DEVELOPMENT OF ALGORITHM FOR THROUGHPUT EVALUATION OF RADIO TERMINALS IN WIDE AREA TELECOMMUNICATION SERVICES.
ABSTRACT

Key role of telecommunication network planner is to evaluate increasingly complex telecommunication systems covering wide area to accommodate anticipated demands, features and performance requirements. The telecommunication industry has evolved from focus on establishing worldwide ubiquitous affordable analogue voice band service (1950’s-1970’s) to an increasingly complex technological capability to support voice, data, and image applications. The challenge to network planners is to plan network topologies, technology deployment, interface protocols, network databases, and supporting network operations like traffic engineering and maintenance and billing. In eastern Europe and Asia, where telephone penetration is limited to a small percentage of population, portable radio terminals are deployed by economics. Mobile services are one of the fastest growing areas in telecommunications for these applications. Digital radio systems enable high density mobile services with low cost terminals deployed in a cell pattern network. In the seventies advanced mobile phone service (AMPS) in USA and similar systems mobile communication systems (MCS) in JAPAN, nordic mobile telephone (NMT) in SCANDENIA and total access communication system (TACS) in UK were introduced using analogue technology. As there is increasing demand of telephones over scattered areas, there is requirement of spectrally efficient digital systems. These systems employ low bit rate voice coding and offer advantage of lower power and bandwidth requirements. In Europe GSM (group special
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Mobile standard has been developed and is being used extensively now in Asia. Now considerable work is being directed for development of spectrally more efficient CDMA (code division multiple access). In Europe PCN (personal communication network) is likely to emerge by adapting GSM technology for 1.8 ghz operations. European telecommunication standard institute (ETSI) is working on Universal mobile telecommunication systems (UMTS) under RACE (research into advanced communication in Europe) programme. CCIR group 8 is considering Future Public Land Mobile systems (FPLMTS) that will support wide range of voice and data communications in all environments. Conventional TDMA include in their frame structures overhead symbols for synchronisation and clock recovery, which reduces spectral efficiency considerably. GSM system supports 125 radio channels in 25 mhz bandwidth with 8 voice channels per carrier. Gross bit rate is 270.8 kb/s with per use bit rate 33.85 kb/s. User bit rate is divided into speech codec 13 kb/s, error protection 9.8 kb/s, slow associated control channel 0.95 kb/s and guard time, rampup, and synchronisation 10.1 kb/s. Overhead part is so 30%. JDC systems on the other hand have overheads of 16%[11]. Technology parameters are important for spectral considerations. Formatting transforms the source information into digital symbols. Modulation converts the symbols into waveforms that are compatible with transmission channel. Channel coding is essential for a given data rate to reduce probability of error, and reduce signal to noise ratio. The proposed work relates to radio link engineering for
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throughput evaluation: traffic bearing capacity vis-a-vis band width requirements for an overlay wireless network covering services across wide area. Choice of technology as well as suitable wireless infrastructure gives an account of optimum erlangs per square kms for given bandwidth allocation. The study is meant to focus attention on custom made overlay wireless telecommunication services over wide areas.