

RF Arrays Systems Pvt. Ltd.



Energy Management - Case Study



iEMS: Intelligent Energy Management Solution

iEMS solution for the wireless automation of the 11KV Distribution Substations(DSS) enabled BEST Mumbai to have real-time data acquisition, monitor and control of its 11KV DSS network.

THE PRODUCT

iEMS - **Wireless Substation Data Acquisition and Control**

(Complete supervisory control and data acquisition system) based on IEEE 802.15.4/
ZigBee - open standard communication system

THE CLIENT

Brihan Mumbai Electric Supply and Transport Undertaking (BEST) Mumbai is one of the oldest utility of India catering to the unhindered electric supply to the commercial capital of India.

PROJECT DETAILS

Area of work: Wireless Substation Data Acquisition and control, energy management systems, master station, remote terminal units, ZigBee communication.

Problem addressed: BEST undertaking's 11KV distribution network was managed by high cost SCADA network operating on OFC cable. Given the landscape of Mumbai and its difficulty in having the OFC cable installed at every DSS, and maintaining them, BEST was facing the difficulty in automation of their network and running it without any failure.

Solution implemented: RF Arrays replaced the existing SCADA RTUs with ZigBee based custom RTUs which when installed can communicate through a wireless network. RF Arrays has successfully established a ZigBee MESH cluster network in each of the area covering around 5 SqKms. The substation data is collected at the data concentrator/Data logger through 2.4GHz RF Frequency using the ZigBee protocol.

In this pattern the given area of project work was divided into optimum RF clusters. The Data logger of each RF cluster collects the substation data through RF communication network and uploads the data to the Master control station at regular intervals through the GSM link.

Data transfer between the RTU's and the Data logger coordinator is through license free 2.4 GHz ZigBee network. The communication between the data logger coordinator and the Master control station is through the GSM network.

TECHNICAL ARCHITECTURE:

RTUs name version RFA (Substation Data Automation Unit): **RFA010005**

Routers name explanation: **RFA01003**

End Device name: **RFA01004**

Data logger coordinator name explanation: **RFA01009**

Co-ordinator with GSM: **RFA01002**

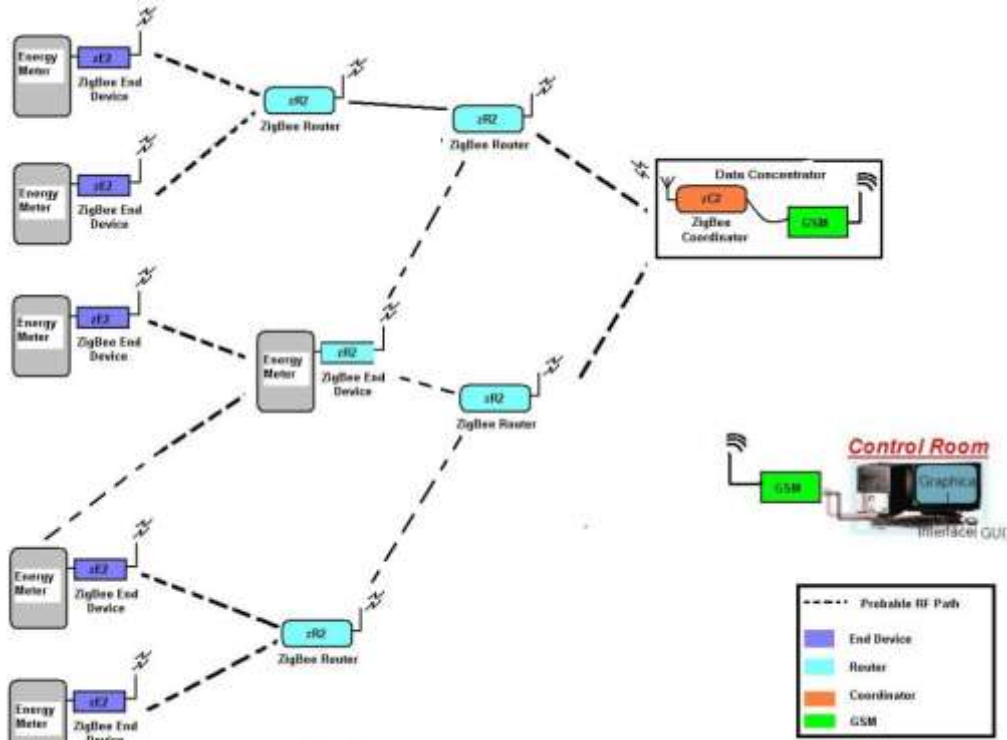
Architecture Diagram:

Fig 3 **ZIGBEE CLUSTER MESH NETWORK**

The above figure shows the block diagram of the system at RF cluster. Each of the end devices are connected to the RTU in the substation and are supported by the router network to send the data to the ZigBee coordinator connected to the data logger. The Routers are mounted on the street lighting poles across the streets. The data concentrators of each cluster send the data to the server as per the periodical server requests. In case of an event occurring at any of the substation, the event is logged onto the Data logger which is duly reported to the server.

BENEFITS:

- Remote Monitoring and Control.
- Easy Fault Detection.
- Very Short Repair / Maintenance Time.
- Effective Distribution Management.
- Self Healing Network (ZigBee Network Feature).
- Reliable and Cost Effective.
- User Friendly GUI.
- Low Maintenance Cost