GOVERNMENT ICT STANDARDS

End-User Computing Devices Standard

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The ICT Authority is a State Corporation under the State Corporations Act 446
www.icta.go.ke

REVISION OF ICT STANDARDS

In order to keep abreast of progress in industry, ICTA Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Chief Executive Officer, ICT Authority, are welcome.

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FOREWORD

The ICT Authority has the mandate to set and enforce ICT standards and guidelines across all aspects of information and communication technology including Systems, Infrastructure, Processes, Human Resources and Technology for the public service. The overall purpose of this mandate is to ensure coherent and unified approach to acquisition, deployment, management and operation of ICTs across the public service in order to achieve secure, efficient, flexible, integrated and cost effective deployment and use of ICTs.

To achieve this mandate, the Authority established a standards committee to identify the relevant standard domains and oversee the standards development process. The committee consulted and researched broadly among subject matter experts to ensure conformity to acceptable international and national industry best practices as well as relevance to the Kenyan public service. The committee eventually adopted the Kenya Bureau of Standards (KEBS) format and procedure for standards development. In an engagement founded on a memorandum of understanding KEBS, participated in the development of these Standards and gave invaluable advice and guidance.

For example, the End User Computing Devices Standard, which falls under the overall Government Enterprise Architecture (GEA), has therefore been prepared in accordance with KEBS standards development guidelines which are, in turn, based on the international best practices by standards development organizations including ISO.

The Authority's Directorate of Programmes and Standards has the oversight role and responsibility for management, enforcement and review of this standard. The Directorate shall carry out quarterly audits in all the Ministries, Counties, and Agencies (MCA) to determine compliance to this Standard.

The Authority shall issue a certificate for compliance to agencies upon inspection and assessment of the level of compliance to the standard. For non-compliant agencies, a report detailing the extent of the deviation and the prevailing circumstances shall be tabled before the Standards Review Board who shall advise and make recommendations to remedy the shortfall.

The ICT Authority management, conscious of the central and core role that standards play in public service integration, fostering shared services and increasing value in ICT investments, shall prioritize the adoption of this standard by all Government agencies. The Authority therefore encourages agencies to adhere to this standard in order to obtain value from their ICT investments.

Dr. Katherine W. Getao, EBS

Chief Executive Officer

ICT Authority

1.0 INTRODUCTION

An end user device is a personal computer (desktop or laptop), consumer device (e.g., personal digital assistant (PDA), smart phone), or removable storage media (e.g., USB flash drive, memory card, external hard drive, writeable CD or DVD) that can collect, process or store information. Government employees are provided access to these technologies to support administrative functions and improve MCDA effectiveness. Government's aim is that as much as possible, the public sector workforce will be able to work from any location on any suitable government or non-government end user device.

However, the nature of laptops, mobile devices, and other end user devices makes it extremely challenging to manage them. Due to the pervasive nature of end user devices, government faces security challenges, substandard devices, challenges of, and disposal.

The rationale for end user devices standard is:

- Ensuring MCDA receive value for money
- Ensuring compatibility and interoperability both with and across MCDA
- Easy maintenance
- Ensure cost effective use by sharing where possible.
- Assuring consistency in equipment performance
- Maximize the equipment functionality
- Improve end-user performance and experience
- Guide procurement and disposal

The standard defines minimum government requirements for end user computing services. It provides technical guidance to MCDA when implementing end user computing internally and when they are procuring these services. It details the issues that need to be considered so each agency can identify the available options that best suit their business requirements, ensuring agencies can take full advantage of the benefits of end user computing services.

This standard shall be applied along with existing standards, policies and guidance that make up the government enterprise architecture including the Information Security standard.

MCDA must carefully consider their obligations to manage government data and information. Contract arrangements and business processes should address requirements for data security, privacy, access, storage, management, retention and disposal. ICT systems and services should support data exchange, portability and interoperability.

2.0 SCOPE

This ICTA Standard establishes guidelines for security, acquisition, support, and disposal of all end-user devices and services. End-user devices may include MCDA approved desktops, laptops, smartphones, tablets, digital cameras, scanners, external storage devices, barcode readers, automated fingerprint readers or any other IT equipment used by an end-user to perform their statutory functions and duties. This is a minimum standard; however, all end-user devices with specifications higher than those detailed in this standard may be procured after a comprehensive business justification.
ICT Authority shall develop and update the minimum specifications, of all categories of equipment on a regular basis, to ensure that prevailing state-of-the-art equipmentis acquired for the purpose of enhancing value for money/cost-effectiveness, extended useful life, and matching the equipment with the required function. The ICT personnel shall enforce these standard specifications and give advice where specifications above the minimum are required.

3.0 APPLICATION

This standard will be applicable to the following:

- Central Government of ICTA
- County Governments
- Constitutional Commissions
- State Corporations

4.0 NORMATIVE REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below. Information on currently valid national and international standards can be obtained from the ICTA Bureau of Standards.

- ITIL V3
- NISTSpecialPublication800-111
- Public Procurement and Disposal Act & Regulations
- Other procurement guidelines released by the Public Procurement Oversight Authority, from time to time.
- NEMA E-waste guidelines
- GoK Information security standard

5.0 DEFINITIONS

5.1.1MCDA-Issued Devices
The concept of issuing a device to users for them to interact with an enterprise's data

5.1.2 Non-MCDA Issued Devices
The concept of allowing a user's mobile device to store and interact with an enterprise's data

5.1.3 Personal Communication Devices (PCDs)
For the purpose of this policy, PCDs are defined to include handheld wireless devices, cellular telephones, laptop wireless cards, and pagers.

5.1.4 Decommissioning
Withdraw an end-user device from service.

5.1.5 Data- in- transit protection
Data in Transit is defined into two categories, information that flows over the public or untrusted network such as the internet and data which flows in the confines of a private network such as a corporate or enterprise Local Area Network (LAN).

5.1.6 Data- at-rest protection
It is a term referring to inactive data that is stored physically in any digital form (e.g. databases, data warehouses, spreadsheets, archives, tapes, off-site backups, mobile devices, etc.)?

5.1.7 Full disk encryption (FDE)
Full disk encryption (FDE), also known as whole disk encryption, is the process of encrypting all the data on the hard drive used to boot a computer, including the computer's OS, and permitting access to the data only after a successful authentication to the FDE product.

5.1.8 Virtual disk encryption (FDE)
Virtual disk encryption is the process of encrypting a file called a container, which can hold many files and folders, and permitting access to the data within the container only after proper authentication is provided, at which point the container is typically mounted as a virtual disk.

5.1.9 File/folder encryption
File encryption is the process of encrypting individual files on a storage medium and permitting access to the encrypted data only after proper authentication is provided.

5.1.10 Single-factor authenticator
Single-factor authentication (SFA) is the traditional security process that requires a user name and password before granting access to the user.

5.1.11Multi-factor authenticator
Multifactor authentication (MFA) is a security system that requires more than one form of authentication to verify the legitimacy of a transaction

6.0 ABBREVIATIONS

GWAE	Government Wide Enterprise Architecture
ICT	Information and communication technology
ICTA	Information and Communication Technology Authority
MCDAs	Ministries, Counties, Departments and Agencies
CIA	Confidentiality, integrity and availability
BYOD	Bring your own device

7.0 SUBDOMAINS

The following are the subdomains covered under end-user devices standard:

- End-user device security
- Equipment acquisition
- Equipment maintenance
- Equipment disposal

8.0 END USER COMPUTING DEVICES STANDARDS

This section provides requirements that offer guidance in the acquisition, maintenance, disposal and security of all ICT end user equipment and services for effective deployment and use of ICT in the public sector.

8.1 End-user Requisition

7.1.1 ICT departments shall be responsible for the preparation and issuance of all technical specifications for the equipment, as well as ensuring that the guidelines stipulated herein are adhered to.

7.1.2 ICT departments shall ensure that requests for procurement and acceptance of ICT equipment are validated by Heads of Department (user department).

7.1.3 Personal Communication Devices (PCDs) shall be issued only to personnel with duties that require them while away from their normal work locations.

7.1.4 Requisition of Handheld wireless devices shall be restricted to personnel whose duties justify their use for operational efficiency.

8.2 Technical Specifications

8.2.1 MCDA shall ensure that equipment acquired has a useful life of not less than five years (Total lifecycle).
8.2.2 MCDA shall specify equipment functionality to guarantee that operational requirements intended to be performed by ICT equipment can be achieved effectively and efficiently with the equipment specified.
8.2.3 MCDA shall provide Security specifications to addresses the need to protect system data and equipment and the operational environment from loss or compromise.
8.2.4 MCDA shall provide Interoperability requirements to facilitate the exchange of information between potentially heterogeneous systems through conformance to open standards.
8.2.5 MCDA shall provide compatibility requirements of ICT equipment components to effectively and efficiently work together in an integrated system.
8.2.6 MCDA shall provide Scalability requirements to ensure that acceptable ICT components enhance the ability of the equipment to support future growth and increased throughput.
8.2.7 MCDA shall provide availability requirements to maintain acceptable operational levels.
8.2.8 MCDA shall provide accessibility requirements that will facilitate the users and operators to access the equipment in a timely fashion and perform its intended functions.
8.2.9 Where the service is outsourced, MCDA shall include support arrangement to ensure availability of vendor and/or internal support, including parts and labour (where applicable).
8.2.10 MCDA shall provide Upgradability requirements to ensure ICT component installations that need updates are updated according to the latest official versions available.
8.2.11 MCDA shall purchase equipment with latest stable technology to guarantees that the devices are based on the latest technology in the market (where applicable).

8.3 Technical evaluation

8.3.1 ICT equipment that does not meet industry and safety standards shall be prohibited from being deployed. All donations shall be required to meet the minimum specifications.
8.3.2 Technical evaluation shall be undertaken to ensure that the equipment is fit for the intended purpose and that it meets the required specifications.
8.3.3 The head of ICT Unit shall participate as technical leads in the technical evaluation and inspection processes for all end-user computing devices.
8.3.4 All ICT equipment and assets (whether new, transferred and/or written off), shall be recorded by the ICT Unit for audit and other asset managerial purposes.
8.3.5 The Head of ICT Unit shall ensure that agreements on warranty, Technical support and guarantees are provided and shall also oversee their administration. The minimum warranty for all ICT equipment shall be three years.
8.3.6 Before installation, the equipment must be tested to ensure they work as per the specifications and associated licensing for the equipment validated.
8.3.7 The equipment shall be deployed and used for the intended purpose. Only qualified personnel shall be allowed to install ICT equipment.
8.3.8 The installation of ICT equipment shall adhere to the OEM instructions. Only trained and qualified personnel will be allowed to operate the ICT equipment
8.3.9 ICT equipment shall be operated within recommended environmental conditions of temperature, humidity, etc. by the OEMs
8.3.10 Access and maintenance of equipment shall only be carried by authorized and accredited personnel.
8.3.11 All new end-user devices (e.g. PCs and Notebooks) shall be supplied with the software installations (where applicable).

8.4 Bring your own device (BYOD) Policy

8.4.1 The deployment and use of personal devices shall be approved by the ICT department;
8.4.2 MCDA shall ensure that users of Personal devices are authenticated, data/information protected/encrypted to limit transfer of government data to an unauthorized entities; and such Personal devices shall have updated antivirus and licensed software.

8.5 Inventory

8.5.1 All equipment and assets whether new, donation, transferred and/or write-off shall be recorded and tagged appropriately by the ICT Unit for audit and other asset managerial purposes
8.5.2 The inventory of ICT assets shall indicate product details (product number, serial number, part number, etc.), tracking information, maintenance schedules and warranty information.
8.5.3 Officers exiting the MCDA shall be required to surrender all ICT equipment in their custody to the organization.
8.5.4 MCDA shall endeavour to automate the end user equipment inventory.

8.6 Maintenance

8.6.1 ICT equipment maintenance may be done in-house by ICT Units where a maintenance function is established.
8.6.2 Sub-contracting for maintenance shall be through appropriate justification and approval by the Accounting Officers in consultation with the ICT Unit. Due diligence shall be undertaken in engaging and retaining such contractors. Contractors shall also Sign a non-disclosure agreement.
8.6.3 The ICT unit shall develop a schedule of maintenance, replacement and upgrading plans for end-user devices. The schedule shall specify the frequency levels and type of maintenance for each type of equipment. In case of mission-critical equipment, users shall be notified of the maintenance in advance.
8.6.4 MCDA shall develop, negotiate and enforce SLAs to guarantee maintenance of end user devices. Vendor's SLAs terms shall ensure value for money to the organization/MCDA.
8.6.5 MCDA shall ensure that end user devices are provided with clean power to protect against damage in the event of power fluctuations
8.6.6 ICT Units shall undertake regular surveys to identify obsolete equipment for the purposes of disposal. Where such equipment contains data, that data shall be backed up and then erased from the device using suitable mechanisms (e.g. equipment sanitization) in line with Government IS standards
8.6.7 ICT Unit shall electronically track the physical locations and status of all equipment where possible.
8.6.8 ICT equipment maintenance shall consider routine/preventive/corrective upgrade, and repair maintenance as may be required.
8.6.9 The ICT unit shall periodically conduct assessment/audit of ICT equipment to ensure compliance with performance standards and requirements, and ensure equipment component parts are as indicated in the inventory.

8.7 Decommissioning

8.7.1 The ICT unit may decommission equipment that is no longer needed on its IT environment. Decommissioning of equipment shall be undertaken through committee. The decommissioning should be in line with the Procurement and Assets Disposal Act.

8.7.2 Equipment may be decommissioned if becomes redundant or there is a change in IS architecture/technologically obsolete or it has insufficient capacity to handle application and/or user requirements or Where upgradability options have been exhausted or Where equipment has become unsafe. The equipment can also be reassigned to lesser demanding tasks or appropriate environment if it meets the required safety standards

8.7.3 MCDA may dispose equipment that it deems no longer useful, damaged beyond repair, cannot be upgraded, the repair cost is higher than the cost of buying a new one, the parts and/or consumables are not available and end of life and no longer supported by the OEM.

8.7.4 The ICT Unit may recommend disposal via donation, trashing, selling, and cannibalizing is such case proper records shall be kept to indicate where such components are used or stored.

8.8 End user equipment data protection, data sharing and authentication

8.8.1 End user equipment data protection shall be in line with the government IS standards

Annex 1: ICT Minimum Hardware Specifications

The Specifications are subject to change as technology changes

TEACHER DIGITAL DEVICE (TDD)

Feature	Specifications
Weight	Max 3kg fully assembled
Display	• Min 300 nits • Min 12", 1280x800
Memory	Min 2 GB
Storage	Min 500 GB
Ruggedness	• Min International Protection rating of IP41 • Min Drop test 50 cm
Battery	• Min 6 hours • Max 80 Whrs • In built battery. Removable by teacher without the use of a tool e.g. screw driver or Allen key
Processor	Min 1.6GHz clock speed
I/O ports	• 1 x micro SD card slot • 1 x microphone jack • 1 x headphone jack • 1 x USB port • 1 x HDMI port • 1 x VGA port
Keyboard	In built QWERTY keyboard
Camera	Min Video 720p, 1 MP
Sound	In-built speaker
Networking	• 802.11 a/b/g/n Wi-Fi • Bluetooth
Branding/Tagging	• Unique manufacturer serial number • GoK issued unique asset tag • GoK branding embedded on all sides of external casing • Colour Blue: Pantone 7460C, RGB 0.174.239 ,Hex #00AEEF

Dimensions	Max 300mm x 200mm x15mm
Charging mechanism	• 240V 50Hz ±20% • 3 pin plug with fuse and earth
Operating system	secure industry standard OS
End point security software	Antivirus and antimalware functionality
Installed Applications	• HTML5 compatible browser. • cost free PDF document reader. • cost free productivity suites.

LEARNER DIGITAL DEVICE (LDD)

Feature	Specifications
Weight	Max 2kg fully assembled
Display	Min 250 nits Min 10", 1280x800
Memory	Min 1 GB
Storage	Min 64 GB
Ruggedness	• Min International Protection rating of IP41 • Min Drop test 50 cm
Battery	• Min 6 hours • Max 30 W hrs • Not easily removable
Processor	Min 1.0 GHz clock speed
I/O ports	1 x micro SD card slot 1 x microphone jack 1 x headphone jack 1 x USB port
Keyboard	QWERTY keyboard , Ruggedness
Camera	Min Video 720p, 1 MP
Sound	In-built speaker
Networking	802.11 a/b/g/n (Wi-Fi) Bluetooth
Branding/Tagging	• Unique manufacturer serial number • GoK issued unique asset tag • GoK branding embedded on all sides of external casing • Colour luminous green: Pantone 389C, RGB 193.217.79, CMYK 29.0.86.0, Hex #C1D94F

Dimensions	Max 300mm x 200mm x15mm
Charging mechanism	• 240V 50Hz ±20% • 3 pin plug with fuse and earth
Operating system	secure industry standard OS
Warranty	Min 1 yr
End point security software	Antivirus and antimalware functionality

SPECIAL NEEDS EDUCATION LEARNER DIGITAL DEVICE (SNELDD)

Feature	Specifications
Weight	Max 2kg fully assembled
Display	• Min 250 nits • Min 14", 1280x800 • Inbuilt features to adjust screen resolution, contrast and brightness to fit learners with special needs.
Memory	Min 1 GB
Storage	Min 64 GB
Ruggedness	• Min International Protection rating of IP41 • Min Drop test 50 cm
Battery	• Min 6 hours • Max 30 W hrs • Requires a tool in order to be removed
Processor	Min 1.0 GHz clock speed
I/O ports	• 1 x micro SD card slot • 1 x microphone jack • 1 x headphone jack • 1 x USB port
Keyboard	• Full size, in-built QWERTY keyboard • Separate number • Braille incorporated in the keyboard. • Large printed keys
Camera	Min Video 720p, 1 MP
Sound	In-built speaker

Networking	802.11 a/b/g/n (Wi-Fi) Bluetooth
Branding/Tagging	• Unique manufacturer serial number • GoK issued unique asset tag • GoK branding embedded on all sides of external casing • Bright primary colours for learner device; identifiable but not loud
Dimensions	Max 300mm x 200mm x15mm
Charging mechanism	240V 50Hz ±20% 3 pin plug with fuse and earth
Operating system	secure industry standard OS
Warranty	Min 1 yr
End point security software	Antivirus and antimalware functionality
Accessories	• Adjustable over the ear earphones/ headphones. • 30mm Jack • 15-28,000Hz
Applications	• Screen magnifiers • Screen readers • JAWs (Windows) NVDA linux. • Note taker- to pick up voice from the surroundings and convert to text
Webcam	HD Webcam

TABLE BRAILLE EMBOSSER

Feature	Specifications
Speed	J100 characters per second
Printing	Should support single-sided and double sided printing
Braille font	2.5 mm
Forming method	42 hammers
Tactile resolution	Min 50 dpi
User interface	• Audio / speech feedback. • Braille panel • LED status • Sound signaling
Ports	• Serial port • Parallel • USB

Printer drivers	Drivers must be included where applicable
Power	• 220-240 V AC • 100 W • 3 pin plug
Braille dot	Library of congress standard
Braille cells	Min 6 cell
Paper type	Min 11 x 11.5"
Paper weight	Min 120- g/m traditional Braille paper (recommended)
Software	Braille translation software –(Duxbury braille translator)
Firmware	Required

DIGITAL CONTENT SERVER & WIRELESS ROUTER (DCSWR)

Feature	Specifications
Storage	Min 3 TB
Memory	Min 2 GB
Ruggedness	Min International Protection rating of IP41
Processor	Min 800 MHz
I/O ports	• 1 x USB • 1 x micro SD card slot
Power consumption	Max 250 W
Battery	Min 4 hrs.
LAN	Min 1 x Ethernet port
Simultaneous users	Min 50
WAN Technologies	• 2G • 3G • LTE
Branding/Tagging	• Unique manufacturer serial number • GoK issued unique asset tag • GoK branding embedded on all sides of an external casing • Bright primary colors for learner device; identifiable but not loud
Operating system	Secure industry-standard OS
Security software	Antivirus and antimalware functionality

PROJECTOR

Feature	Specifications
Resolution	Min XGA Display(1024x768)
Brightness	Min 2500 ANSI Lumens
Contrast Ratio	Min 3000:1
Input ports	VGA
	HDMI
Weight	Max 3 Kg
Power consumption	Max 300 W
	Auto lamp dimming
Lamp life	Min 5,000 hours

DESKTOP COMPUTER

ITEM	MINIMUM REQUIREMENT
Processor & Core Logic	Intel Core i5 (2.20-GHz, 3 MB L2 cache, 1066-MHz FSB) or HigherLGA 1156
System Memory	Standard 4 GB, Upgradeable to at least 8 GB
Storage Subsystem	At least 500 GB 7200 rpm SATA 3.0
Form Factor	Micro TowerAll-in-One
Display/Graphics	17" TFT Flat panel Color LCD, Same brand as CPU
	1024x768(16:9), with EnergyStar rating
Optical Drives	16X Dual LayerDVD+/-RW
Keyboard and Pointing Device	• 1 x USB Enhanced keyboard • 1 x USB Optical Wheel Mouse
Audio	• Stereo audio system with 2 speakers • 2 x Audio ports: headphone and microphone
Communication interface	• Intel® 82578DM, 10/100/1000 MbpsGigabit Ethernet • 56K ITU V.90 data/fax modem, wake-on-ring ready
I/O interface ports	• 6 x High speed USB 2.0 (2 front/4 rear) • 1 x 25 Pin Parallel Port • 1Xrj45 jack for Ethernet • 1 x External VGA-in Port
Operating System	Genuine Windows® 7 Professional (64-bit) pre-installed (OEM media for OS and Drivers supplied by vendor, (with licensed CD or back up CD)

Software	• Latest Version, MS Office 2007 licensed with CDs • Latest Version of anti-virus with licensed CDs
Power supply	220 – 240 VAC , 50/60 Hz(auto-sensing)
Warranty	• One (1) Year • Original detailed and highlighted Brochures MUST be submitted

LAPTOP COMPUTER

ITEM	REQUIREMENT
Processor & Core Logic	Intel) Core) i5- (2.20GHz, 3MB L3 Cache FSB) or higher
System Memory	Standard 4 GB, Upgradeable to at least 8 GB
Storage Subsystem	At least 500GB 7200 rpm SATA 3.0
Optical Drives	16X 9.5mm DVD+/-RWmultiburner
Keyboard and Pointing Device	• Enhanced keyboard • USB Optical Wheel Mouse
Audio	• Stereo audio system • Combo microphone in/audio out
Communication interface	• 10/100 /1000 Mbs Gigabit Ethernet • 802.11 a/g/n (WPA2 Enterprise-compatible)
I/O interface ports	• Atleast 3 USB 2.0 ports • 1Xrj45 jack for Ethernet • 1 x External VGA Port / HDMI port
Operating System	Genuine Windows® 7 Professional 64-bit, (with licensed CD or back up CD)
Software	• Latest Version, MS Office 2007 licensed with CDs • Latest Version of anti-virus with licensed CDs
Accessories	Executive leather carry case
Power Subsystem	• Power management standard to support standby and Hibernation • Power saving modes • 6-cell 60Wh battery pack, 4 hours Batter life;1 AC Power Connector
Warranty	• One (1) Year • Original detailed and highlighted Brochures MUST be submitted

MAC LAPTOP COMPUTER

ITEM	REQUIREMENT
Processor & data bus	• Intel Core i5 or i7 or AMD 2.20GHz, with 6MB shared L3 cache; • 1066MHz –data Bus
System Memory	• Standard 4GB, Upgradeable to 8 GB • DDR3 SDRAM –1066MHz
Storage Subsystem	300GB – serial ATA–7200rpm hard drive, Dual Layer 16X DVD+/-RW
Power System	• Power management standard to support standby and Hibernation • Power saving modes • 6-cell 60Wh battery pack, 4 hours Batter life(when unplugged); 1 AC Power Connector
Display/Graphics	• 15.4" TFT Colour LCD, LCD display at 1440 x 900 • GDDR3 SDRAM 254MB
Keyboard and Pointing Device	• 84/85/88 Key, Built-in pointing device, 12 function keys, 4 cursor keys • Embedded numeric pad
Audio	• PCI 3D audio system, sound card, Built in Microphone • 2 external speakers same brand as laptop
Communication interface	• 10/100/1000 Mbps Gigabit Ethernet, RJ 45 jack, • 802.11 a/g/n (WPA2 Enterprise-compatible)
I/O interface ports	• 1 x audio –SPDIF Input • 1 X Audio – SPDIF output • 1 x 9 Pin Serial Port • 1 x 25 Pin Parallel Port • 4 x USB Port • 1 x External VGA Port
Operating System	Apple Mac OS X v10.6
Accessories	Carry Case, Mouse
Warranty	• One (1) Year • Original detailed and highlighted Brochures MUST be submitted

NOTEBOOK COMPUTERS

ITEM	REQUIREMENTS
Processor and Duo core	At least 2.0 GHz Intel Core i5M L2 Cache or equivalent
System Memory	Standard 4GB SDRAM Upgradeable to 8 GB
Storage	• 320 GB HDD • DVD-RW
Power System	• Power management standard to support standby and Hibernation power saving modes • 60 Wh battery Pack, • At least 4 hour Battery life (when unplugged)
Display Graphics	14" TFT Color LCD, 1024 X 768
Keyboard and pointing device	• Windows Keyboard • Built-in pointing device • 12 function keys, 4 cursor keys
Audio	PCI 3D Audio system
Communication interface	10/100/1000 Mbps Ethernet, RJ45 jack, Built-in Wireless connectivity facility, Bluetooth Wireless Technology, Webcam
I/O Interface	• 4xUSB 2.0 ports • 1xExternal VGA or HDMI Port • 1 AC Power Connector
Operating System	MS Windows 7 Professional Installed (Include Licensed CD) ,
Software	• MS Office 2007 Professional installed & Licensed (Non OEM) Include Licensed CD • Include PDF reader & writer ,DVD/CD Burning Software, Media Playing Software • Most Current Antivirus Solution with current updates
Accessories	Carry Case ,power adapters, external optical mouse
Warranty	• 1 Year Onsite Repair & Replace • Original detailed and highlighted Brochures MUST be submitted

TABLET COMPUTER

ITEM	REQUIREMENTS
Notebook Tablet series	Handwriting and voice recognition enabled through MS Windows 7 Professional. Handwriting must be digitized with an industry standard WACOM digitizer
Processor and core Logic	Intel® Core™2 Duo Processor L7500 (2.2GHz, 4MB, 800MHz)
Weight	1.20 kg (2.1 lb) or (2.6 lb inclusive of accessories)
System Memory	Up to 4GB PC2–5300/677MHz (3GB addressable with 32-bit OS)
Storage	• 160 GB HDD • External (DVD-ROM/CD-ROM) - RW. • Data Security with Embedded Security Subsystem (TCG) • Secure Digital card slot for options that enable storage expansion.
Power System	• Power management standard to support standby and Hibernation power saving modes • Battery life of up to 6.3 hours on 8-cell Li- lon Battery life
Display Graphics	12.1" TFT super-wide Angle with Anti-Reflective/Anti-Glare Protective Coatings Color LCD, 1024 X 768
Keyboard and pointing device	• 84/85/88 Key • Built-in pointing device • 12 function keys, 4 cursor keys • Embedded numeric pad
Audio	• PCI 3D Audio system • Built-in microphone
Communication interface	• 10/100Mbps Ethernet, RJ45 jack(NIC), RJ-11 Port (Modem), Bluetooth and wireless Technology
I/O Interface	• 3xUSB ports • 1xExternal VGA Port • 1 AC power • Docking station with Parallel port, male serial port, vga connector, 2 USB ports, R-J45, R-J11(telecod connector)
Operating System	MS Genuine Windows 7 Professional Installed (Include Licenced CD)

	• MS Office 2007 Professional installed & Licensed (Non OEM) Include CD • Include PDF reader & writer and Media Playing Softwares • Antivirus Solutions with most current updates.
Accessories	• Fingerprint reader, • At least a 128 MB Graphics Accelerator 900 • Carrying Case, power adapter and external optical mouse
Warranty	• 1 Year OnSite Repair & Replace • Original detailed and highlighted Brochures MUST be submitted

WALL MOUNTED LCD PROJECTOR

ITEM	REQUIREMENT
Resolution	XVGA (1024x768) pixel
Display	Poly-Silicon TFTx3 with micro lens army
Brightness	3000 ANSI Lumens
Contrast Ratio	500:1
Video signals	NTSC, PAL,SECAM
Input Signal Format	Video: NTSC, SECAM, SVGA, RGB: VGA, SVGA, And XVGA.
Output Terminal	1xRGB, 1x Audio, Pc control, Screen control, 1xS-video
Audio	2x2.5 Watt Stereo
Aspect Ratio	4:3
Zoom / Focus	Digital zoom
No. of Colours	16.7 million
Lens	Powered Zoom and Focus
Image Size	100cm-700cm-diagonal
Connectivity	• 802.11b/g wireless • 100/1000 Base-TX • USB • PCMCIA
Lamp	270 watt, 1500hours
Accessories	Lens Cap, carry case, Computer VGA cable, product documentation set

Remote control	Wireless remote for projector with pointer, source selection power, resize, mouse functions, volume, preset
Power supply	220-240v, 50/60HZ
Warranty	• At least 1Year • Original detailed and highlighted Brochures MUST be submitted

PORTABLE LCD PROJECTOR

ITEM	REQUIREMENT
Display Technology	3LCD
Max number of colors	16.7 Million
Projector Brightness	At least 2500 ANSI Lumens
Resolution	At least 1024x768 Pixels
Supported Resolution	Upto SXGA
Contrast Ratio	2000:1
Projection Lamp	170W UHE-E-TORL
Zoom / Focus	Digital zoom
Throw ratio	1.45-1.96:1
Aspect ratio	4:3
Locking Type	Adjustable Tripod stand screen at least (2032mm*1524mm)
Rated power supply	120-240 AC, 5 0/ 60 Hz (Auto voltage)
Accessories	Premium carrying case, Installation CDs & manuals
Warranty	• One (1) year • Original detailed and highlighted Brochures MUST be submitted

LASERJET PRINTER

ITEM	REQUIREMENT
Print Quality	1200 x 1200 dpi
Print Speed and throughput	Up to 45ppm black
Print technology	Laser black
Memory	1gb or higher, expandable
Memory slots	2 x100 –pin DDR DIMM
Processor Speed	At least 540Mhz
First page out	Less than 8 sec
Languages	PCL 5e,PCL 6, Postscript 3 emulation
Media Capacity	• 100 multipurpose tray • 500-sheet input trays • 1 manual feeding tray including envelopes, labels, transparencies and special media • Output tray up to 300 sheets
Media Sizes	Letter,legal,executive,A4and A3
Media types	Plain paper, envelopes, transparencies, copier, bond (60 to 200 g/m2)
Duplex printing	Automatic (standard)
Connectivity	IEEE-1284 compliant bi-directional parallel port and/or Universal Serial Bus (USB)
	RJ 45 Ethernet port
Hard disk	20Gb
Duty cycle	200,000 per month
Network	• Yes (Standard) • Compatibility • Smart switch printer language sensing • Linux compatible standard • PCL XL emulation standard
Software	Drivers for windows server 2003/2008/2010, Windows XP/2007/'7
Warranty	One year
	Original detailed and highlighted Brochures MUST be submitted

COLOR LASERJET PRINTER

ITEM	REQUIREMENT
Print speed, black (best quality mode)	40ppm
Print speed, black (normal quality mode)	40 ppm
First page out (black)	As fast as 10 sec
First page out (color)	As fast as 10 sec
Monthly duty cycle	Up to 100,000 pages
Print resolution, black	Up to 600 x 600 dpi
Print resolution, color	Up to 600 x 600 dpi
Ink cartridges	4 (1 each black, cyan, magenta, yellow); all pre-installed
Paper tray(s), minimum	3
Memory	256MB
Duplex Printing	Automatic
Processor speed	At least 533MHz
Print languages, standard	PCL 6, PCL 5c, postscript level 3 emulation
Maximum Input capacity	Up to 1100 sheets
Connectivity	• High Speed USB 2.0 • Two enhanced input/output (EIO slots) • Gigabit Ethernet Print Server
Compatible operating systems	Macintosh, Windows XP Professional; Windows 7); Windows Server 2003 (32/64 bit); Mac OS X v 10.2 or higher; Linux
Software included	Print drivers and installation software on CD-ROM, PCL6, PostScript Level 3 emulation
Warranty	• One (1) Year • Original detailed and highlighted Brochures MUST be submitted

PRODUCTION SCANNER

ITEM	REQUIREMENTS
Recommended Daily Volume	Unlimited
Throughput Speeds*	• Up to 200 pages per minute/800 images per minute (Throughput speeds may vary depending on your choice of driver, application software, operating system and PC.) • *(200 dpi landscape, letter-size document)
Scanning Technology	Dual Tricolor Plus CCD; Grayscale output bit depth is 256 levels (8-bit); Color capture bit depth is 40-bit (10 bits per red, green, blue and black channels); Color output bit depth is 24-bit
Optical resolution	600 dpi
Illumination	Dual Xenon lamps per side, mercury-free
Output resolution	Black and white: 200/240/300/400 dpi; Color/ grayscale: 100/150/200/240/300 dpi
Maximum Document Size	305 mm x 863 mm (12 in. x 34 in.)
Minimum Document Size	64 mm x 64 mm (2.5 in. x 2.5 in.)
Paper Thickness and Weight	With standard feeder: 45 g/m² (12 lb) bond to 200 g/m² (110lb) index; With ultra-lightweight feeder: 25 g/m² (7 lb) rice paper to 75 g/m² (20 lb) bond
Feeder	500-sheet
Multi-feed Detection	Multi-feed detection with ultrasonic technology; three ultrasonic sensors that can work together or independently
Connectivity	IEEE-1394 (FireWire) interface, 6-pin connector; IEEE-1394 card and cable included
Interface Support	TWAIN and ISIS Drivers (included); KODAK Capture Software
Color Touch Screen Control	Operator control via color LCD touch screen
Ergonomic Height Adjustment	Integrated height adjustment span of 25 cm (10 in.) for seated or standing operation
Imaging Features	Perfect Page Scanning, iThresholding, autocrop, aggressive crop, deskew, image rotation, electronic color dropout, dual stream scanning, halftone removal, noise removal, zone processing, toggle patch, automatic color detection, automatic orientation
On-board Compression	CCITT Group IV, JPEG or uncompressed output

File Format Outputs	JPEG (for color and grayscale images); TIFF (for black and white images)
Image Address	Multi-level indexing/batching capabilities
Patch Readers	Four permanently mounted patch readers that can work together or independently
Imprinting	Front pre-scan or rear post-scan imprinting; optional hi-res imprinter available
Electrical Requirements	100-130 VAC, 50/60 Hz, 7 A; 200-240 VAC, 50/60 Hz, 3.5 A
Minimum PC Configuration	Pentium 4 2.4 GHz processor with 512 MB RAM
Supported Operating Systems	• WINDOWS XP Pro (32bit only) • WINDOWS Vista (32 and 64 bit) • WINDOWS 7 (32 and 64 bit) • Original detailed and highlighted Brochures MUST be submitted

DEPARTMENTAL SCANNER

ITEM	REQUIREMENTS
Recommended Daily Volume	Up to 9,000 pages per day
Throughput Speeds*	• Up to 45 pages per minute/90 images per minute • *(200 dpi, landscape, letter size, black and white/grayscale/color)
Scanning Technology	• Dual CCD • Grayscale output bit depth is 256 levels (8-bit) • Color capture bit depth is 48 bits (16 x 3) • Color output bit depth is 24 bits (8 x 3)
Output resolution	75, 100, 150, 200, 240, 300, 400, 600 and 1200 dpi
Maximum Document Size	297 mm x 863 mm (11.7 in. x 34 in.)
Minimum Document Size	64 mm x 89 mm (2.5 in. x 3.5 in.)
Paper Thickness and Weight	34–413 g/m² (9–110 lb.) paper
Feeder	Up to 150 sheets of 60 g/m² (16 lb.) paper
Multi-feed Detection	With ultrasonic technology
Connectivity	USB 2.0
Bundled Software	TWAIN, ISIS, SANE and Windows Imaging Architecture Drivers, KODAK Capture Desktop Software and Smart Touch

Imaging Features	Perfect Page Scanning; Thresholding; adaptive threshold processing; deskew; autocrop; relative cropping; aggressive cropping; electronic color dropout; dual stream scanning; interactive color, brightness and contrast adjustment; automatic orientation, automatic color detection, background color smoothing
File Format Outputs	Single and multi-page TIFF, JPEG, RTF, PDF, searchable PDF
Accessories	• KODAK Imaging Guide Wiper Accessory • Optional A4 black imaging background accessory
Electrical Requirements	100-240 V (International); 50/60 Hz; universal power supply included
Recommended PC Configuration	For documents up to 356 mm (14 in.) long at 400 dpi: Pentium 4, 3.2 GHz processor, 512 MB RAM; For documents up to 660 mm (26 in.) long at 400 dpi: Pentium 4, 3.2 GHz processor, 1 GB RAM; For longer documents/higher resolutions: Pentium 4, 3.2 GHz processor, 3 GB RAM
Supported Operating Systems	• Windows 7 (32-bit and 64-bit) • Windows XP SP2 (32-bit) • Windows XP x64 Edition SP2 • Windows 2000 Professional SP4 • Windows Vista SP1 (32-bit and 64-bit) • Windows 2003 Server x64 Edition • LINUX Ubuntu 6.06, Fedora 8, and SUSE 10.1
Consumables Available	• Feed module, separation module, feed rollers, roller cleaning pads, Staticide Wipes, image guides, pre-separation pad • Original detailed and highlighted Brochures MUST be submitted

WORKGROUP SCANNER

ITEM	REQUIREMENTS
Recommended Daily Volume	Up to 3,000 pages per day
Scanning Technology	Single CCD; i1220 Plus: Dual CCD; Grayscale output bit depth is 256 levels (8 bits); Color capture bit depth is 48 bits (16 x 3); Color output bit depth is 24 bits (8 x 3)
Throughput Speeds (portrait, letter size)	• Bitonal/grayscale: Up to 45 pages per minute at 200 dpi • Color: Up to 30 pages per minute at 200 dpi and 300 dpi • (Throughput speeds may vary depending on your choice of driver, application software, operating system and PC.)
Optical resolution	600 dpi (1200 dpi A4 flatbed accessory)
Illumination	Dual fluorescent (cold cathode)
Output resolution	75, 100, 150, 200, 240, 300, 400, 600 and 1200 dpi
Max./Min. Document Size	215 mm x 863 mm (8.5 in. x 34 in.)/50 mm x 63.5 mm (2 in. x 2.5 in.)
Paper Thickness and Weight	34-413 g/m² (9-110 lb.) paper; ID card thickness: up to 1.25 mm (0.05 in.)
Feeder	• Up to 75 sheets of 75 g/m² (20 lb.) paper • Handles small documents, such as ID cards, embossed cards and insurance cards
Multi-feed Detection	With ultrasonic technology
Connectivity	USB 2.0 (cable included)
Bundled Software	TWAIN, ISIS, WIA Drivers; KODAK Capture Desktop Software, Smart Touch; Nuance ScanSoft PaperPort and OmniPage.
Imaging Features	Perfect Page Scanning; iThresholding; adaptive threshold processing; deskew; autocrop; relative cropping; aggressive cropping; electronic color dropout; dual stream scanning; interactive color, brightness and contrast adjustment; automatic orientation; automatic color detection; background color smoothing; image edge fill; image merge; content based blank page detection; streak filtering; image hole fill; sharpness filter
File Format Outputs	Single and multi-page TIFF, JPEG, RTF, BMP, PDF, searchable PDF

Recommended PC Configuration	For documents up to 660 mm (26 in.) long at 400 dpi: Intel Core2, 2 GHz Duo Processor or equivalent, 2 GB RAM. For longer documents/ higher resolutions: Intel Core2, 2 GHz Duo Processor or equivalent, 4 GB RAM. Note: for optimal performance when using a PC running the Windows 7 operating system, at least 3 GB RAM is recommended.
Supported Operating Systems	Windows XP SP2 and SP3 (32-bit), Windows XP x64 edition SP2, Windows Vista SP1 (32-bit and 64-bit), Windows 7 (32-bit and 64-bit), Windows 2003 Server and 2008 Server x64 Editions, Linux Ubuntu 8.04, Fedora 9, SUSE 11
	Original detailed and highlighted Brochures MUST be submitted

SMALL OFFICE PHOTOCOPIER

ITEM	REQUIREMENTS
Copying technology	Laser
Duplex copying	Two-sided copying Automatic
Input: Output support	1-1, 1-2, 2-1, 2-2
Copying Speed	20cpm
Copy Resolution	• 600 x 600 dpi • Minimum Memory / RAM Installed • 256 MB
Communication Mode	Duplex
Interfaces	USB 2.0 Parallel Port IEEE 1284,(USB cable included);
Display/ Operation	Touch screen panel
Trays	3 paper trays including the bypass tray; Automatic Document Feeder
Media Type	Papers, envelops, transparencies
Document Feeder Capacity	50 sheets
Standard Tray	250 sheets
Optional Tray	250 sheets
Bypass Tray	100 sheets
Output Tray	250 sheets facedown
Auto Tray Switching	Capable
Media Sizes	Document glass and maximum paper size is legal (8.5 x 14 inches);
Monthly Duty Cycle	Maximum 20,000 pages per month.

Power	220-240 VAC 50/60 Hz
Power Saver Mode	50/60 watts
Warm up time	30 Seconds max
First copy out time	8 seconds or less
Toner type	Customer replaceable
Toner Control method	Automatic Toner Density monitoring
Finishing options	Multiposition stapling, fit to new paper size, booklet creation
Document scanner	ADF (full duplex)
Zoom range	25-400% in 1% increments
Other features	Secure print, Delay print, Watermark, Power save mode
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

MEDIUM OFFICE PHOTOCOPIER

ITEM	REQUIREMENTS
Copying / Print technology	Laser
Duplex copying/printing	Two-sided copying Automatic
Input: Output support	1-1, 1-2, 2-1, 2-2.
Copying Speed	30 cpm
Multiple copying	Up to 999 copies
Copy Resolution	up to 1200 x 1200dpi
Memory	512MB expandable to 1024
Hard drive	40GB
Communication Mode	Duplex
Interfaces	USB 2.0 Parallel Port IEEE 1284,(USB cable included);
Trays	3 paper trays including the bypass tray
Media Feed	Include Duplex unit, Automatic media feeder;
Document Feeder Capacity	75 sheets
Output Tray	250 Sheets
Standard Tray	500 Sheets
Optional paper supply	500 Sheets
By pass Tray	100 Sheets
Auto Tray Switching	Capable

Media Sizes	Document glass and maximum paper size is legal (11 x 17 inches); Automatic media feed.
Media type	Paper, Envelopes, labels, cards
Monthly Duty cycle	Maximum 100,000 ppm.
Display/ Operation	Touch screen panel
Power	220-240 VAC 50/60 Hz; consumption 1340 w (max)
Power Saver Mode	35 watts
Warm up time	30 Seconds max
First copy out time	5 seconds or less
Toner Control method	Automatic Toner Density monitoring
Toner	Customer Replaceable
Finishing options	Multi-position stapling, fit to new paper size, Hole punch, booklet creation
Document scanner	ADF (full duplex)
Output capacity	250 Sheet face down
Zoom range	25-400% in 1% step
Other features	Secure print, Delay print, Watermark
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

LARGE OFFICE PHOTOCOPIER

ITEM	REQUIREMENTS
Copying / Print technology	Laser
Duplex copying/printing	Two-sided copying Automatic (standard)
Copying Speed	45cpm
Copy Resolution	Up to 2400 x 600 dpi /4800 x 600 dpi interpolated output
Memory / RAM Installed (Min)	2GB
Hard drive Capacity	60GB
Communication Mode	Duplex
Interfaces	USB 2.0 Parallel Port IEEE 1284,(USB cable included);
Trays	3 paper trays including the bypass tray.
Multiple Copying	Up to 9999 copies
Media Feed	Include Duplex Automatic media feed tray;
Input: output support	1-1, 1-2, 2-1, 2-2.
Document Feeder Capacity	100 sheets
Output Tray Capacity	500 Sheets
Standard Tray	550 sheets
Optional paper supply	550 Sheets
Bypass Tray	100 sheets
Auto Tray Switching	Capable
Media Sizes	Document glass and maximum paper size is legal (11x 17 inches); Automatic media feed
Media type	Paper, Envelopes, labels, cards
Display /Operations	Touch screen
Monthly Duty Cycle	Maximum 200,000 pages per month.
Power	220-240 VAC 50/60 Hz
Power Saver Mode	50/60 watts
Warm up time	30 Seconds max
First copy out time	4 seconds or less
Toner Control method	Automatic Toner Density monitoring
Original	Maximum A3
Finishing options	Multi-position stapling, fit to new paper size, hole punch, booklet creation
Document scanner	ADF (full duplex)
Output capacity	250 Sheet face down

Zoom range	25-400% in 1% step
Other features	Secure print, Delay print, Watermark
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

DSLR DIGITAL CAMERA

ITEM	REQUIREMENTS
Resolution	14.1 Megapixels
sensor type	CMOS
Image Stabilization	Standard
Image Resolution	4320 x 3240
Minimum Shutter speed	60 sec
Minimum continuous shooting speed	3.5 frames per second
Video capture	1280 x 720; 640 x 480 ; 320 x 240
Maximum Frame Rate	30 fps
Digital Video Format	MOV, AVI, MPEG-4,MJPEG, H.264
Still image format	JPEG, RAW,RAW+JPEG
Lens type	Lens mountable
Minimum Lens	18-55mm
optical zoom	10X
Minimum Field of view	1.5
View Finder	LCD
Display resolution	920,000
Light Sensitivity	6400 ISO
Expandable Memory Type:	MS Duo / MS PRO Duo / SD / SDHC/SDXC/MMC
Exposure Modes	Programmable, automatic
Battery:	Li-ion rechargeable battery
Power Device	Battery charger external
Connector type	USB, Composite video/audio
Battery Life	300 shots
Face detection	Standard
Shooting modes	Auto, portrait, landscape, night, close-up, snapshot, flash off, indoor , low light, movie
Self – Timer	2 Sec/10 Sec
Flash type	Auto
Flash Mode	Flash On/off, red eye reducer, auto

Sound	Built in Microphone and speakers
Accessories	Rechargeable Li-ion Battery, Battery Charger, Remote Control, USB Cable, Audio/Video Cable, case and strap
Focus Mode	Automatic, Manual
White balance	Custom, automatic, presets
Firmware	User upgradable
Software	Windows XP/ Windows Vista/ Windows 7/Mac/ Linux compatible image viewing software
Warranty	1 year
	Original detailed and highlighted Brochures MUST be submitted

COMPACT DIGITAL CAMERA

ITEM	REQUIREMENTS
Resolution	14.1 Megapixels
sensor type	CCD
Pixel Density	24 MP/cm²
Still image format	JPEG
Image Stabilization	Optical/lens
Image Resolution	4320 x 3240
Minimum Shutter speed	60 sec
Video capture	1280 x 720; 640 x 480 ; 320 x 240
Maximum Frame Rate	30 fps
Digital Video Format	MOV, AVI, MPEG-4,MJPEG
Optical zoom	10 x
Minimum wide angle zoom	25mm
View Finder	LCD
Display Resolution	460,000
Light Sensitivity	3200 ISO
Built in Memory	40MB
Expandable Memory Type:	MS Duo / MS PRO Duo / SD / SDHC/SDXC/MMC
Exposure Modes	Programmable, automatic
Battery:	Li-ion rechargeable battery
Power Device	Battery charger external
Connector type	USB, Composite video/audio
Battery Life	300 shots
Operating system compatibility	Linux, Windows XP, Windows 7

Face detection	Standard
Shooting modes	auto, portrait, night snapshot, indoor and low light,
Self – Timer	2 Sec/10 Sec
Flash type	Built-in;
Flash Mode	Flash On/off, red eye reducer, auto
Sound	Microphone and speakers built in
Accessories	Rechargeable Li-ion Battery, Battery Charger, Remote Control, USB Cable, Audio/Video Cable, case and strap
Lens type	Built in
White balance	Custom, automatic, presets
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

PROFESSIONAL DIGITAL CAMCORDER

ITEM	REQUIREMENTS
Image Sensor	CMOS/ 3M0S
Image Sensor size	1/4 in
Minimum Filter Diameter	40 mm
Total minimum pixels	8 MP
Minimum Digital Zoom	200 X
Optical Zoom	10 X
Min Focal Length	40 mm (35 mm equivalent)
Minimum Shutter Speed	1/30 (Auto slow shutter On); 1/60(Auto slow shutter Off)
Image Stabilization	Optical
Audio Support	5.1 Surround Sound, AC-3 (2 channels)
Video Capture Format	HDV ,MPEG-2, MPEG-4, AVC/H.264 (HD Compliant)
Maximum Video Capture Resolution	1440 x 1080
Display type	LCD
Display resolution	200,000 pixels
Video Broadcast Standard	NTSC
Video signal	1080/60i

Recording Media	Memory Stick Duo, Memory Stick PRO Duo, Sony Memory Stick Image Capture (SD/SDHC/ SDXC), High Definition Mini DV (recommended) ,MiniDV cassette
Flash	Accessory Shoe, Red-Eye Reduction
Still Camera resolution	10MP
Image Format	JPEG
White Balance	Auto, outdoor, indoor, daylight, sunny, shade, cloudy, manual
Exposure Settings	Auto Exposure, Manual Exposure
Internal Memory type	Hard drive/Flash Memory
Minimum Internal Memory	32 GB
Included Components	AC Adapter, Battery, Battery Recharger, Cables - A/V (RCA Composite), Cables - Component Video, Cables - USB, Docking / Cradle Stand, Remote, software CD/DVD Rom, Carrying case
Interface Connection	SD output, HD output , headphones, A/V Output, Component Video, HDMI, LANC Terminal, Microphone, Proprietary, S-Video, USB2.0 - Universal Serial Bus
Additional Features	Backlight Compensation, Built-in Light, Built-in Speaker, Fader Function, PictBridge Support, Touch Screen, Viewfinder Power
Focus Features	Auto Focus, Face Recognition Auto Focus, Manual Focus, Spot Focus
Power requirement	7.2 V(Battery)
Power Source	AC Adaptor, Lithium-Ion Battery
Focus	Auto/Manual
Iris	Auto/Manual
Warranty	1 Year Limited Warranty
	Original detailed and highlighted Brochures MUST be submitted

STANDARD USER DIGITAL CAMCORDER

ITEM	REQUIREMENTS
Image Sensor	CMOS
Image sensor size	1/8 in
Minimum Filter Diameter	40 mm
Total minimum pixels	10 MP
Minimum Digital Zoom	100 X
Optical Zoom	12 X
Min Focal Length	40 mm (35 mm equivalent)
Minimum Shutter Speed	1/30 (Auto slow shutter On); 1/60(Auto slow shutter Off)
Image Stabilization	Optical
Audio Support	Stereo
Video Capture Format	MPEG-2, H.264/AVC
Maximum Video Capture Resolution	1920 x 1080
Display type	LCD
Display resolution	200,000 pixels
Video Broadcast Standard	NTSC
Recording Media	Memory Stick Duo, Memory Stick PRO Duo, Sony Memory Stick Image Capture (SD/SDHC/ SDXC), ,MiniDV cassette
Flash	Accessory Shoe, Red-Eye Reduction
Still Camera resolution	10MP
Still Image Format	JPEG
White Balance	Auto,outdoor, indoor, daylight, sunny, shade, cloudy, manual
Exposure Settings	Auto Exposure, Manual Exposure
Internal Memory type	Hard drive/Flash Memory
Minimum Internal Memory	32 GB
Included Components	AC Adapter, Battery, Battery Recharger, Cables - A/V (RCA Composite), Cables - Component Video, Cables - USB, Docking / Cradle Stand, Remote, software CD/DVD Rom, Carrying case
Interface Connection	A/V Output, Component Video, LANC Terminal, Microphone, Proprietary, S-Video, USB - Universal Serial Bus 2.0
Additional Features	Backlight Compensation, Built-in Light, Built-in Speaker, Fader Function, PictBridge Support, Touch Screen, Viewfinder Power

Focus Features	Auto Focus, Face Recognition Auto Focus, Manual Focus, Spot Focus
Power Source	AC Adaptor DC Input, Lithium-Ion Battery
Focus	Auto/Manual
Iris	Auto/Manual
Warranty	• 1 Year Limited Warranty • Original detailed and highlighted Brochures MUST be submitted

STANDARD USER DIGITAL DVD CAMCORDER

ITEM	REQUIREMENTS
Image Sensor	CMOS/CCD
Image sensor size	1/6 in
Minimum Filter Diameter	30 mm
Total minimum pixels	10 MP
Minimum Digital Zoom	100 X
Optical Zoom	12 X
Min Focal Length	40 mm (35 mm equivalent)
Minimum Shutter Speed	1/30 (Auto slow shutter On); 1/60(Auto slow shutter Off)
Image Stabilization	Optical
Audio Support	Stereo
Video Capture Format	MPEG-2, H.264/AVC
Maximum Video Capture Resolution	1920 x 1080
Display type	LCD
Display resolution	123,000 pixels
Video Broadcast Standard	NTSC
Recording Media	DVD/ Flash Media
DVD Type	DVD-R/-RW/-R DL
Flash	Accessory Shoe, Red-Eye Reduction
Still Camera resolution	10MP
Still Image Format	JPEG
White Balance	Auto, outdoor, indoor, daylight, sunny, shade, cloudy, manual
Exposure Settings	Auto Exposure, Manual Exposure
Internal Memory type	Flash Memory

Included Components	AC Adapter, Battery, Battery Recharger, Cables - A/V (RCA Composite), Cables - Component Video, Cables - USB, Docking / Cradle Stand, Remote, software CD/DVD Rom, Carrying case
Interface Connection	A/V Output, Component Video, LANC Terminal, Microphone, Proprietary, S-Video, USB - Universal Serial Bus 2.0
Additional Features	Backlight Compensation, Built-in Light, Built-in Speaker, Fader Function, PictBridge Support, Touch Screen, Viewfinder Power
Focus Features	Auto Focus, Face Recognition Auto Focus, Manual Focus, Spot Focus
Power Source	AC Adaptor DC Input, Lithium-Ion Battery
Focus	Auto/Manual
Iris	Auto/Manual
Warranty	1 Year Limited Warranty
	Original detailed and highlighted Brochures MUST be submitted

DISK DUPLICATOR

ITEM	REQUIREMENTS
Operating type	Stand alone
Max Writing speed	• DVD-R: 24X • DVD-RW: 8X • DVD-R DL: 10X • DVD+R: 24X • DVD+RW: 8X • DVD+R DL 10X • CD-R: 52X • CD-RW: 52X
Supporting Discs	DVD-ROM DVD-R DVD-Video DVD-RW DVD+R DVD+RW CD-ROM CD-R CD-Audio Disc CD-RW Multi-session Photo CD CD-I Video CD CD-ROM XA & CD Extra (CD Plus), Blu Ray
Supported Recording Discs	12cm 4.7GB DVD-R/RW 12cm 4.7GB DVD+R/RW 12cm 8.5GB DVD+R DL 12cm 8.5GB DVD-R DL 12cm 80min/700MB CD-R 12cm 74min/650MB CD-RW 8cm 1.47GB mini DVD-R 8cm 24min/210MB mini CD-R 8cm 50MB Business Card CD-R, Blu-ray
Display	LCD
Hard drive	250GB

Hard drive partitioning	Continuous
Buffer Memory	128MB
Connectivity	USB 2.0 and Network connectivity
Firmware upgradeable	Yes
Security	User account management
DVD format conversion	Convert media between DVD+R/RW and DVD-R/RW automatically
Auto counter	Yes
Labeling	Laser labeling technology
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

DIGITAL VIDEO CAMERA

ITEM	REQUIREMENTS
Optical sensor size	1/3 in
Optical sensor type	CMOS
Min illumination	7 lux
Image stabilizer	Optical
Min shutter speed	1/4 sec
Shooting modes	Digital photo mode
White balance	Custom, Presets, Automatic
White balance presets	Auto, Indoor, Outdoor, Manual
Lens aperture	F/1.8-2.1
Optical zoom	12 x
Lens system type	Zoom lens
Min focal length	5.1 mm
Auto focus	TTL contrast detection
Filter size	37 mm
Manual focus	Manual, Automatic
Zoom adjustment	Manual, Motorized drive
Media type	Mini DV (HDV) PAL
Image storage	JPEG 1920 x 1440, JPEG 1440 x 1080, JPEG 1920 x 1080, JPEG 640 x 480
Flash memory	16 MB – Memory Stick Duo
Recording speed	SP

Display type	LCD display – TFT active matrix
Display form factor	Rotating
Display resolution	123,200 pixels
Audio input type	Microphone
Microphone type	Built-in
Microphone operation mode	Stereo
Connections	1 x Component video output, 1 x Composite video/audio output, 1 x S-Video output, 1 x Headphones, 1 x Audio input, 1 x Control-L (LANC), 1 x USB, 1 x DC power input
Cables included	A/V cable, Component video cable, USB cable
Video input features	Built-in speaker, Histogram display, Backlight compensation, RGB primary color filter, Analog to digital conversion with pass through Remote control Remote control – Infrared
Included accessories	Lens cap, Lens hood, Camcorder shoulder strap, Memory Stick Duo adapter,
Power	External power adaptor 240v, Lithium rechargeable battery pack, charger
Warranty	• 1 Year • Original detailed and highlighted Brochures MUST be submitted

VIDEO RECORDING PRESENTER WITH LASER POINTER

ITEM	SPECIFICATIONS
Technical features	4-in-1 Product - Product functions as a PowerPoint presenter with laser pointer, integrated voice recorder and SD memory card reader
Storage	Built-in SD memory card reader and SD Card Storage - Allows recording of presentations, meetings or notes and save to a SD card in .wav format;
Wireless	2.4GHz wireless technology that provides up to a 50-foot (15m) working range for full control of the presentation from anywhere in the room
Stow-n-go® receiver	USB receiver that can be stored conveniently inside presenter for easier storage and travel
Carrying case	Carrying case with extra storage compartment for 2 spare AAA batteries

Led status indicators	SD card memory full, low battery power and laser beam currently in use
	Indicator lights to notify user of any status changes, so there are no unexpected surprises during an important presentation
System requirements/compatibility	Windows 7, USB port,SD memory card
Communication interface	USB Port
Convenience	Easily record any presentation questions with the click of a button
Weight	55 g
Battery	2 AAA batteries and 2 spare AAA batteries
Functions on the presenter	Scroll wheel provides for navigation through presentations; Other buttons include: On/ off, Next/previous page, dark screen/resume, application switch, slideshow/ESC and volume control
Warranty	2 years
	Original detailed and highlighted Brochures MUST be submitted

WIRELESS INTERNET MODEM

ITEM	SPECIFICATIONS
Main features	• Able to add external Antenna incase signal not enough strong. • Smaller and more compact. • Stable and Reliable. • Compatible with Windows 7 operating systems and MacOS. • Zero CD Technology: No CD Requires, Auto plug and play. Simple and easy.
Technical standard	• HSDPA/UMTS: 3GPP R99, R5 • GSM/GPRS/EDGE: 3GPP R99
Operating frequency	• HSDPA/UMTS 2100MHz • GSM/GPRS/EDGE 850/900/1800/1900MHz
Support speed	• Maximum download speed : 3600 kbps • Maximum upload speed: 384 kbps
External interface	• Mini USB interface: supporting USB 2.0 Full Speed • Antenna: Internal antenna • External Antenna Slot: Able add external antenna.

	• With Extra Micro SD Memory Slot (up to 4GB). • SIM/USIM card: standard 6 PIN SIM card interface
Dimensions	• 70.1 mm (D) x 25.7 mm (W) x 11.6 mm (H)
Usb	• Auto plug and play
Weight	• ← 50g
Led indicator	• Green Light You are connected to the GPRS/ EDGE network (fast) • Blue Light You are connected to the 3G network (faster) • Cyan Light You are connected to the HSDPA or Turbo network (fastest)
Warranty	• One Year • Original detailed and highlighted Brochures MUST be submitted

DIGITAL LCD DISPLAY PANEL

ITEM	SPECIFICATIONS
Picture/display	
Aspect ratio	16:9
Size	Between 47"
Brightness	• 500 CD/M2 • Total Input-Line: 4 ,Total Input-Terminal: 4
Contrast ratio	1600: 1 Dynamic Contrast Ratio,
Display screen	LCD WXGA Active Matrix TFT
Screen enhancement	Anti Reflection Coated Screen
Viewing angle	Horizontal: 178°, Vertical: 178° Degrees
Audio power output	14W Total (7Wx2 Digital AMP)
Inputs and Outputs Specifications	• Analog Audio Input(s) -Pinjack (x2), Analog Audio Output(s)-Pinjack (x2), Composite Video Output(s) • BNC (x1) Loop Through • Dual Option Slot-1.8 Slot, Ethernet Connection(s), • HD Component Video Input(s) • RGB/COMPONENT IN: HD D-sub 15-pin female (x1) • HD Component Video Output(s) RGB/ COMPONENT Out: HD D-sub 15-pin female (x1)

	• HDMI™ Connection(s) Available through Option Card BKM-FW15 • PC Audio Input(s), RS232 Control- D-sub 9-pin (x1) • S-Video Input(s) • Mini DIN 4-pin (x1): when S-Video is used, Composite Video is inactive • Video In (BNC) (x1): when Video is used, S-Video is inactive
Video Specifications Format(s) Supported	• NTSC/PAL/PAL-M/PAL-N/NTSC4.43/PAL60 • Viewing Angle • Display Technology - 8MS • Picture Mode - Custom, Vivid, Standard, Conference, DICOM
Display RESPONSE TIME	8MS
Panel resolution	1920 x 1080 Display Resolution
Sound	Virtual Surround sound
	Stereo sound Output
Remote Control	LAN / RS232 Available
Digital Inputs Specifications	DVI-D, HDSDI (SMPTE 292M) , No (Available through Option Card BKM-FW16)
Power Specifications	Internal Power Supply
Power Consumption (in Operation)	Approx 320W
Power Requirements	AC 100-240V, 50/60Hz
HDMI™ Technology	No (Available through Option Card BKM-FW15)
Multiple Language Display	English, French, Spanish, Italian, German, Japanese, Dutch, Swedish, Russian, Chinese
On-Screen Display	• Picture and Picture • Yes • Yes • VGA in SUB 15 HD
Convenience Specifications	Cable Management System, Wall/Arm Mount
Mount Design	Landscape, Portrait Auto sensing Logo illumination
Remote Control	Multi-Function Remote
Operating Conditions Specifications	• Color Temperature Control • Colors • Operating Humidity • Operating Temperature • Screen Treatment
PC Connection	PC : Computer display with support for resolutions up to 1920 x 1080 through HDMI and VGA

MULTIPURPOSE PHOTOCOPIER (4 IN ONE)

ITEM	REQUIREMENTS
Printing specifications	
Functions	
All-in-one functions	Print, copy, Scan and Fax
Multitasking capability	Yes
Print quality technology	
Print technology	Laserjet
Print speed, black (normal quality mode)	Up to 40 ppm
Print speed, color (normal quality mode)	Up to 40 ppm
First page out (black)	As fast as 11.5 sec
First page out (color)	As fast as 11.5 sec
Monthly duty cycle	Up to 200,000 pages
Recommended monthly print volume	8,000 to 17,000 pages
Print resolution, black	Up to 1200 x 600 dpi
Print resolution, color	Up to 1200 x 600 dpi
Memory	512 MB
Processor speed	835 MHz
Paper handling	
Paper handling optional, input	1 x 500 Feeder Stand, 3 x 500 feeder stand-one or the other of these should be present with each unit.
Paper handling optional, output	Tray 1 and a Cassette Tray 2 and 3 (Tray 1 holds 100 sheets, Tray 2 and 3 holds 500 sheets each) F Bundle includes and additional 2 x 500 sheet input trays (trays 4 and 5)
Paper handling standard, output	500-sheet face down output bin
Envelope capacity	Up to 10 envelopes
Duplex printing	Automatic
Document finishing	Sheetfeed simplex or duplexed face down to standard output bin; Optional devices handle Stacking, Stapling and Booklet making
Media sizes, standard	Multipurpose tray 1: letter, letter-R, legal, executive, statement, 8.5 x 13 in, 11 x 17 in, 12 x 18 in, index cards (4 x 6, 5 x 8), envelopes (No. 9, 10, Monarch); Input tray 2: letter, letter-R, legal, executive, 8.5 x 13 in, 11 x 17 in; Input trays 3, 4, and 5: letter, letter-R, legal, executive, 8.5 x 13 in, 11 x 17 in, 12 x 18 in

Media sizes, custom	Multipurpose tray 1: 4 x 5.5 to 12.6 x 18 in; Tray 2: 5.8 x 8.3 to 11.7 x 17 in; Trays 3, 4, 5:: 5.8 x 8.3 to 12.6 x 18 in
Media types	Paper (bond, recycled, glossy, mid-weight, heavy, heavy glossy, extra heavy, extra heavy glossy, rough, tough), transparencies, labels, envelopes, cardstock, user-defined
Scanner specifications	
Scanner type	Flatbed, ADF
Scan resolution, optical	Up to 600 dpi
Scan size, maximum (flatbed)	11.7 x 17 In
Scan size, maximum (ADF)	11.7 x 17 In
Scan speed (default)	Up to 40 ppm (mono letter simplex); up to 38 ppm (mono A4 simplex); up to 41 ppm (mono A3 simplex) up to 16 ppm (mono letter duplex); up to 15 ppm (mono A4 duplex); up to 16 ppm (mono A3 duplex)
Scanner features	Yes
Automatic paper sensor	Yes
Supported file formats	PDF, JPEG, TIFF, or MTIFF
Copier specifications	
Copy resolution, black	Up to 600 x 600 dpi
Copy resolution, color	Up to 600 x 600 dpi
Copy reduce/enlarge settings	25 to 400%
Maximum number of copies	Up to 999 copies
Fax specifications	
Faxing	Yes
Fax transmission speed (seconds per page)	13 sec per page
Fax resolution, black (dots per inch)	Up to 300 x 300 dpi (Recv can support 400x400)
Speed dials, maximum number	100 speed dials and 100 numbers per speed dial.
Auto redial	Yes
Fax delayed sending	No
Fax broadcast	100 Locations
Junk fax barrier	Up to Blocked 20 fax numbers
Polling	No
Remote retrieval	No
Fax forwarding	Yes

Warranty	I year
Connectivity	
Connectivity, standard	1 Hi-Speed USB 2.0, 1 built-in wired Ethernet, 1 PictBridge, 1 built-in wireless 802.11b/g
Connectivity, optional	HP bt300 Bluetooth Wireless Printer Adaptor Q3395A
Macintosh compatible	Yes
Print drivers, standard	HP PCL 3 GUI
Compatible operating systems	
Microsoft Windows 7, Windows XP Professiona, Mac OS X v10.2.8, 10.3, 10.4, 10.5, 10.6, Linux	
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

EXTERNAL HARDDISK

ITEM	REQUIREMENTS
Capacity	500 GB
Hard Disk Spindle Speed	7200 rpm
Cache	2 MB
Hard disk Interface	FireWire 800, FireWire 400 and USB 2.0
Data Transfer Rate	480 MB/s
Seek time	14 ms
Compatible operating systems	Windows XP, Windows Vista, Windows 7/ windows 8.1 and Mac OS 9.x / 10.1 or higher
Power Source	USB bus and FireWire bus
Power Requirements	100 - 240 VAC
Warranty	• 1 year • Original detailed and highlighted Brochures MUST be submitted

FLASH DISK

ITEM	REQUIREMENTS
Capacity	4 GB
Rotational Speed	4200 rpm
Cache	2 MB
Interface	ATA 100, Zer Insertin Frce (ZIF) cnnectr / USB 2.0
Max. External Transfer Rate	100 MB/s
SEEK TIME	
Track t Track	3 ms
Average	15 ms
Maximum	26 ms
SHCK	
Perating	500G @ 2ms
Nn-perating	1500G @ 1ms
Original detailed and highlighted Brochures MUST be submitted	

INTERNAL SERVER HARDDISK

	Performance-optimized high-capacity storage for high-intensity applications.	High-performance, high-capacity storage for mid-intensity applications.	The maximum capacity energy-efficient cold storage HDD.
Designed For	Datacenter storage, high-end NAS/SAN and Surveillance, and performance-oriented high capacity storage.	Bulk cloud storage, replicated environments, content delivery networks (CDNs), entry level servers, and backup.	Datacenter archive storage, cold storage servers, tape library disk layer, tape library and VTL replacement.
Capacity	250 GB - 6 TB	1 TB - 6 TB	6 TB OR MORE
Interface	SAS 6 Gb/s -10000 or 15000rpm	SATA 6 Gb/s- 7200 or 10000rpm	SATA 6 Gb/s- 7200 or 10000rpm
	SATA 6 Gb/s- 7200 or 10000rpm		
	SATA 3 Gb/s – 7200 or 10000rpm		
MTBF	Up to 2 M hours	800 K - 1 M hours	500 K hours
Workload	550 TB per year	180 TB per year	60 TB per year
Format	512n / 512e / 4Kn	512e	Advanced Format (AF)

Cache	32, 64 MB and 128 MB	64 MB and 128 MB	64 MB
Form Factor	3.5-inch	3.5-inch	3.5-inch
Warranty			

INTERNAL SERVER HARDDISK

ITEM	REQUIREMENTS
Capacity	146 GB 10K rpm upgradable to 1.75TB
Maximum Raw Storage	584 GB 10K rpm
Classification	Serve V890 Suns Solaris
Host interface	160 MB SCSI LVD
Hard Disk Drives	160 MB SCSI 3.5 inch low profile
Supported Drives	73 GB 10K rpm; 146 GB 10K rpm
Original detailed and highlighted Brochures MUST be submitted	

STANDBY UPS

ITEM	REQUIREMENTS
Power provided	At least 650 VA
Input Voltage Swing	AC 196 - 280 V
Output voltage Range	AC 230 V
Localization	220 - 240V / 50Hz
Output Frequency	50 - 60HZ auto-sensing
Design	• Automatic voltage regulaton • Mains Isolation • User replaceable batteries • Static-Automatic bypass • Run time (full load) 2,4 min • Maintenance bypass incase of servicing
Battery Module	• Minimum 16 minutes backup time on 50% rated outout • Minimum 5 minutes backup time on100% rated outout • Minimum 3 year lifetime • Type (Sealed lead-acid preferred) • Automatic periodic battery tests • Short recharge time (Maximum 5 hours for 100% runtime) • Protection against excessive/damaging discharge

Protection	Output Overload
	Input/Output short-circuit
Communication Interface	Serial port communications support
Warranty	• 1 Year OnSite Repair & Replace • Original detailed and highlighted Brochures MUST be submitted

ONLINE/SMART UPS

ITEM	REQUIREMENTS
Product Description	850VA UPS
Power	850Va / 500W
Input Voltage range	165-275 Vac
Frequency	50 Hz
Charging Time	12 hours (90%)
Battery type (Ah)	Air-tight, maintenance-free, lead battery with anti-leak seal
Autonomy	1.5 min (full load) - 7 min (medium load)
Output voltage (Single Phrase)	230Vac + 10% - 15%50Hz 5% in-line
Power (kVA/KW)	850 Va/500 W
Output number	Back: 2 IEC sockets + 2 sockets No backup: 2 sockets
Switch time	10 ms
Dimensions (W x D x H)	126 mm x 325 mm x 220 mm
Weight	6 Kg
Control Software	UPSILON 2000
Communication Port	• USB • Original detailed and highlighted Brochures MUST be submitted

INDUSTRIAL/MODULAR UPS

ITEM	REQUIREMENTS
Rating	At least 6 KVA
Input Voltage Swing	Minimum. 220V to 270V
Output voltage	220V - 240V
Output Frequency	• 50 - 60HZ auto-sensing • Automatic voltage regulation • Mains Isolation
Design	• User replaceable batteries • Static-Automatic bypass,SMART capabilities enabled • Maintenance bypass in case of servicing
Battery Module	• Minimum 60 minutes backup time on 50% rated output • Minimum 30 minutes backup time on 100% rated output • Minimum 5 year lifetime, on Battery • Type (Sealed lead-acid preferred) • Automatic periodic battery tests, Front panel mounted fuse • Short recharge time (Maximum 5 hours for 100% runtime) • Protection against excessive/damaging discharge
Protection	• Output Overload • Input/Output short-circuit
Form Factor	Rack Mountable
Communication Interface	Asynchronous serial COM port, 10BaseT Ethernet SNMP/HTTP port, Transport Cases, Slides and
Optional accessories	Alternate I/O Configurations, Dual Source Input, Battery Expansion, Battery less Operation, Battery charger/conditioner, power distribution unit, System interface Mounting Kits
Operational environment requirements	Room temperature/humidity (ie. Min. Air Conditioning)
Warranty	• At Least 2 years service, replace and Repair • Original detailed and highlighted Brochures MUST be submitted

APPLICATION SERVER (DEDICATED)

ITEM	REQUIREMENTS
Processor Speed	Intel processor 3.6 GHz duo Core (4 or 2 Processors)
Cache Memory	2MB second level ECC cache
Chipset	Intel E7520 Chipset
Memory(RAM)	Minimum:2GB
Expansion Slots	3 (64-bit/133MHz) PCI-X
Redundancy & Storage Controllers	Support RAID Level 5 (Disk Stripping with Parity) & Smart Array 6i Controller (integrated on system board)
Back Up Functionality	• Tape Drive & Backup Software • 16X IDE DVD-RW
Internal Storage Capacity	MINIMUM 1TB
Display/Graphics	17" TFT Flat Panel LCD, same brand as CPU
Interfaces	• 1 Serial • 1 Pointing Device (Mouse) • 1 VGA Graphics Adapter • 1 Keyboard • 1 External SCSI • Dual Port PCI-X 1000T Gigabit Server Adapter (embedded) • 3 USB (1 front, 2 back) & 1 Fire wire interface
Form Factor	Rack Mountable(2U),
Support software, and configuration utilities	Include Server managements manufacturers packs
Power Supply Unit	• 2 Redundant 500 W Power supply • Input: 220 - 240 VAC
Warranty	2 Years
SERVER SOFTWARE	
Operating Systems Software	BSD
Original detailed and highlighted Brochures MUST be submitted	

STORAGE SERVER (CLUSTERED)

ITEM	REQUIREMENTS
Form factor	12U rack-mount (19")
CPU	Intel® Itanium® 2 Processor; 1.50 GHz/1.60 GHz
Interconnect	Point-to-point crossbar; max data transmission 25.6 gigabits per second
Memory	1TB
Internal Storage	10TB
PCI Slots	Max 18
Partitions	Max 10
External Dimensions	482 (W) x 820 (D) x 530 (H)
Weight	Max 150 kg
Supported Operating Systems	BSD
Original detailed and highlighted Brochures MUST be submitted	

TV CARDS

PARTICULARS	GENERAL REQUIREMENTS
Video Input	Able to receive HDTV signals, allowing a system equipped with it to act as a tuner for a connected HDTV-ready device.
Device Type	ATSC HDTV receiver / analog TV / radio tuner / video input adapter
Enclosure Type	Plug-in module
Interface Type	Express Card
VIDEO	
Form Factor	Plug-in module
Interface Type	FM input, S-video input, Composite video input
Analog Video Format	NTSC, PAL-M, PAL-N
Analog Video Signal	S-Video, Composite video
Digital Video Format	MPEG-1, MPEG-2, MPEG-4
Audio Input Support	Standard
Features	Teletext, Sleep timer, Channels preview, Closed captioning, Electronic Program Guide
Audio Input Type	FM tuner - Integrated

Expansion / Connectivity Interfaces	1 x TV antenna - Input, 1 x Display / video - S-video input - 4 pin mini-DIN - External, 1 x Display / video - Composite video input - RCA - External, 1 x Radio - FM input
Software Included	Drivers & Utilities OS Required Microsoft Windows Vista / XP, Peripheral / Interface Devices Sound card, DirectX 9.0c compatible graphics card System Requirements Details - RAM 256 MB - HD 200 MB
Original detailed and highlighted Brochures MUST be submitted	

ANNEX 2: MANDATORY AND FIXED VERSIONS OF SOFTWARE SPECIFICATIONS

Software Type	Software Item	Details
Operating System	• Microsoft Windows 7 • Must be supplied with: • Original media and booklet AND appropriate Certificate of Authenticity	
Office Automation	Microsoft Office 2007 with Publisher	• MS Word, MS Excel, • MS PowerPoint, MS Access, • MS Publisher
Internet Browser	• Microsoft Internet Explorer 7.0 • Microsoft Internet Explorer 7.0 • Firefox Mozilla • Opera • Flock	Including all security Patches
Electronic Mail Microsoft	Outlook	Version 2007
Network Connectivity	TCP / IP	Operating System.
CD Burning		Functionality provided by the Operating System.

ANNEX 3: MANDATORY AND UPGRADABLE VERSIONS SOFTWARE SPECIFICATIONS

Software Type	Software Item	Details
Multimedia	Windows Media Player	Latest stable version.
Virus Protection	Anti-virus software available in the market	Latest stable version.
PDF Document	Adobe Reader	Latest stable version.
Reader		
Flash Player	Adobe Flash Player	Latest stable version.

PERSONAL FIREWALL

• Every workstation connected to the Internet via the gateway shall have a Personal Firewall active at all times, configured with parameters specific to the gateway			
Description	PC	Laptop / Remote PC	
Connect directly to GWI	Firewall disabled	Enabled with configuration using MS Windows tools	
Connect to GWI through an untrusted network(centrally managed)	Firewall enabled	Enable with configuration using CISCO VPN Client.	
Virtual Machine	Sun JAVA Virtual Machine		

ANNEX 4: ACCESSIBILITY BY PERSONS WITH DISABILITY

a. Usage without vision

Where ICT provides visual modes of operation, some users need ICT to provide at least one mode of operation that does not require vision.NOTE: Audio and tactile user interfaces may contribute towards meeting this clause.

b. Usage with limited vision

Where ICT provides visual modes of operation, some users will need the ICT to provide featuresthat enable users to make better use of their limited vision.

NOTE 1: Magnification, reduction of required field of vision and control of contrast, brightness and intensity can contribute towards meeting this clause.

NOTE 2: Where significant features of the user interface are dependent on depth perception, the provision of additional methods of distinguishing between the features may contribute towards meeting this clause.

NOTE 3: Users with limited vision may also benefit from non-visual access (see clause 1).

c. Usage without perception of color

Where ICT provides visual modes of operation, some users will need the ICT to provide a visual mode of operation that does not require user perception of color.

NOTE: Where significant features of the user interface are color-coded, the provision of additional methods of distinguishing between the features may contribute towards meeting this clause.

d. Usage without hearing
Where ICT provides auditory modes of operation, some users need ICT to provide at least one mode of operation that does not require hearing.
NOTE: Visual and tactile user interfaces may contribute towards meeting this clause.

e. Usage with limited hearing
Where ICT provides auditory modes of operation, some users will need the ICT to provide enhanced audio features.

NOTE 1: Enhancement of the audio clarity, reduction of background noise, increased range of volume and greater volume in the higher frequency range can contribute towards meeting this clause.

NOTE 2: Users with limited hearing may also benefit from non-hearing access (see clause 4).

f. Usage without vocal capability
Where ICT requires vocal input from users, some users will need the ICT to provide at least one mode of operation that does not require them to generate vocal output.

NOTE 1: This clause covers the alternatives to the use of orally-generated sounds, including speech, whistles, clicks, etc.

NOTE 2: Keyboard, pen or touch user interfaces may contribute towards meeting this clause.

g. Usage with limited manipulation or strength
Where ICT requires manual actions, some users will need the ICT to provide features that enable users to make use of the ICT through alternative actions not requiring manipulation or hand strength.

NOTE 1: Examples of operations that users may not be able to perform include those that require fine motor control, path dependent gestures, pinching, twisting of the wrist, tight grasping, or simultaneous manual actions.

NOTE 2: One-handed operation, sequential key entry and speech user interfaces may contribute towards meeting this clause.

NOTE 3: Some users have limited hand strength and may not be able to achieve the level of strength to perform an operation. Alternative user interface solutions that do not require hand strength may contribute towards meeting this clause.

h. Usage with limited reach
Where ICT products are free-standing or installed, the operational elements will need to be within reach of all users.

NOTE: Considering the needs of wheelchair users and the range of user statures in the placing of operational elements of the user interface may contribute towards meeting this clause.

i. Minimize photosensitive seizure triggers
Where ICT provides visual modes of operation, some users need ICT to provide at least one mode of operation that minimizes the potential for triggering photosensitive seizures.

NOTE: Limiting the area and number of flashes per second may contribute towards meeting this clause.

j. Usage with limited cognition
Some users will need the ICT to provide features that make it simpler and easier to use.

NOTE 1: This clause is intended to include the needs of persons with limited cognitive, language and learning abilities.

NOTE 2: Adjustable timings, error indication and suggestion, and a logical focus order are examples of design features that may contribute towards meeting this clause.

k. Privacy
Where ICT provides features that are provided for accessibility, some users will need their privacy to be maintained when using those ICT features that are provided for accessibility.

NOTE: Enabling the connection of personal headsets for private listening, not providing a spoken version of characters being masked and enabling user control of legal, financial and personal data are examples of design features that may contribute towards m

APPENDIX 1: COMPLIANCE CHECKLISTS

Compliance Checklists for end-user equipment Acquisition

There is a policy on hardware acquisition?	Yes	No	Comments
ICT equipment that does not meet industry and safety standards is prohibited from being deployed?			
Technical specifications are provided by the ICT function in consultation with ICT Authority?			
Technical evaluation is undertaken to ensure that the equipment is fit for the purpose intended and that it meets the required specifications?			
MCDA ensures that the Head of ICT Unit is involved in the technical evaluation and inspection processes?			
All donations are required to meet the minimum specifications?			
Further, all equipments and assets whether new, transferred and/ or written off, are recorded by the ICT Unit for audit and other asset managerial purposes.			
The Head of ICT Unit ensures that agreements on warranty and guarantees are provided and also oversee their administration?			
The minimum warranty for all ICT equipment is one year and three years for servers?			
Before installation, the equipment is tested to ensure they work as required?			
The equipment are used for the intended purpose?			
Associated licensing for the equipment are validated?			
Only qualified personnel are allowed to install the ICT equipment?			
The installation of ICT equipment adhere to the OEM instructions?			
Only trained and qualified personnel are allowed to operate the ICT equipment?			
ICT equipment is operated within recommended environmental conditions of temperature, humidity, etc?			
Access and maintenance of equipment is carried outby authorised and accredited personnel.			
All new PCs and Notebooks are to be supplied with the software installations shown in Appendix II and III			
The use of personal devices are approved by the IT department of government;			
Personal devices are installed with government encryption software to limit transfer of government data to an unauthorized entities; and			
Personal devices are updated antivirus and licensed software Employee productivity			

Compliance Checklists for Inventory

General requirements	Yes	No	Comments
All equipment received through purchase or donation are tagged appropriately?			
All equipment and assets whether new, transferred and/or write-off shall be recorded by the ICT Unit for audit and other asset managerial purposes ?			
The inventory of ICT assets indicates product details (product number, serial number, part number, etc.), tracking information, maintenance schedules and warranty information.			
Officers exiting the MCDA are required to surrender all ICT equipment in their custody to the ICT unit.			
MCDA endeavor to automate the end user equipment inventory.			

Compliance Checklists for Maintenance Schedule

General requirements	Yes	No	Comments
ICT equipment maintenance is done in-house by ICT Units where a maintenance function is established?			
Sub-contracting for maintenance is done through appropriate justification and approval by the Accounting Officers in consultation with the ICT Unit?			
Due diligence is undertaken in engaging and retaining such contractors?			
The ICT unit has developed a schedule of maintenance for equipment as well as an equipment upgrading plan.			
MCDA ensures there are SLAs to guarantee maintenance of end user devices			
ICT unit ensures that the vendor's SLAs terms are made to the satisfaction of MCDA.			
The Head of ICT Unit has prepared an annual maintenance report and forward it to the Accounting Officer.			
ICT Units has undertaken surveys to identify obsolete equipment for the purposes of disposal?			
Where such equipment contains data, that data is permanently erased using suitable mechanisms?			
ICT Unit electronically tracks the physical locations and status of all equipment where possible?			
The ICT unit has draws up a maintenance schedule of all equipment under its custody?			
The schedule specifies the frequency levels and type of maintenance for each type of equipment?			

In case of mission-critical equipment, users are notified of the maintenance in advance?			
The ICT unit ensures that the vendor's SLAs terms are made to the satisfaction of MCDA?			
ICT equipment maintenance considers routine/preventive, upgrade, and repair maintenance as may be required.			
The ICT unit periodically conducts assessment/audit of ICT equipment to ensure compliance with performance standards and requirements, and ensure equipment component parts are as indicated in the inventory?			

Compliance Checklists for Decommissioning

General requirements	Yes	No	Comment
Decommissioning of equipment is undertaken through a committee?			
Candidate equipment for decommissioning determined to be still useful and still meets the required safety standards is reassigned to lesser demanding tasks or appropriate environment			
Decommissioned equipment that is no longer required is treated as candidate items for disposal.			

Compliance Checklists for Disposal mechanisms

General requirements	Yes	No	Comment
Departments wishing to dispose of ICT equipment seek advice from the ICT unit.			
When equipment is identified for disposal, all application software and data is backed up and permanently erased from the equipment in accordance with the relevant regulations or guidelines.			
The inventory tags are also be removed and destroyed while updating the inventory system.			
Equipment identified for disposal are handed over to the committee on disposal to be disposed of in accordance with the relevant disposal regulations?			
ICT equipment identified for disposal but deemed to be still usable are transferred to other agencies and installed for low-end non-critical use where appropriate?			
Adherence to the statutes and regulations on disposal isobserved?			

ICT equipment for disposal are tagged with the standard Government labelling conventions and appropriately physically secured?			
The ICT unit electronically keep an inventory of all the ICT equipment that has been disposed of?			
Equipment is disposed of by Cannibalizing ICT equipment that cannot be used in whole?			
Proper records are kept to indicate where such components are used or stored.			
Appriopriate disposal mechanisms are recommended by the ICT unit e.g donation,selling, trashing, cannibalization			

Compliance checklist for Data- in- transit protection (MCDA-Issued Devices, Non-MCDA Issued Devices)

		Compliance	
General requirements	**Yes**	**No**	**Comment**
Remote end user devices accessing MCDA Security Gateway at the boundary of its enterprise network are configured in accordancewith the IPsec security standard			
Independent formal assurance is conducted due to implementation errors and vulnerabilities often introduced despite vendor assertions to the contrary.			

Compliance checklist Data- at-rest protection (MCDA-Issued Devices, Non-MCDA Issued Devices)

			Compliance	
		Yes	**No**	**Comment**
General requirements	The primary security controls for restricting access to sensitive information stored on end user devices are encryption and authentication. The characteristics of encryption technologies are as shown on Appendix IV.			
	When selecting storage encryption technologies, MCDA takes into consideration the extent to which each technology will require the infrastructure and end user devices to be changed.			
	AES is used for the encryption algorithm whenever possible because of its strength and speed.			
	When evaluating solutions, MCDA compares the loss of functionality with the gain in security capabilities and decide if the tradeoff is acceptable.			

	When selecting a storage encryption technology, MCDA considered solutions that use existing system features (such as operating system features) and infrastructure			
	MCDA uses centralized management for all deployments of storage encryption except for standalone deployments and very small-scale deployments.			
	MCDA ensures that all cryptographic keys used in a storage encryption solution are secured and managed properly to support the security of the solution.			
	MCDA has selected appropriate user authenticators for storage encryption solutions.			
	MCDA has implemented measures that support and complement storage encryption implementations for end user devices e.g Securing and maintaining end user devices properly, which should reduce the risk of compromise or misuse. This includes securing device operating systems, applications, and communications, and physically securing devices, making users aware of their responsibilities for storage encryption, such as encrypting sensitive files, physically protecting mobile devices and removable media, and promptly reporting loss or theft of devices and media.			
Encryption techniques	**Full disk encryption (FDE) is used on laptops and desktops in view of the following considerations** • For a computer that is not booted, all the information encrypted by FDE is protected, assuming that pre-boot authentication is required. • When the device is booted, then FDE provides no protection; once the OS is loaded, the OS becomes fully responsible for protecting the unencrypted information. • The exception to this is when the device is in a hibernation mode; most FDE products can encrypt the hibernation file. • FDE does not provide any protection for files copied or moved from the encrypted storage to another location (either local or on the network), because they automatically decrypt the files as part of the copy or move process.			

	Virtual disk encryption is used on all types of end user device storage in consideration of the following: • When virtual disk encryption is employed, the contents of containers are protected until the user is authenticated for the containers. • If single sign-on is being used for authentication to the solution, this usually means that the containers are protected until the user logs onto the device. If single sign-on is not being used, then protection is typically provided until the user explicitly authenticates to a container. • Virtual disk encryption does not provide any protection for data outside the container, including swap and hibernation files that could contain the contents of unencrypted files that were being held in memory. • Volume encryption provides the same protection as virtual disk encryption, but for a volume instead of a container. • Volume encryption, does not provide any protection for files copied or moved from the encrypted storage to another location (either local or on the network), because they automatically decrypt the files as part of the copy or move process.			

	File/folder encryption is used on all types of end user devices in consideration of the following: • File/folder encryption protects the contents of encrypted files (including files in encrypted folders) until the user is authenticated for the files or folders. • If single sign-on is being used, this usually means that the files are only protected until the user logs onto the device. • If single sign-on is not being used, then protection is typically provided until the user explicitly authenticates to a file or folder. • File/folder encryption does not provide any protection for data outside the protected files or folders, including swap and hibernation files that could contain the contents of unencrypted files that were being held in memory. • File/folder encryption software also cannot protect the confidentiality of filenames and other file metadata, which itself could provide valuable information to attackers (for examples, files that are named by Social Security number).			
Shared end user devices	Implemented volume, virtual disk, or file/folder encryption on the laptop.			
	Data is stored on external media, such as a flash drive or external hard drive, and uses volume, virtual disk, or file/folder encryption to protect the media			
	Data is stored on a remote system and give the first user access to the data through secured means (e.g., VPN).			
Transferring files between computers	Acquired and uses a flash drive with self-contained storage encryption capabilities, such as encryption software and secure key storage.			
	Acquired a volume, virtual disk, or file/folder encryption solution that works on both PCs. Encrypted the documents using the solution and stored the encrypted data on a flash drive.			
	Deployed virtual disk or file/folder encryption software to the user and contractor's computers. Encrypt the data using the software and burn the encrypted data onto CDs or DVDs.			
	Acquired USB flash drives or external hard drives that have built-in storage encryption capabilities.			
	Stored the copies of the data on the encrypted drives.			

Sharing data with a contractor	Acquired USB flash drives or external hard drives. Deploy virtual disk, volume, or file/ folder encryption software to the user and contractor's computers. Encrypted the data using the software and store it on the drives.			
Travelling with a laptop	Uses the laptop's OS access control features to strictly limit where the user can save files. Implement volume, virtual disk, or file/folder encryption on the laptop to protect the user's files.			
	Implemented FDE on the laptop, and require pre-boot authentication.			
	Provided the user with a loaner laptop when needed for travel. Protected the user's sensitive data on the laptop using either of the methods described above. When the user returns from travel, wipes and rebuilds the loaner laptop to remove any traces of sensitive data from it.			

Authentication (MCDA-Issued Devices,Non-MCDA Issued Devices)

General requirements		Compliance		
		Yes	No	Comment
a.	MCDA has carefully considered the security implications of using the same single-factor authenticator for multiple purposes. In particular, organizations should not use email passwords and other passwords sometimes transmitted. .Using a single-factor authenticator for multiple purposes significantly weakens the protection that authentication provides			
b.	MCDA has ensured that the storage encryption authenticators are protected properly. This includes both technical mechanisms, such as encrypting passwords or storing cryptographic hashes of passwords, and operational and management mechanisms.			
c.	MCDA has determined how the loss of authenticators (both user and administrator-level) will be handled before implementing storage encryption.			
d.	MCDA has considered the tradeoff between availability and security when selecting and planning recovery mechanisms			

END-USER COMPUTING DEVICES
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