Agilent X-Series Signal Generators

N5171B/72B/73B EXG
N5181B/82B/83B MXG

Getting Started Guide

Agilent Technologies

Notices

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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- Programming Examples
- Programming the Status Register System
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SCPI Reference	• SCPI Basics • Basic Function Commands • LXI System Commands • System Commands • Analog Modulation Commands • Arb Commands • Real-Time Commands
Programming and Compatibility Guide	Provides a listing of SCPI commands and programming codes for signal generator models that are supported by the Agilent N5171B/72B/73B EXG and N5181B/82B/83B MXG X- Series signal generators.
Service Guide	• Troubleshooting • Replaceable Parts • Assembly Replacement • Post-Repair Procedures • Safety and Regulatory Information • Instrument History
Key Help[a]	• Key function description • Related SCPI commands

[a]Press the **Help** hardkey, and then the key for which you wish help.

1 Safety Information

- Warnings, Cautions, and Notes on page 1
- General Safety Considerations on page 1
- Instrument Markings on page 2

Warnings, Cautions, and Notes

The documentation for this product uses the following safety notations. Familiarize yourself with each notation and its meaning before operating the signal generator.

WARNING	***Warning* denotes a hazard. It calls attention to a condition or situation that could result in personal injury or loss of life. Do not proceed beyond a warning until you fully understand the indicated conditions or situations.**

CAUTION	*Caution* calls attention to a condition or situation that could result in damage to or destruction of the signal generator, or in the loss of a user's settings or data. Do not proceed beyond a caution until you fully understand the indicated conditions.

NOTE	*Note* calls the user's attention to an important point or special information in the text.

General Safety Considerations

WARNING	**If the signal generator is not used as specified, the protection provided by the equipment could be impaired. The signal generator must be used in a normal condition only, in which all means for protection are intact.**

WARNING	**Personal injury may result if the signal generator covers are removed. There are no operator serviceable parts inside. To avoid electrical shock, refer servicing to qualified personnel.**

Instrument Markings

The signal generator has the following markings. Familiarize yourself with each marking and its meaning before operating the signal generator.

	This symbol marks the standby position of the power line switch.
	This symbol indicates that the input power required is AC.
	The instruction manual symbol. The product is marked with this symbol when it is necessary for you to refer to instructions in the manual.
	The CE mark is a registered trademark of the European Community. If this symbol is accompanied by a year, it is the year when the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association International.
N10149	The C-Tick Mark is a trademark registered to the Australian Spectrum Management Agency. This indicates compliance with all Australian EMC regulatory information.
ICES/NMB-001	This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001)
ISM1-A	This is the symbol of an Industrial Scientific and Medical Group 1 Class A Product. (CISPER 11, Clause 4)
LXI	This symbol indicates conformance to the standard specifications.
40	Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.
	This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).
	This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.
	This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home. **South Korean Class A EMC Declaration** A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으 로 합니다 .

2 Getting Started

CAUTION To avoid damaging or degrading the performance of the signal generator, do not exceed 33 dBm (2W) *maximum* of reverse power levels at the RF input. See also *Tips for Preventing Signal Generator Damage* on *www.agilent.com*.

NOTE **Software Updates**

Is your product software up-to-date? Periodically, Agilent releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at *www.agilent.com/find/TechSupport*.

NOTE **Documentation Updates**

Is your product documentation up-to-date? To search for documentation updates for your product, go to the Agilent X-Series Signal Generators website at *www.agilent.com/find/X-Series_SG*.

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Checking the Shipment

1. Inspect the shipping container for damage.

   Signs of damage can include a dented or torn shipping container or cushioning material that indicates signs of unusual stress or compacting.

2. Carefully remove the contents from the shipping container and verify that your order is complete.

   The following items are included with each signal generator:

   - Getting Started Guide
   - documentation CD-ROM (CD-ROM contents are also available in hardcopy format)
   - three-prong AC power cord specific to geographic location

3. Verify that the options you ordered are included with the shipment by checking the serial number label on the rear of the signal generator and the packing literature included with the shipment.

See also, "Ordering Accessories" on page 10.

Signal Generator Physical Characteristics

- Height: 8.8 cm (3.46 in)
- Depth: 50.8 cm (20 in)
- Width (N5171B/81B/72B/82B): 45.8 cm (18 in)
- Width (N5173B/83B): 44.5 cm (17.5 in)
- Weight (N5171B/81B): 13.6 kg (30 lb)
- Weight (N5172B/82B): 15.9 kg (35 lb)
- Weight (N5173B/83B): 13.8 kg (30 lb)

Meeting Environmental and Electrical Requirements

CAUTION To avoid the loss of data, GPIB settings, or current user instrument states that have not been permanently saved to non-volatile memory, the signal generator should always be powered down either via the signal generator's front panel power button or the appropriate SCPI command. Signal generator's installed in rack systems and powered down with the system rack power switch rather than the signal generator's front panel switch display a Error -310 due to the signal generator not being powered down correctly.

Environment

- indoor use
- altitudes < 15,000 feet (4,572 meters)
- 0 to 55°C temperature, unless otherwise specified
- humidity 10% - 95%

CAUTION This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2, per IEC 61010-1 Third Edition.

NOTE The instruments can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage.

Ventilation

Ventilation holes are located on the rear panel and all four sides of the signal generator cover. To ensure proper air flow through the signal generator, do not allow these holes to be obstructed.

Line Setting Requirements

CAUTION The signal generator has autoranging line voltage input; ensure that the supply voltage is within the specified range.

Voltage:	100/120 volts nominal
	220/240 volts nominal
Frequency:	for 100/120 volts: 50/60/400 Hz nominal
	for 220/240 volts: 50/60 Hz nominal
Power:	160 W maximum (N5171B & N5181B)
	300 W maximum (N5172B & N5182B)
	280 W maximum (N5173B & N5183B)

Connecting the AC Power Cord

This is a Safety Class 1 Product provided with a protective earth ground incorporated into the power cord. The front panel switch is only a standby switch; it is not a line switch. The AC power cord is the disconnecting device that disconnects the signal generator mains circuits from the mains supply. Alternatively, an external switch or circuit breaker, readily identifiable and easily reached by the operator, may be used as a disconnecting device.

WARNING **The instrument shall be set flat in its normal use position so that the detachable power cord is readily identifiable and is easily reached by the operator. It shall not be placed on the four feet of the rear panel in normal use.**

WARNING **The mains plug shall be inserted only in a socket outlet provided with a protective earth contact. Always use the three-prong AC power cord supplied with the signal generator. Personal injury can occur if there is any interruption of the protective conductor inside or outside of the signal generator. Intentional interruption is prohibited.**

CAUTION The mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Inadequate earth grounding can damage the signal generator. Always use the three-prong AC power cord supplied with the signal generator.

Connect the AC power cord as follows:

1. Ensure that the power cord is not damaged.
2. Install the signal generator so that one of the following items is readily identifiable and easily reached by the operator: AC power cord, alternative switch, or circuit breaker.
3. Insert the mains plug into a socket outlet provided with a protective earth grounding.

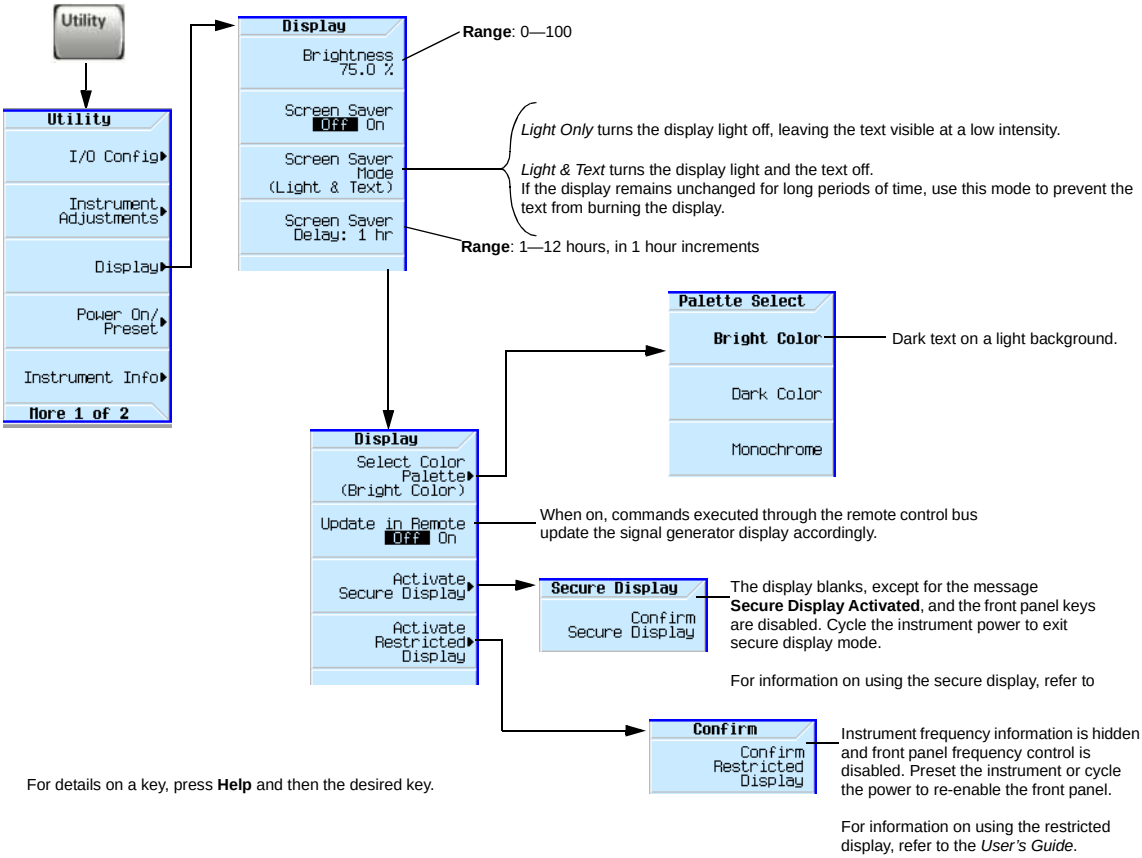
Configuring the Display

Screen saver settings are persistent states; they are unaffected by preset or a power cycle.

Use the arrow keys, numeric keypad, or front panel knob to adjust numeric values.

NOTE X-Series signal generators are shipped from the factory with default display settings. When the signal generator display is not required to be active for long periods of time, consider using the Screen Saver Mode to extend the life of the display.

Figure 2-1 Display Softkeys

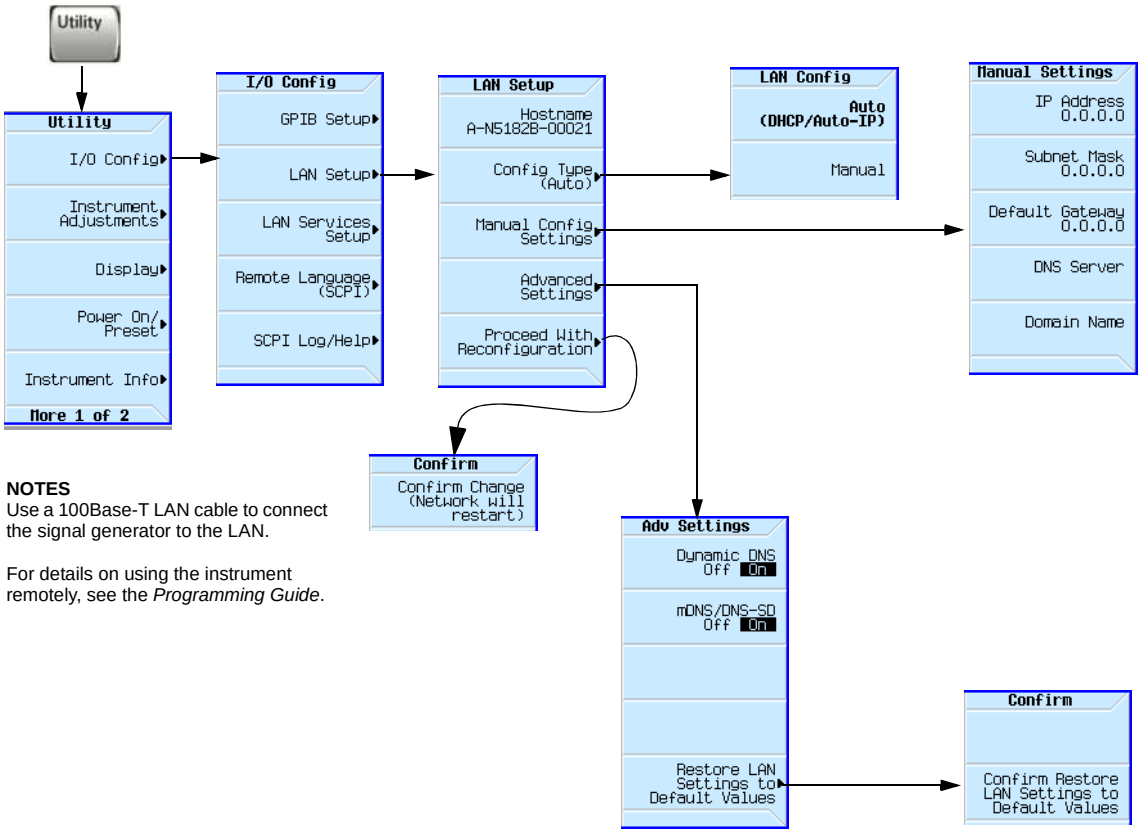


NOTE With the brightness set to minimum, the display may be too dark to see the softkeys. If this happens, use Figure 2-1 to locate the brightness softkey and adjust the value so that you can see the display.

Configuring for Remote Control

LAN Configuration

Configuring the LAN Interface

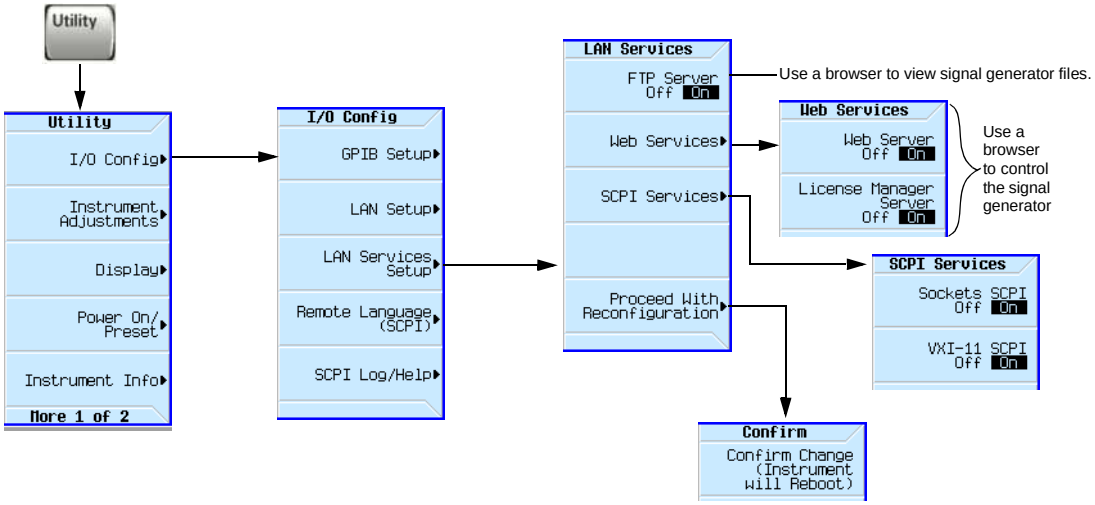


NOTES
Use a 100Base-T LAN cable to connect the signal generator to the LAN.

For details on using the instrument remotely, see the *Programming Guide*.

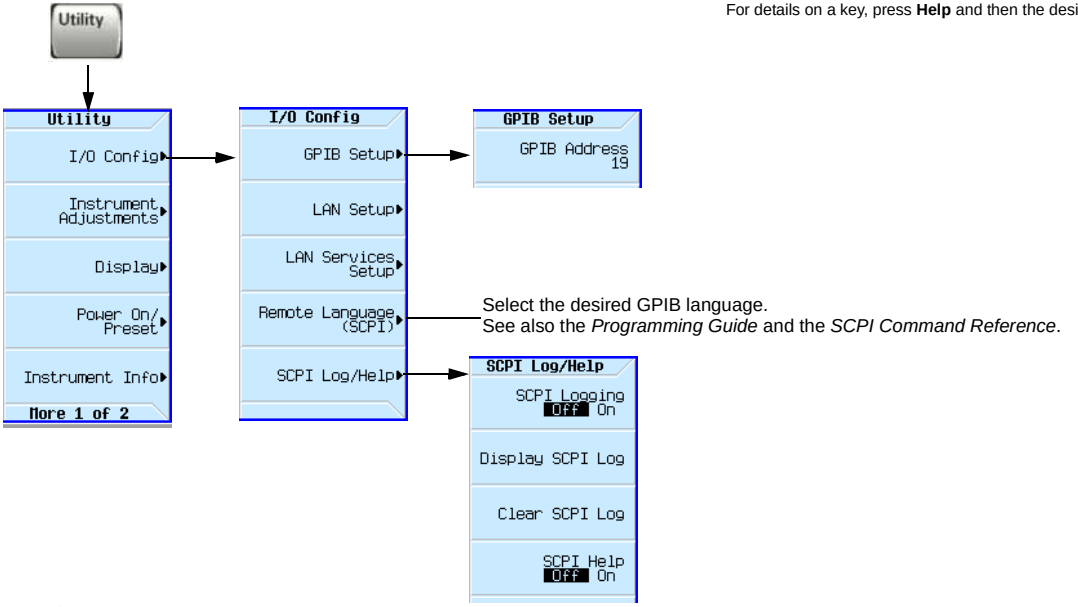
For details on a key, press **Help** and then the desired key.

Enabling LAN Services: Browser, Sockets, and VXI-11



GPIB Configuration

For details on a key, press **Help** and then the desired key.



NOTES

USB is also available. It is not shown in the menu because it requires no configuration.

For details on using the instrument remotely, see the *Programming Guide*.

Ordering Accessories

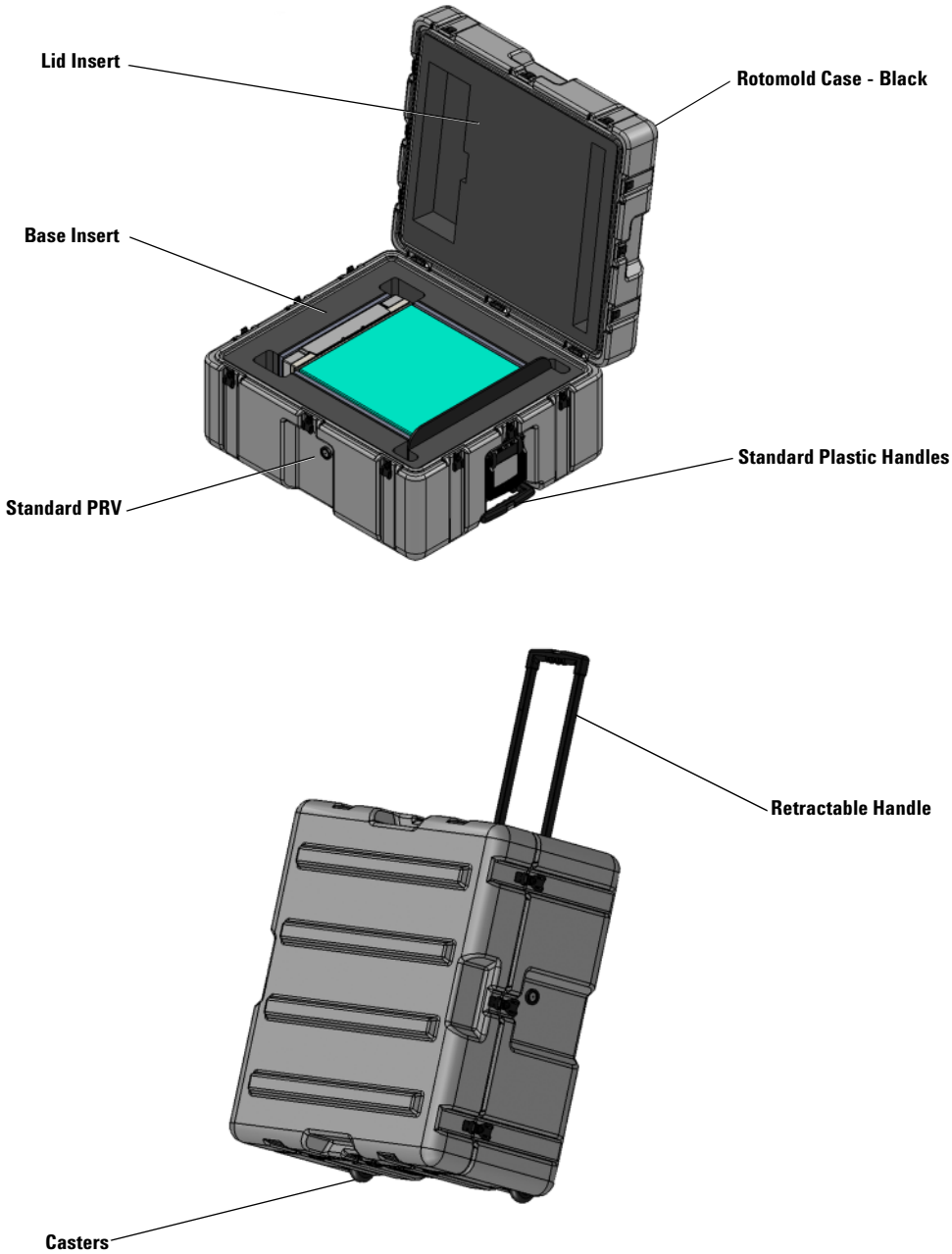
You can purchase accessories or documentation at: *http://www.agilent.com/find/mxg*

If you do not have access to the Internet, please contact your Agilent field engineer. See also, "Contacting Agilent" on page 13.

Description[a]	Part Number
Rack Mount Kit	1CM010A
Rack Mount Kit with Handles	1CP004A
Rack Slide Kit	1CR012A
Front Handle Kit	1CN006A
Transit Case (See Figure 2-2 on page 11)	N5180-80053
EXG Data Sheet (N5171B/72B/73B)[b]	5991-0039EN
MXG Data Sheet (N5181B/82B/83B)[b]	5991-0038EN
Getting Started Guide[b]	N5180-90054
User's Guide[b]	N5180-90056
SCPI Reference[b]	N5180-90057
Programming Guide[b]	E8251-90355
Service Guide[b]	N5180-90059
Documentation CD-ROM[b]: *PDF files*: • Data Sheet • Documentation Set • Getting Started Guide *Text files*: • error messages • programming examples	N5180-90058

[a]For a description of the contents of each guide and reference, see page v.
[b]Always refer to *www.agilent.com* for the most up-to-date documentation.

Figure 2-2 Transit Case



Proper Use and Cleaning

The signal generator cover protects against physical contact with internal assemblies that contain hazardous voltages, but does not protect internal assemblies against contact with liquids. To avoid damage and personal injury, ensure that liquids are positioned away from the signal generator.

WARNING **Personal injury may result if the signal generator is not used as specified. Unspecified use impairs the protection provided by the equipment. The signal generator must be used with all means for protection intact.**

Cleaning Suggestions

WARNING **To prevent electrical shock, disconnect the instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

Cleaning connectors with alcohol shall only be done with the instruments power cord removed, and in a well-ventilated room. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

To ensure good connections, regularly clean the instrument's front and rear panel connectors with alcohol.

To prevent dust build-up that could potentially obstruct ventilation, periodically clean the instrument's cover. Use a dry cloth or a cloth slightly dampened with water to clean the external case parts.

Returning a Signal Generator to Agilent Technologies

1. Gather as much information as possible about the signal generator's problem.
2. Contact Agilent using the phone number that is specific to your geographic location. These phone numbers are listed on the Internet at *http://www.agilent.com/find/assist*. If you do not have access to the Internet, contact your Agilent field engineer.

   After you provide information about the signal generator and its condition, you will receive information about where to ship your signal generator for repair.
3. Ship the signal generator in the original factory packaging materials, if available, or use similar packaging to properly protect the signal generator.

Contacting Agilent

Assistance with test and measurements needs, information on finding a local Agilent office, and information on purchasing accessories and documentation are available on the Internet at: *http://www.agilent.com/find/assist*

If you do not have access to the Internet, please contact your Agilent field engineer.

NOTE In correspondence or telephone conversation, refer to the signal generator by its model number and full serial number. With this information, the Agilent representative can determine if your unit is still within its warranty period.

3 Operation Verification

CAUTION To avoid damaging or degrading the performance of the signal generator, do not exceed 33 dBm (2W) *maximum* of reverse power levels at the RF input. See also *Tips for Preventing Signal Generator Damage* on *www.agilent.com.*

NOTE For the instrument to meet performance specifications allow a warm up period of 45 minutes within an operational temperature range of 0 to 55 °C. For more information, refer to the EXG and MXG signal generator *Data Sheet*s.

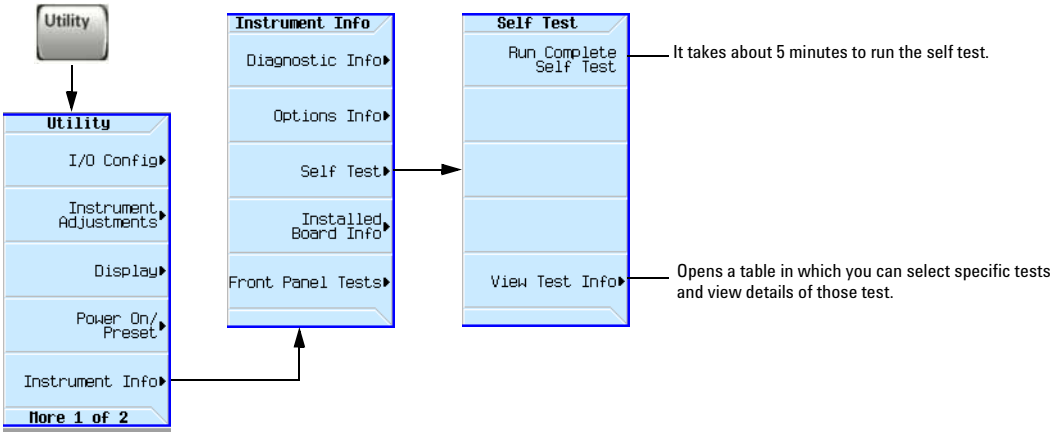
Operation verification is a series of tests used to confirm that the signal generator is operating properly, or to diagnose problems. Operation verification does not verify performance to instrument specifications.

Perform operation verification when you initially set up the signal generator, after a minor repair (refer to the *Service Guide* for details), or when the integrity of the signal generator is in question.

- Running Self Test on page 16
- Frequency Range and Accuracy Check on page 18
- Checking the Output Power on page 19

Running Self Test

Self Test is a series of internal tests of signal generator functions. If this test fails, refer to "Self Test Failure" on page 17 for further instructions.



Use the following procedure to run self test:

1. Disconnect all external cables, including GPIB, LAN, and USB cables.
2. Preset the signal generator: Press **Preset > Utility > Instrument Info > Self Test**.

   The following message appears:

   - `The current status of the self-test is: Incomplete. Not all tests have been run.`
3. Press **Run Complete Self Test**.

   An activity bar displays on the screen indicating the test progress.

   If you press **Abort** while self-test is running, the following message displays:

   - `The current status of the self-test is: Incomplete. Not all tests have been run.`

   When self-test completes, one of the following messages displays:

   - `The current status of the self-test is: Passed`
   - `The current status of the self-test is: Failure. One or more tests have failed. System diagnostics indicate this test as the root failure: xxx`

   If the signal generator fails only one test, the title of the failed test displays. If the signal generator fails more than one test, the test number of the most significant failure `(root failure)` displays.

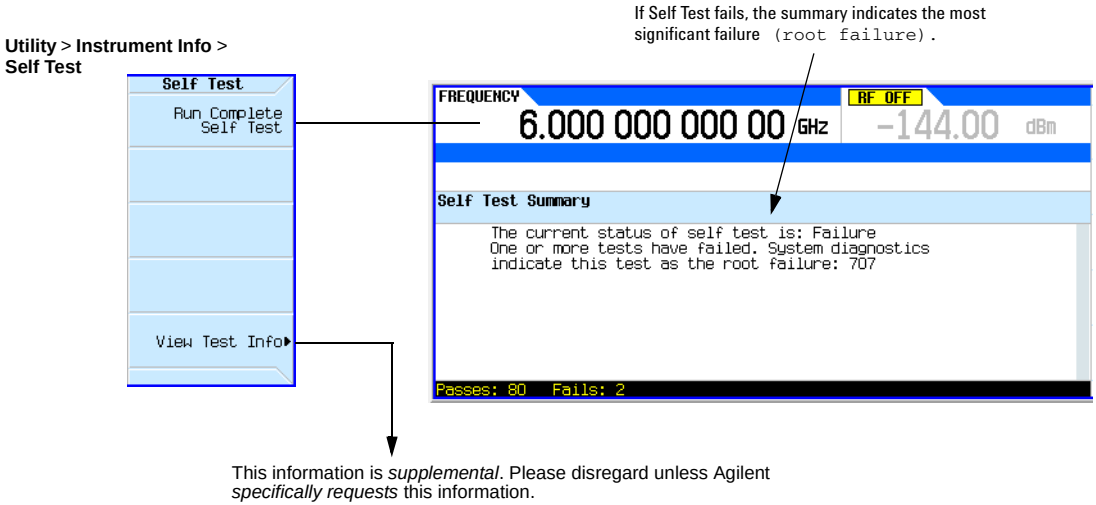
NOTE The `root failure` is the error to report to Agilent Support. Refer to "Contacting Agilent" on page 13.

Self Test Failure

1. Confirm that all external cables, including GPIB, LAN, and USB cables, are disconnected from the signal generator and repeat the self-test.
2. If the self-test continues to fail, the signal generator requires service. If you are unable to service the signal generator, send it to an Agilent service center for repair. Include a detailed description of the most significant failure (`root failure`) and any displayed error messages. Also include the model, serial number, installed options, and firmware version.

   See "Returning a Signal Generator to Agilent Technologies" on page 12 for return instructions.

Viewing Test Results



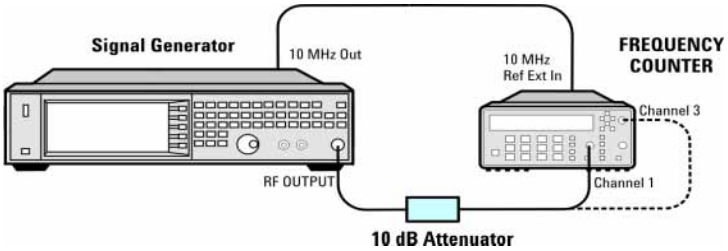
Frequency Range and Accuracy Check

The frequency range is tested by determining the frequency accuracy relative to the timebase at the frequency limits of the signal generator. This test can be performed with a frequency counter that meets the frequency accuracy limits in Table 3-1.

Frequency Counter Procedure

Test Setup

1. Connect the equipment as shown.



2. Preset the signal generator: Press **Preset**.
3. Turn modulation off: Press the **Mod On/Off** so that the MOD On/Off LED turns off.
4. Set the amplitude:
   Press **Amplitude** and enter 0 dBm.
5. Turn RF on: Press **RF On/Off** so that the RF On/Off LED lights.
6. Verify that the frequency counter is locked to the 10 MHz external reference frequency (±1 Hz).
7. For maximum accuracy, set the gate time on the frequency counter to >5 seconds.
   (For example, press **Gate & ExtArm** twice and use the arrow keys to set the value.)
8. Set the frequency: Press **Frequency** and set the signal generator to the first frequency listed in Table 3-1.
9. Confirm that the measured frequency is within the limits listed.
10. Repeat step 8 and step 9 for all of the frequencies in the table that are within the frequency range of your signal generator.

NOTE For frequencies <200 MHz, use Channel 3 on the frequency counter (press **Freq Ratio** until `CH3:` displays).

Table 3-1 Frequency Accuracy Limits

Frequency (MHz)	Limit (Hz)
0.01 MHz	±2
0.1 MHz	±2
200 MHz	±2
300 MHz	±2
500 MHz	±2
1000 MHz	±2
2000 MHz	±2
3100 MHz	±2
6000 MHz	±2

Troubleshooting Problems with the Frequency Accuracy Check

- Verify the cables are connected correctly.
- If you are using a frequency counter, verify that you are using the correct channel for the frequencies you are measuring.

Checking the Output Power

This test verifies that the CW output power from the signal generator is within defined limits. The following table lists the preferred equipment for this test.

Test Equipment	Recommended Model
Power Meter	Agilent E4418B or E4419A/B E-Series or equivalent
Power Sensor, Input: Type-N (m)	Agilent E9304A

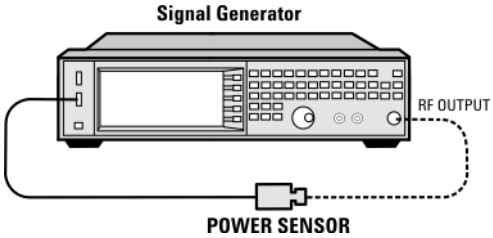
- N5171B/81B Test Procedure on page 20
- N5171B/81B Alternative Test Procedure on page 20
- N5172B/82B Test Procedure on page 22
- N5172B/82B Alternative Test Procedure on page 23
- N5173B/83B Test Procedure on page 25
- N5173B/83B Alternative Test Procedure on page 25

If this test fails, refer to “Troubleshooting Problems with the Output Power Check” on page 27 for further instructions.

N5171B/81B Test Procedure

Test Setup

1. Connect the equipment as shown:



2. Zero and calibrate the power sensor.

NOTE USB U2000A Series Power Sensors do not require the sensor to be zeroed or calibrated.

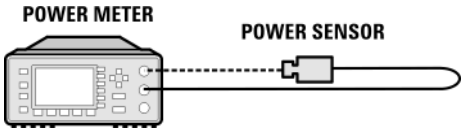
3. Connect the power sensor to the RF output of the signal generator. Once the LED on the power sensor turns off, the sensor is ready to measure.
4. Preset the signal generator: Press **Preset**
5. Turn the internal power meter channel on: Press **Aux Fctn** > **Power Meter Measurements** > **Channel A On** (or **Channel B On**).
6. Turn RF on: Press **RF On/Off** so that the RF On/Off LED lights.
7. Turn modulation off: Press **Mod On/Off** so that the **Mod On/Off** LED turns off.
8. Set the frequency: Press **Frequency** and enter the first frequency value listed in Table 3-2.
9. Set the amplitude: Press **Amplitude** and enter the amplitude value for that frequency.
10. Measure the output power level.
11. Repeat steps 8 through 10 to measure power at each of the frequencies listed in Table 3-2.
12. Confirm that the measured power levels are within the limits listed in the table.

N5171B/81B Alternative Test Procedure

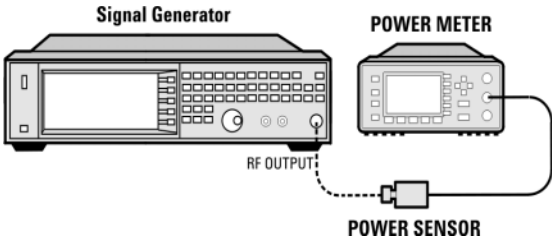
If a USB power sensor is not available, use a power meter to measure the output power of the signal generator.

Test Setup

1. Zero and calibrate the power sensor to the power meter:



2. Connect the equipment as shown:



3. Preset the signal generator: Press **Preset**.
4. Turn RF on: Press **RF On/Off** so that the RF On/Off LED lights.
5. Turn modulation off: Press **Mod On/Off** so that the Mod On/Off LED turns off.
6. Set the frequency: Press **Frequency** and enter the first frequency value listed in Table 3-2.
7. Set the amplitude: Press **Amplitude** and enter the amplitude value for that frequency.
8. Configure the power meter for the measurement.
   a. Press the **Frequency Cal Fac** button on the power meter.
   b. Select a power meter channel (if applicable).
   c. Use the arrow keys to enter the frequency at which to measure the power.
9. Measure the output power level.

10. Repeat steps 6 through 9 to measure power at each of the 15 frequencies listed in Table 3-2.
11. Confirm that the measured power levels are within the limits listed in the table.

NOTE Limit values are due to power meter uncertainty.

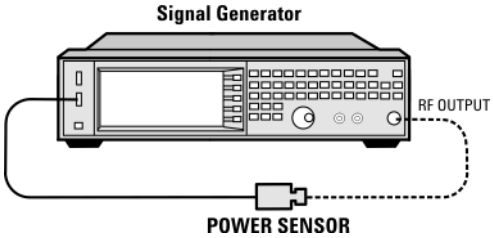
Table 3-2 Leveled Output Power Limits

N5171B/81B Output Power		
Frequency	**Amplitude (dBm)**	**Limits (dB)**
125 MHz	7	±2
275 MHz	7	±2
338 MHz	7	±2
425 MHz	7	±2
538 MHz	7	±2
675 MHz	7	±2
850 MHz	7	±2
1075 MHz	7	±2
1350 MHz	7	±2
1700 MHz	7	±2
2150 MHz	7	±2
2700 MHz	7	±2
3400 MHz	7	±2
4300 MHz	7	±2
5400 MHz	7	±2

N5172B/82B Test Procedure

Test Setup

1. Connect the equipment as shown:



2. Zero and calibrate the power sensor.

NOTE USB U2000A Series Power Sensors do not require the sensor to be zeroed or calibrated.

3. Connect the power sensor to the RF output of the signal generator. Once the LED on the power sensor turns off, the sensor is ready to measure.
4. Preset the signal generator: Press **Preset**
5. Turn the internal power meter channel on: Press **Aux Fctn** > **Power Meter Measurements** > **Channel A On** (or **Channel B On**).
6. Turn RF on: Press **RF On/Off** so that the RF On/Off LED lights.
7. Turn modulation off: Press **Mod On/Off** so that the **Mod On/Off** LED turns off.
8. Set the frequency: Press **Frequency** and enter the first frequency value listed in Table 3-3.
9. Set the amplitude: Press **Amplitude** and enter the amplitude value for that frequency.
10. Measure the output power level.
11. Repeat steps 8 through 10 to measure power at each of the frequencies listed in Table 3-3.
12. Confirm that the measured power levels are within the limits listed in the table.

Without Modulation

1. Set the signal generator frequency to the first value listed in Table 3-3:

   Press **Frequency** > **250** > **MHz**.

2. Set the amplitude to 7 dBm:

   Press **Amplitude** > **7** > **dBm**.

3. If using a power meter, configure the power meter as follows:
   a. On the power meter, press the **Frequency Cal Fac** button.
   b. If applicable, select a power meter channel.
   c. Use the arrow keys to enter the frequency at which to measure the power.
4. Measure the output power level.
5. Repeat steps 1 through 4 for the remaining frequencies in the table, and confirm that the power level at each point is within limits.

Table 3-3 Output Power without Modulation

N5172B/82B Output Power without Modulation		
Frequency (MHz)	Amplitude (dBm)	Limits (dB)
250	7	±2
338	7	±2
425	7	±2
538	7	±2
675	7	±2
850	7	±2
1075	7	±2
1350	7	±2
1700	7	±2
2150	7	±2
2700	7	±2

Table 3-3 Output Power without Modulation

N5172B/82B Output Power without Modulation		
Frequency (MHz)	**Amplitude (dBm)**	**Limits (dB)**
3400	7	±2
4300	7	±2
5400	7	±2

With Modulation

1. Preset the signal generator: Press **Preset**.
2. Select the factory-supplied waveform `SINE_TEST_WFM`:
   a. Press **Mode > Dual ARB > Select Waveform**.
   b. Highlight the `SINE_TEST_WFM` waveform.
   c. Press **Select Waveform**.
3. Turn the arbitrary waveform player on: Press the **ARB** softkey to highlight **On**.
4. Set the frequency to the first value listed in Table 3-4:

   Press **Frequency** > **250** > **MHz**.
5. Set the amplitude to 7 dBm:

   Press **Amplitude** > **7** > **dBm**.
6. If using a power meter, configure the power meter as follows:
   a. On the power meter, press the **Frequency Cal Fac** button.
   b. Select a power meter channel (if applicable).
   c. Use the arrow keys to enter the frequency at which to measure the power.
7. Measure the output power.
8. Repeat steps 4 through 7 for the remaining frequencies listed in Table 3-4, and confirm that the power level at each point is within limits.

Table 3-4 Output Power with Modulation

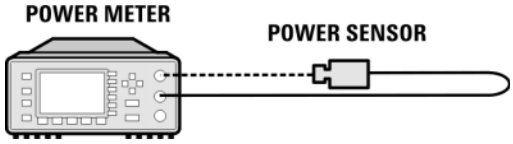
N5172B/82B Output Power with Modulation		
Frequency (MHz)	**Amplitude (dBm)**	**Limits (dB)**
250	7	±2
323	7	±2
512	7	±2
814	7	±2
1275	7	±2
2025	7	±2
2750	7	±2
3750	7	±2
5250	7	±2

N5172B/82B Alternative Test Procedure

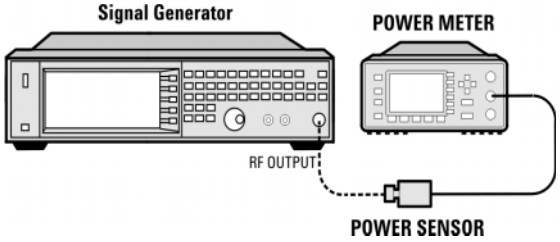
If a USB power sensor is not available, use a power meter to measure the output power of the signal generator.

Test Setup

1. Zero and calibrate the power sensor to the power meter:



2. Connect the equipment as shown below:



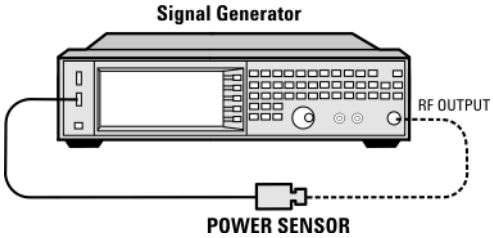
3. Preset the signal generator: Press **Preset**.
4. Turn RF on: Press **RF On/Off** so that the RF On/Off LED lights.
5. Turn modulation off:

   Press **Mod On/Off** so that the Mod On/Off LED turns off.
6. Continue the procedure from "Without Modulation" on page 22.
7. Continue the procedure from "With Modulation" on page 23 to complete the output power measurements of the N5172B/82B.

N5173B/83B Test Procedure

Test Setup

1. Connect the equipment as shown:



2. Zero and calibrate the power sensor.

NOTE USB U2000A Series Power Sensors do not require the sensor to be zeroed or calibrated.

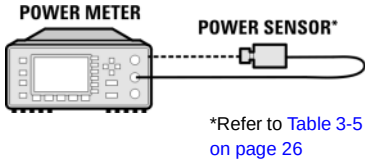
3. Connect the power sensor to the RF output of the signal generator. Once the LED on the power sensor turns off, the sensor is ready to measure.
4. Preset the signal generator: Press **Preset**
5. Turn the internal power meter channel on: Press **Aux Fctn** > **Power Meter Measurements** > **Channel A On** (or **Channel B On**).
6. Turn RF on: Press **RF On/Off** so that the **RF On/Off** LED lights.
7. Turn modulation off: Press **Mod On/Off** so that the **Mod On/Off** LED turns off.
8. Set the frequency: Press **Frequency** and enter the first frequency value listed in Table 3-6.
9. Set the amplitude: Press **Amplitude** and enter the amplitude value for that frequency.
10. Measure the output power level.
11. Repeat steps 8 through 10 to measure power at each of the frequencies listed in Table 3-6.
12. Confirm that the measured power levels are within the limits listed in the table.

N5173B/83B Alternative Test Procedure

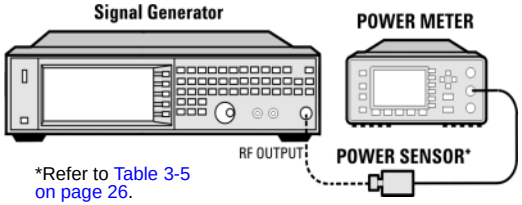
If a USB power sensor is not available, use a power meter to measure the output power of the signal generator.

Test Setup

1. Zero and calibrate the power sensor to the power meter:



2. Connect the equipment as shown:



3. Preset the signal generator: Press **Preset**.
4. Turn RF on: Press **RF On/Off** so that the **RF On/Off** LED lights.
5. Turn modulation off: Press **Mod On/Off** so that the **Mod On/Off** LED turns off.
6. Set the frequency: Press **Frequency** and enter the first frequency value listed in Table 3-6.
7. Set the amplitude: Press **Amplitude** and enter the amplitude value for that frequency.
8. Configure the power meter for the measurement.
   a. Press the **Frequency Cal Fac** button on the power meter.
   b. Select a power meter channel (if applicable).
   c. Use the arrow keys to enter the frequency at which to measure the power.
9. Measure the output power level.

10. Repeat steps 6 through 9 to measure power at each of the 15 frequencies listed in Table 3-6.
11. Confirm that the measured power levels are within the limits listed in the table.

Table 3-5 Power Sensors by Frequency and Options

N5173B/83B	Frequency	Power Sensor
Option 513/520/540	< 5GHz	E9304A
Option 520	≥ 5GHz	8485A
Option 532/540	≥ 5GHz	8487A

Table 3-6 Leveled Output Power Limits

N5173B/83B Output Power					
Frequency	Amplitude (dBm) Standard Power		Amplitude (dBm) Option 1EA		Limits[a] [b] (dB)
	513/520	532/540	513/520	532/540	
200 MHz	11	7	15	14	±2
300 MHz	11	7	15	14	±2
500 MHz	11	7	15	14	±2
800 MHz	11	7	15	14	±2
1.0 GHz	11	7	15	14	±2
2.0 GHz	11	7	15	14	±2
3.1 GHz	11	7	15	14	±2
5.0 GHz	11	7	18	14	±2
10 GHz	11	7	18	14	±2

Table 3-6 Leveled Output Power Limits

N5173B/83B Output Power					
Frequency	Amplitude (dBm) Standard Power		Amplitude (dBm) Option 1EA		Limits[a] [b] (dB)
	513/520	532/540	513/520	532/540	
20 GHz (Option 520)	--	7	--	13	±2
31.8 GHz (Option 532)	--	7	--	13	±2
40 GHz (Option 540)	--	7	--	12	±2

a. Limit values are due to power meter uncertainty.
b. For questions around measurement uncertainty, refer to the *Data Sheet*.

Troubleshooting Problems with the Output Power Check

- Verify that you are using the appropriate power sensor.
- Normally, power sensor calibration factors are automatically downloaded to the power meter when the power meter turns on. If this does not occur, manually enter the correct calibration factors for the power sensor you are using.
- Verify that the power sensor is properly calibrated to the power meter.

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Compliance with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB du Canada.

Compliance with European Machinery Directive Acoustic Requirement

Acoustic statement (European Machinery Directive 2002/42/EC, 1.7.4.2u)

Acoustic noise emission

LpA < 70 dB

Operator position

Normal operation mode

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Apple mDNSresponder

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Version 2.0, January 2004

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