DataScout Modem

PRODUCT MANUAL

Items 3921, 3922, 3923, 3920, 3920S, and 3924

Spectrum® Technologies, Inc.

INTRODUCTION

Thank you for purchasing a DataScout Modem.

Access to SpecConnect.net web portal is purchased separately. Please contact your distributor or Spectrum sales representative to order.

DataScout modems are compatible with WatchDog Retrievers as well as the 2000-Series Full and Mini Weather Stations. See Page 8 for minimum firmware requirements.

DataScout modems collect data from attached weather station or Retriever and send the data periodically to SpecConnect.net.

Tri-Color LED conveys information on battery level, signal and signal strength, as well as diagnostic information.

TABLE OF CONTENTS

This manual will familiarize you with the features and operation of your new DataScout Modem. Please read this manual thoroughly before launching the units.

For customer support or to place an order, call Spectrum Technologies, Inc. at 800-248-8873 or 815-436-4440, FAX at 815-436-4460, or e-mail at info@specmeters.com.

www.specmeters.com

Spectrum Technologies, Inc.
3600 Thayer Court
Aurora, IL 60504

GENERAL OVERVIEW

SpecConnect Solution

The SpecConnect solution is comprised of environmental sensors whose data is transmitted wirelessly by the DataScout modem to the web where it can be viewed anywhere in the world.

Retrievers/Pups

The Retriever and Pups are used to build Spectrum's wireless sensor network solution. They use a mesh style of communication, which allows any Pup within the network to wirelessly route data from another Pup back to the Retriever. The mesh network is ideal for locations with multiple microclimates within close proximity of one another
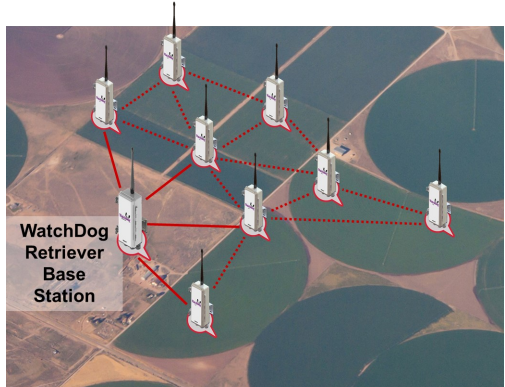

Weather Stations

The WatchDog Full and Mini weather stations are ideal when one or two logger locations are sufficient to capture environmental conditions at any given site.

SpecConnect Web Portal

The DataScout modem communicates weather data directly to the SpecConnect web portal. SpecConnect puts current and historical data at your fingertips. Additionally, users can configure the sensor settings for their stations and setup alerts directly from the web.

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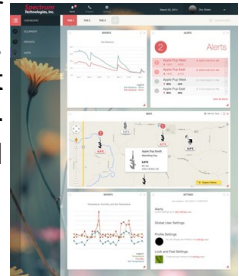
Models

The DataScout modems are available with Cellular or WiFi communication options. All Cellular versions are powered with rechargeable batteries and include a solar panel. The WiFi version offers the option of providing power via an AC/DC power adapter.

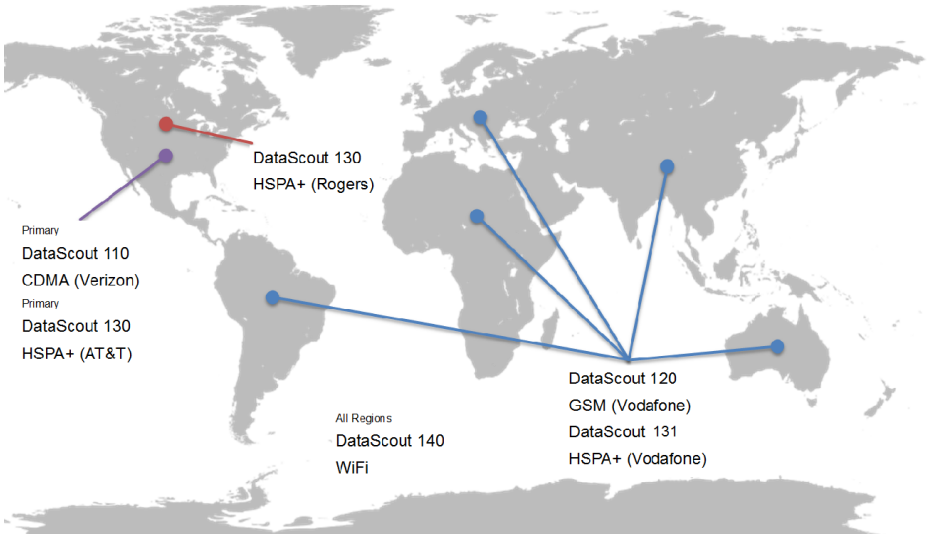| Item	Description
3921 (DataScout 120)	Cellular, GSM/GPRS 2G (International)
3922 (DataScout 110)	Cellular, CDMA 2G (USA)
3923 (DataScout 130)	Cellular, HSPA+ 3G (North America)
3920 (DataScout 140)	WiFi, AC/DC Powered
3920S (DataScout 140)	WiFi, Solar Powered
3924 (DataScout 131)	Cellular, HSPA+ 3G (EMEA, APAC, Latin America)

Your DataScout package should contain
- Product Manual
- Antenna & antenna stabilizer sleeve
- Rechargeable battery pack, DC Plug Adapter, 5W Solar Panel (all except item 3920)
- AC/DC Power Adapter (item 3920 only)
- Mounting brackets (Enclosure, Solar Panel)
- U-bolt, clamp, and nuts
- Screws (2) for back of unit
- 2 station connection cables (WatchDog 2000 station, WatchDog Retriever)
- USB flash drive

a   b

Antennas for the a.) cellular and b.) WiFi modems

Network Compatibility

The DataScout modem is available in various models for global network capability. A cellular data plan is included with the Spec-Connect subscription.

DataScout 130
HSPA+ (Rogers)

Primary
DataScout 110
CDMA (Verizon)
Primary
DataScout 130
HSPA+ (AT&T)

All Regions
DataScout 140
WiFi

DataScout 120
GSM (Vodafone)
DataScout 131
HSPA+ (Vodafone)

Region	Modem	Carrier
USA Primary	DataScout 110 (3922) CDMA	Various including Verizon, Sprint
USA *Secondary*	DataScout 130 (3923) HSPA+	Various including AT&T, T-Mobile
Canada, Mexico	DataScout 130 (3923) HSPA+	Various including Rogers
International	DataScout 120 (3921) GSM DataScout 131 (3924) HSPA+	Various including Vodafone
All Regions	DataScout 140 (3920/3920S) WiFi	Customer Supplied WiFi Access Point and Internet Service

Getting Started

Get your DataScout running in the following nine steps.

- Gather up all of the accessories (brackets, cables, etc.) into one location for easier setup
- Find a tutorial video online at www.specmeters.com/videos/

1 Power-up Station/ Retriever

Retriever should be pre-configured with Pups and Sensors using RPLU (not necessary for Weather Stations)

pg. 9

2 Connect Station to DataScout

Use the cable appropriate for the unit being attached (Black -Retriever, Gray - WatchDog 2000 Series)

pg. 9

3 Connect Power to DataScout

Connect Battery Pack and Solar Panel or AC-DC power cable to DataScout

pg. 9

4 Connect to Access Point (**WiFi only**)

Hold button for 8 seconds to enter WiFi provisioning mode to connect DataScout to your WiFi access point

pg. 10

5 Perform Connection Test

Hold button for 2 seconds to perform a connection test to verify that the DataScout has good network connectivity

pg. 12-13

6 Mount DataScout with Station/Retriever

Utilize the included brackets and hardware to mount the DataScout with the Weather Station or Retriever

pg. 14

7 Go To Speconnect.net

Using your PC or SmartPhone, go to specconnect.net and log in with your username and password

pg. 16

8 Set Time Zone

On SpecConnect, navigate to the Equipment page and click on Configure for your Weather Station or Retriever and set the local time zone.

pg. 16

9 View and Manage your Data

Use SpecConnect to view your data, set alerts, and make configuration changes to your Weather Station or Retriever & Pups Units

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Specifications - General

Waterproof	IP65 (with waterproof glands)
External Interfaces	Communication: USB Station/Retriever: Modular Connector 3.5mm stereo jack not used
Operating Temperature	14 to 130 °F (-10 to 55 °C)
Station Serial Interface	9600 Baud
WatchDog Firmware Requirement	Retriever: 01.01.01 or greater 2000 Series Full Station: 7.6 or greater 2000 Series MiniStation: 4.1 or greater
Power	Solar: 5W panel, 2200 mAh, 7.2V NiMH AC/DC: Max 17VDC
LED	3-color (Red, Yellow, Green)
Enclosure Dimensions	3.75 x 2 x 8 in (9.5 x 5.2 x 20.2 cm)
Weight	Solar powered Cellular and WiFi 5.14 lbs (2.33 kg) Non-Solar powered Cellular and WiFi 1.70 lbs (0.77 kg)

Disclaimer
After assembly, and prior to shipment, DataScout modems are 100% functionally tested. Altering components or using non-approved accessories with your DataScout will void the warranty. Damage resulting from the changing or modification of any internal components, including SIM cards, will be the sole responsibility of the customer. The use of 3rd party SIM cards will drastically reduce Spectrum Technology's ability to provide technical support for DataScout modems. Data continuity when using 3rd party SIM cards cannot be guaranteed.

Pre-Deployment Configuration

Both WiFi and Cellular models
The device the modem is being connected to should be powered up and active before connecting the DataScout modem.

Retriever
Consult the "Retriever & Pup Wireless Network" Product Manual for complete details on configuring a WatchDog Retriever & Pups network. The network should be set up using the RPLU and verified to be up and running (data being logged) before connecting the Retriever to the DataScout. Note that the Retriever firmware version must be 01.01.10 or higher for use with the DataScout. The firmware version can be checked in the Retriever tab of the RPLU by floating your mouse over the serial number. After connecting the DataScout, remove the 6 AA batteries. Unused alkaline batteries tend to corrode over time and can damage the device.

WatchDog 2000-series Weather Stations
No pre-deployment configuration is necessary for the WatchDog Weather Stations. Note that the Weather Station firmware version must be 7.6 or higher (Full Station), 4.1 or higher (Mini Station), or 3.5 or higher (Model 2800 Weather Station) for use with the DataScout.

Connect to the DataScout with the appropriate interface cable: black is for Retrievers, gray is for WatchDog 2000-series stations. After the cable is connected between the Retriever or Station and the DataScout, apply power to the DataScout by connecting the battery clip to the rechargeable battery pack. The Status LED will light green briefly and then turn off. The DataScout will automatically determine if the unit is connected.

Caution: Be sure to remove the batteries from the station before connecting the DataScout modem. Failure to do so will lead to weather station damage.

Cellular Models
The Cellular Models come pre-configured with cellular access. No additional network setup is necessary.

WiFi models — Access Point Provisioning

The following steps outline how to connect the DataScout modem to the desired WiFi network.

1. Hold button until the light turns off (approximately 8 seconds) to enter WiFi provisioning mode. The DataScout will create a WiFi network access point called "DataScout WiFi" and the light will the flash amber.

2. From PC, smart phone, or tablet, find and connect to the network that was created in Step 1. No password is necessary to connect to the network.

3. From your device's web browser, type in the following URL to bring up the DataScout Setup screen:
   www.datascoutsetup.com

4. Click the "Network Settings" button on that screen.

5. From the WiFi Network Settings screen, you can either scan for an existing network or manually configure the parameters. The first option is usually the easiest.

6. If you choose the scan option, select your Access Point from the list of available networks.

7. Only the Access Point name (SSID) and passphrase fields

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need to be populated. The passphrase is whatever is set on the WiFi Access Point. If either are entered incorrectly, return to step 1 to repeat the Access Point Provisioning process. Once you have entered the correct information, click the "Next" button.
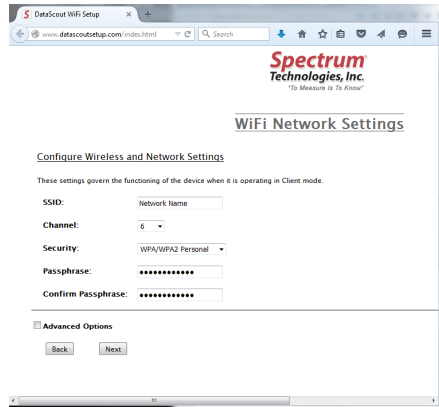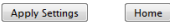

8. Click the "Save" button on the Wireless Configuration Summary screen to bring up the Wireless Settings screen. Click "Apply Settings". The DataScout will attempt to connect to the WiFi network (the connection with your PC, smart phone or tablet will be terminated). If successful, the LED will briefly glow green.

After 1 to 2 minutes the LED will flicker green and then shut off. The PC will display a message that the wireless settings have been saved. If the light is still blinking amber after 3 minutes, the provisioning has failed. At this point, quickly press and release the button to remove it from provisioning mode. Return to step 1 to repeat the process.

9. Perform the Signal/Comm test (see p. 13) to confirm the DataScout modem is now communicating properly with the network. If no connection is indicated, repeat the process from step 1.

BUTTON & LED INFORMATION

This section describes how the button on the DataScout is used to perform diagnostic and functional tasks. It also explains what information is conveyed by the LED. This information is summarized on the labels (Figures 1 and 2) affixed inside the door of each unit.

Button Functions
The length of time the DataScout button is pressed determines which function it performs. The LED has 3 colors; green, yellow, and red.

Battery State: Press and immediately release the button to check the battery status and whether or not it is currently being charged by the solar panel. The explanation of each color is given in the *Battery State* column of the figures*.*

Signal/Communication Strength: Press and hold the button until the light comes on (approximately 2 seconds) to initiate a test of the signal strength and/or communication state.

Cellular: If the DataScout has good signal strength and can connect to the SpecConnect servers, the LED will light Green. Amber indicates that it can connect but has low signal strength. If there is no connection (bad cellular signal or server cannot be reached), the LED will light Red.

DataScout Cellular Button and LED Information

Button Push	Response		
Short Press	Battery State		
2 Sec Hold	Signal Strength/Comm. Test		

LED Color	Battery State	Signal/ Comm.	Flashing
Green	Good & Charging	Good & Connected	Data RX
Amber	Good & Not Charging	Low & Connected	Data TX
Red	Low & Not Charging	Not Connected	Error

Figure 1. Cellular DataScout reference label

WiFi: If the DataScout can connect to the SpecConnect servers, the LED will light Green. Amber indicates that it is connected to WiFi but cannot reach the servers (internet service to access point may be down). If there is no connection at all to your local WiFi network, the LED will light Red.

DataScout Wi-Fi Button and LED Information

Button Push	Response		
Short Press	Battery State		
2 Sec Hold	Connection Test		
8 Sec Hold	Wi-Fi Setup		

LED Color	Battery State	Connect State	Flashing
Green	Good & Charging	Web Connected	Data RX
Amber	Good & Not Charging	Wi-Fi Connected	Data TX
Red	Low & Not Charging	Not Connected	Error

Figure 2. WiFi DataScout reference label

WiFi Provisioning: For the DataScout WiFi modes (items 3920 and 3920S), there is one additional button function: WiFi Provisioning. Press and hold the button until the light turns out (approximately 8 seconds) to initiate the provisioning sequence to setup the DataScout with the desired WiFi Access point. See p. 10 for details on WiFi provisioning.

Radio Activity
In addition to responding to button presses, the LED will intermittently flash to indicate data activity. It will flash green when it receives data from the network or the attached Station/Retriever. It will flash amber when transmitting data. If the LED flashes red, it is an indication of a problem with reception and/or transmission of data to/from the network/servers. See "Troubleshooting" (p. 19) for more details.

Note: The no-button flash sequences occur automatically and may possibly overlap with other LED activity.

INSTALLATION

After completing the pre-deployment steps (pages 9 - 11), the DataScout is ready for installation.

Tools recommended for installation
- 7/16-inch (11-mm) wrench
- Phillips screwdriver

1. Attach the antenna to the DataScout.

2. Mount the DataScout to the tripod or another pole/surface using the provided bracket and u-bolts/screws. See figures 3 and 4.

3. Connect the DataScout to the AUX port of your Weather Station or Retriever to using the appropriate cable (Black-Retriever, Gray-Weather Station). Screw the strain-relief gland into the threaded hole on the bottom of the housing.

4. Ensure the attached station/Retriever is powered on.

5. Connect the battery to the DataScout.

6. Mount the solar panel using provided hardware (see fig. 5). Ensure that the panel is unobstructed and facing the equator. Note that even partial shade will drastically reduce the effectiveness of the solar panel.

7. Connect the solar panel to the DataScout using the included barrel adapter. The black wire is ground (-). If using a non-solar WiFi DataScout, connect the AC/DC adapter and plug into a wall outlet.

8. Wait 1 minute after powering the DataScout modem to check signal strength and confirm acceptable communication. Press and hold the DataScout button until the light comes on (approximately 2 seconds) to initiate the test. If, after several attempts, communication is still unsuccessful (red LED), try moving the DataScout to an area with better signal coverage

Figure 3. WatchDog 2000 Series Station and DataScout

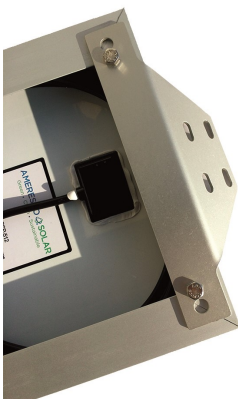*Figure 4. Retriever and DataScout setup with solar panel*

Figure 5. Connecting solar panel bracket using provided bolts and nuts

Completing On-line Set-up

- After purchasing SpecConnect products, you will receive an email with instructions on how to log in.
- When logging in, the equipment list should include all Watch-Dog Weather Stations and Retriever & Pups for which you have active subscriptions. Please contact Spectrum to add equipment to this list.
- After connecting your DataScout to your WatchDog station (or Retriever) and connecting power, it can take up to 1 hour for SpecConnect.net and your DataScout to fully synchronize.
- After synchronization, you will be able to click the "Configure" button (fig. 6) next to the WatchDog Weather Station, Retriever, or Pup. **You MUST SELECT THE TIME ZONE (fig. 7) on WatchDog Stations and Retrievers to begin receiving data on the site.**
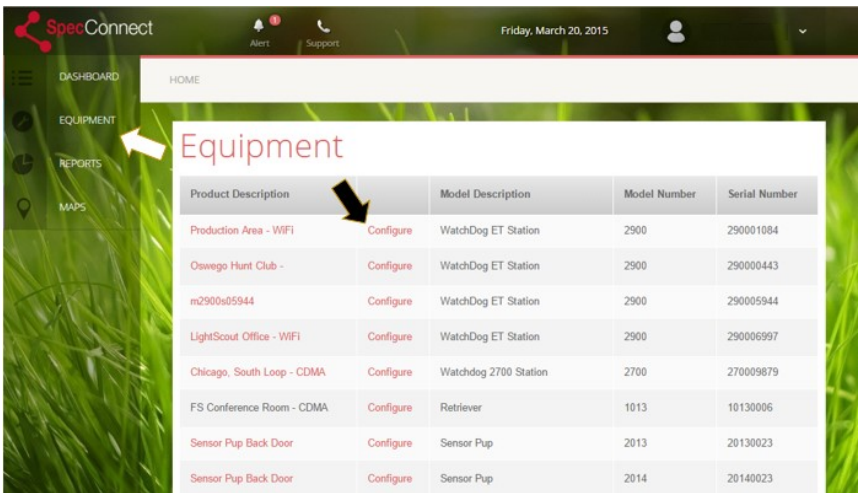

Figure 6. SpecConnect Equipment page.

- Turning the DST (Daylight Savings Time) switch on will enable automatic time updates when Daylight Savings Time begins and ends.
- The DataScout modems are designed to maximize battery life. Therefore, the unit only periodically connects to SpecConnect.net to send data and receive any updated configuration settings.

Figure 7. SpecConnect Configure Weather Station page.

Updating Firmware

The firmware for the DataScout modem can be updated by the user. The current firmware version your modem is running can be obtained by contacting Spectrum Technologies technical support. The latest firmware version as well as the link to the update files is available on Spectrum's website at:

http://www.specmeters.com/technical-support/software-updates/
datascout-software/

Update Procedure
1. Save the latest firmware update to a USB flash drive.
2. Completely remove power from the modem. Detach the connector from the battery pack and disconnect the solar panel cable.
3. Insert the flash drive into the modem. Wait 10 seconds.
4. Reconnect power to the modem
5. The LED will flash red then rapidly flash green until the update is completed. Once completed, the LED will then shut off.

Radio Information

Model	Frequency Bands	Network Type	Antenna
110	800/1900 MHz	CDMA 1xRTT (2G)	Multi-band w/ SMA connector
120	850/900/1800/ 1900 MHz	GSM/GPRS (2G)	Multi-band w/ SMA connector
130	850/900/1800/ 1900/2100 MHz	HSPA+ (3G)	Multi-band w/ SMA connector
131	850/900/1800/ 1900/2100 MHz	HSPA+ (3G)	Multi-band w/ SMA connector
140	2.4 GHz	ISM WiFi	Reverse polarity SMA

Regulatory Information

Model	FCC	IC
110	RI7CE910-DUAL	5131A-CE910DUAL
120	RI7GE910Q3	5131A-GE910Q3
130	RI7HE910	5131A-HE910
131	RI7HE910	5131A-HE910
140	YOPGS2011MIES	9154A-GS2011MIES

TROUBLESHOOTING

1. Configuration changes are not showing up in Spec-Connect

To prolong battery life, the DataScout modem does not remain continuously connected to the internet and SpecConnect. Depending on how your DataScout modem is configured, **it can take up to 60 minutes** for settings to propagate to the modem, or for data to be sent to SpecConnect. Wait until, at least, 2 log intervals have elapsed. If the changes still do not appear, try resending the configuration from SpecConnect.

2. Data is not showing up on SpecConnect

- Ensure that the serial number of the station or pup(s) connected to the modem are listed in the Equipment list of SpecConnect. Contact Spectrum if they do not appear in this list.

- If the serial number appears on the list, click "Configure" to ensure the time zone is set. Data from the modem will not be accepted until the time zone has been provided. Wait for two "upload intervals" to transpire to determine if data is being transmitted.

- If data is still not showing up in SpecConnect, check the following:

• Is the PC cable still connected to the station, Retriever, or modem? If so, there will be no transmission to SpecConnect.
• Is there damage or water in the Retriever and modem enclosures?
• Are the modem and Retriever antennas are firmly attached in an upright orientation?
• Is the weather station/pup is powered up and connected to the modem with the appropriate cable
• Is the Repeat-Transmit interval properly configured for the weather station so it will send logged records?
• Does the modem have adequate power and signal strength (use button press tests, pp. 12 - 13)?
• Does the modem have adequate connection to the internet (use 2-second button-press test)? If not, try reconnecting to your WiFi

hotspot (WiFi models), or relocating to an area which may have better signal coverage (all models).

3. Modem indicates it is connected to the server, but no data is being sent to SpecConnect

Modem needs to be reset to the factory defaults

• Remove all power from DataScout. Detach the connector from the battery pack <u>and</u> disconnect the solar panel cable.
• Hold down button while re-attaching power to the device.
• Continue holding the button for at least 8 seconds.
• Check to ensure data flow is restored to SpecConnect.

Note: Data stored on the DataScout will be lost when performing this clearing process

4. Batteries are not recharging

If the rechargeable batteries are completely depleted, they will not charge up even when connected to a functioning solar panel. The modem first needs to be jump started to re-activate the charging circuitry.

• Use a voltmeter to verify that the solar panel is outputting the correct voltage. Touch the positive electrode to the inside of the barrel of the power connector. Touch the negative electrode to the outside of the barrel. A properly functioning solar panel should read between 18 to 22 V in full sunlight.
• If solar panel is functioning, re-attach to the modem.
• Connect a fresh 9V battery to the modem's battery clip.
• The modem should turn on (LED flashes green). Once the LED goes dark, unplug the 9V battery.
• Use the voltmeter to take a reading across the battery clip coming from the modem. A correct reading will be about 7 to 9V.
• If this voltage is correct, attach the modem's power clip to the rechargeable battery pack.

WARRANTY

This product is warranted to be free from defects in material or workmanship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

CE

DECLARATION OF CONFORMITY

Spectrum Technologies, Inc.
3600 Thayer Court
Aurora, IL 60504 USA

Model Numbers:	3921, 3922, 3923, 3920, 3920S
Description:	DataScout Modem
Type:	Electrical equipment for measurement, control, and laboratory use
Directive:	2014/30/EU
Standards:	IEC 61000-4-2:2008
	IEC 61000-4-3:2006 including A1:2007 and A2:2010
	EN 55022:2010
	EN 61000-6-1:2007
	EN 61000-6-3:2007

Paul Martis, Project Manager—Weather   March 1, 2015

USA and Canada Conformity Standards:
FCC Part 15 CFR Title 47: 2014
ICES-003: 2012 Digital Apparatus (Industry Canada)

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