Canonical

Ubuntu Desktop Certified Hardware Coverage for 24.04 LTS

Canonical

Contents

1. Introduction

This document lists the coverage for certification of Ubuntu Desktop 24.04 LTS.

For each test job, one of the following certification statuses is specified:

Blocking
: Features that are required for certification. If any of the blocking tests fails, the certification will fail.

Non-blocking
: Features that are tested but not mandatory for certification. Failure in non-blocking tests will not prevent certification. However, a note will be added to the certificate to inform potential customers or users.

> **Note**
>
> Only categories of hardware are tested and not specific types of hardware. For example, tests are run to verify USB controllers work, but the type of peripheral(s) used during those tests are not specified.
>
> Coverage is flexible based on customer requirements (for example, if a device's use cases don't require LEDs, then LEDs can be non-blocking)

Certain test jobs are designed to validate specific hardware capabilities, such as camera and audio playback functionality. To ensure that the required hardware capabilities are present and properly recognised on the machine under test, these features are explicitly defined in *manifest entries* and linked to the relevant test jobs. This prevents test jobs from being skipped due to system deficiencies in automated detection.

Full test descriptions can be found in Canonical certification site for partners:

https://certification.canonical.com

2. client-cert-desktop-24-04

Note

The certification tests presented in this document are validated by Checkbox[1] version *4.4.0.dev55*.

2.1. Blocking

2.1.1. Audio tests

Output sound needs to be undistorted between 0%-100%. Output lines tested:

- Internal speakers
- 3.5mm headphones
- 3.5mm headset
- HDMI audio output
- DisplayPort audio output
- Thunderbolt 3 audio output

Input needs to be recorded undistorted between 0%-100%. Input lines tested:

- Internal microphone
- 3.5mm microphone
- 3.5mm headset

Plug detection: when a new audio line input or output is plugged in the system, it needs to be recognized.

The following test units are covered in this category:

Test unit ID	Summary
`audio/alsa_record_playback_external`	Verify external microphone sound recording and playback.
`audio/alsa_record_playback_internal`	Test internal microphone recording and playback functionality.
`audio/microphone-plug-detection`	Ensure that the system can detect when a microphone is plugged in.
`audio/playback_auto`	Ensure the internal speakers are working by playing a tone.
`audio/playback_headphones`	Verify headphone connectivity and audio playback quality.
`audio/speaker-headphone-plug-detection`	Ensure the system automatically detects when speakers or headphones are plugged in.

[1] https://github.com/canonical/checkbox/tree/beta

2.1.2. Bluetooth tests

Bluetooth LE (Smart and Smart Ready) is tested for device scanning and pairing. Apart from pairing, several profiles are specifically tested and required:

- Audio (A2DP)
- HID Over GATT Profile (HOGP), Low-Energy keyboard or mouse with basic functionality
- File transfer (OBEX)
- Bluetooth LE advertisement (Scan)

The following test units are covered in this category:

Test unit ID	Summary
`bluetooth/audio-a2dp`	Verify Bluetooth device's High Fidelity Playback (A2DP) capability.
`bluetooth/audio_record_playback`	Verify Bluetooth HSP/HFP profile capability for recording and playback.
`bluetooth/bluetooth_obex_send`	Bluetooth OBEX send
`bluetooth/detect-output`	Store Bluetooth device information for reports.
`bluetooth4/HOGP-keyboard`	Verify HOGP keyboard functionality with Bluetooth Smart.
`bluetooth4/HOGP-mouse`	Test the functionality of a Bluetooth Smart mouse using HID Over GATT Profile.
`bluetooth4/beacon_eddystone_url_interface`	Test system can get beacon EddyStone URL advertisements on the {{ interface }} adapter

2.1.3. Camera tests

Internal main webcams are tested to be able to take static pictures and video.

The following test units are covered in this category:

Test unit ID	Summary
`camera/detect`	This Automated test attempts to detect a camera.
`camera/display_name`	Webcam video display test for {product_slug}
`camera/led_name`	Webcam LED test for {product_slug}
`camera/multiple-resolution-images_name`	Webcam multiple resolution capture test for {product_slug}
`camera/still_name`	Webcam still image capture test for {product_slug}

2.1.4. CPU tests

x86_64 and ARM processors are tested to ensure proper functionality. We will test specific features as:

- CPU's performance states (frequency up and down in runtime)
- CPU's sleep states (cpu on and off in runtime)
- Running CPU at its maximum frequency

We will also include a general stress test performed for 120 minutes to verify that the system can handle a sustained high load for a period of time. This test uses the tool "stress-ng" available in the Universe repositories.

The following test units are covered in this category:

Test unit ID	Summary
cpu/cstates	Run C-States tests
cpu/maxfreq_test	Test that the CPU can run at its max frequency
cpu/offlining_test	Test offlining of each CPU core
cpu/scaling_test	Test the CPU scaling capabilities
cpu/topology	Check CPU topology for accuracy between proc and sysfs

2.1.5. Disk tests

The following test units are covered in this category:

Test unit ID	Summary
disk/detect	Gathers information about each disk detected
disk/read_performance_name	Disk performance test for {product_slug}
disk/storage_device_name	Disk I/O stress test for {product_slug}
thunderbolt3/storage-manual	Thunderbolt 3 HDD storage insertion + read/write + removal

2.1.6. Ethernet Device tests

- Connections are tested for functionality, but not for performance.
- Hot plugging must be supported and working.

The following test units are covered in this category:

Test unit ID	Summary
ethernet/detect	Detect if at least one ethernet device is detected
ethernet/hotplug-interface	Ensure hotplugging works on port {{ interface }}

2.1.7. Graphics tests

The ability to run the desktop environment out of the box is required. When certifying, stock Ubuntu open source drivers need to work to complete the installation of Ubuntu, although proprietary drivers are accepted, if they are installable through Ubuntu Drivers.

Laptops

- The integrated display is tested with its highest resolution (up to 4k). At its highest resolution, the image should look clean, without any type of corruption.
- Each of the available external video ports (currently supported: HDMI, DisplayPort, Mini DisplayPort, Thunderbolt 3) are tested one by one. Hot plugging and different modes (mirror, extended, just internal, just external) are required to work. If several external ports are available, they are not required (nor tested) to work simultaneously.

- Display brightness. It should be possible to dim the brightness of the internal display.
- The system must support Gnome Shell 46 and basic 3D rendering.
- On systems with Hybrid graphics, BIOS default mode must be “Hybrid”. This is the only mode required to work for certification.
- Hybrid graphics:
  - On systems with an integrated and an NVidia discrete GPU, users should be able to run graphics workloads in the discrete GPU.
  - On systems with an integrated and an AMD discrete GPU, users should be able to run graphics workloads in the discrete GPU.
  - On systems with an integrated and an Intel discrete GPU, users should be able to run graphics workloads in the discrete GPU.

Desktops with an integrated display (aka All-In-Ones)

- The integrated display is tested with its highest resolution. At its highest resolution (up to 4k), the image should look clean, without any type of corruption.
- The integrated display must support Gnome Shell 46 and basic 3D rendering.
- The system must support display rotation (0°, 90°, 180°, 270°)
- Each of the available external video ports (currently supported HDMI, DisplayPort, Mini DisplayPort, Thunderbolt 3) are tested one by one. Different modes (mirror, extended, just internal, just external) are required to work. If several external ports are available, they are not required (nor tested) to work simultaneously.

Desktops without an integrated display

- The system is tested using the default BIOS Graphics settings.
- Each of the available external video ports (currently supported HDMI, DisplayPort, Mini DisplayPort, Thunderbolt 3) are tested one by one, at their highest resolution (up to 4k). Different modes (mirror, extended, just internal, just external) are required to work.
- If several external ports are available, no matter how many ports are designed to work synchronously on the graphic controller, only two of them (regardless of the combination) are supported simultaneously (dual-head), unless the hardware does not support two monitors setup.
- The system must support Gnome Shell 46 and basic 3D rendering.
- The system must support display rotation (0°, 90°, 180°, 270°)
- Desktops with multiple discrete GPUs are not supported; we only support one discrete GPU, as above.

Convertible Laptops (aka 2-in-1s)

- The system must support display rotation (0°, 90°, 180°, 270°)
- The desktop environment must rotate automatically when sensors detect a rotation
- A swipe up from the bottom edge of the touchscreen should bring up the on-screen keyboard

The following test units are covered in this category:

Test unit ID	Summary
graphics/VESA_drivers_not_in_use	Test that VESA drivers are not in use
graphics/auto_glxgears	Test that glxgears works for current video card
graphics/auto_glxgears_fullscreen	Test that glxgears works in full screen mode for current video card
graphics/valid_glxgears	Test that glxgears works for current video card
graphics/valid_glxgears_fullscreen	Test that glxgears works in full screen mode for current video card

2.1.8. Hotkey tests

- Super key (Windows logo key). The Super key needs to show all open windows.
- Volume. Output volume needs to react to up and down volume keys
- Volume mute. Audio output needs to be muted and unmuted when pressing the volume mute key.
- Microphone mute key: Audio input should be stopped and could be continued when pressing again.
- Brightness. Internal display brightness needs to react to brightness keys.
- Monitor. Several display modes need to react to the monitor hotkey.
- Media control. Keys that control media play need to be able to control a video played through “Totem” or an audio file played through “Rhythmbox”
- Wireless. Soft and hard wireless keys need to turn on and off wireless and Bluetooth in the system
- Non-RGB Keyboard backlight. Backlight of the internal keyboard needs to be turned on and off when pressing the keyboard backlight key.
- Power button. When the system is booted, pressing the power button will bring up the dialog to power off, reboot or log out from the system.

The following test units are covered in this category:

Test unit ID	Summary
keys/brightness	Test the brightness keys functionality on the keyboard.
keys/keyboard-backlight	Test the functionality of the keyboard backlight toggle key.
keys/lock-screen	Test the functionality of the screen lock key.
keys/media-control	Test media keys functionality on the keyboard.
keys/microphone-mute	Test the microphone mute key functionality.
keys/mute	This test checks if the mute key on the keyboard operates as expected.
keys/power-button	Test if the power management prompt appears upon pressing the power button.
keys/power-button-event	Check power button event filtering
keys/sleep	Test the functionality of the sleep key on the keyboard.
keys/super	Test the functionality of the super key on your keyboard.
keys/video-out	Validate the functionality of the External Video hot key with an external monitor.
keys/volume	Test the functionality of the volume keys on the keyboard.
keys/wireless	Test the functionality of the wireless key on keyboards with special keys.

2.1.9. Input Devices tests

Integrated input devices

- Internal keyboard (basic functionality)
- TrackPoint

The following test units are covered in this category:

Test unit ID	Summary
input/accelerometer	Test the accelerometer's detection and operation as a joystick device.
input/clicking_product_slug_category___index__	Check button functionality for {product}
input/keyboard	Test the functionality of your keyboard.
input/pointing_product_slug_category___index__	Check pointing functionality for {product}

2.1.10. LED tests

LED indicators are very common in laptops and some types of desktops. When those exist, they will be tested by following some basic expectations here. The actual behavior may vary depending on the hardware design. To ensure that the behavior is working as expected, please be sure to test against specifications obtained from OEM, as each OEM may have different defined behavior for LEDs.

- Power/suspend button LED. This needs to work as prescribed by OEM's expected LED behavior.
- Suspend chassis LED. This needs to work as prescribed by OEM's expected LED behavior.

- Volume mute LED. This needs to work as prescribed by OEM's expected LED behavior.
- Microphone mute LED. Fixed light when input volume is muted.
- Caps lock LED. Fixed light when input is set to all caps.
- Num lock LED. Fixed light when numeric keypad is on.
- Power supply LED. This needs to work as prescribed by OEM's expected LED behavior.
- Camera LED. Fixed light when the camera is on.

The following test units are covered in this category:

Test unit ID	Summary
`led/caps-lock`	Verify the functionality of the Caps Lock LED by pressing the Caps Lock key.
`led/microphone-mute`	Verify the functionality of the Microphone Mute LED.
`led/mute`	Verify the functionality of the Audio Mute LED.
`led/numeric-keypad`	Verify the function of the numeric keypad LED by toggling and typing with it.
`led/power`	Power LED behavior when powered
`led/power-blink-suspend`	Power LED behavior when suspended
`led/suspend`	Verify if the Suspend LED blinks or changes color while the system is suspended.
`led/wireless`	Verify the WLAN/Bluetooth LED functionality by toggling wireless connections.

2.1.11. Media Card tests

Media Card readers are tested for read and write for the following type or cards:

- SD
- SDHC

The following test units are covered in this category:

Test unit ID	Summary
`mediacard/sdhc-storage-manual`	Test SDHC card insertion + read/write + removal.

2.1.12. Memory tests

Proper detection of the amount of memory installed is required (the amount of memory installed is the memory seen by the OS).

The following test units are covered in this category:

Test unit ID	Summary
`memory/info`	Check the amount of memory reported by meminfo against DMI

2.1.13. Miscellaneous tests

The following test units are covered in this category:

Test unit ID	Summary
miscellanea/check_prerelease	Test that the system is not a pre-release version
miscellanea/debsums	Check the MD5 sums of installed Debian packages
miscellanea/grub_file_check	Check if the file core.efi exists to make sure shim and grub can be upgraded
miscellanea/oops	Run FWTS OOPS check
miscellanea/ubuntu-desktop-minimal-recommends	Check that all the recommended packages for ubuntu-desktop-minimal are installed
miscellanea/ubuntu-desktop-recommends	Check that all the recommended packages for ubuntu-desktop are installed

2.1.14. Monitor tests

The following test units are covered in this category:

Test unit ID	Summary
monitor/multi-head	Verify multi-monitor output functionality on desktop systems.

2.1.15. Non-device specific networking tests

The following test units are covered in this category:

Test unit ID	Summary
networking/gateway_ping	Verifies if the system can connect to the Internet.
networking/info_device__index___interface	Network Information of device {__index__} ({interface})
networking/ntp	Test NTP server synchronization capability.

2.1.16. Optical Drive tests

Optical drives are tested for read based on specifications of the optical unit. Depending on the unit theoretical feature support, we will test:

- CD read capabilities (data only)
- DVD read capabilities (data only)
- Blu Ray-disc read capabilities (data only)

The following test units are covered in this category:

Test unit ID	Summary
optical/detect	Displays discovered optical drives
optical/read-automated_name	Tests read functionality of optical drive {name}

2.1.17. Power Management tests

Suspend/Resume

A 30 cycle suspend/resume stress test is performed using the fwts suspend test. Only the default suspend method (S3 or s2idle) is required to work. The test is passed if all 30 cycles complete without failure. Any errors reported in the fwts log for the 30 cycle suspend/resume stress test are informational only and do not affect the outcome of the test, however, we do recommend examining and fixing any failures noted, as they indicate firmware non-compliance with standards.

Apart from the stress test, a single cycle suspend/resume is performed, if it's a hybrid graphic system, suspend and graphic related functionalities are required to work flawlessly on the On-demand mode, and the following features and devices are tested and need to work after suspend:

- CPU
- Memory
- Networking (Wifi, Ethernet)
- Audio
- Bluetooth
- Display resolutions should be consistent before and after suspend
- USB and Thunderbolt controllers
- Input devices
- Mediacards

Cold/Warm boot

Both cold boot and warm boot are tested and required to work. Cold reboot is performed where an RTC is available (see next section).

The following features and devices are tested and need to work after cold/warm boot:

- USB and Thunderbolt controllers

The following test units are covered in this category:

Test unit ID	Summary
power-management/cold-reboot	Cold reboot
power-management/fwts_wakealarm	Executes ACPI Wakealarm test to validate functionality.
power-management/lid	Check if the laptop lid sensors cause the system to suspend when the lid is closed.
power-management/lid_close_suspend_open	Test the functionality of the laptop's lid sensor for suspend/resume actions.
power-management/post-cold-reboot	Post cold reboot service check
power-management/post-warm-reboot	Post warm reboot service check
power-management/rtc	Test that RTC functions properly (if present)
power-management/tickless_idle	Verify the tickless idle feature configuration in the kernel.
power-management/warm-reboot	Warm reboot

2.1.18. Suspend tests

The following test units are covered in this category:

Test unit ID	Summary
suspend/audio_after_suspend_auto	Verify mixer settings consistency after system suspend.
suspend/audio_before_suspend	Record mixer settings before suspending.
suspend/cpu_after_suspend_auto	Ensure all CPUs are online post-resumption.
suspend/cpu_before_suspend	Verify that all the CPUs are online before suspending
suspend/display_after_suspend	Verify if the display functions normally after a suspend and resume cycle.
suspend/memory_after_suspend_auto	Ensure all memory is accessible after waking from suspend mode.
suspend/memory_before_suspend	Dumps memory info to a file for comparison after suspend
suspend/network_after_suspend_auto	Verify the network functionality after system resume.
suspend/network_before_suspend	Record the current network before suspending.
suspend/oops_after_suspend	Run fwts oops tests post-suspension to ensure system stability.
suspend/resolution_after_suspend	Verify resolution consistency after resuming from suspension.
suspend/resolution_before_suspend	Record the current resolution before suspending.

2.1.19. Touchpad tests

Capacitive touchpads are tested for single touch and multitouch. Functionality tested:

- Single touch, including single tap and double tap
- Scrolling feature (horizontal and vertical) should work either with the edge scrolling option or the 2 finger scrolling option.

The following test units are covered in this category:

Test unit ID	Summary
`touchpad/basic`	<missing summary>
`touchpad/continuous-move`	Verify that the touchpad supports continuous movement without interruption.
`touchpad/detected-as-mouse`	Check if the touchpad is recognized as a mouse by the system.
`touchpad/drag-and-drop`	Test the drag and drop functionality on the touchpad.
`touchpad/multitouch`	Test the touchpad's 2-finger scroll functionality.
`touchpad/multitouch-rightclick`	Test the right-click function of touchpad with a multi-touch gesture.
`touchpad/singletouch-selection`	<missing summary>

2.1.20. Touchscreen tests

Touch screens are tested for single touch and multitouch. Functionality tested:

- Single touch, including single tap and double tap
- For multitouch touch screens with more than two finger support, at least 4 finger gestures must be recognized by the OS. Gestures tested include:
  - 2 finger expand/pinch zoom
  - 3 finger touch-tap
  - 4 finger touch-tap

The following test units are covered in this category:

Test unit ID	Summary
`touchscreen/drag-n-drop`	Assess touchscreen functionality for drag & drop tasks.
`touchscreen/evdev/2-touch-tap-product_slug`	Validate proper detection of a 2-touch tap on touchscreen devices.
`touchscreen/evdev/3-touch-tap-product_slug`	Validate proper detection of a 3-touch tap on touchscreen devices.
`touchscreen/evdev/4-touch-tap-product_slug`	Validate the detection of a 4-touch tap on touchscreen devices.
`touchscreen/evdev/single-touch-tap-product_slug`	Validate the detection of a single-touch tap on touchscreen devices.
`touchscreen/multitouch-zoom`	Check touchscreen pinch gesture for zoom

2.1.21. TPM 2.0 (Trusted Platform Module)

The following test units are covered in this category:

Test unit ID	Summary
clevis-encrypt-tpm2/detect-ecc-capabilities	Ensure the TPM has required capabilities for clevis ECC test
clevis-encrypt-tpm2/detect-rsa-capabilities	Ensure the TPM has required capabilities for clevis RSA test
clevis-encrypt-tpm2/ecc	clevis encrypt/decrypt key ecc
clevis-encrypt-tpm2/precheck	clevis encrypt/decrypt precheck
clevis-encrypt-tpm2/rsa	clevis encrypt/decrypt key rsa

2.1.22. USB tests

USB 2.0

USB storage devices must work on all available USB ports. USB Human Interface Devices (HID), specifically keyboard or mouse, should be working properly on any USB port.

USB 3.2

USB storage devices must work on all available USB ports. USB Human Interface Devices (HID), specifically keyboard or mouse, should be working properly on any USB port.

USB Type-C

USB Type-C supports various types of devices (e.g. Video, Power) through the use of adapters or peripherals. The following adapters/peripherals should work:

- Storage devices
- Keyboard or mouse (basic functionality)
- When DisplayPort over USB Type-C is advertised:
  - Display hot plugging and the following display are required to work: mirrored, extended, internal only, external only.
  - Audio output needs to be undistorted over this port.

USB4

USB controllers are tested using storage devices in all available USB ports. And the USB human interface device, keyboard or mouse, should be working properly with any USB port.

- Storage devices
- Keyboard or mouse (basic functionality)
- For USB4 controllers that support Thunderbolt, Thunderbolt functionality will be tested

The following test units are covered in this category:

Test unit ID	Summary
usb-c/c-to-a-adapter/hid	USB HID work on USB Type-C port using a “USB Type-C to Type-A” adapter
usb-c/c-to-a-adapter/storage-manual	Test USB 3 storage device insertion + read/write + removal using a “Type-C to Type-A” adapter.
usb-c/storage-manual	USB 3.0 storage device insertion + read/write + removal on USB Type-C port
usb/detect	Display USB devices attached to SUT
usb/hid	USB keyboard works
usb/storage-manual	Test USB 2.0 storage device insertion + read/write + removal.
usb3/storage-manual	Test USB 3.0 storage device insertion + read/write + removal.

2.1.23. Wireless networking tests

Wi-Fi interfaces are tested for connection to access points configured for 802.11 b/g/n/ac/ax (Wi-Fi 6) protocols.

The following test units are covered in this category:

Test unit ID	Summary
wireless/wireless_connection_open_ac_nm_interface	Connect to unencrypted 802.11ac Wi-Fi network on {{ interface }}
wireless/wireless_connection_open_ac_np_interface	Connect to unencrypted 802.11ac Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_open_ax_nm_interface	Connect to unencrypted 802.11ax Wi-Fi network on {{ interface }}
wireless/wireless_connection_open_ax_np_interface	Connect to unencrypted 802.11ax Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_open_be_nm_interface	Connect to unencrypted 802.11be Wi-Fi network on {{ interface }}
wireless/wireless_connection_open_be_np_interface	Connect to unencrypted 802.11be Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_open_bg_nm_interface	Connect to an unencrypted 802.11b/g Wi-Fi network on {{ interface }}
wireless/wireless_connection_open_bg_np_interface	Connect to unencrypted 802.11b/g Wi-Fi network on {{ interface }} using netplan
wireless/wireless_connection_open_n_nm_interface	Connect to an unencrypted 802.11n Wi-Fi network on {{ interface }}
wireless/wireless_connection_open_n_np_interface	Connect to unencrypted 802.11n Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa3_ax_nm_interface	Connect to WPA3-encrypted 802.11ax Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa3_ax_np_interface	Connect to WPA3-encrypted 802.11ax Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa3_be_nm_interface	Connect to WPA3-encrypted 802.11be Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa3_be_np_interface	Connect to WPA3-encrypted 802.11be Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa_ac_nm_interface	Connect to WPA-encrypted 802.11ac Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa_ac_np_interface	Connect to WPA-encrypted 802.11ac Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa_ax_nm_interface	Connect to WPA-encrypted 802.11ax Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa_ax_np_interface	Connect to WPA-encrypted 802.11ax Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa_be_nm_interface	Connect to WPA-encrypted 802.11be Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa_be_np_interface	Connect to WPA-encrypted 802.11be Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa_bg_nm_interface	Connect to WPA-encrypted 802.11b/g Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa_bg_np_interface	Connect to WPA-encrypted 802.11b/g Wi-Fi network on {{ interface }} - netplan
wireless/wireless_connection_wpa_n_nm_interface	Connect to a WPA-encrypted 802.11n Wi-Fi network on {{ interface }}
wireless/wireless_connection_wpa_n_np_interface	Connect to a WPA-encrypted 802.11n Wi-Fi network on {{ interface }} using netplan
wireless/wireless_scanning_interface	Test system can discover Wi-Fi networks on {{ interface }}

2.1.24. Wireless Wide Area Network

The following test units are covered in this category:

Test unit ID	Summary
wwan/detect	Identify if WWAN module is missing
wwan/gsm-connection-manufacturer-model-hw_id-auto	Verify a GSM broadband modem can create a data connection

2.2. Non-blocking

2.2.1. Advanced Configuration and Power Interface

The following test units are covered in this category:

Test unit ID	Summary
acpi/oem_osi	Test ACPI OEM _OSI strings

2.2.2. Audio tests

The following test units are covered in this category:

Test unit ID	Summary
audio/alsa_info_attachment	Attach audio hardware data collection log to the results.
audio/alsa_info_collect	Collect audio-related system information for simulation and detailed testing.
audio/alsa_record_playback_automated	Test playback and recording functionality on the default audio input and output.
audio/channels	Verify that all audio channels are functioning correctly by hearing a voice clearly from them.
audio/detect_sinks	Ensure audio sinks are available for detection.
audio/external-linein	Verify external line-in connection functionality by recording and playback testing.
audio/external-lineout	Verify external line out connection functionality by inserting a cable to speakers, selecting 'Line Out' in system sound preferences, and testing sound channels.
audio/list_devices	Check if audio devices can be detected.
audio/valid-sof-firmware-sig	Ensure SOF firmware signature is valid.

2.2.3. Benchmarks tests

The following test units are covered in this category:

Test unit ID	Summary
benchmarks/disk/hdparm-cache-read_name	Cached read timing benchmark of {name} using hdparm
benchmarks/disk/hdparm-read_name	Raw read timing benchmark of {name} using hdparm

2.2.4. Camera tests

The following test units are covered in this category:

Test unit ID	Summary
camera/camera-quality-image_name	Attach the image used for the BRISQUE score for {product_slug}
camera/camera-quality_name	Webcam BRISQUE score for {product_slug}
camera/multiple-resolution-images-attachment_name	Attach an image from the multiple resolution images test for {product_slug}

2.2.5. CPU tests

The following test units are covered in this category:

Test unit ID	Summary
cpu/clocktest	Tests the CPU for clock jitter
cpu/cstates_results.log	Attach C-States test log
cpu/maxfreq_test-log-attach	Attach CPU max frequency log
cpu/scaling_test-log-attach	Attach CPU scaling capabilities log

2.2.6. Disk tests

The following test units are covered in this category:

Test unit ID	Summary
disk/apste_support_on_name	Check support for Autonomous Power State Transition on {name}
disk/check-software-raid	Validate the configuration of software RAID devices are expected
disk/hdd-parking	Test the system's hard drive protection mechanism.
disk/stats_name	Disk statistics for {product_slug}
thunderbolt3/daisy-chain	Daisy-chain testing for Thunderbolt 3 storage and display device

2.2.7. Ethernet Device tests

The following test units are covered in this category:

Test unit ID	Summary
ethernet/iperf3_reverse_interface	Iperf3 stress testing for {interface} (reverse)
ethernet/iperf3_interface	Iperf3 stress testing for {interface}
ethernet/wol_S3_interface	Wake on LAN (WOL) test from S3 - {interface}
ethernet/wol_S5_interface	Wake on LAN (WOL) test from S5 - {interface}

2.2.8. Fingerprint reader tests

The following test units are covered in this category:

Test unit ID	Summary
fingerprint/delete	Remove existing fingerprint signatures
fingerprint/detect	Check if at least one fingerprint reader is detected
fingerprint/enroll	Enroll a fingerprint
fingerprint/unlock	Fingerprint unlock screen
fingerprint/verify-match	Fingerprint positive match
fingerprint/verify-no-match	Fingerprint negative match

2.2.9. Firmware tests

The following test units are covered in this category:

Test unit ID	Summary
firmware/fwts_desktop_diagnosis	Run FWTS QA-concerned desktop-specific diagnosis tests.
firmware/fwts_desktop_diagnosis_results.log.gz	Attach FWTS desktop diagnosis log to submission
firmware/fwts_dump_acpi_attachment.gz	Collect the ACPI tables dump from FWTS
firmware/fwupdmgr_get_devices	Collect the device firmware update information

2.2.10. Gathers information about the DUT

The following test units are covered in this category:

Test unit ID	Summary
cpuinfo	Collect information about the CPU
dpkg	Collect information about dpkg version
inter-face	Collect information about interfaces
lsb	[DEPRECATED, use 'os' instead] Collect information about installed operating system (os-release)
meminfo	Collect information about system memory (/proc/meminfo)
package	Collect information about installed software packages
snap	Collect information about installed snap packages
uname	Collect information about the running kernel

2.2.11. Hotkey tests

- The function keys from external keyboards shipped with the AIO system are supposed to work.
- RGB Keyboard backlight. Backlight of the internal keyboard needs to be turned on and off when pressing the keyboard backlight key.

The following test units are covered in this category:

Test unit ID	Summary
keys/fn-lock	<missing summary>

2.2.12. Informational tests

The following test units are covered in this category:

Test unit ID	Summary
acpi_sleep_attachment	Attach the contents of /proc/acpi/sleep for further analysis.
codecs_attachment	Attach a report of installed codecs for Intel HDA.
cpuinfo_attachment	Attach a copy of /proc/cpuinfo
dkms_info_attachment	Attaches json dumps of installed dkms package information.
dmesg_attachment	Attach a copy of dmesg or the current dmesg buffer to the test
dmi_attachment	Attach a copy of /sys/class/dmi/id/*
dmidecode_attachment	Attach output of dmidecode
efi_attachment	Attaches firmware version info
info/buildstamp	Attaches the buildstamp identifier for the OS
info/disk_partitions	Attaches info about disk partitions
info/hdparm_name.txt	Attaches info from hdparm about {name}
info/kernel-config-iommu-flag	Check if the kernel is compiled with IOMMU support
info/secure-boot-check	Check secure boot state
info/systemd-analyze	System boot-up performance statistics
info/systemd-analyze-critical-chain	Print the tree of the time-critical chain of SystemD
info/touchpad_driver	Gather touchpad name, driver name, and driver version informat
installer_debug.gz	Attach the installer's debug log for diagnostic purposes.

continues on ne

Table 1 – continued from previous page

Test unit ID	Summary
kernel_cmdline_attachment	Attach a copy of /proc/cmdline
lsmod_attachment	Attach a list of currently running kernel modules
lspci_attachment	Attach a list of PCI devices
lspci_standard_config_attachment	Attach PCI configuration space hex dump
lstopo_visual_attachment	Attach the output of lstopo command to present system topolo
lsusb_attachment	Attach output of lsusb
manifest	Hardware Manifest
meminfo_attachment	Attach copy of /proc/meminfo
modinfo_attachment	Attach modinfo information
modprobe_attachment	Attach the contents of /etc/modprobe.*
modules_attachment	Attach the contents of /etc/modules
recovery_info_attachment	Attach the recovery partition versions
sysctl_attachment	Attach sysctl configuration files.
sysfs_attachment	Attach detailed sysfs property output from udev
udev_attachment	Attach dump of udev database

2.2.13. Input Devices tests

The following test units are covered in this category:

Test unit ID	Summary
input/fixed_screen_orientation_on_product___index__	Check whether screen orientation is fixed on {product}

2.2.14. LED tests

The following test units are covered in this category:

Test unit ID	Summary
led/fn	Test the Fn key LED functionality by activating/deactivating the Fn keys locking.

2.2.15. Media Card tests

The following test units are covered in this category:

Test unit ID	Summary
mediacard/storage-preinserted-symlink_uuid	Automated test of SD Card reading & writing ({symlink_uuid})

2.2.16. Miscellaneous tests

The following test units are covered in this category:

Test unit ID	Summary
`install/apt-get-gets-updates`	Ensure apt can access repositories and get updates without installing them, to aid in recovery from broken updates.
`miscellanea/chvt`	Verify the system's ability to switch between a virtual terminal and the X session.
`miscellanea/device_check`	Device Check
`miscellanea/oops_results.log`	Attach the FWTS oops results for submission.
`miscellanea/submission-resources`	Check that data for a complete result are present

2.2.17. Power Management tests

Suspend/Resume time

On average, resume time needs to be less than 5 seconds, with an overall suspend/resume time of less than 10 seconds.

The following test units are covered in this category:

Test unit ID	Summary
`power-management/fwts_wakealarm-log-attach`	Attach and display fwts wakealarm test log.
`power-management/light_sensor`	Test the functionality of the Ambient Light Sensor by checking if sensor values and screen backlight change when covered.

2.2.18. Snapd

The following test units are covered in this category:

Test unit ID	Summary
snappy/snap-install	Test the snap install command is working
snappy/snap-list	Test that the snap list command is working.
snappy/snap-refresh-automated	Test whether the snap refresh command is working.
snappy/snap-remove	Test the snap remove command is working.
snappy/snap-reupdate-automated	Test the snap refresh command works after blacklisting.
snappy/snap-revert-automated	Test the snap revert command is working.
snappy/snap-search	Test that the snap find command is working.
snappy/test-snaps-confinement	Test all the snaps' confinement
snappy/test-store-config-store	Test that image is using the correct snappy store configuration.
snappy/test-store-install-beta	Snappy install command - beta channel store
snappy/test-store-install-edge	Snappy install command - edge channel store
snappy/test-system-confinement	Test if the system confinement is strict

2.2.19. Suspend tests

The following test units are covered in this category:

Test unit ID	Summary
suspend/oops_results_after_suspend.log	Attach FWTS oops results log post-suspend.
suspend/suspend-single-log-attach	Attaches the log from the single suspend/resume test
suspend/suspend-time-check	Ensure time to suspend/resume is under threshold

2.2.20. Touchpad tests

Resistive touchpads are tested for single touch and multitouch. The experience of a resistive touchpad is allowed to be worse than a capacitive touchpad (needs higher FTF - force to fire - to active cursor moving).

Functionality tested:

- Single touch, including single tap and double tap
- Scrolling feature (horizontal and vertical) should work either with the edge scrolling option or the 2 finger scrolling option.

The following test units are covered in this category:

Test unit ID	Summary
touchpad/palm-rejection	Evaluate touchpad's palm rejection feature by ensuring it ignores palm touches.
touchpad/palm-rejection-firmware-labeling_product_slug	Check palm rejection firmware/labeling for touchpads

2.2.21. Touchscreen tests

The following test units are covered in this category:

Test unit ID	Summary
touchscreen/multitouch-rotate	Check touchscreen pinch gesture for rotate

2.2.22. TPM 2.0 (Trusted Platform Module)

TPM 2.0 functionality will be tested using clevis[2] encrypt and decrypt commands with both RSA and ECC keys with the following options:

- hash algorithm: sha256
- pcr algorithm bank to use for policy: sha256
- pcr ids: 0 and 1 only

The following test units are covered in this category:

Test unit ID	Summary
tpm2/fwts-event-log-dump	Dump the contents of the TPM Event Log

2.2.23. USB tests

The following test units are covered in this category:

Test unit ID	Summary
usb-c/c-to-ethernet-adapter-insert	Check if USB Type-C to Ethernet adapter works
usb/storage-detect	Detect storage partitions on a device on the USB bus
usb/storage-preinserted-symlink_uuid	Test USB storage on 2.0 or 1.1 ports detected by udev ({symlink_uuid})

2.2.24. Wireless networking tests

- Wi-Fi interfaces are tested for connection to access points configured for Wi-Fi 6E protocol.
- network-manager hotspot mode.

The following test units are covered in this category:

[2] https://manpages.ubuntu.com/manpages/jammy/en/man1/clevis-encrypt-tpm2.1.html

Test unit ID	Summary
wireless/check_iwlwifi_microcode_crash_interface	Check there have been no iwlwifi crashes
wireless/detect	Detect if at least one Wireless LAN device is detected

2.2.25. Wireless Wide Area Network

WWAN interfaces are tested for connection to 3G/4G/LTE services.

The following test units are covered in this category:

Test unit ID	Summary
wwan/3gpp-scan-manufacturer-model-hw_id-auto	Scan for available 3GPP networks with the {model} modem
wwan/check-sim-present-manufacturer-model-hw_id-auto	Check if a SIM card is present in a slot connected to the modem

2.3. Manifest Entries

The following manifest entries are required for certification:

Manifest entry	Summary
has_audio_capture	Audio capture: Machine can record sound. (For example, a desktop
has_audio_playback	Audio playback: Machine can emit sound. (For example, a desktop P
has_bt_obex_support	A Bluetooth Module with OBject EXchange (OBEX) Support
has_bt_smart	A Bluetooth Module with Smart (4.0 or later) Support
has_camera	Camera/Capture Device
has_card_reader	Media Card Reader
has_dvd_bluray_inserted	DVD or Bluray disc inserted
has_ethernet_adapter	An Ethernet Port
has_ethernet_wake_on_lan_support	Wake-on-LAN support through Ethernet port
has_fingerprint_reader	A fingerprint reader
has_headset	Headset (Headphones + Microphone) port
has_internal_microphone	Internal microphone
has_internal_speakers	Internal speakers
has_key_audio_mute	Audio mute
has_key_brightness	Screen brightness up/down
has_key_fn_lock	Function lock (Fn lock)
has_key_keyboard_backlight	Keyboard backlight
has_key_lock_screen	Lock screen
has_key_media_control	Media control (Play, Next, etc.)
has_key_microphone_mute	Microphone mute
has_key_sleep	Sleep
has_key_super	Super (usually the key with the Windows logo)
has_key_video_out	Video out (to toggle video output)
has_key_volume	Volume up/down
has_key_wireless	Wireless on/off

Table 2 – continued from previous page

Manifest entry	Summary
has_led_audio_mute	Audio mute
has_led_camera	Camera
has_led_caps_lock	Caps lock
has_led_fn_lock	Function key lock (Fn lock)
has_led_microphone_mute	Microphone mute
has_led_numeric_keypad	Numeric keypad
has_led_power	Power
has_led_suspend	Suspend
has_led_wireless	Wireless
has_line_in	Line in (Microphone) port
has_line_out	Line out (Headphones) port
has_md_raid	Software RAID
has_sim_card	A working SIM card inserted
has_thunderbolt	Thunderbolt Support
has_thunderbolt3	Thunderbolt 3 Support
has_touchpad	Touchpad
has_touchscreen	Touchscreen
has_tpm2_chip	TPM 2.0 Support
has_usb_storage	USB Storage Device Connected
has_usbc_data	USB Type-C Data (e.g. HID, Drives, Ethernet)
has_wlan_adapter	A Wi-Fi Module
has_wwan_module	A WWAN Module

3. Appendix A. FWTS tests

As part of the certification process, we run a series of firmware tests that are part of the Canonical Firmware Test Suite. In general, any HIGH or CRITICAL error found in the fwts log can cause potential errors in the system and should be looked at by OEMs/ODMs.

Category	Test Item	Description
Information	acpidump	Check ACPI table acpidump.
Information	version	Gather kernel system information.
ACPI	acpitables	ACPI table settings confidence checks.
ACPI	apicinstance	Check for single instance of APIC/MADT table.
ACPI	hpet_check	High Precision Event Timer configuration test.
ACPI	mcfg	MCFG PCI Express* memory mapped config space.
ACPI	method	ACPI DSDT Method Semantic Tests.
CPU	mpcheck	Check Multi Processor tables.
CPU	msr	CPU MSR consistency check.
CPU	mtrr	MTRR validation.
System	apicedge	APIC Edge/Level Check.
System	klog	Scan kernel log for errors and warnings.