Volume-5, Issue-4, April - 2016 • ISSN No 2277 - 8160 IF : 3.62 | IC Value 70.36

Research Paper Engineering

Green Communication: The New Era of Wireless Communication

Amar Choudhary Assistant Professor, Department of Electronics Engineering, Women's Institute of Technology, L.N.M.U., Darbhanga, Bihar

Deependra Kumar Jha Assistant Professor, Department of Computer Science Engineering, Women's Institute of Technology, L.N.M.U., Darbhanga, Bihar

ABSTRACT

Energy potency in cellular networks could be a growing concern for cellular operators to not solely maintain profit, however additionally to scale backs the general effects on surroundings. This rising trend of achieving energy potency in cellular networks inspires the regularity authorities and network operators to always explore future technologies so as to bring enhancements within the entire network infrastructure. In this article, we present a concise survey of ways to boost potency of cellular networks, Since base stations consume a most portion of the overall energy utilized in a cellular system, we are going to initial give a comprehensive survey on techniques to get energy savings in base stations. Lastly, we provide some broader aspects in realizing a "green cellular network technology".

KEYWORDS : "Towards Real Energy-efficient Network Design (TREND)", "Energy Aware Radio and Network Technologies (EARTH)".

INTRODUCTION

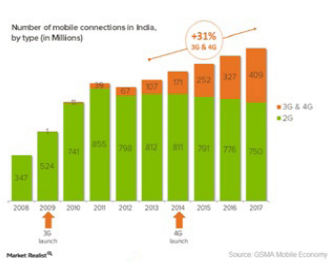
During the last twenty years, there's vital growth in cellular networks market is observed. The number of subscribers and also the demand for cellular traffic has escalated logarithmically. With the introduction of iPhone, Android and Windows devices, websites like Twitter, Facebook, Whatsapp, etc. has increased the demand for cellular traffic considerably in recent years. Hence, mobile operators realize meeting these new demands in wireless cellular networks inevitable, whereas they need to keep their prices minimum.

This unprecedented growth in cellular trade has offered the bounds of energy consumption in wireless networks. Presently there are over 5 million base stations (BSs) serving 1103 million mobile users. The power consumption of each Base station is about 30 MWh every year. The Base Stations are going to be almost doubled by 2020. Information and Communication Technology (ICT) already represents around 2% of total carbon emissions networks represent approximate 0.2%), and this is supposed to enhance each year.

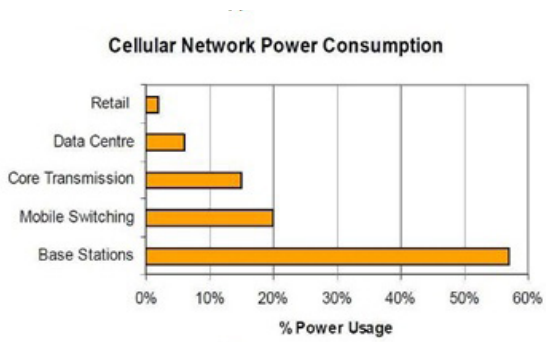
Whereas the BSs connected to electrical grid generally cost about 3000$ each year to operate. Base Stations in remote areas generally typically run on diesel power generators which may cost 10 times more. The rising energy prices and carbon footprint of in operation cellular networks have led to an rising trend of addressing energy potency amongst the network operators and regulatory bodies.

This trend has enthused the interest of researchers in an innovative new research area known as "green cellular networks. Figure 1 a breakdown of power consumption of typical cellular network.

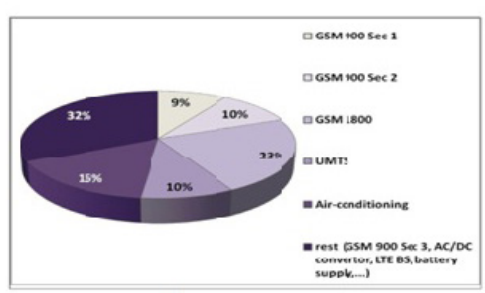
In this paper, we offer plan and scope behind Green Wireless communication, with all about Green Manufacturing, Waste Disposal, Methods of Reducing Carbon Footprint, Green Technologies, Green base transceiver stations, Green handoff, Green charger, Smart grid technology, Green antennas



A



B



C

Figure 1: cellular power consumption

GREEN WIRELESS COMMUNICATION

Green Wireless Communication is often understood as the technology that uses assortment of energy proficient methodologies at totally different stages to reduce the drawbacks of technology on the environment. Growing telecommunication infrastructure needs increasing quantity of electricity to power it. India presently has over 310000 mobile phone towers that consume concerning a pair of billion liters of diesel per annum. The move from diesel to sun and different alternate sources of energy can lead to a discount of 5 million plenty of carbonic dioxide emissions furthermore as a savings of $1.4 billion in operative expenses for telecommunication tower firms.

GREEN TELECOMMUNICATION NETWORK

In telecommunication networks, greening would ask minimizing utilization of energy through use of energy proficient technology, with re-

newable energy resources and environmental friendly consumables.

GREEN MANUFACTURING

The greening method would involve via eco-friendly parts, energy proficient producing instrumentation, electronic and mechanical waste employment and disposal, reduction in use of harmful of substances like Cr, lead and mercury and reduction of harmful radio radiation.

WASTE DISPOSAL

A major challenge to the telecommunication trade is that however the electronic wastage in eco friendly manner so any toxicant material used throughout production doesn't get channelized into the atmosphere or underground water.

METHODS OF REDUCING CARBON FOOT PRINT

From earlier explanations it is obvious that variety of base stations in Asian nation is increasing considerably. Therefore it's extremely needed to cut back the carbon footprint. Following steps may be taken to cut back carbon footprint.

1. Correct radio attending to cut back variety of Base transceiver stations
2. Sharing of passive and active infrastructure
3. Exchanging air-conditioners with forced air cooling
4. Installing the outdoor base-stations
5. Using renewable energy resources and energy efficient technology

GREEN TECHNOLOGIES

GREEN BASE TRANCEIVER STATIONS

In times of step by step rising energy expenses and with the vanishing resources of the traditional and non- regenerative energy sources, we have a tendency to see the challenge of finding new solution for the uninterruptible power provider to Base transceiver stations.

The inexperienced Base Station that is introduced is operational with the regenerative energy sources wind generation and photo voltaic energy lessen power utilization taken out of the general public grid to a minimum, whenever the daylight or wind is available. The use of sun energy, wind energy and hydrogen create the inexperienced BTS a true hybrid system and even permit one to suppose off-grid solutions. Alternative energy, wind energy, Fuel cells or Pico Hydro technologies may be feed base transceiver stations.

GREEN HANDOFF

Cellular networks have a mechanism of Handoff in which it is supposed to maintain the standard of call when moving between BTS's.

The criterion for relinquishment in common cellular systems is predicated on the standard of received downlink signal. This criterion makes sense when the downlink and uplink are symmetric. Consequently a moving phone might receive Cell A with very best quality, whereas Cell B might receive the mobile at higher quality than Cell A, and thus Cell B needs minimal emission from the moving phone.

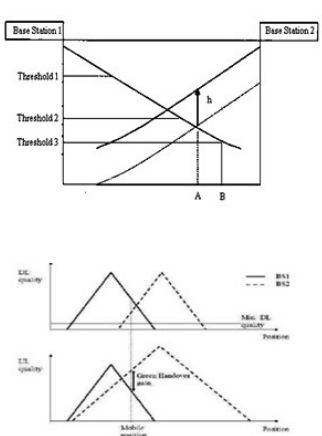


Fig 2: Handoff and green handoff

The new relinquishment mechanism (Green Handoff) uses this idea and chooses, among neighboring cells with comfortable downlink, the cell that the emission from the moving phone is reduced. This mechanism needs ways to estimate the estimated uplink emission.

This consists of procedures wherever cells broadcast their uplink requirements or request mobiles to perform check transmissions.

The intercommunication system study is that the largest and most thorough study attempting to assess whether or not cell phone usage is related to cancer.

Rise in uplink quality successively permits for an analogous decrease within the uplink transmission power and individual exposure to radiation. However, in common systems, whenever BS is nearby, in several cases the moving phone would prefer another base station needs higher uplink power and radiation over it. This is often as a result of the criterion for handover in common cellular systems is predicted on the received downlink signal strength or signal quality. This relinquishment criterion is straight forward and makes sense when the uplink and downlink are balanced. This is often not the case in MIMO systems. In such systems, the most criterions for selecting a BS for establishing a connection and relinquishment are that the received DL signal strength or signal quality. Signal to noise ratio (SNR) or signal to interference and noise ratio (SINR) are common parameters for the downlink signal quality. Obviously, the DL signal quality isn't the sole criterion within the relinquishment method. Every theme exploits the MIMO channel otherwise which frequently leads to completely different link quality.

GREEN CHARGER

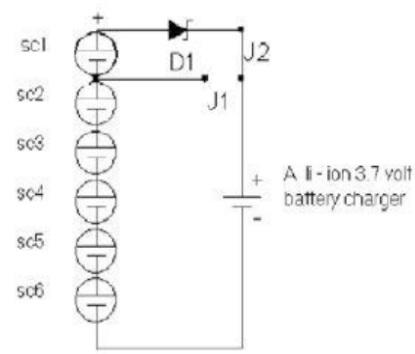


Fig 3: A Li- Ion 3.7 v battery charger

Figure 3 shows a green charger using solar cells. Each set of 3 solar cells develops about 2.0 volts across itself when it is in full sunlight. The string of 6 solar cells produces around 4V without load. When the solar cells are connected through the battery (3.7V), a flowing current will charge the battery.

The 6 solar cell panel including diode is the recommended circuit. The diode opposes the battery from discharging and the 6th cell boosts the voltage up sufficient to compensate for the voltage drop across the diode. For a 6 solar cell panel, jumper J2 connected and J1disconeected.

SMART GRID TECHNOLOGY

This technology is all about the electricity distribution system therefore it monitors, protects and self optimizes the working of its interconnected elements–from the central and distributed generator through the high-voltage transmission network and therefore the distribution system, to industrial users and building automation systems, to energy storage installations and to end-use users and their thermostats, electrical vehicles, appliances and different home devices. Two-way seamless communication is that the key concept of realizing the vision of sensible grid. There is various standardized wired and wireless communication technologies present for for numerous sensi-

ble grid applications. With the recent growth in wireless communication, it offers standardized technologies for WAN, MAN, LAN and PAN. Numerous sensible grid applications are often achieved through standardized wireless communication technologies, e.g. IEEE 802.11 based mostly wireless local area network, IEEE 802.16 based mostly WiMAX, 3G/4G cellular, etc.

Smart grid is going to be characterized by two-way flow of power in electrical network, and knowledge in communication network.

GREEN ANTENNAS AND GREEN ELECTRONICS

Solar power is the prime source for renewable energy. Over the past decade, some works are reported on integrating the antenna with solar cells light reflecting green antenna for the solar cell must be designed. Green Antenna and its ground plane at the same time act as light-reflecting surfaces for the solar-cell system. These antennas are often used for advanced wireless technologies for energy proficient green communication. Lead free electronics must be developed to promote the idea of green wireless communication.

CONCLUSIONS

Green Wireless Communication will offer energy proficient communication so it is required to develop green wireless communication systems. It results into less radiation through devices as well as more economic solutions to service providers and subscriber. Green wireless communication is the wing of Corporate Social Responsibility. Government should also make rules and regulations to certify a service provider as a Green service provider. The combination of different energy proficient technologies like Green BTS, Green Handover, Green antennas, Green manufacturing, Green electronics and Smart Grid solution will create balance between human being and nature.

REFERENCES

[1] Ultra-spectra communication system (USCS): a promising way to energy-efficient green communication networks Bin Li*, Zheng Zhou and Weixia Zou

[2] Rongpeng Li, Zhifeng Zhao, Xuan Zhou, and Honggang Zhang, Energy Savings Scheme in Radio Access Network via Compressed Sensing Based Traffic Load Prediction,European Transactions on Emerging Telecommunications Technologies (ETT), November2012.

[3] Green Communications and Networking Systems – A Challenge to Current Communications and Protocols Dr. J. Thirumaran, S. Dhinakaran

[4] 3GPP TR 32.826, Telecommunication management; Study on Energy Savings Management (ESM), (Release 10), Mar 2010. Available: http://www.3gpp.org/ftp/Specs/html-info/32826.htm

[5] ITU-T Focus Group on Future Networks (FG FN), FG-FN OD-66, Draft Deliverable on "Overview of Energy Saving of Networks", October 2010.

[6] "Energy Aware Radio and NeTwork TecHnologies (EARTH)". https://www.ict-earth.eu/

[7] "Towards Real Energy-efficient Network Design (TREND)". http://www.fp7-trend.eu/

[8] Pardo-Castellote G, Farabaugh B, Warren R (2005) An Introduction to DDS and Data-Centric Communications. In: Real-Time Innovations.