

**5G**



# ***V2X – learnings in 3GPP***

# Outline

- 📶 3GPP started to engage into addressing functionality needed for the automotive industry back in 2015 (C-V2X)
- 📶 This work is now in its 3<sup>rd</sup> iteration (Release 14-15-16), and expected to continue beyond 2019
- 📶 There are several learnings of this engagement
- 📶 These slides present several learnings – many of these are expected to be applicable to other vertical engagements

# *Why did 3GPP get into V2X?*

- 📶 DSRC technology was already specified well before 3GPP C-V2X started
- 📶 As the success of LTE flourished → 3GPP ecosystem has started to expand into adjacent segments
- 📶 3GPP started V2X in Release 14 (started in 2015, frozen 2017)
  - Make LTE suitable for an evolved more capable technology choice for the automotive industry needs
  - Capitalize on the economies of scale of the LTE ecosystem
- 📶 3GPP work was strongly motivated by an existing but limited technology choice (802.11p) already being available → clear motivation to design a superior solution
- 📶 Key vendors (chipset and network) saw a strong opportunity with the automotive industry: large volumes, expanding need for connectivity

**Learning-1:** Potential for large volumes and feature rich evolution (i.e. value-add) is a strong motivator for 3GPP buy-in

# Where is 3GPP work now?

- 📶 Enhanced LTE-based V2X completed in 3GPP in Release 15 (2018) – where next?
- 📶 Intense industry debate in 1H/2018 whether to start **5G V2X work**
  - Introducing yet another radio for V2X – is that a good idea?
  - The killing argument for 5G V2X was the presumed need for advanced V2X capabilities
  - Release 16 SI approved for 5G V2X, work ongoing
- 📶 As a late comer, Public Safety community is now wanting to add their requirements to 5G V2X work
  - In general: such convergence across verticals is good - but not so late in the process, please
- 📶 Major challenge: large scope, not enough guidance from industry on priorities!

**Learning-2:** 3GPP needs stronger guidance from industry representatives: on the floor and active participation in decision making (3GPP plenary meetings)

**Learning-3:** Convergence of vertical requirements is needed **early in the process**

# Case Study: 2 vs 4 antennas

- 📶 5G NR specifications mandate the use of 4 Rx for devices (LTE mandates 2)
  - This was a result of some hard fought debates in 3GPP chipset manufacturers vs operators
  - Larger number of antennas provides better overall performance
- 📶 Automotive industry came with a (late) Rel-15 request to allow 2 Rx for vehicle-mounted devices
  - It is not practical/possible to have 4 antennas on cars
- 📶 Mobile operators were objecting this relaxation: it was feared that smartphones can misuse this relaxation resulting in performance degradation
- 📶 The debate eventually got resolved: 2Rx allowed but strictly for car-mounted devices

**Learning-4:** Some vertical requirements will inevitably clash with mobile operator interests. In-advance education and proper safeguards against mis-use are needed!

# Summary

**Learning-1:** Potential for large volumes and feature rich evolution (i.e. value-add) is a strong motivator for 3GPP buy-in

**Learning-2:** 3GPP needs stronger guidance from vertical industry representatives: on the floor and active participation in decision making (3GPP plenary meetings)

**Learning-3:** Convergence of vertical requirements is needed **early in the process**

**Learning-4:** Some vertical requirements will inevitably clash with mobile operator interests. In-advance education and proper safeguards against mis-use are needed!

***Thank you!***