

SRD RSU C-V2x R

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- Predisposition for housing in a Smart Road multifunctional pole structure
- Road Side Unit (RSU) device complete with all C-V2x and DSRC communication standards
- Highly reliable redundant power system
- WiFi 802.11 p (DSRC) - 5.9 GHz
- C-V2x (PC5) compliant ITS G5 3GPP Rel.15 @ 5.9 GHz
- LoRaWan 868 communication channel for emergency diagnostics
- 2 Antennas for C-V2x radios
- 2 DSRC radio antennas
- 1 GPS GNSS antenna
- Complies with C-ITS Roadside ITS-G5 System Profile 2.0.7 specifications by C-Roads
- Complies with C-ITS Message Profiles 2.0.7 specifications by C-Roads
- Services and definition of use cases as per C-ITS version 2.0.7
- Dual radio communication channel working simultaneously: C-V2X and DSRC
- Support for Cyber Security standards based on public key management infrastructure (PKI)
- General warning message support
- Support road intersection safety messages
- Support road works messages in vehicle signs
- Support road works messages
- Support dynamic messages in toll stations
- Optimal speed message support for "green wave"
- Message support for "green wave" speed
- Support weather alert messages
- Park & Ride message support
- Support danger zone messages
- Traffic Management Message Support (Shockwave Damping)



DESCRIPTIONS

SRD RSU C-V2x R is the highly reliable radio communication system with redundant power supply, between infrastructure and vehicles, specifically designed to be integrated into the Smart Road multifunctional pole product and dedicated to the creation of Smart Road infrastructures, Smart City and critical infrastructures in type.

SRD RSU C-V2x R is an all-in-one integrated professional radio system, designed to guarantee reliable V2x communication between the ground infrastructure and the OBUs (On Board Units) of the latest generation vehicles; the product manages multiple connectivity standards such as: ITS 802.11P DSRC and ITS C-V2X (PC5).

SRD RSU C-V2x R allows you to create your V2x network quickly and easily without a critical radio-design project. A compact and reliable IP67 enclosure allows the system to be installed on an existing pole or gantry infrastructure. A set of 4 antennas (+1 GPS antenna) combined in an all-in-one mechanical solution ensures optimized coverage of a road segment and maximizes the coverage area of radio communications while minimizing radio emissions outside the edge area of the road.

TECHNICAL FEATURES

HW features

Processor	QuadCore ARM CORTEX ARM57 1.5 GHz
Co-processor	GPU 0,5 TFLOP for neural network support
Memory	4GigaBytes LPDDR4, eMMC 16GB
Mass memory	HD SSD standard M2 from 128GB (expandable up to 2TB)
Expansion slots	MicroSD Card + MiniPCE Card
I/O	2 Porte Gigabit Ethernet with the possibility of connecting a fiber optic connector 2 USB Ports N. 1 serial port RS485
Radio	N. 2 Hybrid radio modules with DSRC or CV2-x technology configurable via software
Radio channel characteristics C-V2x (PC5)	3GPP Rel.15 @5.9 GHz
Radio channel characteristics DSRC	802.11p
Emergency diagnostics	Additional LoRaWAN radio channel supported by internal battery for diagnostic communications in the event of a power failure to the equipment or serious failure of the same.
Antennas	n°2 dedicated to C-V2x radios
Antenna	n°2 dedicated to DSRC radios n° 1 GPS GNSS
Antenna fixing	Mechanical with safety lock

SW features

Security/Encryption	Hardware session (one for each radio module)(HSM). Container opening alarm (Tamper); all data in memory encrypted.
Extensions	"Sensor fusion" package integrated with measurement of various internal parameters such as: temperature, humidity, inclination, oscillation, state of input currents, etc., with generation of alarms in case of exceeding working thresholds.
Simultaneity	Dual communication channel simultaneously C-V2X and DSRC (ITS-G5) Support for all message types in both channels Support encryption via PKI on both channels Support sending C-ITS messages simultaneously in both channels or only in the selected channel as needed Support forwarding C-ITS messages received from vehicles to the C-ITS back-end system from each channel

General characteristics

RSU Dimensions	160 x 220 x 80 mm (h/l/w)
Maximum antenna dimensions	1200 x 300 mm diameter
Operating Temperature	-40° + 65°C
MTBF	100.000 hour
Industrial protection degree	IP67
Antenna connectors	n°7 IP67
LAN-POE	n°1 IP67 connector
Case RSU	Anodized Aluminum
Protection	Alarm signal in case of opening of the RSU device
Development system	SDK/API to modify geonet elements (traffic classes, message lifetime, maximum number of retransmissions, geonet destination area, destination port, message repeat interval, message repeat duration etc.)
Communication between RSU and back-end C-ITS system	UDP over VPN with the possibility of using DTLS for greater session security for PKI levels 1 and 2. Use of two different UDP ports for C-V2X and for ITS-G5 for data exchange between RSU and C backend -ITS.

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Weight RSU & Antennas	15 Kg. ca
Power Supply	
Redundant power supply stage	18-36 Vdc 60W; or Ultra-POE IEEE 802.3bt type3 60W
Consumption	Max 35W



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Compliance

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Complies with C-ITS Roadside ITS-G5 System Profile 2.0.7 standards of the C-Roads regulations
Complies with all ETSI, ISO referenced standards for each level of the RSU. Support for DENM, IVIM, SPATEM, MAPEM, SSEM, SREM (minimum version 1.3.1) and CAM (minimum version 1.4.1) messages and support DENM 2.1.1 messages
PKI support (vendor agnostic, as long as they meet security standards) and compliance with all reference security standards, EU security policy and EU certificate policy
Compliant with C-ITS 2.0.7 C-Roads message profiles; support for the data fields of each type of message, support for the creation, update and deletion of DENM and IVIM messages. SDK/API for creating and editing data fields
Services and definition of use cases as per C-ITS version 2.0.7

OPTIONALS

- WiFi 802.11 module a/b/g/n/ac/ax
- LTE-V module supporting bands 3-8 (FCC) and bands 39-41 (TDD)
- Sigfox module for diagnostics and survival channel



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