LANSEN

OMS LTE-M1/LTE-CAT1 gateway battery/mains wM-Bus

DEVICE

The battery or mains powered wireless M-Bus gateway is a highly configurable plug-and-play device used for collecting data from Wireless M-Bus/OMS meters and transmitting the data over a cellular connection. The enclosure is designed to make the gateway as discrete as possible.

PERFORMANCE

Exceptional range, high sensitivity, and strong interference resistance are achieved with advanced transceivers, sharp filtering, and ultra-low-noise amplifiers. A high-performance front-end filter ensures reliable operation even in noisy urban environments, providing excellent blocking near RF transmitters.

ANTENNA

The device offers flexible antenna options to ensure optimal performance in any installation. Both internal and external interfaces are selectable. Internally, antennas are mounted at 90 degrees to utilize both horizontal and vertical polarizations, maximizing range and minimizing multipath issues. Antenna diversity helps prevent signal loss due to polarization mismatches—particularly valuable indoors where meters and gateways may be positioned in various orientations.

External SMA connectors support high-gain antennas for extended coverage or long-distance transmission, whether receiving wireless M-Bus data or forwarding it via cellular communication.

FIRMWARE UPGRADE

The firmware in the gateway can be upgraded over the air.

GATEWAY WITH LANSEN REPEATER

When used with a Lansen repeater, the gateway can optionally extract and include additional routing data from the repeater, such as:

* Signal quality between sensor and repeater
* Which repeater forwarded the message
* Number of hops to reach the gateway

TIME KEEPING

To ensure accurate timing the gateway synchonizes its clock with a configurable NTP timer server on each conection to the network or every 12 hours.

INDICATIONS

Optional sound on first connection to cellular network.
LED indication on wM-Bus message reciever, MQTT connection, wM-Bus radio active, Power on

GATEWAY WITH REPEATERS IN BATTERY NETWORK

In cases where radio shadows block communication between meters and the gateway, a Lansen repeater can be used to bridge the gap.

When using a battery-powered repeater, it is essential that the repeater and gateway are synchronized to be active simultaneously. The Lansen gateway ensures this synchronization is maintained throughout the device's service life, enabling reliable and energy-efficient operation at all times.

CONFIGURATION

Configuration can be done in different ways.
1) Over wM-bus interface using the LAN-WMBUS-D2-TC USB to wM-Bus dongle.
2). Remote configuration using MQTT interface over the cellular connection.
3) Full (not GW5R) gateway version also have a USB-C interface for local configuration.
All interfaces are accessablle using the tool LansenConfigurator

CLOUD

The gateway uses an integrated MQTT client to deliver raw wireless M-Bus packets to an MQTT server, enabling two-way communication with the cloud. If the server is temporarily unavailable, packets are buffered locally for later delivery. Depending on the configuration, all data can be stored persistently to survive power loss.

CONNECTION MODES

Constantly connected (only for mains powered)

MQTT connection to the server is always on. This means it is always possible to change parameters and transmit data to the gateway. Data is transmitted immediately to the cloud when received. If the connection to the MQTT server is down the packets are stored in the flash memory and transmitted when the connection is restored.

#### Interval mode (Battery or Mains powered)

The gateway starts up at a predefined interval, for example:

* Start at 12 pm every day
* Listen for data for 20 minutes and store in the gateway
* Transmit the data to the server at 13 pm.
* Listen for incoming configuration parameters

DATA STRUCTURE

The recieved packets are retransmitted as MQTT packets with recieved data in a M-Bus container with the RSSI and time appended. This way of transmitting data makes it super easy for any M-Bus parser to directly parse the data coming from the gateway.

M-Bus	Gateway ID	Time	Rssi	Meter packet
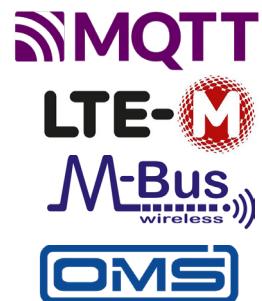
METER INSTALLATION
The gateway supports up to 2000 meters and only retransmits data coming from the devices in the routing list.
The meters can be added manually or automatically.

Manual mode (White-list)
A meter can be added to the gateway manually using the manufacturer and serial number e.g. LAS01234571 or with the complete wM-Bus serial LAS012345671B07

Automatic mode
In automatic mode the meters are added to the list automatically depending on a number of filtering criteria.
- Only add devices from a specific manufacturer, e.g. "LAS".
- Only add devices of a specific type, such as water meters.
- Only add devices from a specific manufacturer and specific type.
- Combine with RSSI filtering to only accept devices that are close to the gateway.

FILTER AND MINIMIZE DATA (SUPRESSION TIMER)
A number of parameters can additionally be used to filter incoming data, reducing both data transfer and memory usage:

Limit reception to one packet per device at defined intervals (minute, hour, day, or week)

- Limit reception by device type (e.g. water meter, heat meter) with individual intervals
- Configure specific devices (e.g. serial number LAS012345671B07) for real-time data
- Choose to transmit only OMS-compatible packets or all received packets

BATTERY LIFETIME
The battery version of the gateway is optimized for long service time with low power consumption. The parameters that affect battery lifetime are:
- Listen time on wM-Bus. (how often and long the wM-bus reciever is active)
- How often data is transmitted using the cellular connection.
- How good the connection is between the gateway and the cellular base station.
- The operating temperature (high or low temperatures will will give shorter battery lifetime).
- How many telegrams to transmit to the server (depends on number meters and the supression timer)

BATTERY SAVING FUNCTION
The gateway is available in a version that have a special function for meters transmitting less often, but still according to the OMS timing algorithm.
In that case the gateway will learn about the transmitter pattern and will only listen when the devices are expected to transmit. this will increase the battery lifetime considerably.
Contact us for more details about this function.

Example:
200 S1 mode meters transmitting every 4 hours.
Reading the meters 30 times / month uploading 30 times/ month. (Daily value)
This would give an expected battery lifetime of approximately 14 years***

LISTEN TIME (MAXIMIZE BATTERY LIFETIME)
To maximize the battery lifetime and still get the data when needed, a number of possible configuration parameters can be used, such as:
- Number of minutes to be active / not active
- Specific time during the day to start listen for meter data (e.g., at 12:30)
- Specific days to be active (e.g., Mondays and Wednesdays)
- Specific day of month (e.g., 1st and 15th) or the first weekday after 1st .
- Suppression timer (limit number of packets stored per meter/week/ day/hour/minute).

SECURITY/ENCRYPTION
To achieve the highest security numerous functions are found.
Cloud security

Encryption	Off or TLS 1.2
Client certificate	Supported
Server (root certificate)	Supported

Login credential
To protect the gateway from unotherized configuation changes 3 different passwords are used.
No password: Can read out all configuration except servers and passwords. No changes can be made.
Level 1 password: As above, but meters can be added and removed. Settings that do not affect battery lifetime.
Level 2 password: As above, but settings that effect battery lifetime, such as listen timer and upload interval can be changed.
Level 3 password: All settings can be changed.

Wireless security
Wireless configuration via the wM-Bus interface is protected with an AES128 key.

Listen / day	How often	Upload interval	Telegrams	Battery lifetime***
5 hours	15 times / month	15 times / month	2000	~9 years.
15 minutes	every day	every day	2000	~14 years
60 minutes	2 times / month	2 times/ month	2000	~20 years

Contact Lansen for calculations on you specific use case

FIRMWARE

INPUT MODE	T+C-mode (default) or S-mode (max bit rate error ± 3%)
OUTPUT MODE	C-mode (default), T-mode or S-mode
MAX SENSORS	2000 sensors
MAX WMBUS LENGTH	255 bytes
FILTERING	0 min to 127 hours suppression timer, RSSI, manufacturer, whitelisting, etc.
SECURITY	Supports recieving of Security Profile A , B and D according to OMS 4 or any message with a wM-Bus header.
STATUS TX INTERVAL	60 seconds on wM-Bus interface

GENERAL INFORMATION

POWER SUPPLY	M: 100-240 VAC, 50/60Hz
OVERVOLTAGE CATEGORY	III (Up to 2000m)
BATTERY	BE: 3.6V, 38000mA battery pack 2xER34615+SPC1550/W Li-SOCl² (replaceable)
APPROVALS	2014/53/EU (RED)
	2014/35/EU (LVD)
	EN 13757-3/4:2013
CLOUD PROTOCOL	MQTT 3.1 (M-Bus compatible data)

CELLULAR

LTE-M1 BAND	B1/B2/B3/B4/B5/B8/B12/B13/B14/B18/B19/B20/ B25/B26/B27/B28/B66/B85
LTE-CAT1 BAND	LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/ B25/B26/B28/B66
	LTE-TDD: B34/B38/B39/B40/B41
ANTENNA	One internal wide bandwidth antenna. X-variant with external SMA connector.
SIMCARD SIZE	4FF/Nano-SIM

STORAGE

TYPE	Flash (survive power loss)
SIZE	~128 Mbit
	~270000 wM-Bus packets can be stored if size is ~50 bytes

POWER

wM-Bus radio	12mA
LTE-M1	Typical 120 - 150 mA in transmission Max 600mA
LTE-CAT1	Typical 120 - 150 mA in transmission Max 900mA

WM-BUS RADIO

RECEIVER CLASS	2
HARDWARE FILTER	For LTE/GSM/GPRS and other disturbances.
RADIATED POWER	~14 dBm (< 25mW)
SENSITIVITY	Down to S/T,C -111 dBm/-108 dBm**
INPUT RF LIMIT	18 dBm
ANTENNA	Two internal diversity antennas X-variant with external SMA connector.

ENCLOSURE

DIMENSIONS	150x150x53 mm,
COLOR	RAL 9003 (signal white)
MATERIAL	UV-resistant PC/ABS
FLAMMABILITY RATING	UL 94 HB

ENVIRONMENT

POLLUTION DEGREE	3
TEMPERATURE	Enclosure:-20ºC to + 60ºC. Radio: -30ºC to +60ºC.
ENCLOSURE IP-CLASSIFICATION	M: IP40 (A1), IP65 (A2)
	BE: IP40 (A1)
	BE: IP65 (A2), external antennas
	BE: IP65 & IP67 (A2), int antennas

ACCESSORIES

LAN-WMBUS-D2-TC	Configuration dongle
LANSEN CONFIGURATOR	Configuration software
LAN-A-PMB-KIT-ID58-78	Pole mounting kit
LAN-MAG-R4	Magnet with telescopic shaft
LAN-R4-IP-KIT	Sealing kit for A2 enclosure
	Antennas
	Antenna cables

OPTIONS FOR LAN-WMBUS-GW5 GATEWAY

LAN-WMBUS-	SERIES	- POWER OPTION	- RECEIVER SENSITIVITY -	ENCLOSURE IP-CLASS	- ANTENNA (wM-Bus) -	CLOUD INTERFACE -	ANTENNA (CLOUD)
	GW5 Gateway gen. 5	**BE** 3.6V/38Ah+supercap	**LR** Improved receiver sensitivity for fantastic robustness and range	**A1** IP40. Suited for indoor use	**(Blank)** Internal antenna	**CATM1**	**(Blank)** Internal antenna
		M 230 VAC		**A2** IP65 & IP67. Suited for indoor and outdoor use	**X** SMA connector for external antenna	**CAT1/4G**	**X** SMA connector for external antenna

Examples	Battery	Typical lifetime expectancy***	Dual w-Mbus Internal antenna	External w-Mbus SMA interface	LTE-M1 antenna	Enclosure
LAN-WMBUS-GW5-BE-LR-A2-CATM1	X	10 years	X		Internal	A2 (IP65 & IP67)
LAN-WMBUS-GW5-M-LR-A2-CATM1-X			X		External	A2 (IP65)

*Lithium < 5g/cell, UN3091 class 9
**The sensitivity can be enhanced using the range extender LAN-WMBUS-FAMP868
***The expected battery lifetime stated is based on simulations and true measurements at 25 C° and is valid to the best of our ability
 but not a guarantee. The calculations and measurements can be sent upon request for your reference.