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## Energy Meter Reading Using Wireless Communication System

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**ABSTRACT:**Energy meter reading is a tedious and a costly issue. The meter reader needs to go and take the reading physically to give the bill, which will later be entered in the software to computerize the charging and installment system. It would have decreased the relentless task and monetary wastage if can mechanize the manual meter understanding procedure and bill information passage process. This paper proposes another arrange communication system for Energy meter reading by incorporating communication innovation and software system alongside the current meters. A wireless or wired communication system will be coordinated with electronic Energy meter to have wireless access over the use of power. Despite the fact that they are two unique modules, Energy meter convey the reading subtleties as on when it requests by the communication system. The communication system is additionally associated with power provincial/sub-regional office, which will rather go about as a base station. Rather than making a different communication system and spine, any of the safe existing communication administration foundations may likewise be used to maintain a strategic distance from any initial investments. The communication channel is distinguished by the buyer's number and it is made secured by any cryptographic standards. Base office can check the Energy meters execution by checking the everyday utilization of Energy. This will likewise assist with keeping away from any tempering or break-down of Energy meter.

**KEYWORDS:**Energy Meter, Energy Calculation, Reading, Power Measurement, Wireless Communication

### I. INTRODUCTION

Considerably in the wake of shutting all the entryways of theft and tempering of the power by taking number of measures, for example, presentation of electronic meters, the expense of power is as yet rising. This is expected to the absence of polished methodology in dealing with the dispersion and estimating system and liberal authoritative costs. Present Energy meter [1] reading is a monotonous and a costly task as various meter readers needs to proceed to take the reading physically (from the shopper's home) to give the bill, which will later be entered in the software to computerize the charging and installment system.

Besides the possibility of tempering the understanding subtleties and not announcing the robbery endeavors are normal. Another significant burden with the current system is, that on the off chance that one electronic Energy meter separates, the workplace will come to know simply following two or much more months relying upon the obligation of the individual who is going to take the reading of shopper, to fix or supplant the harmed meter.

This paper proposes a wireless communication [2] system for Energy meter reading by coordinating communication innovation and software system with the current meters, which is required to diminish both power estimating and authoritative change of expenses. Wired or wireless communication system will be coordinated with Electronic Energy Meter (EEM) [3] to quantify the utilization of power wirelessly even from the workplace. Despite the fact that they are two unique modules, Energy meter conveys the reading subtleties as on when requested by the communication system. The communication system [3] is further associated with power local/sub-territorial office, which will rather go about as a base station to measure the inventory of power even without the intercession of meter reader. Rather than making a separate communication system and spine, any of the protected existing communication administration foundations

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may likewise be used to decrease any overhead cost that comes in introducing the proposed system. The communication channel is recognized by the shopper's number and it is made secured by any encryption [4] principles. Whenever base office can check the Energy meters execution by checking the everyday utilization of Energy in order to stay away from any tempering or separate of Energy meter.

## II. PROPOSED WORK

Proposed system is represented in the Figure 1, which has three primary modules, Consumer's Automatic Electronic Energy Meter (AEEM)[5], Communication System, and a Base Station. Previously explaining further on the proposed convention, the documentations utilized right now characterized underneath. AEEM are utilized to quantify the inventory or use of the power. The EEM is implanted with Automatic communication Device (ACD) [6], which can be depending on both wired and additionally wireless innovation. Since AEEM is a blend of two autonomous modules, breakdown of one won't influence the working of other. On the off chance that the Energy meter separates, no sign will be gotten by ACD, and this blunder will be answered to the base station; and if ACD separates, no sign will be gotten by the base station, and their software will report for earnest fix. AEEM is distinguished by its one of a kind purchaser's number. At a time ACD will be in any of the dynamic/inert/rest mode. ACD is engaged with a Lithium battery to have a continuous assistance and for a particular time (say 10:00 AM to 04:00 PM) to expand the life time of the gadget.

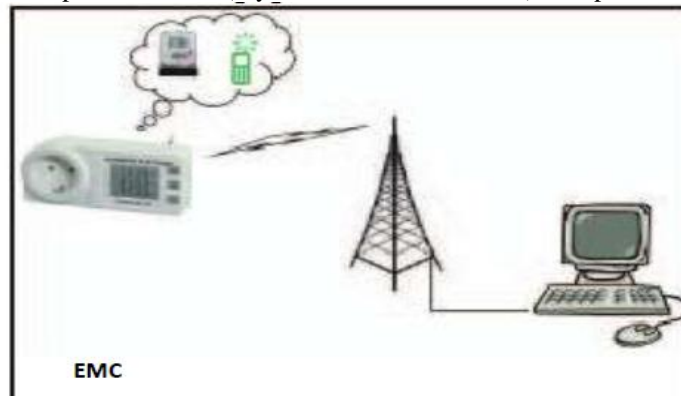


Fig.1: Proposed Communication System

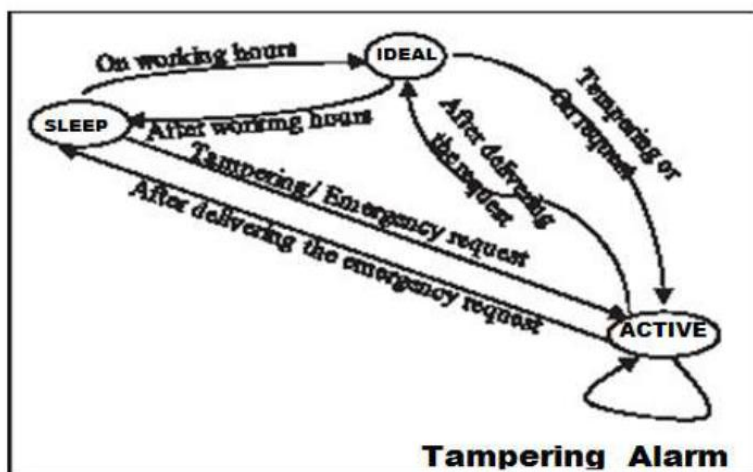
During the inert mode practically 70% of the segments will be in working mode. After the stipulated time, the gadget will rest mode where practically 90% of the segments are not in the working state. Figure 2 shows the state graph of AEEM. Base station is where all the AEEM are controlled with the assistance of software; this paper calls it as energy meter controller.

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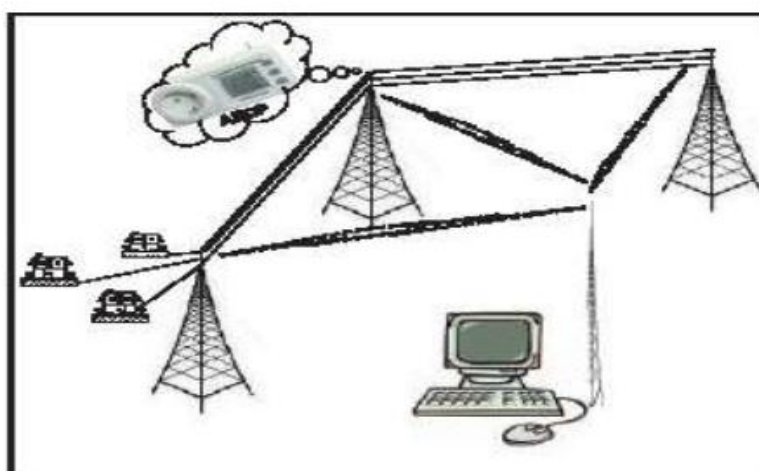
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**Fig.2: State Diagram**

Consistently EMC will take the reading with the assistance of AEEM what's more, store the data in their database. Month to month or every other month bill will be produced consequently as the parameters are set. Whole or part of working system or software or parameters can be set from the EMC room itself. The approved people can take the rundown of fix rundown and alter boycott, to take important activities to keep away from any further misfortune or robbery of power.



**Fig.3: Typical Transmission System**

In the case of standing directions, credit/charge card or any prepaid plan is incorporated with EMC, line before charge installment segment can likewise be dodged. Regular transmission system is appeared in Figure (3). Communication systems are the spine utilized by the base station and AEEM to send and get messages/demands. Spine, for example, any of wired (optical/link) or wireless (GSM/CDMA/other 3G conventions) or both can be utilized.

With regards to the communication to control or deal with the proposed system, for the most part four circumstances emerges which needs extraordinary consideration.

*Daily Report:*

This is a report with respect to the utilization of power by a customer. In the event that no reacts from the AEEM, EMC will arrive at a resolution that the ACD isn't working appropriately and it requires pressing consideration. Figure 4 (a)

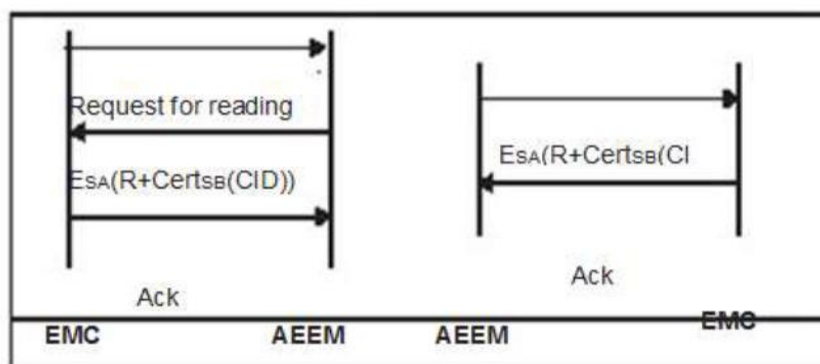
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shows the exchange subtleties for creating day by day report. After accepting the solicitation for every day report, AEEM will send a scrambled message,  $E_{SA}(R+Cert_{SB}(CID))$ , and a computerized declaration given by base station, B, when parameters are set in ACP. In the event that B can decode the report effectively, at that point ACK will send.



**Figure 4. Comm. b/w AEEM & EMC**

**Fig.4: Comm.b/w AEEM & EMC**

### *Tampering:*

When anybody attempts to interfere, by breaking the equipment or software of AEEM, a hardening message will be send by scrambling utilizing the AEEM's private key [7], alongside their computerized signature. Figure 4 (b) shows the exchange subtleties. In the event that B can unscramble effectively, comparing CID will be accounted for and put operating at a profit rundown and ACK will be send.

### *Change of Parameters:*

Specifically, predefined parameters in the AEEM can be changed (set or reset) by EMC, for the refreshing and smooth running of AEEM. Encryption systems are utilized to guarantee the security of the communication.

(4) In the AEEM, three sorts of software's are utilized. (a) System Initialization of Software (SIS), which is the fundamental system level software that will run constantly (in any event, during the rest mode) requires very less assets (state half), which can't be reinstalled from the EMC b) Operating system (OS) [8] in the AEEM in intended to run with the accessible limited assets and can be reinstalled from EMC with the assistance of SIS. (c) Control Software (CS) [9] can be introduced or uninstalled with the assistance of OS, which really scrambles/decodes or sending/accepting the reports from EEM, etc. EMC can set/reset the parameters in the CS. Figure (5) shows the communication [10] between AEEM, AACP, and EMC.

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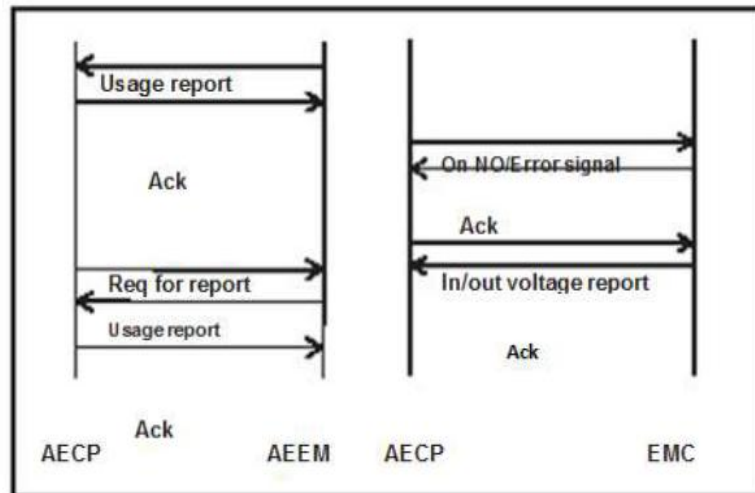


Fig.5: Comm.b/w AEEM, AECP & EMC

## III. CONCLUSION

This paper proposed a hypothetical model of an effective and make secured Network Communication System for Energy Meter Reading issues. Since all the entryways are shut to keep away from any conceivable tempering, present loss of power issue will impressively lessen. Increasingly over the overhead cost for meter reading will be nearly nil, when the Automatic Electronic Energy Meter is presented. The encoded secure communication will confine the burglary and tempering of Energy meter. The security of this system lies on the security and vigor of the encryption standard and diverse homomorphism, permutation and mix capacities utilized in encryption calculation, which can additionally be changed and created to improve the effectiveness of the convention.

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