Data Sheet

OS Spectra

True Non-Line-of-Sight Wireless Networks

OS-SPECTRA 300 INTEGRATED

Spectrum-Efficient Wireless Ethernet Bridge

More range, more capacity and more ways to use the unlicensed spectrum

You Shouldn't Need a License to Speed

With wireless Ethernet bridging, you have always needed a license to go fast. That's because a license reserved a part of the radio spectrum just for you. With less interference, your wireless links could go farther, faster, at higher capacity and with greater reliability.

Orthogon Systems brings together the speed and reliability of licensed wireless with the flexibility of the unlicensed space. With the OS-Spectra point-to-point, 5.8GHz wireless Ethernet bridge, you no longer have to suffer the delay and expense of applying for a license to set up your IP and circuit-switched wireless networks.

Higher Spectrum Efficiency

Utilizing only 30 MHz of the 5.8 band, the OS-Spectra delivers up to 300Mbps Ethernet data rate – that's over 300% more spectral-efficient than our nearest competitor. Network performance is significantly improved as a result of less crowding within the band and subsequently less interference.

Interference Mitigation

In the event OS-Spectra does encounter interference, it automatically applies these mitigation techniques to vastly increase the likelihood your wireless network will work:

- Automatic Frequency Selection: OS-Spectra self-selects the frequency over which it can sustain the highest data rate
- Adaptive Modulation: OS-Spectra self-selects the modulation scheme over which it can sustain the highest data rate (256QAM, 64QAM, 16QAM, QPSK, BPSK, Multiple FEC rates, single and dual payload)

More than WiMAX-Compatible

OS-Spectra has been designed to fully integrate with other WiMAX systems, allowing seamless end-to-end management of your infrastructure. The OS-Spectra 300 is capable of backhauling the throughput requirements of 12 WiMAX base station sectors with the equivalent of only three WiMAX channels.

Very High Throughput

With 256QAM modulation, OS-Spectra delivers a faster data stream using less of the available 5.8 GHz frequency band. Plus, dual transceivers at each end of the link allow you to send two parallel data streams at once. These transceivers can also send redundant streams, offering much greater range compared to competitive solutions, especially over water or in non-line-of-sight conditions.

More Range to Anywhere OS-Spectra links have class-leading sensitivity and power output, which enable the links to go farther, regardless of conditions:

- Line-of-sight
- Non-line-of-sight
- Over water

Orthogon is the only provider to combine multi-beam space-time encoding, OFDM (orthogonal frequency division modulation) and our advanced signal processing algorithms. This combination allows OS-Spectra to create four simultaneous signals between pairs of transceivers at each end (without losing spectrum efficiency), a technique that increases signal integrity by an unprecedented 300 times.

Data from A to B – or B to A – is sent on four signals, increasing by 300 times the likelihood data will get through.

In non-adverse environments, each pair can operate in parallel, in effect creating two links and doubling throughput.

T1/E1 Ports Mean More Ways to Use the Band

In a crowded RF area, the unlicensed spectrum may not allow for a wide channel, but that does not narrow your options. OS-Spectra's innovative architecture combines an abundance of Ethernet and circuit-switched options. Whether your infrastructure is based on Ethernet over copper or multimode fiber… 10/100/1000 Base T, or 1000 Base SX…or even dual T1/E1 ports that bundle circuit-switched connectivity with IP service, you can connect with one wireless solution: OS-Spectra.

Managing the Spectrum for Maximum Throughput and Reliability OS-Spectra monitors all available channels and dynamically selects those over which it can sustain both the highest data rate and the most reliable availability. This means the OS-Spectra is very likely to find a clear channel (without operator intervention) even in a crowded space, allowing the transmitter and receiver to automatically use the frequency with the highest throughput. You can also lock the frequency manually (in either direction) and restrict each link to specified frequencies.

Reassuring, Robust Layered Security With Orthogon's unique software, each wireless bridge will only communicate with its matched counterpart at the other end of the link – and with no other. That communication is also encoded using an encryption algorithm. In addition, another layer of encryption is provided with 128-bit AES encryption (optional).

Technical Specifications for the OS-Spectra Integrated

Web and WiMAX Management

OS-Spectra is configured and managed using a standard web browser, with both direct and remote management (including WiMAX MIB). Configure the link, check operational status and monitor link performance all in real-time from any web browser or using third-party network management systems.

Radio Technology	Remarks
RF band	5.725 GHz–5.850 GHz (ISM)
Channel size	30 MHz
Channel selection	Automatic Spectrum Management or manual configuration; automatic channel selection on start-up and continual monitoring to avoid interference; 10 MHz step size for WiMAX compatibility
Transmit power	Varies with modulation mode and settings from 0 dBm to 24 dBm
System gain	Varies with modulation mode and antenna gain between 163 dBm and 128 dBm using 23dBi integrated antenna
Receiver sensitivity	Adaptive; varying between -92 dBm and -63 dBm
Modulation	Dynamic; adaptive between BPSK single and 256QAM dual
Error correction	FEC and ARQ
Duplex scheme	TDD 50:50, 67:33
Antenna: type/gain/B/W	Integrated flat plate / 23 dBi / 7° – or external antenna
Range	Up to 124 miles (200km)*
Data rates	Variable modulation up to 300 Mbps depending on range and path loss
Security & encryption	Proprietary scrambling mechanism; support of VPN; optional AES
Weather sensitivity	Unaffected by rain or snow; NLoS (Non-Line-of-Sight) links automatically adjust for foliage-induced fading
	** In all cases the range limit is set by the latest software release*

Ethernet Bridging & E1/T1	Remarks
Protocol	IEEE 802.3 compatible
User data throughput	Dynamically variable up to 300 Mbps (aggregate)
Interface	10BaseT / 100BaseT / 1000BaseT (RJ45) - auto MDI / MDIX, 1000BaseSX option
Latency	1ms typical each direction
Dual E1/T1 interface	G703/G704

Management & Installation	Remarks
LED indicators	Power status, Ethernet link status and activity
System management	Web or SNMP using MIBII, WiMAX and private MIB
Installation	Built-in audio assistance for link optimization
Connection	Distance between outdoor unit and primary network connection: up to 330' (100 meters)

Physical	Remarks
Dimensions	Outdoor unit (ODU): Width 14.5" (370 mm); Height 14.5" (370 mm); Depth 3.75" (95 mm) Powered Indoor Unit (PIDU): Width 9" (225 mm); Height 1.5" (38 mm); Depth 3.5" (85 mm)
Weight	ODU: 11.3 lbs (5.2 kg) including bracket; PIDU: 1 lb. (450 g)
Wind speed	150 mph (242 kph)
Power supply	Integrated with Indoor Unit
Power source	90-240 VAC, 50-60 Hz and 36 to 60V DC, redundant powering configurations supported
Power consumption	55W max

Environmental & Regulatory	Remarks
Operating temperature	-40°F (-40°C) to +140°F (+60°C) including solar radiation
Safety	UL60950; IEC60950; EN60950; CSA-C22.2 No. 60950
Protection	IP65 for the ODU
Radio	FCC Part 15, sub-part C 15.247, Eire ComReg 03/42
EMC	USA-FCC Part 15, Class B; Europe-EN 301 489-4

Put OS-Spectra To Work for You

Telecoms – With its multi-level security, ability to connect dual T1/E1 ports for bundled connectivity and significant WiMAX backhaul capability, OS-Spectra supports sophisticated, convergent, multimedia applications, supplying services to large, widespread customer bases.

Large Enterprises – OS-Spectra supports high-bandwidth enterprise applications in environments where wired networks are either too expensive or impossible to implement. It efficiently uses the frequency spectra to reduce interference and boost performance for business-critical applications.

Vertical Markets – Whether migrating from an analog to a digital network, linking separate loops within a building or linking networks in a campus setting, OS-Spectra offers high throughput and reliability for multiple applications in a variety of markets, including self-maintained users, utilities, transportation, healthcare, government and education.

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