APPENDIX E

PC 99 Master Checklist

If a recommended feature is implemented, it must meet the PC 99 requirements for that feature as defined in this document.

Checklist for PC 99 Basic Requirements

Consumer	Office	Mobile	Workstation	Entertainment
3.1. System performance meets PC 99 minimum requirements				
300 MHz,	*300 MHz,*	*233 MHz,*	*400 MHz,*	*300 MHz*
32 MB	*64 MB*	*32 MB*	*128 MB*	*64 MB*
3.2. System design meets ACPI 1.0 specification and PC 99 requirements				
Required for all system types, with exceptions for mobile PCs				
3.3. Hardware design supports OnNow and Instantly Available PC initiatives				
Required for all system types, with exceptions for mobile PCs				
3.4. BIOS meets PC 99 requirements for OnNow support				
Required for all system types				
3.5. BIOS meets PC 99 requirements for boot support				
Required for all systems, with exceptions for mobile PCs				
3.6. All expansion slots in the system are accessible for users to insert cards				
Required for all system types, with extra guidelines for mobile				
3.7. Audible noise meets PC 99 requirements				
Required for all system types				
3.8. System and component design practices follow accessibility guidelines				
Recommended for all system types				
3.9. Internal system modification capabilities are not accessible to end users				
Recommended for all system types				
3.10. System design provides physical security				
Recommended for all system types				
3.11. Each device and driver meets PC 99 device requirements				
Required for all system types				
3.12. Each bus and device meets Plug and Play specifications				
Required for all system types				

3.13. Unique Plug and Play device ID provided for each system device and add-on device
Required for all system types

3.14. Option ROMs meet Plug and Play requirements
Required for all system types

3.15. "PNP" vendor code used only to define a legacy device's Compatible ID
Required for all system types

3.16. Device driver and installation meet PC 99 requirements
Required for all system types

3.17. Minimal user interaction needed to install and configure devices
Required for all system types

3.18. Connections use icons, plus keyed or shrouded connectors, with color coding
Required for all system types, with exceptions for mobile PCs

3.19. Hot-plugging capabilities for buses and devices meet PC 99 requirements
Required for all system types

3.20. System includes Device Bay 1.0-compatible bay
Recommended for all system types

3.21. Multifunction add-on devices meet PC 99 device requirements for each device
Required for all system types

3.22. All devices support correct 16-bit decoding for I/O port addresses
Required for all system types

3.23. All PC 99 input devices support Microsoft DirectInput and work simultaneously
Required for all system types

3.24. Each bus meets written specifications and PC 99 requirements
Required for all system types

3.25. System includes USB with two USB ports, minimum
Required for all system types, with exceptions for mobile PCs

3.26. System includes support for IEEE 1394
Recommended for all system types, with 3 ports recommended for Entertainment PCs

3.27. If present, PCI bus meets PCI 2.1 or later, plus PC 99 requirements
Required for all system types

3.28. System does not include ISA expansion devices or slots
Required for all system types

3.29. System includes keyboard connection and keyboard
Required for all system types

3.30. System includes pointing-device connection and pointing device
Required for all system types

3.31. System includes connection for external parallel devices
Required for all system types

3.32. System includes connection for external serial devices
Required for all system types

3.33. System includes IR devices compliant with IrDA specifications
Recommended for all system types

Consumer	Office	Mobile	Workstation	Entertainment
3.34. System includes PC 99-compatible CD or DVD drive and controller				
Required	*Recommended*	*Recommended*	*Required*	*DVD required*
3.35. System includes audio support that meets PC 99 requirements				
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*
3.36. System includes a modem or other public network communications support				
Required	*Recommended*	*Required*	*Recommended*	*Required*
3.37. System includes a network adapter				
Recommended	*Required*	*Recommended*	*Required*	*Recommended*
3.38. System includes smart card support				
Recommended for all system types				
3.39. Graphics adapter meets PC 99 minimum requirements				
Required for all system types, with specific guidelines for each system type				
3.40. Color monitor is DDC-compliant with unique EDID identifier				
Required for all system types, with exceptions for mobile PCs				
3.41. System meets PC 99 DVD-Video and MPEG-2 playback requirements, if system supports DVD-Video				
Required for all system types, with exceptions for mobile PCs				
3.42. Adapter supports television output if system does not include a large-screen monitor				
Recommended for all system types				
3.43. System supports PC 99 analog video input and capture capabilities				
Recommended for all system types				
3.44. System includes analog television tuner				
Recommended for all system types				
3.45. System BIOS and option ROMs support Int 13h Extensions				
Required for all system types				
3.46. Host controller for storage device meets PC 99 requirements				
Required for all system types				
3.47. Host controllers and hard disk devices support bus mastering				
Required for all system types				
3.48. Hard drive meets PC 99 requirements				
Required for all system types				
3.49. Operating system recognizes the boot drive in a multiple-drive system				
Required for all system types				
3.50. Floppy disk capabilities, if implemented, do not use legacy FDC				
Recommended for all system types				
3.51. System supports WHIIG				
Not applicable	*Required*	*Required with Windows NT*	*Required*	*Not applicable*
3.52. System includes driver support for WMI				
Not applicable	*Required*	*Required with Windows NT*	*Required*	*Not applicable*

Consumer	Office	Mobile	Workstation	Entertainment
3.53. Management information service provider enabled by default				
Not applicable	*Required*	*Required with Windows NT*	*Required*	*Not applicable*
3.54. Expansion devices can be remotely managed				
Not applicable	*Required*	*Recommended*	*Required*	*Not applicable*
3.55. SMBIOS 2.2 static table support is provided				
Not applicable	*Required*	*Recommended*	*Required*	*Not applicable*

Checklist for Workstation PC 99

4.1. Workstation meets all requirements for Office PC 99
Required

4.2. Workstation performance meets Workstation PC 99 minimum requirements
Required

4.3. Workstation supports multiple processors
Recommended

4.4. Workstation RAM can be expanded
Recommended

4.5. Workstation system memory includes ECC memory protection
Required

4.6. Workstation includes APIC support
Required

4.7. Workstation includes high-performance components
Recommended

4.8. Workstation supports 64-bit I/O bus architecture
Required for 64-bit platforms

4.9. Workstation does not include ISA expansion slots
Required

4.10. Graphics subsystem supports workstation performance demands
Required, with special conditions depending on PC 99 market category

4.11. Storage components rely on SCSI controller
Recommended

4.12. Workstation includes multiple hard drives
Recommended

Checklist for Entertainment PC 99

5.1. System performance meets Entertainment PC 99 minimum requirements
Required

5.2. Entertainment PC includes three IEEE 1394 ports, with at least one easily accessible connector
Recommended

5.3. All Entertainment PC input devices meet USB HID specifications
Recommended

5.4. Entertainment PC includes a remote-control pointing device
Recommended

5.5. Entertainment PC audio subsystem meets PC 99 audio requirements
Required

5.6. Graphics subsystem meets Entertainment PC 99 requirements for 3-D acceleration
Required

5.7. Entertainment PC includes support for television output if the system doesn't have a large-screen monitor
Recommended

5.8. Entertainment PC includes large-screen DDC2B color entertainment monitor
Recommended

5.9. Entertainment PC DVD and TV playback meet PC 99 requirements
Required

5.10. Entertainment PC includes analog video input and capture capabilities
Recommended

5.11. Entertainment PC includes analog television tuner
Recommended

5.12. Entertainment PC includes digital broadcast satellite subsystem
Recommended

5.13. Entertainment PC includes DTV support
Recommended

Checklist for Mobile PC 99

6.1. Mobile PC performance meets Mobile PC 99 minimum requirements
Required

6.2. Mobile PC supports Smart Battery or ACPI Control Method battery
Required

6.3. Expansion capabilities of mobile PC are accessible to users
Required

6.4. Mobile PC connections use icons plus keyed or shrouded connectors
Required

6.5. Mobile PC includes one USB port
Required

6.6. USB-connected device does not maintain fully on power state
Required

6.7. Mobile PC includes an IEEE 1394 port
Recommended

6.8. Mobile PC includes CardBus
Required

6.9. Mobile PC keyboard and pointing device meet PC 99 requirements
Required

6.10. Mobile PC includes IR devices compliant with IrDA specifications
Recommended

6.11. Mobile PC includes support for installing the operating system
Required

6.12. Mobile PC includes audio that meets Mobile PC 99 audio requirements
Recommended

6.13. Mobile PC includes communications device
Recommended

6.14. Mobile system supports hot-pluggable devices and alternative network connections
Recommended

6.15. Mobile system meets Mobile Power Guidelines '99
Recommended

6.16. Mobile system includes CD or DVD drive
Recommended

6.17. Mobile system meets Manageability Baseline requirements
Required if Windows NT is preinstalled

6.18. Built-in display adapter meets Mobile PC 99 minimum capability
Required

6.19. Built-in display adapter with 3-D hardware acceleration capabilities meets Mobile PC 99 minimum capability
Required

6.20. Mobile system meets Mobile PC 99 requirements for supporting multiple adapters and multiple monitors
Required

6.21. External graphics adapter interface supports DDC monitor detection
Required

6.22. Mobile system with MPEG-2 or DVD playback features meets Mobile PC 99 requirements for video playback
Required

6.23. Mobile system with AGP supports meets Mobile PC 99 requirements
Required

6.24. System meets Mobile PC 99 requirements if television output is implemented
Required

6.25. Built-in mobile display supports ICC color management
Required

6.26. System supports PCI docking through a bridge connector
Recommended

6.27. Docked mobile PC supports state change notification using ACPI
Required

6.28. Docked mobile PC has the ability to identify the specific model of the dock
Required

6.29. Docked mobile PC has the ability to uniquely identify the dock
Required

6.30. Mobile PC/docking station combination meets PC 99 requirements
Required

6.31. Docking station meets all PC 99 system requirements
Required

6.32. Mobile/docking station interface is supported using ACPI-defined mechanisms
Required

6.33. Mobile PC/docking station combination supports automatic resource assignment and dynamic disable capabilities
Required

6.34. Docking station supports warm docking
Required

6.35. Docking system supports fail-safe docking
Required

6.36. Docking station includes an IEEE 1394 port
Recommended

6.37. Docking station/mobile pair meets PC 99 audio requirements
Recommended

6.38. Mini-dock supports automatic resource assignment and dynamic disable capabilities for replacement devices
Required

6.39. Mini-dock supports warm docking
Required

6.40. Mini-dock supports fail-safe docking
Required

6.41. Mini-dock includes an IEEE 1394 port
Recommended

6.42. Mini-notebook performance meets PC 99 minimum requirements
Required

Checklist for USB

7.1. System includes USB with two USB ports, minimum
Required for all system types, with exceptions for mobile PCs

7.2. Systems include BIOS support for USB keyboards and hubs
Required

7.3. All USB hardware complies with USB 1.0 specification
Required

7.4. Connections use USB icon
Required

7.5. Devices and drivers support maximum flexibility of hardware interface options
Required

7.6. USB host controller meets either OpenHCI or UHCI specification
Required

7.7. USB host controller can wake the system
Required

7.8. USB hubs comply with USB 1.1 specification
Recommended

7.9. Bus-powered USB hubs provide ports that can be individually power switched
Recommended

7.10. Systems and devices comply with USB power management requirements
Required

7.11. USB devices meet requirements in related USB device class specification
Required

Checklist for IEEE 1394

8.1. Controllers and devices support mandatory features in IEEE P1394.a with backward compatibility with IEEE 1394-1995
Required

8.2. Controllers comply with OpenHCI for IEEE 1394
Required

8.3. OpenHCI controllers and devices support advances defined in IEEE P1394.a
Required

8.4. Host supports peak data rate of 400 Mb/s, minimum
Required

8.5. Design avoids excessive currents resulting from ground-fault potential among devices
Recommended

8.6. Device command protocols conform to standard device class interfaces
Required

8.7. Devices support peak data rate of 400 Mb/s, minimum
Required

8.8. Devices requiring support for high-bandwidth data transfer use IEEE 1394
Recommended

8.9. Plug and Play devices demonstrate interoperability with other devices
Required

8.10. Topology faults do not cause the bus to fail
Required

8.11. Removable media devices support media status notification
Required

8.12. Devices that can initiate peer-to-peer communications also support remote programming
Required

8.13. Device provides a configuration ROM for unique device identification
Required

8.14. Device configuration ROM implements general ROM format
Required

8.15. Bus information block implemented at a base address offset of 0404h
Required

8.16. Configuration ROM provides globally unique device ID
Required

8.17. Root directory is located at a fixed address following the bus information block
Required

8.18. Configuration ROM includes a unit directory for each independent device function
Required

8.19. Each unit directory provides a valid Unit_Spec_Id and Unit_Sw_Version
Required

8.20. Each unit directory provides a pointer to a unit-dependent directory
Required

8.21. Vendor and model leaves support textual descriptor leaf format
Required

8.22. Unit-dependent directory provides a pointer to the unit's CSRs
Required

8.23. Device provides more than one connector port
Recommended

8.24. Device uses the approved IEEE 1394 connectors
Required

8.25. Self-powered devices propagate the power bus through each connector
Required

8.26. Only single-port leaf-node devices use 4-pin connectors
Required

8.27. Device connectors exhibit common speed and power characteristics
Required

8.28. Standard S400-rated IEEE 1394 cable is provided with devices
Required

8.29. Devices provide sufficient power to their PHY at appropriate times
Required

8.30. Devices report power source and cable power consumption in Self_id packet
Deleted

8.31. Devices implement link power control
Required

8.32. Device requiring power increments in excess of Link_on implements unit-power CSRs
Required

8.33. Devices that source cable power report this capability
Required

8.34. IEEE 1394-enabled PC sources cable power compliant with IEEE 1394a-1999
Required

8.35. Power source supplies appropriate cable power
Deleted

8.36. Devices notify the power manager of power change requests
Deleted

8.37. Devices and controllers comply with the 1394 Trade Association Power Specification, Part 1: Cable Power Distribution, Rev. 0.98
Required

8.38. Devices and controllers comply with IEEE 1394 power specification
Deleted

Checklist for PCI

9.1. All components comply with PCI 2.1
Required

9.2. System does not contain ghost devices
Required

9.3. System uses standard method to close BAR windows on nonsubtractive decode PCI bridges
Required

9.4. System provides 3.3 V to all PCI connectors
Required

9.5. PCI add-on devices support both 5 V and 3.3 V signaling
Recommended

9.6. System-board bus complies with PCI 2.1
Required

9.7. Bus master privileges are supported for all connectors
Required

9.8. Functions in a multifunction PCI device do not share writable PCI Configuration Space bits
Required

9.9. All PCI devices complete memory write transaction (as a target) within specified times
Required

9.10. Devices use PCI 2.1 Configuration Space for Plug and Play device ID
Required

9.11. Device IDs include Subsystem IDs
Required

9.12. Configuration Space is correctly populated
Required

9.13. Interrupt routing is supported using ACPI
Required

9.14. BIOS does not configure I/O systems to share PCI interrupts
Recommended

9.15. BIOS configures boot device IRQ and writes to the interrupt line register
Required

9.16. Systems that support hot plugging for any PCI device use ACPI-based methods
Required

9.17. All PCI components comply with PCI Bus Power Management Interface specification
Required

9.18. System provide support for 3.3Vaux if a system supports S3 or S4 states
Required

9.19. Bus power states are correctly implemented
Required

9.20. PCI-based modem and network adapters support wake-up
Required

Checklist for ATA and ATAPI

10.1. Controller and peripherals comply with ATA-2, ATA-3, or ATA/ATAPI-4 standards
Required

10.2. Bootable ATA controller supports El Torito No Emulation mode
Required

10.3. Option ROMs support Int 13h Extensions
Required

10.4. Dual ATA adapters use single FIFO with asynchronous access or dual FIFOs and channels
Required

10.5. System BIOS and devices support LBA
Required

10.6. System BIOS supports ARMD
Recommended

10.7. Controller and peripherals support Ultra DMA
Required

10.8. Controller and peripheral connections include Pin 1 cable designation with keyed and shrouded connectors
Required

10.9. Peripherals comply with ATA/ATAPI-4 or SFF 8020i v.2.5
Required

10.10. Removable media devices support media status notification
Required

10.11. BIOS enumeration of all ATAPI devices complies with ATA/ATAPI-4 or SFF 8020i v.2.5
Required

10.12. ATAPI devices support DEVICE RESET command
Required

10.13. Each device has a Plug and Play device ID
Required

10.14. Dynamic resource configuration is supported for all devices
Required

10.15. Resource configuration meets bus requirements
Required

10.16. ISA address ranges 3F7h and 377h are not claimed by ATA controllers
Required

10.17. Bus and device meet PC 99 power management requirements
Required

10.18. ATA device supports ATA STANDBY command
Required

Checklist for SCSI

11.1. SCSI host controller supports bus mastering
Required

11.2. Bootable SCSI controller supports El Torito No Emulation mode
Required

11.3. Option ROM supports Int 13h Extensions
Required

11.4. Option ROM supports virtual DMA services
Required

11.5. Bus type is clearly indicated on connectors for all adapters, peripherals, cables, and terminators
Required

11.6. Differential devices support DIFFSENS as defined in SPI standard
Required

11.7. Automatic termination circuit and SCSI terminators meet SCSI-3 standard
Required

11.8. Terminator power is supplied to the SCSI bus with overcurrent protection
Required

11.9. External connector meets SCSI-2 or later standard
Required

11.10. Controller and peripherals implement SCSI bus data protection signal
Required

11.11. SCSI connections use keyed and shrouded connectors
Required

11.12. External devices use automatic termination or an accessible on-board termination switch
Required

11.13. Shielded device connector meets SCSI-2 or later standard
Required

11.14. Removable media devices support media status notification
Required

11.15. Each device has a Plug and Play device ID
Required

11.16. Dynamic resource configuration is supported for all devices
Required

11.17. Resource configuration meets bus requirements
Required

11.18. SCAM support is disabled by default
Required

11.19. SCSI devices that support hot-plugging meet PC 99 requirements
Required

11.20. SCSI controllers provide multi-initiator support
Recommended

11.21. Bus and device meet PC 99 power management requirements
Required

11.22. Hardware supports the STOP/START UNIT command as defined in the SPI standard
Required

11.23. STOP/START UNIT command is used to decrease power consumption
Required

Checklist for PC Card

12.1. All devices comply with the PC Card standards
Required

12.2. System and ZV-compatible 16-bit PC Cards comply with ZV standard definitions
Required

12.3. Controller supports industry-standard ExCA register set
Required

12.4. System maintains mapping of IRQ Routing Register bits to system interrupt vectors
Required

12.5. IRQ connections can be determined by using the 0805 register
Required

12.6. CardBus controllers support both ISA and PCI interrupts
Required

12.7. System supports industry-standard definition for CardBus bridges
Required

12.8. BIOS initializes CardBus controller in 82365-compatible mode and supports backward compatibility
Recommended

12.9. CardBus controllers do not share writable PCI Configuration Space bits
Required

12.10. Each 16-bit PC Card memory window in CardBus controller has it own page register
Required

12.11. Card supports required I/O card tuples
Required

12.12. Configuration table entry tuples listed in priority order
Required

12.13. Card specifies maximum configuration options
Required

12.14. Configuration Space meets Common Silicon Guidelines
Required

12.15. RESERVED fields comply with PCI 2.1
Required

12.16. CardBus card implements required and recommended tuples
Required

12.17. Socket controller complies with device class power management reference specification
Required

12.18. 16-bit PC Card cards implement power-related events using ReqAttn bit and #STSCHG mechanism
Required

12.19. CardBus controllers and cards implement PCI power management specifications
Required

12.20. No user intervention required for correctly installing devices
Required

12.21. Device is immediately functional without restarting the system
Required

12.22. ZV-compatible PC Card driver uses DirectDraw LVE
Required

12.23. 16-bit PC Card card driver supports sharing of level-mode interrupts
Required

Checklist for I/O Ports and Devices

13.1. System includes connection for external serial devices
Required for all system types

13.2. System includes connection for external parallel devices
Required for all system types

13.3. System includes external connection for keyboard
Required for all system types

13.4. System includes pointing-device connection and pointing device
Required for all system types

Consumer	Office	Mobile	Workstation	Entertainment
13.5. System includes USB game pad or joystick				
Required for all system types; wireless recommended for Entertainment PC				
13.6. System includes built-in wireless capabilities				
Recommended for all system types				
13.7. Devices use USB or external bus connections rather than legacy serial or parallel ports				
Required	*Recommended*	*Recommended*	*Required*	*Required*
13.8. All devices meet PC 99 general device requirements				
Required				
13.9. Serial port meets device class specifications for its bus				
Required				
13.10. Legacy serial port is implemented as 16550A UART or equivalent and supports 115.2K baud				
Required				
13.11. Legacy serial port supports dynamic resource configuration				
Required				
13.12. Conflict resolution for legacy serial port ensures availability of at least one serial port				
Required				
13.13. Parallel port meets device class specifications for its bus				
Required				
13.14. Flexible resource configuration supported for each parallel port				
Required				
13.15. EPP support does not use restricted I/O addresses				
Required				
13.16. Compatibility, nibble mode, and ECP protocols meet IEEE 1284-1994 specifications				
Required				
13.17. Port connectors meet IEEE 1284-I specifications, minimum				
Required				
13.18. IEEE 1284 peripherals have Plug and Play device IDs				
Required				
13.19. Device identification string provides a Compatible ID key				
Recommended				
13.20. Daisy-chained parallel port device is Plug and Play capable				
Required				
13.21. Pointing-device connection meets requirements for its bus class				
Required				
13.22. Remote control pointing device provides PC 99 minimum support				
Recommended				
13.23. Keyboard connection meets requirements for its bus class				
Required				
13.24. No interference occurs between multiple keyboards				
Required				
13.25. Keyboard includes Windows and Application logo keys				
Recommended				

13.26. Device meets USB HID class specification requirements
Required

13.27. IR device uses NDIS 5.0 miniport driver
Required

13.28. IR device meets IrDA specifications
Required

13.29. IR device meets PC 99 bus and port specifications
Required

13.30. IR device supports dynamic resource configuration
Required

13.31. IR device meets USB guidelines for interfacing with IrDA Data and IrDA Control devices
Required

13.32. System supports standard input speeds of 4 Mb/s
Required

13.33. System provides a separate, physically-isolated transceiver for each IR protocol supported
Required

13.34. System supports RF capabilities
Optional

13.35. RF implementation uses a low-power RF alternative
Recommended

13.36. RF implementation provides a method to defeat noise and conflict with other RF devices
Recommended

13.37. System and RF device have separate local certification
Recommended

13.38. Smart card reader complies with ISO 7816
Required

13.39. Smart card reader supports ISO 7816 T=0 and T=1 protocols
Required

13.40. Smart card reader supports inverse-convention smart cards
Required

13.41. Smart card reader supports 258 byte packets in T=0 and 259 byte packets in T=1
Required

13.42. Smart card reader supports a smart card insertion/removal monitor
Required

13.43. Smart card reader supports PTS
Required

13.44. Smart card reader supports 3.5795 MHz minimum clock frequency
Required

13.45. Smart card reader supports 9600 bps minimum data rate
Required

13.46. Smart card reader supports the Power Down command
Required

13.47. Smart card reader does not use an additional power supply
Recommended

13.48. Each device has a unique Plug and Play device ID
Required

13.49. Dynamic resource configuration is supported for all devices
Required

13.50. Each device complies with its device class power management reference specification
Required

13.51. Device supports wake-up events
Required for wireless input; optional for other devices

13.52. Device drivers and installation meet PC 99 requirements
Required

13.53. All PC 99 input devices support Microsoft DirectInput and work simultaneously
Required

Checklist for Graphics Adapters

Consumer	Office	Mobile	Workstation	Entertainment
14.1. Graphics adapter uses PCI, AGP, or another high-speed bus				
Required for all system types				
14.2. System provides hardware-accelerated 3-D graphics				
Required	*Recommended*	*Recommended*	*Required*	*Required*
14.3. System uses WC with higher-performance processors				
Required for all system types				
14.4. Primary graphics adapter works normally with default VGA mode driver				
Required for all system types				
14.5. Adapter and driver support multiple adapters and multiple monitors				
Required	*Required*	*Recommended*	*Required*	*Required*
14.6. Adapter supports television output if system does not include large-screen monitor				
Recommended for all system types				
14.7. Adapter meets PC 99 general device requirements				
Required for all system types				
14.8. Screen resolution and local memory capacity meet PC 99 minimum requirements				
Required for all system types, with exceptions for mobile PCs				
14.9. Adapter meets VESA specifications for ergonomic timing rates				
Required for all system types, with exceptions for mobile PCs and flat panel desktop displays				
14.10. All supported color depths are enumerated				
Required for all system types				
14.11. Graphics operations use relocatable registers only				
Required for all system types				
14.12. Adapter supports downloadable RAMDAC entries for integrated color management				
Required for all system types				
14.13. Adapter supports DDC monitor detection				
Required for all system types, with exceptions for mobile PCs				

Consumer	Office	Mobile	Workstation	Entertainment
14.14. Hardware supports video overlay surface with scaling				
Required for systems that support TV or DVD video playback, with exceptions for mobile PCs				
14.15. Hardware supports VGA destination color keying for video rectangle				
Required for systems that support TV or DVD video playback				
14.16. Hardware supports alpha blending of graphics and video				
Required for systems that support TV or DVD video playback, with exceptions for mobile PCs and Office PCs				
14.17. Video port meets PC 99 specifications if present on graphics adapter				
Required				
14.18. Hardware supports MPEG-2 motion compensation acceleration				
Recommended				
14.19. Hardware supports scanning at the same frequency as the incoming video				
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*
14.20. Extended resources can be dynamically relocated after system boot				
Required				
14.21. VGA resources can be disabled by software				
Required				
14.22. Frame buffer can be accessed directly by applications				
Required for all system types				
14.23. Adapter and driver support linear-mapped, low-resolution modes				
Required for all system types				
14.24. Hardware supports transparent blter				
Required for all system types				
14.25. Hardware provides support to prevent tearing				
Required for all system types				
14.26. Hardware supports programmable blter stride				
Required for all system types				
14.27. Hardware supports PC 99-required RGB rasterization				
Required for all system types, with exceptions for mobile PCs				
14.28. Hardware supports recommended RGB rasterization features				
Recommended for all system types, with exceptions for mobile PCs				
14.29. Hardware supports multi-texturing				
Recommended	*Recommended*	*Recommended*	*Required*	*Required*
14.30. Hardware supports texture formats				
Required for all system types, with exceptions for mobile PCs				
14.31. Hardware complies with texture size limitations				
Required	*Recommended*	*Recommended*	*Required*	*Required*
14.32. Hardware supports destination RGB alpha blending				
Recommended for all system types				
14.33. Hardware supports Z comparison modes and Direct3D-compatible formats				
Recommended	*Recommended*	*Recommended*	*Required*	*Required*
14.34. Hardware meets PC 99 3-D accelerator performance requirements				
Recommended	*Recommended*	*Recommended*	*Required*	*Required*

Consumer	Office	Mobile	Workstation	Entertainment
14.35. Adapter supports both NTSC and PAL output				
Recommended for all system types				
14.36. Default boot mode supports appropriate locale				
Required for all system types				
14.37. Adapter supports underscan scaling				
Required	*Recommended*	*Recommended*	*Recommended*	*Required*
14.38. Adapter supports flicker filter				
Required for all system types, with exceptions for mobile PCs				
14.39. Adapter provides proper termination				
Required				
14.40. Adapter supports composite video and S-Video connectors				
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*
14.41. Adapter with television output supports both VGA and television output				
Required for all system types				
14.42. Software supports positioning				
Required	*Recommended*	*Recommended*	*Recommended*	*Required*
14.43. Software supports detection of television connection				
Required	*Recommended*	*Recommended*	*Recommended*	*Required*
14.44. Analog video outputs, such as NTSC, have copy protection on DVD-enabled platforms				
Required for all system types				
14.45. Each device has a Plug and Play device ID				
Required				
14.46. System supports conflict resolution, VGA compatibility, and extended registers				
Required				
14.47. Chips support linear packed-pixel frame buffer, relocatable above 16 MB				
Required				
14.48. Option ROM supports DDC2B				
Required, with exceptions for Mobile PCs				
14.49. BIOS setup utility provides option to force use of system-board graphics				
Recommended				
14.50. BIOS supports large frame buffers for graphics adapters				
Required				
14.51. AGP meets PC 99 implementation guidelines				
Required				
14.52. PCI graphics device supports IRQ and correctly populates PCI BARs				
Required	*Recommended*	*Recommended*	*Required*	*Required*
14.53. PCI system-board graphics device is not hidden from Plug and Play enumeration				
Required for all system types				
14.54. Graphics adapter complies with device class power management reference specification				
Required				
14.55. Graphics adapter complies with VBE/Core 2.0 extensions for power management				
Required				

14.56. Device drivers and installation meet PC 99 requirements
Required

14.57. Driver does not bypass any Microsoft-provided system components
Required

14.58. Applications provided with device meet requirements for Win32-based applications
Required

14.59. Driver supports dynamic color bit-depth change
Required

Checklist for Video and Broadcast Components

Consumer	Office	Mobile	Workstation	Entertainment

15.1. System meets PC 99 requirements for playback of MPEG-2 video from DVD-Video
Required for all systems that support TV or DVD video playback

15.2. System meets PC 99 requirements for playback of MPEG-2 video from digital TV broadcasts

Consumer	Office	Mobile	Workstation	Entertainment
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*

15.3. System supports PC 99 analog video input and capture capabilities
Recommended for all system types

15.4. System includes analog TV tuner
Recommended for all system types

15.5. System includes digital satellite receiver module
Recommended for all system types

15.6. System includes digital cable receiver module
Recommended for all system types

15.7. System includes ATSC DTV support
Recommended for all system types

15.8. System includes DVB cable, satellite, or terrestrial receiver module
Recommended for all system types

15.9. System includes support for multiple digital TV delivery methods
Recommended for all system types

15.10. System supports DV decoding and encoding
Recommended for all system types

15.11. MPEG sources such as DVD or a receiver module support bus mastering
Required for all system types, with exceptions for mobile PCs

15.12. Separate MPEG-2 hardware decoder for high-definition video does not cause PCI bus contention
Required

15.13. PCI-based sources of uncompressed standard-definition digital video support bus mastering with scatter/gather DMA
Required

15.14. All MPEG-2 decoders can accept an MPEG-2 elementary stream
Required

Consumer	Office	Mobile	Workstation	Entertainment
15.15. All MPEG transport stream information is available to the central host processor				
Required				
15.16. Background tasks do not interfere with MPEG-2 playback				
Required	*Recommended*	*Recommended*	*Required*	*Required*
15.17. Video input, capture, and broadcast device support is based on DirectX foundation class and WDM Stream class				
Required				
15.18. All components meet PC 99 general device requirements				
Required				
15.19. MPEG-2 MP@ML playback meets PC 99 requirements				
Required for all systems that support TV or DVD video playback, with exceptions for mobile PCs				
15.20. MPEG-2 playback for ATSC, DVB, or other digital TV systems meets PC 99 requirements				
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*
15.21. MPEG-2 video decode implementations meet PC 99 quality requirements				
Required for all systems that support TV or DVD video playback, with exceptions for mobile PCs				
15.22. De-interlacing of standard-definition video meets PC 99 requirements				
Required for all systems that support TV or DVD video playback				
15.23. MPEG-2 decoder supports the pull-down algorithm				
Recommended				
15.24. DVD decoder driver correctly handles media types, time discontinuity, and decode-rate adjustment				
Required				
15.25. DVD decoder supports subpicture compositing and closed captioning				
Required for all system types, with exceptions for mobile PCs				
15.26. Subpicture decoder correctly handles subpicture properties and other functions				
Required for all system types, with exceptions for mobile PCs				
15.27. System supports seamless DVD-Video 1.0 navigation				
Required				
15.28. All DVD video decoders must support Line21 closed-caption data				
Required				
15.29. System provides a licensed CSS copyright protection scheme				
Required				
15.30. Analog video decoder such as NTSC/PAL/SECAM meets PC 99 quality requirements				
Required				
15.31. Analog video capture device outputs video data at 3.7 MB/sec, minimum				
Required				
15.32. Video input or capture device provides raw sampled VBI data				
Required				
15.33. Digital video camera uses external bus support				
Required				
15.34. Video input image orientation identification meets PC 99 requirements				
Required				

15.35. Analog TV tuner/decoder supports PC 99 audio and video performance
Required

15.36. Analog TV tuner/decoder includes stereo audio decoder and supports SAP
Recommended for all system types

15.37. VBI capture oversamples VBI data at least four times
Required

15.38. VBI capture makes VBI data available to the CPU for processing
Required

15.39. Digital broadcast module can receive all streams contained in the particular transport stream
Required

15.40. Digital broadcast module can receive full bandwidth from each frequency
Required

15.41. Digital broadcast module can receive a minimum of 16 simultaneous elementary streams
Required

15.42. System can simultaneously receive two or more broadcast frequencies
Recommended

15.43. Digital broadcast module provides support for conditional access
Recommended

15.44. Digital broadcast module provides signal quality and other diagnostic information
Required

15.45. Digital broadcast receiver module supports general-purpose data cryptography
Recommended

15.46. Digital broadcast receiver module supports stream filtering
Recommended

15.47. ATSC DTV tuner/demodulator is fully implemented
Required

15.48. Stream splitting is supported using DirectShow filters
Recommended

15.49. Each hardware device has a Plug and Play device ID
Required

15.50. Dynamic resource configuration is supported for all devices
Required

15.51. Dependent video device is not independently enumerated
Required

15.52. Device drivers and installation meet PC 99 requirements
Required

15.53. Software drivers are installed during hardware driver installation
Required

15.54. Applications provided with device meet Win32 requirements
Required

15.55. NDIS 5.0 miniport driver provided for digital broadcast receiver
Required

Checklist for Monitors

16.1. Color monitor is DDC2B-compliant with unique EDID identifier
Required

16.2. Monitor supports Integrated Color Management
Required

16.3. Monitor meets all PC 99 general device and driver requirements
Required

16.4. CRT-based monitor supports a mechanism for control from host software
Recommended

16.5. Monitor meets minimum graphics resolution, based on monitor size
Required

16.6. CRT-based monitor supports ergonomic timing standards
Required

16.7. CRT-based monitor synchronizes to a new format in a timely fashion
Recommended

16.8. Large-screen monitor is 20 inches (viewable diagonal) or larger if included with an Entertainment PC system
Required

16.9. Entertainment CRT-based monitor supports 800 × 600 at 60 Hz refresh rate
Required

16.10. Entertainment monitor operates at the lower scan rates used by the operating system
Required

16.11. Entertainment monitor's host control has digitally controlled geometry
Recommended

16.12. External monitor meets DDC2B and EDID standards
Required

16.13. Monitor complies with device class power management reference specification
Required

Checklist for Audio Components

Consumer	Office	Mobile	Workstation	Entertainment
17.1. PC system includes PC 99 audio capabilities				
Recommended	*Recommended*	*Recommended*	*Recommended*	*Required*
17.2. Audio device does not connect to ISA bus				
Required for all system types				
17.3. Audio device does not use legacy hardware interfaces for MS-DOS–based applications				
Required for all system types				
17.4. Audio performance meets PC 99 requirements				
Required, with exceptions for mobile PCs				

17.5. Audio subsystem supports basic data formats in full duplex
Required

17.6. Audio subsystem supports full-duplex operation at independent sampling rates
Required

17.7. Analog microphone input meets PC 99 jack and circuit specifications
Required

17.8. Audio driver reports sample position for stream synchronization
Required

17.9. Audio connectors use icons with color coding
Required

17.10. Audio subsystem provides sufficient externally accessible inputs and outputs
Recommended

17.11. Microphone meets performance recommendations for PC 99 speech-recognition microphones
Recommended

17.12. Audio subsystem provides hardware or software support for DLS
Recommended

17.13. Audio subsystem supports AEC reference inputs
Recommended

17.14. Audio subsystem provides hardware filtering of 3-D localization filters
Optional

17.15. CD, DVD, and broadcast audio playback meet PC 99 requirements
Required with systems that support video playback

17.16. Audio subsystem provides consistent volume levels for different devices
Optional

17.17. Audio subsystem does not provide a DB-15 analog joystick/MIDI port
Recommended

17.18. Each hardware device has a unique Plug and Play device ID
Required

17.19. Dynamic resource configuration is supported for all devices
Required

17.20. PCI device conforms to PCI 2.1 and additional PC 99 requirements
Required

17.21. PCI device supports initiator, target, and block transfer
Required

17.22. PCI device supports non-DWORD-aligned audio buffers
Recommended

17.23. PCI device does not use ISA-based resources
Required

17.24. PCI device is digital ready
Required

17.25. Audio meets USB specification and USB audio device class specification
Required

17.26. USB audio device uses MMHID for control of basic functions
Required

17.27. Audio meets PC 99 requirements for IEEE 1394
Required

17.28. System and device comply with PCI bus power management specification
Required

17.29. Audio device complies with device class power management reference specification
Required

17.30. Device drivers and installation meet PC 99 requirements
Required

17.31. Audio meets PC 99 requirements for WDM driver support
Required

17.32. Applications provided with device meet Win32 requirements
Required

Checklist for Storage and Related Peripherals

18.1. Storage controller and hard disk devices support bus master capabilities
Required

18.2. Removable media devices support media status notification
Required

18.3. Device meets PC 99 general device requirements
Required

18.4. Device meets PC 99 requirements for ports or buses
Required

18.5. Device Bay storage device meets PC 99 requirements
Required

18.6. ATA controllers and devices support Ultra DMA
Required

18.7. USB-based mass storage device meets PC 99 requirements for USB
Required

18.8. System BIOS or option ROM supports El Torito No Emulation mode
Required

18.9. System BIOS or option ROM supports bootable ARMD
Recommended

18.10. Host controller for secondary storage uses IEEE 1394
Recommended

18.11. Floppy disk capabilities, if implemented, do not use legacy FDC
Recommended for all system types

18.12. Legacy FDC device meets resource configuration requirements, if present
Required

18.13. System supports dynamic configuration of legacy FDC
Required

18.14. Operating system recognizes the boot drive in a multiple-drive system
Required

18.15. Hard drive is SMART-compliant and uses SMART IOCTL API
Optional

18.16. CD device provides 8x minimum transfer rate or better performance
Required

18.17. CD drive is CD-Enhanced compatible
Required

18.18. CD drive supports specified logical and physical CD formats
Required

18.19. ATA/ATAPI CD drive complies with SFF 8020i v. 2.6
Required

18.20. CD drive supports multisession and compatibility forms of the READ_TOC command
Required

18.21. ATA/ATAPI CD changer complies with the MMC-2 standard
Required

18.22. CD device supports digital audio detection
Required

18.23. CD device uses push-to-close design
Recommended

18.24. Block rewritable optical ATAPI device complies with SFF 8070i
Required

18.25. DVD device provides 2 MB per second minimum transfer rate or better performance anywhere on the disc
Required

18.26. DVD drive and controller support bus master DMA transfers
Required

18.27. DVD drive meets minimum compatibility requirements
Required

18.28. DVD device complies with the MMC-2 standard
Required

18.29. DVD device uses push-to-close design
Recommended

18.30. DVD device supports defect management
Required

18.31. DVD device supports copyright protection
Required

18.32. Each device has a Plug and Play device ID
Required

18.33. Dynamic resource configuration is supported for all devices
Required

18.34. 3F7h and 377h are unclaimed by devices
Required

18.35. Physical security is provided for storage devices
Recommended

18.36. Option ROMs support Int 13h Extensions
Required

18.37. Device and controller comply with device class power management reference specification
Required

18.38. Device supports wake-up events
Optional

18.39. Device drivers and installation meet PC 99 requirements
Required

18.40. Device driver runs in protected mode following installation
Required

18.41. Applications provided with the device meet Win32 requirements
Required

18.42. Device driver for partitioned media supports all Windows and Windows NT partition types
Required

18.43. Device driver for block-mode device supports extended BPBs
Required

Checklist for Modems

Consumer	Office	Mobile	Workstation	Entertainment
19.1. Modem device is provided with PC system				
Required	*Recommended*	*Required*	*Recommended*	*Required*
19.2. Modem controller meets PC 99 requirements				
Required				
19.3. Modem supports V.250 AT command set				
Required				
19.4. Data modem supports V.90 (1998) analog modem modulation				
Required				
19.5. Data modem supports Annex A/V.34 (1998) SRC				
Recommended				
19.6. Data modem supports V.42 LAPM, V.42 bis, and V. 80 Synchronous Access data protocols				
Required				
19.7. Modem supports call control signaling, controlled using V.251 modem commands				
Required				
19.8. Fax modem supports 14.4 Kbps (V.17) with Class 1 (TIA-578-A) command set				
Required				
19.9. Modem supports delayed and blacklisted number clearing				
Recommended				
19.10. Modem supports TDD, meeting V.18-1996 with V.250 AT commands				
Recommended				

19.11. Voice modem supports ITU V.253 (AT+V)
Required in modems supporting voice

19.12. Voice modem support includes PC 99 recommendations
Recommended

19.13. Voice modem supports Caller ID Detection and Reporting
Recommended

19.14. Voice modem supports speakerphone
Required in modems supporting voice

19.15. Wireless support is implemented for modems
Recommended

19.16. Digital cellular phone support is implemented for modems
Recommended

19.17. ISDN driver supports unattended installation, with limitations
Required

19.18. ISDN modem supports required command set
Required

19.19. ISDN modem exposes both B channels
Recommended

19.20. ISDN modem supports asynchronous-to-synchronous conversion
Required

19.21. ISDN modem defaults to HDLC PPP after INF installation
Recommended

19.22. ISDN modem uses high-speed port
Recommended

19.23. Modem pair passes basic V.34 file transfer test
Required

19.24. Modem pair passes basic call connect reliability test
Required

19.25. Modem pair passes concurrency test
Required

19.26. Driver-based modem uses a WDM-based driver solution
Required

19.27. Driver-based modem processor usage is not excessive
Recommended

19.28. Driver does not disable interrupts for excessive periods of time
Recommended

19.29. Driver handles thread priorities appropriately
Recommended

19.30. Driver tolerates reasonable operating system and bus latencies.
Recommended

19.31. Driver does not make excessive use of locked memory
Recommended

19.32. Each hardware device has a unique Plug and Play device ID
Required

19.33. Each device has a Plug and Play compatible ID
Required

19.34. Dynamic resource configuration is supported for all devices
Required

19.35. PCI modem meets PC 99 requirements
Required

19.36. USB modem meets PC 99 specifications
Required

19.37. Device Bay modem meets PC 99 requirements
Required

19.38. Device complies with device class power management reference specification
Required

19.39. Device supports wake-up events
Required

19.40. Device drivers and installation meet PC 99 requirements
Required

19.41. Driver supports Unimodem
Required

19.42. Applications provided with device meet Win32 requirements
Required

Checklist for Network Communications

Consumer	Office	Mobile	Workstation	Entertainment
20.1. PC system includes network adapter				
Recommended	*Required*	*Recommended*	*Required*	*Recommended*
20.2. PC system includes internal or external ISDN device				
*Recommended**	*Recommended*	*Recommended*	*Recommended*	*Recommended**
20.3. PC system includes cable modem				
*Recommended**	*Recommended*	*Recommended*	*Recommended*	*Recommended**
20.4. PC system includes ATM adapter				
Optional	*Optional*	*Optional*	*Optional*	*Optional*
20.5. PC system includes ADSL adapter				
*Recommended**	*Recommended*	*Recommended*	*Recommended*	*Recommended**
20.6. PC system includes satellite or broadcast receiver with NDIS driver				
*Recommended**	*Recommended*	*Recommended*	*Recommended*	*Recommended**

20.7. Adapter uses NDIS 5.0 miniport driver
Required

20.8. Intermediate NDIS 5.0 miniport driver is deserialized
Recommended

20.9. Full-duplex adapter automatically detects and switches to full duplex mode
Required

20.10. Adapter automatically senses presence of functional network connection
Required

20.11. Adapter automatically senses transceiver type
Required

20.12. Adapter can transmit packets from buffers aligned on any boundary
Required

20.13. Adapter communicates with driver across any bridge
Required

20.14. Adapter supports filtering for at least 32 multicast addresses
Required

20.15. Adapter and driver support promiscuous mode
Required

20.16. Adapter is compatible with remote new system setup capabilities if used as a boot device
Required

20.17. PCI network adapters are bus masters
Required

20.18. Device Bay-type network adapter meets PC 99 requirements
Required

20.19. USB or IEEE 1394 device meets specifications for network communications devices
Recommended

20.20. Network adapter and driver supports priority for IEEE 802-style networks
Recommended

20.21. Internal ISDN device meets PC 99 network adapter requirements
Required

20.22. Internal ISDN device supports synchronous HDLC framing
Required

20.23. NDIS interface and driver support raw unframed synchronous B channel I/O
Required

20.24. ISDN driver supports unattended installation, with limitations
Required

20.25. ISDN device with U-interface includes built-in NT-1 capability
Recommended

20.26. ISDN device includes software-selectable terminating resistors
Required

20.27. Device is implemented as an integrated cable modem
Recommended

20.28. Integrated cable modem meets PC 99 network adapter requirements
Required

20.29. Integrated cable modem exposes an ATM or Ethernet interface
Required

20.30. ATM adapter meets PC 99 network adapter requirements
Required

20.31. ATM adapter supports a minimum number of simultaneous connections
Required

20.32. ATM adapter supports all service types defined by the ATM Forum
Recommended

20.33. ATM adapter supports UBR service type
Required

20.34. ATM adapter supports a minimum number of simultaneously active VBR or CBR connections
Required

20.35. ATM adapter supports traffic shaping
Required

20.36. ATM adapter enforces PCR on UBR virtual circuits
Required

20.37. ATM adapter and driver support dynamic link speed configuration
Required

20.38. ATM adapter supports OAM
Recommended

20.39. ATM adapter supports buffer chaining (Tx + Rx)
Recommended

20.40. ADSL device is implemented as an integrated ADSL modem
Recommended

20.41. Integrated ADSL modem meets PC 99 network adapter requirements
Required

20.42. ATM/ADSL solution is implemented for integrated ADSL modems
Recommended

20.43. ADSL modem supports DMT line encoding
Recommended

20.44. ADSL modem supports rate adaptation
Recommended

20.45. Infrared device meets PC 99 network adapter requirements
Required

20.46. Infrared device supports both FIR and SIR
Required

20.47. IrDA hardware supports unattended driver installation
Required

20.48. Home networking adapter meets PC 99 network adapter requirements
Required

20.49. Home networking uses appropriate media
Recommended

20.50. Home networking media supports IP
Required

20.51. Each device has a unique Plug and Play device ID
Required

20.52. Dynamic resource configuration is supported for all devices
Required

20.53. Plug and Play capabilities support multiple adapters
Required

20.54. All resource settings are reported in the user interface
Required

20.55. Device complies with device class power management reference specification
Required

20.56. Device supports wake-up events
Required

20.57. Device drivers and installation meet PC 99 requirements
Required

20.58. Driver works correctly with Microsoft network clients and protocols
Required

20.59. NDIS miniport driver makes only NDIS library calls or WDM system calls
Required

20.60. NDIS 5.0 driver uses new INF format
Required

Note: For items marked with an asterisk (*) symbol, it is recommended to implement an ADSL modem, ISDN device, or home networking adapter.

Checklist for Printers

21.1. IEEE 1394 printer meets PC 99 requirements for IEEE 1394
Required

21.2. USB printer meets PC 99 requirements for USB devices
Required

21.3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I
Required

21.4. IEEE 1284 printer meets IEEE 1284-II requirements
Recommended

21.5. ECP printer works correctly when ECP mode is turned off
Required

21.6. IEEE 1284 hardware supports error notification
Required

21.7. Daisy-chained parallel port device is Plug and Play capable
Required

21.8. Network printer supports standard port monitor
Required

21.9. Plug and Play support implemented for all supported buses
Required

21.10. Peripheral device meets IEEE 1284 requirements
Required

21.11. Printer INF file and installation meet PC 99 requirements
Required

21.12. Driver correctly reports device capabilities
Required

21.13. Driver supports error notification
Required

21.14. Driver supports ICC color management
Required

21.15. Port monitor software meets DDK guidelines
Required

21.16. Driver supports point-and-print network installation
Required

21.17. Device is available immediately following installation
Required

21.18. Device supports accurate printable regions
Required

21.19. Driver supports required DDIs
Required

21.20. Driver is based on Unidriver
Recommended

Checklist for Digital Still Image Devices

22.1. Device uses PC 99 compatible port connection with USB or IEEE 1394 connection
Required

22.2. Icons provided for port and peripheral connectors
Required

22.3. Device supports ICC color management
Required

22.4. IR device meets PC 99 IR requirements
Required

22.5. Digital still image device with an IR interface uses Fast IR
Required

22.6. Digital still image device with an IR interface provides a secondary PC interface
Required

22.7. SCSI device meets PC 99 SCSI requirements
Required

22.8. SCSI device attaches to any PC 99-compliant SCSI controller
Required

22.9. USB device meets PC 99 USB requirements
Required

22.10. USB device supports string descriptors
Required

22.11. USB imaging device has a zero-bandwidth alternate interface
Recommended

22.12. USB device does not saturate the USB bus
Recommended

22.13. USB device follows PC 99 USB performance recommendations
Required

22.14. Digital camera uses PC-compatible file system for removable storage
Required

22.15. Digital camera stores images in common file formats such as JPEG or FlashPix
Recommended

22.16. IEEE 1394 device meets PC 99 requirements for IEEE P1394.a
Required

22.17. Serial device complies with Plug and Play External COM Device Specification v. 1.0
Required

22.18. Plug and Play capabilities implemented for all supported buses
Required

22.19. Each device has a Plug and Play device ID
Required

22.20. Daisy-chained parallel port imaging devices must be Plug and Play capable.
Required

22.21. Device supports power management requirements for its bus
Required

22.22. Device drivers and installation meet PC 99 requirements
Required

22.23. Driver support is implemented under the Still Image architecture
Required

22.24. Applications provided with the device meet Win32 specifications
Required

22.25. Device driver supports TWAIN 1.7 or later
Required

22.26. Digital still image devices with an IR interface use the Windows Sockets interface
Required

22.27. Asynchronous imaging device with an IEEE 1394 interface uses SBP2Port
Recommended