Sonardyne
SOUND IN DEPTH

OPERATION GUIDE

NANO TRANSPONDER

QSG-OG-8262-A3
05/2017
910-0016

To access more information on the Nano, scan this code using an appropriate app on your smartphone.

SAFETY & SUPPORT

Before any activity is carried out on the equipment, it is recommended that the included Sonardyne Safety Manual and all warnings and cautions in this and the equipment manual(s) are read and fully understood.
It is recommended the operator complies with the Health and Safety Regulations applicable to the vessel and the region before operating this equipment.
Operators and service personnel must be familiar with the normal operating and safety procedures for subsea equipment.
Documentation must be consulted whenever a ⚠ or ⚠ warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which must be taken.
If any additional equipment is used, any warnings and cautions in the equipment user manual must be read and fully understood and the equipment must only be used as specified by the manufacturer.
The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

⚠ WARNINGS

Personal protection. Appropriate protective equipment such as protective footwear, hard hat and gloves must be worn when handling or carrying out any procedures involving Sonardyne and other equipment.

Heavy equipment. Many Sonardyne products and equipment types, such as transponders, transceivers, cable drums etc. require Manual Handling Equipment (MHE) for lifting due to their heavy weight. If MHE is not available, it is the responsibility of the operator to perform a manual handling risk assessment prior to carrying out manual lifting/handling. Refer to the individual equipment documentation for weight specifications.

PRODUCT SUPPORT Email: support@sonardyne.com Telephone: +44 (0) 1252 872288
24 Hour Emergency Helpline: +44 (0) 1252 877600

The Sonardyne 24 hour helpline is answered during normal UK office hours: 08:00–17:00. Outside these hours, your call is automatically transferred to an operator who will log the details of your emergency and alert the appropriate Sonardyne personnel. Our aim is to ensure that emergency requests are dealt with immediately during office hours and are responded to within 30 minutes at all other times. Alternatively, please contact your nearest Sonardyne Office.

To view open source software licences used by the Nano, see *UM-8262 "User Manual for the Type 8262 Nano Transponder"*.

STEP 1 INTRODUCTION

ABOUT THIS OPERATION GUIDE

This guide covers the basic installation, connection, configuration and troubleshooting of the Nano Transponder in the following steps:

- Technical Description
- Installation & Deployment
- Operation & Retrieval
- Functional Testing
- Troubleshooting

RELATED PUBLICATIONS

For more and related information for the Nano Transponder refer to the following publications:

- *UM-8262 "User Manual for the Type 8262 Nano Transponder"*
- *UM-8300-099 "User Manual for 6G Terminal Lite"*
- *UM-8315 "User Manual for the Type 8315 iWAND"*

INTRODUCTION TO THE NANO

The Type 8262-000-01 Nano Transponder (Nano) operates in the Medium Frequency (MF) band and is designed for short duration acoustic positioning of divers or small underwater vehicles. The Type 8262-000-03 incorporates an integrated pressure sensor. All versions of the Nano include a MEMs inclinometer sensor.

The Nano is constructed of lightweight polymer depth rated to 500 m and has an acoustic source level and beam-shape that is designed to operate over a 750 m slant range under normal conditions.

The Wideband 2 technology uses a correlation reception technique with phase encoded signals over a wide range of carrier frequencies. Signal coding allows for hundreds of channels enabling multiple users to work in the same area without interference.

The Nano connector-less design is charged and configured using the Nano Docking Station.

The Nano can be configured using Sonardyne 6G Terminal Lite software or an iWAND hand-held test unit.

The Nano is sealed and contains no user-serviceable parts.

TYPICAL NANO SYSTEM OPERATION

The diagram below shows Nano Transponders integrated into a typical Mini-Ranger 2 system.

1. PC
2. Mini-Ranger 2 Navigation Software
3. ESH
4. HPT 3000 USBL Transceiver
5. Nano Transponder(s)

MECHANICAL DESCRIPTION

The Nano is sealed and contains no user-serviceable parts.

Pressure Relief Vent Valve

A pressure relief vent valve ❶ is fitted to automatically release any build-up of pressure inside the Nano during deployment.

If there is any reason to suspect there may be pressure inside the transponder, the pressure relief vent valve must be operated as described below.

1. Using your fingers or a suitable tool, carefully withdraw the pressure relief vent valve as far as it will extract and wait for any internal pressure to be released.

Note

If using a tool to extract the valve be careful not to damage the valve's surface.

2. After any pressure has been released, push the valve fully back into its recess.

DOCKING STATION

Description

The Docking Station can be connected via USB to the 115/230V ac charger for fast charging or to a PC running Sonardyne 6G Terminal Lite software for configuration and slow charging.

The battery takes approximately 12 hours to fully charge from depleted using the ac charger.

When the Nano is placed onto the Docking Station the Enable/Disable LED will light red if the Nano is detected and is disabled or green if the Nano is detected and enabled.

The Nano can be disabled or enabled by pressing the push-button once and recycled by holding the push-button for five seconds.

Notes

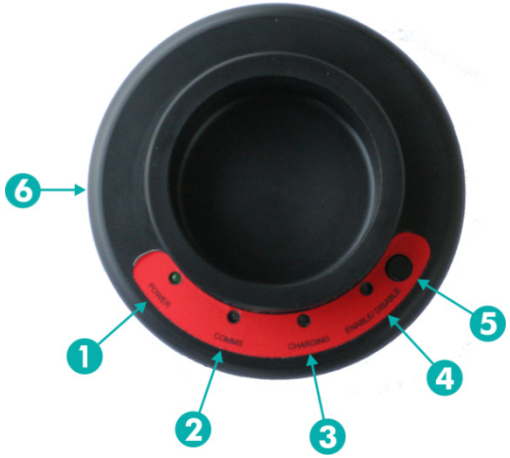
The battery takes approximately 18 hours to fully charge when the Docking Station is connected to a PC.

In disabled mode the battery will continue to be charged.

If the battery completely drains, the LED status will still show enabled (green) when the Nano is placed in the Docking Station. The Nano must be reset by performing a power-cycle.

Functions

The Docking Station status LEDs, push-button and micro USB socket are described below.



Docking Station	Status		Description
1 Power LED	●	Green	Docking station is powered
2 Communications LED	☀	Flashing Green	Searching for Nano
3 Charging LED	☀	Flashing Red	Nano charging
	●	Green	Nano fully charged
4 Enable/Disable LED	●	Red	Nano detected and disabled
	●	Green	Nano detected and enabled
5 Push-Button		Press to enable Nano	
		Press to disable Nano (disconnects the battery)	
		Press and hold for five seconds to power-cycle Nano	
6 Micro USB Socket		Provides power from charger to Docking Station	
		Provides communications between PC and Nano	

STEP 6 INSTALLATION & DEPLOYMENT

INSTALLATION

First Use

Before the Nano is used for the first time, the battery must be charged for a minimum of 12 hours using the supplied ac charger.

Charging the Battery

Connect the supplied charger to a 115/230 V ac supply and place the Nano in the Docking Station to initiate charging. When fully charged, the **Charging** LED changes from flashing red ☀ to green ● .

CAUTION

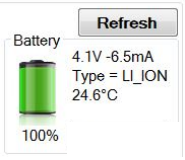
⚠ **Potential heat source. Ensure there are no metal or other foreign objects located inside the docking station cradle while charging.**

Battery Status

Checking the Battery Status using 6G Terminal Lite

Connect to the Nano using 6G Terminal Lite; see *STEP 9 "6G Terminal Lite"*.

The battery status is displayed on the **6G Setup** tab.



Checking the Battery Status using an iWAND

See *UM-8315 "User Manual for the Type 8315 iWAND", Section "Quick Check > Battery Status"*.

Connecting/Disconnecting the Battery

The battery can be disconnected/connected by pressing the Docking Station push-button.

STEP 7 INSTALLATION & DEPLOYMENT

Pre-use Checks

Before installation and deployment, checks should be carried out to make sure the Nano is serviceable and ready for use. These checks include:

- Inspect the Nano for any signs of mishandling, external damage or leakages.
- Check the pressure relief vent valve; see *STEP 3 "Pressure Relief Vent Valve"*.
- Check the battery contains enough charge for the current deployment operation; see *STEP 6 "Battery Status"*.

Configuration

Carry out the following procedures to configure the Nano if necessary, ready for deployment.

Note

There are two methods of accessing the Nano configuration; using 6G Terminal Lite software or using an iWAND hand held test device.

1. Connect to the Nano using 6G Terminal Lite; see *STEP 9 "6G Terminal Lite"* or an iWAND hand held test unit; see *STEP 9 "iWAND Hand Held Test Device"*.
2. For instructions on functional testing and configuring the Nano, see *STEP 9 "Functional Testing"*.
3. Make sure the Unique Identity (UID) and address are correct.

   Note

   The UID should match the UID printed on the Nano housing label.
4. Check all the displayed settings are correct.

DEPLOYMENT

The Nano can be deployed for short duration acoustic positioning of divers or small underwater vehicles.

CAUTION

Ensure the Nano has a clear line of sight to the transceiver and is not obstructed by apparatus or expelled gas from underwater breathing equipment.

STEP 8 OPERATION & RETRIEVAL

OPERATION

Operational Modes

Nano transponders are tracked by a Sonardyne 6G surface control system like Mini-Ranger 2. For operating instructions refer to the system's user manual.

RETRIEVAL

When retrieving from the water, the Nano must be cleaned and inspected before being transported and/or stored.

Cleaning

1. Thoroughly wash the Nano in warm clean fresh water, paying particular attention to the pressure relief vent valve.
2. Dry the Nano using a clean lint free cloth

Inspection

1. Inspect the pressure relief vent valve.
2. Inspect the transducer and housing for any signs of mishandling, external damage or leakages.

Transportation and Storage

WARNING

When transporting and storing the Nano, the battery must be disconnected.

1. Disconnect the battery; see *STEP 6 "Connecting/Disconnecting the Battery"* and then confirm the battery has been successfully disconnected by using 6GTerminal Lite (6G Setup tab will not populate; see *STEP 12*) or by using an iWand/6G transceiver (no acoustic ranging or telemetry is possible).
2. Store the Nano in its transit case.
3. Equipment must be kept in a dry, non-condensing atmosphere (20% to 80% humidity), free from corrosive agents and isolated from sources of vibration.
4. When storing for long periods of time it is recommended to visually inspect the equipment at least annually.
5. When equipment is taken from low temperature storage for immediate use its temperature should be raised to normal operating temperature before use.

Note

To prolong the life of the battery, it is recommended not to exceed the storage temperature range of 0 to 30°C.

FUNCTIONAL TESTING

To make sure the Nano functions correctly, testing and configuration can be carried out including:

- Wideband transmit and receive circuitry
- Hardware self-check
- Checking the Sensors
- Changing the Nano's address
- Creating a report

Equipment

The following equipment can be used to carry out functional testing of the Nano:

Description	Sonardyne Part Number
PC with a USB port	N/A
USB cable (Micro)	820-0503
6G Terminal Lite on 6G Utilities CD-ROM	920-2000
iWAND hand held test device	8315-0002

6G Terminal Lite

6G Terminal Lite software is supplied on the 6G Utilities CD. See *UM-8300-099 "User Manual for 6G Terminal Lite"* (referred to as *"6G Terminal Lite"* in this manual).

iWAND Hand Held Test Device

The Type 8315 iWAND is a hand held acoustic transponder test and configuration device for use with Sonardyne's 6G product range.

TEST PROCEDURES

The following test procedures are described using 6G Terminal Lite. Many of the procedures can also be performed using the iWAND hand held test unit; for more information see *UM-8315 "User Manual for the Type 8315 iWAND"*.

To carry out operational testing of the Nano, connect the USB cable from the Nano Docking Station to a PC running 6G Terminal Lite software.

1	PC (Terminal Lite Software)	3	Nano
2	USB Cable	4	Docking Station

6G TERMINAL LITE

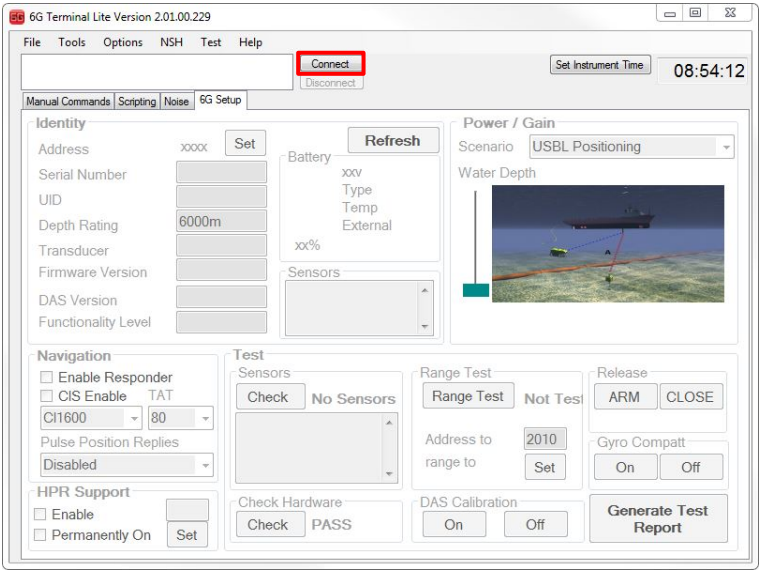
Connecting to 6G Terminal Lite

Ensure the PC has 6G Terminal Lite software installed and connect the Nano as described below.

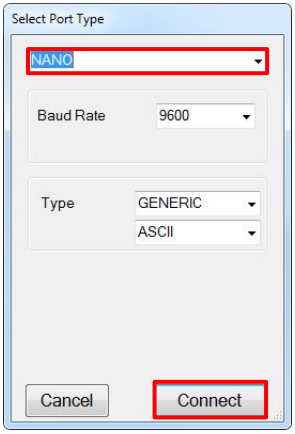
1. Connect the Docking Station to the PC and place the Nano in the Docking Station (ensure it is enabled).
2. Double-click the **6G Terminal Lite** desktop icon to start the software.

3. The 6G Terminal Lite dialog box will open on the **6G Setup** tab.

4. Click **Connect**.



5. On the **Select port type** drop-down list, select **Nano** and then click **Connect** (all other options can be left as default).

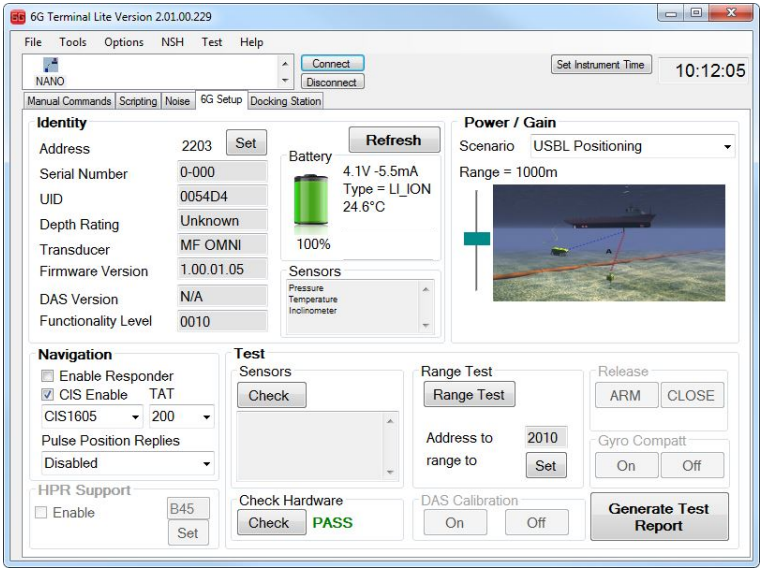


6G Setup

The **6G Setup** tab displays information on the connected transponder including address, serial number, depth rating and battery status.

Note

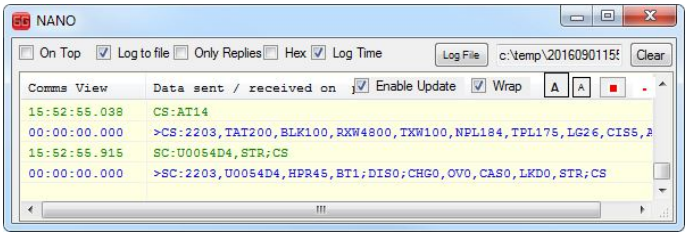
The Battery **Connect/Disconnect** button is not displayed for the Nano.



A COMMS log window will also open (green text indicates the commands sent from the software to the transponder and blue text is the transponder's response).

Note

This window automatically logs all communications when open and should be left open to ensure communications are logged for diagnostic purposes.



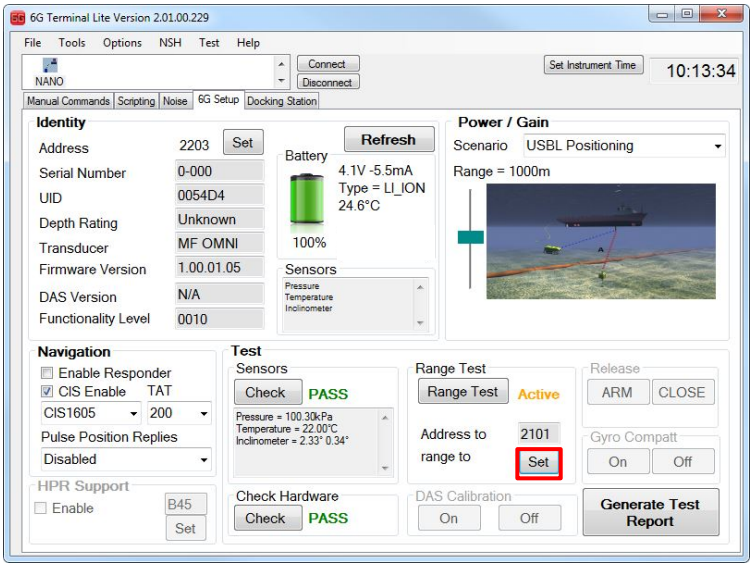
Checking the Wideband Acoustics

Note

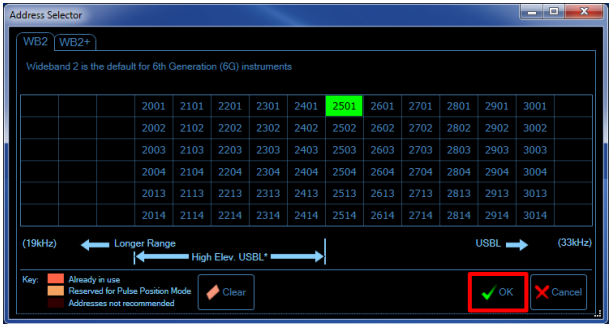
The same checks can also be performed using the iWAND hand held test unit; see *UM-8315 "User Manual for the Type 8315 iWAND", Section "Ping Check"*.

To carry out a check of the Wideband Acoustics of the transponder, it will also be necessary to enter the address of an acoustic target to range to. This can be any 6G transponder or an iWAND set to Transponder Mode.

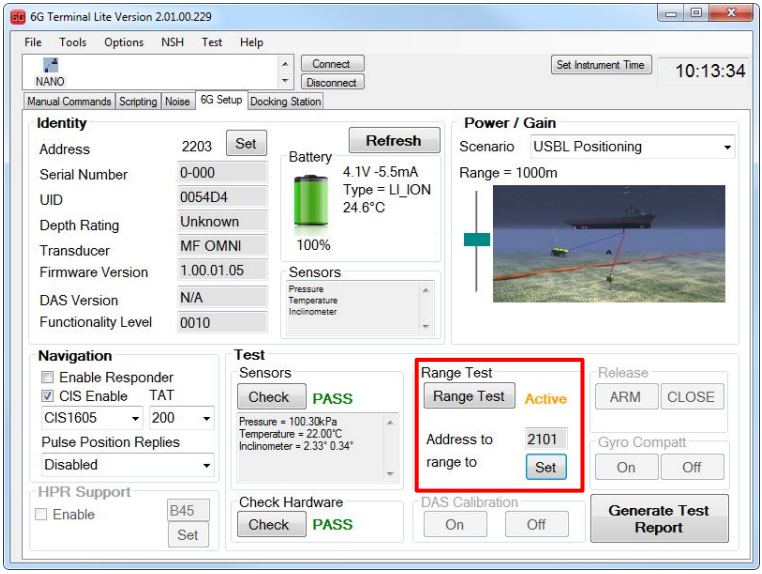
1. To enter the address of the acoustic target, click **Set** on the **Range Test** section.



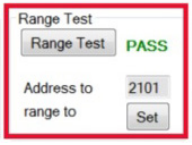
2. An **Address Selector** window will open listing all available Wideband 2 addresses. Select the address for the attached device and then click **OK**.



3. The 6G Setup tab will open with the selected address next to **Address to range to**.
4. Click **Range Test** to begin the acoustic check.
5. During the test **Active** will appear next to the **Range Test** button to indicate the test is in progress.



6. If the Acoustic check is successful **Pass** will appear next to the **Range Test** button (If **Fail** appears, move the transponder to a new location and repeat the range test. If the Range Test continues to fail contact Sonardyne Support).



7. The acoustic checks are now complete.

Note

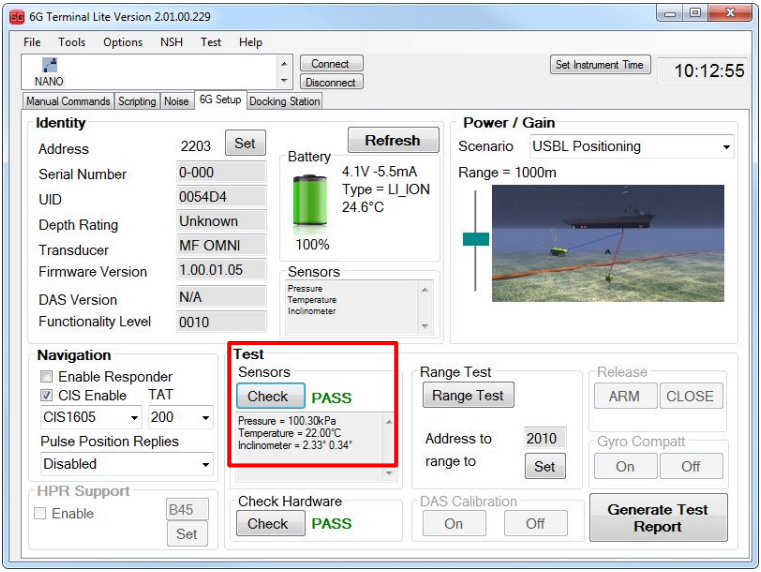
The Mini-Ranger 2 system does not support Wideband 1 for the Nano.

Checking the Sensor Measurements

Note

The same checks can also be performed using the iWAND acoustic transponder; see *UM-8315 "User Manual for the Type 8315 iWAND", Section "View Sensors"*.

1. Click **Test Sensors Check** to perform a test of all sensors installed in the transponder.
2. **Acquiring** appears next to the **Test Sensors Check** button to indicate the test is in operation.
3. **PASS** appears next to the **Test Sensors Check** button to indicate the test is successful (if the test is unsuccessful the word **FAIL** appears).



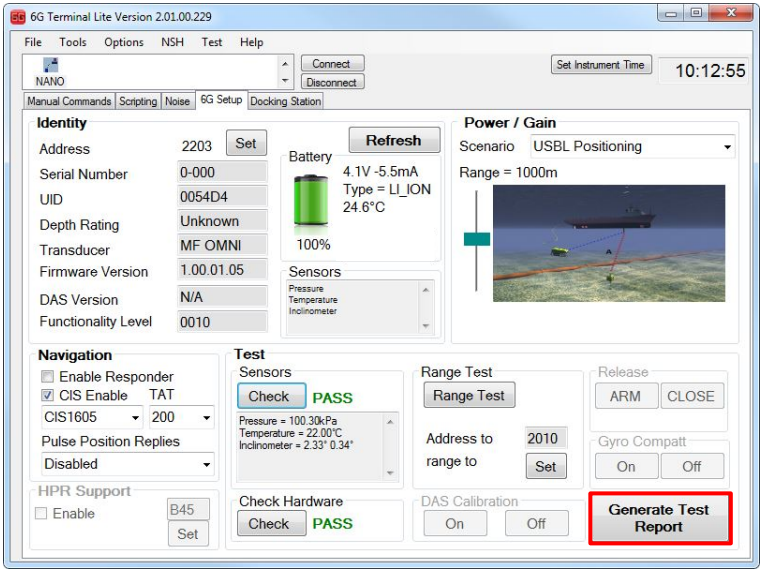
Note

The Inclination values refer to the roll then pitch in degrees.

Creating a Test Report

On completion of a functional testing of the transponder a test report can be created. The report lists detailed information on the transponder, settings, battery and sensors and will indicate if the transponder has passed the tests.

1. Click **Generate Test Report**.



2. Select the folder to save the Test Report.pdf to and then click **OK**.

Fault	Possible Cause	Action
Transponder does not reply to interrogation or commands.	Incorrect transponder address set in the surface transceiver.	Check address and repeat with the correct address.
	Operating at long range.	Increase power to the surface transceiver.
	Ray-bending effects stopping the transponder from receiving.	Use software application RAY_TRACE available from Sonardyne Int Ltd.
	Surface thermocline refracting reply signals.	Lower transducer below thermocline.
	Noise level at surface transducer too high.	Lower the dunking transducer/transceiver and reduce the surface transceiver gain settings.
	Noise level at surface transducer too high.	Perform a noise check using the applicable transceiver noise check command.
	Transponder has low battery power.	Check log for battery output before deployment.
		Check battery levels since deployment.
	Transponder is set to low power.	Check log for Navigation Power Level (NPL) in the Configuration Status (CS) Command before deployment.
	Transponder is set to low gain.	Check log for Linear Gain (LG) in the Configuration Status (CS) Command before deployment.
	Other acoustic systems may be operating in the same frequency band.	

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SOUND IN DEPTH

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