

Title: Liaison Statement on Technology Evaluation of LTE-V2X and DSRC

Source: NGMN Alliance V2X Task-Force

To: 5GAA

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1. About the NGMN Alliance

The NGMN Alliance (see www.ngmn.org) was founded by leading international network operators in 2006. Its objective is to ensure that the functionality and performance of next generation mobile network infrastructure, service platforms and devices will meet the requirements of operators and, ultimately, will satisfy end user demand and expectations. The NGMN Alliance will drive and guide the development of all future mobile broadband technology enhancements with a focus on 5G. The targets of these activities are supported by the strong and well-established partnership of worldwide leading operators, vendors, universities, other industry players (like software companies, vertical industry representatives) and by successful co-operations with industry organisations.

2. NGMN 5G Work-Programme and the NGMN V2X Task-Force

In February 2015 the NGMN Alliance published its 5G White Paper providing consolidated 5G operator requirements. Subsequently in 2016, NGMN published a number of deliverables to detail on the requirements and architecture as well as business principles, including views on the vertical industry applications. In June 2016, NGMN started a further extension of its 5G-focused work-programme with the launch of new additional work-items for the coming years: 5G Trial & Testing Initiative, End-to-end Architecture Framework, and the V2X Task-Force. Main objective of the V2X Task-Force is to evaluate V2X technologies and business opportunities, and to drive V2X adoption and success.

Specifically, among three Work Streams formed in the Task-Force, WS 1 has been working on an internal Technical Report regarding “Technology Evaluation of LTE-V2X and DSRC” to quantitatively examine how the two different technologies perform in various settings of parameters. WS 1 has come up with extensive results based on input from multiple companies.

3. Intention of the Liaison Statement and Required Actions

The intention of the liaison statement from the NGMN V2X Task-Force to the 5GAA is to inform 5GAA of evaluation results summary on link level simulation (LLS) and system level simulation (SLS) for LTE-V2X performance compared with DSRC performance provided by multiple companies:

- The LTE-V2X was simulated on a so-called PC5 interface mode (e.g., device-to-device, or ProSe (Proximity-based Service)) whereas the DSRC portion of the SLS was performed on a so-called ad-hoc mode (or infrastructure-less mode) of IEEE 802.11p interface.
- The LLS results showed that higher SNR's are required for DSRC than for LTE-V2X to achieve the same link performance (BLER=0.1) for both LOS and NLOS transmission scenarios. For example, the required SNR of DSRC is about 4.2 dB to 5.2 dB higher than LTE-V2X in LOS scenarios with relative speed of 30km/h to 280km/h, respectively. The difference between SNR of DSRC and LTE-V2X is decreased, but the SNR of DSRC is about 0.5 dB to 2.8 dB higher than LTE-V2X in NLOS scenarios with relative speed of 30km/h to 120km/h.
- The SLS results also demonstrated that 3GPP LTE-V2X outperforms over DSRC by a range between 20-80% of gain in communication range, which also showed a gain of more than 80% in communication range in some simulated cases.
- In conclusion, both LLS and SLS results showed that C-V2X has better performance than that of DSRC in required SNR, communication range and reliability perspective.

The simulation settings, various results and summary chars are included in the annex documents. Some companies will plan to provide more simulation results. If the simulation results are ready, NGMN will share them with 5GAA.

Annex



Simulation
assumptions and



Summary Charts
of V2X simulation