

Flat Roof antennas

Multifrequency antennas module

Benefits :

- ▶ Future vehicles will require more services and antennas for the autonomous driving systems
 - **Ficosa Flat Roof antennas Modules** allows multiple antenna to be integrated in the same roof module
 - No visible impact improves car's aesthetical image and aerodynamic penetration
 - Installation process for all antennas is reduced to a single module assembly



Flat Roof antennas

Multifrequency antennas module

Technical Advantage :

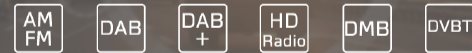
- ▶ Module variants are customized depending on vehicle services and configurations

High Frequency module



*Estimated dimensions: 654 x 84 (mm)

Broadcast module



*Estimated dimensions: 880 x 260 (mm)

Flat Roof antennas

Multifrequency antennas module

Applications :

- ▶ **Antennas module** is designed for optimal signals reception
- ▶ Each module works on all models belonging to a single platform



3-doors



5-doors



Sedan



Wagon

Carcom

Technological Platform

Benefits :

- ▶ Adds several connectivity services in a single **technological platform**
- ▶ **Modular architecture** to early deploy most innovative technologies
- ▶ Physical platform to test in vehicle and **shorten the time-to-market**

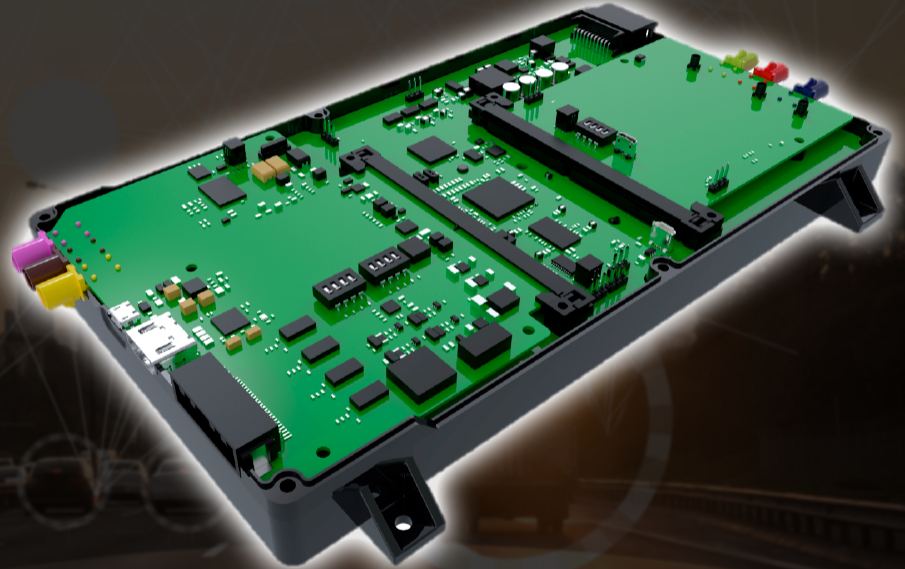


Carcom

Technological Platform

Technical Advantages :

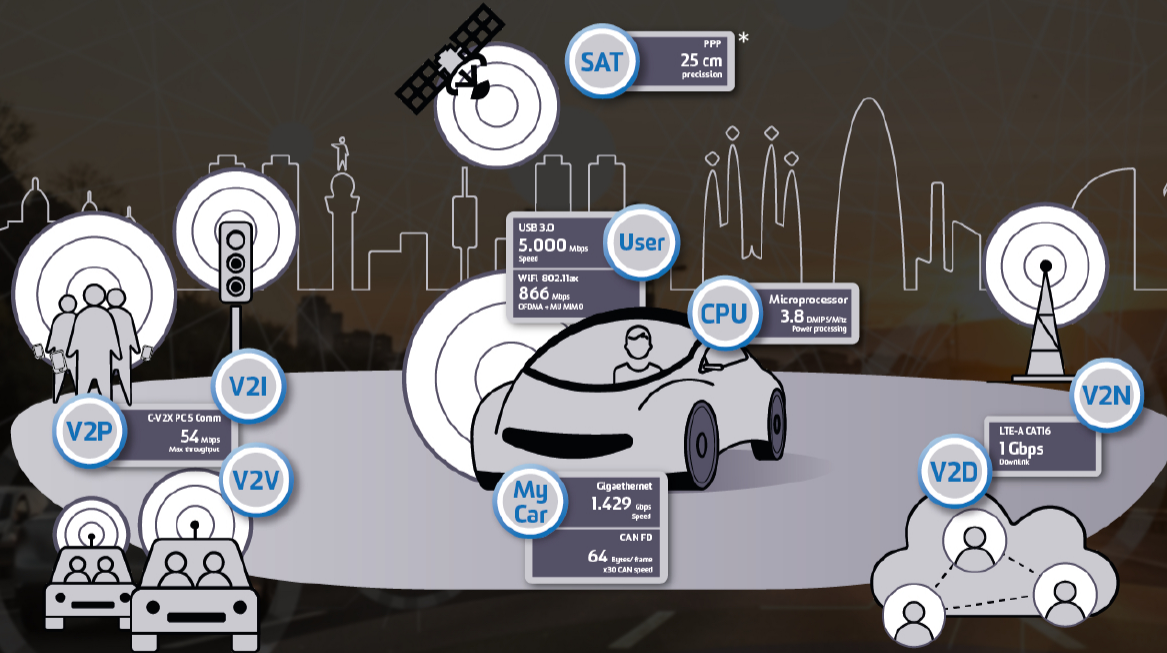
- ▶ Central CPU with **modular stick connections**
- ▶ NAD LTE-A Cat16 for V2N, V2C and UU
- ▶ C-V2X stand alone stick for PC5 direct communication for V2V and V2I
- ▶ **Precise Point Positioning (PPP)** technology to provide data with precision on cm level



Carcom

Technological Platform

Application :



*Precise Point Position

Panasonic AUTOMOTIVE

FICOSA



V2X Systems

C -V2X and 802.11p On Board Units

Benefits :

- ▶ Intelligent Transport System aims to provide innovative services relating to different modes of transport and traffic management for more informed and safer users.
- ▶ **Ficosa V2X On board Units** supplies the vehicle with a low latency V2X communication either using DSRC or C-V2X technology
- ▶ **Ficosa's expertise on antennas design** increases the ranges of signal reception with an optimize antenna adaptation as well as compensates cable length looses

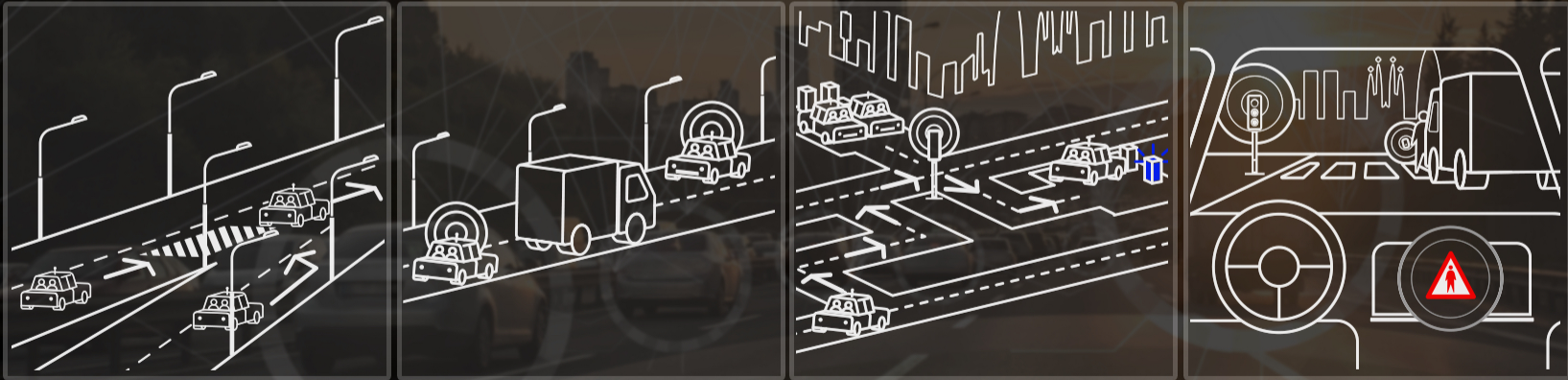


V2X Systems

C-V2X and 802.11p On Board Units

Technical Advantages :

- ▶ Module variants are customized depending on vehicle services and configurations
- ▶ **Ficosa modules** follow the IEEE 8011.p as well as 3GPP standards



V2X Systems

C -V2X and 802.11p On Board Units

Applications :

- ▶ V2X use cases increase safety and security for vehicles and pedestrians of future cities
- ▶ Technology that drives us to a Level 5 autonomous driving
- ▶ Ficosa's systems architecture allows **migrating services** from one to another platform



Telematix

From Low Cost 3G to LTE-A product variants

Benefits :

- ▶ Low end version TCU's specially designed for ERA-GLONASS and eCALL regulation compliant have been deployed since 2006
- ▶ Evolution of mobile communication drives us to include advanced safety, security and infotainment applications in the vehicle based on **scalable designs**



Telematics

From Low Cost 3G to LTE-A product variants

Technical Advantages :

- ▶ LTE & LTE-A connectivity
- ▶ WiFi, USB and Ethernet communication ports
- ▶ Firmware and software remotely updated **Over-The-Air**
- ▶ Low power design: ON, Sleep & Deep Sleep mode
- ▶ Backup battery for security and safety services
- ▶ **Integrated antennas** ensures continuous communication even in case of crash



Telematics

From Low Cost 3G to LTE-A product variants

Application :

- ▶ Ficosa TCU's with vehicle position, CAN bus connection, accelerometer and others, offer the opportunity to implement a wide range of services for final users and OEMS: diagnostics, maintenance, emergency call, telemetry, remote control,...

