

# Transponder Unit OBU-4021.



## Product Description.

The OBU-4021 is a smart in-vehicle communication device designed for applications which call for a standardized Dedicated Short Range Communication (DSRC) microwave link, operating at 5.8 GHz. It is an integral component in Automatic Vehicle Identification (AVI), Electronic Access Control (EAC) and Electronic Toll Collection (ETC) systems. It is fully compliant with European CEN DSRC/EFC standards. It is fully compliant with European CEN DSRC/EFC standards.

The combination of attractive design and functionality makes the OBU a natural choice for every issuer that wishes to increase user acceptance of its DSRC-based charging system whether based on high speed interurban multi-lane free-flow, urban congestion charging applications or plaza-based operations.

The functionality of the transponder enables interoperability according to the most common harmonised specifications, including A1, CESARE/PISTA and CARDME. The user memory can be structured in several elements and this flexibility makes the OBU-4021 an ideal choice for Electronic Fee Collection as well as for other applications. Data security and integration is ensured by a high degree of integration in combination with efficient integral cryptographic functions based on the DES and triple-DES algorithms.

A push button enables the user to change the axle class or other parameters specifically related to the EFC scheme, as well as check the OBU status. The current axle class as well the status of the OBU are shown by LEDs. In addition an acoustic signal (buzzer) is implemented which is controlled by the roadside equipment (RSE). Thus the user is acoustically informed if a DSRC transaction was performed successfully or if a failure occurred.

The OBU-4021 is designed for in-vehicle windscreen mounting and is self-installable within a few minutes, promoting user acceptability.



## Technical Specification:

### Features

- Fully proven in single lane and multi-lane free-flow applications
- Enables high speed operation
- Compatible with CEN DSRC specifications
- Compatible with GSS, A1, CARDME and CESARE/PISTA
- Supports e-purse functionality
- Mutual authentication to resist spoofing
- Ultra-fast DES and 3-DES algorithms
- Supports several key generations
- Supports multiple applications
- 1600 bytes of access-protected data memory
- Battery lifetime in excess of 3 years

### DSRC Communication

In accordance with RTTT-DSRC and EFC standards:

- EN 12253: 2004 DSRC Physical Layer
- EN 12795: 2003 DSRC Data Link Layer
- EN 12834: 2003 DSRC Application Layer
- EN 13372: 2004 DSRC Profiles for RTTT Applications
- EN ISO 14906: 2004 EFC – Application Interface Definition for DSRC Communications
- GSS (Global Specification for Short Range Communication)
- Centre Frequency: 5.8 GHz
- Uplink subcarriers: 1.5 and 2.0 MHz

### Power Supply

- Built-in 3,6 V Lithium battery
- Typical battery lifetime more than 3 years

### User Memory

- Type: RAM (battery backed-up)
- Capacity: 1600 bytes
- Access only via the DSRC-interface

### Man-Machine Interface

- Buzzer 55 dBA @ 1 m
- Operator-configurable buzzer

### Casing

- Bi-coloured PC/ABS
- Standard colour styles:  
Light grey, dark grey

### Weight

- 100 g

### Dimensions

- 120 mm x 70 mm x 30 mm

### Accessories

- Cleaning tissue
- Velcro-Tapes

### Installation in Lorries and Busses

(vertical/near vertical windscreens)

- With Velcro® Tapes at the bottom and centre of the windscreen inside

### MTBF

- 650 000 hours Ref: MIL-HDBK-217F
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### Temperature Range, Storage

- +5 °C to +40 °C Ref: IEC 60721-2-1

### Temperature Range, Operating

- 25 °C to +85 °C Ref: IEC 60721-2-1, (including heating effect due to solar radiation)

### Humidity

- Max 95% relative humidity, non condensing Ref: IEC 60721-3-5, Class 5K2

### Vibration

- Random 1 m<sup>2</sup>/s<sup>3</sup> 10–200 Hz
- 0,3 m<sup>2</sup>/s<sup>3</sup> 200–500 Hz
- Ref: IEC 60721-3-5, Class 5M2

### Free fall

- 1000 mm, Each face

### Housing

- IP 40 Ref: IEC 60529

### Conformity

#### • Electrostatic Discharge

4 kVp (direct), 8 kVp (indirect)  
Ref: EN 301489-1, -3

#### • Electromagnetic Immunity

AM 1kHz: 3 V/m, 80-1000 MHz  
Ref: EN 301489-1, -3

#### • Electromagnetic Emission

30-230-1000MHz, 40\_40/47-47  
dBµV/m Ref: EN 301489-1, -3

#### • Type Approval

The transponder is compliant with the European directives:  
R&RTTE 1999/5/EC  
EMC 89/336/EC  
LVD 73/23/EC

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