



OpenWrt Software Release Notes

Morse Micro Evaluation Kit Software



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1 Overview

This OpenWrt software release introduces a range of new features for the MM6108 and MM8108 evaluation kits, which are now available for evaluation and development.

2 Software Change History

2.1 Release 3.0.2 (MM6108)

Release 3.0.2 is the latest release for the OpenWrt-based evaluation kits, following the previous 2.12.6 release. Starting with the 3.x series, MM6108 and MM8108 drivers/firmware are maintained as separate components within OpenWrt, and each may be updated independently. OpenWrt releases may update one driver while leaving the other unchanged. In this release, version 3.0.2 covers MM6108 only with no updates to MM8108. The most significant change relative to 2.12.6 is the update of the driver/firmware for MM6108 from 1.17.9 to 2.0.1; MM8108 driver/firmware remains at version 1.17.9.

2.1.1 New Features

- Updated the MM6108 driver/firmware to 2.0.1 (from 1.17.9)
- Added Brazil (BR) country code handling in OpenWrt for Wi-Fi HaLow
- Airtime Fairness is enabled by default

2.1.2 Feature Improvements

- 802.11s Mesh improvements:
 - Mesh peer count raised to 20
 - Added mesh keep-alive
 - Default Mesh Point beacon interval set to 1000 ms (configurable 1000–2000 ms)
 - Default mesh RSSI threshold changed from –85 dBm to –80 dBm

2.1.3 Known Issues

2.1.3.1 System stability and performance

- Multi-STA throughput instability and medium monopolization: in larger setups (more than 4 stations), a few stations can monopolize the medium and starve others
 - At 8 MHz, TCP uplink throughput is lower than expected with 7 stations
 - At 4 MHz, UDP downlink is unstable with more than 5 stations, and TCP fails with 7 stations
 - At 2 MHz and 1 MHz, downlink and TCP uplink are spotty or collapsing, and reliable only with 1–3 stations

- DPP association reliability: DPP may occasionally fail and need a retry
- Association and roaming: CAC association can take longer under load
- 802.11s Mesh: stability and throughput gaps remain after the 3.0 mesh improvements
- Fragmentation: Thin LMAC does not support fragmentation
- UDP traffic can have up to 1.6% packet loss under heavy load, though maximum throughput can still be achieved

2.1.3.2 GUI and EasyMesh

- The GUI permits transmission power settings that exceed BCF regulatory constraints; however, these values are not applied even though no error message is shown
- ARP-scan diagnostics dropdown does not show wireless interface names
- Range-Test field needs a validation limit, and there is a header mismatch in the exported CSV
- EasyMesh agent advertises an incorrect model name/serial in the 1905 AP-Autoconfiguration WSC packet, and may fail to re-associate after a Controller SSID change with WPS retry

Please refer to the Linux Software Release Notes for comprehensive details regarding the new features and known issues introduced in the 2.0.1 (MM6108) driver/firmware update.

2.2 Release 2.12.6

Release 2.12.6 is the latest release for the Openwrt-based evaluation kits, building on the 2.11.12 release. The 2.12.6 release updates the base to OpenWrt 24.10.5, integrates a **beta S1G driver**, and steps the Morse driver/firmware to 1.17.9, together with a range of GUI, channelization, roaming, multi-STA, and stability improvements.

2.2.1 New Features

- Updated OpenWrt version from 23.05.5 to 24.10.5
 - Updates the Linux kernel from v5.15.167, with v6.1.110-1 mac80211 backport, to v6.6.119, with a v6.12.61 mac80211 backport.
- Introduces a beta S1G (NS1G) driver integrated alongside the existing Morse driver, with in-GUI driver switching.
 - Enables an evaluation platform for NS1G support
- Integrates release 1.17.9 of the Linux Firmware and Driver Package for MM6108 and MM8108.
 - Please refer to the Linux Firmware and Driver Package Release Notes for details regarding release 1.17.9
- SSH and HTTP are disabled by default (only the HTTPS web UI is accessible)
- Digicert-based OpenSSL image signature verification applies (unsigned images require forcing / enforce_fw_sign='0')
- Default Morse interface name changed from `wlanX` to `wlhX`

2.2.2 Feature Improvements

2.2.2.1 System stability and performance

- Fixed unsanitized network password fields when generating sysdumps
- Improved disassociation behavior
 - Fixed AP's incorrectly disassociating stations
- Improved DPP push button behavior
 - Increased scan dwell time
- Fixed STA disconnect after long-running periods
- Fixed Wi-Fi HaLow interface failing to come up on hard power cycle
 - Renamed the default Morse interface name from ``wlanX`` to ``wlhX``
- Fixed Wi-Fi HaLow interface failing to come up when switching between USB ports on USB devices

2.2.2.3 Mesh and networking improvements

- Fixed the previously associated agent, which was sometimes unable to reconnect after a controller channel change
- Fixed agent 2.4GHz SSID not automatically syncing with the controller
- Fixed extender not inheriting mesh gate's channelization parameters

2.2.3 Known Issues

2.2.3.1 Constraints with new native S1G feature

- As NS1G is marked as a Beta product, it is expected that not only will features be limited, but users will go through a more manual configuration process than the default Morse path. For example, the Morse Wizards are not compatible with the NS1G driver. The intended use for NS1G currently is a basic AP/STA setup, and configuration will be done primarily through the Quick Config/Network pages.
- Userspace applications such as *iwinfo* and the frontend may report slightly erroneous information.

2.2.3.2 Unbalanced downlink distribution and crashes in multi-STA scenarios

- In multi-STA setups, an unbalanced downlink distribution may be observed when traffic is sent simultaneously to more than four stations, with the first two associated stations potentially monopolizing the medium.
- Even with `enable_airtime_fairness` enabled, an AP crash may occur when more than 6 stations saturate the downlink.

2.2.3.3 Performance constraints on MM6108

- UDP throughput over IPv6 is lower than IPv4 when using 4 MHz and 8 MHz channels
- In regulatory domains with duty-cycle restrictions (e.g., EU, Japan), MCS10 may not provide usable bandwidth without Burst Mode
 - Workaround: Enable Burst Mode

2.2.3.4 Networking and protocol behavior on MM6108 & MM8108

- Intermittent STA association latency may occur, occasionally resulting in an “MFP required” error report.
- In rare circumstances, it is possible that despite DPP succeeding in both AP and STA and credentials being correctly provisioned, they will fail to reach a connected state.
 - Workaround: Wait for the DPP lockout period and retry.

2.2.3.5 Receive degradation at 2 MHz near -73 dBm RSSI on MM8108

- Some degradation is observed at 2 MHz, with an RSSI of approximately -73 dBm.
 - Workaround: Increase or decrease the RSSI by 2 dB to resolve this issue.

2.2.3.6 Receive degradation at 1 MHz at strong signals on MM8108

- Some degradation is seen at 1 MHz at strong signal levels.
 - Workaround: Move the devices farther apart to lower the signal strength.

2.2.3.7 Intermittent STA association failure at very close range on MM8108

- When pairing two devices at very close range, the STA may intermittently fail to join the device due to excessively strong received signal levels (greater than -10 dBm).
 - Workaround: Ensure a minimum separation of 2 meters between the AP and STA before initiating the pairing sequence to maintain reliable association. An improvement is planned for the next firmware release.

2.3 Release 2.11.12

This section summarizes software changes made since release 2.9.3.

2.3.1 New Features

- Integrate release 1.17.8 of the Linux Firmware and Driver Package for MM6108 and MM8108.
 - Please refer to the Linux Firmware and Driver Package Release Notes for details regarding release 1.17.8
- Updated AU channelization support (IEEE 802.11-2024)
 - Aligns Australian channel definitions with the latest IEEE 802.11-2024 specification
- Scheduled Scan support
 - Enables periodic background scanning for improved network discovery and roaming
- 802.11s Mesh support (Beta) on MM8108
 - Enables multi-node mesh networking with dynamic routing and self-healing capabilities

2.3.2 Feature Improvements

2.3.2.1 Security compliance improvements

- Updated OpenSSL configuration to meet current security standards

2.3.2.2 Multi-STA performance

- Improved multi-STA performance (validated up to 8 stations)
- Improved interference performance on MM8108 under challenging RF conditions

2.3.2.3 System stability and performance

- Enhanced Automatic Channel Selection (ACS):
 - Avoids invalid/disabled channels
 - Improved ACS noise measurement behavior
- Improved QoS handling:
 - Improved resilience to QoS Control field mismatches
 - Offloaded features now use QoS Data frames
- Improved channel handling:
 - Wider channels no longer disabled due to sub-channel restrictions
- Improved scan and association behavior:
 - Fixed scan timeout behavior and standby recovery issues
 - Fixed probe response bandwidth handling

- Improved driver stability:
 - Fixed memory handling issues during hardware restart
- Improved system behavior under interference conditions on MM8108
- Power save behavior update on MM8108
 - SDIO clock pin now enters high-impedance state during power save
 - Reduces unintended power consumption

2.3.2.4 Mesh and networking improvements

- On MM8108:
 - Introduction of 802.11s mesh (Beta)
- On MM6108:
 - Optimizations to 802.11s mesh (HWMP)
 - Improved multi-hop traffic handling (including DHCP propagation)
 - Avoided unnecessary HWMP frames when other mesh protocols are used

2.3.2.5 Power and efficiency improvements

- On MM6108:
 - Optimized TIM handling under duty cycle constraints
 - Reduced unnecessary host wakeups through firmware-based packet filtering
- On MM8108:
 - Improved power-saving behavior through:
 - WNM Sleep
 - Dynamic TWT
 - SDIO power handling improvements

2.3.2.6 Platform updates

- Updated regulatory support:
 - IEEE 802.11-2024 AU channelization
 - EU and GB region support

2.3.2.7 Documentation

- Updated user guide:
 - Lists open network ports with usage context
 - Includes additional configuration guidance

2.3.3 Known Issues

2.3.3.1 Unbalanced downlink distribution in multi-STA scenarios

- In multi-STA setups, an unbalanced downlink distribution may be observed when traffic is sent simultaneously to more than four stations, with the first two associated stations potentially monopolizing the medium.
 - Workaround: Enable airtime fairness on both MM8108 & MM6108 (enable_airtime_fairness=1).

2.3.3.2 Performance constraints on MM6108

- UDP throughput over IPv6 is lower than IPv4 when using 4 MHz and 8 MHz channels
- In regulatory domains with duty-cycle restrictions (e.g., EU, Japan), MCS10 may not provide usable bandwidth without Burst Mode
 - Workaround: Enable Burst Mode

2.3.3.3 Networking and protocol behavior on MM6108

- Intermittent STA association latency may occur, occasionally resulting in an “MFP required” error report.
- In rare cases, DPP provisioning may fail and require a retry.

2.3.3.4 Receive degradation at 2 MHz near -73 dBm RSSI on MM8108

- Some degradation is observed at 2 MHz, with an RSSI of approximately -73 dBm.
 - Workaround: Increase or decrease the RSSI by 2 dB to resolve this issue.

2.3.3.5 Receive degradation at 1 MHz at strong signals on MM8108

- Some degradation is seen at 1 MHz at strong signal levels.
 - Workaround: Move the devices farther apart to lower the signal strength.

2.3.3.6 Intermittent STA association failure at very close range on MM8108

- When pairing two devices at very close range, the STA may intermittently fail to join the device due to excessively strong received signal levels (greater than -10 dBm).
 - Workaround: Ensure a minimum separation of 2 meters between the AP and STA before initiating the pairing sequence to maintain reliable association. An improvement is planned for the next firmware release.

2.4 Release 2.9.3

This section summarizes software changes made since the previous release.

2.4.1 New Features

- Support for MM8108, including BCFs for MM8108-based modules
 - The MM8108 is the next-generation Wi-Fi HaLow SoC developed by Morse Micro. It offers a highly integrated, low-power, single-chip Wi-Fi HaLow connectivity solution. It supports long-range data rates up to 43 Mbps using 256-QAM modulation over the air at 8 MHz bandwidth in the sub-1 GHz (license-exempt) bands worldwide. For more details, visit morsemicro.com/chips
- Integrate release 1.16.4 of the Linux Firmware and Driver Package for MM6108 and MM8108.
 - Please refer to the Linux Firmware and Driver Package Release Notes for details regarding release 1.16.4.
- Support for the new MM8108-EKH19 evaluation kit
 - The MM8108-EKH19 is a new evaluation kit that combines an off-the-shelf router running OpenWRT with a Morse Micro USB network adapter, providing a fully integrated Wi-Fi HaLow connectivity experience
- USB hot-plugging support for MM8108-based devices
 - Hotplugging allows USB devices to be plugged in and removed while the host router is powered and without requiring a reboot.

2.4.2 Feature Improvements

- The EasyMesh topology viewer now shows the bridge MAC address
- EasyMesh will now manage all Wi-Fi radios, rather than just HaLow
 - This means that network credentials and configuration changes for all Wi-Fi radios will be synchronized across agents. To function, this requires that the radio be included in the br-prpl bridge network
- Support added for EU and GB regions. ACS and DCS are always enabled for the EU to allow 100% duty cycle operation on 2MHz channels
- Support has been added for MM8108 FullMAC mode (beta - not for production)
 - This allows the upper MAC layer of the network stack to run on the MM8108, which reduces the processing load on the host CPU
 - Note that this feature is released for beta testing, integration, and development. It is not considered suitable for mass production
- The Web UI now shows which BCFs are installed on the device, along with some basic metadata about each BCF
 - If multiple BCFs are present, it is possible to select which one to use
- The range testing UI now uses OpenStreetMaps for visualizing the range test

- The range testing UI allows the location to be manually populated
- Multiple SSIDs running on a single Wi-Fi HaLow radio are supported in OpenWrt
- Various improvements have been made to DPP push-button pairing to enhance the speed and reliability of pairing

2.4.3 Other Improvements

- Introduced a 4.3V FEM mode option, with platform-specific support handling for clarity and consistency
- Enhanced reliability of upgrades over Wi-Fi HaLow, reducing the likelihood of timeout errors
- Improved user guide display on mobile browsers for a smoother, more accessible experience
- Optimized USB hotplug detection across platforms for consistent and accurate device recognition

2.4.4 Known Issues

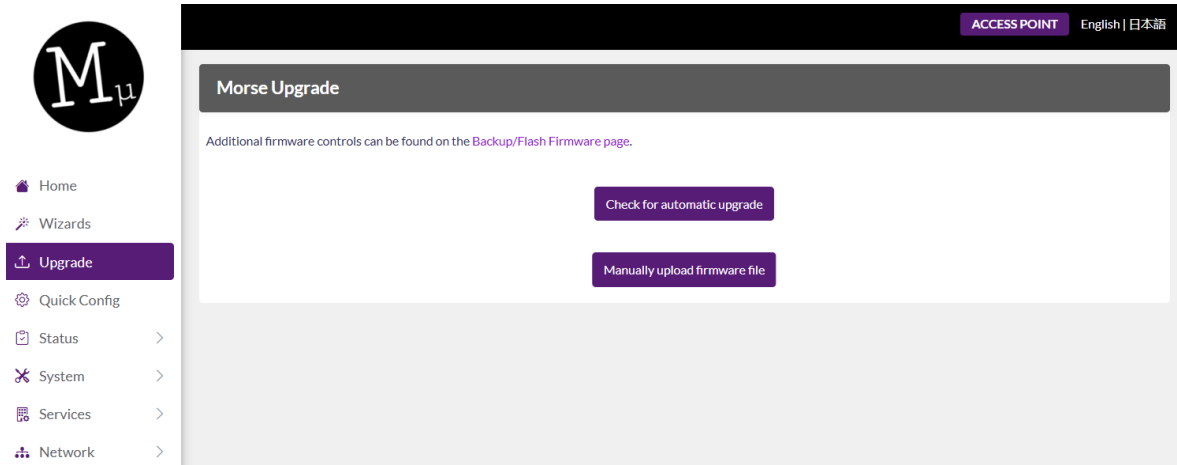
- In some cases, EasyMesh agents may not join the mesh as expected or may not appear correctly in the connection map.
- While not officially supported in the 1.16 MM8108 driver, 802.11s mesh can still be configured and used in non-production environments.
- MM6108 EKH devices may occasionally drop connections under heavy traffic conditions, but will automatically recover. The root cause is still under investigation.
 - Workaround: If this behavior is causing a significant impact in your environment, you can mitigate it by disabling the `disassoc_low_ack` setting in the wireless configuration with the following commands:

```
uci wireless.<wifi-iface>.disassoc_low_ack='0'  
uci commit  
reload_config
```

- The new MM8108 driver does not yet include all features available on the MM6108. For a detailed list of supported features, see the MM8108 1.16.4 release notes.
- Power saving is currently unavailable for Wi-Fi HaLow radios connected via the USB interface

3 Upgrade Guide

The device can be easily upgraded via the built-in Web UI by navigating to the Upgrade page.



If the device is connected to the Internet, select “Check for automatic upgrade” and follow the on-screen instructions.

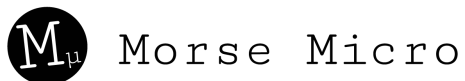
Alternatively, you may perform a manual upgrade by uploading the firmware through a web browser. To do this, select “Manually upload firmware file”, choose the appropriate file from your local system, and follow the prompts to complete the process. The device will automatically reboot once the upgrade is finalized.

Configuration settings can be retained during version upgrades but not during downgrades. Unless configuration preservation is specifically required, we recommend starting with a fresh configuration to prevent legacy settings from previous versions from carrying over.

4 Revision History

Release Number	Release Date	Release Notes
Version 4	1 Jul 2026	Maintenance release 3.0.2 (MM6108)
Version 3	26 Jun 2026	Maintenance release 2.12.16
Version 2	1 May 2026	Maintenance release 2.11.12
Version 1	23 Sep 2025	Initial release 2.9.3

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Morse Micro Pty. Ltd. Corporate Headquarters

Level 8, 10-14 Waterloo Street, Surry Hills, NSW 2010, AUSTRALIA

Email: sales@morsemicro.com

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