

User Guide

Motorola SURFboard®

SBG6782 DOCSIS® 3.0 Wireless Gateway





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Safety and Regulatory Information

IMPORTANT SAFETY INSTRUCTIONS

Read This Before You Begin — When using your equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- Read all of the instructions listed here and/or in the user manual before you operate this device. Give particular attention to all safety precautions. Retain the instructions for future reference.
- This device must be installed and used in strict accordance with manufacturer's instructions, as described in the user documentation that is included with the device.
- Comply with all warning and caution statements in the instructions. Observe all warning and caution symbols that are affixed to this device.
- To prevent fire or shock hazard, do not expose this device to rain or moisture. The device must not be exposed to dripping or splashing. Do not place objects filled with liquids, such as vases, on the device.
- This device was qualified under test conditions that included the use of the supplied cables between system components. To ensure regulatory and safety compliance, use only the provided power and interface cables and install them properly.
- Different types of cord sets may be used for connections to the main POWER supply circuit. Use only a main line cord that complies with all applicable device safety requirements of the country of use.
- Installation of this device must be in accordance with national wiring codes and conform to local regulations.
- Operate this device only from the type of power source indicated on the device's marking label. If you are not sure of the type of power supplied to your home, consult your dealer or local power company.
- Do not overload outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard.
- Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine the point where they exit from the device.
- Place this device in a location that is close enough to an electrical outlet to accommodate the length of the power cord.
- Place the device to allow for easy access when disconnecting the power cord of the device from the AC wall outlet.
- Do not connect the plug into an extension cord, receptacle, or other outlet unless the plug can be fully inserted with no part of the blades exposed.
- Place this device on a stable surface.
- Avoid damaging the cable modem with static by touching the coaxial cable when it is attached to the earth-grounded coaxial cable-TV wall outlet.
- Always first touch the coaxial cable connector on the cable modem when disconnecting or reconnecting the Ethernet cable from the cable modem or user's PC.
- It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the device by local lightning strikes and other electrical surges.
- Postpone installation until there is no risk of thunderstorm or lightning activity in the area.
- Do not use this product near water: for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.



- Do not cover the device or block the airflow to the device with any other objects. Keep the device away from excessive heat and humidity and keep the device free from vibration and dust.
- Wipe the device with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the device or use forced air to remove dust.
- For added protection, unplug the device from the wall outlet and disconnect the cables to avoid damage to this device due to lightning and power surges.
- Upon completion of any service or repairs to this device, ask the service technician to perform safety checks to determine that the device is in safe operating condition.
- Do not open the device. Do not perform any servicing other than that contained in the installation and troubleshooting instructions. Refer all servicing to qualified service personnel.
- This device should not be used in an environment that exceeds 104° F (40° C).

SAVE THE ABOVE INSTRUCTIONS

Note to CATV System Installer — This reminder is provided to call the CATV system installer's attention to Article 820.93 and 820.100 of the National Electric Code, which provides guidelines for proper grounding and, in particular, specifies that the Coaxial cable shield shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

FCC STATEMENTS

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the device and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC CAUTION: Any changes or modifications not expressly approved by Motorola for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with the FCC RF exposure compliance requirements, the separation distance between the antenna and any person's body (including hands, wrists, feet and ankles) must be at least 20 cm (8 inches).

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter except those already approved in this filing.



The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destinations. The firmware setting is not accessible by the end user.

AVIS D'INDUSTRIE CANADA (IC)

Cet appareil est conforme à la réglementation RSS-210 d'Industrie Canada. Son utilisation est assujettie aux deux conditions suivantes :

- Cet appareil ne doit pas causer d'interférences et
- Cet appareil doit accepter toute interférence reçue, y compris les interférences causant un fonctionnement non désiré.

Cet appareil numérique de classe B est conforme à la norme NMB-003 du Canada.

Au Canada, les appareils de réseau local sans fil ne sont pas autorisés à utiliser les bandes de fréquence 5600-5650 MHz.

AVERTISSEMENT: afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux, les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur

Les radars à haute puissance sont définis en tant qu'utilisateurs principaux (c.-à-d. prioritaires) des bandes de fréquences 5250-5350 MHz et 5650-5850 MHz. Ces radars peuvent causer de l'interférence ou des dommages susceptibles de nuire aux appareils exempts de licence-réseau local (LAN-EL).

DÉCLARATION DE IC SUR L'EXPOSITION AUX RAYONNEMENTS

NOTE IMPORTANTE: cet équipement est conforme aux limites d'exposition aux rayonnements établies par IC pour un environnement non contrôlé. Cet équipement doit être installé et utilisé de manière à maintenir une distance d'au moins 20 cm entre la source de rayonnement et votre corps.

INDUSTRY CANADA (IC) STATEMENT

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions:

- This device may not cause interference, and
- This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

In Canada, RLAN devices are restricted from using the 5600-5650 MHz frequency band.

CAUTION: To reduce the potential for harmful interference to co-channel mobile satellite systems, use of the 5150-5250 MHz frequency band is restricted to indoor use only.

High power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz frequency bands. These radars could cause interference and/or damage to License Exempt–Local Area Network (LE-LAN) devices.

IC RADIATION EXPOSURE STATEMENT

IMPORTANT NOTE: This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.



WIRELESS LAN INFORMATION

This device is a wireless network product that uses Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency-Division Multiple Access (OFDMA) radio technologies. The device is designed to be interoperable with any other wireless DSSS and OFDMA products that comply with:

- The IEEE 802.11 Standard on Wireless LANs (Revision B, Revision G, and Revision N), as defined and approved by the Institute of Electrical Electronics Engineers
- The Wireless Fidelity (Wi-Fi) certification as defined by the Wireless Ethernet Compatibility Alliance (WECA).





Restrictions on the Use of Wireless Devices

In some situations or environments, the use of wireless devices may be restricted by the proprietor of the building or responsible representatives of the organization. For example, using wireless equipment in any environment where the risk of interference to other devices or services is perceived or identified as harmful.

If you are uncertain of the applicable policy for the use of wireless equipment in a specific organization or environment, you are encouraged to ask for authorization to use the device prior to turning on the equipment.

The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this product, or the substitution or attachment of connecting cables and equipment other than specified by the manufacturer. Correction of the interference caused by such unauthorized modification, substitution, or attachment is the responsibility of the user.

The manufacturer and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from failing to comply with these guidelines.

Note: The use of the 5150-5250 MHz frequency band is restricted to Indoor Use Only.

SECURITY WARNING: This device allows you to create a wireless network. Wireless network connections may be accessible by unauthorized users. For more information on how to protect your network, see the *SBG6580 User Guide* for instructions or visit the Motorola website.

CARING FOR THE ENVIRONMENT BY RECYCLING



When you see this symbol on a Motorola product, do not dispose of the product with residential or commercial waste.

Recycling your Motorola Equipment

Please do not dispose of this product with your residential or commercial waste. Some countries or regions, such as the European Union, have set up systems to collect and recycle electrical and electronic waste items. Contact your local authorities for information about practices established for your region. If collection systems are not available, call Motorola Customer Service for assistance. Please visit www.motorola.com/recycle for instructions on recycling.



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Getting Started

Introduction

The Motorola SURFboard® SBG6782 DOCSIS® 3.0 Wireless Cable Modem Gateway is a combination wireless cable modem, router, and MoCA (Multimedia over Coax) device that provides wireless high-speed data and multimedia service access on your home network. With built-in MoCA technology, the SBG6782 also provides high-speed Internet access to multiple MoCA-enabled devices using the existing coaxial cable connection in your home. The SBG6782 includes a Wi-Fi Pairing option for quick and easy connections for your wireless devices.

This guide provides instructions for installing and configuring the SBG6782 gateway, setting up a secure wireless network connection, and managing your gateway and network configurations.

In the Box

Before installing your new wireless gateway, check that the following items are included in the box with the gateway. If any items are missing, please contact Motorola Broadband Technical Support at: **1-877-466-8646**.

Table 1 - SBG6782 Package Contents

ITEM	DESCRIPTION
Power Cord	Provides power to the gateway through an electrical outlet connection
10/100/1000 Base-T Ethernet Cable	Standard Category 5, or higher, cable for connecting to the network
Software License & Regulatory Card	Contains software license, warranty, and safety information for the gateway
SBG6782 Quick Start Guide	Provides basic information for connecting the gateway

Additional Items You May Need

- Coaxial cable, if one is not already connected to a cable outlet
- RF splitter (for additional coaxial cable connections, e.g., multi-room MR-DVR)



System Requirements

- High-speed Internet access account
- Compatible operating systems:
 - o Windows Vista[™], Service Pack 1 or later
 - o Windows® 7
 - o Windows XP, Service Pack 2 or later
 - o Mac® 10.4 or higher
 - o UNIX®
 - o Linux®

Contact Information

For technical support additional Motorola product information, please visit the Motorola Support website at www.motorola.com/us/support.

Motorola Broadband Technical Support is also available at **1-877-466-8646**. When you call, you will need the following information from the gateway product label located on the bottom of the gateway:

- Gateway model number (HFC MAC ID)
- Gateway serial number (S/N)





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Front Panel

Product Overview



Figure 1 - SBG6782 Front View

Table 2 - SBG6782 Front Panel LED Icons

BUTTON/ LED ICON	FLASHING	ON
WPS button	Not applicable — no LED on button	Not applicable — no LED on button
		See Wi-Fi Protected Security (WPS) for description
POWER	Not applicable — icon does not flash	Green: Power is properly connected
RECEIVE	Scanning for a downstream (receive) channel connection	Green : Non-bonded downstream channel is connected
		Blue* : High-speed Internet connection with bonded downstream channels
SEND	Scanning for an upstream (send) channel connection	Green : Non-bonded upstream channel is connected
CLIND		Blue* : High-speed Internet connection with bonded upstream channels
ONLINE	Scanning for an Internet connection	Green : Gateway is connected to the network



BUTTON/ LED ICON	FLASHING	ON
WIRELESS	Green : Wi-Fi enabled with encrypted wireless data activity. Long/short flash indicates wireless pairing in progress	Green : 2.4 GHz wireless connection is made between the SBG6782 and another Wi-Fi enabled device on your network — printer, tablet, laptop, etc.
	Amber: Wi-Fi enabled with unencrypted wireless data activity	Amber : Turns ON during the wireless pairing process. LED turns green after five minutes.
(((v)) Wireless	Green : Wi-Fi enabled with encrypted wireless data activity. Long/short flash indicates wireless pairing in progress	Green : 5 GHz wireless connection is made between the SBG6782 and another Wi-Fi enabled device on your network — printer, tablet, laptop, etc
	Amber: Wi-Fi enabled with unencrypted wireless data activity	Amber : Turns ON during the wireless pairing process. LED turns green after five minutes
O MoCA	Green : Indicates MoCA activity in progress	Green : A MoCA-enabled device is connected and running

^{*}Indicates DOCSIS 3.0 operation (high-speed Internet access) which may not be available in all locations. Check with your service provider for availability in your area.

Note: To increase the bandwidth available for receiving and transmitting data, your service provider may also implement bonded channels for RECEIVE and SEND channel connections.

Wi-Fi Protected Setup (WPS)

The Wi-Fi Protected Setup (WPS) is a wireless network setup option that provides a quick and easy solution for setting up a secure wireless network connection for any WPS-enabled device; such as a computer, tablet, or printer. WPS automatically configures your wireless network connections and sets up wireless security.





Rear Panel



Figure 2 - SBG6782 Rear View

Table 3 - SBG6782 Rear Panel Ports & Connectors

	PORT NAME	DESCRIPTION
1 日本 日本 日本 日本 日本 日本 日本 日本 日本 日本 日本 日本 日本 日		Four one-gigabit Ethernet ports for RJ-45 cable connections
		 Green LED is ON - Indicates a data transfer rate of one gigabit per second
		 Amber LED is ON - Indicates a data transfer rate of less than one gigabit per second
2	0	MoCA 1.1 coaxial cable connector
	CABLE	
3	POWER	100 - 240VAC Power connector

Gateway Label

The SBG6782 gateway product label is located on the bottom of the gateway. It contains specific gateway ID information that may be needed when contacting your service provider.

To receive Internet access, you may have to provide the MAC address (**HFC MAC ID**) and serial number (S/N) listed on the gateway label to your Internet service provider.



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Installing the Gateway



This product is for indoor use only. Do not route the Ethernet cable outside of the building. Exposure of the cables to lightning could create a safety hazard and damage the product.

Connecting to Your Computer

Before installing the gateway:

- Check with your service provider to ensure high-speed Internet service is available in your area.
- Choose a location where your computer and gateway are preferably near existing cable and electrical wall outlets.
- Make sure your computer is powered OFF.

Note: The following procedure steps you through the wired Ethernet connection process to ensure the gateway is properly connected and your network access is working. Upon successful completion, you can proceed with the wireless setup. See **Connecting Your Wireless Devices** for more information.



Figure 3 - SBG6782 Connection Diagram

- 1. Check that a coaxial cable is connected to a cable wall outlet or RF splitter.
- 2. Connect the other end of the coaxial cable to the Cable connector on the gateway. Hand-tighten the connectors to avoid damaging them.
- 3. Connect the Ethernet cable to any open Ethernet port on the gateway.
- 4. Connect the other end of the Ethernet cable to the Ethernet port on your computer.



- 5. Plug the power cord into the Power port on the gateway.
- 6. Plug the other end of the power cord into an electrical outlet. This automatically powers ON the gateway.

Connecting Your MoCA-Enabled Devices

You can also connect your MoCA-enabled devices, such as a multi-room DVR, to the SBG6782. You will need to use an RF cable splitter and an additional coaxial cable to connect the device and SBG6782 to the same cable wall outlet. Follow the instructions included with the device to complete the applicable connections for that device.

Testing the Gateway Connections

Perform the following gateway connectivity test to verify that all the components were connected properly:

- 1. Power ON your computer and then log on.
- 2. Check that the POWER, RECEIVE, and SEND front panel LEDs on the gateway first FLASH in sequential order and then light SOLID. See **Front Panel** for additional LED status information.
 - If an LED did not light SOLID, contact your service provider for assistance.
- 3. Contact your service provider to activate (provision) the gateway.
 - **Note**: Your service provider may allow for automatic activation which will automatically launch a special website when you open a web browser.
- 4. Once your gateway is provisioned, open a web browser on your computer, such as Internet Explorer, Firefox, Google Chrome, or Safari.
- 5. Type a valid URL (for example, <u>www.motorola.com</u>) in the address bar and then click or press **Enter**.
 - If the web page did not open, contact your service provider for assistance or proceed to **Connecting the Gateway to the Internet** to manually set up the network options on your computer.

Connecting the Gateway to the Internet

IMPORTANT! Your computer may already be configured to automatically connect to the Internet. If so, **do not** change the network options before contacting your service provider for assistance.

If you cannot access the Internet after completing the gateway installation, you may have to set up your computer to connect to the Internet. To do this, you will have to enable the network options on your computer to automatically obtain an IP address and DNS server address.

Operating system-specific commands for configuring computer network options are not provided in this document. The general steps provided in this section apply to the following Microsoft Windows platforms supported by the SBG6782:

- Windows 7
- Windows XP

Consult the documentation for the Windows operating system you are running for specific command selections.



- 1. Click the **Start** button from the Taskbar on your desktop to select **Network Connections**. **Note**: Additional selections may be necessary for Windows 7 systems.
- 2. Step through to open the Local Area Connection Properties window.
- 3. Select **Internet Protocol (TCP/IP)** option and click **Properties** to open the Internet Protocol (TCP/IP) Properties window.
- 4. Select **Obtain an IP address automatically** and **Obtain DNS server address automatically**.
- 5. Click **OK** to save the TCP/IP settings and close the Internet Protocol (TCP/IP) Properties window.
- 6. Step through to close the remaining windows and exit.
- 7. To verify the IP address, open a command prompt window using the **Start** button from the Taskbar on your desktop.
- 8. Type **ipconfig** and press **Enter** to display the IP configuration.
- 9. To renew the IP address, type **ipconfig /renew** and press **Enter**. A new IP address for your computer will display.
- 10. Type **exit** and then press **Enter** to return to Windows.

If you still cannot access the Internet, contact your service provider.







Setting Up a Wireless Network Connection

You cannot set up a wireless network connection or connect wireless devices without being able to access a broadband or high-speed Internet service from your computer. There are two options available for setting up a wireless network connection:

- Changing Your Computer Wireless Network Options
- Using the WPS Pairing Button

After setting up your wireless network connection, make sure to check that the wireless network connection was set up properly. See <u>Testing Your Wireless Network Connection</u> for more information.

Changing the Wireless Network Options on Your Computer

Note: The steps for setting up a wireless network may differ slightly depending on the operating system installed on your computer. The following steps apply for Windows 7.

- From the Windows taskbar, click Start, Control Panel, Network and Internet Connections, Network Connections, Wireless Network Connection to open Wireless Network Connection window.
- 2. Scroll down and select the SBG6782 wireless network name (**SSID** is listed on the gateway label). Click the MOTOROLA wireless network name and then click **Connect**.
- 3. Enter **Network key** code in the Network key & Confirm network key fields listed as **Wi-Fi Security key** on the gateway label.
- 4. Click **Connect** to complete the wireless network connection. Connected status should display.
- 5. Close the Wireless Network Connection window.

Using the WPS Pairing Button

Note: To use the WPS Pairing button option, your computer hardware must support WPS and also have WPA security compatibility.

This option automatically configures the SSID wireless network name and Wi-Fi Security Key to connect your gateway and other WPS-enabled devices to a wireless network.

- 1. Power ON your gateway and other WPS-enabled devices that you want to connect to the wireless network.
- 2. Press the **WPS** button located on the top of the SBG6782.
- Press the WPS button on your WPS-enabled computer or other device.
 Repeat for each additional WPS-enabled device.



Testing Your Wireless Network Connection

Perform the following test to verify that your wireless network is set up properly and all the devices were connected properly.

- 1. If you installed the SBG6782 using the wired Ethernet connection option, disconnect the Ethernet cable from the rear of the gateway and your computer.
- 2. Open a web browser on your computer, such as Internet Explorer, Firefox, Google Chrome, or Safari.
- Type a valid URL (<u>www.motorola.com</u>) in the address bar and click or press Enter.
 If the web page did not open, see <u>Troubleshooting Solutions</u> for more information or contact your service provider for assistance.







Troubleshooting

If the solutions listed in this section do not solve your problem, contact your service provider for assistance.

You may have to reset the SBG6782 gateway configuration to its original factory settings if the gateway is not functioning properly.

Your service provider may ask for the status of the LEDs as described in **Front Panel LED Icons and Error Conditions**.

Solutions

Table 4 – Troubleshooting Solutions

MODEM PROBLEM	POSSIBLE SOLUTION
POWER LED Icon is OFF	 Check the power connection between the gateway and the electrical outlet. Check that the electrical outlet is working (is the outlet controlled by a light switch?). If so, disconnect and find another electrical outlet.
Cannot Send or Receive Data	 Check each end of the coaxial cable connection on the gateway and cable outlet. Hand tighten, if necessary. Check the Ethernet cable to make sure it is properly connected to the gateway and computer. On the front panel, check the status of the LED icons and refer to Front Panel LED Icons and Error Conditions to identify the problem. If you have cable television, check your television to ensure your cable service is operating properly. Check the IP address. Follow the steps for verifying the IP address for your operating system in Verifying Your IP Address in Windows 7 or Vista or Verifying Your IP Address in Windows XP. Call your service provider if you need an IP address. If none of the above solutions resolve the problem, contact your service provider for further assistance.



Front Panel LED Icons and Error Conditions

The SBG6782 front panel LED icons provide status information for the following error conditions:

Table 5 – Front Panel LED Icons and Error Conditions

LED ICON	STATUS	IF, DURING STARTUP:	IF, DURING NORMAL OPERATION
POWER	OFF	Modem is not properly plugged into the electrical outlet	Modem is unplugged
RECEIVE	FLASHING	Downstream receive channel cannot be acquired	Downstream channel is lost
SEND	FLASHING	Upstream send channel cannot be acquired	Upstream channel is lost
ONLINE	FLASHING	IP registration is unsuccessful	IP registration is lost
WIRELESS	OFF	No connected device is detected	Device is disconnected
(((·i)) WIRELESS	OFF	No connected device is detected	Device is disconnected
MoCA	OFF	No connected device is detected	Device is disconnected





Warranty Information

SURFboard SBG6782 DOCSIS 3.0 Wireless Cable Modem Gateway Motorola Mobility, LLC ("Motorola")

Retail Purchasers: If you purchased this Product directly from Motorola or from an authorized Motorola retail reseller, Motorola warrants to you, the original end user customer, that (A) the Product, excluding Software, will be free from defects in materials and workmanship under normal use, and (B) with respect to Software, (i) the media on which the Software is provided will be free from defects in material and workmanship under normal use, and (ii) the Software will perform substantially as described in its documentation. This Limited Warranty to you, the original end user customer, continues (A) for Software and the media upon which it is provided, for a period of ninety (90) days from the date of purchase from Motorola or an authorized Motorola reseller, and (B) for the Product (excluding Software), for a period of one (1) year from the date of purchase from Motorola or from an authorized Motorola reseller. To take advantage of this Limited Warranty or to obtain technical support, you must call the Motorola toll-free phone number 1-877-466-8646. Technical support charges may apply. Motorola's sole and exclusive obligation under this Limited Warranty for retail sales shall be to repair or replace any Product or Software that does not meet this Limited Warranty. All warranty claims must be made within the applicable Warranty Period.

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Motorola Mobility, LLC 101 Tournament Drive Horsham, PA 19044 U.S.A.

http://www.motorola.com

