MG5

Outdoor Mobile LTE Gateway

All in One Connection for Real-Time Visibility.

Datasheet

LTE-**M** **NB-IoT** LTE Cat.1 **Bluetooth**® GPS

PRODUCT OVERVIEW

MG5 Outdoor Mobile LTE Gateway serves as a constant companion to assets throughout the supply chain,working with the Bluetooth low energy tags and sensors, collecting and uploading the Bluetooth data in real-time to your cloud.

It converts vehicle activities into actionable insights for your solutions to boost your business and even revolutionizes supply chain management by ensuring sustained real-time visibility, based on Bluetooth, LTE-M & NB-IoT communications, and GPS tracking, empowering stakeholders to make decisions in a more effective way, to enhance operational efficiency, and to deliver excellent customer experiences.

KEY FEATURES

▬ LTE-M / NB-IoT Network Flexible Switching

MG5 can support two types of medium to low rate cellular communication LTE-M and NB IoT, which can effectively and quickly compatible with local networks in different countries or regions; Also, it can adapt to the requirements of different reporting rates or working modes, in order to flexibly switch network mode, providing effective data for users, and saving power consumption or data traffic costs;

▬ GPS Outdoor & LBS Indoor Positioning Seamlessly

In addition to outdoor GPS positioning and Bluetooth scanning, the MG5 also supports Bluetooth low-energy broadcasting, so that when GPS signals cannot be covered in indoor warehouses and other environments, the presence of the MG5 position can be detected through Bluetooth LBS positioning, achieving seamless switching between indoor and outdoor, ensuring data continuity and visibility.

▬ Gateway Real-time Mode or Tracker Low-energy Mode Switchable

The celluler reporting interval can be configured based on your own working mode; If you need real-time location and temperature status of assets during transportation, you can set up high-frequency without worrying about energy consumption with an external power supply, which is gateway real-time mode; If you prefer low enregy and wireless deployment, the uploading interval can be set once a day, etc which is the tracker low-energy mode;

▬ Amazon AWS, Microsoft Azure, Nordic nRf Cloud, etc.

After adaptation, MG5 supports Amazon AWS and Microsoft Azure, and Nordic nRF cloud services such as FOTA and positioning, effectively promoting the rapid development, hardware compatibility, creative feasibility, and PoC testing and deployment by solution integrators, shortening development cycles, meeting terminal scenario implementation, commercial promotion, etc;

▬ Bluetooth Scanning & Built-in Sensors

MG5 supports Bluetooth communication and data filtering, transmitting environmental sensing data to remote servers, such as Bluetooth signal strength of asset tags, temperature and humidity of cold chain transfer boxes, door open&close, fuel level detection, etc. Under LTE-M network, it supports about 100 Bluetooth tags online simultaneously; In addition, the MG5 has a built-in accelerometer, temperature sensor and a barometer(optional), which can also provide necessary data for solution integrators;

▬ Wide Voltage Power Supply for Real-time Reporting

MG5 supports vehicle wide voltage 8V~52V power supply, effectively ensuring continuous and normal operation of equipment and real-time data transmission. In case of abnormal situations, such as abnormal temperature data from sensors inside the carriage, illegal opening of doors, abnormal ignition of engines, or cutting of external power supply wires, the data will be immediately reported, so that administrators can quickly respond and take remedial measures;

▬ Data Security & Data Back-up in Disconnection & Automatic Reconnection

With MQTT protocal, MG5 supports SSL/TLS data encryption, ensuring data security while uploading complete and effective data. So when the device passes through an environment with weak network access, such as remote roads or underground tunnels, although cellular data cannot be uploaded then, Bluetooth data could be received and saved normally. When the device returns to a normal network area, MG5 can automatically reconnect the base station and cloud server, and resume uploading;

▬ Cellular Module Supports Multi-operator Access & Regulatory Certification

● AT&T, Verizon, Bell, China Telecom, Deutsche,Telekom, KDDI, Telstra,Vodafone, etc.
● GCF, PTCRB, FCC (USA), CE (EUR), UKCA (UK), ISED(CAN), SRRC (CHN), ACMA RCM (AUS),NCC (TWN), MIC (JPN), MSIP (KOR), (IND) and more.

THE BENEFITS OF REAL-TIME VISIBILITY IN TRANSIT

– Enhanced Collaboration & Efficiency

Real-time visibility facilitated by MG5 promotes collaboration and provides accurate and latest information sharing among stakeholders. It enables timely decision-making on transportation, inventory, and labor cost, issue resolution, and improved operational efficiency.

– Improved Traceability & Compliance

The MG5, coupled with ambient IoT sensors or asset tags, provides end-to-end traceability of products during the transit. This helps in complying with regulations, facilitating recalls if necessary or governing safety for foods, pharma drugs and even life-saving vaccines.

– Reduced Theft & Pilferage

The real-time visibility provided by MG5 can help to deter theft and pilferage of products in transit.

– Increased Customer Satisfaction

After shipping, customers are increasingly demanding transparency and traceability for products they shop online. The real-time visibility helps to improve customer satisfaction by letting them know their products are being handled and transported in a safe place and in a right time.

MARKET APPLICATIONS

Smart Logistics   Cold Chain Transportation   Smart Warehousing   Construction Sites   Smart School Buses

APPLICATION SCENARIOS

Next-level Cold Chain Monitoring

Taking cold chain monitoring to new heights, MG5 ensures temperature-sensitive goods integrity with real-time tracking, alerts, and advanced analytics for theoptimal cold chain management.

Pharma Logistics

We address challenges related to limited visibility into temperature conditions during transportation and the need for compliance with strict regulatory guidelines. By offering real-time temperature monitoring, automated alerting, and data analysis, we enable timely identification and correction of temperature fluctuations, ensuring improved pharma product quality and safety.

Dairy Product Transportation

Temperature fluctuations pose significant challenges to dairy product transportation. We tackle this by installing temperature sensors on refrigerated trucks for continuous monitoring and real-time data transmission. Fleet managers receive alerts, enabling proactive measures to prevent spoilage, and resulting in improved product quality, safety, customer satisfaction, and loyalty.

Humidity Alert: 78%
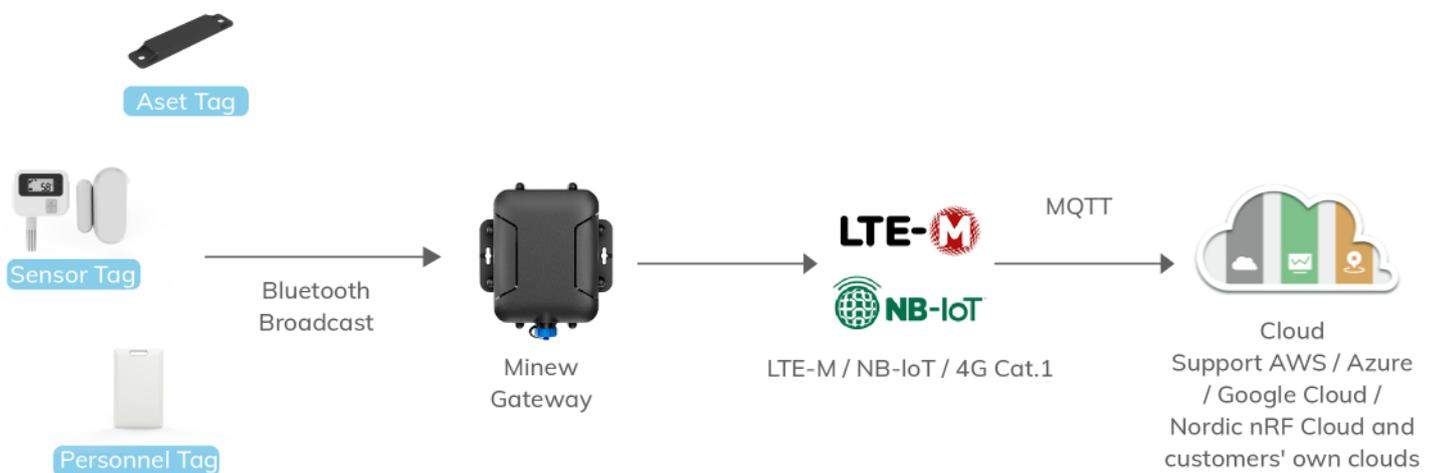Sensor: MST01
Time: 2023/6/8 17:12

Bakery Product Transportation

We address the challenges of bakery product transportation by providing real-time temperature monitoring and alerts. With sensors deployed, we ensure increased visibility into temperature conditions and prompt response to deviations. Real-time analytics enable quick issue identification, while alerts for factors like door openings, power outages, and refrigeration system failures further enhance control.

* **Supplementary Remarks:** Else applications such as equipment presence & inspection on smart construction sites, and detection of school buses and student personnel on smart campuses

WORKING PRINCIPLE

Aset Tag

Sensor Tag

Personnel Tag

Bluetooth Broadcast

Minew Gateway

LTE-M

NB-IoT

LTE-M / NB-IoT / 4G Cat.1

MQTT

Cloud
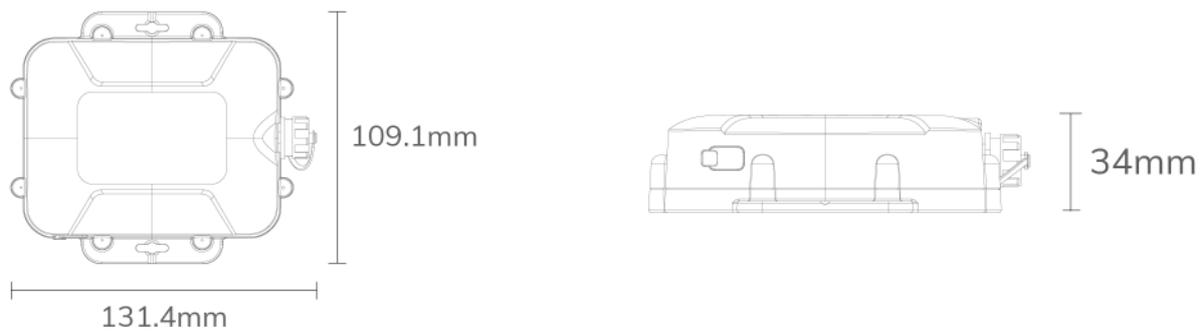Support AWS / Azure / Google Cloud / Nordic nRF Cloud and customers' own clouds

The working principle of MG5 gateway

① Please choose or match the MINEW Bluetooth sensor or asset tags based on the actual needs, as MG5 supports the Bluetooth protocol and other manufacturers' Bluetooth devices can also be compatible.

② Please use the MQTT Assistant tool to configure your own reporting mode based on the actual needs after successfully configuring the network through the Bluetooth App, so that the MG5 can directly use the low-energy mode powered by the back-up battery or the real-time mode powered by the external battery wired.

③ Configure the network among LTE-M, NB-IoT and 4G Cat.1 through App or MQTT; Therefore, MG5 will transmit the Bluetooth data uploading by cellular network; Meanwhile, under normal network conditions, MG5 can also upload its own data including GPS coordinates, temperature, ACC,etc.

④ MINEW will provide an SDK for parsing the reported data, so that customers can process the hexadecimal data on their own server, and finally turn it into JSON format. Then, based on the JSON data format document provided by MINEW, they can develop their own applications.

109.1mm

131.4mm

34mm

PRODUCT SPECIFICATIONS

BASIC SPECIFICATIONS	
Model	MG5
Name	Outdoor Mobile LTE Gateway
Material	PC (UV Radiation Resistance)
Color	Black / Grey (Optional)
Size	131.4 X 109.1 X 34 mm (External Wires not included)
Weight	● Full function product body (including battery) 109.3g; ● Full function product body (including battery and external wires) 318.6g; ● Simplified product body (excluding battery and external wires) 270.6g;
IP Rating	IP68
IK Rating	IK10
Power Supply	● 8V~52V DC Input External Power Supply; ● Built-in rechargeable battery (optional, backup);
Sleep Current	≤1mA
Backup Battery	● High temperature resistant rechargeable battery ≤ 3000mAh (3000mAh By Default);
Flash	32MB(256Mb)
LED	4 pcs included ● LED 1, Blue, Switch / Restart; ● LED 2, Yellow, Cellular; ● LED 3, White, GPS positioning; ● LED 4, Green, charging;
Button	1 pc internal button included ● Turn-on; ● Restart;
Accelerometer	Default built-in
Temperature Sensor	Default built-in ● The device reports internal temp erature and prevents the internal battery charging in extreme temperatures; ● Internal temperature provides an indication of ambient temperature but may not always be precise;
Barometer	Supported, optional
SIM	Nano SIM / eSIM
External Wire Interface	● Positive Power line (Red, Positive Pole): 8V~52V; ● Digital Input Line (Orange): 8V~ 52 V, detects whether the car engine is ignited/started; ● Negative Power Line (Black);
Working Environment	Outdoor environment dedicated desig; Mostly for vehicles or trucks,etc.;
Operating Temperature	● -20~70℃ (Powered by an external battery); ● 0~45℃ (During normal charging for built-in backup battery) ;
Stocking Temperature	-10~40℃ recommended
FOTA	● Bluetooth App OTA; ● MQTT remote OTA;
Configuration	● Bluetooth App Configuration; ● MQTT Remote Configuration;
Transmit Protocal	MQTT Supported
Data Security	SSL / TLS
SDK	Supported (for data parsing in client server)

SMART FUNCTIONS

Power Supply Switching Prompt	When the external power supply is disconnected normally, MG5 automatically switches to backup battery power supply, maintains operation, and reports a switching signal signal. MG5 keeps reporting the latest power supply status data for customer to detect power supply switching.
Tamper Alerts	When the external power supply is abnormally cut off, MG5 reports an abnormal signal.
Real-time Tracking	Under external power supply, MG5 can continuously report by setting real-time mode to achieve real-time asset tracking during transportation.
Device Low Battery Reminder	MG5 can automatically detect the built-in battery level. If the battery level is too low, it can report an abnormality.
Ignition Detection	1 x dedicated ignition digital line input 8V~48V DC detection on / off for engine.
Subrounding Cellular Signal Strength Detection	Support regular detection and reporting of cellular base station signals around the device, providing networking quality parameters to the client.
Subrounding Bluetooth Signal Detection	If there is no Bluetooth signal nearby, MG5 only reports its own data, such as Temp, Acc, GPS, RSRP, etc.
Flexible Adjustment for Reporting Mode	The flexible adjustment for reporting mode adopts a combination of heartbeat reporting and sampling interval, combined with an smart trigger reporting mechanism, for saving energy and selectively monitors data changes in real-time.
Reconnection after Network Down	When it returns to a normal eare from a disconnected situation, MG5 automatically reconnects.
Edge Data Filtering	Data can be filtered based on surrounding Bluetooth sensor signal strength, Mac, and other conditions to reduce invalid data uploading.
Third Party Cloud Services (Optional)	Amazon AWS, Microsoft Azure, Google Cloud, nRF Cloud (Pending)
Geo-fence	Geo-fence can be realized based on the GPS coordinates and other data uploaded by MG5.

COMMUNICATION & RF

BLUETOOTH SPECIFICATIONS

Protocol Version	Bluetooth Low Energy 5.0
Frequency Band	2.4Ghz，40 channels (2400 ~ 2483.5MHz)
Modulation	GFSK
Communication Range	● 100M (328ft) or more for scanning ● 85M (278.8ft) or more for broadcasting (Open environment testing for referance)
Broadcast Interval	Configurable, default by 2 Secs
Scanning Interval	Configurable
Configuration	Supported with App
Throughput	● 10 Bluetooth packets / s for NB-IoT ● 60 Bluetooth packets / s for LTE-M
Antenna	Internal

CELLULAR SPECIFICATIONS

Cellular Connection	LTE-M (eMTC / Cat.M1) NB-IoT (NB1, Default after shippting, Configurable)
Cellular Data Rates	Ideally connection as below: ● LTE-M (eMTC) : Max. 300Kbps (DL); Max.375Kbps (UL) ● NB-IoT (NB1): Max.32kbps (DL), Max. 70Kbps (UL)
Cellular Networks Bands	● 698-960MHz low frequency & 1710-2200MHz high frequency; ● LTE frequency band : B1, B2, B3, B4, B5, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B66;
Cellular Antenna	Internal，full band

GNSS SPECIFICATIONS

Parallel GNSS	GPS + Beidou
Positioning Accuracy	2.5M~10M (16.4~32.8ft, depending on the installation environment and deployment conditions)
Sensity	Cold Start: -148dBm Tracking:-162dBm
Standalone TTFF	Cold Start: ≤32s Warm Start: ≤1s Hot Start: ≤1s
Location Update Rate	Up to 1 Hz
GNSS Antenna	Internal

SOFTWARE & TOOL SUPPORT

Bluetooth Configuration App	APK files can be provided for pre deployment close range configuration, distribution network or firmware upgrades, etc
MQTT Assistant PC Tool	Available for remote configuration or data reading after successful networking, and can be configured to the customer's own server for testing or deployment.
Uploaded Data Parsing SDK	Available for calling in the client server and unpacking the uploaded data and parsing it into JSON format.
Document for Parsed JSON Format Data	Available for illustrating the JSON data format obtained after parsing.
Bluetooth Tags Data Format Document	Available for BeaconPlus or V3 protocol for MINEW's Bluetooth tags.

PRECAUTIONS

Vehicle Internal Mounting	Fix your MG5 inside your trailer engine cabinet, please Try not to set up metal objects on the frontside of the device as much as possible. It is recommended to reserve a clearance area to achieve the best GPS satellite search effect possible.
Tight Contact Between Ground Wire	When connecting the black (ground) wire from the wiring harness, look for bolts, screws, or wires that come into contact with exposed metal on the trailer chassis. Loosen the bolt, slide the grounding wire down, and then tighten the bolt. If your grounding wire does not come into contact with exposed metal, your MG5 will not work. Loose or weak grounding connections may cause inconsistent readings of MG5.
Country/Region	If you use the appropriate global roaming Nano SIM or virtual network operator, please use MG5 in countries or regions that support LTE-M or NB IoT.
Working Environment Temperature	Do not use it for a long time in an environment exceeding 70 ℃, otherwise it may cause damage to the built-in battery or other devices.
Other Document Support	If you need more documents, please consult MINEW sales & technical team for more information.
Preset-APN	APN parameters can be pre-set before shipping, based on the different operators used by different customers in different countries.
Factory Set Network	The device defaults to NB-IoT networking after shipping. When configuring the network, users should combine their own SIM card and modify it to a suitable one, such as LTE-M. The default SIM card for MG5 only supports LTE-M.
Power Wiring for PoC Testing	For customer's PoC testing in the laboratory before deployment in vehicles, it is recommended to use a local 12V/2A AC-DC power adapter and manually connect the positive and negative wires of device in terms of power connection.

INSTALLATION

Red Power Line	Must connect to a your reefer trailers battery 12V DC or above (Positive) contact.
Black Ground Line	Connect ground wire to your trailers' battery (Negative contact) or trailers chassis.
Orange Digital Input Line	● Connect to the car ACC interface, and detect whether the motor vehicle is ignited and started (8V~48V); ● Can be also used as a digital input; ● If there is no usage requirement, it can be ignored;
Easy Mounting	● 3M double-sided tape (recommended); ● Screws; ● Ties; ● Bracket (Optional，not available yet, shown as below figure, 2 images);
Vehicle External Installation	In order to achieve the best GPS positioning and LTE communication performance, MG5 can also be installed outside the vehicle/truck according to the customer's own needs since the device has IP and IK protection, but this will accelerate the aging process of the device and is not conducive to long-term use.

* MG5 with the bracket

* Bracket

Negative Electrode

Positive Electrode

Ignition Detection Line

CERTIFICATIONS

FCC warning:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encour- aged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

Note: MG5 has already been certified by CE FCC, and any other certification can be provided upon request. If other certifica- tions are needed, please contact our sales team.

QUALITY ASSURANCE

The factory has already obtained the certification of ISO9001 Quality System. Each product has been strictly tested (tests include transmission power, sensitivity, power consumption, stability, aging, etc.).
Warranty Period: 12 months from the date of shipping (Battery and other accessories excluded).

DECLARATION

Statement of Rights:

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MINEW

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