3GPP TSG RAN Release 19 workshop

Taipei, 15 - 16 June, 2023

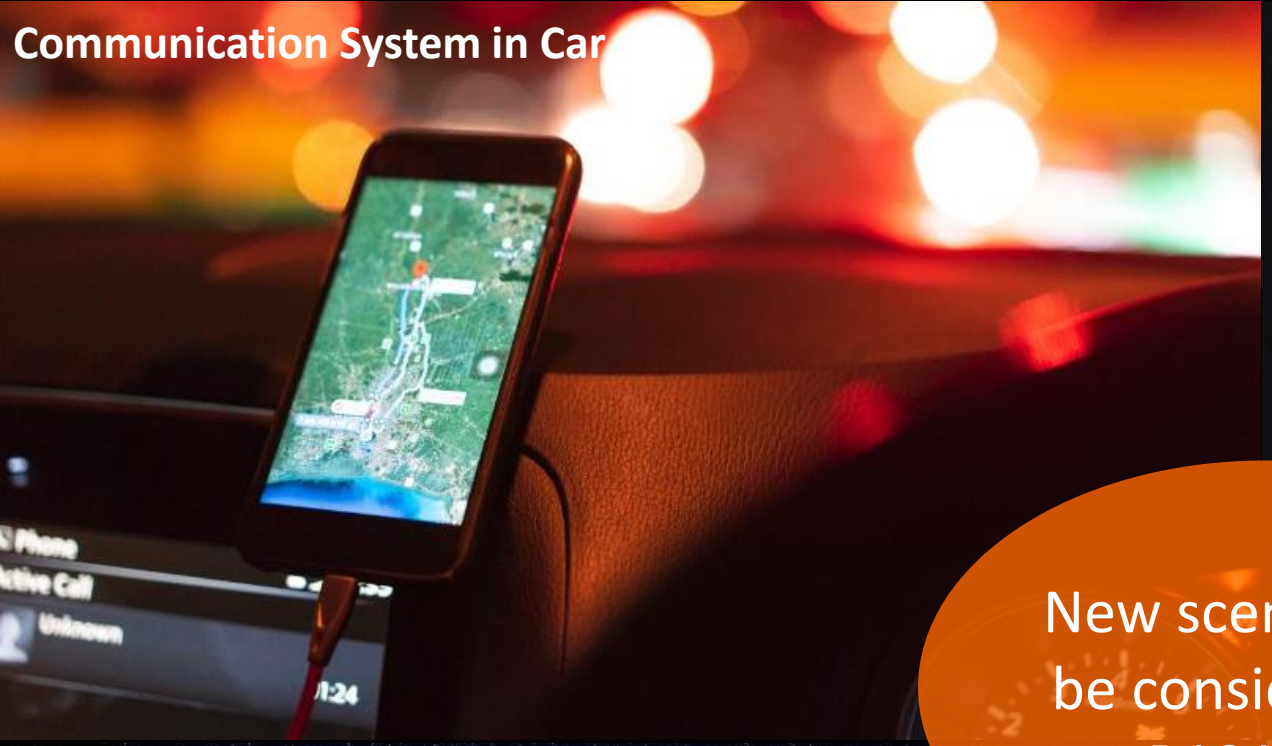
RWS-230309

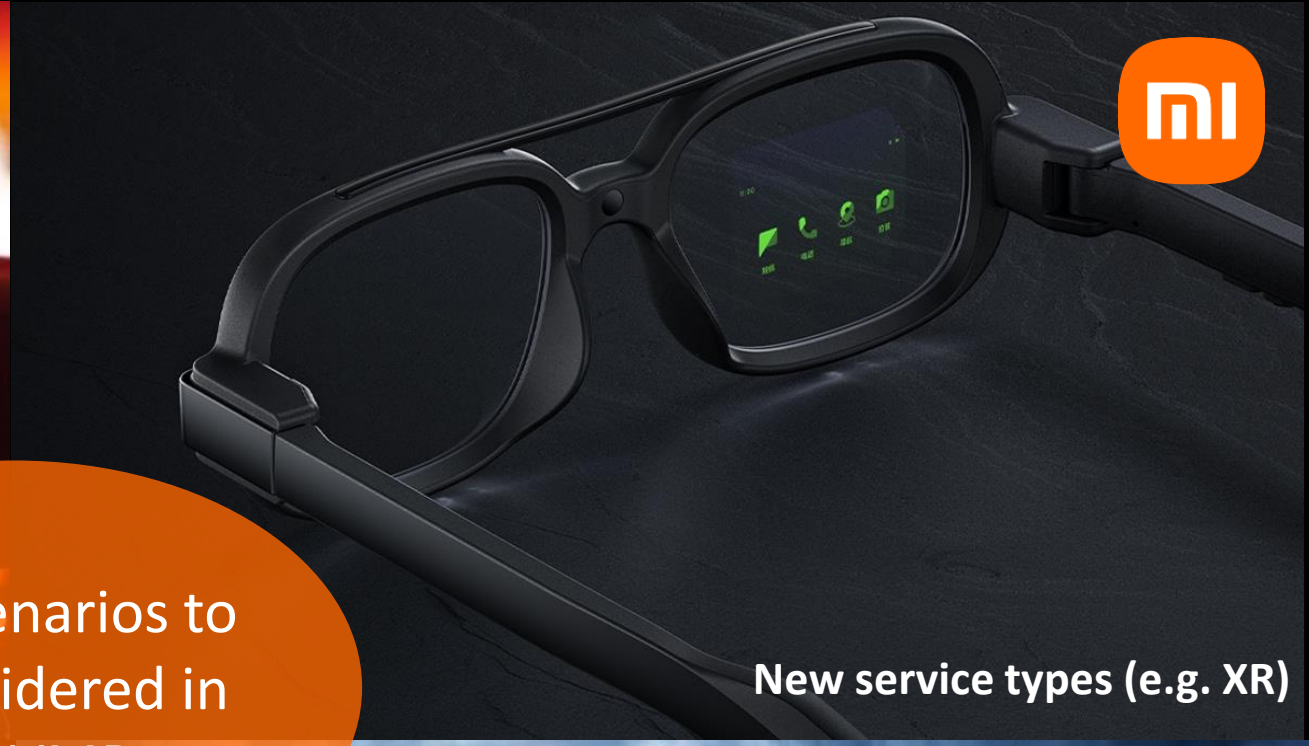
Vehicle-Mounted Relay in Rel-19

Agenda Item: 5

Source: Xiaomi

Document for: Discussion





New scenarios to be considered in R19 VMR

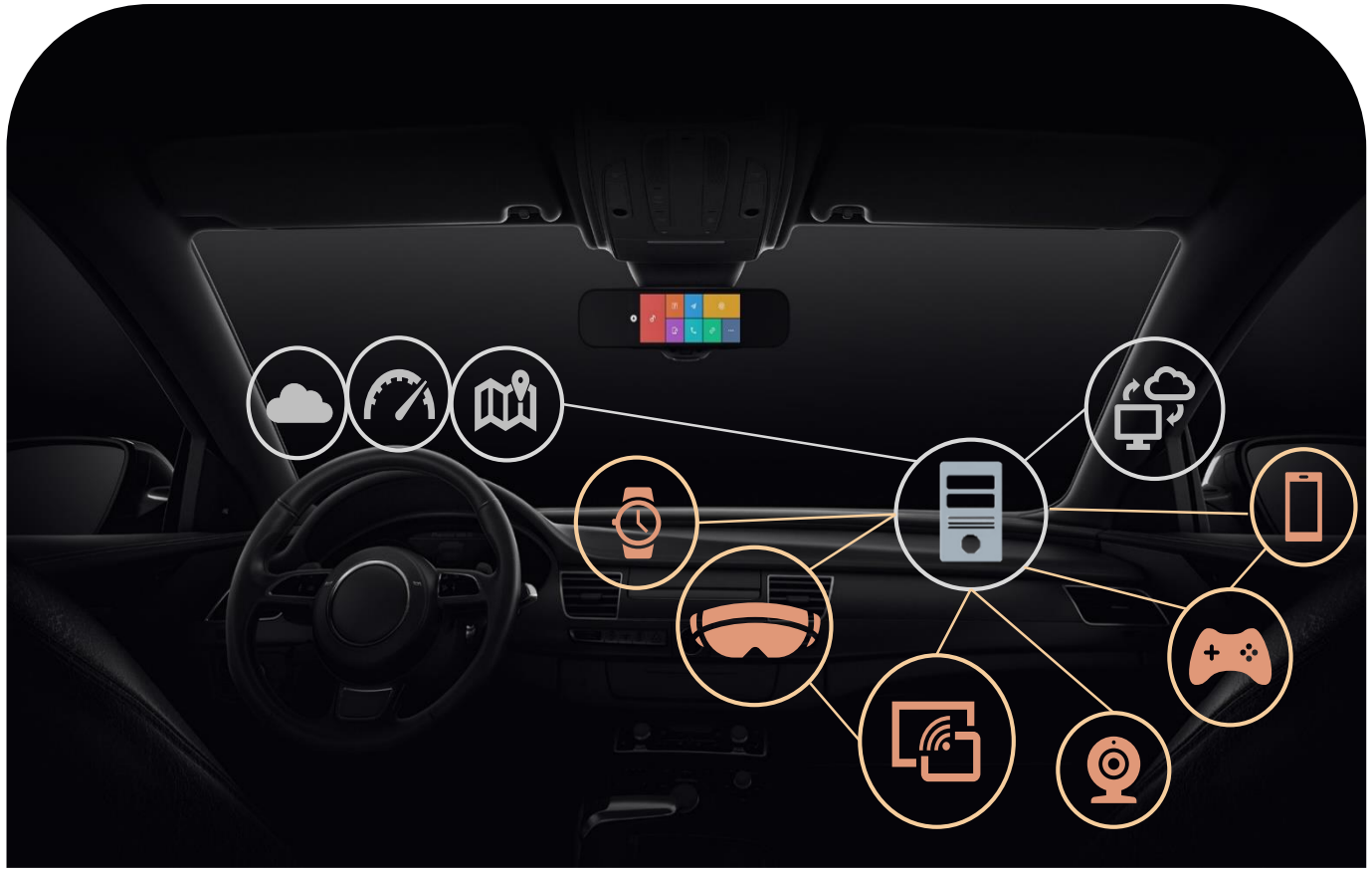
ECO-Communication System in Car

Motivation:

- Various devices can be connected to a smart car via different access technologies (e.g. Wi-Fi, BlueTooth and 3GPP Sidelink/Uu).
- Those devices in car may want to communicate locally or access local services in car.

Proposal:

- Support of multiple access technologies.
- Support of local service breakout.



VMR with NTN

Motivation:

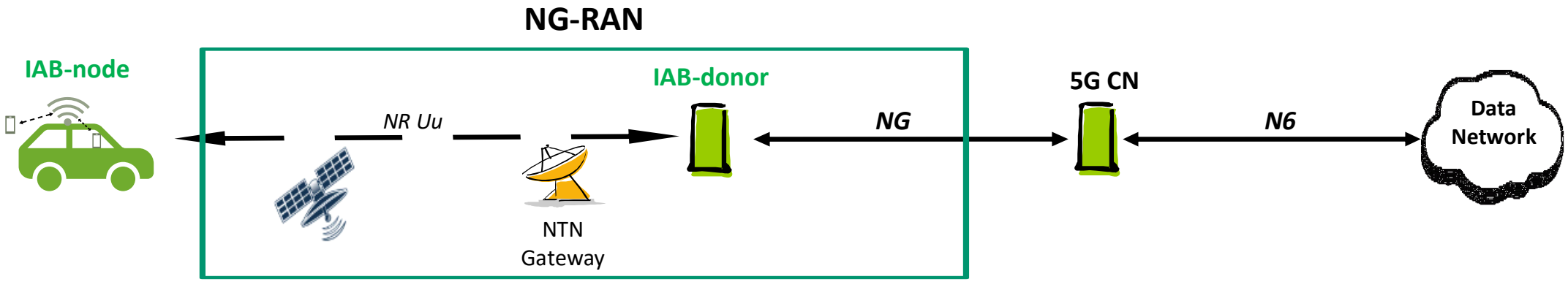
- NTN can provide better coverage for VMR (i.e. mobile IAB-node) to expand the VMR scenarios.
- The backhauling mechanism in VMR is well suited to regenerative NTN with inter-satellite link.
- NTN includes an airborne (HAPs, UAS including LTA, HTA) or space-borne (GEO, MEO, LEO, HEO) NTN vehicle and an NTN Gateway.

Proposal: Consider the following combination options of NTN and IAB-node:

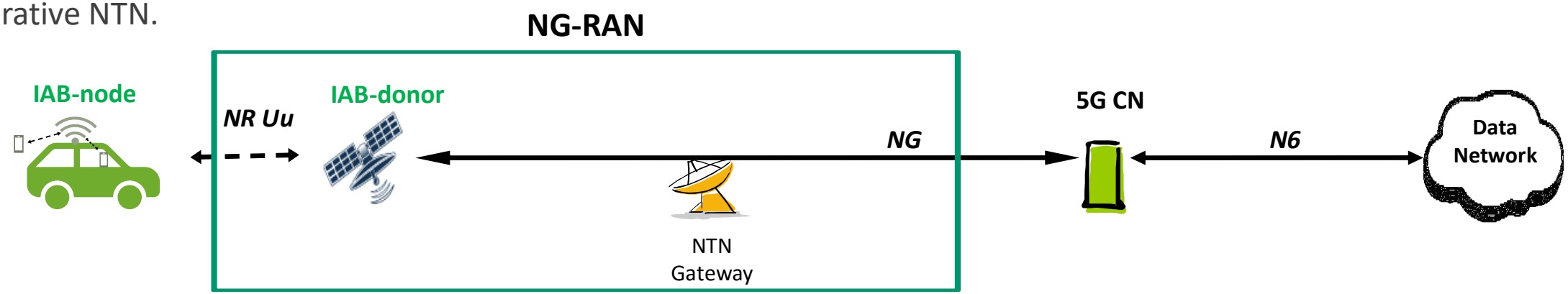
- Option 1, IAB-node access to transparent NTN, both IAB-node and its donor are on ground.
- Option 2, IAB-node access to regenerative NTN, IAB-donor is on satellite/HAPs.
- Option 3, IAB-node is on satellite/HAPS, IAB-donor is on ground.
- Option 4, IAB-node and IAB-donor are on different satellites e.g. in different orbits.

VMR with NTN (2)

Option 1, IAB-node access to transparent NTN, both IAB-node and its donor are on ground, to improve the coverage for IAB-node in transparent NTN.



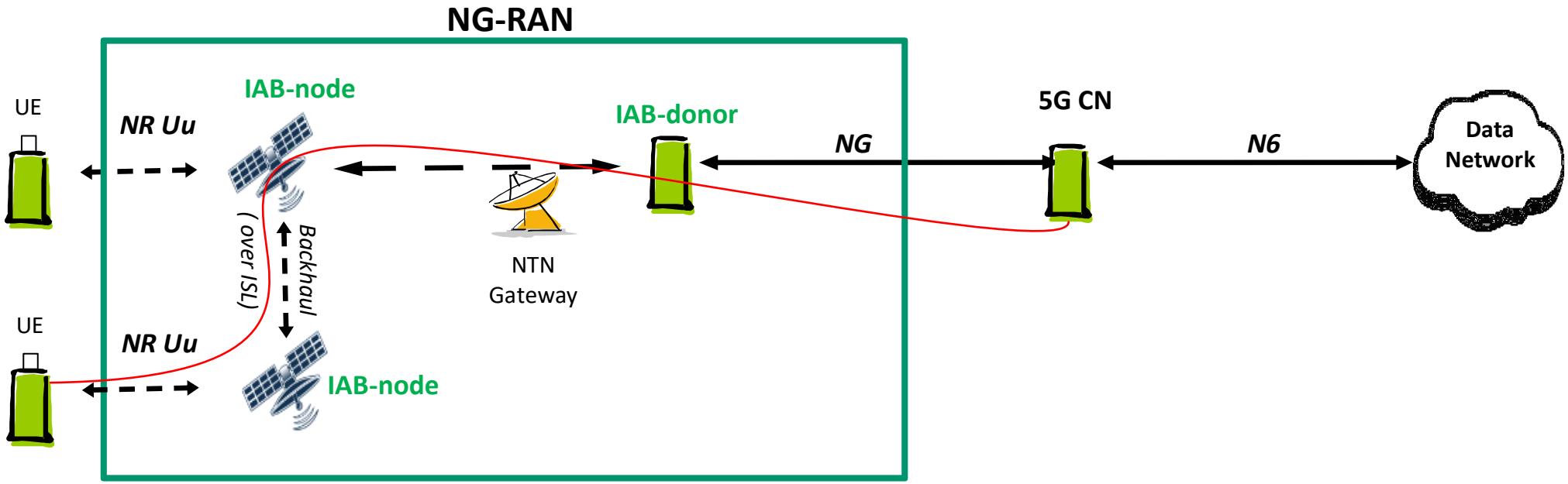
Option 2, IAB-node access to regenerative NTN, IAB-donor is on satellite/HAPs, to improve the coverage for IAB-node in regenerative NTN.



VMR with NTN (3)

Option 3, IAB-node is on satellite/HAPs, IAB-donor is on ground, the following are benefits:

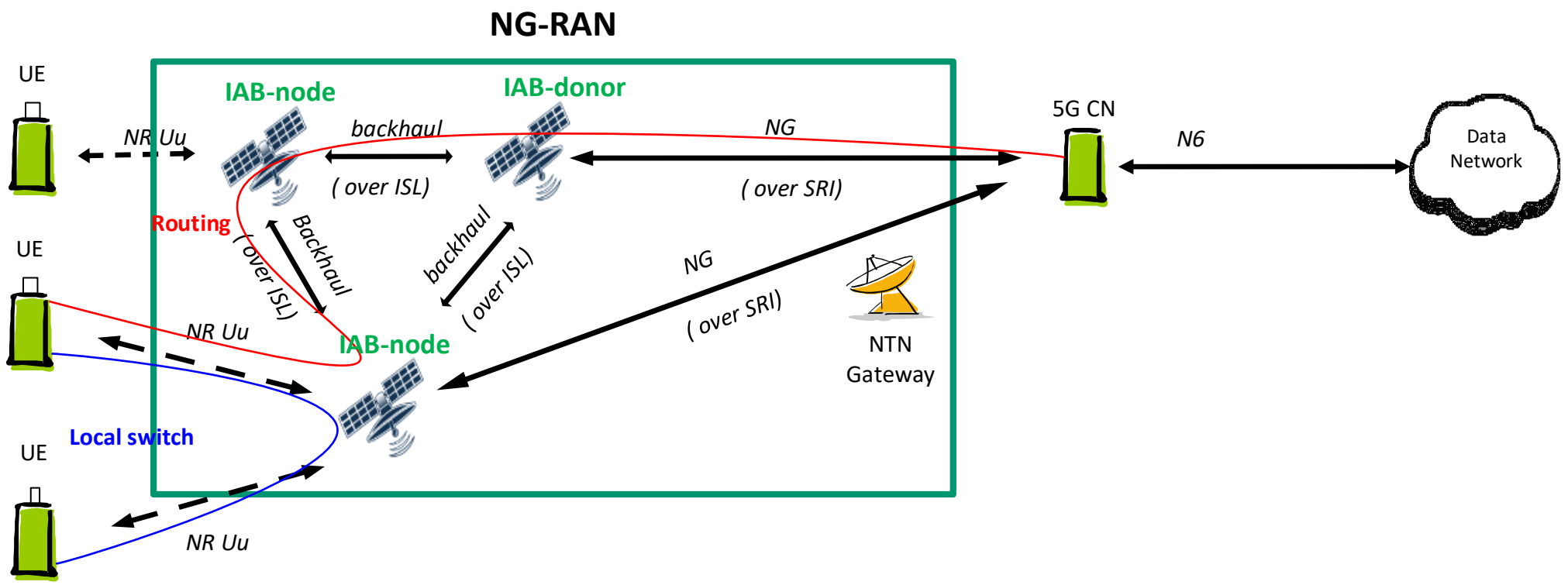
- Reduce the processing payload in satellite in regenerative NTN.
- Provide Uu for feeder link, defined by 3GPP.
- Support data routing between satellites in case a satellite is not able to connect to a NTN GW, due to the limited GW deployment.



VMR with NTN (4)

Option 4, IAB-node and IAB-donor are on different satellites e.g. in different orbits.

- IAB-donor can be deployed in fixed orbits, e.g. GEO.
- Support local switch under the donor's control, to reduce latency.
- Benefits are similar to Option 3.

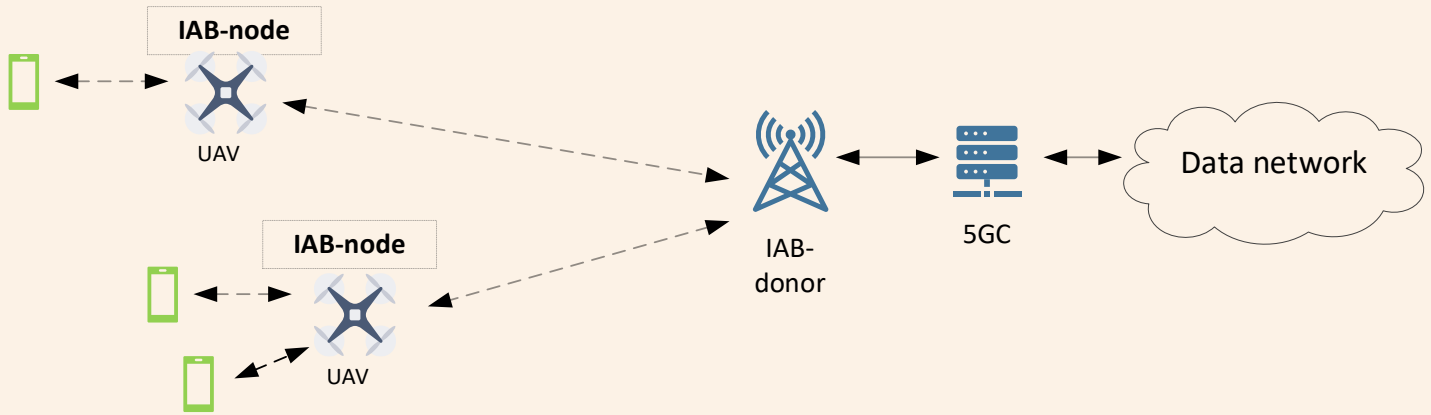


VMR with UAV

Motivation: UAV can be deployed as IAB-node to provide services for more UEs in some scenarios, e.g. disaster monitoring, border surveillance, and emergency assistance.

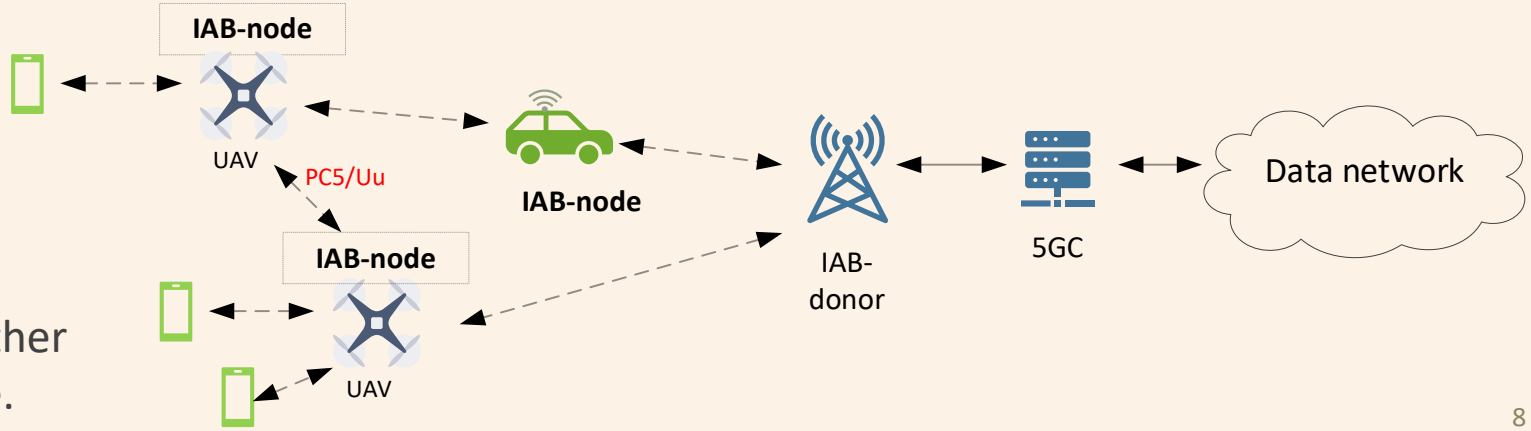
Proposal: support IAB-node on UAV, consider single hop and multi hop.

Option 1 IAB-node on UAV, single-hop.



Option 2 IAB-node on UAV, multi-hop.

UAV connected to IAB-donor via other IAB-nodes(s), to improve coverage.



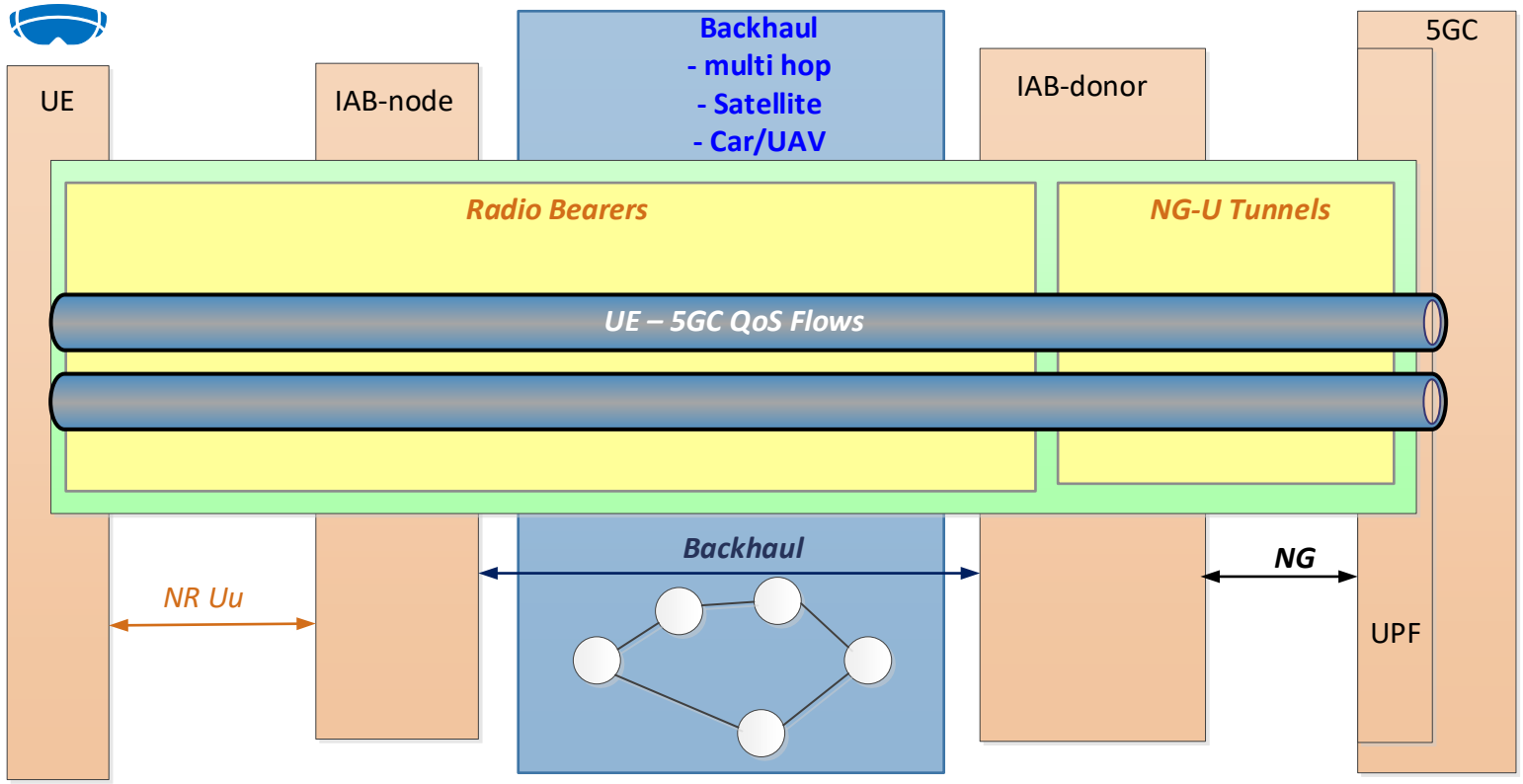
Backhaul QoS assurance

Motivation:

- With the popularization of multimedia system, users may have XR services in more scenarios, e.g via VMR network.
- There is a wide variety of backhaul types in VMR, e.g. via NTN, UAV if supported in R19.
- There may be different paths and hops for a service in VMR topology.
- QoS handling for XR services is different from the legacy services.

Proposal:

- Ensure the backhaul QoS in VMR network for XR services.



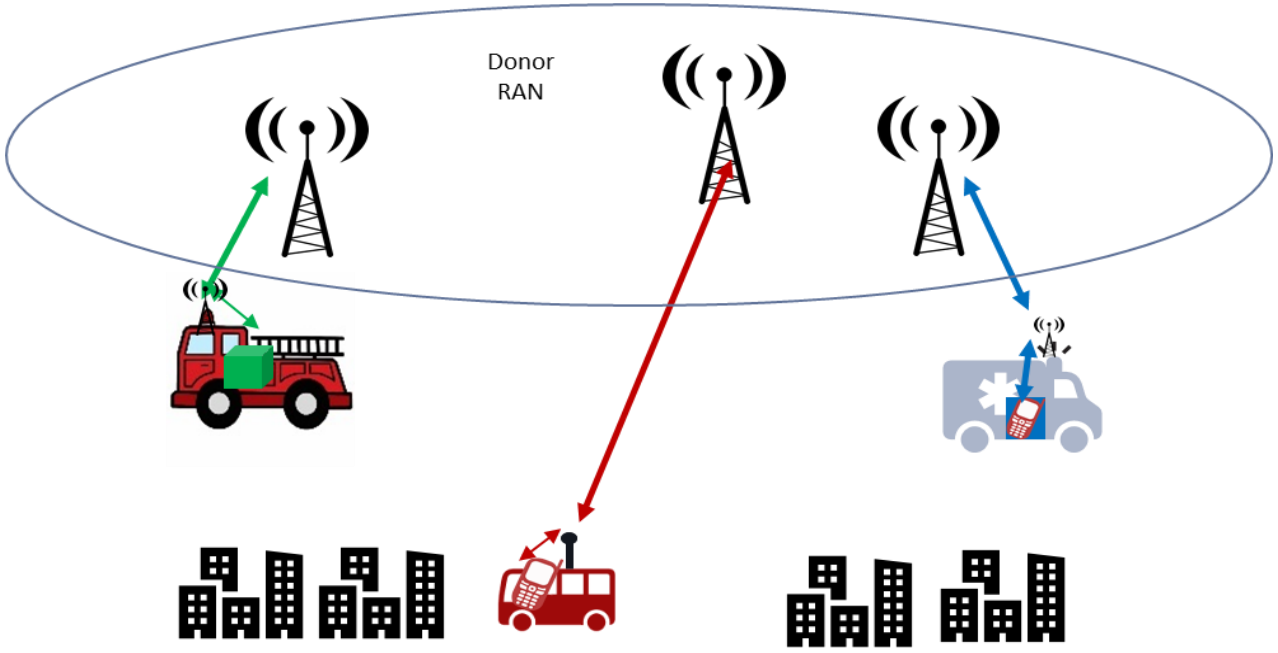
R18 leftovers

Motivation:

- There are scenarios where it is possible to improve performance of 5G UEs inside a vehicle, camped or connected via the vehicle relay to the 5G network, in particular when the UE is known to be located inside the vehicle.
- This may not be fully supported in R18.

Proposal:

- Support of on-board UE identification
- Support group mobility for the onboard UEs.



Source: 3GPP TR 22.839 V18.1.0

Conclusions

The following scenarios can be considered in R19 VMR:

- In car services and communication.
- The combination of VMR and NTN including satellite, HAPS and UAV.
- XR services in VMR topology.
- R18 leftovers on UE access control and mobility.

The following aspects can be discussed in R19 VMR:

- Support of multiple access technologies and local service breakout.
- Consider different combination options of NTN and VMR.
- Support IAB-node on UAV including single-hop and multi-hop.
- Ensure the backhaul QoS in VMR network for XR services.
- Support of onboard UE identification and group mobility (depends on R18 progress).

Thanks