

## Measurement Guide

# Tracking Generator

for Anritsu RF and Microwave Handheld Instruments

## Spectrum Master™ E-Series

Tracking Generator

Option 20

## Spectrum Master™ T-Series

Tracking Generator

Option 809

Option 813

Option 820



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# Chapter 1 — General Information

## 1-1 Introduction

This Measurement Guide documents Option 20 Tracking Generator functions of the Anritsu Spectrum Master E-Series handheld instruments and Option 809, Option 813, and Option 820 of the Spectrum Master T-Series instrument

The Option 20 Tracking Generator has a starting frequency of 500 kHz. The Option 809, Option 813, and Option 820 Tracking Generators have a starting frequency of 100 kHz. The highest frequency is the same as the highest tuning frequency of the spectrum analyzer.

<b>Note</b>	Not all instrument models offer every option or measurement mode. Please refer to the Technical Data Sheet of your instrument for available options. The screen images on your instrument may vary from those shown in this Measurement Guide.
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Options 20, 809, 813, and 820 add Tracking Generator function to the Spectrum Analyzer mode of the instrument. This measurement guide describes only specific Tracking Generator functions.

The tracking generator and spectrum analyzer combination allows a signal to be applied to a device under test (DUT) to measure the frequency response.

General Spectrum Analyzer measurement functions including **Frequency, Amplitude, Span, Bandwidth, Marker, Sweep, Trace, and Limit** menus are detailed in the Spectrum Analyzer Measurement Guides (SPA MG) available on the Anritsu Web site:

- T-Series Spectrum Master SPA MG (p/n 10580-00349)

<b>Note</b>	Master Software Tools does not support capture of Tracking Generator traces.
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## 1-2 Product Information, Compliance, and Safety

Read the Handheld Instruments Product Information, Compliance, and Safety Guide (PN: 10100-00065) for important safety, legal, and regulatory notices before operating the equipment. For additional information and literature covering your product, visit the product page of your instrument on <http://www.anritsu.com/> and select the Library tab.

Not all instrument models offer every option. Please refer to the Technical Data Sheet of your instrument for available options.

## 1-3 Contacting Anritsu

To contact Anritsu, please visit:

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

From here, you can select the latest sales, select service and support contact information in your country or region, provide feedback, complete a “Talk to Anritsu” form to have your questions answered, or obtain other services offered by Anritsu.

Updated product information can be found on the Anritsu web site:

<http://www.anritsu.com/>

Search for the product model number. The latest documentation is on the product page under the Library tab.

## 1-4 Selecting Tracking Generator

Press the **Menu** button and select the Tracking Generator measurement shortcut by tapping on the touch screen (Figure 1-1).

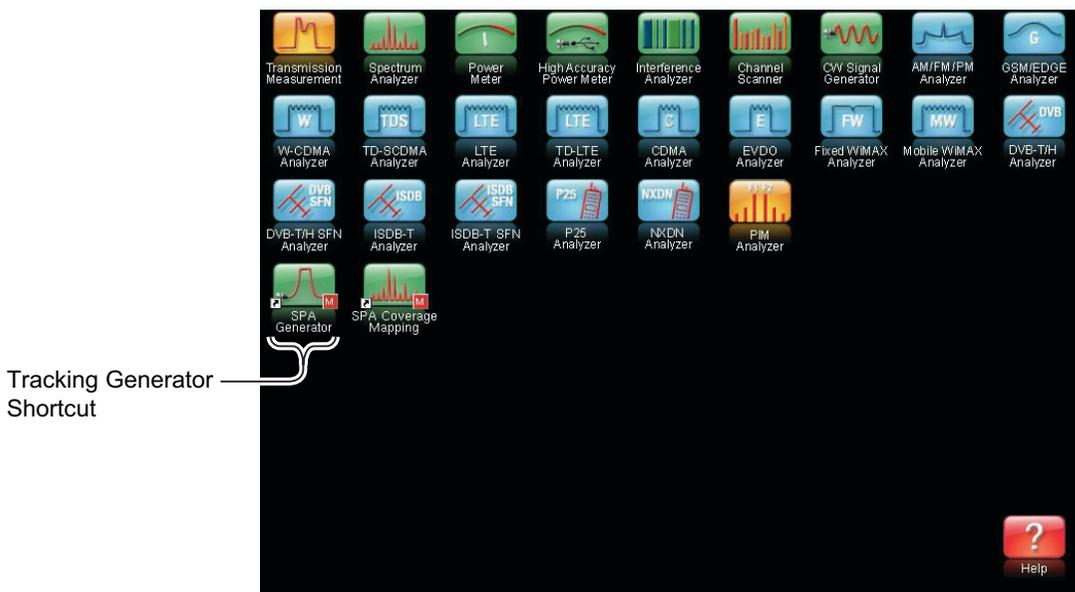
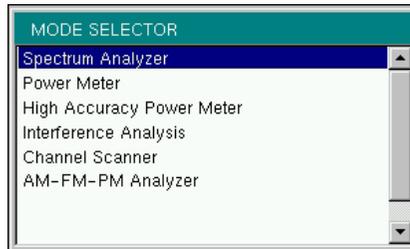
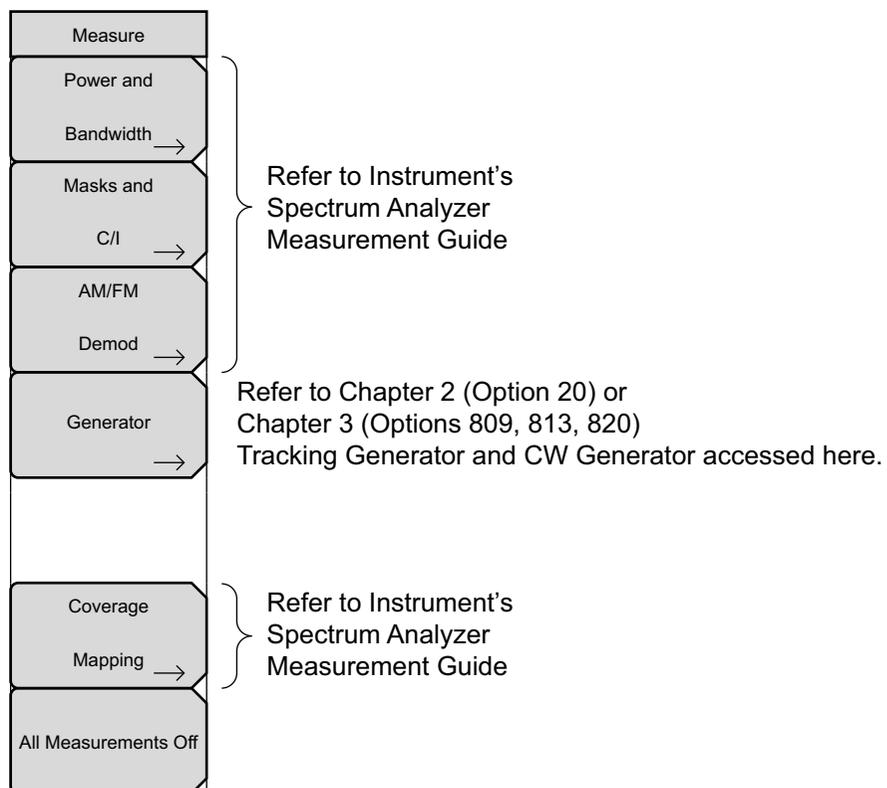


Figure 1-1. Menu Button Screen

You can also press the **Shift** key then the **Mode (9)** key, select Spectrum Analyzer ([Figure 1-2](#)) from the list using the rotary knob or the **Arrow** key, and press **Enter**. In Spectrum Analyzer mode, press the **Shift** then **Measure (4)** keys and then press Generator ([Figure 1-3](#) on page 1-3).



**Figure 1-2.** Measurement Mode List (example)



**Figure 1-3.** Tracking and CW Generator Options

Refer to [Chapter 2, “E-Series Tracking Generator”](#) or [Chapter 3, “T-Series Tracking Generator”](#) for detailed information on the tracking generator operation and menus.



# Chapter 2 — E-Series Tracking Generator

(Option 20)

## 2-1 Generator Mode

Option 20 adds a Tracking Generator to the Spectrum Analyzer mode of the instrument. The Tracking Generator generates a swept signal with an output frequency that is the same as the tuning frequency of the spectrum analyzer.

Additionally, a CW generator feature is included in Option 20. The sine wave output frequency and power is set by the user. Refer to [Section 2-5 “CW Generator Overview” on page 2-8](#).

The output power is leveled and has a specified power range  $-50$  dBm to  $+0$  dBm in  $0.1$  dB steps.

<b>Note</b>	Operation outside this power range is possible. However, performance and compliance with specifications are not guaranteed.
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Power output information is available for both absolute and transmission (normalized) measurements.

Enhanced power level calibration is available for the generator output. Additional information about the enhanced level calibration is provided later in this chapter.

## 2-2 Tracking Generator Overview

1. Set the **Mode** to Spectrum Analyzer. Refer to [Chapter 1](#) for details.
2. **Preset** the instrument (Shift+1 > Preset).
3. Set the spectrum analyzer frequency range using the Frequency (**Freq**) menu and submenus. Refer to the Spectrum Analyzer Measurement Guide (10580-00244) for additional information.
4. Press the **Shift** key, then the **Measure (4)** key. Press the **Generator** key.
5. Press the **Output Power** button and set the output power (at the output connector before any external attenuation). In tracking mode, the output is leveled and flat over the spectrum analyzer frequency range.
6. Set the **Generator Mode** to Tracking. In Tracking Mode, the output frequency is paired with the spectrum analyzer input sweeping frequency.
7. Turn **Generator Output On**. The output power turns on at the level that has been set previously with the **Output Power** key.

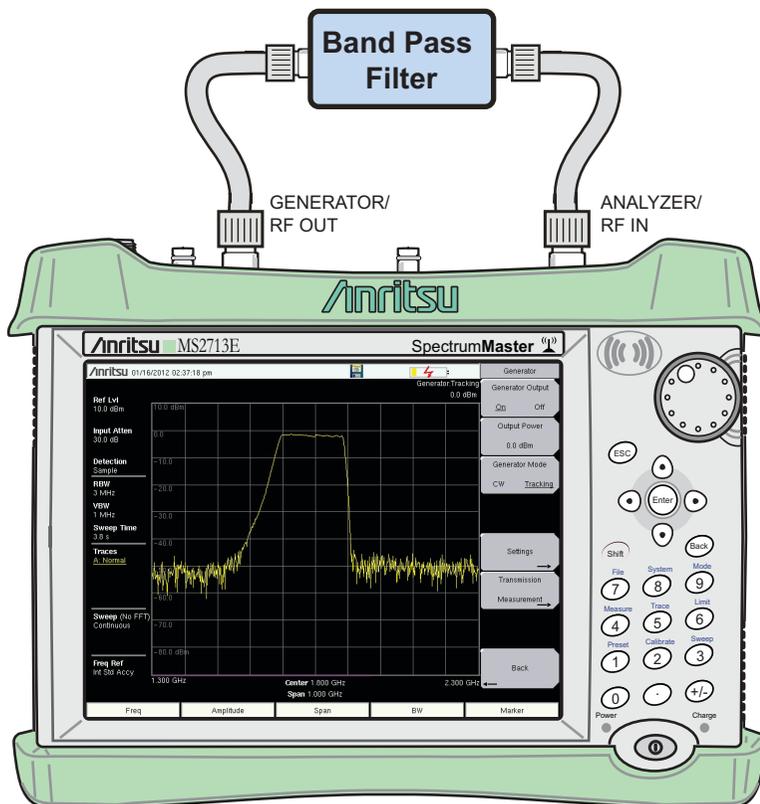
**Note**

Turning the Tracking Generator On sets the detection type (**Amplitude** > Detection) to Sample and sets the sweep mode (**Sweep** > Sweep Mode) to No FFT. Turning off the generator resets both parameters to their previous settings. Either parameter may be changed by the user with the Tracking Generator on or by the instrument when other measurements are also turned on.

## 2-3 Measurement Example

This example demonstrates how to connect a Device Under Test (DUT) and make a measurement. This example will characterize the frequency response of a filter in the GSM frequency band.

1. Set the frequency range to cover the range of the DUT being tested. In this example, the center frequency is set to 1.8 GHz with a 1 GHz span.
2. Set the Generator to Tracking Mode with an Output Power of 0.0 dBm. Refer to the previous “[Tracking Generator Overview](#)” section for additional information.
3. Connect the DUT as shown in [Figure 2-1 on page 2-2](#). For connector torque and connector care information, refer to the User Guide for your instrument.
4. Toggle the Generator Output to On.

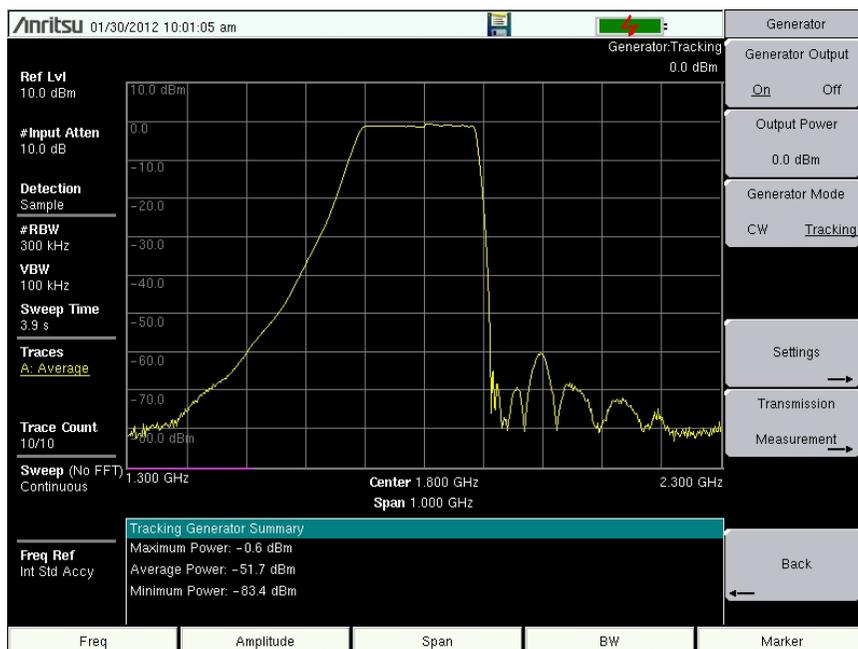


**Figure 2-1.** Connection of Device Under Test

5. Observe the measurement to confirm that the pass band frequency range covers the required span.
6. If the spectrum analyzer noise floor is too high for the necessary measurements, then reduce the input attenuation and RBW to maximize the dynamic range. [Figure 2-2 on page 2-3](#) shows the sample setup with the input attenuation lowered from 30 dB to 10 dB and with the RBW reduced from 3 MHz to 300 kHz.
7. When measuring a filter with a very high insertion loss in the stop band, press the **Shift** key, then the **Trace (5)** key. Press the Trace A Operations submenu key, then the **Average** → **A** submenu key to turn on averaging and clean up the stop band area. An averaging value of 10 will probably be adequate for most filters.
8. Under the **Setting** submenu turn **Power Statistics On** ([Figure 2-2](#)) to display the spectrum analyzer received Maximum, Average, and Minimum power of each frequency range sweep.

**Note**

If the noise floor drops below the visible display, then set the Scale dB/division setting to a value larger than 10. This will increase the displayed amplitude range.



**Figure 2-2.** Increasing Measurement Dynamic Range, Trace Averaging On, Displaying Power Statistics

**Note**

Many of displayed settings on the left side of the screen are used as menu shortcuts. Select a parameter by touching the appropriate setting on the touch screen to display the menu and set the parameter for editing.

## Enhancing Accuracy

For detailed power level measurements, the output flatness of the tracking generator can be calibrated in the field.

1. After the frequency range and other settings are determined, disconnect the DUT and make a through connection between the GENERATOR/RF OUT connector and the ANALYZER/RF IN connector. For the most accurate results, use the same cables and adapters for this connection as were used to connect the DUT.
2. From the Generator > Setting submenu, press Enhanced Generator Power Accuracy.
3. Select the number of external Matching Pad (3 dB) pads to use for calibration and measurements. Press Enhanced Accuracy Calibration. External attenuators will need to be inserted for the 3 dB and 6 dB pad options.

**Note**

Matching 3 dB external attenuators are not required. Attenuators do provide a more accurate 50 ohm match to the generator output and analyzer input. This may help in cases where transmission ripple needs to be minimized.

For the most accurate results, use the same 3 dB pad setup (0, 1, or 2 pads) in measurements as were used for calibration.

4. Follow the onscreen instructions shown in [Figure 2-3 on page 2-5](#).

During the Enhanced Accuracy Calibration process, the instrument calibrates across the frequency range, reducing any output ripple. After the successful completion, the (+Accy) label will be displayed after the Generator output power ([Figure 2-5 on page 2-6](#)).

5. [Figure 2-4 on page 2-5](#) is a detail of the top of the filter trace shown in [Figure 2-2](#) before calibration. [Figure 2-5](#) shows the same trace section after enhanced calibration using two 3 dB pads.

The 7.5 dB loss from the 0 dBm generator power is from the two 3 dB pads, the filter, and cables connected between the Generator port and Spectrum Analyzer receiver.

**Caution**

The Enhanced Accuracy calibrations are eliminated at Preset, Power-on, or when the generator output level is changed. The calibrations are not saved nor recalled with Save/Recall.

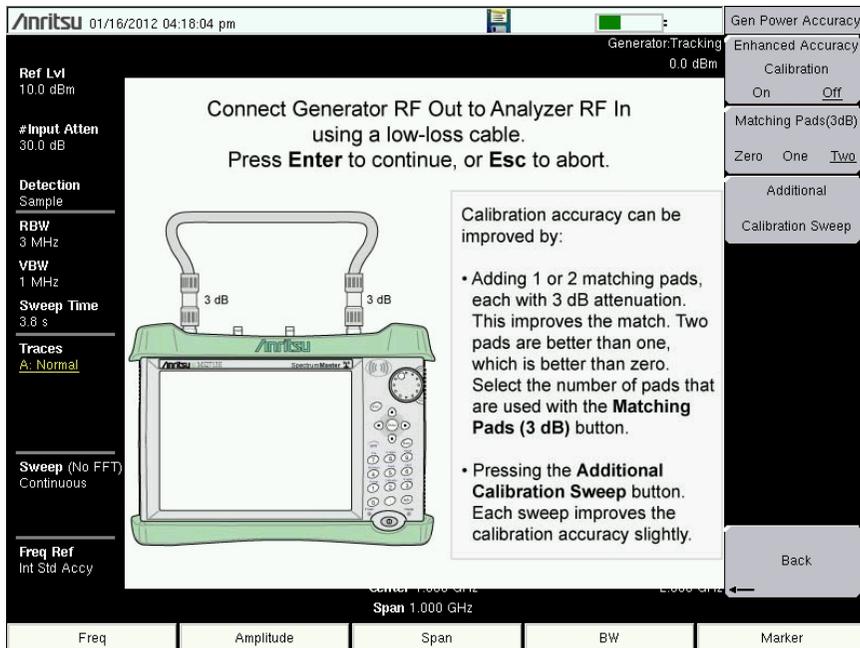


Figure 2-3. Enhanced Generator Accuracy

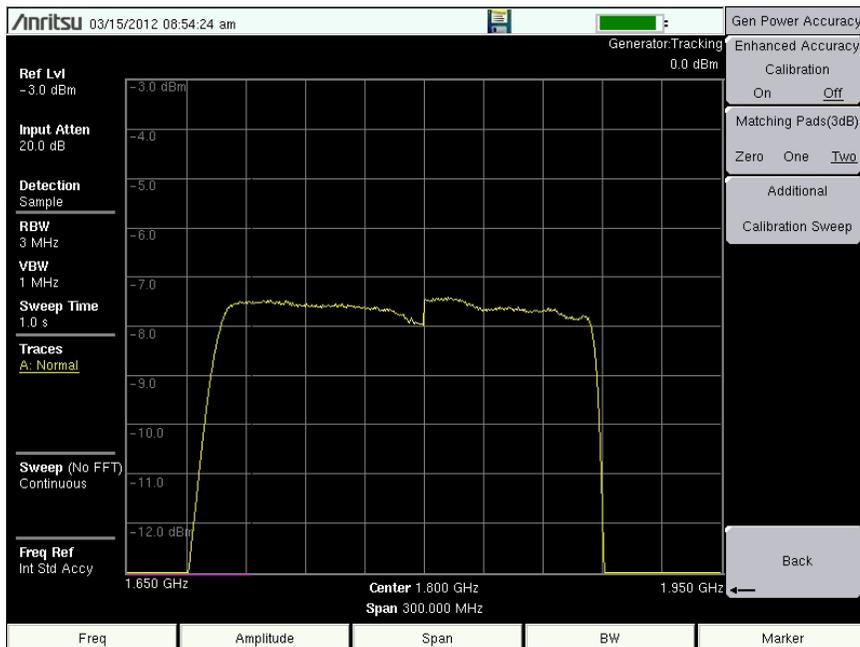


Figure 2-4. Before Enhanced Accuracy Calibration

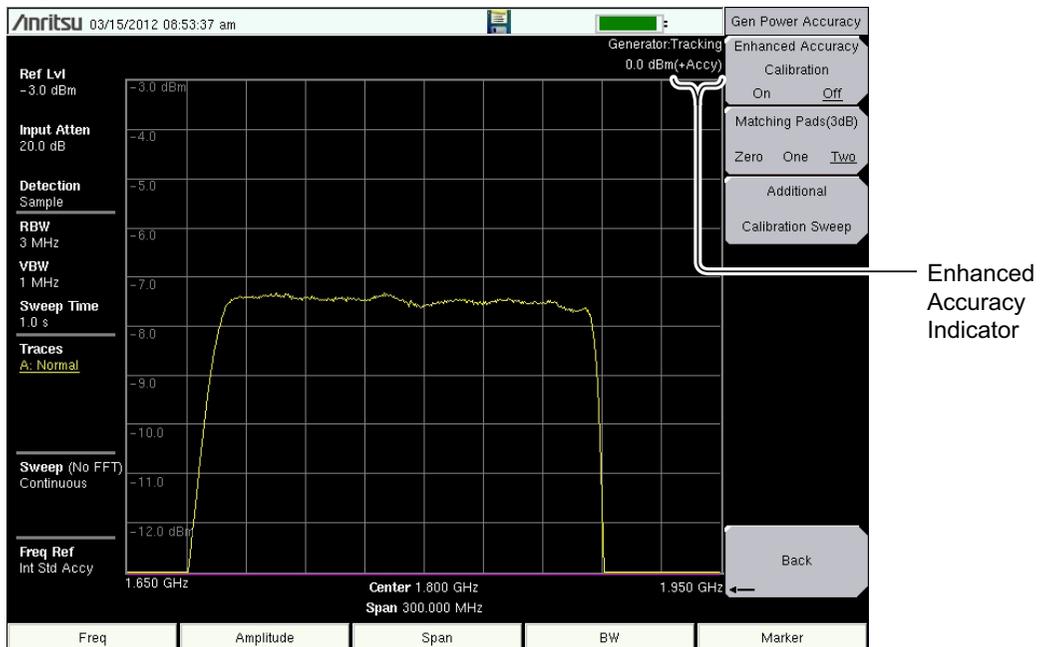


Figure 2-5. After Enhanced Accuracy Calibration

## 2-4 Transmission Measurements

Option 20 includes normalized transmission measurements. This functionality is similar to a previous option, Option 21 “2-Port Transmission Measurement”.

1. Connect a through cable between GENERATOR/RF OUT and ANALYZER/RF In connectors. From the Generator submenu, press the Transmission Measurement submenu key and then set Normalize On.
2. [Figure 2-6](#) shows a through cable measurement after normalization. Note the relative scale numbers on the graticule lines (in increments of 10 dB) on the right side of the sweep window now that Normalization is ON. If desired, the resolution bandwidth and video bandwidth can be changed after normalization without needing to renormalize. After the normalization sweep is completed, reconnect the DUT between the GENERATOR/RF OUT and ANALYZER/RF In connectors.

[Figure 2-7](#) shows the filter measurement after normalization. Displaying the trace required changing the Relative Ref (top of the graticule) and the Relative Scale (db range between grids).

Refer to “[Transmission Measurement Menu](#)” on page 2-13 for additional information including Transmission Statistics and Transmission Offset.

**Note** Set the appropriate input attenuation needed before turning Normalization ON.  
The **Amplitude** menus and the **Frequency** menus are disabled while Normalization is ON.

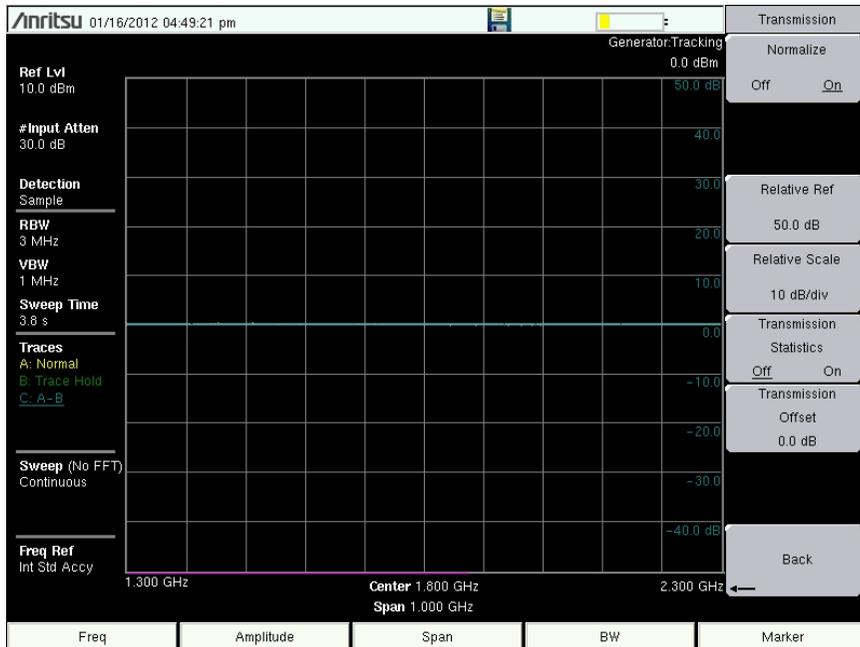


Figure 2-6. Normalized Through Cable (Trace at 0 dB)



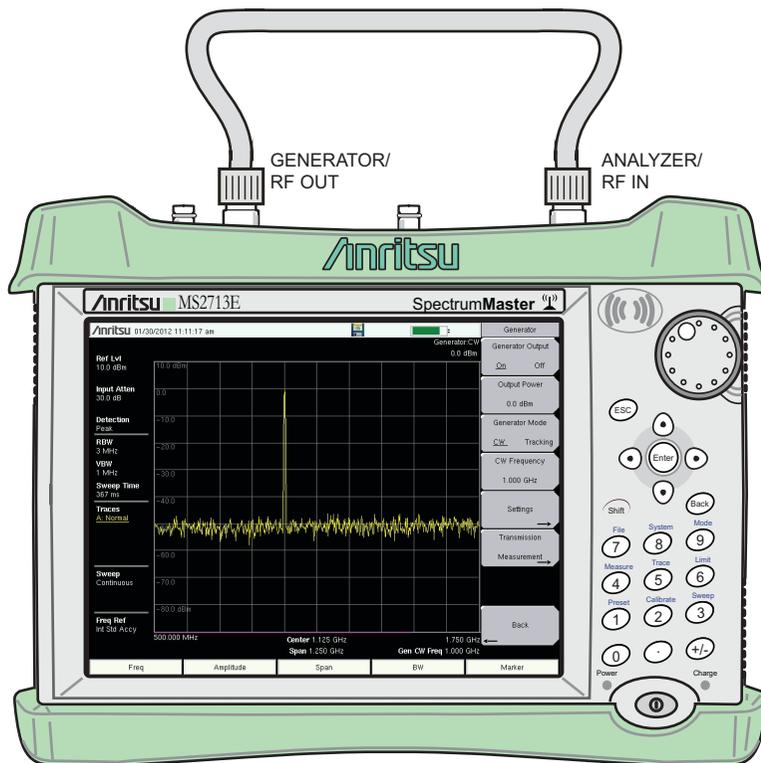
Figure 2-7. Normalized Filter Trace

## 2-5 CW Generator Overview

Option 20 includes a CW Generator. The CW Signal Generator provides a continuous wave (CW) signal from the GENERATOR/RF OUT port of the instrument.

The following example displays the generator CW signal on the instrument display.

1. Connect a THROUGH cable between the GENERATOR/RF OUT and ANALYZER/RF In connectors as shown in [Figure 2-8](#)



**Figure 2-8.** Through Cable Setup Example

2. Set the **Mode** to Spectrum Analyzer. Refer to [Chapter 1](#) for details.
3. **Preset** the instrument (Shift+1 > Preset).
4. Set the spectrum analyzer frequency range using the Frequency (**Freq**) menu and submenus. Refer to the Spectrum Analyzer Measurement Guide (10580-00244) for additional information.
5. Press the **Shift** key, then the **Measure (4)** key. Press the Generator key.
6. Press the Output Power button and set the output power (at the output connector before any external attenuation).

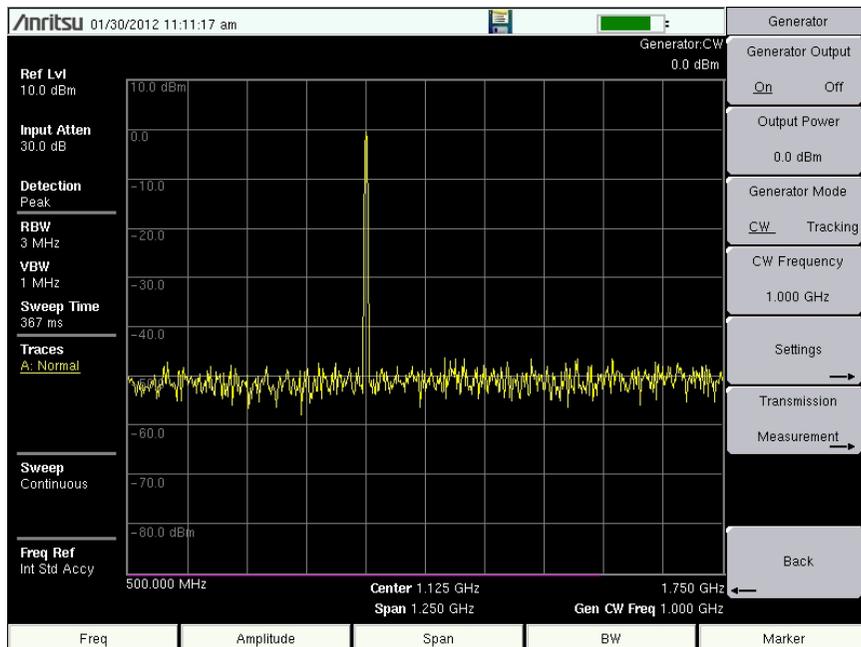
- Set the Generator Mode to CW and set the CW Frequency.

**Note** Confirm that the CW Frequency is set within the spectrum analyzer span, or the signal will not be displayed on the instrument.

- Turn Generator Output On. The output power turns on at the level that has been set previously with the Output Power key.

**Note** Turning the CW Generator On sets the detection type (**Amplitude** > Detection) to Peak and sets the sweep mode (**Sweep** > Sweep Mode) to Performance. Turning off the generator resets both parameters to their previous settings. Either parameter may be changed by the user with the Tracking Generator on or by the instrument when other measurements are also turned on.

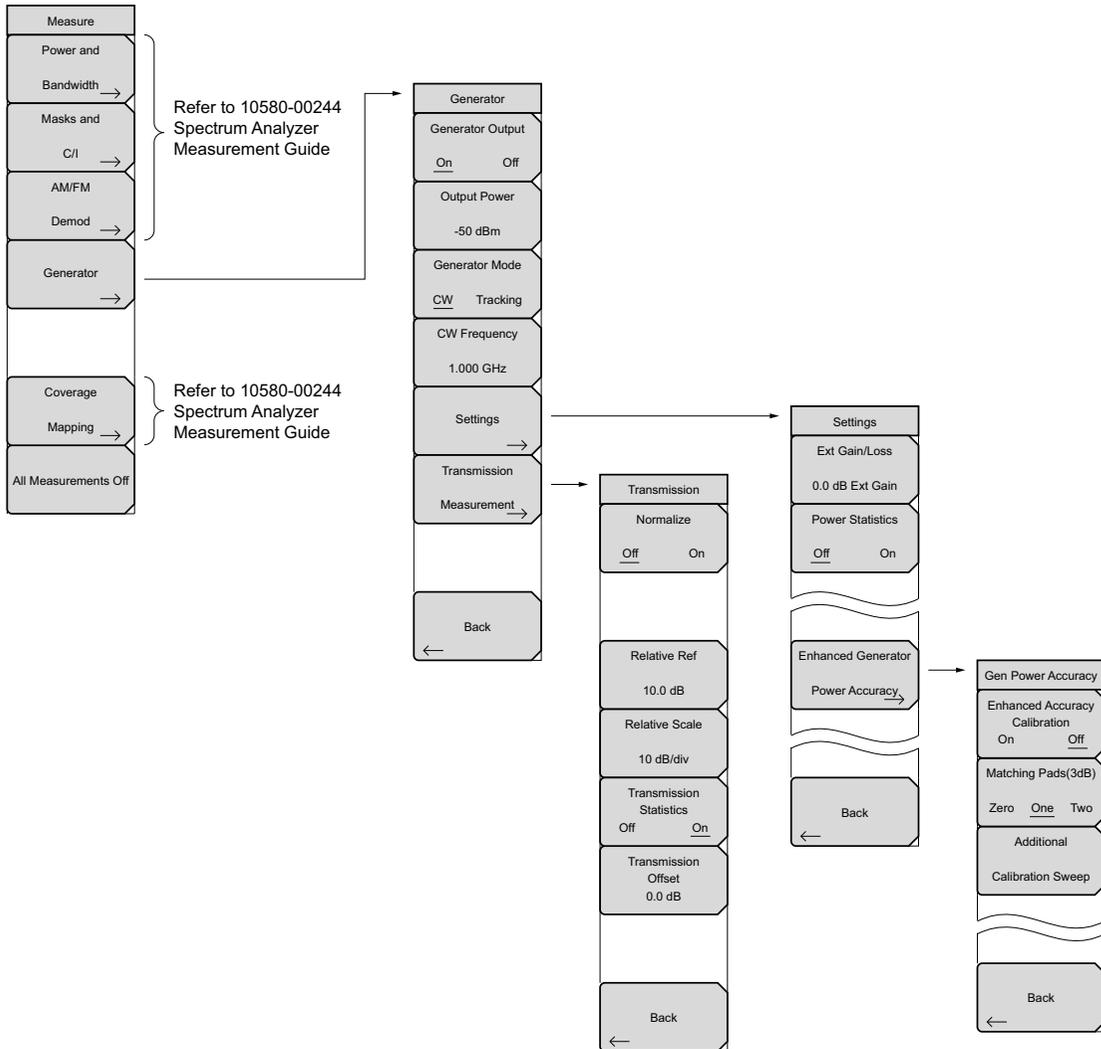
- Figure 2-9 displays the CW output at 1 GHz frequency and 0.0 dBm power. Refer to “Generator Menu” on page 2-11 for additional information.



**Figure 2-9.** CW Output Example

## 2-6 Tracking Generator Menus

To access the functions under the Measure menu, press the **Shift** key, then the **Measure** (4) key. The addition of Option 20 adds the Tracking Generator submenu key and subsequent menus, as shown [Figure 2-10](#). Menu maps typically display all possible submenu keys, although some keys are displayed on the instrument only under special circumstances (refer to menu descriptions).



**Figure 2-10.** Measure Menu with Tracking Generator (Option 20)

**Note**

General Spectrum Analyzer measurement menu including **Frequency, Amplitude, Span, Bandwidth, Marker, Sweep, Trace, and Limit** menus are detailed in the Spectrum Analyzer Measurement Guide (p/n 10580-00244).

General instrument operating functions including the **Preset, File, Mode and System** are described in the instrument User Guide.

## 2-7 Generator Menu

Key Sequence: **Measure (Shift + 4)** > Generator

Generator	<b>Generator On Off:</b> Press to turn the tracking generator On or Off. The output power is turned on at the level that was previously set with the Output Power submenu key.
Generator Output On Off	<b>Output Power:</b> Press to set the output power of the generator. The specified range is from –80 dBm to 15 dBm. If the user has entered an external gain or loss value, that value will be added to the displayed value.
Output Power -50 dBm	<b>Generator Mode:</b> Press to toggle the Generator Mode between CW and Tracking. In CW Mode, the output frequency is fixed and set by the CW Frequency submenu. In Tracking Mode, the output frequency is paired with the spectrum analyzer input sweeping frequency. The frequency range is set using the <b>Freq</b> main menu and submenu keys. Setting Generator Mode to Tracking will automatically, set Sweep Mode to NO FFT and Detection to Sample.
Generator Mode CW Tracking	<b>CW Frequency:</b> Sets the frequency of the output when the Generator Mode is set to CW.
CW Frequency 1.000 GHz	<b>Settings:</b> Displays the “ <a href="#">Settings Menu</a> ” on page 2-12.
Settings →	<b>Transmission Measurement:</b> Displays the “ <a href="#">Transmission Measurement Menu</a> ” on page 2-13.
Transmission Measurement →	<b>Back:</b> Returns to the <b>Measure</b> menu.
Back ←	

**Figure 2-11.** Generator Menu

## Settings Menu

Key Sequence: **Measure (Shift + 4)** > Generator > Settings

**Ext Gain/Loss:** Sets the tracking generator (GENERATOR/RF OUT) external attenuation or gain. Press the Ext Gain/Loss submenu key and select a value from 0 dB to 100 dB, then select either dB External Loss or dB External Gain. The Generator Gain/Loss setting (other than 0 dB) is displayed in the upper-right corner after the Generator output power level. The external attenuation or gain is also reflected in the displayed output power.

**Power Statistics:** Press to display the Tracking Generator Summary table displaying the spectrum analyzer received Maximum, Average, and Minimum power of each frequency range sweep. Only available with Generator Mode set to tracking.

**Enhanced Generator Accuracy:** Displays the Gen Power Accuracy submenu.

**Enhanced Accuracy Calibration:** Improves the output accuracy of the generator when turned on. The calibration can be done in both Tracking Generator and CW Generator modes. Changing the output power turns enhanced calibration OFF. (+Acy) is displayed after the Generator power level when Enhanced Accuracy is ON.

**Matching Pads(3dB) Zero One Two:** Sets the number of external 3 dB attenuators used during the Enhanced Accuracy Calibration procedure.

**Additional Calibration Sweep:** Pressing this key after Enhanced Accuracy Calibration is completed starts an additional set of calibration sweeps to improve the power accuracy level of the generator output.

**Back:** Press to return to the [“Generator Menu” on page 2-11](#).

**Figure 2-12.** Settings Menu

## Transmission Measurement Menu

Key Sequence: **Measure (Shift + 4)** > Generator [Generator = ON] [Generator Mode = Tracking]  
> Transmission Measurement

<p>Transmission</p> <p>Normalize</p> <p><u>Off</u>    On</p>	<p><b>Normalize:</b> Press to toggle Normalization On or Off. When turned On, a calibration process is started. Make a THROUGH connection between the tracking Generator Output and the Spectrum Analyzer Input connectors before performing normalization. For the most accurate results, use the same cables and adapters that will be used for the normalization as will be used for the measurement. The current state (Off or On) is underlined.</p>
<p>Relative Ref</p> <p>10.0 dB</p>	<p><b>Relative Ref:</b> Press to set the value of the top graticule line in dB relative to the THROUGH connection that was made when normalization was performed.</p>
<p>Relative Scale</p> <p>10 dB/div</p>	<p><b>Relative Scale:</b> Press to set the scale factor from 1 dB/division to 15 dB/division in 1 dB steps.</p>
<p>Transmission Statistics</p> <p>Off    <u>On</u></p>	<p><b>Transmission Statistics:</b> Press to display the Transmission Measurement Statistics table displaying the received spectrum analyzer Maximum, Average, and Minimum relative power of each frequency range sweep.</p>
<p>Transmission Offset</p> <p>0.0 dB</p>	<p><b>Transmission Offset:</b> Sets the offset for the normalized trace. Offset value is displayed in the Transmission Measurement Statistics.</p>
<p>Back</p> <p>←</p>	<p><b>Back:</b> Press to return to the <a href="#">“Generator Menu” on page 2-11</a>.</p>

**Figure 2-13.** Transmission Measurement Menu



# Chapter 3 — T-Series Tracking Generator

(Option 809, Option 813, and Option 820)

## 3-1 Generator Mode

Options 809, 813, and 820 add a Tracking Generator to the Spectrum Analyzer mode of the instrument. The Tracking Generator generates a swept signal with an output frequency that is the same as the tuning frequency of the spectrum analyzer.

Additionally, a CW generator feature is included in these options. The sine wave output frequency and power is set by the user. Refer to [Section 3-5 “CW Generator Overview” on page 3-6](#).

The output power is leveled and has a specified power range from  $-40$  dBm to  $+0$  dBm in  $0.1$  dB steps.

### Note

Operation outside this power range is possible. However, performance and compliance with specifications are not guaranteed.

Power output information is available for both absolute and transmission (normalized) measurements.

## 3-2 Tracking Generator Overview

1. Set the **Mode** to Spectrum Analyzer. Refer to [Chapter 1](#) for details.
2. **Preset** the instrument (Shift+1 > Preset).
3. Set the spectrum analyzer frequency range using the Frequency (**Freq**) menu and submenus. Refer to the Spectrum Analyzer Measurement Guide (10580-00349) for additional information.
4. Press the **Shift** key, then the **Measure (4)** key. Press the Generator key.
5. Press the Output Power button and set the output power (at the output connector before any external attenuation). In tracking mode, the output is leveled and flat over the spectrum analyzer frequency range.
6. Set the **Generator Mode** to Tracking. In Tracking Mode, the output frequency is paired with the spectrum analyzer input sweeping frequency.
7. Turn **Generator Output On**. The output power turns on at the level that has been set previously with the Output Power key.

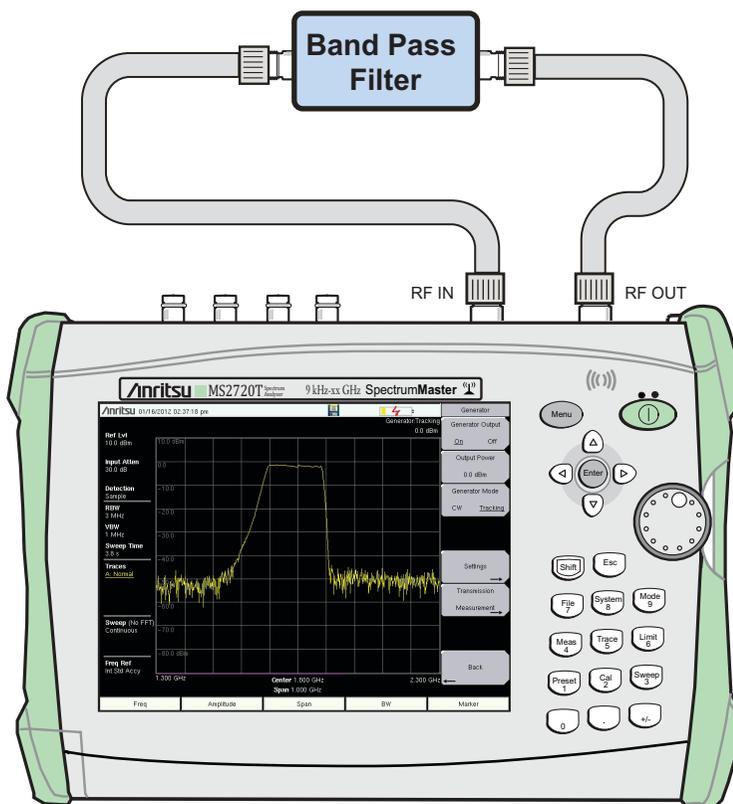
### Note

Turning the Tracking Generator On sets the detection type (**Amplitude** > Detection) to Sample and sets the sweep mode (**Sweep** > Sweep Mode) to No FFT. Turning off the generator resets both parameters to their previous settings. Either parameter may be changed by the user with the Tracking Generator on or by the instrument when other measurements are also turned on.

### 3-3 Measurement Example

This example demonstrates how to connect a Device Under Test (DUT) and make a measurement. This example characterizes the frequency response of a filter in the GSM frequency band.

1. Set the frequency range to cover the range of the DUT being tested. In this example, the center frequency is set to 1.8 GHz with a 1 GHz span.
2. Set the Generator to Tracking Mode with an Output Power of 0.0 dBm. Refer to the previous “[Tracking Generator Overview](#)” section for additional information.
3. Connect the DUT as shown in [Figure 3-1 on page 3-2](#). For connector torque and connector care information, refer to the User Guide for your instrument.
4. Toggle the Generator Output to On.

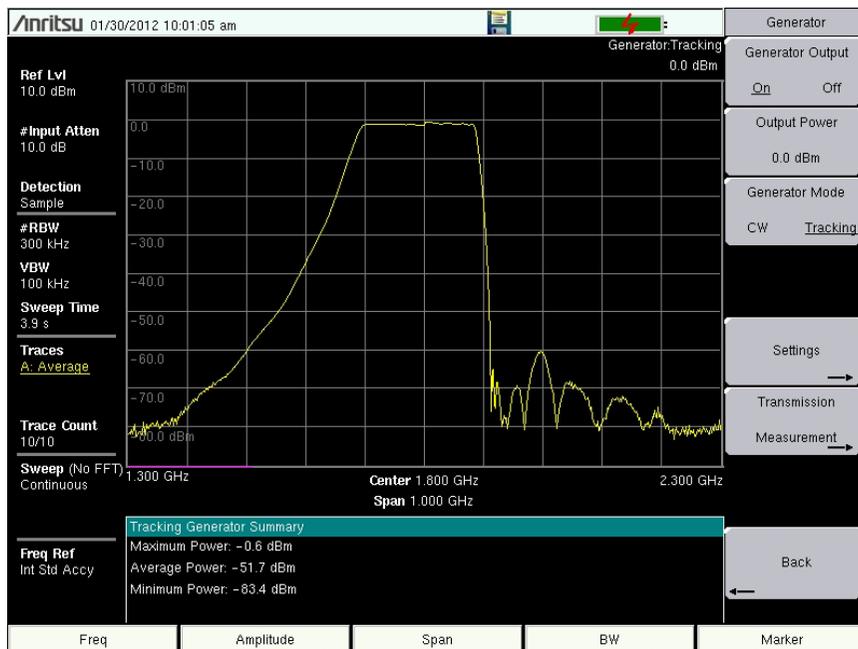


**Figure 3-1.** Connection of Device Under Test

5. Observe the measurement to confirm that the pass band frequency range covers the required span.
6. If the spectrum analyzer noise floor is too high for the necessary measurements, then reduce the input attenuation and RBW to maximize the dynamic range. [Figure 3-2 on page 3-3](#) shows the sample setup with the input attenuation lowered from 30 dB to 15 dB and with the RBW reduced from 3 MHz to 300 kHz.

7. When measuring a filter with a very high insertion loss in the stop band, press the **Shift** key, then the **Trace (5)** key. Press the Trace A Operations submenu key, then the **Average** → A submenu key to turn on averaging and clean up the stop band area. An averaging value of 10 will probably be adequate for most filters.
8. Under the Setting submenu turn Power Statistics On (**Figure 3-2**) to display the spectrum analyzer received Maximum, Average, and Minimum power of each frequency range sweep.

**Note** If the noise floor drops below the visible display, then set the Scale dB/division setting to a value larger than 10. This will increase the displayed amplitude range.



**Figure 3-2.** Increasing Measurement Dynamic Range, Trace Averaging On, Displaying Power Statistics

**Note** Many of displayed settings on the left side of the screen are used as menu shortcuts. Select a parameter by touching the appropriate setting on the touch screen to display the menu and set up the parameter for editing.

## 3-4 Transmission Measurements

Each Tracking Generator option includes normalized transmission measurements.

1. Set the frequency and amplitude parameter required for the DUT.
2. Press the **Shift** key, then the **Measure (4)** key. Press the Generator key. Set the Generator Mode to Tracking and turn Generator Output On.
3. Connect a through cable between the RF OUT and RF In connectors. From the Generator submenu, press the Transmission Measurement submenu key (Figure 3-3).

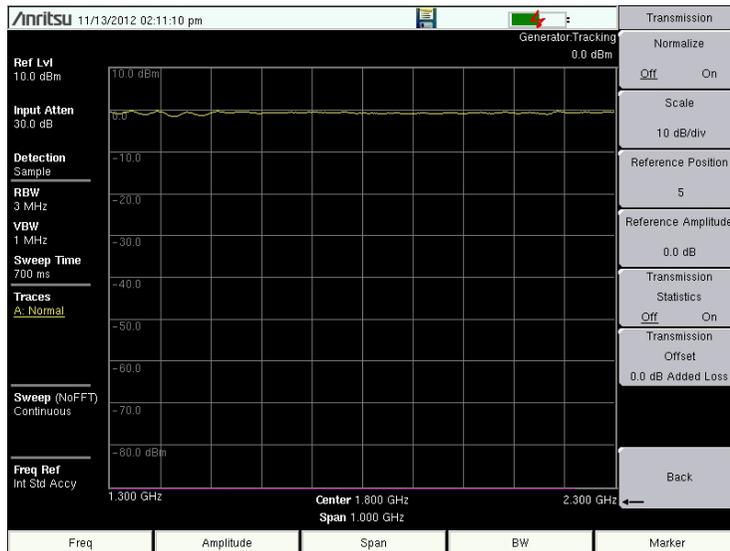


Figure 3-3. Normalize Off (Trace at ~0 dBm)

4. Toggle Normalize On (Figure 3-4). A message will flash when the process is complete.

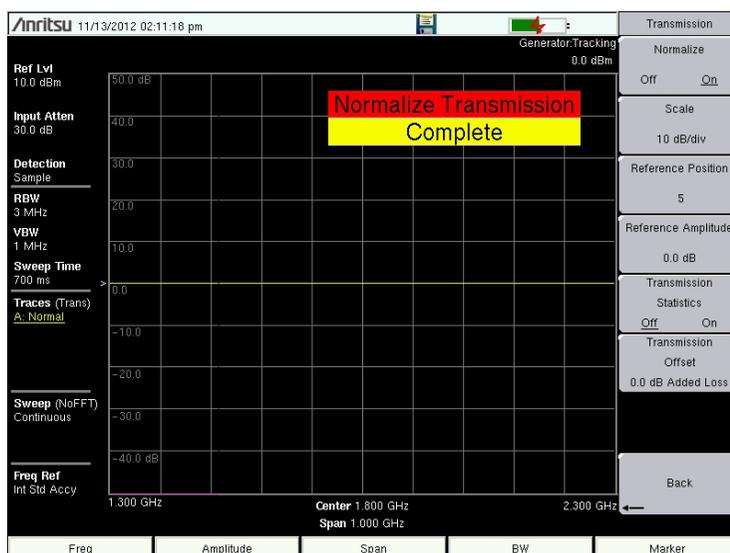


Figure 3-4. Normalize On (Trace at 0 dB)

After Normalization:

- Units in the Amplitude scale change from absolute (dBm) to relative (dB).
- The trace is centered in the graticule at 0 dB when Reference Position is set 5 (default) and Reference Amplitude is 0.0 dB (default).
- (Trans) is added after the **Traces** header on the left of the display.

**Note** Set the appropriate input attenuation needed *BEFORE* turning Normalization ON. Changes to the **Amplitude** menus or the **Frequency** menus will automatically turn OFF Normalization.

After the normalization sweep is completed, reconnect the DUT between the RF OUT and RF In connectors.

Figure 3-5 shows a filter measurement after the normalization process. Displaying the trace required changing the Reference Position to 9 and the Scale (db range between grids).

Refer to “Transmission Measurement Menu” on page 3-11 for additional information including Transmission Statistics and Transmission Offset.



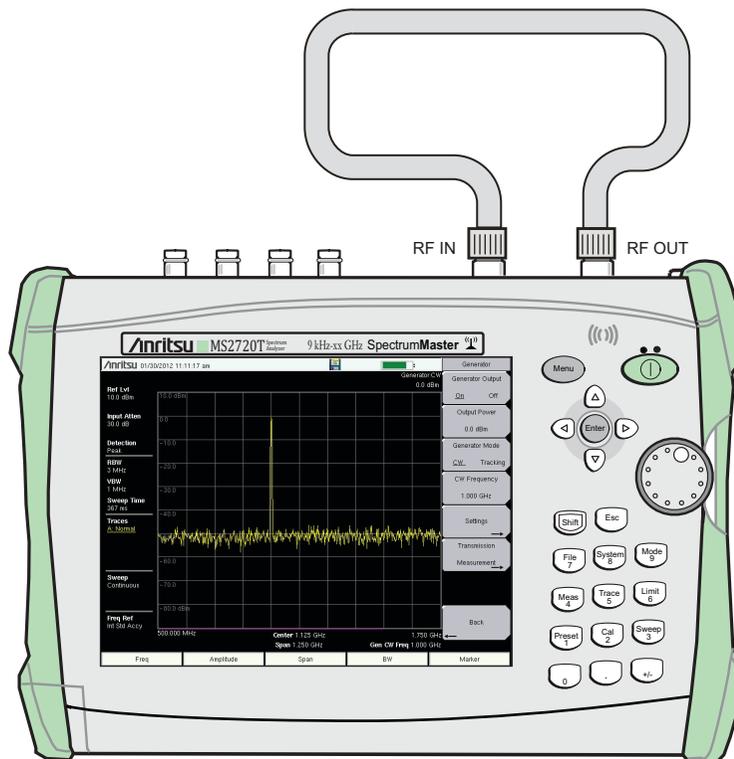
Figure 3-5. Normalized Filter Trace

## 3-5 CW Generator Overview

These Tracking Generator options include a CW Generator. The CW Signal Generator provides a continuous wave (CW) signal from the GENERATOR/RF OUT port of the instrument.

The following example displays the generator CW signal on the instrument display.

1. Connect a THROUGH cable between the RF OUT and RF In connectors as shown in [Figure 3-6](#)



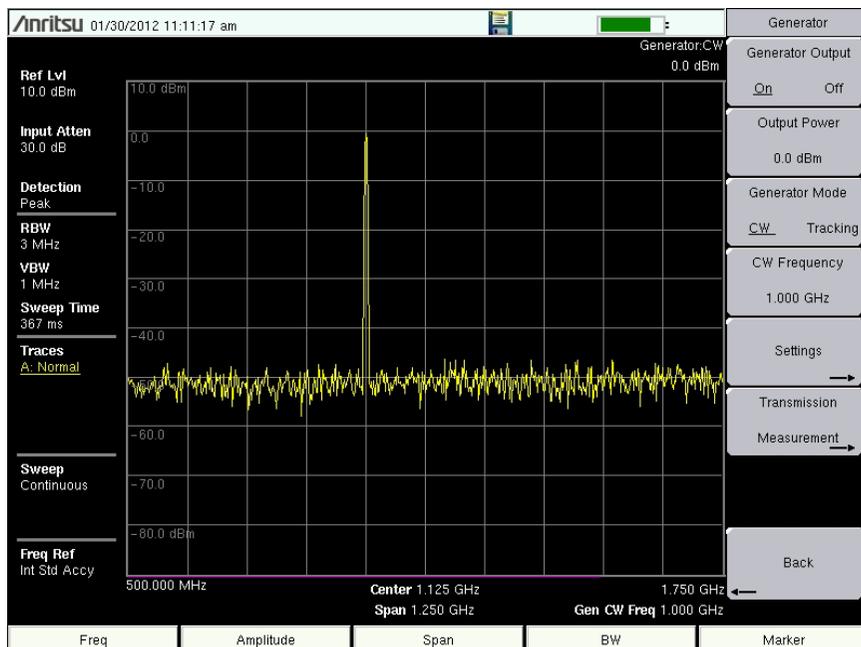
**Figure 3-6.** Through Cable Setup Example

2. Set the **Mode** to Spectrum Analyzer. Refer to [Chapter 1](#) for details.
3. **Preset** the instrument (Shift+1 > Preset).
4. Set the spectrum analyzer frequency range using the Frequency (**Freq**) menu and submenus. Refer to the Spectrum Analyzer Measurement Guide (10580-00349) for additional information.
5. Press the **Shift** key, then the **Measure (4)** key. Press the Generator key.
6. Press the Output Power button and set the output power (at the output connector before any external attenuation).

- Set the Generator Mode to CW and set the CW Frequency.

**Note** Confirm that the CW Frequency is set within the spectrum analyzer span, or the signal will not be displayed on the instrument.

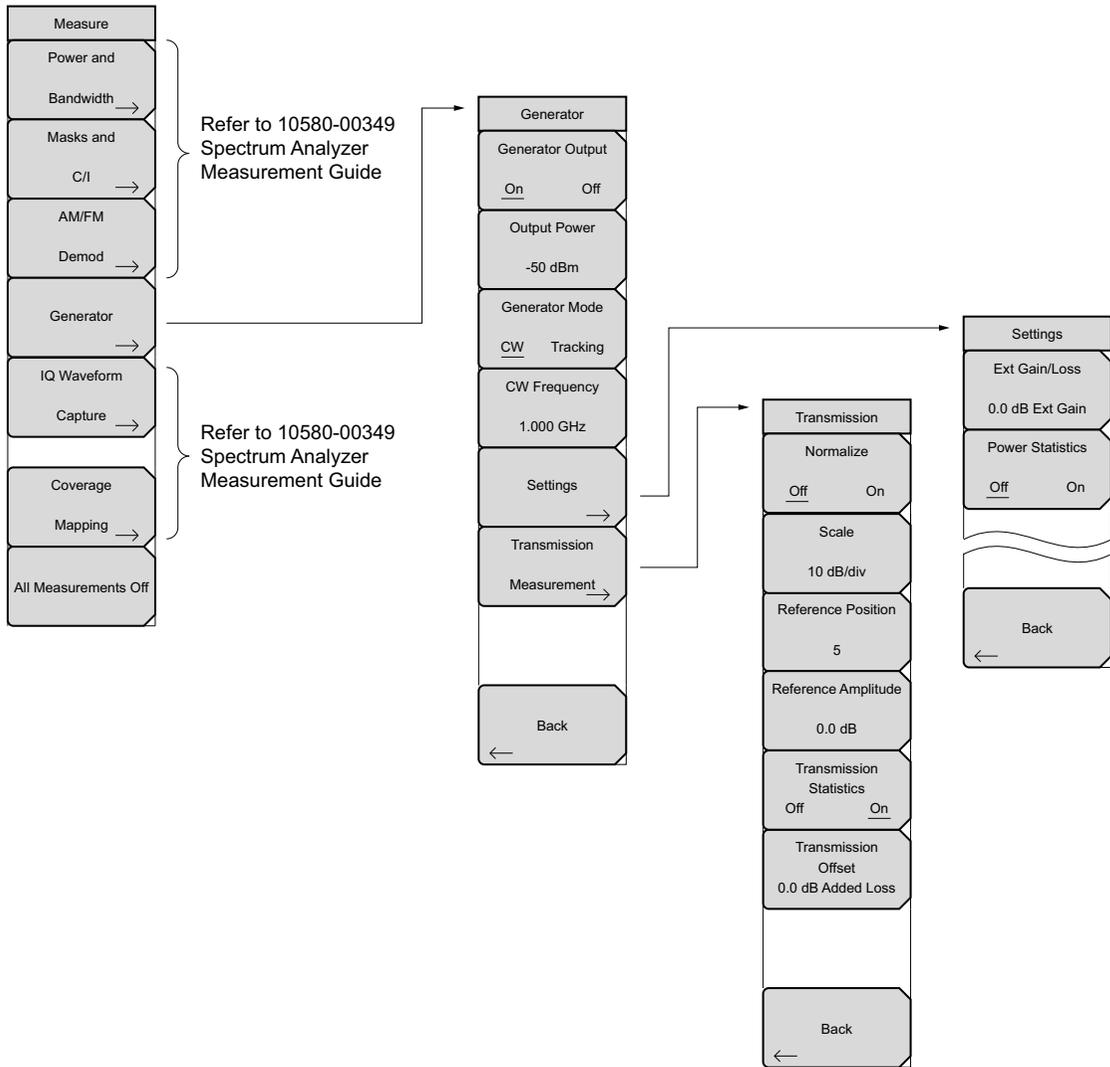
- Turn Generator Output On. The output power turns on at the level that has been set previously with the Output Power key.
- Figure 3-7 displays the CW output at 1 GHz frequency and 0.0 dBm power. Refer to “Generator Menu” on page 3-9 for additional information.



**Figure 3-7.** CW Output Example

### 3-6 Tracking Generator Menus

To access the functions under the Measure menu, press the **Shift** key, then the **Measure (4)** key. The addition of Option 809, Option 813, and Option 820 adds the Tracking Generator submenu key and subsequent menus, as shown **Figure 3-8**. Menu maps typically display all possible submenu keys, although some keys are displayed on the instrument only under special circumstances (refer to menu descriptions).



**Figure 3-8.** Measure Menu with Tracking Generator (Options 809, 813, and 820)

**Note**

General Spectrum Analyzer measurement menu including **Frequency, Amplitude, Span, Bandwidth, Marker, Sweep, Trace, and Limit** menus are detailed in the Spectrum Analyzer Measurement Guide (p/n 10580-00349).

General instrument operating functions including the **Preset, File, Mode and System** are described in the instrument User Guide.

## 3-7 Generator Menu

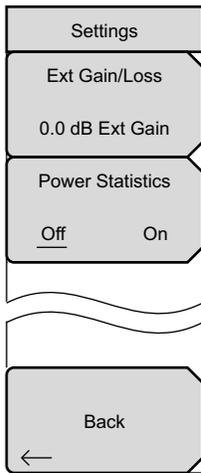
Key Sequence: **Measure (Shift + 4)** > Generator

Generator	<p><b>Generator On Off:</b> Press to turn the tracking generator On or Off. The output power is turned on at the level that was previously set with the Output Power submenu key.</p> <p><b>Output Power:</b> Press to set the output power of the generator. The specified range is from <math>-40</math> dBm to <math>0</math> dBm. The range that can be requested is <math>-50</math> dBm to <math>+15</math> dBm, which the instrument will deliver on a best efforts basis. Levels beyond <math>-40</math> dBm to <math>0</math> dBm are not warranted. If the user has entered an external gain or loss value, that value will be added to the displayed value.</p> <p><b>Generator Mode:</b> Press to toggle the Generator Mode between CW and Tracking. In CW Mode, the output frequency is fixed and set by the CW Frequency submenu. In Tracking Mode, the output frequency is paired with the spectrum analyzer input sweeping frequency. The frequency range is set using the <b>Freq</b> main menu and submenu keys.</p> <p><b>CW Frequency:</b> Sets the frequency of the output when the Generator Mode is set to CW.</p> <p><b>Settings:</b> Displays the “<a href="#">Settings Menu</a>” on page 3-10.</p> <p><b>Transmission Measurement:</b> Displays the “<a href="#">Transmission Measurement Menu</a>” on page 3-11. To enter into Transmission mode, the Generator Mode must be set to Tracking and the Generator Output must be set to On.</p> <p><b>Back:</b> Returns to the <b>Measure</b> menu.</p>
Generator Output	
On      Off	
Output Power	
-40 dBm	
Generator Mode	
CW      Tracking	
CW Frequency	
1.000 GHz	
Settings →	
Transmission Measurement →	
Back ←	

**Figure 3-9.** Generator Menu

## Settings Menu

Key Sequence: **Measure (Shift + 4)** > Generator > Settings



**Ext Gain/Loss:** Sets the tracking generator (RF OUT) external attenuation or gain. Press the Ext Gain/Loss submenu key and select a value from 0 dB to 100 dB, then select either dB External Loss or dB External Gain. The Generator Gain/Loss setting adjusts the Generator output power level displayed in the upper-right corner.

Regardless of the external gain or loss setting, the output power range of the tracking generator will not change.

**Power Statistics:** Press to display the Tracking Generator Summary table displaying the spectrum analyzer received Maximum, Average, and Minimum power of each frequency range sweep. Only available with Generator Mode set to tracking.

**Back:** Press to return to the [“Generator Menu” on page 3-9](#).

**Figure 3-10.** Settings Menu

## Transmission Measurement Menu

Key Sequence: **Measure (Shift + 4)** > Generator [Generator = ON] [Generator Mode = Tracking]  
> Transmission Measurement

Transmission	<b>Normalize:</b> Press to toggle Normalization On or Off. When turned On, a calibration process is started. Make a THROUGH connection between the tracking Generator Output and the Spectrum Analyzer Input connectors before performing normalization. For the most accurate results, use the same cables and adapters that will be used for the normalization as will be used for the measurement. The current state (Off or On) is underlined.
Normalize <u>Off</u> On	<b>Scale:</b> Press to set the scale factor from 1 dB/division to 15 dB/division in 1 dB steps.
Scale 10 dB/div	<b>Reference Position:</b> Press to set the graticle position of the Reference Amplitude. A setting of 5 uses the middle grid line. Position indicated by the > symbol.
Reference Position > 5	<b>Reference Amplitude:</b> Press to set the reference amplitude. The Reference Amplitude value is placed at the defined Reference Position and the displayed amplitude values are adjusted based on the Scale division.
Reference Amplitude 0.0 dB	<b>Transmission Statistics:</b> Press to display the Transmission Measurement Statistics table displaying the received spectrum analyzer Maximum, Average, and Minimum relative power of each frequency range sweep.
Transmission Statistics Off <u>On</u>	<b>Transmission Offset:</b> Sets the offset for the normalized trace. Offset value is displayed in the Transmission Measurement Statistics.
Transmission Offset 0.0 dB Added Loss	<b>Back:</b> Press to return to the <a href="#">“Generator Menu” on page 3-9</a> .
Back ←	

**Figure 3-11.** Transmission Measurement Menu



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