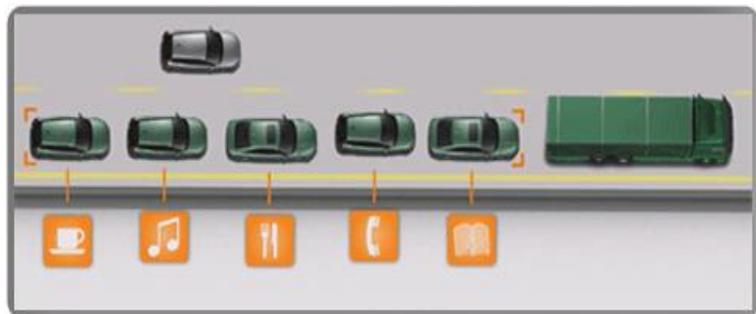


Discussion for FS_eV2XARC

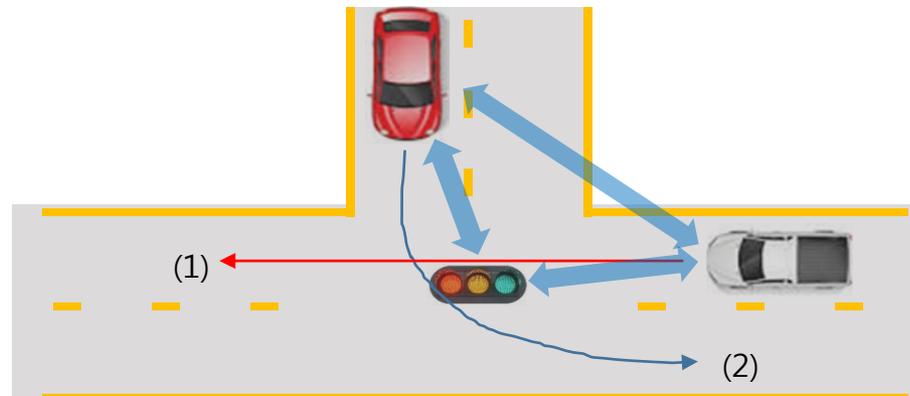
(Study on architecture enhancements for 3GPP support of advanced V2X services)

LG Electronics

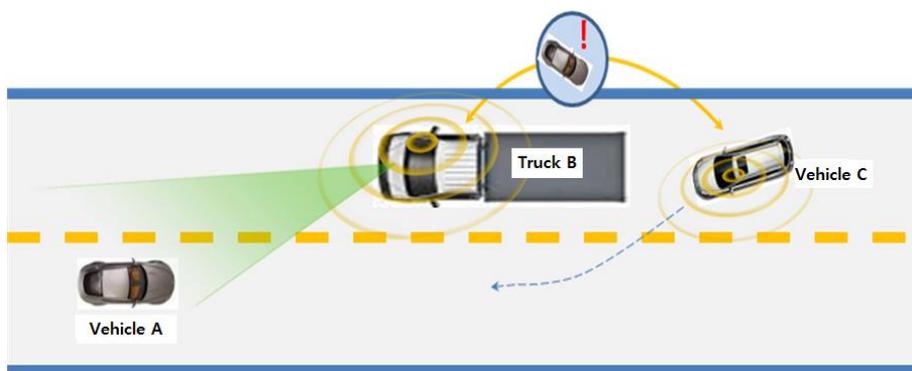
- ❖ SA1 study was completed with **TR 22.886**.
- ❖ **SA1 eV2X WID** [1] and **TS 22.186** [2] were approved at SA#75 (March 2017).
- ❖ Four categories of eV2X use cases:



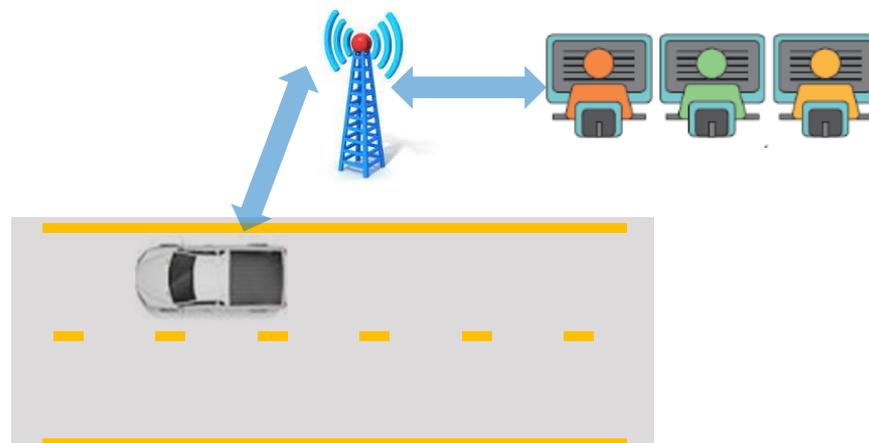
<Vehicle Platooning>



<Advanced Driving>



<Extended Sensors>



<Remote Driving>

- ❖ During RAN#75, there was discussion on how to call 3GPP V2X and whether any different naming between LTE V2X and NR V2X is needed.
 - It was considered that calling "LTE V2X", "NR V2X", "5G V2X" is not a good idea.
 - Calling "3GPP V2X" or "Cellular V2X (C-V2X)" regardless of 3GPP Release was considered appropriate to give consistent impression on 3GPP V2X activities to outside of 3GPP.
 - Therefore, **RAN calls**
 - Rel-14 V2X "3GPP V2X Phase 1"
 - Rel-15 V2X "3GPP V2X Phase 2"
 - Rel-16 V2X "3GPP V2X Phase 3"

- ❖ At RAN#75, one WID "**3GPP V2X Phase 2 (V2X_Ph2)**" [3] and one SID "**Study on evaluation methodology of new V2X use cases (FS_V2X_eval)**" [4] were approved.
 - **V2X_Ph2** [3] is considered as **enhancements on Rel-14 LTE-V2X** and to support advanced V2X services as identified in TR 22.886.
 - However, the scope of this WI needs to be visited based on SA2 feedback regarding support of unicast and groupcast transmission over PC5 for advanced V2X services such as Vehicle Platooning, Advanced driving, Extended Sensors.
 - Therefore, RAN sent an LS [5] to SA2 to ask for advanced V2X services (as identified in TR 22.886) provided over PC5, whether any AS layer Unicast and Groupcast transmission mechanism over PC5 is needed, or it could be left to the upper layers (e.g. NAS layer or Application layer) which means only Broadcast transmission mechanism over PC5 is needed in the AS layer.
 - **FS_V2X_eval** [4] is considered as a preliminary study before technical-solutions study item "**Study on 3GPP V2X Phase 3**" which means FS_V2X_eval is to establish the evaluation methodology to be used for evaluating technical solutions to support the full set of advanced V2X use cases as identified in TR 22.886 and the full set of **5G RAN** requirements in TR 38.913.
 - The study should at least target extended sensor sharing, ranging to enhance positioning accuracy and other network based positioning enhancements, platooning, advanced driving, remote driving.

- ❖ RAN#75 discussed a SID "**Study on 3GPP V2X phase 3 (FS_V2X_ph3)**" [6] to study what further enhancements are needed (if any) to 3GPP-V2X to support the full set of advanced V2X use cases as identified in TR 22.886 and the full set of **5G RAN** requirements in TR 38.913.
- ❖ This SID was not approved, instead the following aim was captured in "Way Forward on Rel-15 NR SIs" [7] which was endorsed by TSG RAN.

3. The formal approval of the "*Study on V2X phase-3*" is aimed for earliest possible TSG given the status of V2X phase-2 and eV2V evaluation methodology work

- ❖ Study on architecture enhancements for 3GPP support of advanced V2X services (FS_eV2XARC) [8] is proposed with the following points:
 - **The SI covers both EPS and 5G System.**
 - Because at this stage, no clear guidance/decision on which use cases/requirements require NR and which use cases/requirements works with LTE.
 - To develop solutions which are common both for EPS and 5G System as much as possible.
 - **RAT agnostic solutions**
 - Both LTE and NR applicable solutions from system perspective
 - Forward compatible solutions, i.e. LTE targeted solutions considering NR
 - **CN agnostic or CN adaptable solutions**
 - V2X Control Function related/involved operations to be developed for EPC such as V2, V3, V4, V6 procedures would work for 5G Core without change or with minimal changes.
 - Forward compatible solutions, i.e. EPC targeted solutions considering 5G Core
 - **Phased normative work spin-offed from the proposed SI**
 1. The study will be **spin-offed to Rel-15 work item targeting EPS** in order to move topics concluded and solutions agreed to normative work. → eV2XARC_Ph1 (or V2XARC_Ph2)
 2. The study will be **spin-offed to Rel-16 work item mainly targeting 5G System** in order to move topics concluded and solutions agreed to normative work. → eV2XARC_Ph2 (or V2XARC_Ph3)
 - Rel-15 normative work is expected to commence based on agreed interim conclusions when the TR is sent for information to SA Plenary (i.e. SA#77 (09/2017)).

References

- [1] SP-170158, SA1 WID on Enhancement of 3GPP support for V2X scenarios (eV2X), *LGE*
- [2] SP-170250, TS 22.186v1.0.1 "Enhancement of 3GPP Support for V2X Scenarios; Stage 1"
- [3] RP-170798, RAN WID on 3GPP V2X Phase 2 (V2X_Ph2), *Huawei, CATT, LGE*
- [4] RP-170837, RAN SID on Evaluation methodology of new V2X use cases (FS_V2X_eval), *LGE, Qualcomm, NTT DOCOMO, Intel*
- [5] RP-170841/S2-171765, LS on the support of Unicast and Groupcast transmission over PC5 for eV2X, To: SA2 / Cc: SA, SA1, SA3
- [6] RP-170680, RAN SID on 3GPP V2X phase 3 (FS_V2X_ph3), *LGE, Qualcomm, NTT DOCOMO*
- [7] RP-170827, Way Forward on Rel-15 NR SIs, *Drafting group convenor – Balazs Bertenyi (Nokia)*
- [8] S2-171826, SA2 SID on architecture enhancements for 3GPP support of advanced V2X services (FS_eV2XARC), *LGE, Qualcomm*