

User Guide

MX281000A Auto Test and Alignment Software



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Chapter 1 — General Information

1-1 Introduction

This manual provides instructions on using the MX281000A Auto Test and Alignment Software with the Anritsu MA25211A Auto Test and Alignment Accessory Kit and LMR Master S412E. The MX281000A Auto Test and Alignment software performs radio testing and alignment functions as prescribed by manufacturers of Land Mobile Radios. MX281000A runs on an external PC that controls the LMR Master S412E, external test equipment, contained within the MA25211A accessory kit, and the radio under test.

1-2 Auto Test and Alignment System Requirements

The MX281000A Auto Test and Alignment software requires a PC, software options, LMR Master, node-locked license, and an MA25211A accessory kit. Each is described below.

PC Requirements

- Desktop or Laptop PC
- Intel i5 processor or equivalent or higher
- 8 GB of RAM or higher
- Minimum of 1 GB Disk Storage available for Software installation and storage of test data

Software Options and Licensing

The MX281000A software requires a node-locked license or a USB dongle. Refer to [“The PC License File Format” on page 2-5](#).

Supporting Analyzer and Options

- S412E: Land Mobile Radio Modulation (LMR) Master
- S412E-0521: P25/P25p2 Analyzer Measurements
- S412E VNA mode required for cable loss characterization)

MA25211A Accessory Kit

The test equipment and accessories are listed in [“MA25211A Kit Contents and Equipment Required” on page 2-1](#).

Supported Radios

The radios supported are:

APX6000, APX6500, APX7000, APX8000, APX8000H, APX8500, and APXNext

1-3 Additional Documentation

Anritsu test equipment used along with the MX281000A Auto Test and Alignment User Guide is part of a set of manuals shown in [Table 1-1](#). Refer to instrument product page for more information.

Table 1-1. Related Manuals

Document Part Number	Description
10100-00066	Power Meters, Power Sensors, and Power Analyzers Product Information, Compliance, and Safety
11410-00621	MA24103A, MA24105A Technical Data Sheet
11410-00486	S412E LMR Master Technical Data Sheet
10580-00508	MA25211A Quick Start Guide
10580-00318	S412E LMR Master User Guide
10580-00243	Land Mobile Radio Analyzer and Coverage Measurement Guide

For additional information and literature covering your product, visit the product page of your analyzer and select the Library tab:<https://www.anritsu.com/en-us/test-measurement/products/s412e>.

1-4 ESD Caution

The equipment discussed in this manual is susceptible to electrostatic discharge (ESD) damage. Operators should exercise practices outlined within industry standards such as JEDEC-625 (EIA-625), MIL-HDBK-263, and MIL-STD-1686, which pertain to ESD and ESDS devices, equipment, and practices. Because these apply to the user's PC and the analyzer, it is recommended that any static charges that may be present are dissipated before disassembling the computer case or connecting cables or antennas to the analyzer. It is important to remember that the operator may carry a static charge that can cause damage and these charges should be dissipated through proper grounding. Following the practices outlined in the above standards will ensure a safe environment for both personnel and equipment.

1-5 Contacting Anritsu for Sales and Service

To contact Anritsu, visit the following URL and select the services in your region:

<http://www.anritsu.com/contact-us>

Chapter 2 — Hardware and Software Installation

2-1 Introduction

This chapter provides the hardware testing setups and software installation for the Auto Test and Alignment of mobile and portable radios.

The mobile testing setup is shown in [“Mobile Radio Test Setup” on page 2-2](#).

The portable testing setup is shown in [“Portable Radio Test Setup” on page 2-3](#).

Software Installation is described in [“Software Installation” on page 2-5](#)

MA25211A Kit Contents and Equipment Required

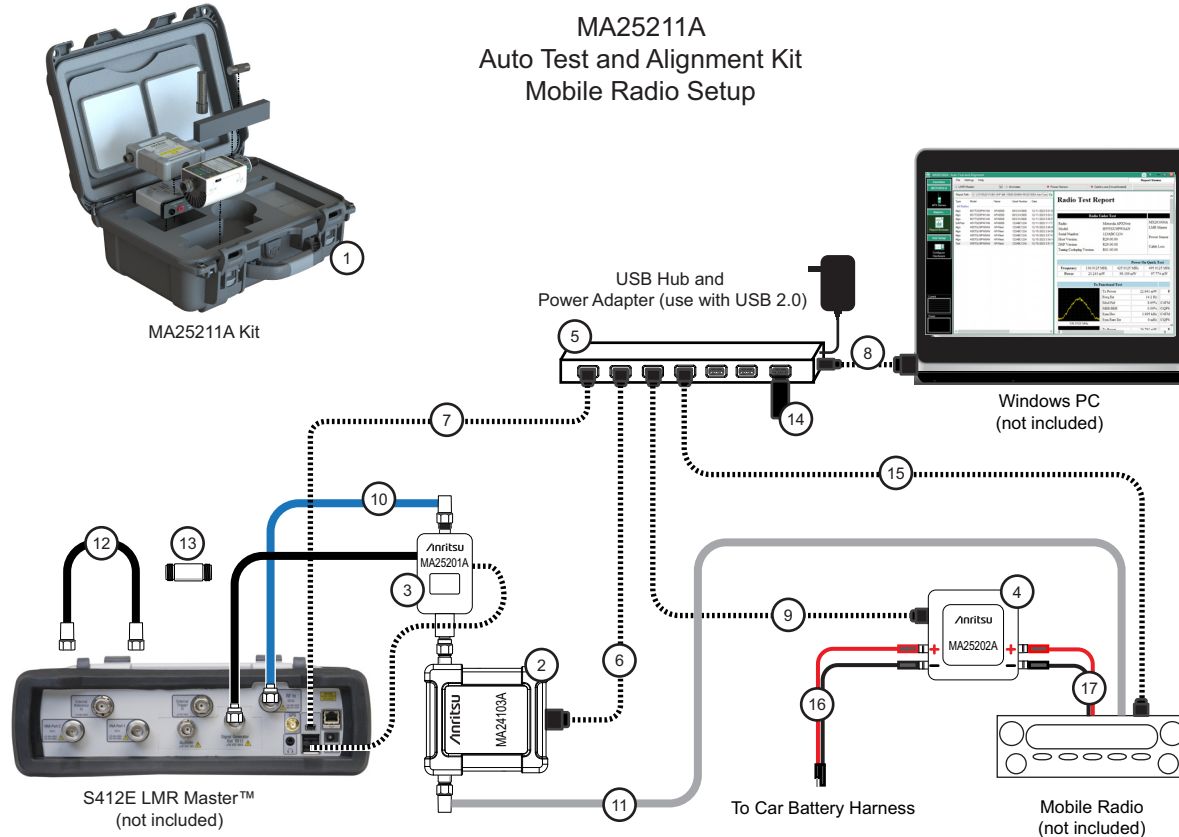
Test equipment contained in MA25211A Auto Test and Alignment Accessory Kit to perform alignment and testing of the mobile and portable radios are shown in [Figure 2-1, “Mobile Radio Test Setup” on page 2-2](#) and [Figure 2-2, “Portable Radio Test Setup” on page 2-3](#).

Not included

- S412E LMR Master
- Power Supply
- Windows PC
- Portable or Mobile Radio

Mobile Radio Test Setup

The mobile radio test setup using the MA25211A Kit is shown in [Figure 2-1](#). The portable radio test setup is shown in [Figure 2-2 on page 2-3](#).

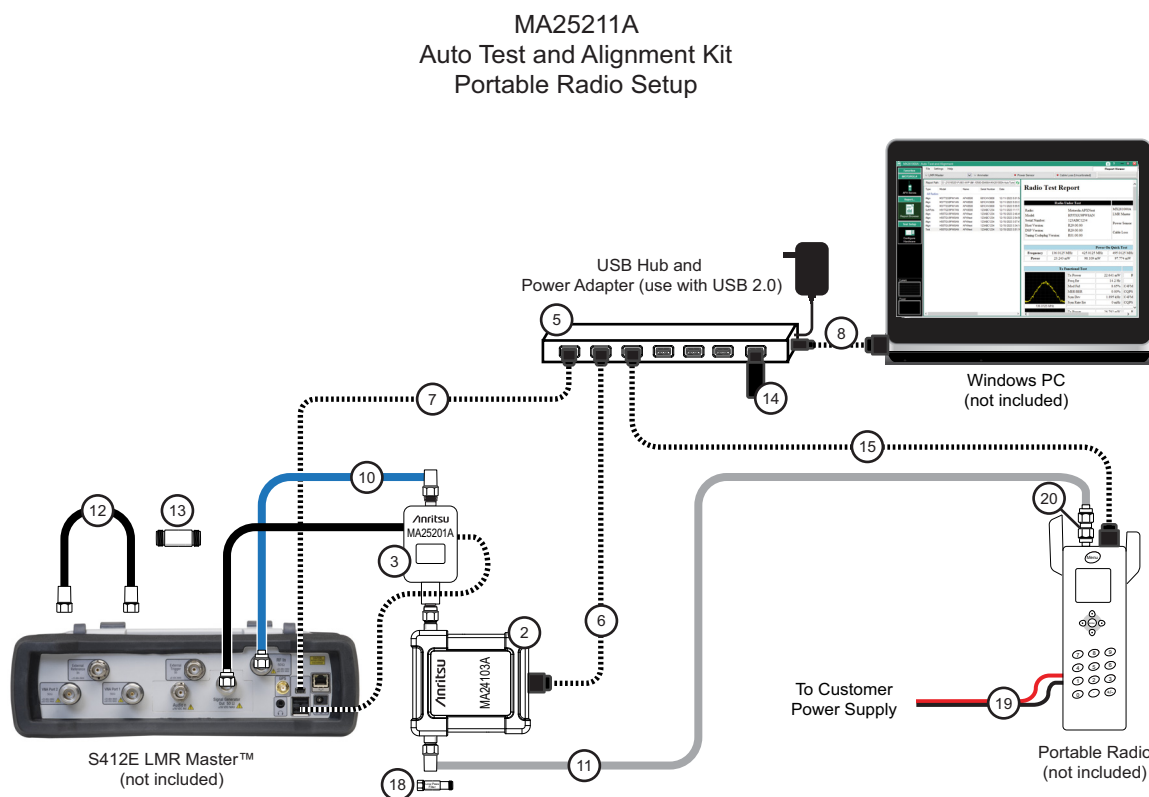


- | | |
|--|--|
| <ol style="list-style-type: none"> 1. 760-301-R MA25211A Foam-lined Case 2. MA24103A Inline Power Sensor 3. MA25201A High Power Input Protection Module 4. MA25202A Ammeter Module 5. 2000-2157-R 7-Port USB Hub and Power Adapter 6. 2000-2010-R USB-A/Micro-USB, Cable Assembly (6ft) (MA24103A Cable) 7. 3-2000-1498 USB Cable, Type-A to Mini-B (10 ft) 8. 3-806-468 USB 3.0 USB Cable, Type-C to Micro-B (3.33 ft) 9. 3-806-469 USB Cable Type-A to Type-C (6.56 ft) 10. 806-470 Cable Assembly, N(m) to N(m) (right angle) (18 in) (Blue Cable) 11. 806-465-R Test Cable, N(m) (right angle) to N(m) (6.56 ft) (Silver Cable) | <ol style="list-style-type: none"> 12. 806-466-R Test Cable, N(m) to N(m), (20 in) 13. 1091-474-R RF Adapter N(f) to N(f) 14. USB License Key (Not required if Node-Locked license is used) 15. Customer Supplied USB Cable 16. 2000-2168-R SAE Connector/Adapter to 4 mm Banana Plug (635 mm, 25 in) 17. 2000-2169-R SAE Connector to 4 mm Banana Plug (609.6 mm, 24 in) 18. 1030-328-R Filter, Low Pass, DC-270 MHz, 50 Ω (Figure 2-2 on page 2-3) (not used mobile setup) 19. Customer Supplied Power Cable (Figure 2-2 on page 2-3) (not used mobile setup) 20. Customer Supplied RF Adapter (Figure 2-2 on page 2-3) (not used mobile setup) 21. 10580-00508 MA25211A Quick Start Guide |
|--|--|

Figure 2-1. Mobile Radio Test Setup

Portable Radio Test Setup

The portable radio test setup using the MA25211A Kit is shown in [Figure 2-2](#). The mobile test setup is shown in [Figure 2-1](#).



1. 760-301-R MA25211A Foam-lined Case (Figure 2-1 on page 2-2)	11. 806-465-R Test Cable, N(m) (right angle) to N(m) (6.56 ft) (Silver Cable)
2. MA24103A Inline Power Sensor	12. 806-466-R Test Cable, N(m) to N(m), (20 in)
3. MA25201A High Power Input Protection Module	13. 1091-474-R RF Adapter N(f) to N(f)
4. MA25202A Ammeter Module (Figure 2-1 on page 2-2) (not used in portable setup)	14. USB License Key (Not required if Node-Locked license is used)
5. 2000-2157-R 7-Port USB Hub and Power Adapter	15. Customer Supplied USB Cable
6. 2000-2010-R USB-A/Micro-USB, Cable Assembly (6ft) (MA24103A Cable)	16. 2000-2168-R SAE Connector/Adapter to 4 mm Banana Plug (635 mm, 25 in) (Figure 2-1 on page 2-2) (not used in portable setup)
7. 3-2000-1498 USB Cable, Type-A to Mini-B (10 ft)	17. 2000-2169-R SAE Connector to 4 mm Banana Plug (609.6 mm, 24 in) (Figure 2-1 on page 2-2) (not used in portable setup)
8. 3-806-468 USB 3.0 USB Cable, Type-C to Micro-B (3.33 ft)	18. 1030-328-R Filter, Low Pass, DC-270 MHz, 50 Ω (Figure 2-1 on page 2-2) (not used in portable setup)
9. 3-806-469 USB Cable Type-A to Type-C (6.56 ft) (Figure 2-1 on page 2-2) (not used in portable setup)	19. Customer Supplied Power Cable
10. 806-470 Cable Assembly, N(m) to N(m) (right angle) (18 in) (Blue Cable)	20. Customer Supplied RF Adapter
	21. 10580-00508 MA25211A Quick Start Guide

Figure 2-2. Portable Radio Test Setup

2-2 Software Installation

To install the MX281000A Auto Test and Alignment software:

1. Go to the Anritsu S412E product page here.
<https://www.anritsu.com/en-us/test-measurement/products/s412e>
2. Click DOWNLOADS button and click MX281000A Auto Test and Alignment to download the software and launch the installer.
3. The first dialog provides the start installation screen.
4. Press run to start the software installation process.
5. When the installation is complete, the Auto Test and Alignment screen is displayed as shown in [Figure 3-1 on page 3-2](#).

2-3 Installing the License Key

The user must install the license key using one of the following methods.

- [“The PC License File Format”](#)
- [“The USB Dongle License Key Format” on page 2-7](#)

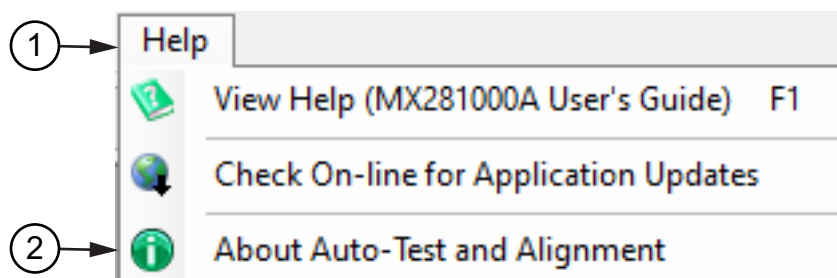
Note

Microsoft .NET framework 4.5.2 or higher must be installed on your PC. If .NET 4.5.2 is not present, the MX281000A software installer will prompt you to install this framework. In some Windows installations, there may be a file missing called vcredist_x64.exe. This file is part of the Microsoft Visual C distribution. To use the MX281000A software, you may need to download and execute this file.

The PC License File Format

This license is delivered by email and provides a numeric key that enables the features on a single specified PC. This license is not transferable and if the specified PC is lost, a new license for a new PC must be purchased. The end user's email address AND a generated PC registration code must be provided to enable the generation and delivery of the PC node locked license. The PC registration code is generated as described below.

1. Download and install MX281000A software onto the target PC that will be used to run the licensed software.
2. Launch Auto Test and Alignment and open the About Auto Test and Alignment dialog from the Help menu as shown in [Figure 2-3](#).



1. Help File
2. About Auto Test and Alignment

Figure 2-3. Help Menu

3. Press the "Generate Registration" button.

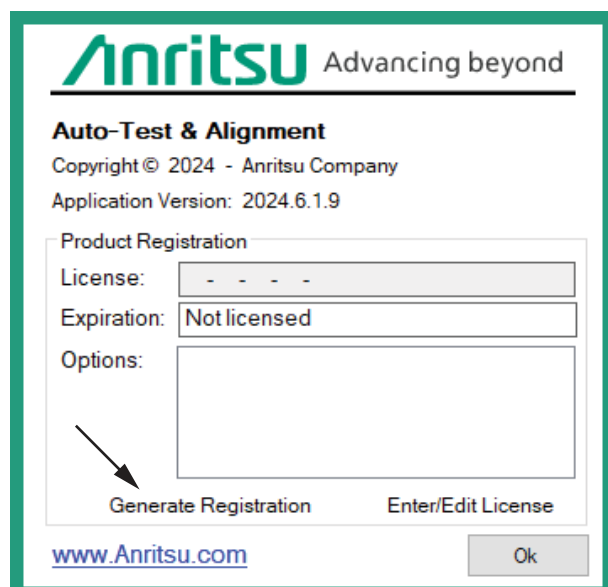


Figure 2-4. Generate Registration Button

4. Record the registration code from the information dialog shown in [Figure 2-5](#).

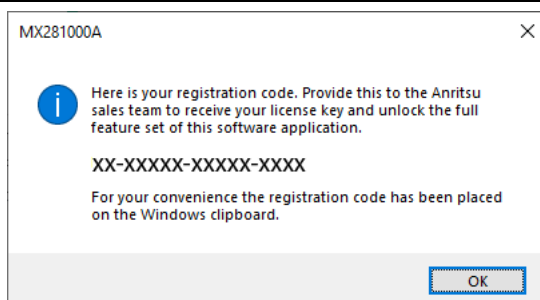


Figure 2-5. Registration Dialog

5. Contact Anritsu Sales and Service and provide the registration code for the PC to be licensed. For contact information, see: <https://www.anritsu.com/en-us/contact-us>
A license key will be emailed to you.

6. When you receive your license key, launch Auto Test and Alignment and open the “About Auto Test and Alignment” dialog from the Help menu to display the Licensing dialog shown in [Figure 2-6](#).

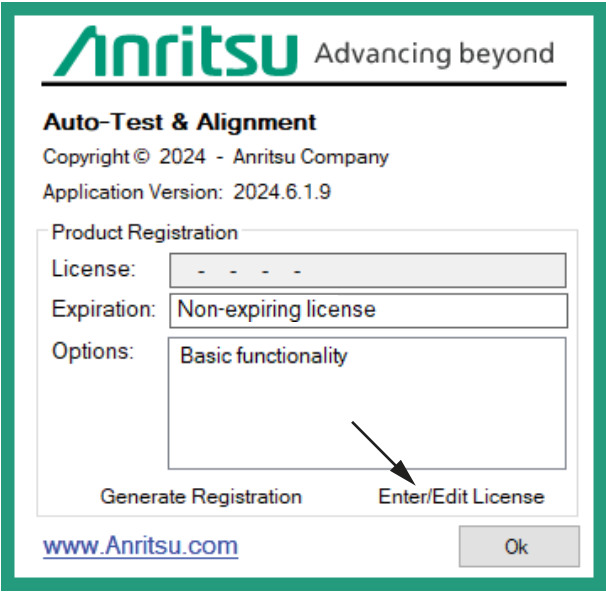


Figure 2-6. Licensing Dialog

7. Press Enter/Edit License and enter the License key into the License field.

The USB Dongle License Key Format

The PC license is delivered in the form of a physical USB dongle. The licensed features will run on any PC that has the USB dongle inserted at the time of use. This means the software can be inserted on multiple PCs but will only run at any moment in time on the PC that has the dongle inserted. Removing the dongle will immediately disable the licensed features on the PC it was removed from. If the USB dongle is lost, a new license key dongle must be purchased. The Dongle registration is shown in [Figure 2-7](#).

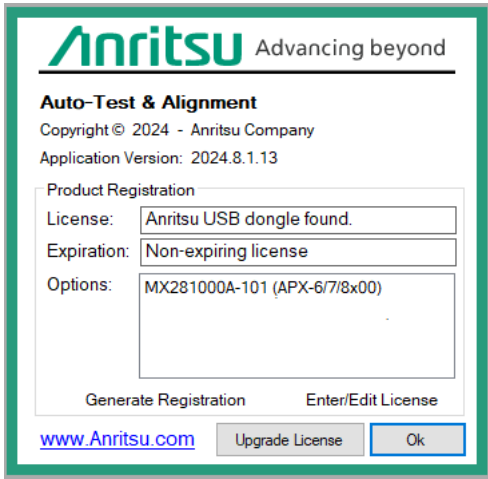


Figure 2-7. Dongle Dialog

2-4 Upgrade License

To add additional options, send an email to Anritsu providing the options and the serial number of the dongle. If more than one dongle is requiring additional options, provide the serial number of each dongle. To upgrade or add additional options, contact Anritsu at: <https://www.anritsu.com/contact-us> for service. Pressing the About Auto-Test and Alignment displays the dialog shown in Figure 2-8. Obtain and copy the license Key provided in the confirmation email and paste it into the License Key field. The added options field is displayed as shown in Figure 2-7.



Figure 2-8. Paste License Key Into License Key Field

Chapter 3 — MX281000A Overview

3-1 Introduction

This chapter provides an overview of the MX281000A Auto Test and Alignment software for testing portable and mobile radios. The MX281000A Auto Test and Alignment software provides a user interface that is used with the MA25211A kit for testing and aligning portable and mobile radios.

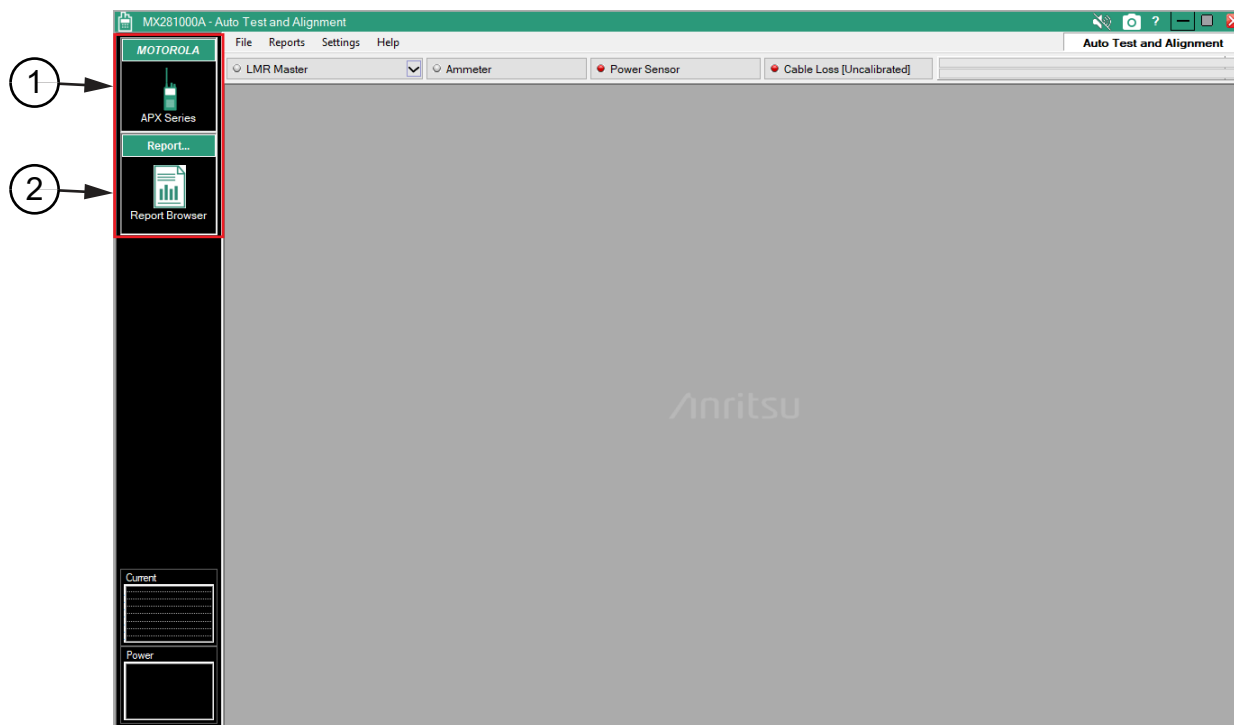
Testing Procedure

The procedure outlined below provides the basic testing sequence to perform the radio test and alignment described in this chapter.

1. Connect the test equipment as described in [Chapter 2, “Hardware and Software Installation”](#). The radio types setups are:
 - [“Mobile Radio Test Setup” on page 2-2](#)
 - [“Portable Radio Test Setup” on page 2-3](#)
2. Install the MX281000A Auto Test and Alignment software as described in [“Software Installation” on page 2-5](#). Once loaded and opened, the opening screen will be displayed as shown in [Figure 3-1](#).
3. Use the opening screen to select a testing mode as described in [“Mode Menus” on page 3-3](#).
4. In the Mode menus, press the APX Series button to display the main test screen as shown in [Figure 3-4 on page 3-4](#). This is the main testing menu. The MX281000A software displays a user interface that provides radio test and report prompts.
5. Characterize the calibration cables as described in [“Compensating for Cable Loss” on page 3-15](#). Characterizing cable loss is an important process to compensate for the power loss through the test cable in order to optimize the radio testing and alignment.
6. Zero the MA24103A as described in [“Power Sensor Zeroing” on page 3-7](#). Power sensor zeroing is important to optimize the MA24103A power sensor performance.
7. Use the [“Settings Menu” on page 3-6](#) to set up testing preferences.
8. Connect the LMR Master S412E, ammeter (required for Mobile Test only), and power sensor as described in [“Test Equipment Status Toolbar” on page 3-14](#). Before testing can begin, all the status LED indicators must be green.
9. Press the Connect button to connect to the radio as shown in [“Connecting” on page 3-23](#).
10. Refer to the [“Start Testing –Test and Alignment Control” on page 3-24](#) to start the test and alignment of the radio.
11. Create and generate test reports by using the Report tab described in the [“Menu Bar” on page 3-5](#) and the [“Reports” on page 3-28](#).

Opening Screen

Once the software is installed as described in [“Software Installation” on page 2-5](#), the opening screen is displayed as shown in [Figure 3-1](#). The testing mode menus are displayed at the top left corner. Use the mouse to click (press) a testing mode and display a mode menu as described in [“Mode Menus” on page 3-3](#) below.



1. MX281000A Auto Test and Alignment software
2. Testing Mode Menu Tabs

Figure 3-1. Opening Screen

Mode Menus

Press a mode menu to display testing or a reports user interface. The mode menus are shown below.

Motorola Mode

The MOTOROLA mode is shown in [Figure 3-2](#). This mode menu provides the APX series testing user interface.

	APX Series: Press to display the APX series testing menu. This is the main radio test menu that provides the radio testing interface as shown in Figure 3-4 on page 3-4 .
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Figure 3-2. MOTOROLA Mode

Report Mode

The Report mode is shown in [Figure 3-3](#). This mode menu provides the Report Browser user interface.

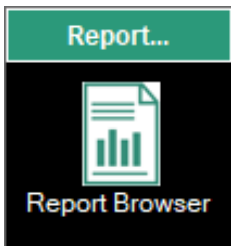
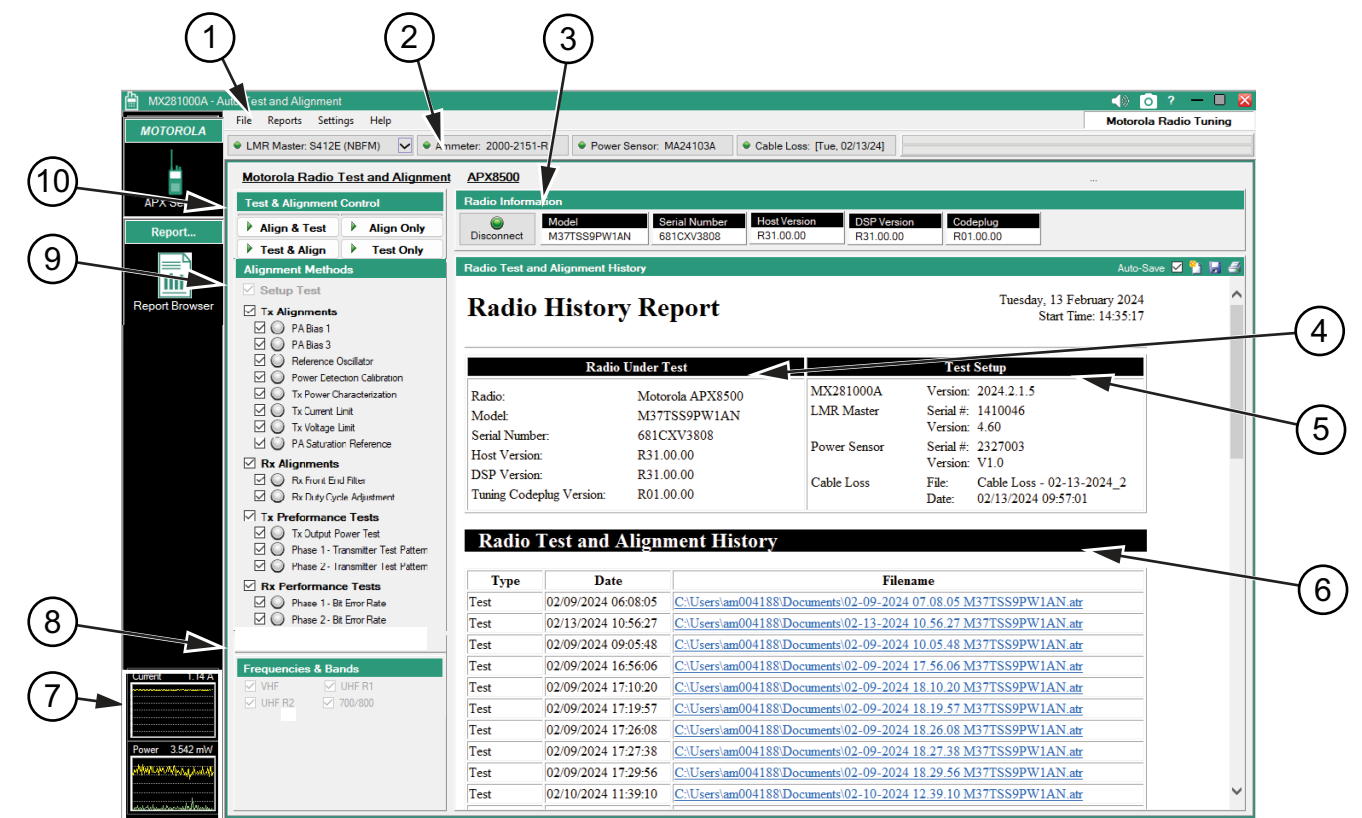
	Report Browser: Press to display the selected radio test results. The reports types set and printed are described in “Reports” on page 3-28 .
--	--

Figure 3-3. Report Mode

3-2 Main Test Menus

The MX281000A APX Series mode user interface is outlined in [Figure 3-4](#).



- | | |
|---|--|
| 1. Section 3-3 “Menu Bar” | 6. “Radio Test and Alignment History” on page 3-25 |
| 2. Section 3-4 “Test Equipment Status Toolbar” | 7. “Front Screen Display” on page 3-7 |
| 3. “Radio Identification Panel” on page 3-23 | 8. “Frequencies and Bands” on page 3-25 |
| 4. “Radio Under Test and Test Setup” on page 3-30 | 9. “Alignment Methods” on page 3-24 |
| 5. “Radio Under Test and Test Setup” on page 3-30 | 10. “Start Testing –Test and Alignment Control” on page 3-24 |

Figure 3-4. APX Test and Alignment Menu

3-3 Menu Bar

The MA281000A menu bar is shown in [Figure 3-5](#). The menus are described below.

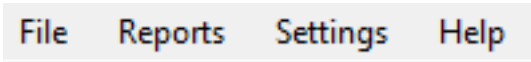
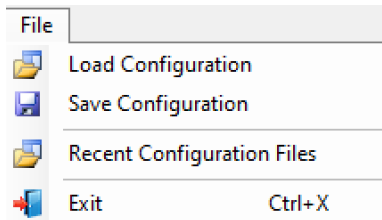


Figure 3-5. Menu Bar

- See [“File Menu”](#).
- See [“Reports Menu”](#).
- See [“Settings Menu”](#) on page 3-6.

File Menu

The File menu is shown in [Figure 3-6](#).



Load Configuration: Opens a browse dialog to find and load a configuration file.

Save Configuration: Open to display the saved settings for the MX281000A software that have been recently used. Basic information is stored and subsequently when the same file is opened again it is very fast. Along with the basic file description, user settings such as markers are also stored in the same place.

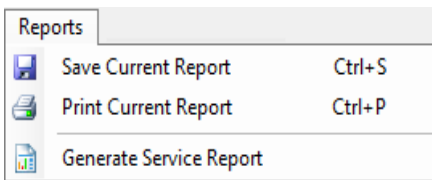
Recent Configuration Files: Displays the most recent configuration files from the saved configuration folder.

Exit: Exits the program.

Figure 3-6. File Menu

Reports Menu

The Reports menu is shown in [Figure 3-7](#).



Save Current Report: Opens the save dialog.

Print Current Report: Opens the Print dialog.

Generate Service Report: Press to provide the Service Report Generator menu. Use the Service Report Generator dialog to set the testing results print criteria. See [“Service Report Generator”](#) on page 3-11.

Figure 3-7. Reports Menu

Settings Menu

The Settings menu is shown in [Figure 3-8](#).

Settings

Application Settings F2

Filename Template Editor

Application Settings: See [“Application Settings” on page 3-6](#).

Filename Template Editor: See [“Filename Template Editor” on page 3-10](#).

Figure 3-8. Settings Menu

Application Settings

Press the Application Settings menu to show the Program Options and Settings dialog shown in [Figure 3-9](#). Use this dialog to set test preferences.

MX281000A - Program Options and Settings

Hardware Configuration Options

☐ Automatically connect to LMR Master on program start

☐ Automatically connect to Power Sensor of program start

Power Sensor Zeroing

Warn: 8.0 hours

Require: 24.0 hours

Cable Loss Expiration

Warn: 14.0 days

Require: 30.0 days

Front screen display:

☒ Ammeter☒ Power Sensor

After Test complete:

☒ No mode switch☐ Switch to Align Mode

☒ Disconnect Radio☐ Stay Connected

Reporting Options

CSV Export Delimiter: ☒ Comma☐ Semicolor☐ Tab

Report Footer Text:

Report Headers:

Text Color

Background

Report file extension: ☐ *.atr☒ *.htm

☐ Prompt for Customer Field entry on radio connect

Audio Notification Options

☐ Play Sounds [Mute]

Event	Default	Custom	Custom File
☐ Process Start	☒	☐	
☒ Process Step	☒	☐	
☒ Step Failure	☒	☐	
☒ Process Abort	☒	☐	
☒ Process Finish	☒	☐	
☒ Cable Change	☐	☒	

Screenshot Options

Screenshot Destination: ☒ Clipboard☐ Disk File☐ Both

Folder: C:\Users\OneDrive - ANRITSU

Ok

Cancel

Figure 3-9. Application - Program Options and Settings Menu

Hardware Configuration Options

The hardware configuration options provide MA24103A and cable loss re-characterization time settings as shown in [Figure 3-10](#).

Hardware Configuration Options

☐ Automatically connect to LMR Master on program start

☐ Automatically connect to Power Sensor of program start

Power Sensor Zeroing

Warn: 4.0 hours

Require: 24.0 hours

Cable Loss Expiration

Warn: 1.0 days

Require: 7.0 days

Front screen display:

☒ Ammeter☒ Power Sensor

After Test complete:

☒ No mode switch☐ Switch to Align Mode

☒ Disconnect Radio☐ Stay Connected

Figure 3-10. Hardware Configuration Options

Automatically connect to LMR Master on program start: The LMR Master needs to be connected into the test configuration. When checked, the program will attempt to connect to the hardware when the program starts. When not checked, the user will need to connect manually. The LMR Master connection can be done manually by pressing the LMR button on the toolbar.

Automatically connect to MA24103A on program start: The MA24103A needs to be connected into the test configuration. When checked, the program will attempt to connect to the hardware when the program starts. When not checked, the user will need to connect manually. The MA24103A connection can be done manually by pressing the MA24103A button on the toolbar.

Power Sensor Zeroing: The MA24103A is required to be zeroed periodically. Zeroing a MA24103A is important to reduce zero offset and noise impact, thereby continually maximizing the accuracy of an RF power measurement.

Warn: (warning): Set time from 1 to 24 hours to inform of the remaining time before power sensor zeroing is required.

Require: Set the time box value from 1 to 96 hours. When the set time set is reached, the testing will not perform calibrations until the cable loss is calibrated.

The indicator is green when operating within the set warning time. Yellow indicates the power sensor zeroing warning time has been reached, but testing can continue. Red indicates time to re-zero the power sensor. Testing will be blocked until the power sensor is zeroed again.

To start a Power Sensor Zeroing, press the icon described in [“Zero the Power Sensor:” on page 3-8](#).

Cable Loss Expiration: The RF Test Cable requires a cable loss calibration to be performed to compensate impedance mismatch between the load and the internal impedance on a radio frequency (RF) transmission line that may occur when connecting and disconnecting the testing cables. The cable loss calibration should be performed periodically and can be set as follows:

Warn: (warning): Set time from 0.5 to 14 days to inform of the remaining time before cable loss calibration is required.

Require: Set the time box value from 0.5 to 90 days. When the set time set is reached, the testing will not perform calibrations until the cable loss is calibrated.

The indicator is green when operating within the set warning time. Yellow is warning to recalibrate the cable loss, but testing can continue. Red indicates time to recalibrate due to cable loss that may have occurred. Testing will be blocked until the power sensor is zeroed again.

Front Screen Display: Because the measurement screens are unavailable to view when using the test and alignment screens, check the boxes to provide a small screen view of the MA25202A and MA24103A displays on the front screen as shown in [Figure 3-11](#).

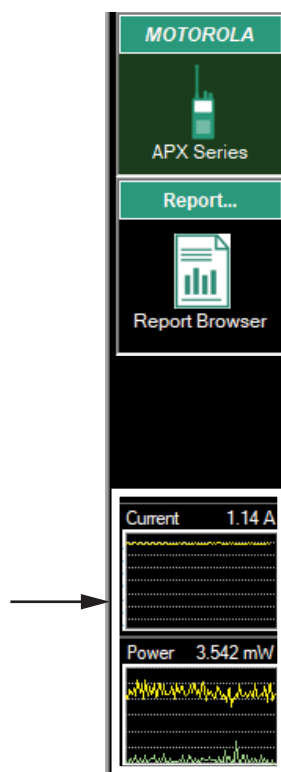


Figure 3-11. MA25202A and MA24103A Small Screen Display

After Test Complete

Set a mode of operation when the test is complete.

No Mode Switch: Stay in Test Mode.

Disconnect Radio: Provides a prompt to disconnect radio when test is complete.

Switch to Align Mode: Switch testing to Align Testing.

Stay Connected: Stay connected, but set a new mode to continue.

Hardware Configuration Icons: The Hardware Configuration Options icons are shown in [Figure 3-12](#).

	Zero the Power Sensor: Press to perform the MA24103A zeroing calibration. Zeroing a MA24103A periodically is necessary in order to reduce zero measurement offset and noise impact to improve the accuracy of RF power measurement.
	Cable Characterization: Press to perform cable characterization to compensate for test setup cable loss. See “Compensating for Cable Loss” on page 3-15 .

Figure 3-12. Hardware Configuration Options Icons

Reporting Options

The Reporting Options menu shown in [Figure 3-13](#) provides the generating report preferences.

Reporting Options

CSV Export Delimiter: ☒ Comma ☐ Semicolor ☐ Tab

Report Footer Text:

Report Headers:

Text Color

Background

SoftPot Display Encoding: ☐ Decimal ☒ Hexadecimal

Report file extension: ☒ *.atr ☐ *.htm

☐ Prompt for Customer Field entry on radio connect

Figure 3-13. Reporting Options

CSV Export Delimiter: Set the export file delimiter to Comma, Semicolon, or Tab.

Report Footer Text: Type the text that will appear at the footer of the report. This can be used to identify a testing facility, customer company name, or other identifying report name.

Report Headers: Press the left black box and select a color for the text. Press the right black box to select a color for the background. See [Figure 3-14](#).

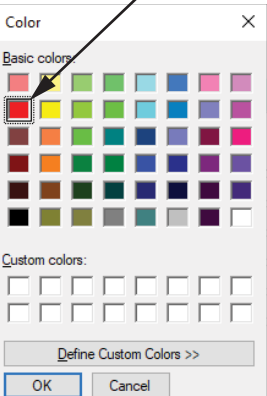
Report Headers:

Text Color

Background

Color

Basic colors:



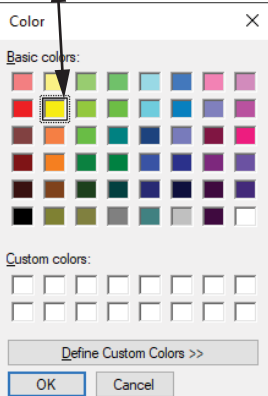
Custom colors:

Define Custom Colors >>

OK Cancel

Color

Basic colors:



Custom colors:

Define Custom Colors >>

OK Cancel

Figure 3-14. Report Color Palette

Report file extension: Set the file extension of the test results report as .atr (Anritsu Test Report) or .htm.

.atr: The report files can be easily identified using Windows File Explorer, but can only be opened with the MX281000A software.

.htm: The user can share the report by sending an .htm file for anyone to view.

Prompt for Customer Field Entry on Radio Connect: Checking the box displays the Customer Field Entry dialog when the Connect button is pressed. The Connect button is shown in [Figure 3-32 on page 3-23](#). For more information on using the Customer Entry Field dialog to customize the generated service reports, see [“Customer Input Fields” on page 3-13](#).

Screenshot Options

The Screenshot Options menu shown in [Figure 3-15](#) provides preferences for saving a screenshot.

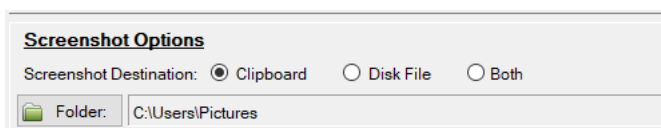


Figure 3-15. Screenshots Options Menu

Screenshot Destination: Set the destination of a screenshot capture when using the camera utility. Set the destination as the Clipboard, Disk File, or Both.

Folder: Set the destination folder for the captured images.

Audio Notification Options Menu

The Audio Notification Options shown in [Figure 3-16](#) provides conditional audio sound preferences. Test and alignment can take several minutes to complete. An audible alarm can be set to alert the user of a test status or condition.

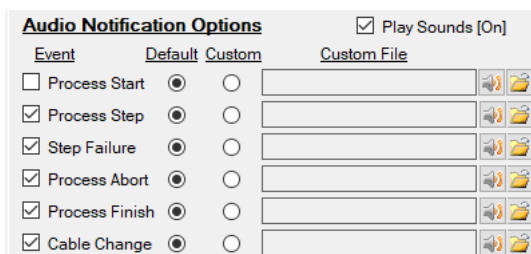


Figure 3-16. Audio Notifications Options Menu

Event: Set the event to sound an audible alarm. The user can set audible alarms with a custom alarm or as off with no audible alarms.

Process Start: An audible alarm sounds when the test is to start.

Process Step: An audible alarm provides notice when a step in the test is complete.

Step Failure: An audible alarm provides notice when the test has failed.

Process Abort: An audible alarm provides notice when the test is aborted.

Process Finish: An audible alarm provides notice when the test is complete.

Cable Change: An audible alarm provides notice when the cable change is requested.

Default: Set the Default radio button to set the default sound.

Custom: Set the Custom radio button to apply a user provided sound from a custom file.

Custom File: Use the folder icon to browse to the folder/file location.

Filename Template Editor

The Filename Template Editor provides the filename template builder shown in [Figure 3-17](#). The report file is generated automatically after each auto tune and alignment is performed. Use the Filename Builder to customize the format of the filename for each auto-generated test result. To add a macro into the filename, type the macro shown so it is positioned within the string as required. Refer to the examples in the dialog for template building formats. To remove a macro from the template string, move the mouse over the macro to highlight and then press delete.

Filename Builder

Report filename template: %date% %TIME% %modelnum%

Cable filename template: Cable Loss - %date%

Macros:

- %count% : Four digit sequential number (e.g. 0037)
- %date% : Short format date (e.g. 12-15-2023)
- %DATE% : Long format date (e.g. December 15, 2023)
- %day% : Day of the week (e.g. Monday, Tuesday, etc.)
- %mon% : Abbreviated month name (e.g. Jan, Feb, etc.)
- %month% : Full month name (e.g. January, February, etc.)
- %yy% : Short format year (e.g. 22, 23, 24, etc.)
- %yyyy% : Long format year (e.g. 2023, 2024, etc.)
- %time% : Short format time (e.g. 8.00 AM)
- %TIME% : Long format time (e.g. 8.00.49 AM)
- %modelnum% : Radio model number (e.g. H91TGD9FW7AN)
- %modelname% : Radio model name (e.g. APX 8000)
- %serial% : Radio serial number (e.g. 456CBN0234)
- %computer% : Computer name
- %username% : User name

Other characters are literal and will show up as entered

Examples

Template: "Radio Report %date% (%count%)"
Filename: Radio Report 12-15-2023 (0001)

Template: "%modelnum% - %DATE% - %TIME%"
Filename: H91TGD9FW7AN - December 15, 2023 - 8.00.49 AM

Template: "%modelname% - %serial% (Omaha North)"
Filename: APX 8000 - 456CBN0234 (Omaha North)

Reset Ok Cancel

Figure 3-17. Filename Template Builder

Service Report Generator

In the menu bar, press Reports and then press Generate Service Report to display the Service Report Generator dialog shown in [Figure 3-18](#). Here, the user can customize the report by checking the provided informational fields and add up to six user-defined fields. The fields selected format the generated Excel Service Report spreadsheet shown in [Figure 3-20 on page 3-13](#).

Figure 3-18. Service Report Generator

The default generated columns included in each report are Model number, Name of the radio series, Serial Number of the mobile radio, and Date of the testing. The user selected criteria and columns that will be included in the Service report is described in [Figure 3-19](#).

Begin date: 11/10/2023 End Date: 12/23/2023	Date Range: Set the Service Report Begin Date and End Date. The spreadsheet will list the tests performed within the dates selected.
Automatic Fields ☐ Report Type ☐ Test Location ☐ Radio Firmware Ver. ☐ Codeplug Version ☐ User name ☐ Host PC	Report Fields: Check the fields that will display in the service report. Report Type : Displays the testing Type column. This column lists the testing type as Alignment and Test. Test Location: Displays the testing Location. Radio Firmware Version: Displays the Radio Host version. Codeplug Version : Displays the codeplug file that contains the programming information for the mobile radio. User Name : Displays the Tester user name. Host PC: Displays the Host PC.
Sort Order	Earliest First: Sort by earliest first Most Recent First: Sort by most recent first
File Types: ☒ Test Reports ☐ Alignment Reports	File Types: Check the file type to display in the service report Test Reports : Displays all the Test reports withing the set date range. Alignment Reports: Displays all the Alignment reports withing the set date range.

Figure 3-19. Service Report Generator Interface Description

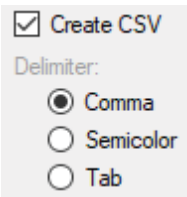
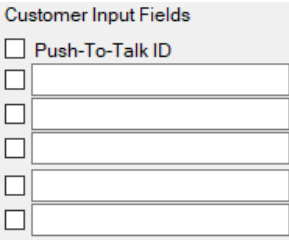
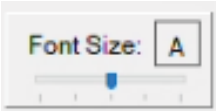
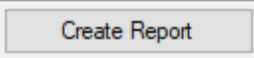
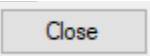
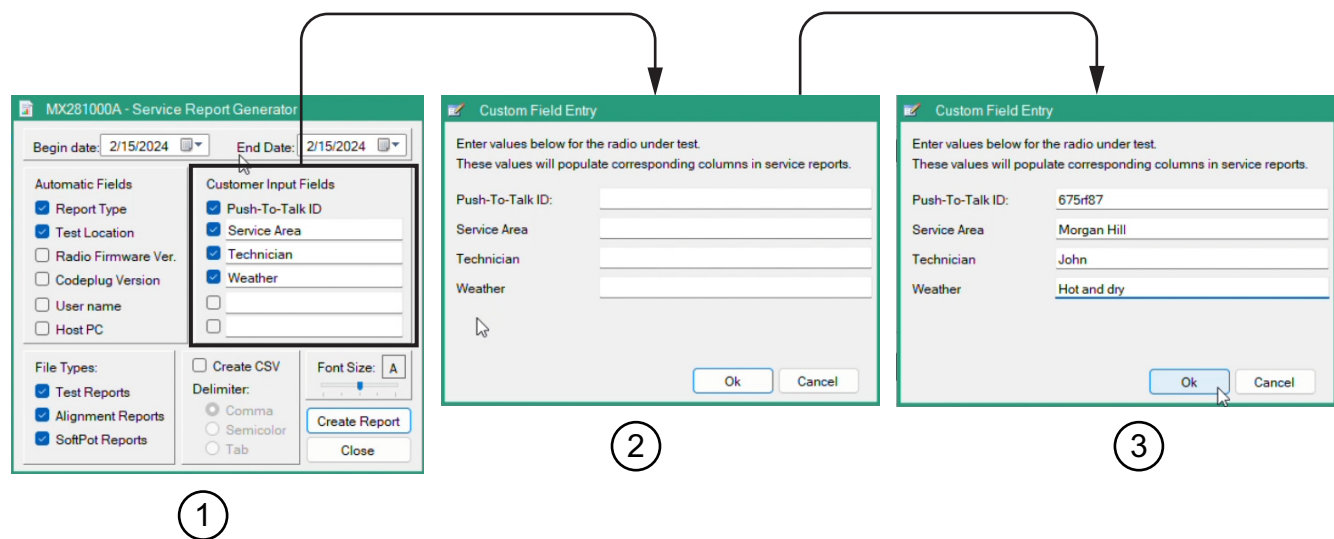
	Create CSV: Opens the save browse dialog. Name and save the report as a CSV file. Delimiter: Set the delimiter for the Excel spreadsheet columns as Comma, Semicolon, or Tab.
	Customer Input Fields: “Customer Input Fields” must be enabled by checking the “Prompt for Customer Field Entry on Radio Connect” checkbox shown in Figure 3-9, “Application - Program Options and Settings Menu” on page 3-6.
	Font Size: Use the slider to adjust the generated report font size.
	Create Report: Press to generate the service report. To print the report, go to the menu bar and press Reports, and then press Print Report to display the print dialog.
	Close: Press to close and exit Service Report Generator dialog.

Figure 3-19. Service Report Generator Interface Description

Customer Input Fields

The Customer Input Fields dialog provides additional columns that can be used to customize the Generated Service Report. The additional entries are entered manually using the dialogs shown in [Figure 3-20](#). The Customer Input Fields dialog is displayed when the “[Prompt for Customer Field Entry on Radio Connect](#)” from the “[Application Settings](#)” on [page 3-6](#) is checked and when the “[Connect Button](#)” is pressed. Note the dialog is not displayed until the Connect button is pressed.

Type in the additional custom fields in the Custom Field Entry dialog. The test pauses and waits for input typed into the added fields from the “[Customer Input Fields](#)” dialog. These entries are used to add up to six columns in the Service Report. Note that the Push to Talk ID is a fixed field that can be completed, but can be ignored if not required to view in the report. In the Customer Fields Entry dialog, type the information required that will appear in the column created. The additional information will appear in the generated Service Report is shown in [Figure 3-21](#).



- 1. Customer Input Fields Dialog
- 2. Customer Field Entry Dialog
- 3. Completed Custom Field Entry

Figure 3-20. Customer Input Fields Dialog Sequence

Generated Service Report

The generated Service Report shown in [Figure 3-21](#) displays by default the test: Type, Model, Name, Serial Number of the device under test as well as the date of the test and testing status. The additional columns were added as described in “[Customer Input Fields](#)”.

Service Report									
Report Date:		Thursday, 15 February 2024							
Start Date:		Thursday, 15 February 2024							
End Date:		Thursday, 15 February 2024							
Type	Model	Name	Serial Number	Date	Location	Push-To-Talk ID	Service Area	Technician	Weather
Align	M37TSS9PW1AN	APX8500	681CXV3808	02/15/2024 07:12:08	-0.0000000	675r87	Morgan Hill	John	Hot and dry

Figure 3-21. Generated Service Report Example

3-4 Test Equipment Status Toolbar

The test equipment status toolbar shown in [Figure 3-22](#) shows connectivity and status of the LMR Master, MA25202A Ammeter, MA24103A Power Sensor, and Cable Loss characterization.



Figure 3-22. Toolbar

The toolbar button functions are shown in [Figure 3-23](#).

	LMR Master: Press to connect to the LMR Master. A progress bar provides the preset progress status. The indicator shows green when the connection is successful. Press the caret to display the menu shown below. Use this menu to set the mode of operation that the S412E LMR is set to. For more information on the LMR Master modes of operation, see the S412E LMR Master User Guide, 10580-00318. Radio Alignment (NBFM) Performance Testing (P25-Phase1) Performance Testing (P25-Phase 2)
	MA25202A Button: The indicator shows green when it is remotely connected successfully to the MA25202A.
	Power Sensor Button: Press the Power Sensor button to connect to the MA24103A.
	Cable Loss Button: The Cable Loss button provides cable loss tools as shown in “Cable Loss Button” on page 3-15.

Figure 3-23. Test Equipment Status Toolbar

3-5 Compensating for Cable Loss

Before testing can begin, the RF Cable Test cable requires a cable loss calibration to be performed to compensate signal loss between the output of the transmitter under test and the power sensor of the test system. Cable loss in the calibration and alignment system must be corrected for as power losses can affect the accuracy of the measurement. The cable loss compensation must be performed periodically to assure the test system power measurements are optimized. Refer to the following cable calibration setups as directed by the software:

- “Characterizing the Calibration Cable” on page 3-17.
- “Calibrating the Tx Cable” on page 3-18.
- “Calibrating the Rx Cable” on page 3-19.

Cable Loss Button

Press the “[Cable Loss Button](#)” to provide a cable loss menu for performing test and alignment measurements. The Cable Loss menu is shown in [Figure 3-24](#).

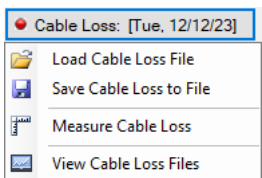
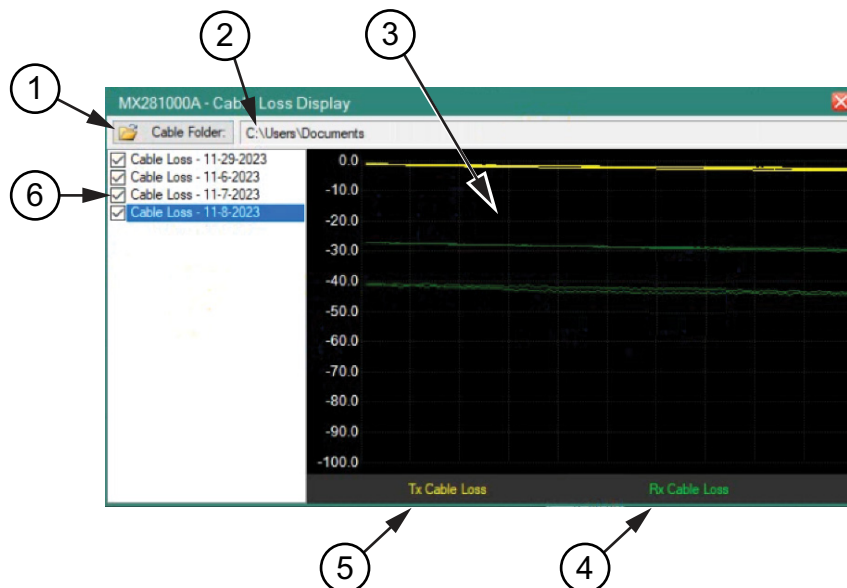
	Cable Loss: Press to display the cable loss menu. The date refers to the Cable Loss file currently in use. Load Cable Loss File: Opens the Open file dialog. Save Cable Loss to file: Open the Save file dialog. Measure Cable Loss: Press to perform a cable loss measurement. Performs the same function as the Measure Cable Loss icon in “Hardware Configuration Icons” on page 3-8. View Cable Loss: Press to view cable loss files.
---	---

Figure 3-24. Cable Loss Menu

Cable Loss Display

Cable loss files can be viewed and opened to apply to the mobile radio alignment and measurement application. The cable loss display is shown in [Figure 3-25](#).

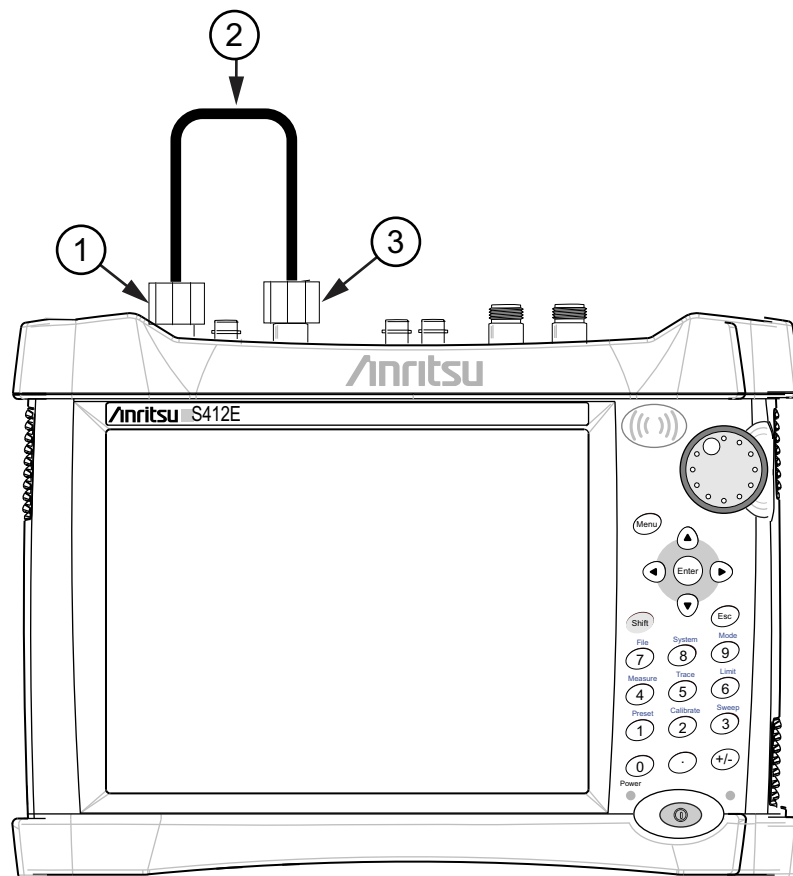


1. Press to open the cable loss folder.
2. Cable loss file path.
3. Previous cable loss data measurements.
4. Indicates the Rx cable loss type when the waveform displayed is green.
5. Indicates the Tx cable loss type when the waveform displayed is yellow.
6. Displays the Cable Loss files in the displayed path folder. Checked opens the data file to view in the window.

Figure 3-25. Cable Loss Display

Characterizing the Calibration Cable

The calibration cable provides a known characterized cable power loss that is used as a reference when performing the Tx and Rx calibration procedure. Therefore, any cable and equipment path inserted in series with the calibration cable can be measured accurately and therefore adjusted to provide accurate cable loss measurements.



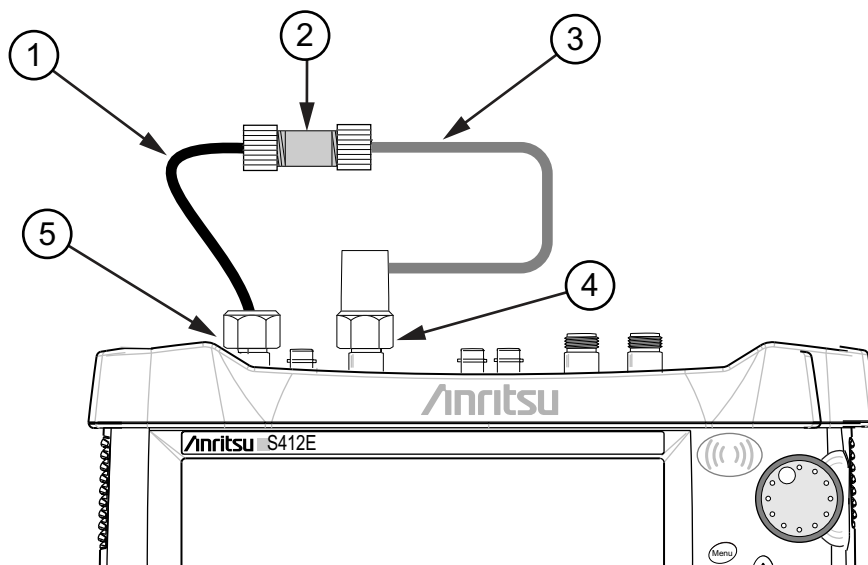
1. VNA Port 2
2. Calibration Cable
3. VNA Port 1

Figure 3-26. Cable Loss Measurements

1. Connect the calibration cable between the VNA Port 1 and VNA Port 2 as shown in [Figure 3-26](#).
2. Press the [“Measure Cable Loss”](#) on page 3-15.
3. Use this cable to perform the [“Calibrating the Tx Cable”](#) on page 3-18.

Calibrating the Tx Cable

The cable that connects the portable radio and the MA24103A carries the transmitter signal (Tx). The power loss associated with this cable connection must be characterized in order to optimize the radio under test output power measurements. Refer to [Figure 3-27](#) for the Tx calibration setup.



1. Calibration Cable
2. N-type Barrel Connector (Included with Calibration Cable Assembly)
3. Tx cable (Silver cable that connects mobile radio to MA24103A)
4. Connect to VNA Port 1
5. Connect to VNA Port 2

Figure 3-27. APX6000/7000/8000 Tx Cable

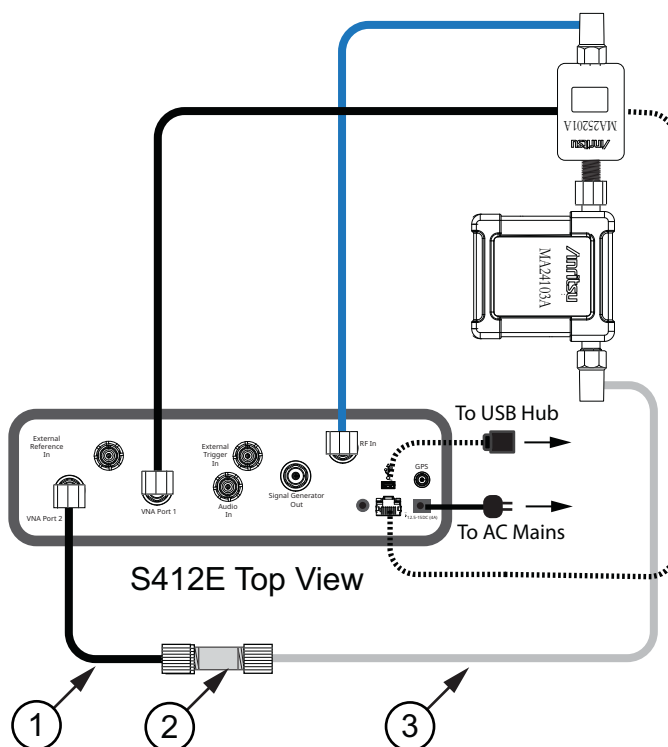
Procedure

1. Disconnect and remove the Tx cable (silver cable) from the MA24103A and the device under test. This is the Tx cable that is being characterized.
2. Connect one end (the right-angle end if applicable) of the Tx cable to VNA Port 1 of the S412E.
3. Connect the other end of the Tx cable to an N-Type barrel.
4. Connect one end of the calibration cable (this is the cable that was characterized in [“Characterizing the Calibration Cable” on page 3-17](#)) to the open end of the N-Type barrel.
5. Connect the open end of the calibration cable to the VNA Port 2.
6. Press the Next button to perform the Tx cable calibration.

When complete, reconnect the test setup as shown in [“Portable Radio Test Setup” on page 2-3](#), or [“Mobile Radio Test Setup” on page 2-2](#),

Calibrating the Rx Cable

The Rx power loss calibration calibrates the incoming signal path being received from the mobile radio through to the S412E RF input port. The power loss associated with this cable connection must be characterized in order to optimize the radio under test receive power measurements. Refer to [Figure 3-28](#) for the Rx calibration setup.



1. Calibration Cable
2. N-Type Barrel Adapter
3. Cable from Mobile Radio Connection

Figure 3-28. Rx Cable Assembly Calibration

Procedure

1. Connect the MA25201A to the LMR Master Port 1.
2. Connect the Tx Cable to the LMR Master VNA Port 2 via the calibration cable and N-Type adapter.
3. Connect the other end of the Tx Cable to the MA24103A.
4. Ensure connections are as shown in [Figure 3-28](#).
5. Press Next to perform the Rx calibration.
6. When complete, reconnect the test setup as shown in “[Portable Radio Test Setup](#)” on page 2-3, or “[Mobile Radio Test Setup](#)” on page 2-2.

Reconnect Setup for Testing

If calibrating a portable radio, reconnect the test setup as shown in [Figure 2-2, “Portable Radio Test Setup”](#) on page 2-3.

If calibrating a mobile radio, reconnect the test setup as shown in [Figure , “Mobile Radio Test Setup”](#) on page 2-2.

3-6 APX6000/APX7000 Front End Filter Rx Alignment

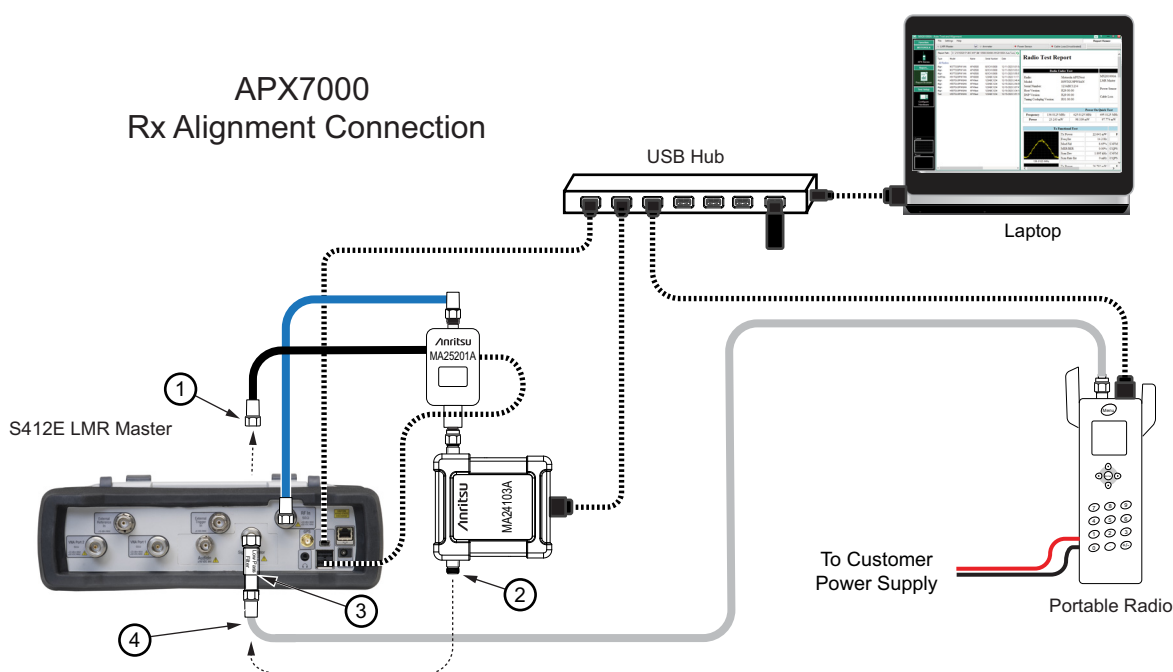
APX6000 and APX7000 radios that have a UHF band will require a Front End Filter (FEF) Rx alignment. The Auto Test and Alignment program will prompt the user to change the setup to connect the radio directly to the S412E as shown in [Figure 3-29](#).

When aligning the FEF for the APX7000 only, use the Low Pass Filter to prevent unwanted signals from causing a misalignment. The Low Pass Filter is not used for any tests other than the APX7000 Rx Front End Filter Alignment. After performing the FEF alignment, remove the Low Pass Filter and restore the cable connections.

Warning It is important that bypassing the MA25201A is only done for the FEF test. Reconnect the S412E when the FEF testing is complete. If the radio transmits directly into the S412E, the S412E may be damaged.

APX7000 FEF Cable Setup

For the APX7000 FEF cable setup, refer to [Figure 3-29](#). For the APX6000 cable setup, refer to “[APX6000 FEF Cable Setup Procedure](#)” on page 3-21.



1. S412E Signal Generator Out Port
2. MA24103A Port
3. DC to 270 MHz Low Pass Filter to the S412E Signal Generator Out Port (Only for APX7000 series)
4. Silver Cable from the Portable Radio to the DC to 270 MHz Low Pass Filter

Figure 3-29. APX7000 Front End Filter (FEF) Rx Alignment Setup

Procedure

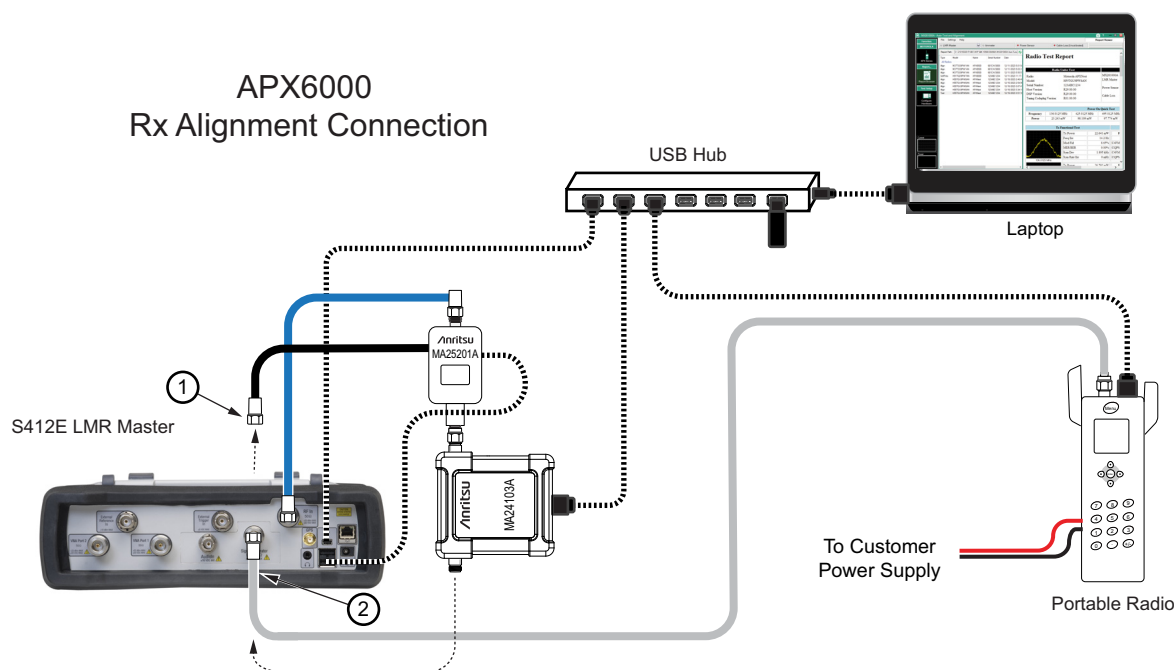
1. Disconnect the MA25201A cable from the S412 Signal Generator Out port.
2. Disconnect the radio under test cable (silver cable) from the MA24103A port.
3. Connect the DC to 270 MHz Low Pass Filter to the S412E Signal Generator Out port.
4. Connect the radio cable end (silver cable) that was disconnected from the MA24103A to the DC to 270 MHz Low Pass Filter.

5. Press Next to perform the FEF Rx alignment.
6. When the FEF Rx alignment is complete, disconnect and remove the DC to 270 MHz Low Pass Filter from the S412E Signal Generator Out port and reconnect the cable from the MA25201A.
7. Disconnect the DC to 270 MHz Low Pass Filter from the silver cable.
8. Reconnect the silver cable to the MA24103A silver cable.
9. Reconnect the S412E cable to the Signal Generator Out port.
10. When complete, reconnect the radio under test to the test setup as shown in “[Portable Radio Test Setup](#)” on page 2-3, or “[Mobile Radio Test Setup](#)” on page 2-2.

After the setup is restored, the software will run the Setup Check to ensure that the cables have been properly restored to the correct positions. To prevent damage, do not continue testing until the setup test passes.

APX6000 FEF Cable Setup Procedure

For the APX6000 FEF Cable Setup Procedure, refer to [Figure 3-30](#). For the APX7000 cable setup, refer to “[APX7000 FEF Cable Setup](#)” on page 3-20.



1. MA25201A Cable from the S412 Signal Generator Out Port
2. Silver Cable from the MA24103A Port

Figure 3-30. APX6000 Front End Filter (FEF) Rx Alignment Setup

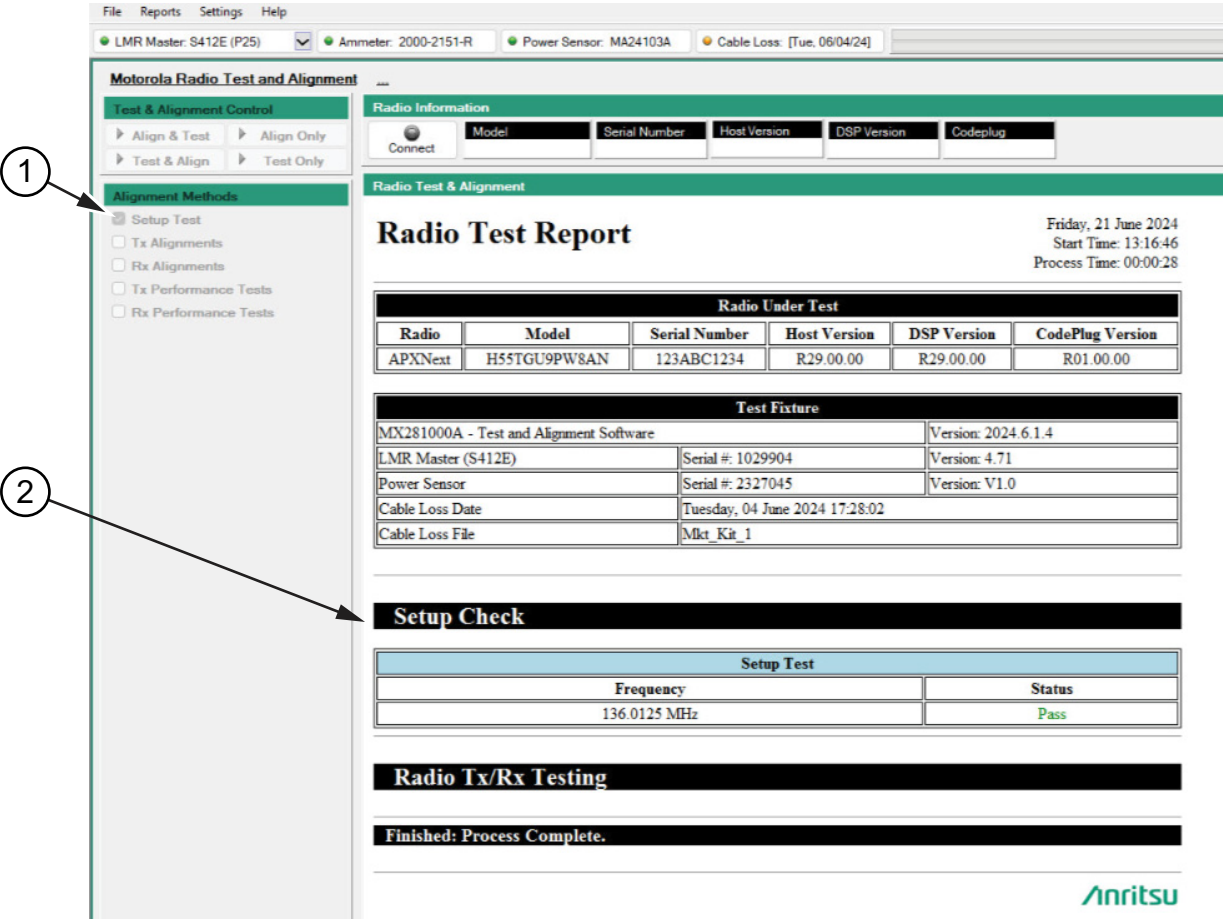
Procedure

1. Disconnect the MA25201A cable from the S412 Signal Generator Out port.
2. Disconnect the portable radio cable (silver cable) from the MA24103 port.
3. Move and connect the Silver Cable from the radio under test directly to the S412E Signal Generator Out Port.
4. Press Next to perform the FEF Rx alignment.
5. When the FEF Rx alignment is complete, reconnect the MA24103A silver cable.
6. When complete, reconnect the test setup as shown in “[Portable Radio Test Setup](#)” on page 2-3, or “[Mobile Radio Test Setup](#)” on page 2-2.

After the setup is restored, the software will run the Setup Check to ensure that the cables have been properly restored to the correct positions. To prevent damage, do not continue testing until the setup test passes.

3-7 Setup Check

Verify the test setup is correct by checking Setup Test in the Alignment Methods section. The Radio Test Report is displayed with the Setup Check results as shown in [Figure 3-31](#).

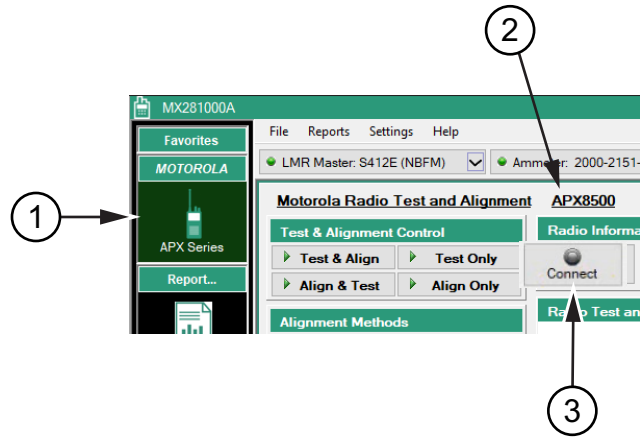


1. Setup Test: Check to test and verify test setup passes.
2. Setup Test verification is result is shown in the Status column.

Figure 3-31. Setup Test Verification

3-8 Connecting

After cable calibrations are complete as described in “Compensating for Cable Loss” on page 3-15, and the test setups are complete as described in “The toolbar button functions are shown in Figure 3-23.” on page 3-14, the alignment and testing of the radio can be performed. Point to the MOTOROLA tab and press APX Series to open the mobile radio type series menu. Press the Connect button as shown in Figure 3-32. Once connected, the button displays Disconnect. Press Disconnect when testing is complete to disconnect the radio from the MX281000A testing program.

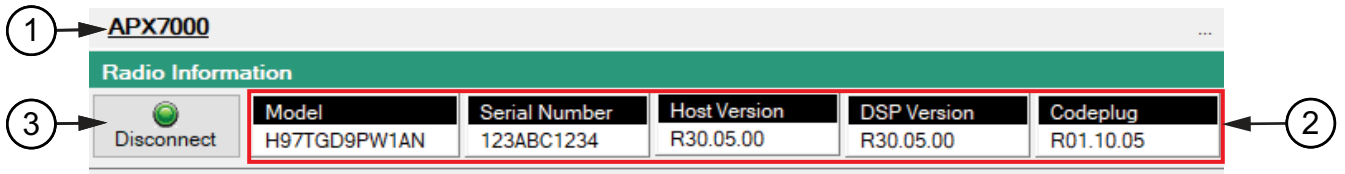


- 1. APX Series Mode
- 2. Radio Series Type
- 3. Connect Button

Figure 3-32. Connect Button

Radio Identification Panel

Pressing the Connect button auto-detects the radio identification and connection details which is then displayed in the Radio Information panel as shown in Figure 3-33. This information is provided as the Radio Under Test in the Radio Test and Alignment Reports. See “Reports” on page 3-28.



- 1. Mobile Radio Series Type: Auto detected
- 2. Mobile Radio Details: Auto detected
- 3. Connect/Disconnect button

Figure 3-33. Radio Information

3-9 Start Testing –Test and Alignment Control

The Test and Alignment Control window is shown in [Figure 3-34](#). Press a test type button to start to test and/or align the radio.

Align & Test Align Only Test & Align Test Only	Align and Test: Press to perform an Align and test. Align Only: Performs an alignment only. Test and Align: Performs tests. If any tests fail, specific alignments are done to try to fix the failure, and then a test is performed again to verify. Test Only: Performs a test only.
--	---

Figure 3-34. Test and Alignment Control

Alignment Methods

Use the Alignment Methods window shown in [Figure 3-35](#) to set the Transmitter and Receiver Alignment testing for the model type. The tests that appear in the Alignment Methods window are applicable to each specific radio connected. This list will be different for different model types. When opened, check the boxes for the tests to be performed.

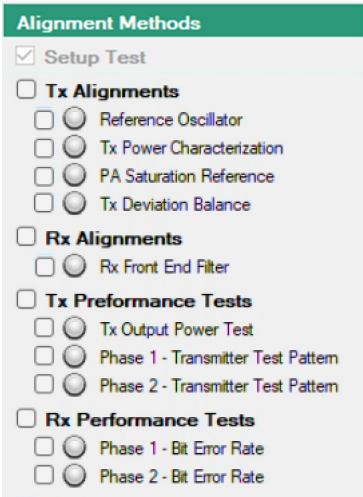


Figure 3-35. Alignment Methods for APX8000 Model

Frequencies and Bands

The Frequencies and Bands window provides the supported radio bands that are available for testing as shown in [Figure 3-36](#). Set the bands for testing.



Figure 3-36. Frequencies and Bands

Radio Test and Alignment History

The Radio Test and Alignment History window provides links in the Filename column to the stored Radio Test Report location as shown in [Figure 3-37](#).

Radio Test and Alignment History		
Type	Date	Filename
Test	11/10/2023 3:29:13 PM	C:\Users\Documents\10-21-2023 8.21.29 PM H91TGD9PW7AN.atr
Test	11/30/2023 5:20:55 PM	C:\Users\Documents\11-30-2023 5.20.55 PM H91TGD9PW7AN.atr
Test	11/10/2023 3:29:13 PM	C:\Users\Documents\10-28-2023 10.16.43 AM H91TGD9PW7AN.atr
Alignment	11/10/2023 3:29:13 PM	C:\Users\Documents\10-28-2023 8.28.45 PM H91TGD9PW7AN.atr
Alignment	11/10/2023 3:29:13 PM	C:\Users\Documents\10-31-2023 11.05.39 PM H91TGD9PW7AN.atr
Alignment	11/10/2023 3:29:13 PM	C:\Users\Documents\10-31-2023 5.37.42 PM H91TGD9PW7AN.atr

Figure 3-37. Radio Test Report

Type: Provides the report type of the associated report file.

Date: Provides the most recent date the test was run. If the same test is run again, the file will sequence down and the latest test run will be added on top of the list.

Filename: Provides a link to the file associated with the radio test report. The date in the filename shows the date and time stamp of the completed test.

Auto-Save Toolbar

The Auto-Save toolbar is shown in [Figure 3-38](#).



Figure 3-38. Auto-Save Toolbar

Auto-Save Icons

The Auto-Save icons are shown in [Figure 3-39](#).

	Auto Save: Automatically save test reports after a test or alignment process is complete.
	Clear: Clear the report window of all content.
	Save: Save the report. Performs the same function as the File menu Save Report submenu.
	Print: Provides a standard Windows print dialog box.

Figure 3-39. Auto-Save Icons

Report Browser

The Report Browser displays the stored Test and Alignment testing files shown in [Figure 3-40](#).

Type	Model	Name	Serial Number	↑ Date	Filename
Current Radio					
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/04/2024 18:03:06	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 17:40:01	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 17:03:56	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 16:36:50	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 15:17:27	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 14:56:04	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 14:39:55	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 13:48:59	APX7000-123ABC1234-Test-Ali
Test & Align	H97TGD9PW1AN	APX7000	123ABC1234	06/03/2024 13:41:17	APX7000-123ABC1234-Test-Ali
Align & Test	H97TGD9PW1AN	APX7000	123ABC1234	04/11/2024 17:47:06	04-11-2024 17.47.06 H97TGD9
Test	H97TGD9PW1AN	APX7000	123ABC1234	04/09/2024 10:33:01	04-09-2024 10.33.01 H97TGD9
Align & Test	H97TGD9PW1AN	APX7000	123ABC1234	04/08/2024 18:32:08	04-08-2024 18.32.08 H97TGD9
Test	H97TGD9PW1AN	APX7000	123ABC1234	04/08/2024 17:14:11	04-08-2024 17.14.11 H97TGD9
Align & Test	H97TGD9PW1AN	APX7000	123ABC1234	04/08/2024 16:49:38	04-08-2024 16.49.38 H97TGD9
All Radios					
Test	H91TGD9PW7AN	APX8000	123ABC1234	07/10/2024 19:07:22	APX8000-123ABC1234-Test-00
Test & Align	H91TGD9PW7AN	APX8000	123ABC1234	07/10/2024 10:10:38	APX8000-123ABC1234-Test-Ali
Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 19:05:00	APX8000-123ABC1234-Test-00
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 18:39:11	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 17:44:13	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 17:14:02	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 16:35:54	APX8000-123ABC1234-Align-Tr
Test & Align	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 15:36:53	APX8000-123ABC1234-Test-Ali
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 15:21:25	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 14:35:42	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 13:46:07	APX8000-123ABC1234-Align-Tr
Align & Test	H91TGD9PW7AN	APX8000	123ABC1234	07/09/2024 10:00:23	APX8000-123ABC1234-Align-Tr
Test	M30TSS9PW1AN	APX7500	656CMX0105	07/08/2024 17:04:07	APX7500-656CMX0105-Test-00
Test	M30TSS9PW1AN	APX7500	656CMX0105	07/08/2024 16:55:37	APX7500-656CMX0105-Test-00
Test	M30TSS9PW1AN	APX7500	656CMX0105	07/08/2024 15:57:58	APX7500-656CMX0105-Test-00
Test	M30TSS9PW1AN	APX7500	656CMX0105	07/02/2024 14:47:57	APX7500-656CMX0105-Test-00
Test	M30TSS9PW1AN	APX7500	656CMX0105	07/02/2024 11:52:33	APX7500-656CMX0105-Test-00

1. Column Headers for Tested Mobile Radios Includes Type, Model, Name, Serial Number, Date, and Filename.
2. Report Folder Path
3. Refresh Button: See [“Refresh Button”](#) below
4. List of All Radios Test Result Files
5. List of Current Radio under Test Result Files

Figure 3-40. Report Browser

Refresh Button: When a radio is connected and then pressing Report Browser mode displays ‘all radio’ reports, Clicking the Refresh button will display the ‘current’ connected radio reports and then also ‘all radios’ as shown [Figure 3-40](#). If you don't select the Refresh button, then you get all the radio reports.

File Management Menu

Right-click a Report Browser file to show the details shown in [Figure 3-42](#).

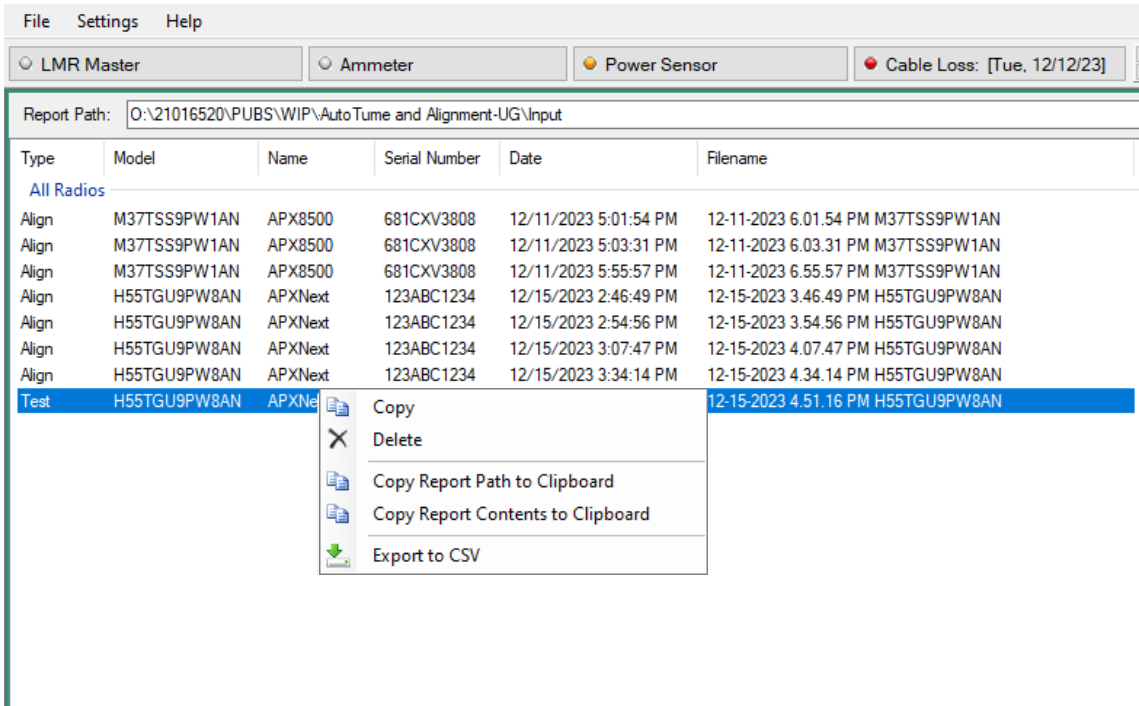


Figure 3-41. Report Browser With Sub-Menu

The Report Browser menu is shown in [Figure 3-42](#).

Copy Delete Copy Report Path to Clipboard Copy Report Contents to Clipboard Export to CSV	Copy: Copy's the Report. Delete: Deletes the File. Copy Report Path to Clipboard: Copy the Report Path to the clipboard. Copy Report Contents to Clipboard: Copy the report contents as seen in the right side of the screen to the clipboard. Export to CSV: Load report to an Excel spreadsheet.
---	--

Figure 3-42. Report Browser File Management Menu

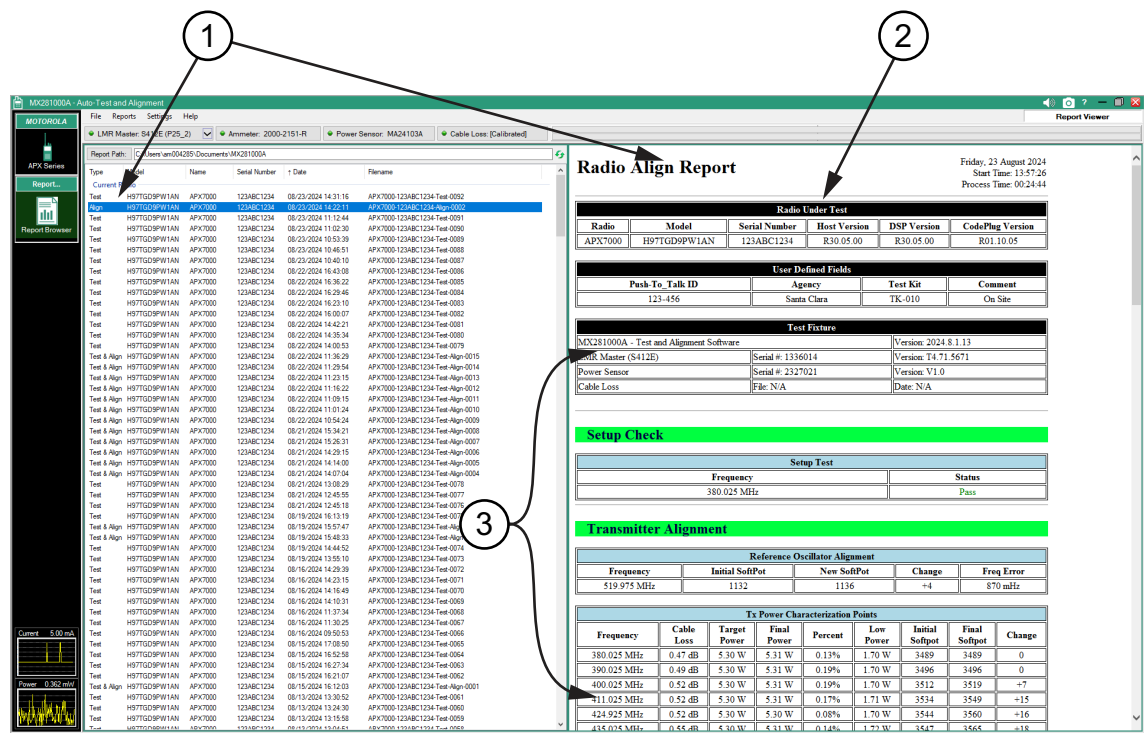
3-10 Reports

The test results for the Align and Test tests are similar to each other in the format shown in [Figure 3-43](#). Click a file in the left panel to show the report results in the right panel. The right panel also includes the Radio Under Test details and the Test Setup details. The test results generated are provided below the radio and equipment panels. Use the scroll bar to view the entire page of test results for the file selected. An example of Align, and Test test results are shown below.

- [“Align Report”](#)
- [“Test Report”](#) on page 3-29
- [“Radio History Report”](#) on page 3-30
- The customized Service Report is described in [“Generated Service Report”](#) on page 3-13.

Align Report

The generated Radio Align Report is shown in [Figure 3-43](#).



1. Align Test highlighted and opened
2. Radio Under Test Details
3. Documented Test Results

Figure 3-43. Align Report

Test Report

The generated Radio Test Report is shown in Figure 3-44.

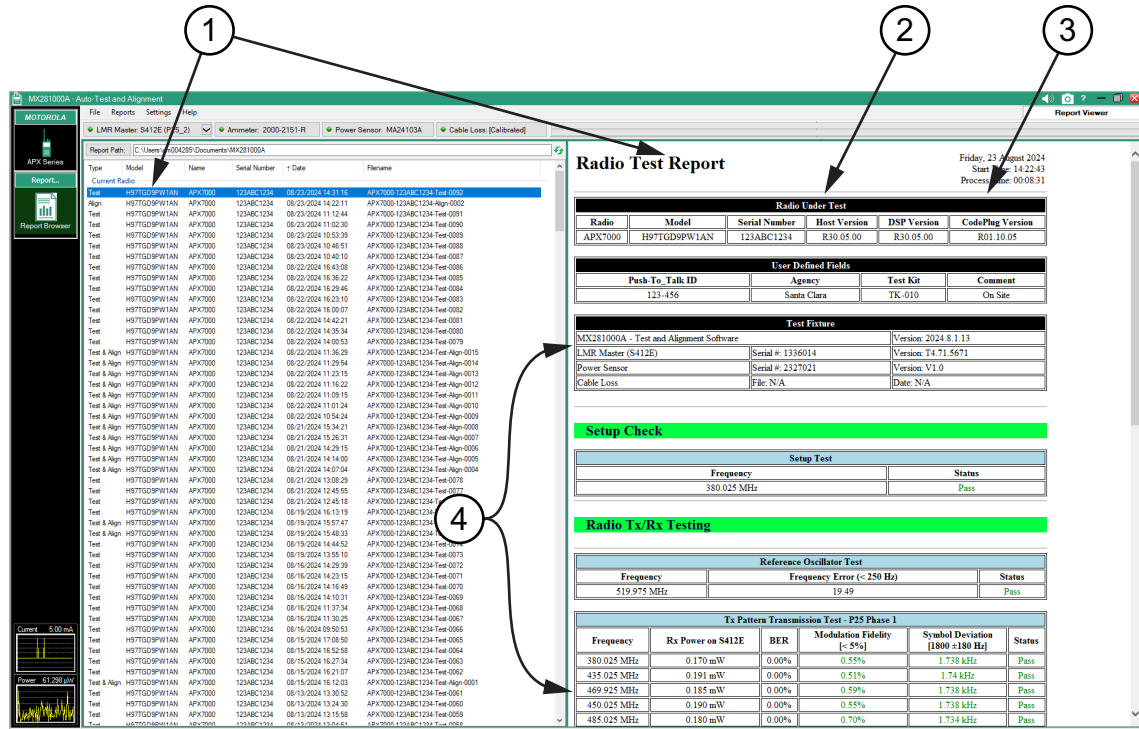


Figure 3-44. Test Report

Radio History Report

The Radio History Report provides links to the Report Browser stored test results. See [“Report Browser” on page 3-26](#). Also included are:

- [“Radio Under Test and Test Setup”](#)
- [“Radio Test and Alignment History” on page 3-25](#)

Radio Under Test and Test Setup

The Radio Under Test and Test Setup window displays are shown in [Figure 3-45](#).

Radio Under Test		Test Setup	
Radio:	Motorola APX7000	MX281000A	Version: 2024.2.1.5
Model:	H97TGD9PW1AN	LMR Master	Serial #: 1410046
Serial Number:	123ABC1234		Version: 4.60
Host Version:	R30.05.00	Power Sensor	Serial #: 2327003
DSP Version:	R30.05.00		Version: V1.0
Tuning Codeplug Version:	R01.10.05	Cable Loss	File: Cable Loss - 12-12-2023
			Date: 02/14/2024 09:06:16

Figure 3-45. Radio Under Test and Test Setup Window

Radio Under Test

The Radio Under Test window displays the radio identification and PC communication information.

- Radio:** Displays the radio type.
- Model:** Displays the model number identification of the radio.
- Serial Number:** Displays the radio’s serial number.
- Host Version:** The version of DTS (Data Transformation Services) that run on mainframe supporting remote terminals, PC's and workstations.
- DSP Version:** The radio Digital Signal Processing (DSP) version.
- Tuning Codeplug Version:** Displays the file version that contains the programming information for the radio.

Test Setup

- The Test Setup window displays the test equipment details.
- MX281000A:** Displays the software version of the MX281000A Auto Test and Alignment program.
- LMR Master:** Displays the LMR Master’s serial number and current software version installed in the LMR.
- Power Sensor:** Displays the MA24103A power sensor serial number and the current software version installed in the MA24103A power sensor.
- Cable Loss:** Displays the cable loss calibration file used that is selected by calibration date and the date the file was applied to testing.

3-11 Help Menu

The Help menu is shown in [Figure 3-46](#).

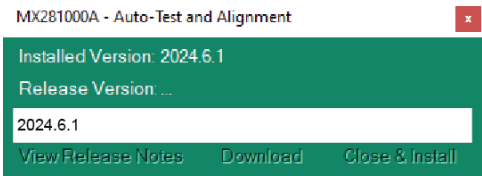
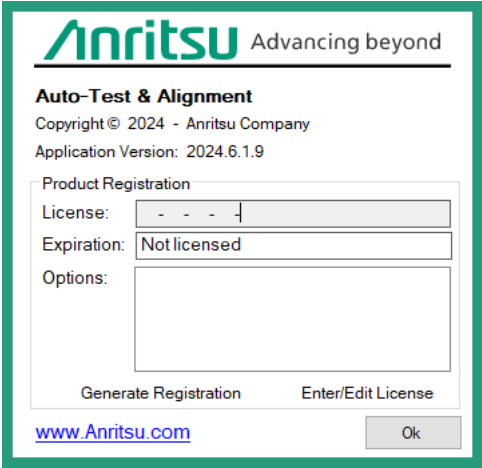
Help  View Help (MX281000A User's Guide) F1  Check On-line for Application Updates  About Auto-Test and Alignment	View Help: Provides the Online MX281000A Help File. Check On-line for Application Updates: Displays the dialog below.  About Auto Test and Alignment: Display the dialog below. 
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Figure 3-46. Help Menu



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