



HOTZONE DUO 1.0

Mesh Wireless Router

Users Guide

October 2006

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Chapter 1: Product Introduction

This guide will assist you with the use, installation, and configuration of the MWR.

Mesh Wireless Router Defined

The Mesh Wireless Router (MWR) is a wireless device that is primarily deployed to seed and extend the range between IAPs and Subscriber Devices while simultaneously increasing the spectral efficiency of the network. MWR functionality includes:

- Maximum continuous data rate support of up to 20 Mbps for stationary 802.11 devices.
- Dynamic Route Selection
- Range Extension for all other network devices
- Automatic Load Balancing
- Network capacity optimization through small packet consolidation

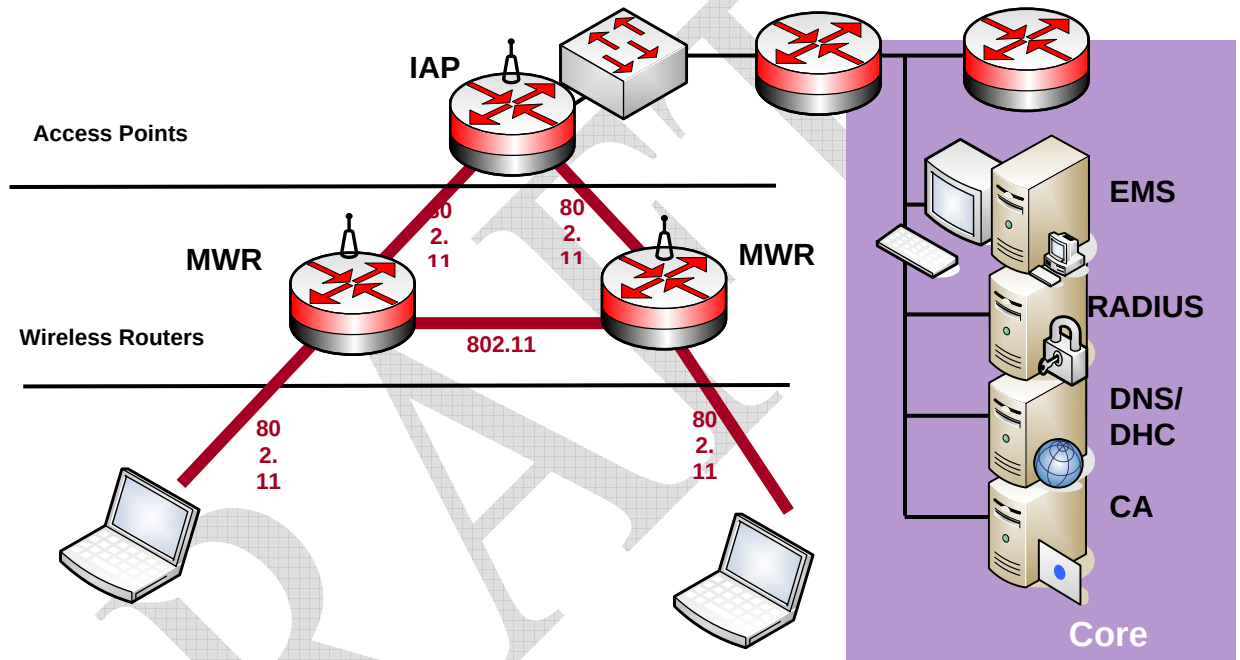
Additional MWR Features

The Mesh Wireless Router (MWR) efficiently combines the functionality of a Wireless Router with a internal high-speed Ethernet port to support a total of two IP addresses. This allows a network of IP-enabled devices to be directly addressed, accessed and managed over the HOTZONE DUO network. Additional IP devices/addresses can be supported by simply linking the connected devices through a NAT capable router.

MWRs Role within a HOTZONE DUO Wireless Network

The **MWR** and the **IAP** are considered as fixed **Infrastructure** devices. Infrastructure devices provide area coverage access for Subscriber Devices (SDs) to the wired network. IAPs act as the principal network management interface for associated MWRs and subscribers. MWRs provide standard 802.11 authentications and access to the Radius server.

Figure 1-1 The MWR Device in Context of the Wireless HOTZONE DUO Network



The MWR device in the context of the HOTZONE DUO wireless network.

Product Specifications

The following specifications apply to the MWR as described in the table below:

Table 1-1 HOTZONE DUO MWR Specifications

HOTZONE DUO MWR Specifications		
	2.4GHz Portion	5.8GHz Portion
Spectrum	2.4GHz	5.8GHz
Security	FIPS 140-2 with a VPN	FIPS 140-2 with a VPN
Backhaul; Requirements	T1 to T3 data rates required at IAPs Fixed wired, Canopy, Fiber, or Microwave	T1 to T3 data rates required at IAPs Fixed wired, Canopy, Fiber or Microwave
Appropriate Tier of Applications Supported	Tier 1 – Tier 4	Tier 1 – Tier 4
Equipment for 1 sq. mi	CONSULT THE CONFIGURATOR TOOL	
Enterprise Features	• Wireless bridge support • Wireless client support • Wireless distribution system • Layer 2 multicast support (pass-through) • DHCP Client • Gateway IP address configurability • Network Time Protocol (NTP) support • AES encryption support (client) • MAC access control lists • VPN pass-through • Domain name server configuration • Web (HTTP) based management interface • SNMP agent for SNMP-based remote management • Telnet interface with command-line management • Configuration of wireless parameters • Firmware update via TFTP • BSS Statistics • Per Station Statistics	
Security		
VPN	FIPS-140-2: Padcom, RadioIP, NetMotion	
Encryption	802.11a/b/g	
Authentication	802.11- Radius EAP, Infrastructure and Client	

Chapter 2: MWR Device Installation

This chapter will provide hardware and software installation information for the HOTZONE DUO MWR device.

Software Requirements

The MWR device must be setup using the HOTZONE DUO MeshManager application suite.

MeshManager is the preferred device setup, configuration, and management method. Prior to using the MeshManager software for device installation and configuration, ensure that it is installed and running on a network computer. MeshManager will be used during the device setup process to validate the installation of the device and to manage it, (as well as other devices) within the wireless network.

The available HOTZONE DUO Device Administration web interface can be used to setup and configure the device by connecting a PC to the wired interface. Please note that the web interface does not offer all the features that are provided within the MeshManager application. Additional web interface information is provided later in the manual.

Detailed information about the MeshManager application is found in the *HOTZONE DUO MeshManager Users Guide*.

MWR Hardware Installation Notes

The MWR (and the IAP) provides a fixed location reference for Geo-Location and wireless routing for units in the area of coverage.

For a HOTZONE DUO deployment, a permanent power source for each MWR must be provided. All infrastructure devices require professional installation to ensure that the installation is performed in accordance with Motorola installation standards.

Infrastructure devices are fitted with two mounting brackets designed to be attached to light poles and other probable installation sites. Alternate mounting hardware is available for mounting directly to

posts or structures that are too large for the standard brackets. Optional remote antenna mount hardware is also available for use with the alternate mounting hardware.

Equipment Specification

The specifications listed in the following table apply for all Infrastructure devices.

Table 2-2 HOTZONE DUO Infrastructure Device Radio Characteristics

Characteristic	2.4GHz	5.8GHz
	802.11 b/g	802.11
Output Power	27 dBm	26 dBm
RF Modulation	CCK/OFDM	OFDM
Operating Frequency (GHz)	2.4-2.4835	5.725-5.825
Maximum Burst Data Rate	54 Mbps	54 Mbps
Spectrum Used	20 MHz	20 MHz

The following list defines the standard hardware components for IAPs and MWRs.

- Device Enclosure with 2 N-type Female Antenna Connector
- 120V A/C Power Cable with a NEMA 5-15 plug
- 2 Antennas with N-type Male Antenna Connector
- Weatherproof RJ-45 Connector
- Mounting Bracket (Standard and Optional)

The Network Operator must supply the following equipment.

- Mounting Location
- Power Source (120V/240V A/C 50/60 Hz)
- Ethernet connection between the IAP and the MiSC

Optional Antennas

The following antennas are recommended for use with Infrastructure devices.

Table 2-3 Recommended Antennas for Infrastructure Devices

Manufacturer	Part Number	Gain	Usage
Radiall-Larsen	R380700212	8 dBi	2.4 GHz Infrastructure
Radiall-Larsen	R380.500.226	10dBi	5.8 GHz Infrastructure

MWR Device Assembly

Figure 2-2 shows the external connection points for the MWR device.

Figure 2-2 Infrastructure Device External Connection Points (TBD)



MWR Device Deployment and Installation

The MWR device requires professional installation to ensure that the installation is performed in accordance with Motorola installation standards. All common precautions for grounding and electrostatic discharge protection should be observed during deployment and installation.

Observe the following additional guidelines when deploying fixed Infrastructure devices (MWR and IAP):

- The MWR may be mounted on a pole having a diameter of 1-3.5 inches, utilizing the provided bracket.
- The antenna must have a separation distance of at least 2 meters from the body of all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- Users and installers must be provided with antenna installation and transmitter operating conditions to satisfy RF exposure compliance.
- When deploying the MWR, the antenna should be a minimum of 30 inches from any nearby metal poles to avoid distortion of the RF pattern.

- The installation location must provide power to the MWR.
- It is the responsibility of the Network Operator to ensure that the installation complies with any local building codes and permits.

Assembling the MWR Device

Use the following procedure to assemble a MWR Device.

Procedure 2-1 Assembling the MWR Device

1	Place the brackets at the desired position on the pole.
2	Adjust the position of the box so that the antenna connectors are positioned vertically. Align the antennas with the N-type connectors on the box and rotate to close.
3	Insert the cable into the external Ethernet port and tighten the connector to ensure a weatherproof seal.
4	Insert the Power Plug into the 4-pin connector.

Initial MWR Device Configuration Information

Prior to attempting configuration of a MWR device, the device must be powered up and have connectivity to the MiSC.

The Geo-location coordinates are entered into an infrastructure device via the **Device Manager** Network management tool installed on the MeshManager server (refer to the **MeshManager Users Guide**). Motorola recommends that a DGPS receiver be used to obtain accurate GPS coordinates.



NOTE

The longitude, latitude, and altitude values should be entered to a precision of 5 digits following the decimal point.

Device Connectivity Testing

When a MiSC has been setup on the network, verify connectivity to the device using the following procedure:

Procedure 2-2 Testing MWR Device Connectivity

1	Apply power to the device, the device should be operation in 60 to 120 seconds
2	Obtain the 802.11 MAC addresses for the device subcomponents that were recorded in the MAC Address Table earlier in this manual. The address will be in the format 02-05-12-30-xx-yy.
3	Within MeshManager's Device Manager screen, right-click on the appropriate MWR device in the Device Tree and select the Ping Device option.
4	Check for a successful response to the Ping command in the <i>Named Device</i> results dialog box. A successful response to the ping commands verifies connectivity to the device (MWR).
5	Repeat steps 1-4 for additional MWR devices.

Chapter 3: Customer Information

This chapter provides information about how to obtain customer service support from Motorola and describes the type of information you should have available prior to making the support call.

Customer Service Information

If you have read this document and made every effort to resolve installation or operation issues yourself and still require help, please contact Motorola System Support Center (SSC) using the following contact information:

Hours of Operation

7 days a week, 24 hours

Technical Support: 800-221-7144 (USA)

Obtaining Support

Motorola provides technical support services for your system and recommends that you coordinate warranty and repair activities through the Motorola System Support Center (SSC). When you consult the Motorola SSC, you increase the likelihood that problems are rectified in a timely fashion and that warranty requirements are satisfied. Check your contract for specific warranty and service information.

System Information

To be provided with the best possible opportunity for support, collect the following system information and have it available when obtaining support.

- Location of the system
- Date the system was put into service
- Software or firmware version information for components of your system

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- Serial number(s) of the device(s) or component(s) requiring support
- A written description of the symptom or observation of the problem:
 - When did it first appear?
 - Can it be reproduced?
 - What is the step-by-step procedure to cause it?
- Do other circumstances contribute to the problem? For example, changes in weather or other conditions?
- Maintenance action preceding problem:
 - Upgrade of software or equipment
 - Change in the hardware or software configuration
 - Software reload - from backup or from CD-ROM (note the version and date)

Return Material Request

After collecting system information, contact the Motorola System Support Center for assistance or to obtain a Return Material Authorization (RMA) number for faulty Field Replaceable Entities (FREs):

North America: 800-221-7144

Radio Products and Services Division

The Radio Products and Services Division is your source for manuals and replacement parts.

Radio Products and Services Division Telephone Numbers

The telephone numbers for ordering are: (800)-422-4210 (US and Canada orders)

The fax numbers are: (800)-622-6210 (US and Canada orders)

The number for help identifying an item or part number is (800)-422-4210; select choice "3" from the menu

Returning System Components to Motorola

Motorola's service philosophy is based on field replaceable entities (FREs). FREs are system components identified by Motorola to be returned to Motorola for repair.

Returning FREs

Return faulty field replaceable entities (FREs) to Motorola for repair. When you return an assembly for service, follow these best practices:

- Place any assembly containing CMOS devices in a static-proof bag or container for shipment.
- Obtain a return authorization (RA) number from the Motorola System Support Center.

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- Include the warranty, model, kit numbers, and serial numbers on the job ticket, as necessary.
- If the warranty is out of date, you must have a purchase order.
- Print the return address clearly, in block letters.
- Provide a phone number where your repair technician can be reached.
- Include the contact person's name for return.
- Pack the assembly tightly and securely, preferably in its original shipping container.

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Chapter 4: Certification and Safety Information

This chapter lists the relevant FCC Certification and Product Safety Information for the HOTZONE DUO devices described in this manual.

FCC Regulatory Information

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.

The MWR requires professional installation to ensure the installation is performed in accordance with Motorola installation standards.

Federal Communications Commission (FCC) Statement:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 2 meters between the radiator and your body.

Safety Information for the HOTZONE DUO Products

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The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. Motorola HOTZONE DUO products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual and the hardware and software guides on the HOTZONE DUO CD will result in user exposure that is substantially below the FCC recommended limits.

- Do not touch or move the antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; otherwise, the radio may be damaged.

Safety Certification



Conforms to UL STD ANSI/UL 60950 3rd Edition

Certified to CAN/CSA C22.2 NO. 60950-00

Equipment shall be suitable for use in Air pressure: 86kPa to 106kPa.