STANLEY

UWB Location Receiver – LR2000R

Installation Guide

November 2015

0981-280-000 Rev B

AeroScout Industrial

Disclaimer

The information and know-how included in this document are the exclusive property of AeroScout Inc. and are intended for the use of the addressee or the user alone. The addressees shall not forward to another their right of using the information, know-how or document forwarded herewith, in whole or in part in all matters relating or stemming from or involved therein, whether for consideration or without consideration, and shall not permit any third party to utilize the information, know-how or the documents forwarded herewith or copies or duplicates thereof, unless at the company's consent in advance and in writing. Any distribution, advertisement, copying or duplication in any form whatsoever is absolutely prohibited. The Company reserves the right to sue the addressee, user and/or any one on their behalves, as well as third parties, in respect to breaching its rights pertaining to the intellectual rights in particular and its rights of whatever kind or type in the information, know-how or the documents forwarded by them herewith in general, whether by act or by omission.

This document is confidential and proprietary to AeroScout Inc. and is not to be distributed to any persons other than licensed AeroScout Visibility System users or other persons appointed in writing by AeroScout Inc.

Trademark Acknowledgements

AeroScout™ is a trademark of AeroScout, Inc. Other brand products and service names are trademarks or registered trademarks of their respective holders.

Cisco™ is a trademark of Cisco Systems, Inc.

Copyright ©2015 AeroScout Inc. All rights reserved.

0981-280-000 Rev A

Table of Contents

Introduction **5**

LED Status Indicators **6**

uLR Connection **7**

Network and Power Connections **9**

Direct Power Supply 9

PoE Switch 9

110/220 VAC to 48 VDC PoE Single-Port Injector 10

Power Connection Summary 10

Resetting the uLR IP Address **11**

Configuring the uLR **12**

Chaining ULRs **13**

Mounting the uLR **14**

Mounting the uLR on a Wall 14

Mounting the uLR on a Pole 15

Appendix A: Ordering Information **18**

Appendix B: uLR Specifications **19**

Appendix C: Chemical Compatibility **21**

REVISION HISTORY		
Revision	**Date**	**Comments**
1	March 2015	Draft Document

Introduction

The UWB Location Receiver-LR2000R (uLR) is a component of the AeroScout suite of enterprise-level visibility solutions. This product provides accurate, robust and sophisticated real time detection and location of tags using Wi-Fi and Ultra Wide Band (UWB) communication.

The uLR is used to complement the AeroScout Wi-Fi based solution by accurately triangulating Tags in areas where sub-meter accuracy is required.

Figure 1: LR2000R-uLR

LED Status Indicators

The uLR has three LEDs that change color based on the unit status as follows:

Figure 2: LED indications

Left LED: Chaining indication

- Constant Green: chaining connected, no communication
- Blinking Green: communication in progress

Middle LED: UWB status

- Single Blue blink: UWB ranging success
- Double Blue blink: UWB ranging failed
- Constant Red: unit malfunction.

Note

The status LED shall remain red during initialization. Under normal conditions, this indication shall be visible for less than a second.

Right LED: Network indication

- Constant Green: network connected, no communication
- Blinking Green: communication in progress

uLR Connection

The uLR has three connectors, two antennas, and an IP Reset button.

Figure 3: uLR Connectors

(#1) Ethernet LAN Connection: IP67 rated RJ-45 connector, used for Ethernet cable connection to the LAN. This connection is also used for Power over Ethernet (PoE, 802.3af).

(#2) Power Connector: Accepts an input voltage of 48V DC. This is a standard M8 connector for direct power supply. The power adapter is not supplied with the ULR and can be purchased separately. When PoE or chaining is used, this connector becomes redundant.

(#3) Chain IN/ OUT: IP67 rated RJ-45 connector. This connector is used for data and power chaining of multiple uLRs (currently only power chaining is supported).

(#4) IP Reset: Restores the ULR's IP address to the company-set default value. To gain access, unscrew the cover screw and press using a pin.

(#5) UWB Antenna: N-Type connector for UWB Antenna. The UWB Antenna is mandatory for the uLR operation.

Note

The uLR is supplied with a half spher UWB Antenna. In some deployments, a full sphere coverage antenna may be preferred, and can be bought seperately.

(#6) Wi-Fi Antenna: N-Type connector for Wi-Fi Antenna. The WiFi Antenna is mandatory for the uLR operation.

Network and Power Connections

Direct Power Supply

To connect to the power supply, connect a 110/220 VAC to 48 VDC power adapter to the ULR's power connector.

Figure 4: 110/220 VAC to 48 VDC Adapter

Note

The uLR requires approximately 5 W of power. When connecting a uLR to a direct power source, verify that the power level is sufficient.

uLRs must only be powered by a limited (marked LPS or NEC class 2) power supply.

PoE Switch

If your network has a Power-over-Ethernet infrastructure, you can connect a CAT-5/6 Ethernet cable from the PoE switch to the uLR's LAN connector. This supplies both the power and the network connection.

Note

Due to PoE safety regulations, the PoE switch and the uLR must be located in the same building/ campus.

110/220 VAC to 48 VDC PoE Single-Port Injector

The PoE Single Port Injector converts 110/220 VAC to 48 VDC. In addition, it can receive a network connection and you can run a single cable to the uLR's LAN connector, thus supplying both power and network connectivity.

When using this injector, the uLR power jack is not used.

Figure 5: 110/220 VAC to 48VDC PoE Single-Port Injector

The injector's IN connector is connected to the network. The injector's OUT connector is connected to the uLR's LAN connector.

Power Connection Summary

The following table summarizes the power connection options:

Power Supply	Input	Output	Max. Current	Available Power	Maximum # of uLRs with One Source
PoE single port injector	100–240 VAC, 50–60 Hz	48 VDC	0.32 A(1)	15.4 W	3
Standard PoE 802.3af switch port	–	48 VDC	0.32 A(1)	15.4 W	3
External power adapter	–	48 VDC	> 0.32 A	> 15 W	3

Note

At this point, only data chaining is supported. In future uLR Firmware versions, power chaining shall be supported as well.

Resetting the uLR IP Address

You can reset the uLR's IP address to the factory default value. The default IP address is 192.168.61.240.

To do so, unscrew the screw covering the IP reset button, and press the **IP Reset button** with a ballpoint pen until a blinking red led indication appears.

Figure 6: IP Reset Button

Configuring the uLR

The Rugged uLRs are configured using the AeroScout Engine Manager (AEM). For detailed configuration instructions, refer to the AeroScout Location Engine Deployment and Administration Guide.

Chaining ULRs

Depending on the deployment layout, you may choose to chain uLRs one to another in order to reduce the amount of cabling.

Up to 3 uLRs may be chained to each other.

Chained uLRs do not require any special setup or configuration beyond the cabling connections.

Note

At this point, only data chaining is supported. In future uLR Firmware versions, power chaining shall be supported as well.

Mounting the uLR

Mounting the uLR on a Wall

In order to mount the uLR to a wall, do the following:

1. Connect the mounting plate to the wall in the slots (shown here) using 4 screws. You may use the mount as a drill template to mark the drill hole locations.

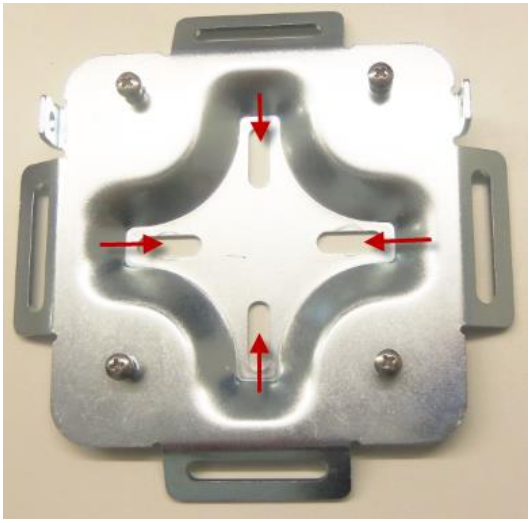

Figure 7: Hanging the Wall Mount

2. After the mounting plate is secured to the wall, snap the uLR on the mounting plate using the 4 key holes. Push down until you hear a "snap".
3. Secure the uLR using two screws (supplied) on the sides of the mounting plate.

Figure 8: Securing the Sides

Mounting the uLR on a Pole

In order to mount the uLR to a pole, do the following:

4. Secure the pole mounting kit to the mounting plate in the desired orientation. When securing, use pliers to secure the nut while tightening the front screws with Allen Key # 5. Use the supplied flat washers and spring-locking washers.

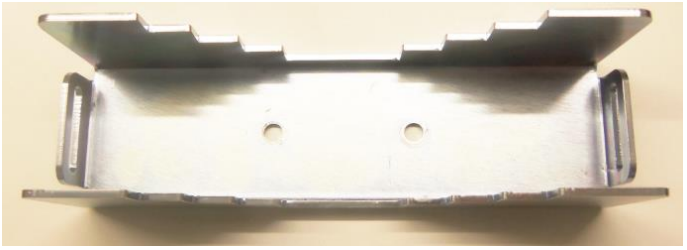

Figure 9: Pole Mounting Kit

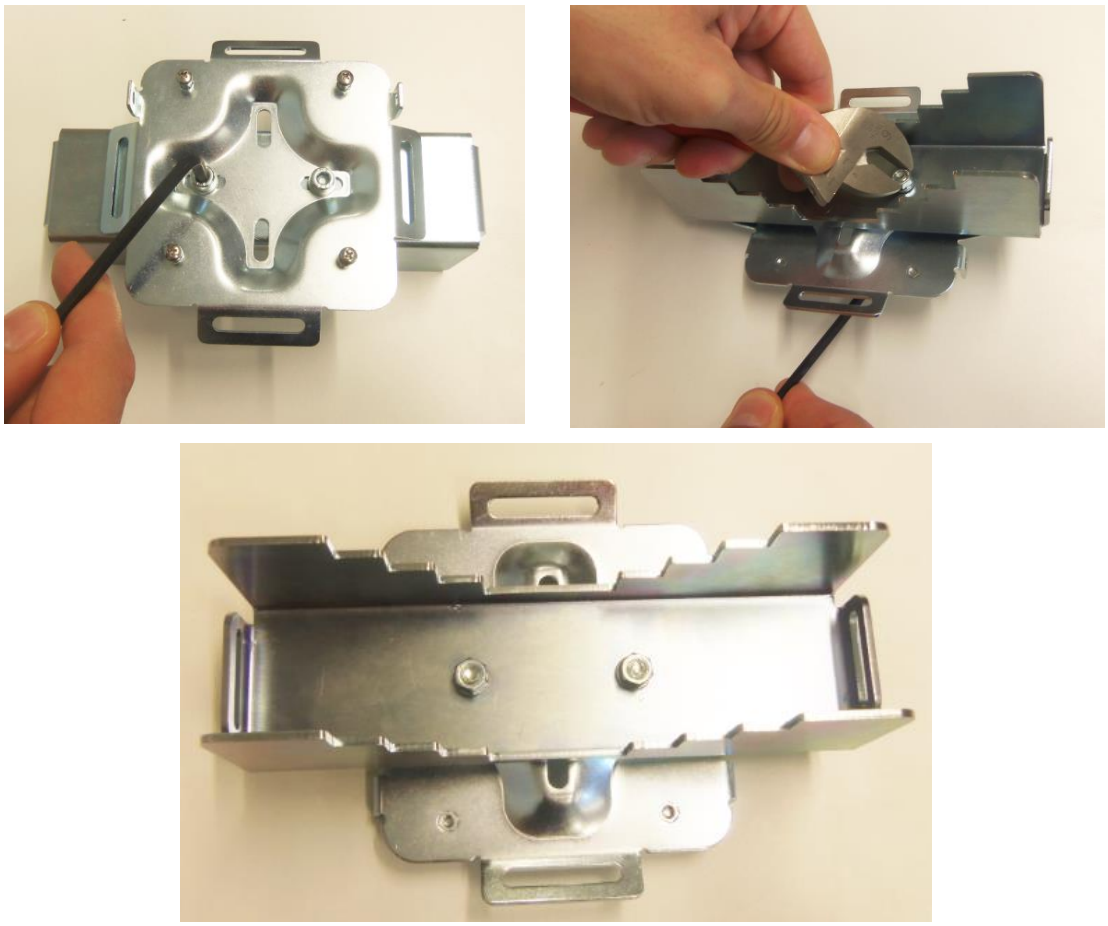

Figure 10: Tightening the Front Screws

5. Insert metal tie-wraps through the side slots and then wrap and secure around the pole.

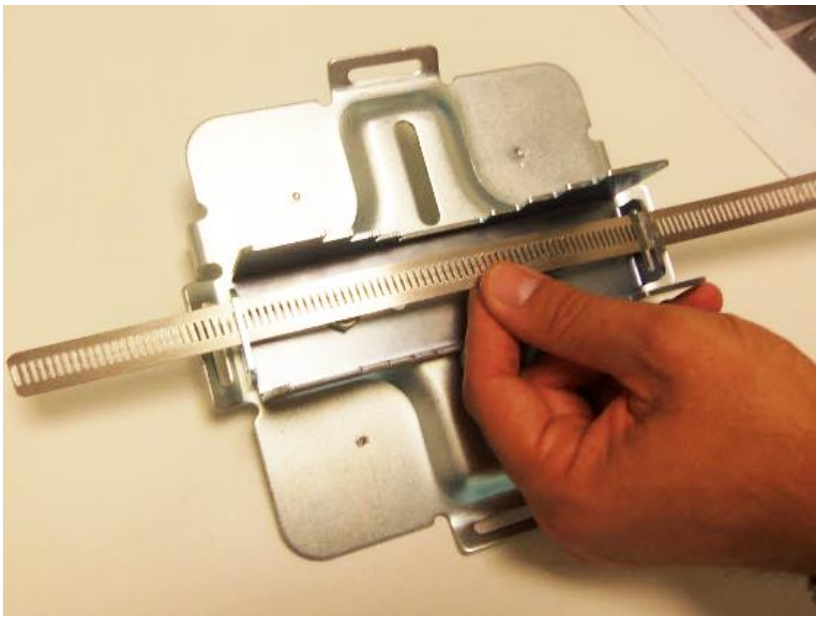

Figure 11: Inserting the Metal Tie Wraps through the Side Slots

6. After the mounting plate is secured to the pole, snap the uLR on the mounting plate using the 4 key holes. Push down until you hear a "snap".

7. Secure the uLR using two screws on the sides of the mounting plate.

Note

When mounting to a large diameter pole, the pole mount may not be needed. Instead, use the wall mount as a pole mount, and use the slots on the wall mount sides for the tie wrap.

Appendix A: Ordering Information

Product	SKU	Description
UWB LR	IND-LR-2000R	UWB LR includes 48 VDC input, LAN/ PoE and Chaining interface. UWB Antenna, Wi-Fi Antenna and wall mounting plate included. Pole mount and power supply not included.
uLR/ EX5200R/ EX5500R Pole mount Kit	IND-AC-100	Pole mounting kit for uLR. Includes pole bracket to be attached to the unit's mounting plate, a metal tie wrap and screws.
180 UWB Antenna (spare)	AC-UA-1801	Spare UWB half sphere for wall/ ceiling installations (180° * 180° coverage);
360 UWB Antenna	AC-UA-3601	Omni-directional UWB antenna for uLR (full 360° coverage).
90deg UWB antenna adapter	AC-UA-9001	
Wi-Fi Antenna (spare)	AC-WA-3601	Spare Wi-Fi___33 antenna for uLR
PoE Injector 110/220VAC-48VDC	ADP-030-U (US) ADP-030-E (Europe) ADP-030-UK (UK) ADP-030-J (Japan)	PoE Power Injector for use with EX200B, EX3210, EX4200, EX5000 and EX5200 ULRs. 110/220VAC-48VDC.

Appendix B: uLR Specifications

Physical and Mechanical

- Dimensions: (without antennas and back-plate): 185mm x 161mm x 53mm (7.2 in. x 6.3 in. x 2.1 in.)
- Dimensions: (with antenna and back-plate): 295mm x 161mm x 60mm (11.61 in. x 6.3 in. x 2.3 in.)
- Weight: 700 g (24.69 oz.)

Recommended uLR density

- 25m between uLRs in cluttered environments, where line of site is not guaranteed (such as a factory floor)
- 50m between uLRs in clear line of site environments

UWB Channel

- UWB Channel Number: 2
- Centre Frequency (MHz) - 3993.6
- Band - 3774-4243.2
- Bandwidth - 499.2

Network Interface

- Ethernet (RJ-45)
- Wi-Fi 802.11b/g/n

Power

- Input voltage: 48 VDC
- PoE (802.3af) 48 VDC
- Maximum power consumption: 5W

Environmental

- Operating temperature: -30 to 65°C (-22°F to 149°F)
- Humidity: 0 to 95%, non-condensing

- IP67 ingress protection
- Tested in accordance to MIL-STD 801F (temperature, humidity, drop, vibration, shock, ingress, rain/ icing, ESD and chemical resistance)

Certifications

- EMC Certifications:
  - US standard: FCC part 15 sub part B
  - European standard: ETSI 300.328, 300.330, ETSI 301.489
- Safety Certifications:
  - US – cTUVus: UL 60950-1; -22
  - Europe – CE mark: EN 60950-1; -22
- Radio Certification:
  - US Standard FCC part 15 sub-part C section 15.247
  - UWB for US: FCC part 15 sub-part F (UWB)
  - Europe: EN302.065 version 1.2.1

Appendix C: Chemical Compatibility

The following table summarizes the uLR's resistance to various chemical compounds.

Use this key:

- R - Resistant
- LR - Limited Resistance (gradual attack over time may occur)
- N - Not Resistant (rapid attack or attack over short time period will occur)

Chemical	Comments
Acetaldehyde	N
Acetic Acid (10% concentration)	R
Acetic Acid (25% concentrated)	N/LR
Acetone	N
Acetylene	R
Acrylonitrile	N
Allyl Alcohol	LR
Alum (Aluminum Ammonium Sulfate)	R
Aluminum Oxalate	R
Aluminum Sulfate	R
Aluminum Chloride (Saturated)	R
Ammonia (Gas)	N
Ammonia (Aqueous)	N
Ammonium Carbonate	LR

Chemical	Comments
Ammonium Chloride	R
Ammonium Fluoride	N
Ammonium Hydroxide	N
Ammonium Nitrate	R
Ammonium Sulfate (Saturated)	R
Ammonium Sulfide	N
Amyl Acetate	N
Amyl Alcohol	LR
Aniline	N
Antimony Trichloride (Saturated)	R
Aqua Regia (3 parts HCl:1 part HNO3)	LR
Arsenic Acid (20% Concentration)	R
Automatic Switch Grease	R
Automotive Waxes	LR
Barium Chloride	R
Battery Acid	R
Benzaldehyde	N
Benzene	N
Benzoic Acid	N
Benzyl Alcohol	N
Betadine	R
Boric Acid	R
Brake Fluid	N
Bromine	N
Bromobenzene	N
Butane	R
Butyl Acetate	N

Chemical	Comments
Butyl Alcohol (Butanol)	R
Butylene Glycol	R
Calcium Chloride (Saturated)	R
Calcium Hypochlorite	R
Calcium Nitrate	R
Butyric Acid	N
Camphor Oil	N
Carbolic Acid	N
Carbon Bisulfite	N
Carbon Dioxide Gas (Moist)	R
Carbon Disulfide	N
Carbon Monoxide	R
Carbon Tetrachloride	N
Caustic Potash (Potassium Hydroxide)	N
Caustic Soda (Sodium Hydroxide)	N
Chlorine Gas (Dry)	LR
Chlorine Gas (Wet)	N
Chlorobenzene	N
Chloroform	N
Chrome Alum (saturated)	R
Chromic Acid (20% concentrate)	R
Coal Gas	R
Copper Sulfate (saturated)	R
Cresol	N
Cupric Chloride (saturated)	R
Cuprous Chloride (saturated)	R
Cyclohexane	R

Chemical	Comments
Cyclohexanol	LR
Cyclohexanone	N
DDT	R
Decalin	R
Developing Solutions	N/LR
Diamyl Phthalate	N
Diesel Fuel	R
Diethyl Ether (Ethyl Ether)	N
Dimethyl Formaldehyde (DMF)	N
Dimethyl Sulfoxide (DMSO)	N
Dinonyl Phthalate (plasticizer)	LR
Dioctyl Phthalate (plasticizer)	LR
Dioxane	N
Diphyl 5,3	LR
Ethanol (Ethyl Alcohol) and Water (96% Concentration)	R
Ethanol (Ethyl Alcohol)	LR
Ethyl Amine	N
Ethyl Acetate	N
Ethyl Bromide	N
Ethylene Chloride	N
Ethylene Chlorohydrin	N
Ethylene Dichloride	N
Ethylene Glycol (Antifreeze)	LR
Ferric Chloride (Saturated)	R
Ferrous Sulfate	R
Formalin (10% concentration)	R

Chemical	Comments
Freon TF	R
Freon (all others)	N
Gasoline	N
Glycerin	R
Glycerol	R
Glycols	R
Glutaraldehyde (50% concentration)	R
Grease, Automotive (Most)	R
Heptane	R
Hexane	R
Hydrazine	R
Hydrazine	N
Hydrochloric Acid	N
Hydrofluoric Acid (20% concentrate)	R
Hydrogen Sulfide	R
Iodine (aqueous solution) (5% concentration)	R
Iodine	N
Isoamyl Alcohol	LR
Isopropyl Alcohol	R
Kerosene	N
Lacquers and Thinners	N
Ligroin (Hydrocarbon Mixture)	R
Loctite	N
Machine Oils (Most)	R
Magnesium Chloride (saturated)	R
Magnesium Sulfate (saturated)	R

Chemical	Comments
Manganese Sulfate (saturated)	R
Mercuric Chloride (saturated)	R
Mercury (saturated)	R
Methane	R
Methanol (Methyl Alcohol)	LR
Methylamine	N
Methyl Cellosolve	N
Methylene Chloride	N
Methyl Ethyl Ketone (MEK)	N
Methyl methacrylate	N
Naphtha (Stanisol)	N
Nickel Sulfate	R
Nitric Acid (20% concentration)	R
Nitrobenzene	N
Nitropropane	N
Nitrous Oxide	N
Ozone	N
Oleic Acid	R
Oxalic Acid (10% concentration)	R
Oxygen	R
Paraffin	R
Pentane	R
Perchloric Acid (10% concentrate)	R
Perchloroethylene	N
Petroleum	LR
Petroleum Ether	LR
Petroleum Oil (Refined)	R

Chemical	Comments
Phenol	N
Phosphoric Acid (10% concentrate)	R
Phosphorous Oxychloride	R
Phosphorous Pentoxide	LR
Phosphorous Trichloride	N
Polyethylene	R
Polyethylene Glycol	R
Potassium Acetate	LR
Potassium Aluminum Alum (Sulfate) (Saturated)	R
Potassium Bichromate	R
Potassium Bromate	R
Potassium Bromide	R
Potassium Chloride	R
Potassium Cyanide	N
Potassium Dichromate (Saturated)	R
Potassium Hydroxide	N
Potassium Metabisulfite (4% concentrate)	R
Potassium Nitrate (Saturated)	R
Potassium Perchlorate (10 % concentrate)	R
Potassium Permanganate (10 % concentrate)	R
Potassium Persulfate (10 % concentrate)	R
Potassium Rhodanide (Saturated)	R
Potassium Sulfate (Saturated)	R
Propane	R
Propargyl Alcohol	R
Propionic Acid (20% concentrate)	R

Chemical	Comments
Propionic Acid	N
Propyl Alcohol (1-Propanol)	R
Pyridine	N
Silicofluoric Acid (30% concentration)	R
Silicone Grease	R
Silicone Oil	R
Silver Nitrate	R
Sodium Bicarbonate (Saturated)	R
Sodium Bisulfate (Saturated)	R
Sodium Bisulfite (Saturated)	R
Sodium Carbonate (Saturated)	R
Sodium Chlorate	R
Sodium Chloride (Saturated)	R
Sodium Chromate	R
Sodium Hydroxide	N
Sodium Hypochlorite (5% chlorine)	R
Sodium Nitrate	N
Sodium Sulfate (Saturated)	R
Sodium Sulfide	N
Sodium Thiosulfate	R
Stannous Chloride	R
Styrene	N
Sulfur Dioxide (Gas)	R
Sulfurous Acid	N
Sulfuryl Chloride	N
Tear Gas (Chloroacetophenone)	LR
Terpineol	N

Chemical	Comments
Tetrahydrofuran	N
Tetralin	N
Thiophene	N
Titanium Tetrachloride	R
Toluene	N
Transformer Oils	R
Trichloroacetic Acid	LR
Tricholorethylamine	N
Trichloroethylene	N
Trichloroethyl phosphate	LR
Tricresyl phosphate	N
Trisodium Phosphate	R
Turpentine	LR
Vacuum Pump Oil	R
Varnish	N
Water (Demineralized or Sea)	R
Xylene	N
Zinc Chloride	R
Zinc Oxide	R
Zinc Stearate	R
Zinc Sulfate	R

FCC Compliance Statement

This device 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 residential installations. 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 and television reception.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with FCC Rules Part 15 and with Industry Canada licence-exempt RSS standard(s). Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation.

The exhibit must have following statement per FCC 15.517 (f).

This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

The transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

About AeroScout

AeroScout is the market leader in Unified Asset Visibility solutions. Clients improve operational efficiency and quality using AeroScout products that leverage standard Wi-Fi networks to track and manage the location, condition and status of mobile assets and people. AeroScout's global customer base consists of leading hospital, manufacturing and logistics organizations, including many of the Fortune 500. The company originally invented the first Wi-Fi-based Active RFID tag, and today is widely recognized as leading the market in number of deployments and tags shipped. Headquartered in the U.S.A, AeroScout has offices in Europe, Asia, the Middle East, Latin America and Australia. For more information, please visit www.aeroscoutIndustrial.com.

AeroScout (Headquarters)
335 Willow Street,
North Andover, MA 01845
Tel: +1 (650) 596-2994
Fax: +1 (650) 596-2969
E-mail: industrial@aeroscout.com

Europe, Middle East, Africa Office
Tel : +32 2 709 29 49
Fax : +32 2 791 9028
E-mail: emea@aeroscout.com

Japan Office
Tel: +81 3 3556 9003
Fax: + 81 3 5875 3723
E-mail: info@aeroscout.co.jp

Latin America Office
Tel : +52 55 5001 5769
E-mail: latam@aeroscout.com

Asia-Pacific Sales
Tel : +1 650 596 2994
E-mail: apac@aeroscout.com

Australia and New Zealand Sales
Tel : +61 3 9038 8690
E-mail: anz@aeroscout.com