Integrating Wireless Communication and Broadband Powerline Communication: Applications of Networking of Depreciation Data Acquiring System

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Abstract — this study focus on the core point of view of the uplink channel of broadband Powerline Communication (PCo) and meter device for reading from the society to the control master station is wireless that is mean, the concentrator connects directly to the master station using by the internal wireless module. A new networking point of view was suggested in this study to contribute in solving the uplink channel problem in case poor signal areas or non-signal faced in the on-site application. At the present time, Wireless Communication (WCo) modules of the concentrator in this respect are installed as separated modules. Meanwhile the uplink (WCo) and the local (PCo) were accomplished by the internal gateway of concentrator specifically. To choose a building with a suitable (PCo) and set up a Powerline broadband is private gateway and (WCo) module (with antenna) on good or high window with very good signal, but with adherent little shelter to make an "upside –down" communication structure. While the downlink from the major station to the concentrator is reversible at the same time also if compared with the original mode, the obstacles and difficulty of constructions on resources and workforce of new point of view are   more cost-effective; from the standpoint of the working principle, in the two-way transition of the Powerline by carrier communication (broadband). While the wireless access point can be chosen easily and the information is often much reliability, security and stability. In addition the data transfer rate is very high; moreover the bandwidth resources can be fully used.

Index Terms— Networking, Powerline Communication (PCo), Wireless Communication (WCo), BPL carrier chip, PHY Chip.

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1 INTRODUCTION

Considers the stable and reliable communications system one of the important aspect as a vital factor in energy depreciation data acquiring system. It should ensure the reliability, timeliness, security, or will be implemented in the operation and management of the entire system [1]. Due to restrictions on the money and planning and a lot of other reasons, and distributed base station communications in a private network power unequally, and coverage is not comprehensive in the practical application of energy depreciation data acquiring system, which lead to a weak signal as our signal in some Communities. The weak wireless signal or no signal. In addition, affected the (WCo) by obstacles during transmission, due to the lack of specialized signal repeater for radio and other equipment, which would cause the failure of the wireless communication between groups of the individual's intense and master station remote in the region and cannot be loaded command data. As a result, singing and means of communication cannot meet the actual requirement. Only with a comprehensive consideration of the various modes of communication on the basis of complement each other and positioning on the local conditions can be achieved telecommunications field. This study aims to analyze the problems happened in the (Wco) between the district and the station remote master in power gather information, depreciation, combined with practical applications, as a suggested solution applied energy, depreciation information collection network system that combines broad-

band Powerline communications (PCo) and wireless communications (WCo), Moreover, tests carried out by the actual feasibility [2].

2 GLANCES ABOUT BROADBAND POWERLINE COMMUNICATION (PCo) AND WIRELESS COMMUNICATION (WCo) IN ENERGY DEPRECIATION DATA ACQUIRING SYSTEM

2.1 Review Stage Application of Broadband (PCo) in Power Depreciation Data Acquiring System

The system usually operates broadband Powerline carrier in the instance frequency range of 1 ~ 40 MHz, it is best to avoid traditional low-frequency interference. Using orthogonal or spread spectrum modulation to achieve data transmission mega above, the data transfer rate of the physical lay-up to 200 megabits per second. With a high data transfer rate and a higher degree of reliability, the broadband Powerline carrier used widely in low voltage Powerline communications (PCo) carrier in recent years, and Become a mainstream technology of the new generation Of low-voltage Powerline carrier communications. At the present time ,Has been applied this technology widely in power PLC depreciation data acquiring projects in all

regions of the country as well as home within the grid. In energy consumption data acquiring system, broadband It consists Powerline carrier network meter reading system master station software system, broadband Powerline carrier condenser, and broadband Powerline carrier and collector meters. Put the acquiring of this system are: broadband carrier Intensive + broadband carrier collector m + RS-485M; intensive broadband carrier + carrier broadband +485 collector / pulse converter + mechanical meter pulse; Intensive broadband carrier + carrier broadband meters [3].

2.2 Application of (WCo) Technology in Power Depreciation Data Acquiring

In this subject the communications channel remote meter and remote reading from the community to control the master station, a public wireless network GPRS, wireless public network CDMA, while wireless private network and fiber optic communication all of them are the common modes currently used. Comparison with (WCo) and optical fiber communication is relatively stable and reliable. In this respect and due to the high cost of construction, and fiber-optic connections are applied to a very narrow range, and the remote channel is basically relying on the media to a wireless network. And to a large extent influenced by the wireless communication same obstacles during transmission because it can shorten the after the move strongly. Given that the data wirelessly transceiver open and other devices can get this data within the scope of RF, it is very necessary to take several modes such as end - to - end advanced encryption standard dynamic frequency - hopping to ensure a safe transition of data. Compared with the private connections that self – constructed channel for public facilities, public (WCo) network method (also known as Channel Communications and Public Relations) uses or rents public communications resources constructed by the public telecom operators. IT services such as network GPRS and CDMA submitted by the operators of mobile phone networks [4].

Majority used in this channel of communications and public relations. While Public wireless networking technologies overmatches those private wireless networks on the views of network coverage, Improvement, and play, etc., because the original The intention of the public telecommunications network channel provides the resources of social communication to the public, on a channel of communication for the public network users should energy information collection system based power a series of techniques to meet special needs. This is especially true on technologies related to security, reliability, real-time application, extensibility, and economic efficiency. Therefore, some restrictions on a public wireless network it can be seen applying power connection,for instance authorized by the Management Committee of the Malaysia Radio, private wireless communications network is the data communications resources based on (WCo) technologies, which have been built on many two and many two -point and a single frequency in the spectrum specified . Development of wireless network is currently the main mode works by Malaysia is an energy system, such as wireless 230MHPrivate network communications

and wireless SCDMA many companies' communication technology in Malaysia. Short the construction period, a secure channel of communication, real-time application and flexible networking are its advantages. Although wireless networking technologies become mature after years of the application on the power system, some of the problems and restrictions can still be observed in practice [5]. On one hand, and an important professional techniques for installation, operation and maintenance. On the other hand, due to the limits less power stations, private networks and planning, capital often cause different distribution and wireless coverage signals. As an outcome, you cannot for some individual communities receiving a signal or can only get bad signals easily. Besides, in the according to the organizing various community programs, some are installed in areas lacking concentrates of such signal parking underground basement, others are blocked by high-rise buildings. All of these main reasons mentioned above, along with the lack of special equipment such as radio signals workstation can lead to the failure of the local (WCo) between Intensive and remote major stations, and the data it cannot be transmitted thereby. All these problems mentioned above, along with those obtained from the energy information collection site reveals limits communication method and one that cannot be handled signed a wide-ranging problem in the energy information collection system. Less stable signals are blocked often occurs in the power, depreciation data acquiring at the site and led projects from material misstatement of this mono-communication method. In order to solve the problems or not, weak signal between the main terminals for local and remote, Put " reverse " consisting of specific Powerline Gateway Broadband and (WCo) module (with Antenna) is suggested in this study [6].

3 NETWORK STYLE OF INCORPORATED CO-MUNICATION TECHNOLOGIES

3.1 Telecommunication Construction Network Joining BPL and (WCo)

With a view to solve problems such as the poor condition communications due to blocking the wireless signal during transmission, and can take three main steps to perfect the construction of networks of " upside down" structure of telecommunications transmission concentrates in the area and the master adapters station in the distance . The first step, and outside areas without or with weak signals, signals in the community, a region that is the wireless signal It was a good choice, such as windows of residential high-rises. BPL gateway task, especially with the phrase attached to the Powerline near windows, BPLC Channel between the condenser and the private ferry Powerline will be held by the patch. The second step is attached, CPE and wireless antenna near Powerline gateway, and data transfer can be recognized between Powerline gate, especially wireless and CPE is using the Ethernet interface and CAT5 twisted pairs. The third step, the channel is established, reliable wireless signal between the CPE and wireless master station in the distance through the antenna, in order to achieve communication and data transfer between the concentrator and the main

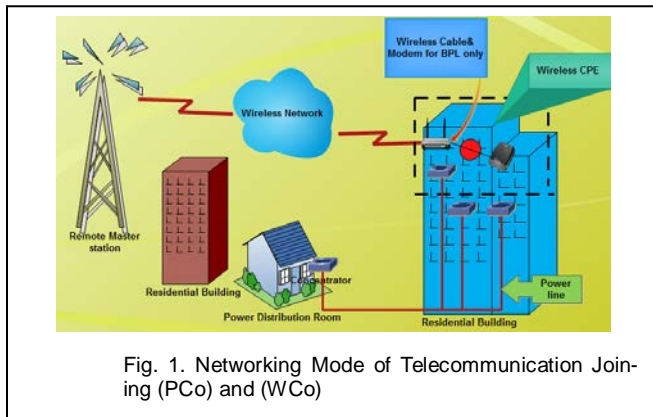station in the distance. Mode appears in (Figure 1) networks [7], [8].

Fig. 1. Networking Mode of Telecommunication Joining (PCo) and (WCo)

3.2 Configuration System (Modem BPL-only)
The BPL modem only in this study consists of MCU, BPL Carrier unit and a unit of the Ethernet PHY chip, as is shown in the following Figure. 2
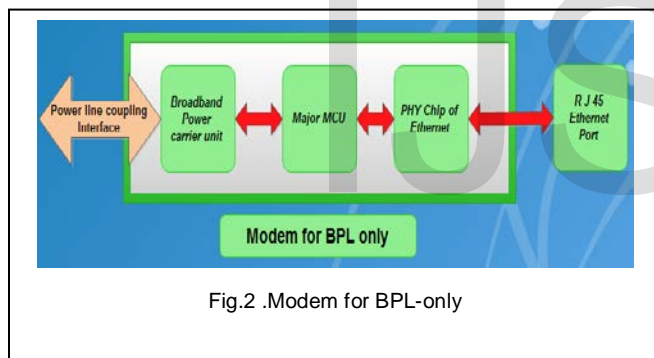

Fig.2 .Modem for BPL-only

1. BPL Module Carrier

 BPL module consists of the BPL chip carrier, filter circuit of the carrier signal, and circuit coupling BPL, and so on Filter circuit of the carrier signal consists of a filter circuit and input output circuit. In the form of Powerline carrier, meter reading BPL signal coming from the carrier concentrates are filtered frequency noise is appointed by the input filter circles, and converted to a signal processing data via the carrier BPLChip, and transmitted to the MCU. Similarly, processed by the MCU, the command signal from the Major broadcast station in the distance to the carrier BPL Converted to chip carrier BPL signal, then sent to the Filter circuit output to the filter , in order to avoid signal - to - noise coupling Powerline . By coupling coupled to the circuit and the signal from the BPL unit to a Powerline, or BPL signal is coupled to the front of the Palestinian Legislative Council (PLC) from the unit. After receiving it, and the Legislative Council will capacitor continue to transmit to the PLC device to obtain data in accordance with's Internal network protocol [9],[10].

2. Major MCU
 A dynamic routing table in storage MCU, indicating, respectively, the IP addresses used in the telecommunications and power lines and wireless communications, in order to determine the source and destination information, and to ensure that the function of the gate-way communication and isolation between the net and external Powerline.Modular unit , and the unit MCU comparison and analysis the source IP address of the head frame analysis and data IP address from the list of IP in storage MCU , in order to determine whether the data received from the wireless communication Network or PLC , and function as a gateway isolate the Powerline network . Then according to the objective of the network data, will MCU seal source IP address of the president of the data frame, and finally send data packets unit of the Ethernet PHY chip, and transferred to the main station in the distance by wireless CPE. Currently, if the unit of the Ethernet PHY chip is busy, the MCU will send data packets to the queue data from the MCU Storage, and transmission of data sequentially until current the unit has been sent Ethernet PHY chip from outside. If the queue full, you will notice the MCU and PLC unit not to receive packet data until there is a vacancy in the data queue. Similarly, the data leadership transition descending from the major station in after the experience of the investigation of the source IP address of the data frame, and re- packing and shipping after arriving MCU. Function unit of the Ethernet PHY chip is to transfer data MCU via RJ45 port, and send it to the major station in the distance by wireless CPE; receive commands from the data RJ45 Port, and sent to the MCU[11],[12].

3. Ethernet and PHY Chip Unit
A task unit of the Ethernet PHY chip is to transmit data from the MCU via RJ45 port, and send the data to the master station in the distance by wireless CPE, for the completion of data transmission of BPL side to side wireless; receive a data command from the RJ45 Ethernet port, and sent to the MCU. The link between the unit and Ethernet PHY chip MCU is recognized through the MII.

4 TELECOMMUNICATION MODE AND APPLICATION JOINING BOARDBAND (PCo) WITH (WCo)

Application in the this field, and five in a society of adapters from Malaysia –Penang is selected and test of the goals development of telecommunications combines broadband (PCo) and wireless to raise the rate of communication on the Internet of concentrated in the main station after the patch. After the field survey, and five with a low rate concentrates online has been chosen. Among them, concentrates in the area of three – phase H34901, is placed also H34902 and H34560 in a signal blind spot in the underground garage; concentrates in And H34660 stopped in the box and sub - stations which are under

intense covering the surrounding residential buildings; concentrates H34790 they have low rates on the Internet because of the dense cover Of tall trees. Through corrected by installing a Powerline modem, CPE and wireless antenna fix in residential windows in buildings, and these five concentrates achieve network status combining broadband (PCo) and (WCo) and building stable channel of communication between local concentrates in the fields of area and the main station remotely. Track records in the case of concentrated on the internet and five transformers should be made in the community in 30 consecutive days at the side of the main station. Must be released parameter to focus every 30 minutes of every day see if the side of the main station gets a response in order to test online rate of five concentrates. Compared with the online rate of five concentrates before the patch, the outcomes are as follows (Figure. 3) [13], [14].
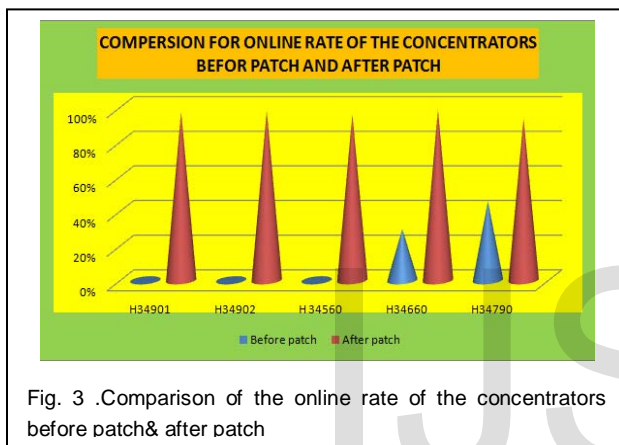

Fig. 3 .Comparison of the online rate of the concentrators before patch& after patch

5 CONCLUSION

Through the analysis of the problems in for this study that occur in the communications between the stage and the main stations through the acquiring of the energy, depreciation information, and this paper provides development of telecommunications combines broadband (PCo) and (WCo) that solves problems and clogged wireless fading signal, signal, signal blocking and signal instability through wireless communication between the regions and the stage consecutively for the main stations. In this respect this situation has been proven to be practical and effective to improve the success acquiring of energy depreciation information. In the future, a joining of broadband (PCo) and (WCo), as well as Information and Communication will provide another strong support for wider coverage and acquiring for information on energy depreciation.

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