



Case Study: Smart Grid AMI

TATUNG Leveraged Billion Low Voltage AMI Module to Win Taipower National Smart Grid Project



Executive Profile

Established in 1918 and headquartered in Taipei, TATUNG Company has evolved into a conglomerate from its strong heritage. As a conglomerate, TATUNG's investees involve in some major industries such as optoelectronics, energy, telecommunication, system integration, industrial system, branding channel, and asset development. TATUNG focuses particularly on the development of advanced technologies and a global network of operation. With its overseas branches expanding into 12 countries.

Summary

TATUNG, a leading provider of energy, telecommunication, and AMI (Advanced Metering Infrastructure), participated in the Smart Grid project with Billion by offering a comprehensive AMI solution. Initiated by the Taiwanese government, Taipower's Smart Grid project aimed to retrofit the entire power grids by combining traditional electricity distribution with IC technology to make the grids two-way communicational. With the goals to reduce carbon emissions and increase energy efficiency, the power grids served as critical backbones transferring electronic information from end users back to Taipower, who then customized electrical distributions most suitable for local demands. TATUNG supplied smart meters embedded with Billion's low voltage communication module to complete the Taipower's Smart Grid/AMI ecosystem. Taipower is the largest, state-owned power company

in Taiwan.

Location: Taipei, Taiwan

Challenges

The first step to establishing a smart grid network and AMI is to replace mechanical meters with smart meters. Powerline Communication (PLC) and wireless are the two main communication protocols used in low voltage AMI. PLC can be classified into Narrowband Power-Line Communication (NPLC) and Broadband Power-Line Communication (BPLC) depending on the size of transmission bandwidth. TATUNG, the only AMI system supplier who has visible Smart Grid installations in Taiwan, used to deploy wireless modules in its wholly-owned smart meters but didn't receive a positive result. Smart meters were installed on the distribution boxes with electrical breakers at residential and commercial sites in Taiwan. Due to the countless variations on architectures, ranging from traditional markets, old-style apartments to ancient buildings, the wireless signal sent from the smart meters could easily be interrupted by random objects, such as walls, concrete, and trees. Taitung used to experience massive networking instability and Internet disconnection by adopting the wireless technology. Thus, they were looking for partners who could provide mature PLC expertise in either NPLC or BPLC to stabilize the transmission links and create consistent networking flows.

Our Solutions

Since Billion has had over 40 years of experience working in the fields of power, energy, and telecommunications, TATUNG wanted to leverage Billion's know-how and facilities to upgrade the infrastructure of its smart meter. TATUNG smart meters embedded with Billion's BPLC communication modules were deployed at over 12,000 households, commercial building, markets, etc. to build automated meter reading and generate electrical information. With the optimal size of bandwidth enabled by BPLC, Taipower could primarily reduce demand response time and system latency. Substantial electronic data collected from IHD (In-Home Display) were automatically updated in Taipower's utility system by end-point smart meters. Taipower used these electronic data to generate integration analysis, monitor, and modify the electrical distribution of different circuits with customized allocations of power resources. By this way, Taipower was able to facilitate system maintenance in real-time to reduce costs, improve reliability, and boost energy efficiency.

In the cooperation with TATUNG, Billion's low voltage BPLC communication module:

- Acted as an essential component maximizing the speed of networking correspondence up to 100%
- Worked with three metering manufacturers and two DCU (Data Collected Unit) providers
- Provided value-add services that can be developed to reach energy conservation and carbon reduction
- Retrofitted the structures of traditional power grid and microgrids to ensure that distributed energy can meet the local energy demands

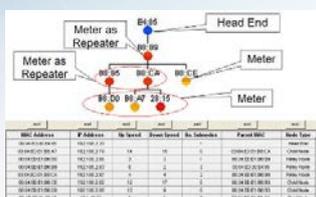
Our Solutions

Billion's low voltage BPLC modules offered steady, powerful power-line communication for Tatung's smart meters to communicate seamlessly with MDAS (Metering Data Management System) and DCU. BPLC was able to bypass environmental constraints, such as apartment basements, concrete walls, huts, steel plates, trees, etc. and transmit the electrical information to back Taipower without disconnections. Compared to wireless technology, Billion's low voltage BPLC communication modules significantly furthered the transmission distance, as well as broadened the signal coverage and available networking bandwidths. The maximized bandwidths are expected to support value-added service provided by Taipower in the future.



Description:

Proof of concept built by Taipower to test medium voltage BPL and low voltage AMI on site. Billion low voltage BPL communication modules were built-in at TATUNG smart meters at several residential apartments.



MAC Address	IP Address	No. Meter	No. Submeter	Parent MAC	Node Type
00:04:00:00:00:00	192.168.1.1	12	12	00:04:00:00:00:00	Head End

Description:

Low voltage performance report at the Proof of Concept field with 10MHz bandwidth. For example, the repeater B8:B9 uplink was 5M with a downlink of 2Mbps; the CPE B8:A7 uplink was 14M with a downlink of 15Mbps. Medium voltage performance report at the Proof of Concept field. Uplink was 17M with a downlink of 49Mbps.

