

## COVERAGE SYSTEMS

# Mandalay Bay Resort Group, Las Vegas

Wireless Coverage a Sure Bet Throughout Mandalay Bay Properties

**Challenge** To provide reliable, seamless wireless communications coverage for the Mandalay Bay Resort Group that offers equal access to all wireless service providers serving the Las Vegas strip.

**Solution** A wireless system incorporating active components including RF amplifiers, and a passive infrastructure including fiber, cable and antennas.

**Result** An in-building distributed antenna system (DAS) that supports multiple carriers and technologies, and provides ubiquitous wireless voice and data coverage for guests at Mandalay Resort Group's Mandalay Bay Hotel & Casino; Mandalay Bay Convention Center; "THEhotel" at Mandalay; Mandalay Place; The Four Seasons Hotel; Excalibur Hotel & Casino; Luxor Hotel & Casino; and, Monte Carlo Hotel & Casino.

## State-of-the-Art Wireless Coverage Access System from Powerwave Improves Quality of Hotel Guest Access to Wireless Voice and Data Services

- Active Components: RF Amplifiers
- Passive Infrastructure: Fiber, Cable and Antennas

In 2004, Mandalay Resort Group, a division of MGM Mirage, selected Powerwave Technologies, a leading source for end-to-end wireless infrastructure solutions, to provide a comprehensive in-building DAS for its entire portfolio of hotel properties located on more than seven million square feet of real estate along the Las Vegas Strip. These hotels include Mandalay Bay Hotel & Casino; Mandalay Bay Convention Center; "THEhotel" at Mandalay; Mandalay Place; The Four Seasons Hotel; Excalibur Hotel & Casino; Luxor Hotel & Casino; and, Monte Carlo Hotel & Casino.

The resorts and casinos of MGM Mirage, including those owned by the Mandalay Bay Resort Group, are famous throughout the world and widely credited for their role in establishing Las Vegas as a world-class resort destination through a winning combination of quality entertainment, luxurious facilities and exceptional customer service. As such, guests of the Mandalay Bay Resort Group have come to expect a certain level of sophistication when it comes to food, wine, gambling, entertainment and even technology. In commissioning Powerwave to develop and implement a comprehensive in-building DAS, the Mandalay Bay Resort Group's primary goal was to again exceed customer expectations and continue to garner a sense of customer loyalty that would bring visitors back to its hotels.



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### Removing Communication Barriers

More specifically, among the Mandalay Bay Resort Group's key objectives in establishing a comprehensive in-building DAS throughout its Las Vegas hotels were to:

- Create a common, non-discriminatory, comprehensive communications access system that leverages state-of-the-art technology to provide hotel operations and guests with reliable, seamless wireless communication coverage throughout the entire hotel group's entire premises.
- Provide equal access for all wireless service providers serving the Las Vegas Strip.
- Accommodate the current technology and capacity requirements for the in-building DAS, with the ability to add capacity and support for emerging technologies as the need arises.
- Provide an efficient administrative reporting interface for hotel operations.
- Install a wireless backbone capable of accommodating the future communication needs of the Resort.

### Betting on a Winner

Powerwave Technologies offers one of most extensive families of end-to-end wireless infrastructure solutions for cellular, PCS, 3G and Wi-Fi frequency bands. With a proven track record for developing and implementing comprehensive DAS 's for some of the world's most challenging indoor and outdoor environments including major metropolitan areas, airports, train stations and hotels, the Mandalay Bay Resort Group felt that Powerwave was the best choice to design its in-building DAS in Las Vegas.

### A Strategy for Success

Similar to winning a hand a poker, placing a successful wager on the roulette table, or beating the house at craps, installing a comprehensive in-building DAS that covers more than seven million square feet of crowded and congested Las Vegas real estate involves planning, strategy and confidence.

Among the major challenges faced by Powerwave during the development and implementation of the in-building DAS for the Mandalay Bay Resort Group was the choice of an installation partner. While the project was started with one subcontractor, Mandalay later switched to another local contractor – one that Powerwave had never worked with before. In addition, the events of September 11, 2001 put the project on hold for more than three years due to a rapid decline in Las Vegas tourism.

In the end, Powerwave was able to solve the challenges of working with the new installation partner by working closely with them, and training the firm to use Powerwave's design and installation standards, as well as Powerwave equipment. And, after starting the project in 2001, only to have it put on hold after 9-11, Powerwave began the installation process again in January 2005, and the DAS system was fully deployed and operational in January 2007. Additionally, AWS Technology installation started in October 2007 and is currently up and running and scheduled for completion in May 2008.

### "Hitting the Jackpot" with Widespread Coverage, Seamless Connectivity

The in-building DAS that Powerwave designed and implemented for the Mandalay Bay Resort Group now provides seamless wireless phone and data service throughout the premises of the Mandalay Bay Hotel & Casino; Mandalay Bay Convention Center; "THEhotel" at Mandalay; Mandalay Place; The Four Seasons Hotel; Excalibur Hotel & Casino; Luxor Hotel & Casino; and, Monte Carlo Hotel & Casino. Supporting all major wireless carriers serving the Las Vegas Strip, and major wireless technologies including cellular and PCS carrier-dedicated equipment installed on the premises enables carriers choosing to use the system to be completely independent of one another.



**Powerwave Wideband Coverage System (WCS)** product line is a flexible platform for wireless enhancement of a base station signal remotely. This line of products can be connected via coax or fiber cable to provide capacity to underserved areas of the network. Applications for this versatile product are indoor distributed antenna systems (DAS) and outdoor coverage challenges. Future expansion and upgrading is made easy using a modular design. Same reliable, field proven technology as Powerwave's Repeater products, as well as the same O&M software for complete NetWay Manager (NWM) and OM-Online compatibility.

#### Key Benefits

- Ultimate flexibility
- Proven technology
- Fiber or Coaxial feed
- Ease of installation
- Output Power options
- Standard O&M platform

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### Conclusion

The flexibility and scalability of Powerwave's in-building DAS will accommodate the current technological and capacity requirements as well as those of emerging technologies and future standards through the addition of new repeaters/amplifiers as needed. The future possibilities are endless with an increasing number of wireless enterprise applications being developed; it's envisioned that in the future the system might be used to support Wi-Fi, as well as enhance the Mandalay Bay Resort Group's own private communications systems which uses 800MHz or 900 MHz frequencies.

Powerwave will be responsible for the operation and maintenance of the in-building DAS for an initial period of two years. Powerwave's National Operations Center (NOC) in Dallas will provide day-to-day operation, management and support of the system. The NOC staff performs ongoing optimization, operations, maintenance and repair of critical network elements including antennas and base station equipment. This service is supplemented with training for a client's internal network operations and support staff.

The Mandalay Bay Resort Group joins Wynn Hotels as the second Las Vegas resort to install a Powerwave DAS.

### About Powerwave Technologies

Powerwave Technologies is a leading source for end-to-end wireless solutions for wireless communications networks. Powerwave designs, manufactures and markets antennas, boosters, combiners, filters, repeaters, multi-carrier RF power amplifiers, tower-mounted amplifiers and advanced coverage solutions, all for use in cellular, PCS and 3G networks throughout the world. Corporate headquarters are located at 1801 E. St. Andrew Place, Santa Ana, CA 92705. Telephone (714) 466-1000. For more information on advanced wireless coverage and capacity solutions, please call (888)-PWR-WAVE (797-9283) or visit our web site at [www.powerwave.com](http://www.powerwave.com). Powerwave, Powerwave Technologies and the Powerwave logo are registered trademarks of Powerwave Technologies, Inc.

### The Powerwave Advantage

- IP65 classified cabinets to meet difficult environmental conditions.
- Flexible and scalable solutions where a fiber-optic distribution system (backbone) or antenna/leaky feeder system can be shared among different operators and technologies.
- Operator-dedicated repeaters ensure complete integrity, and enable operators to individually optimize their networks, while remaining independent during future system expansions and modifications.
- Advanced operations and maintenance platform (OMS) with some configurations.
- Superior RF performance through remote hubs with higher effective radiated power and lower noise figure, allowing for higher data throughput on new 3G services
- Independent link budget for each technology through dedicated amplifier nodes.
- Independent cell topology for each technology through a flexible central hub configuration.
- High dynamic range supporting long fiber runs and high number of carriers over a common fiber infrastructure.
- Aesthetically pleasing design.



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