USB Compliance Checklist
On-The-Go Devices

For the 2.0 USB Specification and
OTG Supplement, Revision 1.0a
Checklist Version 1.0
August, 2003

USB Device Product Information

field	—all fields must be filled in—
Date	
Vendor Name	
Vendor Street Address	
Vendor City, State, Postal Code	
Vendor Country	
Vendor Phone Number	
Vendor Contact, Title	
Vendor Contact Email Address	
Product Name	
Product Model Number	
Product Revision Level	
Test ID Number	
Captive Cable Used (Yes/No)	
Manufacture, Model, & TID of Receptacles used	
Manufacture, Model, & TID of Connectors and/or Cable Assemblies used	
Manufacture & Model Identifier of the USB Silicon used in this peripheral	
Signature of Preparer	

Revision History

Revision	Issue Date	Comment
0.5	03/14/2003	Initial Draft
	06/25/2003	Remove item E7 per OTGWG discussion Update E20 $T_{B\_SVLD\_BCON}$ = 1 second Update P11 $T_{B\_AIDL\_BDIS}$ = 5ms Added items E27 – E29 Added Test Device checklist Added Messaging checklist
RC1	06/25/2003	Document cleanup for RC status
1.0	August 2003	Move document to 1.0

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1. Introduction

This checklist helps designers of USB peripherals to assess their products' compliance with the Universal Serial Bus Specification, Revision 2.0 and the On-The-Go Supplement, Revision 1.0. Unless explicitly stated otherwise, all references to the USB Specification refer to Revision 2.0.

This checklist is also used, in part, to qualify an On-The-Go Device and is required for the USB-IF Integrators List. This document and other USB compliance tools, including USBCV, are available in the developers section of the USB-IF's website, http://www.usb.org/developers/. The compliance checklists are updated periodically, so developers should check for updates when starting new projects.

Section 3, Recommended Questions, contains questions covering areas not required by the USB Specification. Answering these questions is not a requirement for compliance with the Specification or acceptance to the Integrators List. However, vendors are strongly encouraged to take these questions into consideration when designing their products.

Questions or comments regarding the Integrators List, Compliance Workshop testing results, or checklist submissions should be sent to admin@usb.org. If you have questions regarding the checklist itself, feel it fails to adequately cover an aspect of the USB specification, have found an error, or would like to propose a question, please contact the USB-IF at checklists@usb.org.

1.1 General Notes

This document identifies critical design areas for compliance with OTG requirements specified in the OTG Supplement and the USB 2.0 Specification.

An OTG device is defined as a Dual Role Device. As such, it must meet the requirements of a limited host as well as a peripheral. This checklist identifies peripheral, limited host, and OTG specific criteria. If the OTG host controller and peripheral silicon of the device are already certified, then this checklist is all that is required. If the silicon is not certified, then the separate Peripheral Silicon Checklist document must be filled out as well.

All voltages are referenced to the device's USB ground.

Specification references are identified as either USB or OTG. The USB *x.x…* nomenclature references the USB Specification, Revision 2.0. The OTG *x.x…* nomenclature references the On-The-Go Supplement, Revision 1.0.

1.2 Reference Document(s)

- On-The-Go Supplement to the USB 2.0 Specification (www.usb.org/developers/onthego)
- USB 2.0 Specification (http://www.usb.org/developers/docs)
- ECN_27%_ Resistor (http://www.usb.org/developers/docs)

2. Checklists

The checklist questions are divided into Mechanical, Electrical and Protocol questions.

CAUTION: The checklist questions should not replace a comprehensive validation suite.

2.1 Mechanical Checklists

2.1.1 Device Identification and Information

ID	OEM Information
M1	What is the manufacture and model identifier of the connectors or cables used with this peripheral? Manufacturer: _____ Model: _____ NOTE: If the connectors or cables used in this peripheral are **NOT** listed on the USB Integrators List, attach Connector and Cable Assembly checklists covering this peripheral's connectors and cable assemblies.
M2	What is the manufacture and model identifier of the host controllers used with this OTG Device? Manufacturers: _____ Models: _____
M3	What is the manufacture and model identifier of the USB silicon used as OTG B-Device (if different from M2 above)? Manufacturer: _____ Model: _____ NOTE: If the silicon used in this peripheral is **NOT** listed on the USB Integrators List, attach an OTG Peripheral Silicon checklist covering this peripheral's USB silicon.

2.1.2 Device Mechanical Checklist

ID	Device Mechanical Checklist Question	Response	Specification Section Number
M4	Does the OTG device have one, and only one, Mini-AB receptacle?	yes no	OTG 3.2
M5	Does the Mini-AB receptacle have a gray insulator?	yes no	OTG 4.3

2.1.3 Cable Mechanical Checklist

ID	Cable Mechanical Checklist Question	Response	Specification Section Number
M6	Does the cable have a standard-A or mini-A plug on one side and a standard-B or mini-B plug on the other?	yes no	OTG 4.1
M7	Does the Mini-A receptacle have a white insulator?	yes no	OTG 4.3
M8	Does the Mini-A plug have a white insulator?	yes no	OTG 4.3
M9	Does the Mini-A plug to Mini-B plug cables have a propagation delay of 25 ns or less, a physical length of4.5 meters or less, and meets all other requirements of a USB cable? (if bundled with product)	yes no	OTG 4.5.1
M10	Does the Mini-A plug to Std-B plug cable have a propagation delay of 25 ns or less, a physical length of 4.5 meters or less, and meets all other requirements of a USB cable? (if bundled with product)	yes no	OTG 4.5.1
M11	Does the Mini-A plug to captive cable have a propagation delay of 25 ns or less, a physical length of 4.5 meters or less, and meets all other requirements of a USB cable?	yes no	OTG 4.5.1
M12	Is the Mini-A plug overmold compliant with reference? (if bundled with product)	yes no	OTG 4.5.2
M13	Is the Mini-B plug overmold compliant with reference? (if bundled with product)	yes no	OTG 4.5.2
M14	Is the Adapter either: - Std-A receptacle to Mini-A plug - Mini-A receptacle to Std-A plug (if bundled with product)	yes no	OTG 4.5.7
M15	Does the Adapter have a propagation delay of 1ns or less, a physical length of 150 mm or less, and a resistance through V_{BUS} and GND (including contacts) of 70 mΩ or less?(if bundled with product)	yes no	OTG 4.5.7

2.1.4 OTG A-Device Mechanical Design

ID	OTG A-Device Mechanical Design	Response	Specification Section Number
M16	Can the system's USB data lines withstand voltages between –1.0 and 4.6V applied with a source impedance of 39Ω ±2% for up to 100ns?	yes no	USB 7.1.1
M17	When tri-stated, can any data line be continuously shorted to V_{BUS}, GND, anther data line, or a connector's shield without damage occurring?	yes no	USB 7.1.1
M18	When driving 50% of the time, can any data line be shorted to V_{BUS}, GND, anther data line, or a connector's shield without damage occurring?	yes no	USB 7.1.1
M19	Do all D+ and D- traces present a characteristic impedance of 45Ω ±15% to GND and a differential impedance of 90Ω ±15%, between the system's series A receptacles and termination resistors?	yes no	USB 7.1.6
M20	If edge rate control capacitors are used: - Are they located between the transceiver pins and the device's termination resistors? - Is their capacitance less than 75pF and balanced within 10%?	yes no yes no	USB 7.1.6
M21	Does the device present sufficient capacitance between VBUS and GND to prevent adverse effects from flyback voltages when its cable is disconnected? (A minimum of 1.0µF is recommended.)	yes no	USB 7.2.4.2
M22	Do all downstream ports present 150pF or less capacitance on D+ and D-?	yes no	USB 7.1.6
M23	Do all downstream ports have 15kΩ ±5% pull down resistors on D+ and D-?	yes no	USB 7.1.5
M24	For full-speed, is the signaling rate 12.000Mb/s±.25%, even if the device uses spread spectrum clocking?	yes no	USB 7.1.11
M25	For low-speed signals, is the signaling rate 1.50Mb/s±1.5%, even if the device uses spread spectrum clocking?	yes no	USB 7.1.11
M26	Are the receivers and transmitters for any USB port within 3ns of the receptacle for that port?	yes no	USB 7.1.16

2.1.5 OTG B Full Speed Mechanical Design

ID	OTG B-Device Full Speed Mechanical Design	Response	Specification Section Number
MFS1	Does the device's source impedance remain in the shaded areas of Figure 7-4?	yes no	USB 7.1.1.1
MFS3	Is the device's signaling rate 12.000Mb/s±.25%, even if the device uses spread spectrum clocking?	yes no	USB 7.1.11
MUT2	Does the device pull up D+ with a 1.5k? ±5% resistor attached to a voltage source between 3.0 and 3.6V?	yes no	USB 7.1.5
MUT3	Does the device's upstream port present 100pF or less on D+ and D-?	yes no	USB 7.1.6

2.2 OTG B-Device States and Signals

ID	OTG B-Device States and Signals	Response	Specification Section Number
D1	Can the device pull up the appropriate data line to at least 2.0V within 2.5µs?	yes no	USB 7.1.5
D2	Is the device's pullup active only when V_{BUS} is high?	yes no	USB 7.1.5
D3	Is the V_{BUS} switching threshold for the device's pullup control between 1.0V and 4.0V?	yes no	USB 7.1.5
D4	If the device is bus powered, or uses bus power to run any of its components, does it pull up the appropriate data line within 100ms of V_{BUS} exceeding 4.01V?	yes no	USB 7.1.5
D5	Does the device meet all power-on and connection timing requirements, as illustrated in Figure 7-29?	yes no	USB 7.1.7.3 USB 7.3.2
D6	Does the device respond to a reset no sooner than 2.5µs and no later than 10ms after the SE0 begins?	yes no	USB 7.1.7.5
D7	Is the device's reset recovery time less than 10ms?	yes no	USB 7.1.7.5
D8	At the end of reset is the device in the default state?	yes no	USB 7.1.7.3 USB 9.1.1
D9	Can the device correctly handle more than one USB RESET with no intervening packets?	yes no	USB 7.1.7.3
D10	Does the device begin the transition to its suspend state after its bus segment has been idle for 3ms, regardless of the device's state?	yes no	USB 7.1.7.4
D11	Has the device's power consumption dropped to its suspended value after the hub's upstream bus segment has been idle for 10ms?	yes no	USB 7.1.7.4
D12	When suspended, does the device recognize any non-idle state on the bus, excluding a reset, as a resume signal?	yes no	USB 7.1.7.5

ID	OTG B-Device States and Signals	Response	Specification Section Number
D13	When suspended, does the device recognize a reset and act on the signal so that it enters the default state?	yes no	USB 7.1.7.5 USB 7.1.7.3 USB 9.1
D14	Does the device recognize a K→low-speed EOP→J transition on its upstream port as the end of resume signaling?	yes no	USB 7.1.7.7
D15	Is the device able to accept a SetAddress() request 10ms after resume is signaled?	yes no	USB 7.1.7.5
D16	Does the device complete its wakeup within 20ms?	yes no	USB 7.1.7.5
D17	Can the device function correctly with frame lengths between 995 and 1005µs?	yes no	USB 7.1.12
D18	Does the device function correctly on tier 6, when subjected to worst-case hub bit skews and delay times?	yes no	USB 7.1.14 USB 7.1.19
D20	Does the combination of the device's pullup and pulldown resistor at the upstream port yield a voltage between 2.7 and 3.6V when the bus is idle?	yes no	USB 7.3.2
D21	Does the device complete SetAddress() or a standard request with no data in less than 50ms?	yes no	USB 7.3.2 USB 9.2.6.3
D22	Does the device deliver the first and all subsequent data packets, except for the last data packet, for a standard request within 500ms?	yes no	USB 7.3.2 USB 9.2.6.4
D23	Does the device deliver the last data packet for a standard request within 50ms?	yes no	USB 7.3.2 USB 9.2.6.4
D24	Does the device pass a full Device Framework test, as performed by USBCV?	yes no	USB Chapters 8 and 9
D25	Does the device implement a default control endpoint 0 for all addresses?	yes no	USB 9.1.1.4
D26	Are the device's differential *and* single-ended USB signals within spec? Note: This test is especially important if ferrite beads or a common mode choke is used on the USB data lines, as these components often pose a significant signal integrity hazard.	yes no	USB 7.1.6

2.3 OTG B-Device Full-Speed

ID	OTG B-Device Full Speed	Response	Specification Section Number
FS1	Does the device allow an interpacket delay of at least two full-speed bit times?	yes no	USB 7.1.18
FS2	Is the device's transaction timeout 16–18 full-speed bit times?	yes no	USB 7.1.19
FS3	Does the device ignore low-speed packets?	yes no	USB 8.6.5

2.4 OTG B-Device Remote Wakeup (only applicable to devices that support remote wakeup)

ID	OTG B-Device Remote Wakeup	Response	Specification Section Number
W1	Does the device wait at least 5.0ms after its bus segment enters the idle state before sending a remote wakeup?	yes no	USB 7.1.7.5
W2	Does the device signal remote wakeup by driving K upstream for at least 1ms, but not more than 15m?	yes no	USB 7.1.7.5
W3	After driving K, does the device immediately tri-state its buffers without driving the bus to any non-K state?	yes no	USB 7.1.7.5
W4	Does the device send remote wakeups only when configured to do so?	yes no	USB 9.6.2

2.5 Power Delivery

ID	OTG A-Device Power Delivery	Response	Specification Section Number
P2	Does the system implement overcurrent protection to prevent more than 5A from being drawn from any downstream port?	yes no	USB 7.2.1.2.1
P7	Are overcurrent events reported to the host controller?	yes no	USB 10.2
P1	Is the port power rail stabilization time ($\Delta t2$) less than 100ms?	yes no	USB 7.1.7.1
P6	Does the device limit the inrush current drawn from VBUS, either by using capacitors smaller than 10µF or by using soft-start circuits, such that no more than 10µF of capacitance is charged by currents higher than 100mA when the hub is hot plugged?	yes no	USB 7.2.4.1 USB 7.2.3
P8	Does the device have at a total of at least 120µF of low ESR bypass capacitance at its downstream port?	yes no	USB 7.2.4.1
P9	Does the device's port bypassing limit the maximum voltage droop at its downstream port to 330mV, even when subjected to hot-plug inrush currents with peaks of 7.5A or more? (As of this writing, the highest inrush current the USB-IF has observed from a within spec configuration is 7.40A.)	yes no	USB 7.2.4.1

For details on testing USB power provision, consult the USB-IF's drop and droop test description, which can be downloaded from the USB-IF Compliance Program webpage.

2.6 Bus Power Consumption (applicable to all devices, including self powered devices)

Note: the current allotted for a device consuming bus power encompasses all currentdrawn from V_{BUS}, including the power required to drive the device's upstream USB port. For details on testing USB device current consumption, please consult the USB-IF current test description, which can be downloaded from the USB-IF Compliance Program webpage.

2.6.1 Low-Power and Self Powered Devices (not applicable to high power devices)

ID	OTG B-Device Low Power and Self Power	Response	Specification Section Number
LP1	Is the MaxPower field in the device's configuration descriptor 100mA or less?	yes no	USB 7.2.1.3 USB 9.6.2
LP2	Can the device operate in all states with a steady-state V_{BUS} of 4.35–5.25V?	yes no	USB 7.2.2
LP3	Can the device operate in all states with a transient V_{BUS} as low as 4.02V?	yes no	USB 7.2.2
LP4	Does the device draw the amount of current specified in its MaxPower field or less at all times, provided its V_{BUS} is between 4.02 and 5.25V?	yes no	USB 7.2.1.3
LP5	When the device is suspended, is its average current draw less than 500µA?	yes no	USB 7.2.3
LP6	If the device's current draw spikes during suspend, is the maximum spike height less than 100mA and is the spike's edge rate less than 100mA/µs for V_{BUS} between 4.02 and 5.25V?	yes no	USB 7.2.3
LP7	When the device wakes up from suspend, does it limit any inrush currents to 100mA or less?	yes no	USB 7.2.3
LP8	Does the device limit its inrush current, either by using capacitors smaller than 10µF or by using soft-start circuits, such that no more than 10µF of capacitance is charged by currents higher than 100mA when the device is hot plugged?	yes no	USB 7.2.4.1 USB 7.2.3
LP9	Does the device draw no inrush current at configuration or when it transitions to its operating mode?	yes no	USB 7.2.4.1

2.6.2 High Power Devices (not applicable to low-power and self powered devices)

ID	OTG B-Device Low Power and Self Power	Response	Specification Section Number
HP1	Is the MaxPower field in the device's configuration descriptor 500mA or less?	yes no	USB 7.2.2
HP2	Can the device operate in its unconfigured state with a steady-state V_{BUS} of 4.35–5.25V?	yes no	USB 7.2.2
HP3	Can the device operate in its unconfigured state with a transient V_{BUS} as low as 4.02V?	yes no	USB 7.2.2
HP4	While unconfigured, does the device draw 100mA or less at all times, provided its V_{BUS} is between 4.02 and 5.25V?	yes no	USB 7.2.1.3
HP5	Can the device operate in its configured state with a steady-state V_{BUS} of 4.50–5.25V?	yes no	USB 7.2.2
HP6	Can the device operate in its configured state with a transient V_{BUS} as low as 4.17V?	yes no	USB 7.2.2
HP7	While configured, does the device draw the amount of current specified in its MaxPower field or less at all times, provided its V_{BUS} is between 4.02 and 5.25V?	yes no	USB 7.2.1.3
HP8	If the device does not support remote wakeup, the device is not configured, or remote wakeup is disabled, is the device's average suspend current draw less than 500µA?	yes no	USB 7.2.3
HP9	If the device supports remote wakeup, remote wakeup is enabled, and the device is configured, is the device's average suspend current draw less than 2.5mA?	yes no	USB 7.2.3
HP10	If the device's current draw spikes during suspend, is the maximum spike height less than 500mA and the spike's leading edge rate less than 100mA/µs for V_{BUS} between 4.02 and 5.25V?	yes no	USB 7.2.3
HP11	When the device wakes up from suspend, does it limit any inrush currents to 500mA or less?	yes no	USB 7.2.3
HP12	Does the device limit its inrush current, either by using capacitors smaller than 6.5µF or by using soft-start circuits, such that no more than 6.5µF of capacitance is charged: • By currents higher than 100mA when the device is hot plugged? • By currents higher than the device's MaxPower at configuration or when the device transitions to its operating mode?	yes no yes no	OTG 5.1.4 USB 7.2.4.1 USB 7.2.3

2.7 OTG Electrical Checklists

The OTG Device checklist questions are identified as E*x*.

The SRP Capable Host (non-OTG) checklist questions are identified as EH*x*.

The SRP Capable Peripheral (non-OTG) checklist questions are identified as EP*x*.

2.7.1 OTG Device Electrical Checklist

ID	OTG Device Electrical Checklist Question	Response	OTG Supplement Section Number
E1	When attached as an A-Device, does the device support attached devices that draw in excess of 100 mA? If true, mark the question "NA". If false, does the device maintain the V_{BUS} voltage ($V_{A\_VBUS\_OUT}$) between 4.4 - 5.25 Volts under all loads up to the rated output current?	yes no NA	OTG 5.1.1
E2	When attached as an A-Device, does the device support attached devices that draw in excess of 100 mA? If false, mark the question "NA". If true, does the device maintain the V_{BUS} voltage ($V_{A\_VBUS\_OUT}$) between 4.75 - 5.25 Volts under all loads up to the rated output current?	yes no	OTG 5.1.1
E3	When attached as an A-Device, is the V_{BUS} rise time from 0 V to 4.4 V ($T_{A\_VBUS\_RISE}$) less than or equal to 100 ms with the maximum rated load or a load of 100mA whichever is lower and a capacitance of 10uF?	yes no	OTG 5.1.3
E4	When attached as an A-Device and not providing V_{BUS}, is the leakage voltage ($V_{A\_VBUS\_LKG}$) less than or equal to 0.2 Volts five seconds after V_{BUS} has been turned off when measured across a 15k Ohm resistance to ground?	yes no	OTG 5.1.5
E5	Does V_{BUS} ($V_{B\_DRD\_OUT}$) reach at least 2.1 Volts, but does not exceed 5.25 Volts, during V_{BUS} pulsing when attached to a maximum capacitive load of 6.5uF and a minimum resistive load of 40Kohms from V_{BUS} to GND?	yes no	OTG 5.3.4
E6	Does V_{BUS} ($V_{B\_HST\_OUT}$) stay at 2.0 Volts or below during V_{BUS} pulsing when attached to a minimum capacitive load of 96uF and a maximum resistive load of 500Kohms from V_{BUS} to GND?	yes no	OTG 5.3.4
E8	When attached as an A-Device and providing power, does the device provide a minimum of 8mA ($I_{A\_VBUS\_OUT}$)?	yes no	OTG 5.1.1
E9	When attached as a B-device, is the unconfigured average current ($I_{B\_DRD\_UNCFG}$) drawn from V_{BUS} less than or equal to 150uA?	yes no	OTG 5.2.1
E10	Is the discharge current ($I_{B\_DSCHG\_IN}$) from V_{BUS} for the device less than or equal to 8mA?	yes no	OTG 5.2.1
E11	Is the leakage voltage ($V_{DRD\_DATA\_LKG}$) less than or equal to 0.342 Volts when the bus is idle and the data line is pulled to 3.6 volts through a 300k Ohm resistance?	yes no	OTG 5.1.8

ID	OTG Device Electrical Checklist Question	Response	OTG Supplement Section Number
E12	Does the device correctly detect a Mini-B plug by determining if the ID pin resistance to ground is greater than 100K ohms ($R_{B\_PLUG\_ID}$)?	yes no	OTG 4.2
E13	Does the device correctly detect a Mini-A plug by determining if the ID pin resistance to ground is less than 10 ohms ($R_{A\_PLUG\_ID}$)?	yes no	OTG 4.2
E14	Is the Data Line Pull-down (RPD) resistance within the range of 14.25K ohms to 24.8K ohms?	yes no	OTG 5.1.6 OTG 5.2.4
E15	When not providing V_{BUS}, is the input impedance from V_{BUS} to GND ($R_{A\_BUS\_IN}$) less than or equal to 100K ohms?	yes no	OTG 5.1.2
E16	If the device responds to the V_{BUS} pulsing form of SRP, is the input impedance from V_{BUS} to GND ($R_{A\_BUS\_IN}$) greater than or equal to 40K ohms when the device is not providing V_{BUS}?	yes no	OTG 5.1.2
E17	Does the V_{BUS}-pulsing SRP circuitry design assure that, when the device is performing SRP, it will present a maximum load of 8 mA when connected to a voltage source providing from zero to 5.25 Volts?	yes no	OTG 5.3.5
E18	If the device has a rated output on V_{BUS} of less than or equal to 100 mA, will it detect a low-voltage condition if V_{BUS} is below 4.4 Volts ($V_{A\_VBUS\_VLD}$)?	yes no	OTG 5.1.1
E19	If the device responds to V_{BUS} pulsing, is its Device Session Valid threshold ($V_{A\_SESS\_VLD}$) voltage between 0.8 and 2.0 Volts?	yes no	OTG 5.3.6
E20	When attached as a B-Device, does the device assert D+ within 1 second ($T_{B\_SVLD\_BCON}$) after the voltage on V_{BUS} is greater than the B-Device Session Valid threshold ($V_{B\_SESS\_VLD}$) voltage between 0.8 and 4.0 Volts?	yes no	OTG 5.3.7
E21	Is the V_{BUS} Bypass Capacitance (C_{DRD_VBUS}) in the range of 1uF to 6.5uF?	yes no	OTG 5.1.4
E22	Is the duration of a data-line pulse ($T_{B\_DATA\_PLS}$) during an SRP between 5 and 10 ms?	yes no	OTG 5.3.3
E23	Are the transceivers the same for host and peripheral modes?	yes no	
E24	Does the A device include short circuit protection on VBUS that can be reset?	yes no	
E25	Does VBUS (VB_DRD_OUT) reach at least 2.1 Volts, but not exceed 5.25 Volts, during VBUS pulsing from an SRP capable B-Device when attached to a capacitance load of 1 uF and a resistive load of 100Kohms?	yes no	OTG 5.3.4
E26	When attached as a B-Device acting as a peripheral, is the pull-down on the D+ line disabled and the pull-down on the D- line not disabled?	yes no	OTG 5.2.4

ID	OTG Device Electrical Checklist Question	Response	OTG Supplement Section Number
E27	When attached as a B-Device and is idle or acting as a host, are pull-down resistors enabled on both the D+ and D- lines?	yes no	OTG 5.2.4
E28	When attached as an A-Device and is idle or acting as host, are pull-down resistors enabled on both the D+ and D- lines?	yes no	OTG 5.1.6
E29	When attached as an A-device acting as a peripheral, is the pull-down on the D+ line disabled but the pull-down on the D- line is not disabled?	yes no	OTG 5.1.6
E30	Are the A-Device differential and single-ended USB signals within spec? Note: This test is especially important if ferrite beads or a common mode choke is used on the USB data lines, as these components often pose a significant signal integrity hazard.	yes no	USB 7.1.6

2.7.2 SRP Capable Host (Not OTG Device) Electrical Checklist

ID	Electrical Checklist Question	Response	OTG Supplement Section Number
EH2	Does the Host maintain the V_{BUS} voltage ($V_{A\_VBUS\_OUT}$) between 4.75 - 5.25 Volts, for loads up to 0.5 Amps?	yes no	OTG 5.1.1
EH4	When the Host is not providing V_{BUS}, is the leakage voltage ($V_{A\_VBUS\_LKG}$) less than or equal to 0.2 Volts five seconds after V_{BUS} has been turned off?	yes no	OTG 5.1.5
EH15	When not providing V_{BUS}, is the input impedance from V_{BUS} to GND ($R_{A\_BUS\_IN}$) less than or equal to 100K ohms?	yes no	OTG 5.1.2
EH16	If the Host responds to the V_{BUS} pulsing form of SRP, is the input impedance from V_{BUS} to GND ($R_{A\_BUS\_IN}$) greater than or equal to 40K ohms when the device is not providing V_{BUS}?	yes no	OTG 5.1.2
EH19	If the Host responds to V_{BUS} pulsing, is its Device Session Valid threshold ($V_{A\_SESS\_VLD}$) voltage between 0.8 and 2.0 Volts?	Yes no	OTG 5.3.6

2.7.3 SRP Capable Peripheral (Not OTG Device) Electrical Checklist

ID	Peripheral Electrical Checklist Question	Response	OTG Supplement Section Number
EP5	Does V_{BUS} ($V_{B\_DRD\_OUT}$) reach at least 2.1 Volts, but does not exceed 5.25 Volts, during V_{BUS} pulsing when attached to a maximum capacitance load of 6.5uF and a minimum resistive load of 40Kohms from V_{BUS} to GND?	yes no	OTG 5.3.4
EP6	Does V_{BUS} ($V_{B\_HST\_OUT}$) stay at 2.0 Volts or below during V_{BUS} pulsing when attached to a minimum capacitance load of 96uF and a maximum resistive load of 500Kohms from V_{BUS} to GND?	yes no	OTG 5.3.4
EP7	Does the induced transient ($V_{B\_DELTA\_PK}$) on V_{BUS} stay below a di/dt of 100mA/us?	yes no	OTG 5.2.2
EP17	Does the V_{BUS}-pulsing SRP circuitry design assure that, when the device is performing SRP, it will present a maximum load of 8 mA when connected to a voltage source providing from zero to 5.25 Volts?	yes no	OTG 5.3.5
EP20	Does the device assert either D+ or D- within 100ms ($T_{B\_SVLD\_BCON}$) after the voltage on V_{BUS} is greater than the B-Device Session Valid threshold ($V_{B\_SESS\_VLD}$) voltage between 0.8 and 4.0 Volts?	yes no	OTG 5.3.7
EP22	Is the duration of a data-line SRP pulse ($T_{B\_DATA\_PLS}$) between 5 and 10 ms?	yes no	OTG 5.3.3
EP24	Is the V_{BUS} current ($I_{B\_PO\_UNCFG}$) less than or equal to 8mA whenever the device is not configured?	yes no	OTG 5.2.1

2.8 Protocol Checklist

ID	Protocol Checklist Question	Response	OTG Supplement Section Number
P1	For a*n OTG B-device* or *SRP capable peripheral*, is an *OTG configuration descriptor* included in the response to all valid GetDescriptor(Configuration) requests?	yes no	OTG 6.4
P2	For a*n OTG B-device* or *SRP capable peripheral*, is SRP only initiated when the voltage on V_{BUS} is thought to be below $V_{B\_SESS\_END}$ and the bus has been in the SE0 state for at least 2ms ($T_{B\_SE0\_SRP}$)?	yes no	OTG 6.8.3.1
P3	For a*n OTG B-device* or *SRP capable peripheral,* before SRP is initiated, is an indication made to the user that communications are trying to be established?	yes no	OTG 6.8.2.2
P4	For an OTG *B-device* or *SRP capable peripheral*, is an indication made to the user that SRP has failed if a session has not been started within $T_{B\_SRP\_FAIL}$ of initiating SRP?	yes no	OTG 6.8.2.2
P5	For an OTG *B-device* or *SRP capable peripheral*, does SRP take less than 100ms ($T_{B\_SRP\_INIT}$)?	yes no	OTG 6.8.2.2
P6	For a*n OTG A-device*, is an indication made to the user that the B-device is not supported when V_{BUS} takes longer than $T_{A\_VBUS\_RISE}$ to reach $V_{A\_VBUS\_VLD}$?	yes no	OTG 5.1.3 OTG 6.6.5.1
P7	For a*n OTG A-device*, when waiting for a *B-device* connect, is the connect debounced for $T_{A\_BCON\_LDB}$ at the start of a session or after waiting for more than $T_{A\_BCON\_SDB\_WIN}$, and debounced for at least $T_{A\_BCON\_SDB}$ at all other times?	yes no	OTG 6.6.1.12
P8	For an *SRP capable host*, when waiting for a *B-device* connect, is the connect debounced for $T_{A\_BCON\_LDB}$?	yes no	6.6.1.12
P9	For a*n OTG A-device*, if waiting for a *B-device* connect and using a debounce of $T_{A\_BCON\_SDB}$ is the debounce interval started after T_{LDIS_DSCHG}?	yes no	OTG 6.6.1.12
P10	For a*n OTG B-device*, when operating as a peripheral, is HNP only started (with a disconnect) if the bus has been idle for more than 5ms ($T_{B\_AIDL\_BDIS}$ min)?	yes no	OTG 6.3
P11	For a *HS capable OTG B-device*, operating as a HS peripheral, when no bus activity is detected for 5 ms ($T_{B\_AIDL\_BDIS}$), is FS mode entered, the D+ pull-up resistor turned on, and the D+ line checked to be high for at least 1ms ($T_{B\_FS\_BDIS}$ min) before starting HNP?	yes no	OTG 6.3
P12	For a *HS capable OTG B-device*, after operating as a HS peripheral and entering FS mode so that HNP can be started, if the D+ line is not high within $T_{WTRSTHS}$ of turning on the D+ pull-up is a HS chirp started?	yes no	OTG 6.3
P13	For a*n OTG B-device*, if after initiating HNP and 3.125ms ($T_{B\_ASE0\_BRST}$ min) of SE0 is seen, does the device return to being a peripheral and start to process the reset before ($T_{B\_ASE0\_BRST}$ max)?	yes no	OTG 6.6.1.3 OTG 6.6.5.4 OTG 6.7.1 OTG 6.8.1.5

ID	Protocol Checklist Question	Response	OTG Supplement Section Number
P14	For a*n OTG B-device*, if after initiating HNP and the D+ line is high after 25µs (T_{LDIS_DSCHG} min) for at least 2.5µs ($T_{B\_ACON\_DBNC}$ min) after the B-device turns off its D+ pull-up, does the B-device become the host?	yes no	OTG 6.6.1.5 OTG 5.1.9
P15	For a*n OTG B-device*, after successfully becoming host is a bus reset asserted within 1ms (TB_ACON_BSE0 max) of detecting the A-device connect?	yes no	OTG 6.3 OTG 6.7.1
P16	For a*n OTG B-device*, are SetFeature(b_hnp_enable), SetFeature(a_hnp_support) and SetFeature(a_alt_hnp_support) all accepted in the Default, Address and Configured states ?	yes no	OTG 6.5
P17	For a*n OTG device*, are the features b_hnp_enable, a_hnp_support and a_alt_hnp_support cleared on a bus reset and at the end of a session but not with a ClearFeature( ) command ?	yes no	OTG 6.5
P18	For a*n OTG A-device*, is a SetFeature(b_hnp_enable) command only sent to a directly connected *B-device* (no intervening hubs) ?	yes no	OTG 6.5.1
P19	For a*n OTG A-device,* is a SetFeature(a_hnp_support) command only sent between the start of a session and the selecting of a*n OTG B-device* configuration ?	yes no	OTG 6.5.2
P20	For a*n OTG A-device,* if it was successful in setting b_hnp_enable during the current session and a disconnect was detected during suspend, is it's D+ pull-up resistor turned on within 3ms ($T_{A\_BDIS\_ACON}$) of detecting the disconnect?	yes no	OTG 6.3 OTG 6.7.2
P21	For a*n OTG A-device,* after detecting 3ms ($T_{A\_BIDL\_ADIS}$ min) of continuous idle whilst acting as a peripheral, does the *A-device* disconnect within 197ms ($T_{A\_BIDL\_ADIS}$ max - $T_{A\_BIDL\_ADIS}$ min)?	yes no	OTG 6.8.1.6
P22	For a *HS capable OTG A-device*, if a bus reset is detected whilst acting as a peripheral, is the high-speed detection handshake started?	yes no	OTG 6.8.1.6
P23	For a*n OTG A-device*, does the device initiate a session upon the insertion of a mini-A plug?	yes no	
P24	For a*n OTG A-device*, if the answer to P23 is 'Yes', does the device support SRP?	yes no	
P25	For a*n OTG A-device*, does the device support remote wakeup operation when acting as a host?	yes no	USB 10.2
P26	For an OTG A device, is a session always started within 30 seconds of a valid SRP?	yes no	OTG 6.8.2.2
P27	When an OTG A device starts a session is VBUS always valid for at least $T_{A\_WAIT\_BCON}$ (1 second)?	yes no	OTG 6.6.5.2
P28	For an OTG-A device, is a reset always issued within 30 seconds of a B device connect?	yes no	OTG 5.5

ID	Protocol Checklist Question	Response	OTG Supplement Section Number
P29	For an OTG-A device, is a set feature hnp_enable command issued within 30 seconds of the connection of an unsupported B device?	yes no	
P30	For an OTG-A device, is the bus suspended within 30 seconds of bus reset with an unsupported B device acknowledges the set feature hnp_enalbe command?	yes no	
P31	Does the OTG-A device ever abort HNP after suspending when interacting with an unsupported device?	yes no	
P32	Does the OTG-A device always enumerate successfully as a peripheral following an HNP transition?	yes no	
P33	Does the OTG-A device respond to remote wakeup signaling by driving resume for at least 20 milliseconds even if it has not sent an enable remote wakeup command to the downstream device?	yes no	
P34	For a*n OTG B-device*, when operating as a peripheral, is HNP started (with a disconnect) within 150 ms of the bus being idle ($T_{B\_AIDL\_BDIS}$ max)?	yes no	
P35	Does the OTG-B device end the session within 30 seconds of becoming host for the unsupported device following an HNP transition?	yes no	

2.8.1 Test Device Support

This section assumes the attached test device contains a VID=6666 (0x1A0A) ND PID=47837 (0xBADD).

ID	Test Device Support Questions	Response	OTG Supplement Section Number
T1	Does the OTG device consider, as unsupported, an attached A- or B-Device with VID=6666 (0x1A0A), PID=47837 (0xBADD)?	Yes no	OTG 6.6.6
T2	Does the OTG A-Host initiate HNP within $T_{A\_SRP\_RSPNS}$ max upon enumerating the test device?	yes no	OTG 6.8.1.4
T3	Does the OTG B-Host stop bus activity and return to **b_peripheral** state within 30 seconds after enumerating the attached test device?	yes no	OTG 6.8.2.5

2.9 OTG Device Messaging

OTG devices are required to inform the user of situations where unnecessary confusion may occur. This is part of the "No Silent Failures" requirement as specified in section 3.4 of the OTG Supplement. For example, when an unsupported peripheral is connected, the OTG device must inform the user of the lack of support. This section covers the minimal set of messaging that is required.

ID	OTG Device Messaging	Response	OTG Supplement Section Number
MSG1	Does the OTG device provide a means to communicate messages to the user?	yes no	
MSG2	Does the OTG device produce a "device not connected" or "device not responding" or similar error message to a non-responsive attached device?	yes no	
MSG3	Does the OTG A-Host produce a "device not supported" or similar error message when a device it does not recognize uses SRP to start a session and does not support HNP?	yes no	
MSG4	Does the OTG A-Host produce a "device not responding" or similar error message when a device it does not recognize uses SRP to start a session, indicates HNP support, but STALLs the Set Feature B_HNP_ENABLE request?	yes no	
MSG5	Does the OTG B-Host (your device) produce an "unsupported device" or similar error message when it becomes host and enumerates the attached A-peripheral having an unsupported Vendor and Device ID?	yes no	
MSG6	Does the OTG B-peripheral produce a "device not responding" or similar error message when it is unable to start a session with the host?	yes no	
MSG7	Does the OTG B-peripheral produce a "device not responding" or simlar error message when it starts a session and HNP fails?	yes no	

3. Recommended Questions

3.1 OTG B-Device Recommended Questions

R1	Are the device's signal swings matched as closely as possible?	yes no	USB 7.1.2
R2	If ferrite beads are used in the device's USB connection, are they present on only the V_{BUS} and GND lines?	yes no	USB 7.1.6
R3	Does the device complete all commands as quickly as is practical?	yes no	USB 9.2.6.1
R4	If the device is self-powered and does not operate any of its components from bus power, does it only signal an attach when both bus power and external power are available?	yes no	

3.2 OTG A-Device Recommended Questions

R1	If the system uses internal cabling are the cables keyed to prevent incorrect attachments, particularly those which would reverse VBUS and GND?	yes no	
R3	Does the system meet FCC/B or equivalent radiated emissions standards when full-speed devices are connected to the host port and there is full-speed USB traffic?	yes no	
R4	Does the system meet FCC/B or equivalent for conducted emissions when full-speed devices are connected to the host port and there is full-speed USB traffic?	yes no	
R5	Does the system meet FCC/B or equivalent radiated emissions standards when low-speed devices with unshielded cables are connected to the host's downstream port and there is low-speed traffic on the bus?	yes no	
R6	Does the system meet the RF and ESD susceptibility standards stipulated in IEC 802-xx. (Note: at present these standards are only required in the European Economic Community.)	yes no	
R7	Does the system's overcurrent protection prevent a brownout or a blackout from occurring, even if a dead short is placed across a USB port?	yes no	

4. Explanations

This section should be used to explain any “no” answers or clarify answers on checklist items above. Please key entries to the appropriate checklist question.