AeroScout®
Enterprise Visibility Solutions

AeroScout T2 Tag

User Guide

T2-UG-201108-02

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This product includes software developed by the Apache Software Foundation (http://www.apache.org/).

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Introduction

The AeroScout T2 Tag is a key component of the AeroScout Visibility System. The T2 Tag is a small Wi-Fi and active RFID device that enables the wireless network infrastructure to locate assets not connected to a wireless network. The tag can be attached to mobile equipment such as vehicles in parking lots, inventory in a manufacturing line, containers, forklifts and medical equipment in hospitals. The tag can also be used to track people - security personnel hospital patients, and many more.

Figure 1. AeroScout T2 Tag

Figure 2. AeroScout T2 Tag with Call Button

Figure 3. AeroScout T2 Tag with Multi-LED Visual Indication (transparent enclosure)

T2 Tag Features

Temperature and Motion Sensing

Tags are shipped with on-board motion sensors that report when it starts to move and whether it is in motion or not. Tags can optionally be equipped with temperature sensors that can report the changes in temperature or exceeded temperature thresholds.

Telemetry Functionality

The T2 Tags include a serial interface that enables customized connectivity to host units for data retrieval. The tags can be configured to retrieve data from the host periodically and to send the data together with location messages. Applications for this function may include reading mileage and fuel information from cars or reading temperature from shipping containers (Such implementations require specific integration and additional hardware).

Call Button Functionality

T2 Tags that include the call button can be configured to send data retrieved from a host (telemetry) or a standard Tag message when the call button is pressed or released.

The tag can be configured to send different data depending on how the button is pressed: different messages can be associated with a long push of the button and with short, successive pushes.

Intrinsically Safe Tags

Intrinsically safe tags are specially designed to function in potentially hazardous environments. They are designed in a manner that prevents explosions in hazardous locations by employing electrical designs that eliminate the possibility of ignition (due to spark, increased temperature, and the like).

Flexible Mounting and Usage Options

The tag's small size and weight, and convenient form factor, allow mounting on people and a variety of assets. Mounting accessories include wrist band, badge clip and mounting cradle. Other industry-specific mounting accessories are available, including infusion pump mounting accessories, fixed and temporary trailer mounts and more.

Long Battery Life

A powerful, replaceable battery provides power for a period of up to 4 years. The Tag periodically provides a report on the battery level so that when the battery level runs low, it can be replaced efficiently with minimum down time. The AeroScout T2 Tag can also be easily deactivated in order to conserve battery power.

Tag Management

The T2 Tag can be programmed via a wireless interface using the AeroScout Tag Activator. Together with the AeroScout Tag Manager software it allows for easy and efficient Tag configuration, activation or deactivation and programming.

Tag Programmability and Storage

The T2 Tag can store up to 10 messages of 10 bytes each. These messages can either be pre-programmed via the Tag Manager or programmed on the fly by an AeroScout Exciter when a tag is in proximity to it. These messages can also be transmitted in addition to the standard location messages (the tags can be either configured to transmit one of the messages or triggered by an AeroScout Exciter to transmit a specific message).

Active RFID Functionality

Using the AeroScout Exciter, the tag sends out specific location reports upon arrival at chokepoints or gateways. The tag behavior can also be automatically modified while passing through a chokepoint such as a doorway or gate. This includes activating/deactivating tags or changing the tags' transmission rate to accommodate different usage patterns.

Compatibility and Non-interference

AeroScout Tags are 802.11b compatible. The tag's clear channel sensing techniques avoid interference with Wi-Fi networks. The use of the unlicensed 2.4GHz frequency band at low power levels ensures no interference with other wireless equipment, making AeroScout tags safe for use with such sensitive equipment as medical devices in a hospital.

Rugged Performance

AeroScout Tags are designed to function in harsh work environments and weather conditions. The tag enclosure is water-resistant and designed to withstand significant physical shocks.

Tag Mounting

The AeroScout T2 Tag is enclosed in a compact case and offers a variety of mounting options described in this section.

Wrist Strap

Optional accessory - Can be used to strap the tag around the wrist.

Figure 4. AeroScout T2 Tag with Wrist Strap

Velcro or Double-Sided Tape

Apply the adhesive material at the back of the tag and fix the tag on the asset.

Using the Mounting Cradle

The mounting cradle allows you to fix the tag on surfaces where it cannot be attached using the adhesive material or the strap. Using the cradle, tags can be easily removed and replaced without the need to handle adhesives.

Fixing The Cradle to a Surface Using Screws

Follow these steps:

1. Screw the cradle on the asset, using four screws.

Figure 5.

2. Snap the tag into the cradle.

Securing the Tag to the Cradle

After snapping the tag into the cradle it is possible to secure the tag to the cradle using a strap.

Figure 6.

1. Thread the cradle strap through the middle strapping holes and through the tag's back rail.

Figure 7.

2. Tie the strap around the front of the tag.

Attaching the Cradle to a Pole

You can attach the cradle to a pole using two narrow straps. Follow these steps:

1. Thread the cradle strap through the two pairs of strapping holes.

Figure 8.

2. Tie the straps to the pole.

3. Snap the tag into the cradle (or first tie the tag to the cradle and then attach it to the pole).

Figure 9.

Removing the Tag from Cradle

The cradle holds the tag tightly. Gently separate the tag from the cradle using a small screwdriver and then pull the tag out.

Figure 10.

Fixed Tag Trailer Mount

An optional accessory, the Fixed Tag Trailer Mount is intended for permanently mounting the tags on top of trailers and containers. The Fixed Tag Trailer Mount should be placed at the top of the trailer in order to achieve the best possible performance and location accuracy.

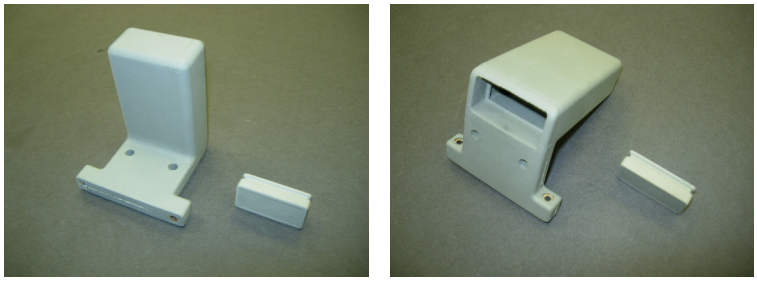

Figure 11. Fixed Tag Trailer Mount

Installing a Fixed Trailer Mount on a Trailer

1. Insert the Tag into the mount (with the thin side of the Tag first). Verify that the T2 Tag's multifunctional attachment plate is not attached to the Tag on its back side.
2. Slide the Tag until it snaps into place.
3. Insert the holster cover until it completely sinks into the aperture. Note that when the cover is completely in place, it should be sunk into the holster in a manner that its surface is sunk deeper than the fixed mount's bottom surface.
4. Attach the AeroScout and barcode labels to the upper side of the holster and to the cover, making sure that the labels fit *exactly* in place. **Note that the barcodes on the mount must be identical to the barcodes on the tag.**
5. Attach the mount to the vehicle.

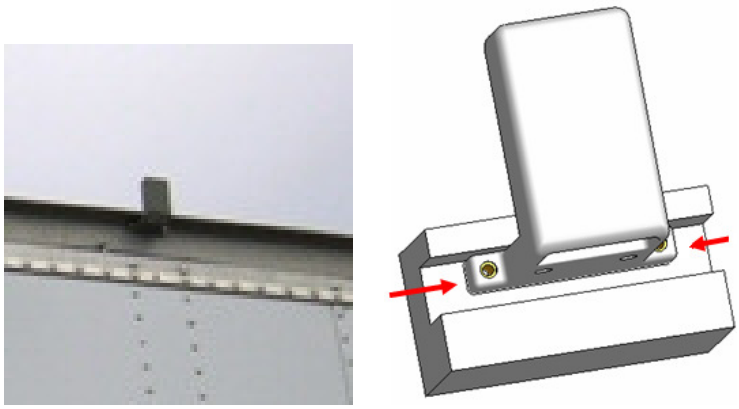

Figure 12. Fixed Tag Trailer Mount attached to vehicle

Note

To learn more about the Fixed Tag Trailer Mount, please refer to the *AeroScout Fixed Tag Trailer Mount User Guide*.

Tag Management

The AeroScout T2 Tag can be configured, programmed and activated via a wireless interface. This is done with the help of the AeroScout Tag Manager application and the AeroScout Tag Activator.

In addition, Tag Manager is used to activate and deactivate tags and to program stored messages on the tags.

The Tag Manager functions can also be activated via APIs that enable easy integration with third-party applications.

Please refer to *AeroScout Tag Manager User Guide* and *AeroScout Tag Manager API User Guide*.

Tag Maintenance

Replacing the Internal Battery

The AeroScout Tag uses one 3.6V Lithium Thionyl Chloride (LTC) ½ AA size cell. This internal battery can last up to 4 years depending on the configured tag parameters (e.g. the transmission interval rate).

Figure 13. T2 Tag Battery

To replace a battery:

1. Deactivate the tag with Tag Activator and Tag Manager (recommended).
2. Remove the rear panel by unscrewing the case screws.
3. Carefully remove the old battery from the battery holder.

Note

Do not use a metal object to remove the battery

4. Install a new 3.6V lithium Thionyl Chloride ½ 'AA' size battery in the battery holder.

   

   WARNING: Use only batteries listed in Table 1 or batteries that have been approved by AeroScout. There is a danger of fatal tag damage if the battery is replaced incorrectly or by an incorrect type. Dispose used batteries according to the instructions.

5. Close the rear panel.
6. Activate the tag.
7. Dispose of the old lithium Thionyl Chloride battery properly.

   

   WARNING: Local regulations vary. Federal regulations allow up to 100 kg./month of lithium thionyl chloride batteries to be disposed in common landfill. All leads (the terminals) should be taped to prevent short circuit. The user is responsible for safe disposal.

Table 1 presents the approved battery types for the T2 tag:

Manufacturer	Battery Part Number
Tadiran	TL-5902
Xeno Energy	XL-050F
Sonnenschein	SL-350
Saft	LS-14250C

Table 1 – T2 Tag Approved Battery Types

Tag Battery Life

Table 2 presents battery life estimates for a new T2 tag battery. The parameters that affect battery life include the tag transmission interval and the number of transmission channels configured for the tag.

Note

The calculations in the table below are true for an operating temperature of 20ºC. The calculations do not take into consideration additional factors such as Exciter activations of Tag, since these are individual parameters.

Transmission Interval	Estimated Battery Life for: 1 channel, 1 transmission repetition	Estimated Battery Life for: 1 channel, 2 transmission repetitions	Estimated Battery Life for: 3 channels, 1 transmission repetition	Estimated Battery Life for: 3 channels, 2 transmission repetitions
1 second	64 days	33 days	22 days	11 days
5 seconds	275 days	151 days	104 days	54 days
10 seconds	1.27 years	275 days	195 days	104 days
30 seconds	2.33 years	1.64 years	1.27 years	275 days
1 minute	2.95 years	2.33 years	1.92 years	1.27 years
3 minutes	3.59 years	3.24 years	2.95 years	2.33 years
5 minutes	3.75 years	3.51 years	3.3 years	2.8 years
30 minutes	3.97 years	3.93 years	3.88 years	3.75 years
1 hour	4 years	3.97 years	3.95 years	3.88 years

Table 2 – T2 Tag Battery Life

Figure 14 and 15 present the Tag battery life at different operating temperatures.

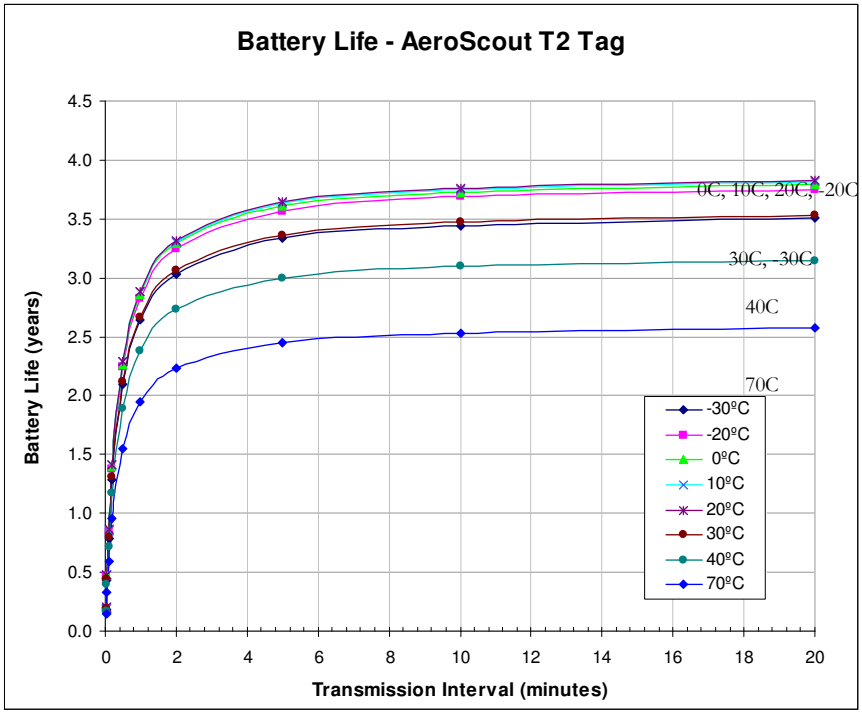

Figure 14. T2 Tag Battery Life in Different Operating Temperatures

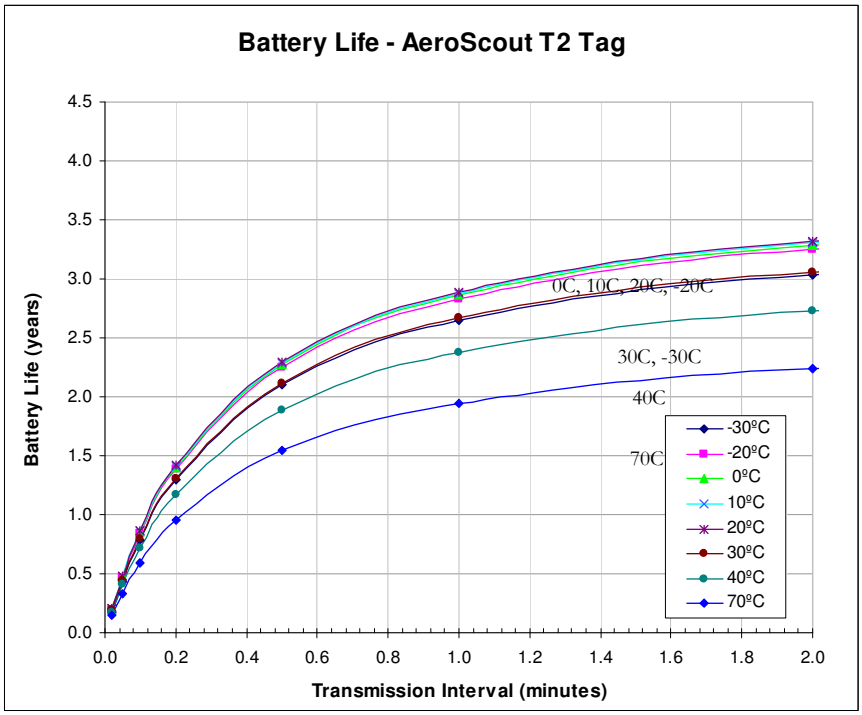

Figure 15. Tag Battery Life in Different Operating Temperatures

Cleaning the Tag

Cleaning the external surface of the Tag's housings can be done using Alcohol or Chloride based wipers only

T2 Tag Models

AeroScout T2 Tag	Comments	Model
AeroScout T2 Tag	Includes 1/2AA Lithium battery and motion sensor	BWH3000
AeroScout T2 Tag with Call Button	Includes 1/2AA Lithium battery, call button and	BWH3000-C
AeroScout T5 Tag with Temperature Sensor	Includes 1/2AA Lithium battery and on-board temperature sensor.	TAG 5100
AeroScout T2 Tag with Multi-LED Visual Indication	Transparent tag enclosure. Includes 1/2AA Lithium battery and 3 LEDs	BWH3000-L
AeroScout T5 Tag with Call Button and Temperature Sensor	Transparent tag enclosure. Includes 1/2AA Lithium battery, call button and on-board temperature sensor.	TAG 5100-C
AeroScout T2 Tag with Call Button and Multi-LED Visual Indication	Transparent tag enclosure. Includes 1/2AA Lithium battery, call button, 3 LEDs	BWH3000-CL

Table 3 – Regular T2 Tags Models

Intrinsically Safe T2 Tag Models

AeroScout T2 Tag	Comments	Model
AeroScout Intrinsically Safe T2 Tag for Gas Group IIB	Includes 1/2AA Lithium battery. ATEX certified, Gas Group B, II 1 G EEx ia IIB T4/T5/T6 & I M1 EEx ia	BWH3000-X1
AeroScout Intrinsically SafeT2 Tag with Call Button for Gas Group IIB	Includes 1/2AA Lithium battery, call button, ATEX certified, Gas Group B, II 1 G EEx ia IIB T4/T5/T6 & I M1 EEx ia	BWH3000-CX1
AeroScout Intrinsically Safe T2 Tag for Gas Group IIC	Includes 1/2AA Lithium battery. ATEX certified, Gas Group C, II 1 G EEx ia IIB T4/T5/T6 & I M1 EEx ia	BWH3000-X2
AeroScout Intrinsically SafeT2 Tag with Call Button for Gas Group IIC	Includes 1/2AA Lithium battery, call button, ATEX certified, Gas Group C, II 1 G EEx ia IIC T4/T5/T6 & I M1 EEx ia	BWH3000-CX2
AeroScout Intrinsically SafeT2 Tag for mining group I	Includes 1/2AA Lithium battery ,ATEX certified, Mining Group I, I M1 EEx ia I	BWH3000-X3
AeroScout Intrinsically SafeT2 Tag with Call Button for mining group I	Includes 1/2AA Lithium battery, call button, ATEX certified, Mining Group I, I M1 EEx ia I	BWH3000-CX3
AeroScout Intrinsically Safe T2 Tag MSHA Certified	Includes 1/2AA Lithium battery. MSHA certified.	BWH3000-X4
AeroScout Intrinsically SafeT2 Tag with Call Button MSHA Certified	Includes 1/2AA Lithium battery and call button. MSHA certified.	BWH3000-CX4
AeroScout Intrinsically Safe T2 Tag FM Certified	Includes 1/2AA Lithium battery. FM certified, Class I, II, III Div 1 Groups A,B,C,D,E,F T4, T5, T6	BWH3000-X5
AeroScout Intrinsically SafeT2 Tag with Call Button FM Certified	Includes 1/2AA Lithium battery and call button. FM certified, Class I, II, III Div 1 Groups A,B,C,D,E,F T4, T5, T6	BWH3000-CX5

Table 4 – Intrinsically safe T2 Tags Models

Tag Accessory Models

Mounting Accessories	Comments	Model
Tag cradle	For attaching the tag to a pole or similar surface.	TAC-250
Removable Tag Trailer Mount	For temporary mounting on trailers and containers	TAC-040

Mounting Accessories	Comments	Model
Fixed Tag Trailer Mount	For permanent mounting on trailers/vehicles/equipment	TAC-240
T2 Tag Wrist Straps 50-pack	Sutitable for T2 Tags attachment to the wrist	TAC-220
Velcro Attachment Kit 50-pack	Velcro Patches	TAC-030
Double-sided Tape Attachment Kit 50-pack	Adhesive Tape patches	TAC-031
Tag Management		
Tag Management Suite	Includes Tag Activator, Tag Manager Software and 110/220V to 5V adaptor	
US Suite	Includes 110/220v to 5v adapter (US)	BWH-1000-02-TA-U
Europe Suite	Includes 110/220v to 5v adapter (Europe)	BWH-1000-02-TA-E
Japan Suite	Includes 110/220v to 5v adapter (Japan)	BWH-1000-02-TA-J
Other		
T2 Tag Battery 25-Pack		TAC-230
T2 Tag Battery 50-Pack		TAC-231

Table 5 – Tag Accessory Models

Specifications

Tag Specifications

Performance

Outdoor range: Up to 200m (600 feet)

Indoor range: Up to 80m (180 feet)

Physical and Mechanical

- Dimensions: 2.44" x 1.57" x 0.67"(62mm x 40mm x 17mm)
- Weight: 1.2oz (35g)

Radio

- 802.11b radio (2.4GHz)
- Low frequency receiver (125kHz)
- Transmission power: up to +19dBm, ~81mW
- Clear channel sensing avoids interference with wireless networks

Environmental Specifications

- Temperature: -30°C to +75°C (-22°F to 167°F)
- Humidity: 0 to 100%, condensing
- The housing is water and dust resistant and includes a rubber lining.
- IP-65

Electrical

- 3.6V Lithium ½ AA battery (replaceable)
- Battery life: up to 4 years

Certification

- Radio:
  - FCC Part 15, sub-part C class B, sub-part B
  - EN 300-328, EN 300-330, EN 301-489
  - RSS 210 (Canada)
  - ARIB STD-T66 (Japan), ARIB STD-33 (Japan)
  - MIC (Korea)
- Safety:
  - CE
  - cTUVus (EN60950)
  - for Intrinsically safe models only
    - ATEX certified, Gas Group B, II 1 G EEx ia IIB T4/T5/T6 & I M1 EEx ia
    - ATEX certified, Gas Group C, II 1 G EEx ia IIB T4/T5/T6 & I M1 EEx ia
    - FM certified, Class I, II, III Div 1 Groups A,B,C,D,E,F T4, T5, T6
    - MSHA certified

Temperature Sensor Specifications

- Measurable temperature range: -30 to 75 °C
- Measurement resolution: 0.03deg C
- Measurement error:

Range	Typical Accuracy	Maximum Accuracy
-30°C to 0°C	± 1 °C	± 2 °C
0°C to 70°C	± 0.5 °C	± 1 °C
70°C to 75°C	± 1 °C	± 2 °C

- Measured sensor data:

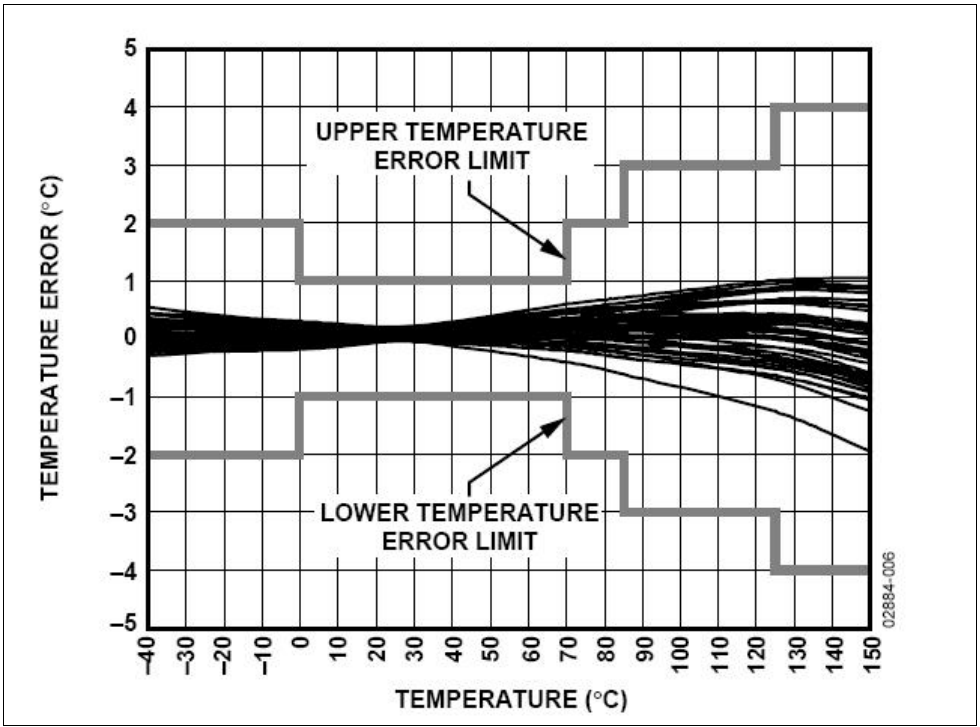

Figure 16. Sensor measurement results

Safety and Warnings

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:
a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and receiver.
c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
d) Consult the dealer or an experienced radio/TV technician.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:
a) This device may not cause harmful interference
b) This device must accept any interference received, including interference that may cause undesired operation.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

Warranty

Hardware. AeroScout Inc. ("AeroScout"), warrants that commencing from the date of delivery to Customer, and continuing for a period of ninety (90) days the Hardware will be free from defects in material and workmanship under normal use. The date of shipment of a Product by AeroScout is set forth on the packaging material in which the Product is shipped. This limited warranty extends only to the original user of the Product. Customer's sole and exclusive remedy and the entire liability of AeroScout and its suppliers under this limited warranty will be, at AeroScout's or its service center's option, shipment of a replacement within the period or a refund of the purchase price if the Hardware is returned to the party supplying it to Customer, if different than AeroScout, freight and insurance prepaid. AeroScout replacement parts used in Hardware repair may be new or equivalent to new. AeroScout's obligations hereunder are conditioned upon the return of affected articles in accordance with AeroScout's then-current Return Material Authorization (RMA) procedures.

Restrictions. This warranty does not apply if the Product (a) has been altered, except by AeroScout, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by AeroScout, (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident; or (d) is sold for beta, evaluation, testing, or demonstration purposes for which AeroScout does not receive a payment of purchase price or license fee.

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