Summary of email thread [93e-28-RAN4-NewWID-700M] - Version 0.0.6
RAN

3GPP TSG-RAN Meeting #93-e RP-212568

Electronic Meeting, September 13 – 17, 2021

Agenda item: 10.1.4

Source: Moderator (RAN4 Chair)

Title: Email discussion summary for [93e-28-RAN4-NewWID-700M]

Document for: Information

1 Introduction

In this email thread we will discussion the following topics:

- New WI proposal for introducing upper 700MHz block A as a new standalone band for NB-IoT for industrial IoT applications.

In this document, we capture comments and conclusions for this email thread.

2 Topic: 700MHz NB-IoT standalone band

2.1 Companies' contributions summary

Table 1: Contributions under discussion

TDoc	Title	Source	Type	AI
RP-212521	LS regarding standardization of a new band (Upper 700 MHz A Block) for NB-IoT (UTC_LS_210817; to RAN; cc: RAN4; contact: Puloli)	Utilities Technology Council (UTC)	LS in	10.1.4

RP-211740	New WID proposal: Introducing Upper 700 MHz Block A as a new stand-alone band for NB-IoT for Industrial IoT applications	Puloli	WID new	10.1.4

2.2 Initial round

2.2.1 Comments & responses

Topic 1: Any question or comment on the justification or any other general comment for WI?

Please take the LS from UTC (Utilities Technology Council) into account when discussing this topic.

The Upper 700 MHz A Block ("700A") is a paired 1+1 MHz spectrum. It is currently not part of any 3GPP band plan. The 700A is situated between Upper C & Public Safety Broadband Blocks in FCC band plan.

The UL transmit is 787-788 MHz. The DL transmit is 757-758 MHz. Given it is 1+1 MHz FDD spectrum, only NB-IoT operation in stand-alone configuration is being proposed for this new band.

Companies are invited to provide the general comments, including comments on justification part, whether the WI is needed, how to handle the work, in the follow table.

Feedback Form 1: Topic 1

1 – Sequans Communications We support standardization of the upper 700 MHz A block for standalone NB-IoT. There should be minimal standardization effort to include this band in the specifications.
2 – Baicells Technologies Co. Ltd Support this WI considering the IIoT use cases. Agree with Sequans to minimize the spec impact considering only standalone NB-IoT is introduced to the spectrum band.
3 – MediaTek Inc. At initial round, at least, we are fine to standardization of the upper 700 MHz A block for standalone NB-IoT.

Topic 2: Comments and responses on the proposed objectives

The following objectives are proposed in the WID.

Core part:

The following are the core objectives of the Work Item:

Study any identified unique aspects specific to the proposed new band. Standardize a new FDD E-UTRA operating band based on the 2 MHz paired spectrum consisting of Upper 700 MHz A Block. To be specific, the uplink band for this new band is 1 MHz, 787-788 MHz; the downlink band is 1 MHz, 757-758 MHz; the duplex spacing is 30 MHz. Refer to Figure 3. Support for 200 kHz bandwidth Specify band numbering and RF characteristics of the new band. Ensure the new band supports only NB-IoT operation. Update the related 3GPP E-UTRA technical specifications to include support for the new band

The Work Item will begin in RAN4 #101-e.

Perf. part

The objectives of the Performance part work item are to

Update the related 3GPP E-UTRA technical specifications to include support for the new band, if necessary.

Companies are invited to provide comments and responses in the following table.

Feedback Form 2: Topic 2

1 – Verizon UK Ltd As a new band work item, the objective should also include the coexistence requirements. This Work Item needs to be updated and state this clearly.
2 – Puloli Agreed and will be updated in the revised version

Topic 3: Comments and responses on impacted/new specifications and target completion date & time budget

The proposed new specification and impacted specifications as well as target completion date are as follows:

(Moderator: the Rel-17 target completion date is March 2022 RAN#95 for Core part)

Table 2: New specifications

New specifications *{One line per specification. Create/delete lines as needed}*					
Type	TS/TR number	Title	For info at TSG#	For approval at TSG#	Remarks

TR xx.xxx	TR	Up-per_700_MHz_A_2022 new E-UTRA Band TRs	RAN#96 June 2022	RAN#96 June 2022	TR xx.xxx

Table 3: Affected existing specifications

Affected existing specifications [None in the case of Study Items]				
Spec No.	CR	Subject of the CR	Approved at ple-nary#	Comments
36.101		E-UTRA; UE Radio transmission and reception	RAN#96 June. 2022	Core part
36.104		E-UTRA; Base Station (BS) radio transmission and reception	Same as above	Core part
36.113		E-UTRA; BS and repeater EMC	Same as above	Core part
36.124		E-UTRA; EMC requirements for mobile terminals and ancillary equipment	Same as above	Core part
36.133		E-UTRA; Require-ments for support of RRM	Same as above	Core part
36.141		E-UTRA; Base Station (BS) con-formance testing	Same as above	Perf part
37.104		E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception	Same as above	Core part

37.113		E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)	Same as above	Core part
37.141		E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing	Same as above	Perf part

Companies are invited to provide comments and responses in the following table.

Feedback Form 3: Topic 3

1 – Ericsson LM

We have a question on intention for including MSR specs (37.xxx) in the WI. Is the intention to define MSR requirements for the new band? The band is standalone (1+1 MHz), which cannot include any other RATs. So we do not see need to define MSR requirements. TS 37.104 and 37.141 are needed for coexistence requirements but this should be clarified in the WID. For coexistence requirements we should also add relevant NR UE and BS specs: 38.101-1, 38.104 and 38.141-1.

2 – Puloli

You are right in that the proposed new band can only support NB-IoT, hence, there is no need for MSR operation. However, we notice from 37.104 that:

”The requirements in the present document for E-UTRA, UTRA and NB-IoT single-RAT operation of MSR BS are also applicable to E-UTRA, UTRA and NB-IoT multi-carrier capable single-RAT BS (see Section 1 Scope)”.

The BTS in the new band will operate multi-carrier NB-IoT.

With regarding to coexistence with NR, we agree to add 38.101-1, 38.104 and 38.141-1.

3 – Huawei Technologies Sweden AB

We would like to ask for clarification whether the EMC specifications require any updates. Those are considred to be band-agnostic.

Regarding the co-existance (Tx spur, Rx blocking) and co-location requirements: BS supporting new 700M band may need to be protected from/not to interfer with the MSR, as well as AAS BS. In our understanding, both MSR and AAS BS specs shall be listed as impacted - same as for any other band.

2.2.2 Summary

Moderator summarizes discussion status for initial round, list all the identified open issues and tentative agreements or candidate options and suggestion for next round.

Topic 1: Any question or comment on the justification or any other general comment for WI?

Tentative agreements

- Proposal 1: It is agreeable to approve a WI to standardize the upper 700MHz A block for standalone NB-IoT only.

Recommendations for intermediate round

Try to endorse Proposal 1.

Topic 2: Comments and responses on the proposed objectives

Tentative agreements

- Proposal 2: Add the coexistence requirements in the WID

Recommendations for intermediate round

Try to endorse Proposal 2.

Topic 3: Comments and responses on impacted/new specifications and target completion date & time budget

Ericsson commented taht MSR specs should not be included. But for co-existence, TS 37.104, TS 37.141, TS 38.101-1, TS 38.104 and TS 38.141-1 should be included.

Huawei proposed to remove EMC spec and keep MSR and AAS BS specs for co-existence.

Tentative agreements

- Proposal 3: For impacted spec,
  - Keep MSR BS specifications (TS 37.104 and TS 37.141) and add clarifications that those specifications are needed for co-existence
  - Add AAS BS specifications for co-existence requirements.
  - Add TS 38.101-1, TS38.104 and TS 38.141-1 for co-existence requirements.
  - Remove TS 36.113, TS 36.124, TS 37.113 EMC specifications

Recommendations for intermediate round

Try to agree proposal 3.

2.3 Intermediate round

2.3.1 Comments & responses

In this round, the following issues need be further discussed and addressed.

Topic 1: Any question or comment on the justification or any other general comment for WI?

- Proposal 1: It is agreeable to approve a WI to standardize the upper 700MHz A block for standalone NB-IoT only.

Companies are invited to provide comments and responses in the following table.

Feedback Form 4: Topic 1 intermediate round

1 – TELECOM ITALIA S.p.A. RAN4 TU estimates are needed. Is there capacity in RAN4 to address this activity in Rel 17?
2 – HuaWei Technologies Co. Moderator: This one is spectrum related topic. For spectrum related topic, we reserve TUs for new band.
3 – Sequans Communications It is our understanding that RAN4 still has capacity to handle Spectrum related WIDs in Rel. 17

Topic 2: Comments and responses on the proposed objectives

- Proposal 2: Add the coexistence requirements in the WID

Companies are invited to provide comments and responses in the following table.

Feedback Form 5: Topic 2 intermediate round

1 – Qualcomm Korea We aren't convinced that coexistence requirements in either direction are needed for this new NB-IoT band. Proprietary systems have already been operating on this band without coexistence. And, it's not clear that the -50 dBm/MHz requirement would be correct here. Firstly, the bandwidth is 200 kHz and secondly, the -50 dBm/MHz was based on cellular type communications, not NB-IoT.
2 – Huawei Technologies Sweden AB By default, co-existance requirements are regulatory requirements and shall be considered. Whether or not those would be technically found as not necessary to be introduced into the specifications, this is RAN4 level discussion. If needed, we can address this in the WID by adding clarification, e.g. "All the necessary co-existance (and co-location) requirements to be considered [RAN4]'.

3 – Ericsson LM We agree with Huawei that the WID should have an objective on co-existence requirements like when introducing any other band.
4 – Sequans Communications We agree coexistance requirements should be included in the WID; it is up to RAN4 to defino which coexistance parameters are necessary for specification of the specific band.

Topic 3: Comments and responses on impacted/new specifications and target completion date & time budget

- Proposal 3: For impacted spec,
  - Keep MSR BS specifications (TS 37.104 and TS 37.141) and add clarifications that those specifications are needed for co-existence
  - Add AAS BS specifications for co-existence requirements.
  - Add TS 38.101-1, TS38.104 and TS 38.141-1 for co-existence requirements.
  - Remove TS 36.113, TS 36.124, TS 37.113 EMC specifications

Feedback Form 6: Topic 3 intermediate round

1 – Qualcomm Korea Unclear whether coexistence requirements are needed.
2 – Huawei Technologies Sweden AB Please see comments to Topic 2. Co-existance requirements are regulatory ones. We need more technical discussion in RAN4 to decide either way.
3 – Ericsson LM List if impacted specs is ok. We also agree to remove UE/BS EMC specs

2.3.2 Summary

Based on the feedback, it is proposed to endorse Proposal #1. More discussion is needed for whether the co-existence requirements are needed or not in final round. And proposal #2 and proposal #3 are on hold until the co-existence requirement issue is addressed.

The following proposal can be endorsed.

- Proposal 1: It is agreeable to approve a WI to standardize the upper 700MHz A block for standalone NB-IoT only.

More discussions for proposal 2 and 3 are needed.

2.4 Final round

2.4.1 Comments & responses

Based on the status of the final round, the following issue need be discussed.

Whether the co-existence requirements are needed for this WI

Companies are invited to have further discussion. After addressing this issue, we can try to endorse Proposal 2 and 3 (maybe with modifications)

Feedback Form 7: Co-existence requirements

1 – AT&T GNS Belgium SPRL We agree with Huawei's and Ericsson's comments in the intermediate round. Having an objective in the WI for co-existence requirements is the normal practice for introduction of any new band in 3GPP.
2 – Qualcomm Korea We disagree with Huawei's justification that coexistence requirements are regulatory. This band is for the US and there are no such coexistence requirements (i.e., -50 dBm/MHz) imposed by the FCC that I'm aware of. Our concern is the potential impact that coexistence requirements might levy onto existing Band 12, 17, 13, and 14 device requirements that might now have to meet a new requirement that was not present before. Are the legacy operators ok with that? If the requirement is expected to be -50 dBm/MHz scaled to 200 kHz bandwidth is -57 dBm which is even tougher than NS_07. The configuration of the band is such that this very well may not be a problem, but I'm not ready to accept this kind of requirement which to my understanding is not regulatory, is not required today for proprietary systems already in operation, without an understanding of the implications. This is a new type of band 1x1 MHz for NB-IoT only, so we should not necessarily impose requirements just because other bands have been done that way.
3 – Baicells Technologies Co. Ltd Agree with Qualcomm's views, we think it is better to keep the similar requirements like existing Band 12,13, 14 and 17 from eNB side point of view. More strict requirements should be carefully studied whether it is necessary or not.
4 – Ericsson LM In our view 700 MHz band for NB-IoT is new band. It is in between band 13/n13 and band 14/n14. So the new band needs to protect at least the existing band 13/n13 and 14/n14 i.e. protection requirements are needed in 36.101 and 36.104. Also it is usual practice to have an objective on coexistence requirements in WI on new band. We suggest to leave the details to RAN4. RAN4 can discuss the which coexistence requirements (if any) are needed.
5 – MediaTek Inc. At this stage, we are fine with the opinions from Qualcomm. From Qualcomm's clarification, this band is for the US and there are no such coexistence requirements (i.e., -50 dBm/MHz) imposed by the FCC. The clarification about question of "Are the legacy operators ok with that?" is important. We have to be really careful about impacts and whether defining a strict requirement is needed or not. More discussion/clarification are needed.

6 – Huawei Technologies Sweden AB

As commented by other companies already, consideration of the co-ex requirements is a typical practise for the new bands to be introduced. We would like to clarify that our intention is not to force co-ex requirements, but to reassure that any applicable regional regulations are followed, new band is not going to interfere with the existing systems, existing systems would not cause 700M band blocking, etc.

Therefore in order to resolve this issue, we suggest to add clarification to the WID, e.g. "*RAN4 to study the need for any applicable co-location and/or co-existance requirements for the 700MHz NB-IoT band, considering regional regulations*".

7 – Sequans Communications

We agree with Qualcomm that additional coexitence requirements with impact to existing specified bands (12, 17, 13, and 14) should be avoided. We consider the compromise suggested by Baicells to be satisfatory.

8 – Puloli

We agree with Qualcomm's concerns that are shared by Baicells, Huawei, MediaTek and Sequans. To avoid unintended consequences, we suggest to re-use coexistence requirements of existing specified bands (12, 17, 13, and 14) for the new band.

2.4.2 Summary

Based on the feedback, companies still had different views on whether to include co-existence requirements. To move forward, moderator would like to suggest to study whether and what co-existence requirements will be specified.

See the summary in Section 3.2

3 Summary of Recommendations

3.1 Outcome of intermediate round

The following proposal can be endorsed.

- **Proposal 1:** It is agreeable to approve a WI to standardize the upper 700MHz A block for standalone NB-IoT only.

NOTE: the WI is spectrum related and can be covered by reserved TU for spectrum related topics.

3.2 Outcome of final round

Moderator propose to endorse the following proposals + Proposal 1 in intermediate round.

- **Proposal 1:** It is agreeable to approve a WI to standardize the upper 700MHz A block for standalone NB-IoT only. (proposed to be endorsed in intermediate round)

- **Modified proposal 2**: Study the need for any applicable co-location and/or co-existance requirements for the 700MHz NB-IoT band, considering regional regulations, and if needed specify the co-existence requirements
- **Modified proposal 3**: For impacted spec,
  - Keep MSR BS specifications (TS 37.104 and TS 37.141) and add clarifications that those specifications are needed for co-existence, and put those specifications in [ ] for the time being.
  - Add AAS BS specifications for co-existence requirements, and put those specifications in [ ] for the time being.
  - Add TS 38.101-1, TS38.104 and TS 38.141-1 for co-existence requirements, and put those specifications in [ ] for the time being.
  - Remove TS 36.113, TS 36.124, TS 37.113 EMC specifications

Please the proponent provided the revised WID for approval.

After final round, RAN Chair announce to endorse proposal 1, modified proposal 2, and modified proposal 3. The revised WID RP-212618 was approved via email.