



Lansitec NTN

Livestock Tracking Tag

User Manual

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Released Note

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V1.0	2026-08-03	Apus Su.	Initial customer release

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1. Product Overview

The Lansitec NTN Livestock Tracking Tag is a solar-assisted tracking device for cattle, sheep, and goats. It combines GNSS, Bluetooth Low Energy, motion sensing, LoRaWAN, and Non-Terrestrial Network connectivity. Depending on the ordered firmware profile, the tag can prefer LoRaWAN and use NTN after the configured fallback criteria are met, or operate as an NTN-only device.



Figure 1. Product appearance

2. Safety Information

- Installation should be performed by trained livestock personnel using a compatible ear-tag applicator.
- Select an appropriate ear location and avoid major blood vessels, cartilage ridges, and existing injuries.
- Inspect the attachment regularly. Remove and replace the tag if the housing, pin, or animal ear is damaged.
- Do not open, puncture, crush, burn, or short-circuit the product or its rechargeable Li-Po battery.
- The battery and, in sealed variants, the SIM are not field-serviceable. Opening the enclosure can damage the product and invalidate its ingress-protection rating.
- IP68 protection applies only when the enclosure is intact and correctly sealed. Do not exceed the validated immersion conditions or clean the product with high-pressure water jets.
- Use only authorized SIM profiles, configuration tools, and firmware packages supplied or approved by Lansitec.
- Satellite and GNSS operation requires adequate sky visibility. Do not rely on the device as the sole control for animal safety or containment.
- NTN and UDP delivery are not guaranteed and may be delayed or unavailable. This product is not an emergency, life-safety, or real-time command system.

3. Product Appearance and Package Contents

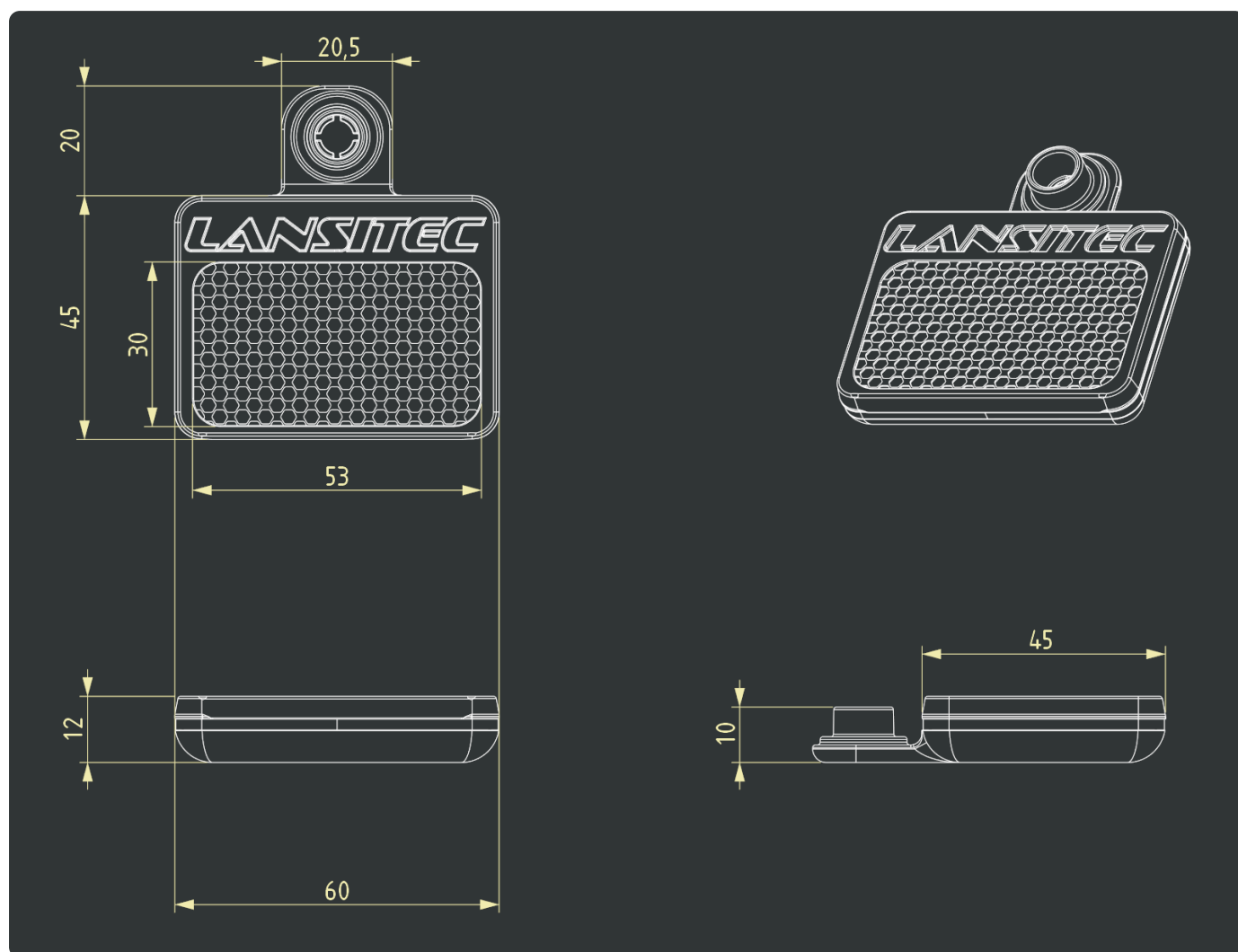
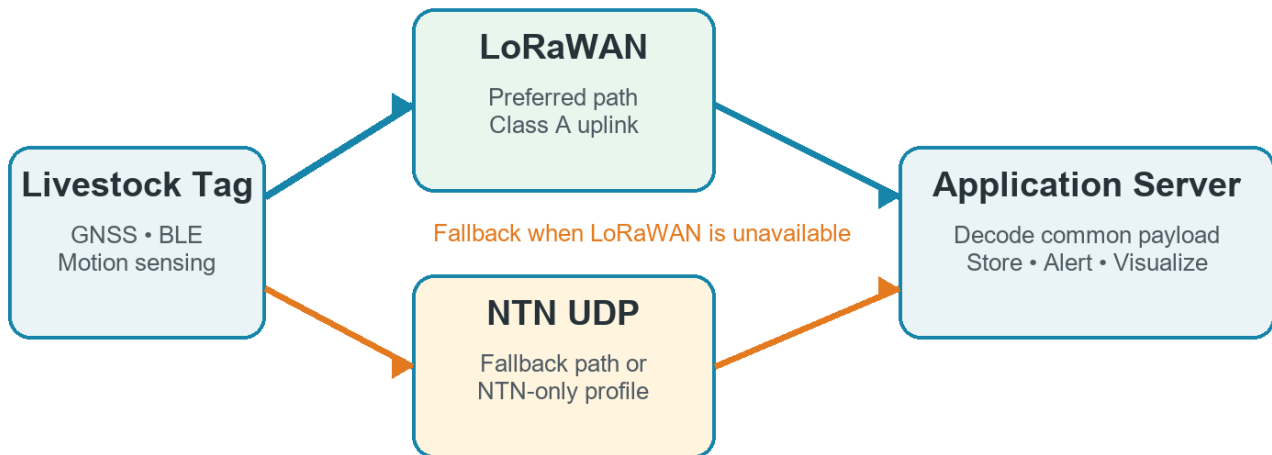


Figure 2. Mechanical outline (dimensions in millimetres)

Item	Specification
Standard package	Livestock tracking tag, mating ear-tag part, and product documentation
Required for installation	Compatible ear-tag applicator; not included unless specified in the order
Required for LoRaWAN	Provisioned LoRaWAN device credentials and network coverage
Required for NTN	Factory-installed or authorized Nano SIM, NTN authorization, applicable APN, satellite coverage, and clear sky visibility

4. System Requirements and Connectivity Profiles



4.1 Hybrid Profile

The tag uses LoRaWAN as the preferred remote uplink. If LoRaWAN is unavailable according to the configured availability and retry policy, the tag generates a new combined NTN Status Report from the current device, position, battery, movement, and alarm state. It does not place a pending LoRaWAN application message inside the UDP datagram. The application server selects the LoRaWAN or NTN UDP decoder according to the transport path, as defined in Protocol Specification 990-01214.

4.2 NTN-only Profile

The tag bypasses LoRaWAN and sends remote reports through NTN UDP. Use this profile when no LoRaWAN network is deployed or when the project requires satellite-only operation. NTN-only operation normally uses more energy than LoRaWAN-first operation; select reporting intervals accordingly.

4.3 Service and Backend Requirements

- The NTN service, SIM profile, APN, and destination endpoint must be approved for the deployment country or region.
- The raw NTN UDP datagram does not include an IMEI. The backend must bind the tag using the approved operator/SIM provisioning record; do not use a changing public source IP as a permanent identity.
- The backend must tolerate delayed, duplicated, reordered, or missing UDP reports and process retries idempotently.

- Use an approved private APN, VPN, or separate application-security profile if the project requires confidentiality, peer authentication, or anti-replay protection.

5. Preparation and Commissioning

5.1 Record the Deployment Identity

- Record the device serial number, LoRaWAN identifiers, IMEI, ICCID, and SIM subscription reference shown on the label or provisioning record, as applicable.
- For LoRaWAN, provision OTAA or ABP credentials in the target network server and confirm the regional frequency plan.
- For NTN, verify the authorized SIM, APN, operator coverage, destination host and UDP port, and regional authorization. Do not open a sealed enclosure to access the SIM.
- Create the backend device record and bind the operator/SIM context before sending the first NTN report.
- Configure the required connectivity profile, reporting intervals, alarm thresholds, and GNSS timeout through the authorized BLE configuration tool.
- Place the tag outdoors with the solar panel exposed to daylight and allow the battery to recover before installation if the device has been stored for an extended period.

5.2 Commissioning Checklist

Check	Acceptance criterion	Record
Device identity	Serial number and applicable LoRaWAN/SIM identifiers match the backend record	Device record ID
LoRaWAN	Device joins the correct regional network and a test uplink reaches the application server	Join/uplink time
NTN	Device registers outdoors and a binary UDP test report reaches the configured endpoint	Registration/report time
Backend decoding	Message type, length, battery, and location fields decode without validation errors	Decoder version
Downlink	A supported command is returned within the applicable receive window and is acknowledged by device behavior	Command/result
Power profile	Reporting intervals and fallback criteria match the approved deployment energy budget	Configuration revision

IMPORTANT: Commissioning gate - Do not install the tag on an animal until every connectivity path

selected for the deployment has passed an outdoor end-to-end test.

6. Installation

6.1 Select the Ear Position

- Use the central area of the ear with sufficient tissue and clearance from the head.
- Avoid major blood vessels, thick cartilage ridges, folds, previous tag holes, and damaged tissue.
- Orient the solar panel outward and upward as much as practical after installation.

6.2 Install the Tag

1. Disinfect the applicator and the selected ear area according to the farm's animal-care procedure.
2. Load the tag and mating part into the compatible applicator in the correct orientation.
3. Align the two parts, apply one smooth firm action, and verify that the locking parts are fully engaged.
4. Confirm that the tag can hang freely without excessive pressure on the ear.
5. Observe the animal after installation and check for bleeding, swelling, or abnormal irritation.

7. Basic Operation

Item	Specification
Power on	Hold the activation control for approximately 3 seconds. The green LED flashes three times.
Power off	Hold the activation control for approximately 3 seconds. The red LED flashes three times.
Network status check	Operate the activation control once. Green indicates that the selected network profile is online; red indicates offline.
Activation control	Depending on the ordered enclosure, this is a physical button or a magnetic service-switch area identified on the product label.
Factory reset	Perform only when instructed by Lansitec support. Record the current configuration first; a reset can remove customer settings.

LED indications are intentionally brief to conserve energy. No LED activity during normal operation does not mean the device is switched off.

8. Positioning and Reporting

8.1 Reporting Modes

- Periodic mode: the tag performs positioning and reporting at configured intervals.
- Autonomous mode: motion information is used to adapt reporting behavior and reduce unnecessary activity.
- On-demand mode: a supported downlink command requests a new positioning cycle.

8.2 Positioning Sequence

1. The tag scans for configured Bluetooth positioning beacons when Bluetooth positioning is enabled.
2. If no valid positioning beacon is found, GNSS is started for outdoor positioning.
3. The tag creates a GNSS, Bluetooth, heartbeat, alarm, or configuration report as required.
4. Before an NTN transmission, the GNSS session is stopped and the modem changes to the NTN network mode; GNSS and NTN transmission are not active at the same time in the release profile.
5. The report is sent through the selected connectivity profile and the device opens only the applicable short receive window.
6. The communication subsystem returns to a low-power state after the transmit and receive cycle.

GNSS and NTN performance is reduced by buildings, metal roofs, dense vegetation, steep terrain, animal body shielding, and poor satellite geometry. Install and operate the product with the clearest practical view of the sky.

9. Bluetooth Configuration and Firmware Update

- Use an authorized Lansitec-compatible BLE configuration tool and connect to the device at close range.
- Read and record the existing configuration before changing network or reporting parameters.
- Configure the LoRaWAN regional plan and credentials only for deployments that use the LoRaWAN path.
- Configure the NTN APN, UDP server host, and UDP port only with values supplied by the system integrator or connectivity provider. The post-uplink receive window is defined by the ordered firmware profile.
- Do not share LoRaWAN keys, SIM credentials, BLE authorization data, or firmware signing material in ordinary support messages or screenshots.
- After saving, read the values back and perform a network status and test-report check.
- Use only signed and approved firmware packages. Keep the device powered and within BLE range until the update finishes and the device restarts.

10. Maintenance

- Inspect the tag, attachment, animal ear, and solar surface at regular livestock handling intervals.
- Remove mud and debris with a soft damp cloth. Do not use solvents, abrasive cleaners, or high-pressure spray.
- Keep the solar panel unobstructed. Persistent dirt or shading reduces charging performance.
- Review battery and communication status on the application platform and investigate repeated low-battery or offline events.
- Before long-term storage, clean and dry the product and store it within the specified temperature range.

11. Troubleshooting

Symptom	Possible cause	Action
No LoRaWAN report	Not joined, wrong credentials or regional plan, or no gateway coverage	Verify OTAA/ABP settings, regional plan, gateway status, and antenna clearance.
No NTN report	SIM/APN not authorized, no operator coverage, or obstructed sky view	Verify SIM activation and APN, move outdoors, improve sky visibility, and retry after the configured interval.
Frequent NTN fallback	Weak or unavailable LoRaWAN coverage	Check gateway power, backhaul, antenna placement, regional settings, and fallback thresholds.
Duplicate or delayed report	UDP retry, fallback delivery, satellite delay, or out-of-order arrival	Process reports idempotently, use the report timestamp, and retain transport metadata for diagnostics.
NTN report assigned to the wrong tag	Missing or incorrect SIM/operator-to-device binding	Verify the provisioning record. Do not use a changing public source IP as the permanent tag identifier.
GNSS position unavailable	Indoor use, shielding, poor sky visibility, or timeout too short	Move to an open area, orient the product correctly, and increase GNSS timeout if the power budget allows.
Low battery	Insufficient solar exposure, short reporting interval, or frequent NTN registration	Clean and expose the solar panel, extend reporting intervals, and inspect installation orientation.
Cannot connect by BLE	Device out of range, busy, asleep, or already connected	Move closer, wait for the current task to finish, retry, and confirm that no other phone is connected.
Device does not power on	Battery deeply discharged or hardware damage	Place the device in strong daylight, retry after charging, and contact support if there is no response.

12. Technical Specifications

Item	Specification
Dimensions	60 × 45 × 12 mm
Weight	32 g
Housing	ABS + PC
Ingress protection	IP68
Battery	3.7 V, 150 mAh rechargeable Li-Po
Solar panel	53 × 30 mm; 0.28 W maximum
Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +85°C
GNSS	BDS / GPS / GLONASS; 2.5 m CEP under specified open-sky conditions
Bluetooth	Bluetooth 5.0; iBeacon; BLE configuration and FOTA
LoRaWAN	LoRaWAN 1.0.2B, Class A; OTAA or ABP
NTN	3GPP IoT NTN using NB-IoT service; UDP/IP; Nano SIM in the release hardware
NTN downlink window	Nominal 5 seconds after uplink in the release firmware
NTN payload limits	Up to 512 bytes uplink and 256 bytes downlink; one application message per datagram

13. Compliance, Support, and Warranty

Certification and operator availability depend on the ordered product configuration and destination region. Use the product only with approved antennas, SIM profiles, firmware, and frequency settings. Contact Lansitec for the applicable declaration of conformity, regional certification status, warranty terms, and return procedure.

Technical support: contact@lansitec.com | Website: www.lansitec.com Related documents: Datasheet 990-01212; Protocol Specification 990-01214