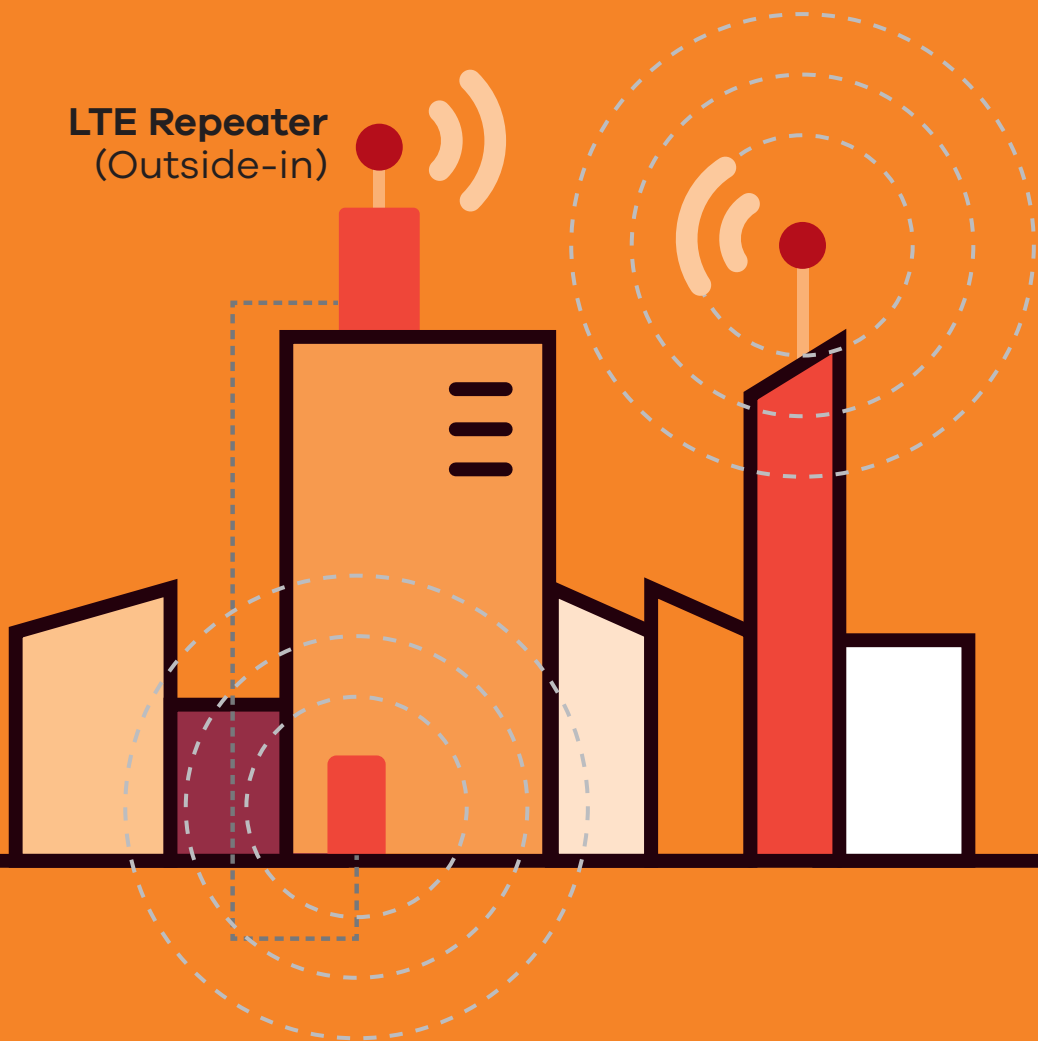# ZYXEL

Your Networking Ally

Zyxel Has You Covered

In-Building Coverage
Solution Brief

We satisfy all your mobile needs

In the highly connected modern mobile space, 80% of traffic is generated by indoor users. Ensuring ubiquitous, uninterrupted connectivity presents significant challenges for operators. This includes movement within a building, which often leads to mobile signal drops that can leave users disconnected and dissatisfied.

The in-building wireless solution industry has typically focused on large-scale public projects — stadiums, civic venues, and airports, for example — often backed with public funding. However, adapting in-building solutions to smaller spaces can be problematic due to issues of affordability and the complexity of multi-layer architecture.
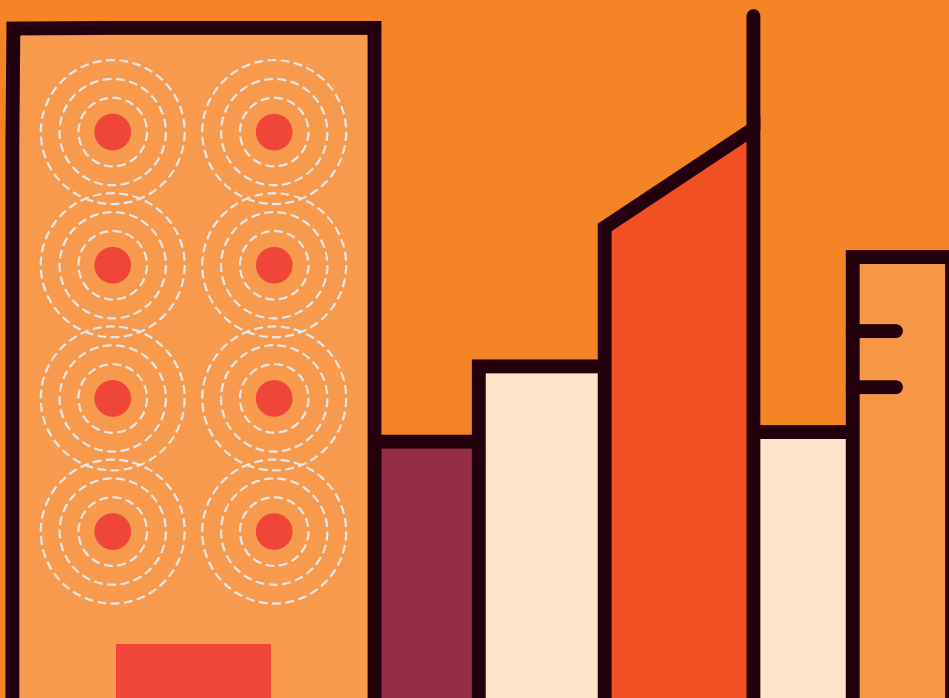
LTE Repeater
(Outside-in)

In-Building Coverage Solution for Urban and Suburban Area

ZoneDAS
(Inside-out)

ZoneDAS solutions

Drawing on nearly 30 years of expertise in the networking industry, Zyxel has created ZoneDAS (Zone Distributed Antenna System), a system integrating active CAT5 DAS solutions that offers owners, operators, and neutral hosting companies a more attractive return on investment for indoor connectivity. With ZoneDAS, Zyxel provides the most efficient solutions for small- to medium-sized indoor scenarios.

Traditional Passive DAS V.S. Zyxel's Active DAS

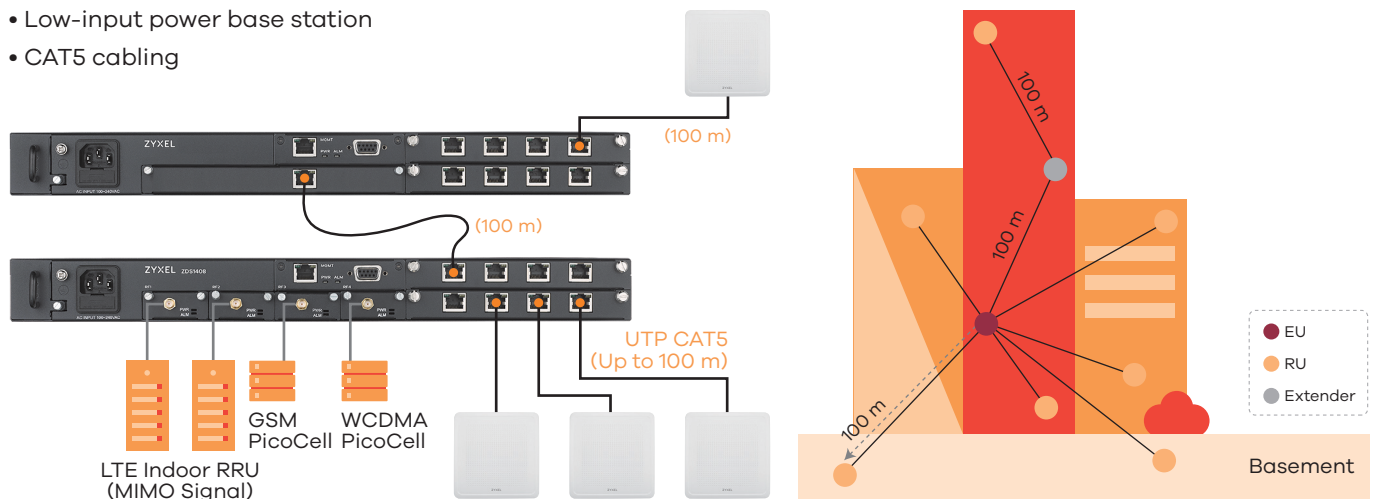|	Traditional passive DAS	Zyxel's active DAS
4G LTE system performance	• 2G, 3G, and poor 4G LTE performance • Does not support MIMO, must invest in and deploy additional DAS	• 2G, 3G, and optimized 4G LTE performance • Easily obtain MIMO upgrade service by adding the new RF modules to RUs
CAPEX comparison	• High cost for select quality components • Can require up to a month of additional deployment time • Requires professional engineers to deploy • Needs expensive high-input power base station	• Lower cost with CAT-5e cables (PoE) • 15-30 times faster deployment time • Does not require professional engineers to deploy • Only needs low-input power base station
Planning indoor coverage	**Complex** • Need to calculate the maximum loss and create link budget • Must take into account signal interference and performance	**Easy** • Adjust power levels on every RU via software • Optimize the signal via EMS or via SNMPv3 • Pattern-configurable antenna
Maintenance and management	On-site	Remote control through EMS

Lower Total Cost of Ownership (TCO)

CAT-5e cables cut costs on high-end components

In the past, DAS were prohibitively expensive. In the case of traditional fiber and coax DAS, passive DAS required numerous RF feeders and devices — combiners and splitters — that must be installed by RF experts. This could increase both installation costs and construction time. It's easy to see why traditional DAS engineering could account for 60-70% of total construction expenditure.

Extensive coax cabling and passive components can substantially weaken signal strength. However, boosting performance by adding premium components to the signal chain along with a high-output power base station would quickly drive up the cost of DAS.

Reduce deployment time and labor

ZoneDAS systems have emerged that change the economic equation on DAS deployments. Rather than utilizing more expensive coax cabling, ZoneDAS relies on easy-to-deploy CAT-5e cables. These inexpensive twisted-pair cables can be installed by networking novices rather than the licensed electricians required for traditional DAS deployments. UTP (Unshielded Twisted Pair) cabling also supports PoE, which eliminates the need for an additional power supply while significantly shortening deployment time and simplifying management. Statistics show that ZoneDAS can be installed 15 to 30 times more quickly than traditional DAS. The means a cable routing and device installation that typically took one month can be completed in a single day.

• Low-input power base station
• CAT5 cabling

Low-input power base station offers economical alternative

Active ZoneDAS brings the amplifier directly to the antenna to deliver the best possible signal-to-noise ratio without degrading signal strength. The 10 mw -

250 mw input base station requirement helps system integrators lower overall CAPEX for deployments.

Ensure High Flexibility

With indoor deployments, radio signals are often subjected to building blockage and absorption during propagation. This can lead to signal degradation and dead spots. The most important aspect of indoor planning today is providing uninterrupted signal coverage with high signal performance, as can be achieved with 4G MIMO. Taking into account signal interference and performance further complicates the process.

Easy and affordable planning

Reconstruction to support MIMO can require additional investment when deploying DAS systems because of the added complexity and cost of traditional DAS solutions.

ZoneDAS, however, utilizes an active distributed antenna system that optimizes the signal via EMS or SNMPv3 for easy control. With ZoneDAS, power levels on every RU module can be adjusted individually. By simply adding new RF modules to RUs, MIMO upgrade service can easily be achieved along with additional carrier support.

Optimize coverage with pattern-configurable antennas

Providing the right signal at the right location is a critical component of system integration. Office buildings, shopping malls, and other public venues have different size and shape spaces with varying levels of building blockage. A ceiling-mount omni antenna would be the right choice to service square spaces, while a wall-mount directional antenna is best for delivering long-distance gallery coverage. ZoneDAS remote units have built-in pattern-configurable antennas in each module. Users can optimize coverage by configuring antennas as omni or directional, according to need.

Successful indoor coverage planning also requires calculating the maximum loss to each antenna in a system and linking the budget accordingly for the areas that each antenna covers. For traditional passive DAS, the limitations of the building must also be taken into account, along with restrictions on where and how heavy coax can be installed. Any re-layout may result signal degradation. Complex installations can also make follow-up planning more difficult.

To optimize coverage, ZoneDAS also features functionality to generate an output power density mapping table. Engineer can reference the received signal strength indicator (RSSI) values in table and achieve high-quality connections and MIMO service easily by adjusting output power and modifying the antenna's radio pattern.

Configurable antenna radio pattern

Config to omni antenna pattern for ceiling mount

Config to directional antenna pattern wall mount
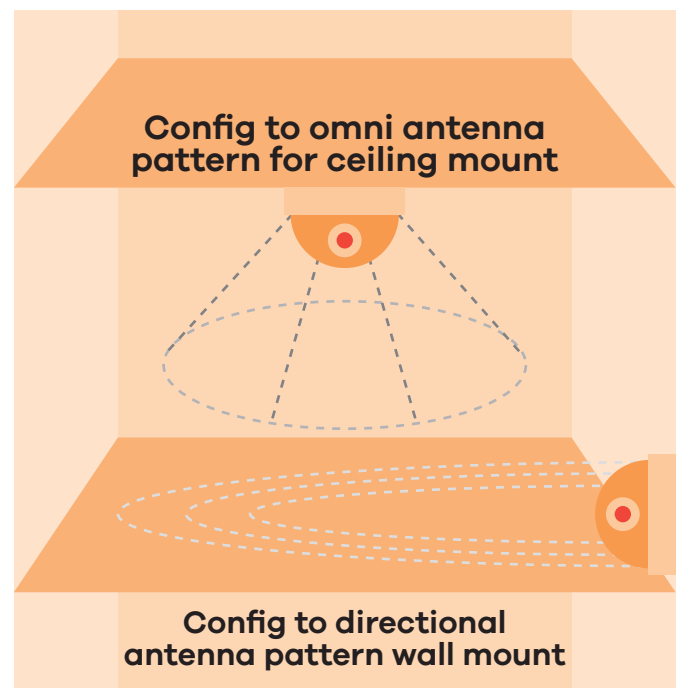
Take Advantage of Simple Maintenance and Management

Traditional DAS do not offer end-to-end monitoring and management. The signal is simply pushed over the RF cable, leaving building owners in the dark with regard to signal issues until users complain. Zyxel's active DAS

— ZoneDAS — solves this with support for end-to-end system monitoring and management. IT staff can now manage from the RF source to the antenna point via EMS and SNMPv3.

BTS Source-independent

Business models for in-building wireless service typically rely on carrier, neutral-host, or enterprise-pays-for-DAS scenarios. Since the BTS signal source can only be provided by carriers, compatibility with various BTS systems is a key issue for adopting a DAS system.

ZoneDAS is BTS source-independent and accepts a low-input power range from 10 dBm to 24 dBm provided by macro, micro, or pico-cell. It can carry RF signals

from four individual cells while offering versatile input combinations such as 2 x MIMO, 4 x SISO, or 1 x MIMO + 2 x SISO from 2G, 3G, or 4G LTE systems.

ZoneDAS simplifies engineering maintenance so that operators can make their investments count by focusing on device capacity expansion and system upgrades, which are essential to increasing ROI.

Comprehensive ZoneDas Families

The design of Zyxel's ZoneDAS family offers abundant flexibility for deployments of different building scales. Not only does ZoneDAS fit buildings of different heights, the full range of products also easily support floors of all sizes from 10,000 m^2, 20,000 m^2 to even 40,000 m^2. Highly efficient and versatile, the ZoneDAS applications make more building deployment scenarios possible and ensure the best return on investments.

LTE repeater solutions

Why Use a Repeater?

LTE is the current global trend for wireless communications. As more operators turn to LTE network technology, demand for indoor LTE coverage also grows. When looking to increase mobile signal coverage for areas of lower user density, capacity is not as much of an issue as it can be in high user density situations. In scenarios such as in a small office building or a suburban area, a repeater provides a cost-effective solution.

While 3G and 4G are equally adept at handling many of the same tasks — talk, text, and some Internet — the real difference is seen with high-speed Internet, which is accessible only through 4G. When building owners or operators are looking to boost signals for end user calls and text messaging, a 3G signal booster will usually fit the bill. However, for data-heavy apps like web browsers, Facebook, YouTube, Google Maps, and streaming applications, existing repeaters on the market often cannot meet high-performance, high-throughput and MIMO demands to which LTE better suited.
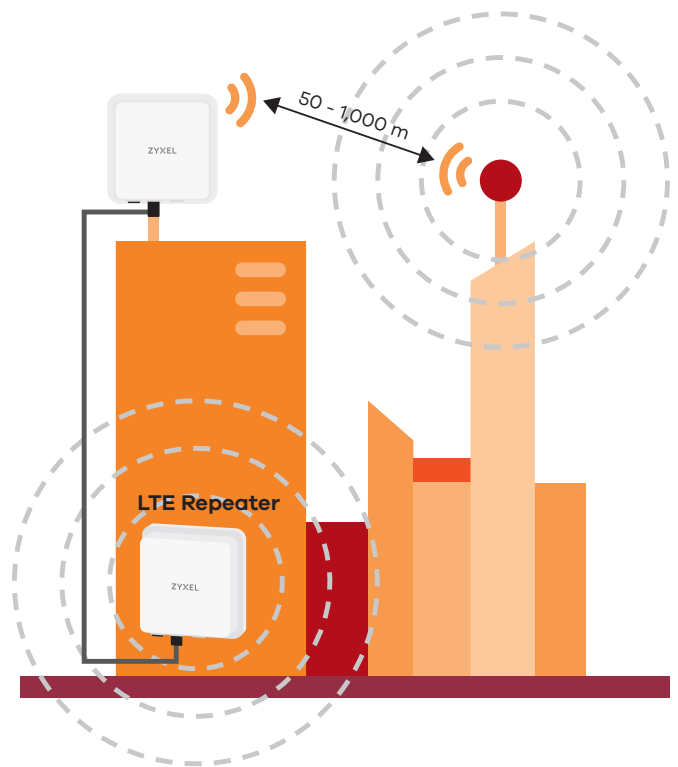
Can't Connect in Spite of Strong Signal?

If repeater is receiving up a poor-quality signal, it is only going to rebroadcast that signal 'louder' with no change in quality. End users will still be stuck with dropped calls and digital noise.

Signal disruption and noise result from excess cable length, antenna loss, and component degradation. Longer transmission lines can compound signal problems, which are amplified by the repeater, further degrading signal-to-noise ratio (SNR).

Non-compliant Repeaters Compound Problems

One problem with cell phone repeaters is that they sometimes over-amplify their signals. This can cause issues for nearby cell phone towers and, in turn, problems for the mobile carrier. For this reason, operators do not want consumers installing and operating non-compliant repeaters in their buildings.

Using a non-compliant repeater disrupts network operations and reduces performance. Their increased power levels can swamp nearby base stations to the point where they become 'blind' to other calls. Coverage is reduced to a small percentage of the original area. As more repeaters are used, coverage degradation only worsens. For a repeater to operate correctly, it would have to respond to network demands to adjust output power when approaching a base station. Because non-compliant repeaters cannot adjust power, they frequently cause severe interference.

How to Remain Network Friendly?

The Zyxel Repeater system stands apart from non-compliant repeaters. It was designed to provide maximum-quality coverage while remaining network friendly.

Symmetric architecture allows the Zyxel repeater to amplify signal and noise when it is initially received, whether DL or UL. This design brings the amplifier directly to the antenna and supports the optimal signal-to-noise ratio. When receiving a good quality signal, it repeats that signal at full strength. Our repeater continuously monitors the power levels of the cell tower it is connected to, adjusting its output power as necessary. The repeater only amplifies and disburses a particular carrier's mobile signal while operating within a set frequency band. This gives the service provider the ability to shut down the repeater remotely using a signal from the base station, if necessary. This all happens without interfering with the carrier's network or other users on the network.

Product at a glance

ZoneDAS

Expansion Unit

- CAT5 cabling
- Excellent sensitivity
- Easy signal optimization
- EMS management
- Low power input
- Hot-swapping module
- Multi-BTS vender
- Multi-system
- Multi-band
- Multi-carrier
- 440 x 270 x 50 mm
- 3,300g

Remote Unit

- MIMO support
- 8 coverage holes
- Remote power feeding
- Built-in omni & directional pattern antenna
- $(50m)^2$ x 8, coverage area
- Modular design
- Extend to passive DAS
- 14 - 23 dBm output power
- CAT5e cable, up to 100m
- 240 x 240 x 64 mm
- 800g

Extender

- CAT5 cabling
- Hot-swapping module
- 440 x 270 x 50 mm
- 3000g

Slim ZoneDAS

Expansion Unit

- Support Off-Air Modular
- CAT5 cabling
- Low power input
- Hot-swapping module
- Multi-BTS vender
- Multi-system
- Multi-band
- Multi-carrier
- 330 x 250 x 50 mm
- 2600g

Remote Unit

- MIMO support
- 8 coverage holes
- Remote power feeding
- Built-in omni & directional pattern antenna
- $(50m)^2$ x 8, coverage area
- Modular design
- Extend to passive DAS
- 14 - 23 dBm output power
- CAT5e cable, up to 100m
- 240 x 240 x 64 mm
- 800g

LTE Repeater
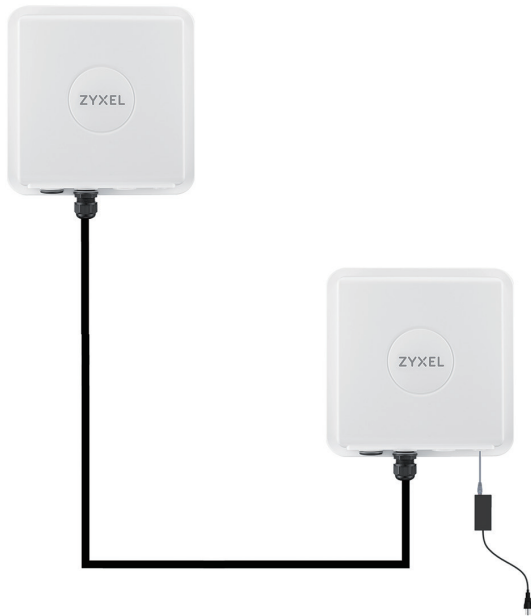
- Channel-selective band
- Symmetric architecture
- Guaranteed end-to-end gain
- Auto cable loss compensation
- Patent-pending echo avoidance mechanism

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For more product information, visit us on the web at www.zyxel.com

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