**3GPP TSG-RAN WG2 #124 *R2-231xxxx***

**Chicago, USA, November 2023**

Agenda Item: 7.15.X

Source: OPPO

Title: Summary of [POST123bis][113][V2X/SL] QoS flows mapping to carriers (OPPO)

Document for: Discussion, Decision

# Introduction

This is for the following email discussion.

* [POST123bis][113][V2X/SL] QoS flows mapping to carriers (OPPO)

      **Scope:** Discuss whether there is any problem (including inter-operability issue, ignoring NW configuration, etc.), if feasible or not, and pros and cons for each option. The discussion will focus idle/inactive/OOC.

      **Intended outcome:** Discussion summary.

      **Deadline:** Long

# Discussion

During 123bis, the following issue has been discussed

**QoS flows mapping to carriers**

[Vivo]: Three options have been discussed for idle/inactive/OOC:

* Option1: UE establish multiple SLRBs to avoid different carrier for QoS flow ids in a SLRB
* Option2: Intersection among QoS flow ids belonging to a SLRB is considered in LCP
* Option3: No further enhancement based on running CR

[Nokia]: For RRC connected, option1 seems already feasible because we just agreed to include flow-to-carrier mapping for each destination into SUI message. [Qualcomm]: have strong concern with option2, e.g. multiple carriers are not guaranteed, whenever the upper layer adds new service type it should update it to the lower layer. [OPPO]: Can we see companies’ view? [IDC]: Option2 and option3 are actually same. Option2 is just for better clarification. Option3 is inherited sentence from LTE V2X as it was. [LG]: Do not think option2 and option3 are same. Prefer either option1 or option3. [Apple]: Option1 means that UE does not follow network configuration, which is not acceptable.

=> We’ll decide one of three options. No more new option is considered.

=> Comeback Friday.

Option1: Huawei, LG, Vivo, Xiaomi, Nokia, Qualcomm (6)

Option2: IDC, Ericsson, Lenovo, Apple (4)

Option3: CATT, ZTE, ASUSTek, OPPO, NEC (5)

It seems beneficial to firstly further analyze the pros/cons for each option, before final conclusion.

## Option-1

During 123bis, there were some offline discussion on option-1, it would be good to further check the Pros/Cons of it.

**Q1-1a: What is the advantage(s) of option-1 in your view?**

**- Pros-1: ensure every flow being delivered via the expected carrier**

**- Others**

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| Company | Pros | Comment |
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**Q1-1b: What is the disadvantage(s) of option-1 in your view?**

**- Cons-1: It leads to a UE behavior igoring the network (pre)configuration for SDAP (i.e., flow-to-bearer mapping)**

**- Cons-2: Inter-operability issue since in legacy, the UE would respect the SDAP configuration from network (pre)configuration**

**- Cons-3: currently there is no enough LCID space (16 for SL DRB) to carry QoS flow (64 at most, since flow-ID is of 6-bit) in an one-to-one manner**

**- Others**

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| Company | Pros | Comment |
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During 123bis, some draft TP is being circulated, to show the potential impact to R2 spec, which is attached in the Annex-1.

But good to re-evaluate it based on the Pros/Cons analysis above.

**Q1-2: Do you agree that the main impact to R2 spec is as shown in Annex-1? If no, please clarify the missing part.**

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| Company | Yes/No | Comment |
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And then finally, it boils down to two questions, whether option-1 is feasible (**not preferred or not, but just about feasibility**), and whether there is strong objection for this option.

**Q1-3a: Is option-1 is technically feasible?**

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| Company | Yes/No | Comment |
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**Q1-3b: Is option-1 acceptable? (i.e., if No, meaning it is unacceptable)**

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| Company | Yes/No | Comment |
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## Option-2

During 123bis, there were some offline discussion on option-2, it would be good to further check the Pros/Cons of it.

**Q2-1a: What is the advantage(s) of option-2 in your view?**

**- Pros-1: Secure higher layer flow-to-carrier mapping without changing legacy SDAP behavior**

**- Others**

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| Company | Pros | Comment |
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**Q2-1b: What is the disadvantage(s) of option-2 in your view?**

**- Cons-1: the intersection operation may lead to a reduced carrier set to deliver V2X traffic**

**- Cons-2: the no-intersection issue anyway cannot be solved**

**- Others**

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| Company | Pros | Comment |
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During 123bis, some draft TP is being circulated, to show the potential impact to R2 spec, which is attached in the Annex-2 (including both normative text-based approach and NOTE-based approach)

But good to re-evaluate it based on the Pros/Cons analysis above.

**Q2-2: Do you agree that the main impact to R2 spec is as shown in Annex-2? If no, please clarify the missing part.**

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And then finally, it boils down to two questions, whether option-2 is feasible (**not preferred or not, but just about feasibility**), and whether there is strong objection for this option.

**Q2-3a: Is option-2 is technically feasible?**

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| Company | Yes/No | Comment |
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**Q2-3b: Is option-2 acceptable? (i.e., if No, meaning it is unacceptable)**

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## Option-3

If R2 cannot converge on either option-1 or option-2, option-3 is result automatically, but then it would be good to align the understanding in case of option-3.

**Q3-1: In case of option-3, do you agree to conclude that**

**- Option-1: R2 not puruse further optimization to enforce flow-to-carrier mapping, for RRC\_IDLE/RRC\_INACTIVE/OOC scenarios, and the case where there are multiple QoS flows mapped to a same SLRB**

**- Others**

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| Company | Yes/No | Comment |
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## Others

**Q4: Do you agree to notify SA2 on the R2 conclusion for this issue?**

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| Company | Yes/No | Comment |
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1. Xxx.

# Conclusion

We have the following proposals:

[Proposal 1 Xxx.](#_Toc148446647)

# Annex-1: TP for Option-1

alternative CR0

5.8.9.1a.2.1 Sidelink DRB addition/modification conditions

For NR sidelink communication, a sidelink DRB addition is initiated only in the following cases:

1> if any sidelink QoS flow is (re)configured by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* and is to be mapped to one sidelink DRB*,* which is not established, or is established but associated with different allowed frequenc(ies); or

1> if any sidelink QoS flow is (re)configured by *RRCReconfigurationSidelink* and isto be mapped to a sidelink DRB, which is not established;

For NR sidelink communication, a sidelink DRB modification is initiated only in the following cases:

1> if any of the sidelink DRB related parameters is changed by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* or *RRCReconfigurationSidelink* for one sidelink DRB*,* which is established;

alternative CR1

5.8.9.1a.2.1 Sidelink DRB addition/modification conditions

For NR sidelink communication, a sidelink DRB addition is initiated only in the following cases:

1> if any sidelink QoS flow is (re)configured by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* and is to be mapped to one sidelink DRB*,* which is not established; or

1. if any sidelink QoS flow is (re)configured by *RRCReconfigurationSidelink* and isto be mapped to a sidelink DRB, which is not established; or
2. if any sidelink QoS flow is (re)configured by sl-ConfigDedicatedNR, SIB12, SidelinkPreconfigNR and is to be mapped to a sidelink DRB, which is established and the carrier frequenci(es) associated with the sidelink QoS flow are different from the carrier frequenc(ies) associated with the sidelink DRB; or
3. if any sidelink QoS flow is (re)configured by RRCReconfigurationSidelink and is to be mapped to a sidelink DRB, which is is established and the carrier frequenc(ies) associated with the sidelink QoS flow are different from the carrier frequenc(ies) associated with the sidelink DRB;
4. NOTE: The carrier frequenc(ies) associated with the sidelink DRB are the carrier frequenc(ies) of QoS flow mapped to the sidelink DRB.

For NR sidelink communication, a sidelink DRB modification is initiated only in the following cases:

1> if any of the sidelink DRB related parameters is changed by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* or *RRCReconfigurationSidelink* for one sidelink DRB*,* which is established;

alternative CR2

5.8.9.1a.2.1 Sidelink DRB addition/modification conditions

UE shall establish different sidelink DRB for different QoS flow associated with different carrier frequenc(ies) among multiple QoS flows, if the multiple sidelink QoS flows are configured to one sidelink DRB configuration.

For NR sidelink communication, a sidelink DRB addition is initiated only in the following cases:

1> if any sidelink QoS flow is (re)configured by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* and is to be mapped to one sidelink DRB*,* which is not established; or

1. if any sidelink QoS flow is (re)configured by *RRCReconfigurationSidelink* and isto be mapped to a sidelink DRB, which is not established;

For NR sidelink communication, a sidelink DRB modification is initiated only in the following cases:

1> if any of the sidelink DRB related parameters is changed by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* or *RRCReconfigurationSidelink* for one sidelink DRB*,* which is established;

# Annex-2: TP for Option-2

alternative CR0

5.22.1.4.1.2 Selection of logical channels

<Text Removed>

- allowed on the carrier where the SCI is transmitted for NR sidelink, if the carrier is configured by upper layers according to TS 38.331 [5] and TS 23.287 [19];

- a LCH is allowed in a carrier based on whether this selected carrier is within a subset of frequencies associated with all the PC5 QoS flows allowed to be mapped to this LCH based on RRC configuration.

- having a priority whose associated [*sl-threshCBR-FreqReselection*] is no lower than the CBR of the carrier when the carrier is (re-)selected in accordance with 5.22.1.11.

alternative CR1

5.22.1.4.1.2 Selection of logical channels

<Text Removed>

- allowed on the carrier where the SCI is transmitted for NR sidelink, if the carrier is configured by upper layers according to TS 38.331 [5] and TS 23.287 [19];

NOTE: A LCH is allowed in a carrier based on whether this selected carrier is within a subset of frequencies associated with all the PC5 QoS flows allowed to be mapped to this LCH based on RRC configuration.

- having a priority whose associated [*sl-threshCBR-FreqReselection*] is no lower than the CBR of the carrier when the carrier is (re-)selected in accordance with 5.22.1.11.