

Spectrum for Vehicle Communications

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Background

- The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies – ICTs
- ITU's global membership includes 193 Member States as well as some 900 companies, universities, and international and regional organizations
 - ▶ The few vehicle manufacturers and Tier-1 suppliers that are ITU members include Hyundai, VW, Tata, Continental, Mitsubishi Electric, Head Acoustics, and Qualcomm
- A core issue is how to make the wireless data communications appropriate for vehicle safety use
 - ▶ Latency – how fast is response in the worst case, not on average
 - ▶ Interference – not acceptable for safety
 - ▶ Coverage – must be everywhere

World Radio Conferences

- General spectrum issues are handled at World Radio Conferences (WRCs)
 - ▶ The last WRC was in 2019 and the next WRC is 2023
 - ▶ Decisions at WRCs are made by Member States
 - ▶ WRC 2019 had an agenda item on harmonizing spectrum for ITS which was partially accomplished by the publication of Recommendation ITU-R M.2121-0 (01/2019): “Harmonization of frequency bands for Intelligent Transport Systems in the mobile service” in spite of substantial opposition by supporters of Wi-Fi and other communications interests
 - ▶ WRC 2023 does not have an agenda item for ITS communications

Scope of Possibilities

Vehicles might use data communications for many purposes

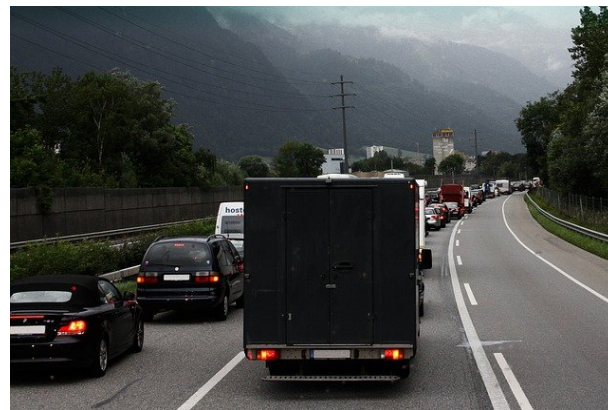
- Software updates
- Road data updates
- Roadwork information
- Vulnerable road user information
 - Pedestrians
 - Emergency responders
 - Cyclists
- Signal phase and timing
- Remote control
- Driver assistance



Scope of Possibilities (2)

Vehicles might use data communications for many purposes

- Direct interactions between vehicles
 - ▶ Collision avoidance
 - ▶ Braking notification
 - ▶ Merging assistance
 - ▶ Priority at intersections
- Dynamic situations
 - ▶ Construction / road closed
 - ▶ Slippery pavement
 - ▶ End-of-traffic queue



Working Activities

- Most Member States have regulatory and government organizations that handle communications
- Since automotive communications have historically used limited communications, the vehicle industry has had limited influence on communications policy
 - This can change by vehicle manufacturers and suppliers increasing their participation in communications regulatory activities
- In the ITU, vehicle manufacturers and suppliers should become members and participate in applications study groups and radio technology groups like WG 5A

Working Activities (2)

- In Member States' activities, **effective** participation in the regulatory and government communications activities by all interested parties is needed
 - ▶ This is particularly challenging in the U.S., where
 - By Order FCC-20-164, the U.S. Federal Communications Commission (FCC) reallocated 60% of the available spectrum in the 5.9 GHz vehicle safety band to unlicensed Wi-Fi
 - Despite verified technical results from the U.S. Department of Transportation (DOT) GPS Adjacent Band Compatibility Study and support from the U.S. Department of Defense (DOD) and other U.S. government agencies, the FCC granted a commercial wireless company authorization to interfere with GNSS signals