Kapsch CBX-9160

V2X Onboard Communication Unit

CBX-9160 is an onboard V2X communication box from Kapsch. It provides IEEE 802.11p™ wireless communication for both the ETSI ITS G5 and IEEE WAVE standards for applications within the Cooperative ITS (C-ITS) environment and ITS applications based on communication technology in general. Equipped with various interface options it is ready to cover all V2X needs from a mobile onboard unit perspective. The CBX-9160 provides fast data exchange between vehicles and the infrastructure like Traffic Management Center or Signal Controllers to enable full capabilities of cooperative systems.

The V2X Onboard Communication Unit supports up to two 5.9GHz radio channels and is based on a high perfor-mance Linux driven dual-core 64 Bit single board computer platform utilizing extensive interface capabilities. The unit can be powered via standard in-vehicle 12/24V power supply.

The versitale platform provides a standard compliant V2X communication stack as needed for deployment in IEEE WAVE™ and ETSI ITS G5 based cooperative systems.

The CBX-9160 is ready for a complete integration within the C-ITS environment. The communication capabilities cover besides the 802.11p™ wireless communication also cellular (LTE) integration and Bluetooth (or Wi-Fi) possibili-

ties to provide the information to the driver in the vehicle and as well to the operator of the backend system, like a traffic management center.

As mobile unit it completes the full end-to-end V2X solution from Kapsch, consisting of V2X Roadside Units and the dedicated Connected Mobility Control Center (CMCC) Software.

Independently if it is used on emergency vehicles to decrease response time, on public transport means to keep the vehicle on schedule, to increase safety while creating awareness of service vehicles or in different pilots, demonstrating current and future possibilities and benefits of Connected Vehicles (V2X), the CBX-9160 covers all of these oportunities in one unit.

CBX-9160 V2X Onboard ITS Station.

Technical features

ITS communication standards
- IEEE 802.11p™/IEEE 802.11™
- SAE J2735 2016 / 2020
- ETSI ITS-G5 standard set or
- IEEE WAVE™ standard set

5.9GHz radio characteristics
- IEEE 802.11p™ radio
- Freq. band: 5.850 – 5.925GHz
- 10MHz channel spacing
- Output power: max. 20dBm
- Sensitivity: typ. -92dBm @ 6Mbps
- Antenna 1 (or 2, diversity or 2nd radio chan.).

Wireless communication
- Bluetooth module
- Cellular modem module (3G/LTE)
- Wi-Fi module*

Positioning and timing (pps)
- Multi-GNSS support
- (GPS, GLONASS, Galileo, BeiDou)
- SBAS (EGNOS, WAAS)
- Integrated IMU (dead recknoning)

Computer platform
- 1,33 GHz, 64 Bit, dual core
- x86 CPU Architecture
- 1GB RAM ECC
- 4GB Flash
- uSD memory extension*

Power supply
- 12V / 24V DC

Enclosure
- IP31, IEC 60529

External interfaces
- GPIO (3x in, 3x out)
- 2x V2X antenna (Fakra Z)
- 1x GNSS antenna (Fakra C)
- 1x WiFi-BT antenna (Fakra I)
- 2x LTE antenna (Fakra D)
- 1x GbE (RJ45)

Security
- Hardware Security Module, ECC
- FIPS 140-2 level 3 compliant, CC EAL4+

Environmental conditions
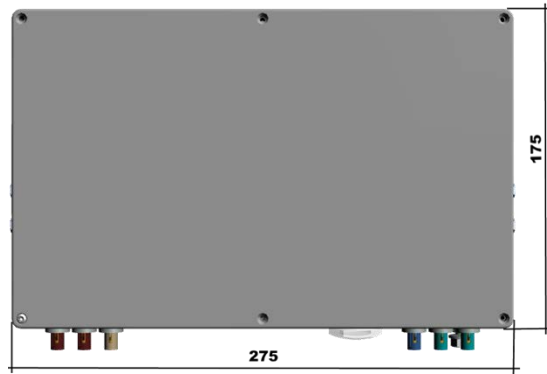- Operation: -40°C to 75°C
- Storage: -40°C to 85°C

Mechanical
- Aluminum base
- Dimensions: 275 x 175 x 70 mm
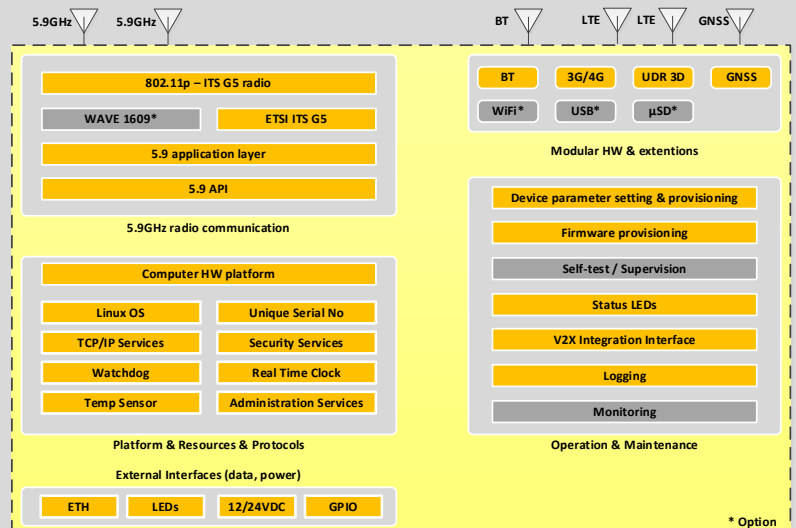
General conformity
- CE

* Optional

CPU Platform
- 1,33GHz, 64 Bit, dual-core x86 CPU Architecture
- 1 GB RAM ECC
- 4GB Flash
- SD-Card Slot

Interfaces
- IEEE 802.11p(TM) (ITS G5 and IEEE WAVE)
- WAN Cellular Network
- BT HMI/GUI
- Connected Mobility control Center (CMCC)

References