

# The path from 4G to 5G

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# Vision or reality?



[Link to source](#)

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# Vehicles need communication



Traffic safety and  
automated driving



Traffic efficiency



Infotainment



“ ... the Commission will follow an integrated approach between automation and connectivity in vehicles ... ”

On the road to automated mobility: An EU strategy for mobility of the future

# Cellular - V2X (C-V2X)



Evolution from LTE to 5G to support V2X communications with a single technology

3GPP has a proven record to innovate with support of backward compatibility

Source: 5GAA

# Hazard warnings: C-V2N support for safety related applications

More „safety potential“ in V2N:

- Sharing of warnings between OEMs e.g. via HERE
- Interface to city and regional traffic management



Mercedes-Benz

Mercedes-Benz offers **communication between cars** since new E-Class in 2016 – „Car-to-X communication **via backend**“

Source: 5GAA – Policy Debate: Cellular-V2X Technology: Paving the Road to 5G, Delivering Today for Connected and Automated Vehicles in Europe, 5.12.2017, Brussels: „Daimler’s Perspective on Car-to-X Technologies“



**25.-27. April, TEN-T Days, Ljubljana...** Today, BMW drivers receive a wide variety of traffic information, such as **hazard warnings**, speed limits, **accident warnings, wrong-way driver alerts**, on- and off-street parking information and far more besides...



When a Volvo switches on hazards, nearby Volvos will know” From 2018 Volvo Cars' **Hazard Light Alert** will connect Swedish and Norwegian Volvo passenger cars and trucks **via a cloud-based system.**

[Link to Source](#)

# Evolution towards 5G

Support the deployment of connected automated vehicles with reliable and enhanced Cellular-V2X (C-V2X) communication technology. Establish 5G as communication technology of choice, starting with advanced LTE capabilities

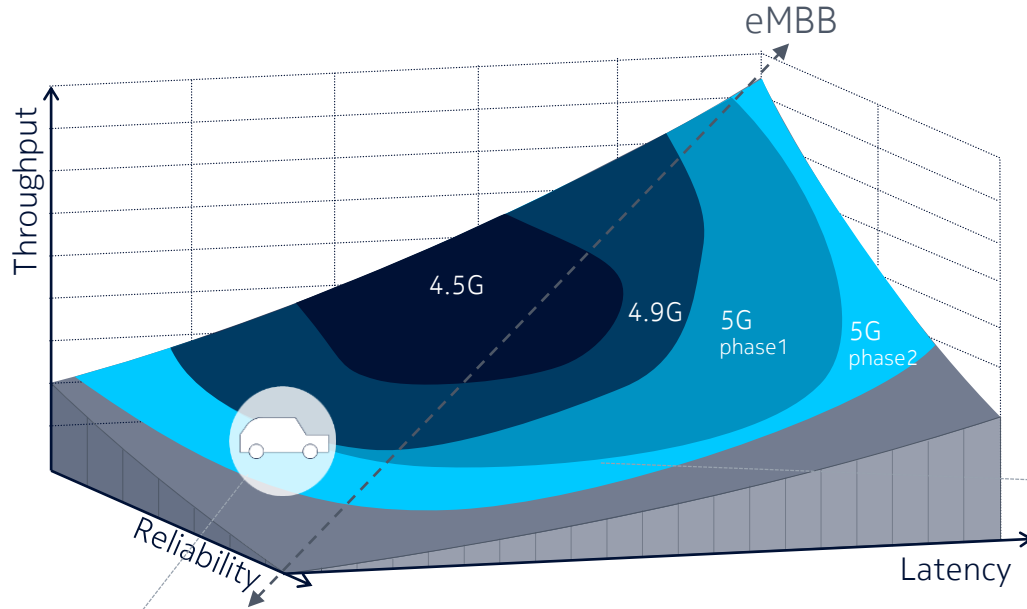
## Full support for 5GAA strategy



[Link to source](#)

# 5G - Transform to meet individual use case requirements

## Important functionalities for Automotive



- New radio with low latency
- Edge computing (MEC)
- Network slicing
- Ultra-reliable low latency communication

### Support of automated driving

| Throughput    | Latency B. | Reliability |
|---------------|------------|-------------|
| 10-300 Mbit/s | 5ms-1s     | Very high   |

# 5G commercial reality - arriving much faster than expected



## 3GPP Standard roadmap

Pre-Standard

Release 15

Release 16

Release 17

## Industry implementation roadmap

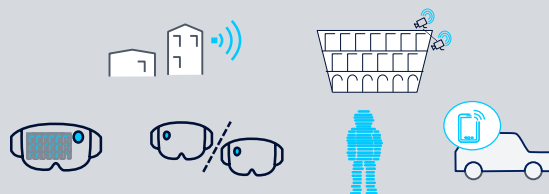
Pre-standard deployments

Standards based deployment Phase 1

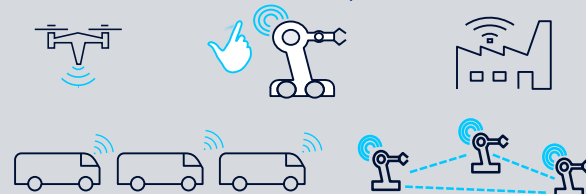
Standards based deployment Phase 2

## Use Cases

### Enhanced mobile broadband



### Ultra reliable low latency communications



# Business evolution to 5G

## Overall 5G business case

5G business will not be driven by single use case but will be a journey of value creation & capture

## Long term 5G value proposition

New markets, strategic partnerships and new business models enabled through E2E transformation & network slicing

# Summary

- 5G is the technology of choice – a single technology meeting the needs of the automotive segment
- Cellular-V2X and in particular LTE V2N delivers early benefits also for traffic safety
- Europe needs to support a technology neutral approach on direct communications to speed up 5G introduction for automotive



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