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WIRELESS COMMUNICATION BASED ANTENNA RADIATION REDUCING SYSTEM

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Abstract - Mobile phones can be an essential means of communication when we are away from the office or home and it can be an important security asset in the event of an emergency. All over the world, people have been debating about associated health risk due to radiation from cell phone and cell tower. These cell towers transmit radiation 24x7, so people living within 10's of meters from the tower will receive 10,000 to 10,000,000 times stronger signal than required for mobile communication. Children's, adults, and birds are more vulnerable to cell phone radiation. So our project gives a solution to avoid more towers. In this project, Stochastic Geometry Modeling and system-level analysis for design the uplink heterogeneous cellular networks with multiple frequencies at the base station (BS) are presented. We develop multiple frequencies in single tower to reduce the radiation.

I. INTRODUCTION

Antennas are basic components of any electric system and are connecting links between the transmitter and free space or free space and the receiver. Thus antennas play very important role in finding the characteristics of the system in which antennas are employed. Antennas are employed in different systems in different forms. That is, in some systems the operational characteristic of the system are designed around the directional properties of the antennas or in some others systems, the antennas are used simply to radiate electromagnetic energy in an omnidirectional or finally in some systems for point-to-point communication purpose in which increased gain and reduced wave interference are required. Various parameters which affect the antenna's performance over a particular range of frequency are frequency band of operations, polarization, input impedance, radiation pattern, gain and efficiency.

Cell towers (or cell sites) that hold antennas and other communications equipment flood the area for miles around with powerful high frequency radio waves (known as microwaves) to support the use of cellphones as well as Wi-Fi, WiMax, Wireless LANs, 802.11 networks, Bluetooth supported devices and more. Cell tower microwaves might travel for as few as two miles in hilly areas, and up to 45 miles where there are fewer obstructions; and of course, they easily penetrate brick and metal. Radio masts - Smaller versions of cell towers, often seen on rooftops and billboards, typically installed 800-1300 feet apart. Mobile towers - Sometimes installed on the tops of buildings. Mobile towers are especially dangerous because they emit microwaves at a frequency of 1900 MHz. Recent studies have shown that the intense radioactivity from mobile phone towers adversely impacts every biological organism within one square kilometer. Cell phone tower microwaves have a significantly higher frequency than even radio waves. The higher the frequency, the more powerful the wave and the more powerful effect on biological organisms.

II. SCOPE

Nowadays, one has to consider the following tendencies when is planning to start a design of an antenna:

Personalization: Depending on which is the goal of the terminal the features of the antenna may vary. It is not the same the design of an antenna for a mobile phone, which currently provides many extra functions, to the design of an antenna for very short ranges, like those that are integrated in devices for control and identification. The second one has more relaxed electromagnetic specifications (e.g. no high gain) that will permit, for instance, to reduce the volume of the antenna even more.

Globalization: Different types of services (such as 2G, 3G, 4G, GPS, Wi-Fi, Bluetooth…) should be able to be rendered by mobile terminals. Each service may work in different band, hence antennas have to be multiband, that is antennas that can perform well in two, three, four or even five bands.

Multimedia services: Current mobile systems not only cover voice service, but also data services (internet, music, video…). In order to ensure high data rates which can carry all this information it is extremely necessary to introduce the latest technologies in the field of antennas and signal processing, such as adaptive arrays, transmission and reception of diversity, and wideband, multiband and MIMO antennas.

Software implementation: This trend has a lot to do with the present project. Trough software which controls the antenna, the performance will be improved. For instance, adaptive control of the antenna can change the features (power, radiation pattern, bandwidth, impedance…) depending on the environmental conditions. In this project, a program that corrects the detuning of the antenna due to the human body effect will be implemented.

III. RELATED WORKS

(1)Michele Beccaria describes a preliminary results on the feasibility of a multibeam antenna based on the use of transmit array are presented. A reduced size configuration has been properly designed and optimized, with the aim to minimize the degradation of the radiation pattern introduced by the variation in the direction of maximum radiation. Thereafter, the numerical analysis of the obtained antenna has been performed.

(2)Marco Di Renzo describes a tractable mathematical framework for the analysis and optimization of two-hop relay-aided cellular networks is introduced. The proposed approach leverages stochastic geometry for system-level analysis, by modeling the locations of base stations, relay nodes and mobile terminals as points of homogeneous Poisson point processes. A flexible cell association and relay-aided transmission protocol based on the best biased average received power are considered. Computationally tractable integrals and closed-form expressions for coverage and rate are provided, and the performance trends of relay-aided cellular networks are identified. It is shown that coverage and rate highly depend on the path-loss exponents of one- and two-hop links. In the interference-limited regime, in particular, it is shown that, if the system is not adequately designed, the presence of relay nodes may provide negligible performance gains. By capitalizing on the proposed mathematical framework, a system-level and interference-aware optimization criterion of the bias coefficients is proposed. Numerical results confirm the effectiveness of the proposed system-level optimization to enhance the coverage probability in the interference-limited regime. The presence of relays, on the other hand, is shown to have a limited impact on average/coverage rate under the same assumptions.

(3)Peng Guan describes the Poisson point process (PPP)-based abstraction for modeling the spatial locations of the base stations (BSs), and it exploits results from stochastic geometry for characterizing the distribution of the other-cell interference. The framework is applicable to spatial multiplexing multiple-input-multiple-output (MIMO) systems with an arbitrary number of antennas at the transmitter (Nt) and at the receiver (Nr). If Nt = Nr = 1, the mathematical approach can be used for arbitrary fading distributions on both useful and interfering links. If either Nt > 1 or Nr > 1, it can be applied to arbitrary fading distributions on the useful link and to Rayleigh fading on the interfering links. It is shown that the proposed approach leads to easy-to-compute integral expressions, which reduce to closed-form formulas in some asymptotic regimes. Furthermore, the framework is shown to provide insights for system design and optimization. The accuracy of the mathematical analysis is substantiated through extensive Monte Carlo simulations for various cellular network setups.

(4)Alessandro Guidotti describes the framework leverages recent application of stochastic geometry to other–cell interference modeling and analysis. The heterogeneous cellular network is modeled as the superposition of many tiers of Base Stations (BSs) having different transmit power, density, path–loss exponent, fading parameters and distribution, and unequal biasing for flexible tier association. A long–term averaged maximum biased–received–power tier association is considered. The positions of the BSs in each tier are modeled as points of an independent Poisson Point Process (PPP). Under these assumptions, we introduce a new analytical methodology to evaluate the average rate, which avoids the computation of the Coverage Probability (Pcov) and needs only the Moment Generating Function (MGF) of the aggregate interference at the probe mobile terminal. The distinguishable characteristic of our analytical methodology consists in providing a tractable and numerically efficient framework that is applicable to general fading distributions, including composite fading channels with small– and mid–scale fluctuations. In addition, our method can efficiently handle correlated Log–Normal shadowing with little increase of the computational complexity. The proposed MGF – based approach needs the computation of either a single or a two–fold numerical integral, thus reducing the complexity of Pcov-based frameworks, which require, for general fading distributions, the computation of a four–fold integral.

(5)Thomas L. Marzetta describes a cellular base station serves a multiplicity of single-antenna terminals over the same time-frequency interval. Time-division duplex operation combined with reverse-link pilots enables the base station to estimate the reciprocal forward- and reverse-link channels. The conjugate-transpose of the channel estimates are used as a linear precoder and combiner respectively on the forward and reverse links. Propagation, unknown to both terminals and base station, comprises fast fading, log-normal shadow fading, and geometric attenuation. In the limit of an infinite number of antennas a complete multi-cellular analysis, which accounts for inter-cellular interference and the overhead and errors associated with channel-state information, yields a number of mathematically exact conclusions and points to a desirable direction towards which cellular wireless could evolve. In particular the effects of uncorrelated noise and fast fading vanish, throughput and the number of terminals are independent of the size of the cells, spectral efficiency is independent of bandwidth, and the required transmitted energy per bit vanishes. The only remaining impairment is inter-cellular interference caused by re-use of the pilot sequences in other cells (pilot contamination) which does not vanish with unlimited number of antennas.

IV. PROPOSED SYSTEM

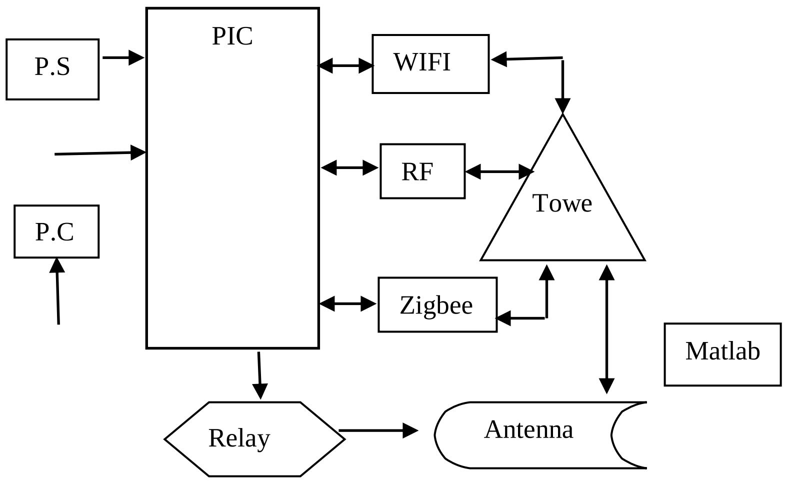
The Proposed System gives a solution to reduce the excessive radiation and avoid more towers. Mounting multiple frequencies in a single tower. Use hyper energy like solar energy, wind energy in case of power failure. 5G is used for data transmission. Improved speed than 4G network. Adaptive beam forming algorithm is used to reduce the frequency collision between different frequencies mounted in the tower.

Advantages

- Collision among the networks are rectified.
- Reduction of multiple antennas, so the excessive radiation also reduced.
- High efficiency.
- Data transmission and reception is fast.
- Higher network capacity.

BLOCK DIAGRAM

SENDER UNIT:



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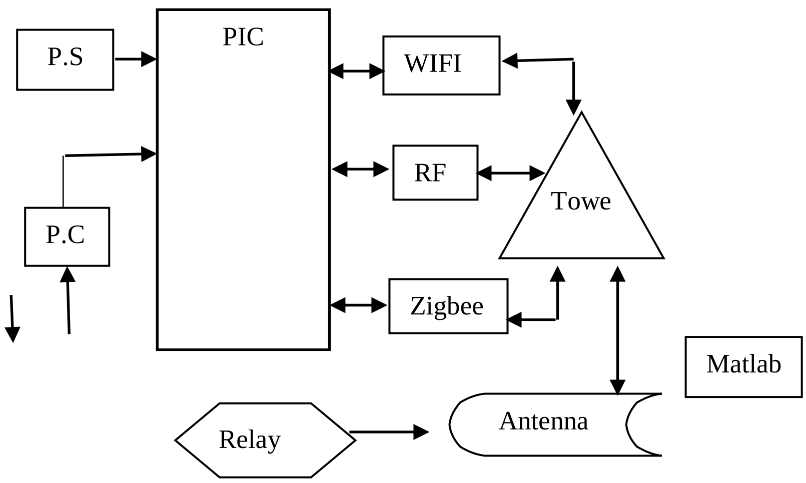


V. DESCRIPTION:

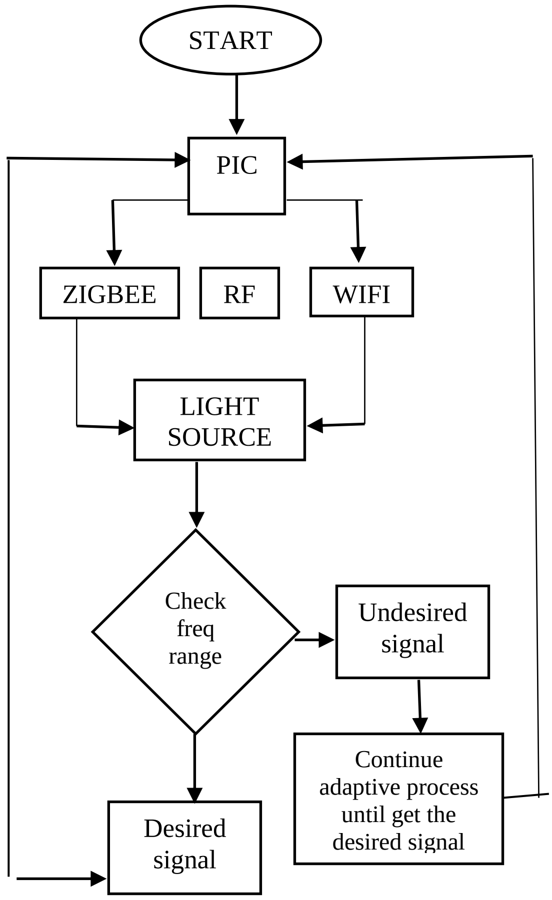
- Single antenna with multiple frequency is used. ZigBee, WIFI, and RF Transmitter/Receiver are the multiple frequencies.
- We develops multiple frequencies in single antenna to reduce the radiation.
- Future fifth generation (5G) cellular networks are being developed to achieve very high network capacity.
- 5G is a packet switched wireless system with wide area coverage and high throughput. 5G cellular networks are probable to provide data rates of multi-Gbps range for bandwidth-intensive multimedia applications with severe quality of service (QoS) requirements.
- Here we used 5g being developed to accommodate Qos rate requirements set by further development of existing 4g applications. Faster and reliable than 4g. Multiple concurrent data transfer path. 5g bandwidth is 4000times faster than today's wireless networks.
- The input 230V AC voltage applied to the step down transformer it step down into 12v Ac. The switch is connected with secondary side of step down transformer.
- Bridge rectifier is converting AC into pulsating DC of 12V.In Bridge Rectifier analog input is connected to the switch and positive, negative edge is connected to the ceramic capacitor.
- Ceramic capacitor is connected for noise rectification.1000uf Ceramic capacitor is used to filter the harmonics in the power supply line. Capacitor is connected to the voltage regulator.
- The 7805 voltage regulator has 3 pins. First pin is 12v input pin, second pin is ground pin and third pin is 5v output pin.
- Input 5v is given to PIC 16F877a microcontroller. Single antenna with multiple frequency is used.
- ZigBee, WIFI, and RF Transmitter/Receiver are the multiple frequencies.
- WIFI operates at a frequency range of 5GHZ, RF operates at a frequency range of 430MHZ and Zigbee operates at a frequency range of 2.4GHZ.
- We develop multiple frequencies in single antenna to reduce the radiation.
- Future fifth generation (5G) cellular networks are being developed to achieve very high network capacity. 5G is a packet switched wireless system with wide area coverage and high throughput.

VI. METHODOLOGY

We use a signalling light in an antenna tower it is placed in the center of the antenna and top of the tower. The role of the signalling light is to take a decision of an frequency range. Depending upon the frequency ranges, it gives a decision to the controller. Antennas transmit and receive electromagnetic waves. Generally composed of metals (mainly copper or aluminum), antennas can convert an electric current into electromagnetic radiation and vice versa. Every wireless communication device contains at least one antenna. Transmission antennas produce radiofrequency radiation that propagate in space.

Receiving antennas perform the reverse process: they receive radiofrequency radiation and convert them into the required signals (e,g. sound, picture) in the receiving device (e.g., radio, television, mobile phone).

The simplest type of antenna consists of two metal rods, and is known as a **dipole**. One of the commonest types of antennas is the **monopole** antenna, consisting of a rod situated vertical to a large metal board that serves as a ground plane. The antenna mounted on vehicles is usually a monopole, with the metal roof of the vehicle serving as the ground plane.



VII. CONCLUSION

In our project we have done by a single antenna with multiple frequency. We develop multiple frequencies in single antenna to avoid the radiation. Here we have discussed with multiple frequency like RF transmitter/receiver, WIFI and Zigbee. First, we use RF transmitter/receiver based data transmission. The transmitter/receiver (TX/Rx) pair operates at a frequency of 434 MHz. Second one is Zigbee based data transmission. The Zigbee pair operates at a frequency of 2.4 GHz. Third one is WIFI based data transmission. The WIFI operates at a frequency 5GHz.
And also we discussed 4G and 5G data transmission. We used 5g being developed to accommodate Qos rate requirements set by further development of existing 4g applications. Faster and reliable than 4g. Multiple concurrent data transfer path. 5g bandwidth is 4000times faster than today’s wireless networks.

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