Sigfox Access Station Micro
SMBS-T4

Product manual

September 2018

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Acronyms

Acronyms/abbreviations	Meanings
AC / DC	alternating / direct current
DC (radio access mode)	Duty Cycle
DL	Downlink
ETH	Ethernet
FH	Frequency hoping
ISM	Industrial, Scientific and Medical
LBT	Listen before talk
PoE	Power over internet
RF	Radio frequency
RX	Reception mode
SDR	Software-Defined Radio
TX	Emission mode
UL	Uplink

1. Product presentation

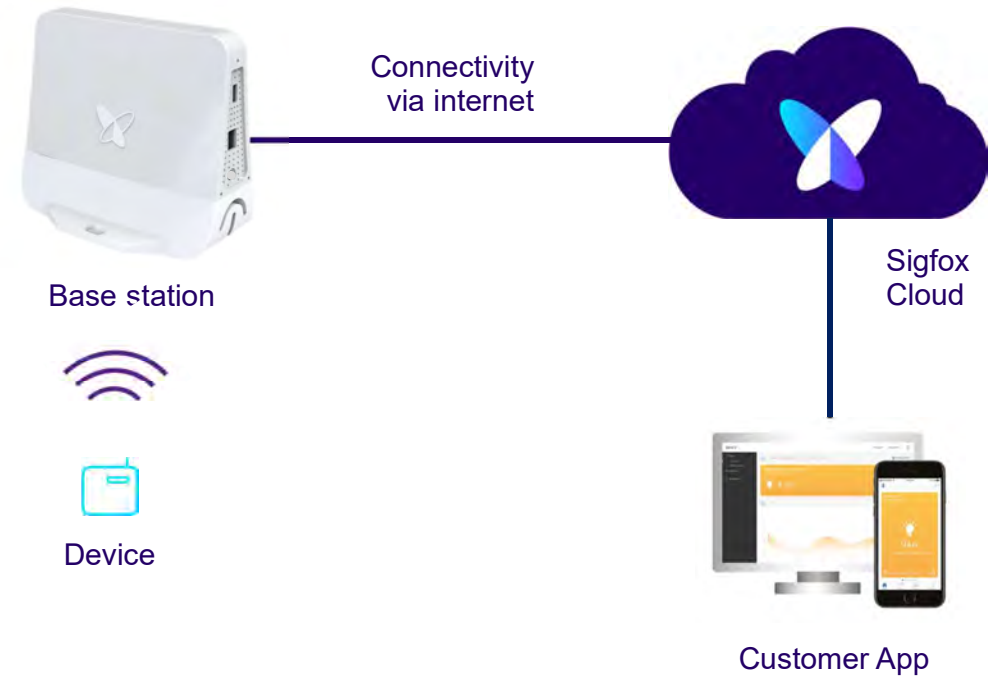
Sigfox Access Stations operate on a specific frequency bandwidth used by sigfox devices. They perform mainly receiving operations (uplink), but are also able to transmit information by doing downlink operations upon device request

The Access Stations Micro include a complete system described in the network overview below.

Sigfox Access Station Micro series are ultra-wide range, high linearity transceivers units and feature first class performance radio and innovative software defined processing, for use in Ultra Narrow Band Machine-To-Machine wireless communication systems.

Sigfox Access Station Micro system has a pre-set receiver frequency depending on the radio regulation applicable in the region. This choice is made by a specific software configuration.

2. Network overview



3. Package contents

- Sigfox Access Station Micro SBMS-T4
- Mounting kits (2 ties and 2 set of screws and anchors)
- PoE DC injector
- Ethernet cable CAT6 1.5m
- Power adaptor 110/220V AC to 24V DC 18W
- Quick Start Guide / Safety Notice

Accessories available separately:

- USB cellular dongle 3G (ref: MS2131i-8-SIG) or 4G (ref: MS2372h)
- Sealing cover

4. Installation site recommendation

Access Station Micro has been developed for indoor and outdoor operation.

Note: For outdoor operation, the adjunction of sealing cover is mandatory to insure waterproofness (see §4.4).

4.1. Equipment

For temporary location, the base station is perfectly stable sitting on a table, a desk or a shelf.
For a more permanent installation, we recommend wall or pole fixation

A drill/screwdriver may be required if the station is to be installed on a wall.

4.2. Coexistence with another RF equipment

As any radio equipment, Access station micro should be installed with proper decoupling precaution versus other radio transmitters. Should the quantified decoupling recommendation listed below be infringed, the access station micro would enter degraded operation, including coverage reduction.
Decoupling protection is usually expressed in dB, however for practical reasons, this guide presents decoupling recommendation in terms of physical separation.

Co-location of access station micro on Telco site or with third party SRD/ISM systems operating on the same band is forbidden.

Regardless the type of installation, the base station must be installed away from obstacles possibly altering the reception, and so that it must not receive more than -20dBm signals from 0 to 821MHz and from 925MHz to 2.5GHz.

General recommendation for outdoor installation would be to not place the Access Station Micro in direct line of sight of broadcasting equipment or cellular station.

For indoor installation, place the station in a different room as other RF equipment, when possible install the station on a different floor.

Use of cell phones in direct vicinity of the Access Station Micro will not affect neither its range, nor its quality of service.

In case of third party equipment in close proximity, with line of sight visibility and horizontal alignment, following physical separation is recommended:

System type	Minimum physical separation	
	indoor	outdoor
100KW Broadcast (FM or digital TV DBV-T)	1000m	3000m
Cellular macrocell (N x 2kW panel)	100m	300m
Cellular pico station	2m	N/A
868-925 MHz SRD / ISM equipment	100m	1000m
Wi-Fi	1m	1m

4.3. Site selection

Radio performance will depend on site configuration. Whatever the type of installation, the station should be clear of massive obstacles or metallic surface within 1m, since possibly altering operation.

Indoor:

If the station is to cover a building on several floors, it is recommended to place it mid-height of the building, but generally in the upper part of the room or area to cover.
The station should not be used within a metallic closet or in a technical room with metallic door.
Avoid placing the Sigfox devices in the same room as the station.
Should all the devices be at close proximity, check with the local Operator how to remotely adjust sensitivity.

Avoid installation on the last floor in case of cellular BS on the roof and away from windows to reduce RF interferers from cellular/broadcasters”

When installed vertically on a wall, the connector must be facing downward.

Outdoor:

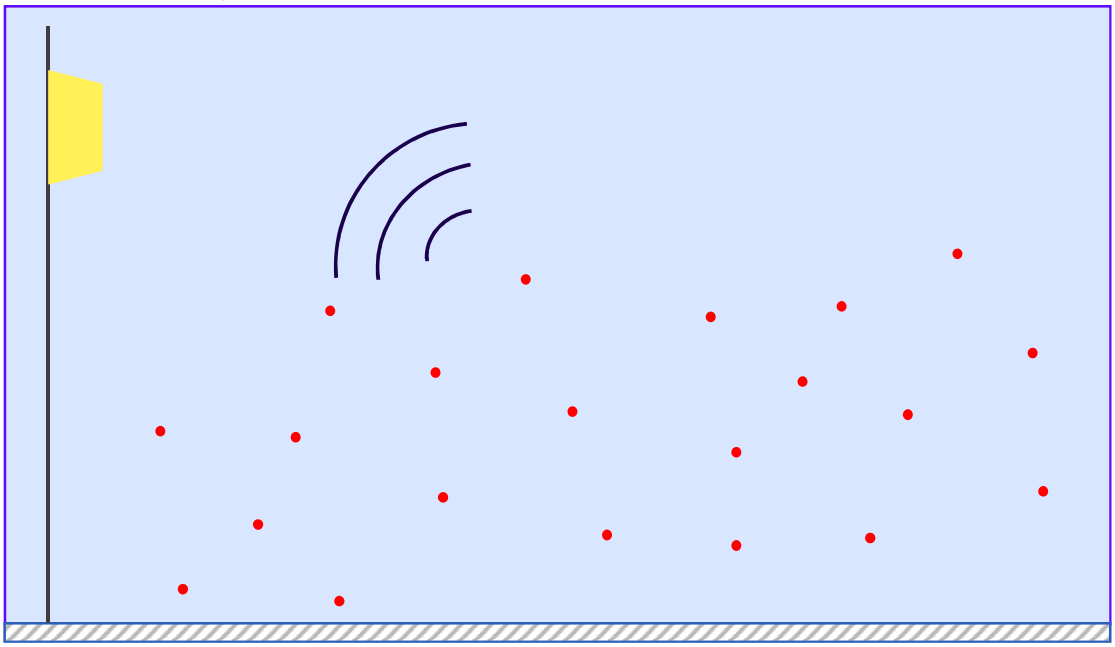
It is recommended for pole and wall installation to place the Access Station Micro **above**, **in the periphery of and facing** the connected devices for best result.

In case the selected site is located in the centre of the area to be covered, the station can be placed horizontally on its base.

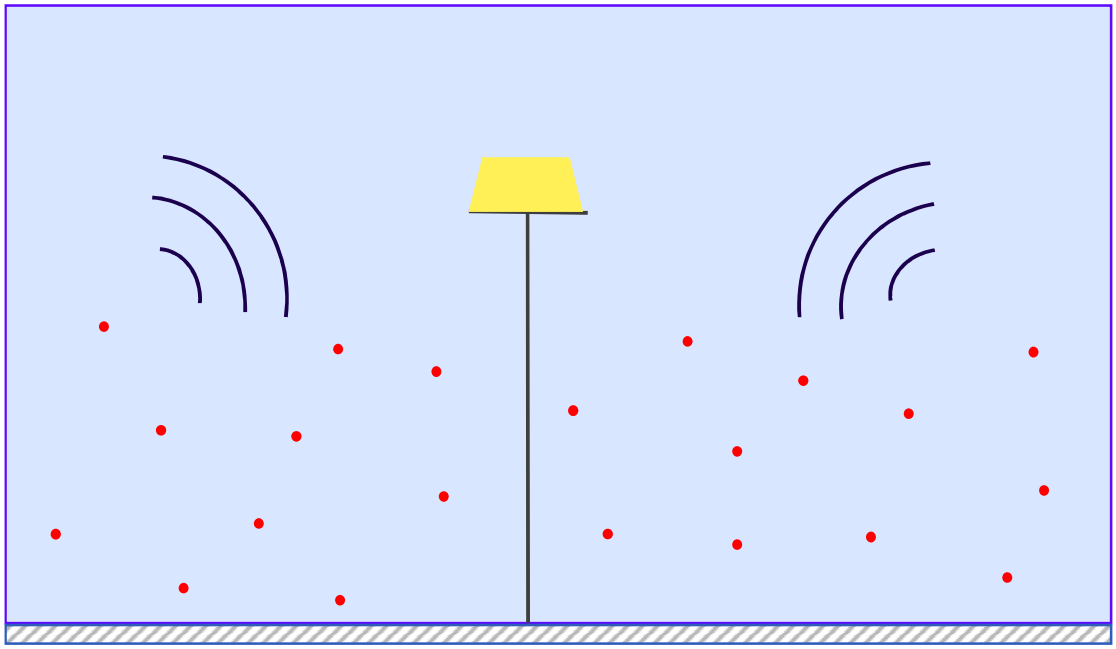
See on the drawings below the area of devices to be covered in blue.

Device to be covered Access Station Micro

Side view for pole or wall installation



Central position



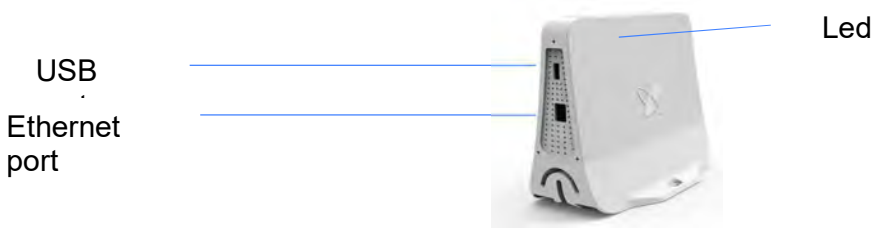
4.4. Outdoor protection

To install the Access station micro outside, or in an environment exposed to high humidity, dust, or even to prevent thief, you must use the sealing cover to protect the connectors and the USB dongle if used.
The sealing cover provides an Ingress Protection IP65.

Ethernet cabling must be Cat5e or above, suitable for outdoor use (with drain wire).
For more details in cable types and maximum length see the power supply § 5.2

5. Connection and commissioning

5.1. Interface



5.2. Power supply

The station is powered with a PoE. The PoE splitter is integrated in the station. The power is conveyed from the AC/DC adapter through the DC injector and the ETH cable.

The equipment must be compliant with safety, EMC country regulations. Customers may need that to re-confirm that the whole system complies with the EMC directives

5.2.1. Input requirement

Power supply: PoE (passive) 24V DC and 0.75A

Nominal voltage range: 11V DC to 26V DC from the supplied PoE injector
Station minimum input voltage: 10V DC
Max input current: 1A

Injector DC connector: 5.5mm x 2.1mm

5.2.2. Cable length

If using another ethernet cable than the one provided, select a cable CAT5e or above, shielded F/FTP, SF/UTP, SF/FTP.
Cable length depends on the wires diameter and station consumption.
For guidance:

Conditions	Output power supply	Gauge size	max length
All	20Vdc < V < 26Vdc	AWG26	40m
Temp always > 0°C (no heating required)	20Vdc < V < 26Vdc	AWG26	60m

5.2.3. Power consumption

The power consumption depends on the station mode, use of cellular dongle and external temperatures.

Typical: 2.3W (RX mode) or 4W (TX mode) with Ethernet connection.
Average power consumption with warm up mode: 4.8W

Peak comsumption: 7.5W with heating mode

Heating mode: 6.3W (temperature <0°C)

Use of cellular dongle for connectivity: 5W (max)

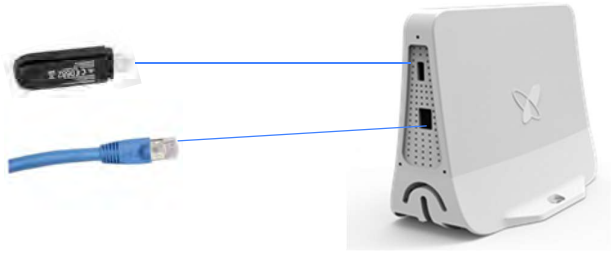
Maximum: 12.5W (cellular + warm up mode + TX mode)

5.3. Connectivity

The primary Internet connection is provided by the ethernet connection of the PoE injector. It can be provided by DSL modem, satellite modem, any kind of backhaul connection or private LAN.
In case of private LAN or direct Backhaul connection, the host network should receive proper configuration in order to allow the IP communication between Sigfox Access station and Sigfox Cloud.

Performance requirement:
Minimum Throughput: 512 Kbit/s (DL) and 128 Kbit/s (UL)
Maximum latency: 2 s

Backup connectivity can be provided with a compatible 3G or 4G USB dongle (see §3 Package contents). Configuration of the cellular connectivity is not yet available via the Sigfox portal and must be done with Access Station tool (see next §5.4 Commissioning).



5.4. Commissioning

Commissioning of the station is done online by the Sigfox Operator via the Backend interface.
Pre-commissioning can also be done with AAT by connecting a suitable phone or tablet to the USB port of the station. Please refer to the AAT user guide for more information.

5.5. LED status

LED	Meaning	Troubleshooting
Off	No power	**Check power supply, injector and Ethernet cable**
Red (for ≈30 secs) Red – Solid (> 1 minute)	Power on Hardware issue	**If the light remains red after 2 minutes, try to unplug and plug again the station. If the problem persists, contact your support.**
Green – Flashing (30 s to 1 min)	Boot up	**If the light remains flashing green after 1 minute, try to unplug and plug again the station. If the problem persists, contact your support.**
Orange – Flashing	Establishing connectivity IP not allocated	**If the light remains flashing orange after 1 minute, check network connection. Check DHCP server and IT configuration**
Orange	Establishing VPN connection	**If the light remains orange after 1 minute, check DNS servers and policy. Check ICMP policy /NTP resolution or remove proxy settings. Check HTTPS connection policy or certificate. Authorise VPN/IPSec policy**
Green – solid	All OK	
Purple – solid	Warming up (temp < 1°) – not in service (max 10 min) Cooling down (temp > 70°C)	

If a cellular USB dongle is used, the led on the USB dongle should be lit or flashing. Please refer to the USB dongle guide.

6. Annexes

6.1. Labels

6.1.1. Product ID

6.1.2. Compliances

Certifications for other countries or regions are still ongoing. New certifications will be added over time, without product modification.
Once the certification has been validated for a country, the product will be compliant even if the label has not yet been updated.
Check the lasted version of this manual or the safety notice for up to date information.

6.2. Specifications

RADIO CHARACTERISTICS	
Standard	Sigfox Ultra Narrow Band Protocol for M2M and IoT
Max range of operating frequencies *	865 to 928 MHz
Receiver Sensitivity	-132dBm @ 100bps / -124dBm @ 600bps
Data Rate and Modulation	100 bps D-BPSK (UL) 600 bps GFSK (DL)
Max Transmit Power * (EIRP)	23 dBm ± 1dB
Antenna	Integrated. Typ. 0dBi, max 3dBi.

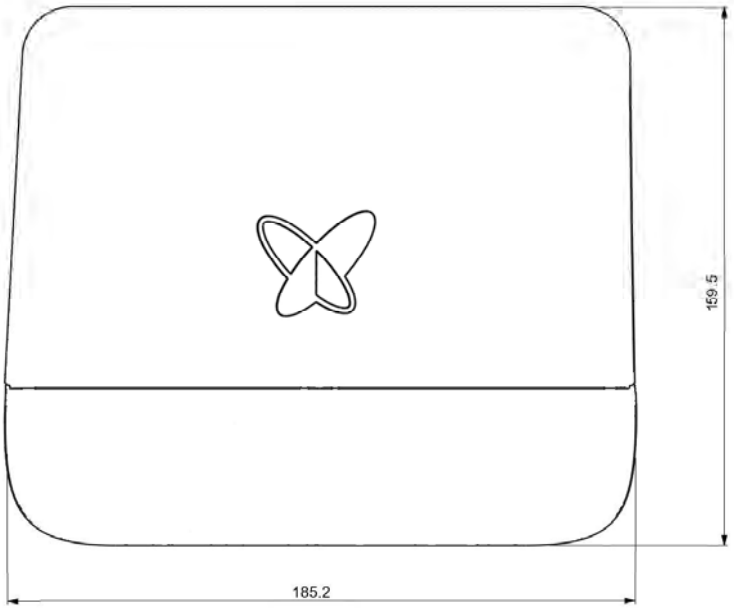
(*)Note: The maximum frequency range and power setting will vary by channel and according to country regulations. Refer to the regulatory groups table for more details.

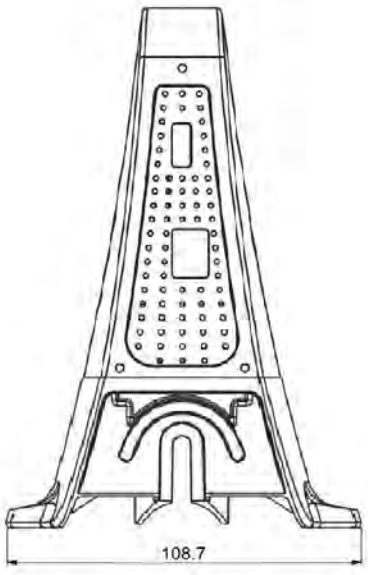
Regulatory groups for SMBS-T4

REGULATORY GROUP	RADIO ACCESS MODE	OPERATING BAND	MAX OUTPUT RADIATED POWER (EIRP)	COUNTRY
A	FH	915-928MHz	23dBm	AUSTRALIA
B	FH	902-907.5 & 915-928MHz	23dBm	BRAZIL
C	FH	915 - 928MHz	23dBm	COLOMBIA URUGUAY
E	DC 10%	869.4-869.65MHz	23dBm	EUROPE (EU) IRAN KENYA LEBANON MAURITIUS OMAN SOUTH AFRICA TUNISIA UAE
H	FH	920-925MHz	23dBm	HONG KONG
J	LBT	920.6-922.2MHz	23dBm	JAPAN
K	LBT	920.8 - 923.4MHz	14dBm	SOUTH KOREA
N	FH	920-928MHz	23dBm	NEW ZEALAND
P	FH	916-928MHz	23dBm	PERU
S	FH	920-925MHz	23dBm	SINGAPORE
T	FH	920-925MHz	23dBm	TAIWAN
U	FH	902-928MHz	23dBm	USA CANADA ARGENTINA MEXICO PANAMA PUERTO RICO

MECHANICAL AND ENVIRONMENTAL	
Product weight	450g (1 lb)
Operating temperatures	-20°C to +55°C
Storage temperatures	-30°C to +85°C
Robustness	MTBF 92,000 hours
Casing material	Plastic ASA/PC

Dimensions (in mm):





Sealing cover: