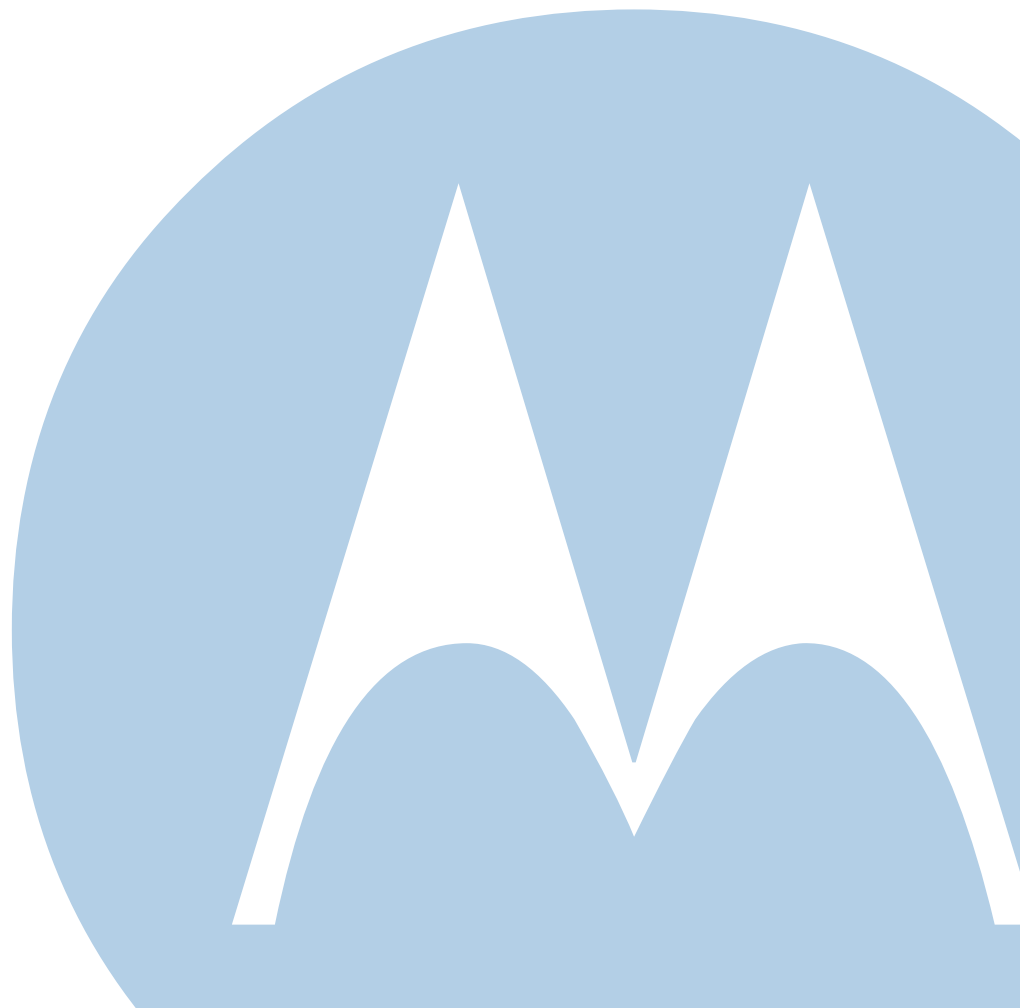




Installation Manual

Motorola SURFboard[®]

SB6180 DOCSIS[®] 3.0 Cable Modem





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Safety and Regulatory Information

IMPORTANT SAFETY INSTRUCTIONS

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 systems 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 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.
- 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.
- 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.
- 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.
- 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.



- 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 40° C (104°F).

SAVE THESE INSTRUCTIONS

Note to CATV System Installer — This reminder is provided to call the CATV system installer’s attention to Section 820.93 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 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 DECLARATION OF CONFORMITY

Motorola Inc, 101 Tournament Drive, Horsham, PA 19044, 1-215-323-1000, declares that the SURFboard® SB6180 DOCSIS® 3.0 Cable Modem complies with 47 CFR Parts 2 and 15 of the FCC rules as a Class B digital device.

INDUSTRY CANADA (IC) STATEMENT

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.

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

Congratulations on your purchase of a Motorola SURFboard® SB6180. Before installing your new modem, please take a moment to ensure that you have all of the items listed **Inside the Box**. If you are missing items, please contact Motorola Broadband Technical support at 1-877-466-8646.

Inside the Box

| Item | Description |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply |  Provides power using an AC electrical outlet |
| 10/100/1000 Base-T Ethernet cable |  Standard Cat 5, or higher, cable for connecting to the network |
| Software License & Regulatory Card |  Contains software license, warranty, and safety information for the modem |
| SB6180 Install Sheet |  Provides basic information for setting up the modem |

Minimum System Requirements

The SB6180 is compatible with the following operating systems:

- Windows 7
- Windows Vista™, Service Pack 1 or later
- Windows® XP, Service Pack 2 or later
- Mac® 10.4 or later (Ethernet connection only)
- UNIX® (Ethernet connection only)
- Linux® (Ethernet connection only)

Contact Information





To learn additional information about Motorola products visit the Motorola support website at <http://broadband.motorola.com/consumers/support>.

For Motorola Broadband Technical support at: 1-877-466-8646. You may need the modem's Media Access Control (MAC) address and serial number. The MAC label is located on the bottom of the modem and contains the MAC address, Serial number, SSID, WPA-PSK, and Passcode (for use with the CD Wi-Fi Wizard).



Front and Rear Panel Overview



| ICON | If the icon is... | Then the device is... |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  POWER | Steady green and visible | <ul style="list-style-type: none">Properly connected and ready for use |
| 2  RECEIVE | Green and flashing *Blue and flashing a high-speed Internet connection with bonded downstream channels | <ul style="list-style-type: none">Connected to a non-bonded downstream channelScanning for a downstream (receive) channel connection |
| 3  SEND | Green : Non-bonded upstream channel is connected *Blue : High-speed Internet connection with bonded upstream channels | <ul style="list-style-type: none">Scanning for an upstream (send) channel connection |
| 4  ONLINE | Green and flashing *Blue : High-speed Internet connection | <ul style="list-style-type: none">Completing the startup processScanning for an Internet connection |
| 5 LINK | * Blue - Indicates DOCSIS 3.0 mode; contact your ISP to learn if the feature is available. | |
| Port Name | Description | |
| 6 Ethernet | A green LED indicates a data connection is made | |
| 7 Cable | Coaxial cable connector | |
| 8 Power | +12VDC Power connector | |

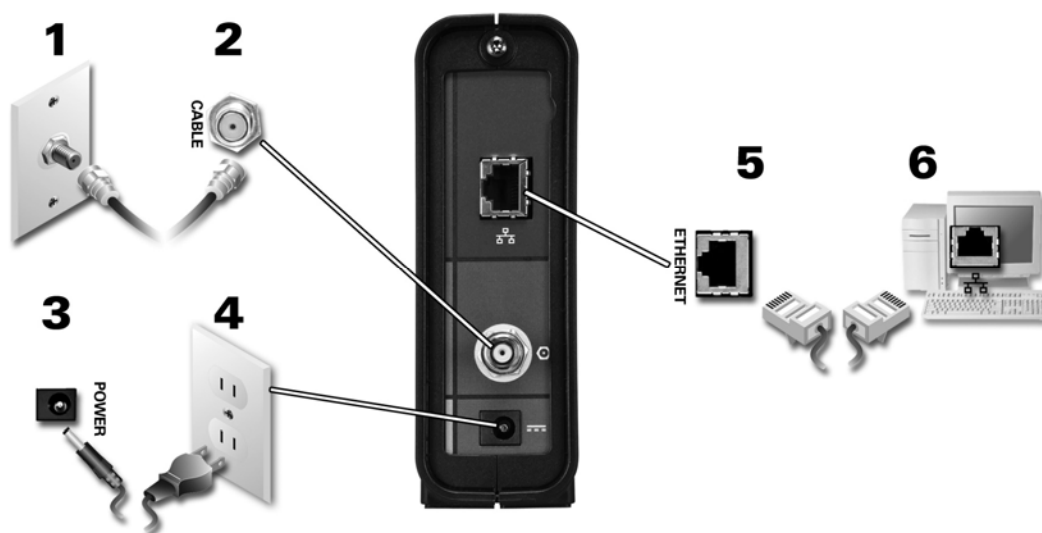


Connecting the Modem



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.

1. Verify that the coaxial cable is connected to a cable outlet or splitter.
2. Connect the other end of the coaxial cable to the cable connector on the modem. Hand-tighten the connectors to avoid damaging them.
3. Plug the power cord into the Power port on the modem.
4. Plug the other end of the power cord into an electrical wall outlet.
5. Connect the Ethernet cable to the Ethernet port on the computer.
6. Connect the other end of the Ethernet cable to the Ethernet port on the modem.





“Configuring TCP/IP for Windows 7

1. Click **Start** and then click **Control Panel**.
2. Click **Network and Internet** to display the Network and Internet window.
3. Click **Network and Sharing Center** to display the Network and Sharing Center window.
4. Click **Change adapter settings** to display the LAN or High-Speed Internet connections window.
5. Right-click the network connection for your network interface.
6. Select *Properties* to display the Local Area Connection Properties window.
7. Select Internet Protocol Version 4 or 6 (TCP/IPv4 or v6) and click Properties to display the Internet Protocol Properties window.
8. Select Obtain an IP address automatically and Obtain DNS server address automatically.
9. Click **OK** to save the TCP/IP settings and close the Internet Protocol Version 4 (TCP/IPv4) Properties window.
10. Click **Close** to close the Local Area Connection Properties window.
11. Close the remaining windows and exit the Control Panel.

When you complete the TCP/IP configuration, go to [Verifying the IP Address in Windows 7](#).

Configuring TCP/IP in Windows Vista

1. Click **Start**.
2. Right click on **Network**.
3. Scroll down to *Properties*.
4. Click **Manage network connections**.
5. Right-click on the appropriate (if more than one listing) Local Area Connection.
6. Click **Properties**. Vista may prompt you for permission to continue – Click Continue.
7. Select **Internet Protocol Version4 (TCP/IPv4)** and click **Properties**.
8. Verify that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** options are selected.
9. Click **Advanced**. Use the table below to verify the Advanced TCP/IP Settings.



| IP Settings Tab | DNS Tab | WINS Tab |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• DHCP Enabled listed IP address box• Default gateways box is empty• Automatic metric is selected | <ul style="list-style-type: none">• DNS server addresses box is empty• Append primary and connection specific DNS suffixes is selected• Append parent suffixes of the primary DNS suffix is checked• Register this connection's addresses in DNS is checked• Append these DNS suffixes (in order) is not selected | <ul style="list-style-type: none">• WINS addresses box is empty• Enable LMHOSTS lookup is checked• Default: Use NetBIOS setting from the DHCP server is selected |

10. Click **OK**.
11. Click **Alternate Configuration** and verify that *Automatic private IP address* is selected.
12. Click **OK**. Vista prompts you to restart your computer.

Configuring TCP/IP In Windows XP

1. Click **Start**.
2. Click **Control Panel**.
3. Click **Network and Internet Connections / Network Connections** (will vary according to settings).
4. Click **LAN** or **High-Speed Internet** connections.
5. Select *Properties* from the drop-down menu. Be sure Internet Protocol (TCP/IP) is checked.
6. Select *Internet Protocol (TCP/IP)* and click **Properties**.
7. Verify that *Obtain an IP address automatically* and *Obtain DNS server address automatically* are selected.
8. Click **OK** to save the TCP/IP settings.
9. Click **OK** to exit the Local Area Connection Properties window.

Renewing Your IP Address

1. Click **Start**.
 2. Select *Run*.
 3. Type **cmd** and click **OK**.
 4. Type **ipconfig /renew** and press **ENTER**. If a valid IP address is displayed as shown, Internet access should be available.
 5. Type **exit** and press **ENTER** to return to Windows.
- If problems persist, contact your Internet Service Provider.



Verifying Your IP Address in Windows 7 and Vista

1. Click **Start**.
2. Click **All Programs**.
3. Click **Accessories**.
4. Click **Run** to display the Run window.
5. Type **cmd** and click **OK** to open a command prompt window.
6. Type **ipconfig** and press **Enter** to display the IP Configuration.

Verifying Your IP Address in Windows XP

1. Click **Start**.
2. Select **Run**.
3. Type **cmd** and click **OK**.
4. Type **ipconfig** and press **ENTER** to display your IP configuration.

Troubleshooting

| Problem | Possible Solution |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The system will not power on (no icons are visible) | <ul style="list-style-type: none">• Check the ends of the plug connected to the modem, and the electrical outlet.• Verify that the electrical outlet is working (is the outlet controlled by a light switch) |
| Cannot send or receive data | <ul style="list-style-type: none">• Check the coaxial cable connected to the modem and the wall outlet. Hand-tighten if necessary.• Check the Ethernet cable; ensure that it is connected to the modem and the computer.• Check the IP address. Follow the steps for verifying the IP address for your system, see Configuring TCP/IP for Windows 7. Call your service provider if you need an IP address. |



Wall Mounting the Modem



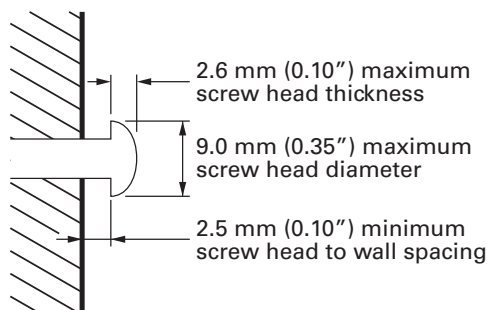
Before drilling holes in the wall, check the structure for potential damage to water, gas, or electrical lines.

You will need a screwdriver and two M3 (#6) screws.

1. Print the [Wall Mount Template](#). **Note:** You can mount the modem horizontally or vertically.
2. Remove all cables (power, coaxial, and Ethernet) from the modem.
3. Select a location to mount the modem.

Notes:

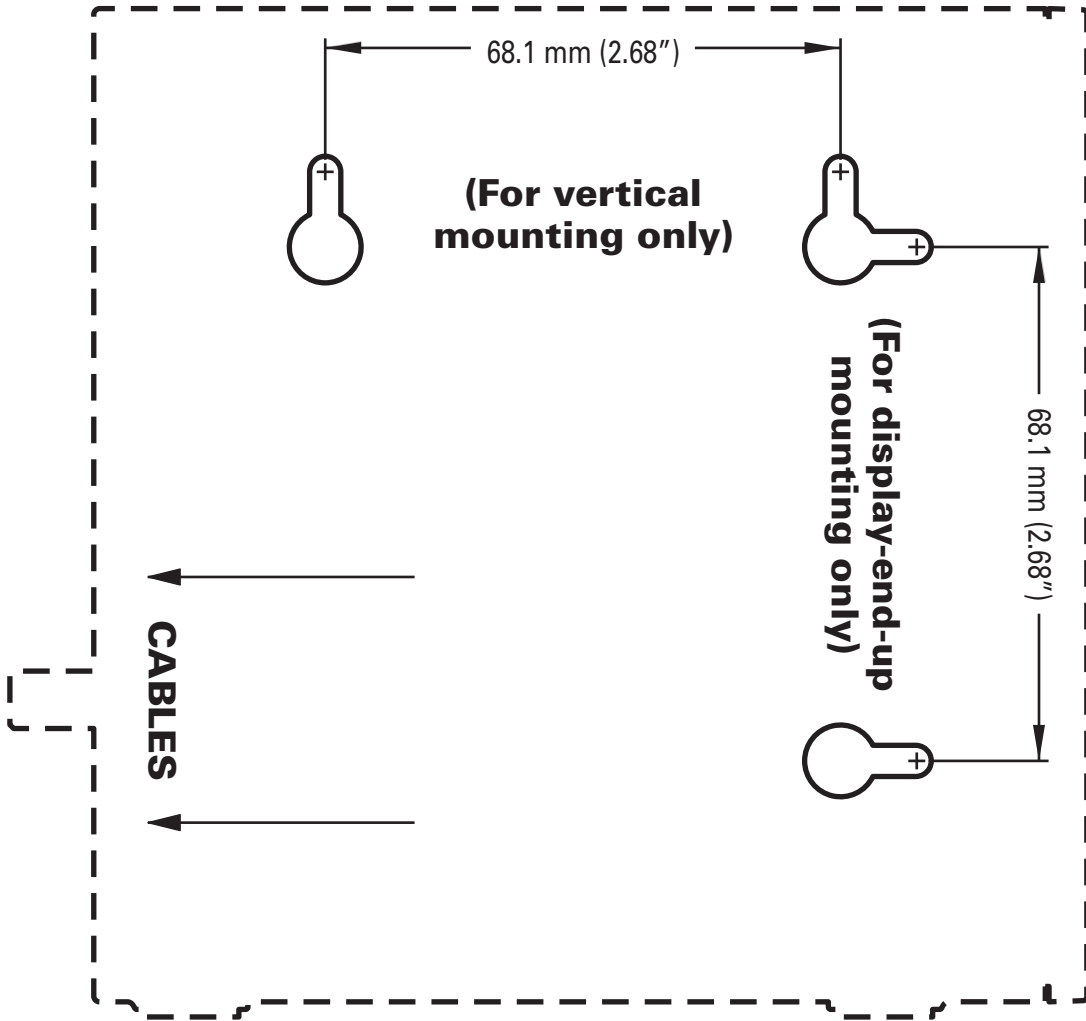
- Locate the unit according to local or national codes governing residential or business cable TV and communications services.
 - Follow all local standards for installing a network interface unit/network interface device (NIU/NID).
 - It is recommended that you mount the modem to concrete, masonry, a wooden stud, or some other solid wall material. Use anchor bolts if necessary (for example, if you mount the unit on drywall).
4. Position and secure the wall mounting template on the wall to mark the holes.



5. Select an appropriate depth and diameter to drill the holes to a depth of at least 1½ inches (3.8 cm). **Note:** There must be .10 inch (2.5 mm) between the wall and underside of the screw head.
6. Insert the #6 screws in the holes and then attach the modem.
7. Verify the modem is still securely attached to the wall.
8. Reconnect the coaxial, Ethernet, power cables.
9. Plug the power cord into an electrical outlet.
10. Arrange the cables to prevent any safety hazards.



Wall Mounting Template





Product Specifications

General Specifications

| | |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable Interface | 75 Ω F-connector |
| CPE Network Interface | 10/100/1000Base-T Ethernet (RJ-45) |
| Data Protocol | TCP/IP |
| Dimensions | 5.7 in H x 5.7 in W x 1.5 in D (146 mm x 146 mm x 38 mm) |
| Power | 12W (nominal) |
| Input Power | |
| North America | 105 to 125 VAC, 60 Hz |
| Outside North America | 100 to 240 VAC, 50 to 60 Hz |
| Regulatory | UL listed (U.S. and Canada), CE, unit is RoHS compliant, ENERGY STAR V2, COC V3, Compliant per the "Code of Conduct on Energy Consumption of Broadband Equipment", CMM, MEPS |

Environmental

| | |
|-----------------------|------------------------------------|
| Operating Temperature | 32 °F to 104 °F (0 °C to 40 °C) |
| Storage Temperature | -22 °F to 158 °F (-30 °C to 70 °C) |
| Operating Humidity | 5 to 95% R.H. (non-condensing) |

Downstream

| | |
|--------------------------------|-------------------------------------------------------------------------------------------------|
| Modulation | 64 or 256 QAM |
| Downstream Channel Capture | Two independent 32 MHz Wideband Tuners |
| Maximum Theoretical Data Rate* | |
| DOCSIS | 343.072 Mbps (8 channels) / 42.884 (single channel) @ 256 QAM at 5.36 Msym/s |
| EuroDOCSIS | 444.928 Mbps (8 channels) / 55.616 (single channel) @ 256 QAM at 6.952 Msym/s |
| Bandwidth | |
| DOCSIS | \leq 48 MHz/2 |
| EuroDOCSIS | \leq 64 MHz/2 |
| Symbol Rate | |
| DOCSIS | 64 QAM 5.057 Msym/s; 256 QAM 5.361 Msym/s |
| EuroDOCSIS | 64 QAM 6.952 Msym/s; 256 QAM 6.952 Msym/s |
| Operating Level Range | -15 to 15 dBmV |
| Bonded Channel RF | |
| Level Tolerance | 10dBmV |
| Input Impedance | 75 Ω (nominal) |
| Frequency Range | DOCSIS and EuroDOCSIS 108 to 1002 MHz (edge to edge), Optional 91 to 1002 MHz (edge to edge) |
| Frequency Plan | |
| EuroDOCSIS | Annex A |
| DOCSIS | Annex B |
| J-DOCSIS | Annex B, modified for Japan Frequencies |
| Security | DOCSIS 3.0 Security (BPI+, EAE, AES, and SSD) |
| Network Management | SNMP v2 & v3 |
| Provisioning | Supports IP addressing using IPv4 and/or IPv6 (dual stack) |



Upstream

| | |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modulation | QPSK and 8, 16, 32, 64, 128 QAM |
| Maximum Channel Rate* | |
| DOCSIS | 131.072 Mbps (4 channels) / 32.768 Mbps (single channel): @ 128 QAM at 6.4 MHz |
| EuroDOCSIS | 131.072 Mbps (4 channels) / 32.768 Mbps (single channel): @ 128 QAM at 6.4 MHz |
| Channel Width | 200 kHz, 400 kHz, 800 kHz, 1.6 MHz, 3.2 MHz, 6.4** MHz |
| Symbol Rates | 160, 320, 640, 1280, 2560, 5120** ksym/s |
| Operating Level Range | Level range per channel (Multiple Transmit Channel mode disabled, or only Multiple Transmit Channel mode enabled with one channel in the TCS)DOCSIS/EuroDOCSIS |
| TDMA | Pmin to +57 dBmV (32 QAM, 64 QAM) Pmin to +58 dBmV (8 QAM, 16 QAM) Pmin to +61 dBmV (QPSK) |
| S-CDMA | Pmin to +56 dBmV (all modulations), where: Pmin = +17 dBmV, 1280 kHz modulation rate Pmin = +20 dBmV, 2560 kHz modulation rate Pmin = +23 dBmV, 5120 kHz modulation rate |
| Level range per channel (two channels in the TCS) | |
| TDMA | Pmin to +54 dBmV (32 QAM, 64 QAM) Pmin to +55 dBmV (8 QAM, 16 QAM) Pmin to +58 dBmV (QPSK) |
| S-CDMA | Pmin to +53 dBmV (all modulations), where: Pmin = +17 dBmV, 1280 kHz modulation rate Pmin = +20 dBmV, 2560 kHz modulation rate Pmin = +23 dBmV, 5120 kHz modulation rate |
| Level range per channel (three or four channels in the TCS) | |
| TDMA | Pmin to +51 dBmV (32 QAM, 64 QAM) Pmin to +52 dBmV (8 QAM, 16 QAM) Pmin to +55 dBmV (QPSK) |
| S-CDMA | Pmin to +53 dBmV (all modulations), where: Pmin = +17 dBmV, 1280 kHz modulation rate Pmin = +20 dBmV, 2560 kHz modulation rate Pmin = +23 dBmV, 5120 kHz modulation rate |
| Output Impedance | 75 Ω (nominal) |
| Frequency Range | DOCSIS 5-42 MHz (edge to edge), EuroDOCSIS and optional DOCSIS 5 to 65 MHz (edge to edge) |
| Compatibility | PC: 90496, Pentium, or later; Windows 7™, Vista, 2000, or XP or Linux® with Ethernet connection (older versions of Windows, although not specifically supported, will work with this cable modem) Macintosh: Power PC or later; OS 9 or higher, Ethernet connection UNIX: Ethernet connection Home Networking: Ethernet router or wireless access point |



Software License

Motorola SURFboard SB6180 DOCSIS 3.0 Cable Modem
Motorola, Inc.
101 Tournament Drive, Horsham, PA 19044

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Motorola SURFboard SB6180 DOCSIS 3.0 Cable Modem
Motorola, Inc.
101 Tournament Drive, Horsham, PA 19044
Motorola, Inc., (“Motorola”)

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