



# Imola LX 5596



# Imola LX 5596



## Ultra-broadband router Fiber, xDSL, 5G and Wi-Fi 6

### IMOLA LX xx96 SERIES

The Imola LX xx96 series routers are state-of-the-art all-in-one routers, equipped with GE/Fibre connectivity up to 10Gbits and Wi-Fi 6 for FTTC, FTTH and FTTO profiles.

The different product models differ in the presence or absence of certain connectivity (xDSL, Voice, 4G, 5G).

### ALL-IN-ONE



FTTC, FTTH and, FWA in a single device for reliable, versatile and scalable connectivity. Our Imola LX series devices are adaptable to any technology and include the features

- Routing & switching
- Multi fail-over
- QoS

### KEY FACTORS



#### Secure by design

Right from the design phase for robust and natively secure solutions.



#### Always-On

Stable connections anywhere, with multiple links, transparent backup, and quality of service for uninterrupted business.



#### Smart value

Maximizes business value with an excellent performance-to-price ratio.



#### Factory pre-configurations

Receive your product pre-configured according to your specific case.



#### 100% factory-tested

We test all our equipment.



#### Zero Touch Provisioning

For remote management and agile configuration of the installed base, with Tiesse's TNA suite.



Imola LX 5596



4 Gigabit  
Ethernet ports



1 eVDSL  
port



2 fiber ports up  
to 10GB



1 radio cellular  
port



Wi-Fi 6 AX



Zero Touch  
Provisioning



## SUGGESTED SCENARIOS AND APPLICATIONS



**ISP & Telco Ready**  
Designed to meet the requirements of service providers, telecom operators, carriers, and system integrators.



**Backup and redundancy on multiple links**  
Optimised products for ultra-connected branches and remote locations



**Service continuity and Mission Critical applications**  
Business applications requiring always-on links, network performance and quality of service

## BACKUP: high availability mission critical

## Seamless backup

The user does not perceive service interruptions and the transition to backup.

Transitions from normal to backup mode and vice versa are performed considering the operational costs.

## Multiple Backup

A pair of routers in VRRP performs physical backup of both the network and the hardware.

## Homogeneous Backup

A single router integrates all ports, wired and mobile.

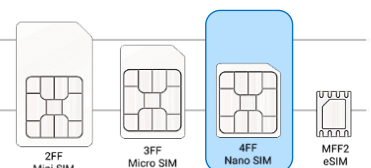
## Heterogeneous backup

An installed base can be upgraded by adding a mobile router and using the VRRP (Virtual Router Redundancy Protocol).

## HARDWARE INTERFACES

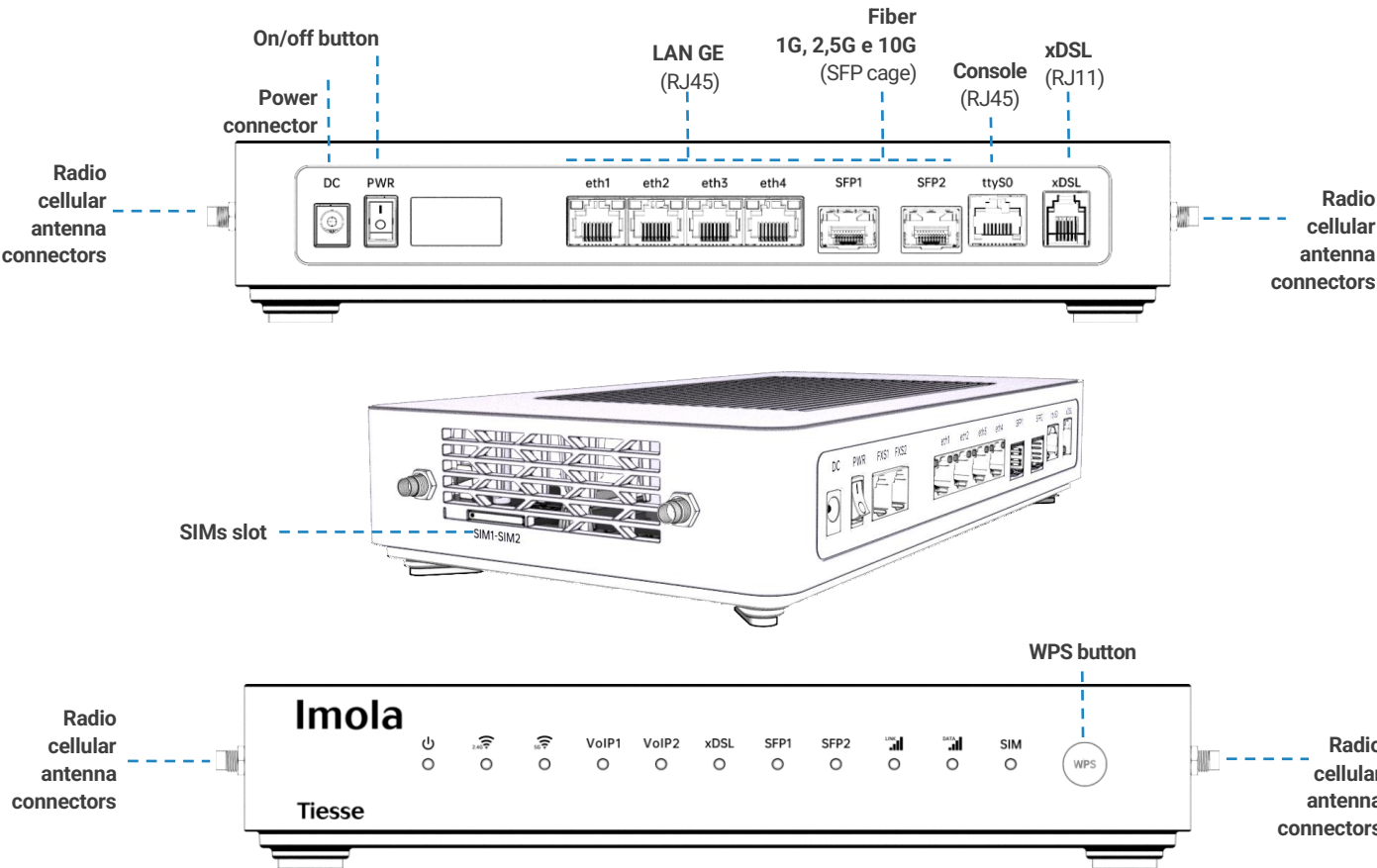
Ports	N°	Description	Details
LAN / WAN	4	GE	10/100/1000 Mbps ports
	2	SFP/SFP+	1G / 2.5 / 10 Gbit ports, via SFP/SFP+ cages (transceiver module not included)
Wi-Fi	1	RF	IEEE 802.11ax IEEE 802.11ac IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11a
		Bands	2.4 GHz and 5 GHz simultaneous
		Antennas	Internal antennas, MIMO 4x4
ADSL2/2+	1	ADSL2/2+	– Downstream data rates up to 24 Mbps - Upstream data rates up to 3.5 Mbps – Compliant with Standard G.992.1 annex A,B,C&I, G.992.2-g.Lite, G.992.3 annex A, B, I, J, M, G.992.4-g.Lite.bis, G.992.5 annex A, B, C, I, J, M, ANSI T1.413 issue2, ETSI TS 388 ADSL-over-ISDN, ITU T-I361, ITU T-I.363.5, ITU T-I.432, ITU T-I610, ITU T-I731
VDSL2		VDSL2	– Support for all VDSL2 profiles: 8 MHz up to 30 MHz ITU-T G993.2 – Compliant with G.Vector standard (ITU-T G.993.5) – Compliant with ITU-T G.998.4 G.INP standard – Compatible with ADSL2 (backward compatibility)
eVDSL		eVDSL	– 35 MHz ITU-T G993.2 Annex Q profile support (35b or Vplus profiles) with aggregate rates up to 400Mbps
RADIO CELLULAR	1	WCDMA	– <b>Frequencies:</b> B1, B5, B8 – <b>Throughput:</b> Max. 42 (DL)/Max. 5.76 (UL)
		LTE	– <b>Frequencies:</b> LTE-FDD: B1/3/5/7/8/20/28 - LTE-TDD: B38/40/41/42/43 – <b>Throughput:</b> LTE-FDD: Max. 1.6 Gbps (DL) / Max. 211 Mbps (UL) (*)
		5G Sub-6 GHz	– <b>5G NR frequencies:</b> n1/3/5/7/8/20/28/38/40/41/77/78 – <b>Throughput:</b> 5G SA Sub-6: Max. 4.67 Gbps (DL)/Max. 1.25 Gbps (UL) (*) 5G NSA Sub-6: Max. 3.74 Gbps (DL)/Max. 1.46 Gbps (UL) (*)
	2	SIM	– 2 Nano SIM Slots (Dual SIM Single ACTIVE) – SIM insertion type: tray eject
	4	Antennas	– 4 external, removable antennas, male SMA connector – MIMO: DL 4x4 – UL 2x2

\* Throughput value depends on network configuration, bandwidth allocated to the UE, number of users, and RF signal conditions.

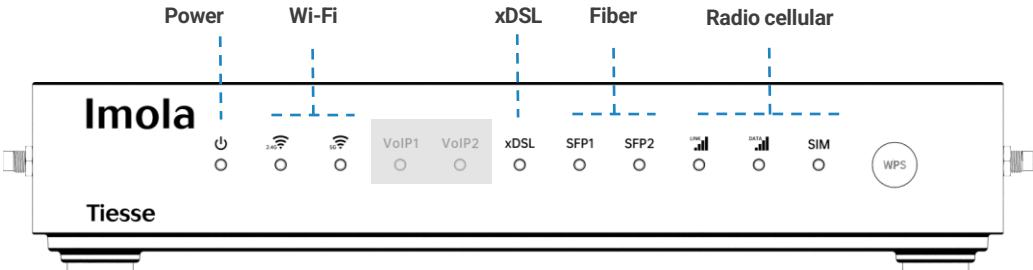




HARDWARE INTERFACES



LED DESCRIPTION



NOTE: The use of LEDs depends on the active functionality of each specific model. The figure above shows the LEDs used in the models covered by this datasheet.

LED	Color	Description
Power		Green router power operational status
Wi-Fi		Green Wi-Fi connection status 2.4 GHz band
		Green Wi-Fi connection status 5 GHz band
xDSL	xDSL	Green xDSL connection operating status
Fiber	SFP1	Green fibre connection operational status of SFP1 port
	SFP2	Green fibre connection operational status of SFP2 port
Radio cellular		Green Link: radio cellular link operative status
		Green Data: radio cellular connection operative status
	SIM	Yellow/Green SIM: operational status of the SIM card in use
ETH		Yellow/Green for each ETH port, indicate operational status (green 1000 Mbps - yellow 10/100 Mbps)



## MONITORING AND PERFORMANCE MEASUREMENT FUNCTIONALITIES

### IP SLA / Active Probing support for quality measurements

- One-Way Delay
- Round-Trip Delay
- Jitter
- Packet Loss

### Active measurement of link quality using test packages

- BFD – Rapid detection of connectivity faults
- ICMP Echo / Ping – RTT and reachability
- UDP/TCP Probe – Verification with real transport protocols
- HTTPS Probe – Application service availability check
- TWAMP/OWAMP – Standardised measurement of delay, Jitter and loss

### Data collection and supervision

- SNMPv2/v3 – Polling and status traps
- Syslog – System event and alarm logs
- NetFlow / IPFIX – Traffic flow analysis
- TNA MOS Tiesse

## SOFTWARE

Note: the following list is purely indicative, active features depend on version and software update (NOS).

### NETWORKING

- IPv4 / IPv6 Dual Stack advanced forwarding, filtering, and dual-stack policies
- VXLAN (RFC 7348): L2 over IP/UDP with per-tenant VNI encapsulation
- SRv6 Native SID Support:
  - Implements End, End.X, End.DT6, End.B6 behaviors
  - Integrated with BGP SR Policy for flexible traffic engineering
- High Availability: ECMP, VRRP, BFD, fast convergence via EVPN multihoming

### LAYER 2 features

- IEEE 802.1Q VLANs: iTagged VLAN support with configurable trunks and access ports
- Ethernet Bridging: hardware/software bridge domains with MAC learning and filtering
- Layer 2 protocol Tunneling (L2TP)
- 802.1Q-in-802.1Q
- EVPN (RFC 7432):
  - L2/L3 VPN overlay over IP/MPLS
  - MAC/IP route advertisement (Type-2), IP Prefix routes (Type-5)
  - Ethernet Segment Identifier (ESI) for multihoming and redundancy
- Spanning Tree Protocols (optional): support for RSTP/MSTP
- VXLAN + EVPN Integration:
  - EVPN as the control plane for VXLAN overlays
  - Seamless tenant segmentation and MAC mobility

### ROUTING & MULTICAST

- BGP – Border Gateway Protocol:
  - Full IPv4/IPv6 support with route-maps, prefix-lists, communities
  - Route Reflector, Confederation, Add-Path, Route Refresh
  - BGP-LU for MPLS/SRv6 integration
  - BGP EVPN and SR-TE extensions
  - RPKI for route origin validation
- OSPF / IS-IS:
  - Dynamic IGP support for underlay routing
  - SRv6 SID advertisement via IGP extensions
- RIP, RIPNG
- Static Routing with route distance, and route tagging
- Route Redistribution
- Policy Based Routing
- Full VRF Support
- VRR (Virtual Routing Redundancy Protocol)
- Multicast routing with PIMv2 sparse-mode and PIMv2 dense-mode, MSDP
- IGMP v1-v2-v3, IGMP snooping, IGMP Proxy
- MPLS Support
  - Native MPLS Forwarding
  - Support for LDP for label Distribution
- Multihoming and Failover:
  - BGP multipath, BFD fast detection, graceful restart



## SOFTWARE

Note: the following list is purely indicative, active features depend on version and software update (NOS).

### QoS

- Traffic classification based on source IP, destination IP, protocols (UDP, ICMP, TCP, etc.) and ports, and their combinations, on application recognition, on IP Precedence and DSCP
- DiffServ
- Remarking of IP Precedence, DSCP and CoS
- Shaping with guaranteed bandwidth allocation and redistribution of excess bandwidth
- Committed Access Rate and Multicast rate limit
- Traffic prioritisation mechanisms, definition of an arbitrary number of priority classes
- IEEE 802.3ad link aggregation

### VPN and TUNNELLING

- IPsec VPN (site-to-site and remote-access):
  - Supports IKEv1/IKEv2
  - Policy-based and route-based IPsec
- GRE / GRE over IPsec:
  - Simple L3 tunneling or secure encapsulation.
  - NHRP (Next Hop Resolution Protocol) for DMVPN Architecture
- L2TP / L2TPv3:
  - Layer 2 VPN over IP
  - Optional pseudowire emulation with static or dynamic control
- OpenVPN Support client and server

### SECURITY

- Access Control Lists (ACLs):
  - IPv4/IPv6 L2-L4 filtering with permit/deny actions
  - Applied on ingress/egress per interface or globally
- Stateful Firewall:
  - Connection tracking with session-based filtering
  - Inspection of TCP/UDP/ICMP flows with dynamic port handling
  - Protection against SYN floods and malformed packets
- NAT / PAT Support:
  - Source NAT, Destination NAT, Port Address Translation
  - Useful for IPv4-to-IPv6 interworking and traffic isolation
- 802.1x
  - Access port authentication using EAP with RADIUS backend

### SERVICES

- DHCP client, DHCP server with anti-spoofing functions, DHCP relay
- Intelligent DNS Proxy, local and remote
- Traceroute
- NTP Client and Server support
- DynDNS

### MANAGEMENT and CONFIGURATION

- SNMPv2, SNMPv3
- Netflow
- Telnet server with multiple simultaneous sessions
- SSH server with multiple simultaneous sessions (SSHv2)
- Fault management Syslog /Trap
- Radius Support, TACACS+
- Netconf and YANG Models
- Tracking for backup management, scheduled commands and events
- Software update via TFTP, FTP, sFTP, HTTP, HTTPS, SCP
- Configuration via Command Line Interface (CLI), Text/Menu oriented and Telnet
- TNA (Tiesse Network Architecture) suite for self-provisioning and automated remote management
- Management of an unlimited number of configurations

## SD-WAN with TNA Suite



**IMOLA** routers are integrated into the **TNA (Tiesse Network Architecture)** suite, the SD-WAN solution developed by Tiesse in order to make available a dynamic, secure, reliable, high-performance and scalable solution. The TNA solution has at its base the usability of the product and emphasizes the effectiveness and easy realizability of an SD-WAN solution without having to implement complex and expensive architectures and for this adoptable by few and structured end customers.

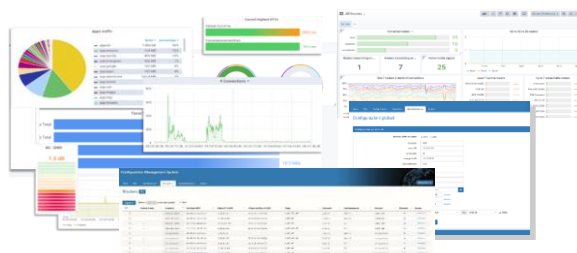
With highly established and robust use cases, the TNA suite has integrated, with a modular architecture, innovative features to realize a concrete SD-WAN solution that is responsive to market needs.

The TNA is a **modular All-In-One** solution composed of separate entities: **CoS**, **MoS**, and **NAD** that work together organically to handle all aspects of managing a network in both IP and Overlay architectures. In this case, the suite is complemented by an additional module called OVN.

At the heart of Tiesse's SD-WAN solution is **Intelligent Routing**, which enables the network, whether in overlay scenarios or not, to react to changes in state, being able to operate autonomously at its best even in the presence of congestion, saturation or abnormal traffic.

### TNA Suite DASHBOARD

Through a flexible dashboard, which can also be customized, the SD-WAN can be administered and managed.



\* Note: Available features may vary by product model.

Dashboard	Description	Parameters
<b>ROUTER</b>	<b>Monitoring and visualization of key resources for each device (Router, CPE, IoT)</b>	<ul style="list-style-type: none"> <li>– Reachability and connectivity to a target network/internet (primary/backup or other)</li> <li>– Uptime and number of reboots</li> <li>– Round Trip Time last mile or to target Internet</li> <li>– CPU utilization, memory, router load based on current and queued activities</li> <li>– Number of active connections</li> <li>– Throughput inbound/outbound and traffic generated/received by individual interface</li> <li>– Traffic classification by type of application for specific device</li> <li>– Number of devices connected to active Wi-Fi networks</li> <li>– GPON optical connections: uptime, optical power input/output, SFP temperature</li> <li>– Cellular network connections: signal strength for each connection type (5G/4G/3G/2G and SINR, RSRP, RSSI, RSCP, EC/IO), SIM in use</li> <li>– xDSL connection: uptime, signal status and attenuation, noise margin (SNR), redundancy errors (CRC)</li> </ul>
<b>GENERAL</b>	<b>Aggregate monitoring and visualizations</b>	<ul style="list-style-type: none"> <li>– Total number of apparatus: <ul style="list-style-type: none"> <li>– connected, reachable, and unreachable as a function of uptime</li> <li>– transmitting on a specific interface</li> <li>– with an active mobile connection</li> <li>– active grouped by connection type (primary, backup, other)</li> <li>– connected over 5G, 4G, 3G, and 2G networks</li> </ul> </li> <li>– Reachable and unreachable devices, by uptime, over a specified time range</li> <li>– Device classification/sorting: <ul style="list-style-type: none"> <li>– top 5 (active) by number of connections</li> <li>– time order of last connected routers and routers no longer reachable</li> <li>– by response time (highest and lowest RTT) to a given destination</li> </ul> </li> </ul>
<b>OVN</b>	<b>Monitoring and visualizations of data related to the Overlay Network</b>	<ul style="list-style-type: none"> <li>– Total number of apparatus: <ul style="list-style-type: none"> <li>– connected, reachable, and unreachable as a function of uptime</li> <li>– with an active mobile connection</li> <li>– broadcasting on a specific interface</li> <li>– active grouped by connection type (primary, backup, other)</li> </ul> </li> <li>– Reachable and unreachable devices, by uptime, over a specified time range</li> <li>– Device classification/sorting: <ul style="list-style-type: none"> <li>– top 5 (active) by number of connections</li> <li>– time order of last connected routers and routers no longer reachable</li> <li>– by response time (highest and lowest RTT) to a given destination</li> </ul> </li> </ul>

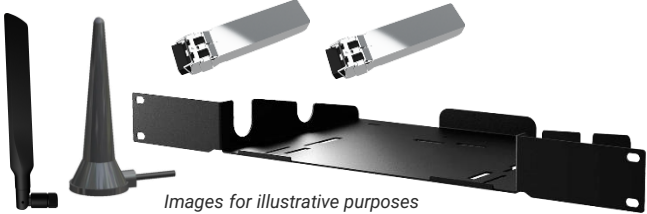


SYSTEM FEATURES

PROCESSOR	Quadcore 2.2 GHz	CHASSIS	Plastic material, black color
MEMORY	512 MB	FORM FACTOR	Desktop
FLASH MEMORY	256 MB		Rack 2 U (optional kit)

ADD-ONS

Optional accessories such as antennas for both indoor and outdoor omnidirectional and directional installations, SFP transceiver modules and rack-mount kits are available. Please consult the relevant datasheets, which can be downloaded from [www.tiesse.com](http://www.tiesse.com).



OTHER INFORMATION AND SUPPORT

[SUPPORTO.TIESSE.COM](http://SUPPORTO.TIESSE.COM)

- Technical documentation, installation instructions, quick start guide, first access data
- Firmware updates
- Declaration of conformity EMC, RED, RoHS, ...
- Technical support request
- End of sale and end of product support information
- Warranty repair and product reconditioning

[WIKI.TIESSE.COM](http://WIKI.TIESSE.COM)

- Website dedicated to software documentation
- User manuals
- First access guides
- Case studies, tutorials and other useful resources for product use

PRODUCT IMAGES







SUSTAINABILITY

SYSTEM

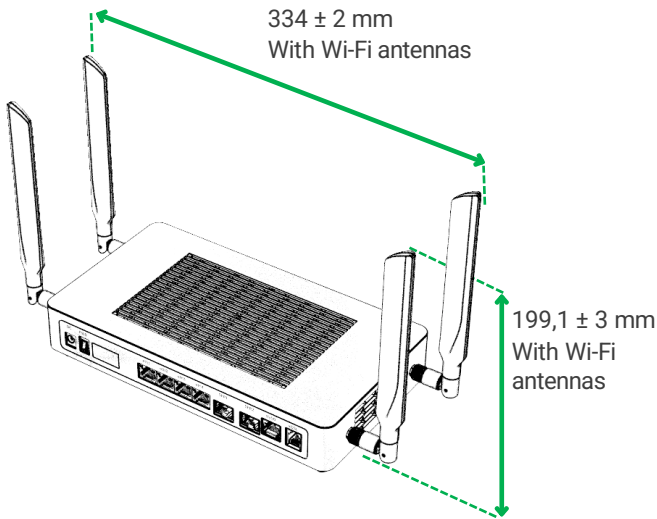
Power	<div>- 12V external desktop power supply</div> <div>- On/Off button</div>
Colling	Fanless
Consumption (full functions)	≈ 20W
EEE (Energy-Efficient Ethernet)	Tiesse products comply with the EEE (802.3az) standard, which saves energy by automatically reducing the consumption of Ethernet ports during periods of low traffic, without altering their performance.
Dynamic Power Scaling	Tiesse products use control mechanisms to automatically reduce power consumption by lowering the CPU clock frequency when the load is low.

ENVIRONMENTAL DATA

Operations	Temperature	−10° C / +45° C
	Humidity	5% ~ 95% (non condensing)
Storage	Temperature	−40° C / +85° C
	Humidity	5% ~ 95% (non condensing)

SIZE and WEIGHT

Machine body	280,8 x 145,2 x 50,4 (L x P x A mm)		
	≈ 2150 gr (maximum weight including packaging and accessories)		
Total weight	Product	Accessories	Packaging
	≈ 1155 gr	≈ 445 gr	≈ 550 gr



OTHER INFORMATION

Packaging and wrapping	100% of the packaging material of the individual product is paper/cardboard - 0% plastic.
	100% of the packaging material is recyclable
RAEE waste	For the correct disposal of Waste Electrical and Electronic Equipment (WEEE), pursuant to Article 26 of Legislative Decree No. 49 of 14 March 2014 'Implementation of Directive 2012/19/EU': contact <a href="mailto:raee@tiesse.com">raee@tiesse.com</a>



Tiesse is a totally Italian company with more than 25 years of experience in the design, development and production of network equipment and IoT devices, suitable for use in mission-critical and industrial scenarios. Tiesse's most successful series, Imola, Lipari and Levanto, are innovative, competitive and certified, and are present in the networks of the major telecommunications operators, in the energy sector, large-scale distribution and vertical sectors, both in the Italian and foreign markets.

Further information on Tiesse solutions can be found on the company website [www.tiesse.com](http://www.tiesse.com).



Info: [info@tiesse.com](mailto:info@tiesse.com)

Marketing & sales: [marketing@tiesse.com](mailto:marketing@tiesse.com)

Tel. +39.0125.230544

[www.tiesse.com](http://www.tiesse.com)



© Copyright Tiesse S.p.A.

Any disclosure, derivation or reproduction of this document, even partial, is strictly prohibited without prior written authorization by Tiesse S.p.A.

#### Disclaimer

The informations in this document may contain predictive statements including, without limitation, statements regarding the future financial and operating results, future product portfolio, new technology, etc. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in the predictive statements. Therefore, such information is provided for reference purpose only and constitutes neither an offer nor an acceptance. Tiesse may change the informations at any time without notice.

Ver. ENG 201125

