# VMware SD-WAN™ by VeloCloud®

## VMware SD-WAN Edge Platform Specifications

### AT A GLANCE

VMware SD-WAN enables enterprises to securely support application growth, network agility, and simplified branch implementations while delivering high-performance and reliable branch access to cloud services, private data centers, and SaaS-based enterprise applications. VMware SD-WAN is built on software-defined networking principles to address end-to-end automation, application continuity, branch transformation, and security from the data center and cloud to the edge.

### KEY BENEFITS

- Simplified WAN Management: Zero touch deployments, simplified operations, one-click service insertion

- Assured Application Performance: Transport-independent performance for the most demanding applications, leveraging economical bandwidth

- Managed On-ramp to the Cloud: Direct cloud access with performance, reliability, and security

## Introduction

VMware SD-WAN™ by VeloCloud® is a cloud-delivered solution for network operators and application owners who want to ensure high application performance and availability for their end users while lowering networking costs. VMware SD-WAN ensures a reliable and resilient WAN, with a choice of connection types, including MPLS, LTE, Wi-Fi, and broadband. VMware SD-WAN combines multiple links and uses traffic steering technology to select the best path for each application to ensure consistent performance and overcome quality issues and outages. It can detect slight degradation that would affect application performance, improve performance over a single link using congestion mitigation technology, and adapt without any noticeable impact on the user experience.

## VMware SD-WAN Components

The VMware SD-WAN solution consists of hosted or on-premises cloud gateways; branch office appliances and data center appliances; a central orchestrator to automate policies; and virtual services insertion capabilities.

### VMware SD-WAN Edge

Enterprise-class appliances that provide secure, optimized connectivity to applications in any location, including private data centers, public clouds, and hybrid deployments.

- VMware SD-WAN Edge software is zero-touch provisioned from the cloud for secure, optimized connectivity to applications and data.

- The VMware SD-WAN Edge with Dynamic Multi-Path Optimization (DMPO) and deep application recognition aggregates multiple links (e.g., Private, Cable, DSL, 4G-LTE) and steers traffic over optimal links to other on-premises VMware SD-WAN Edges in branch offices, private data centers, campuses, and headquarters.

- They can easily integrate with the existing network via routing protocols and benefit from dynamic learning and automation. Edges deliver highly available deployment with a redundancy protocol.

- They can host VNF services simplifying branch office deployments of network services.

The VMware SD-WAN Edge is available as a hardware-based appliance, a virtual appliance, and on the cloud marketplace on AWS and Azure. It can also be loaded in a VM on a server or as a VNF.

**vm**ware®

### VMware SD-WAN Gateways

VMware SD-WAN Gateways optimize data paths to all applications, branches, and data centers along with the ability to deliver network services to and from the cloud. A distributed network of gateways, deployed around the world or on-premises at service providers, provide scalability, redundancy, and on-demand flexibility.

VMware SD-WAN Gateways implement VMware SD-WAN Dynamic Multi-path Optimization (DMPO), cloud VPN, and VMware SD-WAN Multisource Inbound Quality of Service between global cloud services (SaaS, IaaS, network services) and each VMware SD-WAN Edge, enabling multiple broadband and private leased lines to appear as a single, high-performance WAN.

### VMware SD-WAN Orchestrator

A cloud-hosted or on-premises secure and scalable web-based central management tool provides simplified configuration, provisioning, monitoring, fault management, logging, and reporting. The VMware SD-WAN Orchestrator enables the simple implementation of business-based policies for application delivery, simplifying application traffic management.

Using VMware SD-WAN's zero-touch deployment capability, VMware SD-WAN can be quickly installed. The VMware SD-WAN Edge is shipped to the branch office where non-IT personnel can plug in power and a few cables. Activation, configuration, and ongoing management are all handled in the VMware SD-WAN Orchestrator.
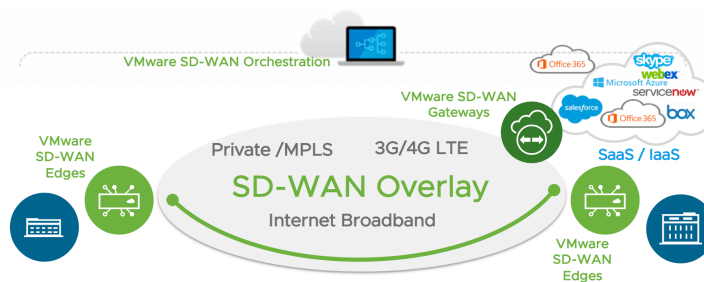


*Figure 1 VMware SD-WAN by VeloCloud*

## Software Features

| Category | Features |
|---|---|
| AAA | RADIUS, Local authentication and authorization, Multitenant 3 Tier RBAC Architecture, Auditing, Roles and privileges |
| Availability | High Availability for Edge, Disaster Recovery for Orchestrator, Multi-Link for high availability of WAN. Edge Clustering |
| Configuration and Monitoring | REST API, SDK (Java and Python), Syslog, SNMP, NetFlow, 3000+ Applications/Categories, ANPM, Application Usage, Device identification, Live Mode, Zero IT Touch Activation |
| Deployment Flexibility | Eliminate Pre-stage, No CLI, Group Policies, Consolidated ICOM and End customer dashboard, VNF form-factor, Multi-tenant Stateless Headend, Transport group for Business Policy Abstraction, Application aware Service Insertion OnPrem or in Cloud, RMA Workflow, Customized Application Maps |
| Dynamic Multi-path Optimization | Application and Network Condition aware sub-second steering, Jitter/Loss Correction, Fast Intelligent Routing, Intelligent Gateway Selection, Link Aggregation, TCP Flow Optimization, Uni-Directional Link measurements, Bandwidth Detection |

| Multi-tenancy | Controller, Gateway, Orchestrator |
|---|---|
| **Network Services** | IPv4, DNS, DHCP Client, DHCP Server, DHCP relay, NAT |
| **QOS** | Shaping, Policing, Per-flow queueing, Tunnel Shaper, Multi-Source Inbound QoS, Rate-Limiter, COS Aware, Outer/Inner DSCP Tagging, Smart Defaults, MPLS COS |
| **Remote Troubleshooting** | Live Mode, Alerts, Events, Remote Diagnostics (examples - DNS Test, Ping Test, Flush active flows, List active flows, Paths, VPN Tests, Packet capture etc.), PKI Infrastructure with Certificate Management workflows, Diagnostic Bundles |
| **Routing** | OSPF, BGP, Static, Connected, ICMP Probes/Responders, Overlay Flow Control, Per-Packet Application aware steering, Route filter, Route redistribution |
| **SaaS/IaaS** | Improved performance for cloud apps, supports well-known IaaS (e.g. AWS, Azure), Cloud Web Security (e.g., Zscaler, Websense, OpenDNS) |
| **Security** | AES256/128, SHA1/SHA2, IKEv2, VPNC Compliant IPSec, PKI, Segmentation, TLS1.2, SCEP, Firewall L2-7, 1:1 NAT, Port Forwarding, Dynamic Branch to Branch, MAC Filtering<br>Security Service Insertion capabilities:<br>Simplified service insertion of third-party NGFW VNF running locally on Edge Simplified cloud-based NGFW, AV, IPS/IDS, threat-detection service insertion |
| **VLAN Tagging** | 802.1Q, 802.1ad, QinQ (0x8100), QinQ (0x9100), Native |
| **WAN Overlay Support** | Public/Private/Hybrid Transport, Cloud and On-Premise |

## Software Subscriptions Editions

VMware SD-WAN software is based on different subscription editions with different features designed for a wide variety of use cases, and they are listed below

| Feature | Standard Subscription | Enterprise Subscription | Premium Subscription |
|---|---|---|---|
| VMware SD-WAN Orchestrator | ● | ● | ● |
| Dynamic Multi-Path Optimization (DMPO) | ● | ● | ● |
| Max Number of Data Segments | 1 | Max Supported | Max Supported |
| Max Number of Edges supported | 50 | Unlimited | Unlimited |
| Partner Gateway Support (SP Only; SaaS access only in Premium) | ● | ● | ● |
| Advance Features: multicast and dynamic routing (OSPF/BGP), dynamic B2B VPN/Mesh topology, Resource aware hub clustering, Customizable business policy | | ● | ● |
| Virtual services orchestration, include for Next Generation Firewall | | ● | ● |
| Separate lower-bandwidth tier of 10, 30, 50, and 100 Mbps | | ● | ● |
| Cloud Gateway Service for SaaS, IaaS, Legacy DC | | | ● |
| Cloud Scale VPN (Branch Edge ➔ Gateway ➔ Branch Edge) | | | ● |
| PCI Certified Service | | Add-on | Add-on |
| Software Upgrade | ● | ● | ● |
| Upgradeable to a higher edition | ● | ● | N/A |
| Mixed Editions | | ●<br>(with Premium) | ●<br>(with Enterprise) |

VMware SD-WAN is also licensed by bandwidth tier; please see bandwidth tier to platform table below.

| Edge / BW | 10 M | 30 M | 50 M | 100 M | 200 M | 500 M | 1 G | 2 G | 5 G | 10 G |
|---|---|---|---|---|---|---|---|---|---|---|
| Edge 510 | ● | ● | ● | ● | ● | | | | | |
| Edge 510-LTE | ● | ● | ● | ● | ● | | | | | |
| Edge 520 | ● | ● | ● | ● | ● | | | | | |
| Edge 610 | ● | ● | ● | ● | ● | | | | | |
| Edge 520v | ● | ● | ● | ● | | | | | | |
| Edge 540 | | | | ● | ● | ● | ● | | | |
| Edge 620 | | | | ● | ● | ● | ● | | | |
| Edge 640 | | | | ● | ● | ● | ● | ● | | |
| Edge 840 | | | | ● | ● | ● | ● | ●[1] | | |
| Edge 680 | | | | ● | ● | ● | ● | ● | | |
| Edge 2000 | | | | | | ● | ● | ● | ● | ● |
| Edge 3400 | | | | | | ● | ● | ● | ● | ● |
| Edge 3800 | | | | | | ● | ● | ● | ● | ● |

## Software Support Levels

| Software Support Plans | VeloCloud Basic | VeloCloud Production | VeloCloud Premier |
|---|---|---|---|
| Call Center | 24x7 (Sev1)<br>12x5 (Sev2, Sev3, Sev4) | 24x7 (Sev1)<br>12x5 (Sev2, Sev3, Sev4) | 24x7 (Sev1, Sev2)<br>12x5 (Sev3, Sev4) |
| Response Time | Sev1: Within 1 hour<br>Sev2: Within 6 hours<br>Sev3: Within 12 hours<br>Sev4: Not applicable | Sev1: Within 30 mins<br>Sev2: Within 4 hours<br>Sev3: Within 8 hours<br>Sev4: Within 24 hours | Sev1: Within 30 mins<br>Sev2: Within 2 hours<br>Sev3: Within 4 hours<br>Sev4: Within 12 hours<br>Sev5: per schedule |
| Software Maintenance | Yes | Yes | Yes |
| Federal Support | - | Yes | Yes |

## Hardware Replacement Services

| Hardware Support Plans | VeloCloud Return (RTR) | VeloCloud Next Day (NBD) | VeloCloud Same Day (SBD) |
|---|---|---|---|
| Replacement Shipment SLA | Ships next business day after RMA unit returned to factory | Advanced replacement. Ships next business day if RMA request is received by 20:00 UTC | Advanced replacement. Ships same day if RMA request is received by 18:00 UTC |

Hardware replacement is shipped from California, USA and may be subject to customs clearance holds. If guaranteed delivery is needed, custom options are available.

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1  When a firewall VNF is deployed on Edge 840, the max combined SD-WAN + Firewall throughput is 1 Gbps

## Physical Edge Specifications (Edge 6x0 numbers estimated and not final)

### Performance and Scale

| Edges | 510 | 510-LTE | 520 | 520v² | 540 | 610 | 620 |
|---|---|---|---|---|---|---|---|
| Maximum (1300-byte)[3] | 200 Mbps | 200 Mbps | 200 Mbps | 200 Mbps | 1 Gbps | 200 Mbps | 1 Gbps |
| Internet Traffic Mix (IMIX)[4] | 100 Mbps | 100 Mbps | 100 Mbps | 100 Mbps | 500 Mbps | 100 Mbps | 500 Mbps |
| Small (64-byte)[5] | 30 Mbps | 30 Mbps | 30 Mbps | 30 Mbps | 150 Mbps | 30 Mbps | 150 Mbps |
| Maximum Tunnel Scale | 25 | 25 | 50 | 50 | 100 | 50 | 100 |
| Flow per second | 2,400 | 2,400 | 2,400 | 2,400 | 4,800 | 2,400 | 4,800 |
| Max concurrent flows | 240K | 240K | 240K | 240K | 480K | 240K | 480K |
| Max number of routes | 16K | 16K | 6K | 16K | 16K | 16K | 16K |
| Maximum Segments | 16 | 16 | 16 | 16 | 16 | 16 | 16 |

### Connectivity

| Edges | 510 | 510-LTE | 520 | 520v | 540 | 610 | 620 |
|---|---|---|---|---|---|---|---|
| LAN / WAN 1G RJ-45 | 4 | 4 | 2 | 2 | 2 | 6 | 6 |
| LAN / WAN 1G SFP | | | 2 | 2 | 2 | 2 | 2 |
| L2 Switching Only RJ-45 | | | 8 | 8 | 8 | | |
| Console ports | Mini USB | Mini USB | Mini USB | Mini USB | Mini USB | Mini USB | Mini USB |
| Integrated Wi-Fi | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Integrated LTE | | Yes[6] | | | | | |
| USB ports (3G/4G LTE) | 2 (2.0) | 2 (2.0) | 2 (2.0) + 2(3.0) | 2 (2.0) + 2 (3.0) | 2 (2.0) + 2 (3.0) | 2 (3.0) | 2 (3.0) |

### Memory, Storage and 3rd Party VNFs

| Edges | 510 | 510-LTE | 520 | 520v | 540 | 610 | 620 |
|---|---|---|---|---|---|---|---|
| System Memory (RAM) | 4 GB | 4 GB | 4 GB | 8 GB | 8 GB | 4 GB | 8 GB |
| System Flash | 8 GB | 8 GB | 8 GB | 8 GB | 8 GB | 16 GB | 16 GB |
| System Storage | | | | 64 GB (SSD) | | | 120 GB (SSD) |
| VNF Capable | | | | Yes | | | Yes |

### Dimension, Power, Environment, and Reliability

| Edges | 510 | 510-LTE | 520 | 520v | 540 | 610 | 620 |
|---|---|---|---|---|---|---|---|
| Cooling | Fan-less | Fan-less | Fan-less | with Fan | with Fan | Fan-less | with Fan |
| Mounting | Desktop / Wall-mount / 19-inch rack-mounts ||||||| 
| Size (W x D x H) in mm | 206 x 180 x 39.7 mm || 206 x 180 x 51 mm |||| 206 x 180 x 51 mm |
| Weight in lbs. | 2.0 lb || 2.6 lb |||| 5.0 lb |
| Power Supply | External: AC |||||||
| AC input | Voltage: 100 V to 240 V auto-ranging; Frequency: 50 Hz to 60 Hz |||||||
| Power Load (Typical / Max) | 15 W / 40 W | 15 W / 40 W | 25 W / 45 W | 30 W / 45 W | 30 W / 50 W | 25 W / 65 W | 30 W / 65 W |
| Operating conditions | Temperature (0 °C to 40 °C), Humidity (5% to 85%), Altitude (5,000 m) |||||||
| Non-operating conditions | Temperature (-40 °C to 70 °C), Humidity (5% to 95%), Altitude (5,000 m) |||||||
| MTBF (25 °C ambient temperature)[7] | 40.6 yrs. | | 22.9 yrs. | 22.8 yrs. | 22.8 yrs. | 22.8 years ||

2 The Edge 520v can sustain maximum 100 Mbps (1300-byte) throughput when a FW VNF is actively service chained
3  Maximum performance based on large packet (1300-byte) payload with AES-128 encryption and DPI turned on
4  Internet traffic (IMIX) performance based on average packet size of 417-byte payload with AES-128 encryption and DPI turned on
5  Small packet performance based on 64-byte packet size payload with AES-128 encryption and DPI turned on
6  510-LTE supports additional 2 LTE interfaces through USB for 3 concurrent active interfaces
7  MTBF based on Telcordia SR-332 methodology, excludes system fans in the calculation

## Physical Edge Specifications (Edge 6x0 numbers estimated and not final)

### Performance and Scale

| Edges | 640 | 680 | 840[8] | 2000 | 3400 | 3800 |
|---|---|---|---|---|---|---|
| Maximum (1300-byte)[9] | 4 Gbps | 6 Gbps | 4 Gbps | 10 Gbps[10] | 7 Gbps | 10 Gbps |
| Internet Traffic Mix (IMIX)[11] | 1.5 Gbps | 2 Gbps | 1.5 Gbps | 5 Gbps | 2.5 Gbps | 5 Gbps |
| Small (64-byte)[12] | 400 Mbps | 500 Mbps | 400 Mbps | 1 Gbps | 650 Mbps | 1 Gbps |
| Maximum Tunnel Scale | 400 | 800 | 400 | 4,000 | 2,000 | 6,000 |
| Flow per second | 19,200 | 19,200 | 19,200 | 19,200 | 19,200 | 19,200 |
| Max concurrent flows | 1.9M | 1.9M | 1.9M | 1.9M | 3.8M | 3.8M |
| Max number of routes | 16K | 16K | 16K | 100K | 100K | 100K |
| Maximum Segments | 16 | 16 | 16 | 16 | 16 | 16 |

### Connectivity

| Edges | 640 | 680 | 840 | 2000 | 3400 | 3800 |
|---|---|---|---|---|---|---|
| LAN / WAN 1G RJ-45 | 6 | 6 | 6 | 6 | 6 | 6 |
| LAN / WAN 1G/10G SFP+ | 2 | 2 | 2 | 2 | 4 | 4 |
| Console ports | Mini USB | Mini USB | RJ-45 / VGA | RJ-45 / VGA | RJ45 / Mini USB | |
| Integrated Wi-Fi | Yes | Yes | | | | |
| USB ports (3G/4G LTE) | 2 (3.0) | 2 (3.0) | 2 (3.0) | 2 (2.0) + 2 (3.0) | 2 (3.0) | 2 (3.0) |

### Memory, Storage, and 3rd Party VNFs

| Edges | 640 | 680 | 840 | 2000 | 3400 | 3800 |
|---|---|---|---|---|---|---|
| System Memory (RAM) | 32 GB | 32 GB | 32 GB | 32 GB | 32 GB | 32 GB |
| System Flash | 16 GB | 16 GB | n/a | n/a | n/a | n/a |
| System Storage | 120 GB (SSD) | 120 GB (SSD) | 100 GB (SSD) | 100 GB (SSD) | 256 GB (SSD) | 256 GB (SSD) |
| VNF Capable | Yes | Yes | Yes | | Yes | Yes |

### Dimension, Power, Environment, and Reliability

| Edges | 640 | 680 | 840 | 2000 | 3400 | 3800 |
|---|---|---|---|---|---|---|
| Mounting | Desktop/Wall-mount/RMK | | 1RU Rack Mounts | | | |
| Size (W x D x H) in mm | 206 x 180 x 51 mm | | 437x249x43 | 437x650x43 | 434 x 381 x 44 mm | |
| Weight in lbs. | 6.0 lb | | 12 lb | 23.5 lb | 13.75 lb | 15.74 lb |
| Power Supply | External: AC | | Internal: AC | | | |
| Redundant Power Supply | No | No | No | Yes (1+1) | Yes (1+1) | Yes (1+1) |
| AC Input | Voltage: 100 V to 240 V auto-ranging; Frequency: 50 Hz to 60 Hz | | | | | |
| Power Load (Typical / Max) | 35W / 120W | 40W / 120W | 40W/70W | 150W/200W | 165W/400W | 200W/400W |
| Operating Temperature | 0 to 40 °C | | 10 to 40 °C | 10 to 35 °C | 0 to 45 °C | |
| Operating Humidity | 5% to 85% | | 5% to 85% | 5% to 85% | 5% to 85% | |
| Operating Altitude | | | 5,000 m | 5,000 m | 3,048 m | |
| Non-operating Temperature | -40 °C to 70 °C | | -40 to 70 °C | -40 to 70 °C | -40 to 70 °C | |
| Non-operating Humidity | 5% to 95% | | 5% to 95% | 5% to 95% | 5% to 95% | |
| Non-operating Altitude | | | 5,000 m | 5,000 m | 10,688 m | |
| MTBF (25 °C ambient temperature)[7] | 22.8 years | | 11.5 yrs. | 7.0 yrs. | 17.1 years | |

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8  The Edge 840 can sustain maximum 1 Gbps throughput when a FW VNF is actively service chained

9  Maximum performance based on large packet (1300-byte) payload with AES-128 encryption and DPI turned on

10  VeloCloud Edges support clustering for Multi-gigabit performance

11  Internet traffic (IMIX) performance based on average packet size of 417-byte payload with AES-128 encryption and DPI turned on

12  Small packet performance based on 64-byte packet size payload with AES-128 encryption and DPI turned on

## Wireless Specifications

### Wireless LAN (Wi-Fi) Specifications

| Wi-Fi Capabilities | 510 / 510-LTE | 520 / 520v / 540 | 6X0 |
|---|---|---|---|
| Wi-Fi Standards | 802.11 a/b/g/n/ac | 802.11 a/b/g/n/ac | 802.11 a/b/g/n/ac |
| Frequency Bands (GHz) | 2.400-2.4835, 5.150-5.250, 5.725-5.850 | | |
| Antenna (max data rate) | 2x2 MIMO | 3x3 MIMO | 2x2 MIMO |
| Max Simultaneous SSIDs | 8 | 8 | 8 |
| Max Transit Power | 23 dBm/chain for 2.4 GHz, 19 dBm/chain for 5 GHz | | |

### Wireless WAN (3G / 4G / LTE) Specifications

| 3G / 4G / LTE Capabilities | 510-LTE-NAEU | 510-LTE-AP |
|---|---|---|
| Modem | Sierra Wireless EM7455 | Sierra Wireless EM7430 |
| Geography | North America & Europe | Asia, ANZ, LATAM |
| LTE Category | Cat-6 | Cat-6 |
| Carrier Aggregation | Yes | Yes |
| 3G Fallback | HSPA+ | HSPA+ |
| SIM Slots | 2 (only 1 active) | 2 (only 1 active) |
| LTE Bands | 1, 2, 3, 4, 5, 7, 8, 12, 13, 20, 25, 26, 29, 30, 41 | 1, 3, 5, 7, 8, 11, 18, 19, 21, 28, 38, 39, 40, 41 |
| Antennas | Main and AUX (via SMA connectors) | |
| Theoretical Speeds[13] | 300 M Down / 50 Up | 300 M Down / 50 Up |

## Virtual Edge Specifications

| | 2 vCPU | 4 vCPU | 8 vCPU | 10 vCPU |
|---|---|---|---|---|
| Maximum Performance | 250 Mbps | 1 Gbps | 4 Gbps | 4 Gbps |
| Maximum Tunnel Scale | 50 | 400 | 800 | 2000 |
| Minimum Memory (DRAM) | 4 GB | 8 GB | 8 GB | 8 GB |
| Minimum Storage | 8 GB | 8 GB | 8 GB | 8 GB |
| Supported Hypervisors | ESXi 6.0, 6.5U1, 6.7U1, KVM Ubuntu 14.04 LTS or 16.04 | | | |
| Supported Public Cloud | AWS, Azure | | | |
| Support Network I/O | SR-IOV, VirtIO, VMXNET3 | | | |
| Recommended Host Settings | • CPUs at 2.0 GHz or higher<br>• CPU support for AES-NI, SSE3, SSE4 ,and RDTSC instruction set<br>• Hyper-threading disabled | | | |

Note: Performance measured was obtained using an Intel® Xeon® CPU E5-2683 v4 @ 2.10 GHz (AES-NI) and SR-IOV enabled network adapter using large packet payload (1300-byte).

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13  The 510 platform is limited to maximum 200 Mbps of aggregate throughput

## Regulatory and Compliance Certifications

| | 510 | 510-LTE | 520 | 520v | 540 | 840 | 2000 | 610 | 620 | 640 | 680 | 3400 | 3800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RADIO Certifications** | | | | | | | | | | | | | |
| FCC (US) | ● | ● | ● | ● | ● | | | | | | | | |
| CE | ● | ● | ● | ● | ● | | | | | | | | |
| RED (Europe) | ● | ● | ● | ● | ● | | | | | | | | |
| R-Mark (Japan) | ● | ● | ● | ● | ● | | | | | | | | |
| SRRC (China) | ● | ● | ● | ● | ● | | | | | | | | |
| EN32032 (HK) | ● | ● | ● | ● | ● | | | | | | | | |
| KCC (Korea) | ● | ● | ● | ● | ● | | | | | | | | |
| BSMI (Taiwan) | ● | ● | ● | ● | ● | | | | | | | | |
| ACMA (AUS) | ● | ● | ● | ● | ● | | | | | | | | |
| **Safety** | | | | | | | | | | | | | |
| UL 60950-1 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| CAN/CSA C22.2 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 60950-1 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| AS/NZS 60950-1 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| IEC 60950-1 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| GB-4943 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| **EMC** | | | | | | | | | | | | | |
| 47 CFR, Part 15 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| ICES-003 Class A | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 55022 Class A | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| CISPR 22 Class A | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| AS/NZS 3548 Class A | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| VCCI V-3 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| CNS 13438 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 300-386 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 61000 (Immunity) | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 55024 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| CISPR 24 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |
| EN 50082-1 | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● |