Satellic

OBU Handbook

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Abbreviated Terms

The following abbreviated terms apply in this document:

GNSS	Global Navigation Satellite System
OBU	On Board Unit
LED	Light Emitting Diode

1. Introduction

Please familiarize yourself with the functionalities of your On Board Unit and read the document carefully before starting your first journey. The On Board Unit may not be operated while driving.

From April 1st 2016, all owners of heavy goods vehicles of over 3.5 tonnes must pay a road charge in Belgium. This regulation will apply on motorways and on a number of regional and municipal roads.

To detect whether a toll road is used, an On Board Unit (OBU) is installed in the vehicle. The OBU is mandatory in order to comply with the toll regulations of the Belgian regional authorities.

The main tasks of the OBU are:

- ✓ Detecting whether or not the vehicle is driving on a toll road.

- ✓ Helping the driver check relevant vehicle characteristics.

- ✓ Calculating the price for the usage of toll roads based upon all relevant charge information.

- ✓ Sending relevant charge information to a central system.

- ✓ Informing the driver about the OBU's current state.

A green LED will be displayed, to indicate that the OBU is ready for charging toll. A red LED will be displayed to indicate that the OBU is not ready for charging toll. Only when the OBU shows a green LED, the driver complies with the toll regulations.

2. Controls

The OBU has six buttons: **"button ok" (4), "button up, down, left, right" (3)** and **"button back" (5)**. The **red LED (1)** and the green **LED (2)** are optical indicators for the status of the OBU. The **"display" (6)** is the main optical indicator for the OBUs status.
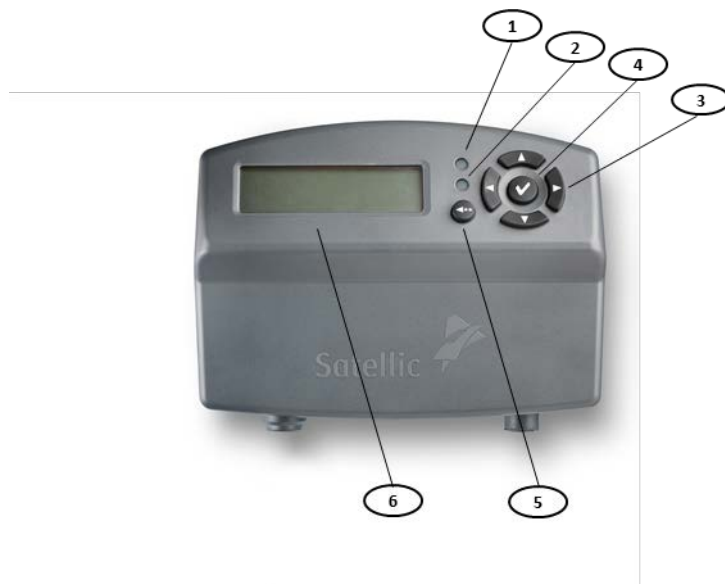

Figure 1: General Handling of OBU

(1) Red LED:

The red LED indicates the status of the OBU. The red LED lights up during the booting process or when problems occur. The OBU does not function in the automatic toll collection when the red LED is switched on.

(2) Green LED:

The green LED indicates the status of the OBU. The green LED lights up if the booting process is performed and the OBU works properly. All requirements for automatic toll collection have been met.

(3) Buttons "up, down, left, right"

These are navigation buttons for moving forward and backward in the menu. In order to enter the menu screen, the user has to hold the navigation button.

(4) Button "ok"

The ok button is used to confirm menu selections and waking up the OBU from sleep mode.

(5) Button "back"

The back button is used for returning to the default screen.

(6) Display

The display informs the road user about the journey on Belgian roads.

3. Operation

3.1 Initial operation with the OBU

When setting up the OBU for the first time it boots automatically. The red LED will light up. The full booting process can take up to ten minutes. Meanwhile, the OBU itself will have a red light next to the LCD display, showing the Satellic logo followed by the text "Starting…". As soon as the LED turns green and the screen shows your personalized information, such as your licence plate number, it is ready to collect charge. This personalized information includes the amount you will be charged for every kilometre you travel on the road you are on (€/km), the total amount you will be charged for the total distance and the total kilometres travelled on toll roads. When driving on a toll-free road, this will be shown on the display of the OBU.

Check our FAQ in chapter 5 for any questions you may have. Other issues will be dealt with by the Satellic Customer Support Department.

3.1.1 OBU Display

The following messages are shown during the OBU start-up process:

(1)   Satellic logo

(2)   Starting…

(3)   After successful start-up: default screen

3.1.2 OBU LED

A red LED is shown during the booting process. The green LED will switch on if the OBU is ready for toll collection within approximately 10 minutes.

3.1.3 OBU SOUNDS

No sound during the start-up process.

3.2 While travelling with the OBU

While travelling, the OBU display content may vary, depending on where the vehicle is driving, if problems occur or information is published by Satellic. The OBU records exactly the road you are driving on. Contrary to GPS devices, the verification of the exact travelled route may take a while. That is why the display is updated with a slight delay.

3.2.1 OBU Display

I. Default Screen

A default screen is displayed per default while travelling with the OBU unless a special (overlaying) screen with additional information appears. The default screen is not scrollable and not configurable by the user. The default screen has three different operational modes:

(1)	Inside Belgium	–	Toll > 0
(2)	Inside Belgium	–	Toll = 0
(3)	Outside Belgium	–	Toll-free

✓ **Default screen → Toll > 0**

The following screen is used on toll roads:

- Toll/Unit or Toll/km: this is the basic price per kilometre (normal case in Belgium) or the basic price per unit (e.g. for toll tunnels).

- Toll since 00:00: this is the collected toll amount since 00:00 of the current day. The counter is reset every night at 00:00. Current day: midnight CET = GMT +1

- Km since 00:00: this is the collected distance in km since 00:00 of the current day. The counter is reset every night at 0:00.

- Licence plate number: the licence plate number of the vehicle to enable the driver to check if he is using the correct OBU in the current vehicle.

```
€ 0,146                                              € 25,00

KM 23,456                                            B-LN 778
```

Figure 2: Default Screen Toll > 0

✓ **Default screen → Toll = 0**

The Toll = 0 screen is a special case. All fields are filled out as described above, but the basic price per km or unit is set to 0.00 € This screen is used if a toll object with an amount 0 € is defined.

```
€ 0,00                                    € 25,00

KM 23,456                                 B-LN 778
```

Figure 3: Default Screen Toll = 0

✓ **Default screen → Toll-free**

The toll-free screen is used for roads, which are not subject to toll. If the vehicle is driving in a toll-free area, the fields "Toll since 00:00" and "Km since 00:00" show the last known value from the toll network until daily break times.

```
TOLLFREE                                  € 25,00

KM 23,456                                 B-LN 778
```

Figure 4: Default Screen Toll-free

II. Supporting Screens

✓ **Supporting Screens**

A supporting screen is shown as a response to events, status changes or external triggers. The supporting screens have additional information for the road user and overlay the default screen. The messages displayed are scrollable if necessary and may have to be confirmed by the road user.

✓ **Supporting Screen – "OBU Locked Screens"**

This screen is shown if the OBU is locked for some reason:

The screen shows the following information:

- Line 1: "OBU blocked"

- Line 2: lock reason

```
OBU BLOCKED
CALL YOUR CREDIT CARD ISSUER
```

```
OBU BLOCKED
INVALID PAYMENT MEAN
```

```
OBU BLOCKED
INVALID REGISTRATION PAPERS
```

```
OBU BLOCKED
STOLEN VEHICLE
```

```
OBU BLOCKED
TOP UP YOUR PRE-PAID BALANCE
```

```
OBU BLOCKED
CALL YOUR FUEL CARD ISSUER
```

Figure 5: Screen "OBU Locked"

✓ **Supporting Screen – "Top-Up Screen"**
This screen is shown if the pre-paid balance of the OBU is updated.

The screen shows the following information:

• Line 1: "Top-up received"

• Line 2: Top-up value, ####,## €

```
TOP-UP RECEIVED
VALUE
```

Figure 6: Screen "Top-up"

✓ **Supporting Screen – "Satellic Communication Screen"**
A Satellic Communication Screen is shown if Satellic informs or points something out to the road user. The screen shows the following information:

• Line 1: <screen title>, e.g. "Invalid LPN"

• Line 2: <message text> "Invalid licence plate registration. Please contact Satellic Customer Support"

```
CALL SATELLIC
(0)0800-72 83 55 42 (0)0800-SATELLIC
```

```
NEWS!
CHECK WWW.SATELLIC.BE
```

```
NEW TARIFF SCHEME
CHECK WWW.SATELLIC.BE
```

```
INVALID DATA
INVALID GVW/EMISSION CLASS REGISTRATION. HIGHEST RATES APPLIED. PLEASE
CONTACT SATELLIC CUSTOMER SUPPORT.
```

```
INVALID LPN
INVALID LICENSE PLATE REGISTRATION. PLEASE CONTACT SATELLIC CUSTOMER
SUPPORT.
```

```
CREDIT LOW
CALL SATELLIC (0)0800-72 83 55 42 (0)0800-SATELLIC
```

Figure 7: Screen "Satellic Communication"

✓ **Supporting Screen – "Wake-up on Movement Screen"**

The OBU supports automatic wake-up from sleep mode without having to push a button in case movement of the vehicle is detected. Because the driver should have turned on the OBU manually before starting his journey, a special warning sign will be shown. The screen shows the following information:

- Line 1: "Activate OBU"

- Line 2: "Press OK button"

```
ACTIVATE OBU
PRESS OK BUTTON
```
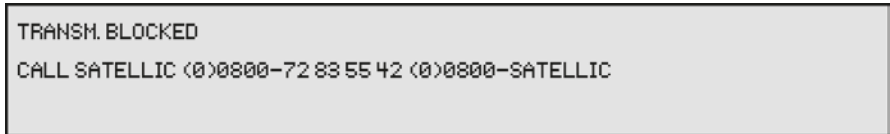
Figure 8: Screen "Wake-up Movement"

✓ **Supporting Screen – "Error Screen"**

Errors are shown by the OBU as a response to internal errors. Error screens can only be overlaid by menu screens to let the user check OBU data in the menu. All error screens show the following information:

- Line 1: <error reason>, e.g. „Not ready"

- Line 2: <message text>

```
NOT READY
```

```
TRANSM. BLOCKED
CALL SATELLIC (0)0800-72 83 55 42 (0)0800-SATELLIC
```

```
OBU BLOCKED
TOP UP YOUR PRE-PAID BALANCE
```

Figure 9: Screen "Errors"

✓ **Supporting Screen – "Warning Screens"**

Warning screens are shown by the OBU as a response to certain types of behaviour of the OBU, which can be corrected by the user. All warning screens show the following information:

- Line 1: <warning reason>, e.g. „Balance low"

- Line 2: <message text> e.g. Top up your pre-paid balance

```
TRANSM. PROBLEM
CALL SATELLIC (0)0800-72 83 55 42 (0)0800-SATELLIC
```

```
BALANCE LOW
TOP UP YOUR PRE-PAID BALANCE
```

Figure 10: Screen "Warnings"

III. Menu Screen

The OBU provides a menu with user information. In order to enter the menu screen the user has to hold the navigation button. The information in the menu screen is not selectable or changeable, except for the language. The Menu Screen is always accessible even if overlaying screens are displayed.

The OBU menu is structured as follows:

Main Menu

1. Language

1.1 English

1.2 French

1.3 German

1.4 Dutch

2. Vehicle characteristics

2.1 Licence Plate Number

2.2 Vehicle Weight

2.3 Emission Class

3. OBU information

3.1 Hardware

3.1.1 Manufacturer

3.1.2 Type

3.1.3 Revision

3.2 Contact Support

3.3 OBU Identification

3.4 Software Version

4. Account Info

4.1 Payment Info

3.2.2   OBU LED

I.   Default Screens

The LED is always green when the OBU shows its default screen.

II.   Supporting screens

1) <u>OBU Locked Screen</u>

LED → Red

2) <u>Top-Up Screen</u>

LED → Green

3) <u>Satellic Communication Screen</u>

LED → Green

4) <u>Wake-Up on Movement Screen</u>

LED → Red

5) <u>Error Screen</u>

LED → Red

6) <u>Warning screen</u>

LED → Green

III.   Menu screen

The menu screen has no influence on the LEDs so the LED colour could be green as well as red.

3.2.3   OBU SOUNDS

I.   Default Screens

No sound during the default screen.

II.   Supporting screens

1) OBU Locked Screen

Sound → Beep on screen appearance

2) Top-Up Screen

Sound → Beep on screen appearance

3) Satellic Communication Screen

Sound → Depends on notification

4) Wake-Up on Movement Screen

Sound → Beep on screen appearance

5) Error Screen

Sound → Depends on notification

6) Warning screen

Sound → Beep on screen appearance

III.   Menu screen

No sound during the menu screen.

4. Basic Safety Instructions

In order to ensure a safely operation of the OBU the following basic instructions must be followed:

1) *Operating the OBU while driving is not permitted.*

2) *Danger caused by battery (rechargeable):*
→ In compliance with EU Directives 94/9/EC (ATEX 95) and 2014/34/EU, using the device in potentially explosive atmospheres is not permitted.

→ For use in potentially explosive atmospheres, an adaptation kit for permanent power connection to the vehicle is available.
For more information visit www.satellic.be/adr.

→ Do not expose the rechargeable battery to temperatures above 85°C.
The battery may leak or ignite.

→ Do not open the battery compartment.

3) *Danger caused by obstructed line of sight:*
→ Mount the OBU onto the windscreen in such a way that the driver's view on the road is not obstructed.

→ Do not cover any air vents.

4) *Danger caused by the OBU falling off:*
→ The windscreen area where the device is fixed must be clean, dry and free from grease and oil.

→ The suction cups must be clean, attached correctly and firmly stuck to the windscreen.

5) *Danger caused by obstructed line of sight:*
→ Observe a minimum distance of 25 cm between the OBU and medical devices such as heart pacemakers.

If there are any doubts, please contact Satellic's Customer Support free of charge on 00800-72835542 (= 00800-SATELLIC) from within Belgium and its neighbouring countries. From the rest of Europe, dial +3278151515 or +3224160416.

5. OBU – FAQ

Q : **The amount of kilometres shown differs from the amount I know I have driven.**

A : The OBU only shows the amount of kilometres you have driven on tolled roads. Therefore, if the displayed kilometres differ from the amount you know you have driven it is likely because part of the way you have travelled was along toll-free roads.

Q : **The information displayed on the OBU screen seems to refresh at random times. Furthermore, these times are sometimes far between.**

A : This is a known issue, which is planned to be resolved.

Q : **While driving the display suddenly showed the Satellic logo again.**

A : Over-the-air updates will sometimes be performed after which the OBU will need to be restarted and the Satellic logo will be shown again. The OBU should start up like normal afterwards. However, should you notice this issue please send us an e-mail so we can make sure this coincides with planned over the air updates.