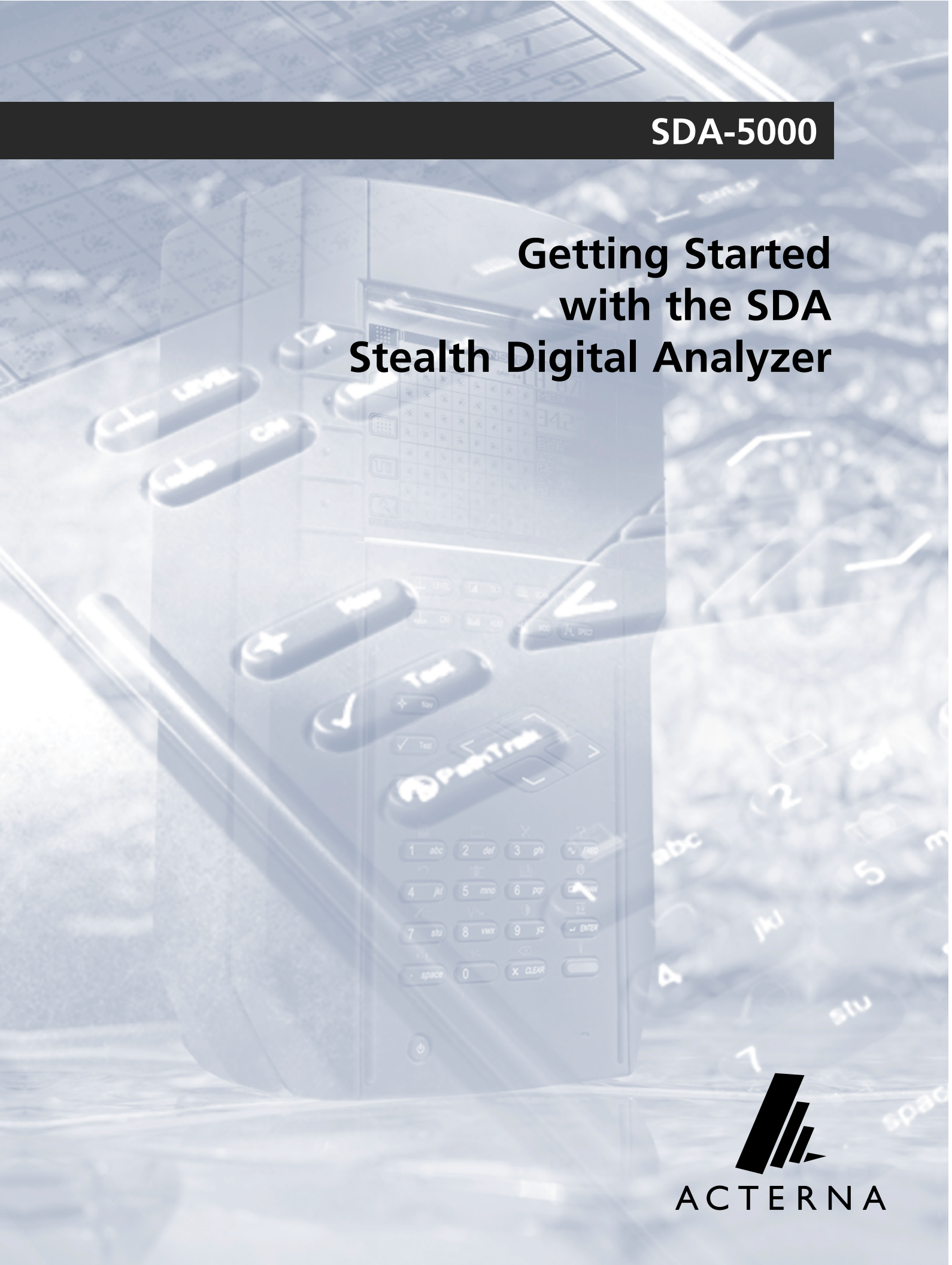
SDA-5000

Getting Started with the SDA Stealth Digital Analyzer



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GETTING STARTED WITH THE STEALTH DIGITAL ANALYZER (SDA)

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- **Application Notes 1, 2, 3, 5**
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- ***Wavelengths* Newsletter, January 2000 issue**
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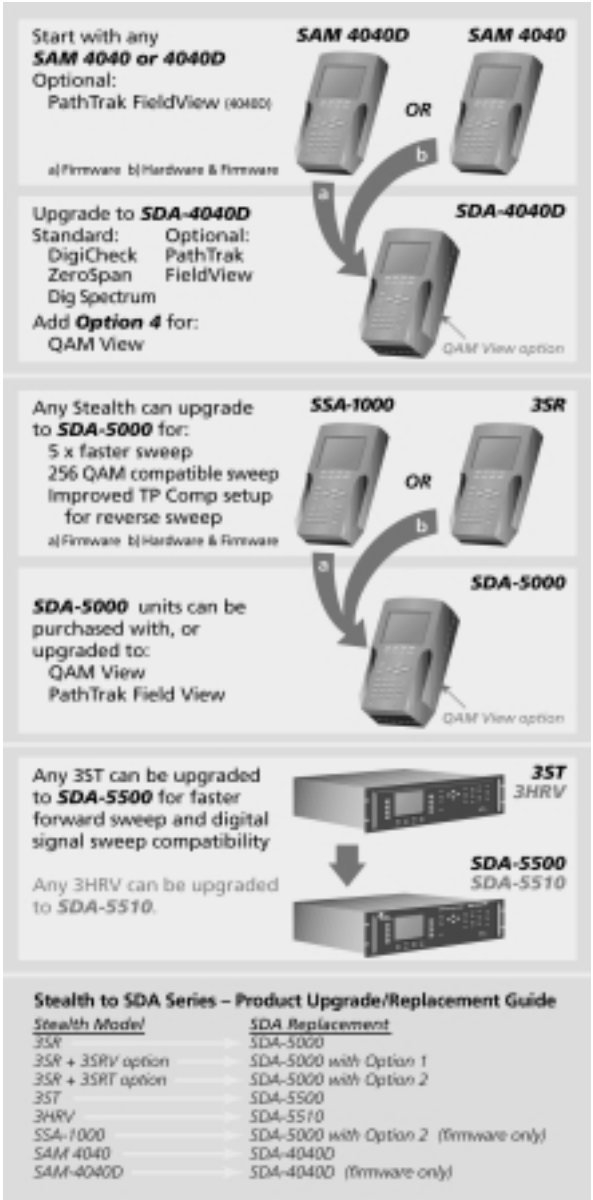

Stealth to SDA Series – Product Upgrade/Replacement Guide

Stealth Model	SDA Replacement
3SR	SDA-5000
3SR + 3SRV option	SDA-5000 with Option 1
3SR + 3SRT option	SDA-5000 with Option 2
3ST	SDA-5500
3HRV	SDA-5510
SSA-1000	SDA-5000 with Option 2 (firmware only)
SAM 4040	SDA-4040D
SAM-4040D	SDA-4040D (firmware only)

Figure 13

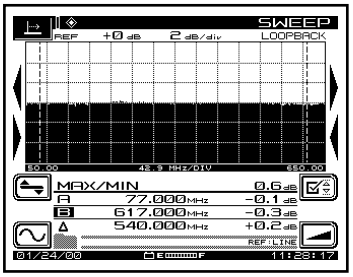

Figure 14

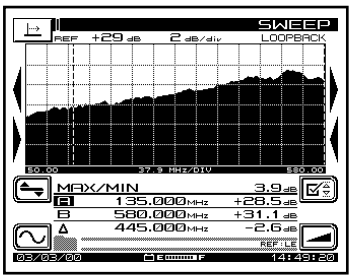

Figure 15

AUTOMATIC CENTER FREQUENCY DEFAULT – NTSC DIGITAL CARRIERS

If a digital channel is being enabled in the channel plan editor, please observe that an auto center frequency feature has been implemented for NTSC channel plans. This feature adds 1.75 MHz to the video frequency of the channel being modified, and the measurement bandwidth now defaults to 5.6 MHz. Adding 1.75 MHz to the video frequency establishes the center frequency in a standard 6 MHz bandwidth. The user should always verify the 5.6 MHz measurement bandwidth with the system operator, and adjust as needed.

EXAMPLE: *Channel* 89 *is being converted from a video channel to a digital channel. The video frequency is* 613.25 MHz, *and the measurement* BW *is* 4 MHz (*Figure* 16). *After converting the channel to a digital carrier, the center frequency is* 615.00 MHz, *and the measurement bandwidth is* 5.6 MHz (*Figure* 17).

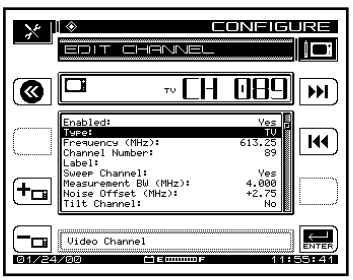

Figure 16

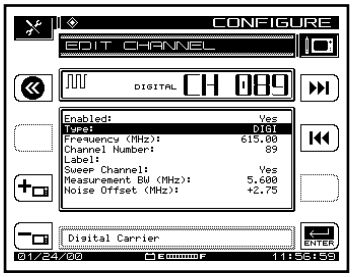

Figure 17

QAM VIEW OPTION FOR SDA LEVEL METERS

Once you have upgraded the SDA platform, you can purchase the QAM View Option 4 to ensure the quality of your forward digital services. For measurement and analysis of digital TV and forward modem signals, the new digital QAM View option provides a full complement of digital quality measurements. Included is a 64/256 QAM constellation display with zoom average digital power level and BER and MER (Figure 18). An equalizer display shows equalizer stress and distance to fault.

In addition, an exclusive noise mode allows technicians to see ingress/noise under an active digital carrier (Figure 19). This tool is invaluable for detecting forward path ingress otherwise hidden by conventional spectrum views!

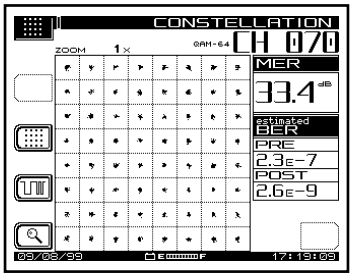

Figure 18

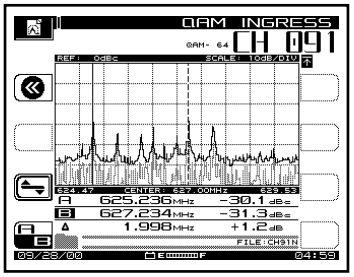

Figure 19

Stealth / SDA Replacement

The following chart shows the SDA replacements for current Stealth meters.

Stealth Model	SDA Replacement
3ST	SDA-5500
3HRV	SDA-5510
3SR	SDA-5000
3SRV option	Option #1 SDA-5000
3SRT option	Option #2 SDA-5000
PathTrak Field View Option	Option #3 SDA-5000

Stealth and* SDA *Sweep Compatibility

Your new SDA meter is fully forward and reverse sweep compatible with older Stealth units! For example, an SDA-5500 Sweep Transceiver (replaces the 3ST) will operate as normal with your existing 3SR, 3SRV, 3SRT, 3HRV or StealthTrak SSA-1000. Alternatively, your 3ST will operate with the new SDA-5000 series (replaces the 3SR and SSA-1000). The reverse sweep operates in the same manner with all Stealth or SDA field instruments whether you are using the 3HRV or it's replacement, the SDA-5510 Reverse Sweep Manager.

The only requirement for backwards compatibility is that the 3ST and 3HRV must have at least firmware version 9.3 installed. This firmware upgrade is free from the Acterna web site.

To take advantage of the new digital compatible forward sweep, all field and rack mount instruments must be SDA series and the transmitter/receivers programmed for Stealth (SDA Compatible) sweep.

Note: When configuring your SDA instruments for forward or reverse sweeping, make sure that STEALTH SWEEP is selected in SWEEP MODE unless all instruments in your system are SDA series!

Functionality Variations Between the Stealth and SDA

The new SDA user interface is nearly identical to the Stealth series, and all of the same features found on the Stealth are included on the SDA. What you will immediately notice is the NAVIGATOR menu is now standard on all instruments, providing the same consistent "feel" from meter to meter. You will also see some improvements in the Test Point Compensation set-up and sweep transmitter configuration. Best of all, you'll see new features like digital compatible forward sweep and a valuable Loopback feature for in-field component troubleshooting.

SDA-5500 versus* 3ST *Sweep Configuration

Sweep configuration of the SDA-5500 is much the same as the 3ST. The primary differences are: 1) the Navigator replaces the 3ST SET-UP screen, and 2) there is an additional TRANSMIT selection for Stealth Sweep or SDA Sweep. The following instructional sequence will guide you through these differences.

Step 1. To begin sweep configuration of the SDA transmitter, select the CONFIG icon under the files and Configure Tab on the Navigator (Figure 1).

Step 2. Select SWEEP in the CONFIGURE menu (Figure 2).

Step 3. Select TRANSMIT in the SWEEP MODE if all field technicians in your system are not using SDA-5000 sweep receivers (Figure 3). By selecting TRANSMIT mode, all Stealth models (3Sx, SSA-1000) and the SDA-5000 are compatible with the SDA-5500. The sweep speed is the same as the Stealth sweep using firmware version 9.3. Your sweep channel plan should be configured as used in the model 3ST.

Step 4. Select TRANSMIT (SDA COMPATIBLE) if all field technicians are using SDA-5000 field receivers (Figure 4). This selection provides greater forward sweep speed when compared to the 3ST, especially when operating with a channel plan that includes multiple scrambled and digital signal types. By the way, when constructing a sweep channel plan and using the SDA compatible mode, you may now reference 64/256 QAM digital carriers as you would an analog video or scrambled channel. Remember, the Transmit (SDA Compatible) mode should only be used if all field sweep technicians have meters that are upgraded to the SDA series.

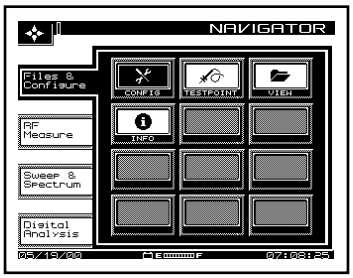

Figure 1

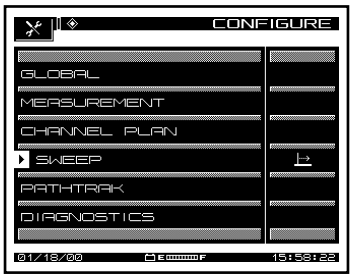

Figure 2

Figure 3

Figure 4

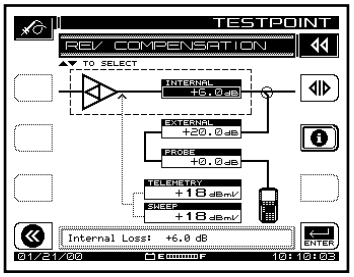

Figure 5

SDA-5000 *Test Point Compensation / Reverse Level Configuration*

A new graphical user interface has been added to simplify programming of the forward and reverse test point compensation. Test point compensation can be accessed by either sequentially pressing the FUNCTION (green) and 7 keys, or selecting the TEST POINT icon in the NAVIGATOR menu.

Reverse Compensation and Reverse Sweep / Telemetry Levels

Reverse test point compensation values and reverse telemetry and sweep level values are now programmed from the same screen (Figure 5). Losses internal or external to the device under test may be entered.

The reverse telemetry level and sweep levels are also entered on the reverse compensation screen. When adjusting the levels please note the following program sequence:

- Entering the telemetry value will change the sweep value to same level. That is, the sweep value will always "track" the telemetry value unless the sweep value is changed independently. This feature was implemented since both telemetry values and sweep values are the same under most circumstances.

- If the device being tested requires different values for telemetry and sweep, simply enter the desired telemetry value first, followed by the sweep value.

- Always remember to enter the desired level that you want injected to the device under test. The user will be warned if the desired input level is not achievable given the test point compensation values (transmitter output is adjustable from +20 to +50 dBmV).

Reverse Compensation Information Screen

The reverse compensation information screen provides additional detail to the reverse TP set-up screen (Figure 6). Information includes the transmitted output level from the SDA-5000, and the actual level at the device under test.

- Please note the REVERSE TELEMETRY FREQUENCY header at the top of Figure 6. This reference frequency that appears in the header is actually programmed in the 3ST, 3HRV, SDA-5500 or SDA-5510, but is displayed after you perform the first reverse sweep. Therefore, the default frequency will always be 40 MHz until you perform a reverse sweep, and then this frequency will change depending on what frequency was programmed in the headend unit.

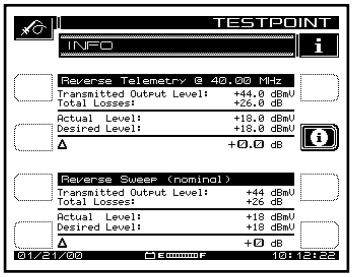

Figure 6

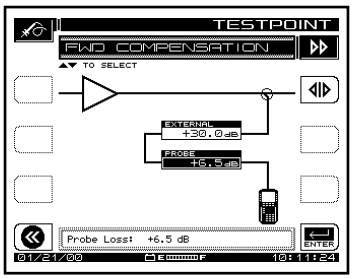

Figure 7

Forward Compensation

Forward Path external and probe compensation values are also programmed in the testpoint compensation screen (Figure 7).

Saving Test Point Compensation Files

Test point screens can now be saved by sequentially pressing the FUNCTION (green) key and #2 key. Common test point configurations can be saved with a descriptive name of the node type, amplifier type or location. The files can then be recalled and applied to the appropriate device under test.

NEW FEATURES ON THE SDA SERIES METERS

SDA-5000 (*with* OPT. 1) CW *Loopback*

CW Loopback allows the user to generate and receive a single CW frequency using one unit (Figure 8). Connect the output (opt. port) of the SDA-5000 to the input of the device under test (DUT), and connect the SDA receiver input to the output of the DUT. The CW Loopback measurement can be accessed by selecting the LOOPBACK icon from under the RF Measure Tab in the NAVIGATOR (Figure 9).

- This feature is ideal for simple troubleshooting of a field active/passive device to determine gain, loss or continuity. Any frequency from 5-1000 MHz can be selected, and the output is adjustable from +20 to +50 dBmV.

- The transmitter is at the maximum output of +50 dBmV when initially enabled. The user may adjust the transmitted output level by scaling the attenuator (Figure 10) for the desired output level.

- Test point compensation can be enabled, if desired, for the CW Loopback mode. This mode recognizes the forward test point compensation values, regardless of the frequency that is being generated. If enabled, the test point compensation value will be displayed in the lower left corner of the Loopback display.

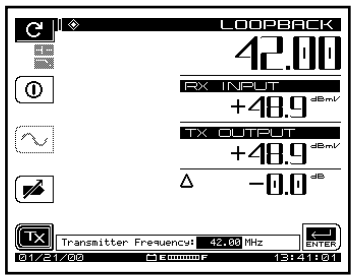

Figure 8

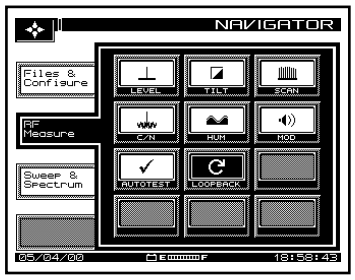

Figure 9

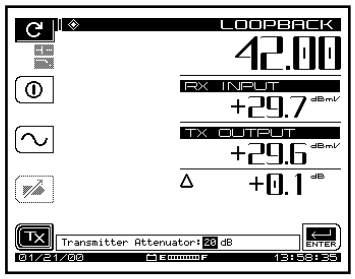

Figure 10

***Loopback* Sweep**

Transmitting and receiving a sweep signal from a single SDA-5000 (OPT. 2 required) meter can be achieved through the Loopback Sweep mode. The Loopback Sweep mode is an ideal solution for characterizing frequency response of network active and passive devices.

- The Loopback Sweep feature is selected in the SWEEP MODE menu in the SWEEP CONFIGURATION menu (Figure 11). Cabling the Sweep Loopback is nearly identical to the CW Loopback. The SDA-5000 transmitter output (OPT. port) is cabled to the input of the device under test (DUT). The SDA receiver input is cabled to the DUT output.

- A dedicated channel plan is required for Sweep Loopback, and building the plan is similar to building a reverse plan (Figure 12). The channel plan is constructed by selecting a start / stop frequency and interval between frequencies. Channel plans may be built from 5-1000 MHz. Channel frequencies may be edited as needed. Tilt channels are enabled at the highest and lowest frequencies built in the plan.

  *WARNING! TO AVOID INTERFERENCE WITH ACTIVE SERVICES ON THE CABLE SYSTEM, MAKE SURE THAT THE LOOPBACK SWEEP TEST IS PERFORMED OUT-OF-SERVICE, OR BUILD SWEEP CHANNELS AROUND ANY ACTIVE SERVICES!

- After the channel plan is built, select the desired sweep insertion level into the device being tested (Figure 13).

- Press the front panel sweep key to begin the Sweep Loopback measurement. A reference will typically need to be established to account for any test cable losses or mismatches. This is accomplished by connecting the test cables from the SDA-5000 transmitter output (OPT port) to the input port. Press the FUNCTION key followed by the #6 key to store a reference (Figure 14).

Note: The level reading is an absolute measurement (example: dBmV units) prior to establishing a reference. After the reference has been established, the meter will read in relative units (dB).

- Connect the transmitter output of the SDA-5000 to the input of the DUT, and connect the receiver input to the output of the DUT. In Figure 15, the sweep loopback measurement is used to check the frequency response of a line extender.

Figure 11

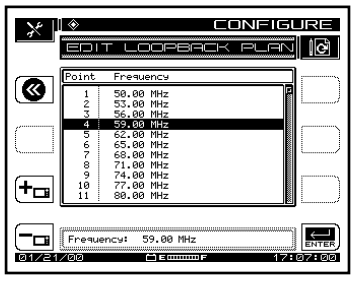

Figure 12

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