

# 5GAA Workshop: C-V2X Interoperability and Deployment

9:00 -9:30

## Opening Session

*Welcome to Plugtests Event.* Ultan Mulligan, ETSI

*Welcome to DEKRA Automotive Test Center.* Thomas Jaeger, DEKRA

*5GAA welcome and introduction to the workshop.* Maxime Flament, 5GAA

9:30 -9:50

## Session 1

*Debrief of Klettwitz plugtests activities.* Saurav Arora, Plugtests™ Event

9:50 -10:20

## Coffee Break

10:20-11:35

## Session 2

*Road operator perspective: “German Perspective on C-ITS Deployment”.* Farzin Godarzi, BASt

*The future of C-V2X: “Commercial deployment of C-V2X vehicles”.* Johannes Springer, T-Systems

*Certification: “The importance of Certification for 5G Automotive”.* Thomas Jaeger, DEKRA

*Testing Network V2X platform: “Vodafone’s V2X Safer Transport for Europe Platform (STEP)”.*

Robert Banks, Vodafone

11:35-12:10

## Moderated discussion – Bringing C-V2X on the Roads: the Role of Interoperability for Deployment

12:10-12:30

## Closing Remarks

Saurav Arora, Plugtests™ Event

Maxime Flament, 5GAA



# Workshop: C-V2X Interoperability and Deployment



[www.5gaa.org](http://www.5gaa.org)



[www.5gaa.org](http://www.5gaa.org)



[www.5gaa.org](http://www.5gaa.org)



**Ultan Mulligan,**  
Director,  
ETSI Centre for Testing and  
Interoperability



**Thomas Jaeger,**  
Head of Technology Technical Service  
Management,  
SVP, Service Division  
Product Testing  
DEKRA





**Maxime Flament,**  
CTO  
5GAA



5GAA welcome and introduction  
to the workshop



# Connected mobility for people, vehicles and transport infrastructure

5GAA bridges the automotive and telecommunication industries in order to address society's connected mobility needs bringing inclusive access to smarter, safer and environmentally sustainable services and solutions, integrated into intelligent road transportation and traffic management.



## AUTOMOTIVE INDUSTRY

Vehicle Platform, Hardware  
and Software Solutions



## TELECOMMUNICATIONS

Connectivity and Networking  
Systems, Devices & Technologies



# 5GAA Main Achievements

- 5GAA is regarded as the global lead organization on automotive connectivity
- 5GAA helped to transform C-V2X from a new standard into a market reality
- 5GAA has established 5G as the reference technology for future automotive connectivity





# Challenges of the ecosystem related to communications

1. OEMs have different views about role and benefits of long- and short-range communications
2. Road operators have different views about role and benefits of long- and short-range communications
3. OEMs and road operators are divided on the right short-range technology
4. Too many small-scale technology oriented PoCs and trials not giving insights into impact on traffic safety and efficiency KPIs
5. Costs to digitalise “older” road infrastructure
6. Sustainable business and cooperation models for traffic safety and automated driving related applications



# Market developments - 5G enabled vehicles

**First 5G enabled car on the road**

source: [Autonews Gasgoo](#), December 2020



**Audi is equipping its vehicles with the new 5G mobile communications standard**

source: [Audi](#), August 2021



**GM to produce 5G-connected cars in 2023 with AT&T**

source: [RCR Wireless](#), August 2021



**BMW iX will be available with 5G connectivity via two network operators**

source: [BMW Blog](#), September 2021



# Growing momentum: Connectivity enables many safety use cases

## Examples:

### C-V2X enabled vehicles in China



"Intelligent Electric SUV Flagship Hongqi E-HS9 with C-V2X", December, 2020



"First 5G enabled car on the road", December, 2020



"BMW iX with 5G connectivity via two network operators", September, 2021

### Data for road safety initiative in the EU

#### Objective:

Create an SRTI Ecosystem to share safety critical data between OEMs, service providers and public authorities ...", Data for Road [Safety](#)



#### 8 SRTI Use cases:

1. Temporary slippery road
2. Unprotected accident area
3. Short term road works
4. ...

### Intelligent traffic with smartphone apps

#### The Netherlands – Talking Traffic:

- 1,8 million users
- 800 Intelligent traffic light in operation
- extra 1000 planned, [Source](#)



#### US: Georgia, Texas, .. TravelSafely-App

- 1000+ intersections
- Emergency vehicles
- School zone warning
- Rail crossing warning
- ... , [Source](#)

### Deployment of C-V2X RSUs

#### Italy - ANAS:

Deployment of C-V2X connecting 80Km of Smart Highway 51 to Cortina [Source](#)



#### China: G5021 Shiyu Highway (Chongqing)

128km highway upgrade with 300+ C-V2X smart RSUs (12 tunnels, 5 dangerous spots), [Source1](#) [Source2](#)



# C-V2X status in Europe and US

## USA:

- Increasing momentum behind cellular solutions
- US FCC decided on new allocation of 5.9GHz ITS spectrum in favor of C-V2X, but reduction of ITS spectrum from 75 MHz to 30 MHz
- Several OEMs committed to deploy 5 million vehicles with V2X capabilities by 2025; e.g.: announcements from Ford and [Audi](#)
- Deployment of V2X Solutions across States ongoing, C-V2X in Colorado, Virginia, Georgia, Texas, DSRC in Detroit among others



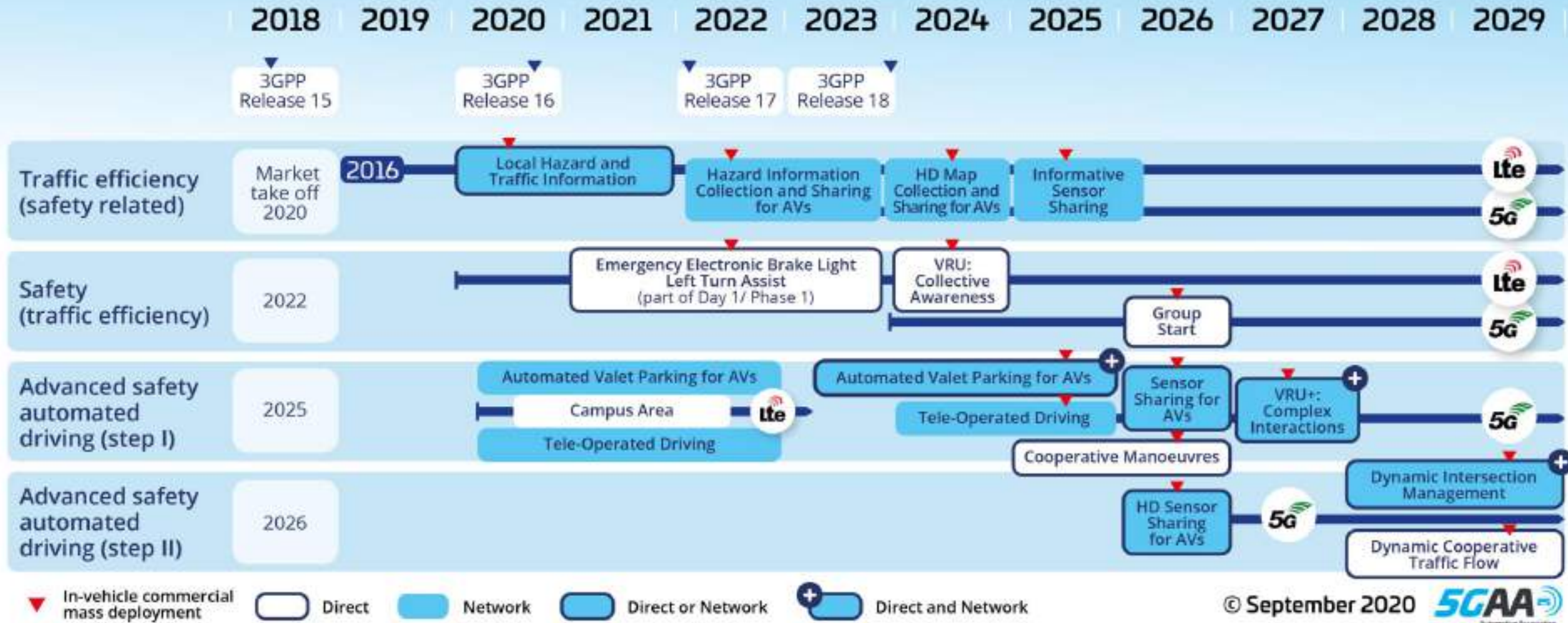
## EU:

- 5.9 GHz Spectrum for safety related services
- Delegated Act on C-ITS relying on ITS G5 only was rejected by EU Council (member states)
- Major cross-OEM/operator/border corridor projects kicked-off and further projects in preparation
- Exchange of safety related information between OEMs: EU Data task force finished – successor established: SRTI Ecosystem - [Data for Road Safety](#) RSU deployments announced; e.g.: Asfinag (ITS G5), ANAS (C-V2X)
- 5G Spectrum auctions ongoing – some countries with obligations on road coverage





# Expected timelines for mass deployment of C-V2X use cases







## SESSION 1

# Debrief of Klettwitz plugtests activities



**Saurav Arora,**  
Technical Project Manager,  
PlugtestsTM Event



The Standards People



# C-V2X#3 Plugtests

Presented by: **Saurav Arora**

For: **Workshop**

31 March 2022



# Motivation

---

- ✓ The purpose of C-V2X Plugtests interoperability event is to help enable interoperability of products, which is crucial to the successful deployment of new technologies.
- ✓ Provide feedback into standards-making, enhancing the quality of the final standards.
- ✓ Plugtests are an excellent opportunity for vendors to assess and demonstrate end-to-end interoperability, to validate the base specification(s) and to promote the technology in a neutral environment.

# Test Scope

---

- ✔ ETSI lab-based Interoperability test plan for ITS protocol.
- ✔ ETSI outdoor test plan for interoperability.
- ✔ C-V2X GCF Conformance Certification test cases and ETSI ITS conformance test cases.
- ✔ ETSI outdoor test plan for PC5 and LTE-Uu interface.
- ✔ PKI Security Interoperability Testing.
- ✔ 5GAA C-V2X lab-based Interoperability Test Plan for Mode 4 PC5.

# Outdoor Test Plan

---

- UC1: Road Works Warning RWW
- UC3: Time to Green T2G
- UC5: In-Vehicle Signage
- UC6: Intersection Collision Risk Warning ICRW
- UC7: Longitudinal Collision Risk Warning LCRW
- UC8: Traffic Jams Warning TJW
- UC9: Road Hazard Warning RHW

# Vendors

allbesmart

Anritsu  
Advancing beyond

Cohda  
Wireless

CTAG

ETAS

commsignia

AUTOCRYPT

Qualcomm

Autotalks

AtoS

VECTOR

IDnomic

autostrade // per l'italia

vodafone

spirent  
Promise. Assured

ROHDE & SCHWARZ

MOVYON  
ELECTRONICS

S·E·A

MICROSEC

KEYSIGHT  
TECHNOLOGIES

YoGoKo  
"You Go, We Connect"



# Registered Devices

---

**PKI Vendors** – Atos IDnomic, AutoCrypt, CTAG, ETAS, Microsec, Movyon(Autostrade), Vector

**OBV Vendors** – Allbesmart, Cohda Wireless, Commsignia, CTAG, Vector, Yogoko

**RSU Vendors** – Allbesmart, CTAG, Movyon Electronics, Vector

**TE Vendors** – Anristu, Keysight, Rohde & Schwarz, S.E.A. Datentechnik, Spirent

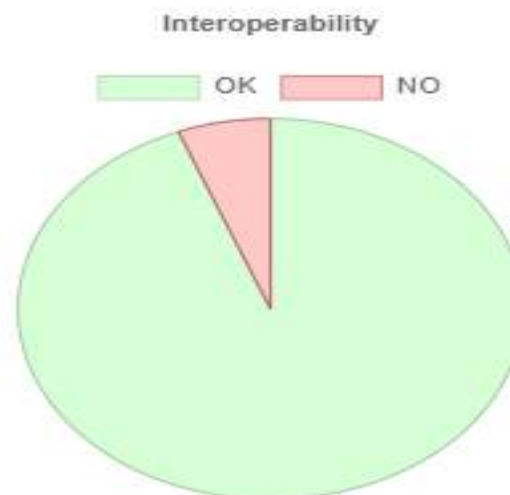
**LTE Network** – Vodafone



# Preliminary Results (End of Day 3)

Number of Test Sessions: 72

Interoperability	
OK	NO
111 (94.0%)	7 (5.9%)





Thank You