

## ISTITUTO COMPRENSIVO STATALE GANDHI

### Codice Progetto 13.1.1A-FESRPN-TO-2021-202

“Cablaggio strutturato e sicuro all’interno degli edifici scolastici”

**CIG:** Z4135C6728

**Cup:** F19J21007920006

## CAPITOLATO TECNICO (riepilogo)

Q.TÀ	DETTAGLIO FORNITURE
12	Access Point Ruckus® R350 (o equivalente) 802.11ax dual radio WiFi 6 con controller integrato
1	Access Point Ruckus Outdoor 802.11ax dual radio WiFi 6
4	Switch 8 porte Gigabit   4 PoE
2	Firewall FortiGate-40F Hardware + 3 anni 24x7 FortiCare&FortiGuard
1	Firewall FortiGate-60F Hardware + 3 anni 24x7 FortiCare&FortiGuard
4	Armadio a Rack di Rete da 10" 6U - Parete - A 33 x L 31.2 x P 30 cm COMPLETO

## CAPITOLATO TECNICO (dettaglio)

### Datasheet con caratteristiche tecniche degli Access Point richiesti

#### Access Point RUCKUS® R350 Indoor Wi-Fi 6 (802.11ax) dual radio WiFi 6 con controller integrato

Wi-Fi Standards	· IEEE 802.11a/b/g/n/ac/ax
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Supported Rates	<ul style="list-style-type: none"> <li>· 802.11ax: 4 to 1774 Mbps</li> <li>· 802.11ac: 6.5 to 867 Mbps (MCS0 to MCS9, NSS = 1 to 2 for VHT20/40/80)</li> <li>· 802.11n: 6.5 Mbps to 300 Mbps (MCS0 to MCS15)</li> <li>· 802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6Mbps</li> <li>· 802.11b: 11, 5.5, 2 and 1 Mbps</li> </ul>
Supported Channels	<ul style="list-style-type: none"> <li>· 2.4GHz: 1-13</li> <li>· 5GHz: 36-64, 100-144, 149-165</li> </ul>
MIMO	<ul style="list-style-type: none"> <li>· 2x2 SU-MIMO</li> <li>· 2x2 MU-MIMO</li> </ul>
Spatial Streams	<ul style="list-style-type: none"> <li>· 2 streams SU/MU-MIMO 5GHz</li> <li>· 2 streams SU/MU-MIMO 2.4GHz</li> </ul>
Radio Chains and Streams	<ul style="list-style-type: none"> <li>· 2x2:2 (5 GHz)</li> <li>· 2x2:2 (2.4GHz)</li> </ul>
Channelization	<ul style="list-style-type: none"> <li>· 20, 40, 80MHz</li> </ul>
Security	<ul style="list-style-type: none"> <li>· WPA-PSK, WPA-TKIP, WPA2 , WPA3-Personal, WPA3- Enterprise, AES, WPA3, 802.11i, Dynamic PSK</li> <li>· WIPS/WIDS</li> </ul>
Other Wi-Fi Features	<ul style="list-style-type: none"> <li>· WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/v</li> <li>· Hotspot</li> <li>· Hotspot 2.0</li> <li>· Captive Portal</li> <li>· WISPr</li> </ul>

2.4GHZ TX POWER TARGET	
Rate	Pout (dBm)
MCS0 HT20	20
MCS7 HT20	15

5GHZ TX POWER TARGET	
Rate	Pout (dBm)
MCS0 VHT20	20
MCS7 VHT20	17
MCS0 VHT40,VHT80	17
MCS7 VHT40, VHT80	17

PERFORMANCE AND CAPACITY	
Peak PHY Rates	<ul style="list-style-type: none"> <li>· 2.4GHz: 574Mbps</li> <li>· 5 GHz: 1200Mbps</li> </ul>
Client Capacity	<ul style="list-style-type: none"> <li>· Up to 256 clients per AP</li> </ul>
SSID	<ul style="list-style-type: none"> <li>· Up to 16 per AP</li> </ul>

RADIO MANAGEMENT
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Antenna Optimization	<ul style="list-style-type: none"> <li>· BeamFlex+</li> <li>· Polarization Diversity with Maximal Ratio Combining (PD- MRC)</li> </ul>
Wi-Fi Channel Management	<ul style="list-style-type: none"> <li>· ChannelFly</li> <li>· Background Scan Based</li> </ul>
Client Density Management	<ul style="list-style-type: none"> <li>· Adaptive Band Balancing</li> <li>· Client Load Balancing</li> <li>· Airtime Fairness</li> <li>· Airtime-based WLAN Prioritization</li> </ul>
SmartCast Quality of Service	<ul style="list-style-type: none"> <li>· QoS-based scheduling</li> <li>· Directed Multicast</li> <li>· L2/L3/L4 ACLs</li> </ul>
Mobility	<ul style="list-style-type: none"> <li>· SmartRoam</li> </ul>
Diagnostic Tools	<ul style="list-style-type: none"> <li>· SpeedFlex</li> </ul>

RF	
Antenna Type	<ul style="list-style-type: none"> <li>· BeamFlex adaptive antennas</li> <li>· Adaptive antenna that provides up to 64 unique antenna patterns per band</li> </ul>
Antenna Gain (max)	<ul style="list-style-type: none"> <li>· Up to 3dBi</li> </ul>
Peak Transmit Power (aggregate across MIMO chains)	<ul style="list-style-type: none"> <li>· 2.4GHz: 23 dBm</li> <li>· 5GHz: 23 dBm</li> </ul>
Minimum Receive Sensitivity <sup>1</sup>	<ul style="list-style-type: none"> <li>· -101 dBm</li> </ul>
Frequency Bands	<ul style="list-style-type: none"> <li>· ISM (2.4-2.484GHz)</li> <li>· U-NII-1 (5.15-5.25GHz)</li> <li>· U-NII-2A (5.25-5.35GHz)</li> <li>· U-NII-2C (5.47-5.725GHz)</li> <li>· U-NII-3 (5.725-5.85GHz)</li> </ul>

2.4GHZ RECEIVE SENSITIVITY (dBm)			
HT20		HT40	
MCS0	MCS7	MCS0	MCS7
-94	-70	-91	-72

5GHZ RECEIVE SENSITIVITY (dBm)					
VHT20		VHT40		VHT80	
MCS0	MCS7	MCS0	MCS7	MCS0	MCS7
-95	-76	-92	-73	-89	-70

NETWORKING	
Controller Platform Support	<ul style="list-style-type: none"> <li>· SmartZone</li> <li>· ZoneDirector</li> <li>· Unleashed2</li> <li>· Cloud</li> <li>· Standalone</li> </ul>

Mesh	· SmartMesh™ wireless meshing technology. Self-healing Mesh
IP	· IPv4, IPv6
VLAN	· 802.1Q (1 per BSSID or dynamic per use based on RADIUS) · VLAN Pooling · Port-based
802.1x	· Authenticator & Supplicant
Tunnel	· L2TP, GRE, Soft-GRE
Policy Management Tools	· Application Recognition and Control · Access Control Lists · Device Fingerprinting · Rate Limiting

CERTIFICATIONS AND COMPLIANCE	
4	<ul style="list-style-type: none"> <li>· Wi-Fi CERTIFIED™ a, b, g, n, ac</li> <li>· Wi-Fi CERTIFIED 6™</li> <li>· WPA3™ -Enterprise, Personal</li> <li>· Wi-Fi Enhanced Open™</li> <li>· Wi-Fi Agile Multiband™</li> <li>· Passpoint®</li> <li>· Vantage</li> <li>· WMM</li> </ul>
Standards Compliances	<ul style="list-style-type: none"> <li>· EN 60950-1 Safety</li> <li>· EN 60601-1-2 Medical</li> <li>· EN 61000-4-2/3/5 Immunity</li> <li>· EN 50121-1 Railway EMC</li> <li>· EN 50121-4 Railway Immunity</li> <li>· IEC 61373 Railway Shock &amp; Vibration</li> <li>· UL 2043 Plenum</li> <li>· EN 62311 Human Safety/RF Exposure</li> <li>· WEEE &amp; RoHS</li> <li>· ISTA 2A Transportation</li> </ul>

SOFTWARE AND SERVICES	
Location Based Services	· SPoT
Network Analytics	· SmartCell Insight (SCI)
Security and Policy	· Cloudpath

PHYSICAL INTERFACES	
Ethernet	· 1 x 1GbE port, RJ-45
USB	· 1 USB 2.0 Port, Type A

PHYSICAL CHARACTERISTICS	
Physical Size	<ul style="list-style-type: none"> <li>· 14.60(L) x 15.59(W) x 3.93(H) cm</li> <li>· 5.75(L) x 6.14(W) x 1.55(H) in</li> </ul>
Weight	· 368g (13 oz)
Mounting	<ul style="list-style-type: none"> <li>· Wall, Drop ceiling, Desk</li> <li>· Secure bracket (sold separately)</li> </ul>

Physical Security	<ul style="list-style-type: none"> <li>· Hidden latching mechanism</li> <li>· T-bar Torx</li> </ul>
Operating Temperature	· 0 °C (32 °F) to 40 °C (104 °F)
Operating Humidity	· Up to 95%, non-condensing

## Datasheet con caratteristiche tecniche dei Firewall richiesti

### Firewall FortiGate-60F/40F Hardware + 3 anni 24x7 FortiCare & FortiGuard

Hardware Specifications	
GE RJ45 WAN / DMZ Ports	2 / 1
GE RJ45 Internal Ports	5
GE RJ45 FortiLink Ports (Default)	2
Wireless Interface	Single Radio (2.4GHz/5GHz), 802.11 a/b/g/n/ac-W2
USB Ports	1
Console (RJ45)	1
Internal Storage	–

System Performance — Enterprise Traffic Mix	
IPS Throughput 2	1.4 Gbps
NGFW Throughput 2, 4	1 Gbps
Threat Protection Throughput 2, 5	700 Mbps

System Performance	
Firewall Throughput (1518 / 512 / 64 byte UDP packets)	10/10/6 Gbps
Firewall Latency (64 byte UDP packets)	3.3 µs
Firewall Throughput (Packets Per Second)	9 Mpps
Concurrent Sessions (TCP)	700 000
New Sessions/Second (TCP)	35 000
Firewall Policies	5000
IPsec VPN Throughput (512 byte) 1	6.5 Gbps
Gateway-to-Gateway IPsec VPN Tunnels	200
Client-to-Gateway IPsec VPN Tunnels	500
SSL-VPN Throughput	900 Mbps
Concurrent SSL-VPN Users (Recommended Maximum, Tunnel Mode)	200
SSL Inspection Throughput (IPS, avg. HTTPS)	630 Mbps
SSL Inspection CPS (IPS, avg. HTTPS)	400
SSL Inspection Concurrent Session (IPS, avg. HTTPS)	55 000
Application Control Throughput (HTTP 64K)	1.8 Gbps
CAPWAP Throughput (HTTP 64K)	8 Gbps
Virtual Domains (Default / Maximum)	10 / 10
Maximum Number of FortiSwitches Supported	16
Maximum Number of FortiAPs (Total / Tunnel Mode)	64 / 32
Maximum Number of FortiTokens	500
High Availability Configurations	Active-Active, Active-Passive, Clustering

Radio Specifications	
Multiple User (MU) MIMO	3x3
Maximum Wi-Fi Speeds	1300 Mbps @ 5 GHz, 450 Mbps @ 2.4 GHz
Maximum Tx Power	20 dBm
Antenna Gain	3.5 dBi @ 5 GHz, 5 dBi @ 2.4 GHz

## Datasheet con caratteristiche tecniche degli switch richiesti

### Switch 8 porte Gigabit | 4 PoE - GS1920-8HPv2

Model GS1920-8HPv2  
 Product name 8-port GbE Smart Managed PoE Switch  
 Switch class Smart Managed

#### Port Density

Total port count 10  
 100/1000 Mbps 8  
 Gigabit Combo (RJ-45/SFP) 2

#### PoE

PoE ports 8  
 Total PoE budget (Watts) 130  
 High power PoE 802.3at Yes

#### Performance

Switching capacity (Gbps) 20  
 Forwarding rate (Mpps) 15  
 Packet buffer (byte) 1.5 M  
 address table 16 K  
 Flash/RAM 32 MB/256 MB

## **Datasheet con caratteristiche tecniche degli armadi rack richiesti**

### **Armadio a Rack di Rete da 10 Pollici 6U - Montaggio a Parete**

- Alloggiamento a parete da 10 pollici con porta a vetri
- Progettato per il cablaggio e l'installazione di vari componenti ed accessori
- Compatto e perfetto per l'uso di numerosi prodotti e applicazioni della gamma da 10 pollici
- Dimensioni: 310 x 312 x 300 mm

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Capannoli, 28 marzo 2022

Il progettista

Prof. Alessandro Salvini

