**3GPP TSG RAN WG1 Meeting #102-e R1-200xxxx**

**e-Meeting, August 17th – 28th, 2020**

**Agenda Item:** 5

**Source:** Samsung

**Title:** [102-e-LS-AI5-03] Email discussion/approval of reply LS for R1-2005208, including its necessity (i.e., whether to have the LS or not)

**Document for:** Discussion and Decision

# **Introduction**

[102-e-LS-AI5-03] Email discussion/approval of reply LS for R1-2005208, including its necessity (i.e., whether to have the LS or not), by 08/20 (TBD, Samsung)

# **Discussion**

* Question1: Do you think the RAN1 reply LS in RAN1 #102-e is necessary?

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| **Source** | **Yes or no** | **Comments** |
| Huawei, HiSilicon | Yes | * In the LS action, RAN1 is clearly asked by RAN2 to response. * The concerned per-UE capabilities in the RAN2 LS are all sourced from RAN1, as listed below. Companies can easily confirm RAN1 as a source by TR 38.822 * All of the concerned per-UE capabilities are baseband capabilities, otherwise they would have been per-band or other types of UE capabilities. Such baseband capabilities in the list does not require any RF or RAN4 expertise. |
| ZTE | No | Reply LS in RAN1#102-e is NOT necessary.  Based on our understanding, whether the SUL/SDL should be considered as FDD/TDD or new duplex mode needs to be determined by RAN4 first.  The RAN1 discussion may greatly impacted by the RAN4 conclusion. For example, if RAN4 confirms that SUL/SDL can be considered as FDD, then it seems reasonable for SUL/SDL to share the FDD capability bits; but if RAN4 confirms that SUL/SDL is a new duplex mode different from TDD/FDD, then RAN1 may need to further discuss how to handle the SDL/SUL capability issue.  Once we get reply LS from RAN4, RAN1 can start to discuss/clarify the concerned RAN1 UE capabilities. For the concerned RAN1 UE capabilities, a case-by-case discussion is preferred in the late stage in Rel-15 in order to avoid potential unnecessary NBC issue. |
| Nokia, NSB | Yes (but maybe better wait) | In our understanding RAN1 has the expertise on the issue and should be in the best position to respond. Still, we do agree with ZTE that it maybe better to wait till the second week of RAN1#102 to have a better idea of RAN4 status. |
| Samsung | No | No strong preference. But, as ZTE and Nokia commented, we can wait RAN4 confirmation first about whether the SUL/SDL band corresponds to TDD or FDD band. And then we can further discuss potential RAN1 impacts if necessary. |
| CATT | No | We agree with ZTE that it would be better to wait for RAN4 agreements first. |
| Huawei, HiSilicon (2) | Yes | In response to ZTE comments, we should avoid deadlock between RAN1 and RAN4 by providing RAN1 inputs to RAN4. Because, as commented before, **all the concerned UE capabilities are sourced from RAN1, RAN4 needs RAN1 views to make progress. Please companies saying No could clarify what the exact harm is if RAN1 provides inputs on RAN1 capabilities to RAN4.**  Additionally, we don’t feel ZTE correctly interpret what is asked by RAN2. It is nothing about whether SUL/SDL band can be considered as FDD/TDD band, nor about whether RAN1 functionality of SUL/SDL can follow the functionality of FDD/TDD band. It is just about which reported values of per-UE capabilities can be applied to SUL/SDL. |
| Qualcomm | No | The RAN1 discussion seems to have dependence on whether every SDL band can be categorized unambiguously as either FDD or TDD, and similarly, whether every SUL band can be categorized unambiguously as either FDD or TDD. RAN4 needs to provide an answer to this first. |
| Ericsson | No | It is more efficient to let RAN4 conclude on this and then treat it in RAN1 |
| MediaTek | Yes | But share the same views as Nokia. It’s better to know the latest RAN4 band status before replying to RAN2. Maybe RAN1 can discuss this issue from RAN1 perspective first. |
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**Observation:**

* 2 companies including Huawei, HiSilicon think the RAN1 reply LS in RAN1 #102-e is necessary
* 3 companies including Nokia, NSB, MediaTek think the RAN1 reply LS in RAN1 #102-e is necessary but better to wait and know the RAN4 status before replying to RAN2.
* 5 companies including ZTE, Samsung, CATT, Qualcomm, Ericsson think the RAN1 reply LS in RAN1 #102-e is not necessary and then RAN1 should wait the reply LS/conclusion from RAN4 before replying to RAN2.

**Possible conclusion:** Depending on the inputs from the majority of companies, the following conclusion is suggested.

* It is concluded to wait RAN4 decision about xDD differentiation for SDL/SUL before having the reply LS to RAN2 in RAN1 #102-e.
* Question2: If the RAN1 reply LS in RAN1 #102-e is necessary, what is your view about the following first question from RAN2 LS [1]?

Question:“Could per-UE capabilities for SUL/SDL bands be differentiated on the duplex mode(s) for Rel-15 and Rel-16?”

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| **Source** | **Comments** |
| Huawei, HiSilicon | Yes. Taking dynamicSFI as example, its functionality specified in 38.211 and 38.213 differentiate SUL from TDD. |
| Nokia, NSB | The SDL could be understood as FDD downlink when interpreting per-UE capabilities or capabilities that have a different default or minimum value for FDD and TDD bands, as the RAN1 specs do not differentiate SDL SCell from a DL-only SCell on FDD.  The SUL may not be directly understood as either FDD or TDD uplink when interpreting the per UE-capabilities or capabilities that have a different default or minimum value for FDD and TDD bands, but the capability list would need to be checked to see for possible fall-in-between cases as RAN1 specs differentiate SUL carrier from uplink FDD carrier. |
| Ericsson | Depends on RAN4 input |
| MediaTek | Based on our understanding, for SUL, all SUL bands are also FDD bands in Rel-15. In Rel-16, one new SUL band is added and it’s TDD band. For SDL, all SDL bands are also TDD bands in Rel-15. In Rel-16, one new SDL band is added and it’s different from all existing TDD and FDD bands. Therefore, we may discuss whether to address this issue differently for Rel-15 & Rel-16. But we will need to wait for RAN4’s input. |
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**Observation:** None

**Possible conclusion:** None

* Question3: If the RAN1 reply LS in RAN1 #102-e is necessary, what is your view about the following second question from RAN2 LS [1]?

Question: “Which duplex mode(s) (i.e. FDD or TDD) for the per-UE capabilities which are differentiated by FDD and TDD are applied for SUL/SDL in both Rel-15 and Rel-16?”

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| **Source** | **Comments** |
| Huawei, HiSilicon | As analysis in R1-2006935, with respect to IoDT and functionality for those per-UE UE capabilities in the list, the capability value reported by a Rel-15 UE for FDD is also applied to SUL bands if it is applicable to uplink, otherwise, the capability value is also applied to SDL if it is applicable to downlink.  For Rel-16 UE, the same new mechanism in R1-2005212 is applied for SUL/SDL because all the concerned per-UE capabilities differentiating FDD/TDD have been changed to per-band in Rel-16 by RAN2. In short, those concerned capabilities are reported in a basis of per-band but required to be the same values among SUL bands per frequency range, so does among SDL bands per frequency range.  R1-2005212:  “*For release-16 UE capabilities for which both xDD and FRx differentiations are allowed, RAN2 intends to use “per band” capability signalling. This way, the problem above no longer exists for release-16 capabilities.*”  “ |
| Nokia, NSB | We agree with the general principle Huawei suggests. However, that alone may not suffice as 3GPP has specified some other cases that rely on all bands and carriers being either FDD or TDD and it is not clear how these capabilities should be understood in the presence of SUL/SDL (examples below).  Further, RAN1 specifications refer to paired and unpaired spectrum, where SDL and SUL would logically be “unpaired”, but functionally they should typically fall under “paired”, leaving some parts of RAN1 specification open to interpretation.  ***simultaneousRxTxInterBandCA***  *Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band NR CA. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4].*  ***simultaneousRxTxInterBandCA***  *Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band EN-DC. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-3 [4].* |
| Huawei, HiSilicon (2) | In response to Nokia, thank you for your comments   * Discussions here are about per-UE capabilities, but the two capabilities in your comments simultaneousRxTxInterBandCA and simultaneousRxTxInterBandCA are on basis of per band combination. Therefore, different values can be reported by a UE between CA band combination, SUL combination and EN-DC combinations. If you check TS 38.331 and TS 38.101-1/-2/-3, you could find that your concerns have been identified and resolved in Rel-15. * We understand your point. But in RAN1 agreements and RAN1 specifications, SUL has never been mixed with unpaired spectrum, for example, as the table titles of Table 6.3.3.2-2 and Table 6.3.3.2-3 in TS 38.211. They are well separated in RAN1 history. |
| Qualcomm | SUL is being defined in both FDD bands and TDD bands (examples for the latter include 1880-1920MHz SUL band or 2300-2400MHz SUL band). We do not understand why SUL in a TDD band should be categorized as FDD. As mentioned, RAN4 should clarify whether it can be unambiguously determined if the SUL band is FDD or TDD. If yes, then that designation could be the baseline.  In addition, FGs themselves can be categorized as related to the DL or related to the UL or related to both. If a FG relates to both the DL and UL then the relevant duplex mode could be equally categorized based on the duplex mode of the DL or the duplex mode of the UL. At present, the DL is always TDD for any SUL. Therefore, the determination can be based on the TDD capability setting for these FGs. As an example, consider FG *ul-SchedulingOffset*, which has clearly a dependence on both DL (where PDCCH is) and UL (where PUSCH is), so it is unclear to us why it should be categorized solely based on what duplex mode the UL has. |
| Ericsson | Depends on RAN4 input |
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**Observation:** None

**Possible conclusion:** None

# **Conclusion**

[TBD]

# **Reference**

[1] R1-2005208 LS on UE capability xDD differentiation for SUL/SDL bands Samsung

[2] R1-2006082 [Draft] Reply LS on UE capability xDD differentiation for SUL/SDL bands Samsung

[3] R1-2006335 [DRAFT] Reply LS on UE capability xDD differentiation for SUL/SDL bands ZTE

[4] R1-2006934 Draft LS reply on UE capability xDD differentiation for SUL/SDL bands Huawei, HiSilicon

[5] R1-2006935 Discussion on UE capability xDD differentiation for SUL/SDL bands Huawei, HiSilicon