3GPP TSG-RAN WG2 Meeting#AH1801 **R2-1800453**

R2-18xxxxx

Vancouver, Canada, 22 - 26 Jan 2018 **(Re-submission of R2-1708108)**

Agenda item: **10.4.1.6.5**

Source: **ZTE**

Title: **Upper layer actions for the Random Access problem**

Document for: **Discussion and Decision**

1 Introduction

There has been some discussion on the on-demand SI procedure, and the following agreement has been made:

> Agreement RAN2 adhoc#2:
> 1 Msg1 for SI request re-transmission is continued until reaching max preamble transmissions. Thereafter, a Random Access problem to upper layers is indicated. (Depending on the NR RACH procedure design)
> FFS: Upper layer actions when MAC reports Random Access problem. To be discussed in CP session.

In this contribution, we focus on the Upper layer actions when MAC reports Random Access problem.

2 Discussions

In this section, we first describe the possible solutions according to the email discussion in #98 meeting and then introduce 3 different scenarios according to the neighbor cell layout, at last we will compare the performance of each solution for 3 different scenarios.

2.1 Alternatives and Scenarios

In the LTE R12, a new abnormal case processing scheme was introduced. With this scheme, if the UE received the Random access problem for a consecutive *connEstFailCount* times on the same cell, the UE will use *connEstFailOffset* for the parameter *Qoffsettemp* for the concerned cell when performing cell selection and re-selection for a period as indicated by *connEstFailOffsetValidity*. When performing cell selection, if no suitable or acceptable cell can be found, it is up to UE implementation whether to stop using *connEstFailOffset* for the parameter *Qoffsettemp* during *connEstFailOffsetValidity* for the concerned cell. Besides, in the last meeting there are also some other alternatives, and combine the alternatives provided in [1], we can get the following 3 alternatives:

- Alternative 1: UE shall treat the cell as barred
- Alternative 2: UE retry the SI request on the current cell upon a certain timer expiry

Note: In [1], the alternative 2 is that treat the cell as barred for the essential SI and retry SI request for the non-essential SI, we think it could be seen as a combination of Alternative 1 and 2. For simplicity, we modify the alternative 2 as above.

- Alternative 3: Increase cell selection or reduce re-selection threshold for a period as that scheme introduced in LTE R12.

For the sake of discussion, according to the neighbor cell layout we divide all the scenarios into 3 types as follow:

Scenario A: No suitable neighbor cell;

Scenario B: There is suitable neighbor cell with worse RSRP/RSRQ;

Scenario C: There is suitable neighbor cell which can provide similar RSRP/RSRQ.

In the next section we will focus on performance comparison of each solution for 3 different scenarios.

2.2 Comparison

Table 1 Performance Comparison

Scenario/Solution	Option1: Barred directly	Option 2: Retry	Option3: Increase threshold
Scenario A : **No suitable neighbor cell**	Enter no service state ☹☹	Stay on the current cell and retry☺	Stay on the current cell and retry☺
Scenario B: **Worse Rsrp/Rsrq**	UE will camp on the neighbor cell☺☺	Stay on the current cell and retry☹	UE will re-select to the neighbor cell at last☺
Scenario C: **Similar Rsrp/Rsrq**	UE will camp on the neighbor cell☺☺	Stay on the current cell and retry☹☹	UE will re-select to the neighbor cell☺☺

From theTable1, we can see that for option 1, the UE may enter no service state when there is no suitable neighbor cell. For the option 2, the use can't re-select to the neighbor cell even when the neighbor cell can provide similar RSRP/RSRQ, which will result in unnecessary power consumption.

Observation 1: If the UE treat the cell as barred when MAC reports Random Access problem, the UE may enter no service state when there is no suitable neighbor cell.

Observation 2: Re-sending SI Request on the current cell will result in unnecessary power consumption when the neighbor cell can provide similar RSRP/RSRQ.

Proposal: If the UE received the Random access problem for consecutive times on the same cell, the UE will adopt Qoffsettemp for the concerned cell when performing cell selection and re-selection for a period.

3 Conclusion

Based on all the analysis above, we give our observations and proposal as:

Observation 1: If the UE treat the cell as barred when MAC reports Random Access problem, the UE may enter no service state when there is no suitable neighbor cell.

Observation 2: Re-sending SI Request on the current cell will result in unnecessary power consumption when the neighbor cell can provide similar RSRP/RSRQ.

Proposal: If the UE received the Random access problem for consecutive times on the same cell, the UE will adopt Qoffsettemp for the concerned cell when performing cell selection and re-selection for a period.

4. References

[1] R2-1707090 Summary of [98#34][NR] On demand SI (Lenovo) Lenovo, Motorola Mobility report Rel-15 NR_newRAT-Core