# SensorTec
Canada

MIMO PMP 2x2 Family

The MIMO 2x2 is the highest capacity Point-to-Multipoint solution available for unlicensed and licensed bands including 4.9 – 6.0 GHz and 6.0 – 6.4 GHz. The innovative high-speed basestations and CPE models are available for both licensed and unlicensed bands. As an example, the base station units provide a high sector capacity of up to 240 Mbps and uses leading-edge radio protocols providing unrivalled spectral efficiency.

Compared to traditional Point-to-Multipoint systems, both operating range and link reliability have increased significantly through the use of advanced Multiple Antenna Technology and Adaptive Multipoint Access Protocol.
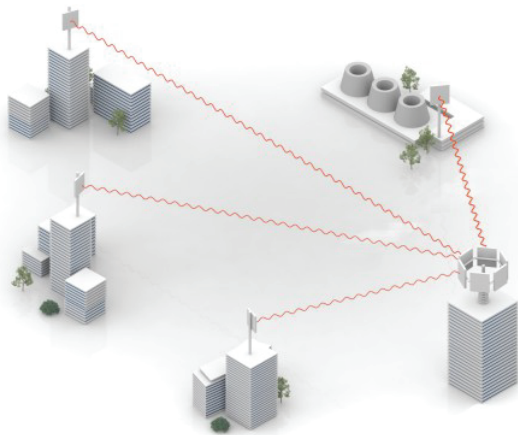
The MIMO 2x2 portfolio represents a unique proposition to all types of operators (e.g. WISP's, organisations of all sizes, government authorities, etc.) wishing to deliver Fast Ethernet data, voice and video services at ultra long ranges, whilst at the same time providing a wide set of networking features and maintaining strict QoS control. With their increased aggregate bit rates and improved coverage range, our base stations now allow operators to cater for more and higher capacity remote subscriber units than ever before, thus reducing capital expenditure on network infrastructure.

SensorTec Wireless' new MIMO 2x2 product family is an optimal solution for a diverse range of applications, from Wireless ISP's requiring multi-megabit capacity to corporates, from government authorities to mobile operators.

Key Features and Highlights
- Available in multiple frequency bands 4.9 – 6.05 GHz and 6.05 – 6.4 GHz
- 240 Mbps base station sector capacity with just 40 MHz of spectrum, reducing capital expenditure
- Increased NLOS range and performance
- Supports channel width size from 5 to 40 MHz, reducing licence expenditure
- Advanced Quality-of-Service features, offering a reliable and robust solution
- Integrated Sector Antenna Base Stations, ensuring maximum RF performance and quick & simple installation
- Unparalleled selection of integrated antenna subscriber terminals ranging from compact and lightweight 19 dBi antenna model to unique 28 dBi terminal ideally suitable for long-range connectivity in excess of 15-20 km from a base station
- Optional Instant DFS Base Station feature allowing non-invasive background spectrum monitoring and seamless frequency channel change on channel congestion
- CCTV optimized Subscriber Terminals with PoE output for camera power supply

MIMO 2x2 Technology
MIMO 2x2 stands for Multiple Input / Multiple Output innovative technology and it requires the use of two antennas at both the transmitter and receiver to improve.

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Solution Benefits

- Low entry costs
- Faster ROI using more capacity in less spectrum
- Best-in-Class Price/Functionality Ratio
- Savings on third-party networking equipment
- Pure IP transport, allowing simultaneous transmission of data, video and voice services
- High MTBF, less resources needed for servicing and maintenance
- Flexible frequency planning and high spectral efficiency, reducing licensing costs
- Ultra-low latency and jitter, optimal for video and voice data transmitting
- Easiest, extra-cost free deployment
- Unique interference mitigation capabilities

Applications

- High-Speed local or wide area corporate networks
- CCTV and Video surveillance Networks
- Triple-play services for Wireless ISP's
- Long-range Rural Connectivity
- Government & Municipal Networks

Equipment

MIMO 2x2 Base Stations

System components	ST-BH5240i	ST-BH5240e	ST-B5240i
Model			
Device description	High-capacity Integrated Sector Antenna Base Station	High-capacity External Antenna Base Station	Medium-capacity Integrated Sector Antenna Base Station
Performance	• Up to 240 Mbps sector net throughput	• Up to 240 Mbps sector net throughput	• Up to 240 Mbps sector net throughput
Frequency Bands/Antennae	• 4.9 – 6.0 GHz / Integrated 16 dBi dual-pol integrated 90 degrees sector antenna • 6.0 – 6.4 GHz / Integrated 16 dBi dual-pol integrated 90 degrees sector antenna	• 4.9 – 6.0 GHz / Connectorised Antenna (2 x N-type (Female) connectors) • 6.0 – 6.4 GHz / Connectorised Antenna (2 x N-type (Female) connectors)	• 4.9 – 6.0 GHz / Integrated 16 dBi dual-pol integrated 90 degrees sector antenna
Distance	• Middle-to-long range (35+ km)	• Middle-to-long range (20+ km)	• Middle range (up to 15-20 km)
Radio	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: up to 23 dBm • Receiver sensitivity: -67..-97 dBm • Channel bandwidth: 5/10/20/40 MHz • 16 dBi dual-pol integrated 90 degrees antenna • Instant DFS support (optional)	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: up 23 dBm • Receiver sensitivity: -67..-97 dBm • Channel bandwidth: 5/10/20/40 MHz • 2 x N-type (Female) connectors • Instant DFS support (optional)	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: up to 18 or 23 dBm (model-dependent) • Receiver sensitivity: -67..-97 dBm • Channel bandwidth: 5/10/20/40 MHz • 16 dBi dual-pol integrated 90 degrees antenna
Wired nterfaces	• Gigabit Ethernet port (10/100/1000 Base-T) RJ-45 connector • Serial port (RS-232)	• Gigabit Ethernet port (10/100/1000 Base-T) RJ-45 connector • Serial port (RS-232)	• 2 x Fast Ethernet (10/100 Base-T) RJ-45 connector • PoE output at the second Ethernet port
Powerconsumption	• Consumption: Up to 12 Watts • Power options: 110-240 VAC @ 50/60 Hz ±43..56 VDC	• Consumption: Up to 12 Watts • Power options: 110-240 VAC @ 50/60 Hz ±43..56 VDC	• Consumption: Up to 7 Watts • Power options: 110-240 VAC @ 50/60 Hz +9..56 VDC
Form actor and dimensions	• Outdoor Unit (ODU): **16 dBi antenna** 370 x 370 x 85 mm, 3.7 kg • Indoor Unit (IDU-BS-G) 124 x 72 x 38 mm 0.3 kg	• Outdoor Unit (ODU): **External antenna** 240 x 240 x 51 mm, 2.3 kg • Indoor Unit (IDU-BS-G) 124 x 72 x 38 mm 0.3 kg	• Outdoor Unit (ODU): **16 dBi antenna** 371 x 371 x 83 mm, 2.8 kg • Indoor Unit (IDU-CPE) 85 x 76 x 36 mm 0.15 kg

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MIMO 2x2 Subscriber Terminals

System components Model	ST-CH5180i	ST-CH5180e	ST-CH5180is
Device description	High-capacity Integrated Antenna Subscriber Terminal	High-capacity External Antenna Subscriber Terminal	High-capacity Reduced Form Factor Integrated Antenna Subscriber Terminal
Performance	• 8 Mbps (up to 8 Mbps net) • 50 Mbps (up to 50 Mbps net) • 300 Mbps (up to 180 Mbps net) • License upgradeable	• 8 Mbps (up to 8 Mbps net) • 50 Mbps (up to 50 Mbps net) • 300 Mbps (up to 180 Mbps net) • License upgradeable	• 8 Mbps (up to 8 Mbps net) • 50 Mbps (up to 50 Mbps net) • 300 Mbps (up to 180 Mbps net) • License upgradeable
Frequency Bands/Antennae	• 4.9 – 6.0 GHz / Integrated 21, 23 or 28 dBi Dual-polarization Antenna • 6.0 – 6.4 GHz / Integrated 24 or 27 dBi Dual-polarization Antenna	• 4.9 – 6.0 GHz / Connectorised Antenna (2 x N-type connectors) • 6.0 – 6.4 GHz / Connectorised Antenna (2 x N-type connectors)	• 4.9 – 6.0 GHz / Integrated 19 dBi Dual-polarization Antenna • 6.0 – 6.4 GHz / Integrated 19 dBi Dual-polarization Antenna
Distance	• 21 dBi antenna: middle range (up to 8-10 km) • 23 or 24 dBi antenna: middle-to-long range (10-12 km) • 28 dBi antenna: long range (15-25 km)	• Middle-to-long range (35+ km with external high-gain antenna)	• Short-to-middle range (up to 5-7 km)
Radio	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: • Up to 18 or 23 dBm (4.9-6.0 GHz models) • Up to 23 dBm (6.0-6.4 GHz models) • Receiver sensitivity: -67..-97 dBm • Frequency bands: 4.9-6.0 GHz and 6.0-6.4 GHz • Channel bandwidth: 5/10/20/40 MHz	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: • Up to 18 or 23 dBm (4.9-6.0 GHz models) • Up to 23 dBm (6.0-6.4 GHz models) • Receiver sensitivity: -67..-97 dBm • Frequency bands: 4.9-6.0 GHz and 6.0-6.4 GHz • Channel bandwidth: 5/10/20/40 MHz	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Duplex method:TDD • Transmit power: • Up to 18 dBm (4.9-6.0 GHz models) • Up to 23 dBm (6.0-6.4 GHz models) • Receiver sensitivity: -67..-97 dBm • Frequency bands: 4.9-6.0 GHz • Channel bandwidth: 5/10/20/40 MHz
Wired Interfaces	• 2 x Fast Ethernet (10/100 Base-T) RJ-45 connector • PoE output at the second Ethernet port	• 2 x Fast Ethernet (10/100 Base-T) RJ-45 connector • PoE output at the second Ethernet port	• 1 x Fast Ethernet (10/100 Base-T) RJ-45 connector
Power Consumption	• Consumption: Up to 7 Watts • Power options: 110-240 VAC @ 50/60 Hz +9..56 VDC	• Consumption: Up to 7 Watts • Power options: 110-240 VAC @ 50/60 Hz +9..56 VDC	• Consumption: Up to 7 Watts • Power options: 110-240 VAC @ 50/60 Hz +9..56 VDC
Foam Factor and Dimensions	• Outdoor Unit (ODU): **27 or 28 dBi antenna** 600 x 600 x 75 mm, 6.1 kg **23 dBi antenna** 371 x 371 x 83 mm, 2.8 kg **21 or 24 dBi antenna** 305 x 305 x 73 mm, 2.0 kg • Indoor Unit (IDU-CPE) 85 x 76 x 36 mm 0.15 kg	• Outdoor Unit (ODU): **External antenna** 240 x 240 x 51 mm, 1.6 kg • Indoor Unit (IDU-CPE) 85 x 76 x 36 mm 0.15 kg	• Outdoor Unit (ODU): **19 dBi antenna** 207 x 207 x 67 mm, 1.0 k • Indoor Unit (IDU-CPE) 85 x 76 x 36 mm 0.15 kg

TECHNICAL SPECIFICATION

RADIO
* **Voice/RTP Aware Superpacketing**
- to minimize jitter and latency for multimedia applications
* **DFS**
- intelligent search for a cleanest channel and interference avoidance
- radar detection (depending on regulatory domain)
- continuous background spectrum monitoring (for Instant DFS enabled units only)
- seamless channel change in case of congestion or radar detection (for Instant DFS enabled units only)
* **Automatic Bitrate Control**
- to ensure a 100% stable link irrelevant of changes in external conditions
* **Automatic Transmit Power Control**
- to track and keep optimal input signal level to maximize performance for each link and reduce overall interference within a given transmit
power and EIRP limitations
* **Automatic Distance Learning**
- to optimize performance for any link distances from dozens of meters to 100 km and above
* **Channel Time Adjustment**
- to improve performance on heavily loaded links
* **Spectrum Analyzer mode**
- interference detection
- non-invasive spectrum analysis (for Instant DFS enabled units only)
* **Channel testing tools**
- channel performance measurement
- advanced diagnostics

MANAGEMENT FEATURES
* **Web-interface**
- basic settings
- channel diagnostics: spectrum analysis, antenna alignment, channel throughput measurement
- unit and RF links monitoring
- maintenance: firmware upgrade, license and configuration import/export
- tech support diagnostic reports generation
- command-line access
* **Command-line interface for in-depth configuration and diagnostics accessible via:**
- secure shell (SSH)
- telnet
- serial port
- remote shell
* **SNMPv1 / SNMPv3 support (MIB II, private MIB)**
* **Configurable SNMP Traps**

QUALITY-OF-SERVICE
With many QoS permutations, QoS implementation works transparently in the network based on IEEE802.1p standard as well as ToS/DiffServ, guaranteeing optimal performance under any load conditions and lowest jitter/delays for priority traffic.
Quality-of-Service features:
* **16 priority queues**
* **IEEE 802.1p support**
* **IP TOS / DiffServ support**
* **Full voice support**
* **Traffic limiting**
(absolute, relative, mixed)
* **Traffic redirection**

NETWORKING
* **Ethernet-over-IP tunneling**
* **ARP protocol support**
* **MAC/IP filtering**
* **Full-fledged 2nd layer switch:**
- Transparent transport for any type of Ethernet traffic including MPLS, stacked VLANs, etc.
- Multiple switching groups
- Full VLAN support including Q-in-Q (IEEE 802.1q and 802.1ad)
- STP/rSTP support
- IGMP Snooping with Querrier mode
- Trunk groups support
* **RIPv2 / OSPFv2 /static routing**
* **Tunneling**
(Ethernet-over-IP, IP-over-IP)
* **L2/L3 Firewall**
* **NAT(multipool, H.323-aware)**
* **DHCP client/server/relay**

MAC
* **Dynamic adaptive Polling**
- Centralized marker grant mode
- Dynamically takes into account channel activity
- Permanent channel testing
* **Pseudo-radio Interface**
- unique SensorTec Wireless feature to join SensorTec Wireless networks via 3rd party equipment (Wired Ethernet segments, IP clouds)
* **Automatic over-the-air firmware upgrade**

STANDARD COMPLIANCE
* **Radio**
- EN 301 893 v.1.5.1
- EN 302 502 v.1.2.1
- FCC part 15.247
* **EMC**
- EN 301 489-1
- EN 301 489-17
- FCC Part 15 Class B
* **Safety**
- EN 60 950-1:2006
* **RoHS**
- Directive 2002/95/EC

SECURITY FEATURES
* **Storm / flood protection**
* **Password protection**
* **Secure command-line access via SSH protocol**

ENVIRONMENTAL
* **Outdoor Units:**
-40..+60C, 100% humidity, condensing
* **Indoor Unit:**
0..+40C, 95% humidity, non-condensing