17th, 2023**

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

**Title: Session Notes of AI 8.16.3**

**Agenda Item:** **8.16.3**

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

### 8.16.3 UE features for expanded and improved NR positioning

The following is a typo in the latest Rel. 18 NR UE features list:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 41. NR\_pos\_enh2 | 41-1-1 | Common SL PRS Processing Capability in a SL BWP | 1. Maximum SL PRS bandwidth in MHz in a resource pool for positioning, which is supported and reported by UE for SL-PRS measurement2. Maximum number of active SL PRS resources across all configured RPsassuming maximum SL PRS bandwidth in MHz, which is supported and reported by UE3. Maximum number of slots with active SL PRS resources across all configured RPsassuming maximum SL PRS bandwidth in MHz, which is supported and reported by UE4. Minimum time after the end of a slot carrying the active SL-PRS resource(s) assuming maximum number of symbols and maximum bandwidth for a UE finish the SL-PRS resource processing [and preparing the positioning measurement report] [assuming the active SL-PRS resources during this time haven’t exceeded the reported capabilities] which is supported and reported by UE][5. SL PRS buffering capability] |  | Yes | No | The UE does not support the reception and processing of SL PRS | [Per FS/Per Band/Per FCPC] | n/a | n/a | n/a | Component 1 candidate values:FR1 bands: {5, 10, 20, 40, 50, 80, 100}FR2 bands: {50, 100, 200, 400}Component 2 candidate values:FR1 bands: {1, 2, 4, 6, 8, 12, 16[, 24, 32, 48, 64, 128]} for each SCS: 15kHz, 30kHz, 60kHzFR2 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64, 128} for each SCS: 60kHz, 120kHzComponent 3 candidate values:FFSComponent 4 candidate values: {[30ms, 40ms, 50ms, 100ms]}[Component 5 candidate values: {Type 1 – sub-slot/symbol level buffering, Type 2 – slot level buffering}]Note: a SL PRS resource is considered as active starting at the end of the last symbol of the PSCCH carrying the SCI trigger and the occupancy is released at the end of timeline indicated in component 4Need for location server/~~server~~ UE to know if the feature is supported | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-2 | Receiving SL-PRS in a shared resource pool | 1. Support SL-PRS in shared resource pool2. Support receiving SCI format 2D | [15-1, 15-4, 41-1-1] | Yes | [No] | Receiving SL-PRS in a shared resource pool is not supported | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported[UE indicating support of FG 41-1-1 must indicate either this feature group or feature group 41-1-3 is supported or both are supported] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-3 | Receiving SL-PRS in a dedicated resource pool | 1. Support SL-PRS in dedicated resource pool2. Support receiving SCI format 1B | [15-1, 15-4 41-1-1] | Yes | [No] | Receiving SL-PRS in a dedicated resource pool is not supported | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported[UE support of FG 41-1-1 must indicate either this feature group or feature group 41-1-2 is supported or both are supported] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-4c | Transmitting SL-PRS mode 2 in a dedicated resource pool | 1. UE can transmit SL-PRS and PSCCH within a slot without PSSCH in dedicated resource pool2. UE can transmit SL-PRS according to the mapping rule between PSCCH and SL-PRS3. Support transmitting SCI format 1B | [15-[x], 41-1-3], at least one of {41-1-8, 41-1-10} | Yes | FFS | Transmitting SL-PRS mode 2 in a dedicated resource pool is not supported  | [Per band] | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7a | SL PRS measurement for SL-RSTD | 1. Support SL RSTD measurement based on SL-PRS2. Support SL RSTD measurement reporting[FFS reporting N SL RSTD measurements for different SL-PRS reception for the same pair of UEs] | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported[FFS: candidate values of N={1,2,3,4}] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7b | SL PRS measurement for SL RTOA | 1. Support SL RTOA measurement based on SL-PRS2. Support SL RTOA measurement reporting[FFS reporting N SL RTOA measurements for different SL-PRS reception for the same pair of UEs] | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported[FFS: candidate values of N={1,2,3,4}] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7c | SL PRS measurement for UE Rx – Tx time difference without Tx time stamp | 1. Support UE Rx – Tx time difference measurement based on SL PRS2. Support UE Rx – Tx time difference measurement reporting without Tx time stamp[FFS reporting N Rx-Tx measurements for different SL-PRS reception for the same pair of UEs] | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported[FFS: candidate values of N={1,2,3,4}] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7d | SL PRS measurement for UE Rx – Tx time difference with Tx time stamp | 1. Support UE Rx – Tx time difference measurement based on SL PRS2. Support UE Rx – Tx time difference measurement reporting with Tx time stamp3. Reporting M Rx-Tx measurements for the same SL-PRS transmission (or reception) and different SL-PRS reception (or transmission) for the same pair of UEs[FFS reporting N Rx-Tx measurements for different SL-PRS reception for the same pair of UEs] | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supportedComponent 3 candidate values of M={1,2,3,4}[FFS: candidate values of N={1,2,3,4}] | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7e | SL PRS measurement for SL PRS-RSRP | 1. Support SL PRS-RSRP measurement based on SL-PRS2. Support SL PRS-RSRP measurement reporting | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7f | SL PRS measurement for SL PRS-RSRPP | 1. Support SL PRS-RSRPP measurement based on SL-PRS2. Support SL PRS-RSRPP measurement reporting | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-1-7g | SL PRS measurement for SL AoA | 1. Support SL AoA measurement based on SL-PRS2. Support SL AoA measurement reporting types. Candidate values: bitmap {GCS, LCS with translation, LCS without translation}. | FFS | No | No |  | Per band | n/a | n/a | n/a | Need for location server/~~server~~ UE to know if the feature is supported | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-5-1 | PRS measurement with Rx frequency hopping within a MG and measurement reportin RRC\_CONNECTED for RedCap UEs | ~~[~~1. Maximum DL PRS bandwidth across all hops~~]~~~~[2. Maximum DL PRS bandwidth per hop~~3. Maximum number of hops~~]~~~~[~~4. Duration of DL PRS symbols N3 in units of ms a UE can process every T3 ms ~~]~~~~[~~5. RF Rx retune times between consecutive hops~~]~~~~[~~6. Overlapping PRB(s) between adjacent hops~~]~~ | 13-1 [, 28-1] | Yes | n/a | PRS measurement with Rx frequency hopping within a MG and measurement report in RRC\_CONNECTED for RedCap UEs is not supported | Per band | n/a | n/a | n/a | ~~[~~Component 1 candidate values:FR1: {40, 50, 80, 100}FR2: {100, 200, 400}~~]~~~~[Component 2 candidate values:~~~~FR1: {5, 10, 20}~~~~FR2: {50, 100}~~Component 3 candidate values: {2,3,4,5,6}~~]~~~~[~~Component 4 candidate values:T3: {8, 16, 20, 30, 40, 80, 160, 320, 640, 1280} msN3: {0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50} ms~~]~~~~[~~Component 5 candidate values:FR1: {70us, 140us, 210us}FR2: {35us, 70us, 140us}~~]~~~~[~~Component 6 candidate values: {0, 1, 2, 4}~~]~~Note 1: The maximum DL PRS bandwidth per hop follows component 1 of FG 13-1Note 2: DL PRS buffering capability follows component 2 of FG 13-1FFS: whether this FG is applicable to non-Redcap UENeed for location server to know if the feature is supported. | Optional with capability signalling |

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| 41. NR\_pos\_enh2 | 41-5-2 | Support of positioning SRS with Tx frequency hopping ~~[~~in RRC\_CONNECTED~~/RRC\_INACTIVE]~~ for RedCap UEs | 1. Maximum SRS bandwidth across all hops2. Maximum number of hops 3. RF Tx retuning time between consecutive hops4. Switching time between active BWP and frequency hop5. Overlapping PRB(s) between adjacent hops6. Support of {0,1,2,4} overlapping PRB(s) between adjacent hops~~FFS: One component is Frequency domain overlap(s) between hops~~~~FFS: separate row for processing capability~~ |  | Yes | n/a | Positioning SRS with Tx hopping in RRC\_CONNECTED is not supported | Per band | n/a | n/a | n/a | Component 1 candidate values:FR1: {40, 50, 80, 100}FR2: {100, 200, 400}Component 2 candidate values: {2,3,4,5,6,FFS} Component 3 candidate values:FR1: {70us, 140us, 210us}FR2: {35us, 70us, 140us}Component 4 candidate values:{100us, 140us, 200us, 300us, 500us}Note: No additional UE requirements shall be specified for the case of Tx hopping with non-overlapping hops compared to the case of Tx hopping with overlapping hops, e.g., a UE is not responsible for keeping phase continuity across the hops in either case of overlapping or non-overlapping hopsNeed for location server to know if the feature is supported | Optional with capability signalling |
| 41. NR\_pos\_enh2 | 41-5-2a | Support of positioning SRS with Tx frequency hopping in RRC\_INACTIVE for RedCap UEs | 1. Maximum SRS bandwidth across all hops2. Maximum number of hops 3. RF Tx retuning time between consecutive hops4. Switching time between active BWP and frequency hop5. Overlapping PRB(s) between adjacent hops6. Support of {0,1,2,4} overlapping PRB(s) between adjacent hops | 27-15b | Yes | n/a | Positioning SRS with Tx hopping in RRC\_INACTIVE is not supported | Per band | n/a | n/a | n/a | Component 1 candidate values:FR1: {40, 50, 80, 100}FR2: {100, 200, 400}Component 2 candidate values: {2,3,4,5,6,FFS} Component 3 candidate values:FR1: {70us, 140us, 210us}FR2: {35us, 70us, 140us}Component 4 candidate values:{100us, 140us, 200us, 300us, 500us}Note: No additional UE requirements shall be specified for the case of Tx hopping with non-overlapping hops compared to the case of Tx hopping with overlapping hops, e.g., a UE is not responsible for keeping phase continuity across the hops in either case of overlapping or non-overlapping hopsNeed for location server to know if the feature is supported | Optional with capability signalling |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 41. NR\_pos\_enh2 | 41-1-1 | Common SL PRS Processing Capability in a SL BWP | 1. Maximum SL PRS bandwidth in MHz in a resource pool for positioning, which is supported and reported by UE for SL-PRS measurement2. Maximum number of active SL PRS resources across all configured RPsin a slotassuming maximum SL PRS bandwidth in MHz, which is supported and reported by UE3. Maximum number of slots with active SL PRS resources across all configured RPsassuming maximum SL PRS bandwidth in MHz, which is supported and reported by UE4. Minimum time after the end of a slot carrying the active SL-PRS resource(s) assuming maximum number of symbols and maximum bandwidth for a UE to finish the SL-PRS resource and the associated PSCCH processing ~~[and prepareing the positioning measurement report] [assuming the active SL-PRS resources during this time haven’t exceeded the reported capabilities]~~ which is supported and reported by UE~~]~~~~[5. SL PRS buffering capability]~~ |  | Yes | No | The UE does not support the reception and processing of SL PRS | [Per FS/Per Band/Per FSPC] | n/a | n/a | n/a | Component 1 candidate values:FR1 bands: {5, 10, 20, 40, 50, 80, 100}FR2 bands: {50, 100, 200, 400}Component 2 candidate values:FR1 bands: {1, 2, 4, 6, 8, 12, 16~~[~~, 24~~, 32, 48, 64, 128]~~} for each SCS: 15kHz, 30kHz, 60kHzFR2 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64, 128} for each SCS: 60kHz, 120kHzComponent 3 candidate values: FFSComponent 4 candidate values: {[30ms, 40ms, 50ms, 100ms]}~~[Component 5 candidate values: {Type 1 – sub-slot/symbol level buffering, Type 2 – slot level buffering}]~~Note: a SL PRS resource is considered as active starting at the end of the last symbol of the PSCCH carrying the SCI trigger and the occupancy is released at the end of timeline indicated in component 4Need for location server/server UE to know if the feature is supported | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-4a | Transmitting SL-PRS ~~[scheme mode 1 and scheme 2]~~ in a shared resource pool | 1. Support of transmitting SL-PRS ~~[scheme mode 1 and scheme 2]~~ in a shared resource pool2. Support transmitting SCI format 2D~~[3. Support downlink pathloss based open loop power control for SL PRS]~~ | [15-2, 41-1-2] | Yes | ~~FFS~~ No | Transmitting SL-PRS ~~[scheme mode 1 and scheme 2]~~ in a shared resource pool is not supported | ~~[~~Per band~~]~~ | n/a | n/a | n/a | The supported resource allocation modes are the same as for communication and signaled in FGs [x-y] and [x-z]~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-4b | Transmitting SL-PRS ~~scheme~~ mode 1 in a dedicated SL PRS resource pool | 1. UE can transmit SL-PRS and PSCCH within a slot without PSSCH in dedicated SL PRS resource pool2. UE can transmit SL-PRS according to the mapping rule between PSCCH and SL-PRS3. Support transmitting SCI format 1B4. Support receiving DCI format ~~[~~3\_2~~x]~~~~[~~5. Support downlink pathloss based open loop power control of SL-PRS~~]~~  | [15-2, 41-1-3] | Yes | ~~FFS~~ No | Transmitting SL-PRS ~~scheme~~ mode 1 in a dedicated SL PRS resource pool is not supported  | ~~[~~Per band~~]~~ | n/a | n/a | n/a | ~~[~~Need for location server/UE to know if the feature is supported~~]~~Note: component 5 is not required to be supported in a band indicated with only the PC5 interface in 38.101-1 Table 5.2E.1-1 | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-5 | SL-PRS congestion control in a dedicated resource pool | 1) UE can report SL PRS CBR measurement to gNB when operating in ~~scheme~~ mode 1 and ~~scheme~~ mode 2~~[~~2) UE can adjust its radio parameters based on SL PRS CBR measurement and SL PRS CRlimit~~.]~~3) UE can process SL PRS CBR and SL PRS CR within the time it indicates | FFS | Yes | No | SL-PRS congestion control in a dedicated resource pool is not supported | Per band | n/a | n/a | n/a | ~~[~~Component-3 candidate value set{Congestion process time 1, Congestion process time 2, Congestion process time 3} whereCongestion process time 1: 2, 2, 4, 8 slots for 15, 30, 60, 120 kHz subcarrier spacing.Congestion process time 2: 2, 4, 8, 16 slots for 15, 30, 60, 120 kHz subcarrier spacingCongestion process time 3: 3, 6, 12, 24 slots for 15, 30, 60, 120 kHz subcarrier spacing~~]~~Note: component 1 is not required to be supported in a band indicated with only the PC5 interface in 38.101-1 Table 5.2E.1-1 | Optional with capability signaling. |

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| 41. NR\_pos\_enh2 | 41-1-7a | SL PRS measurement for SL-RSTD | 1. Support SL RSTD measurement based on SL-PRS2. Support SL RSTD measurement reporting~~[FFS~~ 3. Maximum number of ~~reporting N~~ SL RSTD measurement~~s~~ reporting for different SL-PRS reception for the same pair of UEs~~]~~ | FFS | No | No | UE does not support SL PRS measurement for SL-RSTD | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported~~[FFS:~~ Component 3 candidate values: ~~of N=~~{1,2,3,4}~~]~~ | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-7b | SL PRS measurement for SL RTOA | 1. Support SL RTOA measurement based on SL-PRS2. Support SL RTOA measurement reporting~~[FFS~~ 3. Maximum number of ~~reporting N~~ SL RTOA measurement~~s~~ reporting for different SL-PRS reception for the same pair of UEs~~]~~ | FFS | No | No | UE does not support SL PRS measurement for SL RTOA | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported~~[FFS:~~ Component 3 candidate values: ~~of N=~~{1,2,3,4}~~]~~ | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-7c | SL PRS measurement for UE Rx – Tx time difference without Tx time stamp | 1. Support UE Rx – Tx time difference measurement based on SL PRS2. Support UE Rx – Tx time difference measurement reporting without Tx time stamp~~[FFS~~ 3. Maximum number of ~~reporting N~~ Rx-Tx measurement~~s~~ reporting for different SL-PRS reception for the same pair of UEs~~]~~ | FFS | No | No | UE does not support SL PRS measurement for Rx – Tx time difference without Tx time stamp | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported~~[FFS:~~ Component 3 candidate values: ~~of N=~~{1,2,3,4}~~]~~ | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-1-7d | SL PRS measurement for UE Rx – Tx time difference with Tx time stamp | 1. Support UE Rx – Tx time difference measurement based on SL PRS2. Support UE Rx – Tx time difference measurement reporting with Tx time stamp3. Reporting M Rx-Tx measurements for the same SL-PRS transmission (or reception) and different SL-PRS reception (or transmission) for the same pair of UEs~~[FFS~~ 4. Maximum number of ~~reporting N~~ Rx-Tx measurement~~s~~ reporting for different SL-PRS reception for the same pair of UEs~~]~~ | FFS | No | No | UE does not support SL PRS measurement for UE Rx – Tx time difference with Tx time stamp | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supportedComponent 3 candidate values of M={1,2,3,4}~~[FFS:~~ Component 4 candidate values: ~~of N=~~{1,2,3,4}~~]~~ | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-3-1 | SRS for positioning configuration in multiple cells for UEs in RRC\_INACTIVE state for initial UL BWP | 1. SRS for positioning configuration in multiple cells for UEs in RRC\_INACTIVE state for initial UL BWP~~[2. Maximum number of configured [cells] for SRS for positioning in RRC\_INACTIVE state]~~ | FFS | Yes | n/a | SRS for positioning configuration in multiple cells for UEs in RRC\_INACTIVE state for initial UL BWP is not supported | Per band | n/a | n/a | n/a | Need for location server to know if the feature is supported | Optional with capability signalling |
| 41. NR\_pos\_enh2 | 41-3-1a | UE autonomous TA adjustment  | UE autonomously adjust the TA when cell-reselection happens | 41-3-1 | Yes | n/a | UE cannot autonomously adjust the TA when cell-reselection happens | Per band | n/a | n/a | n/a |  | Optional with capability signalling |

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| 41. NR\_pos\_enh2 | 41-4-6 | Positioning SRS bandwidth aggregation in RRC\_CONNECTED | ~~[~~1. The ~~maximum~~ number of supported aggregated carriers in intra band contiguous carriers2. Maximum aggregated UL SRS bandwidth in MHz, which is supported and reported by UE~~]~~~~[3. Support of periodic/semi-persistent/aperiodic UL SRS for UL bandwidth aggregation]~~5. Max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation6. Maximum number of ~~[periodic/semi-persistent/aperiodic]~~ aggregated SRS resources for bandwidth aggregation7. Maximum number of ~~[periodic/semi-persistent/aperiodic]~~ aggregated SRS resources for bandwidth aggregation per slot8. Support the same SRS power reduction across aggregated carriers | [13-8, 6-2] | Yes | n/a | Positioning SRS bandwidth aggregation in RRC\_CONNECTED is not supported  | ~~[~~Per ~~band~~ FS~~]~~ | n/a | n/a | n/a | ~~[~~Component 1 candidate values: {2, 3, 2and3}Component 2 candidate values:For 2 in Component 1:FR1 bands: {80, 100, 160, 200}FR2 bands: {50, 100, 200, 400, 600, 800}~~]~~For 3 in Component 1:FR1 bands: {80, 100, 160, 200, 300}FR2 bands: {50, 100, 200, 400, 600, 800, 1000, 1200}Component 5 candidate values: {1, 2, 4, 8, 12, 16}Component 6 candidate values: ~~{1,2,4,8,16,32,64}~~[Periodic: {1,2,4,8,16,32,64}Aperiodic: {0,1,2,4,8,16,32,64}Semi-persistent: {0,1,2,4,8,16,32,64}]Component 7 candidate values: [Periodic: {1,2,3,4,5,6,8,10,12,14}Aperiodic: {0,1,2,3,4,5,6,8,10,12,14}Semi-persistent: {0,1,2,3,4,5,6,8,10,12,14}]Note: The UE supports the simultaneous transmission in a coherent manner of 2 or 3 SRS resources in 2 or 3 intra-band contiguous CCs.Note: each two or three linked SRS resources are counted as 1 resourceNote: A UE that support FG 13-8a must signal a non-zero value for components 6 and 7 for aperiodic Need for location server to know if the feature is supported. UE only reports the number on bands for the current configured CA band combination. | Optional with capability signaling |
| 41. NR\_pos\_enh2 | 41-4-6a | Joint triggering by single Rel. 17 DCI | Support a Rel-17 single DCI scheduling positioning SRS resource sets across the linked carriers for SRS bandwidth aggregation in RRC\_CONNECTED state | 41-4-6 | Yes | n/a | Joint triggering by single Rel. 17 DCI is not supported  | [Per band] | n/a | n/a | n/a |  | Optional with capability signaling |

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| 41. NR\_pos\_enh2 | 41-4-7 | Positioning SRS bandwidth aggregation independent from UL communication CA in RRC\_CONNECTED | ~~[~~1. The ~~maximum~~ number of supported aggregated carriers in intra band contiguous carriers2. Maximum aggregated UL SRS bandwidth in MHz, which is supported and reported by UE~~]~~~~[3. Support of periodic/semi-persistent/aperiodic UL SRS for UL bandwidth aggregation]~~5. Max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation6. Maximum number of ~~[periodic/semi-persistent/aperiodic]~~ aggregated SRS resources for bandwidth aggregation7. Maximum number of ~~[periodic/semi-persistent/aperiodic]~~ aggregated SRS resources for bandwidth aggregation per slot8. Support the same SRS power reduction across aggregated carriers[9. Guard period] | FFS | Yes | n/a | Positioning SRS bandwidth aggregation independent from UL communication CA in RRC\_CONNECTED is not supported  | ~~[~~Per ~~band~~ FS~~]~~ | n/a | n/a | n/a | ~~[~~Component 1 candidate values: {2,3,2and3}Component 2 candidate values:For 2 in Component 1:FR1 bands: {80, 100, 160, 200M}FR2 bands: {50, 100, 200, 400, 600, 800}~~]~~For 3 in Component 1:FR1 bands: {80, 100, 160, 200, 300}FR2 bands: {50, 100, 200, 400, 600, 800, 1000, 1200}Component 5 candidate values: {1, 2, 4, 8, 12, 16}Component 6 candidate values: ~~{1,2,4,8,16,32,64}~~[Periodic: {1,2,4,8,16,32,64}Aperiodic: {0,1,2,4,8,16,32,64}Semi-persistent: {0,1,2,4,8,16,32,64}]Component 7 candidate values: ~~{1,2,3,4,5,6,8,10,12,14}~~[Periodic: {1,2,3,4,5,6,8,10,12,14}Aperiodic: {0,1,2,3,4,5,6,8,10,12,14}Semi-persistent: {0,1,2,3,4,5,6,8,10,12,14}]Note: The UE supports the simultaneous transmission in a coherent manner of 2 or 3 SRS resources in 2 or 3 intra-band contiguous CCs.Note: each two or three linked SRS resources are counted as 1 resourceNeed for location server to know if the feature is supported. UE only reports the number on bands for the current configured CA band combination.Note: Guard period is needed before and after the aggregated SRS transmissions when SRS resource is configured within a CC without PUSCH/PUCCH is linked for aggregation with an SRS resource configured within an UL active BWP of a UL communication CC | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-4-8 | Positioning SRS bandwidth aggregation in RRC\_INACTIVE | ~~[~~1. The ~~maximum~~ number of supported aggregated carriers in intra band contiguous carriers2. Maximum aggregated UL SRS bandwidth in MHz, which is supported and reported by UE~~]~~~~[3. Support of periodic/semi-persistent UL SRS for UL bandwidth aggregation]~~5. Max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation6. Maximum number of ~~[periodic/semi-persistent]~~ aggregated SRS resources for bandwidth aggregation7. Maximum number of ~~[periodic/semi-persistent]~~ aggregated SRS resources for bandwidth aggregation per slot8. Support the same SRS power reduction across aggregated carriers | [27-15b] | Yes | n/a | Positioning SRS bandwidth aggregation in RRC\_INACTIVE is not supported  | ~~[~~Per band~~]~~ | n/a | n/a | n/a | ~~[~~Component 1 candidate values: {2,3,2and3}Component 2 candidate values:For 2 in Component 1:FR1 bands: {80, 100, 160, 200M}FR2 bands: {50, 100, 200, 400, 600, 800}~~]~~For 3 in Component 1:FR1 bands: {80, 100, 160, 200, 300}FR2 bands: {50, 100, 200, 400, 600, 800, 1000, 1200}Component 5 candidate values: {1, 2, 4, 8, 12, 16}Component 6 candidate values: ~~{1,2,4,8,16,32,64}~~[Periodic: {1,2,4,8,16,32,64}Semi-persistent: {0,1,2,4,8,16,32,64}]Component 7 candidate values: ~~{1,2,3,4,5,6,8,10,12,14}~~[Periodic: {1,2,3,4,5,6,8,10,12,14}Semi-persistent: {0,1,2,3,4,5,6,8,10,12,14}]Need for location server to know if the feature is supported. | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-11 | TDM-based multiplexing of SL-PRS ~~[transmission/~~reception~~]~~ from different UEs in the same slot in dedicated resource pool | Support of TDM-based multiplexing of SL-PRS ~~[transmission/~~reception~~]~~ from different UEs in the same slot in dedicated resource pool  | FFS | No | ~~FFS~~ No | TDM-based multiplexing of SL-PRS ~~[transmission/~~reception~~]~~ from different UEs in the same slot is not supported in dedicated resource pool | ~~[~~Per band~~]~~ | n/a | n/a | n/a | ~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-14 | LoS/NLoS indicator for SL positioning ~~[~~per measurement~~]~~ | Support of LoS/NLoS indicator for SL positioning ~~[~~per measurement~~]~~ | FFS | No | ~~FFS~~ No | LoS/NLoS indicator for SL positioning ~~[~~per measurement~~]~~ is not supported | Per band | n/a | n/a | n/a | Component 1 candidate values: {hard value, hard+soft value}~~[~~Need for location server/UE to know if the feature is supported~~]`~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-17 | Open loop SL pathloss based power control for SL-PRS and associated PSCCH and SL RSRP report ~~[~~for dedicated resource pool~~]~~ | ~~FFS: merge with 41-1-4 for SL PC and 41-1-3 for RSRP report~~Support of open loop SL pathloss based power control for SL-PRS and associated PSCCH and SL RSRP report ~~[~~for dedicated resource pool~~]~~ for unicast transmissions | FFS | Yes | ~~FFS~~ Yes | Open loop SL power control and SL RSRP report ~~[~~for dedicated resource pool~~]~~ is not supported for unicast transmissions ~~FFS: whether/how to address UEs that only support SL PRS reception but not sidelink RSRP reporting~~ | Per band | n/a | n/a | n/a |  | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-2-1 | DL RSCP reporting based on DL PRS in RRC\_CONNECTED | 1. Support of DL RSCP reporting based on DL PRS in RRC\_CONNECTED~~2. The Maximum number of Rx-Tx measurements that can be associated with the first path PRS RSCP measurements per TRP~~  | FFS | No | n/a | DL RSCP reporting based on DL PRS in RRC\_CONNECTED is not supported | Per band | n/a | n/a | n/a | Note: DL RSCP is reported together with UE Rx-Tx time difference measurement~~[Note: The maximum number of RSCP measurements per TRP is less than or equal to four times the value in FG 13-11]~~~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-2-1a | DL RSCPD reporting based on DL PRS in RRC\_CONNECTED | 1. Support of DL RSCPD reporting based on DL PRS in RRC\_CONNECTED~~2. The maximum number of first path PRS RSCPD measurements per pair of TRPs~~ | FFS | No | n/a | DL RSCPD reporting based on DL PRS in RRC\_CONNECTED is not supported | Per band | n/a | n/a | n/a | Note: DL RSCPD is reported along with measurement report for DL-RSTD~~[Note: The maximum number of RSCPD measurements per TRP is less than or equal to FG 13-6]~~~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-2 | Receiving SL-PRS in a shared resource pool | 1. Support SL-PRS in shared resource pool2. Support receiving SCI format 2D | [15-1, 15-4, 41-1-1] | Yes | ~~[~~No~~]~~ | Receiving SL-PRS in a shared resource pool is not supported | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported[UE indicating support of FG 41-1-1 must indicate either this feature group or feature group 41-1-3 is supported or both are supported] | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-3 | Receiving SL-PRS in a dedicated resource pool | 1. Support SL-PRS in dedicated resource pool2. Support receiving SCI format 1B | [15-1, 15-4 41-1-1] | Yes | ~~[~~No~~]~~ | Receiving SL-PRS in a dedicated resource pool is not supported | Per band | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported[UE support of FG 41-1-1 must indicate either this feature group or feature group 41-1-2 is supported or both are supported] | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-4c | Transmitting SL-PRS mode 2 in a dedicated resource pool | 1. UE can transmit SL-PRS and PSCCH within a slot without PSSCH in dedicated resource pool2. UE can transmit SL-PRS according to the mapping rule between PSCCH and SL-PRS3. Support transmitting SCI format 1B | [15-[x], 41-1-3], at least one of {41-1-8, 41-1-10} | Yes | ~~FFS~~ No | Transmitting SL-PRS mode 2 in a dedicated resource pool is not supported  | ~~[~~Per band~~]~~ | n/a | n/a | n/a | Need for location server/server UE to know if the feature is supported | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-12 | Comb-based multiplexing for SL-PRS reception from different UEs in the same slot in dedicated resource pool | Support of comb-based multiplexing for SL-PRS reception from different UEs in the same slot in dedicated resource pool | FFS | No | ~~FFS~~ No | Comb-based multiplexing for SL-PRS reception from different UEs in the same slot is not supported in dedicated resource pool | ~~[~~Per band~~]~~ | n/a | n/a | n/a | ~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-13 | Reporting the additional paths for SL positioning | 1. Maximum number of additional detected path timing reporting for K additional paths for SL positioning2. Support of RSRPP reporting for additional paths | FFS | No | ~~FFS~~ No | Reporting the additional paths for SL positioning is not supported | Per band | n/a | n/a | n/a | Component 1 candidate values: {~~[~~1, 2,~~]~~ 4, 6, 8}~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-19 | ARP location provision for sidelink as assistance data | Support of ARP location provision for sidelink as assistance data | ~~FFS~~ | No | ~~FFS~~ No | UE cannot provide ARP location for sidelink as assistance data | ~~FFS~~ Per band | ~~FFS~~ n/a | ~~FFS~~ n/a | ~~FFS~~ n/a | ~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-1-19a | Report of Rx ARP-ID with SL positioning measurements | Support providing Rx ARP-ID with SL positioning measurements |  | No | ~~FFS~~ No | UE cannot report Rx ARP-ID with SL positioning measurements | ~~FFS~~ Per band | ~~FFS~~ n/a | ~~FFS~~ n/a | ~~FFS~~ n/a | ~~[~~Need for location server/UE to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-2-2 | DL RSCP reporting based on DL PRS in RRC\_INACTIVE | Support of DL RSCP reporting based on DL PRS measurement in RRC\_INACTIVE | FFS | No | n/a | DL RSCP reporting based on DL PRS in RRC\_INACTIVE is not supported | Per band | n/a | n/a | n/a | Note: DL RSCP is reported together with UE Rx-Tx time difference measurement~~[Note: The maximum number of RSCP measurements per TRP is less than or equal to FG 13-11]~~~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-2-2a | DL RSCPD reporting based on DL PRS in RRC\_INACTIVE | 1. Support of DL RSCPD reporting based on DL PRS measurement in RRC\_INACTIVE | FFS | No | n/a | DL RSCPD reporting based on DL PRS in RRC\_INACTIVE is not supported | Per band | n/a | n/a | n/a | Note: DL RSCPD is reported along with measurement report for DL-RSTD~~[Note: The maximum number of RSCP measurements per TRP is less than or equal to FG 13-6]~~~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-2-3 | Measurement on indicated DL PRS resource sets within the indicated time window(s) ~~[~~for UE based and UE assisted~~]~~ | Support of Measurement on indicated DL PRS resource sets within the indicated time window(s) ~~[~~for UE based and UE assisted~~]~~ | 13-1, FFS more | No | N.A. | Measurement on indicated DL PRS resource sets within the indicated time window(s) ~~[~~for UE based and UE assisted~~]~~ is not supported | Per band | N.A. | N.A. | N.A. | ~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling |

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

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| 41. NR\_pos\_enh2 | 41-3-3 | Support of PRS measurement in RRC\_IDLE | Support of DL PRS measurement in RRC\_IDLE for Rel. 17 methods the UE supports in RRC\_INACTIVE ~~[with measurement reporting when UE switches to RRC\_CONNECTED mode]~~ | FFS | No | n/a | PRS measurements in RRC\_IDLE not supported | Per band | n/a | n/a | n/a | ~~[~~Need for location server to know if the feature is supported~~]~~ | Optional with capability signaling. |

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

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| 41. NR\_pos\_enh2 | 41-5-1a | PRS measurement with Rx frequency hopping ~~[and measurement report]~~ in RRC\_INACTIVE for RedCap UEs | Support of PRS measurement with Rx frequency hopping ~~[and measurement report]~~ in RRC\_INACTIVE for RedCap UEs | 41-5-1, 27-6 | Yes | n/a | PRS measurement with Rx frequency hopping ~~[and measurement report]~~ in RRC\_INACTIVE for RedCap UEs is not supported | Per band | n/a | n/a | n/a | Need for location server to know if the feature is supported. | Optional with capability signalling |

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

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| 41. NR\_pos\_enh2 | 41-1-10 | Support of full sensing in a dedicated resource pool | 1. UE can transmit SL-PRS and associated PSCCH using full sensing2. Support DL pathloss based open loop power control when configured by NR Uu | FFS | Yes | No | UE cannot transmit SL-PRS using full sensing in a dedicated resource pool | [Per FS] | n/a | n/a | n/a | Note: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in 38.101-1 Table 5.2E.1-1Note: Component 2 is not required to be supported in a band indicated with only the PC5 interface in 38.101-1 Table 5.2E.1-1 | Optional with capability signaling |

R1-2310826 Sidelink positioning UE features FUTUREWEI

R1-2310843 UE features for Rel-18 positioning Huawei, HiSilicon

R1-2310891 On UE features for expanded and improved NR positioning Nokia, Nokia Shanghai Bell

R1-2311119 Discussion on Rel-18 positioning UE features vivo

R1-2311147 On UE features for expanded and improved NR positioning Intel Corporation

R1-2311185 Discussion on UE features for expanded and improved NR positioning Spreadtrum Communications

R1-2311277 Discussion on UE features for expanded and improved NR positioning OPPO

R1-2311330 Remaining issues on UE features for expanded and improved NR positioning CATT

R1-2311395 Discussion on UE features for expanded and improved NR positioning xiaomi

R1-2311463 UE features for Rel-18 NR positioning ZTE

R1-2311502 Discussion on UE features for expanded and improved NR positioning CMCC

R1-2311555 Discussion on UE features for Rel-18 NR positioning China Telecom

R1-2311644 Discussion on UE features for expanded and improved NR positioning NTT DOCOMO, INC.

R1-2311708 On UE features for expanded and improved NR positioning Apple

R1-2311869 UE features for expanded and improved NR positioning Samsung

R1-2312063 UE features for expanded and improved NR positioning Qualcomm Incorporated

R1-2312080 Summary of UE features for expanded and improved NR positioning Moderator (AT&T)

R1-2312192 UE features for expanded and improved NR positioning Ericsson