1   Introduction

This email discussion addresses the following documents:

Table 1:

RP-211765	[Draft] Reply LS to ESOA on NTN IoT normative work	Hughes/EchoStar
RP-212493	LS on EPS support for IoT NTN in Rel-17	SA2
RP-212313	[DRAFT] Reply LS Reply to SA2, cc SA/CT on Rel-17 NB-IoT/eMTC support for Non-Terrestrial Networks	MediaTek Inc.

- RP-211765 is a reply LS to ESOA (original LS in RP-210220) informing about the approval at RAN#92e of

  - TR 36.763
  - New Rel-17 WID on IoT NTN

- RP-212493 is an LS from SA2 informing about the agreement (for SA#93e approval) of a new Rel-17 Work Item to introduce IoT NTN in EPS and asking RAN to provide early feedback to SA#93e.

- RP-212313 is the corresponding draft reply LS to SA2, SA and CT.

2   Initial Round

2.1   RP-211765: Reply LS to ESOA

The reply LS to ESOA is factual and not expected to be controversial. The moderator proposes:

Moderator Proposal (RP-211765):

- Reply to ESOA (cc. SA, CT) as proposed in RP-211765

- If so, a revision is needed: removing the word "DRAFT" and updating the source to "RAN"

Please indicate below whether you agree with the moderator proposal. If not, please indicate <u>why</u>.

Feedback Form 1: Initial Round: Reply LS to ESOA

1 – THALES

Agree with moderator's proposal

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2 – Sateliot

Agree

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3 – NOVAMINT

Agree with the moderator's proposal.

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4 – Ericsson LM

We agree with the proposal, but we would like to slightly revise the LS text. We should remove "RP-210220 [1] informing the following… IoT solution in Rel-17" (no need to restate the content of the incoming LS; also the reference is redundant because it's already mentioned in the header). With this rewording the LS would start like this: "3GPP TSG RAN would like to thank EMEA Satellite Operators Association (ESOA) for their liaison statement. TSG RAN would like to inform ESOA that: …".

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5 – Qualcomm Incorporated

Although we are not really sure of the usefulness of sending this reply LS, if the group deems it to be useful we propose the following changes:

- For the IOT NTN TR, refer to version 17.0.0, which is the latest one.

- For the bullet on the work item, include a reference to the tdoc number with the lastest WID.

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6 – HUGHES Network Systems Ltd

Agree with moderator's proposal

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7 – MediaTek Inc.

As a courtesy, a reply LS to ESOA should be sent.

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8 – Eutelsat S.A.

Suggest to update TR version number to the lastest version before sending the reply.

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9 – Samsung Research America

Agree with sending a reply LS. Also suggest to delete the text about the content of the LS we are replying to, and add the tdoc number of the WID.

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10 – Apple GmbH

Agree with moderator's proposal. The version of TR36.763 may be updated to 17.0.0.

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11 – Nokia France

We support sending a reply, and also agree with the modifications proposed by Ericsson and Qualcomm. Thank you.

12 – Lenovo (Beijing) Ltd

Agree with moderator's proposal

13 – Spreadtrum Communications

Agree with moderator's proposal

14 – Intelsat

Agree with the moderator's proposal.

15 – ZTE Corporation

Agree to send the reply LS with the latest information, e.g., WID number.

16 – Beijing Xiaomi Mobile Software

Agree with the moderator's proposal.

17 – Ligado Networks

Agree, with the modifications proposed by Ericsson and Qualcomm.

18 – Gatehouse Satcom A/S

Agree with the moderator's proposal, but update following Qualcomm's comment.

19 – HUAWEI TECHNOLOGIES Co. Ltd.

We agree with the proposal to send an LS to ESOA and to inform ESOA about the latest RAN progresses for IoT NTN. Similar to comments raised by Qualcomm, we feel it would be good to provide latest information to ESOA, so ESOA can access to the latest information when needed. In addtion to the lastest information as of today, we propose to also inform ESOA where to find the up-to-date information in the future, we therefore suggest to add below text as well:

Latest technical report for Rel-17 NTN IoT is available at: https://portal.3gpp.org/desktopmodules/Specifications/Specifica

Latest work item description for Rel-17 NTN IoT is available at:

https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=920169

20 – Intel Corporation SAS

Agree with the moderator's proposal.

21 – VODAFONE Group Plc

agree with the moderator's proposal

2.2   RP-212493 (LS from SA2) and RP-212313 (LS Reply)

The moderator proposes to mark the incoming LS from SA2 as noted and to focus the discussion around the reply LS in RP-212313.

Moderator Proposal (RP-212493):

  – Note the incoming LS in RP-212493

Please indicate below should you disagree with the moderator proposal to note the LS from SA2.

Feedback Form 2: Initial Round: RP-212493 (LS from SA2)

1 – Ericsson LM   We agree with the proposal to note 2493.
2 – NOVAMINT   Agree with the moderator's proposal to note the incoming LS
3 – HUGHES Network Systems Ltd   Agree with moderator's proposal to note 2493
4 – Nokia France   OK
5 – Lenovo (Beijing) Ltd   Agree with moderator's proposal
6 – Spreadtrum Communications   Agree with moderator's proposal
7 – Intelsat   Agree with moderator's proposal to note 2493
8 – ZTE Corporation   Agree with moderator's proposal
9 – Beijing Xiaomi Mobile Software   Agree with moderator's proposal.

10 – Ligado Networks   Agree.
11 – Gatehouse Satcom A/S   Agree with moderator's proposal.
12 – HUAWEI TECHNOLOGIES Co. Ltd.   Agree with moderator proposal to note the LS from SA2
13 – Intel Corporation SAS   We agree with the proposal to note the LS.
14 – VODAFONE Group Plc   We agree with the proposal to note 2493.
15 – Eutelsat S.A.   Agree

The moderator would like to stress early response should be sent this week by RAN as requested in the incoming LS. Treatment in GTW#2 of the reply LS resulting from this email discussion would be best.

RP-212313 observes SA2 does <u>not</u> plan to define new functionality to support *discontinuous coverage* in Rel-17, unlike the RAN WID approved at RAN#93e (LTE_NBIOT_eMTC_NTN-Core). RP-212313 emphasizes discontinuous coverage is minimum essential functionality in RAN and recommends CT to consider low-hanging fruit solutions relying on *existing* functionality. The moderator would like to note that no TDoc has been submitted at RAN#93e to rescope the LTE_NBIOT_eMTC_NTN-Core WID. The moderator assumes the scope of this WID should remain unchanged.

Moderator Proposal (LTE_NBIOT_eMTC_NTN-Core WID):

– Keep the scope of the RAN WID as is.

Please indicate below whether you agree with the moderator proposal. If not, please indicate why/what.

> **Feedback Form 3:   Keep LTE_NBIOT_eMTC_NTN-Core WID scope unchanged**

1 – Lenovo (Beijing) Ltd   We support the moderator's proposal to keep the WID scope unchanged. Discontinuous coverage is an important commercial scenario for IoT NTN, wherein satellite access can be provided by operators with sparse constellation and lower cost. Multiple companies have participated in the RAN WG discussions and agreements have been made. There is no reason to change the WID scope at this time.

2 – THALES

Agree with the moderator's proposal

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3 – Sateliot

Agree to keep the RAN WID scope unchanged

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4 – Ericsson LM

We agree with the moderator's proposal to keep the RAN WID scope unchanged.

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5 – NOVAMINT

Agree with the moderator's proposal to keep the RAN WID scope unchanged

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6 – Qualcomm Incorporated

At this stage, it is a bit unclear to us how doing the work on discontinuous coverage in RAN without any SA/CT corresponding normative work would lead to a working solution in this release. Discontinuous coverage is a system level feature that requires changes in the core network and NAS.

Our suggestion to ensure alignment across TGSs would be as follows:

1.- Include in the LS reply that there is a RAN objective on discontinuous coverage, and ask SA/CT if they would reconsider adding an objective to cover this case. Include also in the LS that, if SA/CT do not do any work on discontinuous coverage, RAN will remove the objective from the current work item.

2.- Depending on the LS reply from SA, RAN to remove or keep the current objective.

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7 – HUGHES Network Systems Ltd

We support the moderator's proposal to keep the WID scope unchanged.

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8 – MediaTek Inc.

Based on earlier discussions, we don't see that changing the scope of the RAN WI is justified - however a middle ground should be sought bearing in mind new functionality to support discontinuous coverage was not agreed in SA2 and we do not expect this will change. We think the pragmatic course of action is to acknowledge in RAN the situation in SA2 and seek a middle ground in CT at this stage i.e. with some very basic support for discontinuous coverage.

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9 – Samsung Research America

Agree to keep the scope of the RAN WID unchanged.

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10 – Apple GmbH

Agree with moderator's proposal to keep the scope unchanged.

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11 – Intelsat

Agree with the moderator's proposal

12 – ZTE Corporation

Agree with moderator's proposal

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13 – Ligado Networks

Agree with the moderator's proposal.

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14 – Gatehouse Satcom A/S

Agree with moderator's proposal to keep the scope of the RAN WID unchanged.

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15 – HUAWEI TECHNOLOGIES Co. Ltd.

We support moderator proposal to keep the RAN WID as it is for the time being. But we also share similar view with Qualcomm that RAN should align with SA/CT in a release. If SA/CT cannot support discontinuous coverage in Rel-17, RAN will have to consider removing the objective of discontinuous coverage later.

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16 – VODAFONE Group Plc

While support for discontinuous coverage is useful - especially in early deployments, there is (was) a lack of time in SA2 to study its impact. 3GPP specs need to be consistent across a release. The Mediatek approach may be one way forward.

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17 – Beijing Xiaomi Mobile Software

In RAN2#115e, it was concluded that there may be some work that needs to be done in SA2 and CT1 for paging, (e)DRX, PSM and PLMN search handling mechanisms and their configurations when the UE is in discontinuous coverage and the related LS had been sent to SA2 and CT1. SA2 does not plan to define new functionality to support discontinuous coverage in Rel-17. In this sense, we think it is better for RAN to keep alignment with SA/CT and hold the objective in the work item until we get the response from CT. Otherwise, we may unnecessarily spent time on specifying the design for discontinuous coverage that is not workable in Rel-17 due to the lack of support for SA/CT.

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18 – Eutelsat S.A.

We agree with the moderator that RAN should support discontinuous coverage in Rel-17, irrespective of SA or CT additional work. The support in RAN of this feature is essential in our view. We also agree with Mediatek and Vodafone that if CT can consider minimal enhancements in R17 that could be useful.

The moderator proposes to discuss the content of the draft reply LS in RP-212313. Please provide your comments below. (Please avoid editorial comments).

Feedback Form 4: Comments to draft Reply LS in RP-212313

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1 – Ericsson LM

We agree to reply, but we propose to slightly reword the LS. There's probably no need for RAN to mention specific details to CT, so we should reword the last sentence of the 1st paragraph as follows: "Bearing in mind the scope of SA2 WID, TSG RAN would like to ask TSG CT to consider specifying "low-hanging

fruit" solutions relying on existing functionality, if feasible." The action to CT should also read: "TSG RAN would like to ask TSG CT to consider specifying "low-hanging fruit" solutions relying on existing functionality, if feasible."

2 – Qualcomm Incorporated

See our reply to the previous question.

3 – MediaTek Inc.

As author of the LS, our opinion is in 2313. Ericsson proposal is reasonable.

4 – ZTE Corporation

We are in general fine with the LS, and the suggestion listed in the LS can be one way as middle ground to support the basic feature.

5 – HUAWEI TECHNOLOGIES Co. Ltd.

Ericsson's suggestion is OK.

It would also be good to let CT aware of the possible action in RAN if discontinuous coverage is not supported in CT. Similar to Qualcomm suggestion, we would suggest to add some wording in the LS like: If there is no support from CT for discontinuous coverage in Rel-17, RAN will have to consider removing the objective of discontinuous coverage from the current WID.

As the potential solution will be discussed in CT1 instead of CT plenary, we are wondering it might be good to send the LS to CT1 as well.

6 – Nokia France

We support sending a reply, and agree with Ericsson's proposed modification to avoid mentioning the specifics of a solution.

We would also like to add the following after the second paragraph: "TSG RAN also notes that WUS does not need to be mentioned as an exception, as it has in fact been discussed in RAN2 in line with an objective of the RAN WID."

7 – VODAFONE Group Plc

Ericsson's proposal seems OK

8 – Beijing Xiaomi Mobile Software

Since RAN2 had already sent the LS to CT1 on the technical issue of the discontinuous coverage, in this reply LS to CT, we share the same view with HW, some wording like ' if CT don't plan to do any work on discontinuous coverage in rel-17, RAN will delete the objective of discontinuous coverage from the current WID' shoule be included in the reply LS.

9 – Eutelsat S.A.

Ericsson proposal would be OK. CT should determine what can be done in the time available.

2.3 Conclusions from Initial Round

Issue 2.1 – RP-211765: Reply LS to ESOA

- There is a wide support (and no objection) to send a reply LS to ESOA. A number of edits have been suggested.

- The moderator has drafted a revision of RP-211765 (RP-211765r01) in inbox/drafts/[93e-31-IoT-NTN]

- **WAY FORWARD**

  - move forward with RP-211765r01
  - no further edits to be done (Unless absolutely needed)
  - *Close this part of the email discussion*

Issue 2.2 - RP-212493 (LS from SA2) and RP-212313 (LS Reply)

- **RP-212493** – all companies agree to note the incoming LS.

  - **WAY FORWARD**
    - Note RP-212493
    - *Close this part of the email discussion*

- **Keep LTE_NBIOT_eMTC_NTN-Core WID ("RAN WID" in the following) scope unchanged**

  - There is a unanimous view to keep the scope unchanged for the time being
  - Regarding discontinuous coverage, the discrepancy between RAN and SA2 WI is acknowledged.
    - A number of companies recommend to revisit the scope of the RAN WI at a later plenary should no support for discontinuous coverage be available at NAS
    - One company recommends to request SA/CT if they would reconsider adding an objective to cover discontinuous coverage
    - One company recommends to keep the work on discontinuous coverage on hold in RAN until a response is received from CT
  - **WAY FORWARD**
    - Keep the scope of the RAN WID unchanged
    - Document in the minutes that should there be NO support for discontinuous coverage at NAS, the scope of the RAN WID may be aligned accordingly at a later plenary; and
    - To continue work on discontinuous coverage as already planned in RAN WGs
    - Highlight the discrepancy in RP-212313 (rev thereof)
    - *Close this part of the email discussion*

undefined **RP-212313**

- There is wide support to emphasize the discrepancy between the RAN WID and the SA2 WID with regards to discontinuous coverage. There is wide support to ask CT to consider specifying "low-hanging fruit solutions relying on existing functionality, if feasible" (without hinting on a particular solution)
- One company also identified a discrepancy wrt. WUS
- **Moderator Proposal**
  - To emphasize the discrepancy wrt. WUS
  - To emphasize the discrepancy wrt. Discontinuous coverage
    - To ask SA to re-consider supporting Discontinuous coverage.
    - To ask CT to consider low-hanging fruit solutions relying on existing functionality if feasible or, should SA introduce an objective on Discontinuous coverage, to align with SA.
  - A revision of RP-212313 (RP-212313 r01 MTK) is available in inbox/drafts/[93e-31-IoT-NTN] accordingly

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3   Intermediate Round

3.1   General Comments

Should you have any (major) concerns on any of the above Way Forward proposals (except regarding RP-212313), please indicate so below.

<div align="center">

Feedback Form 5: (Major) Concerns on Way Forward proposals (except on RP-212313)

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1 – Qualcomm Incorporated
We would like to modify the following bullet to allow the possibility of changing the WID in this meeting if a reply from SA is quickly received:
Document in the minutes that should there be NO support for discontinuous coverage at NAS,
the scope of the RAN WID may be aligned accordingly ~~at a later plenary~~;
2 – MediaTek Inc.
Qualcomm proposal makes sense
3 – Gatehouse Satcom A/S
Qualcomm's rephrasing is preffered.

3.2   RP-212313 (LS Reply)

As indicated above, a revision of RP-212313 (RP-212313 r01 MTK) is available in inbox/drafts/[93e-31-IoT-NTN].

Please indicate below should you have any comment on the draft.

Feedback Form 6: Comments to RP-212313 r01 (see inbox/drafts/[93e-31-IoT-NTN]

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1 – Qualcomm Incorporated

We have two main comments:

1) We should expect a reply from SA/CT/CT1 informing of the outcome (being it positive or negative). Thus, we propose to modify the bullet as follows:

TSG SA/CT/CT1 to inform TSG RAN ~~should there be~~ *no* ~~support for discontinuous coverage at NAS in Rel-17~~ on the outcome of the discussion above.

2) We should also inform SA/CT/CT1 that RAN may align the WID accordingly if there is no NAS support for discontinuous coverage (in line with our input for 3.1)

3) For WUS, the question is a bit unclear, should we rephrase it as follows?

TSG RAN would also like to emphasize that work to support WUS in IoT NTN is ongoing and would therefore like to ask TSG SA, CT/CT1 <u>whether</u> WUS is <u>planned to be</u> supported.

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2 – Apple GmbH

In our opinion, the rapporteur's proposal for the Reply LS to SA2 is reasonable. RAN2 has already sent an LS to SA2, CT1, RAN3, and SA4 (R2-2109213) that some impact on paging, (e)DRX, PSM, and PLMN search mechanisms is expected when UE is in discontinuous coverage, and we think RAN should echo the message from RAN2. So we would like to suggest modifying the following sentence in the Reply LS:

"TSG SA to reconsider supporting new functionality to support discontinuous coverage;"

to

"TSG SA to reconsider supporting new functionality to support discontinuous coverage, especially with respect to paging, e()DRX, PSM, and PLMN search;"

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3 – NOVAMINT

We tend to support to go in the direction proposed by Apple to reinforce the message already sent by RAN2.

Some small editorial corrections in the reply to LS are needed to mention CT1 or SA2 in the text of the different actions when relevant

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4 – Gatehouse Satcom A/S

We are also more aligned with the direction initiated by Apple (complemented by the editorial input of Novamint).

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5 – Sateliot

We are supportive of Apple and Novamint proposals

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6 – Nokia France

Thanks for the updated LS.

We support Qualcomm's proposed modification (1).

For Qualcomm's proposed modification (3), we are not sure what was unclear, given that WUS was for some reason specifically excluded in the SA WID, based on an apparent wrong assumption about the status of the work in RAN. We would like to revert to the WUS text in r01-MTK.

The Apple proposal is OK, except "especially" could be changed to "including".

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7 – HUAWEI TECHNOLOGIES Co. Ltd.

Regarding that WUS part, our understanding is that the discrepancy comes from SA2 WID (S2-2106794) lists WUS in the exception part, while RAN has agreement that existing WUS can be reused without enhancement. If we can only choose one from Nokia's proposal for WUS and the moderator's proposal for WUS, we prefer to use Nokia's original wording "TSG RAN also notes that WUS does not need to be mentioned as an exception, as it has in fact been discussed in RAN2 in line with an objective of the RAN WID". If we can improve it further, we would suggest wording like below: TSG RAN wonders why SA2 WID has excluded WUS functionality considering the RAN2 agreement that existing WUS mechanism can be reused without enhancements.

3.3   Conclusions from Intermediate Round

Issue 2.1 - RP-211765 Reply LS to ESOA

- No concerns expressed on the moderator proposal

- **WAY FORWARD: Approve RP-211765r01** (with necessary normal clean-up) **under a New TDOC number**

- **The discussion is CLOSED**

Issue 2.2 - RP-212493

- No concerns expressed on the moderator proposal

- **WAY FORWARD: Note RP-212493**

- **The discussion is CLOSED**

Issue 2.2 - Keep LTE_NBIOT_eMTC_NTN-Core WID ("RAN WID" in the following) scope unchanged

- Misc. suggestions received on moderator proposal to remove the statement "at a later plenary" (for potential WI alignment in RAN)

- **WAY FORWARD:**

  - **Keep the scope of the RAN WID unchanged**
  - **Document in the minutes that should there be NO support for discontinuous coverage at NAS, the scope of the RAN WID may be aligned accordingly; and**
  - **To continue work on discontinuous coverage as already planned in RAN WGs**
  - **Highlight the discrepancy in RP-212313 (rev thereof, see below)**
  - **The discussion is CLOSED**

Issue 2.2 - RP-212313 LS Reply to SA, SA2, CT, CT1

- Overall the draft update was deemed reasonable. Some changes were suggested.

    ○ To indicate in the LS that discontinuous coverage may impact paging, (e)DRX, PSM, and PLMN search
    ○ WUS: it was confirmed WUS will be supported with IoT NTN (no enhancements needed as per RAN2 agreement), that the earlier SA2 decision was based on a wrong assumption and thus need to be fixed. A number of different wordings are suggested.
    ○ Misc. editorials

- Moderator proposal:

    ○ Discontinuous coverage: the impact on paging, (e)DRX, PSM and PLMN search is indicated (once, to avoid repetition throughout the LS).
    ○ WUS: proceed with this wording: *TSG RAN would also like to emphasize that work to support WUS in IoT NTN is ongoing, with RAN2 concluding the existing WUS mechanism can be reused without enhancement. TSG RAN would therefore like to ask TSG SA, SA2, CT, CT1 to ensure WUS is supported.*
    ○ A new revision **RP-212313r03** is provided in the inbox/drafts/[93e-31-IoT-NTN]
    ○ The moderator would like to reiterate that early reply to SA#93e this week was requested by SA2, and thus proposes to approve RP-212313r03 in GTW#2 today (Sep 15)

- **WAY FORWARD**

    ○ **The moderators recommends approval RP-212313r03 in GTW#2 today** (inbox/drafts/[93e-31-IoT-NTN]) **(new TDoc number needed)**

4   Final Round

To be filled in by the moderator depending on GTW#2