

Agenda item : 9.3.2.2
Source : Samsung
Title : Views on NTN RAN4 specifications
Document for : Discussion and Decision

Background

- ◇ In RAN#93-e, the decision about incorporating NTN specific requirements in new RAN4 TS versus in existing RAN4 TSs (38.101-1, 38.133) has been postponed to RAN#94-e.
 - ◆ Leaving time for companies to digest PROs and CONs of each option.
 - ◆ For Satellite access node side (NW side), new specifications were already introduced for RF requirements and RF conformance.
 - ◆ Referring to the draft Rel-18 WID, one of the scopes is to specify new types of NTN/Satellite specific UE (above 10GHz) e.g. VSAT, ESIM. Significant differences are expected in RF design of such UE from terrestrial UE.

- ◇ With the consideration that only 2 RAN4 meetings are left before the finalization of core part in March 2022 RAN#95, decision by RAN in this meeting is necessary to facilitate the RAN4 work on NR_NTN_Solutions in Rel-17.

Consideration

- ◇ For RF part, new RAN4 NTN TS(s) would facilitate the inclusion of frequency bands between FR1 and FR2.
 - ◆ Incorporating NTN specific RF requirements in existing RAN4 TSs will face the difficulty to find an appropriate space for frequency bands between FR1 and FR2.
- ◇ From ITU candidate IMT technology submission perspective, separate RAN4 NTN TSs would make it easier and clearer to proceed the submission to ITU for either terrestrial or satellite component of IMT in future.
 - ◆ For RRM and Demod part, it is OK to incorporate these requirements in either new or existing TSs. But for the latter case, such requirements should be contained in dedicated sub-clauses with suffixes in corresponding TSs (e.g. TS 38.133) given the experience in previous practices (e.g. V2X, unlicensed).
- ◇ Having new RAN4 NTN TS(s) to incorporate NTN specific requirements would ensure the consistency of the entire structure/framework in a self-contained manner.
 - ◆ It would make NTN TS(s) editorially friendly for its future development.

Detailed analysis can be found in Annex.

Proposal

With aforesaid considerations, we have following proposals:

- ◇ Proposal 1: Decision on this matter by RAN#94-e meeting is needed.

- ◇ Proposal 2: NTN specific RF requirements should be incorporated in new separate RAN4 TS(s).
 - ◆ Either new specification e.g. 38.10x or new sub-part of existing specification e.g. 38.101-x.

- ◇ Proposal 3: NTN specific RRM and Demod requirements could be incorporated either in new RAN4 TS(s) or in existing RAN4 TS(s) with new dedicated clauses with suffixes.

Annex – Further consideration(1/2)

◇ With following considerations on

- ◆ **Variety of UE types:** There is a common understanding on the necessity to create a separate TS for the RF requirements of NTN/Satellite non-handheld UEs, considering the significant difference on RF capabilities compared to the UEs of terrestrial networks.
- ◆ **New bands:** The difficulty is also observed to incorporating NTN specific RF requirements in existing RAN4 TSs when the operating frequency bands of NTN/Satellite network fall into the frequency range between FR1 and FR2.
- ◆ **Regulatory aspects:** The operation of NTN/Satellite system with its all components including terminals shall comply with the regulations of FSS/MSS services which are totally different from terrestrial system under mobile service, and will result in difference in the RF requirements also.
- ◆ **ITU submission:** It is better to have separate TS(s) for candidate technology for terrestrial and satellite components in terms of ITU definition as we did in 4G time for unlicensed operations (LAA was removed to separate TS before ITU submission). Separate 3GPP TSs for TN and NTN are facilitate such submission work and further update in the future.

◇ The new dedicated TS for NTN RF requirements is better to cover all bands and all UE types for future evolution.

- ◆ Having new RAN4 NTN TS(s) to incorporate NTN specific requirements would ensure the consistency of the entire structure/framework in a self-contained manner and would make NTN TS(s) editorially friendly for its future development.
- ◆ For RRM and Demod part, it is OK to incorporate these requirements in either new or existing TS(s). But for the latter case, such requirements should be contained in dedicated sub-clauses with suffixes in corresponding TSs (e.g. TS 38.133) given the experience in previous practices (e.g. V2X, unlicensed).

Annex – Further consideration(2/2)

Some concerns were raised in previous RAN4 meetings to capture NTN/Satellite handheld UE RF requirements in a separate specification from the current one for TN.

- ◆ The User Equipment supporting TN can implement NTN, and it seems important to have a single User Equipment specification for both TN and NTN functionalities.
- ◆ RAN4 should understand the consequences of separating NTN UE from TN UE specification.

◇ **As a general working manner, RAN4 will take such implementation requirement into account when specifying each RF requirement, but not tight coupling with where RF requirements to be captured.**

- ◆ With the current Rel-17 WI discussion in RAN4, we well recognized and fully agreed that some selected RF requirements of TN UE should be reused for NTN handheld UE considering above implementation requirement.
- ◆ We have to note that, as a new feature, when a handheld UE support NTN, it has to satisfy the NTN-specific RF requirements, e.g specific band for NTN/satellite etc., so it is impossible to share exactly the same spec.s for both NTN/Satellite handheld UE and TN UE. Even in the same spec., NTN-specific sub-sections need to be introduced anyway. So we believe there is no fundamental difference to capture those RF requirements of NTN/Satellite UE in current spec. or a new one.
- ◆ Our preference on new spec. approach are mainly based on the consideration to facilitate NTN spec. management in later releases as well as ITU-R submission etc.