

# Paper 143 High precision synchronous phasor measurement based on 5th generation mobile networks

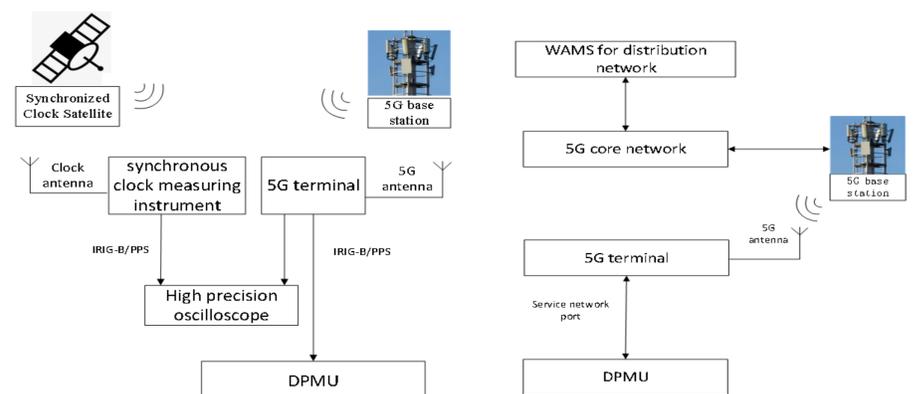
Xu Quan\*, Yuan Zhiyong, Lei Jinyong, Lin Yuehuan  
Electric Power Research Institute, CSG, Guangzhou, China  
\*whyxq@163.com

## Abstract

With the construction of new power system, large-scale distributed energy will be connected to the power grid. Based on the synchronous measurement information, we can give full play to the potential of multi-resource cooperative operation. It can ensure the green, safe and reliable operation of the power grid. At the same time, it can improve the capacity of the power grid to absorb large-scale distributed energy. However, current 4G and other wireless communications are usually difficult to meet the requirements of real-time coordination and control, and the cost of optical fiber communication is high. At the same time, the cost of BDS or GPS time service is high, and some antennas are difficult to install. This paper carries out the test of commercial engineering. In terms of timing, the test results show that the error is within 150 nanoseconds. In terms of communication delay, the results show that the maximum bidirectional delay from PMU to master station is less than 37ms. Through 5G module, the low delay communication and high-precision time service of PMU can be realized. The two difficult problems of field communication and time service can be solved in the field of situation awareness, control and protection.

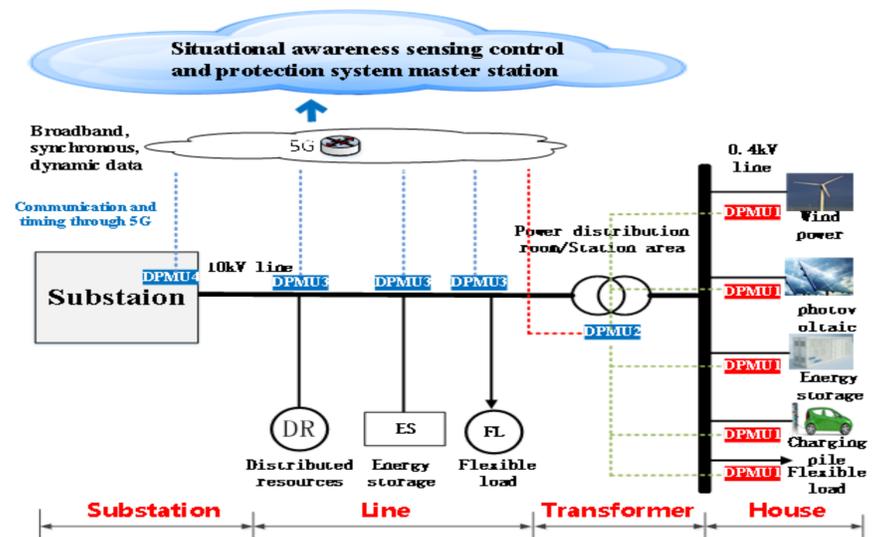
## Commercial field test methods for DPMU

The timing accuracy test method is shown in Fig. 3. The delay time test method for DPMU is shown in Fig. 4.



## Prospect of DPMU integrating 5G

Based on 5G technology, different series of PMUs can be developed. Large scale deployment of different series of devices in "substation-line-transformer-house", which can solve common key problems of distribution system with large-scale distributed energy.



## Conclusions

In the commercial scenario, the test of 5G based DPMU is completed, which verifies that the existing commercial 5G network can meet the requirements of situational awareness control terminal for channel bandwidth, timing accuracy and communication delay, and shows the broad prospect of 5G technology in the application of intelligent distribution network situational awareness control.