Microsoft Teams and Skype for Business Logo Devices Specification

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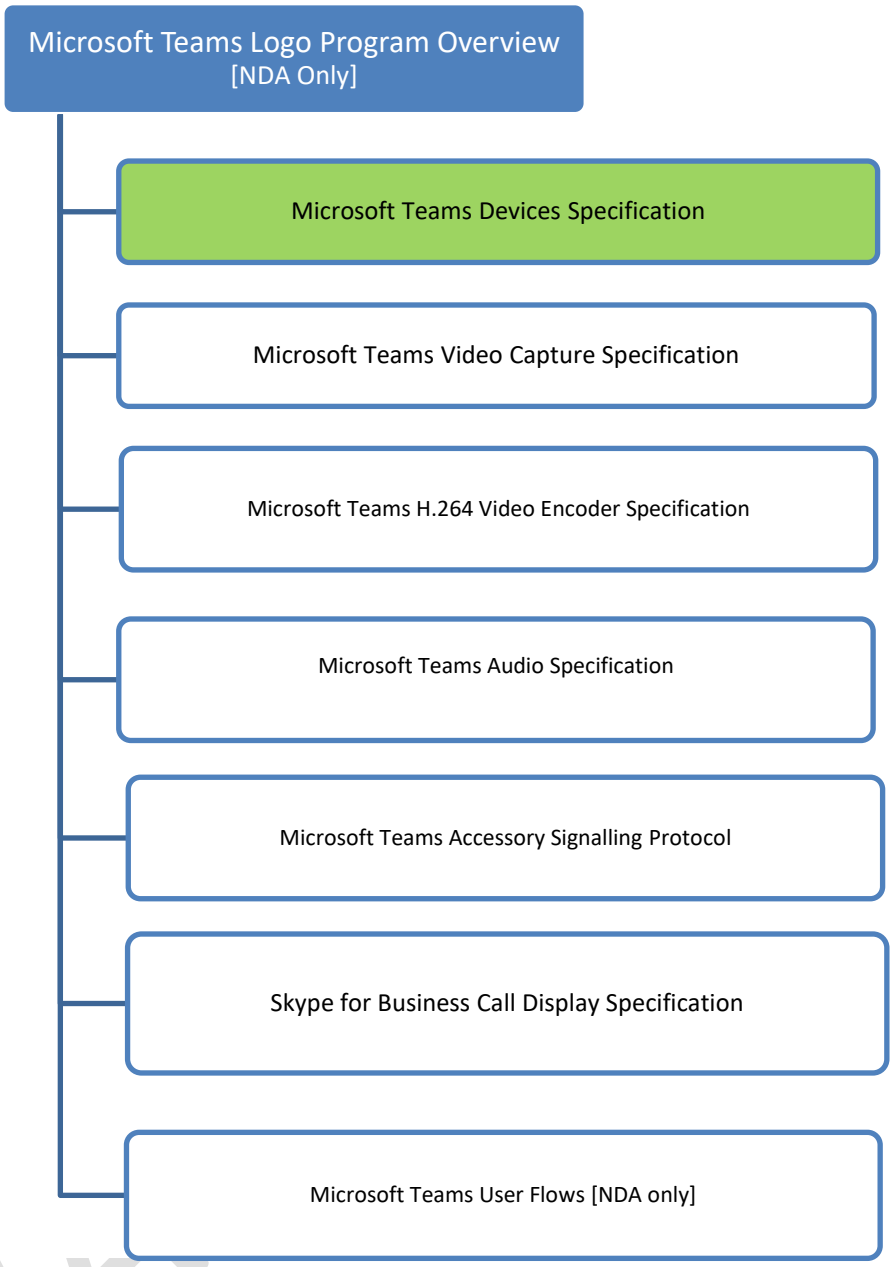
1.0 Revision History

Revision	Date	Description
4.0	8/2019	First specification version to grant Certified for Teams. Removed PC certification category Added: • New categories and category clarifications: Personal & conferencing monitor, Added DSP Mixer category. mobile phone dock category • category specific requirements including industrial design recommendations (6.0) • Changes to requirements matrix (section 3.2) to include beta testing, new categories, and additional footnotes. • Requirement for submission pre-approval for H.264 camera (3.3.6) • beta testing section (3.5). • category notes section (3.2.3) • OOBE and setup (3.5) • Telemetry (3.6) • Teams requirements: notification, invocation, Teams button/LED (4.0 and elsewhere)
3.0	12/2016	Added Skype Room Systems v2 requirements (note: Skype Room Systems is now called Microsoft Teams Rooms)
2.0	9/2014	No changes
1.0	8/2013	First version with unified specification for Lync and Skype. Based on Lync Logo Rev G. Changes: list of HID commands sent to all connected devices; documentation of telephony page voicemail and send commands

2.0 Introduction

The family of documents supporting the Microsoft Teams and Skype for Business Certification Program is shown below and contains detailed requirements that candidate devices being submitted to the *Certification Program* must meet.



The technical requirements listed in this document, the *Microsoft Teams and Skype for Business Devices General Specification*, have been derived solely for the purpose of maximizing interoperability and optimizing the quality of experience of devices used with Microsoft Teams and Skype for Business. Any use of this technical specification for platforms other than optimizing the quality for Microsoft Teams and Skype for Business is not authorized.

Partners who license, develop, market, and/or sell Microsoft Teams and Skype for Business devices that are qualified by Microsoft, are required to adhere to the specifications outlined in this document. Partners seeking changes, modifications and/or additions to this specification will be required to receive written approval from Microsoft before certification of the device. Microsoft reserves the right to update the contents of this technical specification at any time without prior notice. Purposes of such

updates include the capture of new capabilities in Microsoft Teams and Skype for Business platform, new device categories, as well as performance improvements in the hardware used in peripheral devices.

2.1 Evolution from Skype for Business to Teams

Microsoft Teams introduces several new requirements focused on providing devices with the ability to:

- Invoke Teams client
- Notify the user of events from Teams client
- Engage voice skills (cortana powered)

Note: Devices that certify to this specification package will receive the marketing badge for the Certified for Microsoft Teams and Skype for Business. Devices certified to previous specification (V3.0 or before) are only allowed to use the marketing badge associated with Skype for Business unless they complete recertification testing based on this requirement set.

2.2 Additional References

Additionally, this document references the following industry standards:

Document Name	Link
Universal Serial Bus Specification (v2.0)	http://www.usb.org/developers/docs/
Universal Serial Bus HID Usage Tables	http://www.usb.org/developers/devclass_docs/Hut1_12v2.pdf

2.3 Contacting Microsoft

For any questions regarding the requirements detailed in this specification, please contact the certification team by sending an email to TeamsDeviceCert@microsoft.com.

2.4 Terms

This section describes standard terms and conventions used in this document.

AEC	Acoustic Echo Cancellation (AEC), a process by which echo is removed from voice communications to improve audio quality.
Call Control Buttons	Refers to the physical buttons potentially present on a device manufacturer's headset, handset or speakerphone or present on an inline call/sound control for corded devices to manage sound and call activities. These can vary depending on the specific feature set implementation and device partner terminology (e.g., Flash Button, Mute Button, Volume Control, Speaker Button, or Multi-function Control).
Corded	A device is physically connected to a computer's USB port, typically by using a 5 to 7- foot cord.
DECT	Digital Enhanced Cordless Telecommunications (DECT), an ETSI standard for digital portable phones (wireless home telephones) that specifies a means for portable wireless phones to access a fixed telecommunications network via radio. Only wideband implementations of DECT are acceptable for Skype for Business Optimized devices.

DSP	Digital Signal Processing. Typically refers to audio processing such as acoustic echo cancellation (AEC), or noise suppression (NS).
Handsfree	Refers to the scenario when a user or group is not required to physically hold the device to receive and transmit audio signals during a conversation.
Hookswitch	A single button or switch that sends either offhook (answer) or onhook (end call) when activated. Some devices use a single hookswitch due to limited space, while others offer separate answer and end buttons. Alternately may refer to the telephony page HID usage name.
HID	Human Interface Device (HID)
Lync	The Microsoft implementation of unified communications released in 2010.
MTR	Microsoft Teams Rooms is the meeting room solution for Microsoft Teams and Skype for Business.
OFF HOOK	The state of the telephone when the communication switch is open between the device and Skype for Business client.
ON HOOK	The state of the telephone when the communication switch is closed between the device and Skype for Business client.
SRS	Skype Room Systems is the former name for Microsoft Teams Rooms.
UCQ	Unified Communications Qualification (UCQ) descriptor, the set of fields sent to Skype for Business by a telephony HID device indicating the capabilities supported by the device.
Wireless	A device that is not physically connected to the computer and relies on Bluetooth, DECT, or a proprietary radio frequency for audio and data communications to a USB dongle connected to the computer.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

3.0 Device Categories and Requirements

3.1 Category definitions

USB Device Categories are classes of devices grouped by usage scenario and by typical functionality that is specifically intended with USB connected devices. Categories may have sub-types or additional categorization to allow for additional feature and usage differentiation.

The *Logo Program* recognizes and supports different device categories, as follows:

- **Conferencing Monitor** – A personal monitor which contains both an embedded webcam and speakerphone. Note that the speakerphone component must be USB and the device must meet all bi-directional device enumeration requirements. Monitors fall into 2 categories:
    - **Personal** – smaller monitors for individual use (27 inches and below), will be tested as a personal device.
    - **Collaboration Display** - Large Monitors must be tested as a conferencing audio device following the standalone speakerphone category unless it is designed and marketed exclusively for a MTR bundle.
      If a monitor will be marketed for both personal and shared use, OEM must review requirements with Microsoft well in advance of certification to receive approval to submit. In general, such devices will need to meet the requirements for both categories.
- **DSP Mixer –** A USB connected audio mixing hub which connects multiple in-room microphones and speakers, and is intended for large or flexible use meeting rooms. This product is eligible for certification exclusively for use with SRS. Additional requirements beyond the audio/video performance criteria will be communicated to OEMs under NDA.
- **Handsets** – A handset is a corded or wireless device with a form factor resembling a phone hand bar that typically has a dial-pad, but may or may not have a display. Handsets may support a speakerphone mode, but only handset (non-speakerphone) audio mode is evaluated by the *Logo Program*.
- **Headsets** – This category comprises two sub-types of headsets: corded headsets and wireless headsets. A corded headset is physically connected to the computer's USB port by the device's audio transmission cable. A wireless headset consists of a handsfree headset with a boom microphone or a fitted ear device, the latter consisting of an ear bud speaker and a small boom fitted with a microphone. Wireless headsets connect to the computer by using a USB dongle.
    - **Basic Headsets** – This category is intended to offer very inexpensive headsets which provide uncompromised audio performance. To be eligible for this category the MSRP must be below a target threshold, and other limitations apply. Partners must contact Microsoft at beginning of project for approval prior to certification.
- **Mobile Phone Dock** – a Bluetooth connected peripheral for mobile phones, which offers charging capability (wireless for supported phones), and rich teams integration.
- **Personal PCs** –a computer form factor intended for personal use. As of June 2019, certification for PCs is no longer allowed under the Skype for Business certification program (specification version 3) and there is not currently a Microsoft Teams certification program for PCs. This

means that the only computer form factors that are eligible for certification are those that meet MTR requirements.

- **Microsoft Teams Rooms** (MTR) – A compute unit (PC) designed for meeting room usage. If the SRS has integrated audio and/or video, it must meet the webcam and speakerphone requirements defined by this specification for the relevant room size. SRS systems which do not have integrated audio and/or video are not covered by this specification. Additional requirements beyond the audio/video performance criteria will be communicated to OEMs under NDA.
- **Speakerphones** – A speakerphone is a USB or wireless device with a microphone and speaker that is designed for handsfree personal use, or for a conference setting. There are 2 categories of requirements for speakerphones and OEMs can target one or both depending on their deployment and marketing intentions. Devices which only target a single category are only certified for use in that type of deployment. The 2 categories are:
    - ***Standalone speakerphone*** – intended for scenarios where users will connect the speakerphone to a desktop client rather than MTR. Unless device is included in an approved MTR bundle, it must meet requirements for this category. Portable (Puck style) speakerphones and collaboration displays are examples of this category.
    - ***MTR speakerphone*** – intended for connection exclusively to MTR systems. This category requires less HID and call control button functionality because the MTR console is designed to be the primary user interface and is always available (compared w/ desktop where the Teams client could be in background). Soundbar speakerphones and larger fixed (non-portable) speakerphones are examples of this category.
- **USB Desk Phones** – A USB desk phone is a corded device with a dial pad, display, speakerphone, and extensive call control features and is designed to replace a typical desktop phone.
- **USB Camera** – A camera used for either personal use when connected to a PC, or for conferencing use. If the camera is part of a bundle with a speakerphone, both speakerphone and camera requirements apply.

3.2 USB Device Categories and Requirements Matrix

The following table identifies mandatory and optional requirements for each of the Microsoft Teams and Skype for Business device categories.

3.2.1 Personal Devices

M	Mandatory Feature
O	Optional Feature
-	Not Applicable

Requirements	Section		Handsets	Headsets	Basic Headsets	Speakerphones	Personal Monitor	Mobile Phone Dock	USB Desk Phones
General	3.4.1	Windows & Mac Operating Systems	M	M	M	M	M	-	M
	3.4.5.1	USB 2.0 Support	M	M	O	M	M	-	M
	3.4.2	Firmware Update	M	M	O	M	M	-	M
	3.4.5.3	UCQ Descriptor	M	M	M	M	M	-	M
	3.4.5.4	Power	M	M	M	M	M	-	M
	3.4.6	No Driver Installation	M	M	M	M	M	M	M
	3.4.3	Bidirectional Audio Device Enumeration	M	M	M	M	M	-	M
Call Control	5.1	HOOK SWITCH with LED	M	M	O	M	M	M	M
	5.2	Volume Control[1]	M	M	O	M	M	M	M
	5.3	Mute Button and LED	M	M	O	M	M	M	M
	5.4	Flash	O	O	O	O	O	O	M
Call Indicators/LED	5.5	Off Hook, Mute	M	M	M	M	M[2]		M
Dial Pad	5.6	Standard Telephone Keypad	M	O	O	O	-	O	M
Standard buttons	-	Hookswitch (or separate onhook/offhook), mute	M	M	M	M	M[2]		M
Audio	See Microsoft Teams Audio Specification		M	M	M	M	M	M	M
Call Display[3]	See Skype for Business Call Display Specification		O	O	O	O	-	O	M
Beta Testing	3.7		M	M	M	M	M	M	M
New requirements for TEAMS interaction[4]									

[1] Volume control is optional for small form factor earbuds due to limited button interface space.

[2] Monitors, MTR Speakerphones and DSP Mixers are not required to have a physical hookswitch but are required to have a mute button. They must claim support for hook switch via USB HID otherwise mute won't work. (contact Microsoft for details)

[3] At the time of publication, call display and dialpad is supported in Skype for Business but not in Teams.

[4] The Teams interaction requirements are only tested with Teams clients. No backwards compatibility with Skype for Business is expected at this time. If Skype for Business adds

Cortana	4.2		M	M	M	M	M	M	M
Teams Button	4.1.1		M	M	M	M	M	M	M
Teams LED	4.1.1		M	M	M	M	M	M	M
OOBE and Setup	3.5		M	M	M	M	M	M	M
Telemetry	3.6		M	M	O	M	M	M	M
Audible Notifications	4.3		M	M	M	M	M	M	M

3.2.2 Meeting Room Devices & cameras

M	Mandatory Feature
O	Optional Feature
-	Not Applicable

Requirements	Section		Group Monitor	USB Camera[5]	MTR Speakerphone	Standalone Speakerphone	DSP Mixer
General	3.4.1	Windows & Mac Operating Systems	M	M	M[6]	M	M[7]
	3.4.5.1	USB 2.0 Support	M	M	M	M	M
	3.4.2	Firmware Update	M	M	M	M	M
	3.4.5.3	UCQ Descriptor	M	-	M	M	M
	3.4.5.4	Power	M	M	M	M	M
	3.4.4	No Driver Installation	M	M	M	M	-
	3.4.3	Bidirectional Audio Device Enumeration	M	-	M	M	M
Call Control	5.1	HOOK SWITCH with LED	O[2]	-	O[2]	M	-
	5.2	Volume Control	M	-	O	M	-
	5.3	Mute LED	M		M	M	-
	5.4	Flash	O	-	O	O	-
Call Indicators/LED	5.5	Off Hook, Mute	M[2]	-	M	M	-
Dial Pad	5.6	Standard Telephone Keypad	-	-	-	-	-

support for any of these then testing would also be conducted using Skype for Business for those features.

[5] OEMs seeking to certify USB cameras intended for personal use should contact Microsoft at least 9 months prior to certification.

[6] MTR Speakerphones are only supported for use with MTR therefore only Windows OS is required (check for supported Windows 10 versions for MTR at time of certification).

[7] *DSP Mixers are only supported for use with MTR, therefore only Windows OS is required (check supported Windows 10 versions for MTR at time of certification).*

Standard buttons	-	Hookswitch (or separate onhook/offhook)	M[2]	-	O	M	-
	5.3	Mute Button	M	-	M[8]	M	-
Audio	See Microsoft Teams Audio Specification		M	M[9]	M		M
Video	See Skype for Business Video Capture Specification and H.264 encoding Specification (Applicable to webcams supporting H.264)		M	M	-	-	-
Call Display[3]	See Skype for Business Call Display Specification		-	-	-		
Beta Testing	3.7		M	M	M	M	M
New requirements for TEAMS interaction[10]							
Cortana	4.2		M	-	M	M	M
Teams Button	4.1.1		-	-	O	M[11]	-
Teams LED	4.1.1		-	-	O	M	-
OOBE and Setup	3.5		-	-	O	M	-
Telemetry	3.6		M	M	M	M	M
Audible Notifications	4.3		-	-	O	M	-

3.2.3 Skype for Business only certification

Devices certified against version 3 of this specification set were certified for Skype For Business, and devices certified against version 4 of this specification will be granted certification for Microsoft Teams and Skype for Business.

As of publication of this version 4 specification, submissions for Skype for Business certification (V3 specification) are no longer accepted.

3.2.4 Teams Certification upgrades

Existing Skype for Business device models can be upgraded to deliver much of the value of a newly designed for Teams certification device. To encourage partners to invest in the firmware updates, so that we can bring Teams integration to the largest set of users, previously certified devices will be allowed to re-certify against the V4 requirements (retesting required) and will be allowed several exceptions. These exceptions apply only to units that were shipped as Skype for Business certified product, and which were certified before the deadline to transition to Teams certification.

[8] Mute button not required for MTR Speakerphone installed as Front-of-Room device.
[9] Conference webcams are strongly recommended to not expose microphone to OS unless as part of a soundbar (microphone for camera framing purposes is recommended). If webcam supports a microphone, it must comply for send requirements for the usage distances that the product is certified for.
[10] The Teams interaction requirements are only tested with Teams clients. No backwards compatibility with Skype for Business is expected at this time. If Skype for Business adds support for any of these then testing would also be conducted using Skype for Business for those features.
[11] Teams Button behavior in MTR mode may vary from standalone mode.

Exceptions:

- Devices will not be required to have a new Teams button (i.e., a separate button which is branded according to Teams guidelines), but instead may do one of the following:
- Leverage an existing (unbranded) multi-purpose button for the functionality associated with Teams button
- Use the hookswitch button to invoke Teams events
- Headsets will not be required to have a Teams LED

3.3 Category Notes

3.3.1 Distinction between personal PCs and Microsoft Teams Rooms:

To avoid confusion with MTR systems, any computing system that is not clearly designed for meeting room use will not be eligible for certification under the MTR category. As an example, a computer that is sold under the same model identifier both with the MTR OS image and also with an option for a non-MTR OS image would be prohibited. Personal computers are not eligible for certification at this time.

3.3.2 Devices that may not fit existing categories

Devices that are different from previously certified products may have additional requirements beyond those listed in this specification. Any such device should be presented on a case by case basis, generally at least 6-12 months prior to desired certification so that any additional requirements can be agreed upon and device can be modified as necessary to meet the requirements.

Devices that this section includes, but is not limited to devices with novel connectivity relative to previously certified products (e.g., peripheral intended to be used with desk phone, mobile phone or other product other than a PC), devices with significantly different form factor than previously qualified products, or devices with new functionality that relates to the interaction with Microsoft Teams client.

3.3.3 System chassis design

This specification cannot explicitly enumerate all design factors for all systems and therefore offers measurable performance requirements rather than being a design reference. However, some product chassis layouts are prohibited:

1. Designs that position camera such that it would be obscured in normal use or with poor orientation relative to users.
2. Designs that position microphone close to sources of noise (e.g., next to mouse, keyboard, or cooling fan)

If you believe your system falls into one of the two categories above, you should either not designate that system for certification, or you must contact Microsoft to review your mitigation plan well in advance of submitting for certification. No waivers for subjective or objective failures will be allowed for systems that have issues resulting from poor placement of camera, microphone, speaker, or sources of noise.

3.3.4 USB C connected peripherals

USB C connections are becoming more common on PCs, but are also prevalent on mobile devices. USB device features such as device enumeration logic and support for call control over USB HID are features currently supported only for Skype for Business and Teams desktop clients. Partners are required to clearly indicate in marketing materials that full integration with Teams and Skype for Business is offered on desktop only and support when used with mobile devices may be limited.

3.3.5 USB BT connected peripherals

More and more USB devices also have Bluetooth connectivity. With the exception of the mobile phone dock category of devices, all other peripherals are intended for integration with the Teams and Skype for Business desktop clients over USB connection. This is due to a combination of factors which include:

- current state of call control support via BT protocol across different current and legacy clients
- challenges of media over BT with PCs
- challenges of connecting to multiple Teams clients simultaneously

Partners are required to clearly indicate in marketing materials that full integration with Skype for Business and Teams is offered on desktop only and will not support full call control, notification and invocation for "dual client connectivity" (e.g., same headset connected to desktop and mobile client).

3.3.6 Cameras with H.264 encoding support

limited capacity program category

Testing for H.264 encoding cameras includes testing performed by Microsoft and is not fully executed by the independent 3rd party labs, therefore H.264 certification is allowed only by prior agreement based on Microsoft's capacity to support. OEM must contact Microsoft well in advance of certification to receive approval and confirm Microsoft's ability to support the testing as well as any potential updates to requirements.

3.4 General Requirements for Microsoft Teams Devices

This section lists the general requirements for all Microsoft Teams device categories submitted to the logo program.

3.4.1 Operating system support

Teams certification introduces the first certified peripherals designed for Teams mobile client (the Mobile phone dock category).

Mobile phone docks must meet the mobile operating systems requirements, while USB peripherals must meet the desktop operating system requirements. Under the current specification, devices are not eligible for 'dual certification' (i.e., for both mobile and desktop use).

3.4.1.1 Mobile Operating Systems

Requirement: Mobile phone dock SHALL support interfacing to the following versions of operating systems:

- iOS
- Android

latest 2 released major versions at the time the device submits for certification must be supported.

3.4.1.2 Deskop Operating Systems

Requirement: USB Devices SHALL support interfacing to the following versions of operating systems:

- Windows 7 with latest service pack
- Windows 8, 8.1
- Windows 10
- Latest 2 versions of Macintosh

3.4.2 Firmware Update

Requirement: Devices* SHALL support a mechanism to update firmware in the field.
* Basic headset category is exempted from this requirement.

The tools and process that are used to provide the update are the responsibility of the device maker. These updates should be available for the end user of the device as well as a mass update option for IT administrators.

In the event that a firmware update is not the most effective support solution, device makers must provide an alternate solution for rapid resolution of support issues for devices in the field.

Requirement: USB devices designed for use with Microsoft Teams Rooms devices such as cameras and speakerphones are required to deliver firmware updates via Windows Update.

• The updates **MUST** install “silently” without need for user interaction and display no user interface.

• See the reference *Updating Device Firmware using Windows Update* for WU development details. (https://docs.microsoft.com/en-us/windows-hardware/drivers/install/updating-device-firmware-using-windows-update)

• All FW/driver update **MUST** be published in Windows Update Test Distribution server as a CRITICAL UPDATE as part of public release to enable automatic updating, per the following instructions. (https://docs.microsoft.com/en-us/windows-hardware/drivers/dashboard/publishing-for-test-distribution)

• All FW/driver update **MUST** be published as a CRITICAL UPDATE for the public release.

3.4.3 Friendly Device Name

Requirement: Devices SHOULD use a friendly name to identify the device appropriately for end-user selection.

Guidance is to provide at least the following fields *<brand> + <model> + <device category>*. The maximum string length displayed by the client varies depending on user’s resolution settings. As a best practice, the total length SHOULD be less than 28 characters.

Device maker SHOULD submit a device metadata package to provide proper icon in windows. Refer to the following URL for details:

https://docs.microsoft.com/en-us/windows-hardware/drivers/install/overview-of-device-metadata-packages

3.4.4 No Driver Installation

Requirement: Devices SHALL be fully compatible with the Windows USB class driver and require no additional driver installation to be initialized and successfully used with Microsoft Teams and Skype for Business.

The *Logo Program* does not preclude a device maker from developing and distributing value-added software for use with Windows and the client. However, it is the device manufacturer's sole responsibility to ensure interoperability and compatibility with Windows, Microsoft Teams and Skype for Business.

Requirement: If additional software is provided for the device then the device SHALL meet the qualification criteria for the logo program with and without the additional software.

3.4.5 USB Device Requirements

Certified USB peripherals must meet the following USB requirements

3.4.5.1 USB 2.0

Requirement: Peripheral devices SHALL support version 2.0 of the USB interface, this includes cameras and other devices that also support version USB 3.0 (one reason for USB 3.0 devices to also support 2.0 is the greater options for cable extensions).

See http://www.usb.org/developers/docs

All HID commands must be sent to Microsoft Teams and Skype for Business via the USB interface, which means all wireless devices except mobile phone docking stations must come paired with a compatible USB dongle to facilitate communication between the device and PC.

3.4.5.2 Bidirectional Device Enumeration

Requirement: Audio devices SHALL enumerate as a telephony device supporting bidirectional audio (i.e., 0x40X enumerations) for proper use with the client.

Devices that enumerate as a 0x201/0x301 are selected as the default system sound device by the operating system and are used to send audio alerts, such as application and message alerts. Additionally, this type of enumeration does not provide accurate information about the device capabilities.

When using a bi-directional device such as a 0x402 headset, the user enjoys benefits such as:

- Windows automatically selects 0x40X devices as both default communications device, and default communications device starting Win 10 RS1
- Audio Ducking: system volume (e.g. streaming music) is reduced when a call is answered on the 'communications device' in Windows.
- Improved echo cancelling for headsets: the media stack in the client recognizes 0x402 headsets and applies echo cancelling optimizations.
- System alerts are sent to the default speaker, avoiding missed alerts when user isn't wearing headsets.

Audio devices MUST correctly set the terminal type as defined in Table 2.4 of the Universal Serial Bus Device Class Definition for Terminal Types Release 1.0 dated March 18, 1998. These Terminal Types describe an Input and an Output Terminal for voice communication and require two Terminal descriptors. The two Terminals are linked together using the **bAssocTerminal** field. Additionally, the Associated Interfaces descriptor can be used to reference an HID interface for conferencing functions.

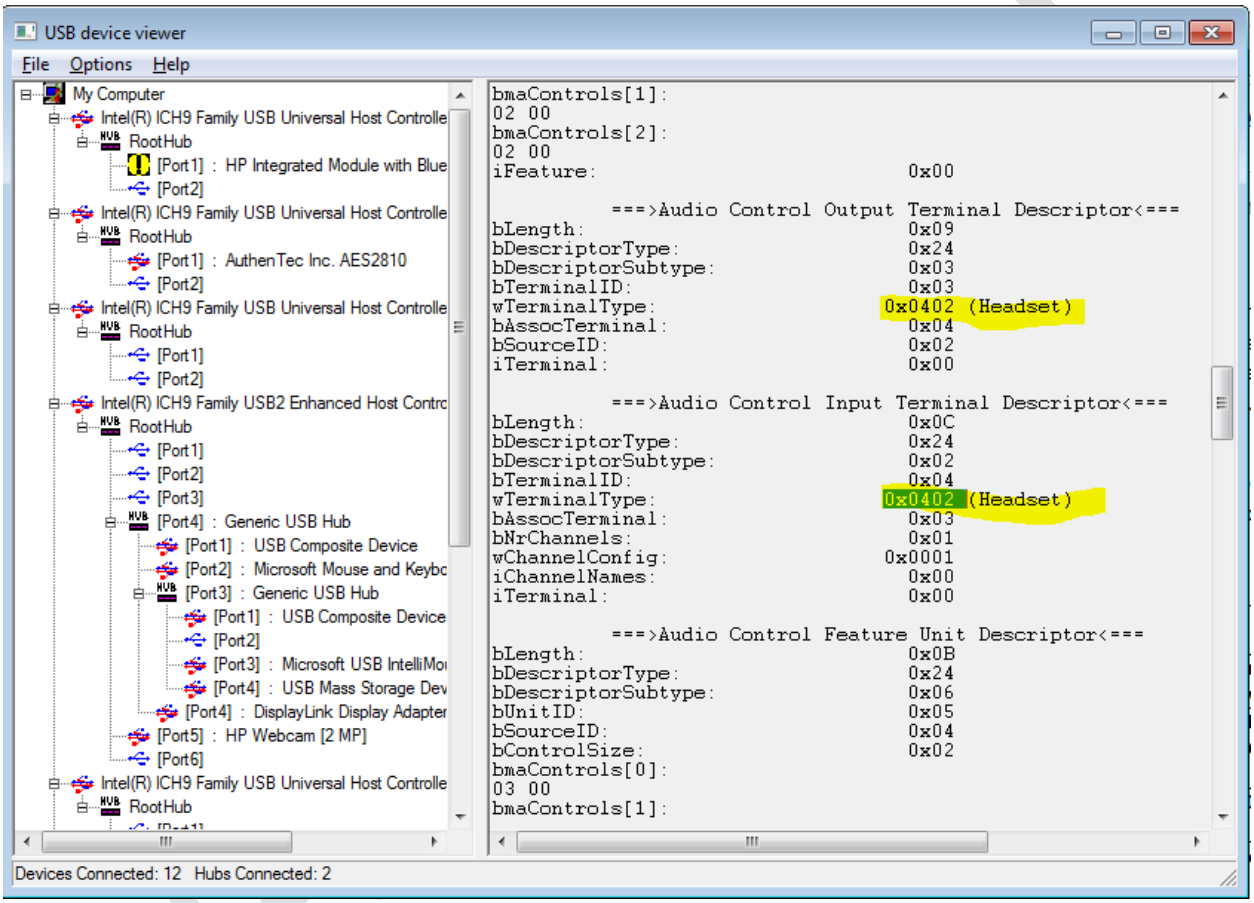
Bidirectional Terminal Types from USB 2.0 Specification

Terminal Type	Code	I/O	Description
Bidirectional Undefined	0x0400	I/O	Bidirectional Terminal, undefined Type.
Handset	0x0401	I/O	Handheld bidirectional audio device.
Headset	0x0402	I/O	Head-mounted bidirectional audio device.
Speakerphone, no echo reduction	0x0403	I/O	A handsfree audio device that is designed for host-based echo cancellation.
Echo-suppressing speakerphone	0x0404	I/O	A handsfree audio device with echo suppression capable of half-duplex operation.
Echo-cancelling speakerphone	0x0405	I/O	A handsfree audio device with echo cancellation capable of full-duplex operation.
Telephony Undefined	0x0500	I/O	Telephony Terminal, undefined Type.
Phone line	0x0501	I/O	Can be an analog telephone line jack, an ISDN line, a proprietary PBX interface, or a wireless link.
Telephone	0x0502	I/O	Device can be used as a telephone. When not in use as a telephone, handset is used as a bidirectional audio device.
Down Line Phone	0x0503	I/O	A standard telephone set connected to the device. When not in use as a telephone, it can be used as a bidirectional audio device.

Note: For convenience, this table is reproduced from the industry standard USB 2.0 Specification. Microsoft is not responsible for the maintenance of the information contained here.

To verify that the device correctly enumerates the bidirectional terminal type:

1. Start USBView.exe (can be obtained in the Windows Driver Kit).
2. Browse through the list of enumerated USB devices in the USB tree until you find the device being tested.
3. Scroll through the device descriptors until you find the 'Audio Control Input Terminal Descriptor' and the 'Audio Control Output Terminal Descriptor' as shown in the image below.
4. Verify that the 'wTerminalType' matches the requirement for the device type being tested (e.g. 0x402 for a headset)



3.4.5.3 UC Qualification (UCQ) Descriptor for HID

Requirement: Devices SHALL support the UCQ descriptor to inform Skype for Business of their unique capabilities.

The UCQ descriptor is used by Skype for Business to determine the basic capabilities of the audio device. The string is requested by Skype for Business through a standard USB string descriptor request at index 0x33. The full UCQ string is 17 characters long (including the characters 'UCQ'). If the UCQ string is truncated, any missing elements will be treated as '0' values. Currently Skype does not use the UCQ description, but all certified for Skype devices must support this so that they function properly with Skype for Business and are future proof in the event that Skype supports UCQ and USB HID in the future.

The following table presents the fields and associated values for the UCQ descriptor:

Qualified Skype for Business Devices	Display Supported	Speakerphone	Handset	Headset	AEC	RESERVED	Wireless	Skype for Business HID Version (major)	Skype for Business HID Version (minor)	SIP endpoint
"UCQ "	"0" No "1" Yes	"0" No "1" Yes	"0" No "1" Yes	"0" No "1" Yes	"0" No "1" Yes	NOT USED	"0" No "1" Yes	0x01 2007 R2	0x00 2007 R2	Always "0"
UCQ	1	0	1	0	0	000	0	01	00	0

- The first 5 bit strings (after the characters 'UCQ') declare support for the named functionality.
- The RESERVED field is for legacy systems device vendors SHOULD set this to "000". Other values if used could cause problems with later Skype for Business releases.
- The Skype for Business HID Version (major) is used to determine Skype for Business compatibility. USB devices implemented according to current Skype for Business devices specifications SHALL declare Skype for Business HID version as '01'. As of October 2010, 2 versions of Skype for Business HID exist:
  - Version '00' for versions of Lync clients prior to the 2007 R2 client
  - Version '01' for versions of Skype for Business clients form 2007 R2 client and beyond
- The Skype for Business HID Version (minor) only has one option as of October 2010. Devices MUST set this element to '00'.

Warning: HID functionality (such as for call display) will be limited if device reports version '00' for Skype for Business *HID version (major).*

Example 1: "UCQ10100000001000" string means that this UC device has a LCD display (following the Skype for Business HID display protocol), is a handset and supports the Skype for Business HID published for 2007 R2 client or later.

To verify the UCQ string, use a USB bus analyzer (e.g. Beagle 12 USB analyzer and Total Phase software).

1. Connect the device and the analyzer to a computer that is running the Total Phase software.
2. Launch Total Phase.
3. Select Connect To Analyzer from the Analyzer menu.
4. Start the capture.
5. Start Skype for Business.
6. Stop the capture as soon as Skype for Business is fully started and look for the record 'Get String Descriptor' with Data 'Index=33…'
7. Verify UCQ string vs. to those that are expected for device.

3.4.5.4 Power Management

Requirement: Corded devices *(handsets, headsets, webcams, and standard speakerphones)* SHOULD draw no more than 100 mA from a USB bus.

This allows the handset/headset to operate while connected to a bus powered USB hub.

Requirement: A conference-grade speakerphone SHALL draw up to 500 mA of power. If a device draws more than 100 mA of power from the USB bus, then the device MUST support both suspend and resume power modes. Speakerphones drawing more than 5V/500mA MUST include a standalone power supply.

The device enters a low power suspend state when it detects no activity. The device resumes a normal power state on either of the following event occurrences:
1) detection of USB resume signaling from the client, or
2) detection of a local wakeup event, such as the OFF HOOK notification or any other physical button press on the device. When a device wakes up because of a local wakeup event and enters a resume power mode, it must generate a remote wakeup event to awaken the computer.

Requirement: Any device that is classified as a 'high power' USB device MUST provide end user documentation stating that if the device is connected to an external hub then the hub must be self-powered in order to prevent performance issues due to insufficient power provided by a shared hub. Example text provided:

> ***"NOTE** the phone will not work correctly if it is connected to a bus-powered USB hub (such as a keyboard with an integrated USB hub). The USB connection between the phone and the computer not only provides the connection to* Microsoft Teams*, but also supplies power from the computer to the phone."*

3.4.6 Bluetooth Device Requirements

Certified Bluetooth connected peripherals must meet the following

3.5 OOBE and Setup

Requirement: Device must work out of the box without requiring any additional setup this includes but is not limited to:

- No 3rd party driver or added software needed for basic functionality outlined in this specification (drivers are allowed for additional functionality beyond the scope of this specification)
- Device must work each time user uses it (auto reconnect) for all devices that connect via USB cord or USB dongle, and must follow industry best practices for reconnection on mobile. As an example, devices that connect to a BT dongle must use technology such as BT multipoint to allow them to maintain the connection to the USB dongle even if paired also with a mobile phone.
- For devices that support multiple concurrent connections, device must meet requirements in this specification even when also connected to a secondary connection. This means for example that if a USB device also allows pairing with mobile phone, the USB connection must not be degraded when it is connected to the mobile phone.
- Device will be tested using default configuration. If there are configuration options that are required to achieve functionality outline in this specification, it must be enabled by default.

Requirement: Devices with Teams button must include an OOBE guide indicating the usage of the Teams button.

Teams device integration introduces new user flows and user scenarios compared to previous Skype for Business peripherals which mostly supported only basic call control.

Because of the new user flows it will be important to provide clear quick start guides and other documentation. Microsoft requires that in-box collateral and out of box experience (OOBE, aka first run experience) be reviewed prior to product shipping for the first model by each OEM. If packaging, OOBE guide or device functionality differs significantly for follow on devices then partner should submit for review as well.

At a minimum, the OOBE guide to provide guidance on the following:

- Use of Teams button and associated notifications
- Mention need to install Teams client on mobile phone or PC that will be used with it in order to use the Teams button

3.6 Telemetry

Telemetry is critical to measuring product capabilities, deployed inventory and troubleshooting quality issues. To improve customers experience with managing their certified devices devices shall support the following categories of telemetry:

- Static device data
- In-call data
- User interaction telemetry

Note: Teams is currently working on defining a method to upload telemetry data from device for items listed as TBD. While the data transfer method is being refined, we are publishing the set of data that we

expect the device to report so that device vendors can already confirm the device has the data. We will expect devices to support a FW update that enables reporting the data within 2 quarters of Microsoft publishing the data reporting method. Partners should expect a small addendum to this specification when we finalize the interface for telemetry.

3.6.1 Static Device data

Static data helps in identifying the device and its capabilities, which can be used to build device performance reports like call quality dashboard (CQD) and can be offered to both On-Prem and Online customers in the form of dashboards.

Data Item	Value options	Source
Device Name	Device name should be specific to device and user intelligible. Dongles (e.g., for BT or DECT) should communicate with the headset to report actual headset	Part of device enumeration
Certified Mode	Offload, Raw, Cascaded	TBD
Connectivity	Wireless BT, Wireless DECT, USB Corded	TBD
Device Category	Speaker Phone/Headset	UCQ string
VID/PID	Vendor ID and Product ID of the device	Device enumeration
Serial Number	Unique serial number for the device.	Device enumeration
Device F/W	Firmware version	Device enumeration
DSP Capabilities	AEC, AGC, NS, etc.,	TBD

3.6.2 In-Call data

Real time data about each call provides important information that can improve support response to service degradations and drive coloration between devices and call quality performance.

Data Item	Value options	Source

Battery Level	Applies for devices that require battery to function Range: No drained/disconnected, low, good	TBD
Signal Strength	Applies for DECT and BT wireless devices Range: No connection, poor, good	TBD
Disconnect event	Applies for wireless devices when they unpair (in this case the USB dongle would remain connected so OS info on USB disconnect would not catch this)	
Ambient noise	For all devices in dB	TBD
Echo	TBD.	TBD
Codec used during call	TBD (for BT devices)	TBD
Side Tone	in dB (actual setting)	TBD
Others:	• Consider adding "auxiliary device" (for PCs if they have something external connected) • Consider something for devices w/ extensions (e.g., daisy chained speakperphones, or speakerphones w/ extension mics	

3.7 Beta Testing and 'dogfooding'

Lab testing is important, but the quality of certified products is made much more robust by incorporating real customer feedback prior to certification. Technology Adoption Programs (TAP) and/or Microsoft internal usage (known as Dogfood) are requirements for certification. Beta testing is required for all conference devices and also for personal devices which are significantly different than previously certified models by the OEM (e.g., an OEMs first certification in a given category, or other changes in features or form factor).

For any devices that are designated as requiring beta testing the partner must contact Microsoft at least 5 months prior to desired certification date to plan for beta testing. The exact TAP/dogfood plan will be developed by the partner and the certification program team during the product development timeframe, but the default criteria for TAP is described in the table below. Depending on the complexity of the device and degree of difference relative to previously certified models from the same vendor the actual beta requirement may be reduced and/or Microsoft internal beta testing may be accepted as an alternative.

TAP criteria	Typical conditions	Additional information
Number of customers	5-10 active large customers 5-20 active small/medium customers	Customer selection criteria to be agreed upon jointly based on product usage criteria (not marketing value)
TAP duration	4-10 weeks 1-2 product updates during TAP timeframe	Usage criteria to be defined by Microsoft ahead of TAP typically this includes a matrix of: • feature/scenarios for the certification candidate product • MS components involved in solution (e.g., mobile vs. desktop client usage) • Measurement criteria
Training content	Partner responsibility May be delivered as digital/physical collateral and also as webinar	Typically, partner will use the TAP to get validation on the content that they will publish once product is certified.
Support for TAP customers	Partner bears primary responsibility	Microsoft certification team will facilitate support on a best effort basis. This may include pre-deployment, deployment and in-use support.
Sample product	Partner delivers	
TAP entrance criteria	Microsoft and Partner jointly agree	The product used during TAP is not yet certified but is expected to be at a high quality/stability bar in order to maximize usage and the ability to collect meaningful feedback.
Customer recruitment	<<Program to define whether MS recruits or partner or joint>>	

In addition to customer facing beta as described above, all meeting room devices must complete an internal dogfood coordinated by Microsoft. The general process for dogfood is as follows:

- Begins after full lab testing of the product, including retuning for non-waiverable failures or approval of any waivers for minor failures.
- Scheduling and deployment to dogfood room may take several weeks depending on other devices being certified concurrently
- Typical duration of dogfood (time in room) is 3 weeks, but this could be longer if issues are found.

4.0 Teams Notification and Invocation

Device shall implement the Teams Accessory Signaling Protocol (ASP) to provide support for the user flows specification. That specification outlines, for example, notification events which will cause the LED to pulse and invoking the Teams client via button press. The ASP is transport is transport agnostic, so while the messaging itself for ASP will be the same for both USB and Bluetooth connected devices, they will have different encapsulation and triggering mechanisms.

The main enhanced capabilities provided for the Teams button are:

- Notification – one or more LEDs capable of on/off, flashing and pulsing which inform user of state of integration w/ Teams as well as alerts or notification for user to an take action via Teams.
- Invocation—the ability to launch teams from the device in a way that is contextually aware. An invocation in response to a notification will open Teams in the appropriate context to respond to the notification (e.g., by joining a meeting).
- Voice Skills (subset of Cortana) – Teams users will optimize their productivity by being able to perform certain productivity or collaboration tasks directly with their voice. This is not intended to be an unlimited set of search queries, but instead could be thought of as a curated set of the most high-value commands, commands which are frequently used, and which would require multiple steps to perform via normal software user interface (e.g., starting a conference call with multiple different people).

4.1.1 Provide a Teams button and LED

Teams button must be in a prominent location on the device, easily accessible (not crowded or hidden between other buttons) and be distinguishable by touch (for accessibility consideration). Contact Microsoft for the icon to be placed on the Teams button. See 6.0 for category specific recommendations.

The LED must be:

- Closely associated with the Teams button (see category requirements for examples or discuss w/ Microsoft prior to locking the layout)
- Dedicated for use as defined by the user flow specification (i.e., not overloaded with any other functions such mute state, or media playback indictors)
- Visible from a distance, and in all directions.
- Variable intensity, capable of pulsing (‘breathing’) as well as being solid on, or flashing. The recommended rate and ramp rate of breathing may vary slightly from device to device depending on size and intensity of the LED, but a reasonable expectation is that the ramp cycle will be 2-4 seconds.
- Allowed Color: purple or white. Device must use a different color for call activity indicator if the LED also serves for call activity (e.g., w/ a combined hookswitch button)

The LED should be directly associated with the Teams button, preferably surrounding it.

Note: upgrade requirements for previously certified Skype for Business devices recognizes that the device can't change the existing hookswitch button and LED for products already sold. To requalifying the device for Teams, the OEM will need to meet the functional requirements of this specification such as by implementing the FW functionality associated with the Teams button but won't be required to change the branding on the button or LED.

4.1.2 Co-located Teams and Hookswitch Button

Some device form factors will offer a single button which performs both hookswitch (call answer/end) and Teams button (client invocation and notification) functionality.

Devices with such dual functionality shall act as a hookswitch when calling activity is occurring and shall function as a Teams button at all other times. Long press will invoke Cortana in all cases except during incoming call.

Please refer to section "Teams button and hookswitch state overview" of the user flow specification for further details.

4.1.3 Teams Button Invocation

The ASP protocol defines the application logic supporting the Teams button and associated LED and is written in a transport agnostic manner.

4.1.3.1 USB Devices

When USB devices leverage the protocol, they will wrap the ASP content in HID using the Custom usage page (**FF99**). See the display spec for examples other custom page usages.

Messages from Teams to device will be sent as a HID feature report.

Usage ID	Usage Name	Usage Type	Report ID
3	Teams Notification	MC	9A

Messages from device to Teams in response to a Teams button press on the device will be sent as a HID Input report.

Usage ID	Usage Name	Usage Type	Report ID
4	Teams Button	OSC	9B

Note: Report IDs 9A identifies the HID message as targeting ASP protocol and 9B is to ensure standardized report ID across all partners. The report descriptor for Teams button invocation described here should be presented by devices ***before the Telephony page****.*

4.1.3.2 Bluetooth Devices

4.1.3.2.1 Android

Rather than sending ASP messages encapsulated in USB HID as USB devices do, on Android ASP messages will be delivered over a socket connection to the device. Device must claim support for the Teams ASP protocol UUID (543cea22-ad9c-4254-a47e-5e1ae25a40bd) upon Bluetooth enumeration.

Teams will use the Android API createRfcommSocketToServiceRecord to initiate a socket connection using this UUID and the device must accept the connection.

Once the socket connection is established all ASP messages flow over this connection. Since the socket is initiated by Teams client (i.e., device is unable to establish connection itself), If the mobile phone user forcibly kills the socket connection, a new socket connection attempt will happen the next time the device establishes Bluetooth connection.

Refer to ASP documentation for message payload.

4.1.3.2.2 iOS

To launch the Teams App, device must support MFI, which allows launching device via iOS mechanisms[12] using the ***bundle ID***. For details on triggering an app using the bundle ID, see Apple documentation.

Microsoft Teams client has 3 bundle IDs defined depending on the release type:

- Apple store build: com.microsoft.skype.teams
- Beta build: com.microsoft.dmx.Teamspace-df
- Developer build: com.microsoft.dmx.teamspace

Device must support the Apple store build by default but offer the capability to configure to use another build for development and testing purposes.

Once Teams is launched, Teams will establish a socket connection to the dock over Bluetooth (using EAAccessory Library).

Once the socket connection is established all ASP messages flow over this connection. Since the socket is initiated by Teams client (i.e., device is unable to establish connection itself). This connection will be re-established each time Teams is invoked by the device when Teams is in the background, or when Teams is brought to foreground on the host OS.

Refer to Apple MFI documentation for details on topics such as accepting incoming BT connections and invoking an iOS app (e.g., Teams as a response to Teams button press).

Refer to ASP documentation for message payload.

[12] The Teams client follows the Apple's External Accessories documentation https://developer.apple.com/library/archive/featuredarticles/ExternalAccessoryPT/Introduction/Introduction.html#//apple_ref/doc/uid/TP40009502 devices should follow requirements for the Apple MFI program https://developer.apple.com/programs/mfi/

4.2 Cortana certified audio

Device shall complete the Cortana requirements specified at: https://docs.microsoft.com/en-us/windows-hardware/design/component-guidelines/audio

Note: Cortana distributes their tools only under NDA. Teams and Skype for Business partners must contact the Cortana team at Microsoft access to specifications and tools (contact your certification representative in Teams for an introduction).

4.3 Audible notifications

Audible notifications are an important extension of the visual notifications provided by the Teams button and LED. They are especially important for wearable devices (headsets) where user may not see the LED while it's in use. We provide the following guidelines to ensure that users will hear the notifications:

- Prioritization of Teams notifications in dual-paired scenarios (e.g., headset paired via BT dongle to PC, but via BT directly to mobile phone) – Teams notification should take priority over any currently playing media so that it isn't lost in the dual connected scenario.
- Connection re-establishment speed – wireless devices may enter low power mode to save battery (and reduce wireless interference in high deployment density scenarios). If device enters low power state, it needs to be able to re-activate quickly so that Teams notification is not lost or unnecessarily clipped.

5.0 USB HID Call Control Requirements

USB devices support traditional call control via USB HID. Currently the only non-USB device which supports call control is the mobile phone dock. See 6.1 for similar requirements for that category.

5.1 HOOK SWITCH with LED Notification

Requirement: To be selected by Microsoft Teams and Skype for Business as a valid HID-enabled audio device, a device SHALL declare support for the HOOK SWITCH HID command, even if there is no hardware hook button on the device. The HOOK OFF LED SHOULD use a stand-alone HID output report (i.e. with no other usage defined).

An LED to display the hook state is recommended.

- Skype for Business sends the device an OFF HOOK HID (with Off Hook LED=1) under the following conditions:
  - The user starts or accepts a phone call from the Skype for Business Conversation Window (CW) and audio is directed to the handset or headset.
  - The device is activated by user changing the active device for the call (exact user interface varies by client version).
- Skype for Business sends the device an ON HOOK HID (Off Hook LED=0) under the following conditions:

- The calling party ends the phone conversation while the audio is directed to the headset or handset.
- The user ends the phone call from the Skype for Business conversation window while the audio is directed to the headset or handset.
- The device is deactivated by user selecting a different device for the call (exact user interface varies by client version).

5.2 Volume Control

Requirement: The device's local volume control buttons SHALL send commands to the PC to adjust speaker gain.

5.3 Mute Button and LED

Requirement: Device with a dedicated MUTE microphone button SHALL use the "PHONE MUTE" HID command to indicate that there is no outgoing transmit audio (i.e., microphone muted) and to synchronize the state with the client user interface. Mute button SHOULD be implemented as a HID toggle rather than a HID mute state change.

Requirement: If the device supports an LED for indication of mute state, then it SHALL receive the LED Microphone from the Client user interface. The device SHALL locally manage the mute state in such a way that when the mute button is selected on the device the transmit audio is muted by the device and the mute state is synchronized with the Client via PHONE MUTE.

A user can toggle the Mute state from either the device or the client user interface. Therefore, a device must respond to the "PHONE MUTE" HID command and LED Mute to successfully synchronize the Mute state between the device and client user interface.

5.4 Flash

Requirement: A device may implement the Flash feature by using a dedicated illuminated flash hardware button on the device.

The FLASH HID command can be used to put an existing call on Hold/Resume, or answer an incoming call while the user is in an active call. When one or more calls are on hold, the device SHOULD correctly implement the FLASH HID to ensure an intuitive user experience in multi-call scenarios. The client sends HOLD LED command to allow devices to update LED state when a state change is initiated by the client or by a FLASH command from the device. This update is sent to all connected devices (i.e., not just the active device).

5.5 Standard HID Usage Tables

The telephony features of the device must be based on the USB HID Telephony Device page of the USB HID Usage table. The following table presents the subset of USB HID Usage commands supported by the client.

Telephony Device Page (0x0B) Usages Supported by Microsoft Teams and Skype for Business

Usage ID	Usage Name	Usage Type	Comments
01	Phone	CA (Collection Application)	
04	Handset	CL (Collection Logical)	
05	Headset	CL (Collection Logical)	
06	Telephony Key Pad	Nary (Named Array)	
20	Hook Switch	OOC (On/Off control)	
21	Flash	MC (Momentary control)	
24	Redial[1]	OSC (One-shot control)	
2B	Speakerphone	OOC (On/Off control)	2007 R2 version only
2F	Phone Mute	OOC (On/off control)	Mutes only the outgoing transmit audio. When muted, the user can still hear incoming audio from the caller.
31	Send	OOC	
50	Speed Dial	OSC (Initiates Speed Dial)	Speed Dial supports the number “1” one for voice mail and the “O” translated to “+”
70	Voice Mail	OOC	

Note: For convenience, this table was reproduced from the industry standard USB 2.0 Specification. Microsoft is not responsible for the maintenance of the information that is contained in this standard.

1 For devices that support multiple pairing modes (e.g., Skype for Business, cellphone, PSTN line), the redial button on the device should cause the device to call the last number dialed. If the last number was a Microsoft Teams or Skype for Business call, then the redial HID command should be used, otherwise the method for the appropriate other mode should be used for redial.

The following table presents the current USB HID Usage commands supported by Microsoft Teams and Skype for Business on the Button Page.

Button Page (0x09) Usages Supported by Microsoft Teams and Skype for Business

Usage ID	**Usage Name**	**Usage Type**	**Comments**
01	Button 1 “Delete”*	OSC (One-shot control)	

* Skype for Business responds to the delete button by rejecting the incoming call.

Note: For convenience, this table was reproduced from the industry standard USB 2.0 Specification. Microsoft is not responsible for the maintenance of the information that is contained in this standard.

The following table presents the LED usages that a device can use to illuminate different LEDs.

LED Page (0x08) Usages Supported by Skype for Business

Usage ID	Usage Name	Usage Type	Comments
17	Off Hook	OOC	
18	Ring	OOC	
1E	Speaker	OOC	
09	Mute *	OOC	
19	Message waiting (Voice mail indicator)	OOC	Sent to all connected devices (Devices which support display page will receive voicemail icon instead).
20	Hold	OOC	Sent to all connected devices
24	Send_calls (Forwarding on)	OOC	

* Note that the Skype for Business client sends the Mute (09) Usage ID to the device to light up the Microphone Mute LED and not the Microphone (21) LED command as per HID Usage Table (0x08).

5.6 Dial pad Requirements

The following table presents the HID commands supported by Skype for Business for dial pad functionality over USB HID.

Note: at the time this specification is published Microsoft Teams does not support dialpad over USB HID.

Telephony Device Page (0x0B) Usages Supported by Skype for Business

Usage ID	Usage Name	Usage Type	Comments
B0	Phone Key 0	Sel (Selector)	
B1	Phone Key 1	Sel (Selector)	
B2	Phone Key 2	Sel (Selector)	
B3	Phone Key 3	Sel (Selector)	
B4	Phone Key 4	Sel (Selector)	
B5	Phone Key 5	Sel (Selector)	
B6	Phone Key 6	Sel (Selector)	
B7	Phone Key 7	Sel (Selector)	
B8	Phone Key 8	Sel (Selector)	
B9	Phone Key 9	Sel (Selector)	
BA	Phone Key Star (*)	Sel (Selector)	
BB	Phone Key Pound (#)	Sel (Selector)	

Note: For convenience, this table was reproduced from the industry standard USB 2.0 Specification. Microsoft is not responsible for the maintenance of the information that is contained in this standard.

6.0 Additional category specific requirements

Some categories have additional requirements, which are unique to that category and apply on top of the requirements listed above.

6.1 Teams mobile phone Dock

6.1.1 Form factor and hardware affordances

6.1.1.1 Buttons

In addition to the standard buttons for call control and Teams invocation (e.g., hookswitch, mute, Teams button, volume control) the following buttons are:

- Allowed:
- 3x4 numeric dial pad
- active audio mode selection (e.g., to select headset, speakerphone)
- Hold/Resume
- Not supported:
- Redial – Teams mobile client doesn't support this feature so devices shall not provide it.

6.1.1.2 Lights and indicators

Required lights or indicators

- Variable intensity light ring surrounding Teams Launch button (will be used for variety of notifications)
- LED presence indicator
- Outbound dialer indicator, which represents to user the dialer (Teams vs. cellular) that is active. This requirement may be met either via an LED indicator or via an icon on the display connected with a button to change the selected mode.

6.1.1.3 Display

(optional) Mobile phone dock may provide a display. The display should be minimal so that it doesn't confuse users about what the primary display is for the usage scenario. Primary display for all Teams interaction will be the mobile phone display.

The device display will be used to present the following information:

- Current date/time
- Currently connected phone
- Additional text associated with Teams notifications (e.g., missed call by name, or meeting by name)
- Call type (cellular or Teams for active call. Device must determine this based on it's internal logic)
- Multiple calls (client reports the number of calls and their call status such as active or on hold)
- Caller or current meeting display name

The display must be:

- Size: no more than to 2.5x15 cm (unless otherwise approved by Microsoft prior to certification)
- Maximum 3 lines of text, minimum of 2 lines. Teams client will not provide any images or icons to the device for dynamic display (i.e. there is no protocol to transmit such images) but device vendor must submit for Microsoft review and approval any images that they plan to show on the device at run time (not counting configuration windows and boot up screen).

6.1.1.4 Apple MFI

Chipset used in devices must be MFI certified in order to support launching teams app for iPhone.

For certification purpose, the device should reference Apple Store bundle ID for the Microsoft Teams application as documented in 4.1.3.2.2.

6.1.1.5 Charging

Wired/Wireless charging when the device is docked. Dock connectors for iOS and Android devices (partners may choose to have distinct SKU for Android and iOS or a single SKU that supports both).

Dock should support connecting charging cable without requiring removing the case (for standard sized cases).

6.1.1.6 Audio

Both private and public modes must support wideband audio and HW call controls. For any audio components that are sold as part of the device, it device must meet the acoustics requirements for the relevant form factor (e.g., headset, deskphone speakerphone) as documented in the associated Audio specification published with this specification body.

6.1.2 Call Control

The mobile phone dock needs to implement the HFP for Android and iOS. In addition, some functionalities that are not supported in default HFP are supported by Accessory Signaling Protocol as follows

Call Control	**Android**	**iOS**
Call answer/end	Accessory Signaling Protocol	--
Microphone mute	Accessory Signaling Protocol	Accessory Signaling Protocol
Dial out from dock	Accessory Signaling Protocol	Accessory Signaling Protocol
Volume up/down	Out of scope of this specification (no client/device involvement)	Out of scope of this specification (no client/device involvement)
Hold/Unhold	Accessory Signaling Protocol	--

6.1.3 Other hardware requirements

- Physical lock slot (Kensington style) for the dock.
- (Optional) Analog phone line connectivity
- Fingerprint reader access:
    - Dock should not obstruct front of device fingerprint access (iPhones).
    - If fingerprint reader is on back of phone (Android) user should be able to access fingerprint reader without having to disconnect charging cable. Example mitigations include hinged charging cable; flexible charging cable, or dock which raises phone enough off of baseplate to allow fingerprint access while connected.
- Dock platform must support phone in portrait or landscape mode.
- Dock platform must allow adjustable positioning angle for video calls. Default angle should orient the mobile phone camera at an average user's face when at arms-length in seated position and allow at least 40 degrees of angular adjustment).
- Wireless charger should be positioned so that charging can happen in either orientation.

6.2 Headset

6.2.1 Teams Button placement recommendations for headsets

Headsets come in many different sizes and shapes, which means that there is no one-size fits all solution for placement of the Teams button. The LED associated with the Teams button must be at least as prominent, and visible as other LED indicators on the device.

The Teams physical button shall carry the Teams icon and color profile (purple) and have the LED directly associated with it.

Headsets have limited real estate, so unlike speakerphones which are specified to have separate answer/end and Teams buttons, headsets shall follow one of the following options:

1. Teams button co-located with hookswitch button – Button must include the Teams button logo on the button and a hookswitch icon near the button.
2. Separate Teams branded button and hookswitch button. Teams button must include the Teams button logo on the button.
3. [by exception/approval only] Small devices which don't have the real estate to print the Teams button logo on the button may request an exception to allow a button without the Teams button logo. This button is expected to function as a dual-purpose button similar to #1 above.

In cases #1 and #3 (dual purpose hookswitch and Teams button), the Teams button overloads the short-tap gesture, the device will need to be aware of context and prioritize call handling functionality (answer/end) for single tap gestures during incoming or active calls (see 4.1.2).

Additionally, the following recommendations and requirements apply.

Recommended:

- Headsets should avoid separate answer and end buttons due to branding (i.e., it would be confusing for it to show Teams icon on the answer button, but a hang up icon on the end call button).
- Teams button should be reserved for Teams functionality including call handling (answer/end, reject call), invocation and notification activities (defined as "Teams controls"). Call handling should function as a generic hookswitch when used for applications other than Teams (this includes when used with Skype for Business).
- Control functions which are not associated with Teams user scenarios should not be overloaded on the Teams button. Separate button is recommended for features like multimedia control.

Required:

- If device uses long press to reject incoming call then for a long press during incoming call device should send reject call rather than send a cortana invocation.
- Device with multimedia controls:
- No more than one non-Teams related control may be overloaded on the Teams button. The button gesture reserved for this is doubletap.
- If device needs more than one non-Teams control, it must be provided on a separate button.
- Device vendor is allowed to use the double tap gesture for play/pause, track forward, or reject call. For any other usages, vendor must seek approval from Microsoft prior to seeking certification.
- If devices uses the doubletap gesture for an overloaded non-Teams control, the device must resolve singletap vs. doubletap within 300 miliseconds so that users don't notice the latency when performing a single tap.

Requirements by headset form factor:

Table 1 Teams Button and LED requirements for headsets

Form Factor	Button and LED	Implementation notes
Corded headset (monaural and binaural)	Both Required	Button and LED must be co-located and recommended placement is on the control pad on the cable.
Wireless headset with docking station (this means a dock with control and USB connector – not simply a charging cradle) monaural and binaural	Both Required	Button and LED must be co-located and must be on the docking station. An additional teams button is required on the headset, LED on headset is optional.
Wireless headset with USB dongle (Binaural, and larger form factor monaural)	Both Required	Button must be placed on headset. The LED may be on the dongle instead of headset, and is allowed to be multi-purpose (e.g., reporting pairing state,

		call active state etc. along with pulsing for Teams notifications). If LED is on headset and headset has a charging cradle, then the LED must be on the side of headset that is visible from for a headset that is placed in OEM's charging dock
Small form factor monaural wireless headset (e.g., as small or smaller than Plantronics voyager pro)	Both Required	Button must be placed on headset. The LED may be on the dongle instead of headset, and is allowed to be multi-purpose (e.g., reporting pairing state, call active state etc. along with pulsing for Teams notifications).

Note: Some corded headsets consist of a headset portion and a controller portion. If you are interested in offering a headset which allows users to choose a modular headset with either a 'standard' controller pad or a 'Teams' controller pad, please contact Microsoft prior to certification for certification details. If the controller component is relatively inexpensive, Microsoft would encourage this concept as it could allow customers who are in the process of migrating from Skype for Business to Teams to replace just the controller portion at the time users are migrated.

6.3 Speakerphone

6.3.1 Teams Button placement recommendations for speakerphones

The Teams button allows the user to invoke the Teams application. The button must be in a prominent location which is highly visible and easy to access almost without looking. We define 3 examples for placement, which allow either center of device (preferred), top of device, or edge of circular speakerphone.

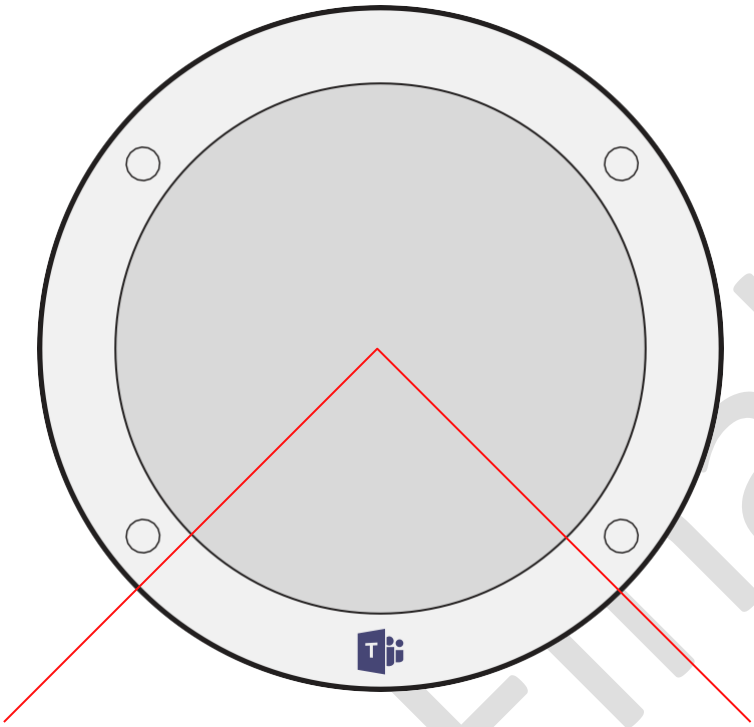


Figure 1 Teams Button Placement, Option 1

When placed near the edge of a circular product, the Teams button must not be crowded by other buttons or features within 45 degrees on each side of the button, as measured from the product center.

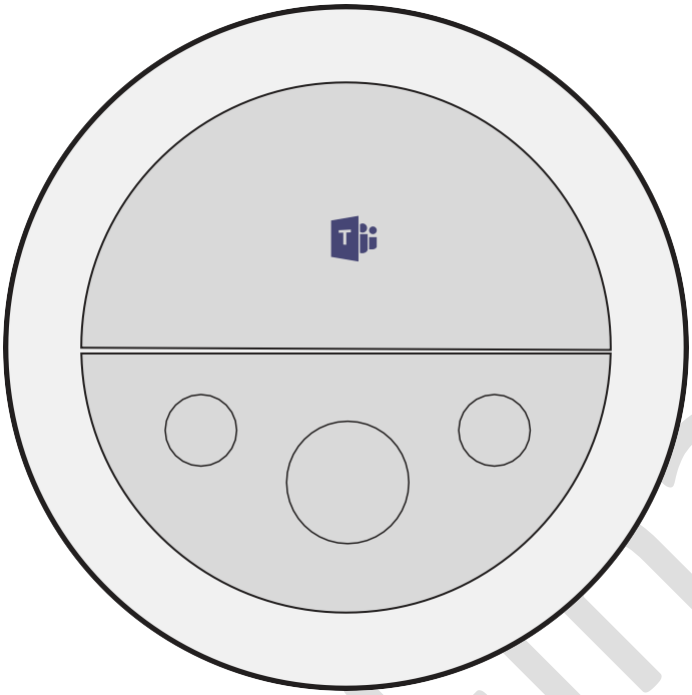


Figure 2 Teams Button Placement, Option 2

When placed atop a product, the Teams, button must be prominent in size and not combined with other buttons.

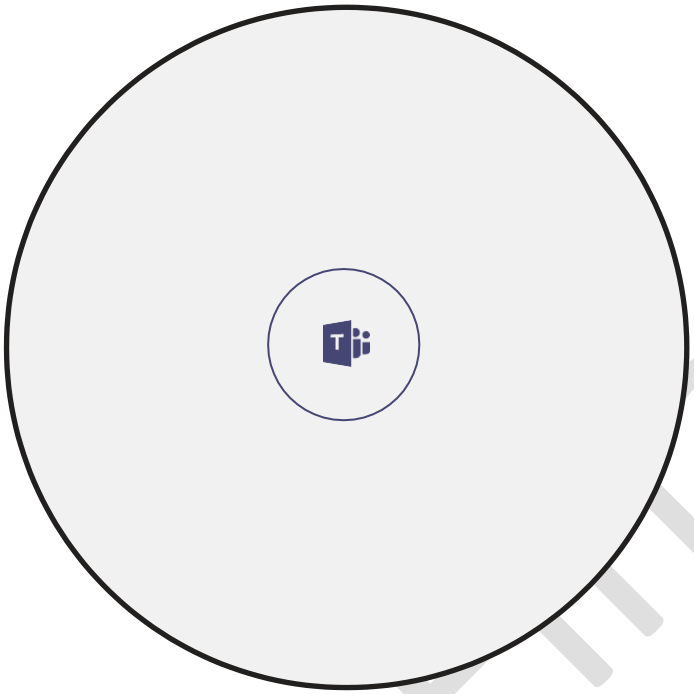


Figure 3 Teams Button Placement, Option 3

When placed in the center of the product, additional care should be taken to avoid crowding the Teams logo onto a small button or near a lighting element.

Appendix A. HID & UCQ Conformance Report template

This template is provided for reference only and the actual template used by labs at qualification time is subject to change. OEMs who are current certification partners may contact their preferred test lab for the current active test template.

Similar templates for ASP related functionality is also provided in the User Flows specification.

Metric	Measurement / Data	Pass/Fail
UCQ String		
Bi-Directional Terminal Type (input)		
Bi-Directional Terminal Type (output)		
Functional tests to be performed on latest 2 Windows and Mac clients (Microsoft Teams and Skype for Business desktop)		
Mute from client	Observe Mute icon on both client and Device toggles ON, and verify mic audio is muted AND speaker is not muted.	
Mute from Device		
Mute speaker from OS	Observe mute icon in OS only (no change in client or on device) Verify speakers are muted (but mic is active)	
Unmute from client	Observe Mute icon on both client and Device toggles OFF, and verify mic audio is unmuted AND speaker is not muted.	
Unmute from Device		
Mute state after call hang up	Start w/ active call & device mic muted Hang up call: verify mute button turns off Start new call: verify new call is NOT muted.	
Mute state upon new call	Set device to mute before initiating call. Start call and verify mute state upon start of call is unmuted once call is connected.	
On Hook (hang up)	Verify call terminated in client and device LEDs turn off. Initiate new call and ensure mute state was reset.	
Off Hook (incoming call answer)	Answer from within client and repeat by answering with device. Verify call is answered, audio goes to device, and LEDs on device reflect call active state.	
Off Hook (transfer from other audio device)	Start call with other audio device active. Audio transfers from other device to device under test and LEDs on device reflect call active state. Mute state is unchanged due to transfer.	
Flash	Flash functions during connecting a call & call on hold is taken off hold.	

Dial pad Tests (call initiation mode)	Test each dial pad key prior to connecting a call. Make sure the key registers and with no unexpected keys	
Dial pad Tests (in-call mode)	Test each dial pad key while call is active. Make sure the key registers and with no unexpected keys	