Performance and Improvement of Antenna Designs in Modern Wireless Communication System

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Abstract

In this paper, the cell innovation and the remote correspondence innovation is creating and enhancing quickly. The reception apparatus goes about as the scaffold between the client terminal and the base station controller. Being a key segment of the remote correspondence framework, the reception apparatus' fundamental capacity is to communicate and to get electromagnetic waves. It will, to an expansive degree, influence the quality and the speed of the correspondence. With the advancing of the reception apparatus innovation, the versatile terminal gadgets have developed from the unique specialized devices to exceptionally intellectualized types of gear. The imparted content was likewise expanded, as there are presently FM programs, TV shows and web. All these, be that as it may, conveys requesting benchmarks to the reception apparatus. For instance, it requires a considerably higher data transmission and best exhibitions from the reception apparatus to help the complex applications and correspondence capacity of the versatile terminals. Furthermore, the correspondence system's convenient terminal has almost bolted the position of the receiving wire, which requests that the span of the radio wire must be downscaled. The control of the wave speed, shape and its directivity can be typically streamlined by enhancing the radiation qualities of the receiving wires, which will help the general execution of a framework. In along these lines, additionally enhanced are the channel limit and the recurrence use proportion. This paper, starting with the presentation of the improvement status of the remote correspondence framework and the radio wires, contemplates a portion of the plans of new reception apparatuses. With that review, this paper likewise breaks down the advancement heading fitting to current correspondence framework and the important gadgets, and in addition the structure adjustment and pattern of reception apparatuses.

Keywords: Mini micro strip antenna; Ultra wideband antenna; Broadband polarization diversity antenna; Reception apparatus; Modern remote communication framework; Mobile terminal; Base station controller (BSC); Macro diversity; Space diversity

Introduction

From the primary radio wire conceived out of the investigations of the German, Hertz, the remote correspondence framework had created from the center and long wave ones to the vertical energized electrically little receiving wire [1]. At that point there are the mandate receiving wire wave reception apparatus, and the order transmitting radio wire. At the transmitting terminal, the receiving wire changes over the vitality from high-recurrence current into the radio wave vitality of a similar recurrence. At the accepting terminal, it changes the high recurrence wave vitality into the present vitality of the separate recurrence. In the WLAN, the receiving wire's configuration is the way to a bigger framework limit and more extensive flag scope [2]. Basically, the receiving wire is a vitality converter. Being the most quickly creating area of present day correspondence framework, portable correspondence, alongside the remote get to correspondence framework, is indistinguishable with radio wires. The progressing of current remote correspondence framework drives the reasonable transformation and tech-development of the reception apparatus. While the reception apparatus' development will likewise have its affect on the advancement of the correspondence framework [3].

Wireless Communication System

The remote correspondence framework is a specialized strategy which utilizes electromagnetic wave to unreservedly spread data over the space. Its improvement started from the 1930s [4]. Significant points of reference are: the find of electromagnetic wave in 1888, the FM hypothesis in 1920, the semiconductor tube in 1960, and CDMA’s endorsement by the FCC of the U.S. in 1992, and the IUT’s institutionalization of the 3G out of 1999 and so on [5]. The following is the Table 1, the present radio-recurrence range.

Current remote correspondence framework principally comprises: the 2G portable cell organize framework spoke to by GSM, IS-95; the 3G by CDMA2000, WCDMA, and TDSCDMA. It additionally incorporates WLAN, WMAX, the radio TV framework and the satellite correspondence framework [6].

The correspondence framework can be separated into the simple correspondence framework and the computerized transmission framework, with the last supplanting the previous. The models for the correspondence framework are outlined in Figure 1 beneath.

Current remote correspondence framework principally comprises: the 2G portable cell organize framework spoke to by GSM, IS-95; the 3G by CDMA2000, WCDMA, and TDSCDMA. It additionally incorporates present day electronic supplies’ mix has influenced the specialized gadgets to end up plainly always conservative, this reason requires the reception apparatuses to be littler and littler. In term of the present innovation, it is a colossal undertaking to minimized the radio wires without lessening its capacity. For the present, on board there are many looks into being advanced, to scale down the volume of the

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receiving wire, for example, to append a parasitic fix to the radiation patch; or to apply a F-shaped smaller scale strip patch; or a Coplanar waveguide full unit. The expansion of coordination of electronic gear as a rule requests that the radio wire can give at least two remote administration in an expansive recurrence go. The broadband receiving wire and the multiband reception apparatus are met all requirements to such a request. This, notwithstanding, brings about the multifaceted nature of the sort of reception apparatus. The sorts of the CPW-bolstered radio wire and the planar monopole antenna have turned into the concentration of study [7]. The Table 2 beneath demonstrates the significant kinds of the reception apparatuses of today.

In term of the current technology, it is a tremendous task to compact the antennas without diminishing its function. For the time being, abound there are many researches being put forward, to downsize the volume of the antenna, such as to attach a parasitic patch to the radiation patch; or to apply a F-shaped micro strip patch or a Co planar wave guide resonant unit. The increase of integration of electronic equipment usually demands that the antenna can provide two or more wireless service in a broad frequency range. The broadband antenna and the multiband antenna are qualified to such a demand. This, however, results in the complexity of the type of antenna. The kinds of the CPW-fed antenna and the planar monopole antenna.

### Three Types of Antenna Designs

#### Mini micro-strip antenna

As a receiving wire at present connected generally on the radio supplies of 100 MHz~100 GHz’s recurrence space, the smaller scale strip radio wire utilizes miniaturized scale strip fix as its radiation source. Being conservative and light weighted, it can likewise thankless rascal into a framework with dynamic gadget and electric circuits. Up till now, smaller scale strip receiving wire’s trial and registering techniques are both ready. When all is said in done, the scaling down of the receiving wire implies just to cut back its volume, and to leave its working recurrence in place. The section beneath is the solid plans for the scaling down, appeared in Table 3.

#### Ultra-wideband antenna

Ultra-wideband antenna mainly applies to short range radio communication system with features of strong ant multipath effect, wide bandwidth and low power thus making ultra-wideband antenna research highpoint Ultra wideband antenna, commonly known as the antenna with very wide bandwidth, is capable of sending picoseconds or nanoseconds narrow-band signals. Technology features of ultra-wideband antenna are mainly as follows.

1. Tiny reflection and allows UWB antenna have a good input impedance matching within working frequency bandwidth.
2. The antenna frequency bandwidth should meet the demands of 3.1 GHz to 10.6 GHz.
3. High standard of non-dispersion characteristic and difficulty of antenna design increases.
4. Very small volume.
5. Radio efficiency should guarantee the effect of Omani-direction, and should be high and stable.
6. Power pattern in each frequency bin should be nearly same and has stable gain.

#### Broadband polarization diversity antenna

As an effective communication technology, diversity technique compensates for channel fading and thus becomes research highpoint with the development of mobile communication technology. The feature of diversity technology is to choose the best signal, receive the sample signal through various means and then combine and classify them. The implementation process of this technology cost little and doesn’t need to increase the transmission power or bandwidth. As a compelling correspondence innovation, assorted variety method makes up for channel blurring and consequently moves toward becoming investigate highpoint with the advancement of portable correspondence innovation [8]. The component of decent variety innovation is to pick the best flag, get the example motion through different means.

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### Table 1: Radio-frequency spectrum.

<table>
<thead>
<tr>
<th>Waveband</th>
<th>Wavelength</th>
<th>Frequency</th>
<th>Mode</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long wave</td>
<td>30000 m~3000 m</td>
<td>10 kHz~100 kHz</td>
<td>Ground wave</td>
<td>Ultra-long range radio communication and navigation</td>
</tr>
<tr>
<td>Medium Wave</td>
<td>3000 m~200 m</td>
<td>100 kHz~1500 kHz</td>
<td>Ground wave and Sky wave</td>
<td>AM radio broadcasting</td>
</tr>
<tr>
<td>Intermediate waves</td>
<td>200 m~50 m</td>
<td>500 kHz~6000 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short wave</td>
<td>50 m~10 m</td>
<td>6 MHz~30 MHz</td>
<td>Sky wave</td>
<td>Microwave</td>
</tr>
<tr>
<td>Meter wave</td>
<td>10 m~1 m</td>
<td>30 MHz~300 MHz</td>
<td>Approximately rectilinear wave</td>
<td>FM radio broadcasting</td>
</tr>
<tr>
<td>Decimeter</td>
<td>1 m~0.1 m</td>
<td>300 MHz~3000 MHz</td>
<td>Rectilinear wave</td>
<td>Television Radar Navigation</td>
</tr>
<tr>
<td>Centimeter wave</td>
<td>10 cm~1 cm</td>
<td>3000 MHz~30000 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millimeter wave</td>
<td>10 cm~1 cm</td>
<td>3000 MHz~30000 MHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Figure 1: Model of communication system.
and afterward consolidate and group them. The execution procedure of this innovation cost nearly nothing and doesn’t have to build the transmission power or data transfer capacity. At present, principles grouping of decent variety receiving wire are appeared in Table 4.

**Conclusions**

In this paper presents the development status of the wireless communication system and the basic research direction of antenna; then it mainly analyzes several internal antenna modes of wireless communication system. These antennas all designed based on the rules of miniaturization. The antenna mainly applies flat structure for the convenience of integration and miniaturization of mobile terminal. To meet the development of modern communication system and relevant equipment, new antennas with high performance has developed rapidly. However, only through breaking by current technology limitations and defects can the new antennas be fully developed in aspects of technology, products and standardization. Combined with communication industry, the mature and application of new type of antenna need concerted effort [9]. In terms of new antennas, undoubtedly, there are many technology difficulties to overcome. For example, multi-standard antenna could flexibly control signals with different patterns by solving the problem of mutual interference of different signals; To solve this problem, equipment support such as high-performance phase shifter and combiner with high isolation is needed; and the intelligent antenna faces technology difficulties of realizing remote control technology and antenna beam scanning more than one dimension; active integrated antenna must breakthrough the limitation of existing device volume and performance, and applies radio frequency devices with multiple frequency ranges in antenna system, in order to integrate RF module and antenna module.

**References**


