

The antenna: Pinnacle of Zain Kuwait's LTE network



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Armed with Huawei's ultra-broadband tri-band antenna, Zain Kuwait deployed a modern LTE1800 network with support for LTE800, LTE2600, and LTE-A evolution. The antennas feature EasyRET, which reduces network O&M expense and enhances RET antenna efficiency and reliability.

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A magnificent jewel, Kuwait sparkles with prosperity, culture, and technology. It is no wonder that Zain, a leading mobile telecom operator in the Middle East and Africa, chose Kuwait as their headquarters. Zain Kuwait deployed Zain Group's first wireless network and has been its flagship subsidiary ever since. Today, it is the local wireless market leader, holding a 37% market share while achieving average revenue per user (ARPU) of USD38 per month.

Beginning in 2011, the explosive growth of smartphone use threatened to overwhelm the existing UMTS network. The network capacity was being pushed to its very limit and user experience began to deteriorate. Zain Kuwait rose to the challenge by building a nationwide LTE1800 network, greatly improving user experience. The new network provides high-quality mobile broadband services with a downlink speed of up to 110Mbps.

The antenna solution

Antenna solutions are typically one of the most difficult challenges of LTE network deployment. While the planning is difficult, the potential benefits are significant. With great insight, Zain made antenna system modernization a key task of the LTE1800 network upgrade; the result was

unparalleled LTE user experience.

An antenna ready for LTE800 and LTE2600 evolution

With the introduction of new bands, antenna systems are becoming increasingly complex. Many wireless sites (including radio masts, towers, and mobile telecommunications vehicles) for Zain's network antennas have significant space and weight limitations. While antenna costs represent a small fraction of network investment, during network upgrade, the costs of antenna modernization are actually quite high – higher than the cost of the hardware itself. With an eye on the future, Zain required a solution that would be ready for network modernization and evolution. In addition, they wanted to be capable of meeting growing network demands during the next few years while avoiding the usual costs of antenna modernization. Their plan included maintaining maximal return on investment (ROI) while ensuring uninterrupted network operation. LTE800 and LTE2600 networks will inevitably launch in the next few years to supplement the capacity of the LTE1800 network; with tri-band antennas already in place, Zain will be ready.

LTE network optimization is costly & difficult

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To provide the best user experience, a network needs to be constantly optimized to improve capacity and coverage. LTE networks require more network optimization than GSM and UMTS networks. LTE cells are sensitive to interference from neighboring cells because they operate on the same frequencies. Furthermore, indoor, outdoor, and small cell networks must be properly coordinated in order to maximize coverage area and capacity.

In the past, Zain Kuwait used non-RET antennas for network optimization. A tower worker had to climb a tower to adjust the antenna’s mechanical tilt, a difficult task in Kuwait’s blistering heat. Each antenna adjustment incurred additional expense, which meant that network optimization was more expensive than the procurement price of RET antennas. To ensure accurate network coverage and reduce cost, Zain chose the remote electrical tilt (RET) antenna for their new LTE network.

Diverse conditions onsite

Zain’s existing network featured many different types of sites, each with different weight-bearing capabilities. The antennas were provided by various vendors, and used different parameters for supported band, gain and bandwidth. This made the modernization solution a real challenge. Traditional antenna vendors could not provide sufficient solutions to help quickly build an LTE

network to divert traffic from the overloaded UMTS network. Zain Kuwait was determined to improve customer experience and attract new customers, so they made finding a solution a top priority.

Antennas are the pinnacle of LTE networks

To address these problems, Zain conducted trial tests of products from major antenna vendors and selected Huawei’s ultra-broadband tri-band antenna (790-960/2x1710-2690MHz) for network modernization. This tri-band antenna supports LTE1800, LTE800, and LTE2600 networks in addition to GSM900/GSM1800 networks. It also supports carrier aggregation (CA), which is needed for evolution to LTE-Advanced (LTE-A). This antenna is supported by the EasyRET solution, which allows independent and remote antenna tilt adjustment for each band. Therefore, separate electrical adjustment devices don’t need to be installed and workers don’t need to climb towers. This solution also increases the reliability of the antenna system.

Quick delivery of LTE

In 2012, Zain asked Huawei to conduct site surveys, solution planning, and to coordinate



equipment preparation and delivery of antennas and other main devices. Huawei achieved quick project delivery and reduced end-to-end procurement cost for Zain. Huawei's robust global logistics network achieved speedy delivery to site, ensuring that Zain rapidly established the largest LTE1800 network in the Middle East. The load of the UTMS network was immediately alleviated and user experience was enhanced.

EasyRET: Reduced O&M, increased reliability, efficient optimization

With the EasyRET solution, manual antenna tilt adjustment becomes history. EasyRET enables independent and remote antenna tilt adjustment for each band, allowing real-time network optimization at minimal expense.

Since EasyRET did not require Zain to install remote control units (RCU) and AISG cable, 45 minutes of installation time was saved at each site. In addition, there was no need to configure RET data and RCU serial numbers, saving another 20 minutes per site. The EasyRET antenna solution features three instead of 15 external connection points, reducing the complexity of manual operation and hence improving RET reliability.

After two years of outdoor operation in the desert sun, Huawei's EasyRET antenna maintained high reliability with zero failures. The LTE network performance is also improving through continuous

optimization.

One antenna deployment to meet long-term evolution requirements

Huawei's ultra-broadband tri-band antenna supports 790MHz to 960MHz low frequencies and also supports LTE800 and GSM900 through a combiner. This makes the whole antenna system lighter, easing deployment on guyed towers and cow sites. The antenna has two ultra-broadband high bands (1710MHz to 2690MHz), allowing evolution to 4x4 MIMO. In addition, the antenna's high band adopts side-by-side architecture with outstanding high-order MIMO performance (In an LTE1800 network, the cell edge throughput of side-by-side architecture is 9% higher than stacked designs).

The antenna also adopts the same azimuth for LTE800 and LTE1800 networks, thereby supporting CA of LTE-A. CA can greatly improve network capacity and reduce the operator's network deployment and O&M costs.

Zain was the first operator in Kuwait to announce the launch of LTE-A services. Their LTE1800 network delivers high-quality and high-speed wireless services such as video conferencing, real-time navigation, HD video-on-demand, and SNS. These services have changed the way people communicate and live; subscribers are now flocking to Zain, whose customer base grew by 8% in 2013. 