E4-E5 (CM)

Optimization of Mobile Network

WELCOME

- This is a presentation for the E4-E5 CM-Module.

- Topic: OPTIMIZATION OF MOBILE NETWORK.

- Eligibility: Those who have got the up-gradation from E4 to E5.

- This presentation is last updated on 11-04-2011.

- You can also visit the Digital library of BSNL to see this topic.

AGENDA

- Optimization Of Mobile Network

- Optimization Process

- Inputs for Optimization

- Performing Optimization of GSM Network

- Coverage Plots – RXLEV and RXQUAL

- Optimization Solutions

Optimization of Mobile Network

❑ Competitive Scenario – *QoS of Mobile Network.*

❑ Retaining Customers - *Need to continually improve QoS.*

❑ QoS Parameters –
   ❑ Contiguity of Coverage.
   ❑ Accessibility.
   ❑ Speech Quality.
   ❑ Fewer Dropped Calls.

Optimization is a continual process for improvement of QoS of the network.

Optimization of Mobile Network

Mobile network customers may face unwanted situations like

- Call drop.
- One way talk.
- Echo.
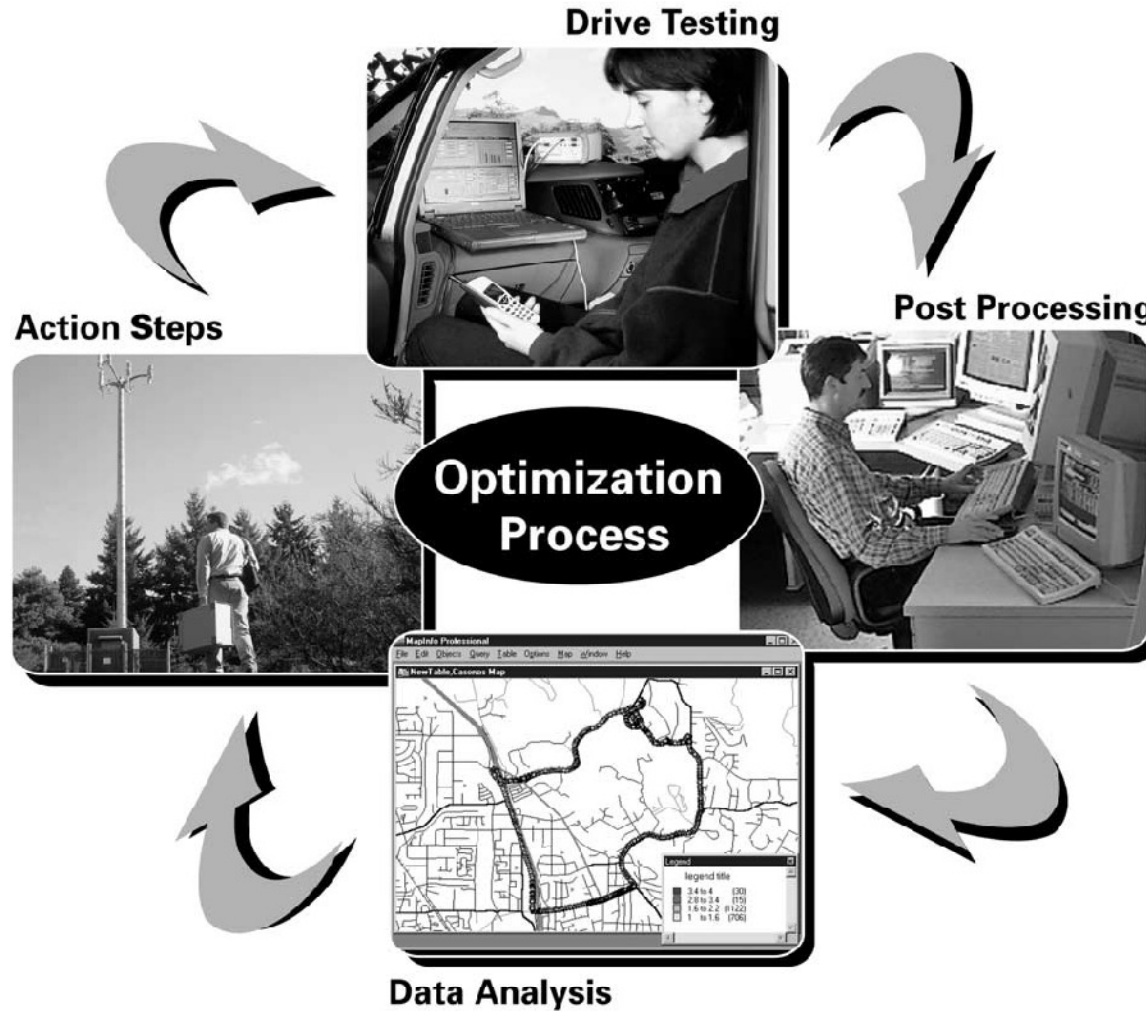- Call Failure.
- Mute.

It leads to *Customer Dissatisfaction.*

Solution: Optimization of Mobile network.

Optimization Process

Network Optimization Process – *Important Steps*

   1. Data collection for network problems.

   2. Analysis of Data for identification of reasons for

     network problems.

   3. Taking actions for resolving network problems.

   4. Again checking the QoS and going back to step 1.
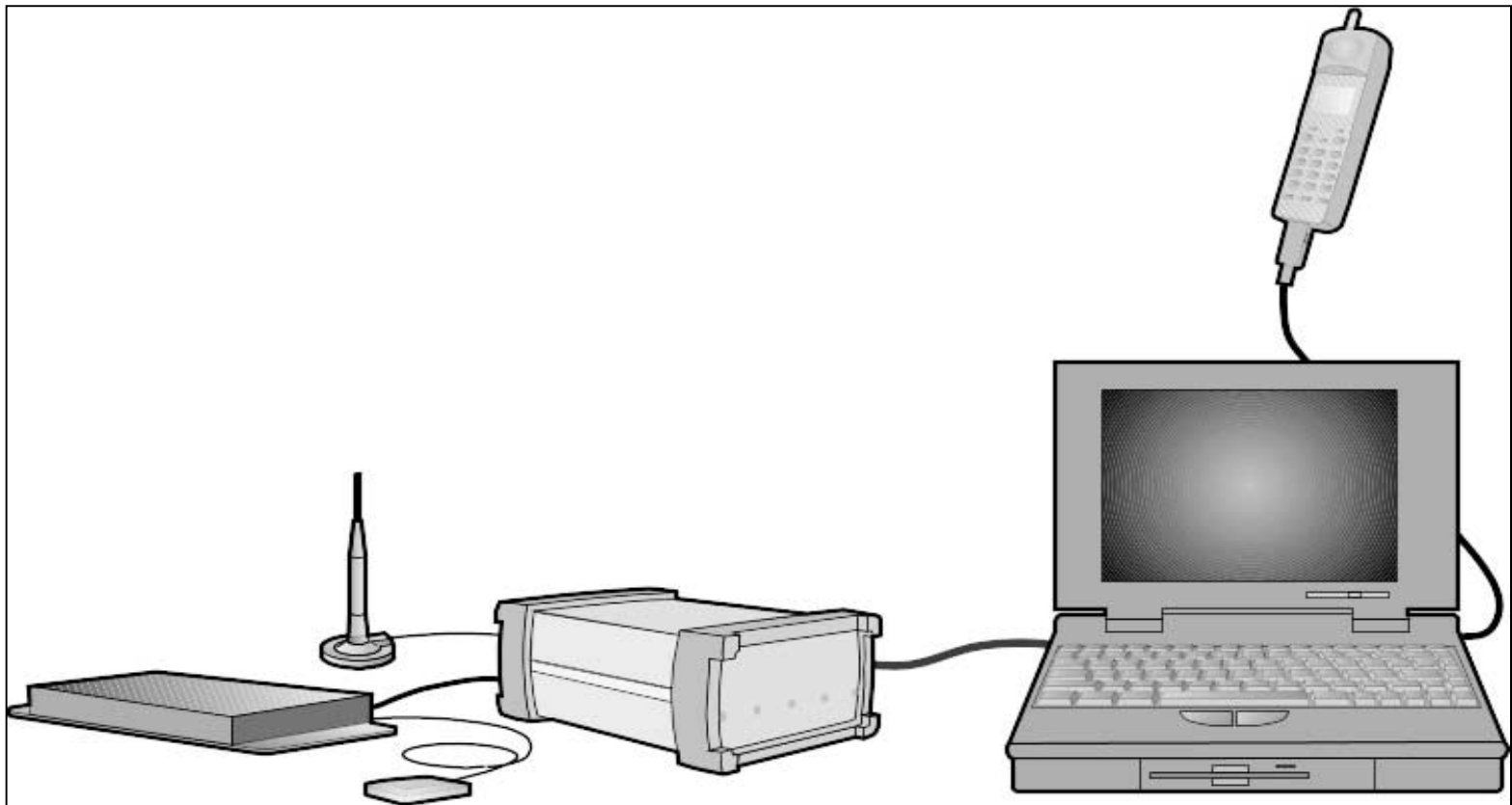
Optimization Process

Drive Test Tool for Optimization

❑ An Integrated Drive-Test Tool (DTT) is used by to detect network problems and identify possible causes.

❑ Components of an Integrated DTT are –

- ▪ A test mobile phone.

- ▪ Software to control and log data from the phone.

- ▪ GSM Receiver

- ▪ GPS Receiver.

Integrated drive-test solution

For internal circulation of BSNL only

Optimization Process

- ## BCH Carriers

  - Constant Power Transmission on all Time-Slots.

- ## TCH Carrier.

  - Bursty Power Transmission

  - Different Power on Different Time slots.

Inputs for Optimization

1. QoS Parameters – Indicators of network quality

- *call success rate, Call drop rate, Handover success rate etc.*

- *Monitoring at cell site, BSC and Network level.*

2. OMC alarms

3. Routine Drive Testing

4. Customer feedback

   - Identifying target areas requiring optimization and verifying coverage against the RF design.

How to perform Optimization

1. For optimization of GSM network Drive test are performed. Reports generated by making calls during drive test are recorded with location data in the attached laptop.

2. System generated OSS reports are very useful and are analyzed using optimization tools like Netact Planner, Planet etc.

Equipment for Drive Testing

- Vehicle.

- Arrangement for AC Power.

- Drive test mobile phone (e.g. Ericsson TEMS).

- GSM Receiver.

- External vehicle mounted GPS.

- Laptop with drive test software & GPS connection capability.

Coverage Plot – RXLEV

- A coverage plot of a service area is obtained by placing the test mobile of the DTT system in the idle mode and driving through the service area.

- RXLEV is then plotted against GPS information to obtain a coverage plot.

- GSM phone-based coverage measurements often do not show the complete picture of coverage contiguity.

   A network-independent digital receiver, combined with a phone-based tool, can provide more complete and accurate results.

Coverage Plot – RXQUAL

- RXQUAL is the Bit Error Rate (BER) derived from the 26 bits midamble on the TDMA burst.

- RXQUAL levels characterize speech quality and dropped calls, *0 the highest quality and 7 the worst.*

- Causes of poor RXQUAL-
  – Poor Coverage RXLEV
  – Interference – Co-channel / Adjacent Channel.
  – Multipath.

Optimization Solutions

- Database Parameter Changes
  - *Handover parameters and thresholds, Maximum transmit power of BTS, Paging parameters, SDCCH Parameters etc.*

- Antenna Orientation and Height Adjustment – *Tilt.*

- Frequency Changes

- Neighbor List Updating

  - *wrong Neigbhour definition, Regular up-dating.*

- Formation Of New Location Areas

- Addition of new cell sites

  - *cell splitting, Micro cells, IBS etc.*