PRODUCT DATASHEET

InfiLINK 2x2 3.5 GHz

Solution Benefits

- Maximise your investment in the licensed 3.5Ghz spectrum by offering improved throughput, spectral efficiency and a wider range of services and applications

- Transmission in LOS, nLOS and NLOS configurations with up to 240 Mb/s effective throughput

- Class-leading equipment span & reach

- Proven field reliability & robustness, based on InfiNet's well-known InfiLINK 2x2 product family

- Low Cost entry and "pay as you grow" model to easily up-scale capacity

- Simple integration into existing infrastructure

- Significantly reduced total cost of ownership (TCO)

- Ultra-low latency and jitter for optimal transmission of video and voice data

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 communication performance

Introduction

The Hypercable Wireless 2x2 family of products was among the very first radio solutions to introduce MIMO technology for Broadband Wireless Access, and has continued ever since to set new standards across the industry for throughput, spectrum optimisation, efficiency, Quality of Service and system reliability.

The InfiLINK 2x2 3.5 GHz is a high-performance broadband wireless point-to point solution designed to operate in the licensed 3.4 to 3.7 GHz frequency range. The various products within this family have been designed primarily to cater for the specific requirements of local authorities, service providers or other organizations that have purchased WiMAX licences. They enable them to deploy more efficient and scalable networks for data, video and voice, whilst at the same time offering up to five times the throughput of existing systems in this frequency range. This is achieved with even fewer network elements, thereby reducing the overall Whole-Life Cost of managing their networks.

The inherent features built into our 3.5 GHz solutions are key enablers in licence-exempt backhauls for ÑCTV/IP surveillance systems, Wireless-ISP networks, high-capacity corporate connectivity and last-mile provisioning, as well as for backing up Free Space Optics (FSO) and microwave links.

Applications

- ❖ 4G/LTE/WiMAX BTS High-capacity backhaul
- ❖ WISP infrastructure backhaul and internet PoP for remote locations
- ❖ Building-to-building or LAN-to-LAN connectivity at Fast Ethernet speeds
- ❖ Redundant Cellular backhaul, multiple E1/T1 TDM & Ethernet/IP transport
- ❖ Cost-effective alternatives to legacy microwave links
- ❖ NLOS and nLOS configurations
- ❖ Reliable backup for fibre lines, high-speed FSO or millimetre- wave links.

Product Key Features and Highlights.

- ❖ Available in 3.4 to 3.7 GHz frequency bands
- ❖ High spectral efficiency 6.5 Bit/s/Hz
- ❖ Multiple Input - Multiple Output (MIMO 2x2) innovative technology
- ❖ "Pay as you grow" software upgradeable features
- ❖ High-capacity - up to 240 Mbps effective throughput
- ❖ Channel width: 3.5/5/7/10/14/15/20/28/30/40 MHz
- ❖ Operational distances in excess of 80 km
- ❖ LOS (Line-Of-Sight) and NLOS (Non-Line-of-Sight)
- ❖ Advanced Quality-of-Service Support
- ❖ Robust design

Equipment

	Recommended Applications	• High-capacity CCTV infrastructure backhaul • 4G/LTE/WiMAX BTS High-capacity backhaul • WISP infrastructure backhaul • WISP Internet POP for remote areas • Redundant Cellular backhaul, Ethernet/IP transport • Reliable backup for fibre lines, high-speed FSO or millimetre- wave links • A cost-effective alternative for legacy microwave links • Ultra-high spectral efficiency backhaul • LAN-to-LAN connectivity at Fast Ethernet speeds	
Product Family		**InfiLINK 2x2 3.5 PRO**	
Model		**R5000-Mmx**	**R5000-Omx**
Device description		High-capacity 40/80/150/300 Integrated 22 dBi Dual-polarization Antenna Point-to-Point backhaul	High-capacity 40/80/150/300 External Antenna Point-to-Point backhaul
Performance		• 40, 80, 150 and 240 Mbps throughput options (license upgradeable)	• 40, 80, 150 and 240 Mbps throughput options (license upgradeable)
Distance		• Middle-to-long range (30+ km)	• Long range (80+ km)
Radio		• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Transmit power: up to 20 dBm • Receiver sensitivity: -67..-101 dBm • Frequency bands: 3.4-3.7 GHz • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 MHz • 22 dBi dual-pol integrated antenna • Center frequency adjustment step: 125 kHz • Channel duplex: TDD	• Radio technology: MIMO 2x2 with OFDM 64/128 • Modulation types: BPSK ½ to QAM64 5/6 • Transmit power: up to 20 dBm • Receiver sensitivity: -67..-101 dBm • Frequency bands: 3.4-3.7 GHz • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 MHz • 2 x N-type (Female) connectors • Center frequency adjustment step: 125 kHz • Channel duplex: TDD
Wired interfaces		• 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)
Power consumption		• Up to 30 Watts • Consumption: 110-240 VAC @ 50/60 Hz 12-48 VDC	• Up to 30 Watts • Consumption: 110-240 VAC @ 50/60 Hz 12-48 VDC
Form factor and dimensions		• Outdoor Unit (ODU): 370 x 370 x 85 mm 3.7 kg • Indoor Unit (IDU-BS-G): 140 x 45 x 40 mm 0.3 kg	• Outdoor Unit (ODU): 240 x 240 x 51 mm 2.3 kg • Indoor Unit (IDU-BS-G): 140 x 45 x 40 mm 0.3 kg

Features

RADIO

- **Voice/RTP Aware Superpacketing**
  - to minimize jitter and latency for multimedia applications
- **Automatic Bitrate Control**
  - to ensure a 100% stable link no matter how external conditions change
- **Automatic Transmit Power Control**
  - to track and keep optimal input signal level to maximize performance per each link and reduce overall interference within given transmit power and EIRP limitations
- **Automatic Distance Learning**
  - to optimize performance for any link distances from tens of meters to 100 km and above
- **Channel Time Adjustment**
  - to improve performance on heavily loaded links
- **Spectrum Analyzer mode**
  - for interference detection and avoidance
- **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**

NETWORKING

- **Ethernet-over-IP tunneling**
- **ARP protocol support**
- **MAC/IP filtering**
- **Fully-fledged Layer 2 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**

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 perfect performance under any load 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**

MAC

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

STANDARD COMPLIANCE

- **Radio**
  - FCC Part 90 pending
  - EN 302 326-2 pending
- **EMC**
  - EN 301 489-1
  - EN 301 489-17
- **Safety**
  - EN 60 950-1:2006
- **RoHS**
  - Directive 2002/95/EC

SECURITY FEATURES

- **Line-speed AES128 over-the-air encryption**
- **Storm / flood protection**
- **Password protection**
- **Protocol messages encryption**
- **Secure command-line access via SSH protocol**

ENVIRONMENTAL

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

PRODUCT DATASHEET

Solution Benefits

- 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

- Easy and fast deployment

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 communication performance.

The InfiMAN 2x2 3.5 GHz

Introduction

The InfiMAN 2x2 3.5 is Infinet's latest family of solutions designed to operate in the licensed band 3.4 to 3.7 GHz. It comprises of a number of high-performance broadband wireless point-to-multipoint modules, designed primarily to cater for the specific requirements of local authorities, service providers or other organizations that have purchased WiMAX licences.

The innovative high-speed base stations provide an unparalleled sector capacity of up to 240 Mbps and use leading-edge radio protocols to provide unrivalled spectral efficiency. They enable operators to deploy more efficient and scalable networks for data, video and voice transmission, whilst at the same time offering up to five times the throughput of existing systems in this frequency range.

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 InfiMAN 2x2 3.5 series represents a unique proposition to operators who have already invested in a WiMAX license but now wish to deliver Fast Ethernet data, voice and video services over long distances, whilst at the same time providing a wide set of networking features and maintaining strict QoS control.

Applications

Key applications of the InfiMAN 2x2 family of solutions include:

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

Key Features and Benefits

- Available in 3.4 to 3.7 GHz frequency bands
- Unrivaled spectral efficiency of 6.5 Bit/s/Hz
- 240 Mbps base station sector capacity with just 40 MHz of spectrum, reducing capital expenditure
- Increased NLOS range and performance
- 3.5/5/7/10/14/15/20/28/30/40 MHz channel widths
- Advanced Quality-of-Service features, offering a reliable and robust solution
- High Transmit Power Base Stations
- Integrated Sector Antenna Base Stations, ensuring maximum RF performance and quick & simple installation
- New! CCTV optimized Subscriber Terminals with PoE output for camera power supply

Equipment

Family component	InfiMAN 2x2 3.5 Base Stations		InfiMAN 2x2 3.5 Subscriber Terminals	
Model	R5000-Mmxb	R5000-Omxb	R5000-Smc	R5000-Lmc
Device description	High-capacity 14 dBi 90 Deg Flat Panel Integrated Sector Antenna Base-Station	High-capacity External Antenna Base-Station	High-capacity Integrated antenna Subscriber Terminal	High-capacity External antenna Subscriber Terminal
Performance	• 240 Mbps net throughput	• 240 Mbps net throughput	• Up to 20 Mbps throughput options (license upgradeable)	• Up to 20 Mbps throughput options (license upgradeable)
Distance	• Middle-to-long range (20+ km)	• Middle-to-long range (20+ km)	• Short-to-Middle range (up to 12km)	• Middle-to-long range (25+ km)
Radio	• Transmit power: up to 23 dBm • Receiver sensitivity: -67..-97 dBm • Frequency bands: 3.4-3.7 GHz • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 Mhz • Center frequency adjustment step: 125 kHz • Channel duplex: TDD • 14 dBi dual-pol 90 deg sector antenna	• Transmit power: up to 23 dBm • Receiver sensitivity: -67..-97 dBm • Frequency bands: 3.4-3.7 GHz • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 MHz • Center frequency adjustment step: 125 kHz • Channel duplex: TDD • 2 x N-type (Female) connectors	• Transmit power: up to 23 dBm • Receiver sensitivity: -67..-97 dBm • Frequency bands: 3.4-3.7 GHz • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 MHz • Center frequency adjustment step: 125 kHz • Channel duplex: TDD • 22 dBi dual-pol integrated antenna	• Transmit power: up to 23 dBm • Receiver sensitivity: -67..-97 dBm • Frequency bands: 3.4-3.7 • Channel bandwidth: 3.5/5/7/10/14/15/20/28/30/40 MHz • Center frequency adjustment step: 125 kHz • Channel duplex: TDD • 2 x N-type (Female) connectors
Wired interfaces	• 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)	• 1 x Fast Ethernet (10/100 Base-T) RJ-45 connector • 1x Fast Ethernet PoE (802.3af) output port (optionally) RJ-45 connector • Serial port (RS-232)	• 1 x Fast Ethernet (10/100 Base-T) RJ-45 connector • Serial port (RS-232)
Power consumption	• Up to 30 Watts • Consumption: 110-240 VAC @ 50/60 Hz 48 VDC	• Up to 30 Watts • Consumption: 110-240 VAC @ 50/60 Hz 48 VDC	• Up to 15 Watts • Consumption: 110-240 VAC @ 50/60 Hz 12-48 VDC	• Up to 15 Watts • Consumption: 110-240 VAC @ 50/60 Hz 12-48 VDC
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