



**USER MANUAL**

**Mobeye® WaterGuard**

**Leakage sensor**

**CM2300**



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## **Attention! Very important**

This user manual contains important guidelines for the installation and usage of the Mobeye® device as described in this manual. Please read these thoroughly before you start using the Mobeye® device.

In case of damage caused by disregarding the guidelines, the warranty becomes void.

The user must regularly check the proper functioning of the device. The manufacturer cannot be held liable for any damage or loss caused by any incorrect use or incorrect functioning of the Mobeye® device.

## **Safety guidelines**

- The permitted ambient temperature during operation may not be exceeded (not lower than -10°C and not higher than 50°C).
- The device is intended for use in dry and clean places.
- Protect the device from moisture, heat and water splashing. Not intended for external use.
- The guidelines for the battery usage must be regarded.
- Do not expose the device to strong vibrations.
- Do not let it fall from height.
- Do not use in an environment where any inflammable gases, vapors or dust are present or could be present.
- Repair of the device may only be carried out by people, trained for Mobeye® repair.
- If the device must be repaired, only original replacement components may be used. The use of different parts may lead to damage of the Mobeye® device.

## **Use in accordance with the regulations**

The purpose of this device in accordance with the regulations is sending SMS text messages and making telephone calls after an alarm situation. Other uses are not permitted and may invalidate the warranty.

## **Battery recycling**

CR123 batteries, as used in the Mobeye WaterGuard, are classified as non-hazardous waste and can be recycled. Please take empty batteries to a nearest collection point.

## 1. GENERAL DESCRIPTION

The Mobeye WaterGuard is a battery operated GSM module used to send an alarm notification after detection of a water based fluid or - if an external power supply is used- after a power failure. The Mobeye WaterGuard can also detect the absence of water.

The factory settings of the Mobeye WaterGuard cause following reactions:

- When the water sensor detects water, the Mobeye WaterGuard sends an alarm SMS text message and calls the phone numbers programmed in by the user. The SMS message contains the text 'Mobeye Water alarm'.
- As soon as no water is detected anymore, an SMS text message is sent to the set telephone numbers containing the text 'Mobeye Water Level OK'.
- When one of the additional inputs is activated by a sensor, the Mobeye WaterGuard sends an alarm SMS text message and calls the phone numbers programmed in by the user.
- When the water sensor and/or another input remain in the alarm status, the Mobeye WaterGuard repeats sending the SMS alarm message every four hours.
- When the batteries need to be replaced, the Mobeye WaterGuard sends a 'low battery' SMS text message to the first telephone number (administrator).
- When an external power supply is used and a power failure occurs, the Mobeye WaterGuard sends a 'power failure' SMS text message to the first telephone number. When the power is restored, the Mobeye WaterGuard sends a 'power restored' SMS text message.

The Mobeye WaterGuard has many options to influence the behaviour, which are described in chapter 4. For additional alarm and monitoring functions the Mobeye WaterGuard can be connected to the Mobeye Internet Portal, which is explained in chapter 7.

## **2. GETTING STARTED**

To get started with the Mobeye WaterGuard, at least the following steps need to be taken in the following order:

1. Insert a SIM card
2. Connect the water sensor to the input
3. Insert the batteries
4. Enter the program mode
5. Program at least one telephone number
6. Arming/disarming the system

These steps are further explained in this chapter. After these steps the module will be operational.

### **2.1 INSERT A SIM CARD**

Open the enclosure by removing the 4 screws and insert a SIM card into the module. Push the black cover slightly outward to open the holder. Before installing the SIM card should have PIN code "0000", or PIN code removed. (A PIN code can be changed or removed by putting the SIM card in to any mobile phone and entering the 'security' menu).

NB: Make sure the SIM card is inserted before the batteries are inserted. If you replace a SIM card, first remove the batteries (and remove any other external power supply). The settings are stored in the device memory. The SIM card shall have the "normal" size and be suitable for 2G. It is advised to use an M2M SIM card.

## 2.2 CONNECT A SENSOR TO THE INPUT

Plug the external water sensor into the metal socket and press it firmly.

Mount the sensor to a fixed place in vertical position at the height where the presence of water should be detected. If necessary, use a metal strip for attaching the sensor.

In case the sensor should detect the absence of water, the input type needs to be changed to NC (please refer to paragraph 5.6).



## 2.3 INSERT THE BATTERIES

Insert the two batteries (CR123) in the module. Use the +/- indication for the correct placement.

## 2.4 ENTER THE PROGRAM MODE

Directly after inserting the batteries, the Mobeye WaterGuard switches to the program mode. First the GSM module establishes network connection. During this time the LED flashes green and red. Within 10-30 seconds the connection is established and the status LED starts flashing 1 sec. on/1 sec. off (or stays on continuously in case the first telephone number has been configured).

The Mobeye WaterGuard returns to the program mode by pressing the on/off button for 5 seconds, until the LED starts flashing red/green. Once it has GSM connection it will be flashing again (or stays on continuously).

As long as the unit is in program mode, the status green LED is on (or flashing 1 sec. on/1 sec. off if the module has no configuration). During the first 3 minutes, the GSM module remains active, ready to receive SMS commands. After 3 minutes a time-out

occurs and the GSM module switches off in order to save the batteries. The unit returns to the low power operational mode.

## **2.5 PROGRAM AT LEAST ONE TELEPHONE NUMBER**

The Mobeye WaterGuard is able to send messages up to 5 telephone numbers. The first telephone number (TEL1) belongs to the administrator. Technical messages (such as *battery low*) are sent to the administrator only. Without the administrators' phone number, the Mobeye WaterGuard cannot function.

When the WaterGuard is in initial (factory) status and the batteries are inserted (so the LED is flashing), the administrators' number is programmed by calling the telephone number of the Mobeye WaterGuard using the administrators' phone. The unit will recognize this number and store it as administrator (TEL1). The administrator will receive a confirmation SMS text message including the security code. This code is needed to program the other settings in the unit.

NB: For this way of programming the number recognition in the administrator's phone must be 'on'. To program or change the administrators' number by SMS command, please refer to 4.2.



## 2.6 SWITCHING ON/OFF

After the previous steps, the Mobeye WaterGuard is ready for use. It is armed (switched on) automatically.

In order to switch off (disarm) the Mobeye WaterGuard:

- Press the on/ off button at the upper side for 1 second. The green LED switches off to indicate the disarmed status.

In the disarmed status the Mobeye WaterGuard will not send alarm notifications. The functions automatic arming and sending a 'low battery' message, are still active.

In order to switch on (arm) the Mobeye WaterGuard:

- Press the on/ off button at the upper side for 1 second. The green LED blinks once every 3 seconds (battery-powered) or stays 'on' continuously (in case of an external power supply).

If powered externally (GSM is open), switching can be done via SMS commands:

SMS command to switch on:	CODE ARM
SMS command to switch off:	CODE DISARM
example:	1111 ARM

The status can be requested via SMS command CODE STATUS? (see chapter 5).

## 2.7 CONFIRMATION OF THE ALARM MESSAGE

When the system is triggered it will send alarm notifications. First an SMS text message is sent to all programmed alarm numbers, followed by a phone call. When you pick up the phone, you will hear beeps. It is possible to confirm the phone call by answering the phone and pressing any key. The other alarm numbers will not be called afterwards.

By switching off the 'SMS' function, the system will only call. This prevents the other numbers being notified by SMS.

### 3. USE OF THE INPUTS AND EXTERNAL POWER SUPPLY

#### 3.1 USING THE INPUTS

It is possible to connect external (NO/NC) sensors to the inputs. As a standard reaction after a triggered input, the Mobeye WaterGuard sends an SMS text message to the preset numbers and calls these numbers.

Insert the 2 wires of an external sensor through the hole of the enclosure to the inside part and next in the two connectors of input 1 (press on the green pins for connecting the wires). It does not matter which wire is connected to which connector.

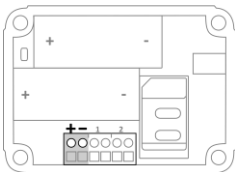
As default the inputs are programmed as Normally Open (NO) contacts. This means the inputs are triggered if the input is closed for at least 1 second. In case the contact is Normally Closed (NC), please refer to paragraph 5.6. If you require the sensor to be activated for a shorter or longer period before triggering an alarm, please refer to 5.7.

When using a second sensor, connect this to input 2.

#### 3.2 USE OF EXTERNAL POWER SUPPLY

Although the Mobeye WaterGuard is designed to run on batteries, it is possible to use an external power supply. In this mode the module is always connected with the GSM network and therefore always in program mode. When the power fails, the batteries take over and a power failure message is sent. The module continues operating albeit in the low power mode. This means the GSM module switches off and only establishes network connection when it needs to send an alarm notification, test message or low battery alert.

Connect the external power adapter (or any other regulated 12VDC power supply) to the power input of the connector (press on the green pins to connect the wires):



- V+ (black lead with white stripe) to “+”
- Ground (black lead) to “-“

## **4. CONFIGURATION**

To program the Mobeye WaterGuard, the GSM module must have network connection. In case only batteries are used, first switch the unit to the program mode. Next send SMS commands for the configuration. All settings are stored and will be kept in the unit, even in case the power supplies are removed.

### **4.1 PROGRAM MODE**

If the unit is connected to an external power supply, the WaterGuard has continuous network connection and the unit is permanently in program mode.

If the unit is battery-powered the program mode can be achieved by pressing the on/off button for 5 seconds, until the LED starts flashing red and green. Alternatively, the program mode can be accessed by (re) inserting the batteries.

First the GSM module establishes network connection. During this time the LED flashes green/red. Normally this takes 10-30 seconds. Once the connection is established the status LED starts flashing 1 sec. on/1 sec. off (or stays on continuously in case the first telephone number has been configured).

In program mode, the device is ready to receive SMS commands. If no correct command is received for 3 minutes, the GSM module switches off in order to save the batteries. The unit returns to the low power operational mode.

The program mode is interrupted by pressing the on/off button for one second until the LED switches off. The unit is switched off completely (disarmed).

## 4.2 THE (SECURITY) CODE

For configuration activities the (security) code of the Mobeye WaterGuard must be used. The initial (security) code is '1111'. You can change the (security) code to your own code. See section 4.4.

## 4.3 PROGRAMMING THE SETTINGS BY SMS

To program the settings by SMS text message:

1. Make sure the WaterGuard is in program mode (please refer to 4.1).
2. Send an SMS text message with the (security) code and the command.
3. The green LED blinks 3 times to indicate the successful configuration. In case of an incorrect command, the red LED flashes 5 times.

SMS messages have the following content: **CODE COMMAND:OPTION**

- Do not forget the space character between (security) code and command.
- The commands are case insensitive.
- Several commands may be combined in one SMS message (with a maximum of 160 characters) by placing a # between the commands.

**CODE COMMAND:OPTION#COMMAND:OPTION#COMMAND:OPTION**

See section 4.4 for a full list of SMS commands.
--

#### 4.4 LIST OF SMS COMMANDS FOR CONFIGURATION

The setting options for the WaterGuard. The commands are case insensitive.

Setting	SMS Command	Options	Default value
Change security code	INSTCODE:	0000...9999	1111
Set telephone number for alarm messages	TEL1: ... TEL5:		Empty
Delete telephone number	DEL1 ... DEL5		
Identification text	NAME:	20 characters	Mobeye
Call on/off	CALL:	ON, OFF	ON
SMS on/off	SMS:	ON, OFF	ON
Input type input 1	TYPEIN1:	NO, NC	NO
Input type input 2	TYPEIN2:	NO, NC	NO
Input type water sensor	TYPEIN3:	NO, NC	NO
Delay on input 1	DELAY1:	0...999 (sec)	1
Delay on input 2	DELAY2:	0...999 (sec)	1
Delay on water sensor	DELAY3:	0...999 (sec)	30
Inactive time input 1	INACTIVEIN1:	0...60 (min)	0
Inactive time input 2	INACTIVEIN2:	0...60 (min)	0
Inactive time water sensor	INACTIVEIN3:	0...60 (min)	0
Alarm repeat time	REPEAT:	0...24 (hrs)	4
Alarm text water alarm	TEXT1:	20 characters	Water alarm
Text restore water alarm	TEXT2:	20 characters	Water level OK
Alarm text input 1	TEXT3:	20 characters	Alarm 1
Alarm text input 2	TEXT4:	20 characters	Alarm 2
Alarm text power failure	TEXT5:	20 characters	Power failure
Text power restore	TEXT6:	20 characters	Power restored
Power failure delay time	DELAYPOW:	0...999 (min)	0
Power message	POWERMESSAGE:	OFF,ALERT,ALARM	ALERT

Setting	SMS Command	Options	Default value
Actual time	TIME:	hhmm	Empty
Actual date	DATE:	yyyymmdd	Empty
Use of on/off button	BUTTONLOCK:	ON (button locked) OFF (unlocked)	OFF
Low power status	LOWPOWER:	ON, OFF	OFF
Interval 'test SMS'	TEST:	0...30 (days)	0
Time test message	TESTTIME:	hhmm	

Example: Set phone number 1: 1111 TEL1:0712345678 Mind the space behind 1111

## 5. POSSIBLE SETTINGS

### 5.1 PHONE NUMBERS

The Mobeye WaterGuard is able to send alarm messages to up to 5 phone numbers. The first telephone number (TEL1) belongs to the administrator. Only this number receives all system messages. The other phone numbers (including the administrator) only get the alarm messages.

#### To set or change telephone numbers:

SMS command 1<sup>st</sup> telephone number:

example:

**TEL1:**

1111 TEL1:07123456789

... similar for TEL2:, TEL3:, TEL4: and TEL5:

For foreign numbers, start with + followed by the country code (depending on the country leave out the zero for the local area code).

example:

1111 TEL1:+447123456789

#### To delete telephone numbers:

SMS command delete 1<sup>st</sup> telephone number: **DEL1**

example: 1111 DEL1

... similar for DEL2, DEL3, DEL4 and DEL5

### 5.2 IDENTIFICATION TEXT

It is possible to add a standard identification text (NAME) to all messages sent out by the Mobeye WaterGuard. The alarm messages are a combination of the name and the alarm text. A user defined identification has a length of maximum 20 characters. The default identification text is 'Mobeye'.

SMS command identification text:

example:

**NAME:**

1111 NAME:my Mobeye device

### 5.3 ALARM TEXTS

Unique alarm texts can be programmed into the Mobeye WaterGuard. User defined texts have a maximum length of 20 characters.

Following default texts are programmed:

Text 1 (water detection):	Water alarm
Text 2 (end of water detection):	Water level OK
Text 3 (input 1):	Alarm 1
Text 4 (input 2):	Alarm 2
Text 5 (power failure):	Power failure
Text 6 (power is restored):	Power restored

SMS command text water detection: **TEXT1:**

SMS command text end water detection: **TEXT2:**

Similar for TEXT3...TEXT6

example: 1111 TEXT2:water level is OK

NB: text 5 and 6 are only valid at POWERMESSAGE set to 'ALARM'.

### 5.4 SMS ON/OFF

By default, the Mobeye WaterGuard sends alarm notifications via text message and calls (you will hear a beep signal) to the preset contact persons. By turning off the SMS, the unit will only call after a triggered input.

SMS command enable / disable SMS: **SMS:ON** or **SMS:OFF**

example: 1111 SMS:OFF

### 5.5 CALL ON/OFF

By default, the Mobeye WaterGuard sends alarm notifications via text message and calls the preset contact persons. By turning off the CALL, the unit will only send an SMS text message as alarm notification. It is not possible to switch off both the SMS and the call.

SMS command enable / disable call: **CALL:ON** or **CALL:OFF**

example: 1111 CALL:ON



## 5.6 INPUT TYPE

As default behaviour the Mobeye WaterGuard sends out an alarm after detection of a water based fluid. If the water level in a tank needs to be monitored, the WaterGuard needs to send out the alarm as soon as the sensor detects the absence of water. As default the input type IN3 is set to NO (normally open); for alarming the absence of water, IN3 needs to be changed to NC (normally closed).

SMS command input type water sensor:     **TYPEIN3:NO** or **TYPEIN3:NC**  
example:                                    1111 TYPEIN3:NC

The input type defines the character of the inputs IN1 and IN2. This can be Normally Open (NO) or Normally Closed (NC). In case an input is set to NO, the alarm will be triggered as soon as the terminals of the input are closed. If the input is set to NC, the alarm is triggered when the connection between the input terminals is broken. The default input type is set to NO.

SMS command input type input 1:           **TYPEIN1:NO** or **TYPEIN1:NC**  
SMS command input type input 2:         **TYPEIN2:NO** or **TYPEIN2:NC**  
example:                                    1111 TYPEIN1:NC

## 5.7 ALARM DELAY TIME

The input delay time defines the time that the input is triggered before an alarm is initiated. If the input returns to the non-alarm status within the delay time, no alarm is sent. The time can be set between 0 and 999 seconds. As default, the input delay time is set to 1 second for inputs 1 and 2 and 30 seconds for the leak sensor.

SMS command alarm delay input 1:         **DELAY1:**  
SMS command alarm delay input 2:         **DELAY2:**  
SMS command alarm delay water sensor:   **DELAY3:**  
example:                                    1111 DELAY1:999

## 5.8 INACTIVE TIME

The "inactive time" defines the time an input is not active after an activation. During the inactive time, no new alarm message will be sent. Only when the input returned to the non-alarm status, gets activated again and remains active, an alarm will be sent yet after the inactive time. If the time is set to "0" (minutes), the input will be active again immediately after returning to the non-alarm status. The time can be set between 0 and 60 minutes. As default, the inactive time is set to "0".

SMS command inactive time input 1:           **INACTIVEIN1:**  
SMS command inactive time input 2:           **INACTIVEIN2:**  
SMS command inactive time water sensor:   **INACTIVEIN3:**  
  example: 1111 INACTIVEIN2:45

## 5.9 ALARM REPEAT TIME

In order to emphasize the urgency of the alarm messages, all alarms can be repeated. As long as the input has not returned to the inactive status, the SMS alarm will be repeated after the 'alarm repeat time'. The time can be set between 0 and 24 hours. As default the alarm repeat time is set to 4 hours.

SMS command alarm repeat time:           **REPEAT:**  
  example: 1111 REPEAT:20

## 5.10 POWER FAILURE DELAY TIME

If the Mobeye WaterGuard is powered externally and the power fails it can notify the contact person(s). The power failure delay time defines the time between the initial power failure and the alarm notification. If the power is restored within the delay time, no alarm is sent. The time can be set between 0 and 999 minutes. As default, the delay time is set to 0.

SMS command power failure delay time:   **DELAYPOW:**  
  example: 1111 DELAYPOW:15



## 5.14 TEST MESSAGE

The Mobeye WaterGuard can send regular test SMS messages (*keep alive*) to the administrator (first phone number), to ensure the proper functioning of the unit. The test message function is only active if the unit is armed.

The timing of the test message is determined by the time of programming. The test time can also be programmed.

The interval between the test messages can be set between 0 days (no test message) and 30 days. The default test interval is set to 0 (no test message).

SMS command interval test message:      **TEST:**  
example:                                      1111 TEST:21

## 5.15 SYSTEM RESET

To reset the Mobeye WaterGuard to its factory settings:

1. Remove the batteries (and external power supply).
2. Press the outside button while reinserting the batteries. Keep it pressed for (about) another 5 seconds.
3. Release the button immediately after the LED starts to flash.
4. If relevant, connect the external power supply.

After a successful reset, the status LED on the keypad will blink green to indicate that the module is not configured. The security code is back to factory settings as well.

## 6. REQUEST LIST OF THE STATUS, SETTINGS AND SIGNAL STRENGTH

Several lists and status reports can be retrieved by sending an SMS text message to the Mobeye WaterGuard, from any telephone. Before sending the request, make sure the unit is in the program mode (please refer to 4.1).

Upon sending the command, the Mobeye WaterGuard returns an SMS text message to the originator of the request. The commands are case insensitive.

### STATUS REQUEST

The status can be requested by sending following SMS text message. The status includes the armed/disarmed status, status of the inputs, power and batteries.

SMS command status request:           **STATUS?**  
  example:           1111 STATUS?

### LIST OF SETTINGS

The settings can be requested by sending following SMS text message:

SMS command list basic settings:       **SET?**  
SMS command list advanced settings:   **SETA?**  
SMS command list of texts:           **TEXT?**  
  example:           1111 SET?

### LIST OF PHONE NUMBERS

The list of telephone numbers can be requested by sending following SMS text message:

SMS command list of phone numbers:   **CALL?**  
  example:           1111 CALL?

### GSM SIGNAL STRENGTH

The signal strength of the used mobile network can be requested. If the network is weak, it is advised to use a SIM card of another network provider or an external GSM antenna (a Mobeye accessory). The GSM signal strength can be requested by sending following SMS text message:

SMS command request GSM signal:       **NETWORK?**  
  example:           1111 NETWORK?

## 7. MOBEYE INTERNET PORTAL

The Mobeye WaterGuard sends GSM messages to the preset contact persons. It is also possible to connect the system to the Mobeye Internet Portal. In this secured internet environment the Mobeye WaterGuard system(s) can be administered.

The portal offers various functions:

- 1) the portal forwards alarm messages to contact persons (SMS and/or mail), which are set in the portal. The receivers of alarm messages may be different from the receivers of technical messages. Alarm phone calls will still be done directly from the Mobeye WaterGuard.
- 2) the name and location can be set in the portal. This name is used in SMS and mail messages.
- 3) the device settings can be programmed through the internet portal or via SMS command.
- 4) once connected to the internet portal, test messages (*'keep alive'*) will be sent regardless the armed or disarmed state. The portal will check the receipt of test messages ('keep alive'); when the message was not received on time, it sends an exception message.

Look at [www.mobeye.eu/portal](http://www.mobeye.eu/portal) for more information.

## 8. TECHNICAL MESSAGES AND STATUS FEEDBACK

### Technical messages

In the event of technical issues the administrator receives an SMS message. Possible technical messages are:

Message	Reason
Low batteries, external power supply OK	Power is available, batteries need to be replaced.
No external power supply, batteries OK	No external power supply, batteries are able to take over operation in low power mode.
Low batteries, no external power supply	No external power supply, batteries need to be replaced.
External power supply OK, batteries OK	The external power is restored (or the adapter is plugged in a socket), batteries do not need to be replaced.
(delayed message)	If (delayed message) is added to the SMS text messages, the message couldn't be sent earlier, due to a SIM card failure or GSM network failure.

When receiving one of the above mentioned technical messages, please take appropriate action as soon as possible. During the battery replacement, the SIM card does not have to be removed.

## Status feedback

LED pattern	Status	Required action
Blinking green, 1 second on / 1 second off	Module not configured	Configure at least one telephone number.
1 green flash every 3 seconds	Module is switched on, powered by batteries	No action required.
Green LED stays on continuously	Module is switched on, powered by an external source	No action required.
Flashing red/ green every second	Module establishes network connection	Wait until the network connection is established.
2 flashes red, every 3 seconds	No GSM connection	Try the SIM card in any mobile telephone; replace SIM card using other telecom provider; try the module at another location.
3 flashes red, every 3 seconds	No valid SIM card or wrong PIN	Try the SIM card in any mobile telephone; remove PIN code; check credit; replace SIM card.
Blinking 3 times green	Successful programming action	No action required.
Blinking 5 times red	Faulty programming action	Check SMS command.
4 red flashes every 3 seconds	Low batteries	Replace both batteries.



## Technical specifications

GSM	: Quad band EGSM, 850/900/1800/1900 MHz
Batteries	: 2* CR123 (lithium)
Battery life in normal mode	: >1 year (battery operated) >2 years (external power supply)
Ext. power connection	: 12 VDC (+/- 2 VDC) / min. 500 mA (optional)
Power consumption low power	: ca. 50 $\mu$ A stand-by / max. ca. 500 mA
Power consumption 12V	: ca. 50 mA stand-by / max. ca. 500 mA
Dimensions	: 80 x 60 x 40 mm
Ambient temperature	: -10 °C until +50 °C

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## Declaration of Conformity

Herewith we, Mobeye, declare that the

**Mobeye CM21 telemetry module**

And the derived products

CM2000, CM2100, CM2200, CM2300, CM2300-FS, CM2410, CM2500, CM2600,  
CML2015, CML2025, CML2055, CML2255, CML2275, CML2285, CMVXI-R

are in compliance with the essential requirements of the following European standards / EU Directives:

**Directive 73/23/EEC** (low voltage directive)

**Directive IEC/EN 50130** (Electromagnetic compatibility)

**Directive 2014/53/EU (RED)**

The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonized standards:

EN 60950-1: 2006 + A11 : 2009 + A1: 2010 + A12: 2011 + A2: 2013  
EN 62311 :2008  
EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0  
EN 301 511 V12.5.1

Mobeye  
Poeldouckweg 5  
5216 DX 's-Hertogenbosch  
The Netherlands

Name: Jack van de Vijver  
Position: General Manager  
Signature: 

Date: 12 July 2017



