Enterprise Core Systems Engineering Reference Manual: Hospitality High Density Wi-Fi Access Router

PRODUCT IDENTIFICATION

The hospitality high density Wi-Fi access router (Model HHR-8848) is a purpose-built, carrier-grade routing platform engineered to address the unique connectivity challenges of modern hospitality environments. This system delivers concurrent session support for up to 4,000 guest endpoints, integrated WLAN controller functionality, and advanced subscriber management — all within a compact 1RU form factor. Designed for hotels, resorts, convention centers, and multi-dwelling unit (MDU) deployments, this router eliminates the need for external gateway appliances while providing wire-speed NAT, stateful firewall, and per-user QoS enforcement.



CORE INTERNAL TOPOLOGY

The HHR-8848 architecture centers around a dual-core 2.2 GHz network processor with hardware-accelerated forwarding plane and dedicated cryptography engine. A 40 Gbps non-blocking fabric interconnects the CPU complex, switch ASIC, and four integrated 802.11ax Wi-Fi radio modules (2.4 GHz + 5 GHz + 6 GHz tri-band support). The system incorporates 16 GB DDR4 DRAM for session table storage and 8 GB eMMC flash for firmware and configuration persistence. A separate 4 MB internal SRAM buffer handles microburst absorption and per-flow queue management without CPU intervention.

SWITCHING SUBSYSTEM CAPABILITIES

The integrated 8-port Gigabit Ethernet switch (with 2x 2.5 GbE uplinks and 1x SFP+ 10 GbE fiber uplink) operates in cut-through mode delivering sub-3 microsecond port-to-port latency. Hardware offload supports VLAN 802.1Q (4K active IDs), QinQ double tagging, and GVRP dynamic registration. The routing engine processes IPv4/IPv6 dual stack at line rate with static routes, OSPFv2/v3, BGP-4, and policy-based routing (PBR). For hospitality-specific deployments, the platform includes captive portal acceleration, RADIUS accounting proxy, and DHCP option 82 relay agent insertion.

OPERATIONAL ADVANTAGES

- Zero-touch provisioning (ZTP) via DHCP option 150, lowering deployment time from hours to under 10 minutes per 500-unit rollout
- Per-user bandwidth shaper with 32,000 concurrent flows and hierarchical token bucket (HTB) algorithm ensuring fair airtime distribution across access points
- On-board RADIUS server supporting 1,500 local user credentials or proxying to external AAA with EAP-PEAP and EAP-TLS methods
- Smart RF management: automatic channel selection, transmit power control, and band steering to offload legacy 2.4 GHz clients
- Built-in rogue AP detection with over-the-air scanning while maintaining client service—no dedicated scanning radio required
- Integrated packet capture buffer (256 MB circular) for remote troubleshooting and compliance logging

SPECIFICATION MATRIX

Wi-Fi Standard: 802.11ax (Wi-Fi 6E) tri-band, 8x8 MU-MIMO upstream/downstream

Maximum Guest Sessions: 4,000 concurrent (license upgradeable to 8,000)

NAT Throughput (IMIX): 2.5 Gbps

IPsec VPN Throughput (AES-256-GCM): 1.2 Gbps

Concurrent VPN Tunnels: 256 (site-to-site) + 512 (remote access)

Firewall Policies: 5,000 with stateful inspection

Routing Table Size (IPv4): 8,000 entries

MAC Address Table: 16,000 entries

Jumbo Frame Support: up to 9,216 bytes

Operating Temperature: 0°C to 50°C (32°F to 122°F)

Storage Temperature: -40°C to 70°C (-40°F to 158°F)

Humidity: 5% to 95% non-condensing

Acoustic Noise: 38 dBA typical (fan speed adaptive)

MTBF (25°C): 282,000 hours (Telcordia SR-332)

Parameter	Specification
Form Factor	1RU Standard (19-inch rack-mountable), 44mm x 440mm x 350mm
Switching Capacity	40 Gbps non-blocking fabric (backplane + radio aggregate)
Power Supply	Dual hot-swappable internal AC 100-240V (50/60Hz), 60W max consumption per unit, optional DC

	-48V variant
Ethernet Interfaces	8x 10/100/1000BASE-T (RJ45), 2x 2.5GBASE-T, 1x 10G SFP+ fiber uplink (compatible with SR, LR, and copper SFP)
Wi-Fi Radio Modules	4x integrated M.2 2230 cards, each supporting 2x2:2 802.11ax tri-band, total 8x8 MU-MIMO
Management Ports	1x RJ45 console (115200 baud), 1x 1GbE dedicated out-of-band management (RJ45), USB 2.0 host for firmware recovery

REGULATORY COMPLIANCE

EMC: FCC Part 15 Class A, EN 55032 Class A, EN 55035, ICES-003 Issue 7

Safety: IEC 62368-1:2018, UL 62368-1, CSA C22.2 No. 62368-1

Wireless Radio: FCC 15.407 (5 GHz), FCC 15.247 (2.4 GHz), ETSI EN 301 893, EN 300 328, EN 303 687 (6 GHz draft), RSS-247 Issue 3 (Canada)

Environmental: RoHS3 (EU 2015/863), REACH SVHC, WEEE compliant

Certifications: Wi-Fi Alliance CERTIFIED (Wi-Fi 6E), EasyMesh, Passpoint (Release

3)

