Preface

This manual contains operation instructions and reference information for the dBm SSG. The SSG generates a CW sine wave output with variable amplitude.

This manual is prepared as a reference source for engineers and technicians to use the SSG as part of their Development and/or Production test effort.

The SSG operations manual is divided into the following sections:

- **Section 1: Introduction** shows the SSG equipment, control and connector locations, and describes connector functions.
- **Section 2: Local Operation** describes how to operate the SSG from the front panel.
- **Section 3: Remote Operation** shows how to operate the SSG through the Ethernet, IEEE-488.2, and RS-232 connection.
- **Appendix A: Installation and Troubleshooting** describes installation procedures and lists error messages.
- **Appendix B: Description and Specifications** gives an overview of the SSG technical design and provides technical specifications, and verification testing.
- **Appendix C: Maintenance and Warranty** describes the SSG warranty and directs how to return the SSG for repair or calibration.

Conventions Used in This Manual

**Text Conventions**

- **Italic text** indicates new terms, directories and/or filenames.
- **Bold Text** indicates SSG selections or key presses.
- **Monospaced text** indicates SSG commands entered through remote mode.
- **Bold monospaced text** indicates SSG responses through remote mode.

**Symbols**

The following symbols appear in the manual.

- **See also** icon: This icon indicates a related topic. Text marked this way may be an optional procedure for accomplishing a task, or a time-saving procedure for advanced or familiar users.
- **Tip** icon: This icon indicates a warning. Failure to follow the instructions given here may result in personal injury or damage to the equipment.

Contacting dBm

We encourage you to contact us if you want more information or have any questions or concerns about this or any other dBm product or manual. Use any of the following methods:

- **Mail**: dBm
  32A Spruce Street
  Oakland, NJ 07436
- **Telephone**: (201) 677-0008
- **Fax**: (201) 677-9444
- **E-mail—Technical Support**: info@dbmcorp.com
- **www**: http://www.dbmcorp.com
Introduction

This section introduces you to the Synthesized Signal Generator instrument and describes the features and controls.

Topics include:
- Front and rear views.
- Power and cable connections.
- Startup and shutdown procedures.

GENERAL INFORMATION

Front panel view.

The SSG generates a CW RF output signal with variable amplitude. Frequency is controlled through a rotary knob on the front panel. The frequency increment size can be set by moving the cursor to the desired digit, or by setting a step size using the STEP mode.

Amplitude is set and varied similarly.

For custom SSG units, consult additional documentation provided with the instrument.

Start and Shutdown Procedures

Starting the SSG

1. Connect the power cord and press the Line on/off switch on the rear panel. The instrument will initialize, and momentarily display the model number and firmware revision.

2. The power-on state will be local mode, with the last frequency and amplitude values, and the RF output will be off.

Shutting Down the SSG

1. Press the Line on/off switch on the rear panel to off.
Local Operation

The SSG is a laboratory instrument designed to generate a synthesized CW signal with good spectral purity and variable amplitude. The instrument is controllable from the front panel or remotely via IEEE-488, LAN, and RS-232. The user can set the frequency and amplitude, and also turn the output signal off. The resolution step size is selected by positioning the cursor at the appropriate digit and then turning the front panel knob. Alternatively, a step size value can be set independently for the frequency and for amplitude, and the knob will then change the value by that step size. The IEEE-488 address and LAN IP address are also selectable from the front panel.

Operating States

Power up and Preset

- Upon power-up, the instrument is set to the last frequency and amplitude before power was removed, and the RF output is turned off. The display will momentarily (3-5 sec) indicate the model number and the version of the installed firmware. Holding the **Frequency** key for 2 seconds will set the frequency to 50 MHz.

**Line 2:** Configure Ethernet

- The Remote Address Setup menu display will show the following:
  - **Remote Mode** - Set to GPIB, LAN, or RS-232 control
  - **Frequency**
    - Unit: MHz
    - Range: 10 to 2000 MHz
  - **Amplitude**
    - Unit: dBm
    - Range: -30 to +10 dBm
  - **Output status**
    - Unit: n/a
    - Default: RF ON
    - Range: RF ON or RF OFF

Instrument Status Indicators

- **Remote Mode** - Illuminates when in GPIB, LAN, or RS-232 control
- **MAX** - Illuminates when an over-range value is attempted.
- **MIN** - Illuminates when an under-range value is attempted.
- **RF ON** - Illuminates when the RF output is on.
- **STEP ON** - Illuminates when step mode is active.
- **STEP OFF** - Illuminates when step mode is off.

Remote Address Setup Menu

- Enter the Remote Address Setup menu by pressing and holding the **Rem/Local** key for 3 seconds.
- Press the **Rem/Local** key again to save values and exit the setup display when finished.
- The Remote Address Setup menu display will show the following:
  - Line 1: Configure GPIB
  - Line 2: Configure Ethernet

Displayed Parameter Formats

- **Main display**
  - There are two parameters displayed in the main menu: frequency and amplitude. In addition there is a step mode on/off indicator and an RF output on/off indicator. The display is updated each time a value is changed.
  - **Frequency**
    - Unit: MHz
    - Range: 10 to 2000 MHz
  - **Amplitude**
    - Unit: dBm
    - Range: -30 to +10 dBm
  - **Output status**
    - Unit: n/a
  - **Default**
    - **Range:** RF OFF
  - **Range:** RF ON or RF OFF

Remote Operation Section

Front Panel Key Operation

This section describes how to edit the frequency and amplitude in local mode.

Press either **Frequency** or **Amplitude** to select the desired parameter. The display pointer moves to the selected parameter and the blinking cursor position is centered at the currently selected digit for that parameter.

Use the -- and — keys to move the cursor left or right with each key press of the arrow keys. The cursor does not move beyond the field of the currently selected parameter.

Rotate the front panel knob to modify the value. Clockwise rotation increases the parameter and counterclockwise rotation decreases the parameter. The parameter value will continue to increase or decrease by the amount of the selected resolution until it reaches the maximum or minimum limit of the parameter.

**Rem/Local Key**

- The **Rem/Local** key is used to return the instrument to local operation from the remote mode.
- Press and hold the **Rem/Local** key for 3 seconds to invoke the Remote Address Setup menu, where the GPIB and LAN addresses are viewed and set. Press **Rem/Local** again to see any new values and return to the main menu.

**Frequency Key**

- The **Frequency** key is used to select the frequency field.
- Holding the **Frequency** key for 3 seconds causes the frequency to preset to 50 MHz.

**Amplitude Key**

- The **Amplitude** key is used to select the amplitude field.

**Arrow keys**

- The ➤ moves the cursor to the left. The → moves the cursor to the right.
- In the Remote Address Setup Menu, the ➤ arrow key moves the selected field from the GPIB address to the LAN address. The arrow keys are also used to move the cursor in the IP address and the submask address.

**RF On/Off key**

- The **RF On/Off** key toggles between RF output on and RF output off. “RF ON” or “RF OFF” is displayed.

**STEP On/Off key**

- The **STEP On/Off** key determines the step size that is used to increment or decrement the frequency and amplitude.
- When step mode is off, the parameter resolution is determined by the cursor position, and the digit changes by a count of one.
- When step mode is on, the parameter changes by the step size amount, and the cursor is not displayed. The step size for frequency and amplitude are set independently.

**SET STEP key**

- Pressing the **SET STEP** key invokes the step size menu. Pressing the **SET STEP** again returns to the main menu. A frequency step size and an amplitude step size are displayed. The ➤ and — keys are used to move the cursor position. The **Frequency** key and the **Amplitude** key are used to move the cursor between the frequency field and the amplitude field. Once the desired cursor position is set, the front panel knob is used to modify the step size value.
- With step mode active, the parameter will increment or decrement by the selected step size.
Setting the GPIB Address

With the Remote Address Setup menu visible, use the rotary knob to modify the GPIB address. When finished, press the Rem/Local to return to the main menu or press the → key to invoke the Ethernet submenu.

Setting the Ethernet Address

After accessing the Remote Address Setup menu, press the → key to invoke the Ethernet submenu for IP address and submask address setup.

The Ethernet address submenu appears as follows:
- Line 1: IP 192.168.1.102
- Line 2: SM 255.255.255.0

Use the ← and → keys to move the cursor to the desired position. The arrow keys will move the cursor within each address field. Once the cursor is in the desired position, use the front panel knob to modify the value at the cursor location.

Upon exiting the setup menu using Rem/Local key, all values are stored.

Remote Operation

The SSG can be controlled remotely via any of three interfaces: GPIB, LAN, and RS-232.

All GPIB commands are compliant with IEEE-488.2. The instrument can function as a talker or a listener, but not as a controller.

The LAN and RS-232 interfaces respond to the same commands as the GPIB.

The instrument switches to remote mode upon being addressed with a valid command. Once communication is established on either LAN or GPIB, the other interface cannot be used until the instrument is cycled through local mode. The RS-232 interface is always active.

The instrument returns to local mode upon pressing the Rem/Local key or upon power-up.

When in remote, "REMOTE MODE" is shown in the lower left of the display.

GPIB Command Syntax

Terminator Codes

When sending data to the SSG, any of the following terminator codes are valid:
- Send EOI at end of Write
- Terminate read on EOS
- Set EOI w/EOS on Write
- 8-bit EOS (compare)

Concatenation Terminator

Multiple commands on a single line are separated by the semi-colon concatenation terminator ";".

Example: FREQ 1000; POW -12.5

Spaces

The ASCII space character may appear after any command, or after the concatenation terminator.

Case Insensitivity

Commands and queries may be sent in upper and/or lower case characters.

GPIB Commands

When addressed to listen, the SSG responds to the following commands:

<table>
<thead>
<tr>
<th>Function</th>
<th>Listener Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Frequency</td>
<td>FREQ x, x is frequency value</td>
</tr>
<tr>
<td>Set Output Power</td>
<td>POW ± x</td>
</tr>
<tr>
<td>RF output off</td>
<td>OUTP off or on</td>
</tr>
</tbody>
</table>
| Transmission Query | TST?
| Reset Command | *RST |
| Read-Freq Query (value, "X" on awaiting) | *FRE|
| Operation Complete Command | *OPC |
| Operation Complete Query | *OPC? |
| Read stats disable | *CLS |
| Clear Status | *CLS |
| Event Status Enable | *ESE |
| Event Status Enable Query | *ESR |
| Event Status Register Query | *ESR |
| Service Request Enable Command | *SRE |
| Service Request Enable Query | *SRE |
| Read Status Byte | *STB |

Figure 4. GPIB Commands

Notes:
- Mandatory IEEE 488.2 commands begin with an '*'. Details about these commands can be found in IEEE Std 488.2.
- X represents numeric values from 0 to 9.
- Spaces within the command are ignored.

Figure 5. Other GPIB Query Commands

Examples of GPIB Query Commands

- FREQ? Frequency value MHz
- POW? Output amplitude value dBm
- OUTP? 0 or 1 (0 indicates RF off) 0dBm

SSG Operations Manual
IEEE 488.2 Status Reporting and Queries

The SSG supports IEEE-488.2 status reporting. Status is reported using an 8 bit Status Byte and an 8 bit Standard Event Status Register.

Status Register Bit Assignments

<table>
<thead>
<tr>
<th>Bit #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>not used</td>
</tr>
<tr>
<td>1</td>
<td>not used</td>
</tr>
<tr>
<td>2</td>
<td>not used</td>
</tr>
<tr>
<td>3</td>
<td>not used</td>
</tr>
<tr>
<td>4</td>
<td>MAV</td>
</tr>
<tr>
<td>5</td>
<td>MSS</td>
</tr>
<tr>
<td>7</td>
<td>not used</td>
</tr>
</tbody>
</table>

Event Status Register Bit Assignments

<table>
<thead>
<tr>
<th>Bit #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Operation Complete</td>
</tr>
<tr>
<td>1</td>
<td>Request Control</td>
</tr>
<tr>
<td>2</td>
<td>Query Error</td>
</tr>
<tr>
<td>3</td>
<td>Device Dependent Error</td>
</tr>
<tr>
<td>4</td>
<td>Execution Error</td>
</tr>
<tr>
<td>5</td>
<td>Command Error</td>
</tr>
<tr>
<td>6</td>
<td>User Request</td>
</tr>
<tr>
<td>7</td>
<td>Power On</td>
</tr>
</tbody>
</table>

The Device Dependent Error bit is set when the signal or noise is out of range. The Command Error bit is set when an unknown command or query is received.

Mandatory IEEE 488.2 Commands

*RST - Reset Command
The Reset command performs a SSG reset. It does not affect the state of the IEEE 488 interface, nor any Event Enable Register setting including the Standard Event Status Enable Register settings.

*OPC? - Operation Complete Query
The Operation Complete query places an ASCII character “1” (one) into the SSG  Output Queue when all operations are finished.

*WAI - Wait-to-Continue Command
The Wait-to-Continue command has no functional affect on the SSG since the SSG implements all commands sequentially. No commands are overlapped, that is, one command must finish before the next command is executed.

*CLS - Clear Status Command
The Clear Status command clears status data structures. The Clear Status command clears all bits in the Standard Event Status Register and its summary ESB bit in the Status Register. It does not necessarily clear all bits in the Status Byte Register. For example, the MAV bit may not be cleared by the *CLS command.

*ESE - Standard Event Status Enable Command
The Standard Event Status Enable command sets the Standard Event Status Enable (ESE) Register bits. The ESE is involved in the setting and clearing of the Event Summary Bit (ESB) of the Status Byte Register. The ESB is the inclusive OR of the internal combination of the Standard Event Status Register (ESR) and the ESE Register.

The Standard Event Status Enable bits are Set when any of the following occur:

- Frequency too high
- Frequency too low
- Output Power too high
- Output Power too low

Command Error Bit - set whenever an unknown command or query is received.

*SAV
The save function is used to store the current SSG configuration in one of ten user-defined states. The save registers are labeled 0 – 9.

*IDN - Identification Query
The Identification query allows the SSG to identify itself over the system interface. The response is composed of four fields:

- Manufacturer: dBm LLC
- Model: SSG-10/4000
- Serial number: 12 ASCII characters
- Firmware level: Version number

An example response to the *IDN? query is:

"dBm LLC,SSG-10/4000,0306-007-00001,1.18"

*TST? - Self-Test Query
The self-test query causes the ASCII character “0” (zero) to be placed in the Output Queue upon successful completion of a self-test.

*OPC - Operation Complete Command
The Operation Complete command causes the SSG to set the Operation Complete bit of the Standard Event Status Register when all operations are finished.

Event Status Register Bit Assignments

<table>
<thead>
<tr>
<th>Bit #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ESB Bit 0</td>
</tr>
<tr>
<td>1</td>
<td>ESB Bit 1</td>
</tr>
<tr>
<td>2</td>
<td>ESB Bit 2</td>
</tr>
<tr>
<td>3</td>
<td>ESB Bit 3</td>
</tr>
<tr>
<td>4</td>
<td>ESB Bit 4</td>
</tr>
<tr>
<td>5</td>
<td>ESB Bit 5</td>
</tr>
<tr>
<td>6</td>
<td>ESB Bit 6</td>
</tr>
<tr>
<td>7</td>
<td>ESB Bit 7</td>
</tr>
</tbody>
</table>

Event Status Register Bit Assignments

<table>
<thead>
<tr>
<th>Bit #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Operation Complete</td>
</tr>
<tr>
<td>1</td>
<td>Request Control</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>Device Dependent Error</td>
</tr>
<tr>
<td>4</td>
<td>Execution Error</td>
</tr>
<tr>
<td>5</td>
<td>Command Error</td>
</tr>
<tr>
<td>6</td>
<td>User Request</td>
</tr>
<tr>
<td>7</td>
<td>Power On</td>
</tr>
</tbody>
</table>

Bit assignments in parentheses are bits that have been assigned by the IEEE 488.2 standard but may not be currently used by the SSG.

Operation Complete Bit - set upon execution of the *OPC command.

Device Dependent Error Bit - set when any of the following errors occur:

- Frequency too high
- Frequency too low
- Output Power too high
- Output Power too low

Command Error Bit - set whenever an unknown command or query is received.

*SRE - Service Request Enable Command
The Service Request Enable command sets the Service Request Enable (SRE) Register bits. The SRE is involved in the setting and clearing of the Service Request Enable (SRE) bit of the Status Byte Register. The MSS bit indicates that the SSG has at least one reason for requesting
LAN Operation Overview

The SSG can be controlled remotely using its LAN interface. The instrument can be connected to any IEEE-802 network. It uses TCP/IP, and achieves transfer rates up to approximately 5 MBPS.

Programming control of the SSG can be implemented by two means: 1) Using the SSGControl Application provided by dBm with the instrument or 2) by creating an application, such as a test script.

The SSGControl Application provides a simple user interface to control the SSG.

Installing the SSG Remote Client on a PC

The SSGcontrol Application can be copied from the provided CD to a directory on a PC. Create a directory, for example c:\SSG Client, and copy the following files into the directory:

- SSGControl.exe

Connecting to the SSG

To establish a connection from the PC to the SSG, connect the two devices to a local area network, or connect them directly using an ethernet crossover cable.

Description of the SSG Remote Client

The SSGControl provides a graphical interface to control the SSG from a PC via a LAN connection. The client can address multiple SSG instruments by changing the IP address in the control window.

Controlling the SSG with the Client

Upon startup, the client will command the SSG to the displayed frequency and amplitude values. These values can be modified by typing into the text box, by clicking an end arrow on the slider bar, or by clicking inside of the slider bar.

When typing into the text box, the new value is accepted when the cursor is moved to another field, or by pressing Enter on the PC keyboard.

The resolution of the slider end arrows is controlled by the Step Size text box. For example, if the current frequency is set to 12.345 MHz, and the step size value is 2 MHz, then clicking once on the right end arrow will change the frequency to 14.345 MHz.

Clicking inside of the slider bar provides a coarse step. The frequency change that occurs when clicking inside of the slider bar is controlled by the program, and does not correspond the step size text box.
Commands

The SSG LAN interface responds to the following ASCII command set, which mimics the GPIB commands:

<table>
<thead>
<tr>
<th>Function</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Frequency</td>
<td>FREQ XXXX.XXXXXX</td>
</tr>
<tr>
<td>Set Output Power</td>
<td>POW +/-XX.X</td>
</tr>
<tr>
<td>RF output on/off</td>
<td>OUTP on/off</td>
</tr>
<tr>
<td>Frequency Query</td>
<td>FREQ?</td>
</tr>
<tr>
<td>Power Query</td>
<td>POW?</td>
</tr>
<tr>
<td>RF Output State Query</td>
<td>OUTP?</td>
</tr>
<tr>
<td>Reset</td>
<td>*RST</td>
</tr>
</tbody>
</table>

The SSG serial port responds to the following ASCII command set, which mimics the GPIB commands:

<table>
<thead>
<tr>
<th>Function</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Frequency</td>
<td>FREQ XXXX.XXXXXX</td>
</tr>
<tr>
<td>Set Output Power</td>
<td>POW +/-XX.X</td>
</tr>
<tr>
<td>RF output on/off</td>
<td>OUTP on/off</td>
</tr>
<tr>
<td>Frequency Query</td>
<td>FREQ?</td>
</tr>
<tr>
<td>Power Query</td>
<td>POW?</td>
</tr>
<tr>
<td>RF Output State Query</td>
<td>OUTP?</td>
</tr>
<tr>
<td>Reset</td>
<td>*RST</td>
</tr>
</tbody>
</table>

RS-232 Serial Interface Operation Overview

The RS-232 serial port is configured as follows:

- **Baud**: 9600
- **Parity**: none
- **Data Bits**: 8
- **Stop Bits**: 1
- **Flow control**: none

Connection to the RS-232 port is via a phono jack located on the rear panel.

Installation and Troubleshooting

Installation

Unpacking the SSG

Remove the SSG materials from the shipping containers. Save the containers for future use.

The standard SSG shipment includes:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synthesized Signal Generator</td>
</tr>
<tr>
<td>1</td>
<td>AC power cord</td>
</tr>
<tr>
<td>1</td>
<td>SSG Control CD</td>
</tr>
<tr>
<td>1</td>
<td>SSG User Manual</td>
</tr>
</tbody>
</table>

Initial Inspection

Inspect the shipping container(s) for damage. If container is damaged, retain it until contents of the shipment have been verified against the packing list and instruments have been inspected for mechanical and electrical operation.

If the SSG appears to have been damaged during shipping, do not apply power to the unit. Contact dBm immediately.

Applying power

1. Place the SSG on the intended workbench and connect the AC power cord to the receptacle on the rear of the unit.
2. Press the Line on/off switch on the rear panel. The front panel display should illuminate.
System verification

The following section provides the procedure to verify that the SSG is operating correctly.

1. Attach a main AC power cord and set the rear panel main power switch to the up position. The front panel display will illuminate.

2. Press the **Frequency** button and hold for 3 seconds to reset the frequency to 50 MHz and the amplitude to -10 dBm.

3. Set and measure the frequency and amplitude at each of the following points:
   - 10 MHz
   - 210 MHz
   - 410 MHz
   - 610 MHz
   - 1000 MHz
   - 1500 MHz
   - 2000 MHz
   - 2400 MHz
   - 2700 MHz
   - 3390 MHz

   The frequency error shall be less than ± 2 PPM and the amplitude error shall be less than ± 0.5 dB.

4. Set the frequency to 1000 MHz. Connect the output to a spectrum analyzer and verify the phase noise complies with the specifications.

Specifications Section

**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency Range</strong></td>
<td>10 MHz - 4000 MHz</td>
</tr>
<tr>
<td><strong>Frequency Resolution</strong></td>
<td>10 Hz up to 1999.9999 MHz</td>
</tr>
<tr>
<td><strong>Frequency Accuracy</strong></td>
<td>±2 PPM internal reference</td>
</tr>
<tr>
<td><strong>Frequency Update Rate</strong></td>
<td>2 ms via LAN or GPIB</td>
</tr>
<tr>
<td><strong>Settling Time</strong></td>
<td>2 ms/10 Hz (Typical)</td>
</tr>
<tr>
<td><strong>Spectral Purity</strong></td>
<td>Phase noise at 1 GHz: ±55 dBc @ 10 Hz</td>
</tr>
<tr>
<td></td>
<td>±41 dB @ 100 Hz</td>
</tr>
<tr>
<td></td>
<td>±15 dB @ 1 kHz</td>
</tr>
<tr>
<td><strong>Spurious</strong></td>
<td>&lt;-50 dBc</td>
</tr>
<tr>
<td><strong>Output Noise Floor</strong></td>
<td>&lt;-145 dBm/Hz</td>
</tr>
<tr>
<td><strong>2nd Harmonic</strong></td>
<td>&lt;-15 dBc</td>
</tr>
<tr>
<td><strong>3rd Harmonic</strong></td>
<td>&lt;-25 dBc</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>±10 dBm to ±10 dB</td>
</tr>
<tr>
<td><strong>Power Resolution</strong></td>
<td>0.1 dB</td>
</tr>
<tr>
<td><strong>Power Accuracy</strong></td>
<td>±0.5 dB, ±10 dbm to ±100 dbm</td>
</tr>
<tr>
<td><strong>Impedance</strong></td>
<td>50 ohms</td>
</tr>
<tr>
<td><strong>External Reference</strong></td>
<td>10 MHz sine, ±3 dBm to ±10 dBm</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>Operating Temperature: 0°C to 35°C</td>
</tr>
<tr>
<td></td>
<td>Shock and Vibration: MIL-PRF 70800F Type III Class 4</td>
</tr>
<tr>
<td><strong>Control and Interface</strong></td>
<td>Local interface: Front panel keypad &amp; display</td>
</tr>
<tr>
<td><strong>Primary power</strong></td>
<td>90-264 VAC, 48-66 Hz, 40 VA, 1A, 120° C</td>
</tr>
<tr>
<td><strong>Physical</strong></td>
<td>10” W x 2.75” H x 10” D</td>
</tr>
</tbody>
</table>

Figure 8. SSG Specifications

Maintenance and Warranty Section

**Maintenance and Warranty**

This section describes the SSG maintenance procedures and warranty information.

- Maintenance Information
- Warranty Information
Maintenance Information

Adjustments and Calibration
To maintain optimum measurement performance, the SSG should be calibrated every year. It is recommended that the SSG be returned to dBm or to an authorized calibration facility. For more information please contact our Customer Service Department at (201) 677-0008.

Repair
The SSG should only be serviced by dBm service personnel or trained customer maintenance personnel using the dBm Service Manual for the SSG.

For instruments requiring service, either in or out of warranty, contact dBm Customer Service Department at (201) 677-0008 for pricing and instructions before returning your instrument. When you call, be sure to have the following information available:

- Model number.
- Serial number.
- Full description of the failure condition.

Note: Model and serial number can be found on the rear of the SSG unit, next to the AC outlet.

Equipment Returns
All instruments returned to dBm for repair must be shipped prepaid. Instruments that are eligible for in-warranty repair will be returned prepaid to the customer. For all other situations the customer is responsible for all shipping charges. An evaluation fee may be charged for processing units that are found to have no functional or performance defects.

For out of warranty instruments, dBm will provide an estimate for the cost of repair. Customer approval of the charges will be required before repairs can be made. For units deemed to be beyond repair, or in situations which the customer declines to authorize repair, an evaluation charge may be assessed by dBm.

Warranty Information
All dBm products are warranted against defects in material and workmanship for a period of one year from the date of shipment.

dBm will, at its option, repair or replace products that prove to be defective during the warranty period, provided they are returned to dBm and provided the preventative maintenance procedures are followed. Repairs necessitated by misuse of the product are not covered by this warranty. No other warranties are expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose.

dBm is not liable for consequential damages. Please refer to the previous section for contact information and procedures to return the instrument to dBm.