



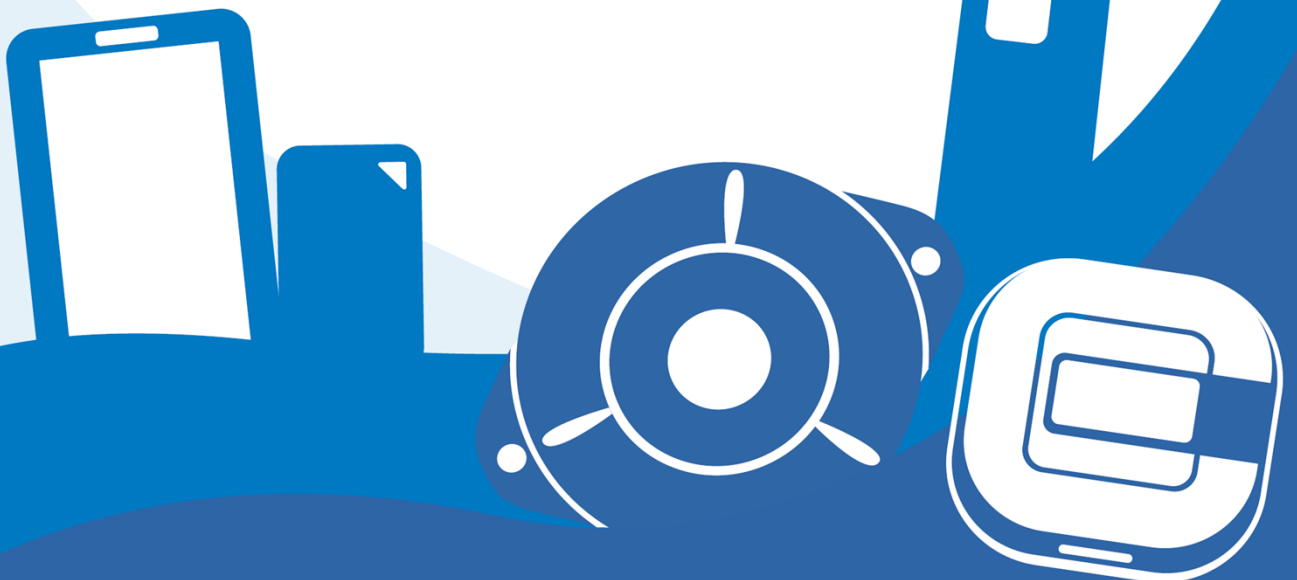
Lansitec LTE Cat.1 Asset Management Tracker Datasheet

Date: 2026-03-19

Rev. 1.1

Document Number: 990-00308

contact@lansitec.com



Contents

1.	General Introduction	2
2.	Abbreviation	2
3.	Features	2
4.	Product Specifications.....	3
5.	Function Description.....	4
5.1	Application Framework.....	4
5.2	Protocol.....	4
5.3	Tracking Feature	5
5.4	Positioning Report Mode	5
5.5	Positioning Process	6
5.6	On/Off and LED Status	6
5.7	Alarm.....	7
5.8	Battery	7
5.9	SIM Card.....	8
5.10	Asset Management	8
5.11	Movement Duration	8
5.12	Temperature	8
6.	MQTT Uplink Message	9
6.1	Registration.....	9
6.2	Heartbeat.....	13
6.3	GNSS Position.....	15
6.4	Beacon	16
6.5	Alarm.....	17
6.6	Configuration Parameter Response	18
7.	MQTT Downlink Message	20
7.1	Tracker Configuration	20
7.2	Query Tracker Configuration Message	22
7.3	Command Request.....	23
8.	Configure the Tracker with a Phone	24
9.	Packaging	24
9.1	Packaging Information	24
10.	Ordering Information.....	25

1. General Introduction

The tracker supports GNSS, Bluetooth Low Energy, and LTE Cat.1 technology. It uses advanced LTE technology and a built-in accelerometer to achieve ultra-long standby time compared to traditional GPRS-based solutions. It supports indoor tracking with Bluetooth and outdoor tracking with GNSS (BDS/GPS/GLONASS) technology. According to your use case, the position acquisition period, the heartbeat period, and the work mode are adjustable.



2. Abbreviation

- **AS:** Application Server
- **IMEI:** International Mobile Equipment Identity
- **IMSI:** International Mobile Subscriber Identity
- **GNSS:** Global Navigation Satellite System
- **MQTT:** Message Queuing Telemetry Transport
- **CEP:** Circular Error Probable
- **TTF:** Time To First Fix
- **NS:** Network Server
- **RFU:** Reserved for future usage
- **RSSI:** Received Signal Strength Indicator
- **PRI:** Position Report Interval
- **UTC:** Universal Time Coordinated

3. Features

- **MQTT/HTTP(S) Protocol**
- **Indoor & outdoor tracking**
- **Movement duration track**
- **Period/Autonomous/On-Demand report mode**
- **Asset management**
- **Temperature report**
- **Flexible Bluetooth positioning**
- **Power Switch Enable**
- **Battery life**
 - 16,000 GNSS coordinates or 30,000 Bluetooth positioning reports.
 - Lifetime> 12 months. (GNSS Interval is 30 minutes)
 - Lifetime> 2 years. (GNSS Interval is 1 hour)
 - Lifetime> 6 years. (GNSS Interval is 12 hours)

4. Product Specifications

Table 1: Product Specifications

Bluetooth	5.0, iBeacon
TX Power	-20, -16, -12, -8, -4, 0, 4dBm
Sensitivity	-96dBm

GNSS	BDS/GPS/GLONASS
Accuracy	2.5m CEP
Cold Start TTFF	30 ~ 120s
Warm Start TTFF	5~10s

Regions	China/India	Europe/Africa	North America	Latin America
FFD	B1/ 3/ 5/ 8	B1/ 3/ 5/ 7/ 8/ 20/ 28	B2/ 4/ 5/ 12/ 13/ 66	B2/ 3/ 4/ 5/ 7/ 8/ 28/ 66
TTD	B34/ 38/ 39/ 40/ 41			
SIM Card	Nano or eSIM			

System	
Max. Current	450mA
Standby Current	45μA
FOTA Over Bluetooth	Support

Battery Life	Please refer to the battery life calculator spreadsheet for details.
GNSS (report interval >3 minutes)	Approx. 16,000 times
Bluetooth positioning	Approx. 30,000times

Physical Parameters	
Dimension	78*79*35mm
Housing Material	ABS+PC
Ingress Protection Rating	IP68
Switch	Button
Operating Temperature	-20°C ~ +65°C
Storage Temperature	-40°C ~ +85°C

5. Function Description

5.1 Application Framework

The tracker supports the **MQTT/HTTP(S)** protocol. It uses the MQTT protocol and the Lansitec MQTT server to communicate with an AS **by default**. Please use the Lansitec server to change the settings when using it for the first time, or contact us to change the default settings upon ordering.

5.2 Protocol

● MQTT

MQTT (Message Queuing Telemetry Transport) is a lightweight messaging protocol widely used in Internet of Things (IoT) contexts, especially suitable for environments with limited bandwidth and unstable networks. Here is a guide to using the MQTT protocol:

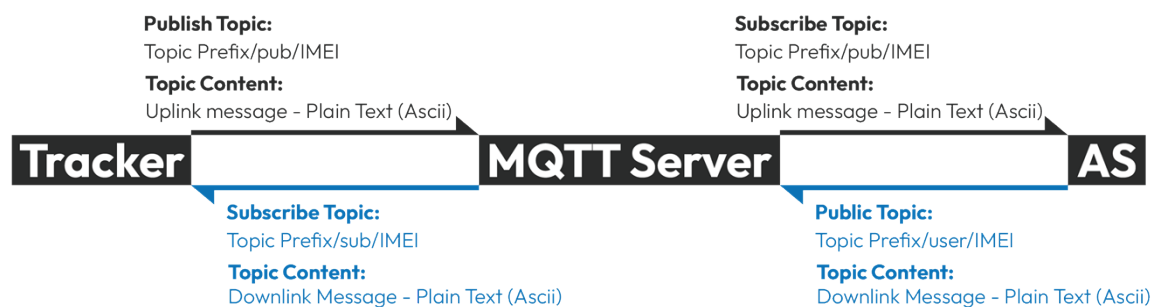


Figure 1. MQTT Application Framework

MQTT Broker: Server IP or URL. (default: `asset.lansitec.com` for test)

MQTT Broker Port: (1~65535) default: 1883.

Publish Topic: `lansitec/pub/IMEI` - This topic is used for pushing uplink data from the tracker. Your application server needs to subscribe to this topic to receive device information. (Data encoding format: ASCII)

Subscribe Topic: `lansitec/sub/IMEI` - This topic is for subscribing to downlink commands. Your application server can push commands to this topic, which will be received by the tracker. (Data encoding format: ASCII)
(IMEI is the tracker device number)

● HTTP(S)

The HTTP protocol requires an HTTP interface to achieve data transmission. If SSL authentication is used, only the unauthenticated CA certification mode is supported.

HTTP(S) URL: Data is sent using the HTTP protocol with POST, and data is retrieved with GET.

Data format: JSON.

(For specific data formats, please contact us)

5.3 Tracking Feature

The tracker supports both Bluetooth and GNSS positioning. Bluetooth positioning beacons must be deployed around the tracker to use Bluetooth tracking. The tracker turns on Bluetooth for 3 seconds (unconfigurable) before tracking (at the start of each interval). The tracker sends nearby beacons' information (major, minor, and RSSI) to the server. It only reports the 3 beacons with the highest RSSI value, regardless of how many are received. The RSSI reported is an average of all messages received within 3 seconds. Since the beacons' positions are already known, the server calculates the distance to the three beacons nearby. Then, the coordinates can be calculated according to the triangulation algorithm.

Please refer to:

990-00170 "B-Fixed® PERSONNEL& ASSET TRACKING SOLUTION" to find out how to design and develop your tracking system.

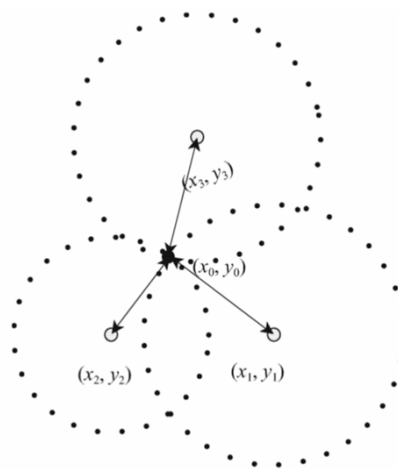


Figure 2. Triangulation method

If no beacon is received, the tracker turns on the GNSS module for outdoor tracking and reports the coordinates to the server whenever they are acquired. On the other hand, GNSS will not be turned on if a positioning beacon is received. GNSS timeout duration is 3 minutes. It stops acquiring satellites when the timeout and will try again in the next cycle.

The heartbeat message report interval can be configured as an integral multiple of 30 seconds. The heartbeat message also contains the status information of the tracker. AS can use it to monitor the tracker.

5.4 Positioning Report Mode

1) Periodic reporting mode

The tracker periodically starts positioning and reports the positioning results at fixed intervals as configured.

Note: Due to the time overhead of the positioning process, the actual positioning report interval received by the Application Server may be longer than the configured position period.

2) Autonomous reporting mode

The tracker decides whether to start the positioning process and reports the positioning result based on the motion status perceived by the accelerometer in the last positioning cycle. It optimizes the battery life to find

the balance between experience and maintenance.

3) On-Demand reporting mode

The tracker starts the positioning process and reports the positioning results only when it receives a downlink instruction deployed by the AS.

The positioning beacon and the GNSS have different report intervals, as specified in Chapter **7.1 Tracker Configuration**.

5.5 Positioning Process

- 1) When the positioning process starts, the tracker turns on the Bluetooth receiver for 3 seconds at the beginning of the cycle. This process is referred to the **Figure 3. Positioning Beacon Report**.

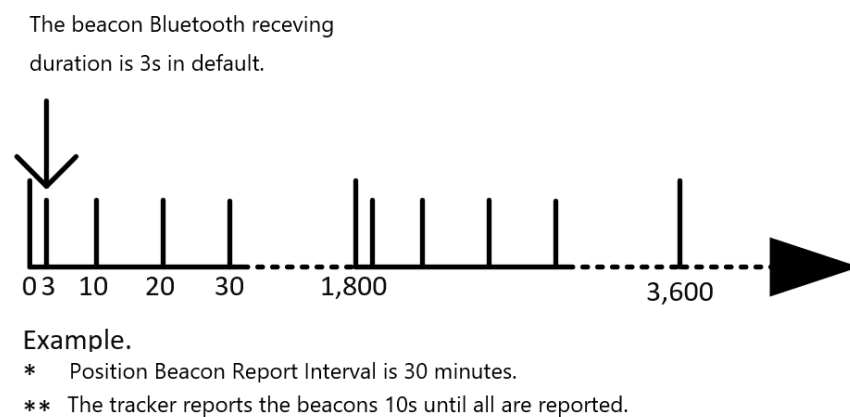


Figure 3. Positioning Beacon Report

If beacons with the advertising UUID " F2-A5-2D-43-E0- AB-48-9C-B6-4C-4A-83-00-14-67-20 " are received, the tracker reports their Major, Minor, and RSSI of the 3 beacons with the strongest RSSI.

- 2) If no beacon is received, the tracker turns on the GNSS module.
Generally, the tracker can acquire the coordinates in about 30 - 120 seconds in an open space. After successful GNSS positioning, it reports the longitude, latitude, and UTC through the LTE Network, and then the positioning process terminates.
- 3) If the GNSS module cannot obtain the coordinates due to the weak satellite signal, the GNSS timeout is 3 minutes. Then, the tracker terminates the positioning process and reports 0 longitude and latitude.

5.6 On/Off and LED Status

- 1) Turn on: Press the button for four seconds; the red LED flashes four times while the green LED is on.
- 2) Turn off: Press the button for four seconds; the red LED flashes four times.
- 3) Reboot: LED status is the same as turning on.
- 4) When joining the network, the green LED is on until the end of the joining process.
- 5) Network status check, single press the button: S

- a) The green LED flashes once: Joined the network successfully.
- b) The red LED flashes once: Lost connection with the network.
- c) No LED flashes: The device is powered off.

5.7 Alarm

Tamper Detection:

Attach a magnet to the TD (Tamper Detection) spot. When the magnet is removed, the tracker beeps 3 times and sends an alarm (0x5005 command) to the MQTT server.

5.8 Battery

The asset management tracker uses two lithium thionyl chloride batteries + a super pulse battery capacitor. The voltage drops when it works and recovers to around 3.5V when idle. And this voltage stays at 3.5V until most of the power is consumed. Due to the discharge characteristics of the battery, the voltage may drop sharply to 3.0V or even lower. Please replace the battery if the voltage is lower than 3.3V in continuous 3 heartbeats messages. For more information on battery consumption, please refer to the LTE Cat.1 tracker battery life estimation spreadsheet (PN: 511-00055).

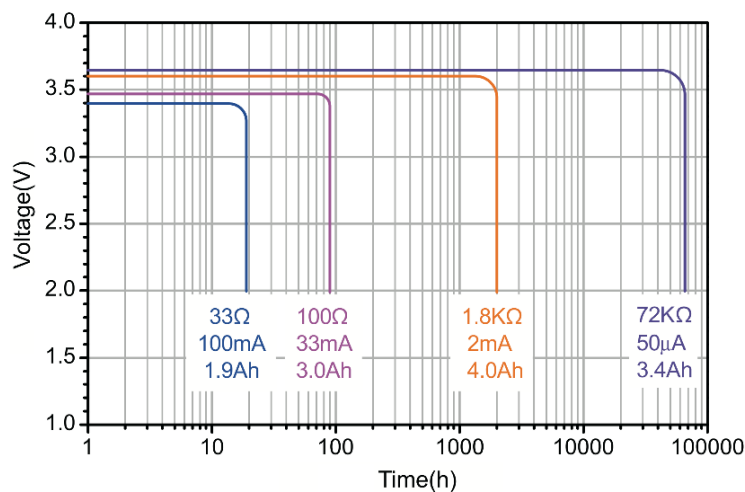


Figure 4. Battery Discharge Characteristics

It is recommended to replace the super pulse battery capacitor when replacing the battery. Please follow the steps below:

- 1) Turn off the switch.
- 2) Remove the capacitor.
- 3) Remove the batteries.
- 4) Install the batteries and make sure the direction is right.
- 5) Plug in the supercapacitor.
- 6) Turn on the switch.

5.9 SIM Card

The tracker uses a nano SIM card. The slot is at the bottom of the PCBA. Each SIM card has only its own IMSI (International Mobile Subscriber Identity).

Don't hesitate to contact us if you prefer to use eSIM.

5.10 Asset Management

The tracker can report the nearby asset Bluetooth beacons' major, minor, and RSSI to the MQTT Server. A maximum of 128 beacons is supported. The tracker reports a maximum of 15 asset beacons at one time. Asset beacon's UUID can be configured with a downlink command.

5.11 Movement Duration

How long the tracker moves between confirmed heartbeat messages. You can use this feature to figure out how long your machine works in a day.

5.12 Temperature

It reports the temperature inside the tracker. The data can be a few degrees different from the outside one.

6. MQTT Uplink Message

Uplink Message format is displayed by the ASCII Hex String. (Plain Text)

Table 2: Uplink Message Table

Message Type	Name	Description
0x1	Registration	Once the tracker registers the network successfully or receives a specific downlink message (Chapter 7.3 Command Request), the tracker will send this message once.
0x2	Heartbeat	The tracker periodically sends this message to report the status of the device.
0x3	GNSS position	The tracker sends this message according to the report policy when GNSS coordinates are acquired successfully.
0x4	Beacon	According to the report policy, the tracker sends this message when receiving beacons.
0x5	Alarm	The tracker sends a confirmed message to report the alarm.
0x6	Configuration Parameter Response	The tracker sends a configuration parameter response when the application server deploys a query configuration parameter message.

6.1 Registration

Bytes	1	4	1	2	2	1	2	1
Item	Type	State	RFU	HB	BLE PRI	BLE Receiving Duration	GNSS PRI	GNSS Receiving Duration
2	1			2	8		2	4
Asset Report Interval	Beacon	Asset Beacon Receiving Duration		Software Version		IMSI	Message ID	RFU

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0x1	Message type Bit7 is the most significant bit.
3-0	RFU	0x0	Reserved for future usage.

State Bit Field

Bit	Name	Value	Description
31	BLE Enable	0: Disable 1: Enable	BLE Enable Status. If BLE is disabled, only GNSS positioning is effective. When GNSS positioning is needed only, turn off this option to save power. The default value is enabled (0x1).
30	GNSS Enable	0: Disable 1: Enable	GNSS Enable Status. If GNSS is disabled, only Bluetooth positioning is effective. When Bluetooth positioning is needed only, turn off this option to save power. The default value is enabled (0x1).
29	Network Status Check	0: Disable 1: Enable	Network Status Check. When this feature is enabled, pressing the button once shows the network status: The default value is enabled (0x1).
28	Power	0: Disable	Power Switch Enable status.

	Switch Enable	1: Enable	If the Power switch off is disabled, the button cannot be used to shut down the device. The default value is enabled (0x1).
27-26	RFU	00	Reserved for future usage.
25	Asset Beacon Sort Enable	0: Disable 1: Enable	Asset Beacon Sort Enable status. If the asset beacon sort is disabled, the asset beacon sort function is invalid. This function sorts the received beacons' RSSI and then sends an asset beacon message in which RSSI sorts the beacons from highest to lowest. If disabled, the device will report an asset beacon message in which the beacons are sorted chronologically. The default value is enabled (0x1).
24	GNSS Failure Report Enable	0: Disable 1: Enable	GNSS Failure Report Enable status. When this feature is enabled, if GNSS fails to acquire the satellites, it will send a GNSS position message with empty data (0x31000000000000000000000000000000) to the server. When disabled, if GNSS fails to acquire the satellites, it will not report the GNSS position message with empty data (0x31000000000000000000000000000000) to the server. The default value is enabled (0x1).
23	Asset Management Enable	0: Disable 1: Enable	Asset Management Enable status If this feature is disabled, the device does not receive asset beacons. The asset management function is invalid. The default value is disabled (0x0).
22-16	RFU	000 0000	Reserved for future usage.
15-14	Position Report Mode	00 01 10	00: Period mode. 01: Autonomous mode (default). 10: On-demand mode;
13-11	RFU	000	Reserved for future usage.
10	Tamper Detection Enable	0: Disable 1: Enable	When the magnet is removed, the tracker beeps 3 times and sends an alarm (0x5005 command) to the MQTT server. The default value is enabled (0x1).
9-8	RFU	00	Reserved for future usage.
7-0	RFU	0x00	Reserved for future usage.

RFU Bit Field

Bit	Name	Value	Description
7-0	RFU	0x00	Reserved for future usage.

HB Period Bit Field

Bit	Name	Value	Description
15-0	Heartbeat Period	0x0001 ~ 0xFFFF	Period of the heartbeat message. Unit: 30s Can't be disabled.

BLE PRI Bit Field

Bit	Name	Value	Description
15-0	BLE Position Report Interval	0x0000 ~ 0xFFFF	The Interval of Bluetooth position report, Unit 5s 0 means OFF.

BLE Receiving Duration Bit Field

Bit	Name	Value	Description
-----	------	-------	-------------

7-0	BLE Position Beacon Receiving Duration	0x00 ~ 0x0A	The duration of the BLE position beacon receiving Unit: 1s. 0 means continuous receiving.
------------	--	-------------	--

GNSS PRI Bit Field

Bit	Name	Value	Description
15-0	GNSS Position Report Interval	0x0000 ~ 0xFFFF	The Interval of the GNSS position report Unit 5s 0 means OFF.

GNSS Receiving Duration Bit Field

Bit	Name	Value	Description
7-0	GNSS Receiving Duration	0x00 ~ 0xFF	The duration of GNSS position receiving Unit: 5s. 0 means continuous receiving.

Asset Beacon Report Interval Bit Field

Bit	Name	Value	Description
15-0	Asset Beacon Report Interval	0x0000 ~ 0xFFFF	Period of asset beacons report. Unit: 5s 0 means OFF.

Asset Beacon Receiving Duration Bit Field

Bit	Name	Value	Description
7-0	Asset Beacon Receiving Duration	0x00 ~ 0x0A	The duration of asset beacon receiving Unit 1s. 0 means continuous receiving

Software Version Bit Field

Bit	Name	Value	Description
15-0	Software Version	16-bit HEX	Firmware version.

IMSI Bit Field

Bit	Name	Value	Description
63- 4	IMSI	60-bit (Binary-Coded Decimal)	The International Mobile Subscriber Identity For SIM.
3-0	RFU	0xF	Reserved for future usage.

Message ID Bit Field

Bit	Name	Value	Description
15-0	Message ID	0x0001 ~ 0xFFFF	The sequence number of downlink messages. It accumulates by 1 with each downlink message.

RFU Bit Field

Bit	Name	Value	Description
31-0	RFU	0x0000 0000	Reserved for future usage.

Example: 10 F3800400 04 0004 003C 03 0168 24 0024 03 0100 460004777770001F 0001 00000000

10 -> Type Bit Field: "1" is the type of Registration message; "0" is reserved for future usage.

F3800400 -> State Bit Field:

- "F" = (Binary) "1111", BLE, GNSS, Network Status Check, Power Switch sign is "1" (enabled).
- "3" = (Binary) "0011", "00" is reserved for future usage, Asset beacon sort enable is "1", and GNSS failure report send function is "1".
- "8" = (Binary) "1000", Asset management enable is "1", and "000" is reserved for future usage.
- "0" is reserved for future usage.
- "0" = (Binary) "0000", Position Report Mode is "00", and "00" is reserved for future usage.
- "4" = (Binary) "0100", Tamper Detection enable is "1", other "0" is reserved for future usage.
- "00" is reserved for future usage.

04 -> Reserved for future usage.

0004->Heartbeat Period Bit Field: Heartbeat period is 2 minutes. ([0x0004] = 4, 4*unit 30s = 2minutes)

003C->BLE Position Report Interval Bit Field: BLE Position Report Interval is 5 minutes. ([0x003C], 60*unit 5s = 5minutes)

03-> BLE Receiving Duration Bit Field: BLE Receiving Duration is 3s. ([0x03] =3, 3*unit 1s = 3s)

0168-> GNSS Position Report Interval Bit Field: GNSS Position Report Interval is 30 minutes.

24-> GNSS Receiving Duration Bit Field: GNSS Receiving Duration is 180s. ([0x24] = 36, 36 * unit 5s = 180s)

0024-> Asset Beacon Report Interval Bit Field: Asset Beacon Report Interval is 3 minutes. ([0x0024] = 36, 36*unit 5s=180s)

03-> Asset Beacon Receiving Duration Bit Field: Asset Beacon Receiving Duration is 3s; ([0x03] = 3, 3*unit 1s = 3s)

0100-> Software Version Bit Field: Firmware version is 1.00 ver.

460004777770001F-> IMSI Bit Field: International Mobile Subscriber Identity for SIM, IMSI: 460004777770001. And "F" is reserved for future usage.

0001 -> Message ID: The sequence number of downlink messages. It accumulates by 1 with each downlink message. The uplink message just displays its count.

00000000-> Reserved for future usage.

6.2 Heartbeat

Bytes	1	4	1	1	1	1
Item	Type	State	Battery Voltage	Battery Level	BLE Receiving Count	GNSS-on Count

2	2	4	2	4
Temperature	Movement Duration	RFU	Message ID	RFU

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0x2	Message type Bit7 is the most significant bit.
3-0	RFU	0x0	Reserved for future usage.

State Bit Field

Bit	Name	Value	Description
31-0	State		The State Bit Field is a universal status bit field for the device. Refer to State Bit Field in the Registration message.

Battery Voltage Bit Field

Bit	Name	Value	Description
7-0	Battery Voltage	0x00 ~ 0xFF	Battery voltage unit: 0.01V. Offset voltage: 2.00V Example: Raw Value = [0xC1] = 193 Battery voltage = Raw Value * Unit + Offset voltage = 1.93V + 2.00V = 3.93V.

Battery Level Bit Field

Bit	Name	Value	Description
7-0	Battery Level	0x00 ~ 0x64	Battery voltage Percent. (0x64 = 100), meaning the battery level is 100%.

BLE Receiving Count Bit Field

Bit	Name	Value	Description
7-0	BLE Receiving Count	0x00 ~ 0xFF	Number of BLE scans within a heartbeat interval

GNSS-on Count Bit Field

Bit	Name	Value	Description
7-0	GNSS-on Count	0x00 ~ 0xFF	Number of GNSS startups within a heartbeat interval.

Temperature Bit Field

Bit	Name	Value	Description
15-0	Temperature	-0x8000 ~ 0x7FFF	Temperature (unit: 1°C) (0x0023 = 35°C) It is the ambient temperature inside the housing. Accuracy: ±5°C.

Movement Duration Bit Field

Bit	Name	Value	Description
15-0	Movement Duration	0 ~ 0xFFFF	How long does the tracker move between confirmed heartbeat messages. (unit: 5s) The tracker checks the accelerometer once every 1s. If the tracker is moved once every 5s, it is considered moved for 5s.

RFU Bit Field

Bit	Name	Value	Description
31-0	RFU	0x0000 0000	Reserved for future usage.

Message ID Bit Field

Bit	Name	Value	Description
15-0	Message ID	0x0001 ~ 0xFFFF	The sequence number of downlink messages. It accumulates by 1 with each downlink message.

RFU Bit Field

Bit	Name	Value	Description
31-0	RFU	0x0000 0000	Reserved for future usage.

Example: 20 F3803000 20 0B 01 00 0023 0004 0000 0000 0001 00000000

20 -> Type Bit Field: "2" is the type of Heartbeat message; "0" is reserved for future usage.

F3800400 -> State Bit Field:

- "F" = (Binary) "1111", BLE, GNSS, Network Status Check, Power Switch sign is "1" (enabled).
- "3" = (Binary) "0011", "00" is reserved for future usage, Asset beacon sort enable is "1", and GNSS failure report send function is "1".
- "8" = (Binary) "1000", Asset management enable is "1", and "000" is reserved for future usage.
- "0" is reserved for future usage.
- "0" = (Binary) "0000", Position Report Mode is "00", and "00" is reserved for future usage.
- "4" = (Binary) "0100", Tamper Detection enable is "1", other "0" is reserved for future usage.
- "00" is reserved for future usage.

A0 -> VOL Bit Field: Battery voltage is 3.2v. ([0xA0] =160, 160*unit 0.01V+2.00V=3.60V).

0B -> VOL Percent Bit Field: Battery voltage is 12%. ([0x0B] = 12, 12%).

01 -> BLE Receiving Count Bit Field: The BLE receiving time is 1 in one heartbeat period.

00 -> GNSS-on Count Bit Field: GNSS is turned on once in one heartbeat period.

0023 -> Temperature Bit Field: The temperature is 23°C.

0004 -> Movement Duration Bit Field: In one heartbeat period, the device had moved 4 times, 4x5s = 20s.

0000 0000 -> Reserved for future usage.

0001 -> Message ID Bit Field: Message ID is 0001, and one downlink message is received.

00000000 -> Reserved for future usage.

6.3 GNSS Position

Bytes	1	4	4	4	5
Item	Type	Longitude	Latitude	Time	RFU

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0x3	Message type Bit7 is the most significant bit.
3-0	GNSS Status	0x0 0x1	0x0: GNSS positioning succeeded. 0x1: GNSS positioning failed.

Longitude Field

Bit	Name	Value	Description
31-0	Longitude	Float	Longitude, IEEE 754 format, the positive value represents east longitude, and the negative value represents west longitude. GNSS Receiving Duration is 3 minutes (default). The tracker reports 0 longitude when GNSS fails to locate.

Latitude Bit Field

Bit	Name	Value	Description
31-0	Latitude	Float	Latitude, IEEE 754 format, the positive value represents north latitude, and the negative value represents south longitude. GNSS Receiving Duration is 3 minutes (default). The tracker reports 0 latitude when the GNSS fails to locate.

Time Bit Field

Bit	Name	Value	Description
31-0	Time	Int	UTC time, seconds since 1970/1/1 00:00:00

RFU Bit Field

Bit	Name	Value	Description
39-0	RFU	0x0000 0000 00	Reserved for future usage.

Example: 30 41FFCEA9 42ED8AAF 6364E0D8 0000 0000 00

30 -> Type Bit Field: "3" is the type of GNSS Position message; "0" means that the GNSS location succeeded.

41FFCEA9 -> Longitude Bit Field: Longitude, IEEE 754 format.

42ED8AAF -> Latitude Bit Field: Latitude, IEEE 754 format.

6364E0D8 -> Time Bit Field: UTC time.

0000 0000 00 -> Reserved for future usage.

6.4 Beacon

Bytes	1	1	2	2	1	..	5
Item	Type	Beacon Count	Major	Minor	RSSI	..	RFU

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0x4	Message type. Bit7 is the most significant bit.
3-0	Beacon type	0x0 0x1	0x0 : Positioning beacon; 0x1 : Asset beacon.

Beacon Count Bit Field

Bit	Name	Value	Description
7-0	Beacon Count	0x01 ~ 0x0F	The sum of beacons. The maximum count of the positioning beacon is 3. The maximum count of the asset beacon is 15 for every package.

Major Bit Field

Bit	Name	Value	Description
15-0	Major	Short	Major of the Bluetooth beacon.

Minor Bit Field

Bit	Name	Value	Description
15-0	Minor	Short	Minor of the Bluetooth beacon.

RSSI Bit Field

Bit	Name	Value	Description
7-0	RSSI	0 ~ 0xFF	Bluetooth Received Signal Strength Indication, unit dBm Signal strength received from the beacon. The application server utilizes this to calculate the distance between the tracker and the beacon. Example: when the value is 170, the real RSSI = 170 - 256 = -86dBm NOTE: This field is represented by a negative 8-bit number for compatibility with the legacy version.

RFU Bit Field

Bit	Name	Value	Description
39-0	RFU	0x0000 0000 00	Reserved for future usage.

Example: 40 02 002E 0012 9E 002F 0013 8F 0000 0000 00

40 -> Type Bit Field: "4" is the type of Beacon message; "0" means that position beacon report.

02 -> Beacon Count Bit Field: "02" represents the beacons' count. There are 2 beacons in all.

002E -> Major Bit Field: Major of the Bluetooth beacon.

0012 -> Minor Bit Field: Minor of the Bluetooth beacon.

9E -> RSSI Bit Field: "9E" is the RSSI of the temp value, $(158[9E] - 256[FF] = -98)$ beacon RSSI is -98 dBm.

002F -> Major Bit Field: Major of the Bluetooth beacon.

0013 -> Minor Bit Field: Minor of the Bluetooth beacon.

8F -> RSSI Bit Field: "8F" is the RSSI of the temp value, $(143[8F] - 256[FF] = -113)$ beacon RSSI is -113 dBm.

0000 0000 00 -> Reserved for future usage.

6.5 Alarm

Bytes	1	1	1
Item	Type	Alarm	RFU

Type Bit Field

Bit	Name	Value	Description
7-4	Type	0x5	Message type, AS uses it to identify different uplink messages.
3-0	RFU	0x0	Reserved for future usage.

Alarm Bit Field

Bit	Name	Value	Description
7-0	Alarm	0x05: Tamper Detection	0x05: The tracker only reports 0x500500 once when the magnet is removed from the TD spot. It does not report anything when the magnet is attached.

RFU Bit Field

Bit	Name	Value	Description
7-0	RFU	0x00	Reserved for future usage.

Example: 50 05 00

50 -> Type Bit Field: "5" is the type of Alarm message; "0" is reserved for future usage.

05 -> Alarm Bit Field: "05" represents the tamper detection alarm.

00 -> Reserved for future usage.

6.6 Configuration Parameter Response

The application server will receive a configuration parameter response when deploying a query tracker configuration downlink message. This message is the response to the downlink message.

Bytes	1	n	
Item	Type	Parameter Command	

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0x6	Message type. Bit 7 is the most significant.
3-0	RFU	0x0	Reserved for future usage.

Parameter Command Bit Field

Name	Value		Description	
	Parameter Type	Parameter Value	Parameter Name	Parameter Definition
Parameter Command	0x00	0x0000 ~ 0xFFFF	Software Version	Firmware version.
	0x01	0x0001 ~ 0xFFFF	HB Period	The interval of the Heartbeat message report. Unit: 30 seconds. Default: 24 hours (0x0B40). Cannot be disabled.
	0x02	0x0000 ~ 0xFFFF	BLE Position Report Interval	The interval of Bluetooth position report, Unit: 5 seconds. Default: 10 minutes (0x0078). 0 means OFF.
	0x03	0x0000 ~ 0xFFFF	GNSS Position Report Interval	The interval of the GNSS position report. Unit: 5 seconds. The default is 60 minutes (0x02D0). 0 means OFF.
	0x04	0x0000 ~ 0xFFFF	Asset Beacon Report Interval	The interval of the Asset beacons report. Unit: 5 seconds. The default is 30 minutes (0x0168). 0 means OFF.
	0x05	0x00 ~ 0x0A	BLE Position Receiving Duration	The duration of the BLE position beacon receiving. Unit: 1 second. The default is 3s (0x03). 0 means continuous receiving.
	0x06	0x00 ~ 0xFF	GNSS Position Receiving Duration	The duration of GNSS position receiving. Unit: 5 seconds. The default is 180s (0x24). 0 means continuous receiving.
	0x07	0x00 ~ 0x0A	Asset Beacon Receiving Duration	The duration of asset beacon receiving. Unit: 1 second. The default is 8s (0x08). 0 means continuous receiving.
	0x0A	128-bit HEX	Position Beacon UUID	Bluetooth position UUID filter. Default UUID (F2-A5-2D-43-E0- AB-48-9C-B6-4C-4A-83-00-14-67-20)
	0x0B	128-bit HEX	Asset Beacon UUID	Bluetooth asset UUID filter. Default UUID (F2-A5-2D-43-E0- AB-48-9C-B6-4C-

				4A-83-00-14-67-21)
0x0E	64-bit HEX	IMSI		The International Mobile Subscriber Identity For SIM.
0x1C	0x00~ 0x01	Temper Alarm Enable		Tamper Detection Enable Status. 0x00 : Disabled 0x01 : Enabled (Default)
0x20	0x00~ 0x02	Position Report Mode		Position Report Mode Status. 0x00 : Period mode 0x01 : Autonomous mode (Default) 0x02 : On-demand mode
0x29	0x00~ 0x01	Asset Management Enable		Asset Management Enable Status. 0x00 : Disable (Default) 0x01 : Enable
0x2A	0x00~ 0x01	GNSS Failure Report Enable		GNSS Failure Report Enable Status. 0x00 : Disable 0x01 : Enable (Default)
0x2B	0x00~ 0x01	Asset Beacon Sort Enable		Asset Beacon Sort Enable Status. 0x00 : Disable 0x01 : Enable (Default)
0x2E	0x00~ 0x01	Power Switch Enable		Power Switch Enable Status. 0x00 : Disable 0x01 : Enable (Default)
0x2F	0x00~ 0x01	Network Status Check		Network Status Check. 0x00 : Disable 0x01 : Enable (Default)
0x30	0x00~ 0x01	GNSS Enable State		GNSS Enable Status. 0x00 : Disable 0x01 : Enable (Default)
0x31	0x00~ 0x01	BLE Enable		BLE Enable Status. 0x00 : Disable 0x01 : Enable (Default)

Example 1: 60 01 000C 06 3C 05 0A.

60 -> Type Bit Field: "6" is the type of Configuration Parameter Response message;" 0" is reserved for future usage.

01 000C -> Parameter Command Bit Field: "01" is the parameter type; "000C" is the parameter value. It means that the HB period is 6 minutes (0x000C).

06 3C -> Parameter Command Bit Field: "06" is the parameter type; "3C" is the parameter value. It means that GNSS Receiving Duration is 300s(3C).

05 0A -> Parameter Command Bit Field: "05" is the parameter type; "0A" is the parameter value. It means that the BLE receiving duration is 10s (0A).

Example 2: 60 0A F2A52D43E0AB489CB64C4A8300146721

60 -> Type Bit Field: "6" is the type of Configuration Parameter Response message;" 0" is reserved for future usage.

0A F2A52D43E0AB489CB64C4A8300146721 -> Parameter Command Bit Field: "0A" is the parameter type; "F2A52D43E0AB489CB64C4A8300146721" is the parameter value. It means that the Bluetooth position of the beacon UUID filter is F2-A5-2D-43 E0-AB-48-9C B6-4C-4A-83 00-14-67-21.

7. MQTT Downlink Message

Notice: Downlink message format needs to be converted to ASCII to deploy.

Table 3: Downlink Message Table

Message Type	Name	Description
0xA	Tracker Configuration	The application server can deploy this message to configure tracker parameters.
0xB	Query Tracker Configuration Message	The application server can deploy this message to query the tracker configuration.
0xC	Command Request	The application server can deploy this message to request the tracker to execute instructions.

7.1 Tracker Configuration

To deploy a tracker configuration, this data includes type, parameter commands, and message ID.

One tracker configuration message can include single or multiple parameter commands. Every parameter command includes one parameter type and a corresponding parameter value.

Message ID is the sequence number of downlink messages. It accumulates by 1 with each downlink message. The message ID must increase by 1 with each downlink message; otherwise, the track will not process the downlink message.

Bytes	1	n		2
Item	Type	Parameter Command		Message ID

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0xA	Message type. Bit7 is the most significant.
3-0	RFU	0x0	Reserved for future usage.

Parameter Command Bit Field

Name	Value		Description	
	Parameter Type	Parameter Value	Parameter Name	Parameter Definition
Parameter Command	0x01	0x0001 ~ 0xFFFF	HB Period	The interval of the Heartbeat message report. Unit: 30 seconds. Default: 24 hours (0x0B40). Cannot be disabled.
	0x02	0x0000 ~ 0xFFFF	BLE Position Report Interval	The interval of Bluetooth position report, Unit: 5 seconds. Default: 10 minutes (0x0078). 0 means OFF.
	0x03	0x0001 ~ 0xFFFF	GNSS Position Report Interval	The interval of the GNSS position report. Unit: 5 seconds. The default is 60 minutes (0x02D0). 0 means OFF.
	0x04	0x0001 ~ 0xFFFF	Asset Beacon Report Interval	The interval of the Asset beacons report. Unit: 5 seconds. The default is 30 minutes (0x0168). 0 means OFF.

	0x05	0x00 ~ 0x0A	BLE Position Receiving Duration	The duration of the BLE position beacon receiving. Unit: 1 second. The default is 3s (0x03). 0 means continuous receiving.
	0x06	0x00 ~ 0xFF	GNSS Position Receiving Duration	The duration of GNSS position receiving. Unit: 5 seconds. The default is 180s (0x24). 0 means continuous receiving.
	0x07	0x00 ~ 0x0A	Asset Beacon Receiving Duration	The duration of asset beacon receiving. Unit: 1 second. The default is 8s (0x08). 0 means continuous receiving.
	0x0A	128-bit HEX	Position Beacon UUID	Bluetooth position UUID filter. Default UUID (F2-A5-2D-43-E0- AB-48-9C-B6-4C-4A-83-00-14-67-20)
	0x0B	128-bit HEX	Asset Beacon UUID	Bluetooth asset UUID filter. Default UUID (F2-A5-2D-43-E0- AB-48-9C-B6-4C-4A-83-00-14-67-21)
	0x1C	0x00~ 0x01	Tamper Detection Enable	Tamper Detection Enable Status. 0x00 : Disabled 0x01 : Enabled (Default)
	0x20	0x00~ 0x02	Position Report Mode	Position Report Mode Status. 0x00 : Period mode 0x01 : Autonomous mode (Default) 0x02 : On-demand mode
	0x29	0x00~ 0x01	Asset Management Enable	Asset Management Enable Status. 0x00 : Disable (Default) 0x01 : Enable
	0x2A	0x00~ 0x01	GNSS Failure Report Enable	GNSS Failure Report Enable Status. 0x00 : Disable 0x01 : Enable (Default)
	0x2B	0x00~ 0x01	Asset Beacon Sort Enable	Asset Beacon Sort Enable Status. 0x00 : Disable 0x01 : Enable (Default)
	0x2E	0x00~ 0x01	Power Switch Enable	Power Switch Enable Status. 0x00 : Disable 0x01 : Enable (Default)
	0x2F	0x00~ 0x01	Network Status Check	Network Status Check. 0x00 : Disable 0x01 : Enable (Default)
	0x30	0x00~ 0x01	GNSS Enable State	GNSS Enable Status. 0x00 : Disable 0x01 : Enable (Default)
	0x31	0x00~ 0x01	BLE Enable	BLE Enable Status. 0x00 : Disable 0x01 : Enable (Default)

Message ID Bit Field

Bit	Name	Value	Description
15-0	Message ID	0x0001 ~ 0xFFFF	The sequence number of downlink messages. It accumulates by 1 with each downlink message.

Example 1: A0 01 000C 06 3C 05 0A 0001

A0 -> Type Bit Field: "A" is the message type, and "0" is reserved for future usage.

01 000C -> Parameter Command Bit Field: "01" is the parameter type; "000C" is the parameter value. It means configuring HB period (0x01) to 6minutes (0x000C).

06 3C -> Parameter Command Bit Field: "06" is the parameter type; "3C" is the parameter value. It means configuring GNSS Receiving Duration to 300s (3C).

05 0A -> Parameter Command Bit Field: "05" is the parameter type; "0A" is the parameter value. It means configuring the BLE receiving duration to 10s (0A).

0001 -> Message ID Bit Field.

Example 2: A0 0A F2A52D43E0AB489CB64C4A8300146721 0002.

A0 -> Type Bit Field: "A" is the type of Tracker Configuration message; "0" is reserved for future usage.

0A F2A52D43E0AB489CB64C4A8300146721 -> Parameter Command Bit Field: "0A" is the parameter type; "F2A52D43E0AB489CB64C4A8300146721" is the parameter value. This means configuring the Bluetooth position of the UUID filter to F2-A5-2D-43 E0-AB-48-9C B6-4C-4A-83 00-14-67-21.

0002 -> Message ID Bit Field.

7.2 Query Tracker Configuration Message

The application server will receive a configuration parameter response when deploying a query tracker configuration downlink message.

Bytes	1	1		2
Item	Type	Parameter Type		Message ID

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0xB	Message type. Bit 7 is the most significant.
3-0	RFU	0x0	Reserved for future usage.

Parameter type Bit Field

Bit	Name	Value	Description
7-0	Parameter Type	0x00 ~ 0xFF	0x00: Software Version 0x01: HB Period 0x02: BLE Position Report Interval 0x03: GNSS Position Report Interval 0x04: Asset Beacon Report Interval 0x05: BLE Position Receiving Duration 0x06: GNSS Position Receiving Duration 0x07: Asset Beacon Receiving Duration 0x0A: Position Beacon UUID 0x0B: Asset Beacon UUID 0x0E: IMSI 0x1C: Tamper Detection Enable 0x20: Position Report Mode 0x29: Asset Management Enable 0x2A: GNSS Failure Report Enable 0x2B: Asset Beacon Sort Enable 0x2E: Power Switch Enable

			0x2F: Network Status Check 0x30: GNSS Enable State 0x31: BLE Enable
--	--	--	--

Message ID Bit Field

Bit	Name	Value	Description
15-0	Message ID	0x0001 ~ 0xFFFF	The sequence number of downlink messages. It accumulates by 1 with each downlink message.

Example: B0 01 06 05 0003

B0 -> Type Bit Field: "B" is the message type; "0" is reserved for future usage.

01 -> Parameter Type Bit Field: HB period.

06 -> Parameter Type Bit Field: GNSS receiving duration.

05 -> Parameter Type Bit Field: BLE Position Receiving Duration.

0003 -> Message ID Bit Field.

7.3 Command Request

Bytes	1	1	2
Item	Type	Command	Message ID

Type Bit Field (the most significant byte)

Bit	Name	Value	Description
7-4	Type	0xC	Message type Bit7 is the most significant bit.
3-0	RFU	0x0	Reserved for future usage.

Command Bit Field

Bit	Name	Value	Description
7-0	Command	0x01: Position request 0x02: Registration request 0x03: Device reboot 0x04: Factory recovery	0x01: Request the device to send a position message. 0x02: Request the device to send a registration message. 0x03: Reboot the device. 0x04: Recover the device to default config.

Message ID Bit Field

Bit	Name	Value	Description
15-0	Message ID	0x0001 ~ 0xFFFF	The sequence number of downlink messages. It accumulates by 1 with each downlink message.

Example: C0 01 0004

C0 -> Type Bit Field: "A" is the message type, and "0" is reserved for future usage.

01 -> Command Bit Field: "01" Position request, requesting the tracker to send the position message.

0004 -> Message ID Bit Field.

8. Configure the Tracker with a Phone

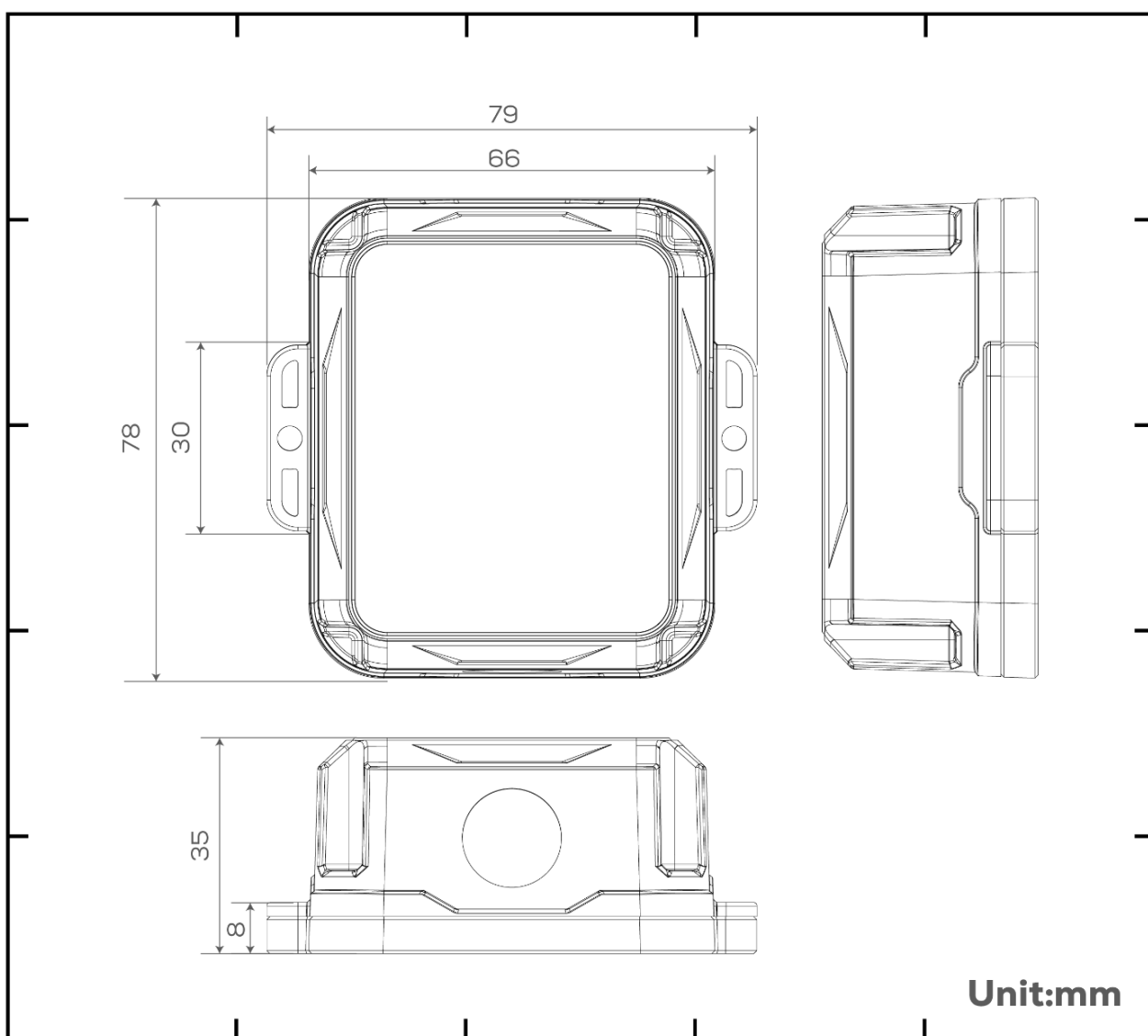
The device can connect to the "LightBlue" APP through Bluetooth and use this APP to change the protocol, APN configuration, tracker configuration, and URL configuration.

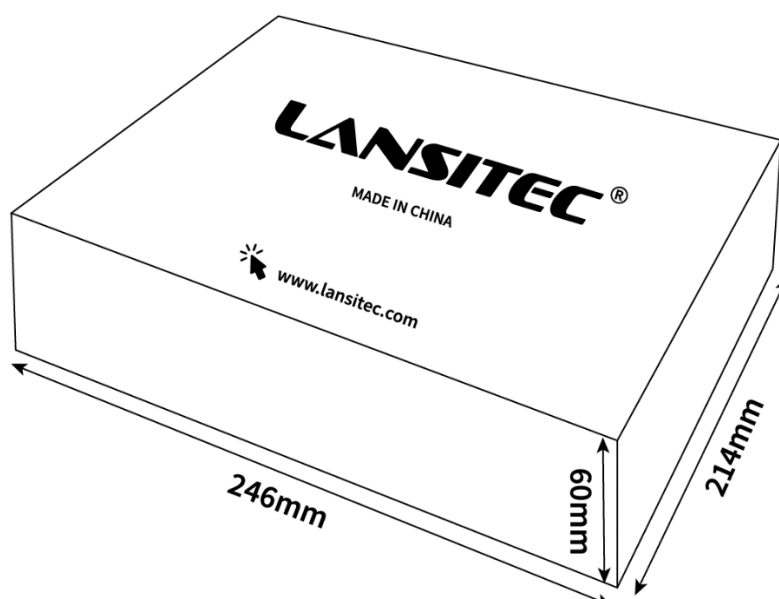
Refer to the document ***How to Configure Lansitec LTE Cat-1 Device via "LightBule"***

Document number: 990-00277

9. Packaging

9.1 Packaging Information





10. Ordering Information

Description	PN
Asset Management Tracker, Cat-1, BLE5.0, 78x79x35mm, IP68, 2x4000mAh	100-000C4

11. FCC Statement

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 encouraged 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

End of the document