# i-STAT® TECHNICAL BULLETIN

## Procedure for Using the i-STAT® 1 Wireless Analyzer

### OVERVIEW

In response to customer requests for expanded wireless transmission capabilities for i-STAT data, Abbott Point of Care has developed a new i-STAT 1 Wireless Analyzer (handheld) that can communicate to the Data Manager via your existing Local Area Network (LAN) wireless infrastructure (with certain restrictions). This Technical Bulletin describes the procedures for:

- Testing i-STAT cartridges using the i-STAT 1 Wireless Analyzer
- Customizing the handheld to enable the Wireless functionality
- Transmitting data wirelessly to the Data Manager
- Using the Wireless Utility Menu to:
  - View the Wireless Settings and
  - Test the Wireless Connections

**For i-STAT 1 Wireless Specifications, see the Technical Bulletin "i-STAT® 1 Wireless Analyzer Specifications" (Art: 728644).**

**For instructions on configuring an i-STAT 1 Wireless Analyzer, see the Technical Bulletin "Configuring Wireless Settings in an i-STAT® 1 Wireless Analyzer" (Art: 726066).**

Note: Users must follow site-specific guidelines for operating wireless devices when using the i-STAT 1 Wireless Analyzer.

If you have any questions regarding the information in this Technical Bulletin, please contact your Support Services provider.

Abbott Point of Care

**Abbott Point of Care Inc**. • Abbott Park, IL 60064 • USA

Art: 726025-01A Rev. Date 24-NOV-14

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## TESTING i-STAT CARTRIDGES USING THE i-STAT 1 WIRELESS ANALYZER

- The i-STAT 1 Wireless Analyzer has the capability to run all current i-STAT cartridges.
- The procedure for testing i-STAT cartridges using the i-STAT 1 Wireless Analyzer is identical to that used by the i-STAT 1 Analyzer (Model 300). Please refer to the i-STAT 1 System Manual for full details on cartridge testing.
- Items needed for the method of powering the handheld are the same as for the i-STAT 1 Analyzer: two 9-volt lithium batteries or a pair of rechargeable batteries purchased only from Abbott Point of Care. However, the user should expect an approximate 30% reduction in the number of cartridges run per battery charge due to the use of wireless downloads. **Note:** the 30% reduction is an approximation based upon a use model of transmitting results wirelessly following each cartridge run.

## CUSTOMIZING THE i-STAT 1 WIRELESS ANALYZER TO ENABLE WIRELESS FUNCTIONALITY

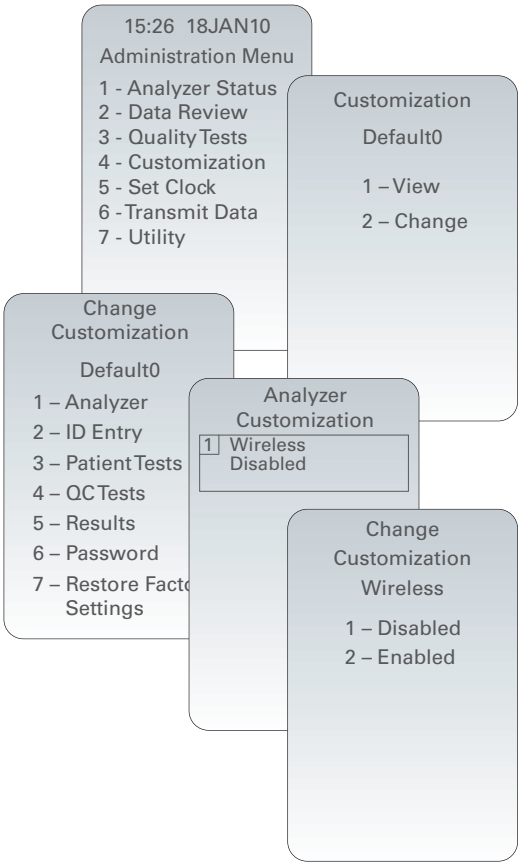
Before configuring the handheld to perform wireless transmissions, the handheld must be customized to enable the Wireless functionality.

The procedure to customize the handheld varies, depending upon whether or not the customization is being done directly using the handheld's keypad, or whether it is being done through the Customization Workspace in Central Data Station (CDS) Version 5 or i-STAT/DE.

- Users who do not have CDS Version 5 or i-STAT/DE ➔ **Proceed to Section A.**
- Users who have CDS Version 5 ➔ **Proceed to Section B.**
- Users who have i-STAT/DE ➔ **Proceed to Section C.**

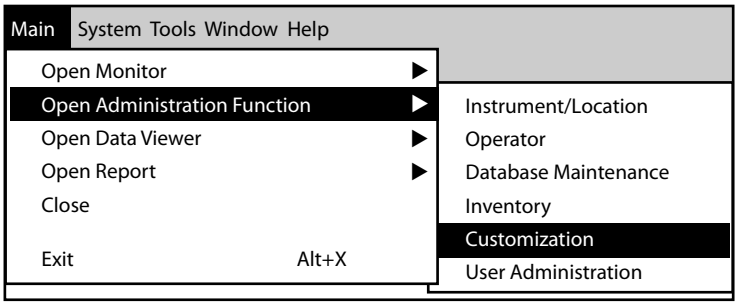
## A. Customizing the Handheld to Enable the Wireless Functionality Using the Handheld Keypad

1. Press ⏻ to turn on the handheld.
2. Press MENU to change screen to **Administration Menu**.
3. Press 4 (Customization).
4. Press 2 (Change).
5. Enter password and press ENT, or just press ENT if no password is required.
6. Press 1 (Analyzer).
7. Press → twice.
8. Press 1 (Wireless).
9. Press 2 to change setting to **Enabled**.
10. The "Wireless" listing should now appear as **Enabled**.
11. Press ⏻ to turn handheld off and save the settings. (If setting is not shown as **Enabled**, return to Step 9).



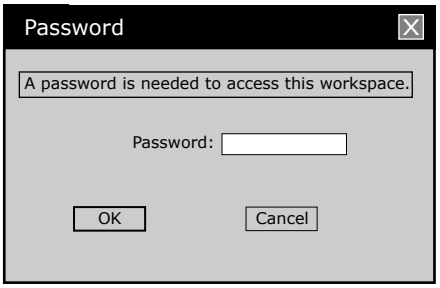

## B. Customizing the Handheld to Enable Wireless Functionality Using CDS Version 5

1. Click on **Main → Open Administration Function → Customization**.

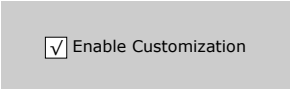



2. Type in your password and click OK. The default password is the word *istat*.

   **Note: Abbott Point of Care Inc. recommends changing the default password.**



3. Make sure the **Enable Customization** box is checked.

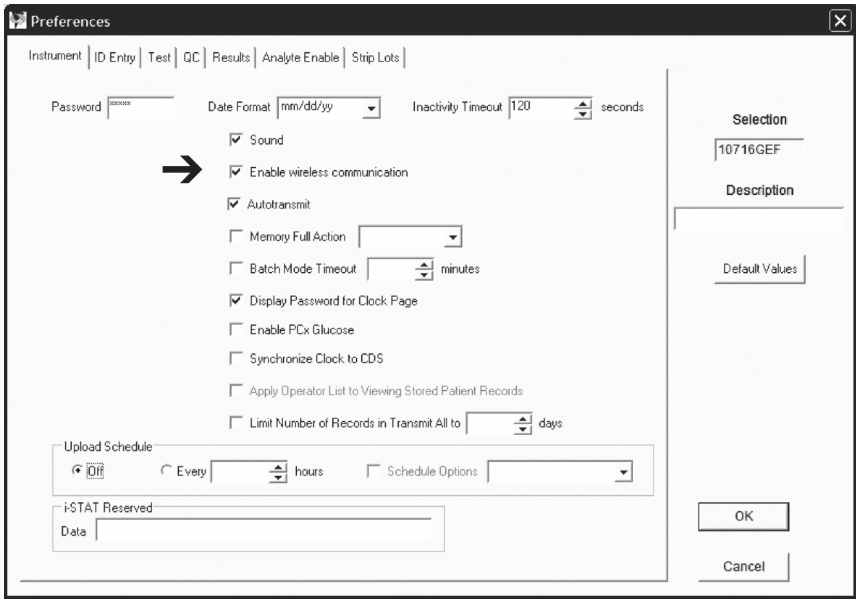



Also, make certain that the **Enable Updates** box is checked for the particular location to which this i-STAT 1 Wireless Handheld is assigned.

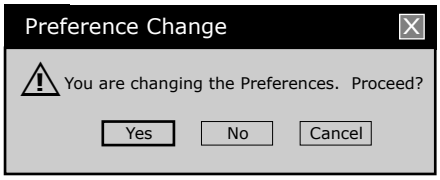
Location-based customization profiles:

| Location | Enable Updates | Use Default Profile | Update CLEW | i-STAT Analyzer CLEW | Philips BAM CLEW | Preferences | STATNotes |
|---|---|---|---|---|---|---|---|
| A_10.10.90.17 | ☑ | ☑ | ☑ | A18 | | DEFAULT0 | CHART0 |
| A_10.10.90.24 | ☑ | ☑ | ☑ | A18 | | DEFAULT0 | CHART0 |
| A_10.10.90.31 | ☑ | ☑ | ☑ | A18 | | DEFAULT0 | CHART0 |
| A_10.10.90.32 | ☑ | ☑ | ☑ | A18 | | DEFAULT0 | CHART0 |

4. If the location to which this Handheld is assigned has a checkmark under the **Use Default Profile** column, double click on the alphanumeric code under **Preferences** in the **Default Customization Profile** column. Otherwise, double click on the alphanumeric code under **Preferences** for the specific location to which this Handheld is assigned.
5. Once the **Preferences** screen opens, click on the **Instrument** tab. Click the box to **Enable wireless communication**.




6. Click **OK** and answer **YES** to the question about changing the preferences.

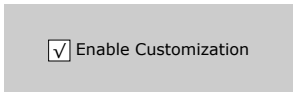


7. Download the handheld to the CDS from a downloader in the location to which this handheld is assigned. This action should upload the chosen customization features into the handheld. Repeat step 7 for all handhelds from this same location to be customized. To customize handhelds from other locations for the same features, return to step 1.

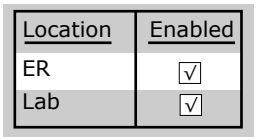
## C. Customizing the Handheld to Enable Wireless Functionality Using i-STAT/DE

1. Access the Customization Workspace
   - RALS-Plus Users:
     - For the RALS-Plus application, choose i-STAT from the drop-down menu.
     - Click on **Device Customization.**
   - PrecisionWeb Users:
     - Double click on the desktop shortcut or Internet Explorer Favorites for **i-STAT Customization**.

2. Make sure the **Enable Customization** box has a check mark in it.

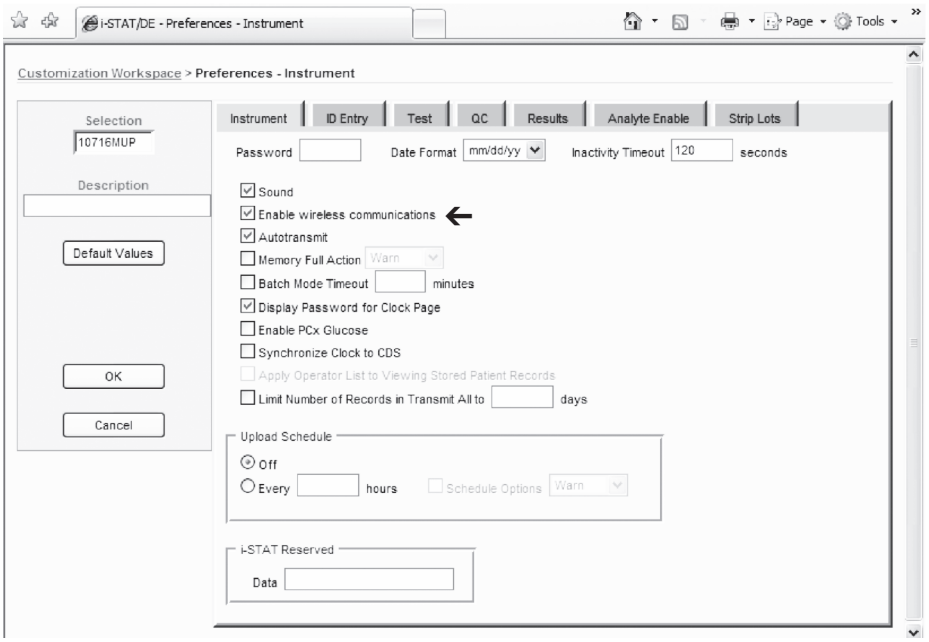



Also, make certain that the **Enable Updates** box is checked for the particular location to which this i-STAT 1 Handheld is assigned.

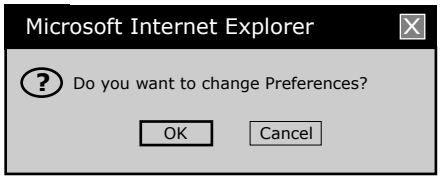



3. If the location to which this handheld is assigned has a checkmark under **Uses Default**, double click on the alphanumeric code under **Preferences** in the **Default Customization Profile** column. Otherwise, double click on the alphanumeric code under **Preferences** for the specific location to which this Handheld is assigned.

4. Once the **Preferences** screen opens, click on the **Instruments** tab. Check the box to **Enable wireless communications.**



5. Click **OK** and answer **YES** to the question about changing the preferences.




6. Download the handheld to the **Data Manager** from a downloader in the location to which the handheld is assigned. This action should upload the chosen customization feature into the handheld. To customize additional handhelds from this same location, repeat step 6. To customize handhelds from other locations for the same features, return to step 1.

## CONFIGURING AN i-STAT 1 WIRELESS ANALYZER

After customizing the handheld to enable the wireless functionality, the handheld must be configured to connect to the facility's WLAN. For instructions on configuring an i-STAT 1 Wireless Analyzer, see the Technical Bulletin "Configuring Wireless Settings in an i-STAT® 1 Wireless Analyzer" (Art: 726066).

## TRANSMITTING RESULTS TO THE DATA MANAGEMENT SYSTEM

Assuming the handheld is customized for auto-transmission, the handheld will attempt an automatic wireless download transmission under the following conditions:

1. When the handheld powers down automatically, according to its customized schedule, it will attempt to download wirelessly all unsent results immediately before the power-down.
2. If the handheld is placed in a downloader or downloader/recharger, the handheld will first attempt to download wirelessly. If it is successful, the download process is complete. If the wireless download is unsuccessful, the handheld will attempt to download using the downloader or downloader/recharger wired network connection.
3. If the user turns off the handheld by pressing , the handheld will first attempt to download all unsent results wirelessly.

Users may additionally elect to perform an on-demand (forced) transmission of results wirelessly to the data management system:

- directly following an individual test cycle using the Test Options menu, or
- using the Transmit Data menu.

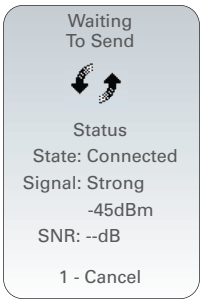
**Note 3.1: When attempting a wireless transmission, the handheld must remain at least 20 cm (approximately 8 inches) from the body (head and torso) when the radio is on. The radio is on:**

- **whenever the handheld is transmitting,**
- **when an operator is using the Wireless Utility Menu, and**
- **during the 2 minutes following a test cycle.**

## A. Transmitting Data Wirelessly following a Test Cycle Using the Test Options Menu

1. When newly generated test results appear on the handheld display, press **1** (Test Options).

2. Press **4** (Transmit Data). A **Waiting to Send** message will appear on the display screen.



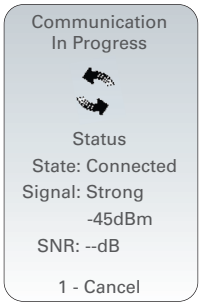

See **Note 3.2**

**Note 2.1:** If the user has not transmitted results within 120 seconds after the end of a test cycle, the wireless module will power off to conserve battery power. Then, if a user initiates a transmission when the radio is off, it will need to power on and connect to the network prior to transmission.

The **State** line toward the middle of the screen may display a series of messages as shown below or indicate that it is connected.

- **Off:** wireless module is off
- **Booting:** loading software on wireless module
- **Joining**: attempting to join the network
- **Associated:** module successfully joined the network, associated with an Access Point, and has been granted permission to communicate to the network
- **Connected:** connected to the data manager

3. Once the Connected state is reached, a **Communication in Progress** message will appear at the top of the screen. When this message disappears and the display returns to the Test Menu, the transmission is successful.




See **Note 3.2**

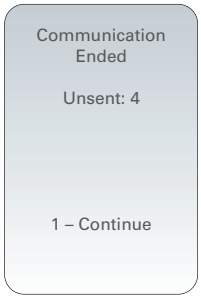
**Note 3.1:** there are two additional parameters on this page which may aid the users in troubleshooting and assessing the strength of the wireless transmission signal.

- **Signal:** indicates the strength of signal in one of three terms: **Weak**, **Medium** or **Strong**.

  Additionally, an actual numeric measurement of the signal is displayed. If users are obtaining failed transmissions when the signal strength is weak, they should re-attempt the transmission in a location that provides a signal strength of **Medium** or **Strong**.

- **SNR:** (Signal to Noise Ratio): This is a measurement of a difference between the strength of the wireless signal and the background noise level.

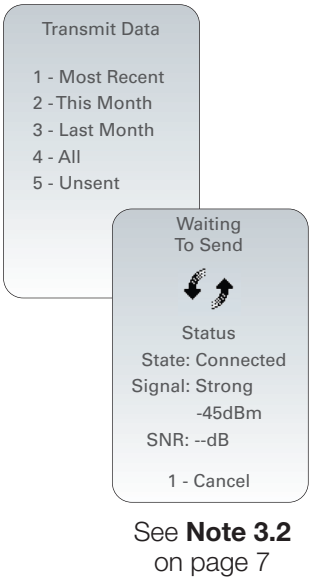
**Note 3.2:** Not all models of i-STAT1 Wireless analyzers report SNR. This item is left on the screen for software compatability with all i-STAT 1 Wireless models. When SNR is not reported it will appear as "--dB".




**Note 3.3:** If there are unsent results remaining in the handheld at the completion of a transmission attempt, a **Communication Ended** message will appear on the handheld indicating how many unsent results are left.

## B. Transmitting Data Wirelessly Using the Transmit Data Menu

1. Press ⏻ to turn on the handheld.
2. Press MENU to change screen to Administration Menu.
3. Press 6 (Transmit Data).



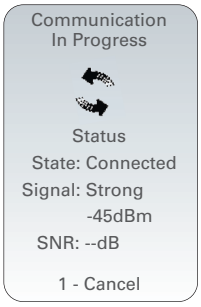

4. Press the number key corresponding to the data set you would like to transmit. A **Waiting to Send** message will appear on the display screen.

   The **State** line toward the middle of the screen may display a series of messages as shown below or indicate that it is connected.

   - **Off:** the wireless module is off
   - **Booting:** loading software on wireless module
   - **Joining:** attempting to join the network
   - **Associated:** module successfully joined the network, associated with an Access Point, and has been granted permission to communicate to the network
   - **Connected:** connected to the data manager

See **Note 3.2** on page 7

5. Once the Connected state is reached, a **Communication in Progress** message will appear at the top of the screen. When this message disappears and the display returns to the Administration Menu, the transmission is successful.




See **Note 3.2** on page 7

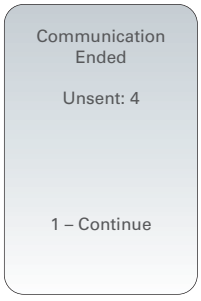
**Note 5.1**: there are two additional parameters on this page which may aid the users in troubleshooting and assessing the strength of the wireless transmission signal.

- **Signal:** indicates the strength of signal in one of three terms:
  - Weak
  - Medium
  - Strong

  Additionally, an actual numeric measurement of the signal is displayed. If users are obtaining failed transmissions when the signal strength is weak, they should re-attempt the transmission in a location that provides a signal strength of **Medium** or **Strong**.

- **SNR:** (Signal to Noise Ratio): This is a measurement of a difference between the strength of the wireless signal and the background noise level.

**Note 5.2:** If there are unsent results remaining in the handheld at the completion of a transmission attempt, a **Communication Ended** message will appear on the handheld indicating how many unsent results are left.

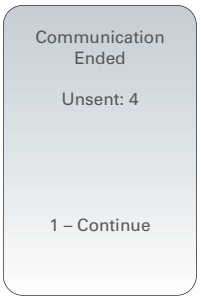


## C. Transmitting Results Using the Downloader or Downloader/Recharger (DR)

1. Place handheld in Downloader or DR.
2. A **Communication in Progress** message will appear on the handheld display.
3. Do not move the handheld until the **Communication in Progress** messages disappears. Once the message disappears, the transmission is successful.

**Note 3.1:** When wireless is enabled and configured on an i-STAT 1 Wireless Analyzer, wireless communication will be attempted first. If wireless communication fails, wired communication will then be attempted.

**Note 3.2:** If there are unsent results remaining in the handheld at the completion of a transmission attempt, a **Communication Ended** message will appear on the handheld indicating how many unsent results are left.



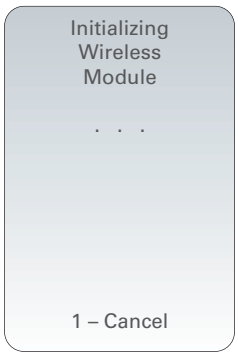
## THE WIRELESS UTILITY MENU

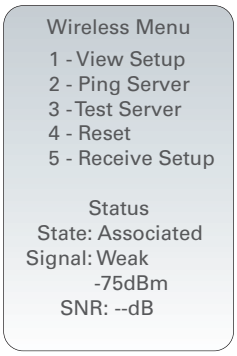
The Wireless Utility Menu aids the user in troubleshooting unsuccessful wireless data transmission by:

- Allowing the user to view the configuration settings for the handheld in question
- Allowing the user to ping the CDS server to verify communication between the analyzer and the server
- Allowing the user to verify the connection to the CDS server
- Allowing the user to reset the wireless module

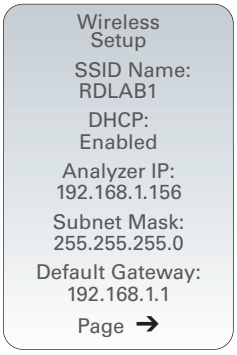
**To access the Wireless Utility Menu:**

1. Press ⏻ on the handheld.
2. Press MENU .
3. Press 8 (Wireless).
4. An **Initializing Wireless Module** message will appear on the screen, followed by the Wireless Menu which has 5 options from which the user may choose.



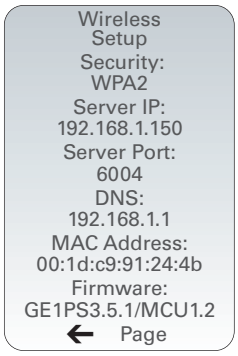



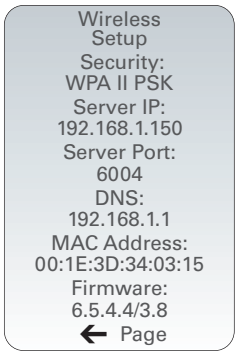

- **1 - View Setup**: Pressing 1 allows the user to view the following Wireless Setup parameters, separated into a list on two pages:




**Page 1**

- SSID (Service Set Identifier) Name: the name of the Wireless Network
- DHCP (Dynamic Host Configuration Protocol): a method for automating the assignment of IP Addresses and other networking information. There are 2 options: **Enabled** or **Disabled**
- Analyzer IP: the IP address to which this handheld has been configured (or assigned to by the DHCP Server)
- Subnet Mask: a network mask used to determine which subnet an IP Address belongs to
- Default Gateway: the device that passes traffic from the local subnet to devices on other subnets



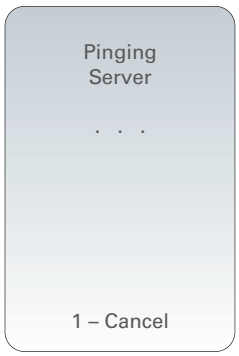



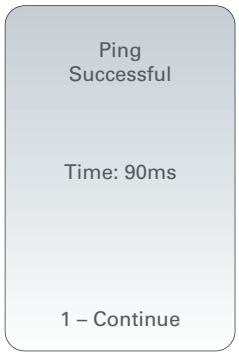

Examples

**Page 2**

- Security: the authentication method for the network
- Server IP: the IP Address of the CDS
- Server Port: the TCP port assignment on the Data Manager for the i-STAT 1 handhelds
- DNS (Domain Name Server): server that translates domain names to IP Addresses
- MAC Address: MAC address of the wireless module contained in the handheld
- Firmware: the Firmware revision of the wireless submodule

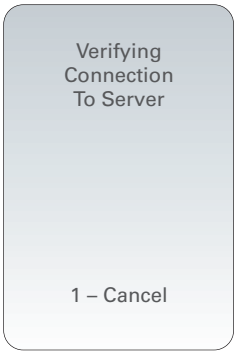
- **2 - Ping Server**: Pressing 2 allows the user to ping the CDS server. The handheld display will indicate if the ping process was successful and will show the round-trip ping time in milliseconds. If the ping was unsuccessful, a **Ping Failed** message (with an error code) will appear.

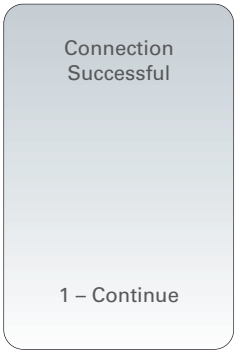



**Note:** Pressing 1-Continue after the Ping Results screen navigates the user back to the Wireless Menu.

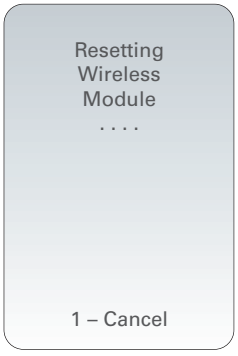
- **3 - Test Server**: Pressing 3 allows the user to verify the connection to the CDS server. A message **Connection Successful** or **Connection Failed** (with error code) will appear on the display following the test.

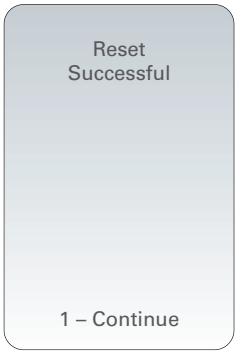



**Note:** Pressing 1-Continue after the Test Server screen navigates the user back to the Wireless Menu.

- **4 - Reset**: Pressing 4 resets the wireless module. The user will receive either a **Reset Successful** or **Reset Failed** message (with an error code) on the display. Reset powers off and powers back on the wireless module. It does not reset the settings to factory default.




**Note:** Pressing 1-Continue after the Reset screen navigates the user back to the Wireless Menu.

- **5 - Receive Setup**: Pressing 5 puts the handheld in setup mode, so that the handheld can connect to the i-STAT 1 Wireless Setup Utility.

  After pressing 5, the user is asked for a password. After entering the appropriate password or pressing **ENT**, the user will see a **Waiting for Setup** screen. Once the test is complete, a **Setup Successful** or **Setup Failed** message (with an error code) will appear.

Note: Pressing 1-Continue after the Receive Setup screen navigates the user back to the Wireless Menu.

**Note 5.1:** The **Receive Setup** function should only be used by IT personnel using the instructions found in the **Configuring Wireless Settings in an i-STAT® 1 Wireless Analyzer** Technical Bulletin (Art: 726066).

## ERROR CODE MESSAGES

| Error Code Description | Wireless Module FCC ID: YOPGS1500M |
|---|---|
| Wireless module is not configured | GS000 |
| DHCP Process Time Out | GS001 |
| Connection to Access Point has failed | GS002, GS010 |
| Failed to make a TCP connection to Data Manager Port 6004 | GS003 |
| Unable to receive setup from APOC Wireless utility ad hoc | GS020, GS021 |
| Wireless configuration storage failed to erase/ write to flash | GS022,GS023 |
| Wireless configuration file corrupt or empty | GS024, GS025 |
| Device customization failed to enable wireless module | GS030 |
| Failed Ping request | TIMEOUT |

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