User Guide

FlatMesh 3G Gateway

FM3G-HSPA
FM3G-HSPA-T
FM3G-HSPA-A

Senceive
Wireless condition monitoring

0.03

Contents

Warnings

> ⚠️ **Warning**
>
> Protection provided by the equipment may be impaired if used in a manner contrary to this user manual.

> ⚠️ **Warning**
>
> Keep a minimum distance of 20cm between the 2G/3G antenna and the human body during normal operation.

> ⚠️ **Warning**
>
> Do not attach any unapproved power source. If in doubt, contact the equipment supplier.

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 Senceive Limited could void the user's authority to operate the equipment.

This equipment must be professionally installed. Only the supplied antennas are to be used with the equipment.

This product must not be disposed of in the normal waste stream. It contains a battery pack and electronic components and so should be recycled appropriately.

In accordance with the WEEE guidelines, customers in the European Union may return the product free of charge for recycling at the end of its life. Contact your supplier for details.

Chapter 1

Overview

1.1 The FlatMesh System

A FlatMesh network consists of a number of nodes connecting to one gateway device. In some situations circumstances multiple networks may be required on a single site, for example a site which exceeds the number supported by a single Gateway, or a site where there are a set of separate measurement zones.

The FlatMesh 3G Gateway is a fully integrated unit which provides all the functionality required to operate a FlatMesh wireless sensor network in a remote location. This document describes the functionality of the gateway only.

1.2 FlatMesh 3G Gateway

The gateway is capable of communicating with nodes over the FlatMesh network, operating on the 2.4GHz ISM band. It will buffer samples collected from sensor-enabled nodes and transmits data over the cellular network. The gateway supports both traditional 2G networks (GPRS) and 3G networks (UMTS/HSPA+).

This device has an internal Lithium Ion battery, which will last around 3 weeks on one charge. Your gateway will be provided with either a power supply, solar panel or booster pack to keep the internal battery charged.

1.3   Product Specifications

1.3.1   Physical Specifications

Dimensions excluding antennas	218 x 68 x 126 mm
Dimensions including antennas	390 x 68 x 126 mm
Total Mass	1.1 kg (approx.)
Housing Material	Die cast aluminium body ASA polymer lid rated to UL94HB Die cast aluminium lid (optional)
International Protection Marking	IP67
Mounting Options	Pole mount integrated with enclosure Wall mount bracket available separately
Operating Temperature Range	-30°C to +75°C

1.3.2   FlatMesh Radio Specifications

Communication Type	Proprietary FlatMesh v3 Mesh Networking Protocols IEEE 802.15.4 compliant
Frequency Band	2400 - 2485 MHz ISM Band
Maximum Transmit Power	6.2dBm (EN 300 328 v1.8.1)
Maximum Antenna Gain	4dBi
Range	Up to 300m depending on the environment Consult with Senceive for your application
Maximum Network Size	Typically up to 100 nodes Consult with Senceive to determine the optimal system configuration
RF Module	Senceive FM3Gateway
FCC ID	2AMFBFM3G

1.3.3   Cellular Radio Specifications

Frequency Bands for GSM/GPRS/EDGE	850/900/1800/1900 MHz
Frequency Bands for UMTS/HSPA+	800/850/900/1900/2100 MHz
Output Power	Class 4 (+33dBm) for EGSM850 / EGSM900 Class 1 (+30dBm) for GSM1800 / GSM1900 Class E2 (+27dBm) for GSM 850/900 8-PSK Class E2 (+26dBm) for GSM 1800/1900 8-PSK Class 3 (+24dBm) for UMTS 800/850/900/1900/2100, WCDMA FDD BdI, BdII, BdVIII, BdV, BdVI
Maximum Antenna Gain	+0.89 dBi
Supported SIM Cards	3V and 1.8V
RF Module	Gemalto PH8-P
FCC ID	QIPPH8-P

1.3.4   Internal Battery (Standard)

Battery Type	Lithium Ion, rechargeable
Nominal Voltage	3.6V
Nominal Capacity	8800mAh
Typical Runtime without charge	21 days
Charging Temperature Range	0°C to +40°C

1.3.5   Internal Battery (-T Version)

Battery Type	Lithium Ion, rechargeable
Nominal Voltage	3.6V
Nominal Capacity	8000mAh
Typical Runtime without charge	19 days
Charging Temperature Range	-30°C to +60°C

1.3.6 Power Input

Recommended Solar Panel Type	12V 20W
Target Voltage for MPPT	15.0V
Maximum Input Voltage	32.0V
Input Voltage for Charging	12.0V - 32.0V

Chapter 2

Installation

The gateway will be delivered to you pre-configured. Simply affix the gateway device to a structure within range of the rest of the network. It is recommended that the gateway be placed in the centre of the network with line of sight to at least two nodes to improve network reliability.

2.1 Mounting

There are two mounting options for the gateway - a clamp fixing for a pole, or a bracket which can be fixed to a wall or strapped to a pole.

> ⚠️ **Warning**
>
> The gateway has a total approximate mass of 1.1kg. Please ensure that the object you are fixing to can handle this load. Ensure that appropriate methods and materials are used when affixing equipment to a wall.

The gateway should be installed with the antennas uppermost. This is key to ensuring the best radio performance for both the Flat-Mesh network and for the cellular connection.

2.1.1 Wall Bracket

The tags at the top and bottom of the bracket may be used to affix the gateway to a wall with screws (not supplied.)

The slots in the middle of the bracket may be used in conjunction with hose clamps (sometimes known as Jubilee clips) to secure the gateway to a horizontal or vertical pole.

Figure 2.1: Wall Bracket

2.1.2   Pole Mounting

Use a 13mm A/F spanner to clamp the gateway to a vertical pole. The standard clamp will accommodate pole diameters of XXX - YYY millimetres.

Figure 2.2: Pole Clamp

2.2   Power

The gateway has an internal Lithium-Ion battery which when fully charged will allow the device to operate for 2-3 weeks. For continued operation, you will have been supplied with either a solar panel or mains power supply.

The three-pin power input connector can be found at the bottom side of the unit, to the left of the human interface port.

Engage the power connector and turn the collar to lock in place.

Figure 2.3: Power connector

2.3   Antennae

There are two distinct antennae which must be connected to the correct N-type socket on the device. The antenna/socket pairs are labelled *2.4GHz* and *2G/3G*.

Check

It is very easy to accidentally cross-thread the antenna connection. Be sure to align the connectors properly before screwing together.

Figure 2.4: Antennas fitted to enclosure

Chapter 3

Access Port

The access port is located on the bottom of the gateway next to
the power connector. Unscrew the clear plastic cover (by hand if
possible to avoid damage.) There is a Micro USB socket, pushbut-
ton and three indicators which can be used to give a basic indiction
of the function of the network.

When finished with the Access Port, replace the cover:

- Screw the cap into the port until the gasket touches the en-
  closure

- Tighten the cap an additional 45° (or $\frac{1}{8}$ of a turn)

3.1 Active Node Count

The pushbutton and indicators may be used to show the number of
nodes currently active on the network. Press the button briefly, and
the blue indicator will illuminate. Then count the number of orange
and red flashes. The number of nodes active on the network is given
by *OrangeFlashes* × 10+ *RedFlashes* × 1.

3.2 USB Port

The gateway provides a Micro USB B socket for attachment to a
Host device, which can either be a personal computer or a tablet.
Contact your supplier for a software package to use with this con-
nection.

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Chapter 4

Maintenance

The product should not require any maintenance after installation.

If the need to clean the product should arise, use only a damp cloth and mild detergent. Do not use any solvents as this may damage the enclosure.

> ⚠️ **Warning**
> Only service personnel authorised by the manufacturer may open the enclosure.
> No user serviceable parts are located inside.

Chapter 5

Support

For assistance and support, contact your supplier or the manufac-
turer:

Senceive Limited
Phone: +44 (0) 207 731 8269
Email: support@senceive.com
Web: http://www.senceive.com

Appendix A

Export Restrictions

Appendix B

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Phone: +44 (0) 207 731 8269

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