

LIME Tag™ 2.0 Sensor

UHF RFID SENSOR TAG

ONBOARD SECURITY and COLD CHAIN MANAGEMENT with OEM SENSOR SUPPORT

SecureRF's Battery Assisted Passive (BAP) Lime Tag™ 2.0 Sensor delivers the world's first public key Onboard Security™ solutions for securing and tracking high value assets and supply chains. In addition to authentication, validation and data protection, the LIME Tag 2.0 provides temperature monitoring and the ability to monitor four additional sensors. The company's strong Lightweight Multistream Encryption (LIME) Tag is based on SecureRF's breakthrough in low-resource public key cryptographic methods which addresses the key management issues associated with many symmetric solutions.

The public key authentication and cryptographic functions co-reside with the international standard EPCglobal Gen2/180006-C UHF air protocol and work with most Gen 2 readers in combination with SecureRF middleware. The LIME Tag 2.0 features up to 3 Kbits of tamper-proof read/write data storage as well as extended user memory that can be encrypted. This user-controlled memory enables the onboard collection of a wide range of information including sensor data, maintenance records, or other supply chain records.



Additional features include energy-saving power management that extends battery life by only powering the necessary components of

the tag during communication or sensing functions. When there is no battery, basic RFID tag functionality is still available through purely passive (i.e. field energized) communications.

The company's BAP tag is part of a family of RFID products that provide a wide range of security and privacy features including authentication, data encryption on the tag, and secured communications between the tag and reader — an industry first.

The LIME Tag 2.0 provides a flexible platform to meet a wide range of industry needs for security and sensing while supporting the ISO18000-6 standard. Customer costs and risks associated with new projects are significantly reduced through the many options provided by the LIME Tag 2.0 platform.

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Applications:

- Pharmaceutical and Biologics
- Border and Port Security
- Defense Applications
- Secure Supply Chain
- Asset Tracking and Management
- Contactless Payment Systems
- Food and other Cold Chain Management applications

Key Features:

Public-Key, Asymmetric Security

Authentication

- Strong authentication of the tag
- Guards consumer privacy e.g. HIPAA

Data Protection and Encryption

- Prevents tampering of the data in user area
- Non-cloneable
- Encrypts data communications
- Unique Session Keys
- Self contained public key (asymmetric) engine

Temperature Sensor

- Addresses cold chain management issues
- Monitors and securely records temperature history
- Improves safety and reliability of temperature sensitive products
- Temperature history and alarms retrieved via RFID reader

Other:

- Uses SecureRF's Algebraic Eraser and industry standards security protocols
- Supports EPCglobal UHF Class 1 Generation 2, and ISO specification 18000-6C including the pending revision for BAP and Sensors
- Operates with installed EPCglobal Gen 2 readers without the need for firmware upgrades
- Custom solutions available

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About SecureRF

SecureRF Corporation provides security solutions for wireless sensor networks, radio frequency identification (RFID), embedded systems, machine-to-machine (M2) and other low resource devices. SecureRF's methods enable high value asset tracking, monitoring and anti-counterfeiting applications in the pharmaceutical, defense and homeland security sectors. The company's technology, based on a breakthrough in cryptography that is lightweight yet highly secure, provides Onboard Security™ features such as authentication and data protection for passive, semi-active and active RFID tags and other embedded systems. SecureRF supports EPCglobal, DASH7 and ISO standards and offers both standard and custom products with optional sensors.

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Specifications:

Physical – Development Platform

Dimensions: 35mm (1.38") x 35mm (1.58") x 20mm (0.79")

Weight: < 1.5 oz.

Extended temperature range -40 deg C to +65 deg C

Battery: 3V coin cell (included and changeable), will operate as passive tag (without security but with temperature sensing) when battery runs down

Battery life with off-the-shelf CR2032 coin cell: 3 years of continuous reading or 1 million secure public key authentications

Low battery alarm can be read by RFID reader

RF Specifications

ISO 180006-C/EPCglobal Gen 2

All standard functions are supported including:

Passive-backscatter, interrogator-talks-first (ITF)

Operating Frequency: 860-960 Mhz – certain models may be antenna dependent

Operating Mode: Battery-Assisted Passive

Data rate-

Reader to Tag: Up to 128 Kbps nom.

Tag to Reader: Up to 640 Kbps

Subcarrier up to 320 KHz

Read Range: Up to 60 ft./20m depending on reader sensitivity

Write Range: Up to 60 ft./20m depending on reader sensitivity

Memory Utilization

EPC MEMORY: Up to 340 bits EPC or UID value

RESERVED MEMORY:

32-bit access password

32-bit "kill" password

TID MEMORY: Extended TID, serial number fixed at factory

USER MEMORY:

Gen2/180006-C User Memory: 3 Kbits

Block Permalock for permanent tamper protection of memory on 64 bit blocks at a time

Encrypted User Memory transmission (Lime 2S only): 1024 bits (expandable). This function should only be used with SecureRF Reader Authentication Software

Conforms to current proposed improvements to ISO 180006-C and EPC Global Gen2 standards including Flex_Query command, XPC bits, and simple sensor data response for readers that support these

Custom Commands

No custom Gen2 commands are required to operate the Lime 2 or Lime 2S, including built in temperature sensing, security, tamper protection, or battery alarm functions. Higher level software is available for driving these functions.

Several tag custom commands (support must be added to a reader) can be used for higher value functionality but are not required. Contact SecureRF for further information.

Temperature Sensor

Internal temperature sensors (requires battery): Hi Alarm, Low Alarm, and current temp

Accuracy: ±0.5° C accuracy -10° C to 20° C

±1.0° C accuracy -40° C to 64° C

Sensing interval: Programmable 1 Sec – 64 Hours

Alarms: Under Temp, Over Temp, and time of alarm

Physical Tamper Protection

Detection of a physical break is detectable on a sense pin. Contact SecureRF for further information.

Security

Completely secure operation without requiring any distribution of private information outside of the tag.

Algebraic Eraser Diffie-Hellman-like (AEDH) Key Exchange

Extensibility

Contact SecureRF with your functional requirements based on NRE