



2G, 3G Network Planning and Optimization...

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Radio Network Planning Optimization

The objective is to build a radio network of large capacity and broad coverage as best as possible and make it available for future network development and expansion.

Network planning optimization is a systematic project covering the whole process of network building from technology system comparison to radio transmission theory, from antenna feeder index analysis to network capability forecast, and from project low level design to network performance test and system parameter adjustment optimization. Network planning is an integrated technology requiring wired and wireless knowledge and abundant practical experiences. It involves from macro view such as technology system, characteristic of coverage capability and general design idea of radio network, to micro view such as cell parameters.

1 Radio Network Planning Optimization Flow

The first stage is call service coverage analysis. The following information is required in order to support network planning: cost limit, various maps, coverage area type, service type, terminal type and proportion, coverage and capability requests of different services, available band, class of service, population distribution, the development of system capacity, income distribution, and the use of fixed-line phone.

The second stage is emulation. Network dimensioning estimate should be carried out on the basis of BSS equipment and the mature planning method after call service coverage analysis to get the coverage areas and the number of base stations, and then obtain the configuration (type, address and height of base station, carrier type, power amplifier type, frequency, antenna feeder combination, equipment type) of all base stations according to call service distribution. Use planning software for emulation and verify and adjust the estimate result. Ensure the stated coverage and capacity and a certain class of service. The third stage is survey. Carry out field exploration according to emulation result. Record potential base station address following the requirement of base station building, including power supply, transmission, electromagnetic background, land condition. Recommend proper resolution for base station address on the basis of the offset range from the ideal address, the influence on the future cell splitting, economic return, and coverage forecast, and decide whether the electromagnetic background is purified or not.

The fourth stage is system design. Decide the frequency, neighboring cell plan, and operating parameters of each cell according to the distribution and type of base stations. Finish the database.

The fifth stage is installation and debugging. Carry out system installation and debugging according to designed data and make sure the normal system running.

The sixth stage is optimization. With the increase of subscribers, network requires continuous optimization. Optimization is a refined adjustment and a complementary to project defects. It also includes resource adjustment of exception conditions such as high-volume traffic burst. Circuit test, traffic statistics, alarm and subjective sense are usually used as optimization measures. Signaling tracing and analysis plays a decisive role in solving tough problems. Carry out optimization report and suggestions for future network building. When the traffic volume exceeds the former object, extend the network and carry out new analysis of capacity and coverage.

2 Difficulties in Radio Network Planning

Among the six stages above, the first four stages are usually called preplanning/planning stages and the last two stages are optimization stages. Early planning is of vital importance to network running. Late optimization can hardly change the network architecture and the quality of network running; therefore, network planning deserves enough emphasis and attention.

The main problems of GSM planning optimization are as follows:

- 1) It is difficult to make theoretical forecast of coverage area because of the complex transmission environment, highly fluctuant signals, and big differences among multi-channel transmissions due to various buildings.
- 2) Besides man-made noise, other serious interferences such as adjacent signals, intermodulation and other radio jamming have to be considered in project design and controlled within a proper range.
- 3) Frequency resource becomes more and more limited with great increase of subscribers.
- 4) Due to outside influences, the cellular structure and base station placement cannot be carried out exactly according to plan in actual project.
- 5) There are some network planning problems in particular situation.

Автор: ourdot на 3:34

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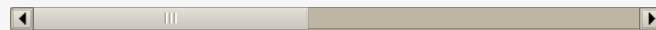
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