Success Story

Zyxel Cell Repeater Brings Life-saving Cell Coverage to Remote Hillside Temple in Taiwan

INDUSTRY	CUSTOMER	COUNTRY	SOLUCIÓN
Religion	Stone Guanyin Temple	Taiwan	Zyxel In-Building Cellular Coverage Solution

Overview

Challenges

- Bring cell coverage to remote temple, where signals are blocked by surrounding mountains
- Strengthen signal inside the temple as well as across wide outdoor area
- Provide a reliable solution that is easy to manage and install

Solution

- Zyxel In-Building Cellular Coverage Solution

Results

- Weak cellular signals improved, with stable voice and data services now accessible through local mobile carriers
- Quick, easy-to-install system setup in only one day
- Reliable solution supported by patented two-level signal amplification, featuring up to 100dB system gain

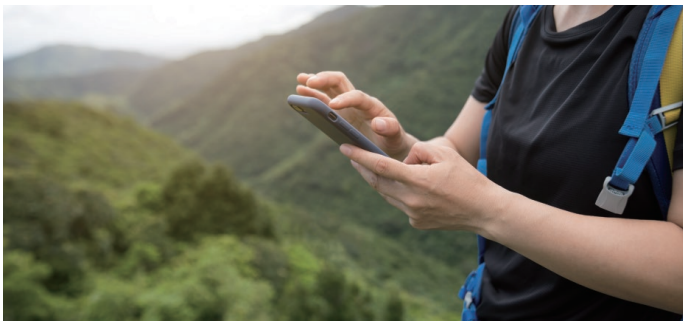
Summary

Ensuring stable communication in remote mountainous areas is notoriously challenging. This was the case for Stone Guanyin Temple in northeastern Taiwan, located as it is literally inside a cave, cushioned between a valley and towering mountains. After learning that an injured hiker had been unable to reach emergency services due to the poor signal, the site's administrators worked swiftly to address the problem. They turned to Zyxel Networks, and we turned immediately to our SymmRepeater Enterprise solution, which is the real hero of the story. Here's why.

Background

Stone Guanyin Temple is quite a sight. Surrounded by green hills and sitting on the crossroads of famous hiking trails in northeast Taiwan, the intriguing shrine is located in a natural hillside cave.

Built some 150 years ago, it is dedicated to the worship of Guanyin, the Goddess of Mercy. Due to its location, the temple is a popular spot to take a break for passing hikers.



Challenges

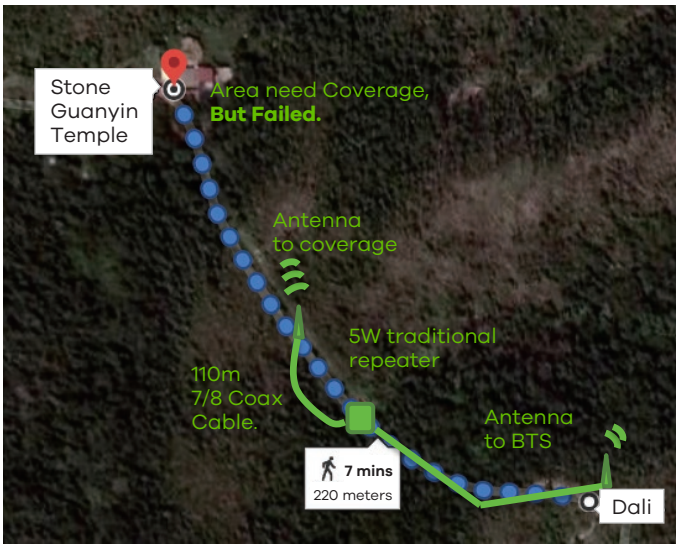
The temple's location in a cave between a valley and steep mountains means cellular signals are not only weak but often not strong enough even to make an emergency call. And this was even after three leading Taiwanese phone carriers had tried installing new cellular infrastructure in the area.

This was until a serious accident involving a hiker put this situation in the spotlight. the injured hiker was unable to reach emergency services. To avoid such an incident occurring again, the temple's administrators moved to improve the site's cellular signals, allowing hikers and worshippers to stay safe.

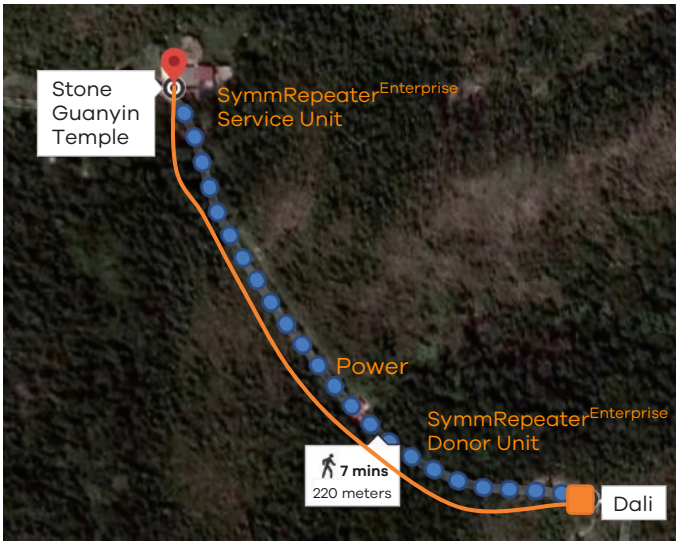
Solutions and Benefits

On the top of the temple administrators' wish list in its search for a vendor was not just strong cellular network infrastructure but reliable technical and after-sale support. They turned to system integrator Tian Po, which specializes in improving signal strength in traditionally hard-to-connect places like elevators, remote areas, and underground parking spaces.

The system integrator initially came up empty when trying to design a solution. At the heart of the problem was that only the Stone Guanyi Temple and the Earth God Temple, which is elsewhere on the trail. have a power supply, and that both are far from repeaters, making it difficult to find the right installation point. The previous solution had used 5W repeaters connected to a BTS antenna via coaxial cables, and required five days for installation as the system integrator had a rough time delivering the cables to their mountainside destination. And even after installation, the RSRP at the donor antenna area was -100dBm, with no 3G/4G coverage.



Early installation



Zyxel's solution

That's when Zyxel was called in, specifically for **SymmRepeater**$^{\text{Enterprise}}$. Using this solution, all that was required was one **SymmRepeater**$^{\text{Enterprise}}$ **Donor Unit and Indoor Service Unit**, 300-meter LMR 400 coaxial cables, and four service antennas inside the temple, with only one day needed for the entire installation. The weather-resistant, robust repeaters are certified with an IP-65 rating, ensuring they can withstand the harsh environment and volatile weather.

Zyxel's innovative solution features patented two-level signal amplification and supports up to 100dB system gain. Zyxel's repeaters can repeat signals from one-bar to two-bar signal strength for as far as 26 km across mountainous and other rural areas. The solution also allows for easy and cost-effective installation, which can be completed with only RG11 coaxial cables. And, with its unique oscillation-avoidance technology, SymmRepeater$^{\text{Enterprise}}$ enables outstanding isolation with auto signal levelling and auto uplink muting, making it invisible to operators.

The Donor Unit was installed on a pole at a height of 400 meters to receive carriers' extremely weak signals. Meanwhile, the Indoor Service Unit was installed inside the Stone Guanyin Temple and used to supply power from the temple through the coaxial cable to the donor unit in the outdoors. Two service antennas were installed in the temple to ensure good signal coverage inside. The other two service antennas were installed facing toward the trail outside the temple to enhance mobile signal strength, enabling hikers to receive strong enough signals and make phone calls in case of emergency.

After years of dangerously poor coverage across this renowned hiking area in northern Taiwan, SymmRepeater$^{\text{Enterprise}}$ has finally achieved what previously seemed to be "Mission Impossible". Outdoors lovers can now access stable, high-speed voice and data connections from all of Taiwan's major mobile operators. In addition to letting hikers and temple staff share mountainside selfies, this also gives them peace of mind, ensuring they can make potentially life-saving calls to emergency services.

Donor antenna and DU

Before installation

After installation

Products Used

SymmRepeater ENTERPRISE Donor Unit and Indoor Service Unit

- Support 2 bands (selectable)
- Support 2G/3G/4G LTE
- End-to-end path length: up to 500m
- Support channelized or full bandwidth
- Service antenna port: 4
- DL Power up to 17dBm
- Oscillation avoidance
- Input power with auto leveling algorithm
- Max. end-to-end gain: 102dB (Tunable)
- Max. coverage space > 3,600m2
- IP65 Donor Unit

About Zyxel Networks

Focused on innovation and customer-centricity, Zyxel has been connecting people to the Internet for over 30 years. Our ability to adapt and innovate with networking technology places us at the forefront of creating connectivity for business and home users.
We're building the networks of tomorrow, unlocking potential, and meeting the needs of the modern workplace — powering people at work, life, and play.
Zyxel, Your Networking Ally.