Configuration Best Practices for Motorola/Symbol Wireless Handheld Scanners on the Cisco Unified Wireless Network

Introduction

This document provides an understanding and best practices for deploying the Motorola/Symbol scanners on the Cisco® Unified Wireless Network infrastructure. This document is applicable only to Cisco Unified Wireless Network and not to autonomous access point deployments.

To get the most of out of the information in this document, you may want to refer to the following resources:

- Wireless Fusion Enterprise Mobility Suite User Guide for Version 2.55 [English] (P/N 72E-107170-01 Rev. A) http://support.symbol.com/support/search.do?cmd=displayKC&docType=kc&externalId=10717001apdf&sliceId=&dialogID=127670821&stateId=1%00%20127656852.
- Wireless Fusion Enterprise Mobility Suite User Guide for Version 2.60 (P/N 72E-113153-01 Rev. A) http://support.symbol.com/support/search.do?cmd=displayKC&docType=kc&externalId=11315301apdf&sliceId=&dialogID=127674591&stateId=1%200%20127676093.

Cisco Compatible Extensions Compliance

The Cisco Compatible Extensions program ensures the widespread availability of client devices that are interoperable with a Cisco Unified Wireless Network infrastructure and take advantage of Cisco innovations for enhanced security, mobility, quality of service, and network management. Cisco compatible client devices are sold and supported by their manufacturers, not Cisco.

If a handheld comes in two models and one is Cisco Compatible Extensions compliant and the other one is not, the Cisco AssureWave testing program recommends using the Cisco Compatible Extensions compatible version for better interoperability with the Cisco wireless infrastructure.

Motorola/Symbol marketing chose not to become Cisco Compatible Extensions compliant except for a few devices. Cisco Compatible Extensions features will not be available for a majority of their devices. It is better to confirm beforehand if the underlying hardware is Cisco Compatible Extensions compliant. An example of a Cisco Compatible Extensions compliant device is MC7090, a Cisco Compatible Extensions Version 3 device.

The latest Cisco Compatible Extensions compliant devices can be found at: http://www.cisco.com/web/partners/pr46/pr147/partners_pgm_partners_0900aecd800a7907.html.

The following Motorola/Symbol devices are Cisco Compatible Extensions compliant: MC17 (v4), MC3090 (v3), VC5090 (v3), MC55 (v4), MC7090 (v3), MC75 (v4), MC9090 (v3), MC95 (v4), TEAM VoWLAN Smartphones (v4), VC6096 (v4) and WT4090 (v3).

Supported Supplicants

Most Motorola/Symbol scanners use Fusion supplicants. This makes the wireless configuration of Symbol scanners very easy and predictable. Fusion is a suite of software that allows for WLAN connectivity, configuration, 802.1x authentication, status reporting, and diagnostics.

A few Motorola/Symbol devices use Symbol Mobile Companion utility as the supplicant. There are a few others that use the Wireless Manager as supplicant - for example, MC55 running on Windows Mobile 5.0. Details for such devices can be found on the Symbol website. This version of the document focuses only on the Fusion-based devices.

Note that if you are using Mobile Companion, the **AEGIS PPC supplicant** functions on top of it for 802.1x authentication.

Models and Operating Systems

Motorola/Symbol handheld scanners are typically based on Microsoft Windows CE 4.2, CE 5.0, Windows Mobile (WM) 5.0, or WM 6.0. The older models are not end-of-life. There are a few models coming out with WM 6. Detailed lists of various models, their features, usage and operating systems can be found in the “Motorola/Symbol Handheld models” section of this document.

The Windows CE based models offer more customization capabilities to the customer than the Windows Mobile models. The user can pick and choose the components to a greater extent with Windows CE than Windows Mobile. As a result, you will see many customers still using the Windows CE models.

Symbol creates a Basic Service Package (BSP) for the handhelds. BSP combines the OS upgrades, supplicant, drivers, and so on needed for each handheld.

Driver Versions

Ensure that sure that the driver versions on the wireless card are updated to the latest available versions. Motorola/Symbol has fixed many issues from their side, and they have been releasing the fixes in some of their latest builds. If you have not already done so, please upgrade the Motorola/Symbol devices to the latest drivers. This is the first step and, in our experience, will most likely solve the basic issues, such as connectivity and roaming.

Table 1 provides details about the Fusion version, operating system, and devices to guide you on the latest versions. However, we recommend that you also check the Symbol website for the latest versions.

Table 1. Fusion Versions

Device	OS	WLAN	Fusion Version
MC3000-R/S	Windows CE 5.0 or Windows Mobile 6.1	Tri mode 802.11a/b/g	v2.55.1.0.010R (CE 5.0, BSP30.0); v2.57.0.0.18R (CE5.0, BSP35.0);v2.57.0.0.018R (WM 6.1);v2.57.0.0.18R(CCX v3[1],CE 5.0, WM6.1 for MC 3090)
MC7090	Windows Mobile 5.0 or 6.1		v2.55.0.016R (WM 5.0); 2.57.0.0.18R (WM 6.1);v 2.57.0.0.18R (CCXv3,WM6.1)

[1] Always choose the Cisco Compatible Extensions version if it exists.

Device	OS	WLAN	Fusion Version
MC9090-G	Windows Mobile 5.0, 6.1 or Windows CE 5.0	Tri mode 802.11a/b/g	2.5.1.0.062R2- (WM 5.0);v2.57.0.0.021B (WM 6.1); 2.57.0.0.18R(Win CE5.0, BSP35.0); 2.55.1.0.010R (BSP30.0, Win CE5.0);v2.57.0.0.18R(CCXv3,CE 5.0,WM6.1)[2]
VC5090	Windows CE 5.0 Professional;802.11a/b/g	802.11a/b/g	v 2.57.0.0.18R (CE 5.0, BSP35.0); 2.55.1.0.010R (CE 5.0, BSP35.0);v2.57.0.0.18R (CCXv3, CE 5.0)
VC6096	Windows Mobile 6.1 Professional Edition	Integrated 802.11a/b/g	3.0.0.0.304R (CCXv4, WM6.1)
WT4000	Windows CE 5.0 Professional	802.11a/b/g	v2.55.1.0.010R (CE 5.0,BSP30.0); v2.57.0.0.18R (CE 5.0,BSP35.0)
MC17	Microsoft Windows CE 5.0 Professional	MC17 - WiFi IEEE 802.11 b/g; MC17T - WiFi IEEE 802.11 a/b/g	2.61.1.0.015R (WinCE 4.2), 2.61.0.0.6R (WinCE 5.0);CCX build unknown
MC55	Windows Mobile 6.1 Professional	802.11b/g	Fusion 2.61.1.0.017B (WM 6.1)
MC70	Windows Mobile 6.1 Premium or phone edition	Tri-mode IEEE 802.11a/b/g	Fusion v2.61.1.0.014B (WM -6.1);Fusion v2.60.1.0.030B (WM 6.0); Fusion 2.57.0.0.021B (WM 6.1);Fusion version 2.57.0.0.18R(CCXv3, v4 unknown, WM 6.0)
MC95	Windows Mobile 6.1	802.11a/b/g	No information available
PPT88xx	Windows Mobile 2003 second edition	802.11b	Does not use Fusion

Here is an example that illustrates the importance of using the correct driver version for each Motorola/Symbol device. The latest version of Fusion for MC7090 (at the time of writing this document) is v2.5.299.0.091B and runs on Windows Mobile 5.0. Some of the issues fixed in previous builds include, but are not limited to, the following:

- The roaming algorithm sometimes took too long to connect to an access point.
- There were Authentication Failures/Device.exe Exceptions in situations where Wi-Fi Protected Access 2 (WPA2)-Enterprise was used in conjunction with more than 16 access points.
- The Wireless Configuration Editor could lose focus on the options screen, leaving it difficult to regain focus on the correct dialog.
- When the Enable IP Management option was not selected, DHCP requests were still generated by Fusion on profiles set up as DHCP.
- The WLAN radio would attempt to associate with access points using a null **Secure Set Identifier** (SSID) upon initialization (following a resume or reboot).
- Users experienced excessive transmit retries when connected to an AP set up as 802.11b with Short Preamble enabled and 1 Mbps as the only basic (required) data rate.
- The mobile device would send a Dynamic Host Configuration Protocol (DHCP) Discover request on resume. The device now properly sends a directed request for an IP address to the same server as before (a DHCP Request).

Using the Fusion Supplicant

The Wireless Application menu on the task tray of the symbol device provides the following options as shown in the figure below:

- Find WLANs
- Manage Profiles
- Manage Certs

[2] Some builds exist in two release trains, v2.55 and v2.57. These are available with different BSPs. Be sure to use the latest versions on the handhelds.

- Manage PACs
- Options
- Wireless Status
- Wireless Diagnostics
- Log On/Off
- Enable/Disable Radio

Tap the **Signal Strength** icon to display the Wireless Applications menu. Refer to Table 2 to interpret the status and action.

Note: Some devices do not have touch screens. Procedures in this guide assume that the device has a touch screen. For those devices without touch screens, refer to the device's user documentation for information on navigating using the keypad.

Table 2. Signal Strength

Status	Action
Excellent	Wireless LAN network is ready to use.
Very Good	Wireless LAN network is ready to use.
Good	Wireless LAN network is ready to use.
Fair	Wireless LAN network is ready to use. Notify the network administrator that the signal strength is only "Fair".
Poor	Notify the network administrator that the signal strength is "Poor".
Out-of-network range (not associated)	No wireless LAN network connection. Notify the network administrator.
No wireless LAN network card detected	No wireless LAN network card detected or radio disabled. Notify the network administrator.

Please refer to Chapters 1 through 4 of the symbol user guide for a complete details on configuring the fusion supplicant

Wireless Fusion Enterprise Mobility Suite User Guide for Version 2.60 (P/N 72E-113153-01 Rev. A)
http://support.symbol.com/support/search.do?cmd=displayKC&docType=kc&externalId=11315301apdf&sliceId=&dialogID=127674591&stateId=1%200%20127676093.

Battery Usage

The handhelds can be put into one of the three battery usage modes. The first one is constant awake mode (CAM), the second one is fast power save mode, and the last one is MAX power save mode. Fast power save is the default power save mode on most of the handhelds with Fusion supplicants.

CAM Mode

The CAM mode gives the best network performance but shortest battery life. The fast power save mode acts between the CAM and the MAX modes, striking a balance between the network performance and the battery life. The CAM mode is recommended for systems using AC power.

PSP/Fast PSP Mode

Some handhelds also support a Fast Power Save or PSP mode. PSP saves power, and is therefore recommended for systems running on battery power. The sliding scale on the device menu can be used to set a PSP performance index suited to the intended operation of the device. Select the **Switch power mode based on power source** check box to automatically transition the system from PSP mode when on battery power to CAM mode when on AC power. Clear the check box to prevent the handheld from transitioning from PSP to CAM when AC power is detected.

MAX Power Save Mode

The MAX power save mode gives the lowest network performance while providing the highest battery life. The transmitter and receiver are powered down when the device receives a beacon that indicates no additional data is available for that mobile station. The transmitter and receiver are then turned off for 10 beacon intervals (100 ms per beacon times 10 beacon intervals = 1 second). The device will then wake up and listen for the 11th beacon. If there is still no data ready for the device, it will shut down for 10 beacon intervals again. This process will continue until there is data available for that mobile station, at which time it will leave the transmitter and receiver powered until all of the buffered transactions are completed.

We suggest that if the application on the handheld is critical (for example, if you a using a mobile point-of-sale application), it is best to perform some usage scenarios for the device with the power level you plan to use. One example would be in the middle of downloading some price data; another example might be when the handheld goes to sleep. If it wakes up again, does it resume the price data download? Selecting the right battery life mode depends on the applications.

Table 3 provides a summary of each power save mode.

Table 3. Power Save Modes

Power Mode	Battery Life	Network Performance/Connectivity	Comments
Constant Awake Mode (CAM)	Shortest	Best	Should be used only when continuous connectivity is required. Recommended for devices running on AC power.
Fast Power Save Mode	Middle	Middle	Optimal battery life and network performance.
MAX Power Save Mode	Longest	Least. In networks with minimal latency, Max Power Save performs as well as Fast Power Save, but with increased battery conservation.	Both transmit (Tx) and receive (Rx) are turned off until the device sees any data from the AP.

WLAN Configuration Best Practices

Setting Data Rates

Motorola/Symbol advises setting the 802.11b data rates as follows:

- 11 & 5.5 Mbps set as supported
- 2 & 1 Mbps set as required
- Disable data rates of 9 and 6 Mbps

Suggested data rate settings are as follows: 1 & 2 basic/supported

- 5.5 supported
- 6 and 9 not used
- 11 supported
- 12/18/24 not used
- 36/48/54 supported

Please note that these settings may contradict Cisco's voice deployment guidelines and are a general recommendation. If the handhelds can associate at a higher rate, probably lower rates can be disabled in a "voice-grade" network. Also, note that the access points will send the broadcast response only at the lowest basic rate as notified by the clients in their probe request. If the client is supporting 1 Mbps as basic, the access point will only multicast the probe responses at 1 Mbps.

However, if the handhelds have problems connecting at a higher rate, either the deployment needs to be revisited (site survey) or more access points should be added. In the worst case, the lower data rates will have to be enabled.

If lower data rates are supported on the access point, the scanners tend to send the management frames at the lowest supported data rate. Ideally, if a client sees that multiple data rates are supported, it should send all the frames at the highest data rate available. For example, if a Motorola/Symbol scanner sees the access point is advertising 1 Mbps, 6 Mbps, 9 Mbps, and 11 Mbps, and the client is capable of b/g rates, it still sends the management frames at 1 Mbps (the lowest).

Cisco Centralized Key Management

Disable Cisco proprietary fast roaming, if applicable. Cisco Centralized Key Management will definitely be supported on Cisco Compatible Extensions Version 5. None of the Motorola/Symbol handhelds are certified to work with Cisco Compatible Extensions Version 5, but it may be possible for Motorola/Symbol to support Cisco Centralized Key Management without the handheld being Cisco Compatible Extensions supported.

The Delivery Traffic Indication Message

Set the Delivery Traffic Indication Message (DTIM) to a value between 2 and 10. Please note that this could be an issue in high multicast traffic areas such as hospitals or other healthcare environments. In such circumstances, the access points also may crash.

Wireless Multi Media (WMM)

If the Cisco 124X (802.11g/b/a) access point is in use, be sure that Wi-Fi Multimedia (WMM) is disabled on the WLAN to which the handheld is connected.

DHCP

If using a DHCP server, consider setting the server for unicast as opposed to multicast.

Load Balancing

Disable the Aggressive Load Balancing on the WLAN.

Beacon Period

Changing the beacon period from 100 to 500 ms may increase the roaming time and the time to connect new clients. Use this setting carefully.

Aironet Extensions

Aironet extensions should be disabled if not needed.

Short Preamble

Short Preamble can be used only in an 802.11g environment. However, it is not recommended if there is mix of 802.11b and 802.11g clients.

MFP

Disable MFP or set it to Allowed mode (but not required), as Symbol does not support MFP.

Handheld Config Options

Adhoc Networks

For security purposes and PCI compliance, it may help to prevent the client from logging on to the ad hoc networks. Right-click on the **supplicant → wireless options → Op Mode filtering** drop-down menu. Uncheck **Adhoc networks**, and hit **Save**.

Country Code

The country code for the scanner can be changed from the supplicant. To do this, right-click **wireless options → Regulatory**. Checking the Enable 802.11d flag at the bottom can enable support for an additional regulatory domain. Hit **Save** after you are done.

Radio Band Selection

The “b/g” or “a” band can be selected or deselected from the supplicant: Right-click -> **wireless options** and select or deselect the 2.4- and 5 GHz- bands.

Security Configuration

The handhelds support the following types of security: EAP-FAST, EAP-TLS, LEAP, PEAP, and EAP-TTLS. If your customer is using the Cisco ACS version, EAP-TTLS is not supported until release 4.2. In this case another radius server should be used for EAP-TTLS. We have tested EAP-TTLS successfully with the Free Radius Server.

Power Modes

The transmit power modes supported are Automatic and Power Plus. These are relevant only on Motorola/Symbol access points. More details are described in the *Using Fusion Supplicant* above. No option is available with Cisco access points except on the Cisco Compatible Extensions handhelds.

Devices Tested by the Cisco AssureWave Program

The following devices are tested in the AssureWave labs for client interoperability testing:

- Motorola/Symbol PPT8800 (WinCE 4.10, WinCE 4.20)
- Motorola/Symbol PDT8100X5 (WinCE 4.20.0/OS 2.20)
- Motorola/Symbol MC9060G (WinCE 4.20.0/Version 3.17)
- Motorola/Symbol MC9090CR (Windows Mobile 5.0)
- Motorola/Symbol MC9090AG (WinCE 5.0)
- Motorola/Symbol WT4090 (WinCE 5.0)

- Motorola/Symbol VRC8946, Mobile Computer (Windows CE)
- Motorola VC5090, Mobile Computer (Windows CE)
- Motorola/Symbol MC70 (Windows Mobile 5.0)
- Motorola/Symbol MC50 (Windows Mobile 5.0)
- Motorola/Symbol MC3090 (Windows Mobile 5.0)

The Motorola/Symbol website mentions that some of the loss of connectivity during roaming occurs if the handheld is operating with battery at less than the nominal charge level or there may possibly be a defective radio card. This is particularly an issue with the PDTs or the VRC (PDT6846, PDT3146, PDT6146, VRC6946). For these handhelds or even others, it is recommended to check the battery life, followed by a check on the radio. Try the roams with other handhelds to eliminate the radio issues, or warm boot the handhelds to re-establish radio associations.

Set Mandatory option

Some Motorola handhelds, such as the MC9060, have the Set Mandatory parameter set by default. As a result, the handheld cannot associate to a new AP even if it loses connectivity with the existing AP and can "see" the new AP. The cause for this is the Set Mandatory option is enabled within the AP's tab of Mobile Companion. This setting prohibits the mobile device from associating with a different AP. When the device roams from the AP coverage cell, the mobile device disassociates with the AP and will not connect to another AP within range unless rebooted.

- To correct the default Set Mandatory option, select the **Mobile Companion** icon from the device task tray (bottom right corner). Select **Status → APs tab → Set Roaming**.
- Tap the **Refresh** button to update the list of access points with the same ESSID.

HandHeld Performance

A Motorola/Symbol handheld may perform better on a Motorola/Symbol access point, if Motorola/Symbol proprietary features of preemptive roaming and load balancing are enabled. Otherwise, the roaming may prove unreliable and disruptive. This is true even if the device, e.g., MC5040, is not using a Motorola/Symbol manufactured PCMCIA card (Sychip Radio). It may still be using the correct firmware of the Mobile Companion version that supports all current features of previous Motorola/Symbol terminals that include preemptive roaming and load balancing.

Using with Cisco Wireless Controller Software version 4.x.xxx

Fusion based and Mobile Companion based wireless handhelds may be unable to authenticate via 802.1x to a Cisco Wireless LAN Controller (WLC) or Cisco Airespace Controller operating on firmware version 4.x.xxx. This should be resolved on the latest versions mentioned above.

- There is a known issue to Cisco support engineering where Motorola/Symbol marketing chose not to become Cisco Compatible Extensions compliant and instead decided to reengineer the radio driver supplicant code to support EAP key index 3. This code value became standard within the supplicant portion of the driver. When these terminals were integrated to the latest Cisco WLC operating on firmware version 4.x.xxx, the controller configuration required a change to the EAP key index value from 0 (default) to 3.
- The required configuration change on Cisco Wireless Lab Controller was *Config advanced EAP key-index*.

For wireless clients to integrate into a Cisco WLAN that utilizes EAP-FAST, that client must be Cisco Compatible Extensions version 3.0 certified or higher.

Design Considerations

If you are deploying Motorola/Symbol handhelds on Hybrid Remote Edge Access Points (H-REAP) across a WAN link, consider the following issues.

Handling Delays and Latency

For H-REAP we recommend that the round-trip delay not exceed 300 ms. The controller provides the ability to monitor the WAN link latency. Monitor this carefully to verify that the round-trip latency does not exceed 300 ms. This feature is available after Cisco Wireless LAN Controller Release 5.2.

Some Symbol handhelds are more susceptible to delays than others. For example, MC9060 based on Windows CE4.2 is the most susceptible to delays. If MC9060 sees more than a 102 ms delay between subsequent control frames, e.g., Association request and response or EAPOL frames, it drops the connection or hangs. MC9090 can tolerate up to 512 ms of delay.

AAA Servers

Prior to Cisco Wireless Control System Release 7.0, in H-REAP deployments the local authentication, authorization, and accounting (AAA) server is never used if the remote AAA is available. The authentication takes longer when the remote AAA is available. Customers were seeing hang issues, particularly with MC9060 during authentication. However, after Release 7.0 the local AAA can override the remote AAA and helps in avoiding these delays.

Software Installation on Symbol Handheld

Fusion Supplicant Update

Manual Installation on Windows CE5.0

1. Copy “Fusion_*.ARM.CAB” onto the device using Active Sync.
2. On the device, browse to the file on the device and double-click the CAB file to extract it.
3. On the File Dialog, press **OK**.
4. Follow on-screen instructions to complete the installation.

At the end of the installation procedure, the device will reboot automatically.

Airbeam Automated Installation on Windows CE5.0

1. Create an Airbeam package that will install “Fusion_2.55.1.0.016R_CE50_4Airbeam.ARM.CAB”.
2. The Airbeam package must warm boot the device after installation.
3. Use Airbeam Client to install.

Installation on WM5.0/6.0

1. Copy the CAB file to the mobile computer/handheld.
2. Click on the CAB file to execute it.

HandHeld OS Update

Installation of a Newer Version of the OS (CE 5.0)

1. Copy the OSUPDATE folder from the DCP and its contents to the root folder of an SD card. Make sure the entire folder structure is copied including the main folders, e.g., OSUPDATE. You can also copy it into the Temp directory. Note that the location needs at least 18 MB of storage space. Additional storage space can be created by going into **Settings → System → Memory** and moving the bar to the right to create at least 18 MB of free memory.
2. Place the SD card in the device to be upgraded.
3. Place the device to be upgrade on A/C power.
4. Navigate to Storage Card and open the folder OSUPDATE.

5. To upgrade a monochrome device, double-click on “*Mono_SD” file. To upgrade a color device, double-click on “*Color_SD” file. The appropriate extension “_TEMP” or “_SD” will have to be selected based on the media being used.

Installation of a Newer Version of the OS (WM 5.0)

1. The update will take about 10 minutes to complete. Do not remove the device from A/C power during this time. To install applications onto the device, developers package the application and all required files into a CAB file, then load the file onto the device using one of the following options:
2. Microsoft ActiveSync 4.1 or greater
3. Storage Card
4. AirBEAM
5. Image Update (for updating the operating system).
   a. Refer to the Microsoft Windows Mobile 5.0 Help file for information on CAB files.
   b. To use the startup folder to automatically install a CAB file, the CAB file needs to be placed in the \Application\Startup folder.

Known Issues

The following are known issues related to the Motorola/Symbol clients:

- SR: 611333461: WLC 2112 5.2.178.16 HREAP 1142 and 1252 (Hobart scales with integrated Symbol NIC) http://www-tac.cisco.com/Teams/ks/c3/casekwery.php?Case=611333461
- CSCee04018: Hand scanners (Symbol) keep roaming when upgraded to a G radio
- SR: 601942053: Symbol Handheld Scanners dropping connection http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=601942053
- SR: 603237357: Connectivity issues with Symbol handheld scanners http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=603237357
- SR: 601661213: Authentication issues between Symbol handheld and ACS through an Aironet WAP http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=601661213
- SR: 600256468: ESC/AP1200 - roaming from repeater to root freezes symbol MC9000 scanner http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=600256468
- SR: 604182905: Cisco access point 1100 - configuration with symbol handheld http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=604182905
- CSCsk23542: HREAP: AP does not transmit deauth
- SR: 611662127: HREAP disassociates from controller and will not join until rebooted http://www-tac.cisco.com/Teams/ks/c3/casekwery.php?Case=611662127
- CSCeg31946: If 3rd-party client sends 0000 in SSID, 350 card goes in hang state
- SR: 601930917: PDT 3146 Symbol Handheld not connecting with AIR-AP1220B-A-K9 http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=601930917
- CSCsj06077: D3: Cannot send more than 1406 byte packet
- CSCsa71262: FL: Symbol handhelds quit passing data after several hours
- SR: 603926743: Symbol device will not work with Airespace WiSM and Leap http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=603926743
- CSCsb55516: Symbol-MS Handheld requires MS-CHAP-v2 to complete L2TP http://cdetsweb-prd.cisco.com/apps/dumpcr?identifier=CSCsb55516&parentprogram=QDDTS

- SR: 603551079: Symbol Handheld PTT8846 locks up on IOS, but not on Vxworks http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=603551079
- SR: 601680051: Symbol handheld problem http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=601680051
- Case: F199419: AP1200 - issue with roaming between access points and the Symbol PDT 7500 handheld scanner http://www-tac-rtp.cisco.com/Teams/ks/casekwery/casekwery.php?Case=F199419&noheader=1&tz=420
- SR: 600300143: Symbol to VxWorks AP http://wwwin-tools.cisco.com/casekwery/getServiceRequest.do?id=600300143
- CSCtf50206: AW: Symbol clients roam across access points frequently http://cdetsweb-prd.cisco.com/apps/dumpcr?identifier=CSCtf50206&parentprogram=QDDTS
- CSCtf12055: AW: Symbol HH cannot get DHCP while coming out of sleep mode http://cdetsweb-prd.cisco.com/apps/dumpcr?identifier=CSCtf12055&parentprogram=QDDTS)

Motorola/Symbol Mobile Computer Models

Table 4 summarizes the various Motorola/Symbol mobile computer models.

Table 4. Motorola/Symbol Models

Model	Features/Applications	Communications	Market Segments	Cisco Compatible Extensions
Industrial Class				
MC1000	1D imaging, Batch applications	Serial or WLAN	Warehouse, retail, government, distribution centers	No
MC3000/3090	Rugged, 1D/2D imaging, available as a rotating head or a straight shooter, MC3090-G: Gun style 3090	WLAN, WPAN	Demanding enterprise environments	Yes (Cisco Compatible Extensionsv3)
MC9000	Max. reliability, performance and functionality, latest OS and best processing power, integrated voice and data, variety of form factors, modular keypads, highly customizable **MC9090G**: Gun, rugged, real-time communications, seamless connectivity, WLAN, WPAN, desktop **MC909X-K**: Ideal for inside and outside mobile workers, integrated voice and data, and WAN **MC9097-K/S**: integrated voice and data with push-to-talk functionality is ideal for your mobile workers **MC9090-G** plus robust voice and WAN capabilities **MC909X-S**:Smaller and lightweight version of MC909X-K **MC9090-G** RFID: Ability to read Gen 1 and Gen 2 RFID tags, it can read any 1D, 2D bar code	WLAN/WWAN/WPAN	Most demanding retail, mfg, logistics, industrial environments	Yes (Cisco Compatible Extensionsv3)
Vehicle Mount				
VC5090	Rugged and high-performance vehicle mount	WLAN	Loading dock, freezer, warehouse	Yes (Cisco Compatible Extensionsv3)

Model	Features/Applications	Communications	Market Segments	Cisco Compatible Extensions
VC6096	All-in-one in-cab solution, wireless voice and data	WWAN, WLAN, WPAN.	Ideal for Less than Truckload (LTL), Truck Load (TL) and Over the Road (OTR) operations	Yes (version unknown)
Wearable Terminals				
WT4000 Series	Voice, latest mobile OS and processing power	WLAN, WPAN	Warehouse	Yes (Cisco Compatible Extensionsv3)
Enterprise Class				
MC17	Self-service scanning, multi-function	WLAN	Retail	Yes (Cisco Compatible Extensionsv4)
MC35	All-in-one Enterprise Digital Assistant, mobile phone, GPS, computer, camera, bar-code scanner,1D/2D/imaging	WLAN, WWAN, WPAN	Enterprise	No
MC55	1D/2D;VoIP	WLAN, WWAN	Enterprise	Yes (v4)
MC70/MC7090	1D/2D/Imaging;VoIP, push-to-talk, GPS,1D/2D bar code scanning, color camera	WWAN/WLAN/WPAN 3G, WLAN, WPAN and IrDA	Enterprise	Yes (CCXv3)
MC75	No information available	No information available	No information available	Yes (CCXv4)
MC95	No information available	No information available	No information available	Yes (CCXv4)
PPT8800	Durable, wireless, scanning, easy-to-use interface	WLAN, WPAN	Retail, healthcare, hospitality, information-sensitive environment	

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