NOKIA

R1-1811400

On UE features supporting beam management in FR1

3GPP TSG RAN WG1 Meeting #94-bis
Chengdu, P.R. China, October 8 – 12, 2018

Agenda item:	7.1.7
Source:	Nokia, Nokia Shanghai Bell

Introduction

Beam management is a key feature introduced by NR in Rel-15

- Critical for operation in FR2
- Very useful in FR1 as well to ensure proper coverage and capacity

Following Rel-15 features require clarification in RAN1 for proper support of beam management in FR1:

- 2-4, 2-21, 2-22, 2-24, 2-29, 2-31, 2-51

In this contribution we provide further motivation for the changes proposed in detail in [1]

Beam measurements and reporting

In 2-24 it is already specified that UE is mandated to measure at least 8 SSB/CSI-RS resources across all CCs for L1-RSRP within a slot

However, there is no conclusion yet on the mechanism for the UE to report such measurements in FR1

- Conclusion is needed on how to ensure UEs are able to report L1-RSRP measurements for FR1
- Impacted features: 2-21, 2-22

For non-group based beam reporting, there is no conclusion yet on the number of RSRP values reported by the UE

- A UE may receive multiple beams with reasonable quality, in which case higher order MIMO transmissions are supported
- Without the information on the quality of a number of beams, the gNB cannot determine the beams that can be combined for a certain UE
- Given that the measurement report is already existing, debating the number of RSRP reports for non-grouped reporting is not truly relevant in the end, and maximum number of values should be supported
- Impacted features: 2-29

Beam management

Given that the UE is receiving from a subset of the beams transmitted by the gNB, it needs to be able to assess the quality of such beams in order to ensure a proper connection is maintained

- It is only reasonable that the UE is able to monitor the quality of the beams it is able to measure in the first place, including for FR1
- Impacted feature: 2-31 (Beam failure recovery)

An underlying assumption in all these discussions is that the UE must be able to understand the relationship between different reference signals and beams

- Number of TCI states configured for the UE needs to be sufficient to accommodate all the possible relationships that UE needs to be aware of
- Impacted features: 2-4, 2-51

Conclusion

In this contribution we presented further reasoning for the proposals in [1] related to beam management in FR1

We urge RAN1 to clarify the feature definitions such that beam management in FR1 is supported properly

References

[1] R1-1811025, “On selected NR Rel-15 MIMO/beam management UE features”, Nokia, Nokia Shanghai Bell

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