RockAIR Mk1 Manual

A manual for the RockAIR tracking and messaging device

Version 2

Last update: 22nd May 2017

ROCK SEVEN
LOCATION COMMUNICATION

Overview

RockAIR is a dual-mode Iridium/cellular tracking and messaging device. It can transmit its position from anywhere on Earth. Primarily designed for carry-on use in light-aircraft and dashboard mounting in vehicles.

This document describes the physical properties, features, and how to use the RockAIR.

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Change Log

Date	
18th January 2017	v0. Initial Version
10th May 2017	v1. Added features summary, completed other sections, corrections based on firmware changes advised
22nd May 2017	v2. Diagrams and remaining items added

Orientation

Your unit is equipped with both Iridium & GPS antennas located on the top part of your casing. For the best results it is important to be mindful of the orientation of your device when in use. To ensure good satellite signal, the antennae should be clear of obstructions and have a clear view of the sky. It should be mounted on a relatively flat surface, antennae side pointing upwards.

Examples of obstructions include large metal or carbon-fibre objects above the RockAIR, being inside a building, or anything which creates a visible blockage between the top of the RockAIR casing and the sky. In these instances, it would be best to reposition your device so that it can have a clear view.

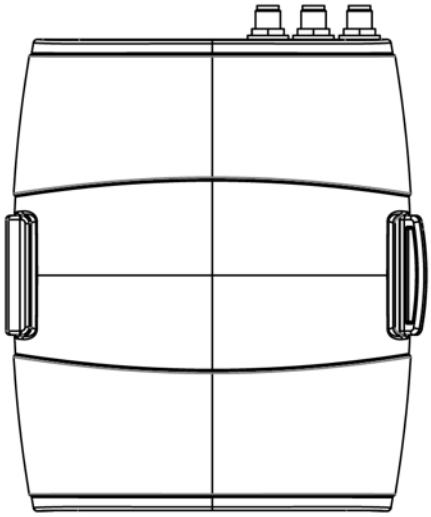
The typical mounting position for the RockAIR is on the dashboard of your aircraft/vehicle, allowing a clear view through the visor/windshield.

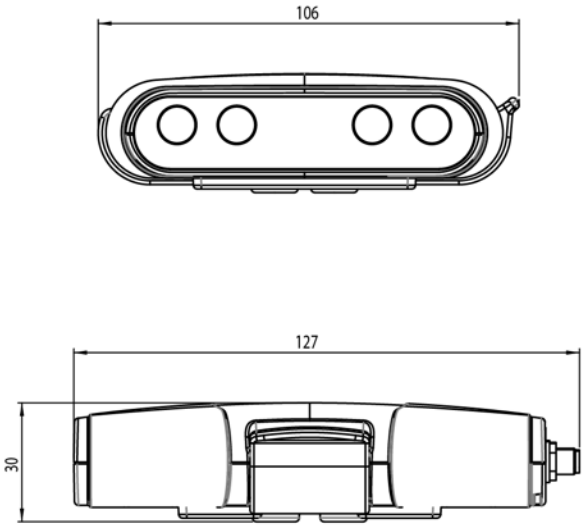
An example of a good mounting position in a helicopter, showing a clear view of the sky through the windshield.

If you are unable to position the unit anywhere with such a view, you may wish to consider installing the external antennae kit - please discuss this with your account manager, ideally before purchase.

Physical Specification

	Unit on own	With Quick Release Clip	With External Antennae
Width:	100 mm	+6mm	+0mm
Length:	119 mm	+0mm	+8mm
Height:	25 mm	+5mm	+0mm
Weight:	210g	+22g	+15g





Dual Mode Cellular/Iridium

RockAIR units are also equipped with Cellular/GPRS, which may or may not be enabled subject to your monthly tariff (ask your account manager if you are unsure). If GSM is enabled, the RockAIR will try to transmit over the cellular network first, and will transmit over Iridium if that fails.

Cellular transmissions are significantly cheaper than satellite based transmissions, and so this provides an option to lower running costs if you spend time in cellular coverage areas. Where no cellular coverage is available, Iridium will be used, which works everywhere on Earth.

The RockAIR can also transmit at different rates when in cellular coverage versus satellite-only (e.g. faster in cellular areas, more slowly when transmitting over Iridium) - this is controlled via the Cellular Profile (see the Profiles section later in the manual for details).

Powering the RockAIR

The RockAIR can be powered in multiple ways:

- ☐ Using a Micro-USB cable (provided in the box)
- ☐ Using an external power source (12/24v DC)
- ☐ Running on internal batteries (temporary use only)

The internal battery will recharge whenever the RockAIR is connected to either USB power or the 12/24v external power source.

If you are powering the unit using the micro-USB cable it is important to use a reputable USB adaptor which can provide at least 1.3A @ 5v.

The Buttons & LEDs

(1) Activate / Deactivate / Suspend

To activate the unit and start tracking positions being sent, press and hold the power button for 2 seconds. The LED will light up, and will show a solid green light to indicate your unit is active and tracking is enabled.

To deactivate the unit, press and hold the power button for 2 seconds again. The LED will turn off, indicating that the unit is now deactivated. When deactivated, no tracking positions, waypoints or messages will be sent.

You can temporarily suspend tracking by a short press on the button. When tracking is suspended, the LED will flash quickly - to unsuspend tracking, press the button again, and the LED will show a solid green light. Note, when tracking is suspended, no routine tracking positions will be sent - however, you can still send alerts and waypoints (see 2 & 3 below).

(2) Watch Mode

Watch mode is designed to give you more peace of mind in certain situations.

When enabled, it will ensure an automatic alert is raised if your provider decides your activity is abnormal (irrespective of whether you raise a manual SOS). Different providers may monitor activity in different ways - for example, some may only alert if tracking data stops being reported for a certain amount of time, others may employ more sophisticated monitoring such as altitude level drops and extreme bank/roll monitoring. Please speak to your provider to determine what activity is monitored when you enable 'watch mode'.

To activate watch mode, press the watch button. The LED will start flashing quickly. At this point the RockAIR is sending a message to your provider, requesting that you wish to be 'watched', and awaiting confirmation that their system has received your watch request.

Once RockAIR receives confirmation from your provider, the LED will show a solid green light. You are now actively being watched, and if routine tracking information stops being sent an automatic alert will be raised.

To deactivate watch mode, press and hold the watch button for 2 seconds. The LED will start flashing slowly. At this point the RockAIR is sending a message to your provider, requesting that you do not wish to be 'watched' any longer, and is awaiting confirmation that their system has received your 'stop watch' request.

Once RockAIR receives confirmation from your provider, the LED will go off. You are now back in normal operating mode, and your provider is **not** actively monitoring your transmissions.

(3) Waypoint/Mark

Sometimes you may wish to mark an interesting spot or waypoint for later review. The RockAIR enables you to do this easily using the Mark button.

Pressing the Mark button will make all four lights flash, requiring you make a choice of which 'type' of waypoint you wish to mark (1, 2, 3 or 4). If you press button 1, then the point will be registered as type 1 etc. Your provider will display these waypoints on the mapping for later review.

Once a waypoint type has been chosen, a GPS fix will be taken at your current location, and will be sent along with the waypoint type to your provider for later review on the map.

(4) SOS Alert

Pressing the red alert button will trigger an alert message to be sent to your provider, and the LED will flash constantly indicating your RockAIR unit is now in 'alert mode'.

Depending on the arrangements you have with your provider, this may alert your own predefined responders, or may alert the emergency services. Check with your account manager if you are unsure who will be alerted in the event of a button press.

Whilst in alert mode, your RockAIR will be transmitting tracking information based on your Distress Profile. See 'Profiles' later in the manual for more information on this.

To cancel your alert, you can either:

- [ ] Press and hold the alert button for 4 seconds
- [ ] Deactivate your RockAIR unit (see button 1)

Reset

In rare situations you may be requested by support staff to perform a 'hard reset' of your RockAIR unit. To do this, you hold down button (1) for 8 seconds.

When the unit has been successfully reset, all of the lights will flash 3 times and it will beep to indicate the unit is ready for use again. Resetting can take up to 60 seconds after the buttons have been released.

Keypad LED brightness adjustment

Depending on your installation, you may wish to adjust the brightness of the LED indicators.

Press and hold the two middle buttons ('Watch' and 'Mark') for 2 seconds. All of the LEDs on the keypad will light up.

You can then use the 'Watch' button to cycle through the five different brightness options.

When you have chosen the most suitable setting, press any of the three other keys ('Power', 'Mark' or 'Alert') to go back to normal operating mode. The LEDs will go back to their previous states, at the new brightness setting.

Tracking Features

The primary function of the RockAIR is to report its GPS position on a regular basis.

In normal operation, the RockAIR will establish a GPS fix, and then try to transmit that fix back to your provider for monitoring and later review.

Tracking Frequency

You are able to select how often your unit transmits a position - the slowest option is once per 24 hours, the fastest is 30 seconds via satellite, and 15 seconds via celluar. Note, extremely quick transmissions via satellite will depend on how good a view of the sky your RockAIR has.

Burst Mode

Burst mode is a special tracking frequency that allows the RockAIR to collect a GPS fix every X seconds, and then transmit a batch of positions at a slower rate (e.g. fixes every 5 seconds, transmit once per minute).

Activity Sense

In all activity sense modes the tracker will switch to the burst mode settings when 'activity' is detected, and use the normal tracking frequency when activity is 'not' detected. Activity is normally motion, but in the case of the 'power' mode, activity is when external power is applied:

POWER - burst mode is activated when external power is applied and normal mode when running on battery.

BUMP - will use the accelerometer to detect bumps, and will activate the burst mode whilst it's 'bumping'

SOG - will turn on the GPS chip all the time, and activate burst mode when SOG is over 4mph (but uses lots of battery).

BUMP+SOG - is kind of between the two. It will trigger burst mode when it detects bumping, and THEN turn on GPS, and will keep burst mode going until SOG goes below 10 knots.

Some notes:

Bump is good for walkers, and something which is continuously bumpy, such as a 4x4 car.

SOG is good all the time, but uses a lot of power as has to have GPS on all the time.

Bump+SOG gives optimum power usage when the aircraft initially is 'bumpy' on tarmac to activate it, but then in cruise is smooth (and so needs the SOG mode to keep burst going).

Tracking Profiles

The RockAIR can send tracking information at different rates, depending on its status. For example, if transmitting data over the cheaper cellular network then it could be set to transmit every 5 minutes, whilst transmitting only every 15 minutes via satellite.

These settings are controlled using ‘Profiles’. Each profile allows you to set a tracking rate, and also a ‘burst mode’ tracking rate.

There are three profiles - Cellular, Iridium & Distress:

Profile Name	
Cellular	Used when the RockAIR has cellular coverage, and the cellular mode is set to ‘GPRS Preferred’ or ‘GPRS Always’
Iridium	Used when the RockAIR does not have cellular coverage, and/or the cellular mode is set to ‘Never’
Distress	Used when the alert button has been pressed on the RockAIR and the unit is in ‘alert mode’

Alert Features

Button alert

Pressing the red alert button on the keypad will trigger an alert message to be sent to your provider, and the LED will flash constantly indicating your RockAIR unit is now in 'alert mode'.

Depending on the arrangements you have with your provider, this may alert your own predefined responders, or may alert the emergency services. Check with your account manager if you are unsure who will be alerted in the event of a button press.

Whilst in alert mode, your RockAIR will be transmitting tracking information based on your Distress Profile.

Dead Man's Switch alert

This function requires a physical button press every X minutes to ensure you are still present and able to respond. The Dead Man's Switch alert is OFF by default.

When the timer runs out, the LEDs on the two middle buttons will flash, and the unit will beep. You are required to press either of the two middle buttons within 20 seconds to **prevent** an alert being sent.

If you do not press either of the two middle buttons to cancel the alert, the RockAIR will be put into alert mode. Whilst in alert mode, your RockAIR will be transmitting tracking information based on your Distress Profile.

Cancelling an alert

If you have inadvertently set off an alert, you are able to send an alert cancellation message.

To cancel your alert, you can either:

- [ ] Press and hold the alert button for 4 seconds
- [ ] Deactivate your RockAIR unit (see button 1)

Depending on the arrangements you have with your provider, this may completely cancel the alert automatically, or you may still be required to take further action to confirm you are safe and the alert was accidental - please check with your account manager if you are unsure.

Power Loss alert

This is a one-time alert which will notify your provider if your RockAIR unit has lost external power. It will not put the RockAIR into distress mode, and cannot be cancelled.

The power loss alert function is OFF by default.

Messaging & Configuration

Using a companion 'app' on an iOS/Android smartphone or tablet you are able to configure your RockAIR's settings. The RockAIR device is capable of sending and receiving short messages and other types of communication via the app.

The standard RockAIR app is called 'RockCONNECT' and you can download this from the iOS App Store or the Google Play Store (depending if you have an Apple or Android device). Other providers may have their own bespoke apps which work with the RockAIR.

Please check with your provider if you are unsure which app you should be using, and to get a manual for the app.

In all cases, the default PIN code (which is required to configure the RockAIR via the app) is 1234.

Settings and Options

GPS Settings

Early Wake Up

By default the RockAIR will try to transmit 'on the minute' - so for example, if set to hourly transmissions, it will try to transmit at :00 past the hour, if set to 5 minute transmissions it will try to transmit at :00, :15, :30, :45 etc.

In order to do this, the RockAIR wakes up slightly earlier than the transmission time to allow it to establish a GPS fix. The default is for it to wake up 20 seconds beforehand.

This default can be changed using the 'early wake up' setting.

NOTE: This only applies when running on battery power alone, when the RockAIR is running on external power the GPS chip is permanently 'on'.

Mode (2D / 3D)

The RockAIR requires a certain quality of GPS fix before it is allowed to transmit data. One of the options is whether it accepts a 2D or 3D fix. A 3D fix generally has more accurate altitude data but requires more GPS satellites to be in view.

By default the RockAIR requires a 2D fix. However, given the RockAIR is usually powered at all times, in the vast majority of cases 3D fixes will be sent.

Fixes before accept

RockAIR requires a certain number of 'good' GPS fixes in a row before it will accept the fix and transmit. This setting controls how many consecutive 'good' fixes are required. The default is 5.

Hot Status

This setting controls whether the GPS chip is permanently powered during battery-only operation. By default when running on battery, the GPS chip will only be turned on for short periods controlled by the 'early wake up' period defined earlier.

Note: During powered operation, the GPS chip will always be on, so the Hot Status will be ignored.

Mailbox Checking

Whenever RockAIR transmits information via satellite, it will also check whether there are any messages waiting to download. This suits most modes of operation, and there is often no need to use specific 'Mailbox Checking'.

However, if you are predominantly running in cellular mode, you may wish to have the unit check-in with the satellites every so often, just to download any messages waiting for you, since otherwise you may not get them.

To do this, you would turn on Mailbox Checking and set the Frequency to suit your preference.

Again, for most customers, this feature is not required or useful, and excessive mailbox checking will incur satellite costs. Refer to your provider for more information on this and for specific advice.

External Accessories Settings

External Power Availability

When connected to an external power source, RockAIR will keep its GPS chip and Iridium modem powered at all times. This enables it to maintain an accurate GPS fix more easily, and also means it will receive messages from Iridium more quickly.

At times you may wish to use your device without external power, but by default this will have the side-effect of turning off the GPS/Iridium when not being used to send a position.

If you wish to ensure GPS and Iridium stay on permanently when running on battery alone, you can set External Power Availability to 'Unlimited'. This will deplete your battery more quickly.

This setting can also control whether your device comes on automatically when external power is applied, and deactivates itself automatically when external power is disconnected. To do this, you would change the setting the 'Unlimited + Activation'. Some may prefer this mode of operation, as it removes the need for the operator to remember to activate/deactivate the tracker - for example, for automated tracking of flights in aircraft.

Note: When set to Automated Power Mode, as a safety measure the unit will not be deactivated automatically unless the GPS speed is lower than 10 knots. For instance, in case power is lost during a flight we assume it is desirable for tracking to continue even though external power is not present.

Serial API

All RockAIR units have a RS-232 serial interface which can be used to send custom data strings. Please refer to the Serial API documentation, and also to your provider who will be able to guide you in the correct way to use this feature.

External Switches & Switch Input Sensitivity

RockAIR has 5 switch inputs which can be used to fire specific 'events'. For example, you could wire a switch input to a door switch, to fire an event each time a door is opened or closed.

Please refer to your provider on the correct way to use these switch inputs, how to wire them, and how to setup the input sensitivity for your application.

Features & Options Summary

Below is a table detailing all of the features and setting options of the RockAIR, and any specific notes regarding the use of these options.

Area	Feature	Options	Notes
Tracking	Status	On / Off	
	Satellite Frequency	15 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 8 min, 10 min, 12 min, 15 min, 30 min, 1 hour, 90 mins, 2 hours, 3 hours, 4 hours, 6 hours, 8 hours, 12 hours, Burst Mode	Frequency of position reports during normal satellite-based operation
	Distress Mode - Frequency	As above list of options	Frequency of position reports during distress mode operation
	Cellular Mode - Frequency	As above list of options	Frequency of position reports during normal cellular-based operation
Tracking / Advanced	Burst Fix Period	5 sec, 10 sec, 15 sec, 30 sec, 30 sec, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min	Frequency of GPS fix taken when in Burst Mode & Satellite-based operation
	Burst Transmit Period	1 min, 2 min, 5 min, 10 min, 15 min, 30 min, 60 min	Frequency of transmission when in Burst Mode & Satellite-based operation
	Distress Mode Burst Fix	As 'Burst Fix Period' list	Frequency of GPS fix taken when in Burst Mode & Distress Mode

Area	Feature	Options	Notes
	Distress Mode Burst Transmit	As 'Burst Transmit Period' list	Frequency of transmission when in Burst Mode & Distress Mode
	Cellular Mode Burst Fix	As 'Burst Fix Period' list	Frequency of GPS fix taken when in Burst Mode & Cellular-based operation
	Cellular Mode Burst Transmit	As 'Burst Transmit Period' list	Frequency of transmission when in Burst Mode & Cellular-based operation
	Activity Sense Status	Off, Power, Bump, SOG, Bump + SOG	Refer to earlier section on Activity Sense modes
	Activity Sense Threshold	18-54	Used for 'bump' mode only 18 =~ 1G force 54 =~ 3G force
	Transmission Format	Standard, Compact, AES	Defines the format used to transmit data. Standard = default.
Alerts	Notify	None, Audible	Method of notification for messages
	Collision Alert Status	Off, On	Alert if collision is detected
	Collision Duration	1ms, 2ms, 5ms, 10ms, 20ms	Period over which force is measured for collision alert
	Collision Threshold	1G, 2G, 4G, 8G, 12G, 16G	Force required for collision alert (over above period)
	Geofence Status	Off, Simple, Polyfence	Alert based on device position
	Geofence Centre		Allows setting of single internal circular geofence position centre
	Geofence Distance	25m, 50m, 100m, 250m, 1km, 2km, 3km	Radius for internal geofence alert based on above centre position
	Geofence Check Frequency	1min, 2min, 3min, 5min, 10min, 15min, 30min	Frequency device checks position against internal circular geofence as set above
	Power Loss Status	Off, On	Alert if external power is lost

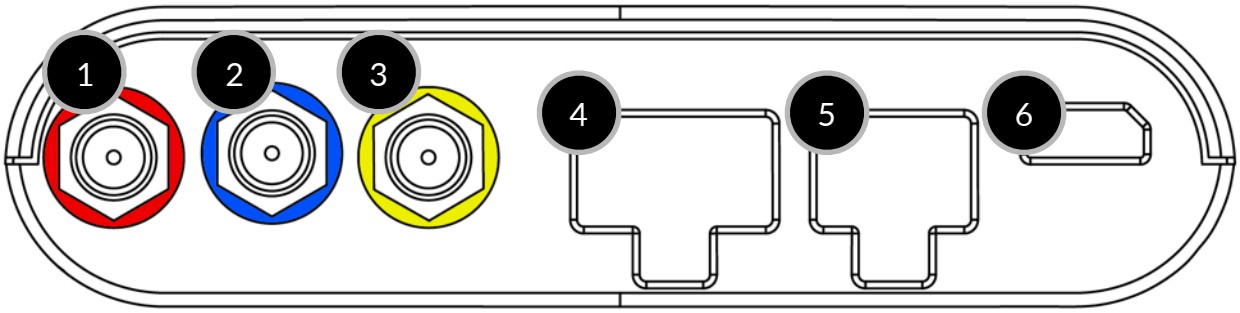
Area	Feature	Options	Notes
	Temperature Check Frequency	1min, 2min, 3min, 5min, 10min, 15min, 30min	Frequency device checks temperature for temperature alert
	Temperature Alert Status	Off, On	Alert based on device temperature
	Cold Temperature	-40 to +50 in 5 degree increments	Temperature below which alert will be sent
	Hot Temperature	-40 to +50 in 5 degree increments	Temperature above which alert will be sent
GPS	Early Wakeup	20 sec, 40 sec, 60 sec, 120 sec, 180 sec, 240 sec	How many seconds before the required transmission the GPS chip is 'woken' to achieve a fix.
	Mode	2D, 3D	Whether the device requires a 2D or 3D GPS fix before it will transmit a position (tends to give more accurate positions, certainly with respect to altitude)
	Fixes before accept	1 fix, 5 fixes, 10 fixes, 20 fixes	How many 'good' GPS fixes in a row are required before the device will transmit a position
	Hot Status	Off, On	Whether the GPS chip is kept powered at all times (helps fix speed and accuracy, reduces battery life)
Mailbox	Check Status	Off, On	Whether the device schedules regular 'mailbox' checks with the Iridium satellites. Not often used, since transmitting over satellite will also do a mailbox check by default each time.
	Check Frequency	5 min, 10 min, 15 min, 20 min, 30 min, 60 min, 90 min, 120 min, 180 min, 140 min, 360 min, 480 min, 720 min	How often the device will conduct a mailbox check with the satellites, regardless of transmission frequency or satellite/cellular mode

Area	Feature	Options	Notes
External Accessory	External Power Availability	Unlimited, Limited, Unlimited+Activate	See earlier notes on External Power Availability modes
	MOB Watcher	Off, On	Reserved, not for general use
	Serial Mode	Always on (no options)	
	Baud Rate	4800 - 115200	
	Sample Rate	5 sec, 10 sec, 20 sec, 40 sec, 60 sec	Sampling rate for compatible external devices
	Input Sensitivity	All Fast, 0/1/2 Fast, 0/1 Fast, 0 Fast, All Slow	Switch input speed sensitivity. Please refer to your provider for help with this option based on your installation.
	GPRS Strategy	Never, Always, Preferred	How the device will switch between Cellular and Satellite. Never means it will never use cellular. Preferred will use cellular whenever available, switching to satellite if not available.. Always will never use satellite.

Ports & Wiring Diagrams

There are three main ports on the back of the RockAIR, and optionally 3 SMA connectors if you have the version with external antennae.

From left to right on the back of the unit:

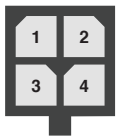


1. Iridium antenna (red SMA connector)
2. GPS antenna (blue SMA connector)
3. Cellular antenna (yellow SMA connector)
4. Switch input port (Molex)
5. Power/Serial port (Molex)
6. Micro USB port (5v power)

Blown up connection diagrams

ROCKAIR
global tracking and messaging device

DC Power & Serial connections



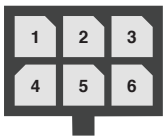
Molex 43045-0408

1	+Ve (12/24 DC)	Black	
2	-Ve (Ground)	White	
3	RS232 Tx (Output)	Green	
4	RS232 Rx (Input)	Red	

***colours refer to Molex over-moulded Microfit 3.0 cables*

IMPORTANT!
Diagrams are drawn as the headers are seen when looking at the rear panel.

Switch (alert) connections



Molex 43045-0608

1	Input 4
2	Input 2
3	Input 0
4	Input 3
5	Input 1
6	Ground

ROCK SEVEN
LOCATION COMMUNICATION

Compliance Information

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1) This device must accept any interference and;
2) This device must accept any interference received including interference that may cause undesired operation

Changes or modifications not expressly approved by Rock Seven Mobile Services Ltd. could void the user's authority to operate the equipment.

Europe (R&TTE Directive)

Declaration of Conformity to R&TTE Directive, 1999/5/EC:

- Hereby, Rock Seven Mobile Services Ltd, declares that this RockAIR is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
- Rock Seven Mobile Services Ltd, vakuuttaa täten että RockAIR tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
- Hierbij verklaart Rock Seven Mobile Services Ltd, dat het toestel RockAIR in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG
- Par la présente, Rock Seven Mobile Services Ltd, déclare que ce RockAIR est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables
- Härmed intygar Rock Seven Mobile Services Ltd, att denna RockAIR står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
- Undertegnede Rock Seven Mobile Services Ltd, erklærer herved, at følgende udstyr RockAIR overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF
- Hiermit erklärt Rock Seven Mobile Services Ltd., dass sich dieser RockAIR in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet
- ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Rock Seven Mobile Services Ltd, ΔΗΛΩΝΕΙ ΟΤΙ RockAIR ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ
- Con la presente Rock Seven Mobile Services Ltd, dichiara che questo RockAIR è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
- Por medio de la presente Rock Seven Mobile Services Ltd, declara que el RockAIR cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE
- Rock Seven Mobile Services Ltd, declara que este RockAIR está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

A signed copy of the full Declaration of Conformity is available from:

http://www.rock7.com