**3GPP TSG RAN Meeting #105 RP-24xxxx**

**Melbourne, Australia, September 9-12, 2024**

## Status Report to TSG

**Agenda item:** 9.2.5

|  |  |
| --- | --- |
| **WI / SI Name** | Study on AI (Artificial Intelligence)/ML (Machine Learning) for mobility in NR |
| included in this status report | Study Item: Yes | Core part: No | Performance part:No | Testing part:No |
| **Acronym** | FS\_NR\_AIML\_Mob |
| **Unique ID** | 1020084 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-240082 |
| **Target Completion Date****(indicate if changed)** | Study Item: 09/2025 | Core part: N/A | Performance part: N/A | Testing part: N/A |
| **Overall Completion level** | Study Item: 38 % | Core part: N/A | Performance Part: N/A | Testing part: N/A |

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** | RAN WG2 |
| **Rapporteur** | **Name** | Zhongda Du |
| **Company** | OPPO |
| **Email** | duzhongda@oppo.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?** | No |

*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

#### 2.1.2 Remaining Open issues

## 2.2 RAN2

#### 2.2.1 Agreements

RAN2#126 agreements:

|  |
| --- |
| **Agreements on simulation assumptions**1 For 2nd study goal i.e. to enhance handover performance, evaluation exercise will focus on FR2 to FR2 intra-frequency scenario.2 For the evaluation exercise for 2nd study goal, RAN2 should assume that there is no reduction in measurement overhead3 Prediction accuracy metric for RRM measurement cell level prediction is defined as “RSRP difference between predicted L3 cell level measurement result and actual L3 cell level measurement result of the same cell” for all RRM sub cases4 for RRM sub case 1, it is up to company to report L1 RSRP difference*5* Definition of measurement reduction for intra-frequency scenario is defined as:(20/20) Measurement reduction rate in temporal domain (MRRT) assuming same length of measurement time instances:MRRT= skipped measurement time instances / total measurement time instancesMeasurement reduction rate in spatial domain (MRRS):MRRS = skipped beams to be measured/ total beams to be measured6 For RRM sub case 1 and 3, it is up to company’s implementation whether L1 filtering is applied for input L1 beam level measurement. Companies are expected to report what L1 filtering they use in their simulation. 7 To agree on methodology of Intra\_F\_C\_T\_Case A as following:  Intra-frequency intra-cell temporal domain case A prediction is done by predicting measurement result(s) in prediction window based on measurement results in observation window of the same cell for both FR1\_to\_FR1 and FR2\_to\_FR2. FFS aligning the prediction window 8 To agree on methodology of Intra\_F\_C\_T\_Case B: Intra-frequency intra-cell temporal domain prediction is done by predicting sub set measurement (case B) instances in temporal domain of the same cell for both FR1\_to\_FR1 and FR2\_to\_FR2. Several measurement reduction rates should be aligned among companies. The detail values for measurement reduction rate are FFS.9 Intra-frequency intra-cell temporal domain prediction can be applied for all RRM sub cases. And it is up to company to report applied RRM sub case together with simulation result.10 Methodology of Intra\_F\_C\_S: Intra-frequency intra-cell spatial domain prediction is done by measuring sub set of configured SSB as input to the model to predict L3 cell level measurements for every instance of the same cell. It is only evaluted for FR2 intra-frequency scenario and RRM sub case 1 and 3. Several measurement reduction rates should be aligned among company without defining detail pattern. The detail rate values are FFS. 11 For both Intra-frequency and inter-frequency inter-cell prediction, the measurement on cell for measurement should not be reduced in both temporal and spatial domain 12 For Inter\_F\_C (inter-frequency inter-cell), RAN2 start evaluation from co-located scenario13 for Inter\_F\_C(inter-frequency inter-cell), RAN2 should focus on the case where cell for measurement and cell for prediction are in the same sector.14 FR1 to FR1 inter-frequency inter-cell prediction is applicable for all RRM sub cases. And it is up to company to report applied RRM sub cases together with their simulation result. 16 Intra\_F\_Inter\_C (intra-frequency inter-cell) prediction will not be evaluated at least in early stage. Intra\_F\_Inter\_C(Intra-frequency inter-cell) refers to both co-located and non-colocated neighbouring cell prediction. 17 No traffic model is simulated18 During simulation UE is dropped 100% outdoor 19 It is up to company’s implementation to select how to distribute the UE20 Fast fading is necessary for RRM sub case 1 and 3. FFS case 221 To agree not consider Oxygen absorption (7.6.1), Time-varying Doppler shift (7.6.6), Explicit ground reflection model (7.6.8) and blockage (7.6.4) for channel modelling (38.901)22 LOSsoft is optionally modelled in the channel modelling23 To agree on following parameters for FR2:1, 30GHz as central frequency2, 200m as ISD3, UMi with distance-dependent LoS probability function defined in Table 7.4.2-1 in TR 38.901 as baseline channel modelling24 For FR1, following parameters are agreed:1, Table 6.2.1-1 template is taken as starting point ( to be updated by individual proposal later on) 3, to set up 2-tier model (7 sites, 3 sectors/cells per site) (20/20)4, 500m as ISD 5, channel modelling is UMa with distance-dependent LoS probability function defined in Table 7.4.2-1 in TR 38.9016, 20MHz as bandwidth 7, The recommendated value in yellow in table 2.3.3-1 ( by removing wording “At least for BM-Case1,”) 25 Section 7.6.5 in 38.901 is taken as baseline for inter-frequency correlation model. Whether inter-frequency correlation model is used is optional and companies can report what they use. FFS on the understanding shadowing correlation in inter-freq. For now companies should report what assumption they have made26 Following RRC parameters need be aligned as simulation parameters: (17/20)- RRC parameters for measurement consolidation- RRC parameters for L3 filtering (filter coefficient, measurement period)27 We apply same L1 sampling period for both intra and inter (i.e. we don’t simulate existence of measurement gap as starting point)28 Simulation assumptions discussed in section 2.3.1~2.3.3 is taken as baseline also for use cases other than RRM measurement prediction. Any update is subject to further discussion on other use cases. 29 The sample period(s) are aligned among companies for intra-frequency intra-cell temporal domain prediction. We can start with 20ms for FR2 and 40ms for FR1.  Measurement period: FFS – suggestion from rapporteur is to start with 480ms for FR2 and 200ms for FR1 30 Simulation parameters in table 2.3.4-1 (by removing Table A.2.1-7 and Table 2.1-10) are taken as starting point for both UE sided model and network sided model for FR2. The number of beams could be left for company to report. FFS Use 100Mhz for channel BW?31 For FR1, following parameters are agreed:2, {4GHz,30KHz} as frequency for intra-frequency scenario and {2GHz, 15KHz(FDD)/30GHz(TDD)} as another frequency for inter-frequency scenario  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Agreements**1 average RSRP difference is taken as prediction accuracy metric for RRM measurement prediction. Note the RSRP difference values should be an absolute value before they are averaged2: Measurement reduction rates e.g. 1/2, for both intra-frequency intra-cell temporal domain prediction case B and spatial domain prediction. Revision in RAN2#127 is open.3: One prediction window for FR1 and FR2 respectively as starting point. The detail value to be decided in the post email discussion. The concluded initial value is 200ms and 400ms for FR1 and FR2 respectively.4: UE trajectory option is up to company’s implementation and report5: UE trajectory boundary processing is up to company’s implementation and report6: For study goal 2, the candidate speeds are 60,90,120 km/h and company can report UE speed along with simulation result7: For study goal 1, the candidate speeds are 30,60,90km/h and company can report UE speed along with simulation result8: To decide on the values in table 2.4-2/3/4 in post email discussion. Updated values after post email discussion.

|  |  |
| --- | --- |
| L3 filtering parameter for both FR1 and FR2 | Recommended value |
| FilterCoefficient | 4 |

Table 2.4-2

|  |  |
| --- | --- |
| Measurement period | Recommended value |
| FR1 to FR1 intra-frequency w.o. gap | 200ms  |
| FR1 to FR1 inter-frequency with gap | 200ms |
| FR2 to FR2 intra-frequency w.o. gap | 400ms  |

Table 2.4-3

|  |  |
| --- | --- |
| Consolidation parameter | Recommended value |
| nrofSS-BlocksToAverage for FR1 | 1 |
| nrofSS-BlocksToAverage for FR2 | 3 |
| absThreshSS-BlocksConsolidation | -110dbm |

Table 2.4-49: To agree on 80MHz as bandwidth for FR210: To agree on 10m for BS antenna height for FR211: Fast fading is necessary for RRM sub case 2 too.12: The shadowing fading of two different frequency layers can be reported by company13: To define cluster approach at least based on the number of input cells, number of output cells and their relationship in temporal domain, spatial domain and frequency domain |

**Agreements:**

**The following is agreed**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case number | Prioritization  | Evaluation scenario combination | target study goal | Methodology |
| 1 | Low | FR1 to FR1 intra-frequency temporal domain case A | 2nd goal | TBD |
| 2 | High | FR1 to FR1 intra-frequency temporal domain case B | 1st goal | Intra-cell |
| 3 | High | FR1 to FR1 inter-frequency (frequency domain) | 1st goal | Inter-cell  |
| 4 | High | FR2 to FR2 intra-frequency temporal domain case A | 2nd goal | Intra-cell |
| 5 | Low | FR2 to FR2 intra-frequency temporal domain case B | 1st goal | TBD |
| 6 | Middle | FR2 to FR2 intra-frequency spatial domain | 1st goal | Intra-cell |

=> We will start the evaluation with measurements prediction accuracy and model complexity. We can discuss system performance after we see which scenarios have good measurements prediction accuracy.

**Agreements**

1. For the cell level measurement prediction, start with consider a fixed value for L3 filtering in simulation. FFS which fixed value
2. For cell level prediction, RSRP difference to the actual measurement is calculated based on L3 filtered measurement result

**Agreements**

1 Study Indirect: RLF prediction based on the temporal domain serving cell measurement predictions (e.g. SINR).

2 Study Direct: Directly RLF prediction by AI/ML models.

3 FR2 study will be prioritized for RLF prediction

4 The study should focus on RLF due to T310 expiry (i.e. in-synch/out-of-synch case) as the representative RLF case for direct and indirect prediction.

5 HOF prediction is down prioritized in our study. NO simulations/evaluations should be done/submitted

6 RLF prediction result is the RLF probability within a time window or at time instance, at least for direct case. FFS on expected RLF time and indirect case.

7 No evaluation/simulations are expected for August meeting for RLF

8 Simulation assumption specific to RLF will be discussed in August. The assumption is that we will reuse RRM simulation assumptions (where possible).

Summarized simulation assumptions based on RAN2’s agreements so far:

|  |  |  |
| --- | --- | --- |
| Parameter | Value for FR1 | Value for FR2 |
| Frequency Range | FR1@{4GHz,30KHz} as central frequency for intra-frequency scenarioFR1@{2GHz, 15/30KHz} as another frequency for inter-frequency scenario | FR2 @ 30 GHz; SCS: 120 kHz |
| Deployment | 2-tier model with wrap-around (7 sites, 3 sectors/cells per site) | 2-tier model with wrap-around (7 sites, 3 sectors/cells per site) |
| Channel model | UMa With distance-dependent LoS probability function defined in Table 7.4.2-1 in TR 38.901, fast fading and optional LOSsoft;without UE rotation, Oxygen absorption, Time-varying Doppler shift, Explicit ground reflection model and blockage. | UmiWith distance-dependent LoS probability function defined in Table 7.4.2-1 in TR 38.901, fast fading and optional LOSsoft;without UE rotation, Oxygen absorption, Time-varying Doppler shift, Explicit ground reflection model and blockage |
| System BW | 20MHz | 80MHz |
| UE speed | 30,60,90 km/h for study targeting measurement reduction60,90,120 km/h for study targeting HO performance improvement | 30,60,90 km/h for study targeting measurement reduction60,90,120 km/h for study targeting HO performance improvement |
| UE distribution | 100% outdoor | 100% outdoor |
| BS Antenna Configuration | Companies need to report which option(s) are used between- 32 ports: (8,8,2,1,1,2,8), (dH,dV) = (0.5, 0.8)λ- 16 ports: (8,4,2,1,1,2,4), (dH,dV) = (0.5, 0.8)λOther configurations are not precluded. | Antenna setup and port layouts at gNB: (4, 8, 2, 1, 1, 1, 1), (dV, dH) = (0.5, 0.5) λOther assumptions are not precluded. |
| BS Antenna radiation pattern | 3-sector antenna radiation pattern, 8 dBi | TR 38.802 Table A.2.1-6, |
| UE Antenna Configuration | 4RX: (1,2,2,1,1,1,2), (dH,dV) = (0.5, 0.5)λ for (rank 1-4)2RX: (1,1,2,1,1,1,1), (dH,dV) = (0.5, 0.5)λ for (rank 1,2)Other configuration is not precluded. | Antenna setup and port layouts at UE: (1, 4, 2, 1, 2, 1, 1), 2 panels (left, right)Other assumptions are not precluded |
| UE Antenna radiation pattern | Omni-direction | TR 38.802 Table A.2.1-8,  |
| BS Tx Power | 44dBm  | 40 dBm (baseline)Other values (e.g., 34 dBm) not precluded |
| Maximum UE Tx Power | 23dbm | 23 dBm |
| BS receiver Noise Figure | 5db | 7 dB |
| UE receiver Noise Figure | 9dB | 10 dB |
| Inter site distance | 500m | 200 m |
| BS Antenna height | 25m | 10m |
| UE Antenna height | 1.5m | 1.5 m |
| Spatial consistency | companies report one of the spatial consistency procedures: - Procedure A in TR38.901- Procedure B in TR38.901 | companies report one of the spatial consistency procedures: - Procedure A in TR38.901- Procedure B in TR38.901 |
| UE trajectory model | 3 options in 38.843 section 6.3.1 | 3 options in 38.843 section 6.3.1 |
| UE trajectory boundary processing model | Companies report which of the following models they used:wrap round model, circle-bouncing model,boundary-terminated model | Companies report which of the following models they used:wrap round model, circle-bouncing model,boundary-terminated model |

Table 2.2.1-1 Simulation assumptions

RAN2#127 agreements:

TP in R2-2406309 is endorsed

About RRM measurement prediction, here are the agreements:

**Agreements**

=> companies are encouraged to considers both prediction from low-frequency cell to high-frequency cell and prediction from high-frequency cell to low-frequency cell, but only low to high is expected.

=> For the agreed frequencies for inter-frequence case, only one UE speed is considered for inter-frequency prediction in simulation, e.g., 30km/h. Companies can consider other speeds for other frequencies if they chose to simulate them.

=> For temporal domain case B prediction the input is historical measurement values and the output is the values at the subsequent time instances that measurement is skipped, i.e., the prediction is always after the measurement and is at future time instance(s).

**Agreements**

1 To keep two filtering options on the table and up to company to report.

*2* One fixed sampling period of FR2 is introduced for L1/L3 filtering option 1 to replace existing one i.e., 20ms. The detail value is FFS.

3 In the definition of 3 RRM sub-cases, all cell level measurement result(s) refers to L3 filtered cell level measurement

*4 continue to discuss following issues in the post email discussion:*

*1, Further clarification of intra-frequency of temporal domain case A and case B.*

*2, The set of observation vs prediction window parameters for intra-frequency temporal domain case A and case B*

*3, The number of TX and RX for FR1 and FR2*

*4, Filtering co-efficient for beam level prediction*

**Agreements**

* Companies can consider to do L3 filtered beam level results for any of this cases. L3 filtered beam level prediction cases are lower priority.
* Case 1: To predict L1 filtered beam level results, then generate L3 filtered results based on the predicted L1 beam results.
* Case 2: To directly predict L3 filtered beam level results based on the L3 beam level measurement results.
* Case 3: To directly predict L3 filtered beam level results based on the L1 beam level measurement results.
* - If companies do L3 filtered beam level prediction simulations, they should focus on FR2-to-FR2 intra-frequency temporal domain prediction case A

About RLF use case, here are the agreements:

|  |  |
| --- | --- |
| **Parameter** | **Value for FR2** |
| Frequency Range | FR2 @ 30 GHz; SCS: 120 kHz |
| Deployment | 2-tier model with wrap-around (7 sites, 3 sectors/cells per site) |
| Channel model | UmiWith distance-dependent LoS probability function defined in Table 7.4.2-1 in TR 38.901, fast fading and optional LOSsoft;without UE rotation, Oxygen absorption, Time-varying Doppler shift, Explicit ground reflection model and blockage |
| System BW | 80MHz |
| UE speed | 30,60,90 km/h for study targeting measurement reduction60,90,120 km/h for study targeting HO performance improvement |
| UE distribution | 100% outdoor |
| BS Antenna Configuration | Antenna setup and port layouts at gNB: (4, 8, 2, 1, 1, 1, 1), (dV, dH) = (0.5, 0.5) λOther assumptions are not precluded. |
| BS Antenna radiation pattern | TR 38.802 Table A.2.1-6, |
| UE Antenna Configuration | Antenna setup and port layouts at UE: (1, 4, 2, 1, 2, 1, 1), 2 panels (left, right)Other assumptions are not precluded |
| UE Antenna radiation pattern | TR 38.802 Table A.2.1-8,  |
| BS Tx Power | 40 dBm (baseline)Other values (e.g., 34 dBm) not precluded |
| Maximum UE Tx Power | 23 dBm |
| BS receiver Noise Figure | 7 dB |
| UE receiver Noise Figure | 10 dB |
| Inter site distance | 200 m |
| BS Antenna height | 10m |
| UE Antenna height | 1.5 m |
| Spatial consistency | companies report one of the spatial consistency procedures: - Procedure A in TR38.901- Procedure B in TR38.901 |
| UE trajectory model | 3 options in 38.843 section 6.3.1 |
| UE trajectory boundary processing model | Companies report which of the following models they used:wrap round model, circle-bouncing model,boundary-terminated model |

=> Agree to use this table as a baseline. Companies can choose the UE speeds and UE distribution they use and report it.

**Agreements**

- Both direct and indirect are allowed. Companies should indicate what they used and what inputs they are using

- Output for indirect: predicted SINR. Based on predicted SINR the time instance the RLF occurs can be determined without further AI/ML models.

- Output for direct: probability of RLF within an window

- Companies should report the prediction time window they have used in the simulations

- For the time being we don’t need HO procedure simulation in RLF simulation

- FFS full buffer and assumption that all the cells are fully loaded. We will not simulate traffic.

- Simulation results are not expected before February

#### 2.2.2 Remaining Open issues

For RRM measurement use case:

1, Further clarification on simulation assumption and further round of evaluation based on updated simulation assumption is expected

For Measurement event use case:

 1, Further clarification on the use case including definition, metrics

 2, Measurement event specific Simulation assumptions, simulation methodology

For RLF use case:

 2, RLF specific Simulation assumptions, simulation methodology etc.

HOF prediction is down prioritized

Issues covered by following objectives in the SID:

* Potential AI mobility specific enhancement should be based on the Rel19 AI/ML-air interface WID general framework (e.g. LCM, performance monitoring etc) [RAN2]
	+ NOTE: This would only be treated after sufficient progress is made in the Rel-19 AI/ML air interface WID
* Potential specification impacts of AI/ML aided mobility [RAN2]
* Evaluate testability, interoperability, and impacts on RRM requirements and performance [RAN4]

## 2.3 RAN3

#### 2.3.1 Agreements

#### 2.3.2 Remaining Open issues

## 2.4 RAN4

#### 2.4.1 Agreements

#### 2.4.2 Remaining Open issues

## 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.

Contributions submitted to RAN2#126 meeting:

R2-2404711 Discussion on work plan of AI mobility SI OPPO,Nokia,Mediatek discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405693 TR 38.744 Skeleton of AI mobility NR OPPO draft TR Rel-19 38.744 0.0.1 FS\_NR\_AIML\_Mob

R2-2404338 RRM Measurement Prediction for Enhanced Handover Lekha Wireless Solutions discussion Rel-19 Late

R2-2404630 On measurement prediction Apple discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405551 Discussion on framework for RRM measurement CEWiT discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404270 Additional consideration for RRM prediction simulation assumption Intel Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404307 Discussion on system-level performance KPI for RRM measurement prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404474 Discussion on Evaluation Methodology of RRM Prediction MediaTek Inc. discussion

R2-2404485 Simulation based evaluation of AIML aided mobility Ericsson discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404601 Discussion on simulation and evaluation methodology Xiaomi discussion

R2-2404713 Discussion on simulation assumptions of RRM measurement OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404955 Summary of [POST125bis][021][AIML mobility ] Simulation assumptions and methodology OPPO discussion Rel-19 FS\_NR\_AIML\_Mob Late

R2-2405005 Discussion on the simulation assumptions and evaluation methodology for RRM measurement prediction NTT DOCOMO, INC. discussion Rel-19

R2-2405064 Discussion on simulation assumption for RRM measurement prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405205 Considerations for mobile UE trajectory generation and channel modelling for simulation evaluation Qualcomm Incorporated discussion Rel-19

R2-2405206 Simulation assumptions and evaluation methodology for RRM measurement prediction Interdigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405444 Further discussion on simulation assumptions and methodology for RRM measurement prediction Nokia, Nokia Shanghai Bell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405592 Considerations on Simulation for AI/ML Mobility Samsung discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405653 Remaining aspects of simulation assumptions for RRM measurement prediction Huawei, HiSilicon discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404260 Other aspects related to RRM measurement prediction Fraunhofer HHI, Fraunhofer IIS discussion

R2-2404283 Discussion on AI/ML based RRM measurement prediction China Telecom Corporation Ltd. discussion Rel-19

R2-2404308 Other aspects related to RRM measurement prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404313 AIML Mob RRM measurement prediction NEC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404368 AI/ML RRM measurement prediction TCL discussion Rel-19

R2-2404472 Evaluation and Preliminary Results on AIML for RRM Measurement Prediction MediaTek Inc. discussion

R2-2404475 Discussion on Other Aspects related to RRM Prediction MediaTek Inc. discussion

R2-2404558 Discussion on AI aided RRM measurement prediction HONOR discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404609 Consideration on AI/ML based RRM measurement prediction Xiaomi discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404629 On evaluation methodology Apple discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404695 Consideration on inter-frequency RRM Measurement Prediction CATT, Turkcell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404700 Discussion on RRM measurement prediction Samsung discussion Rel-19 FS\_NR\_AIML\_Mob Late

R2-2404715 Discussion on open issue of RRM measurement use case OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404824 Further Discussion on Other Aspects related to RRM Measurement Prediction Continental Automotive discussion Rel-19

R2-2404936 Discussion on other aspects related to RRM measurement prediction Spreadtrum Communications discussion Rel-19

R2-2404999 Discussion on other aspects related to RRM measurement prediction NTT DOCOMO, INC. discussion Rel-19

R2-2405028 Discussion on AIML based RRM measurement prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405065 Discussion on RRM measurement prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405095 On AI based RRM measurement predictions Ericsson discussion FS\_NR\_AIML\_Mob

R2-2405161 RRM measurement prediction scenarios and sub-use cases Nokia discussion Rel-19 FS\_NR\_AIML\_Mob Withdrawn

R2-2405162 Considerations on the predicted measurements Nokia discussion Rel-19 FS\_NR\_AIML\_Mob Withdrawn

R2-2405165 RRM measurement prediction Lenovo discussion Rel-19

R2-2405207 Beam prediction related aspects Interdigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405480 RRM measurement prediction for UE sided prediction and NW-sided prediction LG Electronics Inc. discussion FS\_NR\_AIML\_Mob

R2-2405650 Discussion on RRM measurement prediction Huawei, HiSilicon discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405671 RRM measurement prediction scenarios and sub-use cases Nokia discussion Rel-19

R2-2405674 Considerations on the predicted measurements Nokia discussion Rel-19

R2-2404222 Target scenarios for measurement event prediction NEC discussion

R2-2404372 Discussion on measurement event prediction TCL discussion Rel-19

R2-2404473 Evaluation on AI/ML for Measurement Event Prediction MediaTek Inc. discussion

R2-2404559 Discussion on AI aided measurement events prediction HONOR discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404823 Further Discussion on Measurement Event Prediction Continental Automotive discussion Rel-19

R2-2404905 Data collection for event prediction Sony discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405544 Discussion on measurement event predictions ETRI discussion

R2-2405612 Discussion on measurement event predictions III discussion FS\_NR\_AIML\_Mob

R2-2404348 Discussion on RLF/HOF prediction Fujitsu discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404366 AI/ML HO failure prediction TCL discussion Rel-19

R2-2404367 AI/ML RLF prediction TCL discussion Rel-19

R2-2404631 On RLF and HO failure prediction Apple discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404223 Simulation assumption for RLF prediction NEC discussion

R2-2404268 simulation assumption for RLF prediction Intel Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404309 Simulation assumptions and evaluation methodology for RLF failure prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404602 Discussion on RLF prediction simulation and evaluation methodology Xiaomi discussion

R2-2404696 Simulation assumptions and evaluation methodology for RLF prediction CATT, Turkcell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404716 Discussion on simulation assumptions of RLF OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404825 Discussions on simulation assumptions and evaluation methodology for RLF/HOF prediction TCL discussion Rel-19

R2-2405031 Discussion on Simulation Assumption and Methodology for RLF prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405066 Discussion on simulation assumption for RLF prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405096 Discussion on methodology for evaluation of RLF/HOF predictions Ericsson discussion FS\_NR\_AIML\_Mob

R2-2405208 Simulation assumptions and evaluation methodology for RLF prediction Interdigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405431 Discussion on simulation assumption for RLF/HO failure prediction KDDI Corporation discussion Rel-19

R2-2405591 Simulation for HOF and RLF Prediction Samsung discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405651 Simulation assumptions and evaluation methodology for RLF/HOF predictions Huawei, HiSilicon discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405696 Discussion on RLF/HO failure prediction Indian Institute of Tech (M), IIT Kanpur discussion Rel-19

R2-2404269 Areas of interest for RLF/HO failure prediction Intel Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404310 Other aspects related to RLF/HOF prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404428 Discussion on further considerations for AI/ML-based mobility Continental Automotive discussion

R2-2404560 Discussion on HO failure/RLF prediction HONOR discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404597 Discussion on RLF/HOF prediction Samsung Shenzhen discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404603 Discussion on RLF and HOF prediction assumptions Xiaomi discussion

R2-2404697 Consideration on RLF and HO Failure Prediction CATT, Turkcell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404717 Discussion on RLF and HOF use case OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2404807 Prediction for HO failure and RLF Lenovo discussion Rel-19

R2-2405004 Discussions on other aspects related to RLF/HOF prediction NTT DOCOMO, INC. discussion Rel-19

R2-2405029 Discussion on other aspects related to RLF and HOF prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405067 Discussion on RLF and HO failure prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405075 Discussion on failure prediction NEC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405097 Discussion on AI/ML based RLF and HOF predictions Ericsson discussion FS\_NR\_AIML\_Mob

R2-2405203 RLF/HO failure prediction Qualcomm Incorporated discussion Rel-19

R2-2405209 Other aspects related to RLF/HOF prediction Interdigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2405303 Discussion on HO failure/RLF prediction Nokia discussion FS\_NR\_AIML\_Mob

R2-2405382 Potential scenarios for RLF/HOF prediction Kyocera discussion Rel-19 R2-2403420

R2-2405477 HOF prediction at UE side LG Electronics Inc. discussion FS\_NR\_AIML\_Mob

R2-2405478 RLF prediction LG Electronics Inc. discussion FS\_NR\_AIML\_Mob

R2-2405545 Discussion on RLF and HO failure prediction ETRI discussion

R2-2405652 Discussion on HOF and RLF prediction Huawei, HiSilicon discussion Rel-19 FS\_NR\_AIML\_Mob

Contributions submitted to RAN2#127 meeting:

R2-2406309 Text proposal of 38.744 OPPO draft TR Rel-19 38.744 0.0.3 FS\_NR\_AIML\_Mob

R2-2406308 Discussion on cluster based RRM measurement prediction BJTU discussion

R2-2407113 AI-ML based Inter-frequency measurement prediction Rakuten Mobile, Inc discussion Rel-19

R2-2407451 Simulation results for RRM measurement prediction Indian Institute of Tech (M), IIT Kanpur discussion Rel-19

R2-2407484 Intial simulation results RRM Measurement prediciton CEWiT discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406310 Discussion on simulation result of RRM measurement OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406401 Simulation results for RRM measurement prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406422 Evaluation on RRM measurement prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406579 Evaluation and Simulation Results for AIML RRM Prediction MediaTek Inc. discussion

R2-2407558 Evaluation and Simulation Results for AIML RRM Prediction MediaTek Inc. discussion

R2-2406664 RRM measurement prediction results Apple discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406665 Field data for RRM measurement prediction Apple discussion Rel-19 FS\_NR\_AIML\_Mob Late

R2-2406703 Discussion on RRM prediction simulation result Xiaomi discussion

R2-2406816 Simulation results for RRM measurement prediction Qualcomm Incorporated discussion Rel-19

R2-2407568 Simulation results for RRM measurement prediction Qualcomm Incorporated discussion Rel-19

R2-2406824 Discussions on simulation results for RRM measurement prediction NTT DOCOMO, INC. discussion

R2-2406830 Simulation results of intra-frequency RRM Measurement Prediction CATT, Turkcell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406831 Simulation results of inter-frequency RRM Measurement Prediction CATT, Turkcell discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406860 Discussion on the simulation results for RRM measurement prediction Samsung Electronics discussion Rel-19 R2-2406935 Simulation results for RRM measurement prediction Huawei, HiSilicon discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406936 Discussion on other aspects related to RRM prediction Huawei, HiSilicon, China Telecom discussion Rel-19

R2-2406975 Initial simulation results for RRM measurement prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407092 Simulation results for RRM measurement inter-frequency predictions Ericsson discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407219 Simulation results for RRM measurement temporal prediction Ericsson discussion FS\_NR\_AIML\_Mob

R2-2407376 Initial simulation results for RRM measurement predictions InterDigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407479 Measurement Reduction based on RRM Measurement Prediction Nokia, Nokia Shanghai Bell discussion Rel-19

R2-2406311 Discussion on open issue of RRM measurement use case OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406385 Discussion on AI/ML based RRM measurement prediction China Telecom discussion Rel-19

R2-2406402 Other aspects related to RRM measurement prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406423 Discussion on RRM measuremnet prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406499 AIML mobility RRM measurement prediction NEC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406500 AI/ML RRM measurement prediction TCL discussion Rel-19

R2-2406568 Discussion on RRM Measurement Prediction Fraunhofer HHI, Fraunhofer IIS discussion

R2-2406580 Cluster-based Approach for RRM Prediction and Other Aspects MediaTek Inc. discussion

R2-2406704 Discussion on cell and beam RRM prediction Xiaomi discussion

R2-2406759 Discussion on other aspects related to RRM measurement prediction Spreadtrum Communications discussion Rel-19

R2-2406825 Discussion on other aspects related to RRM measurement prediction NTT DOCOMO, INC. discussion

R2-2406861 Discussion on temporal domain RRM measurement prediction Samsung Electronics discussion Rel-19

R2-2406924 Discussion on RRM Measurement Prediction Sharp discussion Rel-19

R2-2406966 Discussion on other aspects related to RRM measurement prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407130 RRM measurement prediction Lenovo discussion

R2-2407287 Discussion on RRM Measurement Prediction Framework Meta Ireland discussion

R2-2407359 Discussion on AI aided RRM measurement prediction HONOR discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407377 Other aspects of RRM measurement predictions InterDigital Inc. discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407480 Mobility Optimization based on RRM Measurement Prediction Nokia discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406344 Target scenarios for measurement event prediction NEC discussion

R2-2406796 Further Discussion on AI based Measurement Event Prediction Continental Automotive discussion Rel-19

R2-2407360 Discussion on AI aided measurement events prediction HONOR discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407541 Discussion on measurement event predictions III discussion

R2-2406312 Discussion on RLF use case OPPO discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406343 Simulation assumption for RLF prediction NEC discussion

R2-2406403 Simulation assumptions and evaluation methodology for RLF prediction vivo discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406424 Discussion on simulation assumption for RLF prediction ZTE Corporation discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406581 Simulation assumptions and evaluation methodology for RLF failure prediction MediaTek Inc. discussion

R2-2406663 On RLF prediction Apple discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2406705 RLF prediction simulation assumption and evaluation methodology Xiaomi discussion

R2-2406813 RLF prediction and RLF prediction reporting Qualcomm Incorporated discussion Rel-19

R2-2406826 Discussions on simulation assumptions and EVM for RLF predictions NTT DOCOMO, INC. discussion

R2-2406832 Simulation assumptions and evaluation methodology for RLF prediction CATT, Turkcell discussion Rel-19

R2-2406885 Discussion on RLF Prediction Lenovo discussion Rel-19

R2-2406937 Discussion on simulation assumptions and evaluation methodology for RLF failure prediction Huawei, HiSilicon discussion Rel-19

R2-2406976 Discussion on Simulation Assumption and Methodology for RLF prediction CMCC discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407071 AI-ML based RLF/HO failure prediction Rakuten Mobile, Inc discussion Rel-19

R2-2407093 AI/ML based RLF predictions Ericsson discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407211 Simulation assumptions and evaluation methodology for RLF prediction InterDigital Inc. discussion Rel-19

R2-2407289 Evaluation Assumptions for RLF/HO Failure Prediction Meta Ireland discussion Rel-19

R2-2407389 Discussion on simulation assumption for RLF prediction KDDI Corporation discussion Rel-19

R2-2407481 RLF Prediction Aspects Nokia discussion Rel-19 FS\_NR\_AIML\_Mob

R2-2407492 Discussion on simulation assumptions and evaluation methodology for RLF prediction Samsung discussion Rel-19

R2-2407514 RLF prediction result for indirect case LG Electronics France discussion FS\_NR\_AIML\_Mob