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**1 Scope**

The purpose of this document is to present the Cluster Acceptance standard and Result of TE LTE project.

**2 Acceptance KPI**

Ninety percent (90%) of sites of the desired cluster should be on air before starting the cluster test. Only agreed special cases of some sites will be considered as standalone sites (SSV) and will be excluded from the cluster acceptance.

**2.1 Drive Test KPIs (Cluster Level)**

|  |  |
| --- | --- |
| **S/N** | **OSS KPI ( Cluster Level)** |
| 1 | Serving RSRP |
| 2 | Serving RSRQ |
| 3 | Serving RS SINR |
| 4 | Serving Channel RSSI |
| 5 | CQI |
| 6 | Attach Success Rate |
| 7 | Paging Success Rate |
| 8 | RRC Connection Setup Success Rate |
| 9 | ERAB Setup Success Rate |
| 10 | CSFB Setup Success Rate |
| 11 | RRC Connection Drop Rate |
| 12 | Bearer Connection Drop Rate |
| 13 | LTE Intra-frequency HO Success Rate |
| 14 | LTE Inter-frequency HO Success Rate |
| 15 | CSFB Success Rate via Redirect |
| 16 | Average Downlink Application User Throughput @ 10 MHz |
| 17 | Average Uplink Application User Throughput @ 10 MHz |
| 18 | Average Downlink Application User Throughput @ 5 MHz |
| 19 | Average Uplink Application User Throughput @ 5 MHz |

**2.2 OSS KPIs (Cluster Level)**

|  |  |
| --- | --- |
| S/N | OSS KPI ( Cluster Level) |
| 1 | DL MCS Distribution |
| 2 | UL MCS Distribution |
| 3 | CQI Distribution |
| 4 | RACH Completion Success Rate |
| 5 | RRC Connection Setup Success Rate |
| 6 | CSFB Setup Success Rate |
| 7 | ERAB Drop Rate |
| 8 | LTE Intra-frequency HO Success Rate |
| 9 | LTE Inter-frequency HO Success Rate |
| 10 | Average DL PDCP User Throughput @ 10 MHz |
| 11 | Average UL PDCP User Throughput @ 10 MHz |
| 12 | Average DL PDCP User Throughput @ 5 MHz |
| 13 | Average UL PDCP User Throughput @ 5 MHz |
| 14 | Downlink BLER |
| 15 | Uplink BLER |
| 16 | ENB Availability |

**3 Drive Test Criteria**

- Detailed routes are considered shared for validation before DT start.

- OSS RFP KPIs commitment to be communicated

- Below rounds to be considered in DT and targets following DT RFP commitment.

a) L700 locked connected:

i. Round 1: UE DL + UE CSFB MO.

ii. Round 2: UE DL 100% load.

iii. Round 3: UE UL.

b) L1800 locked connected:

i. Round 4: UE DL + UE CSFB MT.

ii. Round 5: UE DL 100% load.

iii. Round 6: UE UL.

c) Free Connected:

i. Round 7: UE DL + IDLE.

ii. Round 8: (You tube + Web browsing in same round) (Measurements Only).

- In parallel design validation should be assessed following Nokia RFP commitment and taking into consideration the below KPIs:

* Within 4db of the best server:
  + % of area with 4 servers or more should be <2%
  + % of area with 2 servers or more should be <35%
* Within 10db of the best server:
  + % of area with 7 servers or more should be <2%
* Average and % of achievement for both 700Mhz and 1800Mhz under 100% load following “TE\_RFP\_Coverage Results\_v16” design commitment sheet for (RSRP, RSRQ, SNR, DL and UL Throughput).

**4 Definitions of KPI Formula**

|  |  |
| --- | --- |
| OSS Acceptance KPI | Nokia KPI |
| DL MCS Distribution | LTE\_1074a Avg MCS PDSCH trans |
| UL MCS Distribution | LTE\_1075a Avg MCS PUSCH trans |
| CQI Distribution | LTE\_5427a Average CQI |
| RACH Completion Success Rate | LTE\_5569a RACH Stp Completion SR |
| Average RSSI | LTE\_5444b Avg RSSI for PUSCH |
| RRC Connection Setup Success Rate | LTE\_5218f Total E-UTRAN RRC conn stp SR |
| CSFB Setup Success Rate | 100\*[sum(UE\_CTX\_SETUP\_SUCC\_CSFB) + sum(UE\_CTX\_MOD\_SUCC\_CSFB)] / [sum(UE\_CTX\_SETUP\_ATT\_CSFB) + sum(UE\_CTX\_MOD\_ATT\_CSFB)] |
| ERAB Drop Rate | LTE\_5025e E-RAB DR RAN |
| LTE Intra-frequency HO Success Rate | LTE\_5568a E-UTRAN Intra-Frequency HO Success Ratio |
| LTE Inter-frequency HO Success Rate | LTE\_5114a E-UTRAN Inter-Freq HO SR |
| Peak DL Application Throughput @10MHz | LTE\_291b Max PDCP Thr DL |
| Peak UL Application Throughput @10MHz | LTE\_288b Max PDCP Thr UL |
| Peak DL Application Throughput @5MHz | LTE\_291b Max PDCP Thr DL |
| Peak UL Application Throughput @5MHz | LTE\_288b Max PDCP Thr UL |
| Downlink BLER | LTE\_139d Perc DL\_SCH TB RTRANS |
| Uplink BLER | LTE\_140b Perc UL\_SCH TB RTRANS |
| ENB Availability | LTE\_5750a Cell Avail |

**5 Drive Test Definition**

**5.1 Drive Test devices**

The followings are the general tools configuration of the drive test.

|  |  |
| --- | --- |
| Index | Software |
| 2 |  |
| Index |  |
| 2 |  |
| Index |  |
| 2 |  |
| 2 |  |
| 3 |  |
| 4 |  |

**5.2 Cluster Site List**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site | Call ID | Band | Longitude | Latitude | Height(m) | Azimuth | PCI | E-Tilt | Power | RS Boost |
|  |  |  |  |  |  |  |  |  |  |  |
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**5.3 Cluster Polygon figure + DT Route figure**





**6 Drive Test Result**

**6.1 Scenario 1: Connected Mode Locked L700**

* + **Prediction of L700 Sites**

**6.1.1 DL PCI Plot**



**6.1.2 RAT Technology Plot**



**6.1.3 DL EARFCN**



**6.1.4 DL RSRP Statistics**

6.1.4.1 RSRP Plot

Normal Load



Full Load



6.1.4.2 PDF of legends

Normal Load



Full Load



6.1.4.3 Table of legend vs. # of samples in each legend vs. percentage of

samples of each legend

|  |  |  |
| --- | --- | --- |
| Legend | Number of samples | Percentage of samples |
| (Min, -120) |  |  |
| (-120, -110) |  |  |
| (-110, -100) |  |  |
| (-100, -95) |  |  |
| (-95, -90) |  |  |
| (-90, -80) |  |  |
| (-80, -70) |  |  |
| (-70, -60) |  |  |
| (-60, Max) |  |  |

**6.1.5 DL SINR Statistics**

6.1.5.1 SINR Plot

Normal Load



Full Load



6.1.5.2 PDF of legends

Normal Load



Full Load



6.1.5.3 Table of legend vs. # of samples in each legend vs. percentage of

samples of each legend

|  |  |  |
| --- | --- | --- |
| Legend | Number of samples | Percentage of samples |
| (Min, -5) |  |  |
| (-5, 0) |  |  |
| (0, 5) |  |  |
| (5, 10) |  |  |
| (10, 15) |  |  |
| (15, 20) |  |  |
| (20, 25) |  |  |
| (25, Max) |  |  |

**6.1.6 RFP Commitment**

|  |  |
| --- | --- |
| % of samples with 2 servers and 4dB | 14.72 |
| % of samples with 4 servers and 4dB | 0.96 |
| % of samples with 10 servers and 10dB | 0 |

**6.1.7 Intra Frequency Handover Success Rate Analysis**

6.1.7.1 Handover Plot



6.1.7.2 Handover Failures Plot



**6.1.8 Downlink Long Call Results (FTP Test)**

6.1.8.1 DL Average Physical Throughput Plot

Normal Load



Normal Load



6.1.8.2 PDF of legends

Normal Load



Full Load



6.1.8.3 Table of legend vs. # of samples in each legend vs. percentage of

samples of each legend

|  |  |  |
| --- | --- | --- |
| Legend | Number of samples | Percentage of samples |
| (Min, 1000) |  |  |
| (1000, 5000) |  |  |
| (5000, 10000) |  |  |
| (10000, 20000) |  |  |
| (20000, 30000) |  |  |
| (30000, 40000) |  |  |
| (40000, 50000) |  |  |
| (50000, Max) |  |  |

6.1.8.4 Plot of FTP file DL Radio Access Technology



6.1.8.5 Plots of FTP File DL Average Throughput vs. Average CQI



**6.1.9 Uplink Long Call Results (FTP Test)**

6.1.9.1 UL Average Physical Throughput Plot

