Agilent N2620A
FrameScope™ Pro
Network Performance
Analyzer

Addendum
to the User's Manual Version 1.1

Agilent Technologies

Notices

This document adds post-release information to the FrameScope Pro User's Manual, part no. N2620-90003. It does not replace the FrameScope Pro User's Manual and will be superseded by any version later than 1.1 of the User's Manual.

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Contents

1
IP Video Testing with the FrameScope™ Pro

The Agilent FrameScope Pro IPTV is a powerful handheld instrument capable to measure Video over IP Quality of Service.

This chapter deals with IP Video testing.

IP Video Testing Overview

The FrameScope™ Pro IP Video instrument helps deliver network performance measurement solutions that enable operators to carry out the work of installation and maintenance of IPTV.
It provides a complete suite of features and tools within a handheld platform that enables dispatch technicians to carry out their jobs effectively.

Features

Supported protocols:

Signaling
RTSP(RFC 2326) for Video on Demand(VOD) streams
IGMP v3 (RFC 3376) for multicast streaming

Transport
RTP/RTCP (RFC 3550)
Unicast or Multicast

Video Quality Measurement, as defined in RFC 3550
Calculate the packet loss and jitter based on the incoming RTP packets
total packets received
total packets lost
inter-arrival jitter
interval packet loss ratio

Test Reporting
Log the results of all tests for review by technicians back at the NOC
Signaling events (IGMP/RTSP)
Video Quality Measurements

Following parameters are configurable parameters for every test.
Multicast address/port
RTSP URL
RTSP server port
RTP port

How the FrameScope Pro Tests IP Video Quality

IPTV Channel Setup and Control

Both RTSP and IGMP will be supported to control IPTV channel setup. The product acts as an RTSP client and can establish an RTSP session with the media server. The RTSP client specifies the acceptable transport parameters provided by the user in the SETUP request. The media server is expected to confirm the selected parameters and reply with the server-side parameters (port numbers).

Once the setup is complete, the RTSP client tells the server to start/stop sending media data via the mechanism specified during SETUP.

For multicast streaming, the product uses IGMP to join or leave the multicast addresses to which the media data are sent.

Stream Receiving

The video may consist of only one RTP channel, or two RTP channels (one for video and the other for audio). In the latter case, both RTP streams will be measured and two sets of results will be collected.

Stream data may be interleaved with RTSP in certain network configurations with firewalls. This interleaving is not supported. The media server must send stream data on transport channels separate from the RTSP channel.

Stream Quality Measurement

The IPTV test software will perform video quality measurement by calculating the total packet loss, packet loss ratio, and jitter, using the sequence and timestamp information in the RTP header. The application will periodically poll the results and display to the user.

Running a IP Video Test

Prior to running the IP Video Test, the FrameScope Pro's network settings should be configured. The Network Settings screen can be accessed by pressing the FrameScope Icon on the Main Menu or by pressing **System** from the Main Menu and then pressing **Network Settings** and then **Edit**.

In the GUI Main Menu, the "VoIP & IPTV" button will be displayed instead of the "VoIP" button if the IPTV test license is purchased. Clicking this button brings up the Service Select window, which is new in the GUI.

Main Menu   Service Select Window
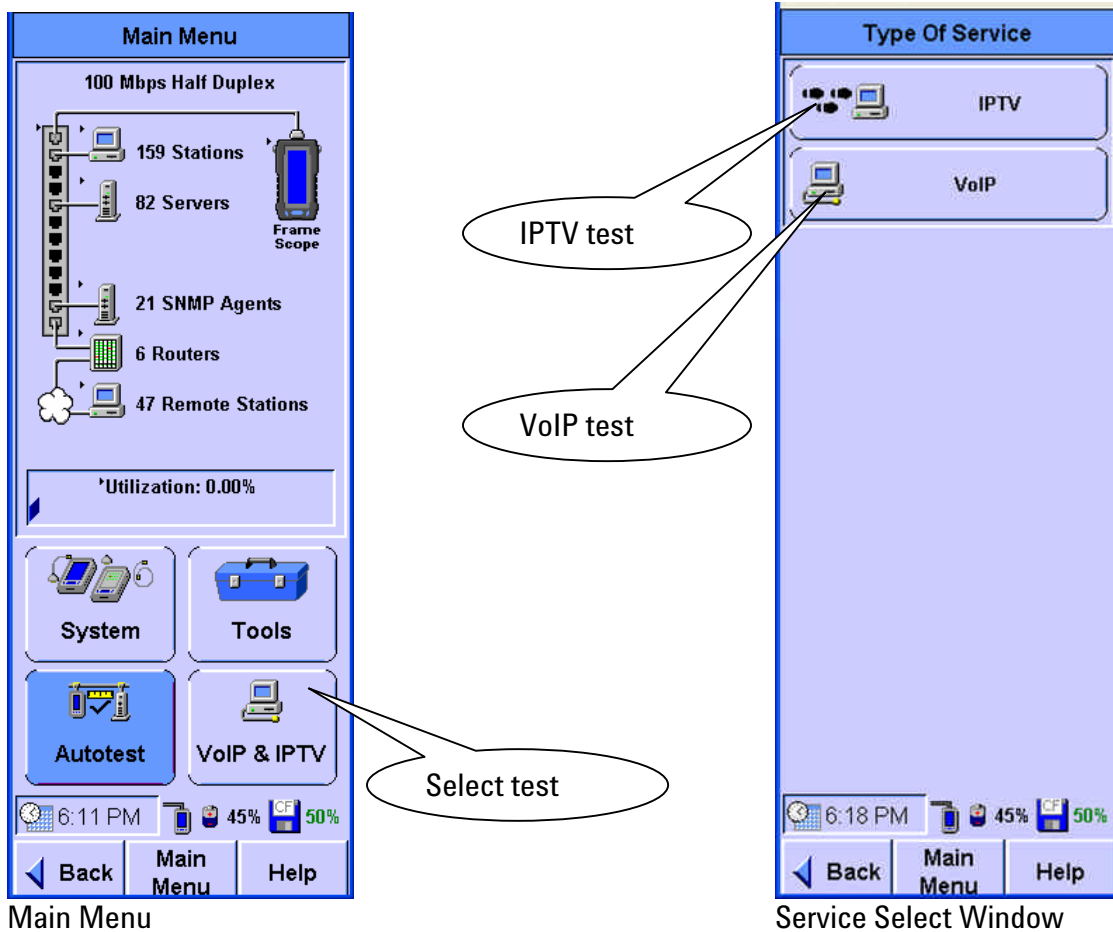
There are two service tests to choose from: **VoIP** for Voice over IP service quality testing, and **IPTV** to measure Video over IP transport quality. Both features require an appropriate license.
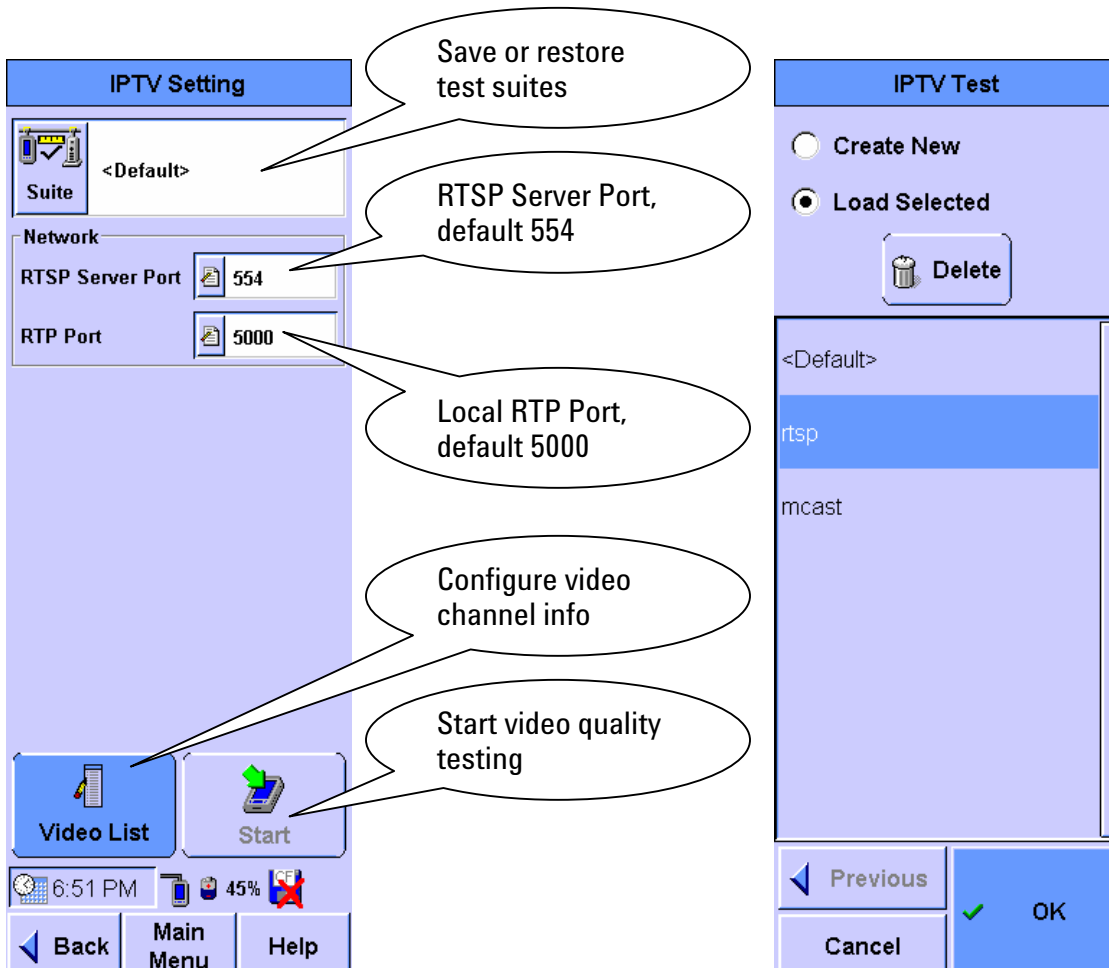
IPTV Settings Window   Loading a Saved Profile

In the **IPTV Setting** window, a default profile or a previously saved IPTV test suite can be chosen by clicking the **Suite** button. If necessary, the network transport port numbers for the RTP and RTSP protocols can be changed.
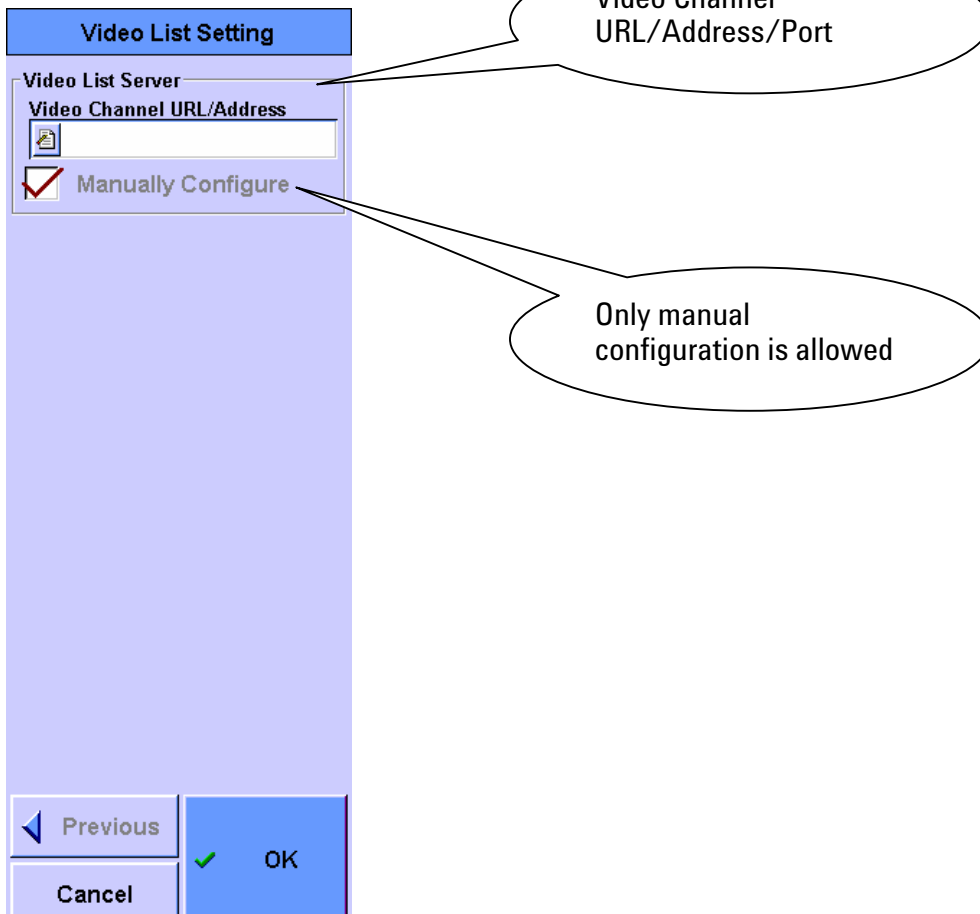
Before starting the test, the video channel information has to be specified; otherwise, the test cannot be started. By clicking the **Video List** button the **Video List Setting** window opens.
The video channel will be shown in the **Video List** container if the channel information is configured correctly (see figure below). Select the channel and click the **Start** button to start the IPTV test.
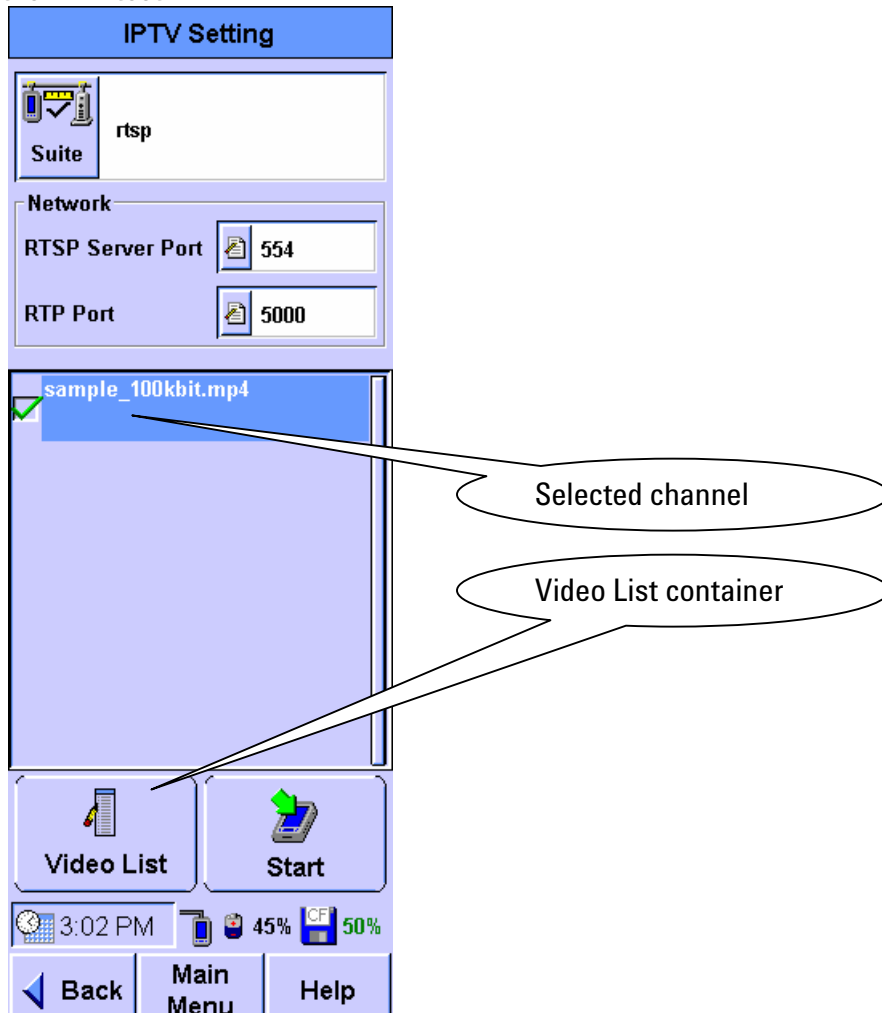
Selecting a video channel

The **Video List Setting** window allows entering the URL or address of the video channel, and the port number used.

Video Channel
URL/Address/Port

Video List Setting

Video List Server
Video Channel URL/Address

Manually Configure

Only manual
configuration is allowed

Previous

✔ OK

Cancel

Video List Setting window

The video channel information must be manually configured in the **Video List Setting** window. The **Video Channel URL/Address** field accepts the following two types of entries:
1. RTSP URL of the following form rtsp://server_name_and_optional_port/video_path
   For example: rtsp://www.testserver.net:554/sample_100kbit.mp4
2. IP multicast address and port of the form A.B.C.D:port
   For example: 239.1.1.1:5000
Invalid formats will be rejected.

Interpreting Results

When the Start button in the **IPTV Setting** window is clicked, the test starts and the result window will be shown below. The **Quality of Service** section shows the measurement data while the test is running.

In addition to the total number of received and lost packets, this section also displays the **Interval Pkt Loss Ratio**, the packet loss ratio during the most recent sampling interval, and **Inter-arrival Jitter**, the mean deviation of the difference in packet spacing at the receiver compared to the sender for a pair of packets, as defined in RFC 3550.

The top half of the **Quality of Service** section shows the statistics for the video channel. If a separate audio stream is detected, the statistics for the audio channel are displayed in the bottom half of the **Quality of Service** section.

Test Results Window

Detailed Test Result Window

The test stops when the **Stop** button is clicked, or when the video reaches its end.
The entire test result can be stored on the Flash Disk by clicking the **Save Results** button. By clicking the **Details** button all test result can be checked as shown below.
The **Test Details** window displays the test results in the form of a table and a line chart. By clicking the table rows, the corresponding results can be viewed in line chart format. The **Back** and **Forward** buttons on the top of the window allow scrolling through all data points. If more than one RTP stream was measured, as in the case where a video had an accompanying audio stream, the **Previous** and **Next Channel** buttons at the bottom can be used to display the results for the individual stream.

Detailed Results Window   Protocol Log Window

The test log, including protocol events, errors, and other information, can be viewed by clicking the **IPTV Log** button.

License Information

To enable IPTV testing on a FrameScope™ Pro, a valid license key is required. The license key is pre-installed if the IPTV test option was purchased with the product. If the license was purchased to upgrade the instrument with the IPTV testing capability, an individual license number matching the instrument's serial number has to be entered manually.
To enter the license key, click the **System** button in the **Main** window. Then select **License Details**. In the **License Details** screen, click the **License Key** box, and type in the license number.
If the license key is accepted, the **IPTV Test** button on the **Main** windows becomes active, and option number "070" appears in the **System Information** window. To find the **System Information** window, choose the **System** button in the **Main** window.

Entering the IPTV license key   Verifying IPTV option number

How to Save and Retrieve Results

FrameScope™ Pro IPTV test results are saved to the Compact Flash™ Card.

Previously stored test data can be reviewed using the **Tests Database** tool. This section describes how to recall and delete stored tests. Press the **Tools** button on the **Main** window to call the Tools menu.

On the Tools menu, click the **Tests Database** button. FrameScope™ Pro IPTV test results are stored in the **Tools Results** folder.

The number left to the folder name indicates the number of stored files in the folder. Select the folder and click the **+** sign, or the **Expand List** button. After selecting the test results file, click the **View** button to display the detailed test results. To delete a stored test, select the test results file and click the **Delete** button.

2
Audio Codec Support

This section describes how to configure the FrameScope™ Pro to use specific audio codecs during VoIP testing. Support for additional audio codecs has been added to the FrameScope™ Pro, namely for G.711 A-law, G.711 µ-law, G.721, G.723.1, G.726, G.729A, and G.729B. Use of VoIP testing requires a suitable software license.

Features

To test a Voice over IP service, the appropriate Codec needs to be used to generate measurement results which are representative for the end user experience. The FrameScope™ Pro is equipped with a list of Codecs to support various VoIP systems. Available Codecs include the following:

G.711 A-law, G.711 µ-law
G.723.1
G.729A, G.729B

The following Codecs require software release 6.0 or later:

G.721 or, respectively,
G.726 with 32 kbit/s,
G.726 with 16, 24, and 40 kbit/s

FrameScope™ Pro as the Caller

If the FrameScope™ Pro is configured as the Caller in a SIP (RFC 3261) based VoIP system, it will use the audio codec in the media negotiation that has been chosen on the **SIP** window.

To configure FrameScope™ Pro as the Caller, clear the checkbox **Auto Answer Incoming Call**.

For software release 6.0 and later: if a Codec from the G.721/ G.726 family is chosen, details are configurable in the **G.726 Stream Properties** box. For other Codecs the buttons (A-law vs. µ-law and Little-Endian vs. Big-Endian) in the **G.726 Stream Properties** box are disabled.

Click **OK** to return to the **SIP Setting** window, where additional settings can be made and where the test can be started.
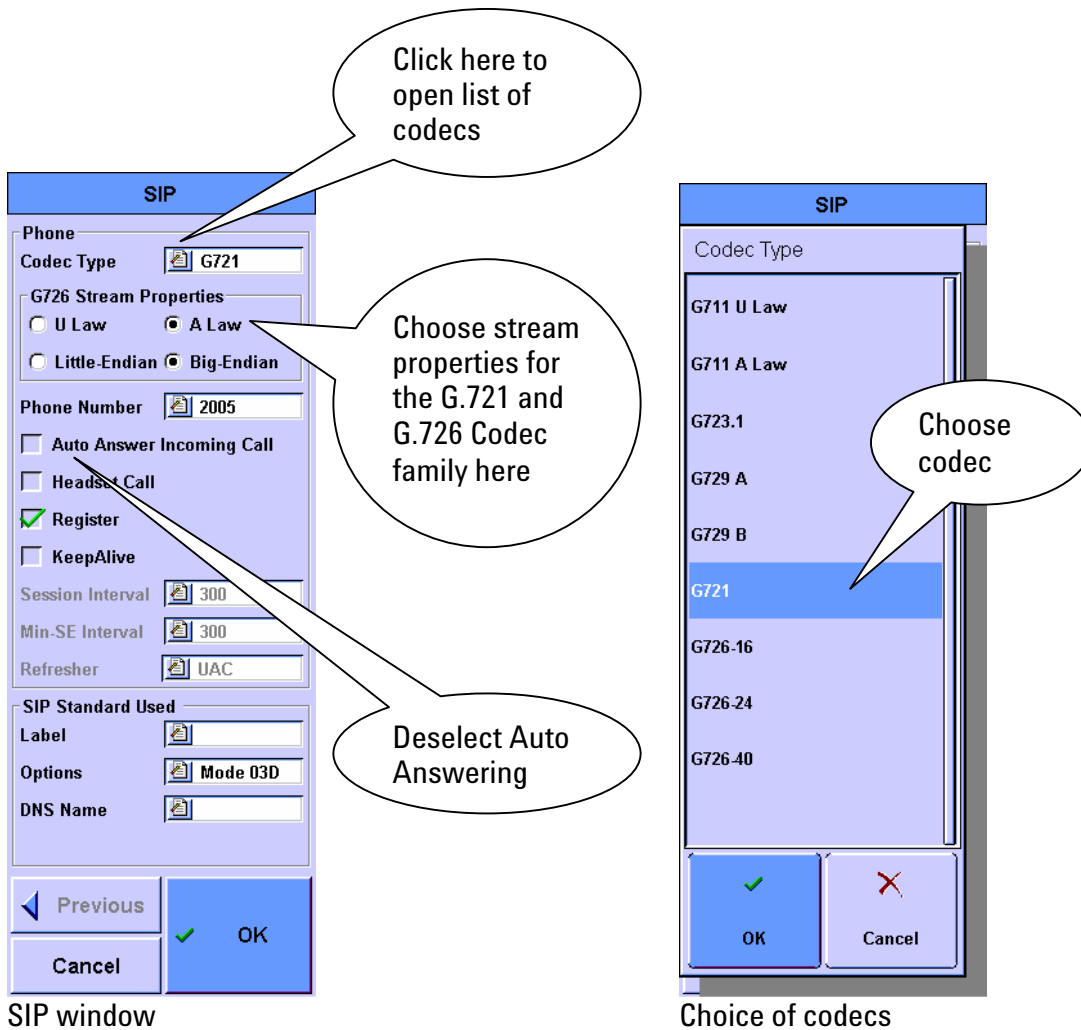
SIP window   Choice of codecs

FrameScope™ Pro as the Callee

If the FrameScope™ Pro is configured as the Callee in a SIP (RFC 3261) based VoIP system, it will support all codecs also available in the caller mode. The audio codec being used is defined in the media negotiation between caller and callee. To configure FrameScope™ Pro as the Callee, select the checkbox **Auto Answer Incoming Call**:

Based on the order of preference of supported audio codecs in the incoming *SIP INVITE* message, the suitable codec is selected in response. For example, if the caller provides the following sequence of supported codecs: G.723.1 – G.729 – G.711 A-law – G.711 μ-law, then the FrameScope™ Pro as the callee will select G.723.1 in the *SIP RESPONSE* message returned to the caller.
If there is no common codec found between caller and callee based on the media information in the incoming *SIP INVITE* message, the FrameScope™ Pro as the callee will return a *488 Media Not Supported* message to Caller side

For software release 6.0 and later: in the Callee mode, the preferred stream properties for the G.721/ G.726 Codec family must be chosen in the **G.726 Stream Properties** box. The setting is used only if Caller and Callee negotiate a G.721 or G.726 Codec, and disregarded otherwise.
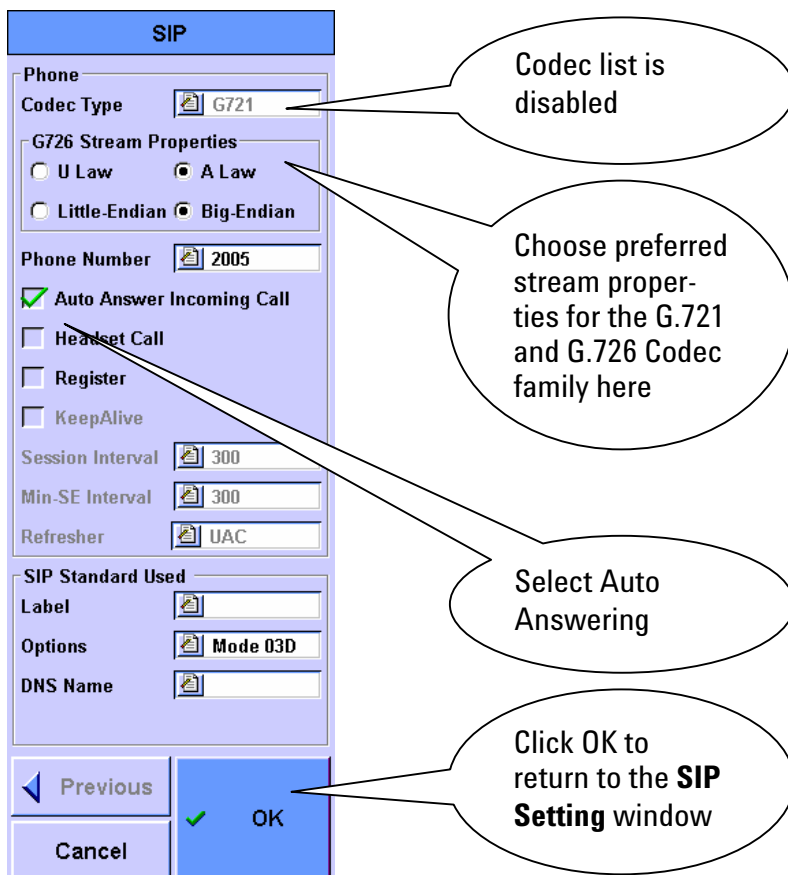
SIP window

3
Autotest of HTTP and FTP Servers with User Authentication

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This section describes how to enable and configure user authentication for the Autotest of HTTP and FTP servers according to RFC 2617.
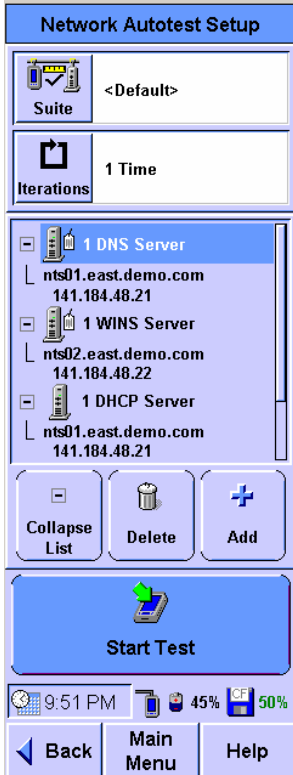
Features

The FrameScope™ Pro can be configured to Autotest web servers and ftp servers that have basic authentication according to RFC 2617 enabled. During the setup, username and password are entered. The FrameScope Pro's HTTP and FTP Autotest is able to interpret HTTP server responses like 401 and reports transfer rates after successful downloads, or error messages upon failure conditions.
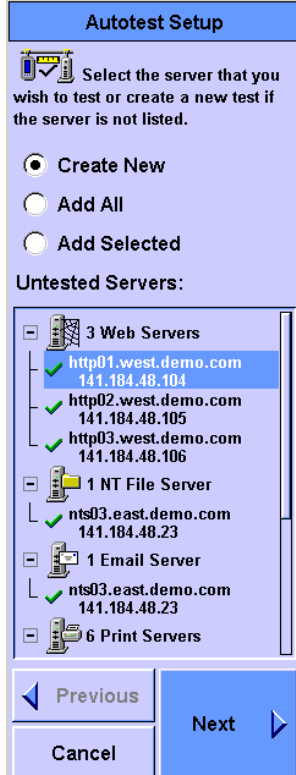
The User Interface

The following example describes the flow of the user interaction to set up the Autotest of an HTTP server. The sequence is similar for FTP server testing.

1. In the **Network Autotest Setup** window, select the **Add** button to add a new server to the Autotest suite.
2. From the list of available servers, select the HTTP server you wish to test. Click **Next** to proceed to the next step.
3. If the server to be tested is not in the list, choose **Create New** to manually enter the address or URL. Click **Next** to proceed.
4. In the **Web Server Setup**, you can enter optional information. Click **Next** to proceed to the next step afterwards:
   a. Use of a proxy server can be enabled, and the proxy server address or URL can be entered.
   b. If the server under test requires the client to send authentication information, select **Authentication** and enter the **User Name** and **Password**.
5. Like for the Autotest of every server type, custom thresholds can be set for the service quality score of individual steps like Name Lookup, PING Response, 1st Response, Read Rate, etc. Click **Next** to proceed.
6. When the **Network Autotest Setup** window returns, press **Start Test** to begin testing.
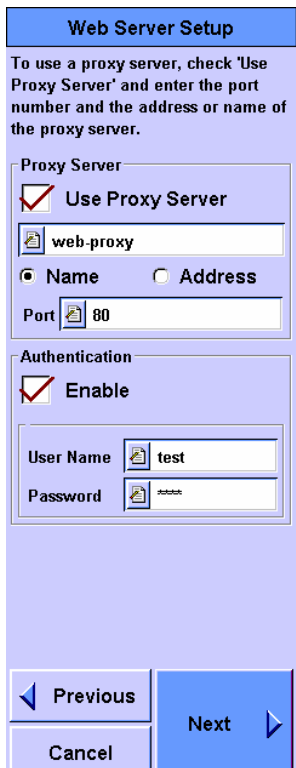
Network Autotest Setup

Network Autotest Setup
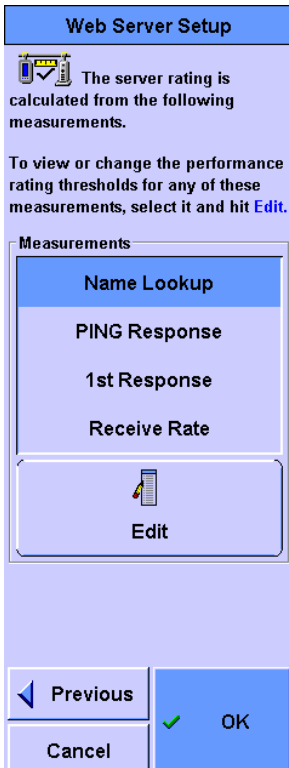
Autotest Setup

Select the server that you wish to test or create a new test if the server is not listed.

○ Create New
○ Add All
○ Add Selected

Untested Servers:

Choose server under test

Autotest Setup

Select the type of server that you wish to test.

Web Server
NT File Server
NFS Server
FTP Server
Novell Server
Email Server
Print Server
DNS Server
WINS Server
DHCP Server
Primary DC
Backup DC
Router

Add a server to be tested

Web Server Setup

Enter the URL for the page to retrieve from the server.

Examples:
http://www.scope.com/index.htm
www.scope.com/index.htm
www.scope.com

URL
http://www.yahoo.com

Specify server URL

Web Server Setup

To use a proxy server, check 'Use Proxy Server' and enter the port number and the address or name of the proxy server.

Proxy Server
☑ Use Proxy Server
web-proxy
● Name   ○ Address
Port 80

Authentication
☑ Enable

User Name test
Password ****

Enter authentication details

Web Server Setup

The server rating is calculated from the following measurements.

To view or change the performance rating thresholds for any of these measurements, select it and hit **Edit**.

Measurements

Name Lookup

PING Response

1st Response

Receive Rate

Edit

Previous

Cancel

✓ OK

Specify scoring levels

Network Autotest Setup

Suite   <Default>

Iterations   1 Time

⊟ 1 Web Server

L www.yahoo.com
www.yahoo.com

Edit   Delete   Add

Start Test

2:11 PM   45%

Back   Main Menu   Help

Start testing

4

VLAN Support for the Auxiliary Port, and Remote Control through the Auxiliary Port

This section describes how to configure VLAN support for the Auxiliary Port and how to set up remote control over the Auxiliary Port of the FrameScope™ Pro.

The Auxiliary Port is a hardware option to the FrameScope™ Pro, and is identified by option number N2620A-041 (Auxiliary Port).

The Auxiliary Port is mutually exclusive with the optional Wiremap port, which is identified by option number N2620A-040 (Wiremap port). While the Auxiliary Port is an active network interface, the Wiremap port is exclusively suitable as a troubleshooting tool to detect miswired network cables.

Features

The Auxiliary Port of the FrameScope™ Pro provides an additional 10/100 Mbit/s Ethernet interface. It allows to remotely control and to access the FrameScope™ Pro through a network different from the network under test.

Also, the Auxiliary Port can be used for **Voice over IP testing** if the test port is being used for background traffic generation at the same time. For futher details, please refer to chapter 6, **Simultaneous Traffic Generation during VoIP Testing**, in this document.

The Auxiliary Port can not be used for network performance testing or with the troubleshooting tools available for the RJ45 and SFP Gigabit Ethernet test ports.
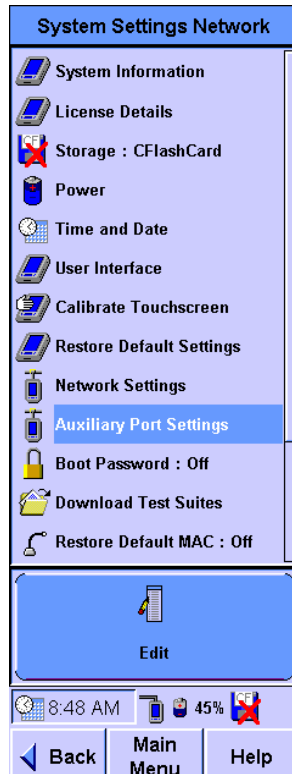
Configuring VLAN Support on the Auxiliary Port

Click **System** on the Main Menu, and then choose **Auxiliary Port Settings** from the System Settings Network window.
Click **Edit** to enter the **Auxiliary Port Settings** window. This window provides information about the Auxiliary Port's current MAC address and IP address.
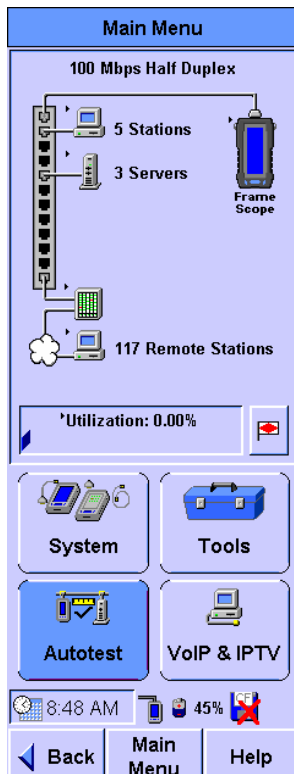
Main Menu

System Settings

Auxiliary Port Settings

To change the Auxiliary Port Settings, click **Edit Settings**. The **Auxiliary Port Setup** window allows changing the MAC Address associated to the Auxiliary Port, its VLAN tag and priority, its IP address, subnet mask and the default gateway.

To configure the Auxiliary Port to use VLAN tagging, activate the checkbox **VLAN Tag** and enter the VLAN Identifier and VLAN priority according to the parameters of the network and service the Auxiliary Port is connected to.

If the Auxiliary Port is connected to a network with DHCP service, choose **Use DHCP**. Otherwise, choose **Manually Configure** and enter IP address and subnet mask.

Important Notes: do not manually configure the default gateway for both, the Test Port and the Auxiliary Port, because the FrameScope™ Pro supports only one default gateway. If the Test Port already has a manually configured default gateway, make sure the default gateway for the Auxiliary Port is set to 0.0.0.0.

With the current software release, do not use DHCP on both, the Test Port and the Auxiliary Port as this will lead to disconnections.

Click **Next** to continue to the network client settings, which allow to specify host name, DNS domain, DNS and WINS server addresses. Click **OK** to finish the Auxiliary Port setup.

A message box appears to inform you that, for the new settings to be activated, the FrameScope™ Pro has to be restarted.

Default Gateway Setup   Network Client Setup   Restarting the instrument
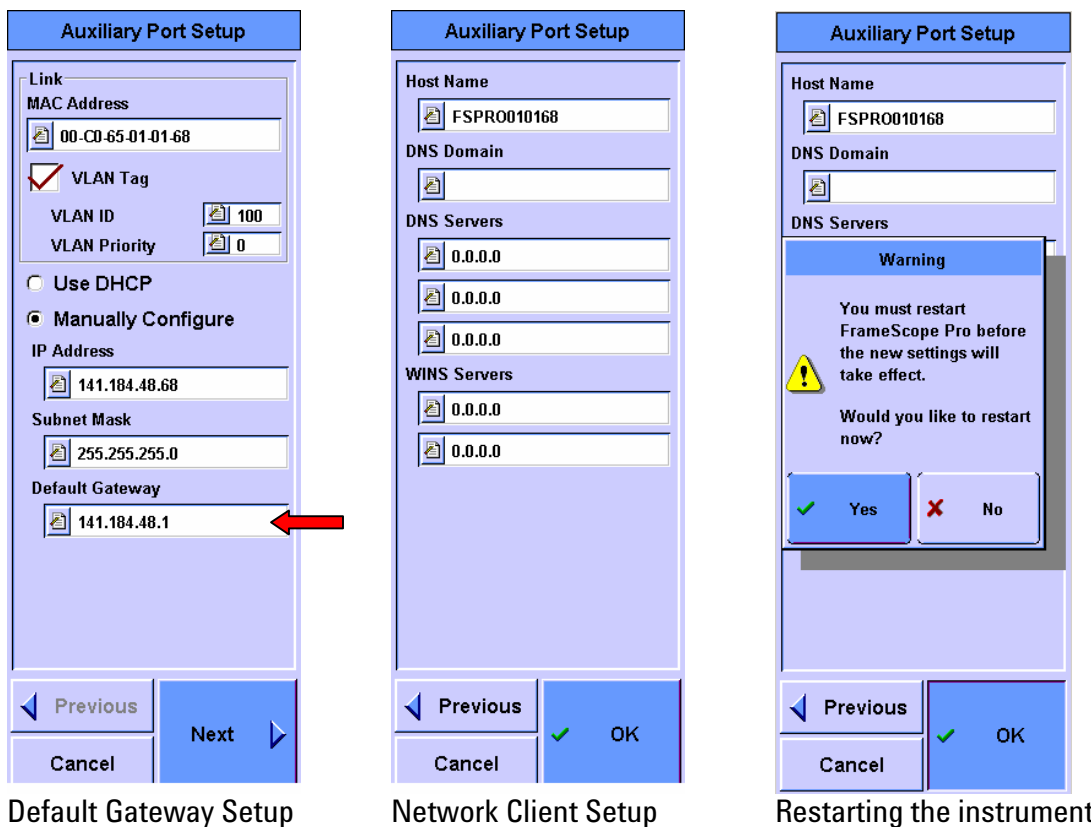
Configuring Remote Control on the Auxiliary Port

The FrameScope™ Pro can be accessed for remote control and web server functionality alternatively from the Test Port or the Auxiliary Port. Which port is being used for remote control and web server access, is configured in the Remote Control setup.
To enter the Remote Control setup, click **System** on the Main Menu, and then choose **Remote Control** from the System Settings Network window.
Click **Edit** to enter the **Remote Control** window. This window indicates whether the web server function is activated, and it indicates the currently active remote control port, its MAC address and IP address.
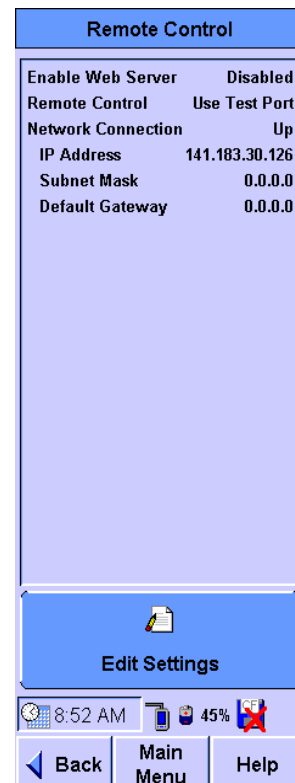Click **Main Menu** to return to the main menu with no changes. Click **Edit Settings** to enter the remote control setup dialog.
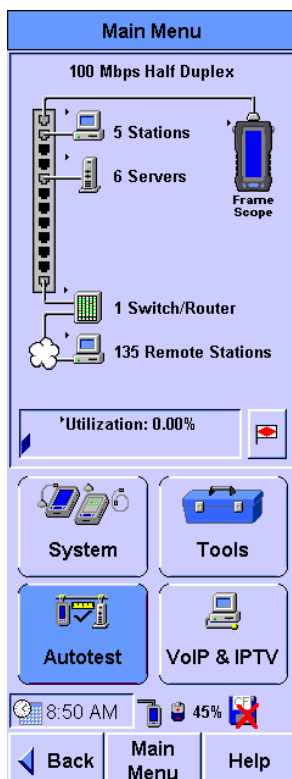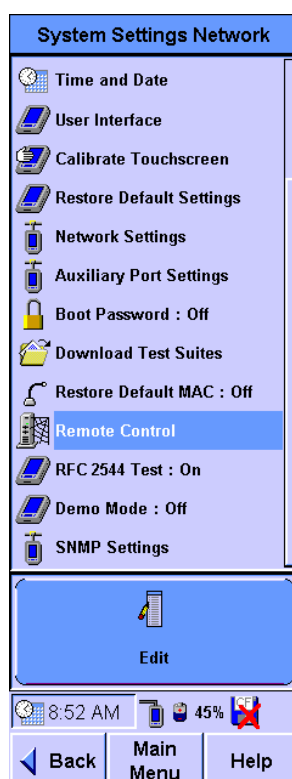
Main menu   System Settings   Remote Control Settings

On the **Remote Control Setup** window, choose either **Use Test Port** or **Use Auxiliary Port** as the network interface for remote control and web server access.

Activate the checkbox **Enable Web Server** to allow for access to the FrameScope's web server. To protect remote access to the FrameScope™ Pro, enter a combination of a user name and a password and record it for later use.
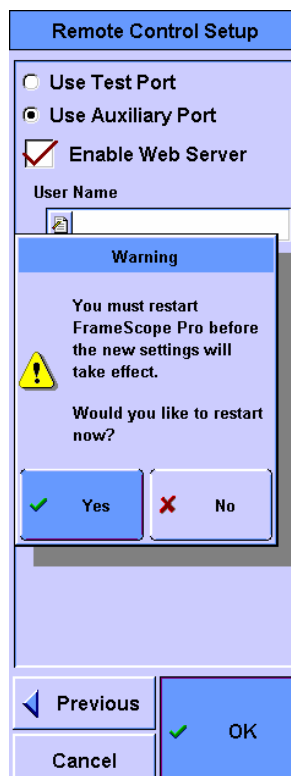
By default, web access to the FrameScope™ Pro works through port 80. If a different port is to be used, enter it in the **Port** field. Click **OK** to finish the Remote Control setup.
A message box appears to inform you that, for the new settings to be activated, the FrameScope™ Pro has to be restarted.
The web server allows to view measurement results in tabular and graphical format from any PC connected to the FrameScope™ Pro's remote control interface (either directly or through a network). To access the instrument, enter the remote control interface's IP address and port number in a web browser, for example: http://141.183.30.126:80
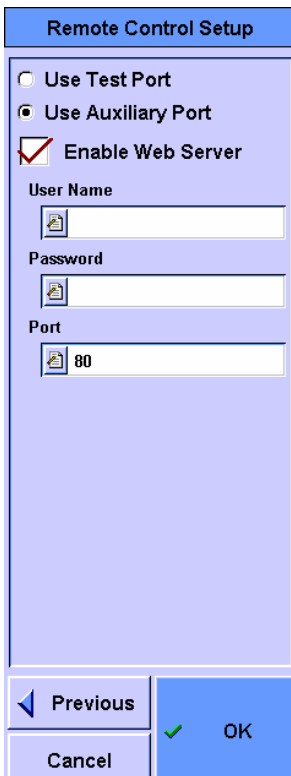
Choose Remote Control Port   Restarting the instrument

5

Download of Test Suites from an FTP Server

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The User Interface   26
This section describes the download of pre-defined test suites from an available FTP server. After downloading, the test suite files are stored in different directories on the CompactFlash card, depending on their filenames.

Features

Users who maintain multiple FrameScope™ Pro in their inventory often have the need to use common test settings on those instruments, and like to prevent operator errors by providing them with pre-defined test suites. To support this approach, the FrameScope™ Pro can be configured to download test suites from an FTP server. This feature also supports FTP authentication.

Important Notice: the test suites are stored on the CompactFlash (CF) card of the instrument under an indexed test suite filename. On the FrameScope™ Pro, the test suites are listed under their profile name for easier handling. The profile name is user configurable and is stored inside the test suite file.

The following table lists the destination directories on the CF card for the different test type prefixes that are part of the file names:

Test Suite Type	Test Suite Filename Prefix	Destination
Load Test	ltst	WSData1.0\ltests
Autotest	ntst	WSData1.0\ntests
VoIP Test	vtst	WSData1.0\vtest
Video Test [1]	iptv_tst	WSData1.0\iptv_test

[1] Video test suites available with software release 6.0 or later

To verify that the test suite has been downloaded, check for the availability of the new test suite's profile name in the **Suite** listing of the related test. Due to renaming, the test suite can not be easily identified by the indexed filename on the CF card.

Test suite files are simple text files (*.txt* extension). Advanced users can create new test suite files based on the test suite templates for the various test types.

The User Interface

Click **System** on the Main Menu, and then choose **Download Test Suites** from the System Settings Network window.
Click **Edit** to enter the **Download Setup** dialog.
To turn the download functionality on, activate the **Download** checkbox.
Enter the FTP server's IP address or URL, the port number to be used for the FTP service, as well as user name and password, if the FTP server requires **FTP Authentication**. If no authentication information is entered, the FrameScope™ Pro will attempt to connect to the FTP server as "anonymous" user.
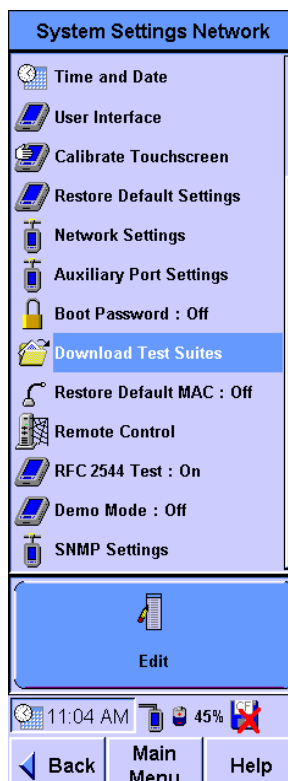Finally, enter the **Test Suite Path** including the filename of the test suite to be downloaded. The test suite filename must have a valid prefix according to the table on page 25.
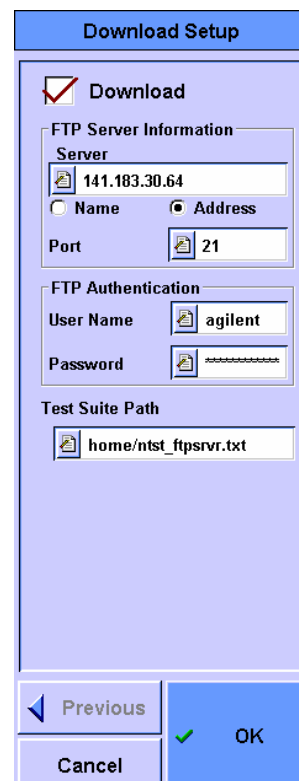Click **OK** to start the download.
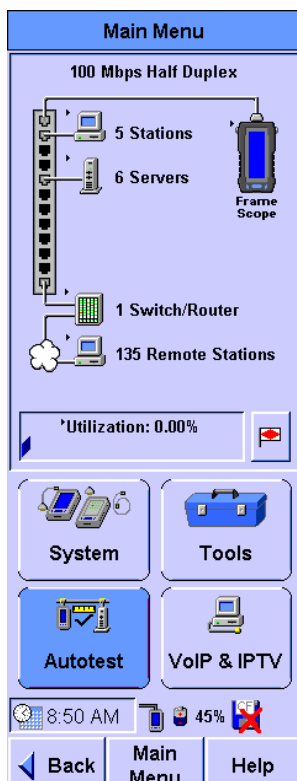
Main Menu   System Settings   Download Setup

            Addendum to the Agilent FrameScope Pro User's Manual

After the download has initiated, a message box may appear to inform about invalid entries or the CF card missing.
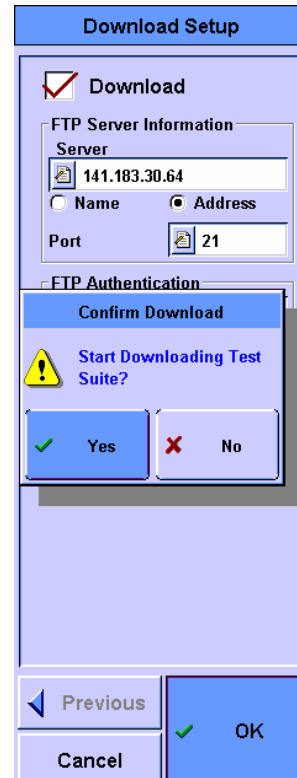If all entries have been made correctly, and the CF card is available, a message box appears to confirm the start of the download process.
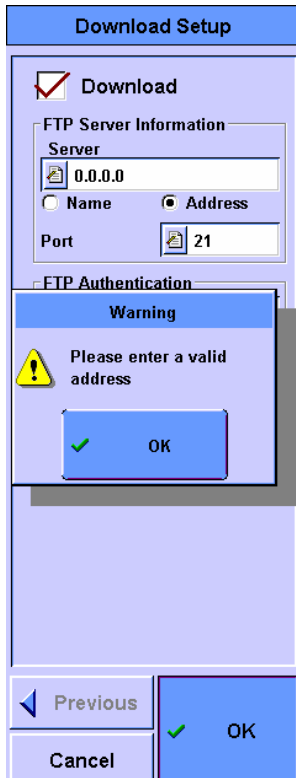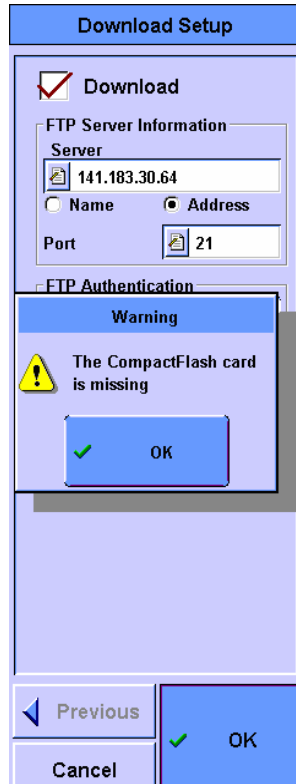
Invalid entry   CF card missing   All entries correct

Once the download is completed, or if a failure happened during the download, a notification box appears.
Should a test suite with the same profile name already exist, you will be prompted to allow overwriting the existing profile. If you choose to not overwrite an existing profile, the downloaded test suite will be discarded.

Download failed	Overwriting a test suite	Test suite stored successfully
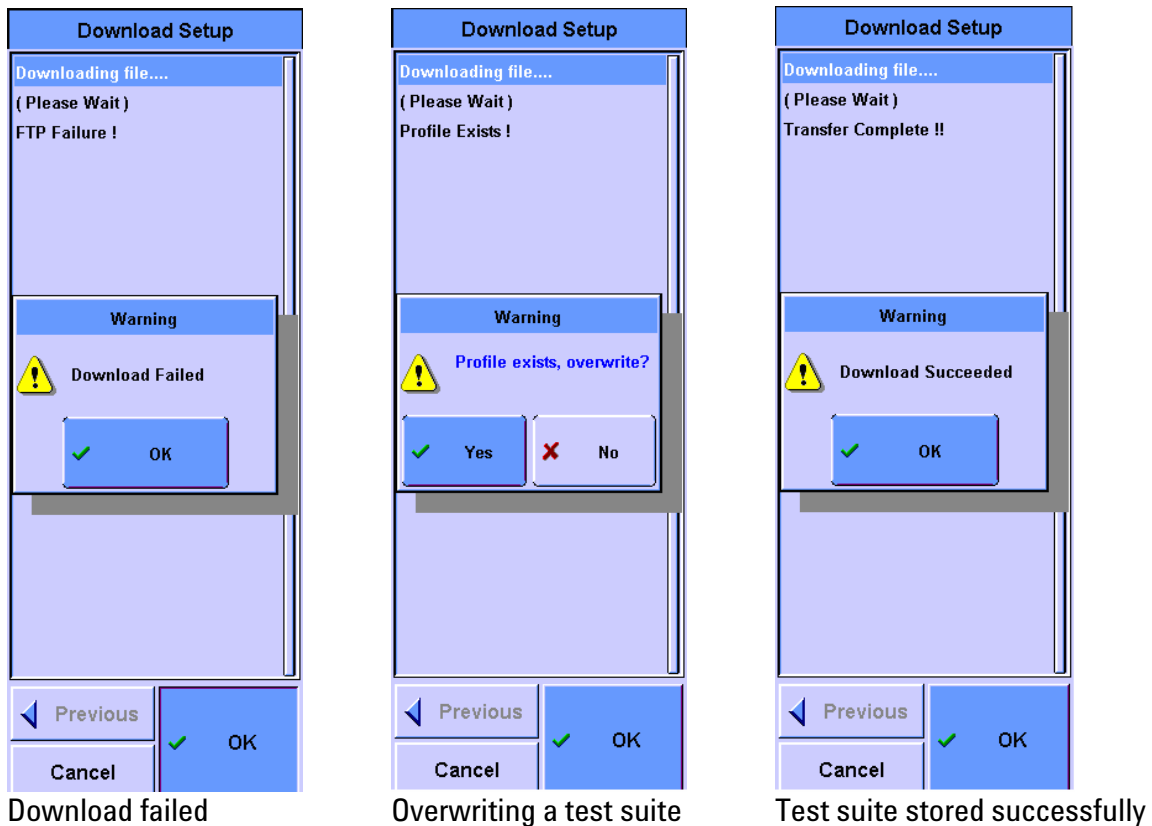
After clicking **OK** following a successful download, the **System Settings Network** window re-appears.
To verify that the download was successful, enter the setup dialog of the related test, and click the **Suite** button. The downloaded test suite should appear under its profile name in the listing of available test suites.

6
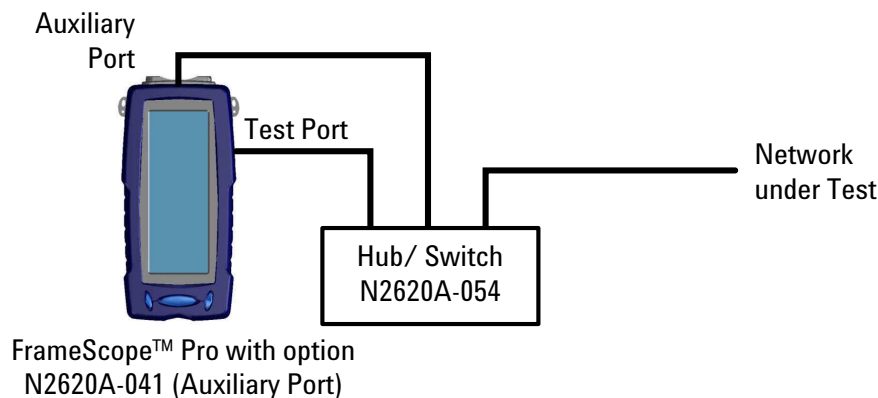# Simultaneous Traffic Generation during VoIP Testing

This section describes how to generate network traffic load on the Test Port while VoIP testing runs on the Auxiliary Port of the FrameScope™ Pro.
This section is only applicable to instruments with the hardware option N2620A-041 (Auxiliary Port) and a VoIP testing license.

Features

Voice over IP systems can respond to increasing traffic load with a degradation of the Quality of Service. By generating background traffic during a VoIP test the FrameScope™ Pro helps identifying bandwidth and latency issues that do not appear with single point-to-point VoIP calls.

In order to perform a VoIP test with background traffic in place, the FrameScope™ Pro needs two network connections, or, if this is not available, a separate hub/switch to combine the background traffic with the VoIP test call. An USB powered 10/100 Mbit/s switch is available as an accessory to the FrameScope™ Pro under option number N2620A-054. It is connected to the FrameScope™ Pro's USB port for power supply. Network connections are made as shown below.

Configuring Traffic Generation during VoIP Testing

Click **VoIP & IPTV** on the Main Menu, and then choose **VoIP** from the **Type of Service** window to enter the setup dialog for VoIP testing.
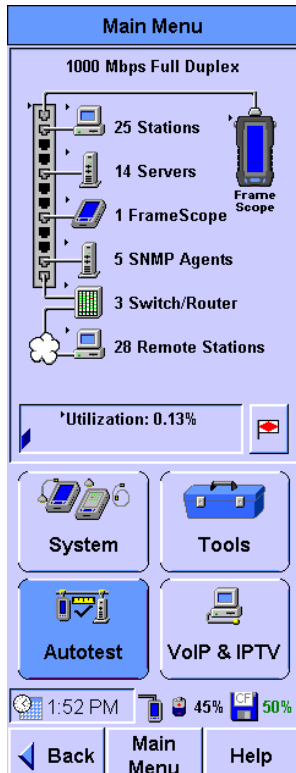
Main Menu   Choosing service to test   Entering the VoIP setup

Click on **Settings** to open the **SIP** setup window. For detailed instructions to set up Voice over IP testing, please refer to the FrameScope™ Pro User's Manual. In this addendum we will focus on configuring the background traffic load.

After all necessary settings like SIP Port, RTP Port, Codec Type, etc, are made to configure the VoIP test, click **Next**. If the FrameScope™ Pro is equipped with option N2620A-041 (Auxiliary Port), the **VoIP on Aux-Port Settings** window appears.

If no checkbox is activated, one of the Test Ports on the right side is used for VoIP testing. In this case, clicking **OK** will complete the VoIP test setup.

Note: whether the SFP interface is used for optical Gigabit Ethernet connections, or the RJ45 interface for Gigabit Ethernet is being used, is configured in the Network Settings dialog.

If the checkbox **VoIP on Aux-Port** is activated, the VoIP test uses the Auxiliary Port on the top of the instrument.

SIP call settings   Choice of interface

Activate checkbox for VoIP testing via the Auxiliary Port

Activate checkbox for traffic load generation on the Test Port
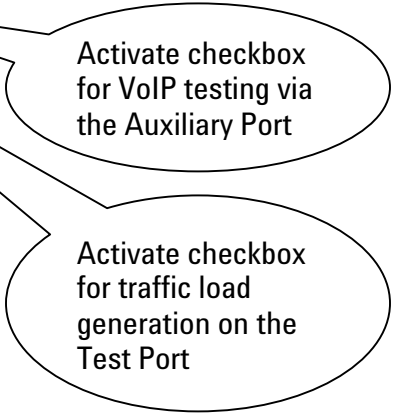
Only if **VoIP on Aux-Port** is checked, it is possible to also activate the **TG on Test-Port** checkbox. An additional entry field **Traffic Generator Settings** appears, and the **OK** button changes to **Next**.

The amount of background traffic generated on the Test Port is quantified in the equivalent number of VoIP calls. A minimum of one call and a maximum of 1000 calls are possible. The traffic load associated with a each call is determined by the VoIP settings, i.e. it is equivalent to the traffic generated by the VoIP test call on the Auxiliary Port.

In the **Traffic Generator Settings** field, enter the desired amount of background traffic to be simulated. Click **Next** to continue.

In **Traffic Generator Settings**, two tabs, **Parameters** and **Frame** are available. The **Parameters** settings are populated automatically by the FrameScope™ Pro based on the chosen amount of background traffic, and the parameters of the VoIP test call, such as the Codec being used.

In the **# Frames** field, specify if continuous background traffic generation is desired or if a limited number of frames are to be sent.

Amount of traffic   Traffic parameter setup
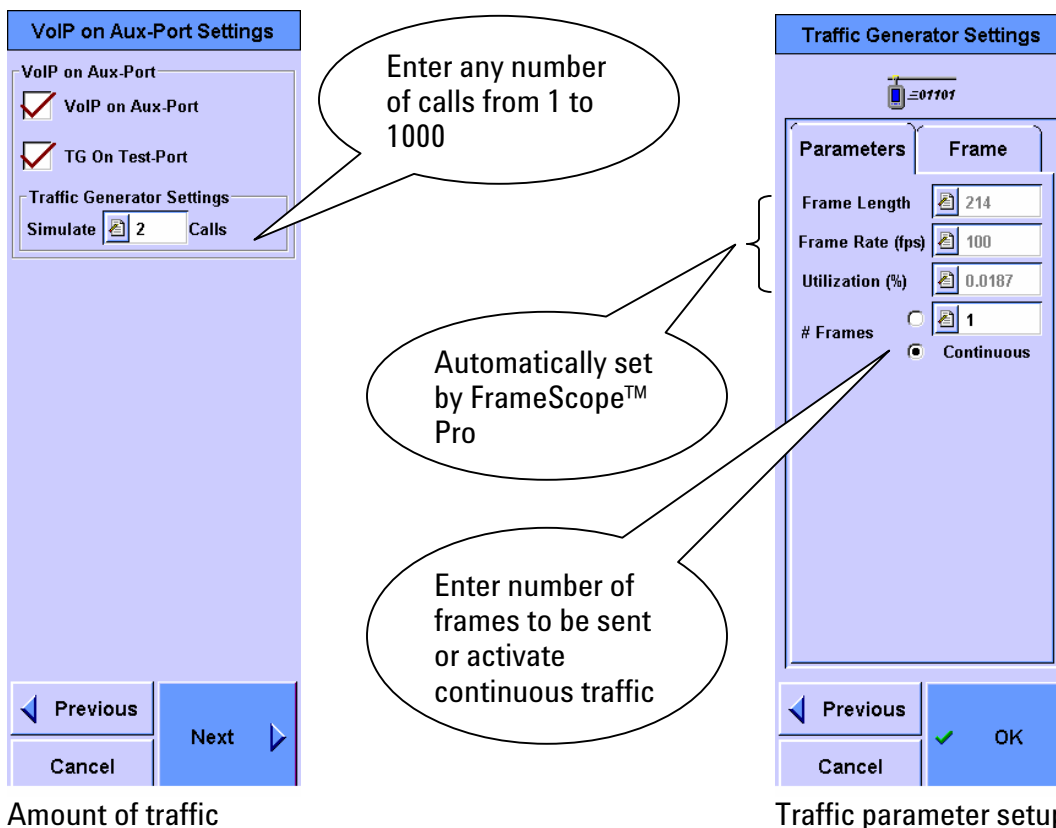
Clicking the **Frame** tab opens additional **Traffic Generator Settings**. Here, you can choose whether the MAC source address for the simulated traffic is the FrameScope™ Pro itself, or 10, 100 or more stations. For the simulation of multiple stations, the amount of traffic generated, as specified by number of calls, will be distributed amongst the number of stations selected.
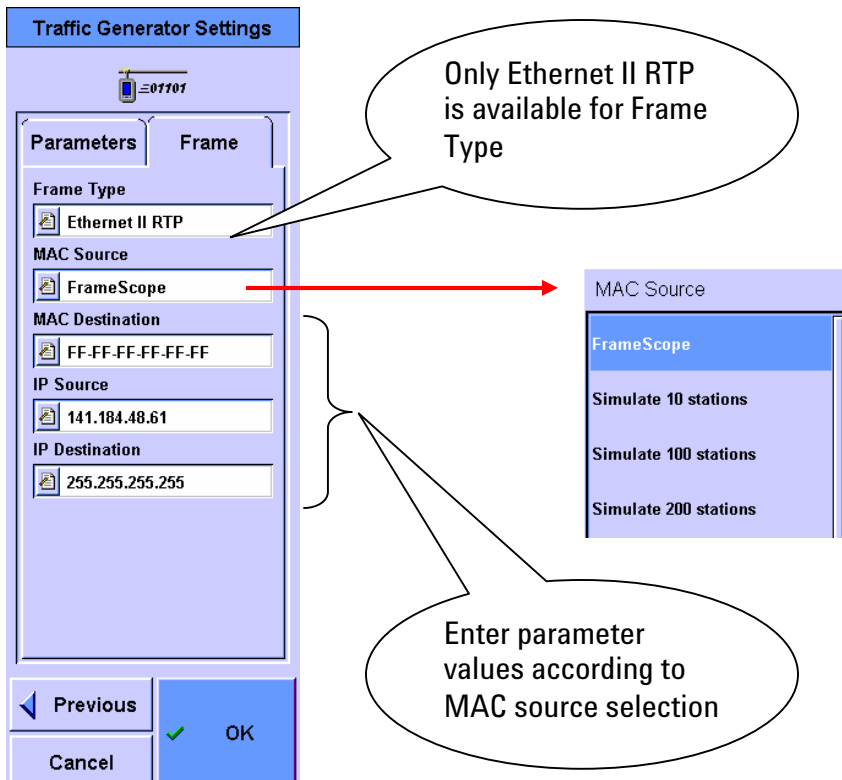

Click **OK** to conclude the configuration of the background traffic generator functionality.
Important Note: VoIP testing with the FrameScope™ Pro can either be done by calling a hardware or software SIP phone, calling a FrameScope™ Pro from a SIP phone, or between two FrameScope™ Pro. In the latter case, the configuration steps described here need to be applied to both instruments involved in the test, depending on the desired test scenario and traffic loading.

Commence the test by clicking the **Start** button. If there is a second FrameScope™ Pro involved in the test, start the callee first, then the caller.

During the testing, the amount of background traffic generated on the Test Port can be increased or decreased using the arrow keys to observe the impact of network traffic on the VoIP quality.
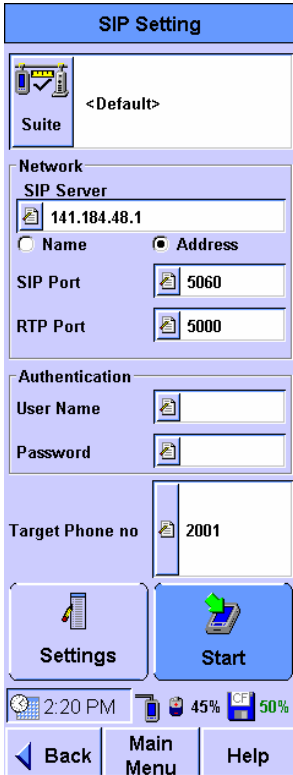
Starting the test
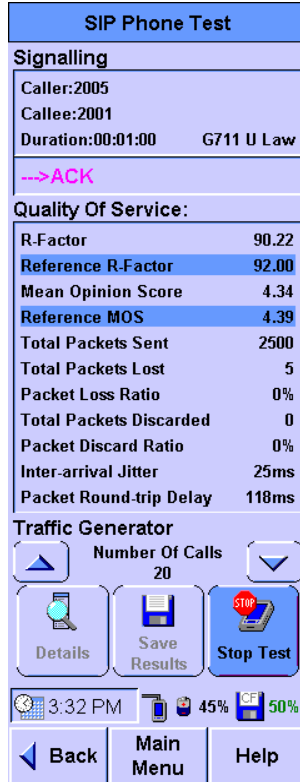
Display during testing

To finish the test, click **Stop Test** on either of the instruments involved, or hang up the SIP phone. The **Details** button now allows studying detailed test results, and the **Save Results** button allows storing the test results on the CF card.

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